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Statistical Analysis of Censored Groundwater Monitoring Data

Global Environmental Health Sciences

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1 ABSTRACT

This study was conducted to statistically analyze proprietary groundwater monitoring data for evidence of hazardous waste release from a Type I surface impoundment located in a former metal reclamation facility in Louisiana. The data was collected approximately semi-annually over a period of ten years following the facility's closure. In compliance with 40 CFR 265, the site has three wells in service to provide detection monitoring: one well as the hydraulically up-gradient, background well, and the other two wells as hydraulically down-gradient compliance wells. Constituents of concern include total and dissolved cobalt, copper, lead, molybdenum, nickel, and vanadium. Other field-measured parameters include: pH and conductivity. Analysis included nonparametric prediction limits for intra-well comparisons of background data to compliance data and analysis of outliers and trends prior using box and whisker plots, time series plots, and the Sen's slope/Mann-Kendall test. This study also explored inter-well comparison of average population ranks equivalent to the medians with the nonparametric version of the one-way analysis of variance (ANOVA), the Kruskal-Wallis test. The Sen's Slope/Mann-Kendall test results show a decreasing trend in molybdenum across the site indicating a general change in groundwater quality over time. Inter-well testing found that the difference in medians between the compliance wells for all constituents is not statistically significant at the 95% confidence interval when examined using the Kruskal-Wallis test statistic. Medians of compliance wells (MW-10 and MW-11) were statistically different from the background well (MW-1) for conductivity and total metals: cobalt, lead, nickel, and vanadium. Using the parametric ANOVA test, a statistically significant difference was found between the means of all wells for the parameter pH. All constituents were within the set prediction limit values, however, with the exclusion of the parameter pH in well MW-11. Because this increase in pH is not correlated with a statistically significant increase in any of the measured constituents of concern, this study concludes that there has been no hazardous constituent release from the surface impoundment. The difference in

means or medians for constituents between the background well and compliance well suggests significant spatial variability may exist. Nonparametric intra-well testing should be continued as the choice statistical method.

2 BACKGROUND

Groundwater monitoring programs are designed to assess the movement of contaminants within the environment, monitor the integrity of impoundments that are used to sequester waste, or a constituent of concern resulting from some industrial activity. To assess risk, groundwater analytical data is compared between compliance wells and background wells. Ideally, the monitoring strategy should aim to detect a possible impact to groundwater at the earliest possible time and to minimize the rate of false positive results.

Groundwater monitoring at industrial sites began in 1976 when the United States enacted the Resource Conservation and Recovery Act (RCRA) to address the growing need for solid waste and hazardous waste management. Under this act the Unites States Environmental and Protection Agency (EPA) was directed to promulgate regulations applicable to owners and operators of facilities that treat, store, or dispose of hazardous waste for the purpose of protecting human health and the environment. The regulations governing hazardous waste are found in Title 40 Code of Federal Regulations (CFR) Parts 260-282. The States are allowed to implement their own rules and regulations as long as they are comparable or more stringent than federal regulations in the effort to protect human health and the environment. In Louisiana the Department of Environmental Quality (LDEQ) has promulgated Louisiana Administrative Code (LAC), Title 33 applicable to all releases which exceed federal or state health and safety standards.

2.1 Site-History

Proprietary data was obtained from Waldemar S. Nelson & Company for the purpose of conducting a statistical analysis of the groundwater monitoring data collected from a former metals reclamation facility. This data was collected over a period ten years following the closure of a hydro-metallurgical manufacturing and reclamation facility. The facility successfully ceased

operation and closed utilizing LDEQ's Risk Evaluation/ Corrective Action Program (RECAP) and EPA Region 6's Corrective Action Strategy in 2005. Upon closure, the facility identified a single surface impoundment to store remaining hazardous waste at the facility. Previously used waste units were consolidated into this area known as the Wastewater Storage Pond (site). Wastewater solids, wastewater effluent, and wastewater solutions from other storage units at the facility placed at the site were characterized by their chemical composition. The chemical composition can be found in Table 1. The impoundment is approximately 9.75 acres containing volume of approximately 225,000 cubic yards. Its final cover consists of a compacted clay cap, topsoil, and vegetative cover.

Table 1. Surface Impoundment Chemical Composition	
Wastewater Solids	Ni 0.1 to 3% Cu 0.2 to 1.5% Ca 5.9 to 32.4% Mg 1.5 to 7.0% Na 0.2% Mo 0.1 to 3% V 0.1 to 3%
Wastewater Solution	Ni 0.1 to 0.5 ppm Cu <0.5 ppm Co <0.1 ppm Mo 1 to 20 ppm V 1 to 20 ppm
Wastewater Effluent	Ni <1 ppm Mo 5 to 10 ppm V 2 to 10 ppm Al <1 ppm

Post-closure groundwater detection monitoring for the site began on November 1, 2005 and continued on an approximately quarterly basis until June 20, 2007, resulting in seven sampling events. As the sole remaining Type I classified industrial surface impoundment at the facility, the site required quarterly groundwater monitoring for a period of two years to create baseline data. Following the establishment of baseline data, semi-annual monitoring was conducted to ensure environmental and public health safety. Sampling occurred on a semi-annual basis after June 20,

2007, with the last date on record for this study being November 18, 2013. The total number of sampling events is twenty.

One well (MW 1) located hydraulically up-gradient and near a river serves as the background well for the site. Two monitoring wells (MW 10, MW 11) were placed hydraulically down-gradient and adjacent to the point of compliance at the site. This is in compliance with LAC 33:VII.709.E. The distance between the two wells is approximately 800ft. Appendix A is a representation of wells MW-1, MW-10, and MW-11and their location relative to one another. Monitoring well location and depths were determined following a one yearlong site-specific groundwater elevation study, which established groundwater water flow across the site. Groundwater flow was determined to be consistent in an east to southeast direction across the facility. The wells monitor the uppermost aquifer consisting of laterally extensive silts and sands that occur within a depth range of 26 to 38 feet below ground surface (-24 to -36 feet mean sea level (MSL)). No potable freshwater aquifers have been identified beneath the facility.

Facility managers determined the constituents of concern intrinsic to waste stored at the site to include the following: cobalt (Co), copper (Cu), molybdenum (Mo), nickel (Ni), vanadium (V), and lead (Pb). Total organic carbon (TOC), total organic halogens (TOX), pH and conductivity were also tested during the two years following closure to create baseline data in compliance with LAC 33:VII.709.E.3. After the baseline data was generated, sampling for TOC and TOX was abandoned as approved by LDEQ. This study only examines sampling data for total and dissolved metals identified, pH, and conductivity.

2.2 Hazardous Metals

Of the six constituents of concern examined in this study, copper, lead, and nickel are considered priority toxic pollutants by the EPA. While copper is considered an essential nutrient, acute

effects such as gastro intestinal disturbances, liver damage, renal damage, and anemia can occur at higher copper concentrations (Agency for Toxic Substances and Disease Registry, 2011) Sources of copper in groundwater include rock weathering, mining, corrosion of brass and copper pipes, and industrial wastes. Water storage reservoirs also frequently use copper sulfate as an algaecide.

The presence of lead in the environment is ubiquitous. Most of it is due to human activities such as burning fossil fuels, mining and manufacturing. Lead most often occurs in drinking water as a result of pipe and fitting corrosion (WHO, 2011). The EPA considers lead to be a carcinogen and at even the lowest detectable levels lead has shown to generate negative health effects. This is particularly true for children. Organ systems affected by elevated blood lead levels include the cardiovascular system, the digestive system, neurological and reproductive systems (Agency for Toxic Substances and Disease Registery, 2011)

Nickel is a common natural element used industrially for manufacturing stainless steel, magnets, and rechargeable batteries. It is a known human carcinogen particularly through inhalation. Ingestion may cause nausea, vomiting, shortness of breath, and harm to pregnancies (Public Health England Center for Radiation, Chemical, and Environmental Hazards, 2009).

Cobalt is found naturally in the earth's crust but not in its free form. It is an essential element as a component vitamin B12. Sources of free cobalt are usually a result of industrial mining for copper and nickel. Cobalt's toxicity has recently garnered a lot of attention due to the increase in law suits resulting from metal-on-metal hip replacements in which a cobalt/chromium alloy was used. Cobalt ions disassociated from the prosthetic joints and accumulated in the surrounding tissues and blood causing visual impairment, deafness, heart failure, and skin rashes (Tower, 2010).

Molybdenum and Vanadium receive a disproportionate amount of attention when compared to the previously listed metals. Only 1.7% and 1.3% of publications regarding metal contamination in soils reference molybdenum and vanadium, respectively (Vodyanitskii, 2012). Both Molybdenum and vanadium are considered essential elements. Vanadium in higher concentrations and oxidation states can cause adverse human health effects and toxicity to marine bacteria (Kamika & Momba, 2014). Vanadium has also been shown to bioaccumulation in vegetables and grasses (Khan et al., 2011). Molybdenum toxicity is often referenced in conjunction with impaired copper metabolism in cattle. Toxic effects in cattle herds include anemia, gastrointestinal problems, and reduced fertility to name a few (Blakely, 2013).

In compliance with applicable federal and state rules and regulations, this site adheres to Table 1. of LDEQ RECAP screening standards for monitoring metals:

LEDEQ RECAP Screening Standards for Groundwater		
Constituent	**Concentration (mg/L)**	**Note**
Cobalt	2.2 E-01	N
Copper	1.13 E+00	MCL
Lead (inorganic)	1.5 E-02	MCL
Nickel	7.3 E-02	N
Vanadium	2.6 E-02	N

(N)= based on non-carcinogenic effect

(MCL)= based on EPA maximum contaminant level (MCL) for drinking water

A screening standard for molybdenum does not appear on the LDEQ Screening Standards table.

A frequent occurrence in reporting concentrations found in groundwater monitoring data for metals is the presence of non-detects. Non-detects are left-censored data meaning the true concentration is hidden somewhere between the laboratory reporting limit (RL) and zero. Statistically, this makes the evaluation of a null hypothesis that there has been no significant

increase in concentration hard to determine. Many studies have been done to more accurately determine what lies beneath the reporting limit of non-detect data and whether or not this data exhibits a normal distribution (Loftis et.al, 1999). This study explores the use of nonparametric statistical analysis methods as recommended by the EPA and the American Society for Testing and Materials International (ASTM).

2.3 Parametric vs. Nonparametric

To assist the states, EPA regions and water quality professionals with implementing the rules and regulations founded by RCRA, the EPA released "Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities: Interim Final Guidance," in April 1989. This document offered guidance in choosing the most accurate statistical method for analyzing groundwater data at that time. This document has since undergone significant revisions as amendments were made to the code of regulations and as experience with implementing various tests increased (EPA, 1989).

In 1992, the EPA issued an addendum to their guidance document entitled, "Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities: Addendum to Interim Final Guidance." This guidance document offered more insight into handling non-detects, or concentrations that are found by the laboratory to be below the reporting limit. It suggested several nonparametric techniques including: the Wilcoxon rank-sum test, nonparametric tolerance intervals, and nonparametric prediction intervals. Nonparametric methods were recommended as they do not involve assumptions about the shape of the data distribution (EPA, 1992).

The addendum was not intended to replace the original guidance document; however, it offered suggestions which were contradictory to the original guidance document. To address this, the EPA released "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified

Guidance" in March 2009. Appendix B of this document provides specific details regarding the differences in statistical approaches to analyzing data which is highly left-censored or non-detect. Notably, the test of proportions which was suggested by both the 1989 guidance and the 1992 addendum was deleted. The test of proportions assumes a normal distribution and ignores magnitudes of detect concentrations which could actually be different. For data >50% non-detect, the 2009 Unified Guidance offers three suggestions: 1) the Wilcoxon rank-sum test which accounts for orders of magnitude and is used in two-sample comparisons; 2) nonparametric tolerance limits or nonparametric prediction limits; and 3) for >90% non-detect concentration data, the Poisson prediction and tolerance limits. Monte Carlo simulations have proven these tests to be more powerful than the test of proportions in analyzing non-detect data (EPA, 2009).

In 2012, ASTM offered the, "Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs." It acknowledges that there is significant variability in the way in which the EPA regulations and guidance are interpreted and practiced, and seeks to limit the false positives and false negatives that could result. Here, ASTM consolidates the federal regulations 40 CFR Part 264 into a flow chart for determining the best course of action given the particular parameters of each facility and the quality of their groundwater monitoring data. In this guidance, where detection frequency is >25%, data should be screened for outliers and historical trends using Sen's Slope test. Those outliers should then be removed and trends adjusted for before computing the nonparametric prediction limit. Where detection data is <25% it suggests setting the nonparametric prediction limit to the maximum quantified value not less than the laboratory reporting limit. If all data are censored, the nonparametric prediction limit should be set equal to the reporting limit.

2.4 Intra-well vs. Inter-well Testing

In the development of a detection monitoring plan, thought must be given as to whether inter-well testing or intra-well testing is more appropriate. Inter-well testing is typically defined as a comparison of wells known to be uncontaminated by industry which are located hydraulically up-gradient to wells which could potentially be impacted by industry located hydraulically down-gradient. Up-gradient wells are known as background wells, and down-gradient wells are called compliance wells. Groundwater monitoring may also involve the use of intra-well testing, where new monitoring data are compared to historical data within the same well. Intra-well statistical methods are recommended by both the EPA and ASTM in cases where only one background well exists and in cases where the percentage of non-detect data exceeds 50%.

In cases were only one background well exists, intra-well methods are recommended on the basis that one well cannot sufficiently describe unaffected water quality at a site. Spatial variability may exist which inter-well testing may discover but incorrectly identify as a statistically significant increase in constituent concentrations. Intra-well methods are also recommended in cases where large proportions of data are non-detect.

3 HYPOTHESIS

3.1 Hypothesis

Groundwater at the facility has not been impacted by a hazardous release of constituents (copper, cobalt, nickel, lead, molybdenum, and vanadium) from the surface impoundment, and is therefore of similar quality to un-impacted groundwater. To test this hypothesis, groundwater obtained from an uncontaminated well (background well) will be compared to the groundwater from the wells near the surface impoundment (compliance wells) by the following methods:

3.2 Aims

The aims of this study are to evaluate and analyze the stated hypothesis using EPA approved statistical analyses.

3.2.1 Aim 1: Trends Analysis

The aim of the trends analysis was designed to determine which, if any, changes have occurred in constituent concentration on a per well basis over time. This analysis will include establishing increasing or decreasing in contaminant concentration trends over time using outliers analysis, time series plots, box and whiskers plots and the Sen's Slope/ Mann-Kendal test.

3.2.2 Aim 2: Intra-well Testing

Intra-well analysis will be conducted to test the hypothesis that no statistically significant increase in measured constituents (copper, cobalt, nickel, lead, molybdenum, and vanadium) has occurred within the well, when compared to background data. Normality testing will be used to establish parametric or nonparametric prediction limits.

3.2.3 Aim 3: Inter-well Testing

Inter-well testing for a difference in means or medians was performed. This aim seeks to compare the sample means from each well dataset. The study hypothesis assumes that there is no difference between the well data sets. These analyses include the nonparametric analysis of variance, the Kruskal-Wallis test, and the one-way analysis of variance ANOVA.

Therefore, the testable null and alternative hypotheses include:

H_0: The data from which the data sets have been drawn (MW-1, MW-10, and MW-11) have the same mean or median.

H_A: The alternative hypothesis states the means are not equal, and at least one sample group has a mean or median that differs from the background well mean or median.

4 METHODOLOGY

4.1 Sampling Methods

The groundwater sampling and analysis plan used for the site follows the requirements of LAC 33:VII.3005-Appendix 3, as described below. Quarterly sampling of three wells occurred on six occasions beginning in November of 2005 until February of 2007. Sampling continued on a bi-annual basis thereafter for seven years resulting in a total of twenty sampling events. The wells sampled include one well (MW-1) located hydraulically up-gradient from the site serving as the background well, and two wells (MW-10, MW-11) located hydraulically down-gradient and adjacent to the point of compliance, which serve as monitoring wells. Their location and depths were determined following a one yearlong site-specific groundwater elevation study, which established groundwater water flow across the site. These wells monitor the uppermost aquifer consisting of laterally extensive silts and sands that occur within a depth range of 26 to 38 feet below ground surface (-24 to -36 feet MSL).

Prior to using any devices for measuring in the well, the devices were decontaminated by thorough rinsing with distilled water and placed on clean plastic sheeting to prevent ground surface contamination. The initial water level in the well was measured and recorded to the nearest 0.01 feet using a graduate tape with a plumb bob. This measurement was taken three times for accuracy with the depth to water referenced to the top of the well casing.

Total well depth was recorded using a decontaminated graduated plumb bob and recorded to the nearest 0.01 feet from the top of the well casing reference point. Three replicate measurements were taken to assure accuracy. In addition to these measurements, the date, time, monitor well

number, name of person recording data, and weather conditions were also recorded in a field log book.

Each well monitored was purged while wearing latex gloves using a well-dedicated PVC bailer with a polypropylene or nylon cord to prevent cross contamination between wells. Wells were purged to dryness or by removing three casing or well volumes. The well volume is equal to:

$$Vw = (L - H)\pi r^2$$

Where Vw is the volume of water initially in the well in cubic feet, L is the length of the well casing in feet, H is the depth in feet from the top of casing to the initial water level, and r is the inside radius of the well in feet to the nearest 0.1.

Wells were sampled immediately following purging and/or when sufficient water recharged the wells. Samples were placed in polyethylene bottles with the appropriate preservative, if any, provided by the commercial laboratory used for analysis. Specific conductance, temperature, and pH were tested using calibrated field instruments and recorded in the field log book. The samples were then placed in an ice chest (held at approximately 4 degrees centigrade) and delivered to the laboratory immediately thereafter.

One field blank was collected during each sampling event by filling a sample container with distilled water while in the field. To check for natural sample variance, one duplicate sample was collected during each sampling event side-by-side with primary samples.

A Louisiana Department of Environmental Quality (LDEQ) accredited commercial laboratory analyzed all samples using inductively coupled plasma-atomic emission spectrometry (ICP-AES), Method SW-846 6010A or 6010C, as described by the EPA for the following constituents: nickel (Ni), copper (Cu), cobalt (Co), molybdenum (Mo), vanadium (V), and lead (Pb). All samples

were labeled using a water resistant marker. Containers were filled to the top so that no air remained in the container and sufficiently tightened. A chain-of-custody and analytical request form accompanied the samples to the laboratory.

4.2 Statistical Analysis

All statistical analyses were performed using Sanitas™ v.9.0 Groundwater Statistical Software Program (Sanitas™). Descriptive data analysis was conducted on all data values to identify trends outliers, normality and distribution spread. To test background data for stability prior to forming intra-well prediction limits, the Sen's Slope, Mann Kendall test was performed which plots observations versus time.

Intra-well testing for each well/constituent pair was conducted using either parametric or nonparametric prediction limits as dictated by the normality of the data distribution. In the construction of prediction limits, background data was chosen from sampling events occurring from 11/1/2005 to 12/13/2011. The compliance data was chosen from the next four sampling events which took place in 2012 and 2013.

Inter-well testing for each constituent was performed using either the parametric or nonparametric ANOVA test. In the cases where the nonparametric ANOVA was utilized, a Kruskal-Wallis test statistic was generated as a comparison of average population ranks equivalent to their medians. Raw data tables can be found in Appendix B.

4.2.1 Trends Analysis

4.2.1.1 Box and Whisker Plots

Box plots were created for this study to describe the symmetry of the distribution and data spread. All three wells were assessed side-by-side for each constituent to visually highlight the similarities and differences in distribution and to check for spatial variability.

Box and Whisker plots divide ordered data into percentiles. The box drawn in the center describes the inter quartile range, between the 25^{th} and 75^{th} percentiles. The whiskers are drawn to the minimum data value and the maximum data value thereby describing the breadth of the distribution tails. The mean is identified with an x, and the median is identified as the central line within the box.

Normally distributed data would present a box plot with the mean and median in the center of the box and whiskers of equal length with no potential outliers. In Log normal distribution data, the mean is larger than the median and the whisker identifying values above the upper 75^{th} percentile will be larger than the lower whisker.

4.2.1.2 Outliers

Outliers were tested for using the 1989 EPA Outlier test provided by Sanitas™. Outliers are observation values that are vastly different from other observation values. Outliers can occur when there is variability in the constituent being measured, or they can occur due to experimental error such as, sampling error or laboratory analysis error. In the Sanitas™ program, data is first tested for normality using the Shapiro-Wilk Test described below. The procedure then follows

that the mean and standard deviation are calculated once data values are log transformed and ordered. The outlier test statistic T_n is calculated:

$$T_n = \frac{(X_n - \overline{X})}{S}$$

Where, X_n is the suspect observation, $\overline{X}$ the sample mean, and S the sample standard deviation.

The absolute value of outlier test statistic, $abs(T_n)$, is then compared to the critical value, $\left(T_{n_{(0.05)}}\right)$ for the given sample size, n (Table 8, Appendix B, EPA, April 1989). Statistical evidence that a suspect observation (X_n) is an outlier occurs if $abs(T_n)$ exceeds the tabulated value. In this case, that observation would be removed and the remaining dataset would be retested until all outliers have been determined.

4.2.1.3 Shapiro-Wilk Test

All well/constituent pairs were tested for normality using the Shapiro-Wilk Test (or $\boldsymbol{W}$ test) provided by Sanitas™. These results were generated within the 1989 EPA Outlier test described above. The Shapiro-Wilk test statistic is used to determine whether or not the data set forms a normal or log normal distribution for any data set $n \leq 50$ (Gilbert, 1989). It tests the null hypothesis

H_0: The population has a normal or log normal distribution.

versus

H_A: The population does not have a normal or log normal distribution.

The $\boldsymbol{W}$ test statistic of **H_0** is then derived from the following:

1. The denominator d for the $\boldsymbol{W}$ test statistic is computed for n data:

$$d = \sum_{i-1}^{n} \left(X_i - \overline{X}\right)^2 = \sum_{i=1}^{n} {X_i}^2 - \frac{1}{n}\left[\sum_{i=1}^{n} X_i\right]^2$$

Where: X_i is the value for the i th observation, $\overline{X}$ is the mean for the n observations, and n is the number of observations.

2. n data is ordered from smallest to largest before computing k where: $k = \frac{n}{2}$ *if* n *is even* and $k = \frac{n-1}{2}$ *if* n *is odd.*

3. For the observed value n locate coefficients $a_1, a_2, a_3 \ldots a_k$ in Table A 6 (Gilbert, 1989)

4. The $\boldsymbol{W}$ test statistic is then derived from the following:

$$W = \frac{1}{d}\left[\sum_{i=1}^{k} a_i \left(X_{[n-i+1]} - X_{[i]}\right)\right]^2$$

5. The α is set at 0.10 level of significance. $\mathbf{H_0}$ is rejected at the α =0.10 significance level if W is less than the quantile given in Table A7 (Gilbert, 1989).

4.2.1.4 Time Series

To visually assess concentration data for randomness, trends over time, and variability, time series plots were created using concentration data versus time. Concentration data were placed on the vertical axis and time intervals were placed on the horizontal axis. All three wells were plotted side-by-side for each constituent to visually highlight the similarities and differences in distribution data and trends across wells.

4.2.1.5 Seasonality

The data provided included samples which were collected quarterly for approximately two years and on a semi-annual basis for approximately eight years. At least 4 values are required for each season to test for seasonality. For this reason, seasonality could not formally be tested.

4.2.1.6 Sen's Slope/ Mann-Kendall

Sanitas™ provided the Sen's Slope/ Mann-Kendall trend test to formally evaluate evidence of linear trends on a per well per constituent basis. This procedure tests the null hypothesis $\mathbf{H_0}$, that there is no trend, versus the alternative hypothesis $\mathbf{H_A}$, that there is a trend at the α=0.10 significance level. The Mann-Kendall test (Hollander & Wolfe. 1973) is a nonparametric test for linear trends which is built upon the idea that if no trend exists the data should correspond with a time series plot fluctuating randomly about a mean level with no apparent pattern upwards or downwards. If a trend does exist, the true slope can be estimated using a nonparametric procedure, the Sen's Slope Estimate (Gilbert, 1987). The benefit of these tests is that they do not require the data to follow a specific distribution, which can be difficult to compute with censored data >50%.

The Mann-Kendall test uses the relative magnitudes of data and not the actual value. In this procedure non-detects are assigned a common value equal to half their detection limits. Tied pairs are given a score of 0 in the calculation of the Mann-Kendall statistic *S*. The first step in the Mann-Kendall test is to order the data as they were collected over time: $x_{1,}x_{2,} \ldots x_n$. The next step is to determine the sign of all possible differences $x_j - x_k$, where $j > k$:

$$sgn(x_j - x_k) = 1 \; if \; x_j - x_k > 0$$

$$sgn(x_j - x_k) = 0 \; if \; x_j - x_k = 0$$

$$sgn(x_j - x_k) = -1 \; if \; x_j - x_k < 0$$

Where,

x_j = the value of the kth observation; and

x_k = the value of the kth observation.

Finally, the Mann-Kendall statistic,S, is calculated thus:

$$S = \sum_{k=1}^{n-1} \sum_{j=k+1}^{n} sgn(x_j - x_k)$$

Where,

n = the total number of observations; and

S statistic = number of positive differences minus the number of negative differences.

In this study a two-tailed test was conducted for the presence of either an upward or downward trend. The absolute value of S was therefore doubled and compared to the corresponding tabulated probability level. The null hypothesis is rejected if the doubled S statistic is less than the a priori α level.

The Sen's nonparametric estimator of slope computes the true slope if a linear trend is present as follows:

For all non-detect data, the value of one half the detection limit is substituted. The N' individual slope estimates, Q, are computed for each time period:

$$Q = \frac{X_i' - X_i}{i' - i}$$

Where,

$X_i' - X_i$ = the data values at time $i'$and i (in days), respectively, $i' > i$; and

N' = the number of data pairs for which, $i' > i$.

Sen's estimator of slope is the median of these N' values of Q (Gilbert, 1987).The median of N' values is found by ranking Q values from smallest to largest. The middle ranked slope is chosen as follows with n being the number of time periods:

$$Q[N' = n(n-1)/2] \quad \text{if } N' \text{ is odd}$$

$$\frac{1}{2}\left(Q_{[N'/2]} + Q_{[(N'+2)/2]}\right) \text{ if } N' \text{ is even}$$

4.2.2 Intra-well Testing

Intra-well prediction limits were chosen for this study due to the large proportion of non-detects present in the data. Both the USEPA and ASTM recommend the use of intra-well nonparametric prediction limits in the presence of non-detects >50%. Sanitas™ chooses the parametric prediction limit if the data set distribution is found to be normal or transformed- normal. Where the presence of censored data exceeds 50%, the nonparametric test is automatically used.

A nonparametric prediction limit is often simply the highest observed value in the background data set. Data sets are ordered and the maximum value or second maximum value is chosen as the prediction limit. The confidence level in correctly predicting the next *m* future sample can be found in Table 18-1, Appendix D of the Unified Guidance.

In this study background data was chosen from the earliest sampling event 11/1/2005 through 12/13/2011. The compliance data was chosen from the next four sampling events which took place semi-annually in 2012 and 2013. Outliers previously identified were removed prior to setting the prediction limit. The prediction limit is used for comparison with future values *m*. Future observations should fall within the set prediction limit value, or retesting may have to take place.

4.2.3 Inter-well Testing

The ANOVA test procedure is used in this study as an inter-well test comparing the mean value of the background well (MW-1) with the mean values of the compliance wells (MW-10, MW-11) to determine if a significant difference exists. Both the parametric and nonparametric one-way analysis of variance were used in this study. As previously discussed, the nonparametric one-way analysis of variance is used whenever the underlying distribution cannot be determined due to the presence of left censored data totaling greater than 50%. Both methods require a minimum of three observations per well.

4.2.3.1 Parametric ANOVA

The parametric ANOVA test requires that the errors or residuals be normally distributed with equal variances. The residuals are the difference between the observed data value and the well mean. Residuals are calculated as:

$$R_{ij} = X_{ij} - \bar{X}_i$$

Where:

R_{ij} = the jth ranked observation in the ith well; and

$\bar{X}_i$ = the mean of the observations in the ith well.

The Shapiro-Francia test for normality is then computed on the residuals (as described below). If the residuals fail the test for normality, they are log transformed and retested for normality. If this test fails, the nonparametric ANOVA is performed.

4.2.3.2 Normality

A normal distribution, or Gaussian distribution, is defined by its probability density function, which follows a bell-shaped curve symmetrical about the mode μ (Rosner, 2006). The probability density function is defined mathematically as

$$f(x) = \frac{1}{\sqrt{2\pi\sigma}} \exp\left[-\frac{1}{2\sigma^2}(x-\mu^2)\right]$$
$$-\infty < x < \infty$$

Where $f(x)$ is the height of the curve at the value x, μ is the mean and σ^2 is the variance of the distribution.

Normality is an important consideration in choosing which statistical methods are appropriate for testing hypotheses. Many probability distributions are built on assumptions about how the data is distributed. Determining data distribution and normality becomes difficult with left-censored data or non-detects. Skewed distributions can result as the true concentration of non-detects lies somewhere between the reporting limit (RL) and zero. Normality was tested for visually using Box and Whiskers Plots. The Shapiro-Wilk Test for normality was used in the 1989 EPA Outlier test, and Shapiro-Francia Test was used in the ANOVA testing procedure.

4.2.3.3 Shapiro-Francia test

For inter-well well data sets where constituent values were pooled ($n \geq 50$) the Shapiro-Francis test for normality was used at the $\alpha = 0.01$ confidence. In cases where non-detects >50% the Sanitas™ software automatically chose the nonparametric method in accordance with the EPA Unified Guidance. The results of the Shapiro-Francia test are generated with the ANOVA test. The Shapiro-Francia test statistic (SF) is calculated as follows:

$$SF = \frac{\left[\sum_{i=1}^{n} m_i x_{(i)}\right]^2}{\left[(n-1)s^2 \sum_{i-1}^{n} m_i^2\right]}$$

Where:

$x_{(i)}$ = the ith ranked observation of the sample,

m_i = the approximate expected value of the i th ordered normal quartile; and

n = the number of observations, and s the standard deviation of the sample.

Values for m_i can be approximately computed as:

$$m_i = \Phi^{-1}\left(\frac{i}{n+1}\right)$$

Where:

Φ^{-1} = the inverse standard normal distribution with zero mean and unit variance.

The null hypothesis that the distribution exhibits a normal or transformed normal distribution is rejected if SF is less than the critical value found in Table A-3 (Appendix A; USEPA, 1992).

4.2.3.4 Nonparametric ANOVA (Kruskal-Wallis)

The Kruskal-Wallis test is a nonparametric alternative to the one way ANOVA test. This procedure does not require that the underlying distribution of that data be known. Instead, it tests differences in equivalent population medians based on ranks. All non-detects or left censored data are treated as tied values at the highest reporting limit. All "J" or "E" values are ranked at their estimated limit. The Kruskal-Wallis statistic, H, tests the null hypothesis **H_0:**

H_0: The populations from which the data sets have been drawn have the same median.

versus

H_A: At least one population has a median larger or smaller than the background population's median.

The H test statistic, where there are no ties, is then derived from the following:

$$H = \left[\frac{12}{N(N+1)}\sum_{i=1}^{k}\frac{R_i^2}{N_i}\right] - 3(N+1)$$

Where:

R_i = the sum of the ranks of the ith group,

N_i =the number of observations in the ith group,

N = the total number of observations; and

k = the number of groups.

The H' test statistic, where there are ties, is derived from the following:

$$H' = \frac{H}{1 - \left[\frac{\sum_{i=1}^{g} T_i}{(N^3 - N)}\right]}$$

Where:

g = the number of groups of distinct tied observations'

N = the total number of observations; and

T_i is calculated as: $T_i = (t_i^3 - t_i)$.

Where:

t_i= the number of observations in the tie group i.

Calculated values for H and H' are then compared to the tabulated chi-squared value with (K-1) degrees of freedom, (Table A-1, Appendix B; USEPA, April 1989), where K is the number of groups. Wherever H or H' exceed the tabulated critical value the null hypothesis is rejected.

5 RESULTS

5.1 Trends Analysis

5.1.1 Outliers

Outliers were tested for using the 1989 EPA Outlier test provided by Sanitas™ v.9.0 Groundwater Statistical Software Program (Sanitas™). Where statistical outliers were observed, those values were flagged and excluded prior to the construction of trend testing and statistical limits. Table 2. denotes values which were determined to be outliers:

Table 2. Outliers Identified

Constituent	Well	Date	Value
Total Vanadium	MW-11	6/20/2007	.21 mg/L
Conductivity	MW-10	8/15/2006	12006ug/cm

The 1989 EPA Outlier test results summary and graphs can be found in Appendix E.

5.1.2 Sen's Slope/Mann-Kendall

The Sen's Slope/ Mann-Kendall trend test was used to evaluate all well/constituent pairs after outliers were removed. Statistically significant decreasing trends were identified in both up-gradient and down-gradient wells (See Table 3.). A statistically significant increasing trend was found in well MW-10 for the constituent conductivity. Where increasing trends were identified over time, data was re-evaluated to determine whether earlier concentrations levels were no longer representative of present-day ground water quality. In those cases, background data was re-selected, eliminating samples taken from earlier time periods. The updated background was used in the construction of intra-well prediction limits in order to provide limits that will be regulatory conservative in detecting future changes in ground water quality.

Table 3. Statistically Significant Trends		
Well	**Constituent**	**Directionality**
MW-1 (up-gradient)	Dissolved Molybdenum	Decreasing
	Total Molybdenum	Decreasing
	Dissolved Nickel	Decreasing
	Total Nickel	Decreasing
	pH	Decreasing
MW-10	Dissolved Molybdenum	Decreasing
	Total Molybdenum	Decreasing
	Dissolved Nickel	Decreasing
	Total Nickel	Decreasing
	Conductivity	Increasing
MW-11	Dissolved Molybdenum	Decreasing
	Total Molybdenum	Decreasing
	Dissolved Nickel	Decreasing
	Total Nickel	Decreasing

The Sen's Slope/ Man-Kendall test results summary and graphs can be found in Appendix F.

5.2 Intra-well Testing

For each well/constituent pair, background data was chosen from the earliest sampling event 11/1/2005 to 12/13/2011. The compliance data was chosen from the next four sampling events which took place semi-annually in 2012 and 2013. The prediction limits set by background data were then compared to the compliance data to determine exceedance.

Parametric prediction limits were used for the parameters of pH and conductivity, as the given values for those observations were found to be normally distributed by the Shapiro-Wilk test at the 99% confidence interval. An upper limit and lower limit was generated for pH at an alpha level of 0.05 (or 95% confidence).

Nonparametric limits were generated for all other constituents, either because censored data was greater than 50% or the data could not be transformed normal. In these cases only the upper limit could be quantified, and it is equal to the largest value in the background data set. The highest calculated alpha level for any individual nonparametric prediction limit is .059 (or 94.1% confidence).

All well/ constituent pairs were found to be within the set prediction limits based on the chosen background data. The only exceedance was found for the constituent pH in well MW-11. Prediction Limits results summary and graphs can be found in Appendix G.

5.3 Inter-well Testing

The nonparametric ANOVA test was used for all metal constituent analyses except dissolved vanadium which was found to be log normal. Conductivity analysis followed the nonparametric method, as the Shapiro-Francia test showed the residuals to be non-normal at 0.01 alpha level. The nonparametric ANOVA was used to determine if a statistically significant difference exists between the average population ranks of compliance wells, MW-10 and MW-11 and the background well MW-1. In this procedure, the Kruskal-Wallis test statistic was generated in Sanitas™ as described above. This statistic was then compared to the tabulated chi-squared value with 2 degrees of freedom at the 5% significance level, (Table A-1, Appendix B; USEPA, April 1989).

The following statistically significant differences were determined:

Table 4. Nonparametric ANOVA Significant Results			
Constituent	**Kruskal-Wallis statistic**	**Tabulated Chi-Squared Value**	**Boneferroni *post-hoc* Significance**
Total cobalt	H'= 13.51	5.991	MW=10 no
			MW=11 no
Total lead	H'= 22.7	5.991	MW=10 no
			MW=11 no
Total nickel	H'= 17.65	5.991	MW=10 no
			MW=11 no
Total Vanadium	H'= 12.53	5.991	MW=10 no
			MW=11 no
Conductivity	H= 40.8	5.991	MW=10 no
			MW=11 no

In the cases where a statistically significant difference in average population ranks was determined, the contrast test, Boneferroni was applied *post-hoc*. This contrast test was used to determine which, if any, compliance wells were significantly greater than the background well. A result of no significance indicates that it is the background well, MW-1, which is significantly higher than the compliance wells, MW-10 and MW-11.

The pH data passed the Shapiro-Francia test for normality on the residuals. Therefore, pH was analyzed with the one-way parametric ANOVA. Significant results are located in Table 5.

Table 5. One-way parametric ANOVA Results			
Constituent	F- statistic	Tabulated F-statistic	Boneferroni *post-hoc* Significance
pH	71.13	3.162	MW=10 yes
			MW=11 yes

A complete results summary for ANOVA analysis can be found in Appendix H.

6 DISCUSSION

6.1 Trends Analysis

6.1.1 Outliers

The observation, 0.21mg/L, on 6/20/2007 at well MW-11 for total vanadium was identified as an outlier by the 1989 EPA Outlier test. A review of laboratory reports from that day confirmed that 0.21mg/L was the actual recorded value. The second highest observed value for total vanadium in well MW-11 was 0.037mg/L. The observation on 6/20/2007 was therefore determined to be a true outlier. Its origin could not be determined, and it was subsequently removed from the data set.

The observation, 12006ug/cm, on 8/15/2006 at well MW-10 for conductivity was also identified as an outlier by the 1989 EPA Outlier test. The field data log for this day was not provided and could not be reviewed for confirmation. When data for this well is ranked, the second highest observation is 8718ug/cm. While the observation 12006ug/cm is high for well MW-10, this value happens to be the mean for the well adjacent to it, MW-11. This was also observed in the box and whiskers plot generated for conductivity. Whether or not observation, 12006ug/cm, is a true outlier for well MW-10 cannot be determined at this time. It should be noted however that it was removed from the data set prior to setting intra-well prediction limits and inter-well statistical analysis of variance.

6.1.2 Sen's Slope/Mann-Kendall

Similar trends found in both up-gradient and down-gradient wells can be considered a change in overall ground water quality over time. Notably molybdenum exhibits a statistically significant decreasing trend across all well groups. Nickel exhibits a statistically significant decreasing trend in both compliance wells. The apparent trend may be due to the changes in reporting limits that

have occurred over the past ten years more recently include estimated values between the reporting limit and the method detection limit.

6.2 Intra-well Testing

All constituents were within the set prediction limit values, with the exclusion of the parameter pH in well MW-11. This increase in pH was not correlated with any other measured constituent. Greater variability in prediction limits well-to-well was observed for total metals concentrations than dissolved metals. This was observation is also depicted in the box and whiskers plots generated.

6.3 Inter-well Testing

Inter-well testing found that the difference in medians between the compliance wells for all constituents is not statistically significant at the 95% confidence interval when examined using the Kruskal-Wallis test statistic. Average population ranks of compliance wells (MW-10 and MW-11) were statistically different from the background well (MW-1) for conductivity and total metals: cobalt, lead, nickel, and vanadium. The hypothesis that the data was collected from a single homogenous population is rejected.

6.4 Assumptions

This study assumes that the background well, MW-1, is representative of overall groundwater quality at the facility and that it is uncontaminated by industrial activities at the site. This is an important assumption when conducting inter-well testing using ANOVA.

Decreasing trends found at the site for nickel and molybdenum could be a result of changes in laboratory reporting limits. Laboratory reports show that the method detection limit (MDL) was not reported before December 16, 2010. Prior to that period, all analytical reports contained only the reporting detection limit (RDL) which is often magnitudes higher than the MDL. The introduction of the MDL in laboratory reports allowed for some observations to be estimated instead of being declared non-detects.

6.5 Limitations

Historical data for background well, MW-1, was not provided or reviewed for evidence of stability or contamination.

The oxidation reduction potential (ORP) was not a measured parameter. This could perhaps have led to more detailed studies into the nature of the soil/groundwater quality and interaction which may contribute to increases in pH, as found in well MW-11. The ORP and pH are both necessary to discovering the predominant oxidation state of each contaminant. The oxidation state is a determining factor in constituents' mobility within groundwater.

7 CONCLUSIONS

Using the ANOVA test, a statistically significant difference was found between the means of all wells for the parameter pH. The increase in pH in well MW-11 could be due to spatial variability across the site. According to the site-specific groundwater elevation study, the wells monitor the uppermost aquifer consisting of laterally extensive silts and sands that occur within a depth range of 26 to 38 feet below ground surface at the facility. These silts and sands may not homogeneous in nature lending to the differences in measurements for pH and conductivity between wells. The increase in pH was not correlated with a statistically significant increase in any other measured constituent of concern. As the increase in pH is not observed with a corresponding increase in any particular contaminant of concern, the change in pH may not be due to a hazardous release from the surface impoundment. Further investigation would be necessary to discover the origin of the increase in pH for well MW-11.

The Sen's Slope/Mann-Kendall test results show a decreasing trend in molybdenum across the site indicating a general change in groundwater quality over time. Inter-well testing found that the difference in populations between the compliance wells for all constituents is not statistically significant at the 95% confidence interval when examined using the Kruskal-Wallis test statistic. The means or medians of compliance wells (MW-10 and MW-11) were statistically different from the background well (MW-1) for conductivity and total metals: cobalt, lead, nickel, and vanadium.

The difference in means and medians between the background well and compliance well suggests significant spatial variability may exist. Nonparametric intra-well testing should be continued as the choice statistical method.

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8 REFERENCES

Agency for Toxic Substances and Disease Registery. (2011, March 3). *Toxic Substances Portal*. Retrieved from Agency for Toxic Substances and Disease Registery: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=22

Agency for Toxic Substances and Disease Registry. (2011, March 3). *Toxic Substances Portal*. Retrieved from Agency for Toxic Substances and Disease Registry: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=37

American Society for Testing and Materials. (2012). Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs. PS 64-96. West Conshohocken, Pennsylvania: ASTM.

Blakely, D. B. (2013, December). *Overview of Molybdenum Poisoning*. Retrieved from The Merck Veterinary Manual: http://www.merckmanuals.com/vet/toxicology/molybdenum_poisoning/overview_of_molybdenum_poisoning.html

Gilbert, R. O. (1987). Statistical Methods for Environmental Pollution Monitoring. New York: Van Nostrand Reinhold Company.

Jim C. Loftis, H. K. (1999). Rethinking Poisson-Based Statistics for Ground Water Quality Monitoring. *Ground Water, 37*(2), 275-281.

Kamika, I., & Momba, M. N. B. (2014). Effect of vanadium toxicity at its different oxidation states on selected bacterial and protozoan isolates in wastewater systems. *Environmental Technology, 35*(16), 2075-2085.

Khan, S., Kazi, T. G., Kolachi, N. F., Baig, J. A., Afridi, H. I., Shah, A. Q., . . . Shah, F. (2011). Hazardous impact and translocation of vanadium (V) species from soil to different vegetables and grasses grown in the vicinity of thermal power plant. *J Hazard Mater, 190*(1-3), 738-743.

Public Health England Center for Radiation, Chemical, and Environmental Hazards. (2009). *Nickel Toxicology Overview.* Retrieved from Health Protection Agency: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1236757324101

Tower, D. S. (2010, May 28). *Cobalt Toxicity in Two Hip Replacement Patients.* Retrieved from State of Alaska Epidemiology: http://www.epi.hss.state.ak.us/bulletins/docs/b2010_14.pdf

U.S. Environmental Protection Agency (EPA). 1992. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Addendum to Interim Final Guidance. Washington, D.C.:Office of Solid Waste.

U.S. Environmental Protection Agency (EPA). 1989. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Interim Final Guidance. Washington, D.C.:Office of Solid Waste.

U.S. Environmental Protection Agency (EPA). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. Washington, D.C.:Office of Solid Waste.

Vodyanitskii, Y. N. (2012). Standards for the contents of heavy metals and metalloids in soils. *Eurasian Soil Science, 45*(3), 321-328.

World Health Organization. (2011). *Guidelines for Drinking-Water Quality Standards, 4th edition.* Geneva, Switzerland: WHO Press.

9 APPENDICES

9.1 Appendix A – Site Map

9.2 Appendix B – Raw Data

9.3 Appendix C – Box and Whiskers Plots

9.4 Appendix D – Time Series

9.5 Appendix E – Outliers

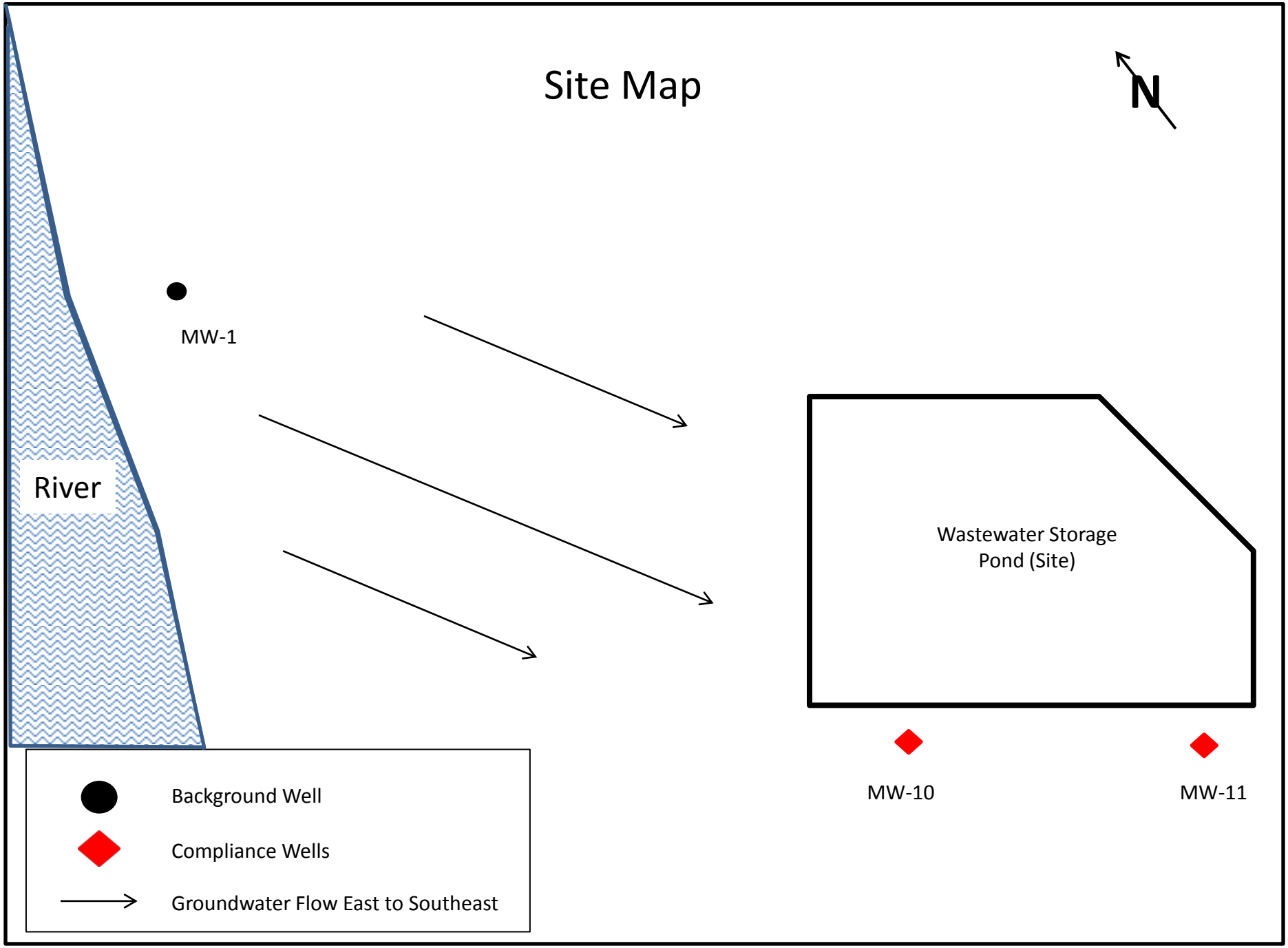
9.6 Appendix F – Sen's Slope/ Mann-Kendall

9.7 Appendix G – Prediction Limits

9.8 Appendix H – Parametric and Nonparametric ANOVA

Appendix A

Site Map


Site Map
N
MW-1
River
Wastewater Storage
Pond (Site)
MW-10
MW-11
Background Well
Compliance Wells
Groundwater Flow East to Southeast

Appendix B

Raw Data

Box & Whiskers Plot

Constituent: Dissolved cobalt (mg/L) Analysis Run 6/16/2014 7:09 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	<0.01	<0.01	<0.01
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	<0.01	<0.01	<0.01
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	<0.01
10/28/2008	<0.01	<0.01	<0.01
3/31/2009	<0.01	<0.01	<0.01
12/21/2009	<0.01	<0.01	<0.01
5/11/2010	<0.01	<0.01	<0.01
12/16/2010	0.0027 (B)	0.0026 (B)	0.0013 (B)
6/10/2011	0.001 (B)	0.0014 (B)	0.00055 (B)
12/13/2011	0.0022 (J)	0.00079 (J)	0.0019 (J)
6/29/2012	0.00089 (J)	0.0036 (J)	0.0016 (J)
12/13/2012	<0.00058	0.0028 (J)	0.0015 (J)
6/10/2013	<0.0025	0.003 (J)	<0.0025
11/18/2013	<0.0025	<0.0025	<0.0025
Median	0.005	0.005	0.005
LowerQ.	0.001725	0.0029	0.00155
UpperQ.	0.005	0.005	0.005
Min	0.00029	0.00079	0.00055
Max	0.005	0.005	0.005
Mean	0.003729	0.004022	0.003717

Box & Whiskers Plot

Constituent: Dissolved copper (mg/L) Analysis Run 6/16/2014 7:09 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	<0.01	<0.01	<0.01
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	<0.01	<0.01	<0.01
6/20/2007	<0.005	<0.005	<0.005
12/18/2007	<0.005	<0.005	<0.005
4/2/2008	<0.005	<0.005	<0.005
10/28/2008	<0.005	<0.005	<0.005
3/31/2009	<0.005	<0.005	<0.005
12/21/2009	<0.005	<0.005	<0.005
5/11/2010	0.012	0.0097	0.012
12/16/2010	0.014	0.013	0.015
6/10/2011	0.017	0.0069 (B)	0.012
12/13/2011	0.003 (J)	0.036	0.059
6/29/2012	0.012	0.013	0.015
12/13/2012	0.0014 (J)	<0.001	<0.001
6/10/2013	0.024	0.023	0.03
11/18/2013	<0.005	<0.005	<0.005
Median	0.005	0.005	0.005
LowerQ.	0.0025	0.0025	0.0025
UpperQ.	0.0085	0.0083	0.012
Min	0.0014	0.0005	0.0005
Max	0.024	0.036	0.059
Mean	0.006545	0.00748	0.00955

Box & Whiskers Plot

Constituent: Dissolved lead (mg/L) Analysis Run 6/16/2014 7:09 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.015	<0.015	<0.015
1/25/2006	<0.015	<0.015	<0.015
5/9/2006	<0.015	<0.015	<0.015
8/15/2006	<0.015	<0.015	<0.015
12/13/2006	<0.015	<0.015	<0.015
2/13/2007	<0.015	<0.015	<0.015
6/20/2007	<0.015	<0.015	<0.015
12/18/2007	<0.015	<0.015	<0.015
4/2/2008	<0.015	<0.015	<0.015
10/28/2008	<0.015	<0.015	<0.015
3/31/2009	<0.015	<0.015	<0.015
12/21/2009	<0.015	<0.015	<0.015
5/11/2010	<0.015	<0.015	<0.015
12/16/2010	0.0015 (B)	0.0017 (B)	0.002 (B)
6/10/2011	<0.0014	<0.0014	<0.0014
12/13/2011	<0.0028	<0.0028	<0.0028
6/29/2012	<0.0028	<0.0028	<0.0028
12/13/2012	<0.002	<0.002	<0.002
6/10/2013	<0.0038	<0.0038	<0.0038
11/18/2013	<0.0038	<0.0038	<0.0038
Median	0.0075	0.0075	0.0075
LowerQ.	0.0017	0.0018	0.0019
UpperQ.	0.0075	0.0075	0.0075
Min	0.0007	0.0007	0.0007
Max	0.0075	0.0075	0.0075
Mean	0.005365	0.005375	0.00539

Box & Whiskers Plot

Constituent: Dissolved moly (mg/L) Analysis Run 6/16/2014 7:09 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.05	<0.05	<0.05
1/25/2006	<0.05	<0.05	<0.05
5/9/2006	<0.05	<0.05	<0.05
8/15/2006	<0.05	<0.05	<0.05
12/13/2006	<0.05	<0.05	<0.05
2/13/2007	<0.05	<0.05	<0.05
6/20/2007	<0.02	<0.02	<0.02
12/18/2007	<0.02	<0.02	<0.02
4/2/2008	<0.02	<0.02	<0.02
10/28/2008	<0.02	<0.02	<0.02
3/31/2009	<0.02	<0.02	<0.02
12/21/2009	<0.02	<0.02	<0.02
5/11/2010	<0.02	<0.02	<0.02
12/16/2010	0.0011 (B)	<0.00087	<0.00087
6/10/2011	<0.00087	<0.00087	<0.00087
12/13/2011	0.0019 (J)	<0.0018	<0.0018
6/29/2012	<0.0018	<0.0018	<0.0018
12/13/2012	0.0096 (J)	0.0049 (J)	0.0074 (J)
6/10/2013	<0.0075	<0.0075	<0.0075
11/18/2013	<0.0075	<0.0075	<0.0075
Median	0.01	0.01	0.01
LowerQ.	0.00375	0.00375	0.00375
UpperQ.	0.025	0.025	0.025
Min	0.000435	0.000435	0.000435
Max	0.025	0.025	0.025
Mean	0.01207	0.01175	0.01188

Box & Whiskers Plot

Constituent: Dissolved nickel (mg/L) Analysis Run 6/16/2014 7:09 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.04	<0.04	<0.04
1/25/2006	<0.04	<0.04	<0.04
5/9/2006	<0.04	<0.04	<0.04
8/15/2006	<0.04	<0.04	<0.04
12/13/2006	<0.04	<0.04	<0.04
2/13/2007	<0.04	<0.04	<0.04
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	<0.01
10/28/2008	<0.01	<0.01	<0.01
3/31/2009	<0.01	<0.01	<0.01
12/21/2009	<0.01	<0.01	<0.01
5/11/2010	<0.01	<0.01	<0.01
12/16/2010	0.007 (B)	<0.00096	<0.00096
6/10/2011	0.0038 (B)	<0.00096	<0.00096
12/13/2011	0.0029 (J)	<0.00084	<0.00084
6/29/2012	0.0025 (J)	0.0012 (J)	0.001 (J)
12/13/2012	<0.0011	<0.0011	<0.0011
6/10/2013	<0.01	<0.01	<0.01
11/18/2013	<0.01	<0.01	<0.01
Median	0.005	0.005	0.005
LowerQ.	0.005	0.0031	0.003
UpperQ.	0.02	0.02	0.02
Min	0.00055	0.00042	0.00042
Max	0.02	0.02	0.02
Mean	0.009087	0.008406	0.008396

Box & Whiskers Plot

Constituent: Dissolved vanadium (mg/L) Analysis Run 6/16/2014 7:09 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	0.031	<0.02	<0.02
1/25/2006	<0.02	<0.02	<0.02
5/9/2006	<0.02	<0.02	<0.02
8/15/2006	<0.02	<0.02	0.023
12/13/2006	<0.02	<0.02	<0.02
2/13/2007	<0.02	<0.02	<0.02
6/20/2007	<0.005	<0.005	<0.005
12/18/2007	<0.005	<0.005	<0.005
4/2/2008	<0.005	<0.005	<0.005
10/28/2008	<0.005	<0.005	<0.005
3/31/2009	0.02	<0.005	0.007
12/21/2009	0.038	0.021	0.029
5/11/2010	<0.005	0.015	0.012
12/16/2010	<0.00082	0.03	0.018 (B)
6/10/2011	0.013 (B)	0.012 (B)	0.015 (B)
12/13/2011	0.0092 (J)	0.0079 (J)	0.0069 (J)
6/29/2012	<0.0012	0.033	0.019 (J)
12/13/2012	0.0063 (J)	0.0076 (J)	0.0067 (J)
6/10/2013	0.07	0.055	0.068
11/18/2013	0.022	0.021	0.021
Median	0.01	0.01	0.01
LowerQ.	0.0025	0.00505	0.0068
UpperQ.	0.0165	0.018	0.0185
Min	0.00041	0.0025	0.0025
Max	0.07	0.055	0.068
Mean	0.01365	0.01375	0.01428

Box & Whiskers Plot

Constituent: Total cobalt (mg/L) Analysis Run 6/16/2014 7:10 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	0.016	<0.01	<0.01
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	<0.01	<0.01	<0.01
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	<0.01
10/28/2008	0.012	<0.01	<0.01
3/31/2009	<0.01	<0.01	<0.01
12/21/2009	0.05	<0.01	<0.01
5/11/2010	<0.01	<0.01	<0.01
12/16/2010	0.054	0.0025 (B)	0.00088 (B)
6/10/2011	0.026	0.0012 (B)	0.0006 (B)
12/13/2011	0.011	0.00098 (J)	0.0018 (J)
6/29/2012	0.0032 (J)	0.0031 (J)	0.0011 (J)
12/13/2012	0.015	0.0042 (J)	<0.00058
6/10/2013	0.037	0.005 (J)	<0.0025
11/18/2013	<0.0025	0.0043 (J)	0.0026 (J)
Median	0.005	0.005	0.005
LowerQ.	0.005	0.00425	0.001525
UpperQ.	0.0155	0.005	0.005
Min	0.00125	0.00098	0.00029
Max	0.054	0.005	0.005
Mean	0.01377	0.004314	0.003676

Box & Whiskers Plot

Constituent: Total Copper (mg/L) Analysis Run 6/16/2014 7:10 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	0.029	<0.01	<0.01
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	0.027	0.013	<0.01
6/20/2007	<0.005	0.008	0.019
12/18/2007	0.012	0.0075	0.0062
4/2/2008	<0.005	<0.005	<0.005
10/28/2008	<0.005	<0.005	<0.005
3/31/2009	0.021	0.01	0.006
12/21/2009	0.14	0.007	0.018
5/11/2010	0.014	<0.005	<0.005
12/16/2010	0.14	0.012	0.023
6/10/2011	0.064	0.0088 (B)	0.028
12/13/2011	0.07	0.041	0.053
6/29/2012	0.017	0.014	0.0011
12/13/2012	0.048	0.0053 (J)	<0.001
6/10/2013	0.093	0.011 (J)	0.043
11/18/2013	<0.005	<0.005	<0.005
Median	0.0155	0.00615	0.005
LowerQ.	0.005	0.005	0.0025
UpperQ.	0.056	0.0105	0.0185
Min	0.0025	0.0025	0.0005
Max	0.14	0.041	0.053
Mean	0.03525	0.00863	0.01189

Box & Whiskers Plot

Constituent: Total lead (mg/L) Analysis Run 6/16/2014 7:10 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.015	<0.015	<0.015
1/25/2006	<0.015	<0.015	<0.015
5/9/2006	<0.015	<0.015	<0.015
8/15/2006	0.022	<0.015	<0.015
12/13/2006	<0.015	<0.015	<0.015
2/13/2007	<0.015	<0.015	<0.015
6/20/2007	<0.015	<0.015	0.021
12/18/2007	<0.015	<0.015	<0.015
4/2/2008	<0.015	<0.015	<0.015
10/28/2008	0.016	<0.015	<0.015
3/31/2009	<0.015	<0.015	<0.015
12/21/2009	0.091	<0.015	<0.015
5/11/2010	0.02	<0.015	<0.015
12/16/2010	0.09	<0.0014	0.002 (B)
6/10/2011	0.041	<0.0014	<0.0014
12/13/2011	0.038	0.0062 (J)	0.0072 (J)
6/29/2012	0.014 (J)	<0.0028	<0.0028
12/13/2012	0.037	0.0047 (J)	<0.002
6/10/2013	0.06	0.0044 (J)	<0.0038
11/18/2013	0.0076 (J)	0.0064 (J)	0.0063 (J)
Median	0.0108	0.0075	0.0075
LowerQ.	0.0075	0.00545	0.00415
UpperQ.	0.0375	0.0075	0.0075
Min	0.0075	0.0007	0.0007
Max	0.091	0.0075	0.021
Mean	0.0252	0.0061	0.006575

Box & Whiskers Plot

Constituent: Total moly (mg/L) Analysis Run 6/16/2014 7:10 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.05	<0.05	<0.05
1/25/2006	<0.05	<0.05	<0.05
5/9/2006	<0.05	<0.05	<0.05
8/15/2006	<0.05	<0.05	<0.05
12/13/2006	<0.05	<0.05	<0.05
2/13/2007	<0.05	<0.05	<0.05
6/20/2007	<0.02	<0.02	<0.02
12/18/2007	<0.02	<0.02	<0.02
4/2/2008	<0.02	<0.02	<0.02
10/28/2008	<0.02	<0.02	<0.02
3/31/2009	<0.02	<0.02	<0.02
12/21/2009	<0.02	<0.02	<0.02
5/11/2010	<0.02	<0.02	<0.02
12/16/2010	0.0026 (B)	<0.00087	<0.00087
6/10/2011	0.00089 (B)	<0.00087	<0.00087
12/13/2011	<0.0018	<0.0018	<0.0018
6/29/2012	<0.0018	<0.0018	<0.0018
12/13/2012	0.011 (J)	0.0027 (J)	0.0022 (J)
6/10/2013	<0.0075	<0.0075	<0.0075
11/18/2013	<0.0075	<0.0075	<0.0075
Median	0.01	0.01	0.01
LowerQ.	0.00375	0.003225	0.002975
UpperQ.	0.025	0.025	0.025
Min	0.00089	0.000435	0.000435
Max	0.025	0.025	0.025
Mean	0.01219	0.01164	0.01162

Box & Whiskers Plot

Constituent: Total nickel (mg/L) Analysis Run 6/16/2014 7:10 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1 (bg)	MW-10	MW-11
11/1/2005	<0.04	<0.04	<0.04
1/25/2006	<0.04	<0.04	<0.04
5/9/2006	<0.04	<0.04	<0.04
8/15/2006	0.04	<0.04	<0.04
12/13/2006	<0.04	<0.04	<0.04
2/13/2007	<0.04	<0.04	<0.04
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	0.015	<0.01	<0.01
10/28/2008	0.028	<0.01	<0.01
3/31/2009	0.019	<0.01	<0.01
12/21/2009	0.12	<0.01	<0.01
5/11/2010	0.015	<0.01	<0.01
12/16/2010	0.14	<0.00096	<0.00096
6/10/2011	0.071	<0.00096	0.0013 (B)
12/13/2011	0.026 (J)	<0.00084	<0.00084
6/29/2012	0.011 (J)	0.0022 (J)	0.0018 (J)
12/13/2012	0.036 (J)	0.0032 (J)	<0.0011
6/10/2013	0.097	<0.01	<0.01
11/18/2013	<0.01	<0.01	<0.01
Median	0.02	0.005	0.005
LowerQ.	0.015	0.0041	0.0034
UpperQ.	0.038	0.02	0.02
Min	0.005	0.00042	0.00042
Max	0.14	0.02	0.02
Mean	0.03665	0.008589	0.008477

Box & Whiskers Plot

Constituent: Total vanadium (mg/L) Analysis Run 6/16/2014 7:10 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1 (bg)	MW-10	MW-11
11/1/2005	0.041	<0.02	<0.02
1/25/2006	<0.02	<0.02	<0.02
5/9/2006	0.031	<0.02	0.025
8/15/2006	0.051	<0.02	<0.02
12/13/2006	<0.02	<0.02	<0.02
2/13/2007	0.029	<0.02	<0.02
6/20/2007	<0.005	<0.005	0.21
12/18/2007	<0.005	<0.005	<0.005
4/2/2008	0.018	<0.005	<0.005
10/28/2008	0.049	<0.005	<0.005
3/31/2009	0.05	<0.005	0.009
12/21/2009	0.13	0.022	0.037
5/11/2010	0.019	0.015	0.014
12/16/2010	0.087	0.031	<0.02
6/10/2011	0.091	0.015 (B)	0.02 (B)
12/13/2011	0.052	0.01 (J)	0.0062 (J)
6/29/2012	<0.0012	0.041	0.028
12/13/2012	0.073	0.01 (J)	0.0013 (J)
6/10/2013	0.12	0.0083 (J)	<0.005
11/18/2013	0.029	0.023	0.029
Median	0.036	0.01	0.01
LowerQ.	0.014	0.0054	0.00435
UpperQ.	0.0625	0.015	0.0225
Min	0.0006	0.0025	0.0013
Max	0.13	0.041	0.21
Mean	0.04478	0.01239	0.02247

Box & Whiskers Plot

Constituent: Conductivity (uS/cm) Analysis Run 6/16/2014 5:39 PM

Facility: Demo Client: Demo Data File: pHConductivity

	MW-1 (bg)	MW-10	MW-11
11/1/2005	19570	7000	13150
1/25/2006	18375	6950	12900
5/9/2006	19050	7213	14128
8/15/2006	17820	12006	13568
12/13/2006	20238	7841	12408
2/13/2007	19890	8128	13813
6/20/2007	18205	6258	11168
12/18/2007	18913	7688	11773
4/2/2008	17480	8653	12635
10/28/2008	18133	8210	11713
3/31/2009	18506	8743	12188
12/21/2009	18950	7912	12362
5/11/2010	17670	8363	12240
12/16/2010	18100	8350	12250
6/10/2011	18613	8640	12523
12/13/2011	19165	8955	12230
12/13/2012	10444	4730	7076
6/10/2013	10102	4620	7176
11/18/2013	18635	8666	13245
Median	18506	8128	12362
LowerQ.	17820	7000	11773
UpperQ.	19050	8653	13150
Min	10102	4620	7076
Max	20238	12006	14128
Mean	17782	7838	12029

Box & Whiskers Plot

Constituent: pH (n/a) Analysis Run 6/16/2014 5:39 PM

Facility: Demo Client: Demo Data File: pHConductivity

	MW-1 (bg)	MW-10	MW-11
11/1/2005	6.82	7.44	7.05
1/25/2006	6.86	7.55	7.05
5/9/2006	6.87	7.12	6.81
8/15/2006	6.72	7.08	7.08
12/13/2006	6.71	7.24	7.08
2/13/2007	6.83	7.38	6.94
6/20/2007	6.71	7.29	6.91
12/18/2007	6.72	7.25	6.88
4/2/2008	6.66	7.16	6.83
10/28/2008	6.6	7.11	6.85
3/31/2009	6.63	7.18	6.89
12/21/2009	6.72	7.11	6.93
5/11/2010	6.71	7.1	6.98
12/16/2010	6.71	7.14	6.98
6/10/2011	6.61	7.21	7.04
12/13/2011	6.48	7.09	7.12
6/29/2012	7.14	7.47	7.01
12/13/2012	6.51	7.21	6.83
6/10/2013	6.47	7.18	6.66
11/18/2013	6.75	7.34	7.14
Median	6.71	7.195	6.96
LowerQ.	6.62	7.115	6.865
UpperQ.	6.785	7.315	7.05
Min	6.47	7.08	6.66
Max	7.14	7.55	7.14
Mean	6.712	7.233	6.953

Appendix C

Box and Whiskers Plots

Box & Whiskers Plot

Facility: Demo Client: Demo Data File: Dissolved Metals Printed 6/16/2014, 3:57 PM

onstituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
issolved cobalt (mg/L)	MW-1 (bg)	20	0.003729	0.001836	0.0004105	0.005	0.00029	0.005	80
issolved cobalt (mg/L)	MW-10	20	0.004022	0.00149	0.0003332	0.005	0.00079	0.005	70
issolved cobalt (mg/L)	MW-11	20	0.003717	0.001808	0.0004044	0.005	0.00055	0.005	75
issolved copper (mg/L)	MW-1 (bg)	20	0.006545	0.006057	0.001354	0.005	0.0014	0.024	65
issolved copper (mg/L)	MW-10	20	0.00748	0.008521	0.001905	0.005	0.0005	0.036	70
issolved copper (mg/L)	MW-11	20	0.00955	0.01355	0.00303	0.005	0.0005	0.059	70
issolved lead (mg/L)	MW-1 (bg)	20	0.005365	0.002995	0.0006698	0.0075	0.0007	0.0075	95
issolved lead (mg/L)	MW-10	20	0.005375	0.002982	0.0006668	0.0075	0.0007	0.0075	95
issolved lead (mg/L)	MW-11	20	0.00539	0.002963	0.0006626	0.0075	0.0007	0.0075	95
issolved moly (mg/L)	MW-1 (bg)	20	0.01207	0.009352	0.002091	0.01	0.000435	0.025	85
issolved moly (mg/L)	MW-10	20	0.01175	0.009573	0.002141	0.01	0.000435	0.025	95
issolved moly (mg/L)	MW-11	20	0.01188	0.009495	0.002123	0.01	0.000435	0.025	95
issolved nickel (mg/L)	MW-1 (bg)	20	0.009087	0.00744	0.001664	0.005	0.00055	0.02	80
issolved nickel (mg/L)	MW-10	20	0.008406	0.007993	0.001787	0.005	0.00042	0.02	95
issolved nickel (mg/L)	MW-11	20	0.008396	0.008003	0.00179	0.005	0.00042	0.02	95
issolved vanadium (mg/L)	MW-1 (bg)	20	0.01365	0.01668	0.00373	0.01	0.00041	0.07	60
issolved vanadium (mg/L)	MW-10	20	0.01375	0.01305	0.002918	0.01	0.0025	0.055	55
issolved vanadium (mg/L)	MW-11	20	0.01428	0.01465	0.003276	0.01	0.0025	0.068	45

Box & Whiskers Plot

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/16/2014, 4:21 PM

onstituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
otal cobalt (mg/L)	MW-1 (bg)	20	0.01377	0.01569	0.003508	0.005	0.00125	0.054	55
otal cobalt (mg/L)	MW-10	20	0.004314	0.001301	0.000291	0.005	0.00098	0.005	65
otal cobalt (mg/L)	MW-11	20	0.003676	0.001902	0.0004253	0.005	0.00029	0.005	75
otal Copper (mg/L)	MW-1 (bg)	20	0.03525	0.04417	0.009876	0.0155	0.0025	0.14	40
otal Copper (mg/L)	MW-10	20	0.00863	0.008418	0.001882	0.00615	0.0025	0.041	45
otal Copper (mg/L)	MW-11	20	0.01189	0.01465	0.003276	0.005	0.0005	0.053	55
otal lead (mg/L)	MW-1 (bg)	20	0.0252	0.02682	0.005998	0.0108	0.0075	0.091	45
otal lead (mg/L)	MW-10	20	0.0061	0.002415	0.0005401	0.0075	0.0007	0.0075	80
otal lead (mg/L)	MW-11	20	0.006575	0.004316	0.0009652	0.0075	0.0007	0.021	80
otal moly (mg/L)	MW-1 (bg)	20	0.01219	0.009281	0.002075	0.01	0.00089	0.025	85
otal moly (mg/L)	MW-10	20	0.01164	0.009668	0.002162	0.01	0.000435	0.025	95
otal moly (mg/L)	MW-11	20	0.01162	0.009693	0.002167	0.01	0.000435	0.025	95
otal nickel (mg/L)	MW-1 (bg)	20	0.03665	0.03903	0.008728	0.02	0.005	0.14	40
otal nickel (mg/L)	MW-10	20	0.008589	0.007831	0.001751	0.005	0.00042	0.02	90
otal nickel (mg/L)	MW-11	20	0.008477	0.007925	0.001772	0.005	0.00042	0.02	90
otal vanadium (mg/L)	MW-1 (bg)	20	0.04478	0.03825	0.008554	0.036	0.0006	0.13	25
otal vanadium (mg/L)	MW-10	20	0.01239	0.01009	0.002257	0.01	0.0025	0.041	55
otal vanadium (mg/L)	MW-11	20	0.02247	0.04528	0.01013	0.01	0.0013	0.21	50

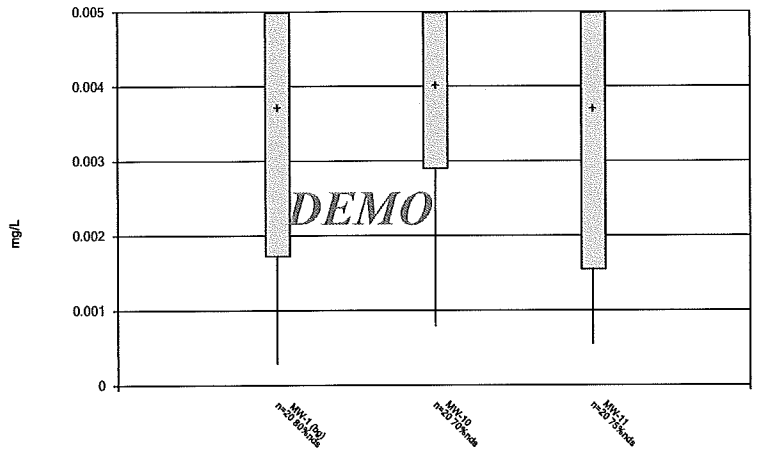
Box & Whiskers Plot

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/16/2014, 4:47 PM

onstituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
onductivity (uS/cm)	MW-1 (bg)	19	17782	2743	629.4	18506	10102	20238	0
onductivity (uS/cm)	MW-10	19	7838	1609	369.2	8128	4620	12006	0
onductivity (uS/cm)	MW-11	19	12029	1878	430.8	12362	7076	14128	0
H (n/a)	MW-1 (bg)	20	6.712	0.1527	0.03414	6.71	6.47	7.14	0
H (n/a)	MW-10	20	7.233	0.1379	0.03084	7.195	7.08	7.55	0
H (n/a)	MW-11	20	6.953	0.1225	0.0274	6.96	6.66	7.14	0

Background/Compliance Box & Whiskers Plot

MW-1,MW-10,MW-11

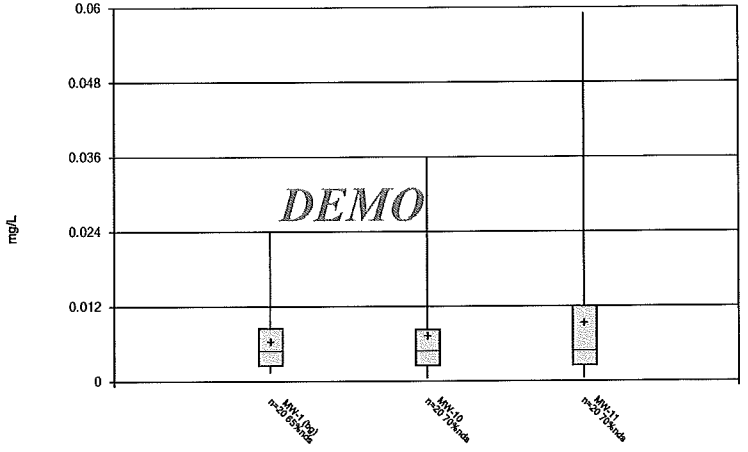


Constituent: Dissolved cobalt Analysis Run 6/16/2014 3:55 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Background/Compliance Box & Whiskers Plot

MW-1,MW-10,MW-11

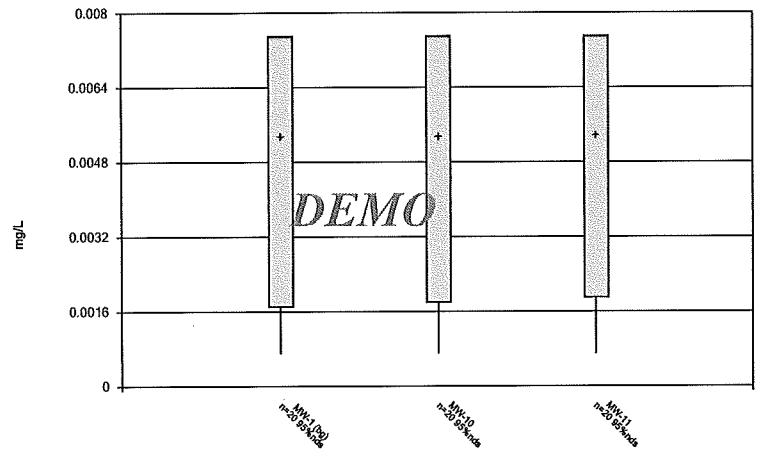


Constituent: Dissolved copper Analysis Run 6/16/2014 3:55 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Background/Compliance Box & Whiskers Plot

MW-1,MW-10,MW-11

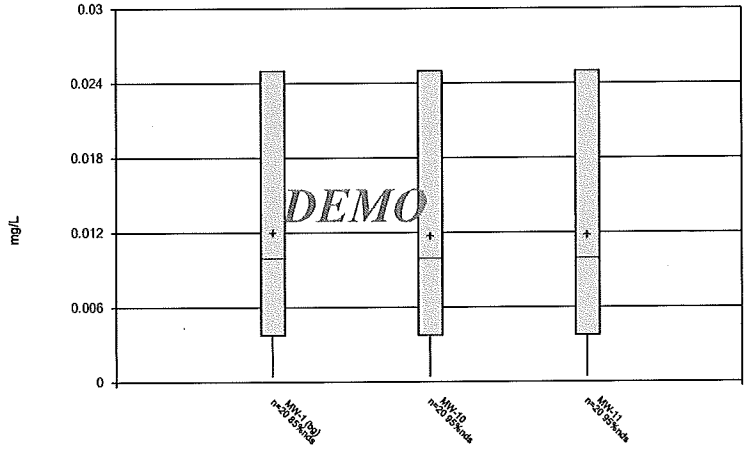


Constituent: Dissolved lead Analysis Run 6/16/2014 3:55 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Background/Compliance Box & Whiskers Plot

MW-1,MW-10,MW-11

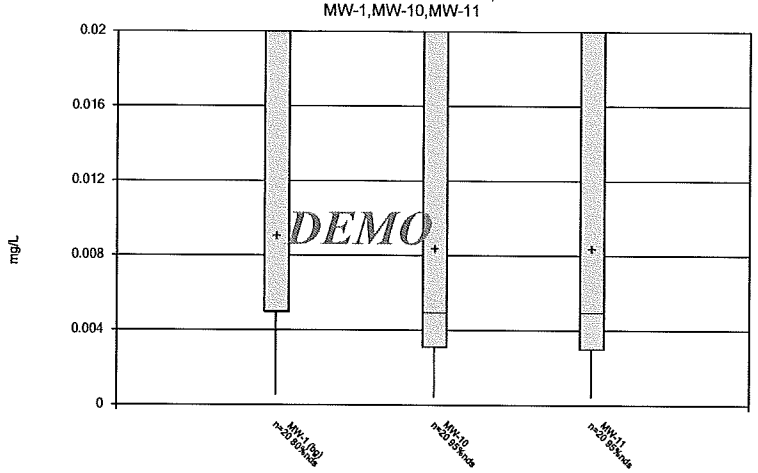


Constituent: Dissolved moly Analysis Run 6/16/2014 3:55 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Background/Compliance Box & Whiskers Plot

MW-1,MW-10,MW-11



Constituent: Dissolved nickel Analysis Run 6/16/2014 3:55 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

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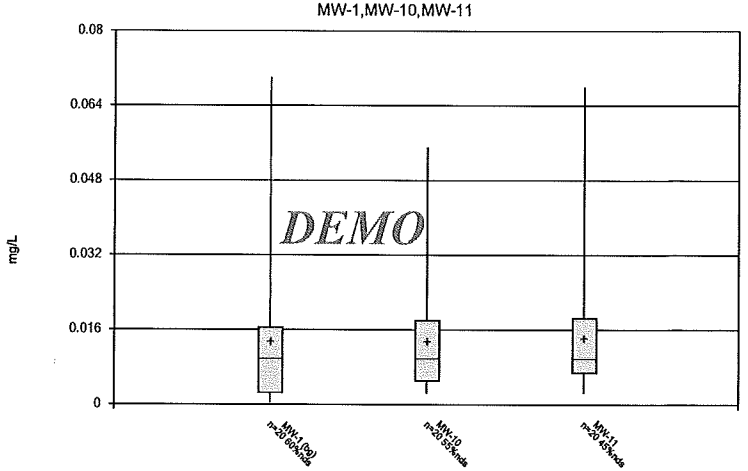
Background/Compliance Box & Whiskers Plot

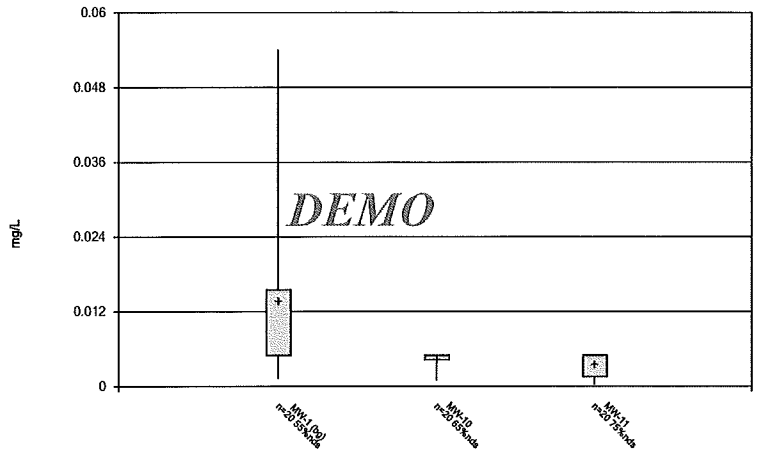
MW-1,MW-10,MW-11



Constituent: Dissolved vanadium Analysis Run 6/16/2014 3:55 PM

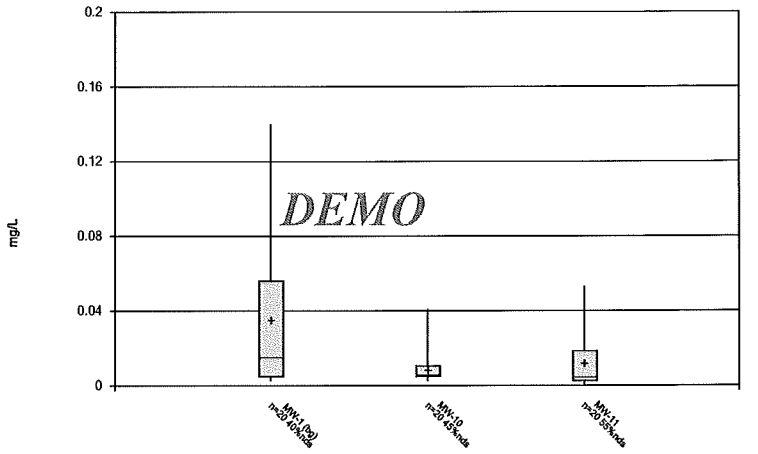
Facility: Demo Client: Demo Data File: Dissolved Metals

Box & Whiskers Plot



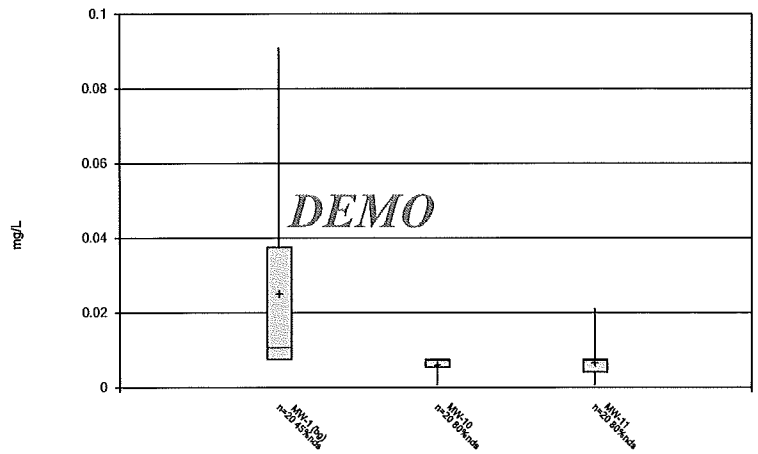
Constituent: Total cobalt Analysis Run 6/16/2014 4:20 PM
Facility: Demo Client: Demo Data File: Total Metals1

Box & Whiskers Plot



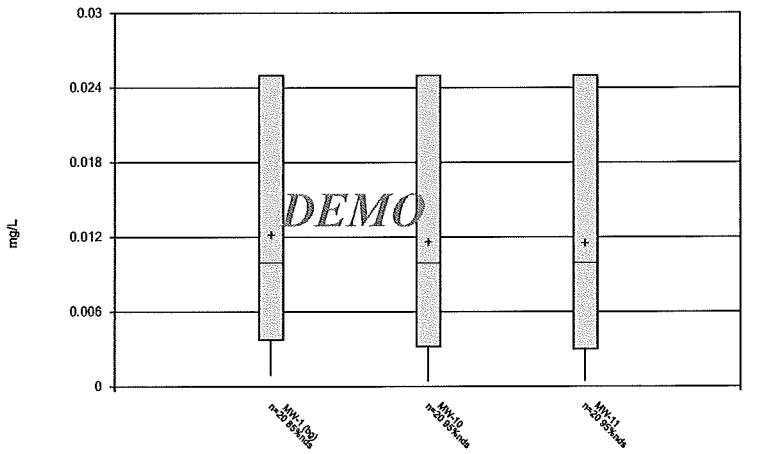
Constituent: Total Copper Analysis Run 6/16/2014 4:20 PM
Facility: Demo Client: Demo Data File: Total Metals1

Box & Whiskers Plot



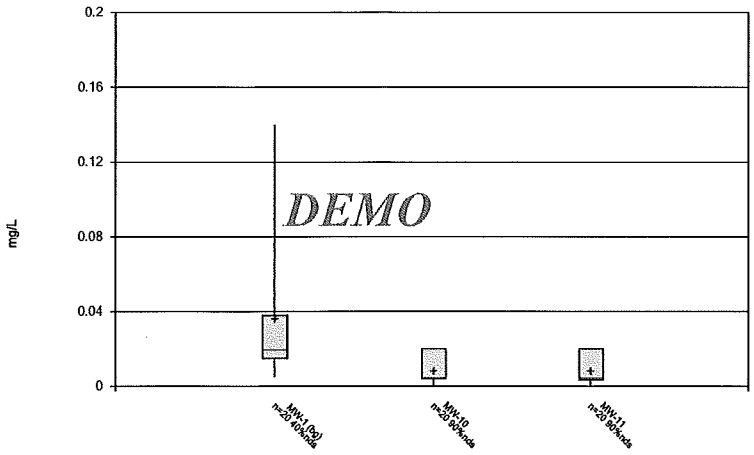
Constituent: Total lead Analysis Run 6/16/2014 4:20 PM
Facility: Demo Client: Demo Data File: Total Metals1

Box & Whiskers Plot



Constituent: Total moly Analysis Run 6/16/2014 4:20 PM
Facility: Demo Client: Demo Data File: Total Metals1

Box & Whiskers Plot



Constituent: Total nickel Analysis Run 6/16/2014 4:20 PM
Facility: Demo Client: Demo Data File: Total Metals1

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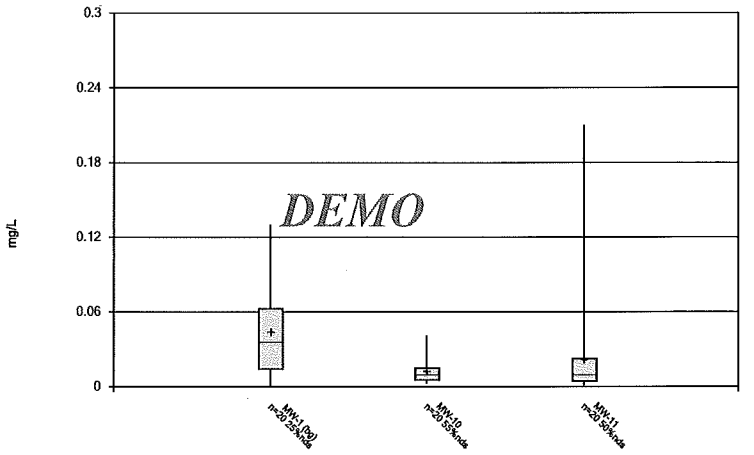
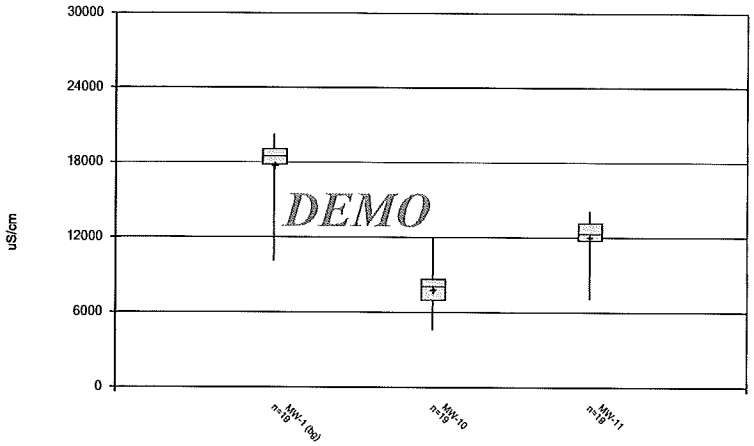
Box & Whiskers Plot



Constituent: Total vanadium Analysis Run 6/16/2014 4:20 PM
Facility: Demo Client: Demo Data File: Total Metals1

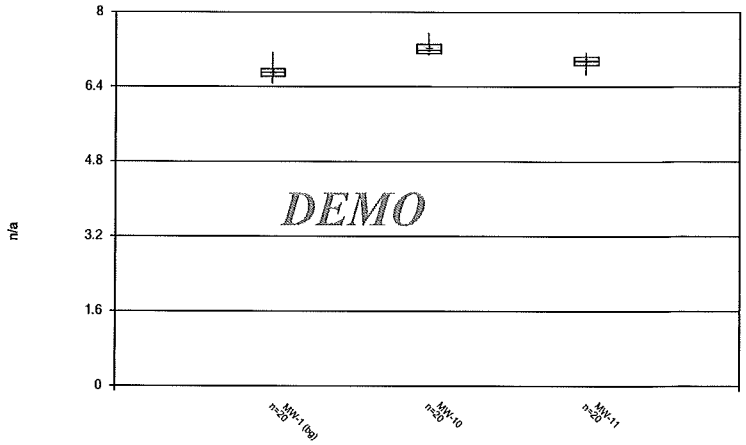
Box & Whiskers Plot



Constituent: Conductivity Analysis Run 6/16/2014 4:47 PM
Facility: Demo Client: Demo Data File: pHConductivity

Sanitas™ v.9.4.32 Not for commercial use. UG

Box & Whiskers Plot



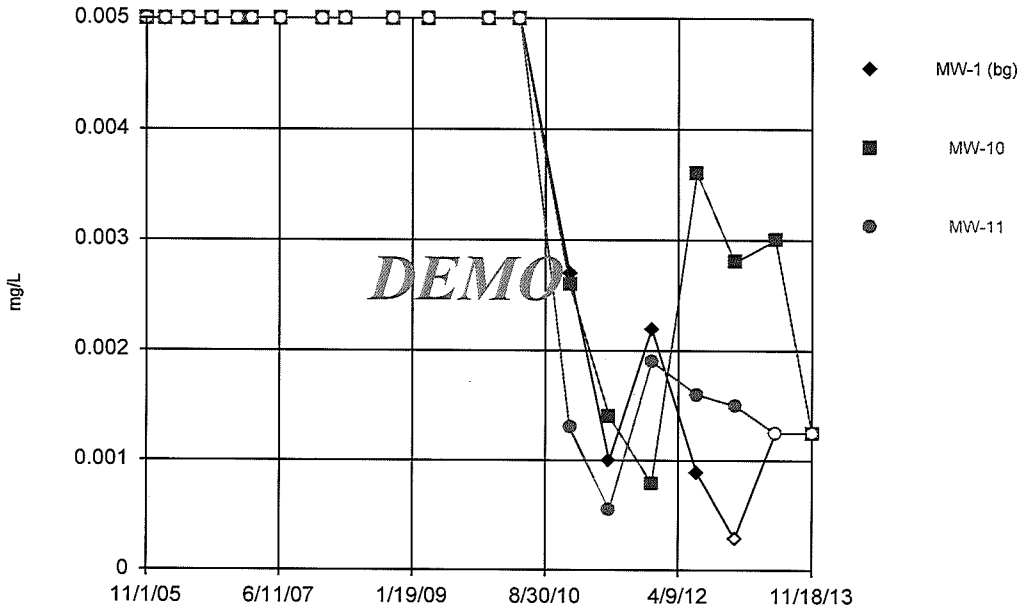
Constituent: pH Analysis Run 6/16/2014 4:47 PM
Facility: Demo Client: Demo Data File: pHConductivity

Appendix D

Time Series

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

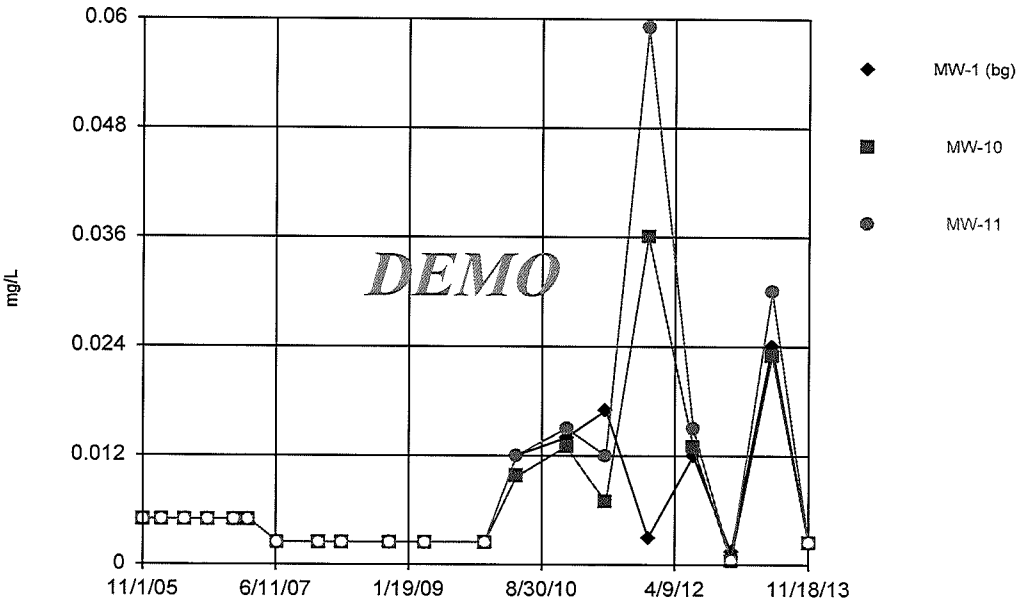
Time Series



Constituent: Dissolved cobalt Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

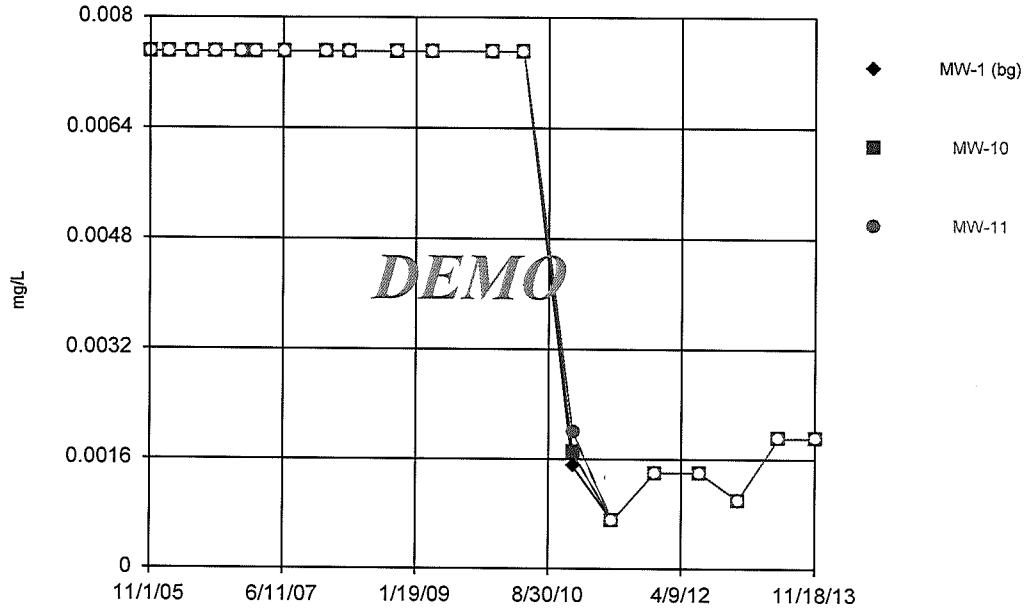
Time Series



Constituent: Dissolved copper Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

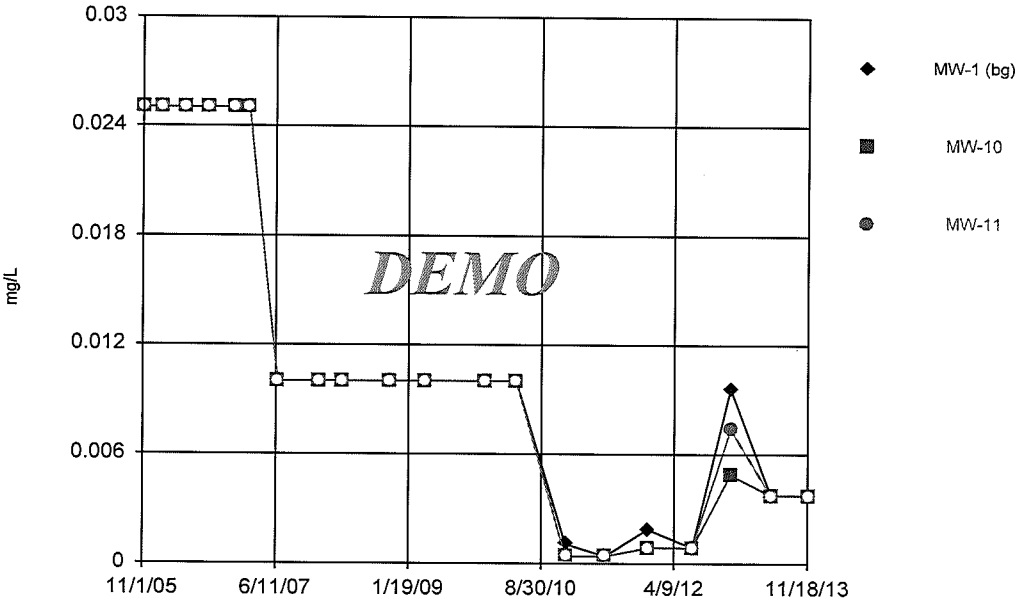
Time Series



Constituent: Dissolved lead Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

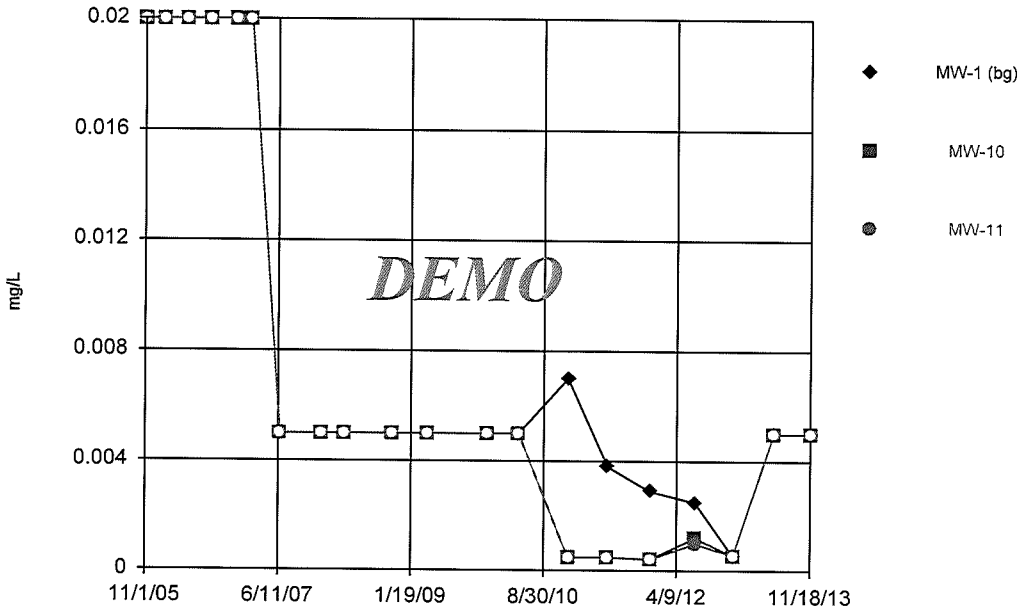
Time Series



Constituent: Dissolved moly Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

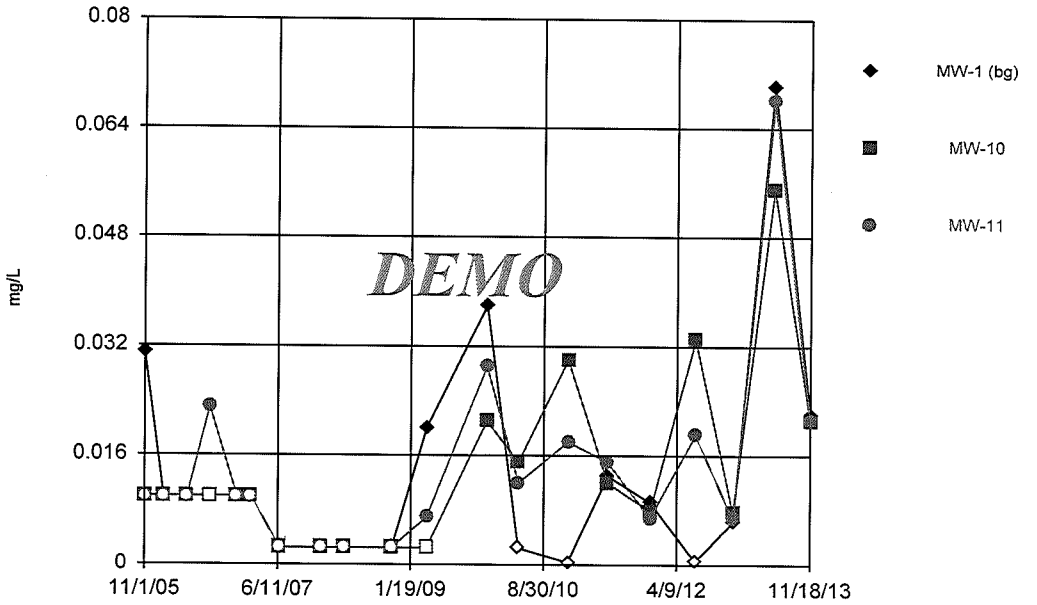
Time Series



Constituent: Dissolved nickel Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

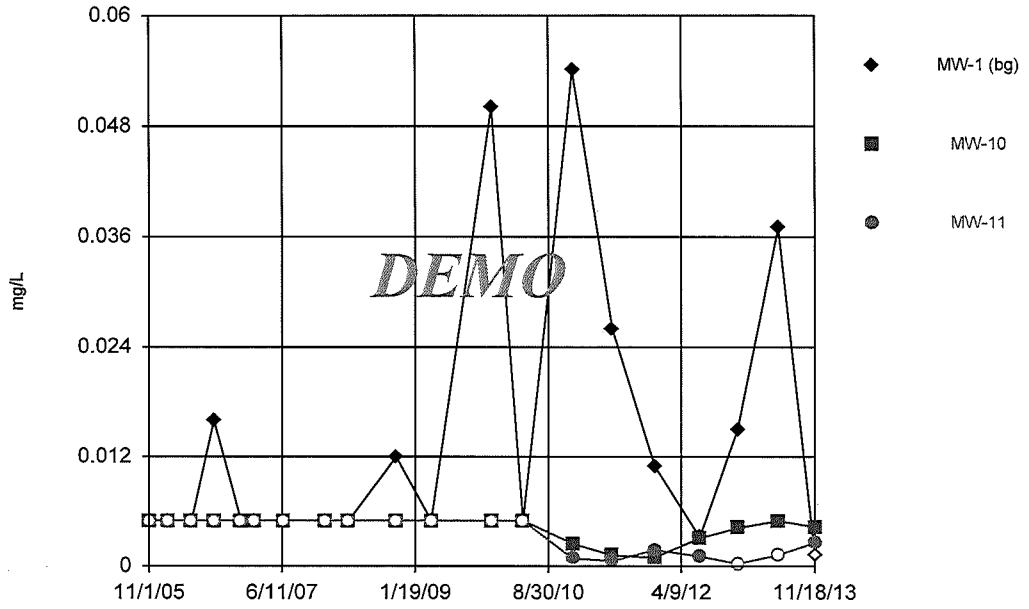
Time Series



Constituent: Dissolved vanadium Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

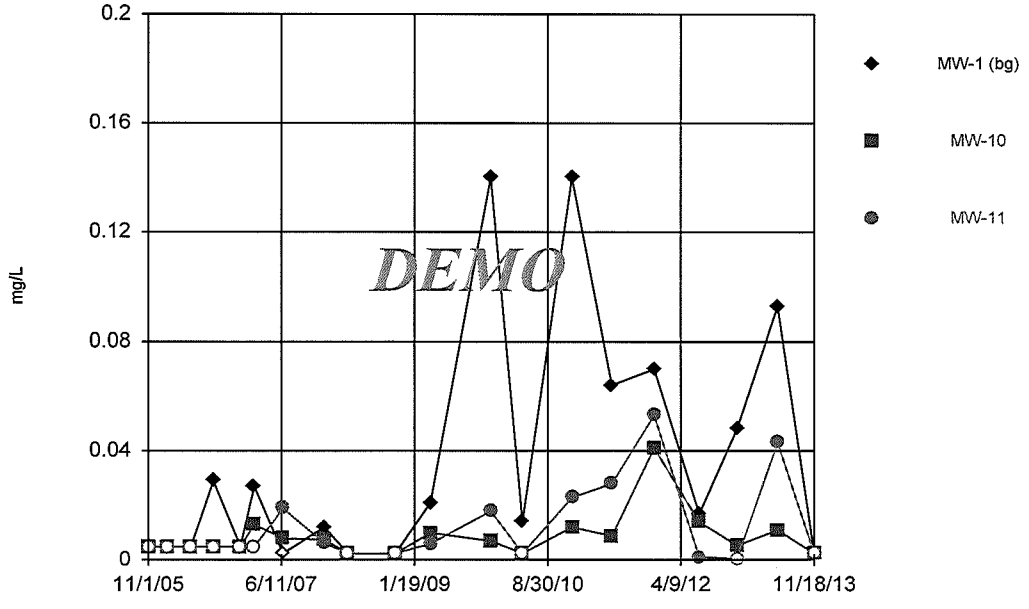
Time Series



Constituent: Total cobalt Analysis Run 6/16/2014 4:17 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

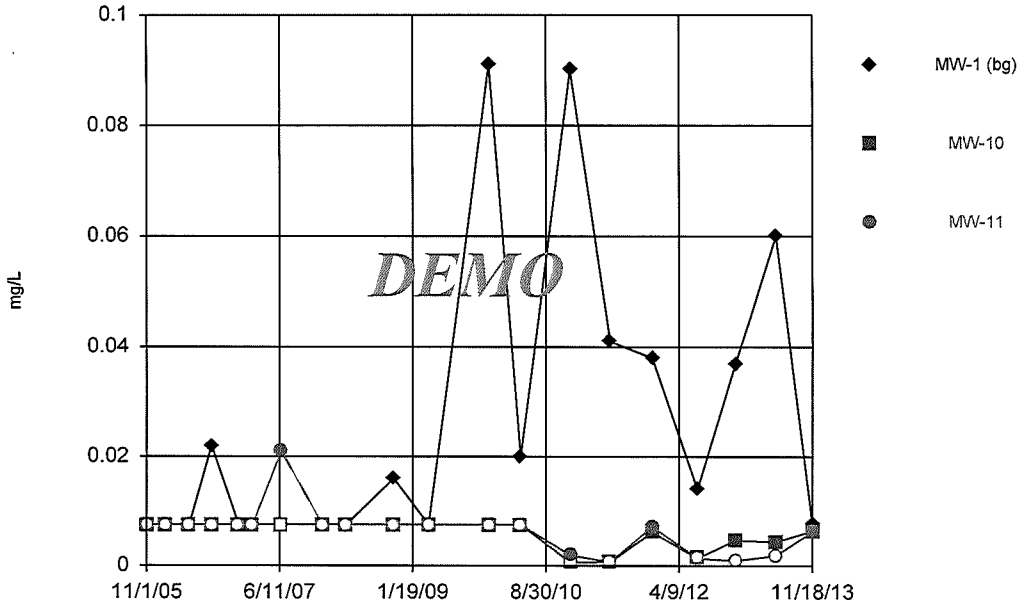
Time Series



Constituent: Total Copper Analysis Run 6/16/2014 4:17 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

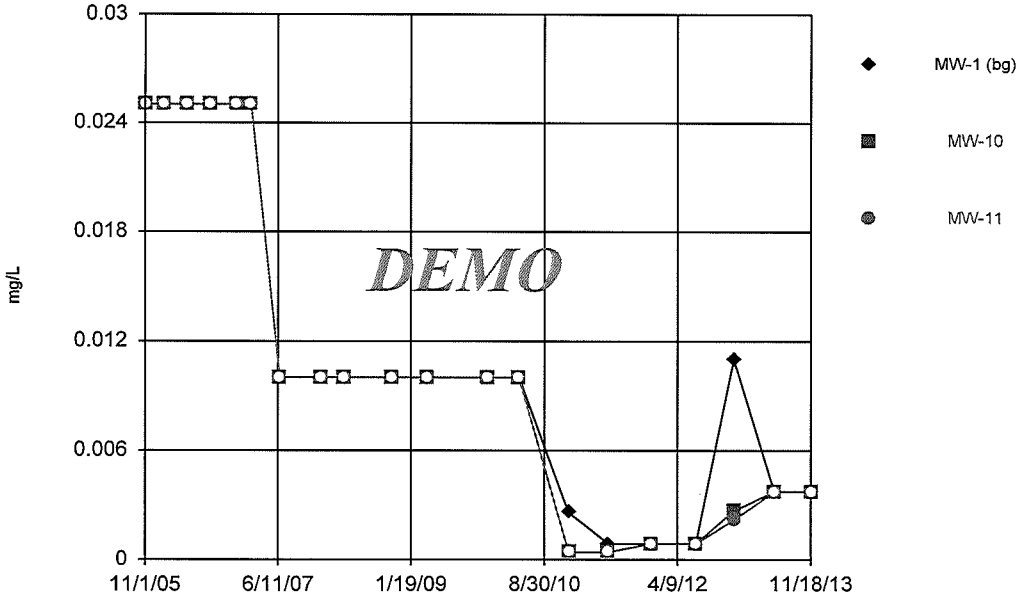
Time Series



Constituent: Total lead Analysis Run 6/16/2014 4:17 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

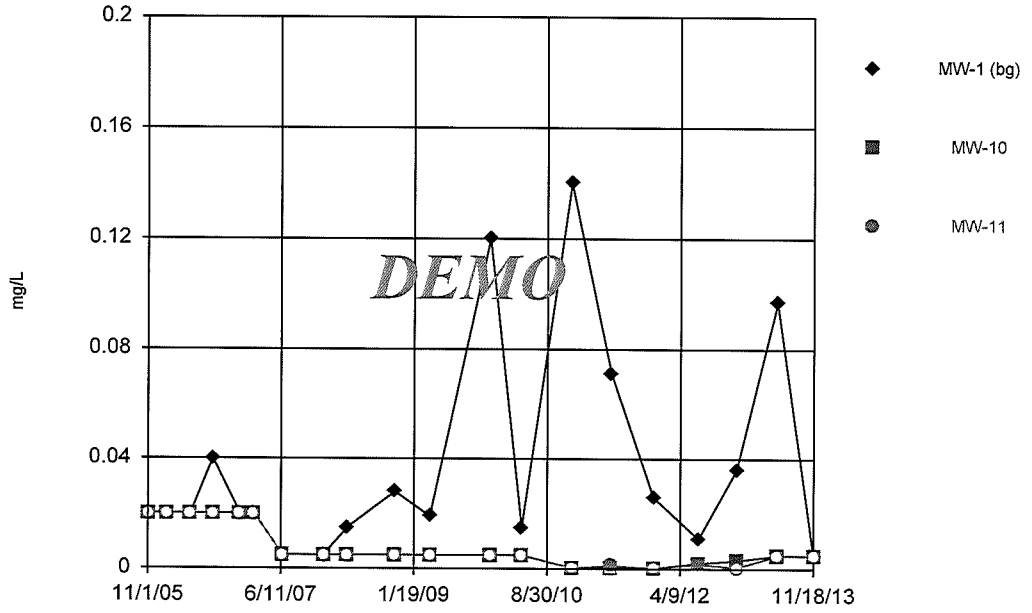
Time Series



Constituent: Total moly Analysis Run 6/16/2014 4:17 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

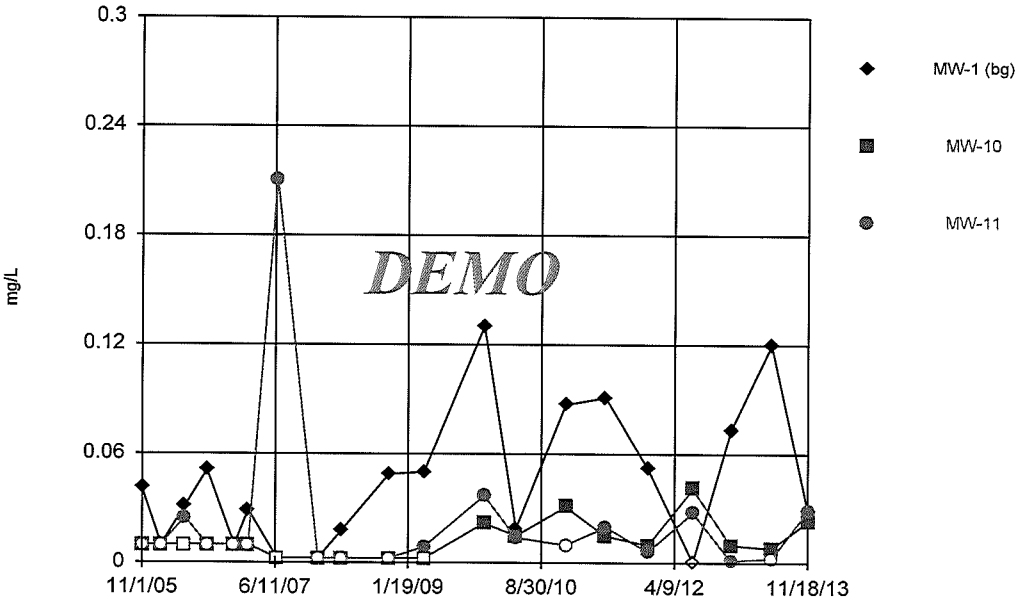
Time Series



Constituent: Total nickel Analysis Run 6/16/2014 4:17 PM
Facility: Demo Client: Demo Data File: Total Metals1

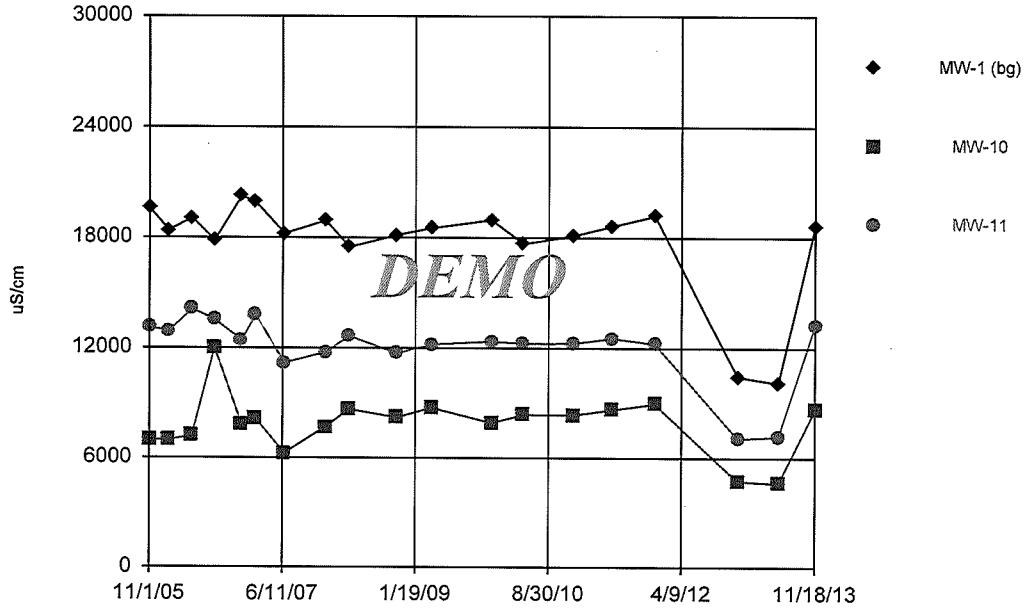
Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Total vanadium Analysis Run 6/16/2014 4:17 PM
Facility: Demo Client: Demo Data File: Total Metals1

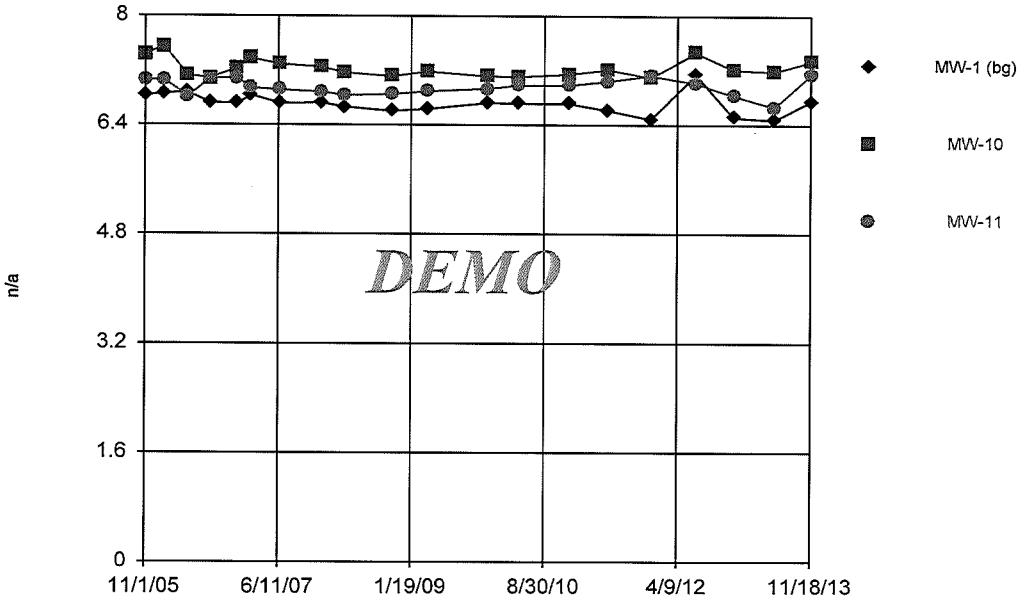
Time Series



Constituent: Conductivity Analysis Run 6/16/2014 4:44 PM
Facility: Demo Client: Demo Data File: pHConductivity

Sanitas™ v.9.4.32 Not for commercial use. UG

Time Series



Constituent: pH Analysis Run 6/16/2014 4:44 PM
Facility: Demo Client: Demo Data File: pHConductivity

Appendix E

Outliers

Outlier Analysis

Facility: Demo Client: Demo Data File: Dissolved Metals Printed 6/12/2014, 12:53 PM

onstituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
issolved cobalt (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.003729	0.001836	unknown	ShapiroWilk
issolved cobalt (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.004022	0.00149	unknown	ShapiroWilk
issolved cobalt (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.003717	0.001808	unknown	ShapiroWilk
issolved copper (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.006545	0.006057	unknown	ShapiroWilk
issolved copper (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.00748	0.008521	ln(x)	ShapiroWilk
issolved copper (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.00955	0.01355	unknown	ShapiroWilk
issolved lead (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.005365	0.002995	unknown	ShapiroWilk
issolved lead (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.005375	0.002982	unknown	ShapiroWilk
issolved lead (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.00539	0.002963	unknown	ShapiroWilk
issolved moly (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.01207	0.009352	unknown	ShapiroWilk
issolved moly (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.01175	0.009573	unknown	ShapiroWilk
issolved moly (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.01188	0.009495	unknown	ShapiroWilk
issolved nickel (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.009087	0.00744	unknown	ShapiroWilk
issolved nickel (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.008406	0.007993	unknown	ShapiroWilk
issolved nickel (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.008396	0.008003	unknown	ShapiroWilk
issolved vanadium (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.01365	0.01668	ln(x)	ShapiroWilk
issolved vanadium (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.01375	0.01305	unknown	ShapiroWilk
issolved vanadium (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.01428	0.01465	ln(x)	ShapiroWilk

Outlier Analysis

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/12/2014, 11:08 AM

onstituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
otal cobalt (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.01377	0.01569	unknown	ShapiroWilk
otal cobalt (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.004314	0.001301	unknown	ShapiroWilk
otal cobalt (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.003676	0.001902	unknown	ShapiroWilk
otal Copper (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.03525	0.04417	unknown	ShapiroWilk
otal Copper (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.00863	0.008418	unknown	ShapiroWilk
otal Copper (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.01189	0.01465	ln(x)	ShapiroWilk
otal lead (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.0252	0.02682	unknown	ShapiroWilk
otal lead (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.0061	0.002415	unknown	ShapiroWilk
otal lead (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.006575	0.004316	unknown	ShapiroWilk
otal moly (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.01219	0.009281	unknown	ShapiroWilk
otal moly (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.01164	0.009668	unknown	ShapiroWilk
otal moly (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.01162	0.009693	unknown	ShapiroWilk
otal nickel (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.03665	0.03903	ln(x)	ShapiroWilk
otal nickel (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.008589	0.007831	unknown	ShapiroWilk
otal nickel (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	20	0.008477	0.007925	unknown	ShapiroWilk
otal vanadium (mg/L)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	20	0.04478	0.03825	unknown	ShapiroWilk
otal vanadium (mg/L)	MW-10	No	n/a	n/a	EPA 1989	0.05	20	0.01239	0.01009	unknown	ShapiroWilk
otal vanadium (mg/L)	**MW-11**	**Yes**	**0.21**	**6/20/2007**	**EPA 1989**	**0.05**	**20**	**0.02247**	**0.04528**	**ln(x)**	**ShapiroWilk**

Outlier Analysis

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/12/2014, 1:27 PM

onstituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
onductivity (uS/cm)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	16	18667	790.3	normal	ShapiroWilk
onductivity (uS/cm)	**MW-10**	**Yes**	**12006**	**8/15/2006**	**EPA 1989**	**0.05**	**16**	**8182**	**1265**	**normal**	**ShapiroWilk**
onductivity (uS/cm)	MW-11	No	n/a	n/a	EPA 1989	0.05	16	12566	787.3	normal	ShapiroWilk

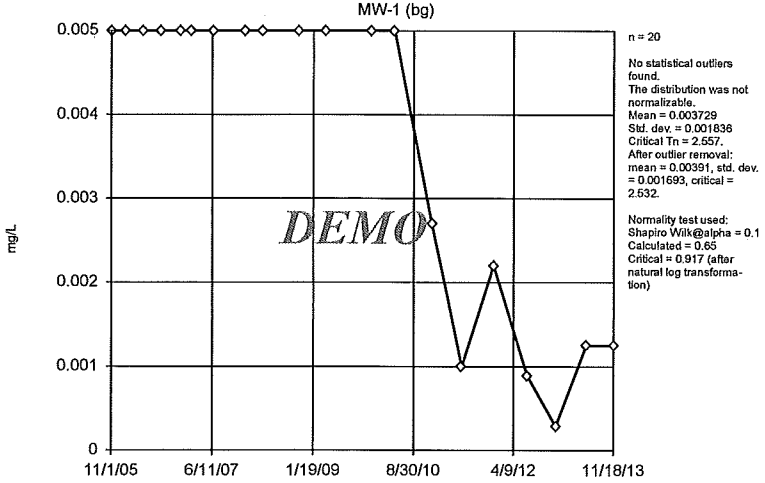
Outlier Analysis

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/12/2014, 1:19 PM

onstituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
H (n/a)	MW-1 (bg)	No	n/a	n/a	EPA 1989	0.05	16	6.71	0.1029	normal	ShapiroWilk
H (n/a)	MW-10	No	n/a	n/a	EPA 1989	0.05	16	7.216	0.138	unknown	ShapiroWilk
H (n/a)	MW-11	No	n/a	n/a	EPA 1989	0.05	16	6.964	0.09804	normal	ShapiroWilk

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.003729
Std. dev. = 0.001836
Critical Tn = 2.557.
After outlier removal: mean = 0.00391, std. dev. = 0.001693, critical = 2.532.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.65
Critical = 0.917 (after natural log transformation)

Constituent: Dissolved cobalt Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

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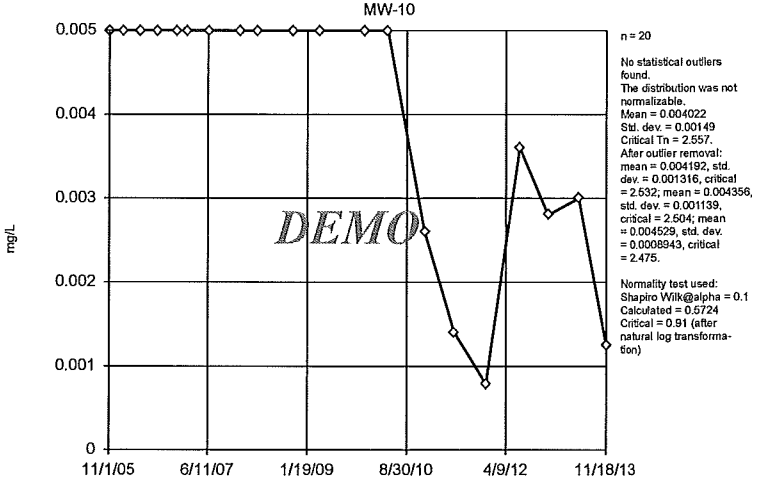
EPA 1989 Outlier Test

MW-10



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.004022
Std. dev. = 0.00149
Critical Tn = 2.557.
After outlier removal: mean = 0.004192, std. dev. = 0.001316, critical = 2.532; mean = 0.004356, std. dev. = 0.001139, critical = 2.504; mean = 0.004529, std. dev. = 0.0008943, critical = 2.475.

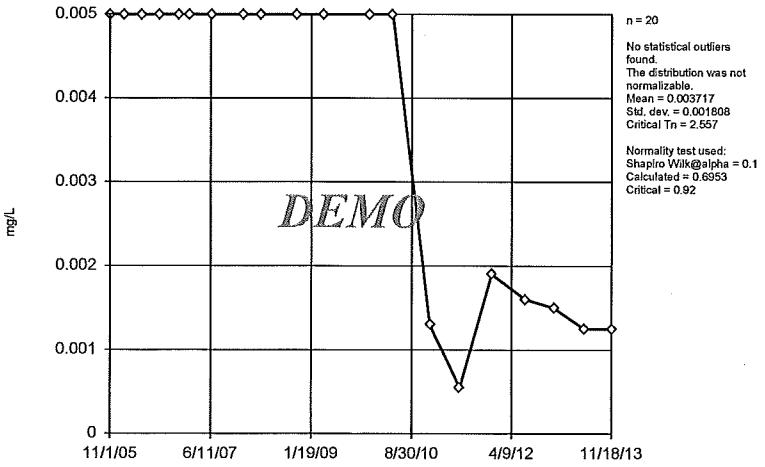
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.5724
Critical = 0.91 (after natural log transformation)

Constituent: Dissolved cobalt Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-11



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.003717
Std. dev. = 0.001808
Critical Tn = 2.557

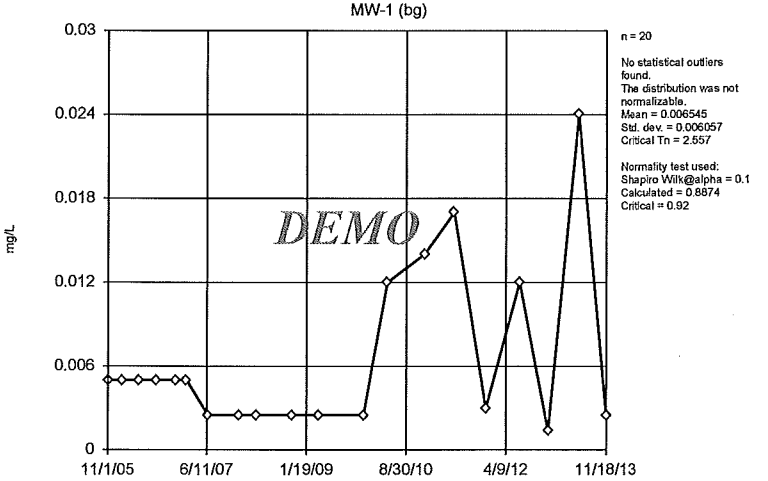
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.6953
Critical = 0.92

Constituent: Dissolved cobalt Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

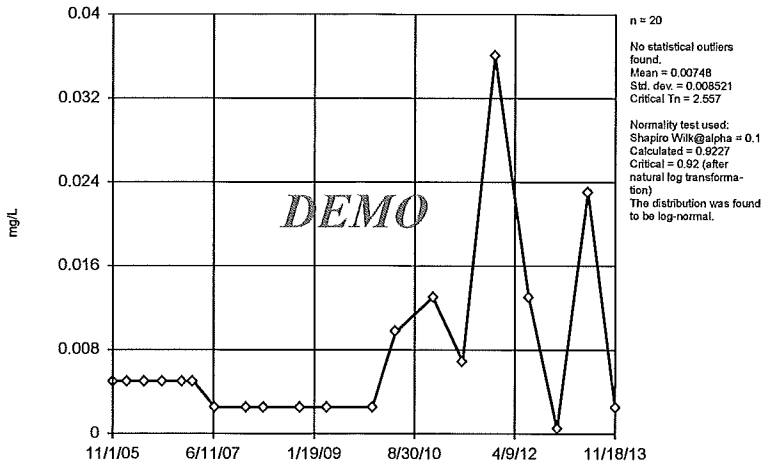
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.006545
Std. dev. = 0.006057
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8874
Critical = 0.92

Constituent: Dissolved copper Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-10



n = 20

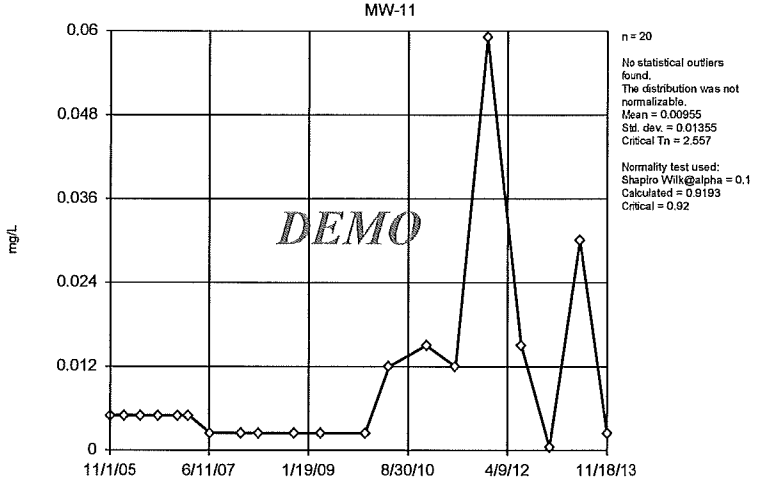
No statistical outliers found.
Mean = 0.00748
Std. dev. = 0.008521
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8227
Critical = 0.92 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Dissolved copper Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-11



n = 20

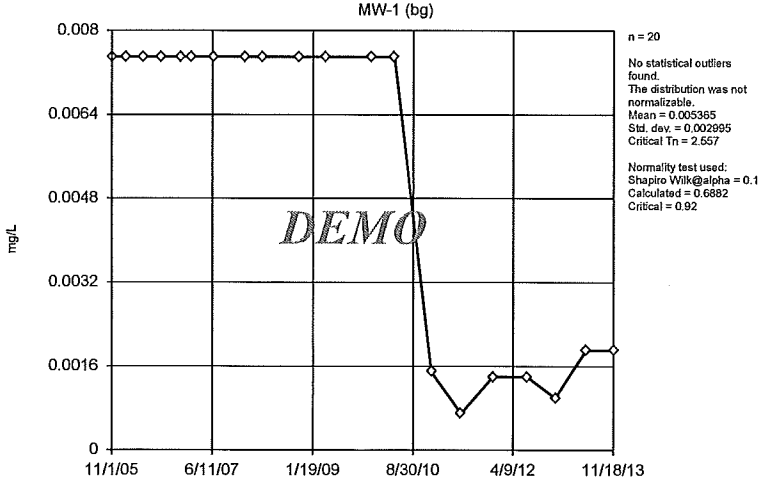
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.00955
Std. dev. = 0.01355
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9193
Critical = 0.92

Constituent: Dissolved copper Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

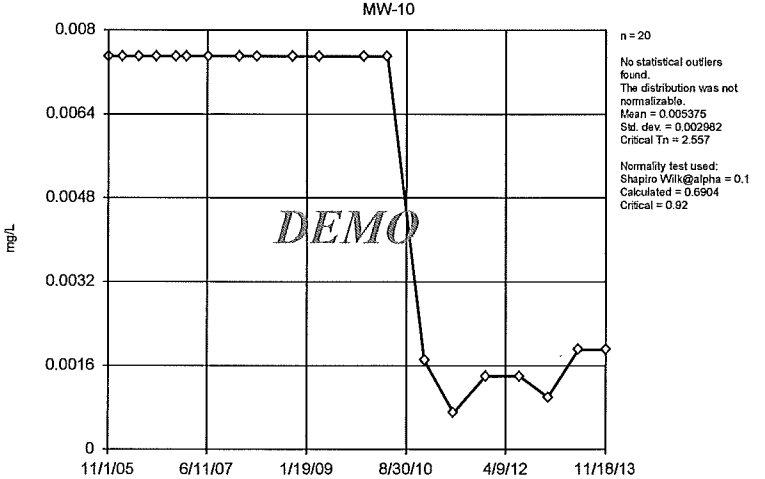
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.005365
Std. dev. = 0.002995
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.6882
Critical = 0.92

Constituent: Dissolved lead Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-10



n = 20

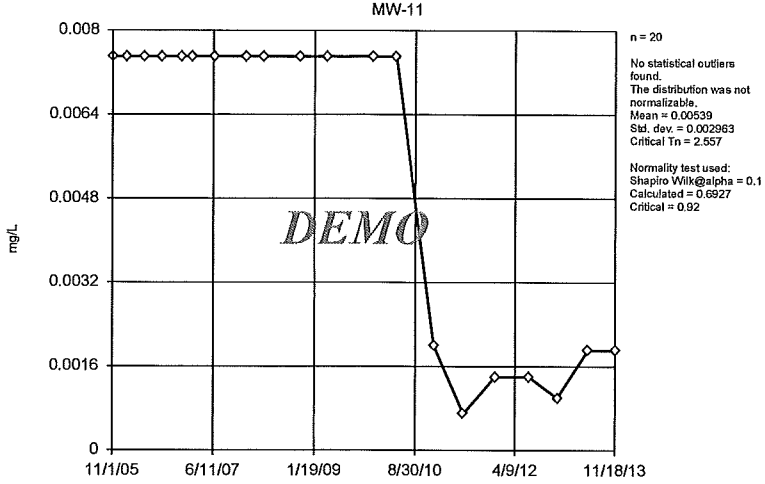
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.005375
Std. dev. = 0.002982
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.6904
Critical = 0.92

Constituent: Dissolved lead Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-11



n = 20

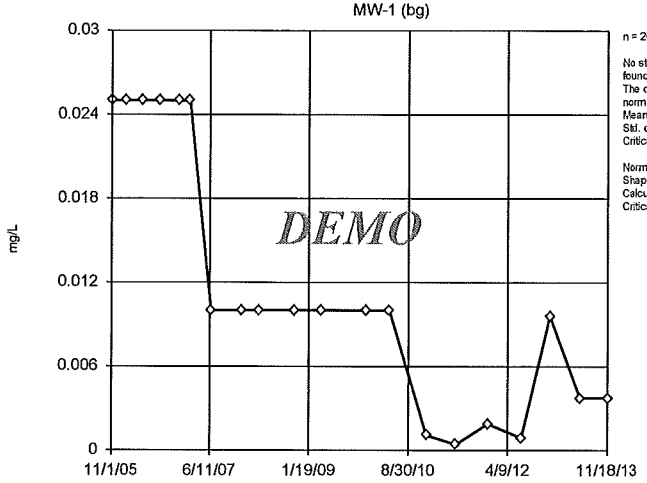
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.00539
Std. dev. = 0.002963
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.6927
Critical = 0.92

Constituent: Dissolved lead Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

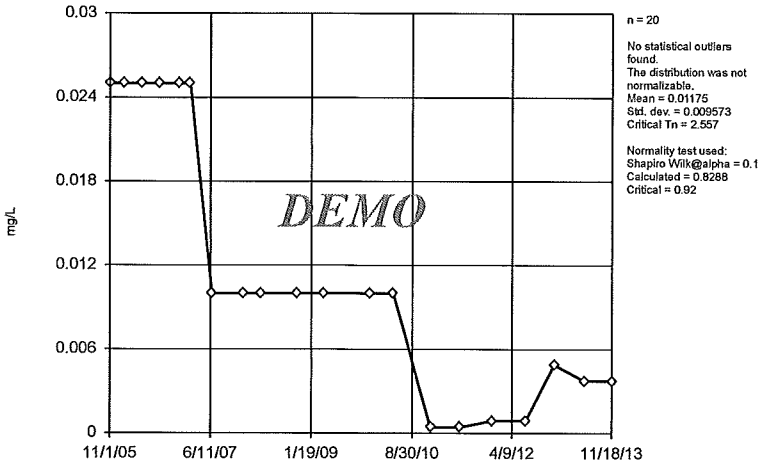
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01207
Std. dev. = 0.009352
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8436
Critical = 0.92

Constituent: Dissolved moly Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-10



n = 20

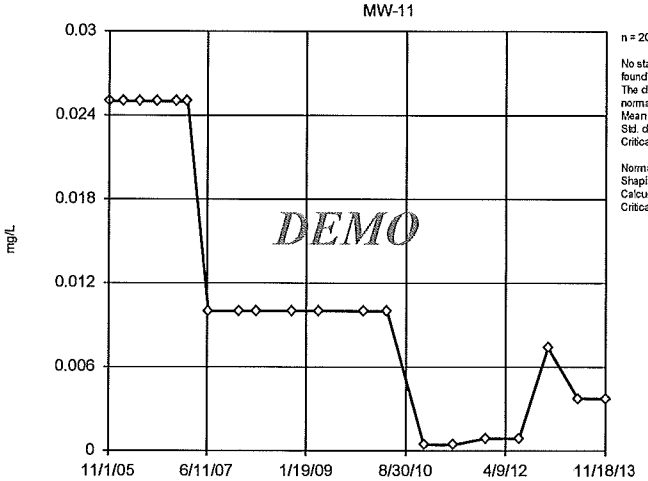
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01175
Std. dev. = 0.009573
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8288
Critical = 0.92

Constituent: Dissolved moly Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-11



n = 20

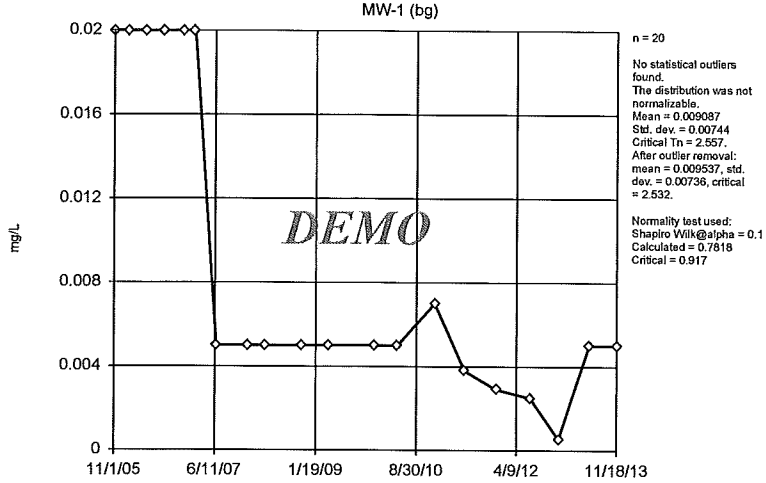
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01188
Std. dev. = 0.009495
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8181
Critical = 0.92

Constituent: Dissolved moly Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

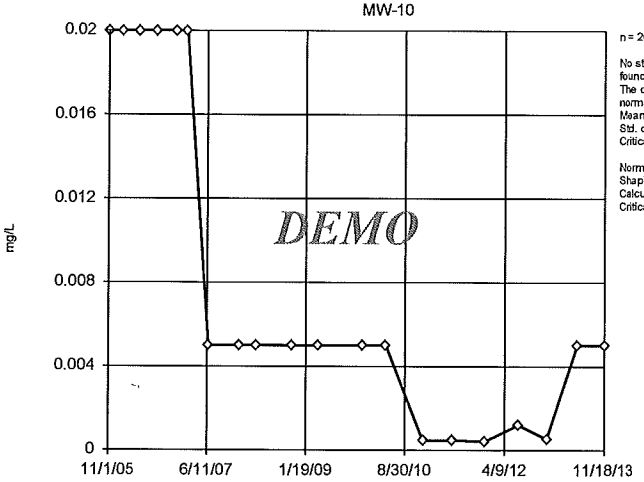
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.009087
Std. dev. = 0.00744
Critical Tn = 2.557.
After outlier removal: mean = 0.009537, std. dev. = 0.00736, critical = 2.532.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.7818
Critical = 0.917

Constituent: Dissolved nickel Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-10



n = 20

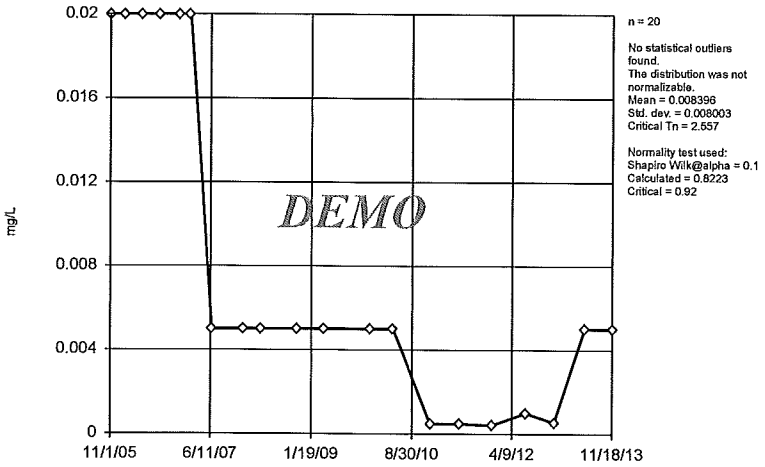
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.008406
Std. dev. = 0.007993
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8247
Critical = 0.92

Constituent: Dissolved nickel Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-11



n = 20

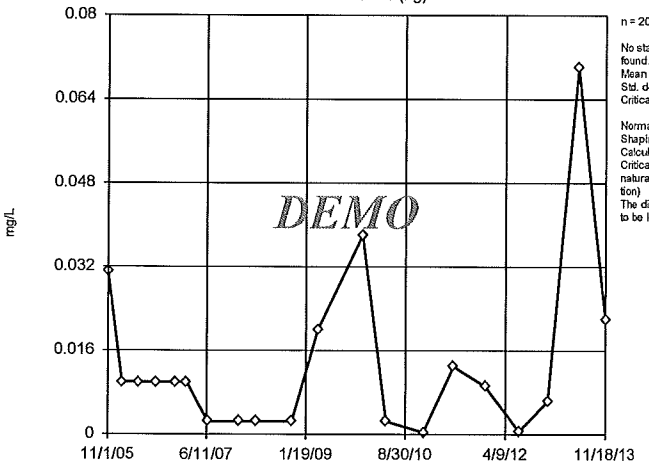
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.008396
Std. dev. = 0.008003
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8223
Critical = 0.92

Constituent: Dissolved nickel Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

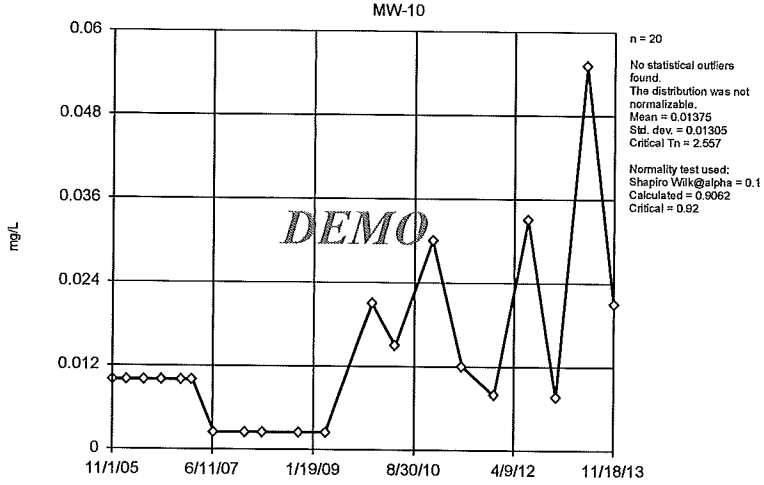
No statistical outliers found.
Mean = 0.01365
Std. dev. = 0.01668
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9463
Critical = 0.92 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Dissolved vanadium Analysis Run 6/12/2014 12:52 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-10



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01375
Std. dev. = 0.01305
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9062
Critical = 0.92

Constituent: Dissolved vanadium Analysis Run 6/12/2014 12:52 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

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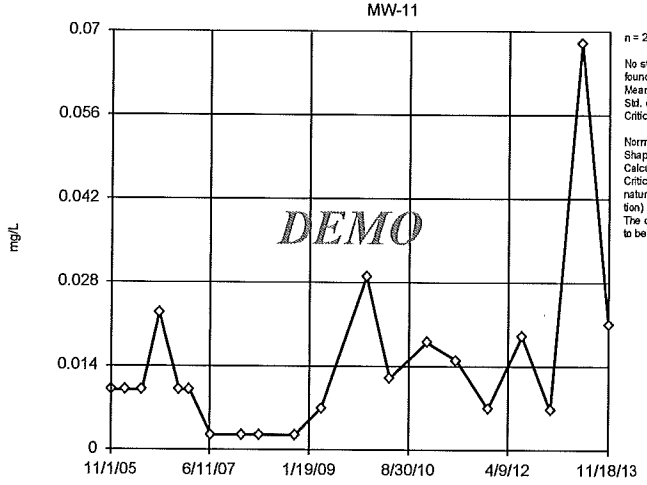
EPA 1989 Outlier Test

MW-11



n = 20

No statistical outliers found.
Mean = 0.01428
Std. dev. = 0.01465
Critical Tn = 2.557

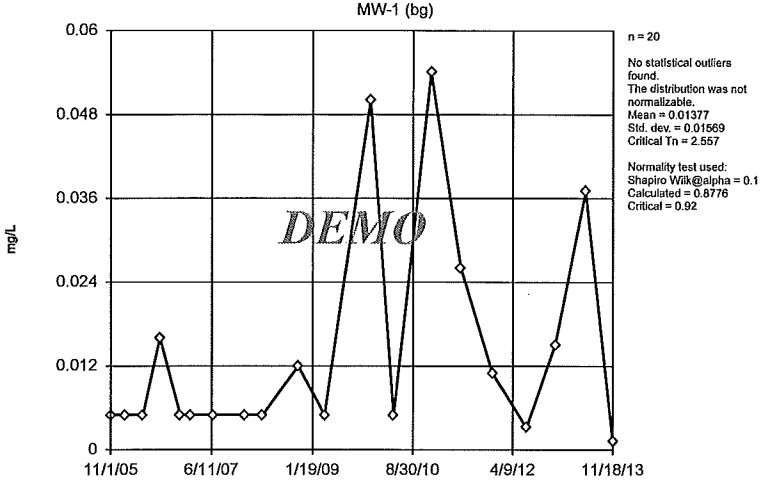
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9341
Critical = 0.92 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Dissolved vanadium Analysis Run 6/12/2014 12:53 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01377
Std. dev. = 0.01569
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8776
Critical = 0.92

Constituent: Total cobalt Analysis Run 6/12/2014 11:06 AM
Facility: Demo Client: Demo Data File: Total Metals1

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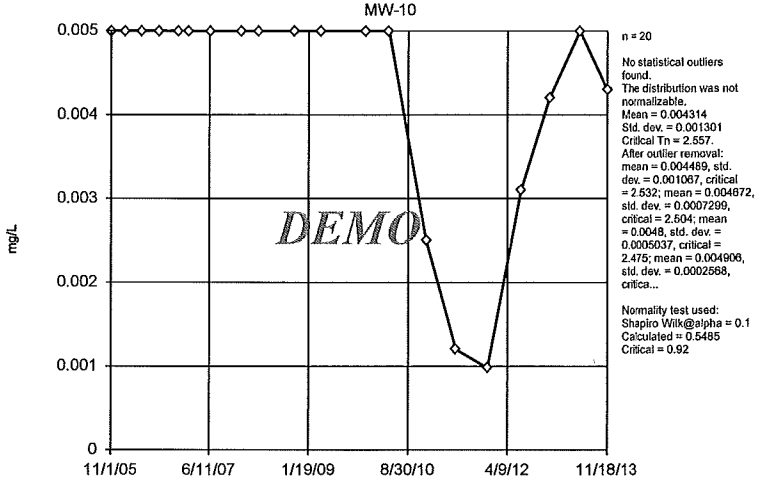
EPA 1989 Outlier Test

MW-10



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.004314
Std. dev. = 0.001301
Critical Tn = 2.557.
After outlier removal: mean = 0.004489, std. dev. = 0.001067, critical = 2.532; mean = 0.004672, std. dev. = 0.0007299, critical = 2.504; mean = 0.0048, std. dev. = 0.0005037, critical = 2.475; mean = 0.004906, std. dev. = 0.0002568, critica...

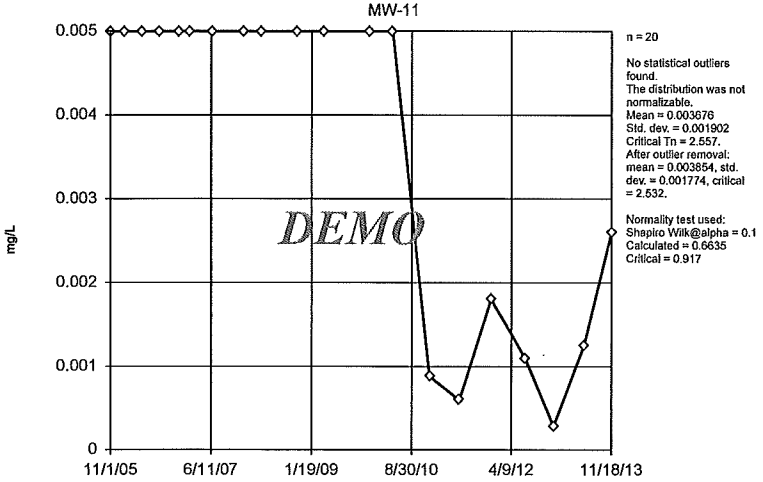
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.5485
Critical = 0.92

Constituent: Total cobalt Analysis Run 6/12/2014 11:06 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-11



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.003676
Std. dev. = 0.001902
Critical Tn = 2.557.
After outlier removal: mean = 0.003854, std. dev. = 0.001774, critical = 2.532.

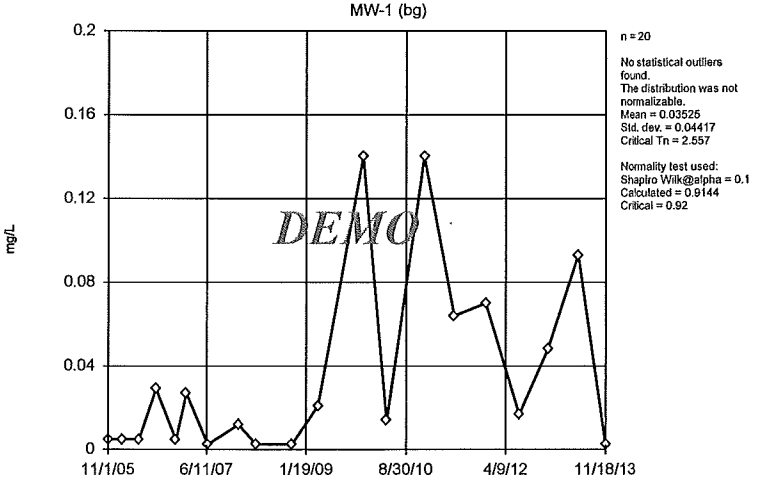
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.6635
Critical = 0.917

Constituent: Total cobalt Analysis Run 6/12/2014 11:06 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

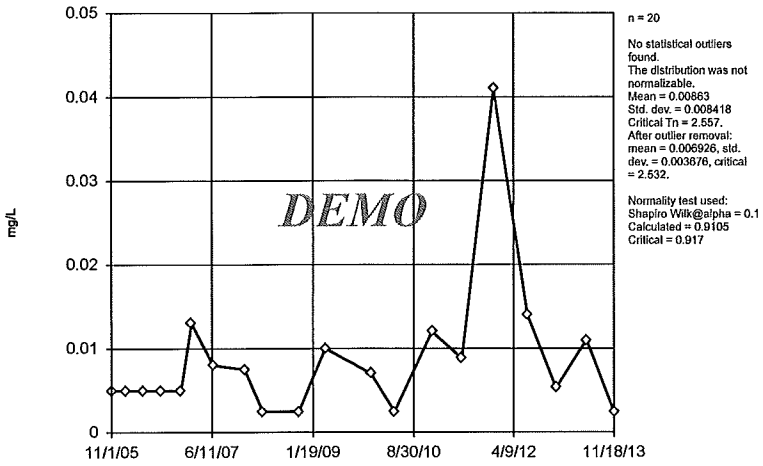
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.03525
Std. dev. = 0.04417
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9144
Critical = 0.92

Constituent: Total Copper Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-10



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.00863
Std. dev. = 0.008418
Critical Tn = 2.557.
After outlier removal: mean = 0.006926, std. dev. = 0.003676, critical = 2.532.

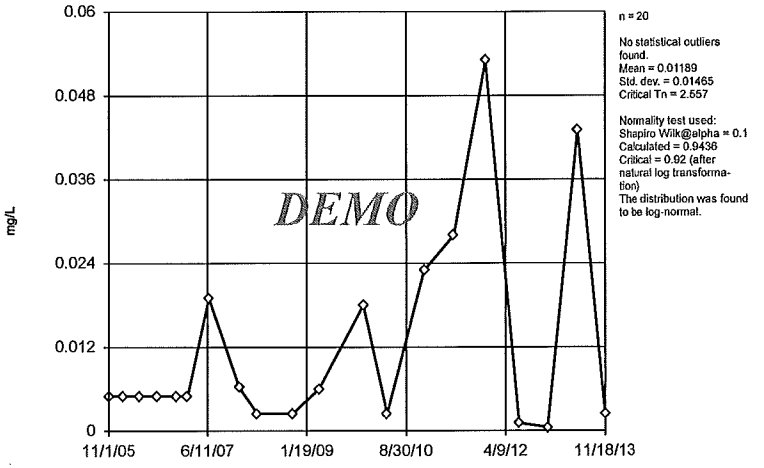
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9105
Critical = 0.917

Constituent: Total Copper Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-11



n = 20

No statistical outliers found.
Mean = 0.01189
Std. dev. = 0.01465
Critical Tn = 2.557

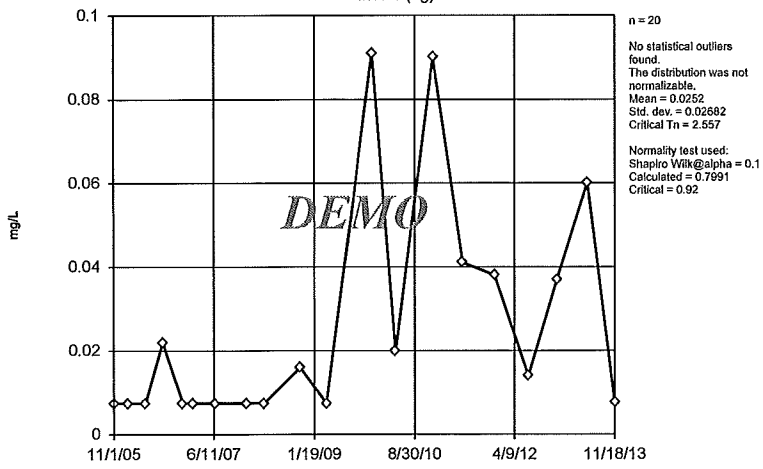
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9436
Critical = 0.92 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Total Copper Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.0252
Std. dev. = 0.02682
Critical Tn = 2.557

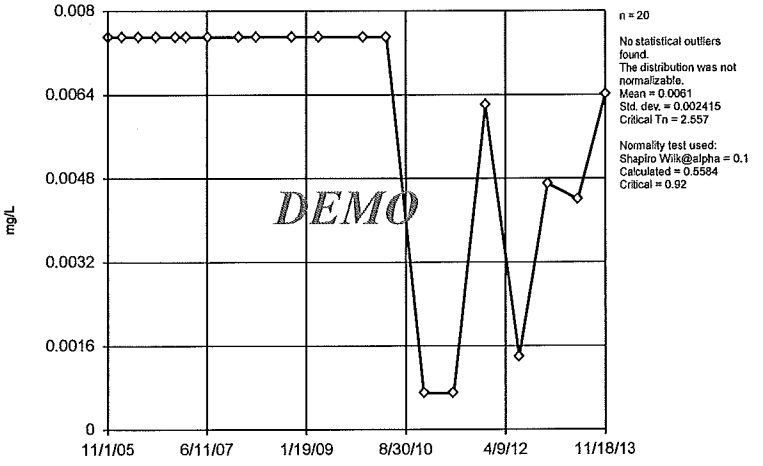
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.7991
Critical = 0.92

Constituent: Total lead Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-10



n = 20

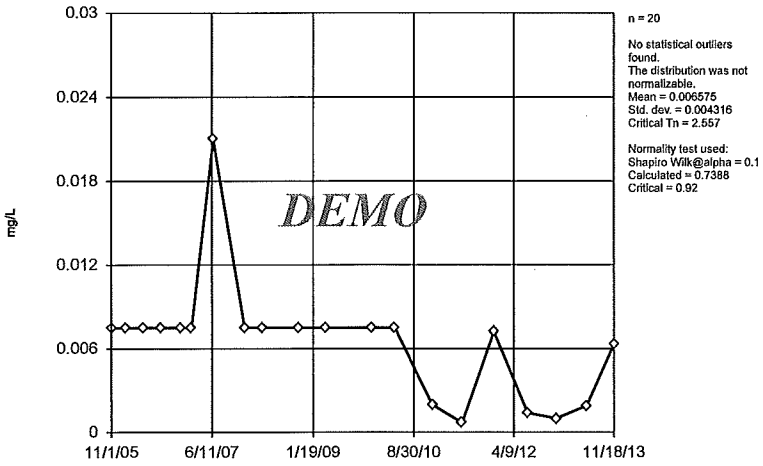
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.0061
Std. dev. = 0.002415
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.5584
Critical = 0.92

Constituent: Total lead Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-11



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.006575
Std. dev. = 0.004316
Critical Tn = 2.557

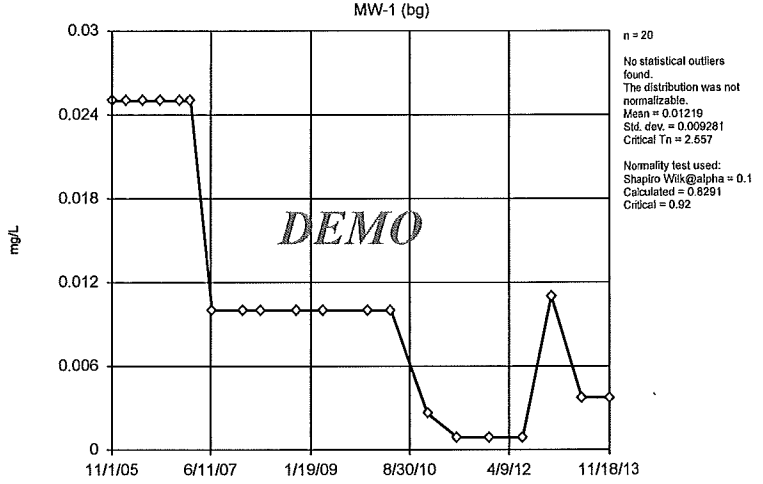
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.7388
Critical = 0.92

Constituent: Total lead Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01219
Std. dev. = 0.009281
Critical Tn = 2.557

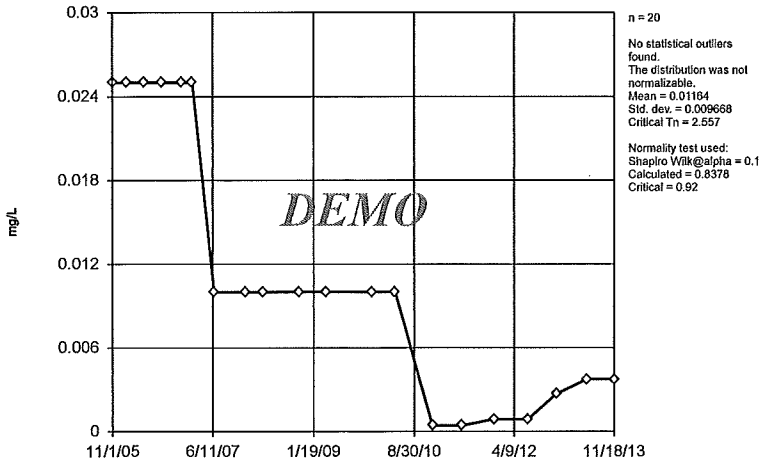
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8291
Critical = 0.92

Constituent: Total moly Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-10



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01164
Std. dev. = 0.009668
Critical Tn = 2.557

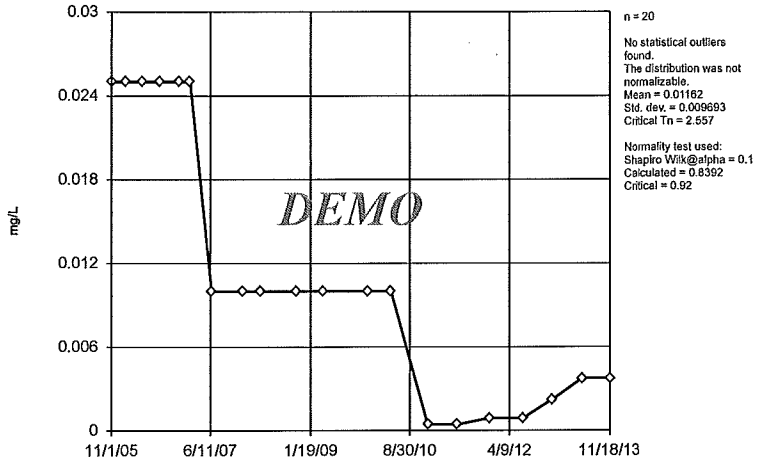
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8378
Critical = 0.92

Constituent: Total moly Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG

EPA 1989 Outlier Test

MW-11



n = 20

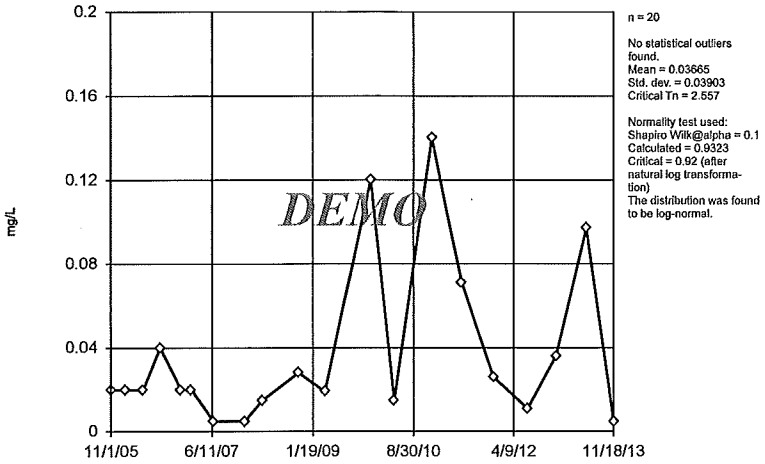
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01162
Std. dev. = 0.009693
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8392
Critical = 0.92

Constituent: Total moly Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

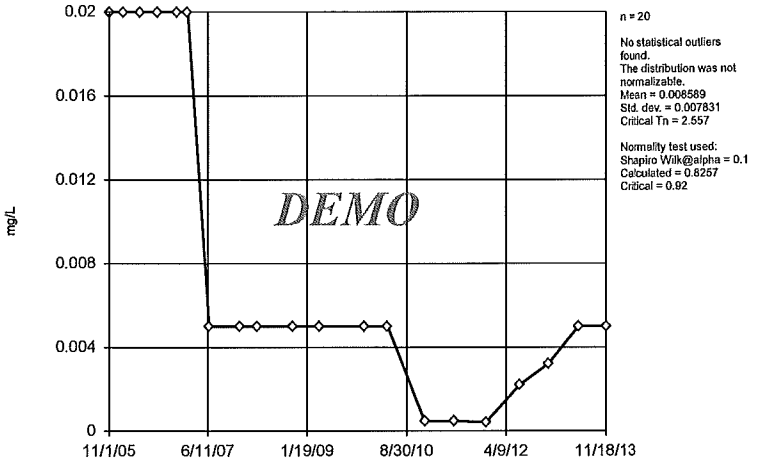
No statistical outliers found.
Mean = 0.03665
Std. dev. = 0.03903
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9323
Critical = 0.92 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Total nickel Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-10



n = 20

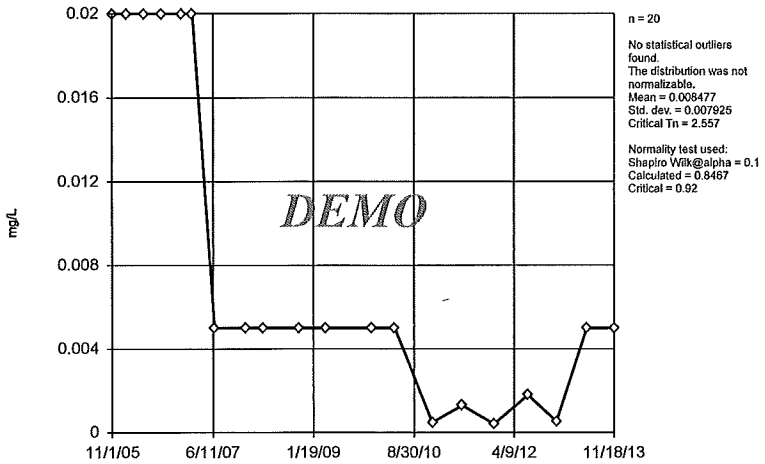
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.008589
Std. dev. = 0.007831
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8257
Critical = 0.92

Constituent: Total nickel Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-11



n = 20

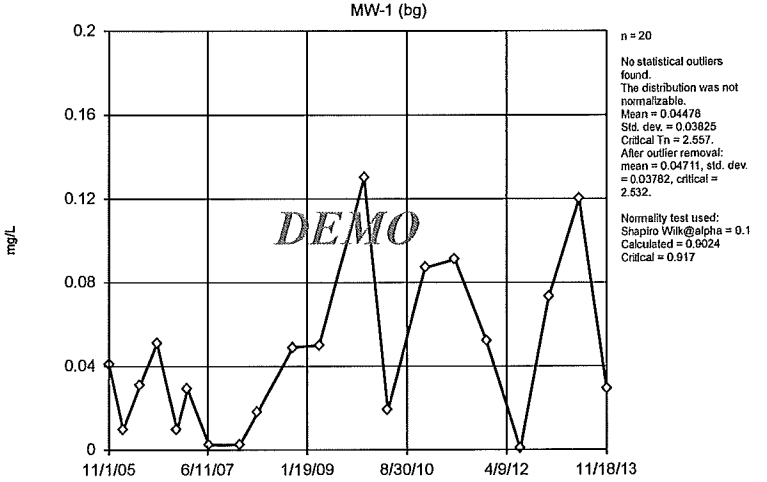
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.008477
Std. dev. = 0.007925
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8467
Critical = 0.92

Constituent: Total nickel Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-1 (bg)



n = 20

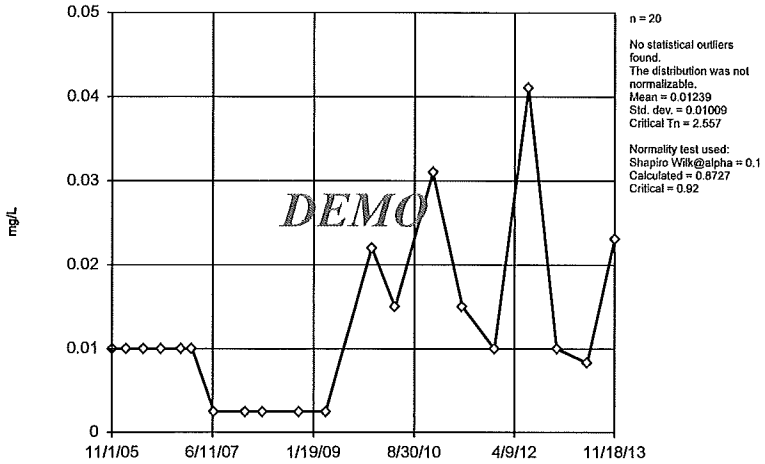
No statistical outliers found.
The distribution was not normalizable.
Mean = 0.04478
Std. dev. = 0.03825
Critical Tn = 2.557.
After outlier removal: mean = 0.04711, std. dev. = 0.03782, critical = 2.532.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9024
Critical = 0.917

Constituent: Total vanadium Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-10



n = 20

No statistical outliers found.
The distribution was not normalizable.
Mean = 0.01239
Std. dev. = 0.01009
Critical Tn = 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8727
Critical = 0.92

Constituent: Total vanadium Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

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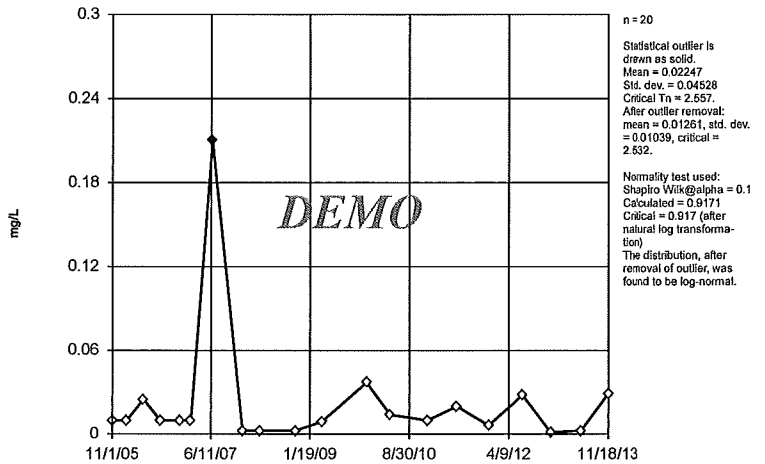
EPA 1989 Outlier Test

MW-11



n = 20

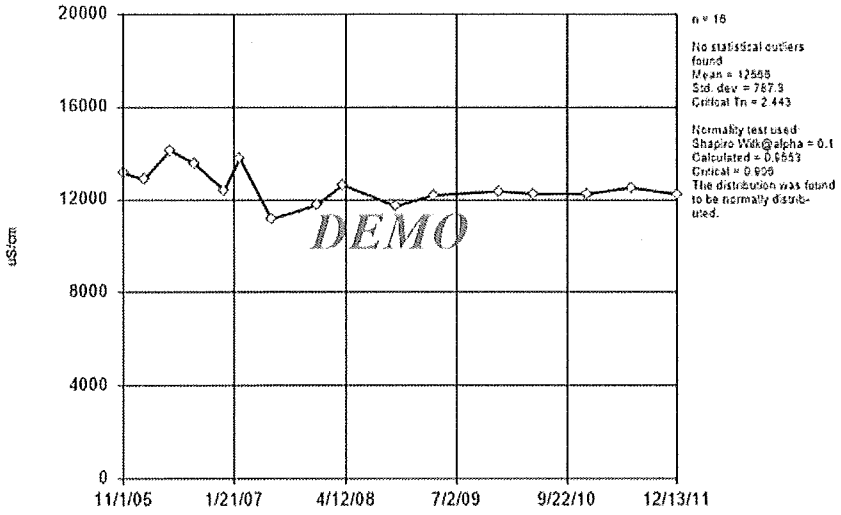
Statistical outlier is drawn as solid.
Mean = 0.02247
Std. dev. = 0.04528
Critical Tn = 2.557.
After outlier removal: mean = 0.01261, std. dev. = 0.01039, critical = 2.532.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9171
Critical = 0.917 (after natural log transformation)
The distribution, after removal of outlier, was found to be log-normal.

Constituent: Total vanadium Analysis Run 6/12/2014 11:07 AM
Facility: Demo Client: Demo Data File: Total Metals1

EPA 1989 Outlier Test

MW-11

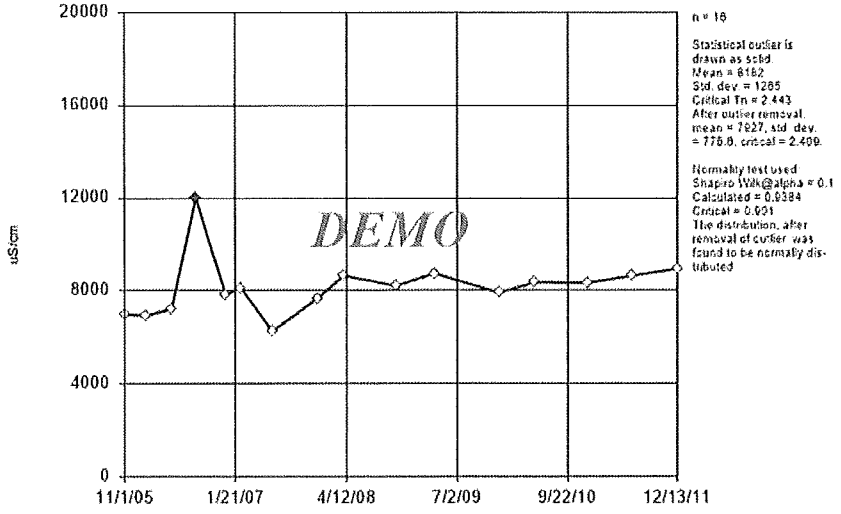


Constituent: Conductivity Analysis Run 6/12/2014 1:26 PM

Facility: Demo Client: Demo Data File: pHConductivity

EPA 1989 Outlier Test

MW-10

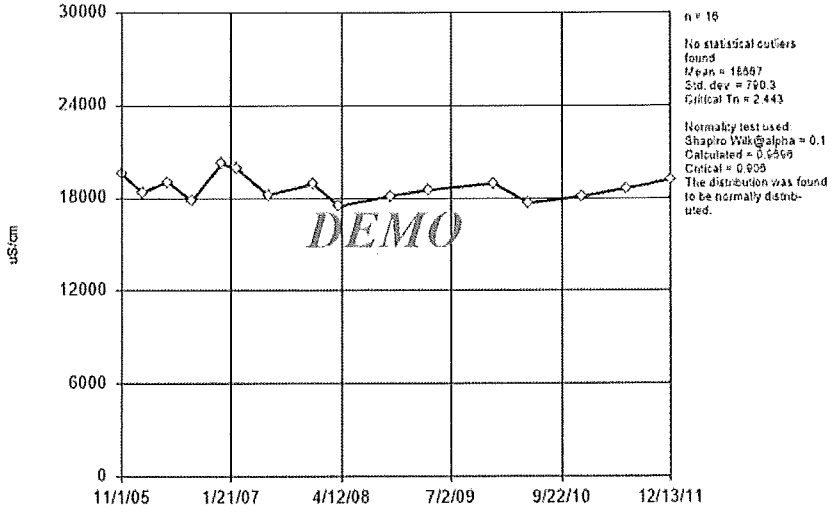


Constituent: Conductivity Analysis Run 6/12/2014 1:25 PM

Facility: Demo Client: Demo Data File: pHConductivity

EPA 1989 Outlier Test

MW-1 (bg)

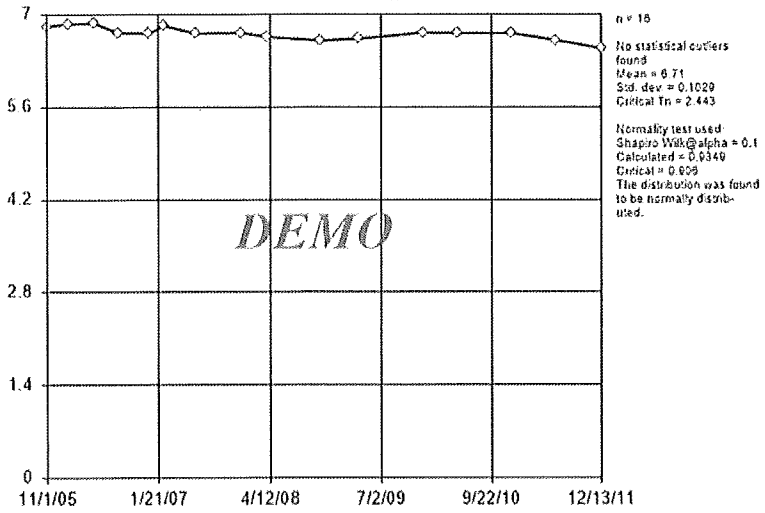


Constituent: Conductivity Analysis Run 6/12/2014 1:25 PM

Facility: Demo Client: Demo Data File: pHConductivity

EPA 1989 Outlier Test

MW-1 (bg)

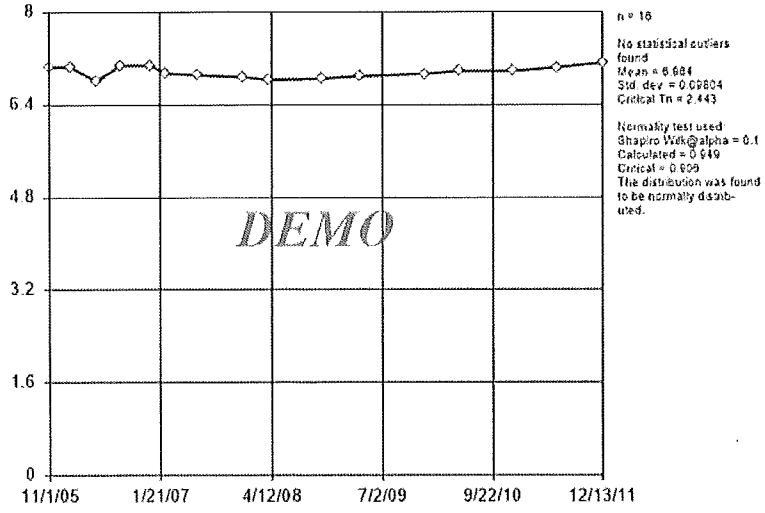


Constituent: pH Analysis Run 6/12/2014 1:18 PM

Facility: Demo Client: Demo Data File: pHConductivity

EPA 1989 Outlier Test

MW-11

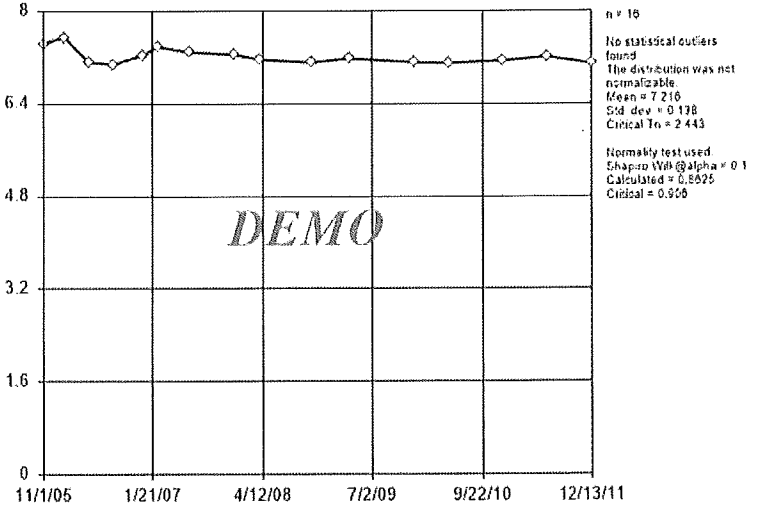


Constituent: pH Analysis Run 6/12/2014 1:18 PM

Facility: Demo Client: Demo Data File: pHConductivity

EPA 1989 Outlier Test

MW-10



Constituent: pH Analysis Run 6/12/2014 1:18 PM

Facility: Demo Client: Demo Data File: pHConductivity

Appendix F

Sen's Slope/ Man-Kendall

Facility: Demo Client: Demo Data File: Dissolved Metals Printed 6/12/2014, 11:05 AM

onstituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
issolved cobalt (mg/L)	MW-1 (bg)	0	-40	-53	No	16	81.25	n/a	n/a	0.02	NP
issolved cobalt (mg/L)	MW-10	0	-42	-53	No	16	81.25	n/a	n/a	0.02	NP
issolved cobalt (mg/L)	MW-11	0	-38	-53	No	16	81.25	n/a	n/a	0.02	NP
issolved copper (mg/L)	MW-1 (bg)	0	0	53	No	16	75	n/a	n/a	0.02	NP
issolved copper (mg/L)	MW-10	0	14	53	No	16	75	n/a	n/a	0.02	NP
issolved copper (mg/L)	MW-11	0	15	53	No	16	75	n/a	n/a	0.02	NP
issolved lead (mg/L)	MW-1 (bg)	0	-40	-53	No	16	93.75	n/a	n/a	0.02	NP
issolved lead (mg/L)	MW-10	0	-40	-53	No	16	93.75	n/a	n/a	0.02	NP
issolved lead (mg/L)	MW-11	0	-40	-53	No	16	93.75	n/a	n/a	0.02	NP
issolved moly (mg/L)	**MW-1 (bg)**	**-0.00411**	**-80**	**-53**	**Yes**	**16**	**87.5**	**n/a**	**n/a**	**0.02**	**NP**
issolved moly (mg/L)	**MW-10**	**-0.00...**	**-79**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
issolved moly (mg/L)	**MW-11**	**-0.00...**	**-79**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
issolved nickel (mg/L)	**MW-1 (bg)**	**-0.00...**	**-70**	**-53**	**Yes**	**16**	**81.25**	**n/a**	**n/a**	**0.02**	**NP**
issolved nickel (mg/L)	**MW-10**	**-0.00...**	**-83**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
issolved nickel (mg/L)	**MW-11**	**-0.00...**	**-83**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
issolved vanadium (mg/L)	MW-1 (bg)	-0.00...	-26	-53	No	16	68.75	n/a	n/a	0.02	NP
issolved vanadium (mg/L)	MW-10	0	7	53	No	16	68.75	n/a	n/a	0.02	NP
issolved vanadium (mg/L)	MW-11	0	4	53	No	16	56.25	n/a	n/a	0.02	NP

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/12/2014, 11:20 AM

onstituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
otal cobalt (mg/L)	MW-1 (bg)	0	39	53	No	16	62.5	n/a	n/a	0.02	NP
otal cobalt (mg/L)	MW-10	0	-42	-53	No	16	81.25	n/a	n/a	0.02	NP
otal cobalt (mg/L)	MW-11	0	-38	-53	No	16	81.25	n/a	n/a	0.02	NP
otal Copper (mg/L)	MW-1 (bg)	0.007131	42	53	No	16	43.75	n/a	n/a	0.02	NP
otal Copper (mg/L)	MW-10	0.000...	31	53	No	16	50	n/a	n/a	0.02	NP
otal Copper (mg/L)	MW-11	0.001303	42	53	No	16	56.25	n/a	n/a	0.02	NP
otal lead (mg/L)	MW-1 (bg)	0.00355	52	53	No	16	56.25	n/a	n/a	0.02	NP
otal lead (mg/L)	MW-10	0	-37	-53	No	16	93.75	n/a	n/a	0.02	NP
otal lead (mg/L)	MW-11	0	-38	-53	No	16	81.25	n/a	n/a	0.02	NP
otal moly (mg/L)	**MW-1 (bg)**	**-0.00...**	**-82**	**-53**	**Yes**	**16**	**87.5**	**n/a**	**n/a**	**0.02**	**NP**
otal moly (mg/L)	**MW-10**	**-0.00...**	**-79**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
otal moly (mg/L)	**MW-11**	**-0.00...**	**-79**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
otal nickel (mg/L)	MW-1 (bg)	0.00122	20	53	No	16	43.75	n/a	n/a	0.02	NP
otal nickel (mg/L)	**MW-10**	**-0.00...**	**-83**	**-53**	**Yes**	**16**	**100**	**n/a**	**n/a**	**0.02**	**NP**
otal nickel (mg/L)	**MW-11**	**-0.00...**	**-82**	**-53**	**Yes**	**16**	**93.75**	**n/a**	**n/a**	**0.02**	**NP**
otal vanadium (mg/L)	MW-1 (bg)	0.008295	42	53	No	16	25	n/a	n/a	0.02	NP
otal vanadium (mg/L)	MW-10	0	14	53	No	16	68.75	n/a	n/a	0.02	NP
otal vanadium (mg/L)	MW-11	0	-3	-48	No	15	60	n/a	n/a	0.02	NP

Trend Test

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/12/2014, 1:35 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Conductivity (uS/cm)	MW-1 (bg)	-86.03	-18	-53	No	16	0	n/a	n/a	0.02	NP
Conductivity (uS/cm)	MW-11	-146.3	-38	-53	No	16	0	n/a	n/a	0.02	NP
Conductivity (uS/cm)	**MW-10**	**292.4**	**65**	**48**	**Yes**	**15**	**0**	**n/a**	**n/a**	**0.02**	**NP**

Trend Test

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/12/2014, 1:16 PM

onstituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
ł (n/a)	**MW-1 (bg)**	**-0.03836**	**-69**	**-53**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.02**	**NP**
ł (n/a)	MW-11	0.007987	9	53	No	16	0	n/a	n/a	0.02	NP
ł (n/a)	MW-10	-0.04056	-49	-53	No	16	0	n/a	n/a	0.02	NP

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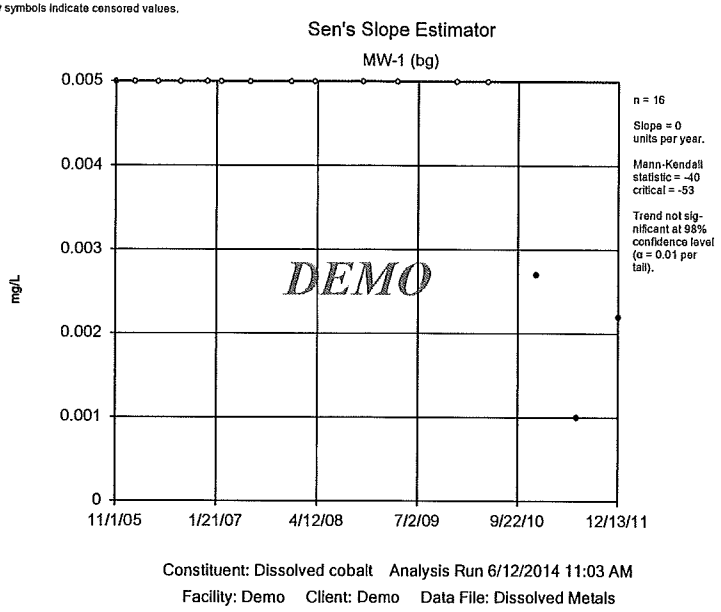
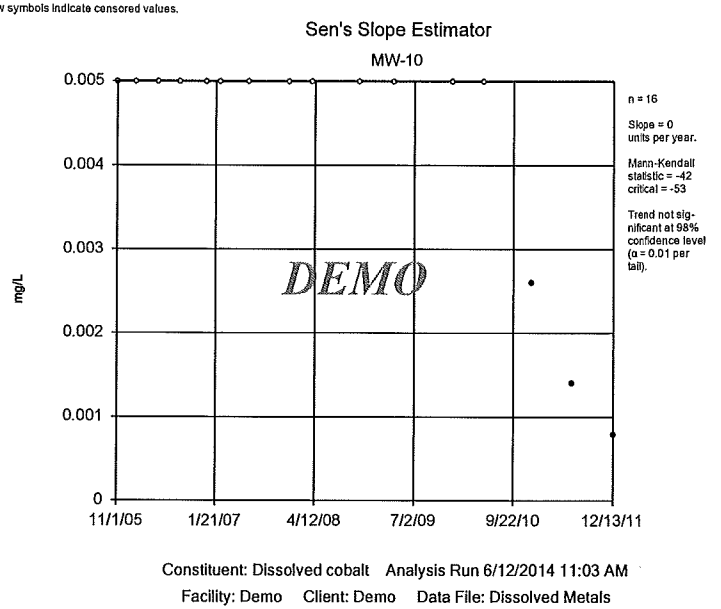
Hollow symbols indicate censored values.



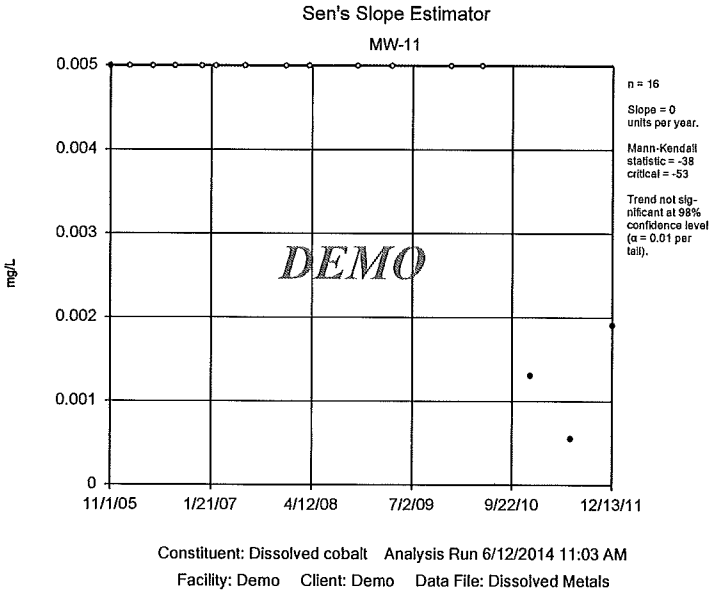
Constituent: Dissolved cobalt Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.



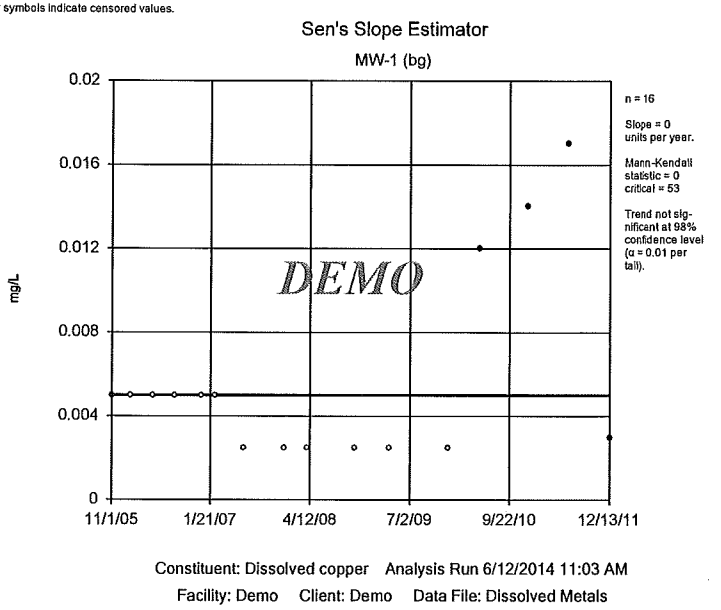
Constituent: Dissolved cobalt Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.



Constituent: Dissolved cobalt Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

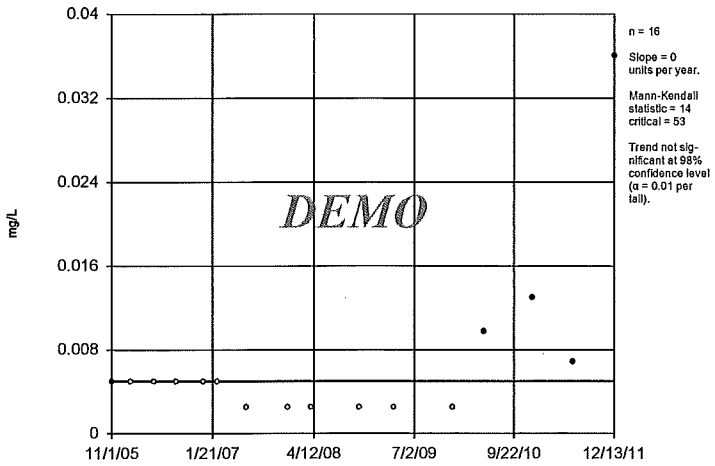


Constituent: Dissolved copper Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10

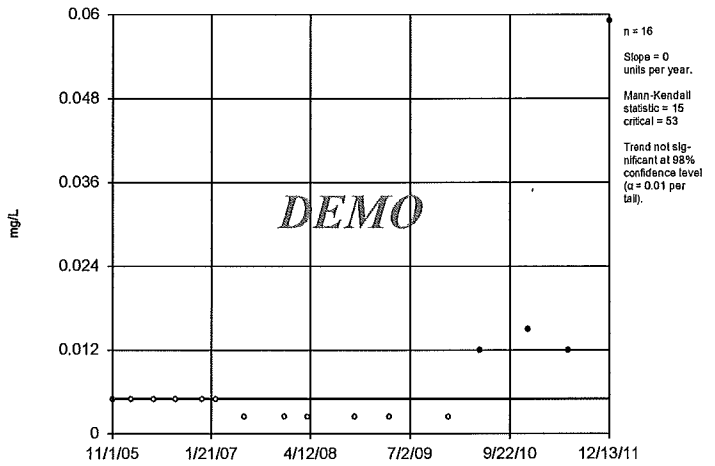


Constituent: Dissolved copper Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11

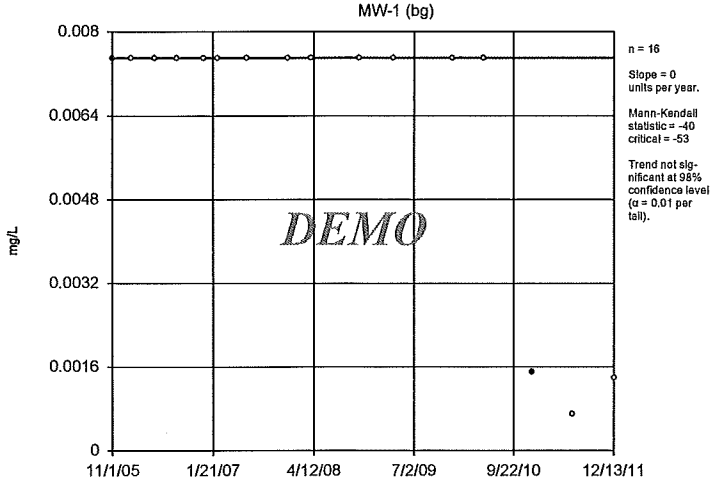


Constituent: Dissolved copper Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)

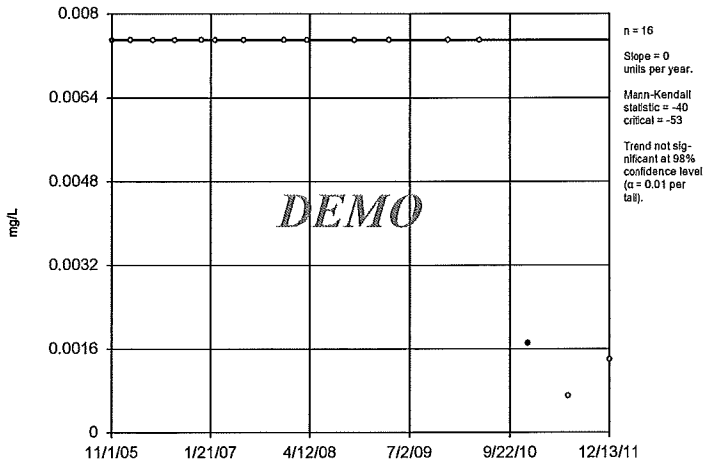


Constituent: Dissolved lead Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



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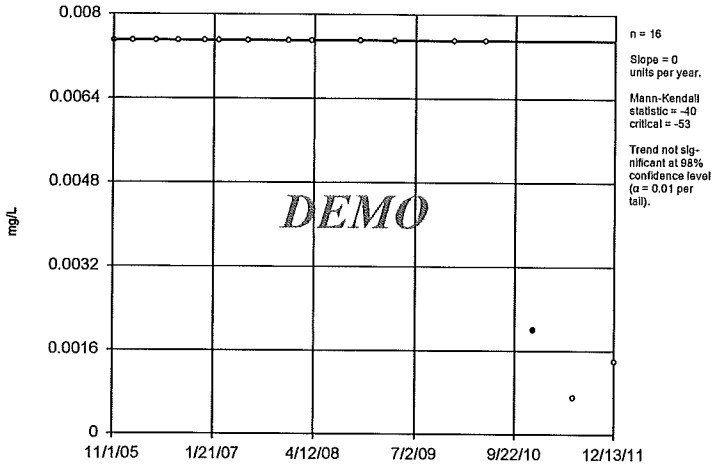
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



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Facility: Demo Client: Demo Data File: Dissolved Metals

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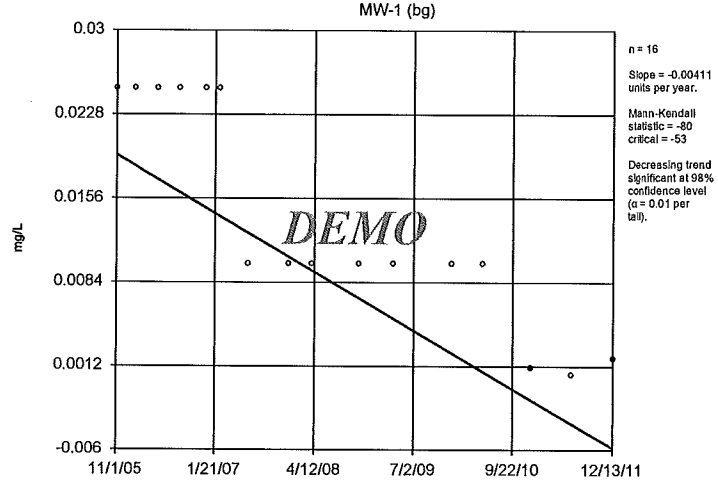
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)

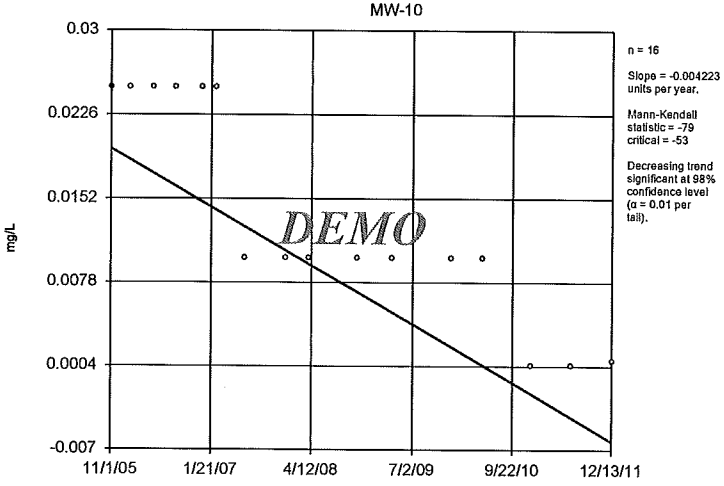


Constituent: Dissolved moly Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10

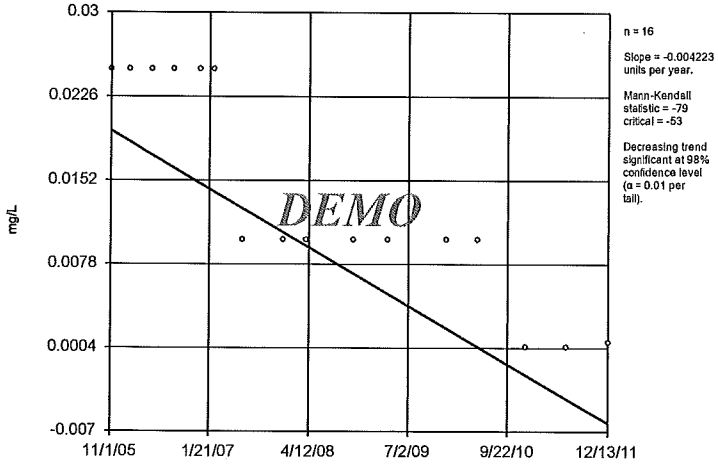


Constituent: Dissolved moly Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11

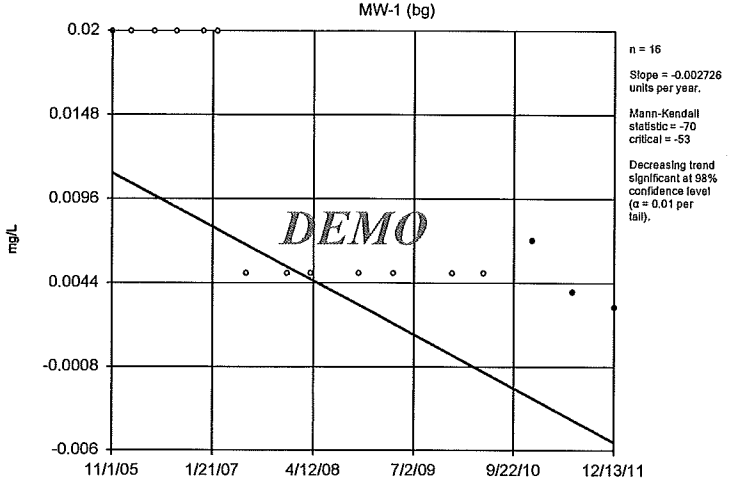


Constituent: Dissolved moly Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)



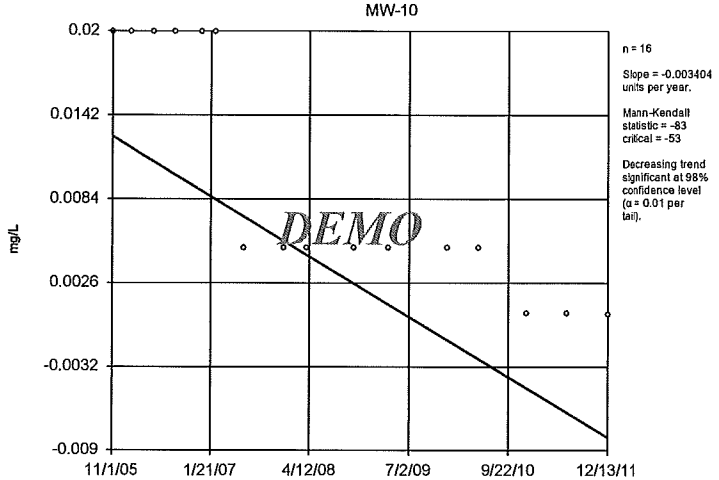
Constituent: Dissolved nickel Analysis Run 6/12/2014 11:03 AM

Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



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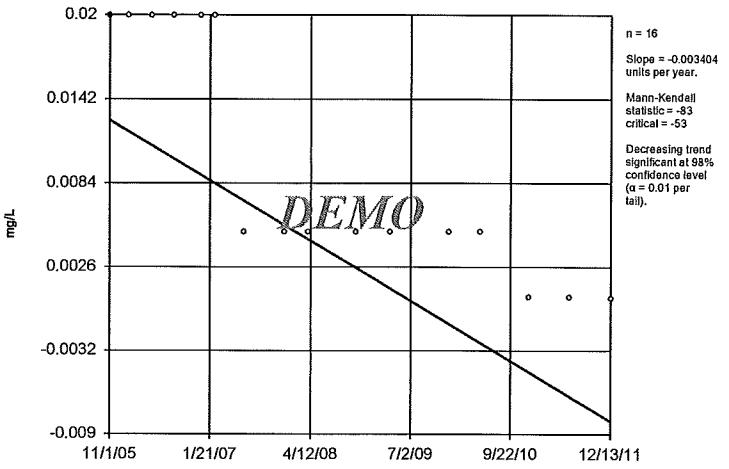
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



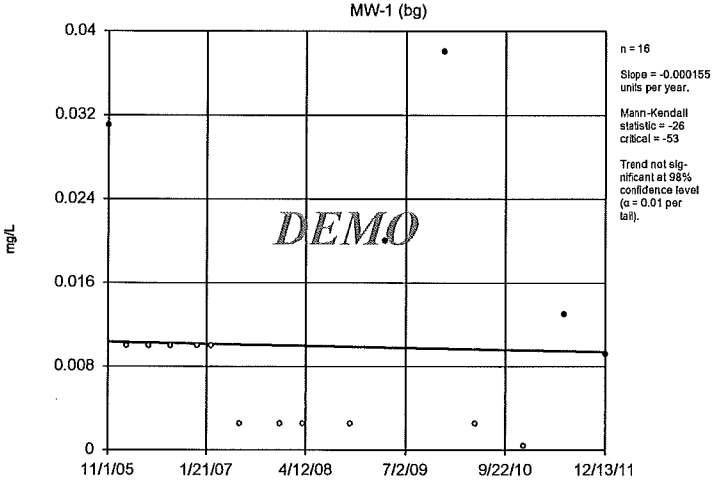
Constituent: Dissolved nickel Analysis Run 6/12/2014 11:03 AM

Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)



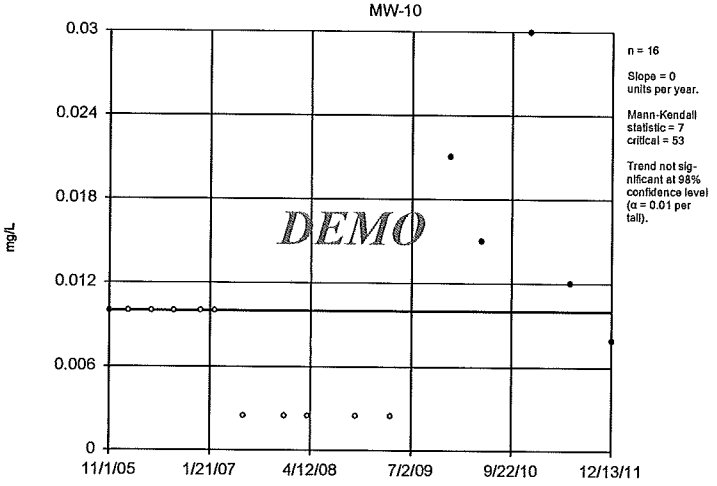
Constituent: Dissolved vanadium Analysis Run 6/12/2014 11:03 AM

Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10

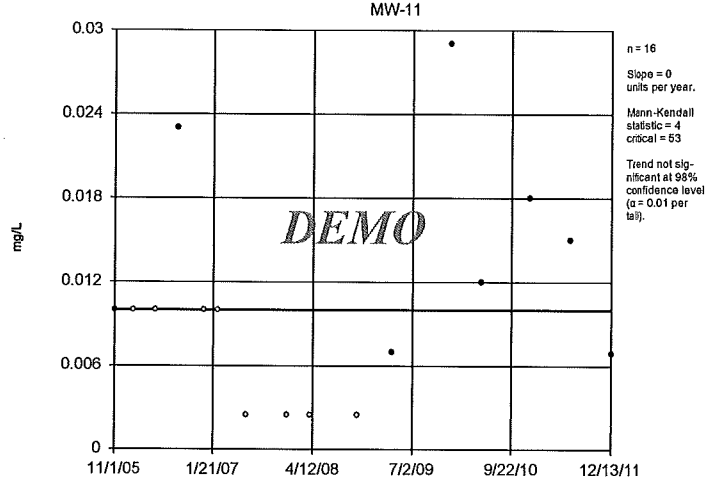


Constituent: Dissolved vanadium Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11

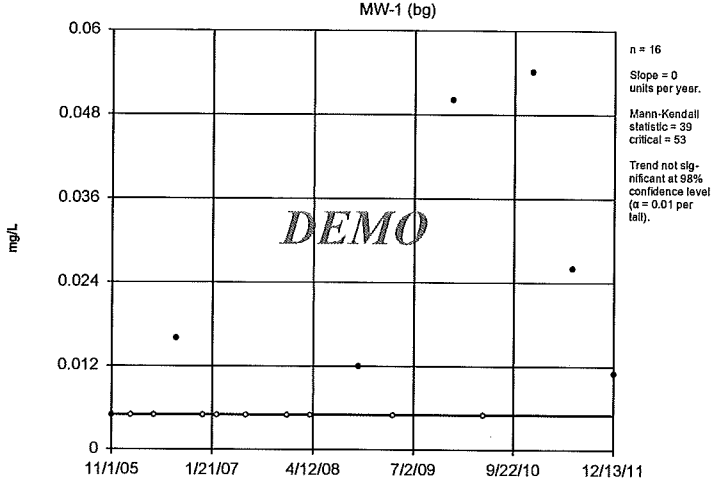


Constituent: Dissolved vanadium Analysis Run 6/12/2014 11:03 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)



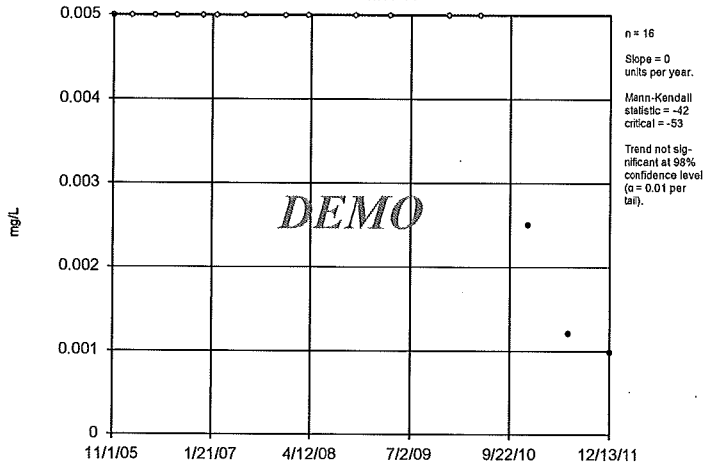
Constituent: Total cobalt Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



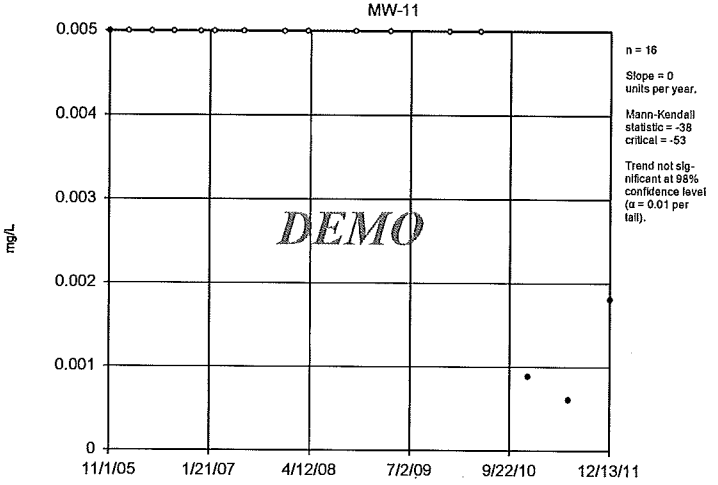
Constituent: Total cobalt Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



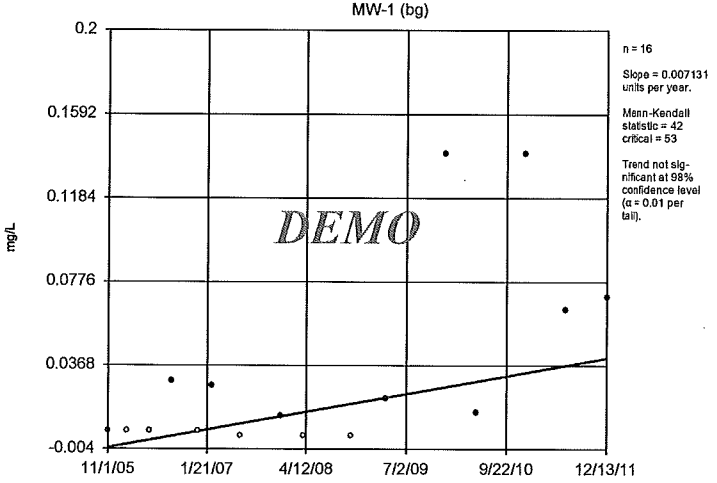
Constituent: Total cobalt Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)



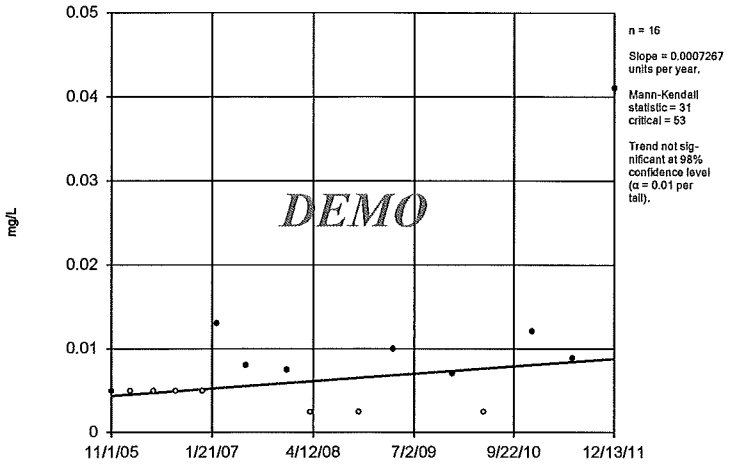
Constituent: Total Copper Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



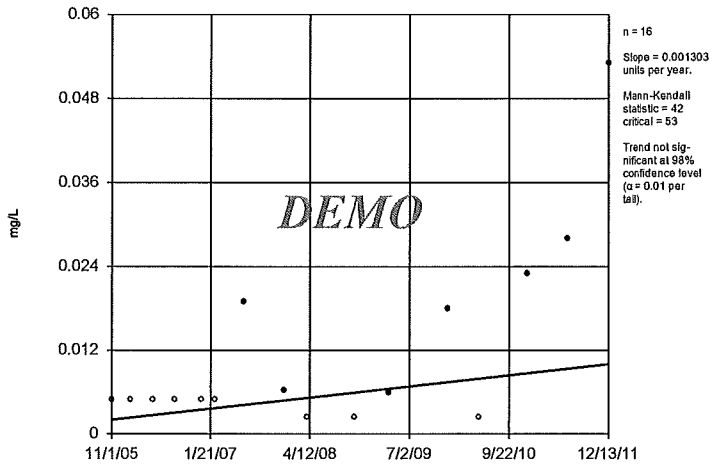
Constituent: Total Copper Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



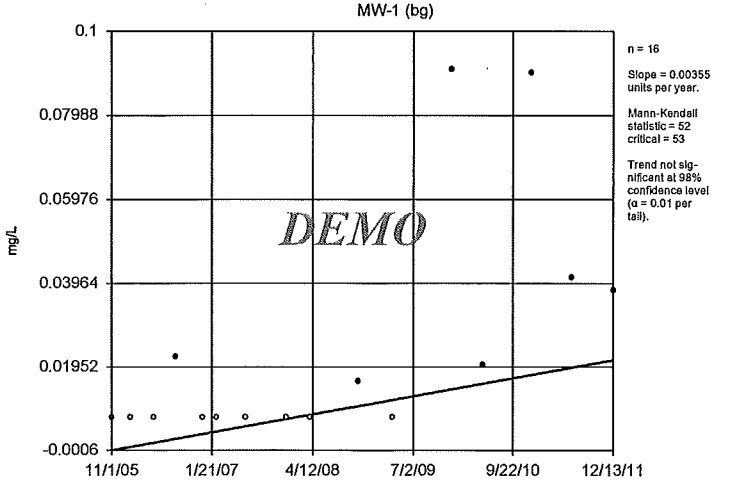
Constituent: Total Copper Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)



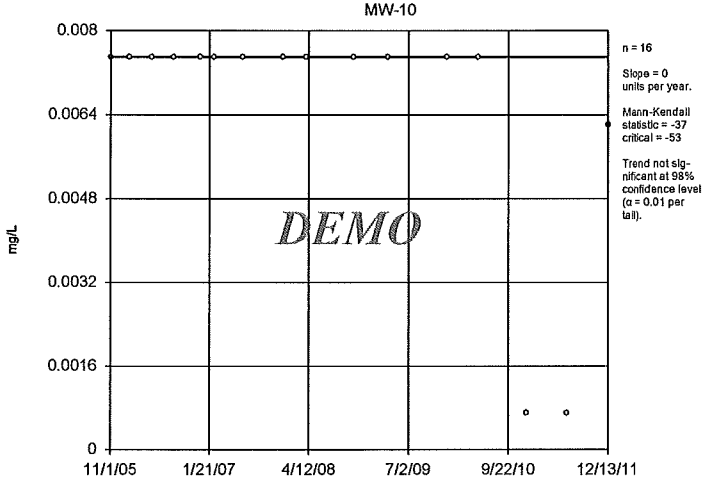
Constituent: Total lead Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



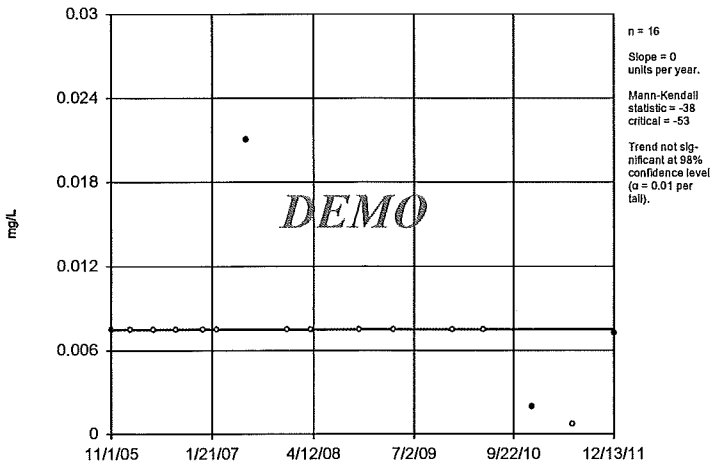
Constituent: Total lead Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



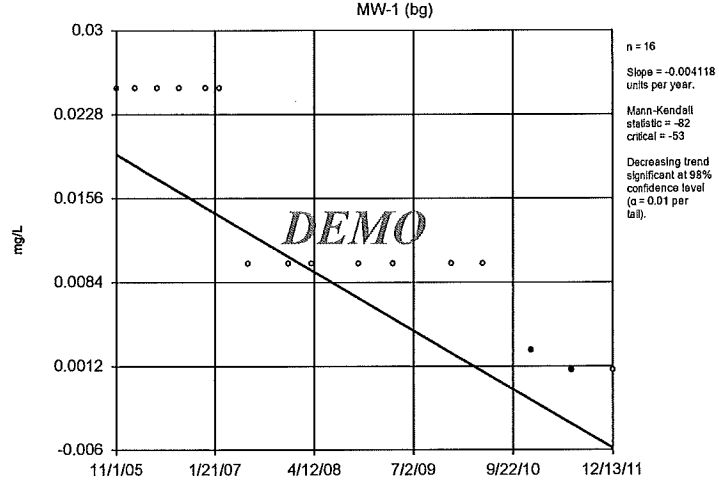
Constituent: Total lead Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)



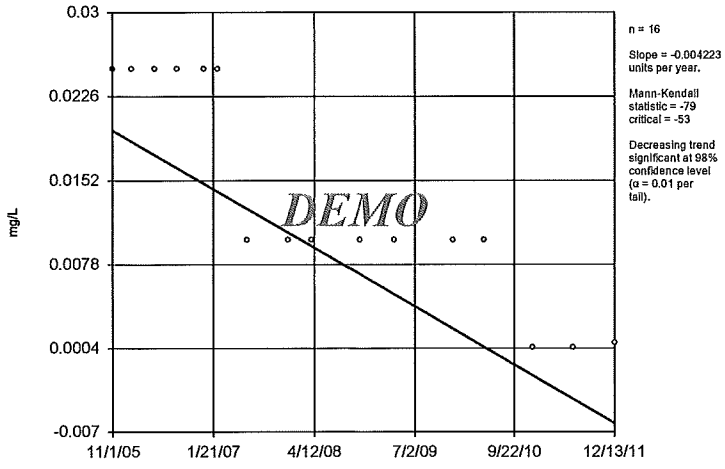
Constituent: Total moly Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10



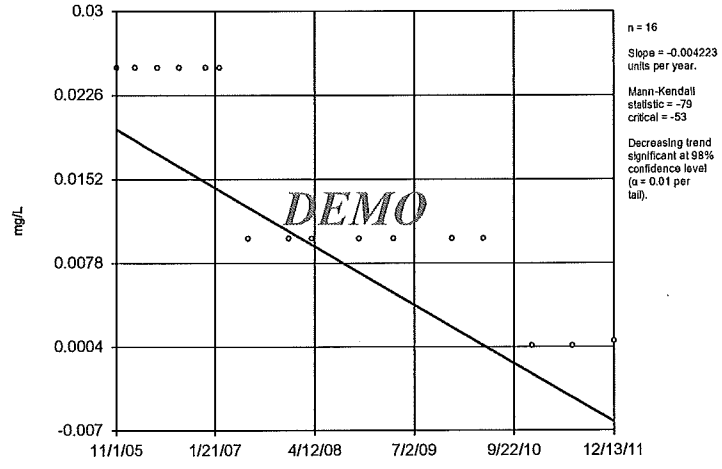
Constituent: Total moly Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11



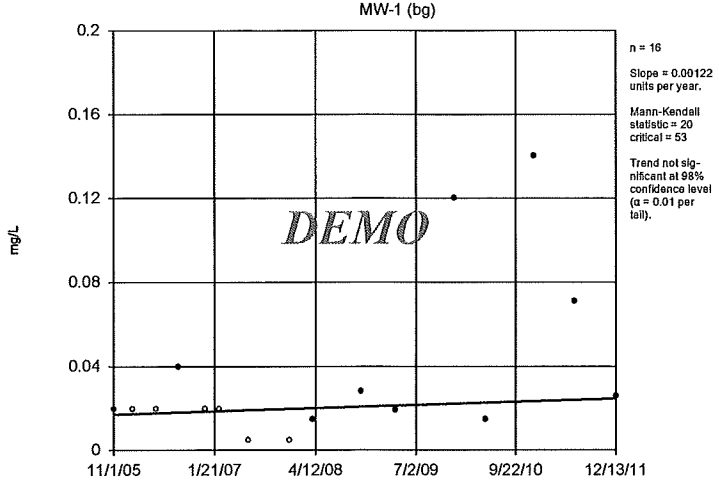
Constituent: Total moly Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)

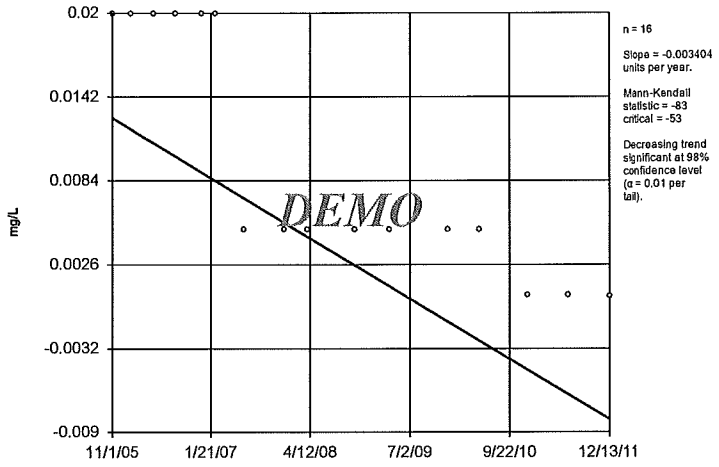


Constituent: Total nickel Analysis Run 6/12/2014 11:09 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10

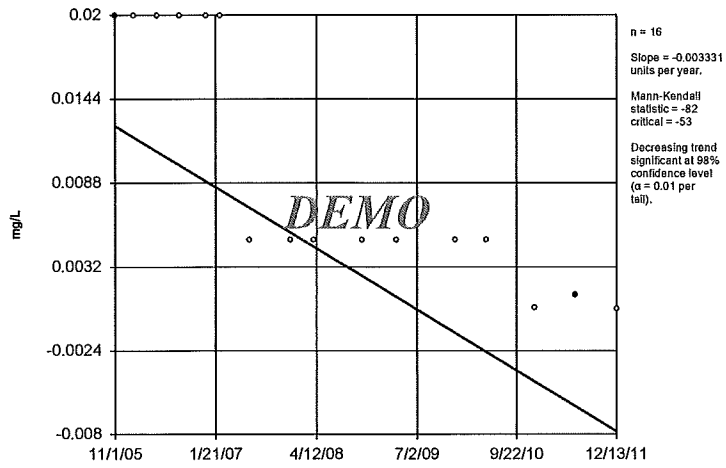


Constituent: Total nickel Analysis Run 6/12/2014 11:09 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-11

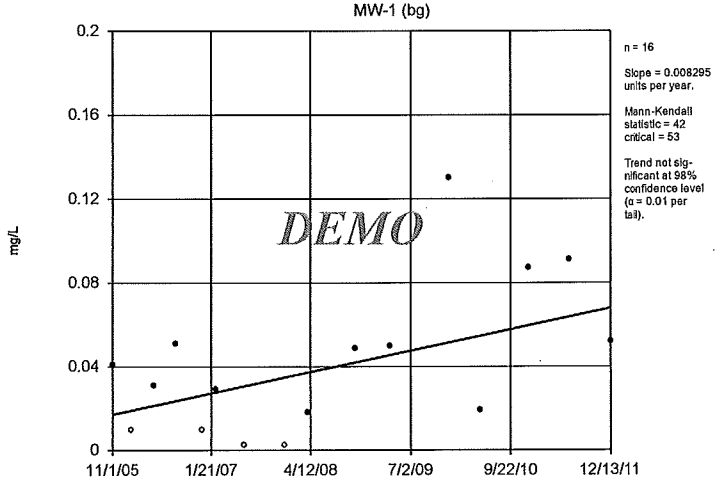


Constituent: Total nickel Analysis Run 6/12/2014 11:09 AM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas™ v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1 (bg)

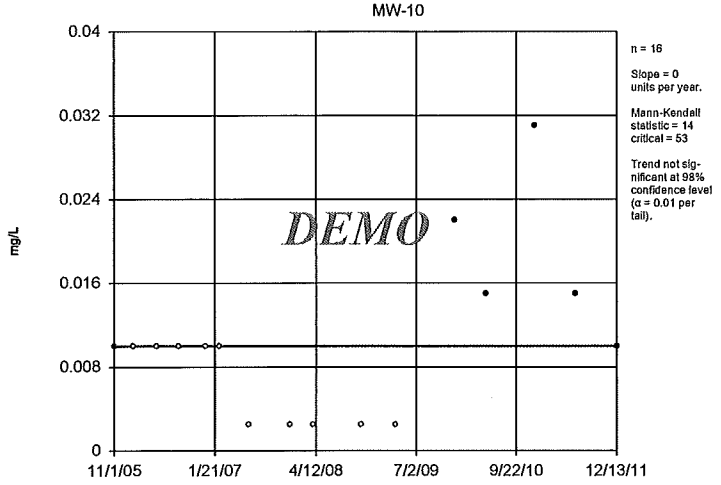


Constituent: Total vanadium Analysis Run 6/12/2014 11:09 AM
Facility: Demo Client: Demo Data File: Total Metals1

Hollow symbols indicate censored values.

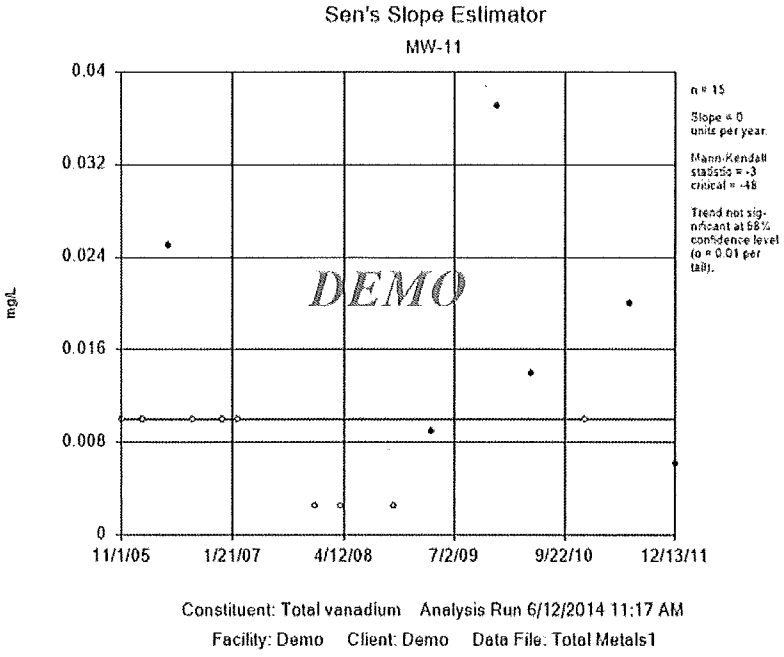
Sen's Slope Estimator

MW-10



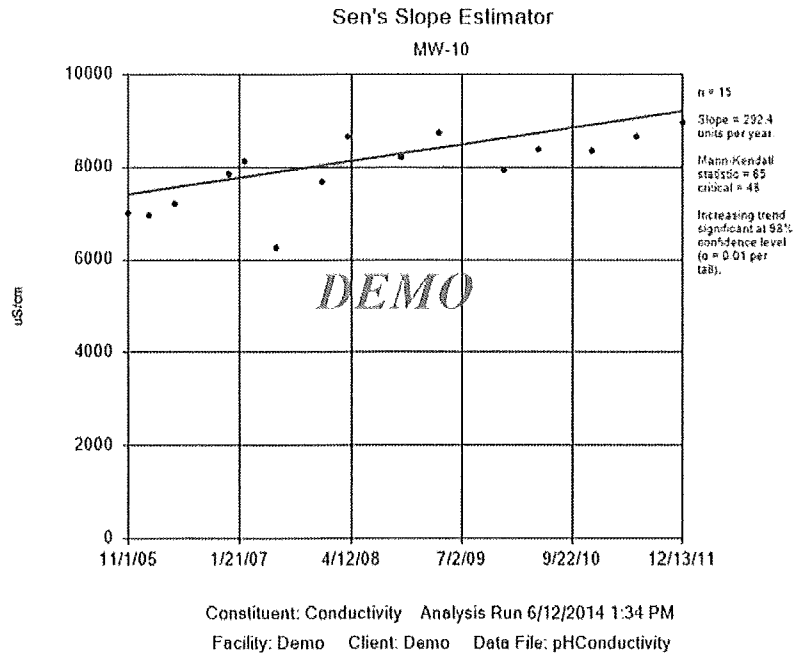
Constituent: Total vanadium Analysis Run 6/12/2014 11:09 AM

Facility: Demo Client: Demo Data File: Total Metals1

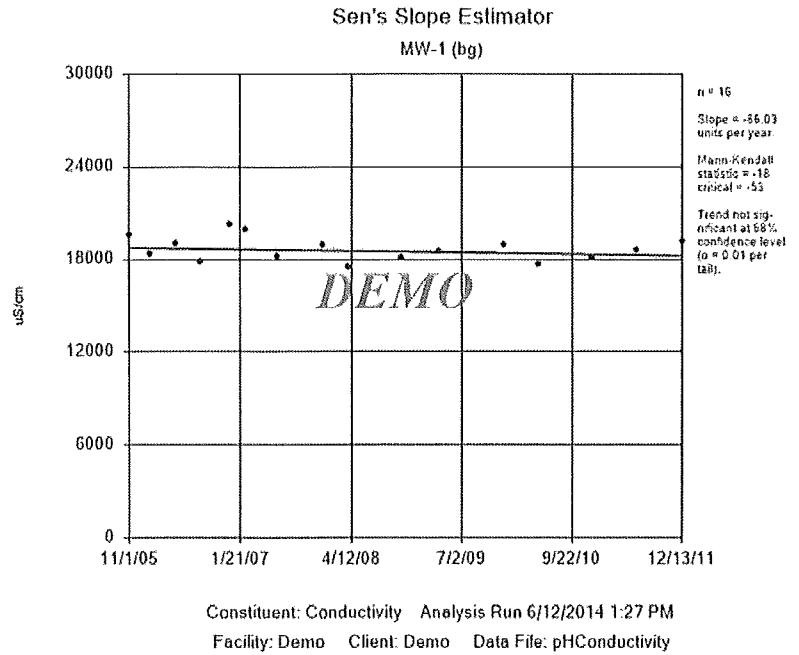


Constituent: Total vanadium Analysis Run 6/12/2014 11:17 AM

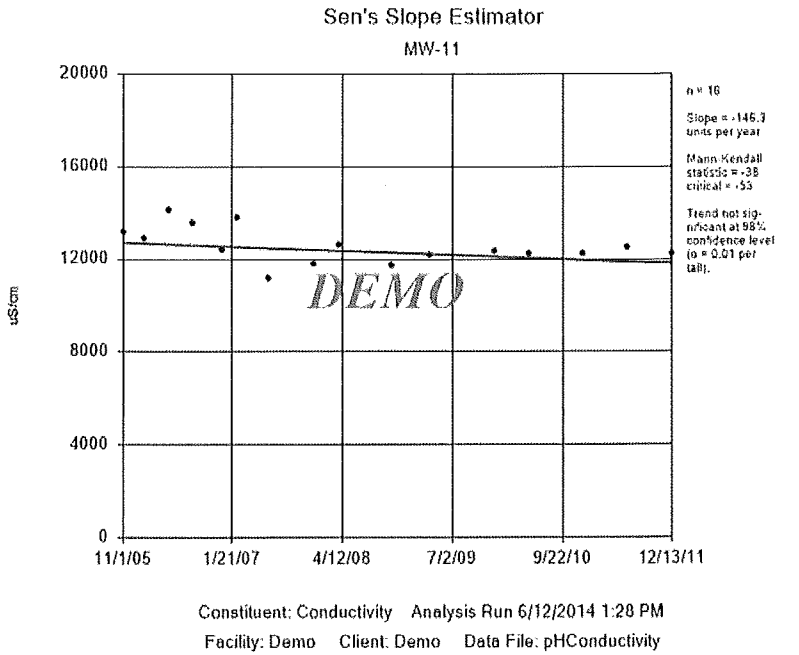
Facility: Demo Client: Demo Data File: Total Metals1



Constituent: Conductivity Analysis Run 6/12/2014 1:34 PM
Facility: Demo Client: Demo Data File: pHConductivity



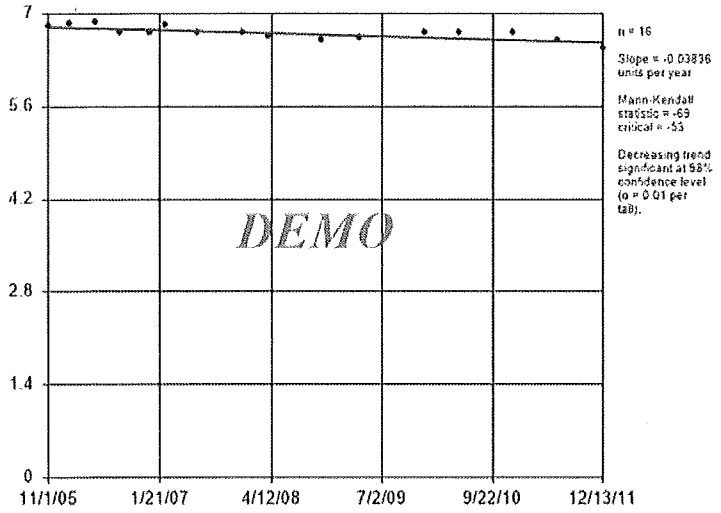
Constituent: Conductivity Analysis Run 6/12/2014 1:27 PM
Facility: Demo Client: Demo Data File: pHConductivity



Constituent: Conductivity Analysis Run 6/12/2014 1:28 PM
Facility: Demo Client: Demo Data File: pHConductivity

Sen's Slope Estimator

MW-1 (bg)

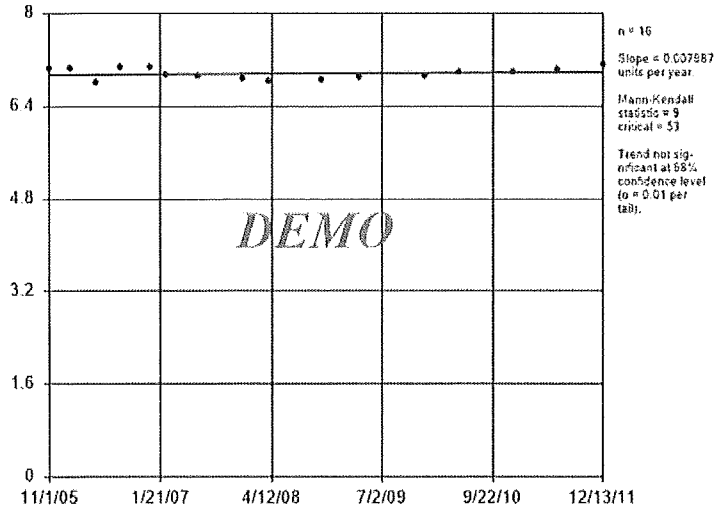


Constituent: pH Analysis Run 6/12/2014 1:17 PM

Facility: Demo Client: Demo Data File: pHConductivity

Sen's Slope Estimator

MW-11

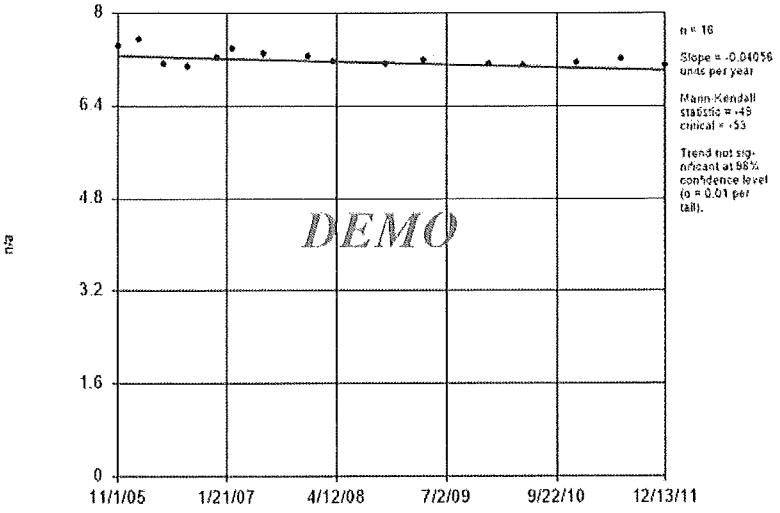


Constituent: pH Analysis Run 6/12/2014 1:17 PM

Facility: Demo Client: Demo Data File: pHConductivity

Sen's Slope Estimator

MW-10



Constituent: pH Analysis Run 6/12/2014 1:15 PM

Facility: Demo Client: Demo Data File: pHConductivity

Appendix G

Prediction Limits

Facility: Demo Client: Demo Data File: Dissolved Metals Printed 6/16/2014, 3:51 PM

onstituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
ssolved cobalt (mg/L)	MW-1	0.005	n/a	11/18/2013	0.00125ND	No	16	81.25	n/a	0.05882	NP Intra (NDs)
ssolved cobalt (mg/L)	MW-10	0.005	n/a	11/18/2013	0.00125ND	No	16	81.25	n/a	0.05882	NP Intra (NDs)
ssolved cobalt (mg/L)	MW-11	0.005	n/a	11/18/2013	0.00125ND	No	16	81.25	n/a	0.05882	NP Intra (NDs)
ssolved copper (mg/L)	MW-1	0.017	n/a	11/18/2013	0.0025ND	No	16	75	n/a	0.05882	NP Intra (NDs)
ssolved copper (mg/L)	MW-10	0.036	n/a	11/18/2013	0.0025ND	No	16	75	n/a	0.05882	NP Intra (NDs)
ssolved copper (mg/L)	MW-11	0.059	n/a	11/18/2013	0.0025ND	No	16	75	n/a	0.05882	NP Intra (NDs)
ssolved lead (mg/L)	MW-1	0.0075	n/a	11/18/2013	0.0019ND	No	16	93.75	n/a	0.05882	NP Intra (NDs)
ssolved lead (mg/L)	MW-10	0.0075	n/a	11/18/2013	0.0019ND	No	16	93.75	n/a	0.05882	NP Intra (NDs)
ssolved lead (mg/L)	MW-11	0.0075	n/a	11/18/2013	0.0019ND	No	16	93.75	n/a	0.05882	NP Intra (NDs)
ssolved moly (mg/L)	MW-1	0.025	n/a	11/18/2013	0.00375ND	No	16	87.5	n/a	0.05882	NP Intra (NDs)
ssolved moly (mg/L)	MW-10	0.0018	n/a	11/18/2013	0.00375ND	No	16	100	n/a	0.05882	NP Intra (NDs)
ssolved moly (mg/L)	MW-11	0.0018	n/a	11/18/2013	0.00375ND	No	16	100	n/a	0.05882	NP Intra (NDs)
ssolved nickel (mg/L)	MW-1	0.02	n/a	11/18/2013	0.005ND	No	16	81.25	n/a	0.05882	NP Intra (NDs)
ssolved nickel (mg/L)	MW-10	0.00084	n/a	11/18/2013	0.005ND	No	16	100	n/a	0.05882	NP Intra (NDs)
ssolved nickel (mg/L)	MW-11	0.00084	n/a	11/18/2013	0.005ND	No	16	100	n/a	0.05882	NP Intra (NDs)
ssolved vanadium (mg/L)	MW-1	0.038	n/a	11/18/2013	0.022	No	16	68.75	n/a	0.05882	NP Intra (NDs)
ssolved vanadium (mg/L)	MW-10	0.03	n/a	11/18/2013	0.021	No	16	68.75	n/a	0.05882	NP Intra (NDs)
ssolved vanadium (mg/L)	MW-11	0.029	n/a	11/18/2013	0.021	No	16	56.25	n/a	0.05882	NP Intra (NDs)

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/16/2014, 4:16 PM

onstituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
otal cobalt (mg/L)	MW-1	0.054	n/a	11/18/2013	0.00125ND	No	16	62.5	n/a	0.006456	NP Intra (NDs) 1 of 2
otal cobalt (mg/L)	MW-10	0.005	n/a	11/18/2013	0.0043	No	16	81.25	n/a	0.006456	NP Intra (NDs) 1 of 2
otal cobalt (mg/L)	MW-11	0.005	n/a	11/18/2013	0.0026	No	16	81.25	n/a	0.006456	NP Intra (NDs) 1 of 2
otal Copper (mg/L)	MW-1	0.14	n/a	11/18/2013	0.0025ND	No	16	43.75	n/a	0.006456	NP Intra (xform) 1 of 2
otal Copper (mg/L)	MW-10	0.041	n/a	11/18/2013	0.0025ND	No	16	50	n/a	0.006456	NP Intra (xform) 1 of 2
otal Copper (mg/L)	MW-11	0.053	n/a	11/18/2013	0.0025ND	No	16	56.25	n/a	0.006456	NP Intra (NDs) 1 of 2
otal lead (mg/L)	MW-1	0.091	n/a	11/18/2013	0.0076	No	16	56.25	n/a	0.006456	NP Intra (NDs) 1 of 2
otal lead (mg/L)	MW-10	0.0075	n/a	11/18/2013	0.0064	No	16	93.75	n/a	0.006456	NP Intra (NDs) 1 of 2
otal lead (mg/L)	MW-11	0.021	n/a	11/18/2013	0.0063	No	16	81.25	n/a	0.006456	NP Intra (NDs) 1 of 2
otal moly (mg/L)	MW-1	0.025	n/a	11/18/2013	0.00375ND	No	16	87.5	n/a	0.006456	NP Intra (NDs) 1 of 2
otal moly (mg/L)	MW-10	0.0018	n/a	11/18/2013	0.00375ND	No	16	100	n/a	0.006456	NP Intra (NDs) 1 of 2
otal moly (mg/L)	MW-11	0.0018	n/a	11/18/2013	0.00375ND	No	16	100	n/a	0.006456	NP Intra (NDs) 1 of 2
otal nickel (mg/L)	MW-1	0.14	n/a	11/18/2013	0.005ND	No	16	43.75	n/a	0.006456	NP Intra (xform) 1 of 2
otal nickel (mg/L)	MW-10	0.00084	n/a	11/18/2013	0.005ND	No	16	100	n/a	0.006456	NP Intra (NDs) 1 of 2
otal nickel (mg/L)	MW-11	0.02	n/a	11/18/2013	0.005ND	No	16	93.75	n/a	0.006456	NP Intra (NDs) 1 of 2
otal vanadium (mg/L)	MW-1	0.13	n/a	11/18/2013	0.029	No	16	25	n/a	0.006456	NP Intra (xform) 1 of 2
otal vanadium (mg/L)	MW-10	0.031	n/a	11/18/2013	0.023	No	16	68.75	n/a	0.006456	NP Intra (NDs) 1 of 2

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/12/2014, 11:53 AM

onstituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
otal vanadium (mg/L)	MW-11	0.037	n/a	11/18/2013	0.029	No	15	60	n/a	0.007533	NP Intra (NDs) 1 of 2

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/16/2014, 4:53 PM

onstituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
onductivity (uS/cm)	MW-1	19556	n/a	11/18/2013	18635	No	15	0	No	0.026	Param Intra 1 of 2
onductivity (uS/cm)	MW-10	8718	n/a	11/18/2013	8666	No	14	0	No	0.026	Param Intra 1 of 2
onductivity (uS/cm)	MW-11	13513	n/a	11/18/2013	13245	No	15	0	No	0.026	Param Intra 1 of 2

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/16/2014, 4:42 PM

onstituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
H (n/a)	MW-1	6.826	6.594	11/18/2013	6.75	No	16	0	No	0.013	Param Intra 1 of 2
H (n/a)	MW-10	7.372	7.06	11/18/2013	7.34	No	16	0	No	0.013	Param Intra 1 of 2
H (n/a)	**MW-11**	**7.075**	**6.853**	**11/18/2013**	**7.14**	**Yes**	**16**	**0**	**No**	**0.013**	**Param Intra 1 of 2**

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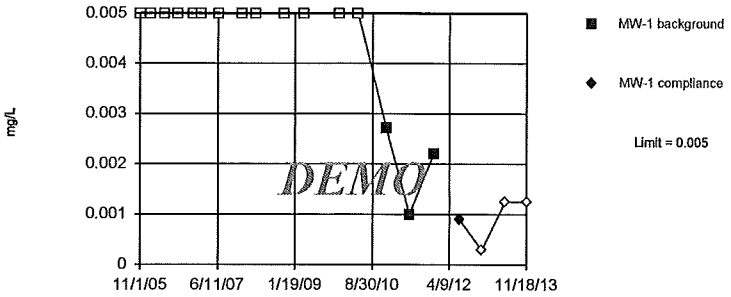
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved cobalt Analysis Run 6/16/2014 3:49 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

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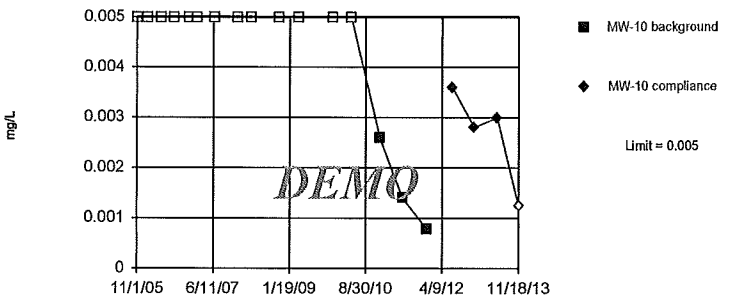
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

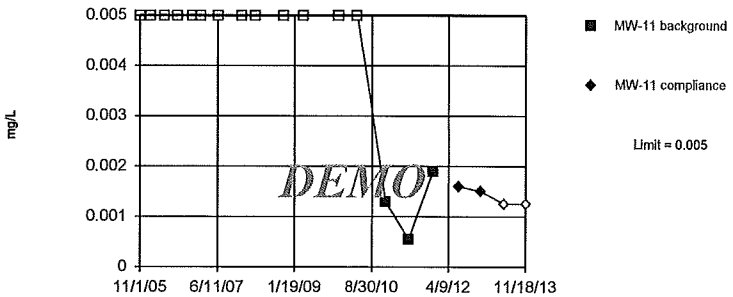
Constituent: Dissolved cobalt Analysis Run 6/16/2014 3:50 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

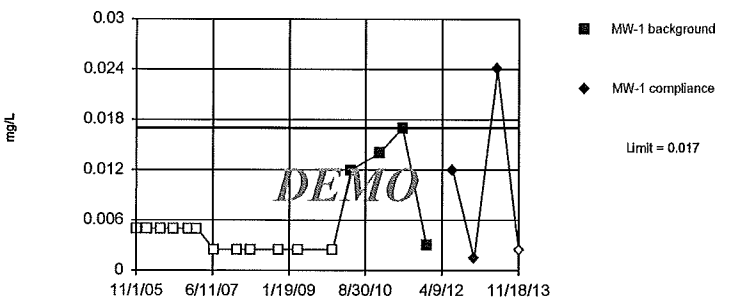
Constituent: Dissolved cobalt Analysis Run 6/16/2014 3:50 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved copper Analysis Run 6/16/2014 3:50 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

Prediction Limit

Constituent: Dissolved cobalt (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1	MW-1
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	0.0027 (B)	
6/10/2011	0.001 (B)	
12/13/2011	0.0022 (J)	
6/29/2012		0.00089 (J)
12/13/2012		<0.00058
6/10/2013		<0.0025
11/18/2013		<0.0025

Prediction Limit

Constituent: Dissolved cobalt (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-10
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	0.0026 (B)	
6/10/2011	0.0014 (B)	
12/13/2011	0.00079 (J)	
6/29/2012		0.0036 (J)
12/13/2012		0.0028 (J)
6/10/2013		0.003 (J)
11/18/2013		<0.0025

Prediction Limit

Constituent: Dissolved cobalt (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-11	MW-11
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
8/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	0.0013 (B)	
6/10/2011	0.00055 (B)	
12/13/2011	0.0019 (J)	
6/29/2012		0.0016 (J)
12/13/2012		0.0015 (J)
6/10/2013		<0.0025
11/18/2013		<0.0025

Prediction Limit

Constituent: Dissolved copper (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

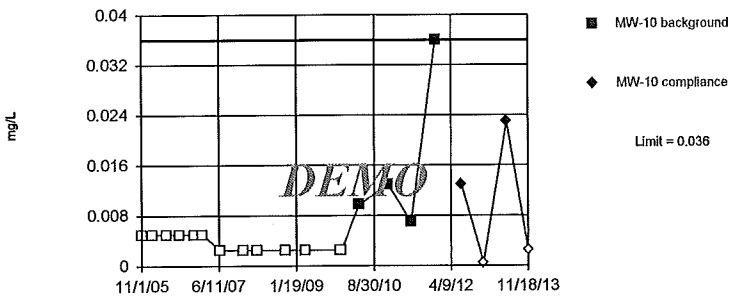
	MW-1	MW-1
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
8/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	<0.005	
12/21/2009	<0.005	
5/11/2010	0.012	
12/16/2010	0.014	
6/10/2011	0.017	
12/13/2011	0.003 (J)	
6/29/2012		0.012
12/13/2012		0.0014 (J)
6/10/2013		0.024
11/18/2013		<0.005

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved copper Analysis Run 6/16/2014 3:50 PM

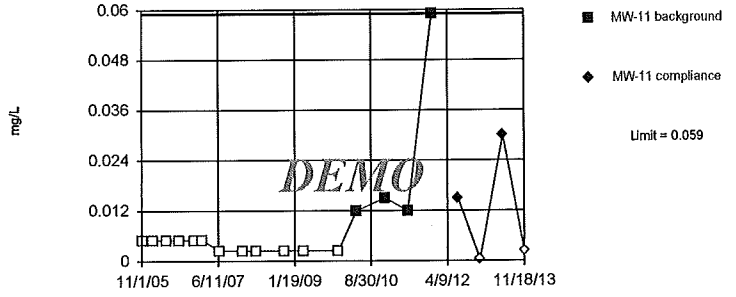
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved copper Analysis Run 6/16/2014 3:50 PM

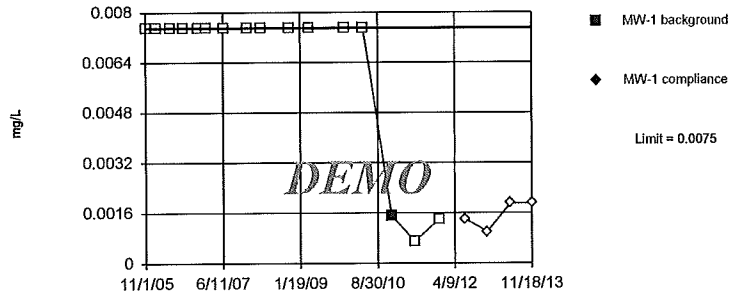
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 93.75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved lead Analysis Run 6/16/2014 3:50 PM

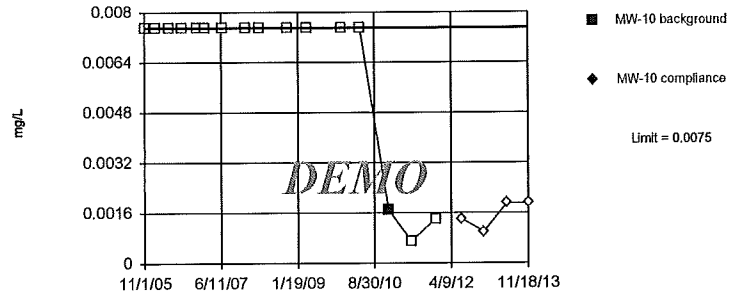
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 93.75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved lead Analysis Run 6/16/2014 3:50 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Prediction Limit

Constituent: Dissolved copper (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-10
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	<0.005	
12/21/2009	<0.005	
5/11/2010	0.0097	
12/16/2010	0.013	
6/10/2011	0.0069 (B)	
12/13/2011	0.036	
6/29/2012		0.013
12/13/2012		<0.001
6/10/2013		0.023
11/18/2013		<0.005

Prediction Limit

Constituent: Dissolved copper (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-11	MW-11
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	<0.005	
12/21/2009	<0.005	
5/11/2010	0.012	
12/16/2010	0.015	
6/10/2011	0.012	
12/13/2011	0.059	
6/29/2012		0.015
12/13/2012		<0.001
6/10/2013		0.03
11/18/2013		<0.005

Prediction Limit

Constituent: Dissolved lead (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1	MW-1
11/1/2005	<0.015	
1/25/2006	<0.015	
5/9/2006	<0.015	
8/15/2006	<0.015	
12/13/2006	<0.015	
2/13/2007	<0.015	
6/20/2007	<0.015	
12/18/2007	<0.015	
4/2/2008	<0.015	
10/28/2008	<0.015	
3/31/2009	<0.015	
12/21/2009	<0.015	
5/11/2010	<0.015	
12/16/2010	0.0015 (B)	
6/10/2011	<0.0014	
12/13/2011	<0.0028	
6/29/2012		<0.0028
12/13/2012		<0.002
6/10/2013		<0.0038
11/18/2013		<0.0038

Prediction Limit

Constituent: Dissolved lead (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

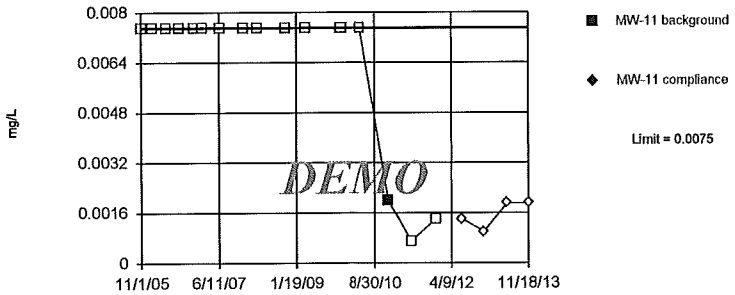
	MW-10	MW-10
11/1/2005	<0.015	
1/25/2006	<0.015	
5/9/2006	<0.015	
8/15/2006	<0.015	
12/13/2006	<0.015	
2/13/2007	<0.015	
6/20/2007	<0.015	
12/18/2007	<0.015	
4/2/2008	<0.015	
10/28/2008	<0.015	
3/31/2009	<0.015	
12/21/2009	<0.015	
5/11/2010	<0.015	
12/16/2010	0.0017 (B)	
6/10/2011	<0.0014	
12/13/2011	<0.0028	
6/29/2012		<0.0028
12/13/2012		<0.002
6/10/2013		<0.0038
11/18/2013		<0.0038

Sanitas® v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 93.75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved lead Analysis Run 6/16/2014 3:50 PM

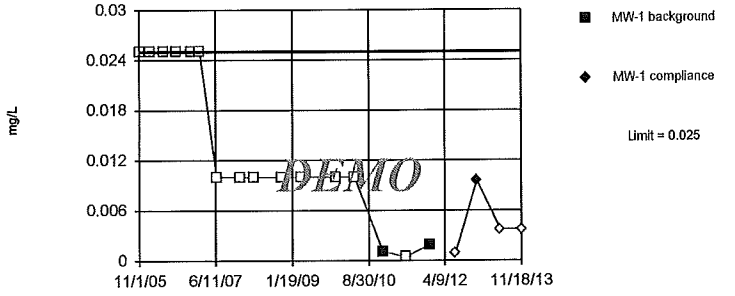
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 87.5% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved moly Analysis Run 6/16/2014 3:50 PM

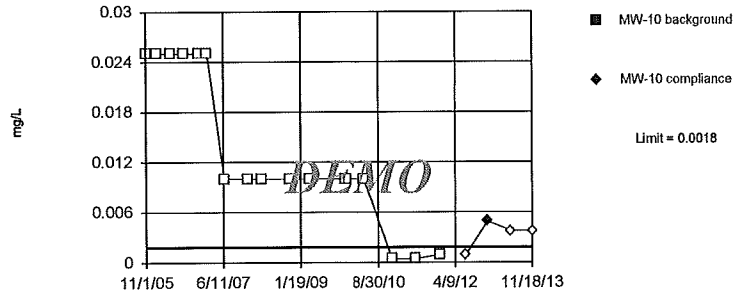
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved moly Analysis Run 6/16/2014 3:50 PM

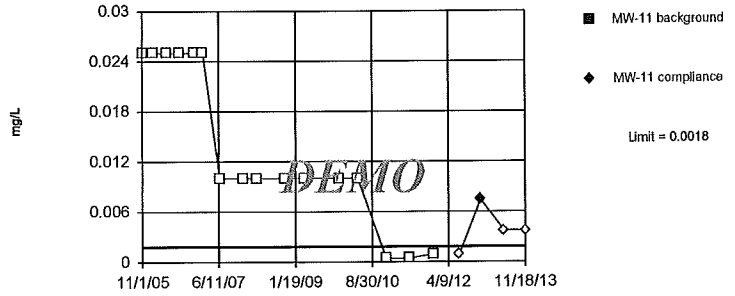
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas® v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved moly Analysis Run 6/16/2014 3:50 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Prediction Limit

Constituent: Dissolved lead (mg/L) Analysis Run 6/16/2014 6:08 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-11	MW-11
11/1/2005	<0.015	
1/25/2006	<0.015	
5/9/2006	<0.015	
8/15/2006	<0.015	
12/13/2006	<0.015	
2/13/2007	<0.015	
6/20/2007	<0.015	
12/18/2007	<0.015	
4/2/2008	<0.015	
10/28/2008	<0.015	
3/31/2009	<0.015	
12/21/2009	<0.015	
5/11/2010	<0.015	
12/16/2010	0.002 (B)	
6/10/2011	<0.0014	
12/13/2011	<0.0028	
6/29/2012		<0.0028
12/13/2012		<0.002
6/10/2013		<0.0038
11/18/2013		<0.0038

Prediction Limit

Constituent: Dissolved moly (mg/L) Analysis Run 6/16/2014 6:08 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1	MW-1
11/1/2005	<0.05	
1/25/2006	<0.05	
5/9/2006	<0.05	
8/15/2006	<0.05	
12/13/2006	<0.05	
2/13/2007	<0.05	
6/20/2007	<0.02	
12/18/2007	<0.02	
4/2/2008	<0.02	
10/28/2008	<0.02	
3/31/2009	<0.02	
12/21/2009	<0.02	
5/11/2010	<0.02	
12/16/2010	0.0011 (B)	
6/10/2011	<0.00087	
12/13/2011	0.0019 (J)	
6/29/2012		<0.0018
12/13/2012		0.0098 (J)
6/10/2013		<0.0075
11/18/2013		<0.0075

Prediction Limit

Constituent: Dissolved moly (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-10
11/1/2005	<0.05	
1/25/2006	<0.05	
5/9/2006	<0.05	
8/15/2006	<0.05	
12/13/2006	<0.05	
2/13/2007	<0.05	
6/20/2007	<0.02	
12/18/2007	<0.02	
4/2/2008	<0.02	
10/28/2008	<0.02	
3/31/2009	<0.02	
12/21/2009	<0.02	
5/11/2010	<0.02	
12/16/2010	<0.00087	
6/10/2011	<0.00087	
12/13/2011	<0.0018	
6/29/2012		<0.0018
12/13/2012		0.0049 (J)
6/10/2013		<0.0075
11/18/2013		<0.0075

Prediction Limit

Constituent: Dissolved moly (mg/L) Analysis Run 6/16/2014 6:08 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

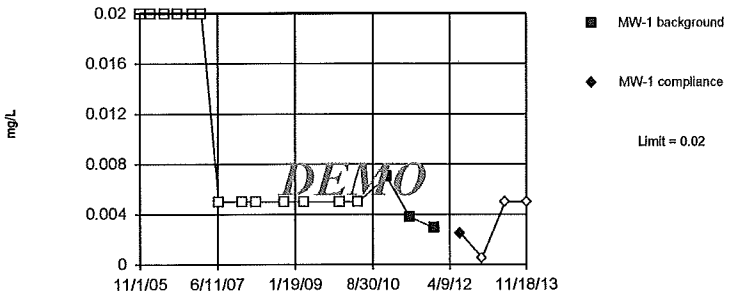
	MW-11	MW-11
11/1/2005	<0.05	
1/25/2006	<0.05	
5/9/2006	<0.05	
8/15/2006	<0.05	
12/13/2006	<0.05	
2/13/2007	<0.05	
6/20/2007	<0.02	
12/18/2007	<0.02	
4/2/2008	<0.02	
10/28/2008	<0.02	
3/31/2009	<0.02	
12/21/2009	<0.02	
5/11/2010	<0.02	
12/16/2010	<0.00087	
6/10/2011	<0.00087	
12/13/2011	<0.0018	
6/29/2012		<0.0018
12/13/2012		0.0074 (J)
6/10/2013		<0.0075
11/18/2013		<0.0075

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved nickel Analysis Run 6/16/2014 3:50 PM

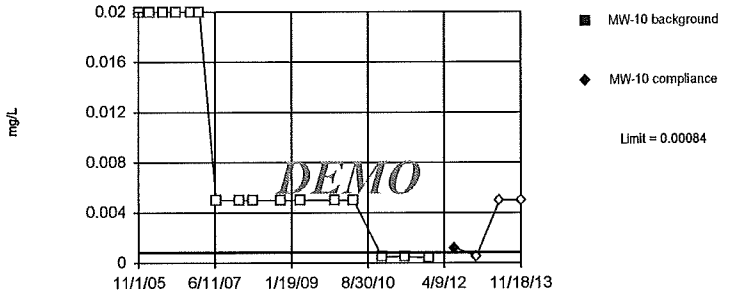
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved nickel Analysis Run 6/16/2014 3:50 PM

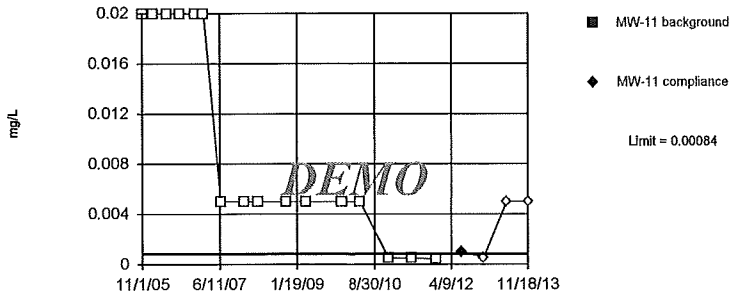
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved nickel Analysis Run 6/16/2014 3:50 PM

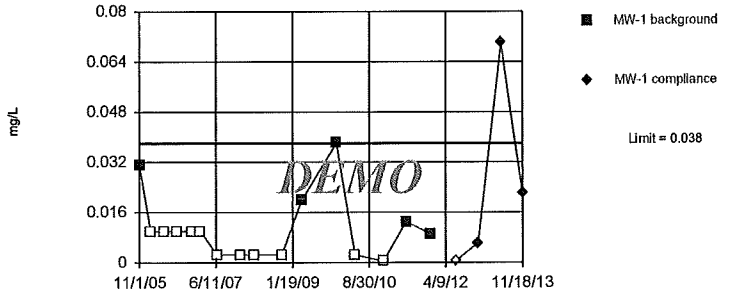
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 68.75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved vanadium Analysis Run 6/16/2014 3:50 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Prediction Limit

Constituent: Dissolved nickel (mg/L) Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1	MW-1
11/1/2005	<0.04	
1/25/2006	<0.04	
5/9/2006	<0.04	
8/15/2006	<0.04	
12/13/2006	<0.04	
2/13/2007	<0.04	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	0.007 (B)	
6/10/2011	0.0038 (B)	
12/13/2011	0.0029 (J)	
6/29/2012		0.0025 (J)
12/13/2012		<0.0011
6/10/2013		<0.01
11/18/2013		<0.01

Prediction Limit

Constituent: Dissolved nickel (mg/L) Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-10
11/1/2005	<0.04	
1/25/2006	<0.04	
5/9/2006	<0.04	
8/15/2006	<0.04	
12/13/2006	<0.04	
2/13/2007	<0.04	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	<0.00096	
6/10/2011	<0.00096	
12/13/2011	<0.00084	
6/29/2012		0.0012 (J)
12/13/2012		<0.0011
6/10/2013		<0.01
11/18/2013		<0.01

Prediction Limit

Constituent: Dissolved nickel (mg/L) Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-11	MW-11
11/1/2005	<0.04	
1/25/2006	<0.04	
5/9/2006	<0.04	
8/15/2006	<0.04	
12/13/2006	<0.04	
2/13/2007	<0.04	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	<0.00096	
6/10/2011	<0.00096	
12/13/2011	<0.00084	
6/29/2012		0.001 (J)
12/13/2012		<0.0011
6/10/2013		<0.01
11/18/2013		<0.01

Prediction Limit

Constituent: Dissolved vanadium (mg/L) Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1	MW-1
11/1/2005	0.031	
1/25/2006	<0.02	
5/9/2006	<0.02	
8/15/2006	<0.02	
12/13/2006	<0.02	
2/13/2007	<0.02	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	0.02	
12/21/2009	0.038	
5/11/2010	<0.005	
12/16/2010	<0.00082	
6/10/2011	0.013 (B)	
12/13/2011	0.0092 (J)	
6/29/2012		<0.0012
12/13/2012		0.0063 (J)
6/10/2013		0.07
11/18/2013		0.022

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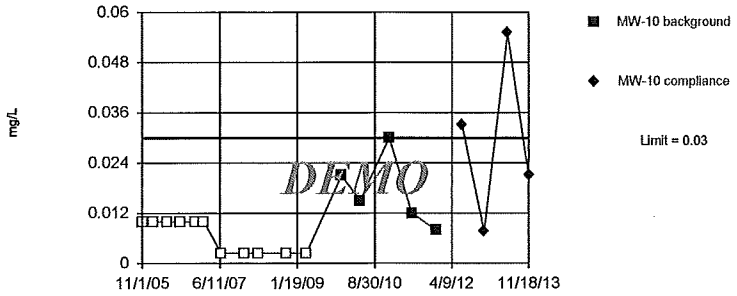
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 68.75% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved vanadium Analysis Run 6/16/2014 3:50 PM

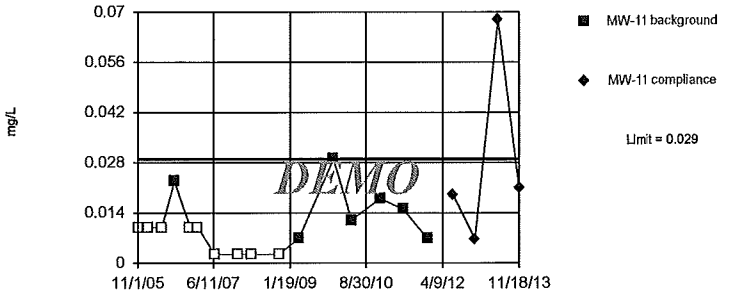
Facility: Demo Client: Demo Data File: Dissolved Metals

Sanitas™ v.9.4.32 Not for commercial use. EPA
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 56.25% NDs. Report alpha = 0.05882. Most recent point compared to limit. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved vanadium Analysis Run 6/16/2014 3:50 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

Prediction Limit

Constituent: Dissolved vanadium (mg/L) Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-10
11/1/2005	<0.02	
1/25/2006	<0.02	
5/9/2006	<0.02	
8/15/2006	<0.02	
12/13/2006	<0.02	
2/13/2007	<0.02	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	<0.005	
12/21/2009	0.021	
5/11/2010	0.015	
12/16/2010	0.03	
6/10/2011	0.012 (B)	
12/13/2011	0.0079 (J)	
6/29/2012		0.033
12/13/2012		0.0076 (J)
6/10/2013		0.055
11/18/2013		0.021

Prediction Limit

Constituent: Dissolved vanadium (mg/L) Analysis Run 6/16/2014 6:09 PM
Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-11	MW-11
11/1/2005	<0.02	
1/25/2006	<0.02	
5/9/2006	<0.02	
8/15/2006	0.023	
12/13/2006	<0.02	
2/13/2007	<0.02	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	0.007	
12/21/2009	0.029	
5/11/2010	0.012	
12/16/2010	0.018 (B)	
6/10/2011	0.015 (B)	
12/13/2011	0.0069 (J)	
6/29/2012		0.019 (J)
12/13/2012		0.0067 (J)
6/10/2013		0.068
11/18/2013		0.021

DEMO

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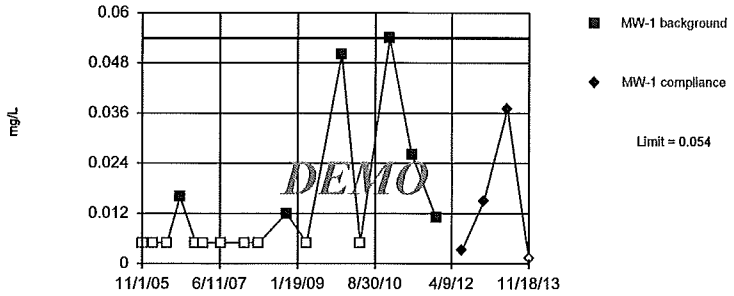
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

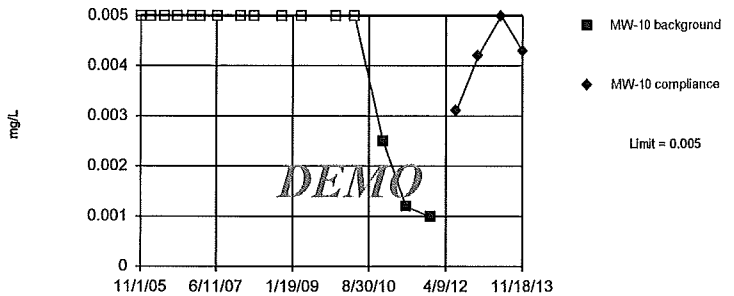
Constituent: Total cobalt Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

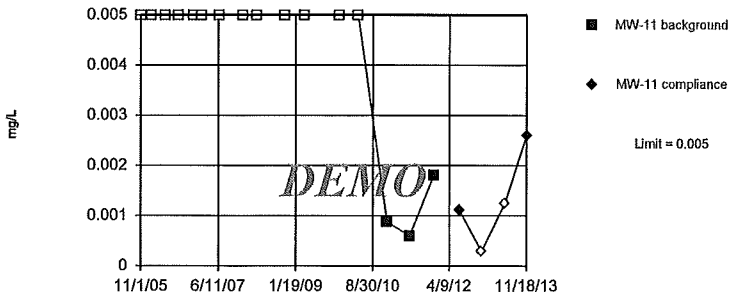
Constituent: Total cobalt Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

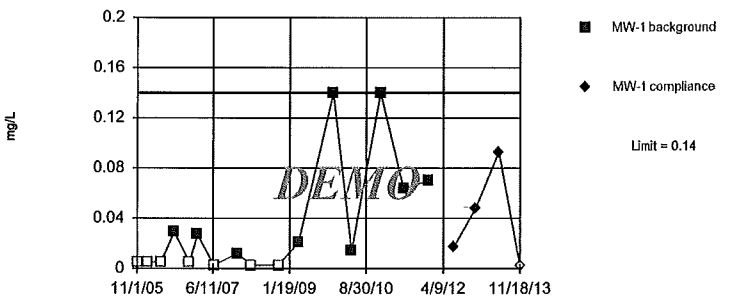
Constituent: Total cobalt Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used after natural log transformation resulted in a parametric limit of 3.919, which exceeds 10 times the highest background value (user-adjustable cutoff). Limit is highest of 16 background values. 43.75% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total Copper Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Prediction Limit

Constituent: Total cobalt (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-1	MW-1
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	0.016	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	0.012	
3/31/2009	<0.01	
12/21/2009	0.05	
5/11/2010	<0.01	
12/16/2010	0.054	
6/10/2011	0.028	
12/13/2011	0.011	
6/29/2012		0.0032 (J)
12/13/2012		0.015
6/10/2013		0.037
11/18/2013		<0.0025

Prediction Limit

Constituent: Total cobalt (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-10
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	0.0025 (B)	
6/10/2011	0.0012 (B)	
12/13/2011	0.00098 (J)	
6/29/2012		0.0031 (J)
12/13/2012		0.0042 (J)
6/10/2013		0.005 (J)
11/18/2013		0.0043 (J)

Prediction Limit

Constituent: Total cobalt (mg/L) Analysis Run 6/16/2014 6:32 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-11	MW-11
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	0.00088 (B)	
6/10/2011	0.0006 (B)	
12/13/2011	0.0018 (J)	
6/29/2012		0.0011 (J)
12/13/2012		<0.00058
6/10/2013		<0.0025
11/18/2013		0.0026 (J)

Prediction Limit

Constituent: Total Copper (mg/L) Analysis Run 6/16/2014 6:32 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1	MW-1
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	0.029	
12/13/2006	<0.01	
2/13/2007	0.027	
6/20/2007	<0.005	
12/18/2007	0.012	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	0.021	
12/21/2009	0.14	
5/11/2010	0.014	
12/16/2010	0.14	
6/10/2011	0.064	
12/13/2011	0.07	
6/29/2012		0.017
12/13/2012		0.048
6/10/2013		0.093
11/18/2013		<0.005

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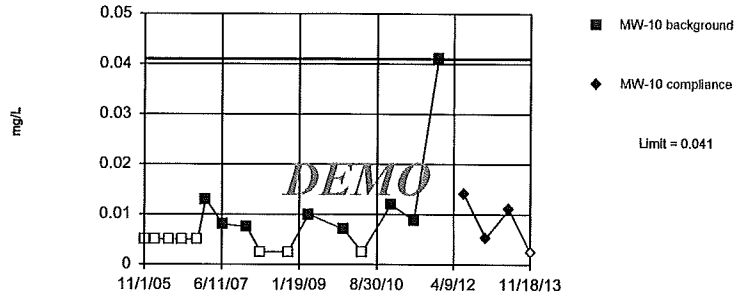
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used after natural log transformation resulted in a parametric limit of 6.98, which exceeds 10 times the highest background value (user-adjustable cutoff). Limit is highest of 16 background values. 50% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

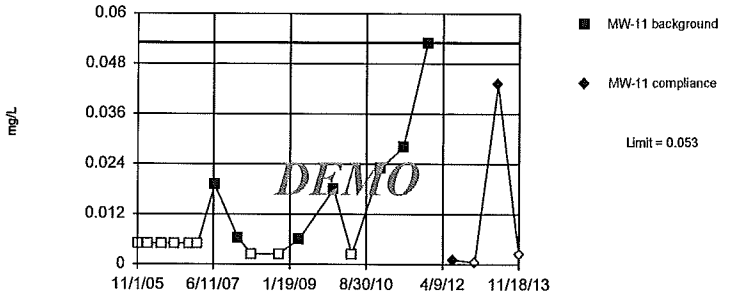
Constituent: Total Copper Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 56.25% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

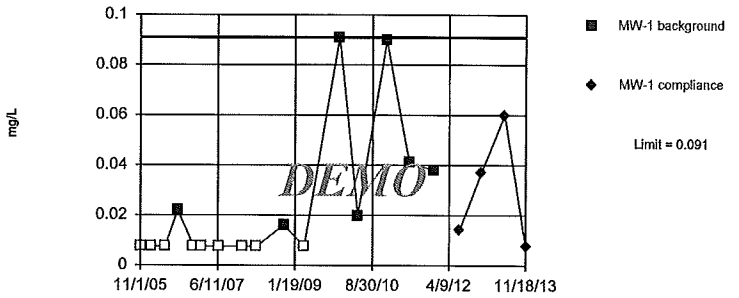
Constituent: Total Copper Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 56.25% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

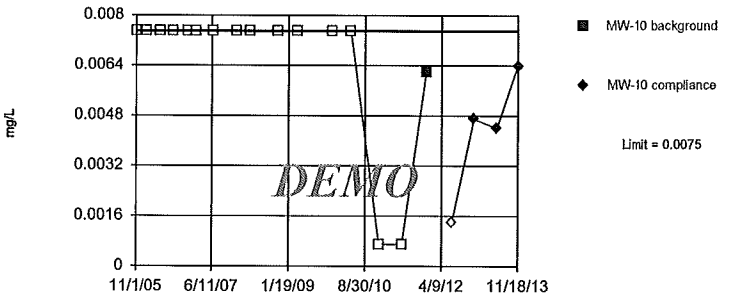
Constituent: Total lead Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 93.75% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total lead Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Prediction Limit

Constituent: Total Copper (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-10
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	0.013	
6/20/2007	0.008	
12/18/2007	0.0075	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	0.01	
12/21/2009	0.007	
5/11/2010	<0.005	
12/16/2010	0.012	
6/10/2011	0.0088 (B)	
12/13/2011	0.041	
6/29/2012		0.014
12/13/2012		0.0053 (J)
6/10/2013		0.011 (J)
11/18/2013		<0.005

Prediction Limit

Constituent: Total Copper (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-11	MW-11
11/1/2005	<0.01	
1/25/2006	<0.01	
5/9/2006	<0.01	
8/15/2006	<0.01	
12/13/2006	<0.01	
2/13/2007	<0.01	
6/20/2007	0.019	
12/18/2007	0.0062	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	0.006	
12/21/2009	0.018	
5/11/2010	<0.005	
12/16/2010	0.023	
6/10/2011	0.028	
12/13/2011	0.053	
6/29/2012		0.0011
12/13/2012		<0.001
6/10/2013		0.043
11/18/2013		<0.005

Prediction Limit

Constituent: Total lead (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-1	MW-1
11/1/2005	<0.015	
1/25/2006	<0.015	
5/9/2006	<0.015	
8/15/2006	0.022	
12/13/2006	<0.015	
2/13/2007	<0.015	
6/20/2007	<0.015	
12/18/2007	<0.015	
4/2/2008	<0.015	
10/28/2008	0.016	
3/31/2009	<0.015	
12/21/2009	0.091	
5/11/2010	0.02	
12/16/2010	0.09	
6/10/2011	0.041	
12/13/2011	0.038	
6/29/2012		0.014 (J)
12/13/2012		0.037
6/10/2013		0.06
11/18/2013		0.0076 (J)

Prediction Limit

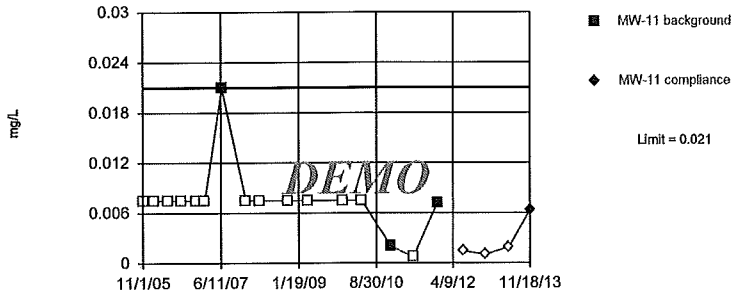
Constituent: Total lead (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-10
11/1/2005	<0.015	
1/25/2006	<0.015	
5/9/2006	<0.015	
8/15/2006	<0.015	
12/13/2006	<0.015	
2/13/2007	<0.015	
6/20/2007	<0.015	
12/18/2007	<0.015	
4/2/2008	<0.015	
10/28/2008	<0.015	
3/31/2009	<0.015	
12/21/2009	<0.015	
5/11/2010	<0.015	
12/16/2010	<0.0014	
6/10/2011	<0.0014	
12/13/2011	0.0062 (J)	
6/29/2012		<0.0028
12/13/2012		0.0047 (J)
6/10/2013		0.0044 (J)
11/18/2013		0.0064 (J)

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



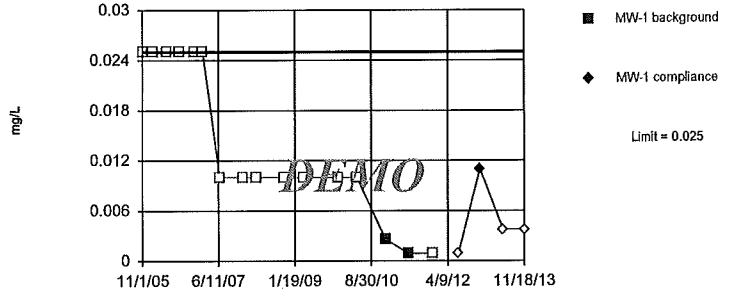
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 81.25% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total lead Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



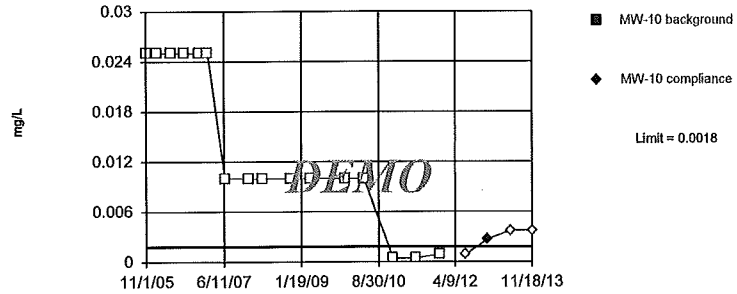
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 87.5% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total moly Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



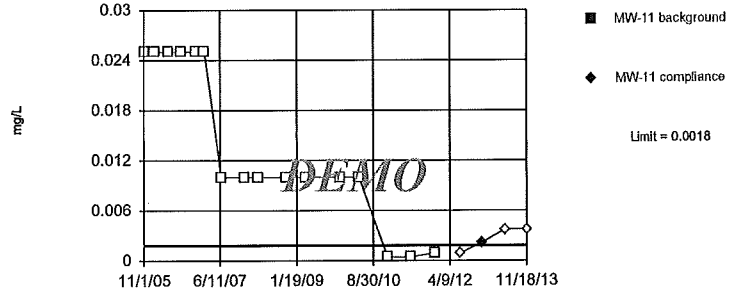
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total moly Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total moly Analysis Run 6/16/2014 4:12 PM
Facility: Demo Client: Demo Data File: Total Metals1

Prediction Limit

Constituent: Total lead (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-11	MW-11
11/1/2005	<0.015	
1/25/2006	<0.015	
5/9/2006	<0.015	
8/15/2006	<0.015	
12/13/2006	<0.015	
2/13/2007	<0.015	
6/20/2007	0.021	
12/18/2007	<0.015	
4/2/2008	<0.015	
10/28/2008	<0.015	
3/31/2009	<0.015	
12/21/2009	<0.015	
5/11/2010	<0.015	
12/16/2010	0.002 (B)	
6/10/2011	<0.0014	
12/13/2011	0.0072 (J)	
6/29/2012		<0.0028
12/13/2012		<0.002
6/10/2013		<0.0038
11/18/2013		0.0063 (J)

Prediction Limit

Constituent: Total moly (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-1	MW-1
11/1/2005	<0.05	
1/25/2006	<0.05	
5/9/2006	<0.05	
8/15/2006	<0.05	
12/13/2006	<0.05	
2/13/2007	<0.05	
6/20/2007	<0.02	
12/18/2007	<0.02	
4/2/2008	<0.02	
10/28/2008	<0.02	
3/31/2009	<0.02	
12/21/2009	<0.02	
5/11/2010	<0.02	
12/16/2010	0.0026 (B)	
6/10/2011	0.00089 (B)	
12/13/2011	<0.0018	
6/29/2012		<0.0018
12/13/2012		0.011 (J)
6/10/2013		<0.0075
11/18/2013		<0.0075

Prediction Limit

Constituent: Total moly (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-10
11/1/2005	<0.05	
1/25/2006	<0.05	
5/9/2006	<0.05	
8/15/2006	<0.05	
12/13/2006	<0.05	
2/13/2007	<0.05	
6/20/2007	<0.02	
12/18/2007	<0.02	
4/2/2008	<0.02	
10/28/2008	<0.02	
3/31/2009	<0.02	
12/21/2009	<0.02	
5/11/2010	<0.02	
12/16/2010	<0.00087	
6/10/2011	<0.00087	
12/13/2011	<0.0018	
6/29/2012		<0.0018
12/13/2012		0.0027 (J)
6/10/2013		<0.0075
11/18/2013		<0.0075

Prediction Limit

Constituent: Total moly (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-11	MW-11
11/1/2005	<0.05	
1/25/2006	<0.05	
5/9/2006	<0.05	
8/15/2006	<0.05	
12/13/2006	<0.05	
2/13/2007	<0.05	
6/20/2007	<0.02	
12/18/2007	<0.02	
4/2/2008	<0.02	
10/28/2008	<0.02	
3/31/2009	<0.02	
12/21/2009	<0.02	
5/11/2010	<0.02	
12/16/2010	<0.00087	
6/10/2011	<0.00087	
12/13/2011	<0.0018	
6/29/2012		<0.0018
12/13/2012		0.0022 (J)
6/10/2013		<0.0075
11/18/2013		<0.0075

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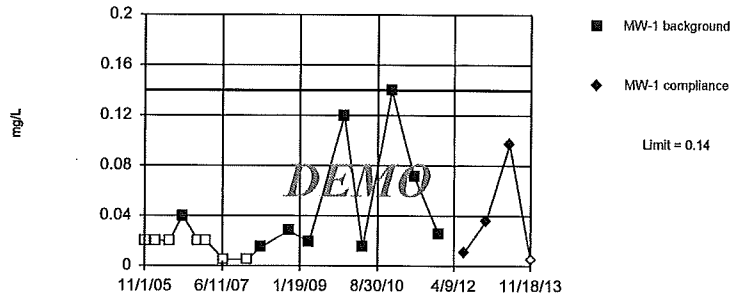
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used after natural log transformation resulted in a parametric limit of 3.846, which exceeds 10 times the highest background value (user-adjustable cutoff). Limit is highest of 16 background values. 43.75% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

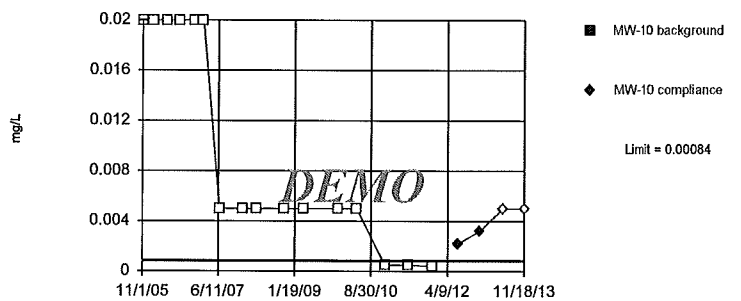
Constituent: Total nickel Analysis Run 6/16/2014 4:13 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 16) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

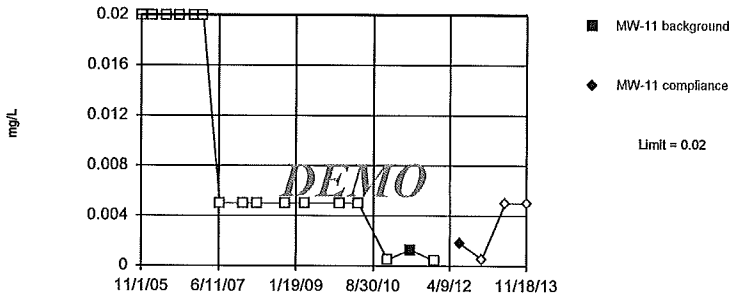
Constituent: Total nickel Analysis Run 6/16/2014 4:13 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 93.75% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

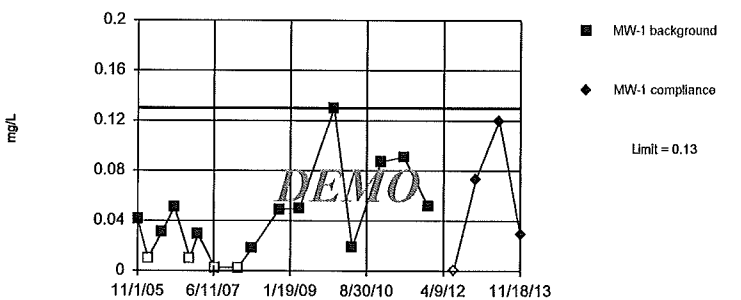
Constituent: Total nickel Analysis Run 6/16/2014 4:13 PM
Facility: Demo Client: Demo Data File: Total Metals1

Sanitas® v.9.4.32 Not for commercial use. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used after natural log transformation resulted in a parametric limit of 1.363, which exceeds 10 times the highest background value (user-adjustable cutoff). Limit is highest of 16 background values. 25% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total vanadium Analysis Run 6/16/2014 4:13 PM
Facility: Demo Client: Demo Data File: Total Metals1

Prediction Limit

Constituent: Total nickel (mg/L) Analysis Run 6/16/2014 6:32 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-1	MW-1
11/1/2005	<0.04	
1/25/2006	<0.04	
5/9/2006	<0.04	
8/15/2006	0.04	
12/13/2006	<0.04	
2/13/2007	<0.04	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	0.015	
10/28/2008	0.028	
3/31/2009	0.019	
12/21/2009	0.12	
5/11/2010	0.015	
12/16/2010	0.14	
6/10/2011	0.071	
12/13/2011	0.026 (J)	
6/29/2012		0.011 (J)
12/13/2012		0.036 (J)
6/10/2013		0.097
11/18/2013		<0.01

Prediction Limit

Constituent: Total nickel (mg/L) Analysis Run 6/16/2014 6:32 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-10
11/1/2005	<0.04	
1/25/2006	<0.04	
5/9/2006	<0.04	
8/15/2006	<0.04	
12/13/2006	<0.04	
2/13/2007	<0.04	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	<0.00096	
6/10/2011	<0.00096	
12/13/2011	<0.00084	
6/29/2012		0.0022 (J)
12/13/2012		0.0032 (J)
6/10/2013		<0.01
11/18/2013		<0.01

Prediction Limit

Constituent: Total nickel (mg/L) Analysis Run 6/16/2014 6:32 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-11	MW-11
11/1/2005	<0.04	
1/25/2006	<0.04	
5/9/2006	<0.04	
8/15/2006	<0.04	
12/13/2006	<0.04	
2/13/2007	<0.04	
6/20/2007	<0.01	
12/18/2007	<0.01	
4/2/2008	<0.01	
10/28/2008	<0.01	
3/31/2009	<0.01	
12/21/2009	<0.01	
5/11/2010	<0.01	
12/16/2010	<0.00096	
6/10/2011	0.0013 (B)	
12/13/2011	<0.00084	
6/29/2012		0.0018 (J)
12/13/2012		<0.0011
6/10/2013		<0.01
11/18/2013		<0.01

Prediction Limit

Constituent: Total vanadium (mg/L) Analysis Run 6/16/2014 6:32 PM

Facility: Demo Client: Demo Data File: Total Metals1

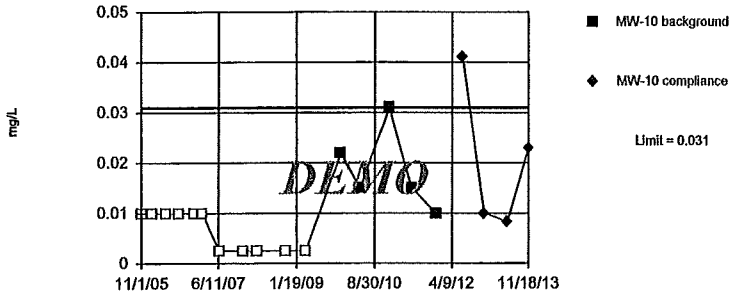
	MW-1	MW-1
11/1/2005	0.041	
1/25/2006	<0.02	
5/9/2006	0.031	
8/15/2006	0.051	
12/13/2006	<0.02	
2/13/2007	0.029	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	0.018	
10/28/2008	0.049	
3/31/2009	0.05	
12/21/2009	0.13	
5/11/2010	0.019	
12/16/2010	0.087	
6/10/2011	0.091	
12/13/2011	0.052	
6/29/2012		<0.0012
12/13/2012		0.073
6/10/2013		0.12
11/18/2013		0.029

Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 16 background values. 68.75% NDs. Well-constituent pair annual alpha = 0.01287. Individual comparison alpha = 0.006456 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

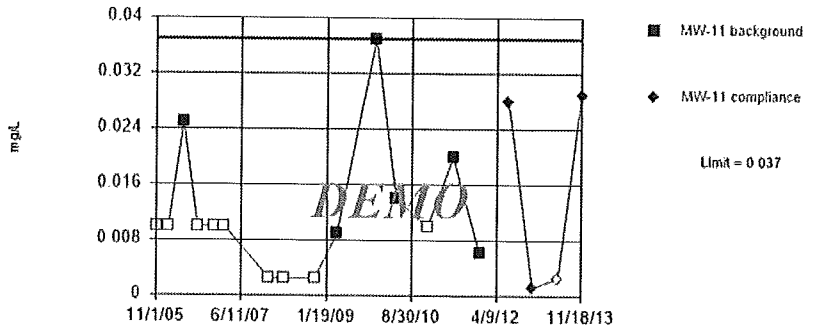
Constituent: Total vanadium Analysis Run 6/16/2014 4:13 PM

Facility: Demo Client: Demo Data File: Total Metals1

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 15 background values. 60% NDs. Well-constituent pair annual alpha = 0.01501. Individual comparison alpha = 0.007533 (1 of 2). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Total vanadium Analysis Run 6/12/2014 11:52 AM

Facility: Demo Client: Demo Data File: Total Metals1

Prediction Limit

Constituent: Total vanadium (mg/L) Analysis Run 6/16/2014 6:32 PM
Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-10
11/1/2005	<0.02	
1/25/2006	<0.02	
5/9/2006	<0.02	
8/15/2006	<0.02	
12/13/2006	<0.02	
2/13/2007	<0.02	
6/20/2007	<0.005	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	<0.005	
12/21/2009	0.022	
5/11/2010	0.015	
12/16/2010	0.031	
6/10/2011	0.015 (B)	
12/13/2011	0.01 (J)	
6/29/2012		0.041
12/13/2012		0.01 (J)
6/10/2013		0.0083 (J)
11/18/2013		0.023

Prediction Limit

Constituent: Total vanadium (mg/L) Analysis Run 6/16/2014 6:34 PM

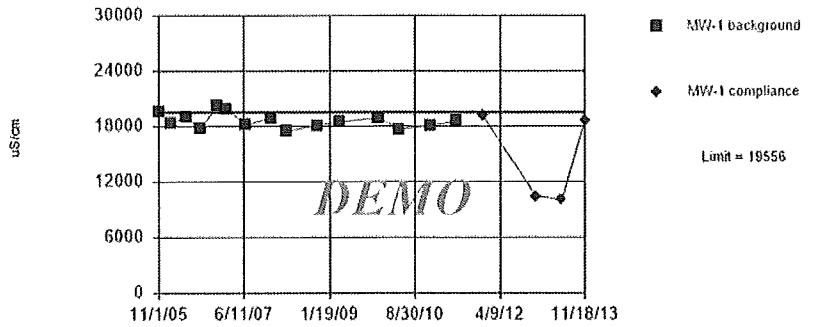
Facility: Demo Client: Demo Data File: Total Metals1

	MW-11	MW-11
11/1/2005	<0.02	
1/25/2006	<0.02	
5/9/2006	0.025	
8/15/2006	<0.02	
12/13/2006	<0.02	
2/13/2007	<0.02	
12/18/2007	<0.005	
4/2/2008	<0.005	
10/28/2008	<0.005	
3/31/2009	0.009	
12/21/2009	0.037	
5/11/2010	0.014	
12/16/2010	<0.02	
6/10/2011	0.02 (B)	
12/13/2011	0.0062 (J)	
6/29/2012		0.028
12/13/2012		0.0013 (J)
6/10/2013		<0.005
11/18/2013		0.029

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=18634, Std. Dev.=806.4, n=15. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9574, critical = 0.835. Kappa = 1.143 (c=1, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.026.

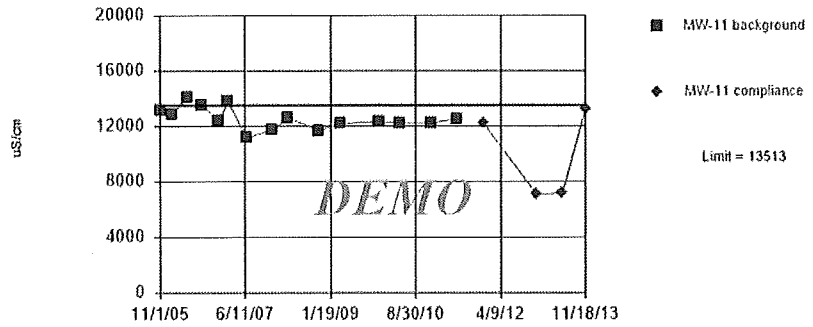
Constituent: Conductivity Analysis Run 6/16/2014 4:50 PM

Facility: Demo Client: Demo Data File: pHConductivity

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=12588, Std. Dev.=809.6, n=15. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9659, critical = 0.835. Kappa = 1.143 (c=1, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.026.

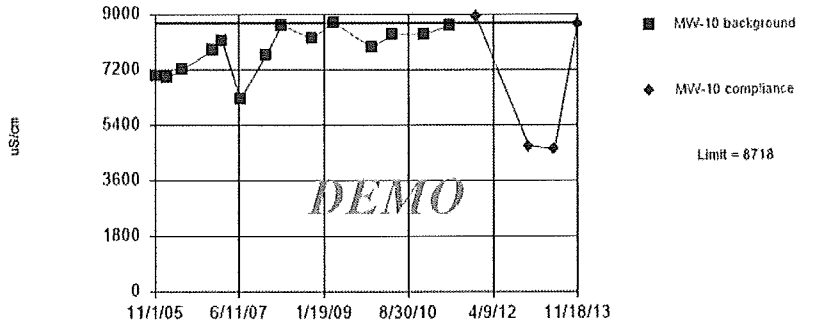
Constituent: Conductivity Analysis Run 6/16/2014 4:51 PM

Facility: Demo Client: Demo Data File: pHConductivity

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7854, Std. Dev.=748.8, n=14. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9236, critical = 0.825. Kappa = 1.155 (c=1, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.026.

Constituent: Conductivity Analysis Run 6/16/2014 4:50 PM

Facility: Demo Client: Demo Data File: pHConductivity

Prediction Limit

Constituent: Conductivity (uS/cm) Analysis Run 8/18/2014 6:57 PM

Facility: Demo Client: Demo Data File: pHConductivity

	MW-1	MW-1
11/1/2005	19570	
1/25/2006	18375	
5/9/2006	19050	
8/15/2006	17820	
12/13/2006	20238	
2/13/2007	19890	
6/20/2007	18205	
12/18/2007	18913	
4/2/2008	17480	
10/28/2008	18133	
3/31/2009	18506	
12/21/2009	18950	
5/11/2010	17670	
12/16/2010	18100	
6/10/2011	18613	
12/13/2011		19165
12/13/2012		10444
6/10/2013		10102
11/18/2013		18635

Prediction Limit

Constituent: Conductivity (uS/cm) Analysis Run 6/16/2014 6:57 PM

Facility: Demo Client: Demo Data File: pHConductivity

	MW-10	MW-10
11/1/2005	7000	
1/25/2006	6950	
5/9/2006	7213	
12/13/2006	7841	
2/13/2007	8128	
6/20/2007	6258	
12/18/2007	7688	
4/2/2008	8653	
10/28/2008	8210	
3/31/2009	8743	
12/21/2009	7912	
5/11/2010	8363	
12/16/2010	8350	
6/10/2011	8640	
12/13/2011		8955
12/13/2012		4730
6/10/2013		4620
11/18/2013		8668

Prediction Limit

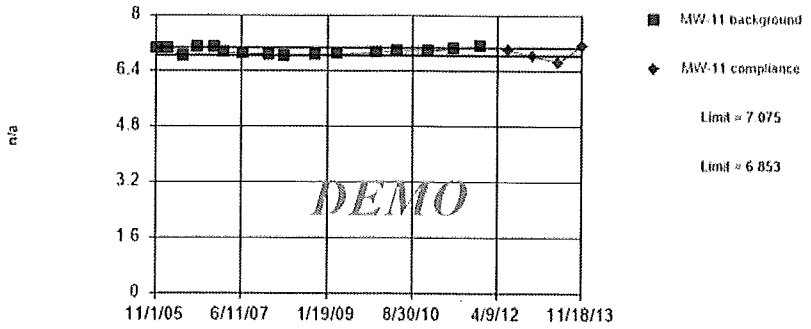
Constituent: Conductivity (uS/cm) Analysis Run 6/16/2014 6:58 PM
Facility: Demo Client: Demo Data File: pHConductivity

	MW-11	MW-11
11/1/2005	13150	
1/25/2006	12900	
5/9/2006	14128	
8/15/2006	13568	
12/13/2006	12408	
2/13/2007	13813	
6/20/2007	11168	
12/18/2007	11773	
4/2/2008	12635	
10/28/2008	11713	
3/31/2009	12188	
12/21/2009	12362	
5/11/2010	12240	
12/16/2010	12250	
6/10/2011	12523	
12/13/2011		12230
12/13/2012		7076
6/10/2013		7176
11/18/2013		13245

Exceeds Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.964, Std. Dev.=0.09804, n=16. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.949, critical = 0.844. Kappa = 1.13 (c=1, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.026.

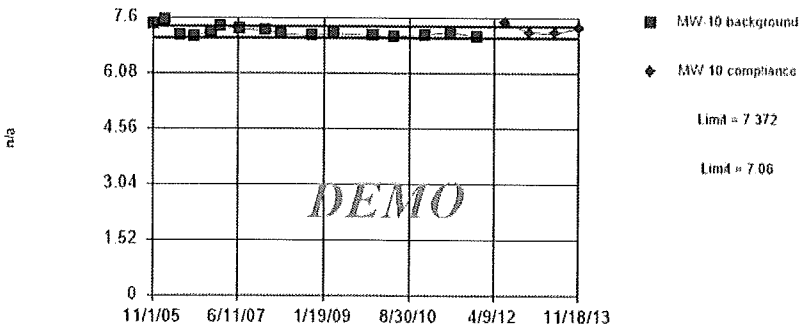
Constituent: pH Analysis Run 6/16/2014 4:40 PM

Facility: Demo Client: Demo Data File: pHConductivity

Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.216, Std. Dev.=0.138, n=16. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8584, critical = 0.844. Kappa = 1.13 (c=1, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.026.

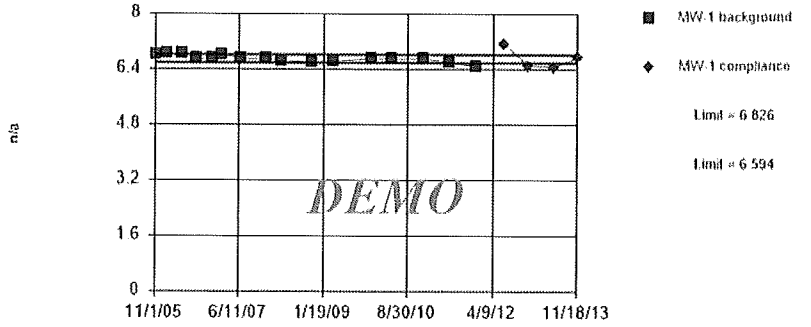
Constituent: pH Analysis Run 6/16/2014 4:43 PM

Facility: Demo Client: Demo Data File: pHConductivity

Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.71, Std. Dev.=0.1029, n=16. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9349, critical = 0.844. Kappa = 1.13 (c=1, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.026.

Constituent: pH Analysis Run 6/16/2014 4:43 PM

Facility: Demo Client: Demo Data File: pHConductivity

Prediction Limit

Constituent: pH (n/a) Analysis Run 6/16/2014 6:55 PM
Facility: Demo Client: Demo Data File: pHConductivity

	MW-1	MW-1
11/1/2005	6.82	
1/25/2006	6.86	
5/9/2006	6.87	
8/15/2006	6.72	
12/13/2006	6.71	
2/13/2007	6.83	
8/20/2007	6.71	
12/18/2007	6.72	
4/2/2008	6.66	
10/28/2008	6.6	
3/31/2009	6.63	
12/21/2009	6.72	
5/11/2010	6.71	
12/16/2010	6.71	
6/10/2011	6.61	
12/13/2011	6.48	
6/29/2012		7.14
12/13/2012		6.51
6/10/2013		6.47
11/18/2013		6.75

Prediction Limit

Constituent: pH (n/a) Analysis Run 6/16/2014 6:55 PM
Facility: Demo Client: Demo Data File: pHConductivity

	MW-10	MW-10
11/1/2005	7.44	
1/25/2006	7.55	
5/9/2006	7.12	
8/15/2006	7.08	
12/13/2006	7.24	
2/13/2007	7.38	
6/20/2007	7.29	
12/18/2007	7.25	
4/2/2008	7.16	
10/28/2008	7.11	
3/31/2009	7.18	
12/21/2009	7.11	
5/11/2010	7.1	
12/16/2010	7.14	
6/10/2011	7.21	
12/13/2011	7.09	
6/29/2012		7.47
12/13/2012		7.21
6/10/2013		7.18
11/18/2013		7.34

Prediction Limit

Constituent: pH (n/a) Analysis Run 6/16/2014 6:56 PM
Facility: Demo Client: Demo Data File: pHConductivity

	MW-11	MW-11
11/1/2005	7.05	
1/25/2006	7.05	
5/9/2006	6.81	
8/15/2006	7.08	
12/13/2006	7.08	
2/13/2007	6.94	
6/20/2007	6.91	
12/18/2007	6.88	
4/2/2008	6.83	
10/28/2008	6.85	
3/31/2009	6.89	
12/21/2009	6.93	
5/11/2010	6.98	
12/16/2010	6.98	
6/10/2011	7.04	
12/13/2011	7.12	
6/29/2012		7.01
12/13/2012		6.83
6/10/2013		6.66
11/18/2013		7.14

Appendix H

Parametric and Nonparametric ANOVA

Analysis of Variance

Facility: Demo Client: Demo Data File: Dissolved Metals Printed 6/16/2014, 3:53 PM

onstituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
ssolved cobalt (mg/L)	MW-11	0.55	10.81	No	0.025	n/a	No	0.05	NP (normality)
ssolved cobalt (mg/L)	MW-10	2	10.81	No	0.025	n/a	No	0.05	NP (normality)
ssolved copper (mg/L)	MW-10	0.975	10.81	No	0.025	n/a	No	0.05	NP (normality)
ssolved copper (mg/L)	MW-11	1.725	10.81	No	0.025	n/a	No	0.05	NP (normality)
ssolved lead (mg/L)	MW-11	0.4	10.81	No	0.025	n/a	No	0.05	NP (NDs)
ssolved lead (mg/L)	MW-10	0.05	10.81	No	0.025	n/a	No	0.05	NP (NDs)
ssolved moly (mg/L)	MW-11	-0.65	10.81	No	0.025	n/a	No	0.05	NP (NDs)
ssolved moly (mg/L)	MW-10	-0.7	10.81	No	0.025	n/a	No	0.05	NP (NDs)
ssolved nickel (mg/L)	MW-11	-3.025	10.81	No	0.025	n/a	No	0.05	NP (NDs)
ssolved nickel (mg/L)	MW-10	-2.975	10.81	No	0.025	n/a	No	0.05	NP (NDs)
ssolved vanadium (mg/L)	MW-10	0.01241	0.04694	No	0.025	x^(1/3)	No	0.05	Param.
ssolved vanadium (mg/L)	MW-11	0.01563	0.04694	No	0.025	x^(1/3)	No	0.05	Param.

Analysis of Variance

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/16/2014, 4:27 PM

onstituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
otal cobalt (mg/L)	MW-11	-16.6	10.81	No	0.025	n/a	Yes	0.05	NP (eq. var.)
otal cobalt (mg/L)	MW-10	-13.77	10.81	No	0.025	n/a	Yes	0.05	NP (eq. var.)
otal Copper (mg/L)	MW-11	-10.5	10.81	No	0.025	n/a	No	0.05	NP (eq. var.)
otal Copper (mg/L)	MW-10	-8.85	10.81	No	0.025	n/a	No	0.05	NP (eq. var.)
otal lead (mg/L)	MW-10	-21.12	10.81	No	0.025	n/a	Yes	0.05	NP (eq. var.)
otal lead (mg/L)	MW-11	-20.05	10.81	No	0.025	n/a	Yes	0.05	NP (eq. var.)
otal moly (mg/L)	MW-11	-2.15	10.81	No	0.025	n/a	No	0.05	NP (NDs)
otal moly (mg/L)	MW-10	-2.05	10.81	No	0.025	n/a	No	0.05	NP (NDs)
otal nickel (mg/L)	MW-11	-19.48	10.81	No	0.025	n/a	Yes	0.05	NP (eq. var.)
otal nickel (mg/L)	MW-10	-19.38	10.81	No	0.025	n/a	Yes	0.05	NP (eq. var.)

Analysis of Variance

Facility: Demo Client: Demo Data File: Total Metals1 Printed 6/16/2014, 4:30 PM

onstituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
otal vanadium (mg/L)	MW-11	-16.85	10.77	No	0.025	n/a	Yes	0.05	NP (eq. var.)
otal vanadium (mg/L)	MW-10	-16.15	10.63	No	0.025	n/a	Yes	0.05	NP (eq. var.)

Analysis of Variance

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/16/2014, 4:58 PM

onstituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
onductivity (uS/cm)	MW-10	-34.27	10.5	No	0.025	n/a	Yes	0.05	NP (normality)
onductivity (uS/cm)	MW-11	-16.79	10.36	No	0.025	n/a	Yes	0.05	NP (normality)

Analysis of Variance

Facility: Demo Client: Demo Data File: pHConductivity Printed 6/16/2014, 4:48 PM

onstituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
H (n/a)	MW-10	0.521	0.1006	Yes	0.0125	No	Yes	0.05	Param.
H (n/a)	MW-11	0.2415	0.1006	Yes	0.0125	No	Yes	0.05	Param.

Non-Parametric ANOVA

Constituent: Dissolved cobalt Analysis Run 6/12/2014 7:58 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.1931

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.14
Adjusted Kruskal-Wallis statistic (H') = 0.1931

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	0.55	10.81	Nc
MW-10	2	10.81	Nc

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric anova because the Shapiro Francia normality test showed the residuals to be non-normal at the 0.01 alpha level.

Non-Parametric ANOVA

Constituent: Dissolved cobalt (mg/L) Analysis Run 6/16/2014 6:20 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	<0.01	<0.01	<0.01
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	<0.01	<0.01	<0.01
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	<0.01
10/28/2008	<0.01	<0.01	<0.01
3/31/2009	<0.01	<0.01	<0.01
12/21/2009	<0.01	<0.01	<0.01
5/11/2010	<0.01	<0.01	<0.01
12/16/2010	0.0026 (B)	0.0013 (B)	0.0027 (B)
6/10/2011	0.0014 (B)	0.00055 (B)	0.001 (B)
12/13/2011	0.00079 (J)	0.0019 (J)	0.0022 (J)
6/29/2012	0.0036 (J)	0.0016 (J)	0.00089 (J)
12/13/2012	0.0028 (J)	0.0015 (J)	<0.00058
6/10/2013	0.003 (J)	<0.0025	<0.0025
11/18/2013	<0.0025	<0.0025	<0.0025

Non-Parametric ANOVA

Constituent: Dissolved copper Analysis Run 6/12/2014 7:58 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.1055

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 6 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.09811
Adjusted Kruskal-Wallis statistic (H') = 0.1055

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-10	0.975	10.81	Nc
MW-11	1.725	10.81	Nc

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric anova because the Shapiro Francia normality test showed the residuals to be non-normal at the 0.01 alpha level.

Non-Parametric ANOVA

Constituent: Dissolved copper (mg/L) Analysis Run 6/16/2014 6:20 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	<0.01	<0.01	<0.01
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	<0.01	<0.01	<0.01
6/20/2007	<0.005	<0.005	<0.005
12/18/2007	<0.005	<0.005	<0.005
4/2/2008	<0.005	<0.005	<0.005
10/28/2008	<0.005	<0.005	<0.005
3/31/2009	<0.005	<0.005	<0.005
12/21/2009	<0.005	<0.005	<0.005
5/11/2010	0.0097	0.012	0.012
12/16/2010	0.013	0.015	0.014
6/10/2011	0.0069 (B)	0.012	0.017
12/13/2011	0.036	0.059	0.003 (J)
6/29/2012	0.013	0.015	0.012
12/13/2012	<0.001	<0.001	0.0014 (J)
6/10/2013	0.023	0.03	0.024
11/18/2013	<0.005	<0.005	<0.005

Non-Parametric ANOVA

Constituent: Dissolved lead Analysis Run 6/12/2014 7:58 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.008612

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.00623
Adjusted Kruskal-Wallis statistic (H') = 0.008612

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	0.4	10.81	Nc
MW-10	0.05	10.81	Nc

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric ANOVA because censored data exceeded 75%.

Non-Parametric ANOVA

Constituent: Dissolved lead (mg/L) Analysis Run 6/16/2014 6:20 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.015	<0.015	<0.015
1/25/2006	<0.015	<0.015	<0.015
5/9/2006	<0.015	<0.015	<0.015
8/15/2006	<0.015	<0.015	<0.015
12/13/2006	<0.015	<0.015	<0.015
2/13/2007	<0.015	<0.015	<0.015
6/20/2007	<0.015	<0.015	<0.015
12/18/2007	<0.015	<0.015	<0.015
4/2/2008	<0.015	<0.015	<0.015
10/28/2008	<0.015	<0.015	<0.015
3/31/2009	<0.015	<0.015	<0.015
12/21/2009	<0.015	<0.015	<0.015
5/11/2010	<0.015	<0.015	<0.015
12/16/2010	0.0017 (B)	0.002 (B)	0.0015 (B)
6/10/2011	<0.0014	<0.0014	<0.0014
12/13/2011	<0.0028	<0.0028	<0.0028
6/29/2012	<0.0028	<0.0028	<0.0028
12/13/2012	<0.002	<0.002	<0.002
6/10/2013	<0.0038	<0.0038	<0.0038
11/18/2013	<0.0038	<0.0038	<0.0038

Non-Parametric ANOVA

Constituent: Dissolved moly Analysis Run 6/12/2014 7:58 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.02155

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.02
Adjusted Kruskal-Wallis statistic (H') = 0.02155

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-0.65	10.81	Nc
MW-10	-0.7	10.81	Nc

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric ANOVA because censored data exceeded 75%.

Non-Parametric ANOVA

Constituent: Dissolved moly (mg/L) Analysis Run 6/16/2014 6:20 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.05	<0.05	<0.05
1/25/2006	<0.05	<0.05	<0.05
5/9/2006	<0.05	<0.05	<0.05
8/15/2006	<0.05	<0.05	<0.05
12/13/2006	<0.05	<0.05	<0.05
2/13/2007	<0.05	<0.05	<0.05
6/20/2007	<0.02	<0.02	<0.02
12/18/2007	<0.02	<0.02	<0.02
4/2/2008	<0.02	<0.02	<0.02
10/28/2008	<0.02	<0.02	<0.02
3/31/2009	<0.02	<0.02	<0.02
12/21/2009	<0.02	<0.02	<0.02
5/11/2010	<0.02	<0.02	<0.02
12/16/2010	<0.00087	<0.00087	0.0011 (B)
6/10/2011	<0.00087	<0.00087	<0.00087
12/13/2011	<0.0018	<0.0018	0.0019 (J)
6/29/2012	<0.0018	<0.0018	<0.0018
12/13/2012	0.0049 (J)	0.0074 (J)	0.0096 (J)
6/10/2013	<0.0075	<0.0075	<0.0075
11/18/2013	<0.0075	<0.0075	<0.0075

Non-Parametric ANOVA

Constituent: Dissolved nickel Analysis Run 6/12/2014 7:58 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.4464

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.3935
Adjusted Kruskal-Wallis statistic (H') = 0.4464

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-3.025	10.81	Nc
MW-10	-2.975	10.81	Nc

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric ANOVA because censored data exceeded 75%.

Non-Parametric ANOVA

Constituent: Dissolved nickel (mg/L) Analysis Run 6/16/2014 6:20 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.04	<0.04	<0.04
1/25/2006	<0.04	<0.04	<0.04
5/9/2006	<0.04	<0.04	<0.04
8/15/2006	<0.04	<0.04	<0.04
12/13/2006	<0.04	<0.04	<0.04
2/13/2007	<0.04	<0.04	<0.04
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	<0.01
10/28/2008	<0.01	<0.01	<0.01
3/31/2009	<0.01	<0.01	<0.01
12/21/2009	<0.01	<0.01	<0.01
5/11/2010	<0.01	<0.01	<0.01
12/16/2010	<0.00096	<0.00096	0.007 (B)
6/10/2011	<0.00096	<0.00096	0.0038 (B)
12/13/2011	<0.00084	<0.00084	0.0029 (J)
6/29/2012	0.0012 (J)	0.001 (J)	0.0025 (J)
12/13/2012	<0.0011	<0.0011	<0.0011
6/10/2013	<0.01	<0.01	<0.01
11/18/2013	<0.01	<0.01	<0.01

Parametric ANOVA

Constituent: Dissolved vanadium Analysis Run 6/12/2014 7:58 AM
Facility: Demo Client: Demo Data File: Dissolved Metals

For observations made between 11/1/2005 and 11/18/2013 the parametric analysis of variance test (after cube root transformation) indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.2479

Tabulated F statistic = 3.162 with 2 and 57 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	0.002724	2	0.001362	0.2479
Error Within Groups	0.3132	57	0.005494	
Total	0.3159	59		

The Bonferroni t-Test indicates that NO compliance well mean is significantly higher than the background (see Contrasts Table below). The critical t (contrast) value is 2.002 with 57 degrees of freedom, 2 compliance wells and a 2.5% error level for each well comparison.

Contrast table:

Well	Difference	Di	Significant
MW-10	0.01241	0.04694	Nc
MW-11	0.01563	0.04694	Nc

Where the difference of a Well is greater than the critical (Di) value the hypothesis of a single population should be rejected

The Shapiro Francia normality test on the residuals passed after cube root transformation. Alpha = 0.01, calculated = 0.9514, critical = 0.945. Levene's Equality of Variance test passed. Calculated = 0.6153, tabulated = 3.162.

Parametric ANOVA

Constituent: Dissolved vanadium (mg/L) Analysis Run 6/16/2014 6:20 PM

Facility: Demo Client: Demo Data File: Dissolved Metals

	MW-1 (bg)	MW-10	MW-11
11/1/2005	0.031	<0.02	<0.02
1/25/2006	<0.02	<0.02	<0.02
5/9/2006	<0.02	<0.02	<0.02
8/15/2006	<0.02	<0.02	0.023
12/13/2006	<0.02	<0.02	<0.02
2/13/2007	<0.02	<0.02	<0.02
6/20/2007	<0.005	<0.005	<0.005
12/18/2007	<0.005	<0.005	<0.005
4/2/2008	<0.005	<0.005	<0.005
10/28/2008	<0.005	<0.005	<0.005
3/31/2009	0.02	<0.005	0.007
12/21/2009	0.038	0.021	0.029
5/11/2010	<0.005	0.015	0.012
12/16/2010	<0.00082	0.03	0.018 (B)
6/10/2011	0.013 (B)	0.012 (B)	0.015 (B)
12/13/2011	0.0092 (J)	0.0079 (J)	0.0069 (J)
6/29/2012	<0.0012	0.033	0.019 (J)
12/13/2012	0.0063 (J)	0.0076 (J)	0.0067 (J)
6/10/2013	0.07	0.055	0.068
11/18/2013	0.022	0.021	0.021

Non-Parametric ANOVA

Constituent: Total cobalt Analysis Run 6/12/2014 9:01 AM
Facility: Demo Client: Demo Data File: Total Metals1

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 13.51

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 10.35
Adjusted Kruskal-Wallis statistic (H') = 13.51

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-16.6	10.81	No
MW-10	-13.77	10.81	No

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison. (Note: In this case, with Anova indicating differences that are not reflected in the contrast test, it should be concluded that it is the median of the Background data which is significantly higher.)

Non-parametric test used in lieu of parametric anova because the Shapiro Francia normality test showed the residuals to be non-normal at the 0.01 alpha level.

Non-Parametric ANOVA

Constituent: Total cobalt (mg/L) Analysis Run 6/16/2014 6:43 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	<0.01	<0.01	0.016
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	<0.01	<0.01	<0.01
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	<0.01
10/28/2008	<0.01	<0.01	0.012
3/31/2009	<0.01	<0.01	<0.01
12/21/2009	<0.01	<0.01	0.05
5/11/2010	<0.01	<0.01	<0.01
12/16/2010	0.0025 (B)	0.00088 (B)	0.054
6/10/2011	0.0012 (B)	0.0006 (B)	0.026
12/13/2011	0.00098 (J)	0.0018 (J)	0.011
6/29/2012	0.0031 (J)	0.0011 (J)	0.0032 (J)
12/13/2012	0.0042 (J)	<0.00058	0.015
6/10/2013	0.005 (J)	<0.0025	0.037
11/18/2013	0.0043 (J)	0.0026 (J)	<0.0025

Non-Parametric ANOVA

Constituent: Total Copper Analysis Run 6/12/2014 9:01 AM
Facility: Demo Client: Demo Data File: Total Metals1

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 4.282

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 4.181
Adjusted Kruskal-Wallis statistic (H') = 4.282

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-10.5	10.81	No
MW-10	-8.85	10.81	No

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric anova because Levene's Equality of Variance test failed at the 0.05 alpha level.

Non-Parametric ANOVA

Constituent: Total Copper (mg/L) Analysis Run 6/16/2014 6:43 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.01	<0.01	<0.01
1/25/2006	<0.01	<0.01	<0.01
5/9/2006	<0.01	<0.01	<0.01
8/15/2006	<0.01	<0.01	0.029
12/13/2006	<0.01	<0.01	<0.01
2/13/2007	0.013	<0.01	0.027
6/20/2007	0.008	0.019	<0.005
12/18/2007	0.0075	0.0062	0.012
4/2/2008	<0.005	<0.005	<0.005
10/28/2008	<0.005	<0.005	<0.005
3/31/2009	0.01	0.006	0.021
12/21/2009	0.007	0.018	0.14
5/11/2010	<0.005	<0.005	0.014
12/16/2010	0.012	0.023	0.14
6/10/2011	0.0088 (B)	0.028	0.064
12/13/2011	0.041	0.053	0.07
6/29/2012	0.014	0.0011	0.017
12/13/2012	0.0053 (J)	<0.001	0.048
6/10/2013	0.011 (J)	0.043	0.093
11/18/2013	<0.005	<0.005	<0.005

Non-Parametric ANOVA

Constituent: Total lead Analysis Run 6/12/2014 9:01 AM
Facility: Demo Client: Demo Data File: Total Metals1

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 22.7

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 18.57
Adjusted Kruskal-Wallis statistic (H') = 22.7

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-10	-21.12	10.81	No
MW-11	-20.05	10.81	No

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison. (Note: In this case, with Anova indicating differences that are not reflected in the contrast test, it should be concluded that it is the median of the Background data which is significantly higher.)

Non-parametric test used in lieu of parametric anova because Levene's Equality of Variance test failed at the 0.05 alpha level.

Non-Parametric ANOVA

Constituent: Total lead (mg/L) Analysis Run 6/16/2014 6:43 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.015	<0.015	<0.015
1/25/2006	<0.015	<0.015	<0.015
5/9/2006	<0.015	<0.015	<0.015
8/15/2006	<0.015	<0.015	0.022
12/13/2006	<0.015	<0.015	<0.015
2/13/2007	<0.015	<0.015	<0.015
6/20/2007	<0.015	0.021	<0.015
12/18/2007	<0.015	<0.015	<0.015
4/2/2008	<0.015	<0.015	<0.015
10/28/2008	<0.015	<0.015	0.016
3/31/2009	<0.015	<0.015	<0.015
12/21/2009	<0.015	<0.015	0.091
5/11/2010	<0.015	<0.015	0.02
12/16/2010	<0.0014	0.002 (B)	0.09
6/10/2011	<0.0014	<0.0014	0.041
12/13/2011	0.0062 (J)	0.0072 (J)	0.038
6/29/2012	<0.0028	<0.0028	0.014 (J)
12/13/2012	0.0047 (J)	<0.002	0.037
6/10/2013	0.0044 (J)	<0.0038	0.06
11/18/2013	0.0064 (J)	0.0063 (J)	0.0076 (J)

Non-Parametric ANOVA

Constituent: Total moly Analysis Run 6/12/2014 9:01 AM
Facility: Demo Client: Demo Data File: Total Metals1

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.2081

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.1931
Adjusted Kruskal-Wallis statistic (H') = 0.2081

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-2.15	10.81	No
MW-10	-2.05	10.81	No

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison.

Non-parametric test used in lieu of parametric ANOVA because censored data exceeded 75%.

Non-Parametric ANOVA

Constituent: Total moly (mg/L) Analysis Run 6/16/2014 6:43 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.05	<0.05	<0.05
1/25/2006	<0.05	<0.05	<0.05
5/9/2006	<0.05	<0.05	<0.05
8/15/2006	<0.05	<0.05	<0.05
12/13/2006	<0.05	<0.05	<0.05
2/13/2007	<0.05	<0.05	<0.05
6/20/2007	<0.02	<0.02	<0.02
12/18/2007	<0.02	<0.02	<0.02
4/2/2008	<0.02	<0.02	<0.02
10/28/2008	<0.02	<0.02	<0.02
3/31/2009	<0.02	<0.02	<0.02
12/21/2009	<0.02	<0.02	<0.02
5/11/2010	<0.02	<0.02	<0.02
12/16/2010	<0.00087	<0.00087	0.0026 (B)
6/10/2011	<0.00087	<0.00087	0.00089 (B)
12/13/2011	<0.0018	<0.0018	<0.0018
6/29/2012	<0.0018	<0.0018	<0.0018
12/13/2012	0.0027 (J)	0.0022 (J)	0.011 (J)
6/10/2013	<0.0075	<0.0075	<0.0075
11/18/2013	<0.0075	<0.0075	<0.0075

Non-Parametric ANOVA

Constituent: Total nickel Analysis Run 6/12/2014 9:01 AM
Facility: Demo Client: Demo Data File: Total Metals1

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 17.65

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 16.5
Adjusted Kruskal-Wallis statistic (H') = 17.65

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-19.48	10.81	No
MW-10	-19.38	10.81	No

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison. (Note: In this case, with Anova indicating differences that are not reflected in the contrast test, it should be concluded that it is the median of the Background data which is significantly higher.)

Non-parametric test used in lieu of parametric anova because Levene's Equality of Variance test failed at the 0.05 alpha level.

Non-Parametric ANOVA

Constituent: Total nickel (mg/L) Analysis Run 6/16/2014 6:43 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.04	<0.04	<0.04
1/25/2006	<0.04	<0.04	<0.04
5/9/2006	<0.04	<0.04	<0.04
8/15/2006	<0.04	<0.04	0.04
12/13/2006	<0.04	<0.04	<0.04
2/13/2007	<0.04	<0.04	<0.04
6/20/2007	<0.01	<0.01	<0.01
12/18/2007	<0.01	<0.01	<0.01
4/2/2008	<0.01	<0.01	0.015
10/28/2008	<0.01	<0.01	0.028
3/31/2009	<0.01	<0.01	0.019
12/21/2009	<0.01	<0.01	0.12
5/11/2010	<0.01	<0.01	0.015
12/16/2010	<0.00096	<0.00096	0.14
6/10/2011	<0.00096	0.0013 (B)	0.071
12/13/2011	<0.00084	<0.00084	0.026 (J)
6/29/2012	0.0022 (J)	0.0018 (J)	0.011 (J)
12/13/2012	0.0032 (J)	<0.0011	0.036 (J)
6/10/2013	<0.01	<0.01	0.097
11/18/2013	<0.01	<0.01	<0.01

Non-Parametric ANOVA

Constituent: Total vanadium Analysis Run 6/16/2014 4:30 PM
Facility: Demo Client: Demo Data File: Total Metals1

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 12.53

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 6 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 12.2
Adjusted Kruskal-Wallis statistic (H') = 12.53

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-11	-16.85	10.77	Nc
MW-10	-16.15	10.63	Nc

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison. (Note: In this case, with Anova indicating differences that are not reflected in the contrast test, it should be concluded that it is the median of the Background data which is significantly higher.)

Non-parametric test used in lieu of parametric anova because Levene's Equality of Variance test failed at the 0.05 alpha level.

Non-Parametric ANOVA

Constituent: Total vanadium (mg/L) Analysis Run 6/16/2014 6:44 PM

Facility: Demo Client: Demo Data File: Total Metals1

	MW-10	MW-11	MW-1 (bg)
11/1/2005	<0.02	<0.02	0.041
1/25/2006	<0.02	<0.02	<0.02
5/9/2006	<0.02	0.025	0.031
8/15/2006	<0.02	<0.02	0.051
12/13/2006	<0.02	<0.02	<0.02
2/13/2007	<0.02	<0.02	0.029
6/20/2007	<0.005		<0.005
12/18/2007	<0.005	<0.005	<0.005
4/2/2008	<0.005	<0.005	0.018
10/28/2008	<0.005	<0.005	0.049
3/31/2009	<0.005	0.009	0.05
12/21/2009	0.022	0.037	0.13
5/11/2010	0.015	0.014	0.019
12/16/2010	0.031	<0.02	0.087
6/10/2011	0.015 (B)	0.02 (B)	0.091
12/13/2011	0.01 (J)	0.0062 (J)	0.052
6/29/2012	0.041	0.028	<0.0012
12/13/2012	0.01 (J)	0.0013 (J)	0.073
6/10/2013	0.0083 (J)	<0.005	0.12
11/18/2013	0.023	0.029	0.029

Non-Parametric ANOVA

Constituent: Conductivity Analysis Run 6/16/2014 4:57 PM
Facility: Demo Client: Demo Data File: pHConductivity

For observations made between 11/1/2005 and 11/18/2013, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 40.8

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-10	-34.27	10.5	No
MW-11	-16.79	10.36	No

The critical (contrast) value was computed with 2 degrees of freedom and a 2.5% error level for each well comparison. (Note: In this case, with Anova indicating differences that are not reflected in the contrast test, it should be concluded that it is the median of the Background data which is significantly higher.)

Non-parametric test used in lieu of parametric anova because the Shapiro Francia normality test showed the residuals to be non-normal at the 0.01 alpha level.

Non-Parametric ANOVA

Constituent: Conductivity (uS/cm) Analysis Run 6/16/2014 5:41 PM

Facility: Demo Client: Demo Data File: pHConductivity

	MW-10	MW-11	MW-1 (bg)
11/1/2005	7000	13150	19570
1/25/2006	6950	12900	18375
5/9/2006	7213	14128	19050
8/15/2006		13568	17820
12/13/2006	7841	12408	20238
2/13/2007	8128	13813	19890
6/20/2007	6258	11168	18205
12/18/2007	7688	11773	18913
4/2/2008	8653	12635	17480
10/28/2008	8210	11713	18133
3/31/2009	8743	12188	18506
12/21/2009	7912	12362	18950
5/11/2010	8363	12240	17670
12/16/2010	8350	12250	18100
6/10/2011	8640	12523	18613
12/13/2011	8955	12230	19165
12/13/2012	4730	7076	10444
6/10/2013	4620	7176	10102
11/18/2013	8666	13245	18635

Parametric ANOVA

Constituent: pH Analysis Run 6/16/2014 4:48 PM
Facility: Demo Client: Demo Data File: pHConductivity

For observations made between 11/1/2005 and 11/18/2013 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 71.13

Tabulated F statistic = 3.162 with 2 and 57 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	2.719	2	1.36	71.13
Error Within Groups	1.089	57	0.01911	
Total	3.809	59		

The 2-tailed Bonferroni t-Test indicates that at least one compliance well mean is significantly higher or lower than the background (see Contrasts Table below). The critical t (contrast) value is 2.302 with 57 degrees of freedom, 2 compliance wells and a 1.25% error level for each well comparison.

Contrast table:

Well	Difference	Di	Significant
MW-10	0.521	0.1006	Yes
MW-11	0.2415	0.1006	Yes

Where the absolute value of the difference of a Well is greater than the critical (Di) value the hypothesis of a single population should be rejected.

The Shapiro Francia normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9702, critical = 0.945. Levene's Equality of Variance test passed. Calculated = 0.07007, tabulated = 3.162.

Parametric ANOVA

Constituent: pH (n/a) Analysis Run 6/16/2014 5:42 PM

Facility: Demo Client: Demo Data File: pHConductivity

	MW-10	MW-11	MW-1 (bg)
11/1/2005	7.44	7.05	6.82
1/25/2006	7.55	7.05	6.86
5/9/2006	7.12	6.81	6.87
8/15/2006	7.08	7.08	6.72
12/13/2006	7.24	7.08	6.71
2/13/2007	7.38	6.94	6.83
6/20/2007	7.29	6.91	6.71
12/18/2007	7.25	6.88	6.72
4/2/2008	7.16	6.83	6.66
10/28/2008	7.11	6.85	6.6
3/31/2009	7.18	6.89	6.63
12/21/2009	7.11	6.93	6.72
5/11/2010	7.1	6.98	6.71
12/16/2010	7.14	6.98	6.71
6/10/2011	7.21	7.04	6.61
12/13/2011	7.09	7.12	6.48
6/29/2012	7.47	7.01	7.14
12/13/2012	7.21	6.83	6.51
6/10/2013	7.18	6.66	6.47
11/18/2013	7.34	7.14	6.75