

**STATISTICAL ANALYSIS SUMMARY**  
**BOTTOM ASH POND**  
**Big Sandy Plant**  
**Louisa, Kentucky**

*Submitted to*



1 Riverside Plaza  
Columbus, Ohio 43215-2372

*Submitted by*



engineers | scientists | innovators

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## LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
RSL	Regional Screening Level
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

## SECTION 1

### EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at the Bottom Ash Pond (BAP), an existing CCR unit at the Big Sandy Power Plant located in Louisa, Kentucky.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron and sulfate at the BAP. An alternate source was not identified at the time, so two assessment monitoring events were conducted at the BAP in 2018, in accordance with 40 CFR 257.95.

Groundwater data underwent several validation tests, including those for completeness, sample tracking accuracy, transcription errors, and consistent use of measurement units. No data quality issues were identified which would impact the usability of the data.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Groundwater protection standards (GWPSs) were established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at a statistically significant level (SSL) above the GWPS. No SSLs were identified, but Appendix III concentrations for boron and sulfate remained above background. Thus, either the unit will remain in assessment monitoring or an alternative source demonstration will be conducted to evaluate if the unit can return to detection monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

## SECTION 2

### BOTTOM ASH POND EVALUATION

#### 2.1 Data Validation & QA/QC

During the assessment monitoring program, two sets of samples were collected for analysis from each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(b) and 257.95(d)(1). Samples from both sampling events were analyzed for the Appendix III and Appendix IV parameters. A summary of data collected during assessment monitoring may be found in Table 1.

Chemical analysis was completed by an analytical laboratory certified by the National Environmental Laboratory Accreditation Program (NELAP). Quality assurance and quality control (QA/QC) samples completed by the analytical laboratory included the use of laboratory reagent blanks (LRBs), continuing calibration verification (CCV) samples, and laboratory fortified blanks (LFBs).

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.5 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

#### 2.2 Statistical Analysis

Statistical analyses for the BAP were conducted in accordance with the January 2017 *Statistical Analysis Plan* (AEP, 2017), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained to meet the requirements of 40 CFR 257.95(b) and 257.95(d)(1) were screened for potential outliers. Outliers identified from the background and detection monitoring events conducted through January 2018 were summarized in a previous report (Geosyntec, 2018). While the reported combined radium value of 83.973 pCi/L for the June 2017 sampling event at downgradient well MW-1614 was not previously identified as an outlier, it was removed from the dataset as an outlier during these analyses based on recent sampling values. Additionally, the reported combined radium value of 65.9 pCi/L for the September 24, 2018 sampling event at downgradient well MW-1614 was identified as an outlier and removed from the database without replacement. The removal of these values did not affect the determination that an SSL was not present for radium at MW-1614.

### 2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (AEP, 2017). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or regional screening level (RSL) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Generally, tolerance limits were calculated parametrically with 95% coverage and 95% confidence. Non-parametric tolerance limits were calculated for antimony, arsenic, barium, cadmium, cobalt, fluoride, and selenium due to apparent non-normal distributions and for mercury due to a high non-detect frequency. Tolerance limits and the final GWPSs are summarized in Table 2.

### 2.2.2 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ( $\alpha = 0.01$ ); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B.

No SSLs were identified at the Big Sandy BAP.

### 2.2.3 Evaluation of Potential Appendix III SSIs

The CCR rule allows CCR units to move from assessment monitoring to detection monitoring if all Appendix III and Appendix IV parameters were at or below background levels for two consecutive sampling events [40 CFR 257.95(e)]. Since no Appendix IV SSLs were identified, Appendix III results were analyzed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations.

Prediction limits were calculated for the Appendix III parameters to represent background values. As described in the January 2018 *Statistical Analysis Summary* report (Geosyntec, 2018), intrawell tests were used to evaluate potential SSIs for calcium, chloride, and TDS, whereas interwell tests were used to evaluate potential SSIs for boron, fluoride, pH, and sulfate.

Prediction limits for the interwell tests were recalculated using data collected during the 2018 assessment monitoring events. Six data points (i.e., two samples from three background wells) were added to the background dataset for each interwell test. New data were tested for outliers prior to being added to the background dataset. The updated prediction limits were calculated for a one-of-two retesting procedure, as during detection monitoring. The values of the updated prediction limits were similar to the values of the prediction limits calculated during detection

monitoring. The revised prediction limits were used to evaluate potential SSIs for boron, fluoride, pH, and sulfate.

For the intrawell tests, limited data made it possible to add only two data points (i.e., two samples from each compliance well) to each background dataset. Because two sample results are insufficient to compare against the existing background dataset, the prediction limits were not updated for the intrawell tests at this time. The prediction limits calculated during detection monitoring were used to evaluate potential SSIs for calcium, chloride, and TDS.

Data collected during the second assessment monitoring event from each compliance well were compared to the prediction limits to evaluate SSIs. The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.132 mg/L at MW-1614 (0.146 mg/L and 0.183 mg/L) and MW-1618 (0.145 mg/L and 0.133 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 54 mg/L at MW-1614 (351 mg/L and 295 mg/L), MW-1615 (256 mg/L and 474 mg/L), and MW-1618 (267 mg/L and 422 mg/L).

Based on these results, concentrations of Appendix III parameters exceeded background levels at compliance wells at the Big Sandy BAP during assessment monitoring. As a result, the Big Sandy BAP CCR unit will remain in assessment monitoring.

### **2.3 Conclusions**

Two assessment monitoring events were conducted in 2018 in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified five potential outliers, including two new outliers which were not previously identified. These outliers were removed without replacement. GWPSs were established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. No SSLs were identified.

The Appendix III results were evaluated to assess whether concentrations of Appendix III parameters exceeded background levels. Interwell tests were used to evaluate potential SSIs for boron, fluoride, pH, and sulfate, and intrawell tests were used to evaluate potential SSIs for calcium, chloride, and TDS. The prediction limits for the interwell tests were updated with additional data collected from the background wells. Prediction limits were recalculated using a one-of-two retesting procedure. The prediction limits calculated during detection monitoring were used for the intrawell tests. Boron and sulfate results exceeded background levels.

Based on this evaluation, the Big Sandy BAP CCR unit will either remain in assessment monitoring or an alternative source demonstration will be conducted to evaluate if the unit can return to detection monitoring.



### **SECTION 3**

#### **REFERENCES**

American Electric Power (AEP). 2017. Statistical Analysis Plan – Big Sandy Plant. January 2017.

Geosyntec Consultants (Geosyntec). 2018. Statistical Analysis Summary – Bottom Ash Pond, Big Sandy Plant, Louisa, Kentucky. January 15, 2018.

United States Environmental Protection Agency (USEPA). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530/R-09-007. March 2009.

# TABLES

**Table 1 – Groundwater Data Summary  
Big Sandy – Bottom Ash Pond**

*Geosyntec Consultants, Inc.*

Parameter	Unit	MW-1614		MW-1615		MW-1618		MW-1619		MW-1620	
		4/24/2018	9/24/2018	4/24/2018	9/24/2018	4/24/2018	9/24/2018	4/24/2018	9/24/2018	4/24/2018	9/24/2018
Antimony	µg/L	0.05 J	0.05	0.08	0.03 J	0.03 J	0.02 J	0.04 J	0.03 J	0.03 J	0.05 J
Arsenic	µg/L	11.5	13.9	0.23	1.2	0.43	3.74	3.15	1.84	14.8	12.4
Barium	µg/L	58.7	42.6	18.5	27.3	16.8	31.5	1570	970	159	141
Beryllium	µg/L	0.097	0.113	0.008 J	0.024	0.01 J	0.02 J	0.04J	0.072	0.026	0.032
Boron	mg/L	0.146	0.183	0.099	0.156	0.145	0.133	0.06	0.054	0.117	0.055
Cadmium	µg/L	0.02 U	0.02 U	0.07	0.17	0.03	0.05	0.03 J	0.12	0.04	0.04
Calcium	mg/L	49.1	49.6	45.2	58.3	50.8	70	146	146	8.4	9.46
Chloride	mg/L	50.5	42.1	30.4	82.1	31.2	71.4	1100	1070	18.1	16.5
Chromium	µg/L	0.341	0.405	0.215	0.323	0.05 J	0.326	0.226	0.445	0.212	0.294
Cobalt	µg/L	2.16	1.65	3.1	27.1	2.26	12.1	5.7	9.64	22.6	20.4
Combined Radium	pCi/L	0.268	65.9	0.921	1.07	1.66	1.27	7.32	7.25	0.714	1.33
Fluoride	mg/L	0.09 J	0.08 J	0.2	0.11	0.18	0.09	0.07 J	0.02 U	0.07	0.07
Lead	µg/L	0.087	0.141	0.171	0.07	0.052	0.083	0.14	0.178	0.03	0.361
Lithium	mg/L	0.002	0.001 U	0.0008 J	0.003	0.001 U	0.014	0.018	0.027	0.005	0.011
Mercury	µg/L	0.007 U	-	0.007 U	-	0.007 U	-	0.007 U	-	0.007 U	-
Molybdenum	µg/L	0.45	0.660	0.08 J	0.14	0.09 J	0.1	0.38	0.09 J	0.27	0.17
Selenium	µg/L	0.09 J	0.1	0.08 J	0.09 J	0.09 J	0.08 J	0.2 U	0.2	0.10 U	0.10 U
Total Dissolved Solids	mg/L	592	578	404	854	484	764	1910	2070	138	178
Sulfate	mg/L	351	295	256	474	267	422	48.7	44.9	51.2	50.4
Thallium	µg/L	0.02 J	0.02 J	0.097	0.103	0.113	0.141	0.06 J	0.058	0.068	0.065
pH	SU	5.94	6.38	6.11	5.80	5.89	5.89	6.34	5.97	5.53	6.08

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U: Parameter was not present in concentrations above method detection limit and is reported as the reporting limit

J: Estimated value. Parameter was detected in concentrations below the reporting limit

-: Not sampled

**Table 2: Groundwater Protection Standards  
Big Sandy Plant - Bottom Ash Pond**

Constituent Name	MCL	RSL	Background Limit
Antimony, Total (mg/L)	0.006		0.00005
Arsenic, Total (mg/L)	0.01		0.016
Barium, Total (mg/L)	2		1.82
Beryllium, Total (mg/L)	0.004		0.00007
Cadmium, Total (mg/L)	0.005		0.00012
Chromium, Total (mg/L)	0.1		0.0017
Cobalt, Total (mg/L)	n/a	0.006	0.023
Combined Radium, Total (pCi/L)	5		14.43
Fluoride, Total (mg/L)	4		0.2
Lead, Total (mg/L)	n/a	0.015	0.00058
Lithium, Total (mg/L)	n/a	0.04	0.031
Mercury, Total (mg/L)	0.002		0.000007
Molybdenum, Total (mg/L)	n/a	0.1	0.002
Selenium, Total (mg/L)	0.05		0.2
Thallium, Total (mg/L)	0.002		0.00014

Notes:

Grey cell indicates calculated UTL is higher than MCL.

MCL = Maximum Contaminant Level

RSL = Regional Screening Level

Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

The higher of the calculated UTL or MCL/RSL is used as the GWPS.

**Table 3: Appendix III Data Evaluation  
Big Sandy Plant - Bottom Ash Pond**

*Geosyntec Consultants, Inc.*

Parameter	Units	Description	MW-1614		MW-1615		MW-1618	
			4/24/2018	9/24/2018	4/24/2018	9/24/2018	4/24/2018	9/24/2018
Boron	mg/L	Interwell Backgorund Value (UPL)	0.132					
		Assessment Monitoring Result	<b>0.146</b>	<b>0.183</b>	0.099	<b>0.156</b>	<b>0.145</b>	<b>0.133</b>
Calcium	mg/L	Intrawell Backgorund Value (UPL)	68.1		96.0		77.5	
		Assessment Monitoring Result	49.1	49.6	45.2	58.3	50.8	70.0
Chloride	mg/L	Intrawell Backgorund Value (UPL)	92.5		59.1		71.1	
		Assessment Monitoring Result	50.5	42.1	30.4	<b>82.1</b>	31.2	<b>71.4</b>
Fluoride	mg/L	Interwell Backgorund Value (UPL)	0.3					
		Assessment Monitoring Result	0.09	0.08	0.2	0.11	0.18	0.09
pH	SU	Interwell Backgorund Value (UPL)	6.50					
		Interwell Background Value (LPL)	5.13					
		Assessment Monitoring Result	5.94	6.38	6.11	5.80	5.89	5.89
Sulfate	mg/L	Interwell Backgorund Value (UPL)	54					
		Assessment Monitoring Result	<b>351</b>	<b>295</b>	<b>256</b>	<b>474</b>	<b>267</b>	<b>422</b>
Total Dissolved Solids	mg/L	Intrawell Backgorund Value (UPL)	937		902		738	
		Assessment Monitoring Result	592	578	404	854	484	<b>764</b>

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

**Bold values exceed the background value.**

Background values are shaded gray.

Based on a 1-of-2 resampling, a statistically significant increase (SSI) is only identified when both samples in the detection monitoring period are above the calculated background value.

# ATTACHMENT A

Certification by Qualified Professional Engineer

**Certification by Qualified Professional Engineer**

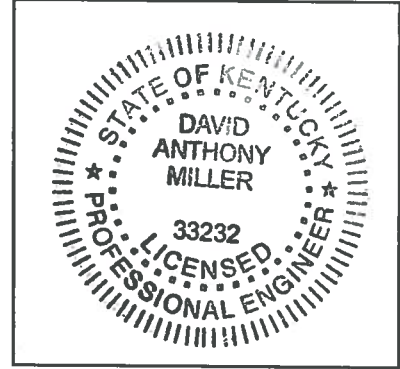
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Big Sandy Bottom Ash Pond CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



33232

License Number

KENTUCKY

Licensing State

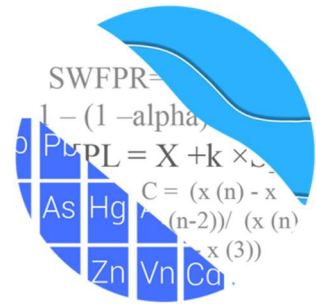
01.08.19

Date

**ATTACHMENT B**  
**Statistical Analysis Output**



# GROUNDWATER STATS CONSULTING



November 11, 2018

Geosyntec Consultants  
Attn: Ms. Allison Kreinberg  
150 E. Wilson Bridge Rd., #232  
Worthington, OH 43085

Re: Big Sandy Bottom Ash Pond  
Assessment Monitoring Event – September 2018

Dear Ms. Kreinberg,

Groundwater Stats Consulting (GSC), formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the evaluation of groundwater data for the September 2018 Assessment Monitoring event for American Electric Power Company's Big Sandy Bottom Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began at site for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** MW-1619 and MW-1620; and
- **Downgradient wells:** MW-1614, MW-1615, and MW-1618.

Data were sent electronically, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC.

The CCR program consists of the following constituents:

- **Appendix III** (Detection Monitoring) - boron, calcium, chloride, fluoride, pH, sulfate, and TDS; and

- **Appendix IV** (Assessment Monitoring) – antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium.

Time series plots for Appendix III and IV parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record. Values in background which have previously been flagged as outliers may be seen in a lighter font and disconnected symbol on the graphs. Additionally, a summary of flagged values follows this letter.

### **Evaluation of Appendix III Parameters**

Interwell prediction limits combined with a 1-of-2 verification strategy were constructed for boron, fluoride, pH and sulfate; and intrawell prediction limits combined with a 1-of-2 verification strategy were constructed for calcium, chloride and TDS. In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of one additional sample to determine whether the initial exceedance is confirmed. When the resample confirms the initial exceedance, a statistically significant increase (SSI) is identified and further research would be required to identify the cause of the exceedance (i.e. impact from the site, natural variation, or an off-site source). If the resample falls within the statistical limit, the initial exceedance is considered a false positive result and, therefore, no further action is necessary. SSIs were noted for some of the Appendix III parameters and the results of those findings may be found in the Prediction Limit Summary tables following this letter.

When a statistically significant increase is identified, the data are further evaluated using the Sen's Slope/Mann Kendall trend test to determine whether data are statistically increasing, decreasing or stable. No statistically significant trends were found. The Trend Test Summary Table follows this letter.

### **Evaluation of Appendix IV Parameters**

Parametric tolerance limits were used to calculate background limits from pooled upgradient well data for Appendix IV parameters with a target of 95% confidence and 95% coverage to determine the Alternate Contaminant Level (ACL). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits were compared to the Maximum Contaminant Levels (MCLs) and Regional Screening Levels (RSLs) in the Groundwater Protection Standards (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons.

Confidence intervals were then constructed on downgradient wells for each of the Appendix IV parameters using the highest limit of either the MCL, RSL, or ACL as discussed above. Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No exceedances were noted for any of the well/constituent pairs. Well MW-1614 had reported observations of 83.97 pCi/L and 65.90 pCi/L on 6/26/17 and 9/24/18, respectively. Because those values are anomalous per discussion with Geosyntec, they were flagged in the database as outliers and deselected prior to construction of the confidence interval. A summary of the confidence interval results follows this letter.

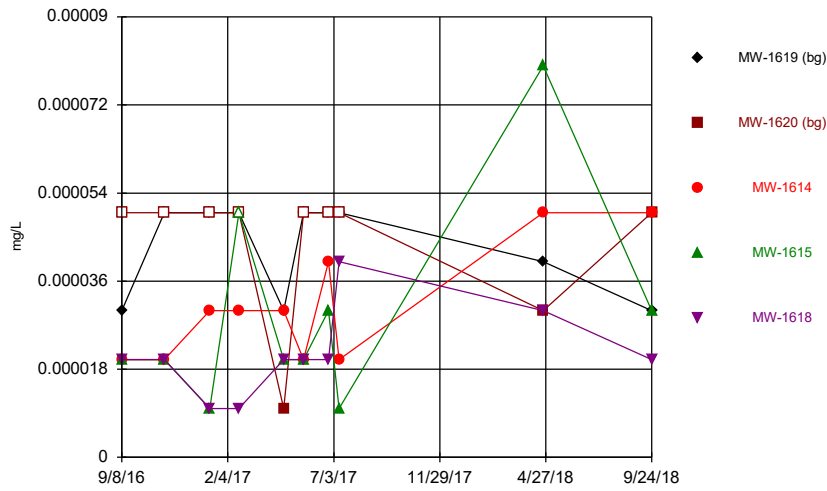
Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for Big Sandy Bottom Ash Pond. If you have any questions or comments, please feel free to contact me.

For Groundwater Stats Consulting,

A handwritten signature in cursive script that reads "Kristina Rayner".

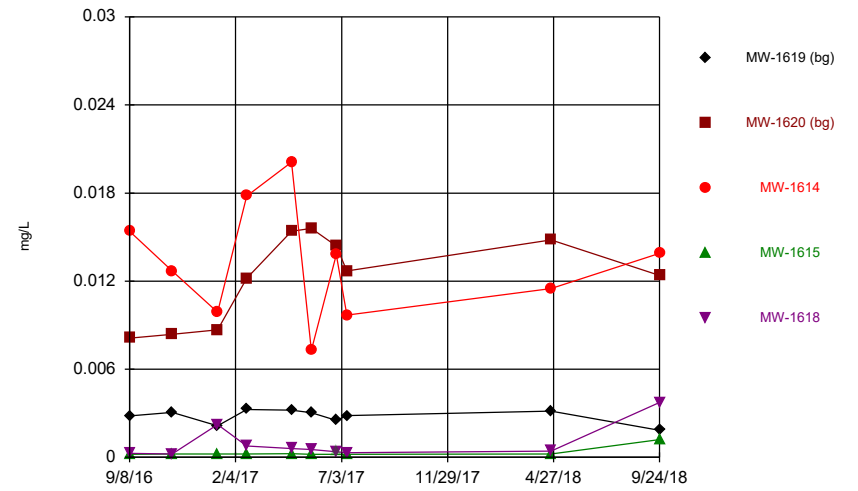
Kristina L. Rayner  
Groundwater Statistician

### Time Series



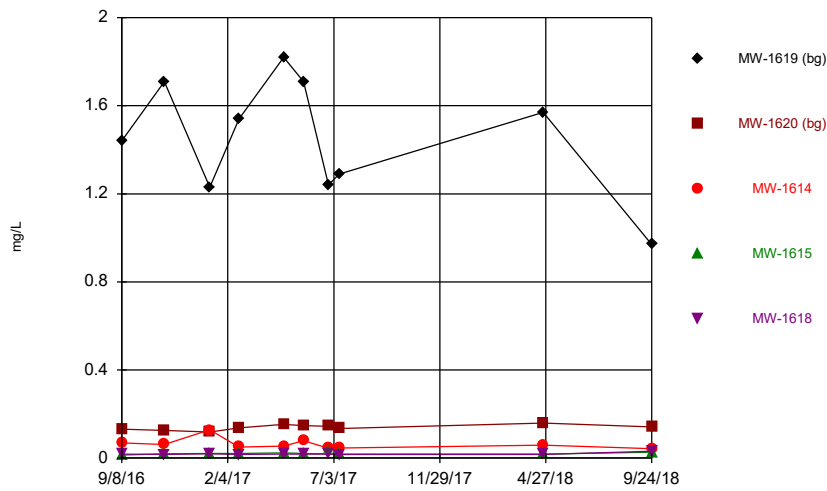
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



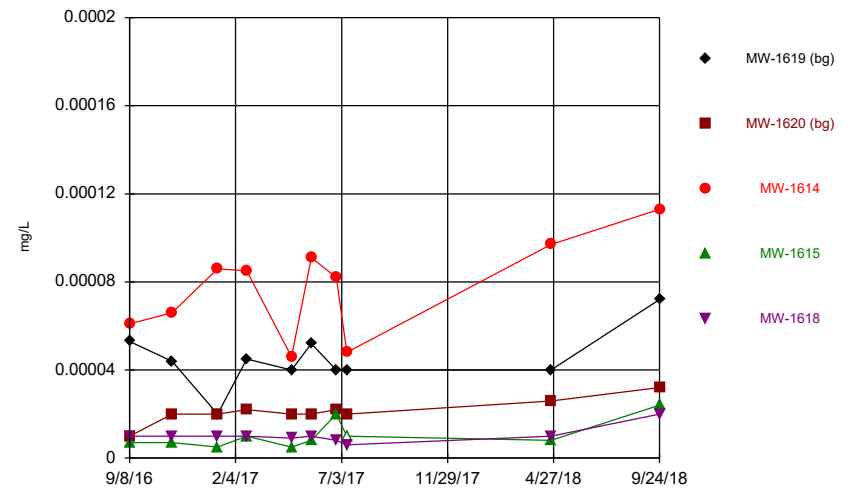
Constituent: Arsenic, Total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



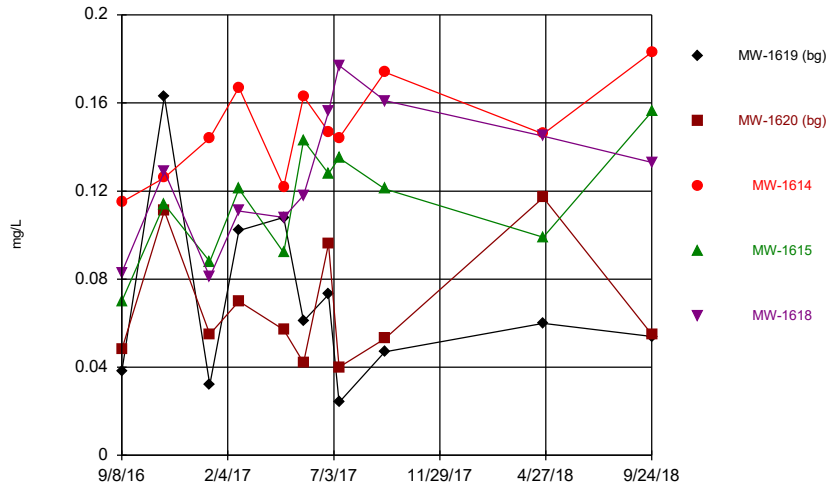
Constituent: Barium, Total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



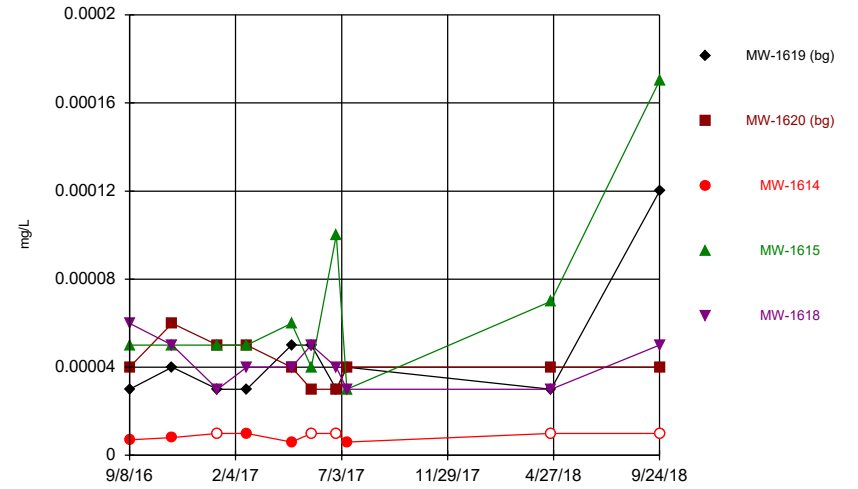
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



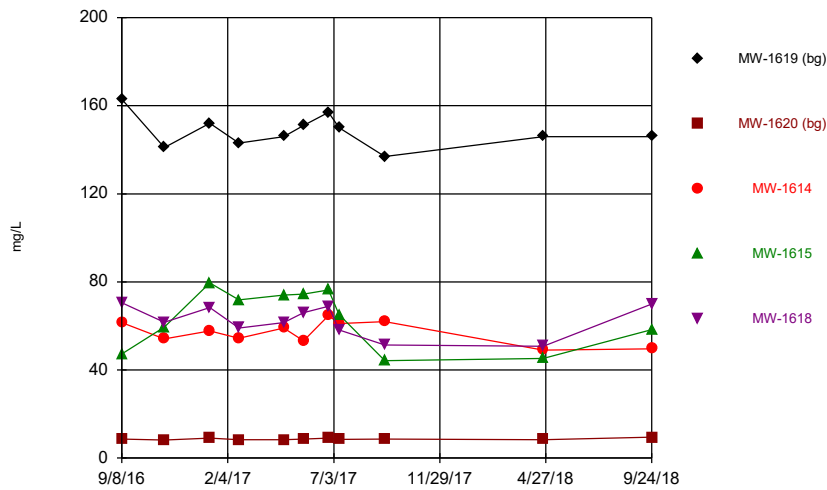
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



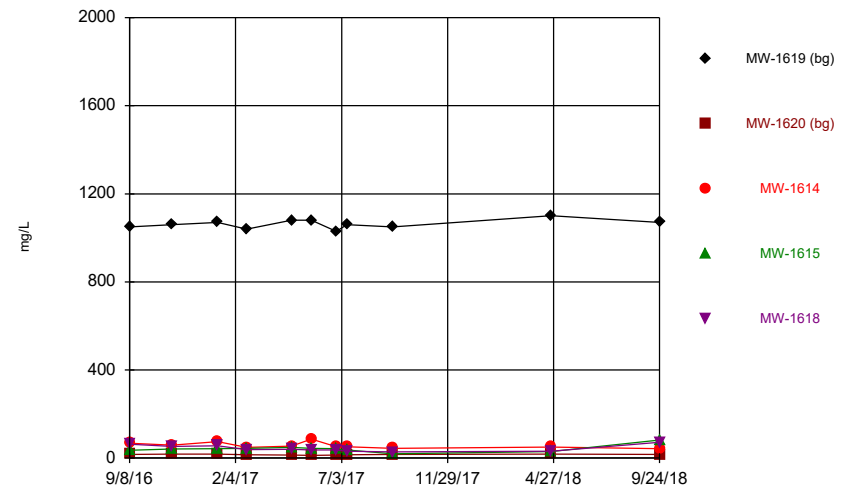
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



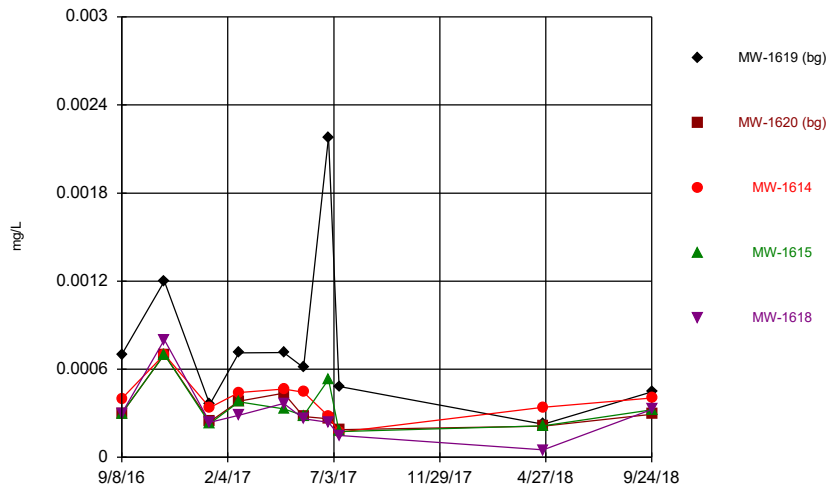
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Time Series



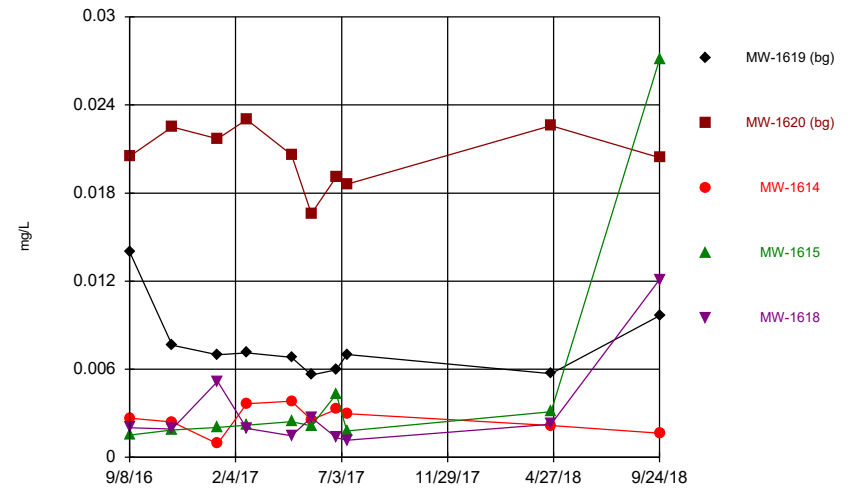
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



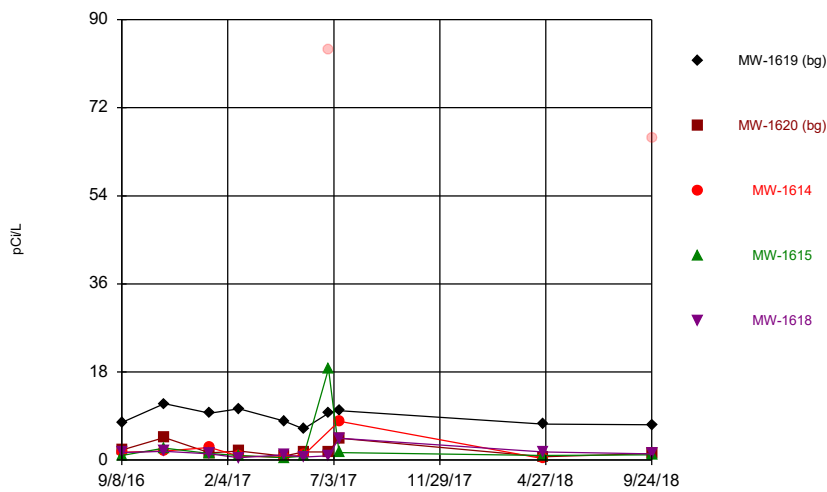
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Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



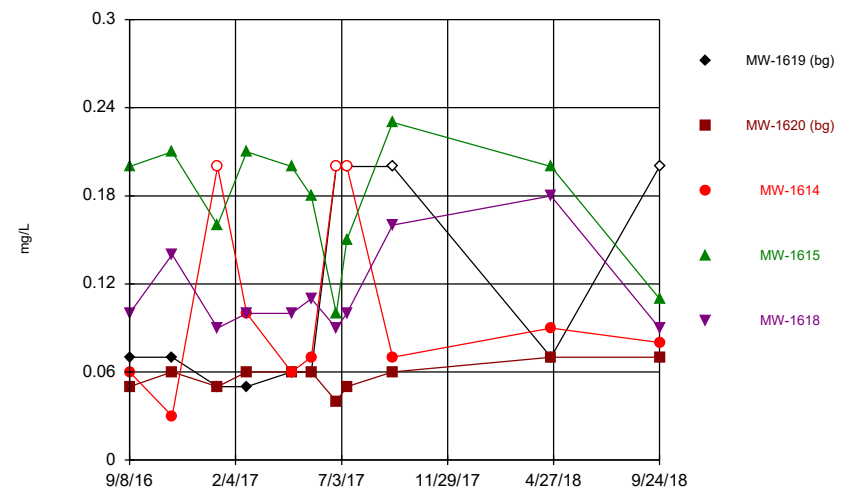
Constituent: Cobalt, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



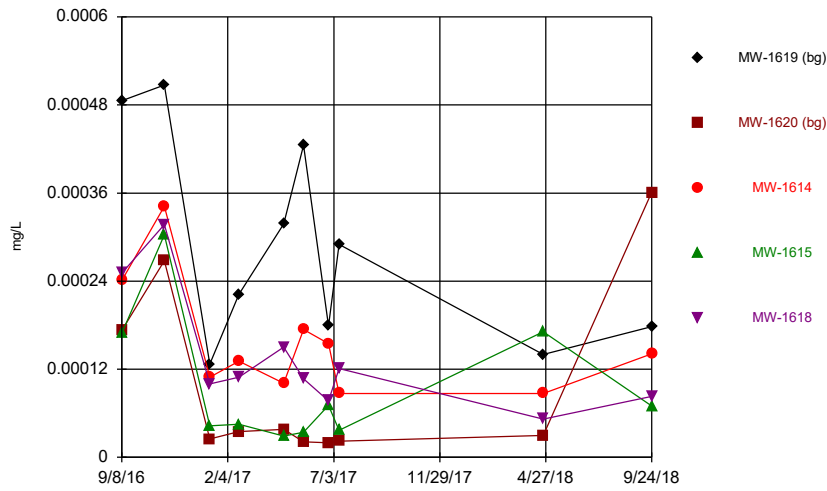
Constituent: Combined Radium 226 + 228 Analysis Run 11/11/2018 8:56 AM View: Time Series - All Well  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



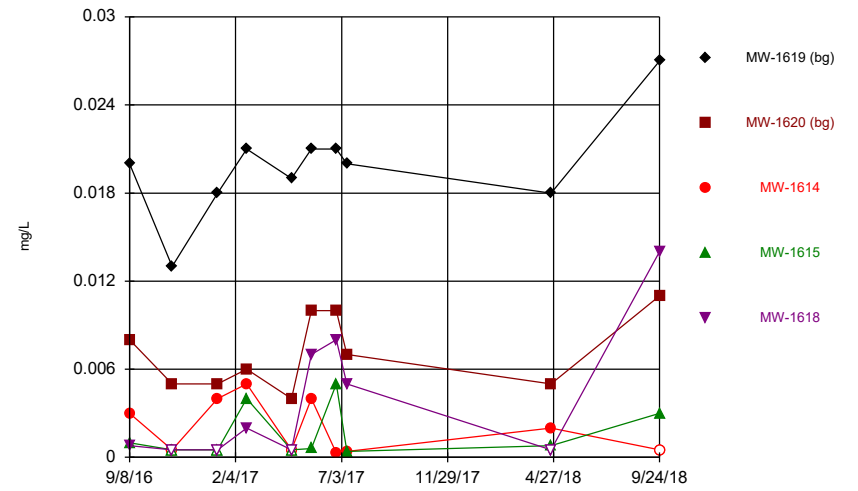
Constituent: Fluoride, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



Constituent: Lead, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

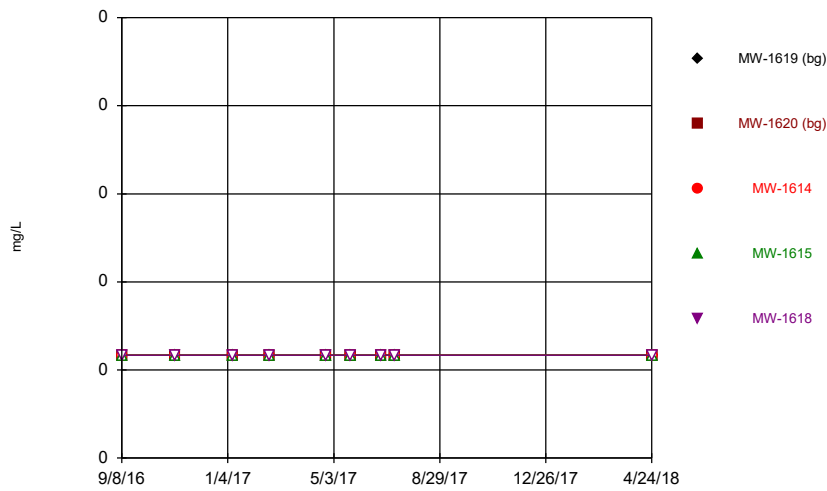
Time Series



Constituent: Lithium, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

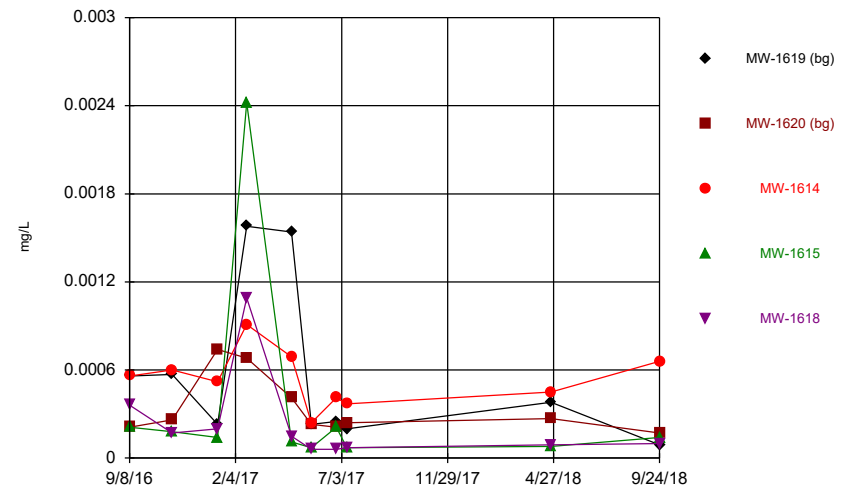
Hollow symbols indicate censored values.

Time Series



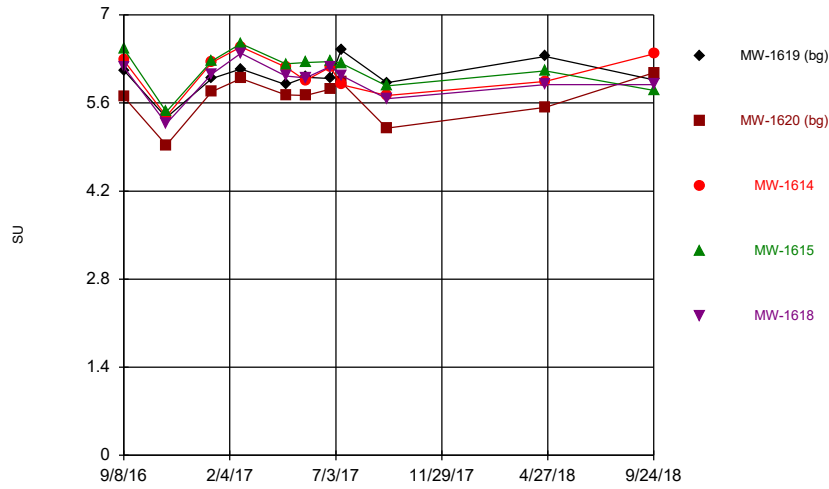
Constituent: Mercury, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



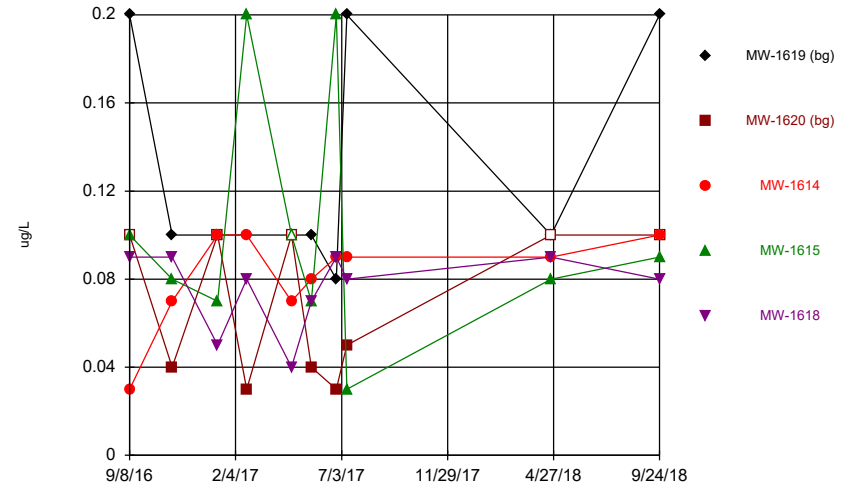
Constituent: Molybdenum, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



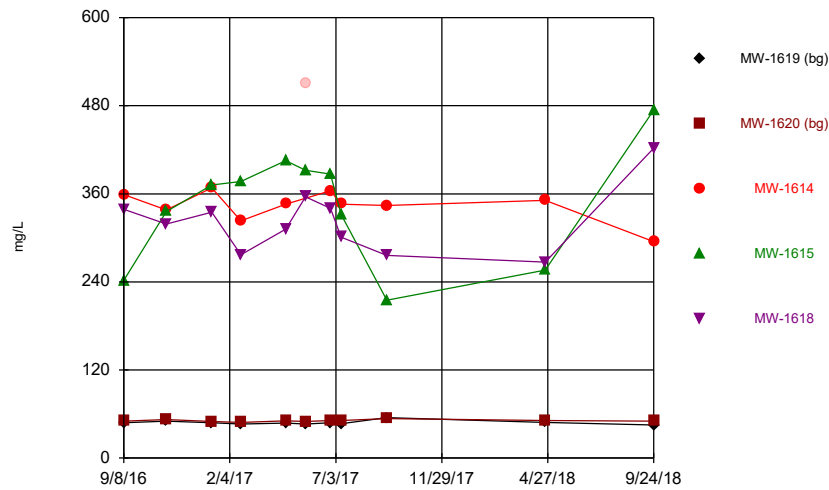
Constituent: pH, field Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



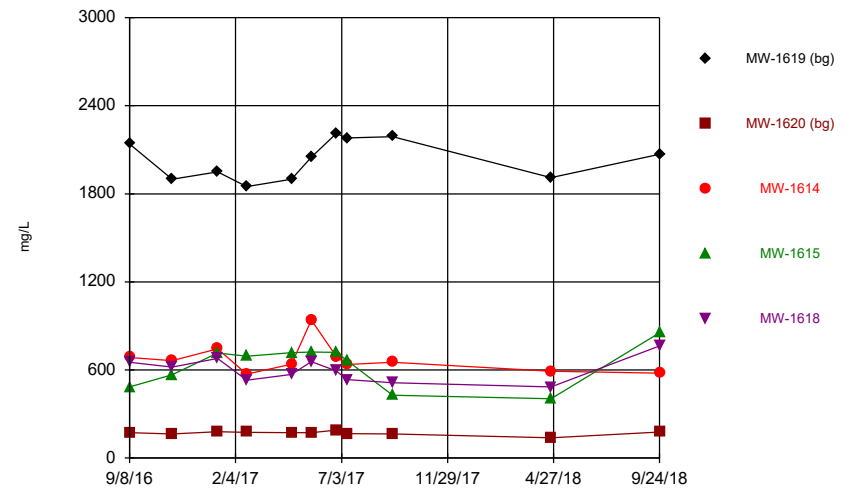
Constituent: Selenium, Total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Time Series



Constituent: Sulfate, total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

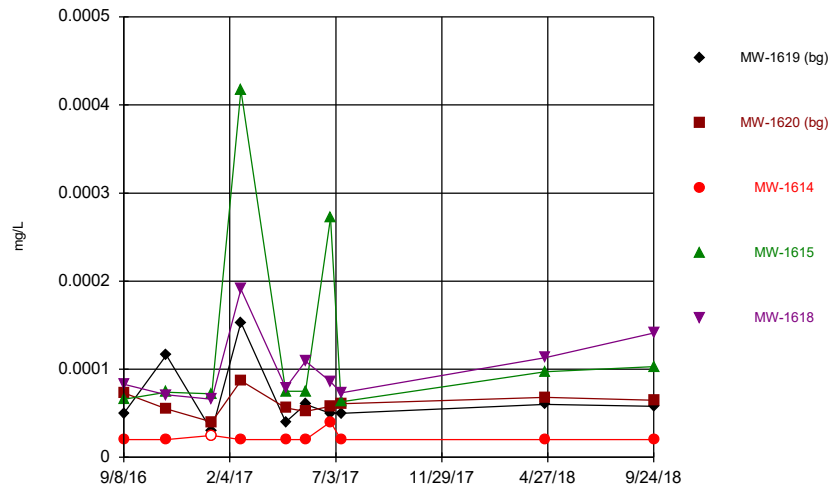
Time Series



Constituent: TDS Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP



### Time Series



Constituent: Thallium, Total Analysis Run 11/11/2018 8:56 AM View: Time Series - All Wells  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

# Interwell Prediction Limit Summary Table - Significant Results

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:06 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	MW-1614	0.1319	9/24/2018	0.183	Yes	22	0.06845	0.03399	0	None	No	0.002505	Param Inter 1 of 2
Boron, total (mg/L)	MW-1615	0.1319	9/24/2018	0.156	Yes	22	0.06845	0.03399	0	None	No	0.002505	Param Inter 1 of 2
Boron, total (mg/L)	MW-1618	0.1319	9/24/2018	0.133	Yes	22	0.06845	0.03399	0	None	No	0.002505	Param Inter 1 of 2
Sulfate, total (mg/L)	MW-1614	54.19	9/24/2018	295	Yes	22	49.59	2.465	0	None	No	0.002505	Param Inter 1 of 2
Sulfate, total (mg/L)	MW-1615	54.19	9/24/2018	474	Yes	22	49.59	2.465	0	None	No	0.002505	Param Inter 1 of 2
Sulfate, total (mg/L)	MW-1618	54.19	9/24/2018	422	Yes	22	49.59	2.465	0	None	No	0.002505	Param Inter 1 of 2

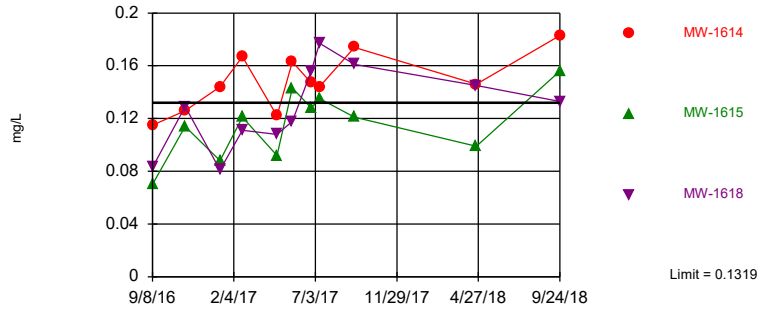
# Interwell Prediction Limit Summary Table - All Results

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:06 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
<b>Boron, total (mg/L)</b>	<b>MW-1614</b>	<b>0.1319</b>	<b>9/24/2018</b>	<b>0.183</b>	<b>Yes</b>	<b>22</b>	<b>0.06845</b>	<b>0.03399</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	<b>Param Inter 1 of 2</b>
<b>Boron, total (mg/L)</b>	<b>MW-1615</b>	<b>0.1319</b>	<b>9/24/2018</b>	<b>0.156</b>	<b>Yes</b>	<b>22</b>	<b>0.06845</b>	<b>0.03399</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	<b>Param Inter 1 of 2</b>
<b>Boron, total (mg/L)</b>	<b>MW-1618</b>	<b>0.1319</b>	<b>9/24/2018</b>	<b>0.133</b>	<b>Yes</b>	<b>22</b>	<b>0.06845</b>	<b>0.03399</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	<b>Param Inter 1 of 2</b>
Fluoride, total (mg/L)	MW-1614	0.2	9/24/2018	0.08	No	22	n/a	n/a	18.18	n/a	n/a	0.003586	NP Inter (normality) ...
Fluoride, total (mg/L)	MW-1615	0.2	9/24/2018	0.11	No	22	n/a	n/a	18.18	n/a	n/a	0.003586	NP Inter (normality) ...
Fluoride, total (mg/L)	MW-1618	0.2	9/24/2018	0.09	No	22	n/a	n/a	18.18	n/a	n/a	0.003586	NP Inter (normality) ...
pH, field (SU)	MW-1614	6.498	9/24/2018	6.38	No	22	5.845	0.3499	0	None	No	0.001253	Param Inter 1 of 2
pH, field (SU)	MW-1615	6.498	9/24/2018	5.8	No	22	5.845	0.3499	0	None	No	0.001253	Param Inter 1 of 2
pH, field (SU)	MW-1618	6.498	9/24/2018	5.89	No	22	5.845	0.3499	0	None	No	0.001253	Param Inter 1 of 2
<b>Sulfate, total (mg/L)</b>	<b>MW-1614</b>	<b>54.19</b>	<b>9/24/2018</b>	<b>295</b>	<b>Yes</b>	<b>22</b>	<b>49.59</b>	<b>2.465</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	<b>Param Inter 1 of 2</b>
<b>Sulfate, total (mg/L)</b>	<b>MW-1615</b>	<b>54.19</b>	<b>9/24/2018</b>	<b>474</b>	<b>Yes</b>	<b>22</b>	<b>49.59</b>	<b>2.465</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	<b>Param Inter 1 of 2</b>
<b>Sulfate, total (mg/L)</b>	<b>MW-1618</b>	<b>54.19</b>	<b>9/24/2018</b>	<b>422</b>	<b>Yes</b>	<b>22</b>	<b>49.59</b>	<b>2.465</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	<b>Param Inter 1 of 2</b>

Exceeds Limit: MW-1614, MW-1615, MW-1618

Prediction Limit  
Interwell Parametric

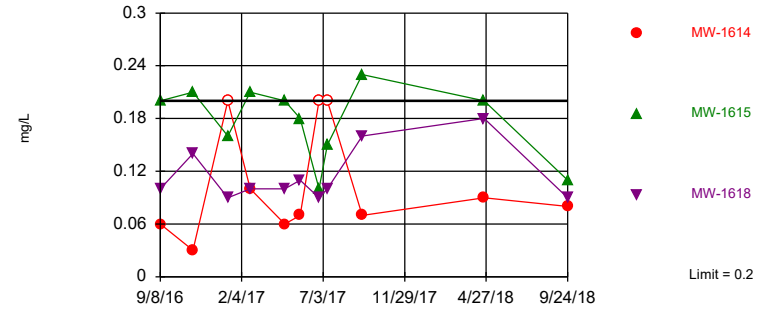


Background Data Summary: Mean=0.06845, Std. Dev.=0.03399, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8851, critical = 0.878. Kappa = 1.866 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Constituent: Boron, total Analysis Run 10/30/2018 9:04 AM View: PLs - Interwell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limit

Prediction Limit  
Interwell Non-parametric

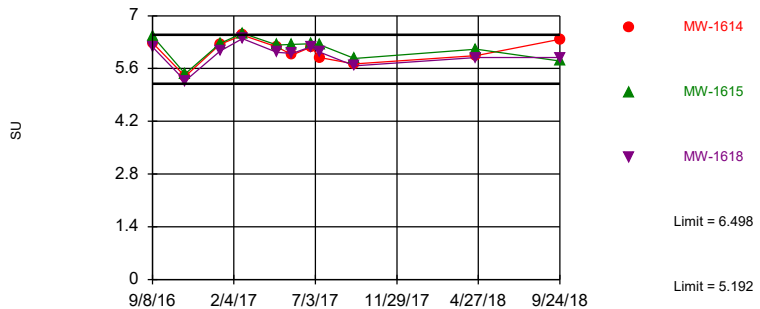


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 22 background values. 18.18% NDs. Annual per-constituent alpha = 0.02133. Individual comparison alpha = 0.003586 (1 of 2). Comparing 3 points to limit.

Constituent: Fluoride, total Analysis Run 10/30/2018 9:05 AM View: PLs - Interwell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limits

Prediction Limit  
Interwell Parametric

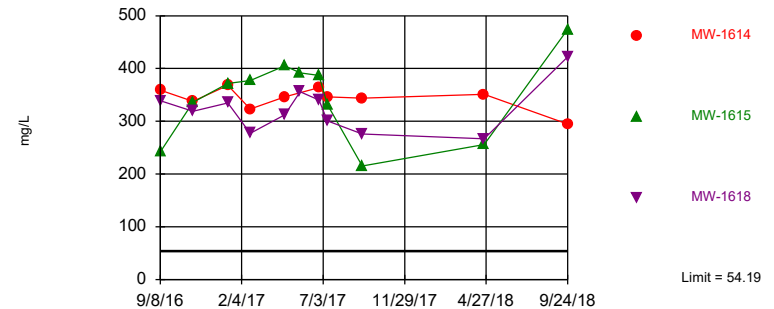


Background Data Summary: Mean=5.845, Std. Dev.=0.3499, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9314, critical = 0.878. Kappa = 1.866 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001253. Comparing 3 points to limit.

Constituent: pH, field Analysis Run 10/30/2018 9:05 AM View: PLs - Interwell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Exceeds Limit: MW-1614, MW-1615, MW-1618

Prediction Limit  
Interwell Parametric



Background Data Summary: Mean=49.59, Std. Dev.=2.465, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.98, critical = 0.878. Kappa = 1.866 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Constituent: Sulfate, total Analysis Run 10/30/2018 9:05 AM View: PLs - Interwell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

# Intrawell Prediction Limit Summary Table - Significant Results

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:16 AM

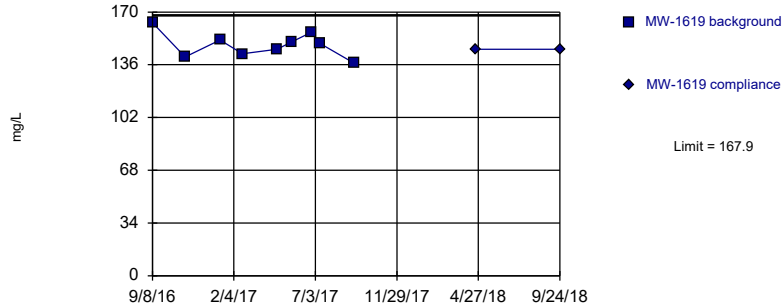
Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	MW-1620	9.324	9/24/2018	9.46	Yes	9	8.574	0.3191	0	None	No	0.002505	Param 1 of 2
Chloride, total (mg/L)	MW-1618	71.11	9/24/2018	71.4	Yes	9	42.76	12.07	0	None	No	0.002505	Param 1 of 2
TDS (mg/L)	MW-1618	737.5	9/24/2018	764	Yes	9	594.3	60.97	0	None	No	0.002505	Param 1 of 2
Chloride, total (mg/L)	MW-1615	59.06	9/24/2018	82.1	Yes	9	39.6	8.288	0	None	No	0.002505	Param 1 of 2

# Intrawell Prediction Limit Summary Table - All Results

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:16 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	MW-1614	68.14	9/24/2018	49.6	No	9	58.67	4.034	0	None	No	0.002505	Param 1 of 2
Calcium, total (mg/L)	MW-1615	96.02	9/24/2018	58.3	No	9	65.82	12.86	0	None	No	0.002505	Param 1 of 2
Calcium, total (mg/L)	MW-1618	77.45	9/24/2018	70	No	9	62.87	6.209	0	None	No	0.002505	Param 1 of 2
Calcium, total (mg/L)	MW-1619	167.9	9/24/2018	146	No	9	148.9	8.115	0	None	No	0.002505	Param 1 of 2
<b>Calcium, total (mg/L)</b>	<b>MW-1620</b>	<b>9.324</b>	<b>9/24/2018</b>	<b>9.46</b>	<b>Yes</b>	<b>9</b>	<b>8.574</b>	<b>0.3191</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	Param 1 of 2
Chloride, total (mg/L)	MW-1614	92.54	9/24/2018	42.1	No	9	60.08	13.83	0	None	No	0.002505	Param 1 of 2
<b>Chloride, total (mg/L)</b>	<b>MW-1615</b>	<b>59.06</b>	<b>9/24/2018</b>	<b>82.1</b>	<b>Yes</b>	<b>9</b>	<b>39.6</b>	<b>8.288</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	Param 1 of 2
<b>Chloride, total (mg/L)</b>	<b>MW-1618</b>	<b>71.11</b>	<b>9/24/2018</b>	<b>71.4</b>	<b>Yes</b>	<b>9</b>	<b>42.76</b>	<b>12.07</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	Param 1 of 2
Chloride, total (mg/L)	MW-1619	1098	9/24/2018	1070	No	9	1058	17.16	0	None	No	0.002505	Param 1 of 2
Chloride, total (mg/L)	MW-1620	20.08	9/24/2018	16.5	No	9	15.69	1.87	0	None	No	0.002505	Param 1 of 2
TDS (mg/L)	MW-1614	937.2	9/24/2018	578	No	9	692.1	104.4	0	None	No	0.002505	Param 1 of 2
TDS (mg/L)	MW-1615	901.6	9/24/2018	854	No	9	635.2	113.5	0	None	No	0.002505	Param 1 of 2
<b>TDS (mg/L)</b>	<b>MW-1618</b>	<b>737.5</b>	<b>9/24/2018</b>	<b>764</b>	<b>Yes</b>	<b>9</b>	<b>594.3</b>	<b>60.97</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.002505</b>	Param 1 of 2
TDS (mg/L)	MW-1619	2378	9/24/2018	2070	No	9	2041	143.4	0	None	No	0.002505	Param 1 of 2
TDS (mg/L)	MW-1620	193.2	9/24/2018	178	No	9	173.6	8.353	0	None	No	0.002505	Param 1 of 2

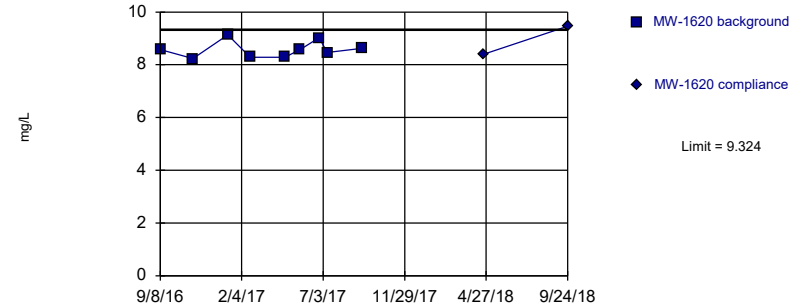
Within Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=148.9, Std. Dev.=8.115, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9824, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

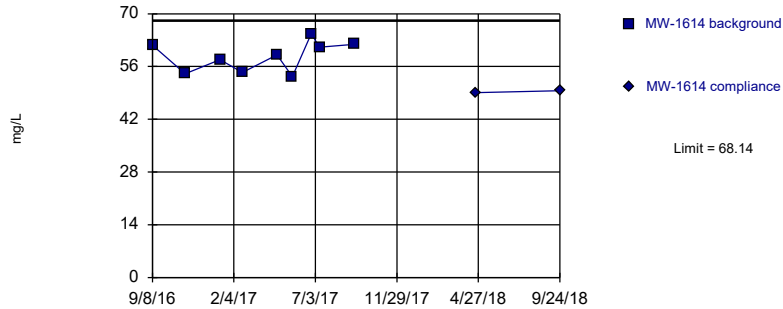
Exceeds Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=8.574, Std. Dev.=0.3191, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8841, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

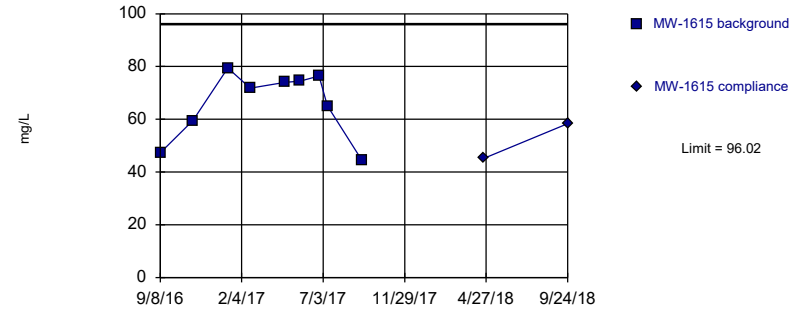
Within Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=58.67, Std. Dev.=4.034, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9257, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

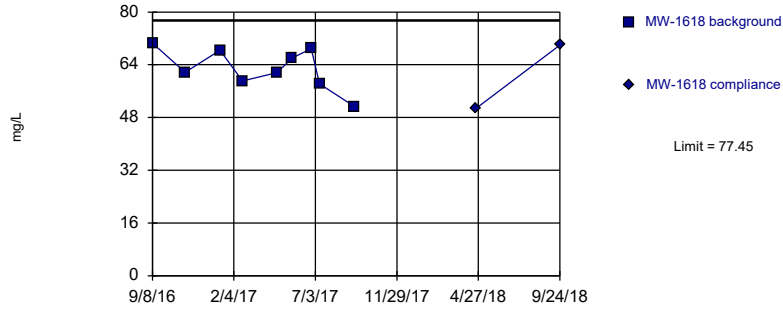
Within Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=65.82, Std. Dev.=12.86, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8719, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

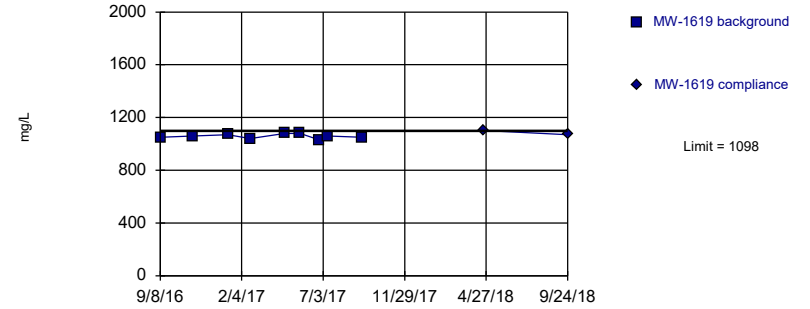
Within Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=62.87, Std. Dev.=6.209, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9413, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

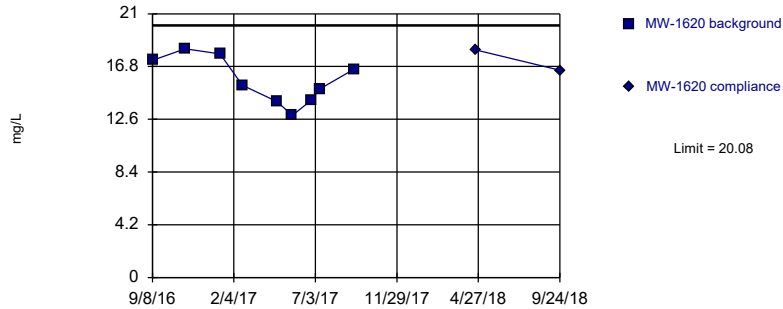
Within Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=1058, Std. Dev.=17.16, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9504, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Chloride, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

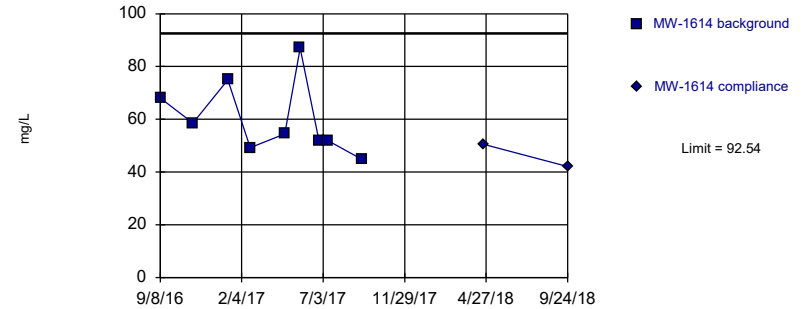
Within Limit Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=15.69, Std. Dev.=1.87, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9436, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Chloride, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limit Prediction Limit  
Intrawell Parametric



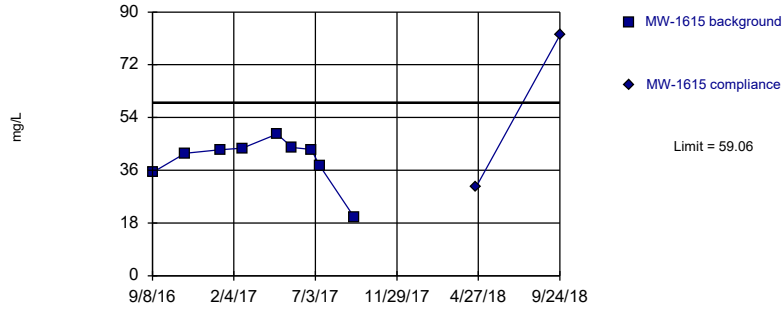
Background Data Summary: Mean=60.08, Std. Dev.=13.83, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8986, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Chloride, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP



Exceeds Limit

Prediction Limit  
Intrawell Parametric

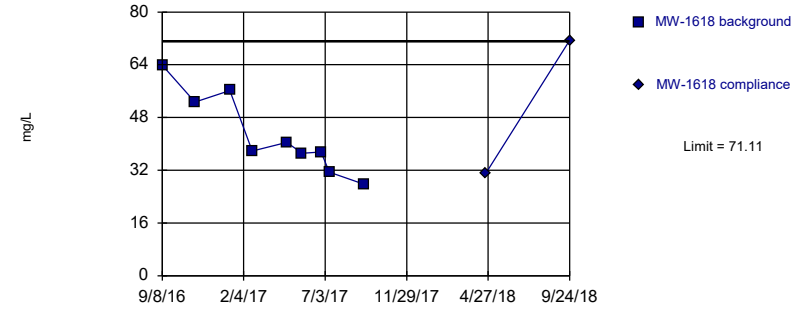


Background Data Summary: Mean=39.6, Std. Dev.=8.288, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7894, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Chloride, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Exceeds Limit

Prediction Limit  
Intrawell Parametric

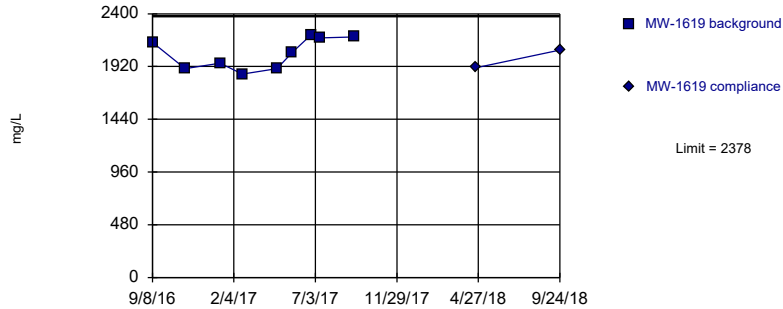


Background Data Summary: Mean=42.76, Std. Dev.=12.07, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9139, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Chloride, total Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limit

Prediction Limit  
Intrawell Parametric

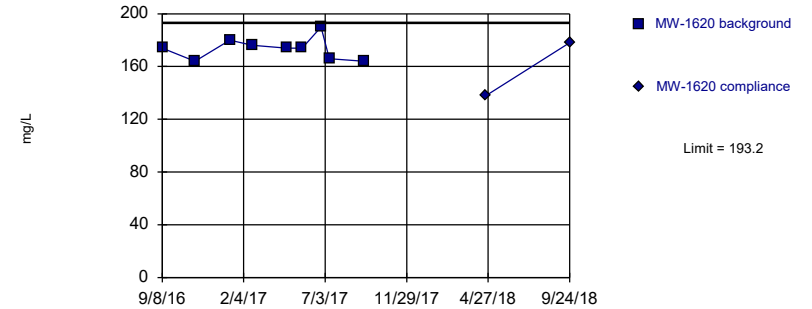


Background Data Summary: Mean=2041, Std. Dev.=143.4, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8749, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: TDS Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limit

Prediction Limit  
Intrawell Parametric

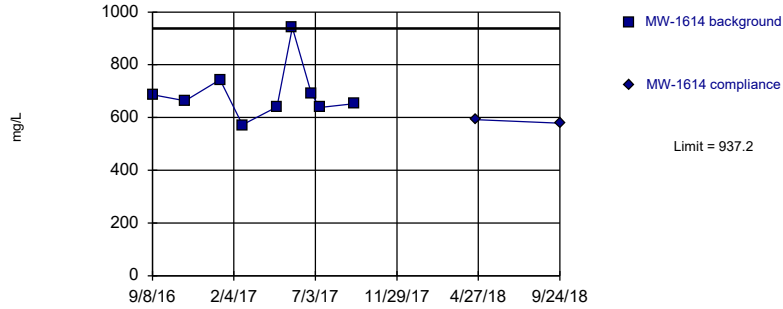


Background Data Summary: Mean=173.6, Std. Dev.=8.353, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9049, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: TDS Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limit

Prediction Limit  
Intrawell Parametric

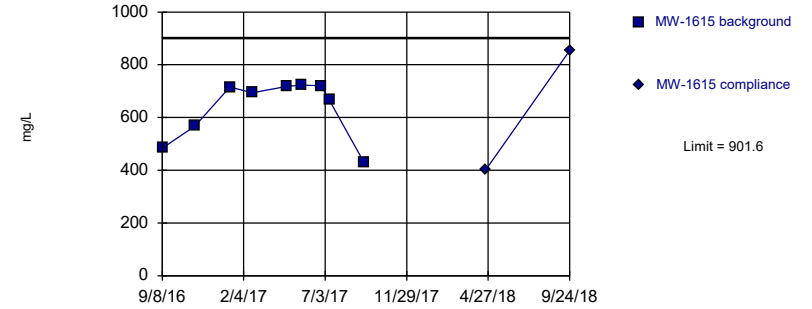


Background Data Summary: Mean=692.1, Std. Dev.=104.4, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8067, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: TDS Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Within Limit

Prediction Limit  
Intrawell Parametric

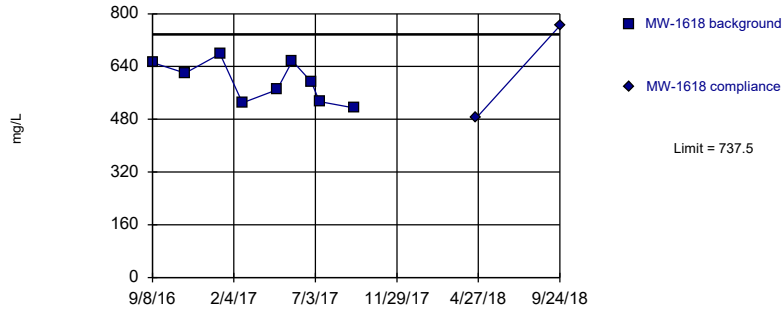


Background Data Summary: Mean=635.2, Std. Dev.=113.5, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7865, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: TDS Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

Exceeds Limit

Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=594.3, Std. Dev.=60.97, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9246, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: TDS Analysis Run 10/30/2018 9:08 AM View: PLs - Intrawell  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

# Trend Test Summary Table - All Results (No Significant Results)

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:20 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	MW-1619 (bg)	-0.01604	-11	-34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1620 (bg)	0	0	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1614	0.02888	28	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1615	0.02433	26	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1618	0.03816	27	34	No	11	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1619 (bg)	-3.724	-10	-34	No	11	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1620 (bg)	0.1738	16	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1619 (bg)	11.93	11	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1620 (bg)	-0.3914	-5	-34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1615	1.203	3	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1618	-21.1	-27	-34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1619 (bg)	-1.005	-6	-34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1620 (bg)	0.4309	9	34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1614	-13.23	-10	-30	No	10	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1615	44.51	7	34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1618	-15.21	-9	-34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1619 (bg)	57.03	14	34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1620 (bg)	-9.542	-9	-34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1618	-86	-15	-34	No	11	0	n/a	n/a	0.01	NP

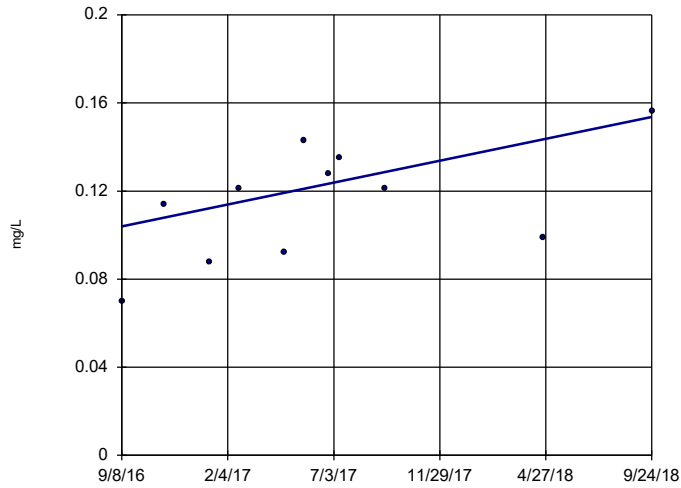
# Trend Test Summary Table - All Results (No Significant Results)

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:20 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	MW-1619 (bg)	-0.01604	-11	-34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1620 (bg)	0	0	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1614	0.02888	28	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1615	0.02433	26	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1618	0.03816	27	34	No	11	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1619 (bg)	-3.724	-10	-34	No	11	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1620 (bg)	0.1738	16	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1619 (bg)	11.93	11	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1620 (bg)	-0.3914	-5	-34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1615	1.203	3	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1618	-21.1	-27	-34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1619 (bg)	-1.005	-6	-34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1620 (bg)	0.4309	9	34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1614	-13.23	-10	-30	No	10	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1615	44.51	7	34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1618	-15.21	-9	-34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1619 (bg)	57.03	14	34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1620 (bg)	-9.542	-9	-34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1618	-86	-15	-34	No	11	0	n/a	n/a	0.01	NP

### Sen's Slope Estimator

MW-1615

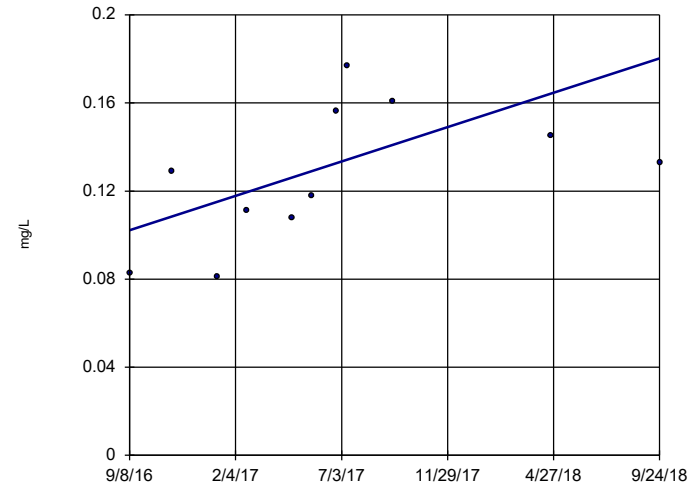


n = 11  
 Slope = 0.02433  
 units per year.  
 Mann-Kendall  
 statistic = 26  
 critical = 34  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Boron, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

MW-1618

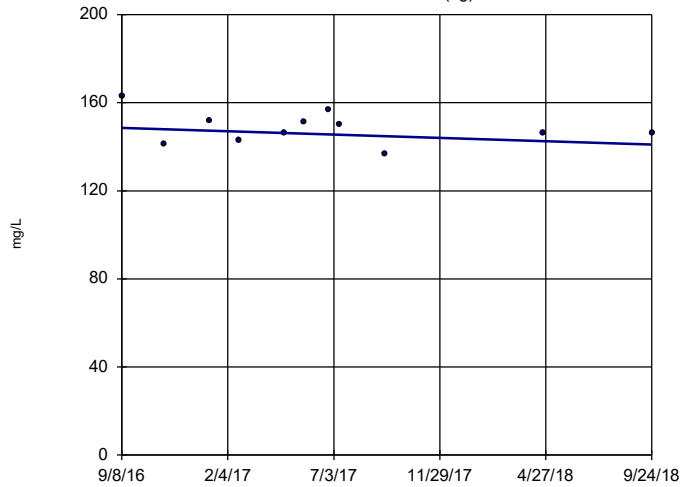


n = 11  
 Slope = 0.03816  
 units per year.  
 Mann-Kendall  
 statistic = 27  
 critical = 34  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Boron, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

MW-1619 (bg)

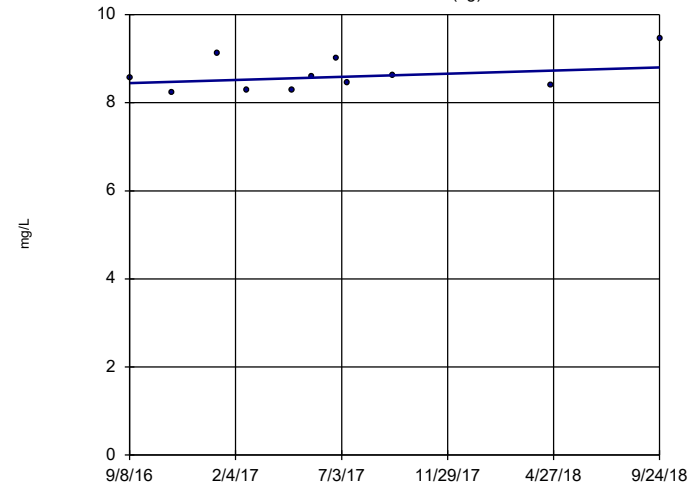


n = 11  
 Slope = -3.724  
 units per year.  
 Mann-Kendall  
 statistic = -10  
 critical = -34  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Calcium, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

MW-1620 (bg)



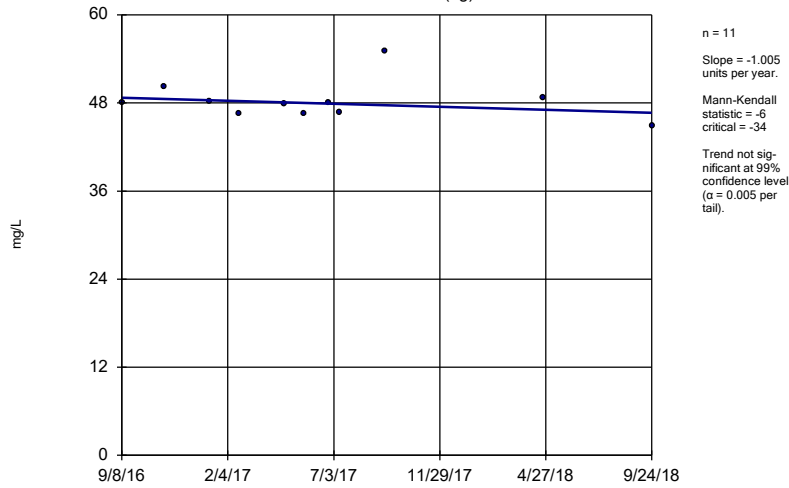
n = 11  
 Slope = 0.1738  
 units per year.  
 Mann-Kendall  
 statistic = 16  
 critical = 34  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Calcium, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP



### Sen's Slope Estimator

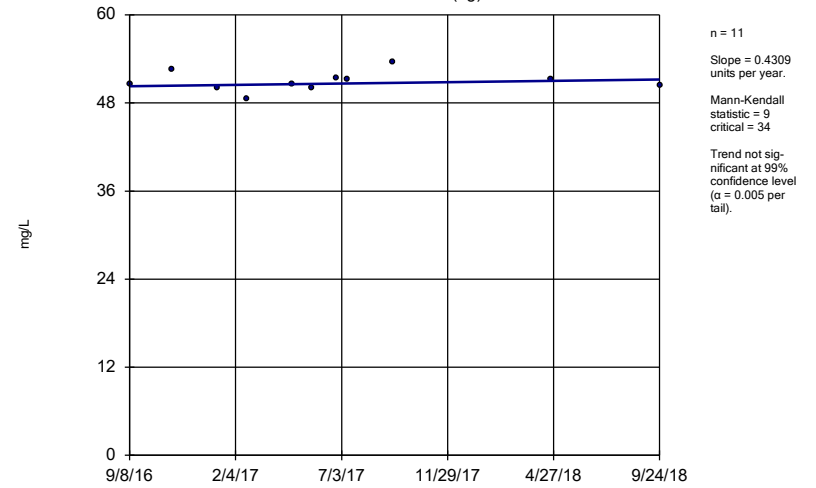
MW-1619 (bg)



Constituent: Sulfate, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

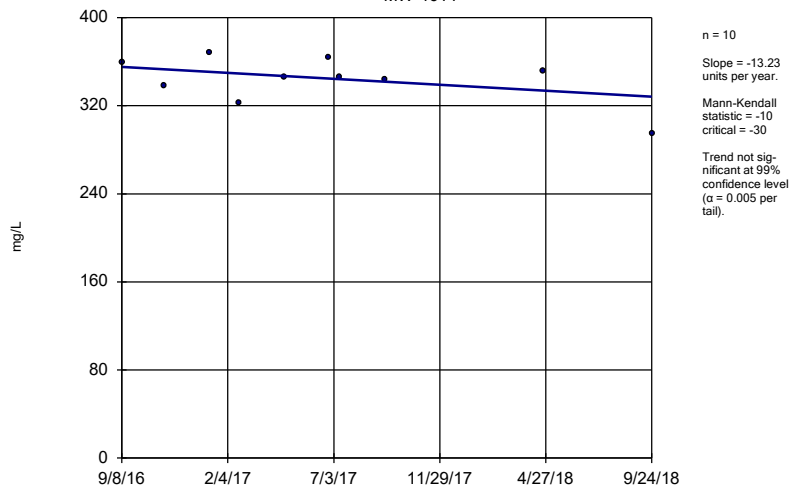
MW-1620 (bg)



Constituent: Sulfate, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

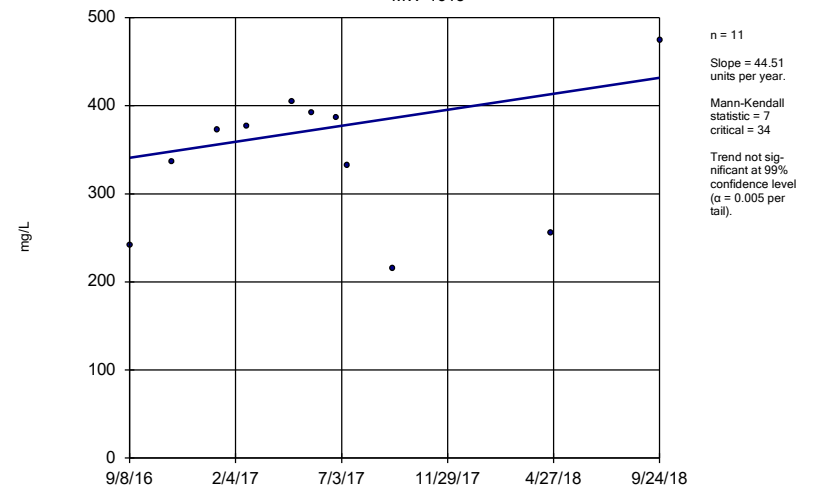
MW-1614



Constituent: Sulfate, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

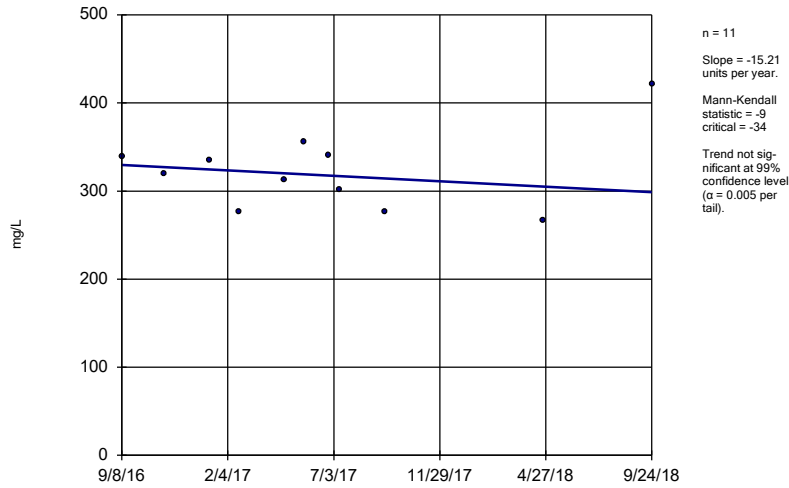
MW-1615



Constituent: Sulfate, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
 Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

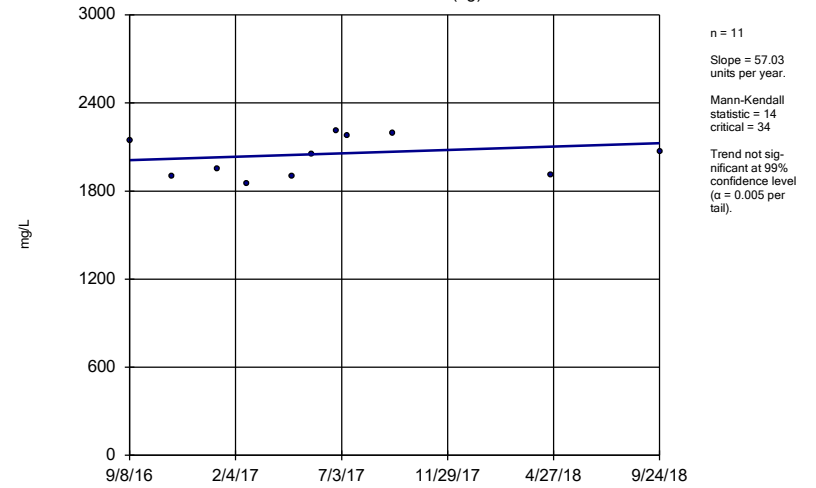
MW-1618



Constituent: Sulfate, total Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

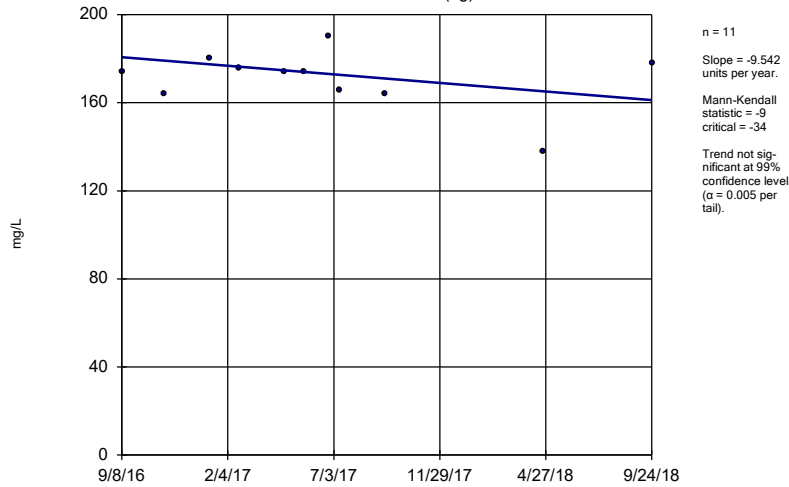
MW-1619 (bg)



Constituent: TDS Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

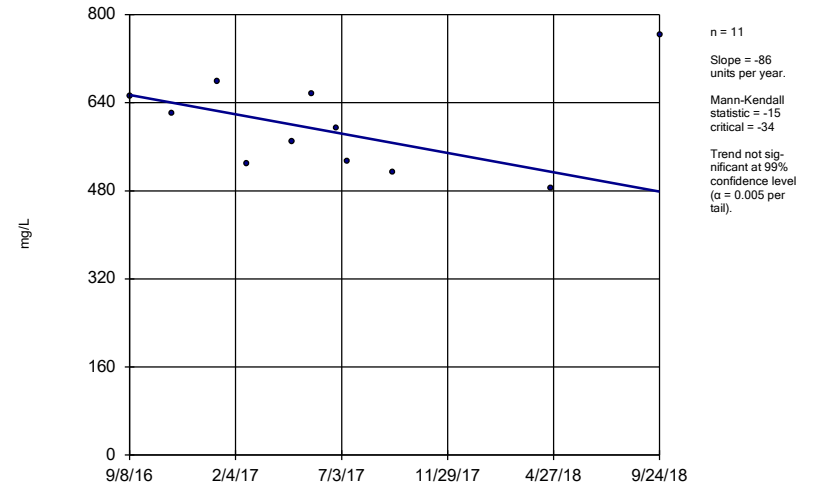
MW-1620 (bg)



Constituent: TDS Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Sen's Slope Estimator

MW-1618



Constituent: TDS Analysis Run 10/30/2018 9:17 AM View: Trend Testing  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP



# Trend Test Summary Table - All Results (No Significant Results)

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:20 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	MW-1619 (bg)	-0.01604	-11	-34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1620 (bg)	0	0	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1614	0.02888	28	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1615	0.02433	26	34	No	11	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW-1618	0.03816	27	34	No	11	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1619 (bg)	-3.724	-10	-34	No	11	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1620 (bg)	0.1738	16	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1619 (bg)	11.93	11	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1620 (bg)	-0.3914	-5	-34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1615	1.203	3	34	No	11	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1618	-21.1	-27	-34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1619 (bg)	-1.005	-6	-34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1620 (bg)	0.4309	9	34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1614	-13.23	-10	-30	No	10	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1615	44.51	7	34	No	11	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1618	-15.21	-9	-34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1619 (bg)	57.03	14	34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1620 (bg)	-9.542	-9	-34	No	11	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1618	-86	-15	-34	No	11	0	n/a	n/a	0.01	NP

<b>BIG SANDY BAP GWPS</b>			
<b>Constituent Name</b>	<b>MCL</b>	<b>RSL</b>	<b>Background Limit</b>
Antimony, Total (mg/L)	0.006		0.00005
Arsenic, Total (mg/L)	0.01		0.016
Barium, Total (mg/L)	2		1.82
Beryllium, Total (mg/L)	0.004		0.00007
Cadmium, Total (mg/L)	0.005		0.00012
Chromium, Total (mg/L)	0.1		0.0017
Cobalt, Total (mg/L)	n/a	0.006	0.023
Combined Radium, Total (pCi/L)	5		14.43
Fluoride, Total (mg/L)	4		0.2
Lead, Total (mg/L)	0.015		0.00058
Lithium, Total (mg/L)	n/a	0.04	0.031
Mercury, Total (mg/L)	0.002		0.000007
Molybdenum, Total (mg/L)	n/a	0.1	0.002
Selenium, Total (mg/L)	0.05		0.2
Thallium, Total (mg/L)	0.002		0.00014

*\*Grey cell indicates ACL is higher than MCL.*

*\*MCL = Maximum Contaminant Level*

*\*RSL = Regional Screening Level*

# Upper Tolerance Limits

Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP Printed 10/30/2018, 9:26 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00005	n/a	n/a	n/a	n/a	20	n/a	n/a	65	n/a	n/a	0.3585	NP Inter(normal...
Arsenic, Total (mg/L)	n/a	0.0156	n/a	n/a	n/a	n/a	20	n/a	n/a	0	n/a	n/a	0.3585	NP Inter(normal...
Barium, Total (mg/L)	n/a	1.82	n/a	n/a	n/a	n/a	20	n/a	n/a	0	n/a	n/a	0.3585	NP Inter(normal...
Beryllium, total (mg/L)	n/a	0.00007009	n/a	n/a	n/a	n/a	20	0.0000329	0.00001552	0	None	No	0.05	Inter
Cadmium, total (mg/L)	n/a	0.00012	n/a	n/a	n/a	n/a	20	n/a	n/a	0	n/a	n/a	0.3585	NP Inter(normal...
Chromium, total (mg/L)	n/a	0.001741	n/a	n/a	n/a	n/a	20	0.07773	0.01777	0	None	x^(1/3)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.023	n/a	n/a	n/a	n/a	20	n/a	n/a	0	n/a	n/a	0.3585	NP Inter(normal...
Combined Radium 226 + 228 (pCi/L)	n/a	14.43	n/a	n/a	n/a	n/a	20	5.427	3.758	0	None	No	0.05	Inter
Fluoride, total (mg/L)	n/a	0.2	n/a	n/a	n/a	n/a	22	n/a	n/a	18.18	n/a	n/a	0.3235	NP Inter(normal...
Lead, total (mg/L)	n/a	0.0005814	n/a	n/a	n/a	n/a	20	0.0001933	0.000162	0	None	No	0.05	Inter
Lithium, total (mg/L)	n/a	0.0306	n/a	n/a	n/a	n/a	20	0.01345	0.007156	0	None	No	0.05	Inter
Mercury, total (mg/L)	n/a	0.000007	n/a	n/a	n/a	n/a	18	n/a	n/a	100	n/a	n/a	0.3972	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.001946	n/a	n/a	n/a	n/a	20	-7.987	0.7285	0	None	ln(x)	0.05	Inter
Selenium, Total (ug/L)	n/a	0.2	n/a	n/a	n/a	n/a	18	n/a	n/a	38.89	n/a	n/a	0.3972	NP Inter(normal...
Thallium, Total (mg/L)	n/a	0.0001352	n/a	n/a	n/a	n/a	20	0.0394	0.004975	0	None	x^(1/3)	0.05	Inter

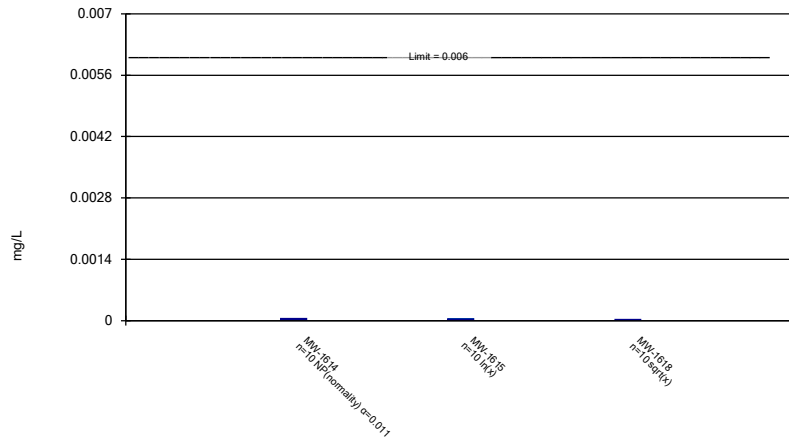
# Confidence Interval - All Results (No Significant Results)

Big Sandy BAP    Client: Geosyntec    Data: Big Sandy BAP    Printed 11/11/2018, 11:05 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	MW-1614	0.00005	0.00002	0.006	No	10	0	No	0.011	NP (normality)
Antimony, total (mg/L)	MW-1615	0.00003761	0.00001308	0.006	No	10	10	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1618	0.00002841	0.00001341	0.006	No	10	0	sqrt(x)	0.01	Param.
Arsenic, Total (mg/L)	MW-1614	0.01667	0.009739	0.016	No	10	0	No	0.01	Param.
Arsenic, Total (mg/L)	MW-1615	0.0012	0.0002	0.016	No	9	0	No	0.002	NP (normality)
Arsenic, Total (mg/L)	MW-1618	0.001362	0.0002677	0.016	No	10	0	ln(x)	0.01	Param.
Barium, Total (mg/L)	MW-1614	0.08256	0.0438	2	No	10	0	x^(1/3)	0.01	Param.
Barium, Total (mg/L)	MW-1615	0.02406	0.01701	2	No	9	0	No	0.01	Param.
Barium, Total (mg/L)	MW-1618	0.0194	0.016	2	No	10	0	No	0.011	NP (normality)
Beryllium, total (mg/L)	MW-1614	0.00009686	0.00005814	0.004	No	10	0	No	0.01	Param.
Beryllium, total (mg/L)	MW-1615	0.000015	0.000005495	0.004	No	10	10	x^(1/3)	0.01	Param.
Beryllium, total (mg/L)	MW-1618	0.00001	0.000006	0.004	No	10	0	No	0.011	NP (normality)
Cadmium, total (mg/L)	MW-1614	0.00001	0.000006	0.005	No	10	50	No	0.011	NP (normality)
Cadmium, total (mg/L)	MW-1615	0.00009516	0.00003695	0.005	No	10	0	x^(1/3)	0.01	Param.
Cadmium, total (mg/L)	MW-1618	0.00005121	0.00003279	0.005	No	10	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1614	0.0005219	0.0002749	0.1	No	10	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1615	0.0004882	0.0002048	0.1	No	10	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1618	0.0004579	0.00014	0.1	No	10	0	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1614	0.0034	0.001814	0.023	No	10	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1615	0.00431	0.00151	0.023	No	10	0	No	0.011	NP (normality)
Cobalt, total (mg/L)	MW-1618	0.004523	0.001289	0.023	No	10	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1614	4.149	0.2828	14.43	No	8	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1615	2.43	0.459	14.43	No	10	0	No	0.011	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-1618	2.312	0.6622	14.43	No	10	0	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	MW-1614	0.1848	0.04953	4	No	11	27.27	No	0.01	Param.
Fluoride, total (mg/L)	MW-1615	0.2126	0.1419	4	No	11	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1618	0.16	0.09	4	No	11	0	No	0.006	NP (normality)
Lead, total (mg/L)	MW-1614	0.0002195	0.00009234	0.015	No	10	0	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1615	0.0001555	0.00003199	0.015	No	10	0	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW-1618	0.000201	0.00007016	0.015	No	10	0	sqrt(x)	0.01	Param.
Lithium, total (mg/L)	MW-1614	0.004	0.0003	0.04	No	10	30	No	0.011	NP (normality)
Lithium, total (mg/L)	MW-1615	0.004	0.0004	0.04	No	10	30	No	0.011	NP (normality)
Lithium, total (mg/L)	MW-1618	0.008	0.0005	0.04	No	10	40	No	0.011	NP (normality)
Mercury, total (mg/L)	MW-1614	0.0000035	0.0000035	0.002	No	9	100	No	0.002	NP (NDs)
Mercury, total (mg/L)	MW-1615	0.0000035	0.0000035	0.002	No	9	100	No	0.002	NP (NDs)
Mercury, total (mg/L)	MW-1618	0.0000035	0.0000035	0.002	No	9	100	No	0.002	NP (NDs)
Molybdenum, total (mg/L)	MW-1614	0.0007098	0.0003722	0.1	No	10	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1615	0.00021	0.00007	0.1	No	10	0	No	0.011	NP (normality)
Molybdenum, total (mg/L)	MW-1618	0.0003303	0.00006494	0.1	No	10	0	ln(x)	0.01	Param.
Selenium, Total (ug/L)	MW-1614	0.09873	0.06733	0.2	No	10	0	x^2	0.01	Param.
Selenium, Total (ug/L)	MW-1615	0.143	0.04943	0.2	No	10	10	sqrt(x)	0.01	Param.
Selenium, Total (ug/L)	MW-1618	0.08932	0.06686	0.2	No	10	0	x^4	0.01	Param.
Thallium, Total (mg/L)	MW-1614	0.000025	0.00002	0.002	No	10	10	No	0.011	NP (normality)
Thallium, Total (mg/L)	MW-1615	0.000272	0.000063	0.002	No	10	0	No	0.011	NP (normality)
Thallium, Total (mg/L)	MW-1618	0.0001328	0.00006895	0.002	No	10	0	sqrt(x)	0.01	Param.

### Parametric and Non-Parametric (NP) Confidence Interval

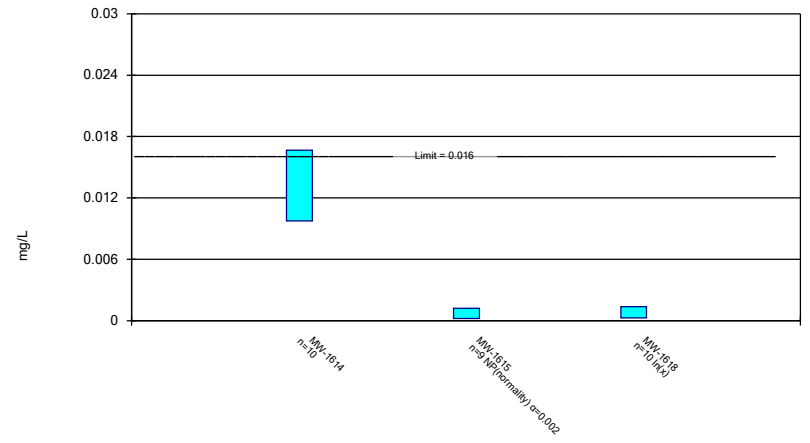
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

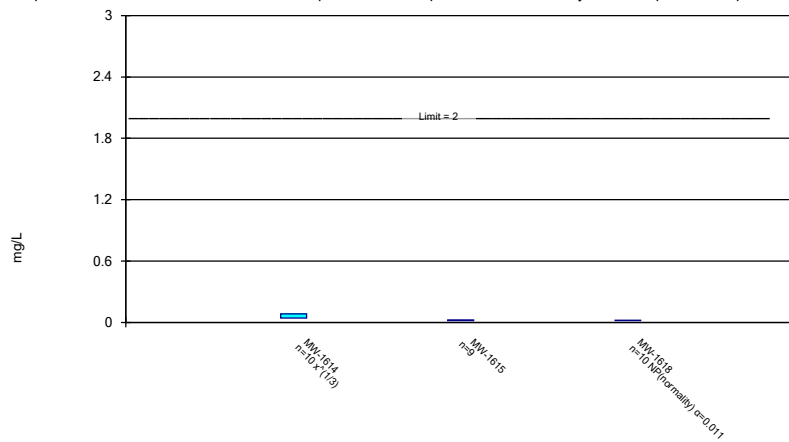
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, Total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

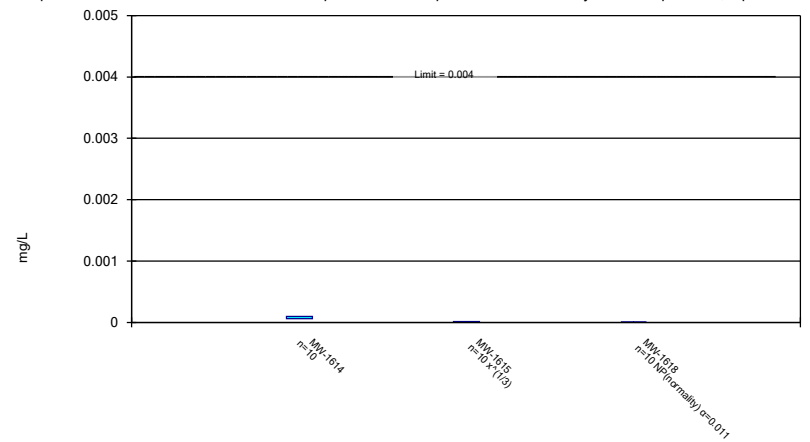
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, Total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

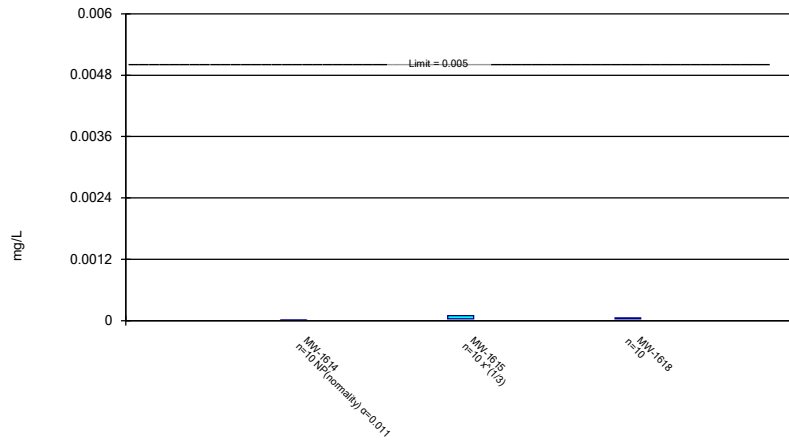
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
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### Parametric and Non-Parametric (NP) Confidence Interval

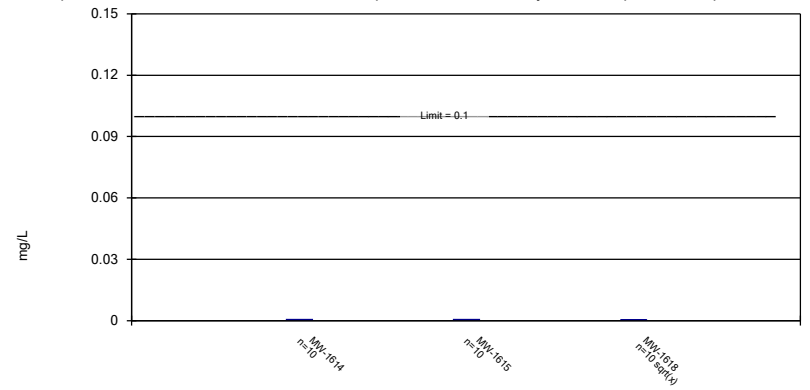
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric Confidence Interval

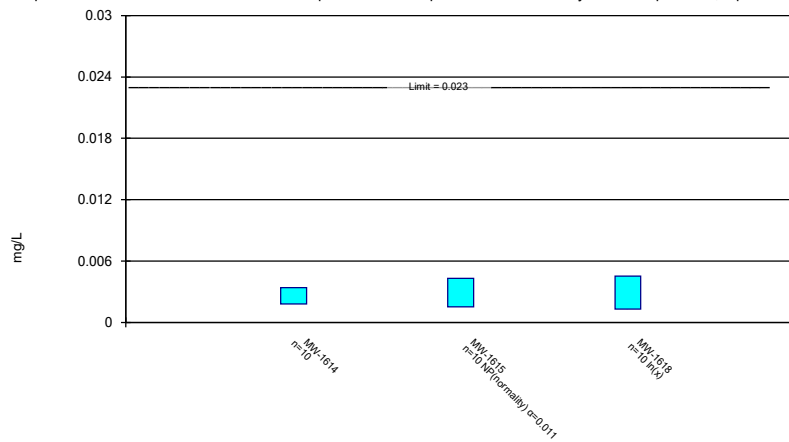
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

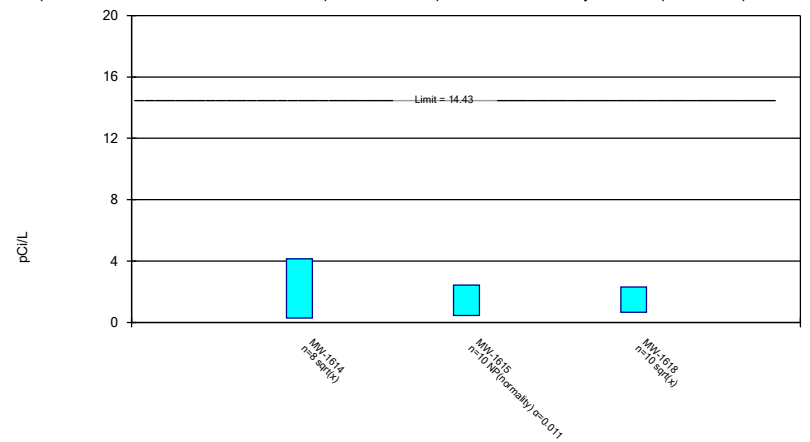
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

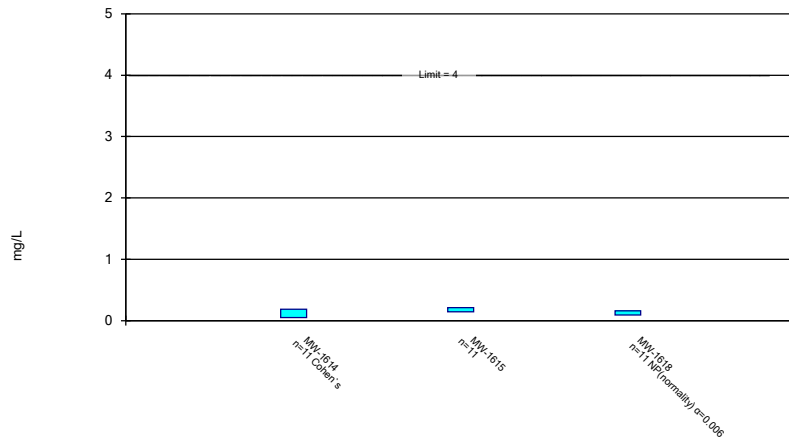
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

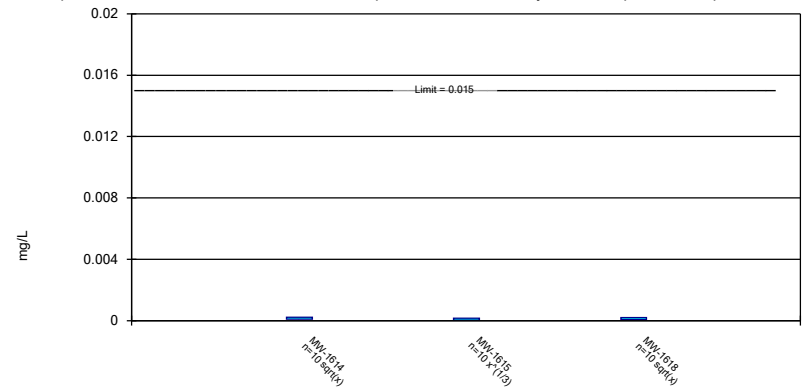
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric Confidence Interval

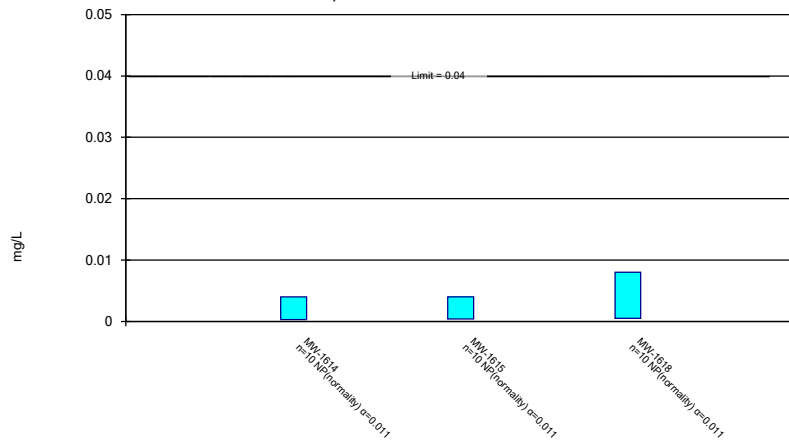
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Non-Parametric Confidence Interval

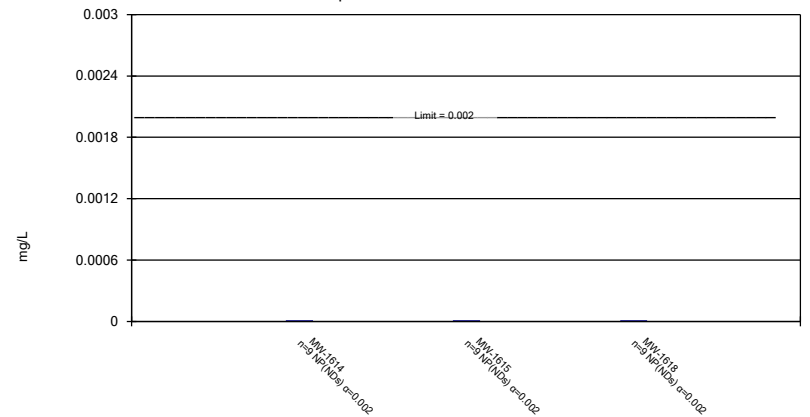
Compliance Limit is not exceeded.



Constituent: Lithium, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Non-Parametric Confidence Interval

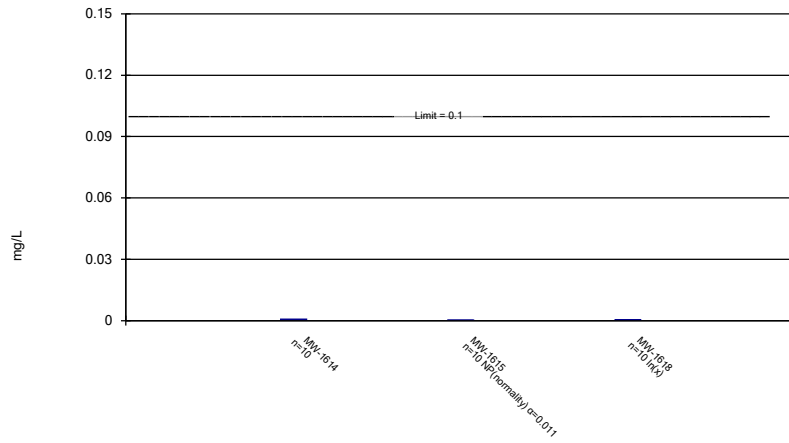
Compliance Limit is not exceeded.



Constituent: Mercury, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

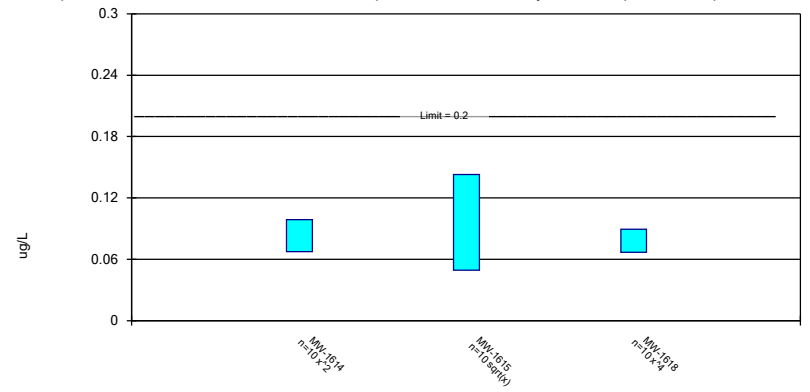
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum, total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric Confidence Interval

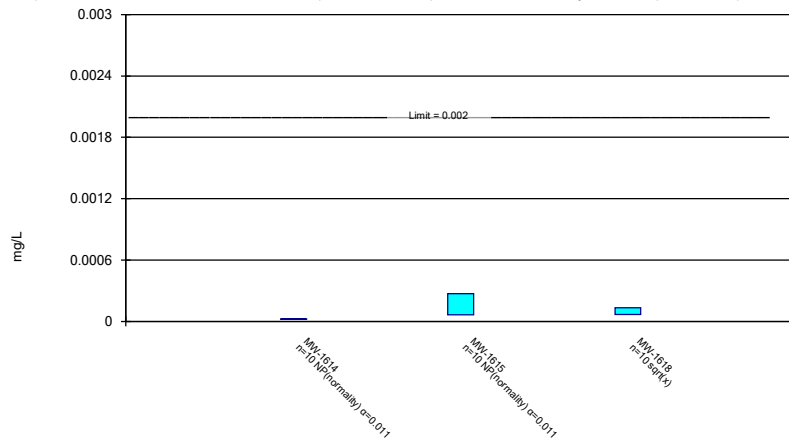
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, Total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP

### Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Thallium, Total Analysis Run 11/11/2018 11:03 AM View: Confidence Intervals - App IV  
Big Sandy BAP Client: Geosyntec Data: Big Sandy BAP