URANIUM ONE U.S.A., INC.

GROUND WATER GEOCHEMICAL EVALUATION AND BACKGROUND WATER QUALITY DETERMINATION FOR THE SHOOTARING CANYON MILL SITE

Submitted by

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1.0 PURPOSE

The purpose of this document is to provide the basis for a ground water monitoring plan (GWMP) for the proposed Shootaring Canyon Mill Tailings Disposal Facility.
This report provides:

- Chemical parameters to be monitored and the basis for their selection,
- Sampling and analysis techniques (Quality Assurance Plan),
- Interim compliance criteria,
- Methodology to determine final compliance criteria and
- Procedures to evaluate monitoring data.

Each of these program elements is described below in the main body of the report, with full details of background determination, Quality Assurance Plan (QAP) and trend analysis approach in appendices.

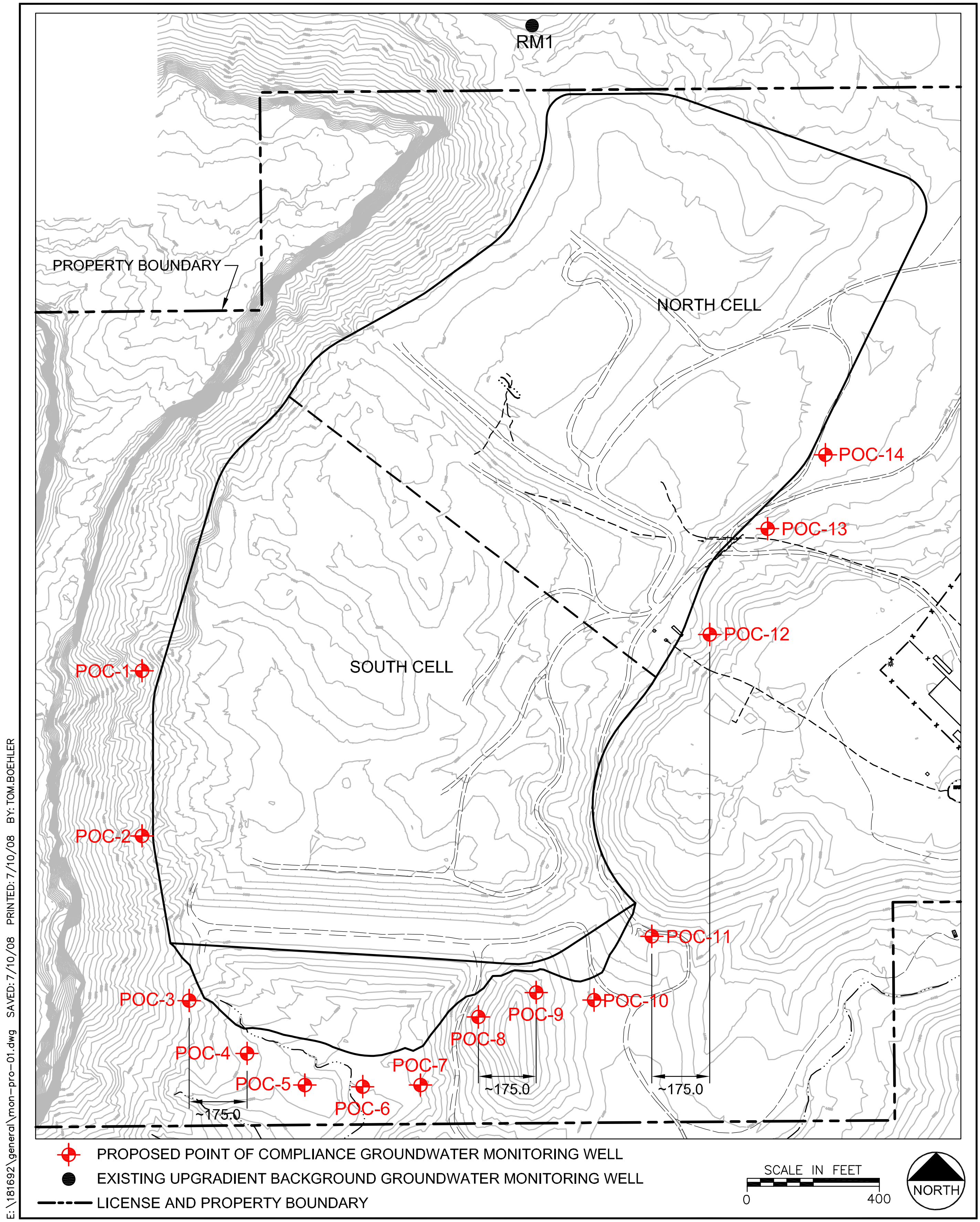
2.0 LOCATION, NUMBER AND TYPE OF MONITORING WELLS

It is proposed that a total of 15 ground water monitoring wells be used at the Site. The locations of the wells were determined using the criteria stipulated in Regulatory Guide 4.14 and in the 10 CFR 40, Appendix A and State of Utah Discharge Permit. The number, location and completion details for the monitoring wells is discussed in detail in a companion report entitled "Groundwater modeling and proposed monitoring wells for the Shootaring Canyon Mill Tailings Disposal Facility" prepared by Gard Water Consultants, June 2008. Specifically, groundwater will be monitored hydrologically up gradient, i.e., not influenced by potential seepage from tailings in one existing well and down-gradient in 14 new point of compliance (POC) wells.

Up gradient ground water quality for the main Entrada aquifer will be monitored at the existing well RM1.

Down gradient ground water quality will be monitored at proposed point of compliance (POC) wells that are yet to be constructed. These new wells will be located at the toe of the final reclaimed tailings area. Since the new POC wells will be at the edge of the final reclamation, they can be used throughout the operational life of the expanded tailings facility and after closure of the facility. Existing well locations that are down gradient from the tailings impoundment will be abandoned in favor of new wells that are located and screened appropriately for the objectives of the groundwater monitoring plan (GWMP)

The locations of the proposed ground water monitoring wells are shown on Figure 1.



Project No. 181692

June 2008

Figure 1
Approximate Location of Proposed Monitoring (POC) Wells

3.0 PARAMETERS TO BE MONITORED

Per criteria stipulated in Regulatory Guide 4.14, 10 CFR 40, Appendix A and State of Utah Discharge Permit, indicator chemical and radiological parameters will be used for early detection of potential tailings seepage. The proposed plan would monitor all inorganic chemical constituents that have historically been measured at the site. Additionally, six other unregulated constituents (magnesium, sodium, potassium calcium, bicarbonate and carbonate) will be monitored that are characteristic of tailings.

Once operations have begun, process waters associated with tailings will be routinely analyzed to assess the need to modify the list of constituents that are monitored. Those not present in the process waters will be considered for elimination from the plan. If additional hazardous constituents are found in the tailings fluid, they will be added to the list of monitored constituents. UDEQ will be petitioned, in writing, for any change to the program. This selection of parameters will assure regulatory compliance and protection of water resources and will also provide for overall performance monitoring of the tailings impoundment.

Table 1 below presents the chemical constituents which will be monitored, their average concentration in the site tailings sump over a 5 year period (2002- 2007), and any ground water standards that currently exist.

Table 1. Parameters for Compliance Monitoring

Analyte	Average in Tailings Sump (2002-2007)*	GW Standard*	Purpose
Arsenic, As	0.005	0.05	**Regulatory Compliance**
Barium, Ba	0.12	2.0	
Cadmium, Cd	0.003	0.005	
Chromium, Cr	0.0095	0.1	
Copper, Cu	0.042	1.3	
Lead, Pb	0.004	0.015	
Mercury, Hg	0.001	0.002	
Molybdenum, Mo	0.256	0.04	
Selenium, Se	0.102	0.05	
Silver, Ag	0.005	0.1	
Zinc, Zn	0.154	5.0	
Ammonia as N (NH_3-N)	14.2	30.0	
Chloride, Cl	841	250	
Fluoride, F	4.47	4.0	
Nitrate + Nitrite as N, (NO_3+NO_2)-N	26.3	10.0	
Sulfate, SO_4	17920	500	
TDS	28191	500	
pH	7.6	6.5 – 8.5	
Uranium, U-nat	7.53	0.030	
Radium, Ra-226+ Ra-228 (1)	1.23	5.0 (pCi/L)	
Gross alpha, adjusted	3877	15 (pCi/L)	
Carbonate, CO_3	< 1	*None*	***Performance***
Bicarbonate, HCO_3	1041	*None*	
Calcium, Ca	*439*	*None*	
Magnesium, Mg	*2143*	*None*	
Sodium, Na	*3468*	*None*	
Potassium, K	*76.2*	*None*	

*mg/L except Ra-226 + Ra228, and gross alpha (pCi/L), and pH in standard units; average was calculated on data through 3rd quarter 2007

1) The regulatory standard for radium is 5 pCi/l for combined Ra-226 and Ra-228. Historically only Ra-226 was measured but both Ra-226 and Ra-228 will be measured in the future. The average value listed for the 2002-2007 period is for 2 Ra-226 only.

4.0 SAMPLING AND ANALYSIS

Ground water samples will be obtained according to procedures outlined in the Ground-Water Quality Assurance Plan (GWQAP) provided in Appendix 1. Sampling, preservation and analysis methods will be followed according to EPA 40 CFR Parts 122, 136, 141 and 143.

5.0 COMPLIANCE CRITERIA

Site wide background ground water quality will be used to establish interim compliance criteria until sufficient time has passed to establish intra-well background water quality in the proposed new POC wells. At that time revised compliance criteria will be determined for each POC well, based upon an analysis of the background water quality for each. It is anticipated that interim compliance criteria will be used for the first two years, after which sufficient intra-well data will be available to use for the final compliance criteria.

5.1 Interim Compliance Criteria- Site Wide Background

The approach utilized to develop interim compliance criteria, is comprised of a series fundamental steps presented below. Figure 2 displays a flow chart showing the structure of the statistical analysis and determination of interim compliance criteria using historical water quality data. Water quality data was available starting in 1979, however only the post -1997 data were used for the analysis as only that data confirmed as being generated by a Utah certified laboratory.

5.1.1 Identification of Water-Bearing Zones

Water quality data for the main Entrada Sandstone aquifer and the perched zone were separated. The distinction was made in recognition of each of these zones being a discreetly identified water-bearing zone. Only the waters from the main Entrada aquifer were used in the evaluation. These wells included RM1, RM2, RM2R, RM3, RM4, RM5, RM6, RM7, RM14, RM15, RM18, RM19 and RM20.

5.1.2 Determination of Principal Water Types

The site-wide major ion composition for the main Entrada aquifer was evaluated to determine if more than one principal water type is present. This analysis was conducted using standard Piper diagrams (Hem, 1985). This analysis showed that, except for RM20 in the Entrada zone, only one water type was present at the site (see details in Appendix 2). Data from RM20 were not retained for further analysis and evaluation due to their anomalous water quality characteristic. It is not clear if the values from this wells are naturally different or a result of historic operations. Regardless, eliminating the anomalously higher values yields lower site wide background values and is conservative relative to evaluating future groundwater data to determine if seepage is occurring. The retained site data for each chemical constituents of concern (COC) was pooled into a single population for further analysis.

5.1.3 Statistical Evaluation Process for Site Wide Background

Per guidance from EPA (1989) and ASTM (2005), existing groundwater quality data were gathered into three groups. The first data group consists of parameters which were detected in almost all of the samples (0-15% non-detects (NDs)) and contained 12 of the 25 parameters. The second group of data, which consists of parameters which had between 15 and 99% NDs, contained 10 of the 25 parameters. The third group of data had three parameters, all of which were at concentrations less than the detection limit (100% ND). The first two groups represent essentially COCs that are present in the site ground water in significant and reasonably measurable concentrations while the third group represents COCs that are fundamentally absent.

The statistical distribution of data for each COC with less than 15% NDs was evaluated to identify normal and log normal data sets. Probability plots used to make this determination for these data sets are found in Appendix 2. The mean value and standard deviation (uncertainty) for these data sets were then calculated, consistent with ASTM (2005). Data sets with no identifiable (normal or log-normal) distribution were tagged for non parametric statistics, consistent with the guidance provided in ASTM (2005). As summarized in Table 2, six of the parameters were either normally or log-normally distributed, and six were neither.

Interim Compliance limits were developed based upon guidance from EPA (1989, 1992) and ASTM (2005) using the historical (post 1997) data. Figure 2 shows the process by which the compliance limits were determined. The data was first divided according to the percent of detectable values for each constituent as explained above. For data with less than or equal to 15% NDs, the NDs were substituted with one-half the detection level before analysis (EPA 1992). Then the data were tested for outliers using box-plots, and the outliers were removed before the data was tested for normality. Data were then evaluated using parametric methods for normally or log-normally distributed data, or non-parametric methods for data that were not normally or log-normally distributed. The compliance limits were set by the 95% Upper Prediction Limit (UPL) for the normally and log-normally distributed data. The 95% UPL is essentially equal to the mean plus two times the standard deviation. For data with less than or equal to 15% NDs that were neither normally or log-normally distributed, compliance limits were set at the maximum measured value as recommended in ASTM (2005). For data with 15-99% NDs, the compliance limit used was also the maximum value as recommended in ASTM (2005). For data with 100% NDs, no statistical analysis was done, and the detection limit or 0.1x the MCL, which ever is greater, was used as the compliance limit.

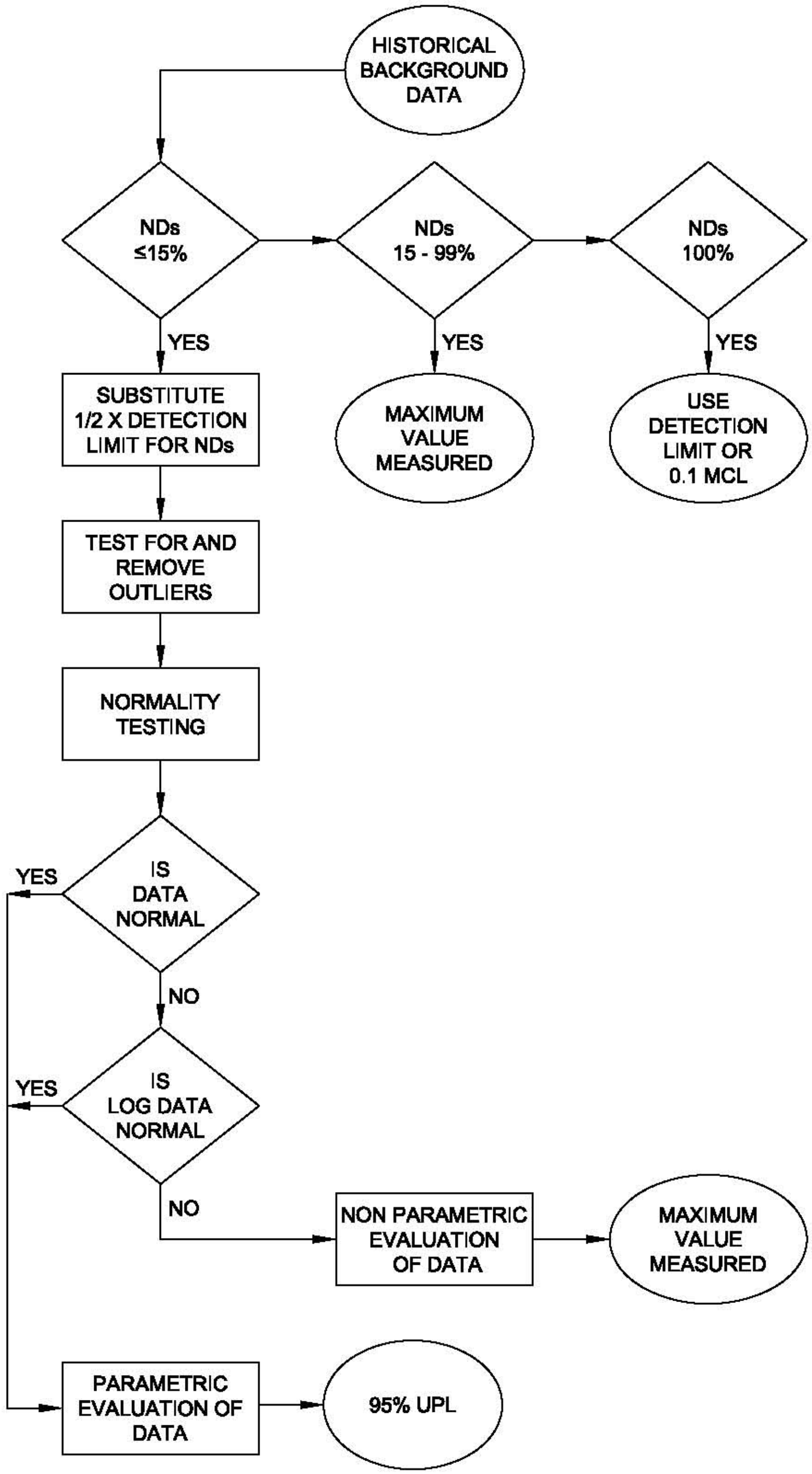


Figure 2. Groundwater Interim Compliance Limit Flow Chart

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Table 2. Groundwater Background Data Summary – Main Entrada Wells (1997-2007)

%Nondetects (ND) Category	Analyte	Units	Number of Samples per Data Set	% NDs	Distribution[1]	Prediction Limit[2,3]	
						Max	95% UPL
0-15%	Ca	mg/l	112	0	NP	26.7	24.8
	Mg	mg/l	113	0	normal	28.2	28.8
	Na	mg/l	111	0	normal	23.9	23.4
	K	mg/l	112	0	lognormal	3.70	3.32
	Cl	mg/l	271	0	NP	15.3	13.0
	F	mg/l	247	0	NP	0.42	0.31
	Gross Alpha	pCi/l	25	0	normal	9.1	8.74
	pH	s.u.	238	--	NP	6.4-9.4	7.1-8.6
	(NO3+NO2)-N	mg/l	239	0	NP	2.28	1.94
	SO4	mg/l	245	0	lognormal	43.4	36.8
	TDS	mg/l	236	0	normal	254	234
	Unat	mg/l	181	2	NA	0.0073	0.0051
15-99%	Ba	mg/l	244	20	NA	0.200	0.155
	As	mg/l	271	78	NA	0.0163	--
	Cd	mg/l	244	98	NA	0.064	--
	Cu	mg/l	244	94	NA	0.06	--
	Mo	mg/l	244	96	NA	0.012	--
	NH3-N	mg/l	243	87	NA	0.230	--
	Pb	mg/l	244	95	NA	0.0082	--
	Ra226	pCi/l	122	73	NA	1.800	--
	Se	mg/l	271	91	NA	0.006	--
	Zn	mg/l	244	77	NA	0.343	--
100%	Ag	mg/l	238	100	NA	--	--
	Cr	mg/l	238	100	NA	--	--
	Hg	mg/l	238	100	NA	--	--

Notes:
NA = not applicable
Summary statistics run on data sets with n > 5.
[1] NP is classified as neither normal nor lognormal distribution
[2] ASTM D 6312 – 98 defines nonparametric Prediction Limits as the highest (maximum) data value.
[3] Shaded areas indicate values selected for compliance criteria, based on the distribution of the data.

5.1.4 Interim Compliance Criteria

For all COCs with less than 15% ND (i.e. mostly present in ground water), the ground water compliance limit is set at either the maximum value or the 95% UPL (Table 2), depending on the distribution of the data. The compliance limit for COCs with 15-99% NDs is set at the maximum value. This approach, consistent with criteria cited by EPA (1989) and ASTM (2005), by definition yields compliance criteria for each COC that provide for a false positive rate of 5%. For any COCs that are 100 % ND, the compliance limit is set at 0.1 times the ground water quality standard, or the detection limit, whichever is greater.

Table 3 presents the proposed monitoring parameters and the compliance criteria for the proposed POC wells during the interim compliance monitoring period.

Table 3. Interim Compliance Criteria

Analyte	Units	Detection Limit	Ground Water Standard	Compliance Criteria
Ca	mg/l	NA	None	26.7
Mg	mg/l	NA	None	28.8
Na	mg/l	NA	None	23.4
K	mg/l	NA	None	3.3
Cl	mg/l	NA	250	15.3
F	mg/l	NA	4	0.42
Gross Alpha	pCi/l	NA	15	8.74
pH	s.u.	NA	6.5 - 8.5	6.4-9.4
(NO3+NO2)-N	mg/l	NA	10	2.28
SO4	mg/l	NA	500	36.8
TDS	mg/l	NA	500	234
Unat	mg/l	NA	0.03	0.0073
Ba	mg/l	NA	2	0.2
As	mg/l	NA	0.05	0.0163
Cd	mg/l	NA	0.005	0.064
Cu	mg/l	NA	1.3	0.06
Mo	mg/l	NA	0.04	0.012
NH3-N	mg/l	NA	30	0.23
Pb	mg/l	NA	0.015	0.0082
Ra226	pCi/l	NA	5	1.8
Se	mg/l	NA	0.05	0.006
Zn	mg/l	NA	5	0.343
Ag	mg/l	0.025	0.1	0.025
Cr	mg/l	0.05	0.1	0.05
Hg	mg/l	0.005	0.002	0.005

NA = not applicable

5.2 Final Compliance Criteria: Intra-well Background

Determination of background for the new POC monitoring wells will use intra-well techniques. The proposed sampling interval was estimated using the procedures from EPA 1989, calculating a minimum time required between samples, using a ground water velocity of 8 feet/year (Gard 2008). The minimal time interval between sampling events that will allow one to obtain an independent sample of groundwater is determined by dividing the monitoring well diameter by the horizontal component of the average linear velocity of groundwater:

Minimum time interval = (4 in) / (0.263 in/day) = 15.2 days

This calculated time interval shows that a quarterly frequency allows sufficient time to pass between sampling events to ensure that an independent sample is taken from each well, which reduces the effects of autocorrelation.

Final compliance criteria will be developed based on intra-well data obtained from the new POC wells. Figure 3 details how the final compliance limits for the POC wells will be determined. The interim compliance limits calculated from the site-wide historical data will be used until eight quarterly samples are collected from each of the POC wells. Once there are greater than or equal to eight samples, the data will be divided into groups based on the percentage of the detected data. For data with detection frequency greater than 25%, the NDs will be substituted with one-half the detection level before analysis, and outliers tested for and removed before the data is tested for normality/distribution (ASTM 2005, Section 5.1.2 Intra-well Comparisons). The data will then be tested for seasonality effects before data evaluation, using parametric or non-parametric methods depending on distribution. Final data evaluation will use parametric (95% UPL) or nonparametric (maximum value measured) methods to determine the compliance limits. For data with detection frequencies between 0% and 25%, an upper 95% Poisson Prediction limit is to be used if there are less than 13 samples (ASTM 2005). If there are 13 or more samples in the data set, the maximum value measured will be used as a nonparametric prediction limit. If the detection frequency of the data set is at 0% (100% NDs), than the detection limit will be used as the compliance limit.

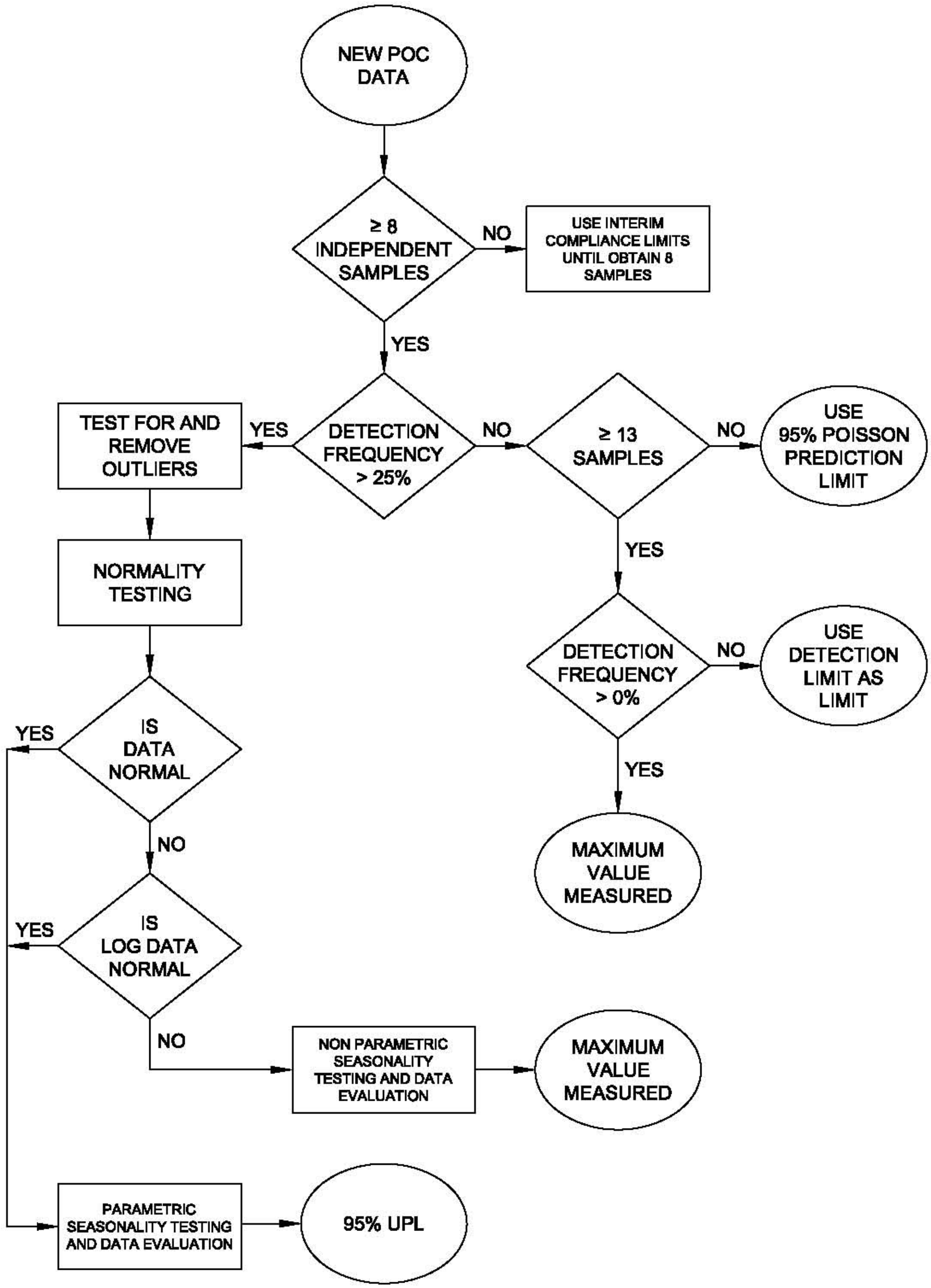

Figure 3. Groundwater Final (Intra-well) Compliance Limit Flow Chart

6.0 COMPLIANCE MONITORING

Figure 4 displays the structure for the POC Monitoring Plan. After collection, data are evaluated for trends and the data are compared to interim or final compliance limits as discussed in the previous section. If constituent values exceed compliance limits for any constituent in one or more POC wells, the analytical laboratory will be contacted to confirm results. On confirmation of the results, the well in question will be re-sampled and re-analyzed for the constituents that exceeded compliance criteria. If the new data still exceeds compliance criteria, consultation with UDEQ/DRC to develop the appropriate action will follow, and the sampling frequency protocol as outlined in Figure 4 will be implemented. If new POC data does not exceed the prediction limit, routine monitoring will continue, and the background data will be updated with the new data.

6.1 Trend Analysis

The projected timeline for operations at the site provide for installation of monitoring wells approximately one year prior to operation of the tailings impoundment. This time, in conjunction with ground water travel times on the order of 3 to 8 feet per year for the main Entrada unit (Hydro-Engineering 1998, Gard 2008), will allow for several years worth of baseline data to be collected for each proposed compliance monitoring well. This baseline data will form the statistical basis for identifying any statistically significant future changes (trends) in water quality. Determination of statistically significant trends represents a viable and useful approach to minimizing the rate of false negative assessment of contamination (potentially undetected contamination) and for identifying potential impacts to ground water quality before compliance limits or ground water standards are reached.

Historical data from 1997-2007 were analyzed to evaluate potential seasonal effects. Data from Main Entrada wells RM1 and RM15 were used. RM1 is the only existing well to be retained for monitoring; RM15 was selected because of its close proximity to the proposed POC wells. Only constituent data from these wells with less then or equal to 15% non-detects were analyzed. Normally or log normally distributed data were compared using one-way ANOVA; data that was neither normal nor lognormal was evaluated using the non-parametric Mann-Whitney comparison test. The wells were sampled quarterly, thus four “seasons” were used to compare the data. Box plots served as a visual comparison among the four seasons. A summary of the box plots and comparison statistics is found in Appendix 3. There were no significant differences among seasons for the constituents tested. Thus for the detected constituent data in wells RM1 and RM15, it was concluded that variability was not attributable to seasonal effects. Therefore seasonal effects are not anticipated to require attention in future trend analysis.

Trend analysis of new data will provide the ability to recognize statistically significant changes in the concentration of COCs in compliance monitoring wells before an exceedance of ground water quality compliance limits occurs. Trend analysis will not be used in any way to determine compliance, it will instead provide an early warning mechanism to identify potential contamination (minimization of false negatives) and allow timely implementation of corrective action while maintaining the corresponding protection against false positives described above.

Methods of trend analysis for the proposed new monitoring well data will be conducted according to the distribution of the data. For data with non-detects less than or equal to 15%, normally/log normally distributed data will be analyzed for trends using simple linear regression (Helsel and Hirsch, 2002), and the non-normal/non-lognormal data will be analyzed for trends using the non parametric Mann-Kendall method. These methods will test whether or not the slope of the data is not equal to zero. Note that if future data show effects of seasonality, then the non-parametric Seasonal Kendall test will be used for trend analysis.

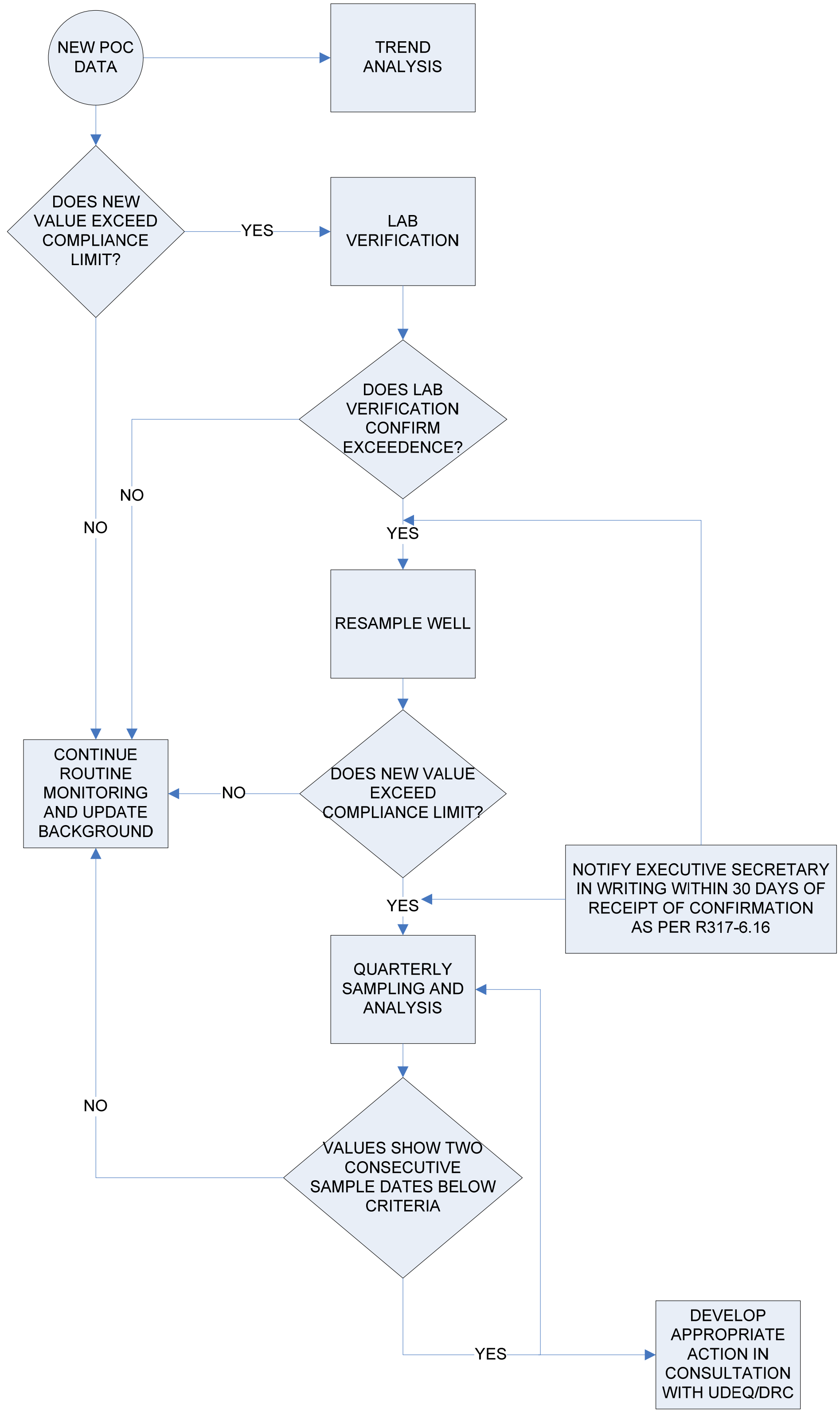

Figure 4. POC Monitoring Plan Flow Chart

6.2 POC Well Sampling Frequency

All proposed monitoring wells will be sampled quarterly for the first two years, so as to attain eight independent samples. Once two years of quarterly baseline data are collected, wells will be sampled annually. POC wells will continue to be monitored annually until such time as any down gradient sample returns an analytical result for any COC that exceeds compliance criteria. In the event that such an exceedance is observed, follow-on actions are triggered to validate the result as indicated in Figure 4. Specifically, if the new POC well value exceeds the compliance criteria and it is verified by the laboratory, the well is resampled. If the resample results also exceed limits, then the sample frequency will be increased to quarterly, until the data show two consecutive measurements below the compliance limit. Once that is reached, the sample frequency returns to annual.

6.3 Actions Taken if Monitoring Data Out of Control

When re-sampling and analysis confirms an exceedance for a COC, UDEQ will be advised in writing, and the sampling frequency protocol will be followed as outlined in Figure 4. Quarterly sampling and analysis for the wells yielding the exceedance will begin immediately (for all compliance COCs) and if values found below the criteria are obtained for two consecutive sampling events, the monitoring will revert back to an annual basis. If the quarterly sample results fail to show two consecutive sample events below the criteria, sample frequency will continue at quarterly, and appropriate actions will be discussed and developed in consultation with UDEQ and DRC.

7.0 REPORTING

All of the analytical data collected during the Shootaring Canyon Mill groundwater compliance program, which includes the intra-well background data collection, will be presented in semi-annual reports to UDEQ, as required by the Ground Water Quality Discharge Permit.

8.0 REFERENCES

ASTM (2005) Standard Guide for Developing Appropriate Statistical Approaches for Ground-Water Detection Monitoring Programs. Method D6312-98. American Society for Testing and Materials.

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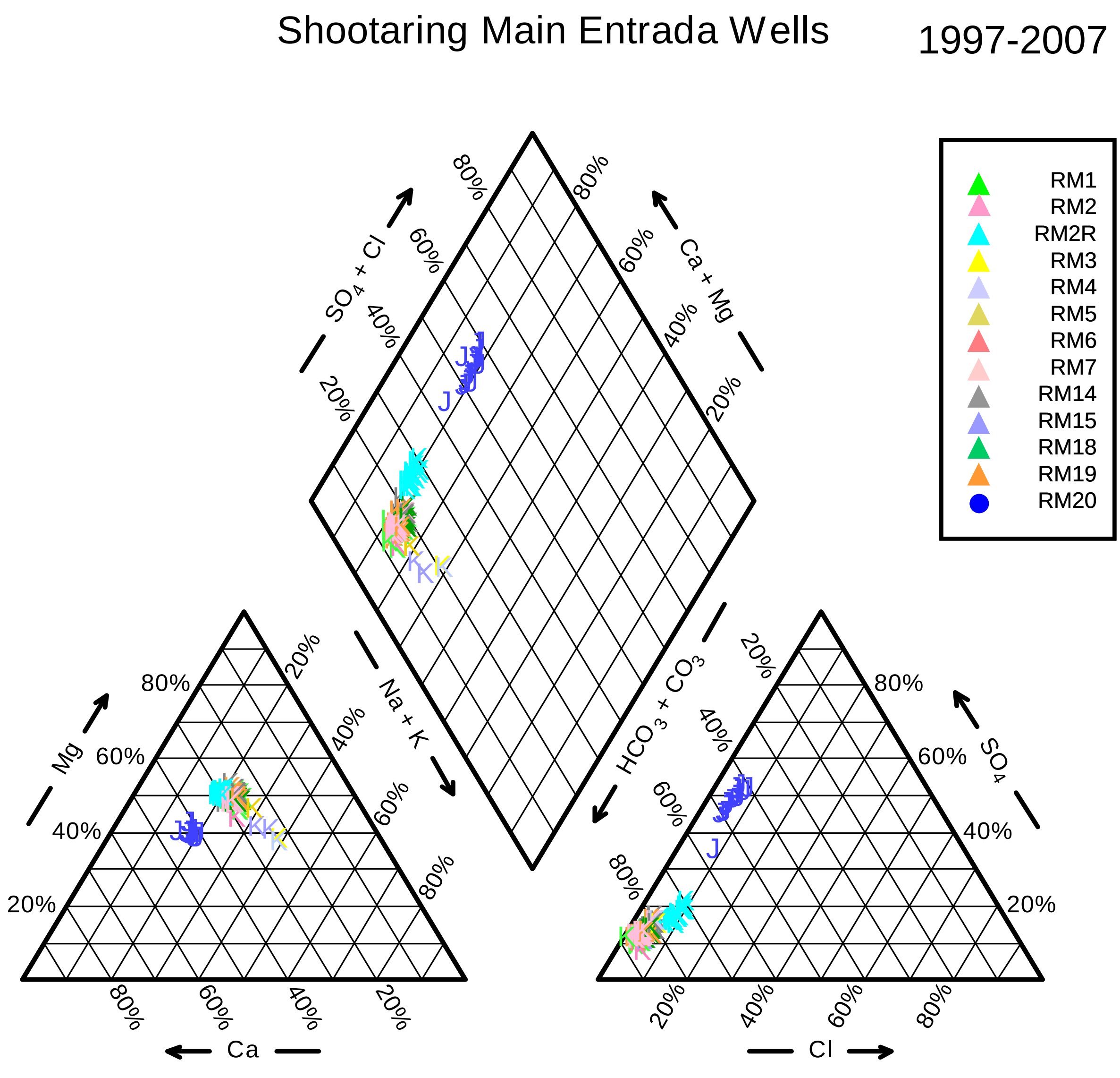
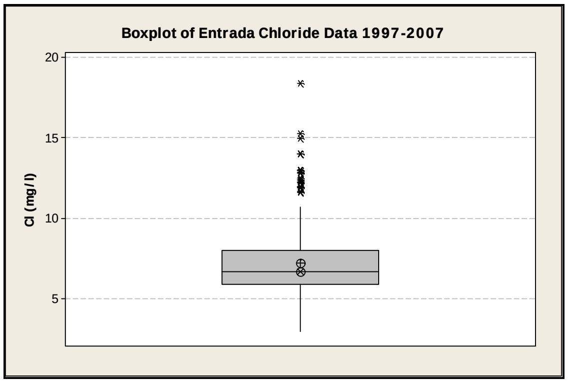
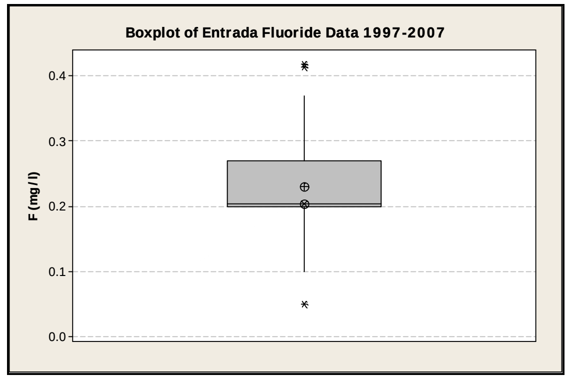
APPENDIX 1
BACKGROUND WATER QUALITY STATISTICS FIGURES

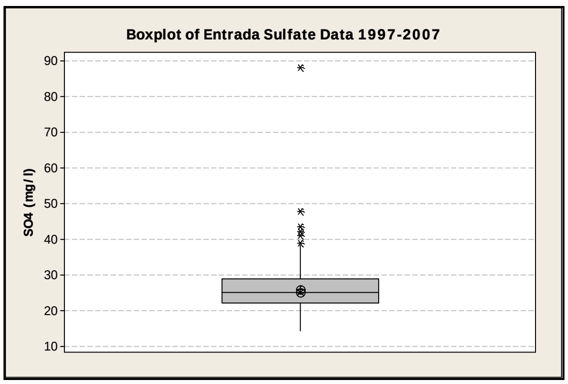
1) Piper Diagram –Main Entrada Wells

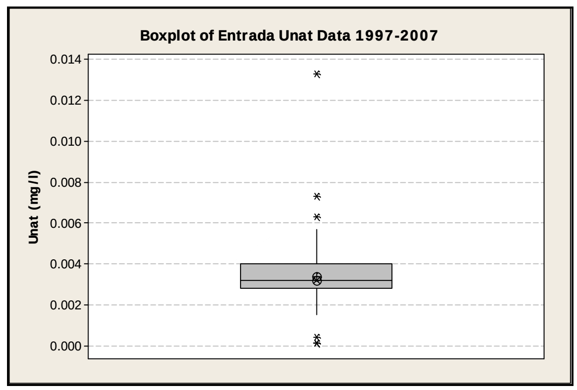


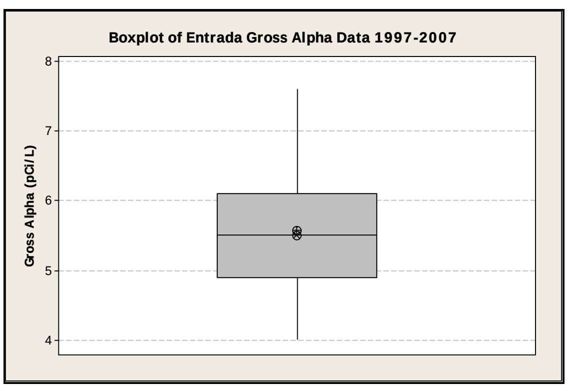
2) Boxplots of Main Entrada Data with Less Than 15% Non-Detects, Showing Outliers

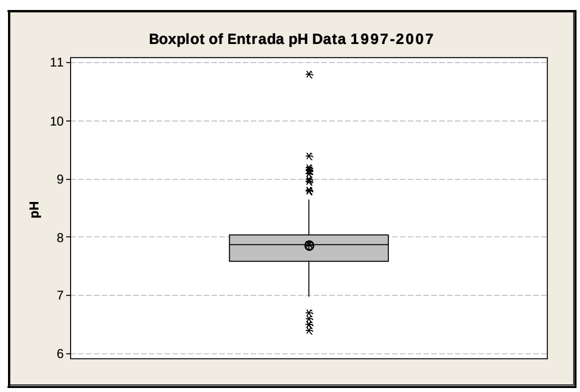


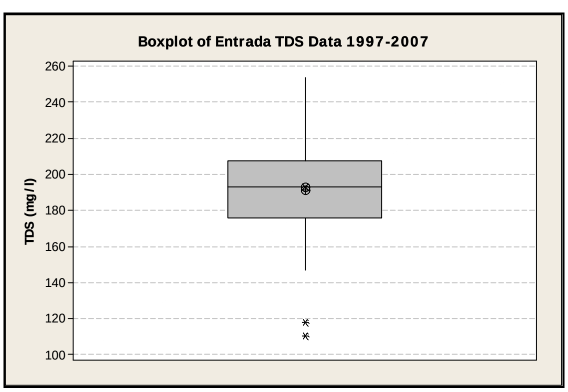


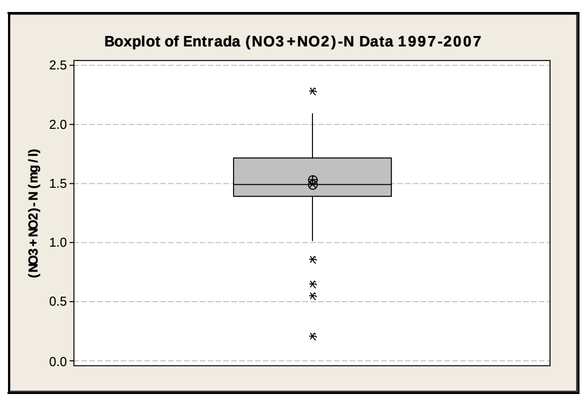


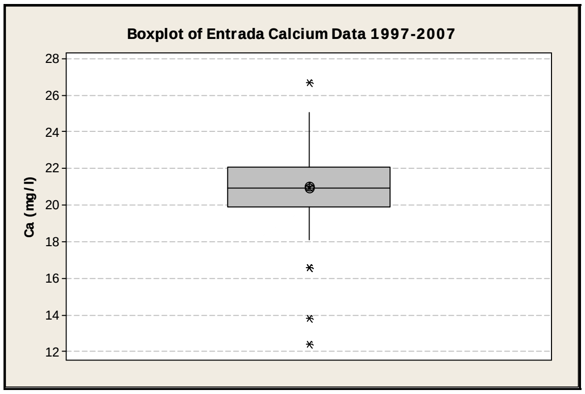


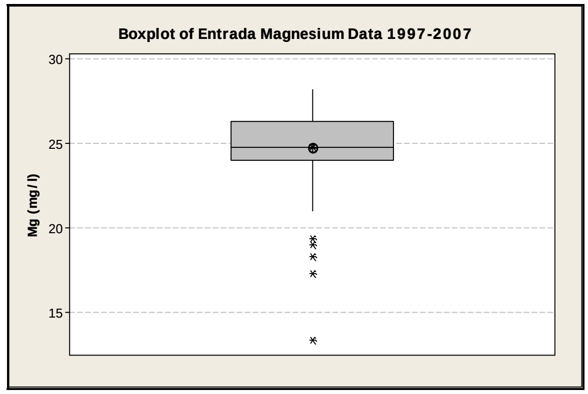


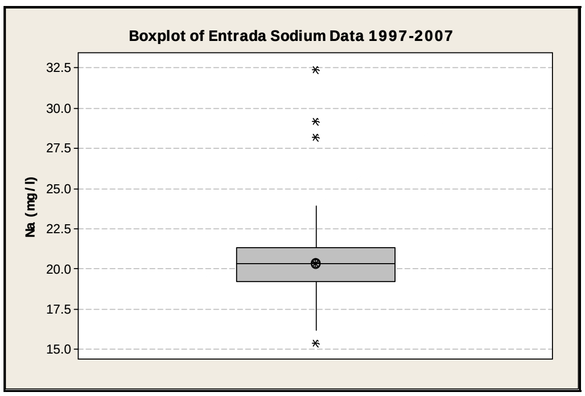


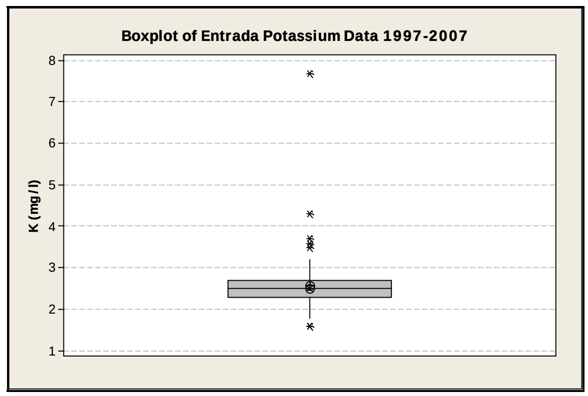





Boxplot of Entrada Calcium Data 1997-2007
Ca (mg/l)
28
26
24
22
20
18
16
14
12

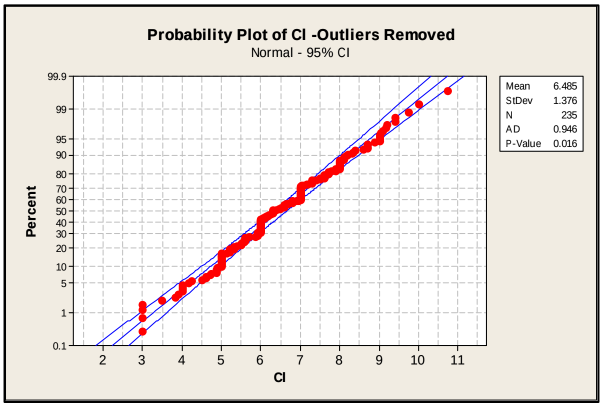

Boxplot of Entrada Magnesium Data 1997-2007
Mg (mg/l)
30
25
20
15


Boxplot of Entrada Sodium Data 1997-2007
Na (mg/l)
32.5
30.0
27.5
25.0
22.5
20.0
17.5
15.0


Boxplot of Entrada Potassium Data 1997-2007
K (mg/l)
8
7
6
5
4
3
2
1

3) Probability Plots of Main Entrada Well Data (post 1997)

Normal | **Lognormal**



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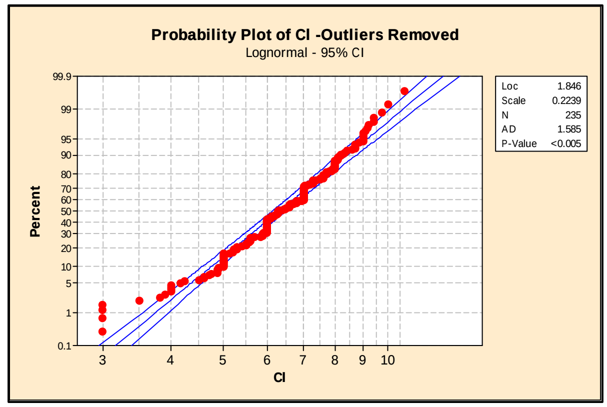
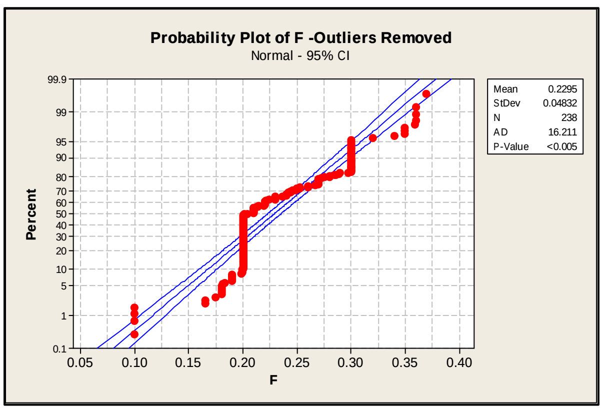
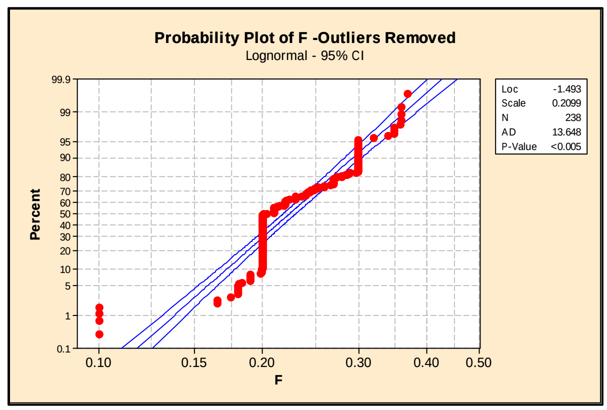
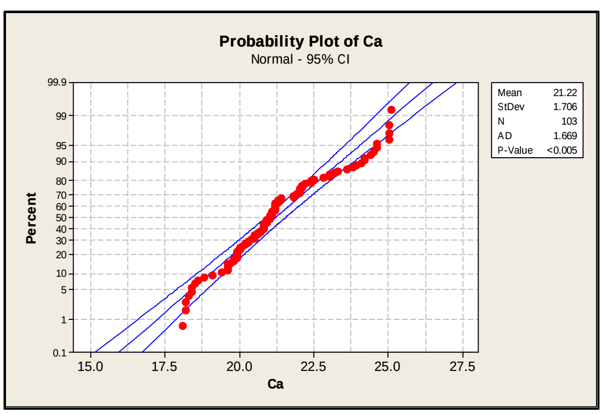
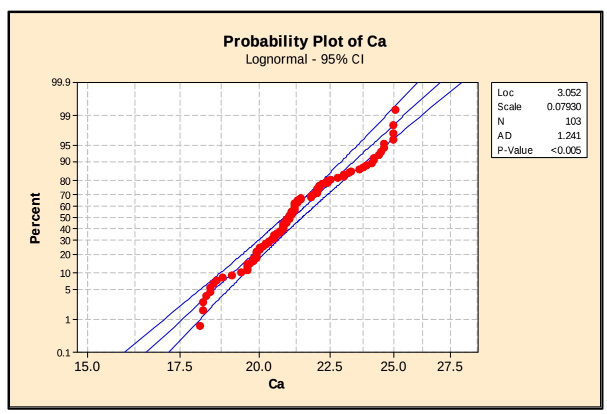
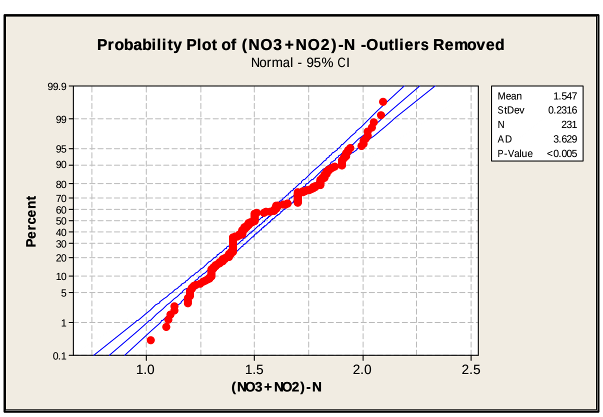


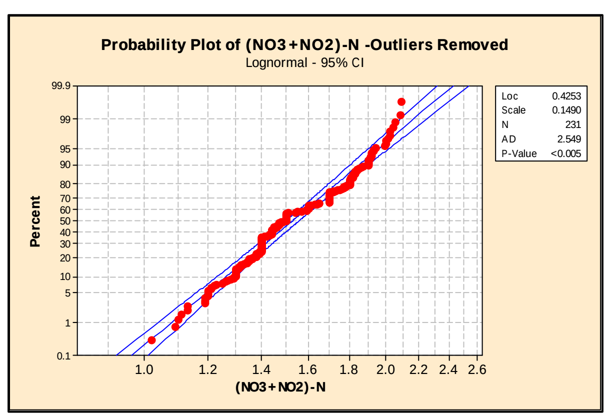




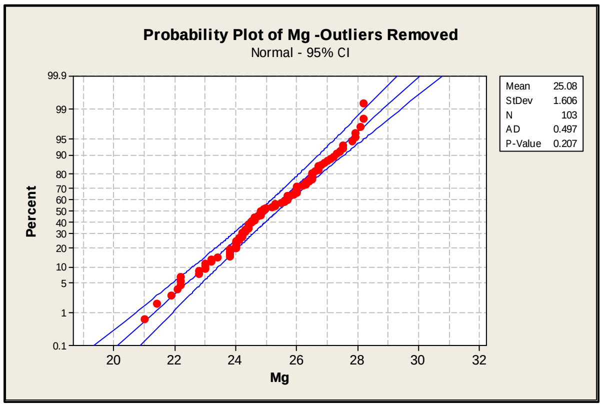








Normal | **Lognormal**



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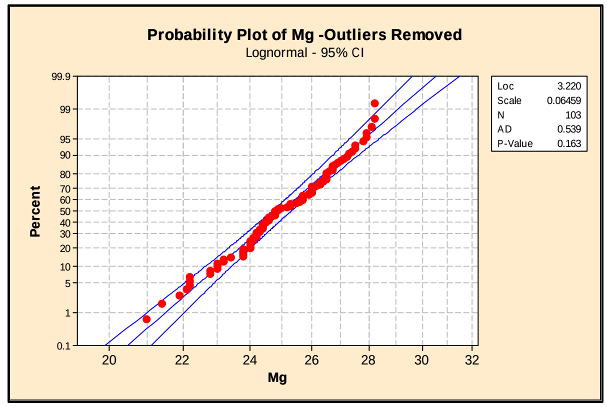

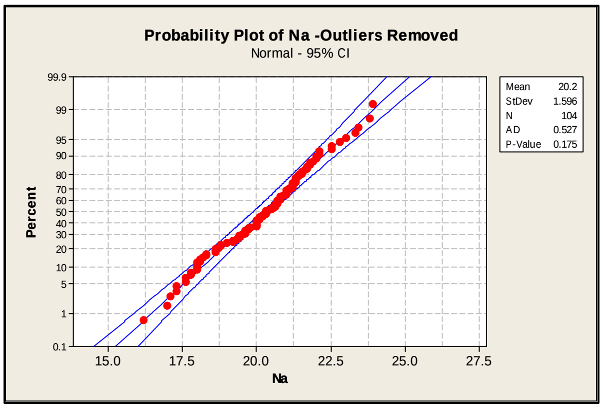

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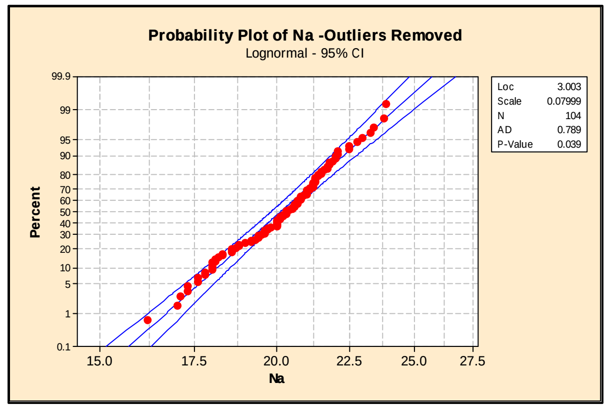
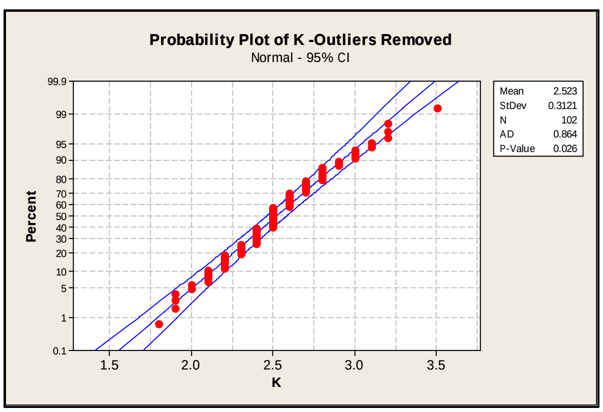
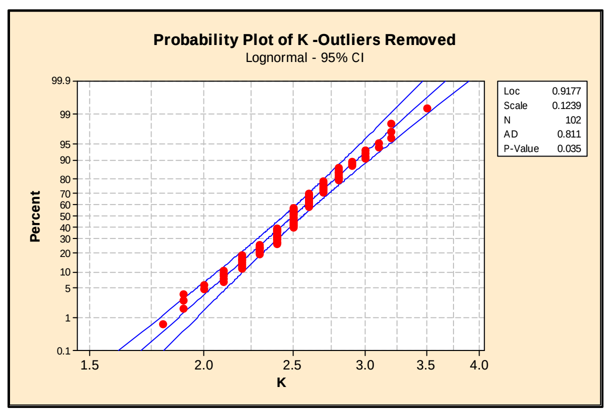
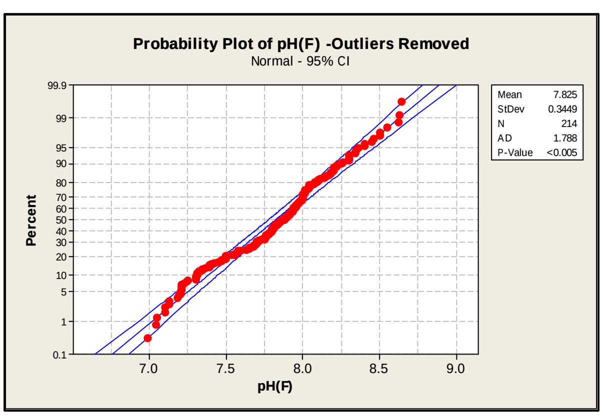
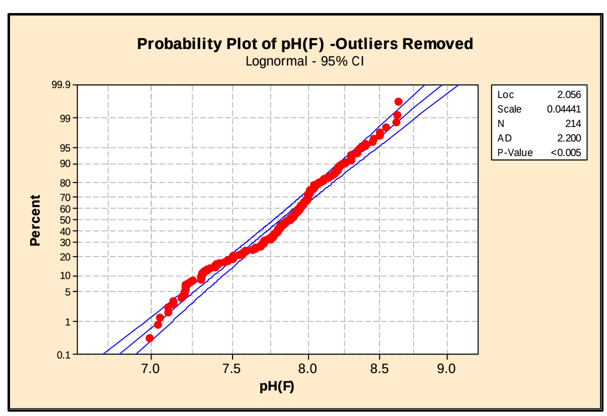


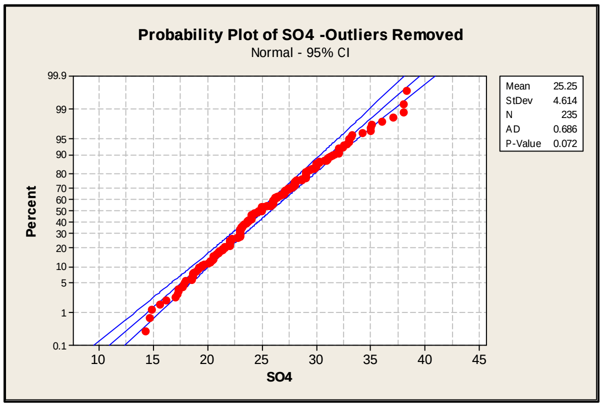


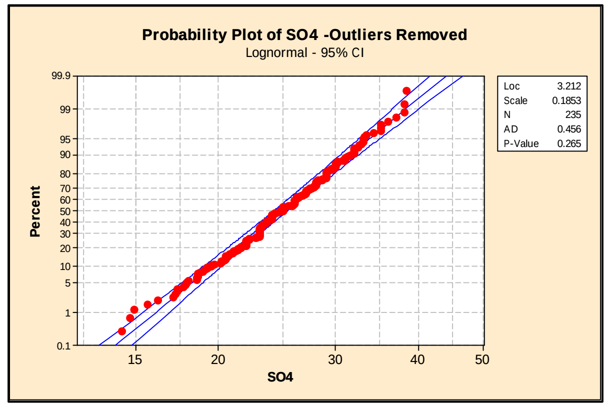


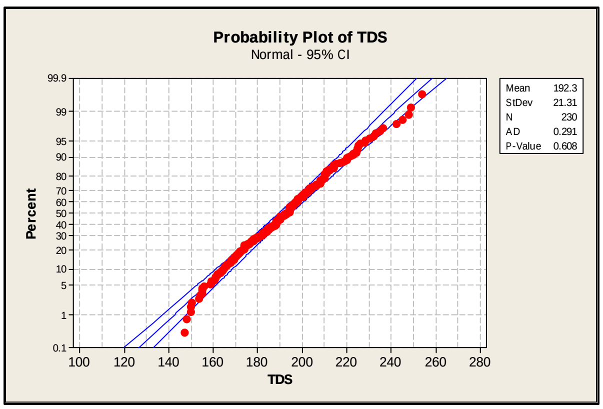




Normal **Lognormal**







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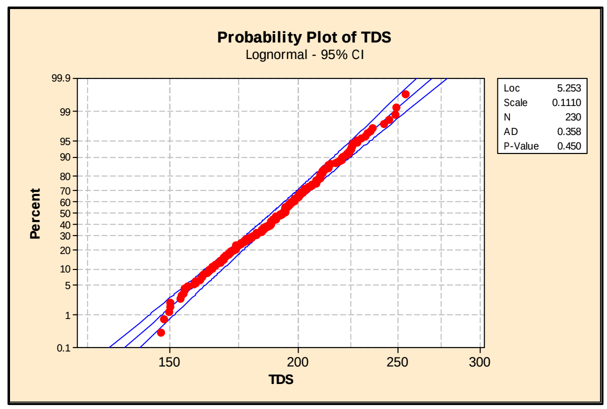
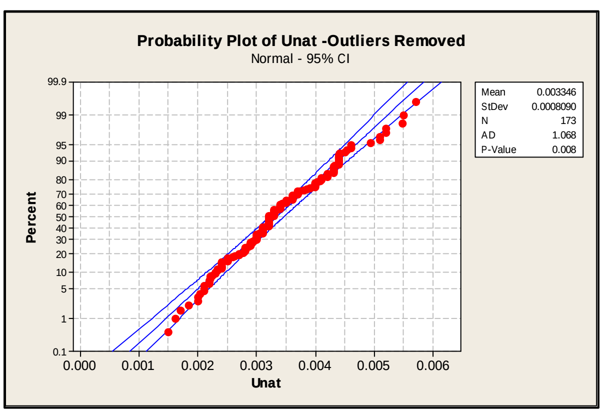
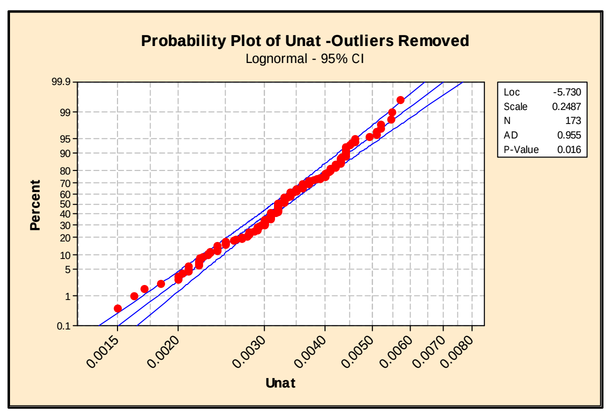






* Indicates significant fit of distribution (P-value > 0.005)

APPENDIX 2
SEASONALITY COMPARISON TEST RESULTS

Seasonality Comparison Tests

Seasonal comparison analysis was done on select Shootaring historical water quality data sets with less than or equal to 15 percent non-detects. Data from two Main Entrada wells were analyzed: Well RM1 - which will be continued to be monitored and used as a background monitoring well, and Well RM15 - because of its close proximity to the proposed POC wells. The method of comparison analysis was based on the distribution of the data. For normally or log-normally distributed data, ANOVA was used to compare means. If data was neither normally nor log-normally distributed, the non-parametric Mann-Whitney comparison test was used to compare medians. The data was divided into four seasons: Season 1 = January - March, Season 2 = April - June, Season 3 = July – September and Season 4 = October - December.

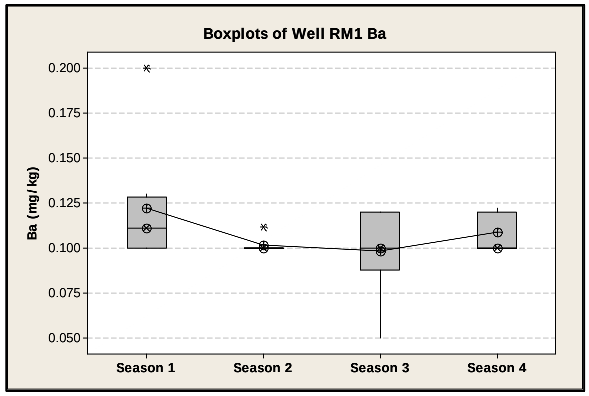
Well RM1

Mann-Whitney test for Ba

Comparison	P-value
Season 1 vs. Season 2	0.1130
Season 1 vs. Season 3	0.1897
Season 1 vs. Season 4	0.3755
Season 2 vs. Season 3	0.7931
Season 2 vs. Season 4	0.1564
Season 3 vs. Season 4	0.5183

Season	N	Median
1	8	0.111
2	7	0.100
3	6	0.100
4	9	0.100

P-values > 0.05 indicating to accept H_O that the medians are not significantly different



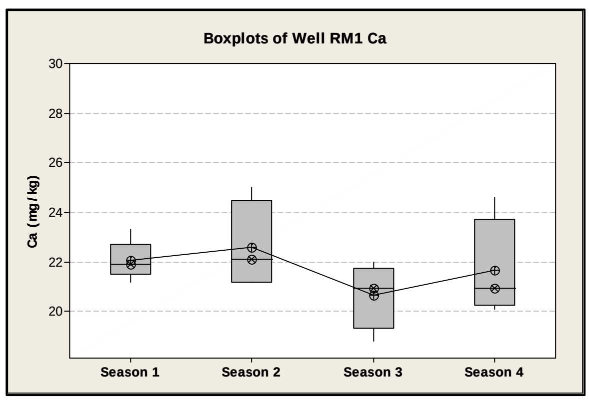
One-way ANOVA for Ca

Source	DF	SS	MS	F	P
Factor	3	8.03	2.68	1.17	**0.359**
Error	13	29.77	2.29		
Total	16	37.80			

S = 1.513 R-Sq = 21.24% R-Sq(adj) = 3.07%

Level	N	Mean	StDev
Season1	5	22.060	0.770
Season2	4	22.600	1.811
Season3	4	20.675	1.345
Season4	4	21.650	2.011

P-value > 0.05 indicating to accept H_O that the means are not significantly different



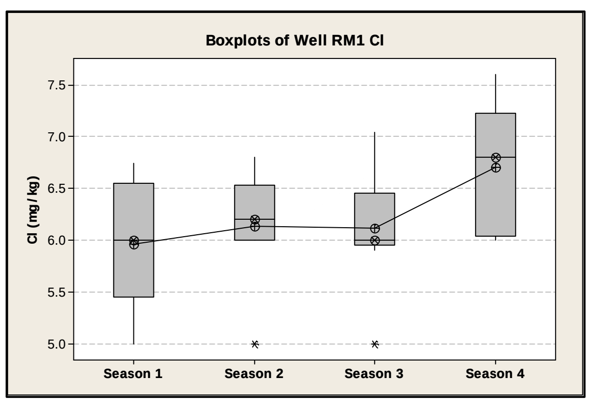
One-way ANOVA for Cl

Source	DF	SS	MS	F	P
Factor	3	2.651	0.884	2.66	**0.066**
Error	30	9.966	0.332		
Total	33	12.617			

S = 0.5764 R-Sq = 21.01% R-Sq(adj) = 13.11%

Level	N	Mean	StDev
Season1	9	5.9600	0.5919
Season2	8	6.1388	0.5401
Season3	9	6.1156	0.5547
Season4	8	6.7063	0.6164

P-value > 0.05 indicating to accept H_O that the means are not significantly different



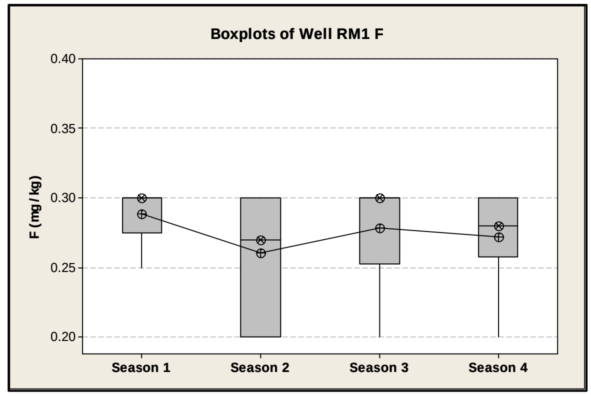
Well RM1 Cont.

Mann-Whitney test for F

Comparison	P-value
Season 1 vs. Season 2	0.1586
Season 1 vs. Season 3	1.0000
Season 1 vs. Season 4	0.2420
Season 2 vs. Season 3	0.3228
Season 2 vs. Season 4	0.6652
Season 3 vs. Season 4	0.4932

Season	N	Median
1	8	0.300
2	7	0.270
3	6	0.300
4	9	0.280

P-values > 0.05 indicating to accept H_O that the medians are not significantly different



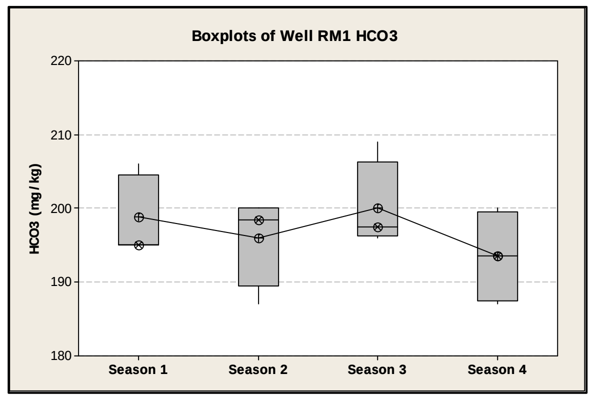
One-way ANOVA for HCO3

Source	DF	SS	MS	F	P
Factor	3	104.7	34.9	0.98	**0.431**
Error	13	461.8	35.5		
Total	16	566.5			

S = 5.960 R-Sq = 18.48% R-Sq(adj) = 0.00%

Level	N	Mean	StDev
Season1	5	198.80	5.31
Season2	4	196.00	6.16
Season3	4	200.00	6.06
Season4	4	193.50	6.45

P-value > 0.05 indicating to accept H_O that the means are not significantly different



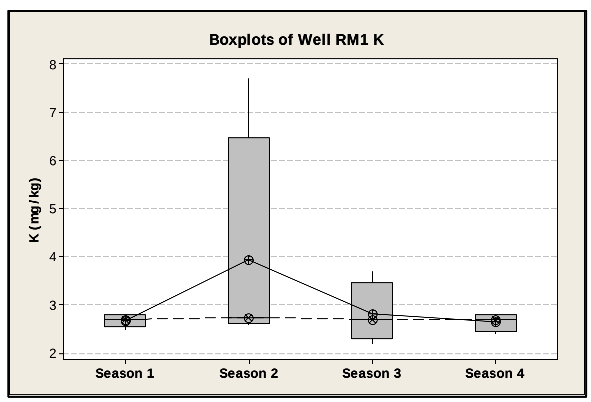
One-way ANOVA for K

Source	DF	SS	MS	F	P
Factor	3	4.73	1.58	1.02	**0.416**
Error	13	20.16	1.55		
Total	16	24.89			

S = 1.245 R-Sq = 19.02% R-Sq(adj) = 0.33%

Level	N	Mean	StDev
Season1	5	2.680	0.130
Season2	4	3.950	2.501
Season3	4	2.825	0.634
Season4	4	2.650	0.191

P-value > 0.05 indicating to accept H_O that the means are not significantly different



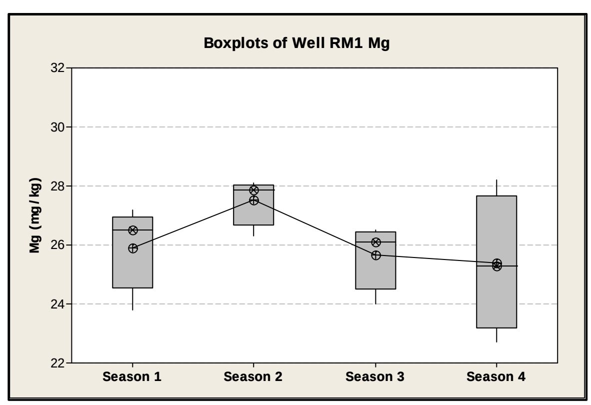
One-way ANOVA for Mg

Source	DF	SS	MS	F	P
Factor	3	11.15	3.72	1.64	**0.229**
Error	13	29.50	2.27		
Total	16	40.65			

S = 1.506 R-Sq = 27.42% R-Sq(adj) = 10.67%

Level	N	Mean	StDev
Season1	5	25.900	1.366
Season2	4	27.525	0.826
Season3	4	25.675	1.135
Season4	4	25.375	2.319

P-value > 0.05 indicating to accept H_O that the means are not significantly different



Well RM1 Cont.

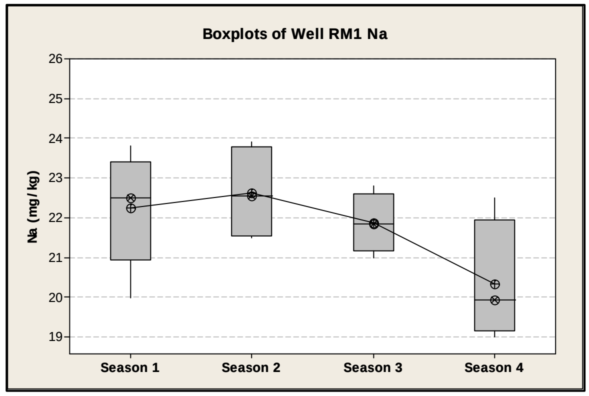
One-way ANOVA for Na

Source	DF	SS	MS	F	P
Factor	3	12.12	4.04	2.47	**0.108**
Error	13	21.24	1.63		
Total	16	33.36			

S = 1.278 R-Sq = 36.34% R-Sq(adj) = 21.65%

Level	N	Mean	StDev
Season1	5	22.240	1.433
Season2	4	22.625	1.204
Season3	4	21.875	0.746
Season4	4	20.350	1.529

P-value > 0.05 indicating to accept H_O that the means are not significantly different



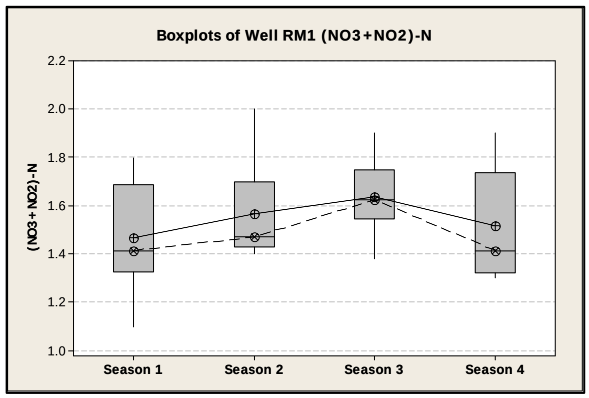
One-way ANOVA for (NO3+NO2)-N

Source	DF	SS	MS	F	P
Factor	3	0.1082	0.0361	0.77	**0.523**
Error	25	1.1744	0.0470		
Total	28	1.2826			

S = 1.278 R-Sq = 36.34% R-Sq(adj) = 21.65%

Level	N	Mean	StDev
Season1	8	1.4675	0.2327
Season2	7	1.5643	0.2162
Season3	6	1.6383	0.1681
Season4	8	1.5175	0.2310

P-value > 0.05 indicating to accept H_O that the means are not significantly different



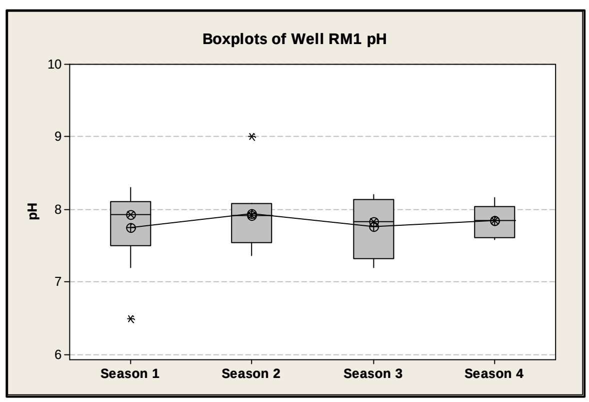
One-way ANOVA for pH

Source	DF	SS	MS	F	P
Factor	3	0.196	0.065	0.32	**0.808**
Error	27	5.447	0.202		
Total	30	5.643			

S = 0.4491 R-Sq = 3.48% R-Sq(adj) = 0.00%

Level	N	Mean	StDev
Season1	9	7.7456	0.5613
Season2	7	7.9486	0.5327
Season3	7	7.7600	0.3831
Season4	8	7.8463	0.2214

P-value > 0.05 indicating to accept H_O that the means are not significantly different

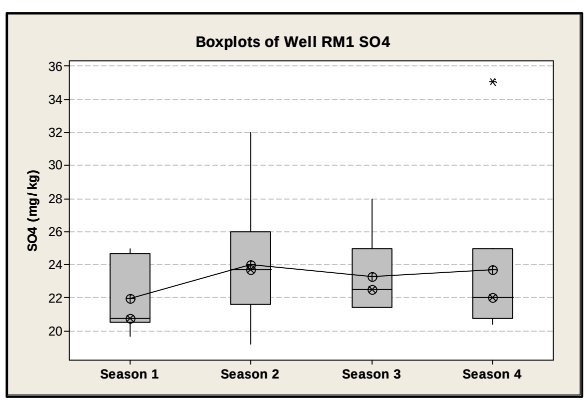


Mann-Whitney test for SO4

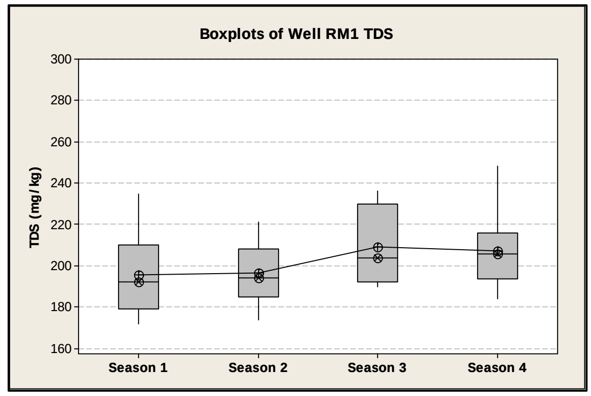
Comparison	P-value
Season 1 vs. Season 2	0.2694
Season 1 vs. Season 3	0.2170
Season 1 vs. Season 4	0.3565
Season 2 vs. Season 3	0.7745
Season 2 vs. Season 4	0.6713
Season 3 vs. Season 4	0.7675

Season	N	Median
1	8	20.75
2	7	23.70
3	6	22.50
4	9	22.00

P-values > 0.05 indicating to accept H_O that the medians are not significantly different



Well RM1 Cont.



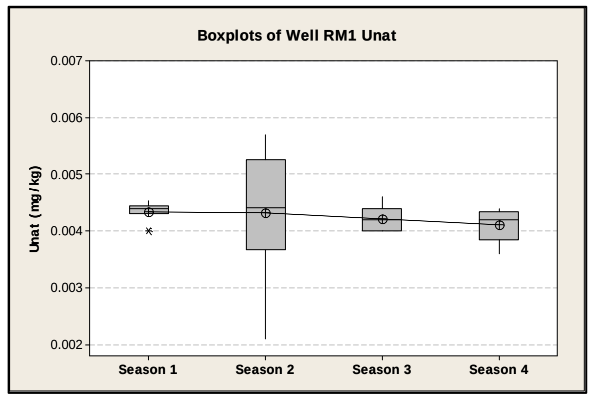
One-way ANOVA for TDS

Source	DF	SS	MS	F	P
Factor	3	1042	347	0.95	**0.433**
Error	25	9168	367		
Total	28	10210			

S = 19.15 R-Sq = 10.20% R-Sq(adj) = 0.00%

Level	N	Mean	StDev
Season1	7	195.57	21.28
Season2	7	196.80	16.27
Season3	6	209.17	19.78
Season4	9	207.36	19.06

P-value > 0.05 indicating to accept H_O that the means are not significantly different



Mann-Whitney test for Unat

Comparison	P-value
Season 1 vs. Season 2	0.6331
Season 1 vs. Season 3	0.2131
Season 1 vs. Season 4	0.1018
Season 2 vs. Season 3	0.2800
Season 2 vs. Season 4	0.2332
Season 3 vs. Season 4	0.9345

Season	N	Median
1	9	0.00440
2	6	0.00441
3	7	0.00420
4	5	0.00420

P-values > 0.05 indicating to accept H_O that the medians are not significantly different

Well RM15 Seasonality Comparison

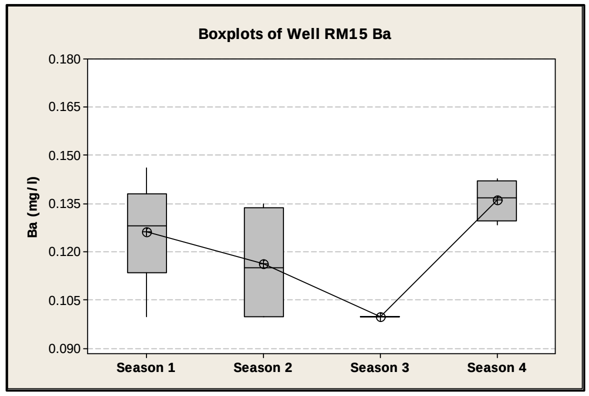
One-way ANOVA for Ba

Source	DF	SS	MS	F	P
Factor	3	0.001987	0.000662	3.19	**0.067**
Error	11	0.002287	0.000208		
Total	14	0.004275			

S = 0.01442   R-Sq = 46.49%   R-Sq(adj) = 31.90%

Level	N	Mean	StDev
Season1	5	0.12620	0.01656
Season2	4	0.11625	0.01887
Season3	2	0.10000	0.0000
Season4	4	0.13620	0.00637

P-value > 0.05 indicating to accept H_O that the means are not significantly different



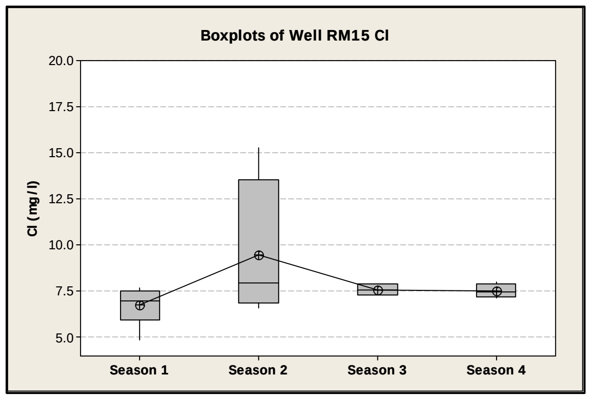
One-way ANOVA for Cl

Source	DF	SS	MS	F	P
Factor	3	16.48	5.49	1.15	**0.371**
Error	11	52.40	4.76		
Total	14	68.88			

S = 2.183   R-Sq = 23.92%   R-Sq(adj) = 3.18%

Level	N	Mean	StDev
Season1	5	6.792	1.120
Season2	4	9.458	3.950
Season3	2	7.595	0.417
Season4	4	7.515	0.372

P-value > 0.05 indicating to accept H_O that the means are not significantly different



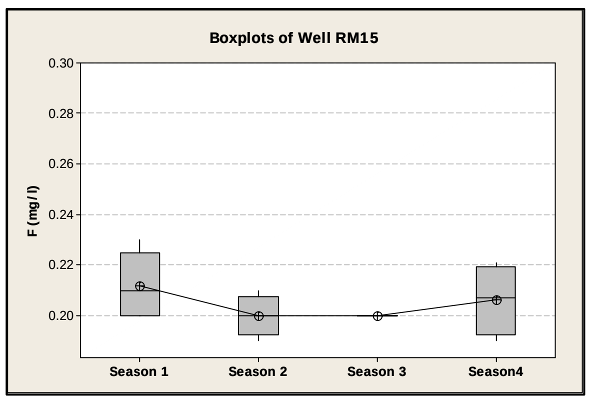
One-way ANOVA for F

Source	DF	SS	MS	F	P
Factor	3	0.000395	0.000132	0.99	**0.433**
Error	11	0.001461	0.000133		
Total	14	0.001855			

S = 0.01152   R-Sq = 21.27%   R-Sq(adj) = 0.00%

Level	N	Mean	StDev
Season1	5	0.21200	0.01304
Season2	4	0.20000	0.00816
Season3	2	0.20000	0.00000
Season4	4	0.20625	0.01391

P-value > 0.05 indicating to accept H_O that the means are not significantly different



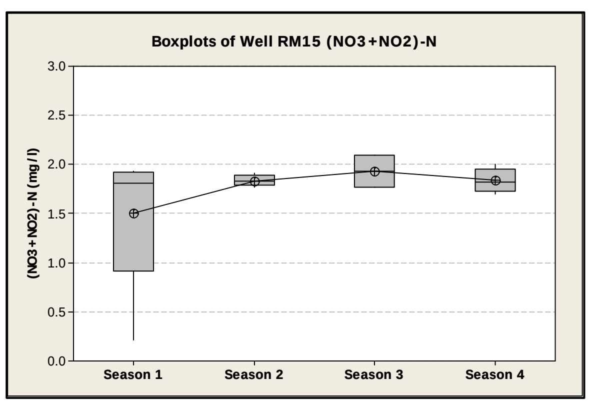
One-way ANOVA for (NO3+NO2)-N

Source	DF	SS	MS	F	P
Factor	3	0.434	0.145	0.71	**0.567**
Error	11	2.245	0.204		
Total	14	2.679			

S = 0.4518   R-Sq = 16.20%   R-Sq(adj) = 0.00%

Level	N	Mean	StDev
Season1	5	1.5000	0.7312
Season2	4	1.8350	0.0574
Season3	2	1.9300	0.2263
Season4	4	1.8375	0.1234

P-value > 0.05 indicating to accept H_O that the means are not significantly different



Well RM15 Cont.

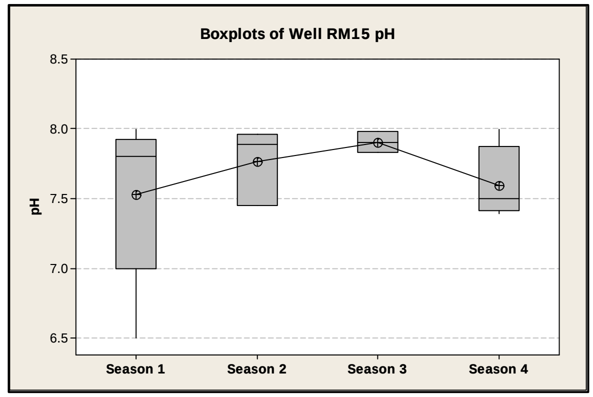
One-way ANOVA for pH

Source	DF	SS	MS	F	P
Factor	3	0.254	0.085	0.46	**0.718**
Error	10	1.846	0.185		
Total	13	2.100			

S = 0.4297 R-Sq = 12.08% R-Sq(adj) = 0.00%

Level	**N**	**Mean**	**StDev**
Season1	5	7.5300	0.6037
Season2	3	7.7667	0.2765
Season3	2	7.9050	0.1061
Season4	4	7.5975	0.2733

P-value > 0.05 indicating to accept H_O that the means are not significantly different



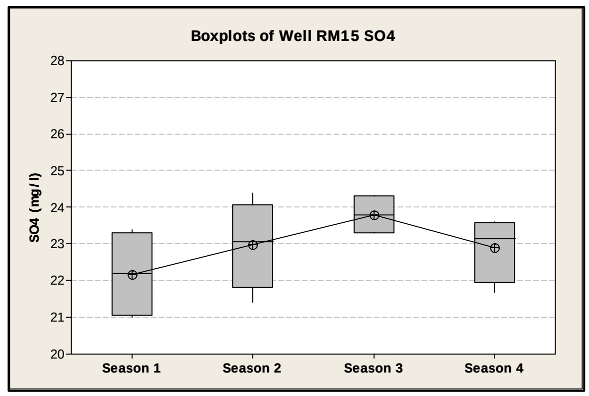
One-way ANOVA for SO4

Source	DF	SS	MS	F	P
Factor	3	4.10	1.37	1.20	**0.354**
Error	11	12.49	1.14		
Total	14	16.59			

S = 1.066 R-Sq = 24.70% R-Sq(adj) = 4.16%

Level	**N**	**Mean**	**StDev**
Season1	5	22.180	1.128
Season2	4	22.988	1.229
Season3	2	23.800	0.707
Season4	4	22.892	0.890

P-value > 0.05 indicating to accept H_O that the means are not significantly different



One-way ANOVA for TDS

Source	**DF**	**SS**	**MS**	**F**	**P**
Factor	3	331	110	0.83	**0.511**
Error	9	1201	133		
Total	12	1532			

S = 11.55 R-Sq = 21.63% R-Sq(adj) = 0.00%

Level	**N**	**Mean**	**StDev**
Season1	3	192.67	10.41
Season2	4	180.19	15.68
Season3	2	189.00	8.49
Season4	4	190.39	7.62

P-value > 0.05 indicating to accept H_O that the means are not significantly different