STATISTICAL ANALYSIS SUMMARY
BOTTOM ASH POND
Northeastern Power Station
Oologah, Oklahoma

Submitted to

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

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January 8, 2019

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LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LPL	Lower Prediction Limit
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
OAC	Oklahoma Administrative Code
ODEQ	Oklahoma Department of Environmental Quality
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 Oklahoma Department of Environmental Quality (ODEQ) and Oklahoma administrative code (OAC) regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (OAC 252:517), groundwater monitoring has been conducted at the Bottom Ash Pond (BAP), an existing CCR unit at the Northeastern Power Station located in Oologah, Oklahoma.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, chloride, fluoride, total dissolved solids (TDS), and sulfate at the BAP. pH values below the lower prediction limit (LPL) resulted in SSIs below background as well. An alternate source was not identified at the time, so two assessment monitoring events were conducted at the BAP in 2018, in accordance with OAC 252:517-9-6.

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. An SSL was identified for lithium. Thus, either the unit will move to an assessment of corrective measures or an alternative source demonstration (ASD) will be conducted to evaluate if the unit can remain in assessment 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 OAC 252:517-9-6(b) and 252:517-9-6(d)(1). Samples from the initial sampling event were analyzed for the Appendix IV parameters, and samples from the second event were analyzed for both 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 OAC 252:517-9-6(b) and 252:517-9-6(d)(1) were screened for potential outliers. The reported cadmium value of 0.00655 milligrams per liter (mg/L) for the August 4, 2017 sampling event at SP-4 was identified as an outlier and removed from the database without replacement. Outliers for Appendix III parameters identified from the background and detection monitoring events conducted through January 2018 were summarized in a previous report (Geosyntec, 2018).

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with OAC 252:517-9-6(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. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for arsenic, cobalt, combined radium, fluoride, and lithium. Non-parametric tolerance limits were calculated for antimony, barium, cadmium, mercury, molybdenum, and selenium due to apparent non-normal distributions; for thallium due to a high non-detect frequency; and for beryllium, chromium, and lead due to both apparent non-normal distributions and high non-detect frequencies. 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.

The following SSL was identified at the Northeastern BAP:

- An LCL for lithium exceeded the GWPS of 0.15 mg/L at SP-10 (0.263 mg/L).

As a result, the Northeastern BAP will either move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring.

2.3 Conclusions

Two assessment monitoring events were conducted in 2018 in accordance with OAC 252:517-9. 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 no potential outliers in the 2018 data. 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. An SSL was identified for lithium.

Based on this evaluation, the Northeastern BAP CCR unit will either move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring.

SECTION 3

REFERENCES

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

Geosyntec Consultants (Geosyntec). 2018. Statistical Analysis Summary – Stations 3 and 4 Bottom Ash Pond, Northeastern Power Station, Oologah, Oklahoma. January 15, 2018.

TABLES

Table 1 – Groundwater Data Summary
Northeastern – Bottom Ash Pond

Geosyntec Consultants, Inc.

Parameter	Unit	SP-1		SP-2		SP-4		SP-5		SP-10		SP-11	
		5/30/2018	7/30/2018	5/30/2018	7/30/2018	5/30/2018	7/30/2018	5/30/2018	7/30/2018	5/30/2018	7/30/2018	5/30/2018	7/30/2018
Antimony	mg/L	0.005 U	0.000690	0.00130 J	0.00121	0.00514	0.000370	0.00121 J	0.0000500 J	0.005 U	0.000340	0.005 U	0.000350
Arsenic	mg/L	0.005 U	0.000930	0.005 U	0.00142	0.005 U	0.00114	0.0289	0.0473	0.00890	0.00761	0.00530	0.00422
Barium	mg/L	0.190	0.174	0.869	0.656	0.268	0.303	1.76	2.14	2.55	2.33	0.160	0.539
Beryllium	mg/L	0.001 U	0.0000600 J	0.001 U	0.0000500 J	0.001 U	0.0000780	0.001 U	0.0000520	0.001 U	0.0000430	0.001 U	0.0000290
Boron	mg/L	-	0.397	-	0.276	-	0.399	-	0.246	-	1.17	-	0.280
Cadmium	mg/L	0.001 U	0.0000800 J	0.001 U	0.0000800 J	0.001 U	0.0000700	0.001 U	0.0000200 J	0.001 U	0.0000200 J	0.001 U	0.0000400
Calcium	mg/L	-	130	-	117	-	164	-	131	-	227	-	124
Chloride	mg/L	-	46.0	-	268	-	521	-	793	-	2280	-	234
Chromium	mg/L	0.001 U	0.00183	0.001 U	0.04 U	0.001 U	0.000562	0.001 U	0.0000820	0.001 U	0.0000600 J	0.000340 J	0.000379
Cobalt	mg/L	0.000530 J	0.000676	0.000550 J	0.000400	0.000490 J	0.000497	0.000880 J	0.000482	0.000830 J	0.00216	0.00161 J	0.00512
Combined Radium	pCi/L	3.64	3.06	7.85	9.61	3.19	4.85	9.15	11.3	6.06	7.89	1.33	0.950
Fluoride	mg/L	1.25	0.986 J	3.50	2.66	4.17	1 U	4.11	4.39	7.33	9.00	3.57	3.78
Lead	mg/L	0.005 U	0.000354	0.005 U	0.000245	0.005 U	0.000356	0.005 U	0.000415	0.005 U	0.000102	0.005 U	0.000404
Lithium	mg/L	0.00785	0.00615	0.0404	0.0346	0.0685	0.0627	0.102	0.0946	0.245	0.242	0.0496	0.0370
Mercury	mg/L	0.000025 U	0.000025 U	0.000025 U	0.000025 U	0.000025 U	0.00000600 J	0.000025 U	0.000025 U	0.000025 U	0.00000600 J	0.000025 U	0.00000500 J
Molybdenum	mg/L	0.0164	0.0171	0.0265	0.0261	0.00370 J	0.00363	0.005 U	0.00117	0.00294 J	0.0185	0.00327 J	0.00885
Selenium	mg/L	0.00423 J	0.00580	0.00216 J	0.00290	0.005 U	0.000700	0.005 U	0.000100	0.00226 J	0.0000900 J	0.00143 J	0.000700
Total Dissolved Solids	mg/L	-	1060	-	1010	-	1180	-	1480	-	3630	-	996
Sulfate	mg/L	-	63.0	-	30.0	-	70.0	-	4.00	-	75.0	-	79.0
Thallium	mg/L	0.00200	0.0000900 J	0.002 U	0.0000600 J	0.00162 J	0.0000500 J	0.002 U	0.0000200 J	0.002 U	0.0000400 J	0.002 U	0.0000300 J
pH	SU	7.27	7.04	7.45	7.45	7.39	7.55	7.58	8.02	7.84	7.62	7.49	7.74

mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Parameter was not present in concentrations above the 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
Northeastern Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Constituent Name	MCL	RSL	Background Limit
Antimony, Total (mg/L)	0.006		0.0051
Arsenic, Total (mg/L)	0.01		0.049
Barium, Total (mg/L)	2		4.59
Beryllium, Total (mg/L)	0.004		0.005
Cadmium, Total (mg/L)	0.005		0.0025
Chromium, Total (mg/L)	0.1		0.084
Cobalt, Total (mg/L)	n/a	0.006	0.046
Combined Radium, Total (pCi/L)	5		16.85
Fluoride, Total (mg/L)	4		5
Lead, Total (mg/L)	n/a	0.015	0.037
Lithium, Total (mg/L)	n/a	0.04	0.15
Mercury, Total (mg/L)	0.002		0.000058
Molybdenum, Total (mg/L)	n/a	0.1	0.007
Selenium, Total (mg/L)	0.05		0.005
Thallium, Total (mg/L)	0.002		0.002

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.

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 Northeastern Bottom Ash Pond CCR management area and that the requirements of OAC 252:517-9-4(g) have been met.

DAVID ANTHONY MILLER
Printed Name of Licensed Professional Engineer

David Anthony Miller
Signature

26057	OKLAHOMA	01.08.19
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

December 13, 2018

Geosyntec Consultants
Attn: Ms. Allison Kreinberg
941 Chatham Lane, #103
Columbus, OH 43221

Re: Northeastern BAP
Assessment Monitoring Event – July 2018

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis of the July 2018 data for American Electric Power Inc.'s Northeastern BAP. 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 the site for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** SP-4 and SP-5; and
- **Downgradient wells:** SP-1, SP2, SP-10, and SP-11.

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;

- **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 previously flagged during the screening as outliers may be seen in a lighter font and disconnected symbol on the time series graphs.

Evaluation of Appendix III Parameters

Interwell prediction limits combined with a 1-of-2 verification strategy were constructed for boron, chloride, fluoride, pH, sulfate and TDS; and intrawell prediction limits combined with a 1-of-2 verification strategy were constructed for calcium. The statistical method selected for each parameter was determined based on the results of the screening analysis performed in January 2018.

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.

Calcium was found to exceed its intrawell prediction limit in downgradient well SP-10, and also exceeded for this event in upgradient well SP-5. Additionally, the reported concentration levels in well SP-10 are comparable to historical levels in both upgradient wells. Upgradient well SP-4 exhibited increasing concentration levels for a period of time, which is an indication that groundwater is changing naturally unrelated to the site for this constituent. Downgradient water quality will continue to be monitored for similar patterns which may occur at downgradient wells as future samples are collected.

Boron, chloride, fluoride and TDS were found to exceed their respective interwell prediction limits for well SP-10; however, concentration levels are stable over time for these constituents at this well. As mentioned above, further research would be required to determine whether the concentrations at this well relative to those reported upgradient are due to natural variation. That study is beyond the scope of this analysis. 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 concentrations are statistically increasing, decreasing or stable. Upgradient wells are included in the trend analyses to identify whether similar patters exist upgradient of the site which is an indication of natural variability in groundwater unrelated to practices at the site.

No statistically significant increasing or decreasing trends were found for any of the downgradient well/parameter pairs with prediction limit exceedances. A statistically significant increasing trend was noted for chloride in upgradient well SP-5. A 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 Standard (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 confidence intervals exceedances were found except for lithium in well SP-10. A summary of the confidence interval results follows this letter.

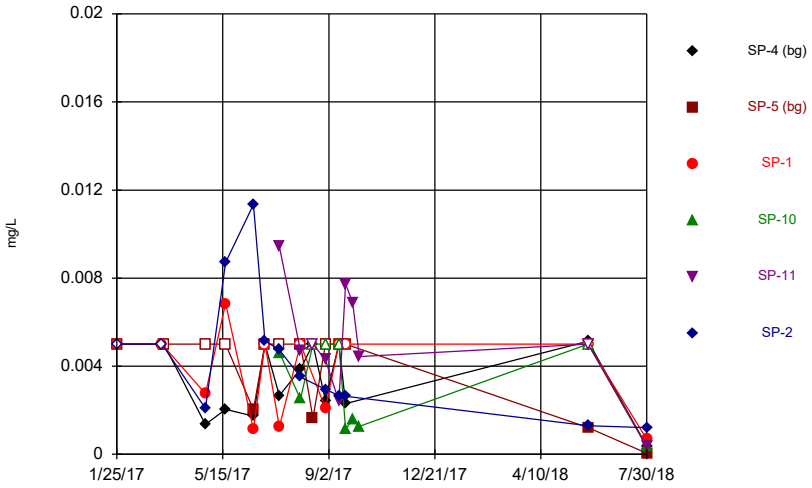
Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Northeastern BAP. If you have any questions or comments, please feel free to contact me.

For Groundwater Stats Consulting,

Kristina L. Rayner
Groundwater Statistician

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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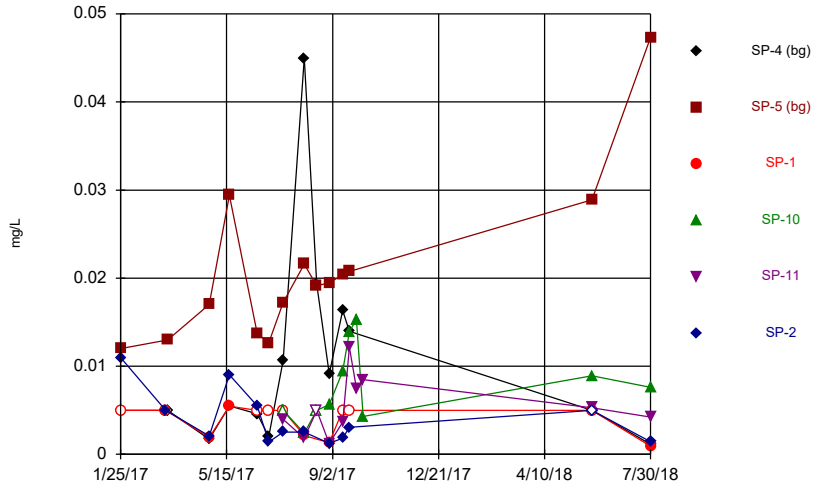
Time Series



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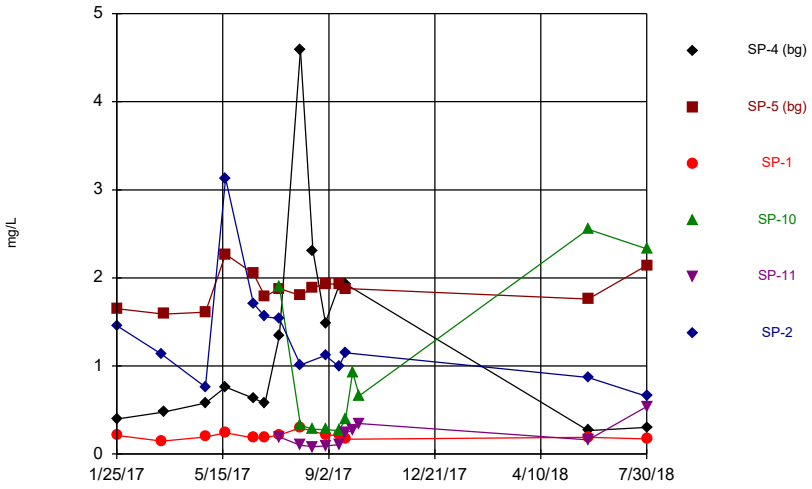
Time Series



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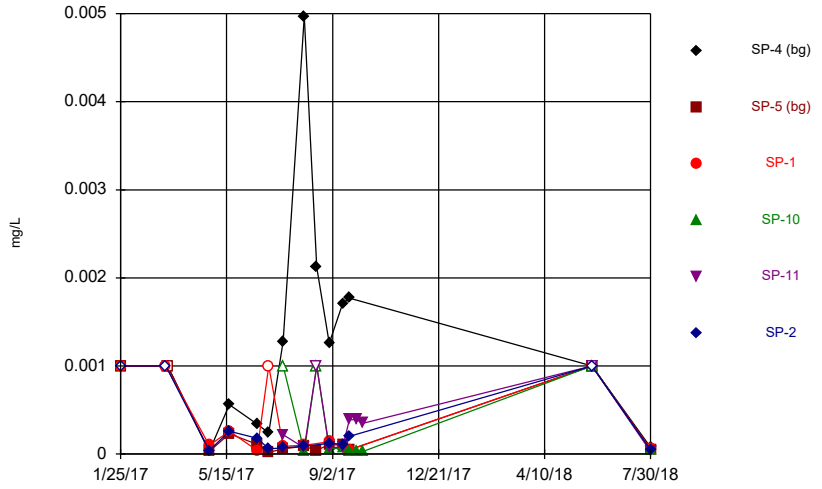

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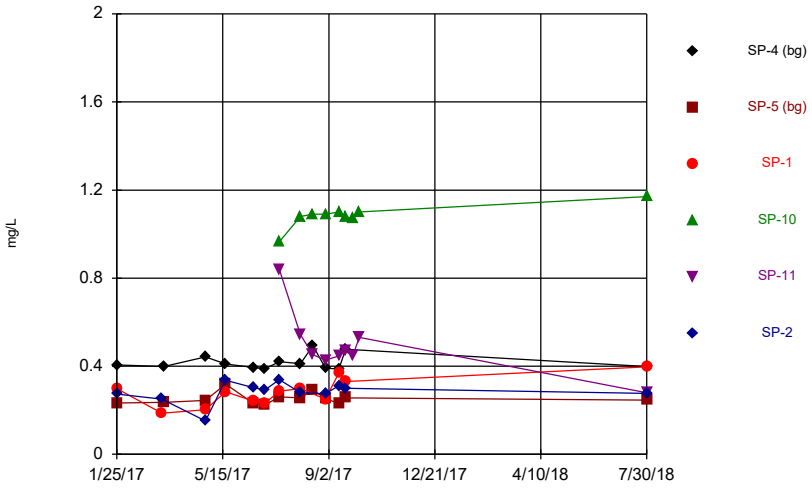
Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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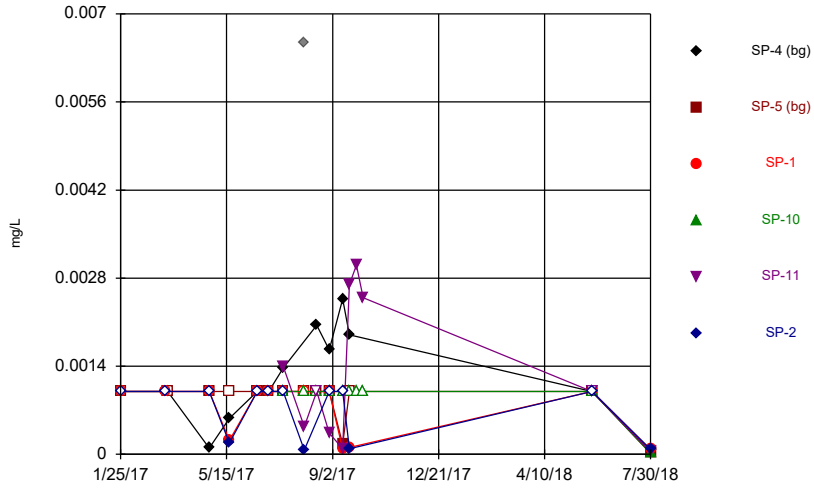

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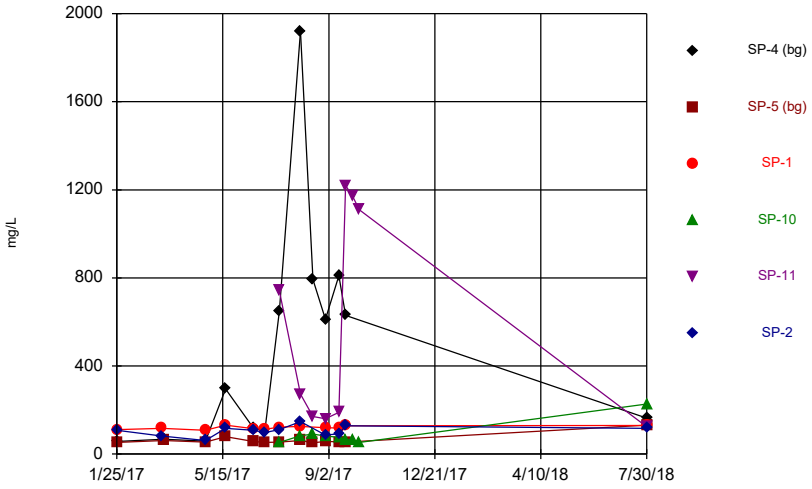
Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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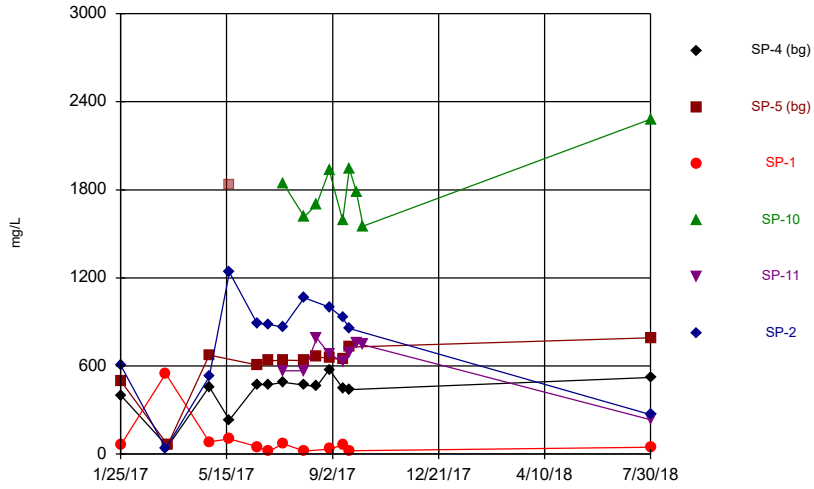
Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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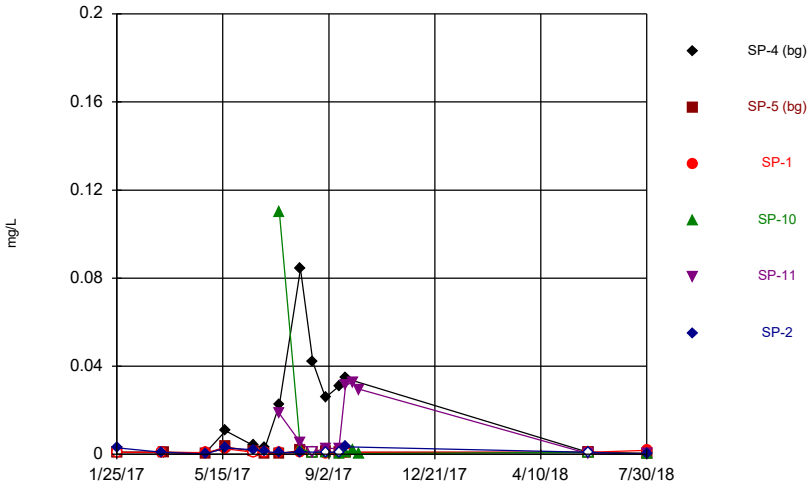

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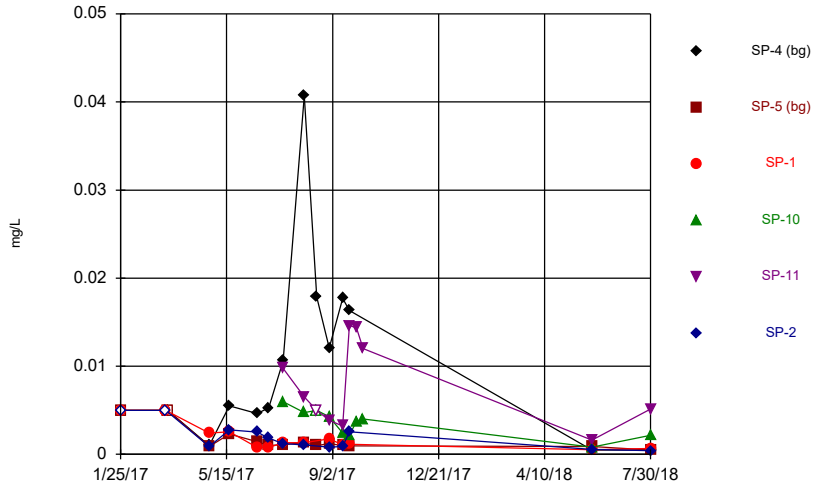

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Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

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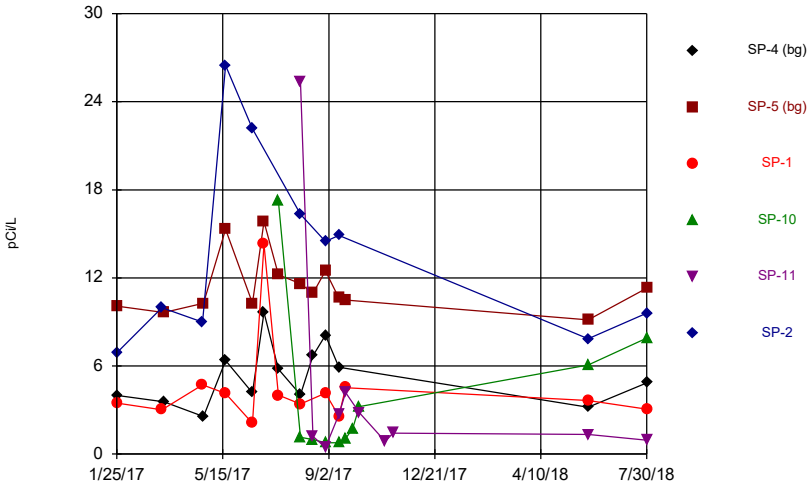

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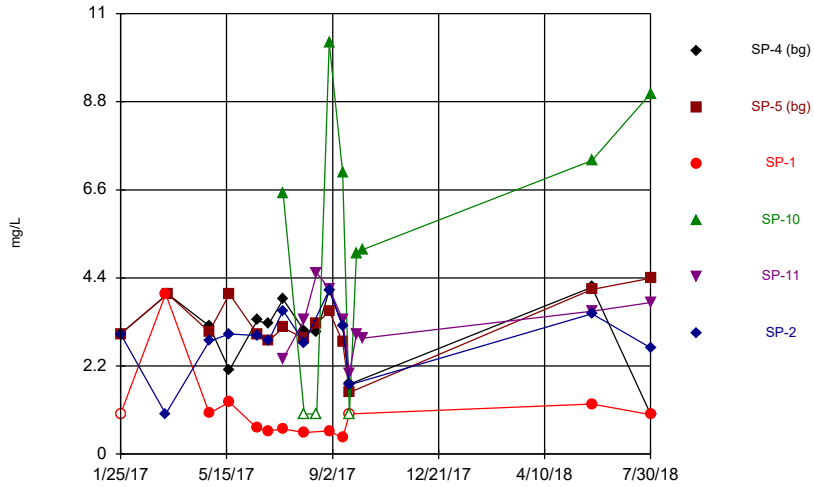

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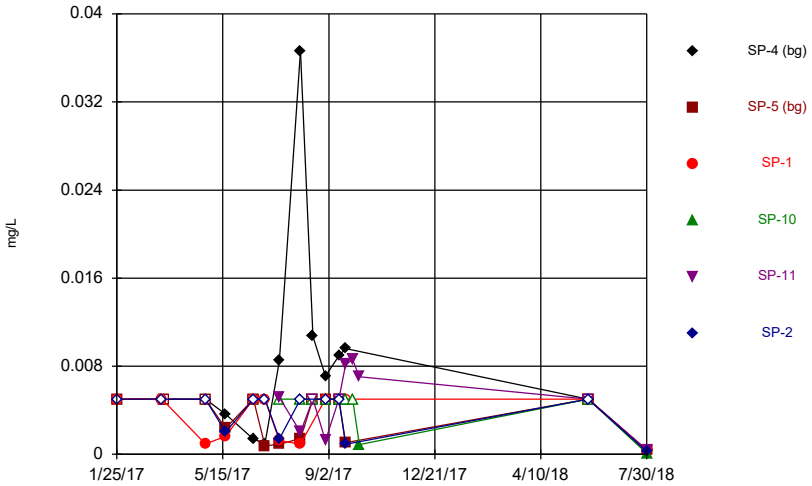

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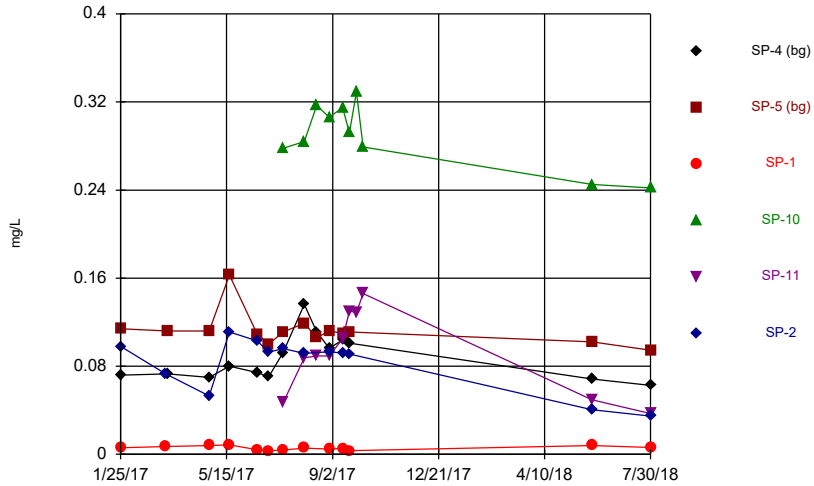
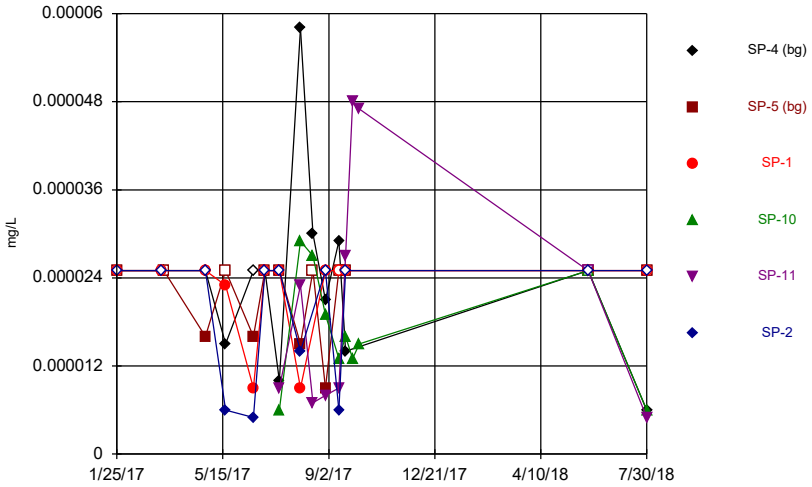
Time Series



Constituent: Lithium Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

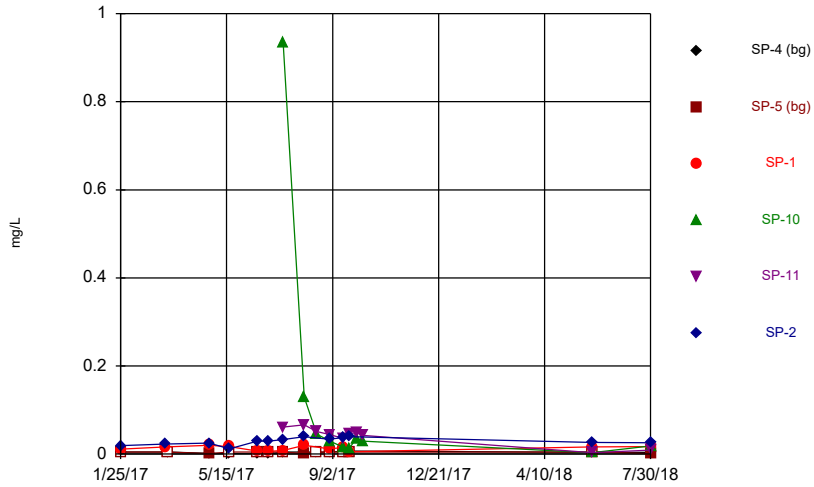
Time Series



Constituent: Mercury Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

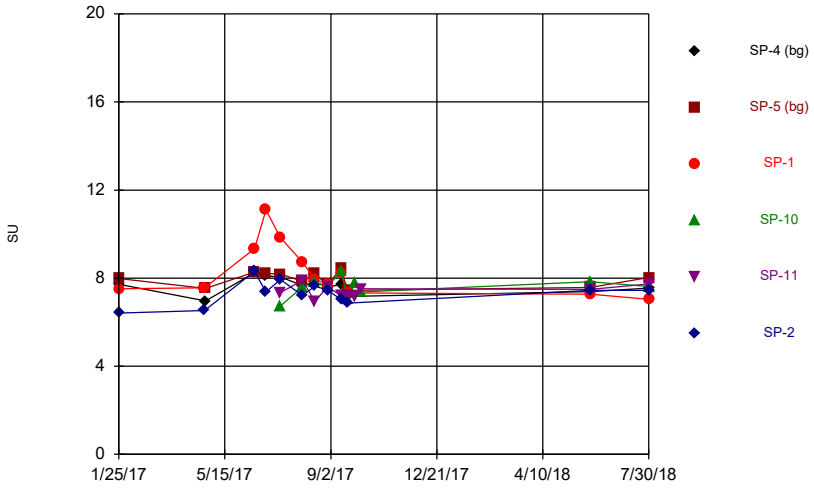
Time Series



Constituent: Molybdenum Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

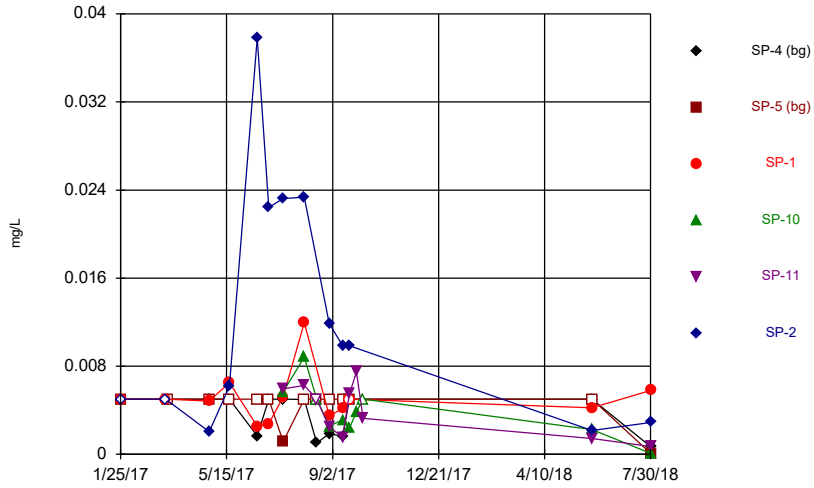
Time Series



Constituent: pH, field Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

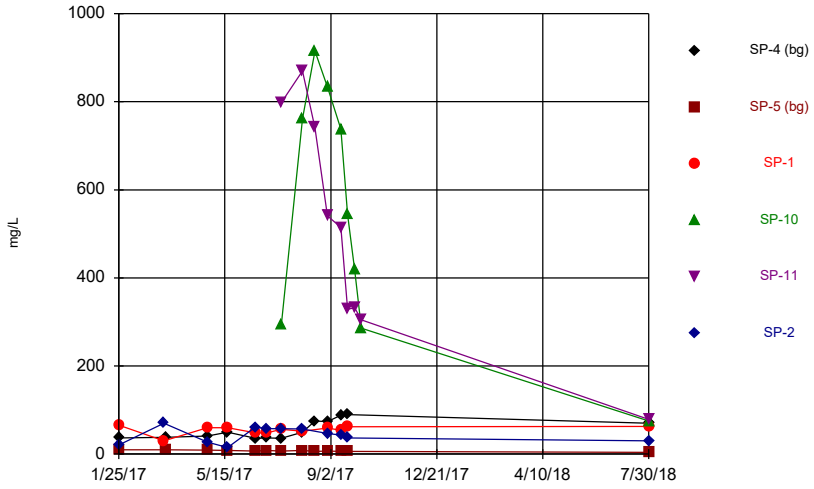
Time Series



Constituent: Selenium Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

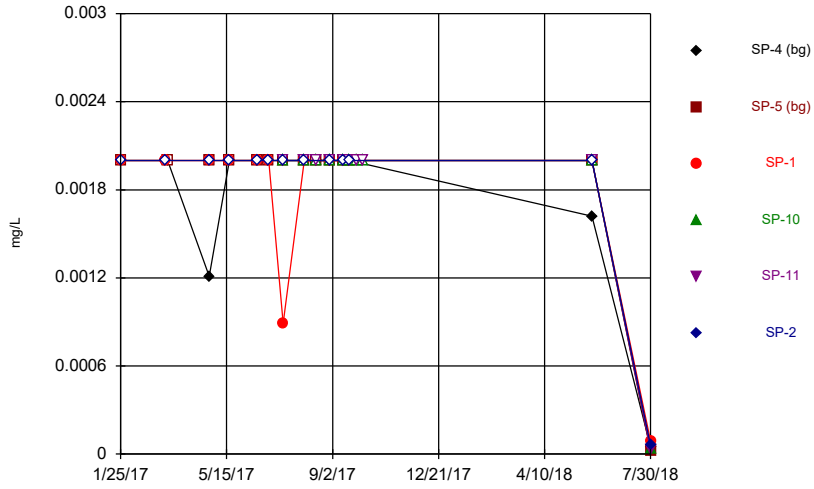
Time Series



Constituent: Sulfate Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

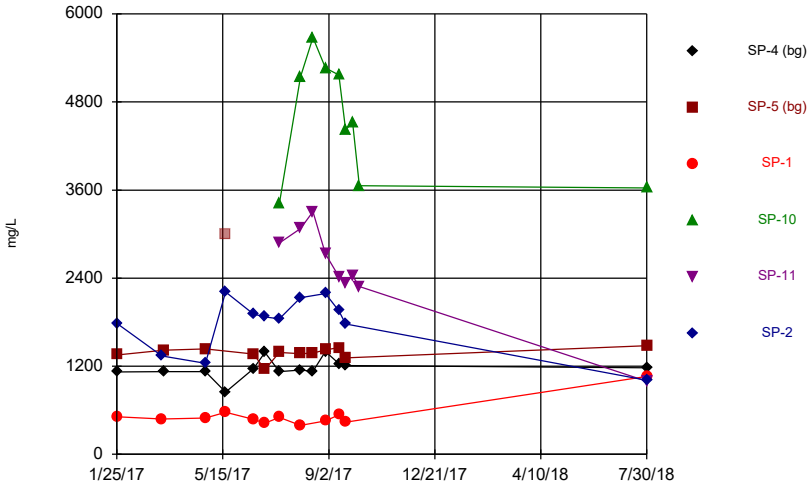
Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Thallium Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/2/2018 8:41 AM View: Descriptive
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Interwell Prediction Limit Summary Table - Significant Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 8:32 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig. Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	**SP-10**	**0.493**	**n/a**	**7/30/2018**	**1.17**	**Yes 26**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.00258**	**NP Inter (normality) ...**
Chloride (mg/L)	**SP-10**	**768.8**	**n/a**	**7/30/2018**	**2280**	**Yes 25**	**291209**	**156656**	**0**	**None**	**x^2**	**0.00188**	**Param Inter 1 of 2**
Fluoride (mg/L)	**SP-10**	**4.712**	**n/a**	**7/30/2018**	**9**	**Yes 28**	**3.167**	**0.8157**	**3.571**	**None**	**No**	**0.00188**	**Param Inter 1 of 2**
pH, field (SU)	**SP-1**	**8.528**	**7.09**	**7/30/2018**	**7.04**	**Yes 24**	**7.809**	**0.3732**	**0**	**None**	**No**	**0.0009398**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (mg/L)	**SP-10**	**1565**	**n/a**	**7/30/2018**	**3630**	**Yes 25**	**1270**	**154**	**0**	**None**	**No**	**0.00188**	**Param Inter 1 of 2**

Interwell Prediction Limit Summary Table - All Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 8:32 AM

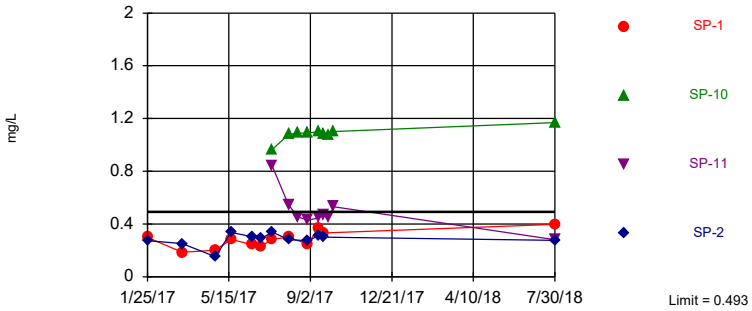
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj	Transform	Alpha	Method
Boron (mg/L)	SP-1	0.493	n/a	7/30/2018	0.397	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Boron (mg/L)	**SP-10**	**0.493**	**n/a**	**7/30/2018**	**1.17**	**Yes**	**26**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.00258**	**NP Inter (normality) ...**
Boron (mg/L)	SP-11	0.493	n/a	7/30/2018	0.28	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Boron (mg/L)	SP-2	0.493	n/a	7/30/2018	0.276	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Chloride (mg/L)	SP-1	768.8	n/a	7/30/2018	46	No	25	291209	156656	0	None	x^2	0.00188	Param Inter 1 of 2
Chloride (mg/L)	**SP-10**	**768.8**	**n/a**	**7/30/2018**	**2280**	**Yes**	**25**	**291209**	**156656**	**0**	**None**	**x^2**	**0.00188**	**Param Inter 1 of 2**
Chloride (mg/L)	SP-11	768.8	n/a	7/30/2018	234	No	25	291209	156656	0	None	x^2	0.00188	Param Inter 1 of 2
Chloride (mg/L)	SP-2	768.8	n/a	7/30/2018	268	No	25	291209	156656	0	None	x^2	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	SP-1	4.712	n/a	7/30/2018	0.986	No	28	3.167	0.8157	3.571	None	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	**SP-10**	**4.712**	**n/a**	**7/30/2018**	**9**	**Yes**	**28**	**3.167**	**0.8157**	**3.571**	**None**	**No**	**0.00188**	**Param Inter 1 of 2**
Fluoride (mg/L)	SP-11	4.712	n/a	7/30/2018	3.78	No	28	3.167	0.8157	3.571	None	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	SP-2	4.712	n/a	7/30/2018	2.66	No	28	3.167	0.8157	3.571	None	No	0.00188	Param Inter 1 of 2
pH, field (SU)	**SP-1**	**8.528**	**7.09**	**7/30/2018**	**7.04**	**Yes**	**24**	**7.809**	**0.3732**	**0**	**None**	**No**	**0.0009398**	**Param Inter 1 of 2**
pH, field (SU)	SP-10	8.528	7.09	7/30/2018	7.62	No	24	7.809	0.3732	0	None	No	0.0009398	Param Inter 1 of 2
pH, field (SU)	SP-11	8.528	7.09	7/30/2018	7.74	No	24	7.809	0.3732	0	None	No	0.0009398	Param Inter 1 of 2
pH, field (SU)	SP-2	8.528	7.09	7/30/2018	7.45	No	24	7.809	0.3732	0	None	No	0.0009398	Param Inter 1 of 2
Sulfate (mg/L)	SP-1	90	n/a	7/30/2018	63	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Sulfate (mg/L)	SP-10	90	n/a	7/30/2018	75	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Sulfate (mg/L)	SP-11	90	n/a	7/30/2018	79	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Sulfate (mg/L)	SP-2	90	n/a	7/30/2018	30	No	26	n/a	n/a	0	n/a	n/a	0.00258	NP Inter (normality) ...
Total Dissolved Solids [TDS] (mg/L)	SP-1	1565	n/a	7/30/2018	1060	No	25	1270	154	0	None	No	0.00188	Param Inter 1 of 2
Total Dissolved Solids [TDS] (mg/L)	**SP-10**	**1565**	**n/a**	**7/30/2018**	**3630**	**Yes**	**25**	**1270**	**154**	**0**	**None**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (mg/L)	SP-11	1565	n/a	7/30/2018	996	No	25	1270	154	0	None	No	0.00188	Param Inter 1 of 2
Total Dissolved Solids [TDS] (mg/L)	SP-2	1565	n/a	7/30/2018	1010	No	25	1270	154	0	None	No	0.00188	Param Inter 1 of 2

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Exceeds Limit: SP-10

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 26 background values. Annual per-constituent alpha = 0.02045. Individual comparison alpha = 0.00258 (1 of 2). Comparing 4 points to limit.

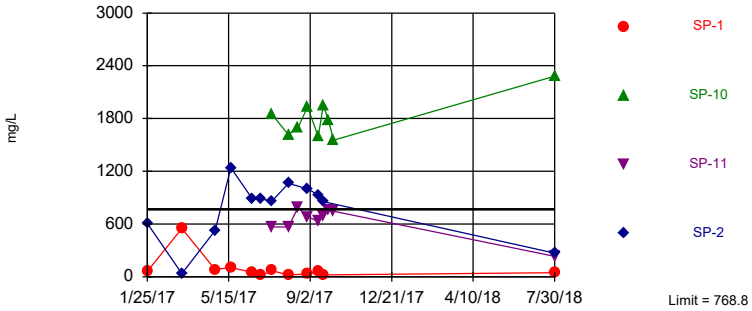
Constituent: Boron Analysis Run 12/2/2018 8:31 AM View: PL's - Interwell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Exceeds Limit: SP-10

Prediction Limit

Interwell Parametric



Background Data Summary (based on square transformation): Mean=291209, Std. Dev.=156656, n=25. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.959, critical = 0.888. Kappa = 1.914 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

Constituent: Chloride Analysis Run 12/2/2018 8:31 AM View: PL's - Interwell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

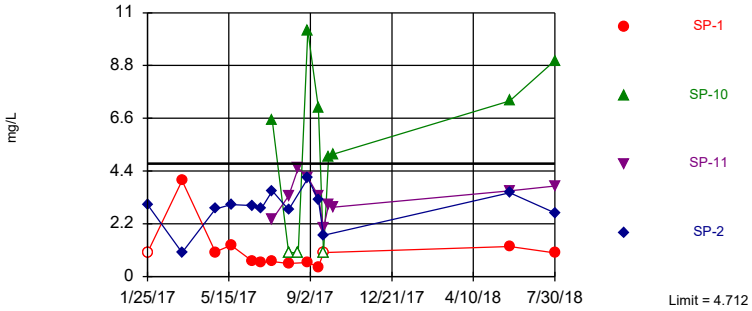
Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Hollow symbols indicate censored values.

Exceeds Limit: SP-10

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=3.167, Std. Dev.=0.8157, n=28, 3.571% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9102, critical = 0.896. Kappa = 1.894 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

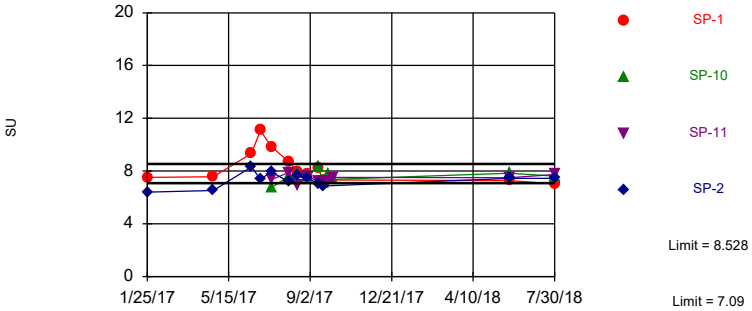
Constituent: Fluoride Analysis Run 12/2/2018 8:31 AM View: PL's - Interwell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Exceeds Limits: SP-1

Prediction Limit

Interwell Parametric



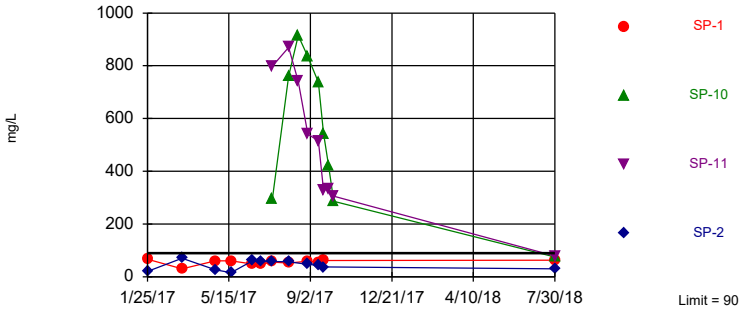
Background Data Summary: Mean=7.809, Std. Dev.=0.3732, n=24. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9695, critical = 0.884. Kappa = 1.927 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009398. Comparing 4 points to limit.

Constituent: pH, field Analysis Run 12/2/2018 8:31 AM View: PL's - Interwell
Northeastern BAP Client: Geosyntec Data: Northeastern 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 26 background values. Annual per-constituent alpha = 0.02045. Individual comparison alpha = 0.00258 (1 of 2). Comparing 4 points to limit.

Constituent: Sulfate Analysis Run 12/2/2018 8:31 AM View: PL's - Interwell

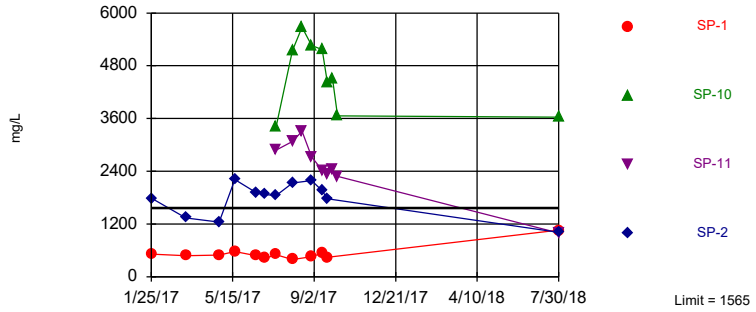
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Exceeds Limit: SP-10

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1270, Std. Dev.=154, n=25. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8924, critical = 0.888. Kappa = 1.914 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/2/2018 8:31 AM View: PL's - Interwell

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Intrawell Prediction Limit Summary Table - Significant Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 8:36 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig. Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium (mg/L)	**SP-5**	**79.1**	**n/a**	**7/30/2018**	**131**	**Yes 12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.01077**	NP (normality) 1 of 2
Calcium (mg/L)	**SP-10**	**108.8**	**n/a**	**7/30/2018**	**227**	**Yes 8**	**71.1**	**14.43**	**0**	**None**	**No**	**0.00188**	Param 1 of 2

Intrawell Prediction Limit Summary Table - All Results

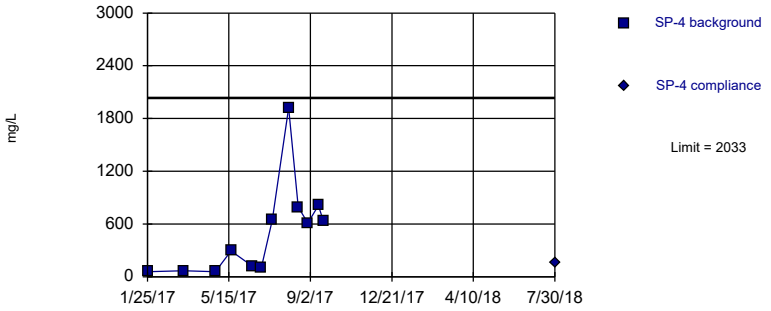
Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 8:36 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj	Transform	Alpha	Method
Calcium (mg/L)	SP-4	2033	n/a	7/30/2018	164	No	12	19.81	11.32	0	None	sqrt(x)	0.00188	Param 1 of 2
Calcium (mg/L)	**SP-5**	**79.1**	**n/a**	**7/30/2018**	**131**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.01077**	NP (normality) 1 of 2
Calcium (mg/L)	SP-1	135.8	n/a	7/30/2018	130	No	11	119.1	7.286	0	None	No	0.00188	Param 1 of 2
Calcium (mg/L)	**SP-10**	**108.8**	**n/a**	**7/30/2018**	**227**	**Yes**	**8**	**71.1**	**14.43**	**0**	**None**	**No**	**0.00188**	Param 1 of 2
Calcium (mg/L)	SP-11	1894	n/a	7/30/2018	124	No	8	629.5	483.3	0	None	No	0.00188	Param 1 of 2
Calcium (mg/L)	SP-2	157.3	n/a	7/30/2018	117	No	11	103.8	23.28	0	None	No	0.00188	Param 1 of 2

Within Limit

Prediction Limit

Intrawell Parametric



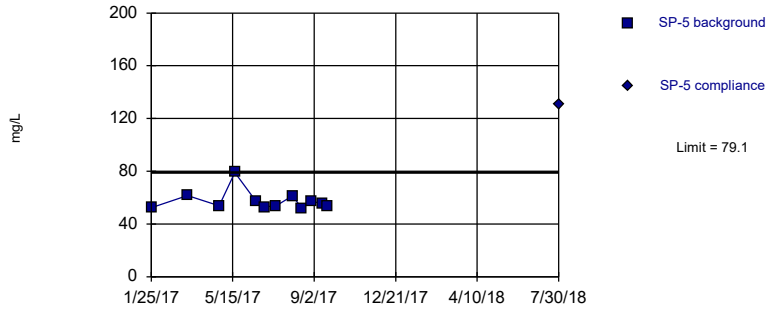
Background Data Summary (based on square root transformation): Mean=19.81, Std. Dev.=11.32, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8858, critical = 0.805. Kappa = 2.232 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 12/2/2018 8:35 AM View: PL's - Intrawell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Exceeds Limit

Prediction Limit

Intrawell Non-parametric



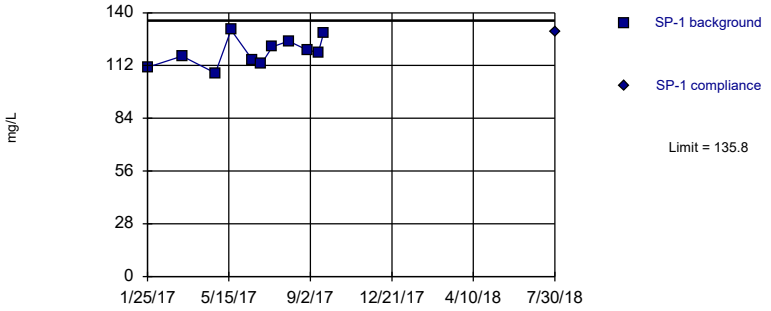
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 12 background values. Well-constituent pair annual alpha = 0.02143. Individual comparison alpha = 0.01077 (1 of 2).

Constituent: Calcium Analysis Run 12/2/2018 8:35 AM View: PL's - Intrawell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Within Limit

Prediction Limit

Intrawell Parametric



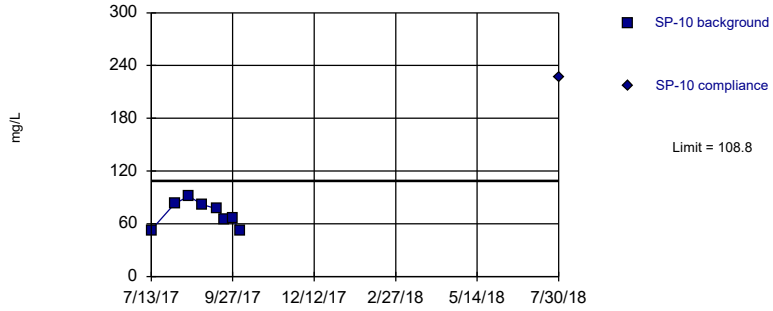
Background Data Summary: Mean=119.1, Std. Dev.=7.286, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9766, critical = 0.792. Kappa = 2.3 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 12/2/2018 8:35 AM View: PL's - Intrawell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Exceeds Limit

Prediction Limit

Intrawell Parametric



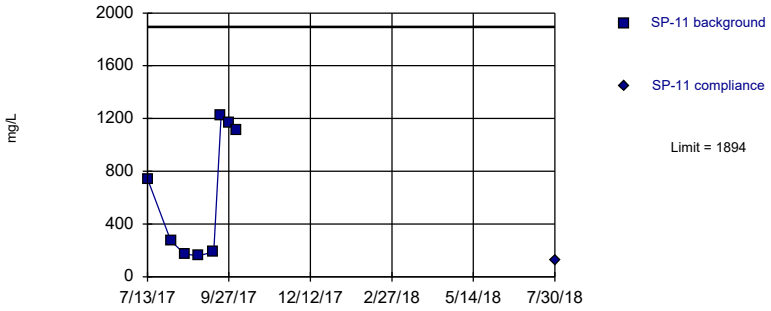
Background Data Summary: Mean=71.1, Std. Dev.=14.43, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9303, critical = 0.749. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 12/2/2018 8:35 AM View: PL's - Intrawell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=629.5, Std. Dev.=483.3, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8, critical = 0.749. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

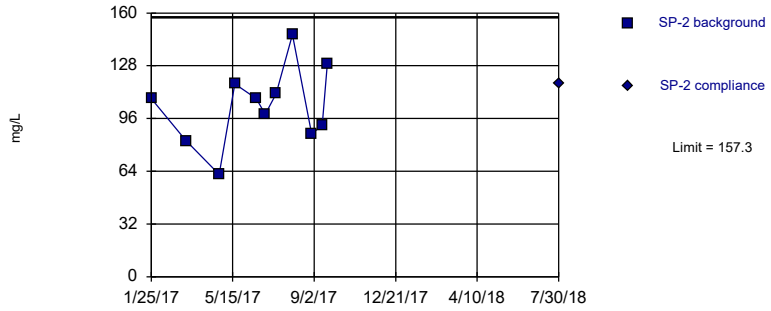
Constituent: Calcium Analysis Run 12/2/2018 8:35 AM View: PL's - Intrawell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=103.8, Std. Dev.=23.28, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9891, critical = 0.792. Kappa = 2.3 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 12/2/2018 8:35 AM View: PL's - Intrawell
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Trend Test Summary Table - Significant Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 9:10 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride (mg/L)	**SP-5 (bg)**	**207.8**	**42**	**38**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.01**	**NP**

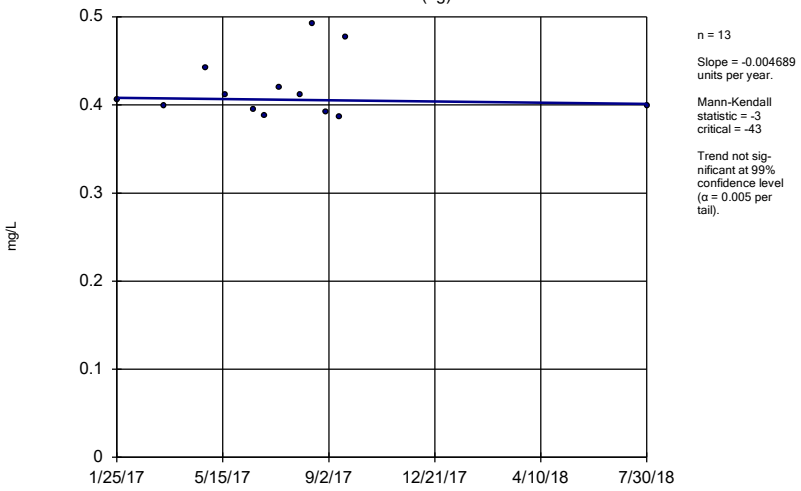
Trend Test Summary Table - All Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 9:10 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	SP-4 (bg)	-0.004689	-3	-43	No	13	0	n/a	n/a	0.01	NP
Boron (mg/L)	SP-5 (bg)	0.011	10	43	No	13	0	n/a	n/a	0.01	NP
Boron (mg/L)	SP-10	0.1046	17	25	No	9	0	n/a	n/a	0.01	NP
Calcium (mg/L)	SP-4 (bg)	964.5	38	43	No	13	0	n/a	n/a	0.01	NP
Calcium (mg/L)	SP-5 (bg)	1.708	5	43	No	13	0	n/a	n/a	0.01	NP
Calcium (mg/L)	SP-10	-37.41	-4	-25	No	9	0	n/a	n/a	0.01	NP
Chloride (mg/L)	SP-4 (bg)	80.24	24	43	No	13	0	n/a	n/a	0.01	NP
Chloride (mg/L)	**SP-5 (bg)**	**207.8**	**42**	**38**	**Yes**	**12**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride (mg/L)	SP-10	384.9	4	25	No	9	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	SP-4 (bg)	-0.4498	-7	-48	No	14	7.143	n/a	n/a	0.01	NP
Fluoride (mg/L)	SP-5 (bg)	0.1065	5	48	No	14	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	SP-10	3.405	14	30	No	10	30	n/a	n/a	0.01	NP
pH, field (SU)	SP-4 (bg)	-0.4904	-26	-38	No	12	0	n/a	n/a	0.01	NP
pH, field (SU)	SP-5 (bg)	-0.2231	-10	-38	No	12	0	n/a	n/a	0.01	NP
pH, field (SU)	SP-1	-1.344	-28	-38	No	12	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (m...	SP-4 (bg)	75.32	37	43	No	13	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (m...	SP-5 (bg)	51.25	18	38	No	12	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (m...	SP-10	-1970	-12	-25	No	9	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

SP-4 (bg)



n = 13

Slope = -0.004689 units per year.

Mann-Kendall statistic = -3 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

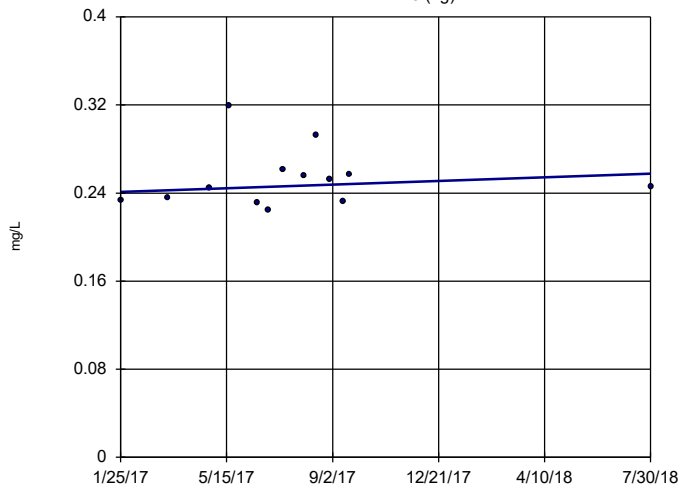
Constituent: Boron Analysis Run 12/2/2018 9:08 AM View: Trend Tests

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-5 (bg)



n = 13

Slope = 0.011 units per year.

Mann-Kendall statistic = 10 critical = 43

Trend not significant at 99% confidence level (α = 0.005 per tail).

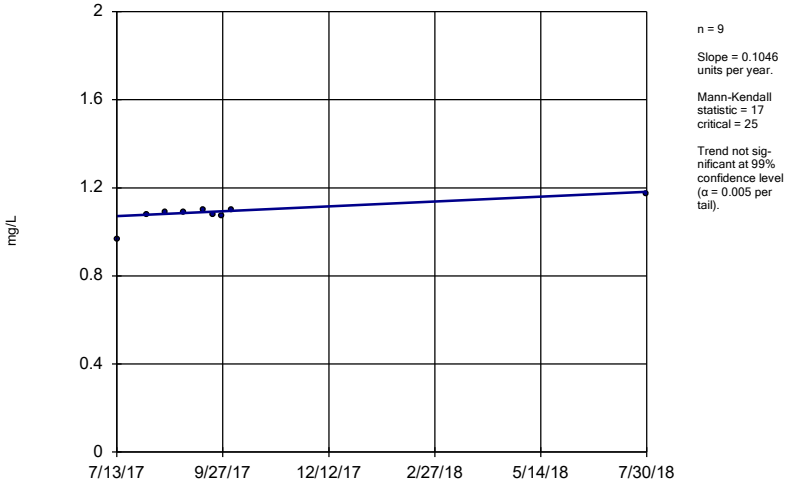
Constituent: Boron Analysis Run 12/2/2018 9:08 AM View: Trend Tests

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-10



n = 9

Slope = 0.1046 units per year.

Mann-Kendall statistic = 17 critical = 25

Trend not significant at 99% confidence level (α = 0.005 per tail).

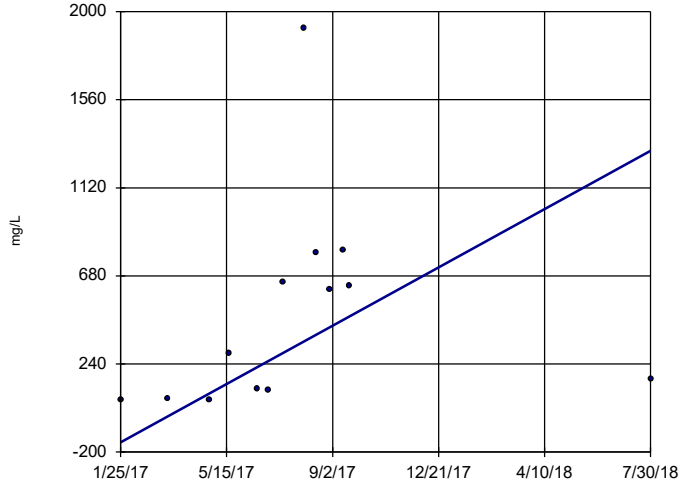
Constituent: Boron Analysis Run 12/2/2018 9:08 AM View: Trend Tests

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-4 (bg)



n = 13

Slope = 964.5 units per year.

Mann-Kendall statistic = 38 critical = 43

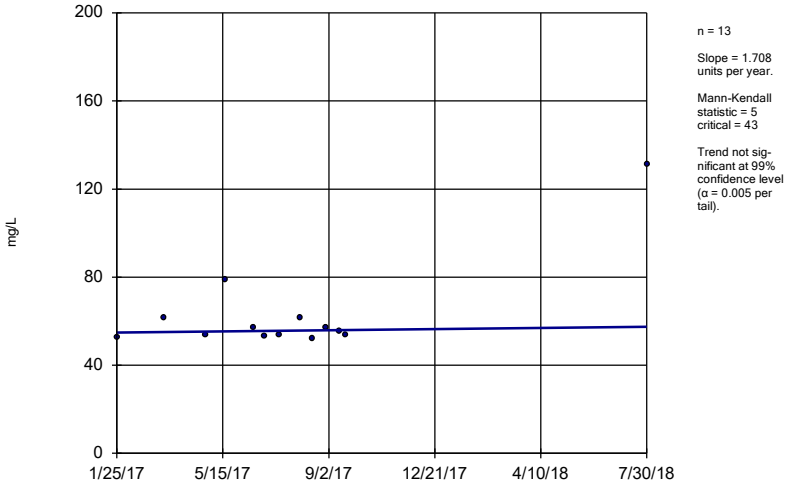
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 12/2/2018 9:08 AM View: Trend Tests

Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sen's Slope Estimator

SP-5 (bg)



n = 13

Slope = 1.708 units per year.

Mann-Kendall statistic = 5
critical = 43

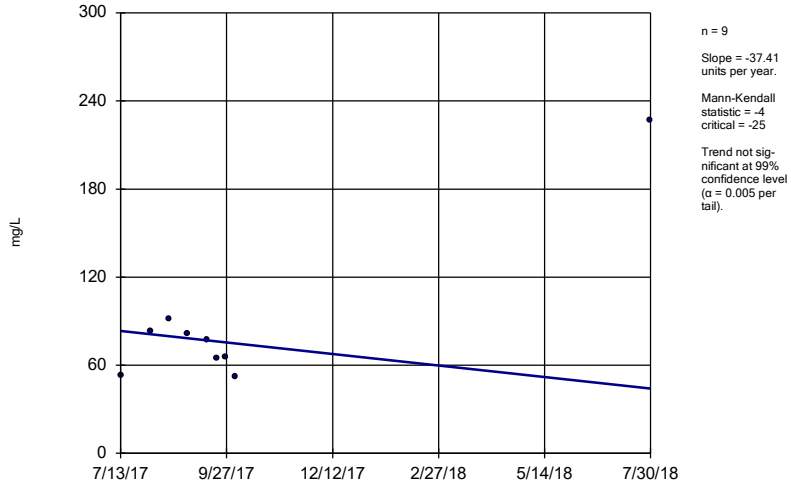
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-10



n = 9

Slope = -37.41 units per year.

Mann-Kendall statistic = -4
critical = -25

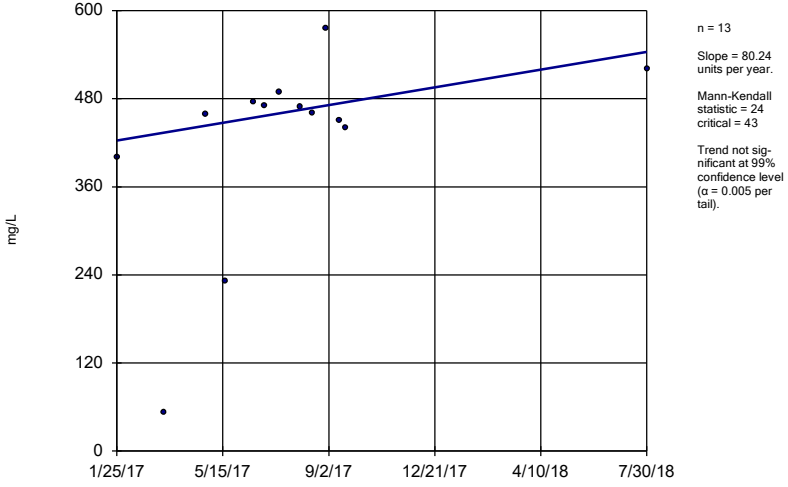
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-4 (bg)



n = 13

Slope = 80.24 units per year.

Mann-Kendall statistic = 24
critical = 43

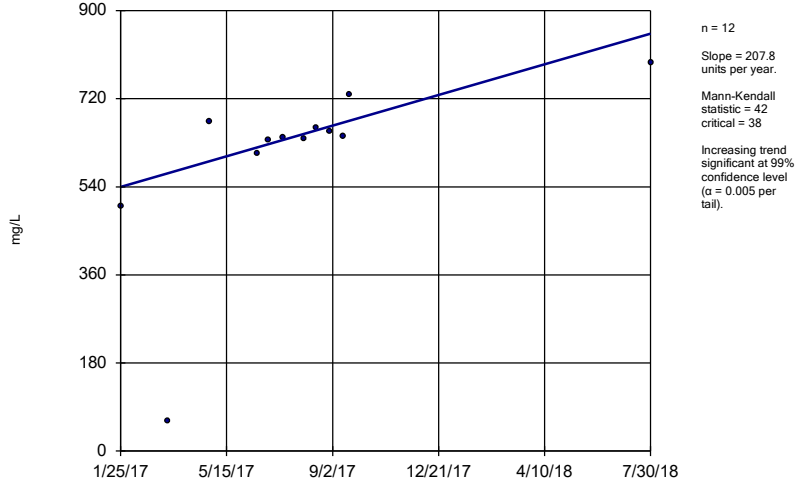
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-5 (bg)



n = 12

Slope = 207.8 units per year.

Mann-Kendall statistic = 42
critical = 38

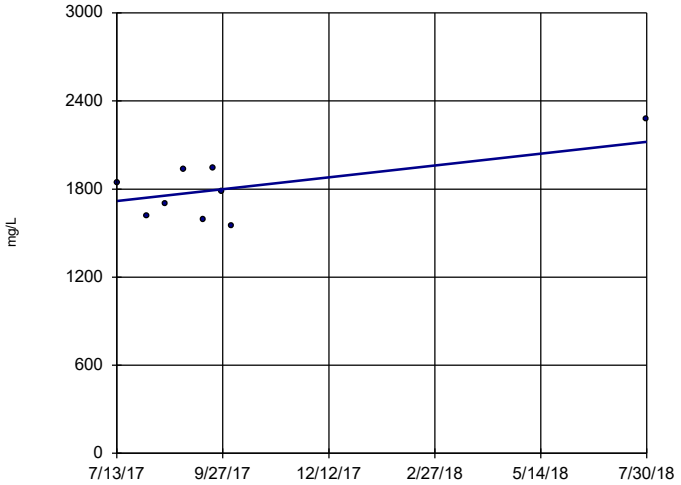
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-10



n = 9

Slope = 384.9 units per year.

Mann-Kendall statistic = 4
critical = 25

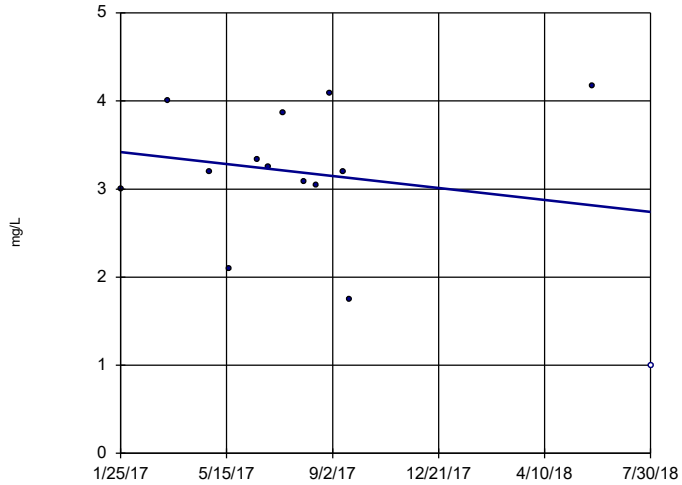
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

SP-4 (bg)



n = 14

Slope = -0.4498 units per year.

Mann-Kendall statistic = -7
critical = -48

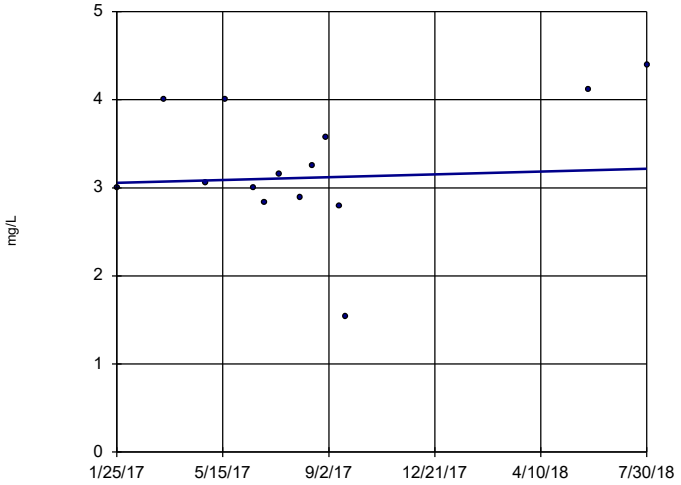
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-5 (bg)



n = 14

Slope = 0.1065 units per year.

Mann-Kendall statistic = 5
critical = 48

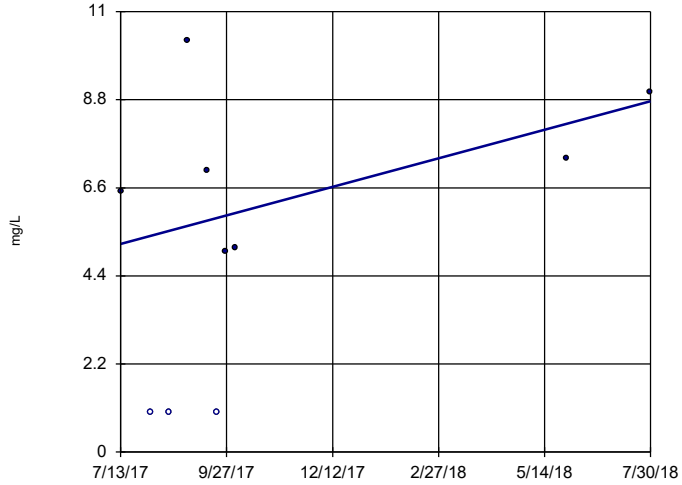
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

SP-10



n = 10

Slope = 3.405 units per year.

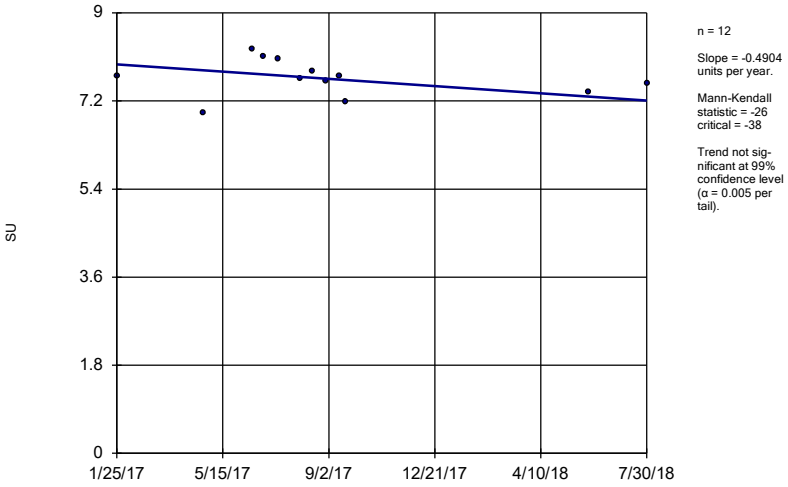
Mann-Kendall statistic = 14
critical = 30

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sen's Slope Estimator

SP-4 (bg)



n = 12

Slope = -0.4904 units per year.

Mann-Kendall statistic = -26
critical = -38

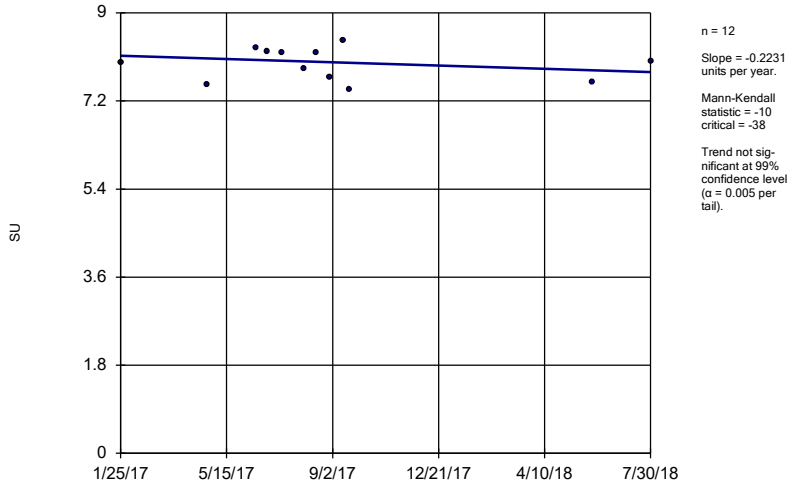
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, field Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-5 (bg)



n = 12

Slope = -0.2231 units per year.

Mann-Kendall statistic = -10
critical = -38

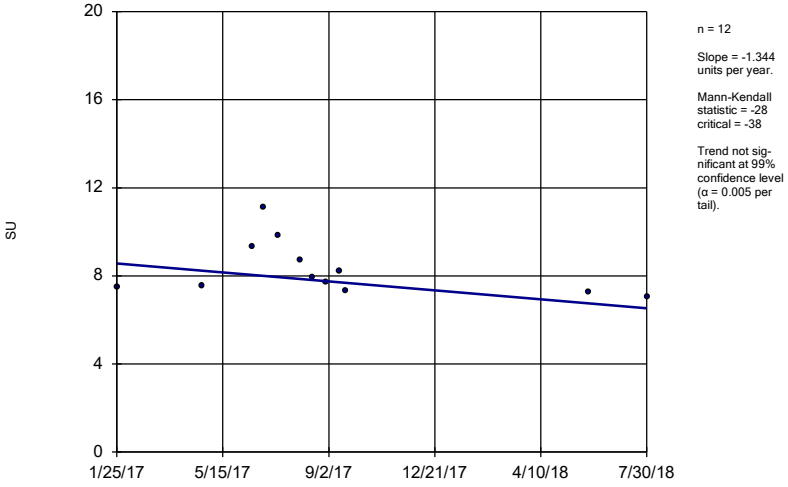
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, field Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-1



n = 12

Slope = -1.344 units per year.

Mann-Kendall statistic = -28
critical = -38

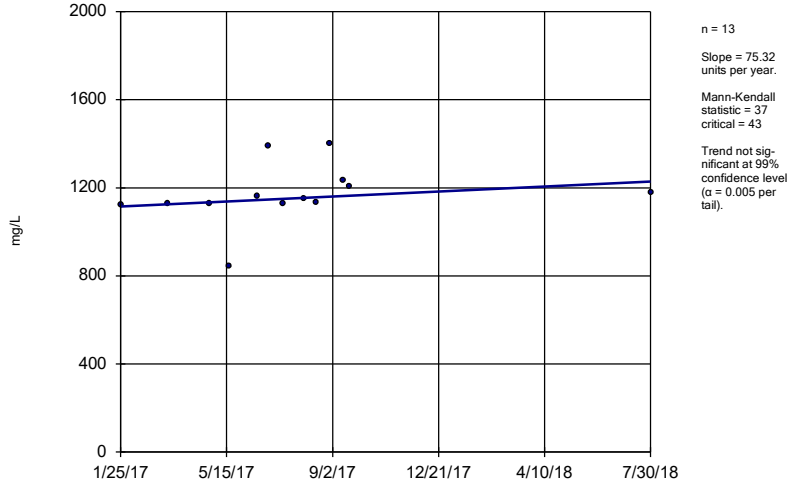
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, field Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-4 (bg)



n = 13

Slope = 75.32 units per year.

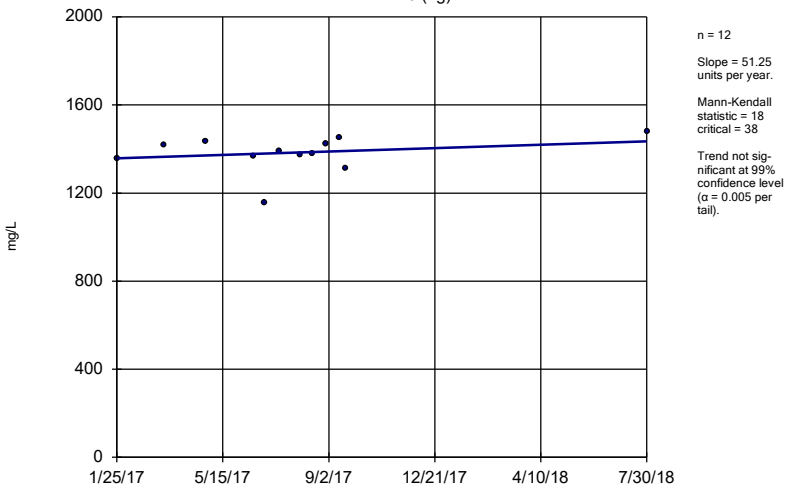
Mann-Kendall statistic = 37
critical = 43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sen's Slope Estimator

SP-5 (bg)



n = 12

Slope = 51.25 units per year.

Mann-Kendall statistic = 18
critical = 38

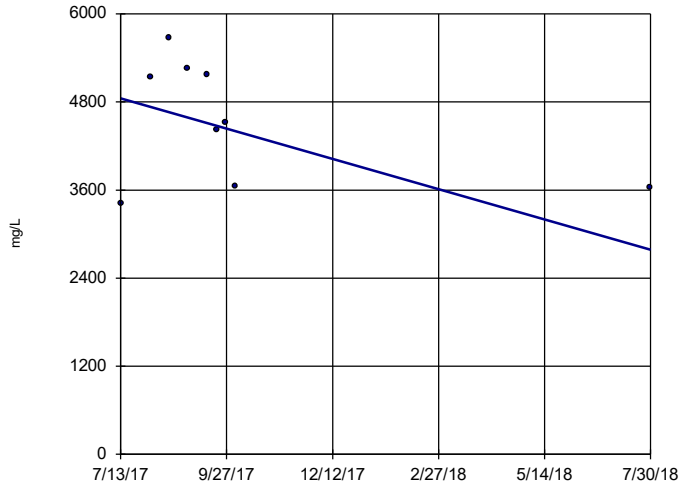
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

SP-10



n = 9

Slope = -1970 units per year.

Mann-Kendall statistic = -12
critical = -25

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/2/2018 9:08 AM View: Trend Tests
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Upper Tolerance Limits

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 8:45 AM

Constituent	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.00514	28	n/a	n/a	53.57	n/a	n/a	0.2378	NP Inter(normality)
Arsenic (mg/L)	0.04878	28	0.1163	0.04651	10.71	None	sqrt(x)	0.05	Inter
Barium (mg/L)	4.59	28	n/a	n/a	0	n/a	n/a	0.2378	NP Inter(normality)
Beryllium (mg/L)	0.00497	28	n/a	n/a	21.43	n/a	n/a	0.2378	NP Inter(Cohens/xform)
Cadmium (mg/L)	0.00247	27	n/a	n/a	62.96	n/a	n/a	0.2503	NP Inter(normality)
Chromium (mg/L)	0.08415	28	n/a	n/a	25	n/a	n/a	0.2378	NP Inter(Cohens/xform)
Cobalt (mg/L)	0.0464	28	-5.915	1.265	14.29	None	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	16.85	27	8.487	3.696	0	None	No	0.05	Inter
Fluoride (mg/L)	5.002	28	3.167	0.8157	3.571	None	No	0.05	Inter
Lead (mg/L)	0.03663	28	n/a	n/a	42.86	n/a	n/a	0.2378	NP Inter(Cohens/xform)
Lithium (mg/L)	0.1502	28	0.09953	0.02253	0	None	No	0.05	Inter
Mercury (mg/L)	0.000058	28	n/a	n/a	57.14	n/a	n/a	0.2378	NP Inter(normality)
Molybdenum (mg/L)	0.00702	28	n/a	n/a	50	n/a	n/a	0.2378	NP Inter(normality)
Selenium (mg/L)	0.005	28	n/a	n/a	71.43	n/a	n/a	0.2378	NP Inter(normality)
Thallium (mg/L)	0.002	28	n/a	n/a	85.71	n/a	n/a	0.2378	NP Inter(NDs)

Confidence Intervals - Significant Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 9:07 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Lithium (mg/L)	**SP-10**	**0.3149**	**0.2625**	**0.15**	**Yes**	**10**	**0**	**No**	**0.01**	**Param.**

Confidence Intervals - All Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 9:07 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	SP-1	0.00685	0.00114	0.006	No	13	53.85	No	0.01	NP (normality)
Antimony (mg/L)	SP-10	0.005	0.00034	0.006	No	10	40	No	0.011	NP (normality)
Antimony (mg/L)	SP-11	0.007325	0.002721	0.006	No	10	20	No	0.01	Param.
Antimony (mg/L)	SP-2	0.00871	0.0013	0.006	No	13	15.38	No	0.01	NP (Cohens/xfrm)
Arsenic (mg/L)	SP-1	0.00548	0.00134	0.049	No	13	61.54	No	0.01	NP (normality)
Arsenic (mg/L)	SP-10	0.01153	0.002668	0.049	No	10	20	No	0.01	Param.
Arsenic (mg/L)	SP-11	0.008248	0.002412	0.049	No	10	10	No	0.01	Param.
Arsenic (mg/L)	SP-2	0.005753	0.001816	0.049	No	13	7.692	sqrt(x)	0.01	Param.
Barium (mg/L)	SP-1	0.2314	0.1748	4.59	No	13	0	No	0.01	Param.
Barium (mg/L)	SP-10	1.535	0.2955	4.59	No	10	0	ln(x)	0.01	Param.
Barium (mg/L)	SP-11	0.3417	0.08478	4.59	No	10	0	No	0.01	Param.
Barium (mg/L)	SP-2	1.703	0.8814	4.59	No	13	0	sqrt(x)	0.01	Param.
Beryllium (mg/L)	SP-1	0.001	0.00005	0.005	No	13	30.77	No	0.01	NP (normality)
Beryllium (mg/L)	SP-10	0.001	0.00003	0.005	No	10	30	No	0.011	NP (normality)
Beryllium (mg/L)	SP-11	0.001	0.000029	0.005	No	10	20	No	0.011	NP (Cohens/xfrm)
Beryllium (mg/L)	SP-2	0.001	0.00005	0.005	No	13	23.08	No	0.01	NP (Cohens/xfrm)
Cadmium (mg/L)	SP-1	0.001	0.00011	0.005	No	13	69.23	No	0.01	NP (normality)
Cadmium (mg/L)	SP-10	0.001	0.00002	0.005	No	10	90	No	0.011	NP (NDs)
Cadmium (mg/L)	SP-11	0.002245	0.0002566	0.005	No	10	20	No	0.01	Param.
Cadmium (mg/L)	SP-2	0.001	0.00008	0.005	No	13	69.23	No	0.01	NP (normality)
Chromium (mg/L)	SP-1	0.00183	0.00055	0.1	No	13	46.15	No	0.01	NP (Cohens/xfrm)
Chromium (mg/L)	SP-10	0.00244	0.00006	0.1	No	10	20	No	0.011	NP (Cohens/xfrm)
Chromium (mg/L)	SP-11	0.02229	0.0009677	0.1	No	10	10	x^(1/3)	0.01	Param.
Chromium (mg/L)	SP-2	0.00217	0.0002485	0.1	No	13	23.08	No	0.01	Param.
Cobalt (mg/L)	SP-1	0.00255	0.000676	0.046	No	13	15.38	No	0.01	NP (Cohens/xfrm)
Cobalt (mg/L)	SP-10	0.004942	0.002116	0.046	No	10	10	No	0.01	Param.
Cobalt (mg/L)	SP-11	0.01184	0.003374	0.046	No	10	10	No	0.01	Param.
Cobalt (mg/L)	SP-2	0.00277	0.00055	0.046	No	13	15.38	No	0.01	NP (Cohens/xfrm)
Combined Radium 226 + 228 (pCi/L)	SP-1	4.71	2.584	16.85	No	13	0	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	SP-10	5.997	0.8426	16.85	No	10	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	SP-11	5.201	0.7041	16.85	No	10	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	SP-2	19.54	7.986	16.85	No	10	0	No	0.01	Param.
Fluoride (mg/L)	SP-1	1.3	0.542	5	No	13	15.38	No	0.01	NP (Cohens/xfrm)
Fluoride (mg/L)	SP-10	8.541	0.5886	5	No	10	30	No	0.01	Param.
Fluoride (mg/L)	SP-11	3.982	2.622	5	No	10	0	No	0.01	Param.
Fluoride (mg/L)	SP-2	3.444	2.275	5	No	13	0	No	0.01	Param.
Lead (mg/L)	SP-1	0.005	0.00094	0.037	No	13	61.54	No	0.01	NP (normality)
Lead (mg/L)	SP-10	0.005	0.000102	0.037	No	10	80	No	0.011	NP (NDs)
Lead (mg/L)	SP-11	0.007261	0.002258	0.037	No	10	30	No	0.01	Param.
Lead (mg/L)	SP-2	0.005	0.00091	0.037	No	13	69.23	No	0.01	NP (normality)
Lithium (mg/L)	SP-1	0.007009	0.004358	0.15	No	13	0	No	0.01	Param.
Lithium (mg/L)	**SP-10**	**0.3149**	**0.2625**	**0.15**	**Yes**	**10**	**0**	**No**	**0.01**	**Param.**
Lithium (mg/L)	SP-11	0.1246	0.05738	0.15	No	10	0	No	0.01	Param.
Lithium (mg/L)	SP-2	0.09956	0.06878	0.15	No	13	0	x^2	0.01	Param.
Mercury (mg/L)	SP-1	0.000025	0.000023	0.002	No	13	76.92	No	0.01	NP (NDs)
Mercury (mg/L)	SP-10	0.00002413	0.000009671	0.002	No	10	10	No	0.01	Param.
Mercury (mg/L)	SP-11	0.00003373	0.000007232	0.002	No	10	10	sqrt(x)	0.01	Param.
Mercury (mg/L)	SP-2	0.000025	0.000006	0.002	No	13	69.23	No	0.01	NP (normality)
Molybdenum (mg/L)	SP-1	0.01696	0.009316	0.1	No	13	0	No	0.01	Param.
Molybdenum (mg/L)	SP-10	0.1314	0.008821	0.1	No	10	0	ln(x)	0.01	Param.
Molybdenum (mg/L)	SP-11	0.05916	0.02273	0.1	No	10	0	No	0.01	Param.
Molybdenum (mg/L)	SP-2	0.03483	0.02266	0.1	No	13	0	No	0.01	Param.
Selenium (mg/L)	SP-1	0.00651	0.00277	0.05	No	13	23.08	No	0.01	NP (Cohens/xfrm)
Selenium (mg/L)	SP-10	0.006779	0.001766	0.05	No	10	20	No	0.01	Param.
Selenium (mg/L)	SP-11	0.006069	0.001847	0.05	No	10	10	No	0.01	Param.

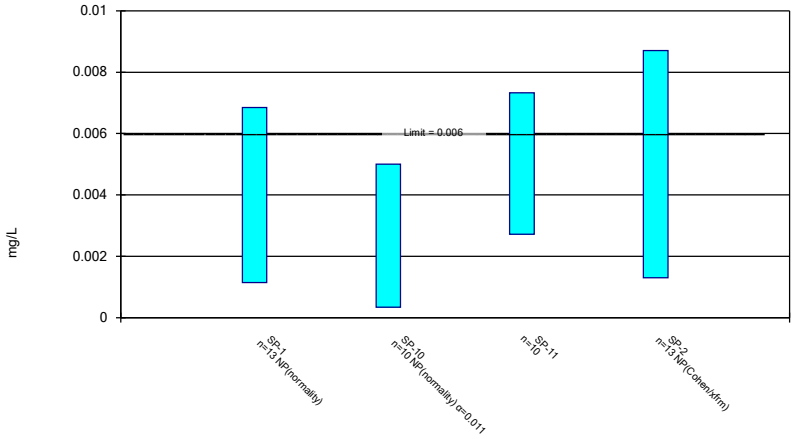
Confidence Intervals - All Results

Northeastern BAP Client: Geosyntec Data: Northeastern BAP Printed 12/2/2018, 9:07 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Selenium (mg/L)	SP-2	0.02336	0.00216	0.05	No	13	15.38	No	0.01	NP (Cohens/xfrm)
Thallium (mg/L)	SP-1	0.002	0.00089	0.002	No	13	76.92	No	0.01	NP (NDs)
Thallium (mg/L)	SP-10	0.002	0.00004	0.002	No	10	90	No	0.011	NP (NDs)
Thallium (mg/L)	SP-11	0.002	0.00003	0.002	No	10	90	No	0.011	NP (NDs)
Thallium (mg/L)	SP-2	0.002	0.00006	0.002	No	13	92.31	No	0.01	NP (NDs)

Parametric and Non-Parametric (NP) Confidence Interval

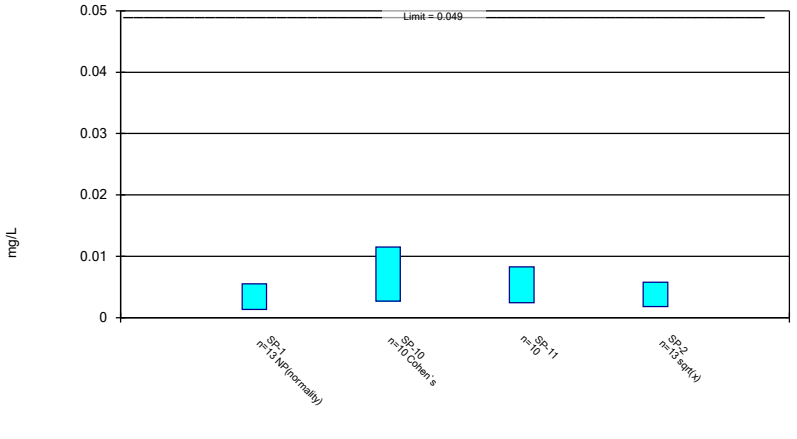
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

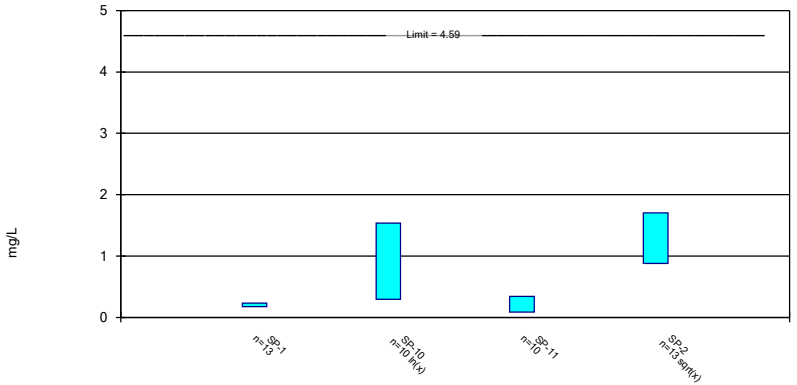
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

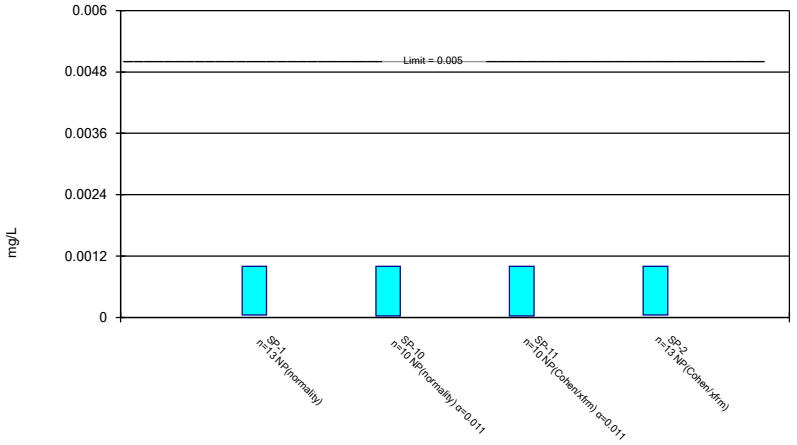
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Non-Parametric Confidence Interval

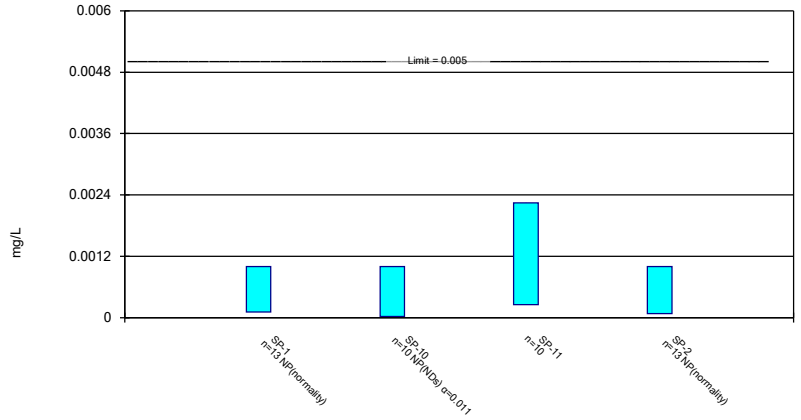
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Beryllium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

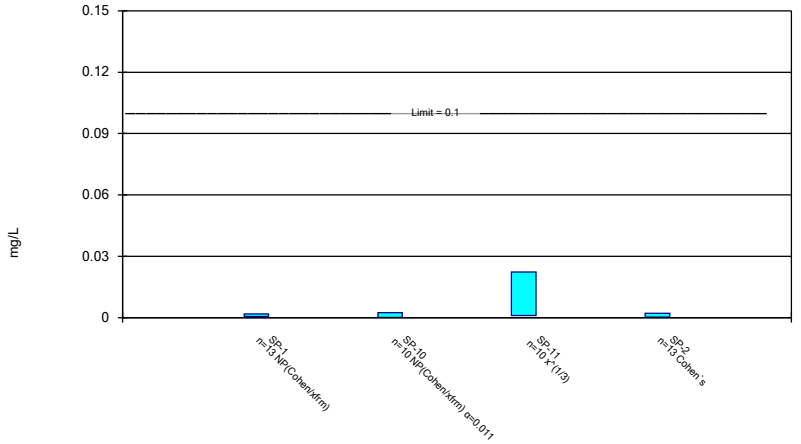
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

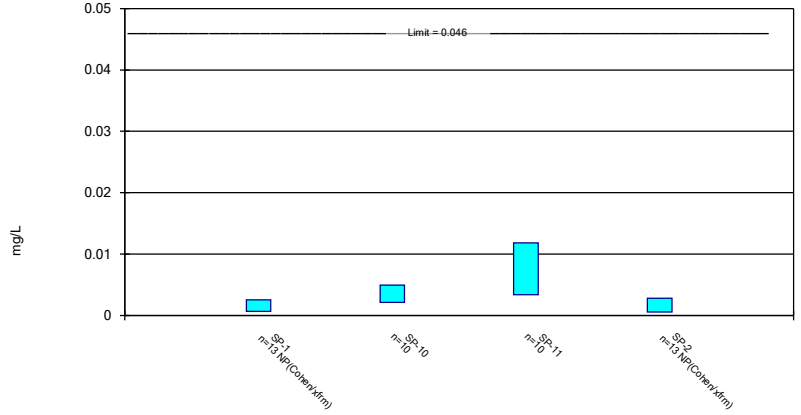
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

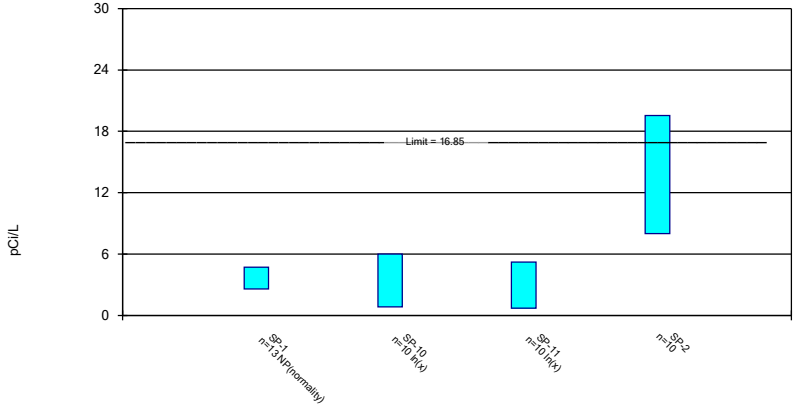
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

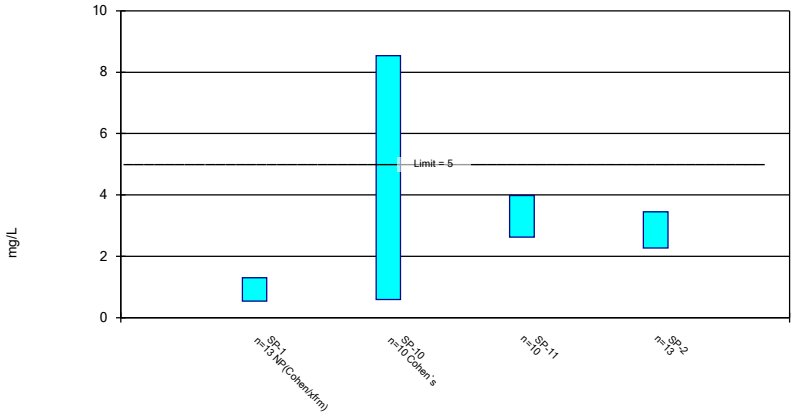
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals -
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

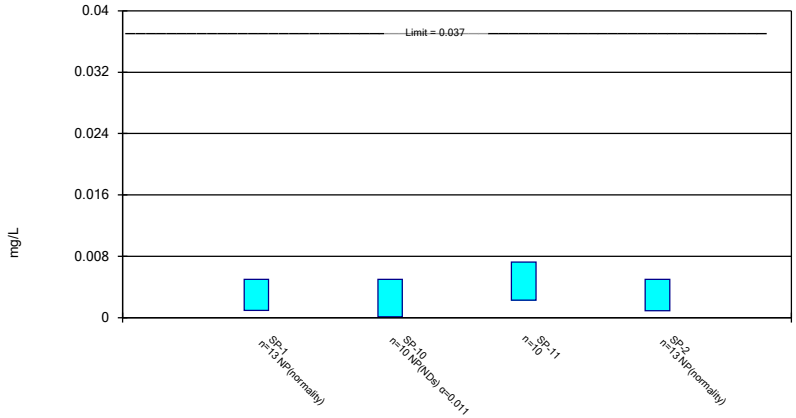
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

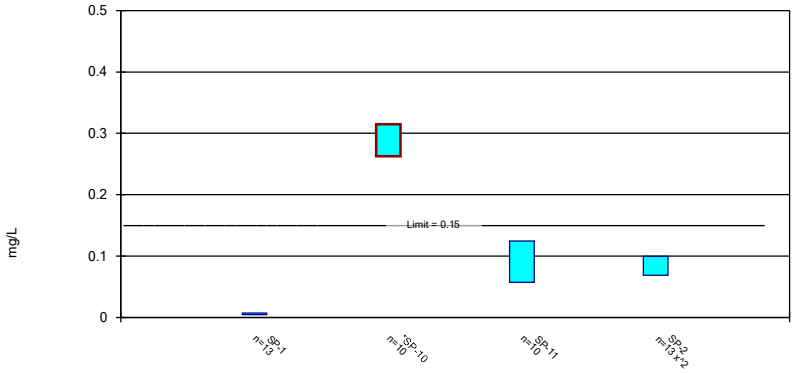
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

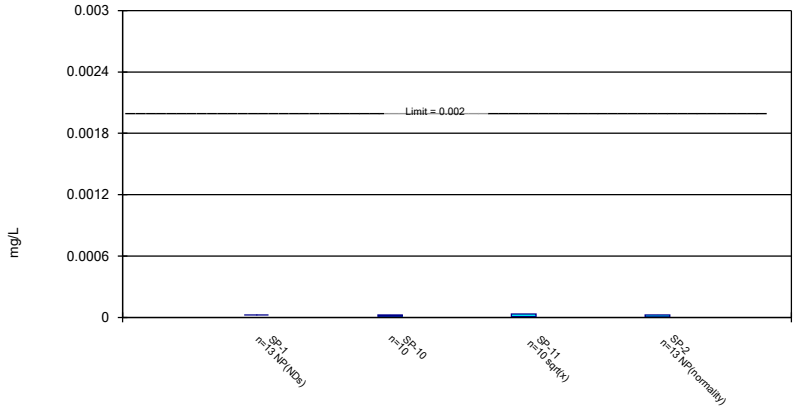
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric and Non-Parametric (NP) Confidence Interval

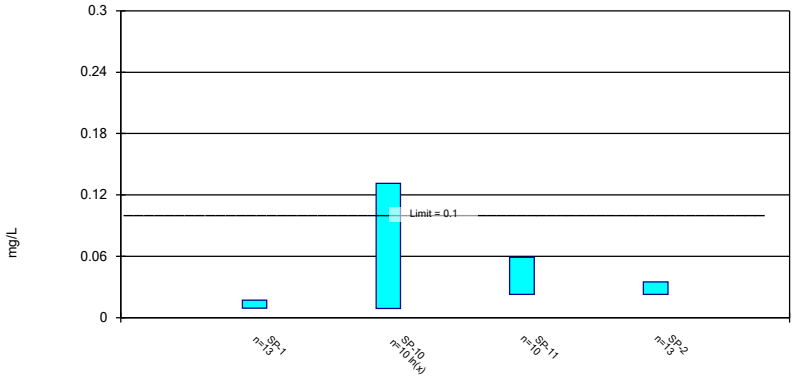
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Parametric Confidence Interval

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

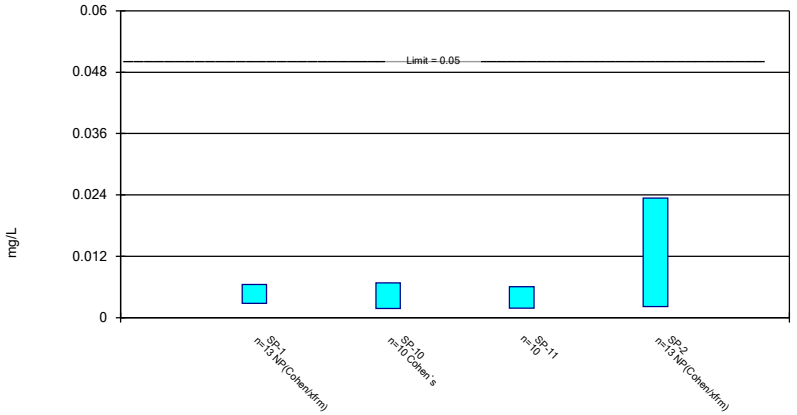


Constituent: Molybdenum Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

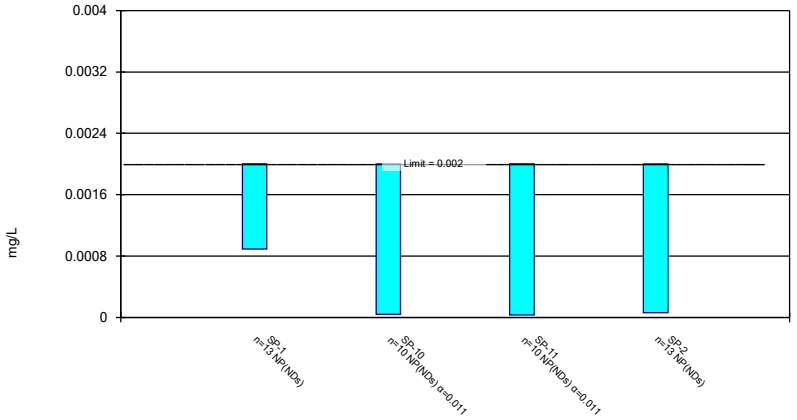


Constituent: Selenium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP

Sanitas™ v.9.6.11 Sanitas software utilized by Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Thallium Analysis Run 12/2/2018 9:02 AM View: Confidence Intervals - App IV
Northeastern BAP Client: Geosyntec Data: Northeastern BAP