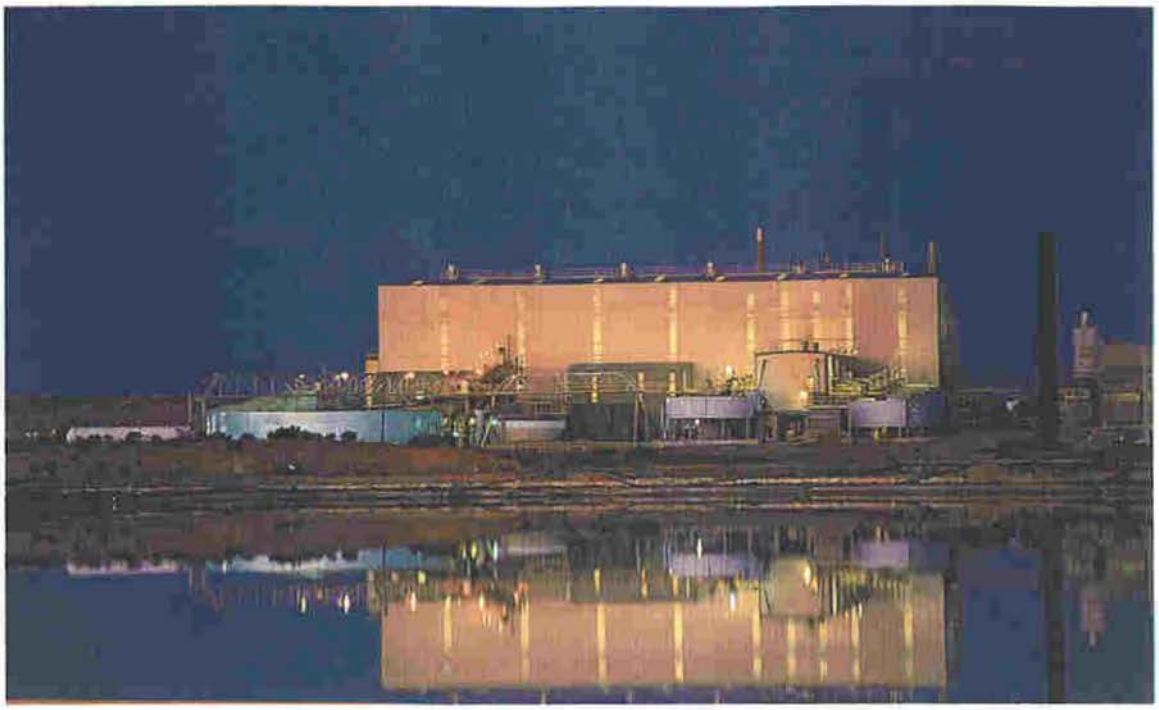


WHITE MESA URANIUM MILL

LICENSE RENEWAL APPLICATION

STATE OF UTAH RADIOACTIVE MATERIALS LICENSE No. UT1900479

February 28, 2007

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

Volume 5 of 5
(Environmental Report)
(Appendices A-C)

DENISONMINES

VIA FEDERAL EXPRESS

December 29, 2006

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

Dear Mr. Finerfrock:

Re: State of Utah Ground Water Discharge Permit No. UW370004 White Mesa Uranium Mill – Background Groundwater Quality Report

Pursuant to Part I.H.3 of State of Utah Ground Water Discharge Permit No. UW370004 and the "Consent Agreement" (Docket Number UGW06-03) at Paragraph 7.A, please find enclosed two copies of the report, ***Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah.***

If you should have any questions regarding the report, please contact either Mr. David Frydenlund or me.

Yours very truly,

DENISON MINES (USA) CORP.
Steven D. Landau
Manager-Environmental Affairs

Cc. Ron Hochstein
Harold Roberts
David Frydenlund

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

1050 17th Street, Suite 950
Denver, CO, USA 80265

www.denisonmines.com

SITE HYDROGEOLOGY AND ESTIMATION OF GROUNDWATER TRAVEL TIMES IN THE PERCHED ZONE WHITE MESA URANIUM MILL SITE NEAR BLANDING, UTAH

Prepared for:

DENISON MINES (USA) CORP
Independence Plaza, Suite 950
1050 17th Street
Denver, Colorado 80265
(303) 628-7798

Prepared by:

HYDRO GEO CHEM, INC.
51 W. Wetmore, Suite 101
Tucson, Arizona 85705-1678
(520)293-1500

February 26, 2007

HYDRO GEO CHEM, INC.

Environmental Science & Technology

TABLE OF CONTENTS

1. INTRODUCTION 1

2. SITE HYDROGEOLOGY 2
   - 2.1 Geologic Setting 2
   - 2.2 Hydrogeologic Setting 3
   - 2.3 Perched Zone Hydrogeology 4
     - 2.3.1 Lithologic and Hydraulic Properties 5
     - 2.3.2 Perched Groundwater Flow 9

3. PERCHED ZONE HYDROGEOLOGY BENEATH AND DOWNGRADIENT OF THE TAILINGS CELLS 11
   - 3.1 Saturated Thickness 11
   - 3.2 Perched Water Flow 12
   - 3.3 Permeability 13

4. EVALUATION OF POTENTIAL FLOW PATHS AND TRAVEL TIMES FOR HYPOTHETICAL SEEPAGE ORIGINATING FROM CELL #3 15
   - 4.1 Estimated Travel Time From the Base of Cell #3 to the Perched Zone ... 15
   - 4.2 Estimated Travel Time From Tailings Cell #3 to Ruin Spring 16
   - 4.3 Estimated Total Travel Time from the Base of Tailings Cell #3 to Ruin Spring 17

5. REFERENCES 19

6. LIMITATIONS STATEMENT 20

TABLES

1 Peel Hydraulic Test Results
2 Results of July 2002 and June 2005 Hydraulic Tests

FIGURES

1 Approximate Elevation of Top of Brushy Basin
2 Perched Water Levels, August 1990
3 Perched Water Levels, August 1994
4 Perched Water Levels, September 2002
5 Kriged Perched Water Levels, 4th Quarter, 2006
6 Portion of USGS Black Mesa 7.5' Sheet Showing Approximate Location of Tailing Cells in Relation to Nearby Canyons and Ruin Spring
7 Depth to Perched Water, 4th Quarter 2006
8 Perched Zone Saturated Thickness, 4th Quarter 2006

1. INTRODUCTION

This report provides a brief description of the hydrogeology of the White Mesa Uranium Mill Site, located south of Blanding, Utah, and focuses on the occurrence and flow of groundwater within the relatively shallow perched groundwater zone at the site. Based on available existing hydrogeologic information from the site, estimates of hydraulic gradients and intergranular rates of groundwater movement (interstitial velocities) are provided. These estimates are then used to calculate average travel times for a hypothetical conservative solute (assuming no dispersion) from tailings cell #3 at the site to a downgradient discharge point.

2. SITE HYDROGEOLOGY

Titan, 1994 provides a detailed description of site hydrogeology based on information available at that time. A brief summary of site hydrogeology that is based primarily on Titan, 1994, but includes the results of more recent site investigations, is provided below.

2.1 Geologic Setting

The White Mesa Uranium Mill site (the "Mill" or the "site") is located within the Blanding Basin of the Colorado Plateau physiographic province. Typical of large portions of the Colorado Plateau province, the rocks underlying the site are relatively undeformed. The average elevation of the site is approximately 5,600 feet (ft) above mean sea level (amsl).

The site is underlain by unconsolidated alluvium and indurated sedimentary rocks consisting primarily of sandstone and shale. The indurated rocks are relatively flat lying with dips generally less than 3°. The alluvial materials consist mostly of aeolian silts and fine-grained aeolian sands with a thickness varying from a few feet to as much as 25 to 30 ft across the site. The alluvium is underlain by the Dakota Sandstone and Burro Canyon Formation, which are sandstones having a total thickness ranging from approximately 100 to 140 ft. Beneath the Burro Canyon Formation lies the Morrison Formation, consisting, in descending order, of the Brushy Basin Member, the Westwater

Canyon Member, the Recapture Member, and the Salt Wash Member. The Brushy Basin and Recapture Members of the Morrison Formation, classified as shales, are very fine-grained and have a very low permeability. The Brushy Basin Member is primarily composed of bentonitic mudstones, siltstones, and claystones. The Westwater Canyon and Salt Wash Members also have a low average vertical permeability due to the presence of interbedded shales.

Beneath the Morrison Formation lie the Summerville Formation, an argillaceous sandstone with interbedded shales, and the Entrada Sandstone. Beneath the Entrada lies the Navajo Sandstone. The Navajo and Entrada Sandstones constitute the primary aquifer in the area of the site. The Entrada and Navajo Sandstones are separated from the Burro Canyon Formation by approximately 1,000 to 1,100 feet of materials having a low average vertical permeability. Groundwater within this system is under artesian pressure in the vicinity of the site, is of generally good quality, and is used as a secondary source of water at the site.

2.2 Hydrogeologic Setting

The site is located within a region that has a dry to arid continental climate, with average annual precipitation of less than 11.8 inches, and average annual evapotranspiration of approximately 61.5 inches. Recharge to aquifers occurs primarily along the mountain fronts (for example, the Henry, Abajo, and La Sal Mountains), and along the flanks of folds such as Comb Ridge Monocline.

Although the water quality and productivity of the Navajo/Entrada aquifer are generally good, the depth of the aquifer (approximately 1,200 feet below land surface [ft bls]) makes access difficult. The Navajo/Entrada aquifer is capable of yielding significant quantities of water to wells (hundreds of gallons per minute [gpm]). Water in wells completed across these units at the site rises approximately 800 feet above the base of the overlying Summerville Formation.

Perched groundwater in the Dakota Sandstone and Burro Canyon Formation is used on a limited basis to the north (upgradient) of the site because it is more easily accessible. Water quality of the Dakota Sandstone and Burro Canyon Formation is generally poor due to high total dissolved solids (TDS) and is used primarily for stock watering and irrigation. The saturated thickness of the perched water zone generally increases to the north of the site, increasing the yield of the perched zone to wells installed north of the site.

2.3 Perched Zone Hydrogeology

Perched groundwater beneath the site occurs primarily within the Burro Canyon Formation. Perched groundwater at the site has a generally low quality due to high total dissolved solids (TDS) in the range of approximately 1,200 to 5,000 milligrams per liter (mg/L), and is used primarily for stock watering and irrigation in the areas upgradient (north) of the site. Perched water is supported within the Burro Canyon Formation by the underlying, fine-grained Brushy Basin Member. Figure 1 is a contour

map showing the approximate elevation of the contact of the Burro Canyon Formation with the Brushy Basin Member, which essentially forms the base of the perched water zone at the site. Contact elevations are based on perched monitoring well drilling and geophysical logs and surveyed land surface elevations. As indicated, the contact generally dips to the south/southwest beneath the site.

Groundwater within the perched zone generally flows south to southwest beneath the site. Beneath the tailings cells at the site, perched water flow is generally southwest to south-southwest.

2.3.1 Lithologic and Hydraulic Properties

Although the Dakota Sandstone and Burro Canyon Formations are often described as a single unit due to their similarity, previous investigators at the site have distinguished between them. The Dakota Sandstone is a relatively-hard to hard, generally fine-to-medium grained sandstone cemented by kaolinite clays. The Dakota Sandstone locally contains discontinuous interbeds of siltstone, shale, and conglomeratic materials. Porosity is primarily intergranular. The underlying Burro Canyon Formation hosts most of the perched groundwater at the site. The Burro Canyon Formation is similar to the Dakota Sandstone but is generally more poorly sorted, contains more conglomeratic materials, and becomes argillaceous near its contact with the underlying Brushy Basin Member. The permeability of the Dakota Sandstone and Burro Canyon Formation at the site is generally low.

No significant joints or fractures within the Dakota Sandstone or Burro Canyon Formation have been documented in any wells or borings installed across the site (Knight Piésold, 1998). Any fractures observed in cores collected from site borings are typically cemented, showing no open space.

2.3.1.1 Dakota

Based on samples collected during installation of wells MW-16 and MW-17, located immediately downgradient of the tailings cells at the site, porosities of the Dakota Sandstone range from 13.4% to 26%, averaging 20%, and water saturations range from 3.7% to 27.2%, averaging 13.5%. The average volumetric water content is approximately 3%. The permeability of the Dakota Sandstone based on packer tests in borings installed at the site ranges from 2.71×10^{-6} centimeters per second (cm/s) to 9.12×10^{-4} cm/s, with a geometric average of 3.89×10^{-5} cm/s.

2.3.1.2 Burro Canyon

The average porosity of the Burro Canyon Formation is similar to that of the Dakota Sandstone. Based on samples collected from the Burro Canyon Formation at MW-16, located immediately downgradient of the tailings cells at the site, porosity ranges from 2% to 29.1%, averaging 18.3%, and water saturations of unsaturated materials range from 0.6% to 77.2%, averaging 23.4%. Titan, 1994, reported that the hydraulic conductivity of the Burro Canyon Formation ranges from 1.9×10^{-7} to

1.6×10^{-3} cm/s, with a geometric mean of 1.1×10^{-5} cm/s, based on the results of 12 pumping/recovery tests performed in monitoring wells and 30 packer tests performed in borings prior to that time.

Hydraulic testing of wells MW-01, MW-03, MW-05, MW-17, MW-18, MW-19, MW-20, and MW-22 during the week of July 8, 2002, and newly installed wells MW-23, MW-25, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, TW4-20, TW4-21, and TW4-22 during June, 2005, yielded average perched zone permeabilities ranging from approximately 2×10^{-7} cm/s to 5×10^{-4} cm/s, similar to the range reported by previous investigators at the site (Hydro Geo Chem, Inc [HGC], 2002; HGC, 2005). Downgradient (south to southwest) of the tailings cells, average perched zone permeabilities based on tests at MW-3, MW-5, MW-17, MW-20, MW-22, and MW-25 ranged from approximately 4×10^{-7} to 1×10^{-4} cm/s Permeability estimates from these tests were based on pumping/recovery and slug tests analyzed using several different methodologies.

A number of temporary perched zone monitoring wells have been installed at the site to investigate elevated concentrations of chloroform initially discovered at well MW-4 in 1999. Some of the conglomeratic zones encountered within the perched zone during installation of these wells are believed to be partly continuous or at least associated with a relatively continuous zone of higher permeability (International Uranium [USA] Corporation [IUSA] and HGC, 2001). The higher permeability zone defined by these wells is generally located east to northeast of the tailings cells at the site,

and is hydraulically cross-gradient to upgradient of the tailings cells with respect to perched groundwater flow. Relatively high permeabilities measured at MW-11, located on the southeastern margin of the downgradient edge of tailings cell #3, and at MW-14, located on the downgradient edge of tailings cell #4, of 1.4×10^{-3} cm/s and 7.5×10^{-4} cm/s, respectively (UMETCO, 1993), may indicate that this zone extends beneath the southeastern margin of the cells. This zone of higher permeability within the perched water zone does not appear to exist downgradient (south-southwest) of the tailings cells, however. At depths beneath the perched water table, the zone is not evident in lithologic logs of the southernmost temporary wells TW4-4 and TW4-6 (located east [cross-gradient] of cell #3), nor is it evident in wells MW-3, MW-5, MW-12, MW-15, MW-16, MW-17, MW-20, MW-21, or MW-22, located south to southwest (downgradient) of the tailings cells, based on the lithologic logs or hydraulic testing of the wells.

Because of the generally low permeability of the perched zone beneath the site, well yields are typically low (less than 0.5 gpm), although sustainable yields of as much as 4 gpm may be possible in wells intercepting larger saturated thicknesses and higher permeability zones on the east side of the site. Sufficient productivity can, in general, only be obtained in areas where the saturated thickness is greater, which is the primary reason that the perched zone has been used on a limited basis as a water supply to the north (upgradient) of the site.

2.3.2 Perched Groundwater Flow

Perched groundwater flow at the site has historically been to the south/southwest. Figures 2 through 5 are perched groundwater elevation contour maps for the years 1990, 1994, 2002, and 2006, respectively. The 1990, 1994, and 2002 maps were hand contoured because of sparse data. As groundwater elevations indicate, the perched groundwater gradient changes from generally southwesterly in the western portion of the site, to generally southerly in the eastern portion of the site. The most significant changes between the 2002 and 2006 water levels result from pumping of wells MW-4, TW4-19, TW4-20, and MW-26. These wells are pumped to reduce chloroform mass in the perched zone east and northeast of the tailings cells.

In general, perched groundwater elevations have not changed significantly at most of the site monitoring wells since installation, except in the vicinity of the wildlife ponds and the pumping wells. For example, relatively large increases in water levels occurred between 1994 and 2002 at MW-4 and MW-19, located in the east and northeast portions of the site, as shown by comparing Figures 3 and 4. These water level increases in the northeastern and eastern portions of the site are likely the result of seepage from wildlife ponds located near the piezometers shown in Figure 4, which were installed in 2001 for the purpose of investigating these changes. The increase in water levels in the northeastern portion of the site has resulted in a local steepening of groundwater gradients over portions of the site. Conversely, pumping of wells MW-4, TW4-19,

TW4-20, and MW-26 has depressed the perched water table locally and reduced average hydraulic gradients to the south and southwest of these wells.

Perched water discharges in springs and seeps along Westwater Creek Canyon and Cottonwood Canyon to the west-southwest of the site, and along Corral Canyon to the east of the site, where the Burro Canyon Formation outcrops. The discharge point located most directly downgradient of the tailings cells is Ruin Spring. This feature is located approximately 10,000 feet south-southwest of the tailings cells at the site and is depicted on the USGS 7.5-minute quad sheet for Black Mesa (Figure 6).

3. PERCHED ZONE HYDROGEOLOGY BENEATH AND DOWNGRADIENT OF THE TAILINGS CELLS

Perched water as of the 4th Quarter, 2006 was encountered at depths of approximately 50 to 115 ft bls in the vicinity of the tailings cells at the site (Figure 7). Beneath tailings cell #3, depths to water ranged from approximately 72 ft below top of casing (btoc) in the eastern portion of the cell (at MW-31), to approximately 115 ft btoc at the southwest margin of the cell (at MW-23). Assuming an average depth of the base of tailings cell #3 of 25 ft below grade, this corresponds to perched water depths of approximately 47 to 90 ft below the base of the cell, or an average depth of approximately 70 feet beneath the base of the cell.

3.1 Saturated Thickness

The saturated thickness of the perched zone as of the 4th Quarter, 2006 ranges from approximately 94 ft in the northeast portion of the site to less than 5 ft in the southwest portion of the site (Figure 8). Beneath tailings cell #3, the saturated thickness varies from approximately 49 feet in the easternmost corner of the cell to approximately 6 ft in the western portion of the cell. South-southwest of the tailings cells, the saturated thickness ranges from less than 1 foot at MW-21 to approximately 25 feet at MW-17. The average saturated thickness south-southwest of the tailings cells, based on measurements at MW-3, MW-5, MW-12, MW-14, MW-15, MW17, and MW-20, is approximately 14 feet. The average saturated thickness based on measurements at

MW-5, MW-15, MW-3, and MW-20, which lay close to a line between the center of tailings cell #3 and Ruin Spring, is approximately 12 feet. By projecting conditions at these wells, the average saturated thickness is estimated to be approximately 10 to 15 feet between MW-20 and Ruin Spring.

3.2 Perched Water Flow

Perched groundwater flow beneath the tailings cells has historically been southwest, with the gradient steepening in recent years (since about 1994) and becoming more westerly as perched water levels in the northeastern portion of the site have risen. Perched water flowing beneath the tailings cells eventually discharges in springs and seeps located in Westwater Canyon, to the south-southwest of the cells. The primary discharge point for perched water flowing beneath the tailings cells is believed to be Ruin Spring, located approximately 10,000 ft south-southwest of the cells.

Perched zone hydraulic gradients currently range from a maximum of approximately 0.05 feet per foot (ft/ft) east of tailings cell #2 to approximately 0.01 ft/ft downgradient of cell #3, between cell #3 and MW-20. The average hydraulic gradient between the downgradient edge of tailings cell #3 and Ruin Spring can be approximated assuming the following:

1) The elevation of Ruin Spring, based on the USGS topographic map for Black Mesa, is approximately 5,390 ft amsl.

2) The distance between the downgradient edge of tailings cell #3 and Ruin Spring is approximately 10,000 ft.

3) The average groundwater elevation at the downgradient edge of tailings cell #3 is approximately 5,510 ft amsl.

Using these assumptions, the average perched zone hydraulic gradient between tailings cell #3 and Ruin Spring is approximately

$$\frac{5510-5390}{10{,}000} = 0.012\,ft/ft$$

A hypothetical worst case average perched zone hydraulic gradient can also be estimated assuming the perched water elevation to be coincident with the base of tailings cell #3. The elevation of the base of tailings cell #3, which is also the approximate pre-existing land surface elevation near the center of the cell, is approximately 5,580 ft amsl. Under these conditions, for an unconfined perched zone, the maximum possible average perched zone hydraulic gradient between tailings cell #3 and Ruin Spring would be approximately:

$$\frac{5580-5390}{10{,}000} = 0.019\,ft/ft$$

3.3 Permeability

The average permeability of the perched zone downgradient of tailings cell #3 can be approximated based on the pumping/recovery test and slug test data obtained from perched zone wells located along the downgradient edge of and south of cell #3. Peel conducted hydraulic tests at perched zone wells MW-11, MW-12, MW-14, and MW-15

in 1992 (UMETCO, 1993). Results of these tests are provided in Table 1. HGC conducted slug tests at perched zone wells MW-3, MW-5, MW-17, MW-20, and MW-22 in July 2002 (HGC, 2002), and MW-25 in June, 2005 (HGC, 2005).

The HGC slug test results were analyzed using different solution methods including KGS (Hyder, 1994), and Bouwer-Rice (Bouwer and Rice, 1976). Each method yielded slightly different results as shown in Table 2, which is based on Table 1 of HGC, 2002, and Table 1 of HGC, 2005. A range of average permeabilities for the portion of the site south of the tailings cells can be obtained by taking the geometric mean of the Peel test results and the results obtained by the various solution methods used to analyze the HGC data. Averaging the Peel test results for wells MW-11, MW-12, MW-14, and MW-15 with the HGC KGS results for wells MW-3, MW-5, MW-17, MW-20, MW-22, and MW-25 yields a geometric average of 2.3×10^{-5} cm/s, and similarly averaging the Peel test results with the HGC Bouwer-Rice results yields a geometric average of 4.3×10^{-5} cm/s, as shown in Table 2. The "early time" results at MW-5 using the Bouwer-Rice solution (from Table 1 of HGC, 2002) were used in the computations to yield a conservatively high estimate of permeability.

4. EVALUATION OF POTENTIAL FLOW PATHS AND TRAVEL TIMES FOR HYPOTHETICAL SEEPAGE ORIGINATING FROM CELL #3

Although more than 25 years of groundwater monitoring at the site has shown no impact to perched water from the tailings cells, an evaluation of hypothetical transport of a conservative solute in seepage from cell #3 is presented assuming a flow path from the base of the cell to the perched water, and thence to Ruin Spring. Average travel times for a conservative constituent moving from the base of tailings cell #3 to the perched water, and then moving with the perched water to Ruin Spring, are computed assuming no dispersion.

The porosities and water saturations used in the calculations were based on measurements reported in Titan, 1994, for samples collected from the Dakota Sandstone during drilling of MW-16 and MW-17, and from the Burro Canyon Formation during drilling of MW-16.

4.1 Estimated Travel Time From the Base of Cell #3 to the Perched Zone

Knight-Piésold estimated a maximum volumetric seepage rate for tailings cell #3 based on cell construction and liner characteristics, of approximately 80 cubic feet per day (ft/day) or 0.42 gpm over the entire cell (Knight-Piésold, 1998). Most of this seepage was estimated to be via diffusion through the liner. This rate was estimated to decrease over time as the cell desaturates once the final cover is emplaced. Assuming a cell footprint of 3.38×10^6 ft^2, this rate is equivalent to 2.37×10^{-5} (ft/day) or 0.0086 ft/year.

The average rate of downward movement of a conservative solute dissolved in the seepage, assuming 1) no dispersion, 2) an average water saturation of 0.20, 3) an average porosity of 0.18, and assuming that this rate of seepage would not significantly raise the average saturation of the underlying materials, can be approximated as:

$$\frac{0.0086\,ft/yr}{(.20)(.18)} = 0.24\,ft/yr$$

The average time to travel 70 ft to the perched water zone would then be approximately 290 years. This is a conservative estimate because the average water saturations would be likely to increase, thereby reducing the downward rate of travel, and increasing the travel time.

4.2 Estimated Travel Time From Tailings Cell #3 to Ruin Spring

Under current conditions, the average hydraulic gradient between the downgradient edge of tailings cell #3 to Ruin Spring is estimated to be 0.012, as discussed in Section 3.2. Assuming the following:

Average porosity	= 0.18
Average hydraulic gradient	= 0.012
Flow path length	= 10,000 ft
Average permeability range	= 2.3×10^{-5} to 4.3×10^{-5} cm/s (0.064 ft/day to 0.120 ft/day)

the average rate of intergranular movement of perched groundwater (interstitial or pore velocity) can be approximated to range from 0.0043 ft/day to 0.0080 ft/day (or 1.6 feet per year (ft/yr) to 2.9 ft/yr). The estimated average travel time for a conservative solute, assuming no dispersion, from tailings cell #3 to Ruin Spring would then be approximately 6,250 to 3,450 years over this range of permeabilities. Under conditions of the maximum possible average perched groundwater gradient of 0.019 ft/ft, as estimated in Section 3.2, and assuming the same permeabilities, porosity, and path length as above, the estimated average travel times would range from approximately 4,055 to 2,160 years.

4.3 Estimated Total Travel Time from the Base of Tailings Cell #3 to Ruin Spring

The total average travel time for a conservative solute from the base of tailings cell #3 to Ruin Spring under current conditions would be the sum of 1) the travel time from the base of cell #3 to the perched water table, and 2) the time to travel within the perched zone to Ruin Spring. Based on the estimates provided in Sections 4.1 and 4.2, the total average travel time of a conservative solute (assuming no dispersion) over the range of average permeability estimates would be between 6,540 and 3,740 years, assuming an average hydraulic gradient of 0.012 ft/ft.

Conditions may hypothetically develop under which travel times may be reduced, such as an increase in average perched zone groundwater gradients between tailings cell #3 and Ruin Spring (as discussed in Section 3.2) or as a result of reduced vadose

zone travel times due to development of a relatively large leak in cell #3. Under hypothetical conditions in which a relatively large leak were to develop in tailings cell #3, potentially reducing vadose zone travel times to only a few years, the vadose zone travel time could be ignored, and the total average travel time (assuming no dispersion) would range from approximately 6,250 to 3,450 years, assuming an average hydraulic gradient of 0.012 ft/ft. Under hypothetical conditions in which the average perched zone hydraulic gradient between tailings cell #3 and Ruin Spring reached 0.019 ft/ft, which also implies a negligible vadose zone travel time, the total average travel time (assuming no dispersion) over the estimated range in permeability would be between approximately 4,055 and 2,160 years.

Estimates based on hypothetical assumptions of a relatively large leak in tailings cell #3 or an average hydraulic gradient as high as 0.019 ft/ft between cell #3 and Ruin Spring are considered very conservative because they assume conditions that are unlikely ever to develop.

5. REFERENCES

Bouwer, H. and R.C. Rice. 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells. Water Resources Research, Vo. 12:3. Pp. 423-428.

Hyder, Z., J.J. Butler, C.D. McElwee, and W. Liu. 1994. Slug tests in partially penetrating wells. Water Resources Research. Vol. 30:11. Pp. 2945-2957.

Hydro Geo Chem. 2001. Update to report "Investigation of Elevated Chloroform Concentrations in Perched Groundwater at the White Mesa Uranium Mill Near Blanding, Utah".

Hydro Geo Chem. 2002. Hydraulic Testing at the White Mesa Uranium Mill Near Blanding, Utah During July, 2002. Submitted to International Uranium (USA) Corporation, Denver, Colorado.

Hydro Geo Chem. 2005. Perched Monitoring Well Installation and Testing at the White Mesa Uranium Mill, April Through June, 2005. Submitted to International Uranium (USA) Corporation, Denver, Colorado.

Knight-Piésold. 1998. Evaluation of Potential for Tailings Cell Discharge – White Mesa Mill. Attachment 5, Groundwater Information Report, White Mesa Uranium Mill, Blanding, Utah. Submitted to UDEQ.

TITAN, 1994. Hydrogeological Evaluation of White Mesa Uranium Mill. Submitted to Energy Fuels Nuclear.

UMETCO, 1993. Groundwater Study. White Mesa Facilities. Blanding, Utah. Prepared by UMETCO Minerals Corporation and Peel Environmental Services.

6. LIMITATIONS STATEMENT

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

TABLES

TABLE 1
Peel Hydraulic Test Results [1]

Well	Hydraulic Conductivity (cm/s)
MW-11	1.4×10^{-3}
MW-12	2.2×10^{-5}
MW-14	7.5×10^{-4}
MW-15	1.9×10^{-5}

[1] From UMETCO, 1993

TABLE 2
Results of July 2002 and June 2005 Hydraulic Tests [2]

	Permeability in centimeters per second	
Well	KGS	Bouwer-Rice
MW-3	4.0×10^{-7}	1.5×10^{-5}
MW-5	3.5×10^{-6}	2.4×10^{-5}
MW-17	2.6×10^{-5}	2.7×10^{-5}
MW-20	--	9.3×10^{-6}
MW-22	1.0×10^{-6}	7.9×10^{-6}
MW-25	1.1×10^{-4}	7.4×10^{-5}

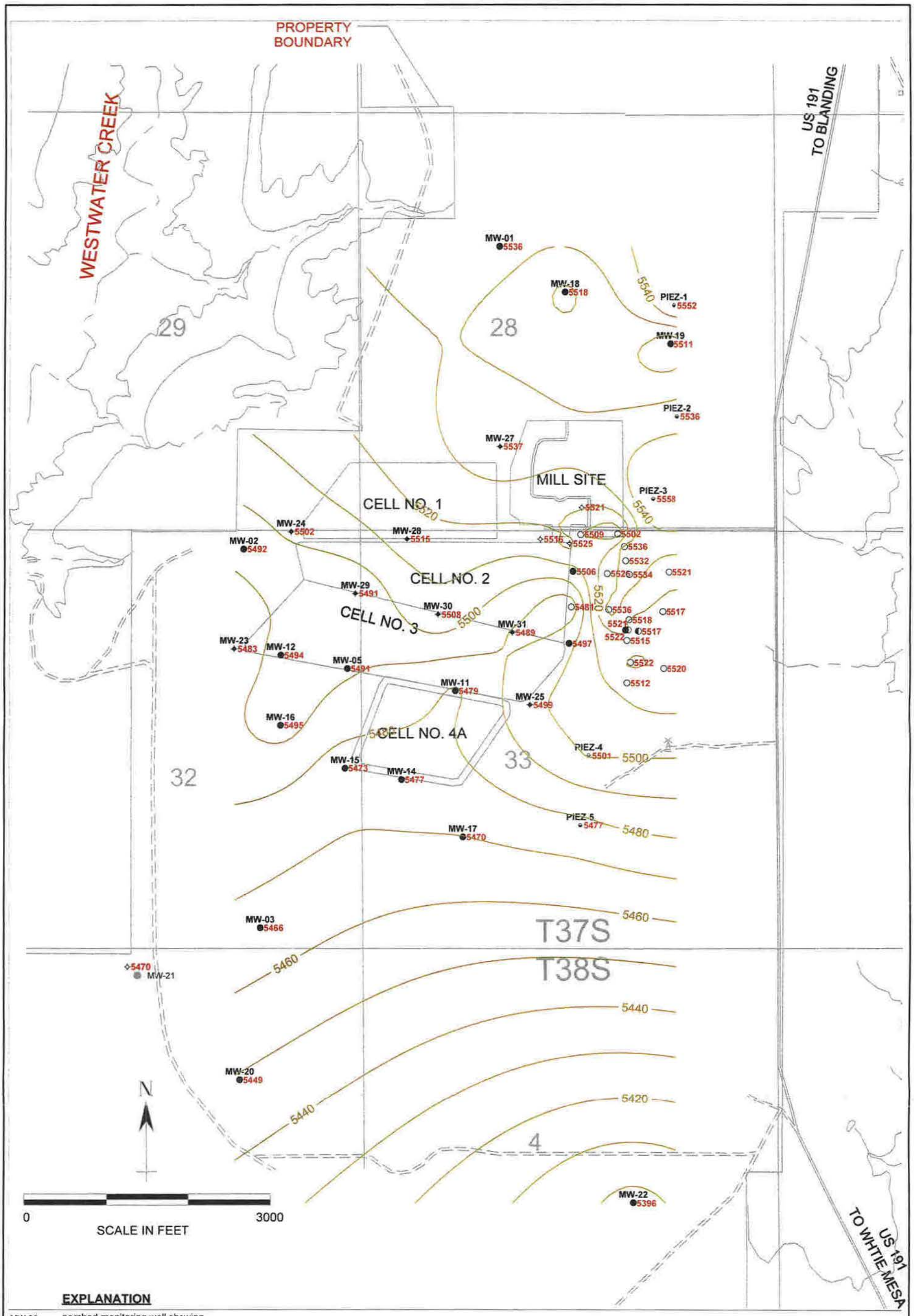
Geometric Average of above test results with Peel[3] test results for MW-11, MW-12, MW-14, and MW-15.

2.3×10^{-5}	4.3×10^{-5}

[2] From HGC, 2002; HGC, 2005

[3] From UMETCO, 1993

FIGURES



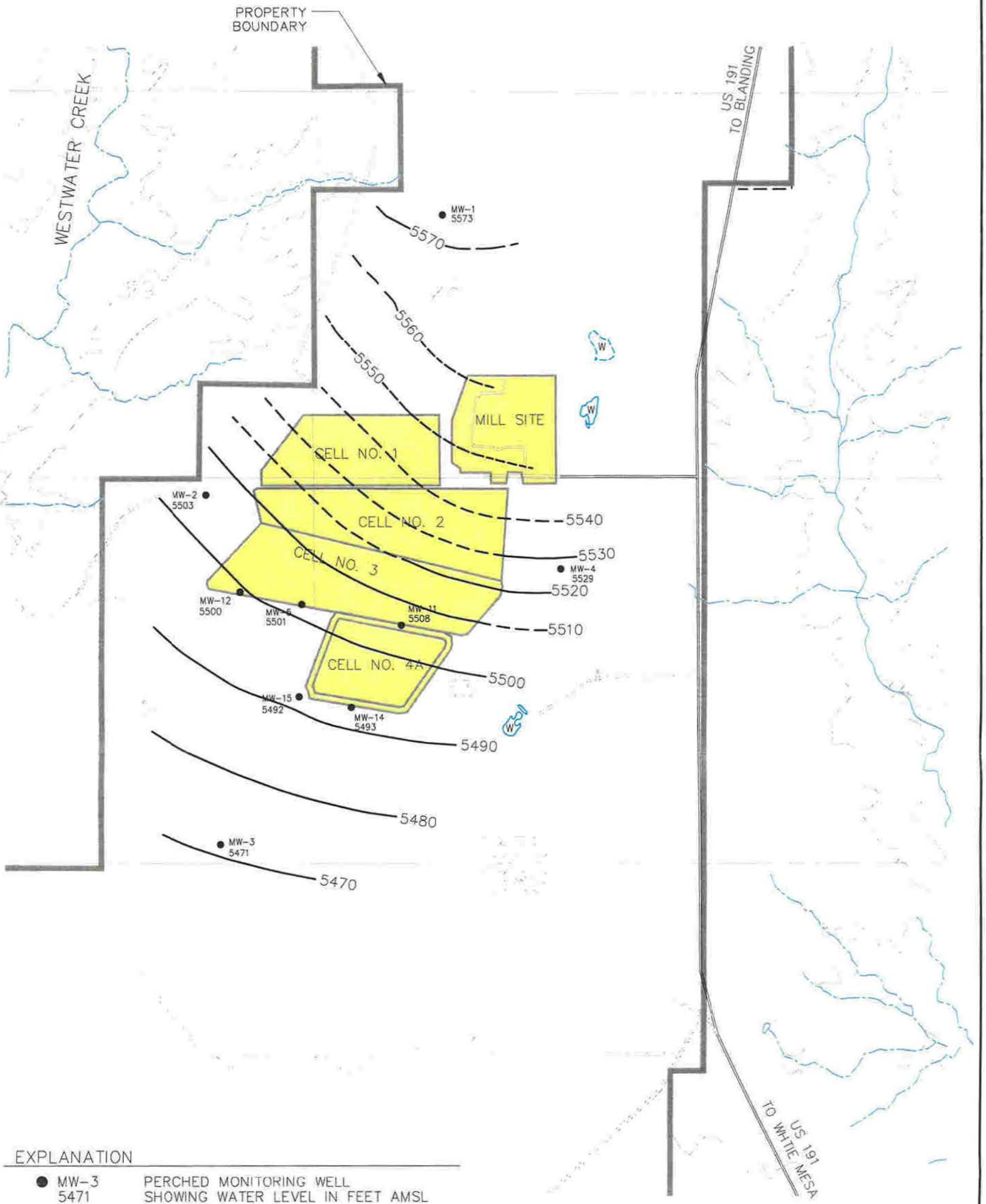
EXPLANATION

MW-20 5449	perched monitoring well showing elevation in feet amsl
5481	temporary perched monitoring well showing elevation in feet amsl
PIEZ-1 5552	perched piezometer showing elevation in feet amsl
MW-31 5489	new perched monitoring well showing elevation in feet amsl
5525	new temporary perched monitoring well showing elevation in feet amsl

HYDRO GEO CHEM, INC.

APPROXIMATE ELEVATION OF TOP OF BRUSHY BASIN (Contours Generated by Kriging)

APPROVED	DATE	REFERENCE	FIGURE
		H:/718000/hydrpt07/bbel0705.srf	1



HYDRO GEO CHEM, INC.

PERCHED WATER LEVELS AUGUST 1990

Approved	Date	Revised	Date	Reference:	FIG:
SS	01/30/03			71800071	2

PROPERTY BOUNDARY

WESTWATER CREEK

US 191 TO BLANDING

MW-1 5572

MW-18 5566

MW-19 5570

5570

W

MILL SITE

CELL NO. 1

CELL NO. 2

CELL NO. 3

CELL NO. 4A

MW-2 5503

MW-4 5532

MW-12 5500

MW-5 5501

MW-11 5510

MW-16 (DRY)

MW-15 5492

MW-14 5493

MW-17 5488

5560

5550

5540

5530

5520

5510

5500

5490

5480

5470

5460

5450

MW-3 5471

MW-20 5463

MW-22 5445

US 191 TO WHITE MESA

EXPLANATION

● MW-3 5471	PERCHED MONITORING WELL SHOWING WATER LEVEL IN FEET AMSL
W	WILDLIFE POND
5580	WATER LEVEL CONTOUR LINE, DASHED WHERE UNCERTAIN

N

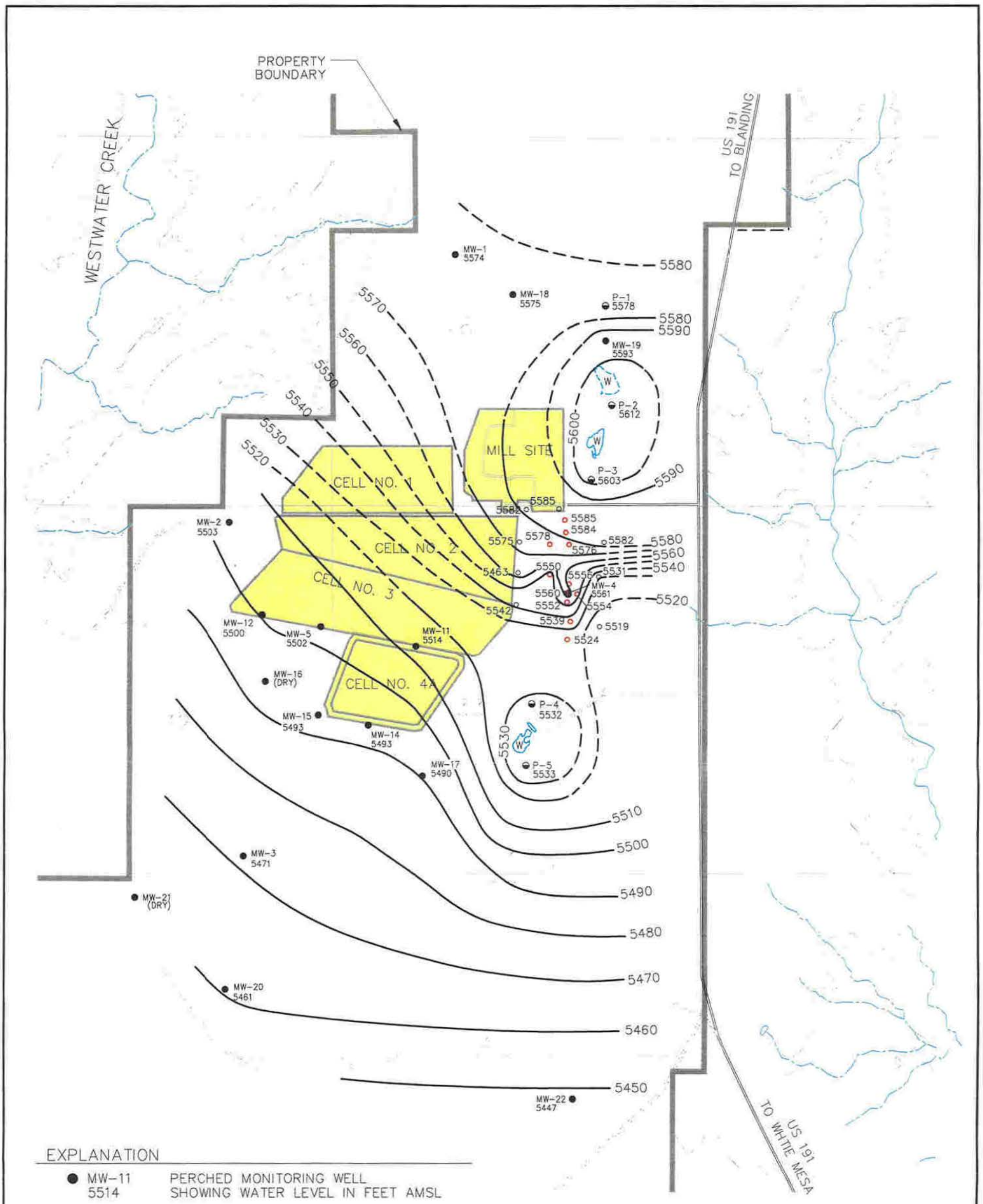
0 3000

SCALE IN FEET

HYDRO GEO CHEM, INC.

PERCHED WATER LEVELS AUGUST 1994

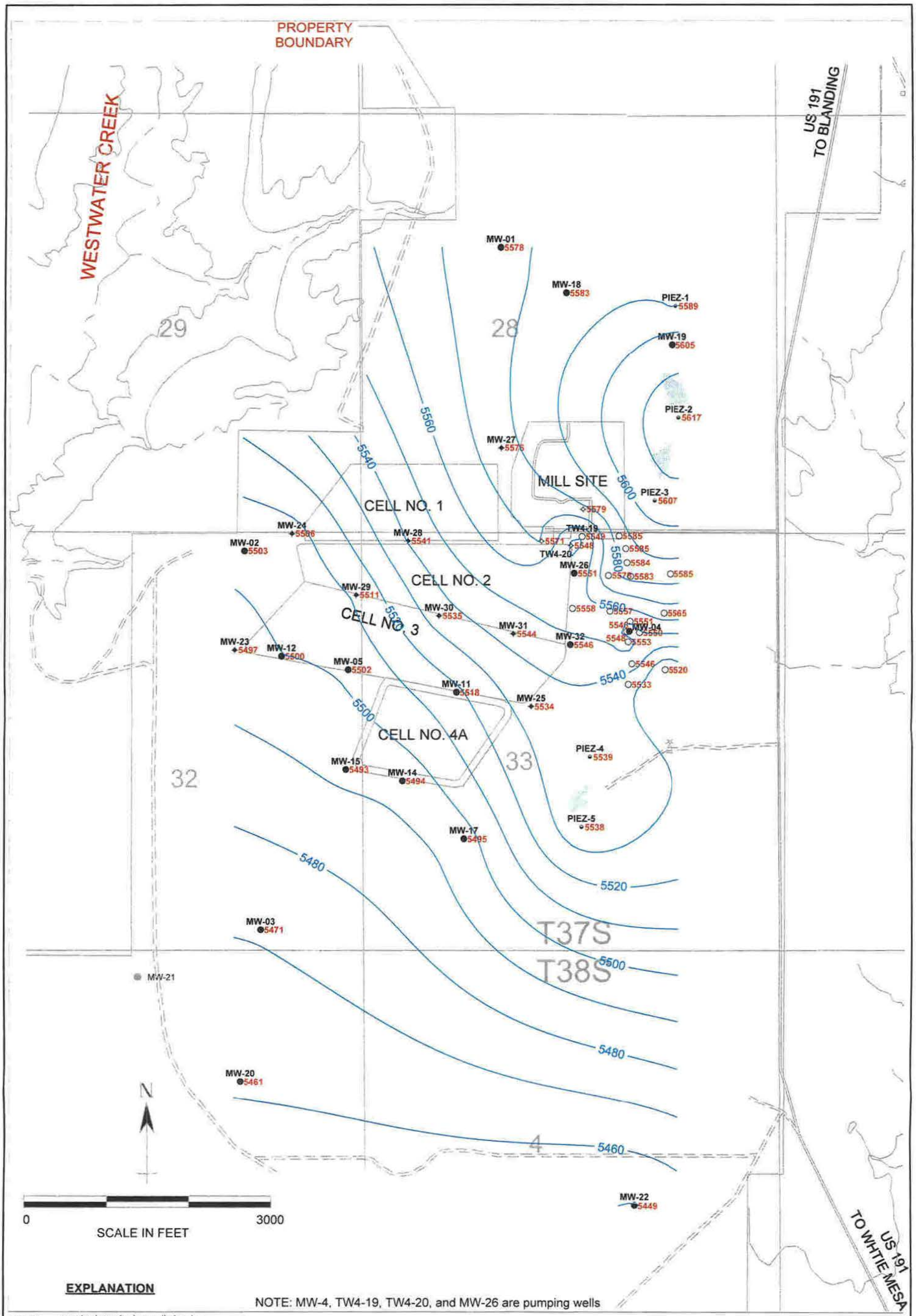
Approved	Date	Revised	Date	Reference:	FIG:
SS	01/30/03			71800070	3



HYDRO GEO CHEM, INC.

PERCHED WATER LEVELS SEPTEMBER 2002

Approved	Date	Revised	Date	Reference:	FIG:
SS	01/30/03			71800074	4



EXPLANATION

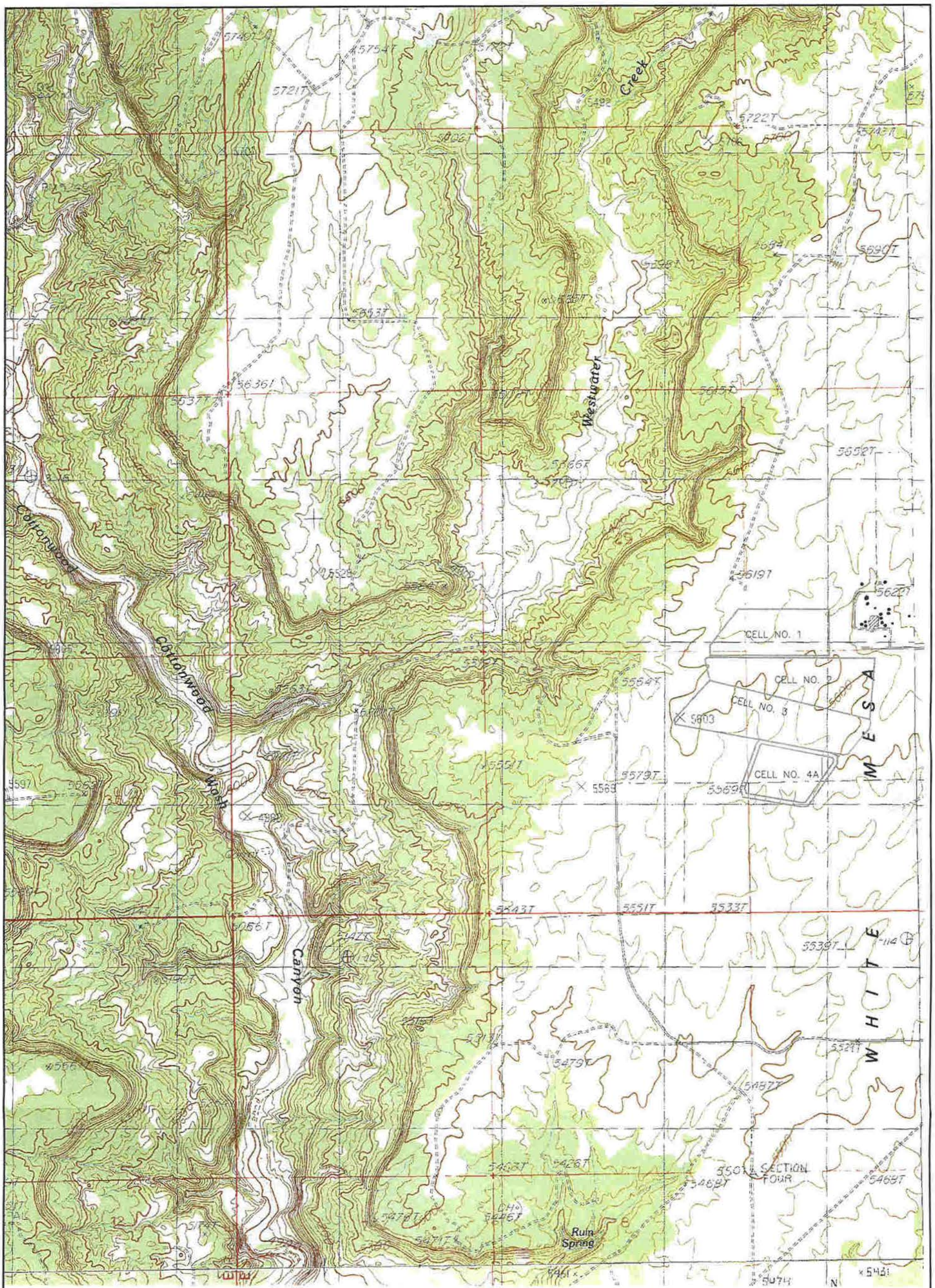
NOTE: MW-4, TW4-19, TW4-20, and MW-26 are pumping wells

MW-20 5461	perched monitoring well showing elevation in feet amsl
5551	temporary perched monitoring well showing elevation in feet amsl
PIEZ-1 5589	perched piezometer showing elevation in feet amsl
MW-31 5544	perched monitoring well installed April, 2005 showing elevation in feet amsl
5571	temporary perched monitoring well installed April, 2005 showing elevation in feet amsl

HYDRO GEO CHEM, INC.

KRIGED PERCHED WATER LEVELS 4th QUARTER, 2006

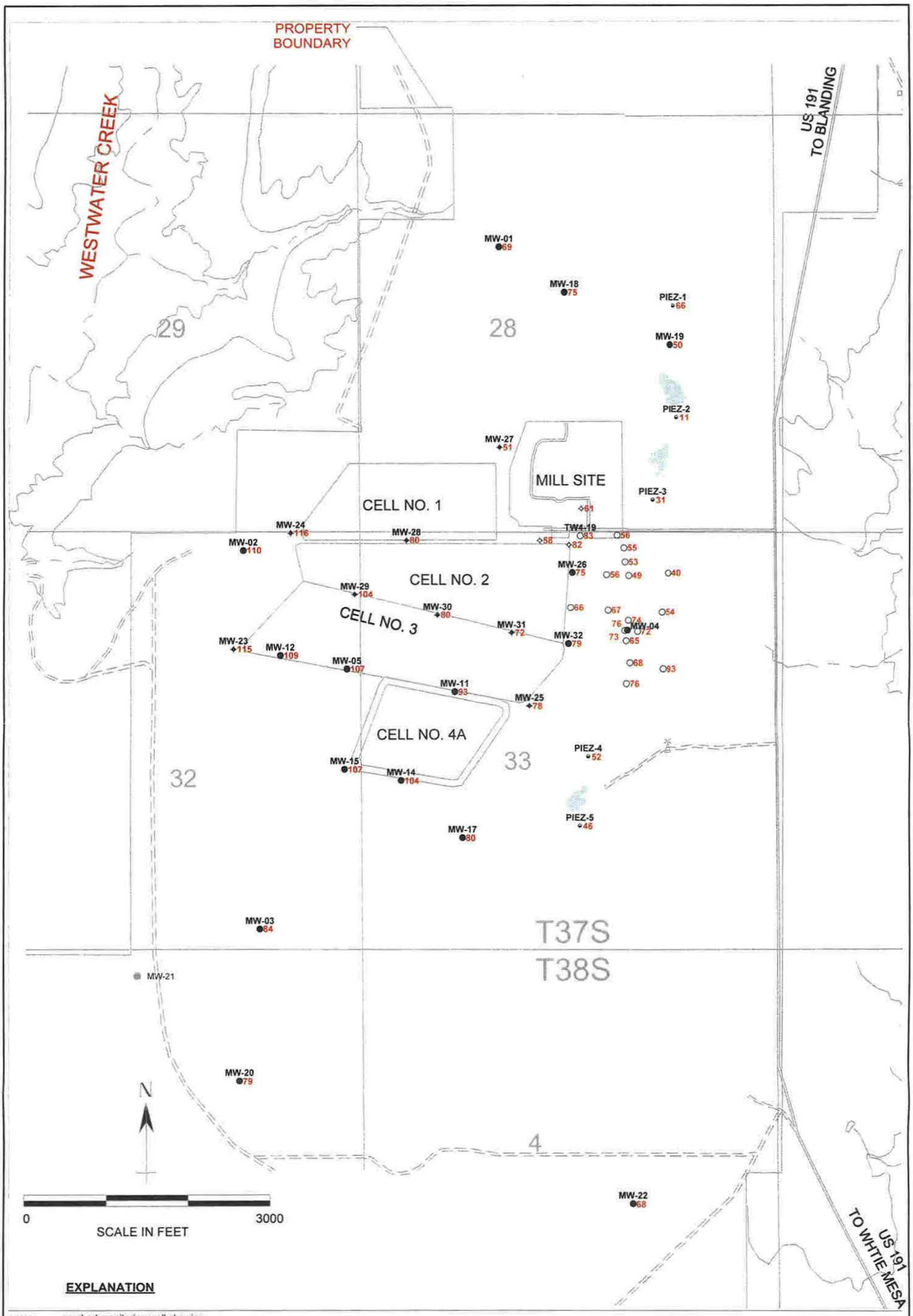
APPROVED	DATE	REFERENCE	FIGURE
		H:/718000/hydrpt07/wl1206.srf	5



HYDRO GEO CHEM, INC.

PORTION OF USGS BLACK MESA 7.5' SHEET SHOWING APPROXIMATE LOCATION OF TAILING CELLS IN RELATION TO NEARBY CANYONS AND RUIN SPRING

Approved	Date	Revised	Date	Reference:	FIG:
SS	1/30/03			71800076	6



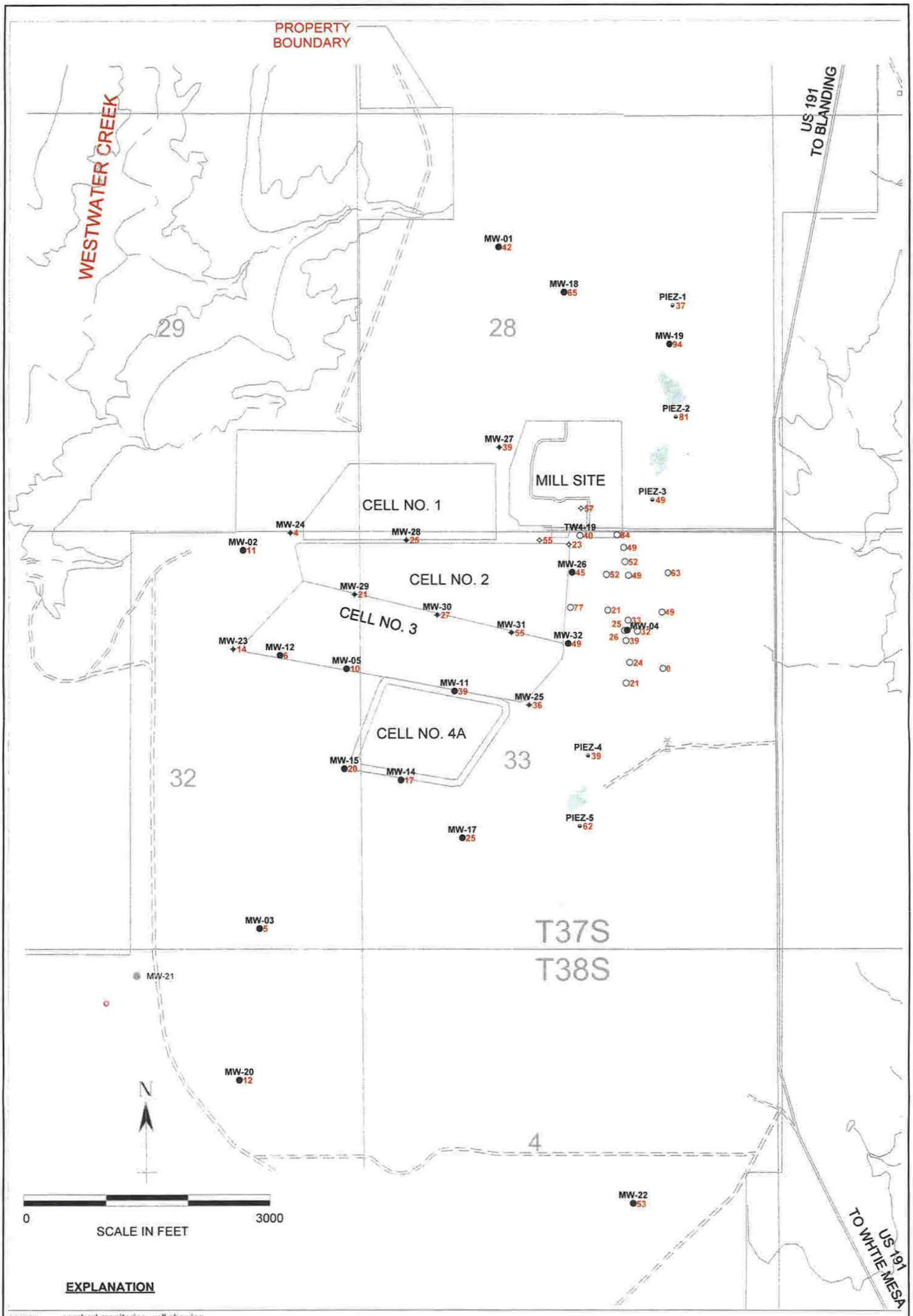
EXPLANATION

MW-20 ● 79	perched monitoring well showing depth to water in feet
○ 74	temporary perched monitoring well showing depth to water in feet
PIEZ-1 ◒ 66	perched piezometer showing depth to water in feet
MW-31 ✦ 72	perched monitoring well installed April, 2005 showing depth to water in feet
✧ 58	temporary perched monitoring well installed April, 2005 showing depth to water in feet

HYDRO GEO CHEM, INC.

DEPTH TO PERCHED WATER 4th QUARTER, 2006

APPROVED	DATE	REFERENCE	FIGURE
		H:/718000/hydrpt07/dtw1206.srf	7



EXPLANATION

MW-20 ● 12	perched monitoring well showing saturated thickness in feet
○ 33	temporary perched monitoring well showing saturated thickness in feet
PIEZ-1 ⬭ 37	perched piezometer showing saturated thickness in feet
MW-31 ✦ 55	perched monitoring well installed April, 2005 showing saturated thickness in feet
✧ 55	temporary perched monitoring well installed April, 2005 saturated thickness in feet

HYDRO GEO CHEM, INC.

PERCHED ZONE SATURATED THICKNESS 4th QUARTER, 2006

APPROVED	DATE	REFERENCE	FIGURE
		H:/718000/hydrpt07/satdthck.srf	8

Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.'s White Mesa Uranium Mill Site, San Juan County, Utah

Prepared for:

DENISONMINES

Denison Mines (USA) Corp.
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Prepared by:

6000 Uptown Boulevard, Suite 100
Albuquerque, New Mexico 87110

December 2006

EXECUTIVE SUMMARY

Denison Mines (USA) Corp.'s (DUSA's) White Mesa Uranium Mill (the Mill) is located approximately 5 miles south of Blanding, Utah. Licensed by the U.S. Nuclear Regulatory Commission (NRC) in 1980, the Mill has processed over 4 million tons of conventionally mined and alternate feed uranium ores for the recovery of over 25 million pounds of U_3O_8 and 34 million pounds of vanadium to date.

In August 2004, Utah became an Agreement State for uranium mills and, as a result, became the primary regulator of the Mill. In March 2005, the Utah Department of Environmental Quality (UDEQ) issued Groundwater Discharge Permit No. UGW370004 (GWDP) for the Mill, which is intended to tailor the state's groundwater protection program to the Mill facility.

While background groundwater quality at the Mill site had been established prior to commencement of operations and accepted by NRC, UDEQ has required, in Part I.H.3 of the GWDP, that DUSA prepare this background groundwater quality report to evaluate all historic data for the purposes of establishing background groundwater quality at the site and developing ground water compliance limits (GWCLs) under the GWDP.

Prior to review and acceptance of the conclusions in this report relating to background at the Mill site, the GWCLs were set on an interim basis in the GWDP. In this regard, the limits were established as fractions of the state ground water quality standards (GWQSs) for drinking water, depending on the quality of water in each monitoring well at the site. The GWDP contemplates that upon approval of this report, the Executive Secretary will re-open the GWDP and modify the GWCLs to account for natural variations in groundwater quality not caused by current or historic operations at the facility. Specifically, the GWDP contemplates that, upon acceptance of background water quality at the site, the GWCL for each constituent in each well will be set as the mean plus two standard deviations, based on historical data for the constituent, on a well-by-well basis. The GWDP contemplates that groundwater monitoring and compliance at the Mill will be performed on a well by well, or intra-well, basis due to natural variations in groundwater across the site.

Because the Mill has been in operation for over 25 years, it is important that care be taken in reviewing historical groundwater monitoring data to ensure that monitoring results have not been impacted by Mill activities. This is particularly important in the case of the Mill, because historic data show mean results in excess of GWQSs and increasing and decreasing trends in a number of constituents both upgradient and far downgradient of the Mill site, as well as at the

Mill site itself. It is therefore not possible to conclude that a mean in excess of its respective GWQS or an increasing trend necessarily represents an impact from milling activities.

In evaluating historic data, we have used the following approach to determine whether groundwater has been impacted by Mill activities:

- If historic data for a constituent in a well do not demonstrate a statistically significant upward trend, then the mean of that data is accepted as representative of background, regardless of whether or not the mean exceeds the state GWQS for that constituent. This is because the monitoring results for the constituent have been consistently representative since commencement of Mill activities; and

- If historic data for a constituent in a well represent a statistically significant upward trend, then that data is further evaluated to determine whether the trend is the result of natural causes or Mill activities. In performing our evaluations, we reviewed spatial and temporal distributions of the constituents and other factors we considered relevant in order to make our determinations.

After applying the foregoing approach, we have concluded that there have been no impacts to groundwater from Mill activities. We base this conclusion on a number of factors, including the following: [1]

- There are a number of exceedances of GWQSs in upgradient and far downgradient wells at the site, which cannot be considered to have been impacted by Mill operations to date. Exceedances of GWQSs in monitoring wells nearer to the site itself are therefore consistent with natural background in the area. In situations where the constituent that exceeds the GWQS is not trending upward, the proper conclusion is that it is representative of natural background.

- There are numerous cases of both increasing and decreasing trends in constituents in upgradient, far downgradient, and Mill site wells, which provide evidence that there are natural forces at work that are impacting groundwater quality across the entire site.

[1] Although there has been some impact at the Mill site from the chloroform and related organic contamination, which is the subject of a separate investigation, this contamination is related to activities that pre-dated the construction of the Mill and is limited to a defined area upgradient and cross gradient from the Mill's tailings cells.

- In almost all cases where there are increasing trends in constituents in wells at the site, there are more pronounced increasing trends in those constituents in upgradient wells. Furthermore, and more importantly, in no case is there any evidence in the wells in question of increasing trends in indicator parameters, such as chloride or fluoride, which are considered the most mobile and best indicators of potential tailings cell leakage at the site. We consider the combination of these factors to be conclusive evidence that all increasing trends at the site are caused by natural forces and not by Mill activities.

Because Mill activities have not impacted background groundwater quality, setting the GWCLs as the mean plus two standard deviations will be appropriate for each constituent that has a sufficient number of data points and that does not exhibit an increasing trend. In most cases, the data for these constituents appear to be close to being normally or log normally distributed. In cases where the data set for a constituent is comprised mainly of non-detects, it may be more appropriate to set the GWCL as the GWQS, since there is no meaningful mean and standard deviation for the constituent. However, where a constituent exhibits a rising trend, setting the GWCL as the mean plus two standard deviations is not recommended, because the data is not distributed normally, and it will be just a matter of time before the increasing trend will cause the GWCL to be exceeded, due entirely to natural causes. In such cases, consideration should be given to developing compliance limits based on other factors, such as ratios between the trending constituent and indicator parameters such as chloride.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

List of Figures vii

List of Tables viii

List of Appendices ix

Glossary x

1.0 INTRODUCTION 1

2.0 APPROACH USED AND APPLICATION OF APPROACH TO THE DATA 3

2.1 Summary of Issues to be Addressed and Approach Used 3

2.2 Application of Approach to the Database 4

2.2.1 Thallium 7

2.2.2 Mercury 7

2.2.3 Chromium 8

2.2.4 Arsenic 8

2.2.5 Lead 8

2.2.6 Chloride 8

2.2.7 Sulfate 9

2.2.8 Total Dissolved Solids 9

2.2.9 Unat 10

2.2.10 Gross Alpha 11

2.2.11 Selenium 11

2.2.12 Manganese 11

2.3 Conclusions 13

3.0 SUMMARY OF HISTORICAL OPERATIONS AND ENVIRONMENTAL SETTING 15

3.1 Current Conditions and Operating Status 15

3.2 Tailings Cells 16

3.3 Geologic Setting and Stratigraphy 16

3.4 Hydrogeologic Setting 17

4.0 AVAILABLE SOURCES OF DATA AND METHODS USED TO COMPILE DATA 19

4.1 Requirements for Background Groundwater Quality Report 19

4.2 Data Compilation 20

5.0 QUALITY ASSURANCE EVALUATION AND DATA VALIDATION 22

5.1 Preparation of the Data Set for Statistical Analysis 24

5.1.1 Screen for Negative Values 24

5.1.2 Screen for Zero Values 24

5.1.3 Screen for Truncated Values 25

5.1.4 Screen for Duplicate Records 25

5.1.5 Screen for Inconsistent Units 25

5.1.6 Handling of Non-Detects 25
5.2 Comparison of Reporting Limits to Groundwater Quality Standards 26
5.3 Analytical Methods 27
5.4 Checks for Internal Consistency of the Data 28
6.0 CALCULATION OF STATISTICAL PARAMETERS 29
6.1 Statistical Plots, Outliers, and Extremes 30
6.2 Distributional Testing 31
6.3 Trends in Concentrations 32
6.4 Descriptive Summary Statistics 32
7.0 RESULTS OF STATISTICAL EVALUATION 34
7.1 Structure of Results Analysis 34
7.2 Regression and Kendall Tau Analysis 35
7.3 Comparison of Data with Groundwater Quality Standards 35
7.3.1 Organic Constituents 36
7.3.2 Inorganic Constituents 38
8.0 SPATIAL AND TEMPORAL ANALYSIS 40
8.1 Spatial Variability of Groundwater Quality at the Mill 41
8.2 Conceptual Framework 42
8.2.1 Mineralogy 42
8.2.2 Sedimentary Facies 42
8.3 Water Level Changes 44
9.0 TRACERS OF POTENTIAL GROUNDWATER IMPACT 46
9.1 Anions 47
9.2 Metals 48
10.0 SPATIAL AND TEMPORAL DISTRIBUTION OF INDICATORS OF POTENTIAL IMPACT 51
10.1 Chloride 52
10.2 Fluoride 53
10.3 Sulfate 53
10.4 Gross Alpha 53
10.5 Selenium 54
10.6 Uranium 54
11.0 TESTS FOR CORRELATIONS BETWEEN CHLORIDE AND URANIUM 56
11.1 Combining Uranium and Chloride Concentration Data to Track Potential Impact 56
12.0 CALCULATION OF GWCLS 59

13.0 CONCLUSIONS 60
14.0 REFERENCES 61

List of Figures

Figure 1 Regional Location Map

Figure 2 Groundwater Isopleth Map 2005 Data

Figure 3 Generalized Box & Whisker Plot

Figure 4 Spatial Distribution of Chloroform in 2005

Figure 5 Map of monitoring wells depicting concentrations of total dissolved solids (TDS) present in samples of groundwater collected in 1983 and 2006

Figure 6 Hydrographs for Site Monitor Wells showing groundwater trends with time

Figure 7 Spatial Distribution of Water Level Changes from 1994 to 2001

Figure 8 Map of monitoring wells depicting concentrations of chloride present in samples of groundwater collected in 1983 and 2006

Figure 9 Map of monitoring wells depicting concentrations of fluoride present in samples of groundwater collected in 1983 and 2006

Figure 10 Map of monitoring wells depicting concentrations of sulfate present in samples of groundwater collected in 1983 and 2006

Figure 11 Map of monitoring wells depicting concentrations of gross alpha present in samples of groundwater collected in 1983 and 2006

Figure 12 Map of monitoring wells depicting concentrations of selenium present in samples of groundwater collected in 1983 and 2006

Figure 13 Map of monitoring wells depicting concentrations of uranium present in samples of groundwater collected in 1983 and 2006

Figure 14 Chloride versus Uranium Plots

List of Tables

Table 1 Existing Wells, Monitoring Parameters, Groundwater Quality Standards and Groundwater Compliance Limits

Table 2 Results for All Detected Organic Compounds in DUSA Samples

Table 3 Examples of Data Quality Issues

Table 4 Comparison of DUSA Reporting Limits (1979 to 2005) to Groundwater Quality Standards

Table 5a Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Quality Standard

Table 5b Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit

Table 6 Summary by Well, Year, And Constituent Where Reporting Limit of Non-Detection Exceeded GWQS & GWCL

Table 7 Energy Laboratories Analytical Methods

Table 8 Comparison of Calculated and Measured TDS for Samples with Complete Major-Ion Analysis

Table 9 Charge balance of major cations and anions

Table 10 Field Duplicate Data and Relative Percent Differences

Table 11a Descriptive Summary Statistics for Constituents in Compliance Wells with Greater than 50% Detects

Table 11b Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects

Table 12 Extremes Flagged and Excluded from Trend Analysis

Table 13 Statistically Significant Trending Kendall *Tau* and Regression (R^2)

Table 14 Classification of inorganic constituents in groundwater by observed frequency of detection

Table 15 Summary of the measured concentrations of several key constituents, tailings impoundment solutions

List of Appendices

Appendix A Box and Whisker Plots

Appendix B Probability Plots

Appendix C Linear Regression Plots

Appendix D Histograms

Appendix E List of Removed Data Records

Appendix F Linear Regression Plots with and without Non-detects

Glossary

µg/L	micrograms per liter
CCD	counter current decantation
DOE	U.S. Department of Energy
DUSA	Denison Mines (USA) Corp.
EPA	U.S. Environmental Protection Agency
GWCL	groundwater compliance limit
GWDP	Groundwater Discharge Permit No. UGW370004
GWQS	groundwater quality standard
mg/L	milligrams per liter
msl	mean sea level
Mill	White Mesa Uranium Mill
NRC	U.S. Nuclear Regulatory Commission
pCi/L	picocuries per liter
POC	point of compliance
QA/QC	quality assurance and quality control
TDS	total dissolved solids
UDEQ	Utah Department of Environmental Quality

Background Ground Water Quality Report: Existing Wells for Denison Mines (USA) Corp.'s White Mesa Uranium Mill Site, San Juan County, Utah

1.0 INTRODUCTION

This report on background groundwater quality was prepared to meet the requirements stated in Part I, Section H.3 of Utah Groundwater Discharge Permit No. UGW370004 (GWDP) issued on March 8, 2005, for Denison Mines (USA) Corp. (DUSA), White Mesa Uranium Mill (the Mill). This document will focus on groundwater monitoring wells MW-1, MW-2, MW-3, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, MW-19, MW-26, and MW-32 see Figure 15 for a map showing monitoring well locations. Newly installed monitoring wells have insufficient data to allow meaningful statistical evaluation (MW-3(A), MW-23, MW-24, MW-25, MW-27, MW-28, MW-29, MW-30, and MW-31). Data from samples of groundwater taken from these wells will be the subject of a subsequent report.

The report is organized as follows:

Section 1: This introduction

Section 2: Approach and application of approach to the data

Section 3: Summary of historical operations and environmental setting with a map showing the location of site features and groundwater monitoring wells

Section 4: Description of available sources of data and methods used to compile data into a database format

Section 5: A quality assurance evaluation and description of steps taken to document the validity of data used in statistical analyses

Section 6: Calculation of statistical parameters

Section 7: Results of statistical analyses

Section 8: Spatial and temporal analyses

Section 9: Tracers of potential groundwater impact

Section 10. Spatial and temporal distribution of indicators of potential impact

Section 11. Tests for correlations between chloride and uranium

Section 12. Calculation of Groundwater Quality Compliance Limits (GWCLs)

Section 13. Conclusions

Section 14: References

Figures and tables follow Section 14. Statistical plots are included in Appendix A - Box and Whisker Plots, Appendix B - Probability Plots, Appendix C - Linear Regression, and Appendix D - Histograms. Time concentration trends were evaluated using a number of statistical procedures as described in subsequent sections. Graphs illustrating data trends over time for each parameter in each well are presented in Appendix C. Compiled data is included on a compact disc. Appendix E contains a list of removed data records. Linear regression plots with and without non-detects are presented in Appendix F.

2.0 APPROACH USED AND APPLICATION OF APPROACH TO THE DATA

2.1 Summary of Issues to be Addressed and Approach Used

The Mill is an existing facility that has been in operation since 1980 (see Section 3.0 of this report for a discussion of the Mill, its historical operations, and environmental setting). It is therefore important that care be taken in reviewing historic groundwater monitoring data to ensure that monitoring results to be used to determine background groundwater quality at the site have not been impacted by Mill activities. Further it is necessary to determine what parameters within the monitoring data set may allow early identification of uranium milling–related groundwater impacts so that responsible and expeditious corrective actions can be undertaken, while screening out spatial and temporal patterns and identifying impacts from sources over which DUSA has no control and no responsibility or ability to abate.

It is well established that groundwater in the perched zone at the Mill site is highly variable. That is why the monitoring program set forth in the GWDP is on an intra-well basis.

There are also natural forces that have resulted in upward and downward trends in a number of constituents in groundwater at the Mill site, as well as upgradient and far downgradient of the Mill site itself. See Table 13 for a listing of all statistically significant trends. The existence of such trends both upgradient and far downgradient of the Mill site is evidence that such trends can result completely from natural causes. See Section 8.0 below for a discussion of the natural influences that can be at play at the site.

Because water quality varies naturally from well to well and natural influences have caused increasing and decreasing trends at the site, it is not possible to conclude that an upward trend in a constituent necessarily represents an impact from milling activities. Rather, each upward trend must be evaluated to determine whether it has been caused by natural influences or by Mill activities.

In evaluating the historic data, we have used the following approach:

- Based on an analysis of indicator parameters (see Sections 9.0 and 10.0), if historic data for a constituent in a well do not demonstrate a statistically significant upward trend, then the mean of that data is accepted as representative of background, regardless of whether or not the mean exceeds the state groundwater quality standard (GWQS) for that constituent (see Table 1 for a listing of the GWQS for each groundwater

monitoring constituent under the GWDP). Accordingly, the mean plus two standard deviations calculated from that data can be used in most cases to determine the GWCL for that constituent in that well under the GWDP. This is because the monitoring results for the constituent have been consistently representative since commencement of Mill activities; and

- If historic data for a constituent in a monitor well represent a statistically significant upward trend, then that data is further evaluated to determine whether the trend is the result of natural causes or Mill activities. If it is concluded that the trend results from natural causes, then the mean plus second standard deviation calculated from that data may be used to determine the GWCL for that constituent in that well, although, as discussed in Sections 12, such an approach is not recommended. Rather, the alternative approaches discussed in that Section would be more appropriate.

As will be discussed in detail below, after applying the foregoing approach, we have concluded that there have been no impacts to groundwater from Mill activities. There have been some detections at the Mill site of chloroform and related organic contamination, which is the subject of a separate investigation, but that contamination is the result of pre-Mill activities (see Section 7.3.1 for a discussion of organics detected at the site).

2.2 Application of Approach to the Database

The database that was assembled from historic monitoring results is large, representing over 19,000 data entries (See Section 4.0). After performing a quality assurance evaluation and data validation of the existing and historical on-site groundwater quality data in accordance with the requirements of Part I.H.3 of the GWDP (See Section 5.0), a database consisting of historical groundwater monitoring data was developed. See Section 5.0 for a discussion of the quality assurance and quality control (QA/QC) issues that were addressed in assembling the database.

From that database, a mean and standard deviation for each constituent in each well were calculated (See Tables 11a and 11b for a listing of each mean and standard deviation and comparisons to the respective GWQS, as well as the discussions in Section 6.0). Tests for normality were also performed (See Section 6.2).

Linear regression analyses were performed on each constituent in each well as well as analysis for trends using Kendall *tau* analysis. Linear regression plots for those constituents with at least eight valid data points are set out in Appendix C. Rising trends identified by either method

were flagged in Table 2.2-1 for further investigation. See Section 6.0 for a full discussion of the statistical approaches used in this report.

The following table sets out those constituents that have a mean in excess of the state GWQS and/or demonstrate a statistically significant upward trend and therefore require further evaluation. It should be noted that we have included in the following table all trends that are statistically significant, even though they may contain a slight trend or an R^2 value that approaches zero. [1] All other constituents have means that are less than their respective GWQS and do not demonstrate increasing trends. For those constituents, the mean and standard deviation set out in Tables 11a and 11b can generally be used to derive GWCLs under the GWDP, without further evaluation. [2]

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

The significance of a correlation coefficient of a particular strength or fit will change depending on the size of the sample from which it was computed. In this report, linear regression trends are considered to be statistically significant if there are enough data points to make a determination and enough of those points fall within the calculated variance of the data set. An ANOVA analysis of the data was performed in order to determine whether the association between the variables is statistically significant at the 95 percent level. In Appendices C and F, significant regressions are noted by red R^2 value.

[2] As will be discussed below, in some cases where the mean exceeds the GWQS due to changing reporting limits over time, it may be more appropriate to use the GWQS as the GWCL.

Table 2.2-1

Constituents Requiring Special Evaluation

Monitoring Well	Constituents That Have a Mean in Excess of the Applicable GWQS[1]	Constituents that have a Statistically Significant Increasing Trend[2]
MW-1 (upgradient well)	Thallium	Mercury
		Chromium
		Sulfate
MW-2		Chromium
		Sulfate
		TDS
MW-3 (far downgradient well)	Thallium	Mercury
	Gross Alpha	Selenium
	Manganese	Unat
MW-5	Thallium	Mercury
		Chromium
MW-11	Thallium	Chloride
		Manganese
		Sulfate
		TDS
		Mercury
MW-12	Thallium	Unat
		Mercury
MW-14	Gross Alpha	Unat
	Manganese	Arsenic
	Unat	Selenium
	Thallium	
MW-15	Gross Alpha	Selenium
	Unat	Unat
	Thallium	Chromium
		Manganese
MW-17		Unat
		Arsenic
MW-18 (upgradient well)	Thallium (<8 data points)	Sulfate
		Arsenic
		Selenium
		Unat
MW-19 (upgradient well)	Lead (<8 data points)	Selenium
		Arsenic

Monitoring Well	Constituents That Have a Mean in Excess of the Applicable GWQS[1]	Constituents that have a Statistically Significant Increasing Trend[2]
MW-26	Manganese	
MW-32	Manganese	Manganese
		Selenium
		Unat

Notes

1. Taken from Tables 11a and 11b, extremes excluded.
2. Taken from Appendix C and includes all positively sloped regression lines, regardless of slope and magnitude of R^2, provided that there is a sufficient number of data points to result in a statistically significant determination. In performing the regression analyses, extremes were excluded.

Each of the constituents included in Table 2.2-1 is discussed in turn in the following sections:

2.2.1 Thallium

Most of the data for thallium in all wells indicated in Table 2.2-1 represent non-detects. As discussed in Section 5.1, all non-detects are included in the database as one-half of the reporting limit used at the time the sample was taken, in accordance with U.S. Environmental Protection Agency (EPA) guidance. The mean of the thallium data exceeds the current GWQS in the wells indicated in Table 2.2-1 because the reporting limits used historically have exceeded the current GWQS. See Appendix F for plots of regression lines for thallium and other constituents in the various wells (three separate plots, with the first showing the full data set, the second showing just the non-detects and the third showing just the detects). In this circumstance, we recommend that the GWCL for thallium in all wells be set at the current GWQS.

2.2.2 Mercury

As is evident from a review of the two sets of regression plots for mercury in Appendix F, all of the data points for mercury for all wells are non-detects. There have been no detects for mercury in any wells at the site. The statistically significant rising trends in some wells have resulted solely from changes in the reporting limits over time. As discussed above, all non-detects are included in the database as one-half of the reporting limit used at the time the sample was taken. If the reporting limit increases over time, a trend will be exhibited in the data even though no detections were recorded. In this circumstance, we recommend that the GWCL for mercury in all wells be set at the current GWQS rather than the mean values.

2.2.3 Chromium

As is evident from a review of the three sets of regression plots for chromium in Appendix F, the data points for chromium for most wells are non-detects. The statistically significant rising trends in some wells have resulted solely from changes in the reporting limits over time. As discussed above, all non-detects are included in the database as one-half of the reporting limit used at the time the sample was taken. If the reporting limit increases over time, a trend will be exhibited in the data even though no detections were recorded. In this circumstance, we recommend that the GWCL be set at the current GWQS rather than the mean values.

2.2.4 Arsenic

As is evident from a review of the three sets of regression plots for arsenic in Appendix F, the regression analyses for arsenic are highly influenced by non-detects. As a result, the statistically significant rising trends in some wells have been caused by changes in the reporting limits over time. For example, all of the data points for arsenic in MW-18 and MW-19 are non-detects. Most of the data points in MW-14 and MW-17 are non-detects. In these circumstances, we recommend the GWCL for arsenic in all wells be set at the GWQS.

2.2.5 Lead

At the time this report was prepared, there were fewer than eight data points for lead in MW-19. All of the data for lead in MW-19 represent non-detects, other than one data point at 86 micrograms per liter (µg/L). The GWQL for lead is 15 µg/L. This one detection would appear to be an outlier and not representative of the groundwater. More sampling data is required. In any event, MW-19 is upgradient of the Mill site, and any lead found in that monitoring well must be due to natural background influences. In this circumstance, we recommend that the GWCL for lead in MW-19 be calculated after further sampling data has been collected.

2.2.6 Chloride

As discussed in Section 9.0, chloride is considered the most mobile constituent in groundwater and the best indicator parameter of tailings cell leakage. An increasing trend in chloride would be expected in the event of groundwater impact by tailings seepage. There is only one statistically significant increasing trend in chloride among all monitoring wells at the site (MW-11), and the R^2 of 0.06 is approaching zero. This R^2 value indicates that the regression line has little predictive capability and explains only 6 percent of the data. Note that if 1983 data were ignored (communication with Mill site personnel who were present during well

installation suggests that wells were flushed with fresh water for development, yielding groundwater concentrations which were non-representative of the conditions at the Site), the regression trend would still be significant, but the R^2 would be slightly less than zero. In addition, there is no evidence of an increasing trend in fluoride, the next best indicator parameter, in MW-11 (see Section 9.0 for a discussion of indicator parameters). For these reasons, the chloride data from samples of groundwater in MW-11 cannot be considered evidence of milling impact.

2.2.7 Sulfate

There are slight upward trends in sulfate in MW-1 and MW-2, represented by R^2 values of 0.10 and 0.12, respectively. These R^2 values explain less than 12 percent of the sulfate measurements in samples of groundwater from these wells and both are among the better examples of the results that could be expected if monitor wells were developed using fresh water (see Appendix C – Regression Plots) . Among the lowest values ever recorded are the first sampling events after well installation and then values rise and stabilize at higher values over the next year or more. Note that other wells display the same pattern. For example MW-3, which is far downgradient, has the same type of pattern in time concentration plots.

There is also an increasing trend in sulfate in MW-11, represented by an R^2 value of 0.34. While still low, this R^2 value suggests a better fit of the regression plot to the data than is the case with MW-1 and MW-2. However, the most significant increasing trend in sulfate is in upgradient well MW-18, which has an R^2 of 0.50. Sulfate is a good indicator parameter for tailings cell leakage although, due to its prevalence in the natural formations, it is not considered as good an indicator parameter as chloride (See Section 9.0). The fact that the most pronounced increasing trend in sulfate at the Mill site is in upgradient well MW-18 is strong evidence that the other increasing trends in sulfate at the Mill site are also due to natural causes. This is supported by the fact that there are no supportable increasing trends in chloride or fluoride at the Mill site.

2.2.8 Total Dissolved Solids

There is an upward trend in total dissolved solids (TDS) in MW-11. This is to be expected given the increasing trend in sulfate in that monitoring well and since sulfate constitutes the largest component of TDS. Because we have concluded that the increase in sulfate is due to natural causes, we also conclude that this increasing trend in TDS in MW-11 is attributed solely to natural causes.

2.2.9 Unat

There are statistically significant increasing trends in uranium in MW- 12, MW-18, MW-3, MW-14, MW-15, MW-17, and MW-32. These will be addressed in turn:

- The R^2 for the regression analysis for MW-12 is 0.08, which is not considered to represent a meaningful fit to the data. Therefore, we do not consider there to be a meaningful increasing trend in uranium in that monitor well.

- The most dramatic and significant increasing trend in uranium at the site is in upgradient well MW-18, which has a relatively steep slope and an R^2 of 0.88. This is conclusive evidence that natural forces at the site are causing increasing trends in uranium. See Section 8.0 for a discussion of possible natural influences at the site.

- The R^2 for the regression analysis for MW-3 is 0.31, which suggests a moderate fit of the regression plot to the data. Since MW-3 is far downgradient of the site, we consider MW-3 to be a good representative well for natural background water quality at the site at this time. It is extremely unlikely that tailings solutions over the last 30 years could have impacted MW-3, which is some 3,000 feet downgradient of the tailing cells, without significant impacts having been observed at the other much closer monitoring wells. An increasing trend in uranium in MW-3, along with the increasing trend in MW-18, supports our conclusion that natural forces are causing increasing uranium trends across the site.

- There are increasing trends in uranium in MW-14, MW-15, and MW-17, with R^2 values of 0.25, 0.14 and 0.28, respectively. These R^2 values represent moderate fits for MW-14 and MW-17 and a poor fit for MW-15. However, there are no increasing trends in chloride or fluoride in any of those wells, which would be expected if these rising trends in uranium were caused by seepage of tailings solutions (see Section 9.0). In fact, one would expect to see a close correlation between chloride and uranium in all samples if the groundwater is being impacted by tailings solutions. It is evident from the correlation plots in Figure 14 that no correlation exists between chloride and uranium in any of these wells. In some circumstances, uranium may approach the mobility of chloride in groundwater, but it cannot exceed it. It is therefore not possible for uranium to be trending upwards in these wells, without a corresponding and linked increase in chloride. This fact, together with the fact that uranium is increasing significantly in upgradient well MW-18 as well as in far downgradient well MW-3 (which also is not

associated with increasing chloride) is conclusive proof that the uranium trends in these wells are not being impacted by Mill activities.

2.2.10 Gross Alpha

The mean gross alpha in MW-3, MW-14, and MW-15 exceed the GWQS, but are not associated with statistically significant upward trends in any of those wells. MW-3 is also far downgradient from the Mill site and is therefore unlikely to have been affected by Mill operations to date. As a result, the concentrations of gross alpha in MW-3, MW-14 and MW-15 are attributed solely to natural causes.

2.2.11 Selenium

Selenium is common across the site. However, while the means calculated from historical data for the wells do not exceed the GWQS for selenium, a number of rising trends require further analysis. As indicated in Appendix C, statistically significant increasing trends in selenium are suggested in MW-3, MW-14, MW-15, MW-18 and MW-19. On a review of the three sets of plots for selenium in Appendix F, it is evident that the upward trends in selenium in MW-14 and MW-18 are caused by non-detects and the changing reporting limits over time. The trends in selenium in those wells should therefore be ignored. This leaves statistically significant increasing trends in selenium in upgradient well MW-19, far downgradient well MW-3 and in MW-15, with the most significant of these being in upgradient MW-19 with a significant slope and an R^2 of 0.41. Combining the fact that increasing trends in selenium are found in both upgradient and far downgradient monitoring wells with the fact that there is no increasing trend in chloride in any of these wells, we conclude that the increasing trends in selenium in MW-19, MW-3, and MW-15 are due to natural causes and not Mill activities.

2.2.12 Manganese

Table 2.2.1 indicates that the average manganese concentration exceeds the GWQS in groundwater samples from the following monitor wells: MW-14, MW-3, MW-26 and MW-32. The manganese concentration in a 1981 sample from far downgradient monitor well MW-3 was 3590 µg/L. Since that time, concentrations in samples from MW-3 have exhibited a significant decreasing trend (R^2=0.61) such that analysis results from the most recent sampling event returned a value of 630 µg/L. The high manganese value in 1981 occurred long before any tailings seepage could have infiltrated to groundwater and traveled more than three quarters of a mile in the subsurface to impact this well. Thus, declining manganese concentrations at this

location must have a source other than tailings seepage and should be considered background or baseline to the site.

Since manganese sampling began at MW-14 in 1991, concentrations in samples have remained relatively constant in a range from a low at the current value of 1650 µg/L to a high of 2110 µg/L in 2005. This range of values, considerably lower than early values of over 3000 µg/L in MW-3, and the consistency of MW-14 manganese concentrations over 15 years of record indicate that these concentrations are also background/baseline to the site.

Although the mean manganese concentration in MW-26 exceeds the GWQS, there is not a significant upward rising trend (R^2=0.0006) (Appendix C). Lack of a rising trend and consistently elevated concentrations of manganese indicate that the manganese in MW-26 is baseline for the site.

Manganese concentrations in groundwater samples from MW-32 exhibit a significant upward trend (R^2=0.54) from 3740 µg/L in results from the first sampling event in February of 2005 to 4680 µg/L in results from the most recent sampling event (June 2006). MW-32 is located a short distance downgradient of identified elevated chloroform concentrations. Manganese has been cited as an electron acceptor during the biodegradation of chlorinated solvents (Wilson, 1996). Microorganisms feed on the energy released from removal of electrons from the chlorinated solvent and their transfer to electron acceptors. Such a transfer would result in the reduction of relatively immobile oxidized manganese (IV) to more mobile reduced manganese (II). Such a process may explain rising the manganese trend in groundwater samples from MW-32.

Significant rising manganese trends also occur in monitor wells MW-11 and MW-15; however, concentrations of manganese in samples from these wells are orders of magnitude below concentrations found in samples from MW-32 (see Appendix C - Regression Plots). Furthermore, the rising trend in MW-11 is anchored by one data point in 1983 and all other data is from 2005/2006. There is no trend in the 2005/2006 data. The trend at MW-15 consists entirely of non-detects with the exception of one 11 µg/L detection in 2006 with a detection limit of 10 µg/L. Further, there are no upward trends in chloride or fluoride in any of these wells. For these reasons, we conclude that upward trends in manganese are not caused by activities at the Mill.

2.3 Conclusions

For all cases where the mean of a constituent is less than its respective GWQS and there is no evidence of an increasing trend in the constituent, the mean can be accepted as natural background and the GWCL under the GWDP set as the mean plus two sigma.

For all cases where the mean of a constituent exceeds its GWQS and there is no evidence of an upward trend, the mean can be accepted as natural background, and the GWCL under the GWDP can be set as mean plus two sigma. In cases where the exceedance is caused solely by changing reporting limits over time, it may be more appropriate to set the GWQS as the GWCL.

Even though there are a number of increasing trends in various constituents at the site, we have concluded that none of these trends are caused by Mill activities, for the following reasons:

- Chloride is unquestionably the best indicator parameter, and there are no significant trends in chloride in any of the wells (we do not consider the slight trend in chloride in MW-11 to be significant, due to its extremely low R^2 of 0.006). Fluoride is the next best indicator, and there are no increasing trends in fluoride at the site.

- There are no correlations between chloride and uranium in wells with increasing trends in uranium. It is inconceivable to have an increasing trend in any other parameter caused by seepage from the Mill tailings, without a corresponding increase in chloride.

- There are significant increasing trends upgradient in MW-18 in uranium, sulfate, and selenium and in far downgradient in MW-3 in uranium and selenium. This provides very strong evidence that natural forces at the site are causing increasing trends in these constituents in other wells and supports the conclusion that natural forces are also causing increasing trends in other constituents as well.

As discussed in Section 12.0, because the Mill site exhibits naturally increasing and decreasing trends in constituents in groundwater, the mean plus two sigma approach for determining compliance at the site will not be appropriate for upward trending constituents. First, in most if not all such cases, the monitoring results are not normally distributed, which brings into question the use of non-parametric statistics. Second, as the natural concentrations of these constituents in these wells are changing over time, it will be just a matter of time before an absolute standard, such as the mean plus two standard deviations, will be violated due solely to natural causes. Further thought should be given to using ratios of constituents to one or more

indicator parameters, such as chloride, as a more appropriate means of determining compliance at the Mill site for such upwardly trending constituents.

3.0 SUMMARY OF HISTORICAL OPERATIONS AND ENVIRONMENTAL SETTING

The Mill is a permitted uranium mill with a vanadium co-product recovery circuit, located within the Colorado Plateau physiographic province approximately 5 miles south of the city of Blanding, Utah (Figure 1). Mill construction began in 1979, and conventionally mined uranium ore was first processed in May 1980. Over its 25 year operating history the Mill has processed over 4 million tons of conventionally mined and alternate feed uranium ores for the recover of 25 million pounds of U_3O_8 and 34 million pounds of vanadium to date.

Uranium ore is received at the Mill and stockpiled for processing. The ore is initially fed to an 18-foot diameter semiautogenous mill and then stored in slurry form in one of three pulp storage tanks. The Mill utilizes a two-stage leach process where overflow solution from the No. 1 counter current decantation (CCD) thickener is combined in an "acid kill" step with feed from the pulp storage tanks. The slurry from this first stage leach is separated in the pre-leach thickener, with the solids going to the second stage leach and the clarified solution going to the solvent extraction circuits. Concentrated sulfuric acid, steam, and sodium chlorate oxidizer are added in the second stage leach. This slurry is subsequently fed to the eight-stage CCD circuit where the underflow is discharged to tailings. The overflow from the CCD circuit is fed to the uranium solvent extraction circuit where the uranium is purified and removed from the solution. For uranium ores which also contain vanadium, the waste solution, or raffinate, from the uranium solvent extraction is fed to the vanadium solvent extraction circuit where the vanadium is removed from the solution. The solution remaining after the vanadium is removed is discharged to the tailings. If no vanadium is present in the ores, the solution remaining after the uranium is removed is discharged to the tailings.

The uranium and vanadium which are purified in the respective solvent extraction circuits are precipitated, dried and packaged.

3.1 Current Conditions and Operating Status

The Mill was in standby status from November 1999 to April 2002. During the standby period, the Mill received and stockpiled alternate feed materials from the Ashland 1 and Linde formally utilized sites remedial action program sites, as well as other sources of alternate feed materials.

During the period from April 2002 to May 2003, the Mill processed 266,690 tons of alternate feed materials. Subsequently the Mill entered standby mode but continued to stockpile alternate feed materials.

The Mill is currently operating, having commenced operations in March 2005, with the processing of Cameco alternate feed materials. During this Mill run other alternate feed materials currently in stockpile will also be processed. DUSA expects to commence processing conventionally mined ores in the first quarter of 2008.

3.2 Tailings Cells

Three flexible membrane-lined cells, Cells 1, 2, and 3, are used to contain tailings. A fourth cell, Cell 4A, does not currently contain any tailings solids, although it did contain some crystallized residue from tailings solutions that were placed in the cell in 1990. The cell had not been used since 1990 and, as a result, damage occurred to the seams in the liner due to thermal stress from years of exposure to full sunlight. DUSA removed the crystals from Cell 4A, deposited them in Cell 3, and is in the process of relining Cell 4A. Cell 4A will provide an additional 2,000,000 tons of capacity. The environmental statement for the Mill contemplates the construction of three other 40-acre tailings cells in addition to Cell 4A to provide a tailings capacity for the Mill of over 10 million tons.

The Mill conducts on-going tailings reclamation by the following processes. As each tailings cell is filled with tailings, solutions are separated from tailings solids and pumped to the evaporation pond. Tailings solids are allowed to dry in place. As each cell reaches final capacity, reclamation will begin with the placement of interim cover over the tailings. As additional cells are excavated, the overburden is used to reclaim previous cells. This sequential reclamation process is intended to reduce total reclamation time and reduce potential for impact to human health and the environment.

3.3 Geologic Setting and Stratigraphy

The Mill is located near the western edge of the Blanding Basin within the Canyonlands section of the Colorado Plateau physiographic province. Broad, generally horizontal uplift and subsequent erosion have produced topography consisting of high plateaus, mesas, buttes, monuments, and deep canyons incised into the relatively flat-lying Mesozoic and Paleozoic sedimentary rocks.

Northeast of the Mill site, igneous intrusions forming the core of the Abajo Mountains have disturbed the classic flat-lying Colorado Plateau stratigraphy, resulting in uncharacteristic local folding and faulting of sedimentary rocks. The Abajo's rise to more than 11,000 feet above mean sea level (msl), and have likely provided a source of sediments to the Mill site (5,600 feet above msl) during intrusion and disturbance of older rocks.

Quaternary deposits overlie the sequence of Mesozoic rocks present in the region. The Cretaceous Mancos Shale and Dakota Sandstone represent the local top of the Mesozoic section in the region and are underlain by the Lower Cretaceous Burro Canyon Formation. This unit is underlain in turn by the Jurassic Morrison Formation (includes the Brushy Basin, Westwater Canyon, Recapture, and Salt Wash Members), Summerville Formation, Entrada Sandstone, and the Navajo Sandstone. The Navajo is underlain by the Jurassic Kayenta Formation, which in turn is underlain by Triassic Chinle and Moenkopi Formations. Paleozoic sedimentary rocks underlie these Mesozoic units.

Cretaceous geologic units that stratigraphically overlie the Burro Canyon Formation regionally (Mancos Shale and Dakota Sandstone) have been removed by erosion in the vicinity of the Mill. Thus, the lower Cretaceous Burro Canyon Formation (already present during the Mid-Tertiary Albajo igneous intrusive event) is directly overlain by Quaternary deposits at the Mill site. The Quaternary colluvial/alluvial sediments are typically coarse-grained deposits that contain little water. The Burro Canyon Formation is described as interbedded conglomerate and grayish-green shale with light-brown sandstone lenses deposited in a fluvial environment (Aubrey, 1989). The average thickness of the unit is approximately 75 feet (U.S. Department of Energy [DOE], 2004).

3.4 Hydrogeologic Setting

The Burro Canyon Formation hosts the uppermost occurrence of groundwater at the site. Groundwater in this unit is perched (i.e., isolated from groundwater that occurs in geologic units that underlie the Burro Canyon Formation). Perched water is supported by the relatively impermeable, underlying, fine-grained Brushy Basin Member of the Morrison Formation. The permeability of the Burro Canyon Formation is generally low. Some conglomeratic zones may exist east to northeast of the tailings cells, potentially explaining a relatively continuous zone of higher permeability. The saturated thickness of the perched groundwater zone ranges from approximately 82 feet in the northeast portion of the site to less than 5 feet in the southwest portion of the site (DOE, 2004). Groundwater isopleths based on water level data collected in June 2005, (Figure 2) indicate that flow in the perched zone is generally from northeast to

southwest, although in the eastern portion of the site the gradient has a more southerly component.

Groundwater in the regional Entrada/Navajo aquifer is under artesian pressure (upward flow gradient) providing a hydrologic barrier to any potential seepage from overlying geologic units. Perched groundwater within the Burro Canyon Formation is characterized by low yields and is generally of poor quality (contains moderate to high concentrations of chloride, sulfate, and TDS (Hunt, 1996).

4.0 AVAILABLE SOURCES OF DATA AND METHODS USED TO COMPILE DATA

Although the Mill is designed as a facility that does not discharge to groundwater, DUSA is subject to the GWDP issued by the Utah Department of Environmental Quality (UDEQ), which specifically tailors the implementation of state groundwater regulations to the Mill site. Utah requires that every operating uranium mill in the state have a groundwater discharge permit, regardless of whether the facility discharges to groundwater or not.

4.1 Requirements for Background Groundwater Quality Report

Part I, Section H.3 of the GWDP specifies the following requirements for the background groundwater quality report for the existing wells:

- Compilation of all available groundwater quality data for all existing wells at the facility
- Evaluation and validation of existing and historic on-site groundwater quality data. The evaluation and validation includes:
    - Identification of records containing zero concentration values and either deleting those values from the data set or providing justification for including them;
    - Evaluation of the adequacy of minimum detection limits used, particularly with respect to the corresponding GWQS for each contaminant;
    - Determination of the adequacy of laboratory and analytical methods used;
    - Determination of the consistency of laboratory units of reporting; and
    - Evaluation of internal consistency between specific and composite types of groundwater quality data (e.g., charge balance of major ions and/or equivalence of measured and calculated TDS, if all major ions are reported), and identifying data that are inconsistent
- Description of methods used in statistical analysis including any special statistical needs for management of data sets with a large proportion of non-detectable values
- Provide descriptive summary statistics for each well and contaminant listed in Table 2 of the GWDP
- Conducting distributional testing for each specified well and contaminant, and justify the use of parametric or nonparametric statistical methods for each

- Evaluate temporal and spatial groundwater quality to determine if there are trends or significant changes over time or with distance across the site.

4.2 Data Compilation

Analytical data for groundwater were compiled from hard-copy reports, electronic reports, and spreadsheet files. Available sources included the Mill's semi-annual effluent reports to regulatory agencies (compiled from 1981 through March 2006), split sampling reports documenting joint DUSA-UDEQ sampling events (compiled from May 1999, November and December 2000, November 2001, and September 2002), and background groundwater and DMT monitoring reports under the GWDP from the first quarter of 2005 through the second quarter of 2006. Other documents from which data were obtained are the Mill groundwater background (D'Appolonia, 1981), point of compliance (POC), and hydrologic evaluation (Titan, 1994) reports; the groundwater POC report (Dames and Moore, 1978), 2000 DUSA groundwater background studies, and 2001 to 2004 UDEQ results from four split sampling periods.

All available groundwater concentration data from 1979 through the second quarter of 2006 were compiled into one database (Appendix 1, data compact disc). Integrating different sources into a single database was a logistical challenge because analyses were performed by different laboratories over the years using various methods and reporting protocols.

Table 1 lists the existing wells and monitoring parameters evaluated in this report. This table also provides the associated GWQS and groundwater compliance limits (GWCL) specified for each well and parameter in Table 2 of the GWDP.

Table 2 of this report lists organic constituents reported as detected concentrations. See Section 7.3.1 for a discussion of organic constituents.

Compiled groundwater quality data include chemical concentrations, field measurements (such as pH), and other variables listed below. There are approximately 19,000 records containing 30 fields that were populated where information was available. All information has been compiled in a standard database format ("flat files") as a table in Excel. Each record includes the following elements (if data were available):

- Monitoring well identification
- Sampling date
- Analyte name and parameter code

- Analytical result and the log of the result
- Result qualifier (U=non-detected, J=detected, but not quantifiable, D=reporting limit increased due to sample matrix interference, B=detected in blank)
- Detection limit (or detectable activity), reporting limit, or practical quantitation limit
- GWCL from permit
- Units of measurement
- Sampling method (BAIL, PERIPUMP, MICROPG)
- Laboratory name or identification of field measurement
- Analytical method
- Date of analysis
- Validation (if performed)

5.0 QUALITY ASSURANCE EVALUATION AND DATA VALIDATION

Information on quality of data is critical to decisions that have to be made to protect human health and the environment. As an example, analyses of samples collected in 1981 and 1982 and during the period from 2000 to 2002 report concentrations of total suspended solids as high as 360 mg/L. This may indicate improper filtration in the field and could result in artificially elevated metals concentrations. In addition, it is unclear whether other data within the data set were filtered or unfiltered and, in the absence of Mill site knowledge from as many as 25 years ago, it may be difficult to determine. As a result, the presence of aluminum, iron, or manganese at concentrations greater than 50 µg/L (0.05 mg/L) should be viewed with caution and may indicate the potential for overestimating concentrations of trace metals, which are known to adsorb on colloids and suspended particulates of the oxi-hydroxides formed from these metals.

Information on recent sampling protocols and practices is described in Section 2.6 of the facility Groundwater and DMT Performance Standard Monitoring Report submitted to UDEQ on August 31, 2005. Documentation of recent protocols and practices indicates a strong commitment to improved sampling and analysis techniques on the part of DUSA and its field personnel.

Documentation of the QA/QC procedures for older samples is sparse. Further, while descriptions of data validation procedures can be found in various reports, it was unclear which data had undergone full validation because electronic data deliverables were not available and few validation flags or qualifiers were included in the reports from which the data were collected. Therefore, this assessment also includes a review of the compiled data for inconsistencies and calculations to check for internal consistency of the data. If more information that is complete becomes available, it should be incorporated into the database and considered in future revisions of this report.

Examples of data quality issues identified are presented in Table 3, and a discussion of these issues follows. Uranium data points for several wells over a period in 1999/2000 were reported as 0.0003 µg/L, which was the reporting limit for uranium. After careful review of the database, it was determined that, due to these and other errors mentioned in Table 3, uranium should be re-entered in its entirety from the available hard copy laboratory reports dating back to 1980.

During the re-entry of uranium data, other inconsistencies became apparent. Early lab reports show laboratory-generated data with hand-written values for uranium activity, and uranium type (i.e. U_3O_8 or U). In many cases, the detection limit was not included in the lab report. This creates a problem when non-detects are reported, because the EPA requires use of half the detection limit in place of non-detects for statistical analysis. In instances where there is a less-than value for the non-detect, that value is assumed to be the detection limit (i.e. <1.0, 1.0 is assumed to be the detection limit).

There were several instances where the detection limit for uranium was in mass (mg/L) and the value was reported in activity (picocuries per liter [pCi/L]). This suggests that the lab determined the value of uranium in mass then converted the mass value to activity assuming secular equilibrium. However, there was nothing found in the records to document this, other than personal communications indicating that the Mill in-house lab (variably known as Wamco, Energy Fuels Nuclear, UMETCO, and CORE) did not have the capability to count U activity and therefore the activity results from that lab were converted from mass.

Other early uranium data reported "uranium as U" values as mg/L, and "uranium as U_3O_8" values were reported in µg/L. All units were converted to µg/L for statistical analysis and comparison. When these values reported in mg/L were converted to µg/L, the values were three orders of magnitude greater than the surrounding and subsequent values in the data set. This is most likely a laboratory reporting error. There were several lab reports that reported uranium as U with a hand-written "$_3O_8$"after the U. Where this issue could not be resolved by additional supporting information to indicate which atomic mass was represented, the U_3O_8 data was removed from the statistical evaluation.

Much uranium data were not distinguished as being total or dissolved. We assumed all uranium data were dissolved unless otherwise noted as total. This assumption was based on groundwater sampling protocol at the Mill and discussions with DUSA personnel who were familiar with the sampling program.

In addition to these data quality issues, there are several monitoring reports for which there are no corresponding laboratory reports. While these data are presented in tables within the historic reports, they cannot be verified (we cannot be sure how the values were obtained). Therefore, these data were excluded from statistical evaluation.

These data quality issues are not unique to the Mill but are typical of environmental data collected over long periods. Methods of analysis have improved during the period of record and

compliance standards have followed improved detection limits to lower values. At the same time, most members of the public, including mine and mill operators, have incorporated an increased awareness of environmental issues as we deal with a legacy of previous practices that were acceptable in a less populous environment. Although early data collection and reporting procedures do not meet today's standards, they were the product of the best understanding of the time and were widely used by investigators to characterize many types of environmental concerns.

5.1 Preparation of the Data Set for Statistical Analysis

In order to perform meaningful statistical analysis, various data quality issues, some of which are listed in Part I, Section H.3 of the GWDP, had to be addressed. With the intent of providing a traceable analysis methodology, an untouched version of the complete data set was maintained for reference, while separate worksheets for statistical analysis were prepared using the following steps.

5.1.1 Screen for Negative Values

First, the data set was screened for negative values. If a negative value was related to a radiological analyte, the value was retained since a negative result is possible with radiological analysis. In some cases it was apparent that a minus sign was used to indicate a result was "less than" a minimum detection limit when the result was associated with a "U" qualifier (non-detect) and the result was the same magnitude as the detection limit. In this case, the minus sign was removed and the result and qualifier were retained. If no qualifier or detection limit was indicated, the data point was removed from analysis and placed in a table containing all removed data points (Appendix E).

5.1.2 Screen for Zero Values

In the next step, the data set was screened for zero values. Again, if a zero value was associated with a radiological analyte the value was retained. If the zero was associated with a non-radiological analyte with a detection limit and a "U" qualifier, it was replaced with one-half the detection limit. Analyte concentrations of "0" with no associated reporting or detection limit were removed from analysis and placed in a table containing all removed data points.

5.1.3 Screen for Truncated Values

Integer values were examined for the potential of representing truncated data. This circumstance with questionable significant figures can reveal a problem with reporting units. For example, a U-natural concentration of 5 mg/L was reported and inspection of surrounding values indicated a more likely value of 0.005 mg/L (5 μg/L). When it was possible to identify a truncated value, the non-truncated version of the value was used (0.005 μg/L instead of 5 mg/L).

5.1.4 Screen for Duplicate Records

If identical sampling dates for the same constituent and the same well were noted containing similar but different results, the entries were considered duplicate samples. When it was possible to identify duplicate samples, the average of the results was used in place of the two separate results. An exception to this rule was if one of the values represented an outlier or extreme value. The value was then treated according to the outlier/extreme procedure described below. When duplicate records having the same sampling date and identical results were identified, one of the records was deleted, assuming that one of the values was a duplicate entry.

5.1.5 Screen for Inconsistent Units

Over the entire sampling record, some data sets contained different reporting units for the same analyte. In some cases, some results appeared to be in one unit while the detection, reporting, or practical quantization limits were stated in another unit. In order to make adequate comparisons to the monitoring requirements of the GWDP, this discrepancy was examined and, if the correct value could be confirmed by inspection of similar values from the same laboratory, units were converted to match the units for each analyte within the GWQS and GWCL listed in Table 2 of the GWDP. Otherwise, the data were excluded from statistical analysis. If such values could be verified, the change was made to the database.

5.1.6 Handling of Non-Detects

Per EPA guidance (EPA, 1988), all results indicated as non-detections were replaced by one-half the reported detection, reporting, or practical quantitation limits to prevent the data set from being censored on the low end. Since the value could be anywhere between zero and the detection limit, this substitution allows a 50% probability that the substituted value will be higher or lower than the substituted value. If the state determines that it is necessary, a more

sophisticated method of dealing with non-detects could be included in a future revision of this report.

Finally, the percent of non-detections was calculated for each analyte for each well. Trend analyses were performed for those analytes for which more than 50% of the data set were non-detects, but they should be regarded with caution. However, descriptive statistics and box and whisker plots to identify outliers were prepared for both greater than and less than 50% non-detect cases.

In a number of cases, the reporting limits changed over time or from time to time because of dilution gain (matrix interference). Since all indicated non-detections are included in the database as one-half of the reporting limit, the changing reporting limits can cause or contribute to upward and downward trends in the data. This is most noticeable in datasets comprised completely of non-detects that demonstrate a trend. To illustrate this, Appendix F contains three versions of linear regression plots for a number of constituents. The first version includes all the data, including the non-detects, and is therefore the same as the linear regression plots in Appendix C. The second version includes only the non-detects, thereby demonstrating any trends generated solely from changes to reporting limits. The third version plots all data other than the non-detects. A comparison of version three to version one shows the impact on the regression analysis caused by inclusion of the non-detects in the dataset.

5.2 Comparison of Reporting Limits to Groundwater Quality Standards

Available data on reporting limits from DUSA reports (1979 to 2006) were compared with GWQSs to evaluate whether reporting limits were adequate to ensure compliance with standards (Table 4). Most cases of reporting limit values in Table 4 that exceed standards do not correspond to non-detection of the analyte during analysis, but occurred when dilution of the sample was necessary to accommodate higher than expected concentrations of a constituent. Another circumstance leading to high reporting limits, known as matrix interference, is when higher than expected concentrations of another constituent in the sample interferes with the measurement of a constituent concentration.

Table 5a presents individual records for non-detect results whose reporting limits exceeded GWQS for each constituent. If a result exceeded the GWQS it necessarily also exceeded the GWCL; however, some non-detect reporting limits only exceeded the GWCL. Table 5b lists the non-detect records exceeding GWCLs. The GWQS are included for comparison. Table 6 presents the information in Tables 5a and 5b by listing the total times a reporting limit

exceeded the GWQSs and/or GWCLs by well, constituent, and year. This shows that beryllium, cadmium, lead, molybdenum, thallium, and vanadium account for the majority of times a reporting limit exceeded the GWQS. Beryllium, cadmium (with a few exceptions, all below GWQS/GWCL), lead, molybdenum, thallium, and vanadium were largely undetected in all other samples when the reporting limit was less than the GWQS and GWCL, indicating that, in spite of instances when detection levels exceeded standards, these constituents are typically below standards in site groundwater.

The non-detect reporting limit for uranium as metal (U-conc) exceeded the GWQS only nine times, all in 1982 and 1983. Since then, the reporting limit appears to be appropriate compared to both the GWQS and GWCL.

The non-detect reporting limit for mercury exceeded the GWQS only five times, four in 1984. However, mercury was reported as undetected 26 times when the reporting limit exceeded the GWCL. In all of the instances between 1999 and 2002, the reporting limit only exceeded the 0.5 µg/L GWCL for monitor wells with Class II water. This has subsequently been rectified, and from 2002-2006 no reporting limit exceeded GWQSs.

Table 6 also reveals that most instances of reporting limits that exceed standards occurred in the early analyses from 1981 to 1985, in 1994, and again between 1999 and 2002. It is interesting to note that during the period 1995 to 1998, no reporting limits were in excess of the GWQS, but some did exceed the GWCL. However, this period is prior to the issuance of the GWDP and the establishment of GWCLs.

5.3 Analytical Methods

Over the years, a number of analytical laboratories have analyzed samples from the Mill. In many cases, laboratory reports for early data were not located, and analytical methods were not specified in the available electronic data. Energy Laboratories has conducted the analysis of groundwater samples from the Mill for the past seven years, employing industry standard methods, generally EPA methods, for analyses. Table 7 summarizes the current analytical methods used by Energy Laboratories for the various analytical constituent groups. Methods listed in Table 7 are considered appropriate for the groundwater analytes from the Mill based on wide consensus among regulatory agencies. EPA, American Society for Testing and Materials, the U.S. Nuclear Regulatory Commission, and most states recommend methodologies similar to those listed in Table 7.

5.4 Checks for Internal Consistency of the Data

The GWDP specified an evaluation of the internal consistency of the data. The following comparisons provide quantifiable methods for evaluating internal consistency.

- TDS calculated from total constituent mass versus measured TDS. Samples that had results for calcium, chloride, magnesium, potassium, sodium, sulfate, total alkalinity, and measured TDS were evaluated for comparability. Table 8 shows the data used to make the comparisons, which had an average ratio of 0.973 (97.3%) and a standard deviation of 0.093 (9.3%). If perfect, the ratio would be 1.0, so a ratio of 0.973 reflects good internal consistency. The ratios ranged from 0.666 (66.6%) to 1.368 (136.8%).
- Charge balance of major cations (Ca, Mg, K, Na) and anions (HCO3-, Cl, SO4). This can be done only for samples in which the major cations (calcium, magnesium, potassium, and sodium) and anions (bicarbonate or total alkalinity, chloride, and sulfate) have been analyzed. In this regard, the older data are incomplete for some of the major ions. The goal for dilute waters ranges from -5.0 to +5.0%. Two rounds of samples (second quarter 1999 and fourth quarter 2000) showed charge balances (as a percentage, where 0 percent is perfect balance) ranging from -43.0 to +94.6%, with 60% of the values falling within the -5.0 to +5.0% range, and 86% of the values falling within the -10.0 to +10.0%, indicating fair internal consistency in the analysis (Table 9).
- When available, the relative percent difference between field duplicates was calculated to provide an estimate of sampling and analytical precision. Results, summarized in Table 10, indicate that most analyses are within acceptable limits and that the data set is usable for determining background groundwater quality.

6.0 CALCULATION OF STATISTICAL PARAMETERS

Descriptive summary statistics were calculated for compliance wells and parameters listed in the GWDP (Table 11). Table 11 is divided into two parts: Table 11a gives summary statistics for those data sets with parameters that were detected in more than 50% of the samples that were analyzed and Table 11b provides summary statistics for data sets where parameters were detected in 50% or fewer of the samples analyzed. This division is based on analysis in EPA *Guidance for Data Quality Assessment* (EPA, 1996), which states:

> *If the degree of censoring (the percentage of data below the detection limit) is relatively low, reasonably good estimates of means, variances and upper percentiles can be obtained. However, if the rate of censoring is very high (greater than 50%) then little can be done statistically except to focus on some upper quantile of the contaminant distribution, or on some proportion of measurements above a certain critical level that is at or above the censoring limit.*

Further, the high proportion of non-detections for certain constituents may reflect the relative importance of that constituent in overall risk to human health and the environment. As described in following sections, a number of groundwater constituents tend to be readily removed from groundwater and immobilized on the aquifer matrix. These constituents tend to be relatively immobile whether they come from ambient, natural sources or if they originate in uranium mill process solutions. For this reason, they make poor indicators of impact from milling related processes. Given the size and complexity of the Mill database, the separation of Table 11 into two parts is intended to allow clearer focus on constituents that could provide more timely indication of potential impact to groundwater from milling processes.

Summary statistics were calculated for constituents detected in less than 50 percent of the samples; however, these values should be regarded with caution because of the large proportion of non-detections that were replaced with proxy values of one-half the reporting limit. A simple substitution using one-half the reporting limit was employed for this initial summary of the data; more advanced methods of handling non-detections may be employed for future analyses.

In addition to summary statistics box-and-whisker plots were constructed for compliance wells and parameters listed in the GWDP to determine whether outliers or extremes are present in the data set.

If at least eight quarters of data were available, statistical analysis also included the following:

- Distributional testing to confirm that data fit a normal distribution using histograms, normal probability plots, and the Shapiro-Wilk W-test; if data were not normally distributed, the data set was log transformed and tested again.
- Time-concentration trends were evaluated using both linear regression and the Kendall *tau* test for covariance.

Regression analysis and Kendall *tau* tests should be viewed with caution for data sets where parameters of interest were detected in 50 percent or less of samples analyzed. Apparent trends within this subset of the data may not be real. See the discussion in Section 5.1 and Appendix F.

6.1 Statistical Plots, Outliers, and Extremes

Box-and-whisker plots (Appendix A) were constructed using STATISTICA data analysis software (version 7.1, Statsoft Inc., 2005) as part of the data evaluation for this investigation. These plots are used to describe and compare data distributions and highlight disparate results known as extreme values. An extreme is an observation that does not conform to the pattern established for other observations. Such values may be mistakes, such as transcription or reporting errors, or may be the result of instrument or laboratory errors. Extremes may also represent inherent variability in the measured parameter. Extremes that are found to be mistakes should be corrected or described and excluded from calculations. In cases where the extreme cannot be verified as an error, summary statistics and tests were performed both with and without the extreme. Figure 3 presents graphically the methodology employed for identifying extremes.

The height of the box (H) represents the 25th (LBV) and 75th (UBV) percentile range of the data set with the median value plotted within. The whiskers represent the limits of the data between 5 and 95 percent of all values. The default outlier coefficient of 1.5 was selected. This identified an outlier as being above or below more than 1.5 times the width of the box.

Extreme values were identified as being more than 3 times above or below the width of the box. Once identified, extreme values were flagged in the original data set. A new data set was created omitting the extremes. Table 12 lists the data records with extreme values that were excluded from trend analyses. Because the exercise of identifying extremes is somewhat circular, with a new set of extremes appearing every time the old ones are eliminated from the data set, a decision rule was applied to limit potential abuse. The first pass of identifying and

eliminating extremes was used as a limiting control on this technique. Any subsequent extremes that were identified were retained for analysis unless eliminated for another reason.

6.2 Distributional Testing

Most statistical tests assume that data represent a normal distribution. However, EPA guidance suggests that a lognormal distribution is a more appropriate default statistical model for most groundwater data (EPA, 1992) and even this assumption commonly fails, requiring the use of non-parametric methods. Parametric statistical methods are preferred due to higher statistical power, but non-parametric methods have to be used when normality or log-normality cannot be verified. It is important to identify the distribution of the data because data that do not fit assumptions made in designing statistical operations can lead to false conclusions.

Histograms were generated for each constituent in each well while applying the Shapiro-Wilk test (Shapiro and Wilk, 1965) for population distribution. The histograms were generated using untransformed data and log transformed data (Appendix D). The Shapiro-Wilk test is "one of the most powerful tests available for detecting departures from a hypothesized normal or lognormal density function" (Gilbert 1987). For the Shapiro-Wilk test to have sufficient power to reject hypothesis of normality (or log normality), the sample number, or "n" should be at least 20. Results of the Shapiro-Wilk test and designation of distributional type are provided in the table of summary statistics for each constituent in each well (Table 11a and 11b).

Probability plots (Appendix B) show the concentration of a chemical in each sample in a manner that also shows how well the data set for the chemical fits a normal or lognormal distribution. The concentrations of some naturally occurring chemicals follow a lognormal distribution, so the original data was also log transformed and then plotted to assess the fit to a lognormal distribution qualitatively (distributional tests such as the Shapiro-Wilk test provide a quantitative measure of how well the data fit a particular distribution).

Normal probability plots are also useful for visual identifying outliers and evaluating the possible presence of multiple populations within a data set. A probability plot consists of a graph of values ordered from lowest to highest and plotted against a standard normal distribution function. The horizontal axis is scaled in units of concentration (for example, mg/L), and the vertical axis is scaled in units of the normal distribution function (normal quantile). The horizontal scale can be plotted either as a linear scale (concentration versus normal quantile) or as a logarithmic scale (the logarithm of concentration versus normal quantile). Populations of data that plot as a straight line in a linear scale are referred to as normally distributed, and

populations that plot as a straight line in a logarithmic scale are referred to as lognormally distributed. There was a tendency for major elements (Cl, SO_4, TDS, etc.) to plot as normal or log normal. Many trace constituents plotted as non-parametric.

6.3 Trends in Concentrations

Temporal trends in data were evaluated graphically using time-concentration plots including linear regression (Table 13 and Appendix C), and using the Kendall *tau* test (Table 13). Although extreme outliers were excluded from the trend analysis, additional outliers that were not obvious on the box and whisker plots are apparent in normal probability plots and should be evaluated further and possibly excluded in subsequent evaluations.

The Kendall *tau* is a nonparametric test for trends that provides a probability that the data represent a trend or that the arrangement of data points over time is due to chance alone (random). The Kendall *tau* test was applied for constituents with detection rates of 50 percent or greater and at least eight samples. A summary of the significant results from the Kendall *tau* test is presented in Table 13. The 95 percent probability level (i.e., p-values less than or equal to 0.0500) was set as indicating statistically significant evidence of a trend. For example, the Kendall *tau* test provides significant evidence that selenium concentrations are rising in upgradient monitor wells MW-18 and MW-19 and in far downgradient monitor well MW-3. Significant decreasing concentrations or values were noted for alkalinity, ammonia, and arsenic, among others.

Regression plots are not shown in Appendix C for any constituents, such as cobalt, with fewer than 8 data points.

6.4 Descriptive Summary Statistics

Summary statistics for each data set are presented in Table 11. For purposes of this report, a data set is defined as all of the analysis results for a single constituent in a single monitoring well. Table 11 is divided into two parts. Table 11a consists of data sets in which the constituent was detected in 50 percent or more of all analyses performed. Table 11b consists of data sets in which the constituent was detected in less than 50 percent of all analyses performed. Within these separate tables, data sets were divided into greater than eight valid N and less than eight valid N.

Descriptive summary statistics and information presented in Table 11 include the following:

- Chemical name

- Number of detections
- Number of samples
- Detection rate as a percentage
- Arithmetic mean
- Geometric mean (the backtransformed mean of the logtransformed data)
- Standard deviation
- Arithmetic mean plus two standard deviations
- 95-percent upper confidence limit on the arithmetic mean (likely upper value of the arithmetic mean)
- Minimum reported concentration
- Maximum reported concentration
- 25th percentile of sample population
- 50th percentile of sample population
- 75th percentile of sample population
- Interquartile range (range between the 25th and 75th percentiles)
- Estimated skew of population distribution (skew greater than 1 indicates a right-skewed population; skew less than −1 indicates a left-skewed population)
- Shapiro-Wilk W-value for untransformed data
- Shapiro-Wilk p-value for untransformed data, where a p-value less than 0.0500 indicates sample population is not normally distributed (nonparametric or lognormal distribution)
- Shapiro-Wilk W-value for log transformed data
- Shapiro-Wilk p-value for log transformed data, where a p-value less than 0.0500 indicates the sample population in not log normally distributed (nonparametric or normal distribution)
- Distribution of sample population; either normal, lognormal, or nonparametric, based on results of the Shapiro-Wilk test.

7.0 RESULTS OF STATISTICAL EVALUATION

Background groundwater quality is determined on a well-by-well basis, as defined by the mean plus two standard deviations (Part 1, Section B of the GWDP, March 8, 2005).

Because many of the Mill data sets are not normally distributed and a high level of non-detects are present for some constituents, the mean plus two standard deviations stipulated in the GWDP (2005) may not be the most appropriate or representative value to use to establish the limit of background for all constituents. Further, evidence is presented in Section 2.0 and elsewhere in this report that concentration trends present in some datasets represent natural processes that need to be incorporated into compliance standards. Methods to incorporate these processes should be discussed before compliance values are finalized. See Section 12.0. Nonetheless, because of the stipulation in the GWDP (2005), values of the arithmetic mean plus two standard deviations were calculated and are presented in Tables 11a and 11b.

7.1 Structure of Results Analysis

We know that a number of chemical constituents present at high concentrations in tailings solutions have transport properties that would allow early detection of milling related impacts to groundwater and we note that the Tailings cells have been in place for over 25 years with little defined impact. These facts suggest that constituents present at lower concentrations in tailings solutions and with higher potential for attenuation would not be likely to provide the required early warning of impact. Therefore, in order to focus on constituents with high potential to provide early warning of impact, this document is organized to separate constituents listed in Table 2 of the GWDP into three groups as presented in Table 14.

Table 14 is essentially a list of the frequency with which a particular constituent from Table 2 of the GWDP has been detected in site monitor wells. The monitor wells that have had detectable concentrations of a parameter on more than half of the occasions that an analysis for the parameter was performed are listed in horizontal rows. The constituents that have been most commonly detected in samples of site groundwater are listed near the top of the table and those that have been rarely detected are listed near the bottom.

Based on this table, it is possible to divide the constituents that make up the GWDP into three groups. The upper, orange part of the list of constituents, with a ubiquitous presence across the site, includes all the major anionic species commonly found in groundwater and discussed in subsequent sections as potential tracers of mill process impact to groundwater. In addition, this

upper part of the list includes uranium. This placement among commonly detected constituents indicates that, of the trace constituents on the GWDP list, these parameters are likely the most mobile in the groundwater environment beneath the Mill site and possibly the most mobile of the constituents of greatest concern.

Nitrate species, in the next group down, have been consistently detected in less than half of historical monitor wells. Molybdenum and arsenic, the two other species that, like selenium, form oxyanions, have been detected less frequently than typically insoluble, redox-sensitive iron and manganese species. Constituents even lower on the list are rarely detected in groundwater beneath the Mill site. The point here is not to propose that sampling of the rarely detected species be discontinued but to focus attention on the more mobile constituents as indicators of milling related impact.

7.2 Regression and Kendall Tau Analysis

Monitor wells and constituents that exhibited a statistically significant upward or downward trend in regression analysis are presented in Table 13. It should be noted that statistically significant upward and downward trends are observed upgradient in MW-1, MW-18, and MW-19, as well as far down-gradient in MW-3.

7.3 Comparison of Data with Groundwater Quality Standards

Table 11 contains summary statistics for all wells and constituents, including and excluding outliers. The table includes the value of the mean plus two standard deviations and states for each condition whether the mean exceeds the GWQS. Historically, not all this information was collected for the groundwater monitoring program. The semi-annual effluent monitoring reports typically provide data for a small number of selected inorganic chemicals (anions, metals, and radionuclides), along with data for pH and specific conductance.

Based on the results of Kendall *tau*, regression analyses, and comparison of the mean to the GWQS for each constituent, a list of constituents and wells was prepared for special evaluation (See Table 2.2-1 in Section 2). The list includes each data set with a result that was above the GWQS or showed statistically significant evidence of an increasing trend. Each data set on this list was evaluated for indications that it might represent impact from uranium mill process solutions. Results of this evaluation are set out in Section 2.0 and provide no evidence that groundwater impacts from process solutions currently exist.

7.3.1 Organic Constituents

Organic constituents present in groundwater in the vicinity of MW-4 (see Figure 15 for the location of MW-4) have been identified as impacting groundwater beneath the Mill site and are currently being removed by active remediation. The source of these constituents is believed to be discharge of laboratory chemicals to historic septic leach fields that pre-date mill operations. Agreements between Utah and DUSA have ensured that this impact will not threaten human health or the environment. These constituents do not represent direct impact by the milling process and they are currently being contained on site. Therefore, with the exception of a brief discussion in the following paragraphs, the remainder of this document will focus on potential impacts from the uranium processing activities and the tailings cells that represent the only potential source of impact at the Mill that might not be as easily controlled.

Analysis for organic chemicals generally commenced with the UDEQ split sampling in 1999. Several organic compounds were detected, most notably chloroform in MW-4. Chloroform was detected at 4700 µg/L in the second-quarter of 1999 in a sample of groundwater from MW-4. Trace amounts of dichloromethane (a daughter product of natural chloroform degradation) and carbon tetrachloride were also detected.

Trace amounts of chloroform (0.9 µg/L, estimated concentration near the reporting limit) and vinyl chloride were detected in the second-quarter 1999 sample from MW-3 (UDEQ split-sample data). Trace amounts of chloroform (1.2 µg/L) were also detected in upgradient well MW-1. Tetrahydrofuran was noted as a tentatively identified compound in samples from MW-3, MW-12, and upgradient well MW-1. In the second quarter of 1999, no organic chemicals (other than phthalate blank contaminants) were detected in wells MW-2, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, and MW-19.

UDEQ collected split samples in the third quarter of 2002 and found trace amounts of tetrachlorethene in samples from upgradient well MW-1 (0.4 µg/L, estimated), and side-gradient well MW-2 (0.2 µg/L, estimated); however, a chloroform concentration of 5190 µg/L was measured in a sample of groundwater from MW-4.

Table 2 lists the wells, sampling dates, constituents and results for all detected organic compounds in DUSA samples. The laboratory detection limit is included, if known, and results that exceed the associated GWCL are highlighted.

Chloroform is the only constituent that consistently exceeds the GWCL, and concentrations are centered around wells MW-4 and MW-26. Figure 4 is a map showing the spatial distribution

of chloroform based on data from 2005 sampling. Tetrahydrofuran results also exceed GWCLs in several other wells but, notably, have not been detected in MW-4 and MW-26. Tetrahydrofuran results that exceed standards are from samples of groundwater in monitor wells MW-1, MW-12, MW-2, MW-3, and MW-5, which are located at a significant distance from the area of obvious chloroform concentrations. This group of wells is widely distributed across the site and includes upgradient (MW-1), side-gradient (MW-2), and far downgradient (MW-3) locations. The tetrahydrofuran is believed to have come from glues used in certain well casings and is currently under investigation. This source would explain why tetrahydrofuran is found in upgradient (MW-1) and far downgradient (MW-3) wells.

Other organic constituents that have been detected include oil and grease (five detectable results), chloromethane (a number of detectable results), toluene (three detectable results at very low concentrations), and methylene chloride (one detectable result). These constituents should not be ignored but are not considered representative of groundwater conditions for the following reasons:

- Analysis for oil and grease occurred only in 1981 and 1982. Since little is known about the sampling protocols from that time, and since oil and grease were also detected upgradient in MW-1, these results should be discounted.

- Toluene and methylene chloride are present at very low concentrations with limited distribution, including in upgradient well MW-18. As a result, these constituent concentrations are likely false positives but worthy of continued attention.

- The chloromethane detections are all close to, and of the same order of magnitude as, the detection limit. Detected concentrations of this constituent are also from samples taken from wells distributed across the site (including upgradient wells MW-1 and MW-19) with no apparent relation to the known area of chloroform detections, therefore these detections are likely not significant, but are worthy of continued attention.

The source of groundwater concentrations of the other organic constituents is currently unclear, but given that they have been measured only in isolated cases, generally in non-recurring situations, including in above-gradient wells, they are likely a field or lab sampling error and are not directly related to the milling process or the tailings cells. The detection of methylene chloride in MW-26 may be from the same source as the chloroform contamination.

7.3.2 Inorganic Constituents

Excluding the extremes listed in Table 12, individual records for ten constituents plus uranium have been detected in excess of their GWQS values; these included cadmium, iron, lead, manganese, selenium, thallium, uranium, and vanadium.

Concentrations of these trace metals that were found to exceed GWQS values were generally metals whose reporting limits were the same as the GWQS for that metal. Detections near the reporting limit have more uncertainty associated with them than detections at higher concentrations; that is, the values are less precise. For example, if the GWQS = reporting limit = 0.004 mg/L for beryllium and beryllium is noted as detected at 0.006 mg/L there is much more uncertainty than if beryllium were detected at 0.045 mg/L where the reporting limit is 0.004 mg/L.

In the data set for beryllium, reporting limits were as high as 0.110 mg/L, which exceeds the GWQS of 0.004 mg/L by two orders of magnitude. Five detected concentrations, ranging from 0.006 to 0.01 mg/L, exceeded the GWQS; however, 127 samples were analyzed for beryllium and there was no spatial relationship between tailings cells and monitor wells that supplied samples that exceeded standards. Wells upgradient (MW-1), side-gradient (MW-2), far downgradient (MW-3), and adjacent to the tailing ponds (MW-5) all produced samples with values exceeding standards. The same holds true for values of thallium, cadmium, mercury, molybdenum, nickel, and selenium that exceed standards. None of these values appears to be related to the tailings wastewater.

Of these, all the thallium that exceed GWQS are suspected to be non-detections that were inadvertently not qualified with a "U," because all have identical results (18 results = 0.009 mg/L). The same holds true for beryllium (four results = 0.010 mg/L) and molybdenum (six results = 0.100 mg/L). Individual records for molybdenum exceed the GWQS in upgradient monitor well MW-19 and in MW-11, MW-12, MW-14, and MW-15, likely because the suspected non-detections of 0.1 mg/L exceed the GWQS by an order of magnitude.

In addition, Table 2.2-1 shows that the constituents that either have increasing trends or have data sets where the calculated mean exceeds the GWQS. These occurrences are also distributed randomly across the site, with no apparent relationship to the tailings cells. See Section 2.0 for a full analysis of these constituents. These observations support evidence given in the spatial analysis presented in Section 8.0 that observed concentrations are natural and the

trends in data sets are due to natural processes. There is no evidence that any concentration in the overall data set is due to impact from uranium milling processes.

8.0 SPATIAL AND TEMPORAL ANALYSIS

A major purpose of the statistical evaluation presented in this document, and specifically of this spatial and temporal analysis of groundwater monitoring data, is to determine what parameters within the monitoring data set may allow early identification of uranium milling related groundwater impacts so that responsible and expeditious corrective actions can be undertaken. Conversely, it is necessary to screen out spatial and temporal patterns identifying impacts from sources over which DUSA has no control and no responsibility or ability to abate.

As described in the GWDP statement of basis, general experience from a number of similar uranium milling facilities has identified constituents and sources that are likely to provide a characteristic signature of milling impacts. Because tailings impoundments represent by far the largest volume and highest concentration potential source term, regulatory interest and groundwater monitoring at the Mill have prudently focused on these features as bellwether indicators of groundwater impacts. As the largest potential source of impact, if groundwater concentrations exhibit no spatial or temporal relationship to the tailings impoundments, both regulators and the Mill operators gain confidence that the milling process does not pose a risk to human health and the environment. Therefore, this analysis devotes particular attention to any indicators of a spatial or temporal relationship between tailings impoundments and groundwater quality distribution and trends.

Spatial and temporal trends exist in many large monitoring data sets that, like data reviewed here, record decades of measurements of groundwater properties in samples from monitor wells distributed across several square miles. Groundwater quality within the Burro Canyon Formation is variable on a regional scale, hosting water types ranging from groundwater suitable for stock watering or other agricultural processes to saline brines (Hunt, 1996).

Furthermore, temporal trends within a groundwater data set that spans decades can be related to a number of factors. In addition to the occurrence of climatic variability and similar cyclic natural phenomenon during the period of record, potential causes of temporal trends in groundwater data include changes in off-site activities as the larger surrounding community grows and land use changes.

Changes in flow systems due to changes in land use are considered part of the natural variability in groundwater quality. Such changes are not the product of addition of pollutants that can be remediated; they are the result of a new adjustment to changing hydrogeologic conditions.

Although changes in a hydrogeologic system may result from human activity, in this case humans are simply one agent of hydrogeologic change among many.

Off-site changes in groundwater flow regime that may occur (evidence that at least one such process is affecting groundwater conditions at the Mill is presented later in this Section) require establishment of new hydrologic and geochemical conditions. As the system moves toward a new equilibrium condition, natural constituent mass previously stored within sedimentary matrix material will likely be destabilized. This may be mass stored for millennia in the vadose zone that is liberated by increasing water levels, or it may be mass bleeding off from fine-grained sediments that was previously masked by dilution during a period of higher groundwater flow. Destabilization can result from numerous other processes, including a number of different chemical reactions responding to new conditions.

8.1 Spatial Variability of Groundwater Quality at the Mill

The spatial distribution of constituent concentrations in the perched groundwater system at the Mill is variable and may not represent a homogeneous flow system. A map of monitoring wells depicting concentrations of TDS present in samples of groundwater collected in 1983 (the oldest full set of data) and, for comparison, a map depicting concentrations in samples collected from the same monitor wells in 2005 and 2006 are included in Figure 5. These maps display relative concentration at each well by setting the area of the symbol (circle) in direct proportion to the magnitude of the concentration. TDS is chosen as a broad indicator of groundwater quality across the site; the distribution of other constituents is discussed in subsequent sections.

These maps highlight the variability of TDS concentrations between different monitor wells and the relative stability of TDS concentrations measured at each well over time. Data collected in 1983 ranges from 1160 mg/L TDS at MW-1 to 4880 mg/L TDS at MW-3, while data collected in 2005 and 2006 range from 1273 mg/L TDS at MW-1 to 5197 mg/L TDS at MW-3. Note that relative concentrations at each well are similar from 1983 to the 2005/2006 data. Varied TDS concentrations also show no apparent relation with a given well's proximity to the tailings cells. Concentrations of constituents in groundwater samples from Mill site monitor wells that exhibit no significant trends over the more than 20 years of sampling record are likely the result of natural, ambient processes related to interaction between the water and the sedimentary matrix that hosts it. See Section 2.0 for discussion of any upward trends in TDS at the site.

8.2 Conceptual Framework

Ambient concentrations of constituents in groundwater are typically controlled by the spatial distribution of various naturally occurring minerals and by the type of geologic materials that host groundwater that monitor wells are completed in. The perched groundwater system at the Mill occurs within the Burro Canyon Formation, which is described as interbedded conglomerate and grayish-green shale, with light-brown sandstone lenses deposited in a fluvial environment (Aubrey, 1989). Mineralogical information is available for the Burro Canyon Formation on a regional basis and a general model of the distribution of sedimentary facies in a fluvial environment can provide insight into conditions in groundwater within the unit.

8.2.1 Mineralogy

The following geochemically important minerals have been identified as occurring regionally within the Burro Canyon Formation: quartz, illite-smectite, kaolinite, calcite, siderite, hematite, and pyrite (Altinok, 1998). Quartz and the clay minerals illite-smectite and kaolinite are widely distributed in the Burro Canyon Formation. Quartz is typically non-reactive but clay minerals are known to be a source of potentially hazardous metals (uranium, nickel, lead, etc.) and semi-metals (arsenic, molybdenum, selenium, etc.) in many geologic settings around the world (Rai and Zachara, 1984).

Calcite and siderite contribute to alkalinity, tending to increase the pH of solutions in contact with these solid phases. In addition, siderite can contribute iron to solution. Hematite and pyrite can also contribute iron and exert strong control over the redox state of groundwater when they are present. In particular, the oxidation of pyrite in sediments can be a major contributor to TDS as sulfide oxidizes to sulfate. This reaction also provides acidity that favors increased concentrations of metals in solution.

8.2.2 Sedimentary Facies

An understanding of the different fluvial sedimentary facies present in the Burro Canyon Formation provides a conceptual framework for understanding the spatial differences in groundwater quality across the Mill site. Over the period that water levels have been measured in the Burro Canyon Formation at the Mill site, the direction of groundwater flow has been consistently from the northeast toward the southwest. The geochemical variability of groundwater samples from monitor wells at the site and their apparent constant concentration over time suggest that, in spite of the continuity of hydraulic heads, local regimes representing different local geochemical sources of groundwater constituents persist within the Burro

Canyon Formation. Local geochemical sources may be related to the distribution of sedimentary facies within the Burro Canyon Formation in the vicinity of the Mill.

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

- channel floor deposits comprising coarse sand or gravel,
- point bar deposits of fine-grained sand, and
- flood plain deposits comprising silt and mud.

As sediment deposition occurs over time, these deposit types are distributed back and forth across the larger stream channel, producing the characteristic discontinuous lens-like nature of a fluvial geologic unit. The different mineralogy and associated hydraulic properties of facies may explain a variable, but relatively stable, water quality regime within a fluvial geologic system.

In general, groundwater moves relatively quickly through the coarse channel sand and gravel but much more slowly through silt and clay flood plain deposits. For these reasons, groundwater in fluvial environments has the potential to exhibit different geochemical types within what is identified as one geologic unit. Hydraulic heads can be maintained within the unit but the bulk of groundwater flow may be restricted to the gravel and sand facies. Note that all fluvial facies, including coarse-grained lenses, are discontinuous across relatively small areas, reducing total flow through the unit. These observations are consistent with the Utah Division of Oil, Gas & Mining Environmental Handbook's description of the Burro Canyon Formation as having very low to low permeability and containing waters which range from fresh to briny (Hunt, 1996).

Sandy and gravelly sediment within the fluvial facies typically contain a high proportion of quartz and other relatively non-reactive minerals. Groundwater in contact with these minerals tends to have lower TDS content than groundwater in contact with clay minerals found in silt and clay facies. The lower groundwater velocities through the latter facies provide longer residence time allowing for more chemical interaction, which typically translates to a higher TDS. Silts and clays also provide more surface area and have greater sorption capacity than coarser sediments typically resulting in higher retention of metals and semi-metals during deposition. These metals can be remobilized, and samples of groundwater from site monitor wells completed in or near silt and clay lenses can be expected to exhibit higher metals and TDS concentrations than samples from monitor wells completed in sand or gravel lenses.

8.3 Water Level Changes

In spite of stability of overall TDS concentrations across the site, groundwater levels have risen dramatically in some monitor wells during the period from the early- to mid-1990s to the present. Trends in water level elevations with time are presented in Figure 6. The monitor wells at the site can be divided into two distinct groups based on these plots: wells that currently exhibit a strong upward trend (MW-1, MW-4, MW-11, MW-17, MW-18, and MW-19) and those that exhibit little to moderate upward trend (MW-2, MW-3, MW-5, MW-12, MW-14, and MW-15).

Of those monitor wells with a record of water level measurements dating back to the early 1980s, MW-4 provides the most obvious record of change in water level trend that affected most or all of the monitor wells in the first group. The trend-line inflection point observed in 1994 data records the beginning of a sharp increase in water levels. Water levels in this well have risen more than 25 feet since 1994. The inflection point and continued rising water levels is similar, although less dramatic, in data from MW-17, MW-18, and MW-19.

The spatial distribution of changes in water levels during the period from 1994 to 2001 (more recent water level data is affected by pumping of wells in the vicinity of MW-4 to recover chloroform) is shown in Figure 7, which reveals that water level increases have occurred preferentially in monitor wells on the east side of the site while western monitor wells are relatively unchanged. Moderate rises can be observed in monitor wells in the west-central part of the site, perhaps indicating a transition zone.

Reasons for water level increases and the uneven spatial distribution are currently unclear. DUSA and UDEQ have concluded that seepage from stock watering ponds upgradient of the Mill site are contributing to increases. Another contributing factor could be that regional increases in precipitation observed during the late 1980s and early 1990s (Diaz and Anderson, 1995) have contributed, and increases may reflect a slug of water from one or more years of high recharge.

One thing appears certain however; higher water levels do not originate as seepage from the Mill tailings cells. The largest groundwater level changes have occurred in MW-19, MW-18, and MW-4 on the northern and eastern boundaries of the Mill site and changes diminish toward the tailings cells. This distribution could be related to the distribution of fluvial facies across the site. A possibility worthy of further consideration is that coarse-grained fluvial facies are more

prevalent on the east side of the Mill site. If so, head differences from whatever source would be translated more quickly through more transmissive sediments.

Data documenting this apparent regional scale change in groundwater levels provides evidence that groundwater at the Mill site is being affected by off-site changes to the groundwater flow regime. As described above, any change in the flow regime has the potential to destabilize constituent mass and instigate geochemical processes that will affect natural water quality. Changes to groundwater quality at the Mill site will occur as a result of observed water level increases and trends in constituent concentrations that result will have an impact on groundwater compliance.

9.0 TRACERS OF POTENTIAL GROUNDWATER IMPACT

Natural variability and trends produced by natural processes should be incorporated into determination of the numerical values that will represent background concentrations, but in some cases it may be difficult to separate natural trends from trends produced as a result of milling related processes. The purpose of the following discussion is to provide a framework for understanding the natural variability of groundwater quality at the site and a logical structure for differentiating between trends and spatial distributions resulting from natural processes and similar trends that could result from potential tailings impact.

A common hurdle facing regulators and operators addressing the potential for groundwater impacts is defining what might indicate an impact (i.e., how will we know that an impact has occurred). Recognizing the importance of constituent concentrations in tailings impoundment solutions as indicators of potential groundwater impact, UDEQ provided a concise summary of available data characterizing these solutions in Table 5 of the statement of basis for the Mill GWDP. Table 15 provides a summary of the measured concentrations of several key constituents, excerpted from UDEQ's more comprehensive list.

The ideal constituent parameters to indicate impacts from tailings solutions would be:

1. The constituent would move with the same velocity as transporting water;
2. It would be present in source solutions at easily measurable concentrations; and
3. It would not be common in ambient groundwater.

A retardation factor is a measure of the rate of movement of a constituent relative to groundwater. A retardation factor of 10 indicates that the constituent will move through the aquifer at a rate that is 10 times slower than the velocity of groundwater. As described by the GWDP, retardation is a function of a constituent's soil-water partitioning coefficient as follows:

$$R = 1 + \rho_b/\eta^* K_d \qquad \text{(Eq. 1)}$$

Where R is the retardation factor, ρ_b is the bulk density of the aquifer matrix (grams per cubic centimeter), η is the effective porosity of the aquifer matrix, and K_d is the distribution coefficient of the constituent. The distribution coefficient is the ratio of the constituent concentration adsorbed to the aquifer media (usually reported as milligrams per kilogram) to the constituent concentration dissolved in groundwater (usually reported as mg/L). Thus the

units of K_d are liters per kilogram or milliliters per gram. A number of factors contribute to the mobility and/or potential for attenuation of a constituent and the sum of these factors are expressed in the distribution coefficient.

A primary control on constituent mobility is the particular ionic species of each constituent that forms, given the specific conditions that are present in the aqueous environment. The types of ionic species and complexes that form in groundwater depend, among other things, on anion and cation availability and on pH and Eh conditions in site groundwater.

As noted in the GWDP statement of basis, transport characteristics of common constituents in groundwater can be separated into groups exhibiting broadly similar behavior. Using the classification scheme from the GWDP, the following sections review the transport characteristics of constituents present in tailings solutions. This review is useful because it allows us to focus on those parameters that would present the first indication of impact from tailings cells.

The strategy employed in evaluating the spatial variability in groundwater quality at the Mill is to compare concentrations and concentration ratios of these first indicators to the concentrations and ratios of the same constituents observed in site monitor wells. If first indicators of tailings impact are not present, water quality variability is most likely the result of other sources and processes.

9.1 Anions

Of the constituents listed in Table 15, chloride has chemical properties that lend themselves most readily to transport by water. Chloride is often chosen as a tracer of groundwater flow because common chloride minerals are highly soluble in water and have little tendency to crystallize from solution. Since chloride participates in relatively few chemical reactions, concentrations move along a groundwater flow path with little attenuation (retardation) in concentrations. A retardation factor of one (no retardation) is commonly assumed for chloride in most groundwater systems.

As one of the few constituents found in groundwater systems with a retardation factor approaching one, chloride meets at least two specifications of an ideal indicator of potential tailings solution impact to groundwater. It is common in ambient groundwater (ranging from less than 1.0 mg/L at MW-23 on the downgradient margin of Cell 3 to 94 mg/L in upgradient monitor well MW-19, after extremes are removed), but the average chloride concentration in tailings impoundment solutions of 4600 mg/L is sufficient to guarantee that any seepage from

tailings impoundments would be measurable in groundwater before any substantial volume had entered the system. Thus, chloride is a primary indicator of potential tailings impact.

Other useful chemical indicator species listed in Table 15 include ammonia, nitrate, fluoride, sulfate, and TDS. TDS is useful primarily because it is the sum of the anionic species present (the bulk of anions in most systems consist of bicarbonate/carbonate, chloride, nitrate, and sulfate) and associated cations (total positive cation charge must equal total negative charge from anions to maintain the electrical neutrality of water).

None of these parameters provides the utility of chloride as a tracer in groundwater at the Mill site. The utility of ammonia and nitrate as tracers is reduced in systems where both are present in large amounts. This is because both are redox sensitive members of the natural nitrogen cycle and, as such, are subject to transformative redox reactions that mask the original abundance of either. Note also that near surface transformation products can easily be masked by the presence of the large nitrogen reservoir in the atmosphere (nitrogen gas accounts for approximately 78% of ambient air).

Sulfate is present in tailings solutions at high concentrations but is present in ambient groundwater at proportionally higher concentrations than chloride. Further, the solubility of common calcium sulfate minerals is much lower than the most common chloride minerals, limiting the amount of sulfate that can remain dissolved and retarding sulfate concentrations along a flow path.

Other than chloride, the constituent with most promise for indicating potential impacts from tailings solutions is fluoride. Referring to a periodic chart of chemical elements, fluoride is in the same elemental period occupied by chloride and, for this reason exhibits similar chemical properties. Fluoride is present in tailings impoundment solutions at an average concentration of nearly 1,500 mg/L. Fluoride is present in natural groundwater at concentrations ranging from less than detection to more than 100 mg/L, but concentrations are typically near one mg/L. However, unlike chloride, the common trace mineral apatite is known to act as a solubility control that can reduce fluoride concentrations along a flow path. Thus, while fluoride concentrations should be monitored, fluoride should be secondary to chloride as an indicator of impact.

9.2 Metals

Most metals are soluble and transportable at low pH but exhibit progressively higher retardation coefficients as pH values rise above the 3 to 4.5 range. Experience at a large

number of uranium mill tailings facilities in the western United States indicates that low pH in tailings solutions rarely persists more than a few hundreds of feet in any transport direction from a source due to the high neutralization potential generally observed in alkaline soils from arid regions of the western United States. These soil properties account for the small "acid halo" commonly observed around many older tailings impoundments that were constructed before liners were required. Some exceptions occur, but most metals are essentially immobile under neutral pH conditions encountered outside of the acid halo and do not serve as useful indicators.

Table 5 of the GWDP statement of basis lists uranium ore related constituents that have been observed in ore deposits near the Mill. Some of these constituents may serve as indicators of impact at the Mill but caution should be used when assigning observed concentrations of these constituents in groundwater to a mill tailings impoundment source. Noting that uranium mills tend to be located in regions with nearby uranium ore, we also have to understand that many of the same characteristics that make a constituent a good indicator of tailings seepage may also allow transport from other nearby sources.

Aside from uranium and associated radionuclides present in the uranium-238 decay series, constituents detailed in Table 2 of the GWDP statement of basis that are present in the uranium milling process and generally considered to be of greatest concern (i.e. present the highest levels of potential risk) are arsenic, chromium, lead, molybdenum, nickel, and selenium. Of these, the redox sensitive metals and metalloids that form oxyanion complexes (arsenic, molybdenum, and selenium) may be the most prone to transport. However, as discussed below, they still are significantly less mobile than chloride and fluoride.

As described by the GWDP, anions generally exhibit lower K_d values than metals. This is due to pH dependant behavior; positively charged cations are more mobile in an acidic environment , anionic species tend to be mobile at higher pH values because they have to compete for positive adsorption surfaces with much more abundant contributors to alkalinity (i.e. bicarbonate and carbonate anions).

Dissolved nickel is present in oxidizing, acidic environments as the cation Ni2+. However, it is strongly adsorbed by Fe/Mn oxides and hydroxides (Rai and Zachara, 1984) that are likely present in abundance in the Burro Canyon Formation.

Arsenic can occur in the environment in several oxidation states (–3, 0, +3 and +5) but in natural waters is mostly found in inorganic form as anionic arsenite [As(III)) or arsenate (As(V)].

Under oxidizing conditions, anionic arsenic can be mobile across a range of pH values because it has to compete for positive adsorption surfaces with much more abundant contributors to alkalinity (i.e. bicarbonate and carbonate anions). In reduced systems where sulfur is present, oxidation processes using sulfate as an electron acceptor precipitate highly insoluble sulfides. Arsenic substitutes readily for sulfur in sulfide, which removes arsenic from groundwater by coprecipitation. In addition, arsenic forms its own sulfide minerals (arsenopyrite and enargite, for example), further reducing arsenic concentrations in groundwater.

Under oxidizing conditions, the dominant molybdenum species above a pH of 5 is molybdate ion (MoO_4^{2-}). Many of the metallic elements have molybdates of low solubility. The sulfide mineral molybdenite, also with a low solubility, forms under reducing conditions.

Selenium occurs in solution as selenate or selenite species under oxidizing Eh conditions. These anionic species are adsorbed under acid conditions and desorb as conditions become more neutral. If conditions become reducing, selenides become more stable and selenium precipitates as ferroselite or substitutes for sulfur in pyrite.

10.0 SPATIAL AND TEMPORAL DISTRIBUTION OF INDICATORS OF POTENTIAL IMPACT

The purpose of this section is to examine the spatial and temporal distribution of groundwater parameters that occur at the site and determine if evidence is available to determine whether water quality variability across the site could be related to impact from the milling operation. If there have been groundwater impacts from the uranium milling process and that impact is included in calculation of standards, the proposed GWCLs could be established at a value too high to provide early warning of potential problems.

On the other hand, concentration trends in natural background that are not accounted for in the GWCL may cause unnecessary corrective actions to be taken and could limit the effectiveness of any action that might be employed. Another factor to consider is that, assuming a normal distribution, setting the GWCL at a value of two standard devotions above the mean, virtually guarantees that each well will be out of compliance in about five percent of all concentration values measured in groundwater samples from that well. This factor is in addition to spatial and temporal changes known to be migrating onto the site with currently unknown implications (i.e., changes in groundwater levels that clearly originate off site.)

However, as discussed in Section 9.0, the chemical constituents present at high concentrations in tailings solutions have transport properties that would allow early detection of milling related impacts to groundwater and the Tailings Cells have been in place for over 20 years with little defined impact. Therefore, to separate those constituents that have little probability of providing definitive indication of mill process related impact to groundwater, the constituents from Table 2 of DUSA's GWDP are divided into three groups, as presented in Table 14.

Based on this table it is possible to divide the constituents that make up the GWDP into three groups. The upper, orange part of the list of constituents, with the ubiquitous presence across the site, include all the major anionic species commonly found in groundwater and discussed above as potential tracers of mill process impact to groundwater.

Interestingly, this upper part of the list also includes uranium. This placement among commonly detected constituents confirms that uranium is likely the most mobile of the trace constituents on the GWDP list in the groundwater environment beneath the mill site, and possibly the most mobile of the heavy metal constituents of greatest concern. Nitrate species, in the next group down, have been consistently detected in less than half of historic monitor wells. Molybdenum and arsenic, the two other species that, like selenium, form oxyanions, have been detected less

frequently than typically insoluble, redox sensitive iron and manganese species. Constituents even lower on the list are rarely detected in groundwater beneath the mill site. The point here is not to propose that sampling of the rarely detected species be discontinued, but rather to focus attention on the more mobile constituents as indicators of milling related impact.

Figures 8 through 13 plot constituent concentration values that were present in groundwater samples taken in 1983 compared to values from samples taken in 2005/2006. Although these plots represent a comparison of snap shots for each constituent, they do show the spatial distribution of the constituents during these periods and give an idea of temporal changes in concentrations. For a full discussion of linear trends in constituents over time, see Section 2.0 and Table 2.2-1

10.1 Chloride

Figure 8 is a plot of the chloride concentration values that were present in groundwater samples taken in 1983 for comparison with concentration values from samples of as many of the same wells with data available in samples from 2005 and 2006. Like the similar plots of TDS concentration presented in Figure 5, these plots indicate the relative magnitude of concentration values by the relative size (area) of the bubble for each well. Note that, as with TDS concentrations, the chloride values are similar from 1983 to 2005-2006, indicating that, in spite of the variable magnitude of concentrations across the site, these comparative snap shots demonstrate that there has been little change in concentrations in samples from each well. See Section 2.0 and Table 2.2-1 for an analysis of any statistically significant chloride trends at the site.

The values plotted for 1983 are only for those wells that were present on the site in 1983. The values plotted for 2005/2006 present a similar plot for all available 2005/2006 data, and while similarities are notable, higher values are present at some recently installed wells giving the impression that something has changed. This is related to the common phenomenon in placement of monitoring wells: they tend to be located adjacent to potential sources of impact. However, the older wells almost completely surround the new wells and the older wells have not changed significantly. If there had been recent impact that produced higher concentrations at the newer wells, it is hard to imagine that older wells could have avoided some impact. Most of the new wells have been located at the downgradient edge of the tailings cells. Therefore, although it may appear that there are higher concentrations at the downgradient edge of the cells. The most likely explanation is that more data has revealed a wider range of groundwater

quality at the site, and that additional wells at random locations around the site would show similar results.

The concentrations of other species of interest are presented in similar two plot series showing snapshots of groundwater quality across the site. Fluoride concentrations are presented in Figure 9. Figure 10 is for sulfate concentrations during the same periods. Figures 11, 12 and 13 present gross alpha concentrations, selenium concentrations, and uranium concentrations respectively. These constituents are discussed below:

10.2 Fluoride

Fluoride concentrations are variable from location to location (Figure 9). In 1983 the highest concentration was 0.74 mg/L fluoride in MW-5, just downgradient of Cell 3. In 2005/2006 the highest concentration was 1.03 mg/L fluoride in upgradient monitor well MW-19. The lowest concentrations measured in 2005 (0.2 mg/L) were in samples from monitor wells MW-14 and MW-15 located just downgradient of Cell 4, and MW-32 located on the eastern margin of Cells 2 and 3. Only one statistically significant trend in fluoride at the site exists. Table 13 indicates that the downward trend of the fluoride regression line is statistically significant. A downward trend in fluoride is evidence that there has been no impact by tailings seepage at this location. See the discussion in Section 2.0.

10.3 Sulfate

The sulfate concentration plots (Figure 10) closely resemble the TDS plots (Figure 5), highlighting the variability of sulfate concentrations between different monitor wells and the relative stability of sulfate concentrations measured at each well over time. Data collected in 1983 ranges from 658 mg/L sulfate at MW-1 to 3226 mg/L sulfate at MW-3, while data collected in 2005/2006 ranges from 688 mg/L sulfate at MW-1 to 3553 mg/L sulfate at MW-3. Like TDS plots (Figure 5) relative concentrations at each well are similar from 1983 to 2006 data, indicating that there is no significant trend in sulfate data for the site as a whole over that time period. See Section 2.0 for an analysis of statistically significant sulfate trends in individual wells at the site.

10.4 Gross Alpha

Gross alpha concentrations are often related to the uranium or thorium decay chains, but a large number of other radionuclides decay by the spontaneous emission of alpha particles. Radionuclides having atomic numbers of 58 (cesium) or higher can decay by this mechanism

(Faure, 1977). In addition, some radionuclides with low atomic number, such as helium, lithium and beryllium decay by this mechanism. Thus, gross alpha may not be a good indicator of milling impact to groundwater. Distribution of gross alpha concentrations in 2005/2006 (Figure 11) show no spatial relationship to tailings cells or mill buildings. Comparison of 2005/2006 concentrations to those measured in 1983 indicates that current groundwater values are lower than those that existed in groundwater before any impact to groundwater could reasonably be expected. See Section 2.0 for a discussion of individual monitoring wells that have exhibited mean gross alpha values in excess of the GWQS for gross alpha.

10.5 Selenium

Selenium is also a redox sensitive constituent and, as mentioned in the discussion of constituent trends in Section 2.0, significant evidence of rising selenium concentration in upgradient monitor well MW-19 and in far downgradient monitor well MW-3 would be difficult to explain as being related to tailings cells or the milling process stream. MW-19 is more than 1,500 feet upgradient of the Mill and as much as 2000 feet upgradient of the first tailings cell. MW-3 is located approximately 3,000 feet downgradient of the closest tailing cell, Cell 4A, and as much as 4,000 feet (or three quarters of a mile) downgradient of the closest active tailings cell. See Section 2.0 for an analysis of increasing trends in selenium in certain monitoring wells at the site. In comparing the distribution of selenium in 1983 and in 2005/2006 (Figure 12), note that the highest concentration of selenium is found in MW-15, which was not in existence in 1983. This relatively high concentration of selenium is MW-15 is indicative of variable water quality at the site combined with natural influences that have caused increasing trends in selenium in certain wells at the site (see Section 2.0).

10.6 Uranium

In comparing uranium distributions from 1983 to 2005/2006, it is notable that, for the wells that existed in 1983, MW-1, MW-2, MW-5, MW-11, and MW-12, there has been little change. As discussed in Section 2.0, however, there have been increasing trends in uranium, most notably in upgradient well MW-18, but also in MW-14, MW-15, MW-17, and far downgradient MW-3. The rising trends in uranium are attributable to natural causes (see Section 2). It is noteworthy from Figure 13 that the highest concentrations of uranium are distributed across the site, both upgradient and downgradient, as well as close to the tailings cells themselves, which further supports our conclusion that uranium concentrations at the site have not been impacted by Mill activities.

Once again, it is necessary to recall that monitoring wells tend to be located adjacent to potential sources of impact and not in locations that might demonstrate that concentration changes are more widespread.

11.0 TESTS FOR CORRELATIONS BETWEEN CHLORIDE AND URANIUM

11.1 Combining Uranium and Chloride Concentration Data to Track Potential Impact

From measured concentrations of uranium and chloride in the tailings solutions (Table 15) we know that the average value of uranium in these solutions is 93.6 mg/L while the average value of chloride is 4608.44 mg/L. If uranium concentrations in wells adjacent to tailings cells represented impact from tailings solution, abundant experience from other uranium mill tailings sites and general experience in numerous groundwater investigations in the last 30 years indicates that cell seepage could not transport uranium more quickly than chloride (see Section 9.0). Thus, any uranium concentrations from tailings cell seepage impacting groundwater would have to be accompanied by corresponding increases in chloride concentrations.

Thus, a primary way to discriminate between tailings solution impact, and lack of impact would be correlation or lack of correlation between uranium and chloride concentrations. If a location has been impacted by tailings solutions and uranium exhibits an increasing trend in concentration it should be accompanied by an increasing chloride trend. In a plot of uranium concentrations versus chloride concentrations, lower values of uranium should be associated with lower values of chloride and higher values of uranium should be associated with higher values of chloride, forming a linear trend of correlated values. If no linear trend exists in a plot of uranium versus chloride, we can conclude that the groundwater sampled has not been impacted by solutions in the tailings cells. Note that it is a lack of correlation that allows a positive logical conclusion. If a correlation exists the conclusion would be that tailings impact cannot be ruled out.

Figure 14 is a plot of chloride versus uranium for monitor wells exhibiting highest uranium concentrations in 2006 that have sufficient data to support an analysis, including monitor wells MW-2, MW-5, MW-11, MW-12, MW-14, MW-15, and MW-17 adjacent to tailings cells, upgradient monitor wells MW-1, MW-18, and MW-19, and downgradient monitor well MW-3. All plots show a "scatter gun" random distribution of data pairs and correlation coefficients are all low. These data indicate that there is no correlation between chloride and uranium in these wells and no spatial relationship between the distribution of uranium concentrations in groundwater and tailings cells or processing facilities.

Figure 13 shows that the highest uranium concentrations measured in samples of groundwater from the site in 2005 and 2006 were from MW-14, averaging 68 µg/L. Figure 8 demonstrates

that the average chloride concentration in MW-14 during 2005-2006 is 19 mg/L. The uranium regression plot for MW-14 (Appendix C) indicates a slight (R^2=0.248) but significant upward trend. However the chloride regression plot for the same well indicates a slight but insignificant negative trend (R^2=0.0064). MW-15, adjacent to MW-14 also exhibits a slight but significant upward trend in uranium (R^2=0.144) and no trend in chloride indicating that uranium concentrations in groundwater from this well are not the result of tailing seepage.

To further illustrate this concept, consider upgradient monitor well MW-18 and far downgradient monitor well MW-3. Groundwater samples from both of these monitor wells exhibit strong and significant upward trends (MW-18, R^2=0.875; MW-3, R^2=0.308) and MW-18 (upgradient of any possible impact from tailings cells) also exhibits a slight but statistically insignificant upward trend in chloride (R^2=0.143). The chloride trend in MW-3 is flat (i.e., no trend, R^2=0.000008)

The observations detailed above demonstrate that uranium trends in monitor wells at the site do not have associated increases in chloride concentrations that would be expected if tailings seepage were impacting groundwater. Further, wells that exhibit increasing trends in uranium bear no spatial relationship to the tailings cells. Upgradient as well as far downgradient wells have increasing uranium trends.

Based on the discussion of retardation and potential use of constituents as tracers of milling impact to groundwater in Section 9.0, and numerous studies of trace element behavior (Yu et al., 2001), uranium has potential to be, next to chloride and fluoride, the most mobile of the constituents that are present in the uranium milling process and generally considered to be of greatest concern. If uranium has not impacted groundwater in the 26 years that the mill has been operational, it is unlikely that less mobile constituents in tailings fluids have or will impact groundwater.

Evidence that uranium, next to chloride and fluoride, is the most mobile of constituents of concern at the Mill is given by its place in the classification of constituents from Table 14, which is based on the frequency that various constituents have been detected in groundwater. While there were periods in the history of sampling and analysis of groundwater that detection limits were too high to detect a small number of constituents (principally beryllium, cadmium, lead, molybdenum, thallium and vanadium), these periods represent less than 30 percent of the sampling record. Omitting these periods results in the same classification of constituents shown in Table 14, thereby supporting uranium as the most mobile of the constituents of concern, next to chloride and fluoride.

The distribution of uranium has been demonstrated above to be unrelated to tailings cells or milling processes at the site. Therefore we conclude that current variability in groundwater concentrations represent natural variability in the Burro Canyon Formation and should be incorporated into calculations of GWCLs. A corollary conclusion is that trends in concentrations, observed, for example, in selenium concentrations measured in groundwater samples from upgradient monitor wells MW-18 and MW-19, and for downgradient well MW-3, also represent natural variability and should be factored into compliance monitoring.

12.0 CALCULATION OF GWCLS

Evidence suggests that changes are occurring to the groundwater system that are not the result of tailings seepage, but instead, represent other natural and/or offsite sources that are not under DUSA's control and which DUSA has no responsibility or ability to abate. Under these conditions compliance standards calculated using a mean plus two standard deviation approach are inappropriate and could lead to a false conclusion that groundwater has been impacted by tailings seepage. Nevertheless, the values calculated using this approach are presented in Tables 11a and 11b as requested by UDEQ. INTERA recommends that alternative methods for calculating compliance standards that incorporate natural changes to the groundwater system should be discussed before compliance values are finalized. One such method would be to base compliance standards on rations between trending constituents and indicative parameters, such as chloride.

13.0 CONCLUSIONS

This Background Groundwater Quality Report has been prepared in accordance with the requirements of Part I.H.3 of the GWDP to evaluate all historic data for the purposes of establishing background groundwater quality at the site and developing GWCLs under the GWDP.

In preparing this Report we have compiled a database of over 19,000 entries, have performed QA/QC analysis on the database, have performed statistical analysis of the data and have analyzed the data and the statistical results as required by Part I.H.3 of the GWDP and have made such other determinations as we have considered necessary in order to establish background groundwater quality at the site.

After extensive analysis of the data, we have concluded that there have been no impacts to groundwater from Mill activities.

Because Mill activities have not impacted background groundwater quality, setting the GWCLs as the mean plus two standard deviations will be appropriate for each constituent that has a sufficient number of data points and that does not exhibit an increasing trend. In most cases, the data for these constituents appear to be close to being normally or log normally distributed. In cases where the data set for a constituent is comprised mainly of non-detects, it may be more appropriate to set the GWCL as the GWQS, since there is no meaningful mean and standard deviation for the constituent. However, where a constituent exhibits a rising trend, setting the GWCL as the mean plus two standard deviations is not recommended, because the data is not distributed normally, and it will be just a matter of time before the increasing trend will cause the GWCL to be exceeded, due entirely to natural causes. In such cases, consideration should be given to developing compliance limits based on other factors, such as ratios between the trending constituent and indicator parameters such as chloride.

14.0 REFERENCES

Altinok, Efem, 1998. Diagenesis of the Burro Canyon Formation, Lisbon Valley Region, Utah-Colorado. Unpublished MS. Thesis, Colorado School of Mines, 1500 Illinois Street, Golden, CO 80401.

Aubrey, W. M., 1989. Mid-cretaceous alluvial-plain incision related to eustasy, southeastern Colorado plateau. Geological Society of America Bulletin101: 443-449.

Dames & Moore, 1978. Environmental report White Mesa Uranium Project San Juan County, Utah. Prepared for Energy Fuels Nuclear, Inc. January 30, 1978

Diaz, H.F., and Anderson, C.A., 1995, "Precipitation trends and water consumption related to population in the southwestern United States: A reassessment": Water Resources Research, v. 31, p. 713-720, March 1995.

DOE, 2004, "Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Draft Environmental Impact Statement", Chapter 3.4, DOE/EIS-0355D, November 2004.

EPA (U.S. Environmental Protection Agency), 1992, Statistical analysis of ground-water monitoring data at RCRA facilities: Addendum to Interim final guidance, Office of Solid Waste, Permits and State Programs Division, U.S. Environmental Protection Agency, 401 M Street, S.W. Washington, D.C. 20460

EPA (U.S. Environmental Protection Agency), 1996, Guidance for data quality assessment practical methods for data analysis EPA QA/G-9 Number: 600R96084, 169p.

EPA (U.S. Environmental Protection Agency), 1988, 40 CFR Part 264: Statistical methods for evaluating from hazardous waste facilities; Final rule, Federal Register, 53, 196, pp. 39720-39731.

Faure, Gunter, 1977, *Principles of isotope geology,* John Wiley & Sons, New York, New York. 464

Gilbert, R.O. 1987. Statistical methods for environmental pollution monitoring. Van Nostrand Reinhold, New York.

Hunt, G. L.,1996, *Environmental handbook, environmental regulations for the oil & gas exploration and production industry,* Prepared by G. L. Hunt, Environmental Manager, Utah Division of Oil, Gas and Mining. January 1996.

International Uranium Corporation, 2002a. November 22, 2002, letter from Utah Department of Environmental Quality to International Uranium Corporation regarding November 2001 split sampling results for White Mesa Uranium Mill. December 20, 2002.

International Uranium Corporation, 2002b. Correspondence from Harold Roberts to Loren Morton. November 26, 2002.

International Uranium Corporation, 2002c. Transmittal of IUSA's field notes and analytical results from November 2001 groundwater split sampling at the White Mesa Uranium Mill, Blanding, Utah. October 18, 2002.

International Uranium Corporation, 2002d. Semi-annual effluent report, July 1 through December 21, 2001., Report prepared for the U.S. Nuclear Regulatory Commission. February 20, 2002.

Rai, D. and J. M. Zachara. 1984. Chemical attenuation rates, coefficients, and constants in leachate migration. Volume I: a critical review. EPRI, EA-3356, Research Project 2188-1.

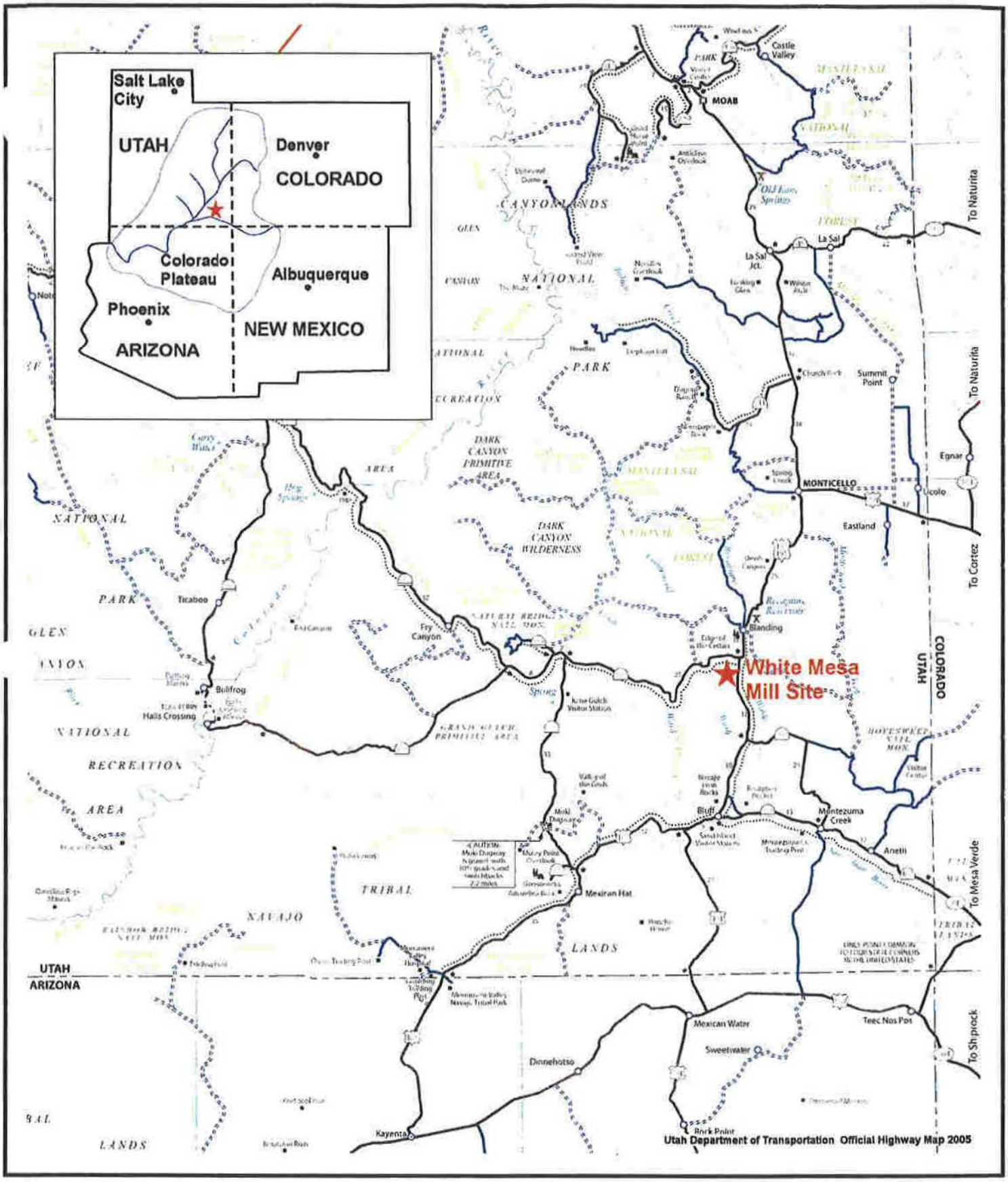
Shapiro, S.S. and Wilk, M.B. (1965) An analysis of variance test for normality (complete samples). Biometrika, 52:591-611.

StatSoft, Inc, 2005,. STATISTICA (data analysis software system), version 7.1. www.statsoft.com.

Titan Environmental Corporation, 1994. A hydrogeologic evaluation of White Mesa Uranium Mill. July 1994.

Yu, C, K.A. Orlandini, J.-J. Cheng, and B.M. Biwer, 2001. Assessing the impact of hazardous constituents on the mobilization, transport, and fate of radionuclides in RCRA waste disposal units. Environmental Assessment Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439

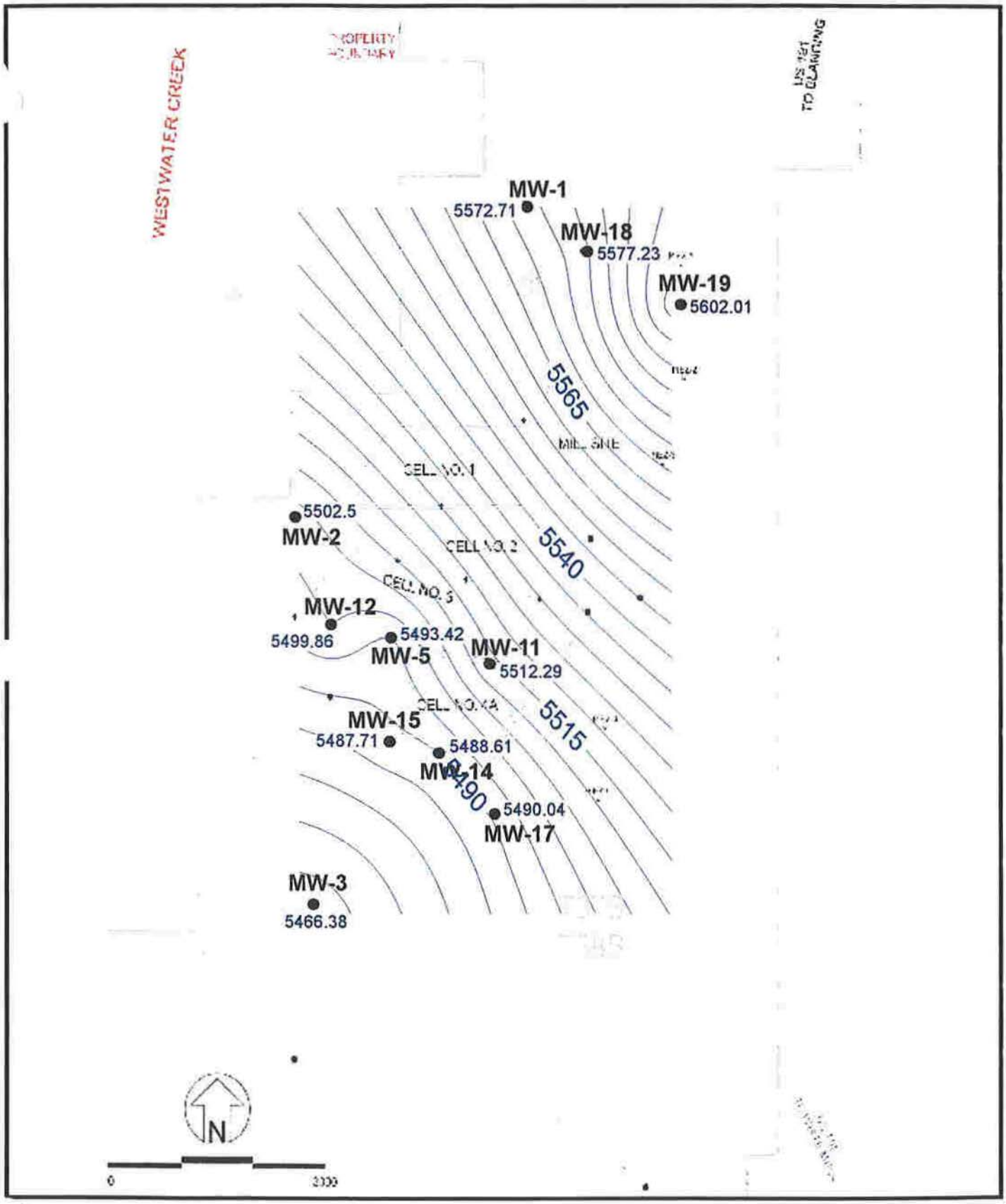
Wilson, J., 1996, Chlorinated solvents biodegradation. Ground Water Currents, Issue No. 16 (http://www.clu-in.org/products/newsltrs/gwc/view.cfm?issue=gwcchlrs.htm)



INTERA

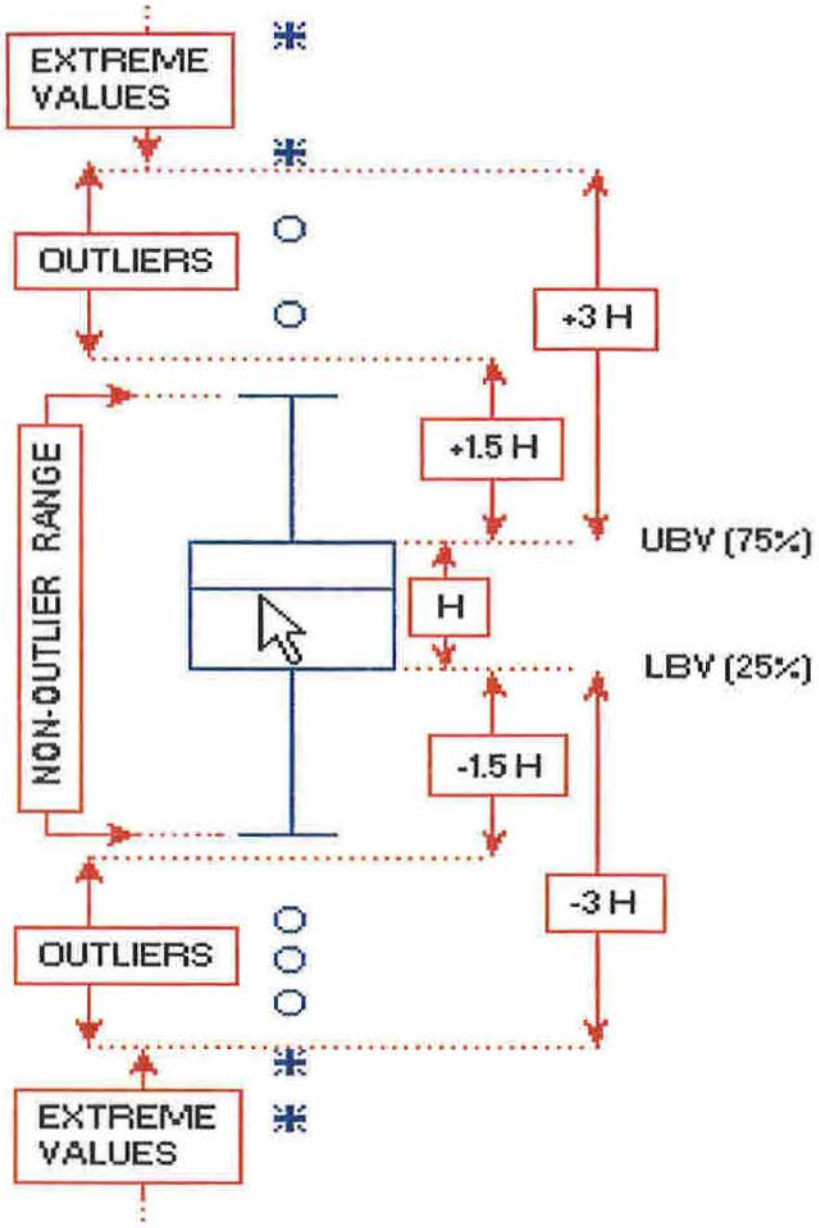
Regional Location Map
White Mesa Mill
Near Blanding, Utah

FIGURE 1



Groundwater Isopleth Map 2005 Data
White Mesa Mill
Near Blanding, Utah

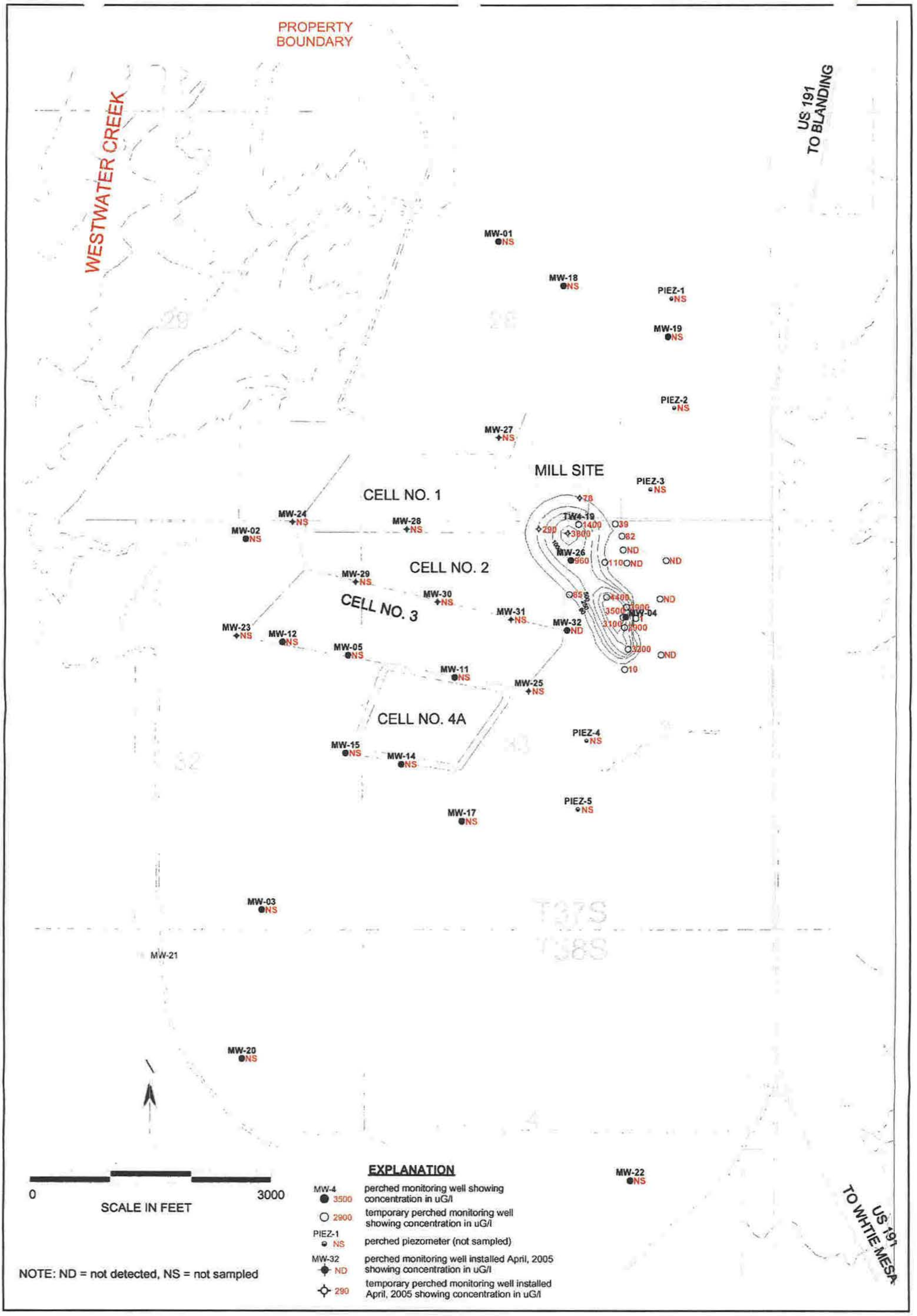
FIGURE 2



(Statsoft, Inc., 2005) from the Statistica data analysis software system, version 7.1, www.statsoft.com

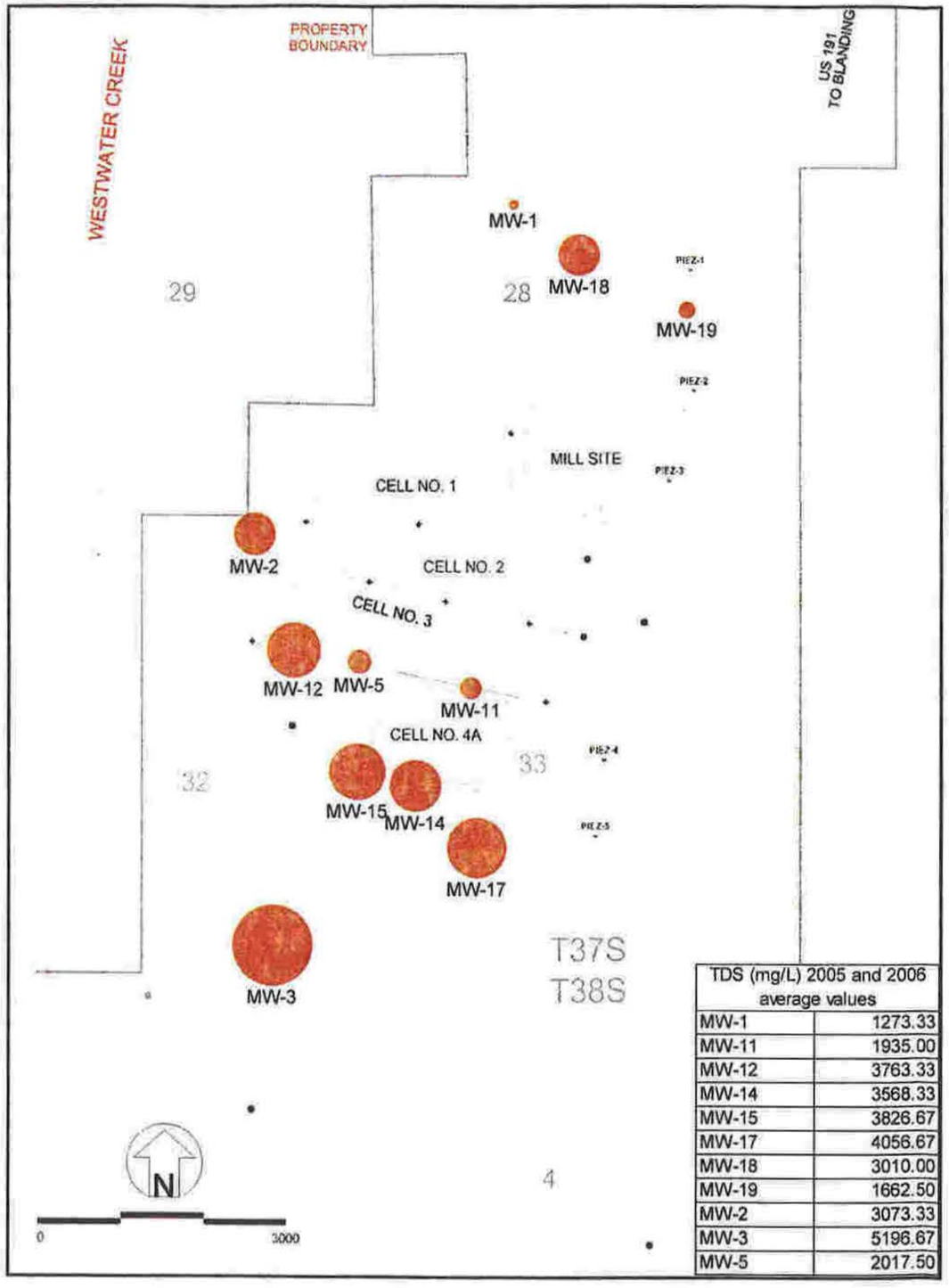
Generalized Box & Whisker Plot

FIGURE 3

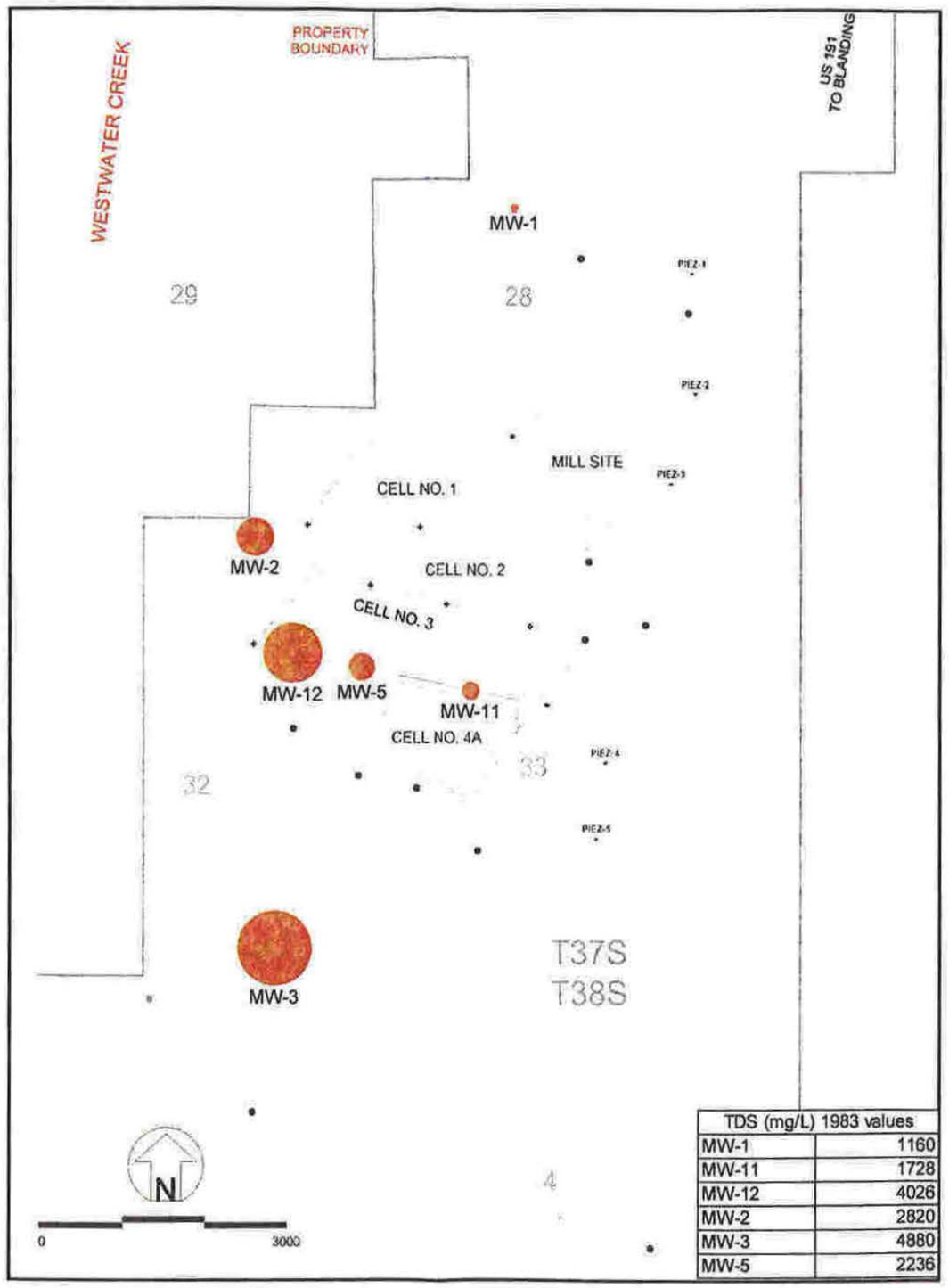


Spatial Distribution of Chloroform in 2005
White Mesa Mill
Near Blanding, Utah

FIGURE 4

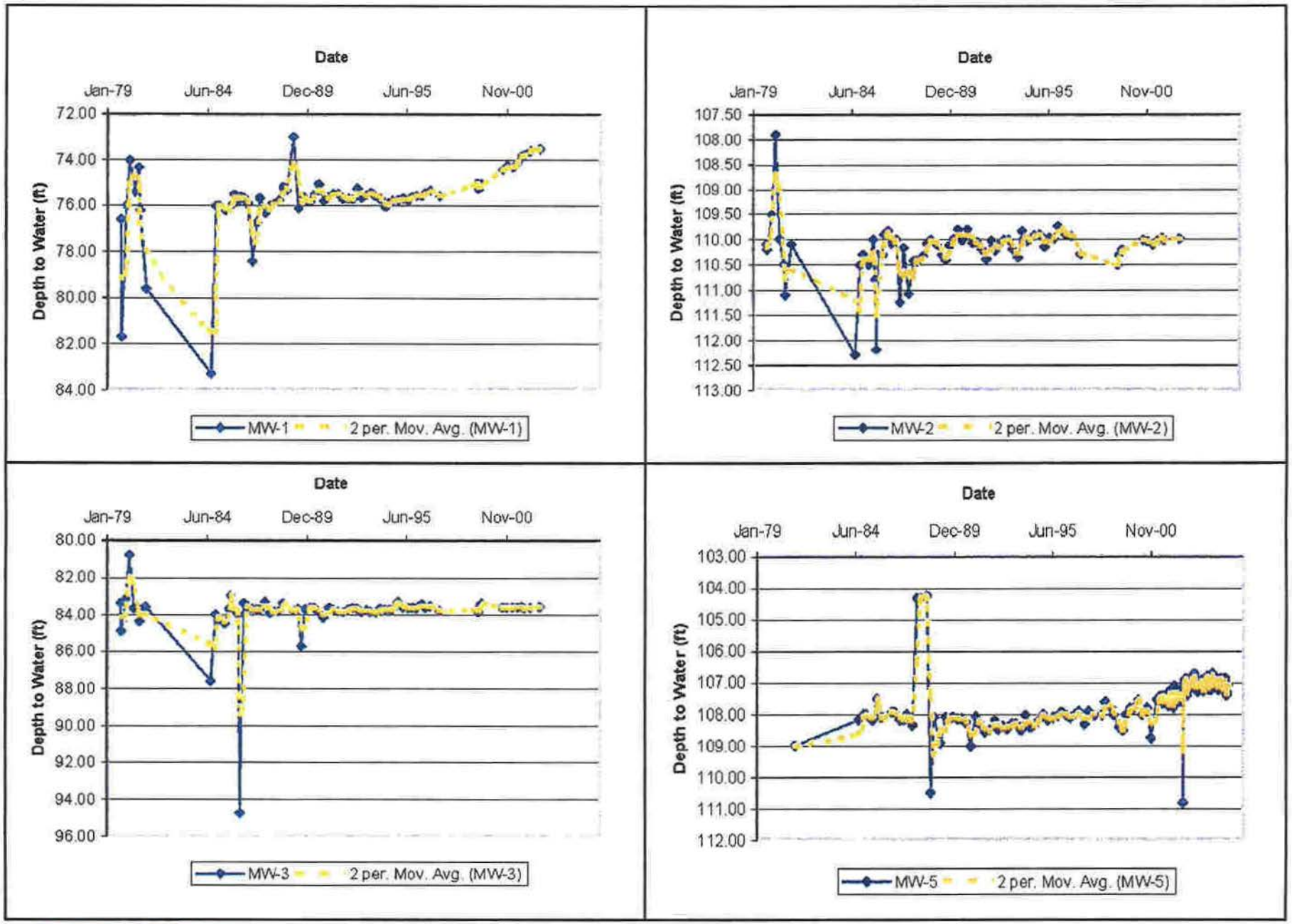


TDS (mg/L) 2005 and 2006 average values	
MW-1	1273.33
MW-11	1935.00
MW-12	3763.33
MW-14	3568.33
MW-15	3826.67
MW-17	4056.67
MW-18	3010.00
MW-19	1662.50
MW-2	3073.33
MW-3	5196.67
MW-5	2017.50

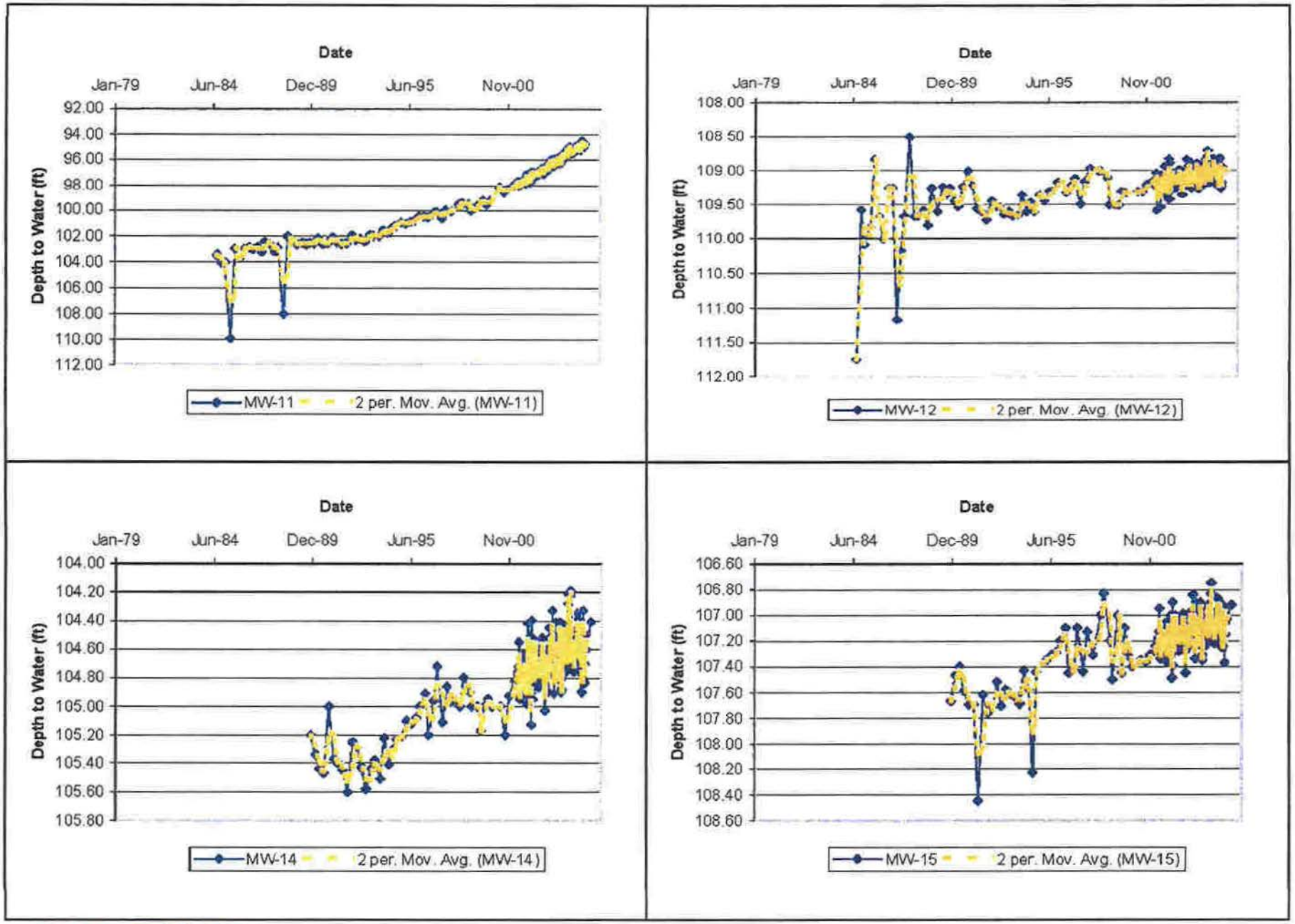


TDS (mg/L) 1983 values	
MW-1	1160
MW-11	1728
MW-12	4026
MW-2	2820
MW-3	4880
MW-5	2236

Figure 5
Map of monitoring wells depicting concentrations of total dissolved solids (TDS) present in samples of groundwater collected in 1983 and 2006.

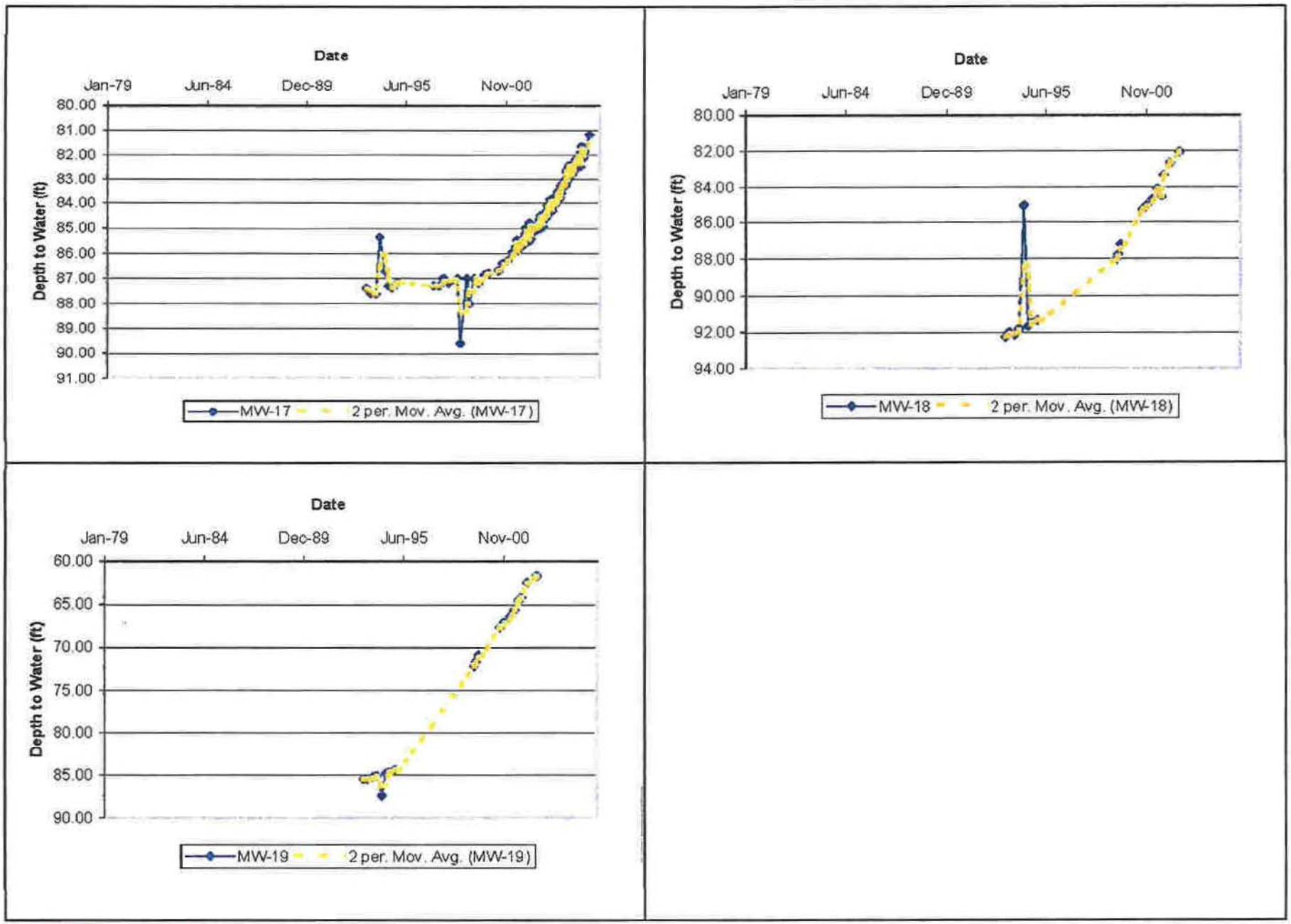


Hydrographs for Site Monitoring Wells showing groundwater trends with time
Figure 6

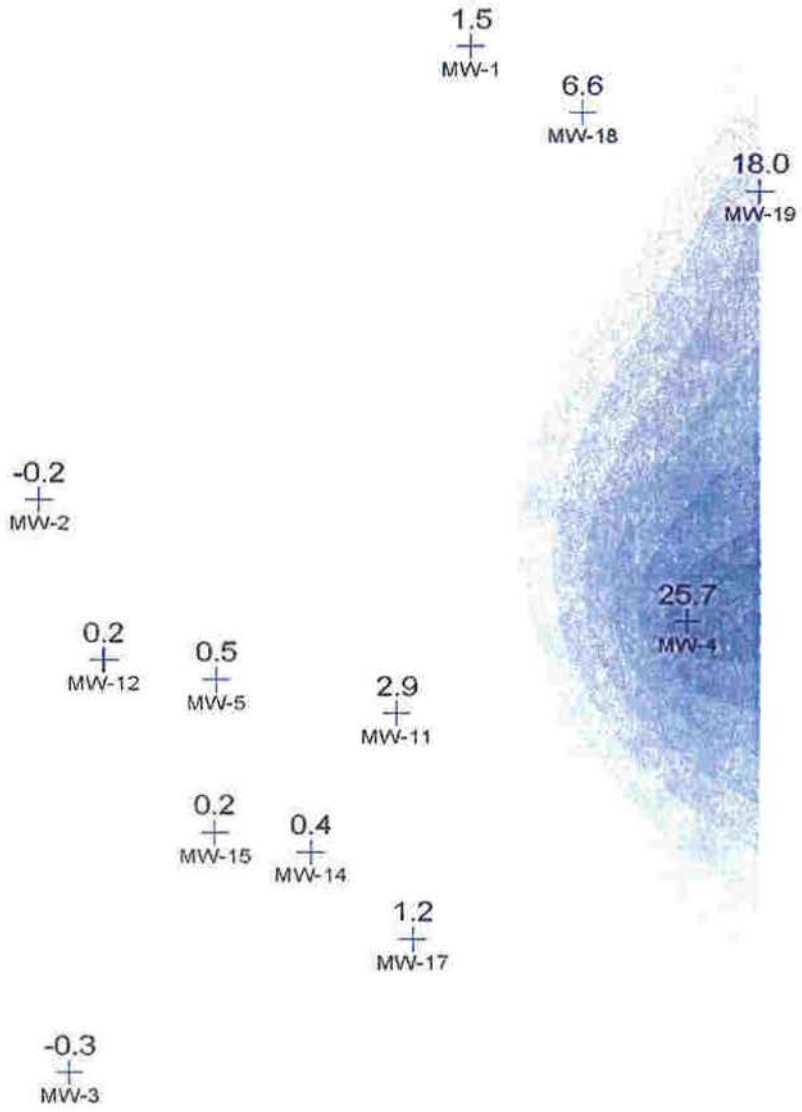


INTERA

Hydrographs for Site Monitoring Wells
showing groundwater trends with time
Figure 6



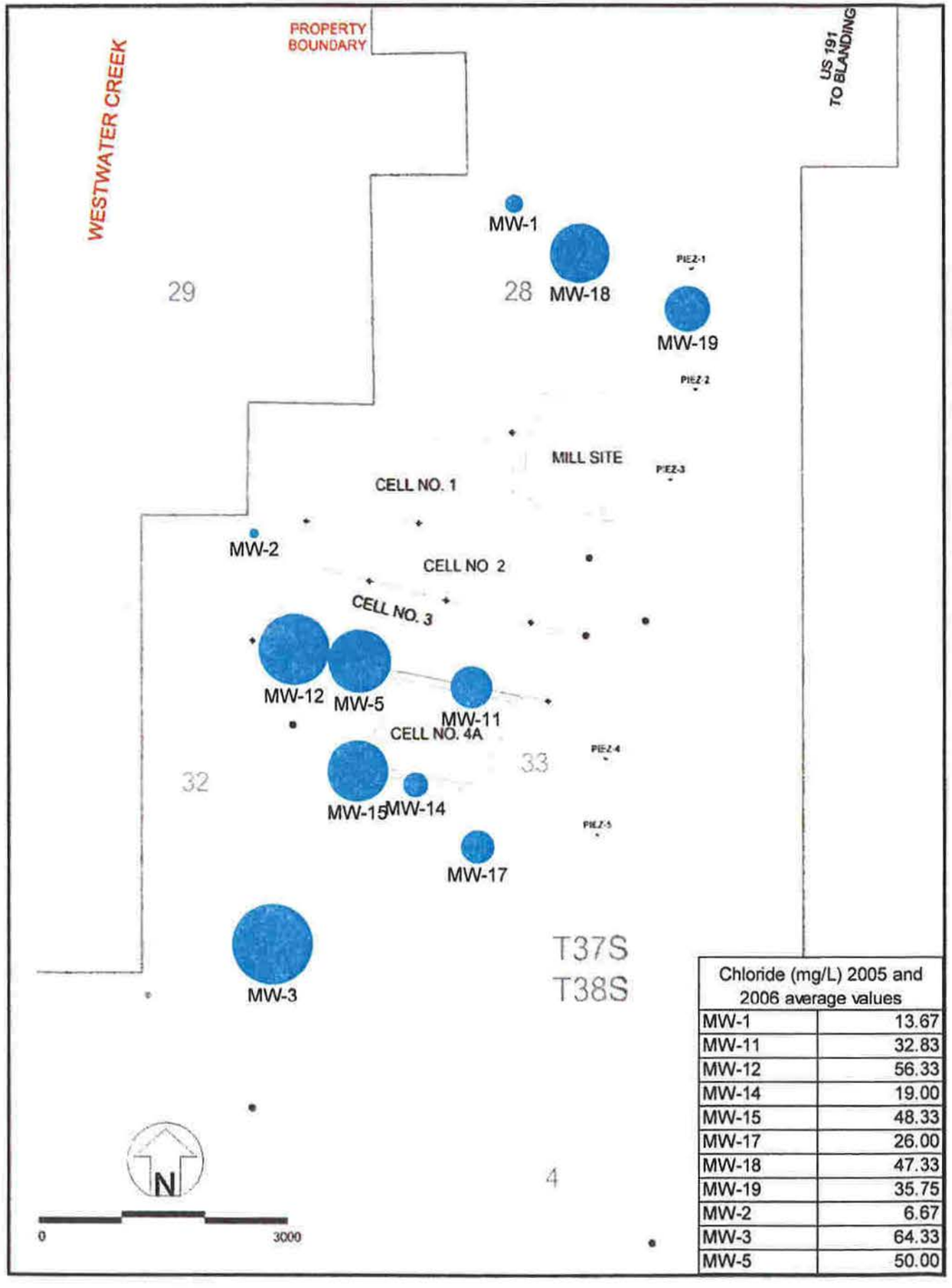
Hydrographs for Site Monitoring Wells showing groundwater trends with time
Figure 6



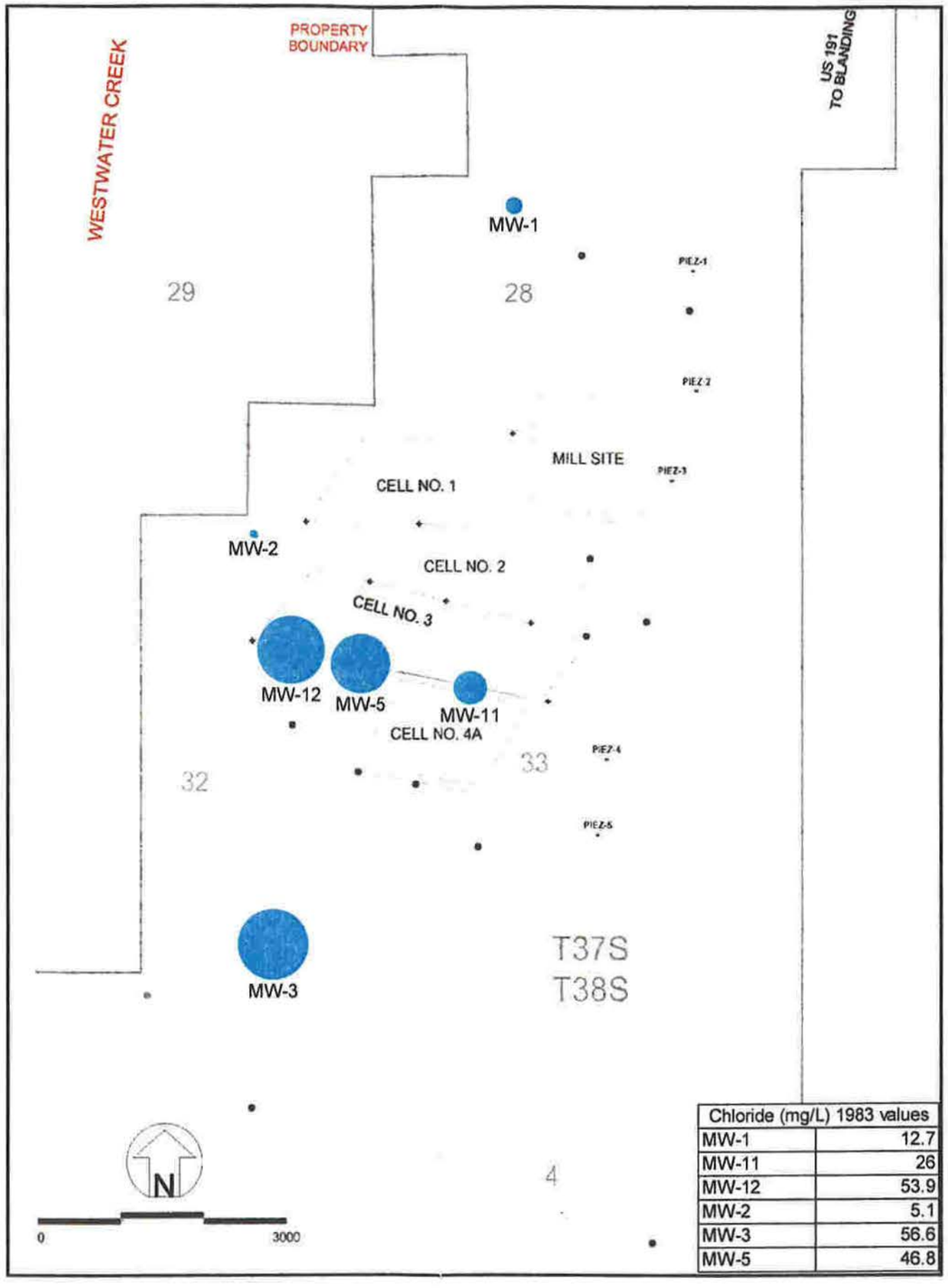
The number posted above each monitor well symbol is the difference in feet between the most current water level data available for each well and measurements taken in 1994.

Spatial Distribution of Water Level Changes from 1994 to 2001
White Mesa Mill
Near White Mesa, Utah

FIGURE 7

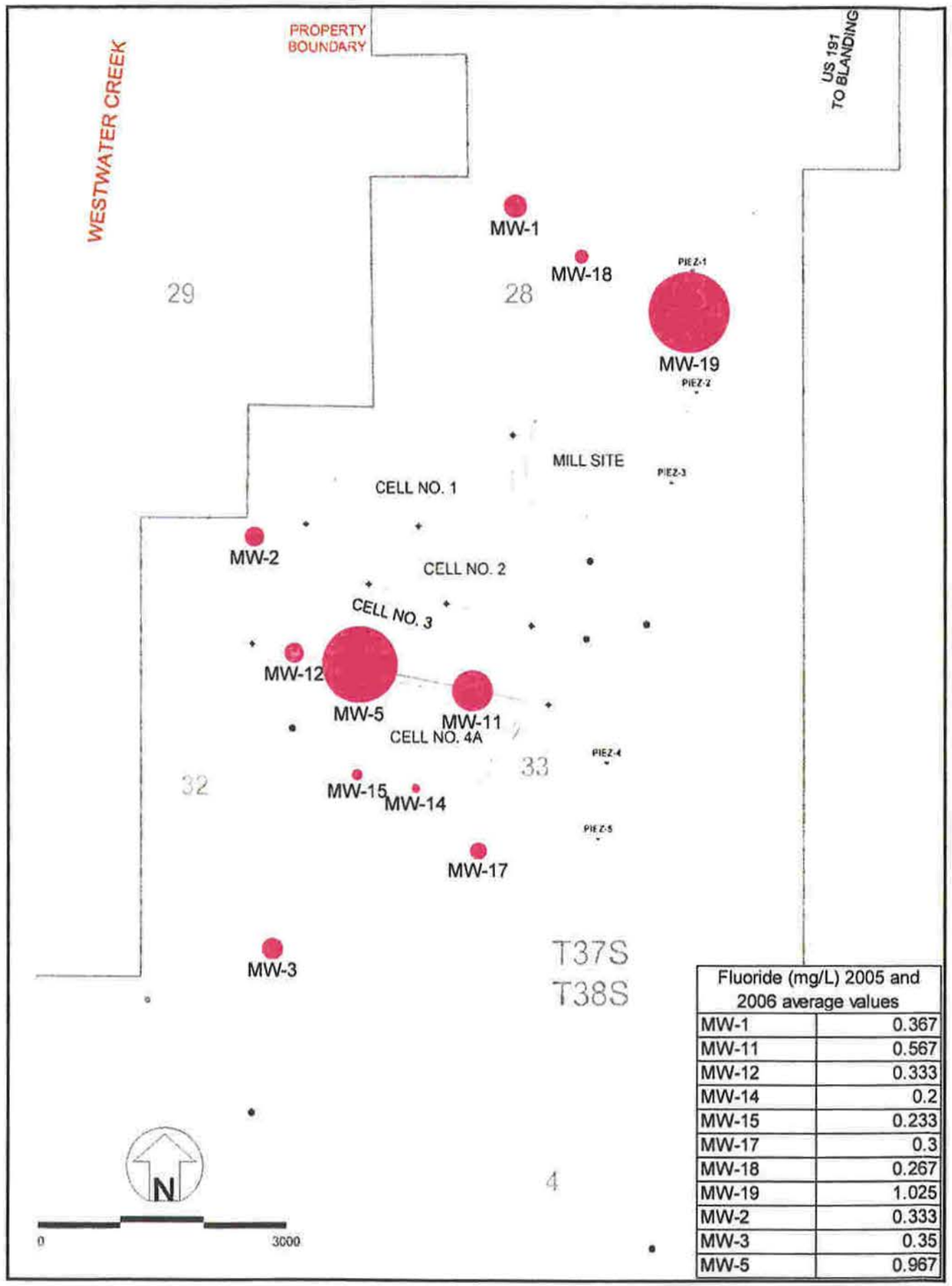


Chloride (mg/L) 2005 and 2006 average values	
MW-1	13.67
MW-11	32.83
MW-12	56.33
MW-14	19.00
MW-15	48.33
MW-17	26.00
MW-18	47.33
MW-19	35.75
MW-2	6.67
MW-3	64.33
MW-5	50.00

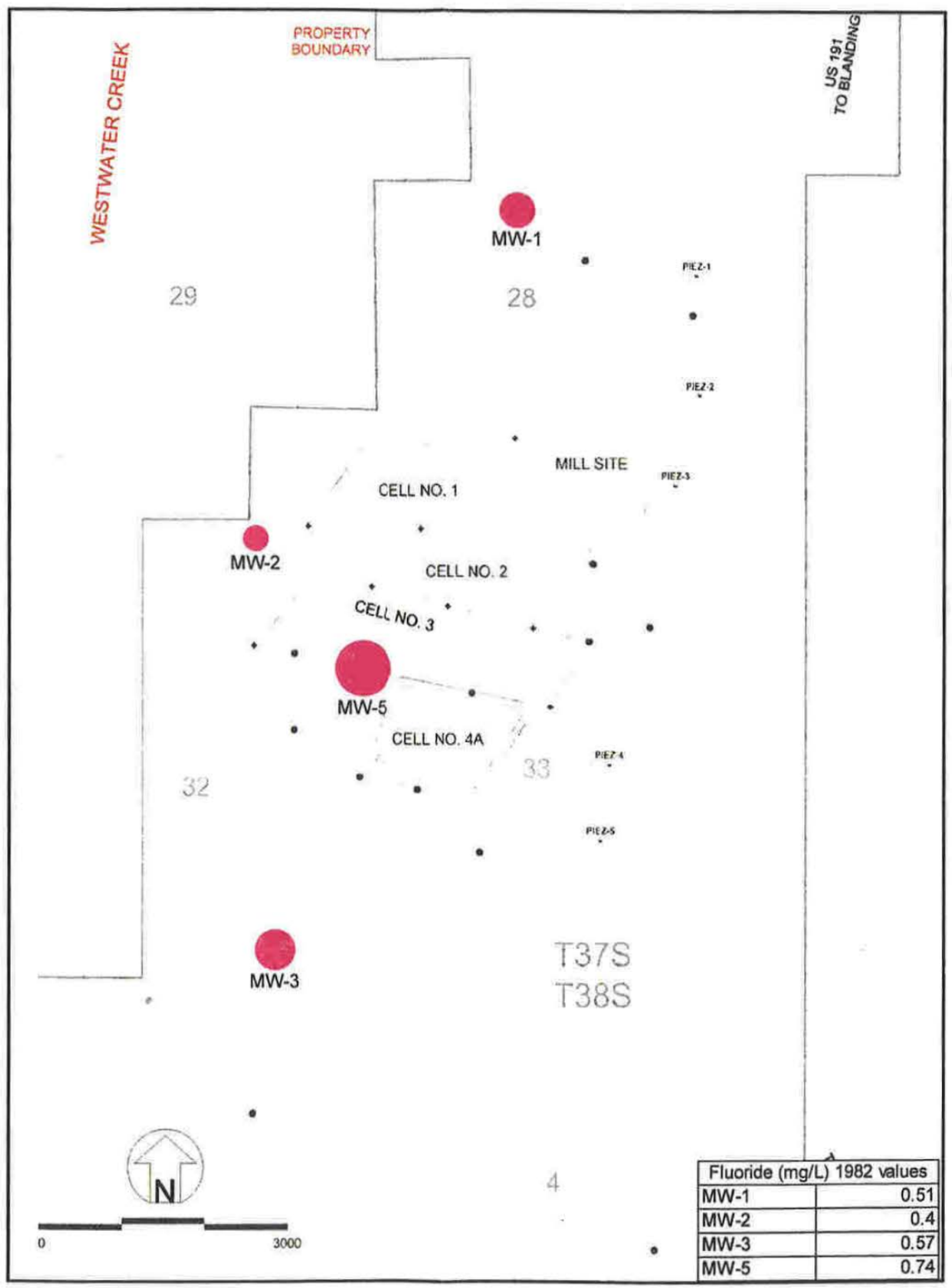


Chloride (mg/L) 1983 values	
MW-1	12.7
MW-11	26
MW-12	53.9
MW-2	5.1
MW-3	56.6
MW-5	46.8

Figure 8
Map of monitoring wells depicting concentrations of chloride present in samples of groundwater collected in 1983 and 2006.

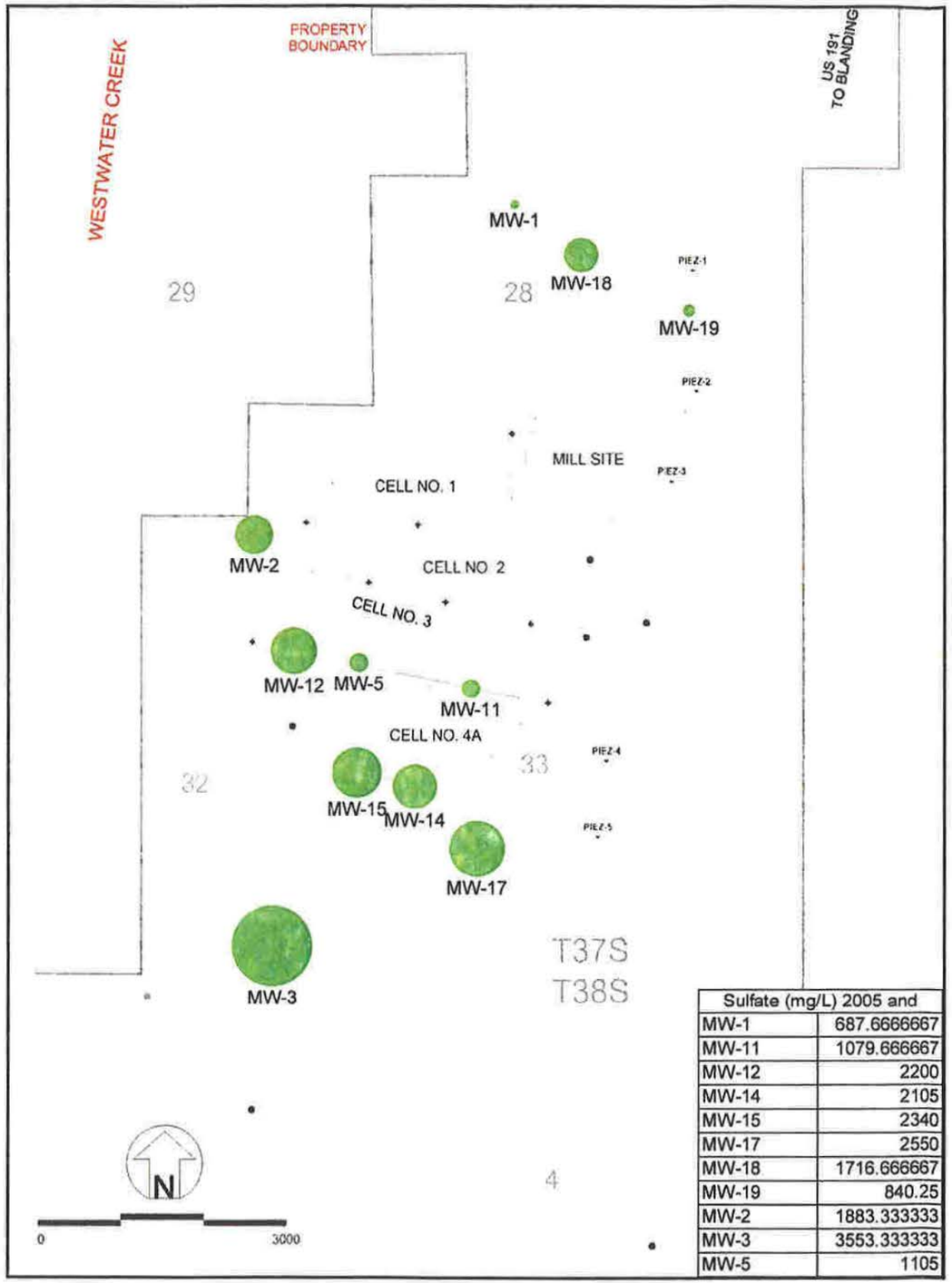


Fluoride (mg/L) 2005 and 2006 average values	
MW-1	0.367
MW-11	0.567
MW-12	0.333
MW-14	0.2
MW-15	0.233
MW-17	0.3
MW-18	0.267
MW-19	1.025
MW-2	0.333
MW-3	0.35
MW-5	0.967

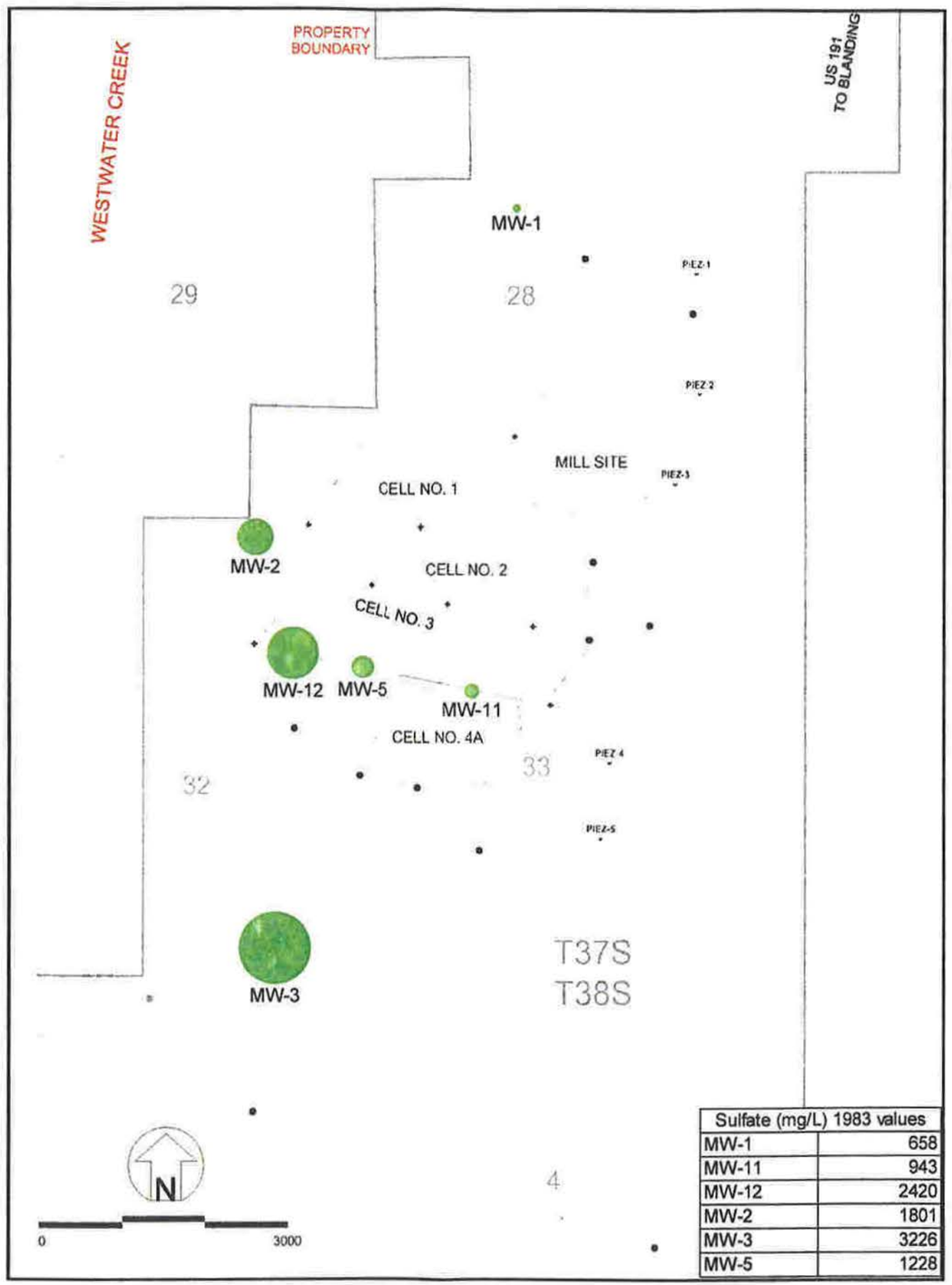


Fluoride (mg/L) 1982 values	
MW-1	0.51
MW-2	0.4
MW-3	0.57
MW-5	0.74

Figure 9
Map of monitoring wells depicting concentrations of fluoride present in samples of groundwater collected in 1983 and 2006.

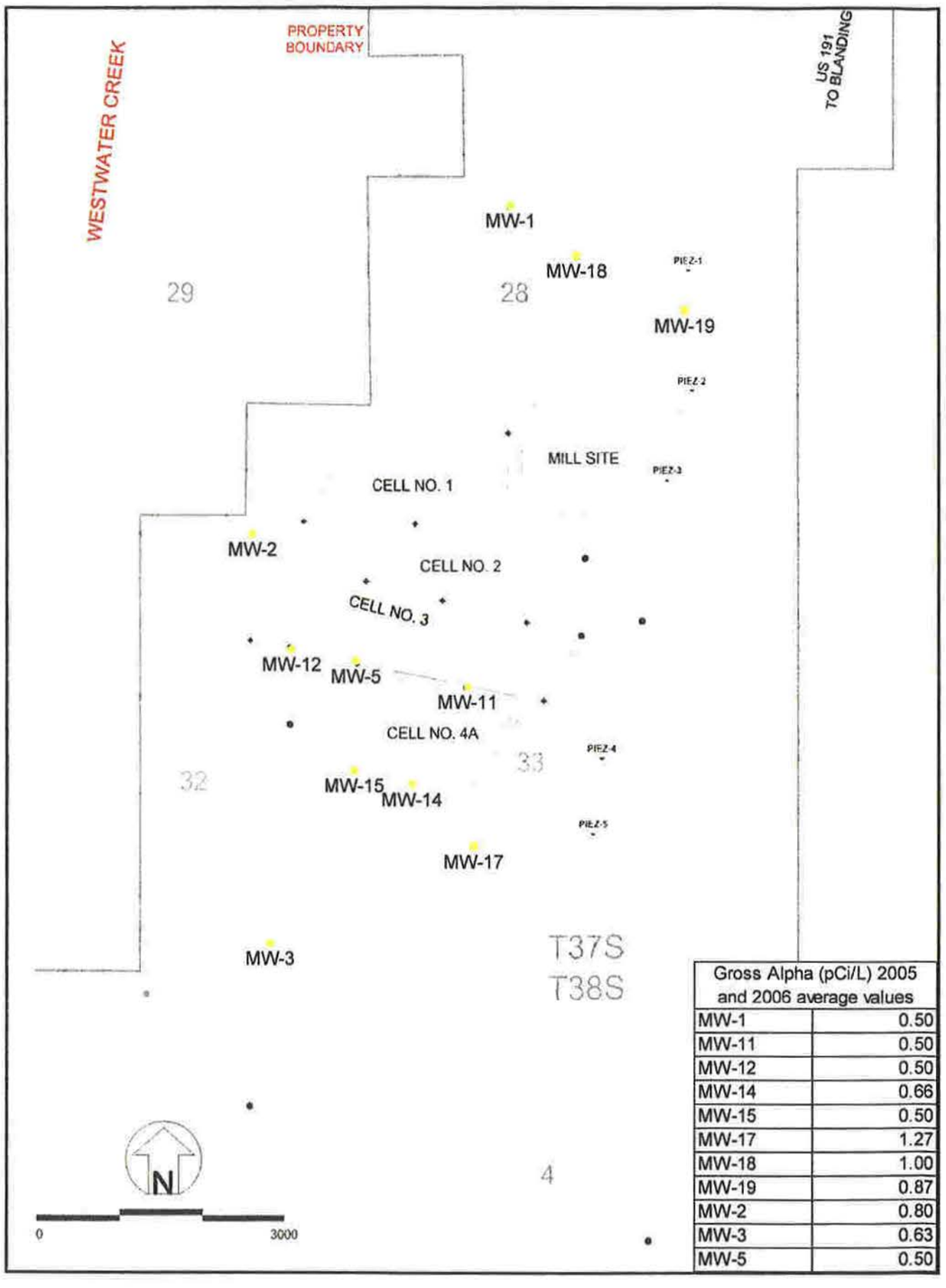


Sulfate (mg/L) 2005 and	
MW-1	687.6666667
MW-11	1079.666667
MW-12	2200
MW-14	2105
MW-15	2340
MW-17	2550
MW-18	1716.666667
MW-19	840.25
MW-2	1883.333333
MW-3	3553.333333
MW-5	1105

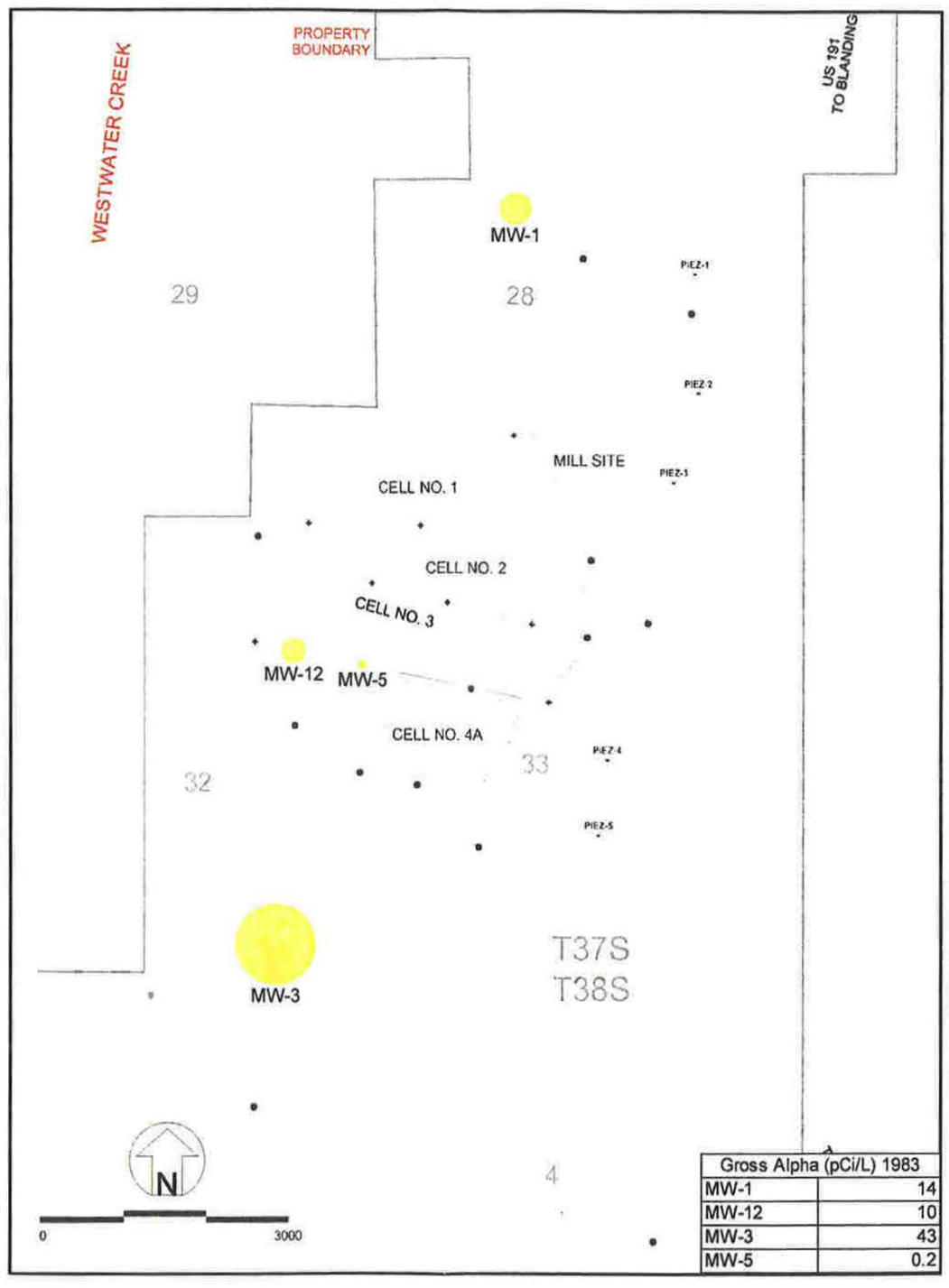


Sulfate (mg/L) 1983 values	
MW-1	658
MW-11	943
MW-12	2420
MW-2	1801
MW-3	3226
MW-5	1228

Figure 10
Map of monitoring wells depicting concentrations of sulfate present in samples of groundwater collected in 1983 and 2006.

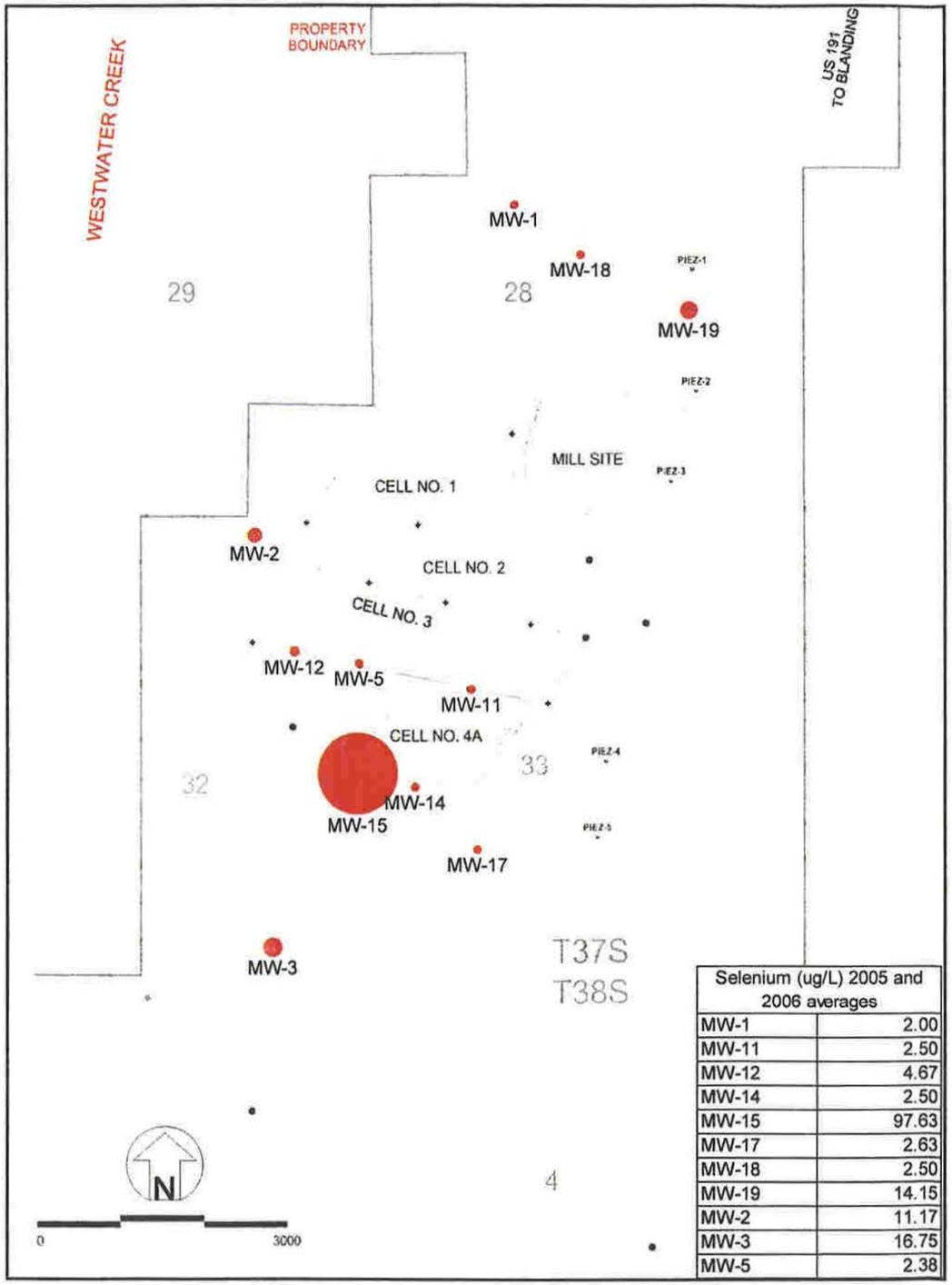


Gross Alpha (pCi/L) 2005 and 2006 average values	
MW-1	0.50
MW-11	0.50
MW-12	0.50
MW-14	0.66
MW-15	0.50
MW-17	1.27
MW-18	1.00
MW-19	0.87
MW-2	0.80
MW-3	0.63
MW-5	0.50

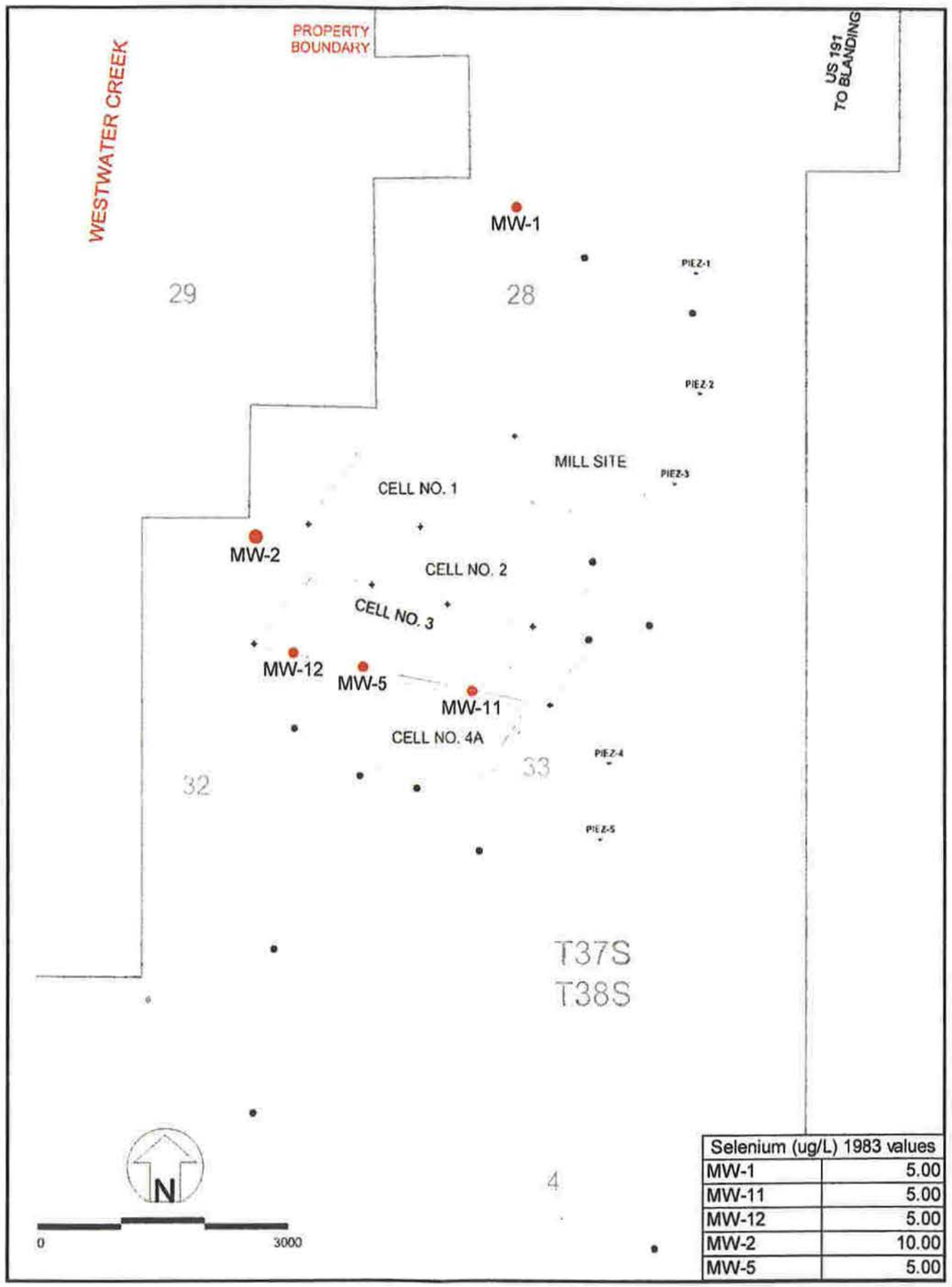


Gross Alpha (pCi/L) 1983	
MW-1	14
MW-12	10
MW-3	43
MW-5	0.2

Figure 11
Map of monitoring wells depicting concentrations of gross alpha present in samples of groundwater collected in 1983 and 2006.

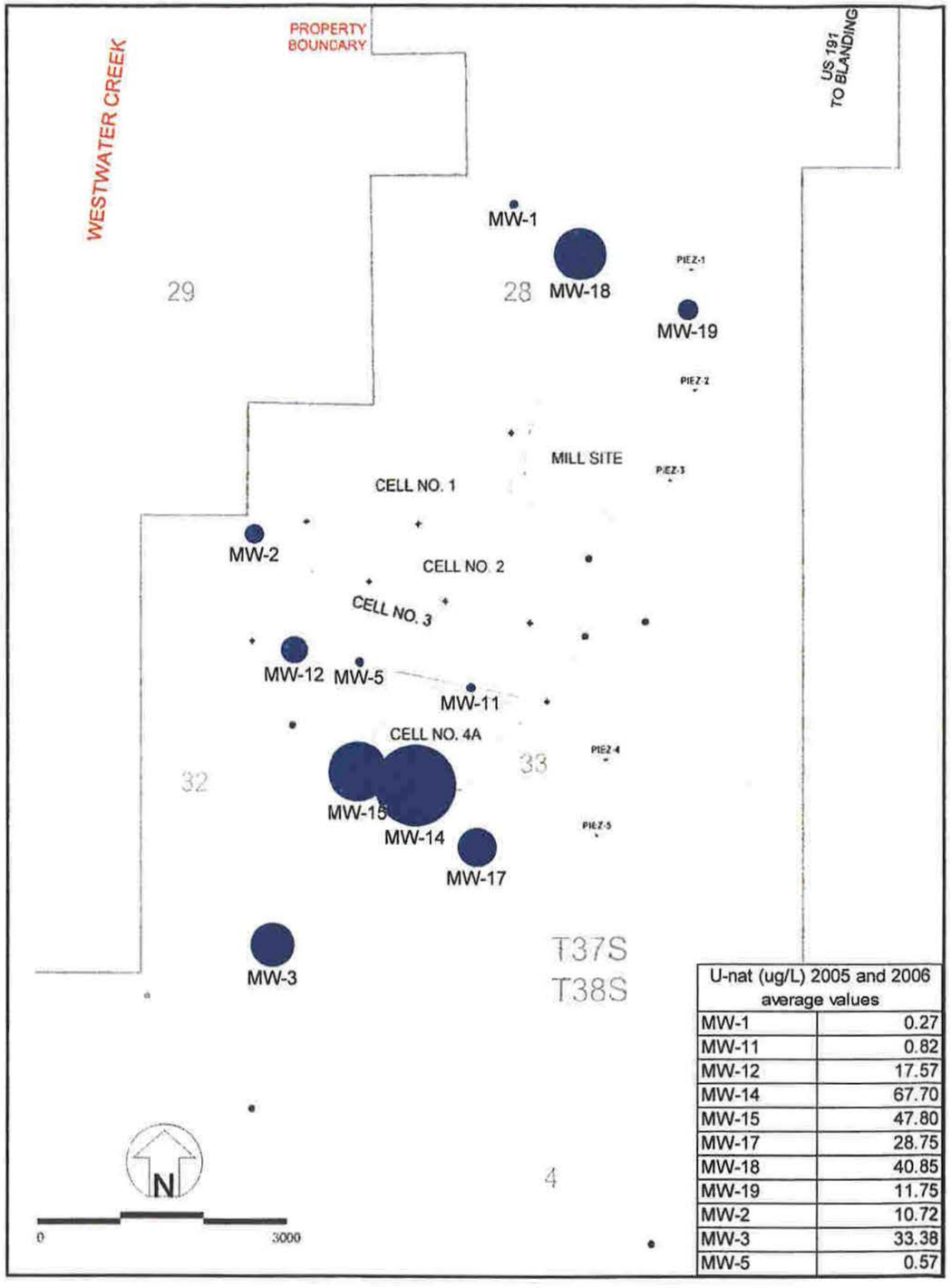


Selenium (ug/L) 2005 and 2006 averages	
MW-1	2.00
MW-11	2.50
MW-12	4.67
MW-14	2.50
MW-15	97.63
MW-17	2.63
MW-18	2.50
MW-19	14.15
MW-2	11.17
MW-3	16.75
MW-5	2.38

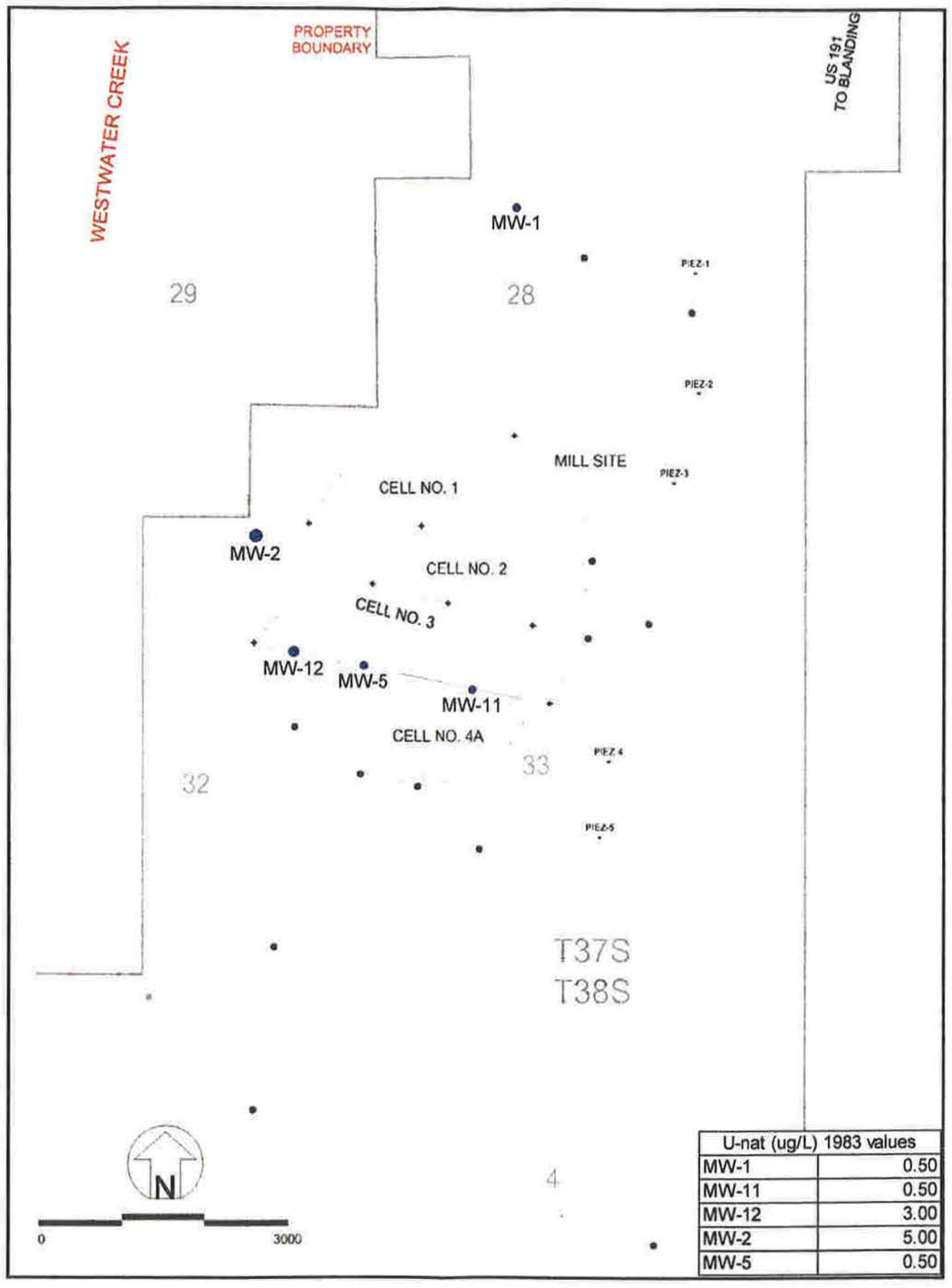


Selenium (ug/L) 1983 values	
MW-1	5.00
MW-11	5.00
MW-12	5.00
MW-2	10.00
MW-5	5.00

Figure 12
Map of monitoring wells depicting concentrations of selenium present in samples of groundwater collected in 1983 and 2006.

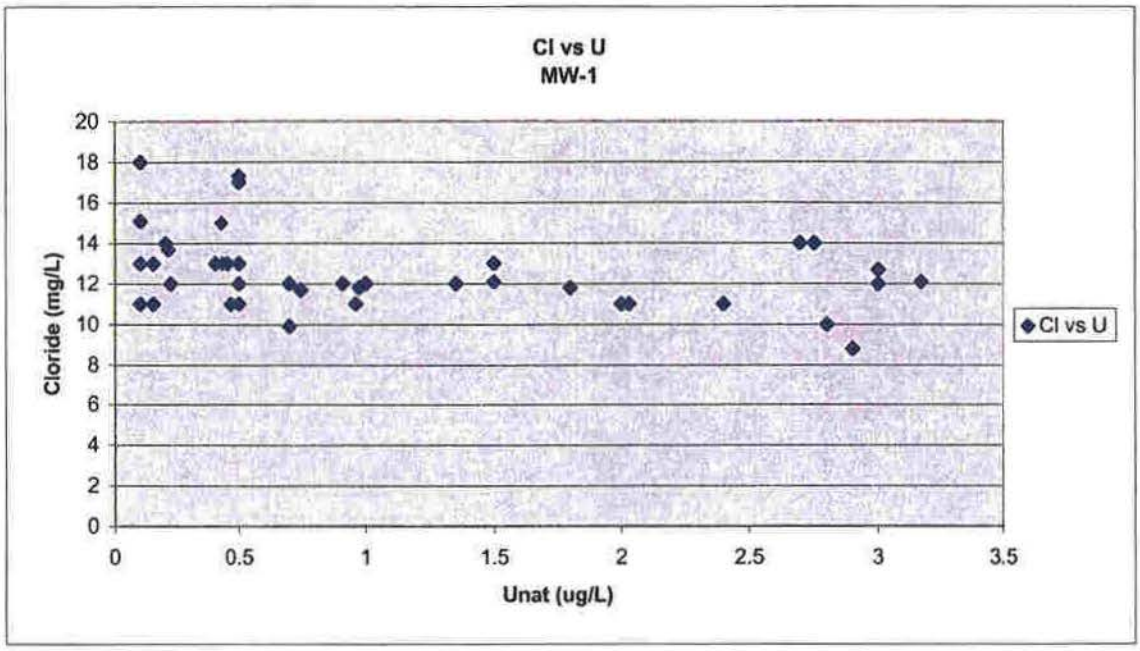


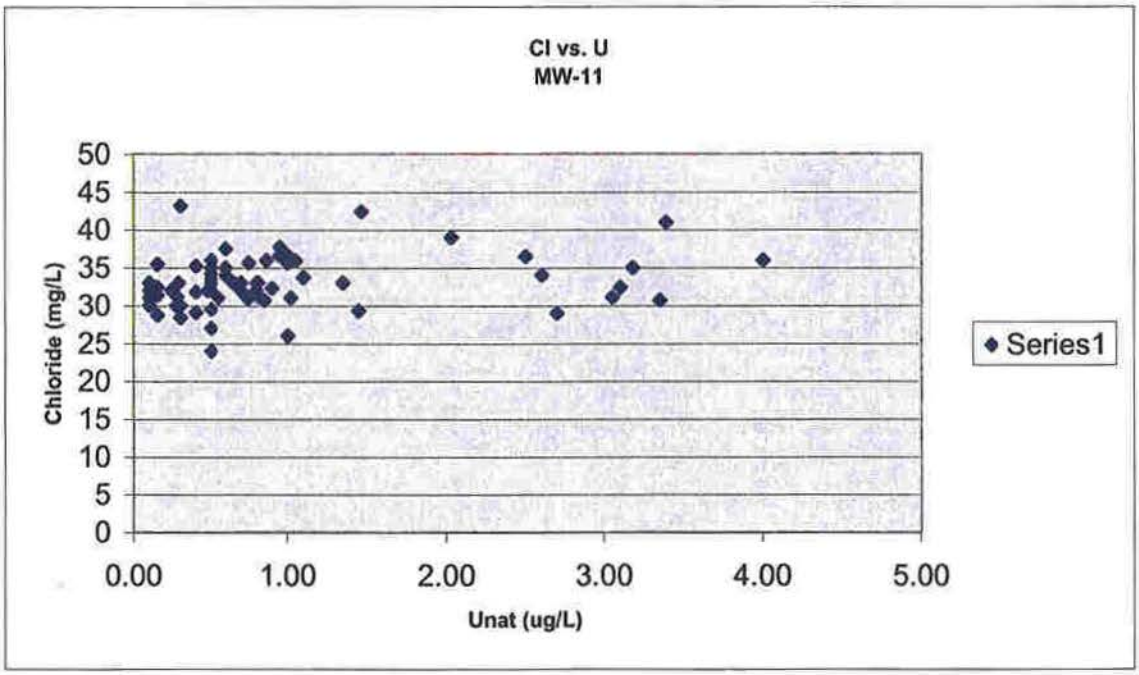
U-nat (ug/L) 2005 and 2006 average values	
MW-1	0.27
MW-11	0.82
MW-12	17.57
MW-14	67.70
MW-15	47.80
MW-17	28.75
MW-18	40.85
MW-19	11.75
MW-2	10.72
MW-3	33.38
MW-5	0.57



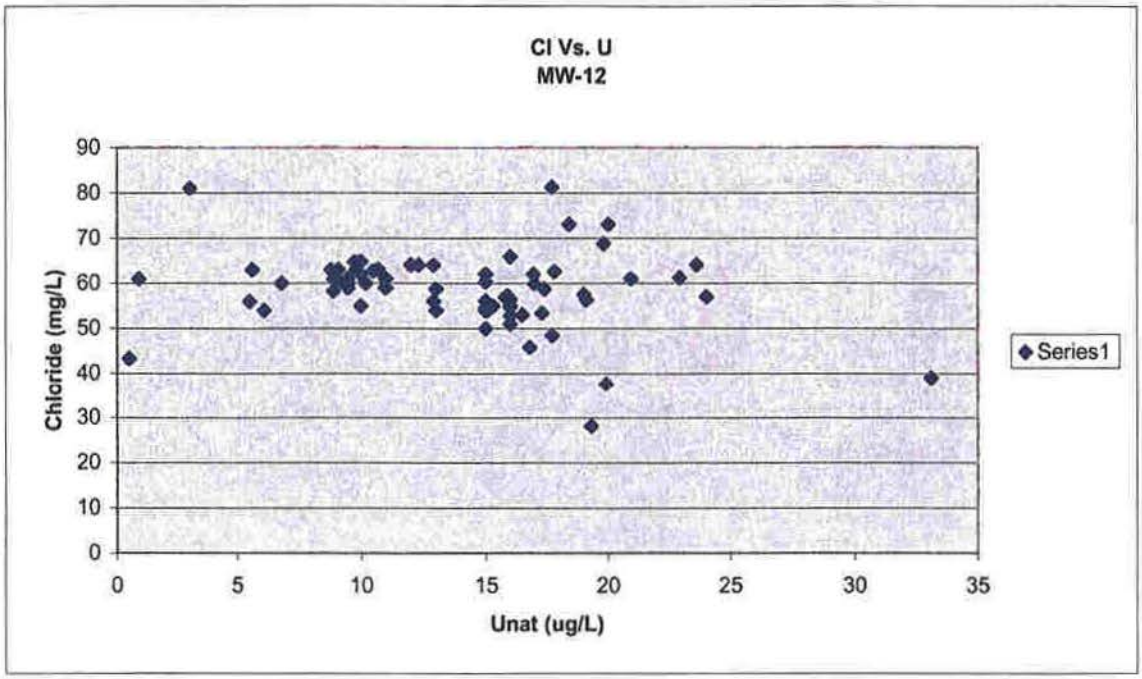
U-nat (ug/L) 1983 values	
MW-1	0.50
MW-11	0.50
MW-12	3.00
MW-2	5.00
MW-5	0.50

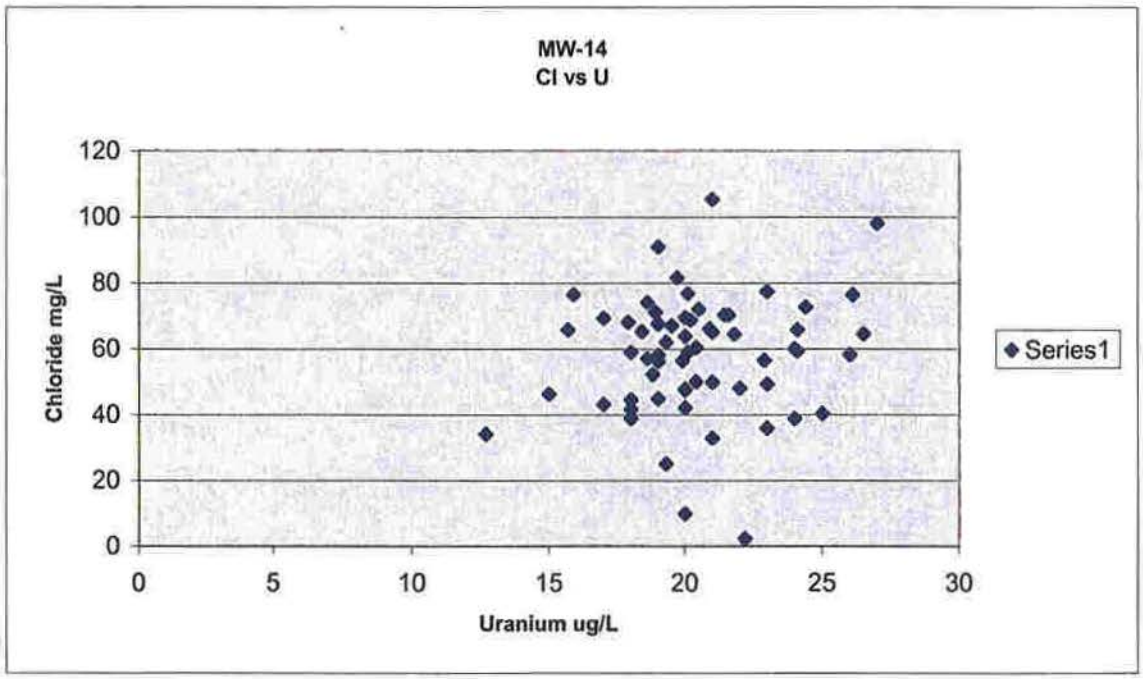
Figure 13
Map of monitoring wells depicting concentrations of uranium present in samples of groundwater collected in 1983 and 2006.



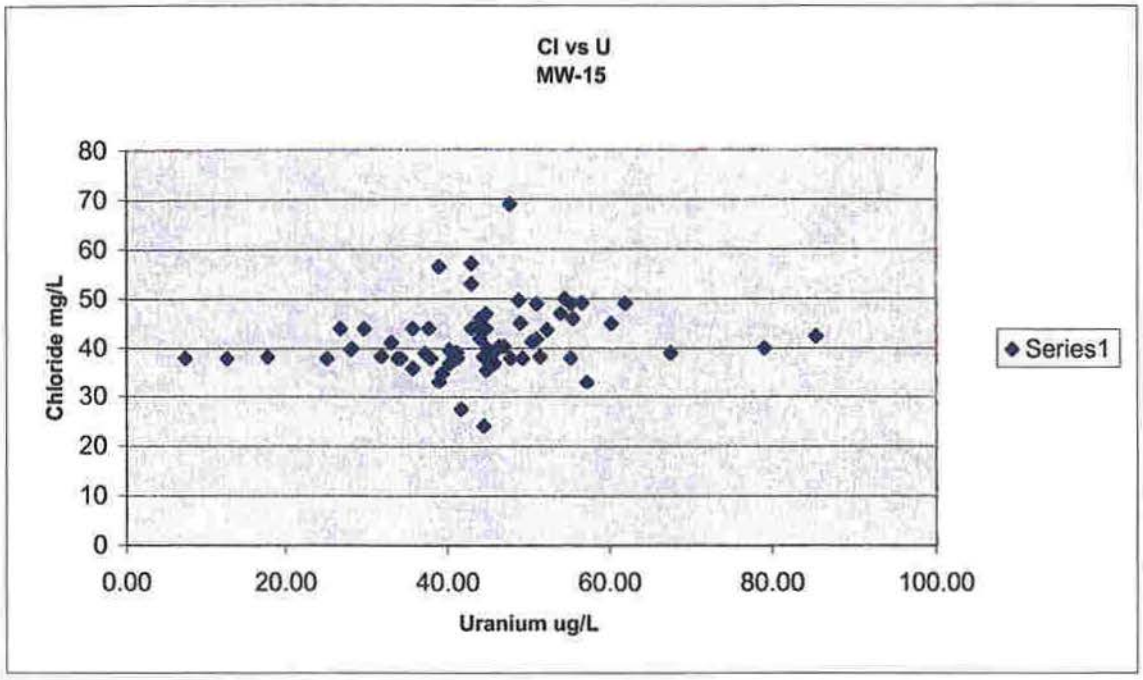


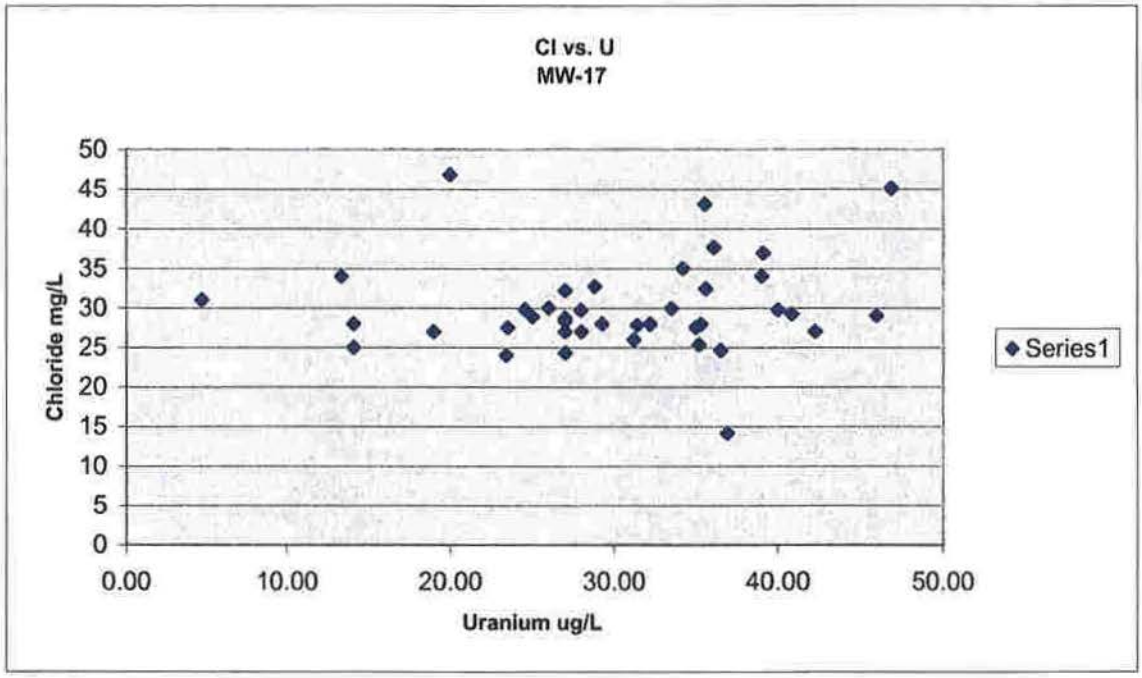
Chloride versus Uranium Plots
FIGURE 14



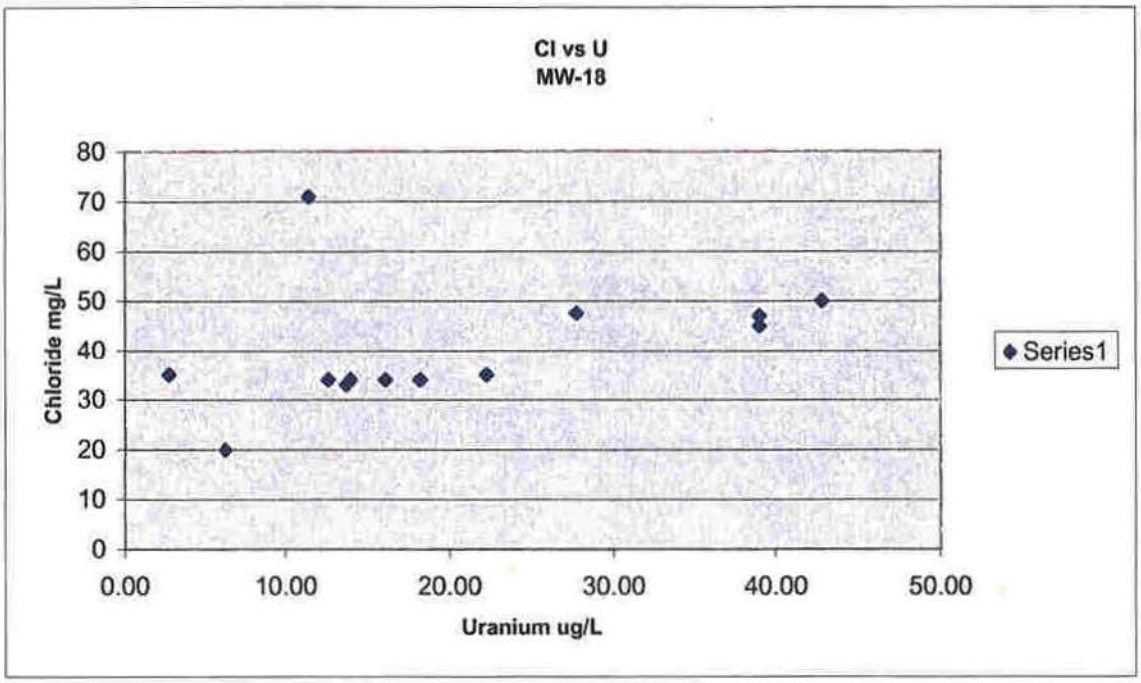


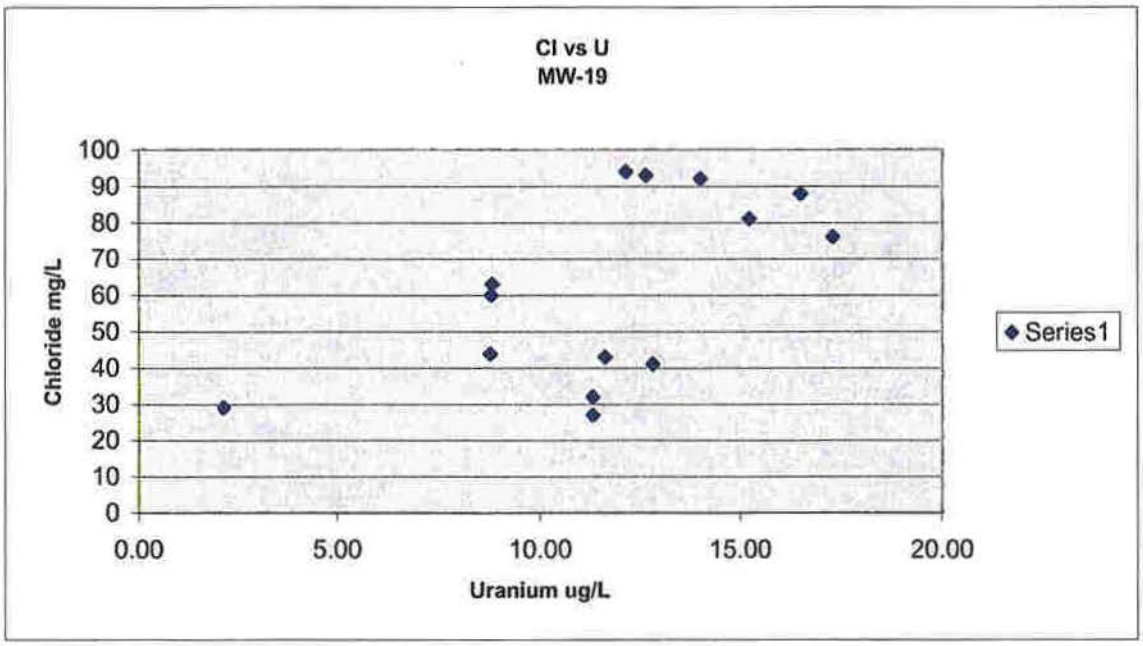
Chloride versus Uranium Plots
FIGURE 14



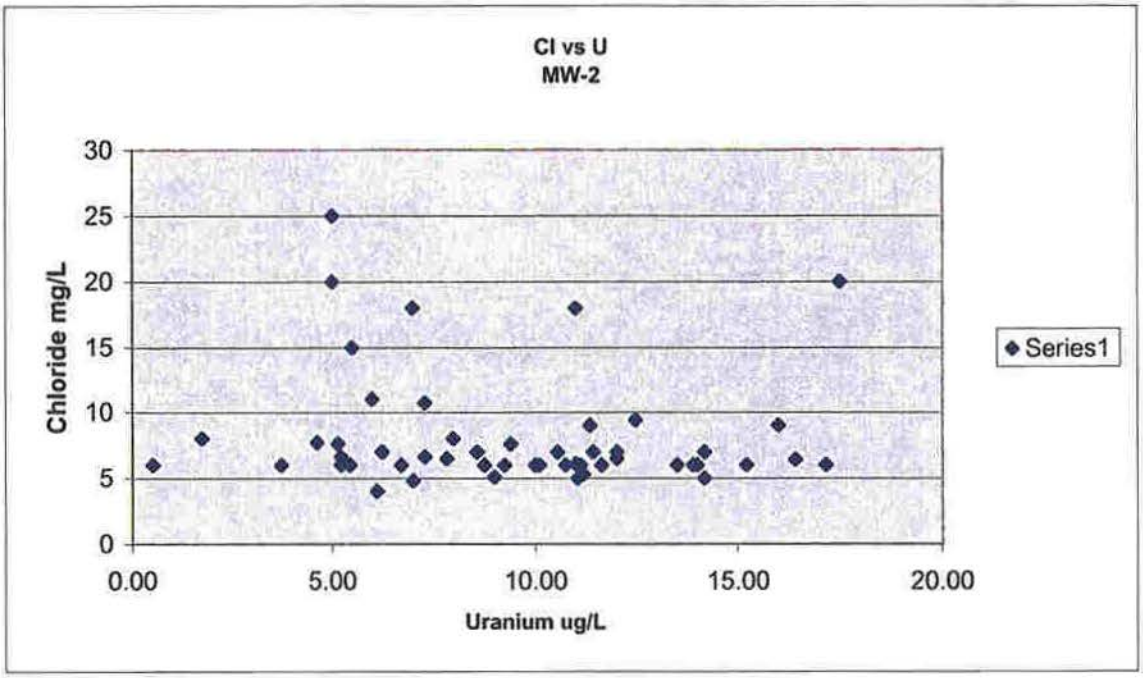


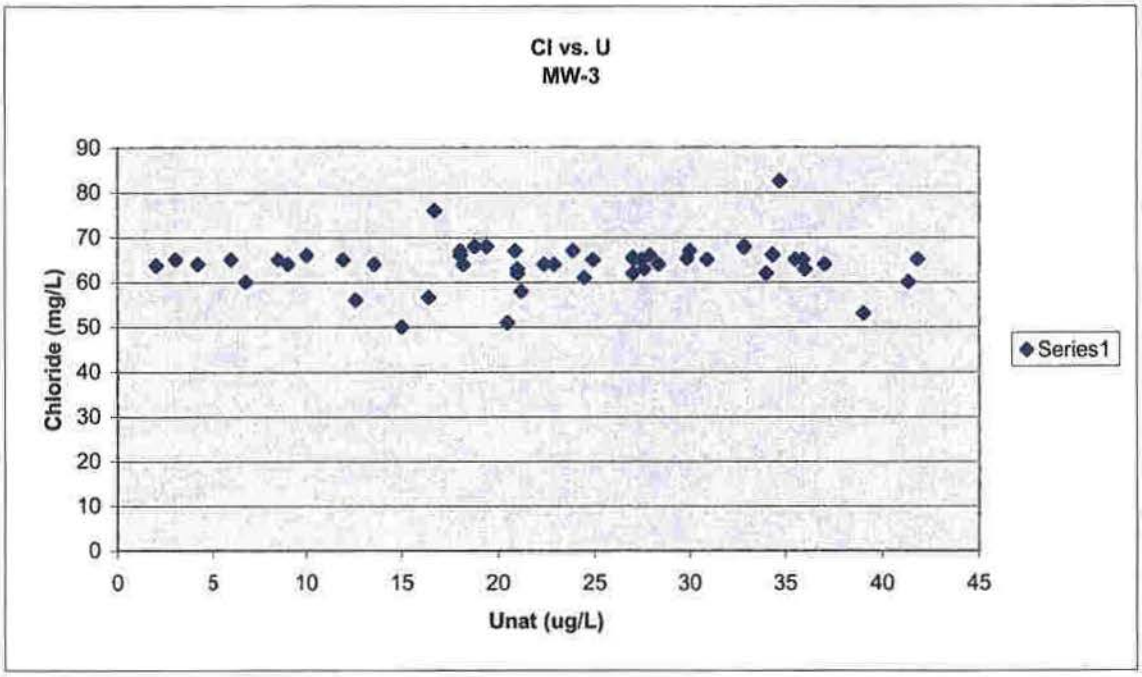
Chloride versus Uranium Plots
FIGURE 14



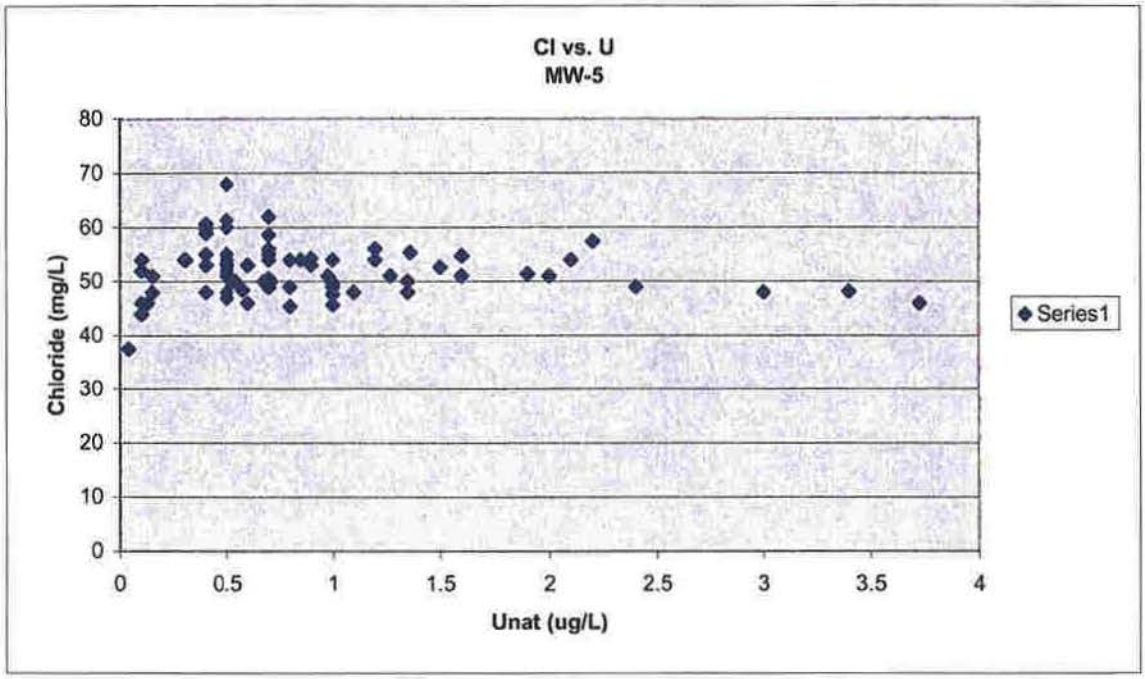


Chloride versus Uranium Plots
FIGURE 14

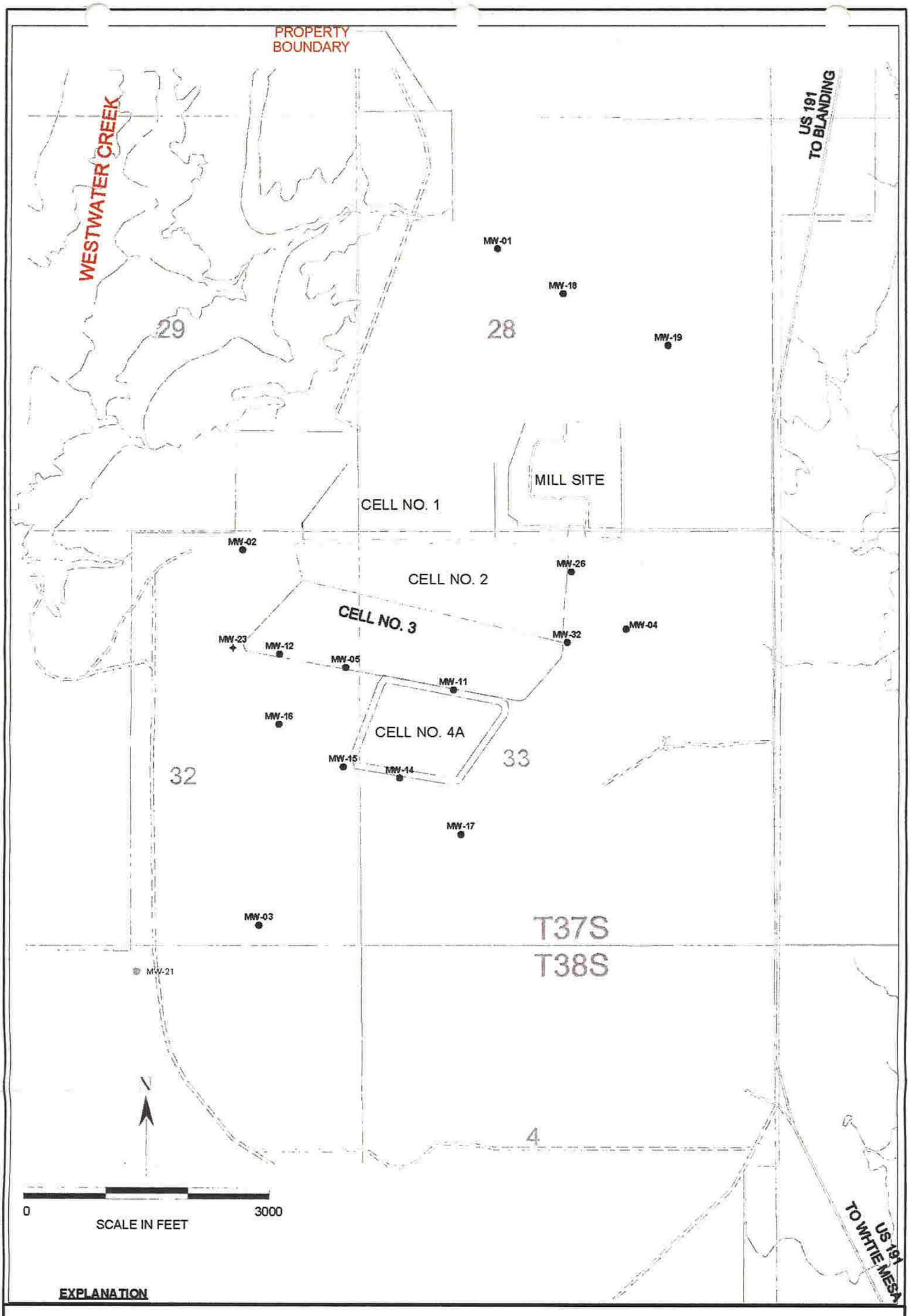




Chloride versus Uranium Plots
FIGURE 14



Chloride versus Uranium Plots
FIGURE 14



Perched Monitoring Well Locations
White Mesa Mill
Near Blanding, Utah

FIGURE 15

Table 1. Existing Wells, Monitoring Parameters, Groundwater Quality Standards and Groundwater Quality Compliance Limits, Background Groundwater Quality Report for White Mesa Mill, Utah

Type	Contaminant	Units	GWQS	MW-1 (Class II) GWCL	MW-2 (Class III) GWCL	MW-3 (Class III) GWCL	MW-5 (Class II) GWCL	MW-11 (Class II) GWCL	MW-12 (Class III) GWCL	MW-14 (Class III) GWCL	MW-15 (Class III) GWCL	MW-17 (Class III) GWCL	MW-18 (Class II) GWCL	MW-19 (Class II) GWCL	MW-26 (Class III) GWCL	MW-32 (Class III) GWCL
Nutrient	Ammonia, N	mg/L	25	6.25	12.5	12.5	6.25	6.25	12.5	12.5	12.5	12.5	6.25	6.25	12.5	12.5
Nutrient	Nitrate+Nitrite, N	mg/L	10	2.5	5	5	2.5	2.5	5	5	5	5	2.5	2.5	5	5
Metal	Arsenic	µg/L	50	12.5	25	25	12.5	12.5	25	25	25	25	12.5	12.5	25	25
Metal	Beryllium	µg/L	4	1	2	2	1	1	2	2	2	2	1	1	2	2
Metal	Cadmium	µg/L	5	1.25	2.5	2.5	1.25	1.25	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5
Metal	Chromium	µg/L	100	25	50	50	25	25	50	50	50	50	25	25	50	50
Metal	Cobalt	µg/L	730	182.5	365	365	182.5	182.5	365	365	365	365	182.5	182.5	365	365
Metal	Copper	µg/L	1,300	325	650	650	325	325	650	650	650	650	325	325	650	650
Metal	Iron	µg/L	11,000	2,750	5,500	5,500	2,750	2,750	5,500	5,500	5,500	5,500	2,750	2,750	5,500	5,500
Metal	Lead	µg/L	15	3.75	7.5	7.5	3.75	3.75	7.5	7.5	7.5	7.5	3.75	3.75	7.5	7.5
Metal	Manganese	µg/L	800	200	400	400	200	200	400	400	400	400	200	200	400	400
Metal	Mercury	µg/L	2	0.5	1	1	0.5	0.5	1	1	1	1	0.5	0.5	1	1
Metal	Molybdenum	µg/L	40	10	20	20	10	10	20	20	20	20	10	10	20	20
Metal	Nickel	µg/L	100	25	50	50	25	25	50	50	50	50	25	25	50	50
Metal	Selenium	µg/L	50	12.5	25	25	12.5	12.5	25	25	25	25	12.5	12.5	25	25
Metal	Silver	µg/L	100	25	50	50	25	25	50	50	50	50	25	25	50	50
Metal	Thallium	µg/L	2	0.5	1	1	0.5	0.5	1	1	1	1	0.5	0.5	1	1
Metal	Uranium	µg/L	30	7.5	15	15	7.5	7.5	15	15	15	15	7.5	7.5	15	15
Metal	Vanadium	µg/L	60	15	30	30	15	15	30	30	30	30	15	15	30	30
Metal	Zinc	µg/L	5,000	1,250	2,500	2,500	1,250	1,250	2,500	2,500	2,500	2,500	1,250	1,250	2,500	2,500
Radiologic	Gross Alpha	pCi/L	15	3.75	7.5	7.5	3.75	3.75	7.5	7.5	7.5	7.5	3.75	3.75	7.5	7.5
Other	Fluoride	mg/L	4	1	2	2	1	1	2	2	2	2	1	1	2	2
Other	Chloride	mg/L	TBD	26.5	90.6	90.6	73.3	48.8	86.1	29.1	55.1	42.4	65.2	111	TBD	TBD
Other	Sulfate	mg/L	TBD	843	3,961	3,961	1,454	1,443	2,625	2,501	2,718	3,225	1,704	2,498	TBD	TBD
Other	TDS	mg/L	TBD	1,552	5,862	5,862	2,518	2,358	4,417	4,119	4,372	5,755	3,086	4,623	TBD	TBD
Other	Field pH	pH	6.5 to 8.5	6.9 to 8.2	6.1 to 7.5	6.1 to 7.6	7.0 to 8.2	7.0 to 8.5	6.3 to 7.6	6.2 to 7.6	6.2 to 8.0	6.3 to 7.9	6.3 to 8.2	6.5 to 8.6	TBD	TBD
VOC	Acetone	µg/L	700	175	350	350	175	175	350	350	350	350	175	175	350	350
VOC	Benzene	µg/L	5	1.25	2.5	2.5	1.25	1.25	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5
VOC	2-Butanone (MEK)	µg/L	4	1	2	2	1	1	2	2	2	2	1	1	2	2
VOC	Tetrachloride	µg/L	5	1.25	2.5	2.5	1.25	1.25	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5
VOC	Chloroform	µg/L	70	17.5	35	35	17.5	17.5	35	35	35	35	17.5	17.5	35	35
VOC	Chloromethane	µg/L	30	7.5	15	15	7.5	7.5	15	15	15	15	7.5	7.5	15	15
VOC	Dichloromethane	µg/L	5	1.25	2.5	2.5	1.25	1.25	2.5	2.5	2.5	2.5	1.25	1.25	2.5	2.5
VOC	Naphthalene	µg/L	100	25	50	50	25	25	50	50	50	50	25	25	50	50
VOC	Tetrahydrofuran	µg/L	46	11.5	23	23	11.5	11.5	23	23	23	23	11.5	11.5	23	23
VOC	Toluene	µg/L	1,000	250	500	500	250	250	500	500	500	500	250	250	500	500
VOC	Total Xylenes	µg/L	10,000	2.5	5	5	2.5	2.5	5	5	5	5	2.5	2.5	5	5

Notes:

GWQS = Groundwater quality standard
mg/L = Milligrams per liter
pCi/L = Picocuries per liter
µg/L = Micrograms per liter

GWCL = Groundwater compliance limit
VOC = Volatile organic compound
MEK = Methyl ethyl ketone
TDS = Total dissolved solids

Class = Classification of groundwater based on TDS content
Class II = TDS from 500 to 3,000 mg/L
Class III = TDS from 3,000 to 10,000 mg/L
TBD = To be determined (defined as the value of the arithmetic mean plus two standard deviations)

Table 2. Results for All Detected Organic Compounds in DUSA Samples
Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	CLASS	SDATE	LAB	CHEMICAL	RESULT	QUAL	DETLIM	GWQS	GWCL	UNITS	EXCEED?
MW-1	II	6/20/2005	Energy	Chloromethane	2.0		1.0	30	7.5	µg/L	No
MW-1	II	12/13/2005	Energy	Chloromethane	1.2		1	30	7.5	µg/L	No
MW-1	II	3/23/2006	Energy	Chloromethane	3.5		1	30	7.5	µg/L	No
MW-1	II	3/30/1982	WAMCO	Oil and Grease	360			NA	NA	µg/L	NA
MW-1	**II**	**11/1/2001**	**Energy**	**Tetrahydrofuran**	**18**			**46**	**11.5**	**µg/L**	**YES**
MW-1	**II**	**6/20/2005**	**Energy**	**Tetrahydrofuran**	**85**		**1.0**	**46**	**11.5**	**µg/L**	**YES**
MW-1	**II**	**12/13/2005**	**Energy**	**Tetrahydrofuran**	**58**		**1**	**46**	**11.5**	**µg/L**	**YES**
MW-1	**II**	**3/23/2006**	**Energy**	**Tetrahydrofuran**	**48**		**1**	**46**	**11.5**	**µg/L**	**YES**
MW-1	**II**	**6/25/2006**	**Energy**	**Tetrahydrofuran**	**60**		**1**	**46**	**11.5**	**µg/L**	**YES**
MW-11	II	6/21/2005	Energy	Chloromethane	2.4		1.0	30	7.5	µg/L	No
MW-11	II	9/22/2005	Energy	Chloromethane	5.6		1	30	7.5	µg/L	No
MW-11	II	3/21/2006	Energy	Chloromethane	4.7		1	30	7.5	µg/L	No
MW-11	II	6/20/2006	Energy	Chloromethane	1.5		1	30	7.5	µg/L	No
MW-11	II	9/1/2002	Energy	Toluene	2.0			1,000	250	µg/L	No
MW-12	III	3/27/2006	Energy	Chloromethane	6.2		1	46	23	µg/L	No
MW-12	III	6/23/2006	Energy	Chloromethane	1.7		1	46	23	µg/L	No
MW-12	III	11/1/2001	Energy	Tetrahydrofuran	21			46	23	µg/L	No
MW-12	**III**	**6/22/2005**	**Energy**	**Tetrahydrofuran**	**24**		**1.0**	**46**	**23**	**µg/L**	**YES**
MW-12	III	12/13/2005	Energy	Tetrahydrofuran	12		1	46	23	µg/L	No
MW-12	III	6/26/2006	Energy	Tetrahydrofuran	16			46	23	µg/L	No
MW-14	III	9/23/2005	Energy	Chloromethane	2.5		1	46	23	µg/L	No
MW-14	III	6/20/2006	Energy	Chloromethane	2		1	46	23	µg/L	No
MW-17	III	6/23/2006	Energy	Chloromethane	2.4		1	46	23	µg/L	No
MW-18	II	6/21/2005	Energy	Chloromethane	4.8		1.0	30	7.5	µg/L	No
MW-18	II	11/1/2001	Energy	Toluene	4			1,000	250	µg/L	No
MW-18	II	9/9/2002	Energy	Toluene	4		1	1,000	250	µg/L	No
MW-19	II	6/21/2006	Energy	Chloromethane	1.2		1	30	7.5	µg/L	No
MW-2	III	6/21/2005	Energy	Chloromethane	3.5		1.0	30	15	µg/L	No
MW-2	III	3/30/1982	WAMCO	Oil and Grease	200			NA	NA	µg/L	NA
MW-2	III	11/1/2001	Energy	Tetrahydrofuran	19			46	23	µg/L	No
MW-26	**III**	**3/30/2005**	**Energy**	**Chloroform**	**230**	**D**	**2.5**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**6/21/2005**	**Energy**	**Chloroform**	**430**		**25**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**7/26/2005**	**Energy**	**Chloroform**	**260**		**1**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**8/24/2005**	**Energy**	**Chloroform**	**780**	**D**	**1**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**9/27/2005**	**Energy**	**Chloroform**	**810**	**D**	**25**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**10/26/2005**	**Energy**	**Chloroform**	**960**	**D**	**25**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**1/25/2006**	**Energy**	**Chloroform**	**1300**	**D**	**25**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**3/22/2006**	**Energy**	**Chloroform**	**120**		**1**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**4/25/2006**	**Energy**	**Chloroform**	**1200**	**D**	**25**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**5/26/2006**	**Energy**	**Chloroform**	**1100**	**D**	**50**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**6/21/2006**	**Energy**	**Chloroform**	**260**	**D**	**1**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**11/15/2006**	**Energy**	**Chloroform**	**1100**	**D**	**12**	**70**	**35**	**µg/L**	**YES**
MW-26	**III**	**12/13/2006**	**Energy**	**Chloroform**	**1200**		**1**	**70**	**35**	**µg/L**	**YES**
MW-26	III	6/21/2005	Energy	Chloromethane	5.5		2.5	30	15	µg/L	No
MW-26	III	11/15/2005	Energy	Chloromethane	4.1	D	1	30	15	µg/L	No
MW-26	III	1/25/2006	Energy	Chloromethane	5.4	D	1	30	15	µg/L	No
MW-26	III	3/22/2006	Energy	Chloromethane	4.7		1	30	15	µg/L	No
MW-26	III	4/25/2006	Energy	Chloromethane	6.6		1	30	15	µg/L	No
MW-26	III	6/21/2005	Energy	Methylene chloride	5.4		2.5	NA	NA	µg/L	NA
MW-26	**III**	**12/13/2005**	**Energy**	**Tetrahydrofuran**	**55**		**1**	**46**	**23**	**µg/L**	**YES**
MW-3	III	9/23/2005	Energy	Chloromethane	5.2		1	30	15	µg/L	No
MW-3	III	6/25/2006	Energy	Chloromethane	1.2		1	30	15	µg/L	No
MW-3	III	3/30/1982	WAMCO	Oil and Grease	100			NA	NA	µg/L	NA
MW-3	**III**	**11/1/2001**	**Energy**	**Tetrahydrofuran**	**130**			**46**	**23**	**µg/L**	**YES**
MW-3	III	12/13/2005	Energy	Tetrahydrofuran	13		1	46	23	µg/L	No
MW-3	**III**	**6/25/2006**	**Energy**	**Tetrahydrofuran**	**26**		**1**	**46**	**23**	**µg/L**	**YES**
MW-32	III	9/22/2005	Energy	Chloromethane	1.7		1	30	15	µg/L	No
MW-32	III	3/22/2006	Energy	Chloromethane	3.6		1	30	15	µg/L	No
MW-5	II	6/21/2005	Energy	Chloromethane	3.2		1.0	30	7.5	µg/L	No
MW-5	II	3/23/2006	Energy	Chloromethane	1.7		1	30	7.5	µg/L	No
MW-5	II	6/25/2006	Energy	Chloromethane	2.7		1	30	7.5	µg/L	No
MW-5	II	3/30/1982	WAMCO	Oil and Grease	10			NA	NA	µg/L	NA
MW-5	II	11/1/2001	Energy	Tetrahydrofuran	10			46	11.5	µg/L	No
MW-5	II	6/21/2005	Energy	Tetrahydrofuran	4.4		1.0	46	11.5	µg/L	No
MW-5	II	12/13/2005	Energy	Tetrahydrofuran	13		1	46	11.5	µg/L	No
MW-5	II	3/23/2006	Energy	Tetrahydrofuran	10		1	46	11.5	µg/L	No
MW-5	II	6/25/2006	Energy	Tetrahydrofuran	7.8		1	46	11.5	µg/L	No

Notes:

PT_NAME = Monitoring well name
CLASS = Class designation based on water quality; Class II waters have TDS less than 3,000 mg/L;
Class III waters have TDS between 3,000 and 10,000 mg/L
SDATE = Sampling date
LAB = Laboratory that performed the chemical analysis
QUAL = Result qualifier, where "U" indicates a nondetection; "D" indicates dilution for analysis
DETLIM = Detection limit
GWQS = Groundwater Quality Standard
GWCL = Groundwater Compliance Limit, based on classification of groundwater (CLASS)
µg/L = Micrograms per liter
EXCEED? = Indicates whether the result exceeds the applicable GWCL; boldface font highlights exceedances; NA means Not Applicable;
UNK means unknown at this time

Table 3. Examples of Data Quality Issues

Well ID	Sampling Date	Problem	Effect/Outcome
MW-1	3/28/1994	Spike error	Chloride data invalid due to spike error
Numerous	Numerous	Result reported as "0" with no reporting limit given	Such "0" value nondetections lacking a reporting limit were qualified with a "Z" qualifier and excluded from statistical analysis
Numerous	Numerous	Disagreement of units and result (mg v µg)	Attempt to correct result or unit prior to statistics
Numerous	Numerous	result and reporting limit are the same value without a U qualifier	
MW-13	3/20/2003	B-qualifier for U and Cl	Detected in blank; results compared with other sample results for same well
MW-14A	3/23/2001	B-qualifier for U, Cl, and K	Detected in blank; results compared with other sample results for same well
MW-14A	6/11/2001	B-qualifier Cl and K	Detected in blank; results compared with other sample results for same well
	6/12/2001		
MW-1	1/27/1988	Arsenic at 690 mg/L	Rest of results are in .001-.005 mg/L range "extreme values out of line with rest of data"; excluded from statistical evaluation.
MW-1	2/16/1990	Selenium at 692 mg/L	Rest of results are in .001-.005 mg/L range "extreme values out of line with rest of data"; excluded from statistical evaluation.
MW-1	8/7/1990	Selenium at 685 mg/L	Rest of results are in .001-.005 mg/L range "extreme values out of line with rest of data"; excluded from statistical evaluation.
MW-4	9/24/1991	Selenium at 1.4 mg/L	Units error or TSS?
MW-1	9/30/2000	Iron at 20 mg/L	Units likely off by 1,000; should be 0.020 mg/L
MW-2	9/30/2000	Iron at 20 mg/L	Units likely off by 1,000; should be 0.020 mg/L
MW-3	9/30/2000	Iron at 20 mg/L	Units likely off by 1,000; should be 0.020 mg/L
MW-17	9/30/2000	Iron at 20 mg/L	Units likely off by 1,000; should be 0.020 mg/L
MW-18	9/30/2000	Iron at 20 mg/L	Units likely off by 1,000; should be 0.020 mg/L
MW-19	9/30/2000	Iron at 1,650 mg/L	Units likely off by 1,000 or TSS contamination
MW-13	9/30/1999	pH = 3.77	Acid groundwater not consistent with earlier and later measurements at MW-13; field error
MW-13	9/3/2000	pH = 3.77	Acid groundwater not consistent with earlier and later measurements at MW-13; field error
MW-13A	12/9/1999	pH = 3.2	Acid groundwater not consistent with earlier and later measurements at MW-13A; field error
MW-20	12/1/1994	pH = 10.01	New well; improperly developed
MW-14	5/1/1999	Zinc at 12,900; 27,500 and 23,200 µg/L	Units incorrect or sample contaminated with TSS
	11/30/2000		
	9/1/2002		
MW-15	5/1/1999	Zinc at 13,000; 25,800 and 16,800 µg/L	Units incorrect or sample contaminated with TSS
	11/30/2000		
	11/1/2001		
MW-5	9/10/2002	Ammonia at 42.5 mg/L	Units error? All other ammonia detections (for all wells) are less than 2 mg/L
MW-3	10/31/1979	TDS low compared to all other results (n = 61) for this	Since 1982, TDS in MW-3 averaged about 5,250 mg/L
	1/31/1980		

Table 3. Examples of Data Quality Issues

Well ID	Sampling Date	Problem	Effect/Outcome
MW-12	9/7/2001	Double entry for Nickel 0.05 and 0.005 ug/L	Possible duplicate not reported.
MW-12	9/10/2002	Double entry for PH 7 and 8	Possible duplicate not reported.
MW-14	9/11/2002	Double entry for PH 6 and 9	Possible duplicate not reported.
MW-15	9/12/2002	Double entry for PH 7 and 8	Possible duplicate not reported.
MW-17	9/13/2002	Double entry for PH 7 and 8	Possible duplicate not reported.
MW-5	9/14/2002	Double entry for PH 7 and 8	Possible duplicate not reported.
PROBLEMS WITH NEW URANIUM ENTRY			
Numerous	Numerous	U reported as activity with detection limit reported as mass	likely that lab generated U data as mass then converted to activity assuming secular equilibrium. Converted back to mass assuming secular equilibrium.
Numerous	Numerous	U not distinguished as total or dissolved in lab report	assumed dissolved based on field protocol
MW-1	5/19/1980	Unat =4mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.004
MW-1	6/17/1980	Unat = 1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-1	7/16/1980	Unat = <1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to <0.001
MW-1	8/19/1980	Unat = 2mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.002
MW-1	9/1/1980	Unat =<1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to <0.001
MW-1	10/1/1980	Unat =1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-1	11/13/1980	Unat =1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-1	12/10/1980	Unat =10mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.010
MW-1	1/22/1981	Unat = 11mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.011
MW-1	2/12/1981	Unat =5mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.005
MW-1	9/1/1981	Unat =<1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to <0.001
MW-1	1/28/1982	Unat = 1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-1	8/23/1988	Unat = 107.46mg/L	?; was excluded with extremes during box and whisker analysis
MW-12	11/22/1988	Unat = 0.177 mg/L	?; was excluded with extremes during box and whisker analysis
MW-12	12/8/1994	Unat =139.25mg/L	Was duplicated with a result of <0.3 mg/L; extremes removed the lower value during box and whisker analysis
MW-12	12/8/1994	(duplicate Sample) Unat = <0.3 mg/L	Was the duplicate sample of a sample with the result of 139.25 mg/L

Table 3. Examples of Data Quality Issues

Well ID	Sampling Date	Problem	Effect/Outcome
MW-2	5/19/1980	Unat =10mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.010
MW-2	6/17/1980	Unat= 1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-2	7/16/1980	Unat =14mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.014
MW-2	8/19/1980	Unat =4mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.004
MW-2	9/1/1980	Unat =67mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.067
MW-2	10/1/1980	Unat =5mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.005
MW-2	11/13/1980	Unat =8mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.008
MW-2	12/10/1980	Unat = mg/L18	Possible reporting unit error, mg/L should be ug/L; changed result to 0.018
MW-2	1/22/1981	Unat =17mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.017
MW-2	2/11/1981	Unat =9mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.009
MW-2	9/1/1981	Unat =1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-3	5/19/1980	Unat =15mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.015
MW-3	6/17/1980	Unat =18mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.018
MW-3	7/16/1980	Unat =21mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.021
MW-3	8/19/1980	Unat =4mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.004
MW-3	9/1/1980	Unat =21mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.021
MW-3	10/1/1980	Unat =3mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.003
MW-3	11/11/1980	Unat =9mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.009
MW-3	12/10/1980	Unat =23mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.023
MW-3	1/22/1981	Unat =13mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.013
MW-3	2/12/1981	Unat =7mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.007
MW-3	9/1/1981	Unat =<1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to <0.001
MW-5	6/17/1980	Unat =8mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.008
MW-5	7/16/1980	Unat =8mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.008

Table 3. Examples of Data Quality Issues

Well ID	Sampling Date	Problem	Effect/Outcome
MW-5	8/19/1980	Unat =10mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.010
MW-5	9/1/1980	Unat =8mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.008
MW-5	10/1/1980	Unat =8mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.008
MW-5	11/13/1980	Unat =1mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.001
MW-5	1/22/1981	Unat =13mg/L	Possible reporting unit error, mg/L should be ug/L; changed result to 0.013
MW-2	5/19/1980	U reported as U3O8	Excluded from statistical analyses
MW-2	6/17/1980	U reported as U3O8	Excluded from statistical analyses
MW-2	7/16/1980	U reported as U3O8	Excluded from statistical analyses
MW-2	8/19/1980	U reported as U3O8	Excluded from statistical analyses
MW-2	12/10/1980	U reported as U3O8	Excluded from statistical analyses
MW-2	1/22/1981	U reported as U3O8	Excluded from statistical analyses
MW-2	2/11/1981	U reported as U3O8	Excluded from statistical analyses
MW-2	3/1/1981	U reported as U3O8	Excluded from statistical analyses
MW-2	4/21/1981	U reported as U3O8	Excluded from statistical analyses
MW-2	9/1/1981	U reported as U3O8	Excluded from statistical analyses
MW-2	1/28/1982	U reported as U3O8	Excluded from statistical analyses
MW-2	1/28/1982	U reported as U3O8	Excluded from statistical analyses
MW-2	4/2/1982	U reported as U3O8	Excluded from statistical analyses
MW-2	8/3/1982	U reported as U3O8	Excluded from statistical analyses
MW-2	12/10/1982	U reported as U3O8	Excluded from statistical analyses
MW-2	10/27/1983	U reported as U3O8	Excluded from statistical analyses
MW-3	5/19/1980	U reported as U3O8	Excluded from statistical analyses
MW-3	6/17/1980	U reported as U3O8	Excluded from statistical analyses
MW-3	7/16/1980	U reported as U3O8	Excluded from statistical analyses
MW-3	8/19/1980	U reported as U3O8	Excluded from statistical analyses
MW-3	12/10/1980	U reported as U3O8	Excluded from statistical analyses
MW-3	1/22/1981	U reported as U3O8	Excluded from statistical analyses
MW-3	2/12/1981	U reported as U3O8	Excluded from statistical analyses
MW-3	3/1/1981	U reported as U3O8	Excluded from statistical analyses
MW-3	4/13/1981	U reported as U3O8	Excluded from statistical analyses
MW-3	9/1/1981	U reported as U3O8	Excluded from statistical analyses
MW-3	1/27/1982	U reported as U3O8	Excluded from statistical analyses
MW-3	1/27/1982	U reported as U3O8	Excluded from statistical analyses
MW-3	4/13/1982	U reported as U3O8	Excluded from statistical analyses
MW-3	8/5/1982	U reported as U3O8	Excluded from statistical analyses
MW-3	12/13/1982	U reported as U3O8	Excluded from statistical analyses
MW-3	4/21/1983	U reported as U3O8	Excluded from statistical analyses
MW-3	10/26/1983	U reported as U3O8	Excluded from statistical analyses
MW-3	10/27/1983	U reported as U3O8	Excluded from statistical analyses
MW-5	5/19/1980	U reported as U3O8	Excluded from statistical analyses
MW-5	6/17/1980	U reported as U3O8	Excluded from statistical analyses
MW-5	7/16/1980	U reported as U3O8	Excluded from statistical analyses
MW-5	8/19/1980	U reported as U3O8	Excluded from statistical analyses

Table 3. Examples of Data Quality Issues

Well ID	Sampling Date	Problem	Effect/Outcome
MW-5	12/9/1980	U reported as U3O8	Excluded from statistical analyses
MW-5	1/22/1981	U reported as U3O8	Excluded from statistical analyses
MW-5	2/11/1981	U reported as U3O8	Excluded from statistical analyses
MW-5	3/1/1981	U reported as U3O8	Excluded from statistical analyses
MW-5	4/21/1981	U reported as U3O8	Excluded from statistical analyses
MW-5	9/1/1981	U reported as U3O8	Excluded from statistical analyses
MW-5	1/26/1982	U reported as U3O8	Excluded from statistical analyses
MW-5	1/26/1982	U reported as U3O8	Excluded from statistical analyses
MW-5	4/13/1982	U reported as U3O8	Excluded from statistical analyses
MW-5	8/3/1982	U reported as U3O8	Excluded from statistical analyses
MW-5	12/13/1982	U reported as U3O8	Excluded from statistical analyses
MW-5	10/27/1983	U reported as U3O8	Excluded from statistical analyses

Table 4. Comparison of DUSA Reporting Limits (1979 to 2005) to Groundwater Quality Standards, Background Groundwater Quality Report for White Mesa Mill, Utah

Type	Chemical or Parameter	GWQS	DUSA MinRL	DUSA MaxRL	Units
Nutrient	Ammonia, N	25	0.05	0.2	mg/L
Nutrient	Nitrate+Nitrite, N	10	0.01	0.1	mg/L
Metal	Arsenic	50	1	100	µg/L
Metal	Beryllium	4	0.2	110	µg/L
Metal	Cadmium	5	0.1	50	µg/L
Metal	Chromium	100	1	50	µg/L
Metal	Cobalt	730	10	10	µg/L
Metal	Copper	1,300	5	50	µg/L
Metal	Iron	11,000	1	50	µg/L
Metal	Lead	15	1	500	µg/L
Metal	Manganese	800	1	100	µg/L
Metal	Mercury	2	0.2	300	µg/L
Metal	Molybdenum	40	1	100	µg/L
Metal	Nickel	100	1	50	µg/L
Metal	Selenium	50	1	50	µg/L
Metal	Silver	100	1	10	µg/L
Metal	Thallium	2	1	100	µg/L
Metal	Uranium	30	0.0003	1	µg/L
Metal	Vanadium	60	1	500	µg/L
Metal	Zinc	5,000	5	1000	µg/L
Radiologic	Gross Alpha	15	0.8	18.7	pCi/L
Other	Fluoride	4	0.1	0.1	mg/L
Other	Chloride	TBD	1	5	mg/L
Other	Sulfate	TBD	1	1	mg/L
Other	TDS	TBD			mg/L
Other	Field pH	6.5 to 8.5			pH
VOC	Acetone	700	20	50	µg/L
VOC	Benzene	5	1	2.5	µg/L
VOC	2-Butanone (MEK)	4,000	1	20	µg/L
VOC	Carbon Tetrachloride	5	1	2.5	µg/L
VOC	Chloroform	70	1	4.9	µg/L
VOC	Chloromethane	30	1	2.5	µg/L
VOC	Dichloromethane*	5	1	5	µg/L
VOC	Naphthalene	100	1	2.5	µg/L
VOC	Tetrahydrofuran	46	1	2.5	µg/L
VOC	Toluene	1,000	1	1	µg/L
VOC	Total Xylenes	10,000	1	2.5	µg/L

Notes:

GWQS = Groundwater quality standard

UDEQ = Utah Department of Environmental Quality

DUSA = Denison Mines (USA) Corp.

MaxRL = Maximum reporting limit in database

MinRL = Minimum reporting limit in database

mg/L = Milligrams per liter

µg/L = Micrograms per liter

pCi/L = Picocuries per liter

VOC = Volatile organic compound

*Dichlormethane also known as Methylene chloride

Table 5.a. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Quality Standard; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	UNITS
MW-15	11/1/2001	Energy	AS	METAL	Arsenic	0.1	U	0.1	0.05	MG/L
MW-1	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-1	8/1/1994	EPA	BE	METAL	Beryllium	0.001	U	0.01	0.004	MG/L
MW-1	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-1	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-1	9/9/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-11	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-11	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-11	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-11	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-11	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-11	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-11	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-12	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	11/30/2000	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-12	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-14	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	11/30/2000	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-14	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-15	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-15	11/20/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-15	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-15	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-15	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-15	11/1/2001	Energy	BE	METAL	Beryllium	0.005	U	0.01	0.004	MG/L
MW-15	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-17	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-17	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-17	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-17	9/10/2002	Energy	BE	METAL	Beryllium	0	U	0.11	0.004	MG/L
MW-18	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-18	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-18	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-18	9/9/2002	Energy	BE	METAL	Beryllium	0	U	0.11	0.004	MG/L
MW-19	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-19	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-19	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-19	9/10/2002	Energy	BE	METAL	Beryllium	0	U	0.11	0.004	MG/L
MW-2	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-2	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-2	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	11/20/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	5/1/1999	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-3	9/12/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-5	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-5	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-5	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-5	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-5	11/30/2000	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L

Table 5.a. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Quality Standard; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	UNITS
MW-5	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-5	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	MG/L
MW-5	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	MG/L
MW-1	12/28/1981	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-1	4/22/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-1	8/1/1994	EPA	CD	METAL	Cadmium	0.001	U	0.01	0.005	MG/L
MW-11	5/24/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-11	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-12	5/4/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-12	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-14	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-15	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-15	11/1/2001	Energy	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-17	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-18	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-19	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-2	12/28/1981	CORE	CD	METAL	Cadmium	0.1	U	0.01	0.005	MG/L
MW-2	5/4/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-2	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-3	12/28/1981	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-3	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-5	12/28/1981	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-5	5/24/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	MG/L
MW-5	8/1/1994	EPA	CD	METAL	Cadmium	0.1	U	0.01	0.005	MG/L
MW-1	8/14/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-1	12/28/1981	CORE	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-1	3/30/1982	WAMCO	PB	METAL	Lead	0.5	U	0.5	0.015	MG/L
MW-1	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-1	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-1	9/9/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-11	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-11	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-11	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-11	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-12	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-12	11/30/2000	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-12	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-12	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-12	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-14	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-14	11/30/2000	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-14	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-14	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-14	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-15	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-17	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-17	9/10/2002	Energy	PB	METAL	Lead	0	U	0.05	0.015	MG/L
MW-18	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-18	9/9/2002	Energy	PB	METAL	Lead	0	U	0.05	0.015	MG/L
MW-19	11/30/2000	Energy	PB	METAL	Lead	0.003	U	0.03	0.015	MG/L
MW-19	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-19	9/10/2002	Energy	PB	METAL	Lead	0	U	0.05	0.015	MG/L
MW-2	8/11/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-2	3/30/1982	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-2	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	8/18/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	12/28/1981	CORE	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	3/30/1982	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	5/1/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-3	9/12/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-5	8/18/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L

Table 5.a. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Quality Standard; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	UNITS
MW-5	12/28/1981	CORE	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-5	3/30/1982	WAMCO	PB	METAL	Lead	0.5	U	0.5	0.015	MG/L
MW-5	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-5	11/30/2000	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-5	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-5	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-5	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	MG/L
MW-1	6/13/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	MG/L
MW-11	6/12/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	MG/L
MW-12	6/12/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	MG/L
MW-15	11/1/2001	Energy	HG	METAL	Mercury	0.1	U	0.1	0.002	MG/L
MW-5	6/14/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	MG/L
MW-1	2/12/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-1	4/14/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-1	8/14/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	4/22/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	8/1/1994	EPA	MO	METAL	Molybdenum	0.01	U	0.1	0.04	MG/L
MW-1	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	9/9/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-11	5/24/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-11	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-11	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-11	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-11	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-12	5/4/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-12	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-12	11/30/2000	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-12	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-12	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-12	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-14	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-14	11/30/2000	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-14	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-14	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-14	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-15	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-15	11/1/2001	Energy	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-15	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-17	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-17	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-17	9/10/2002	Energy	MO	METAL	Molybdenum	0	U	0.1	0.04	MG/L
MW-18	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-18	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-18	9/9/2002	Energy	MO	METAL	Molybdenum	0	U	0.1	0.04	MG/L
MW-19	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-19	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-19	9/10/2002	Energy	MO	METAL	Molybdenum	0	U	0.1	0.04	MG/L
MW-2	2/11/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-2	4/21/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-2	8/11/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-2	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-2	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-2	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	2/12/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-3	4/13/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-3	8/18/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	5/1/1999	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L

Table 5.a. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Quality Standard; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	UNITS
MW-3	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-3	9/12/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	2/11/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-5	4/21/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	MG/L
MW-5	8/18/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	5/24/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	11/30/2000	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-5	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	MG/L
MW-1	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-1	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-1	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-1	9/9/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-11	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-11	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-11	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-11	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-11	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-12	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-12	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-12	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-12	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-14	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-14	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-14	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-14	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-14	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-15	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-15	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-15	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-15	11/1/2001	Energy	TL	METAL	Thallium	0.1	U	0.1	0.002	MG/L
MW-15	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-17	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-17	9/10/2002	Energy	TL	METAL	Thallium	0	U	0.01	0.002	MG/L
MW-18	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-18	9/9/2002	Energy	TL	METAL	Thallium	0	U	0.01	0.002	MG/L
MW-19	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-19	9/10/2002	Energy	TL	METAL	Thallium	0	U	0.01	0.002	MG/L
MW-2	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-2	11/1/2001	Energy	TL	METAL	Thallium	0.1	U	0.1	0.002	MG/L
MW-3	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-3	5/1/1999	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-3	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-3	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-3	9/12/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-5	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-5	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-5	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-5	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-5	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	MG/L
MW-1	4/14/1981	WAMCO	V	METAL	Vanadium	0.5	U	0.5	0.06	MG/L
MW-1	8/14/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-1	12/28/1981	CORE	V	METAL	Vanadium	1	U	0.5	0.06	MG/L
MW-1	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-1	4/22/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-1	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	MG/L
MW-1	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-1	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L

Table 5.a. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Quality Standard; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	UNITS
MW-1	9/9/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-11	5/24/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-11	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	MG/L
MW-11	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-11	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-11	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-12	5/4/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-12	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	MG/L
MW-12	11/30/2000	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-12	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-12	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-12	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-14	11/30/2000	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-14	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-14	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-14	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-15	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-17	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-17	9/10/2002	Energy	V	METAL	Vanadium	0	U	0.1	0.06	MG/L
MW-18	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-18	9/9/2002	Energy	V	METAL	Vanadium	0	U	0.1	0.06	MG/L
MW-19	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-19	9/10/2002	Energy	V	METAL	Vanadium	0	U	0.1	0.06	MG/L
MW-2	4/21/1981	WAMCO	V	METAL	Vanadium	0.5	U	0.5	0.06	MG/L
MW-2	8/11/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-2	12/28/1981	CORE	V	METAL	Vanadium	0.5	U	0.5	0.06	MG/L
MW-2	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-2	5/4/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-2	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-3	8/18/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-3	12/28/1981	CORE	V	METAL	Vanadium	0.5	U	0.5	0.06	MG/L
MW-3	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-3	5/1/1999	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-3	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-3	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-3	9/12/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	4/21/1981	WAMCO	V	METAL	Vanadium	0.5	U	0.5	0.06	MG/L
MW-5	8/18/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	12/28/1981	CORE	V	METAL	Vanadium	0.05	U	0.5	0.06	MG/L
MW-5	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	5/24/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	MG/L
MW-5	11/30/2000	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L
MW-5	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	MG/L

NOTES:
PT_NAME = Monitoring well location
SDATE = Sampling date
LAB = Laboratory that performed the chemical analysis
PC = Parameter code
GROUP = Analytical group
QUAL = Result qualifier, where "U" means reported as not detected
RL = Reporting limit
GWQS = Groundwater quality standard
mg/L = Milligrams per liter
µg/L = Micrograms per liter

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-15	11/1/2001	Energy	AS	METAL	Arsenic	0.1	U	0.1	0.05	0.025	MG/L
MW-1	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-1	8/1/1994	EPA	BE	METAL	Beryllium	0.001	U	0.01	0.004	0.001	MG/L
MW-1	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-1	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-1	9/9/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.001	MG/L
MW-11	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-11	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-11	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-11	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-11	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-11	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-11	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.001	MG/L
MW-12	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	11/30/2000	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-12	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.002	MG/L
MW-14	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	11/30/2000	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-14	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.002	MG/L
MW-15	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-15	11/20/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-15	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-15	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-15	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-15	11/1/2001	Energy	BE	METAL	Beryllium	0.005	U	0.005	0.004	0.002	MG/L
MW-15	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.002	MG/L
MW-17	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-17	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-17	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-17	9/10/2002	Energy	BE	METAL	Beryllium	0	U	0.11	0.004	0.002	MG/L
MW-18	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-18	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-18	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-18	9/9/2002	Energy	BE	METAL	Beryllium	0	U	0.11	0.004	0.001	MG/L
MW-19	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-19	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-19	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-19	9/10/2002	Energy	BE	METAL	Beryllium	0	U	0.11	0.004	0.001	MG/L
MW-2	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-2	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-2	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	11/20/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	5/1/1999	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.002	MG/L
MW-3	9/12/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.002	MG/L
MW-5	11/1/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-5	12/15/1989	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-5	3/28/1994	Barringer	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-5	8/1/1994	EPA	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-5	11/30/2000	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-5	11/1/2001	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-5	9/1/2002	Energy	BE	METAL	Beryllium	0.01	U	0.01	0.004	0.001	MG/L
MW-5	9/10/2002	Energy	BE	METAL	Beryllium	0.11	U	0.11	0.004	0.001	MG/L
MW-1	2/12/1981	WAMCO	CD	METAL	Cadmium	0.002	U	0.002	0.005	0.00125	MG/L
MW-1	12/28/1981	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-1	3/30/1982	WAMCO	CD	METAL	Cadmium	0.002	U	0.002	0.005	0.00125	MG/L
MW-1	4/22/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-1	11/20/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-1	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-1	8/1/1994	EPA	CD	METAL	Cadmium	0.001	U	0.01	0.005	0.00125	MG/L
MW-1	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-1	9/1/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-1	9/9/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-11	5/24/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-11	11/1/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-11	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-11	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-11	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-11	9/1/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-11	9/10/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-12	5/4/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-12	11/1/1989	Barringer	CD	METAL	Cadmium	0.0005	U	0.005	0.005	0.0025	MG/L
MW-12	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-12	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-12	11/30/2000	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-12	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-12	9/1/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-12	9/10/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	11/1/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	12/15/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-14	11/30/2000	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	9/1/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-14	9/10/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-15	11/1/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-15	11/20/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-15	12/15/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-15	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-15	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-15	11/1/2001	Energy	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-15	9/10/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-17	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-17	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-17	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-17	9/10/2002	Energy	CD	METAL	Cadmium	0	U	0.005	0.005	0.0025	MG/L
MW-18	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-18	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-18	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-18	9/9/2002	Energy	CD	METAL	Cadmium	0	U	0.005	0.005	0.00125	MG/L
MW-19	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-19	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-19	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-19	9/10/2002	Energy	CD	METAL	Cadmium	0	U	0.005	0.005	0.00125	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-2	12/28/1981	CORE	CD	METAL	Cadmium	0.1	U	0.01	0.005	0.0025	MG/L
MW-2	5/4/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-2	11/20/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-2	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-2	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-2	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-3	12/28/1981	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-3	11/20/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-3	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-3	8/1/1994	EPA	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.0025	MG/L
MW-3	5/1/1999	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-3	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-3	9/1/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-3	9/12/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.0025	MG/L
MW-5	12/28/1981	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-5	3/30/1982	WAMCO	CD	METAL	Cadmium	0.002	U	0.002	0.005	0.00125	MG/L
MW-5	5/24/1983	CORE	CD	METAL	Cadmium	0.01	U	0.01	0.005	0.00125	MG/L
MW-5	6/14/1984	UCC	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	11/1/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	12/15/1989	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	3/28/1994	Barringer	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	8/1/1994	EPA	CD	METAL	Cadmium	0.1	U	0.01	0.005	0.00125	MG/L
MW-5	11/30/2000	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	11/1/2001	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	9/1/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-5	9/10/2002	Energy	CD	METAL	Cadmium	0.005	U	0.005	0.005	0.00125	MG/L
MW-1	11/1/2001	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-1	9/1/2002	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-1	9/9/2002	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-1	6/20/2005	Energy	CR		Chromium	50	U	50	100	25	ug/L
MW-11	6/25/1985	EDA	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/1/2001	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/1/2002	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/2002	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/21/2005	Energy	CR		Chromium	50	U	50	100	25	ug/L
MW-18	11/1/2001	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-18	9/9/2002	Energy	CR	METAL	Chromium	0	U	0.05	0.1	0.025	MG/L
MW-18	6/21/2005	Energy	CR		Chromium	50	U	50	100	25	ug/L
MW-19	11/1/2001	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-19	9/10/2002	Energy	CR	METAL	Chromium	0	U	0.05	0.1	0.025	MG/L
MW-19	6/22/2005	Energy	CR		Chromium	50	U	50	100	25	ug/L
MW-5	6/25/1985	EDA	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/30/2000	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/1/2001	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/1/2002	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/2002	Energy	CR	METAL	Chromium	0.05	U	0.05	0.1	0.025	MG/L
MW-5	6/21/2005	Energy	CR		Chromium	50	U	50	100	25	ug/L
MW-11	5/1/1999	Energy	ROSS	RADIO	Gross Alpha	4	U	4	15	3.75	PCI/L
MW-14	5/1/1999	Energy	ROSS	RADIO	Gross Alpha	11	U	11	15	7.5	PCI/L
MW-19	5/1/1999	Energy	ROSS	RADIO	Gross Alpha	5	U	5	15	3.75	PCI/L
MW-3	5/1/1999	Energy	ROSS	RADIO	Gross Alpha	11	U	11	15	7.5	PCI/L
MW-3	11/30/2000	Energy	ROSS	RADIO	Gross Alpha	11.3	U	11.3	15	7.5	PCI/L
MW-5	5/1/1999	Energy	ROSS	RADIO	Gross Alpha	4	U	4	15	3.75	PCI/L
MW-1	2/12/1981	WAMCO	PB	METAL	Lead	0.01	U	0.01	0.015	0.00375	MG/L
MW-1	8/14/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-1	12/28/1981	CORE	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-1	3/30/1982	WAMCO	PB	METAL	Lead	0.5	U	0.5	0.015	0.00375	MG/L
MW-1	4/22/1983	CORE	PB	METAL	Lead	0.01	U	0.01	0.015	0.00375	MG/L
MW-1	6/13/1984	UCC.	PB	METAL	Lead	0.005	U	0.005	0.015	0.00375	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-1	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-1	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-1	9/9/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-11	6/12/1984	UCC.	PB	METAL	Lead	0.005	U	0.005	0.015	0.00375	MG/L
MW-11	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-11	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-11	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-11	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-12	5/4/1983	CORE	PB	METAL	Lead	0.01	U	0.01	0.015	0.0075	MG/L
MW-12	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-12	11/30/2000	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-12	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-12	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-12	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-14	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-14	11/30/2000	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-14	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-14	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-14	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-15	11/1/2001	Energy	PB	METAL	Lead	0.01	U	0.01	0.015	0.0075	MG/L
MW-15	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-17	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-17	9/10/2002	Energy	PB	METAL	Lead	0	U	0.05	0.015	0.0075	MG/L
MW-18	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-18	9/9/2002	Energy	PB	METAL	Lead	0	U	0.05	0.015	0.00375	MG/L
MW-19	11/30/2000	Energy	PB	METAL	Lead	0.003	U	0.03	0.015	0.00375	MG/L
MW-19	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-19	9/10/2002	Energy	PB	METAL	Lead	0	U	0.05	0.015	0.00375	MG/L
MW-2	2/11/1981	WAMCO	PB	METAL	Lead	0.01	U	0.01	0.015	0.0075	MG/L
MW-2	8/11/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-2	3/30/1982	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-2	5/4/1983	CORE	PB	METAL	Lead	0.01	U	0.01	0.015	0.0075	MG/L
MW-2	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	2/12/1981	WAMCO	PB	METAL	Lead	0.01	U	0.01	0.015	0.0075	MG/L
MW-3	8/18/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	12/28/1981	CORE	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	3/30/1982	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	5/1/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-3	9/12/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.0075	MG/L
MW-5	2/11/1981	WAMCO	PB	METAL	Lead	0.01	U	0.01	0.015	0.00375	MG/L
MW-5	8/18/1981	WAMCO	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-5	12/28/1981	CORE	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-5	3/30/1982	WAMCO	PB	METAL	Lead	0.5	U	0.5	0.015	0.00375	MG/L
MW-5	5/24/1983	CORE	PB	METAL	Lead	0.01	U	0.01	0.015	0.00375	MG/L
MW-5	6/14/1984	UCC.	PB	METAL	Lead	0.005	U	0.005	0.015	0.00375	MG/L
MW-5	2/18/1999	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-5	11/30/2000	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-5	11/1/2001	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-5	9/1/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-5	9/10/2002	Energy	PB	METAL	Lead	0.05	U	0.05	0.015	0.00375	MG/L
MW-1	6/13/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	0.0005	MG/L
MW-1	5/1/1999	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-1	11/1/2001	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-1	9/1/2002	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-1	9/9/2002	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-11	6/12/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	0.0005	MG/L
MW-11	5/1/1999	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-11	11/1/2001	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-11	9/1/2002	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-11	9/10/2002	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-12	6/12/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	0.001	MG/L
MW-15	11/1/2001	Energy	HG	METAL	Mercury	0.1	U	0.1	0.002	0.001	MG/L
MW-18	11/1/2001	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-18	9/9/2002	Energy	HG	METAL	Mercury	0	U	0.001	0.002	0.0005	MG/L
MW-19	11/1/2001	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-19	9/10/2002	Energy	HG	METAL	Mercury	0	U	0.001	0.002	0.0005	MG/L
MW-5	6/14/1984	UCC.	HG	METAL	Mercury	0.1	U	0.1	0.002	0.0005	MG/L
MW-5	11/30/2000	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-5	11/1/2001	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-5	9/1/2002	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-5	9/10/2002	Energy	HG	METAL	Mercury	0.001	U	0.001	0.002	0.0005	MG/L
MW-1	2/12/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.01	MG/L
MW-1	4/14/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.01	MG/L
MW-1	8/14/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	4/22/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	8/1/1994	EPA	MO	METAL	Molybdenum	0.01	U	0.1	0.04	0.01	MG/L
MW-1	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	9/9/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-1	6/20/2005	Energy	MO	METAL	Molybdenum	20	U	20	40	10	ug/L
MW-11	5/24/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-11	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-11	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-11	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-11	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-11	6/21/2005	Energy	MO	METAL	Molybdenum	20	U	20	40	10	ug/L
MW-12	5/4/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-12	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-12	11/30/2000	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-12	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-12	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-12	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-14	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-14	11/30/2000	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-14	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-14	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-14	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-15	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-15	11/1/2001	Energy	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.02	MG/L
MW-15	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-17	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-17	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-17	9/10/2002	Energy	MO	METAL	Molybdenum	0	U	0.1	0.04	0.02	MG/L
MW-18	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-18	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-18	9/9/2002	Energy	MO	METAL	Molybdenum	0	U	0.1	0.04	0.01	MG/L
MW-18	6/21/2005	Energy	MO	METAL	Molybdenum	20	U	20	40	10	ug/L
MW-19	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-19	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-19	9/10/2002	Energy	MO	METAL	Molybdenum	0	U	0.1	0.04	0.01	MG/L
MW-19	6/22/2005	Energy	MO	METAL	Molybdenum	20	U	20	40	10	ug/L
MW-2	2/11/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.02	MG/L
MW-2	4/21/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.02	MG/L
MW-2	8/11/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-2	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-2	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-2	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	2/12/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.02	MG/L
MW-3	4/13/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.02	MG/L
MW-3	8/18/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	5/1/1999	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-3	9/12/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.02	MG/L
MW-5	2/11/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.01	MG/L
MW-5	4/21/1981	WAMCO	MO	METAL	Molybdenum	0.05	U	0.05	0.04	0.01	MG/L
MW-5	8/18/1981	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	12/28/1981	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	3/30/1982	WAMCO	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	5/24/1983	CORE	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	8/1/1994	EPA	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	11/30/2000	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	11/1/2001	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	9/1/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	9/10/2002	Energy	MO	METAL	Molybdenum	0.1	U	0.1	0.04	0.01	MG/L
MW-5	6/21/2005	Energy	MO	METAL	Molybdenum	20	U	20	40	10	ug/L
MW-1	8/1/1994	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	6/27/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	9/14/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	12/7/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	3/28/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	6/5/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	9/10/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	3/20/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	11/1/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	9/1/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	9/9/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	8/1/1994	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/27/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/14/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	12/7/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/27/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/5/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/22/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/19/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/11/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/30/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	1/8/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/16/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	5/12/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/24/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/3/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	2/18/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	5/11/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/30/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	12/9/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/17/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/6/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/3/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-11	11/30/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/23/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/12/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/4/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/4/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/1/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/14/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	5/20/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/1/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/21/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/20/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	6/27/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/24/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/24/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	3/19/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	5/27/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	9/14/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-11	11/9/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-18	8/1/1994	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-18	11/1/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-18	9/9/2002	Energy	NI	METAL	Nickel	0	U	0.05	0.1	0.025	MG/L
MW-19	8/1/1994	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-19	11/1/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-19	9/10/2002	Energy	NI	METAL	Nickel	0	U	0.05	0.1	0.025	MG/L
MW-5	8/1/1994	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	6/27/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/14/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	12/7/1995	EPA	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/27/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	6/5/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/22/1996	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/19/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	6/11/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/30/1997	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	1/8/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/16/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	5/12/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/24/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/3/1998	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	2/18/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	5/12/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/30/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	12/9/1999	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/17/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	6/6/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/3/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/30/2000	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/24/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	6/13/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/7/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/7/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/6/2001	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/15/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-5	5/20/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/1/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/10/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/21/2002	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/20/2003	Energy	NI	METAL	Nickel	5	U	0.05	0.1	0.025	MG/L
MW-5	6/27/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/24/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/23/2003	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	3/19/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	5/27/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	9/14/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-5	11/9/2004	Energy	NI	METAL	Nickel	0.05	U	0.05	0.1	0.025	MG/L
MW-1	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-1	5/1/1999	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-1	11/30/2000	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-1	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-1	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-1	9/9/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-1	6/20/2005	Energy			Thallium	1	U	1	2	0.5	ug/L
MW-11	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-11	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-11	5/1/1999	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-11	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-11	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-11	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-11	6/21/2005	Energy			Thallium	1	U	1	2	0.5	ug/L
MW-12	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-12	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-12	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-12	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-14	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-14	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-14	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-14	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-14	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-15	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-15	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-15	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-15	11/1/2001	Energy	TL	METAL	Thallium	0.1	U	0.1	0.002	0.001	MG/L
MW-15	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-17	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-17	9/10/2002	Energy	TL	METAL	Thallium	0	U	0.01	0.002	0.001	MG/L
MW-18	11/30/2000	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-18	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-18	9/9/2002	Energy	TL	METAL	Thallium	0	U	0.01	0.002	0.0005	MG/L
MW-18	6/21/2005	Energy			Thallium	1	U	1	2	0.5	ug/L
MW-19	11/30/2000	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-19	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-19	9/10/2002	Energy	TL	METAL	Thallium	0	U	0.01	0.002	0.0005	MG/L
MW-19	6/22/2005	Energy			Thallium	1	U	1	2	0.5	ug/L
MW-2	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-2	11/1/2001	Energy	TL	METAL	Thallium	0.1	U	0.1	0.002	0.001	MG/L
MW-3	11/20/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-3	5/1/1999	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-3	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-3	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-3	9/12/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.001	MG/L
MW-5	11/1/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-5	12/15/1989	Barringer	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-5	5/1/1999	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-5	11/30/2000	Energy	TL	METAL	Thallium	0.001	U	0.001	0.002	0.0005	MG/L
MW-5	11/1/2001	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-5	9/1/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-5	9/10/2002	Energy	TL	METAL	Thallium	0.01	U	0.01	0.002	0.0005	MG/L
MW-5	6/21/2005	Energy			Thallium	1	U	1	2	0.5	ug/L
MW-1	2/12/1981	WAMCO	V	METAL	Vanadium	0.05	U	0.05	0.06	0.015	MG/L
MW-1	4/14/1981	WAMCO	V	METAL	Vanadium	0.5	U	0.5	0.06	0.015	MG/L
MW-1	8/14/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-1	12/28/1981	CORE	V	METAL	Vanadium	1	U	0.5	0.06	0.015	MG/L
MW-1	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-1	4/22/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-1	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	0.015	MG/L
MW-1	11/30/2000	Energy	V	METAL	Vanadium	0.03	U	0.03	0.06	0.015	MG/L
MW-1	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-1	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-1	9/9/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-1	6/20/2005	Energy	V	METAL	Vanadium	20	U	20	60	15	ug/L
MW-11	5/24/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-11	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	0.015	MG/L
MW-11	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-11	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-11	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-11	6/21/2005	Energy	V	METAL	Vanadium	20	U	20	60	15	ug/L
MW-12	5/4/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-12	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	0.03	MG/L
MW-12	11/30/2000	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-12	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-12	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-12	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-14	11/30/2000	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-14	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-14	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-14	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-15	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-17	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-17	9/10/2002	Energy	V	METAL	Vanadium	0	U	0.1	0.06	0.03	MG/L
MW-18	11/30/2000	Energy	V	METAL	Vanadium	0.03	U	0.03	0.06	0.015	MG/L
MW-18	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-18	9/9/2002	Energy	V	METAL	Vanadium	0	U	0.1	0.06	0.015	MG/L
MW-18	6/21/2005	Energy	V	METAL	Vanadium	20	U	20	60	15	ug/L
MW-19	11/30/2000	Energy	V	METAL	Vanadium	0.03	U	0.03	0.06	0.015	MG/L
MW-19	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-19	9/10/2002	Energy	V	METAL	Vanadium	0	U	0.1	0.06	0.015	MG/L
MW-19	6/22/2005	Energy	V	METAL	Vanadium	20	U	20	60	15	ug/L
MW-2	2/11/1981	WAMCO	V	METAL	Vanadium	0.05	U	0.05	0.06	0.03	MG/L
MW-2	4/21/1981	WAMCO	V	METAL	Vanadium	0.5	U	0.5	0.06	0.03	MG/L
MW-2	8/11/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-2	12/28/1981	CORE	V	METAL	Vanadium	0.5	U	0.5	0.06	0.03	MG/L
MW-2	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-2	5/4/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-2	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-3	2/12/1981	WAMCO	V	METAL	Vanadium	0.05	U	0.05	0.06	0.03	MG/L
MW-3	4/13/1981	WAMCO	V	METAL	Vanadium	0.05	U	0.05	0.06	0.03	MG/L
MW-3	8/18/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L

Table 5.b. Records Where "Non-Detected" Reporting Limit Exceeded the Groundwater Compliance Limit; Background Groundwater Quality Report for White Mesa Mill, Utah

PT_NAME	SDATE	LAB	PC	GROUP	CHEMICAL	RESULT	QUAL	RL	GWQS	GWCL	UNITS
MW-3	12/28/1981	CORE	V	METAL	Vanadium	0.5	U	0.5	0.06	0.03	MG/L
MW-3	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-3	5/1/1999	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-3	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-3	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-3	9/12/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.03	MG/L
MW-5	2/11/1981	WAMCO	V	METAL	Vanadium	0.05	U	0.05	0.06	0.015	MG/L
MW-5	4/21/1981	WAMCO	V	METAL	Vanadium	0.5	U	0.5	0.06	0.015	MG/L
MW-5	8/18/1981	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	12/28/1981	CORE	V	METAL	Vanadium	0.05	U	0.5	0.06	0.015	MG/L
MW-5	3/30/1982	WAMCO	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	5/24/1983	CORE	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	6/25/1985	EDA	V	METAL	Vanadium	0.2	U	0.2	0.06	0.015	MG/L
MW-5	11/30/2000	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	11/1/2001	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	9/1/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	9/10/2002	Energy	V	METAL	Vanadium	0.1	U	0.1	0.06	0.015	MG/L
MW-5	6/21/2005	Energy	V	METAL	Vanadium	20	U	20	60	15	ug/L

µg/L = Micrograms per liter
GROUP = Analytical group
GWCL = Groundwater Compliance Limit (a fraction of the GWQS, initially based on classification of the groundwater)
GWQS = Groundwater quality standard
LAB = Laboratory that performed the chemical analysis
mg/L = Milligrams per liter
NOTES:
PC = Parameter code
PT_NAME = Monitoring well location
QUAL = Result qualifier, where "U" means reported as not detected
RL = Reporting limit
SDATE = Sampling date

Table 6. Summary by Well, Year, and Constituent Where Reporting Limit of Non-Detection Exceeded GWQS & GWCL; Background Groundwater Quality Report for White Mesa Mill, Utah

Well	>GWQS	>GWCL
MW-1	36	73
MW-11	29	94
MW-12	32	40
MW-14	28	36
MW-15	21	27
MW-17	14	17
MW-18	14	30
MW-19	15	32
MW-2	23	29
MW-3	39	50
MW-5	46	121

Constituent	N	>GWQS	>GWCL
Ammonia	83	0	0
Arsenic	379	1	1
Beryllium	227	65	65
Cadmium	250	21	78
Chromium	183	0	21
Copper	168	0	0
Fluoride	150	0	0
Gross Alpha	323	0	6
Iron	160	0	0
Lead	188	46	58
Manganese	189	0	0
Mercury	181	5	21
Molybdenum	232	65	70
Nickel	477	0	109
Nitrate	133	0	0
Nitrite	133	0	0
pH	760	0	0
Selenium	369	0	0
Silver	148	0	0
Thallium	156	41	53
Vanadium	185	54	67
Zinc	164	0	0

Year	>GWQS	>GWCL
1981	38	48
1982	12	14
1983	14	18
1984	4	8
1985	4	6
1986	0	0
1987	0	0
1988	0	0
1989	25	37
1990	0	0
1991	0	0
1992	0	0
1993	0	0
1994	43	59
1995	0	9
1996	0	11
1997	0	7
1998	0	10
1999	9	28
2000	13	34
2001	56	90
2002	80	134
2003	0	8
2004	0	8
2005	0	20
2006	0	0

Notes:

GWQS = Groundwater Quality Standard
GWCL = Groundwater Compliance Limit (a fraction of the GWQS, based on classification of the groundwater, CLASS)
U-Conc = Uranium concentration measured and reported in milligrams per liter

Table 7. Energy Laboratories Analytical Methods
Background Groundwater Quality Report for White Mesa Mill, Utah

Analyses	Method
Alkalinity as CaCO3 Carbonate as CO3 Bicarbonate as HCO3	A2320 B
Ammonia as N	A4500-NH3 G
Calcium, magnesium, potassium, sodium, iron	E200.7
Chloride	A4500-Cl B
Fluoride	A4500-F C
Gross Alpha	E900.1
Metals, other than iron	E200.8
Nitrate + Nitrite as N	E353.2
pH	A4500-H B
Sulfate	A4500-SO4 E
TDS	A2540 C
Turbidity	A2130 B
Uranium	E200.8 ASTM D2907
Volatile Organic Compounds	SW8260B

Table 8. Comparison of Calculated and Measured TDS for Samples with Complete Major-Ion Analysis

Background Groundwater Quality Report for White Mesa Mill, Utah

Well	Sampling Date	ALK_TOT	Ca	Cl	K	Mg	Na	SO4	Measured TDS	Units	Ratio of Calculated TDS to Measured TDS as a Percentage
MW-1	3/30/1982	267	142	13.0	14.0	55.0	170	613	1,199	mg/L	106.3%
MW-1	12/10/1982	295	143	10.9	6.4	51.0	170	653	1,326	mg/L	100.2%
MW-1	4/22/1983	290	150	16.5	6.0	51.0	170	658	1,160	mg/L	115.6%
MW-1	10/26/1983	275	140	12.7	6.1	54.0	170	675	1,225	mg/L	108.8%
MW-1	6/13/1984	280	150	12.0	5.7	54.0	170	680	1,400	mg/L	96.6%
MW-1	2/27/1991	271	123	12.0	6.0	52.0	171	662	1,272	mg/L	102.0%
MW-1	11/19/1992	258	152	13.0	6.7	63.0	182	654	1,567	mg/L	84.8%
MW-1	3/24/1993	260	149	14.0	6.2	54.0	167	614	1,295	mg/L	97.6%
MW-1	6/8/1993	270	150	12.0	7.3	55.0	170	676	1,300	mg/L	103.1%
MW-1	9/1/1993	252	142	12.0	6.2	53.0	164	658	1,300	mg/L	99.0%
MW-1	12/1/1993	250	167	18.0	8.0	63.0	170	752	1,692	mg/L	84.4%
MW-1	3/28/1994	256	159	15.0	6.1	61.2	163.7	722	1,210	mg/L	114.3%
MW-1	6/15/1994	251	130	13.0	7.0	55.0	170	670	1,271	mg/L	102.0%
MW-1	8/1/1994	261	168	15.1	5.7	59.0	168	691	1,357	mg/L	100.8%
MW-1	12/1/1994	260	153	22.1	6.3	54.0	167	705	1,361	mg/L	100.5%
MW-1	11/30/2000	260	138	15.2	5.9	50.8	156	608	1,270	mg/L	97.2%
MW-1	11/1/2001	251	158	17.3	6.0	59.2	158	691	1,360	mg/L	98.6%
MW-1	6/20/2005	245	123	11.0	5.8	51.8	166	637	1,220	mg/L	101.6%
MW-1	6/25/2006	245	150	17.0	6.6	60.0	160	724	1,320	mg/L	103.2%
MW-11	12/16/1982	477	36	24.4	5.7	8.8	550	926	1,812	mg/L	111.9%
MW-11	5/24/1983	360	31	26.8	4.7	7.7	530	943	1,728	mg/L	110.1%
MW-11	10/26/1983	300	28	26.0	5.0	6.7	540	922	1,697	mg/L	107.7%
MW-11	6/12/1984	330	29	32.0	5.1	7.0	530	920	1,700	mg/L	109.0%
MW-11	2/28/1991	301	33	31.0	6.0	8.7	522	967	1,686	mg/L	110.8%
MW-11	11/19/1992	329	198	41.0	10.6	73.0	520	1507	2,850	mg/L	94.0%
MW-11	3/24/1993	312	117	35.0	9.2	36.0	551	1162	2,090	mg/L	106.3%
MW-11	6/8/1993	308	150	39.0	12.2	48.0	517	1309	2,396	mg/L	99.5%
MW-11	9/1/1993	310	140	36.0	11.3	47.0	557	1307	2,352	mg/L	102.4%
MW-11	12/1/1993	305	50	33.0	8.0	15.0	556	1054	2,528	mg/L	79.9%
MW-11	3/28/1994	312	117	35.0	9.2	36.0	551	1162	2,090	mg/L	106.3%
MW-11	6/15/1994	309	150	32.0	8.0	23.0	560	1118	1,916	mg/L	114.8%
MW-11	8/1/1994	310	55.1	31.2	5.2	14.9	510	999	1,910	mg/L	100.8%
MW-11	12/1/1994	310	45.6	30.7	6.1	11.7	561	1040	1,873	mg/L	107.1%
MW-11	11/30/2000	314	94	40.8	9.7	30.6	487	1140	2,130	mg/L	99.3%
MW-11	11/1/2001	308	91.9	42.4	7.0	29.8	574	1150	2,100	mg/L	104.9%
MW-11	6/21/2005	298	58.7	31.0	6.3	18.2	544	1090	1,950	mg/L	104.9%
MW-12	12/17/1982	508	500	57.4	16.0	214.0	310	2395	4,116	mg/L	97.2%
MW-12	5/4/1983	445	530	80.5	12.0	270.0	310	2420	4,026	mg/L	101.0%
MW-12	10/27/1983	715	530	53.9	13.0	210.0	290	2338	3,922	mg/L	105.8%
MW-12	6/12/1984	400	580	65.0	13.0	250.0	320	2400	4,100	mg/L	98.2%
MW-12	2/28/1991	296	313	61.0	9.6	81.0	213	1850	3,260	mg/L	86.6%
MW-12	11/19/1992	334	504	62.0	13.3	224.0	318	2343	4,323	mg/L	87.9%
MW-12	3/24/1993	344	514	60.0	14.7	215.0	305	2096	3,920	mg/L	90.5%
MW-12	6/8/1993	362	512	54.0	15.1	214.0	302	2154	4,156	mg/L	86.9%
MW-12	9/1/1993	343	507	54.0	14.9	210.0	277	2234	3,908	mg/L	93.1%
MW-12	12/1/1993	325	489	61.0	14.7	210.0	298	2261	4,306	mg/L	85.0%
MW-12	3/28/1994	344	514	60.0	14.7	215.0	305	2096	3,920	mg/L	90.5%
MW-12	6/15/1994	337	494	5.0	14.0	207.0	280	2187	3,744	mg/L	94.1%
MW-12	8/1/1994	346	547	58.3	10.8	236.0	285	2487	3,883	mg/L	102.2%
MW-12	12/1/1994	359	536	64.7	13.0	204.0	299	2421	4,077	mg/L	95.6%
MW-12	11/30/2000	346	499	60.7	11.9	216.0	248	2000	3,860	mg/L	87.6%
MW-12	11/1/2001	342	531	81.2	11.7	228.0	229	2190	3,900	mg/L	92.6%
MW-12	6/22/2005	330	466	55.0	11.4	203.0	262	2120	3,680	mg/L	93.7%
MW-12	6/23/2006	346	520	61.0	15.0	220.0	320	2270	3,860	mg/L	97.2%
MW-14	3/4/1991	361	306	23.0	7.9	41.0	265	1512	2,684	mg/L	93.7%
MW-14	11/19/1992	406	474	18.0	11.5	157.0	358	2098	3,833	mg/L	91.9%
MW-14	3/24/1993	392	498	19.0	13.2	150.0	352	1872	3,630	mg/L	90.8%
MW-14	6/8/1993	384	500	17.0	13.6	155.0	349	2051	3,728	mg/L	93.1%
MW-14	9/1/1993	378	498	18.0	13.9	151.0	355	2106	3,708	mg/L	94.9%
MW-14	12/1/1993	387	477	18.0	13.6	148.0	353	2067	4,062	mg/L	85.3%
MW-14	3/28/1994	392	498	19.0	13.2	150.0	352	1872	3,630	mg/L	90.8%
MW-14	6/15/1994	383	499	20.0	13.0	152.0	350	2110	3,512	mg/L	100.4%

Table 8. Comparison of Calculated and Measured TDS for Samples with Complete Major-Ion Analysis

Background Groundwater Quality Report for White Mesa Mill, Utah

Well	Sampling Date	ALK_TOT	Ca	Cl	K	Mg	Na	SO4	Measured TDS	Units	Ratio of Calculated TDS to Measured TDS as a Percentage
MW-14	8/1/1994	393	537	19.3	9.4	175.0	313	2260	3,623	mg/L	102.3%
MW-14	12/1/1994	388	527	18.8	11.4	143.0	327	2230	3,714	mg/L	98.1%
MW-14	11/30/2000	380	494	23.5	11.3	154.0	289	1900	3,590	mg/L	90.6%
MW-14	11/1/2001	382	527	26.5	11.4	168.0	257	2030	3,650	mg/L	93.2%
MW-14	6/22/2005	364	483	18.0	11.4	156.0	314	2120	3,560	mg/L	97.4%
MW-15	3/4/1991	356	365	41.0	9.4	120.0	466	1876	3,356	mg/L	96.3%
MW-15	11/19/1992	357	431	39.0	10.1	172.0	478	2362	4,233	mg/L	90.9%
MW-15	6/8/1993	358	451	38.0	11.7	165.0	488	2203	4,084	mg/L	91.0%
MW-15	9/1/1993	357	430	38.0	14.6	163.0	496	2298	4,052	mg/L	93.7%
MW-15	12/1/1993	355	446	38.0	12.2	169.0	467	2292	4,530	mg/L	83.4%
MW-15	6/15/1994	257	453	36.0	11.0	161.0	480	2361	3,860	mg/L	97.4%
MW-15	8/1/1994	367	475	39.7	8.2	188.0	400	2169	3,517	mg/L	103.7%
MW-15	12/1/1994	342	434	39.8	9.4	143.0	467	2440	3,943	mg/L	98.3%
MW-15	11/1/2001	327	451.5	48.9	10.8	172.5	377	2235	3,615	mg/L	100.2%
MW-17	3/24/1993	384	406	28.0	17.8	200.0	615	2,004	4,607	mg/L	79.3%
MW-17	6/8/1993	385	388	27.0	17.7	188.0	641	2,079	4,636	mg/L	80.4%
MW-17	9/1/1993	383	375	25.0	18.7	180.0	724	2,678	4,592	mg/L	95.5%
MW-17	12/1/1993	385	372	28.0	18.6	177.0	688	2,460	5,296	mg/L	78.0%
MW-17	3/28/1994	336	441	36.0	7.5	93.3	193	1,465	2,426	mg/L	106.0%
MW-17	6/15/1994	438	410	31.0	16.0	200.0	680	2,553	4,534	mg/L	95.5%
MW-17	8/1/1994	395	481	29.8	11.4	237.0	575	2,684	4,519	mg/L	97.7%
MW-17	12/1/1994	398	387	29.7	13.0	167.0	638	2,751	4,578	mg/L	95.8%
MW-17	11/30/2000	394	403	31.0	12.8	209.0	586	2,520	4,290	mg/L	96.9%
MW-17	11/1/2001	392	458	43.1	13.8	233.0	661	2,860	4,670	mg/L	99.8%
MW-17	6/22/2005	361	310	24.0	12.0	162.0	517	2,360	3,750	mg/L	99.9%
MW-17	6/23/2006	430	340	28.0	16.0	200.0	580	2,600	4,200	mg/L	99.9%
MW-18	3/24/1993	324	415	34.0	7.1	92.0	185	1371	2,655	mg/L	91.5%
MW-18	6/8/1993	325	445	34.0	7.6	96.0	192	1431	2,720	mg/L	93.0%
MW-18	9/1/1993	323	437	34.0	7.8	97.0	198	1466	2,700	mg/L	94.9%
MW-18	12/1/1993	328	419	34.0	7.4	95.0	193	1446	2,940	mg/L	85.8%
MW-18	3/28/1994	213	208	75.0	10.4	72.7	448.7	1447	2,299	mg/L	107.6%
MW-18	6/15/1994	246	424	35.0	7.0	95.0	190	1416	2,557	mg/L	94.4%
MW-18	8/1/1994	330	443	33.0	5.6	104.0	183	1498	2,466	mg/L	105.3%
MW-18	12/1/1994	291	297	19.9	6.6	68.1	212	1069	1,920	mg/L	102.3%
MW-18	11/30/2000	337	467	47.3	7.0	88.3	180	1600	2,770	mg/L	98.4%
MW-18	11/1/2001	322	456.5	43.8	7.8	86.9	155	1485	2,405	mg/L	106.3%
MW-18	6/21/2005	342	515	45.0	8.3	111.0	184	1710	2,980	mg/L	97.8%
MW-19	3/24/1993	194	245	81.0	12.7	88.0	432	1500	2,625	mg/L	97.2%
MW-19	6/8/1993	205	316	92.0	11.8	111.0	438	1736	3,144	mg/L	92.6%
MW-19	9/1/1993	208	305	93.0	13.0	115.0	476	1811	3,172	mg/L	95.2%
MW-19	12/1/1993	206	287	94.0	12.8	102.0	475	1793	3,694	mg/L	80.4%
MW-19	3/28/1994	398	424	31.0	15.4	199.3	653	2448	4,829	mg/L	86.3%
MW-19	6/15/1994	223	166	63.0	11.0	61.0	430	1204	2,067	mg/L	104.4%
MW-19	8/1/1994	234	162	60.0	6.9	52.4	380	1099	2,037	mg/L	97.9%
MW-19	12/1/1994	255	103	43.8	6.0	37.3	346	853	1,528	mg/L	107.6%
MW-19	11/30/2000	211	392	80.4	7.8	140.0	367	2080	3,420	mg/L	95.9%
MW-19	11/1/2001	220	351	87.9	7.4	122.0	251	1570	2,790	mg/L	93.5%
MW-19	6/22/2005	215	207	43.0	5.8	68.1	264	1070	1,920	mg/L	97.5%
MW-2	3/30/1982	367	325	8.0	26.0	244.0	483	1590	2,769	mg/L	109.9%
MW-2	12/10/1982	428	300	5.5	10.2	90.0	480	1749	3,056	mg/L	100.2%
MW-2	10/27/1983	375	310	5.1	6.5	92.0	500	1818	2,972	mg/L	104.5%
MW-2	6/13/1984	350	330	7.0	10.0	84.0	500	1900	3,200	mg/L	99.4%
MW-2	2/27/1991	349	298	10.0	11.0	91.0	477	1849	3,154	mg/L	97.8%
MW-2	11/19/1992	345	334	6.0	12.3	105.0	467	1864	3,357	mg/L	93.3%
MW-2	3/24/1993	349	355	8.0	11.9	99.0	504	1733	3,122	mg/L	98.0%
MW-2	6/8/1993	345	355	6.0	12.8	98.0	491	1499	3,288	mg/L	85.4%
MW-2	9/1/1993	284	325	6.0	13.6	95.0	472	1841	3,176	mg/L	95.6%
MW-2	12/1/1993	343	332	6.0	12.7	94.0	478	1840	3,800	mg/L	81.7%
MW-2	3/28/1994	347	341	6.0	9.6	97.1	470.3	1840	2,770	mg/L	112.3%
MW-2	6/15/1994	338	325	6.0	12.0	92.0	480	1834	3,043	mg/L	101.4%
MW-2	8/1/1994	338	351	5.3	9.1	90.4	500	1740	3,133	mg/L	96.8%
MW-2	12/1/1994	346	322	9.4	10.0	87.0	453	1930	3,165	mg/L	99.8%

Table 8. Comparison of Calculated and Measured TDS for Samples with Complete Major-Ion Analysis

Background Groundwater Quality Report for White Mesa Mill, Utah

Well	Sampling Date	ALK_TOT	Ca	Cl	K	Mg	Na	SO4	Measured TDS	Units	Ratio of Calculated TDS to Measured TDS as a Percentage
MW-2	11/30/2000	326	298	9.1	9.8	81.8	440	1710	3,130	mg/L	91.8%
MW-2	11/1/2001	319	336	10.7	10.3	86.5	549	1800	3,150	mg/L	98.8%
MW-2	6/21/2005	306	313	7.0	9.7	84.6	473	1850	3,060	mg/L	99.5%
MW-23	6/22/2006	225	440	7.0	13.0	150.0	400	2280	3,440	mg/L	102.2%
MW-24	6/22/2006	513	450	30.0	16.0	170.0	480	2580	3,980	mg/L	106.5%
MW-26	6/21/2005	337	424	52.0	10.1	154.0	234	1880	3,200	mg/L	96.6%
MW-28	6/21/2005	127	452	80.0	11.6	148.0	302	2010	3,720	mg/L	84.2%
MW-28	6/23/2006	142	490	91.0	12.0	170.0	300	2190	3,540	mg/L	95.9%
MW-3	3/30/1982	382	481	64.0	58.0	229.0	757	3100	4,990	mg/L	101.6%
MW-3	12/13/1982	361	480	53.0	16.0	185.0	810	3259	5,366	mg/L	96.2%
MW-3	4/21/1983	430	470	66.5	22.0	260.0	770	3226	4,880	mg/L	107.5%
MW-3	10/26/1983	435	450	56.6	21.0	210.0	800	3226	5,127	mg/L	101.4%
MW-3	6/15/1984	370	470	63.0	21.0	230.0	780	3300	5,300	mg/L	98.8%
MW-3	3/5/1991	204	407	68.0	25.0	234.0	708	2712	5,268	mg/L	82.7%
MW-3	11/19/1992	352	437	63.0	24.3	244.0	736	3200	5,727	mg/L	88.3%
MW-3	3/24/1993	324	466	64.0	25.7	239.0	729	2200	5,385	mg/L	75.2%
MW-3	6/8/1993	410	466	61.0	28.2	238.0	649	1890	5,616	mg/L	66.6%
MW-3	9/1/1993	402	453	61.0	32.0	241.0	755	2572	5,496	mg/L	82.2%
MW-3	12/1/1993	331	457	64.0	28.2	244.0	734	2528	6,186	mg/L	70.9%
MW-3	3/28/1994	358	476	64.0	21.4	249.0	736	3350	5,000	mg/L	105.1%
MW-3	6/15/1994	406	443	65.0	27.0	23.0	740	2199	5,334	mg/L	73.2%
MW-3	8/1/1994	296	581	66.0	20.1	237.0	698	3385	5,281	mg/L	100.0%
MW-3	12/1/1994	371	458	65.1	22.0	219.0	702	3277	5,432	mg/L	94.1%
MW-3	11/30/2000	491	434	62.0	19.9	218.0	807	2920	5,320	mg/L	93.1%
MW-3	11/1/2001	440	470	82.5	20.2	235.0	882	3230	5,380	mg/L	99.6%
MW-3	6/25/2006	290	410	63.0	27.0	230.0	680	4030	5,050	mg/L	113.5%
MW-30	6/22/2005	176	302	125.0	8.9	83.7	113	977	1,940	mg/L	92.0%
MW-31	6/22/2005	169	156	139.0	5.6	78.6	90.3	504	1,290	mg/L	88.6%
MW-3A	6/25/2006	307	440	61.0	30.0	280.0	680	3510	5,700	mg/L	93.1%
MW-5	3/30/1982	290	200	51.0	22.0	83.0	490	1260	2,273	mg/L	105.4%
MW-5	12/13/1982	180	143	47.1	7.4	40.0	431	1182	2,180	mg/L	93.1%
MW-5	5/24/1983	320	150	48.1	6.5	42.0	460	1228	2,236	mg/L	100.8%
MW-5	10/27/1983	325	150	46.8	7.0	41.0	480	1813	2,093	mg/L	136.8%
MW-5	6/14/1984	330	150	54.0	7.4	41.0	470	1200	2,200	mg/L	102.4%
MW-5	2/28/1991	303	118	50.0	7.4	34.0	430	1028	1,850	mg/L	106.5%
MW-5	11/19/1992	322	132	50.0	7.9	43.0	453	1055	2,213	mg/L	93.2%
MW-5	3/24/1993	318	136	50.0	8.7	38.0	460	1007	1,947	mg/L	103.6%
MW-5	6/8/1993	312	136	48.0	9.0	39.0	445	1064	2,048	mg/L	100.2%
MW-5	9/1/1993	309	130	48.0	11.3	39.0	462	1057	2,008	mg/L	102.4%
MW-5	12/1/1993	312	126	52.0	8.4	37.0	433	1065	2,500	mg/L	81.3%
MW-5	3/28/1994	317	125	50.0	6.4	37.7	435.7	1040	1,760	mg/L	114.3%
MW-5	6/15/1994	253	130	44.0	9.0	37.0	440	997	2,126	mg/L	89.8%
MW-5	8/1/1994	314	169	48.4	6.3	33.4	369	999	1,936	mg/L	100.2%
MW-5	12/1/1994	313	135	55.3	7.3	35.9	439	1075	1,952	mg/L	105.6%
MW-5	11/30/2000	312	142	57.0	7.7	40.6	440	1140	2,160	mg/L	99.0%
MW-5	11/1/2001	307	132	67.9	7.1	37.6	388	1090	2,030	mg/L	100.0%
MW-5	6/21/2005	302	122	48.0	6.9	35.8	442	1070	1,950	mg/L	103.9%
MW-5	6/25/2006	318	150	50.0	9.2	42.0	520	1090	2,020	mg/L	107.9%

Notes:

ALK_TOT = Total alkalinity (at site pH levels, this is essentially equal to bicarbonate alkalinity)
Ca = Calcium
Cl = Chloride
K = Potassium
Mg = Magnesium
Na = Sodium
SO4 = Sulfate
Measured TDS = Measured total dissolved solids, as reported by laboratory

Calculated TDS is the sum of the major ions listed in this table (Ca, Cl, K, Mg, Na, SO4, and total alkalinity)
Arithmetic mean of all ratios = 97.2%
Standard deviation for all ratios = 9.3%

Table 9. Charge balance of major cations and anions

Ca	Na	Mg	K	Total Cation Charge	HCO3	Cl	SO4	Total Anion Charge	Percent Difference
7.0	7.4	4.5	0.4	19.2	-4.4	-0.4	-12.8	-17.5	9.0%
7.0	7.4	4.2	0.2	18.8	-4.8	-0.3	-13.6	-18.7	0.2%
7.4	7.4	4.2	0.2	19.1	-4.8	-0.5	-13.7	-18.9	1.0%
6.9	7.4	4.4	0.2	18.9	-4.5	-0.4	-14.1	-18.9	-0.3%
7.4	7.4	4.4	0.1	19.3	-4.6	-0.3	-14.2	-19.1	1.3%
6.0	7.4	4.3	0.2	17.9	-4.4	-0.3	-13.8	-18.6	-3.7%
7.5	7.9	5.2	0.2	20.7	-4.2	-0.4	-13.6	-18.2	12.1%
7.3	7.3	4.4	0.2	19.2	-4.3	-0.4	-12.8	-17.4	9.0%
7.4	7.4	4.5	0.2	19.5	-4.4	-0.3	-14.1	-18.8	3.2%
7.0	7.1	4.4	0.2	18.6	-4.1	-0.3	-13.7	-18.2	2.4%
8.2	7.4	5.2	0.2	21.0	-4.1	-0.5	-15.7	-20.3	3.4%
7.8	7.1	5.0	0.2	20.1	-4.2	-0.4	-15.0	-19.7	2.3%
6.4	7.4	4.5	0.2	18.5	-4.1	-0.4	-13.9	-18.4	0.2%
8.2	7.3	4.9	0.1	20.5	-4.3	-0.4	-14.4	-19.1	7.1%
7.5	7.3	4.4	0.2	19.4	-4.3	-0.6	-14.7	-19.6	-1.0%
6.8	6.8	4.2	0.2	17.9	-4.3	-0.4	-12.7	-17.3	3.0%
7.7	6.9	4.9	0.2	19.6	-4.1	-0.5	-14.4	-19.0	3.3%
6.0	7.2	4.3	0.1	17.7	-4.0	-0.3	-13.3	-17.6	0.4%
7.4	7.0	4.9	0.2	19.4	-4.0	-0.5	-15.1	-19.6	-0.8%
1.8	23.9	0.7	0.1	26.6	-7.8	-0.7	-19.3	-27.8	-4.6%
1.5	23.1	0.6	0.1	25.3	-5.9	-0.8	-19.6	-26.3	-3.8%
1.4	23.5	0.6	0.1	25.6	-4.9	-0.7	-19.2	-24.8	2.8%
1.4	23.1	0.6	0.1	25.2	-5.4	-0.9	-19.2	-25.5	-1.1%
1.6	22.7	0.7	0.2	25.2	-4.9	-0.9	-20.1	-25.9	-2.9%
9.7	22.6	6.0	0.3	38.6	-5.4	-1.2	-31.4	-37.9	1.8%
5.7	24.0	3.0	0.2	32.9	-5.1	-1.0	-24.2	-30.3	7.9%
7.4	22.5	3.9	0.3	34.1	-5.0	-1.1	-27.3	-33.4	2.1%
6.9	24.2	3.9	0.3	35.3	-5.1	-1.0	-27.2	-33.3	5.5%
2.5	24.2	1.2	0.2	28.1	-5.0	-0.9	-21.9	-27.9	0.7%
5.7	24.0	3.0	0.2	32.9	-5.1	-1.0	-24.2	-30.3	7.9%
7.4	24.4	1.9	0.2	33.8	-5.1	-0.9	-23.3	-29.2	13.5%
2.7	22.2	1.2	0.1	26.3	-5.1	-0.9	-20.8	-26.8	-1.9%
2.2	24.4	1.0	0.2	27.8	-5.1	-0.9	-21.7	-27.6	0.6%
4.6	21.2	2.5	0.2	28.6	-5.1	-1.2	-23.7	-30.0	-5.1%
4.5	25.0	2.5	0.2	32.1	-5.0	-1.2	-23.9	-30.2	6.0%
2.9	23.7	1.5	0.2	28.2	-4.9	-0.9	-22.7	-28.5	-0.9%
24.5	13.5	17.6	0.4	56.0	-8.3	-1.6	-49.9	-59.8	-6.8%
26.0	13.5	22.2	0.3	62.0	-7.3	-2.3	-50.4	-60.0	3.3%
26.0	12.6	17.3	0.3	56.2	-11.7	-1.5	-48.7	-61.9	-10.2%
28.4	13.9	20.6	0.3	63.3	-6.6	-1.8	-50.0	-58.4	7.7%
15.3	9.3	6.7	0.2	31.5	-4.9	-1.7	-38.5	-45.1	-43.0%
24.7	13.8	18.4	0.3	57.3	-5.5	-1.7	-48.8	-56.0	2.3%
25.2	13.3	17.7	0.4	56.5	-5.6	-1.7	-43.6	-51.0	9.8%
25.1	13.1	17.6	0.4	56.2	-5.9	-1.5	-44.8	-52.3	7.0%
24.9	12.1	17.3	0.4	54.6	-5.6	-1.5	-46.5	-53.7	1.7%
24.0	13.0	17.3	0.4	54.6	-5.3	-1.7	-47.1	-54.1	0.9%
25.2	13.3	17.7	0.4	56.5	-5.6	-1.7	-43.6	-51.0	9.8%
24.2	12.2	17.0	0.4	53.8	-5.5	-0.1	-45.5	-51.2	4.8%
26.8	12.4	19.4	0.3	58.9	-5.7	-1.6	-51.8	-59.1	-0.3%
26.3	13.0	16.8	0.3	56.4	-5.9	-1.8	-50.4	-58.1	-3.0%
24.5	10.8	17.8	0.3	53.3	-5.7	-1.7	-41.6	-49.0	8.1%

Table 9. Charge balance of major cations and anions

Ca	Na	Mg	K	Total Cation Charge	HCO3	Cl	SO4	Total Anion Charge	Percent Difference
26.0	10.0	18.8	0.3	55.1	-5.6	-2.3	-45.6	-53.5	2.8%
22.8	11.4	16.7	0.3	51.2	-5.4	-1.6	-44.1	-51.1	0.3%
25.5	13.9	18.1	0.4	57.9	-5.7	-1.7	-47.3	-54.7	5.6%
15.0	11.5	3.4	0.2	30.1	-5.9	-0.6	-31.5	-38.0	-26.4%
23.2	15.6	12.9	0.3	52.0	-6.7	-0.5	-43.7	-50.8	2.3%
24.4	15.3	12.3	0.3	52.4	-6.4	-0.5	-39.0	-45.9	12.3%
24.5	15.2	12.8	0.3	52.8	-6.3	-0.5	-42.7	-49.5	6.3%
24.4	15.4	12.4	0.4	52.6	-6.2	-0.5	-43.8	-50.6	4.0%
23.4	15.4	12.2	0.3	51.3	-6.3	-0.5	-43.0	-49.9	2.7%
24.4	15.3	12.3	0.3	52.4	-6.4	-0.5	-39.0	-45.9	12.3%
24.5	15.2	12.5	0.3	52.5	-6.3	-0.6	-43.9	-50.8	3.3%
26.3	13.6	14.4	0.2	54.6	-6.4	-0.5	-47.1	-54.0	1.0%
25.8	14.2	11.8	0.3	52.1	-6.4	-0.5	-46.4	-53.3	-2.3%
24.2	12.6	12.7	0.3	49.8	-6.2	-0.7	-39.6	-46.5	6.6%
25.8	11.2	13.8	0.3	51.1	-6.3	-0.7	-42.3	-49.3	3.6%
23.7	13.7	12.8	0.3	50.5	-6.0	-0.5	-44.1	-50.6	-0.3%
17.9	20.3	9.9	0.2	48.3	-5.8	-1.2	-39.1	-46.1	4.6%
21.1	20.8	14.2	0.3	56.3	-5.9	-1.1	-49.2	-56.1	0.4%
22.1	21.2	13.6	0.3	57.2	-5.9	-1.1	-45.9	-52.8	7.7%
21.1	21.6	13.4	0.4	56.4	-5.9	-1.1	-47.8	-54.8	3.0%
21.9	20.3	13.9	0.3	56.4	-5.8	-1.1	-47.7	-54.6	3.2%
22.2	20.9	13.2	0.3	56.6	-4.2	-1.0	-49.2	-54.4	4.0%
23.3	17.4	15.5	0.2	56.4	-6.0	-1.1	-45.2	-52.3	7.2%
21.3	20.3	11.8	0.2	53.6	-5.6	-1.1	-50.8	-57.5	-7.3%
22.1	16.4	14.2	0.3	53.0	-5.4	-1.4	-46.5	-53.3	-0.5%
19.9	26.8	16.5	0.5	63.6	-6.3	-0.8	-41.7	-48.8	23.2%
19.0	27.9	15.5	0.5	62.8	-6.3	-0.8	-43.3	-50.4	19.9%
18.4	31.5	14.8	0.5	65.2	-6.3	-0.7	-55.8	-62.7	3.7%
18.2	29.9	14.6	0.5	63.2	-6.3	-0.8	-51.2	-58.3	7.7%
21.6	8.4	7.7	0.2	37.9	-5.5	-1.0	-30.5	-37.0	2.2%
20.1	29.6	16.5	0.4	66.6	-7.2	-0.9	-53.2	-61.2	8.0%
23.6	25.0	19.5	0.3	68.4	-6.5	-0.8	-55.9	-63.2	7.6%
19.0	27.8	13.7	0.3	60.8	-6.5	-0.8	-57.3	-64.6	-6.3%
19.8	25.5	17.2	0.3	62.8	-6.5	-0.9	-52.5	-59.8	4.7%
22.5	28.8	19.2	0.4	70.7	-6.4	-1.2	-59.5	-67.2	5.0%
15.2	22.5	13.3	0.3	51.3	-5.9	-0.7	-49.1	-55.7	-8.6%
16.7	25.2	16.5	0.4	58.8	-7.0	-0.8	-54.1	-62.0	-5.4%
20.3	8.1	7.6	0.2	36.1	-5.3	-1.0	-28.5	-34.8	3.7%
21.8	8.4	7.9	0.2	38.3	-5.3	-1.0	-29.8	-36.1	5.7%
21.4	8.6	8.0	0.2	38.2	-5.3	-1.0	-30.5	-36.8	3.8%
20.5	8.4	7.8	0.2	36.9	-5.4	-1.0	-30.1	-36.4	1.4%
10.2	19.5	6.0	0.3	36.0	-3.5	-2.1	-30.1	-35.7	0.7%
20.8	8.3	7.8	0.2	37.0	-4.0	-1.0	-29.5	-34.5	6.9%
21.7	8.0	8.6	0.1	38.4	-5.4	-0.9	-31.2	-37.5	2.2%
14.6	9.2	5.6	0.2	29.6	-4.8	-0.6	-22.3	-27.6	6.7%
22.9	7.8	7.3	0.2	38.2	-5.5	-1.3	-33.3	-40.2	-5.2%
22.4	6.7	7.1	0.2	36.5	-5.3	-1.2	-30.9	-37.4	-2.6%
25.2	8.0	9.1	0.2	42.6	-5.6	-1.3	-35.6	-42.5	0.3%
12.0	18.8	7.2	0.3	38.4	-3.2	-2.3	-31.2	-36.7	4.4%
15.5	19.1	9.1	0.3	44.0	-3.4	-2.6	-36.1	-42.1	4.3%

Table 9. Charge balance of major cations and anions

Ca	Na	Mg	K	Total Cation Charge	HCO3	Cl	SO4	Total Anion Charge	Percent Difference
15.0	20.7	9.5	0.3	45.5	-3.4	-2.6	-37.7	-43.7	3.8%
14.1	20.7	8.4	0.3	43.5	-3.4	-2.7	-37.3	-43.4	0.2%
20.8	28.4	16.4	0.4	66.0	-6.5	-0.9	-51.0	-58.4	11.6%
8.1	18.7	5.0	0.3	32.2	-3.7	-1.8	-25.1	-30.5	5.1%
7.9	16.5	4.3	0.2	29.0	-3.8	-1.7	-22.9	-28.4	1.9%
5.0	15.1	3.1	0.2	23.3	-4.2	-1.2	-17.8	-23.2	0.7%
19.2	16.0	11.5	0.2	46.9	-3.5	-2.3	-43.3	-49.0	-4.5%
17.2	10.9	10.0	0.2	38.4	-3.6	-2.5	-32.7	-38.8	-1.1%
10.1	11.5	5.6	0.1	27.4	-3.5	-1.2	-22.3	-27.0	1.4%
15.9	21.0	20.1	0.7	57.7	-6.0	-0.2	-33.1	-39.3	31.8%
14.7	20.9	7.4	0.3	43.3	-7.0	-0.2	-36.4	-43.6	-0.8%
15.2	21.8	7.6	0.2	44.7	-6.1	-0.1	-37.9	-44.1	1.2%
16.2	21.8	6.9	0.3	45.1	-5.7	-0.2	-39.6	-45.5	-0.9%
14.6	20.8	7.5	0.3	43.1	-5.7	-0.3	-38.5	-44.5	-3.2%
16.4	20.3	8.6	0.3	45.6	-5.7	-0.2	-38.8	-44.6	2.2%
17.4	21.9	8.1	0.3	47.8	-5.7	-0.2	-36.1	-42.0	12.0%
17.4	21.4	8.1	0.3	47.2	-5.7	-0.2	-31.2	-37.0	21.5%
15.9	20.5	7.8	0.3	44.6	-4.7	-0.2	-38.3	-43.2	3.3%
16.3	20.8	7.7	0.3	45.1	-5.6	-0.2	-38.3	-44.1	2.3%
16.7	20.5	8.0	0.2	45.4	-5.7	-0.2	-38.3	-44.2	2.8%
15.9	20.9	7.6	0.3	44.7	-5.5	-0.2	-38.2	-43.9	1.8%
17.2	21.8	7.4	0.2	46.6	-5.5	-0.1	-36.2	-41.9	10.1%
15.8	19.7	7.2	0.3	42.9	-5.7	-0.3	-40.2	-46.1	-7.5%
14.6	19.1	6.7	0.3	40.7	-5.3	-0.3	-35.6	-41.2	-1.1%
16.5	23.9	7.1	0.3	47.7	-5.2	-0.3	-37.5	-43.0	9.9%
15.3	20.6	7.0	0.2	43.1	-5.0	-0.2	-38.5	-43.7	-1.4%
21.6	17.4	12.3	0.3	51.7	-3.7	-0.2	-47.5	-51.4	0.6%
22.1	20.9	14.0	0.4	57.3	-8.4	-0.8	-53.7	-63.0	-9.8%
20.8	10.2	12.7	0.3	43.9	-5.5	-1.5	-39.1	-46.1	-5.1%
22.2	13.1	12.2	0.3	47.8	-2.1	-2.3	-41.8	-46.2	3.3%
24.0	13.1	14.0	0.3	51.4	-2.3	-2.6	-45.6	-50.5	1.7%
23.6	32.9	18.8	1.5	76.8	-6.3	-1.8	-64.5	-72.6	5.5%
23.5	35.2	15.2	0.4	74.4	-5.9	-1.5	-67.9	-75.3	-1.2%
23.0	33.5	21.4	0.6	78.5	-7.0	-1.9	-67.2	-76.1	3.1%
22.1	34.8	17.3	0.5	74.7	-7.1	-1.6	-67.2	-75.9	-1.6%
23.0	33.9	18.9	0.5	76.4	-6.1	-1.8	-68.7	-76.5	-0.1%
20.0	30.8	19.3	0.6	70.7	-3.3	-1.9	-56.5	-61.7	12.6%
21.4	32.0	20.1	0.6	74.1	-5.8	-1.8	-66.6	-74.2	0.0%
22.8	31.7	19.7	0.7	74.9	-5.3	-1.8	-45.8	-52.9	29.3%
22.8	28.2	19.6	0.7	71.4	-6.7	-1.7	-39.4	-47.8	33.1%
22.2	32.9	19.8	0.8	75.7	-6.6	-1.7	-53.5	-61.9	18.3%
22.4	31.9	20.1	0.7	75.1	-5.4	-1.8	-52.6	-59.9	20.3%
23.3	32.0	20.5	0.5	76.4	-5.9	-1.8	-69.7	-77.4	-1.3%
21.7	32.2	1.9	0.7	56.5	-6.7	-1.8	-45.8	-54.3	3.9%
28.5	30.4	19.5	0.5	78.9	-4.9	-1.9	-70.5	-77.2	2.1%
22.5	30.5	18.0	0.6	71.6	-6.1	-1.8	-68.2	-76.1	-6.4%
21.3	35.1	17.9	0.5	74.8	-8.0	-1.7	-60.8	-70.6	5.7%
23.0	38.4	19.3	0.5	81.3	-7.2	-2.3	-67.2	-76.8	5.5%
20.1	29.6	18.9	0.7	69.3	-4.8	-1.8	-83.9	-90.4	-30.5%
14.8	4.9	6.9	0.2	26.8	-2.9	-3.5	-20.3	-26.8	0.3%
7.6	3.9	6.5	0.1	18.2	-2.8	-3.9	-10.5	-17.2	5.5%

Table 9. Charge balance of major cations and anions

Ca	Na	Mg	K	Total Cation Charge	HCO3	Cl	SO4	Total Anion Charge	Percent Difference
21.6	29.6	23.0	0.8	75.0	-5.0	-1.7	-73.1	-79.8	-6.5%
9.8	21.3	6.8	0.6	38.5	-4.8	-1.4	-26.2	-32.4	15.8%
7.0	18.8	3.3	0.2	29.2	-3.0	-1.3	-24.6	-28.9	1.2%
7.4	20.0	3.5	0.2	31.0	-5.2	-1.4	-25.6	-32.2	-3.8%
7.4	20.9	3.4	0.2	31.8	-5.3	-1.3	-37.7	-44.4	-39.6%
7.4	20.5	3.4	0.2	31.4	-5.4	-1.5	-25.0	-31.9	-1.7%
5.8	18.7	2.8	0.2	27.5	-5.0	-1.4	-21.4	-27.8	-1.1%
6.5	19.7	3.5	0.2	29.9	-5.3	-1.4	-22.0	-28.7	4.2%
6.7	20.0	3.1	0.2	30.0	-5.2	-1.4	-21.0	-27.6	8.1%
6.7	19.4	3.2	0.2	29.5	-5.1	-1.4	-22.2	-28.6	2.9%
6.4	20.1	3.2	0.3	30.0	-5.1	-1.4	-22.0	-28.4	5.2%
6.2	18.8	3.0	0.2	28.3	-5.1	-1.5	-22.2	-28.8	-1.7%
6.1	19.0	3.1	0.2	28.4	-5.2	-1.4	-21.7	-28.3	0.3%
6.4	19.1	3.0	0.2	28.8	-4.1	-1.2	-20.8	-26.1	9.2%
8.3	16.1	2.7	0.2	27.3	-5.1	-1.4	-20.8	-27.3	-0.2%
6.6	19.1	3.0	0.2	28.9	-5.1	-1.6	-22.4	-29.1	-0.7%
7.0	19.1	3.3	0.2	29.6	-5.1	-1.6	-23.7	-30.5	-2.7%
6.5	16.9	3.1	0.2	26.6	-5.0	-1.9	-22.7	-29.6	-11.3%
6.0	19.2	2.9	0.2	28.3	-5.0	-1.4	-22.3	-28.6	-0.9%
7.4	22.6	3.5	0.2	33.7	-5.2	-1.4	-22.7	-29.3	12.9%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Sulfate	12/15/1983	Semi-Annual	MW-3	800	DUP	790	mg/L	1.3%
Chloride	12/15/1983	Semi-Annual	MW-3	56.6	DUP	58.3	mg/L	3.0%
Potassium	12/15/1983	Semi-Annual	MW-3	21	DUP	21	mg/L	0.0%
No data for duplicates								
Sodium	9/4/1986	Semi-Annual	MW-5	436	DUP	422	mg/L	3.3%
Sulfate	9/4/1986	Semi-Annual	MW-5	1230	DUP	1240	mg/L	0.8%
Chloride	9/4/1986	Semi-Annual	MW-5	53	DUP	53	mg/L	0.0%
Sodium	9/4/1986	Semi-Annual	MW-12	296	DUP	285	mg/L	3.8%
Sulfate	9/4/1986	Semi-Annual	MW-12	4040	DUP	4110	mg/L	1.7%
Chloride	9/4/1986	Semi-Annual	MW-12	2470	DUP	2560	mg/L	3.6%
Sodium	12/10/1986	Semi-Annual	MW-5	501	DUP	456	mg/L	9.4%
Sulfate	12/10/1986	Semi-Annual	MW-5	1140	DUP	1160	mg/L	1.7%
Chloride	12/10/1986	Semi-Annual	MW-5	54	DUP	55	mg/L	1.8%
U-Dissolved	12/10/1986	Semi-Annual	MW-5	0.15	DUP	2.39	ug/L	176.4%
No data for duplicates								
U-Dissolved	2/20/1987	Semi-Annual	MW-1	0.15	DUP	0.15	ug/L	0.0%
U-Dissolved	2/20/1987	Semi-Annual	MW-11	0.15	DUP	1.34	ug/L	159.7%
Sulfate	11/20/1987	Semi-Annual	MW-1	1120	DUP	1130	mg/L	0.9%
Chloride	11/20/1987	Semi-Annual	MW-1	53.2	DUP	50.6	mg/L	5.0%
Sodium	11/20/1987	Semi-Annual	MW-1	564	DUP	552	mg/L	2.2%
Sulfate	1/27/1988	Semi-Annual	MW-11	919	DUP	912	mg/L	0.8%
Chloride	1/27/1988	Semi-Annual	MW-11	31	DUP	31	mg/L	0.0%
Sulfate	6/1/1988	Semi-Annual	MW-5	1030	DUP	1060	mg/L	2.9%
Chloride	6/1/1988	Semi-Annual	MW-5	45	DUP	54	mg/L	18.2%
Sulfate	11/2/1988	Semi-Annual	MW-1	688	DUP	695	mg/L	1.0%
Chloride	11/2/1988	Semi-Annual	MW-1	11.8	DUP	13.1	mg/L	10.4%
Sodium	11/2/1988	Semi-Annual	MW-1	172	DUP	169	mg/L	1.8%
Sulfate	11/2/1988	Semi-Annual	MW-3	3410	DUP	3430	mg/L	0.6%
Chloride	11/2/1988	Semi-Annual	MW-3	67.7	DUP	69	mg/L	1.9%
Sodium	11/2/1988	Semi-Annual	MW-3	659	DUP	664	mg/L	0.8%
Arsenic	3/10/1989	Semi-Annual	MW-2	0.032	DUP	0.03	mg/L	6.5%
Selenium	3/10/1989	Semi-Annual	MW-2	0.017	DUP	0.019	mg/L	11.1%
Sodium	3/10/1989	Semi-Annual	MW-2	464	DUP	506	mg/L	8.7%
Sulfate	3/10/1989	Semi-Annual	MW-2	1990	DUP	2010	mg/L	1.0%
Chloride	3/10/1989	Semi-Annual	MW-2	7.6	DUP	7.6	mg/L	0.0%
U-Dissolved	3/13/1989	Semi-Annual	MW-2	8.96	DUP	9.85	ug/L	9.5%
Chloride	6/21/1989	Semi-Annual	MW-11	32.4	DUP	32.4	mg/L	0.0%
Sulfate	6/21/1989	Semi-Annual	MW-11	1020	DUP	1020	mg/L	0.0%
U-Dissolved	6/22/1989	Semi-Annual	MW-5	0.90	DUP	0.60	ug/L	40.0%
U-Dissolved	6/22/1989	Semi-Annual	MW-11	1.19	DUP	0.90	ug/L	27.8%
No dups	9/1/1989	Semi-Annual	No data for duplicates					
U-Dissolved	9/13/1989	Semi-Annual	MW-11	2.39	DUP	2.69	ug/L	11.8%
U-Dissolved	9/13/1989	Semi-Annual	MW-5	1.64	DUP	1.79	ug/L	8.7%
U-Dissolved	10/31/1989	Semi-Annual	MW-15	56.72	DUP	52.24	ug/L	8.2%
U-Dissolved	11/20/1989	Semi-Annual	MW-15	65.67	DUP	58.21	ug/L	12.0%
No dups	11/15/1989	Semi-Annual	No data for duplicates					
U-Dissolved	12/18/1989	Semi-Annual	MW-14	19.40	DUP	58.21	ug/L	100.0%
U-Dissolved	1/25/1990	Semi-Annual	MW-14	55.22	DUP	53.73	ug/L	2.7%
Sulfate	2/20/1990	Semi-Annual	MW-4	2140	DUP	2130	mg/L	0.5%
Chloride	2/20/1990	Semi-Annual	MW-4	47	DUP	46	mg/L	2.2%
Chloride	5/8/1990	Semi-Annual	MW-2	7	DUP	6	mg/L	15.4%
Sulfate	5/8/1990	Semi-Annual	MW-2	2020	DUP	1020	mg/L	65.8%
Arsenic	5/8/1990	Semi-Annual	MW-2	0.001	DUP	0.002	mg/L	66.7%
Selenium	5/8/1990	Semi-Annual	MW-2	0.0009	DUP	0.0009	mg/L	0.0%
Sodium	5/8/1990	Semi-Annual	MW-2	504	DUP	489	mg/L	3.0%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Ra-226	5/8/1990	Semi-Annual	MW-2	3.00E-10	DUP	2.00E-10	µCi/mL	40.0%
U-Dissolved	5/10/1990	Semi-Annual	MW-2	11.94	DUP	10.90	ug/L	9.1%
Sulfate	8/7/1990	Semi-Annual	MW-11	973	DUP	958	mg/L	1.6%
Chloride	8/7/1990	Semi-Annual	MW-11	33	DUP	33	mg/L	0.0%
U-Dissolved	8/16/1990	Semi-Annual	MW-11	6.97	DUP	0.8	ug/L	158.8%
Chloride	11/13/1990	Semi-Annual	MW-14	49	DUP	49	mg/L	0.0%
Sulfate	11/13/1990	Semi-Annual	MW-14	2560	DUP	2530	mg/L	1.2%
Arsenic	11/13/1990	Semi-Annual	MW-14	0.006	DUP	0.005	mg/L	18.2%
Selenium	11/13/1990	Semi-Annual	MW-14	0.019	DUP	0.019	mg/L	0.0%
Sodium	11/13/1990	Semi-Annual	MW-14	72.6	DUP	72.6	mg/L	0.0%
U-Dissolved	11/15/1990	Semi-Annual	MW-12	14.93	DUP	14.33	ug/L	4.1%
U-Dissolved	2/28/1991	Semi-Annual	MW-5	0.40	DUP	0.51	ug/L	24.2%
U-Dissolved	5/21/1991	Semi-Annual	MW-2	6.42	DUP	7.01	ug/L	8.8%
Sulfate	9/24/1991	Semi-Annual	MW-1	692	DUP	665	mg/L	4.0%
Chloride	9/24/1991	Semi-Annual	MW-1	11	DUP	14	mg/L	24.0%
U-Dissolved	9/24/1991	Semi-Annual	MW-1	1.22	DUP	1.64	ug/L	29.4%
Sulfate	12/4/1991	Semi-Annual	MW-3	2214	DUP	2220	mg/L	0.3%
Chloride	12/4/1991	Semi-Annual	MW-3	64	DUP	64	mg/L	0.0%
U-Dissolved	12/5/1991	Semi-Annual	MW-3	12.09	DUP	13.13	µCi/mL	8.2%
Sulfate	3/17/1992	Semi-Annual	MW-12	2330	DUP	2337	mg/L	0.3%
Chloride	3/17/1992	Semi-Annual	MW-12	60	DUP	62	mg/L	3.3%
Sulfate	3/17/1992	Semi-Annual	MW-14	2162	DUP	1711	mg/L	23.3%
Chloride	3/17/1992	Semi-Annual	MW-14	22	DUP	21	mg/L	4.7%
U-Dissolved	3/18/1992	Semi-Annual	MW-12	15.07	DUP	12.72	ug/L	16.9%
U-Dissolved	3/18/1992	Semi-Annual	MW-14	45.22	DUP	50.90	ug/L	11.8%
Chloride	6/11/1992	Semi-Annual	MW-2	6	DUP	5	mg/L	18.2%
Sulfate	6/11/1992	Semi-Annual	MW-2	1862	DUP	1867	mg/L	0.3%
Chloride	6/11/1992	Semi-Annual	MW-11	29	DUP	29	mg/L	0.0%
Sulfate	6/11/1992	Semi-Annual	MW-11	976	DUP	980	mg/L	0.4%
U-Dissolved	6/12/1992	Semi-Annual	MW-2	7.01	DUP	3.88	ug/L	57.5%
U-Dissolved	6/12/1992	Semi-Annual	MW-11	0.15	DUP	0.15	ug/L	0.0%
Sulfate	9/3/1992	Semi-Annual	MW-5	1033	DUP	1055	mg/L	2.1%
Chloride	9/3/1992	Semi-Annual	MW-5	46	DUP	46	mg/L	0.0%
Sulfate	9/3/1992	Semi-Annual	MW-15	2366	DUP	2367	mg/L	0.0%
Chloride	9/3/1992	Semi-Annual	MW-15	37	DUP	37	mg/L	0.0%
U-Dissolved	9/15/1992	Semi-Annual	MW-5	6.06	DUP	5.06	ug/L	18.0%
U-Dissolved	9/15/1992	Semi-Annual	MW-15	41.49	DUP	37.31	ug/L	10.6%
Chloride	11/19/1992	Semi-Annual	MW-1	13	DUP	13	mg/L	0.0%
Sulfate	11/19/1992	Semi-Annual	MW-1	654	DUP	674	mg/L	3.0%
Chloride	11/19/1992	Semi-Annual	MW-5	50	DUP	50	mg/L	0.0%
Sulfate	11/19/1992	Semi-Annual	MW-5	1055	DUP	1058	mg/L	0.3%
Chloride	11/19/1992	Semi-Annual	MW-12	62	DUP	71	mg/L	13.5%
Sulfate	11/19/1992	Semi-Annual	MW-12	2343	DUP	2339	mg/L	0.2%
U-Dissolved	12/9/1992	Semi-Annual	MW-1	0.81	DUP	0.30	ug/L	91.9%
U-Dissolved	12/9/1992	Semi-Annual	MW-12	28.81	DUP	21.79	ug/L	27.7%
Chloride	3/24/1993	Semi-Annual	MW-18	34	DUP	34	mg/L	0.0%
Sulfate	3/24/1993	Semi-Annual	MW-18	1371	DUP	1371	mg/L	0.0%
Potassium	3/24/1993	Semi-Annual	MW-18	7.1	DUP	7	mg/L	1.4%
U-Dissolved	3/24/1993	Semi-Annual	MW-18	18.21	DUP	18.21	ug/L	0.0%
Chloride	3/24/1993	Semi-Annual	MW-17	28	DUP	29	mg/L	3.5%
Sulfate	3/24/1993	Semi-Annual	MW-17	2004	DUP	1902	mg/L	5.2%
Potassium	3/24/1993	Semi-Annual	MW-17	17.8	DUP	18.2	mg/L	2.2%
U-Dissolved	3/31/1993	Semi-Annual	MW-17	30.30	DUP	28.21	ug/L	7.1%
Chloride	6/8/1993	Semi-Annual	MW-12	6	DUP	6	mg/L	0.0%
Sulfate	6/8/1993	Semi-Annual	MW-12	1499	DUP	1768	mg/L	16.5%
Potassium	6/8/1993	Semi-Annual	MW-12	12.8	DUP	13.8	mg/L	7.5%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Chloride	6/8/1993	Semi-Annual	MW-12	46	DUP	44	mg/L	4.4%
Sulfate	6/8/1993	Semi-Annual	MW-12	1974	DUP	1878	mg/L	5.0%
Potassium	6/8/1993	Semi-Annual	MW-12	11.8	DUP	11.7	mg/L	0.9%
U-Dissolved	6/9/1993	Semi-Annual	MW-2	13.00	DUP	14.00	ug/L	7.4%
Chloride	9/15/1993	Semi-Annual	MW-18	34	DUP	33	mg/L	3.0%
Sulfate	9/15/1993	Semi-Annual	MW-18	1446	DUP	1450	mg/L	0.3%
Potassium	9/15/1993	Semi-Annual	MW-18	7.8	DUP	6.8	mg/L	13.7%
Chloride	9/15/1993	Semi-Annual	MW-19	93	DUP	93	mg/L	0.0%
Sulfate	9/15/1993	Semi-Annual	MW-19	1811	DUP	1816	mg/L	0.3%
Potassium	9/15/1993	Semi-Annual	MW-19	13	DUP	14.1	mg/L	8.1%
U-Dissolved	9/22/1993	Semi-Annual	MW-18	12.12	DUP	13.13	ug/L	8.0%
U-Dissolved	9/23/1993	Semi-Annual	MW-19	13.13	DUP	12.12	ug/L	8.0%
Chloride	12/15/1993	Semi-Annual	MW-11	33	DUP	32	mg/L	3.1%
Sulfate	12/15/1993	Semi-Annual	MW-11	1054	DUP	1042	mg/L	1.1%
Potassium	12/15/1993	Semi-Annual	MW-11	8	DUP	8	mg/L	0.0%
U-Dissolved	12/15/1993	Semi-Annual	MW-11	0.15	DUP	0.15	ug/L	0.0%
U-Dissolved	3/24/2004	Semi-Annual	MW-1	0.61	DUP	0.67	ug/L	9.4%
U-Dissolved	3/24/2004	Semi-Annual	MW-17	13.34	DUP	13.43	ug/L	0.7%
Chloride	3/28/1994	Semi-Annual	MW-1	15	DUP	spike error	mg/L	spike error
Sulfate	3/28/1994	Semi-Annual	MW-1	702	DUP	661	mg/L	6.0%
Potassium	3/28/1994	Semi-Annual	MW-1	6.8	DUP	6.9	mg/L	1.5%
Chloride	3/28/1994	Semi-Annual	MW-17	36	DUP	36	mg/L	0.0%
Sulfate	3/28/1994	Semi-Annual	MW-17	1465	DUP	1464	mg/L	0.1%
Potassium	3/28/1994	Semi-Annual	MW-17	7.5	DUP	6.6	mg/L	12.8%
Chloride	6/15/1994	Semi-Annual	MW-2	4	DUP	4	mg/L	0.0%
Sulfate	6/15/1994	Semi-Annual	MW-2	17	DUP	10	mg/L	51.9%
Potassium	6/15/1994	Semi-Annual	MW-2	3	DUP	3	mg/L	0.0%
Chloride	6/15/1994	Semi-Annual	MW-14	20	DUP	24	mg/L	18.2%
Sulfate	6/15/1994	Semi-Annual	MW-14	2110	DUP	1392	mg/L	41.0%
Potassium	6/15/1994	Semi-Annual	MW-14	13	DUP	13	mg/L	0.0%
U-Dissolved	6/21/1994	Semi-Annual	MW-14	10.00	DUP	9.70	ug/L	3.0%
Chloride	8/15/1994	Semi-Annual	MW-1	15.1	DUP	14.4	mg/L	4.7%
Sulfate	8/15/1994	Semi-Annual	MW-1	691	DUP	678	mg/L	1.9%
Potassium	8/15/1994	Semi-Annual	MW-1	5.7	DUP	5.6	mg/L	1.8%
U-Dissolved	8/18/1994	Semi-Annual	MW-1	50.15	DUP	49.70	ug/L	0.9%
U-Dissolved	8/18/1994	Semi-Annual	MW-1	0.30	DUP	0.30	ug/L	0.0%
U-Dissolved	8/18/1994	Semi-Annual	MW-3	21.94	DUP	23.88	ug/L	8.5%
U-Dissolved	12/7/1994	Semi-Annual	MW-5	2.01	DUP	0.15	ug/L	172.2%
U-Dissolved	12/8/1994	Semi-Annual	MW-12	20.00	DUP	19.00	ug/L	5.1%
Chloride	12/15/1994	Semi-Annual	MW-5	55.3	DUP	32	mg/L	53.4%
Sulfate	12/15/1994	Semi-Annual	MW-5	1075	DUP	1042	mg/L	3.1%
Potassium	12/15/1994	Semi-Annual	MW-5	7.3	DUP	8	mg/L	9.2%
Chloride	12/15/1994	Semi-Annual	MW-12	64.7	DUP	72.7	mg/L	11.6%
Sulfate	12/15/1994	Semi-Annual	MW-12	2421	DUP	2452	mg/L	1.3%
Potassium	12/15/1994	Semi-Annual	MW-12	13	DUP	12.7	mg/L	2.3%
Chloride	3/14/1995	Semi-Annual	MW-14	20	DUP	20	mg/L	0.0%
Sulfate	3/14/1995	Semi-Annual	MW-14	2105	DUP	2115	mg/L	0.5%
Sodium	3/14/1995	Semi-Annual	MW-14	364	DUP	370	mg/L	1.6%
Chloride	3/14/1995	Semi-Annual	MW-15	39	DUP	39	mg/L	0.0%
Sulfate	3/14/1995	Semi-Annual	MW-15	2295	DUP	2282	mg/L	0.6%
Sodium	3/14/1995	Semi-Annual	MW-15	537	DUP	532	mg/L	0.9%
U-Dissolved	3/16/1995	Semi-Annual	MW-14	42.39	DUP	41.79	ug/L	1.4%
U-Dissolved	3/16/1995	Semi-Annual	MW-15	31.19	DUP	35.52	ug/L	13.0%
Chloride	6/27/1995	Semi-Annual	MW-3	66	DUP	65	mg/L	1.5%
Sulfate	6/27/1995	Semi-Annual	MW-3	3359	DUP	3334	mg/L	0.7%
Potassium	6/27/1995	Semi-Annual	MW-3	23	DUP	23	mg/L	0.0%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Chloride	6/27/1995	Semi-Annual	MW-11	31.2	DUP	30	mg/L	3.9%
Sulfate	6/27/1995	Semi-Annual	MW-11	1023	DUP	1014	mg/L	0.9%
Potassium	6/27/1995	Semi-Annual	MW-11	6.1	DUP	5.9	mg/L	3.3%
U-Dissolved	6/27/1995	Semi-Annual	MW-11	0.15	DUP	0.80	ug/L	136.8%
U-Dissolved	6/27/1995	Semi-Annual	MW-11	0.15	DUP	0.15	ug/L	0.0%
U-Dissolved	6/28/1995	Semi-Annual	MW-3	41.79	DUP	38.36	ug/L	8.6%
U-Dissolved	6/28/1995	Semi-Annual	MW-3	27.80	DUP	28.00	ug/L	0.7%
Chloride	9/14/1995	Semi-Annual	MW-2	7.6	DUP	7.5	mg/L	1.3%
Sulfate	9/14/1995	Semi-Annual	MW-2	1951	DUP	1983	mg/L	1.6%
Potassium	9/14/1995	Semi-Annual	MW-2	10.4	DUP	10.5	mg/L	1.0%
U-Dissolved	9/14/1995	Semi-Annual	MW-2	11.60	DUP	1.80	ug/L	146.3%
U-Dissolved	9/14/1995	Semi-Annual	MW-2	4.85	DUP	2.33	ug/L	70.2%
Sodium	12/7/1995	Semi-Annual	MW-5	455	DUP	450	mg/L	1.1%
Potassium	12/7/1995	Semi-Annual	MW-5	7.2	DUP	7	mg/L	2.8%
U-Dissolved	12/8/1995	Semi-Annual	MW-5	1.00	DUP	3.30	ug/L	107.0%
No data for duplicates								
U-Dissolved	6/6/1996	Semi-Annual	MW-11	0.50	DUP	0.40	ug/L	22.2%
U-Dissolved	9/12/1996	Semi-Annual	MW-15	40.00	DUP	38.00	ug/L	5.1%
U-Dissolved	9/16/1996	Semi-Annual	MW-1	0.15	DUP	1.80	ug/L	169.2%
U-Dissolved	11/25/1996	Semi-Annual	MW-17	21.00	DUP	21.00	ug/L	0.0%
U-Dissolved	3/19/1997	Semi-Annual	MW-11	0.15	DUP	0.15	ug/L	0.0%
Chloride	3/20/1997	Semi-Annual	MW-11	28.7	DUP	29.8	mg/L	3.8%
Sulfate	3/20/1997	Semi-Annual	MW-11	922	DUP	986	mg/L	6.7%
Potassium	3/20/1997	Semi-Annual	MW-11	5.7	DUP	6.1	mg/L	6.8%
Sodium	3/20/1997	Semi-Annual	MW-11	603	DUP	537	mg/L	11.6%
Chloride	3/20/1997	Semi-Annual	MW-15	38	DUP	38.9	mg/L	2.3%
Sulfate	3/20/1997	Semi-Annual	MW-15	2210	DUP	2220	mg/L	0.5%
Potassium	3/20/1997	Semi-Annual	MW-15	9.6	DUP	9.6	mg/L	0.0%
Sodium	3/20/1997	Semi-Annual	MW-15	471	DUP	469	mg/L	0.4%
U-Dissolved	3/20/1997	Semi-Annual	MW-15	45.00	DUP	46.00	ug/L	2.2%
Chloride	6/11/1997	Semi-Annual	MW-11	29.2	DUP	29.4	mg/L	0.7%
Potassium	6/11/1997	Semi-Annual	MW-11	5.7	DUP	5.7	mg/L	0.0%
Chloride	6/11/1997	Semi-Annual	MW-12	55.9	DUP	56.2	mg/L	0.5%
Potassium	6/11/1997	Semi-Annual	MW-12	12.4	DUP	15.1	mg/L	19.6%
Nickel	6/11/1997	Semi-Annual	MW-12	0.049	DUP	0.031	mg/L	45.0%
No data for duplicates								
Chloride	9/24/1998	Semi-Annual	MW-15	41.2	MW-13*	39.5	mg/L	4.2%
Potassium	9/24/1998	Semi-Annual	MW-15	9.7	MW-13*	9.6	mg/L	1.0%
Chloride	9/24/1998	Semi-Annual	MW-14	19.9	MW-14***	47	mg/L	81.0%
Potassium	9/24/1998	Semi-Annual	MW-14	11.2	MW-14***	17	mg/L	41.1%
Chloride	11/3/1998	Semi-Annual	MW-5	50.1	MW-14A***	49.5	mg/L	1.2%
Potassium	11/3/1998	Semi-Annual	MW-5	6.8	MW-14A***	6.8	mg/L	0.0%
Chloride	2/18/1999	Semi-Annual	MW-17	27.5	MW-14A	49.5	mg/L	57.1%
Potassium	2/18/1999	Semi-Annual	MW-17	12.1	MW-14A	7.2	mg/L	50.8%
Chloride	5/12/1999	Semi-Annual	MW-17	39.2	MW-14A	46.8	mg/L	17.7%
Potassium	5/12/1999	Semi-Annual	MW-17	6.1	MW-14A	9.7	mg/L	45.6%
Chloride	9/30/1999	Semi-Annual	MW-17	35	MW-14A***	33	mg/L	5.9%
Potassium	9/30/1999	Semi-Annual	MW-17	14.8	MW-14A***	15	mg/L	1.3%
Chloride	12/9/1999	Semi-Annual	MW-17	27.9	MW-14A***	27.1	mg/L	2.9%
Potassium	12/9/1999	Semi-Annual	MW-17	12.7	MW-14A***	11.8	mg/L	7.3%
Chloride	3/17/2000	Semi-Annual	MW-17	24.6	MW-14A	26.5	mg/L	7.4%
Potassium	3/17/2000	Semi-Annual	MW-17	12.2	MW-14A	12	mg/L	1.7%
Chloride	6/6/2000	Semi-Annual	MW-5	58.9	MW-14A	54.1	mg/L	8.5%
Potassium	6/6/2000	Semi-Annual	MW-5	8.6	MW-14A	8	mg/L	7.2%
Chloride	9/3/2000	Semi-Annual	MW-12	58.7	MW-13	66.2	mg/L	12.0%
Potassium	9/3/2000	Semi-Annual	MW-12	11.6	MW-13	11.9	mg/L	2.6%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Chloride	11/30/2000	Semi-Annual	MW-15	49.7	MW-13*	44.1	mg/L	11.9%
Potassium	11/30/2000	Semi-Annual	MW-15	10.6	MW-13*	10.6	mg/L	0.0%
U-Dissolved	3/23/2001	Semi-Annual	MW-11	2.9	DUP	3.2	ug/L	9.8%
Chloride	3/24/2001	Semi-Annual	MW-11	31.1	MW-13A	35.3	mg/L	12.7%
Potassium	3/24/2001	Semi-Annual	MW-11	7.9	MW-13A	8	mg/L	1.3%
Chloride	6/12/2001	Semi-Annual	MW-11	36.5	MW-13A	36	mg/L	1.4%
Potassium	6/12/2001	Semi-Annual	MW-11	7.4	MW-13A	7.4	mg/L	0.0%
Chloride	9/4/2001	Semi-Annual	MW-11	32	MW-11B	29	mg/L	9.8%
Potassium	9/4/2001	Semi-Annual	MW-11	6.9	MW-11B	6.9	mg/L	0.0%
Chloride	9/4/2001	Semi-Annual	MW-17	34	MW-17A	41	mg/L	18.7%
Potassium	9/4/2001	Semi-Annual	MW-17	14	MW-17A	14	mg/L	0.0%
Chloride	11/6/2001	Semi-Annual	MW-11	35	MW-11A	41	mg/L	15.8%
Potassium	11/6/2001	Semi-Annual	MW-11	7	MW-11A	7	mg/L	0.0%
U-Dissolved	11/6/2001	Semi-Annual	MW-11	1.50	DUP	1.40	ug/L	6.9%
Chloride	3/13/2002	Semi-Annual	MW-11	30.7	MW-13A	29.8	mg/L	3.0%
Potassium	3/13/2002	Semi-Annual	MW-11	6.7	MW-13A	6.6	mg/L	1.5%
U-Dissolved	3/14/2002	Semi-Annual	MW-11	5.10	DUP	1.60	ug/L	104.5%
Chloride	5/20/2002	Semi-Annual	MW-11	35.9	MW-13A	36.3	mg/L	1.1%
Potassium	5/20/2002	Semi-Annual	MW-11	6.9	MW-13A	6.7	mg/L	2.9%
U-Dissolved	5/20/2002	Semi-Annual	MW-11	1.00	DUP	1.10	ug/L	9.5%
Chloride	9/6/2002	Semi-Annual	MW-11	37.1	MW-13A	31.1	mg/L	17.6%
Potassium	9/6/2002	Semi-Annual	MW-11	7.42	MW-13A	7.12	mg/L	4.1%
Chloride	11/21/2002	Semi-Annual	MW-11	37.7	MW-13A	21	mg/L	56.9%
Potassium	11/21/2002	Semi-Annual	MW-11	6.7	MW-13A	6	mg/L	11.0%
U-Dissolved	11/21/2002	Semi-Annual	MW-11	1.00	DUP	0.90	ug/L	10.5%
Chloride	3/20/2003	Semi-Annual	MW-11	36.6	MW-13A	33	mg/L	10.3%
Potassium	3/20/2003	Semi-Annual	MW-11	6.96	MW-13A	7.37	mg/L	5.7%
U-Dissolved	3/20/2003	Semi-Annual	MW-11	0.80	DUP	1.10	ug/L	31.6%
Chloride	6/27/2003	Semi-Annual	MW-11	29.3	MW-13A	30.4	mg/L	3.7%
Potassium	6/27/2003	Semi-Annual	MW-11	7.78	MW-13A	7.86	mg/L	1.0%
U-Dissolved	6/27/2003	Semi-Annual	MW-11	1.60	DUP	1.30	ug/L	20.7%
Chloride	9/24/2003	Semi-Annual	MW-11	36.6	MW-13A**	33	mg/L	10.3%
Potassium	9/24/2003	Semi-Annual	MW-11	7.19	MW-13A**	7.19	mg/L	0.0%
U-Dissolved	9/24/2003	Semi-Annual	MW-11	1.00	DUP	1.00	ug/L	0.0%
Chloride	11/24/2003	Semi-Annual	MW-11	35.5	MW-13**	34.3	mg/L	3.4%
Potassium	11/24/2003	Semi-Annual	MW-11	6.95	MW-13**	6.99	mg/L	0.6%
No data for duplicates								
U-Dissolved	3/19/2004	Semi-Annual	MW-11	1.00	DUP	1.00	ug/L	0.0%
U-Dissolved	5/27/2004	Semi-Annual	MW-11	0.50	DUP	0.50	ug/L	0.0%
Chloride	9/14/2004	Semi-Annual	MW-11	34.2	MW-13A	33.3	mg/L	2.7%
Potassium	9/14/2004	Semi-Annual	MW-11	6.76	MW-13A	6.56	mg/L	3.0%
U-Dissolved	9/14/2004	Semi-Annual	MW-11	0.5	DUP	0.5	ug/L	0.0%
Chloride	11/9/2004	Semi-Annual	MW-11	29.5	MW-13**	20.1	mg/L	37.9%
Potassium	11/9/2004	Semi-Annual	MW-11	7.69	MW-13**	9.29	mg/L	18.8%
U-Dissolved	11/9/2004	Semi-Annual	MW-11	0.5	DUP	0.5	ug/L	0.0%
Chloride	3/30/2005	Quarterly	MW-11	33	MW-63	31	mg/L	6.3%
Copper	3/30/2005	Quarterly	MW-11	17	MW-63	22	ug/L	25.6%
Fluoride	3/30/2005	Quarterly	MW-11	0.5	MW-63	0.5	Mg/L	0.0%
Iron	3/30/2005	Quarterly	MW-11	3190	MW-63	3170	ug/L	0.6%
Lead	3/30/2005	Quarterly	MW-11	29	MW-63	33	ug/L	12.9%
Manganese	3/30/2005	Quarterly	MW-11	83	MW-63	89	ug/L	7.0%
Nitrogen, Ammonia as N	3/30/2005	Quarterly	MW-11	0.61	MW-63	0.6	mg/L	1.7%
TDS	3/30/2005	Quarterly	MW-11	1880	MW-63	1840	mg/L	2.2%
Sulfate	3/30/2005	Quarterly	MW-11	1080	MW-63	1180	mg/L	8.8%
Alkalinity	6/21/2005	Quarterly	MW-11	298	MW-63	303	mg/L	1.7%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Bicarbonate as HCO3	6/21/2005	Quarterly	MW-11	364	MW-63	369	mg/L	1.4%
Calcium	6/21/2005	Quarterly	MW-11	58.7	MW-63	56	mg/L	4.7%
Chloride	6/21/2005	Quarterly	MW-11	31	MW-63	30	mg/L	3.3%
Chloromethane	6/21/2005	Quarterly	MW-11	2.4	MW-63	1.9	mg/L	23.3%
Fluoride	6/21/2005	Quarterly	MW-11	0.7	MW-63	0.7	mg/L	0.0%
Magnesium	6/21/2005	Quarterly	MW-11	18.2	MW-63	17.2	mg/L	5.6%
Manganese	6/21/2005	Quarterly	MW-11	95	MW-63	92	mg/L	3.2%
Nitrogen, Ammonia as N	6/21/2005	Quarterly	MW-11	0.64	MW-63	0.55	mg/L	15.1%
PH	6/21/2005	Quarterly	MW-11	8	MW-63	7.96	SU	0.5%
Potassium	6/21/2005	Quarterly	MW-11	6.3	MW-63	6.2	mg/L	1.6%
Sodium	6/21/2005	Quarterly	MW-11	544	MW-63	544	mg/L	0.0%
Sulfate	6/21/2005	Quarterly	MW-11	1090	MW-63	1070	mg/L	1.9%
TDS	6/21/2005	Quarterly	MW-11	1950	MW-63	1940	mg/L	0.5%
Turbidity	6/21/2005	Quarterly	MW-11	4.16	MW-63	0.3	NTU	173.1%
U-Dissolved	6/21/2005	Quarterly	MW-11	0.76	DUP	0.74	ug/L	2.7%
Bicarbonate as HCO3	9/22/2005	Quarterly	MW-11	378	MW-63	378	mg/L	0.0%
Calcium	9/22/2005	Quarterly	MW-11	50.7	MW-63	52.5	mg/L	3.5%
Chloride	9/22/2005	Quarterly	MW-11	33	MW-63	33	mg/L	0.0%
Fluoride	9/22/2005	Quarterly	MW-11	0.6	MW-63	0.6	mg/L	0.0%
Magnesium	9/22/2005	Quarterly	MW-11	15.3	MW-63	16	ug/L	4.5%
Manganese	9/22/2005	Quarterly	MW-11	81	MW-63	82	ug/L	1.2%
Nitrogen, Ammonia as N	9/22/2005	Quarterly	MW-11	0.59	MW-63	0.61	mg/L	3.3%
PH	9/22/2005	Quarterly	MW-11	8.22	MW-63	8.25	SU	0.4%
Potassium	9/22/2005	Quarterly	MW-11	6.3	MW-63	6.2	mg/L	1.6%
Sodium	9/22/2005	Quarterly	MW-11	551	MW-63	547	mg/L	0.7%
Sulfate	9/22/2005	Quarterly	MW-11	968	MW-63	973	mg/L	0.5%
TDS	9/22/2005	Quarterly	MW-11	1930	MW-63	1920	mg/L	0.5%
U-Dissolved	9/22/2005	Quarterly	MW-11	0.63	MW-63	0.67	ug/L	6.2%
Bicarbonate as HCO3	12/13/2005	Quarterly	MW-11	375	MW-63	375	mg/L	0.0%
Calcium	12/13/2005	Quarterly	MW-11	61.2	MW-63	64.6	mg/L	5.4%
Chloride	12/13/2005	Quarterly	MW-11	36	MW-63	310	mg/L	158.4%
Fluoride	12/13/2005	Quarterly	MW-11	0.5	MW-63	0.5	mg/L	0.0%
Magnesium	12/13/2005	Quarterly	MW-11	19.3	MW-63	20.7	ug/L	7.0%
Manganese	12/13/2005	Quarterly	MW-11	94	MW-63	97	ug/L	3.1%
Nitrogen, Ammonia as N	12/13/2005	Quarterly	MW-11	0.64	MW-63	0.61	mg/L	4.8%
PH	12/13/2005	Quarterly	MW-11	8.12	MW-63	8.19	SU	0.9%
Potassium	12/13/2005	Quarterly	MW-11	6.8	MW-63	6.9	mg/L	1.5%
Sodium	12/13/2005	Quarterly	MW-11	544	MW-63	544	mg/L	0.0%
Sulfate	12/13/2005	Quarterly	MW-11	1070	MW-63	1060	mg/L	0.9%
TDS	12/13/2005	Quarterly	MW-11	1930	MW-63	1930	mg/L	0.0%
U-Dissolved	12/13/2005	Quarterly	MW-11	0.83	MW-63	0.90	ug/L	8.1%
Bicarbonate as HCO3	6/20/2006	Quarterly	MW-11	374	MW-63	378	mg/L	1.1%
Calcium	6/20/2006	Quarterly	MW-11	62.1	MW-63	70.8	mg/L	13.1%
Chloride	6/20/2006	Quarterly	MW-11	31	MW-63	31	mg/L	0.0%
Fluoride	6/20/2006	Quarterly	MW-11	0.5	MW-63	0.5	mg/L	0.0%
Iron	6/20/2006	Quarterly	MW-11	127	MW-63	136	ug/L	6.8%
Magnesium	6/20/2006	Quarterly	MW-11	20.1	MW-63	21.2	mg/L	5.3%
Manganese	6/20/2006	Quarterly	MW-11	102	MW-63	103	ug/L	1.0%
Nitrogen, Ammonia as N	6/20/2006	Quarterly	MW-11	0.64	MW-63	0.59	mg/L	8.1%
PH	6/20/2006	Quarterly	MW-11	8.01	MW-63	7.93	SU	1.0%

Table10. Field Duplicate Data and Relative Percent Differences
Background Groundwater Quality Report for White Mesa Mill, Utah

Field Duplicate Pairs								
Analyte	Sample Date	Report	Sample	Result	Duplicate	Result	Units	RPD
Potassium	6/20/2006	Quarterly	MW-11	7.3	MW-63	7.2	mg/L	1.4%
Sodium	6/20/2006	Quarterly	MW-11	554	MW-63	561	mg/L	1.3%
Sulfate	6/20/2006	Quarterly	MW-11	1150	MW-63	1170	mg/L	1.7%
TDS @ 180 C	6/20/2006	Quarterly	MW-11	2000	MW-63	1970	mg/L	1.5%

Notes:

RPD = Relative percent difference (difference/average*100)
mg/L = Milligrams per liter
μCi/mL = Microcuries per milliliter (multiply by 10E9 to convert to picocuries per liter, pCi/L)
DUP = Duplicate sample
Semi-Annual = Semi-annual Effluent Report

Table 11A. Descriptive Summary Statistics for Constituents in Compliance Wells with Greater than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Greater Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
All	MW-32	Cadmium	ug/L	13	13	100.00%	3.6838	2.2573	6.0867	15.854	1.7000	2.1000	2.7500	0.8000	25.000	0.0500	50.000	23.000	3.5183	3.3067	0.42077	0.02000	NR	NR	Normal	5	No
Extremes Excluded	MW-32	Cadmium	ug/L	12	12	100.00%	2.0042	1.8549	0.7421	3.4884	1.4200	2.0850	2.6650	0.8000	2.9600	0.0500	50.000	2.1600	-0.2953	0.4199	0.93407	0.42524	0.89376	0.13177	Nonparametric	5	No
All	MW-1	Chloride	mg/L	76	76	100.00%	31.204	13.914	151.25	333.95	11.800	13.000	15.000	2.0000	1350.0	0.1000	5.0000	1348.0	8.8114	53.504	0.10924	0.00000	NR	NR	normal	none	No
Extremes Excluded	MW-1	Chloride	mg/L	74	74	100.00%	13.499	13.080	3.1704	19.839	11.800	13.000	15.000	2.5000	25.000	0.1000	5.0000	22.500	0.6388	0.7223	0.90538	0.00004	NR	NR	normal	none	No
All	MW-11	Chloride	mg/L	99	100	99.00%	33.743	33.269	6.3928	46.529	31.160	33.000	35.350	14.600	71.000	0.1000	5.0000	56.400	3.6311	1.2530	0.62650	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-11	Chloride	mg/L	97	97	100.00%	33.182	33.037	3.1397	39.462	31.200	33.000	35.200	24.000	43.200	0.1000	5.0000	19.200	0.4417	0.6248	0.96318	0.00805	NR	NR	Normal	none	No
All	MW-12	Chloride	mg/L	97	97	100.00%	59.031	58.054	12.179	83.356	53.000	60.000	63.000	28.100	150.00	0.1000	5.0000	121.90	3.9579	2.4259	0.85947	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-12	Chloride	mg/L	95	95	100.00%	59.420	58.937	7.3580	74.136	56.000	60.000	63.000	37.600	81.200	0.1000	5.0000	43.600	-0.3865	1.4796	0.92869	0.00006	NR	NR	Normal	none	No
All	MW-14	Chloride	mg/L	73	73	98.63%	20.547	19.956	5.6803	31.740	18.000	20.000	22.000	8.9000	34.000	0.1000	5.0000	25.100	0.1604	0.8469	0.93118	0.00008	NR	NR	Normal	none	No
Extremes Excluded	MW-14	Chloride	mg/L	71	72	98.61%	20.157	19.841	3.3459	26.849	18.600	20.000	21.900	8.9000	27.000	0.1000	5.0000	18.100	-0.5898	0.7728	0.93948	0.00178	NR	NR	Normal	none	No
All	MW-15	Chloride	mg/L	71	71	100.00%	42.023	41.519	6.7389	55.501	38.000	40.400	45.000	24.100	69.000	0.1000	5.0000	44.900	0.9282	1.9673	0.91335	0.00012	NR	NR	Normal	none	No
Extremes Excluded	MW-15	Chloride	mg/L	70	70	100.00%	41.643	41.219	5.9469	53.537	38.000	40.400	44.300	24.100	57.100	0.1000	5.0000	33.000	0.2821	1.3931	0.94679	0.00494	NR	NR	Normal	none	No
All	MW-17	Chloride	mg/L	49	49	100.00%	30.267	29.771	5.5558	41.379	27.500	28.900	33.000	14.100	46.800	0.1000	5.0000	32.700	0.7527	1.5556	0.89628	0.00042	NR	NR	Normal	none	No
All	MW-18	Chloride	mg/L	15	15	100.00%	40.453	38.973	11.619	63.691	34.000	35.000	47.300	19.900	71.000	0.1000	5.0000	51.100	1.0476	5.8799	0.87964	0.04687	NR	NR	Normal	none	No
All	MW-19	Chloride	mg/L	17	17	100.00%	62.535	57.891	23.461	109.46	43.000	60.000	81.000	27.000	94.000	0.1000	5.0000	67.000	-0.1062	11.152	0.91783	0.13570	0.90206	0.073535424	Nonparametric	none	No
All	MW-2	Chloride	mg/L	76	76	100.00%	9.4167	8.0453	6.2618	25.936	6.0000	7.0000	10.000	2.7000	71.000	0.1000	5.0000	68.300	5.0451	1.8382	0.47686	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-2	Chloride	mg/L	75	75	100.00%	8.4013	7.7023	3.9521	16.306	6.0000	7.0000	9.2500	2.7000	20.000	0.1000	5.0000	17.300	1.5865	0.8685	0.78647	0.00000	NR	NR	Normal	none	No
All	MW-3	Chloride	mg/L	78	78	100.00%	63.999	62.548	12.895	89.820	62.000	65.000	66.100	12.600	140.00	0.1000	5.0000	127.40	1.4450	2.8418	0.65083	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-3	Chloride	mg/L	73	73	100.00%	64.244	64.079	4.5653	73.374	62.600	65.000	66.000	50.000	78.000	0.1000	5.0000	28.000	-0.4052	1.0473	0.91630	0.00013	NR	NR	Normal	none	No
All	MW-5	Chloride	mg/L	112	112	100.00%	52.656	52.311	9.5024	71.693	49.350	52.000	55.000	29.000	139.00	0.1000	5.0000	110.00	4.5550	1.7595	0.63162	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-5	Chloride	mg/L	110	110	100.00%	52.588	52.335	5.2341	63.056	49.700	52.000	55.000	37.500	71.000	0.1000	5.0000	33.500	0.6363	0.9781	0.94595	0.00022			Normal	none	No
All	MW-1	Fluoride	mg/L	11	11	100.00%	0.3400	0.3062	0.1444	0.6287	0.3000	0.3000	0.5000	0.1000	0.5700	0.0500	0.1000	0.4700	0.0107	0.0853	0.93141	0.42530	0.87325	0.08535	Nonparametric	4	No
All	MW-11	Fluoride	mg/L	10	10	100.00%	0.6410	0.6173	0.2004	1.0417	0.5000	0.5550	0.7000	0.5000	1.0000	0.0500	0.1000	0.5000	1.3667	0.1242	0.72020	0.00155	NR	NR	Normal	4	No
All	MW-14	Fluoride	mg/L	9	9	100.00%	0.1889	0.1652	0.0333	0.2556	0.2500	0.2000	0.2000	0.1000	0.2000	0.0500	0.1000	0.1000	-3.0000	0.0218	0.38284	0.00000	NR	NR	Normal	4	No
Extremes Excluded	MW-14	Fluoride	mg/L	8	8	100.00%	0.2000	0.2000	0.0000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.0500	0.1000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-19	Fluoride	mg/L	9	9	100.00%	0.9922	0.9898	0.0745	1.1411	0.9300	1.0000	1.0000	0.9000	1.1000	0.0500	0.1000	0.2000	0.2710	0.0486	0.87017	0.12348	0.87371	0.13469	Nonparametric	4	No
All	MW-2	Fluoride	mg/L	11	11	100.00%	0.3382	0.3111	0.1345	0.6072	0.3000	0.3300	0.4000	0.1000	0.6500	0.0500	0.1000	0.5500	0.7773	0.0795	0.89777	0.17359	0.85701	0.05266	Nonparametric	4	No
All	MW-3	Fluoride	mg/L	10	11	90.91%	0.4395	0.3364	0.2649	0.9692	0.3000	0.4600	0.5700	0.0500	1.0000	0.0500	0.1000	0.9500	0.5010	0.1565	0.94755	0.61283	0.82776	0.02182	Lognormal	none	No
All	MW-5	Fluoride	mg/L	14	14	100.00%	0.5157	0.5127	0.2313	1.1004	0.3000	1.0000	1.0000	0.4000	1.0000	0.0500	0.1000	0.6000	-0.6220	0.1214	0.82239	0.24192	0.82754	0.01110	Lognormal	4	No
Extremes Excluded	MW-5	Fluoride	mg/L	12	12	100.00%	0.9617	0.9492	0.1574	1.2764	0.9000	1.0000	1.0000	0.6600	1.2400	0.0500	0.1000	0.5800	-0.2570	0.0890	0.92553	0.33512	0.90347	0.17584	Nonparametric	4	No
All	MW-1	Gross Alpha	pCi/L	17	29	58.62%	5.7172	2.4513	8.3255	22.383	1.0000	2.0000	8.3300	0.5000	37.000	1.0000	11.000	36.500	2.4369	3.0336	0.66781	0.00000	NR	NR	Normal	15	No
Extremes Excluded	MW-1	Gross Alpha	pCi/L	16	28	57.14%	4.6000	2.2060	5.8749	16.350	0.9000	1.7500	5.6500	0.5000	21.000	1.0000	11.000	20.500	1.8375	2.1761	0.71830	0.00001	NR	NR	Normal	15	No
All	MW-12	Gross Alpha	pCi/L	18	29	62.07%	14.391	6.1327	15.554	45.500	2.0000	10.000	24.000	0.5000	62.000	1.0000	11.000	61.500	1.4453	5.6610	0.83085	0.00031	NR	NR	Normal	15	No
All	MW-14	Gross Alpha	pCi/L	19	27	70.37%	33.244	10.295	30.015	93.274	0.5000	39.000	48.000	0.5000	110.00	1.0000	11.000	109.50	0.5509	11.322	0.88585	0.00644	NR	NR	Normal	15	Yes
All	MW-15	Gross Alpha	pCi/L	17	24	70.83%	34.929	11.532	32.105	99.140	0.5000	26.400	57.000	0.5000	98.000	1.0000	11.000	97.500	0.6182	12.845	0.89071	0.01375	NR	NR	Normal	15	Yes
All	MW-17	Gross Alpha	pCi/L	9	12	75.00%	12.683	5.2205	12.428	37.539	0.8500	11.350	21.500	0.5000	39.000	1.0000	11.000	38.500	0.7731	7.0315	0.88237	0.09400	0.84006	0.02773	Lognormal	15	No
All	MW-18	Gross Alpha	pCi/L	8	12	66.67%	8.0000	3.0375	10.086	28.172	0.5000	4.5000	12.000	0.5000	34.000	1.0000	11.000	33.500	1.7497	5.7066	0.77675	0.00516	NR	NR	Normal	15	No
All	MW-19	Gross Alpha	pCi/L	8	12	66.67%	10.358	3.8302	14.656	39.671	0.9000	4.7500	13.700	0.5000	52.000	1.0000	11.000	51.500	2.3624	8.2924	0.69891	0.00082	NR	NR	Normal	15	No
All	MW-2	Gross Alpha	pCi/L	22	29	75.86%	11.948	5.0936	14.917	41.781	1.9000	8.0000	18.800	0.5000	67.000	1.0000	11.000	66.500	2.1810	5.4290	0.74817	0.00001	NR	NR	Normal	15	No
All	MW-3	Gross Alpha	pCi/L	22	31	70.97%	34.269	9.3909	47.109	128.49	1.0000	17.500	47.000	0.5000	180.00	1.0000	11.000	179.50	2.1204	16.583	0.71342	0.00000	NR	NR	Normal	15	Yes
All	MW-5	Gross Alpha	pCi/L	20	31	64.52%	5.2355	2.4560	5.8996	17.035	0.5000	3.9000	8.0000	0.2000	26.700	1.0000	11.000	26.500	1.8369	2.0768	0.79263	0.00004	NR	NR	Normal	15	No
All	MW-1	Iron	ug/L	12	13	92.31%	1048.1	316.29	962.82	2973.7	70.000	1670.0	2000.0	10.000	2110.0	1.0000	100.00	2100.0	-0.1262	523.39	0.73713	0.00134	NR	NR	normal	11000	No
All	MW-3	Iron	ug/L	9	12	75.00%	2041.8	167.87	5687.8	13417	30.500	95.000	1195.0	15.000	20000	1.0000	100.00	19985	3.3953	3218.1	0.40311	0.00000	NR	NR	normal	11000	No
All	MW-32	Iron	ug/L	13	13	100.00%	9971.5	9750.5	1855.5	13782	9710.0	10300	10700	5000.0	12700	1.0000	100.00	7400.0	-1.2254	1052.1	0.85095	0.10050	0.89081	0.09869	Lognormal	11000	No
Extremes Excluded	MW-32	Iron	ug/L	12	12	100.00%	10361	10269	1391.9	13145	9745.0	10300	11100	7220.0	12700	1.0000	100.00	5480.0	-0.5507	787.52	0.93999	0.49791	0.90204	0.16853	Nonparametric	11000	No
All	MW-5	Iron	ug/L	8	12	66.67%	138.08	75.281	118.42	374.91	20.000	175.00	190.00	5.0000	410.00	1.0000	100.00	405.00	0.8590	66.999	0.85922	0.04781	NR	NR	normal	11000	No
All	MW-1	Manganese	ug/L	12	12	100.00%	4626.0	204.80	16119	37058	160.00	217.50	240.00	10.000	55000	0.2000	100.00	54990	3.4641	9118.2	0.33131	0.00000	NR	NR	normal	800	Yes
Extremes Excluded	MW-1	Manganese	ug/L	11	11	100.00%	173.82	123.03	85.889	345.60	150.00	215.00	230.00	10.000	250.00	0.2000	100.00	240.00	-1.3817	50.756	0.78385	0.00577	NR	NR	normal	800	No
All	MW-11	Manganese	ug/L	9	9	100.00%	77.222	65.452	31.316	139.85	61.000	90.000	95.000	10.000	102.00	0.2000	100.00	92.000	-1.6517	20.459	0.76427	0.05793	NR	NR	normal	800	No
Extremes Excluded	MW-11	Manganese	ug/L	8	8	100.00%	85.625	82.778	19.863	125.35	82.000	92.000	97.500	40.000	102.00	0.2000	100.00	62.000	-2.0959	13.764	0.76118	0.01085	NR	NR	normal	800	No
All	MW-12	Manganese	ug/L	11	11	100.00%	2599.5	311.53	5697.3	14164	27.000	330.00	2000.0	10.000	20000	0.2000	100.00	19990	3.2239	3473.1	0.44539	0.00000	NR	NR	normal	800	Yes
Extremes Excluded	MW-12	Manganese	ug/L	10	10	100.00%	628.40	205.47	779.07	2186.5	27.000	320.00	1000.0	10.000	2000.0	0.2000	100.00	1990.0	1.2822	482.86	0.75744	0.00440	NR	NR	normal	800	No
All	MW-14	Manganese	ug/L	19	19	100.00%	1935.3	1930.5	136.15	2207.6	1860.0	2000.0	2000.0	1650.0	2110.0	0.2000	100.00	460.00	-0.9088	61.220	0.89400	0.03794	NR	NR	normal	800	Yes
All	MW-17	Manganese	ug/L	9	9	100.00%	426.56	187.07	453.18	1332.9	48.000	120.00	1000.0	22.000	1000.0	0.2000	100.00	978.00	0.5650	296.07	0.75348	0.00595	NR	NR	normal	800	No
All	MW-2	Manganese	ug/L	8	12	66.67%	131.67	46.617	129.08	389.82	5.0000	140.00	215.00	5.0000	400.00	0.2000	100.00	395.00	0.6309	73.030	0.86677	0.05947	0.76873	0.00422	Lognormal	800	No
All	MW-26	Manganese	ug/L	12	12	100.00%	1177.2	1164.4	179.59	1536.3	993.00	1185.0	1325.0	949.00	1430.0	0.2000	100.00	481.00	-0.0187	101.61	0.91392	0.23945	0.90687	0.19451	Nonparametric	800	Yes
All	MW-3	Manganese	ug/L	16	17	94.12%	1960.7	978.21	1272.1	4504.9	732.00	2000.0	3000.0	5.0000	4000.0	0.2000	100.00	3995.0	-0.1772	604.72	0.93229	0.23766	0.68496	0.00008	Lognormal	800	Yes
All	MW-32	Manganese	ug/L	13	13	100.00%	4627.7	4612.6	379.85	5387.4	4530.0	4670.0	4840.0	3740.0	5090.0	0.2000	100.00	1350.0	-0.8939	206.48	0.91958	0.24756	0.89936	0.13106	Nonparametric	800	Yes
All	MW-5	Manganese	ug/L	12	12	100.00%	229.92	188.09	60.758	391.42	225.00	254.50	275.00	10.000	300.00	0.2000	100.00	290.00	-2.1840	45.662	0.73590	0.00205				800	No
Extremes Excluded	MW-5	Manganese	ug/L	11	11	100.00%	249.91	245.60	43.567	337.04	230.00	259.00	280.00	140.00	300.00	0.2000	100.00	160.00	-1.6777	25.746	0.85878	0.05552	0.76816	0.00359	Lognormal	800	No
All	MW-32	Nickel	ug/L	13	13	100.00%	62.923	62.575	6.7015	76.326	62.000	64.000	68.000	51.000	71.000	1.0000	50.0000	20.000	-0.7862	3.6429	0.88478	0.08280	0.86493	0.04476	Lognormal	100	No
All	MW-16	Nitrate/Nitrite	mg/L	7	8	87.50%	1.7038	1.7020	0.6985	3.1577	2.0000	2.0050	2.2500	0.5000	2.5000	0.0100	0.5000	2.0000	-2.3016	0.4223	0.69121	0.00178	NR	NR	Normal	10	No
All	MW-1	PH	PH	77	77	100.00%	7.5249	7.5128	0.4312	8.3873	7.0000	7.4400	8.0000	7.0000	8.6000	0.0100	0.0100	1.6000	0.1970	0.0963	0.87378	0.00000	NR	NR	Normal	6.5-8.5	No
All	MW-11	PH	PH	92	92	100.00%	7.7749	7.7576	0.5058	8.7865	7.5350	8.0000	8.0000	6.0000	9.0000	0.0100	0.0100	3.0000	-1.1820	0.1034	0.80494	0.00000	NR	NR	Normal	6.5-8.5	No
Extremes Excluded	MW-11	PH	PH	88	88	100.00%	7.7874	7.7768	0.4007	8.5888	7.6800	8.0000	8.0000	7.0000	8.2800	0.0100	0.0100	1.2800	-1.1672	0.0837	0.75106	0.00000	NR	NR	Normal	6.5-8.5	No
All	MW-12	PH	PH	90	90	100.00%	7.6904	7.6828	0.3383	8.3671	7.6641	7.6000	7.8000	6.0000	8.2200	0.0100	0.0100	2.2200	1.4376	0.6896	0.67883	0.00000	NR	NR	Normal	6.5-8.5	No
Extremes Excluded	MW-12	PH	PH	55	55	100.00%	7.0000	7.0000	0.0000	7.0000	7.0000	7.0000	7.0000	7.0000	7.0000	0.0100	0.0100	0.0000	0.0000	NA	NA	NA	NA	NA	NA	6.5-8.5	No
All	MW-14	PH	PH	86	86	100.00%	6.9098	6.9760	0.4604	7.9117	6.8400	7.0000	7.0000	6.0000	8.2100	0.0100	0.0100	2.2100	0.1550	0.1111	0.83232	0.00000	NR	NR	Normal	6.5-8.5	No
Extremes Excluded	MW-14	PH	PH	52	52	100.00%	6.9660	6.9646	0.1385	7.2429	6.8500	7.0000	7.0000	6.6800	7.4000	0.0100	0.0100	0.7200	0.6458	0.0376	0.85394	0.00001	NR	NR	Normal	6.5-8.5	No
All	MW-15	PH	PH	84	84	100.00%	7.0930	7.0829	0.3013	7.6926	7.0000	7.0300	7.0850	6.0000	8.3400	0.0100	0.0100	2.3400	1.4160	0.0738	0.63751	0.00000	NR	NR	Normal	6.5-8.5	No
Extremes Excluded	MW-15	PH	PH	54	54	100.00%	7.0148	7.0144	0.0728	7.1603	7.0000	7.0000	7.0000	6.8100	7.2700	0.0100	0.0100	0.4600	1.4747	0.0194	0.68392	0.00000	NR	NR	Normal	6.5-8.5	No
All	MW-17	PH	PH	45	45	100.00%	7.1337	7.1242	0.4272	7.9911	7.0000	7.0000	7.2400	6.0000	8.3100	0.0100	0.0100	2.3100	0.3869	0.1243	0.76511	0.00000	NR	NR	Normal	6.5-8.5	No
Extremes Excluded	MW-17	PH	PH	39	39	100.00%	7.0985	7.0954	0.2163	7.5310	7.0000	7.0000	7.0800	6.8800	7.9600	0.0100	0.0100	1.0800	2.3922	0.0679	0.63297	0.00000	NR	NR	Normal	6.5-8.5	No
All	MW-18	PH	PH	14	14	100.00%	7.2221	7.2090	0.4581	8.1383	6.9600	7.0050	7.5500	6.6300	8.0000	0.0100	0.0100	1.3700	0.8779	0.2400	0.83752	0.01510	NR	NR	Normal	6.5-8.5	No
All	MW-19	PH	PH	13	13	100.00%	7.5615	7.5426	0.5289	8.6194	7.4700	7.5700	8.0000	6.0000	8.0700	0.0100	0.0100	2.0700	-2.2808	0.2875	0.72811	0.00108	NR	NR	Normal	6.5-8.5	No
All	MW-2	PH	PH	75	75	100.00%	7.2624	7.2537	0.3632	7.9888	7.0000	7.0500	7.4400	6.7300	8.0000	0.0100	0.0100	1.2700	1.0676	0.0822	0.76414	0.00000	NR	NR	Normal	6.5-8.5	No
All	MW-3	PH	PH	77	77	100.00%	6.9504	6.9409	0.3640	7.7183	6.9000	7.0300	7.1000	6.0000	8.0000	0.0100	0.0100	2.0000	-0.2261	0.0813	0.86789	0.00000	NR	NR	Normal	6.5-8.5	No
Extremes Excluded	MW-3	PH	PH	71	71	100.00%	7.0177	7.0137	0.2406	7.4990	7.0000	7.0000	7.1000	6.5000	7.6600	0.0100	0.0100	1.1600	0.7244	0.0560	0.87825	0.00001	NR	NR	Normal	6.5-8.5	No
All	MW-5	PH	PH	105	105	100.00%	7.6858	7.6747	0.4106	8.5070	7.4400	7.9100	8.0000	7.0000	8.6500	0.0100	0.0100	1.6500	-0.6229	0.0785	0.81737	0.00000	NR	NR	Normal	6.5-8.5	No
All	MW-15	Selenium	ug/L	15	22	68.18%	39.136	9.6639	43.560	126.30	1.0000	12.500	79.000	0.5000	117.00	0.0500	10.000	116.50	0.6020	18.211	0.80361	0.00057	NR	NR	normal	50	No
All	MW-19	Selenium	ug/L	8	10	80.00%	8.9100	4.7832	7.8184	24.547	1.0000	8.5000	14.300	0.5000	22.000	0.0500	10.000	21.500	0.3976	4.8458	0.89589	0.19737	0.88243	0.13913	Nonparametric	50	No
All	MW-2	Selenium	ug/L	25	26	96.15%	8.6269	4.6430	9.7404	27.138	1.7500	6.0300	12.600	0.5000	45.000	0.0500	10.000	44.500	2.0569	3.0214	0.76823	0.00001	NR	NR	normal	50	No

Table 11A. Descriptive Summary Statistics for Constituents in Compliance Wells with Greater than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Greater Than 8																										
Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
Extremes Excluded	MW-2	Selenium	ug/L	24	35	68.57%	7.6000	4.3060	6.9333	21.467	1.0000	5.0000	12.000	0.5000	26.000	0.0500	10.000	25.500	1.0150	2.2970	0.88183	0.00133	NR	NR	normal	50	No
All	MW-3	Selenium	ug/L	27	40	67.50%	25.738	5.7330	79.724	185.19	1.0000	4.0000	19.500	0.5000	370.00	0.0500	10.000	369.50	4.6417	24.705	0.35182	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-3	Selenium	ug/L	24	37	64.86%	8.6784	4.2504	9.4523	27.783	1.0000	3.0000	17.000	0.5000	28.000	0.0500	10.000	27.500	0.8576	3.0457	0.79363	0.00001	NR	NR	normal	50	No
All	MW-1	Sulfate	mg/L	71	71	100.00%	655.94	620.58	116.16	888.29	637.00	657.00	691.00	10.000	1090.0	1.0000	30.0000	1080.0	-2.6105	26.760	0.59309	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-1	Sulfate	mg/L	68	68	100.00%	665.62	664.12	44.904	755.43	638.50	658.50	691.00	520.00	816.00	1.0000	30.0000	296.00	0.1360	10.673	0.95604	0.01744	NR	NR	Normal	none	No
All	MW-11	Sulfate	mg/L	64	64	100.00%	1025.6	938.48	222.54	1470.7	949.00	996.00	1057.5	79.000	2250.0	1.0000	30.0000	2171.0	1.6954	54.521	0.88255	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-11	Sulfate	mg/L	61	61	100.00%	1013.1	1009.5	89.776	1192.7	949.00	993.00	1051.0	895.00	1309.0	1.0000	30.0000	414.00	1.4156	22.529	0.87476	0.00002	NR	NR	Normal	none	No
All	MW-12	Sulfate	mg/L	81	81	100.00%	2418.4	2371.0	716.09	3551.2	2240.0	2351.0	2490.0	2000.0	7620.0	1.0000	30.0000	5620.0	7.5828	179.77	0.25237	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-12	Sulfate	mg/L	60	60	100.00%	2328.4	2324.3	138.22	2604.8	2237.0	2347.0	2445.0	2000.0	2560.0	1.0000	30.0000	560.00	-0.3622	34.975	0.96639	0.09699	0.96045	0.04951	Lognormal	none	No
All	MW-14	Sulfate	mg/L	41	41	100.00%	2074.2	2057.5	230.19	2535.1	2057.0	2110.0	2195.0	1130.0	2280.0	1.0000	30.0000	1150.0	-3.2116	70.552	0.69712	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-14	Sulfate	mg/L	39	39	100.00%	2121.3	2119.0	98.281	2317.8	2070.0	2110.0	2208.0	1872.0	2280.0	1.0000	30.0000	408.00	-0.6686	30.845	0.94142	0.04240	NR	NR	Normal	none	No
All	MW-15	Sulfate	mg/L	37	37	100.00%	2271.4	2254.0	274.31	2823.0	2125.0	2314.0	2400.0	1250.0	2650.0	1.0000	30.0000	1350.0	-2.8745	35.385	0.66313	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-15	Sulfate	mg/L	35	35	100.00%	2334.7	2331.7	121.64	2578.0	2253.0	2315.0	2440.0	2100.0	2600.0	1.0000	30.0000	500.00	0.2712	40.299	0.97904	0.72775	0.98255	0.83864	Nonparametric	none	No
All	MW-17	Sulfate	mg/L	17	17	100.00%	2478.8	2448.1	350.93	3179.6	2430.0	2550.0	2690.0	1400.0	2860.0	1.0000	30.0000	1460.0	-1.9557	171.10	0.76850	0.00163	NR	NR	Normal	none	No
Extremes Excluded	MW-17	Sulfate	mg/L	16	16	100.00%	2546.2	2535.1	236.13	3018.5	2465.0	2576.5	2715.0	2004.0	2860.0	1.0000	30.0000	856.00	-1.1968	115.70	0.88617	0.04648	NR	NR	Normal	none	No
All	MW-18	Sulfate	mg/L	15	15	100.00%	1475.1	1465.0	174.38	1823.9	1371.0	1446.0	1600.0	1069.0	1740.0	1.0000	30.0000	671.00	-0.4126	88.247	0.93340	0.30659	0.91027	0.13669	Nonparametric	none	No
All	MW-19	Sulfate	mg/L	17	17	100.00%	1466.3	1362.8	560.62	2587.5	1070.0	1540.0	1793.0	583.00	2770.0	1.0000	30.0000	2187.0	0.5048	266.50	0.95917	0.61587	0.96221	0.67336	Nonparametric	none	No
All	MW-2	Sulfate	mg/L	72	72	100.00%	1774.3	1724.1	367.54	2320.1	1744.5	1830.0	1931.5	240.00	2147.0	1.0000	30.0000	1907.0	-2.8111	71.128	0.71014	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-2	Sulfate	mg/L	69	69	100.00%	1823.2	1812.6	188.45	2200.1	1800.0	1860.0	1933.0	1270.0	2147.0	1.0000	30.0000	877.00	-1.3053	44.464	0.87049	0.00000	NR	NR	Normal	none	No
All	MW-3	Sulfate	mg/L	71	71	100.00%	3033.6	2964.1	478.35	3990.5	2783.0	3200.0	3350.0	930.00	4030.0	1.0000	30.0000	3100.0	-1.0120	111.26	0.57226	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-3	Sulfate	mg/L	70	70	100.00%	3063.8	3034.2	408.73	3861.3	2800.0	3201.5	3359.0	1890.0	4030.0	1.0000	30.0000	2140.0	-0.8154	95.749	0.92687	0.00054	NR	NR	Normal	none	No
All	MW-5	Sulfate	mg/L	73	73	100.00%	1217.4	1145.6	763.87	2335.1	1050.0	1120.0	1182.0	650.00	7620.0	1.0000	30.0000	6970.0	8.2171	182.11	0.18984	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-5	Sulfate	mg/L	71	71	100.00%	1114.9	1111.2	91.323	1297.5	1050.0	1115.0	1180.0	860.00	1348.0	1.0000	30.0000	488.00	0.1227	21.242	0.98549	0.58730	0.98435	0.52223	Nonparametric	none	No
All	MW-1	TDS	mg/L	69	69	100.00%	1258.5	1271.3	257.77	2101.1	1210.0	1270.0	1360.0	627.00	4000.0	10.0000	10.0000	3373.0	6.4092	84.416	0.68557	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-1	TDS	mg/L	65	65	100.00%	1267.8	1264.5	93.149	1454.1	1217.0	1270.0	1300.0	990.00	1567.0	10.0000	10.0000	577.00	0.7565	22.645	0.91970	0.00043	NR	NR	Normal	none	No
All	MW-11	TDS	mg/L	56	53	100.00%	1918.5	1865.8	450.14	2878.8	1720.0	1803.5	1920.0	1620.0	5100.0	10.0000	10.0000	3480.0	5.4291	120.57	0.46084	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-11	TDS	mg/L	55	55	100.00%	1832.6	1826.3	159.48	2151.6	1710.0	1790.0	1915.0	1620.0	2396.0	10.0000	10.0000	776.00	1.6283	42.148	0.85581	0.00001	NR	NR	Normal	none	No
All	MW-12	TDS	mg/L	55	55	100.00%	3951.2	3942.3	268.70	4488.6	3760.0	3930.0	4096.0	3010.0	5100.0	10.0000	10.0000	2090.0	0.6667	71.011	0.87163	0.00003	NR	NR	Normal	none	No
All	MW-14	TDS	mg/L	40	40	100.00%	3601.1	3596.1	188.57	3978.2	3505.0	3626.5	3709.0	3000.0	4062.0	10.0000	10.0000	1062.0	-0.6727	58.437	0.93578	0.02498	NR	NR	Normal	none	No
All	MW-15	TDS	mg/L	37	36	100.00%	3753.2	3687.5	682.62	5118.4	3760.0	3875.0	3960.0	34.000	4530.0	10.0000	10.0000	4492.0	-4.8444	222.96	0.45169	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-15	TDS	mg/L	33	33	100.00%	3861.4	3856.8	186.71	4234.8	3800.0	3880.0	3950.0	3310.0	4233.0	10.0000	10.0000	923.00	-1.4114	63.702	0.86245	0.00065	NR	NR	Normal	none	No
All	MW-17	TDS	mg/L	16	16	100.00%	4375.8	4375.6	606.65	5588.9	4250.0	4555.0	4653.0	2460.0	5296.0	10.0000	10.0000	2836.0	-2.1730	267.21	0.75735	0.00575	NR	NR	Normal	none	No
Extremes Excluded	MW-17	TDS	mg/L	15	15	100.00%	4503.5	4491.5	338.48	5180.4	4280.0	4578.0	4670.0	3750.0	5296.0	10.0000	10.0000	1546.0	0.0438	171.29	0.90639	0.11923	0.90468	0.11224	Nonparametric	none	No
All	MW-18	TDS	mg/L	14	14	100.00%	2636.3	2617.6	315.14	3266.6	2460.0	2677.5	2940.0	1920.0	3030.0	10.0000	10.0000	1110.0	-0.6839	165.08	0.93804	0.39383	0.91355	0.17744	Nonparametric	none	No
All	MW-19	TDS	mg/L	16	16	100.00%	2543.6	2405.3	845.41	4234.4	1925.0	2657.5	3158.0	1120.0	4190.0	10.0000	10.0000	3070.0	0.2342	414.24	0.97673	0.93229	0.96895	0.82130	Nonparametric	none	No
All	MW-2	TDS	mg/L	69	69	100.00%	2964.0	2901.5	480.65	3963.1	2910.0	3122.0	3179.0	855.00	3850.0	10.0000	10.0000	2845.0	-2.7173	115.39	0.67134	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-2	TDS	mg/L	65	65	100.00%	3067.6	3057.8	242.77	3553.2	3013.0	3130.0	3180.0	2278.0	3800.0	10.0000	10.0000	1522.0	-0.5281	59.017	0.88900	0.00003	NR	NR	Normal	none	No
All	MW-3	TDS	mg/L	69	69	100.00%	6120.1	6072.2	552.02	6235.9	5950.0	6231.0	6360.0	2102.0	6188.0	10.0000	10.0000	4054.0	-3.5812	137.54	0.61760	0.00000	NR	NR	Normal	none	No
Extremes Excluded	MW-3	TDS	mg/L	66	66	100.00%	5222.9	5215.6	276.50	5775.9	5089.0	5290.0	5365.0	4400.0	6186.0	10.0000	10.0000	1786.0	-0.2526	66.707	0.92851	0.00094	NR	NR	Normal	none	No
All	MW-5	TDS	mg/L	70	70	100.00%	2137.5	2063.2	579.63	3296.7	1853.0	2035.0	2472.0	1750.0	6630.0	10.0000	10.0000	4880.0	6.8862	126.78	0.31405	0.00000	0.54350	0.00000	Lognormal	none	No
Extremes Excluded	MW-5	TDS	mg/L	68	68	100.00%	2056.1	2050.3	157.74	2371.5	1950.0	2025.0	2149.5	1760.0	2575.0	10.0000	10.0000	815.00	0.8944	37.491	0.95317	0.01231	NR	NR	Normal	none	No
All	MW-1	Unat	ug/L	49	68	72.06%	4.0565	1.13644	14.1516	32.3585	0.50000	1.02230	2.5925	0.14925	107.4627	0.3	1.0	107.3131	6.51651	7.4208	0.24580	0.00000	0.915492	0.004578	Non-parametric	30	No
Extremes Excluded	MW-1	Unat	ug/L	46	65	70.77%	1.65206	0.96541	1.75478	5.1616	0.50000	1.00000	2.2388	0.14925	10.0000	0.3	1.0	9.8507	2.15519	2.0869	0.774829	0.000000	0.955921	0.021104	Non-parametric	30	No
All	MW-11	Unat	ug/L	63	87	72.41%	2.1675	0.75347	7.3713	16.9435	0.40000	0.61600	1.2050	0.14925	51.4925	0.3	1.0	51.3433	6.28213	3.7599	0.230522	0.000000	0.908223	0.000176	Non-parametric	30	No
Extremes Excluded	MW-11	Unat	ug/L	56	80	70.00%	0.87123	0.60849	0.74009	2.3514	0.37910	0.74627	1.0474	0.14925	3.3500	0.3	1.0	3.2007	1.64231	1.0359	0.820445	0.000000	0.920160	0.000097	Non-parametric	30	No
All	MW-12	Unat	ug/L	83	84	98.81%	19.3525	14.34527	22.8875	64.9274	14.10718	16.65000	17.9104	0.14925	177.0000	0.3	1.0	176.8507	5.82545	24.1193	0.327954	0.000000	0.594329	0.000000	Non-parametric	30	No
Extremes Excluded	MW-12	Unat	ug/L	76	77	98.70%	15.63621	15.04915	3.53469	22.7056	14.17910	15.80000	17.7000	3.00000	25.2965	0.3	1.0	22.2965	-0.91978	16.4385	0.904155	0.000026	0.680005	0.000000	Non-parametric	30	No
All	MW-14	Unat	ug/L	80	81	98.77%	58.6370	52.64674	19.4503	97.5376	49.26378	59.80000	69.0900	0.70746	150.7463	0.3	1.0	150.0365	0.52554	63.2698	0.878103	0.033091	0.968179	0.000393	Non-parametric	30	Yes
Extremes Excluded	MW-14	Unat	ug/L	79	80	98.75%	57.81979	51.95897	16.59811	91.0160	48.65672	59.75000	68.8284	0.70746	98.0000	0.3	1.0	97.2925	-1.05717	61.5135	0.924515	0.000156	0.480869	0.000000	Non-parametric	30	Yes
All	MW-15	Unat	ug/L	74	74	100.00%	44.3126	42.32653	14.6845	74.4264	36.50745	45.00000	49.2000	7.31343	118.4179	0.3	1.0	103.1045	1.09480	48.1358	0.807111	0.000000	0.802365	0.000000	Non-parametric	30	Yes
Extremes Excluded	MW-15	Unat	ug/L	71	71	100.00%	42.38539	40.84432	9.55498	61.4953	37.76119	43.00000	48.8000	7.31343	61.9403	0.3	1.0	54.6269	-0.96684	44.6470	0.948496	0.005604	0.728721	0.000000	Non-parametric	30	Yes
All	MW-17	Unat	ug/L	47	47	100.00%	29.4261	27.63573	8.8898	47.2057	24.92537	29.25373	35.6000	4.62687	46.8000	0.3	1.0	42.1731	-0.47120	32.0362	0.977885	0.507872	0.819489	0.000004	Normal	30	No
All	MW-18	Unat	ug/L	17	17	100.00%	20.1277	15.56998	13.4756	47.0788	11.41791	14.34328	27.7000	2.68657	42.8000	0.3	1.0	40.1134	0.65994	27.0562	0.879445	0.031145	0.916056	0.126641	Lognormal	30	No
All	MW-19	Unat	ug/L	17	17	100.00%	12.3084	11.06486	5.2511	22.8107	9.49254	11.60000	14.0000	2.13433	25.3731	0.3	1.0	23.2388	0.73878	15.0083	0.944854	0.380356	0.850763	0.011016	Normal	30	No
All	MW-2	Unat	ug/L	83	83	100.00%	10.5334	8.67215	8.3632	27.1366	5.70000	10.14925	12.2386	1.00000	67.0000	0.3	1.0	66.0000	5.13576	12.6245	0.556072	0.000000	0.877909	0.000015	Lognormal	30	No
Extremes Excluded	MW-2	Unat	ug/L	62	62	100.00%	9.62262	8.39083	4.11834	17.8593	6.70000	10.12687	12.0000	1.00000	18.0000	0.3	1.0	17.0000	-0.16395	10.6685	0.982320	0.511562	0.842315	0.000001	Normal	30	No
All	MW-26	Unat	ug/L	11	11	100.00%	15.9709	14.97873	6.1048	28.1804	10.70000	12.60000	22.7000	9.48000	26.0000	0.3	1.0	16.5200	0.63211	20.0721	0.871664	0.081430	0.900649	0.188255	Normal	30	No
All	MW-3	Unat	ug/L	61	62	98.39%	28.6753	20.53764	31.5531	91.7014	16.41791	22.38805	32.8358	0.50000	219.0000	0.3	1.0	218.5000	4.44425	36.6908	0.518563	0.000000	0.836004	0.000003	Non-parametric	30	No
Extremes Excluded	MW-3	Unat	ug/L	58	59	98.31%	22.44726	18.60335	10.31658	43.0804	15.00000	21.94030	30.9000	0.50000	41.3000	0.3	1.0	40.8000	-0.16542	25.1358	0.978578	0.382524	0.764387	0.000000	Lognormal	30	No
All	MW-5	Unat	ug/L	74	90	77.08%	2.3617	0.53220	5.6475	13.6567	0.50000	0.85224	1.6791	0.04000	48.6975	0.3	1.0	48.4675	6.32823	3.4790	0.356203	0.000000	0.955139	0.002379	Non-parametric	30	No
Extremes Excluded	MW-5	Unat	ug/L	64	86	74.42%	0.97748	0.69782	0.82020	2.6179	0.50000	0.72813	1.2000	0.04000	4.7000	0.3	1.0	4.6600	1.91555	1.1533	0.825065	0.000000	0.956153	0.005310	Non-parametric	30	No
All	MW-14	Zinc	ug/L	7	11	63.64%	2255.7	53.885	4962.9	12161	5.0000	13.000	20.000	5.0000	16500	5.0000	100.0000	16495	1.9451	2332.9	0.49875	0.00000	NR	NR	normal	5000	No
Extremes Excluded	MW-14	Zinc	ug/L	6	9	66.67%	11.556	10.156	5.6593	22.874	5.0000	13.000	16.000	5.0000	20.000	5.0000	100.0000	15.000	0.0075	3.6973	0.90011	0.25264	0.84228	0.06122	Nonparametric	5000	No
All	MW-2	Zinc	ug/L	9	12	75.00%	98.750	42.838	120.13	339.01	11.500	72.500	142.50	5.0000	420.00	5.0000	100.0000	415.00	1.9351	67.968	0.77572	0.00503	NR	NR	normal	5000	No
All	MW-3	Zinc	ug/L	8	13	61.54%	63.077	22.723	119.28	302.03	5.0000	20.000	58.000	5.0000	441.00	5.0000	100.0000	436.00	3.0740	64.947	0.53233	0.00002	NR	NR	normal	5000	No
Extremes Excluded	MW-3	Zinc	ug/L	7	12	58.33%	31.583	17.747	38.811	109.20	5.0000	19.000	42.000	5.0000	139.00	5.0000	100.0000	134.00	2.2323	21.959	0.70677	0.00098	NR	NR	normal	5000	No

Table 11A. Descriptive Summary Statistics for Constituents in Compliance Wells with Greater than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Less Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
All	MW-1	Ammonia as N	mg/L	3	3	100.00%	0.4433	0.4416	0.0473	0.5378	0.3900	0.4600	0.4800	0.3900	0.4800	0.0500	0.0500	0.0900	-1.3896	0.0535	0.90672	0.40721	0.89601	0.37291	Nonparametric	25	No
All	MW-11	Ammonia as N	mg/L	6	6	100.00%	0.6267	0.6263	0.0216	0.6699	0.6100	0.6400	0.6400	0.5900	0.6400	0.0500	0.0500	0.0500	-1.3226	0.0173	0.70539	0.00704	NR	NR	Normal	25	No
All	MW-12	Ammonia as N	mg/L	3	3	100.00%	0.1667	0.1640	0.0379	0.2424	0.1400	0.1500	0.2100	0.1400	0.2100	0.0500	0.0500	0.0700	1.5971	0.0428	0.85465	0.25297	0.87332	0.30499	Nonparametric	25	No
All	MW-14	Ammonia as N	mg/L	6	6	100.00%	0.2183	0.2167	0.0286	0.2755	0.2100	0.2200	0.2400	0.1700	0.2500	0.0500	0.0500	0.0800	-0.9070	0.0229	0.93001	0.58016	0.90385	0.39716	Nonparametric	25	No
All	MW-15	Ammonia as N	mg/L	2	3	66.67%	0.0817	0.0640	0.0633	0.2083	0.0250	0.0700	0.1500	0.0250	0.1500	0.0500	0.0500	0.1250	0.8011	0.0716	0.97453	0.69390	0.99263	0.83580	Nonparametric	25	No
All	MW-17	Ammonia as N	mg/L	3	3	100.00%	0.1600	0.1555	0.0436	0.2472	0.1100	0.1800	0.1900	0.1100	0.1900	0.0500	0.0500	0.0800	-1.6301	0.0493	0.84211	0.21956	0.82340	0.17167	Nonparametric	25	No
All	MW-18	Ammonia as N	mg/L	3	3	100.00%	0.1467	0.1424	0.0404	0.2275	0.1000	0.1700	0.1700	0.1000	0.1700	0.0500	0.0500	0.0700	-1.7321	0.0457	0.75000		0.75000		Nonparametric	25	No
All	MW-19	Ammonia as N	mg/L	3	3	100.00%	0.1100	0.1063	0.0361	0.1821	0.0800	0.1000	0.1500	0.0800	0.1500	0.0500	0.0500	0.0700	1.1521	0.0408	0.94231	0.53674	0.97272	0.68312	Nonparametric	25	No
All	MW-2	Ammonia as N	mg/L	2	3	66.67%	0.0750	0.0621	0.0477	0.1704	0.0250	0.0800	0.1200	0.0250	0.1200	0.0500	0.0500	0.0950	-0.4665	0.0540	0.99176	0.82638	0.92784	0.48058	Nonparametric	25	No
All	MW-26	Ammonia as N	mg/L	6	6	100.00%	0.6250	0.6164	0.1104	0.8458	0.4900	0.6600	0.7000	0.4900	0.7500	0.0500	0.0500	0.2600	-0.5296	0.0883	0.86530	0.20811	0.84051	0.13163	Nonparametric	25	No
All	MW-3	Ammonia as N	mg/L	3	3	100.00%	0.1867	0.1829	0.0473	0.2812	0.1500	0.1700	0.2400	0.1500	0.2400	0.0500	0.0500	0.0900	1.3896	0.0535	0.90672	0.40721	0.93212	0.49661	Nonparametric	25	No
All	MW-32	Ammonia as N	mg/L	6	6	100.00%	1.0117	1.0103	0.0560	1.1237	0.9800	1.0250	1.0600	0.9200	1.0600	0.0500	0.0500	0.1400	-0.8905	0.0448	0.87113	0.23075	0.86721	0.21529	Nonparametric	25	No
All	MW-5	Ammonia as N	mg/L	4	4	100.00%	0.5975	0.5944	0.0695	0.7364	0.5400	0.6000	0.6550	0.5200	0.6700	0.0500	0.0500	0.1500	-0.1201	0.0681	0.93597	0.62991	0.93545	0.62678	Nonparametric	25	No
All	MW-26	Chloride	mg/L	6	6	100.00%	52.167	52.162	0.7528	53.672	52.000	52.000	53.000	51.000	53.000	0.1000	5.0000	2.0000	-0.3126	0.6023	0.86626	0.21171	NR	NR	Normal	none	No
All	MW-32	Chloride	mg/L	6	6	100.00%	32.333	32.309	1.3663	35.066	32.000	32.500	33.000	30.000	34.000	0.1000	5.0000	4.0000	-0.8888	1.0932	0.92664	0.55438	0.91852	0.494739376	Nonparametric	none	No
All	MW-32	Cobalt	ug/L	6	6	100.00%	45.833	45.237	8.1833	62.200	40.000	43.500	55.000	37.000	56.000	10.0000	10.0000	19.000	0.4032	6.5479	0.86768	0.21712	0.87869	0.26309	Nonparametric	730	No
All	MW-12	Fluoride	mg/L	5	5	100.00%	0.3280	0.3258	0.0438	0.4156	0.3000	0.3000	0.3400	0.3000	0.4000	0.0500	0.1000	0.1000	1.5310	0.0384	0.75443	0.03269	NR	NR	Normal	4	No
Extremes Excluded	MW-12	Fluoride	mg/L	5	5	100.00%	0.3280	0.3258	0.0438	0.4156	0.3000	0.3000	0.3400	0.3000	0.4000	0.0500	0.1000	0.1000	1.5310	0.0384	0.75443	0.03269	NR	NR	Normal	4	No
All	MW-15	Fluoride	mg/L	5	5	100.00%	0.2200	0.2048	0.0837	0.3873	0.2000	0.2000	0.3000	0.1000	0.3000	0.0500	0.1000	0.2000	-0.5122	0.0733	0.88104	0.31404	0.85018	0.19509	Nonparametric	4	No
All	MW-17	Fluoride	mg/L	5	5	100.00%	0.2750	0.2563	0.0850	0.4511	0.3000	0.3000	0.3000	0.1000	0.3500	0.0500	0.1000	0.2500	-2.1455	0.0704	0.69879	0.00271	NR	NR	Normal	4	No
Extremes Excluded	MW-17	Fluoride	mg/L	4	4	100.00%	0.3000	0.3000	0.0000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.0500	0.1000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-18	Fluoride	mg/L	6	6	100.00%	0.2617	0.2371	0.1150	0.4916	0.2000	0.2500	0.3700	0.1000	0.4000	0.0500	0.1000	0.3000	-0.1420	0.0920	0.94153	0.67152	0.90938	0.43235	Nonparametric	4	No
All	MW-26	Fluoride	mg/L	6	6	100.00%	0.4167	0.3750	0.2401	0.8969	0.2000	0.3000	0.4000	0.2000	0.8000	0.0500	0.1000	0.5000	2.3984	0.1921	0.69462	0.00038	NR	NR	Normal	4	No
Extremes Excluded	MW-26	Fluoride	mg/L	5	5	100.00%	0.3200	0.3178	0.0447	0.4094	0.3000	0.3000	0.3000	0.3000	0.4000	0.0500	0.1000	0.1000	2.2361	0.0392	0.55218	0.00013	NR	NR	Normal	4	No
All	MW-32	Fluoride	mg/L	5	5	100.00%	0.1633	0.1782	0.0183	0.2650	0.2000	0.2000	0.2000	0.1000	0.2000	0.0500	0.1000	0.0000	-2.4486	0.0327	0.49459	0.00092	NR	NR	Normal	4	No
Extremes Excluded	MW-32	Fluoride	mg/L	5	5	100.00%	0.2000	0.2000	0.0000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.0500	0.1000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-26	Gross Alpha	pCi/L	7	7	100.00%	3.0429	2.8290	1.1559	5.3547	2.2000	2.8000	4.3000	1.3000	4.5000	1.0000	11.000	2.1000	-0.4481	0.5815	0.89545	0.30431	0.82509	0.07186	Nonparametric	15	No
All	MW-32	Gross Alpha	pCi/L	7	7	100.00%	2.0429	1.8882	0.7850	3.6128	1.0000	2.3000	2.5000	1.0000	3.1000	1.0000	11.000	2.1000	-0.4481	0.5815	0.89545	0.30431	0.82509	0.07186	Nonparametric	15	No
All	MW-12	Iron	ug/L	3	6	50.00%	66.500	38.893	97.433	264.37	15.000	35.500	50.000	15.000	263.00	10.000	100.00	251.00	2.3207	17.961	0.63101	0.00107	NR	NR	normal	11000	No
All	MW-18	Iron	ug/L	6	6	100.00%	144.67	86.583	162.43	469.52	56.000	61.000	230.00	20.000	440.00	1.0000	100.00	420.00	1.5802	129.97	0.77260	0.03285	NR	NR	normal	11000	No
All	MW-18	Manganese	ug/L	7	7	100.00%	201.43	110.33	228.44	658.31	77.000	100.00	350.00	10.000	660.00	0.2000	100.00	650.00	1.7210	169.23	0.77081	0.02082	NR	NR	normal	800	No
All	MW-32	Molybdenum	ug/L	5	6	83.33%	13.833	13.533	3.3116	20.457	13.000	13.000	14.000	10.000	20.000	1.0000	100.00	10.000	1.4575	2.0498	0.82121	0.08311	0.67096	0.22645	Nonparametric	40	No
Extremes Excluded	MW-32	Molybdenum	ug/L	5	5	100.00%	12.600	12.520	1.5166	15.633	13.000	13.000	13.000	10.000	14.000	1.0000	100.00	4.0000	-1.7488	1.3293	0.76825	0.04354	NR	NR	normal	40	No
All	MW-15	Nitrate/Nitrite	mg/L	4	6	66.67%	0.6317	0.3223	0.7521	2.1358	0.1400	0.3000	1.0000	0.0500	2.0000	0.0100	0.3000	1.9500	1.5540	0.6018	0.80929	0.07113	0.98382	0.96890	Nonparametric	10	No
Extremes Excluded	MW-19	Nitrate/Nitrite	mg/L	7	7	100.00%	2.1443	2.1368	0.1976	2.5396	2.0000	2.0100	2.3000	2.0000	2.5000	0.0100	0.3000	0.5000	1.1341	0.1464	0.79143	0.03367	NR	NR	Normal	10	No
All	MW-26	Nitrate/Nitrite	mg/L	3	6	50.00%	0.1083	0.0891	0.0736	0.2555	0.0500	0.0750	0.2000	0.0500	0.2000	0.0100	0.3000	0.1500	0.7107	0.0589	0.75467	0.02212	NR	NR	Normal	10	No
All	MW-3	Nitrate/Nitrite	mg/L	5	7	71.43%	0.1814	0.1452	0.1180	0.4173	0.0500	0.2000	0.2000	0.0500	0.4000	0.0100	0.3000	0.3500	0.8415	0.0874	0.85887	0.14788	0.83227	0.08408	Nonparametric	10	No
All	MW-26	PH	PH	5	5	100.00%	7.3580	7.3562	0.1843	7.7266	7.2400	7.2900	7.4200	7.1900	7.6500	0.0100	0.0100	0.4600	1.2269	0.1616	0.89731	0.39517	0.90140	0.41770	Nonparametric	6.5-8.5	No
All	MW-32	PH	PH	4	4	100.00%	7.0425	7.0392	0.2494	7.5414	6.8800	6.9700	7.2050	6.8300	7.4000	0.0100	0.0100	0.5700	1.4876	0.2445	0.87887	0.33384	0.88508	0.36077	Nonparametric	6.5-8.5	No
All	MW-26	Sulfate	mg/L	6	6	100.00%	1876.7	1876.4	32.042	1940.7	1850.0	1885.0	1890.0	1830.0	1920.0	1.0000	30.0000	90.000	-0.3141	25.638	0.95396	0.77217	0.95288	0.76356	Nonparametric	none	No
All	MW-32	Sulfate	mg/L	6	6	100.00%	2345.0	2344.5	55.408	2455.8	2310.0	2340.0	2390.0	2270.0	2420.0	1.0000	30.0000	150.00	0.0635	44.334	0.97653	0.93309	0.97681	0.93463	Nonparametric	none	No
All	MW-26	TDS	mg/L	6	6	100.00%	3165.0	3164.7	47.645	3260.3	3130.0	3155.0	3200.0	3110.0	3240.0	10.0000	10.0000	130.00	0.6990	38.123	0.95513	0.78151	0.95701	0.79640	Nonparametric	none	No
All	MW-32	TDS	mg/L	6	6	100.00%	3701.7	3701.0	74.140	3849.9	3680.0	3710.0	3760.0	3570.0	3780.0	10.0000	10.0000	210.00	-1.1870	59.323	0.90237	0.38815	0.89786	0.36143	Nonparametric	none	No
All	MW-32	Unat	ug/L	5	5	100.00%	2.5860	2.46590	0.9681	4.5221	2.05000	2.16000	2.6600	1.83000	4.2300	0.3	1.0	2.4000	1.73627	3.7880	0.809875	0.097294	0.877819	0.299546	Normal	30	No
All	MW-32	Zinc	ug/L	5	6	100.00%	216.33	174.31	138.31	522.93	105.00	151.00	191.00	100.00	591.00	5.0000	100.0000	491.00	2.2618	150.58	0.66764	0.03217	NR	NR	normal	5000	No
Extremes Excluded	MW-32	Zinc	ug/L	5	5	100.00%	140.80	136.41	39.220	219.24	105.00	141.00	167.00	100.00	191.00	5.0000	100.0000	91.000	0.2120	34.377	0.92514	0.56359	0.91764	0.51458	Nonparametric	5000	No

Notes:

Type = All valid records or records with extremes excluded from the calculations
WELL = Monitoring well location
GROUP = Analytical group
PARCODE = Parameter code
DET = Number of detections
N = Number of samples
%Det = Detection rate as a percentage
Mean = Arithmetic mean
Gmean = Geometric mean
SD = Standard deviation
Mean + 2SD = Arithmetic mean plus two standard deviations. (Note: For pH, the values range from plus or minus two standard deviations)
Q25 = 25th percentile of the sample population
Median = 50th percentile of the sample population
Q75 = 75th percentile of the sample population
MinConc = Minimum detected concentration
MaxConc = Maximum detected concentration
MinRL = Minimum reporting limit
MaxRL = Maximum reporting limit
Qrange = Interquartile range
Skew = Measure of skewness of the data distribution; indicates degree of assymetry and direction of the skewness (values greater than 2 indicate significant skew, with negative values indicating left skew, positive values indicating right skew)
95UCL = One-sided 95 percent confidence limit on the arithmetic mea n
W-norm = Shapiro-Wilk score for normality
p-norm = p-value from Shapiro-Wilk test for normality, where p < 0.05 indicates a non-normal distribution
W-log = Shapiro-Wilk score for lognormality
p-log = p-value from Shapiro-Wilk test for lognormality, where p < 0.05 indicates a non-lognormal distribution
Distribution = Type of distribution, based on Shapiro-Wilk test; Normal, Lognormal, and Nonparametric
ug/L = Micrograms per liter
mg/L = Milligrams per liter
pCi/L = Picocuries per liter
TDS = Total dissolved solids
TSS = Total suspended solids
N/A = Not Applicable, due to lack of detections
NR = Not Run; data set contains extremes or was determined to be normally distributed

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Greater Than 8																										
Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
All	MW-1	Arsenic	ug/L	10	55	21.77%	1.5055	1.5303	1.01734	3.5419	0.5000	0.5000	2.5000	0.5000	5.0000	1.0000	100.0000	99.500	6.7225	2.0319	0.13220	0.00000	NR	NR	normal	50	Yes
Extremes Excluded	MW-1	Arsenic	ug/L	7	43	16.28%	1.4302	0.9652	1.3740	4.1782	0.5000	0.5000	2.5000	0.5000	5.0000	1.0000	100.0000	4.5000	1.4017	0.4107	0.70360	0.00000	NR	NR	normal	50	No
All	MW-11	Arsenic	ug/L	12	38	31.58%	2.1674	1.1147	3.6381	9.5935	0.5000	0.7500	2.5000	0.5000	18.000	1.0000	100.0000	17.500	3.5047	1.1815	0.49440	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-11	Arsenic	ug/L	10	36	27.78%	1.4028	0.9872	1.2807	3.9642	0.5000	0.5000	2.5000	0.5000	5.0000	1.0000	100.0000	4.5000	1.4279	0.4184	0.72662	0.00000	NR	NR	normal	50	No
All	MW-12	Arsenic	ug/L	14	37	37.84%	3.3511	1.4234	6.7771	16.906	0.5000	1.0000	3.0000	0.5000	36.000	1.0000	100.0000	35.500	3.9763	2.1837	0.44452	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-12	Arsenic	ug/L	12	35	34.29%	1.8571	1.1993	1.9042	5.6656	0.5000	1.0000	2.5000	0.5000	9.0000	1.0000	100.0000	8.5000	1.9446	0.6309	0.74028	0.00000	NR	NR	normal	50	No
All	MW-14	Arsenic	ug/L	5	28	17.86%	1.1607	0.8309	1.1390	3.4387	0.5000	0.5000	1.7500	0.5000	5.0000	1.0000	100.0000	4.5000	1.8793	0.4219	0.63979	0.00000	NR	NR	normal	50	No
All	MW-15	Arsenic	ug/L	5	22	22.73%	3.6818	1.1920	10.440	24.561	0.5000	0.5000	2.5000	0.5000	50.000	1.0000	100.0000	49.500	4.5554	4.3624	0.51850	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-15	Arsenic	ug/L	5	21	23.81%	1.4762	0.9977	1.4359	4.3481	0.5000	0.5000	2.5000	0.5000	5.0000	1.0000	100.0000	4.5000	1.5085	0.6141	0.70737	0.00003	NR	NR	normal	50	No
All	MW-17	Arsenic	ug/L	2	12	16.67%	1.7500	1.0079	2.4478	6.6457	0.5000	0.5000	2.5000	0.5000	9.0000	1.0000	100.0000	8.5000	2.7450	1.3633	0.57850	0.00007	NR	NR	normal	50	No
Extremes Excluded	MW-17	Arsenic	ug/L	1	11	9.09%	1.0909	0.8260	0.9170	2.9249	0.5000	0.5000	2.5000	0.5000	2.5000	1.0000	100.0000	2.0000	1.1013	0.5419	0.63276	0.00007	NR	NR	normal	50	No
All	MW-18	Arsenic	ug/L	0	10	0.00%	1.3000	0.9518	1.0328	3.3656	0.5000	0.5000	2.5000	0.5000	2.5000	1.0000	100.0000	2.0000	0.4841	0.6401	0.64049	0.00017	NR	NR	normal	50	No
All	MW-19	Arsenic	ug/L	0	10	0.00%	1.3000	0.9518	1.0328	3.3656	0.5000	0.5000	2.5000	0.5000	2.5000	1.0000	100.0000	2.0000	0.4841	0.6401	0.64049	0.00017	NR	NR	normal	50	No
All	MW-2	Arsenic	ug/L	13	36	36.11%	3.2381	1.5491	5.9335	15.103	0.5000	2.0000	2.5000	0.5000	32.000	1.0000	100.0000	31.500	3.5544	1.9303	0.43523	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-2	Arsenic	ug/L	11	34	32.35%	1.9265	1.3163	1.7239	5.3742	0.5000	2.0000	2.5000	0.5000	8.0000	1.0000	100.0000	7.5000	1.6358	0.5794	0.79178	0.00002	NR	NR	normal	50	No
All	MW-3	Arsenic	ug/L	17	42	40.48%	4.3571	1.7356	8.0674	20.532	0.5000	1.5000	5.0000	0.5000	46.000	1.0000	100.0000	45.500	3.9229	2.4459	0.50924	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-3	Arsenic	ug/L	15	40	37.50%	2.8000	1.4961	3.2988	9.3976	0.5000	1.0000	3.5000	0.5000	12.000	1.0000	100.0000	11.500	1.6169	1.0223	0.72354	0.00000	NR	NR	normal	50	No
All	MW-5	Arsenic	ug/L	17	45	37.78%	2.5533	1.4031	3.7377	10.029	0.5000	1.0000	2.5000	0.5000	19.000	1.0000	100.0000	18.500	3.4031	1.0921	0.51556	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-5	Arsenic	ug/L	15	43	34.88%	1.8140	1.2508	1.6331	5.0801	0.5000	1.0000	2.5000	0.5000	6.0000	1.0000	100.0000	5.5000	1.4193	0.4881	0.76699	0.00000	0.83996	0.00003	Lognormal	50	No
All	MW-1	Beryllium	ug/L	0	15	0.00%	4.6733	0.6878	13.967	32.608	0.5000	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	3.7556	7.6352	0.37103	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-1	Beryllium	ug/L	0	14	0.00%	1.4000	0.6612	1.9552	5.3103	0.5000	0.5000	0.5000	0.1000	5.0000	0.2000	110.00	4.9000	1.5477	1.0242	0.56664	0.00002	NR	NR	normal	4	No
All	MW-11	Beryllium	ug/L	1	19	5.26%	30.032	1.4591	114.24	259.35	0.2500	0.5000	5.0000	0.1000	500.00	0.2000	110.00	499.90	4.2792	51.359	0.28250	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-11	Beryllium	ug/L	0	17	0.00%	1.9912	0.6361	2.2936	6.5784	0.2500	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	0.6675	1.0903	0.64880	0.00003	NR	NR	normal	4	No
All	MW-12	Beryllium	ug/L	6	38	0.00%	5.2139	1.1950	12.631	30.477	0.5000	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	4.0159	5.8353	0.38088	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-12	Beryllium	ug/L	0	17	0.00%	2.2853	1.0357	2.3441	6.9734	0.5000	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	0.3859	1.1143	0.66587	0.00005	NR	NR	normal	4	No
All	MW-14	Beryllium	ug/L	0	20	0.00%	4.7050	1.0812	12.000	28.705	0.2500	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	4.2187	5.2311	0.37020	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-14	Beryllium	ug/L	0	19	0.00%	2.0579	0.8621	2.3115	6.6808	0.2500	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	0.5652	1.0393	0.65080	0.00002	NR	NR	normal	4	No
All	MW-15	Beryllium	ug/L	0	17	0.00%	5.0647	1.1024	13.042	31.150	0.2500	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	3.9415	6.1929	0.38444	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-15	Beryllium	ug/L	0	16	0.00%	1.9438	0.8634	2.1956	6.3349	0.2500	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	0.7354	1.0758	0.68675	0.00012	NR	NR	normal	4	No
All	MW-17	Beryllium	ug/L	0	11	0.00%	6.5773	1.0272	19.202	44.981	0.2500	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	3.2134	9.5747	0.44223	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-17	Beryllium	ug/L	0	10	0.00%	1.7350	0.6899	2.2570	6.2489	0.2500	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	1.0217	1.3989	0.64140	0.00017	NR	NR	normal	4	No
All	MW-18	Beryllium	ug/L	0	10	0.00%	7.2500	1.2098	16.939	41.078	0.2500	0.5000	5.0000	0.2500	55.000	0.2000	110.00	54.750	3.0345	10.499	0.45292	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-18	Beryllium	ug/L	0	9	0.00%	1.8889	0.7916	2.3356	6.5900	0.2500	0.5000	5.0000	0.2500	5.0000	0.2000	110.00	4.7500	0.8499	1.5259	0.64406	0.00031	NR	NR	normal	4	No
All	MW-19	Beryllium	ug/L	0	10	0.00%	7.2500	1.2098	16.939	41.078	0.2500	0.5000	5.0000	0.2500	55.000	0.2000	110.00	54.750	3.0345	10.499	0.45292	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-19	Beryllium	ug/L	0	9	0.00%	1.8889	0.7916	2.3356	6.5900	0.2500	0.5000	5.0000	0.2500	5.0000	0.2000	110.00	4.7500	0.8499	1.5259	0.64406	0.00031	NR	NR	normal	4	No
All	MW-2	Beryllium	ug/L	6	12	0.00%	6.1042	1.1092	15.534	37.172	0.3750	0.5000	5.0000	0.2500	55.000	0.2000	110.00	54.750	3.3560	8.7889	0.41980	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-2	Beryllium	ug/L	0	11	0.00%	1.6591	0.7755	2.1485	5.9580	0.2500	0.5000	5.0000	0.2500	5.0000	0.2000	110.00	4.7500	1.1793	1.2696	0.61045	0.00003	NR	NR	normal	4	No
All	MW-3	Beryllium	ug/L	0	17	0.00%	5.2235	1.1961	13.020	31.236	0.5000	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	3.5208	6.1852	0.38929	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-3	Beryllium	ug/L	0	16	0.00%	2.1156	0.9415	2.3105	6.7368	0.3750	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	0.5621	1.1322	0.65859	0.00006	NR	NR	normal	4	No
All	MW-32	Beryllium	ug/L	1	13	7.69%	0.4308	0.2993	0.6518	1.7343	0.2500	0.2500	0.2500	0.2500	2.6000	0.2000	110.00	2.3500	3.6056	0.3543	0.31101	0.00000	NR	NR	normal	4	No
All	MW-5	Beryllium	ug/L	0	18	0.00%	5.2139	1.1950	12.631	30.477	0.5000	0.5000	5.0000	0.1000	55.000	0.2000	110.00	54.900	4.0159	5.8353	0.38088	0.00000	NR	NR	normal	4	Yes
Extremes Excluded	MW-5	Beryllium	ug/L	0	17	0.00%	2.2853	1.0387	2.3441	6.9734	0.5000	0.5000	5.0000	0.1000	5.0000	0.2000	110.00	4.9000	0.3859	1.1143	0.66587	0.00005	NR	NR	normal	4	No
All	MW-1	Cadmium	ug/L	2	21	9.52%	1.6929	0.9757	1.6424	4.9776	0.5000	1.0000	2.5000	0.0500	5.0000	0.0500	50.000	4.9500	1.1001	0.7024	0.79627	0.00058	NR	NR	Normal	5	No
All	MW-11	Cadmium	ug/L	4	20	20.00%	1.6675	0.8561	1.8384	5.3442	0.2500	0.5000	2.5000	0.1000	6.0000	0.0500	50.000	5.9000	1.2414	0.8057	0.77425	0.00037	NR	NR	Normal	5	No
All	MW-12	Cadmium	ug/L	3	19	15.79%	1.7821	0.9502	1.8329	5.4479	0.5000	1.0000	2.5000	0.0500	6.0000	0.0500	50.000	5.9500	1.1712	0.8242	0.80640	0.00142	NR	NR	Normal	5	No
All	MW-14	Cadmium	ug/L	6	18	33.33%	1.8244	1.4410	1.1515	4.1275	1.1000	1.8500	2.5000	0.2500	5.0000	0.0500	50.000	4.7500	0.9704	0.5320	0.87080	0.01834	NR	NR	Normal	5	No
All	MW-15	Cadmium	ug/L	0	17	0.00%	1.5324	0.7808	1.6362	4.8048	0.2500	0.5000	2.5000	0.0500	5.0000	0.0500	50.000	4.9500	1.1438	0.7778	0.77011	0.00081	NR	NR	Normal	5	No
All	MW-17	Cadmium	ug/L	1	10	10.00%	1.5460	0.9479	1.5508	4.6476	0.5000	0.7300	2.5000	0.2500	5.0000	0.0500	50.000	4.7500	1.3340	0.9612	0.79875	0.01400	NR	NR	Normal	5	No
All	MW-18	Cadmium	ug/L	0	10	0.00%	1.4500	0.7731	1.6150	4.6801	0.2500	0.5000	2.5000	0.2500	5.0000	0.0500	50.000	4.7500	1.3051	1.0010	0.76001	0.00473	NR	NR	Normal	5	No
All	MW-19	Cadmium	ug/L	0	10	0.00%	1.4500	0.7731	1.6150	4.6801	0.2500	0.5000	2.5000	0.2500	5.0000	0.0500	50.000	4.7500	1.3051	1.0010	0.76001	0.00473	NR	NR	Normal	5	No
All	MW-2	Cadmium	ug/L	4	19	21.05%	4.9347	1.6478	11.250	27.495	0.5000	2.0000	5.0000	0.2500	59.000	0.0500	50.000	49.750	3.9451	5.0596	0.43020	0.00000	NR	NR	Normal	5	No
Extremes Excluded	MW-2	Cadmium	ug/L	4	18	22.22%	2.4944	1.3632	2.8716	8.2377	0.5000	1.5000	2.5000	0.2500	11.000	0.0500	50.000	10.750	1.8681	1.3266	0.76105	0.00045	NR	NR	Normal	5	No
All	MW-3	Cadmium	ug/L	7	21	33.33%	3.6481	1.0777	4.4435	12.553	0.5000	2.5000	4.0000	0.5000	15.000	0.0500	50.000	14.500	1.8059	1.9005	0.69339	0.00002	NR	NR	Normal	5	No
Extremes Excluded	MW-3	Cadmium	ug/L	6	20	30.00%	3.0805	1.7871	3.6963	10.473	0.5000	2.5000	3.2500	0.5000	14.000	0.0500	50.000	13.500	2.2028	1.6199	0.66369	0.00002	NR	NR	Normal	5	No
All	MW-5	Cadmium	ug/L	3	25	12.00%	4.0720	1.3348	9.7791	23.630	0.5000	2.5000	2.5000	0.0500	50.000	0.0500	50.000	49.950	4.6967	3.8534	0.30458	0.00000	NR	NR	Normal	5	No
Extremes Excluded	MW-5	Cadmium	ug/L	3	24	12.50%	2.1583	1.1925	2.0630	6.2844	0.5000	2.5000	2.5000	0.0500	7.0000	0.0500	50.000	6.9500	1.1596	0.8254	0.82075	0.00066	NR	NR	Normal	5	No
All	MW-1	Chromium	ug/L	0	15	0.00%	11.533	7.1070	10.173	31.878	5.0000	5.0000	25.000	0.5000	25.000	1.0000	100.00	24.500	0.6045	5.1479	0.74229	0.00073	NR	NR	normal	100	No
All	MW-11	Chromium	ug/L	1	15	6.67%	16.033	10.269	13.145	42.324	5.0000	12.500	25.000	0.5000	50.000	1.0000	100.00	49.500	1.1678	6.6524	0.86351	0.02713	NR	NR	normal	100	No
All	MW-12	Chromium	ug/L	0	12	0.00%	17.542	12.294	9.7479	37.037	8.7500	25.000	25.000	0.5000	25.000	1.0000	100.00	24.500	-0.7357	5.5153	0.74448	0.00234	NR	NR	normal	100	No
All	MW-14	Chromium	ug/L	1	13	7.69%	17.923	12.100	13.127	44.178	10.000	12.500	25.000	0.5000	50.000	1.0000	100.00	49.500	1.0534	7.1360	0.87788	0.06676	0.81716	0.01098	Lognormal	100	No
All	MW-15	Chromium	ug/L	0	10	0.00%	11.000	8.8809	8.0104	27.021	5.0000	7.5000	12.500	5.0000	25.000	1.0000	100.00	20.000	1.1926	4.9648	0.74791	0.00337	NR	NR	normal	100	No
All	MW-2	Chromium	ug/L	0	12	0.00%	10.833	8.0700	8.9400	28.713	5.0000	5.0000	18.750	2.5000	25.000	1.0000	100.00	22.500	1.0327	5.0582	0.72882	0.00162	NR	NR	normal	100	No
All	MW-3	Chromium	ug/L	0	14	0.00%	16.786	12.128	13.172	43.129	5.0000	12.500	25.000	2.5000	50.000	1.0000	100.00	47.500	1.1669	6.8995	0.83865	0.01563	NR	NR	normal	100	No
All	MW-5	Chromium	ug/L	0	18	0.00%	13.222	8.7645	10.065	33.352	5.0000	8.7500	25.000	0.5000	25.000	1.0000	100.00	24.500	0.2760	4.6496	0.76049	0.00044	NR	NR	normal	100	No

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Greater Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
All	MW-1	Copper	ug/L	3	15	20.00%	6.2333	5.8137	2.4558	11.145	5.0000	5.0000	10.000	2.5000	10.000	5.0000	100.0000	7.5000	0.8059	1.2428	0.72732	0.00049	NR	NR	normal	1300	No
All	MW-11	Copper	ug/L	1	12	8.33%	6.2583	5.5368	3.7867	13.762	5.0000	5.0000	5.0000	2.5000	17.000	5.0000	100.0000	14.500	2.5002	2.1425	0.50413	0.00033	NR	NR	normal	1300	No
Extremes Excluded	MW-11	Copper	ug/L	0	9	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-12	Copper	ug/L	0	10	0.00%	5.5000	5.3569	1.5811	8.6622	5.0000	5.0000	5.0000	5.0000	10.000	5.0000	100.0000	5.0000	3.1623	0.9890	0.38572	0.00000	NR	NR	normal	1300	No
Extremes Excluded	MW-12	Copper	ug/L	0	9	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-14	Copper	ug/L	1	10	10.00%	5.5000	5.2589	1.5811	8.6328	5.0000	5.0000	5.0000	5.0000	10.000	5.0000	100.0000	5.0000	3.1623	0.9890	0.38572	0.00000	NR	NR	normal	1300	No
Extremes Excluded	MW-14	Copper	ug/L	0	9	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-2	Copper	ug/L	5	12	41.67%	10.917	8.5948	8.0955	27.108	5.0000	5.0000	20.000	5.0000	26.000	5.0000	100.0000	21.000	0.8696	4.5804	0.72411	0.00145	NR	NR	normal	1300	No
All	MW-3	Copper	ug/L	5	14	35.71%	17.214	9.2109	26.036	69.286	5.0000	5.0000	30.000	5.0000	100.00	5.0000	100.0000	95.000	2.8263	13.638	0.53945	0.00001	NR	NR	Normal	1300	No
All	MW-5	Copper	ug/L	4	15	26.67%	8.0000	6.9096	5.2780	18.556	5.0000	5.0000	10.000	5.0000	20.000	5.0000	100.0000	15.000	1.7994	2.6710	0.62002	0.00004	NR	NR	normal	1300	No
All	MW-11	Gross Alpha	pCi/L	12	26	46.15%	6.1885	2.2643	7.9975	22.183	0.5000	1.7000	10.000	0.5000	33.000	1.0000	11.000	32.500	1.7596	3.0741	0.74562	0.00002	NR	NR	Normal	15	No
All	MW-11	Iron	ug/L	3	13	23.08%	270.09	29.574	577.67	2025.8	15.000	15.000	15.000	15.000	3150.0	1.0000	100.00	3135.0	3.6979	477.20	0.32916	0.00000	NR	NR	normal	11000	No
Extremes Excluded	MW-11	Iron	ug/L	1	11	9.09%	17.636	16.927	6.2012	30.039	15.000	15.000	15.000	15.000	34.000	1.0000	100.00	19.000	2.3659	3.6646	0.50646	0.00000	NR	NR	normal	11000	No
All	MW-14	Iron	ug/L	2	9	22.22%	133.11	30.016	325.84	784.80	15.000	15.000	25.000	15.000	1000.0	1.0000	100.00	985.00	2.9739	212.58	0.42231	0.00000	NR	NR	normal	11000	No
All	MW-2	Iron	ug/L	5	11	45.45%	58.636	32.804	72.667	203.97	15.000	25.000	100.00	10.000	220.00	1.0000	100.00	210.00	1.6346	42.943	0.68868	0.00033	NR	NR	normal	11000	No
All	MW-1	Lead	ug/L	0	15	0.00%	25.100	5.5399	62.943	151.99	0.5000	5.0000	25.000	0.5000	250.00	1.0000	500.00	249.50	3.6004	31.853	0.42091	0.00000	NR	NR	normal	15	Yes
Extremes excluded	MW-1	Lead	ug/L	0	14	0.00%	10.107	3.4089	11.618	33.342	0.5000	3.7500	25.000	0.5000	25.000	1.0000	500.00	24.500	0.6146	6.0856	0.66978	0.00029	NR	NR	normal	15	No
All	MW-11	Lead	ug/L	3	20	15.00%	7.9250	1.8073	11.460	30.844	0.5000	0.5000	22.500	0.5000	29.000	1.0000	500.00	28.500	0.9960	5.0223	0.63217	0.00001	NR	NR	normal	15	No
All	MW-12	Lead	ug/L	0	13	0.00%	10.423	3.0417	12.060	34.544	0.5000	2.5000	25.000	0.5000	25.000	1.0000	500.00	24.500	0.5035	6.5560	0.67427	0.00031	NR	NR	normal	15	No
All	MW-14	Lead	ug/L	0	12	0.00%	10.708	2.5520	12.616	35.940	0.5000	0.5000	25.000	0.5000	25.000	1.0000	500.00	24.500	0.3884	7.1379	0.63959	0.00023	NR	NR	normal	15	No
All	MW-2	Lead	ug/L	0	11	0.00%	12.545	4.9708	12.028	36.601	0.5000	5.0000	25.000	0.5000	25.000	1.0000	500.00	24.500	0.1552	7.1080	0.71411	0.00071	NR	NR	normal	15	No
All	MW-3	Lead	ug/L	0	13	0.00%	14.115	5.3386	12.292	38.699	0.5000	25.000	25.000	0.5000	25.000	1.0000	500.00	24.500	-0.2033	6.6818	0.67693	0.00033	NR	NR	normal	15	No
All	MW-32	Lead	ug/L	3	13	23.08%	1.8462	0.7705	4.2708	10.388	0.5000	0.5000	0.5000	0.5000	16.000	1.0000	500.00	15.500	3.5537	2.3216	0.36279	0.00000	NR	NR	normal	15	No
Extremes excluded	MW-32	Lead	ug/L	0	10	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	NA	NA	NA	NA	NA	NA	NA	15	No
All	MW-5	Lead	ug/L	6	17	0.00%	25.912	5.2008	56.963	139.72	0.5000	5.0000	25.000	0.5000	250.00	1.0000	500.00	249.50	3.8547	26.002	0.41540	0.00000	NR	NR	normal	15	Yes
Extremes excluded	MW-5	Lead	ug/L	0	16	0.00%	11.906	4.0828	12.013	35.932	0.5000	5.0000	25.000	0.5000	25.000	1.0000	500.00	24.500	0.2338	5.8862	0.69265	0.00014	NR	NR	normal	15	No
All	MW-15	Manganese	ug/L	2	8	25.00%	120.00	0.0473	351.35	822.69	2.7500	5.0000	8.0000	0.5000	1000.0	0.2000	100.00	999.50	2.8279	243.59	0.42647	0.00230	NR	NR	normal	800	No
Extremes Excluded	MW-15	Manganese	ug/L	1	7	14.29%	4.5714	2.8985	3.5406	11.653	0.5000	5.0000	5.0000	0.5000	11.000	0.2000	100.00	10.500	0.6887	2.6229	0.83107	0.08190	0.75283	0.01358	Lognormal	800	No
All	MW-1	Mercury	ug/L	0	16	0.00%	3.3761	0.3015	12.424	28.225	0.1000	0.2500	0.5000	0.1000	50.000	0.0003	100.00	49.900	3.9367	6.0924	0.23044	0.00000	NR	NR	normal	2	Yes
Extremes Excluded	MW-1	Mercury	ug/L	0	15	0.00%	0.2700	0.2168	0.1771	0.6242	0.1000	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	0.4867	0.0896	0.76750	0.00145	NR	NR	normal	2	No
All	MW-11	Mercury	ug/L	1	15	6.67%	3.8133	0.3508	12.853	29.290	0.1000	0.2500	0.5000	0.1000	50.000	0.0003	100.00	49.900	3.8720	6.4915	0.26402	0.00000	NR	NR	normal	2	Yes
Extremes Excluded	MW-11	Mercury	ug/L	1	14	7.14%	0.3500	0.2537	0.1653	0.6305	0.1500	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	0.2386	0.0865	0.80685	0.00607	NR	NR	normal	2	No
All	MW-12	Mercury	ug/L	0	12	0.00%	4.4667	0.4269	14.346	33.157	0.2500	0.3750	0.5000	0.1000	50.000	0.0003	100.00	49.900	3.4635	8.1156	0.33681	0.00000	NR	NR	normal	2	Yes
Extremes Excluded	MW-12	Mercury	ug/L	0	11	0.00%	0.3273	0.2769	0.1737	0.6747	0.1500	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	-0.1088	0.1027	0.79219	0.00743	NR	NR	normal	2	No
All	MW-14	Mercury	ug/L	0	13	0.00%	0.3231	0.2835	0.1549	0.6330	0.2500	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	0.0833	0.0842	0.79263	0.00558	NR	NR	normal	2	No
All	MW-15	Mercury	ug/L	6	18	0.00%	5.7556	0.3554	16.592	38.940	0.1000	0.2500	0.2500	0.1000	50.000	0.0003	100.00	49.900	2.9937	10.840	0.59654	0.00000	NR	NR	normal	2	Yes
Extremes Excluded	MW-15	Mercury	ug/L	0	8	0.00%	0.2250	0.1933	0.1336	0.4923	0.1000	0.2500	0.2500	0.1000	0.5000	0.0003	100.00	0.4000	1.1973	0.0926	0.79751	0.02892	NR	NR	normal	2	No
All	MW-2	Mercury	ug/L	0	11	0.00%	0.2146	0.0871	0.1692	0.5529	0.1000	0.2500	0.2500	0.0002	0.5000	0.0003	100.00	0.4999	0.6310	0.1000	0.89011	0.13951	0.68851	0.00033	Lognormal	2	No
All	MW-3	Mercury	ug/L	0	14	0.00%	0.2786	0.1451	0.1868	0.6521	0.1000	0.2500	0.5000	0.0002	0.5000	0.0003	100.00	0.4999	0.1352	0.0978	0.83475	0.01388	NR	NR	normal	2	No
All	MW-5	Mercury	ug/L	1	16	6.25%	3.1863	0.2305	12.665	27.316	0.1000	0.2500	0.5000	0.0002	50.000	0.0002	100.00	50.000	4.1216	5.7855	0.27454	0.00000	NR	NR	normal	2	Yes
Extremes Excluded	MW-5	Mercury	ug/L	1	15	6.25%	0.2594	0.1420	0.1818	0.6231	0.1000	0.2500	0.5000	0.0002	0.5000	0.0003	100.00	0.4999	0.3887	0.0891	0.82992	0.00700	NR	NR	normal	2	No
All	MW-1	Molybdenum	ug/L	3	20	15.00%	24.625	11.069	22.257	69.139	3.7500	17.500	50.000	0.5000	50.000	1.0000	100.00	49.500	0.2106	9.7543	0.75451	0.00020	NR	NR	normal	40	No
All	MW-11	Molybdenum	ug/L	3	19	15.79%	17.632	6.7736	20.617	58.866	2.5000	5.0000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.9487	9.2706	0.71484	0.00008	NR	NR	normal	40	No
All	MW-12	Molybdenum	ug/L	2	16	12.50%	25.031	10.574	23.182	71.394	3.7500	15.000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.1722	11.359	0.72662	0.00034	NR	NR	normal	40	No
All	MW-14	Molybdenum	ug/L	4	16	25.00%	21.781	11.663	20.565	62.910	5.0000	15.000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.6203	10.076	0.76508	0.00097	NR	NR	normal	40	No
All	MW-15	Molybdenum	ug/L	5	15	33.33%	17.200	6.8612	18.497	54.194	1.0000	5.0000	30.000	0.5000	50.000	1.0000	100.00	49.500	0.8028	9.3606	0.81284	0.00540	NR	NR	normal	40	No
All	MW-17	Molybdenum	ug/L	1	11	9.09%	20.727	7.4469	23.353	67.434	2.0000	5.0000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.6172	13.801	0.69976	0.00046	NR	NR	normal	40	No
All	MW-18	Molybdenum	ug/L	1	10	10.00%	18.250	7.7496	22.044	62.339	5.0000	5.0000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.9888	13.663	0.67786	0.00048	NR	NR	normal	40	No
All	MW-19	Molybdenum	ug/L	2	10	20.00%	18.800	9.4143	21.643	62.085	5.0000	6.0000	50.000	1.0000	50.000	1.0000	100.00	49.000	0.9952	13.414	0.67277	0.00041	NR	NR	normal	40	No
All .	MW-2	Molybdenum	ug/L	3	17	17.65%	21.029	9.7138	20.705	62.440	5.0000	10.000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.5988	9.8424	0.77857	0.00105	NR	NR	normal	40	No
All	MW-3	Molybdenum	ug/L	3	21	14.29%	39.035	12.665	83.745	166.90	5.0000	25.000	50.000	0.5000	300.00	1.0000	100.00	299.50	3.0834	27.284	0.51202	0.00000	NR	NR	normal	40	No
Extremes Excluded	MW-3	Molybdenum	ug/L	2	20	10.00%	26.375	10.812	22.900	72.175	5.0000	25.000	50.000	0.5000	50.000	1.0000	100.00	49.500	0.0074	10.036	0.73365	0.00010	NR	NR	normal	40	No
All	MW-5	Molybdenum	ug/L	1	24	4.17%	24.604	9.5081	22.798	70.201	3.7500	17.500	50.000	0.5000	50.000	1.0000	100.00	49.500	0.1723	9.1210	0.73382	0.00003	NR	NR	normal	40	No
All	MW-1	Nickel	ug/L	2	22	9.09%	16.636	11.422	9.7262	36.089	10.000	25.000	25.000	0.5000	25.000	1.0000	50.0000	24.500	-0.4310	4.0643	0.74865	0.00009	NR	NR	normal	100	No
All	MW-11	Nickel	ug/L	2	50	3.92%	21.192	17.058	7.9250	37.042	25.000	25.000	25.000	0.5000	30.000	1.0000	50.0000	29.500	-1.6878	2.0053	0.56913	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-11	Nickel	ug/L	0	46	0.00%	25.000	25.000	0.0000	25.000	25.000	25.000	25.000	25.000	25.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-12	Nickel	ug/L	2	50	3.57%	31.000	21.049	52.595	135.70	25.000	25.000	25.000	0.5000	280.00	1.0000	50.0000	249.50	3.9474	15.700	0.32926	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-12	Nickel	ug/L	0	43	0.00%	25.000	25.000	0.0000	25.000	25.000	25.000	25.000	25.000	25.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-14	Nickel	ug/L	3	59	5.17%	25.862	19.454	30.624	87.111	25.000	25.000	25.000	0.5000	259.00	1.0000	50.0000	249.50	6.9365	7.9320	0.24511	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-14	Nickel	ug/L	0	44	0.00%	25.000	25.000	0.0000	25.000	25.000	25.000	25.000	25.000	25.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-15	Nickel	ug/L	3	58	5.17%	20.631	19.178	42.826	115.34	25.000	25.000	25.000	0.5000	259.00	1.0000	50.0000	249.50	4.9128	11.022	0.30565	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-15	Nickel	ug/L	0	43	0.00%	25.000	25.000	0.0000	25.000	25.000	25.000	25.000	25.000	25.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-17	Nickel	ug/L	2	41	4.88%	245.80	21.425	1431.6	3048.5	25.000	25.000	25.000	0.5000	6000.0	1.0000	50.0000	5999.5	6.3964	429.09	0.16295	0.00000	NR	NR	normal	100	Yes
Extremes Excluded	MW-17	Nickel	ug/L	0	31	0.00%	25.000	25.000	0.0000	25.000	25.000	25.000	25.000	25.000	25.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-18	Nickel	ug/L	1	10	10.00%	13.000	10.692	8.5635	30.127	5.0000	10.000	25.000	5.0000	25.000	1.0000	50.0000	20.000	0.7829	5.3076	0.75622	0.00425	NR	NR	normal	100	No

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Greater Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
All	MW-19	Nickel	ug/L	0	10	0.00%	12.550	8.4932	9.1301	30.810	5.0000	10.000	25.000	0.5000	25.000	1.0000	50.0000	24.500	0.5680	5.6588	0.82792	0.03158	NR	NR	normal	100	No
All	MW-2	Nickel	ug/L	2	20	10.00%	16.550	11.319	9.5213	35.593	10.000	22.500	25.000	0.5000	25.000	1.0000	50.0000	24.500	-0.4527	4.1728	0.77725	0.00040	NR	NR	normal	100	No
All	MW-3	Nickel	ug/L	5	21	23.81%	21.857	19.995	9.1885	40.234	14.000	25.000	25.000	10.000	50.000	1.0000	50.0000	40.000	0.9878	3.9299	0.72960	0.00007	NR	NR	normal	100	No
All	MW-5	Nickel	ug/L	0	50	0.00%	37.950	17.109	329.23	702.37	25.000	25.000	25.000	0.5000	2500.0	1.0000	50.0000	2498.5	7.7376	81.019	0.12265	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-5	Nickel	ug/L	0	46	0.00%	25.000	25.000	0.0000	25.000	25.000	25.000	25.000	25.000	25.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-11	Nitrate/Nitrite	mg/L	0	10	0.00%	0.0305	0.0189	0.1131	0.2568	0.0050	0.0050	0.0050	0.0050	0.4000	0.0100	0.3000	0.3950	3.0840	0.0701	0.44571	0.00000	NR	NR	Normal	10	No
Extremes Excluded	MW-11	Nitrate/Nitrite	mg/L	0	8	0.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-14	Nitrate/Nitrite	mg/L	0	10	0.00%	0.0305	0.0189	0.1131	0.2568	0.0050	0.0050	0.0050	0.0050	0.4000	0.0100	0.3000	0.3950	3.0840	0.0701	0.44571	0.00000	NR	NR	Normal	10	No
Extremes Excluded	MW-14	Nitrate/Nitrite	mg/L	0	8	0.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-5	Nitrate/Nitrite	mg/L	3	8	37.50%	0.2363	0.1026	0.2275	0.6313	0.0500	0.0500	0.2000	0.0500	1.6200	0.0100	0.3000	0.5500	2.5011	0.2272	0.55914	0.00035	NR	NR	Normal	10	No
Extremes Excluded	MW-5	Nitrate/Nitrite	mg/L	2	7	28.57%	0.0929	0.0743	0.0732	0.2392	0.0500	0.0500	0.2000	0.0500	0.2000	0.0100	0.3000	0.1500	1.2296	0.0542	0.60040	0.00028	NR	NR	Normal	10	No
All	MW-1	Selenium	ug/L	13	47	27.66%	28301	2.9955	140478	310252	0.5000	1.0000	2.5000	0.5000	932000	0.0500	10.000	932000	4.6323	49161	0.26977	0.00000	NR	NR	normal	50	Yes
Extremes Excluded	MW-1	Selenium	ug/L	10	44	22.73%	1.7614	1.2098	1.5756	4.9125	0.5000	1.0000	2.5000	0.5000	5.0000	0.0500	10.000	4.5000	1.1315	0.4655	0.75771	0.00000	NR	NR	normal	50	No
All	MW-11	Selenium	ug/L	8	35	25.71%	4.9571	1.6407	12.949	30.856	0.5000	1.0000	2.5000	0.5000	72.000	0.0500	10.000	71.500	4.3548	4.2630	0.35967	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-11	Selenium	ug/L	6	32	18.75%	1.6406	1.2325	1.2715	4.1836	0.5000	1.0000	2.5000	0.5000	5.0000	0.0500	10.000	4.5000	1.1825	0.4405	0.80731	0.00006	NR	NR	normal	50	No
All	MW-12	Selenium	ug/L	10	55	18.71%	4.4714	2.1877	5.6879	15.847	1.0000	2.5000	5.0000	0.5000	21.000	0.0500	10.000	20.500	1.7185	1.5814	0.71226	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-12	Selenium	ug/L	14	33	42.42%	3.5606	1.9164	4.3888	12.338	1.0000	1.0000	4.0000	0.5000	17.000	0.0500	10.000	16.500	1.9037	1.4974	0.70809	0.00000	NR	NR	normal	50	No
All	MW-14	Selenium	ug/L	7	24	29.17%	1.7292	1.3286	1.3020	4.3332	0.7500	1.0000	2.5000	0.5000	5.0000	0.0500	10.000	4.5000	1.3008	0.5209	0.81897	0.00061	NR	NR	normal	50	No
All	MW-17	Selenium	ug/L	5	12	41.67%	6.8333	2.3904	16.335	37.503	1.0000	2.5000	3.0000	0.5000	55.000	0.0500	10.000	54.500	3.2305	8.6762	0.42182	0.00001	NR	NR	normal	50	No
Extremes Excluded	MW-17	Selenium	ug/L	4	11	36.36%	2.4545	1.7975	2.3607	7.1759	1.0000	2.5000	3.0000	0.5000	9.0000	0.0500	10.000	8.5000	2.4246	1.3950	0.66864	0.00033	NR	NR	normal	50	No
All	MW-18	Selenium	ug/L	4	10	40.00%	3.0500	2.3305	3.9444	11.529	1.0000	2.5000	2.5000	0.5000	11.000	0.0500	10.000	10.500	1.6184	2.4447	0.67143	0.00349	NR	NR	normal	50	No
Extremes Excluded	MW-18	Selenium	ug/L	2	8	25.00%	1.8125	1.5811	0.8425	3.4975	1.0000	2.2500	2.5000	0.5000	2.5000	0.0500	10.000	2.0000	-0.6457	0.5838	0.78542	0.01994	NR	NR	normal	50	No
All	MW-5	Selenium	ug/L	13	46	26.80%	4.8474	1.6313	11.639	28.122	0.5000	1.0000	2.5000	0.5000	61.000	0.0500	10.000	60.500	3.8712	3.4008	0.39712	0.00000	NR	NR	normal	50	No
Extremes Excluded	MW-5	Selenium	ug/L	9	41	21.95%	1.6341	1.2135	1.3230	4.2801	0.5000	1.0000	2.5000	0.5000	5.0000	0.0500	10.000	4.5000	1.2950	0.4050	0.78793	0.00000	NR	NR	normal	50	No
All	MW-1	Silver	ug/L	0	10	0.00%	4.1500	3.3312	1.7955	7.7417	5.0000	5.0000	5.0000	0.5000	5.0000	1.0000	10.000	4.5000	-1.7973	1.1130	0.52332	0.00001	NR	NR	normal	100	No
Extremes Excluded	MW-1	Silver	ug/L	0	8	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-11	Silver	ug/L	1	10	10.00%	3.0500	4.2567	2.2417	9.5333	5.0000	5.0000	5.0000	0.5000	10.000	1.0000	10.000	9.5000	0.3349	1.3394	0.85684	0.00227	NR	NR	normal	100	No
Extremes Excluded	MW-11	Silver	ug/L	0	8	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-12	Silver	ug/L	0	9	0.00%	4.5900	3.8713	1.5090	7.5090	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	4.5000	-3.0000	0.9600	0.38084	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-12	Silver	ug/L	0	8	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-14	Silver	ug/L	0	11	0.00%	4.5909	4.0557	1.3588	7.3045	5.0000	5.0000	5.0000	0.5000	5.0000	1.0000	10.000	4.5000	-3.3166	0.8018	0.34459	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-14	Silver	ug/L	0	10	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-3	Silver	ug/L	0	10	0.00%	4.6060	4.2567	1.2649	7.1298	5.0000	5.0000	5.0000	1.0000	5.0000	1.0000	10.000	4.0000	-3.1625	0.7840	0.36572	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-3	Silver	ug/L	0	9	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-5	Silver	ug/L	0	10	0.00%	4.5909	3.9715	1.4229	7.3368	5.0000	5.0000	5.0000	0.5000	5.0000	1.0000	10.000	4.5000	-3.1623	0.8820	0.36572	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-5	Silver	ug/L	0	9	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-1	Thallium	ug/L	0	9	0.00%	2.4389	1.1635	2.4320	7.3030	0.5000	0.5000	5.0000	0.2000	5.0000	0.4000	100.0000	4.8000	0.2639	1.5889	0.68317	0.00090	NR	NR	normal	2	Yes
All	MW-11	Thallium	ug/L	1	12	8.33%	2.3333	1.0974	2.3629	7.0591	0.2500	0.7500	5.0000	0.2500	5.0000	0.4000	100.0000	4.7500	0.3634	1.3369	0.68364	0.00059	NR	NR	normal	2	Yes
All	MW-12	Thallium	ug/L	0	10	0.00%	2.6700	1.2559	2.4580	7.5860	0.2500	2.7500	5.0000	0.2000	5.0000	0.4000	100.0000	4.8000	-0.0057	1.5235	0.67705	0.00046	NR	NR	normal	2	Yes
All	MW-14	Thallium	ug/L	1	13	7.69%	2.1923	1.0330	2.3188	6.8298	0.2500	0.5000	5.0000	0.2500	5.0000	0.4000	100.0000	4.7500	0.5144	1.2605	0.67586	0.00032	NR	NR	normal	2	Yes
All	MW-15	Thallium	ug/L	0	10	0.00%	7.1750	1.6168	15.224	37.623	0.2500	2.7500	5.0000	0.2500	50.000	0.4000	100.0000	49.750	3.0274	9.4356	0.48851	0.00000	NR	NR	normal	2	Yes
Extremes Excluded	MW-15	Thallium	ug/L	0	9	0.00%	2.4167	1.1043	2.4527	7.3220	0.2500	0.5000	5.0000	0.2500	5.0000	0.4000	100.0000	4.7500	0.2654	1.5024	0.67648	0.00075	NR	NR	normal	2	Yes
All	MW-3	Thallium	ug/L	4	10	40.00%	3.0370	2.2428	2.0857	7.2085	1.1300	3.3000	5.0000	0.5000	5.0000	0.4000	100.0000	4.5000	-0.0565	1.2927	0.72761	0.00191	NR	NR	normal	2	Yes
All	MW-5	Thallium	ug/L	0	11	0.00%	2.4727	1.1551	2.4219	7.3166	0.2500	0.5000	5.0000	0.2000	5.0000	0.4000	100.0000	4.8000	0.2063	1.4312	0.67558	0.00023	NR	NR	normal	2	Yes
All	MW-1	Vanadium	ug/L	0	16	0.00%	75.935	30.088	126.84	382.62	12.550	50.000	50.000	0.5000	500.00	1.0000	500.0000	499.50	2.8934	62.151	0.57257	0.00001	NR	NR	normal	60	Yes
Extremes Excluded	MW-1	Vanadium	ug/L	0	14	0.00%	36.643	21.805	27.363	91.369	10.000	50.000	50.000	0.5000	100.00	1.0000	500.0000	99.500	0.5989	14.333	0.85070	0.02270	NR	NR	normal	60	No
All	MW-11	Vanadium	ug/L	1	14	7.14%	26.643	13.487	28.931	84.505	7.5000	10.000	50.000	0.5000	100.00	1.0000	500.0000	99.500	1.3972	15.155	0.77925	0.00280	NR	NR	normal	60	No
All	MW-12	Vanadium	ug/L	0	12	0.00%	35.875	18.988	29.838	95.552	7.5000	50.000	50.000	0.5000	100.00	1.0000	500.0000	99.500	0.5908	16.882	0.82435	0.01796	NR	NR	normal	60	No
All	MW-14	Vanadium	ug/L	1	13	7.69%	21.000	11.561	20.587	62.174	7.5000	10.000	50.000	0.5000	50.000	1.0000	500.0000	49.500	0.7980	11.191	0.73412	0.00124	NR	NR	normal	60	No
All	MW-15	Vanadium	ug/L	2	9	22.22%	16.111	11.216	16.362	48.476	7.5000	10.000	10.000	5.0000	50.000	1.0000	500.0000	45.000	1.0563	26.839	0.66830	0.00309	NR	NR	normal	60	No
All	MW-2	Vanadium	ug/L	0	13	0.00%	63.269	31.282	94.947	233.16	10.000	50.000	50.000	5.0000	250.00	1.0000	500.0000	245.00	1.9550	43.177	0.63027	0.00012	NR	NR	normal	60	Yes
Extremes Excluded	MW-2	Vanadium	ug/L	0	11	0.00%	29.318	21.437	20.436	70.189	10.000	25.000	50.000	5.0000	50.000	1.0000	500.0000	45.000	0.0291	12.076	0.76450	0.00322	NR	NR	normal	60	No
All	MW-3	Vanadium	ug/L	0	15	0.00%	46.167	27.457	59.551	165.33	7.5000	50.000	50.000	5.0000	250.00	1.0000	500.0000	245.00	3.1665	50.152	0.65002	0.00001	NR	NR	normal	60	No
Extremes Excluded	MW-3	Vanadium	ug/L	0	14	0.00%	31.607	23.477	19.966	71.540	7.5000	37.500	50.000	5.0000	50.000	1.0000	500.0000	45.000	-0.2533	10.459	0.75628	0.00151	NR	NR	normal	60	No
All	MW-5	Vanadium	ug/L	0	15	0.00%	44.335	20.768	53.302	150.71	7.5000	50.000	50.000	0.5000	250.00	1.0000	500.0000	249.50	2.9497	25.316	0.63718	0.00001	NR	NR	normal	60	No
Extremes Excluded	MW-5	Vanadium	ug/L	0	18	0.00%	32.667	18.087	26.911	86.488	7.5000	37.500	50.000	0.5000	100.00	1.0000	500.0000	99.500	0.6772	12.432	0.83694	0.00531	NR	NR	normal	60	No
All	MW-1	Zinc	ug/L	5	13	38.46%	64.692	15.571	155.63	321.97	5.0000	5.0000	20.000	5.0000	450.00	5.0000	100.0000	445.00	2.5495	72.644	0.52532	0.00002	NR	NR	normal	5000	No
Extremes Excluded	MW-1	Zinc	ug/L	3	11	27.27%	12.818	8.9108	13.797	40.413	5.0000	5.0000	20.000	5.0000	50.000	5.0000	100.0000	45.000	2.2788	8.1535	0.64595	0.00010	NR	NR	normal	5000	No
All	MW-11	Zinc	ug/L	1	10	10.00%	5.7600	5.4575	2.2136	10.127	5.0000	5.0000	5.0000	5.0000	12.000	5.0000	100.0000	7.0000	3.1623	1.3720	0.36572	0.00000	NR	NR	normal	5000	No
Extremes Excluded	MW-11	Zinc	ug/L	0	9	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-12	Zinc	ug/L	1	9	11.11%	5.7778	5.5108	2.3333	10.444	5.0000	5.0000	5.0000	5.0000	12.000	5.0000	100.0000	7.0000	3.0000	1.5244	0.36984	0.00000	NR	NR	normal	5000	No
Extremes Excluded	MW-12	Zinc	ug/L	0	8	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-15	Zinc	ug/L	2	8	25.00%	4578.8	53.935	9570.1	24219	5.0000	5.0000	5502.5	5.0000	23000	5.0000	100.0000	22995	1.9512	6700.9	0.60127	0.00016	NR	NR	normal	5000	No
Extremes Excluded	MW-15	Zinc	ug/L	1	7	14.29%	1861.4	15.375	4911.6	11685	5.0000	5.0000	5.0000	5.0000	13000	5.0000	100.0000	12995	2.6458	3638.5	0.45297	0.00000	NR	NR	normal	5000	No
All	MW-5	Zinc	ug/L	5	14	35.71%	41.000	10.051	117.70	276.40	5.0000	5.0000	15.000	5.0000	440.00	5.0000	100.0000	444.00	3.7124	61.653	0.34289	0.00000	NR	NR	normal	5000	No
Extremes Excluded	MW-5	Zinc	ug/L	4	13	30.77%	9.6154	7.5120	8.2718	26.159	5.0000	5.0000	12.000	5.0000	30.000	5.0000	100.0000	25.000	1.7667	4.4965	0.64358	0.00016	NR	NR	normal	5000	No

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Less Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
All	MW-27	Ammonia as N	mg/L	5	5	100.00%	1.0450	0.9382	2.2365	5.5180	0.0250	0.0250	0.0630	0.0250	5.1000	0.0500	0.0500	5.0750	2.2350	1.9359	0.55551	0.00315	NR	NR	Normal	25	No
Extremes Excluded	MW-27	Ammonia as N	mg/L	1	4	25.00%	0.0313	0.0297	0.0125	0.0563	0.0250	0.0250	0.0375	0.0250	0.0500	0.0500	0.0500	0.0250	2.0000	0.0122	0.62978	0.00124	NR	NR	Normal	25	No
All	MW-31	Ammonia as N	mg/L	2	5	40.00%	0.0350	0.0330	0.0137	0.0624	0.0250	0.0250	0.0500	0.0250	0.0500	0.0500	0.0500	0.0250	0.6086	0.0120	0.68403	0.00647	NR	NR	Normal	25	No
All	MW-23	Arsenic	ug/L	0	5	0.00%	2.1000	1.9113	0.8165	3.7330	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	2.0000	-2.4495	0.6533	0.49909	0.00032	NR	NR	normal	50	No
Extremes Excluded	MW-23	Arsenic	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-25	Arsenic	ug/L	0	4	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-26	Arsenic	ug/L	1	6	16.67%	2.9167	2.8082	1.0206	4.9579	2.5000	2.5000	2.5000	2.5000	5.0000	1.0000	100.0000	2.5000	2.4495	0.8167	0.49909	0.00032	NR	NR	normal	50	No
Extremes Excluded	MW-26	Arsenic	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-27	Arsenic	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-30	Arsenic	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-31	Arsenic	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-32	Arsenic	ug/L	1	6	16.67%	2.5167	2.5082	1.0206	4.5579	2.5000	2.5000	2.5000	2.5000	5.0000	1.0000	100.0000	2.5000	2.4495	0.8167	0.49909	0.00032	NR	NR	normal	50	No
Extremes Excluded	MW-32	Arsenic	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-3A	Arsenic	ug/L	0	5	0.00%	2.1000	1.9113	0.8944	3.6889	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	2.0000	-2.2361	0.7340	0.55216	0.00013	NR	NR	normal	50	No
Extremes Excluded	MW-3A	Arsenic	ug/L	0	4	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	1.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-23	Beryllium	ug/L	0	6	0.00%	0.2317	0.2206	0.1021	0.4959	0.2500	0.2500	0.2500	0.2500	0.5000	0.2000	110.00	0.2500	2.4495	0.0317	0.49909	0.00032	NR	NR	normal	4	No
Extremes Excluded	MW-23	Beryllium	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-24	Beryllium	ug/L	1	6	16.67%	0.4333	0.3991	0.4203	1.2073	0.2500	0.2500	0.5000	0.2500	1.2000	0.2000	110.00	1.0000	2.1738	0.3369	0.62063	0.00101	NR	NR	normal	4	No
Extremes Excluded	MW-24	Beryllium	ug/L	1	5	20.00%	0.3000	0.2872	0.1118	0.5236	0.2500	0.2500	0.2500	0.2500	0.5000	0.2000	110.00	0.2500	2.2361	0.0980	0.55216	0.00013	NR	NR	normal	4	No
All	MW-25	Beryllium	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-26	Beryllium	ug/L	0	6	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-27	Beryllium	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-28	Beryllium	ug/L	0	5	0.00%	0.2000	0.2872	0.1118	0.5236	0.2500	0.2500	0.2500	0.2500	0.5000	0.2000	110.00	0.2500	2.2361	0.0980	0.55216	0.00013	NR	NR	normal	4	No
Extremes Excluded	MW-28	Beryllium	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-30	Beryllium	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-31	Beryllium	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2000	110.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	4	No
All	MW-3A	Beryllium	ug/L	2	5	40.00%	0.5480	0.4708	0.3245	1.1969	0.2500	0.5000	0.7400	0.2500	1.0000	0.2000	110.00	0.7500	0.5659	0.2844	0.90333	0.42858	0.88794	0.34686	Nonparametric	4	No
All	MW-24	Cadmium	ug/L	1	6	16.67%	0.4000	0.3799	0.1342	0.6683	0.2500	0.4250	0.5000	0.2500	0.5500	0.0500	50.000	0.3000	-0.1863	0.1074	0.84829	0.15245	0.83336	0.11473	Nonparametric	5	No
All	MW-26	Cadmium	ug/L	0	6	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0500	50.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5	No
All	MW-27	Cadmium	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0500	50.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5	No
All	MW-30	Cadmium	ug/L	1	5	20.00%	0.4520	0.3755	0.4517	1.3554	0.2500	0.2500	0.2500	0.2500	1.2000	0.0500	50.000	1.0100	2.2361	0.3659	0.55216	0.00013	NR	NR	Normal	5	No
Extremes Excluded	MW-30	Cadmium	ug/L	1	4	25.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0500	50.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5	No
All	MW-31	Cadmium	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0500	50.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5	No
All	MW-3A	Cadmium	ug/L	2	5	40.00%	2.8320	1.0619	3.4287	9.6894	0.2500	0.5000	6.3000	0.2500	6.8600	0.0500	50.000	6.6100	0.6198	3.0053	0.72864	0.01865	NR	NR	Normal	5	No
All	MW-17	Chromium	ug/L	0	7	0.00%	18.214	14.760	9.0960	36.406	12.500	25.000	25.000	2.5000	25.000	1.0000	100.00	22.500	-0.9313	6.7383	0.77162	0.02122	NR	NR	normal	100	No
All	MW-18	Chromium	ug/L	0	7	0.00%	16.071	12.949	8.9974	34.066	10.000	12.500	25.000	2.5000	25.000	1.0000	100.00	22.500	-0.2176	6.6652	0.85087	0.12518	0.80460	0.04548	Lognormal	100	No
All	MW-19	Chromium	ug/L	0	7	0.00%	16.071	12.949	8.9974	34.066	10.000	12.500	25.000	2.5000	25.000	1.0000	100.00	22.500	-0.2176	6.6652	0.85087	0.12518	0.80460	0.04548	Lognormal	100	No
All	MW-23	Chromium	ug/L	0	6	0.00%	16.250	15.174	6.8465	29.943	12.500	12.500	25.000	10.000	25.000	1.0000	100.00	15.000	0.8764	5.4783	0.73819	0.01523	NR	NR	normal	100	No
All	MW-24	Chromium	ug/L	0	6	0.00%	16.667	15.749	6.4550	29.577	12.500	12.500	25.000	12.500	25.000	1.0000	100.00	12.500	0.9682	5.1650	0.63989	0.00135	NR	NR	normal	100	No
All	MW-25	Chromium	ug/L	0	4	0.00%	15.625	14.865	6.2500	28.125	12.500	12.500	18.750	12.500	25.000	1.0000	100.00	12.500	2.0000	6.1249	0.62978	0.00124	NR	NR	normal	100	No
All	MW-26	Chromium	ug/L	1	6	16.67%	20.417	17.032	15.445	51.306	12.500	12.500	25.000	10.000	50.000	1.0000	100.00	40.000	1.9028	12.358	0.71624	0.00913	NR	NR	normal	100	No
All	MW-27	Chromium	ug/L	0	5	0.00%	14.500	13.732	5.5387	25.437	12.500	12.500	12.500	10.000	25.000	1.0000	100.00	15.000	2.0428	5.2317	0.69740	0.00291	NR	NR	normal	100	No
Extremes Excluded	MW-27	Chromium	ug/L	0	3	0.00%	12.500	12.500	0.0000	12.500	12.500	12.500	12.500	12.500	12.500	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-28	Chromium	ug/L	0	5	0.00%	17.500	16.494	6.8465	31.193	12.500	12.500	25.000	12.500	25.000	1.0000	100.00	12.500	0.6086	6.0011	0.68403	0.00647	NR	NR	normal	100	No
All	MW-30	Chromium	ug/L	0	5	0.00%	14.500	13.732	5.5387	25.437	12.500	12.500	12.500	10.000	25.000	1.0000	100.00	15.000	2.0428	5.2317	0.69740	0.00291	NR	NR	normal	100	No
Extremes Excluded	MW-30	Chromium	ug/L	0	3	0.00%	12.500	12.500	0.0000	12.500	12.500	12.500	12.500	12.500	12.500	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-31	Chromium	ug/L	0	5	0.00%	14.500	13.732	5.5387	25.437	12.500	12.500	12.500	10.000	25.000	1.0000	100.00	15.000	2.0428	5.2317	0.69740	0.00291	NR	NR	normal	100	No
Extremes Excluded	MW-31	Chromium	ug/L	0	3	0.00%	12.500	12.500	0.0000	12.500	12.500	12.500	12.500	12.500	12.500	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-32	Chromium	ug/L	1	6	16.67%	20.417	17.032	15.445	51.306	12.500	12.500	25.000	10.000	50.000	1.0000	100.00	40.000	1.9028	12.358	0.71624	0.00913	NR	NR	normal	100	No
All	MW-3A	Chromium	ug/L	0	5	0.00%	17.500	16.494	6.8465	31.193	12.500	12.500	25.000	12.500	25.000	1.0000	100.00	12.500	0.6086	6.0011	0.68403	0.00647	NR	NR	normal	100	No
All	MW-1	Cobalt	ug/L	0	3	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-11	Cobalt	ug/L	1	6	16.67%	5.8333	5.6123	2.0412	9.9159	5.0000	5.0000	5.0000	5.0000	10.000	10.0000	10.0000	5.0000	2.4495	1.3333	0.49909	0.00032	NR	NR	normal	730	No
Extremes Excluded	MW-11	Cobalt	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-12	Cobalt	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-14	Cobalt	ug/L	1	5	20.00%	5.8333	5.6123	2.0412	9.9159	5.0000	5.0000	5.0000	5.0000	10.000	10.0000	10.0000	5.0000	2.4495	1.6323	0.49909	0.00032	NR	NR	normal	730	No
Extremes Excluded	MW-14	Cobalt	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-15	Cobalt	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-17	Cobalt	ug/L	0	4	0.00%	7.5000	6.5804	5.0000	17.500	5.0000	5.0000	10.000	5.0000	15.000	10.0000	10.0000	10.000	2.0000	4.8999	0.62978	0.00124	NR	NR	normal	730	No
All	MW-18	Cobalt	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-19	Cobalt	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-2	Cobalt	ug/L	0	3	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-23	Cobalt	ug/L	2	6	33.33%	9.0000	7.2892	7.6158	24.232	5.0000	5.0000	10.000	5.0000	24.000	10.0000	10.0000	19.000	2.1190	6.0938	0.63967	0.00134	NR	NR	normal	730	No
All	MW-25	Cobalt	ug/L	1	4	25.00%	7.5000	6.5804	5.0000	17.500	5.0000	5.0000	10.000	5.0000	15.000	10.0000	10.0000	10.000	2.0000	4.8999	0.62978	0.00124	NR	NR	normal	730	No
All	MW-26	Cobalt	ug/L	1	6	16.67%	5.8333	5.6123	2.0412	9.9159	5.0000	5.0000	5.0000	5.0000	10.000	10.0000	10.0000	5.0000	2.4495	1.3333	0.49909	0.00032	NR	NR	normal	730	No
Extremes Excluded	MW-26	Cobalt	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-27	Cobalt	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-3	Cobalt	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-30	Cobalt	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-31	Cobalt	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-5	Cobalt	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	10.0000	10.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	730	No
All	MW-15	Copper	ug/L	0	6	0.00%	8.3333	6.5815	6.1659	24.656	5.0000	5.0000	5.0000	5.0000	25.000	5.0000	100.0000	20.000	2.4495	6.5332	0.49909	0.00032	NR	NR	normal	1300	No
Extremes Excluded	MW-15	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	NA	NA	NA	NA	NA	NA	NA	1300	No
All	MW-17	Copper	ug/L	0	7	0.00%	5.1429	5.1319	0.3780	5.8538	5.0000	5.0000	5.0000	5.0000	6.0000	5.0000	100.0000	1.0000	2.6458	0.2800	0.45297	0.00090	NR	NR	normal	1300	No

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Less Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
Extremes Excluded	MW-17	Copper	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-18	Copper	ug/L	0	7	0.00%	5.1429	5.1319	0.3780	5.8988	5.0000	5.0000	5.0000	5.0000	6.0000	5.0000	100.0000	1.0000	2.6458	0.2830	0.45297	0.00000	NR	NR	normal	1300	No
Extremes Excluded	MW-18	Copper	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-19	Copper	ug/L	0	7	0.00%	5.1429	5.1319	0.3780	5.8988	5.0000	5.0000	5.0000	5.0000	6.0000	5.0000	100.0000	1.0000	2.6458	0.2830	0.45297	0.00000	NR	NR	normal	1300	No
Extremes Excluded	MW-19	Copper	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-23	Copper	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-24	Copper	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-25	Copper	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-26	Copper	ug/L	1	6	16.67%	5.8333	5.5123	2.0412	9.9158	5.0000	5.0000	5.0000	5.0000	10.000	5.0000	100.0000	5.0000	2.7495	1.8335	0.49609	0.00092	NR	NR	normal	1300	No
Extremes Excluded	MW-26	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-27	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-28	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-30	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-31	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-32	Copper	ug/L	1	6	16.67%	12.967	7.7803	13.779	50.526	5.0000	5.0000	5.0000	5.0000	51.000	5.0000	100.0000	46.000	2.4405	15.026	0.49609	0.00092	NR	NR	normal	1300	No
Extremes Excluded	MW-32	Copper	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-3A	Copper	ug/L	1	5	20.00%	6.8000	6.1433	4.0249	14.850	5.0000	5.0000	5.0000	5.0000	14.000	5.0000	100.0000	9.0000	2.2361	3.5279	0.55218	0.00013	NR	NR	normal	1300	No
Extremes Excluded	MW-3A	Copper	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	1300	No
All	MW-25	Gross Alpha	pCi/L	2	5	40.00%	0.7600	0.6910	0.3975	1.5550	0.5000	0.5000	0.9000	0.5000	1.4000	1.0000	11.000	0.9000	1.4076	0.3484	0.76366	0.03963	NR	NR	Normal	15	No
All	MW-30	Gross Alpha	pCi/L	2	6	33.33%	0.8000	0.6948	0.5292	1.8583	0.5000	0.5000	1.0000	0.5000	1.8000	1.0000	11.000	1.3000	1.8223	0.4234	0.68072	0.00385	NR	NR	Normal	15	No
All	MW-31	Gross Alpha	pCi/L	1	5	20.00%	0.6200	0.5354	0.5532	1.1537	0.5000	0.5000	0.5000	0.5000	1.1000	1.0000	11.000	0.6000	2.2361	0.2352	0.55218	0.00013	NR	NR	Normal	15	No
Extremes Excluded	MW-31	Gross Alpha	pCi/L	0	4	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	11.000	0.0000	NA	NA	NA	NA	NA	NA	NA	15	No
Extremes Excluded	MW-12	Iron	ug/L	2	5	40.00%	30.200	26.447	16.814	63.827	15.000	25.000	46.000	15.000	50.000	1.0000	100.00	35.000	0.3982	14.738	0.83589	0.15388	0.84393	0.17609	Nonparametric	11000	No
Extremes Excluded	MW-14	Iron	ug/L	0	7	0.00%	16.429	16.136	3.7796	23.988	15.000	15.000	15.000	15.000	25.000	1.0000	100.00	10.000	2.6458	2.7999	0.45297	0.00000	NR	NR	normal	11000	No
All	MW-15	Iron	ug/L	2	6	33.33%	24.917	13.350	20.786	66.488	15.000	20.000	33.000	0.5000	61.000	1.0000	100.00	60.500	1.0357	16.632	0.93055	0.58437	0.78521	0.04309	Lognormal	11000	No
All	MW-17	Iron	ug/L	2	5	33.33%	38.333	24.823	42.967	136.27	15.000	17.500	25.000	15.000	100.00	1.0000	100.00	125.00	2.4149	30.681	0.53013	0.00015	NR	NR	normal	11000	No
Extremes Excluded	MW-17	Iron	ug/L	1	5	20.00%	18.000	17.597	4.4721	26.944	15.000	15.000	20.000	15.000	25.000	1.0000	100.00	10.000	1.2578	3.9199	0.77091	0.04595	NR	NR	normal	11000	No
All	MW-18	Iron	ug/L	2	6	33.33%	353.67	50.531	650.96	1625.4	15.000	20.000	120.00	15.000	1650.0	1.0000	100.00	1635.0	2.4286	527.61	0.55615	0.00008	NR	NR	normal	11000	No
Extremes Excluded	MW-19	Iron	ug/L	1	5	20.00%	38.000	25.181	46.043	130.09	15.000	15.000	25.000	15.000	120.00	1.0000	100.00	105.00	2.1884	40.358	0.61473	0.00098	NR	NR	normal	11000	No
All	MW-23	Iron	ug/L	1	5	16.67%	17.500	16.537	6.1237	29.747	15.000	15.000	15.000	15.000	30.000	1.0000	100.00	15.000	2.4495	4.8029	0.48509	0.00002	NR	NR	normal	11000	No
Extremes Excluded	MW-23	Iron	ug/L	0	5	0.00%	15.000	15.000	0.0000	15.000	15.000	15.000	15.000	15.000	15.000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	11000	No
All	MW-25	Iron	ug/L	0	4	0.00%	15.000	15.000	0.0000	15.000	15.000	15.000	15.000	15.000	15.000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	11000	No
All	MW-27	Iron	ug/L	0	5	0.00%	15.000	15.000	0.0000	15.000	15.000	15.000	15.000	15.000	15.000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	11000	No
All	MW-31	Iron	ug/L	0	5	0.00%	15.000	15.000	0.0000	15.000	15.000	15.000	15.000	15.000	15.000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	11000	No
All	MW-3A	Iron	ug/L	1	5	20.00%	151.80	32.342	303.83	763.50	15.000	15.000	15.000	15.000	699.00	1.0000	100.00	684.00	2.2361	238.12	0.55218	0.00013	NR	NR	normal	11000	No
Extremes Excluded	MW-3A	Iron	ug/L	0	4	0.00%	15.000	15.000	0.0000	15.000	15.000	15.000	15.000	15.000	15.000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	11000	No
All	MW-15	Lead	ug/L	0	5	0.00%	5.8033	1.4965	9.5214	24.839	0.5000	0.5000	5.0000	0.5000	25.000	1.0000	500.00	24.500	2.2797	7.5426	0.60220	0.00360	NR	NR	normal	15	No
Extremes excluded	MW-15	Lead	ug/L	0	5	0.00%	1.4000	0.7924	2.0125	5.4249	0.5000	0.5000	0.5000	0.5000	5.0000	1.0000	500.00	4.5000	2.2361	1.7640	0.55218	0.00013	NR	NR	normal	15	No
All	MW-17	Lead	ug/L	0	7	0.00%	7.6429	1.7888	11.863	31.368	0.5000	0.5000	25.000	0.5000	25.000	1.0000	500.00	24.500	1.2256	8.7879	0.61735	0.00043	NR	NR	normal	15	No
All	MW-18	Lead	ug/L	0	7	0.00%	7.6429	1.7888	11.863	31.368	0.5000	0.5000	25.000	0.5000	25.000	1.0000	500.00	24.500	1.2256	8.7879	0.61735	0.00043	NR	NR	normal	15	No
All	MW-19	Lead	ug/L	1	7	14.29%	19.857	3.7317	31.329	82.514	0.5000	1.5000	25.000	0.5000	86.000	1.0000	500.00	85.500	1.9859	23.208	0.69897	0.00361	NR	NR	normal	15	Yes
All	MW-23	Lead	ug/L	1	6	16.67%	1.7500	0.7837	3.0619	7.8737	0.5000	0.5000	0.5000	0.5000	8.0000	1.0000	500.00	7.5000	2.4495	2.4500	0.49609	0.00092	NR	NR	normal	15	No
Extremes excluded	MW-23	Lead	ug/L	0	5	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-24	Lead	ug/L	2	6	33.33%	3.7500	1.1010	7.4816	18.713	0.5000	0.5000	1.5000	0.5000	19.000	1.0000	500.00	18.500	2.4341	6.2256	0.52803	0.00096	NR	NR	normal	15	No
Extremes excluded	MW-24	Lead	ug/L	1	5	20.00%	0.7000	0.6229	0.4472	1.5944	0.5000	0.5000	0.5000	0.5000	1.5000	1.0000	500.00	1.0000	2.2361	0.3920	0.55218	0.00013	NR	NR	normal	15	No
All	MW-25	Lead	ug/L	0	4	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-26	Lead	ug/L	1	5	16.67%	0.5533	0.5512	0.2541	0.9618	0.5000	0.5000	0.5000	0.5000	1.0000	1.0000	500.00	0.5000	2.4495	0.1633	0.49609	0.00092	NR	NR	normal	15	No
Extremes excluded	MW-26	Lead	ug/L	0	5	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-27	Lead	ug/L	0	5	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-28	Lead	ug/L	2	5	40.00%	1.0600	0.8524	0.7701	2.6001	0.5000	0.5000	1.8000	0.5000	2.0000	1.0000	500.00	1.5000	0.6469	0.6750	0.72429	0.01690	NR	NR	normal	15	No
All	MW-30	Lead	ug/L	1	5	20.00%	0.6800	0.6053	0.3578	1.3755	0.5000	0.5000	0.5000	0.5000	1.0000	1.0000	500.00	0.5000	2.2361	0.3136	0.55218	0.00013	NR	NR	normal	15	No
Extremes excluded	MW-30	Lead	ug/L	0	4	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-31	Lead	ug/L	0	5	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-3A	Lead	ug/L	0	5	0.00%	0.5000	0.5000	0.0000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	1.0000	500.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	15	No
All	MW-19	Manganese	ug/L	3	7	42.86%	51.600	16.475	86.130	223.26	5.0000	5.0000	31.000	5.0000	240.00	0.2000	100.00	235.00	2.3224	63.835	0.63240	0.00055	NR	NR	normal	800	No
Extremes Excluded	MW-19	Manganese	ug/L	2	6	33.33%	19.500	10.542	23.814	67.128	5.0000	5.0000	35.000	5.0000	61.000	0.2000	100.00	56.000	1.4166	19.055	0.70494	0.00697	NR	NR	normal	800	No
All	MW-27	Manganese	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	0.2000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	800	No
All	MW-31	Manganese	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	0.2000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	800	No
All	MW-17	Mercury	ug/L	0	7	0.00%	0.3357	0.2952	0.1626	0.6609	0.2500	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	-0.0914	0.1204	0.81857	0.06221	0.82291	0.06848	Nonparametric	2	No
All	MW-18	Mercury	ug/L	1	7	14.29%	0.3000	0.2674	0.1472	0.5944	0.2500	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	0.5487	0.1090	0.81249	0.05432	0.83163	0.08291	Nonparametric	2	No
All	MW-19	Mercury	ug/L	0	7	0.00%	0.3000	0.2674	0.1472	0.5944	0.2500	0.2500	0.5000	0.1000	0.5000	0.0003	100.00	0.4000	0.5487	0.1090	0.81249	0.05432	0.83163	0.08291	Nonparametric	2	No
All	MW-23	Mercury	ug/L	0	6	0.00%	0.2917	0.2805	0.1021	0.4630	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.2500	2.4495	0.0817	0.48309	0.00002	NR	NR	normal	2	No
Extremes Excluded	MW-23	Mercury	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-24	Mercury	ug/L	2	6	33.33%	0.4967	0.4240	0.3041	1.1048	0.2500	0.3750	0.8000	0.2500	0.9300	0.0003	100.00	0.6800	0.6856	0.2433	0.81456	0.07914	0.80595	0.06644	Nonparametric	2	No
All	MW-25	Mercury	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-26	Mercury	ug/L	0	6	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-27	Mercury	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-28	Mercury	ug/L	0	5	0.00%	0.2000	0.2872	0.1118	0.5236	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.2500	2.2361	0.0930	0.55218	0.00013	NR	NR	normal	2	No
Extremes Excluded	MW-28	Mercury	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-30	Mercury	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-31	Mercury	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-32	Mercury	ug/L	1	6	16.67%	0.2917	0.2805	0.1021	0.4858	0.2500	0.2500	0.2500	0.2500	0.5000	0.0003	100.00	0.2500	2.4495	0.0517	0.48509	0.00002	NR	NR	normal	2	No
Extremes Excluded	MW-32	Mercury	ug/L	0	5	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-34	Mercury	ug/L	0	5	0.00%	0.2000	0.2872	0.1118	0.5236	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.2500	2.2361	0.0930	0.55218	0.00013	NR	NR	normal	2	No

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Less Than 8																										
Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
Extremes Excluded	MW-3A	Mercury	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.0003	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-23	Molybdenum	ug/L	1	6	16.67%	14.167	9.2458	17.726	49.619	5.0000	7.5000	10.000	5.0000	50.000	1.0000	100.00	45.000	2.3495	14.163	0.62007	0.00350	NR	NR	normal	40	No
Extremes Excluded	MW-23	Molybdenum	ug/L	0	5	0.00%	7.0000	6.5975	2.7386	12.477	5.0000	5.0000	10.000	5.0000	10.000	1.0000	100.00	5.0000	0.6086	2.4005	0.68403	0.00647	NR	NR	normal	40	No
All	MW-24	Molybdenum	ug/L	1	6	16.67%	16.167	10.545	17.837	51.841	5.0000	7.5000	22.000	5.0000	50.000	1.0000	100.00	45.000	1.8245	14.272	0.73296	0.01350	NR	NR	normal	40	No
Extremes Excluded	MW-24	Molybdenum	ug/L	2	6	33.33%	16.167	10.545	17.837	51.841	5.0000	7.5000	22.000	5.0000	50.000	1.0000	100.00	45.000	1.8245	14.272	0.73296	0.01350	NR	NR	normal	40	No
All	MW-26	Molybdenum	ug/L	1	6	16.67%	8.3333	7.0711	6.0553	20.444	5.0000	5.0000	10.000	5.0000	20.000	1.0000	100.00	15.000	1.9517	4.8452	0.66579	0.00264	NR	NR	normal	40	No
All	MW-27	Molybdenum	ug/L	0	5	0.00%	6.0000	5.7435	2.2361	10.472	5.0000	5.0000	5.0000	5.0000	10.000	1.0000	100.00	5.0000	2.2361	1.9300	0.55218	0.00013	NR	NR	normal	40	No
Extremes Excluded	MW-27	Molybdenum	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	40	No
All	MW-28	Molybdenum	ug/L	0	5	0.00%	15.000	9.1028	19.685	54.370	5.0000	5.0000	10.000	5.0000	50.000	1.0000	100.00	45.000	2.1713	17.254	0.52463	0.00131	NR	NR	normal	40	No
Extremes Excluded	MW-28	Molybdenum	ug/L	0	4	0.00%	6.2500	5.9460	2.5000	11.250	5.0000	5.0000	7.5000	5.0000	10.000	1.0000	100.00	5.0000	2.0000	2.4500	0.62978	0.00124	NR	NR	normal	40	No
All	MW-30	Molybdenum	ug/L	0	5	0.00%	6.0000	5.7435	2.2361	10.472	5.0000	5.0000	5.0000	5.0000	10.000	1.0000	100.00	5.0000	2.2361	1.9300	0.55218	0.00013	NR	NR	normal	40	No
Extremes Excluded	MW-30	Molybdenum	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	40	No
All	MW-31	Molybdenum	ug/L	0	5	0.00%	6.0000	5.7435	2.2361	10.472	5.0000	5.0000	5.0000	5.0000	10.000	1.0000	100.00	5.0000	2.2361	1.9300	0.55218	0.00013	NR	NR	normal	40	No
Extremes Excluded	MW-31	Molybdenum	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	100.00	0.0000	0.0000	NA	NA	NA	NA	NA	NA	40	No
All	MW-32	Molybdenum	ug/L	0	6	0.00%	15.000	9.1028	19.685	54.370	5.0000	5.0000	10.000	5.0000	50.000	1.0000	100.00	45.000	2.1713	17.254	0.52463	0.00131	NR	NR	normal	40	No
Extremes Excluded	MW-32	Molybdenum	ug/L	0	5	0.00%	6.2500	5.9460	2.5000	11.250	5.0000	5.0000	7.5000	5.0000	10.000	1.0000	100.00	5.0000	2.0000	2.4500	0.62978	0.00124	NR	NR	normal	40	No
All	MW-3A	Molybdenum	ug/L	0	4	0.00%	6.2500	5.9460	2.5000	11.250	5.0000	5.0000	7.5000	5.0000	10.000	1.0000	100.00	5.0000	2.0000	2.4500	0.62978	0.00124	NR	NR	normal	40	No
All	MW-23	Nickel	ug/L	3	7	42.86%	1503.9	43.513	3593.7	8691.3	10.000	25.000	41.000	10.000	9699.0	1.0000	50.0000	3920.0	2.5457	3514.0	0.45810	0.00000	NR	NR	normal	100	Yes
Extremes Excluded	MW-23	Nickel	ug/L	2	6	33.33%	21.167	17.797	13.258	47.682	10.000	17.500	31.000	10.000	41.000	1.0000	50.0000	31.000	0.5963	10.608	0.83880	0.12742	0.80538	0.06566	Nonparametric	100	No
All	MW-24	Nickel	ug/L	2	6	33.33%	23.833	18.846	18.313	60.459	10.000	17.500	32.000	10.000	56.000	1.0000	50.0000	46.000	1.2645	14.653	0.81978	0.08787	0.83441	0.11709	Nonparametric	100	No
All	MW-25	Nickel	ug/L	0	4	0.00%	10.000	10.000	0.0000	10.000	10.000	10.000	10.000	10.000	10.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-26	Nickel	ug/L	1	6	16.67%	12.500	11.630	8.1237	24.747	10.000	10.000	10.000	10.000	25.000	1.0000	50.0000	15.000	2.4495	7.9999	0.49999	0.00002	NR	NR	normal	100	No
Extremes Excluded	MW-26	Nickel	ug/L	0	5	0.00%	10.000	10.000	0.0000	10.000	10.000	10.000	10.000	10.000	10.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-27	Nickel	ug/L	0	5	0.00%	10.000	10.000	0.0000	10.000	10.000	10.000	10.000	10.000	10.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-30	Nickel	ug/L	0	5	0.00%	10.000	10.000	0.0000	10.000	10.000	10.000	10.000	10.000	10.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-31	Nickel	ug/L	0	5	0.00%	10.000	10.000	0.0000	10.000	10.000	10.000	10.000	10.000	10.000	1.0000	50.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-1	Nitrate/Nitrite	mg/L	0	7	0.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-12	Nitrate/Nitrite	mg/L	1	7	14.29%	0.0586	0.0465	0.0336	0.1211	0.0500	0.0500	0.0500	0.0500	0.1200	0.0100	0.3000	0.1100	1.0690	0.0650	0.75117	0.01205	NR	NR	Non-pl	10	No
Extremes Excluded	MW-12	Nitrate/Nitrite	mg/L	0	5	0.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-17	Nitrate/Nitrite	mg/L	2	5	33.33%	0.0583	0.0531	0.0234	0.0752	0.0500	0.0500	0.0500	0.0500	0.1000	0.0100	0.3000	0.0500	2.4495	0.0163	0.49809	0.00002	NR	NR	Normal	10	No
Extremes Excluded	MW-17	Nitrate/Nitrite	mg/L	1	5	20.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-18	Nitrate/Nitrite	mg/L	1	6	16.67%	0.1033	0.0707	0.1429	0.3911	0.0500	0.0500	0.0500	0.0500	0.4000	0.0100	0.3000	0.3500	2.4495	0.1143	0.49809	0.00002	NR	NR	Normal	10	No
Extremes Excluded	MW-18	Nitrate/Nitrite	mg/L	1	5	20.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-2	Nitrate/Nitrite	mg/L	1	6	16.67%	0.1033	0.0707	0.1429	0.3841	0.0500	0.0500	0.0500	0.0500	0.4000	0.0100	0.3000	0.3500	2.4495	0.1143	0.49809	0.00002	NR	NR	Normal	10	No
Extremes Excluded	MW-2	Nitrate/Nitrite	mg/L	1	5	20.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-25	Nitrate/Nitrite	mg/L	0	4	0.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-32	Nitrate/Nitrite	mg/L	0	6	0.00%	0.1033	0.0707	0.1429	0.3841	0.0500	0.0500	0.0500	0.0500	0.4000	0.0100	0.3000	0.3500	2.4495	0.1143	0.49809	0.00002	NR	NR	Normal	10	No
Extremes Excluded	MW-32	Nitrate/Nitrite	mg/L	0	5	0.00%	0.0500	0.0500	0.0000	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0100	0.3000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	10	No
All	MW-23	Selenium	ug/L	2	6	33.33%	3.7500	3.3921	1.9429	7.6359	2.5000	2.5000	6.0000	2.5000	6.5000	0.0500	10.000	4.0000	0.9970	1.5546	0.66933	0.00289	NR	NR	normal	50	No
All	MW-25	Selenium	ug/L	0	4	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	0.0500	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-26	Selenium	ug/L	1	6	16.67%	3.0833	2.8327	1.4263	5.9411	2.5000	2.5000	2.5000	2.5000	6.0000	0.0500	10.000	3.5000	2.4495	1.1433	0.49809	0.00002	NR	NR	normal	50	No
Extremes Excluded	MW-26	Selenium	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	0.0500	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-32	Selenium	ug/L	1	6	16.67%	2.9167	2.8082	1.0265	4.9579	2.5000	2.5000	2.5000	2.5000	5.0000	0.0500	10.000	2.5000	2.4495	0.8167	0.49809	0.00002	NR	NR	normal	50	No
Extremes Excluded	MW-32	Selenium	ug/L	0	5	0.00%	2.5000	2.5000	0.0000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	0.0500	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	50	No
All	MW-17	Silver	ug/L	0	7	0.00%	4.3571	3.5864	1.7976	7.7523	5.0000	5.0000	5.0000	0.5000	5.0000	1.0000	10.000	4.5000	-2.6458	1.2800	0.45207	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-15	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-17	Silver	ug/L	0	7	0.00%	4.4286	3.6720	1.5119	7.4523	5.0000	5.0000	5.0000	1.0000	5.0000	1.0000	10.000	4.0000	-2.6458	1.1200	0.45297	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-17	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-18	Silver	ug/L	0	7	0.00%	4.4286	3.6720	1.5119	7.4523	5.0000	5.0000	5.0000	1.0000	5.0000	1.0000	10.000	4.0000	-2.6458	1.1200	0.45297	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-18	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-19	Silver	ug/L	0	7	0.00%	4.4286	3.6720	1.5119	7.4523	5.0000	5.0000	5.0000	1.0000	5.0000	1.0000	10.000	4.0000	-2.6458	1.1200	0.45297	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-19	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-2	Silver	ug/L	0	7	0.00%	4.4286	3.6720	1.5119	7.4523	5.0000	5.0000	5.0000	1.0000	5.0000	1.0000	10.000	4.0000	-2.6458	1.1200	0.45297	0.00000	NR	NR	normal	100	No
Extremes Excluded	MW-2	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-23	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-24	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-25	Silver	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-26	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-27	Silver	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-28	Silver	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-30	Silver	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-31	Silver	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-32	Silver	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-3A	Silver	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000	10.000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	100	No
All	MW-17	Thallium	ug/L	2	7	28.57%	1.7514	0.8768	2.2211	6.1937	0.5000	0.5000	5.0000	0.2500	5.0000	0.4000	100.0000	4.7500	1.2220	1.6454	0.63188	0.00064	NR	NR	normal	2	No
All	MW-18	Thallium	ug/L	3	7	42.86%	2.1014	1.4134	2.0130	6.1274	0.5000	1.3000	5.0000	0.5000	5.0000	0.4000	100.0000	4.5000	1.0924	1.4912	0.73929	0.00979	NR	NR	normal	2	Yes
All	MW-19	Thallium	ug/L	2	7	28.57%	1.7886	0.9347	2.1979	6.1844	0.5000	0.5700	5.0000	0.2500	5.0000	0.4000	100.0000	4.7500	1.2135	1.6282	0.65332	0.00112	NR	NR	normal	2	No
All	MW-2	Thallium	ug/L	0	7	0.00%	6.7857	1.5269	18.304	45.394	0.2500	0.5000	5.0000	0.2500	50.000	0.4000	100.0000	49.750	2.6938	13.550	0.54414	0.00006	NR	NR	normal	2	Yes
Extremes Excluded	MW-2	Thallium	ug/L	0	6	0.00%	1.9167	0.8550	2.3910	6.6986	0.2500	0.5000	5.0000	0.2500	5.0000	0.4000	100.0000	4.7500	0.9587	1.9131	0.67347	0.00321	NR	NR	normal	2	No
All	MW-23	Thallium	ug/L	2	6	33.33%	0.4417	0.3824	0.2923	1.0262	0.2500	0.3250	0.5000	0.2500	1.0000	0.4000	100.0000	0.7500	1.8393	0.2339	0.74916	0.01955	NR	NR	normal	2	No
All	MW-24	Thallium	ug/L	1	6	16.67%	0.3783	0.3296	0.2413	0.8609	0.2500	0.2500	0.5000	0.2000	0.8200	0.4000	100.0000	0.6200	1.6220	0.1931	0.75508	0.02233	NR	NR	normal	2	No
All	MW-26	Thallium	ug/L	1	6	16.67%	0.4167	0.3536	0.3028	1.0222	0.2500	0.2500	0.5000	0.2500	1.0000	0.4000	100.0000	0.7500	1.9517	0.2423	0.66579	0.00264	NR	NR	normal	2	No
All	MW-27	Thallium	ug/L	0	5	0.00%	0.3000	0.2872	0.1118	0.5236	0.2500	0.2500	0.2500	0.2500	0.5000	0.4000	100.0000	0.2500	2.2361	0.0930	0.55218	0.00013	NR	NR	normal	2	No
Extremes Excluded	MW-27	Thallium	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.4000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-28	Thallium	ug/L	0	5	0.00%	0.3000	0.2872	0.1118	0.5236	0.2500	0.2500	0.2500	0.2500	0.5000	0.4000	100.0000	0.2500	2.2361	0.0930	0.55218	0.00013	NR	NR	normal	2	No

Table 11B. Descriptive Summary Statistics for Constituents in Compliance Wells with Less than 50% Detects; Groundwater Data from 1979 to 2006
Background Groundwater Quality Report for White Mesa Mill, Utah

N Less Than 8

Type	Well	Analyte	Units	Det	N	% Det	Mean	Gmean	SD	Mean+2SD	Q25	Median	Q75	MinConc	MaxConc	MinRL	MaxRL	Range	Skew	95UCL	W-norm	P-norm	Wlog	plog	Distribution	GWQS	Mean Exceed GWQS?
Extremes Excluded	MW-30	Thallium	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.4000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-30	Thallium	ug/L	0	5	0.00%	0.3300	0.2972	0.1118	0.5536	0.2500	0.2500	0.2500	0.2500	0.5000	0.4000	100.0000	0.2500	2.2361	0.6799	0.55218	0.00016	NR	NR	normal	2	No
Extremes Excluded	MW-31	Thallium	ug/L	0	4	0.00%	0.2500	0.2500	0.0000	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.4000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	2	No
All	MW-32	Thallium	ug/L	1	6	16.67%	0.4167	0.3536	0.3028	1.0222	0.2500	0.2500	0.5000	0.2500	1.0000	0.4000	100.0000	0.7500	1.9517	0.2423	0.66579	0.00264	NR	NR	normal	2	No
Extremes Excluded	MW-15	Vanadium	ug/L	1	7	14.29%	7.8571	7.5560	2.2493	12.356	5.0000	7.5000	10.000	5.0000	10.000	1.0000	500.0000	5.0000	-0.3530	1.6663	0.81809	0.06155	0.80781	0.04890	Lognormal	60	No
All	MW-17	Vanadium	ug/L	0	7	0.00%	27.143	19.454	21.527	70.196	7.5000	15.000	50.000	7.5000	50.000	1.0000	500.0000	42.500	0.3237	15.947	0.72850	0.00753	NR	NR	normal	60	No
All	MW-18	Vanadium	ug/L	0	7	0.00%	21.429	15.458	19.677	60.783	7.5000	10.000	50.000	7.5000	50.000	1.0000	500.0000	42.500	1.1635	14.577	0.69098	0.00295	NR	NR	normal	60	No
All	MW-19	Vanadium	ug/L	0	7	0.00%	21.429	15.458	19.677	60.783	7.5000	10.000	50.000	7.5000	50.000	1.0000	500.0000	42.500	1.1635	14.577	0.69098	0.00295	NR	NR	normal	60	No
All	MW-23	Vanadium	ug/L	2	6	33.33%	27.000	18.199	25.782	78.564	7.5000	14.500	50.000	7.5000	68.000	1.0000	500.0000	60.500	1.0649	20.629	0.80189	0.06111	0.85842	0.18380	Nonparametric	60	No
All	MW-24	Vanadium	ug/L	1	6	16.67%	26.333	15.201	30.490	87.314	7.5000	7.5000	50.000	7.5000	78.000	1.0000	500.0000	70.500	1.3172	24.397	0.70535	0.00703	NR	NR	normal	60	No
All	MW-25	Vanadium	ug/L	0	4	0.00%	8.1250	8.0593	1.2500	10.625	7.5000	7.5000	8.7500	7.5000	10.000	1.0000	500.0000	2.5000	2.0000	1.2250	0.62978	0.00124	NR	NR	normal	60	No
All	MW-28	Vanadium	ug/L	1	6	16.67%	10.417	9.7206	4.3520	20.121	7.5000	7.5000	10.000	7.5000	20.000	1.0000	500.0000	12.500	2.1157	3.8323	0.68197	0.00397	NR	NR	normal	60	No
Extremes Excluded	MW-26	Vanadium	ug/L	0	5	0.00%	8.5000	8.4147	1.3693	11.239	7.5000	7.5000	10.000	7.5000	10.000	1.0000	500.0000	2.5000	0.6086	1.2002	0.68403	0.00647	NR	NR	normal	60	No
All	MW-27	Vanadium	ug/L	0	5	0.00%	8.5000	8.4147	1.3693	11.239	7.5000	7.5000	10.000	7.5000	10.000	1.0000	500.0000	2.5000	0.6086	1.2002	0.68403	0.00647	NR	NR	normal	60	No
All	MW-29	Vanadium	ug/L	0	5	0.00%	16.500	11.610	18.755	54.017	7.5000	7.5000	10.000	7.5000	50.000	1.0000	500.0000	42.500	2.2178	15.442	0.59157	0.00016	NR	NR	normal	60	No
Extremes Excluded	MW-28	Vanadium	ug/L	0	4	0.00%	8.1250	8.0593	1.2500	10.625	7.5000	7.5000	8.7500	7.5000	10.000	1.0000	500.0000	2.5000	2.0000	1.2250	0.62978	0.00124	NR	NR	normal	60	No
All	MW-30	Vanadium	ug/L	0	5	0.00%	8.5000	8.4147	1.3693	11.239	7.5000	7.5000	10.000	7.5000	10.000	1.0000	500.0000	2.5000	0.6086	1.2002	0.68403	0.00647	NR	NR	normal	60	No
All	MW-31	Vanadium	ug/L	0	5	0.00%	8.5000	8.4147	1.3693	11.239	7.5000	7.5000	10.000	7.5000	10.000	1.0000	500.0000	2.5000	0.6086	1.2002	0.68403	0.00647	NR	NR	normal	60	No
All	MW-22	Vanadium	ug/L	1	6	16.67%	10.417	9.7206	4.3520	20.121	7.5000	7.5000	10.000	7.5000	20.000	1.0000	500.0000	12.500	2.1157	3.8323	0.68197	0.00397	NR	NR	normal	60	No
Extremes Excluded	MW-32	Vanadium	ug/L	0	5	0.00%	8.5000	8.4147	1.3693	11.239	7.5000	7.5000	10.000	7.5000	10.000	1.0000	500.0000	2.5000	0.6086	1.2002	0.68403	0.00647	NR	NR	normal	60	No
All	MW-3A	Vanadium	ug/L	1	5	20.00%	22.700	15.395	21.055	64.811	7.5000	7.5000	41.000	7.5000	50.000	1.0000	500.0000	42.500	0.7115	18.455	0.74441	0.02640	NR	NR	normal	60	No
All	MW-17	Zinc	ug/L	1	7	14.29%	7.1429	6.4585	3.9340	15.011	5.0000	5.0000	10.000	5.0000	15.000	5.0000	100.0000	10.000	1.7598	2.9143	0.64619	0.00093	NR	NR	normal	5000	No
All	MW-18	Zinc	ug/L	0	7	0.00%	6.4286	5.7497	3.7796	13.988	5.0000	5.0000	5.0000	5.0000	15.000	5.0000	100.0000	10.000	2.0458	2.7939	0.45257	0.00089	NR	NR	normal	5000	No
Extremes Excluded	MW-18	Zinc	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-18	Zinc	ug/L	0	7	0.00%	6.4286	5.8497	3.7796	13.988	5.0000	5.0000	5.0000	5.0000	15.000	5.0000	100.0000	10.000	2.0458	2.7939	0.45297	0.00089	NR	NR	normal	5000	No
Extremes Excluded	MW-19	Zinc	ug/L	0	6	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-25	Zinc	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-20	Zinc	ug/L	1	6	16.67%	5.8333	5.5123	2.0412	9.5158	5.0000	5.0000	5.0000	5.0000	10.000	5.0000	100.0000	5.0000	2.4475	1.6333	0.49309	0.00092	NR	NR	normal	5000	No
Extremes Excluded	MW-26	Zinc	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-27	Zinc	ug/L	1	5	20.00%	7.8630	6.5302	6.2616	20.322	5.0000	5.0000	5.0000	5.0000	18.000	5.0000	100.0000	14.000	2.2361	5.4379	0.55218	0.00213	NR	NR	normal	5000	No
Extremes Excluded	MW-27	Zinc	ug/L	0	4	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No
All	MW-31	Zinc	ug/L	0	5	0.00%	5.0000	5.0000	0.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	100.0000	0.0000	0.0000	NA	NA	NA	NA	NA	NA	5000	No

Notes:

Type = All valid records or records with extremes excluded from the calculations
WELL = Monitoring well location
GROUP = Analytical group
PARCODE = Parameter code
DET = Number of detections
N = Number of samples
%Det = Detection rate as a percentage
Mean = Arithmetic mean
Gmean = Geometric mean
SD = Standard deviation
Mean + 2SD = Arithmetic mean plus two standard deviations. (Note: For pH, the values range from plus or minus two standard deviations)
Q25 = 25th percentile of the sample population
Median = 50th percentile of the sample population
Q75 = 75th percentile of the sample population
MinConc = Minimum detected concentration
MaxConc = Maximum detected concentration
MinRL = Minimum reporting limit
MaxRL = Maximum reporting limit
Qrange = Interquartile range
Skew = Measure of skewness of the data distribution; indicates degree of assymetry and direction of the skewness (values greater than 2 indicate significant skew, with negative values indicating left skew, positive values indicating right skew)
95UCL = One-sided 95 percent confidence limit on the arithmetic mea n
W-norm = Shapiro-Wilk score for normality
p-norm = p-value from Shapiro-Wilk test for normality, where $p < 0.05$ indicates a non-normal distribution
W-log = Shapiro-Wilk score for lognormality
p-log = p-value from Shapiro-Wilk test for lognormality, where $p < 0.05$ indicates a non-lognormal distribution
Distribution = Type of distribution, based on Shapiro-Wilk test; Normal, Lognormal, and Nonparametric
ug/L = Micrograms per liter
mg/L = Milligrams per liter
pCi/L = Picocuries per liter
TDS = Total dissolved solids
TSS = Total suspended solids
N/A = Not Applicable, due to lack of detections
NR = Not Run; data set contains extremes or was determined to be normally distributed

Table 12. Extremes Flagged and Excluded from Trend Analysis, Background Groundwater Quality Report for White Mesa Mill, Utah

Background Groundwater Quality Report for White Mesa Mill, Utah

Well	Sample Date	Analyte	Group	Result	Qualifier	Detection Limit	Reporting Limit	Units	Year	Quarter	Lab	Analytical Method
MW-1	1/27/1988	Arsenic	METAL	690				MG/L	1988	1	Barringer	206.2
MW-1	8/23/1988	Arsenic	METAL	0.014				MG/L	1988	3	Barringer	206.2
MW-1	3/9/1989	Arsenic	METAL	0.15				MG/L	1989	1	Barringer	206.2
MW-11	8/24/1988	Arsenic	METAL	0.018				MG/L	1988	3	Barringer	206.2
MW-11	3/9/1989	Arsenic	METAL	0.015				MG/L	1989	1	Barringer	206.2
MW-12	8/24/1988	Arsenic	METAL	0.023				MG/L	1988	3	Barringer	206.2
MW-12	3/9/1989	Arsenic	METAL	0.036				MG/L	1989	1	Barringer	206.2
MW-15	11/1/2001	Arsenic	METAL	0.1	U	0.1		MG/L	2001	4	Energy	E200.7
MW-17	3/24/1993	Arsenic	METAL	0.009				MG/L	1993	1	Barringer	206.2
MW-2	8/23/1988	Arsenic	METAL	0.019				MG/L	1988	3	Barringer	206.2
MW-2	3/9/1989	Arsenic	METAL	0.032				MG/L	1989	1	Barringer	206.2
MW-26	3/30/2005	Arsenic	METAL	5	J	5		ug/L	2005	1	Energy	E200.8
MW-3	8/24/1988	Arsenic	METAL	0.025				MG/L	1988	3	Barringer	206.2
MW-3	3/10/1989	Arsenic	METAL	0.046				MG/L	1989	1	Barringer	206.2
MW-32	3/30/2005	Arsenic	METAL	5	J	5		ug/L	2005	1	Energy	E200.8
MW-5	8/24/1988	Arsenic	METAL	0.017				MG/L	1988	3	Barringer	206.2
MW-5	3/9/1989	Arsenic	METAL	0.019				MG/L	1989	1	Barringer	206.2
MW-1	9/9/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-11	3/24/1993	Beryllium	METAL	1	U	0.001		MG/L	1993	1	Barringer	E210.1
MW-11	9/10/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-12	9/10/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-14	9/10/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-15	9/10/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-17	9/10/2002	Beryllium	METAL	0.11	U	0	0.11	MG/L	2002	3	ENERGY	E200.7
MW-18	9/9/2002	Beryllium	METAL	0.11	U	0	0.11	MG/L	2002	3	ENERGY	E200.7
MW-19	9/10/2002	Beryllium	METAL	0.11	U	0	0.11	MG/L	2002	3	ENERGY	E200.7
MW-2	9/10/2002	Beryllium	METAL	0.11	U	0	0.11	MG/L	2002	3	ENERGY	E200.7
MW-3	9/12/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-5	9/10/2002	Beryllium	METAL	0.11	U	0.11	0.11	MG/L	2002	3	ENERGY	E200.7
MW-2	12/28/1981	Cadmium	METAL	0.1	U	0.01		MG/L	1981	4	CORE	E213.2
MW-3	8/18/1981	Cadmium	METAL	0.015		0.002		MG/L	1981	3	WAMCO	E213.2
MW-32	3/30/2005	Cadmium	METAL	23.8		0.5		ug/L	2005	1	Energy	E200.8
MW-5	8/1/1994	Cadmium	METAL	0.1	U	0.01		MG/L	1994	3	EPA	E213.2
MW-1	10/31/1980	Chloride	ANION	30				MG/L	1980	4	WAMCO	E325.3
MW-1	12/15/1985	Chloride	ANION	53				MG/L	1985	4	EDA	E325.3
MW-1	9/4/1986	Chloride	ANION	2				MG/L	1986	3	EDA	E325.3
MW-1	1/27/1988	Chloride	ANION	1350				MG/L	1988	1	Barringer	E325.3
MW-11	12/15/1985	Chloride	ANION	71				MG/L	1985	4	EDA	E325.3
MW-11	6/26/1986	Chloride	ANION	70				MG/L	1986	2	EDA	E325.3
MW-11	6/11/1997	Chloride	ANION	29.2	U	1		MG/L	2002	3	Energy	E325.3
MW-12	6/26/1986	Chloride	ANION	150				MG/L	1986	2	EDA	E325.3
MW-12	2/18/1999	Chloride	ANION	28.1		1		MG/L	1999	1	Energy	E325.3
MW-14	5/1/1999	Chloride	ANION	34				MG/L	1999	2	Energy	E325.3
MW-15	12/13/2005	Chloride	ANION	69			1	mg/L	2005	4	ENERGY	A4500-Cl B
MW-2	5/4/1983	Chloride	ANION	25				MG/L	1983	2	CORE	E325.3
MW-2	12/15/1985	Chloride	ANION	71				MG/L	1985	4	EDA	E325.3
MW-3	10/31/1979	Chloride	ANION	12.6				MG/L	1979	4	WAMCO	E325.3
MW-3	1/31/1980	Chloride	ANION	25				MG/L	1980	1	WAMCO	E325.3
MW-3	12/15/1985	Chloride	ANION	35				MG/L	1985	4	EDA	E325.3
MW-3	6/26/1986	Chloride	ANION	140				MG/L	1986	2	EDA	E325.3
MW-3	11/1/2001	Chloride	ANION	82.5				MG/L	2001	4	Energy	E325.3
MW-5	12/28/1981	Chloride	ANION	20				MG/L	1981	4	CORE	E325.3
MW-5	6/26/1986	Chloride	ANION	130				MG/L	1986	2	EDA	E325.3
MW-11	3/30/2005	Cobalt	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-14	3/30/2005	Cobalt	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-26	3/30/2005	Cobalt	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-11	6/12/1984	Copper	METAL	0.005	U	0.005		MG/L	1984	2	UCC.	E220.1
MW-11	6/25/1985	Copper	METAL	0.02	U	0.02		MG/L	1985	2	EDA	E220.1
MW-12	6/25/1985	Copper	METAL	0.02	U	0.02		MG/L	1985	2	EDA	E220.1
MW-14	3/30/2005	Copper	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-15	11/1/2001	Copper	METAL	0.05	U	0.05		MG/L	2001	4	Energy	E200.7
MW-17	11/30/2000	Copper	METAL	0.012	U	0.012		MG/L	2000	4	Energy	E200.7
MW-18	11/30/2000	Copper	METAL	0.012	U	0.012		MG/L	2000	4	Energy	E200.7
MW-19	11/30/2000	Copper	METAL	0.012	U	0.012		MG/L	2000	4	Energy	E200.7
MW-26	3/30/2005	Copper	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-32	3/30/2005	Copper	METAL	51		10		ug/L	2005	1	Energy	E200.8
MW-12	9/10/2002	Fluoride	ANION	0.1		0.1	0.1	MG/L	2002	3	ENERGY	SM4500
MW-14	9/10/2002	Fluoride	ANION	0.1		0.1	0.1	MG/L	2002	3	ENERGY	SM4500
MW-17	11/30/2000	Fluoride	ANION	0.35				MG/L	2000	4	Energy	SM4500
MW-17	9/10/2002	Fluoride	ANION	0.1		0	0.1	MG/L	2002	3	ENERGY	SM4500
MW-26	3/30/2005	Fluoride	ANION	0.9		0.1		mg/L	2005	1	Energy	A4500-F C
MW-32	9/22/2005	Fluoride	ANION	0.1			0.1	mg/L	2005	3	ENERGY	A4500-F C
MW-5	4/21/1981	Fluoride	ANION	0.4		0.1		MG/L	1981	2	WAMCO	E340.1
MW-5	6/21/2005	Fluoride	ANION	1.3		0.1		mg/L	2005	2	Energy	A4500-F C
MW-1	12/10/1982	Gross Alpha	RADIO	37				PCI/L	1982	4	CORE	E900.0
MW-11	3/30/2005	Iron	METAL	3190		30		ug/L	2005	1	Energy	E200.7
MW-11	6/20/2006	Iron	METAL	127			30	ug/L	2006	2	ENERGY	E200.7
MW-12	6/22/2005	Iron	METAL	266		30		ug/L	2005	2	Energy	E200.7
MW-14	5/1/1999	Iron	METAL	1				MG/L	1999	2	Energy	E236.1
MW-14	3/30/2005	Iron	METAL	83		30		ug/L	2005	1	Energy	E200.7
MW-17	6/23/2006	Iron	METAL	0.14			0.03	mg/L	2006	2	ENERGY	E200.7
MW-19	11/30/2000	Iron	METAL	1.65		0.02		MG/L	2000	4	Energy	E200.7
MW-32	6/21/2006	Iron	METAL	5300			30	ug/L	2006	2	ENERGY	E200.7
MW-1	3/30/1982	Lead	METAL	0.5	U	0.5		MG/L	1982	1	WAMCO	E239.1
MW-15	9/10/2002	Lead	METAL	0.05	U	0.05	0.05	MG/L	2002	3	ENERGY	E200.7
MW-26	3/30/2005	Lead	METAL	1	J	1		ug/L	2005	1	Energy	E200.8
MW-32	3/30/2005	Lead	METAL	16		1		ug/L	2005	1	Energy	E200.8
MW-32	1/25/2006	Lead	METAL	1.8			1	ug/L	2006	1	ENERGY	E200.8
MW-32	4/25/2006	Lead	METAL	1.2			1	ug/L	2006	2	ENERGY	E200.8
MW-5	3/30/1982	Lead	METAL	0.5	U	0.5		MG/L	1982	1	WAMCO	E239.1
MW-1	4/14/1981	Manganese	METAL	56				MG/L	1981	2	WAMCO	E243.1
MW-11	9/10/2002	Manganese	METAL	0.01		0.01	0.01	MG/L	2002	3	ENERGY	E200.7
MW-12	5/4/1983	Manganese	METAL	20				MG/L	1983	2	CORE	E243.1
MW-15	3/4/1991	Manganese	METAL	1				MG/L	1991	1	Barringer	E243.1
MW-19	11/30/2000	Manganese	METAL	0.24		0.005		MG/L	2000	4	Energy	E200.7
MW-5	9/10/2002	Manganese	METAL	0.01		0.01	0.01	MG/L	2002	3	ENERGY	E200.7
MW-1	6/13/1984	Mercury	METAL	0.1	U	0.1		MG/L	1984	2	UCC.	E245.1
MW-11	6/12/1984	Mercury	METAL	0.1	U	0.1		MG/L	1984	2	UCC.	E245.1
MW-12	6/12/1984	Mercury	METAL	0.1	U	0.1		MG/L	1984	2	UCC.	E245.1
MW-15	11/1/2001	Mercury	METAL	0.1	U	0.1		MG/L	2001	4	Energy	E245.1
MW-32	3/30/2005	Mercury	METAL	0.5	J	0.5		ug/L	2005	1	Energy	E200.8
MW-5	6/14/1984	Mercury	METAL	0.1	U	0.1		MG/L	1984	2	UCC.	E245.1
MW-3	11/20/1989	Molybdenum	METAL	0.3				MG/L	1989	4	Barringer	E243.1
MW-32	3/30/2005	Molybdenum	METAL	20	J	20		ug/L	2005	1	Energy	E200.8
MW-11	11/1/1989	Nickel	METAL	0.01	U	0.01		MG/L	1989	4	Barringer	E249.2
MW-11	12/15/1989	Nickel	METAL	0.01	U	0.01		MG/L	1989	4	Barringer	E249.2
MW-11	9/24/1991	Nickel	METAL	0.01	U	0.01		MG/L	1991	3	Barringer	E249.2
MW-11	3/17/1992	Nickel	METAL	0.01	U	0.01		MG/L	1992	1	Barringer	E249.2
MW-11	9/3/1992	Nickel	METAL	0.001	U	0.001		MG/L	1992	3	Barringer	E249.2
MW-11	3/24/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	1	Barringer	E249.2
MW-11	9/1/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	3	Barringer	E249.2
MW-11	3/28/1994	Nickel	METAL	0.03		0.01		MG/L	1994	1	Barringer	E249.2
MW-11	3/30/2005	Nickel	METAL	20	J	20		ug/L	2005	1	Energy	E200.8
MW-11	6/21/2005	Nickel	METAL	20	U	20		ug/L	2005	2	Energy	E200.8
MW-11	9/22/2005	Nickel	METAL	20	U		20	ug/L	2005	3	ENERGY	E200.8
MW-11	12/13/2005	Nickel	METAL	20	U		20	ug/L	2005	4	ENERGY	E200.8
MW-11	3/21/2006	Nickel	METAL	20	U		20	ug/L	2006	1	ENERGY	E200.8
MW-12	12/15/1989	Nickel	METAL	0.02				MG/L	1989	4	Barringer	E249.2
MW-12	9/24/1991	Nickel	METAL	0.01	U	0.01		MG/L	1991	3	Barringer	E249.2
MW-12	3/17/1992	Nickel	METAL	0.01	U	0.01		MG/L	1992	1	Barringer	E249.2
MW-12	9/3/1992	Nickel	METAL	0.001	U	0.001		MG/L	1992	3	Barringer	E249.2
MW-12	3/24/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	1	Barringer	E249.2
MW-12	3/28/1994	Nickel	METAL	0.02		0.01		MG/L	1994	1	Barringer	E249.2
MW-12	9/14/1995	Nickel	METAL	0.5	U	0.05		MG/L	1995	3	EPA	E249.2
MW-12	9/10/1996	Nickel	METAL	0.5	U	0.05		MG/L	1996	3	Energy	E249.2
MW-12	9/7/2001	Nickel	METAL	0.05	U	0.05		MG/L	2001	3	Energy	E200.7
MW-12	11/21/2002	Nickel	METAL	0.5	U	0.05		MG/L	2002	4	Energy	E200.7
MW-12	6/22/2005	Nickel	METAL	20	U	20		ug/L	2005	2	Energy	E200.8
MW-12	12/13/2005	Nickel	METAL	20	U		20	ug/L	2005	4	ENERGY	E200.8
MW-12	3/27/2006	Nickel	METAL	20	U		20	ug/L	2006	1	ENERGY	E200.8
MW-14	11/1/1989	Nickel	METAL	0.03				MG/L	1989	4	Barringer	E249.2
MW-14	12/15/1989	Nickel	METAL	0.03				MG/L	1989	4	Barringer	E249.2
MW-14	9/24/1991	Nickel	METAL	0.01	U	0.01		MG/L	1991	3	Barringer	E249.2
MW-14	3/17/1992	Nickel	METAL	0.01	U	0.01		MG/L	1992	1	Barringer	E249.2
MW-14	9/3/1992	Nickel	METAL	0.001	U	0.001		MG/L	1992	3	Barringer	E249.2
MW-14	3/24/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	1	Barringer	E249.2
MW-14	3/28/1994	Nickel	METAL	0.01	U	0.01		MG/L	1994	1	Barringer	E249.2
MW-14	6/7/2000	Nickel	METAL	0.5	U	0.05		MG/L	2000	2	Energy	E200.7
MW-14	3/30/2005	Nickel	METAL	24		20		ug/L	2005	1	Energy	E200.8
MW-14	6/22/2005	Nickel	METAL	20	U	20		ug/L	2005	2	Energy	E200.8

Table 12. Extremes Flagged and Excluded from Trend Analysis, Background Groundwater Quality Report for White Mesa Mill, Utah

Background Groundwater Quality Report for White Mesa Mill, Utah

Well	Sample Date	Analyte	Group	Result	Qualifier	Detection Limit	Reporting Limit	Units	Year	Quarter	Lab	Analytical Method
MW-14	9/23/2005	Nickel	METAL	20	U		20	ug/L	2005	3	ENERGY	E200.8
MW-14	12/13/2005	Nickel	METAL	20	U		20	ug/L	2005	4	ENERGY	E200.8
MW-14	3/21/2006	Nickel	METAL	20	U		20	ug/L	2006	1	ENERGY	E200.8
MW-14	6/20/2006	Nickel	METAL	20	U		20	ug/L	2006	2	ENERGY	E200.8
MW-15	11/1/1989	Nickel	METAL	0.02				MG/L	1989	4	Barringer	E249.2
MW-15	11/20/1989	Nickel	METAL	0.05				MG/L	1989	4	Barringer	E249.2
MW-15	12/15/1989	Nickel	METAL	0.02				MG/L	1989	4	Barringer	E249.2
MW-15	9/24/1991	Nickel	METAL	0.01	U	0.01		MG/L	1991	3	Barringer	E249.2
MW-15	3/17/1992	Nickel	METAL	0.01	U	0.01		MG/L	1992	1	Barringer	E249.2
MW-15	9/3/1992	Nickel	METAL	0.001	U	0.001		MG/L	1992	3	Barringer	E249.2
MW-15	3/24/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	1	Barringer	E249.2
MW-15	9/1/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	3	Barringer	E249.2
MW-15	3/28/1994	Nickel	METAL	0.01	U	0.01		MG/L	1994	1	Barringer	E249.2
MW-15	9/30/1999	Nickel	METAL	0.5	U	0.05		MG/L	1999	3	Energy	E200.7
MW-15	6/7/2000	Nickel	METAL	0.5	U	0.05		MG/L	2000	2	Energy	E200.7
MW-15	6/23/2005	Nickel	METAL	20	U	20		ug/L	2005	2	Energy	E200.8
MW-15	12/13/2005	Nickel	METAL	20	U		20	ug/L	2005	4	ENERGY	E200.8
MW-15	3/23/2006	Nickel	METAL	20	U		20	ug/L	2006	1	ENERGY	E200.8
MW-15	6/21/2006	Nickel	METAL	20	U		20	ug/L	2006	2	ENERGY	E200.8
MW-17	11/6/1991	Nickel	METAL	9		0.05		MG/L	1991	4	Barringer	E249.2
MW-17	3/24/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	1	Barringer	E249.2
MW-17	9/1/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	3	Barringer	E249.2
MW-17	3/28/1994	Nickel	METAL	0.01	U	0.01		MG/L	1994	1	Barringer	E249.2
MW-17	9/30/1999	Nickel	METAL	0.5	U	0		MG/L	1999	3	Energy	E200.7
MW-17	11/30/2000	Nickel	METAL	0.01	U	0.01		MG/L	2000	4	Energy	E200.7
MW-17	9/24/2003	Nickel	METAL	0.012		0.05		MG/L	2003	3	Energy	E200.7
MW-17	6/22/2005	Nickel	METAL	20	U	20		ug/L	2005	2	Energy	E200.8
MW-17	12/13/2005	Nickel	METAL	20	U		20	ug/L	2005	4	ENERGY	E200.8
MW-17	3/23/2006	Nickel	METAL	20	U		20	ug/L	2006	1	ENERGY	E200.8
MW-26	3/30/2005	Nickel	METAL	25		20		ug/L	2005	1	Energy	E200.8
MW-5	3/30/1982	Nickel	METAL	0.02	U	0.02		MG/L	1982	1	WAMCO	E249.2
MW-5	11/1/1989	Nickel	METAL	0.01	U	0.01		MG/L	1989	4	Barringer	E249.2
MW-5	12/15/1989	Nickel	METAL	0.01	U	0.01		MG/L	1989	4	Barringer	E249.2
MW-5	9/24/1991	Nickel	METAL	0.01	U	0.01		MG/L	1991	3	Barringer	E249.2
MW-5	3/17/1992	Nickel	METAL	0.01	U	0.01		MG/L	1992	1	Barringer	E249.2
MW-5	9/3/1992	Nickel	METAL	0.001	U	0.001		MG/L	1992	3	Barringer	E249.2
MW-5	3/24/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	1	Barringer	E249.2
MW-5	9/1/1993	Nickel	METAL	0.001	U	0.001		MG/L	1993	3	Barringer	E249.2
MW-5	3/28/1994	Nickel	METAL	0.01	U	0.01		MG/L	1994	1	Barringer	E249.2
MW-5	5/1/1999	Nickel	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E200.7
MW-5	3/20/2003	Nickel	METAL	5	U	0.05		MG/L	2003	1	Energy	E200.7
MW-5	6/21/2005	Nickel	METAL	20	U	20		ug/L	2005	2	Energy	E200.8
MW-5	12/13/2005	Nickel	METAL	20	U		20	ug/L	2005	4	ENERGY	E200.8
MW-11	9/10/2002	NO3NO2_N	ANION	0.01	U	0.01	0.1	MG/L	2002	3	ENERGY	E353.2
MW-11	6/20/2006	NO3NO2_N	ANION	0.8	U		0.8	mg/L	2006	2	ENERGY	E353.2
MW-12	11/30/2000	NO3NO2_N	ANION	0.12				MG/L	2000	4	Energy	E353.2
MW-12	9/10/2002	NO3NO2_N	ANION	0.01	U	0.01	0.1	MG/L	2002	3	ENERGY	E353.2
MW-14	9/10/2002	NO3NO2_N	ANION	0.01	U	0.01	0.1	MG/L	2002	3	ENERGY	E353.2
MW-14	6/20/2006	NO3NO2_N	ANION	0.8	U		0.8	mg/L	2006	2	ENERGY	E353.2
MW-17	6/23/2006	NO3NO2_N	ANION	0.1			0.1	mg/L	2006	2	ENERGY	E353.2
MW-18	6/21/2006	NO3NO2_N	ANION	0.8	U		0.8	mg/L	2006	2	ENERGY	E353.2
MW-19	5/1/1999	NO3NO2_N	ANION	1	U			MG/L	1999	2	Energy	E353.2
MW-2	6/20/2006	NO3NO2_N	ANION	0.8	U		0.8	mg/L	2006	2	ENERGY	E353.2
MW-32	6/21/2006	NO3NO2_N	ANION	0.8	U		0.8	mg/L	2006	2	ENERGY	E353.2
MW-5	9/10/2002	NO3NO2_N	ANION	1		0.1	0.1	MG/L	2002	3	ENERGY	E353.2
MW-1	2/16/1990	Selenium	METAL	692				MG/L	1990	1	Barringer	E270.2
MW-1	8/7/1990	Selenium	METAL	685				MG/L	1990	3	Barringer	E270.2
MW-1	11/30/2000	Selenium	METAL	0.052		0.001		MG/L	2000	4	Energy	E200.7
MW-11	11/20/1987	Selenium	METAL	0.02				MG/L	1987	4	Barringer	E270.2
MW-11	8/24/1988	Selenium	METAL	0.072				MG/L	1988	3	Barringer	E270.2
MW-11	11/2/1988	Selenium	METAL	0.029				MG/L	1988	4	Barringer	E270.2
MW-12	3/9/1989	Selenium	METAL	0.021				MG/L	1989	1	Barringer	E270.2
MW-12	6/23/2006	Selenium	METAL	0.018			0.001	mg/L	2006	2	ENERGY	E200.8
MW-17	11/30/2000	Selenium	METAL	0.055		0.001		MG/L	2000	4	Energy	E200.7
MW-18	3/28/1994	Selenium	METAL	0.011		0.002		MG/L	1994	1	Barringer	E270.2
MW-18	11/30/2000	Selenium	METAL	0.011		0.001		MG/L	2000	4	Energy	E200.7
MW-2	8/23/1988	Selenium	METAL	0.045				MG/L	1988	3	Barringer	E270.2
MW-26	3/30/2005	Selenium	METAL	6		5		ug/L	2005	1	Energy	E200.8
MW-3	11/20/1987	Selenium	METAL	0.36				MG/L	1987	4	Barringer	E270.2
MW-3	8/24/1988	Selenium	METAL	0.091				MG/L	1988	3	Barringer	E270.2
MW-3	11/3/1988	Selenium	METAL	0.37				MG/L	1988	4	Barringer	E270.2
MW-32	3/30/2005	Selenium	METAL	5	J	5		ug/L	2005	1	Energy	E200.8
MW-5	11/20/1987	Selenium	METAL	0.018				MG/L	1987	4	Barringer	E270.2
MW-5	8/24/1988	Selenium	METAL	0.061				MG/L	1988	3	Barringer	E270.2
MW-5	11/4/1988	Selenium	METAL	0.026				MG/L	1988	4	Barringer	E270.2
MW-5	6/5/1996	Selenium	METAL	0.046				MG/L	1996	2	Energy	E270.2
MW-1	5/1/1999	Silver	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E272.1
MW-1	11/30/2000	Silver	METAL	0.002	U	0.002		MG/L	2000	4	Energy	E200.7
MW-11	5/1/1999	Silver	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E272.1
MW-11	3/30/2005	Silver	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-12	5/1/1999	Silver	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E272.1
MW-14	5/1/1999	Silver	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E272.1
MW-15	5/1/1999	Silver	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E272.1
MW-17	11/30/2000	Silver	METAL	0.002	U	0.002		MG/L	2000	4	Energy	E200.7
MW-18	11/30/2000	Silver	METAL	0.002	U	0.002		MG/L	2000	4	Energy	E200.7
MW-19	11/30/2000	Silver	METAL	0.002	U	0.002		MG/L	2000	4	Energy	E200.7
MW-2	11/30/2000	Silver	METAL	0.002	U	0.002		MG/L	2000	4	Energy	E200.7
MW-3	11/30/2000	Silver	METAL	0.002	U	0.002		MG/L	2000	4	Energy	E200.7
MW-5	5/1/1999	Silver	METAL	0.001	U	0.001		MG/L	1999	2	Energy	E272.1
MW-1	10/31/1979	Sulfate	ANION	220				MG/L	1979	4	WAMCO	E375.3
MW-1	12/15/1985	Sulfate	ANION	1080				MG/L	1985	4	EDA	E375.3
MW-1	1/27/1988	Sulfate	ANION	10				MG/L	1988	1	Barringer	E375.3
MW-11	2/15/1984	Sulfate	ANION	2250				MG/L	1984	1	UCC.	E375.3
MW-11	12/15/1985	Sulfate	ANION	79				MG/L	1985	4	EDA	E375.3
MW-11	11/19/1992	Sulfate	ANION	1507				MG/L	1992	4	Barringer	E375.3
MW-12	12/15/1985	Sulfate	ANION	7820				MG/L	1985	4	EDA	E375.3
MW-14	12/15/1989	Sulfate	ANION	1160				MG/L	1989	4	Barringer	E375.3
MW-14	5/8/1990	Sulfate	ANION	1160				MG/L	1990	2	Barringer	E375.3
MW-15	12/15/1989	Sulfate	ANION	1250				MG/L	1989	4	Barringer	E375.3
MW-15	5/8/1990	Sulfate	ANION	1260				MG/L	1990	2	Barringer	E375.3
MW-17	3/28/1994	Sulfate	ANION	1400				MG/L	1994	1	Barringer	E375.3
MW-2	10/31/1979	Sulfate	ANION	240				MG/L	1979	4	WAMCO	E375.3
MW-2	1/31/1980	Sulfate	ANION	630				MG/L	1980	1	WAMCO	E375.3
MW-2	5/30/1980	Sulfate	ANION	1075				MG/L	1980	2	WAMCO	E375.3
MW-3	10/31/1979	Sulfate	ANION	930				MG/L	1979	4	WAMCO	E375.3
MW-5	12/15/1985	Sulfate	ANION	7820				MG/L	1985	4	EDA	E375.3
MW-5	6/26/1986	Sulfate	ANION	1890				MG/L	1986	2	EDA	E375.3
MW-1	10/31/1979	TDS	SOLIDS	627				MG/L	1979	4	WAMCO	E160.1
MW-1	1/31/1980	TDS	SOLIDS	870				MG/L	1980	1	WAMCO	E160.1
MW-1	12/15/1985	TDS	SOLIDS	4000				MG/L	1985	4	EDA	E160.1
MW-1	12/1/1993	TDS	SOLIDS	1692				MG/L	1993	4	Barringer	E160.1
MW-11	12/15/1985	TDS	SOLIDS	5100				MG/L	1985	4	EDA	E160.1
MW-11	11/19/1992	TDS	SOLIDS	2850				MG/L	1992	4	Barringer	E160.1
MW-11	12/1/1993	TDS	SOLIDS	2528				MG/L	1993	4	Barringer	E160.1
MW-15	9/24/1991	TDS	SOLIDS	38				MG/L	1991	3	Barringer	E160.1
MW-15	12/1/1993	TDS	SOLIDS	4530				MG/L	1993	4	Barringer	E160.1
MW-15	3/28/1994	TDS	SOLIDS	3120				MG/L	1994	1	Barringer	E160.1
MW-17	3/28/1994	TDS	SOLIDS	2460				MG/L	1994	1	Barringer	E160.1
MW-2	10/31/1979	TDS	SOLIDS	855				MG/L	1979	4	WAMCO	E160.1
MW-2	1/31/1980	TDS	SOLIDS	1080				MG/L	1980	1	WAMCO	E160.1
MW-2	5/30/1980	TDS	SOLIDS	1950				MG/L	1980	2	WAMCO	E160.1
MW-2	6/30/1980	TDS	SOLIDS	1300				MG/L	1980	2	WAMCO	E160.1
MW-3	10/31/1979	TDS	SOLIDS	2102				MG/L	1979	4	WAMCO	E160.1
MW-3	1/31/1980	TDS	SOLIDS	2450				MG/L	1980	1	WAMCO	E160.1
MW-3	7/31/1980	TDS	SOLIDS	4024				MG/L	1980	3	WAMCO	E160.1
MW-5	12/15/1985	TDS	SOLIDS	6600				MG/L	1985	4	EDA	E160.1
MW-5	6/26/1986	TDS	SOLIDS	3210				MG/L	1986	2	EDA	E160.1
MW-15	11/1/2001	Thallium	METAL	0.1	U	0.1		MG/L	2001	4	Energy	E200.7
MW-2	11/1/2001	Thallium	METAL	0.1	U	0.1		MG/L	2001	4	Energy	E200.7
MW-1	1/22/1981	Uranium		11				MG/L	1981	1	WAMCO	
MW-1	8/23/1988	Uranium		72		0.2		pCi/L	1988	3	BARRINGER	
MW-1	8/18/1994	Uranium		3.36E-08		0.0000003		uCi/ml	1994	3	Energy Fuels Nuclear	ASTM D2907
MW-11	8/16/1990	Uranium		4.67E-09		0.3		uCi/ml	1990	3	BARRINGER	
MW-11	3/17/1992	Uranium		2.7E-09		2E-10		uCi/ml	1992	1	UMETCO	ASTM D2907
MW-11	9/15/1992	Uranium		3.39E-09		2E-10		uCi/ml	1992	3	UMETCO	ASTM D2907
MW-11	11/12/1992	Uranium		3.18E-09		2E-10		uCi/ml	1992	4	UMETCO	ASTM D2907
MW-11	6/10/1993	Uranium		0.004		0.0000003		mg/L	1993	2	UMETCO	ASTM D2907
MW-11	6/6/1996	Uranium		3.45E-08		2E-10		uCi/ml	1996	2	Energy Fuels Nuclear	ASTM D2907
MW-11	11/27/2000	Uranium		0.0474		0.0003		mg/L	2000	4	ENERGY	EPA200.8

Table 12. Extremes Flagged and Excluded from Trend Analysis, Background Groundwater Quality Report for White Mesa Mill, Utah

Background Groundwater Quality Report for White Mesa Mill, Utah

Well	Sample Date	Analyte	Group	Result	Qualifier	Detection Limit	Reporting Limit	Units	Year	Quarter	Lab	Analytical Method
MW-12	11/22/1988	Uranium		0.177		0.2		MG/L	1988	4	BARRINGER	
MW-12	12/8/1994	Uranium		9.33E-08		0.0000003		uCi/ml	1994	4	Energy Fuels Nuclear	ASTM D2907
MW-12	12/8/1994	Uranium		<2.0e-10	DUP	0.0000003		uCi/ml	1994	4	Energy Fuels Nuclear	ASTM D2907
MW-12	6/27/1995	Uranium		3.05E-08				uCi/ml	1995	2	Energy Fuels Nuclear	ASTM D2907
MW-12	9/19/1995	Uranium		2.78E-08		2E-10		uCi/ml	1995	3	Energy Fuels Nuclear	ASTM D2907
MW-12	5/12/1999	Uranium		0.0009		0.0003		mg/L	1999	2	ENERGY	EPA200.8
MW-12	12/9/1999	Uranium		0.0005		0.0003		mg/L	1999	4	ENERGY	EPA200.8
MW-14	9/19/1995	Uranium		1.01E-07		2E-10		uCi/ml	1995	4	Energy Fuels Nuclear	ASTM D2907
MW-15	6/27/1995	Uranium		6.42E-08				uCi/ml	1995	2	Energy Fuels Nuclear	ASTM D2907
MW-15	9/19/1995	Uranium		7.8E-08		2E-10		uCi/ml	1995	3	Energy Fuels Nuclear	ASTM D2907
MW-15	5/20/2002	Uranium		0.08526		0.0003		mg/L	2002	2	ENERGY	EPA200.8
MW-2	9/1/1980	Uranium		67				MG/L	1980	3	WAMCO	
MW-3	11/22/1988	Uranium		0.219		0.2		MG/L	1983	4	BARRINGER	
MW-3	12/16/1993	Uranium		8.8E-08		2E-10		uCi/ml	1993	4	UMETCO	ASTM D2907
MW-3	9/20/1995	Uranium		6.91E-08		2E-10		uCi/ml	1995	3	Energy Fuels Nuclear	ASTM D2907
MW-5	6/17/1980	Uranium		8				MG/L	1980	2	WAMCO	
MW-5	7/16/1980	Uranium		8				MG/L	1980	3	WAMCO	
MW-5	8/19/1980	Uranium		10				MG/L	1980	3	WAMCO	
MW-5	9/1/1980	Uranium		8				MG/L	1980	3	WAMCO	
MW-5	10/1/1980	Uranium		8				MG/L	1980	4	WAMCO	
MW-5	1/22/1981	Uranium		13				MG/L	1981	1	WAMCO	
MW-5	6/18/1981	Uranium		12		1		ug/L	1981	2	WAMCO	
MW-5	9/15/1992	Uranium		4.06E-09		2E-10		uCi/ml	1992	3	UMETCO	ASTM D2907
MW-5	3/15/1995	Uranium		3.25E-08		0.0003		uCi/ml	1995	2	Energy Fuels Nuclear	ASTM D2907
MW-5	2/18/1999	Uranium		0.019		0.0003		mg/L	1999	1	ENERGY	EPA200.8
MW-1	4/14/1981	Vanadium	METAL	0.5	U	0.5		MG/L	1981	2	WAMCO	E286.1
MW-1	12/28/1981	Vanadium	METAL	1	U	0.5		MG/L	1981	4	CORE	E286.1
MW-15	11/1/1989	Vanadium	METAL	0.04				MG/L	1989	4	Barringer	E286.1
MW-15	9/10/2002	Vanadium	METAL	0.1	U	0.1	0.1	MG/L	2002	3	ENERGY	E286.1
MW-2	4/21/1981	Vanadium	METAL	0.5	U	0.5		MG/L	1981	2	WAMCO	E286.1
MW-2	12/28/1981	Vanadium	METAL	0.5	U	0.5		MG/L	1981	4	CORE	E286.1
MW-26	3/30/2005	Vanadium	METAL	20	J	20		ug/L	2005	1	Energy	E200.8
MW-3	12/28/1981	Vanadium	METAL	0.5	U	0.5		MG/L	1981	4	CORE	E286.1
MW-32	3/30/2005	Vanadium	METAL	20	J	20		ug/L	2005	1	Energy	E200.8
MW-5	4/21/1981	Vanadium	METAL	0.5	U	0.5		MG/L	1981	2	WAMCO	E286.1
MW-1	4/14/1981	Zinc	METAL	0.25		0.02		MG/L	1981	2	WAMCO	E289.1
MW-1	8/14/1981	Zinc	METAL	0.45				MG/L	1981	3	WAMCO	E289.2
MW-11	3/30/2005	Zinc	METAL	12		10		ug/L	2005	1	Energy	E200.8
MW-12	6/22/2005	Zinc	METAL	12		10		ug/L	2005	2	Energy	E200.8
MW-14	5/1/1999	Zinc	METAL	13				MG/L	1999	2	Energy	E289.1
MW-14	9/1/2002	Zinc	METAL	23	U			MG/L	2002	3	Energy	E200.7
MW-15	11/30/2000	Zinc	METAL	26				MG/L	2000	4	Energy	E200.7
MW-18	11/30/2000	Zinc	METAL	0.03	U	0.03		MG/L	2000	4	Energy	E200.7
MW-19	11/30/2000	Zinc	METAL	0.03	U	0.03		MG/L	2000	4	Energy	E200.7
MW-26	3/30/2005	Zinc	METAL	10	J	10		ug/L	2005	1	Energy	E200.8
MW-3	8/18/1981	Zinc	METAL	0.441		0.005		MG/L	1981	3	WAMCO	E289.1
MW-32	3/30/2005	Zinc	METAL	594		10		ug/L	2005	1	Energy	E200.8
MW-5	8/18/1981	Zinc	METAL	0.449		0.005		MG/L	1981	3	WAMCO	E289.1

Notes:

CLASS = Class designation based on water quality; Class II waters have TDS less than 3,000 mg/L; Class III waters have TDS between 3,000 and 10,000 mg/L
QTR = Quarter of the year
LAB = Laboratory that performed the chemical analysis
GROUP = Analytical group
mg/L = Milligrams per liter
pCi/L = Picocuries per liter
TDS = Total dissolved solids
NO3 = Nitrate
NO2 = Nitrate
U-Activity = Uranium activity reported in picocuries per liter
U-Conc = Uranium concentration measured and reported and milligrams per liter

Table 13. Significant Trending Kendall Tau and Regression (r^2)

Well	Analyte	N	Kendall Tau	Z	p-level	Kendall Tau Significant?	Trend	r(X,Y)	r^2	t	p	Regression Significant?	Trend
MW-11	Chloride	97	0.170521	2.474459	0.013344	Yes	Increase	0.248006	0.061507	2.495217	0.014313	Yes	Increase
MW-18	Chloride	15	0.433755	2.253860	0.024205	Yes	Increase					No	
MW-11	Manganese	8				No		0.893611	0.798540	4.870747	0.002775	Yes	Increase
MW-32	Manganese	13				No		0.733114	0.537456	3.575128	0.004356	Yes	Increase
MW-1	Mercury	15	0.379517	1.972027	0.048607	Yes	Increase	0.675800	0.456705	3.305765	0.005684	Yes	Increase
MW-18	PH	14	0.477807	2.380333	0.017297	Yes	Increase					No	
MW-15	Selenium	22	0.429309	2.796397	0.005168	Yes	Increase	0.564335	0.318474	3.057108	0.006221	Yes	Increase
MW-19	Selenium	10				No		0.639622	0.409372	2.354761	0.046336	Yes	Increase
MW-3	Selenium	37	0.314141	2.736339	0.006213	Yes	Increase	0.530016	0.280917	3.697717	0.000741	Yes	Increase
MW-1	Sulfate	68	0.252592	3.045848	0.002320	Yes	Increase	0.322175	0.103796	2.764775	0.007377	Yes	Increase
MW-11	Sulfate	61	0.513726	5.850279	0.000000	Yes	Increase	0.585645	0.342980	5.549717	0.000001	Yes	Increase
MW-18	Sulfate	15	0.409524	2.127948	0.033341	Yes	Increase	0.704705	0.496609	3.581183	0.003350	Yes	Increase
MW-2	Sulfate	69				No		0.352681	0.124384	3.085050	0.002957	Yes	Increase
MW-1	TDS	65	0.169717	1.998532	0.045659	Yes	Increase					No	
MW-11	TDS	55	0.531453	5.729284	0.000000	Yes	Increase	0.521528	0.271991	4.449868	0.000044	Yes	Increase
MW-2	TDS	65	0.231370	2.724543	0.006439	Yes	Increase	0.411308	0.169174	3.581642	0.000665	Yes	Increase
MW-3	TDS	66	0.352420	4.183455	0.000029	Yes	Increase	0.457938	0.209707	4.121000	0.000111	Yes	Increase
MW-3	Uranium Natural	59	0.349386	3.909297	0.000093	Yes	Increase	0.555003	0.308028	5.037195	0.000005	Yes	Increase
MW-12	Uranium Natural	77	0.254032	3.269248	0.001078	Yes	Increase	0.274826	0.075529	2.475380	0.015567	Yes	Increase
MW-14	Uranium Natural	80	0.445573	5.849812	0.000000	Yes	Increase	0.498277	0.248280	5.075635	0.000003	Yes	Increase
MW-15	Uranium Natural	71	0.326326	4.025102	0.000057	Yes	Increase	0.379304	0.143872	3.405201	0.001106	Yes	Increase
MW-17	Uranium Natural	47	0.309271	3.065888	0.002170	Yes	Increase	0.527631	0.278394	4.166645	0.000138	Yes	Increase
MW-18	Uranium Natural	17	0.394055	2.207573	0.027274	Yes	Increase	0.935530	0.875216	10.25708	0.000000	Yes	Increase
MW-28	Uranium Natural	5	0.800000	1.959592	0.050044	Yes	Increase					No	
MW-31	Uranium Natural	5	1.000000	2.449490	0.014306	Yes	Increase	0.953351	0.908879	5.470201	0.012010	Yes	Increase
MW-32	Uranium Natural	5	1.000000	2.449490	0.014306	Yes	Increase	0.889346	0.790936	3.368930	0.043445	Yes	Increase
MW-1	Arsenic	43	-0.372449	-3.51975	0.000432	Yes	Decrease	-0.408704	0.167039	-2.86740	0.006508	Yes	Decrease
MW-2	Arsenic	34	-0.242637	-2.01789	0.043603	Yes	Decrease					No	
MW-11	Beryllium	17	-0.435151	-2.43780	0.014777	Yes	Decrease					No	
MW-14	Beryllium	19	-0.376192	-2.25058	0.024412	Yes	Decrease					No	
MW-15	Beryllium	16	-0.489608	-2.64521	0.008164	Yes	Decrease	-0.524393	0.274988	-2.30435	0.037043	Yes	Decrease
MW-18	Beryllium	9	-0.588348	-2.20822	0.027229	Yes	Decrease					No	
MW-19	Beryllium	9	-0.588348	-2.20822	0.027229	Yes	Decrease					No	
MW-1	Cadmium	21	-0.324345	-2.05679	0.039707	Yes	Decrease	-0.489098	0.239217	-2.44423	0.024442	Yes	Decrease
MW-11	Cadmium	20	-0.385478	-2.37625	0.017490	Yes	Decrease	-0.447971	0.200678	-2.12581	0.047615	Yes	Decrease
MW-18	Cadmium	10	-0.529150	-2.12979	0.033189	Yes	Decrease					No	
MW-19	Cadmium	10	-0.529150	-2.12979	0.033189	Yes	Decrease					No	
MW-2	Cadmium	18	-0.368777	-2.13717	0.032584	Yes	Decrease	-0.544910	0.296927	-2.59947	0.019362	Yes	Decrease
MW-3	Cadmium	20	-0.362464	-2.23438	0.025458	Yes	Decrease	-0.651958	0.425050	-3.64788	0.001840	Yes	Decrease
MW-5	Cadmium	24	-0.462419	-3.16573	0.001547	Yes	Decrease	-0.567935	0.322550	-3.23647	0.003791	Yes	Decrease
MW-12	Chloride	95	-0.335056	-4.80986	0.000002	Yes	Decrease	-0.361946	0.131005	-3.74435	0.000313	Yes	Decrease
MW-19	Chloride	17	-0.498172	-2.79086	0.005257	Yes	Decrease	-0.518735	0.269086	-2.34995	0.032881	Yes	Decrease
MW-2	Chloride	76	-0.273526	-3.49617	0.000472	Yes	Decrease	-0.460716	0.212259	-4.46537	0.000028	Yes	Decrease
MW-24	Chloride	5	-0.800000	-1.95959	0.050044	Yes	Decrease	-0.925298	0.856177	-4.22598	0.024233	Yes	Decrease
MW-5	Chloride	110	-0.166257	-2.57457	0.010036	Yes	Decrease					No	
MW-26	Chromium	6	-0.894427	-2.52050	0.011719	Yes	Decrease	-0.817468	0.668253	-2.83656	0.046936	Yes	Decrease
MW-32	Chromium	6	-0.894427	-2.52050	0.011719	Yes	Decrease	-0.814279	0.663050	-2.80556	0.048536	Yes	Decrease
MW-2	Copper	12	-0.455842	-2.06305	0.039108	Yes	Decrease					No	
MW-3	Copper	14	-0.610558	-3.04167	0.002353	Yes	Decrease	-0.634015	0.401975	-2.84008	0.014895	Yes	Decrease
MW-5	Copper	15	-0.573805	-2.98158	0.002868	Yes	Decrease	-0.640052	0.409667	-3.00358	0.010169	Yes	Decrease
MW-11	Fluoride					No		-0.714637	0.510706	-5.00502	0.000041	Yes	Decrease
MW-1	Gross Alpha	28	-0.395987	-2.95721	0.003104	Yes	Decrease					No	
MW-11	Gross Alpha	26	-0.678092	-4.85751	0.000001	Yes	Decrease					No	
MW-12	Gross Alpha	29	-0.412576	-3.14209	0.001677	Yes	Decrease	-0.420874	0.177135	-2.41085	0.022993	Yes	Decrease
MW-14	Gross Alpha	27	-0.641291	-4.69250	0.000003	Yes	Decrease	-0.624256	0.389696	-3.99539	0.000501	Yes	Decrease
MW-15	Gross Alpha	24	-0.520420	-3.56280	0.000367	Yes	Decrease	-0.678519	0.460388	-4.33244	0.000268	Yes	Decrease
MW-18	Gross Alpha	12	-0.516734	-2.33863	0.019355	Yes	Decrease	-0.648320	0.420319	-2.69274	0.022593	Yes	Decrease
MW-2	Gross Alpha	29	-0.314844	-2.39778	0.016495	Yes	Decrease	-0.398310	0.158651	-2.33847	0.026466	Yes	Decrease
MW-30	Gross Alpha	6	-0.712697	-2.00839	0.044602	Yes	Decrease					No	
MW-5	Gross Alpha	31	-0.344770	-2.72483	0.006433	Yes	Decrease					No	
MW-11	Iron	11	-0.464016	-1.98680	0.046945	Yes	Decrease					No	
MW-2	Iron	11	-0.571662	-2.44771	0.014377	Yes	Decrease					No	
MW-11	Lead	20	-0.320570	-1.97613	0.048140	Yes	Decrease					No	
MW-14	Lead	12	-0.561769	-2.54245	0.011008	Yes	Decrease	-0.656602	0.431126	-2.75292	0.020376	Yes	Decrease
MW-15	Lead					No		-0.981233	0.962818	-8.81386	0.003078	Yes	Decrease
MW-2	Lead	11	-0.484345	-2.07384	0.038094	Yes	Decrease					No	
MW-3	Lead	13	-0.491507	-2.33893	0.019339	Yes	Decrease					No	
MW-12	Manganese	10	-0.584307	-2.35179	0.018683	Yes	Decrease	-0.960587	0.922728	-9.77397	0.000010	Yes	Decrease
MW-23	Manganese	6	-0.733333	-2.06654	0.038778	Yes	Decrease						
MW-3	Manganese	17	-0.556533	-3.11781	0.001822	Yes	Decrease	-0.780792	0.609636	-4.84000	0.000216	Yes	Decrease
MW-26	Molybdenum	6	-0.774597	-2.18282	0.029049	Yes	Decrease					No	
MW-3	PH	71	-0.258124	-3.18386	0.001453	Yes	Decrease					No	
MW-12	Sulfate	60	-0.400457	-4.52073	0.000006	Yes	Decrease	-0.593976	0.352807	-5.62297	0.000001	Yes	Decrease
MW-14	Sulfate	39	-0.251211	-2.25180	0.024335	Yes	Decrease						
MW-15	Sulfate	35	-0.363944	-3.07527	0.002103	Yes	Decrease	-0.381255	0.145355	-2.36908	0.023838	Yes	Decrease
MW-19	Sulfate	17	-0.435427	-2.43935	0.014714	Yes	Decrease					No	
MW-5	Sulfate	71	-0.310443	-3.82920	0.000129	Yes	Decrease	-0.349442	0.122109	-3.09798	0.002818	Yes	Decrease
MW-12	TDS	55	-0.354101	-3.81736	0.000135	Yes	Decrease	-0.359029	0.128902	-2.80049	0.007105	Yes	Decrease
MW-17	TDS					No		-0.565145	0.319389	-2.46991	0.028139	Yes	Decrease
MW-19	TDS	16	-0.443519	-2.39620	0.016566	Yes	Decrease					No	
MW-30	TDS	5	-0.800000	-1.95959	0.050044	Yes	Decrease	-0.902887	0.815204	-3.63788	0.035795	Yes	Decrease
MW-5	TDS	68	-0.347139	-4.18593	0.000028	Yes	Decrease	-0.443018	0.196265	-4.01455	0.000155	Yes	Decrease
MW-11	Thallium	12	-0.720964	-3.26293	0.001103	Yes	Decrease	-0.653958	0.427661	-2.73352	0.021066	Yes	Decrease
MW-12	Thallium	10	-0.648749	-2.61116	0.009023	Yes	Decrease					No	
MW-14	Thallium	13	-0.633863	-3.01636	0.002558	Yes	Decrease	-0.628257	0.394707	-2.67825	0.021475	Yes	Decrease
MW-15	Thallium	9	-0.784465	-2.94430	0.003237	Yes	Decrease	-0.814726	0.663779	-3.71748	0.007481	Yes	Decrease
MW-2	Thallium	6	-0.745356	-2.10042	0.035692	Yes	Decrease					No	
MW-26	Thallium	6	-0.774597	-2.18282	0.029049	Yes	Decrease					No	
MW-3	Thallium	10	-0.529150	-2.12979	0.033189	Yes	Decrease					No	
MW-32	Thallium	6	-0.774597	-2.18282	0.029049	Yes	Decrease					No	
MW-5	Thallium	11	-0.610696	-2.61484	0.008927	Yes	Decrease					No	
MW-1	Uranium Activity	52	-0.253269	-2.65009	0.008047	Yes	Decrease					No	
MW-5	Uranium Activity	76	-0.300999	-3.84733	0.000119	Yes	Decrease	-0.343756	0.118168	-3.14901	0.002363	Yes	Decrease
MW-5	Uranium Natural					No		-0.507528	0.257585	-3.11685	0.004199	Yes	Decrease
MW-1	Uranium Natural	15	-0.404164	-2.10010	0.035720	Yes	Decrease					No	
MW-1	Zinc	11	-0.582975	-2.49615	0.012555	Yes	Decrease	-0.620361	0.384847	-2.37287	0.041712	Yes	Decrease
MW-2	Zinc	12	-0.534367	-2.41843	0.015588	Yes	Decrease					No	
MW-23	Zinc	6	-0.733333	-2.06654	0.038778	Yes	Decrease	-0.833144	0.694128	-3.01287	0.039439	Yes	Decrease
MW-3	Zinc					No		-0.795944	0.633527	-4.15778	0.001956	Yes	Decrease
MW-5	Zinc	13	-0.594028	-2.82680	0.004702	Yes	Decrease	-0.740633	0.548537	-3.65585	0.003782	Yes	Decrease

Notes:
N= valid number of data poitns
Z= Z distribution
p-level= statistical significance
r(x,y)=
r^2= statistical measure of how well a regression line approximates real data points
t= Student's t distribution
p= Probability

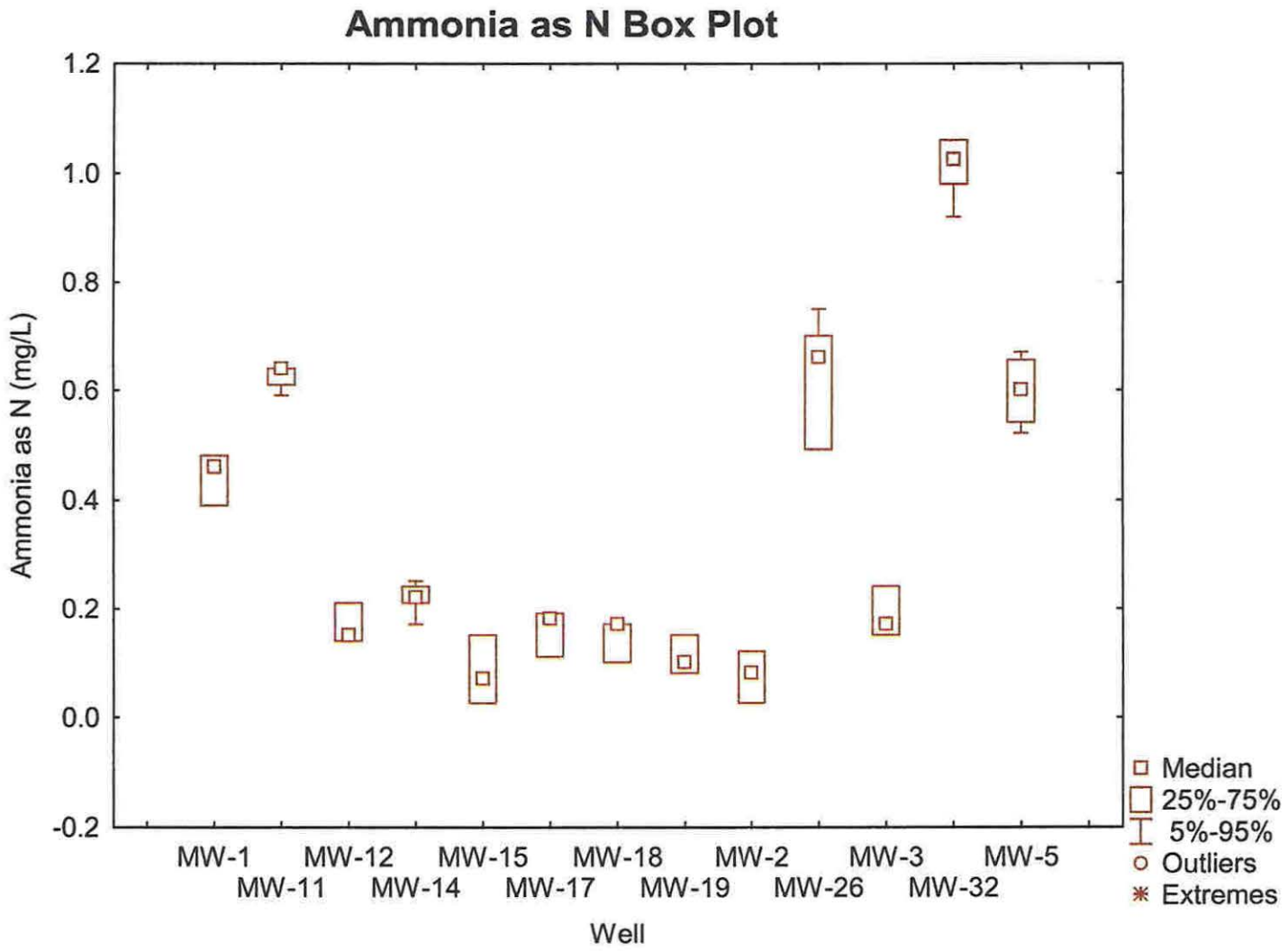
Table 14: Classification of inorganic constituents in groundwater by observed frequencyof detection.

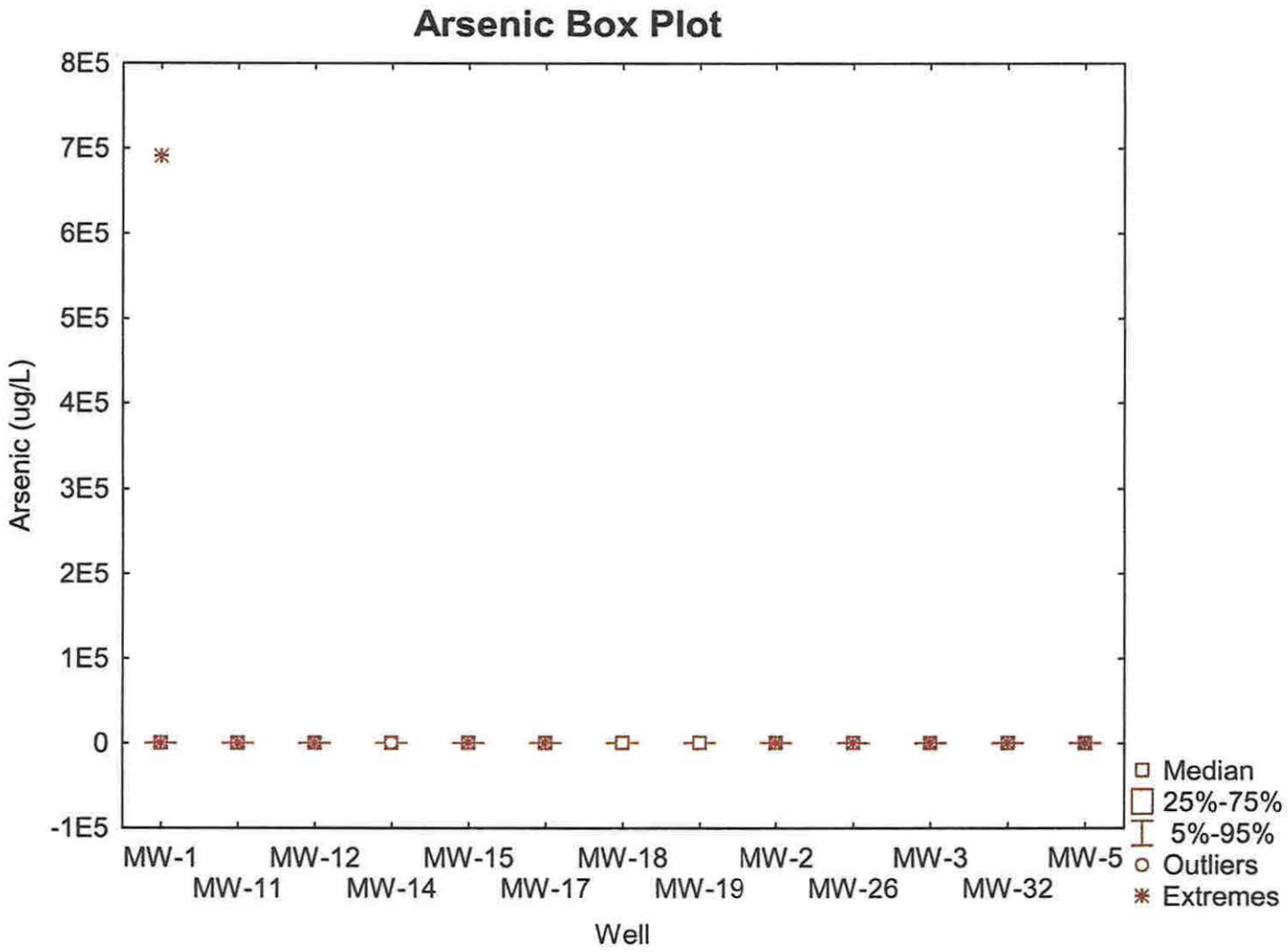
Ammonia	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	
TDS	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	
Chloride	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	
Fluoride	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	
Sulfate	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	**Ubiquitous**
pH	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	
Uranium	MW-1	MW-11	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5	
Gross Alpha	MW-1	MW-12	MW-14	MW-15	MW-17	MW-18	MW-19	MW-2	MW-3	MW-5		
Manganese	MW-1	MW-11	MW-12	MW-14	MW-17	MW-18	MW-2	MW-3	MW-5			
Iron	MW-1	MW-12	MW-18	MW-3	MW-5							
Selenium	MW-15	MW-19	MW-2	MW-3								**Less Common**
Nitrate	MW-15	MW-19	MW-3									
Zinc	MW-14	MW-2	MW-3									
Arsenic												
Cadmium												
Chromium												
Mercury												
Molybdenum												
Vanadium												
Beryllium												**Rare, Generally Immobile in Groundwater**
Copper												
Lead												
Nickel												
Silver												
Thallium												

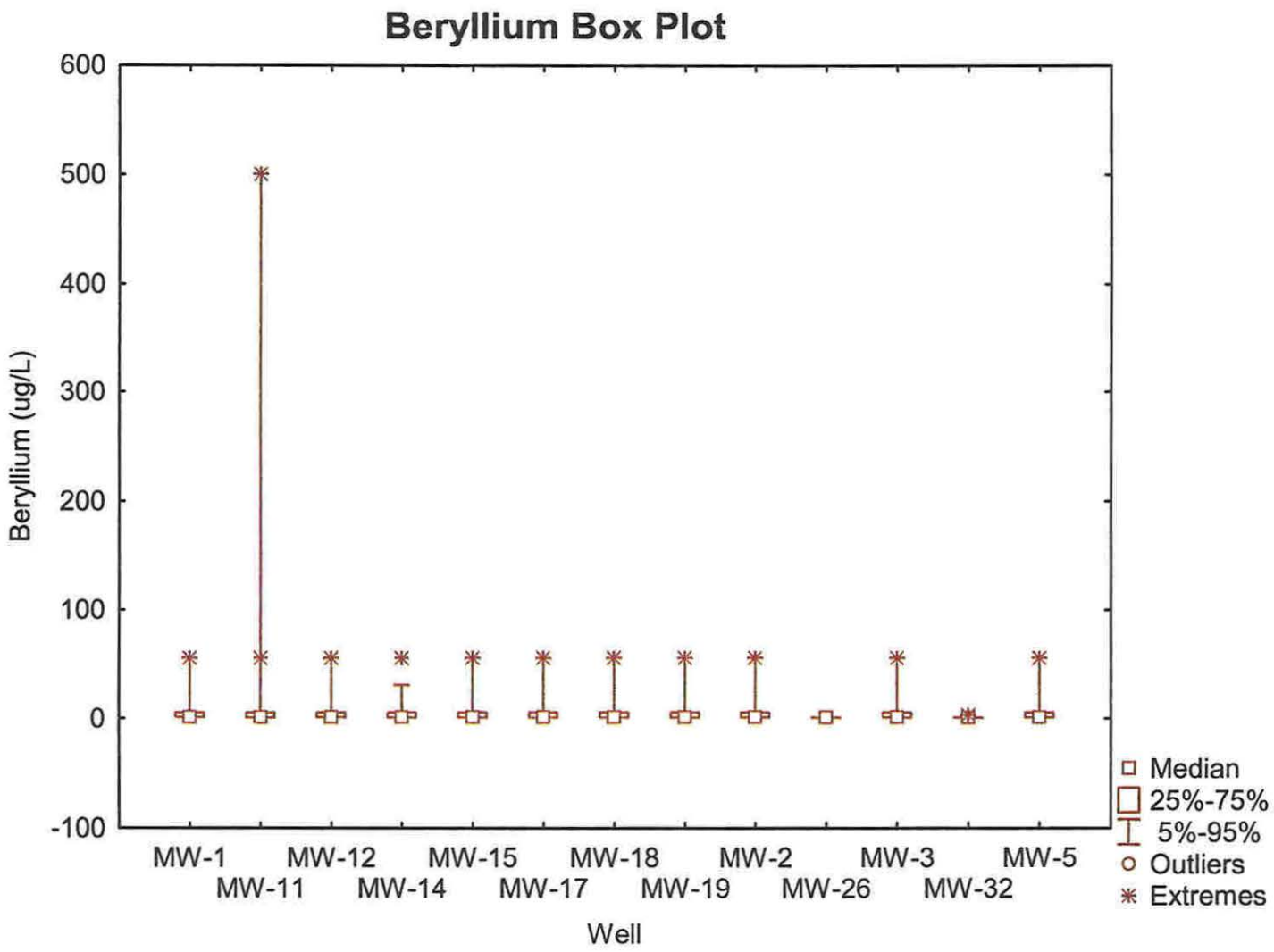
Monitor Wells MW-23, MW-24, MW-25, MW-26, MW-27, MW-28, MW-30, MW-31, and MW-32 are not included because data are only available from less than six sampling rounds.

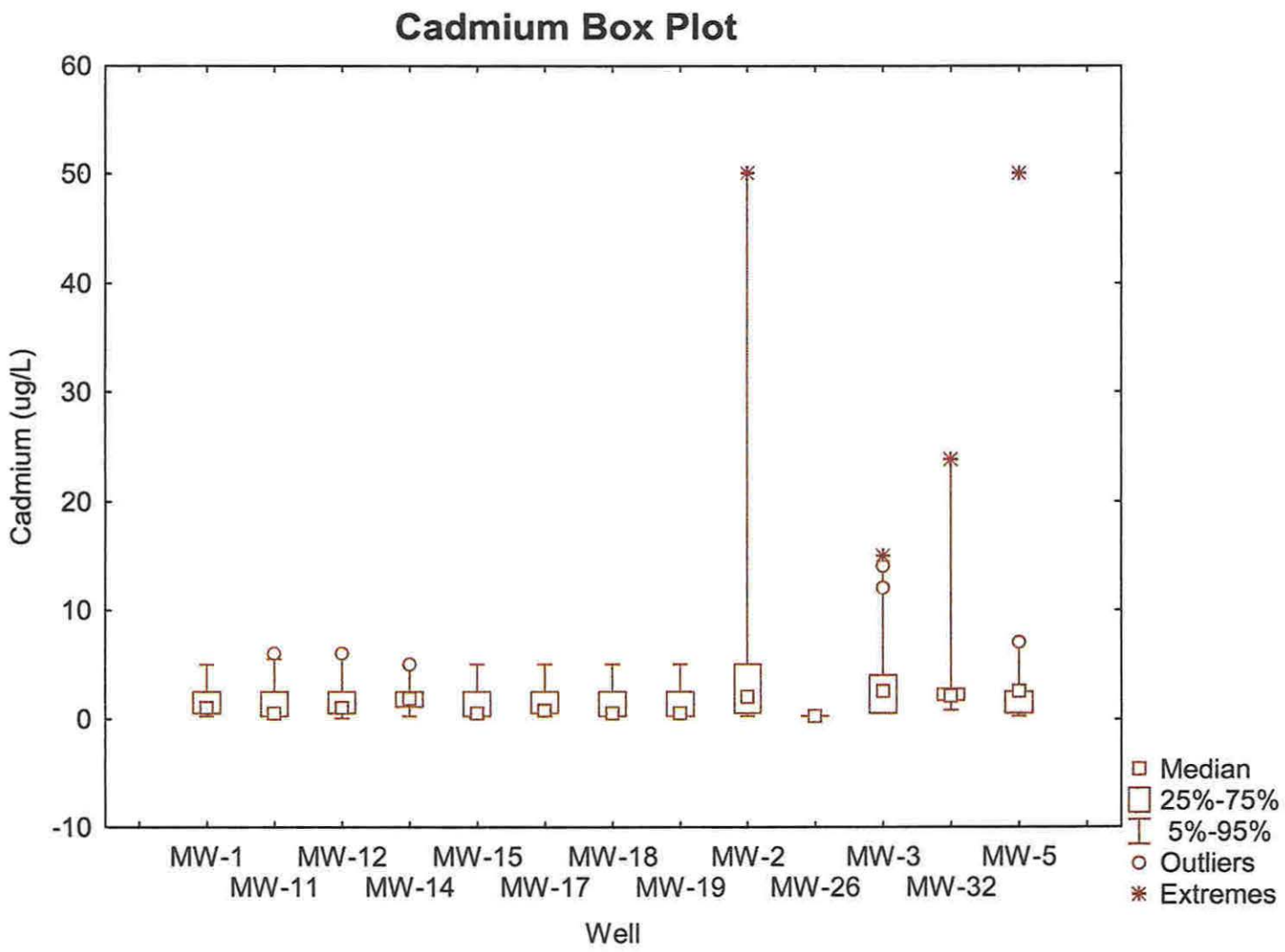
Table 15. Summary of the measured concentrations of several constituents, tailings impoundment solutions from Table 5 of the Statement of Basis for the White Mesa Mill (UDEQ, 2004)

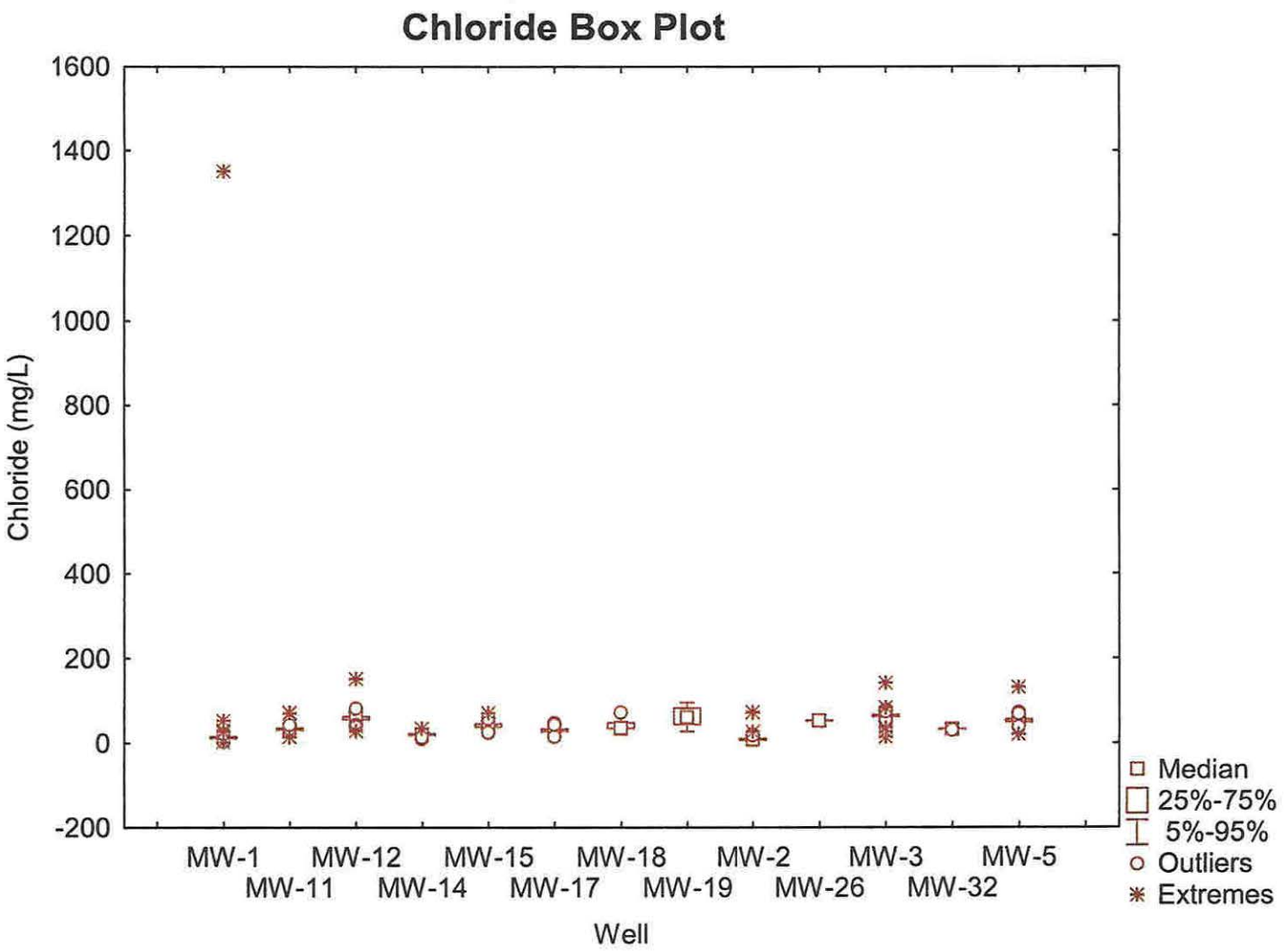
Contaminant	State GWQS mg/L	1979 IUC Bench-top Estimate[1] (mg/L)	1980 NRC Generic EIS Estimate[2] (mg/L)	September, 1980-March, 2003 IUC/NRC Tailings Wastewater Samples[3] Reported Concentrations Min. (mg/L)	Max. (mg/L)	Average (mg/L)	Std. Dev. (mg/L)	Sample Count	Avg/ GWQS Ratio
Nitrate (N)	10			24	24	24		1	2.4
Chloride	N/A	3,050	300	2,110	8,000	4,608.44	2,372.39	16	
Fluoride	4	1.4	5	0.02	4,440	1,694.70	1,449.21	13	423.7
Sulfate	N/A	82,200	30,000	29,800	190,000	64,913.90	48,361.60	17	
Arsenic	0.05	52	0.2	0.3	440	149	148.18	22	2,981
Beryllium	0.004			0.347	1	0.50	0.13	15	125.6
Chromium	0.1	6		1	13	6.20	3.38	17	61.7
Iron	11	N/A	1,000	1080	3,400	2,211.9	887.56	16	201.1
Lead	0.015	1	0.7	0.21	6.0	3.0	1.26	14	198.1
Manganese	0.8	4,580	500	74	222	145.8	34.76	18	182.3
Molybdenum	0.04	7	100	0.44	240	52.8	71.17	18	1,320.30
Nickel	0.1	N/A	N/A	7.2	370	82.6	115.40	17	826.1
Selenium	0.05	0.56	20	0.18	2	1.4	0.67	18	27.0
Urnaium	0.03	2.5		5.0	154	93.6	41.20	17	3,120.60
Gross Alpha	15	250,000		14,000	189,000	120,493	50,345.10	15	8,032.9

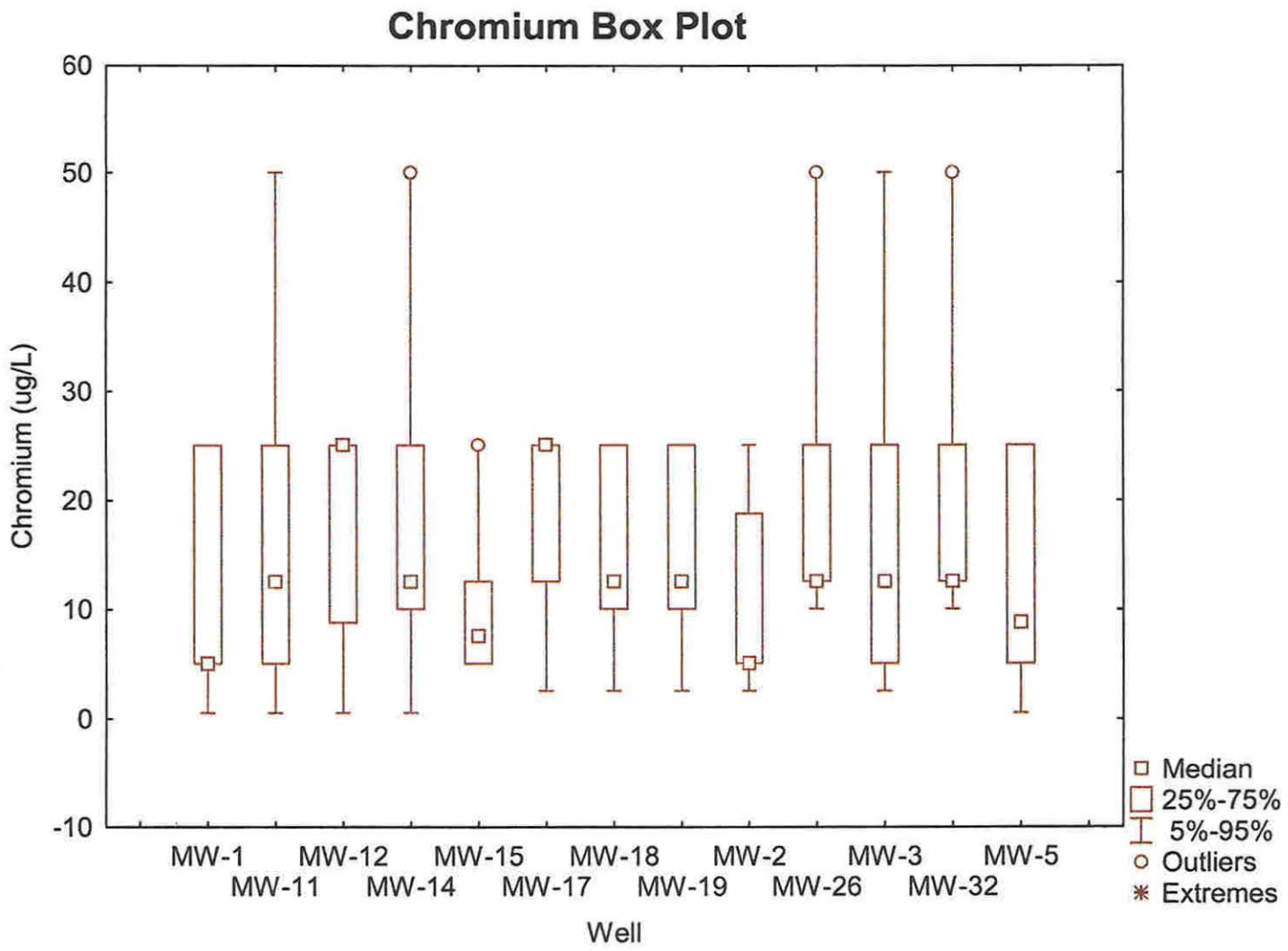

Ammonia as N Box Plot
Ammonia as N (mg/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

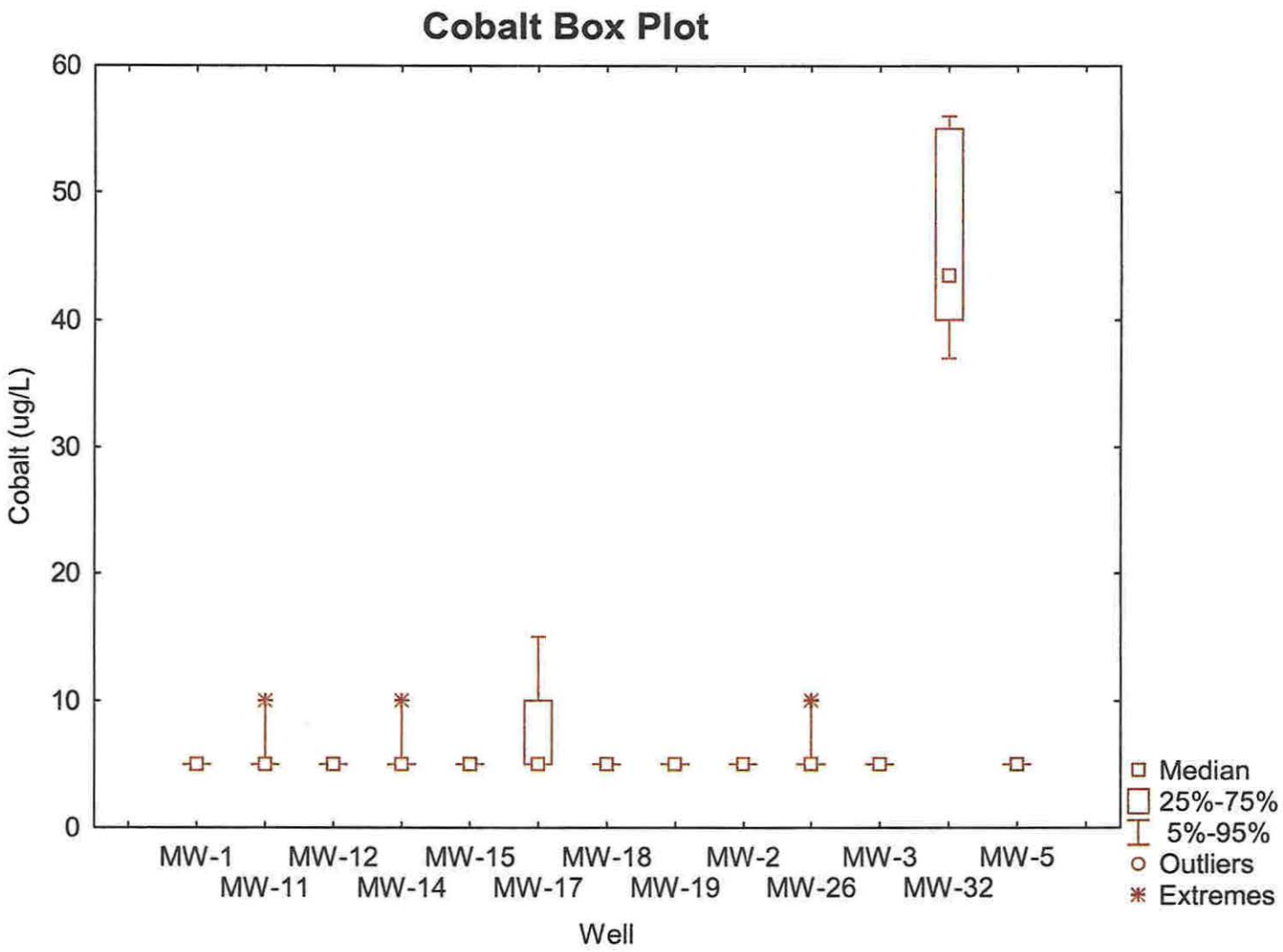

Arsenic Box Plot
8E5
7E5
6E5
5E5
4E5
3E5
2E5
1E5
0
-1E5
Arsenic (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

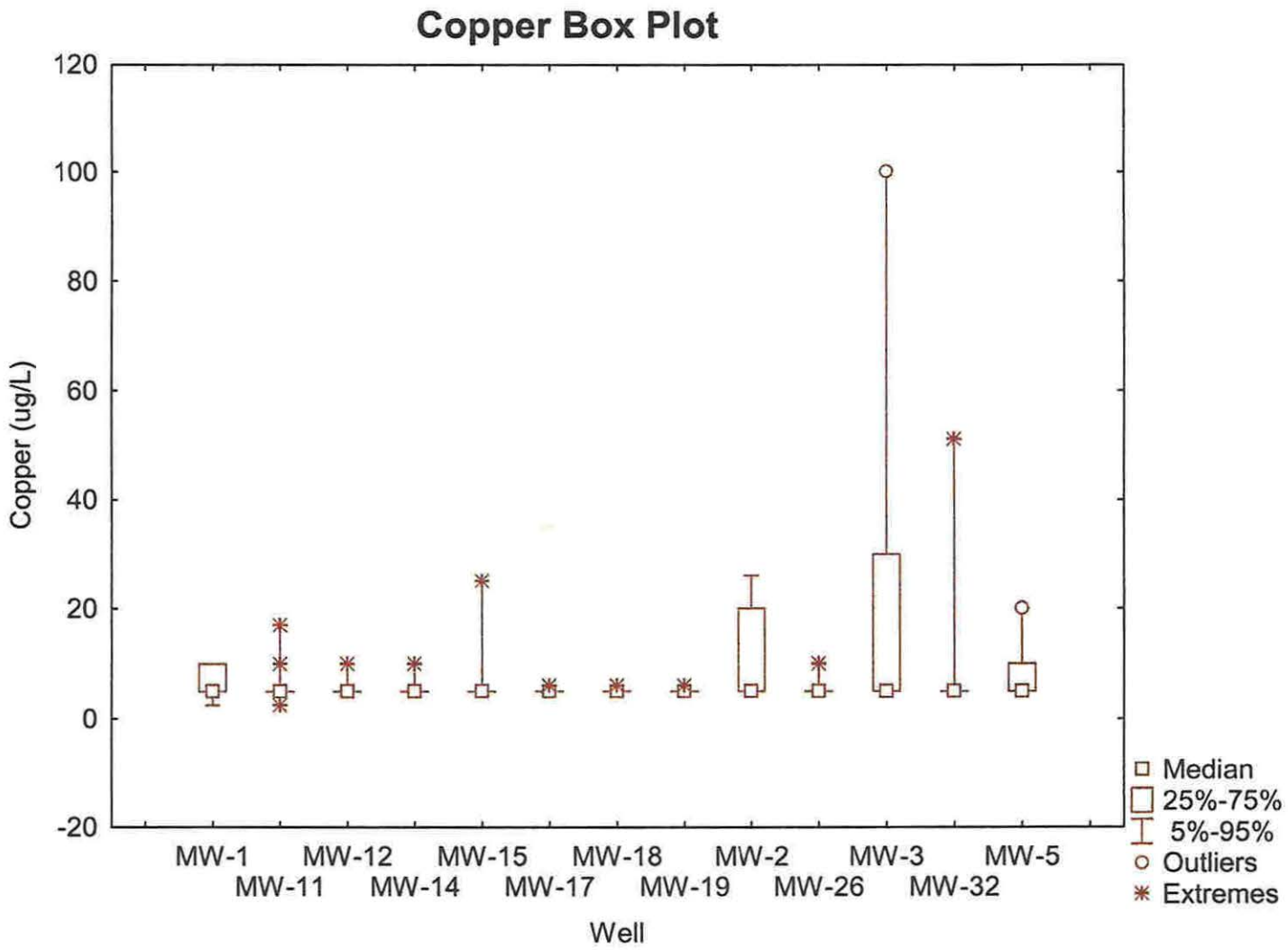

Beryllium Box Plot
600
500
400
300
200
100
0
-100
Beryllium (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

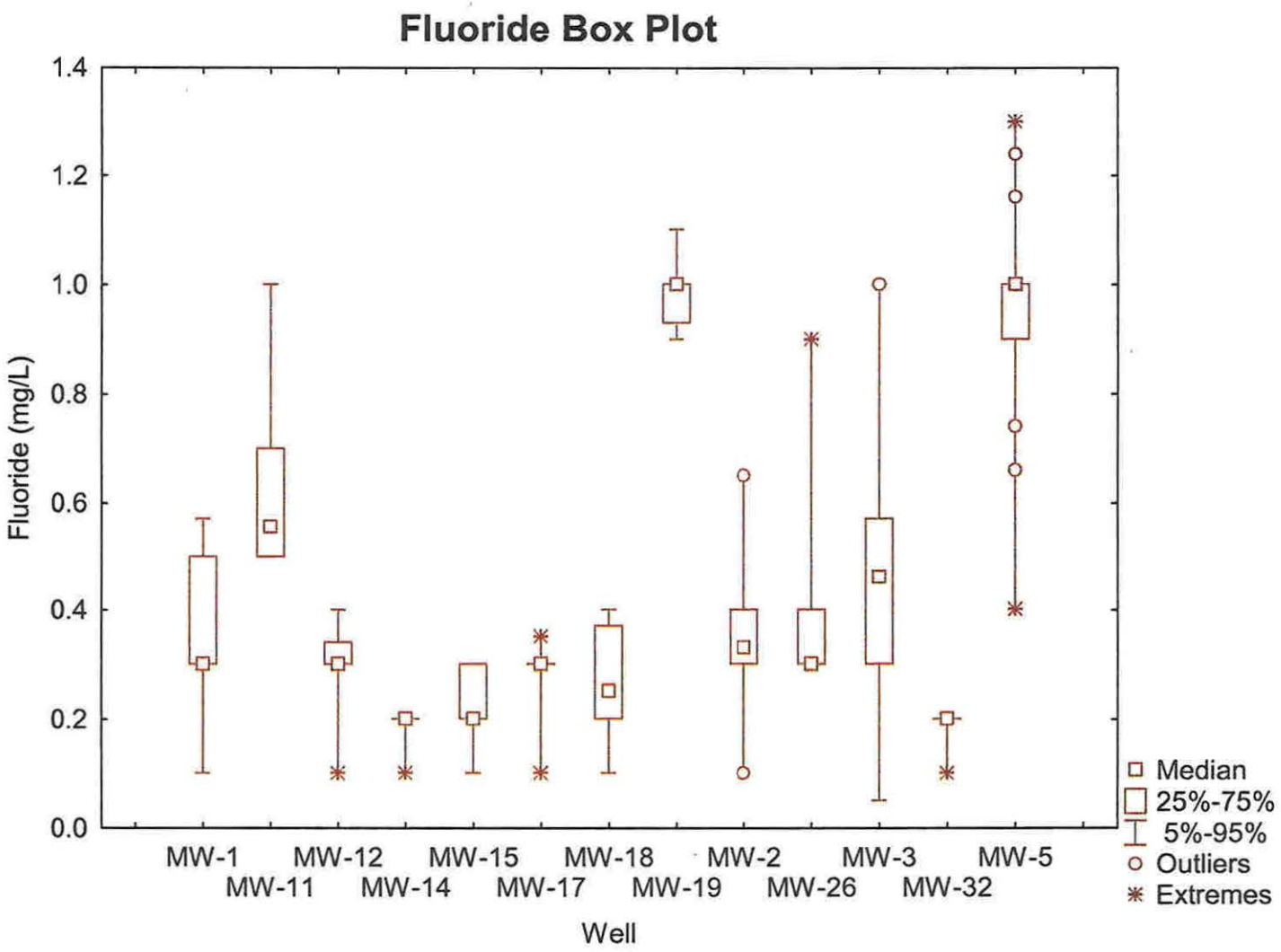

Cadmium Box Plot
60
50
40
30
20
10
0
-10
Cadmium (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

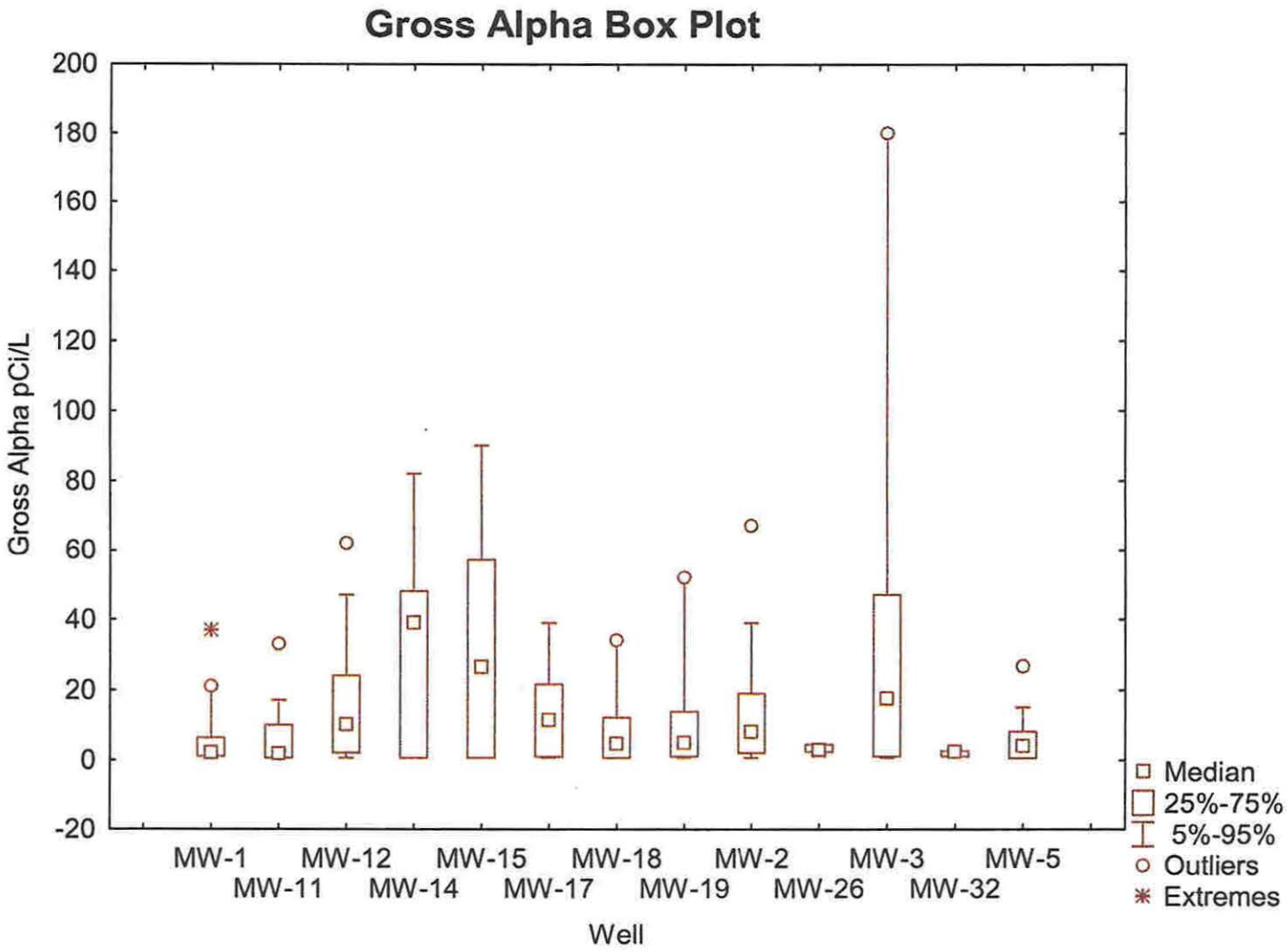

Chloride Box Plot
1600
1400
1200
1000
800
600
400
200
0
-200
Chloride (mg/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

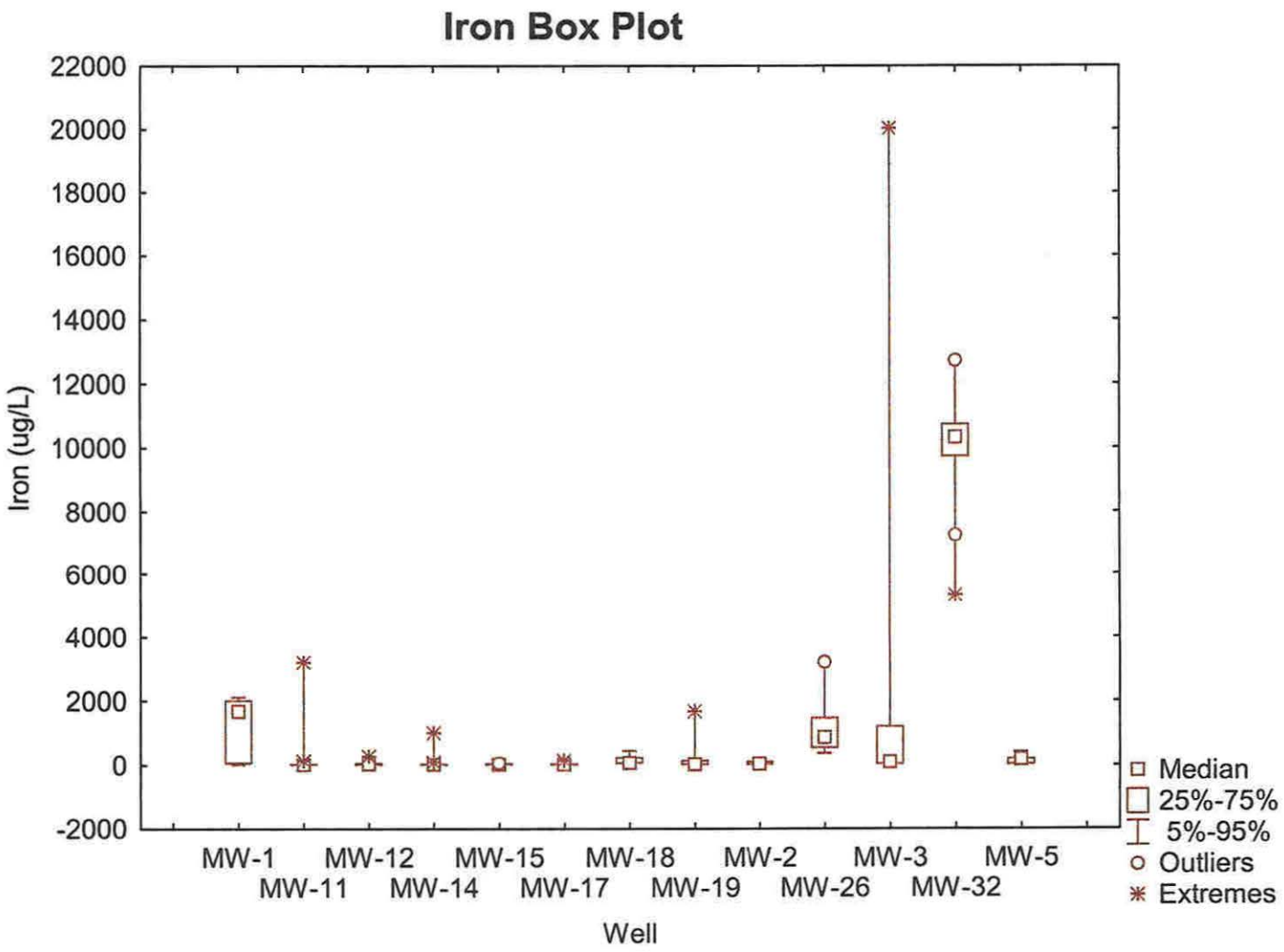

Chromium Box Plot
60
50
40
30
20
10
0
-10
Chromium (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

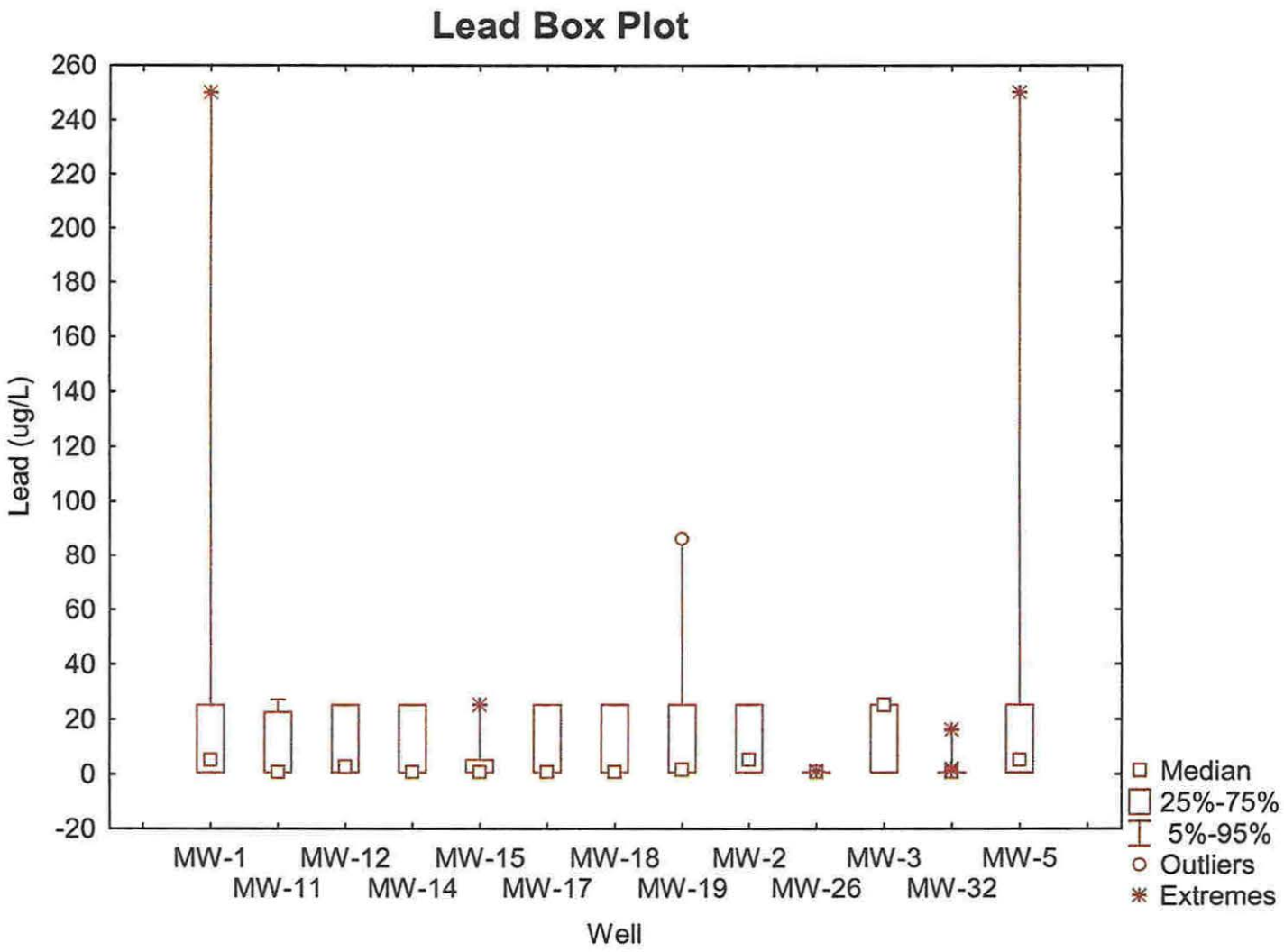

Cobalt Box Plot
60
50
40
30
20
10
0
Cobalt (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

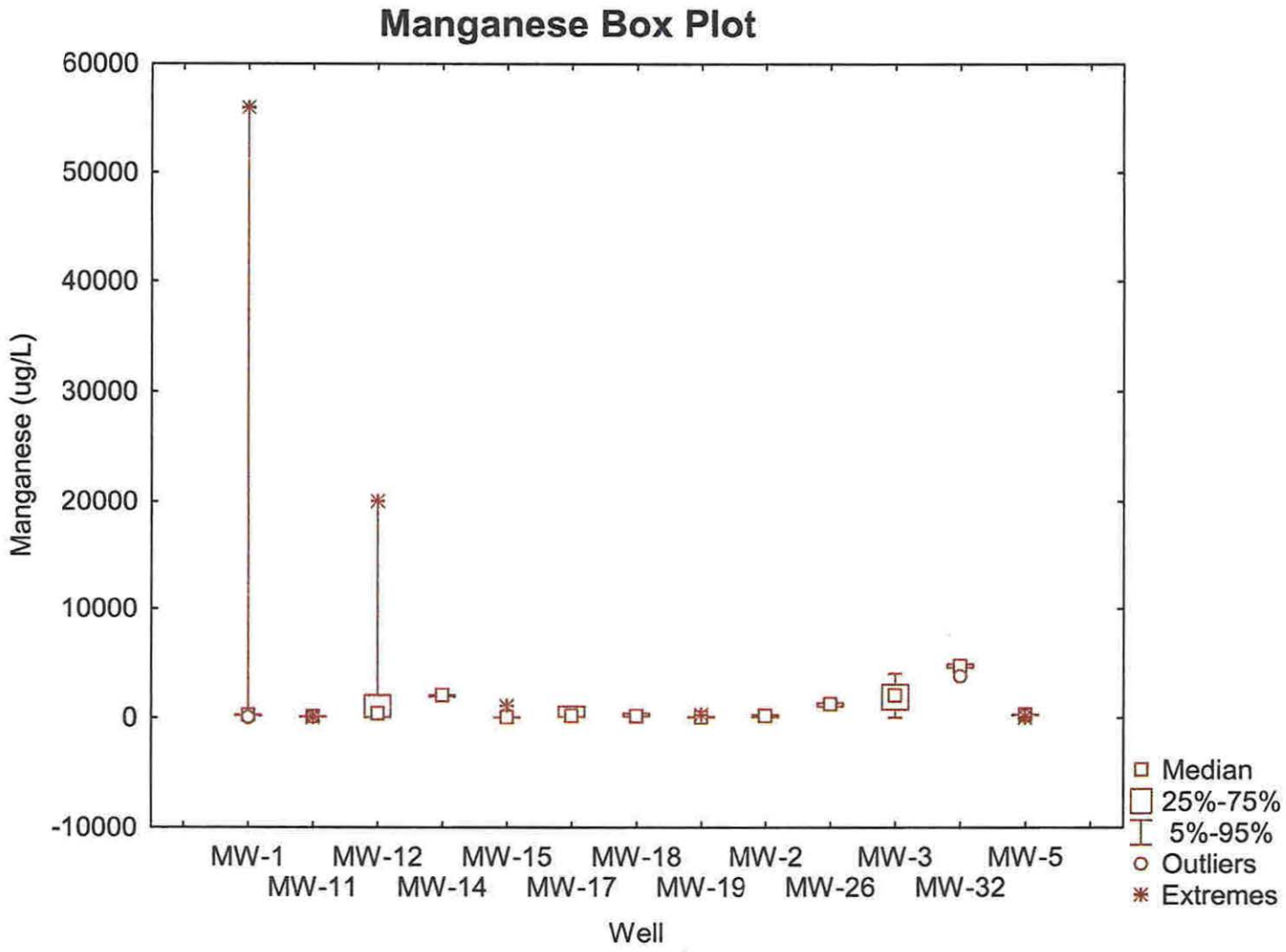

Copper Box Plot
120
100
80
60
40
20
0
-20
Copper (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

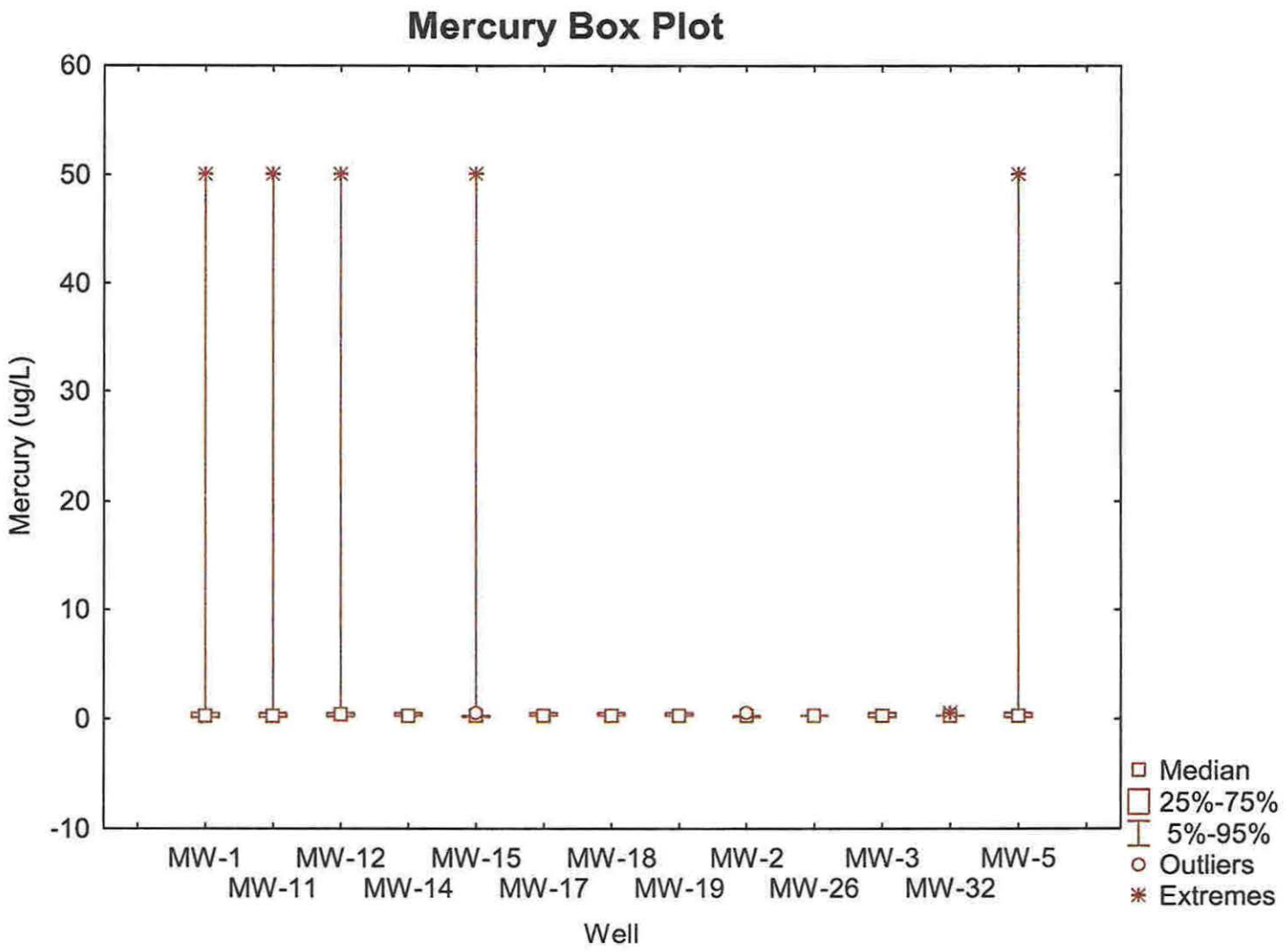

Fluoride Box Plot
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Fluoride (mg/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

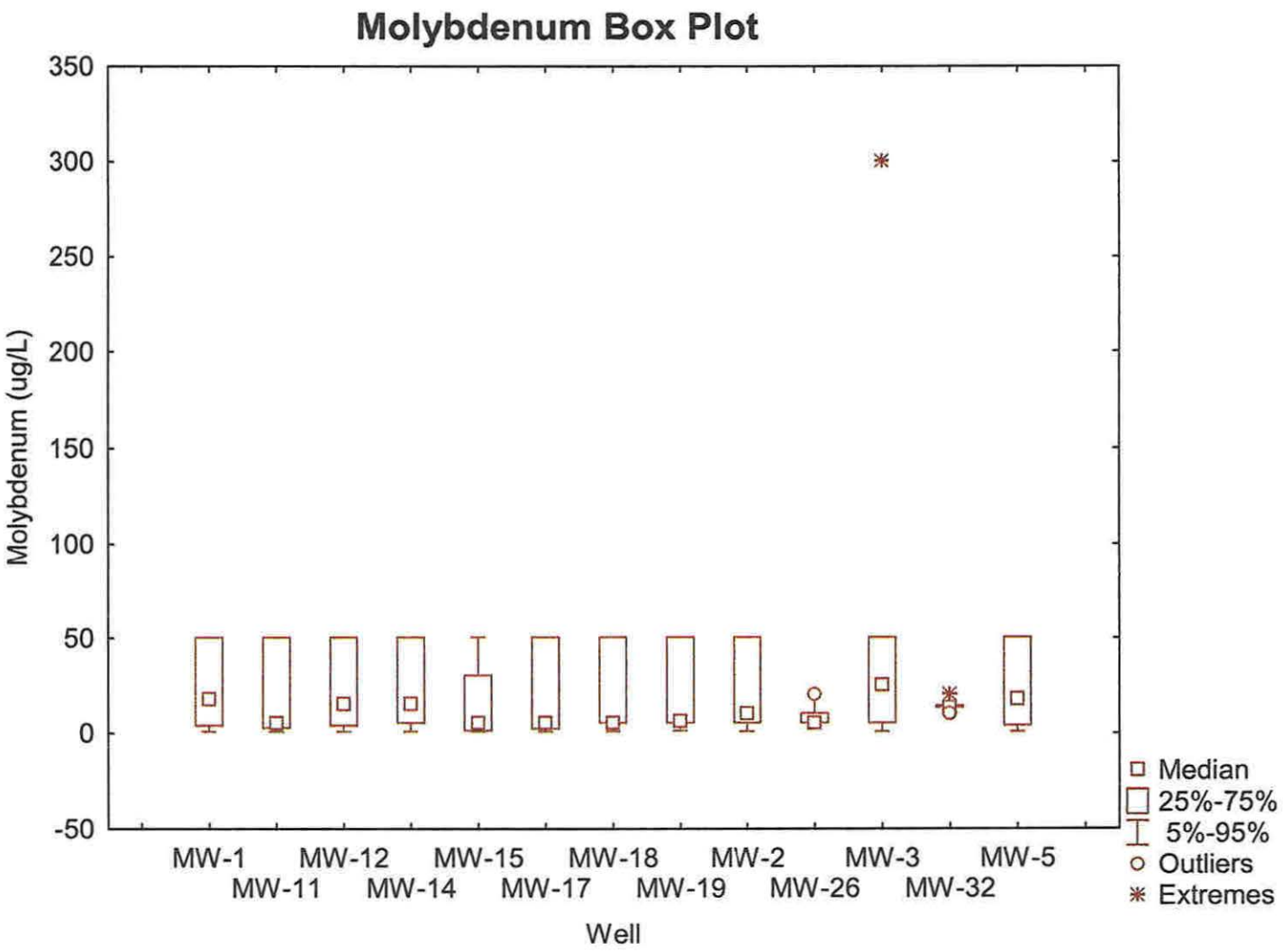

Gross Alpha Box Plot
Gross Alpha pCi/L
200
180
160
140
120
100
80
60
40
20
0
-20
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

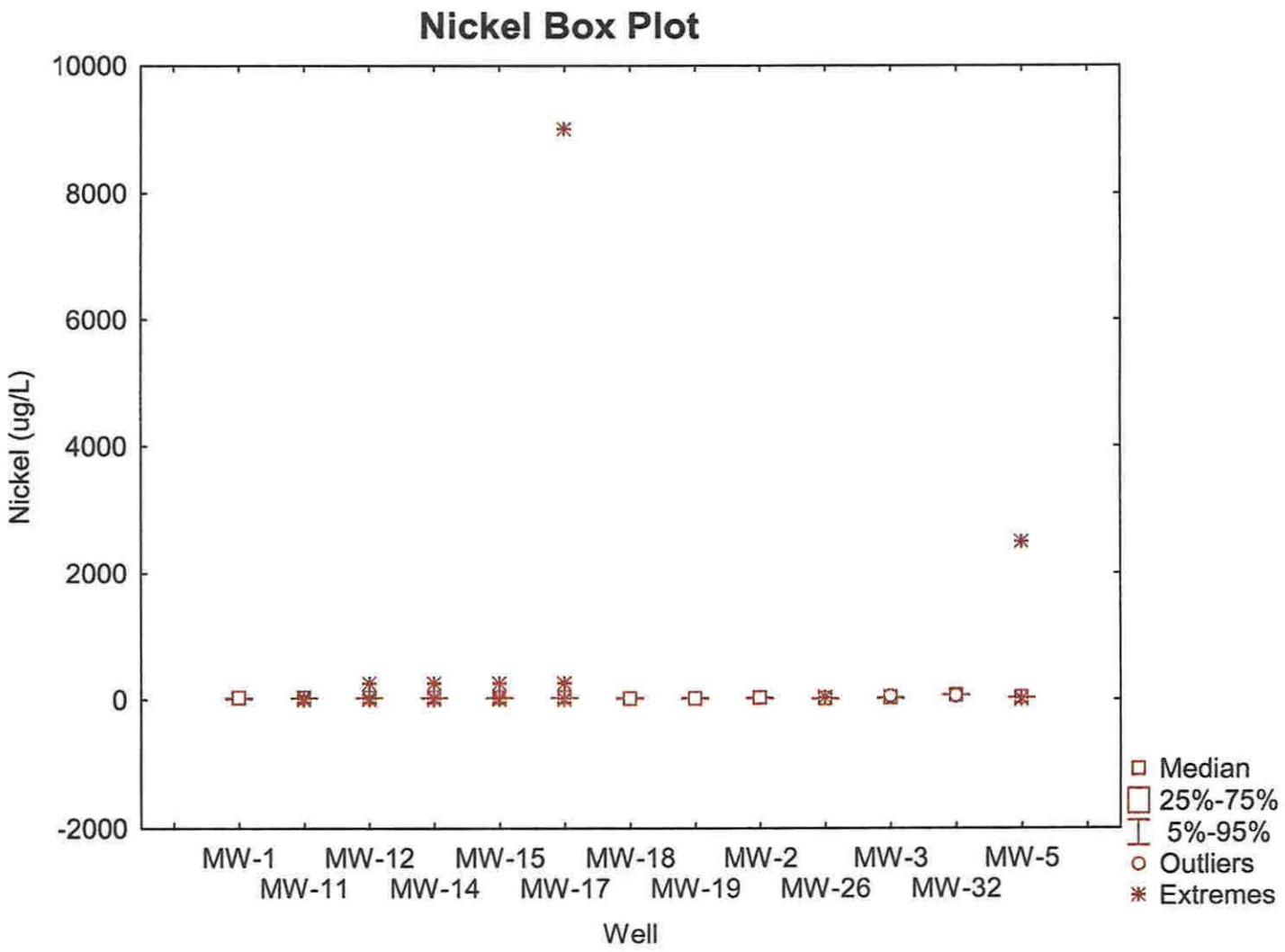

Iron Box Plot
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-2000
Iron (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

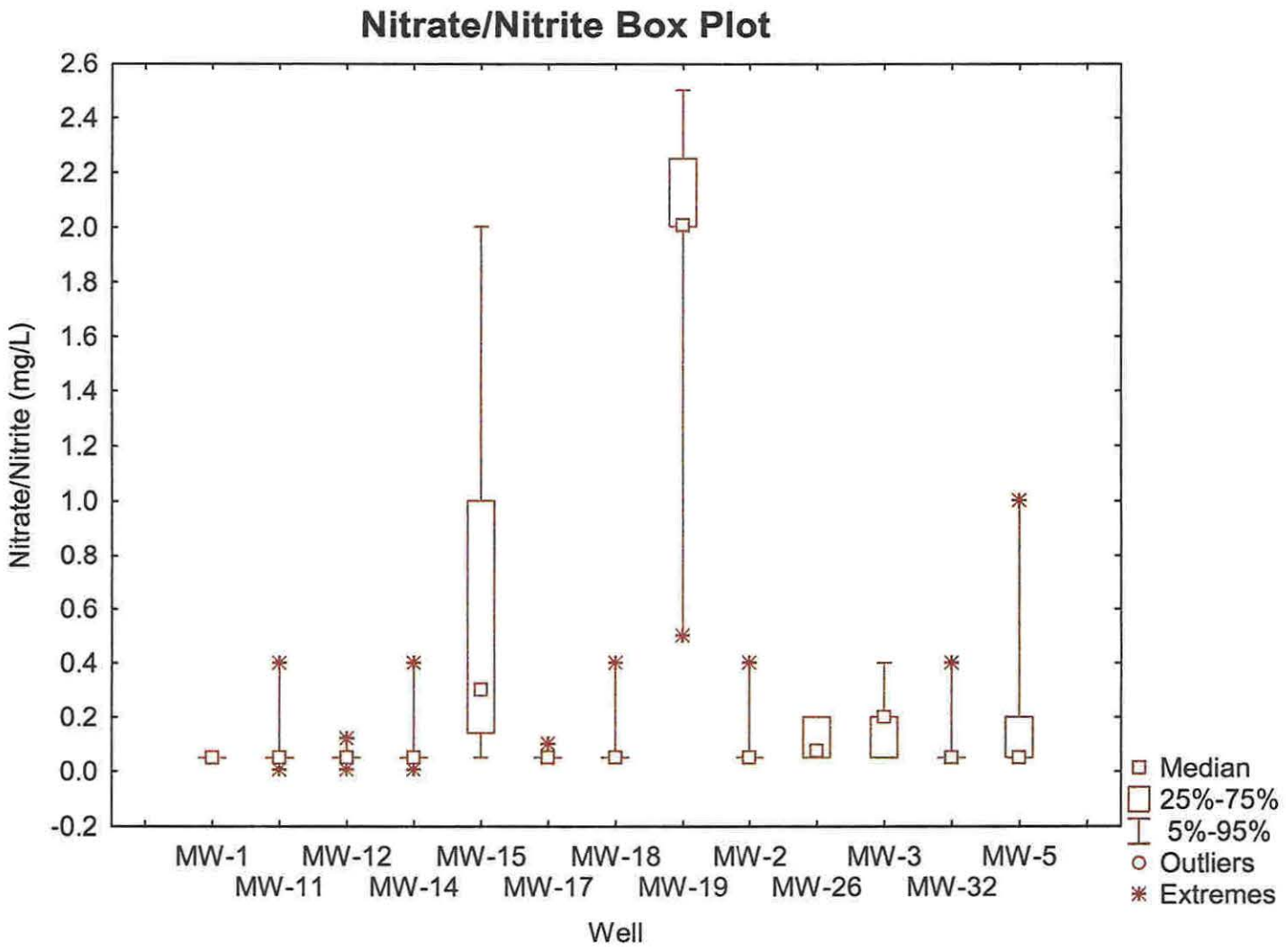

Lead Box Plot
Lead (ug/L)
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

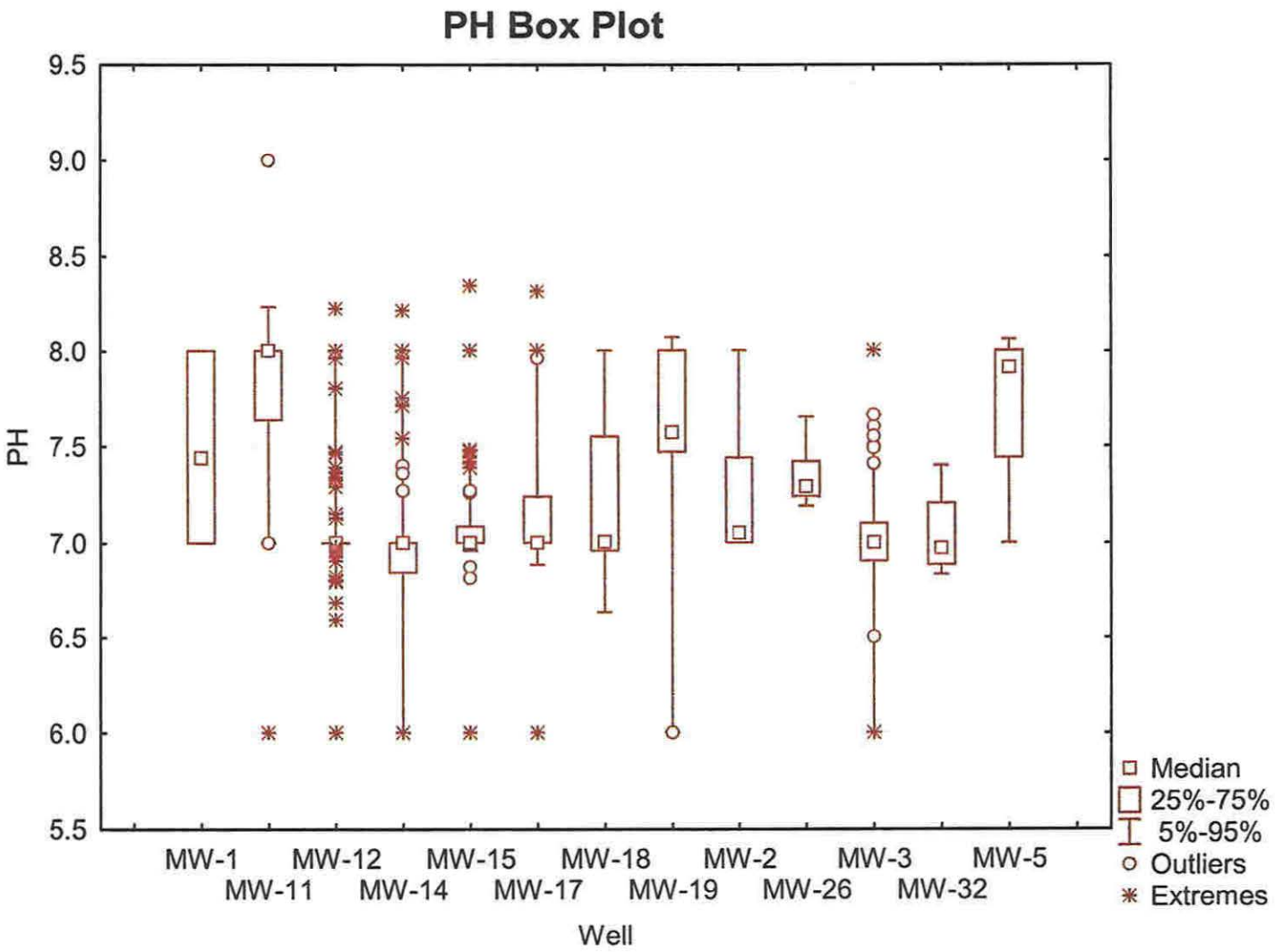

Manganese Box Plot
60000
50000
40000
30000
20000
10000
0
-10000
Manganese (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

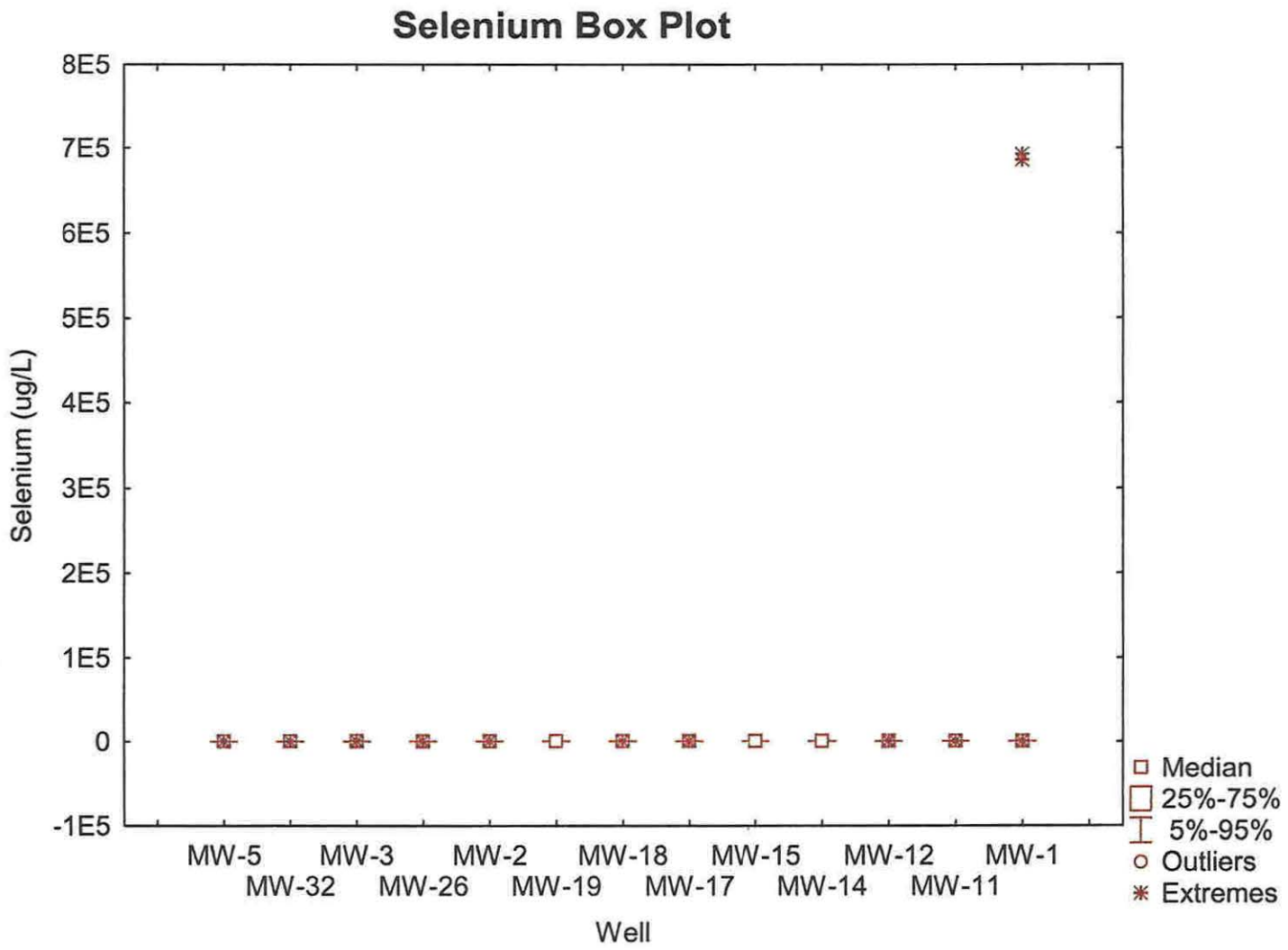

Mercury Box Plot
60
50
40
30
20
10
0
-10
Mercury (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

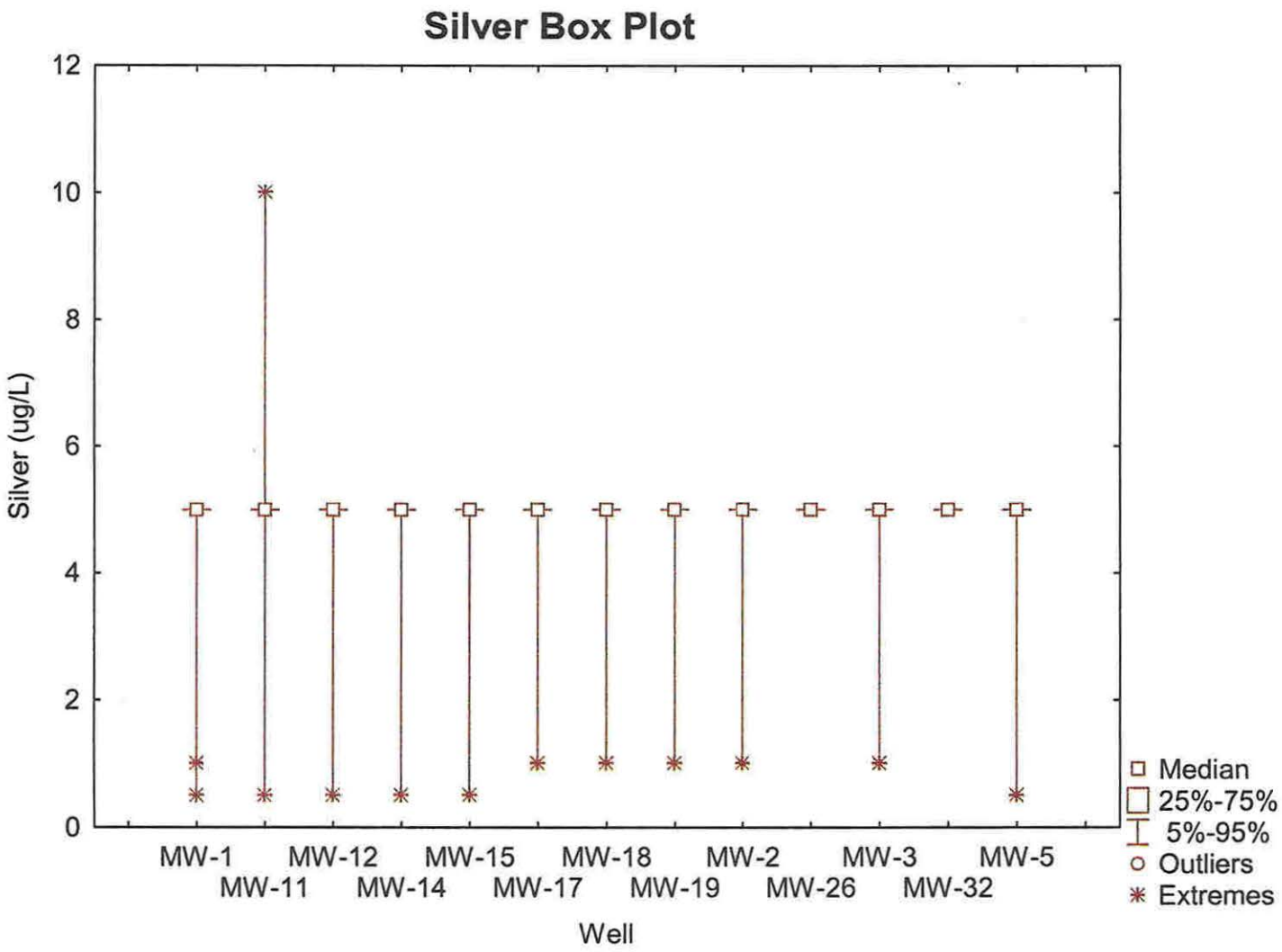

Molybdenum Box Plot
350
300
250
200
150
100
50
0
-50
Molybdenum (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

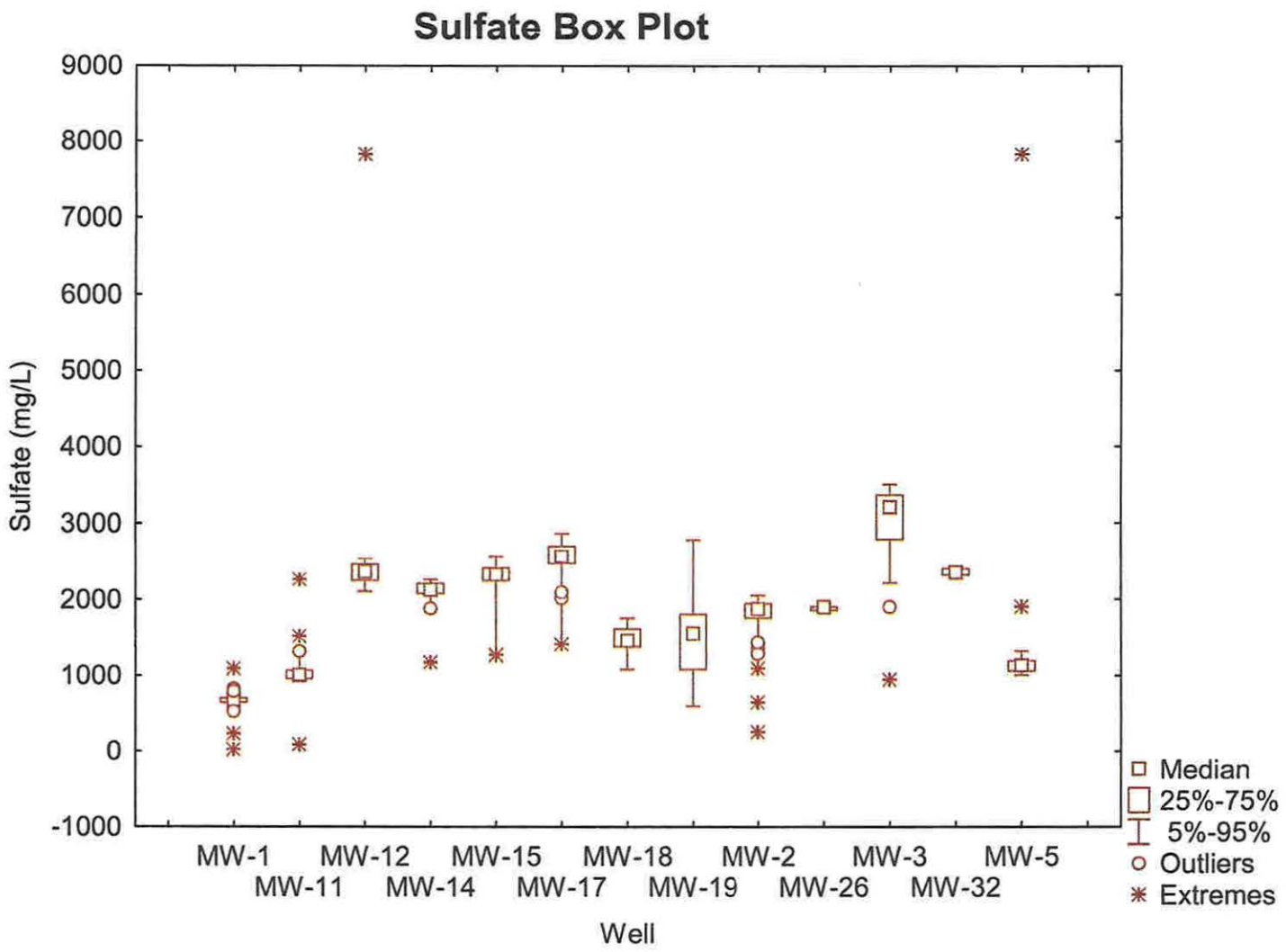

Nickel Box Plot
10000
8000
6000
4000
2000
0
-2000
Nickel (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

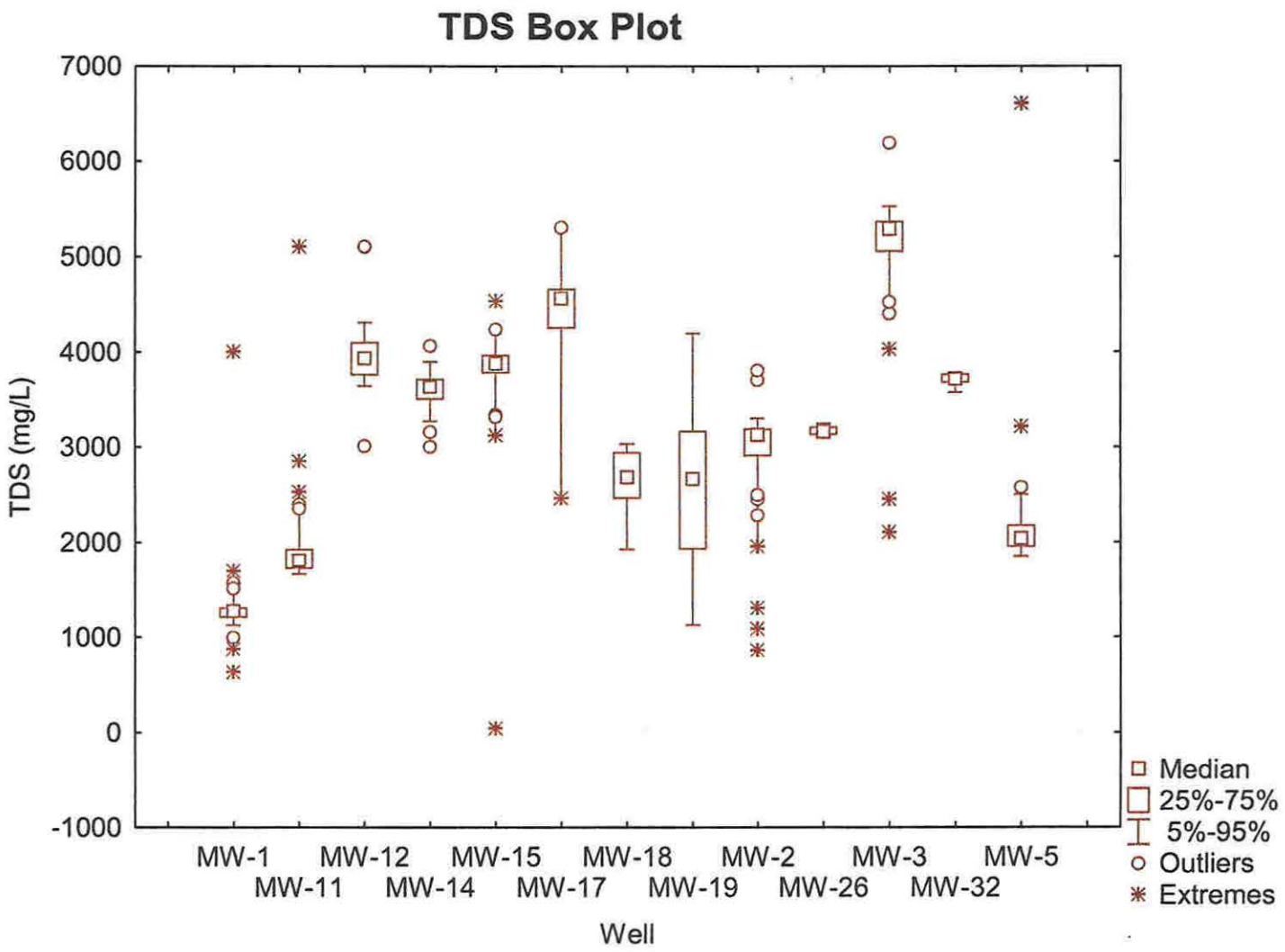

Nitrate/Nitrite Box Plot
Nitrate/Nitrite (mg/L)
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

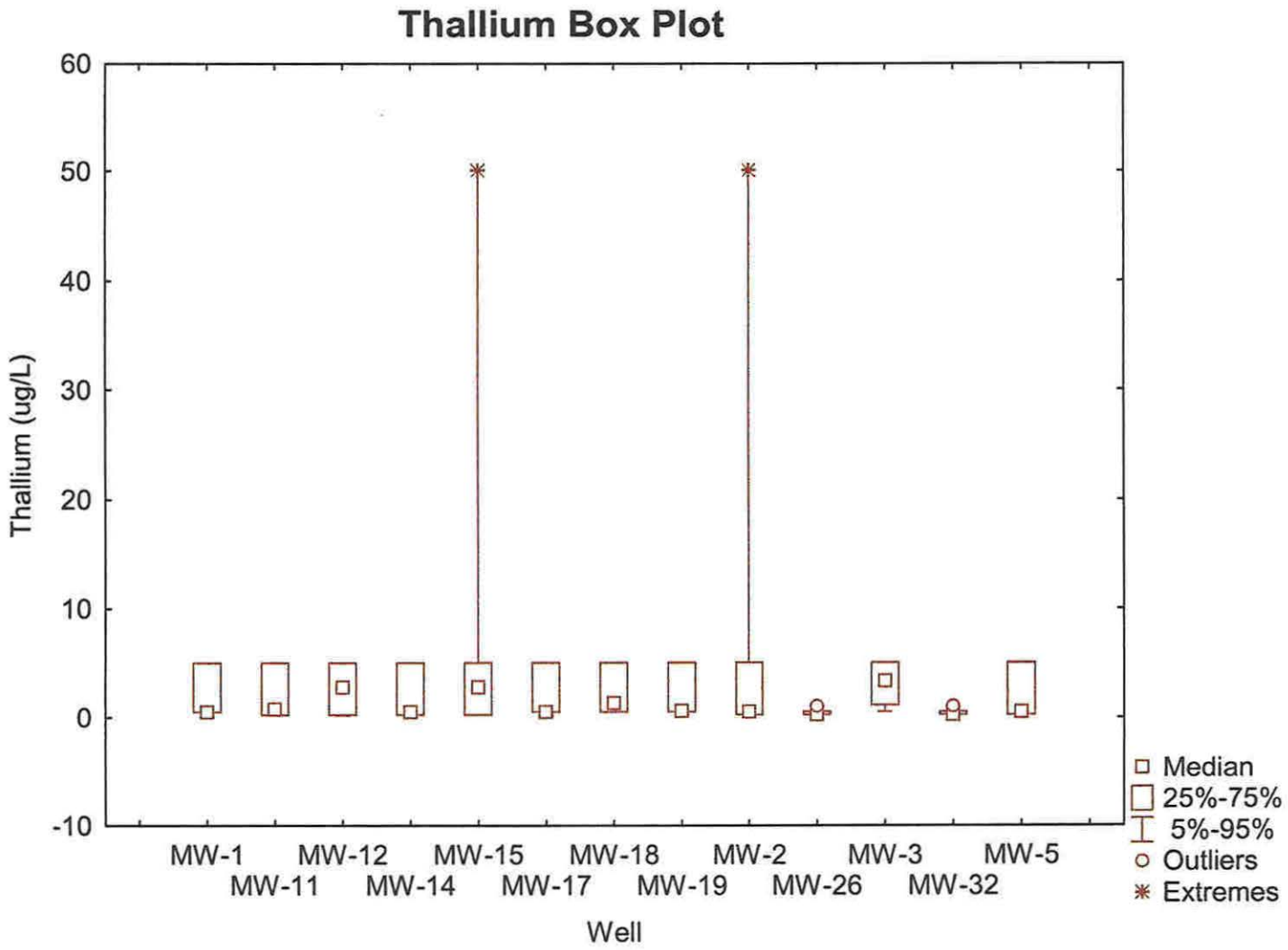

PH Box Plot
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
PH
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

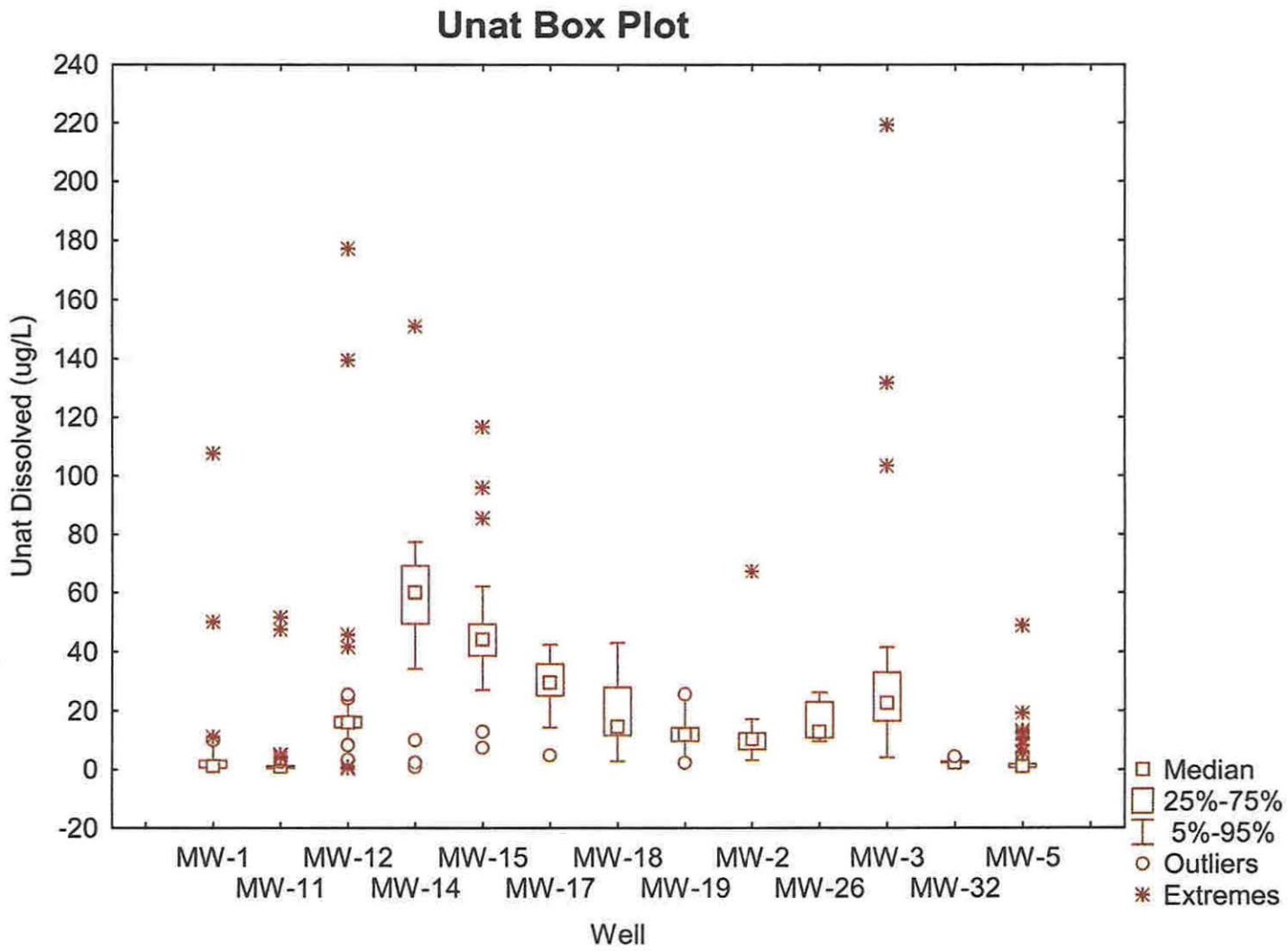

Selenium Box Plot
8E5
7E5
6E5
5E5
4E5
3E5
2E5
1E5
0
-1E5
Selenium (ug/L)
MW-5
MW-32
MW-3
MW-26
MW-2
MW-19
MW-18
MW-17
MW-15
MW-14
MW-12
MW-11
MW-1
Well
Median
25%-75%
5%-95%
Outliers
Extremes

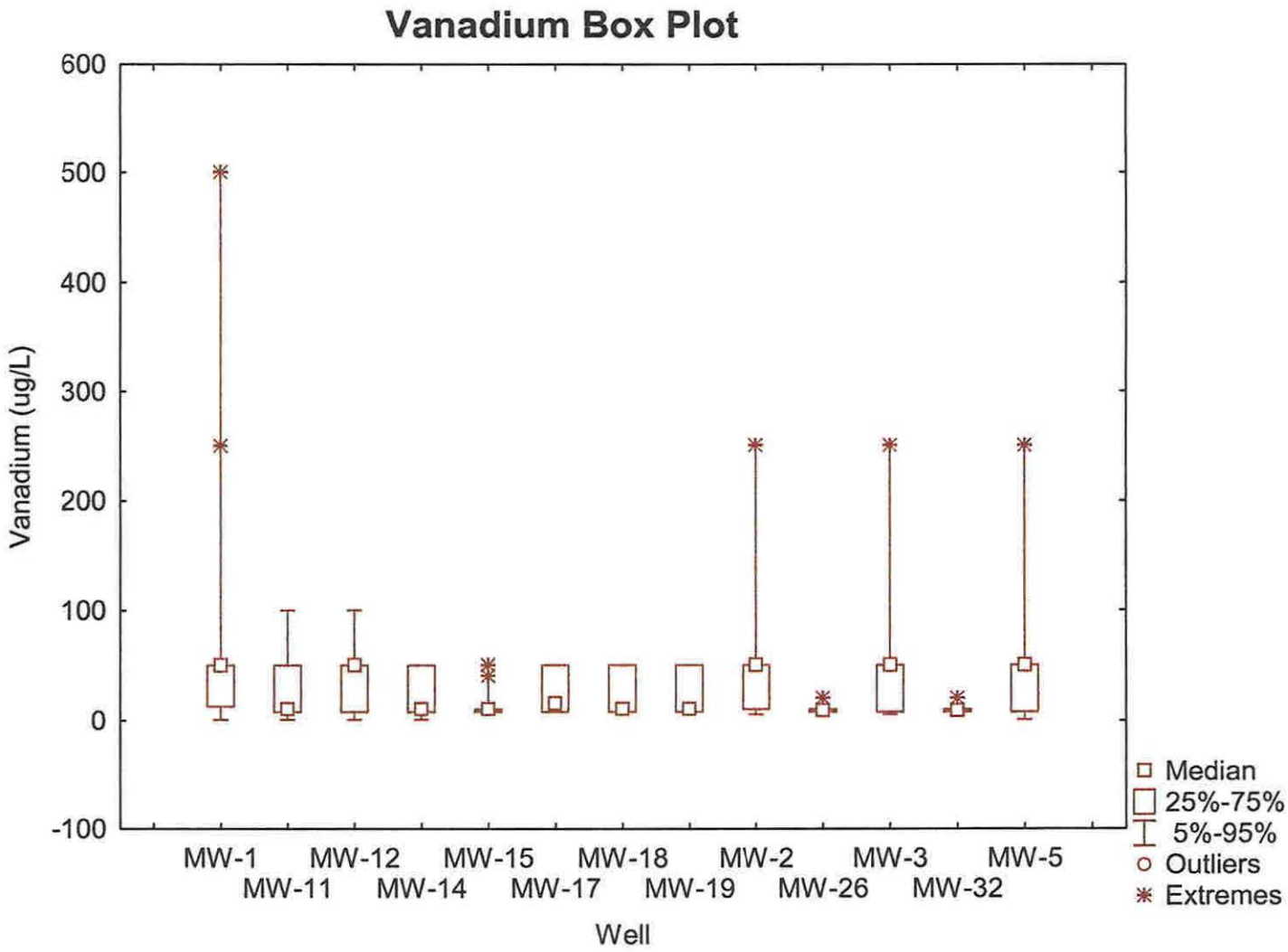

Silver Box Plot
12
10
8
6
4
2
0
Silver (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

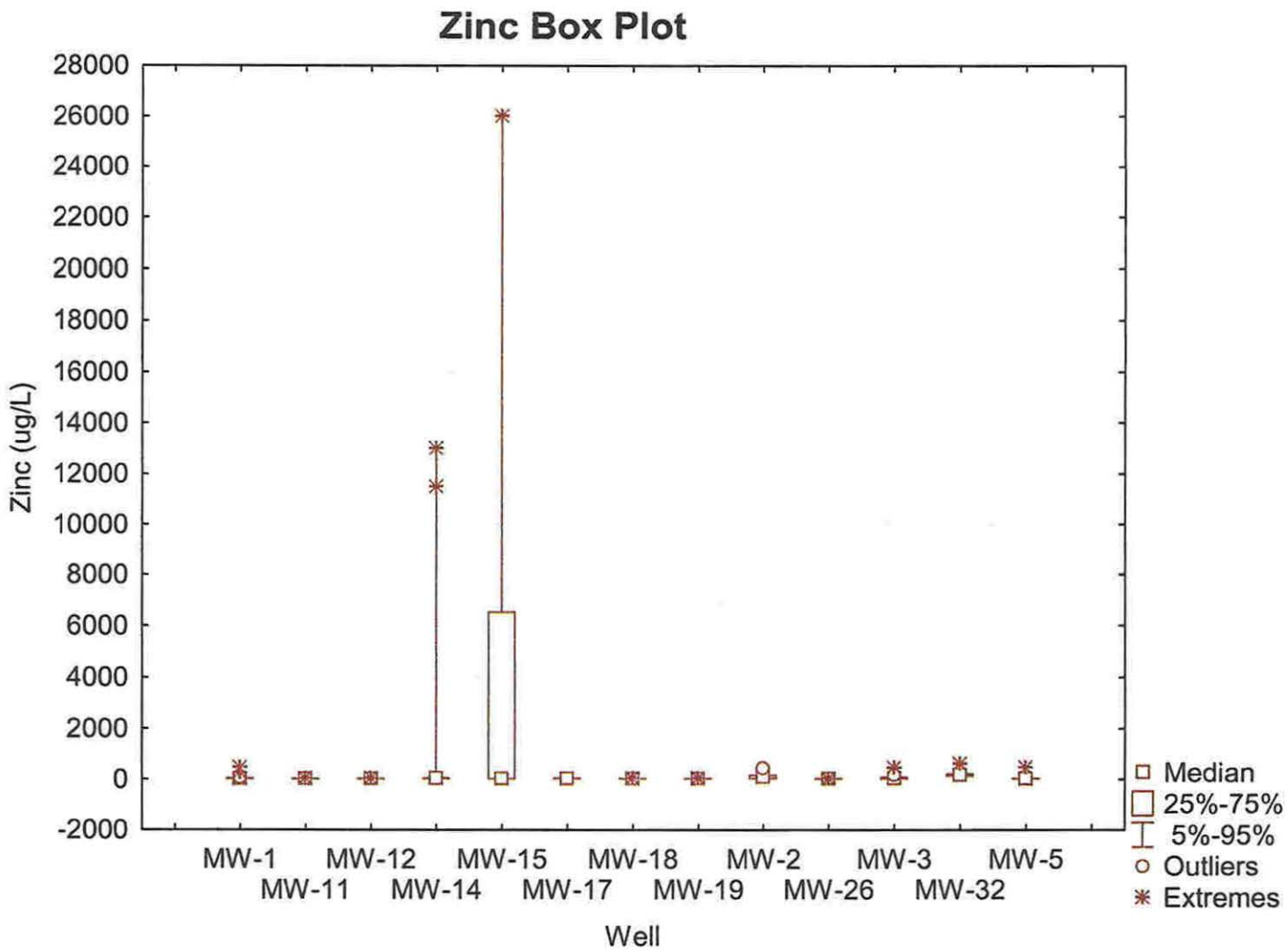

Sulfate Box Plot
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
-1000
Sulfate (mg/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes


TDS Box Plot
7000
6000
5000
4000
3000
2000
1000
0
-1000
TDS (mg/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

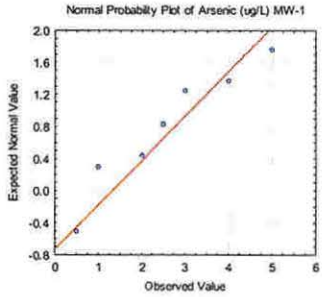

Thallium Box Plot
60
50
40
30
20
10
0
-10
Thallium (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

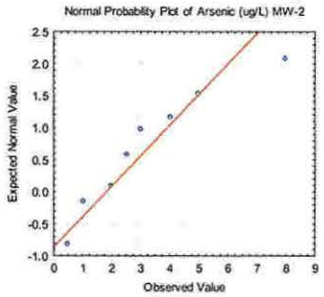

Unat Box Plot
Unat Dissolved (ug/L)
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

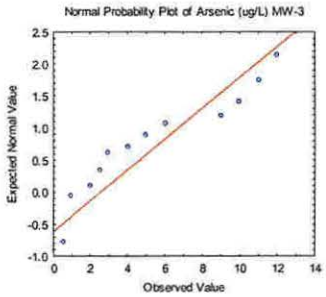

Vanadium Box Plot
600
500
400
300
200
100
0
-100
Vanadium (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

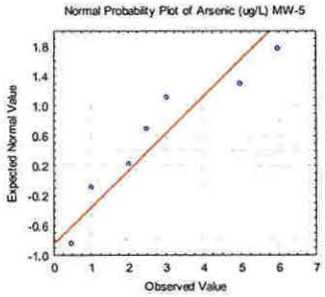

Zinc Box Plot
28000
26000
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-2000
Zinc (ug/L)
MW-1
MW-11
MW-12
MW-14
MW-15
MW-17
MW-18
MW-19
MW-2
MW-26
MW-3
MW-32
MW-5
Well
Median
25%-75%
5%-95%
Outliers
Extremes

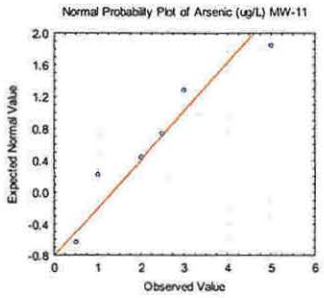
Arsenic Probability Plots

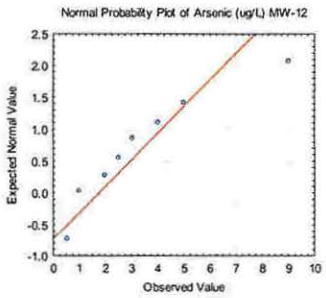


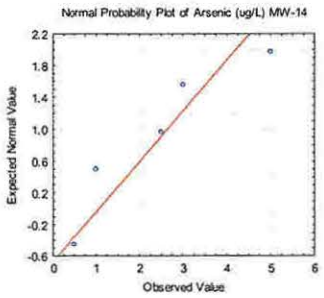


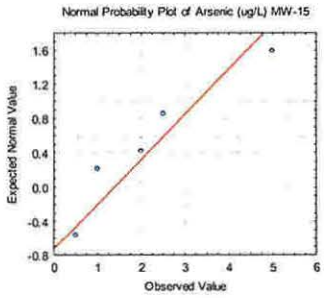


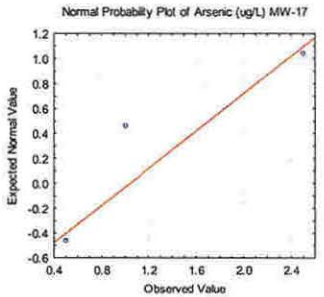


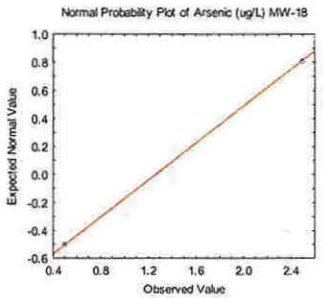


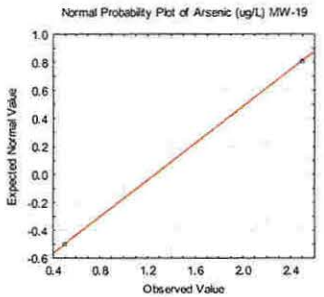




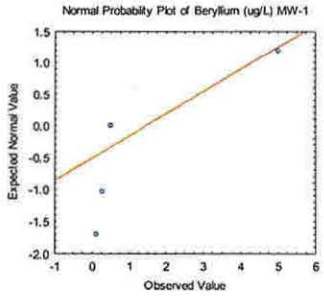


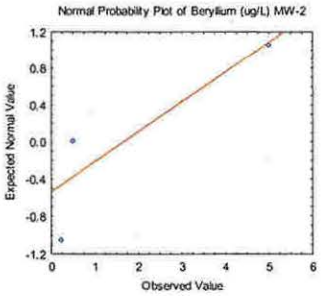


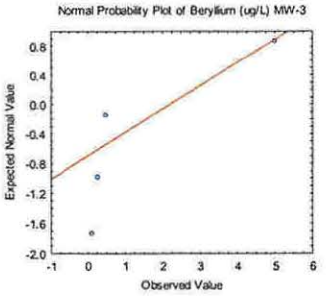


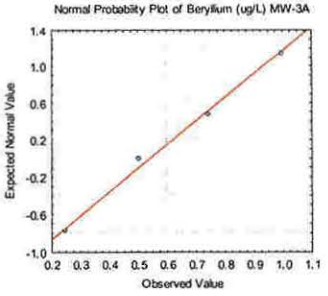


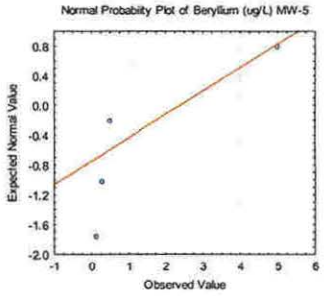
Beryllium Probability Plots

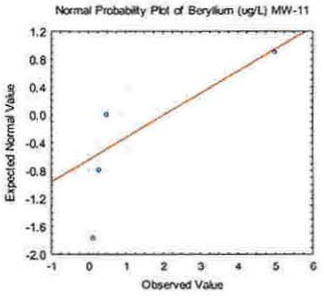


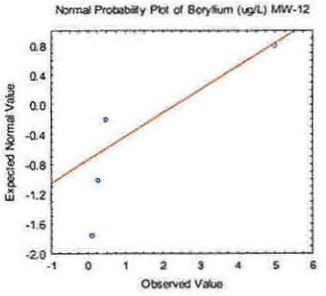


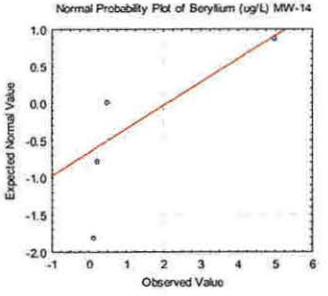


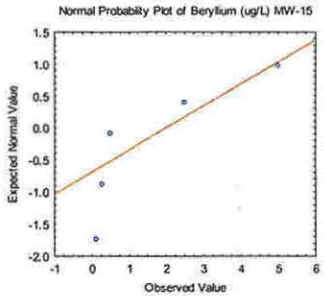


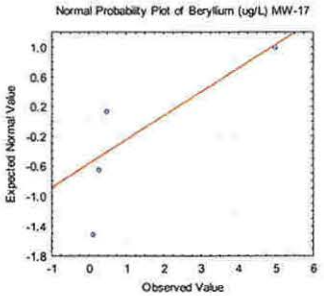


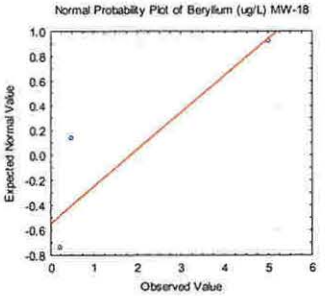


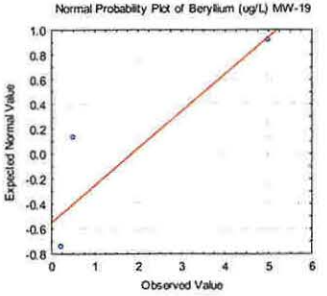




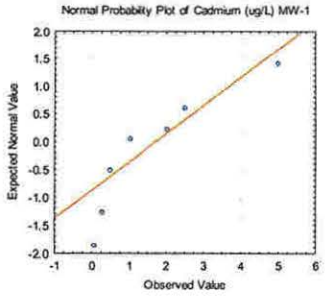


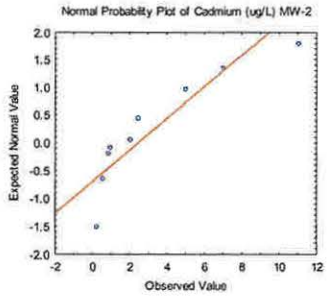


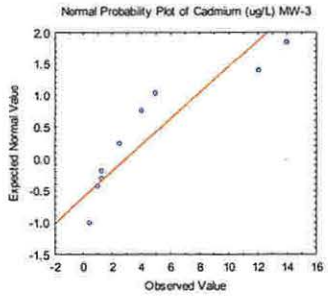


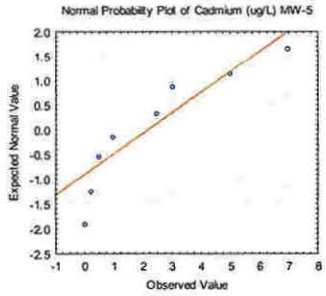


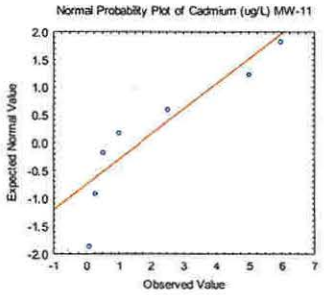
Cadmium Probability Plots

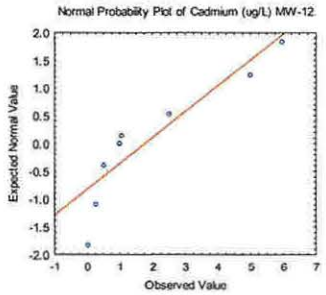


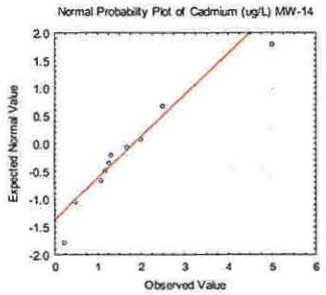


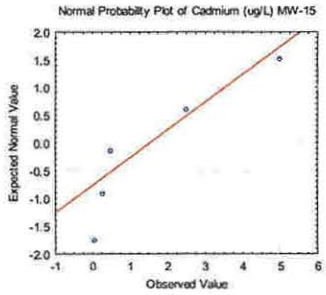


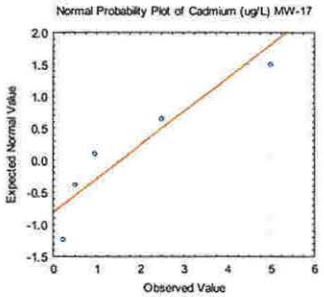


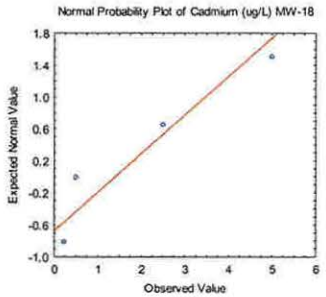


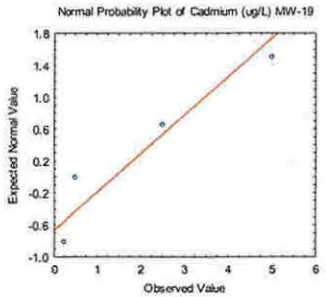


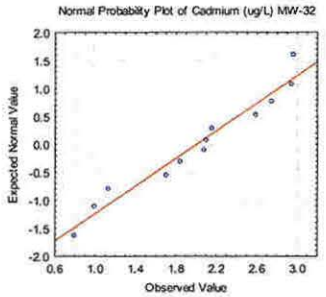




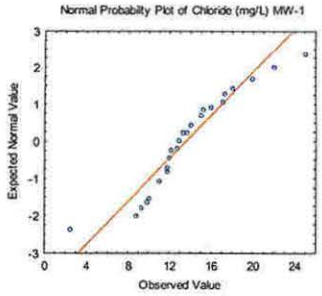


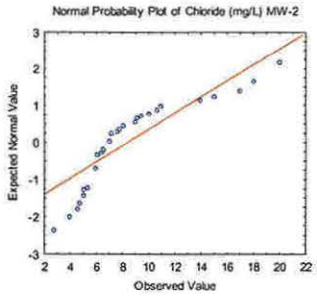


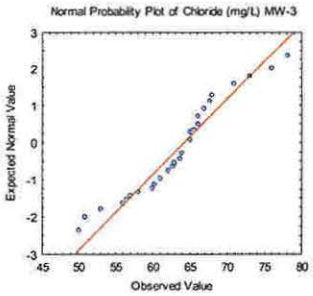


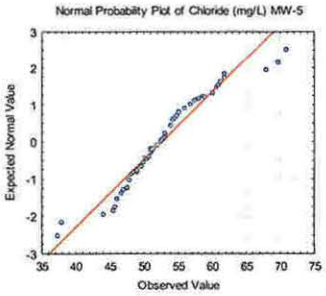


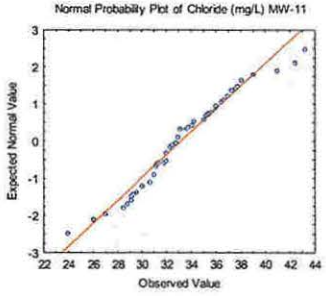
Chloride Probability Plots

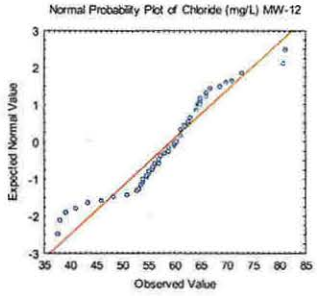


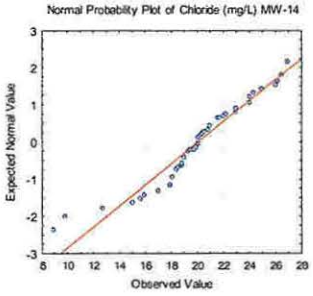


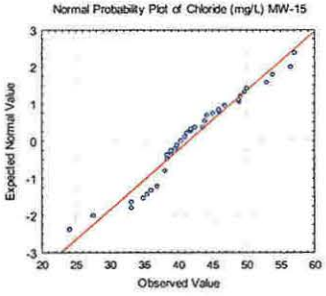


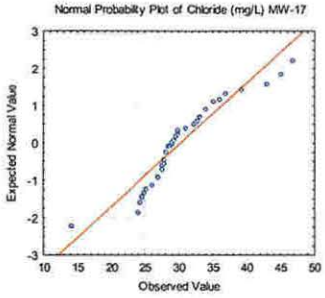


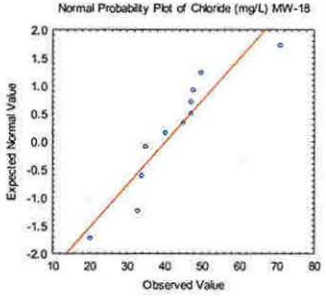


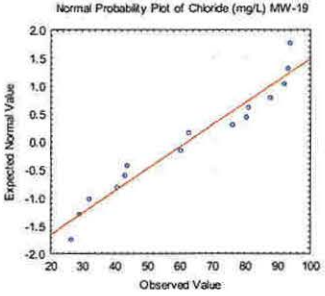




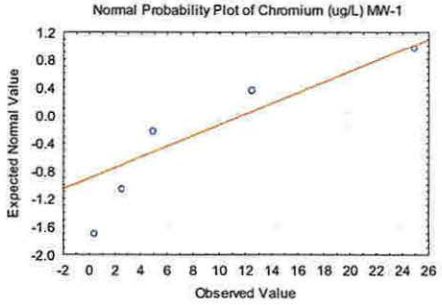


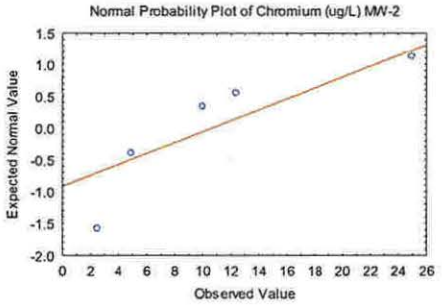


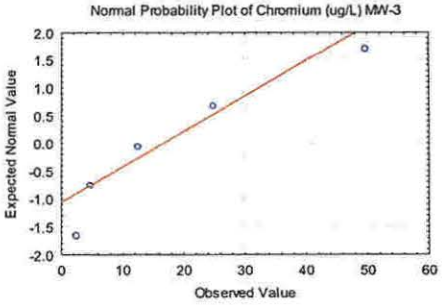


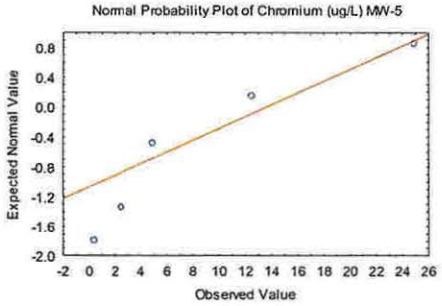


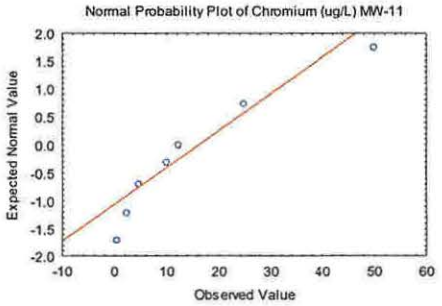
Chromium Probability Plots

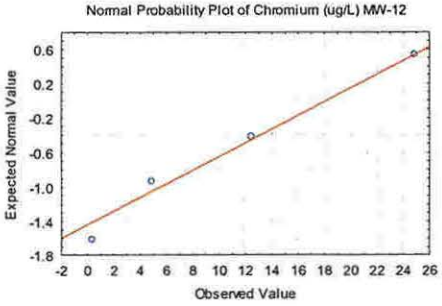


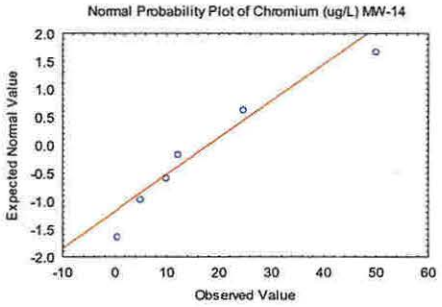


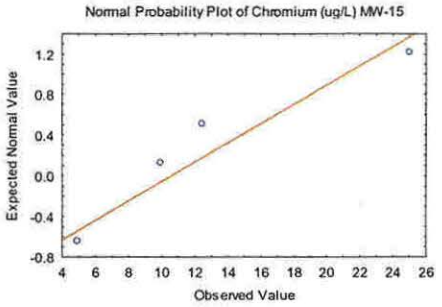




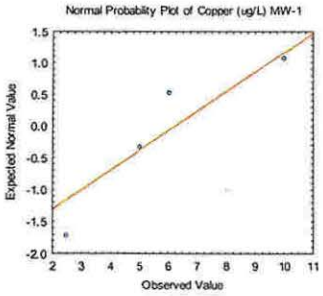


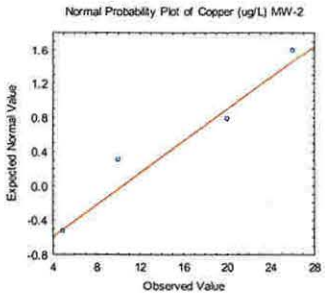


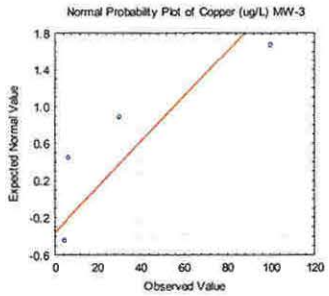


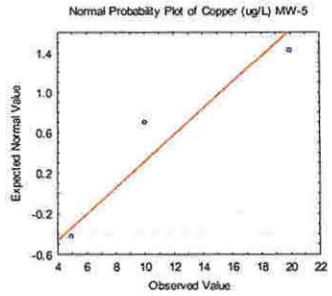


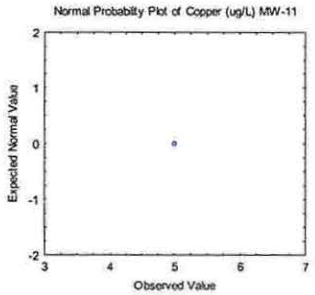
Copper Probability Plots

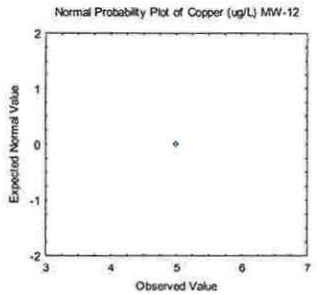


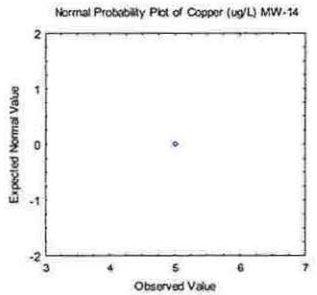


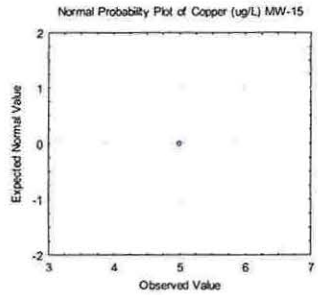


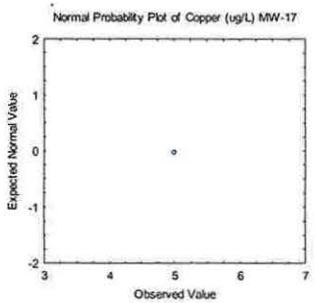


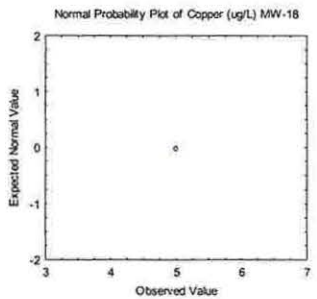


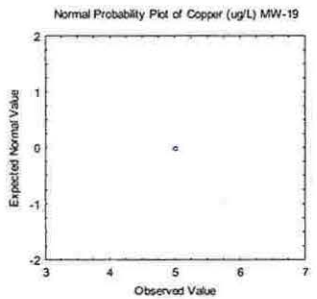




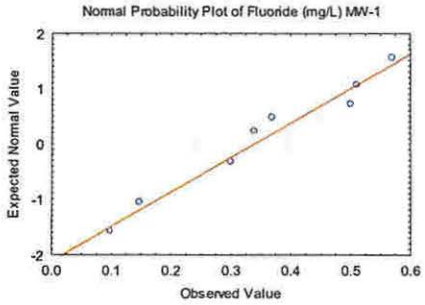


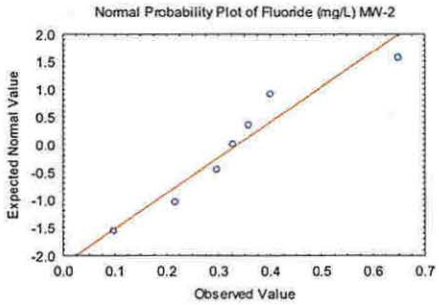


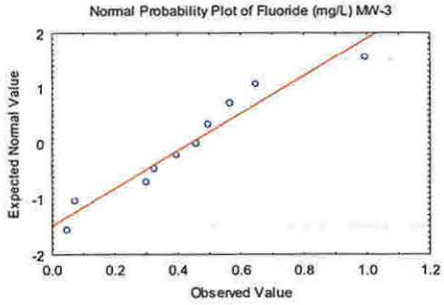


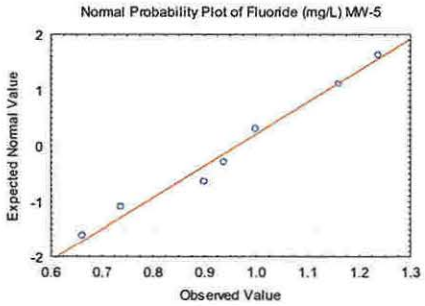


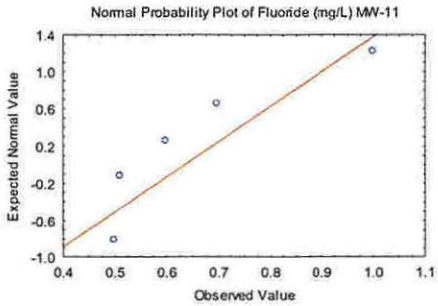
Fluoride Probability Plots

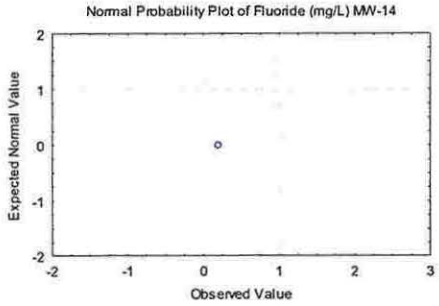


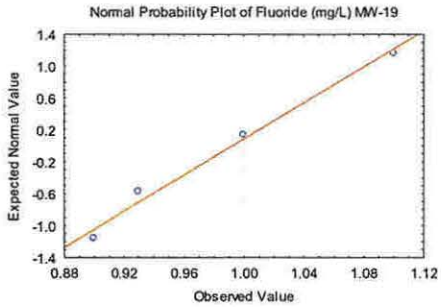




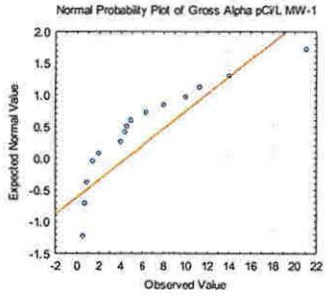


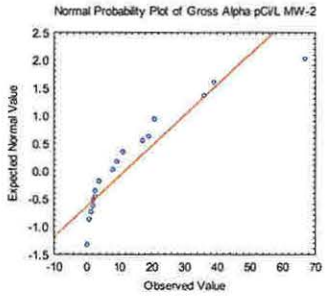


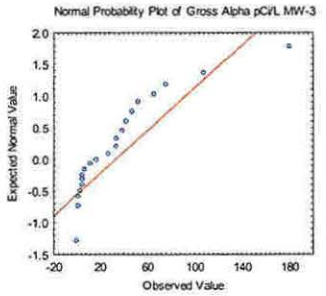


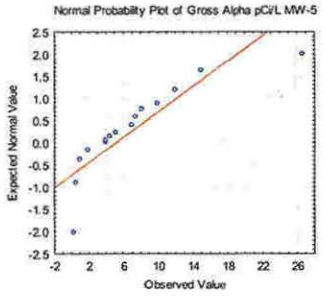


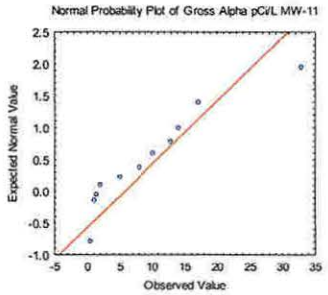
Gross Alpha Probability Plots

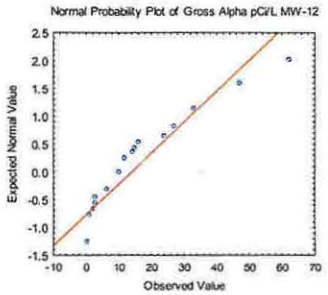


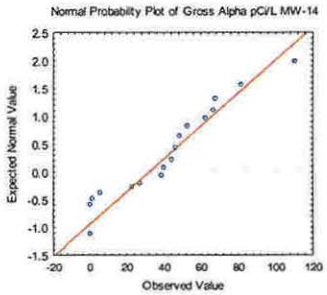


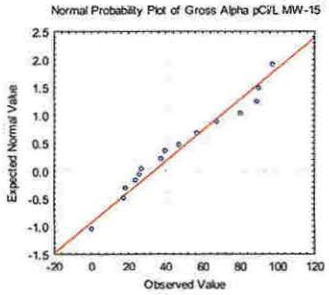


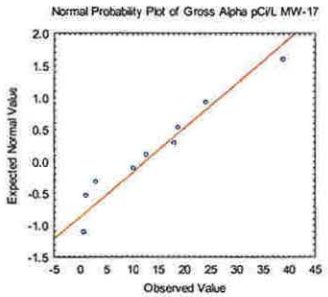


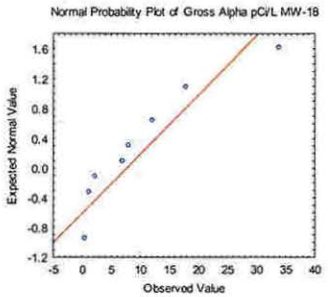


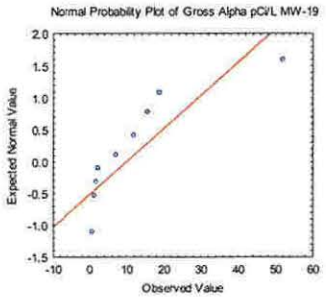




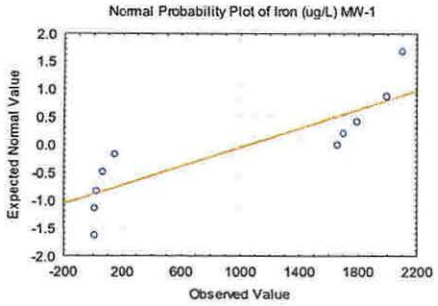


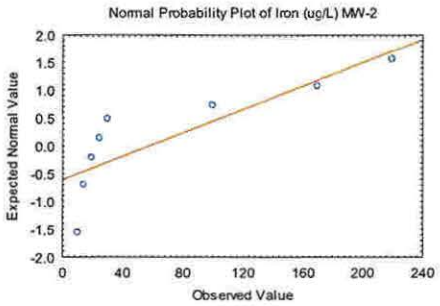


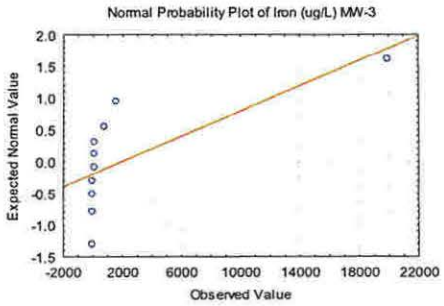


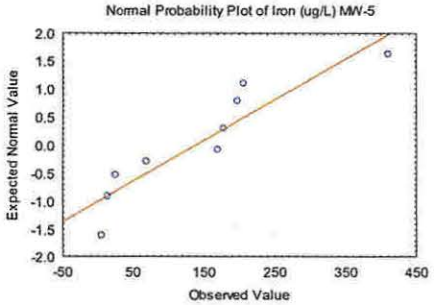


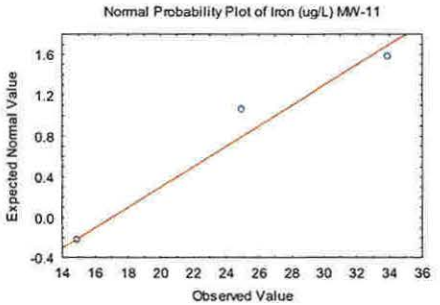
Iron Probability Plots

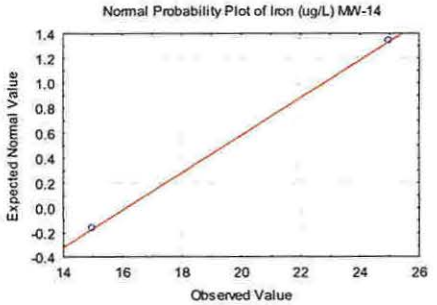


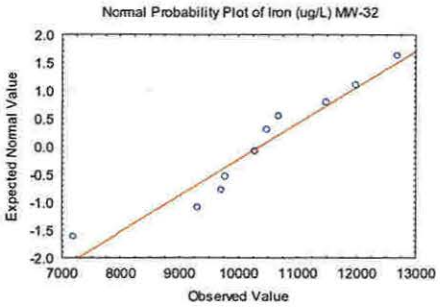




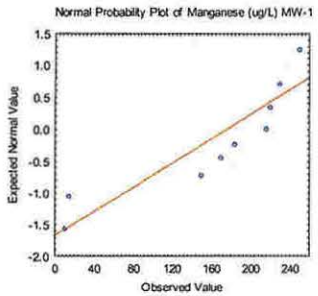


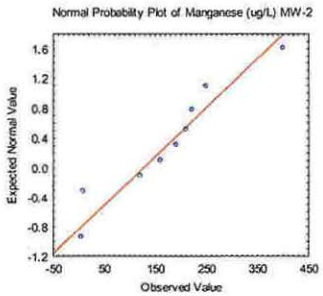


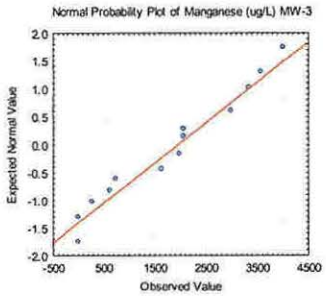


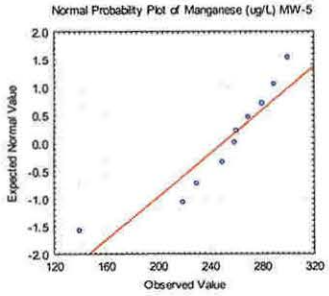


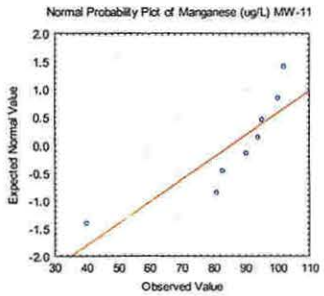
Manganese Probability Plots

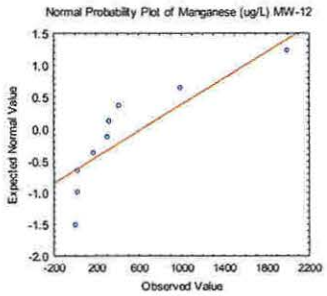


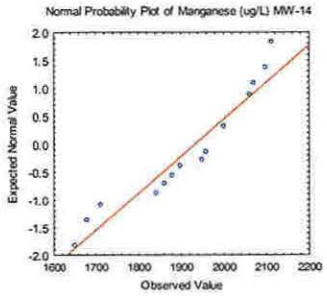


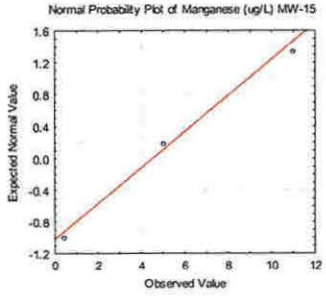


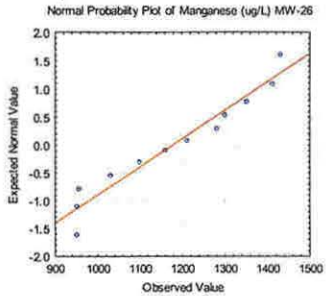


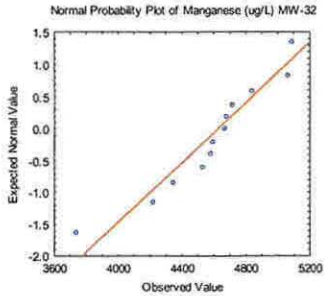




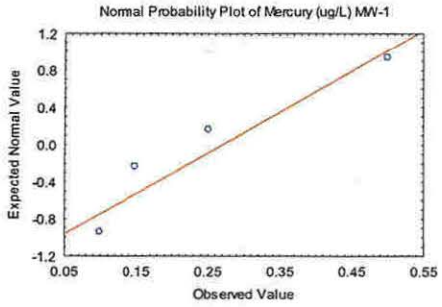


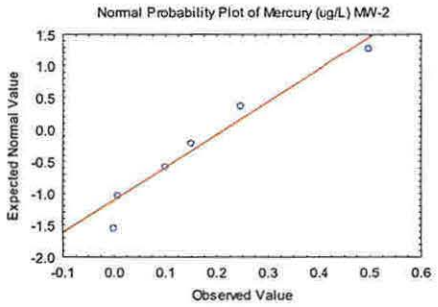


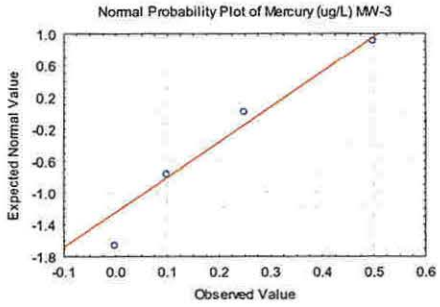


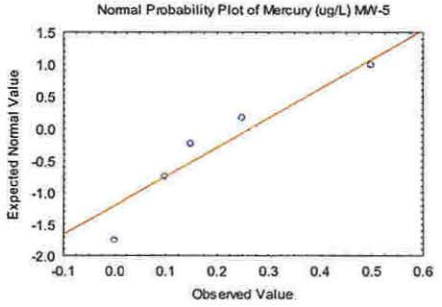


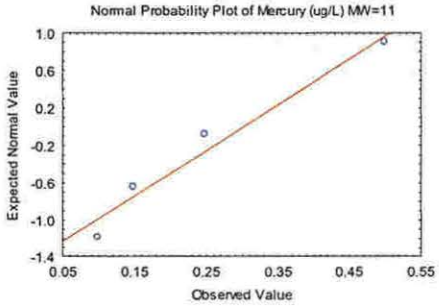
Mercury Probability Plots

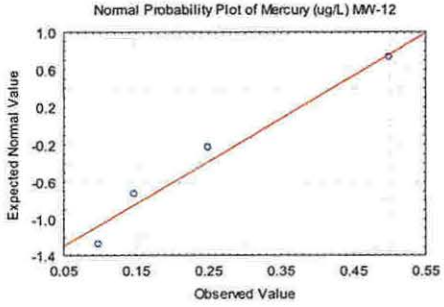


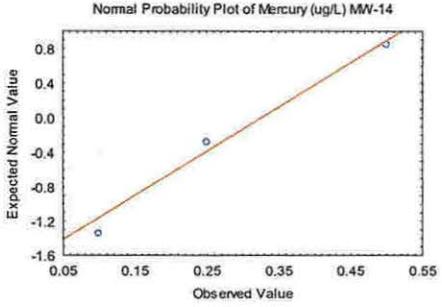


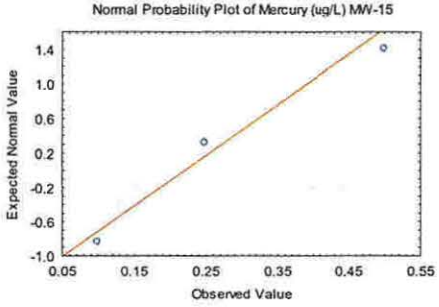




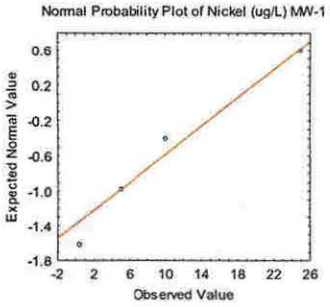


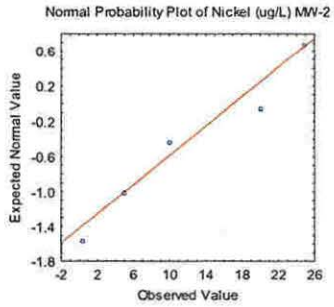


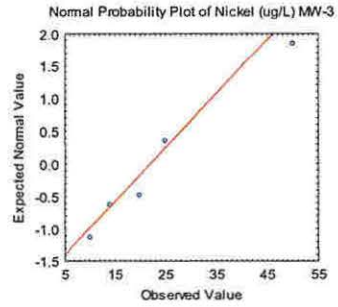


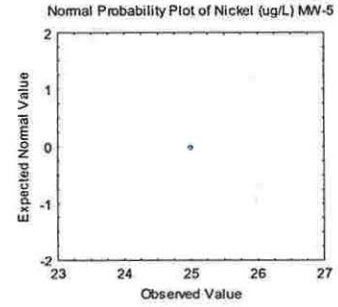


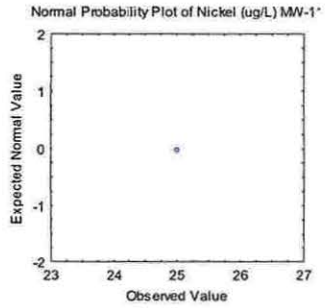
Nickel Probability Plots

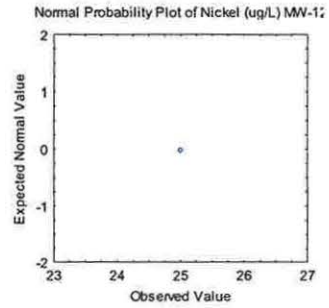


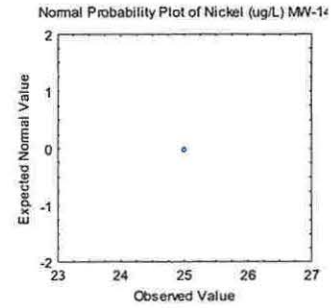


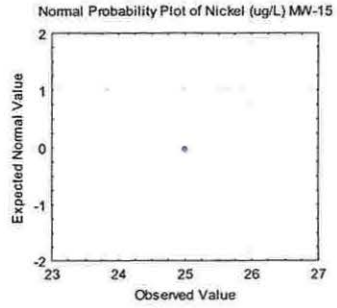


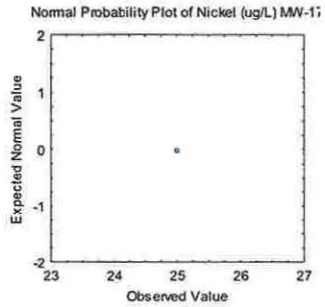


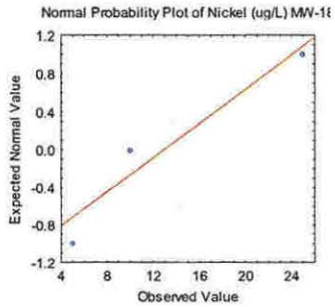


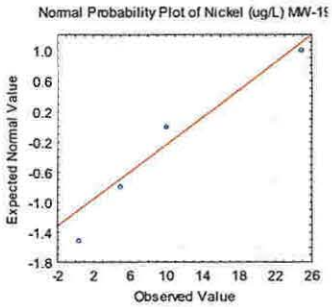


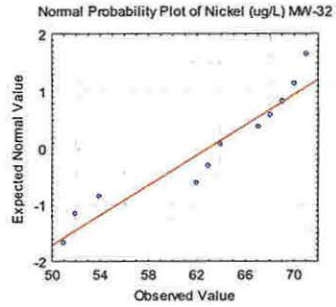




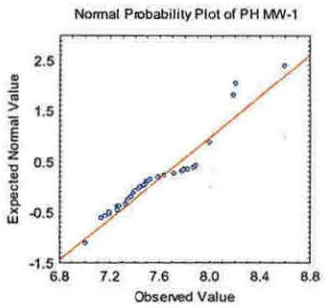


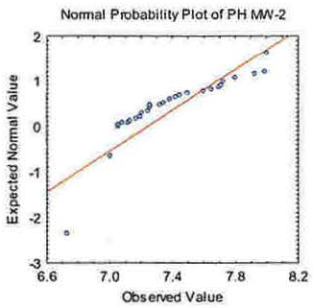


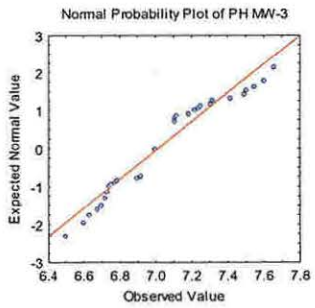


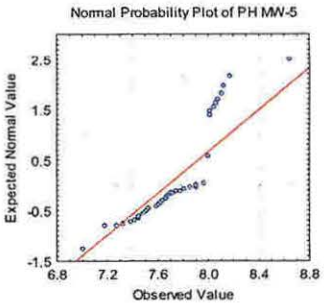


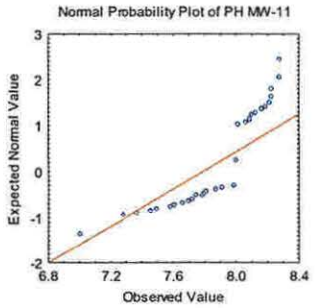
PH Probability Plots

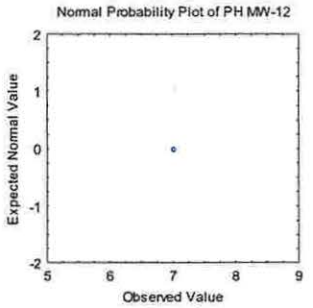


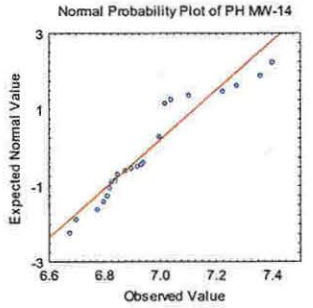


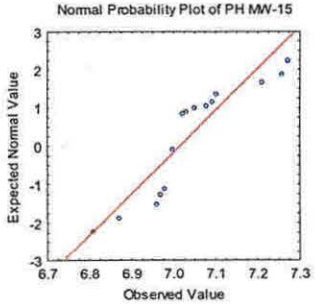


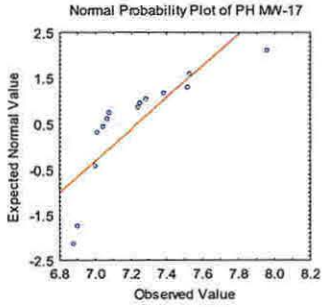


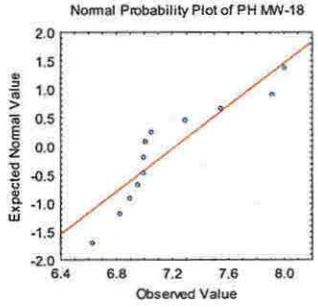


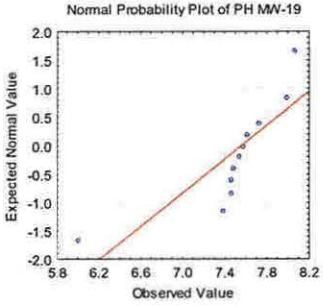




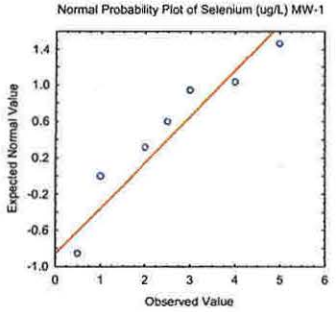


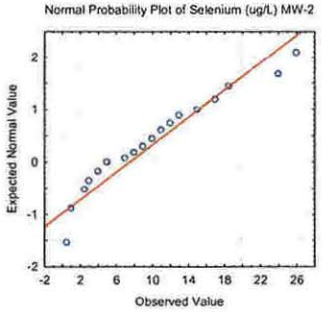


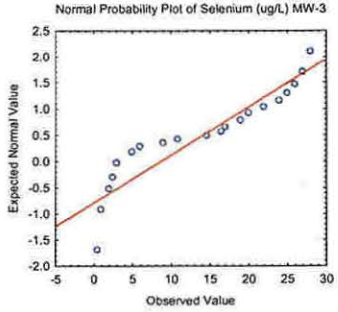


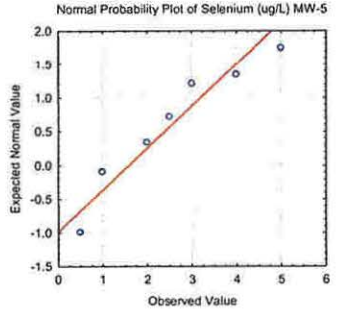


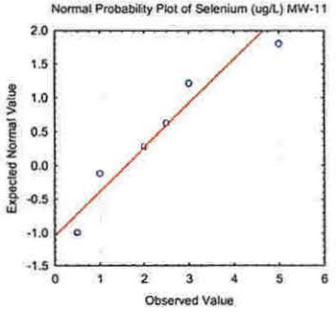
Selenium Probability Plots

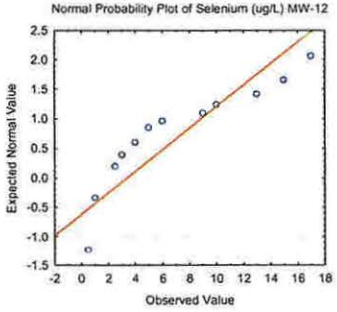


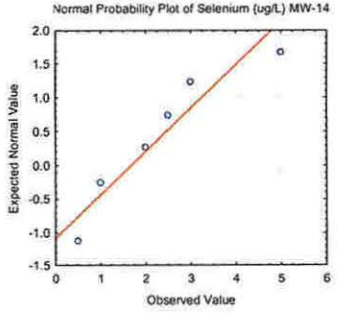


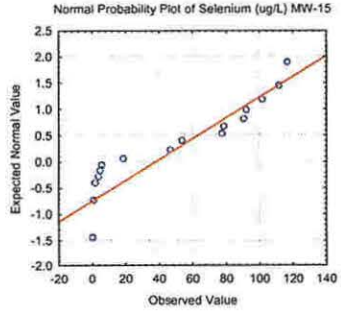


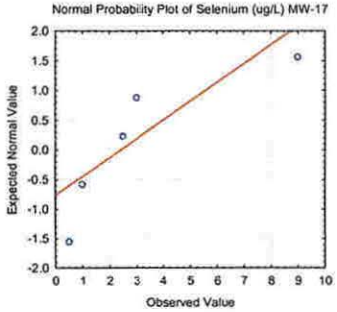


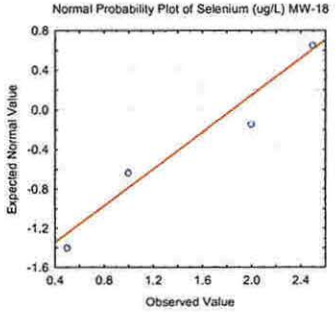


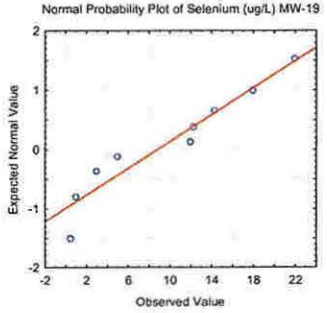




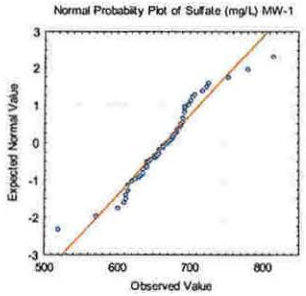


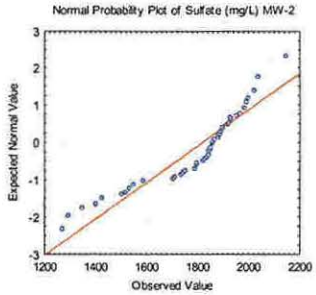


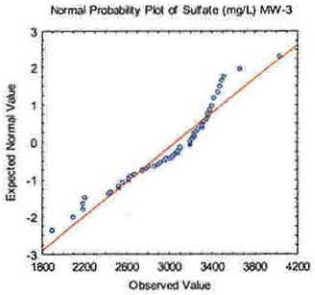


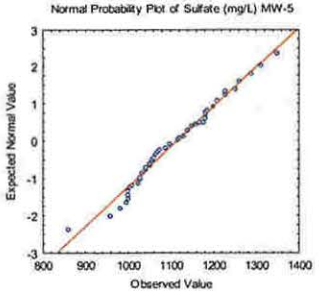


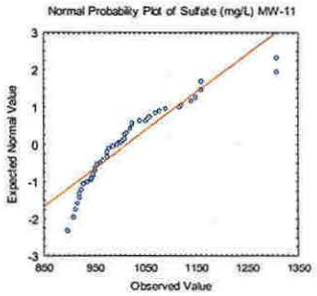
Sulfate Probability Plots

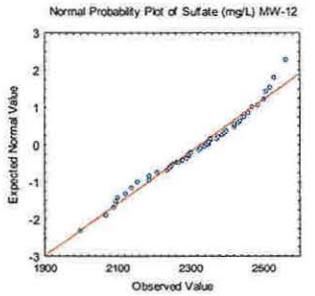


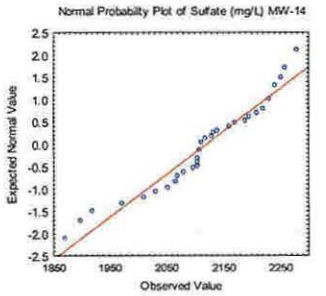


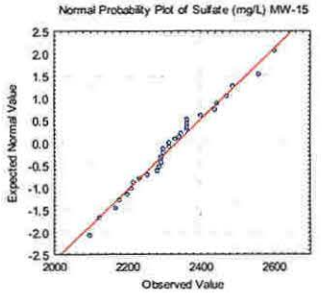


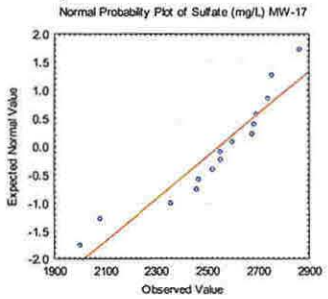


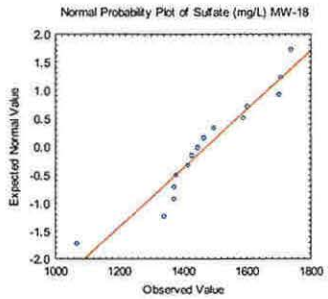


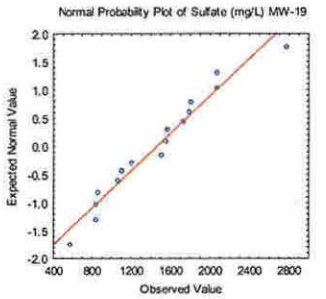




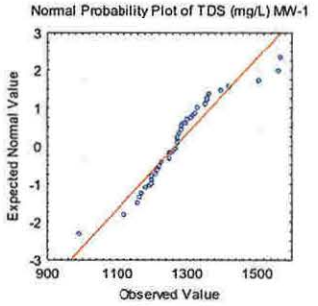


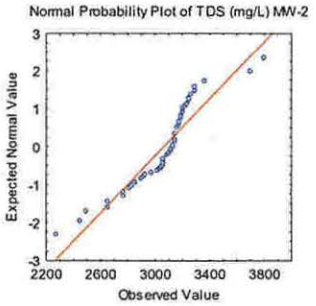


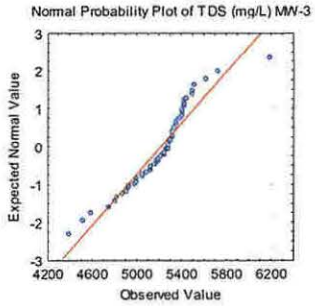


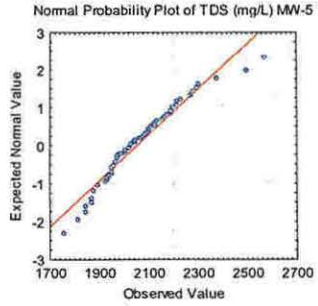


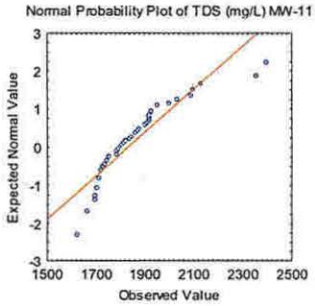
TDS Probability Plots

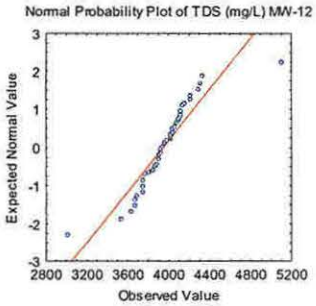


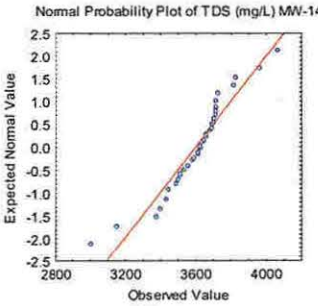


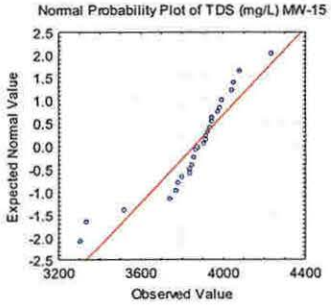


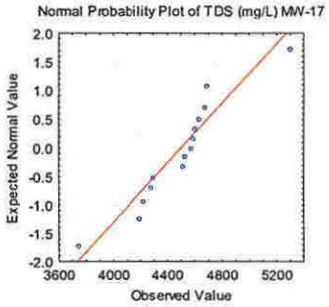


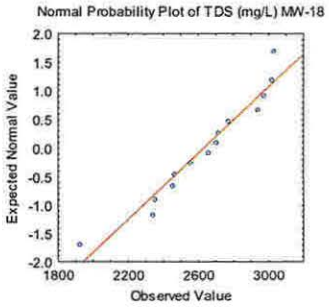


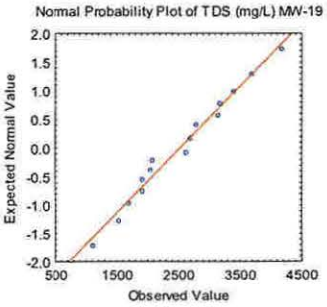




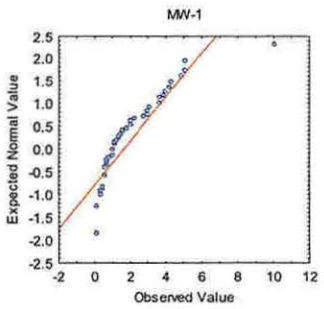


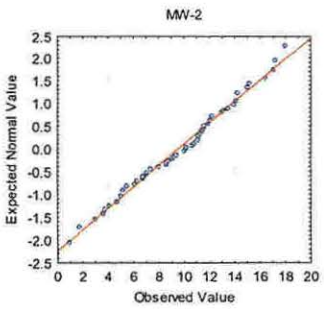


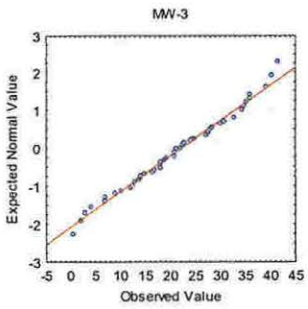


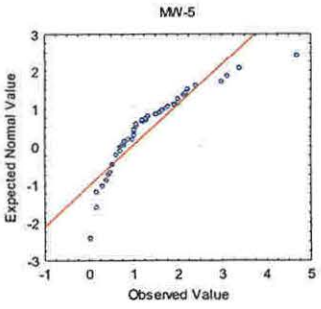


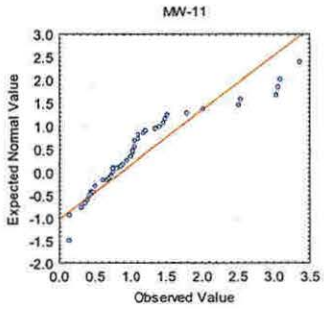
Uranium Probability Plots

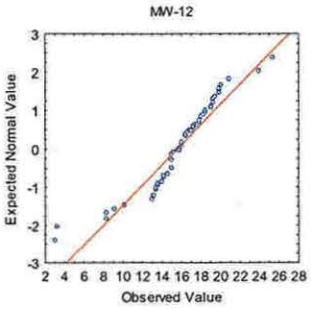


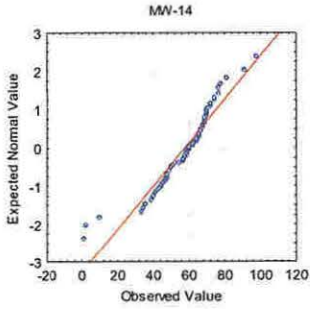


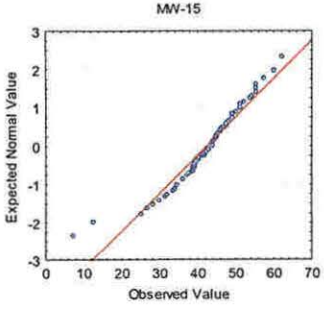


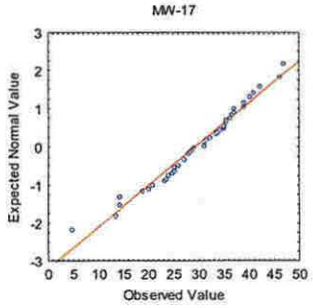


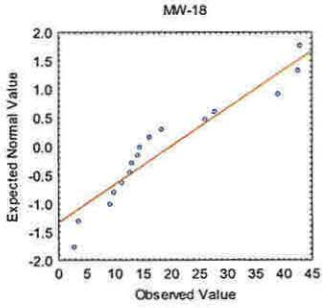


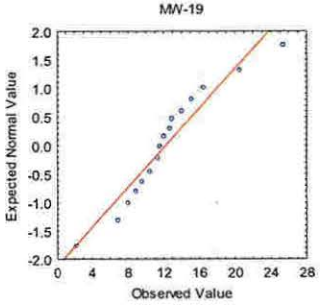




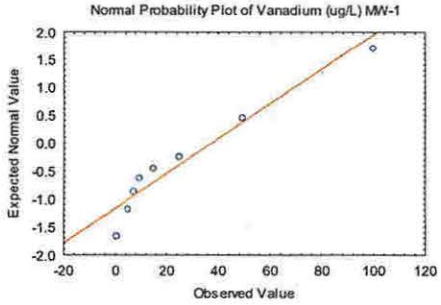


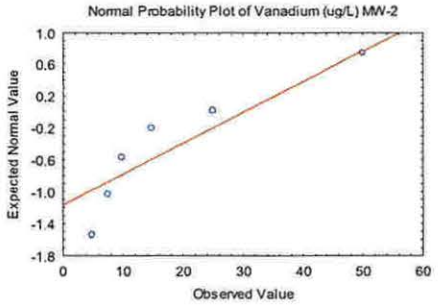


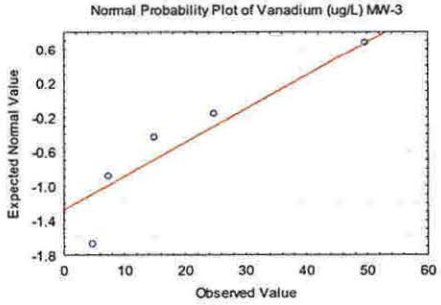


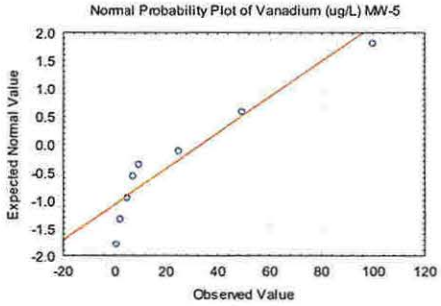


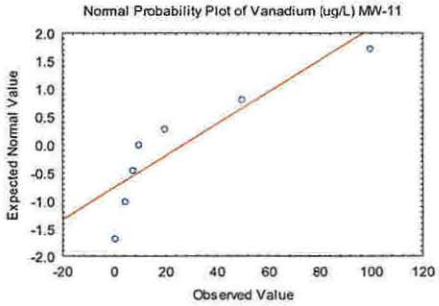
Vanadium Probability Plots

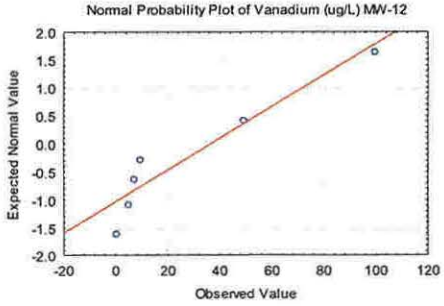


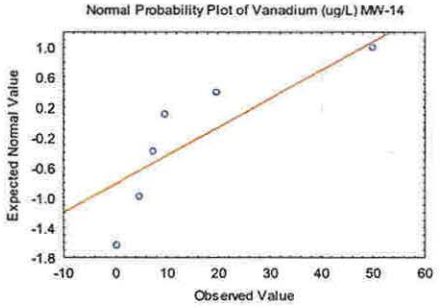




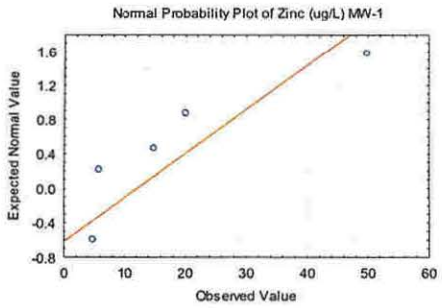


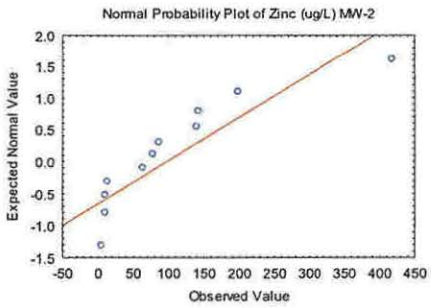


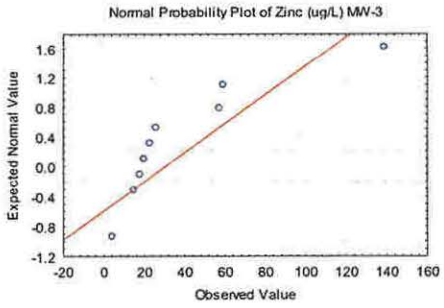


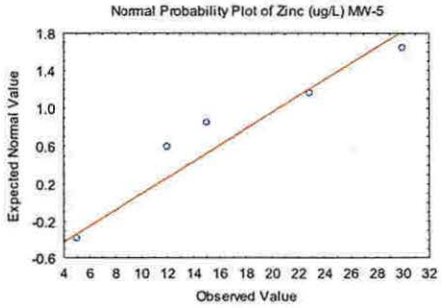


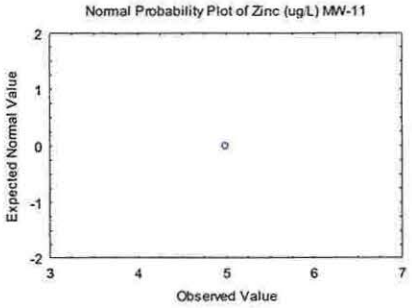
Zinc Probability Plots

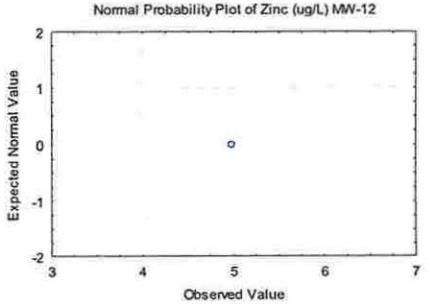


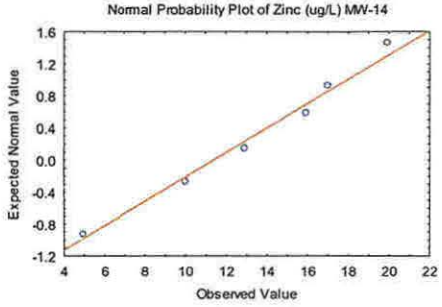


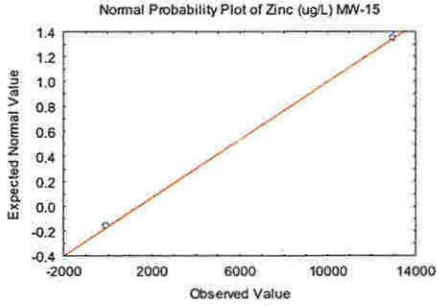




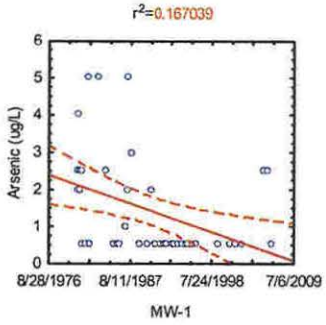


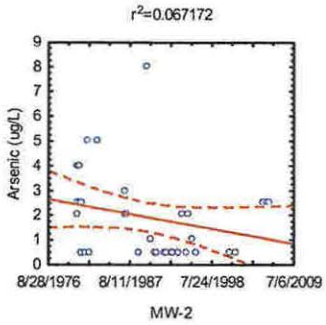


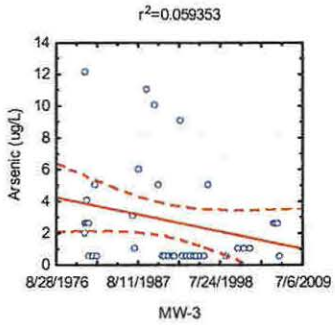


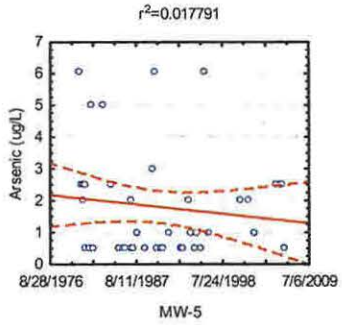


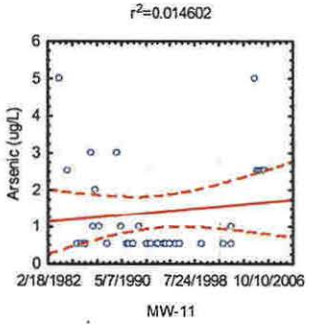
Arsenic Regression Analysis

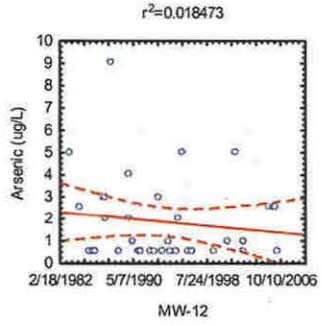


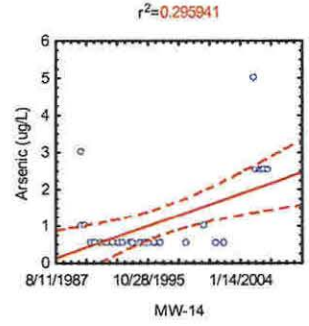


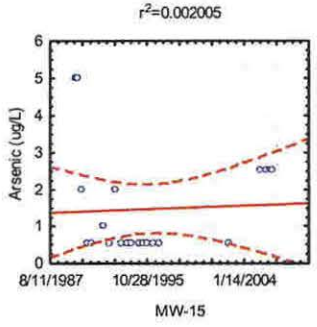


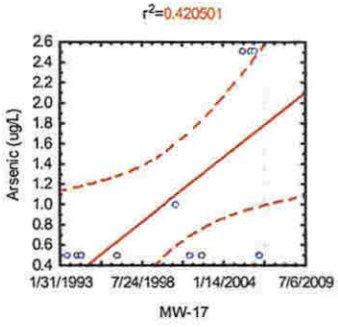


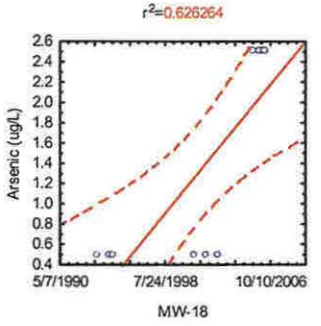


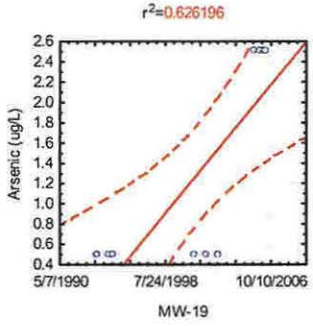




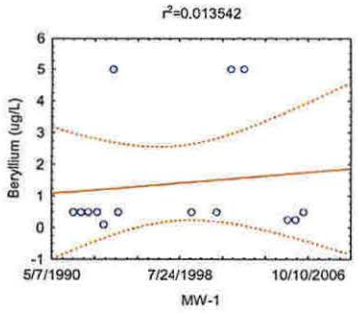


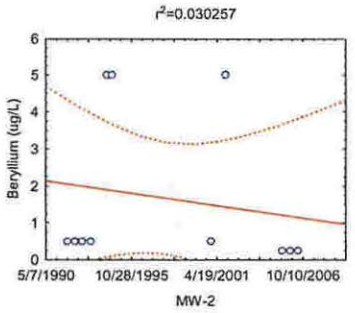


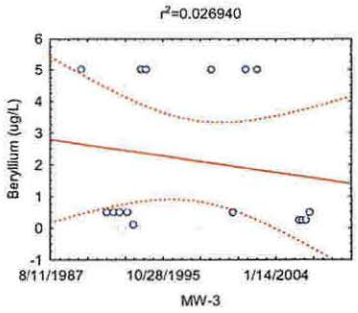


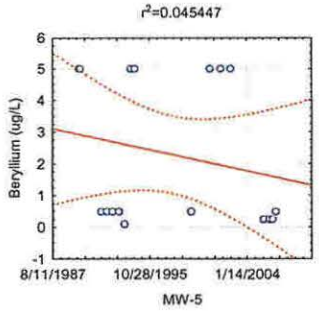


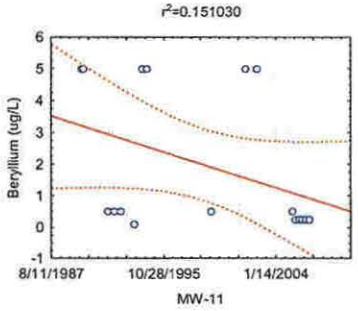
Beryllium Regression Analysis

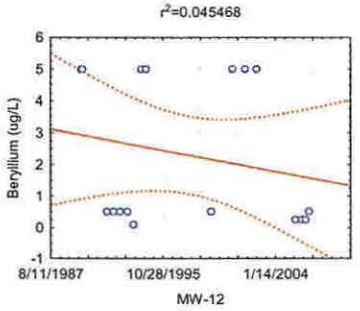


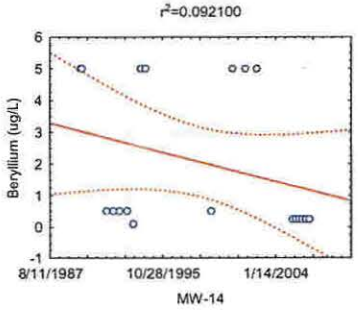


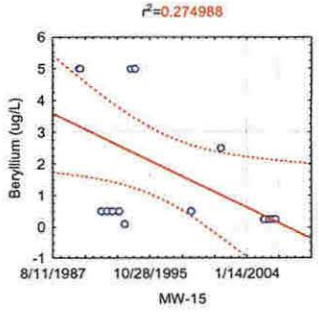


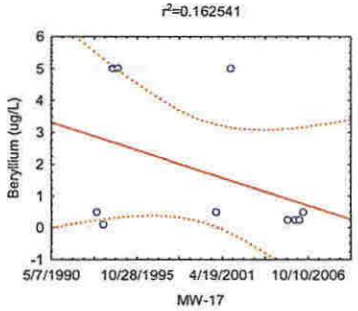


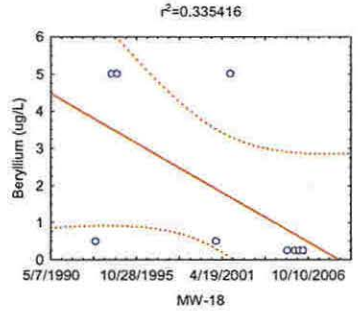


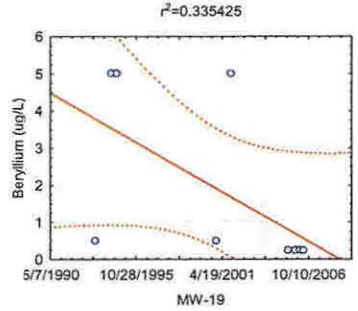


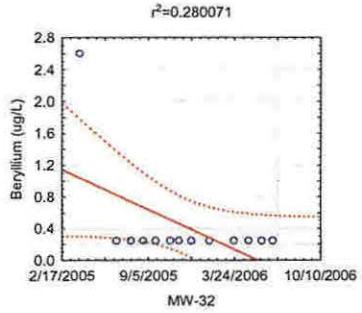




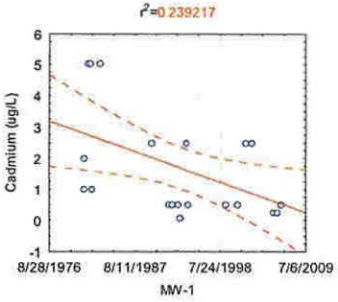


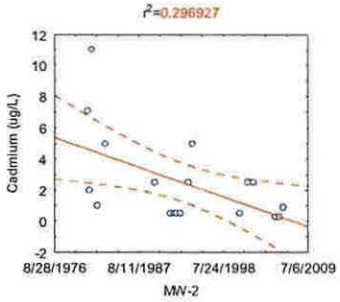


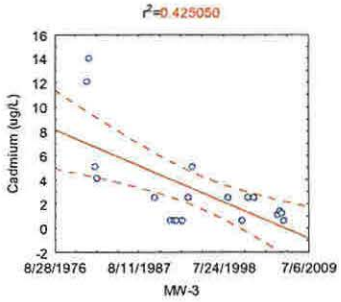


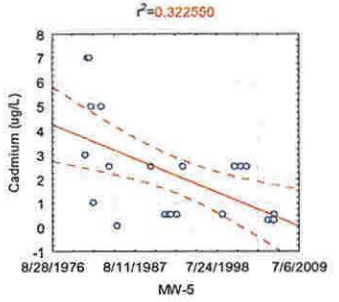


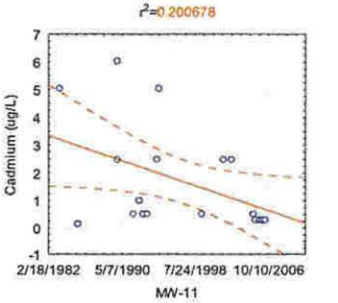
Cadmium Regression Analysis

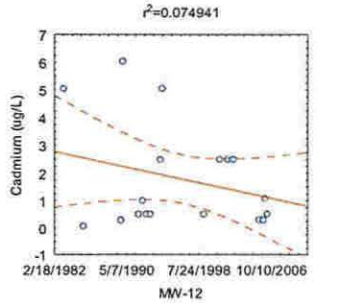


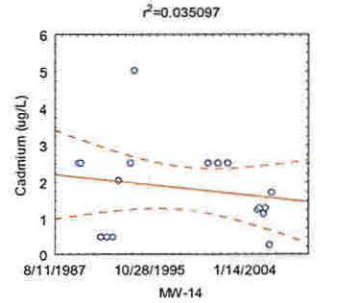


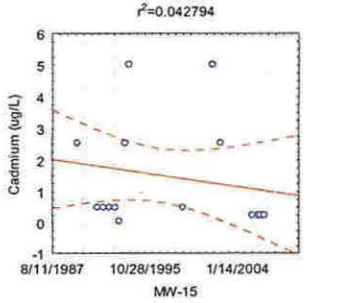


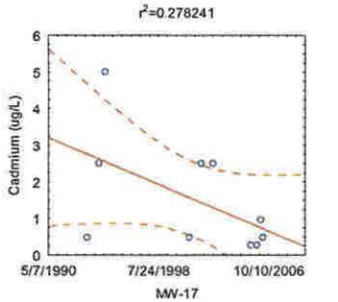


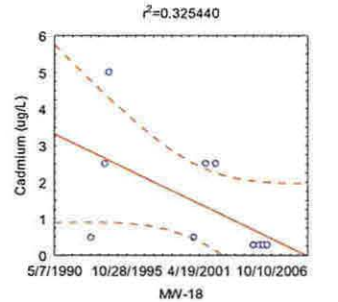


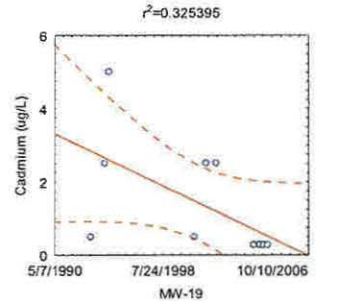


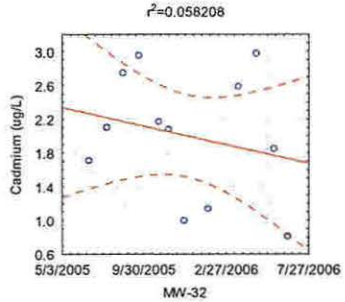




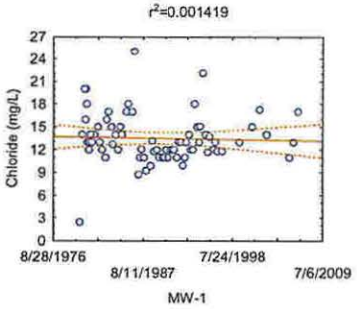




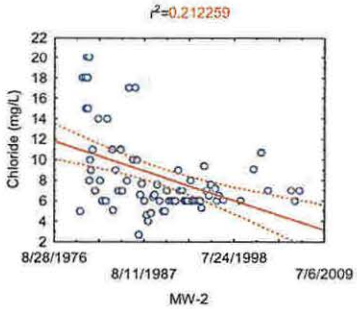




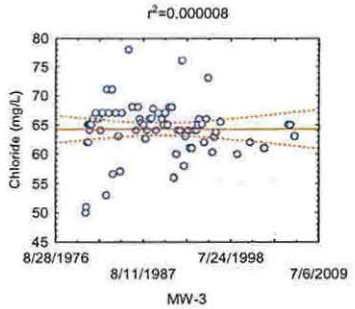
Chloride Regressions



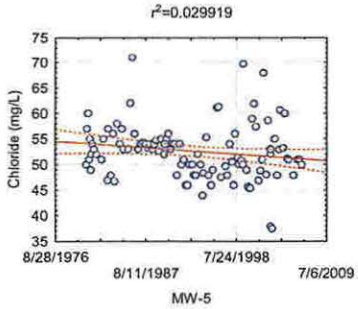
MW-1



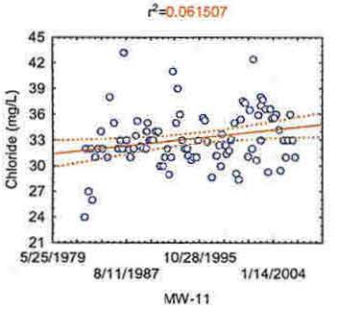
MW-2



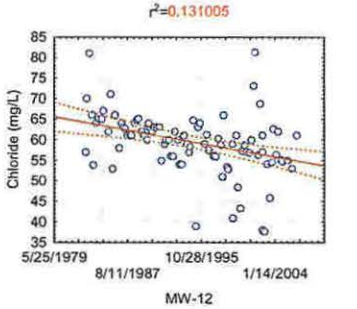
MW-3



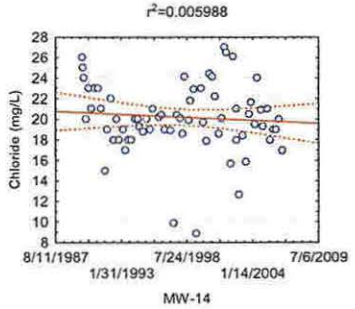
MW-5



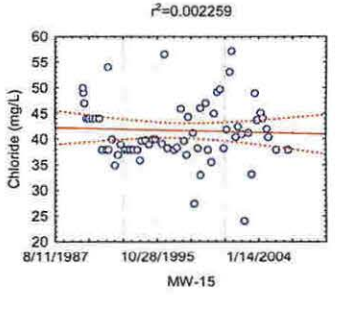
MW-11



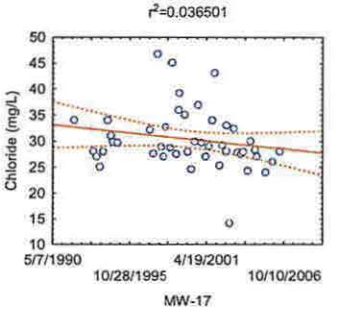
MW-12



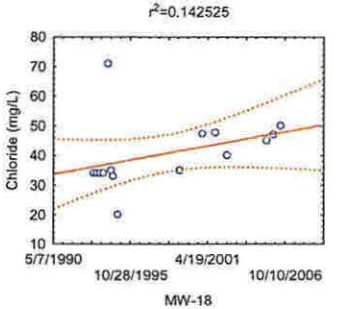
MW-14



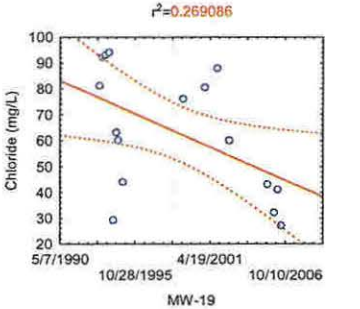
MW-15



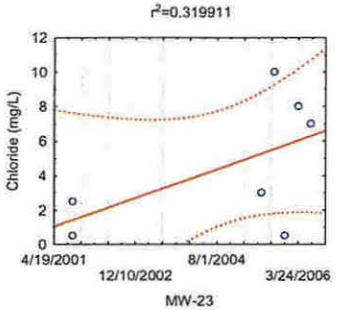
MW-17



MW-18



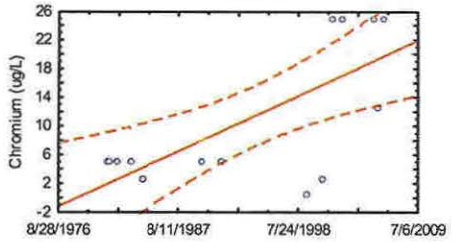
MW-19



MW-23

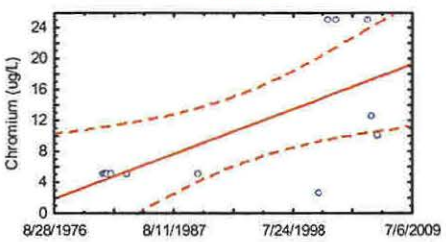
Chromium Regression Analysis

r^2=0.484911



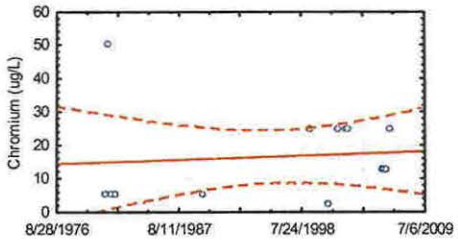
MW-1

r^2=0.438664



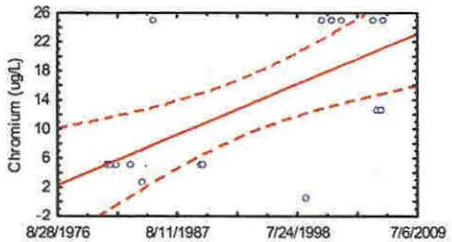
MW-2

r^2=0.008447



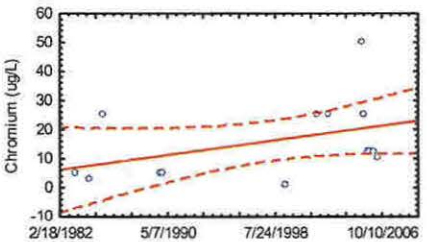
MW-3

r^2=0.420624



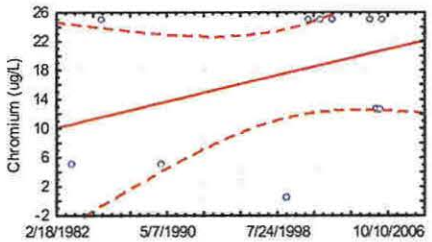
MW-5

r^2=0.484911



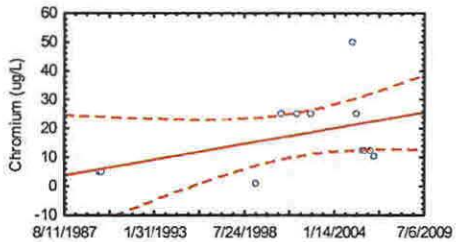
MW-11

r^2=0.136372



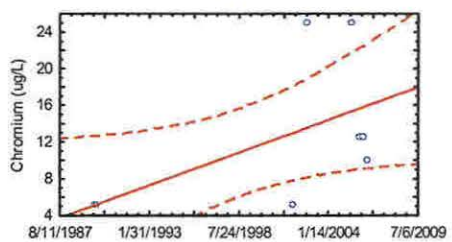
MW-12

r^2=0.186922



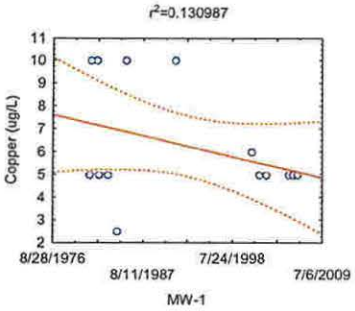
MW-14

r^2=0.401861

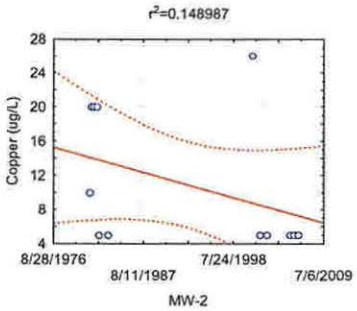


MW-15

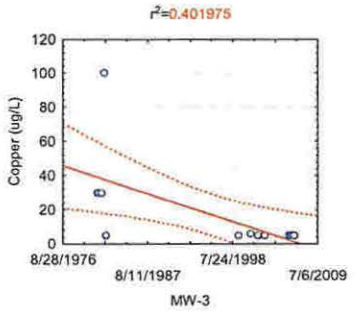
Copper Regression Analysis



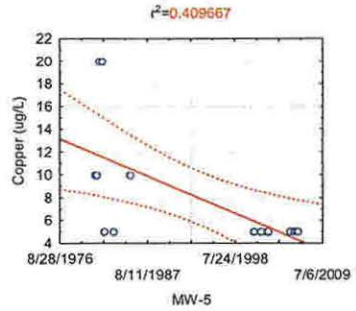
MW-1



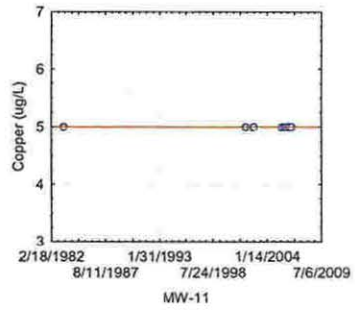
MW-2



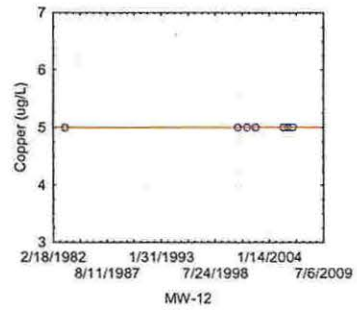
MW-3



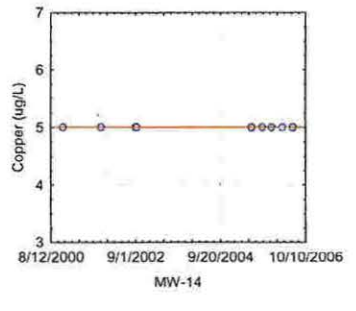
MW-5



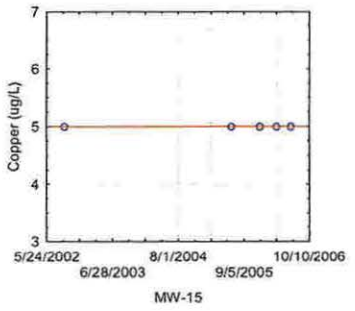
MW-11



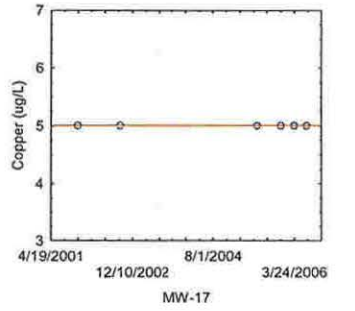
MW-12



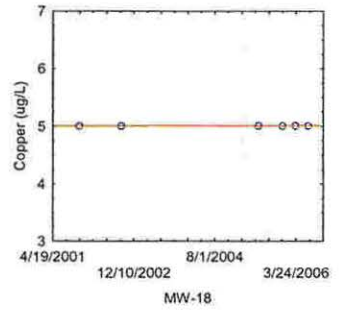
MW-14



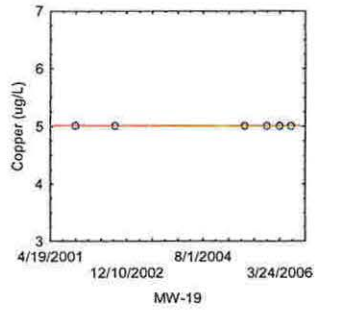
MW-15



MW-17



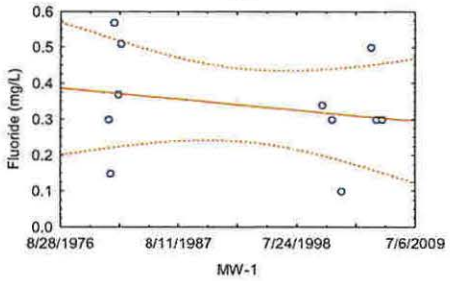
MW-18



MW-19

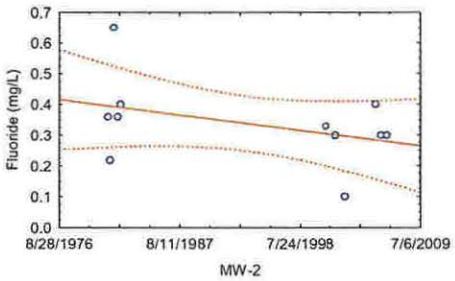
Fluoride Regressions

r^2=0.05



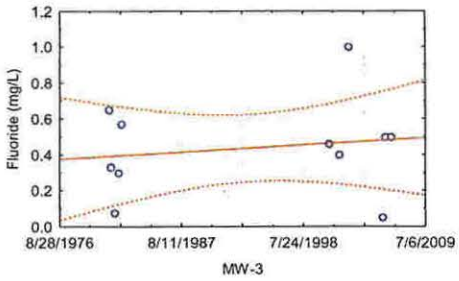
MW-1

r^2=0.16



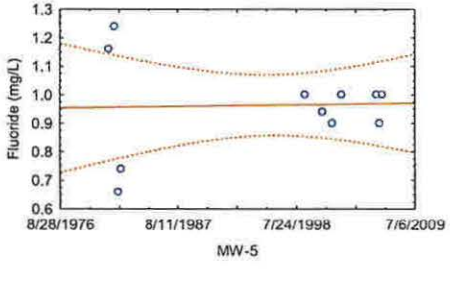
MW-2

r^2=0.03



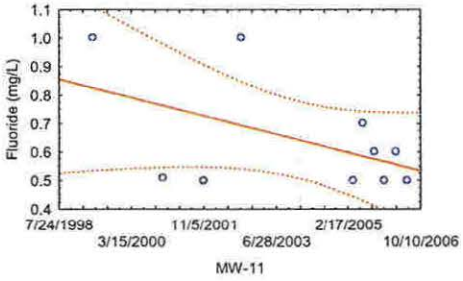
MW-3

r^2=0.001



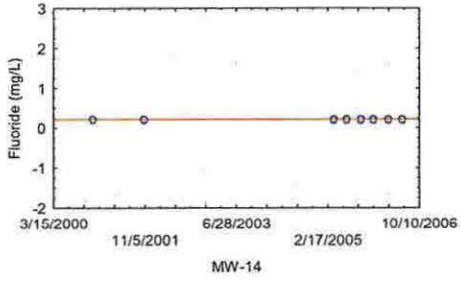
MW-5

r^2=0.25



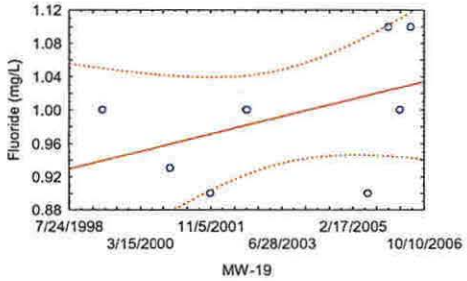
MW-11

r^2=N/A



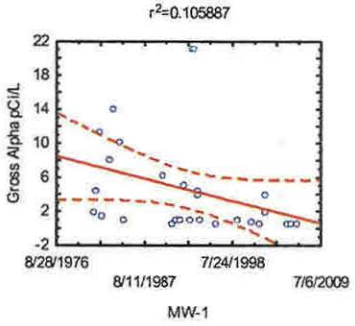
MW-14

r^2=0.20

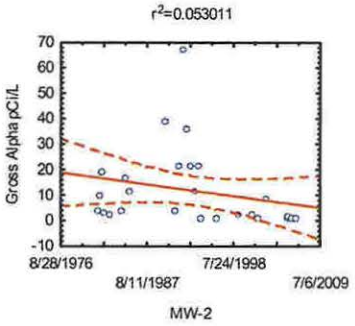


MW-19

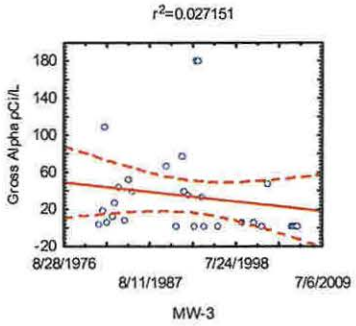
Gross Alpha Regressions



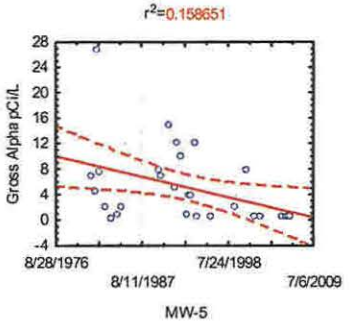
MW-1



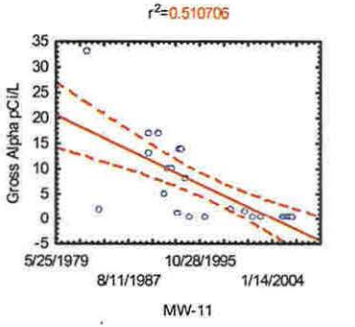
MW-2



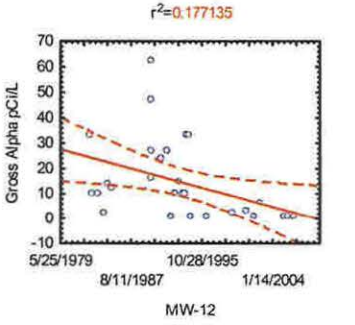
MW-3



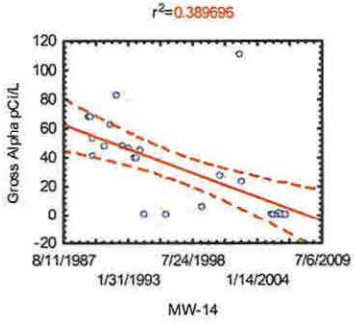
MW-5



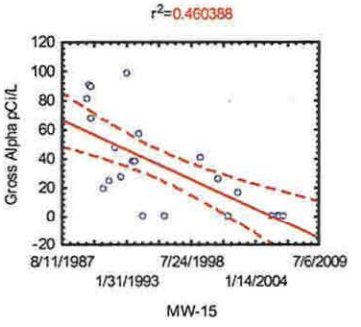
MW-11



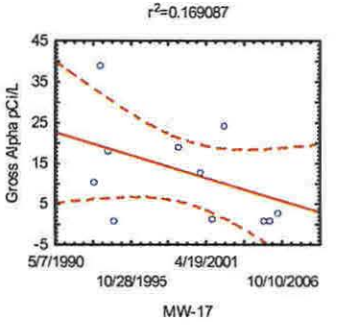
MW-12



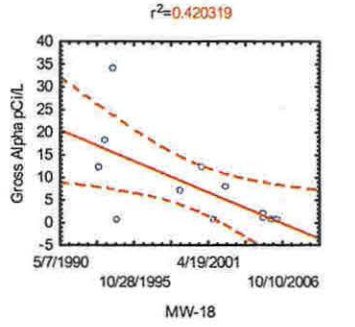
MW-14



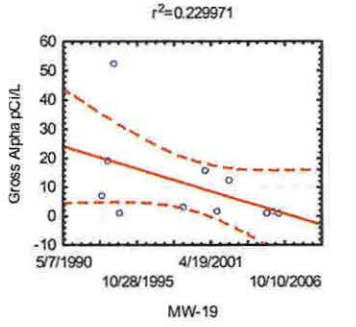
MW-15



MW-17

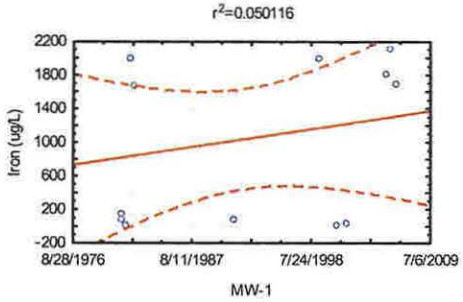


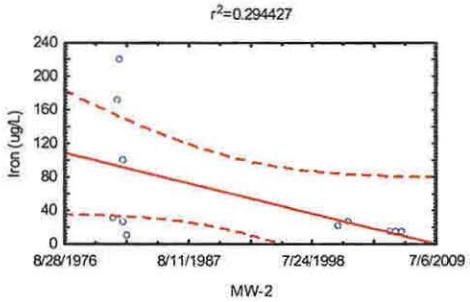
MW-18

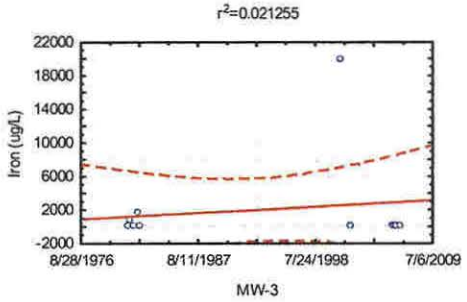


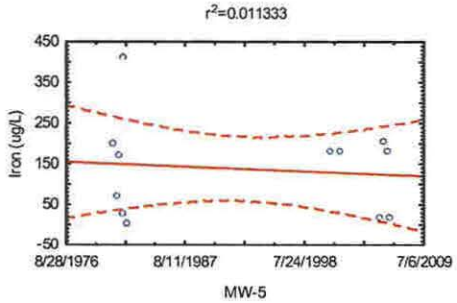
MW-19

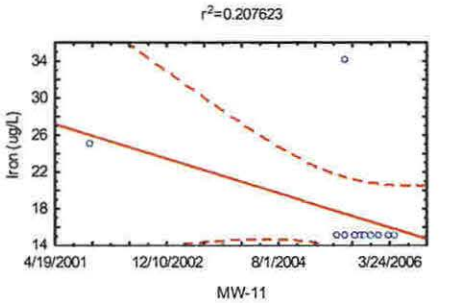
Iron Regression Analysis

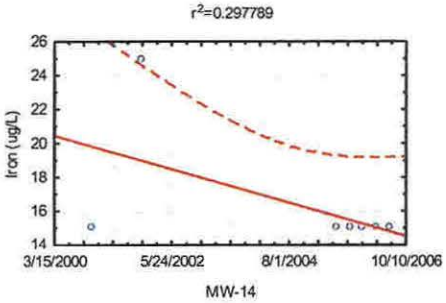


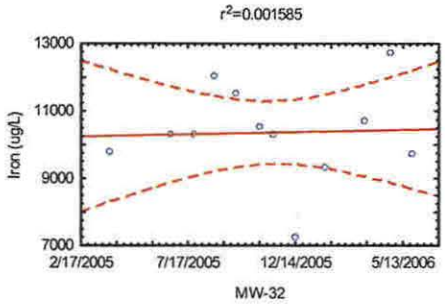




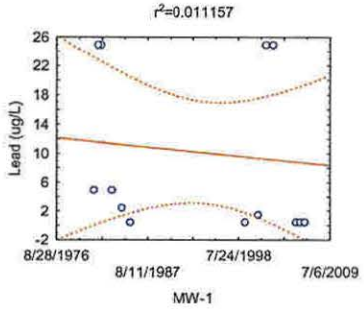


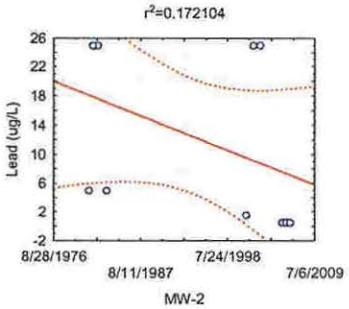


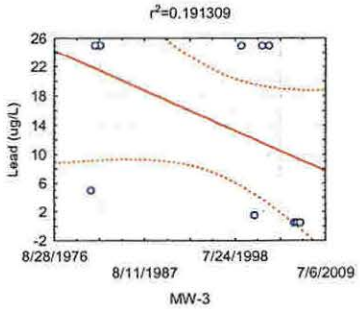


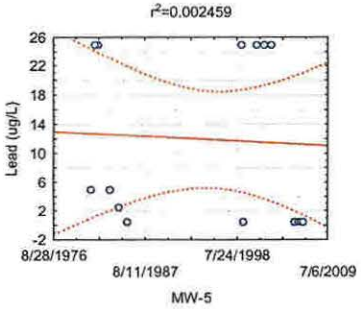


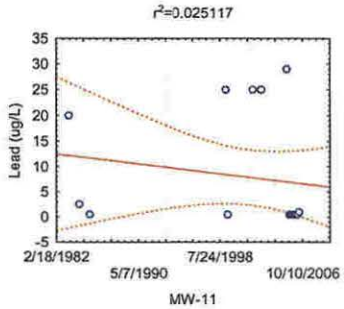
Lead Regression Analysis

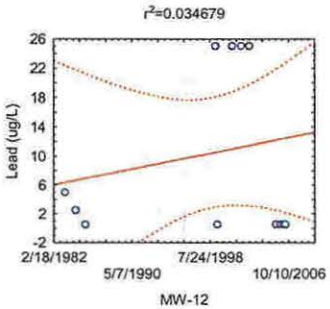


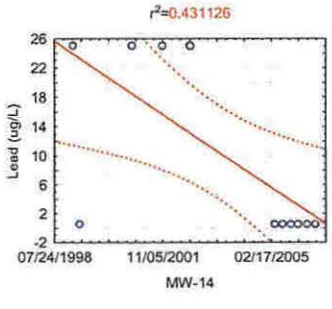


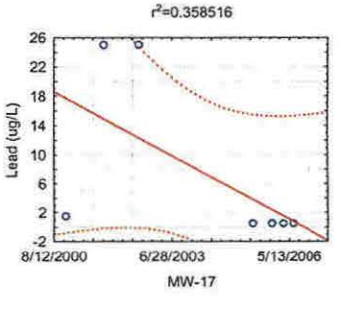


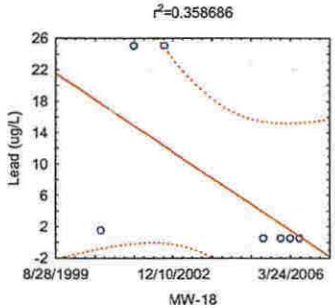


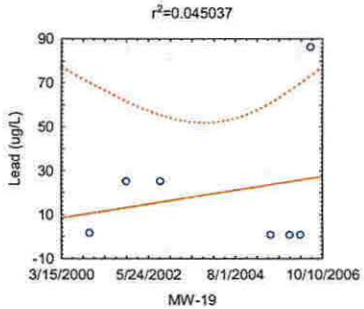


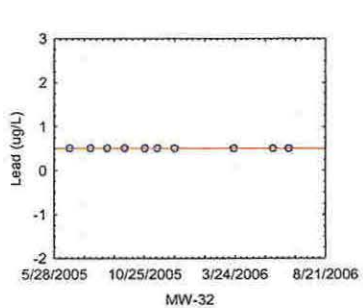




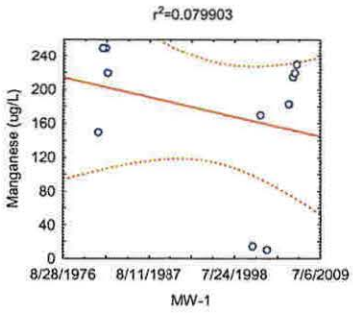


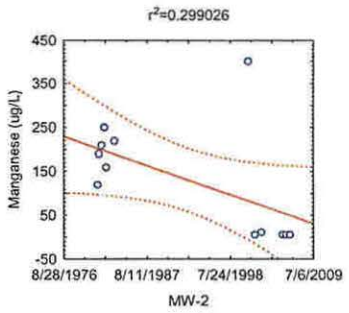


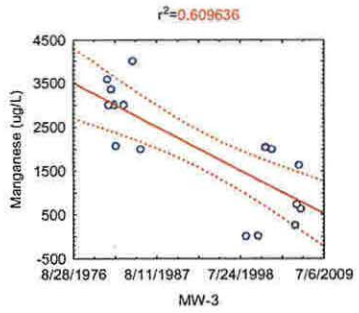


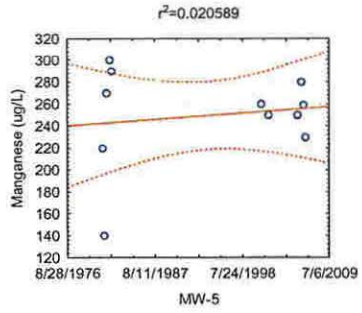


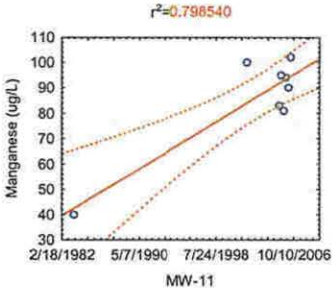
Manganese Regression Analysis

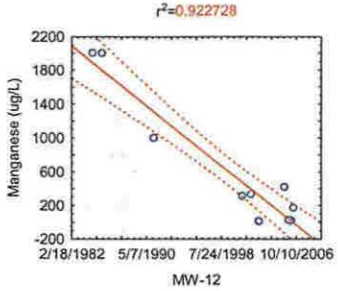


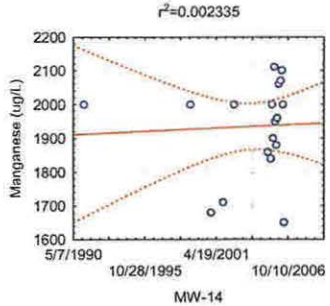


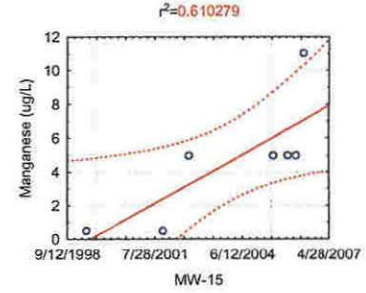


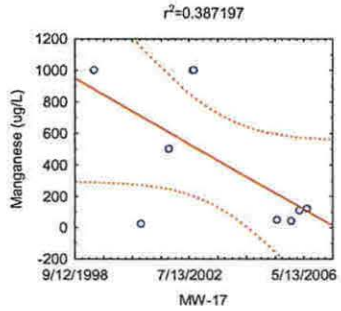


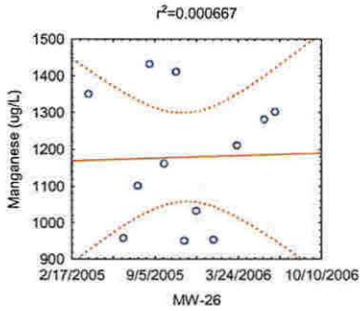


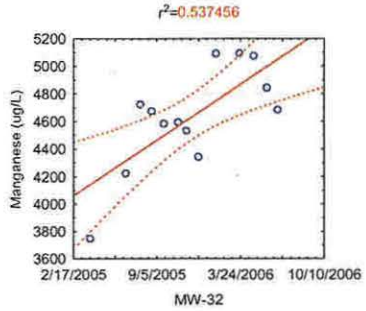




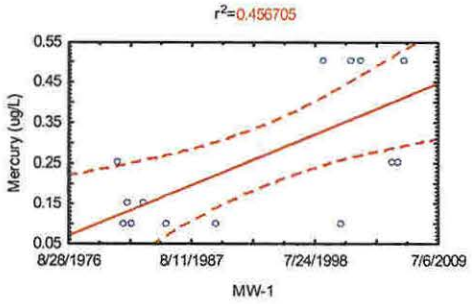




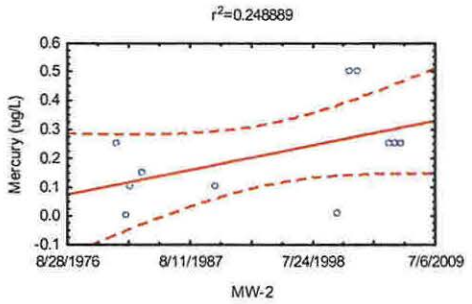




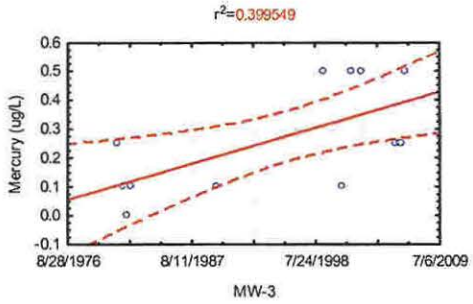
Mercury Regression Analysis



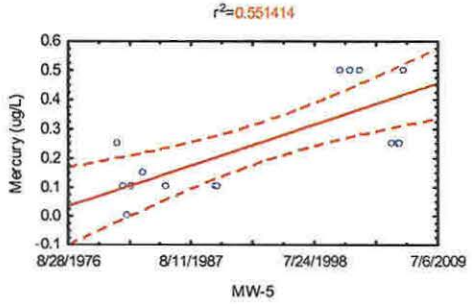
MW-1



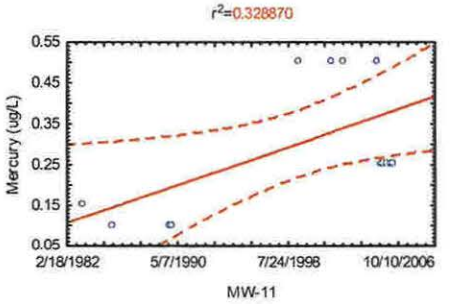
MW-2



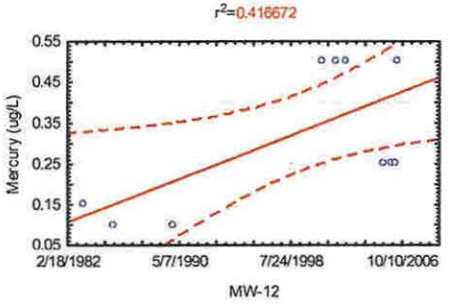
MW-3



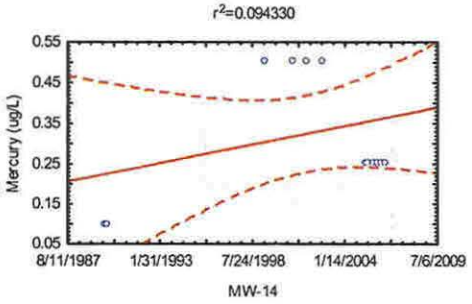
MW-5



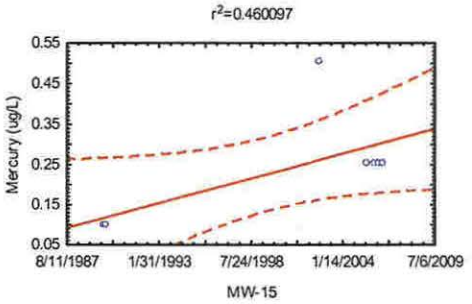
MW-11



MW-12

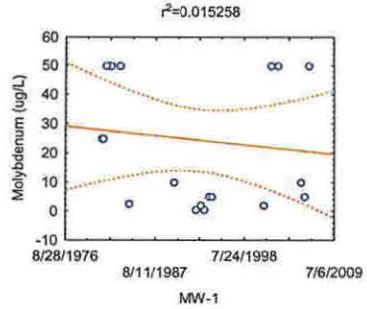


MW-14

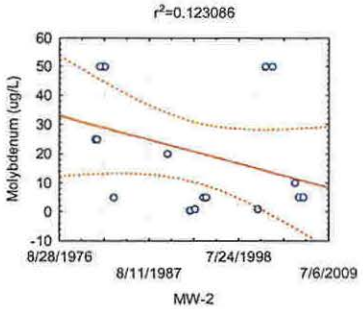


MW-15

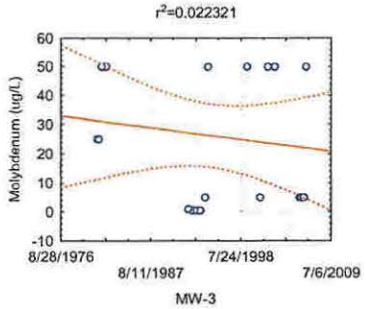
Molybdenum Regression Analysis



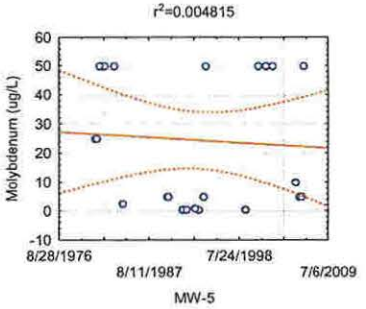
MW-1



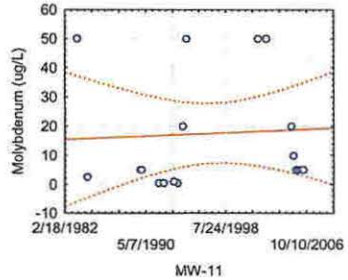
MW-2



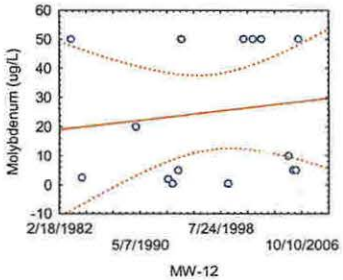
MW-3



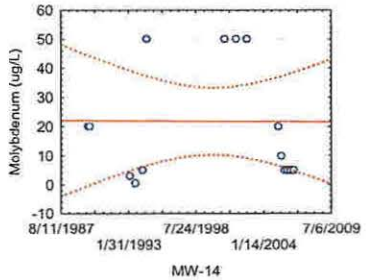
MW-5



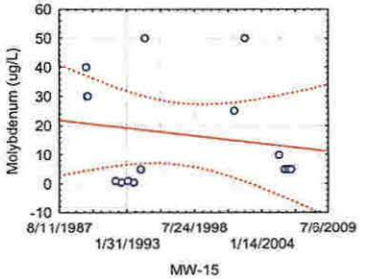
MW-11



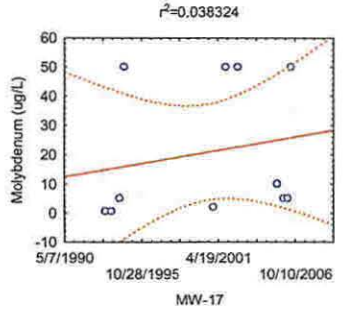
MW-12



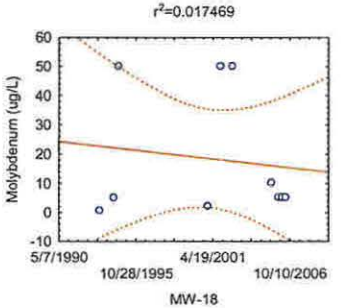
MW-14



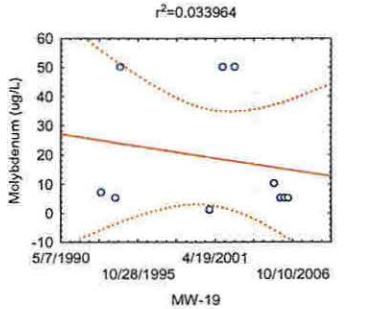
MW-15



MW-17

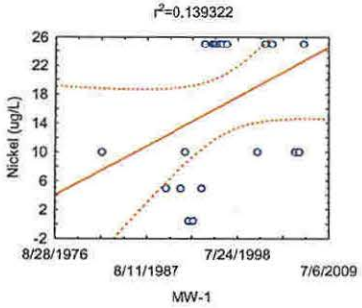


MW-18

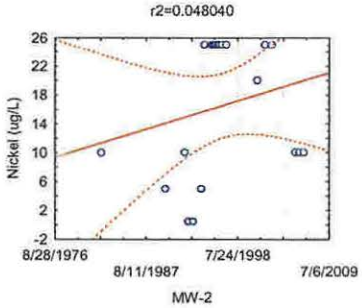


MW-19

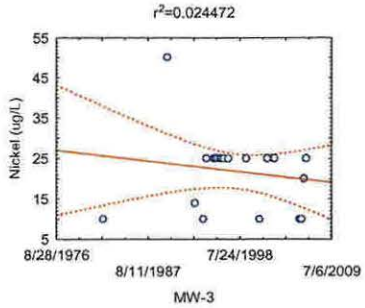
Nickel Regression Analysis



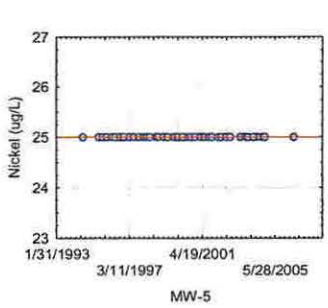
MW-1



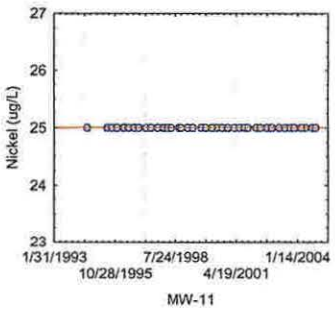
MW-2



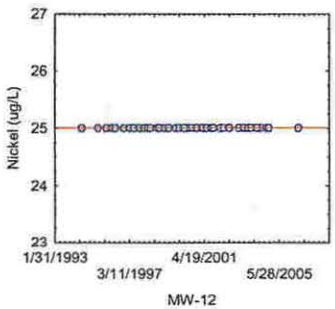
MW-3



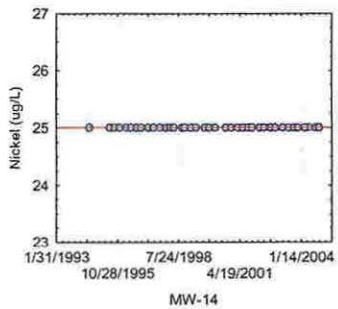
MW-5



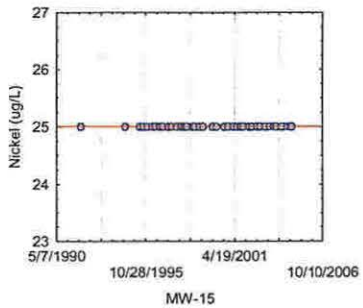
MW-11



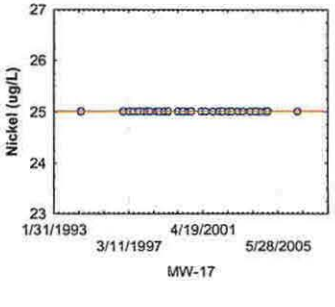
MW-12



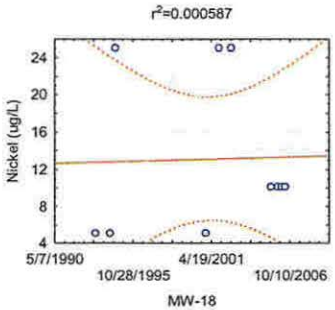
MW-14



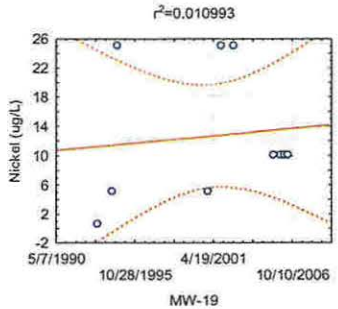
MW-15



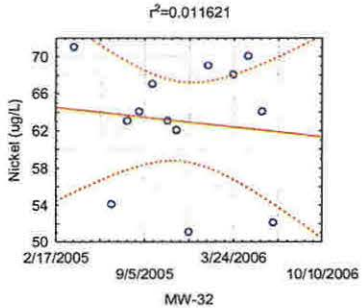
MW-17



MW-18

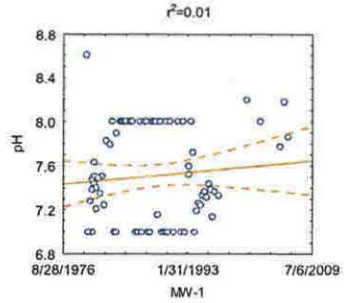


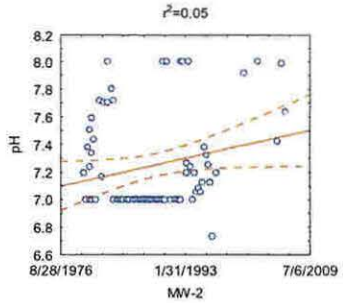
MW-19

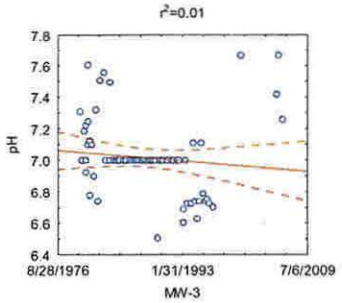


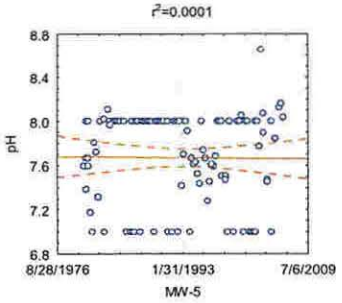
MW-32

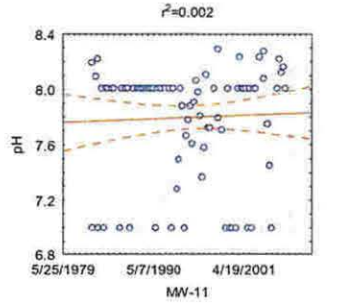
pH Regressions

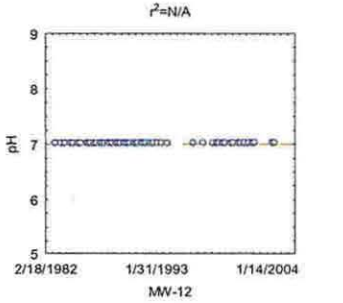


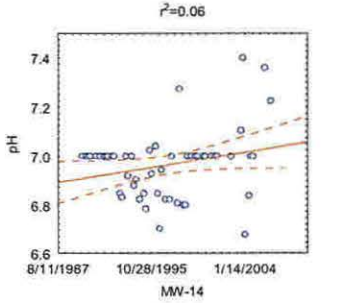


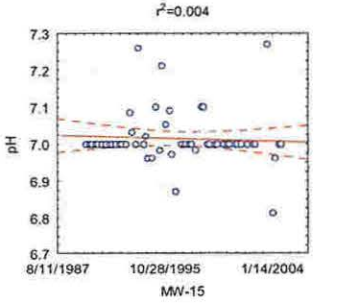


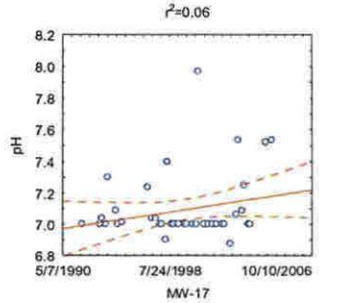


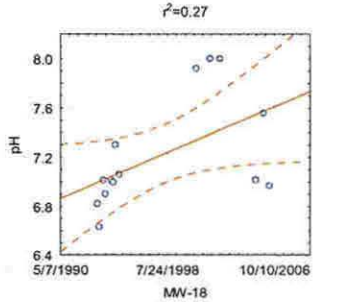


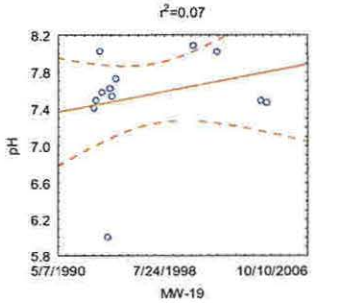




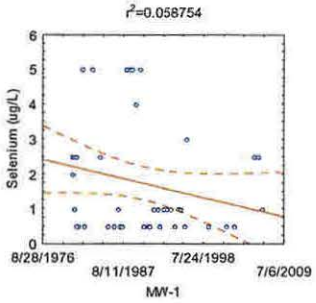


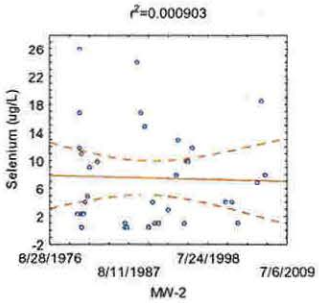


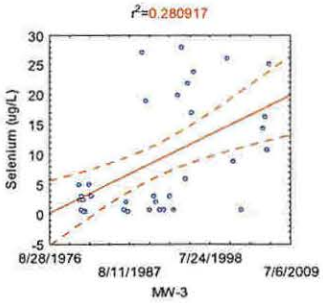


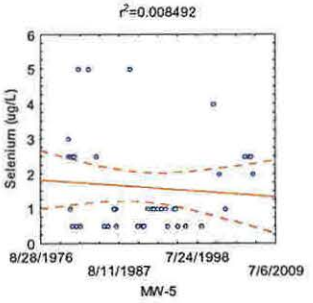


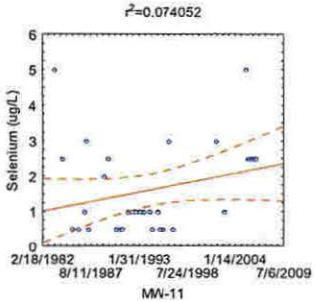
Selenium Regression Analysis

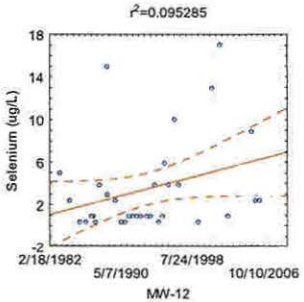


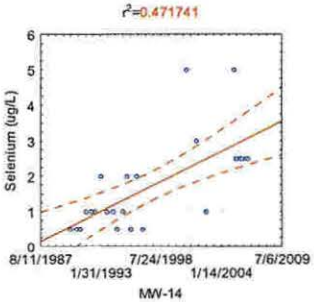


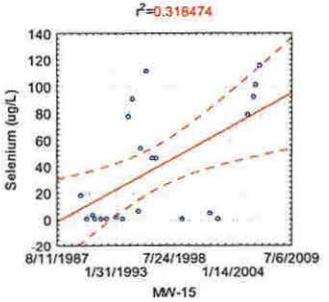


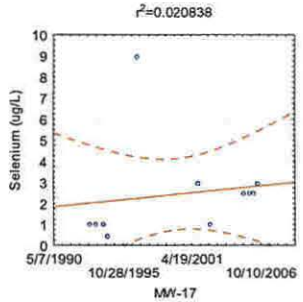


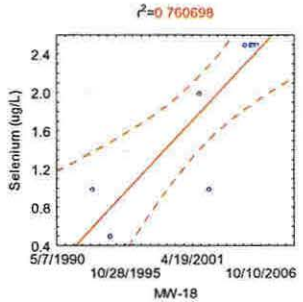


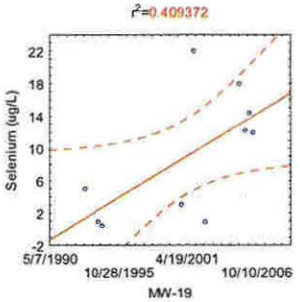


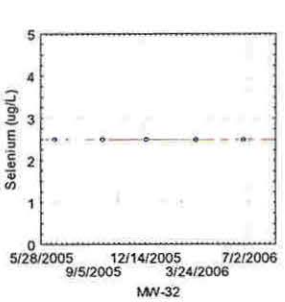




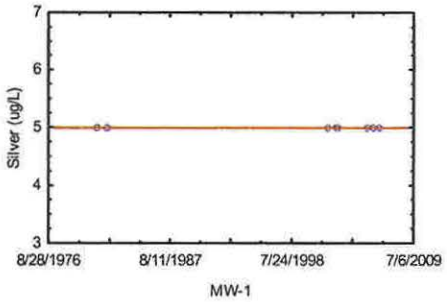




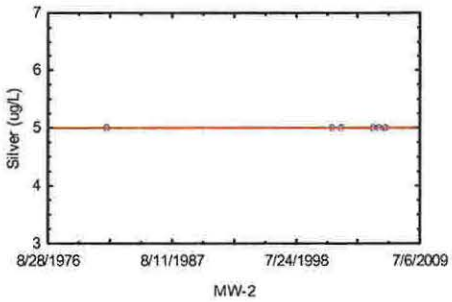




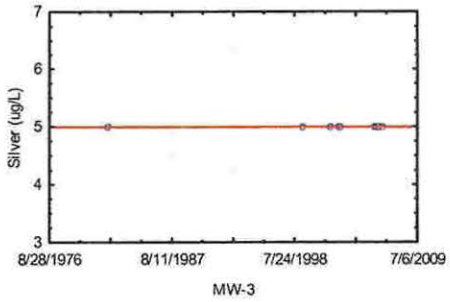
Silver Regression Analysis



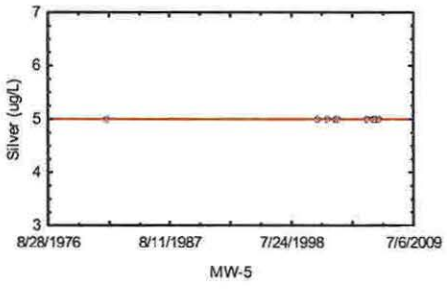
MW-1



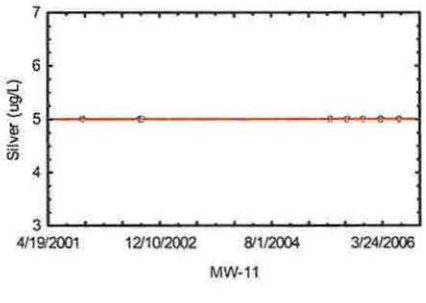
MW-2



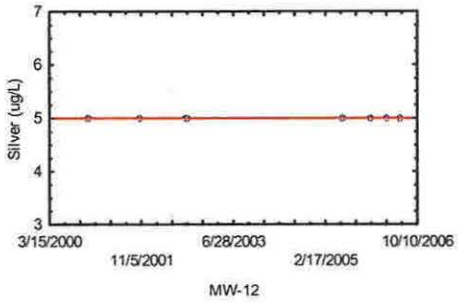
MW-3



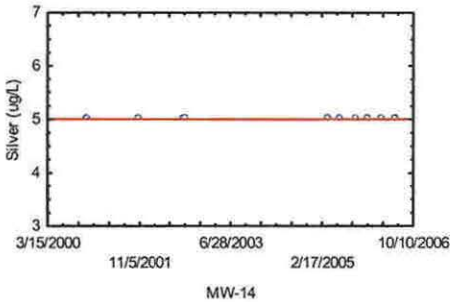
MW-5



MW-11

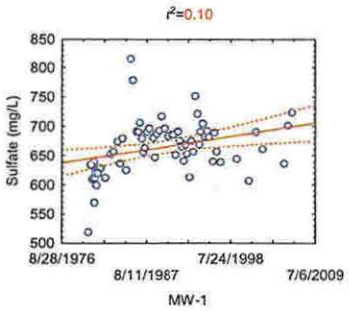


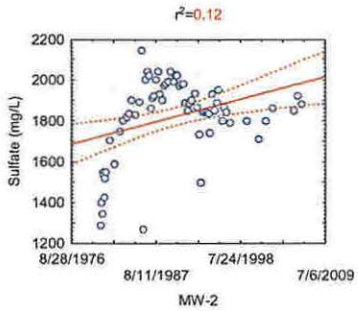
MW-12

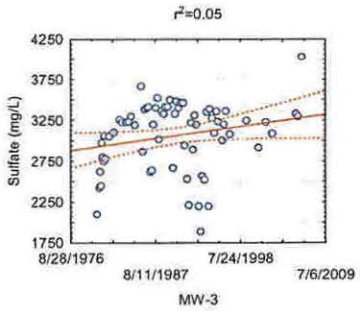


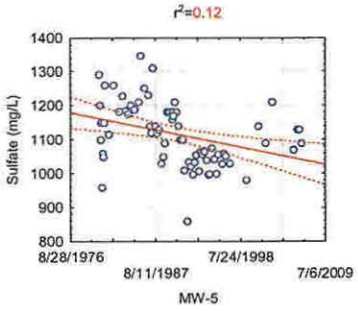
MW-14

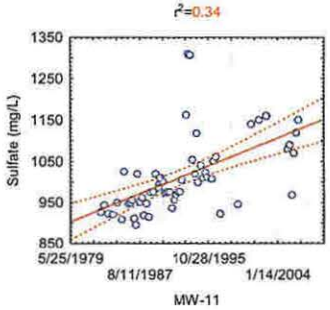
Sulfate Regressions

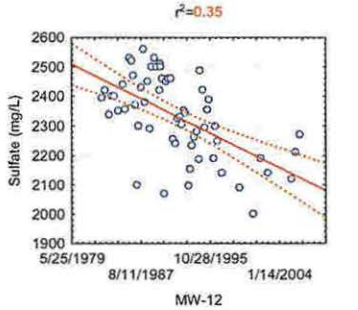


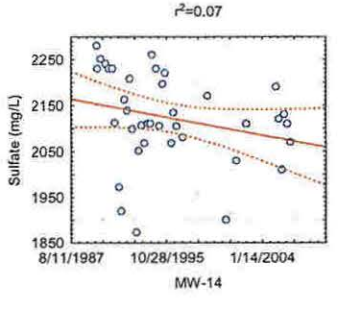


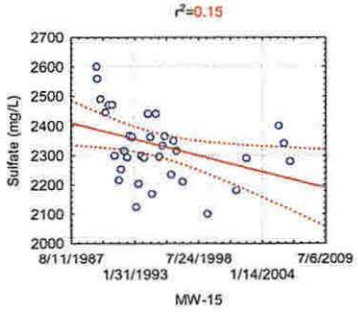


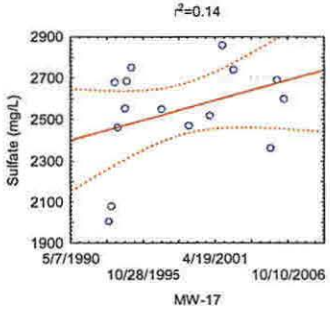


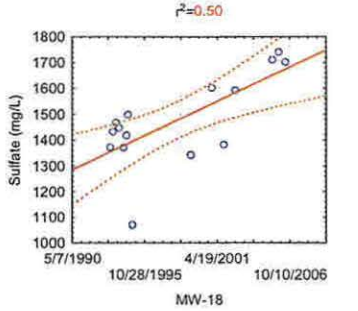


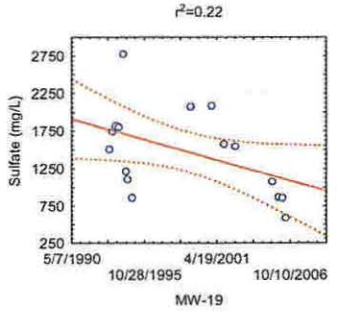




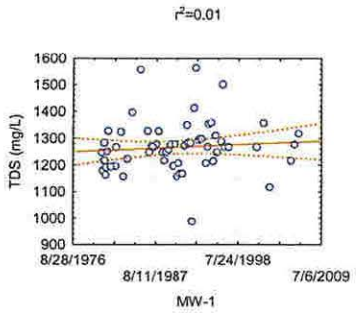


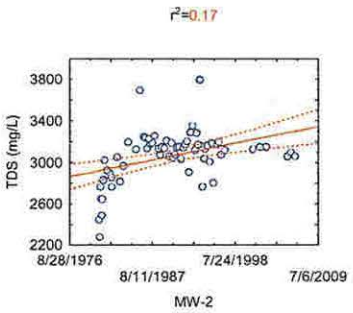


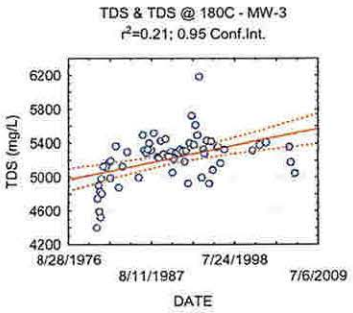


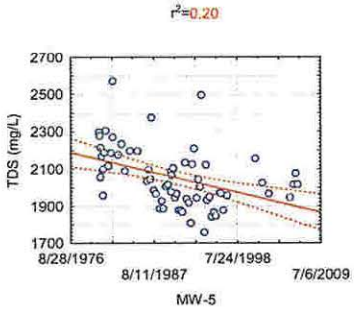


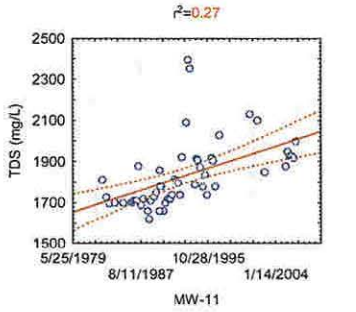
TDS Regressions

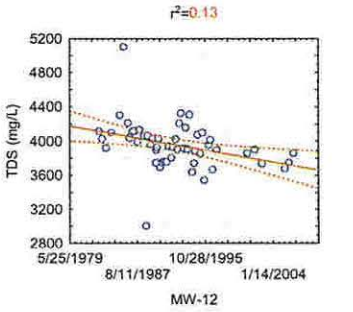


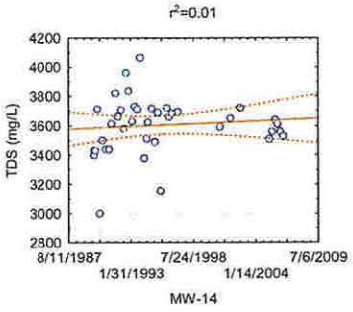


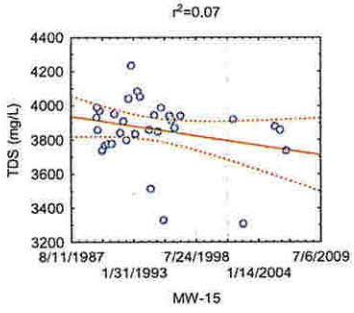


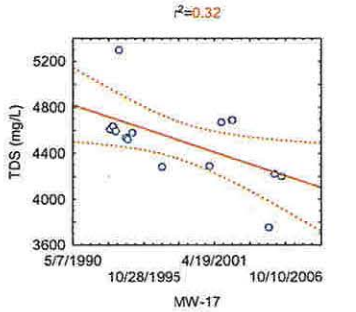


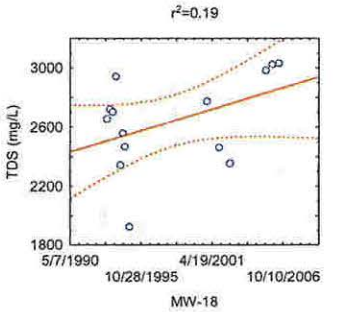


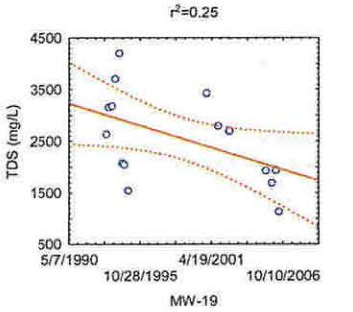




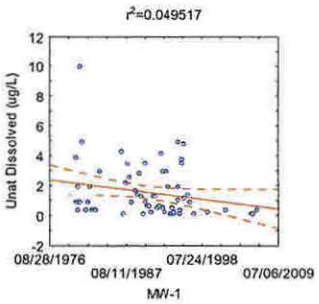


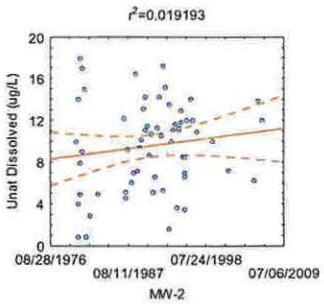


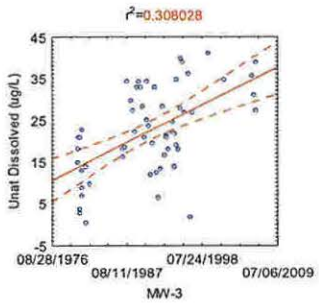


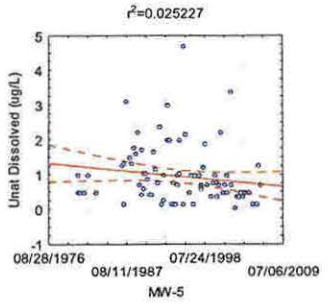


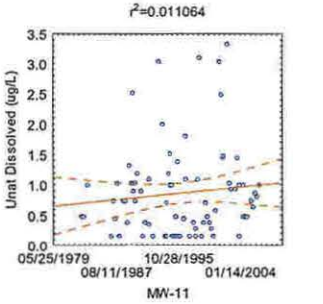
Uranium Regression Analysis

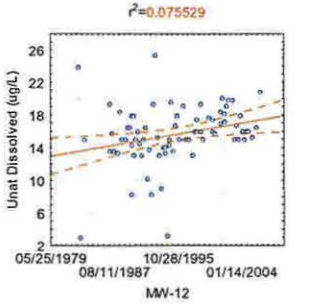


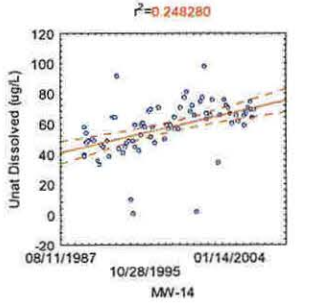


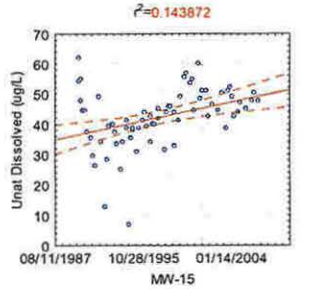


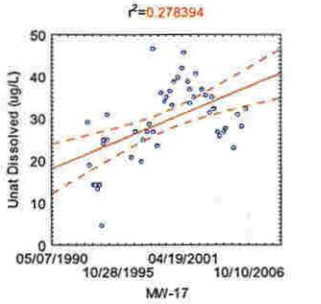


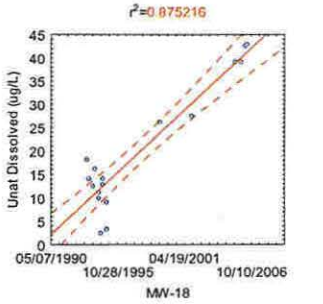


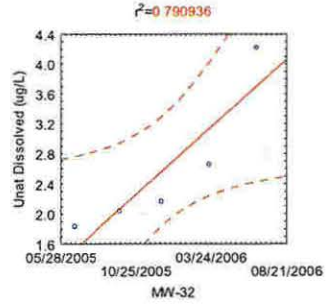




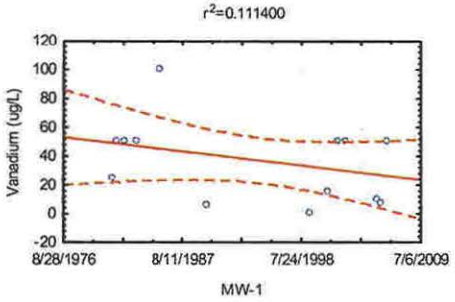


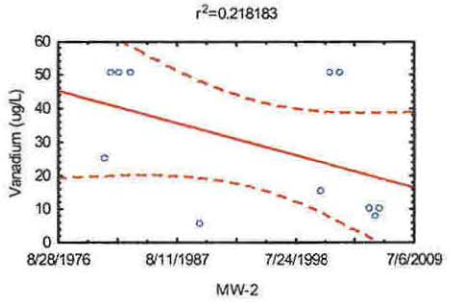


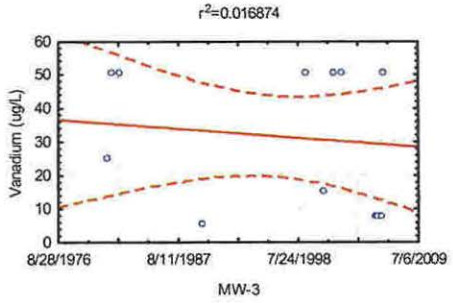


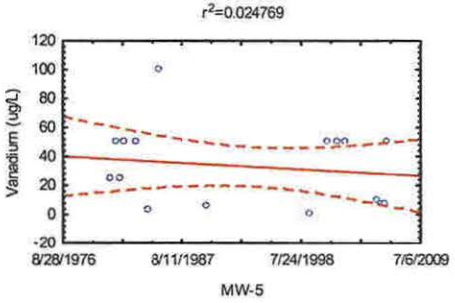


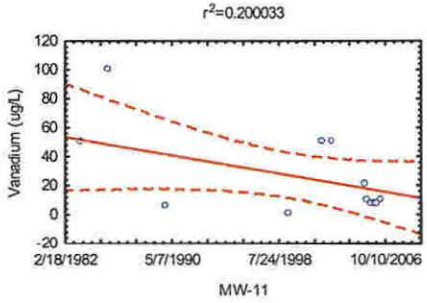
Vanadium Regression Analysis

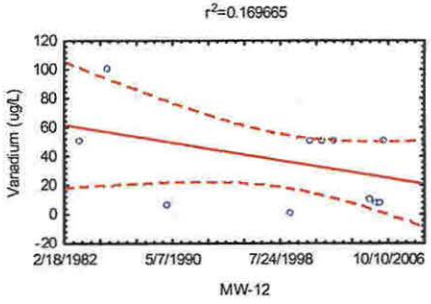


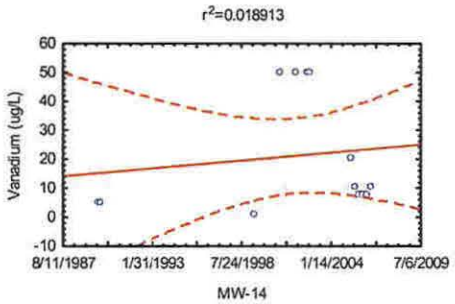




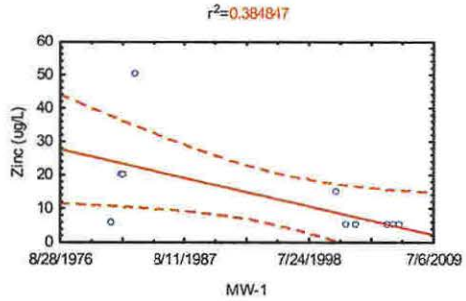




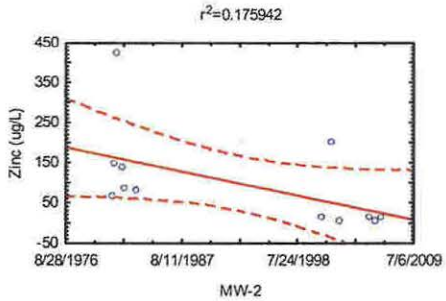




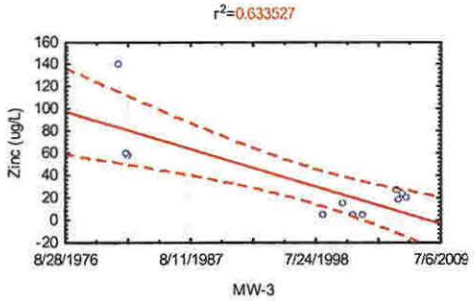
Zinc Regression Analysis



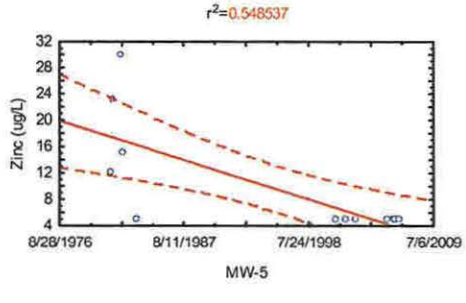
MW-1



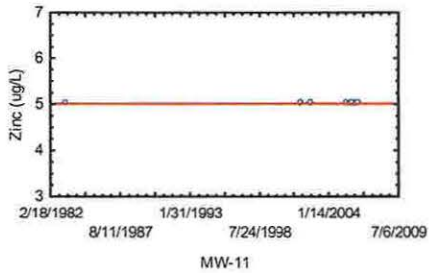
MW-2



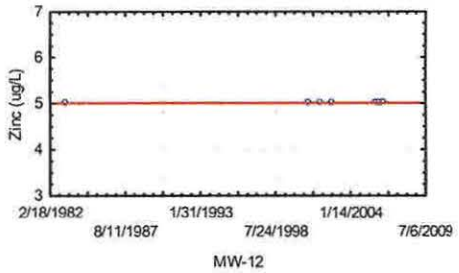
MW-3



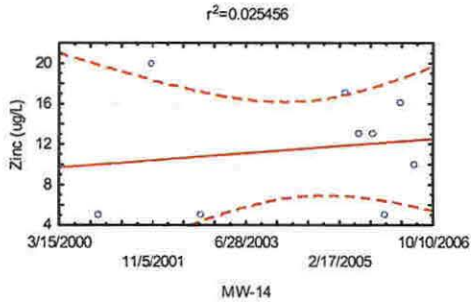
MW-5



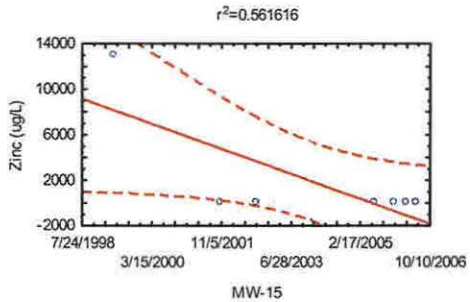
MW-11



MW-12

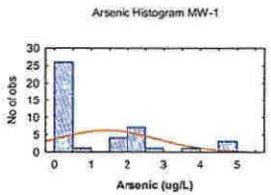


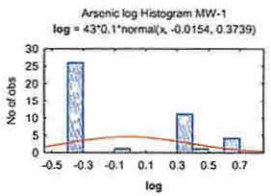
MW-14

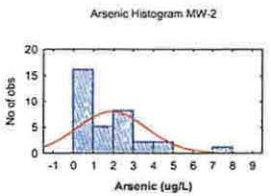


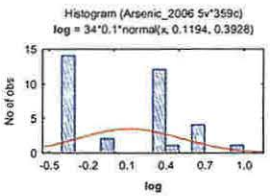
MW-15

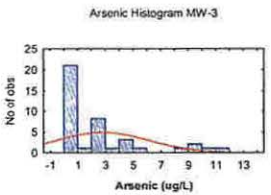
Arsenic Histograms

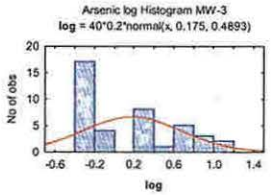


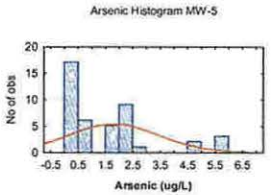


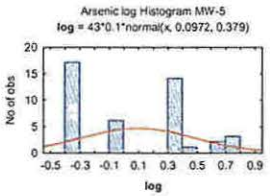


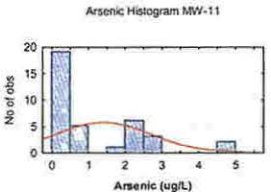


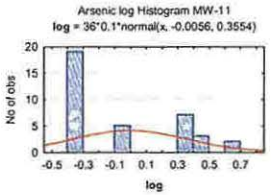


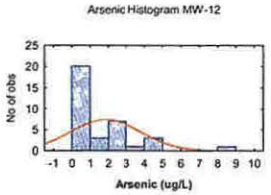


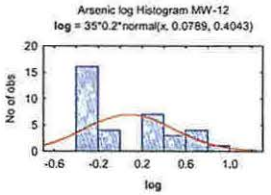


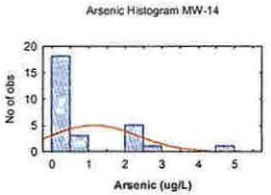


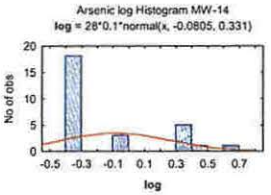


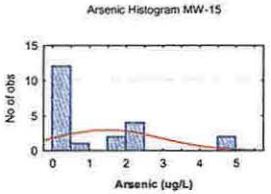


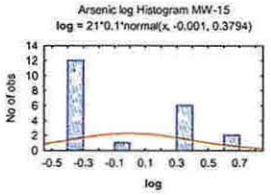


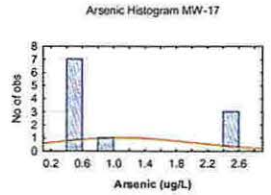


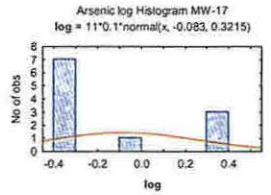


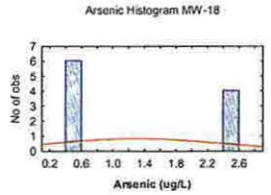


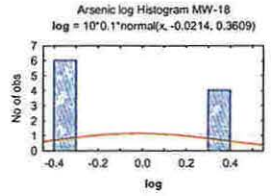


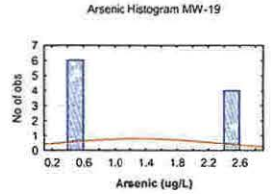


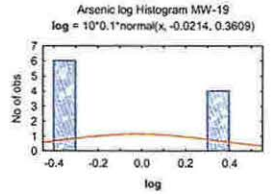




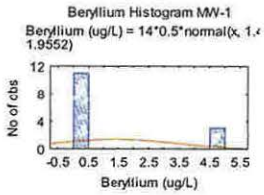


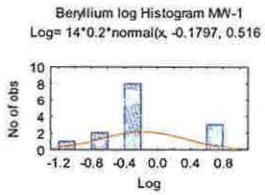


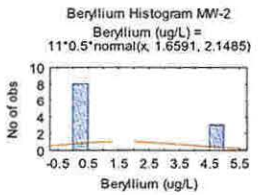


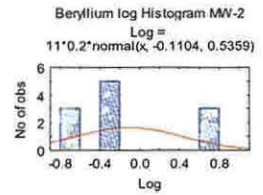


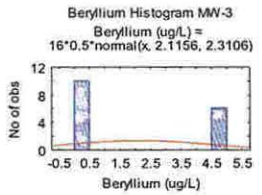
Beryllium Histograms

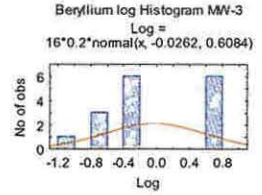


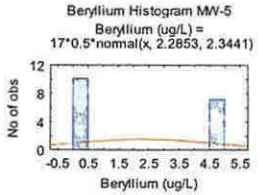


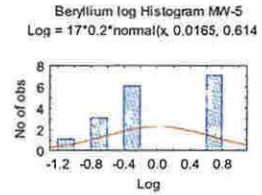


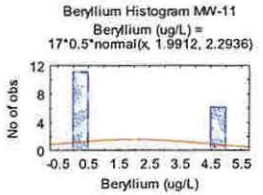


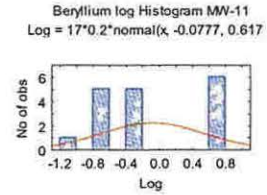


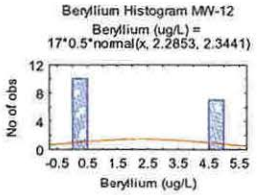


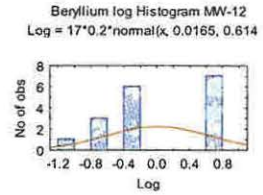


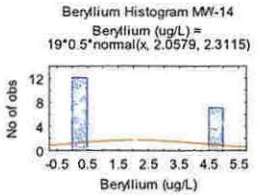


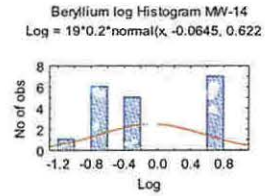


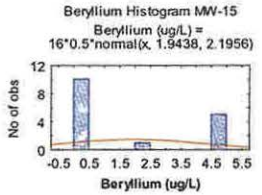


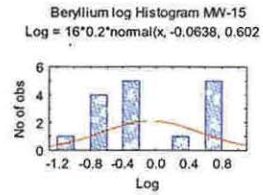


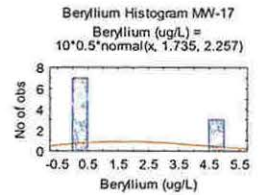


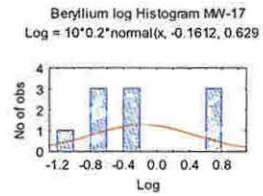


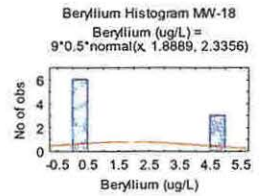


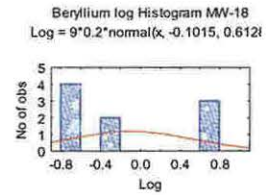


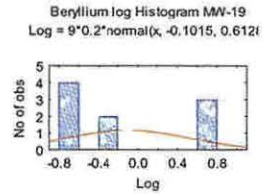


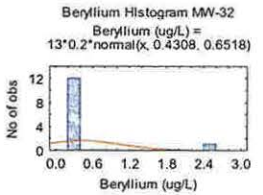


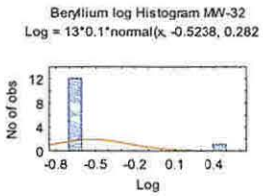




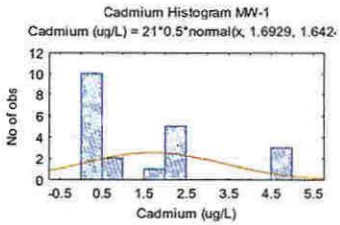


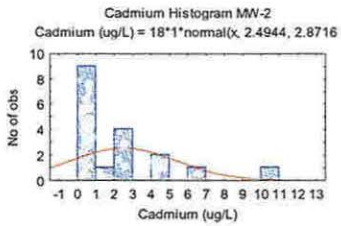


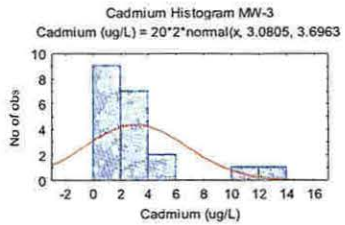


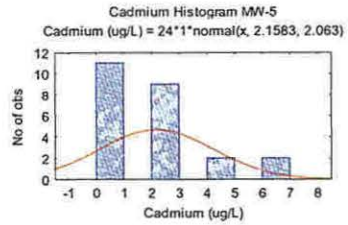


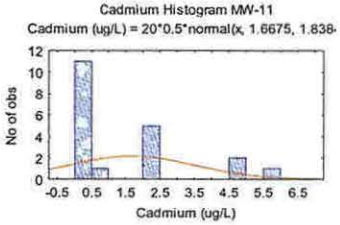
Cadmium Histograms

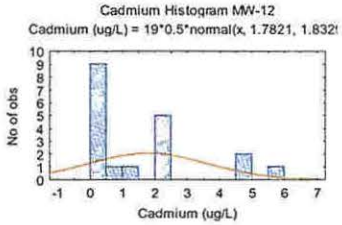


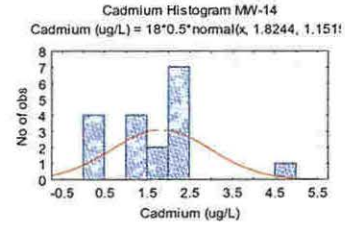


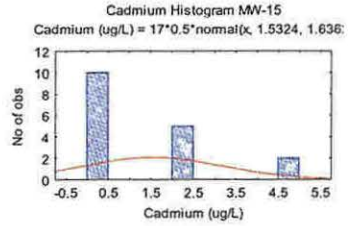


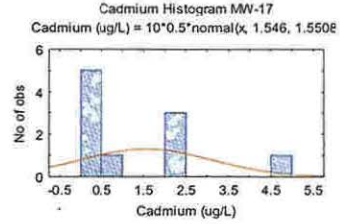


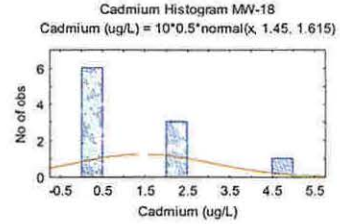


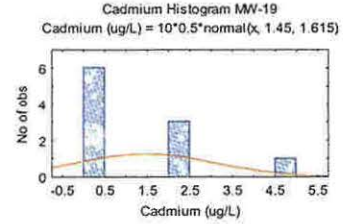


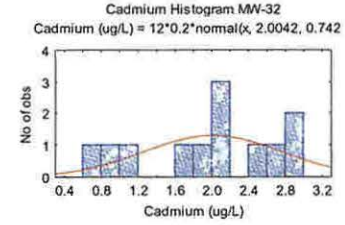


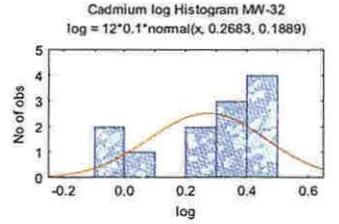




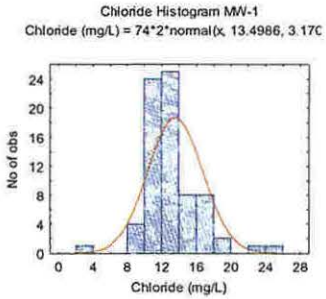


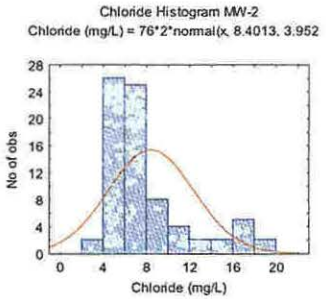


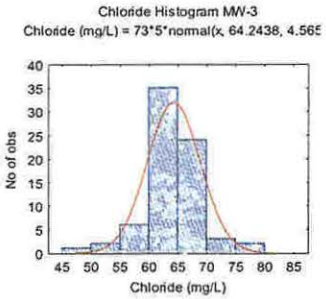


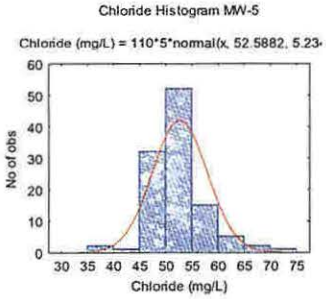


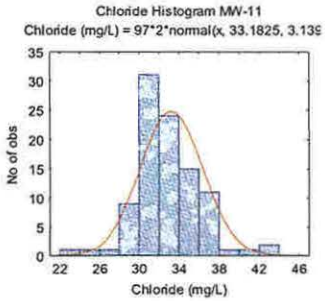
Chloride Histograms

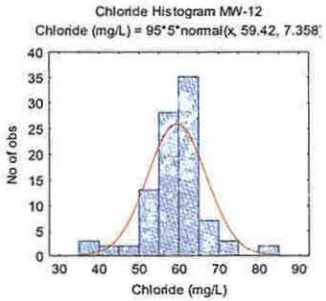


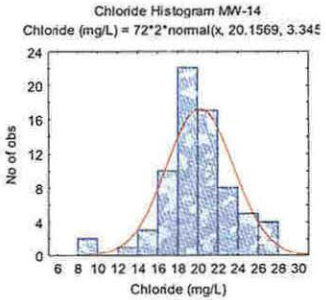


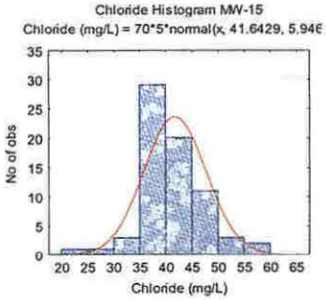


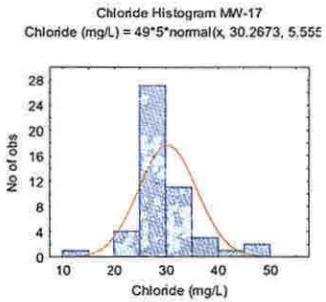


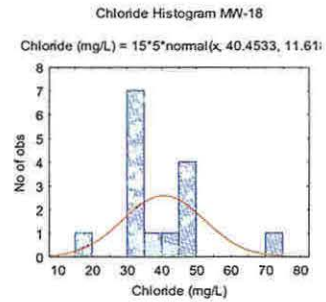


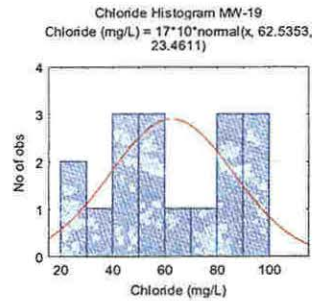


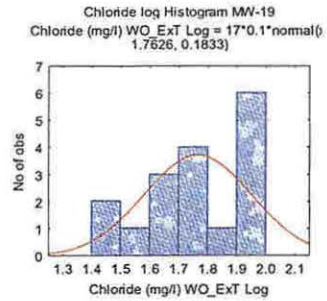




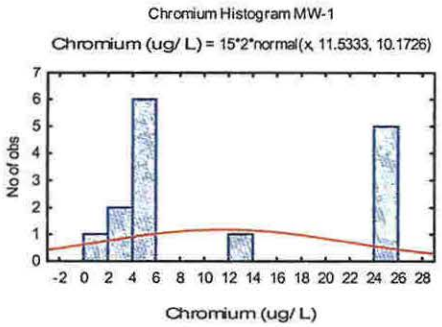


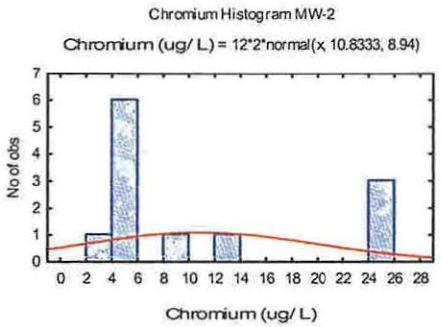


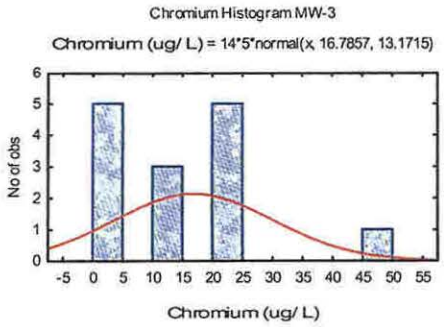


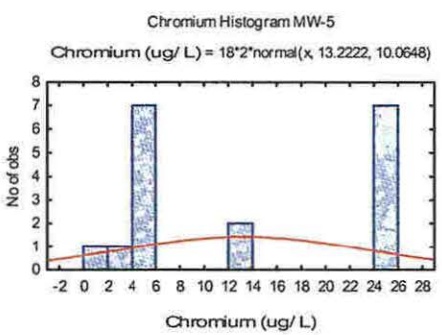


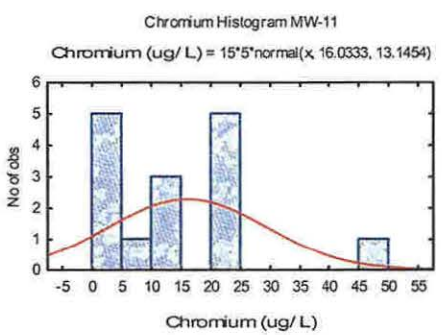
Chromium Histograms

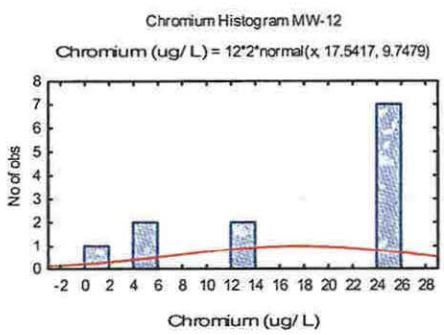


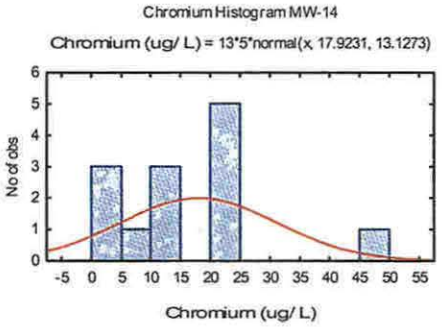


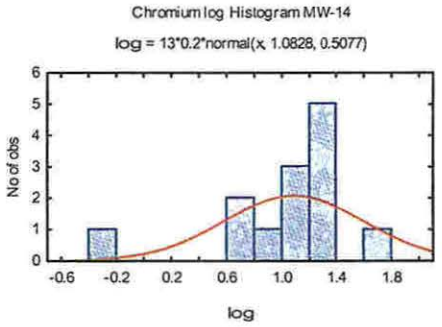


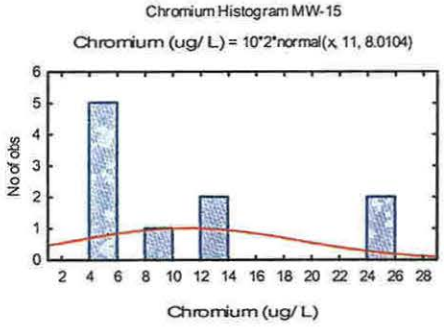








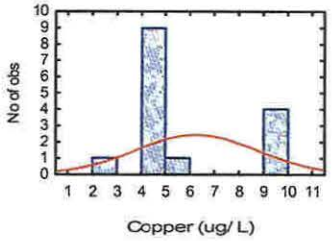




Copper Histograms

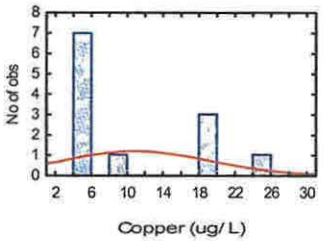
Copper Histogram

Copper (ug/ L) = 15*1*normal(x 6.2333, 2.4558)



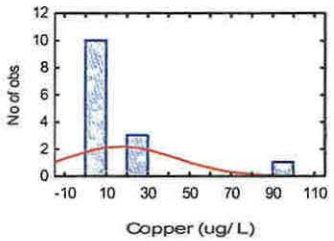
Copper Histogram MW-2

Copper (ug/ L) = 12*2*normal(x 10.9167, 8.0955)



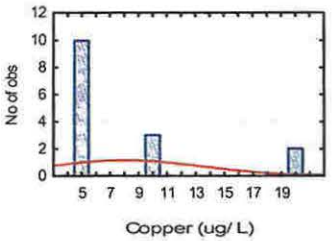
Copper Histogram MW-3

Copper (ug/ L) = 14*10*normal(x 17.2143 26.036)



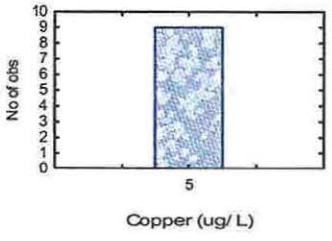
Copper Histogram MW-5

Copper (ug/ L) = 15*1*normal(x 8, 5.278)



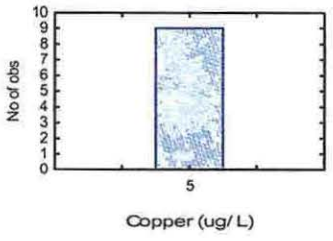
Copper Histogram MW-11

Copper (ug/ L) = Fit not drawn because c invalid range of values



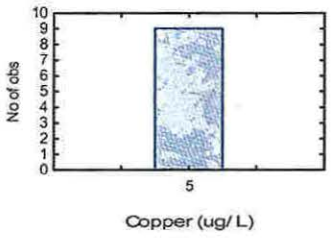
Copper Histogram MW-12

Copper (ug/ L) = Fit not drawn because c invalid range of values



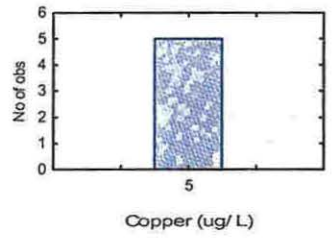
Copper Histogram MW-14

Copper (ug/ L) = Fit not drawn because of invalid range of value



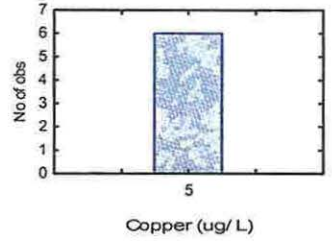
Copper Histogram MW-15

Copper (ug/ L) = Fit not drawn because c invalid range of values



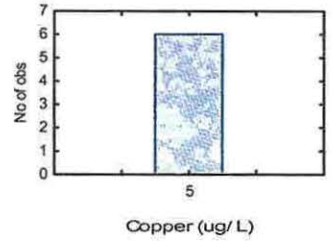
Copper Histogram MW-17

Copper (ug/ L) = Fit not drawn because c invaid range of values



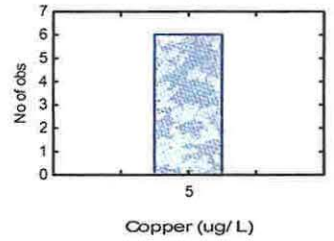
Copper Histogram MW-18

Copper (ug/ L) = Fit not drawn because c invalid range of values



Copper Histogram MW-19

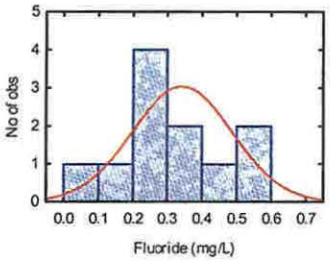
Copper (ug/ L) = Fit not drawn because c invalid range of values



Fluoride Histograms (Log and Normal)

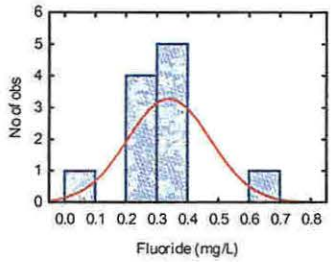
Fluoride Histogram MW-1

Fluoride (mg/L) = 11*0.1*normal(x, 0.34, 0.1444



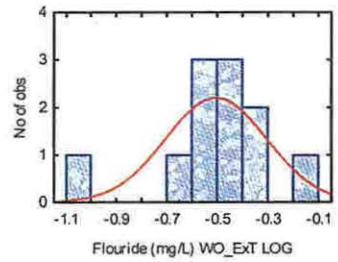
Fluoride Histogram MW-2

Fluoride (mg/L) = 11*0.1*normal(x, 0.3382, 0.134



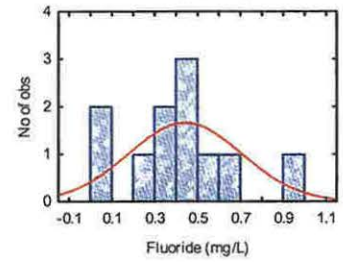
Fluoride log Histogram MW-2

Flouride (mg/L) WO_ExT LOG = 11*0.1*normal(
-0.5071, 0.2003)



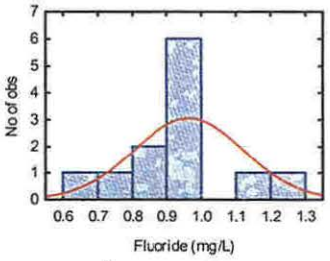
Fluoride Histogram MW-3

Fluoride (mg/L) =
11*0.1*normal(x, 0.4395, 0.2649)



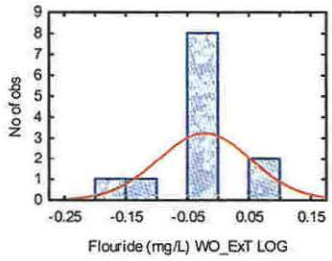
Fluoride Histogram MW-5

Fluoride (mg/L) =
12*0.1*normal(x, 0.9617, 0.1574)



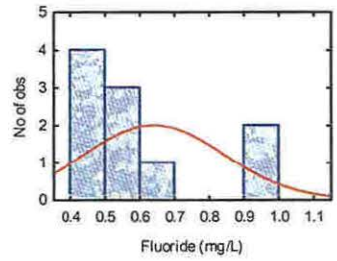
Fluoride log Histogram MW-5

Flouride (mg/L) WO_ExT LOG = 12*0.05*norm
(x, -0.0226, 0.0747)



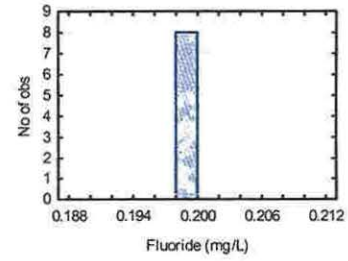
Fluoride Histogram MW-11

Fluoride (mg/L) =
10*0.1*normal(x, 0.641, 0.2004)



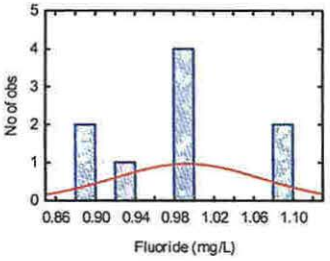
Fluoride Histogram MW-14

Fluoride (mg/L) = Fit not drawn because of inval
range of values



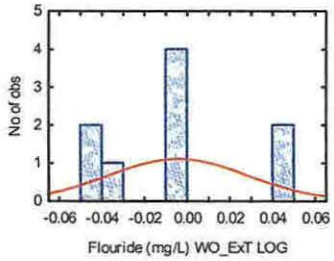
Fluoride Histogram MW-19

Fluoride (mg/L) =
9*0.02*normal(x, 0.9922, 0.0745)



Fluoride log Histogram MW-19

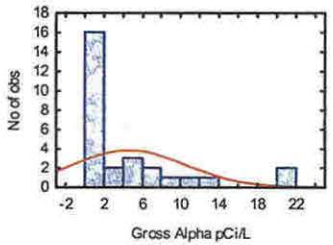
Flouride (mg/L) WO_ExT LOG = 9*0.01*normal(
-0.0045, 0.0325)



Gross Alpha Histograms (Log and Normal)

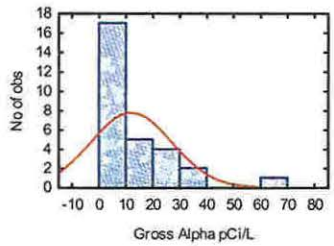
Gross Alpha Histogram MW-1

Gross Alpha pCi/L = 28*2*normal(x, 4.6, 5.874



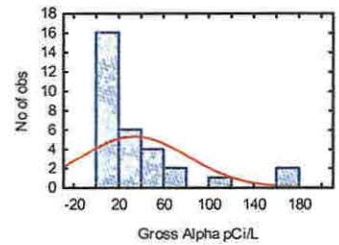
Gross Alpha Histograph MW-2

Gross Alpha pCi/L = 29*10*normal(x, 11.9483 14.9166)



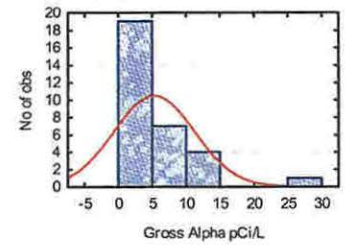
Gross Alpha Histogram MW-3

Gross Alpha pCi/L = 31*20*normal(x, 34.2694 47.1086)



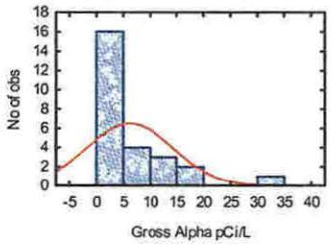
Gross Alpha Histogram MW-5

Gross Alpha pCi/L = 31*5*normal(x, 5.2355, 5.89



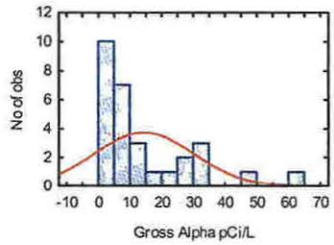
Gross Alpha Histogram MW-11

Gross Alpha pCi/L = 26*5*normal(x, 6.1885, 7.99



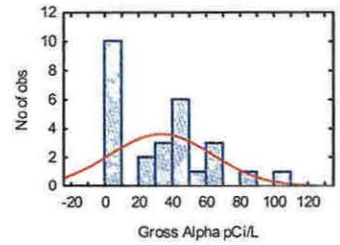
Gross Alpha Histogram MW-12

Gross Alpha pCi/L = 29*5*normal(x, 14.3914, 15.5542)



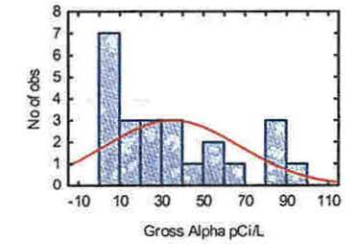
Gross Alpha Histogram MW-14

Gross Alpha pCi/L = 27*10*normal(x, 33.2444 30.015)



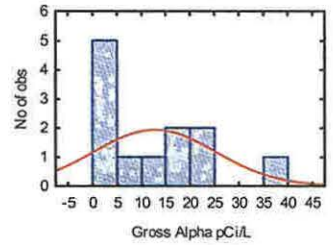
Gross Alpha Histograph MW-15

Gross Alpha pCi/L = 24*10*normal(x, 34.9292 32.1053)



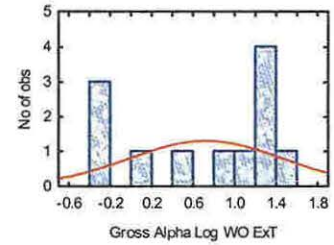
Gross Alpha Histogram MW-17

Gross Alpha pCi/L = 12*5*normal(x, 12.6833, 12.4277)



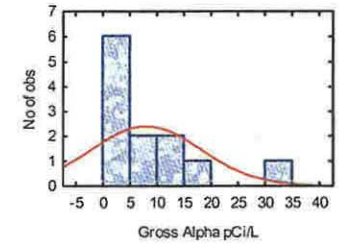
Gross Alpha log Histogram MW-17

Gross Alpha Log WO ExT = 12*0.2*normal(x, 0.7177, 0.7427)



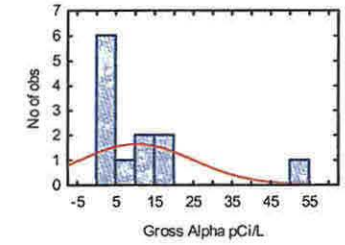
Gross Alpha Histogram MW-18

Gross Alpha pCi/L = 12*5*normal(x, 8, 10.086

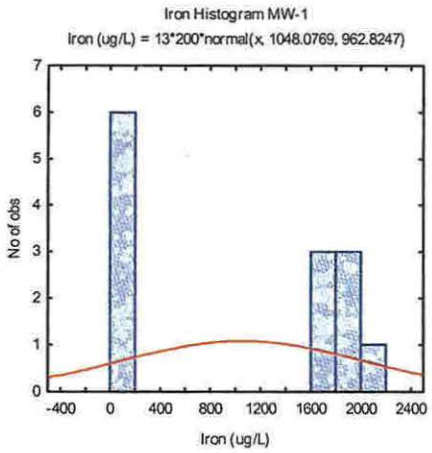


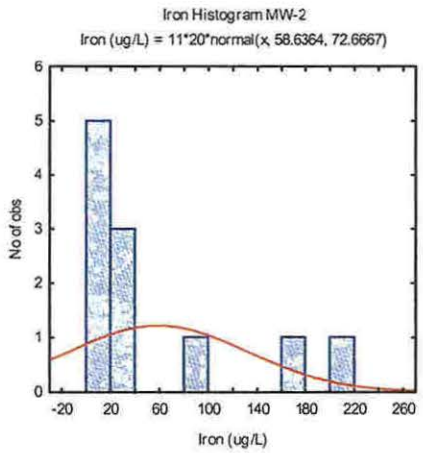
Gross Alpha Histogram MW-19

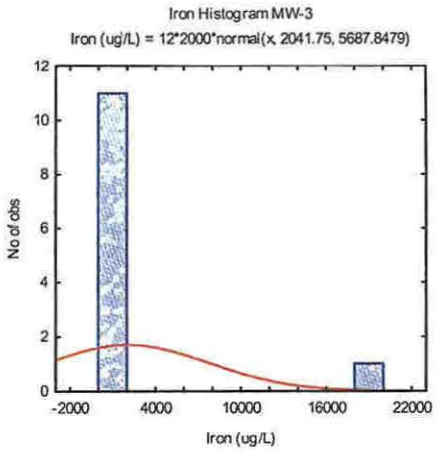
Gross Alpha pCi/L = 12*5*normal(x, 10.3583, 14.6563)

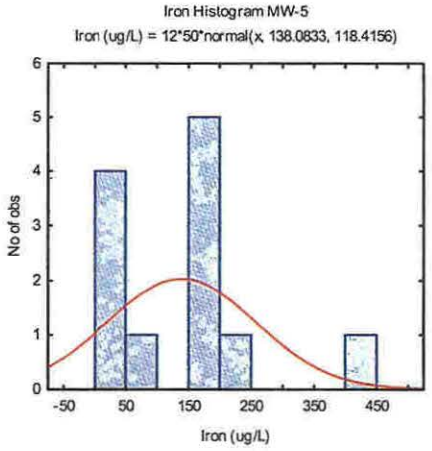


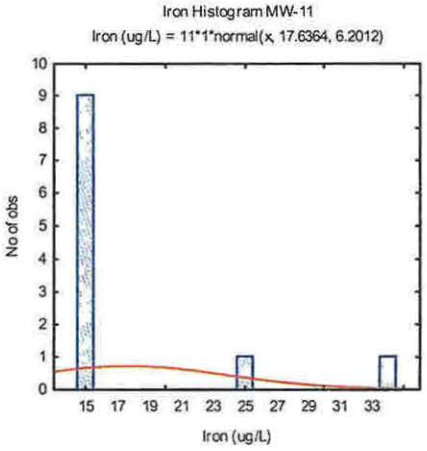
Iron Histograms

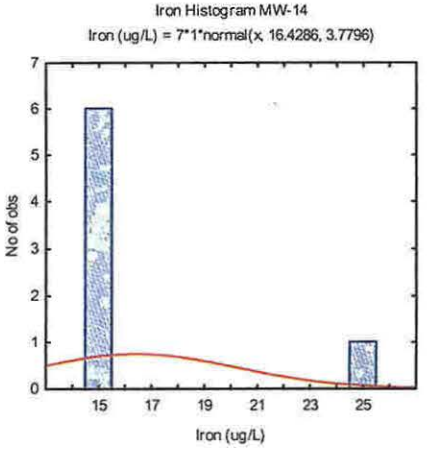








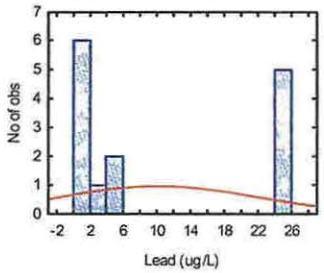




Lead Histograms

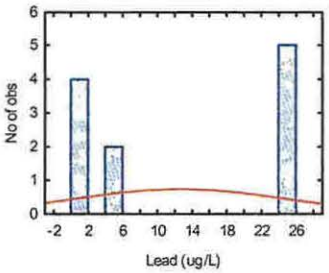
Lead Histogram MW-1

Lead (ug/L) = 14*2*normal(x, 10.1071, 11.617



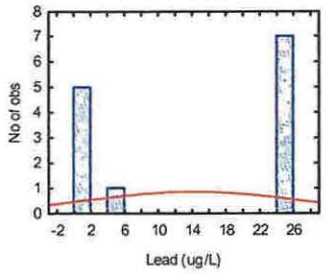
Lead Histogram MW-2

Lead (ug/L) = 11*2*normal(x, 12.5455, 12.028)



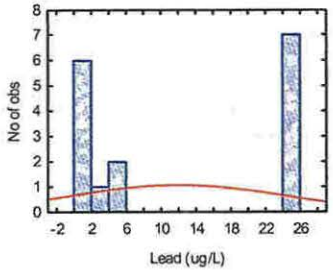
Lead Histogram MW-3

Lead (ug/L) = 13*2*normal(x, 14.1154, 12.291



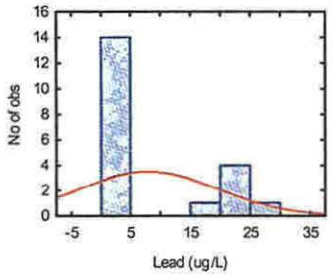
Lead Histogram MW-5

Lead (ug/L) = 16*2*normal(x, 11.9063, 12.0128



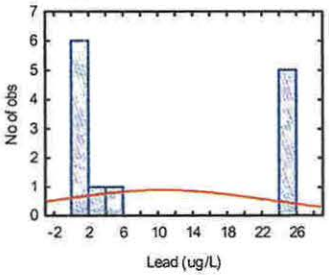
Lead Histogram MW-11

Lead (ug/L) = 20*5*normal(x, 7.925, 11.4596)



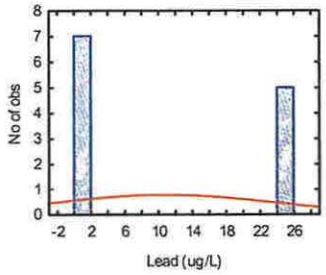
Lead Histogram MW-12

Lead (ug/L) = 13*2*normal(x, 10.4231, 12.0603



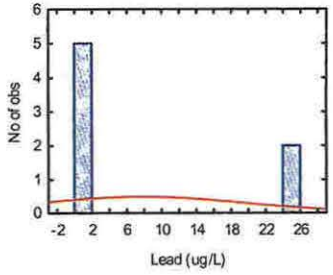
Lead Histogram MW-14

Lead (ug/L) = 12*2*normal(x, 10.7083, 12.6158



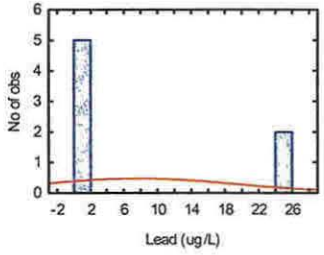
Lead Histogram MW-17

Lead (ug/L) = 7*2*normal(x, 7.6429, 11.8628)



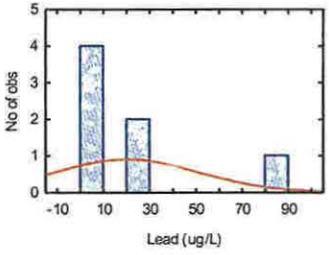
Lead Histogram MW-18

Lead (ug/L) = 7*2*normal(x, 7.6429, 11.8628)



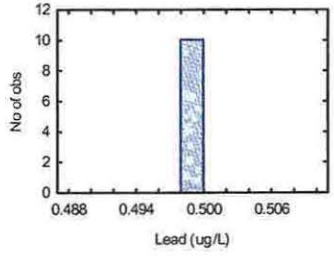
Lead Histogram MW-19

Lead (ug/L) = 7*10*normal(x, 19.8571, 31.3285

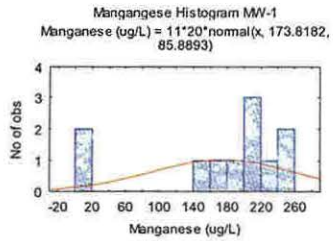


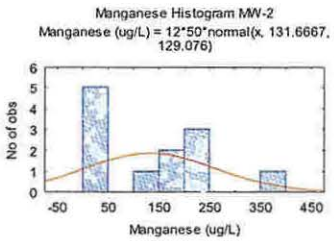
Lead Histogram MW-32

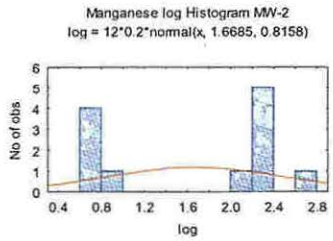
Lead (ug/L) = Fit not drawn because of invalic range of values

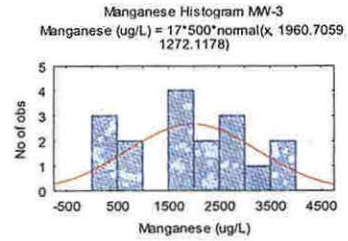


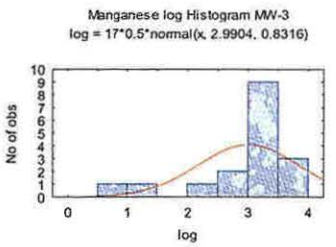
Manganese Histograms

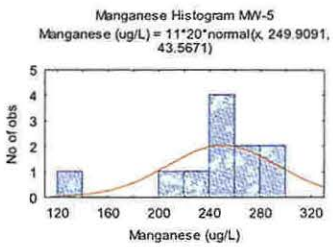


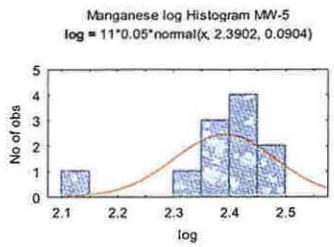


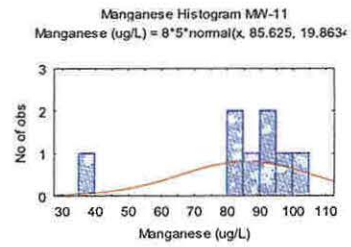


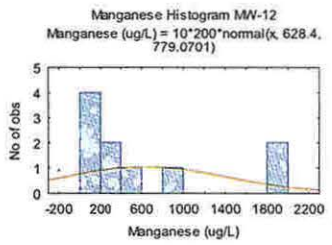


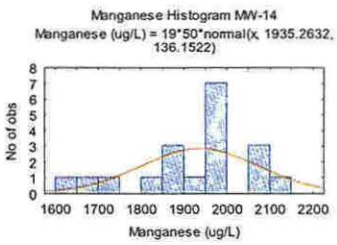


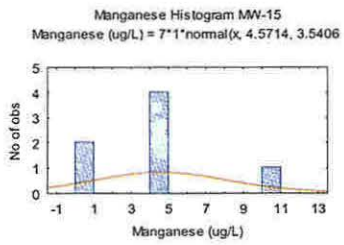


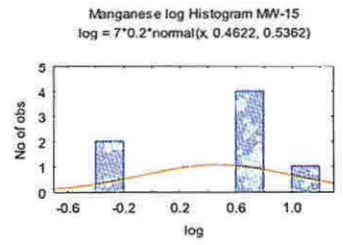


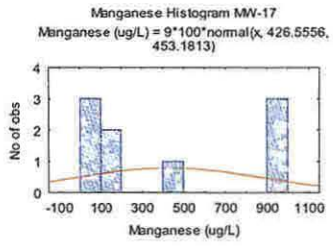


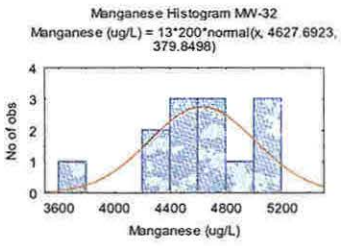


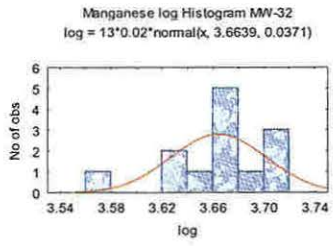




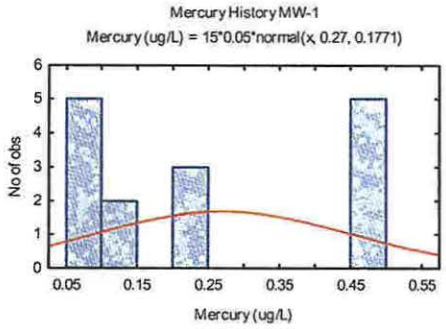


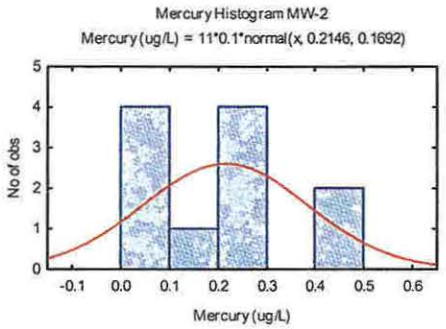


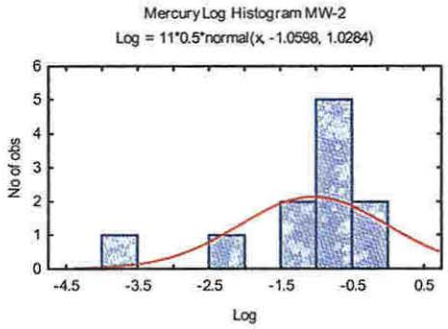


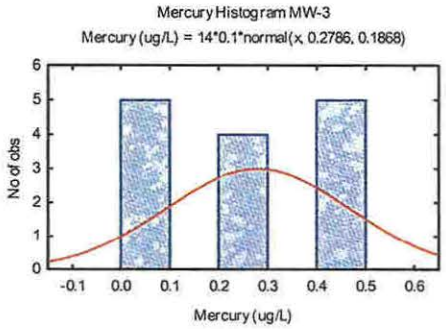


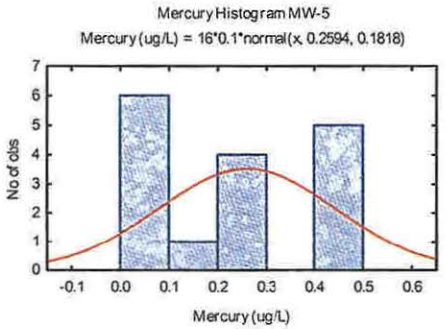
Mercury Histograms

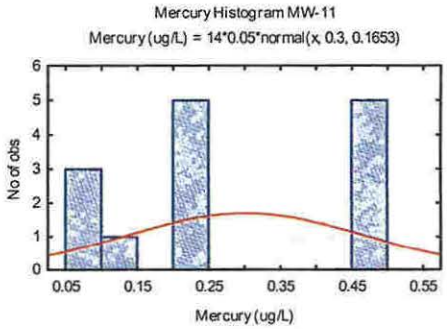


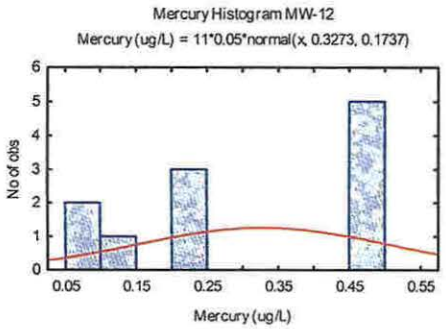


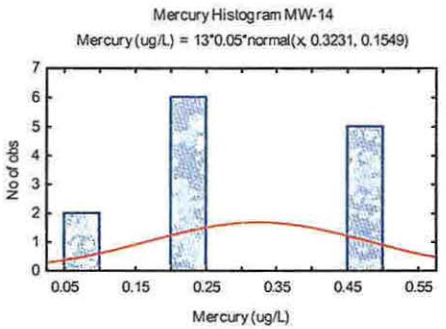


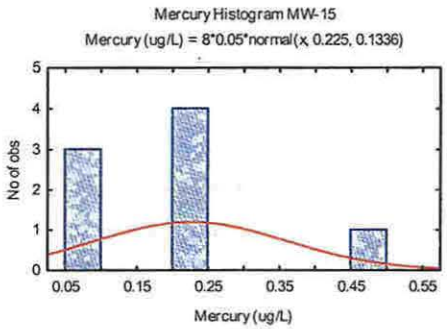




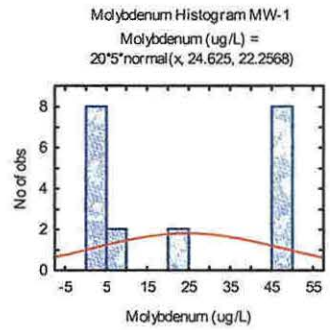


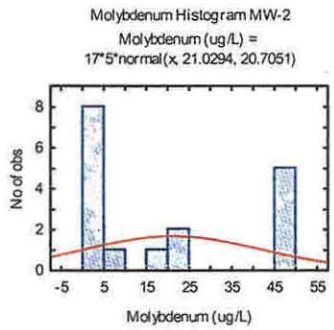


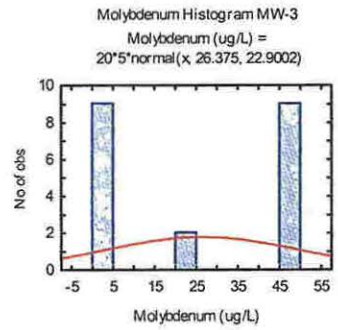


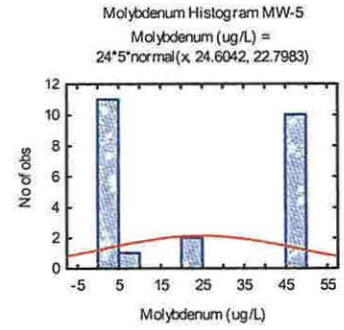


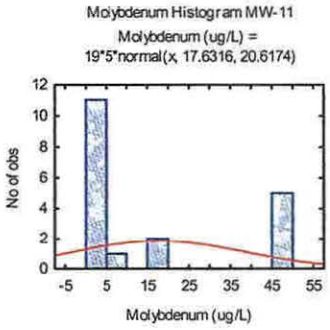
Molybdenum Histograms

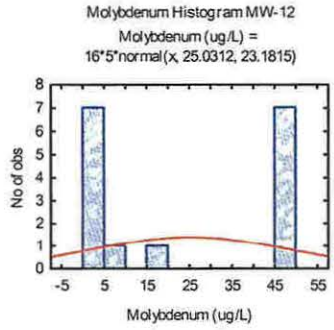


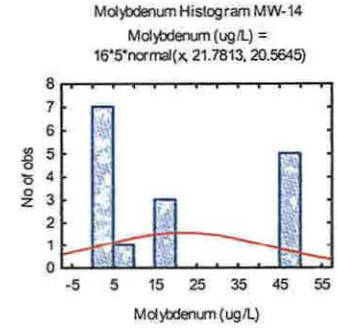


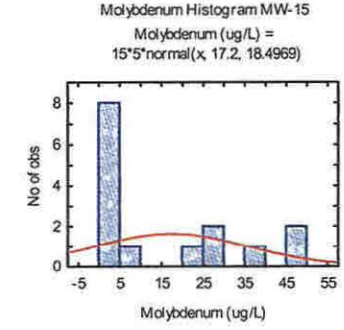


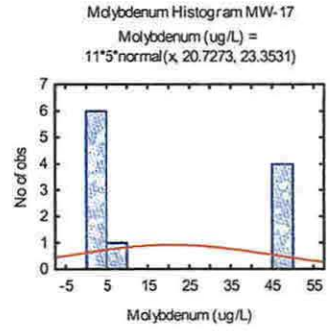


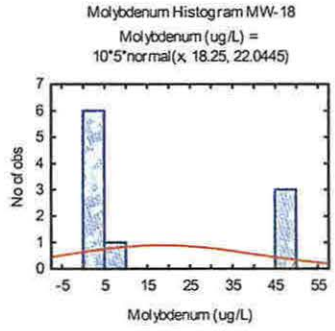


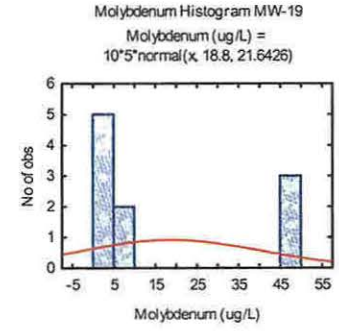






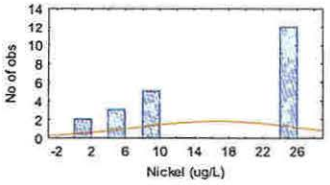




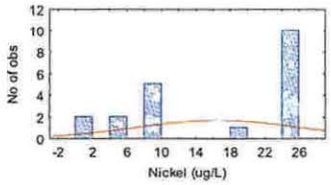


Nickel Histograms

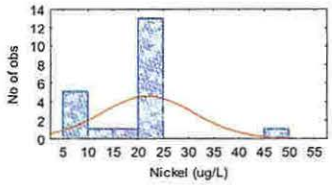
Nickel Histogram MW-1
Nickel (ug/L) = 22*2*normal(x, 16.6364, 9.7262)



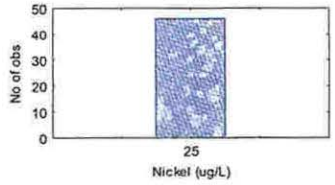
Nickel Histogram MW-2
Nickel (ug/L) = 20*2*normal(x, 16.55, 9.5213)



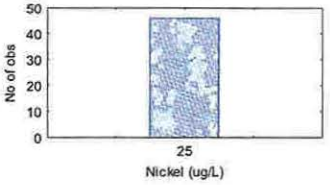
Nickel Histogram MW-3
Nickel (ug/L) = 21*5*normal(x, 21.8571, 9.1885)



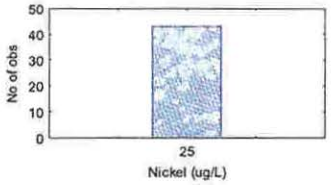
Nickel Histogram MW-5
Nickel (ug/L) = Fit not drawn because of invalid ran of values



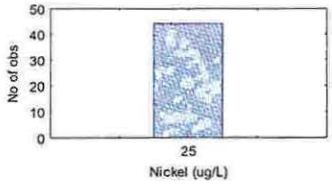
Nickel Histogram MW-11
Nickel (ug/L) = Fit not drawn because of invalid ran of values



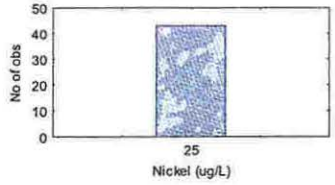
Nickel Histogram MW-12
Nickel (ug/L) = Fit not drawn because of invalid ran of values



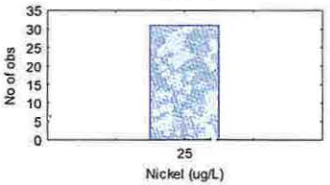
Nickel Histogram MW-14
Nickel (ug/L) = Fit not drawn because of invalid ran of values



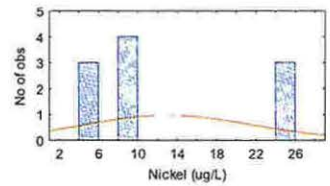
Nickel Histogram MW-15
Nickel (ug/L) = Fit not drawn because of invalid ran of values



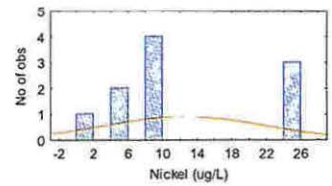
Nickel Histogram MW-17
Nickel (ug/L) = Fit not drawn because of invalid ran of values



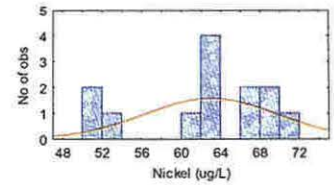
Nickel Histogram MW-18
Nickel (ug/L) = 10*2*normal(x, 13, 8.5635)



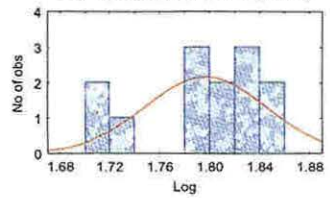
Nickel Histogram MW-19
Nickel (ug/L) = 10*2*normal(x, 12.55, 9.1301)



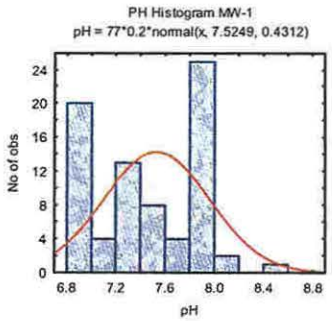
Nickel Histogram MW-32
Nickel (ug/L) = 13*2*normal(x, 62.9231, 6.7015)

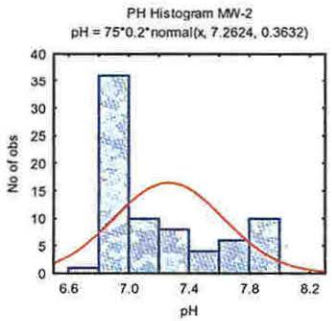


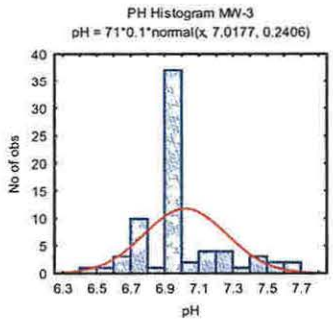
Nickel log Histogram MW-32
Log = 13*0.02*normal(x, 1.7964, 0.0483)

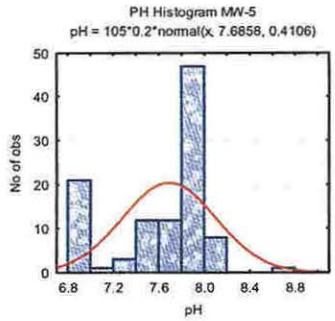


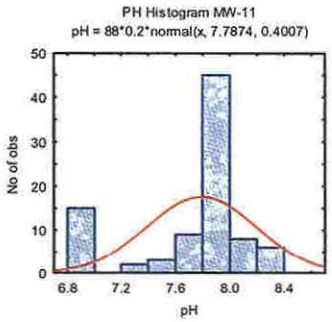
pH Histograms

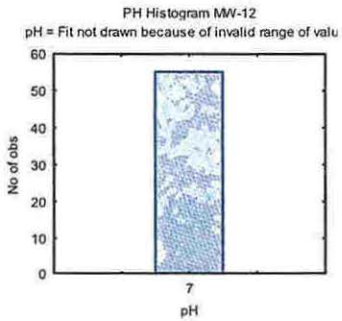


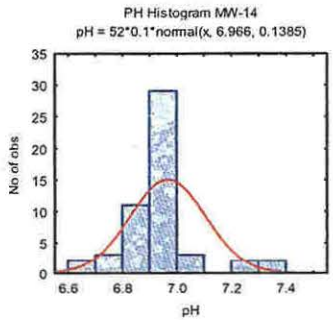


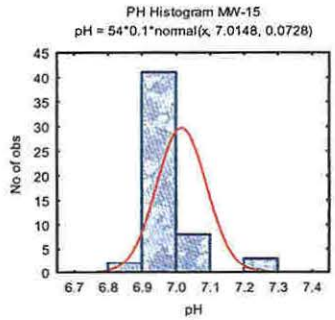


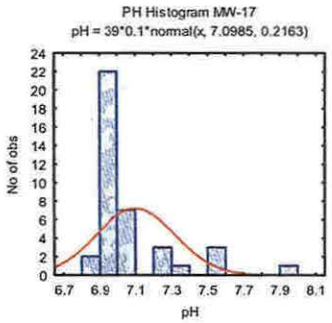


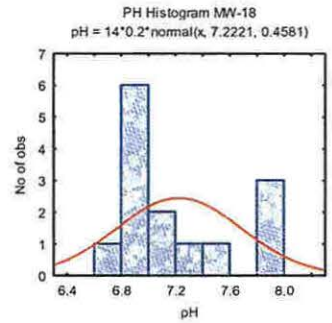


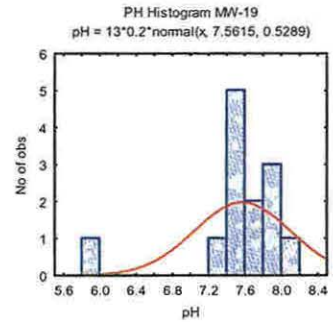




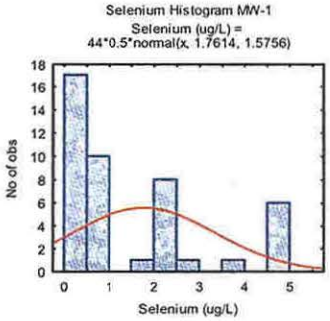


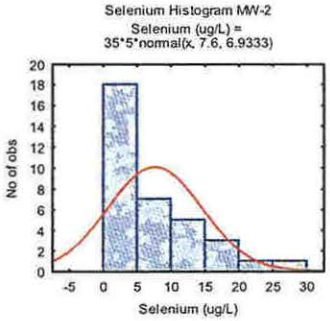


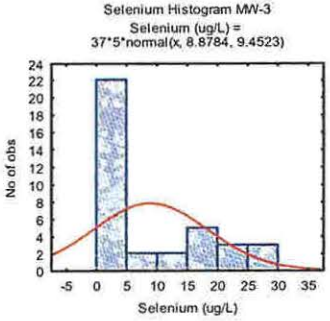


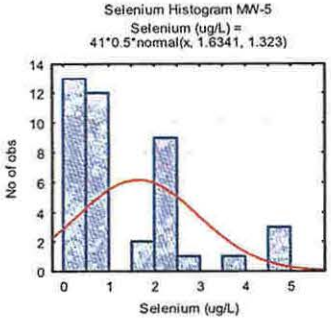


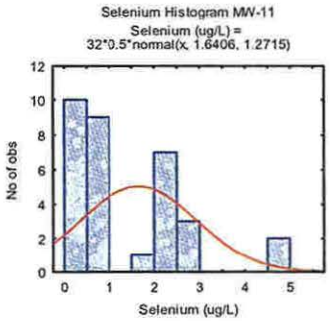
Selenium Histograms

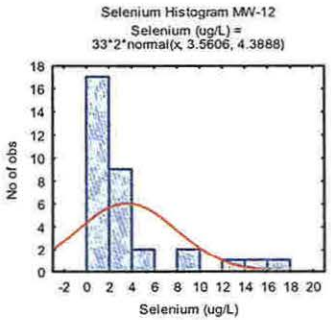


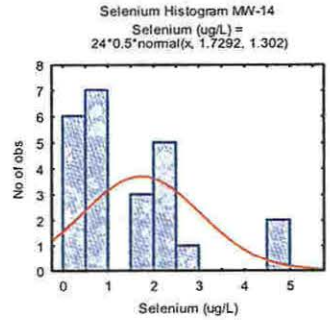


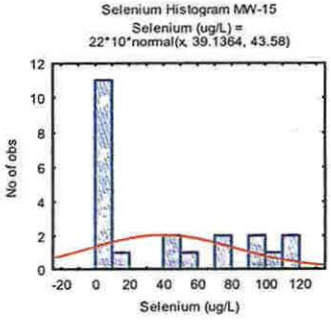


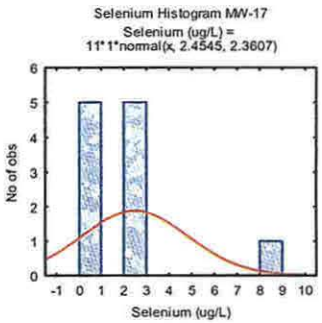


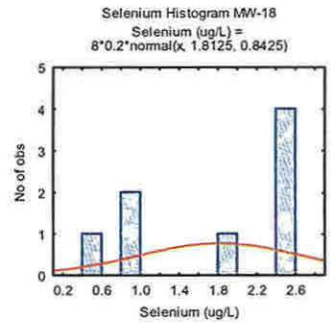


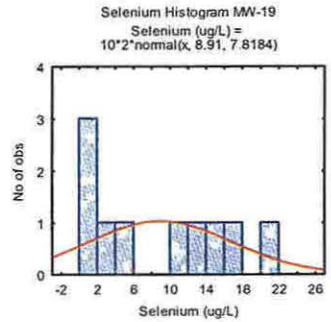




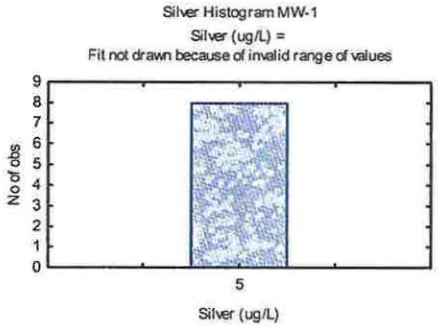


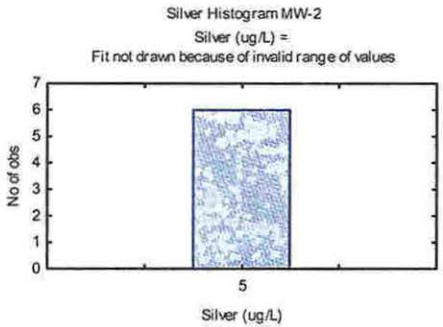


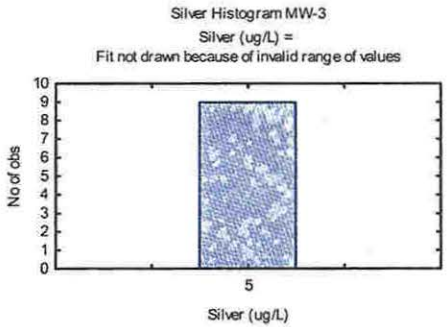


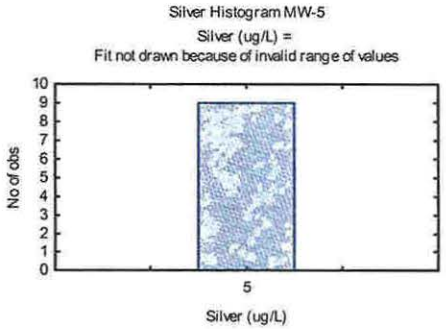


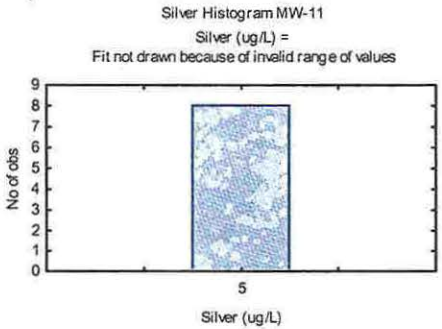
Silver Histograms

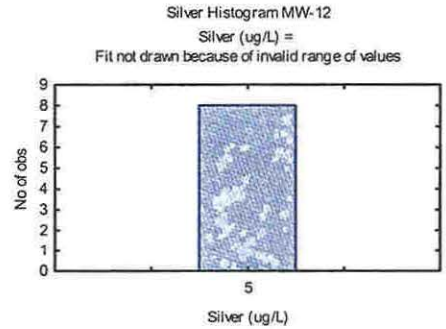


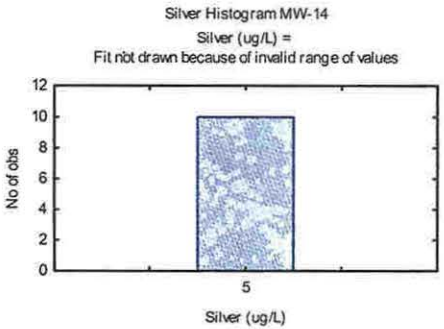




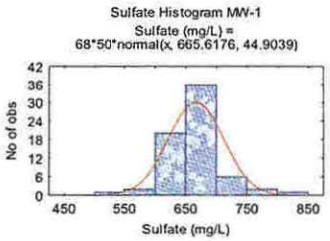


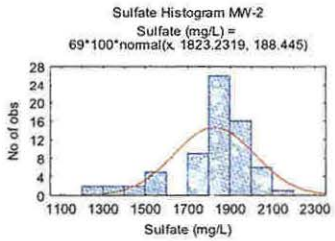


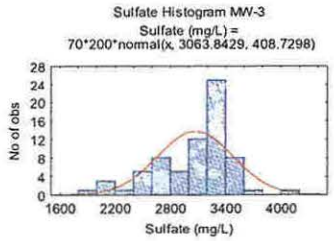


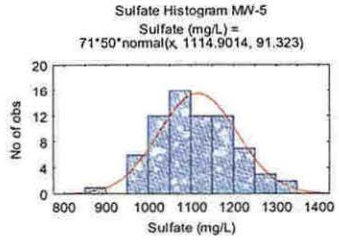


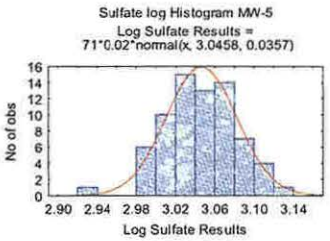
Sulfate Histograms (Log and Normal)

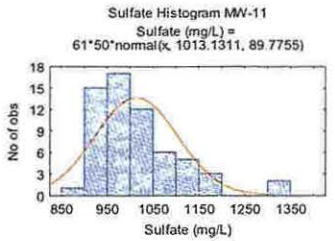


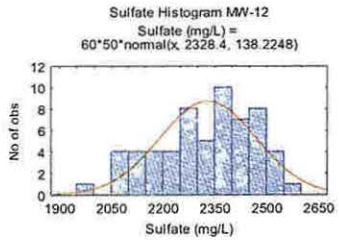


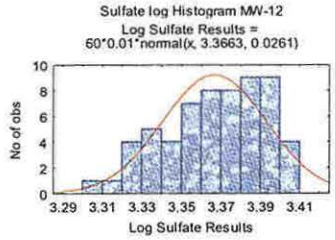


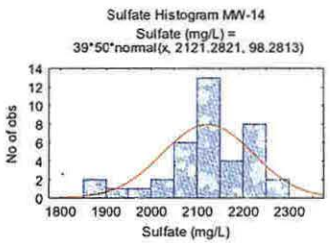


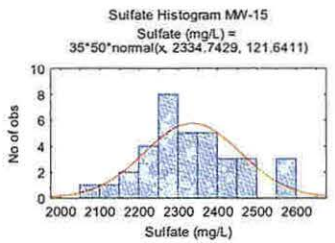


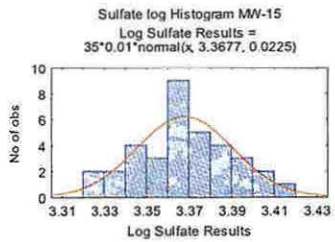


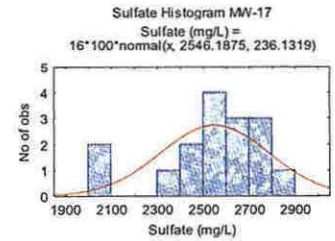


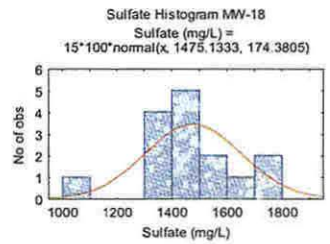


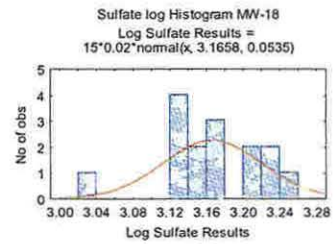


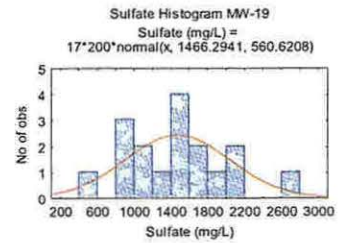


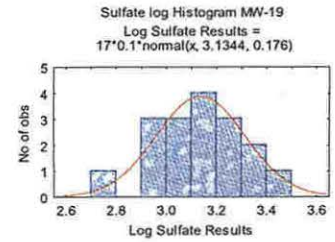




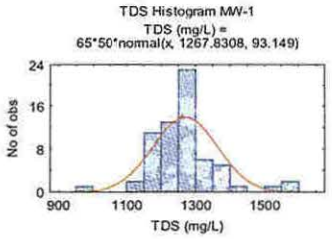


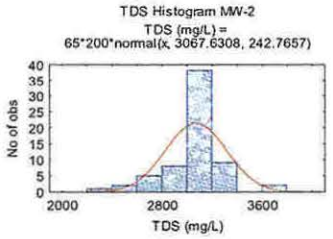


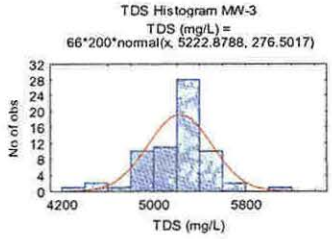


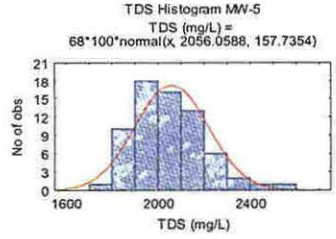


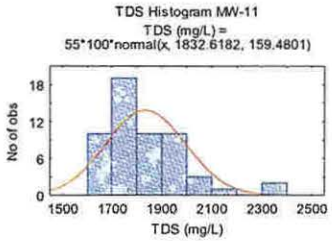
TDS Histograms (Log and Normal)

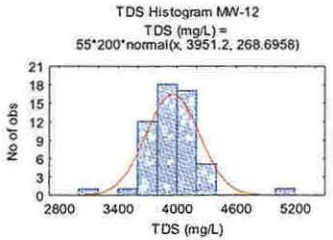


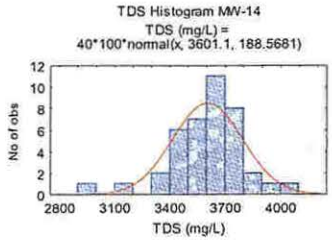


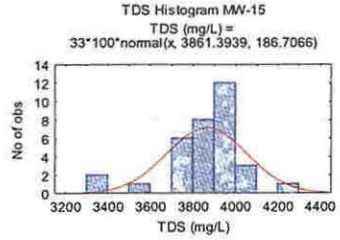


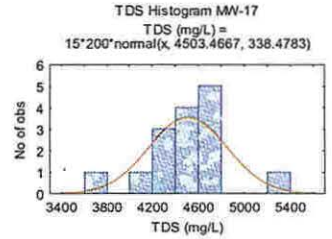


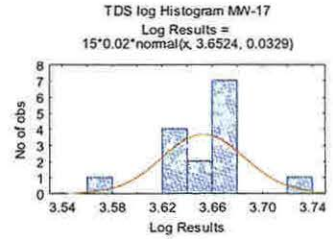


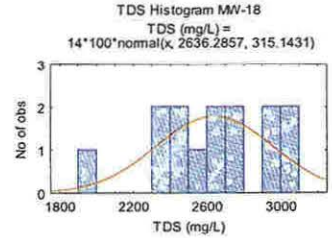


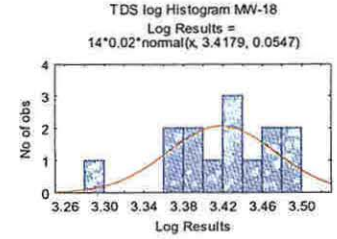


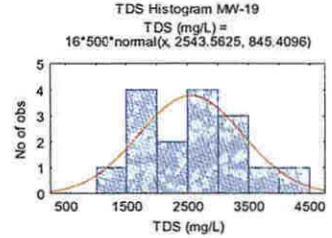


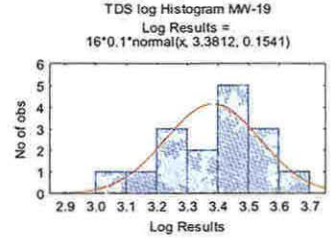




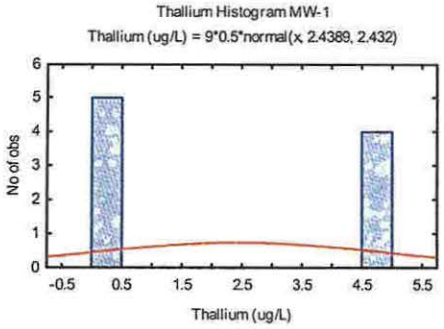


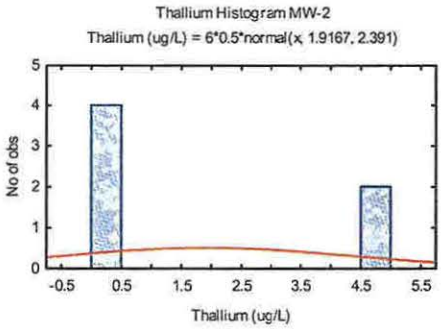


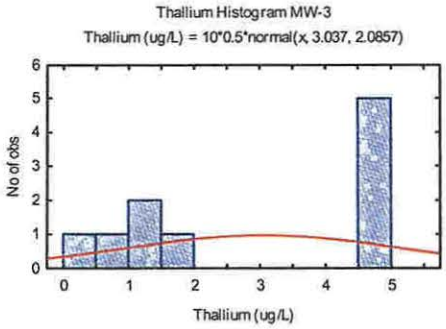


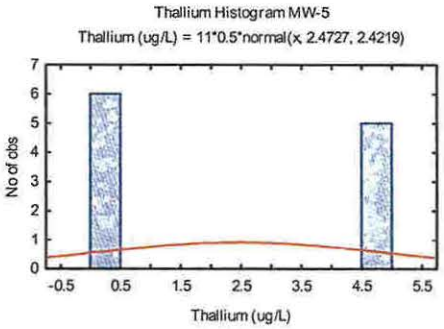


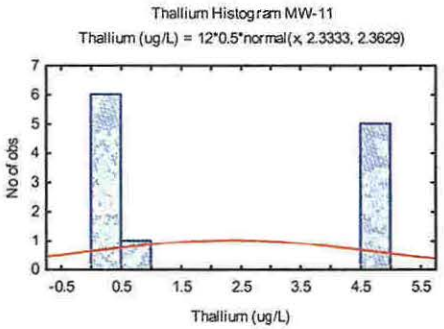
Thallium Histograms

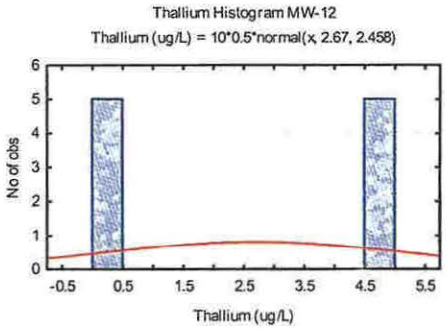


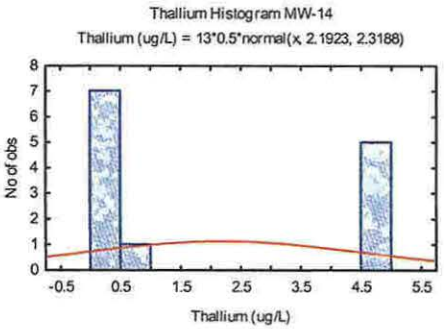


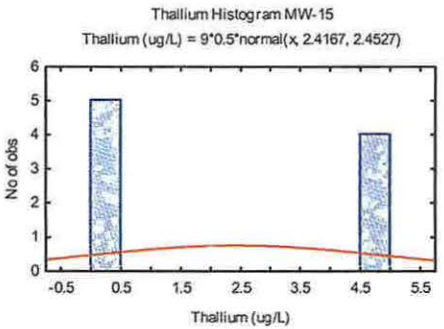




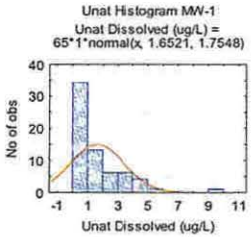


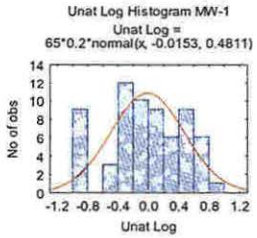


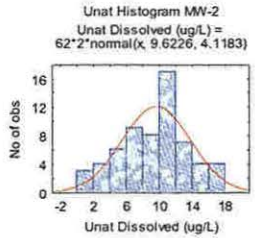


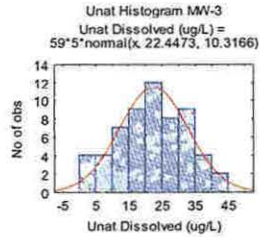


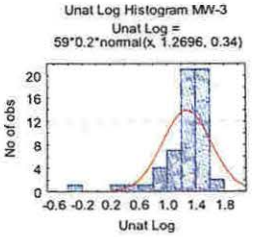
Unat Histograms

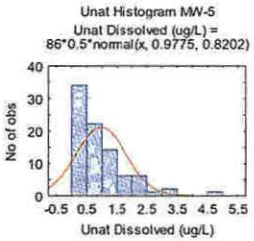


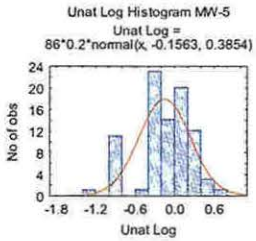


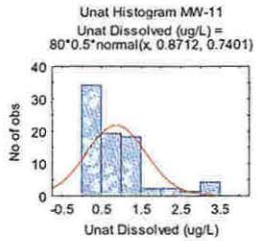


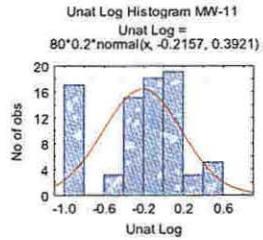


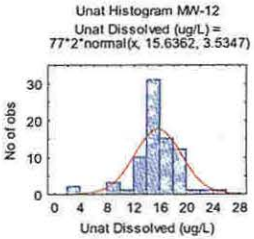


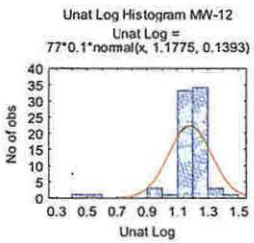


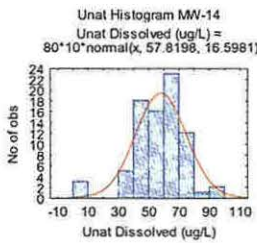


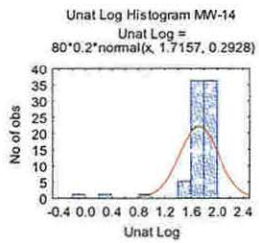


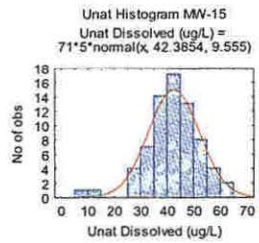


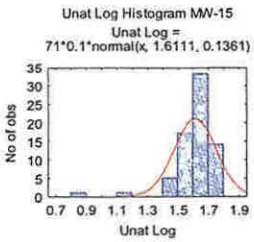


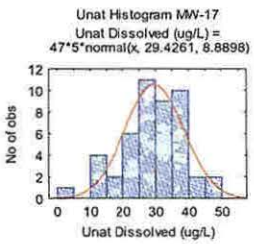


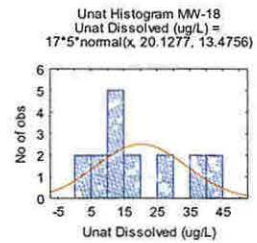


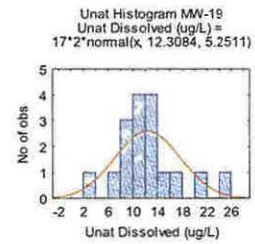


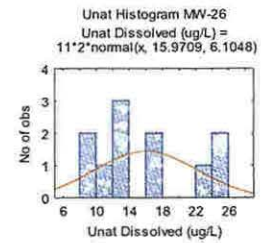




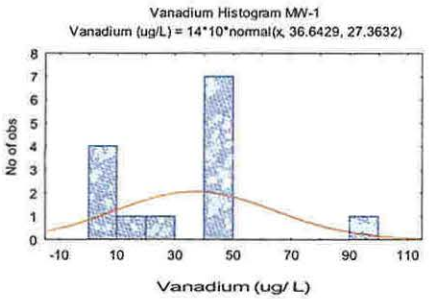


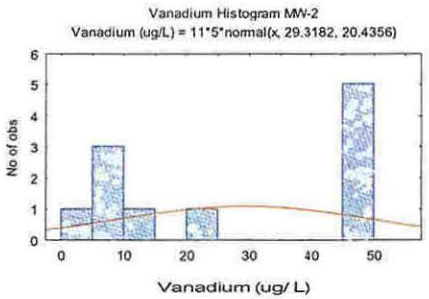


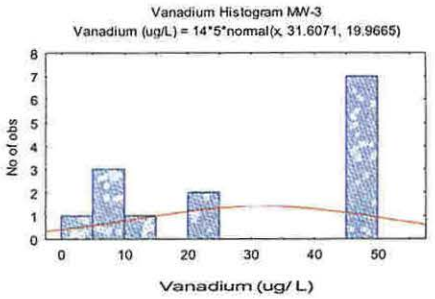


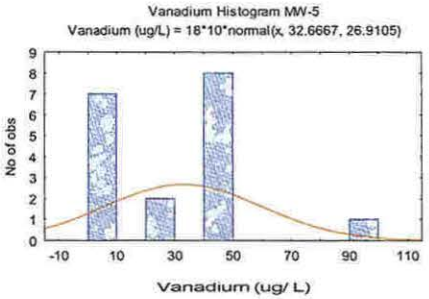


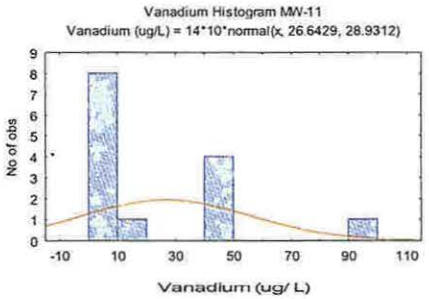
Vanadium Histogram

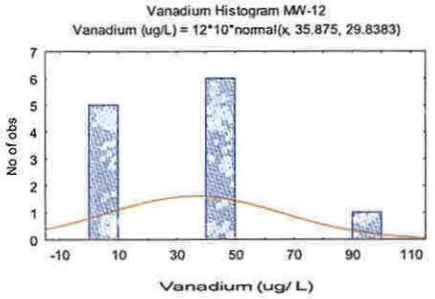


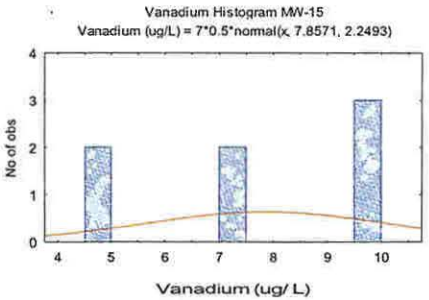




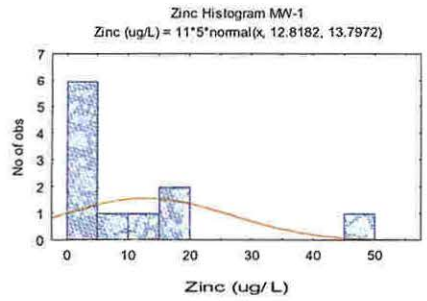


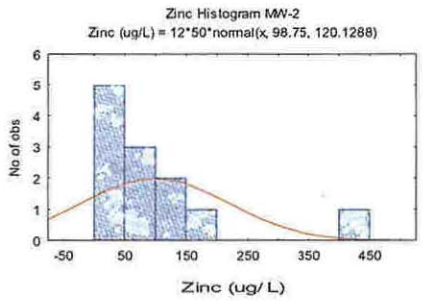


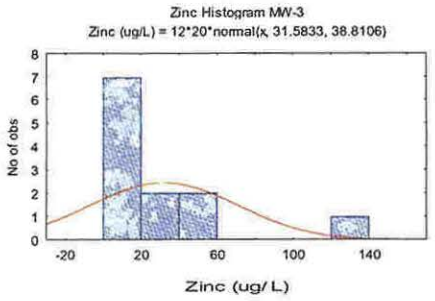


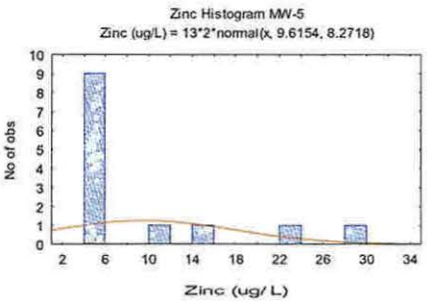


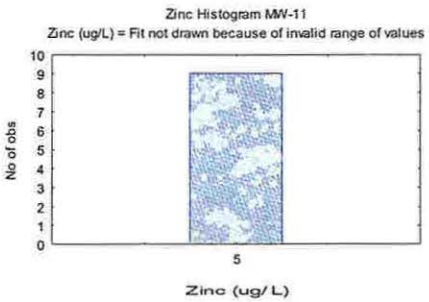
Zinc Histograms

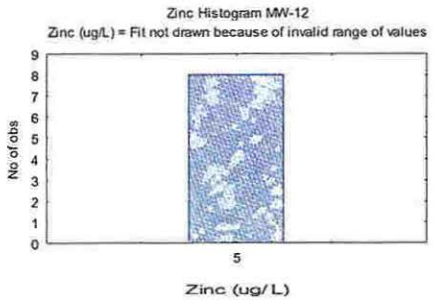


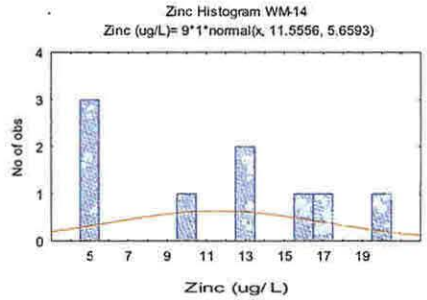


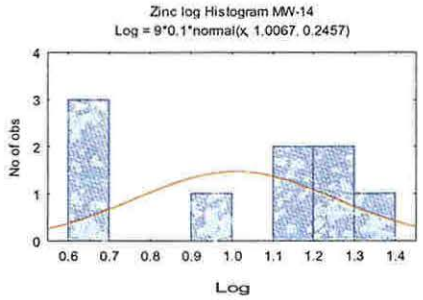


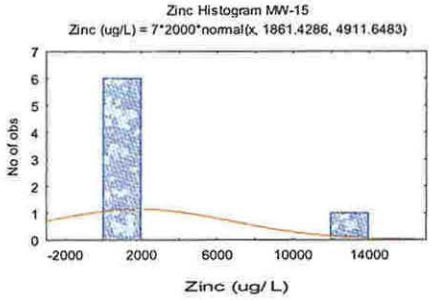












Appendix E. Data excluded from statistical analyses

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-1	8/23/1988	Arsenic	0	14	ug/L	Extreme Value
MW-1	3/9/1989	Arsenic	0	150	ug/L	Extreme Value
MW-11	8/24/1988	Arsenic	0	18	ug/L	Extreme Value
MW-11	3/9/1989	Arsenic	0	15	ug/L	Extreme Value
MW-12	8/24/1988	Arsenic	0	23	ug/L	Extreme Value
MW-12	3/9/1989	Arsenic	0	36	ug/L	Extreme Value
MW-15	11/1/2001	Arsenic	100	50	ug/L	Extreme Value
MW-17	3/24/1993	Arsenic	0	9	ug/L	Extreme Value
MW-2	8/23/1988	Arsenic	0	19	ug/L	Extreme Value
MW-2	3/9/1989	Arsenic	0	32	ug/L	Extreme Value
MW-26	3/30/2005	Arsenic	5	5	ug/L	Extreme Value
MW-3	8/24/1988	Arsenic	0	25	ug/L	Extreme Value
MW-3	3/10/1989	Arsenic	0	46	ug/L	Extreme Value
MW-32	3/30/2005	Arsenic	5	5	ug/L	Extreme Value
MW-5	8/24/1988	Arsenic	0	17	ug/L	Extreme Value
MW-5	3/9/1989	Arsenic	0	19	ug/L	Extreme Value
MW-1	2/27/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-1	9/9/2002	Beryllium	110	55	ug/L	Extreme Value
MW-11	2/28/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-11	3/24/1993	Beryllium	1	500	ug/L	Extreme Value
MW-11	9/10/2002	Beryllium	110	55	ug/L	Extreme Value
MW-12	2/28/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-12	9/10/2002	Beryllium	110	55	ug/L	Extreme Value
MW-14	3/4/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-14	9/10/2002	Beryllium	110	55	ug/L	Extreme Value
MW-15	3/4/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-15	9/10/2002	Beryllium	110	55	ug/L	Extreme Value
MW-17	5/1/1999	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/10/2002	Beryllium	0	55	ug/L	Extreme Value
MW-18	9/1/1993	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-18	9/9/2002	Beryllium	0	55	ug/L	Extreme Value
MW-19	9/1/1993	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/10/2002	Beryllium	0	55	ug/L	Extreme Value
MW-2	2/27/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/1993	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/10/2002	Beryllium	0	55	ug/L	Extreme Value
MW-3	3/5/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-3	9/12/2002	Beryllium	110	55	ug/L	Extreme Value
MW-5	2/28/1991	Beryllium	0	0	ug/L	zero value with zero det. Limit
MW-5	9/10/2002	Beryllium	110	55	ug/L	Extreme Value
MW-1	6/13/1984	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-1	6/25/1985	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-1	9/24/1991	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-11	6/12/1984	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-11	11/20/1989	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-11	1/24/1990	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-11	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-12	6/12/1984	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/1/1989	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/20/1989	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-12	1/24/1990	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-12	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-14	11/20/1989	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-14	1/24/1990	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-14	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-14	5/1/1999	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-15	1/24/1990	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-17	5/1/1999	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-18	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-2	12/28/1981	Cadmium	10	50	ug/L	Extreme Value
MW-2	6/13/1984	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-3	8/18/1981	Cadmium	2	15	ug/L	Extreme Value
MW-3	4/21/1983	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-3	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	Cadmium	0.5	23.8	ug/L	Extreme Value
MW-5	11/20/1989	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-5	1/24/1990	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-5	9/1/1993	Cadmium	0	0	ug/L	zero value with zero det. Limit
MW-5	8/1/1994	Cadmium	10	50	ug/L	Extreme Value
MW-1	10/31/1980	Chloride		30	mg/L	Extreme Value
MW-1	12/15/1985	Chloride		53	mg/L	Extreme Value
MW-1	9/4/1986	Chloride		2	mg/L	Extreme Value
MW-1	1/27/1988	Chloride		1350	mg/L	Extreme Value
MW-11	12/15/1985	Chloride		71	mg/L	Extreme Value
MW-11	6/26/1986	Chloride		70	mg/L	Extreme Value
MW-11	6/11/1997	Chloride		14.6	mg/L	Extreme Value
MW-12	6/26/1986	Chloride		150	mg/L	Extreme Value
MW-12	2/18/1999	Chloride		28.1	mg/L	Extreme Value
MW-14	5/1/1999	Chloride		34	mg/L	Extreme Value
MW-15	12/13/2005	Chloride		69	mg/L	Extreme Value
MW-2	5/4/1983	Chloride		25	mg/L	Extreme Value
MW-2	12/15/1985	Chloride		71	mg/L	Extreme Value
MW-3	10/31/1979	Chloride		12.6	mg/L	Extreme Value
MW-3	1/31/1980	Chloride		25	mg/L	Extreme Value
MW-3	12/15/1985	Chloride		35	mg/L	Extreme Value
MW-3	6/26/1986	Chloride		140	mg/L	Extreme Value
MW-3	11/1/2001	Chloride		82.5	mg/L	Extreme Value
MW-5	12/28/1981	Chloride		20	mg/L	Extreme Value
MW-5	6/26/1986	Chloride		130	mg/L	Extreme Value

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-1	6/25/1985	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-11	11/20/1989	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-11	1/24/1990	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-12	6/12/1984	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/1/1989	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/20/1989	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-12	1/24/1990	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-14	11/20/1989	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-14	1/24/1990	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-15	1/24/1990	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-15	5/1/1999	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-17	5/1/1999	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-3	4/21/1983	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-5	11/20/1989	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-5	1/24/1990	Chromium	0	0	ug/L	zero value with zero det. Limit
MW-11	3/30/2005	Cobalt	10	10	ug/L	Extreme Value
MW-14	3/30/2005	Cobalt	10	10	ug/L	Extreme Value
MW-26	3/30/2005	Cobalt	10	10	ug/L	Extreme Value
MW-1	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-11	6/12/1984	Copper	5	2.5	ug/L	Extreme Value
MW-11	6/25/1985	Copper	20	10	ug/L	Extreme Value
MW-11	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-11	3/30/2005	Copper	10	17	ug/L	Extreme Value
MW-12	6/12/1984	Copper	0	0	ug/L	zero value with zero det. Limit
MW-12	6/25/1985	Copper	20	10	ug/L	Extreme Value
MW-12	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-14	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-14	3/30/2005	Copper	10	10	ug/L	Extreme Value
MW-15	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-15	11/1/2001	Copper	50	25	ug/L	Extreme Value
MW-17	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-17	11/30/2000	Copper	12	6	ug/L	Extreme Value
MW-17	9/1/2002	Copper	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-18	11/30/2000	Copper	12	6	ug/L	Extreme Value
MW-19	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-19	11/30/2000	Copper	12	6	ug/L	Extreme Value
MW-19	9/1/2002	Copper	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	Copper	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	Copper	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	Copper	0	0	ug/L	zero value with zero det. Limit
MW-26	3/30/2005	Copper	10	10	ug/L	Extreme Value
MW-3	4/21/1983	Copper	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-3	6/15/1984	Copper	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	Copper	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	Copper	10	51	ug/L	Extreme Value
MW-5	6/14/1984	Copper	0	0	ug/L	zero value with zero det. Limit
MW-5	5/1/1999	Copper	0	0	ug/L	zero value with zero det. Limit
MW-1	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-1	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-11	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-12	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-12	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-12	9/10/2002	Fluoride	0.1	0.1	mg/L	Extreme Value
MW-14	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-14	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-14	9/10/2002	Fluoride	0.1	0.1	mg/L	Extreme Value
MW-15	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-17	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-17	11/30/2000	Fluoride		0.35	mg/L	Extreme Value
MW-17	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-17	9/10/2002	Fluoride	0	0.1	mg/L	Extreme Value
MW-18	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-2	5/11/1999	Fluoride		0	mg/L	Extreme Value
MW-2	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-26	3/30/2005	Fluoride	0.1	0.9	mg/L	Extreme Value
MW-3	5/1/1999	Fluoride		0	mg/L	Extreme Value
MW-3	9/1/2002	Fluoride		0	mg/L	Extreme Value
MW-32	9/22/2005	Fluoride		0.1	mg/L	Extreme Value
MW-5	4/21/1981	Fluoride	0.1	0.4	mg/L	Extreme Value
MW-5	6/21/2005	Fluoride	0.1	1.3	mg/L	Extreme Value
MW-7-2	12/28/1981	Fluoride		0	mg/L	Extreme Value
MW-1	12/10/1982	Gross Alpha		37	pCi/L	Extreme Value
MW-1	6/25/1985	Gross Alpha		0	pCi/L	Extreme Value
MW-11	5/24/1983	Gross Alpha		0	pCi/L	Extreme Value
MW-11	10/26/1983	Gross Alpha		0	pCi/L	Extreme Value
MW-11	12/4/1984	Gross Alpha		-1	pCi/L	Extreme Value
MW-11	6/25/1985	Gross Alpha		0	pCi/L	Extreme Value
MW-11	1/24/1990	Gross Alpha		0	pCi/L	Extreme Value
MW-12	5/4/1983	Gross Alpha		0	pCi/L	Extreme Value
MW-2	5/4/1983	Gross Alpha		0	pCi/L	Extreme Value
MW-2	10/27/1983	Gross Alpha		0	pCi/L	Extreme Value
MW-3	2/27/1991	Gross Alpha		0	pCi/L	Extreme Value
MW-5	5/24/1983	Gross Alpha		0	pCi/L	Extreme Value
MW-5	6/25/1985	Gross Alpha		0	pCi/L	Extreme Value
MW-5	1/24/1990	Gross Alpha		0	pCi/L	Extreme Value
MW-11	5/1/1999	iron	0	0	ug/L	zero value with zero det. Limit
MW-11	3/30/2005	iron	30	3190	ug/L	Extreme Value
MW-11	6/20/2006	iron	30	127	ug/L	Extreme Value
MW-12	5/1/1999	iron	0	0	ug/L	zero value with zero det. Limit
MW-12	6/22/2005	iron	30	266	ug/L	Extreme Value
MW-14	5/1/1999	iron		1000	ug/L	Extreme Value
MW-14	3/30/2005	iron	30	83	ug/L	Extreme Value
MW-17	5/1/1999	iron	0	0	ug/L	zero value with zero det. Limit
MW-17	6/23/2006	iron	30	140	ug/L	Extreme Value
MW-18	5/1/1999	iron	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	iron	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-19	11/30/2000	iron	20	1650	ug/L	Extreme Value
MW-2	5/11/1999	iron	0	0	ug/L	zero value with zero det. Limit
MW-32	6/21/2006	iron	30	5300	ug/L	Extreme Value
MW-5	5/1/1999	iron	0	0	ug/L	zero value with zero det. Limit
MW-1	3/30/1982	lead	500	250	ug/L	Extreme Value
MW-15	5/1/1999	lead	0	0	ug/L	zero value with zero det. Limit
MW-15	9/10/2002	lead	50	25	ug/L	Extreme Value
MW-17	5/1/1999	lead	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	lead	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	lead	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	lead	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	lead	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	lead	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	lead	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	lead	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	lead	0	0	ug/L	zero value with zero det. Limit
MW-26	3/30/2005	lead	1	1	ug/L	Extreme Value
MW-3	4/21/1983	lead	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	lead	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	lead	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	lead	1	16	ug/L	Extreme Value
MW-32	1/25/2006	lead	1	1.8	ug/L	Extreme Value
MW-32	4/25/2006	lead	1	1.2	ug/L	Extreme Value
MW-5	3/30/1982	lead	500	250	ug/L	Extreme Value
MW-1	4/14/1981	manganese	0	56000	ug/L	Extreme Value
MW-1	4/22/1983	manganese	0	0	ug/L	zero value with zero det. Limit
MW-1	6/13/1984	manganese	0	0	ug/L	zero value with zero det. Limit
MW-1	6/25/1985	manganese	0	0	ug/L	zero value with zero det. Limit
MW-1	2/27/1991	manganese	0	0	ug/L	zero value with zero det. Limit
MW-1	5/1/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-1	9/1/2002	manganese	0	0	ug/L	zero value with zero det. Limit
MW-11	6/12/1984	manganese	0	0	ug/L	zero value with zero det. Limit
MW-11	6/25/1985	manganese	0	0	ug/L	zero value with zero det. Limit
MW-11	2/28/1991	manganese	0	0	ug/L	zero value with zero det. Limit
MW-11	5/1/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-11	9/1/2002	manganese	0	0	ug/L	zero value with zero det. Limit
MW-11	9/10/2002	manganese	10	10	ug/L	Extreme Value
MW-12	5/4/1983	manganese	0	20000	ug/L	Extreme Value
MW-12	5/1/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-12	9/1/2002	manganese	0	0	ug/L	zero value with zero det. Limit
MW-15	3/4/1991	manganese	0	1000	ug/L	Extreme Value
MW-18	5/1/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-19	11/30/2000	manganese	5	240	ug/L	Extreme Value
MW-19	9/1/2002	manganese	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	manganese	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	manganese	0	0	ug/L	zero value with zero det. Limit
MW-2	2/27/1991	manganese	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	manganese	0	0	ug/L	zero value with zero det. Limit
MW-3	3/5/1991	manganese	0	0	ug/L	zero value with zero det. Limit
MW-5	5/24/1983	manganese	0	0	ug/L	zero value with zero det. Limit
MW-5	6/14/1984	manganese	0	0	ug/L	zero value with zero det. Limit
MW-5	6/25/1985	manganese	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-5	2/28/1991	manganese	0	0	ug/L	zero value with zero det. Limit
MW-5	5/1/1999	manganese	0	0	ug/L	zero value with zero det. Limit
MW-5	9/1/2002	manganese	0	0	ug/L	zero value with zero det. Limit
MW-5	9/10/2002	manganese	10	10	ug/L	Extreme Value
MW-1	6/13/1984	mercury	100	50	ug/L	Extreme Value
MW-11	6/12/1984	mercury	100	50	ug/L	Extreme Value
MW-11	11/20/1989	mercury	0	0	ug/L	zero value with zero det. Limit
MW-11	1/24/1990	mercury	0	0	ug/L	zero value with zero det. Limit
MW-12	6/12/1984	mercury	100	50	ug/L	Extreme Value
MW-12	11/1/1989	mercury	0	0	ug/L	zero value with zero det. Limit
MW-12	11/20/1989	mercury	0	0	ug/L	zero value with zero det. Limit
MW-12	1/24/1990	mercury	0	0	ug/L	zero value with zero det. Limit
MW-12	5/1/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-14	11/20/1989	mercury	0	0	ug/L	zero value with zero det. Limit
MW-14	1/24/1990	mercury	0	0	ug/L	zero value with zero det. Limit
MW-15	1/24/1990	mercury	0	0	ug/L	zero value with zero det. Limit
MW-15	5/1/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-15	11/1/2001	mercury	100	50	ug/L	Extreme Value
MW-17	5/1/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	mercury	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	mercury	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	mercury	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	mercury	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	mercury	0	0	ug/L	zero value with zero det. Limit
MW-3	4/21/1983	mercury	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	mercury	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	mercury	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	mercury	0.5	0.5	ug/L	Extreme Value
MW-5	6/14/1984	mercury	100	50	ug/L	Extreme Value
MW-5	11/20/1989	mercury	0	0	ug/L	zero value with zero det. Limit
MW-5	1/24/1990	mercury	0	0	ug/L	zero value with zero det. Limit
MW-5	5/1/1999	mercury	0	0	ug/L	zero value with zero det. Limit
MW-1	6/25/1985	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-1	9/24/1991	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-1	3/17/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-1	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-11	6/25/1985	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-11	11/20/1989	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-11	1/24/1990	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-11	9/3/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-11	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	6/25/1985	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	11/1/1989	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	11/20/1989	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	1/24/1990	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	9/24/1991	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	3/17/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-12	9/3/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-14	11/20/1989	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-14	1/24/1990	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-14	9/24/1991	molybdenum	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-14	3/17/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-14	9/3/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-14	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-15	1/24/1990	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-15	9/24/1991	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-15	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-17	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-18	9/1/1993	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/1993	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	9/24/1991	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	3/17/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/1993	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-3	4/21/1983	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-3	11/20/1989	molybdenum	300	0	ug/L	Extreme Value
MW-3	9/24/1991	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	molybdenum	20	20	ug/L	Extreme Value
MW-5	6/25/1985	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-5	11/20/1989	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-5	1/24/1990	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-5	9/3/1992	molybdenum	0	0	ug/L	zero value with zero det. Limit
MW-1	2/27/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-1	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-1	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-11	11/1/1989	Nickel	10	5	ug/L	Extreme Value
MW-11	11/20/1989	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-11	12/15/1989	Nickel	10	5	ug/L	Extreme Value
MW-11	1/24/1990	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-11	2/28/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-11	9/24/1991	Nickel	10	5	ug/L	Extreme Value
MW-11	3/17/1992	Nickel	10	5	ug/L	Extreme Value
MW-11	9/3/1992	Nickel	1	0.5	ug/L	Extreme Value
MW-11	3/24/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-11	9/1/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-11	3/28/1994	Nickel	10	30	ug/L	Extreme Value
MW-11	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-11	3/30/2005	Nickel	20	20	ug/L	Extreme Value
MW-11	6/21/2005	Nickel	20	10	ug/L	Extreme Value
MW-11	9/22/2005	Nickel	20	10	ug/L	Extreme Value
MW-11	12/13/2005	Nickel	20	10	ug/L	Extreme Value
MW-11	3/21/2006	Nickel	20	10	ug/L	Extreme Value
MW-11	6/20/2006	Nickel	20	10	ug/L	Extreme Value
MW-12	11/1/1989	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-12	11/20/1989	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-12	12/15/1989	Nickel	0	20	ug/L	Extreme Value

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-12	1/24/1990	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-12	2/28/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-12	9/24/1991	Nickel	10	5	ug/L	Extreme Value
MW-12	3/17/1992	Nickel	10	5	ug/L	Extreme Value
MW-12	9/3/1992	Nickel	1	0.5	ug/L	Extreme Value
MW-12	3/24/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-12	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-12	3/28/1994	Nickel	10	20	ug/L	Extreme Value
MW-12	9/14/1995	Nickel	50	250	ug/L	Extreme Value
MW-12	9/10/1996	Nickel	50	250	ug/L	Extreme Value
MW-12	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-12	9/7/2001	Nickel	5	2.5	ug/L	Extreme Value
MW-12	11/21/2002	Nickel	50	250	ug/L	Extreme Value
MW-12	6/22/2005	Nickel	20	10	ug/L	Extreme Value
MW-12	12/13/2005	Nickel	20	10	ug/L	Extreme Value
MW-12	3/27/2006	Nickel	20	10	ug/L	Extreme Value
MW-14	11/1/1989	Nickel	0	30	ug/L	Extreme Value
MW-14	11/20/1989	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-14	12/15/1989	Nickel	0	30	ug/L	Extreme Value
MW-14	1/24/1990	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-14	3/4/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-14	9/24/1991	Nickel	10	5	ug/L	Extreme Value
MW-14	3/17/1992	Nickel	10	5	ug/L	Extreme Value
MW-14	9/3/1992	Nickel	1	0.5	ug/L	Extreme Value
MW-14	3/24/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-14	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-14	3/28/1994	Nickel	10	5	ug/L	Extreme Value
MW-14	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-14	6/7/2000	Nickel	50	250	ug/L	Extreme Value
MW-14	3/30/2005	Nickel	20	24	ug/L	Extreme Value
MW-14	6/22/2005	Nickel	20	10	ug/L	Extreme Value
MW-14	9/23/2005	Nickel	20	10	ug/L	Extreme Value
MW-14	12/13/2005	Nickel	20	10	ug/L	Extreme Value
MW-14	3/21/2006	Nickel	20	10	ug/L	Extreme Value
MW-14	6/20/2006	Nickel	20	10	ug/L	Extreme Value
MW-15	11/1/1989	Nickel	0	20	ug/L	Extreme Value
MW-15	11/20/1989	Nickel	0	50	ug/L	Extreme Value
MW-15	12/15/1989	Nickel	0	20	ug/L	Extreme Value
MW-15	1/24/1990	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-15	3/4/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-15	9/24/1991	Nickel	10	5	ug/L	Extreme Value
MW-15	3/17/1992	Nickel	10	5	ug/L	Extreme Value
MW-15	9/3/1992	Nickel	1	0.5	ug/L	Extreme Value
MW-15	3/24/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-15	9/1/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-15	3/28/1994	Nickel	10	5	ug/L	Extreme Value
MW-15	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-15	9/30/1999	Nickel	50	250	ug/L	Extreme Value
MW-15	6/7/2000	Nickel	50	250	ug/L	Extreme Value
MW-15	6/23/2005	Nickel	20	10	ug/L	Extreme Value
MW-15	12/13/2005	Nickel	20	10	ug/L	Extreme Value
MW-15	3/23/2006	Nickel	20	10	ug/L	Extreme Value
MW-15	6/21/2006	Nickel	20	10	ug/L	Extreme Value
MW-17	11/6/1991	Nickel	50	9000	ug/L	Extreme Value

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-17	3/24/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-17	9/1/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-17	3/28/1994	Nickel	10	5	ug/L	Extreme Value
MW-17	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-17	9/30/1999	Nickel	0	250	ug/L	Extreme Value
MW-17	11/30/2000	Nickel	10	5	ug/L	Extreme Value
MW-17	9/7/2001	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-17	9/7/2001	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-17	9/10/2002	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-17	9/10/2002	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-17	9/24/2003	Nickel	50	12	ug/L	Extreme Value
MW-17	6/22/2005	Nickel	20	10	ug/L	Extreme Value
MW-17	12/13/2005	Nickel	20	10	ug/L	Extreme Value
MW-17	3/23/2006	Nickel	20	10	ug/L	Extreme Value
MW-18	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-2	2/27/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-2	9/24/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-26	3/30/2005	Nickel	20	25	ug/L	Extreme Value
MW-3	3/5/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-3	9/24/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-3	3/17/1992	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-3	9/3/1992	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-3	9/1/1993	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-5	3/30/1982	Nickel	20	10	ug/L	Extreme Value
MW-5	11/1/1989	Nickel	10	5	ug/L	Extreme Value
MW-5	11/20/1989	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-5	12/15/1989	Nickel	10	5	ug/L	Extreme Value
MW-5	1/24/1990	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-5	2/28/1991	Nickel	0	0	ug/L	zero value with zero det. Limit
MW-5	9/24/1991	Nickel	10	5	ug/L	Extreme Value
MW-5	3/17/1992	Nickel	10	5	ug/L	Extreme Value
MW-5	9/3/1992	Nickel	1	0.5	ug/L	Extreme Value
MW-5	3/24/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-5	9/1/1993	Nickel	1	0.5	ug/L	Extreme Value
MW-5	3/28/1994	Nickel	10	5	ug/L	Extreme Value
MW-5	5/1/1999	Nickel	1	0.5	ug/L	Extreme Value
MW-5	3/20/2003	Nickel	50	2500	ug/L	Extreme Value
MW-5	6/21/2005	Nickel	20	10	ug/L	Extreme Value
MW-5	12/13/2005	Nickel	20	10	ug/L	Extreme Value
MW-11	9/10/2002	NO3NO2_N	0.1	0.005	mg/L	Extreme Value
MW-11	6/20/2006	NO3NO2_N	0.8	0.4	mg/L	Extreme Value
MW-12	11/30/2000	NO3NO2_N		0.12	mg/L	Extreme Value
MW-12	9/10/2002	NO3NO2_N	0.1	0.005	mg/L	Extreme Value
MW-14	9/10/2002	NO3NO2_N	0.1	0.005	mg/L	Extreme Value
MW-14	6/20/2006	NO3NO2_N	0.8	0.4	mg/L	Extreme Value
MW-17	6/23/2006	NO3NO2_N	0.1	0.1	mg/L	Extreme Value

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-18	6/21/2006	NO3NO2_N	0.8	0.4	mg/L	Extreme Value
MW-19	5/1/1999	NO3NO2_N		0.5	mg/L	Extreme Value
MW-2	6/20/2006	NO3NO2_N	0.8	0.4	mg/L	Extreme Value
MW-32	6/21/2006	NO3NO2_N	0.8	0.4	mg/L	Extreme Value
MW-5	9/10/2002	NO3NO2_N	0.1	c	mg/L	Extreme Value
MW-1	9/4/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-1	1/27/1988	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-1	6/21/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-1	9/1/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-1	2/16/1990	Selenium	0	692000	ug/L	Extreme Value
MW-1	8/7/1990	Selenium	0	685000	ug/L	Extreme Value
MW-1	11/30/2000	Selenium	1	52	ug/L	Extreme Value
MW-11	9/4/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-11	11/20/1987	Selenium	0	20	ug/L	Extreme Value
MW-11	8/24/1988	Selenium	0	72	ug/L	Extreme Value
MW-11	11/2/1988	Selenium	0	29	ug/L	Extreme Value
MW-11	6/22/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-11	11/15/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-11	5/1/1999	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-11	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-12	9/4/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-12	3/9/1989	Selenium	0	21	ug/L	Extreme Value
MW-12	6/22/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/18/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-12	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-12	6/23/2006	Selenium	1	18	ug/L	Extreme Value
MW-14	11/18/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-14	5/1/1999	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-14	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-15	11/18/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-15	9/3/1992	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-17	5/1/1999	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-17	11/30/2000	Selenium	1	55	ug/L	Extreme Value
MW-17	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-18	9/1/1993	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-18	3/28/1994	Selenium	2	11	ug/L	Extreme Value
MW-18	5/1/1999	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-18	11/30/2000	Selenium	1	11	ug/L	Extreme Value
MW-19	9/1/1993	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	3/27/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/4/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	11/20/1987	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	1/27/1988	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	8/23/1988	Selenium	0	45	ug/L	Extreme Value
MW-2	6/21/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	8/24/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	3/17/1992	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/3/1992	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/1993	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Selenium	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-2	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-26	3/30/2005	Selenium	5	6	ug/L	Extreme Value
MW-3	4/21/1983	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	3/27/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	9/4/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	11/20/1987	Selenium	0	360	ug/L	Extreme Value
MW-3	1/27/1988	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	8/24/1988	Selenium	0	91	ug/L	Extreme Value
MW-3	11/3/1988	Selenium	0	370	ug/L	Extreme Value
MW-3	6/22/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	9/8/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	9/3/1992	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	5/1/1999	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-3	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	Selenium	5	5	ug/L	Extreme Value
MW-5	9/4/1986	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-5	11/20/1987	Selenium	0	18	ug/L	Extreme Value
MW-5	8/24/1988	Selenium	0	61	ug/L	Extreme Value
MW-5	11/4/1988	Selenium	0	26	ug/L	Extreme Value
MW-5	6/22/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-5	8/25/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-5	11/15/1989	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-5	6/5/1996	Selenium	0	46	ug/L	Extreme Value
MW-5	9/1/2002	Selenium	0	0	ug/L	zero value with zero det. Limit
MW-1	5/1/1999	silver	1	0.5	ug/L	Extreme Value
MW-1	11/30/2000	silver	2	1	ug/L	Extreme Value
MW-11	5/1/1999	silver	1	0.5	ug/L	Extreme Value
MW-11	3/30/2005	silver	10	10	ug/L	Extreme Value
MW-12	5/1/1999	silver	1	0.5	ug/L	Extreme Value
MW-14	5/1/1999	silver	1	0.5	ug/L	Extreme Value
MW-15	5/1/1999	silver	1	0.5	ug/L	Extreme Value
MW-17	5/1/1999	silver	0	0	ug/L	zero value with zero det. Limit
MW-17	11/30/2000	silver	2	1	ug/L	Extreme Value
MW-17	9/1/2002	silver	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	silver	0	0	ug/L	zero value with zero det. Limit
MW-18	11/30/2000	silver	2	1	ug/L	Extreme Value
MW-19	5/1/1999	silver	0	0	ug/L	zero value with zero det. Limit
MW-19	11/30/2000	silver	2	1	ug/L	Extreme Value
MW-19	9/1/2002	silver	0	0	ug/L	zero value with zero det. Limit
MW-2	2/11/1981	silver	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	silver	0	0	ug/L	zero value with zero det. Limit
MW-2	11/30/2000	silver	2	1	ug/L	Extreme Value
MW-2	9/1/2002	silver	0	0	ug/L	zero value with zero det. Limit
MW-3	2/12/1981	silver	0	0	ug/L	zero value with zero det. Limit
MW-3	11/30/2000	silver	2	1	ug/L	Extreme Value
MW-5	2/11/1981	silver	0	0	ug/L	zero value with zero det. Limit
MW-5	5/1/1999	silver	1	0.5	ug/L	Extreme Value
MW-1	10/31/1979	Sulfate		220	mg/L	Extreme Value
MW-1	12/15/1985	Sulfate		1080	mg/L	Extreme Value
MW-1	1/27/1988	Sulfate		10	mg/L	Extreme Value
MW-11	2/15/1984	Sulfate		2250	mg/L	Extreme Value
MW-11	12/15/1985	Sulfate		79	mg/L	Extreme Value

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-11	11/19/1992	Sulfate		1507	mg/L	Extreme Value
MW-12	12/15/1985	Sulfate		7820	mg/L	Extreme Value
MW-14	12/15/1989	Sulfate		1160	mg/L	Extreme Value
MW-14	5/8/1990	Sulfate		1160	mg/L	Extreme Value
MW-15	12/15/1989	Sulfate		1250	mg/L	Extreme Value
MW-15	5/8/1990	Sulfate		1260	mg/L	Extreme Value
MW-17	3/28/1994	Sulfate		1400	mg/L	Extreme Value
MW-2	10/31/1979	Sulfate		240	mg/L	Extreme Value
MW-2	1/31/1980	Sulfate		630	mg/L	Extreme Value
MW-2	5/30/1980	Sulfate		1075	mg/L	Extreme Value
MW-3	10/31/1979	Sulfate		930	mg/L	Extreme Value
MW-3	10/31/1980	Sulfate		0	mg/L	Extreme Value
MW-5	12/15/1985	Sulfate		7820	mg/L	Extreme Value
MW-5	6/26/1986	Sulfate		1890	mg/L	Extreme Value
MW-1	10/31/1979	TDS		627	mg/L	Extreme Value
MW-1	1/31/1980	TDS		870	mg/L	Extreme Value
MW-1	12/15/1985	TDS		4000	mg/L	Extreme Value
MW-1	12/1/1993	TDS		1692	mg/L	Extreme Value
MW-11	12/15/1985	TDS		5100	mg/L	Extreme Value
MW-11	11/19/1992	TDS		2850	mg/L	Extreme Value
MW-11	12/1/1993	TDS		2528	mg/L	Extreme Value
MW-15	9/24/1991	TDS		38	mg/L	Extreme Value
MW-15	12/1/1993	TDS		4530	mg/L	Extreme Value
MW-15	3/28/1994	TDS		3120	mg/L	Extreme Value
MW-17	3/28/1994	TDS		2460	mg/L	Extreme Value
MW-2	10/31/1979	TDS		855	mg/L	Extreme Value
MW-2	1/31/1980	TDS		1080	mg/L	Extreme Value
MW-2	5/30/1980	TDS		1950	mg/L	Extreme Value
MW-2	6/30/1980	TDS		1300	mg/L	Extreme Value
MW-3	10/31/1979	TDS		2102	mg/L	Extreme Value
MW-3	1/31/1980	TDS		2450	mg/L	Extreme Value
MW-3	7/31/1980	TDS		4024	mg/L	Extreme Value
MW-5	12/15/1985	TDS		6600	mg/L	Extreme Value
MW-5	6/26/1986	TDS		3210	mg/L	Extreme Value
MW-11	11/20/1989	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/1/1989	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/20/1989	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-14	11/20/1989	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-15	11/1/2001	Thallium	100	50	ug/L	Extreme Value
MW-17	5/1/1999	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-2	11/1/2001	Thallium	100	50	ug/L	Extreme Value
MW-2	9/1/2002	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-5	11/20/1989	Thallium	0	0	ug/L	zero value with zero det. Limit
MW-1	1/22/1981	Uranium		11.00	ug/L	Extreme value
MW-1	2/20/1987	Uranium	0.2	0.15	ug/L	Duplicate sample
MW-1	8/23/1988	Uranium		107.46	ug/L	Extreme value
MW-1	9/24/1991	Uranium	2E-10	1.64	ug/L	Duplicate sample
MW-1	12/9/1992	Uranium	2E-10	0.30	ug/L	duplicate sample
MW-1	3/24/1994	Uranium	0.0000003	0.67	ug/L	duplicate sample

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-1	8/18/1994	Uranium	0.0000003	49.70	ug/L	duplicate sample
MW-1	8/18/1994	Uranium	2E-10	0.30	ug/L	duplicate sample
MW-1	8/18/1994	Uranium		49.93	ug/L	Extreme value
MW-1	9/16/1996	Uranium	0.0003	1.80	ug/L	duplicate sample
MW-11	2/20/1987	Uranium	0.2	1.34	ug/L	duplicate sample
MW-11	6/22/1989	Uranium	2E-10	0.90	ug/L	duplicate sample
MW-11	9/13/1989	Uranium	0.2	2.69	ug/L	duplicate sample
MW-11	8/16/1990	Uranium	0.3	0.80	ug/L	duplicate sample
MW-11	8/16/1990	Uranium		3.88	ug/L	Extreme value
MW-11	5/22/1991	Uranium	2E-10	0.46	ug/L	duplicate sample
MW-11	3/17/1992	Uranium		4.03	ug/L	Extreme value
MW-11	6/12/1992	Uranium	2E-10	0.15	ug/L	duplicate sample
MW-11	9/15/1992	Uranium		5.06	ug/L	Extreme value
MW-11	11/12/1992	Uranium		4.75	ug/L	Extreme value
MW-11	6/10/1993	Uranium		4.00	ug/L	Extreme value
MW-11	6/27/1995	Uranium	0.0003	0.80	ug/L	duplicate sample
MW-11	6/27/1995	Uranium		0.15	ug/L	duplicate sample
MW-11	6/6/1996	Uranium	0.0003	0.40	ug/L	duplicate sample
MW-11	6/6/1996	Uranium		51.49	ug/L	Extreme value
MW-11	3/19/1997	Uranium	0.0003	0.15	ug/L	duplicate sample
MW-11	11/27/2000	Uranium		47.40	ug/L	Extreme value
MW-11	3/23/2001	Uranium	0.0003	3.20	ug/L	duplicate sample
MW-11	11/6/2001	Uranium	0.0003	1.40	ug/L	duplicate sample
MW-11	3/14/2002	Uranium	0.0003	1.60	ug/L	duplicate sample
MW-11	5/20/2002	Uranium	0.0003	1.10	ug/L	duplicate sample
MW-11	11/21/2002	Uranium	0.0003	0.90	ug/L	duplicate sample
MW-11	3/20/2003	Uranium	0.3	1.10	ug/L	duplicate sample
MW-11	6/27/2003	Uranium	0.3	1.30	ug/L	duplicate sample
MW-11	9/24/2003	Uranium	0.3	1.00	ug/L	duplicate sample
MW-11	3/19/2004	Uranium	1	1.00	ug/L	duplicate sample
MW-11	5/27/2004	Uranium	1	0.50	ug/L	duplicate sample
MW-11	9/14/2004	Uranium	1	0.50	ug/L	duplicate sample
MW-11	11/9/2004	Uranium	1	0.50	ug/L	duplicate sample
MW-11	6/21/2005	Uranium	0.3	0.74	ug/L	duplicate sample
MW-11	9/22/2005	Uranium	0.3	0.67	ug/L	duplicate sample
MW-11	12/13/2005	Uranium	0.3	0.90	ug/L	duplicate sample
MW-12	11/22/1988	Uranium		177.00	ug/L	Extreme value
MW-12	11/15/1990	Uranium	0.3	14.33	ug/L	duplicate sample
MW-12	3/18/1992	Uranium	2E-10	12.72	ug/L	duplicate sample
MW-12	12/9/1992	Uranium	2E-10	21.79	ug/L	duplicate sample
MW-12	12/8/1994	Uranium	0.0003	19.00	ug/L	duplicate sample
MW-12	12/8/1994	Uranium		139.25	ug/L	Extreme value
MW-12	12/8/1994	Uranium		0.15	ug/L	Extreme value
MW-12	6/27/1995	Uranium		45.52	ug/L	Extreme value
MW-12	9/19/1995	Uranium		41.49	ug/L	Extreme value
MW-12	5/12/1999	Uranium		0.90	ug/L	Extreme value
MW-12	12/9/1999	Uranium		0.50	ug/L	Extreme value
MW-14	12/18/1989	Uranium	0.3	58.21	ug/L	duplicate sample
MW-14	1/25/1990	Uranium	0.3	53.73	ug/L	duplicate sample
MW-14	3/18/1992	Uranium	2E-10	50.90	ug/L	duplicate sample
MW-14	6/21/1994	Uranium	0.0000003	9.70	ug/L	duplicate sample
MW-14	3/16/1995	Uranium	0.0003	41.79	ug/L	duplicate sample
MW-14	9/19/1995	Uranium		150.75	ug/L	Extreme value
MW-15	10/31/1989	Uranium	0.3	52.24	ug/L	duplicate sample

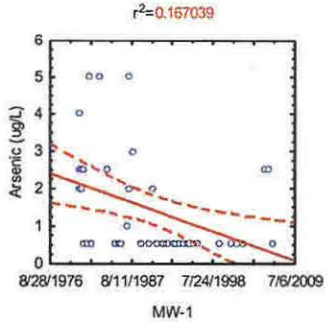
Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-15	11/20/1989	Uranium	0.3	58.21	ug/L	duplicate sample
MW-15	9/15/1992	Uranium	2E-10	37.31	ug/L	duplicate sample
MW-15	3/16/1995	Uranium	0.0003	35.52	ug/L	duplicate sample
MW-15	6/27/1995	Uranium		95.82	ug/L	Extreme value
MW-15	9/19/1995	Uranium		116.42	ug/L	Extreme value
MW-15	9/12/1996	Uranium	0.0003	38.00	ug/L	duplicate sample
MW-15	3/20/1997	Uranium	0.0003	46.00	ug/L	duplicate sample
MW-15	5/20/2002	Uranium		85.26	ug/L	Extreme value
MW-17	3/31/1993	Uranium	2E-10	28.21	ug/L	duplicate sample
MW-17	3/24/1994	Uranium	0.0000003	13.43	ug/L	duplicate sample
MW-17	11/25/1996	Uranium	0.0003	21.00	ug/L	duplicate sample
MW-18	3/24/1993	Uranium	2E-10	18.21	ug/L	duplicate sample
MW-18	9/22/1993	Uranium	0.0000003	13.13	ug/L	duplicate sample
MW-19	9/23/1993	Uranium	0.0000003	12.12	ug/L	duplicate sample
MW-2	5/19/1980	Uranium	1	12.00	ug/L	U3O8
MW-2	6/17/1980	Uranium	1	10.00	ug/L	U3O8
MW-2	7/16/1980	Uranium	1	21.00	ug/L	U3O8
MW-2	8/19/1980	Uranium	1	10.00	ug/L	U3O8
MW-2	9/1/1980	Uranium		67.00	ug/L	Extreme value
MW-2	12/10/1980	Uranium	1	55.00	ug/L	U3O8
MW-2	1/22/1981	Uranium	1	7.00	ug/L	U3O8
MW-2	2/11/1981	Uranium	1	23.00	ug/L	U3O8
MW-2	3/1/1981	Uranium	1	9.00	ug/L	U3O8
MW-2	4/21/1981	Uranium	1	6.00	ug/L	U3O8
MW-2	9/1/1981	Uranium	1	2.00	ug/L	U3O8
MW-2	1/28/1982	Uranium		3.00	ug/L	U3O8
MW-2	1/28/1982	Uranium		3.00	ug/L	U3O8
MW-2	4/2/1982	Uranium		7.00	ug/L	U3O8
MW-2	8/3/1982	Uranium		4.00	ug/L	U3O8
MW-2	12/10/1982	Uranium		0.50	ug/L	U3O8
MW-2	10/27/1983	Uranium		9.00	ug/L	U3O8
MW-2	3/13/1989	Uranium	0.2	9.85	ug/L	duplicate sample
MW-2	5/10/1990	Uranium	0.3	10.90	ug/L	duplicate sample
MW-2	5/21/1991	Uranium	2E-10	7.01	ug/L	duplicate sample
MW-2	6/12/1992	Uranium	2E-10	3.88	ug/L	duplicate sample
MW-2	6/9/1993	Uranium	0.0000003	14.00	ug/L	duplicate sample
MW-2	9/14/1995	Uranium	2E-10	2.33	ug/L	duplicate sample
MW-2	9/14/1995	Uranium	0.0003	1.80	ug/L	duplicate sample
MW-26	6/23/2006	Uranium	0.3	24.60	ug/L	duplicate entry
MW-3	5/19/1980	Uranium	1	15.00	ug/L	U3O8
MW-3	6/17/1980	Uranium	1	23.00	ug/L	U3O8
MW-3	7/16/1980	Uranium	1	33.00	ug/L	U3O8
MW-3	8/19/1980	Uranium	1	13.00	ug/L	U3O8
MW-3	12/10/1980	Uranium	1	48.00	ug/L	U3O8
MW-3	1/22/1981	Uranium	1	20.00	ug/L	U3O8
MW-3	2/12/1981	Uranium	1	5.00	ug/L	U3O8
MW-3	3/1/1981	Uranium	1	0.50	ug/L	U3O8
MW-3	4/13/1981	Uranium	1	10.00	ug/L	U3O8
MW-3	9/1/1981	Uranium	1	1.00	ug/L	U3O8
MW-3	1/27/1982	Uranium		4.00	ug/L	U3O8
MW-3	1/27/1982	Uranium		6.00	ug/L	U3O8
MW-3	4/13/1982	Uranium		35.00	ug/L	U3O8
MW-3	8/5/1982	Uranium		13.00	ug/L	U3O8
MW-3	12/13/1982	Uranium		37.00	ug/L	U3O8

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-3	4/21/1983	Uranium		30.00	ug/L	U3O8
MW-3	10/26/1983	Uranium		42.00	ug/L	U3O8
MW-3	10/27/1983	Uranium		36.00	ug/L	U3O8
MW-3	11/22/1988	Uranium		219.00	ug/L	Extreme value
MW-3	12/5/1991	Uranium	2E-10	13.13	ug/L	duplicate sample
MW-3	12/16/1993	Uranium		131.34	ug/L	Extreme value
MW-3	8/18/1994	Uranium	2E-10	23.88	ug/L	duplicate sample
MW-3	6/28/1995	Uranium		38.36	ug/L	duplicate sample
MW-3	6/28/1995	Uranium	0.0003	28.00	ug/L	duplicate sample
MW-3	9/20/1995	Uranium		103.13	ug/L	Extreme value
MW-5	5/19/1980	Uranium	1	2.00	ug/L	U3O8
MW-5	5/19/1980	Uranium		ND	ug/L	No value
MW-5	6/17/1980	Uranium	1	10.00	ug/L	U3O8
MW-5	6/17/1980	Uranium		8.00	ug/L	Extreme value
MW-5	7/16/1980	Uranium	1	16.00	ug/L	U3O8
MW-5	7/16/1980	Uranium		8.00	ug/L	Extreme value
MW-5	8/19/1980	Uranium	1	31.00	ug/L	U3O8
MW-5	8/19/1980	Uranium		10.00	ug/L	Extreme value
MW-5	9/1/1980	Uranium		8.00	ug/L	Extreme value
MW-5	10/1/1980	Uranium		8.00	ug/L	Extreme value
MW-5	12/9/1980	Uranium	1	2.00	ug/L	U3O8
MW-5	1/22/1981	Uranium	1	2.00	ug/L	U3O8
MW-5	1/22/1981	Uranium		13.00	ug/L	Extreme value
MW-5	2/11/1981	Uranium	1	6.00	ug/L	U3O8
MW-5	3/1/1981	Uranium	1	10.00	ug/L	U3O8
MW-5	4/21/1981	Uranium	1	3.00	ug/L	U3O8
MW-5	6/18/1981	Uranium		12.00	ug/L	Extreme value
MW-5	9/1/1981	Uranium	1	0.50	ug/L	U3O8
MW-5	1/26/1982	Uranium		0.50	ug/L	U3O8
MW-5	1/26/1982	Uranium		1.00	ug/L	U3O8
MW-5	4/13/1982	Uranium		4.00	ug/L	U3O8
MW-5	8/3/1982	Uranium		0.50	ug/L	U3O8
MW-5	12/13/1982	Uranium		0.50	ug/L	U3O8
MW-5	10/27/1983	Uranium		1.00	ug/L	U3O8
MW-5	12/10/1986	Uranium		2.39	ug/L	duplicate sample
MW-5	6/22/1989	Uranium	2E-10	0.60	ug/L	duplicate sample
MW-5	9/13/1989	Uranium	0.2	1.79	ug/L	duplicate sample
MW-5	2/28/1991	Uranium	2E-10	0.51	ug/L	duplicate sample
MW-5	9/15/1992	Uranium	2E-10	5.06	ug/L	duplicate sample
MW-5	9/15/1992	Uranium		5.56	ug/L	Extreme value
MW-5	12/7/1994	Uranium	0.0003	2.00	ug/L	duplicate entry
MW-5	12/7/1994	Uranium	0.0000003	0.15	ug/L	duplicate sample
MW-5	3/15/1995	Uranium		48.51	ug/L	Extreme value
MW-5	12/8/1995	Uranium	0.0003	3.30	ug/L	duplicate sample
MW-5	9/30/1997	Uranium	0.0003	1.00	ug/L	duplicate entry
MW-5	2/18/1999	Uranium		19.00	ug/L	Extreme value
MW-1	4/14/1981	Vanadium	500	250	ug/L	Extreme Value
MW-1	12/28/1981	Vanadium	500	500	ug/L	Extreme Value
MW-1	6/13/1984	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-11	6/12/1984	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-11	11/20/1989	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-11	1/24/1990	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-12	6/12/1984	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-12	11/1/1989	Vanadium	0	0	ug/L	zero value with zero det. Limit

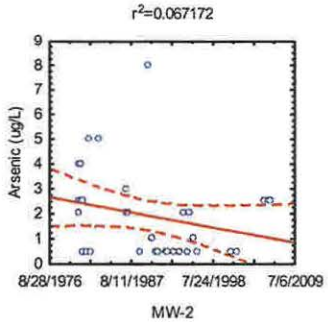
Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-12	11/20/1989	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-12	1/24/1990	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-14	11/20/1989	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-14	1/24/1990	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-15	11/1/1989	Vanadium	0	40	ug/L	Extreme Value
MW-15	1/24/1990	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-15	5/1/1999	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-15	9/10/2002	Vanadium	100	50	ug/L	Extreme Value
MW-17	5/1/1999	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-19	5/1/1999	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-19	9/1/2002	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-2	4/21/1981	Vanadium	500	250	ug/L	Extreme Value
MW-2	12/28/1981	Vanadium	500	250	ug/L	Extreme Value
MW-2	6/13/1984	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-2	9/1/2002	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-26	3/30/2005	Vanadium	20	20	ug/L	Extreme Value
MW-3	12/28/1981	Vanadium	500	250	ug/L	Extreme Value
MW-3	4/21/1983	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	Vanadium	20	20	ug/L	Extreme Value
MW-5	4/21/1981	Vanadium	500	250	ug/L	Extreme Value
MW-5	11/20/1989	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-5	1/24/1990	Vanadium	0	0	ug/L	zero value with zero det. Limit
MW-1	4/14/1981	Zinc	20	250	ug/L	Extreme Value
MW-1	8/14/1981	Zinc	0	450	ug/L	Extreme Value
MW-1	6/13/1984	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-1	6/25/1985	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-1	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-11	6/12/1984	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-11	6/25/1985	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-11	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-11	3/30/2005	Zinc	10	12	ug/L	Extreme Value
MW-12	6/12/1984	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-12	6/25/1985	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-12	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-12	6/22/2005	Zinc	10	12	ug/L	Extreme Value
MW-14	5/1/1999	Zinc	0	13000	ug/L	Extreme Value
MW-14	9/1/2002	Zinc	0	11500	ug/L	Extreme Value
MW-15	11/30/2000	Zinc	0	26000	ug/L	Extreme Value
MW-17	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-17	9/1/2002	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-18	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-18	11/30/2000	Zinc	30	15	ug/L	Extreme Value
MW-19	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-19	11/30/2000	Zinc	30	15	ug/L	Extreme Value
MW-19	9/1/2002	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-2	6/13/1984	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-2	6/25/1985	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-2	5/11/1999	Zinc	0	0	ug/L	zero value with zero det. Limit

Well	Sample Date	Analyte	Det. Limit	Result	Units	Reason
MW-1	1/27/1988	Arsenic	0	690000	ug/L	Extreme Value
MW-2	9/1/2002	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-26	3/30/2005	Zinc	10	10	ug/L	Extreme Value
MW-3	8/18/1981	Zinc	5	441	ug/L	Extreme Value
MW-3	4/21/1983	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-3	6/15/1984	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-3	6/25/1985	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-32	3/30/2005	Zinc	10	594	ug/L	Extreme Value
MW-5	8/18/1981	Zinc	5	449	ug/L	Extreme Value
MW-5	6/14/1984	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-5	6/25/1985	Zinc	0	0	ug/L	zero value with zero det. Limit
MW-5	5/1/1999	Zinc	0	0	ug/L	zero value with zero det. Limit

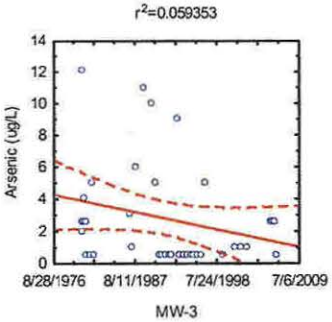
Arsenic Regression Analysis



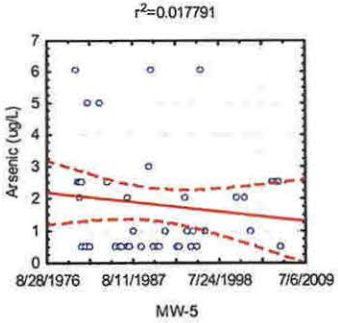
MW-1



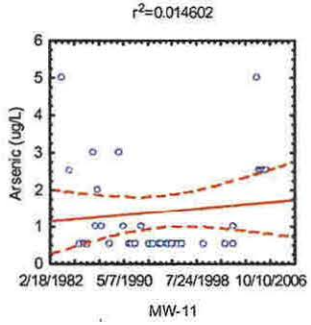
MW-2



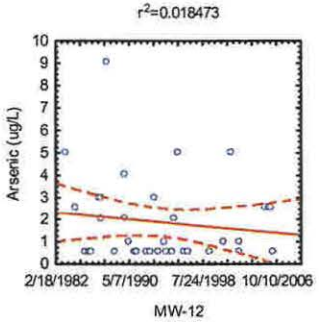
MW-3



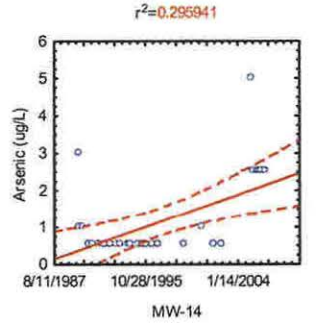
MW-5



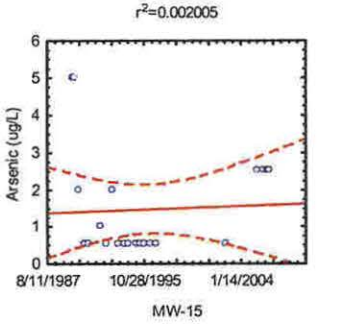
MW-11



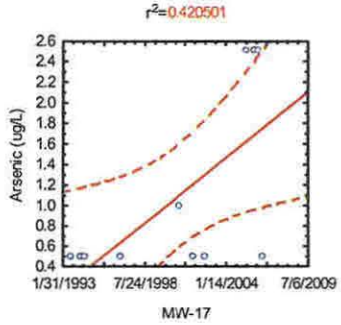
MW-12



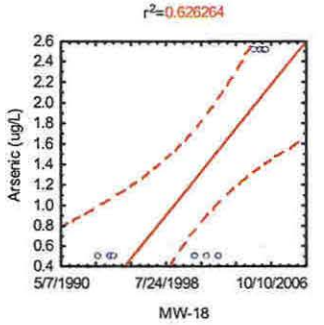
MW-14



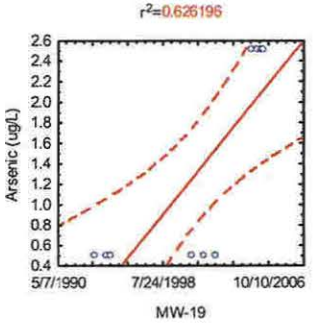
MW-15



MW-17

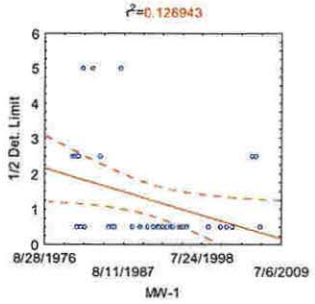


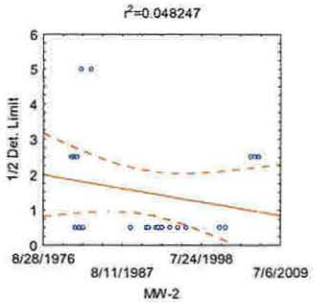
MW-18

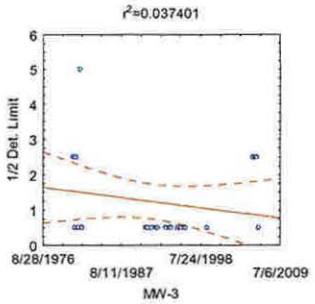


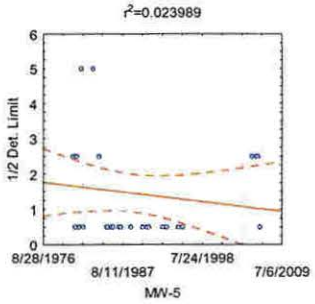
MW-19

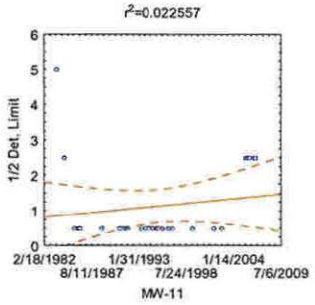
Arsenic Non Detects

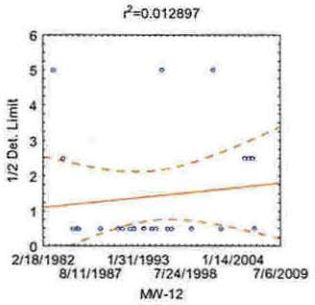


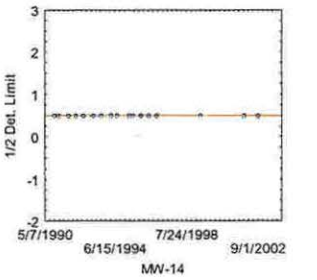


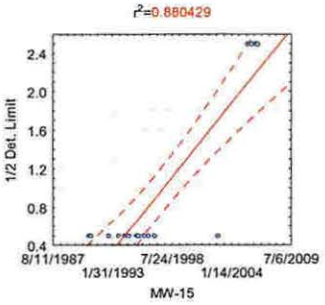


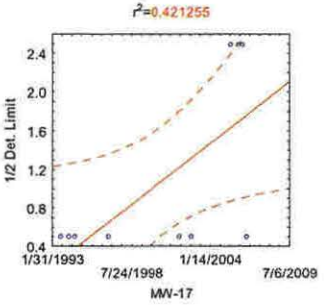


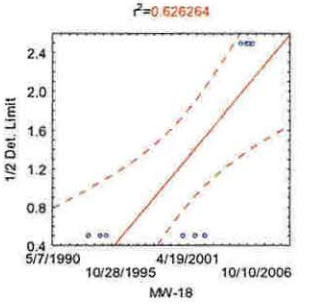


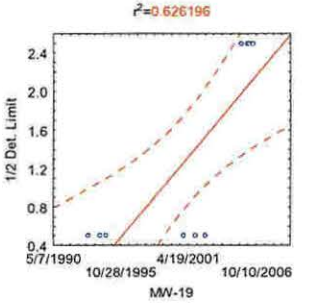


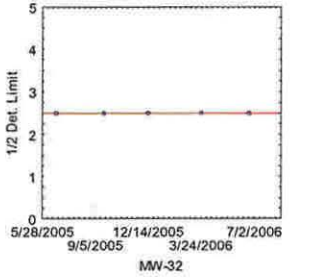




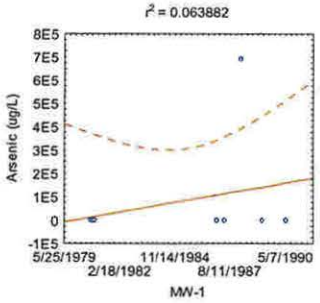


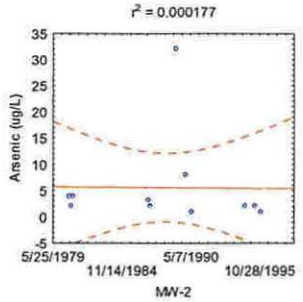


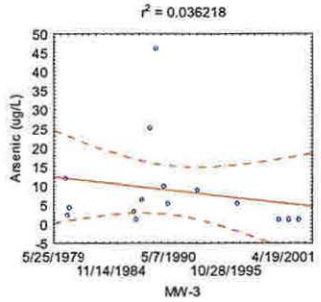


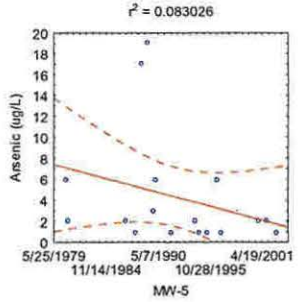


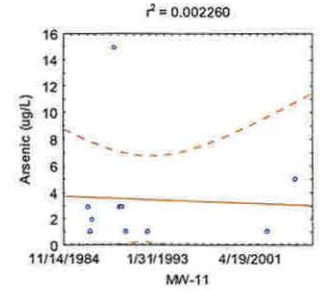
Arsenic Detects

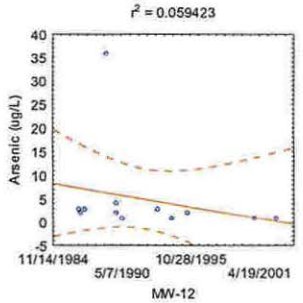


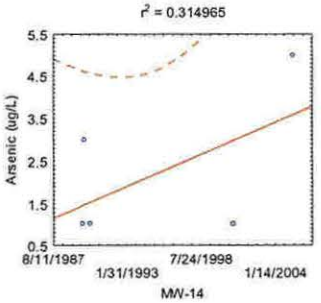


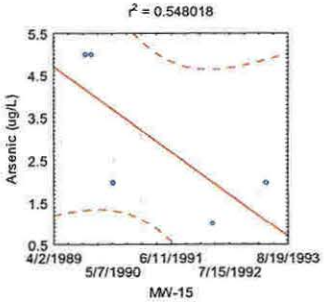


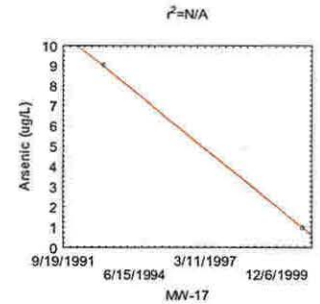


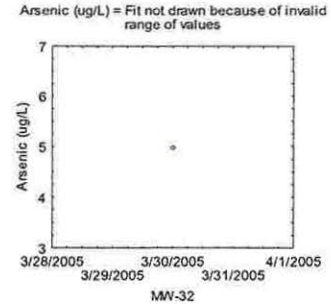






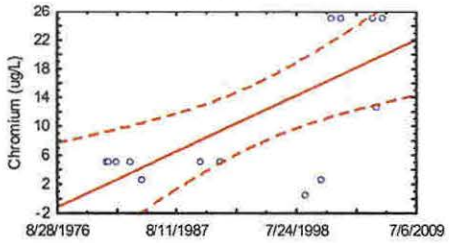






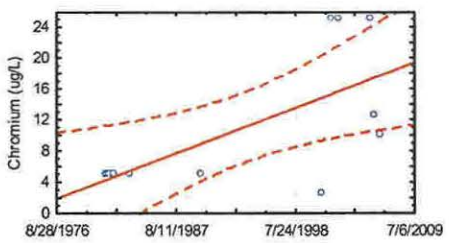
Chromium Regression Analysis

r^2=0.484911



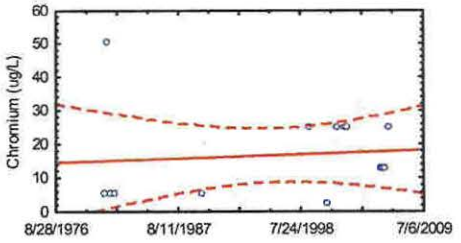
MW-1

r^2=0.438664



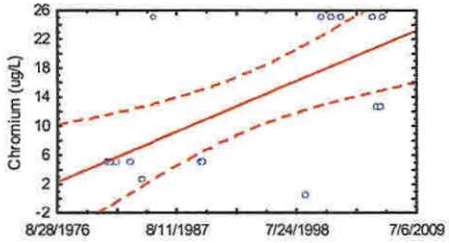
MW-2

r^2=0.008447



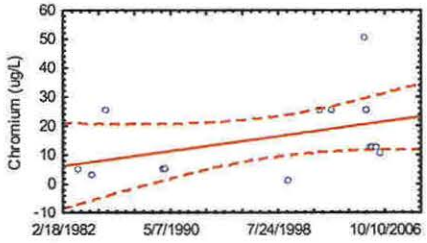
MW-3

r^2=0.420624



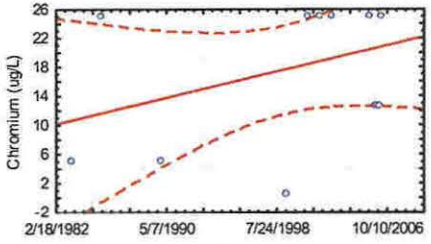
MW-5

r^2=0.484911



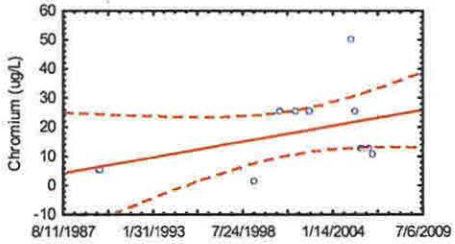
MW-11

r^2=0.136372



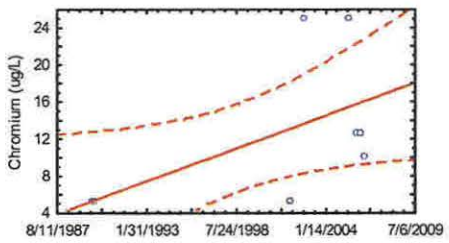
MW-12

r^2=0.186922



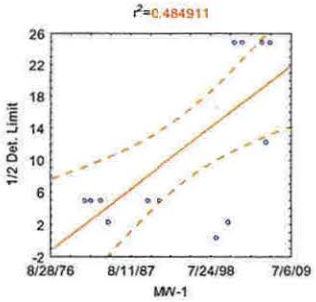
MW-14

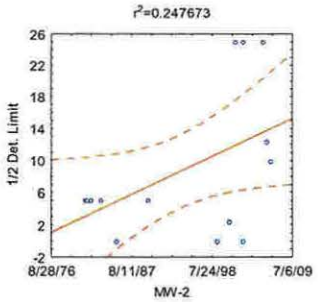
r^2=0.401861

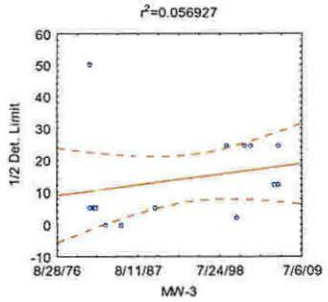


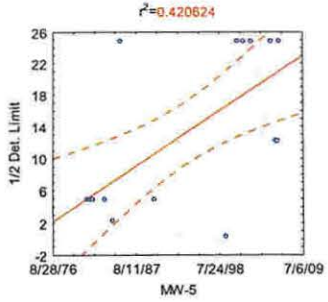
MW-15

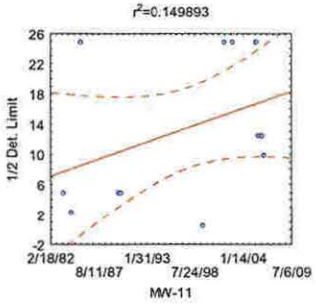
Chromium Non Detects

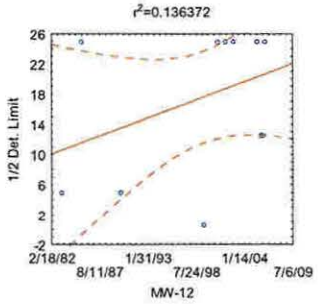


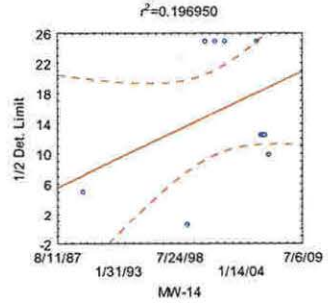


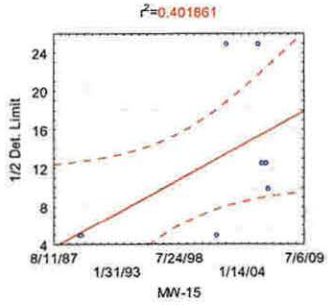


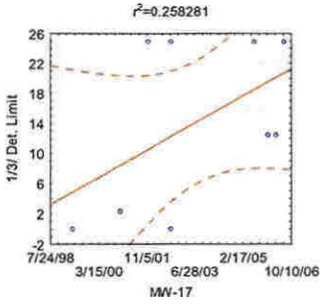


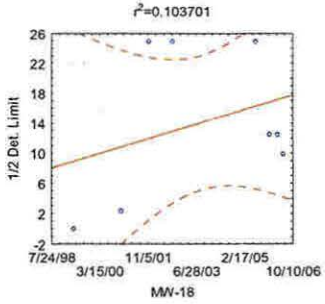


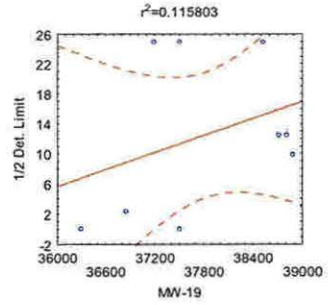


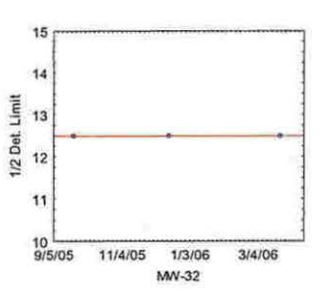




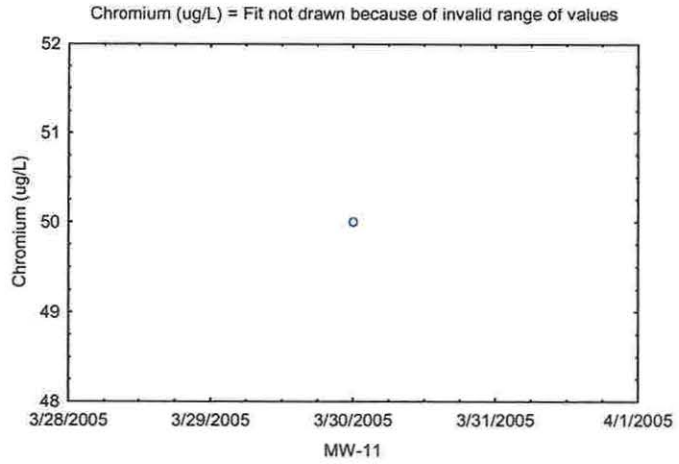


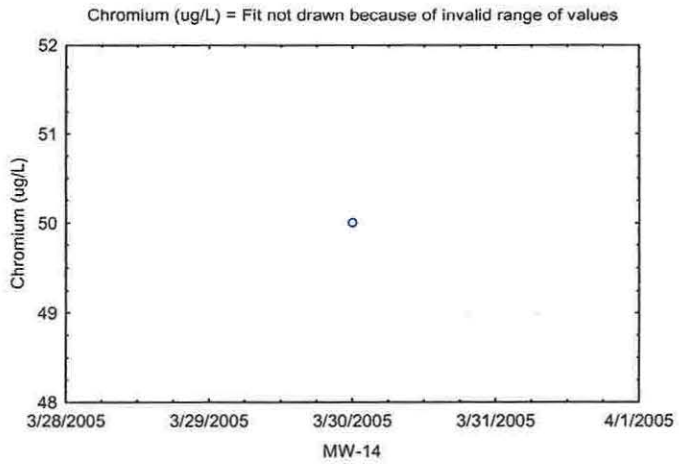


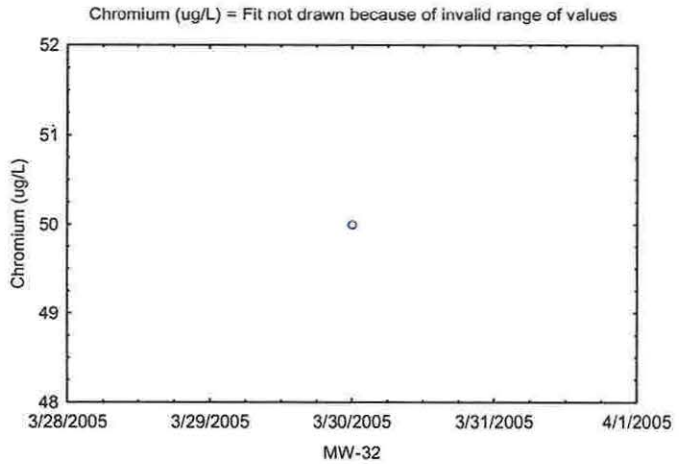




Chromium Detects

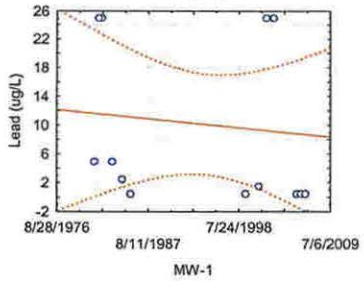






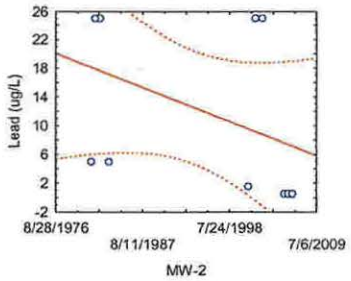
Lead Regression Analysis

r^2=0.011157



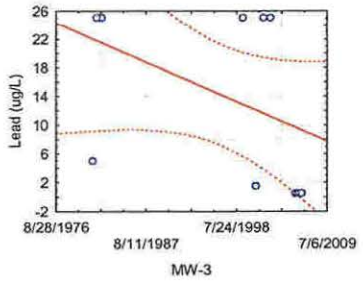
MW-1

r^2=0.172104



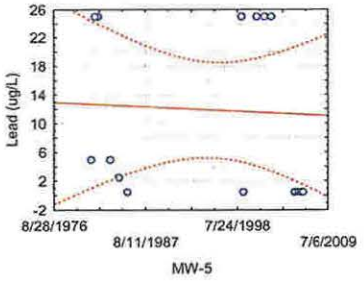
MW-2

r^2=0.191309



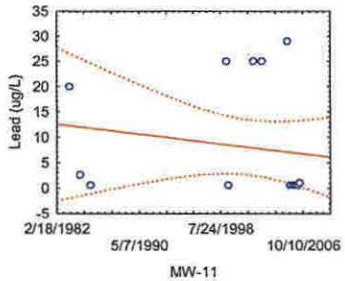
MW-3

r^2=0.002459



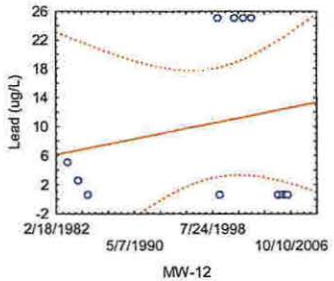
MW-5

r^2=0.025117



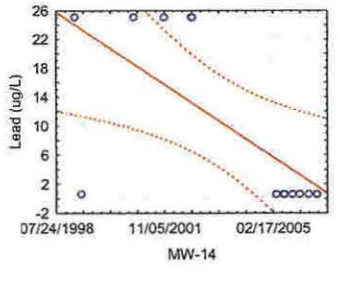
MW-11

r^2=0.034679



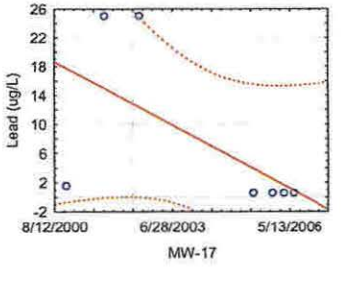
MW-12

r^2=0.431126



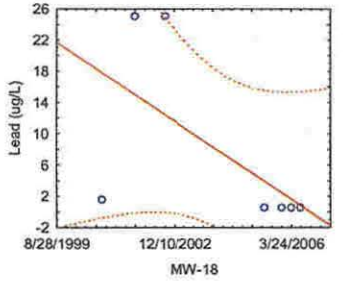
MW-14

r^2=0.358516



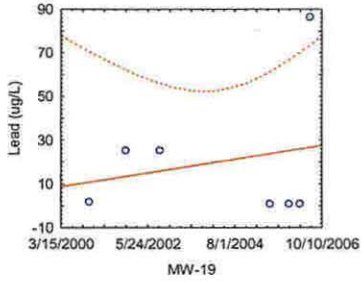
MW-17

r^2=0.358686

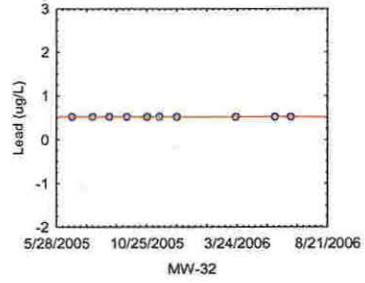


MW-18

r^2=0.045037

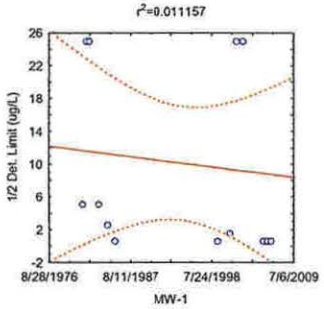


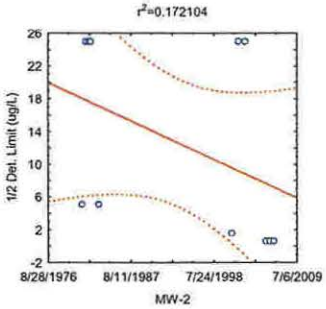
MW-19

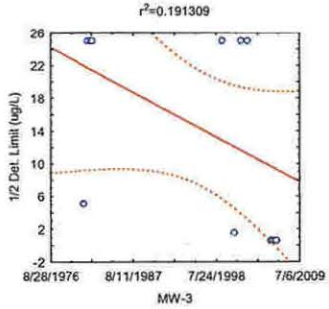


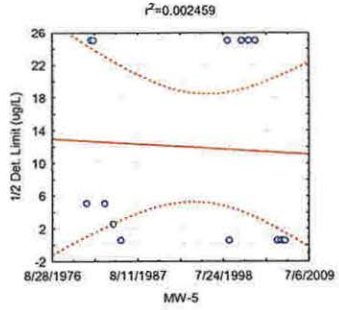
MW-32

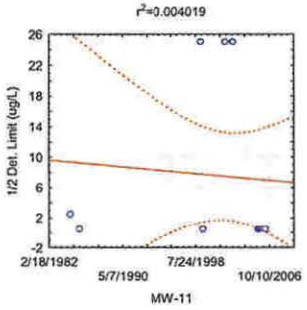
Lead Non Detects

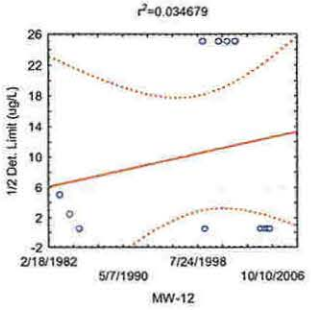


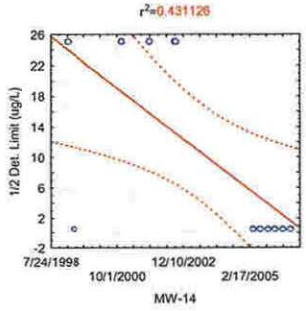


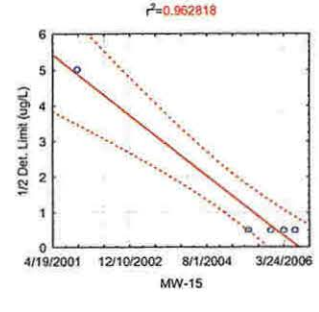


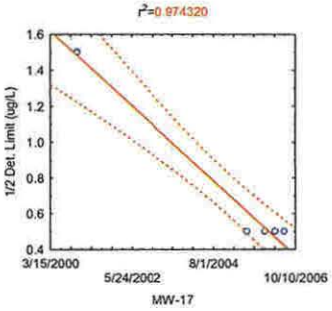


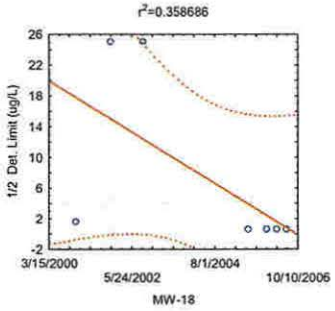


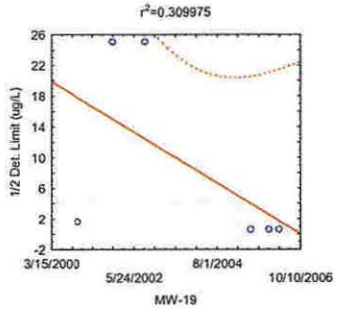


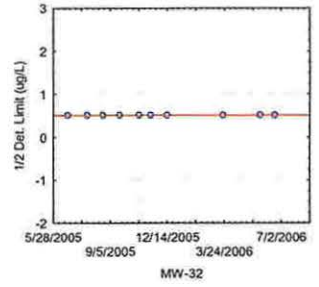




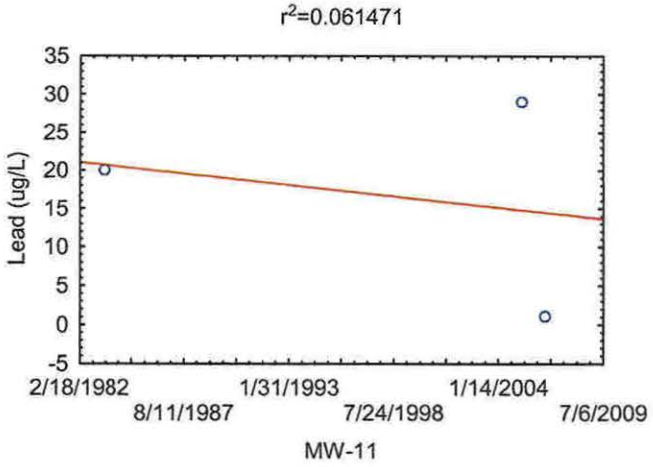




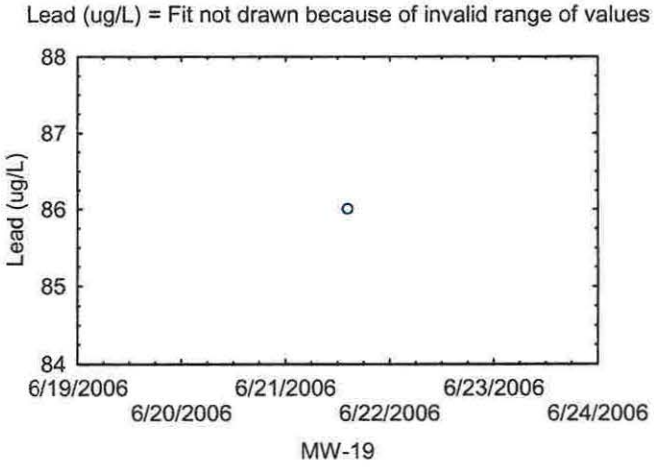




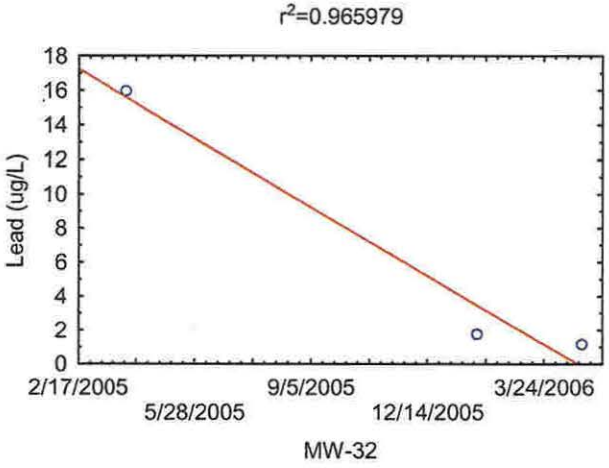
Lead Detections (ug/L)



MW-11

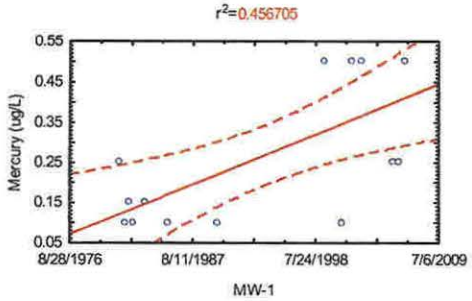


MW-19

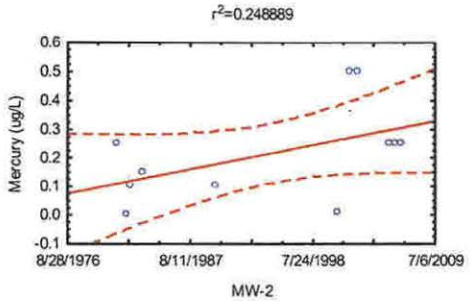


MW-32

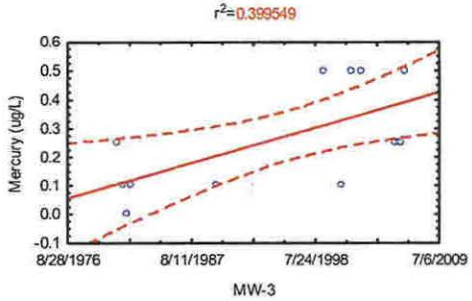
Mercury Regression Analysis



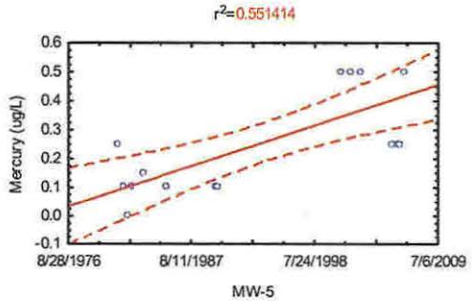
MW-1



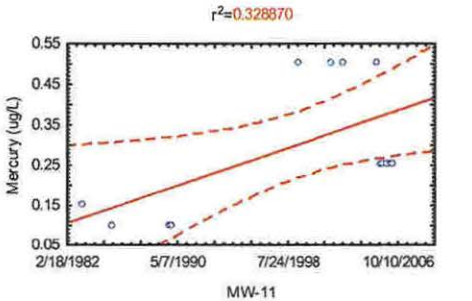
MW-2



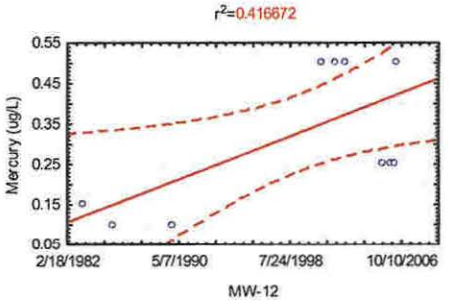
MW-3



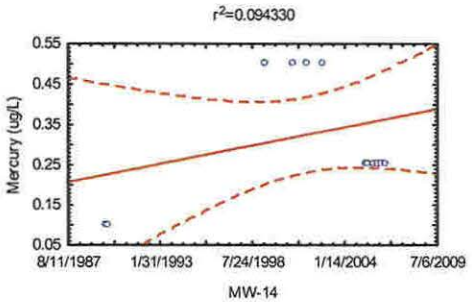
MW-5



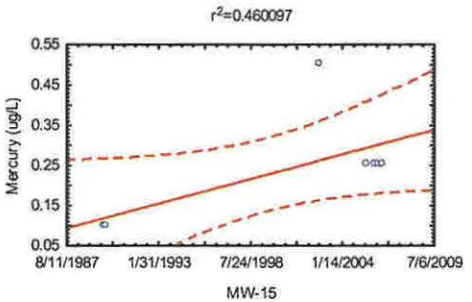
MW-11



MW-12

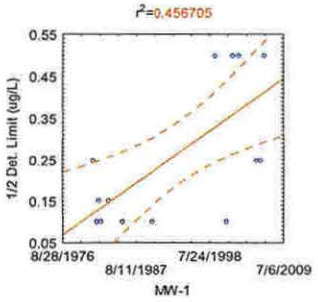


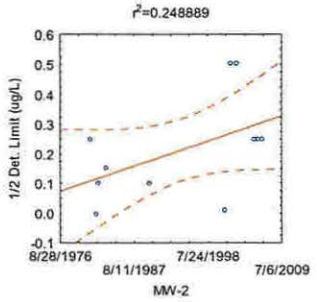
MW-14

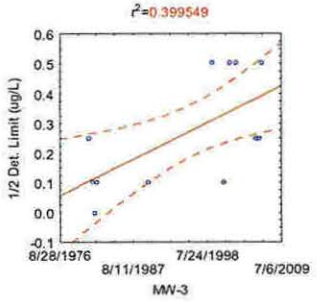


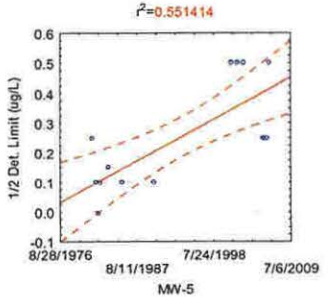
MW-15

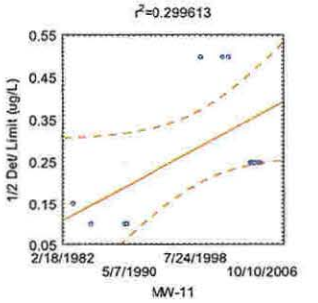
Mercury Non Detects

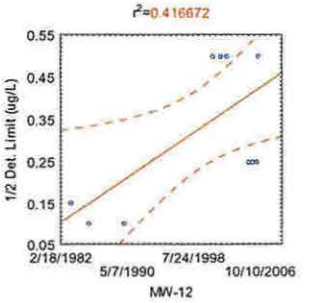


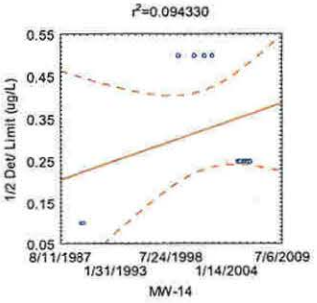


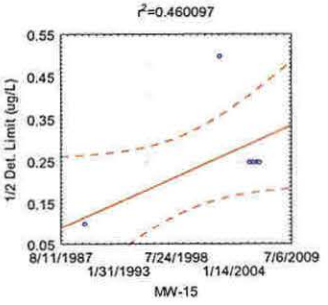


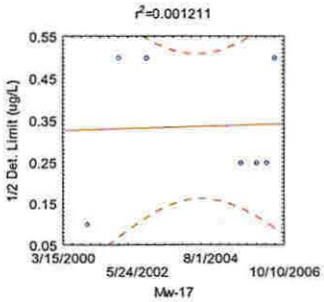


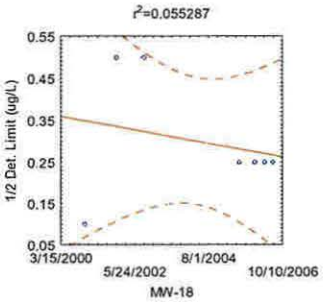


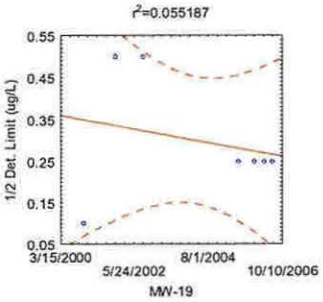


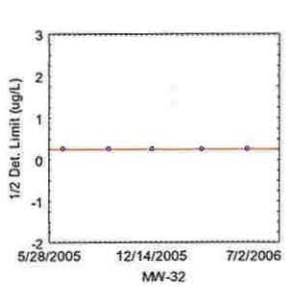




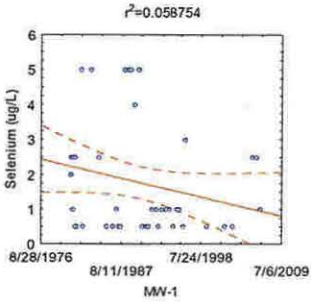


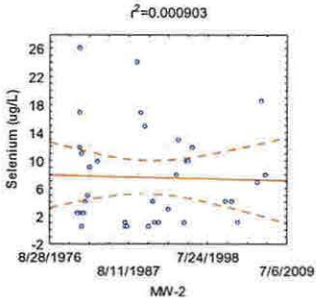


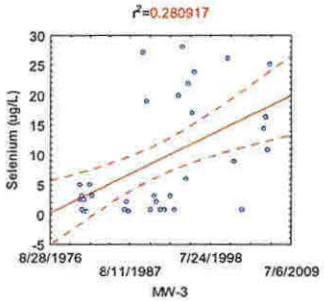


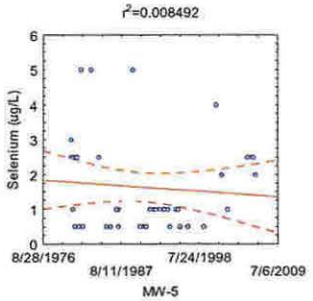


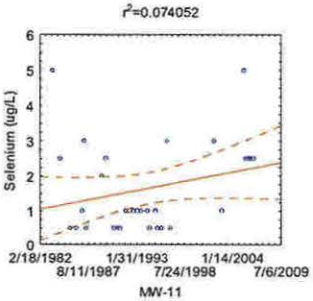
Selenium Regression Analysis

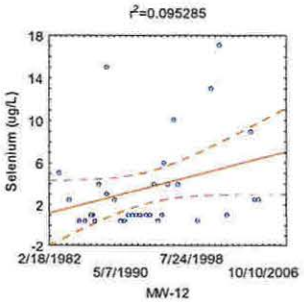


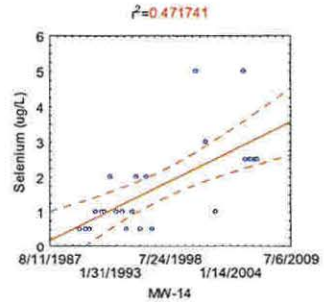


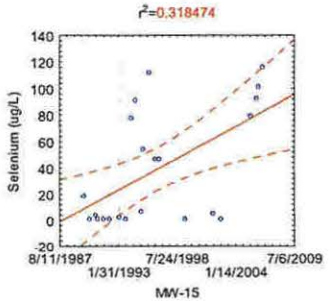


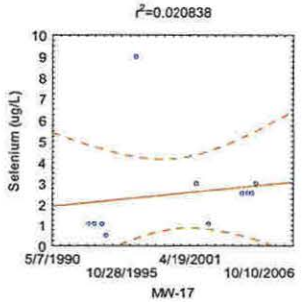


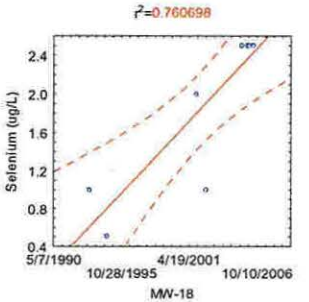


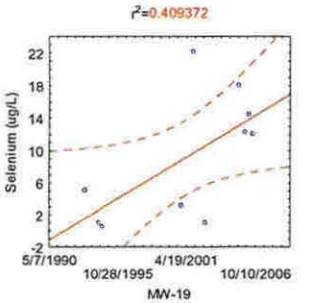


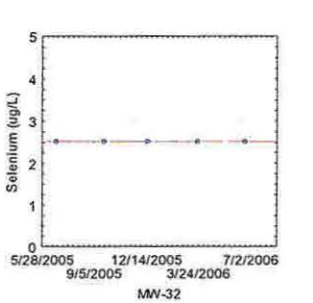




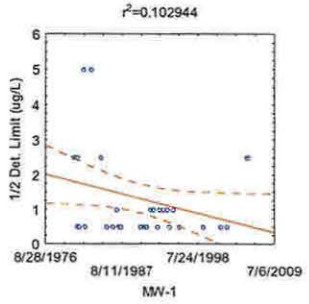


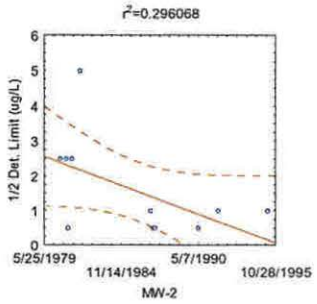


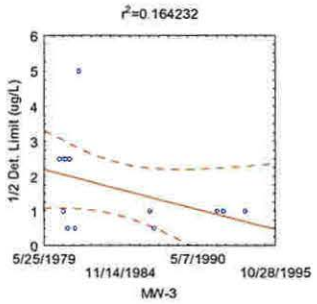


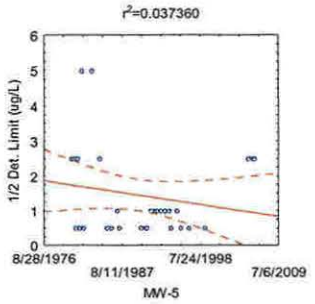


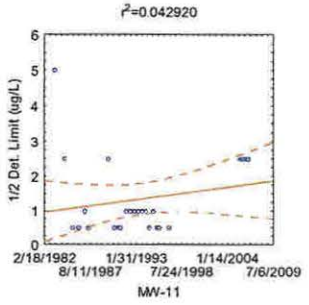
Selenium Non Detects

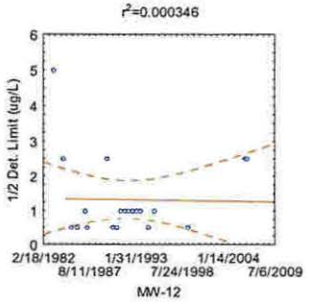


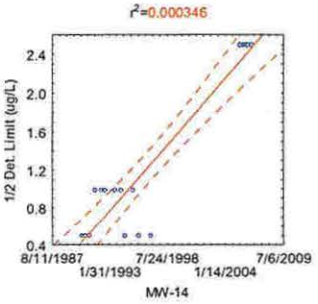


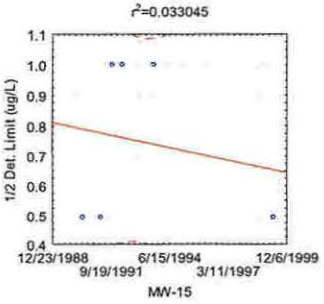


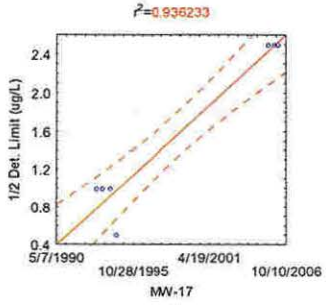


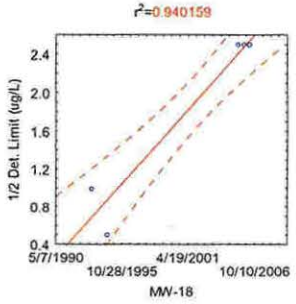


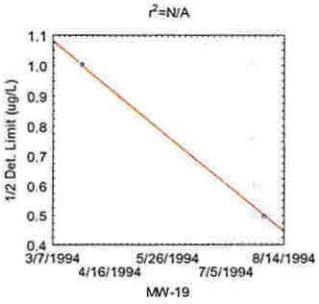


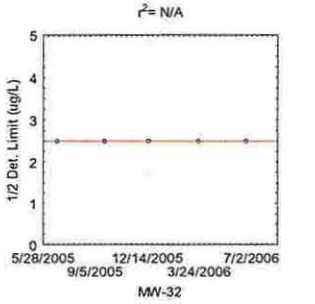




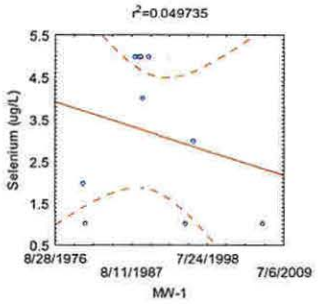


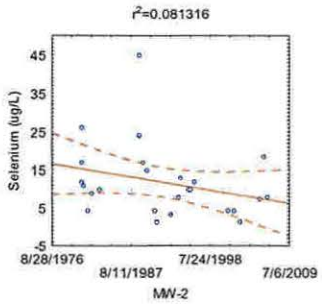


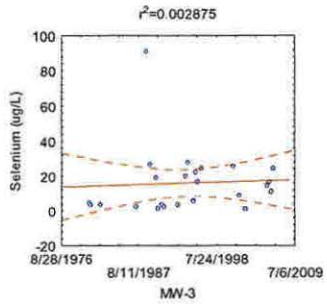


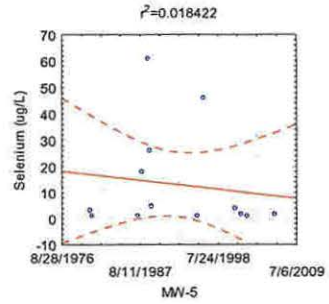


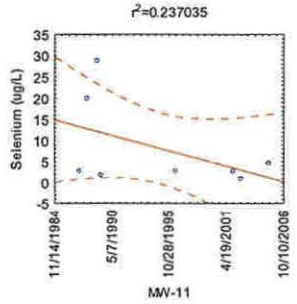
Selenium Detects

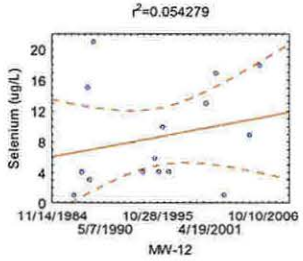


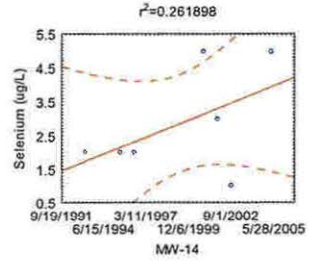


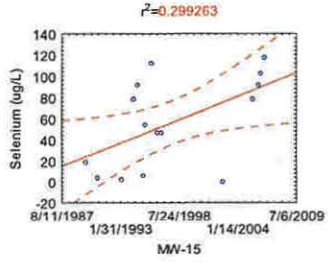


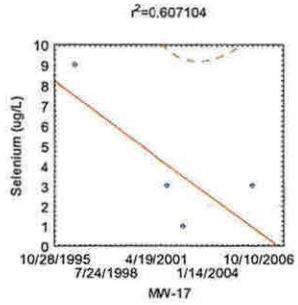


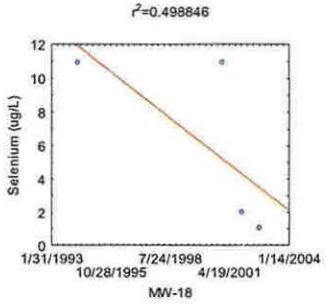


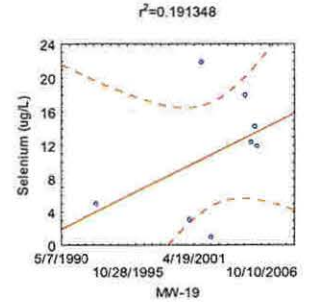


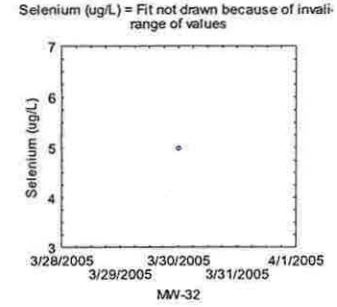




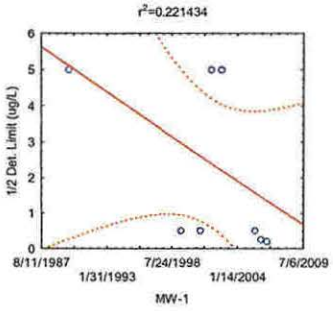


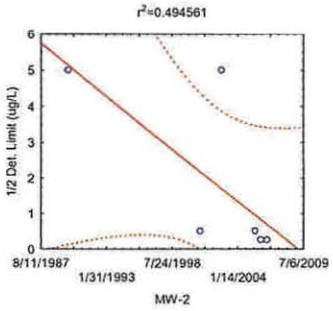


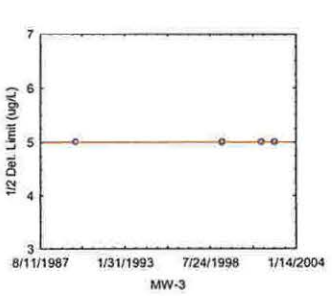


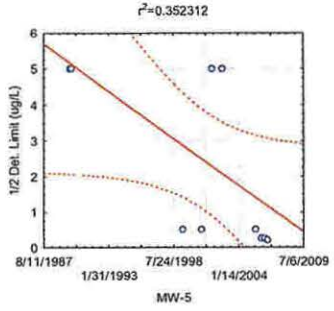


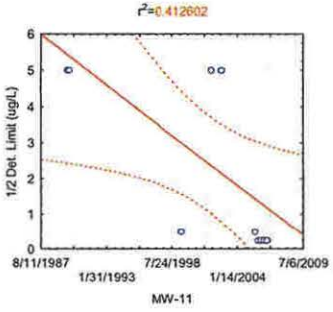
Thallium Non Detects

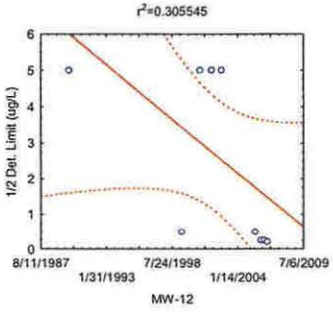


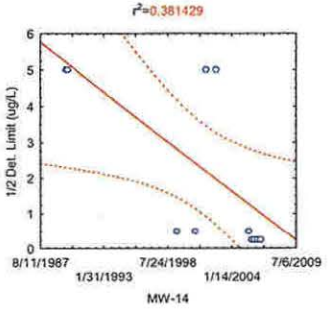


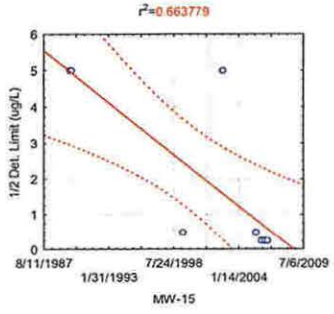


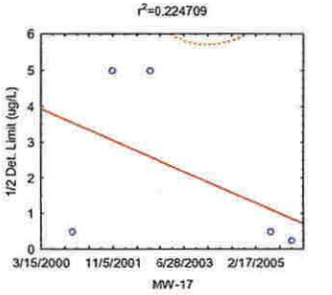


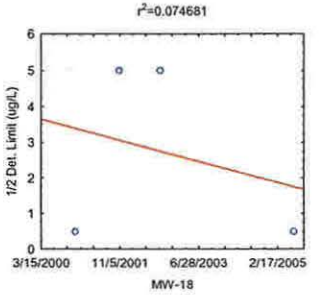


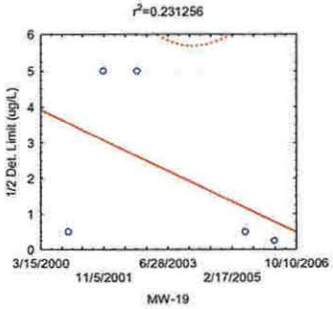


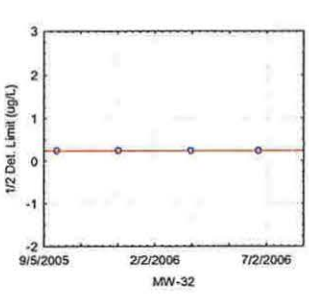




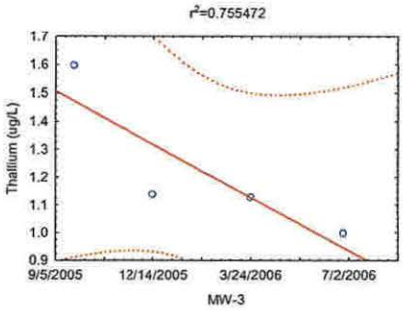


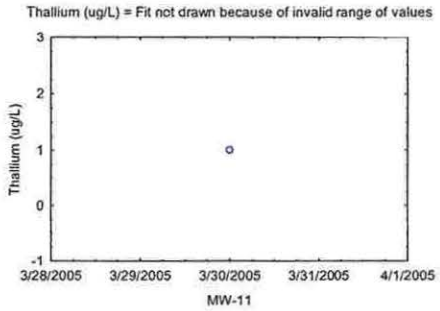


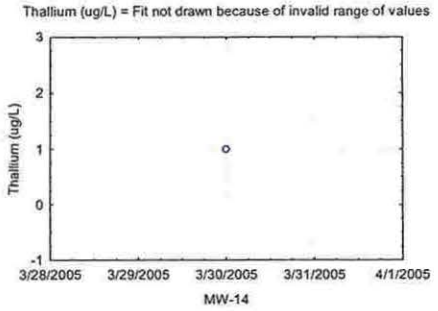


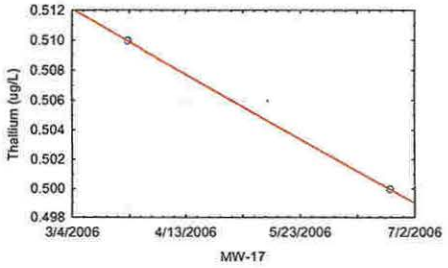


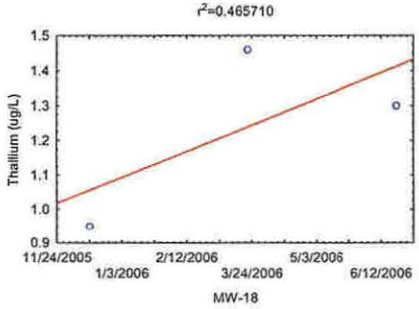
Thallium Detects

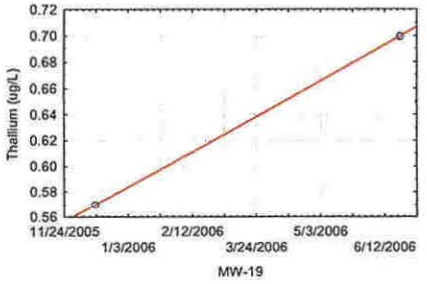


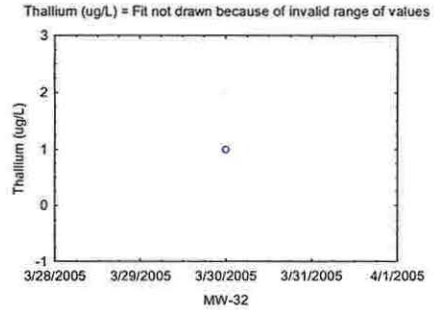




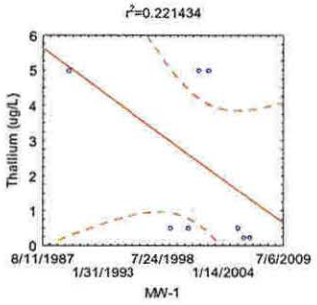


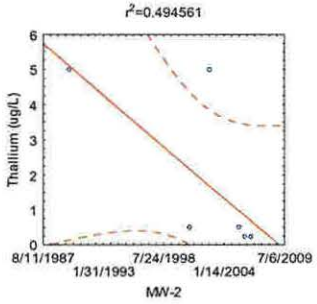


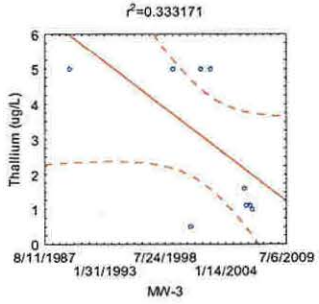


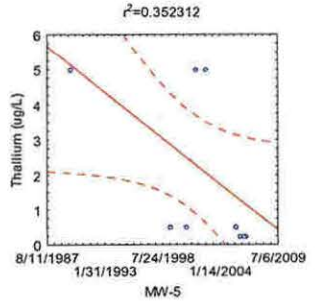


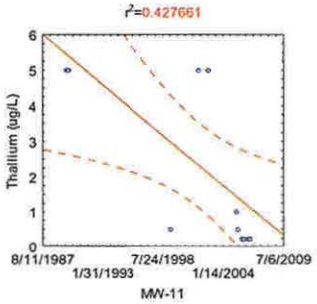
Thallium Regression Analysis

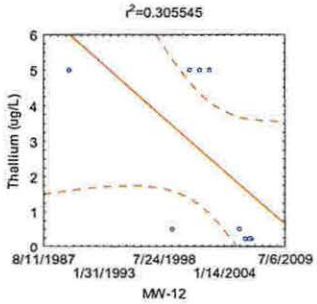


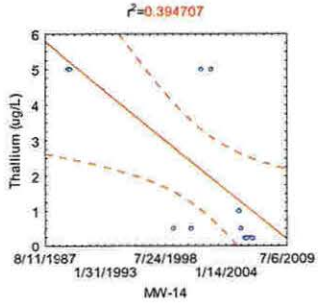


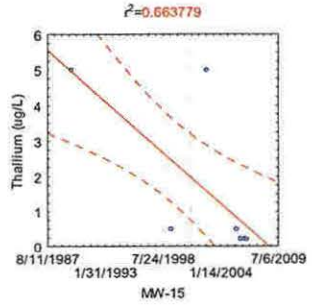


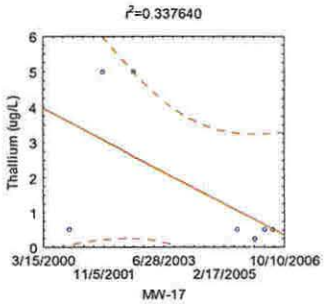


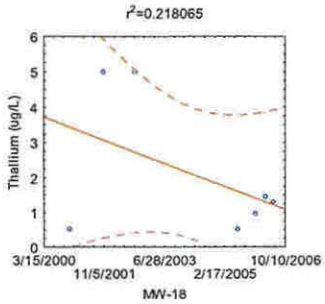


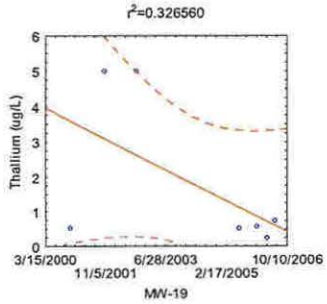


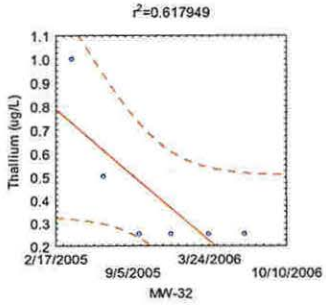












DOSE ASSESSMENT IN SUPPORT OF THE LICENSE RENEWAL APPLICATION & ENVIRONMENTAL REPORT FOR THE WHITE MESA URANIUM MILL

Prepared for:

Denison Mines (USA) Corp. (DUSA)

Prepared by:

SENES Consultants Limited
121 Granton Drive, Unit 12
Richmond Hill, Ontario
L4B 3N4

February 2007

Printed on Recycled Paper Containing Post-Consumer Fibre

EXECUTIVE SUMMARY

Denison Mines (USA) Corp. (DUSA) operates the White Mesa Uranium Mill (hereafter referred to as the "mill") in San Juan County, Utah, approximately 6 miles (9.5 km) south of the city of Blanding. The mill is located on a parcel of land and mill site claims covering approximately 5,415 acres (2,191 ha). The mill is licensed by the State of Utah Division of Radiation Control (DRC) to process uranium ore and selected alternate feed materials.

DUSA has commenced mining activities in the Colorado Plateau district, and conventional ores are being hauled and stockpiled at the mill. In addition, DUSA has mining assets in the Arizona Strip and processing of ores from those properties can be anticipated in the future. Milling of conventional ore is scheduled for early 2008 when the milling of currently available alternate feed material is completed (DUSA 2007).

This dose assessment was prepared in support of the license renewal application for the mill. An element of the license renewal application is to complete a dose estimate to members of the public based on the operations at the mill.

During the recovery of uranium from conventionally mined ore at the mill, small amounts of uranium and other radioactive contaminants can be released to the atmosphere from various processes and activities. The radioactivity can be dispersed by wind into the surrounding environment and subsequently, via deposition to soil, plants and animals.

In this assessment, MILDOS-AREA was used to estimate the dose commitments that could potentially be received by individuals and the general population within a 50 mile (80 km) radius for the processing of Colorado Plateau ore or Arizona Strip ore. The expected ore grade from the Colorado Plateau ore is an average of 0.25% U_3O_8 and 1.5% V_2O_5 (NRC 1980) while the Arizona Strip ore is assumed to contain 0.637% U_3O_8 (DUSA (2007a)). The proposed ore process rate for the Colorado Plateau ore and Arizona Strip ore is approximately 730,000 tons per year (tpy) (an average of 2000 tons per day). Assuming that the average uranium recovery is at the historical recovery yield of 94%, approximately 1,715 tons (3,431,000 lbs) of U_3O_8 per year would be recovered from Colorado Plateau ore at the proposed ore process rate. Similarly, approximately 4,371 tons (8,742,188 lbs) of U_3O_8 per year would be recovered from Arizona Strip ore at the proposed ore process rate. The proposed operating schedule at the mill is assumed to be 24 hr/day for 365 days per year.

The MILDOS-AREA calculated total annual effective dose commitments (including radon) were compared to the Utah Administrative Code R313-15-301(1)(a) requirements that the dose to individual members of the public shall not exceed 100 mrem/yr (radon included). Overall, the

total annual effective dose commitments are at most 1.20 mrem/yr (effective dose for infant at BHV-1) of the R313-15-301(1)(a) limit of 100 mrem/yr (radon included) to an individual member of the public for the processing of Colorado Plateau ore. The total annual effective dose commitments are at most 2.94 mrem/yr (effective dose for infant at BHV-1) of the R313-15-301(1)(a) limit of 100 mrem/yr (radon included) to an individual member of the public for the processing of Arizona Strip ore. Therefore, the predicted annual effective dose commitments for anticipated ore processing operations comply with R313-15.

In addition, the MILDOS-AREA-calculated 40 CFR190 annual dose commitment (excluding radon) was compared to the 40 CFR190 Criterion of 25 mrem/yr to the whole body (excluding the dose due to radon) and 25 mrem/yr to any other organ to any member of the public (EPA 2002). The 40CFR 190 doses were also used to demonstrate compliance with R313-15-101(4) (i.e., the licensee must demonstrate that total effective dose equivalent to the individual member of the public likely to receive the highest total effective dose equivalent will not exceed 10 mrem (absent of the radon dose)). Overall, from Table 6.3, the 40 CFR190 annual dose commitments are at most 4.62 mrem/yr (dose to the bone for the teen at BHV-1) of the 40 CFR190 dose criterion of 25 mrem/yr for Colorado Plateau ore. In addition, the 40 CFR190 annual effective dose commitments demonstrate compliance with the R313-15-101(4) limit of 10 mrem/yr to the individual member of the public likely to receive the highest total effective dose equivalent. From Table 6.8, the 40 CFR190 annual dose commitments are at most 11.7 mrem/yr (dose to the bone for the teen at BHV-1) of the 40 CFR190 dose criterion of 25 mrem/yr for Arizona strip ore. In addition, the 40 CFR190 annual effective dose commitments demonstrate compliance with the R313-15-101(4) limit of 10 mrem/yr to the individual member of the public likely to receive the highest total effective dose equivalent. For Colorado Plateau ores, the maximum effective dose is 0.535 mrem/yr and for Arizona Strip Ore it is 1.37 mrem/yr, in both cases for an infant at BHV-1. Therefore, the predicted 40 CFR annual effective dose commitments for anticipated ore processing operations comply with R313-15-101(4).

TABLE OF CONTENTS

Page No.

EXECUTIVE SUMMARY ES-1

ACRONYMS & ABBREVIATIONS AC-1

1.0 INTRODUCTION 1-1
- 1.1 Background 1-1
- 1.2 Objective 1-2
- 1.3 Approach 1-3
- 1.4 Contents Of This Report 1-4

2.0 REGULATORY COMPLIANCE 2-1

3.0 RADIATION DOSE ASSESSMENT 3-1
- 3.1 Enecotech Assessment 3-1
- 3.2 General Information About Mildos-Area 3-1
- 3.3 The Use Of Mildos-Area In This Assessment 3-3

4.0 SOURCE TERMS 4-1
- 4.1 Point Sources 4-3
  - 4.1.1 Grinder 4-3
  - 4.1.2 Grizzly 4-3
  - 4.1.3 Yellowcake Stacks 4-4
  - 4.1.4 Vanadium Stack 4-5
- 4.2 Area Sources 4-5
  - 4.2.1 Ore Pads 4-5
  - 4.2.2 Tailings ponds 4-6
- 4.3 Meteorological Data 4-8
- 4.4 Population Data 4-8
- 4.5 Uranium Mill Source Emission Rates 4-8
  - 4.5.1 Colorado Plateau Ore 4-8
  - 4.5.2 Arizona Strip Ore 4-9

5.0 RECEPTORS 5-1

6.0 RADIATION DOSE ESTIMATES 6-1
- 6.1 MILDOS-Area Results For Colorado Plateau Ore 6-2
  - 6.1.1 R313-15-301(1)(a) Regulatory Compliance 6-2
  - 6.1.2 40 CFR190 Regulatory Compliance 6-5
- 6.2 MILDOS-Area Results for Arizona Strip Ore 6-10
  - 6.2.1 R313-15-301 (1)(a) Regulatory Compliance 6-11
  - 6.2.2 40 CFR190 Regulatory Compliance 6-14

7.0 KEY OBSERVATIONS 7-1

8.0 REFERENCES 8-1

APPENDIX A: EMISSIONS CALCULATIONS A-1

LIST OF TABLES

Page No.

4.1 Characteristics of Tailings at White Mesa 4-7
4.2 Radioactive Particulate and Radon Emission Rates (Colorado Plateau Ore) 4-9
4.3 Radioactive Particulate and Radon Emission Rates (Arizona Strip Ore) 4-9

6.1 Comparison of Annual Dose Commitments with Applicable Radiation Protection Standards (Colorado Plateau Ore) 6-2
6.2 Total Annual Dose Commitments (mrem) for Meat Ingestion Pathway (Colorado Plateau Ore) 6-5
6.3 Comparison of 40 CFR190 Annual Dose Commitments with Applicable Radiation Protection Standards (Colorado Plateau Ore) 6-6
6.4 40 CFR190 Annual Dose Commitments (mrem) for Meat Ingestion Pathway (Colorado Plateau Ore) 6-9
6.5 Annual Population Dose Commitments within 50 miles (80 km) of the Mill for Colorado Plateau Ore 6-9
6.6 Comparison of Annual Dose Commitments with Applicable Radiation Protection Standards (Arizona Strip Ore) 6-10
6.7 Total Annual Dose Commitments (mrem) for Meat Ingestion Pathway (Arizona Strip Ore) 6-13
6.8 Comparison of 40 CFR190 Annual Dose Commitments with Applicable Radiation Protection Standards (Arizona Strip Ore) 6-14
6.9 40 CFR190 Annual Dose Commitments (mrem) for Meat Ingestion Pathway (Arizona Strip Ore) 6-17
6.10 Annual Population Dose Commitments within 50 miles (80 km) of the Mill for Arizona Strip Ore 6-17

LIST OF FIGURES

Page No.

4.1 Source Locations 4-2

5.1 Receptor Locations with Respect to the Vanadium Stack 5-2

ACRONYMS & ABBREVIATIONS

ALC	Allowable Concentration
ANL	Argonne National Laboratory
ALARA	As Low As Reasonably Achievable
Avg.	Average
ASCII	American Standard Code for Information Interchange
Bi-210	Bismuth 210
Bi-214	Bismuth 214
CCD	Counter Current Decantation
CFR	Code of Federal Regulations
Ci	Curie
DCF	Dose Conversion Factor
DRC	State of Utah Division of Radiation Control
DUSA	Denison Mines (USA) Corp.
EPA	Environmental Protection Agency
E_W	Process Emission Factor
F	Radon Release
FES	Final Environmental Statement
F_S	Annual frequency of occurrence of wind group S
ft	Feet
ft^3	Cubic feet
g	grams
g ore	Grams of ore
GPS	Global Positioning System
GUI	Graphical User Interface
ha	hectares
hr	hours
ICRP	International Commission on Radiological Protection
ID	Induced Draft
lbs	Pounds
km	Kilometres
kts	Knots
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NRC	Nuclear Regulatory Commission
NUREG	Regulatory Guide
m	Meters
m^2	Square metres
mrem	Millirem

MPC	Maximum Permissible Concentration
Pb-210	Lead 210
Pb-214	Lead 214
pCi	picoCurie
Po-210	Polonium 210
Po-218	Polonium 218
Ra-226	Radium 226
Rn-222	Radon 222
R_S	Resuspension rate for wind group S
s	Seconds
S	Emission Rate
SENES	Specialists in Energy, Nuclear and Environmental Science
TGLM	Task group on Lung Dynamics Lung Model
Th-230	Thorium 230
tpy	tons per year
U_3O_8	Triuranium octaoxide ("Yellowcake")
Unat	Natural Uranium
U-234	Uranium 234
U-235	Uranium 235
U-238	Uranium 238
V_2O_5	Vanadium Oxide
yd^3	Cubic yards
yr	Years

1.0 INTRODUCTION

1.1 BACKGROUND

Denison Mines (USA) Corp. (DUSA) operates the White Mesa Uranium Mill (hereafter referred to as the "mill") in San Juan County, Utah, approximately 6 miles (9.5 km) south of the city of Blanding. The mill is located on a parcel of land and mill site claims covering approximately 5,415 acres (2,191 ha). The mill was built in 1979 and licensed by the U.S. Nuclear Regulatory Commission (NRC) to process uranium ore and selected alternate feed materials. The mill began operations in July 1980. In August 2004, the State of Utah became an Agreement State for the regulation of uranium mills, and primary regulatory authority over the mill was assumed by the State of Utah Division of Radiation Control (DRC) at that time.

The mill is a standard design with both uranium and vanadium circuits and uses the acid leach-solvent extraction process for uranium recovery from uranium ores and uranium/vanadium ores. Vanadium in uranium/vanadium-bearing ores is partially solubilized during leaching, and the dissolved vanadium present in uranium raffinate is further processed for recovery of vanadium before recycling (NUREG 1979).

In the early 1990s, the mill began receiving "alternate feed material" (uranium-bearing materials other than conventionally mined ores) for processing. From 1999 to present, the mill has relied solely on alternate feed materials. The mill goes on standby for periods of time and then it processes the stockpiled alternate feeds for the recovery of uranium. The residual tailings from these processes are stored in the tailings ponds on-site. DUSA has commenced mining activities in the Colorado Plateau district and conventional ores are being hauled and stockpiled at the mill. In addition, DUSA has mining assets in the Arizona Strip and processing of those ores can be anticipated in the future. Milling of conventional ore is scheduled for early 2008, when the milling of currently available alternate feed material is completed (DUSA 2007).

This dose assessment was prepared in support of the license renewal application for the mill. An element of the license renewal application is to complete a dose estimate to members of the public based on the operations at the mill. The goal is to determine potential doses to both nearby individuals and to populations in the vicinity of the mill from ore processing operations at the mill.

1.2 OBJECTIVE

The objectives of this assessment are to estimate the potential annual doses to the people living close to the mill and to the population living within 50 miles (80 km), from any releases to the atmosphere of natural uranium (i.e., uranium-238 decay chain and associated radioactive constituents) during the routine ore processing operations.

The mill is licensed for the annual recovery of 4,380 tons of uranium (as U_3O_8) The amount of ore needed to provide that quantity of uranium depends on the grade(s) of the ores processed, with larger quantities of low grade ores and smaller quantities of higher grade ores required to achieve the same production. The mill uses an acid leach-solvent extraction process for uranium recovery with a nominal recovery of approximately 94%, with remainder of the uranium being discharged to tailings.

The ore supply expected for the mill is typically from mining activities on the Colorado Plateau and Arizona Strip districts. The expected ore grade from the Colorado Plateau district is an average of 0.25% U_3O_8 and 1.5% V_2O_5 (NRC 1980) while the Arizona Strip ore is assumed to contain 0.637% U_3O_8 and no vanadium (DUSA (2007a)).

In this assessment, the doses to individual members of the public are estimated separately for the processing of Colorado Plateau and Arizona Strip ores. The proposed ore process rate for the Colorado Plateau ore and Arizona Strip ore is approximately 730,000 tons per year (tpy) (an average of 2000 tons per day). Assuming that the average uranium recovery is at the historical recovery yield of 94%, approximately 1,715 tons (3,431,000 lbs) of U_3O_8 per year would be recovered from Colorado Plateau ore at the proposed ore process rate. Similarly, approximately 4,371 tons (8,742,188 lbs) of U_3O_8 per year would be recovered from Arizona Strip ore at the proposed ore process rate.

The activity concentration of the U-238 in the ore is calculated as follows:

$$\text{Activity Concentration} = (\text{Ore Grade } (\text{g } U_3O_8/\text{g ore}))(\%\text{ U - 238/g } U_3O_8)(\text{Specific Activity of U - 238}) \quad (1)$$

where,

- Ore Grade (g U_3O_8/ g ore) = 0.0025 for Colorado Plateau Ore and 0.00637 for Arizona Strip Ore
- % U-238/g of U_3O_8= 0.848
- Specific Activity of U-238=3.30 x 10^5 pCi/g U-238/g ore

Using equation 1, the activity concentration of U-238 for Colorado Plateau ore is 700 pCi U-238/g ore. Similarly, the activity concentration of U-238 for Arizona Strip ore is 1783 pCi U-238/g ore. In all cases, the ores are assumed to be in secular equilibrium.

It should be noted that the current licensed production capacity is 4,380 tons of U_3O_8 (8,760,000 lbs of U_3O_8) per year. Therefore, the processing of Colorado Plateau ore is approximately at 40% of the current licensed U_3O_8 production capacity while the processing of Arizona Strip ore is just below the current licensed yellowcake production capacity. The proposed operating schedule at the mill is assumed to be 24 hr/day for 365 days per year.

1.3 APPROACH

The MILDOS computer code calculates the dose commitments received by individuals and the general population within a 50 mile (80 km) radius of an operating uranium recovery facility. The MILDOS code is an NRC-approved code designed as a tool to provide input on regulatory and compliance evaluations for various uranium recovery operations.

As part of this assessment, the EnecoTech analysis (EnecoTech 1991a and 1991b) was reviewed to examine the input parameters and emissions calculations used to perform the previous MILDOS modeling for the mill in 1991. The intent of the review was to ensure that issues addressed in 1991 were addressed in the current assessment where relevant.

It should be noted that the MILDOS code developed in 1981 has gone through a number of changes over the years and served as the basis for the development of the MILDOS-AREA code.

The approach used for this assessment is to evaluate the exposure pathways considered in the EnecoTech analysis with the updated MILDOS-AREA code. All sources considered in the EnecoTech analysis (EnecoTech 1991a) are considered in this assessment and updated as appropriate to current conditions. As discussed later, emissions from the vanadium stacks are also considered in this analysis. A description of the sources used in this assessment is provided in Section 4.0.

The source emissions calculations for airborne radioactive releases at the mill include those related to dust generation during ore handling, area source dusting from ore pad stockpiles and the tailings ponds. The source emissions calculations generally follow the guidance of NRC's Regulatory Guide 3.59 (NRC 1987) and NUREG-0706 (NRC 1980). Details of emissions estimates are provided in Appendix A.

Many of the receptors used in the EnecoTech analysis were also used in this assessment. A description of the receptors used in this assessment is provided in Section 5.0. Locations for the sources and receptors used in this assessment were updated with Global Positioning System (GPS) coordinates provided by DUSA (DUSA 2007b).

The physical parameters pertaining to particle size (and distribution) are consistent with the EnecoTech analysis. These parameters are the default values within the MILDOS-AREA code (ANL 1998) as well as in NUREG-0556 (NRC 1979).

The dose to receptors near the mill was estimated using MILDOS-AREA for the processing of Colorado Plateau ore and, separately, for the processing of Arizona Strip ore. The proposed ore process rate for the Colorado Plateau ore is approximately 730,000 tpy which would recover approximately 2,573 tons (3,431,000 lbs) of U_3O_8 per year (assuming that the average uranium recovery is 94%). The proposed ore process rate for Arizona Strip ore is approximately 730,000 tpy, which would recover approximately 4,371 tons (8,742,188 lbs) of U_3O_8 per year (assuming that the average uranium recovery is 94%).

In addition to doses to individual receptors, the dose received by the general population within an 50 mile (80 km) radius of the mill is predicted.

1.4 CONTENTS OF THIS REPORT

The remainder of this report is arranged into seven sections.

Section 2.0, **Regulatory Compliance**, provides a description of the regulatory framework pertaining to the applicable dose limits to members of the public from licensed activities at the mill.

Section 3.0, **Radiation Dose Assessment**, describes the method used to estimate the radiation doses to members of the public and how MILDOS-AREA was used. Section 3.0 also describes how the MILDOS-AREA software has evolved, highlighting some of the key differences between the updated version, MILDOS AREA (NRC 1998), and the original version of MILDOS.

Section 4.0, **Source Terms**, describes the source terms and source emission rates related to the ore processing operations and other input parameters required (i.e., meteorological data and population data) for the MILDOS-AREA runs. The source emission rates were calculated for processing Colorado Plateau ore and Arizona Strip ore based on the ore grade, ore process rate and uranium recovery yield.

Section 5.0, **Receptors**, describes the receptors used in the MILDOS-AREA runs.

Section 6.0, **Radiation Dose Estimates**, provides the dose results from the MILDOS-AREA runs using the parameters described in Sections 4.0 and 5.0.

Section 7.0, **Overviews**, provides a summary of the dose estimates from the MILDOS-AREA runs.

Section 8.0, **References**, provides a list of reference material used to prepare this report.

Appendix A: **Emissions Calculations** describe the basis of the emission estimates for each source.

2.0 REGULATORY COMPLIANCE

The DRC has the regulatory authority over the license issued for the site. As required by Utah Administrative Code R313-15-101(2), the mill shall, to the extent practical, employ procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as reasonably achievable (ALARA). The licensee is required to demonstrate that the total dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem in a year, exclusive of the dose contribution from natural background (including radon) and medical sources. Under 10 CFR20.1301 (NRC 1991), the NRC has adopted the provisions of the U.S. Environmental Protection Agency (EPA) environmental radiation standards in 40 CFR190 (EPA 2002). This subpart requires that the licensee provide reasonable assurance that the radiation attributed the mill operations does not exceed the annual dose of 25 millirem (mrem) to the whole body, 75 millirem to the thyroid and 25 millirem to any other organ of any member of the public (radon and it daughters excepted). In addition, 10 CFR20.1301 (d) (R313-15-101(4)) sets a constraint limit on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters such that the individual member of the public likely to receive the highest total effective dose equivalent will not exceed 10 mrem/yr.

3.0 RADIATION DOSE ASSESSMENT

3.1 ENECOTECH ASSESSMENT

As mentioned in Section 1.3, all of the sources considered by EnecoTech are addressed in this analysis. In addition, the vanadium stack which is an additional point source, is considered in this assessment. The emission calculations from the mill point sources (grinder, loading ore to the grizzly, yellowcake stack and vanadium stack) and area sources such as the ore pads and the tailings ponds were revised based on the new operating parameters and meteorological data provided by DUSA. Some of the receptors used in the EnecoTech analysis are used in this assessment. In addition, there are new receptor locations added to this assessment. Locations for the sources and receptors used in this assessment were updated using the GPS coordinates provided by DUSA (DUSA 2007b).

A description of the sources and receptors used in this assessment is provided in Sections 4.0 and 5.0, respectively. It should be noted that the MILDOS code used in the EnecoTech analysis is outdated. The MILDOS code has been updated to MILDOS-AREA; the most up-to-date MILDOS-AREA code version 2.20β is used in this assessment. A discussion on the development of the MILDOS code is provided in Section 3.2.

3.2 GENERAL INFORMATION ABOUT MILDOS-AREA

The MILDOS computer code was developed from the version IV for Argonne National Laboratory's (ANL's) Uranium Dispersion and Dosimetry (UDAD) computer program 1981. The MILDOS program was based on the models and assumptions from the U.S. NRC's Draft Regulatory Guide RH802-4 (Calculational Models for Estimating Radiation Doses to Man from Airborne Radioactive Material Resulting from Uranium Milling Operation) and portions of the UDAD document (Strenge and Bender 1981).

In 1989, ANL developed MILDOS-AREA code by modifying the MILDOS code developed in 1981. The MILDOS-AREA code was designed or used on IBM or IBM compatible computers; the changes made were intended to enhance capabilities for calculating dose from large area-sources and updated dosimetry calculations. The major revision from the original MILDOS code is the treatment of atmospheric dispersion from area sources; MILDOS-AREA substituted a finite-element approach for the virtual-point source method (the algorithm used in the original MILDOS code) when specified by the user. The new approach subsequently led to a reduction in the number of sources from 20 to 10 in MILDOS-AREA due to the fact that a large area can be considered as a single source rather than two or more point sources.

The internal dosimetry calculations were also updated in MILDOS-AREA. In the original version of MILDOS, the dose to exposed individual is calculated for comparison with requirements of both 40 CFR190 and 10 CFR Part 20 (R313-15). The calculations of ingestion DCFs were based on ICRP Publication 2 and 10A's ingestion models (ICRP 1966). The inhalation DCFs are calculated by the ANL computer program UDAD (Momeni 1979) in accordance with Task group on Lung Dynamics lung model (TGLM) of the International Commission on Radiological Protection (ICRP 1966; ICRP 1972). ICRP Publication 19 (ICRP 1972) gives dose commitments to adult members of the public at age 20 that are assumed to live another 50 years. DCFs are provided as a function of particle size and organ for the radionuclides U-238, U-234, Th-230, Ra-226, Pb-210, Po-210 and Bi-210. The inhalation dose factors incorporated into MILDOS-AREA are calculated using the dosimetric model from ICRP Publication 30 (ICRP 1979) (Yu 1991); the inhalation dose factors are provided for the age groups of infant, child, teenager and adult. However, these factors are fixed internally in the code, and are not part of the input options. The annual average air concentrations were computed to the maximum permissible concentrations (MPCs) in 10 CFR Part 20. The MPCs in 10 CFR20 (incorporated by reference in R313-15) were revised in 1994 to incorporate the updated dosimetry to the 1CRP 1978 recommendations.

In 1997, the MILDOS-AREA code was updated to meet the requirements of the revised 10 CFR Part 20. The dose limit to the general public also changed; which led to a revised calculation of the allowable concentrations (ALCs) for unrestricted areas, with MPC replaced with the term "effluent concentrations".

In 1998, ANL again updated the MILDOS-AREA code in an attempt to improve the "user friendliness" of the software. In the past, the user must develop an input file in an American Standard Code for Information Interchange (ASCII) file containing values that are required by the code. The code executes this file to produce the output. The latest version of MILDOS-AREA, has a graphical user interface (GUI) which provides an interface for the user to input each parameter needed for the calculations in the Windows operating system. The GUI allows the results of the MILDOS-AREA calculations to be viewed. The 1998 update was the last time ANL made changes to the MILDOS-AREA code. The most up-to-date version of MILDOS-AREA is used in this assessment.

MILDOS-AREA calculates the impacts based on annual average air concentrations of nuclides considered. The human pathways considered in MILDOS-AREA for individual and population impacts are: inhalation, external exposure from ground concentrations, external exposure from cloud immersion, ingestion of vegetables, ingestion of meat and ingestion of milk.

3.3 THE USE OF MILDOS-AREA IN THIS ASSESSMENT

The 1991 EnecoTech analysis conducted by EnecoTech Environmental Consultants (under contract from Umetco Minerals) evaluated the potential radiological doses arising from the production of 8,760,000 lbs of U_3O_8 per year at the mill from processing conventionally mined ores. As mentioned, the original MILDOS code is no longer applicable.

In this assessment, the most up-to-date MILDOS-AREA code version 2.20β (ANL 1998a) was used to estimate potential radiation doses to members of the public estimated from the processing of Colorado Plateau or Arizona Strip ores, in separate cases, at the proposed ore process rates for each ore. As mentioned, the proposed ore process rate for the Colorado Plateau ore is approximately 730,000 tpy would recover approximately 1,715 tons (3,431,000 lbs) of U_3O_8 per year (assuming that the average uranium recovery is 94%). The proposed ore process rate for Arizona Strip ore is approximately 730,000 tpy would recover approximately 4,371 tons (8,742,188 lbs) of yellowcake per year (assuming that the average uranium recovery is 94%).

MILDOS-AREA was used to design a conceptual model of the mill. MILDOS-AREA requires the location of sources and receptors to be defined by the user; the locations are calculated relative to the reference point at the mill on a Cartesian grid system. The reference point used for the MILDOS-AREA code used in this assessment was the vanadium stack. The GPS coordinates were plotted using Google Earth Pro (Google 2005). The easting, northing and elevation of each source and receptor relative to the vanadium stack were measured in Google Earth Pro. The measured coordinates are entered directly for point sources. For area (quadrilateral) sources (i.e., ore pads and tailings ponds), the user must enter the boundaries and elevation of the area source which are calculated based on the easting and northing of the source. The sources are defined to represent each significant radionuclide release point at the mill; radionuclide releases for particulates and radon are defined by the user for point sources. MILDOS-AREA calculates the release rates from area sources based on the radionuclide concentrations, source area and meteorological data.

MILDOS-AREA only considers airborne releases of radioactive materials; releases to surface water and groundwater are not addressed. The U-238 decay chain is assumed to be the only significant source of radiation from uranium milling operations (the contribution from the U-235 chain is less than 5% of that from the U-238 chain). The particulate releases include U-238, Th-230, Ra-226 and Pb-210. The gaseous releases are defined for Rn-222 with in-growth of short-lived daughter products also considered. These Rn-222 daughters include Po-218, Pb-214, Bi-214, Pb-210 and Po-210. The model accounts for the releases and in-growth of other radionuclides using the assumption of secular equilibrium within the U-238 decay chain.

The transport of model radiological emissions from the point and area sources is predicted using a sector averaged Gaussian plume dispersion model. The dispersion model uses the meteorological data provided by the user and also includes mechanisms of dry deposition of particulates, re-suspension, radioactive decay and progeny in-growth and plume reflection. Deposition build-up and in-growth of radioactive progeny are considered in estimating ground concentrations.

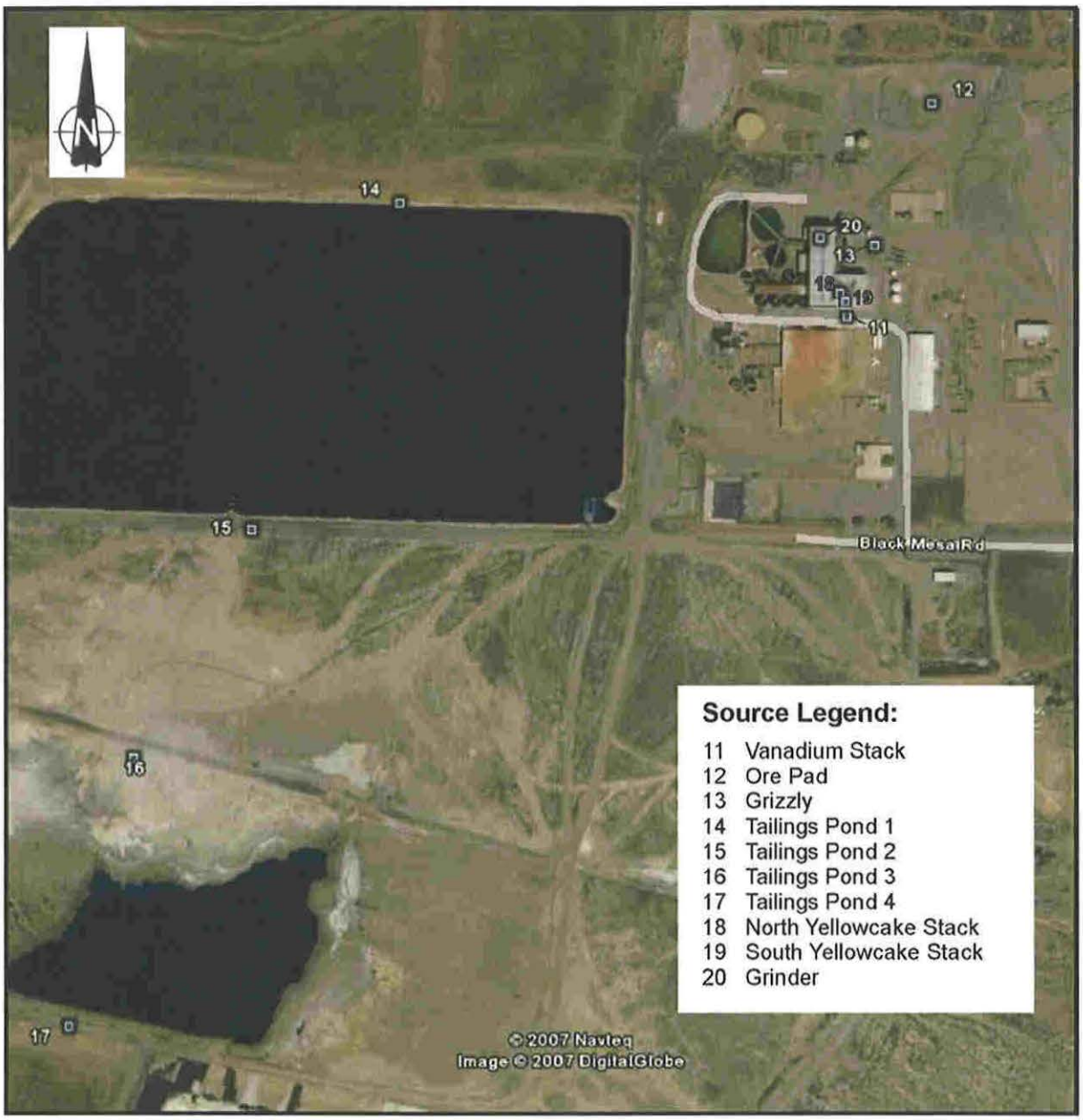
The impacts to humans through various pathways are estimated based on the calculated annual average air concentrations of radionuclides. The pathways considered in this analysis include: inhalation, external exposure from ground concentrations, external exposure from cloud immersion, and ingestion of meat and vegetables.

4.0 SOURCE TERMS

The radionuclides of concern for license renewal modeling consideration include; U-238 and its daughters Th-230, Ra-226, Pb-210 and Rn-222 which are assumed to be in secular equilibrium with the ore. The radioactive particulates and radon are emitted from airborne radioactive releases related to dust generation during ore handling (unloading ore from truck to ore pads and loading ore to the grizzly), point sources (grinder, yellowcake stacks and vanadium stack) and area source dusting from ore pad stockpiles and the tailings ponds. The large area sources such as the tailings area are divided into smaller sources (four tailings ponds) to allow for the size and irregular shape of these areas.

As mentioned in Section 3.3, the source locations used in the EnecoTech analysis were revised using the GPS coordinates provided by DUSA (DUSA 2007b). The coordinates for all the sources except for the grinder were calculated first by plotting the GPS coordinates provided by DUSA (DUSA 2007b) in Google Earth Pro and then using the measuring tool in Google Earth Pro to measure the easting, northing and elevation of each source relative to a reference point at the mill (i.e., the vanadium stack). The source locations (plotted in Google Earth) are shown in Figure 4.1.

FIGURE 4.1
SOURCE LOCATIONS



The dose to members of the public is estimated for the processing of Colorado Plateau ore or Arizona Strip ore in separate cases. Therefore, the emission calculations are provided for each ore type based on the activity concentration of U-238 in the ore, expected ore grade, average uranium recovery and the proposed ore process rate. It should be noted that the MILDOS-AREA model for Colorado Plateau ore has an additional point source (i.e., vanadium stack) since the ore may contain vanadium (assumed at 1.5% V_2O_5). A description of the approach used to calculate the emissions from the point and area sources are described in Section 4.1 and 4.2, respectively. Detailed source emissions calculations are provided in Appendix A.

4.1 POINT SOURCES

Mill point sources used in the EnecoTech analysis were also used in this assessment. These sources include the grinder, loading ore to the grizzly and yellowcake stacks (north and south). The vanadium stack described in section 4.1.4 is exclusive to the processing of Colorado Plateau ore. A description of the approach used to calculate the emissions from point sources is provided in this section.

4.1.1 Grinder

There is no onsite crushing of the ore, only a wet grinding operation. The ore dust emissions are controlled because the material is wet during the grinding operations. The particulate emission control from the grinding operation is assumed to be 99.9%. U-238 and its decay daughters are all emitted at a rate of 9.27E-05 Ci/yr (assuming secular equilibrium) for Colorado Plateau ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 700 pCi/g. Similarly, U-238 and its decay daughters are all emitted at a rate of 2.36E-04 Ci/yr (assuming secular equilibrium) for Arizona Strip ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 1783 pCi/g. The emission rates for Rn-222 released during wet grinding is calculated assuming that only 20% of the radon is available for release or emanation from the mineral grains in which it is produced (NUREG 1980). The Rn-222 concentration in the ore was assumed to be equal to the U-238 concentration. The Rn-222 released during wet grinding is 92.7 Ci/yr and 236 Ci/yr for Colorado Plateau ore and Arizona Strip ore, respectively.

4.1.2 Grizzly

The emissions from trucks dumping ore onto the grizzly is highly controlled; the truck dump area is enclosed on three sides and has a negative pressure on it during dumping activities. The ore is delivered wet with an average moisture content of 10%. The exhaust from the induced draft (ID) fans used on the grizzly is ducted through a baghouse. The combined particulate dust

control on this operation is assumed to be 99.9%. U-238 and its decay daughters are all emitted at a rate of 9.27E-05 Ci/yr (assuming secular equilibrium) for Colorado Plateau ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 700 pCi/g. Similarly, U-238 and its decay daughters are all emitted at a rate of 2.36E-04 Ci/yr (assuming secular equilibrium) for Arizona Strip ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 1783 pCi/g.

4.1.3 Yellowcake Stacks

The mill has two yellowcake dryers (north and south yellowcake dryers). From the EnecoTech analysis, stack tests on the yellowcake dryer yielded a yellowcake emission rate of 0.06 lbs/hr U_3O_8 when the process rate was 1300 lbs/hr. This yields an emission rate of 0.092 lbs/hr of yellowcake per ton of feed (EnecoTech 1991a and 1991b). The emission rate is with all the particulate emissions controls. Since there are north and south yellowcake dryers, the stack emissions from U-238 and its decay daughters are assumed to be divided equally between the two (i.e., north and south yellowcake stacks), and are based on the proposed ore process rate of Colorado Plateau ore and Arizona Strip Ore. Therefore, U-238 is all emitted at a rate of 1.01E-02 Ci/yr for Colorado Plateau ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 700 pCi/g. Similarly, U-238 is emitted at a rate of 2.36E-04 Ci/yr for Arizona Strip ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 1783 pCi/g.

Based on field measurements, the decay daughters of U-238 (Th-230, Ra-226 and Pb-210) are processed along with yellowcake at 0.22%, 0.13% and 0.78%, respectively (EnecoTech 1991a and 1991b). Therefore, the decay daughters Th-230, Ra-226 and Pb-210 are emitted at a rate of 2.22E-05 Ci/yr, 1.31E-05 Ci/yr and 7.88E-05 Ci/yr, respectively for Colorado Plateau ore. This calculation assumes the proposed ore process rate of 730,000 tpy (divided equally between the north and south yellowcake dryers) and an ore specific activity of 700 pCi/g. Similarly, the decay daughters Th-230, Ra-226 and Pb-210 are emitted at a rate of 5.67E-05 Ci/yr, 3.35E-05 Ci/yr and 2.01E-04 Ci/yr, respectively for Arizona Strip ore. This calculation assumes the proposed ore process rate of 730,000 tpy (divided equally between the north and south yellowcake dryers) and an ore specific activity of 1783 pCi/g.

Since the ore processing steps reject nearly all the radium to the tailings, very little radon is released during the production of yellow cake. No significant radon releases occur during yellowcake drying and packaging, since only about 0.1% of the original Ra-226 in the ore is found in yellowcake. Therefore, the amount of Rn-222 emitted from the yellowcake stack is assumed to be negligible.

4.1.4 Vanadium Stack

The vanadium stack source term was only used in the MILDOS-AREA model for Colorado Plateau ore. The vanadium present in the Colorado Plateau ore is partially solubilized during leaching. The dissolved vanadium is present in uranium raffinate. Depending on its vanadium content, the uranium raffinate will either be recycled to the counter-current decantation step or further processed for recovery of vanadium before recycling. The product from the vanadium recovery contains less than 0.005% U_3O_8 (NUREG 1980). Therefore, the emission rate for the vanadium stack was calculated to be 0.005% of the total emission rate from the yellowcake stacks (north and south yellowcake stack). U-238 is emitted at a rate of 1.01E-06 Ci/yr for Colorado Plateau ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 700 pCi/g.

By adopting the EnecoTech analysis (EnecoTech 1991a and 1991b) measurements for the decay daughters of U-238 (Th-230, Ra-226 and Pb-210) processed along with yellowcake of 0.22%, 0.13% and 0.78%, respectively, the emissions from the remaining radionuclides are assumed to be negligible and in any event are likely discharged to the tailings ponds.

4.2 AREA SOURCES

Mill area sources used in the EnecoTech analysis were also used in this assessment. These sources include the ore pads and the tailings ponds. The area of the ore pad was reduced in this assessment to match anticipated future requirements as discussed below. In addition, the number of tailings ponds was reduced from 5 (used in the EnecoTech analysis) to 4 in this assessment. A description of the approach used to calculate the emissions from area sources is provided in this section.

4.2.1 Ore Pads

The ore pad storage operation has two different sources of emissions namely unloading ore from trucks to the ore pad and wind emissions. Approximately 300,000 tons of ore is assumed to be temporarily stockpiled at the mill's ore pads at any given time. Using a bulk ore density of 1.47 tons/yd^3 (DUSA, Feb. 6/07), the quantity of ore would create a pile 30 ft. (9.1 m) tall covering approximately 4 acres (17,000 m^2) stockpile area.

With respect to the truck unloading emissions, a process emission factor of 0.04 lbs of ore is emitted per cubic yard handled (for a truck end and assuming no control (NRC 1987)) and a bulk ore density of 1.47 tons/yd^3 is used in the calculations. U-238 and its decay daughters are all emitted at a rate of 1.58E-02 Ci/yr for each isotope for Colorado Plateau ore. This calculation

assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 700 pCi/g. Similarly, U-238 and its decay daughters are all emitted at a rate of 4.02E-02 Ci/yr (assuming secular equilibrium) for Arizona Strip ore. This calculation assumes the proposed ore process rate of 730,000 tpy and an ore specific activity of 1783 pCi/g.

Wind erosion from the ore pad is assumed to have a 50% control factor due to the active watering program in place. This is conservative, in that actual dust control on the ore pads may be better than this. The annual dust loss from the ore pad is 21.29 g/m^2yr; this was calculated using the method from NRC's Regulatory Guide 3.59 (NRC 1987) on the basis of the meteorological data (provided by DUSA (DUSA 2007c) presented in Appendix A; the annual dust loss from the ore pads is 10% that of the tailings piles since the particulates in the ore pads are coarse material (1 to 6 inch) because the ore has not yet been ground. U-238 and its decay daughters are all assumed to be emitted at a rate of 3.17E-04 Ci/yr for each isotope for Colorado Plateau ore. This calculation assumes the proposed ore process rate of 300,000 tpy and an ore specific activity of 700 pCi/g. Similarly, U-238 and its decay daughters are all emitted at a rate of 8.07E-04 Ci/yr (assuming secular equilibrium) for Arizona Strip ore. This calculation assumes the proposed ore process rate of 300,000 tpy and an ore specific activity of 1783 pCi/g. Therefore, the total emission rate of U-238 and its daughter from truck dumping and wind erosion is 1.61E-02 Ci/yr and 4.10E-02 Ci/yr for Colorado Plateau ore and Arizona Strip ore, respectively.

Rn-222 will be produced in the ore pads from the decay of Ra-226. The estimated annual radon release rate from the ore pads is 375 Ci/yr and 956 Ci/yr for Colorado Plateau ore and Arizona Strip ore, respectively.

4.2.2 Tailings ponds

The current, or anticipated, status of the various tailings ponds at the mill are summarized in Table 4.1. In brief, Tailings Cell 1 is used as an evaporation pond and will always have a water cover (tailings solution); hence, no dust or radon emissions are expected from Tailings Cell 1. Tailings Cell 2 is almost entirely covered with an interim soil cover. Data from the 2005 NESHAP's report indicates an average radon flux of 6.6 pCi/m^2s from covered areas and an average radon flux of 55.8 pCi/m^2s from remaining exposed beaches

TABLE 4.1
CHARACTERISTICS OF TAILINGS AT WHITE MESA

Tailings Cell	Water Cover (acres)	Interim Soil Cover (acres)	Beach (acres)
1	55	-	-
2	-	66.1	0.7
3	35	37	7
4A	36	-	4

Wind erosion of tailings from Cell 2 will be limited to the small area remaining to be covered. Tailings Cell 3 has a mixture of water cover (tailings solution), an interim soil cover and exposed tailings beach. As for cell 1, it is assumed that no tailings dust or radon will be released from the water covered parts of Cell 3. Wind eroded tailings dust would arise from uncovered tailings beach. Radon release rates are based on the 2005 NESHAP's report which indicates a radon flux about 7.1 pCi/m^2s from covered areas and 24.2 pCi/m^2s from exposed tailings beach.

In the case of Cell 4, for present purposes, it is assumed that the cell is fully developed with approximately 36 acres of water cover (tailings solution) and 4 acres of exposed tailings.

As mentioned in Section 4.0, large area sources such as the tailings area are divided into smaller sources (four tailings ponds) to allow for the size and irregular shape of these areas. Therefore, the tailings areas were divided into four area sources in the MILDOS-AREA run. Tailings ponds 1, 2, 3, and 4 represent cell 1, cell 2, cell 3 and cell 4A, respectively.

Using the onsite wind data generated over the last 3 years (provided by DUSA (DUSA 2007c)), the annual dust loss from the tailings ponds is estimated to be approximately 213 g/m^2yr; this was calculated using the method from NRC's Regulatory Guide 3.59 (NRC 1987). It is assumed that the average uranium recovery rate is 94%. In addition, a process emission control factor of 70% was assumed, based on 1) the active watering (tailings solutions spraying) program on exposed areas of tailings beaches in active areas; 2) solutions cover other tailings areas; and 3) crusting agents from the sprayed solutions act to minimize the erosion of the tailings beaches by wind. With these assumptions and the particulate emission factor, U-238 is emitted at a rate of 2.09E-04 Ci/yr and the decay daughters Th-230, Ra-226 and Pb-210 are emitted at a rate of 3.48E-03 Ci/yr from Cell 2 and 3 while U-238 is emitted at a rate of 1.09E-04 Ci/yr and the decay daughters Th-230, Ra-226 and Pb-210 are emitted at a rate of 1.81E-03 Ci/yr from Cell 4A for Colorado Plateau ore. These calculations assume the proposed ore process rate of 730,000 tpy and an ore specific activity of 700 pCi/g. Similarly, for Arizona Strip ore, U-238 is emitted at a rate of 5.32E-04 Ci/yr and the decay daughters Th-230, Ra-226 and Pb-210 are emitted at a rate

of 8.87E-03 Ci/yr from Cell 2 and 3 while U-238 is emitted at a rate of 2.76E-04 Ci/yr and the decay daughters Th-230, Ra-226 and Pb-210 are emitted at a rate of 4.61E-03 Ci/yr from Cell 4A for Arizona Strip ore. These calculations assume the proposed ore process rate of 730,000 tpy and an ore specific activity of 1783 pCi/g.

The tailings consist of a mixture of sands and slimes, which are the sources of radon. The National Emission Standards for Hazardous Air Pollutants (NESHAPS) (Regulation 40 CFR60, Subpart W) standard limits the Rn-222 emission rate to 20 pCi/m^2s from uranium mills and their associated tailings impoundments. In order to demonstrate compliance with NESHAP's, the mill carries out a NESHAP's evaluation on an annual basis. As indicated previously, data from the 2005 NESHAP's report (IUC, 2005) was used in this assessment. In this analysis, a total annual radon releases rate of approximately 130 Ci/yr was estimated for the tailings source.

4.3 METEOROLOGICAL DATA

Meteorological conditions influence re-suspension and dispersion of radionuclides from point sources and area sources. The mill has an onsite weathering monitoring station that records the wind speed, wind direction and stability class. This data is used to formulate a joint frequency distribution which is a required input for MILDOS-AREA. The joint frequency distribution used in this assessment was provided by DUSA (DUSA 2007c) using the most recent three years (2004 to 2006) of recorded data.

4.4 POPULATION DATA

The population data was obtained from the year 2000 U.S. census and were used to complete demographic and population dose projections. Census data is only available in 10 year intervals and local demographics have experienced little change since the 2000 census.

4.5 URANIUM MILL SOURCE EMISSION RATES

4.5.1 Colorado Plateau Ore

The calculated mill radioactive particulate and radon emission rates from point sources and area sources described in Sections 4.1 and 4.2, respectively for Colorado Plateau ore are provided in Table 4.2.

TABLE 4.2
RADIOACTIVE PARTICULATE AND RADON EMISSION RATES
(COLORADO PLATEAU ORE)

		Process							
		Grinding	**Ore Dump to Grizzly**	**Ore Pads**	**North YC Stack**	**South YC Stack**	**Tailings Cell 2 and 3**	**Tailings Cell 4A**	**Vanadium Stack[b]**
Emission Rate (Ci/yr)	U-238	9.27E-05	9.27E-05	1.61E-02	1. 01E-02	1. 01E-02	2.09E-04	1.09E-04	1. 01E-06
	Th-230	9.27E-05	9.27E-05	1.61E-02	2.22E-05	2.22E-05	3.48E-03	1.81E-03	2.22E-09
	Ra-226	9.27E-05	9.27E-05	1.61E-02	1.31E-05	1.31E-05	3.48E-03	1.81E-03	1.31E-059
	Pb-210	9.27E-05	9.27E-05	1.61E-02	7.88E-05	7.88E-05	3.48E-03	1.81E-03	7.88E-09
	Rn-222	9.27E+01	Note a	3.75E+02	Note a	Note a	117.71	12.36	Note a

Notes:
a) No significant release during this process.
b) Source is exclusive to the processing of Colorado Plateau ore.

4.5.2 Arizona Strip Ore

The calculated mill radioactive particulate and radon emission rates from point sources and area sources described in Sections 4.1 and 4.2, respectively for Arizona Strip ore are provided in Table 4.3.

TABLE 4.3
RADIOACTIVE PARTICULATE AND RADON EMISSION RATES
(ARIZONA STRIP ORE)

		Process						
		Grinding	**Ore Dump to Grizzly**	**Ore Pads**	**North YC Stack**	**South YC Stack**	**Tailings Cell 2 and 3**	**Tailings Cell 4A**
Emission Rate (Ci/yr)	U-238	2.36E-04	2.36E-04	4.10E-02	2.58E-02	2.58E-02	5.32E-04	2.76E-04
	Th-230	2.36E-04	2.36E-04	4.10E-02	5.67E-05	5.67E-05	8.87E-03	4.61E-03
	Ra-226	2.36E-04	2.36E-04	4.10E-02	3.35E-05	3.35E-05	8.87E-03	4.61E-03
	Pb-210	2.36E-04	2.36E-04	4.10E-02	2.01E-04	2.01E-04	8.87E-03	4.61E-03
	Rn-222	2.36E+02		9.56E+02	Note a	Note a	117.71	12.36

Note:
a) No significant release during this process.

5.0 RECEPTORS

The receptors used in this assessment were provided by DUSA. The receptors used in this assessment are as follows:

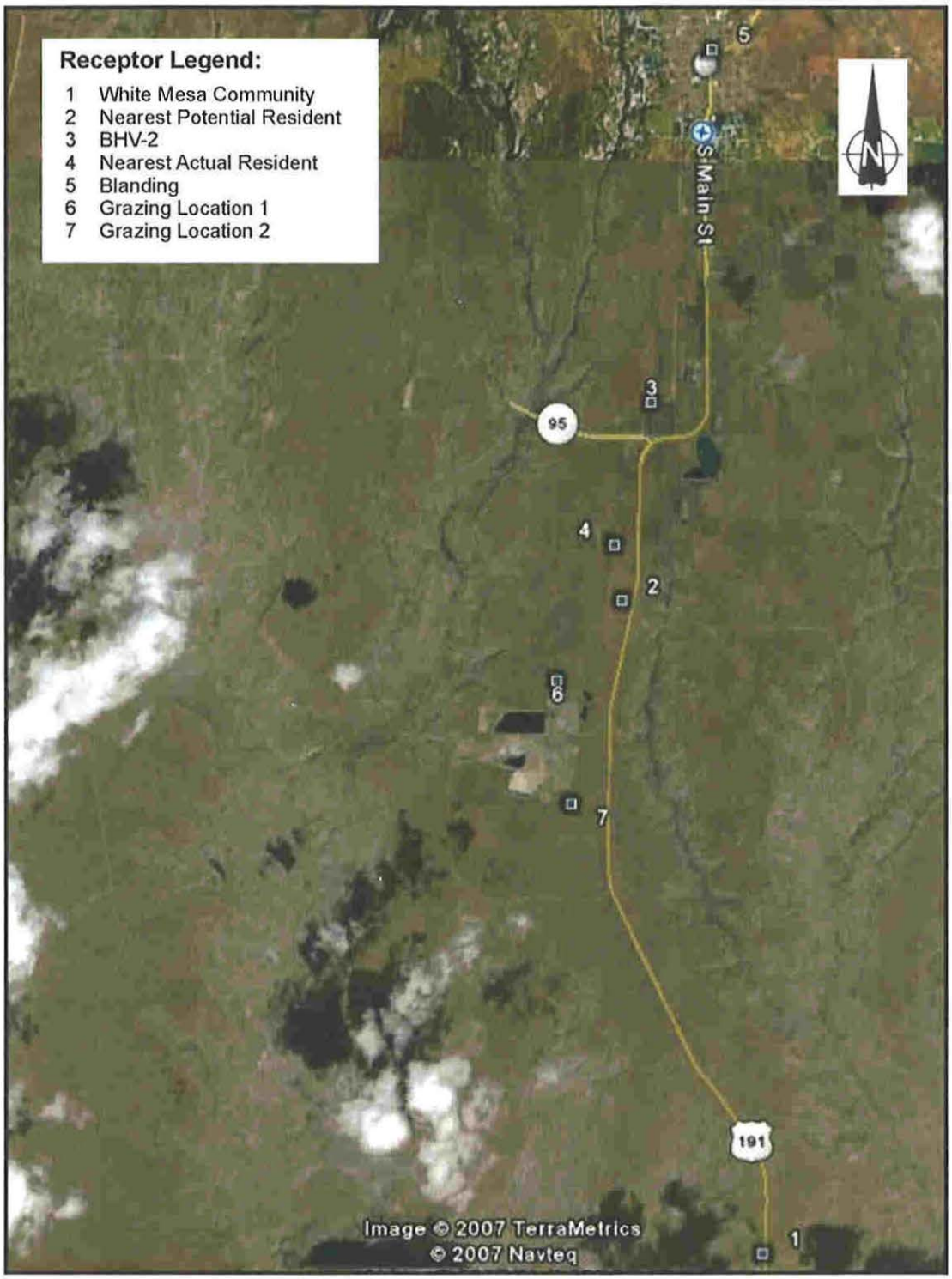
- Nearest Historical Resident (BHV-2);
- Nearest Actual Resident
- Nearest Potential Resident (BHV-1);
- White Mesa Ute Community;
- Blanding, Utah.

In addition, two grazing locations 1 and 2 are considered as a possible source of meat.

As mentioned in Section 1.3, the receptor locations were determined using a GPS receiver and were provided by DUSA (DUSA 2007b). The GPS coordinates were used for all the receptors except for Grazing location 1 and 2 where the easting and northing for Grazing locations 1 and 2 were taken as nominal "mid-points" in Google Earth for these two receptor locations.

The receptor locations (plotted in Google Earth) with respect to the vanadium stack are shown in Figure 5.1.

FIGURE 5.1
RECEPTOR LOCATIONS WITH RESPECT TO THE VANADIUM STACK



At the time of the 1979 Final Environmental Statement (FES) for the mill, the nearest resident lived approximately 4.8 miles (4.5) km north-north east of the mill building, near the location of air monitoring station BHV-2 (also referred to as the historical nearest resident). Currently, the nearest "potential" resident is approximately 1.2 miles (1.9 km) north of the Mill, near the location of air monitoring station BHV-1. The nearest actual resident is located approximately 1.6 miles (2.5 km) north of the mill. Nearby population groups include the community of White Mesa, about 8.5 km south east and the city of Blanding, approximately 6 miles (10 km) from the mill.

The area to the immediate north of the mill (Grazing location 1) is believed to be used only for grazing of meat animals (beef) (NRC 1979). A second location (Grazing location 2) to the east and south of the mill is also used for the grazing of meat animals (beef) as was assumed in the EnecoTech analysis (EnecoTech 1991a and 1991b). Although considered unlikely, in one worst case scenario, it is possible that the meat animal grazed at Grazing location 1 and 2 would be eaten by the residents near the mill. We have not included a scenario whereby it is assumed that grazing at Grazing locations 1 and 2 supports dairy cattle, because the prospect of supporting dairy cattle in those locations is not credible, given the arid climate and the much larger feed requirements of dairy cattle as opposed to beef cattle. We have also been advised by DUSA that no dairy cattle graze in Grazing locations 1 and 2. It should be noted, however, that in all of the MILDOS AREA model runs in this report, we did assume, conservatively, that individuals at each receptor location are assumed to drink all of their milk from cows and eat all of their beef from cattle that graze at the receptor location (but not at Grazing locations 1 or 2). This is also thought to be a very conservative assumption.

6.0 RADIATION DOSE ESTIMATES

This section describes the MILDOS-AREA results of the mill's potential radiological impacts to the population in the vicinity of the Mill. This analysis is primarily based on the estimated annual releases of radioactive materials and assumptions discussed in Sections 4.0 and 5.0. All potential exposure pathways which are likely to impact individuals near the mill have been included in the MILDOS-AREA model.

MILDOS-AREA calculates the total annual effective dose commitment (including radon). The calculated total annual effective dose commitments are compared to the 10 CFR20 (R313-15) requirements that the dose to individual members of the public shall not exceed 100 mrem/yr (radon included). In addition, MILDOS-AREA calculates 40 CFR190 doses (excludes radon). The 40 CFR190 Criterion is 25 mrem/yr to the whole body (excluding the dose due to radon) and 25 mrem/yr to any other organ to any member of the public (EPA 2002). The 40CFR 190 doses are also used to demonstrate compliance with 10 CFR20.1101(d) (R313-15-101(4)). Under 10 CFR 20.1101(d) (R313-15-101(4) the licensee must demonstrate that the total effective dose equivalent to the individual member of the public likely to receive the highest total effective dose equivalent will not exceed 10 mrem/yr (absent of the radon dose).

In this assessment, a worst case scenario in which there is a possibility that individuals near the mill ingest meat from cattle grown at Grazing Location 1 or 2 is considered. It is assumed that the cattle will graze at Grazing location 1 or 2 for 2 months of the year (due to the arid nature of the region and the lack of forage). Therefore, the meat ingestion dose to individuals near the mill who might consume beef grazed at Grazing Location 1 or 2 is assumed to be one-sixth of the MILDOS-AREA calculated meat ingestion dose from these grazing locations.

MILDOS-AREA was run separately for Colorado Plateau ore and Arizona Strip ore. Total annual dose commitments and 40 CFR190 annual dose commitments were estimated for locations in which individual members of the public might reside (BHV-1 (nearest potential resident), BHV-2, Nearest Actual Resident, White Mesa Ute Community and Blanding, Utah) are provided in Sections 6.1 and 6.2 for Colorado Plateau ore and Arizona Strip ore, respectively. In addition, total annual dose commitments and 40 CFR190 annual dose commitments from the meat ingestion pathway that is estimated for Grazing location 1 and 2 are provided in Sections 6.1 and 6.2.

6.1 MILDOS-AREA RESULTS FOR COLORADO PLATEAU ORE

The potential annual doses to the people living close to the mill and to the population living within 50 miles (80 km) as a result of processing Colorado Plateau ore is calculated using MILDOS-AREA. As mentioned in Section 1.2, the proposed ore process rate for the Colorado Plateau ore is approximately 730,000 tpy. Assuming that the average uranium recovery is at the historical recovery yield of 94%, the ore processing operations is expected to yield 1715 tons (3,431,000 lbs) of U_3O_8 per year.

The MILDOS-AREA-calculated total annual dose commitments (including radon) and 40 CFR190 total annual dose commitment for processing of Colorado Plateau ore are provided in Sections 6.1.1 and 6.1.2, respectively

6.1.1 R313-15-301(1)(a) Regulatory Compliance

The MILDOS-AREA calculated total annual dose commitments (including radon) are provided in this section. These doses are regulated by R313-15-301(1)(a) which requires the dose to an individual member of the public shall not exceed 100 mrem/yr (radon included).

Table 6.1 presents a summary of the individual dose commitments for the residential receptors for the age group of infant, child, teenage and adult.

TABLE 6.1
COMPARISON OF ANNUAL DOSE COMMITMENTS TO APPLICABLE RADIATION PROTECTION STANDARDS (COLORADO PLATEAU ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Potential Resident (BHV-1)	Infant	Effective	1.20E+00	100	1.20E-02
		Bone	1.86E+00	-	-
		Avg. Lung	5.01E-01	-	-
		Bronchi	1.05E+01	-	-
	Child	Effective	8.93E-01	100	8.93E-03
		Bone	1.31E+00	-	-
		Avg. Lung	6.68E-01	-	-
		Bronchi	1.05E+01	-	-
	Teenage	Effective	9.34E-01	100	9.34E-03
		Bone	4.65E+00	-	-
		Avg. Lung	5.34E-01	-	-
		Bronchi	1.05E+01	-	-
	Adult	Effective	8.25E-01	100	8.25E-03
		Bone	2.04E+00	-	-
		Avg. Lung	3.72E-01	-	-
		Bronchi	1.05E+01	-	-

TABLE 6.1 (Cont'd)
COMPARISON OF ANNUAL DOSE COMMITMENTS TO APPLICABLE RADIATION PROTECTION STANDARDS (COLORADO PLATEAU ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Historical Resident (BHV-2)	Infant	Effective	2.54E-01	100	2.54E-03
		Bone	2.89E-01	-	-
		Avg. Lung	9.56E-02	-	-
		Bronchi	2.69E+00	-	-
	Child	Effective	2.10E-01	100	2.10E-03
		Bone	2.16E-01	-	-
		Avg. Lung	1.17E-01	-	-
		Bronchi	2.69E+00	-	-
	Teenage	Effective	2.16E-01	100	2.16E-03
		Bone	7.18E-01	-	-
		Avg. Lung	9.42E-02	-	-
		Bronchi	2.69E+00	-	-
	Adult	Effective	2.00E-01	100	2.00E-03
		Bone	3.28E-01	-	-
		Avg. Lung	6.85E-02	-	-
		Bronchi	2.69E+00	-	-
Nearest Actual Resident	Infant	Effective	7.59E-01	100	7.59E-03
		Bone	1.09E+00	-	-
		Avg. Lung	2.95E-01	-	-
		Bronchi	7.01E+00	-	-
	Child	Effective	5.77E-01	100	5.77E-03
		Bone	7.71E-01	-	-
		Avg. Lung	3.93E-01	-	-
		Bronchi	7.01E+00	-	-
	Teenage	Effective	6.01E-01	100	6.01E-03
		Bone	2.70E+00	-	-
		Avg. Lung	3.16E-01	-	-
		Bronchi	7.01E+00	-	-
	Adult	Effective	5.38E-01	100	5.38E-03
		Bone	1.19E+00	-	-
		Avg. Lung	2.21E-01	-	-
		Bronchi	7.01E+00	-	-

TABLE 6.1 (Cont'd)
COMPARISON OF ANNUAL DOSE COMMITMENTS TO APPLICABLE RADIATION PROTECTION STANDARDS (COLORADO PLATEAU ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
White Mesa Community	Infant	Effective	1.77E-01	100	1.77E-03
		Bone	1.29E-01	-	-
		Avg. Lung	5.55E-02	-	-
		Bronchi	2.16E+00	-	-
	Child	Effective	1.56E-01	100	1.56E-03
		Bone	9.08E-02	-	-
		Avg. Lung	5.21E-02	-	-
		Bronchi	2.16E+00	-	-
	Teenage	Effective	1.57E-01	100	1.57E-03
		Bone	2.48E-01	-	-
		Avg. Lung	4.15E-02	-	-
		Bronchi	2.16E+00	-	-
	Adult	Effective	1.52E-01	100	1.52E-03
		Bone	1.25E-01	-	-
		Avg. Lung	3.31E-02	-	-
		Bronchi	2.16E+00	-	-
Blanding	Infant	Effective	8.37E-02	100	8.37E-04
		Bone	8.26E-02	-	-
		Avg. Lung	2.91E-02	-	-
		Bronchi	9.21E-01	-	-
	Child	Effective	7.09E-02	100	7.09E-04
		Bone	6.00E-02	-	-
		Avg. Lung	3.35E-02	-	-
		Bronchi	9.21E-01	-	-
	Teenage	Effective	7.23E-02	100	7.23E-04
		Bone	1.89E-01	-	-
		Avg. Lung	2.73E-02	-	-
		Bronchi	9.21E-01	-	-
	Adult	Effective	6.81E-02	100	6.81E-04
		Bone	8.89E-02	-	-
		Avg. Lung	2.06E-02	-	-
		Bronchi	9.21E-01	-	-

From Table 6.1, the total annual effective dose commitments are at most 0.0120 (effective dose for infant at BHV-1) of the R313-15-301(1)(a) limit of 100 mrem/yr (radon included) to an individual member of the public. Therefore, the predicted annual effective dose commitments comply with R313-15-301.

In the worst case scenario in which there is a possibility that individuals near the mill ingest meat from cattle grown at Grazing Location 1 or 2. It is assumed that the cattle will graze at Grazing location 1 or 2 for 2 months of the year. The meat ingestion dose to individuals near the mill who might consume beef grazed at Grazing Location 1 or 2 is assumed to be one-sixth of the MILDOS-AREA calculated meat ingestion dose from these grazing locations. Table 6.2 presents a summary of the annual dose commitments from the meat ingestion pathway for Grazing location 1 and 2. Even in the very unlikely event that a resident were to consume meat from one of the grazing locations, the total dose would remain well below regulatory limits.

TABLE 6.2
TOTAL ANNUAL DOSE COMMITMENTS (mrem) FOR MEAT INGESTION PATHWAY (COLORADO PLATEAU ORE)

Location	Age Group	Organ[b]		
		Effective[a]	Bone[a]	Avg. Lung[a]
Grazing Location 1	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	1.08E-02	5.35E-02	4.87E-02
	Teenage	1.68E-02	2.78E-01	4.27E-02
	Adult	1.22E-02	1.51E-01	3.52E-02
Grazing Location 2	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	5.82E-04	2.88E-03	2.38E-03
	Teenage	8.95E-04	1.52E-02	2.08E-03
	Adult	6.35E-04	7.93E-03	1.72E-03

Note:
a) Assumes cattle will graze at the particular Grazing location for 2 months of the year.
b) Exclusive of radon.

6.1.2 40 CFR190 Regulatory Compliance

MILDOS-AREA calculated 40 CFR190 doses (excludes radon). These doses are regulated by the 40 CFR190 criterion, which is 25 millirem (mrem) to the whole body (excluding the dose due to radon) (EPA 2002) or to any organ of the body. The 40CFR 190 doses are also used to demonstrate compliance with R313-15-101(4) (10 CFR20.1101(d)). The licensee must demonstrate that total effective dose equivalent to the individual member of the public likely to receive the highest total effective dose equivalent will not exceed 10 mrem/yr (absent of the radon dose).

Table 6.3 presents a summary of the 40 CFR190 individual dose commitments for the residential receptors for the age group of infant, child, teenage and adult.

TABLE 6.3
COMPARISON OF 40 CFR190 ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (COLORADO PLATEAU ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Potential Resident (BHV-1)	Infant	Effective	5.35E-01	25	2.14E-02
		Bone	1.82E+00	25	7.29E-02
		Avg. Lung	4.63E-01	25	1.85E-02
		Bronchi	9.55E-04	not limited	
	Child	Effective	2.23E-01	25	8.94E-03
		Bone	1.27E+00	25	5.10E-02
		Avg. Lung	6.30E-01	25	2.52E-02
		Bronchi	9.55E-04	not limited	
	Teenage	Effective	2.65E-01	25	1.06E-02
		Bone	4.62E+00	25	1.85E-01
		Avg. Lung	4.96E-01	25	1.98E-02
		Bronchi	9.55E-04	not limited	
	Adult	Effective	1.56E-01	25	6.24E-03
		Bone	2.00E+00	25	7.99E-02
		Avg. Lung	3.33E-01	25	1.33E-02
		Bronchi	9.55E-04	not limited	
Nearest Historical Resident (BHV-2)	Infant	Effective	7.84E-02	25	3.14E-03
		Bone	2.72E-01	25	1.09E-02
		Avg. Lung	8.01E-02	25	3.21E-03
		Bronchi	1.35E-04	not limited	
	Child	Effective	3.42E-02	25	1.37E-03
		Bone	1.98E-01	25	7.91E-03
		Avg. Lung	1.00E-01	25	4.01E-03
		Bronchi	1.35E-04	not limited	
	Teenage	Effective	4.03E-02	25	1.61E-03
		Bone	6.92E-01	25	2.77E-02
		Avg. Lung	7.76E-02	25	3.10E-03
		Bronchi	1.35E-04	not limited	
	Adult	Effective	2.40E-02	25	9.61E-04
		Bone	3.07E-01	25	1.23E-02
		Avg. Lung	5.25E-02	25	2.10E-03
		Bronchi	1.35E-04	not limited	

TABLE 6.3 (Cont'd)
COMPARISON OF 40 CFR190 ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (COLORADO PLATEAU ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Actual Resident	Infant	Effective	3.11E-01	25	1.25E-02
		Bone	1.06E+00	25	4.25E-02
		Avg. Lung	2.67E-01	25	1.07E-02
		Bronchi	5.50E-04	not limited	-
	Child	Effective	1.30E-01	25	5.18E-03
		Bone	7.40E-01	25	2.96E-02
		Avg. Lung	3.63E-01	25	1.45E-02
		Bronchi	5.50E-04	not limited	-
	Teenage	Effective	1.53E-01	25	6.14E-03
		Bone	2.66E+00	25	1.07E-01
		Avg. Lung	2.86E-01	25	1.14E-02
		Bronchi	5.50E-04	not limited	-
	Adult	Effective	9.01E-02	25	3.60E-03
		Bone	1.16E+00	25	4.64E-02
		Avg. Lung	1.93E-01	25	7.70E-03
		Bronchi	5.50E-04	not limited	-
White Mesa Community	Infant	Effective	3.18E-02	25	1.27E-03
		Bone	1.11E-01	25	4.43E-03
		Avg. Lung	4.04E-02	25	1.62E-03
		Bronchi	4.06E-05	not limited	-
	Child	Effective	1.18E-02	25	4.73E-04
		Bone	7.01E-02	25	2.80E-03
		Avg. Lung	3.39E-02	25	1.35E-03
		Bronchi	4.06E-05	not limited	-
	Teenage	Effective	1.24E-02	25	4.95E-04
		Bone	2.10E-01	25	8.38E-03
		Avg. Lung	2.39E-02	25	9.56E-04
		Bronchi	4.06E-05	not limited	-
	Adult	Effective	7.75E-03	25	3.10E-04
		Bone	9.88E-02	25	3.95E-03
		Avg. Lung	1.68E-02	25	6.71E-04
		Bronchi	4.06E-05	not limited	-

TABLE 6.3 (Cont'd)
COMPARISON OF 40 CFR190 ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (COLORADO PLATEAU ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Blanding	Infant	Effective	2.13E-02	25	8.51E-04
		Bone	7.34E-02	25	2.94E-03
		Avg. Lung	2.18E-02	25	8.73E-04
		Bronchi	3.36E-05	not limited	-
	Child	Effective	8.58E-03	25	3.43E-04
		Bone	4.97E-02	25	1.99E-03
		Avg. Lung	2.44E-02	25	9.78E-04
		Bronchi	3.36E-05	not limited	-
	Teenage	Effective	9.77E-03	25	3.91E-04
		Bone	1.69E-01	25	6.75E-03
		Avg. Lung	1.86E-02	25	7.43E-04
		Bronchi	3.36E-05	not limited	-
	Adult	Effective	5.87E-03	25	2.35E-04
		Bone	7.51E-02	25	3.00E-03
		Avg. Lung	1.26E-02	25	5.06E-04
		Bronchi	3.36E-05	not limited	-

From Table 6.3, the 40 CFR190 annual dose commitments are at most 0.185 (dose to the bone for the teen at BHV-1) of the 40 CFR190 dose criterion of 25 mrem/yr. In addition, the 40 CFR190 annual effective dose commitments demonstrate compliance with the R313-15-101(4) (10 CFR20.1101(d)) limit of 10 mrem/yr to the individual member of the public likely to receive the highest total effective dose equivalent. The maximum total effective dose equivalent was 0.535 mrem/yr (infant at BHV-1), or 0.0214 of the 10 mrem/yr limit.

In the worst case scenario in which there is a possibility that individuals near the mill ingest meat from cattle grown at Grazing Locations 1 or 2, it is assumed that the cattle will graze at Grazing location 1 or 2 for 2 months of the year. The meat ingestion dose to individuals near the mill who might consume beef grazed at Grazing Location 1 or 2 is assumed to be one-sixth of the MILDOS-AREA calculated meat ingestion dose from these grazing locations. Table 6.4 presents a summary of the 40 CFR190 annual dose commitments from the meat ingestion pathway for Grazing Locations 1 and 2. As before, in the unlikely event a receptor were to eat meat from cattle grazing in areas 1 or 2, the total dose would remain well below regulatory limits.

TABLE 6.4
40 CFR190 ANNUAL DOSE COMMITMENTS (mrem) FOR MEAT INGESTION PATHWAY (COLORADO PLATEAU ORE)

Location	Age Group	Organ[b]		
		Effective[a]	Bone[a]	Avg. Lung[a]
Grazing Location 1	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	1.08E-02	5.35E-02	4.87E-02
	Teenage	1.68E-02	2.78E-01	4.27E-02
	Adult	1.22E-02	1.51E-01	3.52E-02
Grazing Location 2	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	5.80E-04	2.87E-03	2.37E-03
	Teenage	8.92E-04	1.52E-02	2.07E-03
	Adult	6.33E-04	7.90E-03	1.72E-03

Note:
a) Assumes cattle will graze at the particular Grazing location for 2 months of the year.
b) Exclusive of radon.

The annual doses to the population estimated within 50 miles (80 km) of the site are provided in Table 6.5.

TABLE 6.5
ANNUAL POPULATION DOSE COMMITMENTS WITHIN 50 MILES (80 km) OF THE MILL FOR COLORADO PLATEAU ORE

Organ	ANNUAL POPULATION DOSE COMMITMENTS, PERSON-REM PER YEAR
	Mill Operations
Effective	1.15E-01
Bone	9.18E-01
Avg. Lung	1.22E-01
Bronchi	6.28E+00

The population dose arising from the processing of Colorado Plateau ore is estimated at 0.15 person-rem. This can be compared to the dose from natural background sources of radiation.

In the United States, nominal average levels of natural background radiation are as follows (National Council on Radiation Protection and Measurements (NCRP), 1987):

Cosmic and Cosmogenic	28 mrem/yr
Terrestrial	28 mrem/yr
Inhaled (Radon)	200 mrem/yr
Ingested	40 mrem /yr
Total (Average)	**296 mrem/yr (96 mrem/yr excluding radon)**

In the area of the White Mesa Mill, natural background radiation was measured at two sites in 1977: the project site (Blanding) and the Hanksville site. At the Blanding site, the average dose equivalent from external radiation was about 142 mrem/yr. Of this 142 mrem/yr, 68 mrem/yr came from cosmic radiation, while 74 mrem/yr came from terrestrial radiation. (Dames & Moore, 1978). At the Hanksville site, the corresponding average dose equivalent was about 122 mrem/yr (68 mrem/yr from cosmic radiation and 54 mrem/yr from terrestrial radiation). (Dames & Moore, 1978).

Ingested radionuclides would contribute (about) a further 18 mrem/yr (NRC, 1979). This brings the total background dose from external radiation and ingested radioactivity, but exclusive of the dose from radon-222, to about 161 mrem/yr; which is higher than both the US averages of 96 mrem/yr.

If the nominal U.S. dose from radon of about 200 mrem per year is added, then the total dose from natural background in the area of the mill is 360 mrem/y (or more assuming the dose from radon would increase along with that from terrestrial source).

The current population of San Juan county is about 14,400 people. Assuming everyone living in San Juan county receives an annual dose of (about) 360 mrem/y, then the total dose due to natural background is approximately 5184 person-rem. The theoretical incremental dose of 0.15 person-rem is clearly inconsequential by comparison.

6.2 MILDOS-AREA RESULTS FOR ARIZONA STRIP ORE

The potential annual doses to the people living close to the mill and to the population living within 50 miles (80 km) as a result of processing of Arizona Strip ore is calculated using MILDOS-AREA. As mentioned in Section 1.2, the proposed ore process rate for Arizona Strip ore is approximately 730,000 tpy. Assuming that the average uranium recovery is at the historical recovery yield of 94%, the ore processing operations is expected to yield 4,371 tons (8,742,188 lbs) of yellowcake per year.

The MILDOS-AREA calculated total annual dose commitments (including radon) and 40 CFR190 annual dose commitments for processing of Arizona Strip ore are provided in Sections 6.2.1 and 6.2.2, respectively.

6.2.1 R313-15-301 (1)(a) Regulatory Compliance

The MILDOS-AREA calculated total annual dose commitments (including radon) are provided in this section. These doses are regulated by R313-15-301(1)(a) which requires the dose to an individual member of the public shall not exceed 100 mrem/yr (radon included).

Table 6.6 presents a summary of the individual dose commitments for the residential receptors for the age group of infant, child, teenage and adult.

TABLE 6.6
COMPARISON OF ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (ARIZONA STRIP ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Potential Resident (BHV-1)	Infant	Effective	2.94E+00	100	2.94E-02
		Bone	4.74E+00	-	-
		Avg. Lung	1.27E+00	-	-
		Bronchi	2.49E+01	-	-
	Child	Effective	2.15E+00	100	2.15E-02
		Bone	3.35E+00	-	-
		Avg. Lung	1.69E+00	-	-
		Bronchi	2.49E+01	-	-
	Teenage	Effective	2.25E+00	100	2.25E-02
		Bone	1.18E+01	-	-
		Avg. Lung	1.35E+00	-	-
		Bronchi	2.49E+01	-	-
	Adult	Effective	1.97E+00	100	1.97E-02
		Bone	5.19E+00	-	-
		Avg. Lung	9.40E-01	-	-
		Bronchi	2.49E+01	-	-

TABLE 6.6 (Cont'd)
COMPARISON OF ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (ARIZONA STRIP ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Historical Resident (BHV-2)	Infant	Effective	6.00E-01	100	6.00E-03
		Bone	7.35E-01	-	-
		Avg. Lung	2.40E-01	-	-
		Bronchi	6.09E+00	-	-
	Child	Effective	4.87E-01	100	4.87E-03
		Bone	5.45E-01	-	-
		Avg. Lung	2.94E-01	-	-
		Bronchi	6.09E+00	-	-
	Teenage	Effective	5.03E-01	100	5.03E-03
		Bone	1.82E+00	-	-
		Avg. Lung	2.36E-01	-	-
		Bronchi	6.09E+00	-	-
	Adult	Effective	4.60E-01	100	4.60E-03
		Bone	8.29E-01	-	-
		Avg. Lung	1.70E-01	-	-
		Bronchi	6.09E+00	-	-
Nearest Actual Resident	Infant	Effective	1.83E+00	100	1.83E-02
		Bone	2.78E+00	-	-
		Avg. Lung	7.47E-01	-	-
		Bronchi	1.63E+01	-	-
	Child	Effective	1.37E+00	100	1.37E-02
		Bone	1.96E+00	-	-
		Avg. Lung	9.96E-01	-	-
		Bronchi	1.63E+01	-	-
	Teenage	Effective	1.43E+00	100	1.43E-02
		Bone	6.88E+00	-	-
		Avg. Lung	7.99E-01	-	-
		Bronchi	1.63E+01	-	-
	Adult	Effective	1.27E+00	100	1.27E-02
		Bone	3.03E+00	-	-
		Avg. Lung	5.59E-01	-	-
		Bronchi	1.63E+01	-	-

TABLE 6.6 (Cont'd)
COMPARISON OF ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (ARIZONA STRIP ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
White Mesa Community	Infant	Effective	3.96E-01	100	3.96E-03
		Bone	3.23E-01	-	-
		Avg. Lung	1.36E-01	-	-
		Bronchi	4.72E+00	-	-
	Child	Effective	3.45E-01	100	3.45E-03
		Bone	2.24E-01	-	-
		Avg. Lung	1.26E-01	-	-
		Bronchi	4.72E+00	-	-
	Teenage	Effective	3.47E-01	100	3.47E-03
		Bone	6.18E-01	-	-
		Avg. Lung	9.94E-02	-	-
		Bronchi	4.72E+00	-	-
	Adult	Effective	3.34E-01	100	3.34E-03
		Bone	3.10E-01	-	-
		Avg. Lung	7.86E-02	-	-
		Bronchi	4.72E+00	-	-
Blanding	Infant	Effective	1.94E-01	100	1.94E-03
		Bone	2.08E-01	-	-
		Avg. Lung	7.20E-02	-	-
		Bronchi	2.06E+00	-	-
	Child	Effective	1.62E-01	100	1.62E-03
		Bone	1.50E-01	-	-
		Avg. Lung	8.27E-02	-	-
		Bronchi	2.06E+00	-	-
	Teenage	Effective	1.65E-01	100	1.65E-03
		Bone	4.74E-01	-	-
		Avg. Lung	6.68E-02	-	-
		Bronchi	2.06E+00	-	-
	Adult	Effective	1.54E-01	100	1.54E-03
		Bone	2.22E-01	-	-
		Avg. Lung	5.02E-02	-	-
		Bronchi	2.06E+00	-	-

From Table 6.6, the total annual effective dose commitments are at most 0.0294 (effective dose for infant at BHV-1) of the R313-15-301(1)(a) of 100 mrem/yr (radon included) to an individual member of the public. Therefore, the predicted annual effective dose commitments comply with R313-15-101(1)(a).

In the worst case scenario in which there is a possibility that individuals near the mill ingest meat from cattle grown at Grazing Location 1 or 2. It is assumed that the cattle will graze at Grazing location 1 or 2 for 2 months of the year. The meat ingestion dose to individuals near the mill who might consume beef grazed at Grazing Location 1 or 2 is assumed to be one-sixth of the MILDOS-AREA calculated meat ingestion dose from these grazing locations. Table 6.7 presents a summary of the annual dose commitments from the meat ingestion pathway for Grazing location 1 and 2. As before, even in the unlikely event that a receptor consumed beef from one of the grazing locations, the total dose would remain well below regulatory limits.

TABLE 6.7
TOTAL ANNUAL DOSE COMMITMENTS FOR MEAT INGESTION PATHWAY (ARIZONA STRIP ORE)

Location	Age Group	Organ[b]		
		Effective[a]	Bone[a]	Avg. Lung[a]
Grazing Location 1	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	2.73E-02	1.37E-01	1.24E-01
	Teenage	4.28E-02	7.10E-01	1.09E-01
	Adult	3.10E-02	3.83E-01	8.97E-02
Grazing Location 2	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	1.48E-03	7.35E-03	6.05E-03
	Teenage	2.28E-03	3.88E-02	5.30E-03
	Adult	1.62E-03	2.02E-02	4.38E-03

Note:
a) Assumes cattle will graze at the particular Grazing location for 2 months of the year.
b) Exclusive of radon

6.2.2 40 CFR190 Regulatory Compliance

MILDOS-AREA calculated 40 CFR190 doses (excludes radon). These doses are regulated by 40 CFR190 Criterion is 25 millirem (mrem) to the whole body (excluding the dose due to radon) (EPA 2002). The 40CFR 190 doses are also used to demonstrate compliance with R313-15-101(4) (10 CFR20.1101(d)). The licensee must demonstrate that total effective dose equivalent to the individual member of the public likely to receive the highest total effective dose equivalent will not exceed 10 mrem/yr (absent of the radon dose).

Table 6.8 presents a summary of the 40 CFR190 individual dose commitments for residential receptors for the age group of infant, child, teenage and adult.

TABLE 6.8
COMPARISON OF 40 CFR190 ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (ARIZONA STRIP ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Potential Resident (BHV-1)	Infant	Effective	1.37E+00	25	5.47E-02
		Bone	4.65E+00	25	1.86E-01
		Avg. Lung	1.18E+00	25	4.72E-02
		Bronchi	2.43E-03	not limited	
	Child	Effective	5.70E-01	25	2.28E-02
		Bone	3.24E+00	25	1.29E-01
		Avg. Lung	1.60E+00	25	6.41E-02
		Bronchi	2.43E-03	not limited	
	Teenage	Effective	6.75E-01	25	2.70E-02
		Bone	1.17E+01	25	4.70E-01
		Avg. Lung	1.26E+00	25	5.05E-02
		Bronchi	2.43E-03	not limited	
	Adult	Effective	3.96E-01	25	1.58E-02
		Bone	5.10E+00	25	2.04E-01
		Avg. Lung	8.48E-01	25	3.39E-02
		Bronchi	2.43E-03	not limited	
Nearest Historical Resident (BHV-2)	Infant	Effective	2.00E-01	25	8.00E-03
		Bone	6.96E-01	25	2.79E-02
		Avg. Lung	2.04E-01	25	8.18E-03
		Bronchi	3.45E-04	not limited	
	Child	Effective	8.72E-02	25	3.49E-03
		Bone	5.03E-01	25	2.01E-02
		Avg. Lung	2.55E-01	25	1.02E-02
		Bronchi	3.45E-04	not limited	
	Teenage	Effective	1.03E-01	25	4.10E-03
		Bone	1.76E+00	25	7.03E-02
		Avg. Lung	1.98E-01	25	7.91E-03
		Bronchi	3.45E-04	not limited	
	Adult	Effective	6.11E-02	25	2.45E-03
		Bone	7.83E-01	25	3.13E-02
		Avg. Lung	1.34E-01	25	5.35E-03
		Bronchi	3.45E-04	not limited	

TABLE 6.8 (Cont'd)
COMPARISON OF 40 CFR190 ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (ARIZONA STRIP ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Nearest Actual Resident	Infant	Effective	7.93E-01	25	3.17E-02
		Bone	2.71E+00	25	1.09E-01
		Avg. Lung	6.77E-01	25	2.71E-02
		Bronchi	1.40E-03	not limited	-
	Child	Effective	3.30E-01	25	1.32E-02
		Bone	1.89E+00	25	7.54E-02
		Avg. Lung	9.25E-01	25	3.70E-02
		Bronchi	1.40E-03	not limited	-
	Teenage	Effective	3.91E-01	25	1.56E-02
		Bone	6.80E+00	25	2.72E-01
		Avg. Lung	7.28E-01	25	2.91E-02
		Bronchi	1.40E-03	not limited	-
	Adult	Effective	2.29E-01	25	9.17E-03
		Bone	2.96E+00	25	1.18E-01
		Avg. Lung	4.90E-01	25	1.96E-02
		Bronchi	1.40E-03	not limited	-
White Mesa Community	Infant	Effective	8.12E-02	25	3.25E-03
		Bone	2.82E-01	25	1.13E-02
		Avg. Lung	1.03E-01	25	4.12E-03
		Bronchi	1.03E-04	not limited	-
	Child	Effective	3.01E-02	25	1.20E-03
		Bone	1.79E-01	25	7.15E-03
		Avg. Lung	8.62E-02	25	3.45E-03
		Bronchi	1.03E-04	not limited	-
	Teenage	Effective	3.16E-02	25	1.26E-03
		Bone	5.35E-01	25	2.14E-02
		Avg. Lung	6.08E-02	25	2.43E-03
		Bronchi	1.03E-04	not limited	-
	Adult	Effective	1.97E-02	25	7.90E-04
		Bone	2.53E-01	25	1.01E-02
		Avg. Lung	4.27E-02	25	1.71E-03
		Bronchi	1.03E-04	not limited	-

TABLE 6.8 (Cont'd)
COMPARISON OF 40 CFR190 ANNUAL DOSE COMMITMENTS WITH APPLICABLE RADIATION PROTECTION STANDARDS (ARIZONA STRIP ORE)

Location	Age Group	Organ	Estimated Dose (mrem/yr)	Applicable Limit (mrem/yr)	Fraction of Limit
Blanding	Infant	Effective	5.44E-02	25	2.18E-03
		Bone	1.87E-01	25	7.48E-03
		Avg. Lung	5.57E-02	25	2.23E-03
		Bronchi	8.57E-05	not limited	-
	Child	Effective	2.19E-02	25	8.76E-04
		Bone	1.27E-01	25	5.06E-03
		Avg. Lung	6.24E-02	25	2.49E-03
		Bronchi	8.57E-05	not limited	-
	Teenage	Effective	2.49E-02	25	9.95E-04
		Bone	4.30E-01	25	1.72E-02
		Avg. Lung	4.72E-02	25	1.89E-03
		Bronchi	8.57E-05	not limited	-
	Adult	Effective	1.49E-02	25	5.98E-04
		Bone	1.92E-01	25	7.66E-03
		Avg. Lung	3.22E-02	25	1.29E-03
		Bronchi	8.57E-05	not limited	-

From Table 6.8, the 40 CFR190 annual dose commitments are at most 0.47 (dose to the bone for the teen at BHV-1) of the 40 CFR190 dose criterion of 25 mrem/yr. In addition, the 40 CFR190 annual effective dose commitments demonstrate compliance with R313-15-101(4) (10 CFR20.1101(d)) limit of 10 mrem/yr to the individual member of the public likely to receive the highest total effective dose equivalent.

In the worst case scenario in which there is a possibility that individuals near the mill ingest meat from cattle grown at Grazing Location 1 or 2. It is assumed that the cattle will graze at Grazing location 1 or 2 for 2 months of the year. The meat ingestion dose to individuals near the mill who might consume beef grazed at Grazing Location 1 or 2 is assumed to be one-sixth of the MILDOS-AREA calculated meat ingestion dose from these grazing locations. Table 6.9 presents a summary of the 40 CFR190 annual dose commitments from the meat ingestion pathway for Grazing location 1 and 2. Again, even in the unlikely event that someone were to consume beef from grazing area 1 or 2, the total dose would be small and well below regulatory limits.

TABLE 6.9
40 CFR190 ANNUAL DOSE COMMITMENTS (mrem) FOR MEAT INGESTION PATHWAY (ARIZONA STRIP ORE)

Location	Age Group	Organ		
		Effective[a]	Bone[a]	Avg. Lung[a]
Grazing Location 1	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	2.73E-02	1.37E-01	1.24E-01
	Teenage	4.28E-02	7.10E-01	1.09E-01
	Adult	3.10E-02	3.83E-01	8.97E-02
Grazing Location 2	Infant	0.00E+00	0.00E+00	0.00E+00
	Child	1.48E-03	7.32E-03	6.03E-03
	Teenage	2.27E-03	3.87E-02	5.28E-03
	Adult	1.61E-03	2.02E-02	4.35E-03

Note:
a) Assumes cattle will graze at the particular Grazing location for 2 months of the year.
b) Exclusive of radon.

The annual doses to the population estimated within 50 miles (80 km) of the site are provided in Table 6.10.

TABLE 6.10
ANNUAL POPULATION DOSE COMMITMENTS WITHIN 50 MILES (80 km) OF THE MILL FOR ARIZONA STRIP ORE

Organ	ANNUAL POPULATION DOSE COMMITMENTS, PERSON-REM PER YEAR
	Mill Operations
Effective	2.71E-01
Bone	2.21E+00
Avg. Lung	2.88E-01
Bronchi	1.41E+01

The population dose arising from the processing of Colorado Plateau ore is estimated at 0.345 person-rem. This can be compared to the dose from natural background sources of radiation in the Colorado Plateau of about 360 mrem/yr as previously discussed.

In the United States, nominal average levels of natural background radiation are as follows (National Council on Radiation Protection and Measurements (NCRP), 1987):

The current population of San Juan county is about 14,400 people. Assuming everyone living in San Juan county receives an annual dose of (about) 360 mrem/y, then the total dose due to natural background is approximately 5184 person-rem. The theoretical incremental dose of 0.345 person-rem is clearly inconsequential by comparison.

7.0 KEY OBSERVATIONS

As mentioned in Section 1.0, milling of conventional ore is scheduled for early 2008 when the milling of currently available alternate feed materials completed (DUSA 2007). This dose assessment was prepared in support of the license renewal application for the White Mesa Uranium mill.

The goal was to determine the potential doses to populations in the vanity of the mill.

In this assessment, MILDOS-AREA was used to estimate the dose commitments received by individuals and the general population within a 50 mile (80 km) radius for the processing of Colorado Plateau ore or Arizona Strip ore. The expected ore grade from the Colorado Plateau ore is an average of 0.25% U_3O_8 and 1.5% V_2O_5 (NRC 1980) while the Arizona Strip ore is assumed to contain 0.637% U_3O_8 (DUSA 2007a). The proposed ore process rate for the Colorado Plateau ore and Arizona Strip ore is approximately 730,000 tons per year (tpy) (2000 tons per day). Assuming that the average uranium recovery is at the historical recovery yield of 94%, approximately 1,715 tons (3,431,000 lbs) of U_3O_8 per year would be recovered from Colorado Plateau ore at the proposed ore process rate. Similarly, approximately 4,371 tons (8,742,188 lbs) of U_3O_8 per year would be recovered from Arizona Strip ore at the proposed ore process rate. The proposed operating schedule at the mill is assumed to be 24 hr/day for 365 days per year.

The MILDOS-AREA calculated total annual effective dose commitments (including radon) were compared to the R313-15-301(1)(a) (10 CFR20) requirements that the dose to individual members of the public shall not exceed 100 mrem/yr (radon included). Overall, the total annual effective dose commitments are at most 0.0120 (effective dose for infant at BHV-1) of the R313-15-301(1)(a) (10 CFR20) limit of 100 mrem/yr (radon included) to an individual member of the public for the processing of Colorado Plateau ore. The total annual effective dose commitments are at most 0.0294 (effective dose for infant at BHV-1) of the R313-15-301(1)(a) (10 CFR20) limit of 100 mrem/yr (radon included) to an individual member of the public for the processing of Arizona Strip ore. Therefore, the predicted annual effective dose commitments for anticipated ore processing operations comply with R313-15-301(1)(a) (10 CFR20).

In addition, the MILDOS-AREA-calculated 40 CFR190 annual dose commitment (excluding radon) were compared to the 40 CFR190 Criterion, which is 25 mrem/yr to the whole body (excluding the dose due to radon) and 25 mrem/yr to any other organ to any member of the public (EPA 2002). The 40CFR 190 doses were also used to demonstrate compliance with R313-15-101(4) (10 CFR20.1101(d)) (i.e., the licensee must demonstrate that total effective dose equivalent to the individual member of the public likely to receive the highest total effective dose

equivalent will not exceed 10 mrem/yr (absent of the radon dose). Overall, from Table 6.3, the 40 CFR190 annual dose commitments are at most 0.185 (dose to the bone for the teen at BHV-1) of the 40 CFR190 dose criterion of 25 mrem/yr for Colorado Plateau ore. In addition, the 40 CFR190 annual effective dose commitments demonstrate compliance with the R313-15-101(4) (10 CFR20.1101(d)) limit of 10 mrem/yr to the individual member of the public likely to receive the highest total effective dose equivalent. From Table 6.8, the 40 CFR190 annual dose commitments are at most 0.47 (dose to the bone for the teen at BHV-1) of the 40 CFR190 dose criterion of 25 mrem/yr. In addition, the 40 CFR190 annual effective dose commitments demonstrate compliance with R313-15-101(4) (10 CFR20.1101(d)) limit of 10 mrem/yr to the individual member of the public likely to receive the highest total effective dose equivalent. Therefore, the predicted 40 CFR annual effective dose commitments for anticipated ore processing operations comply with R313 -15 (10 CFR20).

8.0 REFERENCES

Argonne National Laboratory (ANL) 1998a. *MILDOS-AREA, Version 2.20β,* Developed at the Environmental Assessment Division

Argonne National Laboratory (ANL) 1998b. *MILDOS-AREA User's Guide (Draft),* Environmental Assessment Division

Code of Federal Regulations (CFR) Title 10 Part 20 *Standards for Protection Against Radiation.* May.

Dames & Moore 1978. *Environmental Report: White Mesa Uranium Project San Juan County, Utah for Energy Fuels Nuclear, Inc.* January.

Denison Mines (USA) Corp. (DUSA) 2007. *Press Release: Denison Announces Operations Update.* January 30.

EnecoTech Environmental Consultants 1991a. *MILDOS Modeling Results (Letter),* Prepared for Umetco Minerals. October 31.

EnecoTech Environmental Consultants 1991b. *MILDOS Modeling Correction (Letter),* Prepared for Umetco Minerals. November 27.

Environmental Protection Agency (EPA) 1989, Code of Federal (CFR) Regulations Title 40 Part *National Emission Standards for Hazardous Air Pollutants (NESHAPS), Subpart W.* December.

Environmental Protection Agency (EPA) 2002. Code of Federal (CFR) Regulations Title 40 Part 190 *Environmental Radiation Protection for Nuclear Power Operations.* February.

Google 2005. *Google Earth Pro 3.0.0762,* November.

International Commission on Radiological Protection (ICRP). 1959. *Report of ICRP Committee II on Permissible Dose for Internal Radiation,* Health Physics 3:1-380, 1960.

International Commission on Radiological Protection (ICRP). 1966. *Deposition and retention models for internal dosimetry of the human respiratory tract.* Health Physics 12; 173-207.

International Commission on Radiological Protection (ICRP). 1971. *Recommendations of the International Commission on Radiological Protection.* ICRP Publication 10A. Pergamon Press, New York.

International Commission on Radiological Protection (ICRP). 1972. *The Metabolism of Compounds of Plutonium and Other Actinides.* ICRP Publication 19, Pergamon Press.

International Commission on Radiological Protection (ICRP) 1979. *Limits for Intakes of Radionuclides by Workers (adopted from July 1978).* ICRP Publication 30.

IUC 2005. *NESHAP's Evaluation of White Mesa Mill.*

Landau, S. (DUSA) 2007a. Email: *RE: 34489- Preliminary Mildos Results and Emissions Calculations.* Received Feb. 13/07.

Nuclear Regulatory Commission (NRC) 1987. Report No. 94. *Exposure of Population in the United States and Canada from Natural Background Radiation*

Nuclear Regulatory Commission (NRC) 1979. *Final Environmental Statement Related to the Energy Fuels Nuclear, Inc,* NUREG-0556. Docket No. 40-8681. May.

Nuclear Regulatory Commission (NRC) 1980. *Final Generic Environmental Impact Statement on Uranium Milling Project M-25,* NUREG-0706 Vol. 3. September.

Nuclear Regulatory Commission (NRC) 1987. *Methods for Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Operations,* March.

Strenge, D.L. and Bander, T.J. 1981. *MILDOS- A Computer Program for Calculating Environmental Radiation Doses from Uranium Recovery Operations,* NUREG/ CR-2011. Prepared for US Nuclear Regulatory Commission.

Turk, D. (DUSA) 2007b. Email: *RE: Receptor GPS.* Received February 14-15.

Turk, D. (DUSA) 2007c. Email: FW: Additional Weather Information. Received Feb 7.

Yu, C. 1992. *Calculation of Radiation Dose from Uranium Recovery Operations for Large Area-Sources,* Argonne National Laboratory.

APPENDIX A

EMISSIONS CALCULATIONS

A.0 EMISSIONS CALCULATIONS

Supplemental Information which describes the model and assumptions used to calculate the source emissions for the sources described in Section 4.0 are provided below.

A.1 Calculation of Annual Dust Loss

The calculation of the annual dust loss from the ore pads and the tailings ponds was required to calculate an emission factor. This dusting rate for the tailings impoundments is calculated according to the emission factor (E_w) equation from NRC's Regulatory Guide 3.59 (NRC 1987). The equation of for the dusting rate is calculated as follows:

$$E_W = \frac{3.156 \times 10^7}{0.5} \times \sum_S R_S F_S \qquad \textbf{(A.1)}$$

where,

E_w= annual dust loss per unit area in g/m^2yr;
F_S= annual average frequency of occurrence of wind speed group S (dimensionless) obtained from the joint relative frequency distribution for the mill (provided by DUSA (DUSA 2007c);
R_S= resuspension rate for the tailings pond at the average wind speed for wind group S, for particles ≤ 20 μm in diameter in g/m^2s;
$3.156x10^7$= number of seconds per year; and,
0.5= fraction of the total dust lost constituted by particle ≤ 20 μm in diameter.

TABLE A.1
PARAMETER VALUES FOR CALCULATION OF ANNUAL DUSTING RATE FOR EXPOSED TAILINGS

Wind Speed (kts)	Average Wind Speed	Resuspension Rate (R_S) (g/m^2s)[a]	Frequency of Occurrence, (F_S)[b]	R_S x F_S
0 to 3	1.5	0	0.165	0.00E+00
4 to 6	5.5	0	0.427	0.00E+00
7 to 10	10.0	3.92E-07	0.276	1.08E-07
11 to 16	15.5	9.68E-06	0.106	1.03E-06
17 to 21	21.5	5.71E-05	0.021	1.20E-06
21+	28.0	2.08E-04	0.005	1.04E-06
			$\sum_S$	3.37E-06

Notes:
a) Resuspension rate of a function of wind speed is computed by the MILDOS code.
b) Wind speed frequency obtained from joint frequency distribution data provided by DUSA (DUSA 2007c).

Using equation A.1 and the parameters in Table A-1, the annual dust loss from the tailings ponds is approximately 213 g/m^{2}yr. As mentioned in Section 4.2.1, the annual dust lost for ore pads is 10% of that of the tailings ponds since the particulates on the ore pad are coarse material (1 to 6 inch) because the ore has not yet been ground; therefore the annual dust loss from the ore pad is 21.29 g/m^{2}yr.

A.2 Emission Calculations

The equations and assumptions used to calculate the radioactive particulate ((U-238) and its daughters thorium (Th-230), radium (Ra-226) and lead (Pb-210)) and radon emission rates from the grizzly, grinding, ore pads, vanadium stack (exclusively for processing Colorado Plateau ore), yellowcake stacks (north and south yellowcake stacks) and the tailings ponds were taken from NRC's Regulatory Guide 3.59 (NRC 1987), NUREG-0706 (NRC 1980) and the EnecoTech analysis (EnecoTech 1991a and 1991b).

A.2.1 Wet Grinding

Radioactive Particulate Emission Rates

	Colorado Plateau Ore	Arizona Strip Ore
Process Rate (tpy)	730,000	730,000
Contaminant Concentration (pCi/g U-238)	700	1783
Process Emission Factor (lbs/ton)[a]	0.16	0.16
Activity Enrichment Ratio	2.5	2.5
Control Factor (%)[b]	99.90	99.90

Notes:

a) For moisture <8% (NRC 1987).

b) Particulate emission control from the wet grinding operations is assumed to be 99.9% (EnecoTech 1991a and 1999b)

The U-238 Emission Rate (S) is calculated as follows:

S= (Process Rate (tons/yr))*(Process Emission Factor (lbs/ton))*(453.6 g/lb)*(Contaminant Concentration (pCi/g))*(Activity Enrichment Ratio)*(1-Control Factor)*(10^{-12} Ci/pCi) **(A.2-1)**

Using equation A.2-1, the U-238 Emission Rate from wet grinding operations of Colorado Plateau ore is approximately 9.27E-05 Ci/yr. U-238 decay daughters (Th-230, Ra-226 and Pb-210) are assumed to be in secular equilibrium; therefore the decay daughters are also emitted at a rate of 9.27E-05 Ci/yr. Similarly, the U-238 Emission Rate from the wet grinding operations of

Arizona Strip ore is approximately 2.36E-04 Ci/yr and the decay daughters (Th-230, Ra-226 and Pb-210) are also emitted at a rate of 2.36E-04 Ci/yr.

Radon Emission Rates

	Colorado Plateau ore	**Arizona Strip ore**
Process Rate (tpy)	730,000	730,000
Contaminant Concentration (pCi/g Ra-226)	700	1783
Activity Factor(%)[a]	20	20

Note:
a) It is assumed that only 20% of the radon is available for release or emanation from the mineral grains in which it is produced (i.e. the emanating fraction or power is 0.20) (NUREG 0706 1980).

Radon Release (F):

F= (Process Rate (tons/yr))*(2000 lbs/ton)*(453.6 g/ton)*(Contaminant Concentration pCi/g Ra-226)*(10^{-12} Ci/pCi)*(Activity Factor) **(A-2-2)**

Using equation A.2-2, the radon release from the wet grinding operations of Colorado Plateau ore is approximately 92.7 Ci/yr. Similarly, the radon release from the wet grinding operations of Arizona Strip ore is approximately 236 Ci/yr.

A.2.2 Ore Dump to Grizzly

Radioactive Particulate Emission Rates

	Colorado Plateau Ore	**Arizona Strip Ore**
Process Rate (tpy)	730,000	730,000
Contaminant Concentration (pCi/g U-238)	700	1783
Process Emission Factor (lbs/ton)[a]	0.16	0.16
Activity Enrichment Ratio	2.5	2.5
Control Factor (%)	99.90	99.90

Notes:
a) For moisture <8% (NRC 1987).
b) Grizzly Dump is enclosed on three sides. Trucks dump inside enclosure under negative pressure. The ID fans are ducted through a baghouse. Ore moisture content is 10 %.

The U-238 Emission Rate (S) is calculated as follows:

S= (Process Rate (tons/yr))*(Process Emission Factor (lbs/ton))*(453.6 g/lb)*(Contaminant Concentration (pCi/g))*(Activity Enrichment Ratio)*(1-Control Factor)*(10^{-12} Ci/pCi) **(A.2-3)**

Using equation A.2-3, the U-238 Emission Rate due to the trucks dumping Colorado Plateau ore on the grizzly is approximately 9.27E-05 Ci/yr. U-238 decay daughters (Th-230, Ra-226 and Pb-210) are assumed to be in secular equilibrium; therefore the decay daughters are also emitted at a rate of 9.27E-05 Ci/yr. Similarly, the U-238 Emission Rate due to the trucks dumping Arizona Strip ore on the grizzly is approximately 2.36E-04 Ci/yr and the decay daughters (Th-230, Ra-226 and Pb-210) are also emitted at a rate of 2.36E-04 Ci/yr.

Radon Emission Rates

No radon is released from the trucks dumping ore onto the grizzly.

A.2.3 Yellowcake Stacks

As mentioned in Section 4.1.3, the mill has two yellowcake dryers (north and south yellowcake stack dryers); therefore the total emissions were assumed to be divided equally between the two stacks (i.e., north and south yellowcake stacks).

Radioactive Particulate Emission Rates

	Colorado Plateau Ore	Arizona Strip Ore
Process Rate (tpy U_3O_8)	1716	4371
Contaminant Concentration (Ci/g of U-238)	3.33E-07	3.33E-07
Process Emission Factor (g U-238/g U_3O_8)	0.848	0.848
Emission Rate/ Control Factor (lbs/ton)[a]	0.092	0.092

Note:

a) Based stack tests that showed an emission rate of 0.06 lbs/hr U_3O_8 per 1300 lbs/hr process rate which translates to 0.092 lb/ton including controls.

The U-238 Emission Rate (S) for one yellowcake stack is calculated as follows:

S= [(Process Rate (tons/yr U_3O_8))*(Emission Rate (lbs/ton))*(Process Emission Factor)* (453.6 g/lb)*(Contaminant Concentration (Ci/g))]/2 **(A.2-4)**

Based on field measurements, the decay daughters Th-230, Ra-226 and Pb-210 are processed along with yellowcake at 0.22%, 0.13% and 0.78%, respectively.

Using equation A.2-4, the U-238 Emission Rate from each yellowcake stack (north and south yellowcake stacks) is approximately 1.01E-02 Ci/yr for the processing of Colorado Plateau ore. The emission rate for the decay daughters Th-230, Ra-226 and Pb-210 is 2.22E-05 Ci/yr, 1.31E-05 Ci/yr and 7.88E-05 Ci/yr, respectively from each yellowcake stack (north and south yellowcake stacks). Similarly, the U-238 Emission Rate from each yellowcake stack (north and south yellowcake stacks) is approximately 2.58E-02 Ci/yr for the processing of Arizona Strip ore. The emission rate for the decay daughters Th-230, Ra-226 and Pb-210 is 5.67E-05 Ci/yr, 3.35E-05 Ci/yr and 2.01E-04 Ci/yr, respectively from each yellowcake stack (north and south yellowcake stacks).

Radon Emission Rates

There is no significant radon releases during this process.

A.2.4 Vanadium Stack

Radioactive Particulate Emission Rates

As mentioned in Section 4.1.4, the vanadium source was only used in the MILDOS-AREA model for Colorado Plateau ore. The product from the vanadium recovery contains less than 0.005% U_3O_8 (NUREG 1980). Therefore, the emission rates of U-238 and its decay daughters from the vanadium stack were assumed to be 0.005% of the total emission rate from the yellowcake stacks (north and south yellowcake stacks).

Radioactive Particulate	Emission Rate (S) (Ci/yr)	
	Total from Yellowcake Stacks	Vanadium Stack[a]
U-238	2.02E-02	1.52E-06
Th-230	4.45E-05	3.34E-09
Ra-226	2.63E-05	1.97E-09
Pb-210	1.58E-04	1.18E-08

Note:

a) Total from yellowcake stacks (north and south yellowcake stacks)*0.005%

Radon Emission Rates

There are no significant radon releases during this process

A.2.5 Ore Pads

The ore pad storage operation has two different sources of emissions - namely unloading from the truck to the ore pad and wind emissions. For the wind emissions calculated, it was assumed that approximately 300,000 tons of ore are temporarily stockpiled with a height of 30 ft. and bulk density of ore of 120 lbs/ft^3 (1.47 tons/yd^3). Using these assumptions, the area of the ore pad is approximately 17,000 m^2.

Radioactive Particulate Emission Rates

Source Description: Truck Unloading

	Colorado Plateau Ore	**Arizona Strip Ore**
Process Rate (tpy)	730,000	730,000
Contaminant Concentration (pCi/g U-238)	700	1783
Process Emission Factor (lbs/yd^3)[a]	0.04	0.04
Activity Emission Ratio	2.5	2.5
Control Factor	None	None
Bulk Density of Ore (tons/yd^3)	1.47	1.47

Note:

a) Process emission factor for Truck end dump (NUREG 1987).

The U-238 Emission Rate (S) is calculated as follows:

S= (Process Rate (tons/yr))*(1 yd^3/1.47 tons)*(Process Emission Factor (lbs/yd^3))*(453.6 g/lb)*(Contaminant Concentration (pCi/g))*(Activity Enrichment Ratio)*(10^{-12} Ci/pCi) **(A.2-5)**

Using equation A.2-5, the U-238 Emission Rate from truck unloading Colorado Plateau ore is approximately 1.58E-02 Ci/yr. U-238 decay daughters (Th-230, Ra-226 and Pb-210) are assumed to be in secular equilibrium; therefore the decay daughters are also emitted at a rate of 1.58E-02 Ci/yr. Similarly, the U-238 Emission Rate from truck unloading of Arizona Strip ore is approximately 4.02E-02 Ci/yr and the decay daughters (Th-230, Ra-226 and Pb-210) are also emitted at a rate of 4.02E-04 Ci/yr.

Source Description: Wind Erosion

	Colorado Plateau Ore	Arizona Strip Ore
Area (m^2)[a]	17000	17000
Contaminant Concentration (pCi/g U-238)	700	1783
Process Emission Factor,E_W (g/m^2yr)[b]	21.29	21.29
Activity Enrichment Ratio	2.5	2.5
Control Factor (%)[c]	50	50

Notes:

a) Calculated assuming a stockpile of 300,000 tons of ore with a height of 30 ft. and bulk ore density of 1.47 $tons/yd^3$.

b) The process emission factor for the ore pad was derived in Section A.1.

c) The control factor of 50% is based on the assumption that an active watering program will be in place during operations.

The U-238 Emission Rate (S) is calculated as follows:

S= (Process Emission Factor (g/m^2yr))*(Area (m^2))*(Contaminant Concentration (pCi/g)) *(Activity Enrichment Ratio)*(1-Control Factor)*(10^{-12} Ci/pCi) **(A.2-6)**

Using equation A.2-6, the U-238 Emission Rate from trucks unloading Colorado Plateau ore is approximately 3.17E-04 Ci/yr. U-238 decay daughters (Th-230, Ra-226 and Pb-210) are assumed to be in secular equilibrium; therefore the decay daughters are also emitted at a rate of 3.17E-04 Ci/yr. Similarly, the U-238 Emission Rate from truck unloading of Arizona Strip ore is approximately 8.07E-04 Ci/yr Ci/yr and the decay daughters (Th-230, Ra-226 and Pb-210) are also emitted at a rate of 8.07E-04 Ci/yr.

The total radioactive particulate emission rates from the ore pad are obtained by adding the results of truck unloading and wind erosion and are as follows:

Radioactive Particulate	**Emission Rate (S) (Ci/yr)**	
	Colorado Plateau Ore	**Arizona Strip Ore**
U-238	1.61E-02	4.10E-02
Th-230	1.61E-02	4.10E-02
Ra-226	1.61E-02	4.10E-02
Pb-210	1.61E-02	4.10E-02

Radon Emission Rates

	Colorado Plateau ore	**Arizona Strip ore**
Area (m^2)	17000	17000
Contaminant Concentration (pCi/g Ra-226)	700	1783
Specific Radon Flux Factor (pCi Rn-222/m^2s)/(pCi/g Ra-226)	1	1

Radon Release (F):

F= (Specific Radon Flux Factor (pCi Rn-222/m^2s)/(pCi/g Ra-226))*(Contaminant Concentration (pCi/g Ra-226))*(Area (m^2)*(3.156x10^7 s/yr)*(10^{-12} Ci/pCi) **(A-2-7)**

Using equation A.2-7, the radon release from storage of Colorado Plateau ore is approximately 375 Ci/yr. Similarly, the radon release from storage of Arizona Strip ore is approximately 956 Ci/yr.

A.2-6 Tailings Ponds

Radioactive Particulate Emission Rates

	Colorado Plateau Ore		Arizona Strip Ore	
	Cell 2 and 3	Cell 4A	Cell 2 and 3	Cell 4A
Area (acres)	7.7	4	7.7	4
Contaminant Concentration (pCi/g U-238)[a]	42	42	107	107
Contaminant Concentration of all other isotopes (pCi/g)	700	700	1783	1783
Process Emission Factor, E_W (g/m^2yr)[b]	213	213	213	213
Activity Enrichment Ratio	2.5	2.5	2.5	2.5
Control Factor (%)[c]	70	70	70	70

Notes:

a) Assumes 94% recovery.

b) The process emission factor for the tailings ponds was derived in Section A.1.

c) The control factor of 70% is based on the assumption that an active watering program as well as crusting agents are used to minimize the erosion of the tailings by wind.

The Emission Rate (S) for U-238 and its decay daughters are calculated as follows:

S= (Process Emission Factor (g/m^2yr))*(Area (acres))*(4047 m^2/acre)*(Contaminant Concentration (pCi/g)) *(Activity Enrichment Ratio)*(1-Control Factor)*(10^{-12} Ci/pCi) **(A.2-8)**

Using equation A.2-8, the U-238 Emission Rate from Tailings Cell 2 and 3 from the processing of Colorado Plateau ore is approximately 2.09E-04 Ci/yr. The decay daughters (Th-230, Ra-226 and Pb-210) are emitted at a rate of 3.48E-03 Ci/yr. The U-238 Emission Rate from Tailings Cell 4A from the processing of Colorado Plateau ore is approximately 1.09E-04 Ci/yr. The decay daughters (Th-230, Ra-226 and Pb-210) are emitted at a rate of 1.81E-03 Ci/yr.

Similarly, the U-238 Emission Rate from the Tailings Cell 2 and 3 from the processing of Arizona Strip ore is approximately 5.32E-04 Ci/yr. The decay daughters (Th-230, Ra-226 and Pb-210) are emitted at a rate of 8.87E-03 Ci/yr. The U-238 Emission Rate from Tailings Cell 4A from the processing of Arizona Strip ore is approximately 2.76E-04 Ci/yr. The decay daughters (Th-230, Ra-226 and Pb-210) are emitted at a rate of 4.61E-03 Ci/yr.

Radon Emission Rates

	Colorado Plateau Ore		Arizona Strip Ore	
	Cell 2 and 3	Cell 4A	Cell 2 and 3	Cell 4A
Area (acres)	112.8	4	112.8	4
Contaminant Concentration (pCi/m^2s)	8.17	24.2	8.17	24.2

Radon Release (F):

F= (Contaminant Concentration (pCi/m^2s)*(Area (acres))*(4047 m^2/acre)*(3.156x10^7 s/yr)*(10^{-12} Ci/pCi) **(A-2-9)**

Using equation A.2-9, the radon release from Tailings Cell 2 and 3 (combined) and Tailings Cell 4A is approximately 117.71 Ci/yr and 12.36 Ci/yr, respectively from the ore processing operations at the mill.