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August 30, 2013

Sent VIA OVERNIGHT DELIVERY

Mr. Rusty Lundberg
Director
Division of Radiation Control
Utah Department of Environmental Quality
195 North 1950 West
P.O. Box 144850
Salt Lake City, UT 84114-4820

**Re: Transmittal of Source Assessment Report for Selenium in MW-31
White Mesa Mill Groundwater Discharge Permit UGW370004
Conditional Approval of May 30, 2013 Plan and Time Schedule**

Dear Mr. Lundberg:

Enclosed are two copies of Energy Fuels Resource (USA) Inc.'s ("EFRI's") Source Assessment Report ("SAR") for Selenium in MW-31 at the White Mesa Mill. Selenium in MW-31 exceeded its Groundwater Compliance Limit ("GWCL") in the third and fourth quarter of 2012. As required by Part I.G.4(d) of the Groundwater Discharge Permit ("GWDP"), EFRI submitted a Plan and Time Schedule for the assessment of Selenium in MW-31 on March 14, 2013. Conditional Approval of the Plan and Time Schedule was received by EFRI on May 30, 2013. Pursuant to the Plan and Time Schedule EFRI has prepared this SAR.

This transmittal also includes two CDs each containing a word searchable electronic copy of the report.

If you should have any questions regarding this report please contact me.

Yours very truly,

JoAnn Tischler

ENERGY FUELS RESOURCES (USA) INC.
Jo Ann Tischler
Manager, Compliance and Licensing

CC: David C. Frydenlund
Harold R. Roberts
David E. Turk
Katherine A. Weinel

SOURCE ASSESSMENT REPORT FOR SELENIUM IN MW-31 WHITE MESA URANIUM MILL

Blanding, Utah

Prepared for:

Energy Fuels Resources (USA) Inc.
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Lakewood, CO 80228

Prepared by:

INTERA
Geosciences & Engineering
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August 30, 2013

EXECUTIVE SUMMARY

This report is an assessment of the sources, extent, and potential dispersion of selenium in MW-31 at the White Mesa Mill, which has exhibited two consecutive exceedances of the applicable Groundwater Compliance Limit ("GWCL"). This report is also an evaluation of potential remedial action to restore and maintain groundwater quality to assure that Goundwater Discharge Permit ("GWDP") limits will not be exceeded at the compliance monitoring point and that, to the extent applicable, discharge minimization technology and best available technology will be re-established.

Given the recent analyses in the Background Reports and other recent analyses and investigations at the site, Energy Fuels Resources (USA) Inc. ("EFRI") believes that selenium in MW-31 is likely due to background influences, including a natural decreasing trend in pH across the site and other factors such as the proximity of this well to the existing nitrate/chloride plume, and not to any potential tailings seepage. Any potential increases in concentrations of selenium in this well are already being addressed by the corrective action being implemented for the nitrate/chloride plume.

As the results of the geochemical analysis will demonstrate, the selenium exceedance in MW-31 can be attributed to natural background and site-wide influences (decreasing pH) or to impacts at the site that are already being addressed with an existing corrective action (nitrate/chloride plume capture). Therefore, a revised GWCL has been proposed in this report. EFRI maintains that GWCLs for constituents in wells with significantly increasing trends that are the result of background influences should be revised regularly, as is recommended by the United States Environmental Protection Agency's Unified Guidance (USEPA, 2009), to account for the trends and to minimize unwarranted out-of-compliance status in such wells.

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ABBREVIATIONS AND ACRONYMS

CFCs	chlorofluorocarbons
CIR	Contaminant Investigation Report
Director	Director of the Division of Radiation Control
DRC	State of Utah Division of Radiation Control
EFRI	Energy Fuels Resources (USA) Inc.
GWCL	Groundwater Compliance Limit
GWDP	State of Utah Ground Water Discharge Permit UGW370004
GWQS	Groundwater Quality Standard
mean + 2σ	mean plus two sigma
µg/L	micrograms per liter
mg/L	milligrams per liter
Mill	White Mesa Uranium Mill
Notice	Notice of Violation and Compliance Order, Docket No.UGWll-02
SAR	Source Assessment Report
TDS	Total Dissolved Solids
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

Energy Fuels Resources (USA) Inc. ("EFRI") operates the White Mesa Uranium Mill (the "Mill"), located near Blanding, Utah (Figure 1), under State of Utah Groundwater Discharge Permit UGW370004 (the "GWDP"). This is the Source Assessment Report ("SAR") required under Part I.G.4 of the GWDP relating to violations of Part I.G.2 of the GWDP with respect to selenium in groundwater compliance monitoring well MW-31 (Figure 2).

Part I.G.2 of the GWDP provides that out-of-compliance status exists when the concentration of a constituent in two consecutive samples from a compliance monitoring point exceeds a groundwater compliance limit ("GWCL") in Table 2 of the GWDP. The GWDP was originally issued in March 2005, at which time GWCLs were set on an interim basis, based on fractions of State of Utah Ground Water Quality Standards ("GWQSs") or the equivalent, without reference to natural background at the Mill site. The GWDP also required that EFRI prepare a background groundwater quality report to evaluate all historical data for the purposes of establishing background groundwater quality at the site and developing GWCLs under the GWDP. As required by then Part I.H.3 of the GWDP, EFRI submitted the following to the Director (the "Director") of the Utah Division of Radiation Control ("DRC") (the Director was formerly the Executive Secretary of the Utah Radiation Control Board and the Co-Executive Secretary of the Utah Water Quality Board):

- A Revised Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah, October 2007, prepared by INTERA, Inc. (the "Existing Wells Background Report").
- A Revised Addendum: Evaluation of Available Pre-Operational and Regional Background Data, Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah, November 16, 2007, prepared by INTERA, Inc. (the "Regional Background Report").
- A Revised Addendum: Background Groundwater Quality Report: New Wells for Denison Mines (USA) Corp.'s Mill Site, San Juan County, Utah, April 30, 2008, prepared by INTERA, Inc. (the "New Wells Background Report," and together with the "Existing Wells Background Report" and the "Regional Background Report," the "Background Reports").

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

The Director issued a Notice of Violation and Compliance Order, Docket No. UGWll-02 (the "Notice"), dated May 9, 2011, based on DRC's findings from the review of the Mill's first, second, and third quarter 2010 Groundwater Monitoring Reports (EFRI, 2010). The Notice cited five violations of the GWDP, including a violation under the Utah Water Quality Act (UC 19-5-107) and Part I.C.1 of the GWDP, in that six contaminants exceeded their respective GWCLs, as defined in Table 2 of the GWDP, for two consecutive sampling events. Section E.4 of the Notice ordered EFRI to prepare and submit, within 30 calendar days of receipt of the Notice, a written plan and time schedule for Director approval to fully comply with the requirements of Part I.G.4(c) of the GWDP. In response to the Notice, EFRI submitted the Initial Plan and Time Schedule ("Initial Plan and Time Schedule") to address constituents that exceeded their respective GWCLs for two consecutive sampling events in the first, second, third, and fourth quarters of 2010 and the first quarter of 2011. The Initial Plan and Time Schedule was submitted June 13, 2011. Subsequent to the Initial Plan and Time Schedule, EFRI submitted a Plan and Time Schedule for the second quarter of 2011 ("Q2 2011 Plan and Schedule") to address constituents that exceeded their respective GWCLs for two consecutive sampling events in the second quarter of 2011. The Q2 2011 Plan and Schedule was submitted on September 7, 2011.

In the first quarter of 2012, the constituent total dissolved solids ("TDS") was identified as exceeding its respective GWCL in MW-31 for two consecutive sampling events. EFRI requested that no additional plan and time schedule be prepared and that this exceedance be addressed in conjunction with the sulfate exceedances as described in the June 13, 2011, Initial Plan and Time Schedule. DRC agreed with this request in correspondence dated August 1, 2012.

Pursuant to the Initial Plan and Schedule and the Q2 2011 Plan and Schedule, EFRI submitted a SAR to DRC on October 10, 2012. The SAR covered the constituents in violation of Part I.G.2 of the GWDP that were identified in the Initial Plan and Time Schedule and in the Q2 2011 Plan and Schedule.

On November 15, 2012, EFRI submitted a notice (the "3rd Quarter 2012 Exceedance Notice") to the Executive Secretary under Part I.G.1(a) of the Permit providing notice that the concentrations of specific constituents in the monitoring wells at the Mill exceeded their respective GWCLs for the third quarter of 2012 and indicating which of those constituents had two consecutive exceedances as of that quarter. A Plan and Time Schedule for the third quarter of 2012 ("Q3 2012 Plan and Time Schedule") covers the constituent that was identified as being in violation of Part I.G.2 of the Permit. The Q3 2012 Plan and Time Schedule was submitted on December 13, 2012. The Q3 2012 Plan and Time Schedule was approved by DRC in correspondence dated February 4, 2013.

On February 15, 2013, EFRI submitted a notice (the "4th Quarter 2012 Exceedance Notice") to the Executive Secretary under Part I.G.1(a) of the Permit providing notice that the concentrations of specific constituents in the monitoring wells at the Mill exceeded their respective GWCLs for the fourth quarter of 2012 and indicating which of those constituents had two consecutive exceedances as of that quarter. A Plan and Time Schedule for the fourth quarter of 2012 ("Q4 2012 Plan and Time Schedule") covers the constituent that was identified as being in violation of Part I.G.2 of the Permit. The Q4 2012 Plan and Time Schedule was submitted on March 14, 2013. The Q4 2012 Plan and Time Schedule was approved by DRC in correspondence dated May 30, 2013.

This SAR addresses the constituent that was identified as being in violation of Part I.G.2 of the GWDP in the 4th Quarter 2012 Exceedance Notice and as described in the DRC-approved Q4 2012 Plan and Time Schedule.

1.1 Source Assessment Report Organization

An overview of Sections 2.0 through 5.0 and the appendices included with this Report is provided below.

A description of the approach used for analysis is provided in Section 2.0, and the results of the analysis are presented in Section 3.0. Conclusions and recommendations are reviewed in Section 4.0, and references are included in Section 5.0.

The appendices are comprised of the analyses performed for this Report and are organized in the following manner: Appendix A contains a table showing exceedances. Appendix B contains the geochemical analysis performed on selenium in MW-31. Appendix C contains the indicator parameter analysis performed on MW-31. Appendix D contains the pH analysis performed on MW-31. Appendix E contains data plots for selenium in MW-31 using all available data to date, compared to the data plots from the Background Reports, as well as current data plots of all indicator parameters and plots of indicator parameters from the Background Reports. Appendix F contains the Flowsheet developed based on the United States Environmental Protection Agency's ("USEPA") *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009), and was approved by DRC prior to completion of the Background Reports. Appendix G is included on the compact disc that accompanies this Report and contains the electronic input and output files used for statistical analysis.

2.0 CATEGORIES AND APPROACH FOR ANALYSIS

Generally, out-of-compliance constituents and wells can be grouped into five categories:

1. Constituents in wells with previously identified rising trends.
2. Constituents in pumping wells.
3. Constituents potentially impacted by decreasing trends in pH across the site.
4. Newly installed wells with interim GWCLs.
5. Other constituents and wells.

This SAR addresses one constituent in one well (selenium in MW-31) which falls into category three because the mobility of selenium in groundwater is sensitive to decreases in pH. In addition, and, as discussed in the October 2012 SAR, MW-31 is located at the margin of the nitrate/chloride plume and has been affected by changes to groundwater related to the elevated nitrate and chloride concentrations associated with that plume.

2.1 Approach for Analysis

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

The assessment for potential sources of selenium in MW-31 was accomplished by performing a geochemical analysis to evaluate the behavior of the constituents in the well to determine if there have been any changes in the behavior of indicator parameters, such as chloride, sulfate, fluoride, and uranium, since the date of the Background Report that may suggest a change in the behavior of that well.

As discussed in detail in Section 9.0 of the Existing Wells Background Report, chloride is the best indicator of potential tailings cell leakage, followed by fluoride and then sulfate (due to mobility and abundance in tailings). Uranium is probably the most mobile of trace (metal) elements and is the best indicator parameter for metals and radionuclides. Any potential seepage from tailings impoundments would be expected to exhibit rising concentrations of chloride followed by fluoride, sulfate, and uranium. While uranium may be the most mobile of trace (metal) elements, it is typically retarded behind chloride, fluoride, and sulfate and would likely not be expressed in groundwater until sometime after chloride, fluoride, and sulfate concentrations had begun to rise. This is because uranium is a metal cation and behaves as other metals with respect to pH. It is important to note, however, that while the absence of a rising trend in chloride would indicate that there has been no impact from tailings, a rising trend in chloride, as well as in other indicator parameters, could also be due to natural influences (see Section 12.0 of the Existing Wells Background Report). Therefore, in situations where there is a significant rising trend in chloride or in other indicator parameters, other evaluations would need to be performed regarding the behavior of the other indicator parameters and whether or not the concentrations and mass balance indicate a potential tailings cell leak.

The geochemical analysis of selenium and the indicator parameters in MW-31 was supported by a statistical analysis that followed the process outlined in the *Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site, San Juan County, Utah* ("Flowsheet") (INTERA, 2007), a copy of which is attached as Appendix F. The Flowsheet was designed based on USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009), and was approved by DRC prior to completion of the Background Reports.

EFRI has observed a decreasing trend in pH in almost every groundwater monitoring well across the Mill site, including the ones that are upgradient and far downgradient. The report, *Investigation of Pyrite in the Perched Zone, White Mesa Uranium Mill Site, Blanding, Utah* (HGC, 2012), attributes the decline in pH across the site to the site-wide, apparently ubiquitous existence of pyrite in the perched zone at the site. Since selenium may be influenced by a decreasing pH trend, a pH analysis was performed for MW-31 to determine whether there has been a significant decrease in pH in that well.

Finally, because MW-31 is located inside the nitrate/chloride plume at the site and has been affected by changes to groundwater related to the elevated nitrate and chloride concentrations associated with that plume, chloride and sulfate are not considered appropriate indicator parameters of any potential tailings cell seepage (see Section 3.1 below). A mass balance analysis was therefore performed on fluoride, which is considered to be the best available indicator parameter for the conditions in this well. In addition, a mass balance of nitrate concentrations in the tailings cells relative to nitrate concentrations found in the nitrate/chloride plume was performed to further evaluate the potential for tailings cell seepage. Since MW-31 is not distant from the Mill's tailing cells, a hydrogeologic analysis was not performed to determine the plausibility of impact from Mill tailings.

2.1.1 Constituents Potentially Impacted by Decreasing pH Trends Across the Site

EFRI has observed a decreasing trend in pH in almost every groundwater monitoring well across the Mill site, including the ones that are upgradient and far downgradient. Selenium in MW-31 fits into this category because the mobility of selenium in groundwater is sensitive to decreases in pH. As noted in Section 2.1, the decline in pH across the site has been studied and attributed to the site-wide, apparently ubiquitous existence of pyrite in the perched zone at the site (HGC, 2012).

The first step in assessing this category was to perform a geochemical analysis evaluating the behavior of the constituents in MW-31 to determine if there have been any changes in the behavior of indicator parameters such as chloride, sulfate, fluoride, and uranium that may suggest a change in the behavior of that well since the dates of the Background Reports. A pH analysis was also performed for MW-31 to determine if there has been a significant decrease in pH in that well, since selenium may be influenced by a decreasing pH trend. If there was a significant decreasing trend in pH in that well, the impact from any such decrease on the constituent in question was also analyzed.

2.2 Approach for Setting Revised GWCLs

If the foregoing approaches resulted in the conclusion that the previous analysis in the Background Reports has not changed, or that the out-of-compliance status of selenium in MW-31 is due to natural or other site-wide influences that are already being addressed by corrective action, then a new GWCL was proposed for the constituent. In proposing a revised GWCL, we have adopted the approach in the Flowsheet.

Appendix B-1 summarizes the geochemical analysis and presents the revised GWCL for selenium in MW-31 based on the Flowsheet. It is assumed that once a revised GWCL is accepted for selenium in MW-31, accelerated monitoring will cease.

2.3 University of Utah Study

At the request of the DRC, T. Grant Hurst and D. Kip Solomon of the Department of Geology and Geophysics of the University of Utah performed a groundwater study (the "University of Utah Study") at the Mill site in July 2007 to characterize groundwater flow, chemical composition, noble gas composition, and age (Hurst and Solomon, 2008) to determine whether or not the increasing and elevated trace metal concentrations in monitoring wells at the Mill site, all of which were identified in the Background Reports, may indicate that potential leakage from tailings cells is occurring.

In order to evaluate sources of solute concentrations at the Mill site, low-flow groundwater sampling was implemented in 15 monitoring wells. In addition, surface water samples were collected from tailings cells 1, 3, and 4A, and two wildlife ponds. Passive diffusion samplers were also deployed and collected in order to characterize the dissolved gas composition of groundwater at different depths within the wells. Samples were collected and analyzed for the following: tritium, nitrate, sulfate, deuterium and oxygen-18 of water, sulfur-34 and oxygen-18 of sulfate, trace metals (uranium, manganese, and selenium), and chlorofluorocarbons ("CFCs"). The 15 wells sampled included MW-31.

Hurst and Solomon (2008, page iii) concluded generally that,

> [t]he data show that groundwater at the Mill is largely older than 50 years, based on apparent recharge dates from chlorofluorocarbons and tritium concentrations. Wells exhibiting groundwater that has recharged within the last 50 years appears to be a result of recharge from wildlife ponds near the site. Stable isotope fingerprints do not suggest contamination of groundwater by tailings cell leakage, evidence that is corroborated by trace metal concentrations similar to historically-observed observations.

With respect to CFC age dating, MW-31 was found to exhibit CFC recharge dates of the 1960s and 1970s, indicating that the water in that well predated construction of the Mill in 1980. Tritium concentrations in MW-31 were found to be non-detect, indicating that impacts from wide-scale atmospheric injection of tritium during above-ground thermonuclear weapons testing in the 1950s and 1960s, expected to be found in surface waters such as Mill tailings, were not observed in that well.

Hurst and Solomon (2008) conclude that,

> [i]n general, the data collected in this study do not provide evidence that tailings cell leakage is leading to contamination of groundwater in the area around the White Mesa Mill. Evidence of old water in the majority of wells, and significantly different isotopic fingerprints between wells with the highest concentrations of trace metals and surface water sites, supports this conclusion. The only evidence linking surface waters to recharging groundwater is seen in MW-27 and MW-19. Measurable tritium and CFC concentrations indicate relatively young water, with low concentrations of selenium, manganese, and uranium. Furthermore, stable isotope fingerprints of ðD and $ð^{18}O$ suggest mixing between wildlife pond recharge and older groundwater in MW-19 and MW-27. $D^{34}S\text{-}SO_4$ and $ð^{18}O\text{-}SO_4$ fingerprints closely relate MW-27 to wildlife pond water, while the exceptionally low concentration of sulfate in MW-27, the only groundwater site to exhibit sulfate levels below 100 mg/L, suggest no leachate from the tailings cells has reached the well.

It should be further noted that, subsequent to the University of Utah Study, EFRI submitted a *Contaminant Investigation Report, White Mesa Uranium Mill Site, Blanding Utah*, dated December 30, 2009, as amended ("CIR") in connection with the nitrate/chloride plume at the Mill site. In the CIR, EFRI observed that a historical pond had existed for many years at a location upgradient from MW-27 and much closer to MW-27 than the wildlife ponds. This historical pond could also have been a contributor of surface water to MW-27.

It is important to note that at the time of the University of Utah Study, the trend analysis for the Background Report had identified that the Mill had rising trends in a number of constituents at the site, including statistically significant rising trends in selenium in upgradient wells MW- 1 and MW-19, as well as Site wells MW-12, MW-14, MW-15, and MW-17. Hurst and Solomon's conclusions that there is no evidence that the tailings cells are leaking, despite these rising trends, is further evidence that there are background influences at work at the site that are causing rising trends in a number of constituents, including selenium.

3.0 RESULTS OF ANALYSIS

This section describes the results of the analysis, summaries of which are provided in Appendix B-1, Appendix C-1, Appendix D-1, and Appendices E-1 and E-2.

3.1 Indicator Analysis

Selenium concentrations in MW-31 are showing a significantly increasing trend (see Appendix B-8). Chloride concentrations in MW-31 are also exhibiting statistically significant increasing trends (see Appendix C-7 for indicator parameter plots). Fluoride is showing a significant decreasing trend in MW-31. Sulfate is relatively low for the site but is showing a significantly increasing trend at the time of this SAR. TDS in MW-31 is significantly increasing and was addressed in the October 2012 SAR. Uranium concentrations in MW-31 are not exhibiting a significantly increasing trend.

In this case, chloride is not a good indicator of potential tailings seepage because MW-31 is directly impacted by the nitrate/chloride plume.

Current sulfate concentrations in MW-31 are among the lowest at the site. Other monitor wells show sulfate concentrations that are three to seven times higher than those in MW-31 (see Table 7 of the October 2012 SAR). Sulfate is also significantly increasing in a number of wells at the site, including upgradient and far downgradient wells. See, for example, the indicator parameter analysis for MW-18 and MW-3 included in the October 2012 SAR (INTERA, 2012), which shows significantly increasing trends in sulfate and suggests that there are natural influences at the site that impact sulfate. For these reasons, sulfate is not a reliable indicator parameter for potential tailings seepage in MW-31.

Fluoride is therefore the fastest-moving available indicator of tailings cell seepage. Fluoride would be expected to travel at least as fast in the subsurface as selenium. Current levels of selenium in samples of groundwater from MW-31 are as high as 83 micrograms per liter ("µg/L"), while the average concentration of selenium in Tailings Cell 1 is near 10,000 µg/L. Thus, the current concentrations of selenium in samples of groundwater from MW-31 are 0.08 percent of the average concentration in Cell 1. The average concentration of fluoride in Cell 1 is 457 milligrams per liter ("mg/L"). Since fluoride travels at least as fast as selenium, we would expect at least 0.08 percent of the average fluoride concentration in Cell 1 to have arrived in MW-31 if the selenium in that well were from potential tailings seepage. However, recent fluoride concentrations in samples of groundwater from MW-31 are as low as 0.73 mg/L and declining, not the 3.8 mg/L that would be expected if selenium were the result of potential tailings seepage.

Uranium concentrations in MW-31 are low for the site, in the 6 to 9 µg/L range, and are not exhibiting a statistically significant upward trend.

Based on the indicator parameters that are available for MW-31, namely, fluoride and uranium, it can be concluded that the increases in concentrations of selenium are not due to potential tailings cell leakage.

3.2 pH Analysis

A pH analysis was performed in addition to the geochemical analysis for MW-31 (see Appendix D). The pH analysis included using box plots to identify and omit extreme outliers, performing the Shapiro-Wilk test of normality (Shapiro and Wilk, 1965), and then testing for trends using either the least squares regression or the Mann-Kendall method (see Appendices D-3 through D-6). Selenium concentrations in MW-31 may be impacted by decreasing trends in pH across the site. The results of the pH analysis in MW-31 show a slightly decreasing trend in pH; however, the decreasing trend is not significant at the time of this SAR. The data appear to show more variance after 2009 (Appendix D-5), correlating somewhat with the indicator parameter plots. Native selenium is stable in mildly oxidizing to extremely reducing conditions (Brookins, 1988). Decreasing pH may increase the solubility of native selenium (Mayland et al., 1991), which could be the cause of, or could contribute to, the increasing trends in selenium in MW-31.

Selenium concentrations are exhibiting increasing trends in several wells site-wide. Appendix B-9 is a summary table of selenium trend tests for each groundwater monitoring well. The table also presents results of trend tests from the pH Report (INTERA, 2012) for comparison. Out of the 13 wells with significantly increasing selenium concentrations, ten have corresponding significantly decreasing pH trends. Further, selenium is found to be significantly increasing in upgradient and far downgradient wells MW-18, MW-3, and MW-3A, which demonstrates that this is a site-wide occurrence that is not related to potential tailings cell leakage.

Although not significant, pH is trending downward in MW-31, which could explain or contribute to the increases in selenium in that well.

3.3 Proximity to Nitrate/Chloride Plume

The location of MW-31 is important when determining potential sources of contamination. MW-31 was included in the October 2012 SAR for exceedances in sulfate and TDS. The October 2012 SAR concluded that the increasing TDS, chloride, and sulfate concentrations were due to the proximity of that well to the nitrate/chloride plume. MW-31 is located at the margin of the nitrate/chloride plume (Figure 2). The nitrate/chloride plume has been the subject of many studies that are described in detail in the following reports:

- Nitrate Contamination Investigation Report (INTERA, 2009)
- Quarterly Nitrate Reports (EFRI, 2009–2013)

3.4 Mass Balance Analyses

As discussed in Section 3.1 above, a mass balance calculation was performed for fluoride, which indicates that if the increases in selenium in MW-31 are attributable to potential tailings cell leakage, fluoride should have increased to 3.8 mg/L. Instead fluoride has exhibited a significantly decreasing trend, with concentrations as low as 0.73 mg/L and declining. The behavior of fluoride in MW-31 is not consistent with a potential tailings cell leak.

A mass balance was also performed and presented in the December 2009 CIR, where one of the suggested possibilities was a groundwater mound from the tailings cells that might cause elevated nitrate and chloride concentrations upgradient in the area of the nitrate/chloride plume. The nitrate/chloride plume with associated sulfate in groundwater is the cause of the increase in chloride, sulfate, and TDS observed in MW-31 located at the margins of the plume in areas where increases would be expected. A calculation for nitrate to evaluate this possibility (a calculation for chloride would be similar) suggests that on the order of 11 percent tailings solution (assuming the highest recently observed nitrate concentration in the tailings of 290 mg/L) would have to mix with un-impacted groundwater (assuming 1 mg/L) to account for the observed mass of nitrate in groundwater, assuming an average nitrate concentration in the plume above the 20 mg/L isopleth of 30 mg/L.

The size of the nitrate plume above 20 mg/L is approximately 40 acres, or 1,800,000 square feet in map area. Assuming 45 feet of saturation (INTERA, 2009) and a porosity of 0.2, there are 16,200,000 cubic feet or 121,176,000 gallons of groundwater in that area. Eleven percent of that is 13,329,360 gallons (approximately 41 acre feet), which is a conservative estimate of the volume of tailings solution that would have to be mixed with groundwater to account for the mass of nitrate in the portion of the plume above 20 mg/L nitrate.

Assume:

- Nitrate concentration in tailings solution 290 mg/L
- Nitrate concentration in un-impacted groundwater 1 mg/L
- Average plume concentration 30 mg/L

Mixing equation: $C_t*V_t + C_g*V_g = C_m*V_m$ (eq 1)

Where: C_t = Concentration of nitrate in tailings solutions

V_t = Volume of tailings solutions

C_g = Concentration of nitrate in un-impacted groundwater

V_g = Volume of un-impacted groundwater

C_m = Concentration of nitrate in mixture of groundwater and tailings solutions

V_m = Volume of mixture of groundwater and tailings solutions

Another equation: $V_t + V_g = V_m$ (eq 2)

Substituting eq2 in eq1: $C_t{*}V_t + C_g{*}V_g = C_m{*}\,(V_t + V_g)$ (eq 3)

Substitute nitrate concentrations in eq 3:

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

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

$$260{*}V_t = 29{*}V_g$$

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

The volume of tailings solution would have to be 11 percent of the volume of un-impacted groundwater in the mixture.

That theoretical volume of potential seepage from the tailings cells would certainly generate a detectable groundwater mound. Such a mound would have to be on the order of 5 feet on average over the entire 40 acres, but would likely be much higher than that at the centroid of the theoretical plume (beneath the tailings cells) and would taper off toward the edges of the plume. However, no such mounding exists under the tailings cells. While groundwater mounding can be observed towards the eastern portion of the site, away from the tailings cells, it is clearly related to the wildlife ponds and not the tailings cells. Equally as important, if the concentration of nitrate in tailings documented in the Statement of Basis for the 2005 GWDP (24 mg/L) or as documented in the annual tailings sampling and analysis, were used in the calculation, no amount of tailings solution would bring the plume concentration to 30 mg/L.

It is also important to note that, as discussed in more detail in Section 2.3 above, MW-31 was included in the University of Utah Study, in which Hurst and Solomon concluded that “stable isotope fingerprints do not suggest contamination of groundwater by tailings cell leakage, evidence that is corroborated by trace metal concentrations similar to historically-observed concentrations.”

3.5 Proposed Revised GWCL for Selenium in MW-31

The reasons discussed above support the conclusions that (1) MW-31 is not being impacted by any potential tailings cell seepage, and (2) selenium concentrations in MW-31 are the result of background and/or site-wide influences, such as a site-wide decline in pH and the nitrate/chloride plume. A new GWCL for selenium is therefore proposed as follows:

- MW-31: The current GWCL is 71 µg/L, which exceeds the GWQS of 50 µg/L. In accordance with the Flowsheet, the proposed revised GWCL is 79 µg/L, which is the mean + 2σ, based on all data available to date.

EFRI maintains that GWCLs for constituents in wells with significantly increasing trends that are the result of background influences should be revised regularly, as is recommended by USEPA's Unified Guidance (USEPA, 2009), to account for the trends and to minimize unwarranted out-of-compliance status in such wells.

4.0 CONCLUSIONS AND RECOMMENDATIONS

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

The focus of this SAR was therefore to identify any changes in the circumstances identified in those studies. A geochemical analysis for the indicator parameters in MW-31 was performed. The results of the analyses show that the exceedances of selenium in MW-31 are not due to potential tailings cell leakage. This is evident from the behavior of fluoride in MW-31, which is trending downward, not upward. Mass balance analyses of fluoride and nitrate also indicate that the tailings cells are not leaking. As a result, INTERA concludes that the increasing trend in selenium in MW-31 is likely due to the site-wide decline of pH. The site-wide decline in pH was the subject of the pH Report (INTERA, 2012b) and the *Investigation of Pyrite in the Perched Zone, White Mesa Uranium Mill Site, Blanding, Utah* (HGC, 2012). A pH analysis was performed on MW-31 for purposes of this Report, concluding that pH is declining, but not significantly.

Previous reports have noted that pH has been declining in most wells at the site. Interestingly, selenium is also increasing in many wells across the site. Selenium is significantly increasing in MW-3, MW-3A, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, MW-22, MW-27, MW-30, MW-31, and MW-35. Further, the selenium concentrations found in analyses from MW-31 are not unusual across the site. For example, selenium concentrations in analyses from far downgradient MW-3A have been consistently 10 to 20 µg/L higher than concentrations in MW-31. Thus, EFRI believes that increasing selenium concentrations in MW-31 are due to background influences, including the natural decreasing trend in pH across the site together with the proximity of this well to the existing nitrate/chloride plume, and not to any potential tailings seepage.

Table 1
Summary of Findings

Well	Out-of-Compliance Constituent	Summary	Path Forward
MW-31	Selenium	MW-31 is located at the margin of the nitrate/chloride plume, and selenium may be affected by decreasing pH. Chloride and sulfate are significantly increasing; fluoride is significantly decreasing. Increasing concentrations in this well are already being addressed by the corrective action for the nitrate/chloride plume.	Revise GWCL; continue remedial action on the nitrate/chloride plume.

MW-31 is located at the margin of the nitrate/chloride plume and is likely being affected by the plume, as is evidenced by the increasing trend in TDS (addressed in the October 2012 SAR), chloride, and sulfate. Any potential increases in concentrations in this well are already being addressed by the corrective action being implemented for the nitrate/chloride plume. The increase in selenium in MW-31 will also be addressed by that corrective action.

A revised GWCL has been proposed. EFRI maintains that GWCLs for constituents in wells with significantly increasing trends should be revised regularly, as is recommended by the USEPA's Unified Guidance (USEPA, 2009), to account for the trends and to minimize unwarranted out-of-compliance status in such wells.

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FIGURES

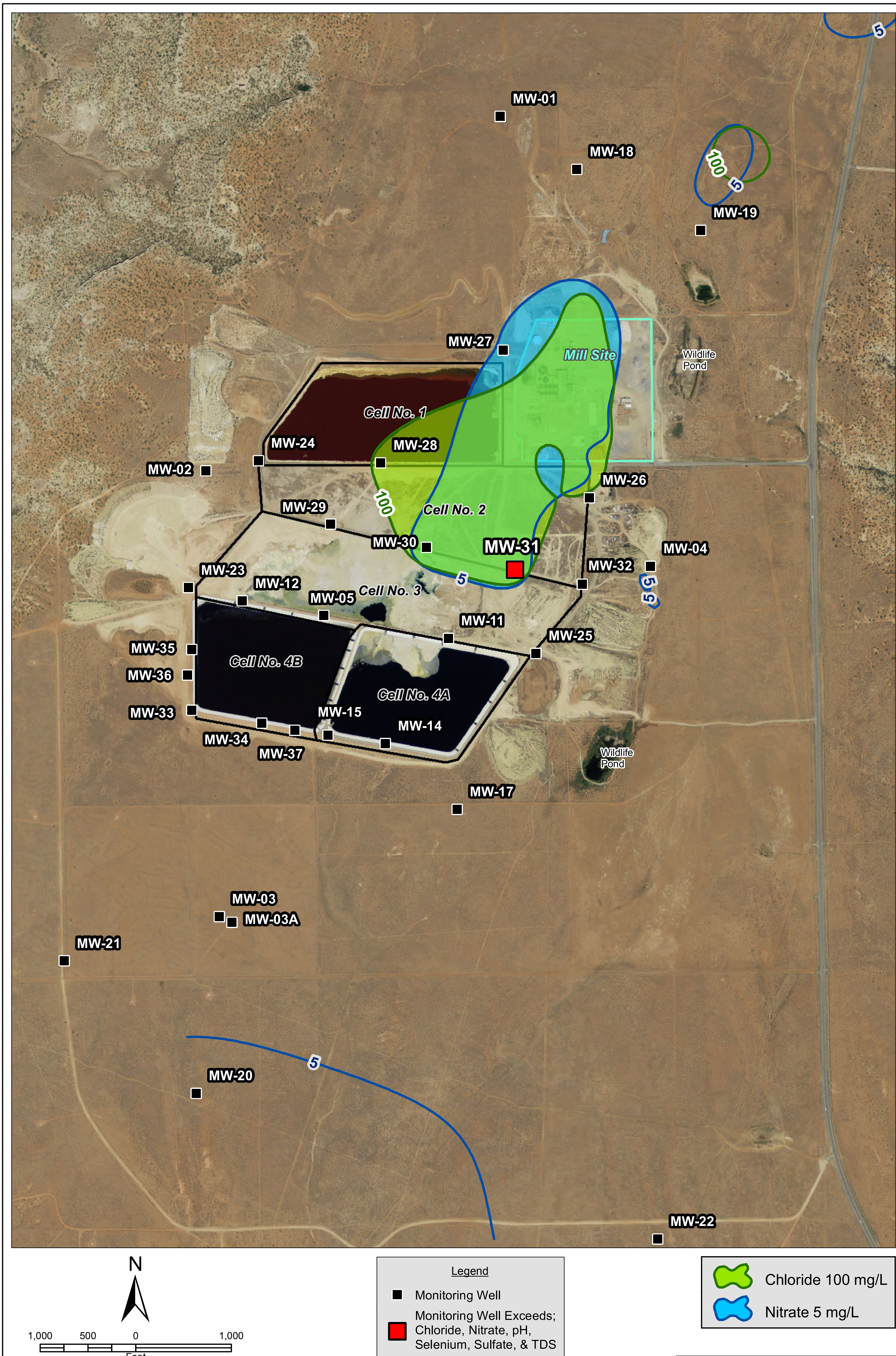

Figure 2
Exceedances and Proximity of MW-31 to Nitrate/Chloride Plume
White Mesa Uranium Mill

INTERA

Source(s): Aerial – NAIP Utah 2011;
Wells – HGC, Inc., May 2008 report;
Nitrate and chloride data collected June 2012.

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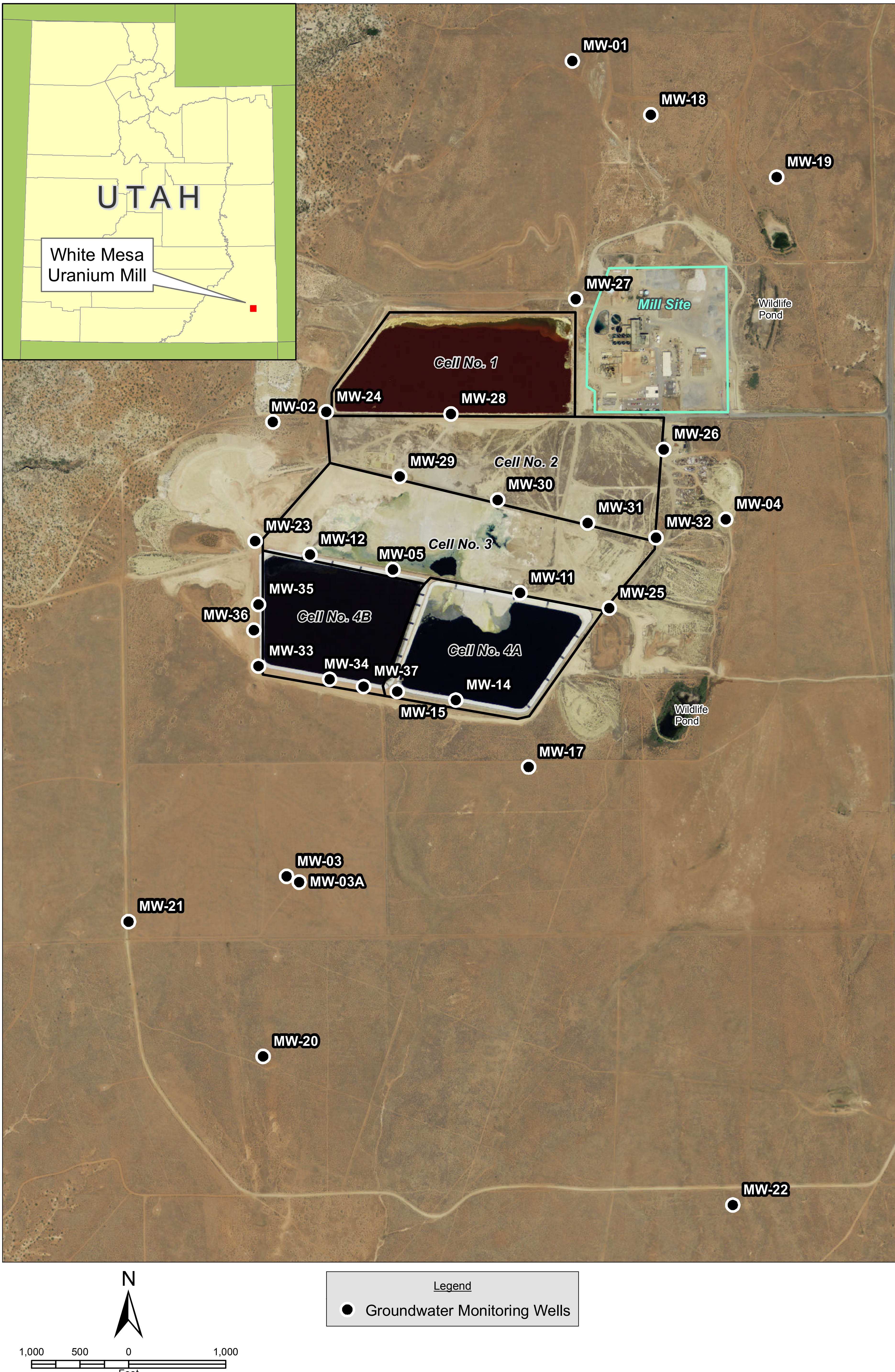

INTERA

Source(s): Aerial – NAIP Utah 2011;
Wells – HGC, Inc., May 2008 report.

Figure 1
Location of White Mesa
Mill Site
White Mesa Uranium Mill

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APPENDIX A

GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	Q1 2010 Results: Q1 2010 Sample Date	Q1 2010 Result	Q2 2010 Results: Q2 2010 Sample Date	Q2 2010 Result	May 2010 Monthly Sample Date	May 2010 Monthly Result	June 2010 Monthly Sample Date	June 2010 Monthly Result	Q3 2010 Results: July 2010 Monthly Sample Date	July 2010 Monthly Result	August 2010 Monthly Sample Date	August 2010 Monthly Result	Q3 2010 Sample Date	Q3 2010 Result	Q4 2010 Results: October 2010 Monthly Sample Date	October 2010 Monthly Result	Q4 2010 Sample Date	Q4 2010 Result	December 2010 Monthly Sample Date	December 2010 Monthly Result
Required Quarterly Sampling Wells																						
MW-11 (Class II)	Field pH (S.U.)	6.5 - 8.5	2/10/2010	7.34	4/28/2010	7.22	5/24/2010	7.29	6/16/2010	8.21	7/20/2010	7.51	8/25/2010	7.32	9/8/2010	8.34	10/20/2010	7.49	11/11/2010	7.44	12/15/10	7.37
	Manganese (ug/L)	131.29		***134***		***137***		122		99		123		***138***		128		***141***		***133***		***158***
MW-14 (Class III)	Manganese (ug/L)	2230.30	2/2/2010	2060	4/21/2010	2070	5/21/2010	NA	6/16/2010	NA	7/20/2010	NA	8/25/2010	NA	9/8/2010	1920	10/20/2010	NA	11/10/2010	1980	12/15/2010	NA
	Field pH (S.U.)	6.5 - 8.5		***6.45***		***6.29***		***6.36***		***6.45***		7.19		***6.48***		6.51		6.60		***6.37***		***6.47***
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	2/26/2010	6.53	4/28/2010	7.2	NS	NA	NS	NA	NS	NA	NS	NA	9/8/2010	6.58	NS	NA	11/10/2010	***6.36***	NS	NA
	Cadmium (ug/L)	1.5		1.26		1.44		NA		NA		NA		NA		1.4		NA		1.26		NA
	Chloride (mg/L)	35		31		31		NA		NA		NA		NA		31		NA		31		NA
	Uranium	6.5		5.93		6.43		NA		NA		NA		NA		***6.57***		NA		5.89		NA
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	2/2/2010	***1.3***	4/22/2010	***2***	5/21/2010	0.3	6/16/2010	0.4	7/21/2010	0.6	8/16/2010	0.6	9/26/2010	***0.7***	10/20/2010	0.4	11/15/2010	0.2	12/15/2010	0.4
	Uranium (ug/L)	41.8		***58.7***		***66.7***		37.4		36.6		34.4		***71.8***		***72.7***		37.5		30.4		29.6
	Chloroform (ug/L)	70		***700***		***1700***		***800***		***940***		***900***		***2800***		***2100***		***1000***		***1900***		***1400***
	Chloride (mg/L)	58.31		***72***		57		***80***		47		52		49		***64***		52		48		52
	Field pH (S.U.)	6.74 - 8.5		***6.59***		7.18		***6.36***		6.98		***6.45***		***6.39***		***6.60***		***6.61***		***6.49***		***6.45***
	Dichloromethane (Methylene Chloride) (ug/L)	5		1		***9.9***		NR		2.2		***12***		***24***		***45***		***5.5***		***16***		1.2
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	2/9/2010	***16.1***	4/27/2010	***15.8***	5/21/2010	***17***	6/15/2010	***15.3***	7/21/2010	***16***	8/24/2010	***16***	9/14/2010	***15***	10/19/2010	***15***	11/9/2010	***15***	12/14/2010	***16***
	Chloride (mg/L)	128		127		97		NS		NS	NS	NS	NS	NS		111		NS		126		NS
	Uranium (ug/L)	8.32		6.82		6.82		NS		NS	NS	NS	NS	NS		7.10		NS		6.64		NS
	Selenium (ug/L)	34		32		***35.3***		NS		NS	7/27/2010	33.5	8/24/2010	***35.6***		32.6		32.4		32.2		30.5
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	2/9/2010	***21.7***	4/20/2010	***22.5***	5/21/2010	***23***	6/15/2010	***21.1***	7/21/2010	***20***	8/24/2010	***22***	9/13/2010 (9/21/10)	***21***	10/19/2010	***20***	11/9/2010	***20***	12/14/2010	***20***
	TDS (mg/L)	1320		1150		1220	NS	NA	NS	NA	NS	NA	NS	NA		***1330***	NS	NA		1320		NS
	Chloride (mg/L)	143		128		128	NS	NA	NS	NA	NS	NA	NS	NA		139	NS	NA		138		NS
	Selenium (ug/L)	71		60.8		59.6	NS	NA	NS	NA	NS	NA	NS	NA		64.4	NS	NA		60		NS
	Field pH (S.U.)	6.5 - 8.5		6.96		7.38	5/21/2010	6.95	6/15/2010	7.01	7/21/2010	7.80	8/24/2010	7.10		7.66 (7.13)	10/19/2010	6.92		6.98		6.95
	Sulfate (mg/L)	532		507		522	NS	NA	NS	NA	NS	NA	NS	NA		527	NS	NA		***539***		NS
MW-35 (Class II)	Manganese (ug/L)	200	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/30/2010	***698***	NS	NA
	Thallium (ug/l)	0.5		NA		NA		NA		NA		NA		NA		NA		NA		***1.14***		NA
	Molybdenum (ug/L)	10		NA		NA		NA		NA		NA		NA		NA		NA		<10		NA
	Gross Alpha minus Rn & U (pCi/L)	3.75		NA		NA		NA		NA		NA		NA		NA		NA		2.6		NA
	Selenium (ug/L)	12.5		NA		NA		NA		NA		NA		NA		NA		NA		ND		NA
	Uranium (ug/L)	7.5		NA		NA		NA		NA		NA		NA		NA		NA		***27.2***		NA
Required Semi-Annual Sampling Wells																						
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	5/5/2010	212	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/18/2010	275	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		7.8		NA		NA		NA		NA		NA		NA		10.7		NA
	Sulfate (mg/L)	838		NA		805		NA		NA		NA		NA		NA		NA		792		NA
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	5/3/2010	***37.2***	NS	NA	NS	NA	NS	NA	NS	NA	9/20/2010	35.5	NS	NA	11/19/2010	***38.8***	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.14 (6.25)***		NA		NA		NA		NA		***6.39***		NA		***6.35***		NA
	Fluoride (Mg/L)	0.68		NA		***0.71***		NA		NA		NA		NA		0.63		NA		***0.77***		NA
MW-3A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	5/4/2010	***6.23 (6.24)***	NS	NA	NS	NA	NS	NA	NS	NA	9/21/2010	***6.42***	NS	NA	11/22/2010	***6.21***	NS	NA
	Sulfate (mg/L)	3640		NA		***3680***		NA		NA		NA		NA		3630		NA		***3850***		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		1.0		NA		NA		NA		NA		NA		NA		1.2		NA
	TDS (mg/L)	5805		NA		***5860***		NA		NA		NA		NA		5470		NA		5330		NA
	Selenium (ug/L)	89		NA		81.4		NA		NA		NA		NA		NS		NA		***94.8***		NA

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

			Q1 2010 Results		Q2 2010 Results						Q3 2010 Results						Q4 2010 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	Q1 2010 Sample Date	Q1 2010 Result	Q2 2010 Sample Date	Q2 2010 Result	May 2010 Monthly Sample Date	May 2010 Monthly Result	June 2010 Monthly Sample Date	June 2010 Monthly Result	July 2010 Monthly Sample Date	July 2010 Monthly Result	August 2010 Monthly Sample Date	August 2010 Monthly Result	Q3 2010 Sample Date	Q3 2010 Result	October 2010 Monthly Sample Date	October 2010 Monthly Result	Q4 2010 Sample Date	Q4 2010 Result	December 2010 Monthly Sample Date	December 2010 Monthly Result
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	4/26/2010	0.39	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/11/2010	***11.6***	NS	NA
MW-12 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	4/27/2010	7.16	NS	NA	NS	NA	NS	NA	NS	NA	9/20/2010	6.62	NS	NA	11/19/2010	***6.47***	NS	NA
	Selenium (ug/L)	25		NA		***25.7***		NA		NA		NA		NA		***31.9***		NA		***27.6***		NA
MW-15 (Class III)	Selenium (ug/L)	128.7		NA	4/21/2010	100	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/11/2010	99.5	NS	NA
	Iron (ug/L)	81.7		NA		ND		NA		NA		NA		NA		NA		NA		ND		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	5/4/2010	***3.73***	NS	NA	NS	NA	NS	NA	NS	NA	9/15/2010	***3.64***	NS	NA	11/18/2010	***3.57***	NS	NA
	Sulfate (mg/L)	1938.9		NA		***1950***		NA		NA		NA		NA		1930		NA		1910		NA
	Field pH (S.U.)	6.25-8.5		NA		***6.2***		NA		NA		NA		NA		7.23		NA		6.37		NA
	TDS (mg/L)	3198.77		NA		***3280***		NA		NA		NA		NA		3190		NA		3030		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	5/4/2010	***6.61 (6.66)***	NS	NA	NS	NA	NS	NA	NS	NA	9/15/2010	6.93	NS	NA	11/18/2010	6.8	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		0.9		NA		NA		NA		NA		NA		NA		1.2		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		2.6		NA		NA		NA		NA		NA		NA		2.4		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	4/22/2010	***6.18***	NS	NA	NS	NA	NS	NA	NS	NA	9/14/2010	7.05	NS	NA	11/22/2010	***6.44***	NS	NA
	Manganese (ug/L)	550		NA		184		NA		NA		NA		NA		NS		NA		65		NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	5/6/2010	***4.28***	NS	NA	NS	NA	NS	NA	NS	NA	9/21/2010	***5.06***	NS	NA	11/17/2010	***3.22***	NS	NA
	Fluoride (Mg/L)	0.36		NA		0.14		NA		NA		NA		NA		NA		NA		0.18		NA
	Thallium (ug/L)	1		NA		***1.3***		NA		NA		NA		NA		***1.57***		NA		***1.09***		NA
	Field pH (S.U.)	6.5 - 8.5		NA		***5.91 (5.78)***		NA		NA		NA		NA		6.64		NA		***6.1***		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	5/3/2010	***5.8***	NS	NA	NS	NA	NS	NA	NS	NA	9/14/2010	***5.9***	NS	NA	11/12/2010	***5.7***	NS	NA
	Chloride (mg/L)	38		NA		***42***		NA		NA		NA		NA		***42***		NA		***45***		NA
	Sulfate (mg/L)	462		NA		***469***		NA		NA		NA		NA		461		NA		452		NA
	Field pH (S.U.)	6.5-8.5		NA		6.78		NA		NA		NA		NA		7.68		NA		6.89		NA
	TDS (mg/L)	1075		NA		***1160***		NA		NA		NA		NA		1060		NA		***1110***		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		1.6		NA		NA		NA		NA		NA		NA		***2.4***		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	4/19/2010	***108***	NS	NA	NS	NA	NS	NA	NS	NA	9/14/2010	***106***	NS	NA	11/12/2010	***107***	NS	NA
	Manganese (ug/L)	1837		NA		1550		NA		NA		NA		NA		NA		NA		1510		NA
	Field pH (S.U.)	6.1 - 8.5		NA		***5.67***		NA		NA		NA		NA		***5.91***		NA		***5.72***		NA
MW-29 (Class III)	Iron (ug/L)	1869	NS	NA	4/27/2010	1630	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/9/2010	1490	NS	NA
	Manganese (ug/L)	5624		NA		4820		NA		NA		NA		NA				NA		4890		NA
	TDS (mg/L)	4400		NA		4400		NA		NA		NA		NA				NA		4390		NA
	Field pH (S.U.)	6.46 - 8.5		NA		6.82		NA		NA		NA		NA				NA		***6.17***		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	4/20/2010	***4.5***	NS	NA	NS	NA	NS	NA	NS	NA	9/13/2010	2.9	NS	NA	11/10/2010	***8.8***	NS	NA
	Field pH (S.U.)	6.4 - 8.5		NA		***6.03***		NA		NA		NA		NA		***6.33***		NA		***6.05***		NA

Notes:
GWCL values are taken from August 24, 2012 version of GWDP.
NS = Not Required and Not Sampled
NR = Required and Not Reported
NA = Not Applicable
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

			Q1 2011 Results						Q2 2011 Results						Q3 2011 Results						Q4 2011 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2011 Monthly Sample Date	January 2011 Monthly Sample Result	Q1 2011 Sample Date	Q1 2011 Result	March 2011 Monthly Sample Date	March 2011 Monthly Result	Q2 2011 Sample Date	Q2 2011 Result	May 2011 Monthly Sample Date	May 2011 Monthly Result	June 2011 Monthly Sample Date	June 2011 Monthly Result	July 2011 Monthly Sample Date	July 2011 Monthly Result	Q3 2011 Sample Date	Q3 2011 Result	September 2011 Monthly Sample Date	September 2011 Monthly Result	Q4 2011 Sample Date	Q4 2011 Result	November 2011 Monthly Sample Date	November 2011 Monthly Result	December 2011 Monthly Sample Date	December 2011 Monthly Result
Required Quarterly Sampling Wells																										
MW-11 (Class II)	Field pH (S.U.)	6.5 - 8.5	1/11/2011	7.43	2/2/2011	7.47	3/15/2011	7.94	4/4/2011	7.50	5/10/2011	7.25	6/15/2011	6.86	7/6/2011	7.07	8/3/2011	7.25	9/7/2011	7.29	10/4/2011	7.52	11/9/2011	7.47	12/14/2011	7.88
	Manganese (ug/L)	131.29		121		***145***		68		***148***		***170***		121		***151***	8/30/11	118		106		112		105		100
MW-14 (Class III)	Manganese (ug/L)	2230.30	1/11/2011	NA	2/7/2011	2020	3/14/2011	NA	4/4/2011	2140	5/10/2011	NA	6/15/2011	NA	7/5/2011	NA	8/3/2011	1990	9/8/2011	NA	10/4/2011	1960	11/9/2011	NA	12/12/2011	NA
	Field pH (S.U.)	6.5 - 8.5		***6.37***		***6.22***		6.76		6.63		***6.37***		***5.83***		***6.4***		***6.23 (6.41)***		6.50		6.71 (6.82)		6.63		6.84
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/11/2011	***6.44***	2/2/2011	6.66	3/15/2011	6.79	4/4/2011	6.7	5/11/2011	***6.1***	6/20/2011	***5.77***	7/6/2011	***6.29***	8/3/2011 8/30/11	***6.42 (6.54)***	9/7/2011	6.54	10/4/2011	6.6	11/9/2011	6.51	1212/2011	6.87
	Cadmium (ug/L)	1.5		NA		1.34		NA		1.27		NA		NA		NA	8/30/2012	1.19		NA		1.27		NA		NA
	Chloride (mg/L)	35		NA		30		NA		31		NA		NA		NA	8/3/2011	32		NA		32		NA		NA
	Uranium	6.5		***7.02***		4.77		***6.8***		5.56		***6.72***		***7.06***		***6.74***		6.37		5.96		5.27		***6.56***		6.1
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/12/2011	0.2	2/16/2011	0.25	3/15/2011	0.6	4/1/2011	***0.8***	5/10/2011	0.4	6/20/2011	0.3	7/6/2011	***0.9***	8/3/2011 8/30/11	0.6	9/7/2011	***2.4***	10/12/2011	***0.9***	11/9/2011	***1.3***	12/14/2011	***2.3***
	Uranium (ug/L)	41.8		32		***69.3***		31.8		***60.2***		***57.4***		18.5		***57.1***		19.0		***56.1***		***58.9***		***55.6***		***57***
	Chloroform (ug/L)	70		***800***		***730***		***1200***		***390***		***1900***		***730***		***300***		***1000***		***1300***		***440***		***1200***		***1400***
	Chloride (mg/L)	58.31		52		***59***		***64***		***64***		54		39		***64***		***60***		***66***		***61***		55		***62***
	Field pH (S.U.)	6.74 - 8.5		6.83		***6.06***		6.89		***6.22***		***6.43***		***6.52***		***6.35***		***6.07 (6.58)***		***6.71***		6.82		6.75		7.1
	Dichloromethane (Methylene Chloride) (ug/L)	5		<1.0		***10***		***14***		3.1		***20***		***7***		2.4		***10***		***7.9***		2.6		***8.9***		***11***
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/10/2011	***15***	2/1/2011	***16***	3/14/2011	***17***	4/11/2011	***16***	5/10/2011	***16***	6/20/2011	***17***	7/5/2011	***17***	8/3/2011	***14***	9/7/2011	***16***	10/4/2011	***16***	11/8/2011	***16***	12/12/2011	***16***
	Chloride (mg/L)	128		NS		***134***		NS		***134***		128		127		127		126		***145***		***129***		122		124
	Uranium (ug/L)	8.32		NS		5.97		NS		6.49		NS		NS		NS		8		NS		***9.83***		NS		NS
	Selenium (ug/L)	34		***36.2***		***34.7***		***34***		***44.4***		***38.3***		***38.7***		32.4		***39.7***		32.4		***36.6***		***36.8***		***38***
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/10/2011	***19***	2/1/2011	***21***	3/14/2011	***22***	4/1/2011	***21***	5/10/2011	***20***	6/20/2011	***22***	7/5/2011	***22***	8/2/2011	***20***	9/6/2011	***21***	10/3/2011	***21***	11/8/2011 (11/29/12)	***21***	12/12/2011	***21***
	TDS (mg/L)	1320		1240		1220		1250		***1370***		1290		***1330***		1280		1300		1300		1320		1290		***1330***
	Chloride (mg/L)	143		NS		***145***		NS		143		143		***145***		***148***		***148***		***148***		***145***		***145***		***148***
	Selenium (ug/L)	71		NS		64.6		NS		65.2		NS		NS		NS		66.2		NS		68.8		NS		NS
	Field pH (S.U.)	6.5 - 8.5		6.65		7.21		7.43		7.01		6.73		***6.16!***		6.64		6.67		7.03		7.28		7.01 (7.34)		7.46
	Sulfate (mg/L)	532		NS		***538***		531		503		512		***540***		532		***537***		***541***		***539***		***552***		530
MW-35 (Class II)	Manganese (ug/L)	200	NS	NA	2/15/2011	***248***	NS	NA	6/7/2011	***369***	NS	NA	NS	NA	7/20/11	***348***	8/30/2011	***267***	9/7/11	***270***	10/3/11	***271***	11/8/2011	***283***	12/14/11	***247***
	Thallium (ug/l)	0.5		NA		< 0.50		NA		< 0.50		NA		NA		NA		***0.52***		NA		***0.57***		< 0.50		***0.63***
	Molybdenum (ug/L)	10		NA		<10		NA		<10		NA		NA		NA		<10		NA		<10		NA		NA
	Gross Alpha minus Rn & U (pCi/L)	3.75		NA		2.6		NA		3.7		NA		NA		NA		***4.5***		NA		***4.4***		***4.7***		***4.2***
	Selenium (ug/L)	12.5		NA		ND		NA		ND		NA		NA		NA		9.3		NA		10.5		NA		NA
	Uranium (ug/L)	7.5		NA		***12.7***		NA		***21.7***		NA		NA		***24.2***		***18.3***		***22.3***		***20.1***		***24***		***23.6***
Required Semi-Annual Sampling Wells																										
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	NS	NA	NS	NA	4/11/2011	218	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	10/11/2011	206	NS	NA	NS	NA
	Tetrahydrofuran (ug/L)	11.5		NA		NA		NA	4/19/2011	10.7		NA		NA		NA		NA		NA		7.82		NA		NA
	Sulfate (mg/L)	838		NA		NA		NA	4/11/2011	704		NA		NA		NA		NA		NA		713		NA		NA
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	2/15/2011	***40.5***	NS	NA	4/13/2011	***45.4***	NS	NA	NS	NA	NS	NA	8/10/2011	***46***	NS	NA	10/10/2011	***46.7***	NS	NA	NS	NA
	Field pH (S.U.)	6.5 - 8.5		NA		***6.09***		NA		***6.46***		NA		NA		NA		***6.32***		NA		6.53 (6.83)		NA		NA
	Fluoride (Mg/L)	0.68		NA		***0.69***		NA		0.68		NA		NA		NA		***0.96***		NA		***0.91***		NA		NA
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/16/2011	***6.05***	NS	NA	4/13/2011	6.58	NS	NA	NS	NA	NS	NA	8/11/2011	***6.19***	NS	NA	10/11/2011	6.5 (6.92)	NS	NA	NS	NA
	Sulfate (mg/L)	3640		NA		***3730***		NA		3350		NA		NA		NA		3560		NA		***3750***		NA		NA
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		NA		NA		1.2		NA		NA		NA		NA		NA		1.1		NA		NA
	TDS (mg/L)	5805		NA		5770		NA		5720		NA		NA		NA		***5810***		NA		5630		NA		NA
	Selenium (ug/L)	89		NA		***99***		NA		85.8		NA		NA		NA		88.5		NA		***95***		NA		NA

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

			Q1 2011 Results						Q2 2011 Results						Q3 2011 Results						Q4 2011 Results					
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2011 Monthly Sample Date	January 2011 Monthly Sample Result	Q1 2011 Sample Date	Q1 2011 Result	March 2011 Monthly Sample Date	March 2011 Monthly Result	Q2 2011 Sample Date	Q2 2011 Result	May 2011 Monthly Sample Date	May 2011 Monthly Result	June 2011 Monthly Sample Date	June 2011 Monthly Result	July 2011 Monthly Sample Date	July 2011 Monthly Result	Q3 2011 Sample Date	Q3 2011 Result	September 2011 Monthly Sample Date	September 2011 Monthly Result	Q4 2011 Sample Date	Q4 2011 Result	November 2011 Monthly Sample Date	November 2011 Monthly Result	December 2011 Monthly Sample Date	December 2011 Monthly Result
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	2/14/2011	**29.5**	NS	NA	4/12/2011	7.16	NS	NA	NS	NA	NS	NA	8/9/2011	0.5	NS	NA	10/10/2011	4.52	NS	NA	NS	NA
MW-12 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/15/2011	**6.43**	NS	NA	4/5/2011	6.67	NS	NA	NS	NA	NS	NA	8/9/2011	**6.13**	NS	NA	10/6/2011	6.7 (6.97)	NS	NA	NS	NA
	Selenium (ug/L)	25		NA		**39**		NA		21.7		NA		NA		NA		**25.4**		NA		**35.4**		NA		NA
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	NS	NA	NS	NA	4/12/2011	116	NS	NA	NS	NA	NS	NA	NS	**NA**	NS	NA	10/10/2011	112	NS	NA	NS	NA
	Iron (ug/L)	81.7		NA		NA		NA		<0.50		NA		NA		NA	NS	NA		NA		**137**		NA		NA
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/15/2011	**3.49**	NS	NA	4/6/2011	**3.74**	NS	NA	NS	NA	NS	NA	8/10/2011 9/21/11	**4.0 3.39**	NS	NA	10/11/2011	**3.83**	NS	NA	NS	NA
	Sulfate (mg/L)	1938.9		NA		1770		NA		1780		NA		NA		NA		1910		NA		**2020**		NA		NA
	Field pH (S.U.)	6.25-8.5		NA		6.27		NA		6.71		NA		NA		NA		**5.95**		NA		6.55 (6.63)		NA		NA
	TDS (mg/L)	3198.77		NA		**3250**		NA		**3250**		NA		NA		NA		3190		NA		**3220**		NA		NA
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	2/21/2011	6.78	NS	NA	4/5/2011	7.03	NS	NA	NS	NA	NS	NA	7/20/3011	**6.65**	NS	NA	10/12/2011	6.88 (7.02)	NS	NA	NS	NA
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		NA		NA		0.5		NA		NA		NA		NA		NA		0.6		NA		NA
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		NS		NA		2.6		NA		NA		NA		NS		NA		**4.0**		NA		NA
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/9/2011	**6.13**	NS	NA	4/5/2011	7.14	NS	NA	NS	NA	NS	NA	8/4/2011	**6.38**	NS	NA	10/6/2011	6.56 (6.77)	NS	NA	NS	NA
	Manganese (ug/L)	550		NA		NS		NA		32		NA		NA		NA		NS		NA		**551**		NA		NA
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	2/10/2011	**2.78**	NS	NA	4/5/2011	**2.61**	NS	NA	NS	NA	NS	NA	8/4/2011	1.46	NS	NA	10/11/2011	1.78	NS	NA	NS	NA
	Fluoride (Mg/L)	0.36		NA		NA		NA		0.19		NA		NA		NA		NA		NA		0.36		NA		NA
	Thallium (ug/L)	1		NA		**1.42**		NA		**1.07**		NA		NA		NA		<0.50		NA		0.62		NA		NA
	Field pH (S.U.)	6.5 - 8.5		NA		**5.73**		NA		**6.12**		NA		NA		NA		**6.45**		NA		**6.44**		NA		NA
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/9/2011	**6**	NS	NA	4/5/2011	**6.4**	NS	NA	NS	NA	NS	NA	8/8/2011	**6**	NS	NA	10/5/2011	**6.3**	NS	NA	NS	NA
	Chloride (mg/L)	38		NA		**46**		NA		**43**		NA		NA		NA		**43**		NA		**44**		NA		NA
	Sulfate (mg/L)	462		NA		455		NA		442		NA		NA		NA		424		NA		456		NA		NA
	Field pH (S.U.)	6.5-8.5		NA		6.71		NA		6.79		NA		NA		NA		**6.39**		NA		7.17 (7.24)		NA		NA
	TDS (mg/L)	1075		NA		**1090**		NA		**1190**		NA		NA		NA		**1090**		NA		**1110**		NA		NA
	Gross Alpha minus Rn & U (pCi/L)	2		NA		0.7		NA		1.1		NA		NA		NA		0.8		NA		1.5		NA		NA
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	2/14/2011	**114**	NS	NA	4/11/2011	**109**	NS	NA	NS	NA	NS	NA	8/8/2011	105	NS	NA	10/5/2011	**143**	NS	NA	NS	NA
	Manganese (ug/L)	1837		NA		NA		NA		1690		NA		NA		NA		NA		NA		1540		NA		NA
	Field pH (S.U.)	6.1 - 8.5		NA		**5.69**		NA		**6.01**		NA		NA		NA		**5.78**		NA		**6.07** (6.11)		NA		NA
MW-29 (Class III)	Iron (ug/L)	1869	NS	NA	NS	NA	NS	NA	4/18/2011	**3010**	NS	NA	NS	NA	NS	NA	8/9/2011	1080	NS	NA	10/5/2011	1220	NS	NA	NS	NA
	Manganese (ug/L)	5624		NA	NS	NA		NA		4900		NA		NA		NA		NA		NA		4800		NA		NA
	TDS (mg/L)	4400		NA	NS	NA		NA		4080		NA		NA		NA		NA		NA		4280		NA		NA
	Field pH (S.U.)	6.46 - 8.5		NA	NS	NA		NA		**6.45**		NA		NA		NA		**6.20**		NA		6.52		NA		NA
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/9/2011	1.5	NS	NA	4/1/2011	**4.6**	NS	NA	NS	NA	NS	NA	8/2/2011 8/30/11	1.9	NS	NA	10/3/2011	**3.7**	NS	NA	NS	NA
	Field pH (S.U.)	6.4 - 8.5		NA		**5.99**		NA		**6.14**		NA		NA		NA		**6.10 (6.20)**		NA		**6.35**		NA		NA

Notes:
GWCL values are taken from August 24, 2012 version of GWDP.
NS = Not Required and Not Sampled
NR = Required and Not Reported
NA = Not Applicable
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.
! Values was below the GWCL. Field pH was monitored, tracked and reported for the required 8 quarters. The constituent was removed from accelerated reporting pursuant to the DRC latter dated 8/28/12.

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	Q1 2012 Results: January 2012 Monthly Sample Date	January 2012 Monthly Result	Q1 2012 Sample Date	Q1 2012 Result	March 2012 Monthly Sample Date	March 2012 Monthly Result	Q2 2012 Results: April 2012 Monthly Sample Date	April 2012 Monthly Result	Q2 2012 Sample Date	Q2 2012 Result	June 2012 Monthly Sample Date	June 2012 Monthly Result	Q3 2012 Results: Q3 2012 Sample Date	Q3 2012 Result	August 2012 Monthly Sample Date	August 2012 Monthly Result	September 2012 Monthly Sample Date	September 2012 Monthly Result	Q4 2012 Results: October 2012 Monthly Sample Date	October 2012 Monthly Result	Q4 2012 Sample Date	Q4 2012 Result	December 2012 Monthly Sample Date	December 2012 Monthly Result	Sample Frequency
Required Quarterly Sampling Wells																											
MW-11 (Class II)	Field pH (S.U.)	6.5 - 8.5	1/26/2012	7.51	2/13/2012	7.59	3/13/2012	7.47	4/10/2012	7.66	5/8/2012	7.49	6/19/2012	7.82	7/11/2012	7.74	8/7/2012	7.43	9/19/2012	7.91	10/23/2012	7.39	11/12/2012	7.47	12/24/2012	7.46	Quarterly
	Manganese (ug/L)	131.29		102		154		121		132		127		122		135		166		130		161		138		137	Quarterly
MW-14 (Class III)	Manganese (ug/L)	2230.30	1/24/2012	NA	2/21/2012	1790	3/14/2012	NA	4/12/2012	NA	5/9/2012	2360	6/19/2012	NA	7/11/2012	2100	8/7/2012	2300	9/18/2012	2140	10/23/2012	2110	11/27/2012	2100	12/18/2012	1950	Quarterly
	Field pH (S.U.)	6.5 - 8.5		6.36		6.57		6.51		6.97		6.73		6.90		6.89		6.58		7.08		6.83		6.52		6.60	Quarterly
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/25/2012	6.63	2/14/2012	6.83	3/14/2012	6.55	4/9/2012	6.58	5/2/2012	6.73	6/18/2012	6.99	7/10/2012	6.88	8/6/2012	6.55	9/18/2012	6.54	10/22/2012	6.54	11/12/2012	6.47	12/24/2012	6.62	Quarterly
	Cadmium (ug/L)	1.5		NA		1.31		NA		NA		1.33		NA		1.24		NA		NA		NA		1.56		NA	Quarterly
	Chloride (mg/L)	35		NA		30		NA		NA		30		NA		33		NA		NA		NA		28.8		NA	Quarterly
	Uranium	6.5		6.6		6.5		6.93		6.52		5.90		7.6		6.45		6.72		6.01		6.37		6.61		4.83	Quarterly
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/25/2012	1.9	2/15/2012	1.2	3/14/2012	3	4/11/2012	3.4	5/7/2012 6/26/2012	2.9	6/19/2012	2.3	7/11/2012	1.9	8/8/2012	1.6	9/19/2012	1.8	10/24/2012	3.5	11/15/2012	0.55	12/24/2012	1.46	Quarterly
	Uranium (ug/L)	41.8		64.6	2/21/2012	59.4		31.2		42.2		18.2		66.0		28.4		67.4		64.9		26.9		56.8		51.3	Quarterly
	Chloroform (ug/L)	70		1900	2/15/2012	3300		2900		2900		1700		2400	8/16/2012	970		2200		2300		4720		4020		1250	Quarterly
	Chloride (mg/L)	58.31		68		40		74		82		74		85	7/11/2012	78		78		67		2.62		52.9		65.9	Quarterly
	Field pH (S.U.)	6.74 - 8.5		6.59	2/15/2012 2/21/2012	6.72 (6.91) (6.71)		6.39		6.88		7.00 (7.01)		7.00	7/11/2012 8/16/2012	7.10 (6.80)		6.60		7.40		6.63		6.60		6.78	Quarterly
	Dichloromethane (Methylene Chloride) (ug/L)	5		13	2/15/2012	24		27		20		10		16	8/16/2012	4.9		17		9.8		15.0		34.6		5.5	Quarterly
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/24/2012	17	2/14/2012	17	3/14/2012	18	4/10/2012	17	5/2/2012	16	6/18/2012	15	7/10/2012	17	8/7/2012	18	9/19/2012	16	10/23/2012	16.2	11/13/2012	18.5	12/26/2012	17.2	Quarterly
	Chloride (mg/L)	128		124		126		128		128		124		131		128		139		130		135		114		122	Quarterly
	Uranium (ug/L)	8.32	NS	NA		7.42		8.38		7.84		6.81		7.8		7.64		8.04		7.67		7.86		7.03		5.80	Quarterly
	Selenium (ug/L)	34	1/24/2012	33.3		35		39.5		39.1		32.3		37		38.5		38.4		41.9		45.2		36		31.6	Quarterly
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/24/2012	21	2/13/2012	21	3/13/2012	22	4/9/2012	21	5/2/2012	20	6/18/2012 6/29/2012	21.6	7/9/2012	21	8/6/2012	21	9/18/2012	21	10/22/2012	18	11/6/2012	23.6	12/18/2012	22.2	Quarterly
	TDS (mg/L)	1320		1360		1240		1400		1380		1410		1460		1400		1400		1460		1320		1230		1270	Quarterly
	Chloride (mg/L)	143		155		150		152		160		151		138		161		175		172		157		189		170	Quarterly
	Selenium (ug/L)	71		NS		67.8		NS		NS		70.2		NA		74		NA		NA		NA		76.9		NA	Quarterly
	Field pH (S.U.)	6.5 - 8.5		6.78		7.37		7.13		7.14		7.19		7.28 (7.63)		7.53		6.96		7.1		7.05		7.04		7.10	Quarterly
	Sulfate (mg/L)	532		539		538		517		547		532		497		529		571		561		545		557		664	Quarterly
MW-35 (Class II)	Manganese (ug/L)	200	1/24/2012	264	2/14/2012	253	3/13/2012	269	4/10/2012	277	5/2/2012	258	6/19/2012	304	7/10/2012	272	8/8/2012	273	9/19/2012	283	10/23/2012	253	11/13/2012	241	12/18/2012	240	Quarterly
	Thallium (ug/l)	0.5		< 0.50		0.65		0.71		0.59		0.66		< 0.50		0.57		0.61		0.54		0.517		0.554		0.5	Quarterly
	Molybdenum (ug/L)	10		<10		<10		NA		NA		<10		NA		<10		NA		NA		NA		30.4		NA	Quarterly
	Gross Alpha minus Rn & U (pCi/L)	3.75		6.5		4.1		6.2		4.1		4.5		4.9		3.5		4.2		5.4		4.31		4.23		6.5	Quarterly
	Selenium (ug/L)	12.5		NA		19.7		NA		NA		11.4		7.0		15.9		18.8		8.2		19.0		15.4		12.1	Quarterly
	Uranium (ug/L)	7.5		16.1		24.7		24.9		22.4		22.2		22.5		24.5		26.2		22.9		22.4		21.8		21	Quarterly
Required Semi-Annual Sampling Wells																											
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	NS	NA	NS	NA	NS	NA	5/1/2012	176	NS	NA	NS	NA	NS	NA	NS	NA	NS	NA	11/27/2012	315	NS	NA	Semi-Annually
	Tetrahydrofuran (ug/L)	11.5		NA		NA		NA		NA		10.3		NA		NA		NA		NA		NA		21.8		NA	Semi-Annually
	Sulfate (mg/L)	838		NA		NA		NA		NA		659		NA		NA		NA		NA		NA		846		NA	Semi-Annually
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	2/29/2012	43.1	NS	NA	NS	NA	5/14/2012	52.8	NS	NA	7/18/2012	51.1	NS	NA	NS	NA	NS	NA	11/28/2012	58.9	NS	NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		6.63		NA		NA		6.67		NA		6.99		NA		NA		NA		6.55		NA	Semi-Annually
	Fluoride (Mg/L)	0.68		NA		0.86		NA		NA		1.04		NA		0.96		NA		NA		NA		1.26		NA	Semi-Annually
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/1/2012	6.46	NS	NA	NS	NA	5/15/2012	6.68	NS	NA	7/19/2012	7.01	NS	NA	NS	NA	NS	NA	11/29/2012	6.35	NS	NA	Semi-Annually
	Sulfate (mg/L)	3640		NA		3020		NA		NA		3220		NA		3700		NA		NA		NA		2780		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		NA		NA		NA		1.1		NA		NA		NA		NA		NA		1.31		NA	Semi-Annually
	TDS (mg/L)	5805		NA		5690		NA		NA		5730		NA		5720		NA		NA		NA		5610		NA	Semi-Annually
	Selenium (ug/L)	89		NA		65.8		NA		NA		85.1		NA		99.3		NA		NA		NA		111		NA	Semi-Annually

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

			Q1 2012 Results						Q2 2012 Results						Q3 2012 Results						Q4 2012 Results						
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2012 Monthly Sample Date	January 2012 Monthly Result	Q1 2012 Sample Date	Q1 2012 Result	March 2012 Monthly Sample Date	March 2012 Monthly Result	April 2012 Monthly Sample Date	April 2012 Monthly Result	Q2 2012 Sample Date	Q2 2012 Result	June 2012 Monthly Sample Date	June 2012 Monthly Result	Q3 2012 Sample Date	Q3 2012 Result	August 2012 Monthly Sample Date	August 2012 Monthly Result	September 2012 Monthly Sample Date	September 2012 Monthly Result	October 2012 Monthly Sample Date	October 2012 Monthly Result	Q4 2012 Sample Date	Q4 2012 Result	December 2012 Monthly Sample Date	December 2012 Monthly Result	Sample Frequency
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	2/28/2012	***18.6***	NS	NA	NS	NA	5/9/2012	1.23	NS	NA	7/16/2012	0.75	NS	NA	NS	NA	NS	NA	11/27/2012	0.402		NA	Semi-Annually
MW-12 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/29/2012	6.81	NS	NA	NS	NA	5/10/2012	6.91	NS	NA	7/17/2012	6.98	NS	NA	NS	NA	NS	NA	11/27/2012	6.54	NS	NA	Semi-Annually
	Selenium (ug/L)	25		NA		***27.2***		NA		NA		19.6		NA		20.7		NA		NA		NA		23		NA	Semi-Annually
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	2/22/2012	NA	NS	NA	NS	NA	5/9/2012	***152***	NS	NA	7/17/2012	120	NS	NA	NS	NA	NS	NA	11/14/2012	117		NA	Semi-Annually
	Iron (ug/L)	81.7		NA		< 30		NA		NA		< 30		NA		< 30		NA		NA		NA		<30		NA	Semi-Annually
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/27/2012	***3.63***	NS	NA	NS	NA	4/30/2012	***3.51***	NS	NA	7/18/2012	***3.73***	NS	NA	NS	NA	NS	NA	11/26/2012	***3.2***	NS	NA	Semi-Annually
	Sulfate (mg/L)	1938.9		NA		1920		NA		NA		1790		NA		1900		NA		NA		NA		1210		NA	Semi-Annually
	Field pH (S.U.)	6.25-8.5		NA		6.6		NA		NA		6.59		NA		6.64		NA		NA		NA		6.51		NA	Semi-Annually
	TDS (mg/L)	3198.77		NA		***3230***		NA		NA		***3280***		NA		***3220***		NA		NA		NA		3160		NA	Semi-Annually
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	2/28/2012	6.83	NS	NA	NS	NA	5/16/2012	6.86	NS	NA	7/19/2012	7.21	NS	NA	NS	NA	NS	NA	12/13/2012	***6.71***	NS	NA	Semi-Annually
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		NA		NA		NA		0.9		NA		NA		NA		NA		NA		***4.86***		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		***3.9***		NA		NA		***3.7***		NA		***4***		NA		NA		NA		***3.96***		NA	Semi-Annually
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	2/20/2012	6.61	NS	NA	NS	NA	5/16/2012	6.74	NS	NA	7/17/2012	7.10	NS	NA	NS	NA	NS	NA	12/5/2012	6.61	NS	NA	Semi-Annually
	Manganese (ug/L)	550		NA		51		NA		NA		49		NA		117		NA		NA		NA		54.3		NA	Semi-Annually
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	2/23/2012	2.25	NS	NA	NS	NA	5/10/2012	2.01	NS	NA	7/18/2012	***4.7***	NS	NA	NS	NA	NS	NA	11/29/2012	1.35	NS	NA	Semi-Annually
	Fluoride (Mg/L)	0.36		NA		NA		NA		NA		0.14		NA		NA		NA		NA		NA		***0.558***		NA	Semi-Annually
	Thallium (ug/L)	1		NA		0.96		NA		NA		0.74		NA		***1.36***		NA		NA		NA		0.666		NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		***6.03***		NA		NA		***6.21***		NA		***6.45***		NA		NA		NA		***6.01***		NA	Semi-Annually
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/28/2012	***6.4***	NS	NA	NS	NA	5/1/2012	***6.2***	NS	NA	7/16/2012	***6.7***	NS	NA	NS	NA	NS	NA	11/13/2012	***6.9***	NS	NA	Semi-Annually
	Chloride (mg/L)	38		NA		***45***		NA		NA		***46***		NA		***47***		NA		NA		NA		***44.2***		NA	Semi-Annually
	Sulfate (mg/L)	462		NA		451		NA		NA		446		NA		453		NA		NA		NA		451		NA	Semi-Annually
	Field pH (S.U.)	6.5-8.5		NA		7.24		NA		NA		7.03		NA		7.40		NA		NA		NA		6.69		NA	Semi-Annually
	TDS (mg/L)	1075		NA		***1140***		NA		NA		***1170***		NA		***1150***		NA		NA		NA		1070		NA	Semi-Annually
	Gross Alpha minus Rn & U (pCi/L)	2		NA		***2.3***		NA		NA		0.8		NA		1.2		NA		NA		NA		1.33		NA	Semi-Annually
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	2/28/2012	***109***	NS	NA	NS	NA	5/8/2012	***114***	NS	NA	7/16/2012	105	NS	NA	NS	NA	NS	NA	11/14/2012	***115***	NS	NA	Semi-Annually
	Manganese (ug/L)	1837		NA		NA		NA		NA		***1850***		NA	8/1/2012	1660		NA		NA		NA		1680		NA	Semi-Annually
	Field pH (S.U.)	6.1 - 8.5		NA		6.22		NA		NA		6.15		NA	7/16/2012 8/1/2012	***6.38*** ***(5.81)***		NA		NA		NA		***5.98***		NA	Semi-Annually
MW-29 (Class III)	Iron (ug/L)	1869	NS	NA	2/22/2012	1310	NS	NA	NS	NA	5/8/2012	1400	NS	NA	7/16/2012	1270	NS	NA	NS	NA	NS	NA	11/14/2012	1350	NS	NA	Semi-Annually
	Manganese (ug/L)	5624		NA		NA		NA		NA		***6140***		NA	8/1/2012	5190		NA		NA		NA		5040		NA	Semi-Annually
	TDS (mg/L)	4400		NA		NA		NA		NA		***4600***		NA	8/1/2012	***4420***		NA		NA		NA		***4430***		NA	Semi-Annually
	Field pH (S.U.)	6.46 - 8.5		NA		7.12		NA		NA		6.47		NA	7/16/2012 8/1/2012	***6.68*** ***(6.45)***		NA		NA		NA		6.48		NA	Semi-Annually
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/21/2012	1.8	NS	NA	NS	NA	4/30/2012	2.4	NS	NA	7/9/2012	1.4	NS	NA	NS	NA	NS	NA	11/6/2012	2.97	NS	NA	Semi-Annually
	Field pH (S.U.)	6.4 - 8.5		NA		6.57		NA		NA		6.40		NA		6.72		NA		NA		NA		***6.23***		NA	Semi-Annually

Notes:
GWCL values are taken from August 24, 2012 version of GWDP.
NS = Not Required and Not Sampled
NR = Required and Not Reported
NA = Not Applicable
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

			Q1 2013 Results						Q2 2013 Results						
Monitoring Well (Water Class)	Constituent Exceeding GWCL	GWCL in August 24, 2012 GWDP	January 2013 Monthly Sample Date	January 2013 Monthly Result	Q1 2013 Sample Date	Q1 2013 Result	March 2013 Monthly Sample Date	March 2013 Monthly Result	April Monthly 2013 Monthly Sample Date	April 2013 Monthly Result	Q2 2013 Sample Date	Q2 2013 Result	June 2013 Monthly Sample Date	June 2013 Monthly Result	Sample Frequency
Required Quarterly Sampling Wells															
MW-11 (Class II)	Field pH (S.U.)	6.5 - 8.5	1/23/2013	7.45	2/20/2013	7.46	3/20/2013	7.33	4/16/2013	6.17	5/14/2013	7.88	6/25/2013	7.47	Quarterly
	Manganese (ug/L)	131.29		115		139		164		181		144		135	Quarterly
MW-14 (Class III)	Manganese (ug/L)	2230.30	1/23/2013	1930	2/26/2013	2250	3/20/2013	2110	4/16/2013	2060	5/14/2013	2200	6/25/2013	1990	Quarterly
	Field pH (S.U.)	6.5 - 8.5		6.48		6.52		6.48		7.58		7.39		6.54	Quarterly
MW-25 (Class III)	Field pH (S.U.)	6.5 - 8.5	1/22/2013	6.65	2/20/2013	6.62	3/19/2013	6.41	4/17/2013	7.00	5/14/2013	7.19	6/24/2013	6.61	Quarterly
	Cadmium (ug/L)	1.5		NS		1.35		1.40		1.36		1.52		1.31	Quarterly
	Chloride (mg/L)	35		NS		36.1		NS		NS		28.1		30.4	Quarterly
	Uranium	6.5		5.97		5.39		5.68		5.56		5.88		5.35	Quarterly
MW-26 (Class III)	Nitrate + Nitrite (as N) (mg/L)	0.62	1/24/2013	1.66	2/20/2013	1.38	3/20/2013	1.61	4/17/2013	1.73	5/23/2013	2.01	6/5/2013 6/25/2013	3.04 2.11*	Quarterly
	Uranium (ug/L)	41.8		65.7		57.8		69		58.8		64.3		71.3	Quarterly
	Chloroform (ug/L)	70		1270		1500		1340		1680		1210		4030*	Quarterly
	Chloride (mg/L)	58.31		63.5		77		73.6		70.4		63.1		87.8 77.9*	Quarterly
	Field pH (S.U.)	6.74 - 8.5		6.51		6.71		6.70		6.96		7.31		6.85	Quarterly
	Dichloromethane (Methylene Chloride) (ug/L)	5		6.49		5.53		8.31		10.2		4.07		52.4* [12.1]	Quarterly
MW-30 (Class II)	Nitrate + Nitrite (as N) (mg/L)	2.5	1/23/2013	19.2	2/26/2013	21.4	3/20/2013	14.3	4/17/2013	16.8	5/15/2013	18.8	6/25/2013	16.1	Quarterly
	Chloride (mg/L)	128		128		129		126		117		119		127	Quarterly
	Uranium (ug/L)	8.32		8.36		7.4		6.85		7.08		6.31		8.22	Quarterly
	Selenium (ug/L)	34		37.2		42.3		39		37.3		39.4		32.1	Quarterly
MW-31 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5	1/22/2013	22.8	2/19/2013	19.3	3/19/2013	19.1	4/16/2013	18.8	5/13/2013	23.8	6/24/2013	20.0	Quarterly
	TDS (mg/L)	1320		1270		1390		1420		1260		1540		1380	Quarterly
	Chloride (mg/L)	143		176		174		168		171		169		179	Quarterly
	Selenium (ug/L)	71		NS		74.1		81.8		72.9		75.9		73.7	Quarterly
	Field pH (S.U.)	6.5 - 8.5		6.94		7.32		7.28		6.37		7.92		7.10	Quarterly
	Sulfate (mg/L)	532		611		644		611		668		630		659	Quarterly
MW-35 (Class II)	Manganese (ug/L)	200	1/23/2013	247	2/26/2013	272	3/19/13	246	4/17/2013	243	5/13/2013	252	6/24/2013	243	Quarterly
	Thallium (ug/l)	0.5		<0.5		<0.5		0.505		<0.5		0.715		0.946	Quarterly
	Molybdenum (ug/L)	10		NS		<10		<10		<10		<10		<10	Quarterly
	Gross Alpha minus Rn & U (pCi/L)	3.75		6.62		5.09		9.51		4.75		4.92		3.24	Quarterly
	Selenium (ug/L)	12.5		11.0		10.8		22.6		11.8		16.1		13.6	Quarterly
	Uranium (ug/L)	7.5		23.6		21.3		22.1		20.0		22.0		19.3	Quarterly
Required Semi-Annual Sampling Wells															
MW-01 (Class II)	Manganese (ug/L)	289	NS	NA	3/12/2013	173	NS	NA	NS	NA	5/21/2013	127	NS	NA	Semi-Annually
	Tetrahydrofuran (ug/L)	11.5		NA		12.6		NA		NA		3.26		NA	Semi-Annually
	Sulfate (mg/L)	838		NA		761		NA		NA		839		NA	Semi-Annually
MW-03 (Class III)	Selenium (ug/L)	37	NS	NA	3/12/2013	51.8	NS	NA	NS	NA	5/22/2013	46.3	NS	NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		6.20		NA		NA		7.14		NA	Semi-Annually
	Fluoride (Mg/L)	0.68		NA		0.902		NA		NA		0.994		NA	Semi-Annually
MW-03A (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/13/2013	6.84	NS	NA	NS	NA	5/23/2013	7.10	NS	NA	Semi-Annually
	Sulfate (mg/L)	3640		NA		3480		NA		NA		3120		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	1.3		NA		1.22		NA		NA		1.11		NA	Semi-Annually
	TDS (mg/L)	5805		NA		5750		NA		NA		6020		NA	Semi-Annually
	Selenium (ug/L)	89		NA		88.7		NA		NA		75.6		NA	Semi-Annually

APPENDIX A
GWCL Exceedances for Second Quarter 2013 under the August 24, 2012 GWDP

			Q1 2013 Results						Q2 2013 Results						
Monitoring Well (Water Class)	**Constituent Exceeding GWCL**	**GWCL in August 24, 2012 GWDP**	**January 2013 Monthly Sample Date**	**January 2013 Monthly Result**	**Q1 2013 Sample Date**	**Q1 2013 Result**	**March 2013 Monthly Sample Date**	**March 2013 Monthly Result**	**April Monthly 2013 Monthly Sample Date**	**April 2013 Monthly Result**	**Q2 2013 Sample Date**	**Q2 2013 Result**	**June 2013 Monthly Sample Date**	**June 2013 Monthly Result**	**Sample Frequency**
MW-05 (Class II)	Uranium (ug/L)	7.5	NS	NA	3/11/2013	***36***	NS	NA	NS	NA	5/14/2013	1.33	NS	NA	Semi-Annually
MW-12 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/6/2013	6.56	NS	NA	NS	NA	5/15/2013	7.19	NS	NA	Semi-Annually
	Selenium (ug/L)	25		NA		19.6		NA		NA		19.0		NA	Semi-Annually
MW-15 (Class III)	Selenium (ug/L)	128.7	NS	NA	3/5/2013	***137***	NS	NA	NS	NA	5/15/2013	120	NS	NA	Semi-Annually
	Iron (ug/L)	81.7		NA		<30		NA		NA		<30		NA	Semi-Annually
MW-18 (Class III)	Thallium (ug/l)	1.95	NS	NA	2/25/2013	***3.26***	NS	NA	NS	NA	5/20/2013	***2.81***	NS	NA	Semi-Annually
	Sulfate (mg/L)	1938.9		NA		1270		NA		NA		1860		NA	Semi-Annually
	Field pH (S.U.)	6.25-8.5		NA		6.35		NA		NA		6.97		NA	Semi-Annually
	TDS (mg/L)	3198.77		NA		***3350***		NA		NA		3160		NA	Semi-Annually
MW-19 (Class III)	Field pH (S.U.)	6.78-8.5	NS	NA	3/13/2013	***6.50***	NS	NA	NS	NA	5/20/2013	7.16	NS	NA	Semi-Annually
	Gross Alpha minus Rn & U (pCi/L)	2.36		NA		1.11		NA		NA		1.19		NA	Semi-Annually
	Nitrate + Nitrite (as N) (mg/L)	2.83		NA		***3.61***		NA		NA		***4.21***		NA	Semi-Annually
MW-23 (Class III)	Field pH (S.U.)	6.5 - 8.5	NS	NA	3/11/2013	***6.37***	NS	NA	NS	NA	5/23/2013	7.23	NS	NA	Semi-Annually
	Manganese (ug/L)	550		NA		137		NA		NA		24.3		NA	Semi-Annually
MW-24 (Class III)	Cadmium (ug/L)	2.5	NS	NA	3/13/2013	2.0	NS	NA	NS	NA	5/22/2013	1.32	NS	NA	Semi-Annually
	Fluoride (Mg/L)	0.36		NA		0.355		NA		NA		0.211		NA	
	Thallium (ug/L)	1		NA		0.88		NA		NA		0.618		NA	Semi-Annually
	Field pH (S.U.)	6.5 - 8.5		NA		***6.29***		NA		NA		6.77		NA	Semi-Annually
MW-27 (Class III)	Nitrate + Nitrite (as N) (mg/L)	5.6	NS	NA	2/25/2013	***7.94***	NS	NA	NS	NA	5/21/2013	***7.09***	NS	NA	Semi-Annually
	Chloride (mg/L)	38		NA		***50.3***		NA		NA		***44.3***		NA	Semi-Annually
	Sulfate (mg/L)	462		NA		431		NA		NA		***497***		NA	Semi-Annually
	Field pH (S.U.)	6.5-8.5		NA		7.03		NA		NA		7.58		NA	Semi-Annually
	TDS (mg/L)	1075		NA		***1140***		NA		NA		***1110***		NA	Semi-Annually
	Gross Alpha minus Rn & U (pCi/L)	2		NA		<1.0		NA		NA		1.57		NA	Semi-Annually
MW-28 (Class III)	Chloride (mg/L)	105	NS	NA	3/5/2013	***110***	NS	NA	NS	NA	5/15/2013	102	NS	NA	Semi-Annually
	Manganese (ug/L)	1837		NA		1680		NA		NA		1730		NA	Semi-Annually
	Field pH (S.U.)	6.1 - 8.5		NA		***6.00***		NA		NA		6.63		NA	Semi-Annually
MW-29 (Class III)	Iron (ug/L)	1869	NS	NA	3/6/2013	1350	NS	NA	NS	NA	5/23/2013	1250	NS	NA	Semi-Annually
	Manganese (ug/L)	5624		NA		5340		NA		NA		5140		NA	Semi-Annually
	TDS (mg/L)	4400		NA		***4500***		NA		NA		4340		NA	Semi-Annually
	Field pH (S.U.)	6.46 - 8.5		NA		***6.36***		NA		NA		6.88		NA	Semi-Annually
MW-32 (Class III)	Gross Alpha minus Rn & U (pCi/L)	3.33	NS	NA	2/19/2013	***5.02***	NS	NA	NS	NA	5/13/2013	***3.72***	NS	NA	Semi-Annually
	Field pH (S.U.)	6.4 - 8.5		NA		6.52		NA		NA		7.10		NA	Semi-Annually

Notes:
GWCL values are taken from August 24, 2012 version of GWDP.
NS = Not Required and Not Sampled
NR = Required and Not Reported
NA = Not Applicable
Exceedances are shown in yellow
Values in () parentheses are the field pH measurements for the resampled analyses.
* Data are reported from the 6/5/13 chlorofrm program sample.

APPENDIX B

Geochemical Analysis for Selenium in MW-31

Appendix B-1: Summary of Geochemical Analysis for Selenium in MW-31

Well	Constituent	N	% Non-Detected Values	Mean	Standard Deviation	Shapiro-Wilk Test for Normality		Normally or Lognormally distributed?	Least Squares Regression Trend Analysis		Significant Trend	Previously Identified Increasing Trend?	Highest Historical Value (HHV)	Mean + 2σ	BKG Rpt Proposed GWCL	Current GWCL	Flowsheet GWCL	Flowsheet GWCL Rationale
						W	p		r^2	p								
MW-31	Selenium	34	0	64.0559	7.2669	0.9626	0.2883	Yes	0.3508	0.0002	Yes	No	81.8	79	71	71	79	Mean +2SD

Notes:

σ = sigma
%ND = percent of non-detected values
µg/L = micrograms per liter
mg/L = milligrams per liter

N = number of valid data points
p = probability
W = Shapiro Wilk test value
r2 = The measure of how well the trendline fits the data where r2=1 represents a perfect fit.

Distribution = Distribution as determined by the Shapiro-Wilk distribution test for constituents with % Detect > 50% and N>8
Mean = The arithmatic mean as determined for normally or log-normally distributed constituents with % Detect > 50%
Standard Deviation = The standard deviation as determined for normally or log-normally distributed constituents with % Detect > 85%
Highest Historical Value = The highest observed value for constituents with % Detect < 50%

Appendix B-2: Comparison of Calculated and Measured TDS in MW-31

Date Sampled	Alkalinity (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)	Measured TDS (mg/L)	Calculated TDS (mg/L)	Ratio
6/22/2005	169	156	139	5.6	78.6	90.3	504	1290	1143	88.57%
3/19/2008	212	161	124	6.2	78.2	91	521	1220	1193	97.82%
6/3/2008	197	163	128	5.96	80.8	93.7	514	1180	1182	100.21%
8/4/2008	210	180	124	6.07	88.3	94.4	499	1240	1202	96.92%
11/11/2008	205	180	119	6.2	84.9	97	541	1220	1233	101.07%
2/3/2009	205	169	115	5.4	80.1	82.8	488	1210	1145	94.65%
5/13/2009	209	146	124	5.1	72.7	84	493	1230	1134	92.18%
8/24/2009	215	169	122	6	79.4	92.7	460	1230	1144	93.02%
10/14/2009	214	170	138	6.09	78.5	93.6	497	1160	1197	103.21%
2/9/2010	224	170	128	6.2	80.2	92.2	507	1150	1208	105.01%
4/20/2010	220	162	128	5.8	79.4	91.3	522	1220	1209	99.06%
9/13/2010	226	164	139	5.74	78.1	91	527	1330	1231	92.54%
11/9/2010	216	166	138	5.9	77.8	85.4	539	1320	1228	93.04%
2/1/2011	211	168	145	5.75	79.6	91.6	538	1220	1239	101.55%
4/1/2011	213	172	143	6.1	80.1	95	503	1370	1212	88.48%
8/2/2011	199	172	148	5.7	81.2	95.3	537	1300	1238	95.25%
10/3/2011	202	177	145	5.9	83.3	85.5	539	1320	1238	93.77%
2/13/2012	203	190	150	6	87.9	97.2	538	1240	1272	102.59%
5/2/2012	208	187	151	7	88	87.9	532	1410	1261	89.43%
7/9/2012	202	189	161	6	90.1	98	529	1400	1275	91.08%
11/6/2012	172	182	189	5.65	86.5	92.6	557	1230	1285	104.45%
2/19/2013	178	200	174	6.37	91.6	98.6	**644**	1390	1393	100.18%
5/13/2013	174	191	169	5.52	90.9	99.2	630	1540	1360	88.29%

Appendix B-3: Charge Balance Calcultions for Major Cations and Anions in MW-31

Well	Date	Calcium (meq/L)	Sodium (meq/L)	Magnesium (meq/L)	Potassium (meq/L)	Total Cation Charge (meq/L)	HCO_3 (meq/L)	Chloride (meq/L)	SO_4 (meq/L)	Total Anion Charge (meq/L)	Percent Difference
MW-31	6/22/2005	7.78	3.93	6.47	0.14	**18.32**	-2.77	-3.92	-10.49	**-17.18**	6.21%
MW-31	3/19/2008	8.03	3.96	6.43	0.16	**18.58**	-3.47	-3.50	-10.85	**-17.82**	4.12%
MW-31	6/3/2008	8.13	4.08	6.65	0.15	**19.01**	-3.23	-3.61	-10.70	**-17.54**	7.73%
MW-31	8/4/2008	8.98	4.11	7.26	0.16	**20.51**	-3.44	-3.50	-10.39	**-17.33**	15.50%
MW-31	11/11/2008	8.98	4.22	6.98	0.16	**20.34**	-3.36	-3.36	-11.26	**-17.98**	11.62%
MW-31	2/3/2009	8.43	3.60	6.59	0.14	**18.76**	-3.36	-3.24	-10.16	**-16.76**	10.65%
MW-31	5/13/2009	7.29	3.65	5.98	0.13	**17.05**	-3.43	-3.50	-10.26	**-17.19**	-0.80%
MW-31	8/24/2009	8.43	4.03	6.53	0.15	**19.15**	-3.52	-3.44	-9.58	**-16.54**	13.62%
MW-31	10/14/2009	8.48	4.07	6.46	0.16	**19.17**	-3.51	-3.89	-10.35	**-17.75**	7.41%
MW-31	2/9/2010	8.48	4.01	6.60	0.16	**19.25**	-3.67	-3.61	-10.56	**-17.84**	7.34%
MW-31	4/20/2010	8.08	3.97	6.53	0.15	**18.74**	-3.61	-3.61	-10.87	**-18.08**	3.48%
MW-31	9/13/2010	8.18	3.96	6.43	0.15	**18.71**	-3.70	-3.92	-10.97	**-18.60**	0.63%
MW-31	11/9/2010	8.28	3.71	6.40	0.15	**18.55**	-3.54	-3.89	-11.22	**-18.65**	-0.57%
MW-31	2/1/2011	8.38	3.98	6.55	0.15	**19.06**	-3.46	-4.09	-11.20	**-18.75**	1.65%
MW-31	4/1/2011	8.58	4.13	6.59	0.16	**19.46**	-3.49	-4.03	-10.47	**-18.00**	7.52%
MW-31	8/2/2011	8.58	4.15	6.68	0.15	**19.55**	-3.26	-4.17	-11.18	**-18.62**	4.80%
MW-31	10/3/2011	8.83	3.72	6.85	0.15	**19.56**	-3.31	-4.09	-11.22	**-18.62**	4.77%
MW-31	2/13/2012	9.48	4.23	7.23	0.15	**21.09**	-3.33	-4.23	-11.20	**-18.76**	11.07%
MW-31	5/2/2012	9.33	3.82	7.24	0.18	**20.57**	-3.41	-4.26	-11.08	**-18.74**	8.89%
MW-31	7/9/2012	9.43	4.26	7.41	0.15	**21.26**	-3.31	-4.54	-11.01	**-18.87**	11.26%
MW-31	11/6/2012	9.08	4.03	7.12	0.14	**20.37**	-2.82	-5.33	-11.60	**-19.75**	3.06%
MW-31	2/19/2013	9.98	4.29	7.54	0.16	**21.97**	-2.92	-4.91	-13.41	**-21.23**	3.34%
MW-31	5/13/2013	9.53	4.31	7.48	0.14	**21.47**	-2.85	-4.77	-13.12	**-20.74**	3.40%

Notes:

meq/L= milliequivalent per liter

HCO_3 = Bicarbonate

SO_4 = Sulfate

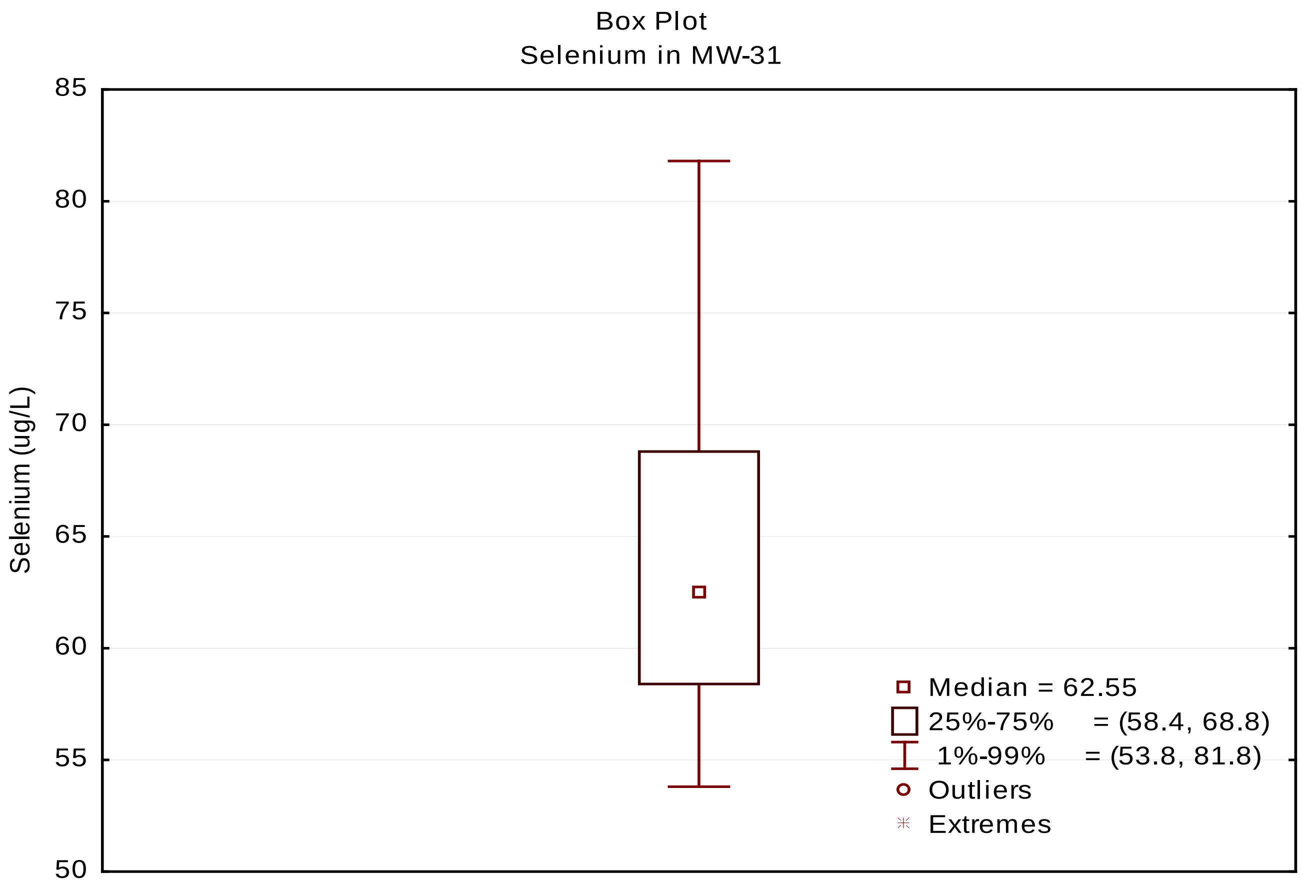
Appendix B-4: Descriptive Statistics for Selenium in MW-31

Data Set	Analyte	Units	% Non-Detects	N	Distribution	Mean	Min. Conc.	Max. Conc.	Std. Dev.	Range	Geometric Mean	Skewness	Q25	Median	Q75
2013 SAR	Selenium	µg/L	0	34	normal or lognormal	64.1	53.8	81.8	7.3	28.0	63.7	0.61	58.4	62.6	68.8
Background Report	Selenium	µg/L	0	10	normal or lognormal	62.6	56.6	70.1	4.2	13.5	62.5	0.5	59.2	62.4	65.8

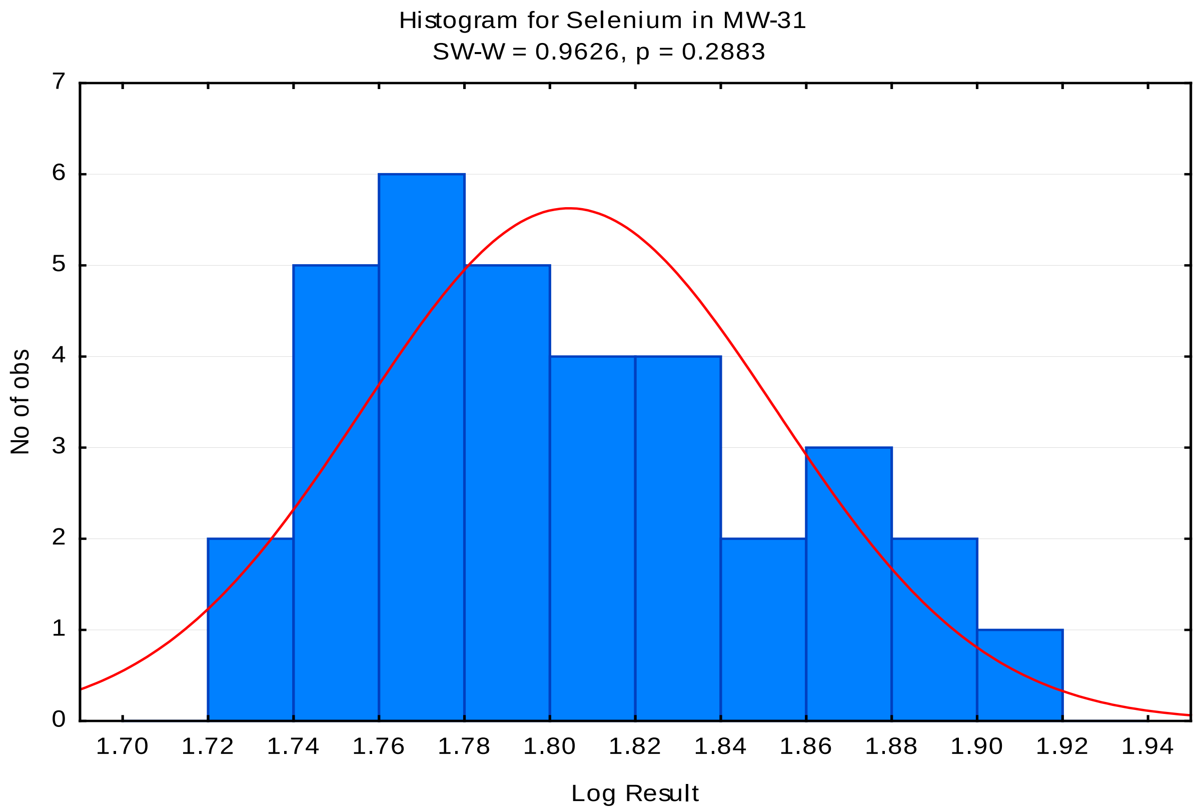
Appendix B-5: Selenium in MW-31 Data Used for Analysis

Field Sample ID	Location ID	SDG	Date Sampled	Parameter Name	Report Result	Log Result	Report Units	Lab Qualifier	Lab Detection Limit/MDC	Detected	Sample Matrix	Sample Purpose	Sample Type
MW-31_06222005	MW-31		6/22/2005	Selenium	68	1.832508913	ug/L			Y	WATER	REG	GW
MW-31_09222005	MW-31		9/22/2005	Selenium	58.6	1.767897616	ug/L			Y	WATER	REG	GW
MW-31_12142005	MW-31		12/14/2005	Selenium	62.6	1.796574333	ug/L			Y	WATER	REG	GW
MW-31_03222006	MW-31		3/22/2006	Selenium	62.5	1.795880017	ug/L			Y	WATER	REG	GW
MW-31_06212006	MW-31		6/21/2006	Selenium	70.1	1.845718018	ug/L			Y	WATER	REG	GW
MW-31_09132006	MW-31		9/13/2006	Selenium	65.8	1.818225894	ug/L		5	Y	WATER	REG	GW
MW-31_10252006	MW-31		10/25/2006	Selenium	62.3	1.794488047	ug/L		5	Y	WATER	REG	GW
MW-31_03152007	MW-31		3/15/2007	Selenium	59.2	1.772321707	ug/L			Y	WATER	REG	GW
MW-31_08272007	MW-31		8/27/2007	Selenium	60.8	1.783903579	ug/L			Y	WATER	REG	GW
MW-31_10242007	MW-31		10/24/2007	Selenium	56.6	1.752816431	ug/L			Y	WATER	REG	GW
MW 31_03192008	MW-31	C08030921	3/19/2008	Selenium	54.4	1.7355989	ug/L		5	Y	WATER	REG	GW
MW 31_06032008	MW-31	C08060292	6/3/2008	Selenium	55.3	1.742725131	ug/L		5	Y	WATER	REG	GW
MW 31_08042008	MW-31	C08080344	8/4/2008	Selenium	56.4	1.751279104	ug/L		5	Y	WATER	REG	GW
MW 31_11112008	MW-31	C08110568	11/11/2008	Selenium	53.8	1.730782276	ug/L		5	Y	WATER	REG	GW
MW 31_02032009	MW-31	C09020234	2/3/2009	Selenium	55.6	1.745074792	ug/L		5	Y	WATER	REG	GW
MW 31_05132009	MW-31	C09050510	5/13/2009	Selenium	56.1	1.748962861	ug/L		5	Y	WATER	REG	GW
MW 31_08242009	MW-31	C09081027	8/24/2009	Selenium	58.2	1.764922985	ug/L		5	Y	WATER	REG	GW
MW 31_10142009	MW-31	C09100623	10/14/2009	Selenium	58.4	1.766412847	ug/L		5	Y	WATER	REG	GW
MW-31_02092010	MW-31	C10020458	2/9/2010	Selenium	60.8	1.783903579	ug/L		5	Y	WATER	REG	GW
MW 31_04202010	MW-31	C10040828	4/20/2010	Selenium	59.6	1.77524626	ug/L		5	Y	WATER	REG	GW
MW 31_09132010	MW-31	C10090689	9/13/2010	Selenium	64.4	1.808885867	ug/L		5	Y	WATER	REG	GW
MW 31_11092010	MW-31	C10110505	11/9/2010	Selenium	60	1.77815125	ug/L		5	Y	WATER	REG	GW
MW-31_02012011	MW-31	C11020163	2/1/2011	Selenium	64.6	1.810232518	ug/L		5	Y	WATER	REG	GW
MW-31_04012011	MW-31	C11040106	4/1/2011	Selenium	65.2	1.814247596	ug/L		5	Y	WATER	REG	GW
MW-31_08022011	MW-31	C11080269	8/2/2011	Selenium	66.2	1.820857989	ug/L		5	Y	WATER	REG	GW
MW-31_10032011	MW-31	C11100300	10/3/2011	Selenium	68.8	1.837588438	ug/L		5	Y	WATER	REG	GW
MW-31_02132012	MW-31	C12020681	2/13/2012	Selenium	67.8	1.831229694	ug/L		5	Y	WATER	REG	GW
MW-31_05022012	MW-31	C12050196	5/2/2012	Selenium	70.2	1.846337112	ug/L		5	Y	WATER	REG	GW
MW-31_07092012	MW-31	C12070448	7/9/2012	Selenium	74	1.86923172	ug/L		5	Y	WATER	REG	GW
MW-31_11062012	MW-31	314781	11/6/2012	Selenium	76.9	1.88592634	ug/L		5	Y	WATER	REG	GW
MW-31_02192013	MW-31	1302339	2/19/2013	Selenium	74.1	1.869818208	ug/L		0.005	Y	WATER	REG	GW
MW-31_03192013	MW-31	1303552	3/19/2013	Selenium	81.8	1.912753304	ug/L		0.005	Y	WATER	REG	GW
MW-31_04162013	MW-31	1304547	4/16/2013	Selenium	72.9	1.862727528	ug/L		0.005	Y	WATER	REG	GW
MW-31_05132013	MW-31	1305419	5/13/2013	Selenium	75.9	1.880241776	ug/L		0.005	Y	WATER	REG	GW

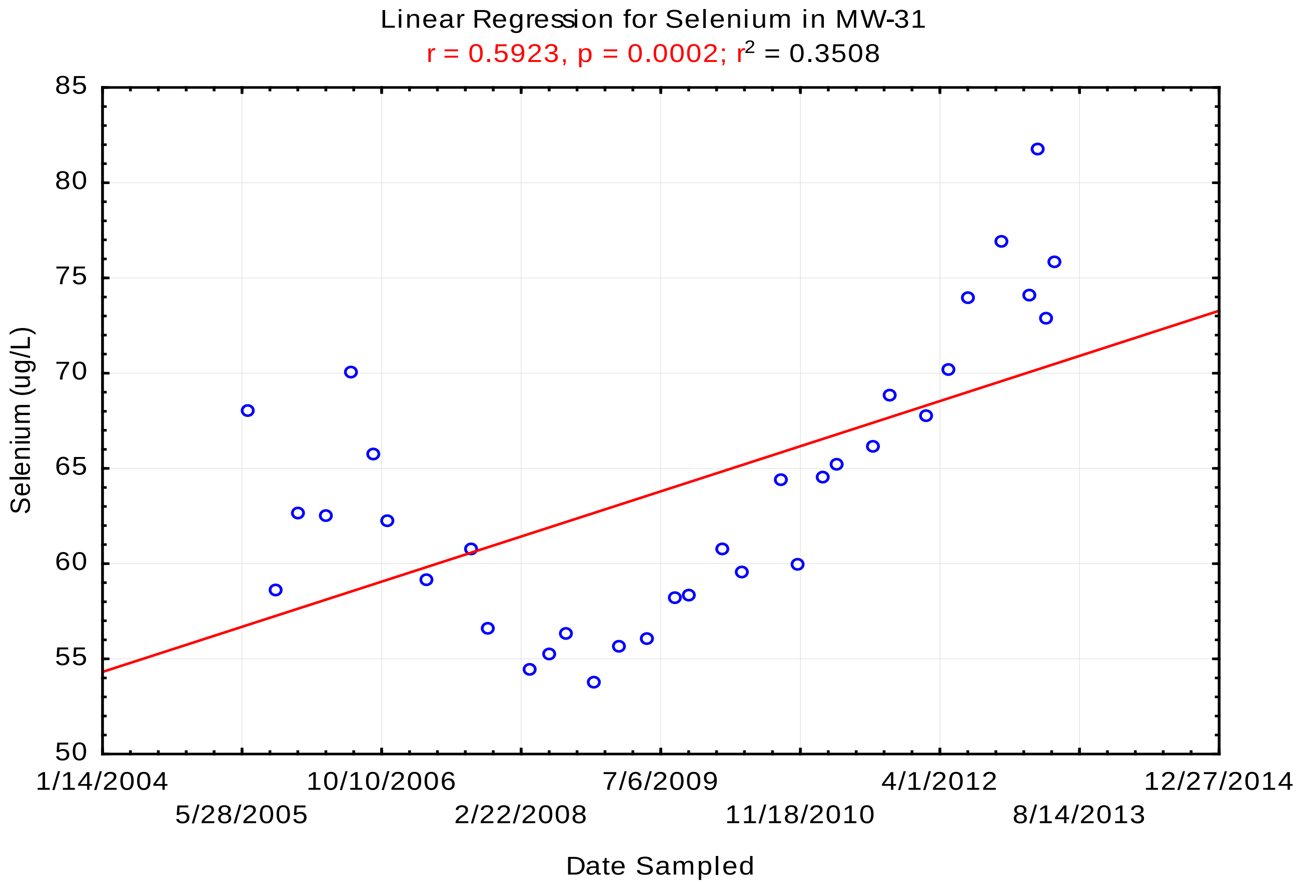
Appendix B-6: Box Plot



Appendix B-7: Histogram



Appendix B-8: Linear Regression



Appendix B-9: Selenium and pH Trend Summary for Groundwater Monitoring Wells

Location ID	N	% Detected	Shapiro-Wilk		Regression		Mann-Kendall		Selenium		pH Trend		Currently Out of compliance for Se?
			W	P	r2	p	S	p	Trend	Significant	pH Trend	Significant	
MW-01	35	43%	0.653	0.000			25	0.339	none	no	down	no	
MW-02	60	80%	0.884	0.000			179	0.127	none	no	down	no	
MW-03	75	84%	0.888	0.000			1894	0	increasing	yes	down	yes	yes
MW-03A	27	100%	0.974	0.711	0.238	0.010			increasing	yes	down	yes	yes
MW-05	25	52%	0.763	0.000			44	0.132	increasing	no	down	no	
MW-11	72	17%	0.766	0.000			1116	5.50E-10	increasing	yes	down	yes	
MW-12	43	84%	0.839	0.000			540	7.04E-09	increasing	yes	down	yes	yes
MW-14	56	18%	0.768	0.000			624	1.42E-07	increasing	yes	down	yes	
MW-15	47	85%	0.713	0.000			771	7.61E-13	increasing	yes	down	yes	
MW-17	29	59%	0.911	0.019			316	1.04E-09	increasing	yes	down	yes	
MW-18	26	23%	0.788	0.000			93	0.009	increasing	yes	down	yes	
MW-19	33	91%	0.813	0.000			20	0.384	increasing	no	down	no	
MW-20	16	0%	NA	NA					none-all ND		up	no	
MW-22	17	100%	0.930	0.219	0.250	0.041			increasing	yes	down	yes	
MW-23	21	0%	NA	NA					none-all ND		down	no	
MW-24	23	0%	NA	NA					none-all ND		down	yes	
MW-25	34	0%	NA	NA					none-all ND		down	yes	
MW-26	42	38%	0.743	0.000			163	0.020	increasing	yes	flat	no	
MW-27	27	100%	0.968	0.554	0.235	0.010			increasing	yes	down	no	
MW-28	27	44%	0.698	0.000			-79	0.033	decreasing	yes	down	no	
MW-29	23	0%	NA	NA					none-all ND		down	no	
MW-30	58	100%	0.956	0.036			775	1.03E-07	increasing	yes	down	yes	yes
MW-31	37	100%	0.959	0.182	0.413	0.000			increasing	yes	down	no	yes
MW-32	28	4%	NA	NA					NA		down	yes	
MW-35	21	86%	0.944	0.257	0.243	0.023			increasing	yes	down	no	yes
MW-36	9	100%	0.955	0.748	0.101	0.405			increasing	no	up	no	
MW-37	8	75%	0.913	0.375	0.450	0.069			increasing	no	down	yes	

APPENDIX C

Geochemical Analysis for Indicator Parameters in MW-31

Appendix C-1: Summary of Geochemical Analysis for Indicator Parameters in MW-31

Well	Constituent	N	% Non-Detected Values	Mean	Standard Deviation	Shapiro-Wilk Test for Normality		Normally or Lognormally distributed?	Least Squares Regression Trend Analysis[a]		Mann-Kendall Trend Analysis[b]		Previously Identified Increasing Trend?	Significant Trend
						W	p		r^2	p	S	p		
MW-31	Chloride (mg/L)	50	0	145.6200	18.0565	0.971	0.2543	Yes	0.5567	0				Increasing
MW-31	Fluoride (mg/L)	31	0	0.8611	0.0600	0.9753	0.6727	Yes	0.4448	0.00004				Decreasing
MW-31	Sulfate (mg/L)	47	0	527.4681	34.5271	0.941	0.0195	No			567	1.03E-07	Yes	Increasing
MW-31	Uranium (µg/L)	32	0	7.3478	0.7425	0.9666	0.4116	Yes	0.004	0.7301				None

Notes:

σ = sigma
%ND = percent of non-detected values
µg/L = micrograms per liter
mg/L = milligrams per liter

N = number of valid data points
p = probability
W = Shapiro-Wilk test value
r2 = The measure of how well the trendline fits the data where r2=1 represents a perfect fit.

S = Mann-Kendall statistic

a = A regression test was performed on data that was determined to have normal or log-normal distribution
b = The Mann-Kendall test was performed on data that are not normally or lognormally distributed

Appendix C-2: Descriptive Statistics for Indicator Parameters in MW-31

Data Set	Analyte	Units	% Non-Detects	N	Normally or Lognormallly Distributed?	Mean	Min. Conc.	Max. Conc.	Std. Dev.	Range	Geometric Mean	Skewness	Q25	Median	Q75
2013 SAR	Chloride	mg/L	0	50	Yes	145.6	115.0	189.0	18.1	74.0	144.6	0.50	132.0	144.0	157.0
	Fluoride	mg/L	0	31	No	0.9	0.7	1.0	0.1	0.3	0.9	-0.17	0.8	0.9	0.9
	Sulfate	mg/L	0	47	No	527.5	436.0	630.0	34.5	194.0	526.4	0.56	507.0	529.0	540.0
	Uranium	ug/L	0	32	Yes	7.3	5.8	9.3	0.7	3.6	7.3	0.73	6.9	7.2	7.7
2008 Background Report	Chloride	mg/L	0	10	Yes	132.9	122.0	139.0	5.2	17.0	132.8	-1.1	131.0	134.0	136.0
	Fluoride	mg/L	0	10	No	0.9	0.8	1.2	0.1	0.4	0.9	1.9	0.9	0.9	0.9
	Sulfate	mg/L	0	10	No	504.3	436.0	532.0	27.8	96.0	503.6	-1.9	497.0	512.5	522.0
	Uranium	ug/L	0	10	Yes	7.6	6.6	9.3	0.7	2.8	7.6	1.2	7.2	7.4	8.0

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	SDG	Sample Date	Parameter	Result	Units	QUAL
MW-31	9/24/2007	6/22/2005	Chloride	139	mg/L	
MW-31	9/14/2007	9/22/2005	Chloride	136	mg/L	
MW-31	9/16/2007	12/14/2005	Chloride	135	mg/L	
MW-31	9/17/2007	3/22/2006	Chloride	133	mg/L	
MW-31	9/18/2007	6/21/2006	Chloride	138	mg/L	
MW-31	9/17/2007	9/13/2006	Chloride	131	mg/L	
MW-31	9/18/2007	10/25/2006	Chloride	127	mg/L	
MW-31	9/20/2007	3/15/2007	Chloride	132	mg/L	
MW-31	1/22/2008	8/27/2007	Chloride	136	MG/L	
MW-31	2/21/2008	10/24/2007	Chloride	122	mg/L	
MW-31	C08030921	3/19/2008	Chloride	124	mg/L	
MW-31	C08060292	6/3/2008	Chloride	128	mg/L	
MW-31	C08080344	8/4/2008	Chloride	124	mg/L	
MW-31	C08110568	11/11/2008	Chloride	119	mg/L	
MW-31	C09020234	2/3/2009	Chloride	115	mg/L	
MW-31	C09050510	5/13/2009	Chloride	124	mg/L	
MW-31	C09081027-009	8/24/2009	Chloride	122	mg/L	
MW-31	C09100623-008	10/14/2009	Chloride	138	mg/L	
MW-31	C10020458	2/9/2010	Chloride	128	mg/L	
MW-31	C10040828	4/20/2010	Chloride	128	mg/L	
MW-31	C10090689	9/13/2010	Chloride	139	mg/L	
MW-31	C10110505	11/9/2010	Chloride	138	mg/L	
MW-31	C11020163	2/1/2011	Chloride	145	mg/L	
MW-31	C11040106-002	4/1/2011	Chloride	143	mg/L	
MW-31	C11050449-005	5/10/2011	Chloride	143	mg/L	
MW-31	C11060884-005	6/20/2011	Chloride	145	mg/L	
MW-31	C11070274-005A	7/5/2011	Chloride	148	mg/L	
MW-31	C11080269-008A	8/2/2011	Chloride	148	mg/L	
MW-31	C11090325-005A	9/6/2011	Chloride	148	mg/L	
MW-31	C11100300-011	10/3/2011	Chloride	145	mg/L	
MW-31	C11110484-005	11/8/2011	Chloride	145	mg/L	
MW-31	C11120540-005	12/12/2011	Chloride	148	mg/L	
MW-31	C12010822-005A	1/24/2012	Chloride	155	mg/L	
MW-31	C12020681-005A	2/13/2012	Chloride	150	mg/L	
MW-31	C12030624-005A	3/13/2012	Chloride	152	mg/L	
MW-31	C12040736	4/9/2012	Chloride	160	mg/L	
MW-31	C12050196	5/2/2012	Chloride	151	mg/L	
MW-31	C12060935	6/18/2012	Chloride	138	mg/L	
MW-31	MW-31_07092012	7/9/2012	Chloride	161	mg/L	
MW-31	MW-31_08062012	8/6/2012	Chloride	175	mg/L	
MW-31	C12090804	9/18/2012	Chloride	172	mg/L	
MW-31	1210420	10/22/2012	Chloride	157	mg/L	
MW-31	1211109	11/6/2012	Chloride	189	mg/L	
MW-31	1212473	12/18/2012	Chloride	170	mg/L	
MW-31	1301517	1/22/2013	Chloride	176	mg/L	
MW-31	1302339	2/19/2013	Chloride	174	mg/L	

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	SDG	Sample Date	Parameter	Result	Units	QUAL
MW-31	1303552	3/19/2013	Chloride	168	mg/L	
MW-31	1304547	4/16/2013	Chloride	171	mg/L	
MW-31	1305419	5/13/2013	Chloride	169	mg/L	
MW-31	1306566	6/24/2013	Chloride	179	mg/L	
MW-31	C05061037	6/24/2005	Fluoride	0.83	mg/L	
MW-31	C05091152	9/27/2005	Fluoride	0.91	mg/L	
MW-31	C05120754	12/16/2005	Fluoride	0.85	mg/L	
MW-31	C06031287	3/30/2006	Fluoride	0.9	mg/L	
MW-31	C06061214	6/23/2006	Fluoride	0.86	mg/L	
MW-31	C06090583	9/14/2006	Fluoride	0.94391324	mg/L	
MW-31	C07030904	3/20/2007	Fluoride	0.94193656	mg/L	
MW-31	C07081677	8/31/2007	Fluoride	0.98863962	mg/L	
MW-31	C07101341	10/26/2007	Fluoride	0.85	mg/L	
MW-31	C08030921	3/21/2008	Fluoride	0.92	mg/L	
MW-31	C08060292	6/6/2008	Fluoride	0.94	mg/L	
MW-31	C08080344	8/8/2008	Fluoride	0.85	mg/L	
MW-31	C09020234	2/5/2009	Fluoride	0.91	mg/L	
MW-31	C09050510	5/15/2009	Fluoride	0.9	mg/L	
MW-31	C09081027	8/27/2009	Fluoride	0.89	mg/L	
MW-31	C09100623	10/15/2009	Fluoride	0.9	mg/L	
MW-31	C10020458	2/9/2010	Fluoride	0.88	mg/L	
MW-31	C10020458	2/16/2010	Fluoride	0.88	mg/L	
MW-31	C10040828	4/20/2010	Fluoride	0.84	mg/L	
MW-31	C10090689	9/13/2010	Fluoride	0.89	mg/L	
MW-31	C10110505	11/9/2010	Fluoride	0.84	mg/L	
MW-31	C11020163	2/1/2011	Fluoride	0.83	mg/L	
MW-31	C11040106-002	4/1/2011	Fluoride	0.83	mg/L	
MW-31	C11080269-008A	8/2/2011	Fluoride	0.8	mg/L	
MW-31	C11100300-011	10/3/2011	Fluoride	0.84	mg/L	
MW-31	C12020681-005A	2/13/2012	Fluoride	0.86	mg/L	
MW-31	C12050196	5/2/2012	Fluoride	0.78	mg/L	
MW-31	MW-31_07092012	7/9/2012	Fluoride	0.78	mg/L	
MW-31	1211109	11/6/2012	Fluoride	0.763	mg/L	
MW-31	1302339	2/19/2013	Fluoride	0.733	mg/L	
MW-31	1305419	5/13/2013	Fluoride	0.764	mg/L	
MW-31	9/24/2007	6/22/2005	Sulfate	504	mg/L	D
MW-31	9/14/2007	9/22/2005	Sulfate	436	mg/L	D
MW-31	9/16/2007	12/14/2005	Sulfate	509	mg/L	D
MW-31	9/17/2007	3/22/2006	Sulfate	485	mg/L	D
MW-31	9/18/2007	6/21/2006	Sulfate	522	mg/L	D
MW-31	9/17/2007	9/13/2006	Sulfate	516	mg/L	D
MW-31	9/18/2007	10/25/2006	Sulfate	526	mg/L	D
MW-31	9/20/2007	3/15/2007	Sulfate	516	mg/L	D
MW-31	1/22/2008	8/27/2007	Sulfate	532	MG/L	D
MW-31	2/21/2008	10/24/2007	Sulfate	497	mg/L	D
MW-31	C08030921	3/19/2008	Sulfate	521	mg/L	D

Appendix C-3: Indicator Parameter Data Used in Analysis

Well	SDG	Sample Date	Parameter	Result	Units	QUAL
MW-31	C08060292	6/3/2008	Sulfate	514	mg/L	D
MW-31	C08080344	8/4/2008	Sulfate	499	mg/L	D
MW-31	C08110568	11/11/2008	Sulfate	541	mg/L	D
MW-31	C09020234	2/3/2009	Sulfate	488	mg/L	D
MW-31	C09050510	5/13/2009	Sulfate	493	mg/L	D
MW-31	C09081027-009	8/24/2009	Sulfate	460	mg/L	D
MW-31	C09100623-008	10/14/2009	Sulfate	497	mg/L	
MW-31	C10020458	2/9/2010	Sulfate	507	mg/L	D
MW-31	C10040828	4/20/2010	Sulfate	522	mg/L	D
MW-31	C10090689	9/13/2010	Sulfate	527	mg/L	D
MW-31	C10110505	11/9/2010	Sulfate	539	mg/L	D
MW-31	C11020163	2/1/2011	Sulfate	538	mg/L	D
MW-31	C11030538	3/14/2011	Sulfate	531	mg/L	D
MW-31	C11040106-002	4/1/2011	Sulfate	503	mg/L	D
MW-31	C11050449-005	5/10/2011	Sulfate	512	mg/L	D
MW-31	C11060884-005	6/20/2011	Sulfate	540	mg/L	
MW-31	C11070274-005A	7/5/2011	Sulfate	532	mg/L	
MW-31	C11080269-008A	8/2/2011	Sulfate	537	mg/L	
MW-31	C11090325-005A	9/6/2011	Sulfate	541	mg/L	D
MW-31	C11100300-011	10/3/2011	Sulfate	539	mg/L	D
MW-31	C11110484-005	11/8/2011	Sulfate	552	mg/L	D
MW-31	C11120540-005	12/12/2011	Sulfate	530	mg/L	
MW-31	C12010822-005A	1/24/2012	Sulfate	539	mg/L	
MW-31	C12020681-005A	2/13/2012	Sulfate	538	mg/L	
MW-31	C12030624-005A	3/13/2012	Sulfate	517	mg/L	D
MW-31	C12040736	4/9/2012	Sulfate	547	mg/L	D
MW-31	C12050196	5/2/2012	Sulfate	532	mg/L	D
MW-31	C12060935	6/18/2012	Sulfate	497	mg/L	
MW-31	MW-31_07092012	7/9/2012	Sulfate	529	mg/L	
MW-31	MW-31_08062012	8/6/2012	Sulfate	571	mg/L	
MW-31	C12090804	9/18/2012	Sulfate	561	mg/L	
MW-31	1210420	10/22/2012	Sulfate	545	mg/L	
MW-31	1211109	11/6/2012	Sulfate	557	mg/L	
MW-31	1301517	1/22/2013	Sulfate	611	mg/L	
MW-31	1303552	3/19/2013	Sulfate	611	mg/L	
MW-31	1305419	5/13/2013	Sulfate	630	mg/L	
MW-31	9/24/2007	6/22/2005	Uranium	6.56	µg/L	
MW-31	9/14/2007	9/22/2005	Uranium	7.25	µg/L	
MW-31	9/16/2007	12/14/2005	Uranium	7.27	µg/L	
MW-31	9/17/2007	3/22/2006	Uranium	8.04	µg/L	
MW-31	9/18/2007	6/21/2006	Uranium	9.32	µg/L	
MW-31	9/17/2007	9/13/2006	Uranium	8.03	µg/L	
MW-31	9/18/2007	10/25/2006	Uranium	7.71	µg/L	
MW-31	9/20/2007	3/15/2007	Uranium	7.6	µg/L	
MW-31	1/22/2008	8/27/2007	Uranium	7.18	µg/L	
MW-31	2/21/2008	10/24/2007	Uranium	7.2	µg/L	

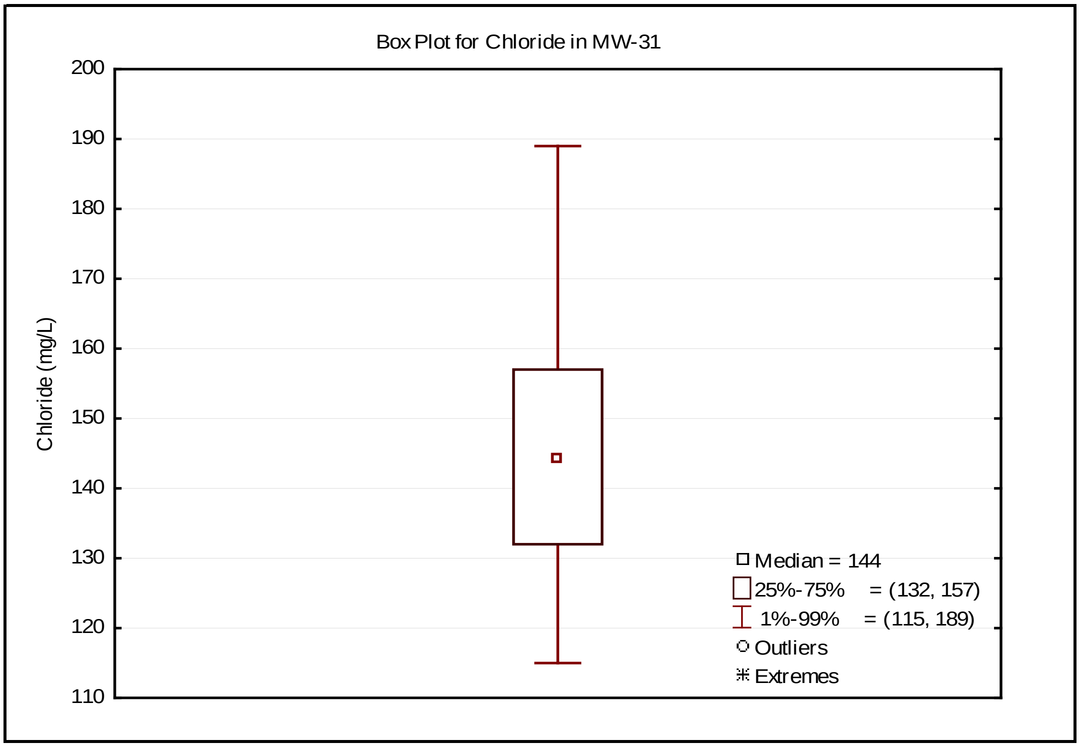
Appendix C-3: Indicator Parameter Data Used in Analysis

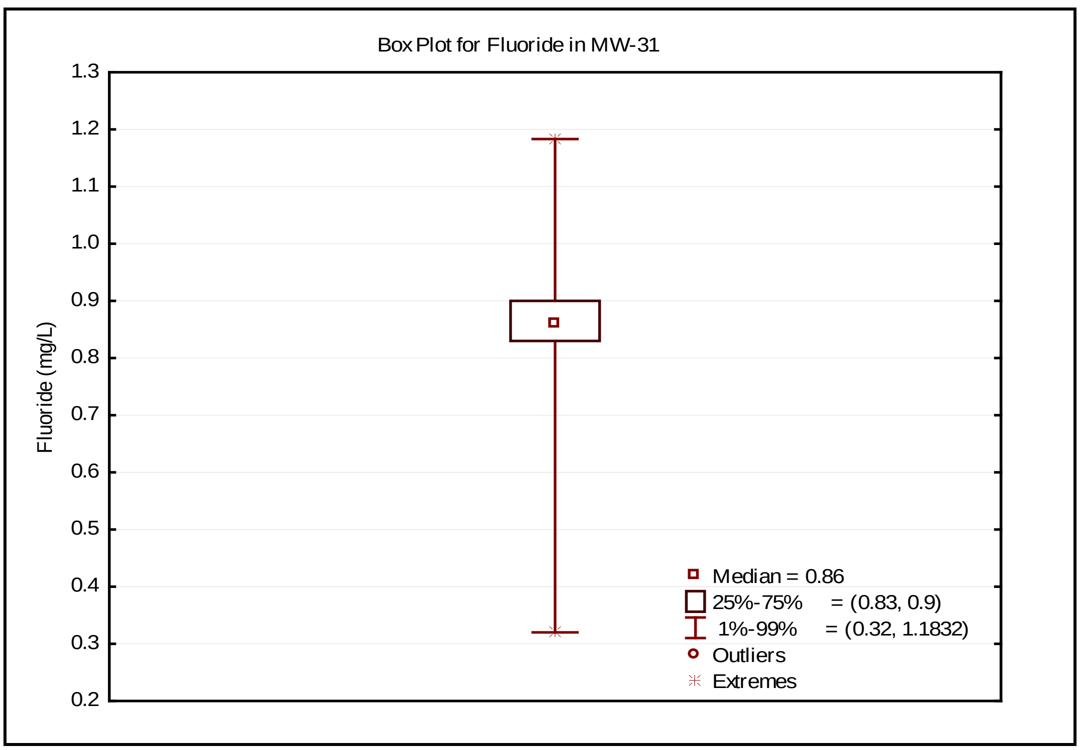
Well	SDG	Sample Date	Parameter	Result	Units	QUAL
MW-31	C08030921	3/19/2008	Uranium	7.02	µg/L	
MW-31	C08060292	6/3/2008	Uranium	6.95	µg/L	
MW-31	C08080344	8/4/2008	Uranium	6.77	µg/L	
MW-31	C08110568	11/11/2008	Uranium	6.35	µg/L	
MW-31	C09020234	2/3/2009	Uranium	7.08	µg/L	
MW-31	C09050510	5/13/2009	Uranium	6.76	µg/L	
MW-31	C09081027-009	8/24/2009	Uranium	6.97	µg/L	
MW-31	C09100623-008	10/14/2009	Uranium	6.97	µg/L	
MW-31	C10020458	2/9/2010	Uranium	7.12	µg/L	
MW-31	C10040828	4/20/2010	Uranium	6.74	µg/L	
MW-31	C10090689	9/13/2010	Uranium	7.23	µg/L	
MW-31	C10110505	11/9/2010	Uranium	6.72	µg/L	
MW-31	C11020163	2/1/2011	Uranium	5.77	µg/L	
MW-31	C11040106-002	4/1/2011	Uranium	6.81	µg/L	
MW-31	C11080269-008B	8/2/2011	Uranium	7.68	µg/L	
MW-31	C11100300-011	10/3/2011	Uranium	8.87	µg/L	
MW-31	C12020681-005B	2/13/2012	Uranium	7.96	µg/L	
MW-31	C12050196	5/2/2012	Uranium	7.34	µg/L	
MW-31	MW-31_07092012	7/9/2012	Uranium	8.17	µg/L	
MW-31	314781	11/6/2012	Uranium	8.73	µg/L	
MW-31	1302339	2/19/2013	Uranium	7.33	µg/L	
MW-31	1305419	5/13/2013	Uranium	7.63	µg/L	

Appendix C-4: Indicator Parameter Data Removed from Analysis

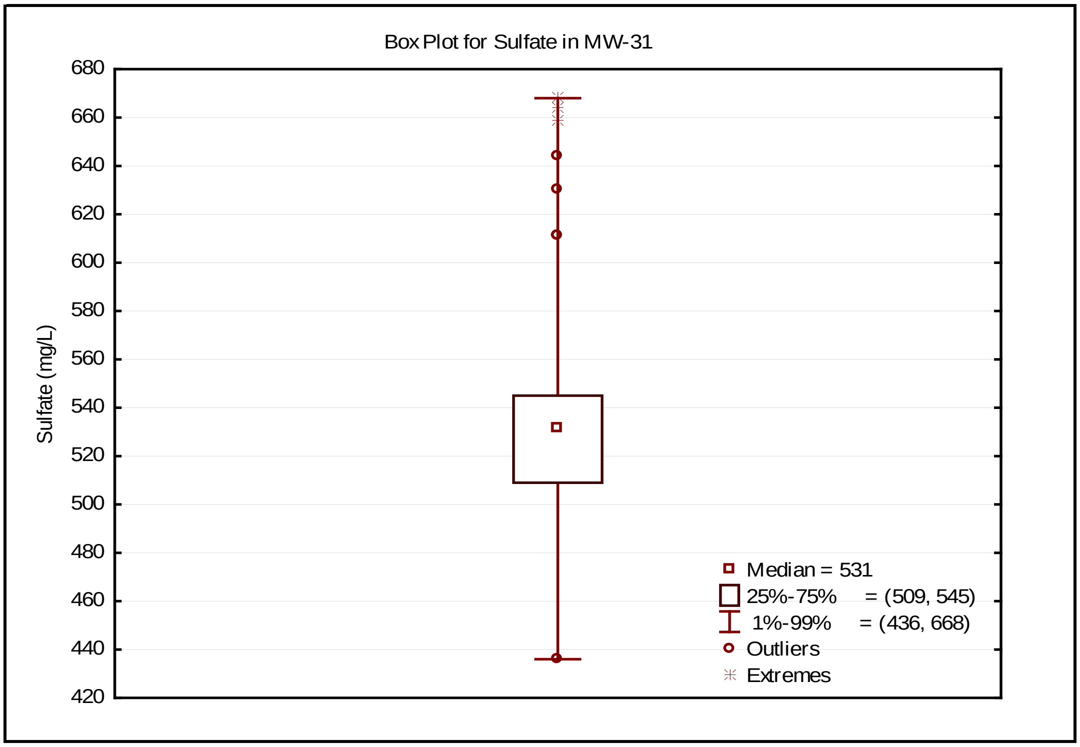
Reason	Location ID	SDG	Date Sampled	Parameter Name	Report Result	Report Units	Lab Qualifier	Lab Detection Limit/MDC
extreme outlier	MW-31	C06101300	10/27/2006	Fluoride	1.18	mg/L		0.1
extreme outlier	MW-31	C08110568	11/11/2008	Fluoride	0.3	mg/L		0.1
extreme outlier	MW-31	1212473	12/18/2012	Sulfate	664	mg/L		100
extreme outlier	MW-31	1302339	2/19/2013	Sulfate	644	mg/L		100
extreme outlier	MW-31	1304547	4/16/2013	Sulfate	668	mg/L		50

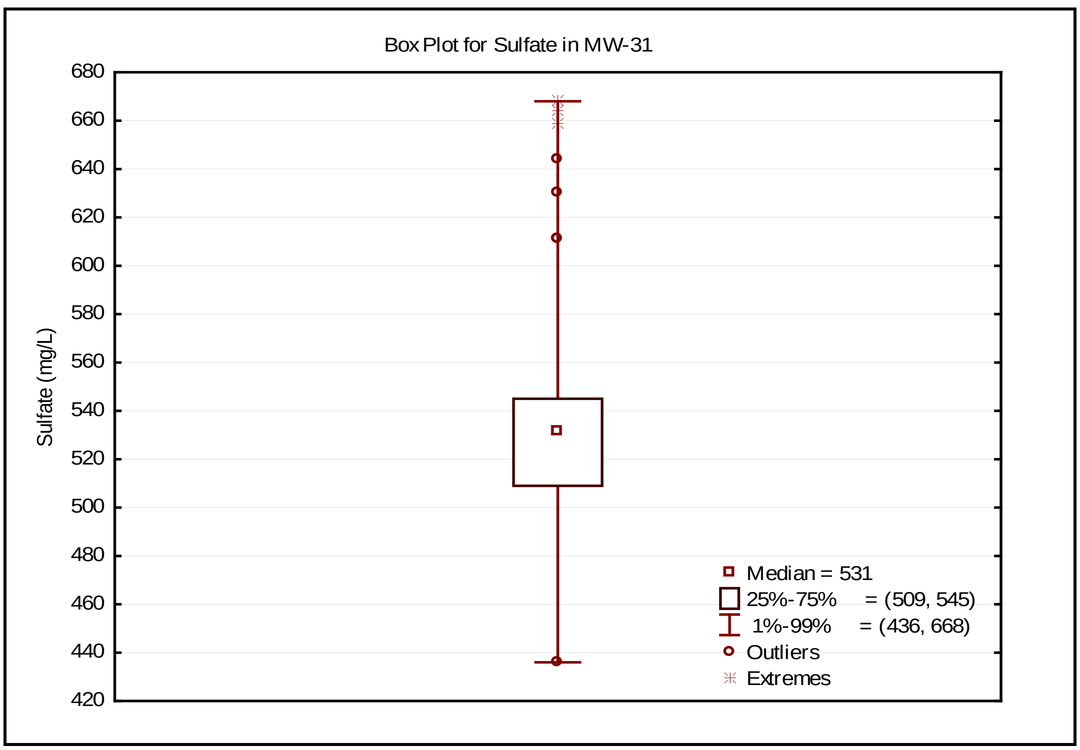
Appendix C-5: Box Plots for Indicator Parameters in MW-31



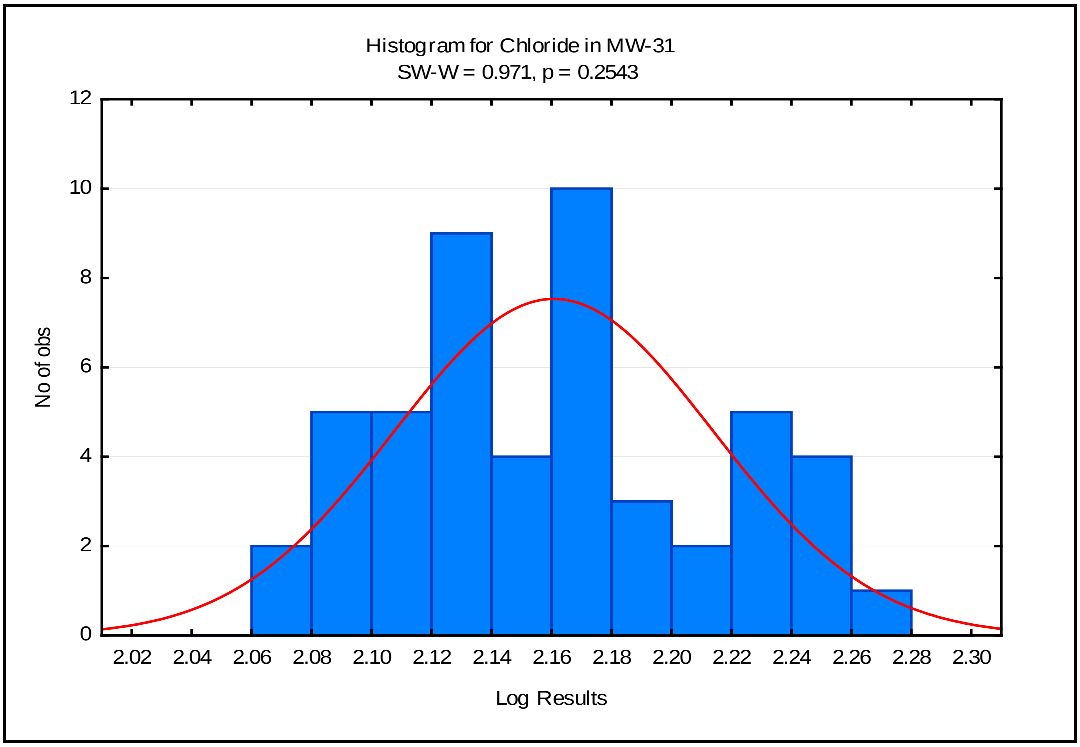


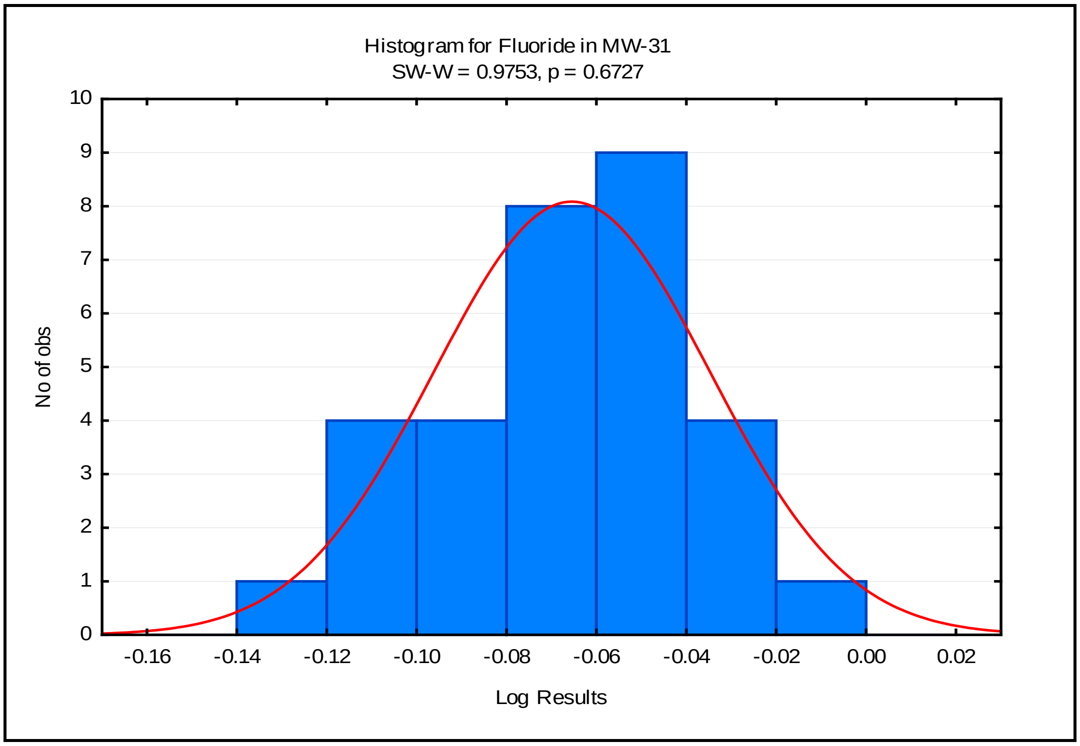
Appendix C-5: Box Plots for Indicator Parameters in MW-31



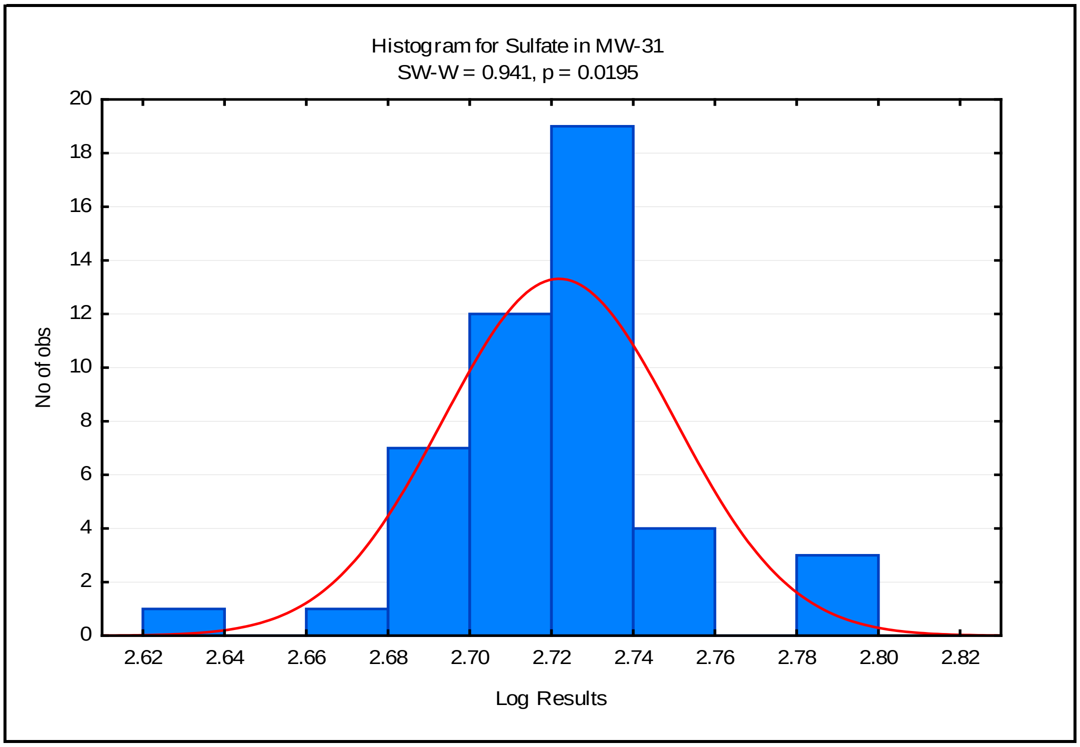


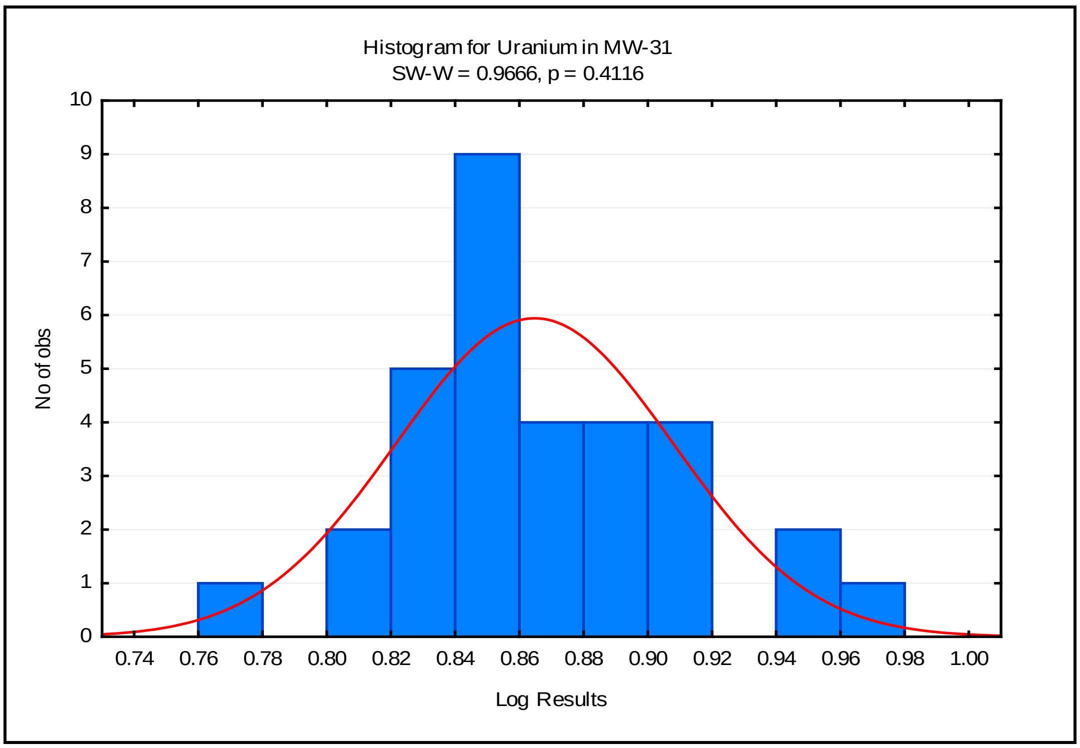
Appendix C-6: Histograms for Indicator Parameters in MW-31



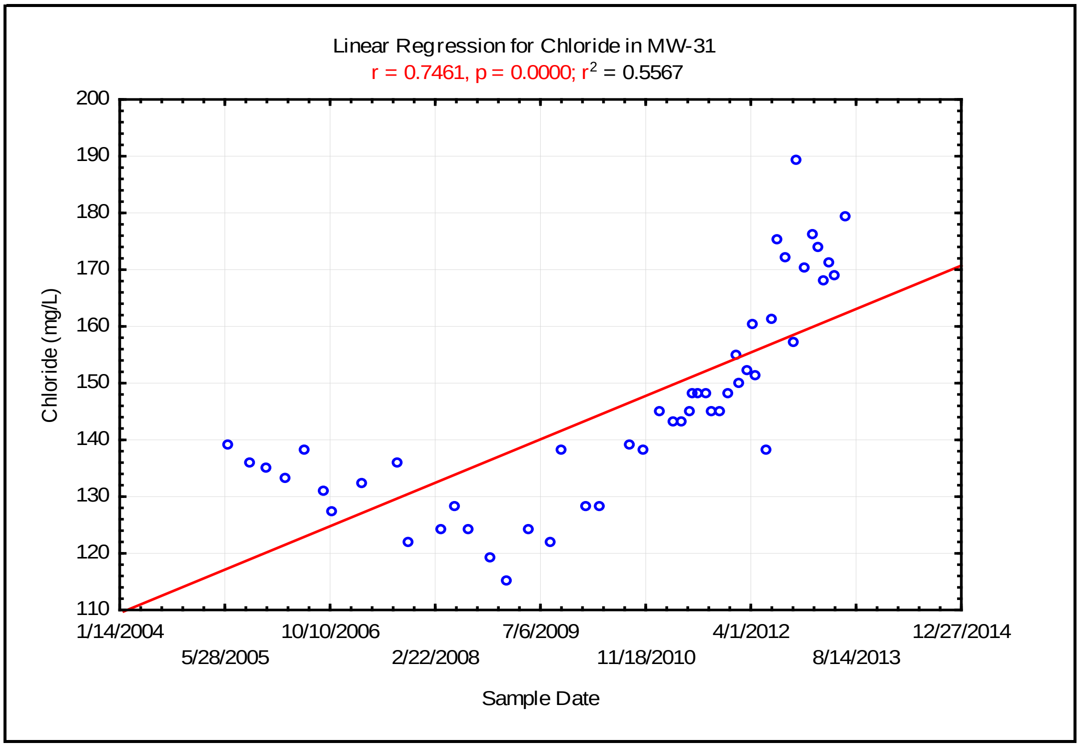


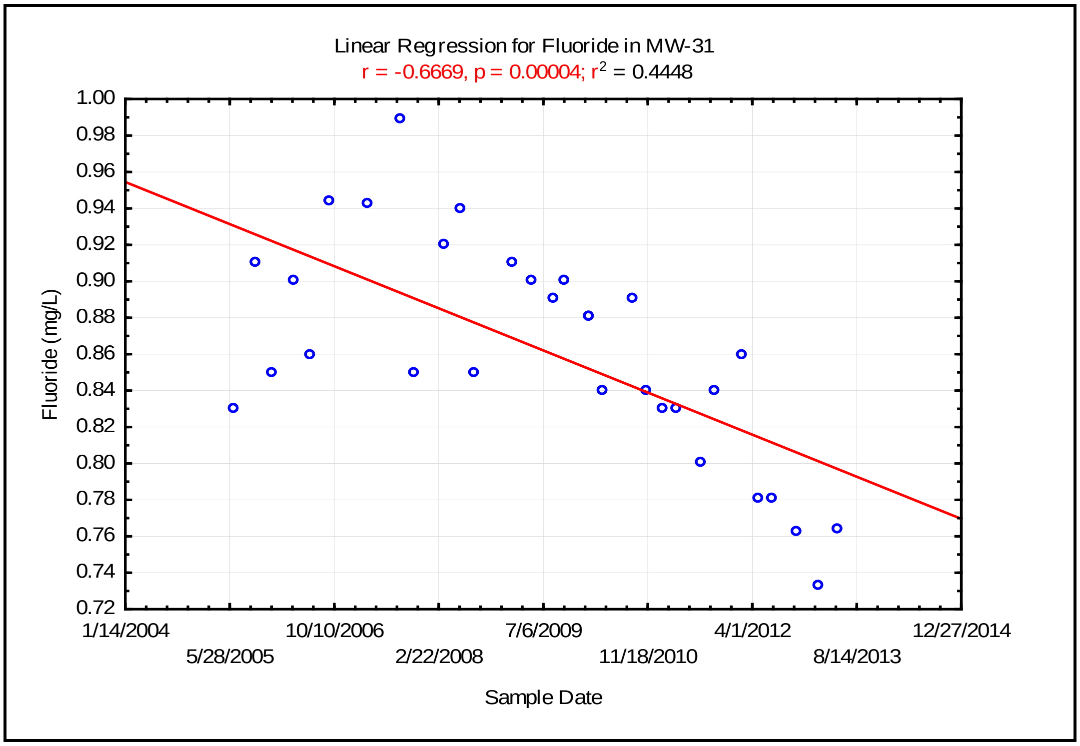
Appendix C-6: Histograms for Indicator Parameters in MW-31



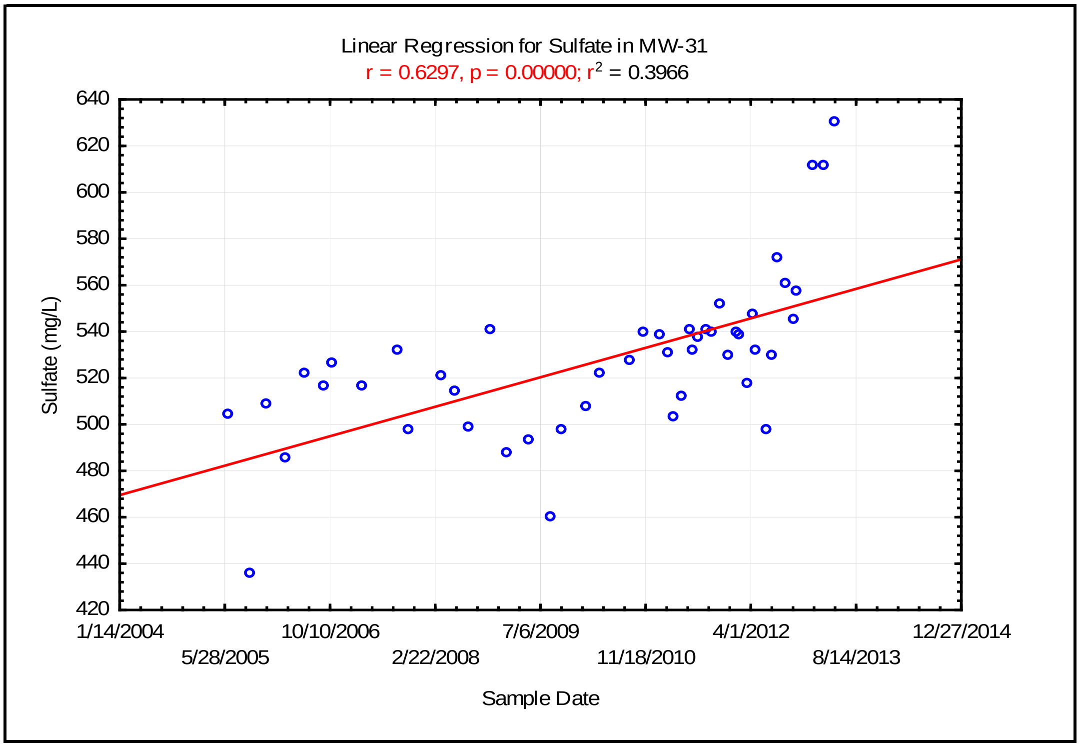


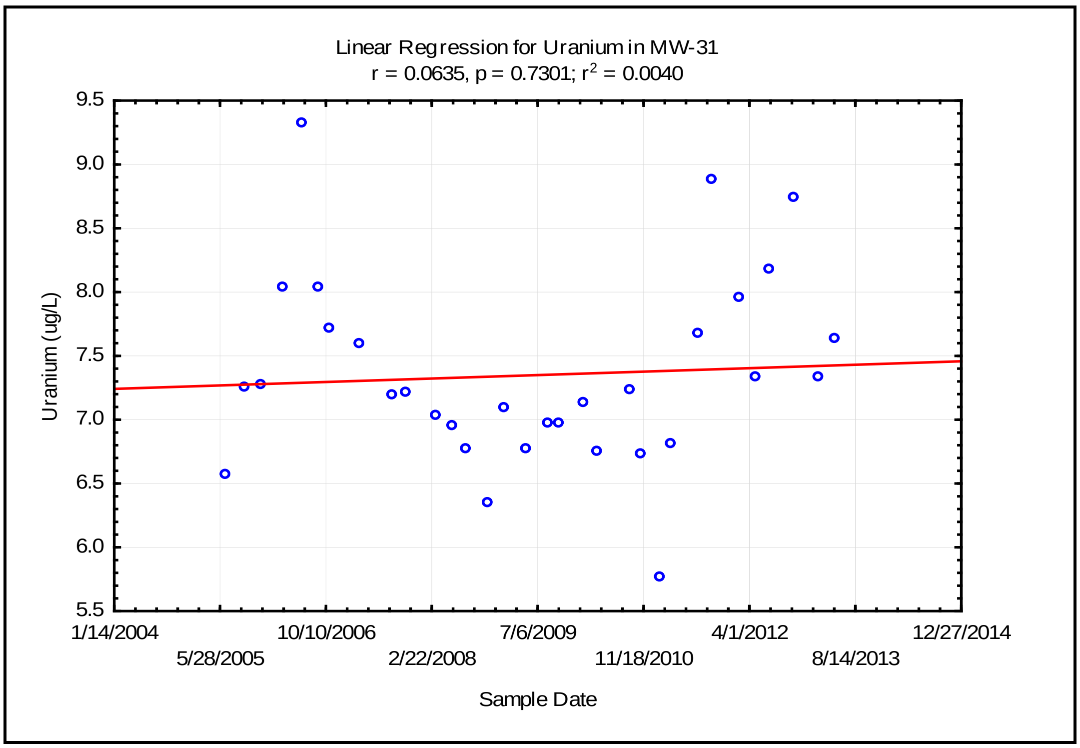
Appendix C-7: Linear Regressions for Indicator Parameters in MW-31





Appendix C-7: Linear Regressions for Indicator Parameters in MW-31





Appendix C-8: Mann-Kendall Analysis for Constituents Not Normally or Lognormally Distributed

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	8/6/2013 4:49:16 PM
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulfate (mg/L)

General Statistics

Number of Values	47
Minimum	436
Maximum	630
Mean	527.5
Geometric Mean	526.4
Median	529
Standard Deviation	34.53
SEM	5.036

Mann-Kendall Test

Test Value (S)	567
Critical Value (0.05)	1.645
Standard Deviation of S	109
Standardized Value of S	5.194
Approximate p-value	1.0293E-07

Statistically significant evidence of an increasing trend at the specified level of significance.

APPENDIX D
pH Analysis

Appendix D-1: PH Analysis Summary Table

Well	Constituent	N	% Non-Detected Values	Mean	Minimum	Maximum	Standard Deviation	Shapiro-Wilk Test for Normality			Mann-Kendall Trend Analysis[a]			Significant Trend
								W	p	Normally or Lognormally distributed?	S	p	Trend	
MW-31	pH	57	0	7.13	6.16	7.80	0.27	0.9568	0.0403	no	-212	0.0731	Decreasing	No

Notes:

N = number of valid data points

W = Shapiro Wilk test value

p = probability

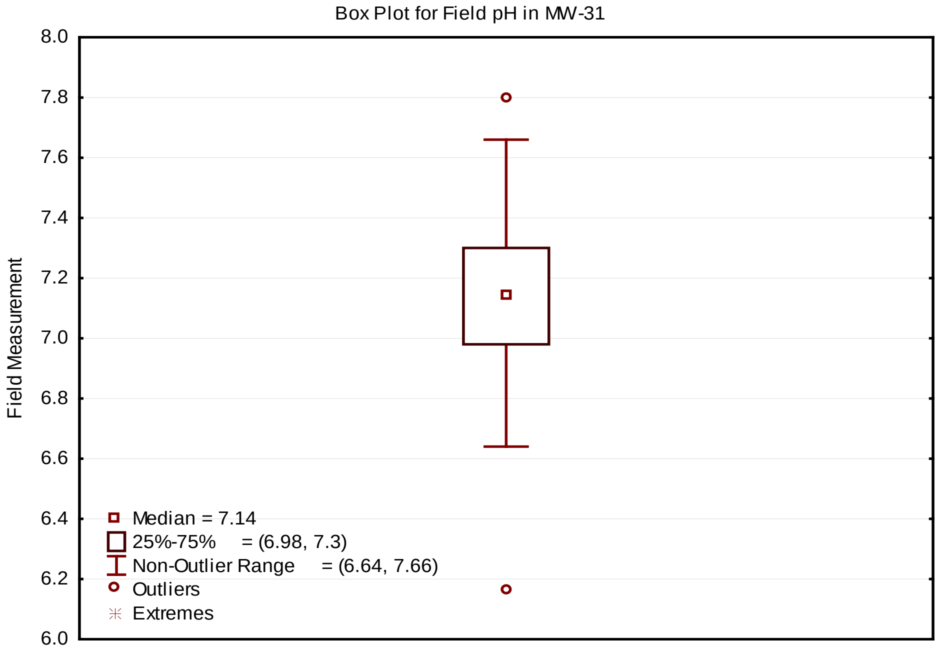
S= Mann-Kendall Statistic

a = The Mann-Kendall test was performed on data that are not normally or lognormally distributed

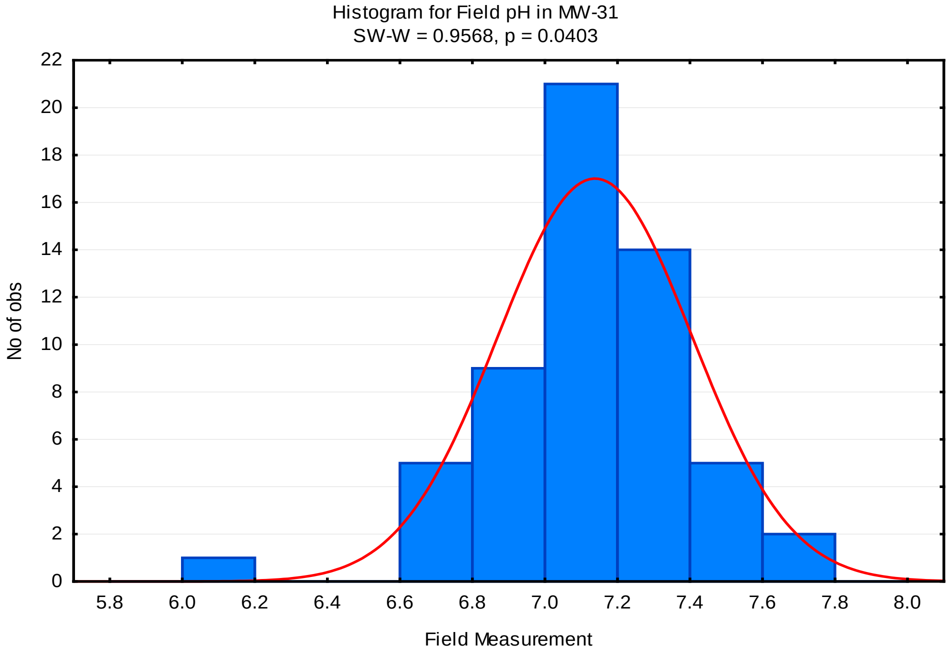
Appendix D-2: Field pH Measurements Used for pH Analysis

Location ID	Field Parameter	Date Measured	Field Measurement
MW-31	pH	6/22/2005	7.27
MW-31	pH	9/22/2005	7.19
MW-31	pH	12/14/2005	7.3
MW-31	pH	3/22/2006	7.33
MW-31	pH	6/21/2006	7.15
MW-31	pH	9/13/2006	7.31
MW-31	pH	10/25/2006	7.26
MW-31	pH	3/15/2007	7.41
MW-31	pH	8/27/2007	7.08
MW-31	pH	10/24/2007	6.97
MW-31	pH	3/19/2008	6.95
MW-31	pH	6/3/2008	7.2
MW-31	pH	8/4/2008	7.2
MW-31	pH	11/10/2008	7.42
MW-31	pH	2/3/2009	7.3
MW-31	pH	5/13/2009	7.12
MW-31	pH	8/10/2009	7.34
MW-31	pH	8/24/2009	7.18
MW-31	pH	10/14/2009	7.05
MW-31	pH	12/2/2009	7.17
MW-31	pH	2/9/2010	6.96
MW-31	pH	4/20/2010	7.38
MW-31	pH	5/21/2010	6.95
MW-31	pH	6/15/2010	7.01
MW-31	pH	7/21/2010	7.8
MW-31	pH	8/24/2010	7.1
MW-31	pH	9/13/2010	7.66
MW-31	pH	9/21/2010	7.13
MW-31	pH	10/19/2010	6.92
MW-31	pH	11/9/2010	6.98
MW-31	pH	12/14/2010	6.95
MW-31	pH	1/10/2011	6.65
MW-31	pH	2/1/2011	7.21
MW-31	pH	3/14/2011	7.43
MW-31	pH	4/1/2011	7.01
MW-31	pH	5/10/2011	6.73
MW-31	pH	6/20/2011	6.16
MW-31	pH	7/5/2011	6.64
MW-31	pH	8/2/2011	6.67
MW-31	pH	9/6/2011	7.03
MW-31	pH	10/3/2011	7.28
MW-31	pH	11/8/2011	7.01
MW-31	pH	11/29/2011	7.34
MW-31	pH	12/12/2011	7.46
MW-31	pH	1/24/2012	6.78
MW-31	pH	2/13/2012	7.37
MW-31	pH	4/9/2012	7.14
MW-31	pH	5/2/2012	7.19
MW-31	pH	7/9/2012	7.53
MW-31	pH	8/6/2012	6.96
MW-31	pH	9/18/2012	7.1
MW-31	pH	10/22/2012	7.05
MW-31	pH	11/6/2012	7.04
MW-31	ph	12/18/2012	7.1
MW-31	pH	1/22/2013	6.94
MW-31	pH	2/19/2013	7.32
MW-31	pH	3/19/2013	7.28

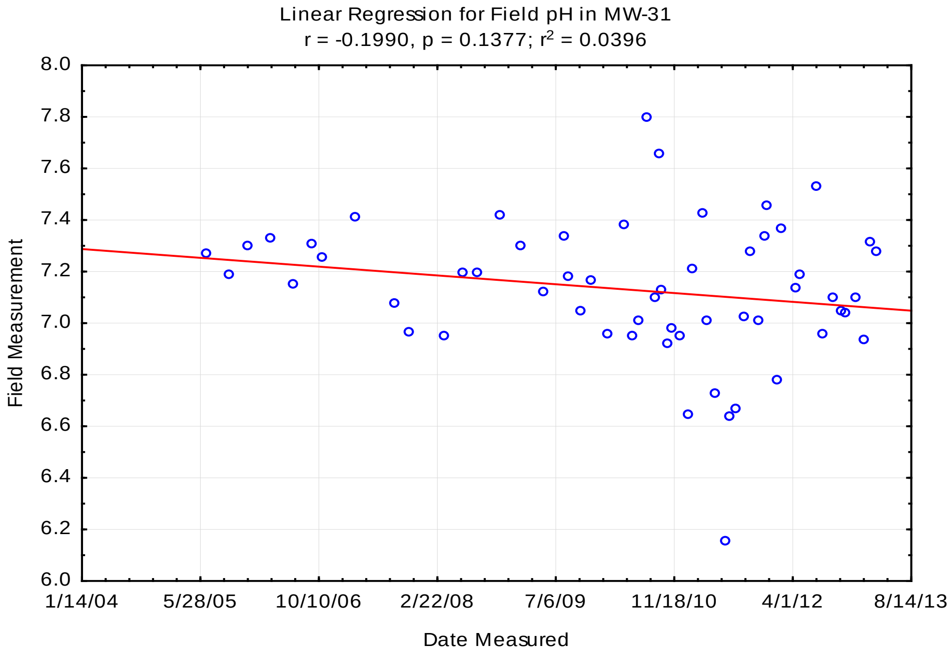
Appendix D-3: Box Plots for pH



Appendix D-4: Histograms for pH



Appendix D-5: Linear Regressions for pH



Appendix D-6: Mann-Kendall Analysis for pH

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	8/8/2013 11:18:37 AM
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Field pH

General Statistics

Number of Values	57
Minimum	6.16
Maximum	7.8
Mean	7.131
Geometric Mean	7.126
Median	7.14
Standard Deviation	0.267
SEM	0.0354

Mann-Kendall Test

Test Value (S)	-212
Critical Value (0.05)	-1.645
Standard Deviation of S	145.2
Standardized Value of S	-1.453
Approximate p-value	0.0731

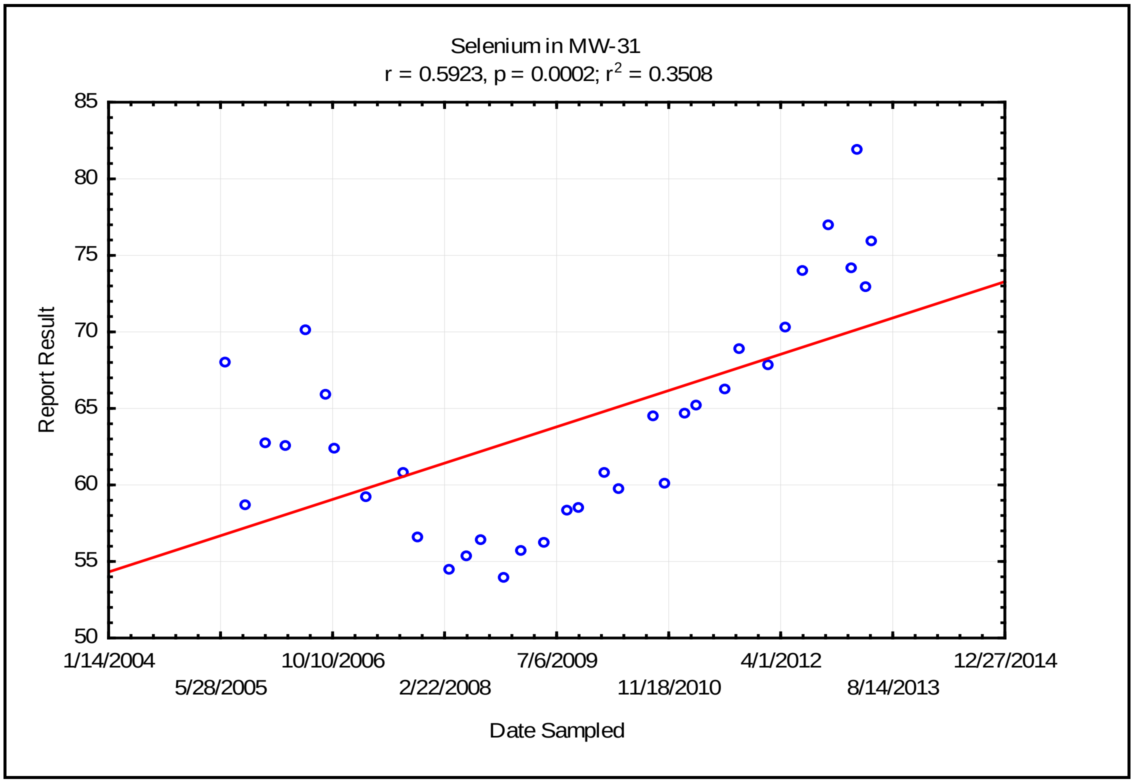
Insufficient evidence to identify a significant trend at the specified level of significance.

APPENDIX E

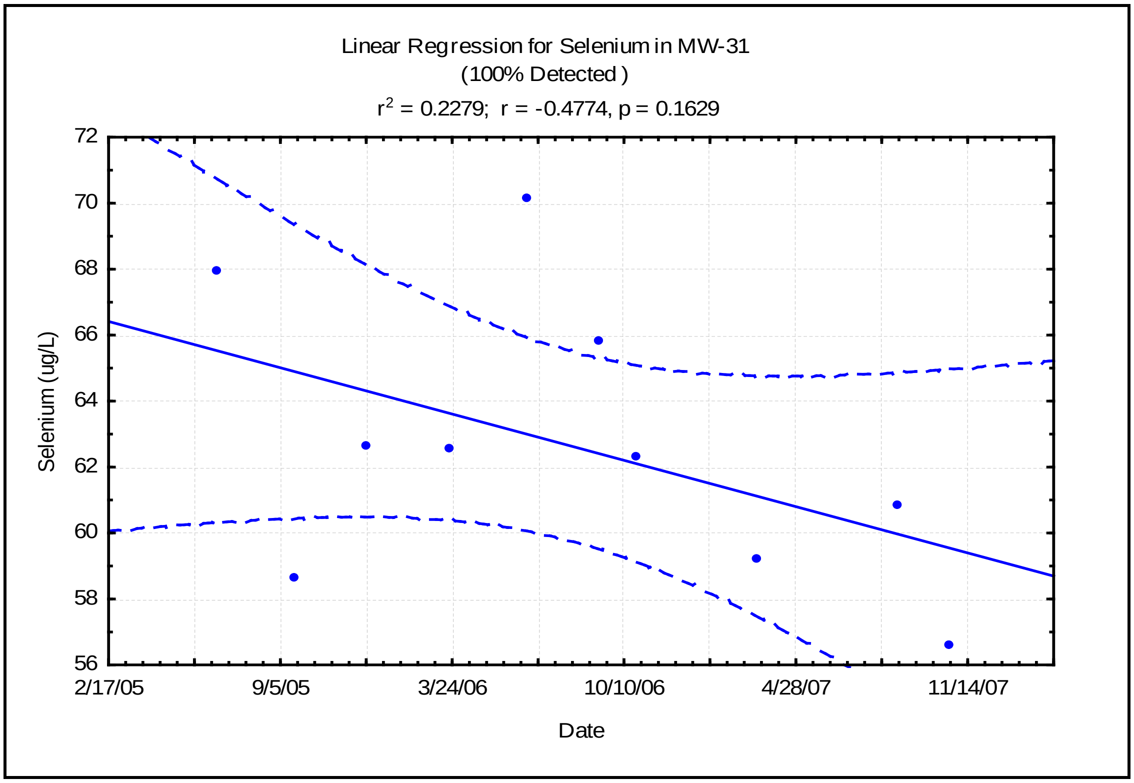
Time Concentration Plots Compared to Background Report Plots

Appendix E-1: Linear Regression for Selenium in MW-31 Compared to Background Report

SAR Trend Plot

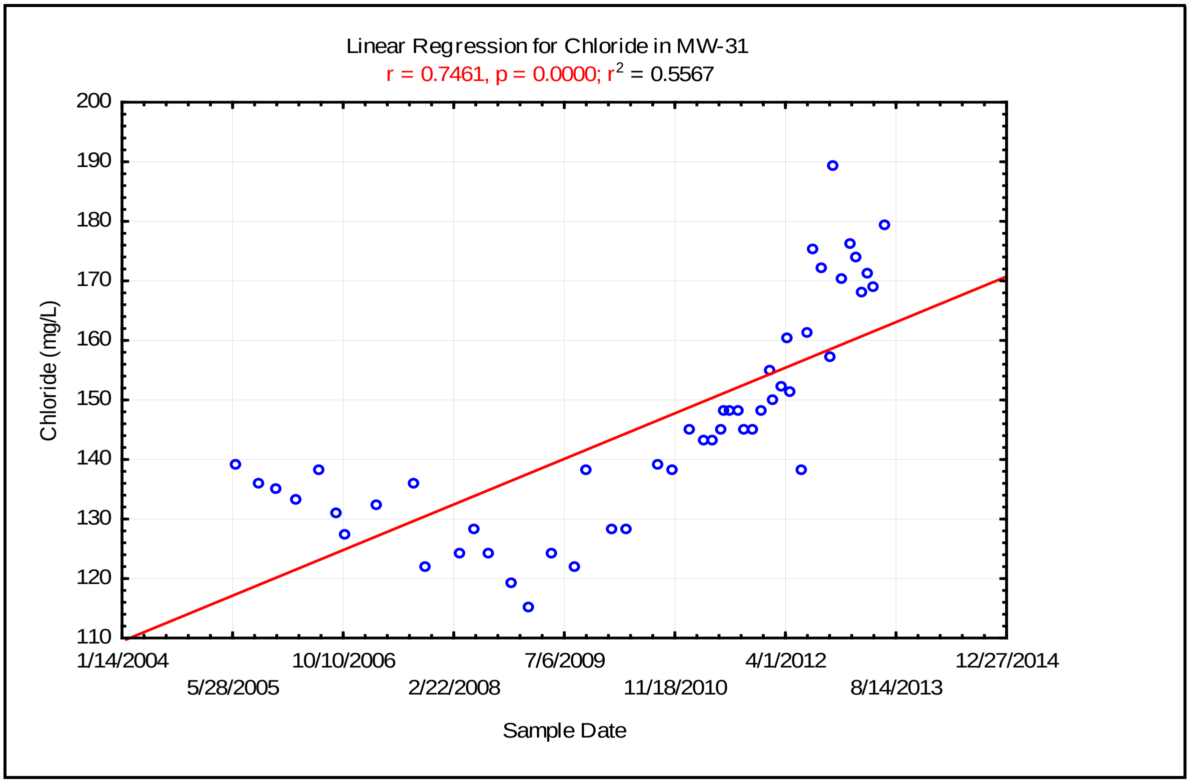


Background Report Trend Plot

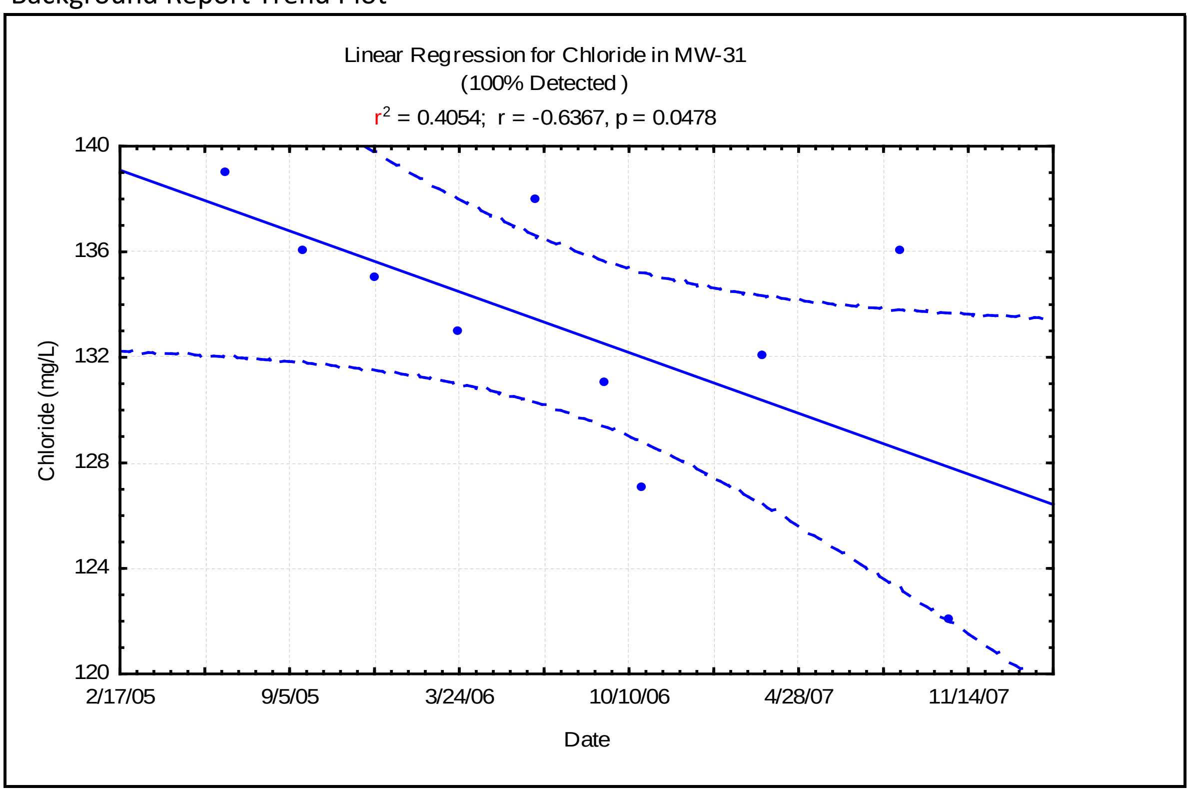


Appendix E-2: Linear Regressions for Indicator Parameters in MW-31 Compared to Background Report

SAR Trend Plot

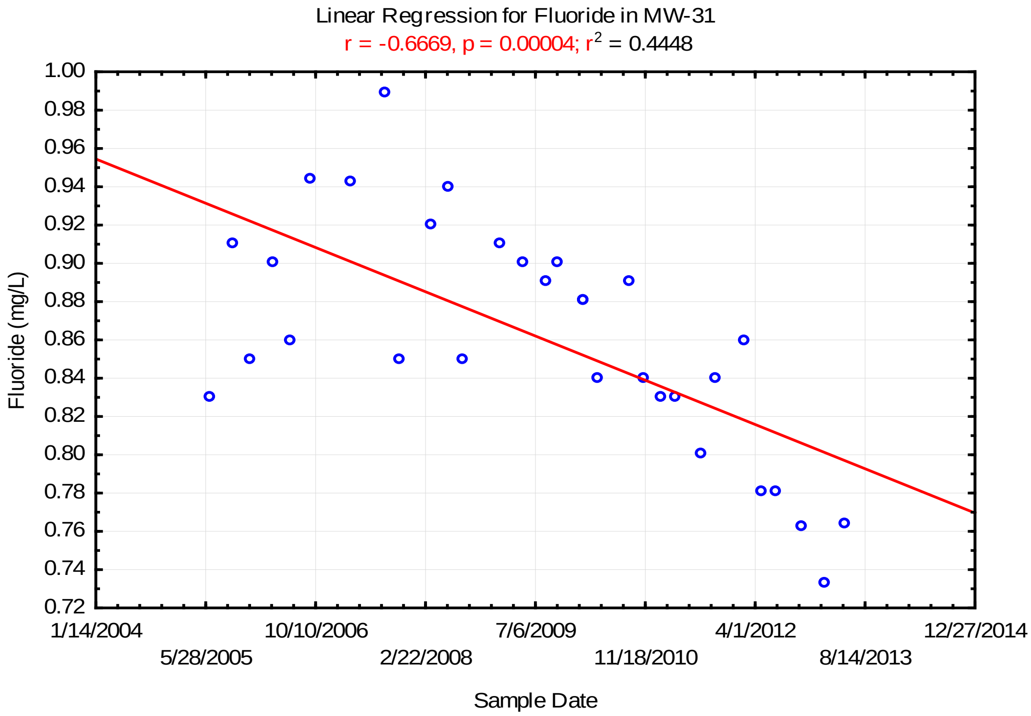


Background Report Trend Plot

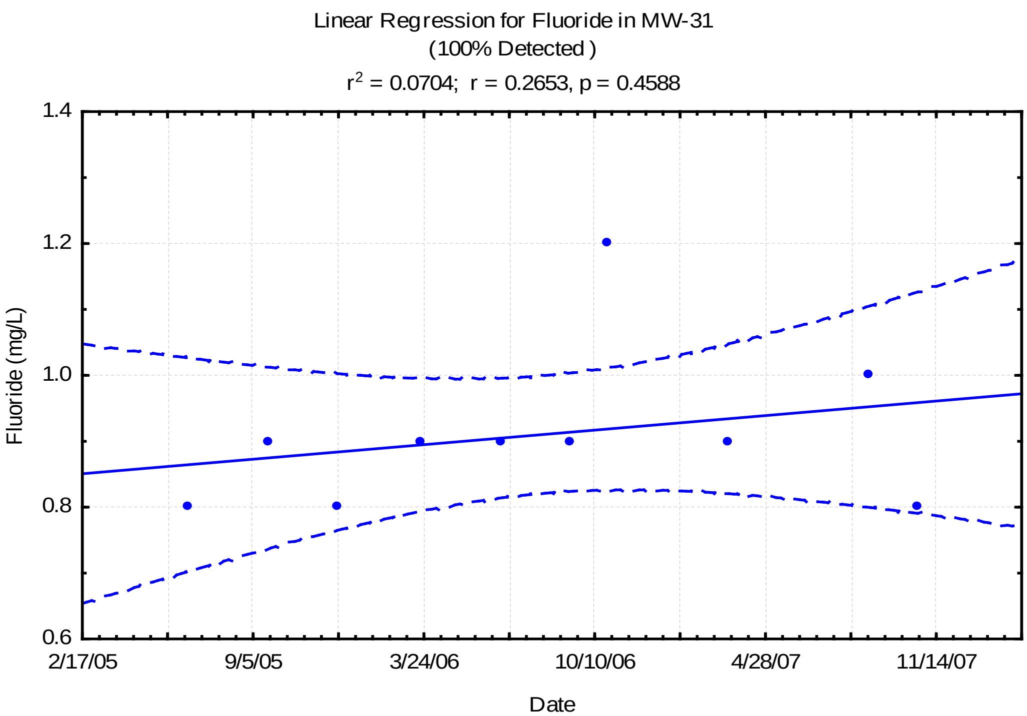


Appendix E-2: Linear Regressions for Indicator Parameters in MW-31 Compared to Background Report

SAR Trend Plot

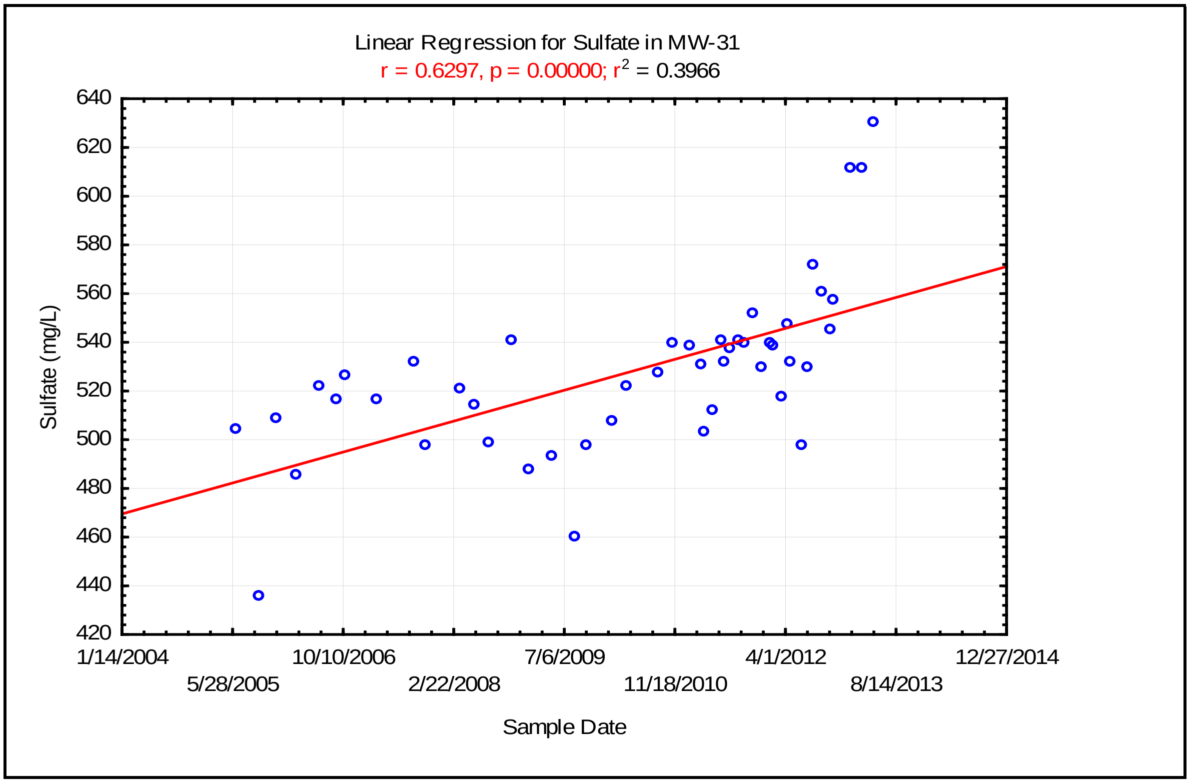


Background Report Trend Plot

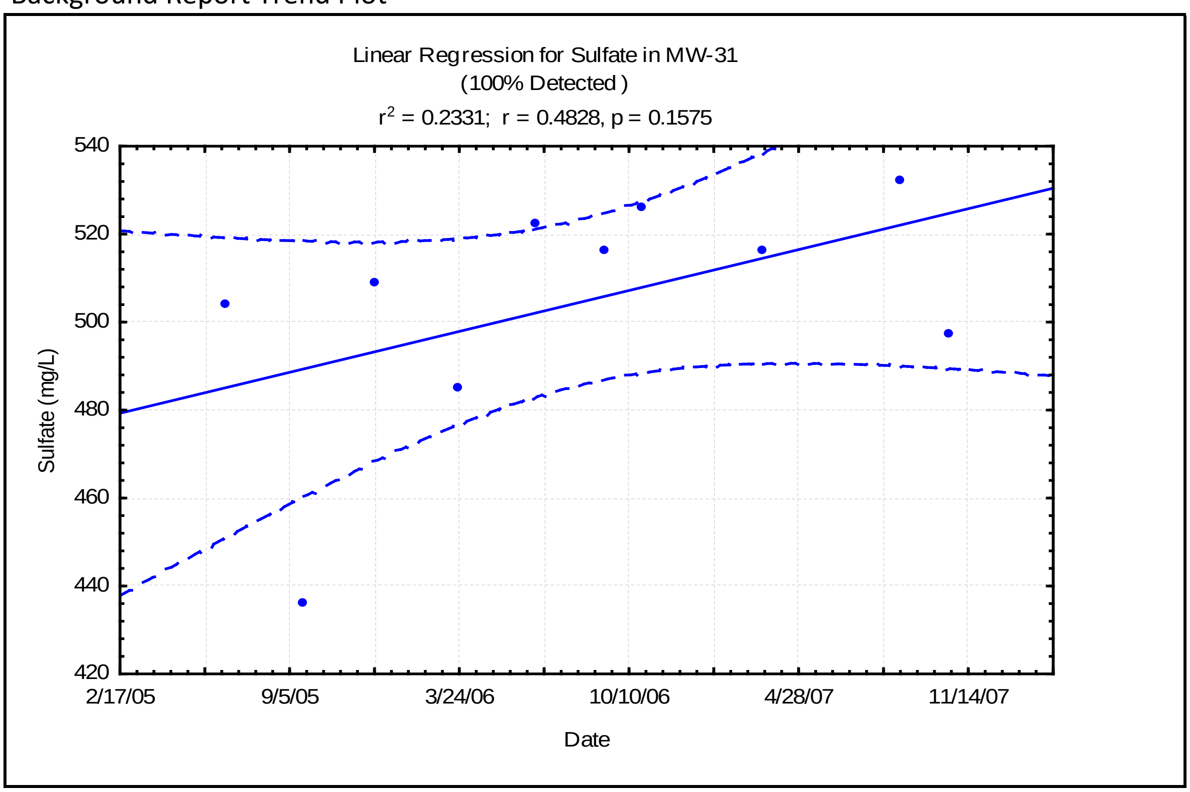


Appendix E-2: Linear Regressions for Indicator Parameters in MW-31 Compared to Background Report

SAR Trend Plot

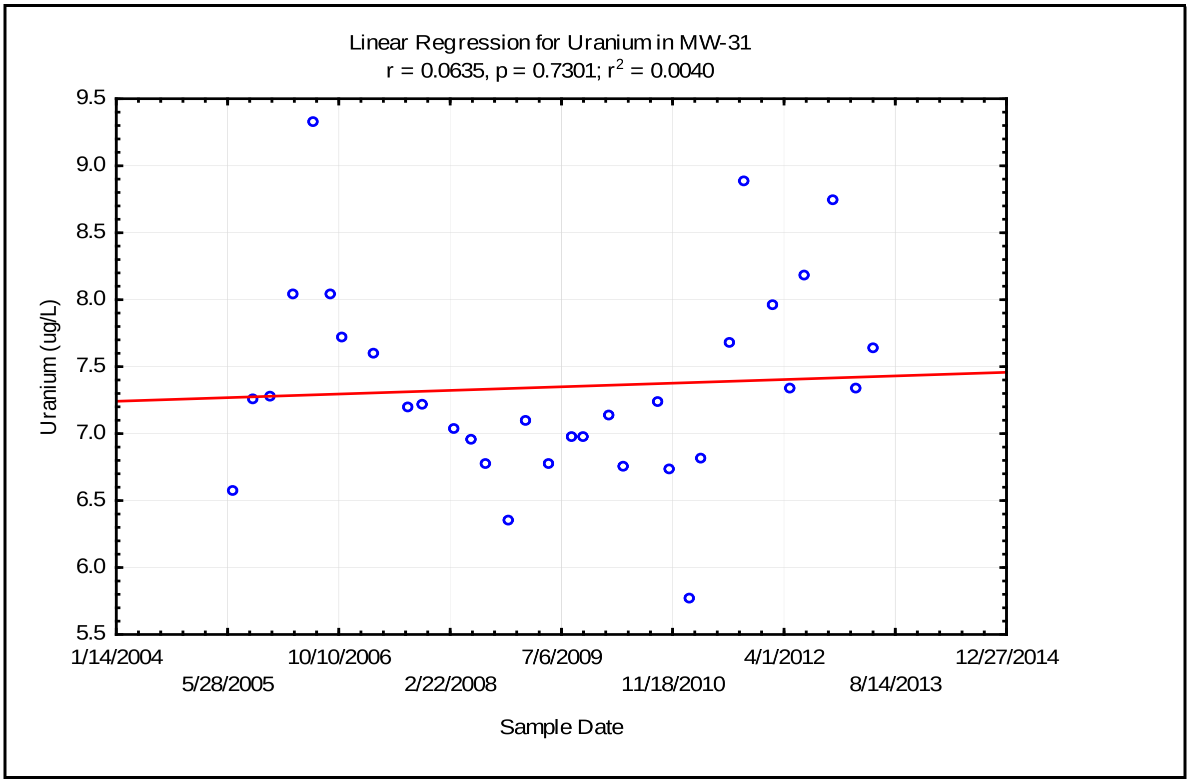


Background Report Trend Plot

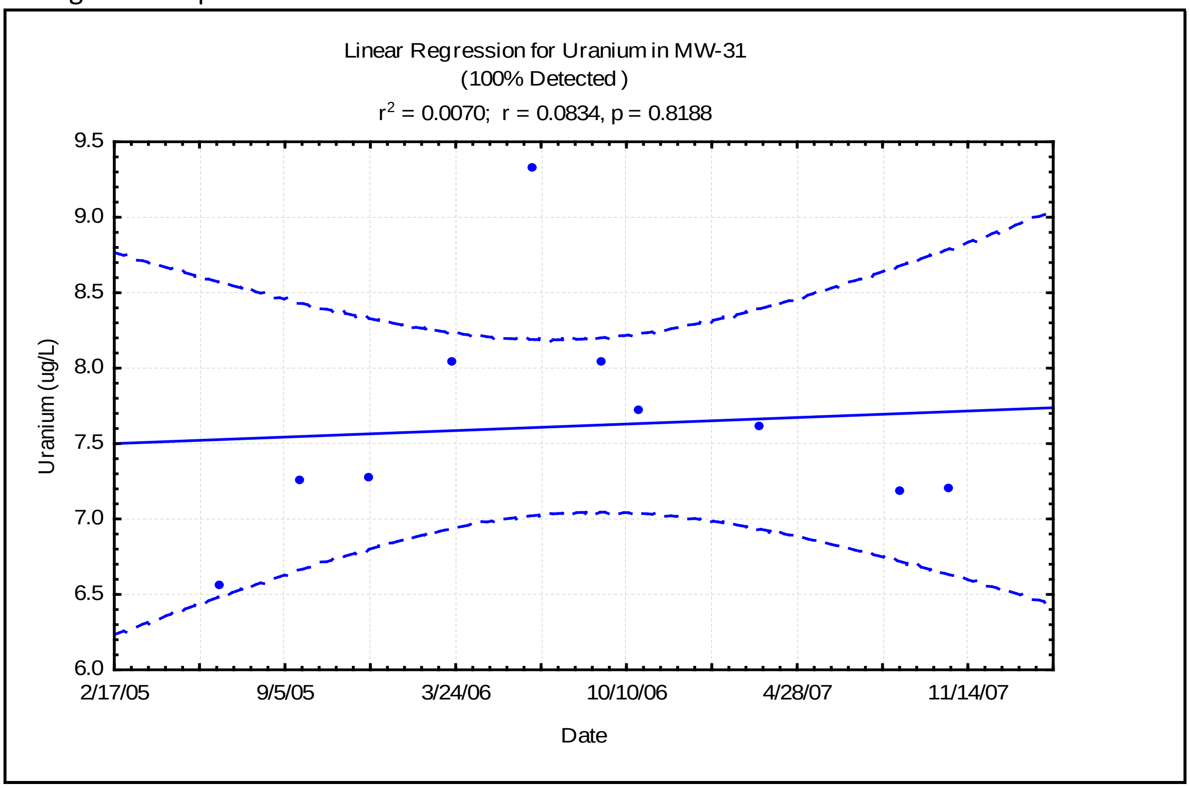


Appendix E-2: Linear Regressions for Indicator Parameters in MW-31 Compared to Background Report

SAR Trend Plot



Background Report Trend Plot

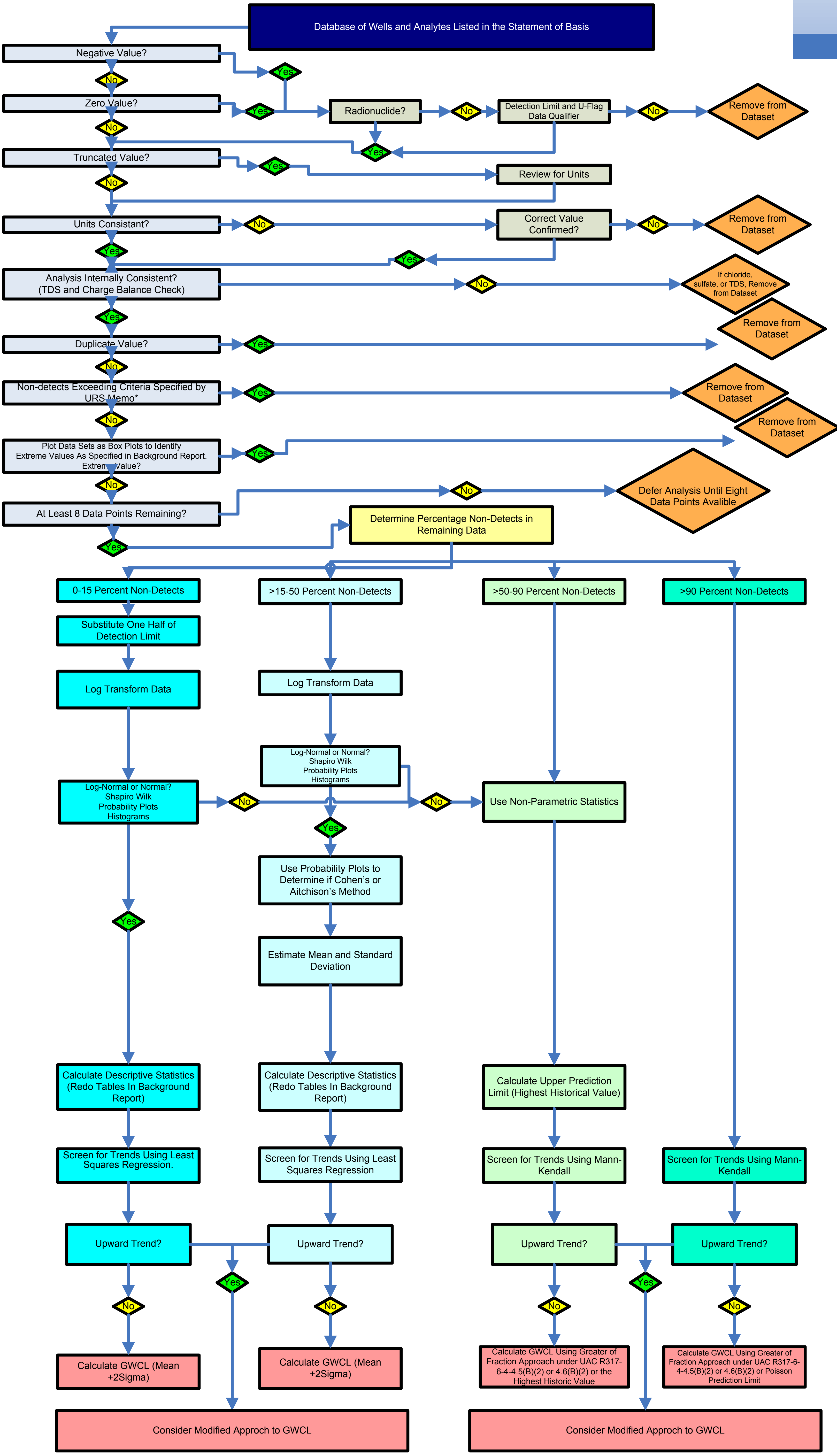


APPENDIX F

Flowsheet

(Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site (INTERA, 2007))

Groundwater Data Preparation and Statistical Process Flow for Calculating Groundwater Protection Standards, White Mesa Mill Site, San Juan County, Utah



*A non-detect considered "insensitive" will be the maximum reporting limit in a dataset and will exceed other non-detects by, for example, an order of magnitude (e.g., <10 versus <1.0 µg/L). In some cases, insensitive non-detects may also exceed detectable values in a dataset (e.g., <10 versus 3.5 µg/L).

APPENDIX G

Input and Output Files (Electronic Only)