2018 Annual Groundwater Monitoring and Corrective Action Report

Lon D. Wright Power Plant

Fossil Fuel Combustion Ash (FFCA) Monofill

City of Fremont Department of Utilities
401 E Military Road
Fremont, Nebraska 68025

SCS ENGINEERS

File No. 27218066.00 | January 21, 2019

SCS Engineers
14755 Grover Street
Omaha, NE 68144
402-884-6202

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1.0 INTRODUCTION

This 2018 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" published by the U.S. Environmental Protection Agency (USEPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (USEPA, 2015). Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e) and the Assessment Monitoring Program described in 40 CFR 257.95. The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2018 Annual Groundwater Monitoring and Corrective Action Report for the 11.36-acre CCR FFCA monofill at the Lon D. Wright Power Plant, which is owned by the City of Fremont Department of Utilities (FDU).

This report covers the period of groundwater monitoring from January 1, 2018 through December 31, 2018.

2.0 §257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. *For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by*

§ 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

2.1 §257.90(E)(1) SITE MAP

A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

A site vicinity map with an aerial image showing the property boundary of the Lon D. Wright Power Plant is provided as **Figure 1**. A site map with an aerial image showing the FFCA monofill and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program is provided as **Figure 2**.

2.2 §257.90(E)(2) MONITORING SYSTEM CHANGES

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

No new monitoring wells were installed and no wells were decommissioned as part of the groundwater monitoring program for the FFCA monofill in 2018. The groundwater monitoring system

currently consists of eight monitoring wells (1 upgradient and 7 downgradient). Monitoring wells MW-1 through MW-5 were installed in 1996 to intercept the shallow groundwater table beneath the FFCA monofill. Monitoring wells MW-6 through MW-8 were installed in 2016 to increase the interception potential of predominant down- and cross-gradient flow migration pathways and to demonstrate compliance with 40 CFR 257.91. Background monitoring well MW-4 was replaced with MW-4R in 2016 due to the poor integrity of the monitoring well.

2.3 §257.90(E)(3) SUMMARY OF SAMPLING EVENTS

In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

Two groundwater samples were collected from each CCR monitoring well for the semi-annual assessment monitoring events. Samples from the first sampling event on February 26, 2018 were analyzed for both Appendix III and Appendix IV constituents. Samples from the second sampling event on June 14, 2018 were analyzed for Appendix III and Appendix IV detects constituents. A summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs is included in **Table 1**. The submitted Groundwater Monitoring Program Reports for the first and second sampling events to the NDEQ, which include the analytical reports, groundwater contour maps, field data sheets and statistical summaries, are provided in **Appendices A1** and **A2**.

2.4 §257.90(E)(4) MONITORING TRANSITION NARRATIVE

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels);

As required by 40 CFR 257.90(b), eight background groundwater monitoring events were completed from October 2016 through September 2017 under the detection monitoring program. Statistical analysis of the analytical results from the eight background groundwater monitoring events resulted in all seven downgradient wells having statistically significant increases (SSIs) in concentration above the background concentration data at MW-4R. The SSI determinations completed in 2017 resulted in the transition from the detection monitoring program into the assessment monitoring program in February 2018.

2.5 §257.90(E)(5) OTHER REQUIREMENTS

Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

Additional potentially applicable requirements for the annual report, and the location of the requirement within the Rule, are provided in the following sections. For each cited section of the Rule, the portion referencing the annual report requirement is provided below in *italics*, followed by applicable information relative to the 2018 Annual Groundwater Monitoring and Corrective Action Report for the 11.36-acre CCR FFCA monofill at the Lon D. Wright Power Plant, which is owned by the City of Fremont Department of Utilities (FDU).

2.5.1 §257.90(e) General Requirements

For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.

Status of Groundwater Monitoring and Corrective Action Program. The groundwater monitoring and corrective action program is currently in assessment monitoring.

Summary of Key Actions Completed. The facility prepared and implemented a groundwater monitoring program that transitioned from detection monitoring to assessment monitoring. The facility conducted groundwater monitoring in accordance with assessment monitoring protocols and established groundwater protection standards.

Description of Any Problems Encountered. No problems were encountered involving the two groundwater monitoring events.

Discussion of Actions to Resolve the Problems. See above. No problems were encountered involving the two groundwater monitoring events.

Projection of Key Activities for the Upcoming Year (2019):

Annual groundwater sampling and analysis event for all constituents identified in appendix III and appendix IV of 40 CFR part 258 (First Quarter 2019).

Within 14 days, place a notice in the operating record identifying the appendix IV constituents that have been detected and notify the NDEQ that this notice has been placed in the operating record (if applicable).

Statistical evaluation and determination of any SSIs for the First Quarter 2019 monitoring event.

Within 90 days, or on at least a semiannual basis, resample all monitoring wells and analyze for all the constituents in appendix III and all appendix IV detects of 40 CFR part 258.

Statistical evaluation and determination of any SSIs for the second assessment monitoring groundwater sampling and analysis event.

2.5.2 §257.94(d) Alternative Detection Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not Applicable. No alternative detection monitoring frequency has been proposed. The facility is currently in assessment monitoring.

2.5.3 §257.94(e)(2) Alternative Source Demonstration for Detection Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not Applicable. No alternative source demonstration was completed in 2018.

2.5.4 §257.95(c) Alternative Assessment Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not Applicable. No alternative assessment monitoring frequency has been proposed.

2.5.5 §257.95(d)(3) Assessment Monitoring Results and Standards

Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Assessment Monitoring Results and Standards for the two assessment monitoring events can be found in the submitted Groundwater Monitoring Program Reports to the NDEQ. These reports, which include the analytical reports, groundwater contour maps, field data sheets and statistical summaries, are provided in Appendices A1 and A2.

2.5.6 §257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not Applicable. No alternative source demonstration for assessment monitoring was completed in 2018.

2.5.7 §257.96(a) Extension of Time for Corrective Measures Assessment

The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measure due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not Applicable. Corrective measures assessment has not been initiated.

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TABLE 1

CCR Rule Groundwater Samples Summary

Table 1
CCR Rule Groundwater Samples Summary
Lon D. Wright Power Plant FFCA Monofill
February & June 2018

Well ID	Designation	Number of Samples Collected	Sampling Dates
MW-1	Downgradient	2 (1 each event)	2.26.18
			6.14.18
MW-2	Downgradient	2 (1 each event)	2.26.18
			6.14.18
MW-3	Downgradient	2 (1 each event)	2.26.18
			6.14.18
MW-4R	Upgradient	2 (1 each event)	2.26.18
			6.14.18
MW-5	Downgradient	2 (1 each event)	2.26.18
			6.14.18
MW-6	Downgradient	2 (1 each event)	2.26.18
			6.14.18
MW-7	Downgradient	2 (1 each event)	2.26.18
			6.14.18
MW-8	Downgradient	2 (1 each event)	2.26.18
			6.14.18

Note - All monitoring wells are currently in the assessment monitoring program

FIGURE 1

Site Vicinity Map

NOTE: BACKGROUND IMAGE FROM GOOGLE EARTH DATED 6/4/2018.

REV.	DATE	CK. BY
△	-	-
△	-	-
△	-	-
△	-	-
△	-	-
△	-	-

SHEET TITLE
SITE VICINITY MAP

PROJECT TITLE
ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CLIENT
FREMONT DEPARTMENT OF UTILITIES
LON D. WRIGHT POWER PLANT
FREMONT, NEBRASKA

SCS ENGINEERS
14755 GROVER STREET
OMAHA, NEBRASKA 68144
PH. (402) 884-6202 FAX. (402) 884-6203

PROJ. NO. 27218066.00
DSN. BY: ZEM
DWN. BY: ZEM
CHK. BY: BRS
Q/A RVW BY: BRS
PROJ. MGR. BRS

CADD FILE: ANNUAL GW CAR FIGURES.DWG

DATE: 1/18/19

FIGURE NO.
1

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FIGURE 2

Site Map with Monitoring Wells

LEGEND

- RAILROAD TRACKS
- FENCE/CCR MONOFILL BOUNDARY
- MONITORING WELL
- PIEZOMETER

100 0 100 200

SCALE FEET

REV.	DATE	CK. BY
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

SHEET TITLE
SITE MAP

PROJECT TITLE
ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CLIENT
FREMONT DEPARTMENT OF UTILITIES
LON D. WRIGHT POWER PLANT
FREMONT, NEBRASKA

SCS ENGINEERS
14755 GROVER STREET
OMAHA, NEBRASKA 68144
PH. (402) 884-8202 FAX. (402) 884-6203

PROJ. NO. 27218066.00
DSN. BY: KB
DWN. BY: ZEM
CHK. BY: CJ
Q/A RVW BY: CJ
PROJ. MGR. BRS

CADD FILE: ANNUAL GW CAR FIGURES.DWG

DATE: 1/18/19

FIGURE NO.
2

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APPENDIX A

Groundwater Monitoring Program Reports

A1 February 2018 Groundwater Monitoring Program Report

REC'D NDEQ - (8/27/2018) - (20180058178)

FREMONT
Department of Utilities

Operated by the
Board for Public Works

400 EAST MILITARY AVENUE P.O. BOX 1468 FREMONT, NE 68025

July 25, 2018

State of Nebraska
Department of Environmental Quality
Remediation Section

Attn:
Nancy Harris
Groundwater Geologist
Waste Management Division
Suite 400, The Atrium
1200 N. Street
P.O. Box 98922
Lincoln, NE 68509-8922

Dear Ms. Harris:

Enclosed is one copy of the Groundwater Monitoring Program Report for the **Fremont Utilities FFCA Monofill IIS 48518, Permit # NE0203777** for your review. The report is based on the requirements of the Coal Combustion Residuals Regulation for assessment monitoring and the above referenced permit. The report represents the sampling round completed on February 26, 2018. If you have any questions concerning this report please feel free to call or email Tony Sedlacek.

Sincerely,

Tony Sedlacek

Tony Sedlacek
Environmental Engineering Technician
Lon D. Wright Power Plant
Fremont Department of Utilities
2701 E. 1st St
Fremont, NE 68025
Phone (402) 727-2651
Fax (402) 727-2640
tony.sedlacek@fremontne.gov

Enclosures

REC'D NDEQ - (8/27/2018) - (20180058178)

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   1.1 Well Samples Parameters Analyzed

2. **Results:**
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   3.2 Field Log Book Entries
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   4.2 Chain-of-Custody Records
   4.3 Statistical Summary Report

REC'D NDEQ - (8/27/2018) - (20180058178)

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60264779001	MW-1	Water	02/26/18 11:32	02/28/18 06:15
60264779002	MW-2	Water	02/26/18 12:13	02/28/18 06:15
60264779003	MW-3	Water	02/26/18 10:06	02/28/18 06:15
60264779004	MW-4R	Water	02/26/18 09:23	02/28/18 06:15
60264779005	MW-5	Water	02/26/18 10:48	02/28/18 06:15
60264779006	MW-6	Water	02/26/18 14:37	02/28/18 06:15
60264779007	MW-7	Water	02/26/18 13:58	02/28/18 06:15
60264779008	MW-8	Water	02/26/18 13:15	02/28/18 06:15
60264779009	DUPLICATE	Water	02/26/18 23:59	02/28/18 06:15

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www.pacelabs.com

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE ANALYTE COUNT

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60264779001	MW-1	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779002	MW-2	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779003	MW-3	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779004	MW-4R	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779005	MW-5	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779006	MW-6	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779007	MW-7	EPA 6010	JRS	3	PASI-K

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SAMPLE ANALYTE COUNT

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779008	MW-8	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K
60264779009	DUPLICATE	EPA 6010	JRS	3	PASI-K
		EPA 6020	JGP	11	PASI-K
		EPA 7470	TDS	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 9040	MJK	1	PASI-K
		EPA 9056	AGO	3	PASI-K

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SAMPLE SUMMARY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60264871001	MW-1	Water	02/26/18 11:32	02/28/18 06:15
60264871002	MW-2	Water	02/26/18 12:13	02/28/18 06:15
60264871003	MW-3	Water	02/26/18 10:06	02/28/18 06:15
60264871004	MW-4R	Water	02/26/18 09:23	02/28/18 06:15
60264871005	MW-5	Water	02/26/18 10:48	02/28/18 06:15
60264871006	MW-6	Water	02/26/18 14:37	02/28/18 06:15
60264871007	MW-7	Water	02/26/18 13:58	02/28/18 06:15
60264871008	MW-8	Water	02/26/18 13:15	02/28/18 06:15
60264871009	DUPLICATE	Water	02/26/18 23:59	02/28/18 06:15

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SAMPLE ANALYTE COUNT

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60264871001	**MW-1**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871002	**MW-2**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871003	**MW-3**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871004	**MW-4R**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871005	**MW-5**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871006	**MW-6**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871007	**MW-7**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871008	**MW-8**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60264871009	**DUPLICATE**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-1 **Lab ID: 60264779001** Collected: 02/26/18 11:32 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**167**	ug/L	100	1	03/01/18 13:50	03/06/18 17:34	7440-42-8	
Calcium	**114**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:34	7440-70-2	M1
Lithium	**35.9**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:34	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7440-36-0	
Arsenic	**3.7**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7440-38-2	
Barium	**135**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:21	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:21	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7439-92-1	
Molybdenum	**8.6**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7439-98-7	
Selenium	**10.8**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:21	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 12:42	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:19	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**507**	mg/L	5.0	1		03/05/18 11:31		
9040 pH	Analytical Method: EPA 9040							
pH	**7.2**	Std. Units	0.10	1		03/06/18 10:21		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**9.7**	mg/L	1.0	1		03/06/18 11:19	16887-00-6	
Fluoride	**1.3**	mg/L	0.20	1		03/06/18 11:19	16984-48-8	
Sulfate	**53.8**	mg/L	5.0	5		03/06/18 12:01	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-2 **Lab ID: 60264779002** Collected: 02/26/18 12:13 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**127**	ug/L	100	1	03/01/18 13:50	03/06/18 17:40	7440-42-8	
Calcium	**101**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:40	7440-70-2	
Lithium	**27.4**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:40	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7440-36-0	
Arsenic	**3.2**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7440-38-2	
Barium	**99.5**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:25	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:25	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7439-92-1	
Molybdenum	**7.1**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7439-98-7	
Selenium	**12.7**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:25	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 12:45	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:22	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**430**	mg/L	5.0	1		03/05/18 11:31		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		03/06/18 10:23		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**13.6**	mg/L	1.0	1		03/06/18 13:10	16887-00-6	
Fluoride	**0.86**	mg/L	0.20	1		03/06/18 13:10	16984-48-8	
Sulfate	**39.3**	mg/L	5.0	5		03/06/18 13:24	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-3 **Lab ID: 60264779003** Collected: 02/26/18 10:06 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**106**	ug/L	100	1	03/01/18 13:50	03/06/18 17:42	7440-42-8	
Calcium	**94.3**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:42	7440-70-2	
Lithium	**27.1**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:42	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7440-36-0	
Arsenic	**2.8**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7440-38-2	
Barium	**168**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:37	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:37	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7439-92-1	
Molybdenum	**12.7**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7439-98-7	
Selenium	**8.3**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:37	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 12:51	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:29	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**435**	mg/L	5.0	1		03/05/18 11:32		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		03/06/18 10:19		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**25.6**	mg/L	5.0	5		03/06/18 13:52	16887-00-6	
Fluoride	**0.75**	mg/L	0.20	1		03/06/18 13:38	16984-48-8	
Sulfate	**56.7**	mg/L	5.0	5		03/06/18 13:52	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-4R **Lab ID: 60264779004** Collected: 02/26/18 09:23 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**161**	ug/L	100	1	03/01/18 13:50	03/06/18 17:49	7440-42-8	
Calcium	**87.0**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:49	7440-70-2	
Lithium	**26.7**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:49	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7440-36-0	
Arsenic	**3.9**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7440-38-2	
Barium	**120**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:42	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:42	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7439-92-1	
Molybdenum	**5.2**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7439-98-7	
Selenium	**6.6**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:42	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 12:53	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:31	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**409**	mg/L	5.0	1		03/05/18 11:32		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		03/06/18 10:17		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**23.3**	mg/L	5.0	5		03/06/18 14:20	16887-00-6	
Fluoride	**0.83**	mg/L	0.20	1		03/06/18 14:06	16984-48-8	
Sulfate	**39.8**	mg/L	5.0	5		03/06/18 14:20	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-5 **Lab ID: 60264779005** Collected: 02/26/18 10:48 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**137**	ug/L	100	1	03/01/18 13:50	03/06/18 17:51	7440-42-8	
Calcium	**103**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:51	7440-70-2	
Lithium	**29.3**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:51	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7440-36-0	
Arsenic	**4.3**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7440-38-2	
Barium	**128**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:46	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:46	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7439-92-1	
Molybdenum	**5.4**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7439-98-7	
Selenium	**8.6**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:46	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 12:56	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:33	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**450**	mg/L	5.0	1		03/05/18 11:32		
9040 pH	Analytical Method: EPA 9040							
pH	**7.2**	Std. Units	0.10	1		03/06/18 10:20		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**18.9**	mg/L	5.0	5		03/06/18 14:48	16887-00-6	
Fluoride	**1.0**	mg/L	0.20	1		03/06/18 14:34	16984-48-8	
Sulfate	**36.3**	mg/L	5.0	5		03/06/18 14:48	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-6 **Lab ID: 60264779006** Collected: 02/26/18 14:37 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**115**	ug/L	100	1	03/01/18 13:50	03/06/18 17:53	7440-42-8	
Calcium	**36.6**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:53	7440-70-2	
Lithium	**19.7**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:53	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7440-36-0	
Arsenic	**3.8**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7440-38-2	
Barium	**68.4**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:50	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 22:50	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7440-48-4	
Lead	**1.9**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7439-92-1	
Molybdenum	**7.9**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7439-98-7	
Selenium	**3.0**	ug/L	1.0	1	03/01/18 13:50	03/12/18 22:50	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 12:58	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:35	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**256**	mg/L	5.0	1		03/05/18 11:33		
9040 pH	Analytical Method: EPA 9040							
pH	**7.2**	Std. Units	0.10	1		03/06/18 10:28		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**16.3**	mg/L	1.0	1		03/06/18 15:02	16887-00-6	
Fluoride	**0.73**	mg/L	0.20	1		03/06/18 15:02	16984-48-8	
Sulfate	**18.8**	mg/L	1.0	1		03/06/18 15:02	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-7 **Lab ID: 60264779007** Collected: 02/26/18 13:58 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**186**	ug/L	100	1	03/01/18 13:50	03/06/18 17:55	7440-42-8	
Calcium	**109**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:55	7440-70-2	
Lithium	**30.9**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:55	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7440-36-0	
Arsenic	**3.4**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7440-38-2	
Barium	**119**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 23:03	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 23:03	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7439-92-1	
Molybdenum	**8.5**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7439-98-7	
Selenium	**9.4**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:03	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 13:04	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:37	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**478**	mg/L	5.0	1		03/05/18 11:33		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		03/06/18 10:25		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**26.6**	mg/L	5.0	5		03/06/18 16:11	16887-00-6	
Fluoride	**0.85**	mg/L	0.20	1		03/06/18 15:57	16984-48-8	
Sulfate	**48.5**	mg/L	5.0	5		03/06/18 16:11	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: MW-8 **Lab ID: 60264779008** Collected: 02/26/18 13:15 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**136**	ug/L	100	1	03/01/18 13:50	03/06/18 17:57	7440-42-8	
Calcium	**93.5**	mg/L	0.10	1	03/01/18 13:50	03/06/18 17:57	7440-70-2	
Lithium	**29.1**	ug/L	10.0	1	03/01/18 13:50	03/06/18 17:57	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7440-36-0	
Arsenic	**2.3**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7440-38-2	
Barium	**150**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 23:08	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 23:08	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7439-92-1	
Molybdenum	**7.5**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7439-98-7	
Selenium	**10.5**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:08	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 13:06	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:40	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**414**	mg/L	5.0	1		03/05/18 11:34		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		03/06/18 10:24		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**29.2**	mg/L	5.0	5		03/06/18 16:39	16887-00-6	
Fluoride	**0.78**	mg/L	0.20	1		03/06/18 16:25	16984-48-8	
Sulfate	**34.7**	mg/L	5.0	5		03/06/18 16:39	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

Sample: DUPLICATE **Lab ID: 60264779009** Collected: 02/26/18 23:59 Received: 02/28/18 06:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**115**	ug/L	100	1	03/01/18 13:50	03/06/18 18:00	7440-42-8	
Calcium	**34.2**	mg/L	0.10	1	03/01/18 13:50	03/06/18 18:00	7440-70-2	
Lithium	**18.8**	ug/L	10.0	1	03/01/18 13:50	03/06/18 18:00	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Antimony	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7440-36-0	
Arsenic	**3.8**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7440-38-2	
Barium	**68.3**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7440-39-3	
Beryllium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 23:12	7440-41-7	
Cadmium	ND	ug/L	0.50	1	03/01/18 13:50	03/12/18 23:12	7440-43-9	
Chromium	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7440-47-3	
Cobalt	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7440-48-4	
Lead	ND	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7439-92-1	
Molybdenum	**7.8**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7439-98-7	
Selenium	**3.0**	ug/L	1.0	1	03/01/18 13:50	03/12/18 23:12	7782-49-2	
Thallium	ND	ug/L	1.0	1	03/01/18 13:50	03/13/18 13:08	7440-28-0	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	1	03/09/18 10:00	03/09/18 13:42	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**260**	mg/L	5.0	1		03/05/18 11:35		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		03/06/18 10:30		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**16.2**	mg/L	1.0	1		03/06/18 16:53	16887-00-6	
Fluoride	**0.72**	mg/L	0.20	1		03/06/18 16:53	16984-48-8	
Sulfate	**18.7**	mg/L	1.0	1		03/06/18 16:53	14808-79-8	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-1 **Lab ID: 60264871001** Collected: 02/26/18 11:32 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.835 ± 0.611 (0.842)** **C:NA T:83%**	pCi/L	03/15/18 20:23	13982-63-3	
Radium-228	EPA 904.0	**0.987 ± 0.415 (0.658)** **C:76% T:89%**	pCi/L	03/15/18 15:08	15262-20-1	
Total Radium	Total Radium Calculation	**1.82 ± 1.03 (1.50)**	pCi/L	03/20/18 10:47	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-2 **Lab ID: 60264871002** Collected: 02/26/18 12:13 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.404 ± 0.441 (0.693)** **C:NA T:89%**	pCi/L	03/15/18 20:23	13982-63-3	
Radium-228	EPA 904.0	**1.35 ± 0.491 (0.715)** **C:75% T:82%**	pCi/L	03/15/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	**1.75 ± 0.932 (1.41)**	pCi/L	03/20/18 10:47	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-3 **Lab ID: 60264871003** Collected: 02/26/18 10:06 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.742 ± 0.549 (0.742) C:NA T:79%**	pCi/L	03/15/18 20:38	13982-63-3	
Radium-228	EPA 904.0	**1.68 ± 0.525 (0.661) C:75% T:86%**	pCi/L	03/15/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	**2.42 ± 1.07 (1.40)**	pCi/L	03/20/18 10:47	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-4R **Lab ID: 60264871004** Collected: 02/26/18 09:23 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.588 ± 0.591 (0.921)** **C:NA T:82%**	pCi/L	03/15/18 20:46	13982-63-3	
Radium-228	EPA 904.0	**1.48 ± 0.513 (0.721)** **C:73% T:86%**	pCi/L	03/15/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	**2.07 ± 1.10 (1.64)**	pCi/L	03/20/18 10:47	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-5 **Lab ID: 60264871005** Collected: 02/26/18 10:48 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.784 ± 0.549 (0.724)** **C:NA T:85%**	pCi/L	03/15/18 20:38	13982-63-3	
Radium-228	EPA 904.0	**1.50 ± 0.504 (0.686)** **C:75% T:87%**	pCi/L	03/15/18 15:08	15262-20-1	
Total Radium	Total Radium Calculation	**2.28 ± 1.05 (1.41)**	pCi/L	03/20/18 11:12	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-6 **Lab ID: 60264871006** Collected: 02/26/18 14:37 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.514 ± 0.491 (0.748)** **C:NA T:87%**	pCi/L	03/15/18 20:38	13982-63-3	
Radium-228	EPA 904.0	**0.715 ± 0.360 (0.629)** **C:79% T:92%**	pCi/L	03/15/18 15:08	15262-20-1	
Total Radium	Total Radium Calculation	**1.23 ± 0.851 (1.38)**	pCi/L	03/20/18 11:12	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-7 **Lab ID: 60264871007** Collected: 02/26/18 13:58 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.378 ± 0.554 (0.947)** **C:NA T:80%**	pCi/L	03/15/18 20:38	13982-63-3	
Radium-228	EPA 904.0	**0.682 ± 0.376 (0.678)** **C:80% T:84%**	pCi/L	03/15/18 15:08	15262-20-1	
Total Radium	Total Radium Calculation	**1.06 ± 0.930 (1.63)**	pCi/L	03/20/18 11:12	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: MW-8 **Lab ID: 60264871008** Collected: 02/26/18 13:15 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.484 ± 0.506 (0.793)** **C:NA T:86%**	pCi/L	03/15/18 20:38	13982-63-3	
Radium-228	EPA 904.0	**1.12 ± 0.435 (0.672)** **C:81% T:87%**	pCi/L	03/15/18 15:09	15262-20-1	
Total Radium	Total Radium Calculation	**1.60 ± 0.941 (1.47)**	pCi/L	03/20/18 11:12	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

Sample: DUPLICATE **Lab ID: 60264871009** Collected: 02/26/18 23:59 Received: 02/28/18 06:15 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.345 ± 0.489 (0.829)** **C:NA T:79%**	pCi/L	03/15/18 20:49	13982-63-3	
Radium-228	EPA 904.0	**0.559 ± 0.366 (0.695)** **C:79% T:86%**	pCi/L	03/15/18 15:08	15262-20-1	
Total Radium	Total Radium Calculation	**0.904 ± 0.855 (1.52)**	pCi/L	03/20/18 11:12	7440-14-4	

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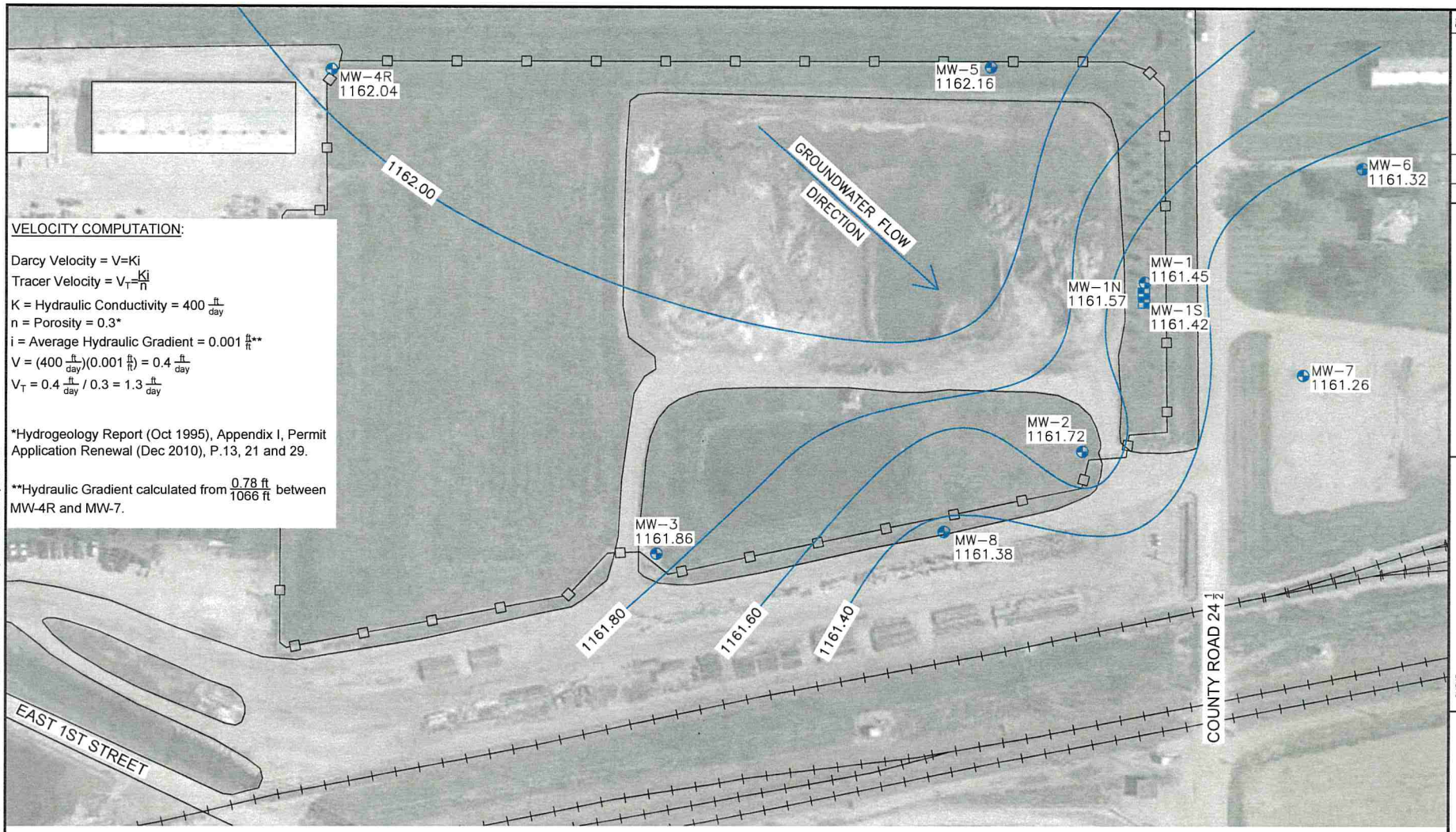

VELOCITY COMPUTATION:

Darcy Velocity = V=Ki

Tracer Velocity = $V_T = \frac{Ki}{n}$

K = Hydraulic Conductivity = 400 $\frac{ft}{day}$

n = Porosity = 0.3*

i = Average Hydraulic Gradient = 0.001 $\frac{ft}{ft}$**

$V = (400 \frac{ft}{day})(0.001 \frac{ft}{ft}) = 0.4 \frac{ft}{day}$

$V_T = 0.4 \frac{ft}{day} / 0.3 = 1.3 \frac{ft}{day}$

*Hydrogeology Report (Oct 1995), Appendix I, Permit Application Renewal (Dec 2010), P.13, 21 and 29.

**Hydraulic Gradient calculated from $\frac{0.78 \text{ ft}}{1066 \text{ ft}}$ between MW-4R and MW-7.

LEGEND

RAILROAD TRACKS		PIEZOMETER	
FENCE		GROUNDWATER CONTOURS	
MONITORING WELL	1162.00	FEET ABOVE MEAN SEA LEVEL	

NOTES:

1. Depths to groundwater measured 2/26/2018.
2. Groundwater data from MW-1N and MW-1S not utilized in calculation of groundwater contours.

100 0 100 200

SCALE FEET

REV.	DATE	CK. BY

SHEET TITLE: GROUNDWATER FLOW DIRECTION MAP

PROJECT TITLE: BACKGROUND GROUNDWATER SAMPLING

CLIENT: FREMONT DEPARTMENT OF UTILITIES
LON D. WRIGHT POWER PLANT
FREMONT, NEBRASKA

SCS ENGINEERS
14155 GROVER STREET
OMAHA, NEBRASKA 68144
PH. (402) 884-6200 FAX: (402) 884-6203

PROJ. NO. 27218066.00 | DWN. BY: ZEM | S/A PRW BY: CJ
PAR. NO. KB | CHK. BY: CJ | PROJ. MGR: BRS

CADD FILE: GROUNDWATER CONTOURS.DWG

DATE: 6/22/18

FIGURE NO. 1

T:\27218066.00\Data and Calculations\Groundwater\DWG\01 Groundwater Contours.dwg Jun 22, 2018 - 10:27am Layout Name: 11x17 By: 42772zem

REC'D NDEQ - (8/27/2018) - (20180058178)

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-1
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 39 °F (Mean) — Wind Direction: N (S) E W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing: - Paint chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18/11:09
Total Depth: ____ feet below TOC
Static Water Level: 19.47 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 11.22 pH 7.17 ORP 106
Sp. Cond. 0.808 Turbidity 0.0 DO 7.36
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
11:17	1500	300	11.53	6.88	105	0.822	0.0	7.26	19.47
11:22	3000	300	11.61	6.87	108	0.824	0.0	7.07	19.47
11:27	4500	300	11.68	6.82	112	0.823	0.0	6.93	19.47

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18/11:32
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 11.68 pH 6.82 ORP 112
Sp. Cond. 0.823 Turbidity 0.0 DO 6.93
Water Level 19.47 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)
WL for MW-1N = 20.36'
WL for MW-1S = 20.35'

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-2
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 42 °F (Mean) — Wind Direction: N (S) E W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing: - Paint chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18 / 11:51
Total Depth: ____ feet below TOC
Static Water Level: 15.74 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 11.10 pH 6.97 ORP 105
Sp. Cond. 0.705 Turbidity 0.0 DO 8.20
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
11:58	1500	300	11.24	6.92	110	0.709	0.0	6.79	15.74
12:03	3000	300	11.29	6.83	115	0.709	0.0	6.23	15.74
12:08	4500	300	11.32	6.84	116	0.709	0.0	6.11	15.74

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18 / 12:13
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 11.32 pH 6.84 ORP 116
Sp. Cond. 0.709 Turbidity 0.0 DO 6.11
Water Level 15.74 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-3
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 34 °F (Mean) — Wind Direction: N S E W (circle two if needed)
Precipitation: None Light Heavy — Sky: Cloudy Sunny Partly

Well Observations
Well Pad: Good
Casing: - Cap fits poorly
Protective Casing: - Paint chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18 / 09:39
Total Depth: ____ feet below TOC
Static Water Level: 16.95 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer Dedicated Pump Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch 4-inch Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 10.62 pH 7.02 ORP 98
Sp. Cond. 0.741 Turbidity 3.4 DO 7.55
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
09:46	1500	300	11.81	7.09	92	0.728	11.7	10.73	16.95
09:51	3000	300	12.11	6.81	98	0.719	13.7	10.17	16.95
09:56	4500	300	12.23	6.79	100	0.719	11.2	9.77	16.95
10:01	6000	300	12.32	6.79	101	0.717	5.2	9.34	16.95

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18 / 10:06
Sample Method: Bailer Dedicated Pump Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 12.32 pH 6.79 ORP 101
Sp. Cond. 0.717 Turbidity 5.2 DO 9.34
Water Level 16.95 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-4R
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 27 °F (Mean) — Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18 / 08:51
Total Depth: ____ feet below TOC
Static Water Level: 16.25 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: — Min.Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 10.28 pH 9.08 ORP 70
Sp. Cond. 0.746 Turbidity 1.5 DO 8.12
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
09:03	1500	300	10.76	7.22	75	0.702	0.0	6.91	16.25
09:08	3000	300	10.77	7.29	79	0.695	0.0	6.20	16.25
09:13	4500	300	10.68	7.19	85	0.695	0.0	5.96	16.25
09:18	6000	300	10.70	7.10	89	0.695	0.0	5.73	16.25

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18 / 09:23
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 10.70 pH 7.10 ORP 89
Sp. Cond. 0.695 Turbidity 0.0 DO 5.73
Water Level 16.25 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-5
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 37 °F (Mean) — Wind Direction: N (S) E W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing: - Paint chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18 / 10:25
Total Depth: ____ feet below TOC
Static Water Level: 15.90 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 11.27 pH 7.25 ORP 86
Sp. Cond. 0.757 Turbidity 0.0 DO 6.78
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
10:33	1500	300	11.44	6.95	93	0.749	0.0	6.39	15.90
10:38	3000	300	11.52	6.94	97	0.745	0.0	6.12	15.90
10:43	4500	300	11.56	6.92	100	0.744	0.0	5.96	15.90

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18 / 10:48
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 11.56 pH 6.92 ORP 100
Sp. Cond. 0.744 Turbidity 0.0 DO 5.96
Water Level 15.90 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-6
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 51 °F (Mean) — Wind Direction: N (S) E W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18/14:12
Total Depth: ____ feet below TOC
Static Water Level: 16.46 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 10.51 pH 6.99 ORP 121
Sp. Cond. 0.592 Turbidity 0.0 DO 6.92
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
14:22	1500	300	11.19	6.88	121	0.478	0.0	5.58	16.46
14:27	3000	300	11.28	6.88	122	0.443	0.0	5.04	16.46
14:32	4500	300	11.27	6.79	124	0.437	0.0	5.06	16.46

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18/14:37
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 11.27 pH 6.79 ORP 124
Sp. Cond. 0.437 Turbidity 0.0 DO 5.06
Water Level 16.46 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)
Duplicate taken here at "23:59"

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-7
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 49 °F (Mean) — Wind Direction: N (S) E W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18 / 13:30
Total Depth: ____ feet below TOC
Static Water Level: 16.09 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 10.57 pH 6.93 ORP 117
Sp. Cond. 0.742 Turbidity 0.0 DO 7.23
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
13:43	1500	300	11.24	6.87	122	0.772	0.0	6.61	16.09
13:48	3000	300	11.39	6.83	125	0.778	0.0	6.47	16.09
13:53	4500	300	11.43	6.86	126	0.783	0.0	6.38	16.09

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18 / 13:58
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 11.43 pH 6.86 ORP 126
Sp. Cond. 0.783 Turbidity 0.0 DO 6.38
Water Level 16.09 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Monitoring Point: MW-8
Date(s): 2.26.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 45 °F (Mean) — Wind Direction: N (S) E W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 2.26.18 / 12:44
Total Depth: ____ feet below TOC
Static Water Level: 16.16 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 2.26.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 11.32 pH 7.09 ORP 110
Sp. Cond. 0.691 Turbidity 0.0 DO 6.67
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
13:00	1500	300	12.24	6.94	115	0.688	0.0	5.62	16.16
13:05	3000	300	12.48	6.90	119	0.686	0.0	5.33	16.16
13:10	4500	300	12.58	6.87	121	0.686	0.0	5.24	16.16

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 2.26.18 / 13:15
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 12.58 pH 6.87 ORP 121
Sp. Cond. 0.686 Turbidity 0.0 DO 5.24
Water Level 16.16 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

REC'D NDEQ - (8/27/2018) - (20180058178)

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Date: 2.26.18
Weather Information - AM - Sunny, clear, high 20's, 0-5 mph SE
PM - Sunny, clear, low 50's, 10-15 mph S
Personnel Onsite: B. Stephens (SCS)
Equipment Onsite: F-250 (SCS)
Field Equipment: Horiba U-52 → S/N YBR3D302
↳ Calibrated 2.22.18
QED M210 Bladder Pump Controller
↳ S/N 50870
↳ Calibrated 2.22.18
Nitrogen Cylinder (#1)

Work Comments/Observations:
08:10 - SCS (Stephens) arrive onsite
08:16 - Met FDU (Scollard) at gate
08:20 - Arr at MW-4R
09:27 - Moved to MW-3
10:10 - Moved to MW-5
10:51 - Moved to MW-1
11:38 - Moved to MW-2
12:20 - Moved to MW-8

Cont'd →

REC'D NDEQ - (8/27/2018) - (20180058178)

13:20 - Moved to MW-7
14:01 - Moved to MW-6. Duplicate taken here at "23:59"
15:01 - SLS offsite.
End of Log for 2.26.18

Bret Stephens
Senior Technician
2.26.18

REC'D NDEQ - (8/27/2018) - (20180058178)

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QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

QC Batch: 516918 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

METHOD BLANK: 2115760 Matrix: Water
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	03/09/18 13:14	

LABORATORY CONTROL SAMPLE: 2115761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2115762 2115763

Parameter	Units	60265095002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.7	4.6	93	92	75-125	1	20	

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QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

QC Batch: 515964 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

METHOD BLANK: 2111579 Matrix: Water
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	ND	100	03/06/18 17:29	
Calcium	mg/L	ND	0.20	03/06/18 17:29	
Lithium	ug/L	ND	10.0	03/06/18 17:29	

LABORATORY CONTROL SAMPLE: 2111580

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	985	99	80-120	
Calcium	mg/L	10	10.2	102	80-120	
Lithium	ug/L	1000	1030	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2111581 2111582

Parameter	Units	60264779001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	167	1000	1000	1120	1140	96	98	75-125	2	20	
Calcium	mg/L	114	10	10	122	122	73	72	75-125	0	20	M1
Lithium	ug/L	35.9	1000	1000	1060	1050	102	101	75-125	0	20	

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QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

QC Batch: 515965 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

METHOD BLANK: 2111584 Matrix: Water
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	1.0	03/12/18 22:12	
Arsenic	ug/L	ND	1.0	03/12/18 22:12	
Barium	ug/L	ND	1.0	03/12/18 22:12	
Beryllium	ug/L	ND	0.50	03/12/18 22:12	
Cadmium	ug/L	ND	0.50	03/12/18 22:12	
Chromium	ug/L	ND	1.0	03/12/18 22:12	
Cobalt	ug/L	ND	1.0	03/12/18 22:12	
Lead	ug/L	ND	1.0	03/13/18 17:22	
Molybdenum	ug/L	ND	1.0	03/12/18 22:12	
Selenium	ug/L	ND	1.0	03/12/18 22:12	
Thallium	ug/L	ND	1.0	03/13/18 12:38	

LABORATORY CONTROL SAMPLE: 2111585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.7	97	80-120	
Arsenic	ug/L	40	38.9	97	80-120	
Barium	ug/L	40	38.9	97	80-120	
Beryllium	ug/L	40	38.6	97	80-120	
Cadmium	ug/L	40	39.3	98	80-120	
Chromium	ug/L	40	39.5	99	80-120	
Cobalt	ug/L	40	39.7	99	80-120	
Lead	ug/L	40	39.0	97	80-120	
Molybdenum	ug/L	40	39.7	99	80-120	
Selenium	ug/L	40	37.8	94	80-120	
Thallium	ug/L	40	38.2	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2111586 2111587

Parameter	Units	60264779002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	40	40	39.6	38.9	98	96	75-125	2	20	
Arsenic	ug/L	3.2	40	40	41.7	41.3	96	95	75-125	1	20	
Barium	ug/L	99.5	40	40	138	139	96	98	75-125	1	20	
Beryllium	ug/L	ND	40	40	35.6	35.2	89	88	75-125	1	20	
Cadmium	ug/L	ND	40	40	39.0	38.1	97	95	75-125	2	20	
Chromium	ug/L	ND	40	40	39.3	39.1	98	97	75-125	1	20	

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QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2111586 2111587

Parameter	Units	60264779002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cobalt	ug/L	ND	40	40	38.2	38.1	95	95	75-125	0	20	
Lead	ug/L	ND	40	40	40.6	39.3	101	97	75-125	3	20	
Molybdenum	ug/L	7.1	40	40	48.7	48.1	104	103	75-125	1	20	
Selenium	ug/L	12.7	40	40	48.5	48.4	89	89	75-125	0	20	
Thallium	ug/L	ND	40	40	39.4	38.9	98	97	75-125	1	20	

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QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

QC Batch: 516243 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

METHOD BLANK: 2112913 | Matrix: Water
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	03/05/18 11:30	

LABORATORY CONTROL SAMPLE: 2112914

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1000	100	80-120	

SAMPLE DUPLICATE: 2112915

Parameter	Units	60264779001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	507	503	1	10	

SAMPLE DUPLICATE: 2112916

Parameter	Units	60264910001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	72.5	78.0	7	10	

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REC'D NDEQ - (8/27/2018) - (20180058178)

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

QC Batch: 516402 | Analysis Method: EPA 9040
QC Batch Method: EPA 9040 | Analysis Description: 9040 pH
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

SAMPLE DUPLICATE: 2113661

Parameter	Units	60264597001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH	Std. Units	6.0	6.0	0	10	H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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REC'D NDEQ - (8/27/2018) - (20180058178)

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Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: City of Fremont/27218066.00
Pace Project No.: 60264779

QC Batch: 516422 Analysis Method: EPA 9056
QC Batch Method: EPA 9056 Analysis Description: 9056 IC Anions
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

METHOD BLANK: 2113727 Matrix: Water
Associated Lab Samples: 60264779001, 60264779002, 60264779003, 60264779004, 60264779005, 60264779006, 60264779007, 60264779008, 60264779009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	03/06/18 10:11	
Fluoride	mg/L	ND	0.20	03/06/18 10:11	
Sulfate	mg/L	ND	1.0	03/06/18 10:11	

LABORATORY CONTROL SAMPLE: 2113728

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	80-120	
Fluoride	mg/L	2.5	2.5	99	80-120	
Sulfate	mg/L	5	4.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2113729 2113730

Parameter	Units	60264779001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	9.7	5	5	14.7	14.7	101	100	80-120	0	15	
Fluoride	mg/L	1.3	2.5	2.5	3.7	3.7	98	97	80-120	1	15	
Sulfate	mg/L	53.8	25	25	80.1	79.9	105	104	80-120	0	15	

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REPORT OF LABORATORY ANALYSIS

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REC'D NDEQ - (8/27/2018) - (20180058178)

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

QC Batch: 290125 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60264871001, 60264871002, 60264871003, 60264871004, 60264871005, 60264871006, 60264871007, 60264871008, 60264871009

METHOD BLANK: 1420930 Matrix: Water
Associated Lab Samples: 60264871001, 60264871002, 60264871003, 60264871004, 60264871005, 60264871006, 60264871007, 60264871008, 60264871009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.274 ± 0.332 (0.702) C:82% T:83%	pCi/L	03/15/18 15:06	

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REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL - RADIOCHEMISTRY

Project: City of Fremont/27218066.00
Pace Project No.: 60264871

QC Batch: 290123 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60264871001, 60264871002, 60264871003, 60264871004, 60264871005, 60264871006, 60264871007, 60264871008, 60264871009

METHOD BLANK: 1420929 Matrix: Water
Associated Lab Samples: 60264871001, 60264871002, 60264871003, 60264871004, 60264871005, 60264871006, 60264871007, 60264871008, 60264871009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.356 ± 0.331 (0.436) C:NA T:88%	pCi/L	03/15/18 19:52	

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REC'D NDEQ - (8/27/2018) - (20180058178)

FREMONT DEPARTMENT OF UTILITIES
GROUNDWATER LEVEL MEASUREMENTS FOR
FIRST CCR ASSESSMENT MONITORING SAMPLING EVENT

Well No.	Well Type	Top of Casing Elev*	Date	Static Water Level (FT) **	Groundwater Elev
1	Dn. Gradient	1180.68	2/26/2018	19.47	1161.21
1N	Dn. Gradient	1181.71	2/26/2018	20.36	1165.97
1S	Dn. Gradient	1181.60	2/26/2018	20.35	1164.65
2	Dn. Gradient	1177.09	2/26/2018	15.74	1160.84
3	Dn. Gradient	1178.53	2/26/2018	16.95	1162.63
4R	Up Gradient	1177.77	2/26/2018	16.25	1161.52
5	Dn. Gradient	1177.61	2/26/2018	15.9	1161.71
6	Dn. Gradient	1177.61	2/26/2018	16.46	1161.15
7	Dn. Gradient	1177.30	2/26/2018	16.09	1161.21
8	Dn. Gradient	1177.37	2/26/2018	16.16	1161.21

* Top of Casing Elevation (top of square casing with lid open) surveyed January 14, 2011 by Dodd Engineering & Surveying, LLC. for monitoring wells 1, 1N, 1S, 2, 3, and 5.
Monitoring wells 4R, 6, 7 and 8 were surveyed September 20, 2016 by APEX Land Surveying LLC.

** Static water level measurement from top of steel casing were collected during well sampling

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately

Page: | of |

Section A Required Client Information:

Company:	SCS Engineers
Address:	14755 Grover Street
	Omaha NE 68144
Email To:	mmiller@scsengineers.com
Phone: 402-884-6202	Fax:
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Michael Miller
Copy To:	Chuck Joyce (cjoyce@scsengineers.com)
	Bret Stephens (bstephens@scsengineers.com)
Purchase Order No.:	
Project Name:	City of Fremont
Project Number:	27218066.00

Section C Invoice Information

Attention:	Michael Miller
Company Name:	SCS Engineers
Address:	
Pace Quote Reference:	
Pace Project Manager:	Trudy Gipson 913-563-1405
Pace Profile #:	9797 Line 1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NE

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	3010 Total Metals: B-Ca-Li	6020 Total Metals *	7470 Total Hg	9056 Chloride-Fluoride-Sulfate	2540C TDS	9040 pH							Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																			N	N	N												
1	MW-1	WT	G	xxx	xxx	2.26.18	11:32		3	1		2							X	X	X	X	X	X									60264779 2BP3820 BDZU 01
2	MW-2	WT	G	xxx	xxx	2.26.18	12:13		3	1		2							X	X	X	X	X	X									02
3	MW-3	WT	G	xxx	xxx	2.26.18	10:06		3	1		2							X	X	X	X	X	X									03
4	MW-4R	WT	G	xxx	xxx	2.26.18	09:23		3	1		2							X	X	X	X	X	X									04
5	MW-5	WT	G	xxx	xxx	2.26.18	10:48		3	1		2							X	X	X	X	X	X									05
6	MW-6	WT	G	xxx	xxx	2.26.18	14:37		3	1		2							X	X	X	X	X	X									06
7	MW-7	WT	G	xxx	xxx	2.26.18	13:58		3	1		2							X	X	X	X	X	X									07
8	MW-8	WT	G	xxx	xxx	2.26.18	13:15		3	1		2							X	X	X	X	X	X									08
9	DUPLICATE	WT	G	xxx	xxx	2.26.18	23:59		3	1		2							X	X	X	X	X	X									09
10																																	
11																																	
12																																	

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Ship To: 9608 Loiret Boulevard, Lenexa, KS 66219	Bret Stephens / SCS	2.27.18	09:00	[signature]	2/28	0845	13	X	X	X
* Sb-As-Ba-Be-Cd-Cr-Co-Pb-Mo-Se-Ti										

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Bret Stephens					
SIGNATURE of SAMPLER: Bret Stephens	DATE Signed (MM/DD/YY): 2.27.18				

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-Feb-2007

REC'D NDEQ - (8/27/2018) - (201800581780)

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 1 of 1

Section A Required Client Information:

Company:	SCS Engineers
Address:	14755 Grover Street
	Omaha NE 68144
Email To:	mmiller@scsengineers.com
Phone: 402-884-6202	Fax:
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Michael Miller
Copy To:	Chuck Joyce (cjoyce@scsengineers.com)
	Bret Stephens (bstephens@scsengineers.com)
Purchase Order No.:	
Project Name:	City of Fremont
Project Number:	27218066.00

Section C Invoice Information:

Attention:	Michael Miller
Company Name:	SCS Engineers
Address:	
Pace Quote Reference:	
Pace Project Manager:	Trudy Gipson 913-563-1405
Pace Profile #:	9797 Line 2

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NE

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (A-Z, 0-9 / .-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	903.1 Radium-226*	904.0 Radium-228*	Total Radium*	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 60264871
1	MW-1	WT	G	xxx	xxx	2.26.18	11:32		2			2							X	X	X		2BPIN 601
2	MW-2	WT	G	xxx	xxx	2.26.18	12:13		2			2							X	X	X		602
3	MW-3	WT	G	xxx	xxx	2.26.18	10:06		2			2							X	X	X		603
4	MW-4R	WT	G	xxx	xxx	2.26.18	09:23		2			2							X	X	X		604
5	MW-5	WT	G	xxx	xxx	2.26.18	10:48		2			2							X	X	X		605
6	MW-6	WT	G	xxx	xxx	2.26.18	14:37		2			2							X	X	X		606
7	MW-7	WT	G	xxx	xxx	2.26.18	13:58		2			2							X	X	X		607
8	MW-8	WT	G	xxx	xxx	2.26.18	13:15		2			2							X	X	X		608
9	DUPLICATE	WT	G	xxx	xxx	2.26.18	23:59		2			2							X	X	X		609
10																							
11																							
12																							

SS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Ship To: 9608 Loiret Boulevard, Lenexa, KS 66219	Bret Stephens / SCS	2.27.18	09:00	Allen PACE	2/28	0615	1.9	Y	Y	Y
*Subcontract Pace PA (2-1L plastic HNO3)										

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bret Stephens

SIGNATURE of SAMPLER: Bret Stephens

DATE Signed (MM/DD/YY): 2.27.18

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-Feb-2007

REC'D NDEQ - (8/27/2018) - (201800581781)

Chain of Custody

☐ Samples were sent directly to the Subcontracting Laboratory.

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Workorder: 60264871 **Workorder Name:** CITY OF FREMONT **Owner Received Date:** 2/28/2018 **Results Requested By:** 3/22/2018

Report To

Trudy Gipson
Pace Analytical Kansas
9608 Loiret Blvd.
Lenexa, KS 66219
Phone 1(913)563-1405

Subcontract To

Pace Analytical Pittsburgh
1638 Roseytown Road
Suites 2,3, & 4
Greensburg, PA 15601
Phone (724)850-5600

Requested Analysis

WO#: 30245099

30245099

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3						Radium 226, Radium 228	Total Radium										LAB USE ONLY
1	MW-1	PS	2/26/2018 11:32	60264871001	Water	1						X	X										001
2	MW-2	PS	2/26/2018 12:13	60264871002	Water	1						X	X										002
3	MW-3	PS	2/26/2018 10:06	60264871003	Water	1						X	X										003
4	MW-4R	PS	2/26/2018 09:23	60264871004	Water	1						X	X										004
5	MW-5	PS	2/26/2018 10:48	60264871005	Water	1						X	X										005
6	MW-6	PS	2/26/2018 14:37	60264871006	Water	1						X	X										006
7	MW-7	PS	2/26/2018 13:58	60264871007	Water	1						X	X										007
8	MW-8	PS	2/26/2018 13:15	60264871008	Water	1						X	X										008
9	DUPLICATE	PS	2/26/2018 23:59	60264871009	Water	1						X	X										009

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature]	3/1 1800	[signature]	3/2/18 1000
2				
3				

Comments

Cooler Temperature on Receipt N/A °C | **Custody Seal** Y or (N) | **Received on Ice** Y or (N) | **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*
This chain of custody is considered complete as is since this information is available in the owner laboratory.

REC'D NDEQ - (8/27/2018) - (2018005817)

REC'D NDEQ - (8/27/2018) - (20180058179)

SCS ENGINEERS

Lon D. Wright Power Plant

Statistical Summary July 2018

Presented To:

City of Fremont Department of Utilities
401 E Military Road
Fremont, Nebraska 68025

Presented By:

SCS ENGINEERS
14755 Grover Street
Omaha, NE 68144
(402) 884-6202

July 2018
File No. 27218066.00

Offices Nationwide
www.scsengineers.com

REC'D NDEQ - (8/27/2018) - (20180058179)

Statistical Summary July 2018

Presented To:

City of Fremont Department of Utilities
401 E Military Road
Fremont, Nebraska 68025

Presented By:

SCS ENGINEERS
14755 Grover Street
Omaha, NE 68144
(402) 884-6202

July 2018
File No. 27218066.00

REC'D NDEQ - (8/27/2018) - (20180058179)

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1.2 Outlier Analysis 2
1.3 Interwell Prediction Limits 2
1.4 Intrawell Prediction Limits 3
1.5 Sen's Slope/Mann-Kendall Trend Analysis 4
1.6 Statistical Summary 4

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Table 2. Constituents and Wells Evaluated Using Intrawell Prediction Limits **4**
Table 3. 2018 Groundwater Monitoring Summary **5**

Attachments

A.1 Time Series Plots – February 2018
A.2 Outlier Analysis – February 2018
A.3 Interwell Prediction Limits – February 2018
A.4 Intrawell Prediction Limits – February 2018
A.5 Sen's Slope/Mann-Kendall Trend Analysis – February 2018

REC'D NDEQ - (8/27/2018) - (20180058179)

JULY 2018 STATISTICAL SUMMARY

Statistical analysis consisted of methods outlined in the 40 CFR Part 257, Subpart D (CCR rule) and the EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance (Unified Guidance) dated March 2009 using Sanitas™ Statistical Software version 9.5.32. The statistical analysis methods used include time series plots, outlier analysis, interwell prediction limit analysis, intrawell prediction limit analysis, and Sen's slope trend analyses. The statistical results have been summarized in **Table 3** found in **Section 1.6**.

1.1 TIME SERIES PLOTS

Time series plots were prepared for analyzed Appendix III and Appendix IV constituents to show the concentration variations over time. Time series graphs are included in **Attachment A.1**.

1.2 OUTLIER ANALYSIS

An outlier analysis was performed on all available data for each Appendix III and IV constituent at both upgradient and downgradient monitoring wells. A statistical outlier is a value that is extremely different from the other values in the data set. The outlier tests identify data points that do not appear to fit the distribution of the rest of the data set and determines if they differ significantly from the rest of the data set. A value is considered suspect if it is an order of magnitude larger or smaller than the rest of the data. The Tukey's Outlier Test was employed for both normal and non-normal data. Once a value is identified as a statistical outlier, it is checked for possible lab instrument failure, field collection problems, or data entry errors. However, outliers may exist naturally in the data if there is an extremely wide inherent or temporal variability in the data. The Unified Guidance states that unless a likely error can be identified, the outlier should not be removed. No outliers were identified in the historical database or for the recent February 2018 sampling event. Outlier analysis results are included in **Attachment A.2**.

1.3 INTERWELL PREDICTION LIMITS

An interwell prediction limit analysis compares data collected from compliance (downgradient) monitoring wells with data collected from background (upgradient) monitoring wells. Upgradient monitoring well data is used to calculate the interwell prediction limit and is used to determine if a single data point is statistically representative of a group of data points. If a data point exceeds the calculated interwell prediction limit, then an initial exceedance is noted; however, this may not indicate a statistically significant increase (SSI). The distribution of the data was calculated by applying the Shapiro-Wilk test for normality, or the Ladder of Powers (Helsel & Hirsh, 1992) for transformed data. A parametric prediction limit was constructed for data determined to have a normal or transformed normal distribution. A non-parametric prediction limit was calculated for data not transformed normal or containing 51 percent to 90 percent non-detect results.

REC'D NDEQ - (8/27/2018) - (20180058179)

Interwell prediction limits were used for downgradient monitoring wells to compare the current data collected to the historical data from abandoned upgradient well MW-4 and the recent data from replacement upgradient well MW-4R. Interwell prediction limits were used to statistically evaluate constituents and wells without an established background prior to October 2016. **Table 1** below identifies the constituent/well pairs that were evaluated using interwell prediction limits.

Table 1. Constituents and Wells Evaluated Using Interwell Prediction Limits

Constituents	Wells
All constituents	MW-6, MW-7, and MW-8
Antimony, Arsenic, Beryllium, Boron, Cadmium, Chloride, Cobalt, Fluoride, Lead Lithium, Mercury, Molybdenum, Radium 226 and 228 combined, and Thallium	MW-1, MW-2, MW-3, and MW-5

Five interwell statistical exceedances were identified for the downgradient monitoring wells during the February 2018 sampling event. The interwell prediction limit results are included in **Attachment A.3**.

1.4 INTRAWELL PREDICTION LIMITS

The intrawell comparison utilizes prediction intervals for statistical comparison of constituents. An intrawell prediction limit analysis compares the historical data of a well to its own compliance data. The historical data is used to calculate the prediction limit that is compared to the compliance data point. If a compliance data point exceeds the calculated prediction limit, then an initial exceedance is noted; however, this may not indicate a statistical significant increase (SSI). The distribution of the data was calculated by applying the Shaprio-Wilk test for normality or the Ladder of Powers (Helsel & Hirsh, 1992) for transformed data. A parametric prediction limit was constructed for data determined to have a normal or transformed normal distribution. A non-parametric prediction limit was calculated for data not transformed normal or containing 51 percent to 90 percent non-detect results.

Intrawell prediction limits were used to statistically evaluate the upgradient well and constituents with an established background prior to October 2016. **Table 2** below identifies the constituent/well pairs that were evaluated using interwell prediction limits.

Table 2. Constituents and Wells Evaluated Using Interwell Prediction Limits

Constituents	Wells
All constituents	MW-4R
Barium, Calcium, Chromium, pH, Sulfate, Selenium, and Total Dissolved Solids	MW-1, MW-2, MW-3, and MW-5

No intrawell exceedances were identified during the February 2018 sampling event for the constituent/well pairs listed in **Table 2**. Intrawell prediction limit analysis results are included in **Attachment A.4**.

REC'D NDEQ - (8/27/2018) - (20180058179)

1.5 SEN'S SLOPE/MANN-KENDALL TREND ANALYSIS

Sen's Slope/Mann-Kendall statistical analysis was performed on the detected constituent/well pairs from the February 2018 sampling event to determine trends in the concentration of these constituents. A trend is the general increase or decrease in observed values of a variable over time. A trend analysis can be used to determine the significance of an apparent trend and to estimate the magnitude of that trend. The Mann-Kendall test is nonparametric, meaning that it does not depend on an assumption of a particular underlying distribution. The test uses only the relative magnitude of data rather than actual values. Therefore, missing values are allowed, and values that are recorded as non-detects by the laboratory can still be used in the statistical analysis by assigning values equal to half their reporting limits. Sen's Slope is a simple nonparametric procedure developed to estimate the true slope. The advantage of this method over linear regression is that it is not greatly affected by gross data errors or outliers, and can be computed when data is missing. Trends were performed at the 98% confidence level. Sen's Slope/Mann-Kendall analysis results are included in **Attachment A.5**.

1.6 STATISTICAL SUMMARY

The statistical analyses results from the February 2018 sampling event have been summarized in **Table 3** below. Four of the five prediction limit exceedances noted did not have statistically significant trends nor exceed Groundwater Protection Standards (GWPSs), if a GWPS was established. Molybdenum at well MW-3 was one of the five prediction limit exceedances that did have a statistically significant increasing trend. However, the molybdenum concentration at MW-3 did not exceed EPA GWPS identified in the *Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final* Rule (July 17, 2018). These exceedances will be further evaluated during the next sampling event. The monitoring wells will remain in assessment monitoring at this time.

REC'D NDEQ - (8/27/2018) - (20180058179)

Table 3. Statistical Summary

Well	Detected Parameter	Result	Interwell Exceedance?[1]	Intrawell Exceedance?[2]	Significant Trend?	GWPS Exceedance?[3]
MW-1	Arsenic (ug/L)	3.7	No	n/a	No	No
	Barium (ug/L)	135	n/a	No	No	No
	Boron (ug/L)	167	No	n/a	No	No[4]
	Calcium (mg/L)	114	n/a	No	No	No[4]
	Chloride (mg/L)	9.7	No	n/a	No	No
	Fluoride (mg/L)	1.3	**Yes**	n/a	No	No
	Lithium (ug/L)	35.9	**Yes**	n/a	No	No
	Molybdenum (ug/L)	8.6	No	n/a	No	No
	pH (S.U.)	7.2	n/a	No	+	No
	Selenium (ug/L)	10.8	n/a	No	-	No
	Sulfate (mg/L)	53.8	n/a	No	-	No
	Total Dissolved Solids (mg/L)	507	n/a	No	No	**Yes**
	Total Radium (pCi/L)	1.82	No	n/a	No	No
MW-2	Arsenic (ug/L)	3.2	No	n/a	No	No
	Barium (ug/L)	99.5	n/a	No	No	No
	Boron (ug/L)	127	No	n/a	No	No[4]
	Calcium (mg/L)	101	n/a	No	No	No[4]
	Chloride (mg/L)	13.6	No	n/a	No	No
	Fluoride (mg/L)	0.86	No	n/a	No	No
	Lithium (ug/L)	27.4	No	n/a	No	No
	Molybdenum (ug/L)	7.1	No	n/a	-	No
	pH (S.U.)	7.1	n/a	No	No	No
	Selenium (ug/L)	12.7	n/a	No	-	No
	Sulfate (mg/L)	39.3	n/a	No	-	No
	Total Dissolved Solids (mg/L)	430	n/a	No	-	No
	Total Radium (pCi/L)	1.75	No	n/a	No	No
MW-3	Arsenic (ug/L)	2.8	No	n/a	No	No
	Barium (ug/L)	168	n/a	No	+	No
	Boron (ug/L)	106	No	n/a	No	No[4]
	Calcium (mg/L)	94.3	n/a	No	-	No[4]
	Chloride (mg/L)	25.6	No	n/a	No	No
	Fluoride (mg/L)	0.75	No	n/a	No	No
	Lithium (ug/L)	27.1	No	n/a	No	No
	Molybdenum (ug/L)	12.7	**Yes**	n/a	+	No
	pH (S.U.)	7.1	n/a	No	No	No
	Selenium (ug/L)	8.3	n/a	No	-	No
	Sulfate (mg/L)	56.7	n/a	No	-	No
	Total Dissolved Solids (mg/L)	435	n/a	No	-	No
	Total Radium (pCi/L)	2.42	No	n/a	No	No
MW-4R	Arsenic (ug/L)	3.9	n/a	No	No	No
	Barium (ug/L)	120	n/a	No	No	No
	Boron (ug/L)	161	n/a	No	No	No[4]
	Calcium (mg/L)	87.0	n/a	No	-	No[4]
	Chloride (mg/L)	23.3	n/a	No	No	No
	Fluoride (mg/L)	0.83	n/a	No	No	No
	Lithium (ug/L)	26.7	n/a	No	No	No
	Molybdenum (ug/L)	5.2	n/a	No	No	No
	pH (S.U.)	7.1	n/a	No	No	No
	Selenium (ug/L)	6.6	n/a	No	-	No
	Sulfate (mg/L)	39.8	n/a	No	No	No
	Total Dissolved Solids (mg/L)	409	n/a	No	No	No
	Total Radium (pCi/L)	2.07	n/a	No	No	No

REC'D NDEQ - (8/27/2018) - (20180058179)

MW-5	Arsenic (ug/L)	4.3	No	n/a	No	No
	Barium (ug/L)	128	n/a	No	No	No
	Boron (ug/L)	137	No	n/a	No	No[4]
	Calcium (mg/L)	103	n/a	No	+	No[4]
	Chloride (mg/L)	18.9	No	n/a	No	No
	Fluoride (mg/L)	1.0	No	n/a	No	No
	Lithium (ug/L)	29.3	No	n/a	No	No
	Molybdenum (ug/L)	5.4	No	n/a	No	No
	pH (S.U.)	7.2	n/a	No	No	No
	Selenium (ug/L)	8.6	n/a	No	-	No
	Sulfate (mg/L)	36.3	n/a	No	-	No
	Total Dissolved Solids (mg/L)	450	n/a	No	+	No
	Total Radium (pCi/L)	2.28	No	n/a	No	No
MW-6	Arsenic (ug/L)	3.8	No	n/a	No	No
	Barium (ug/L)	68.4	No	n/a	No	No
	Boron (ug/L)	115	No	n/a	No	No[4]
	Calcium (mg/L)	36.6	No	n/a	No	No[4]
	Chloride (mg/L)	16.3	No	n/a	No	No
	Fluoride (mg/L)	0.73	No	n/a	No	No
	Lead (ug/L)	1.9	No	n/a	No	No
	Lithium (ug/L)	19.7	No	n/a	No	No
	Molybdenum (ug/L)	7.9	No	n/a	No	No
	pH (S.U.)	7.2	No	n/a	No	No
	Selenium (ug/L)	3.0	No	n/a	No	No
	Sulfate (mg/L)	18.8	No	n/a	No	No
	Total Dissolved Solids (mg/L)	256	No	n/a	No	No
	Total Radium (pCi/L)	1.23	No	n/a	No	No
MW-7	Arsenic (ug/L)	3.4	No	n/a	No	No
	Barium (ug/L)	119	No	n/a	No	No
	Boron (ug/L)	186	No	n/a	No	No[4]
	Calcium (mg/L)	109	**Yes**	n/a	No	No[4]
	Chloride (mg/L)	26.6	No	n/a	No	No
	Fluoride (mg/L)	0.85	No	n/a	No	No
	Lithium (ug/L)	30.9	No	n/a	No	No
	Molybdenum (ug/L)	8.5	No	n/a	No	No
	pH (S.U.)	7.1	No	n/a	No	No
	Selenium (ug/L)	9.4	No	n/a	No	No
	Sulfate (mg/L)	48.5	No	n/a	No	No
	Total Dissolved Solids (mg/L)	478	No	n/a	No	No
	Total Radium (pCi/L)	1.06	No	n/a	No	No
MW-8	Arsenic (ug/L)	2.3	No	n/a	No	No
	Barium (ug/L)	150	**Yes**	n/a	No	No
	Boron (ug/L)	136	No	n/a	No	No[4]
	Calcium (mg/L)	93.5	No	n/a	No	No[4]
	Chloride (mg/L)	29.2	No	n/a	No	No
	Fluoride (mg/L)	0.78	No	n/a	No	No
	Lithium (ug/L)	29.1	No	n/a	No	No
	Molybdenum (ug/L)	7.5	No	n/a	No	No
	pH (S.U.)	7.1	No	n/a	No	No
	Selenium (ug/L)	10.5	No	n/a	No	No
	Sulfate (mg/L)	34.7	No	n/a	No	No
	Total Dissolved Solids (mg/L)	414	No	n/a	No	No
	Total Radium (pCi/L)	1.6	No	n/a	No	No

[1]Constituent/well pairs noted by n/a were not analyzed using interwell prediction limits. See Table 1.
[2]Constituent/well pairs noted by n/a were not analyzed using intrawell prediction limits. See Table 2.
[3]GWPS exceedances were established by the NDEQ Title 118 Groundwater Quality Standards or the EPA *Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part one); Final Rule* (July 17, 2018).
[4]No GWPS has been established.

REC'D NDEQ - (8/27/2018) - (20180058179)

A.1 TIME SERIES PLOTS – FEBRUARY 2018

REC'D NDEQ - (8/27/2018) - (20180058179)

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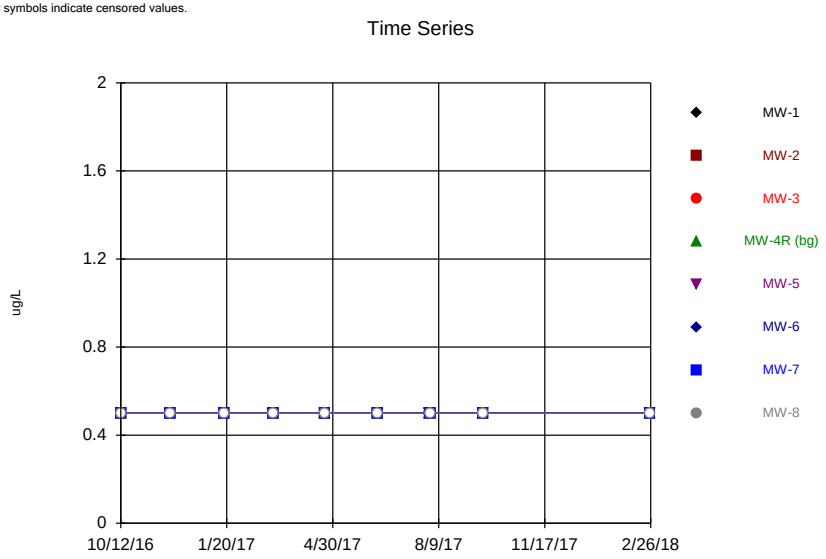
Hollow symbols indicate censored values.



Constituent: Antimony [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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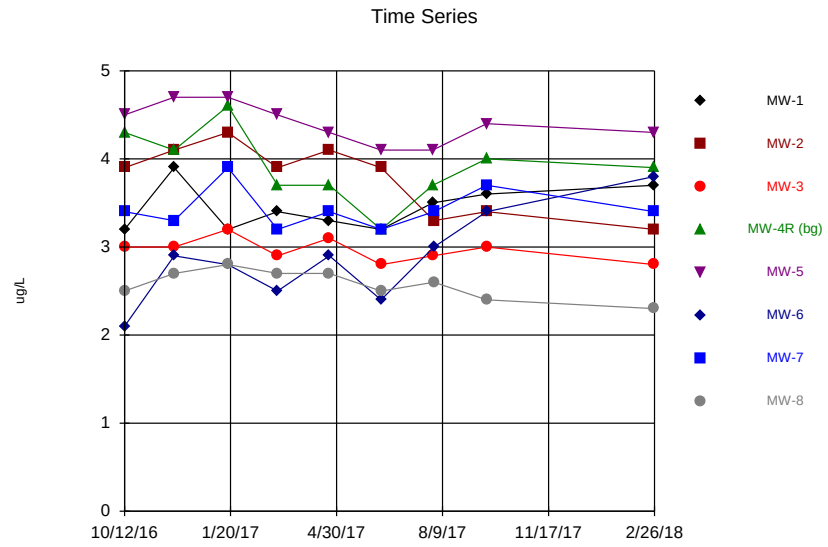

Constituent: Arsenic [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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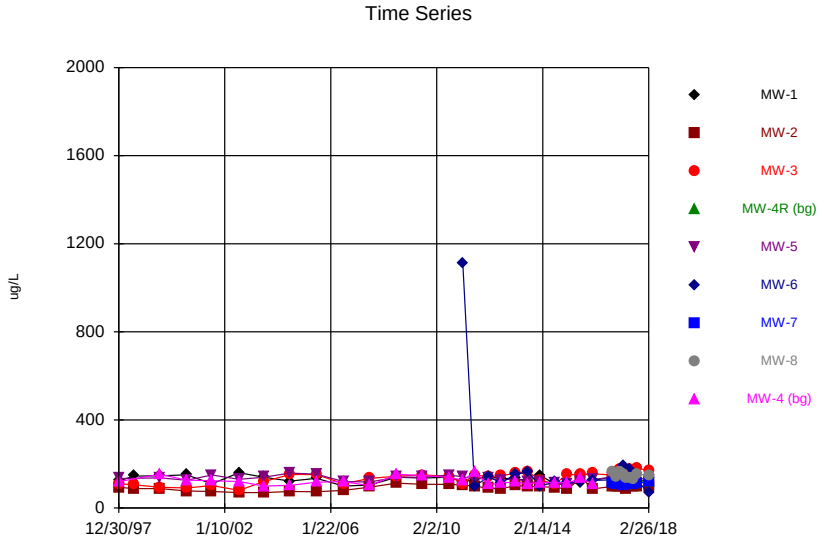

Constituent: Barium [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
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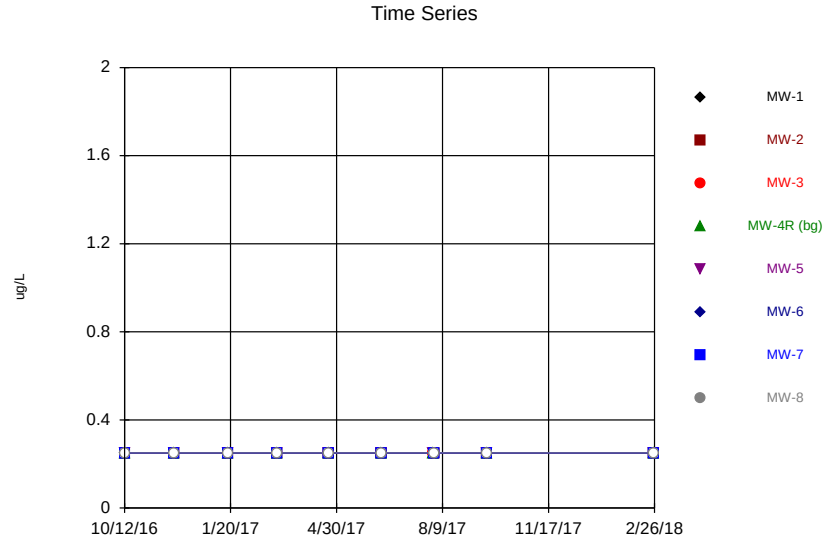

Constituent: BERYLIUM Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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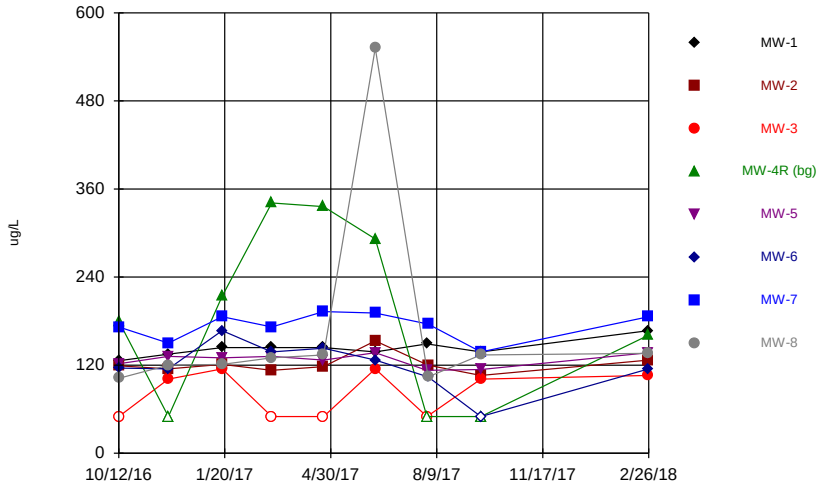

Constituent: Boron Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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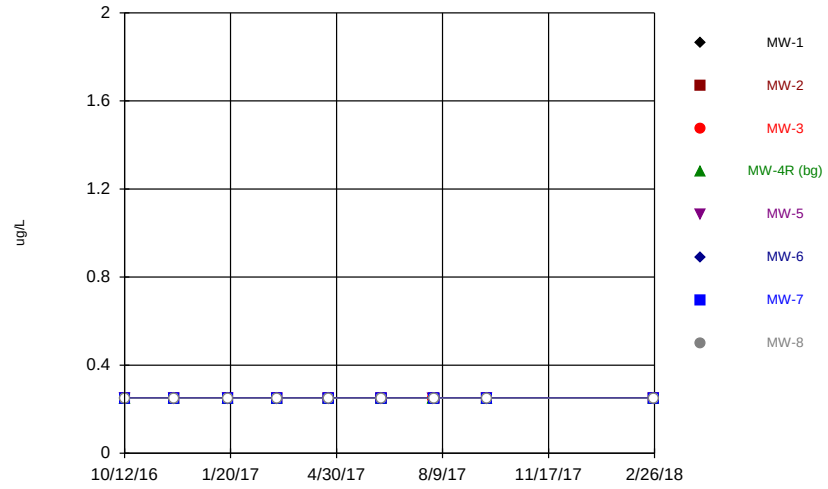
Time Series



Constituent: Cadmium [total] Analysis Run 6/14/2018 4:36 PM View: Time Series

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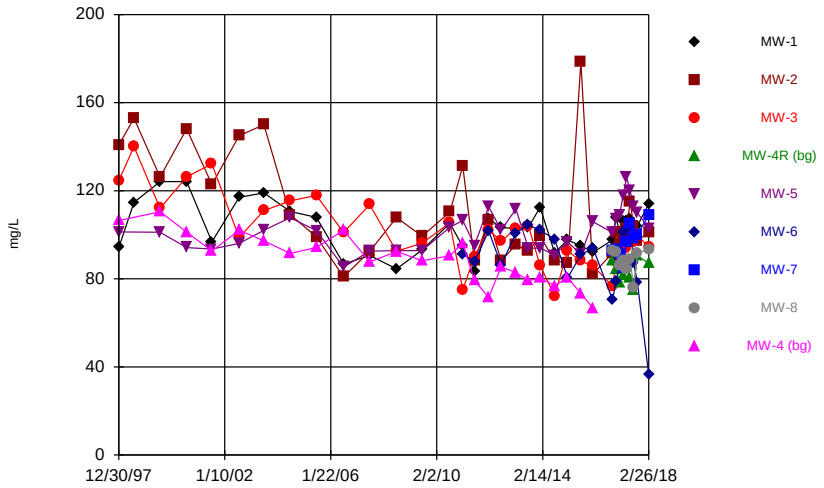
Time Series



Constituent: Calcium Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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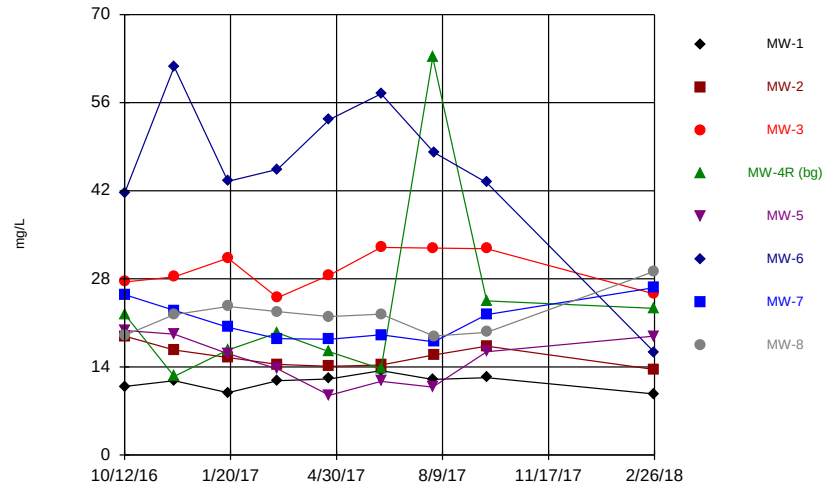
Time Series



Constituent: Chloride Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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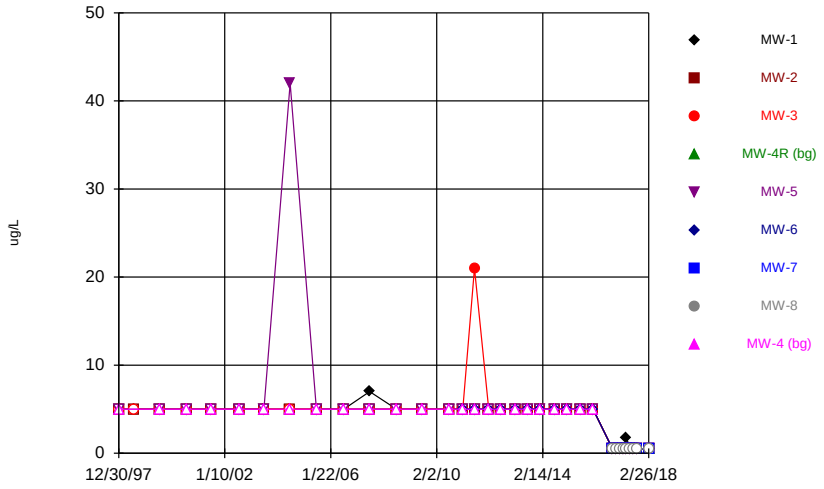
Time Series



Constituent: Chromium [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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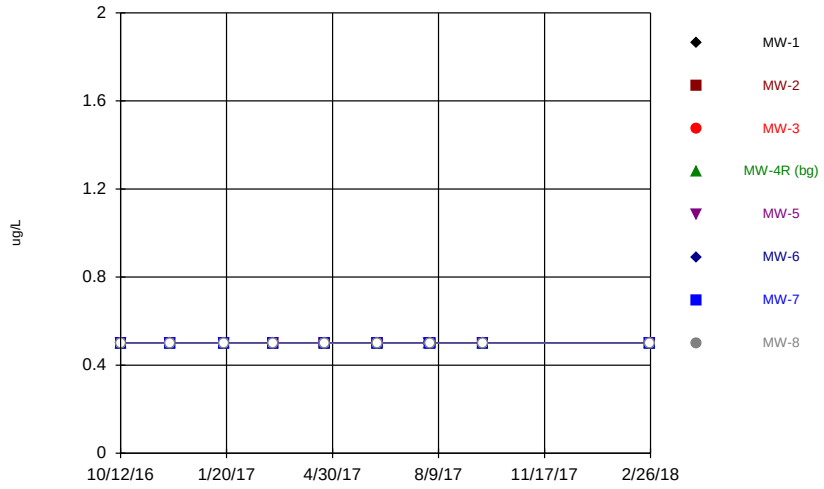
Time Series



Constituent: Cobalt [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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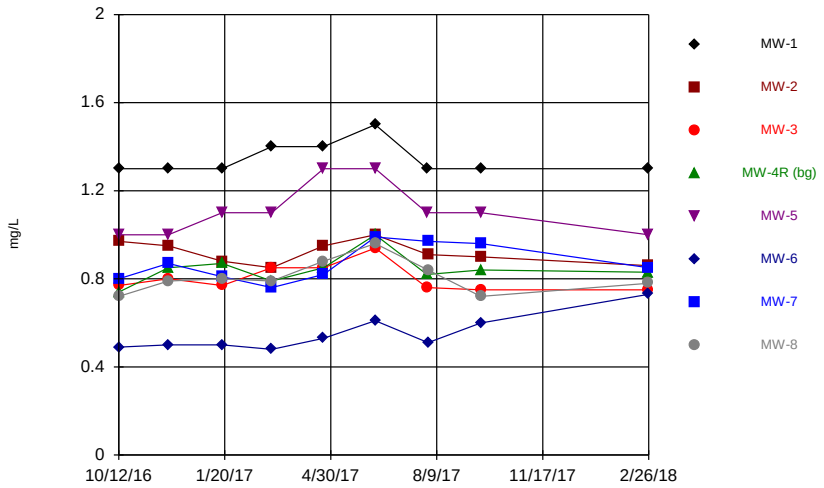
Time Series



Constituent: Fluoride Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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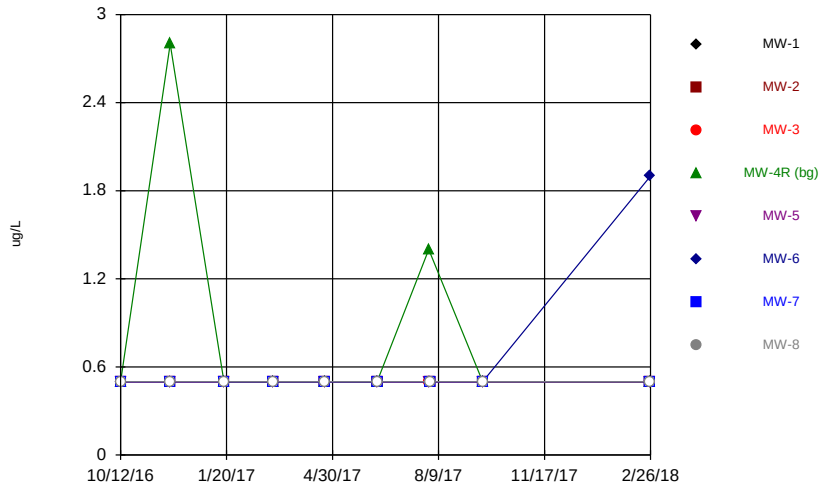
Time Series



Constituent: Lead [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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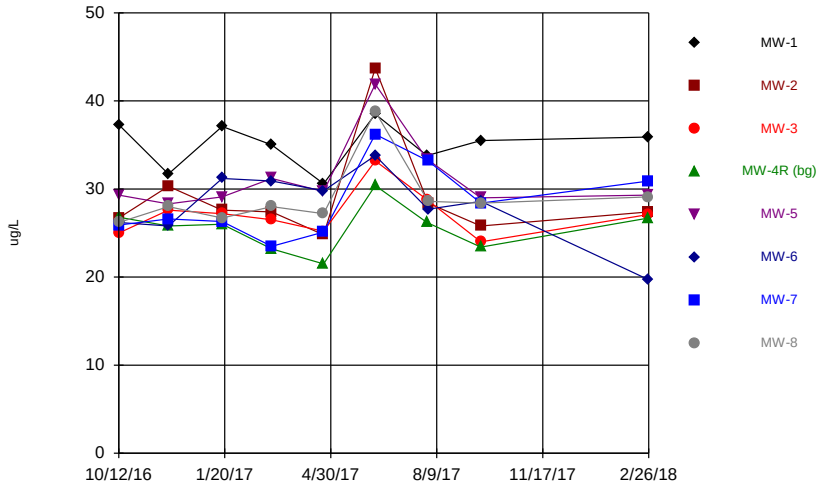
Time Series



Constituent: Lithium Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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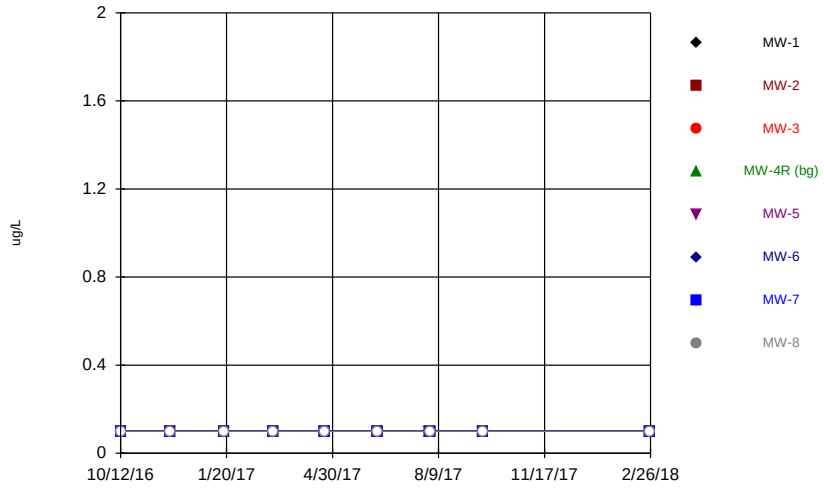
Time Series



Constituent: Mercury Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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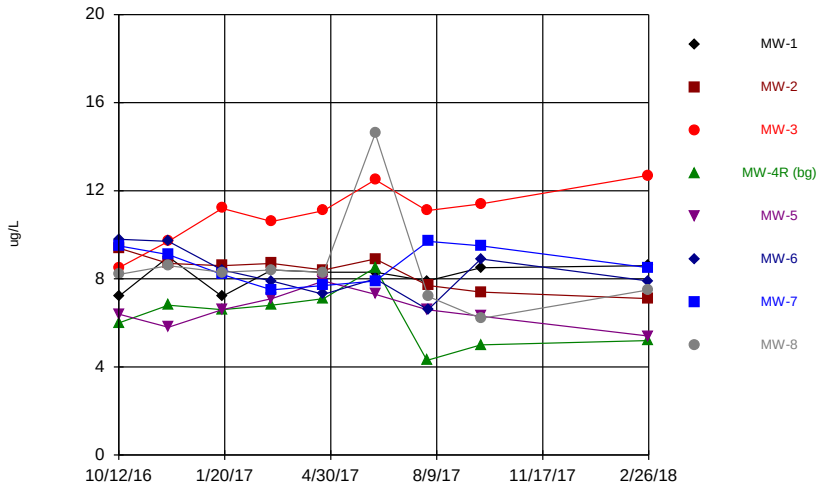
Time Series



Constituent: Molybdenum Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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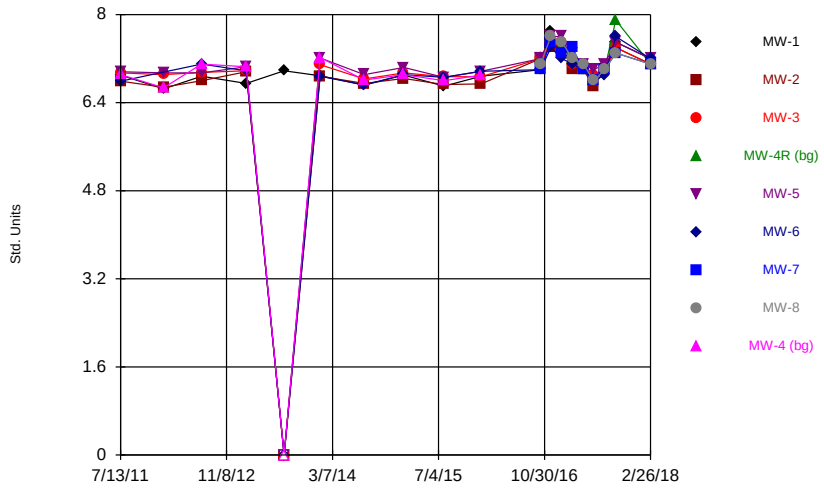
Hollow symbols indicate censored values.

Time Series



Constituent: pH Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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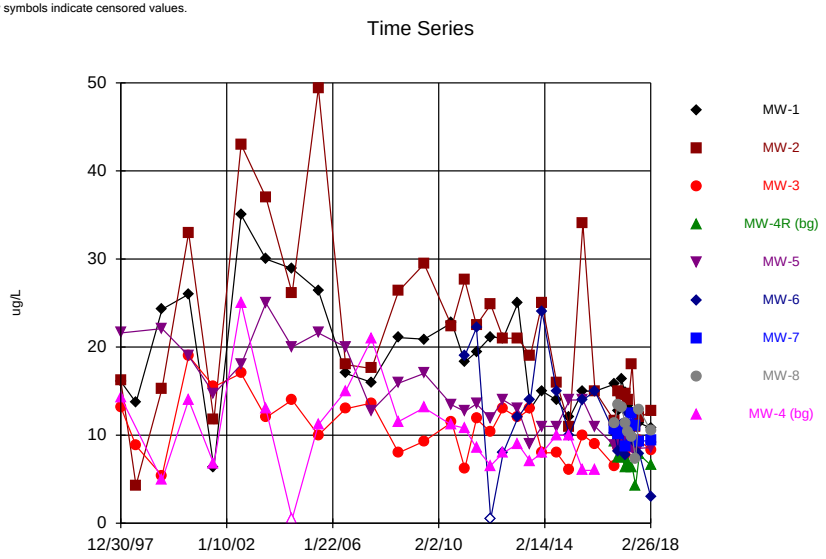

Constituent: Selenium [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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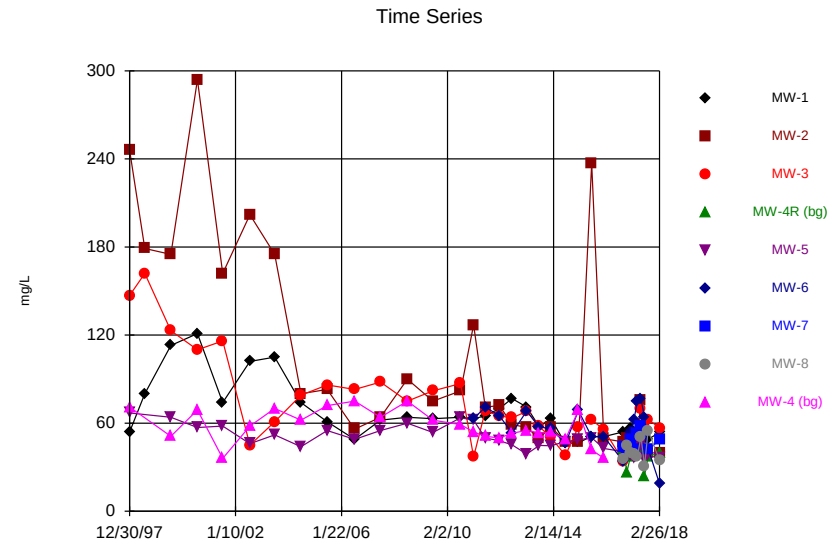

Constituent: Sulfate Analysis Run 6/14/2018 4:36 PM View: Time Series
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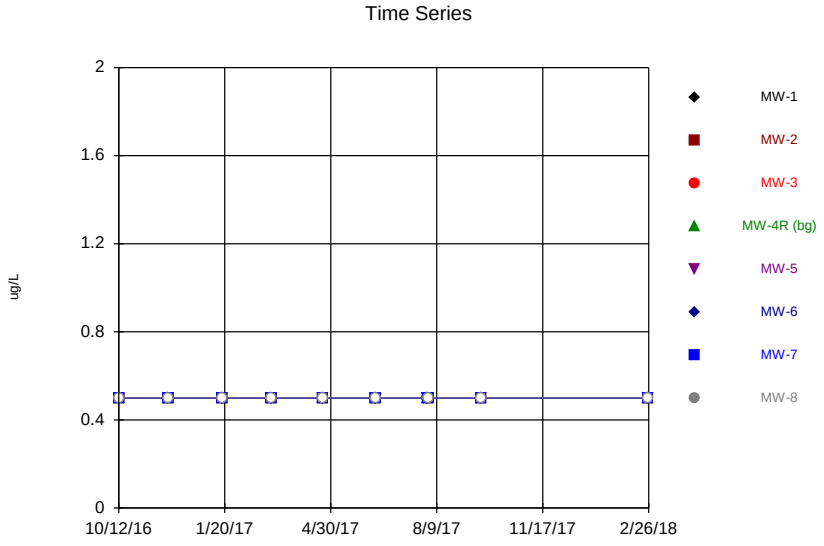
Hollow symbols indicate censored values.



Constituent: Thallium [total] Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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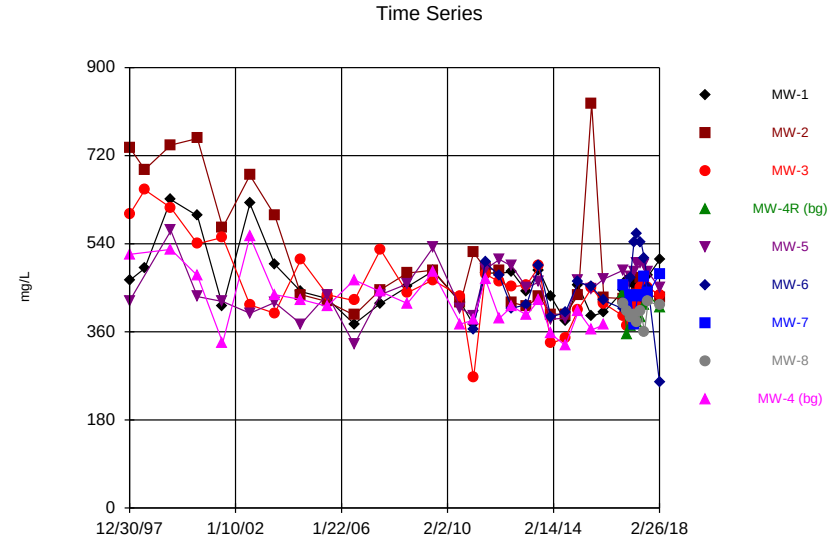

Constituent: Total Dissolved Solids Analysis Run 6/14/2018 4:36 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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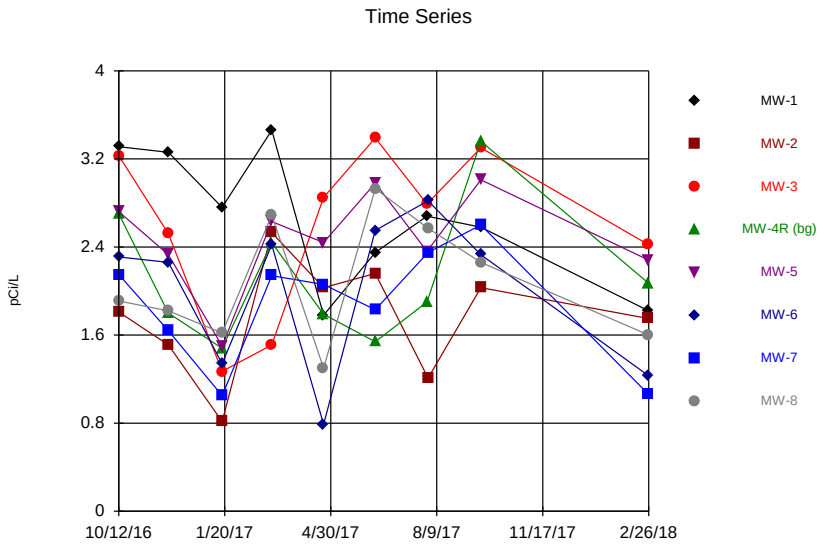

Constituent: Total Radium Analysis Run 6/14/2018 4:36 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

A.2 OUTLIER ANALYSIS – FEBRUARY 2018

REC'D NDEQ - (8/27/2018) - (20180058179)

Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/20/2018, 1:50 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony [total] (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Arsenic [total] (ug/L)	MW-1	No	n/a	n/a	NP	NaN	9	3.444	0.2506	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-2	No	n/a	n/a	NP	NaN	9	3.789	0.3919	x^6	ShapiroWilk
Arsenic [total] (ug/L)	MW-3	No	n/a	n/a	NP	NaN	9	2.967	0.1323	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	3.911	0.4045	normal	ShapiroWilk
Arsenic [total] (ug/L)	MW-5	No	n/a	n/a	NP	NaN	9	4.4	0.2236	normal	ShapiroWilk
Arsenic [total] (ug/L)	MW-6	No	n/a	n/a	NP	NaN	9	2.867	0.5148	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-7	No	n/a	n/a	NP	NaN	9	3.433	0.2291	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-8	No	n/a	n/a	NP	NaN	9	2.578	0.1641	x^4	ShapiroWilk
Barium [total] (ug/L)	MW-1	No	n/a	n/a	NP	NaN	34	131.3	15.75	x^2	ShapiroWilk
Barium [total] (ug/L)	MW-2	No	n/a	n/a	NP	NaN	34	93.48	13.53	ln(x)	ShapiroWilk
Barium [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	34	140.1	27.26	unknown	ShapiroWilk
Barium [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	118.4	6.766	x^3	ShapiroWilk
Barium [total] (ug/L)	MW-5	No	n/a	n/a	NP	NaN	33	134.7	13.02	normal	ShapiroWilk
Barium [total] (ug/L)	MW-6	No	n/a	n/a	NP	NaN	19	133.4	29.86	normal	ShapiroWilk
Barium [total] (ug/L)	MW-7	No	n/a	n/a	NP	NaN	9	112.4	5.318	x^4	ShapiroWilk
Barium [total] (ug/L)	MW-8	No	n/a	n/a	NP	NaN	9	147.8	12.55	x^(1/3)	ShapiroWilk
Barium [total] (ug/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	123	17.22	ln(x)	ShapiroWilk
BERYLIUM (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Chloride (mg/L)	MW-1	No	n/a	n/a	NP	NaN	9	11.54	1.182	x^3	ShapiroWilk
Chloride (mg/L)	MW-2	No	n/a	n/a	NP	NaN	9	15.63	1.749	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-3	No	n/a	n/a	NP	NaN	9	29.44	3.155	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	23.57	15.45	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-5	No	n/a	n/a	NP	NaN	9	15.12	3.863	normal	ShapiroWilk
Chloride (mg/L)	MW-6	No	n/a	n/a	NP	NaN	9	45.62	12.98	x^3	ShapiroWilk
Chloride (mg/L)	MW-7	No	n/a	n/a	NP	NaN	9	21.3	3.213	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-8	No	n/a	n/a	NP	NaN	9	22.19	3.159	ln(x)	ShapiroWilk
Chromium [total] (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	34	3.903	2.03	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	34	3.809	2.015	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	34	4.279	3.57	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	33	4.894	6.962	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	20	2.975	2.297	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Chromium [total] (ug/L)	MW-4 (bg)	No	n/a	n/a	NP (nrm)	NaN	24	5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk

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Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/20/2018, 1:50 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Cobalt [total] (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Fluoride (mg/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	1.344	0.07265	unknown	ShapiroWilk
Fluoride (mg/L)	MW-2	No	n/a	n/a	NP	NaN	9	0.9189	0.05159	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-3	No	n/a	n/a	NP	NaN	9	0.8044	0.06405	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	0.8433	0.07036	ln(x)	ShapiroWilk
Molybdenum (ug/L)	MW-3	No	n/a	n/a	NP	NaN	9	10.98	1.297	x^3	ShapiroWilk
Molybdenum (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	6.256	1.277	sqrt(x)	ShapiroWilk
Molybdenum (ug/L)	MW-5	No	n/a	n/a	NP	NaN	9	6.6	0.7616	sqrt(x)	ShapiroWilk
Molybdenum (ug/L)	MW-6	No	n/a	n/a	NP	NaN	9	8.278	1.053	ln(x)	ShapiroWilk
Molybdenum (ug/L)	MW-7	No	n/a	n/a	NP	NaN	9	8.622	0.8482	ln(x)	ShapiroWilk
Molybdenum (ug/L)	MW-8	No	n/a	n/a	NP	NaN	8	7.838	0.8158	x^6	ShapiroWilk
pH (Std. Units)	MW-1	No	n/a	n/a	NP	NaN	19	7.003	0.2763	ln(x)	ShapiroWilk
pH (Std. Units)	MW-2	No	n/a	n/a	NP (nrm)	NaN	19	6.598	1.616	unknown	ShapiroWilk
pH (Std. Units)	MW-3	No	n/a	n/a	NP (nrm)	NaN	18	7.066	0.2103	unknown	ShapiroWilk
pH (Std. Units)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	7.244	0.3395	ln(x)	ShapiroWilk
pH (Std. Units)	MW-5	No	n/a	n/a	NP (nrm)	NaN	18	7.138	0.2306	unknown	ShapiroWilk
pH (Std. Units)	MW-6	No	n/a	n/a	NP	NaN	17	7.024	0.2272	ln(x)	ShapiroWilk
pH (Std. Units)	MW-7	No	n/a	n/a	NP	NaN	9	7.156	0.2297	ln(x)	ShapiroWilk
pH (Std. Units)	MW-8	No	n/a	n/a	NP	NaN	9	7.189	0.2472	ln(x)	ShapiroWilk
pH (Std. Units)	MW-4 (bg)	No	n/a	n/a	NP (nrm)	NaN	10	6.237	2.197	unknown	ShapiroWilk
Selenium [total] (ug/L)	MW-1	No	n/a	n/a	NP	NaN	34	18.02	6.372	x^(1/3)	ShapiroWilk
Selenium [total] (ug/L)	MW-2	No	n/a	n/a	NP	NaN	34	20.89	9.824	x^(1/3)	ShapiroWilk
Selenium [total] (ug/L)	MW-3	No	n/a	n/a	NP	NaN	34	10.4	3.164	ln(x)	ShapiroWilk
Selenium [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	6.967	1.351	x^2	ShapiroWilk
Selenium [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	33	13.78	4.804	unknown	ShapiroWilk
Selenium [total] (ug/L)	MW-6	No	n/a	n/a	NP	NaN	20	11.79	5.704	normal	ShapiroWilk
Selenium [total] (ug/L)	MW-7	No	n/a	n/a	NP	NaN	9	10.37	1.138	ln(x)	ShapiroWilk
Selenium [total] (ug/L)	MW-8	No	n/a	n/a	NP	NaN	9	11.13	1.926	x^3	ShapiroWilk
Selenium [total] (ug/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	10.47	5.168	sqrt(x)	ShapiroWilk
Sulfate (mg/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	34	65.09	19.24	unknown	ShapiroWilk
Sulfate (mg/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	34	96.29	69	unknown	ShapiroWilk
Sulfate (mg/L)	MW-3	No	n/a	n/a	NP	NaN	34	71.55	30.15	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	37.39	7.31	x^5	ShapiroWilk
Sulfate (mg/L)	MW-5	No	n/a	n/a	NP	NaN	33	48.47	8.769	ln(x)	ShapiroWilk
Total Radium (pCi/L)	MW-8	No	n/a	n/a	NP	NaN	9	2.078	0.5606	ln(x)	ShapiroWilk
BERYLIUM (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Boron (ug/L)	MW-1	No	n/a	n/a	NP	NaN	9	142.8	11.28	ln(x)	ShapiroWilk
Boron (ug/L)	MW-2	No	n/a	n/a	NP	NaN	8	117.4	6.209	x^4	ShapiroWilk
Boron (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	82	30.77	unknown	ShapiroWilk
Boron (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	186	119.7	normal	ShapiroWilk
Boron (ug/L)	MW-5	No	n/a	n/a	NP	NaN	9	127.1	9.006	x^6	ShapiroWilk
Boron (ug/L)	MW-6	No	n/a	n/a	NP	NaN	9	119.4	32.27	x^2	ShapiroWilk
Boron (ug/L)	MW-7	No	n/a	n/a	NP	NaN	9	173.8	18.78	x^6	ShapiroWilk
Boron (ug/L)	MW-8	No	n/a	n/a	NP	NaN	8	122.6	13.49	x^6	ShapiroWilk

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Outlier Analysis

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Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Cadmium [total] (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.25	0	unknown	ShapiroWilk
Calcium (mg/L)	MW-1	No	n/a	n/a	NP	NaN	34	103	10.53	x^(1/3)	ShapiroWilk
Calcium (mg/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	34	109.7	23.65	unknown	ShapiroWilk
Calcium (mg/L)	MW-3	No	n/a	n/a	NP	NaN	34	100.4	15.74	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	83.53	4.959	x^4	ShapiroWilk
Calcium (mg/L)	MW-5	No	n/a	n/a	NP	NaN	33	102.2	9.434	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-6	No	n/a	n/a	NP	NaN	20	89.13	15.83	x^4	ShapiroWilk
Calcium (mg/L)	MW-7	No	n/a	n/a	NP	NaN	9	96.71	7.365	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-8	No	n/a	n/a	NP	NaN	9	88.16	5.529	x^6	ShapiroWilk
Calcium (mg/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	88.7	11.45	normal	ShapiroWilk
Fluoride (mg/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	1.111	0.1167	unknown	ShapiroWilk
Fluoride (mg/L)	MW-6	No	n/a	n/a	NP	NaN	9	0.55	0.08216	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-7	No	n/a	n/a	NP	NaN	9	0.87	0.08367	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-8	No	n/a	n/a	NP	NaN	9	0.8089	0.07607	ln(x)	ShapiroWilk
Lead [total] (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.8556	0.7876	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.6556	0.4667	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Lead [total] (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Lithium (ug/L)	MW-1	No	n/a	n/a	NP	NaN	9	35.04	2.614	x^6	ShapiroWilk
Lithium (ug/L)	MW-2	No	n/a	n/a	NP	NaN	8	27.3	1.655	ln(x)	ShapiroWilk
Lithium (ug/L)	MW-3	No	n/a	n/a	NP	NaN	9	27.18	2.699	ln(x)	ShapiroWilk
Lithium (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	25.56	2.589	ln(x)	ShapiroWilk
Lithium (ug/L)	MW-5	No	n/a	n/a	NP	NaN	9	31.24	4.278	ln(x)	ShapiroWilk
Lithium (ug/L)	MW-6	No	n/a	n/a	NP	NaN	9	28.19	4.072	x^3	ShapiroWilk
Lithium (ug/L)	MW-7	No	n/a	n/a	NP	NaN	9	28.46	4.167	ln(x)	ShapiroWilk
Lithium (ug/L)	MW-8	No	n/a	n/a	NP	NaN	8	27.78	0.9925	x^6	ShapiroWilk
Mercury (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Mercury (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.1	0	unknown	ShapiroWilk
Molybdenum (ug/L)	MW-1	No	n/a	n/a	NP	NaN	9	8.156	0.6146	x^6	ShapiroWilk
Molybdenum (ug/L)	MW-2	No	n/a	n/a	NP	NaN	9	8.322	0.7579	x^5	ShapiroWilk
Sulfate (mg/L)	MW-6	No	n/a	n/a	NP	NaN	20	55.82	14.64	x^2	ShapiroWilk
Sulfate (mg/L)	MW-7	No	n/a	n/a	NP	NaN	9	48.11	6.061	normal	ShapiroWilk
Sulfate (mg/L)	MW-8	No	n/a	n/a	NP	NaN	9	40.76	7.942	ln(x)	ShapiroWilk

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Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/20/2018, 1:50 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Sulfate (mg/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	57.9	11.32	normal	ShapiroWilk
Thallium [total] (ug/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-5	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-6	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-7	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-8	No	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	34	463.2	59.89	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	34	500	122.4	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-3	No	n/a	n/a	NP	NaN	34	451.6	78.13	x^(1/3)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	398.7	28.73	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-5	No	n/a	n/a	NP	NaN	33	452	48.93	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-6	No	n/a	n/a	NP	NaN	20	447.1	71.29	x^2	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-7	No	n/a	n/a	NP	NaN	9	437.6	30.47	x^4	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-8	No	n/a	n/a	NP	NaN	9	398.3	19.65	x^6	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	423.9	59.19	ln(x)	ShapiroWilk
Total Radium (pCi/L)	MW-1	No	n/a	n/a	NP	NaN	9	2.667	0.6139	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-2	No	n/a	n/a	NP	NaN	9	1.76	0.5198	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-3	No	n/a	n/a	NP	NaN	9	2.587	0.7586	x^3	ShapiroWilk
Total Radium (pCi/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	2.12	0.6108	ln(x)	ShapiroWilk
Total Radium (pCi/L)	MW-5	No	n/a	n/a	NP	NaN	9	2.472	0.4541	x^3	ShapiroWilk
Total Radium (pCi/L)	MW-6	No	n/a	n/a	NP	NaN	9	2.005	0.6999	x^4	ShapiroWilk
Total Radium (pCi/L)	MW-7	No	n/a	n/a	NP	NaN	9	1.876	0.5401	x^3	ShapiroWilk

REC'D NDEQ - (8/27/2018) - (20180058179)

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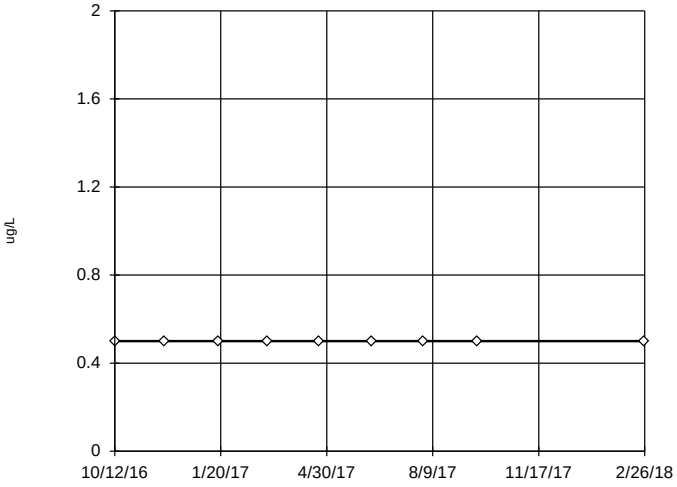
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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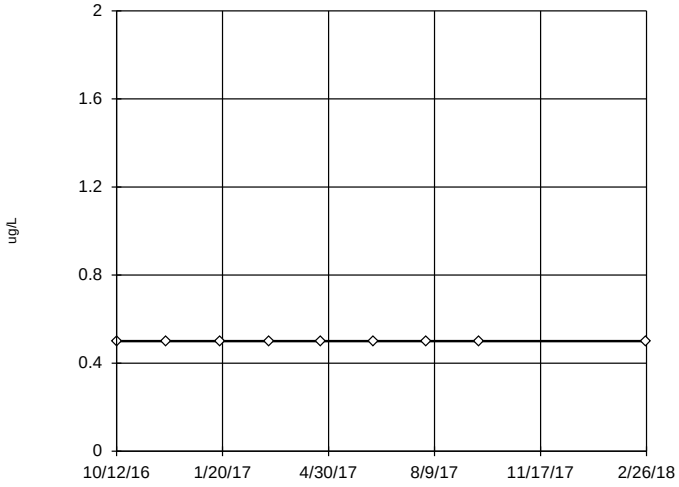
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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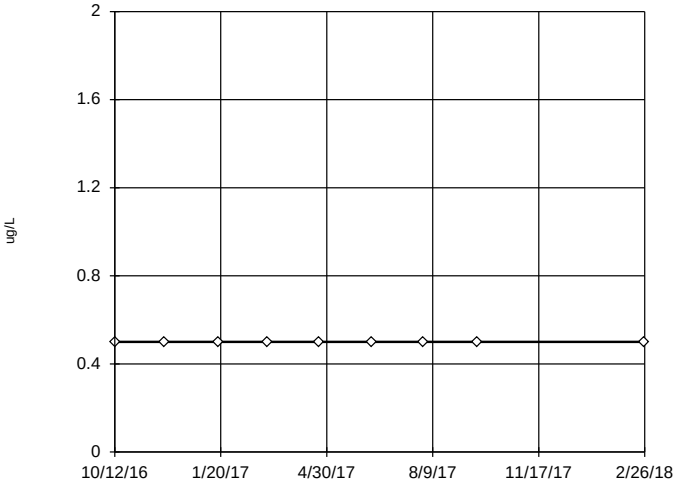
Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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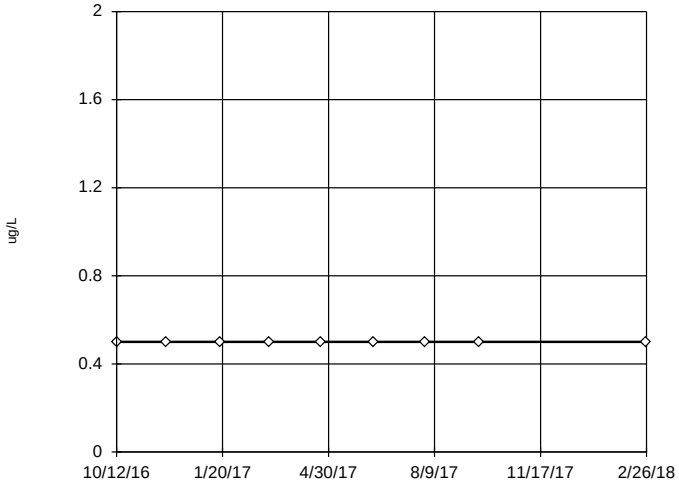
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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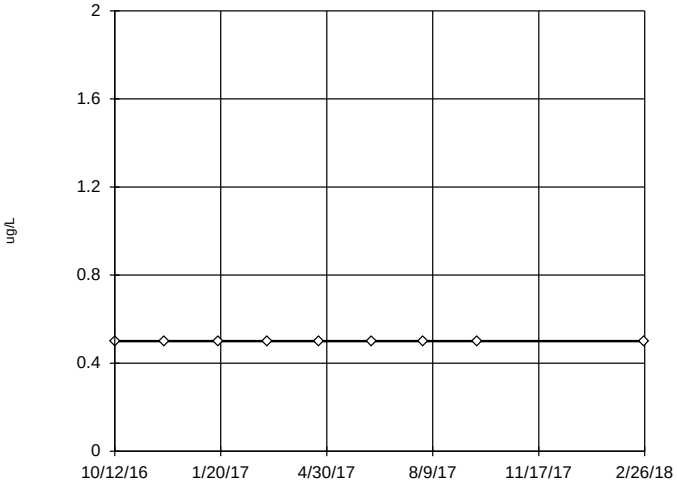
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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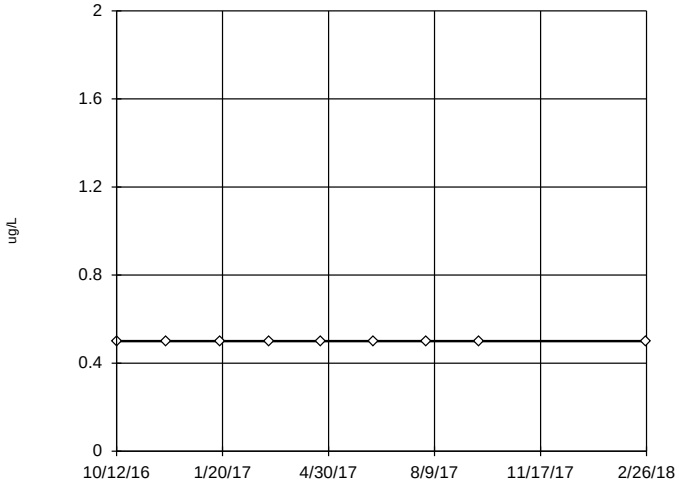
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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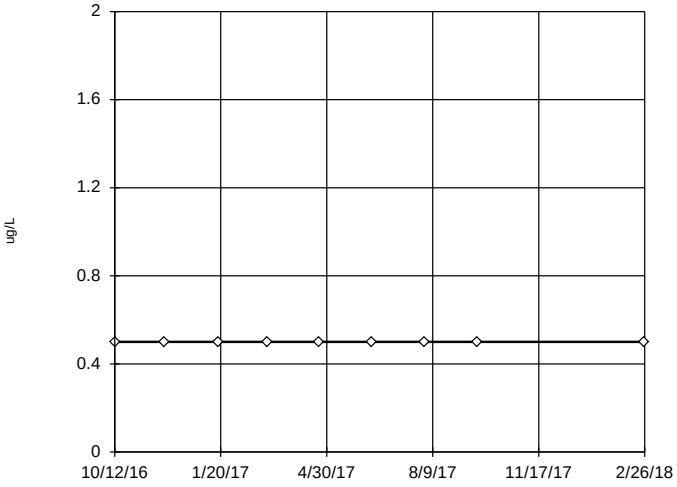
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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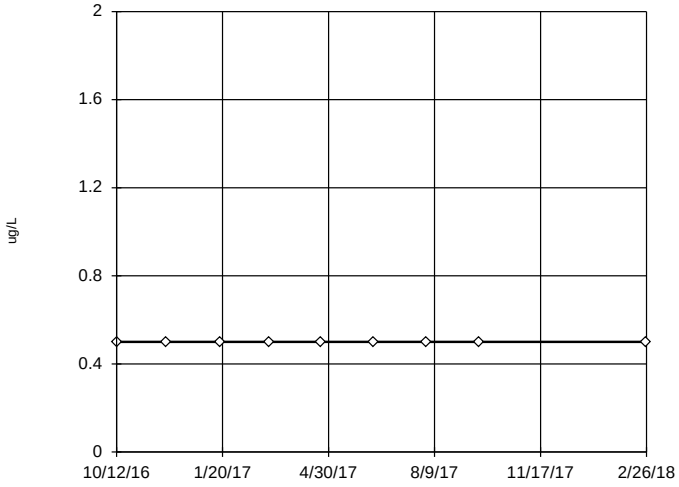
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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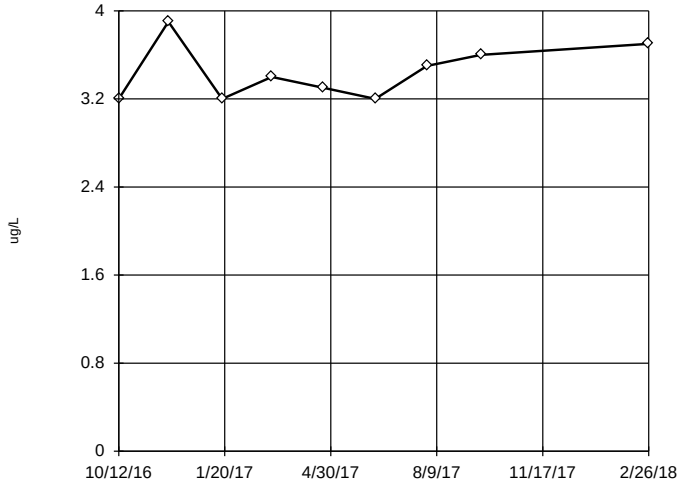
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 5.415, low cutoff = 2.157, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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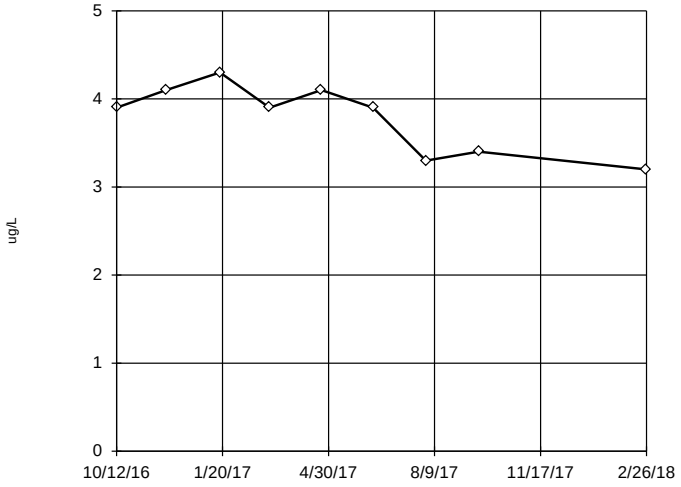
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.952, low cutoff = -4.524, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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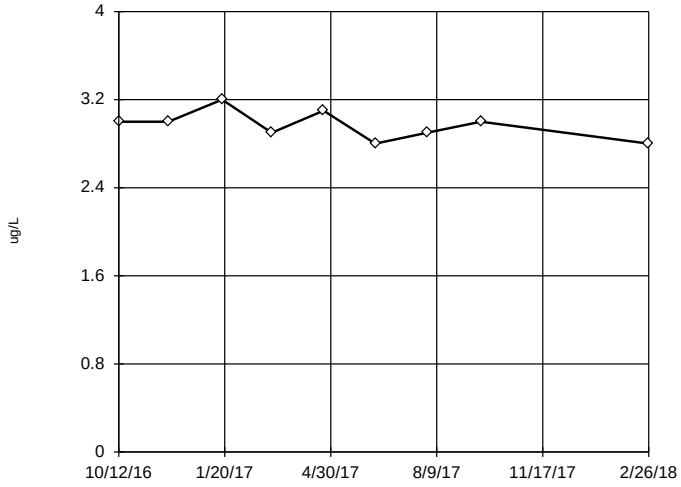
Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.738, low cutoff = 2.325, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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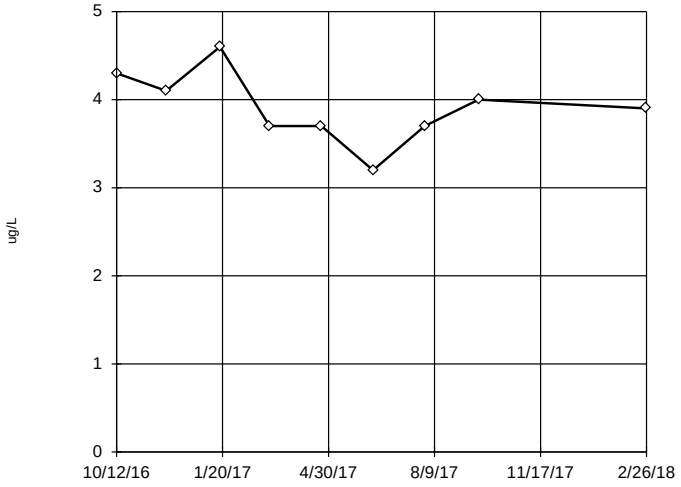
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 5.7, low cutoff = 2.2, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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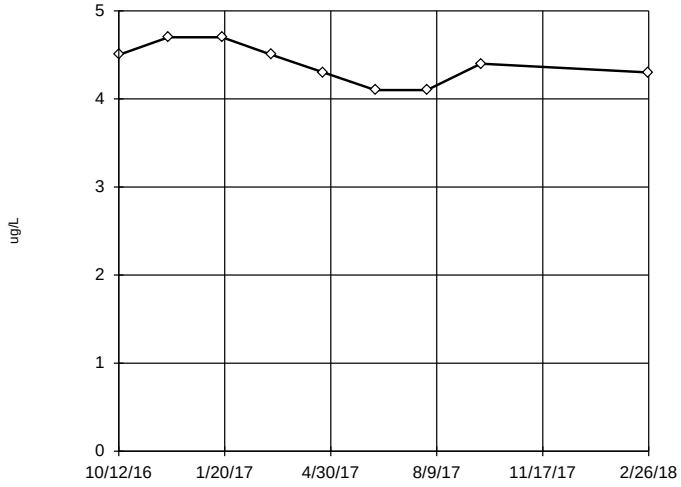
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 5.8, low cutoff = 3, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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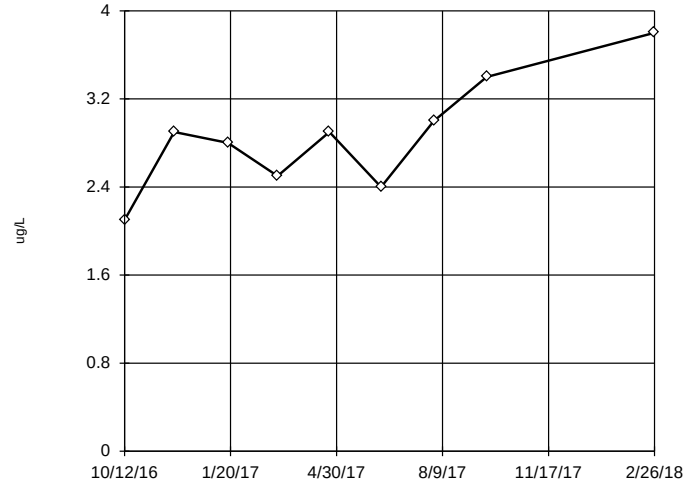
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.079, low cutoff = 1.105, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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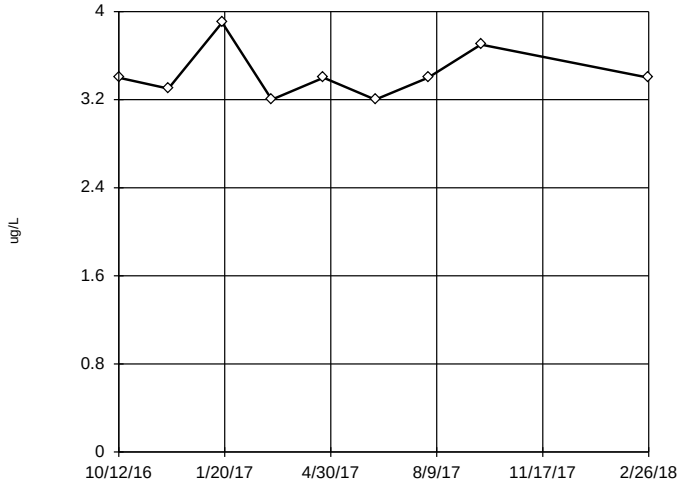
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.612, low cutoff = 2.499, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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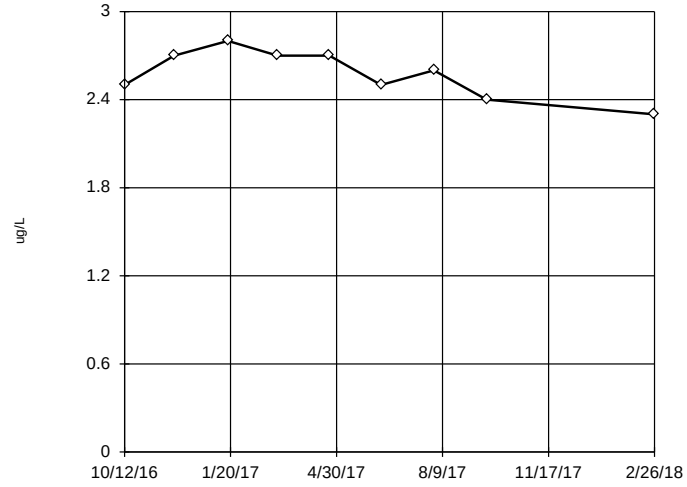
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.195, low cutoff = -1.966, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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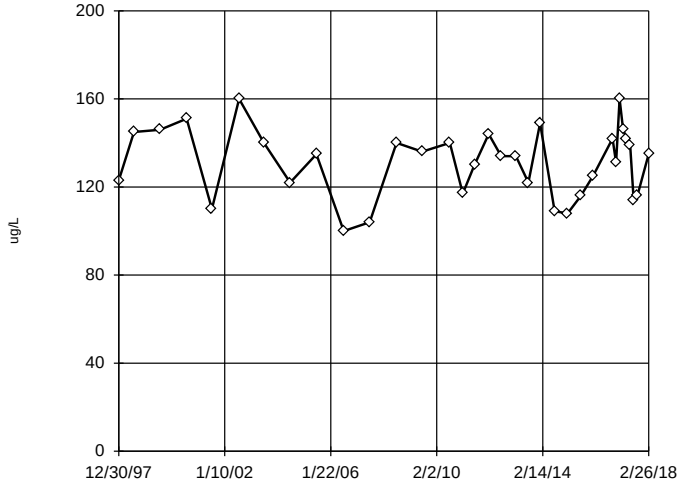
Tukey's Outlier Screening

MW-1



n = 34

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 202.7, low cutoff = -84.02, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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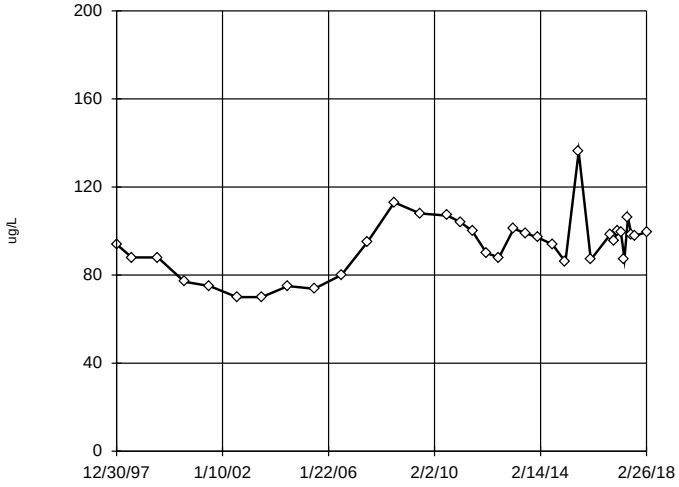
Tukey's Outlier Screening

MW-2



n = 34

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 154.5, low cutoff = 55.98, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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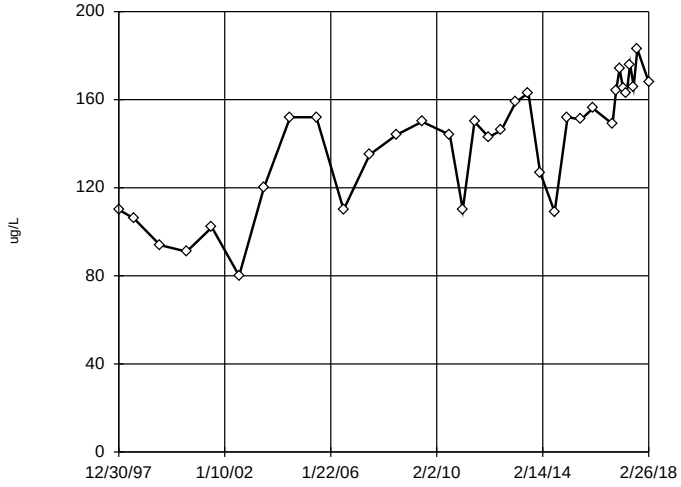
Tukey's Outlier Screening

MW-3



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 237.1, low cutoff = -197.2, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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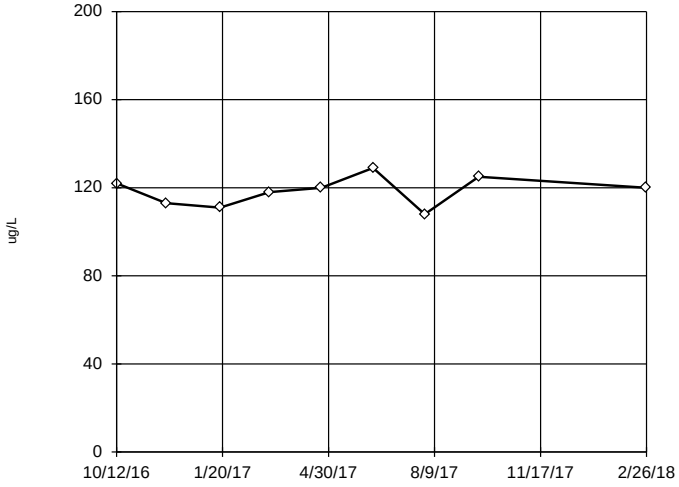
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 149.2, low cutoff = -31.88, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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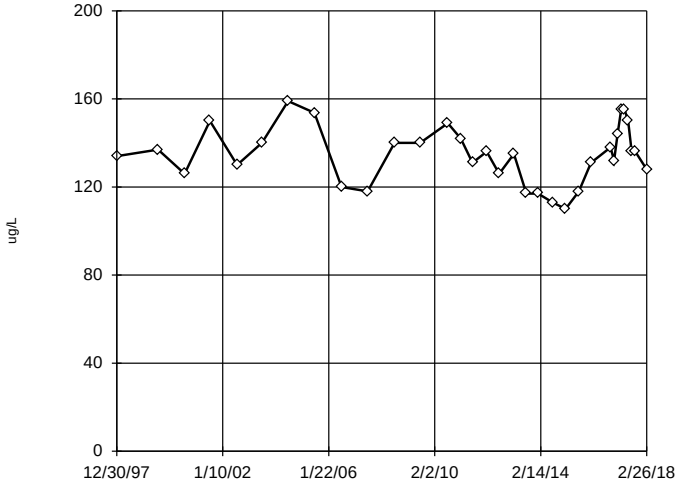
Tukey's Outlier Screening

MW-5



n = 33

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 194, low cutoff = 75, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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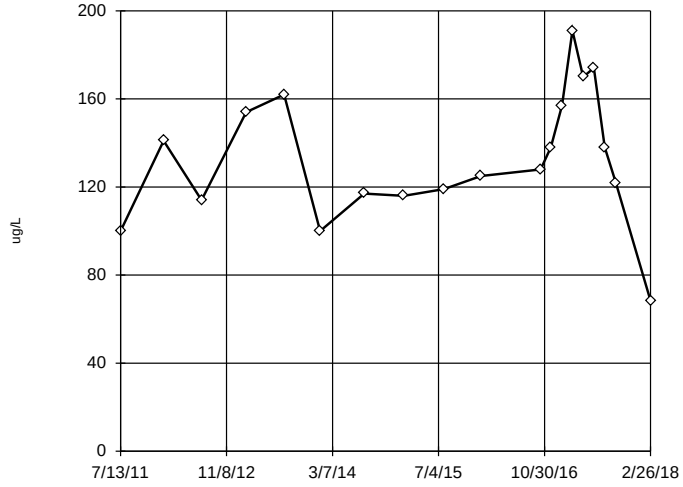
Tukey's Outlier Screening

MW-6



n = 19

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 280, low cutoff = -7, based on IQR multiplier of 3.

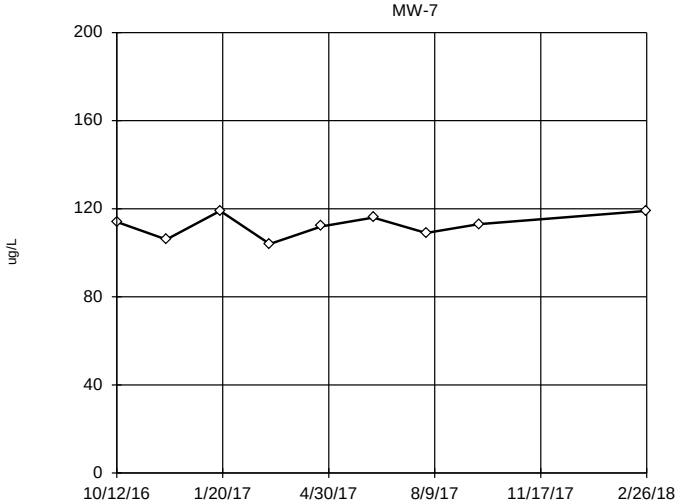
Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were *x*^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 137.9, low cutoff = -78.3, based on IQR multiplier of 3.

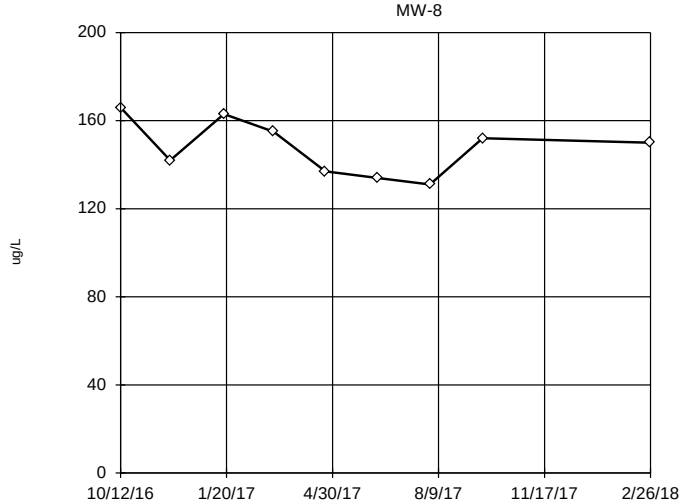
Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 245.3, low cutoff = 79.14, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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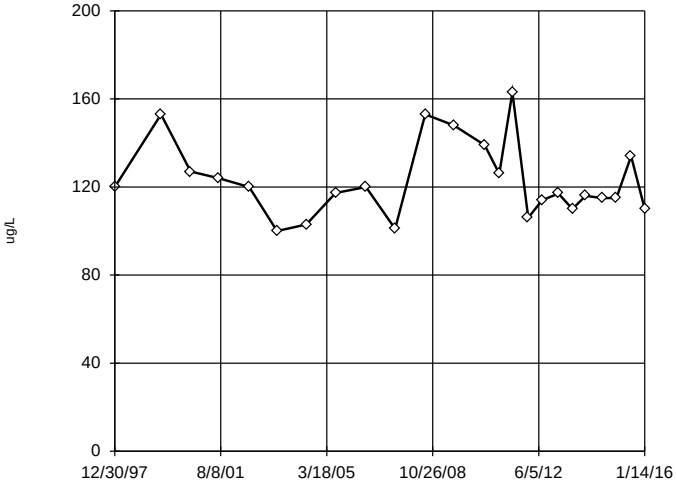
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 206.2, low cutoff = 70.83, based on IQR multiplier of 3.

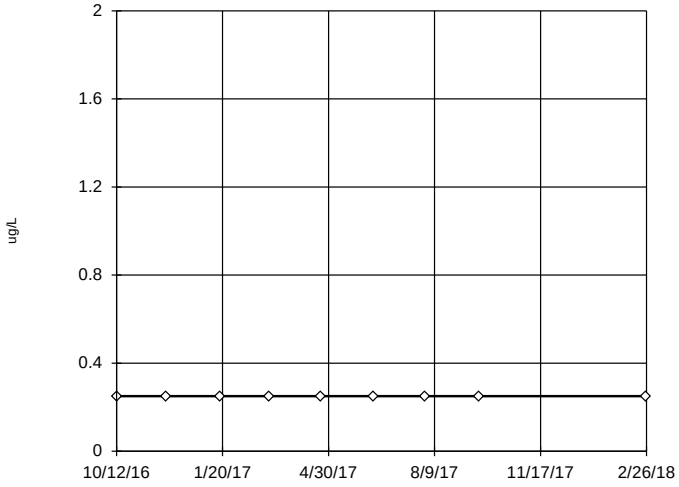
Constituent: Barium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

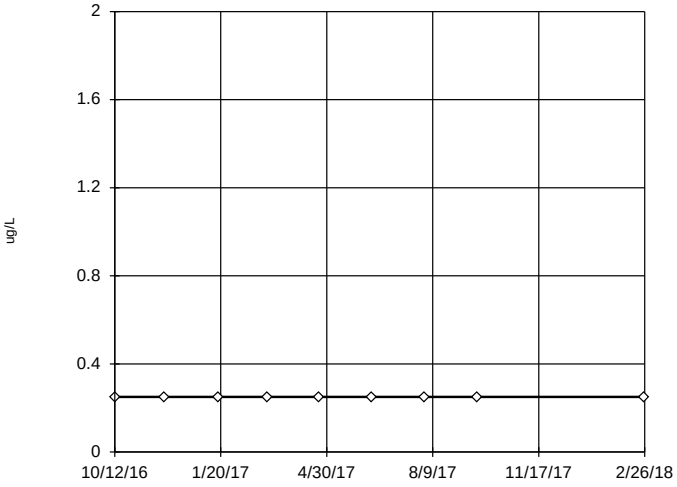
Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

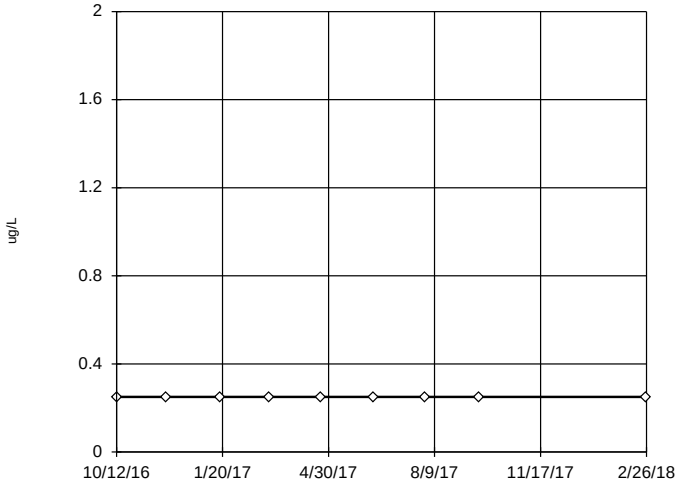
Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

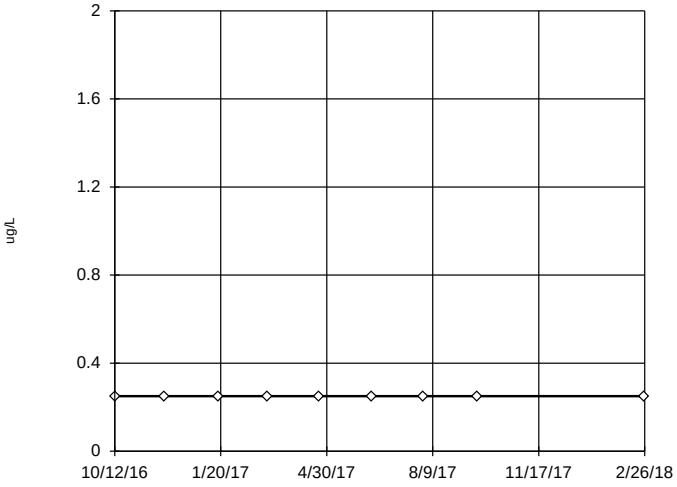
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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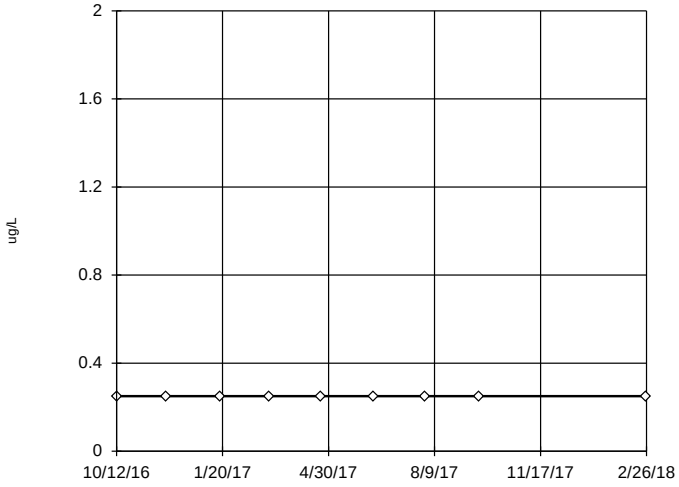
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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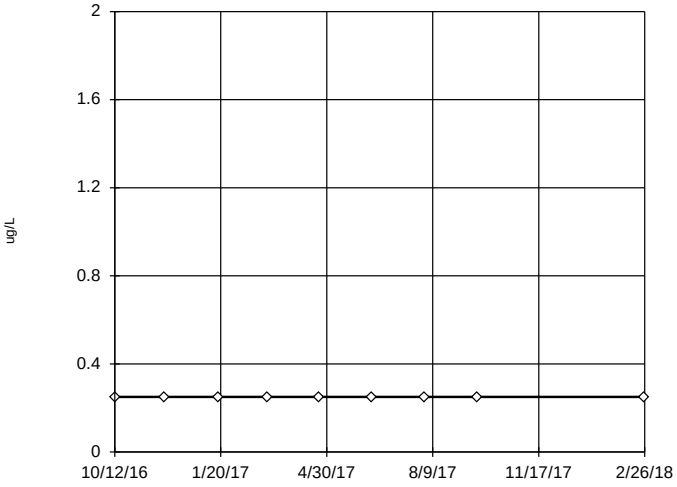
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

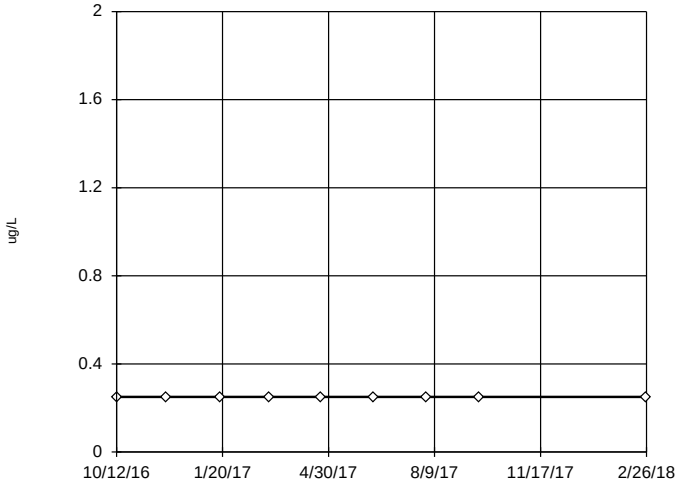
Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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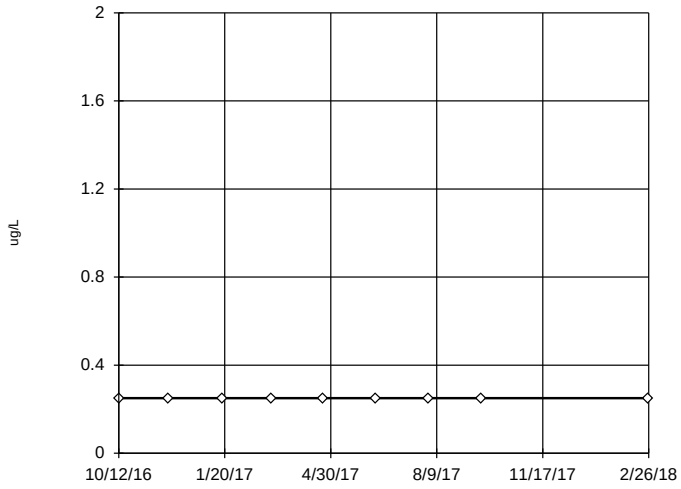
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

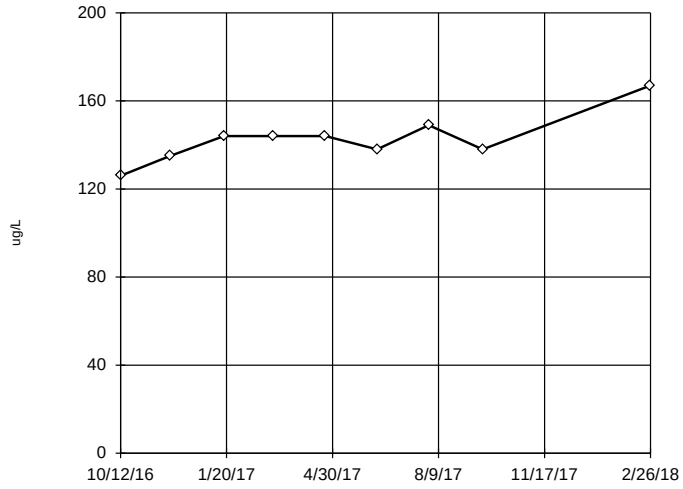
Constituent: BERYLIUM Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 181, low cutoff = 110.4, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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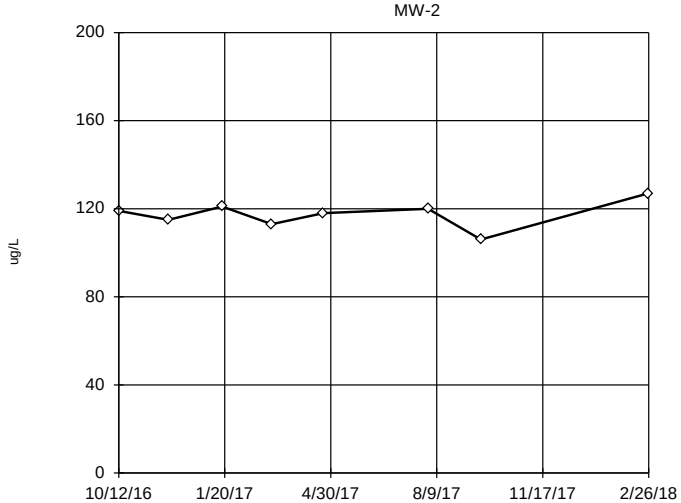
Tukey's Outlier Screening

MW-2



n = 8

No outliers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 135.4, low cutoff = 81.13, based on IQR multiplier of 3.

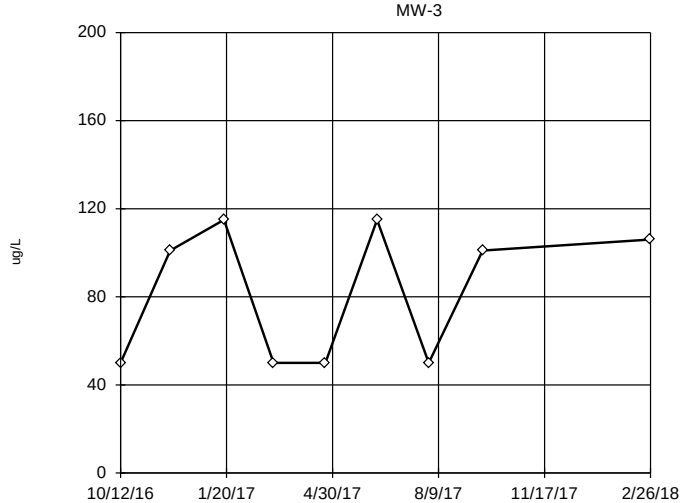
Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 139.6, low cutoff = -133, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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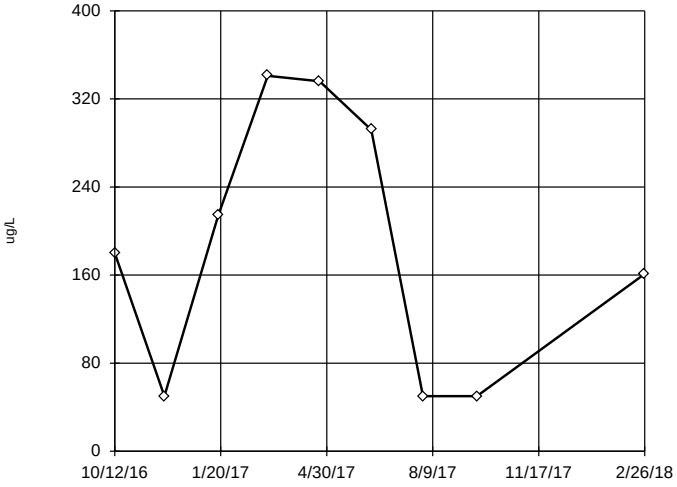
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 1106, low cutoff = -742, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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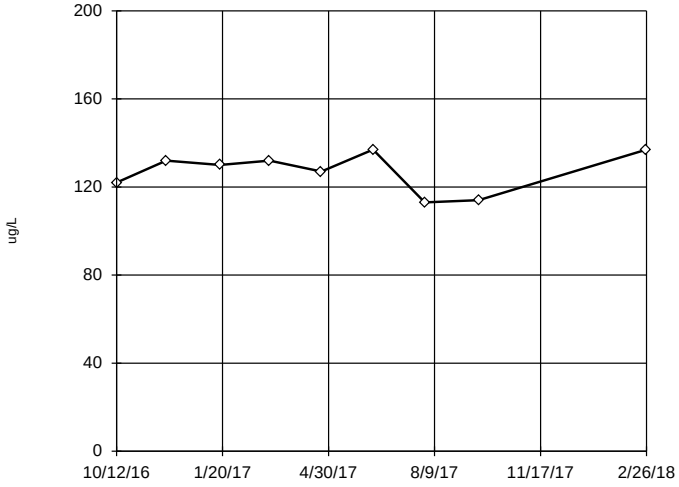
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 158, low cutoff = -137.9, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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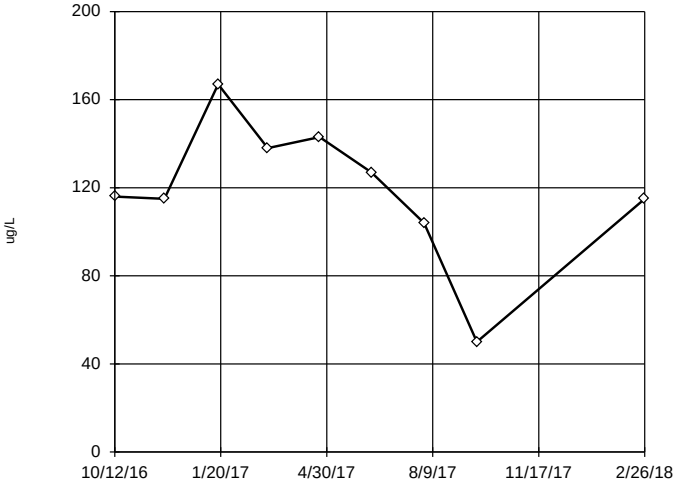
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 207.2, low cutoff = -105.6, based on IQR multiplier of 3.

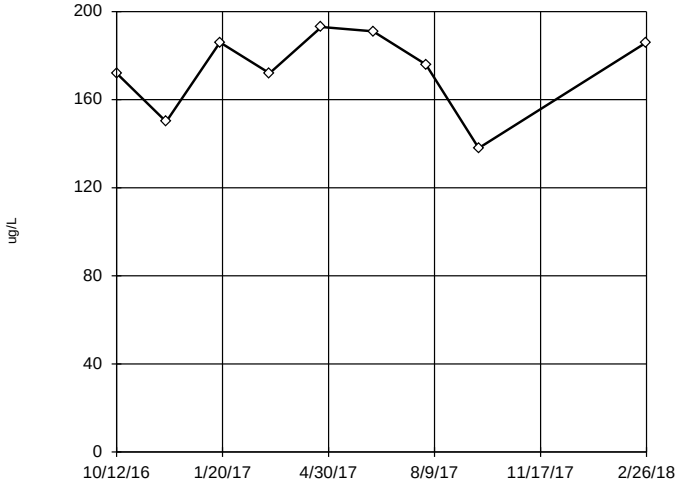
Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 223.3, low cutoff = -198.1, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

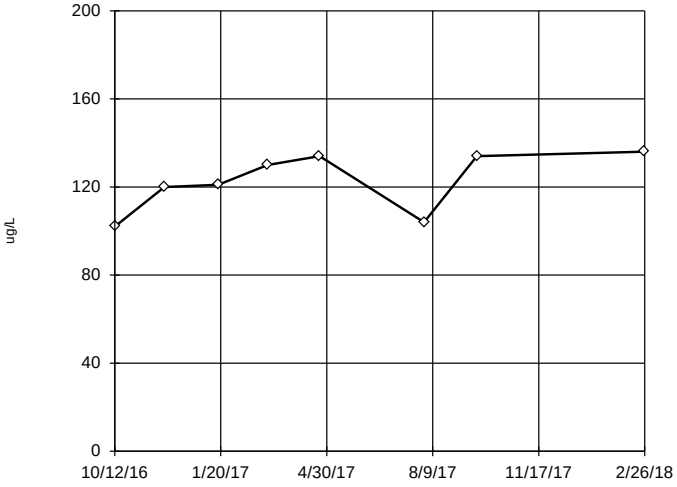
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 8

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 160, low cutoff = -143.9, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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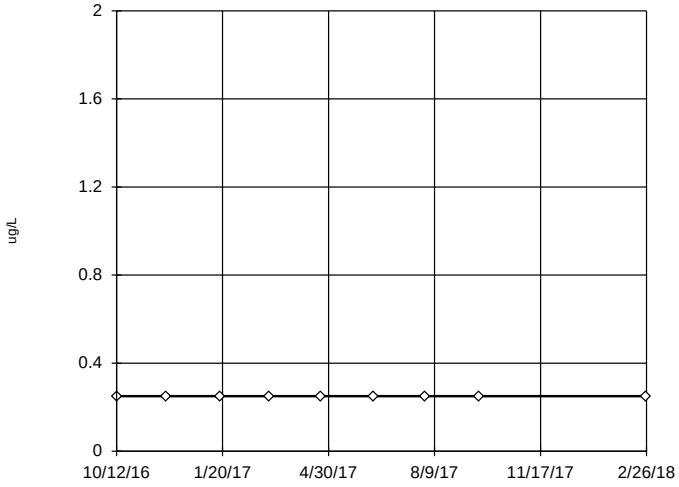
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

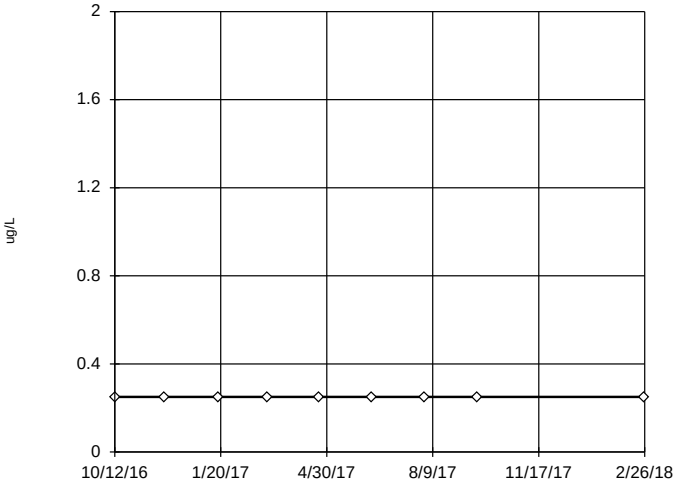
Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

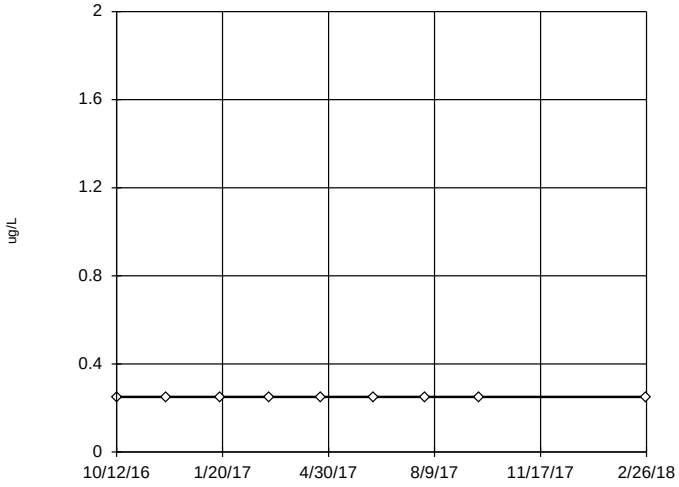
Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

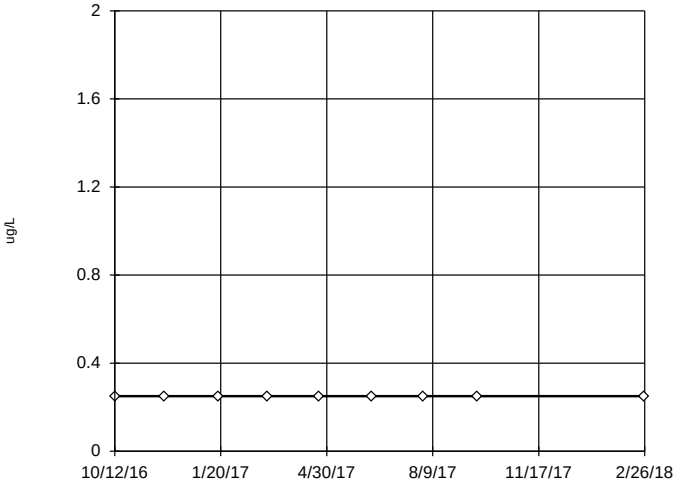
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

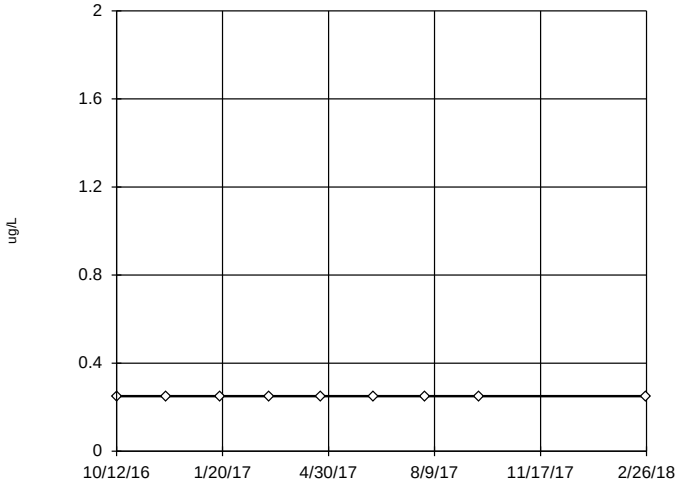
Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

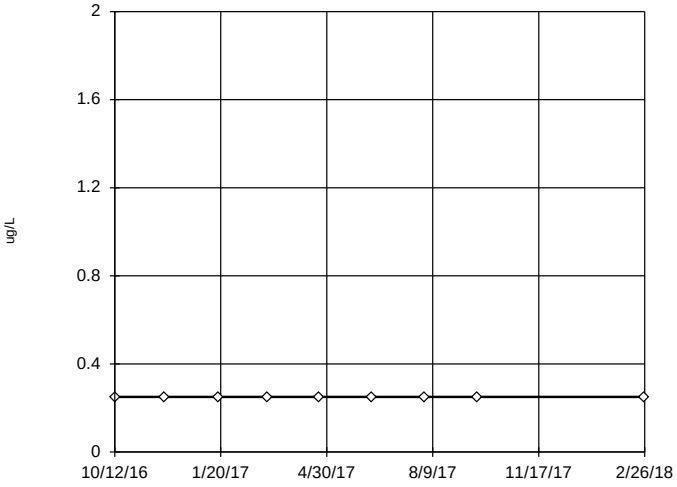
Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

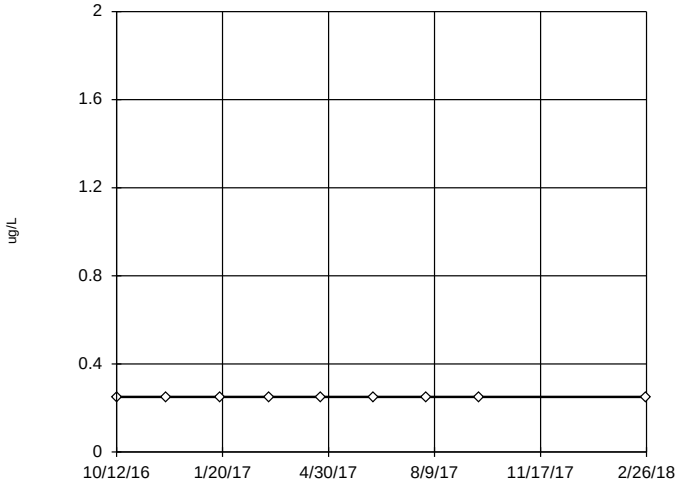
Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

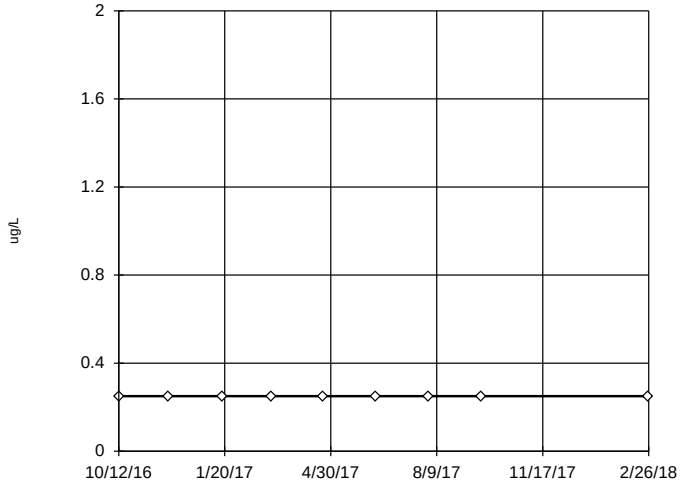
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

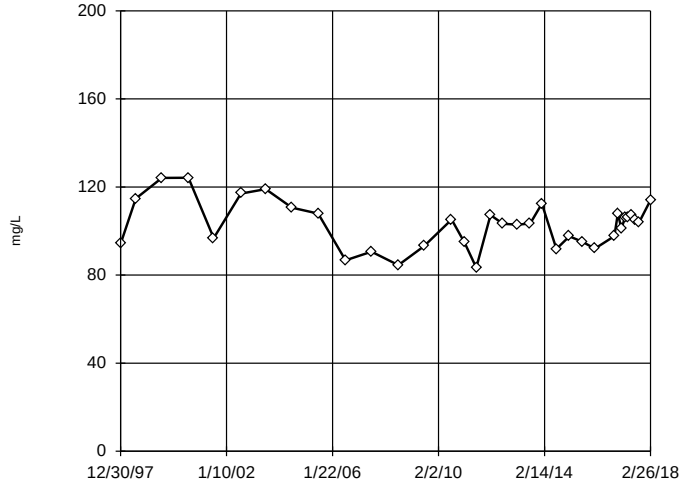
Constituent: Cadmium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 34

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 163.1, low cutoff = 58.07, based on IQR multiplier of 3.

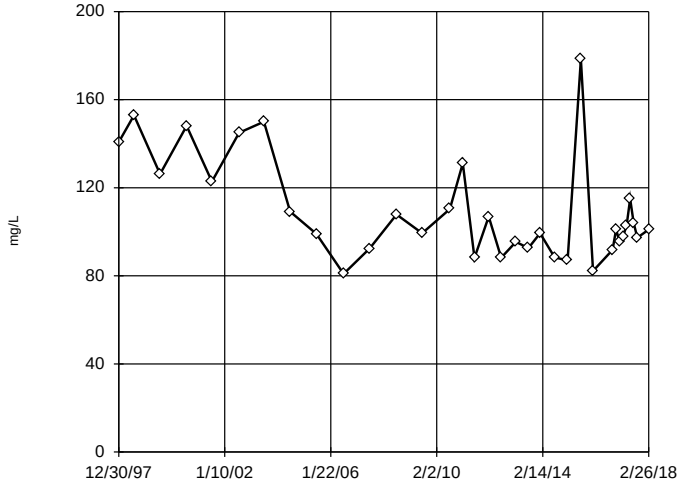
Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 303.7, low cutoff = 37.93, based on IQR multiplier of 3.

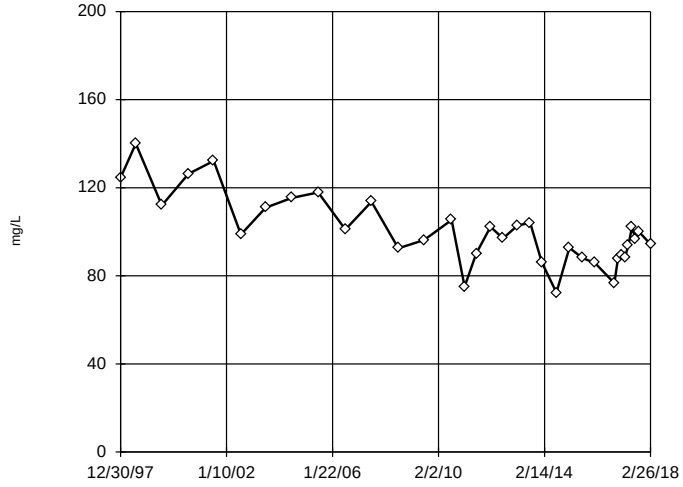
Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 34

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 220.4, low cutoff = 44.96, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

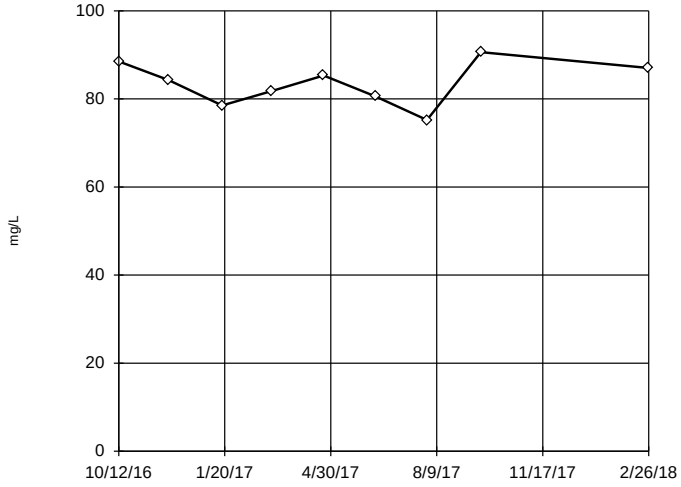
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 104, low cutoff = -64.77, based on IQR multiplier of 3.

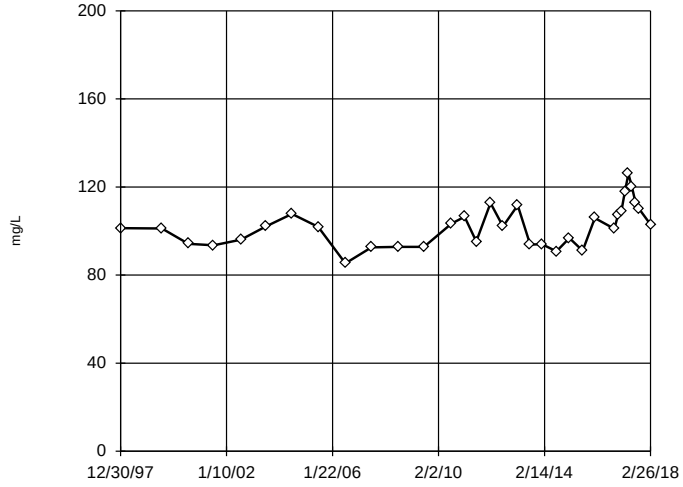
Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 33

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 166.5, low cutoff = 61.13, based on IQR multiplier of 3.

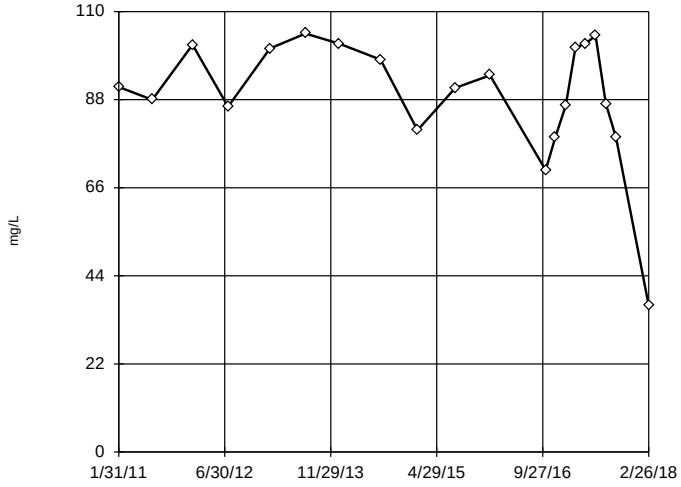
Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 20

No outliers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 129, low cutoff = -105.2, based on IQR multiplier of 3.

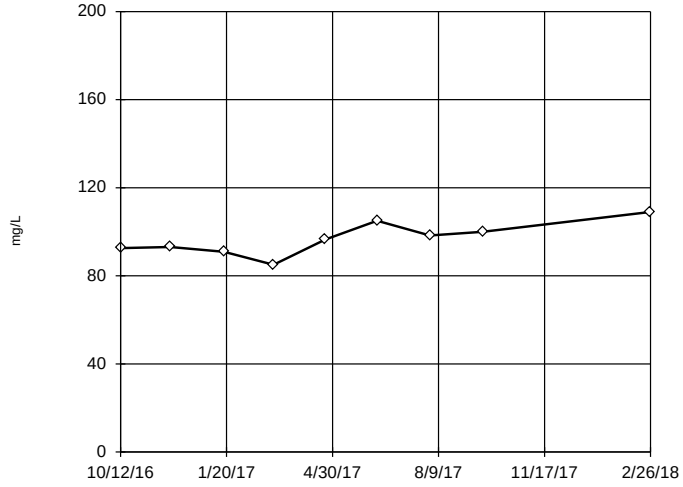
Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 142.8, low cutoff = 65.85, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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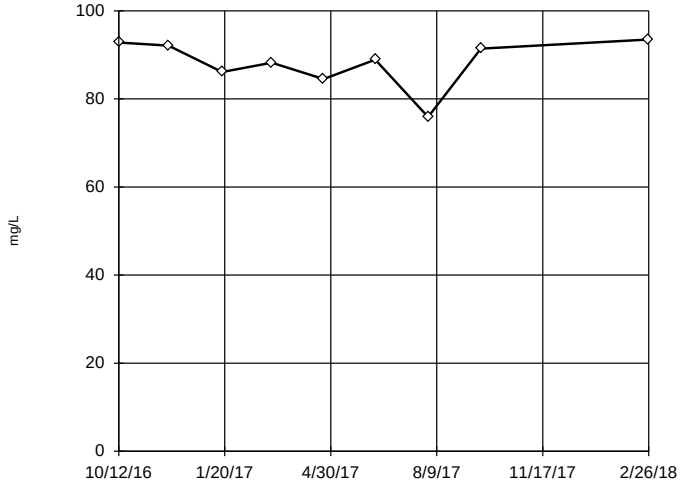
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 105, low cutoff = -83.16, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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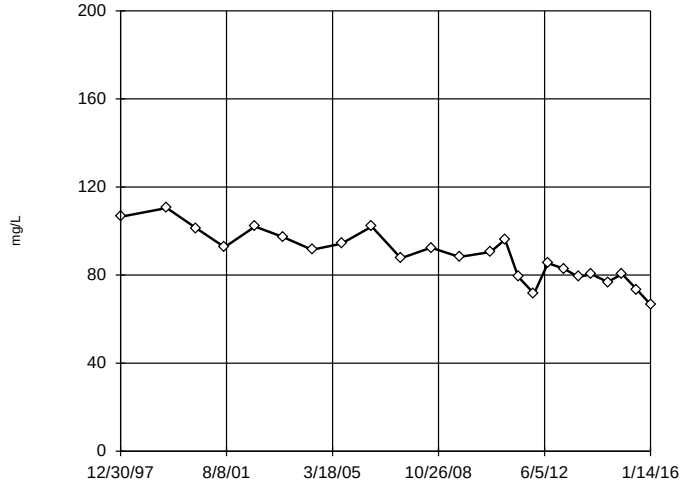
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 147.4, low cutoff = 29.08, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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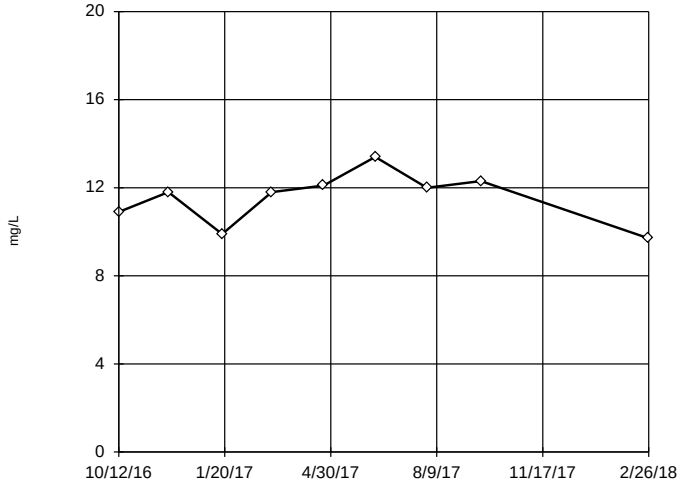
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 15.7, low cutoff = -9.719, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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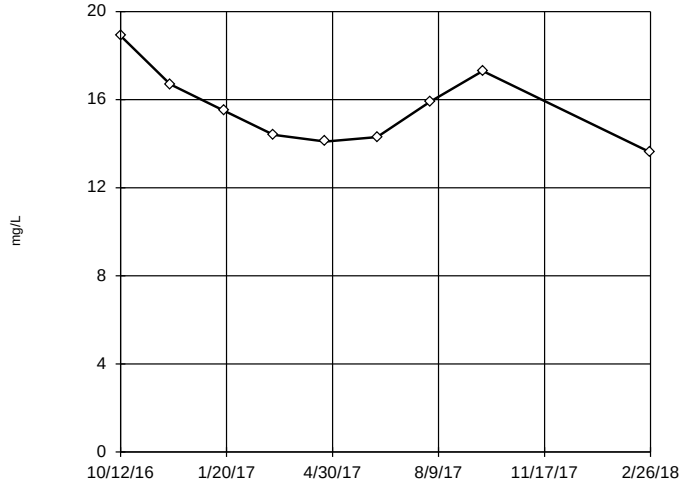
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 29.15, low cutoff = 8.279, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

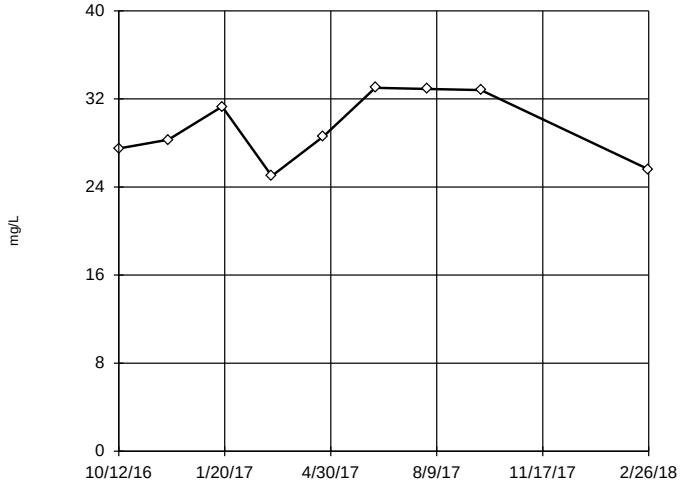
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 62.34, low cutoff = 13.98, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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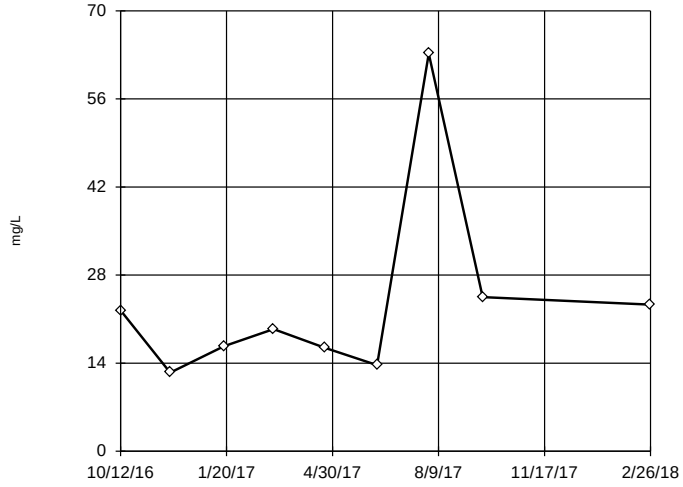
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 96.76, low cutoff = 3.701, based on IQR multiplier of 3.

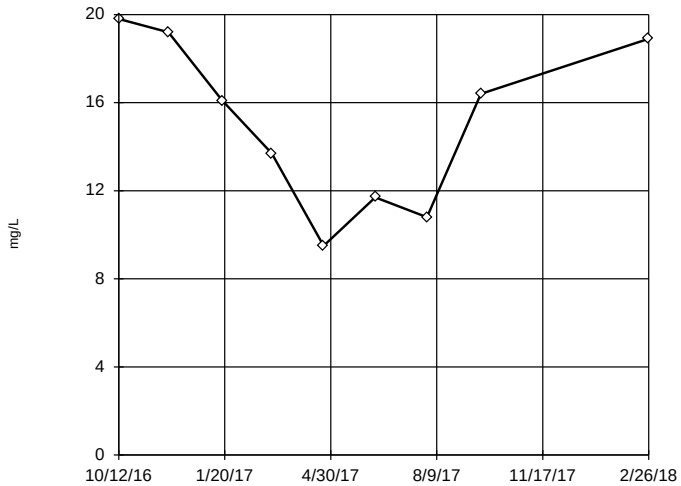
Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 42.45, low cutoff = -12.15, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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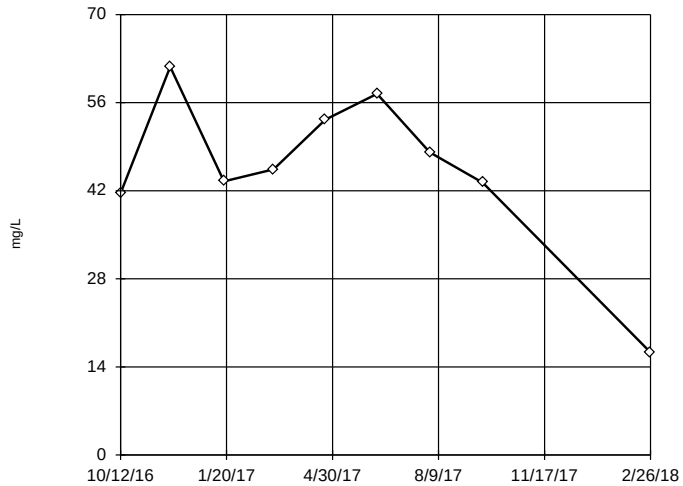
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 76.71, low cutoff = -58.91, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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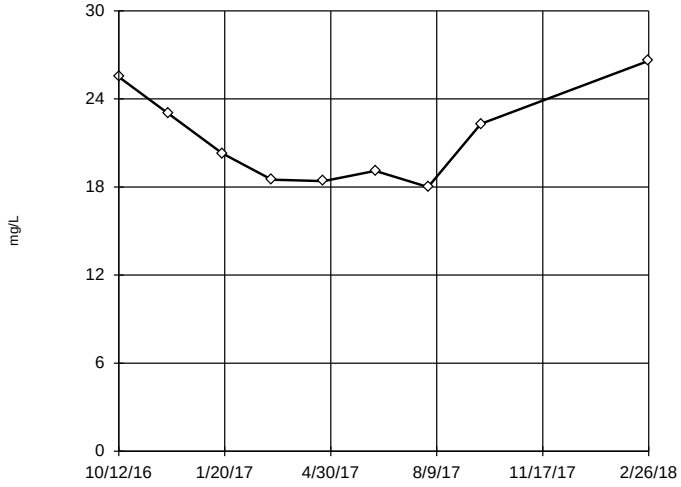
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 54.77, low cutoff = 8.158, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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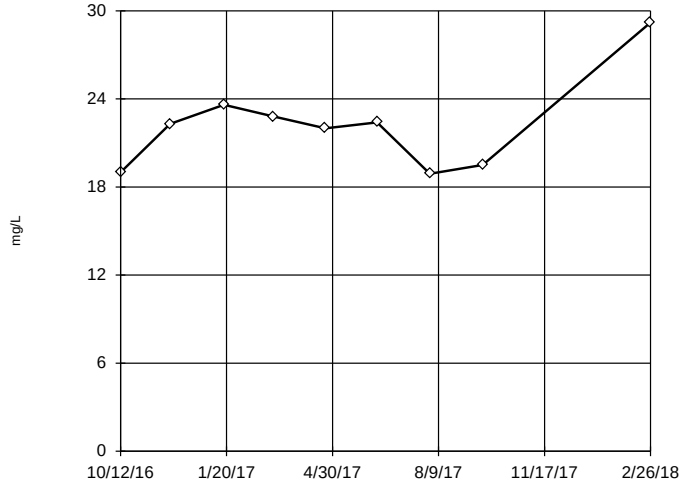
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 40.6, low cutoff = 11, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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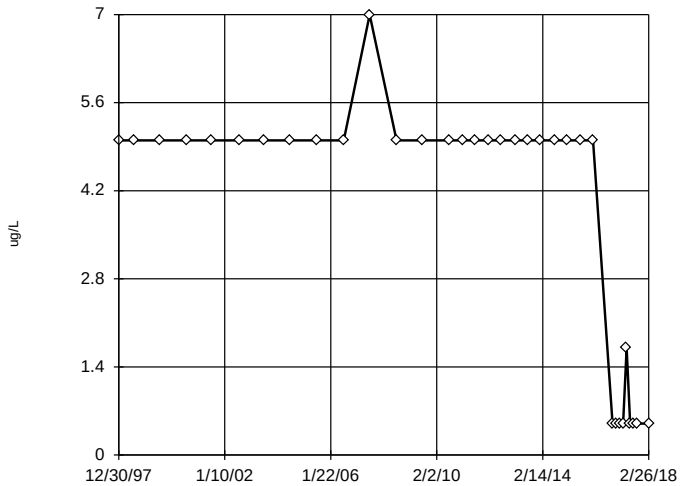
Tukey's Outlier Screening

MW-1



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.762, low cutoff = -8.29, based on IQR multiplier of 3.

Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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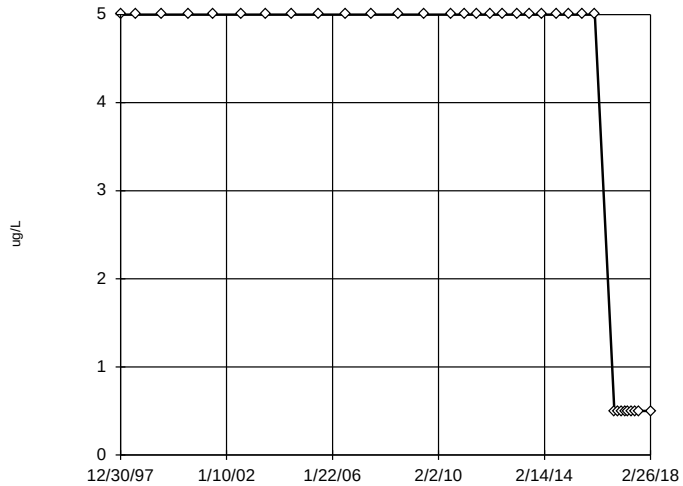
Tukey's Outlier Screening

MW-2



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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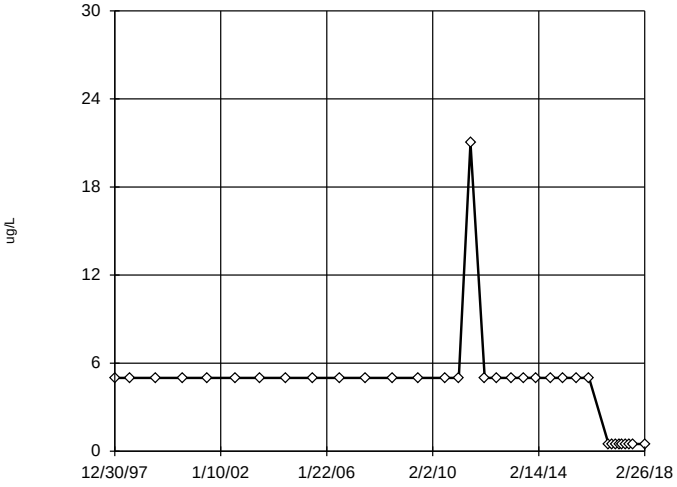
Tukey's Outlier Screening

MW-3



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

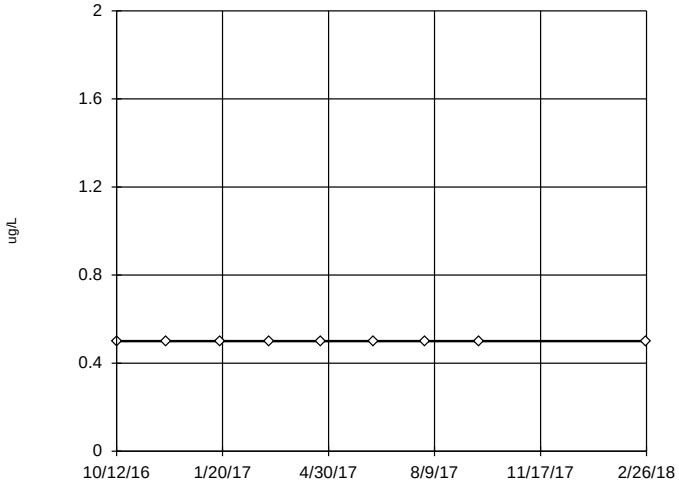
Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

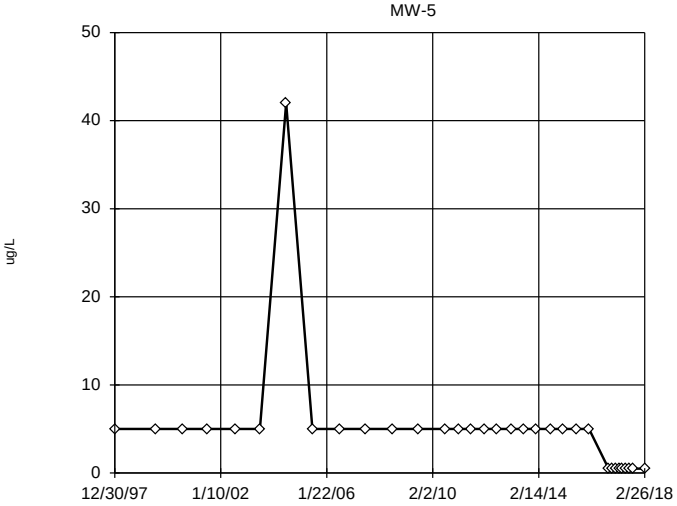
Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 33

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

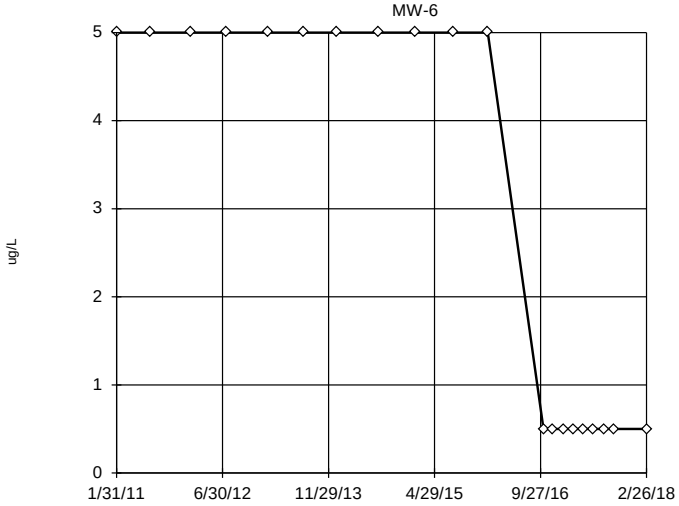
Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 20

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

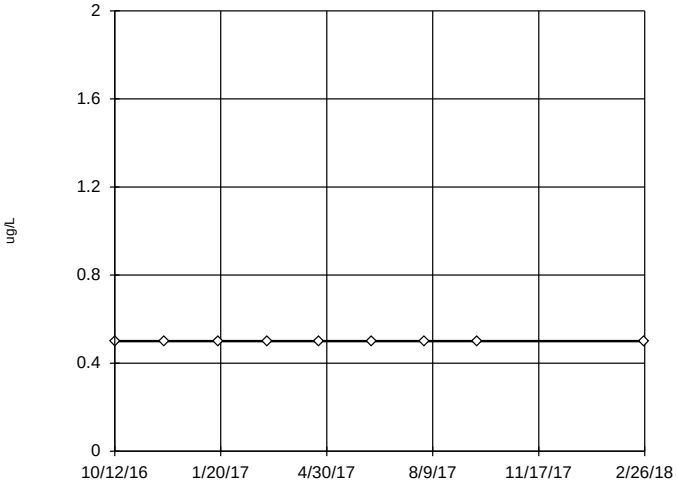
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

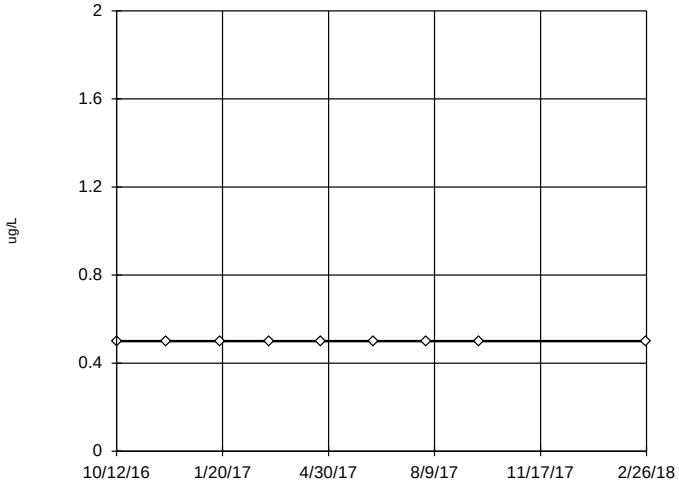
Constituent: Chromium [total] Analysis Run 6/20/2018 1:47 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

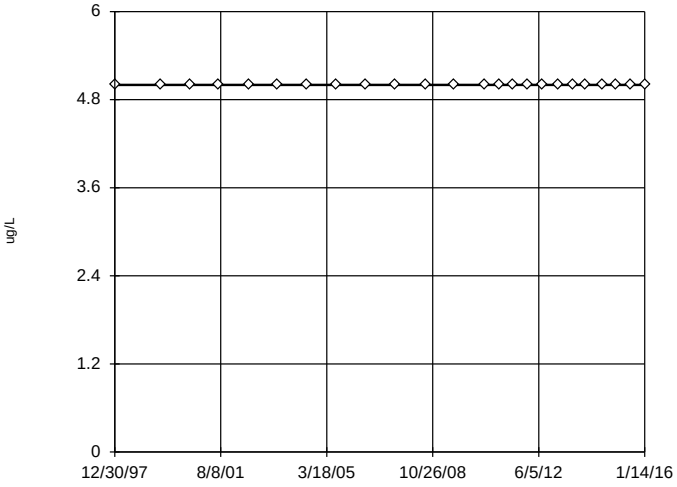
Constituent: Chromium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

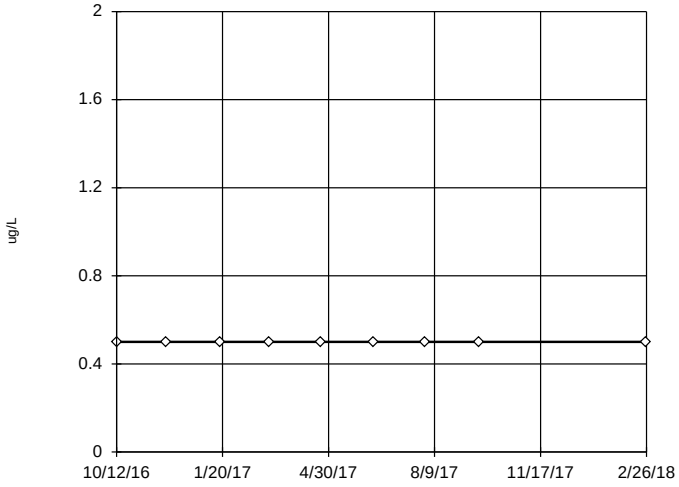
Constituent: Chromium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

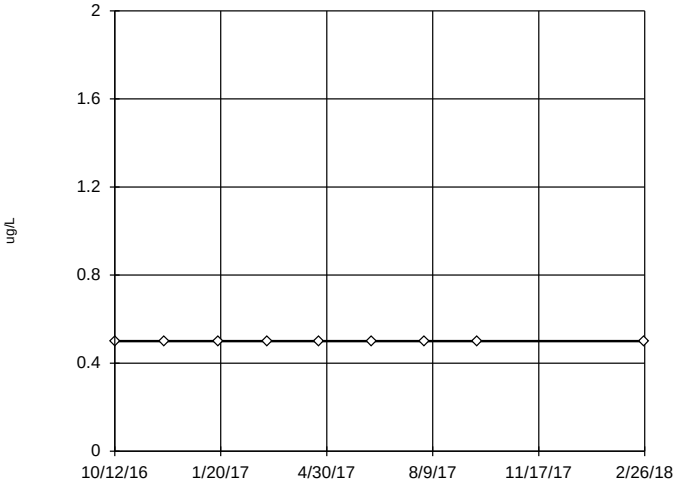
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

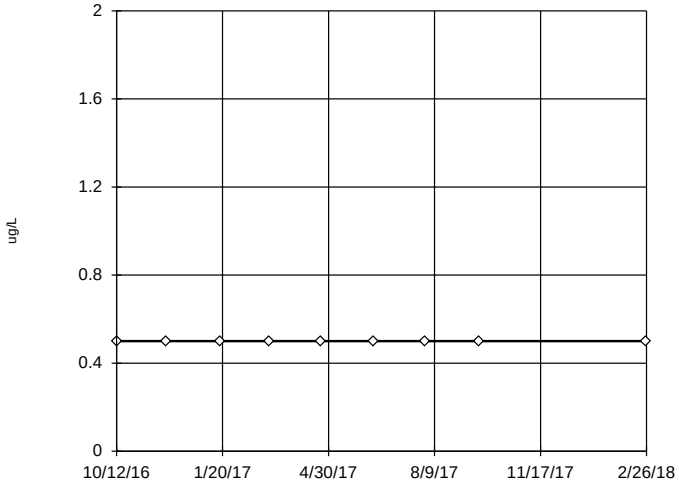
Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

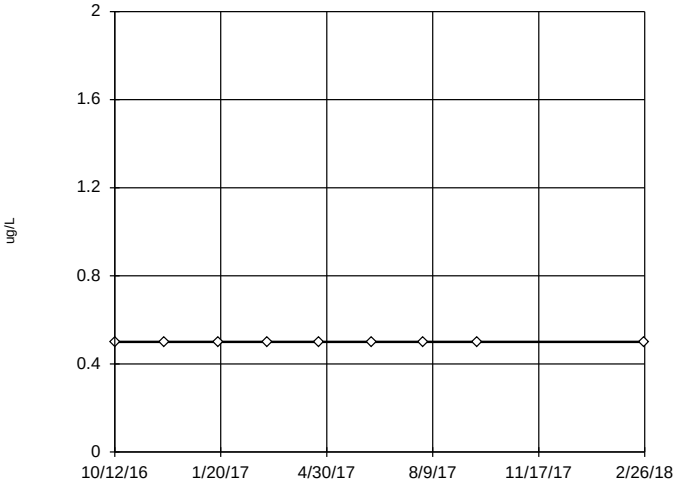
Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

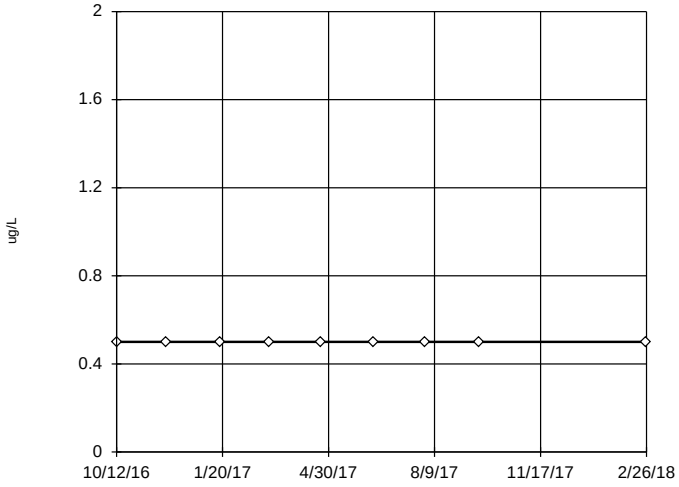
Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

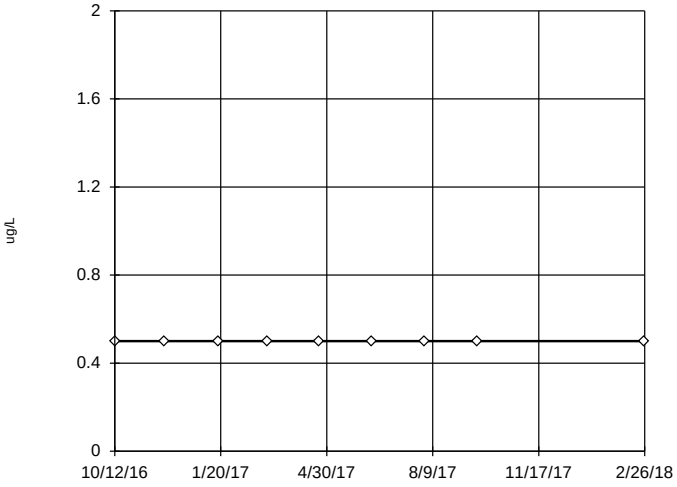
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

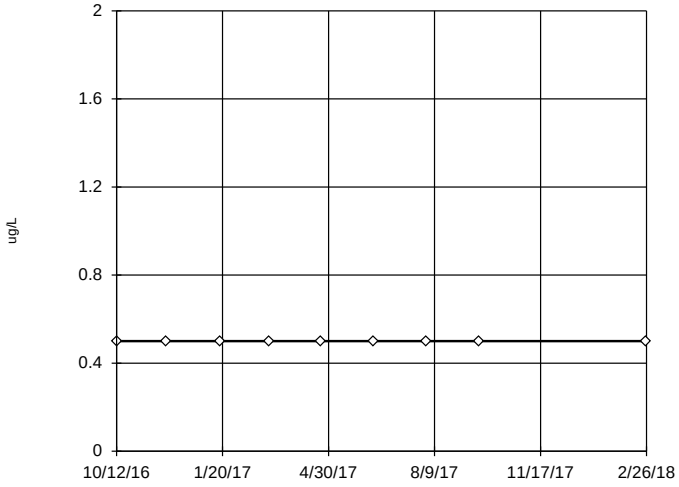
Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

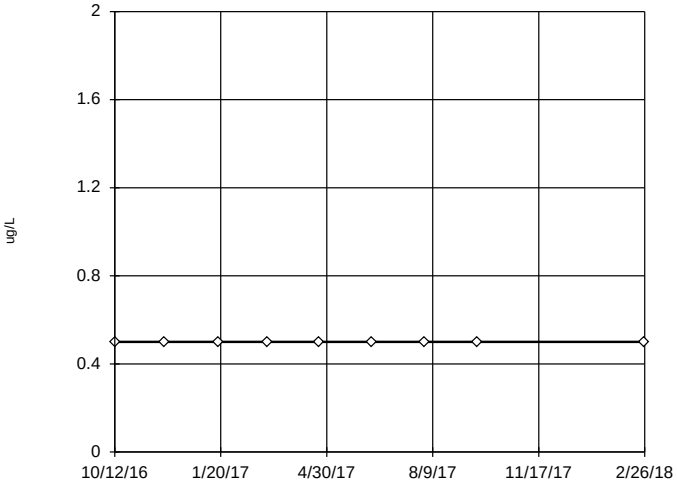
Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

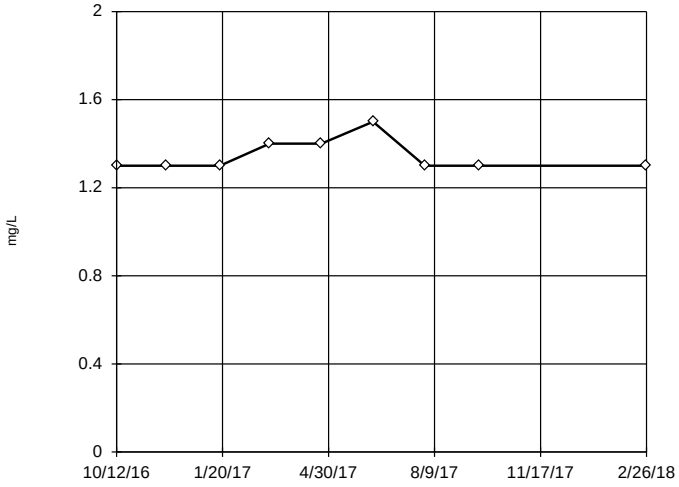
Constituent: Cobalt [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.749, low cutoff = 1.041, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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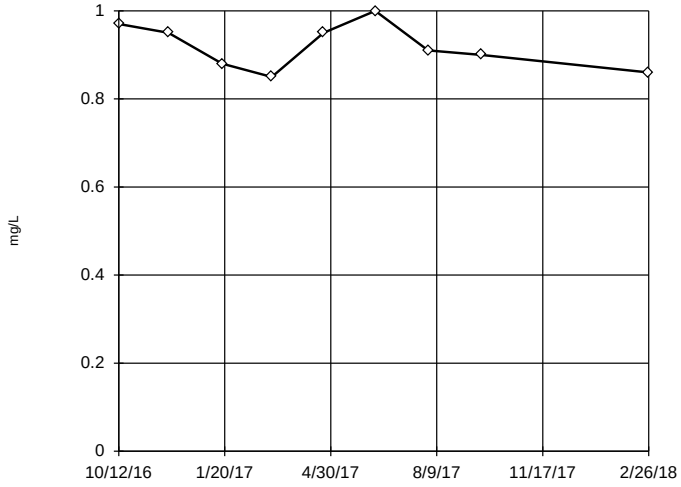
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.29, low cutoff = 0.6475, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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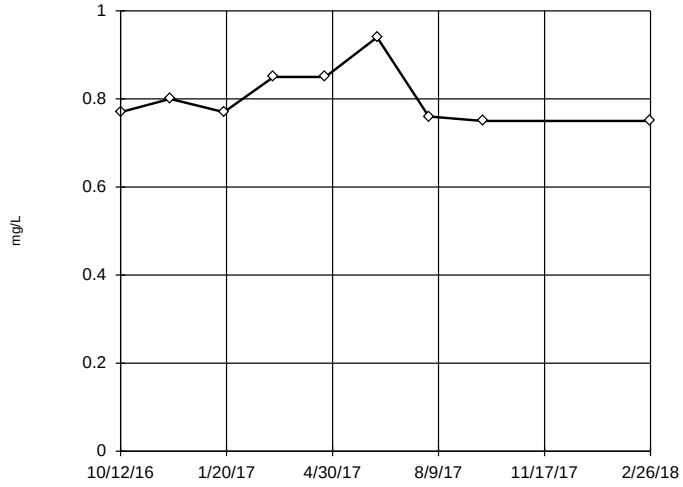
Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.213, low cutoff = 0.529, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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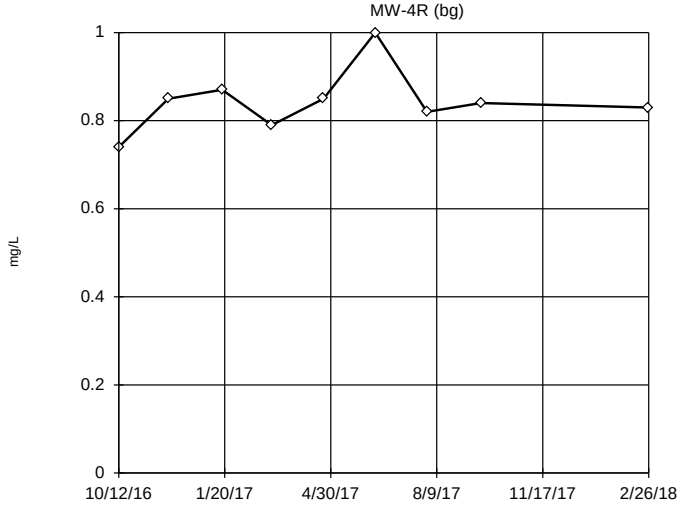
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.049, low cutoff = 0.6599, based on IQR multiplier of 3.

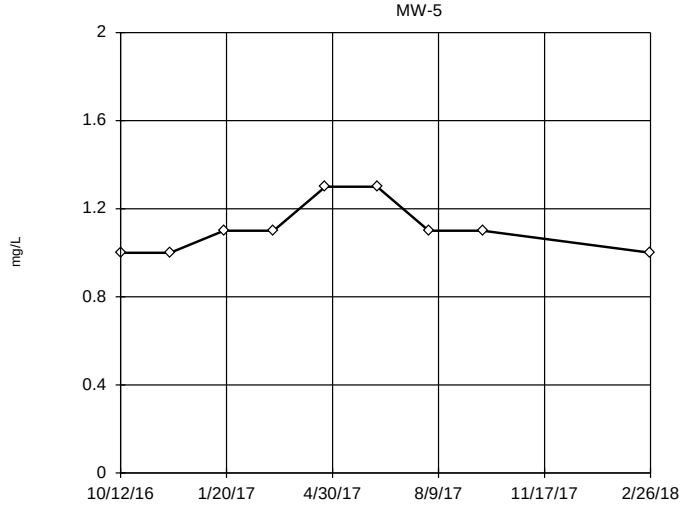
Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 2.045, low cutoff = 0.5848, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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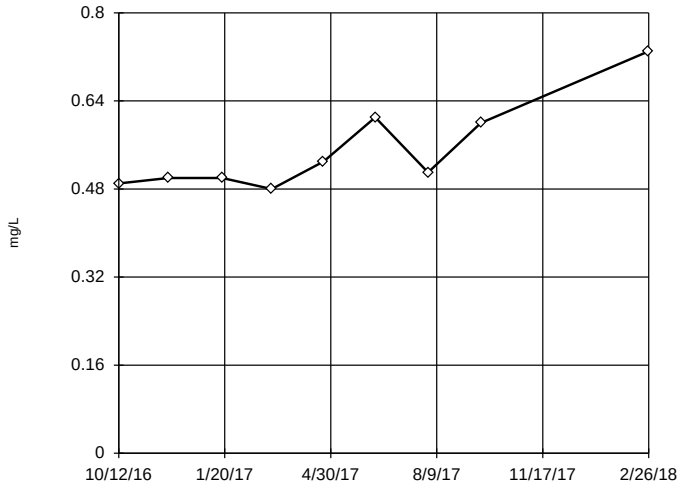
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.105, low cutoff = 0.2711, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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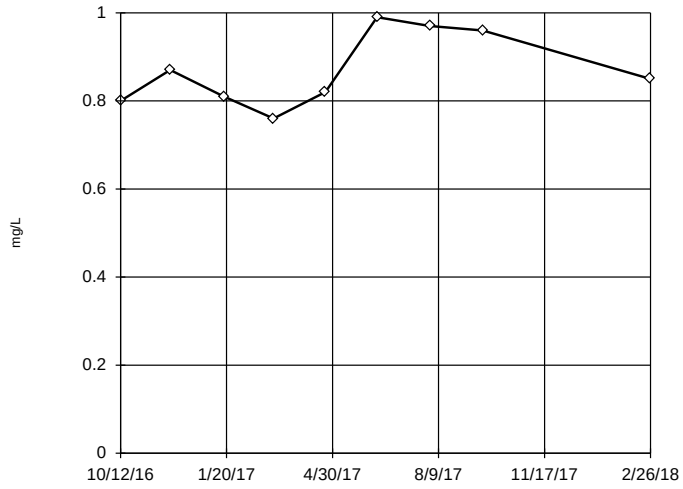
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.662, low cutoff = 0.4673, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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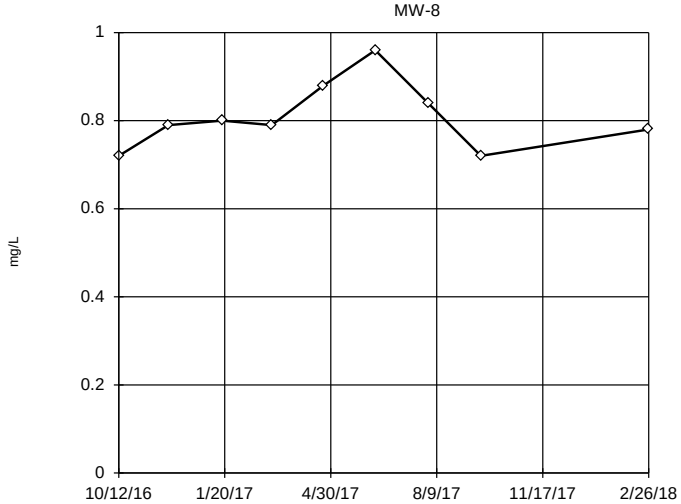
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.298, low cutoff = 0.4963, based on IQR multiplier of 3.

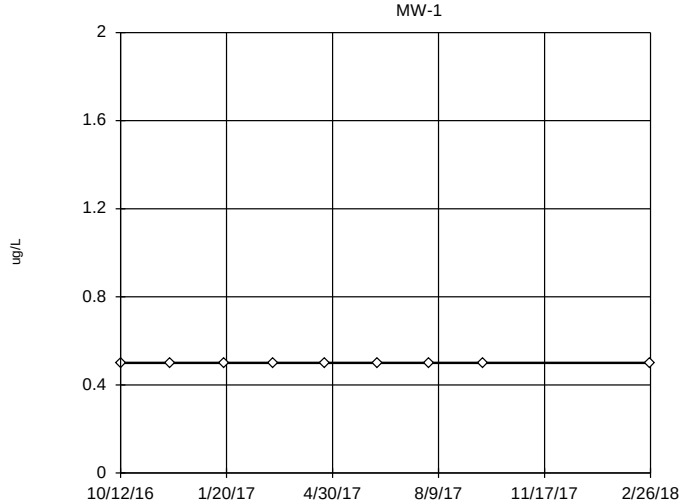
Constituent: Fluoride Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

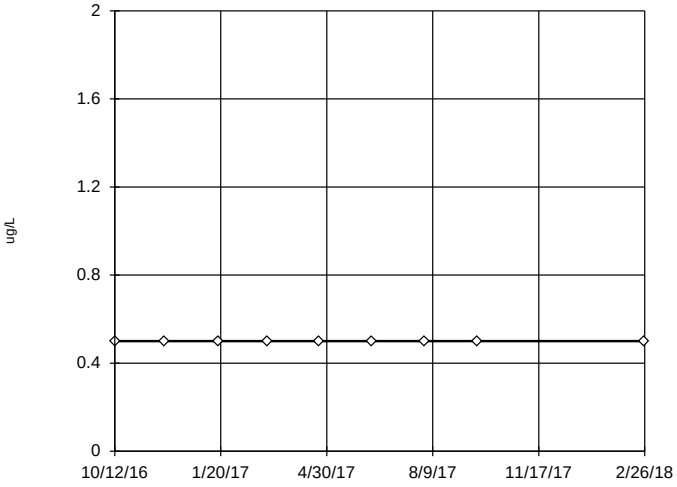
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

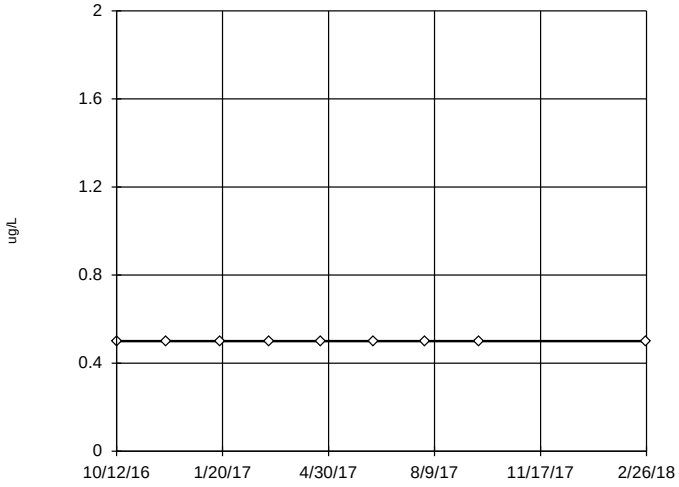
Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

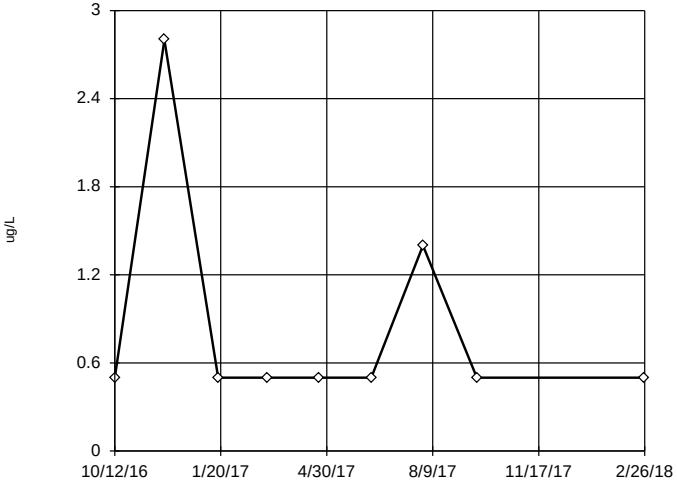
Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.92, low cutoff = 0.1067, based on IQR multiplier of 3.

Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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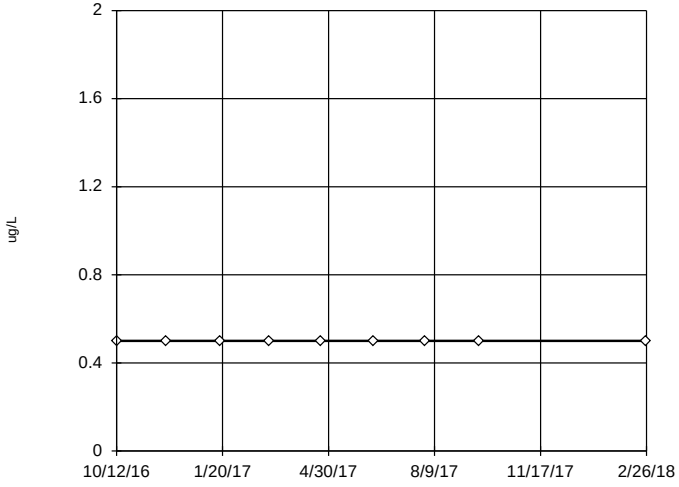
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

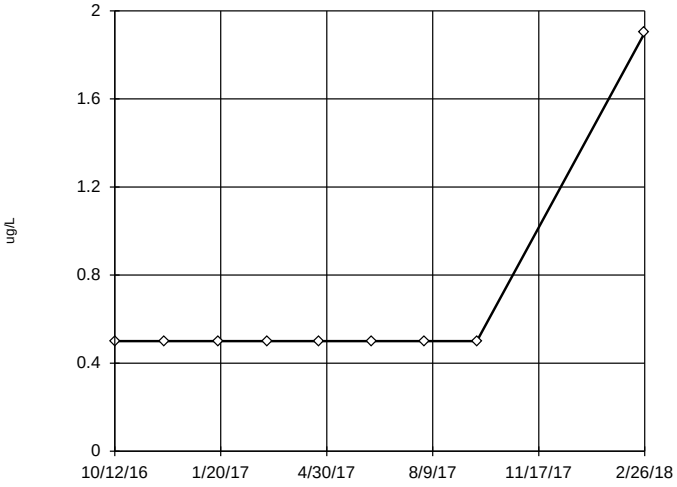
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

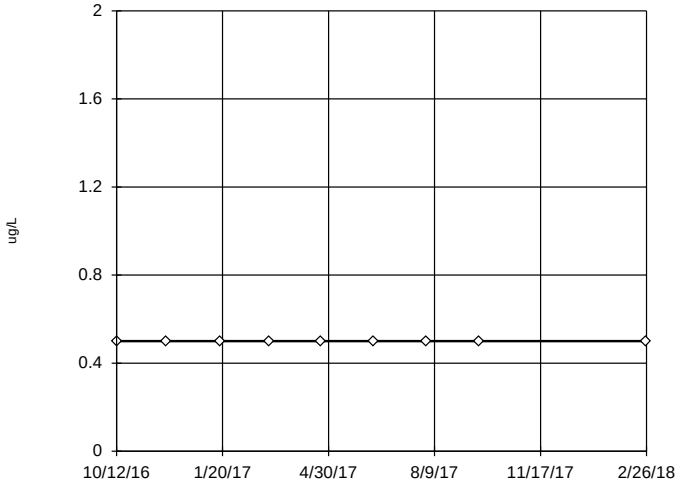
Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

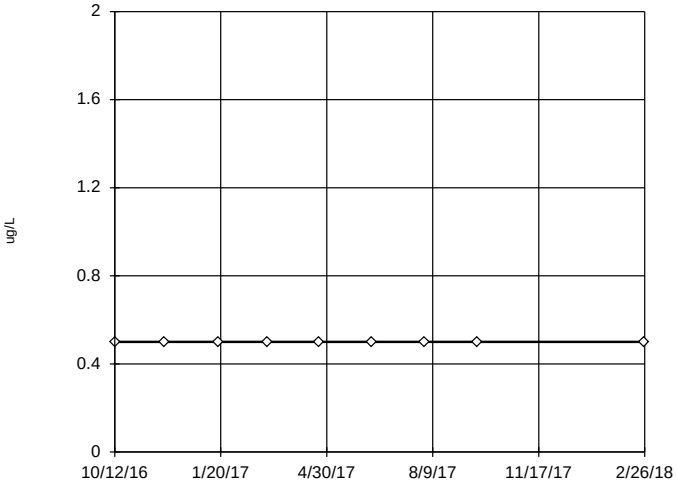
Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

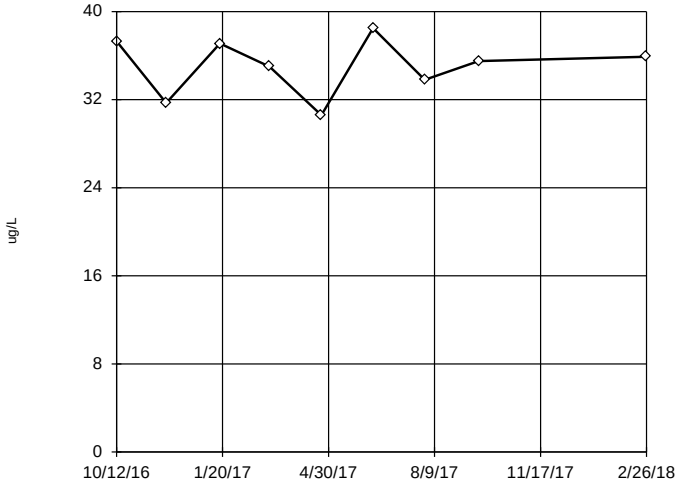
Constituent: Lead [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 43.57, low cutoff = -37.85, based on IQR multiplier of 3.

Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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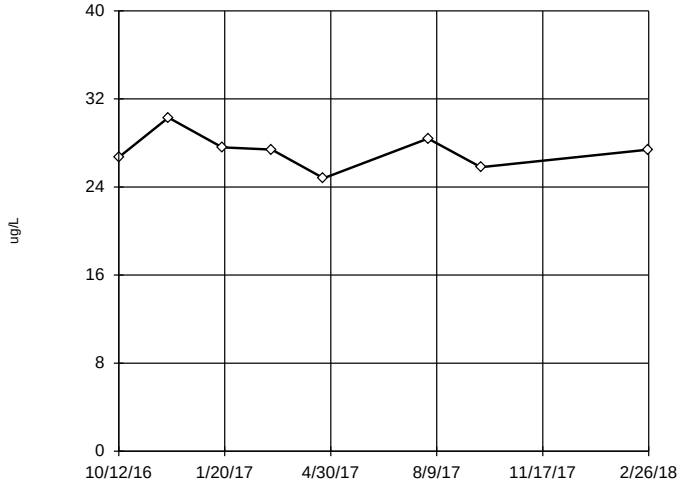
Tukey's Outlier Screening

MW-2



n = 8

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 33.98, low cutoff = 21.62, based on IQR multiplier of 3.

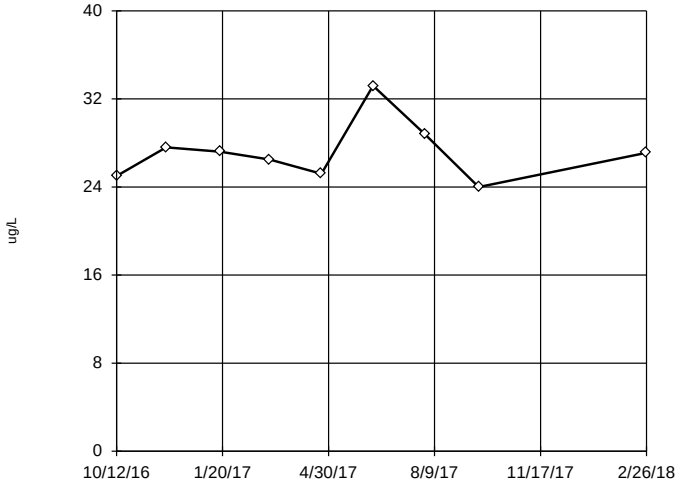
Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 39.96, low cutoff = 17.71, based on IQR multiplier of 3.

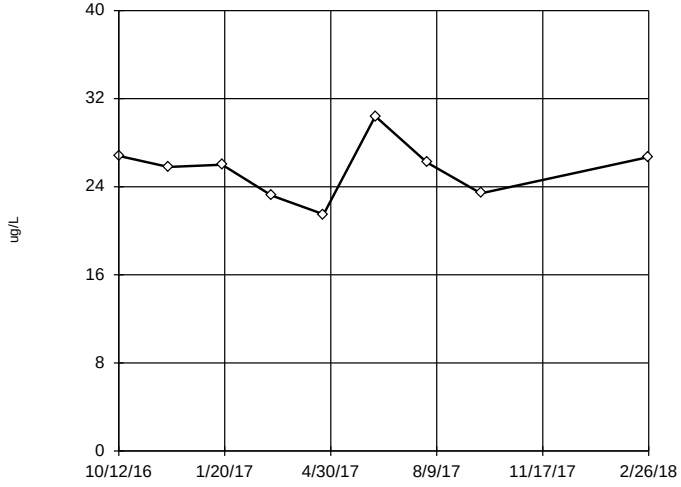
Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 40.48, low cutoff = 15.4, based on IQR multiplier of 3.

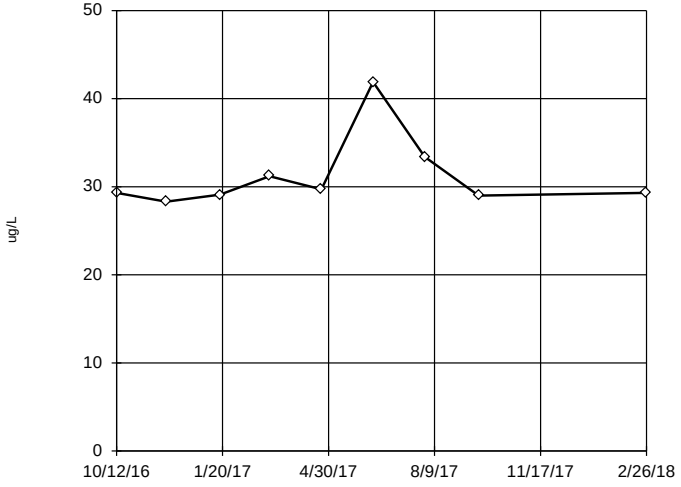
Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 44.3, low cutoff = 21.17, based on IQR multiplier of 3.

Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

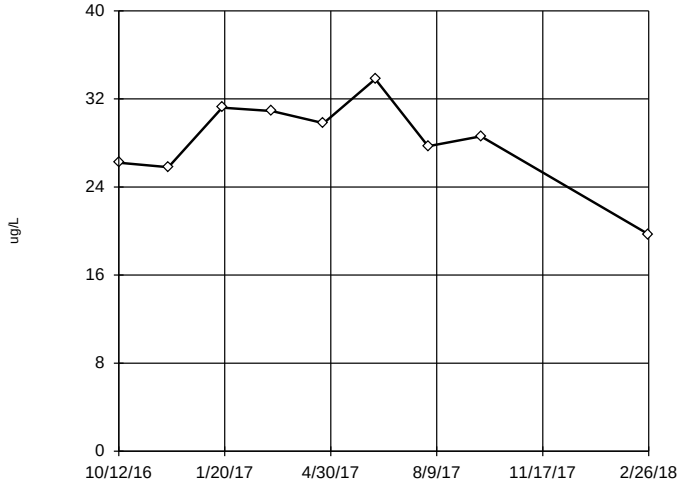
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 40.62, low cutoff = -26.91, based on IQR multiplier of 3.

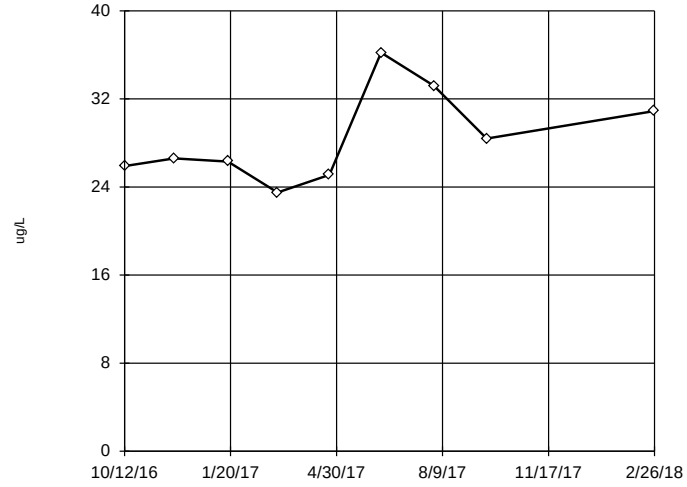
Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 63.49, low cutoff = 12.86, based on IQR multiplier of 3.

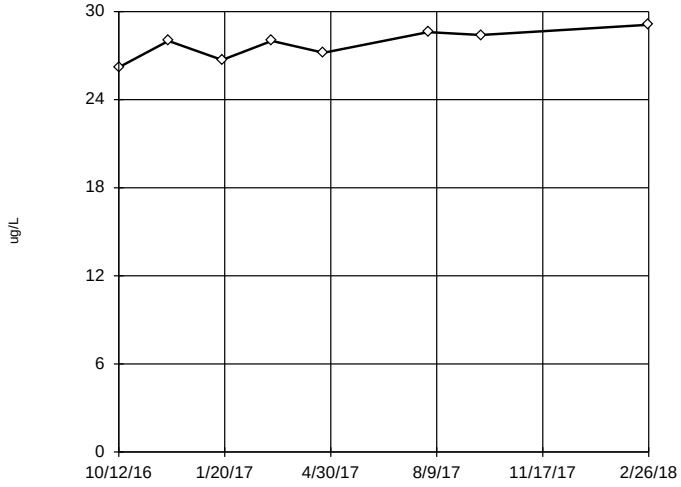
Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 8

No outliers found. Tukey's method selected by user.

Data were *x*^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 31.59, low cutoff = -20.46, based on IQR multiplier of 3.

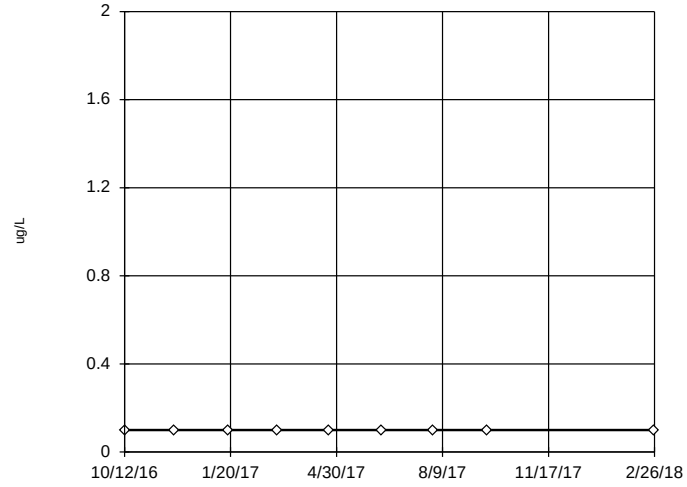
Constituent: Lithium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

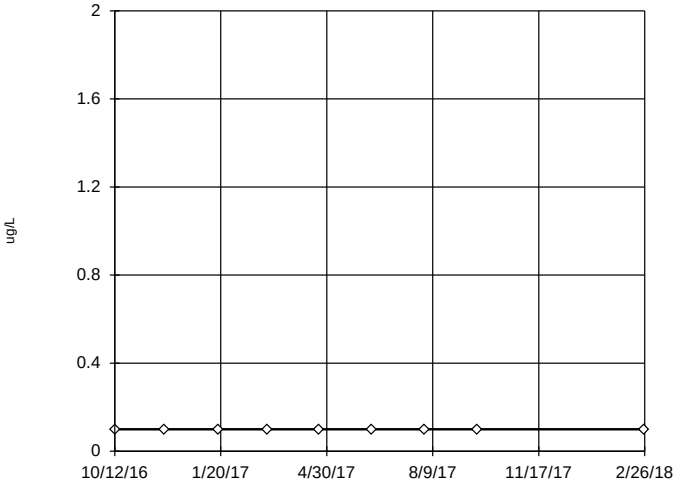
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

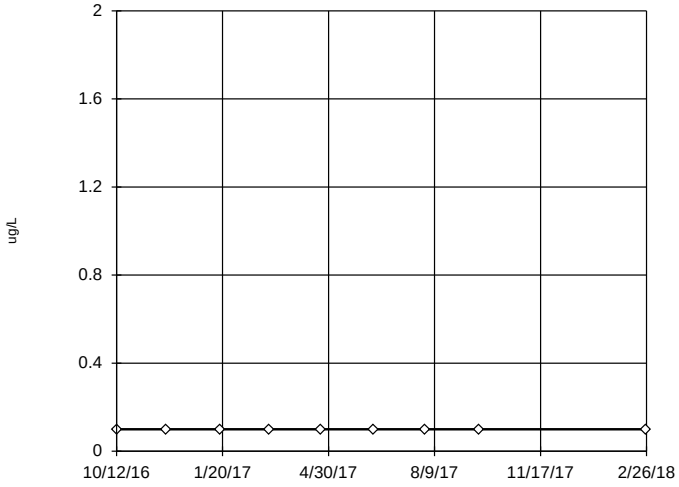
Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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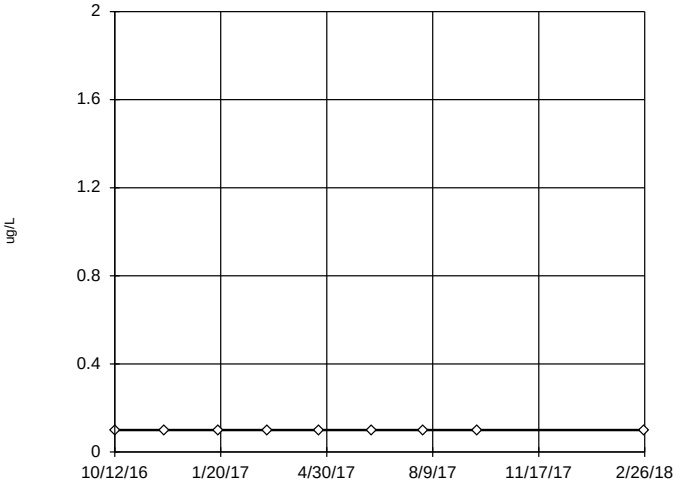
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

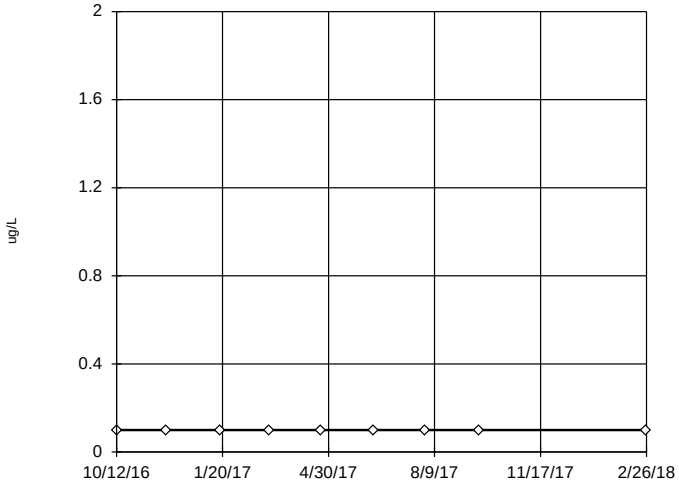
Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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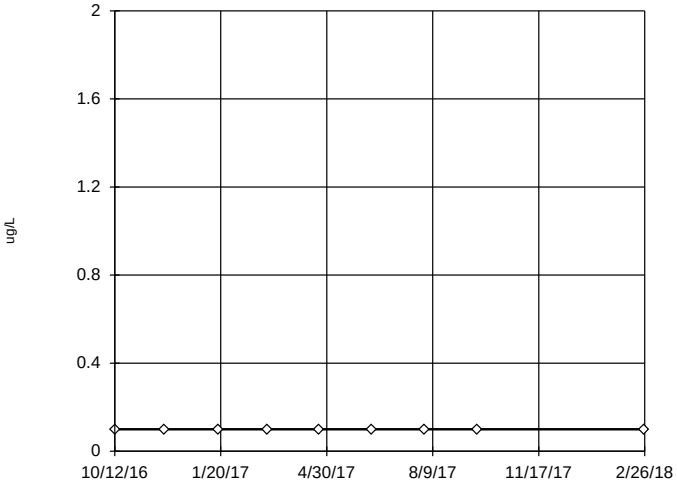
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

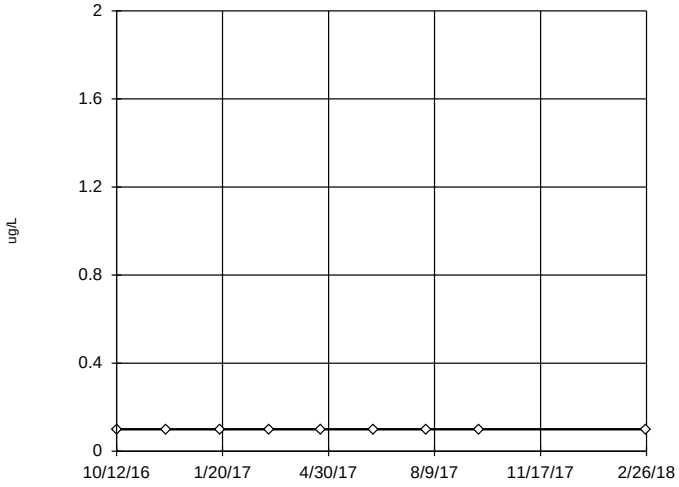
Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

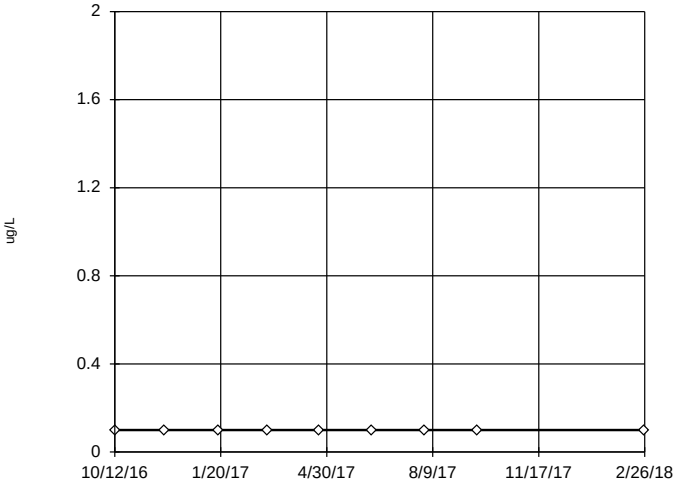
Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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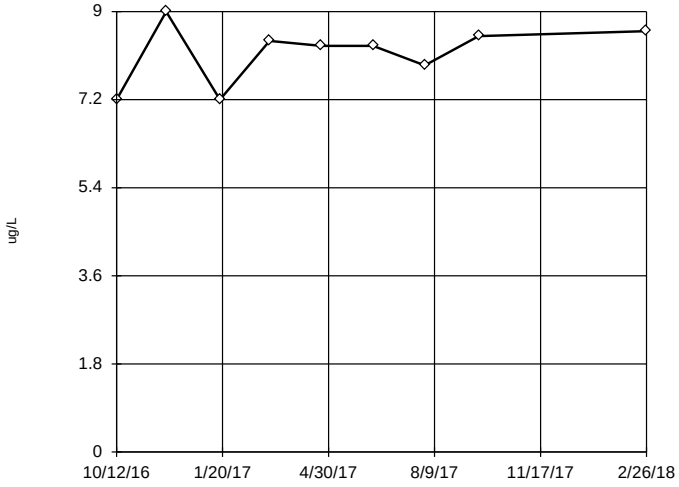
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.983, low cutoff = -8.611, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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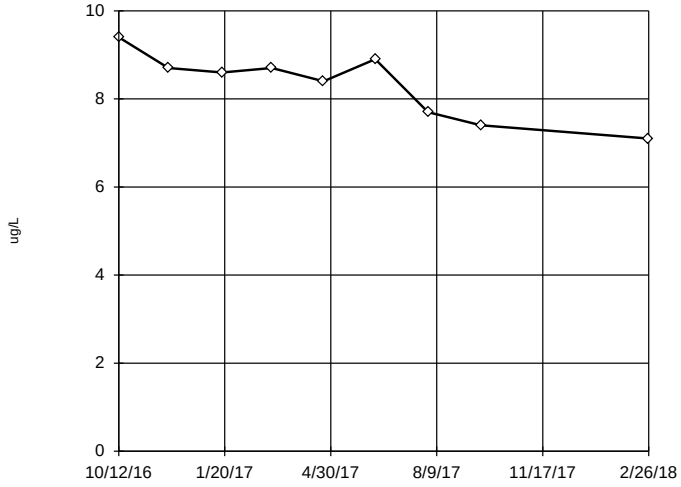
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 10.66, low cutoff = -9.029, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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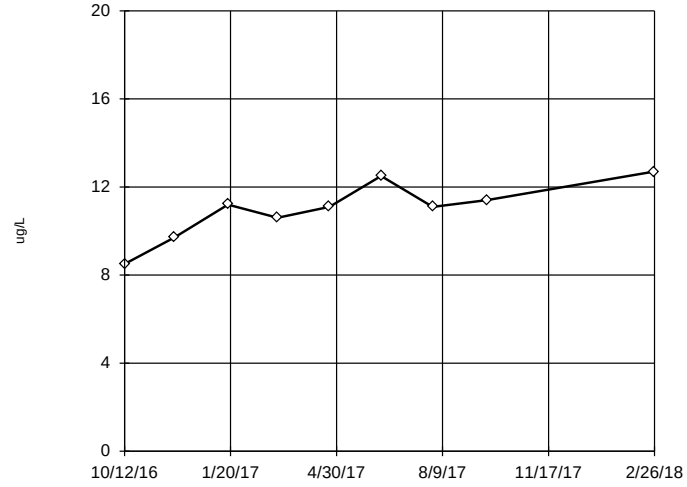
Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 15.49, low cutoff = -9.812, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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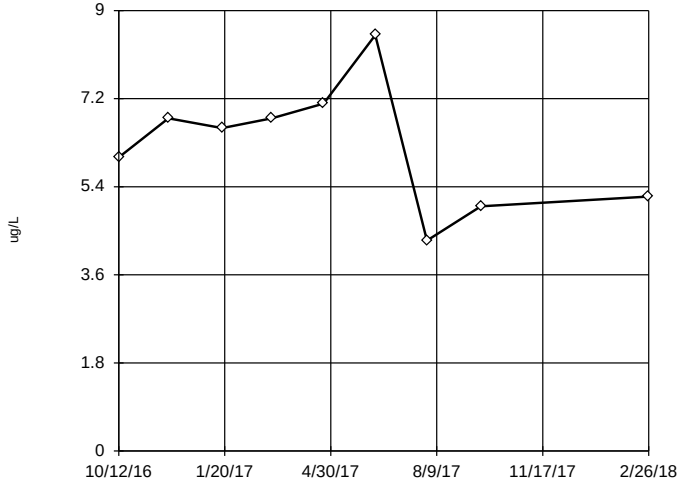
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 14.21, low cutoff = 1.264, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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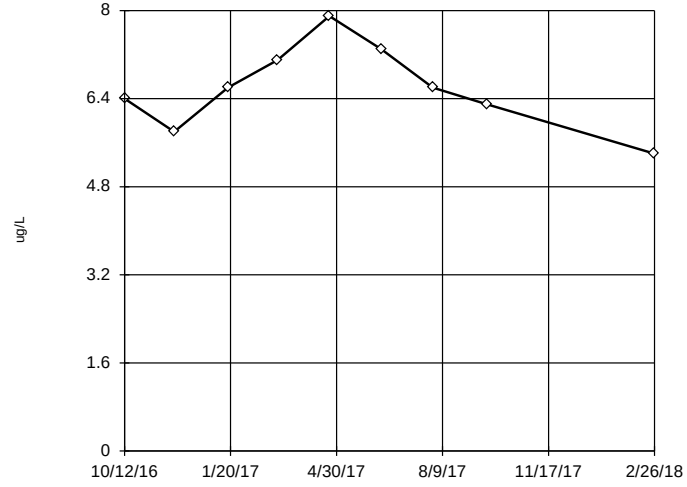
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 11.26, low cutoff = 3.193, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

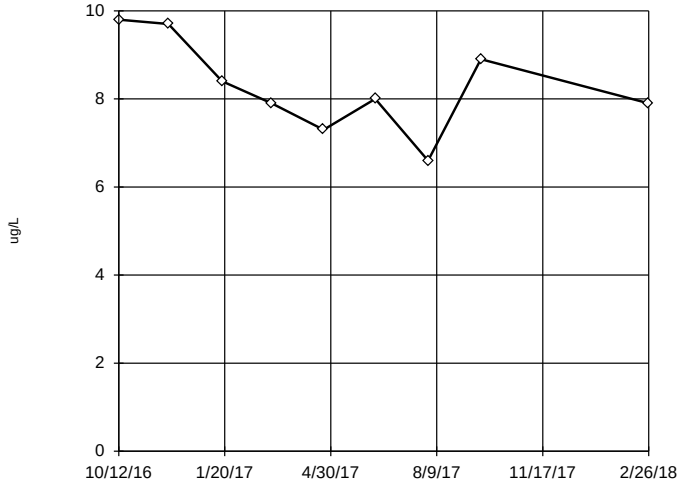
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 17.02, low cutoff = 4.146, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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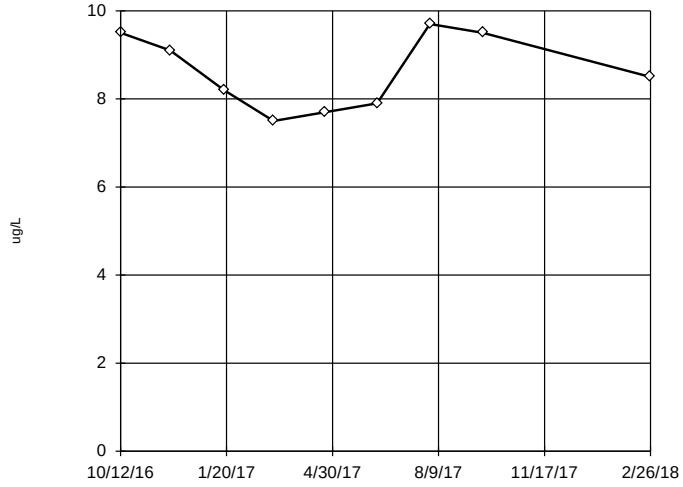
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 17.17, low cutoff = 4.316, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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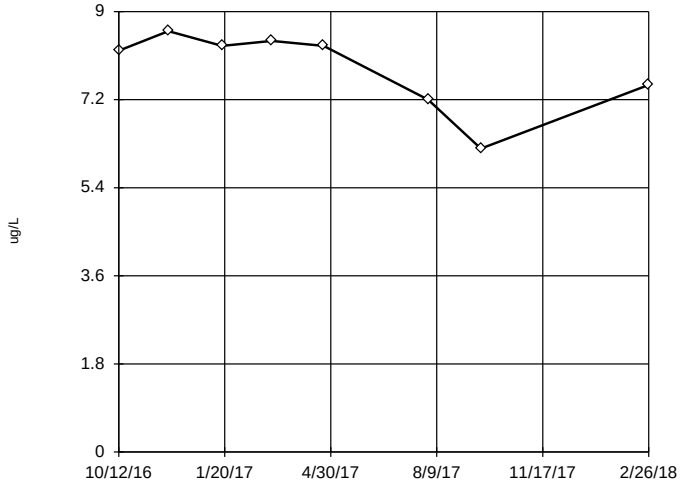
Tukey's Outlier Screening

MW-8



n = 8

No outliers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.79, low cutoff = -8.521, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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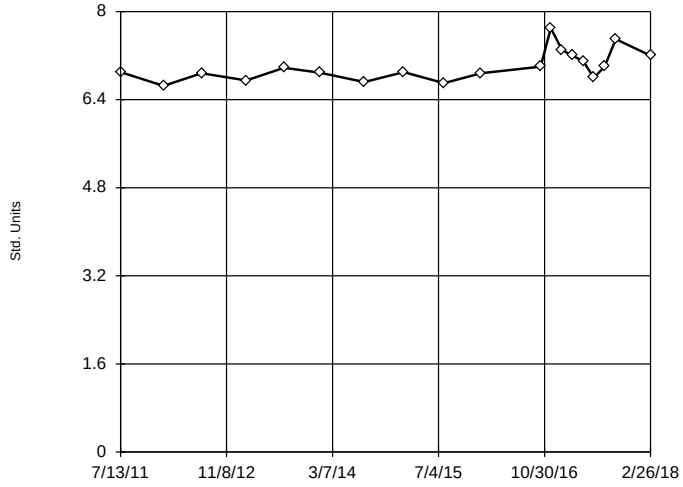
Tukey's Outlier Screening

MW-1



n = 19

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.547, low cutoff = 5.728, based on IQR multiplier of 3.

Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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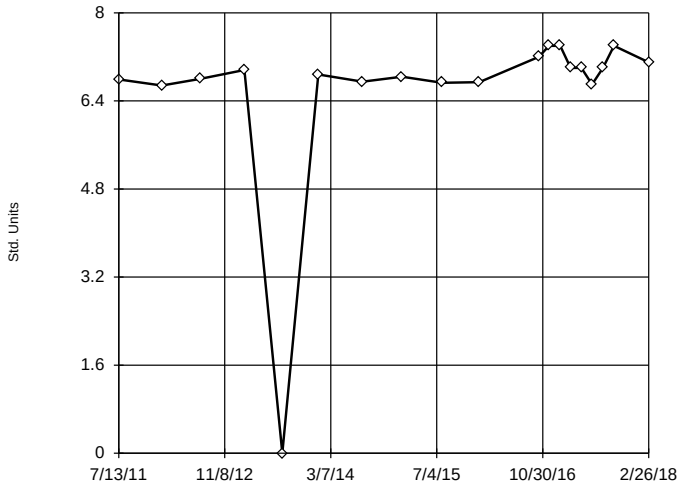
Tukey's Outlier Screening

MW-2



n = 19

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.834, low cutoff = -4.587, based on IQR multiplier of 3.

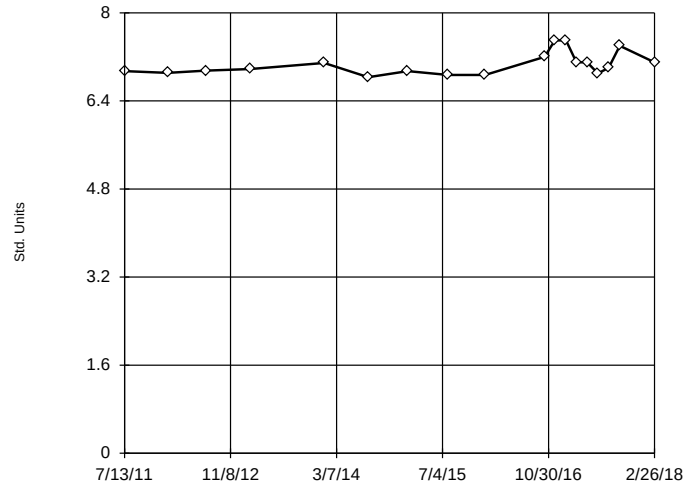
Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 18

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.938, low cutoff = 6.22, based on IQR multiplier of 3.

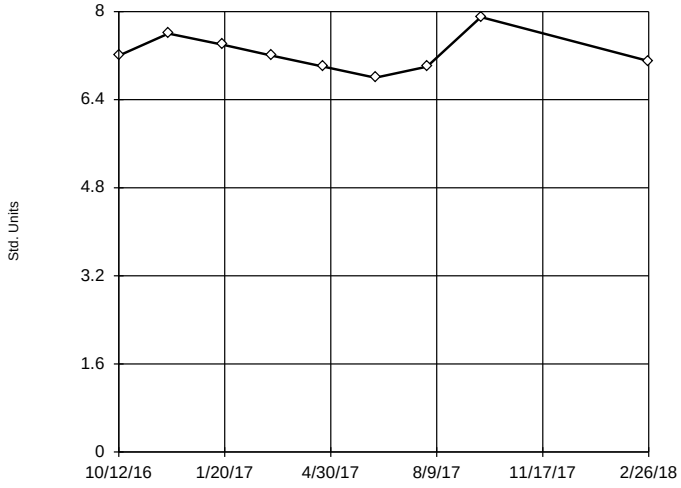
Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.221, low cutoff = 5.693, based on IQR multiplier of 3.

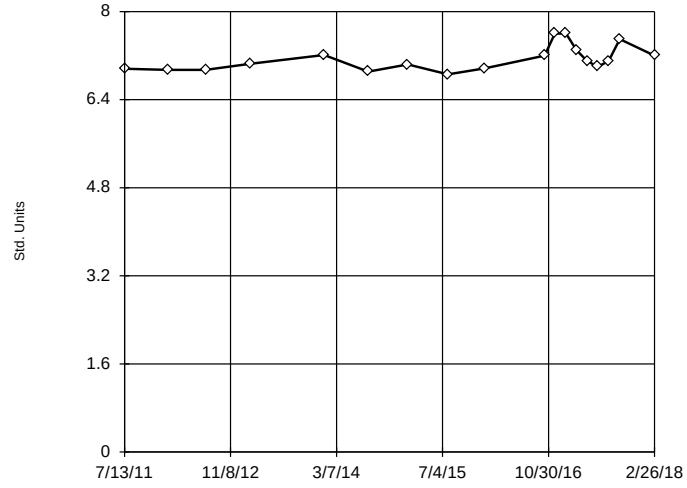
Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 18

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.252, low cutoff = 6.11, based on IQR multiplier of 3.

Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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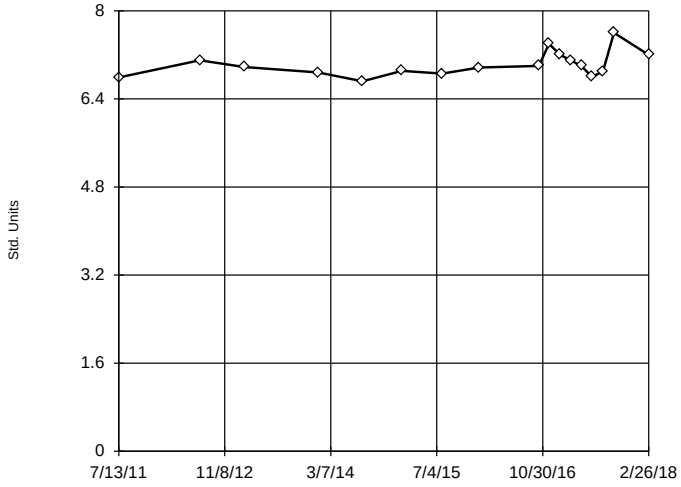
Tukey's Outlier Screening

MW-6



n = 17

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.06, low cutoff = 6.095, based on IQR multiplier of 3.

Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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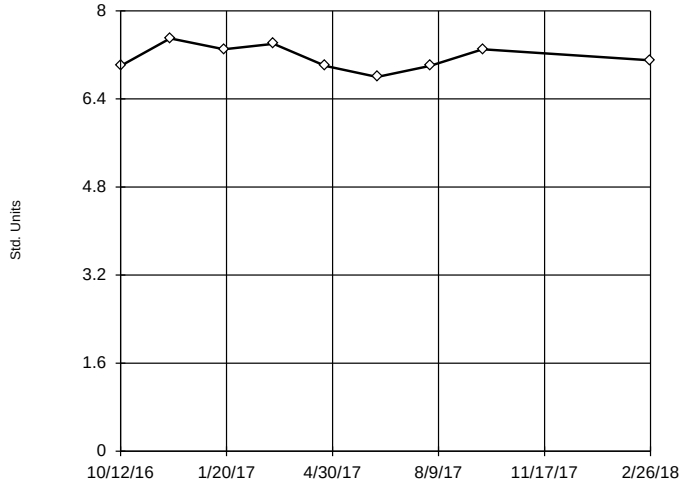
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.508, low cutoff = 6.047, based on IQR multiplier of 3.

Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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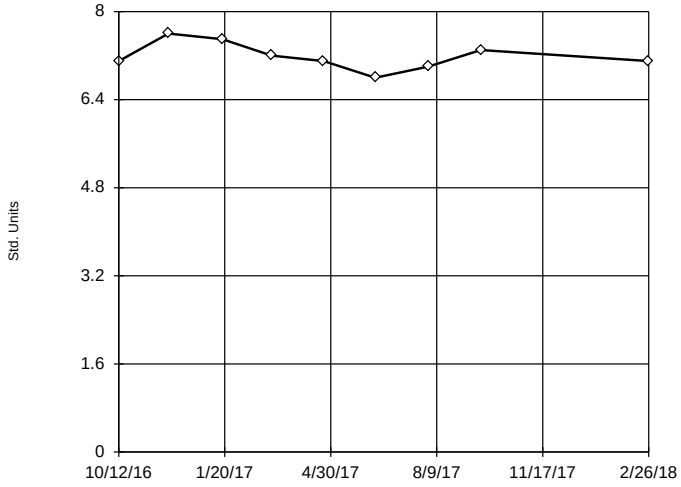
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.555, low cutoff = 6.097, based on IQR multiplier of 3.

Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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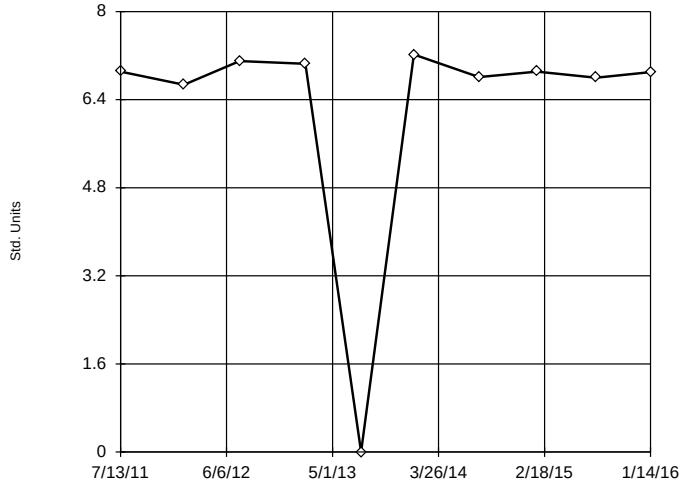
Tukey's Outlier Screening

MW-4 (bg)



n = 10

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.778, low cutoff = -3.679, based on IQR multiplier of 3.

Constituent: pH Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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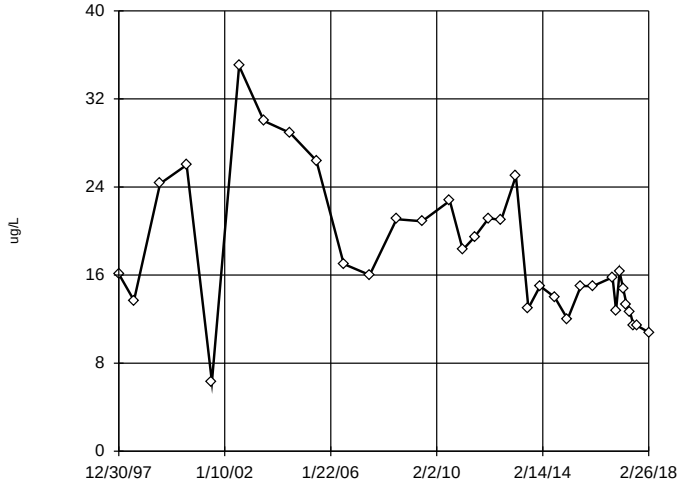
Tukey's Outlier Screening

MW-1



n = 34

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 69.83, low cutoff = 1.132, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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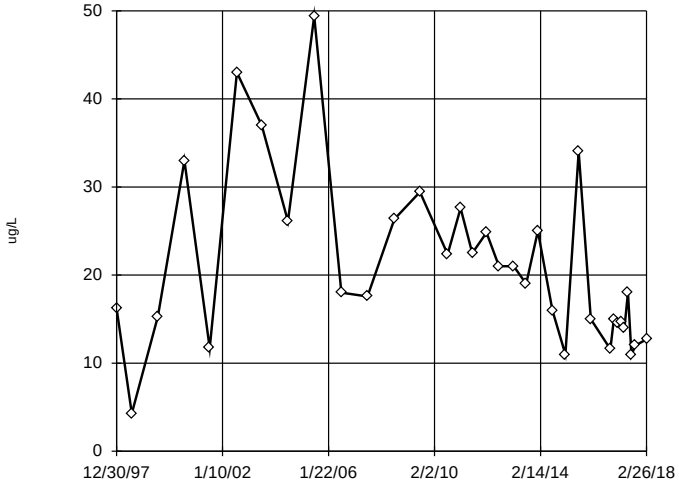
Tukey's Outlier Screening

MW-2



n = 34

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 97.46, low cutoff = 0.5044, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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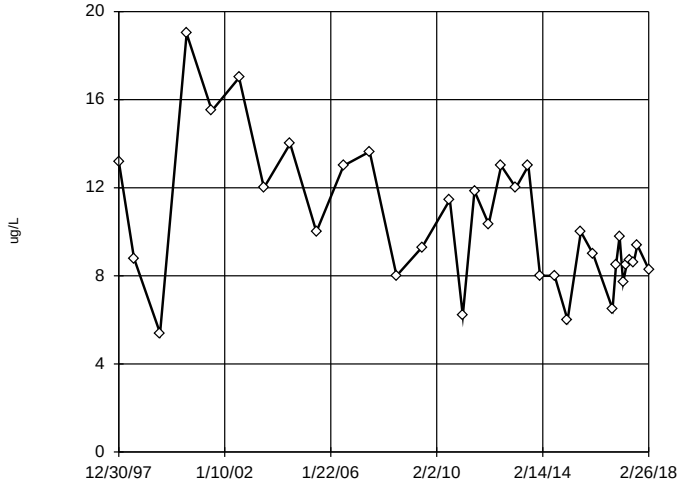
Tukey's Outlier Screening

MW-3



n = 34

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 52.79, low cutoff = 2.007, based on IQR multiplier of 3.

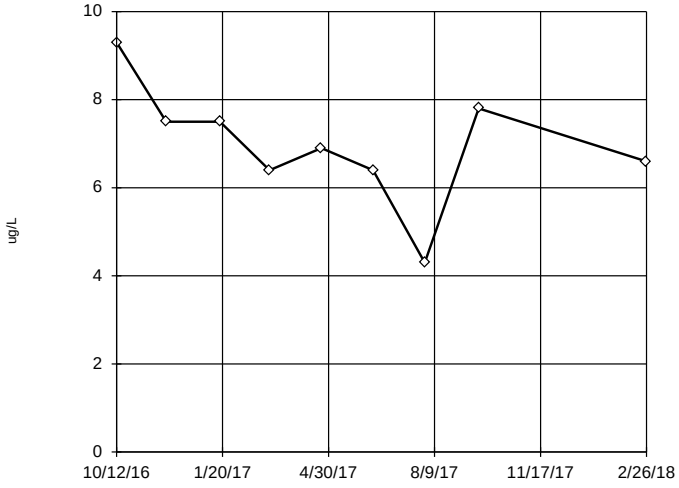
Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 10.55, low cutoff = -3.434, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

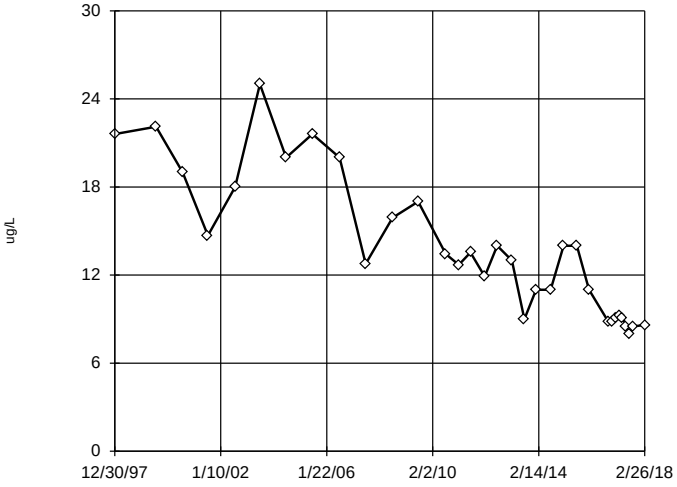
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 33

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 124.4, low cutoff = 1.28, based on IQR multiplier of 3.

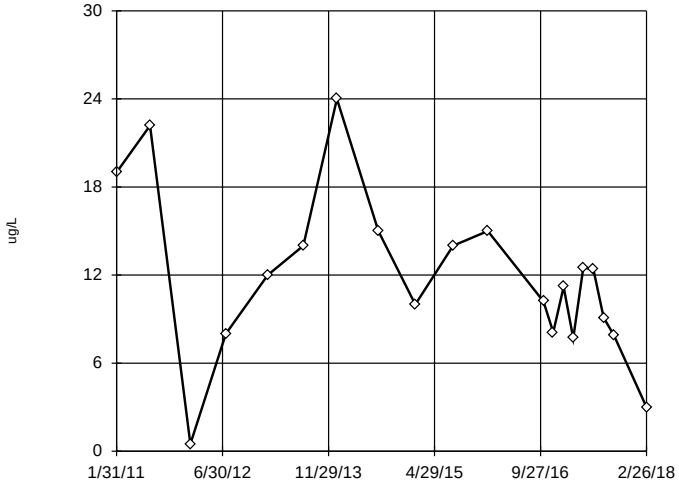
Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 20

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 33.85, low cutoff = -11.3, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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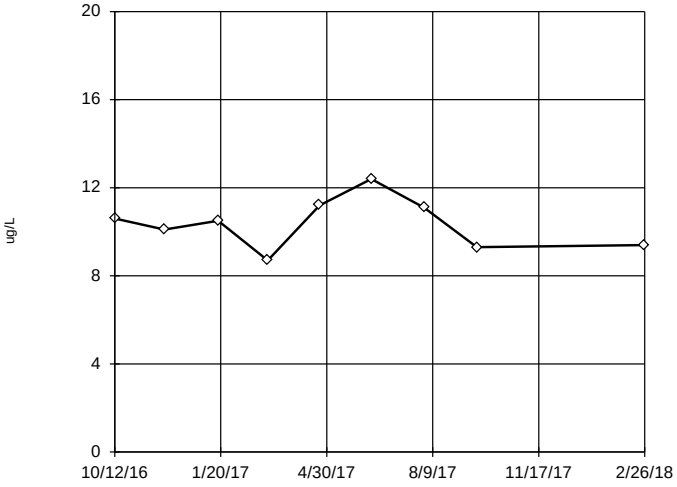
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 18.91, low cutoff = 5.513, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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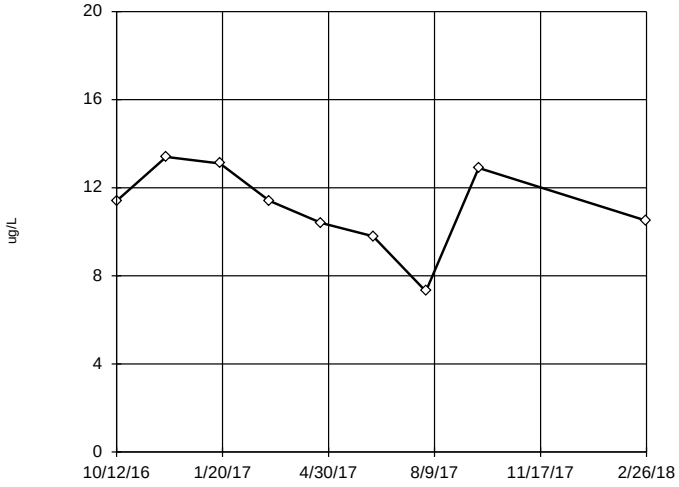
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 17.85, low cutoff = -13.5, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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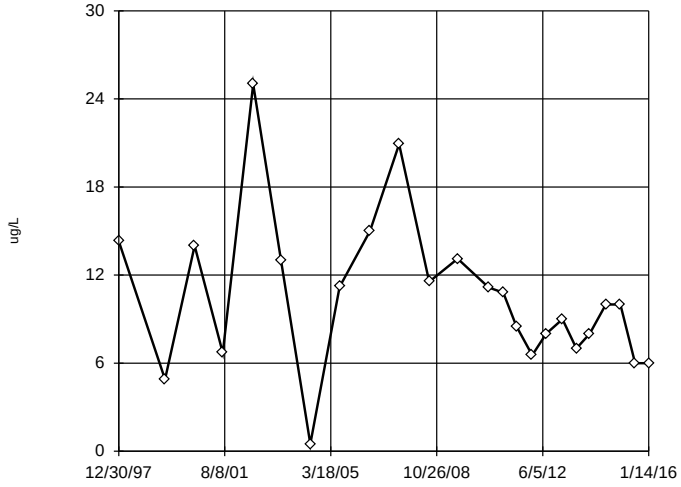
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method select-ed by user.

Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 43.58, low cutoff = -0.1377, based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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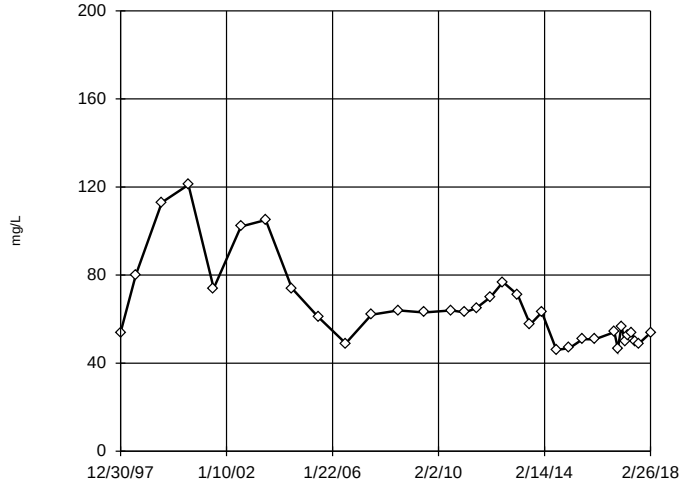
Tukey's Outlier Screening

MW-1



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 209.9, low cutoff = 17.56, based on IQR multiplier of 3.

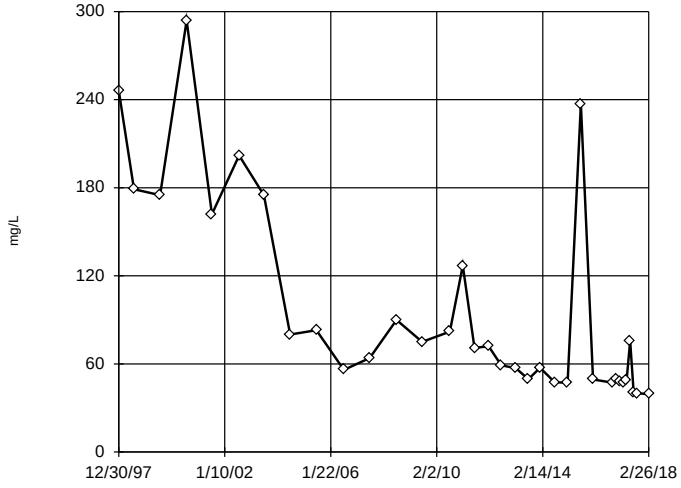
Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3654, low cutoff = 1.914, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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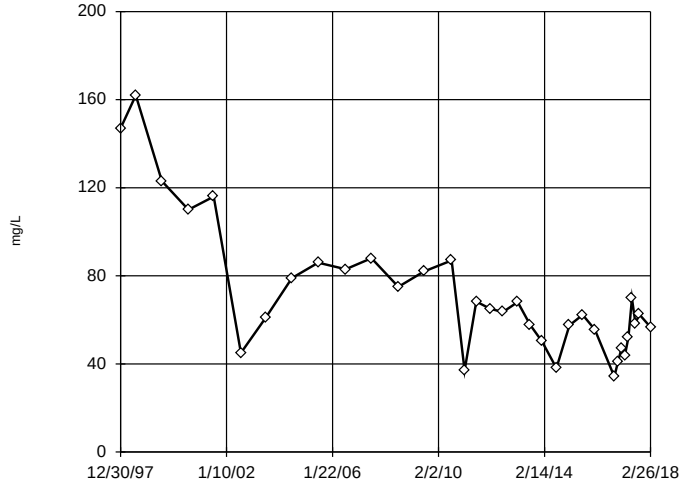
Tukey's Outlier Screening

MW-3



n = 34

No outliers found. Tukey's method select-ed by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 379.8, low cutoff = 11.39, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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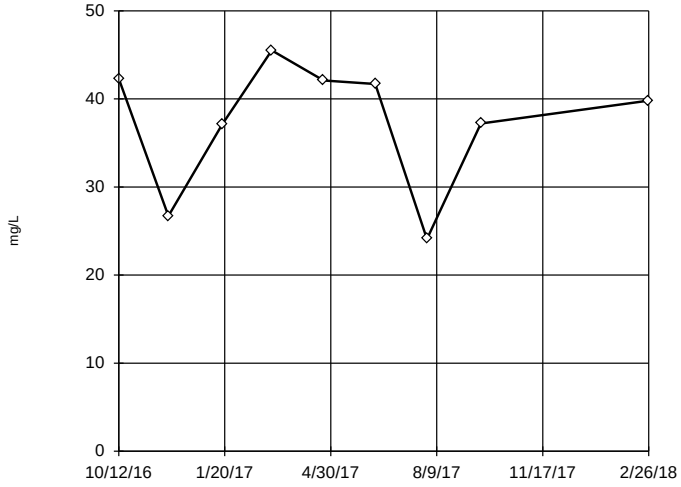
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 52.78, low cutoff = -47.18, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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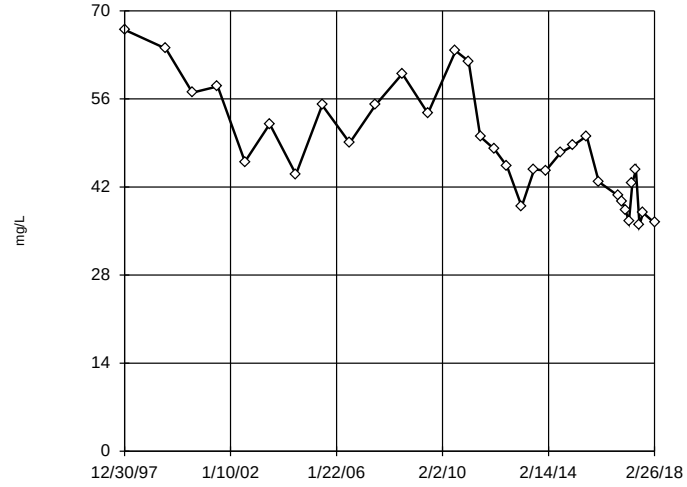
Tukey's Outlier Screening

MW-5



n = 33

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 126.8, low cutoff = 18.06, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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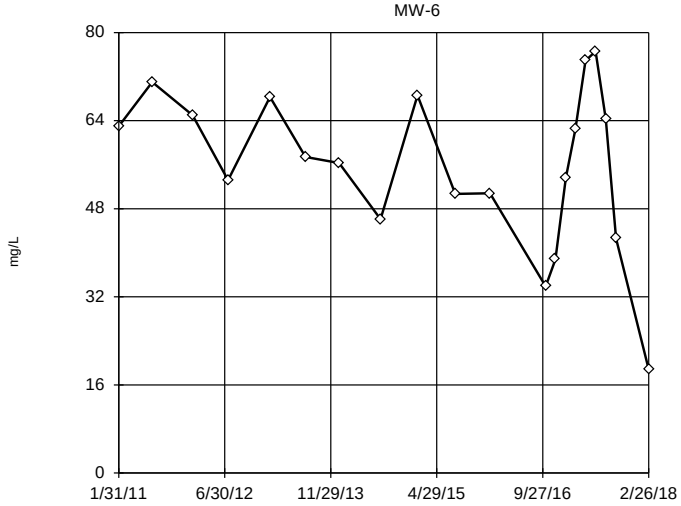
Tukey's Outlier Screening

MW-6



n = 20

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 103.6, low cutoff = -62.8, based on IQR multiplier of 3.

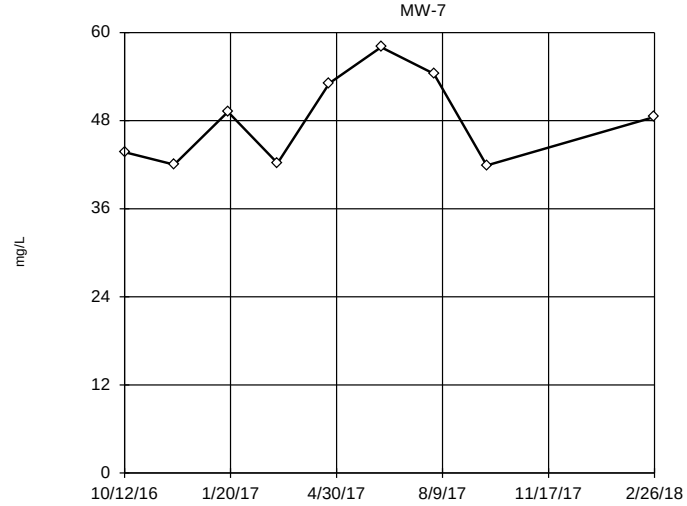
Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 88.7, low cutoff = 7.15, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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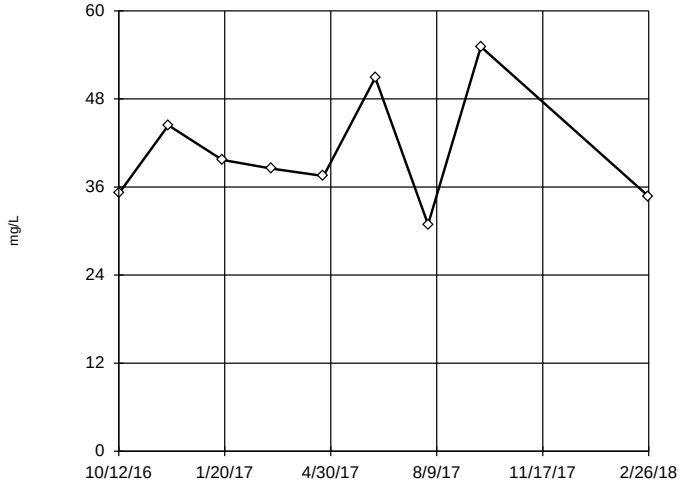
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 120.2, low cutoff = 13.81, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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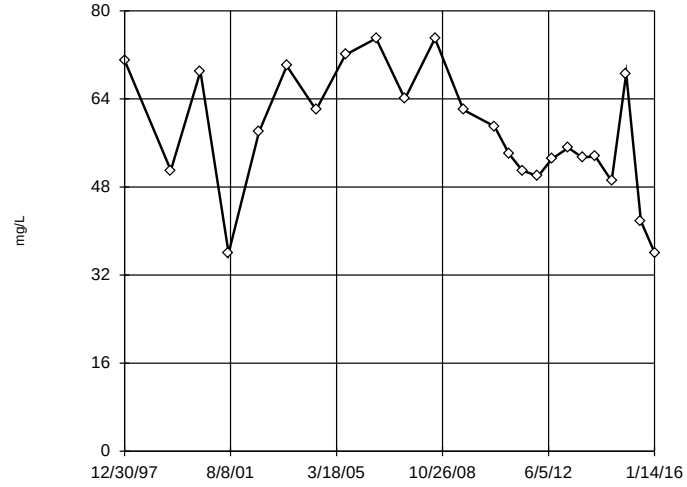
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 122.2, low cutoff = -2.4, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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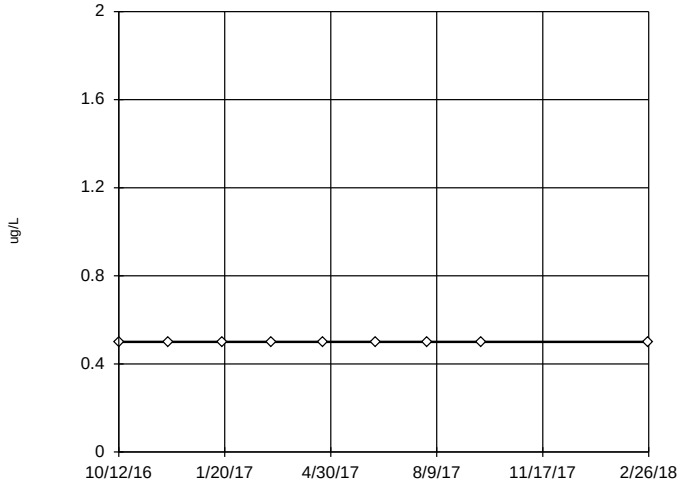
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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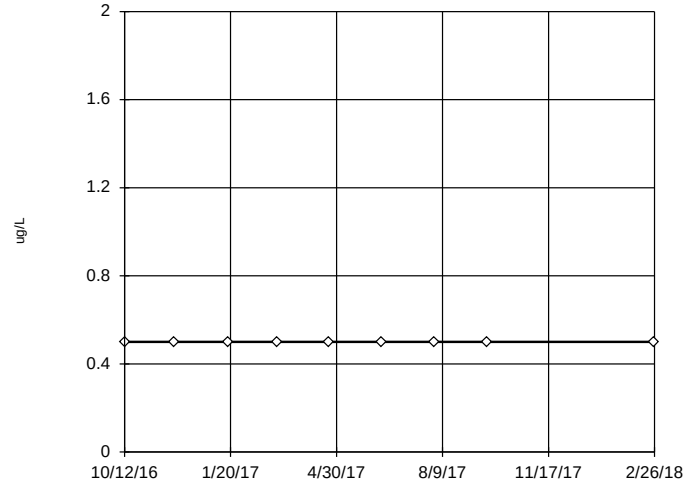
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

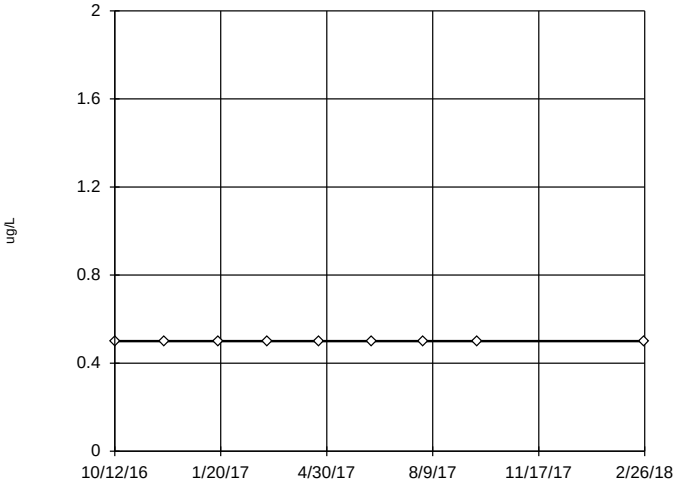
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

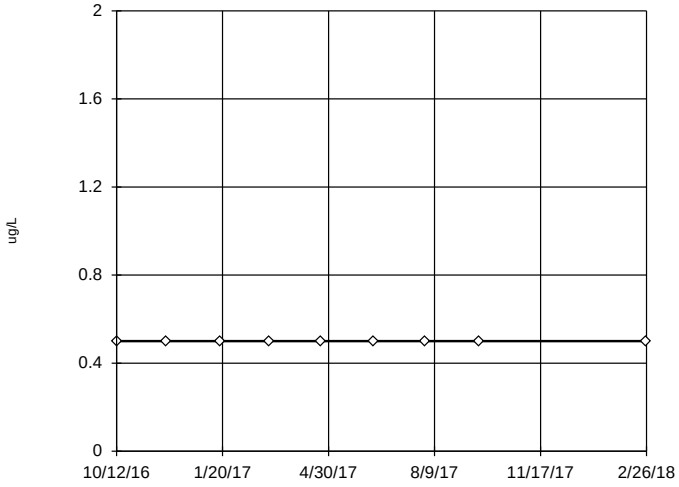
Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

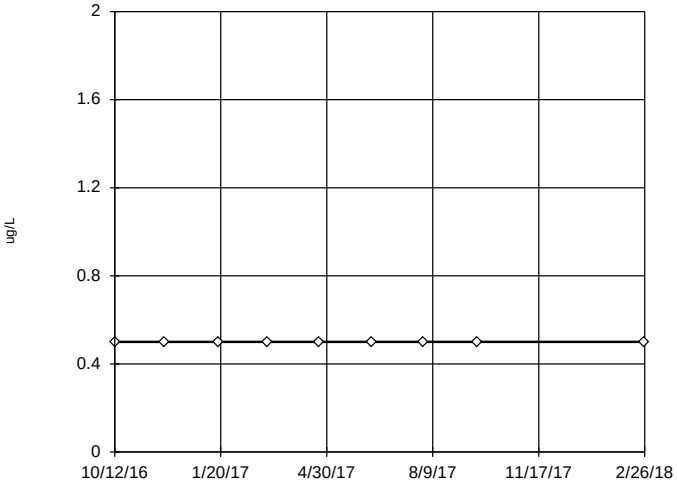
Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

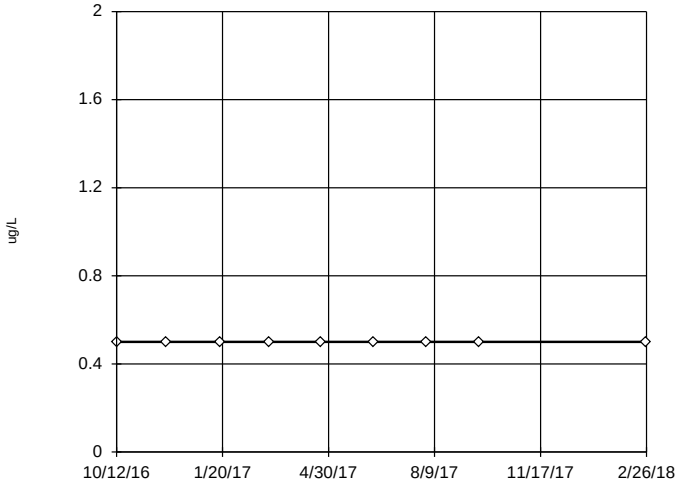
Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

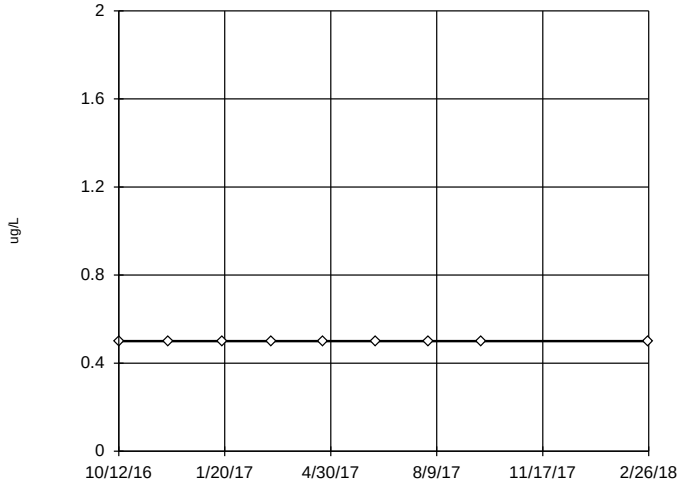
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

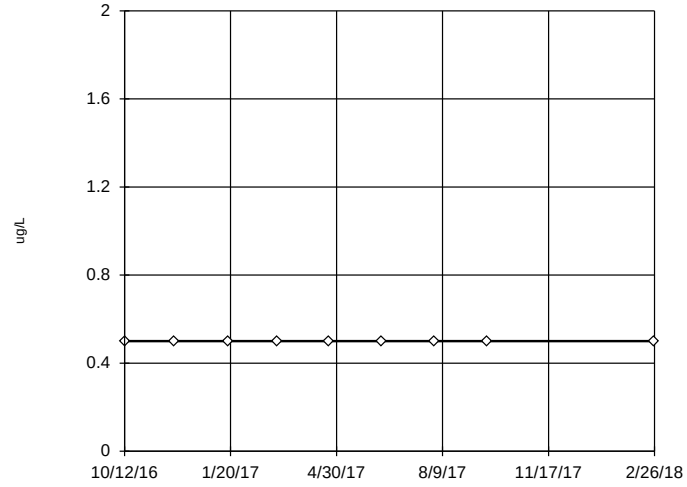
Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalid-ated, because the lower and upper quartiles are equal.

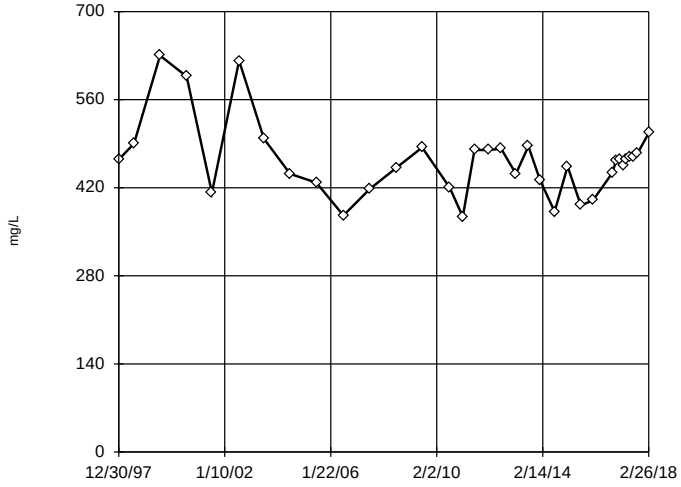
Constituent: Thallium [total] Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-1



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 714.1, low cutoff = 286.8, based on IQR multiplier of 3.

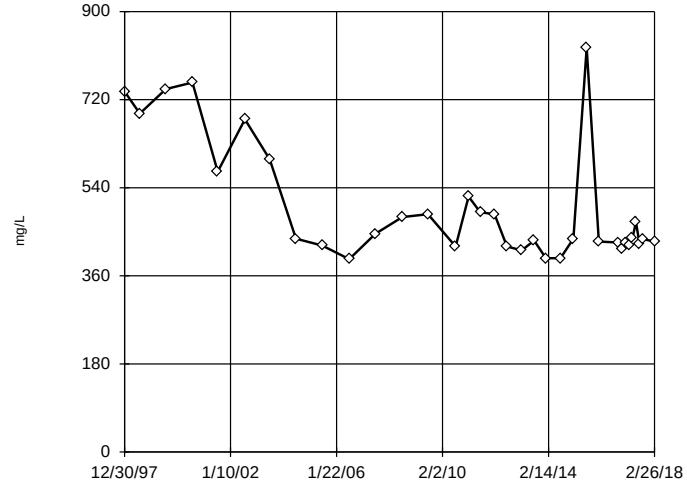
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-2



n = 34

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1186, low cutoff = 194.8, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

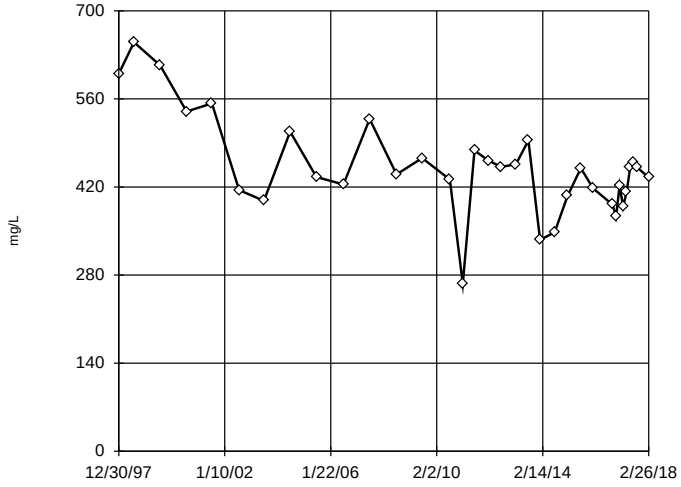
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 34

No outliers found. Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 773.5, low cutoff = 227.6, based on IQR multiplier of 3.

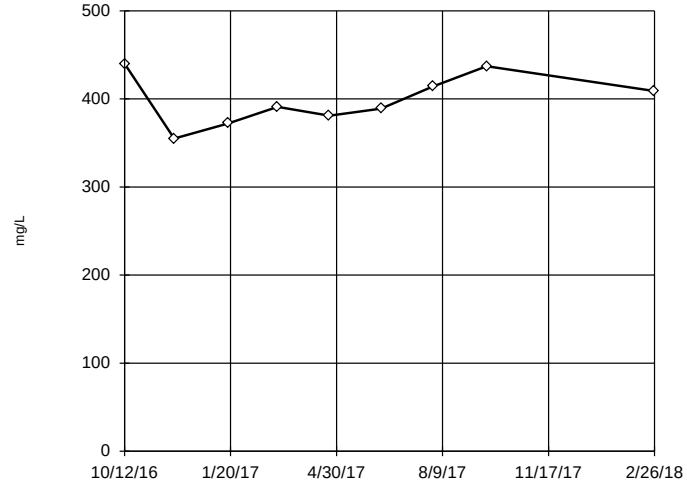
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 613.4, low cutoff = 261, based on IQR multiplier of 3.

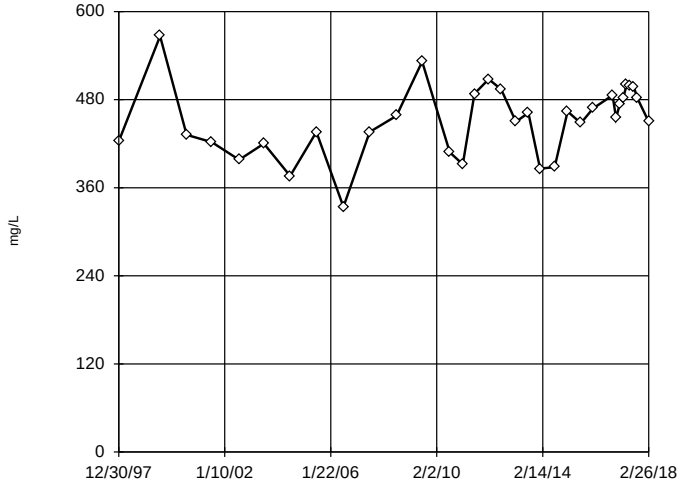
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-5



n = 33

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 685, low cutoff = 223, based on IQR multiplier of 3.

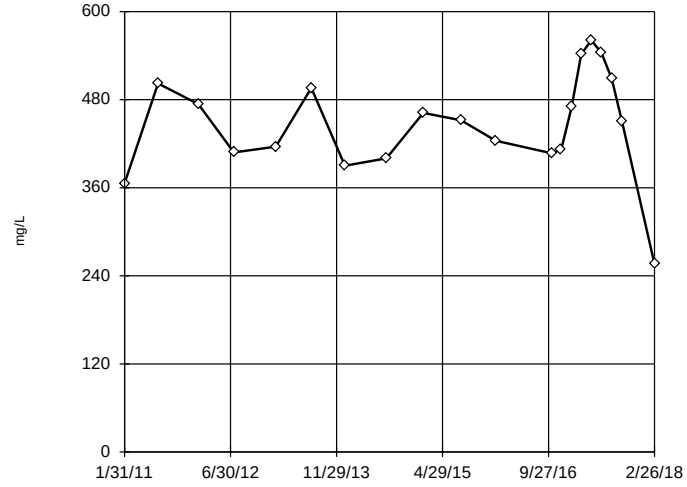
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-6



n = 20

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 705.6, low cutoff = -287.8, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

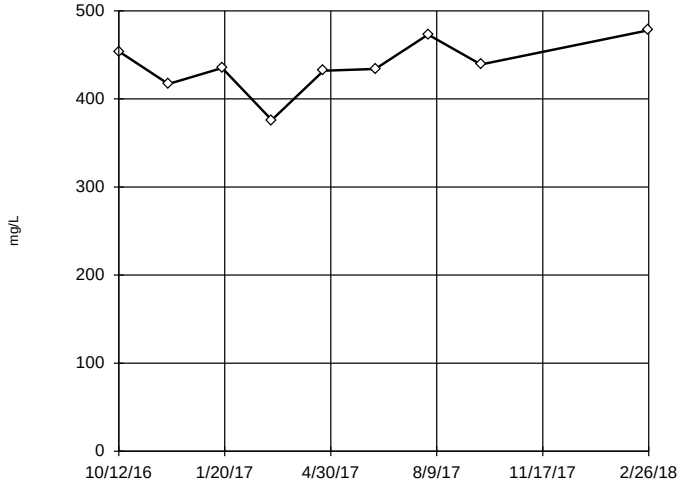
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-7



n = 9

No outlers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 543.8, low cutoff = -305.2, based on IQR multiplier of 3.

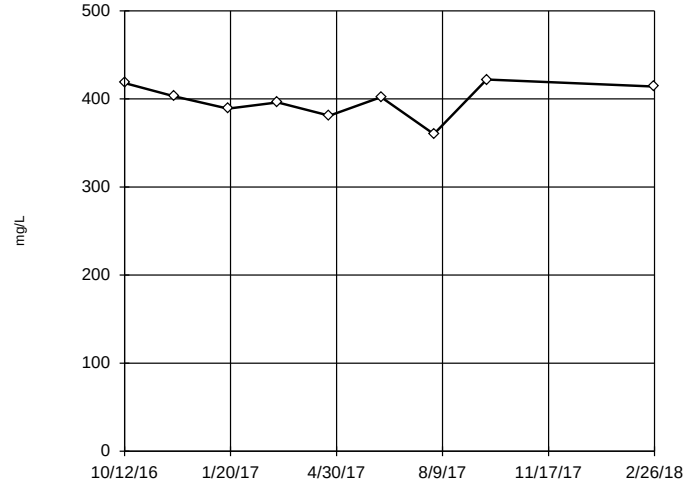
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-8



n = 9

No outlers found. Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 471.3, low cutoff = -368.6, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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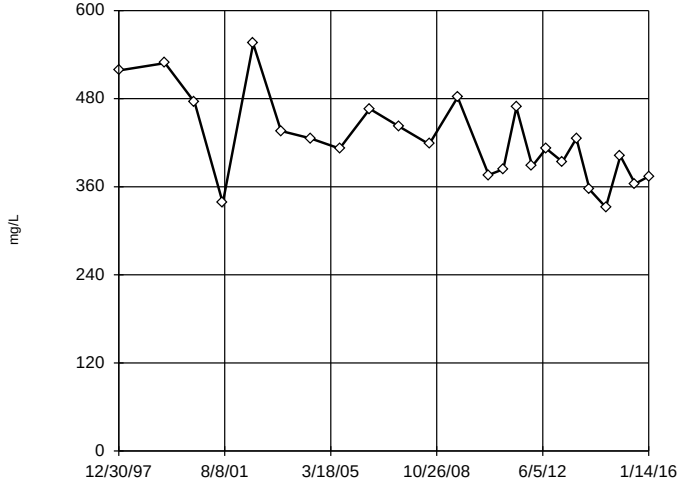
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 866.9, low cutoff = 204.7, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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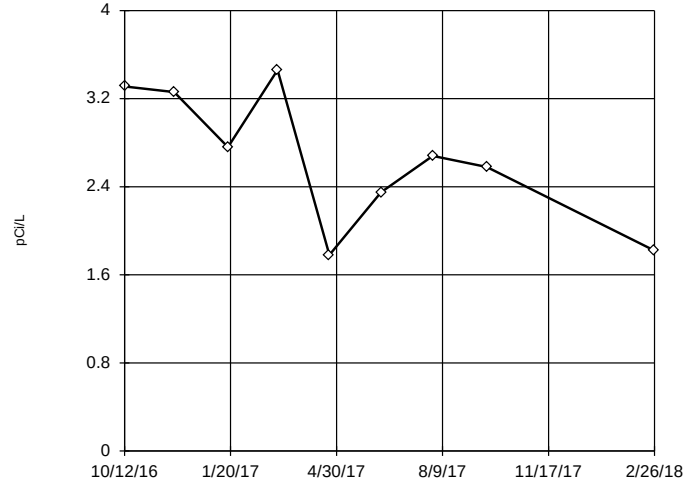
Tukey's Outlier Screening

MW-1



n = 9

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 5.469, low cutoff = -3.835, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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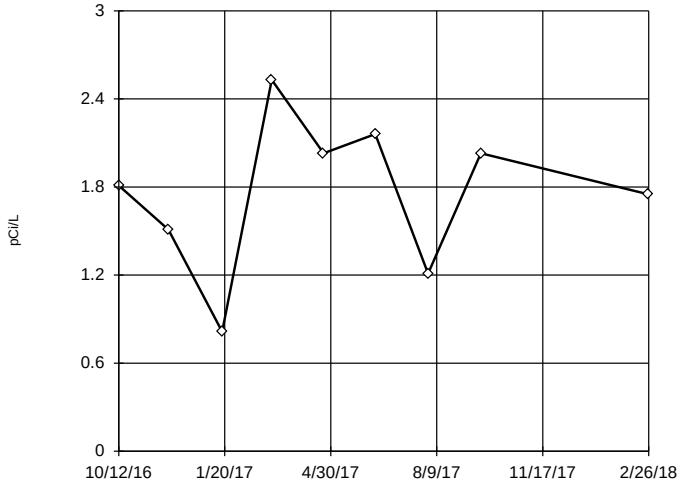
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.458, low cutoff = -2.386, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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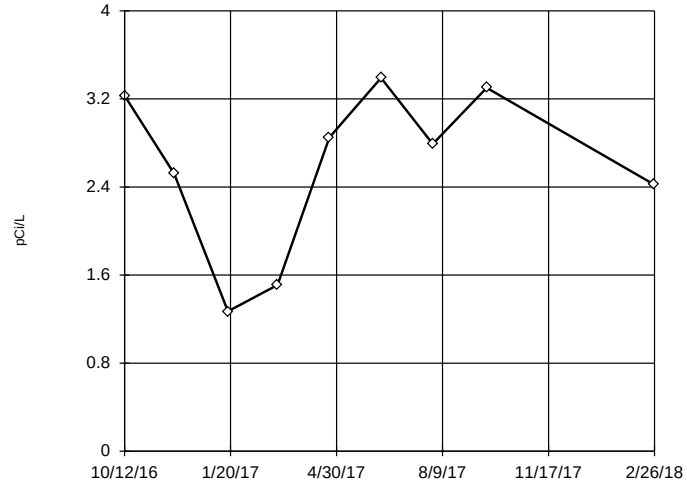
Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.832, low cutoff = -4.106, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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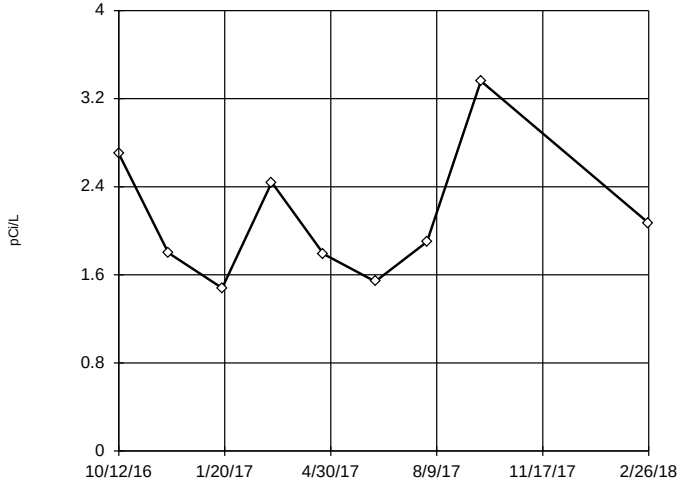
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.483, low cutoff = 0.4494, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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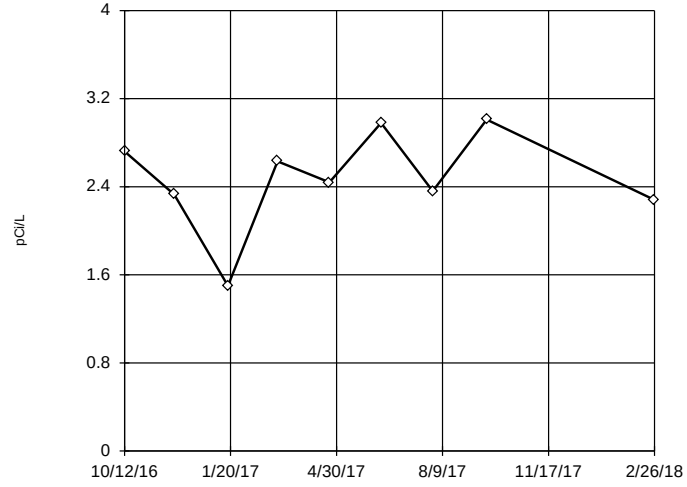
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.835, low cutoff = -2.754, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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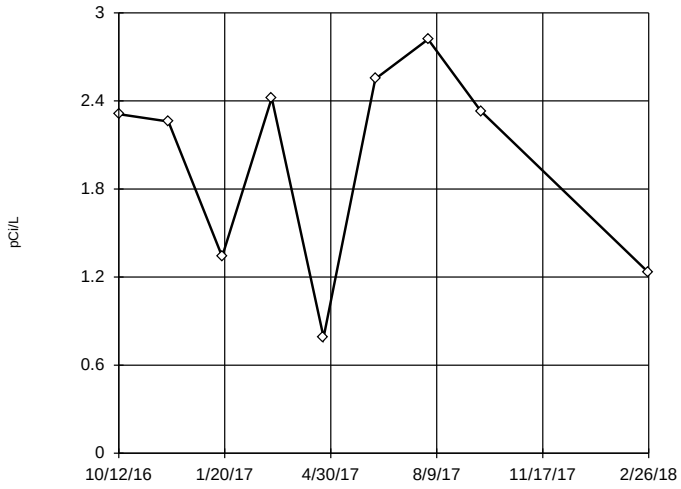
Tukey's Outlier Screening

MW-6



n = 9

No outliers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.469, low cutoff = -3.192, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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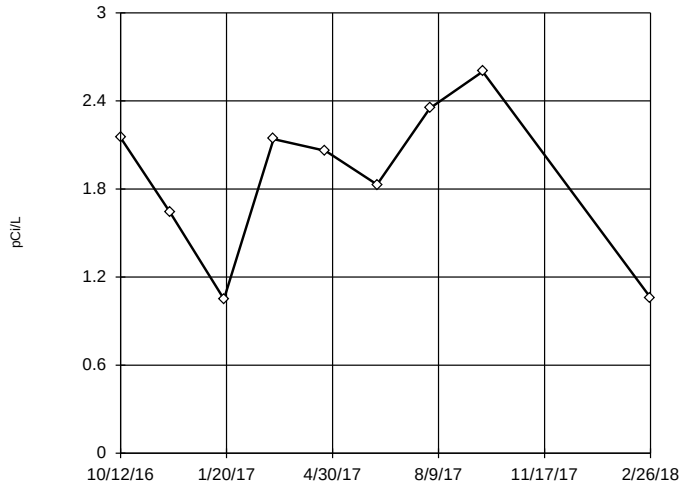
Tukey's Outlier Screening

MW-7



n = 9

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.345, low cutoff = -2.851, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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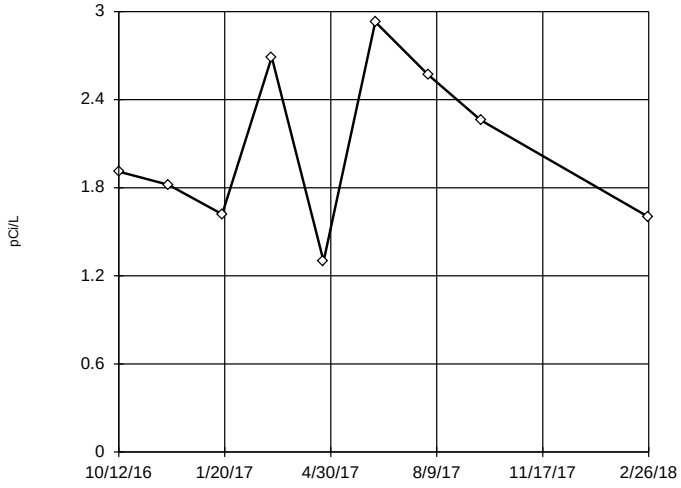
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 11.45, low cutoff = 0.3696, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 6/20/2018 1:48 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

A.3 INTERWELL PREDICTION LIMITS – FEBRUARY 2018

REC'D NDEQ - (8/27/2018) - (20180058179)

Interwell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/19/2018, 8:26 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic [total] (ug/L)	MW-1	5.255	n/a	2/26/2018	3.7	No	9	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-2	5.255	n/a	2/26/2018	3.2	No	9	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-3	5.255	n/a	2/26/2018	2.8	No	9	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-5	5.255	n/a	2/26/2018	4.3	No	9	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-6	5.255	n/a	2/26/2018	3.8	No	9	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-7	5.255	n/a	2/26/2018	3.4	No	9	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-8	5.255	n/a	2/26/2018	2.3	No	9	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-6	140.9	n/a	2/26/2018	68.4	No	9	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-7	140.9	n/a	2/26/2018	119	No	9	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	**MW-8**	**140.9**	**n/a**	**2/26/2018**	**150**	**Yes**	**9**	**0**	**No**	**0.000...**	Param 1 of 2
Boron (ug/L)	MW-1	513.8	n/a	2/26/2018	167	No	9	33.33	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-2	513.8	n/a	2/26/2018	127	No	9	33.33	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-3	513.8	n/a	2/26/2018	106	No	9	33.33	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-5	513.8	n/a	2/26/2018	137	No	9	33.33	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-6	513.8	n/a	2/26/2018	115	No	9	33.33	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-7	513.8	n/a	2/26/2018	186	No	9	33.33	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-8	513.8	n/a	2/26/2018	136	No	9	33.33	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-6	100	n/a	2/26/2018	36.6	No	9	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	**MW-7**	**100**	**n/a**	**2/26/2018**	**109**	**Yes**	**9**	**0**	**No**	**0.000...**	Param 1 of 2
Calcium (mg/L)	MW-8	100	n/a	2/26/2018	93.5	No	9	0	No	0.000...	Param 1 of 2
Chloride (mg/L)	MW-1	86.6	n/a	2/26/2018	9.7	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-2	86.6	n/a	2/26/2018	13.6	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-3	86.6	n/a	2/26/2018	25.6	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-5	86.6	n/a	2/26/2018	18.9	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-6	86.6	n/a	2/26/2018	16.3	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-7	86.6	n/a	2/26/2018	26.6	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-8	86.6	n/a	2/26/2018	29.2	No	9	0	x^(1/3)	0.000...	Param 1 of 2
Fluoride (mg/L)	**MW-1**	**1.077**	**n/a**	**2/26/2018**	**1.3**	**Yes**	**9**	**0**	**No**	**0.000...**	Param 1 of 2
Fluoride (mg/L)	MW-2	1.077	n/a	2/26/2018	0.86	No	9	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-3	1.077	n/a	2/26/2018	0.75	No	9	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-5	1.077	n/a	2/26/2018	1	No	9	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-6	1.077	n/a	2/26/2018	0.73	No	9	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-7	1.077	n/a	2/26/2018	0.85	No	9	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-8	1.077	n/a	2/26/2018	0.78	No	9	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	**MW-1**	**34.16**	**n/a**	**2/26/2018**	**35.9**	**Yes**	**9**	**0**	**No**	**0.000...**	Param 1 of 2
Lithium (ug/L)	MW-2	34.16	n/a	2/26/2018	27.4	No	9	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-3	34.16	n/a	2/26/2018	27.1	No	9	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-5	34.16	n/a	2/26/2018	29.3	No	9	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-6	34.16	n/a	2/26/2018	19.7	No	9	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-7	34.16	n/a	2/26/2018	30.9	No	9	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-8	34.16	n/a	2/26/2018	29.1	No	9	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-1	10.5	n/a	2/26/2018	8.6	No	9	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-2	10.5	n/a	2/26/2018	7.1	No	9	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	**MW-3**	**10.5**	**n/a**	**2/26/2018**	**12.7**	**Yes**	**9**	**0**	**No**	**0.000...**	Param 1 of 2
Molybdenum (ug/L)	MW-5	10.5	n/a	2/26/2018	5.4	No	9	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-6	10.5	n/a	2/26/2018	7.9	No	9	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-7	10.5	n/a	2/26/2018	8.5	No	9	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-8	10.5	n/a	2/26/2018	7.5	No	9	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-6	8.373	6.116	2/26/2018	7.2	No	9	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-7	8.373	6.116	2/26/2018	7.1	No	9	0	No	0.000...	Param 1 of 2

REC'D NDEQ - (8/27/2018) - (20180058179)

Interwell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/19/2018, 8:26 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
pH (Std. Units)	MW-8	8.373	6.116	2/26/2018	7.1	No	9	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-6	11.46	n/a	2/26/2018	3	No	9	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-7	11.46	n/a	2/26/2018	9.4	No	9	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-8	11.46	n/a	2/26/2018	10.5	No	9	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-6	61.68	n/a	2/26/2018	18.8	No	9	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-7	61.68	n/a	2/26/2018	48.5	No	9	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-8	61.68	n/a	2/26/2018	34.7	No	9	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-6	494.1	n/a	2/26/2018	256	No	9	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-7	494.1	n/a	2/26/2018	478	No	9	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-8	494.1	n/a	2/26/2018	414	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-1	4.15	n/a	2/26/2018	1.82	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-2	4.15	n/a	2/26/2018	1.75	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-3	4.15	n/a	2/26/2018	2.42	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-5	4.15	n/a	2/26/2018	2.28	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-6	4.15	n/a	2/26/2018	1.23	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-7	4.15	n/a	2/26/2018	1.06	No	9	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-8	4.15	n/a	2/26/2018	1.6	No	9	0	No	0.000...	Param 1 of 2

REC'D NDEQ - (8/27/2018) - (20180058179)

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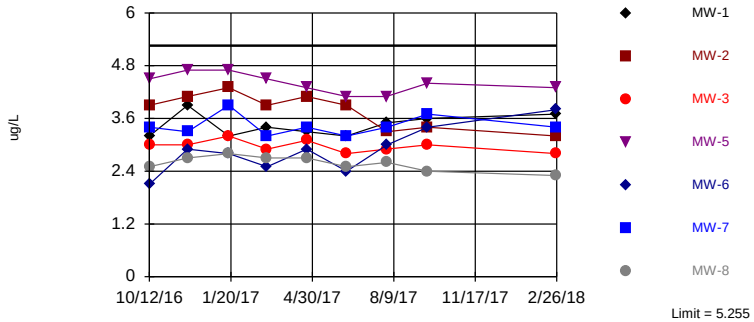
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=3.911, Std. Dev.=0.4045, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9694, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Arsenic [total] Analysis Run 6/19/2018 8:22 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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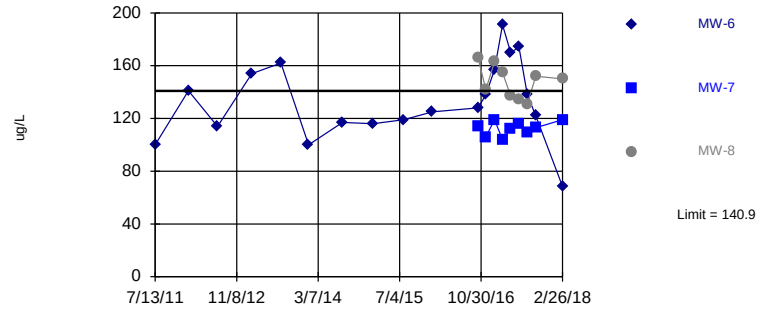
Exceeds Limit: MW-8

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=118.4, Std. Dev.=6.766, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9727, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 8:22 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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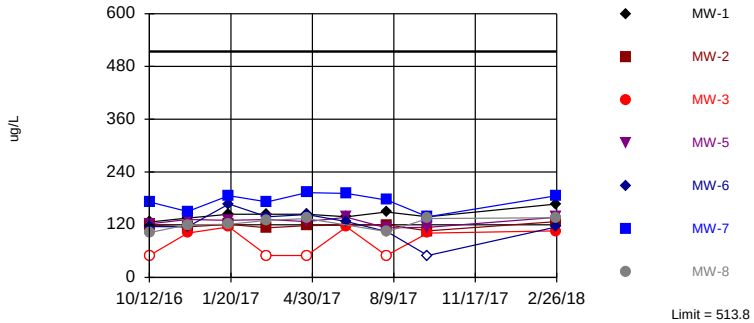
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=202.7, Std. Dev.=93.63, n=9, 33.33% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8759, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Boron Analysis Run 6/19/2018 8:22 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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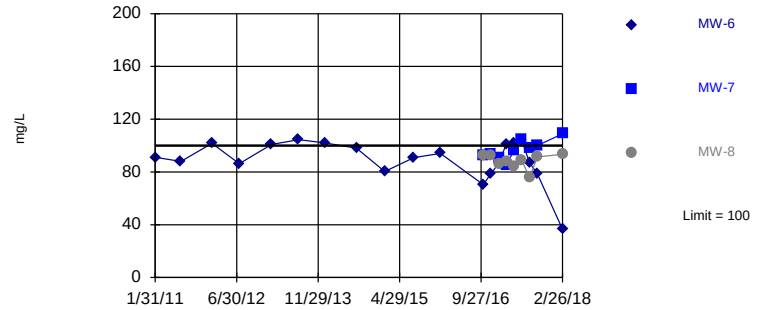
Exceeds Limit: MW-7

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=83.53, Std. Dev.=4.959, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9832, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 8:22 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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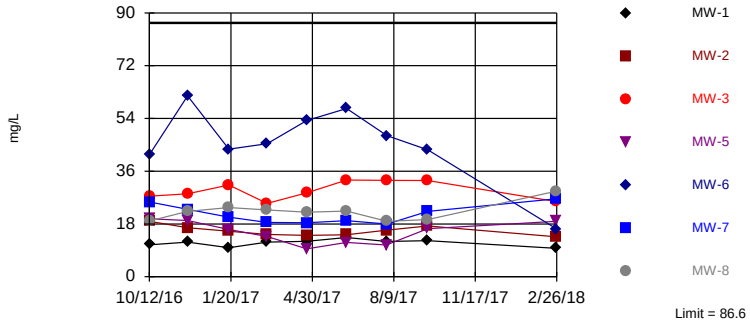
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=2.784, Std. Dev.=0.4934, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7795, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Chloride Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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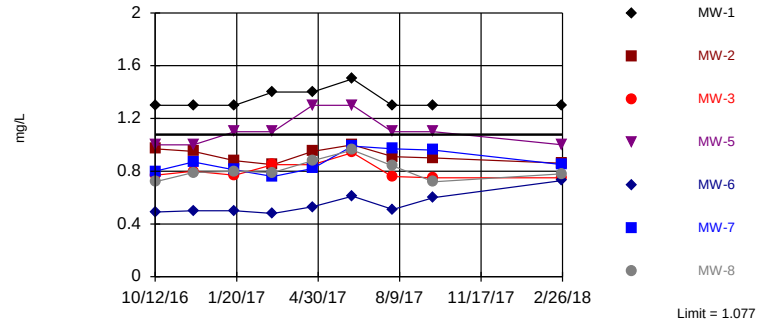
Exceeds Limit: MW-1

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.8433, Std. Dev.=0.07036, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8818, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Fluoride Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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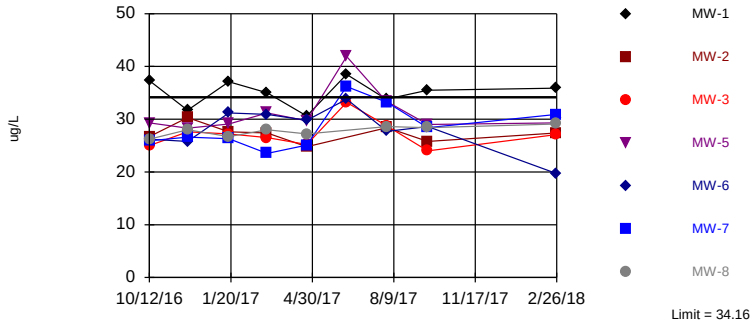
Exceeds Limit: MW-1

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=25.56, Std. Dev.=2.589, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9392, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Lithium Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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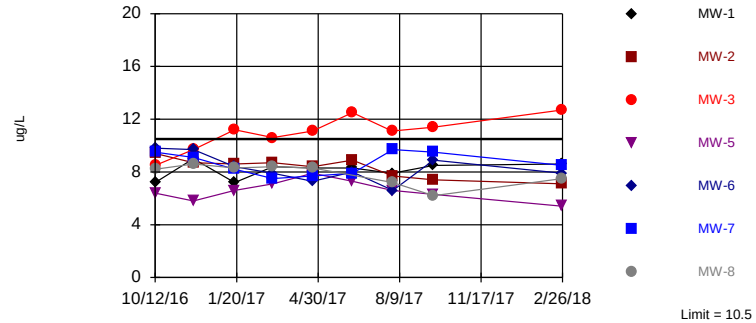
Exceeds Limit: MW-3

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=6.256, Std. Dev.=1.277, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9642, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Molybdenum Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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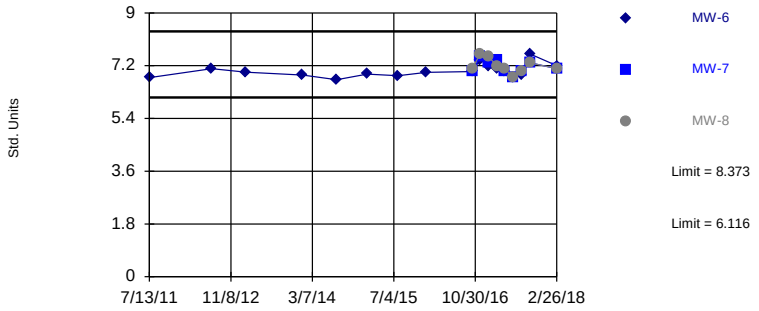
Within Limits

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=7.244, Std. Dev.=0.3395, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9395, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0001792. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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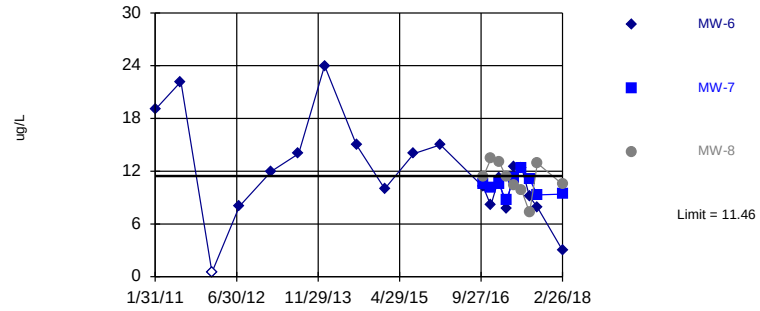
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=6.967, Std. Dev.=1.351, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9381, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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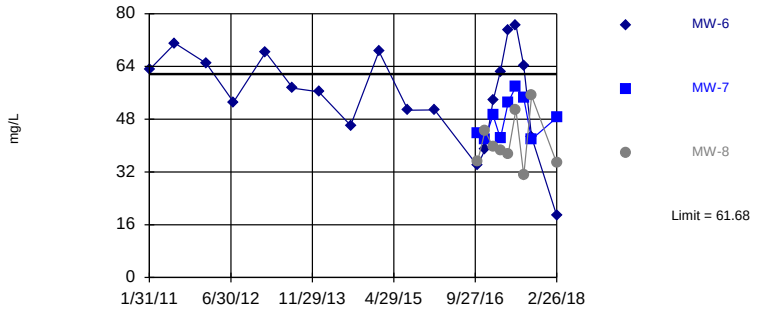
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=37.39, Std. Dev.=7.31, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8512, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

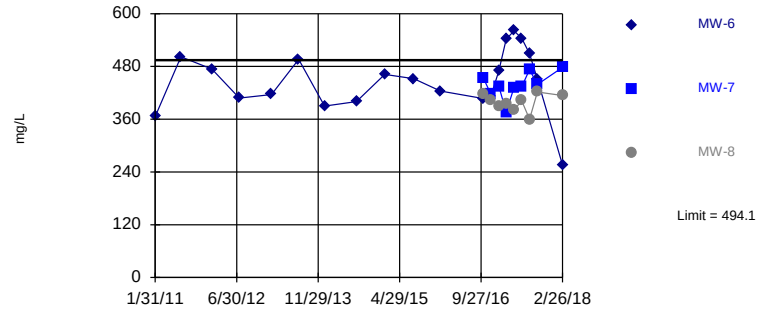
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=398.7, Std. Dev.=28.73, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9585, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg well

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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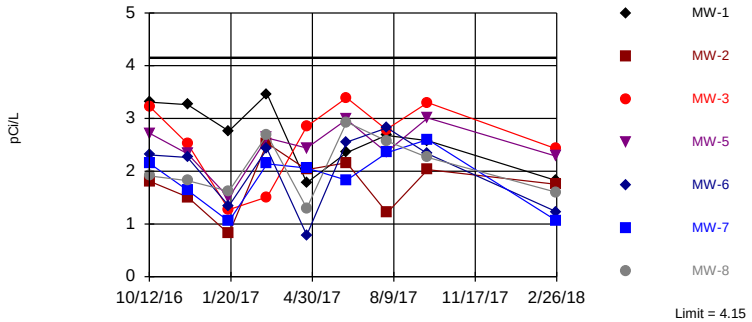
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=2.12, Std. Dev.=0.6108, n=9. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8981, critical = 0.764. Kappa = 3.324 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Radium Analysis Run 6/19/2018 8:23 AM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

A.4 INTRAWELL PREDICTION LIMITS – FEBRUARY 2018

REC'D NDEQ - (8/27/2018) - (20180058179)

Intrawell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/19/2018, 7:34 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony [total] (ug/L)	MW-4R	1	n/a	2/26/2018	0.5ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Arsenic [total] (ug/L)	MW-4R	5.479	n/a	2/26/2018	3.9	No	8	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-4R	144.4	n/a	2/26/2018	120	No	8	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-4	164.9	n/a	n/a	1 future	n/a	24	0	No	0.000...	Param 1 of 2
BERYLIUM (ug/L)	MW-4R	0.5	n/a	2/26/2018	0.25ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Boron (ug/L)	MW-4R	563.2	n/a	2/26/2018	161	No	8	37.5	No	0.000...	Param 1 of 2
Cadmium [total] (ug/L)	MW-4R	0.5	n/a	2/26/2018	0.25ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Calcium (mg/L)	MW-4R	101.6	n/a	2/26/2018	87	No	8	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-4	116.6	n/a	n/a	1 future	n/a	24	0	No	0.000...	Param 1 of 2
Chloride (mg/L)	MW-4R	102.8	n/a	2/26/2018	23.3	No	8	0	x^(1/3)	0.000...	Param 1 of 2
Chromium [total] (ug/L)	MW-4R	1	n/a	2/26/2018	0.5ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Chromium [total] (ug/L)	MW-4	10	n/a	n/a	1 future	n/a	24	100	n/a	0.003124	NP (NDs) 1 of 2
Cobalt [total] (ug/L)	MW-4R	1	n/a	2/26/2018	0.5ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Fluoride (mg/L)	MW-4R	1.117	n/a	2/26/2018	0.83	No	8	0	No	0.000...	Param 1 of 2
Lead [total] (ug/L)	MW-4R	2.8	n/a	2/26/2018	0.5ND	No	8	75	n/a	0.02144	NP (NDs) 1 of 2
Lithium (ug/L)	MW-4R	35.3	n/a	2/26/2018	26.7	No	8	0	No	0.000...	Param 1 of 2
Mercury (ug/L)	MW-4R	0.2	n/a	2/26/2018	0.1ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Molybdenum (ug/L)	MW-4R	11.09	n/a	2/26/2018	5.2	No	8	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-4R	8.561	5.964	2/26/2018	7.1	No	8	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-4	7.22	0	n/a	1 future	n/a	10	10	n/a	0.02952	NP (normality) 1 of 2
Selenium [total] (ug/L)	MW-4R	12.22	n/a	2/26/2018	6.6	No	8	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-4	23.06	n/a	n/a	1 future	n/a	24	4.167	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-4R	65.19	n/a	2/26/2018	39.8	No	8	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-4	85.49	n/a	n/a	1 future	n/a	24	0	No	0.000...	Param 1 of 2
Thallium [total] (ug/L)	MW-4R	1	n/a	2/26/2018	0.5ND	No	8	100	n/a	0.02144	NP (NDs) 1 of 2
Total Dissolved Solids (mg/L)	MW-4R	507.6	n/a	2/26/2018	409	No	8	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-4	568.1	n/a	n/a	1 future	n/a	24	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-4R	4.491	n/a	2/26/2018	2.07	No	8	0	No	0.000...	Param 1 of 2

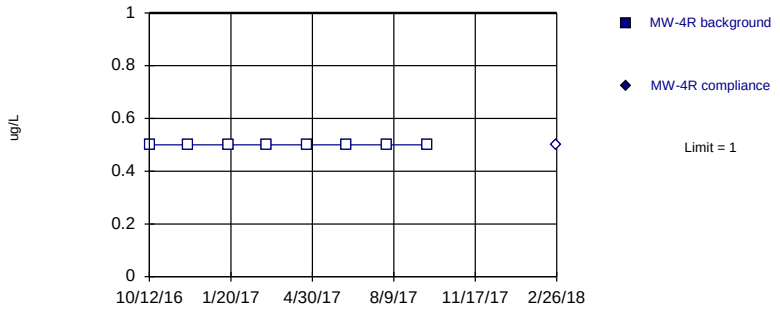
REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Antimony [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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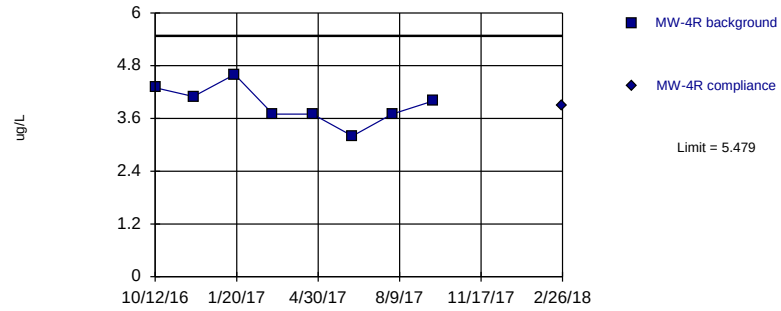
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.913, Std. Dev.=0.4324, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9648, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Arsenic [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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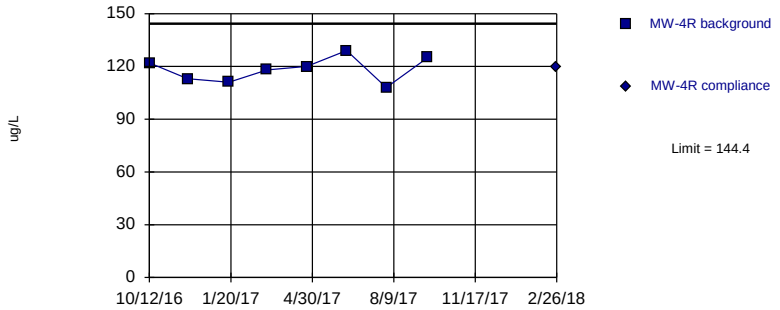
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=118.3, Std. Dev.=7.206, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9744, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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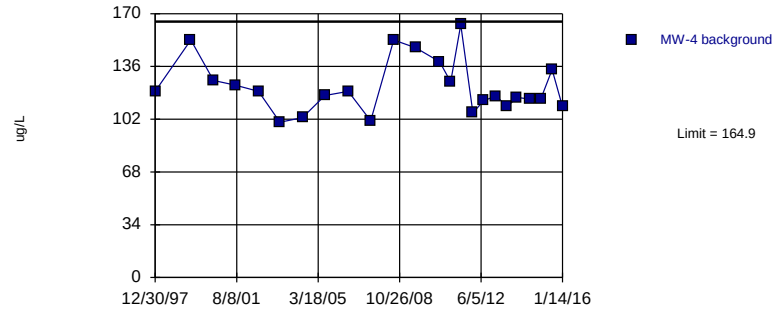
Prediction Limit

Intrawell Parametric, MW-4 (bg)



Background Data Summary: Mean=123, Std. Dev.=17.22, n=24. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9104, critical = 0.884. Kappa = 2.437 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

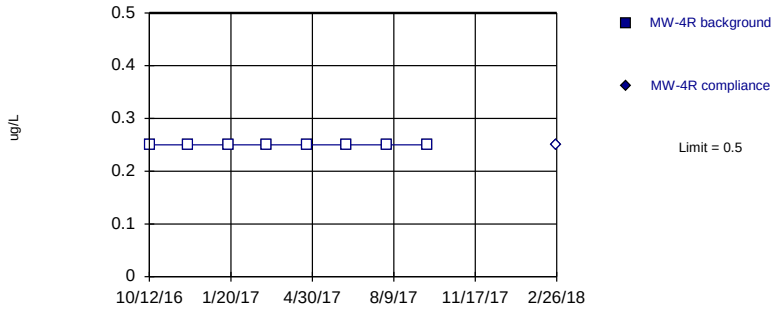
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

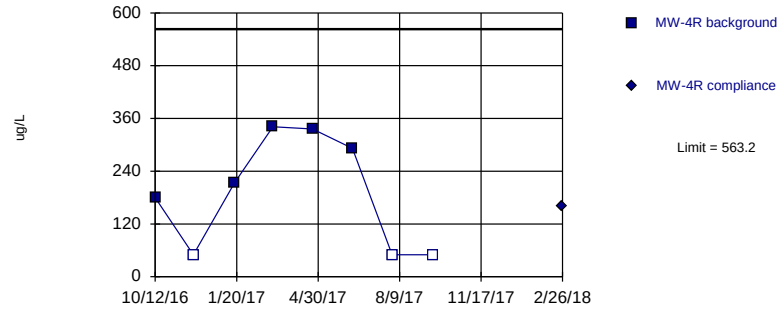
Constituent: BERYLIUM Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=207.9, Std. Dev.=98.07, n=8, 37.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8468, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

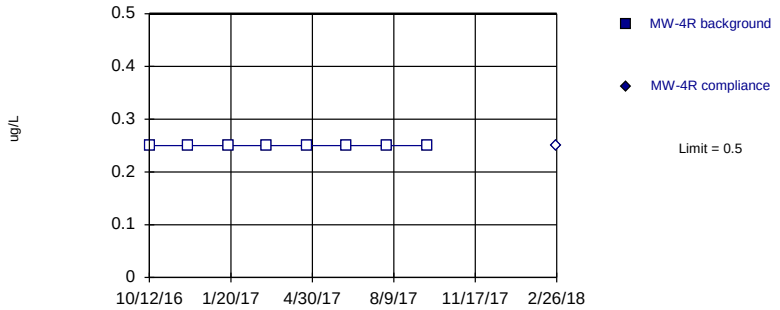
Constituent: Boron Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

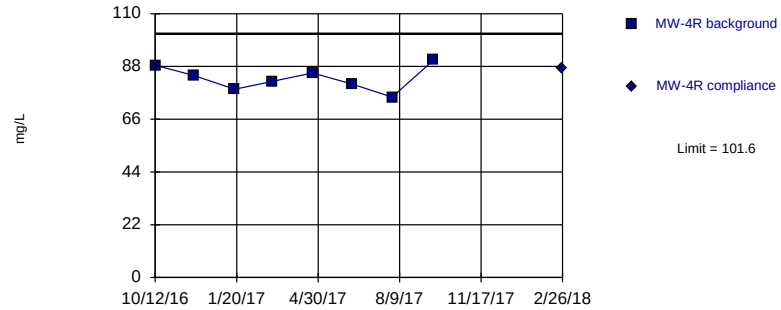
Constituent: Cadmium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=83.1, Std. Dev.=5.116, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9865, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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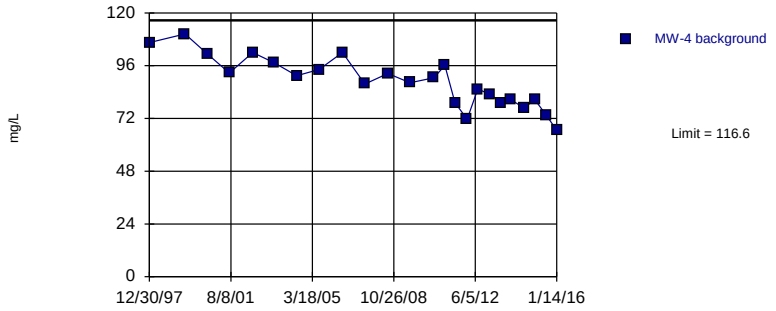
Prediction Limit

Intrawell Parametric, MW-4 (bg)



Background Data Summary: Mean=88.7, Std. Dev.=11.45, n=24. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9848, critical = 0.884. Kappa = 2.437 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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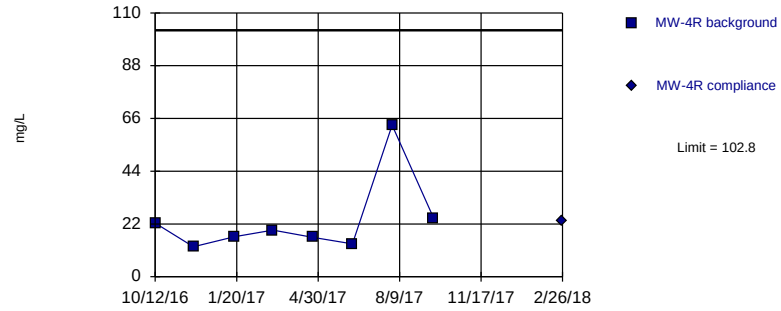
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on cube root transformation): Mean=2.775, Std. Dev.=0.5267, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7714, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Chloride Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

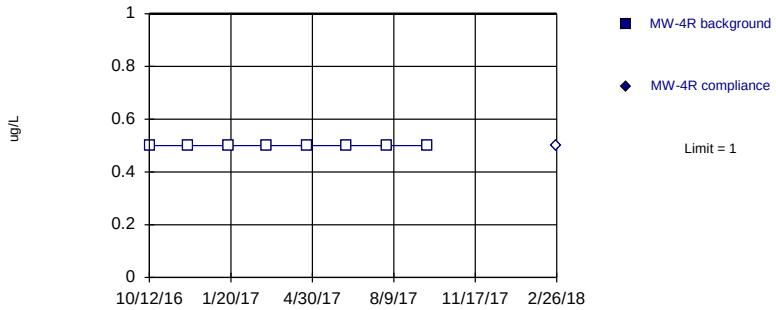
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

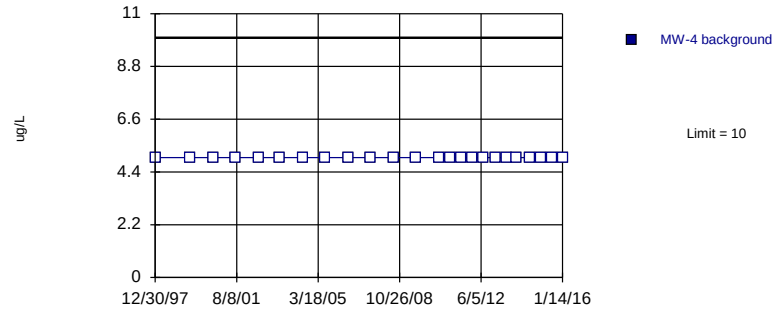
Constituent: Chromium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Prediction Limit

Intrawell Non-parametric, MW-4 (bg)



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 24) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.006238. Individual comparison alpha = 0.003124 (1 of 2). Assumes 1 future value. After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Chromium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

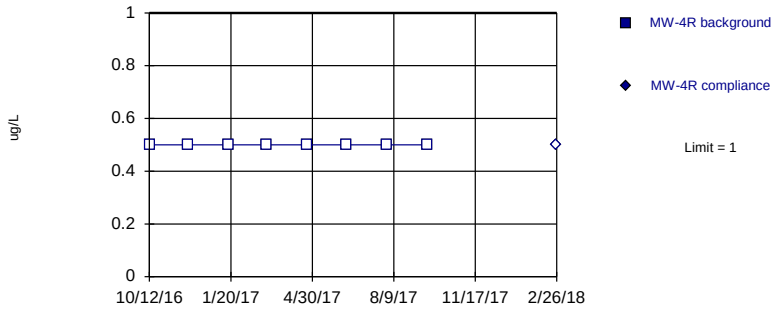
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Cobalt [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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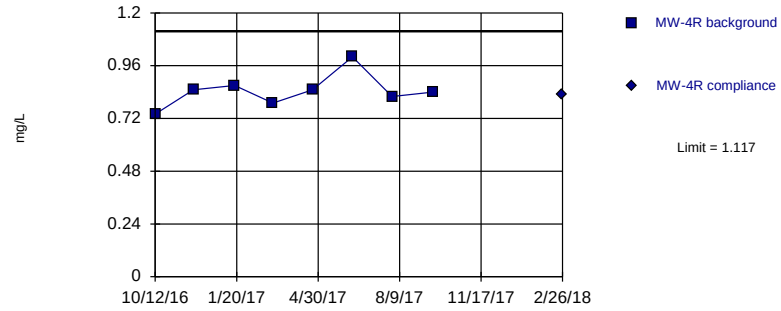
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.845, Std. Dev.=0.07502, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9014, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Fluoride Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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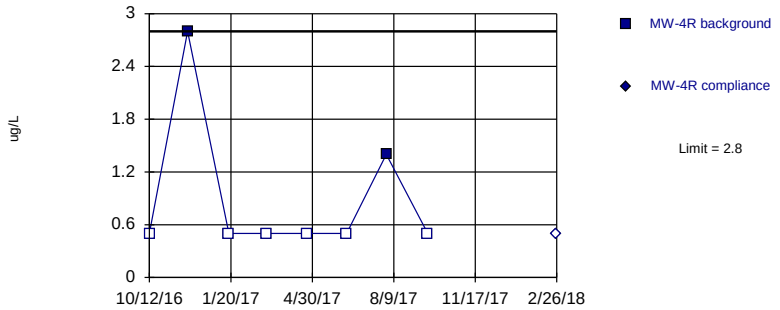
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 75% NDs. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Lead [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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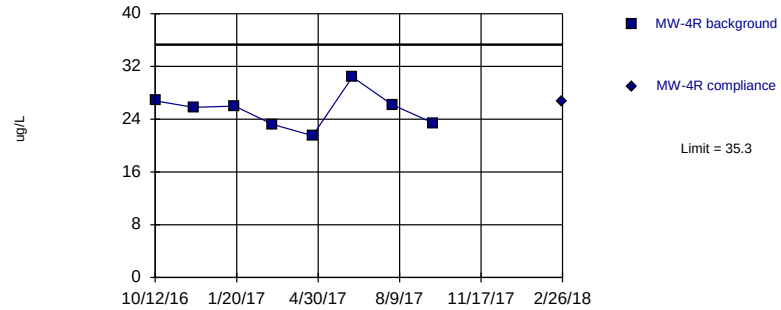
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=25.41, Std. Dev.=2.73, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9459, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Lithium Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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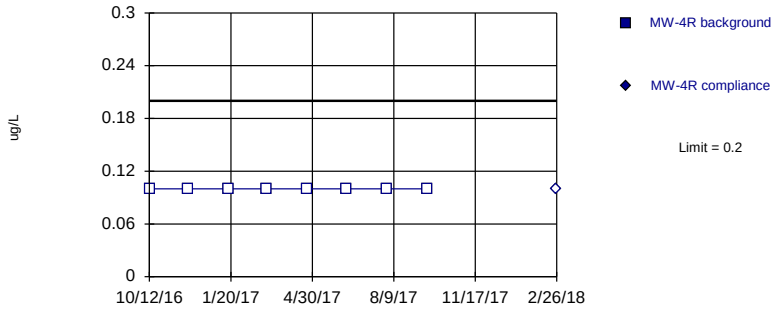
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Mercury Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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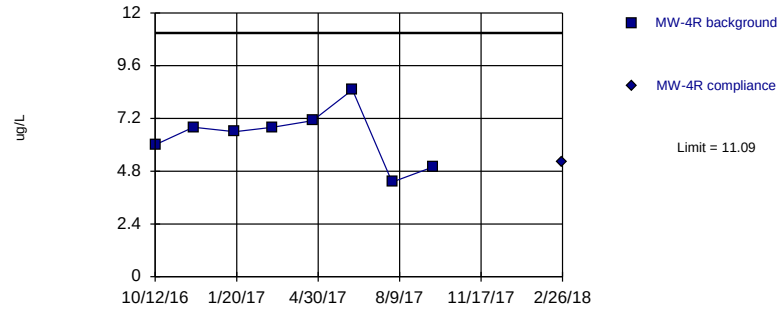
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.388, Std. Dev.=1.298, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9559, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Molybdenum Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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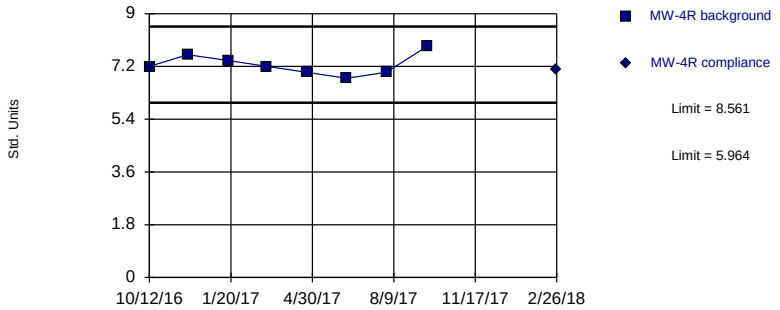
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.263, Std. Dev.=0.3583, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9526, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

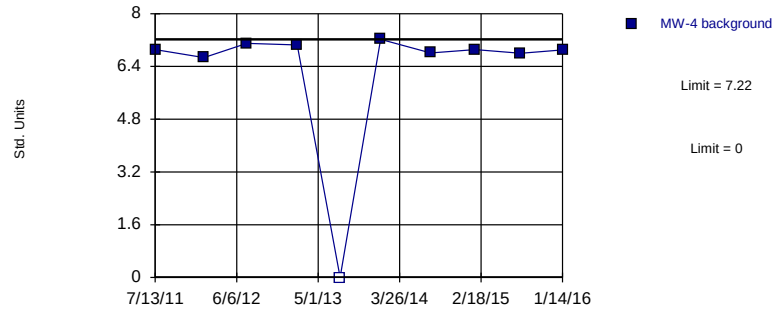
Constituent: pH Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Prediction Limit

Intrawell Non-parametric, MW-4 (bg)



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. Limits are highest and lowest of 10 background values. 10% NDs. Well-constituent pair annual alpha = 0.0586. Individual comparison alpha = 0.02952 (1 of 2). Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

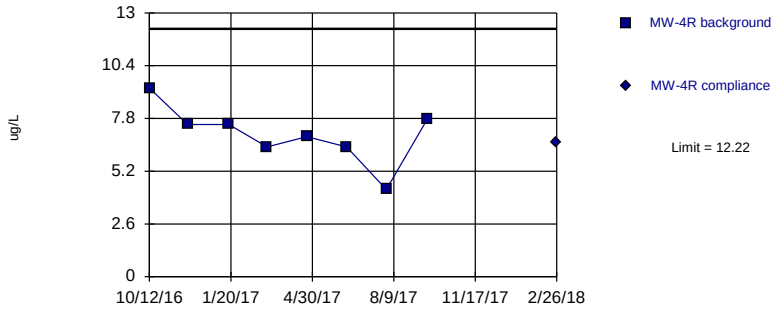
REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.013, Std. Dev.=1.437, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9446, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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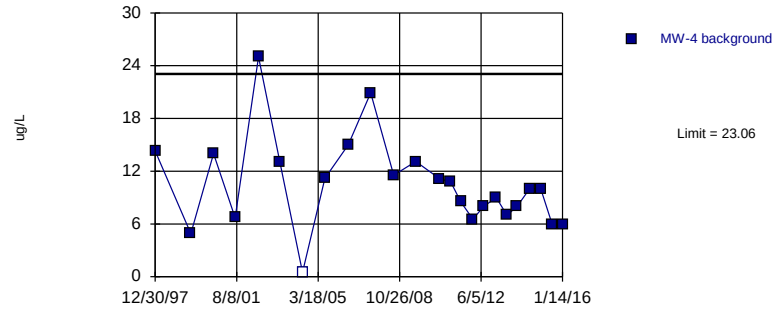
Hollow symbols indicate censored values.

Prediction Limit

Intrawell Parametric, MW-4 (bg)



Background Data Summary: Mean=10.47, Std. Dev.=5.168, n=24, 4.167% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9308, critical = 0.884. Kappa = 2.437 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

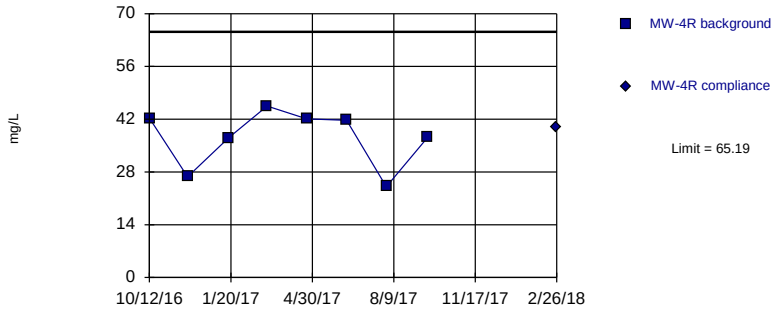
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=37.09, Std. Dev.=7.755, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8586, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

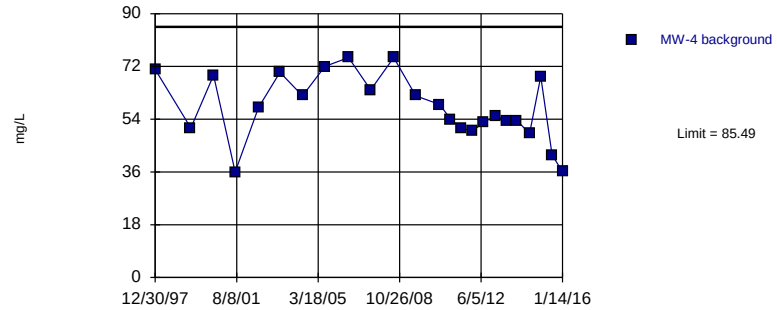
Constituent: Sulfate Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Prediction Limit

Intrawell Parametric, MW-4 (bg)



Background Data Summary: Mean=57.9, Std. Dev.=11.32, n=24. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9501, critical = 0.884. Kappa = 2.437 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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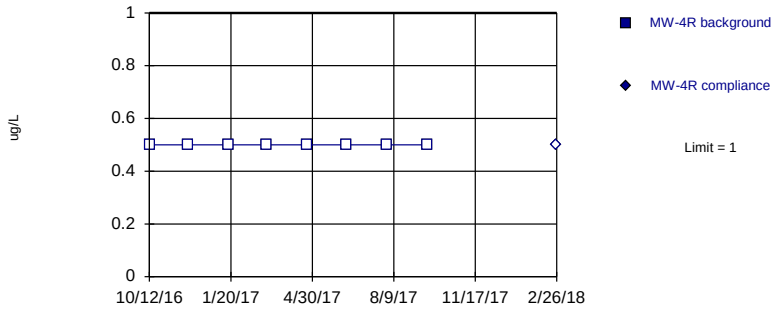
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.04242. Individual comparison alpha = 0.02144 (1 of 2). After outlier removal distribution was non-normal, so outlier results were invalidated. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Thallium [total] Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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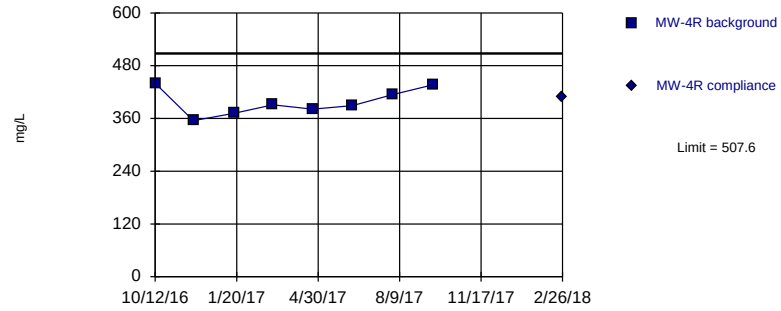
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=397.4, Std. Dev.=30.43, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9355, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

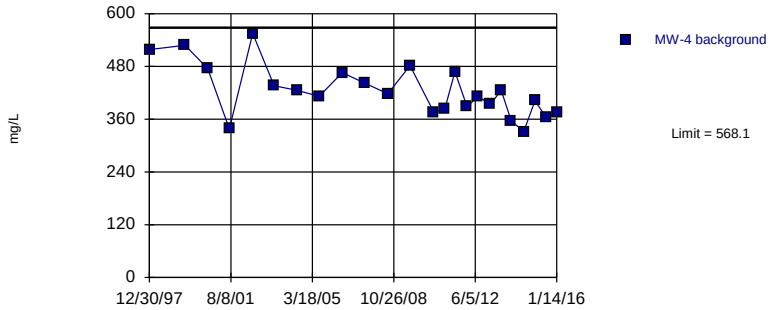
Constituent: Total Dissolved Solids Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Prediction Limit

Intrawell Parametric, MW-4 (bg)



Background Data Summary: Mean=423.9, Std. Dev.=59.19, n=24. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.964, critical = 0.884. Kappa = 2.437 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found.

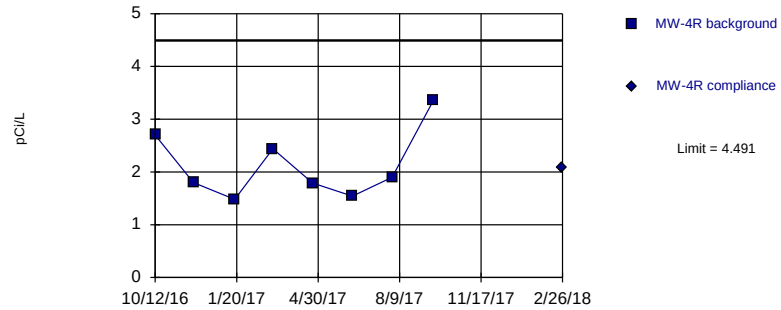
Constituent: Total Dissolved Solids Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=2.126, Std. Dev.=0.6527, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8842, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Radium Analysis Run 6/19/2018 7:32 AM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Intrawell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/19/2018, 8:17 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Barium [total] (ug/L)	MW-1	168.4	n/a	2/26/2018	135	No	33	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-2	125.2	n/a	2/26/2018	99.5	No	33	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-3	202.6	n/a	2/26/2018	168	No	33	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-5	165.7	n/a	2/26/2018	128	No	32	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-1	127.1	n/a	2/26/2018	114	No	33	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-2	172.1	n/a	2/26/2018	101	No	33	0	ln(x)	0.000...	Param 1 of 2
Calcium (mg/L)	MW-3	137.6	n/a	2/26/2018	94.3	No	33	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-5	120	n/a	2/26/2018	90.52	No	32	0	No	0.000...	Param 1 of 2 Deseas
pH (Std. Units)	MW-1	7.717	6.266	2/26/2018	7.2	No	18	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-2	7.914	4.812	2/26/2018	6.683	No	18	5.556	x^4	0.000...	Param 1 of 2 Deseas
pH (Std. Units)	MW-3	7.5	6.83	2/26/2018	7.1	No	17	0	n/a	0.01183	NP (normality) 1 of 2
pH (Std. Units)	MW-5	7.756	6.512	2/26/2018	7.2	No	17	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-1	32.97	n/a	2/26/2018	10.8	No	33	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-2	41.96	n/a	2/26/2018	17.99	No	33	0	No	0.000...	Param 1 of 2 Deseas
Selenium [total] (ug/L)	MW-3	17.89	n/a	2/26/2018	8.3	No	33	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-5	23.71	n/a	2/26/2018	12.41	No	32	0	No	0.000...	Param 1 of 2 Deseas
Sulfate (mg/L)	MW-1	121	n/a	2/26/2018	53.8	No	33	0	n/a	0.001701	NP (normality) 1 of 2
Sulfate (mg/L)	MW-2	277.1	n/a	2/26/2018	87.54	No	33	0	sqrt(x)	0.000...	Param 1 of 2 Deseas
Sulfate (mg/L)	MW-3	149.3	n/a	2/26/2018	56.7	No	33	0	sqrt(x)	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-5	67.16	n/a	2/26/2018	46.17	No	32	0	No	0.000...	Param 1 of 2 Deseas
Total Dissolved Solids (mg/L)	MW-1	630	n/a	2/26/2018	507	No	33	0	n/a	0.001701	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-2	826	n/a	2/26/2018	430	No	33	0	n/a	0.001701	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-3	636.4	n/a	2/26/2018	435	No	33	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-5	568	n/a	2/26/2018	450	No	32	0	No	0.000...	Param 1 of 2

REC'D NDEQ - (8/27/2018) - (20180058179)

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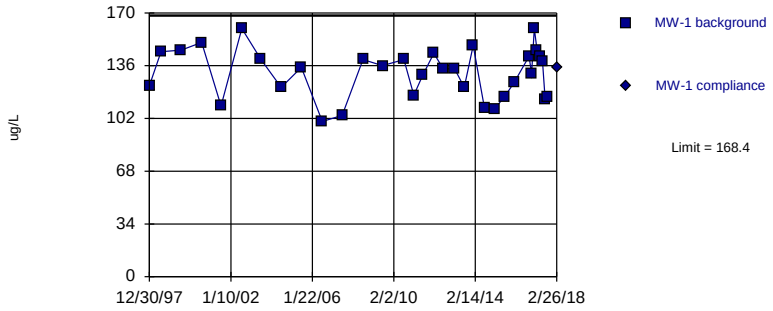
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=131.2, Std. Dev.=15.98, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9621, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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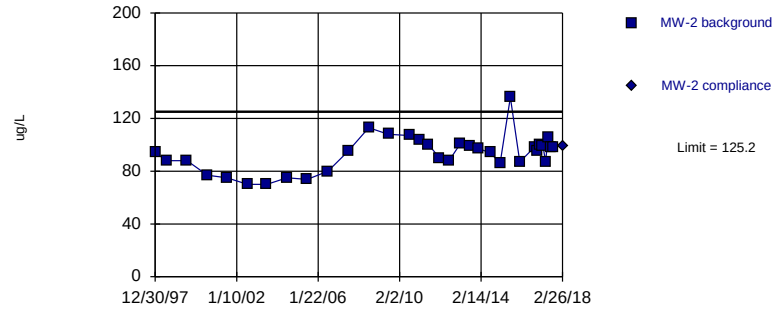
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=93.3, Std. Dev.=13.7, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9454, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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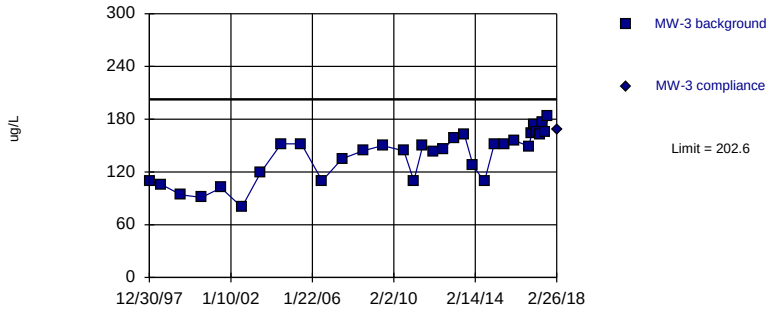
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=139.3, Std. Dev.=27.23, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9282, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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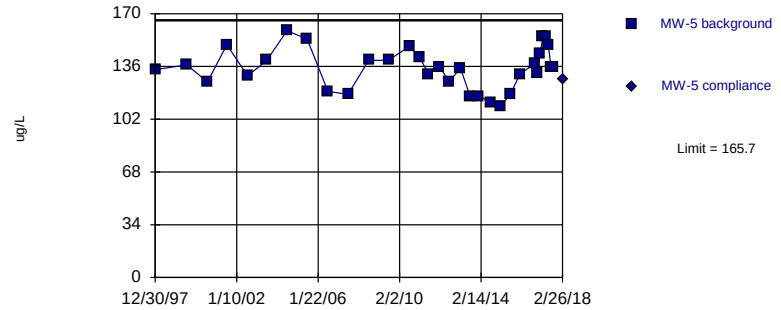
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=135, Std. Dev.=13.18, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9643, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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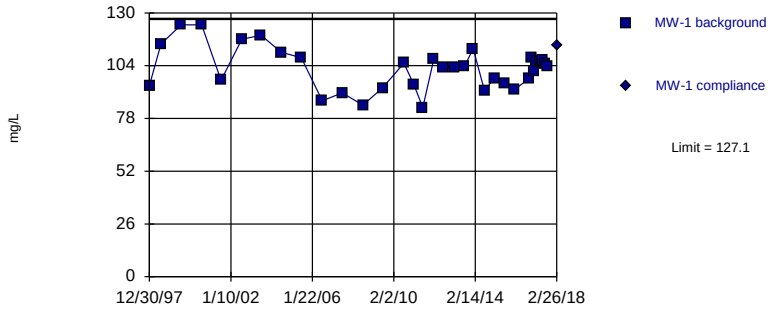
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=102.6, Std. Dev.=10.51, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9721, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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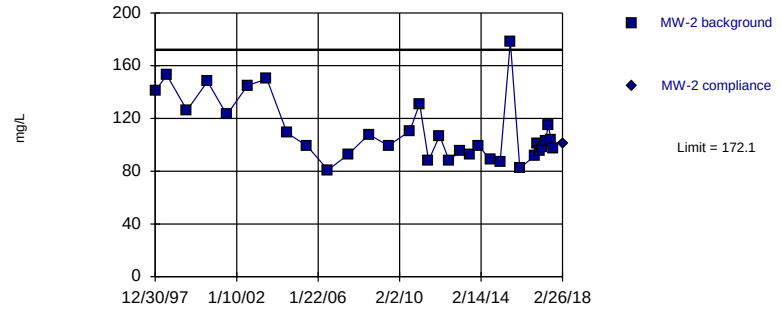
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=4.679, Std. Dev.=0.2016, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9175, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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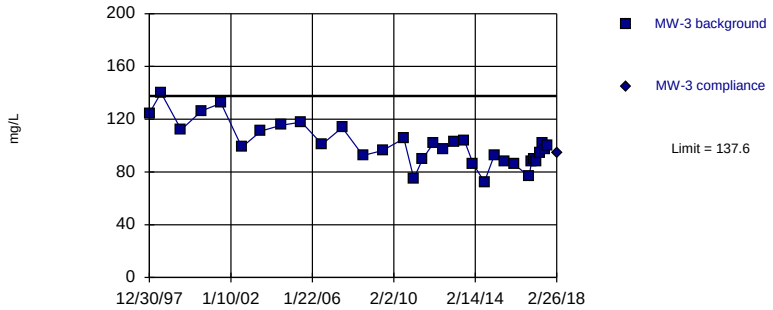
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=100.6, Std. Dev.=15.94, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9657, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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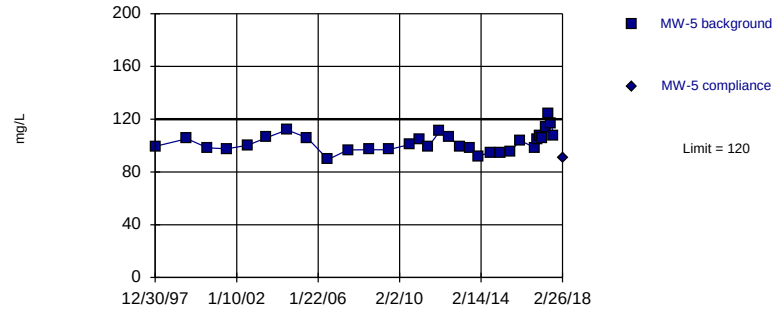
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=102.6, Std. Dev.=7.479, n=32. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9498, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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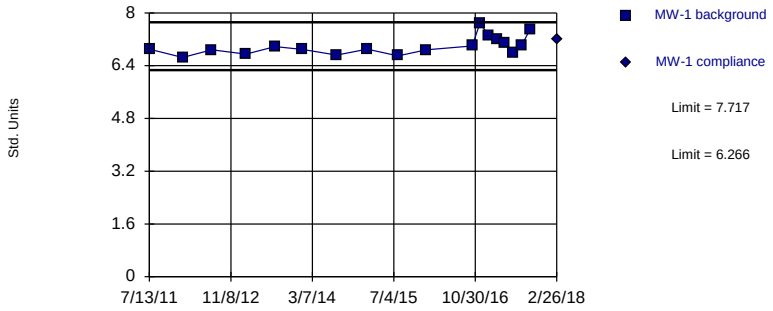
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.992, Std. Dev.=0.2801, n=18. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8894, critical = 0.858. Kappa = 2.59 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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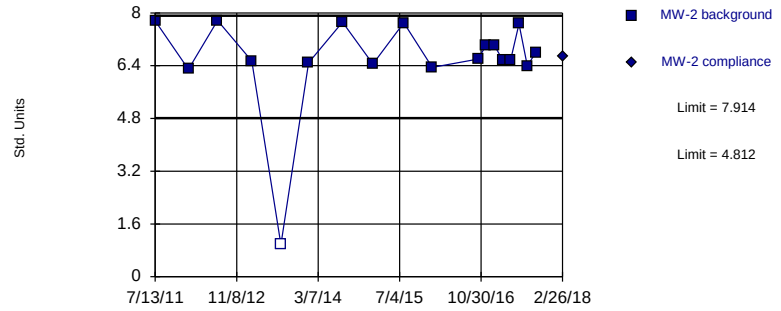
Hollow symbols indicate censored values.

Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^4 transformation): Mean=2229, Std. Dev.=653.7, n=18, 5.556% NDs. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8697, critical = 0.858. Kappa = 2.59 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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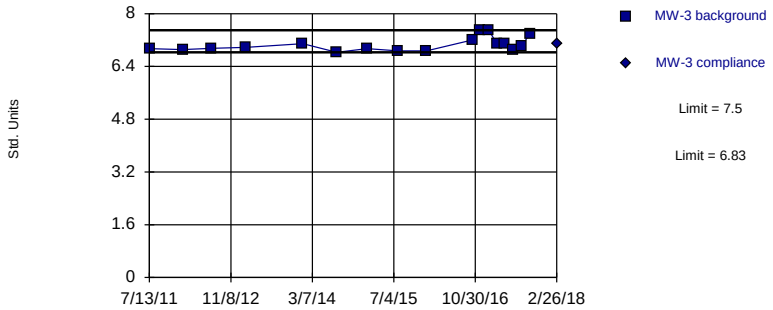
Within Limits

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. Limits are highest and lowest of 17 background values. Well-constituent pair annual alpha = 0.02359. Individual comparison alpha = 0.01183 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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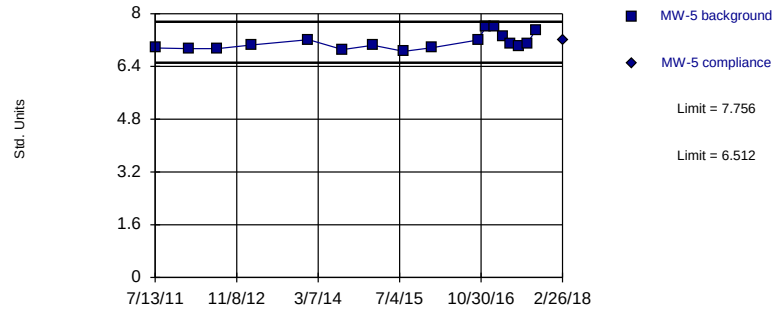
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.134, Std. Dev.=0.2371, n=17. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8612, critical = 0.851. Kappa = 2.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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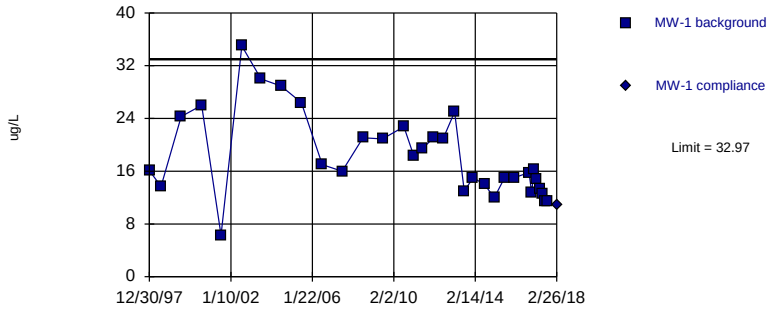
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=18.23, Std. Dev.=6.34, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9452, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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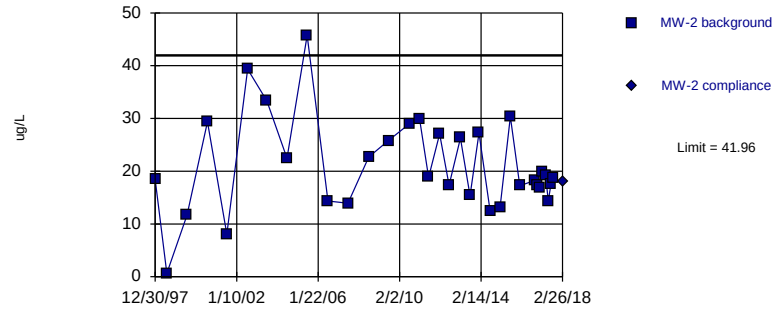
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=20.97, Std. Dev.=9.025, n=33. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9617, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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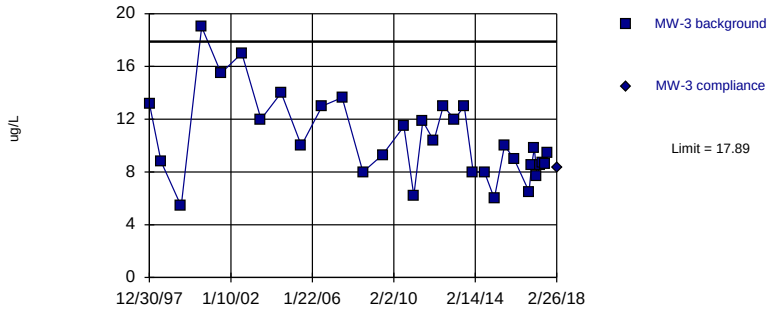
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=10.47, Std. Dev.=3.191, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9503, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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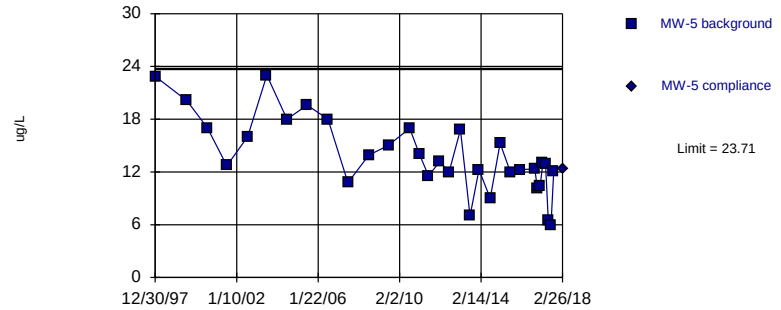
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=13.83, Std. Dev.=4.235, n=32. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9649, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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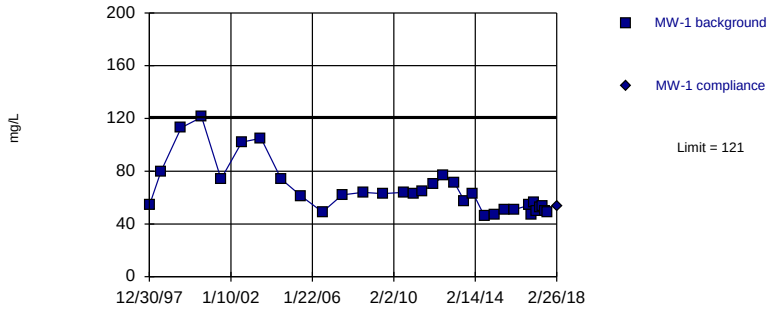
Within Limit

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 33 background values. Well-constituent pair annual alpha = 0.003399. Individual comparison alpha = 0.001701 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Seasonality was not detected with 95% confidence.

Constituent: Sulfate Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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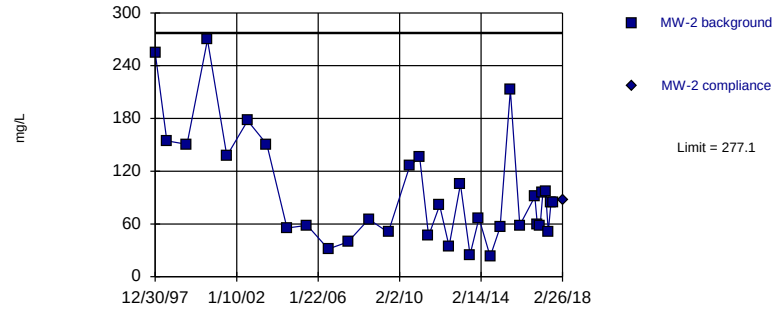
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=9.415, Std. Dev.=3.111, n=33. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9415, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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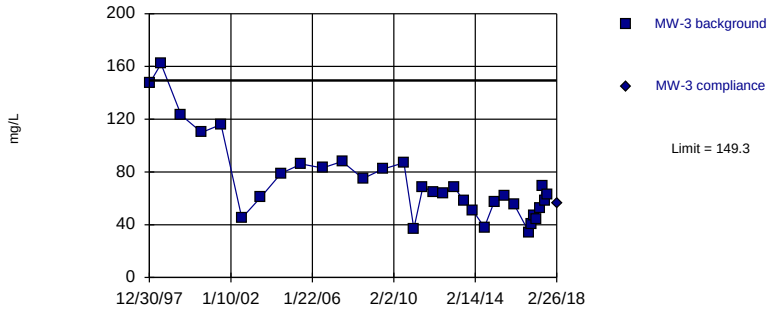
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=8.324, Std. Dev.=1.675, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9341, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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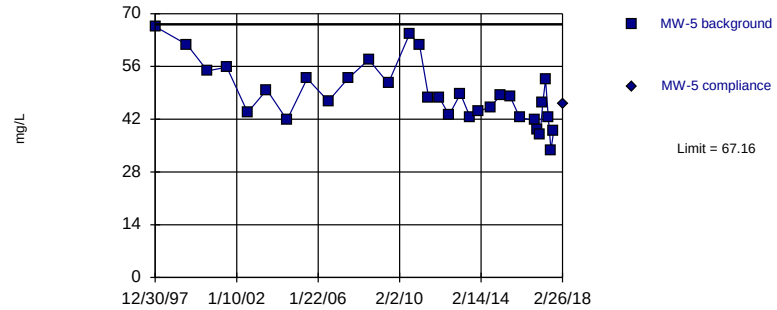
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=48.55, Std. Dev.=7.979, n=32. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9595, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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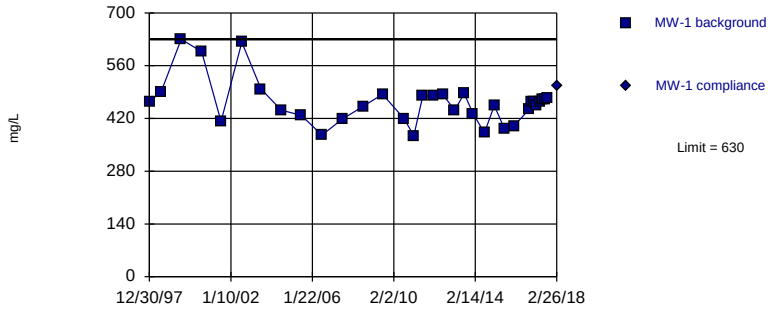
Within Limit

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 33 background values. Well-constituent pair annual alpha = 0.003399. Individual comparison alpha = 0.001701 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Seasonality was not detected with 95% confidence.

Constituent: Total Dissolved Solids Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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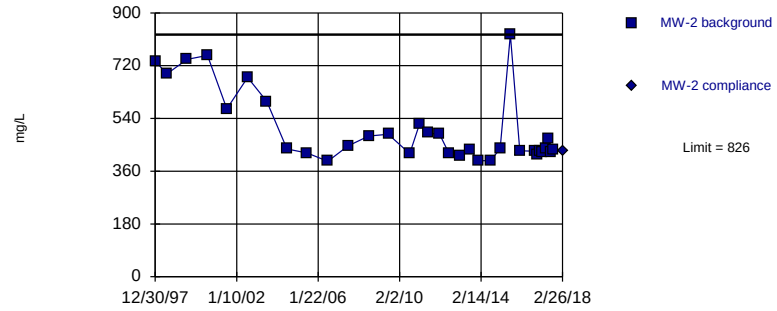
Within Limit

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 33 background values. Well-constituent pair annual alpha = 0.003399. Individual comparison alpha = 0.001701 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Seasonality was not detected with 95% confidence.

Constituent: Total Dissolved Solids Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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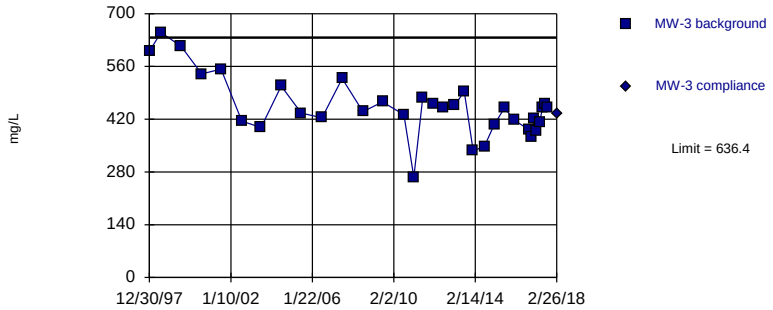
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=452.1, Std. Dev.=79.28, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9597, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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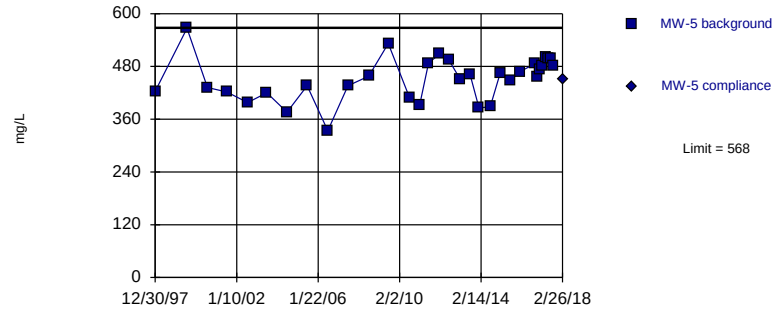
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=452, Std. Dev.=49.71, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.99, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 6/19/2018 8:17 AM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

A.5 SEN'S SLOPE/MANN-KENDALL TREND ANALYSIS – FEBRUARY 2018

REC'D NDEQ - (8/27/2018) - (20180058179)

Trend Test

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/20/2018, 9:51 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony [total] (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-6	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Antimony [total] (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-1	0.3556	13	23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-2	-0.7462	-20	-23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-3	-0.1547	-13	-23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-4R (bg)	-0.305	-11	-23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-5	-0.3657	-18	-23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-6	0.9626	21	23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-7	0	3	23	No	9	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-8	-0.3429	-18	-23	No	9	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-1	-0.1532	-34	-158	No	34	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-2	0.8124	145	158	No	34	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	**MW-3**	**3.559**	**356**	**158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Barium [total] (ug/L)	MW-4R (bg)	4.404	5	23	No	9	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-5	-0.09282	-18	-151	No	33	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-6	4.758	43	68	No	19	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-7	3.932	7	23	No	9	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-8	-14.9	-16	-23	No	9	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-4 (bg)	-0.5182	-42	-95	No	24	0	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-6	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
BERYLIUM (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Boron (ug/L)	MW-1	19.7	18	23	No	9	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-2	3.333	2	20	No	8	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-3	0	6	23	No	9	44.44	n/a	n/a	0.02	NP
Boron (ug/L)	MW-4R (bg)	-25.53	-5	-23	No	9	33.33	n/a	n/a	0.02	NP
Boron (ug/L)	MW-5	2.005	2	23	No	9	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-6	-28.35	-13	-23	No	9	11.11	n/a	n/a	0.02	NP
Boron (ug/L)	MW-7	7.424	4	23	No	9	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-8	18.32	19	20	No	8	0	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-6	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cadmium [total] (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-1	-0.141	-18	-158	No	34	0	n/a	n/a	0.02	NP

REC'D NDEQ - (8/27/2018) - (20180058179)

Trend Test

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/20/2018, 9:51 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Calcium (mg/L)	MW-2	-1.546	-150	-158	No	34	0	n/a	n/a	0.02	NP
Calcium (mg/L)	**MW-3**	**-1.586**	**-247**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-4R (bg)	0.462	0	23	No	9	0	n/a	n/a	0.02	NP
Calcium (mg/L)	**MW-5**	**0.7812**	**178**	**151**	**Yes**	**33**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-6	-1.709	-37	-73	No	20	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7	12.17	22	23	No	9	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-8	-1.176	-2	-23	No	9	0	n/a	n/a	0.02	NP
Calcium (mg/L)	**MW-4 (bg)**	**-1.863**	**-199**	**-95**	**Yes**	**24**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Chloride (mg/L)	MW-1	0.6807	9	23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2	-1.976	-14	-23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3	2.623	8	23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4R (bg)	7.07	10	23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	-5.682	-10	-23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	-13.2	-6	-23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7	-1.354	-6	-23	No	9	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-8	0.3591	2	23	No	9	0	n/a	n/a	0.02	NP
Chromium [total] (ug/L)	**MW-1**	**0**	**-229**	**-158**	**Yes**	**34**	**94.12**	**n/a**	**n/a**	**0.02**	**NP**
Chromium [total] (ug/L)	**MW-2**	**0**	**-225**	**-158**	**Yes**	**34**	**100**	**n/a**	**n/a**	**0.02**	**NP**
Chromium [total] (ug/L)	**MW-3**	**0**	**-219**	**-158**	**Yes**	**34**	**97.06**	**n/a**	**n/a**	**0.02**	**NP**
Chromium [total] (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
Chromium [total] (ug/L)	**MW-5**	**0**	**-227**	**-151**	**Yes**	**33**	**96.97**	**n/a**	**n/a**	**0.02**	**NP**
Chromium [total] (ug/L)	**MW-6**	**-0.6993**	**-99**	**-73**	**Yes**	**20**	**100**	**n/a**	**n/a**	**0.02**	**NP**
Chromium [total] (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Chromium [total] (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Chromium [total] (ug/L)	MW-4 (bg)	0	0	95	No	24	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-6	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Cobalt [total] (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-1	0	2	23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2	-0.0726	-11	-23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3	-0.01773	-9	-23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4R (bg)	0.02914	3	23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	0	6	23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	0.1361	23	23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7	0.06502	12	23	No	9	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-8	0.0576	4	23	No	9	0	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-4R (bg)	0	-3	-23	No	9	77.78	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-6	0	8	23	No	9	88.89	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Lead [total] (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-1	0.08667	0	23	No	9	0	n/a	n/a	0.02	NP

REC'D NDEQ - (8/27/2018) - (20180058179)

Trend Test

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Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Lithium (ug/L)	MW-2	-1.255	-5	-20	No	8	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-3	0.143	0	23	No	9	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-4R (bg)	0.148	0	23	No	9	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-5	0.7774	7	23	No	9	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-6	-3.023	-4	-23	No	9	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-7	3.896	12	23	No	9	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-8	1.872	19	20	No	8	0	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-6	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Mercury (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-1	0.3891	10	23	No	9	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	**MW-2**	**-1.654**	**-25**	**-23**	**Yes**	**9**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Molybdenum (ug/L)	**MW-3**	**2.594**	**25**	**23**	**Yes**	**9**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Molybdenum (ug/L)	MW-4R (bg)	-0.8229	-3	-23	No	9	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-5	-0.2136	-3	-23	No	9	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-6	-1.87	-17	-23	No	9	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-7	0.1246	1	23	No	9	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-8	-0.9013	-13	-20	No	8	0	n/a	n/a	0.02	NP
pH (Std. Units)	**MW-1**	**0.06789**	**71**	**68**	**Yes**	**19**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (Std. Units)	MW-2	0.06259	65	68	No	19	5.263	n/a	n/a	0.02	NP
pH (Std. Units)	MW-3	0.02848	47	63	No	18	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-4R (bg)	-0.2605	-8	-23	No	9	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-5	0.04109	55	63	No	18	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-6	0.04018	43	58	No	17	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-7	-0.1825	-6	-23	No	9	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-8	-0.365	-11	-23	No	9	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-4 (bg)	-0.01003	-4	-27	No	10	10	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	**MW-1**	**-0.8078**	**-271**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	**MW-2**	**-1.003**	**-196**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	**MW-3**	**-0.3066**	**-198**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	MW-4R (bg)	-2.006	-14	-23	No	9	0	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	**MW-5**	**-0.7055**	**-379**	**-151**	**Yes**	**33**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	MW-6	-1.203	-62	-73	No	20	5	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	MW-7	-0.3706	-2	-23	No	9	0	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	MW-8	-2.338	-15	-23	No	9	0	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	**MW-4 (bg)**	**-0.4298**	**-97**	**-95**	**Yes**	**24**	**4.167**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-1**	**-1.664**	**-271**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-2**	**-5.641**	**-381**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-3**	**-3.265**	**-285**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	MW-4R (bg)	-2.248	-6	-23	No	9	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-5**	**-1.254**	**-331**	**-151**	**Yes**	**33**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	MW-6	-2.262	-36	-73	No	20	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7	5.004	6	23	No	9	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-8	-1.805	-2	-23	No	9	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-4 (bg)**	**-1.309**	**-99**	**-95**	**Yes**	**24**	**0**	**n/a**	**n/a**	**0.02**	**NP**

REC'D NDEQ - (8/27/2018) - (20180058179)

Trend Test

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 6/20/2018, 9:51 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Thallium [total] (ug/L)	MW-1	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-2	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-3	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-4R (bg)	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-5	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-6	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-7	0	0	23	No	9	100	n/a	n/a	0.02	NP
Thallium [total] (ug/L)	MW-8	0	0	23	No	9	100	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-1	-0.2665	-9	-158	No	34	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	**MW-2**	**-8.606**	**-193**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids (mg/L)	**MW-3**	**-6.652**	**-188**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids (mg/L)	MW-4R (bg)	43.06	12	23	No	9	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	**MW-5**	**3.343**	**153**	**151**	**Yes**	**33**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids (mg/L)	MW-6	7.754	32	73	No	20	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7	25.4	14	23	No	9	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-8	-2.385	-2	-23	No	9	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	**MW-4 (bg)**	**-7.449**	**-130**	**-95**	**Yes**	**24**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Radium (pCi/L)	MW-1	-0.8567	-18	-23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-2	0.09626	1	23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-3	0.3213	4	23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-4R (bg)	0.1838	4	23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-5	0.0771	2	23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-6	0.0538	2	23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-7	0.3015	4	23	No	9	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-8	-0.09728	-2	-23	No	9	0	n/a	n/a	0.02	NP

REC'D NDEQ - (8/27/2018) - (20180058179)

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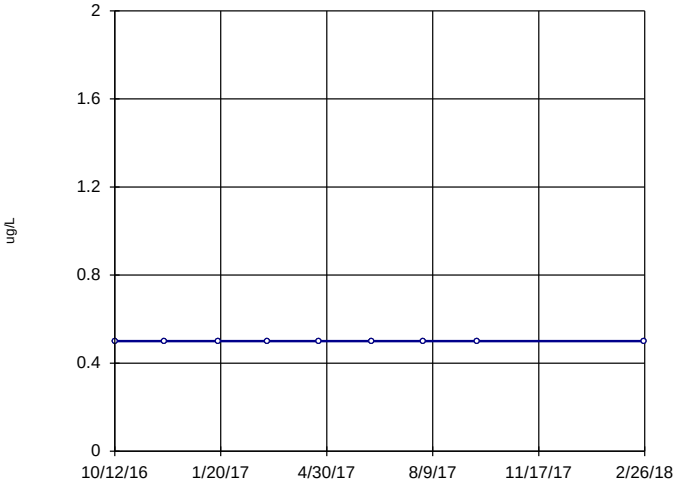
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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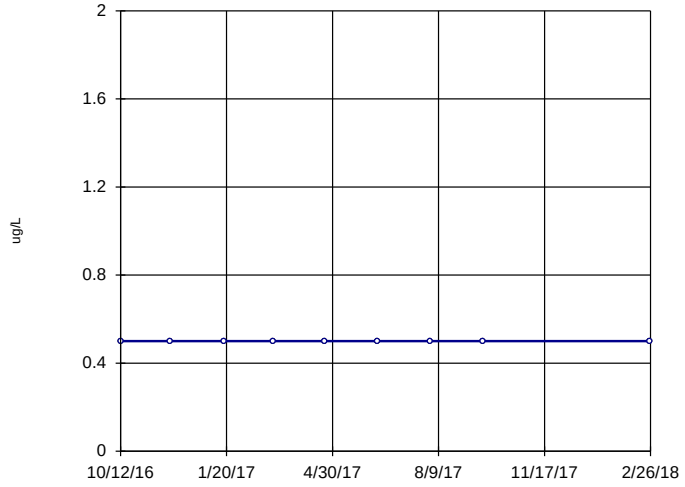
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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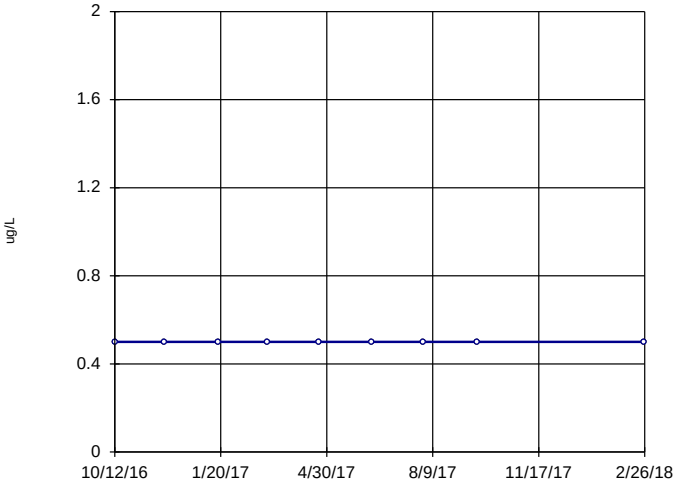
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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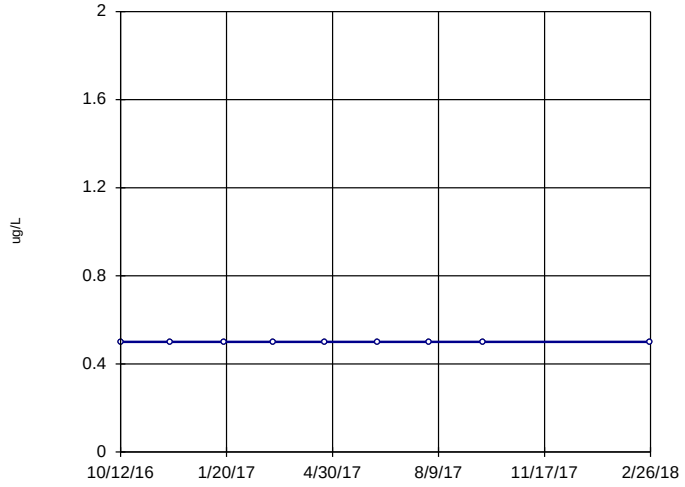
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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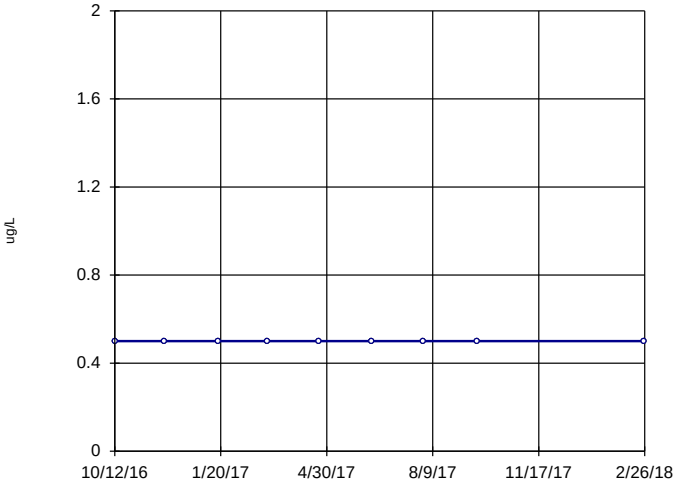
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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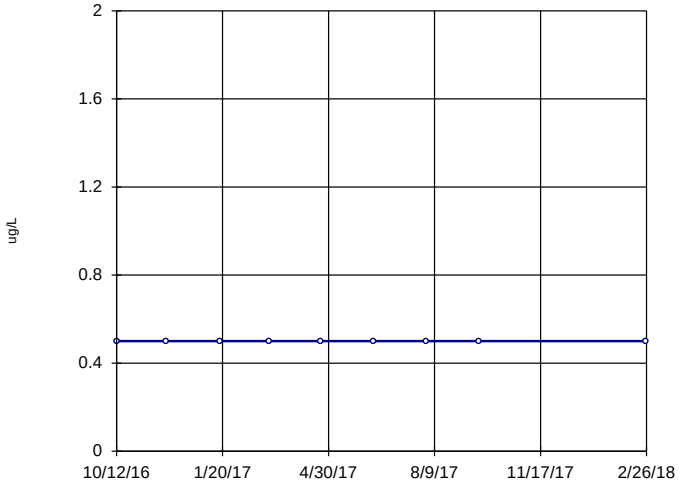
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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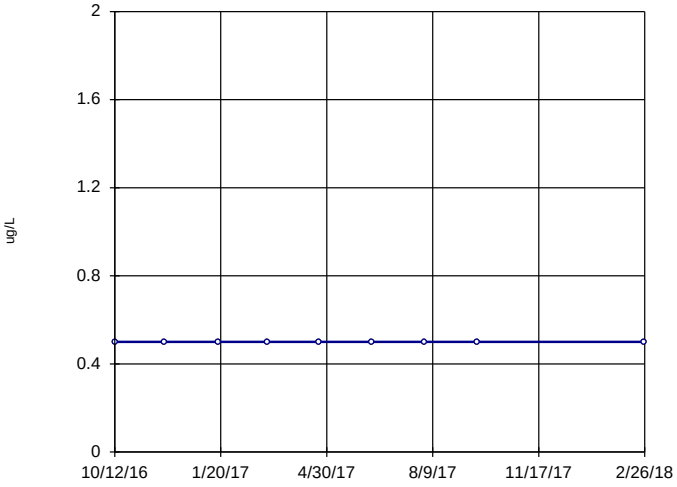
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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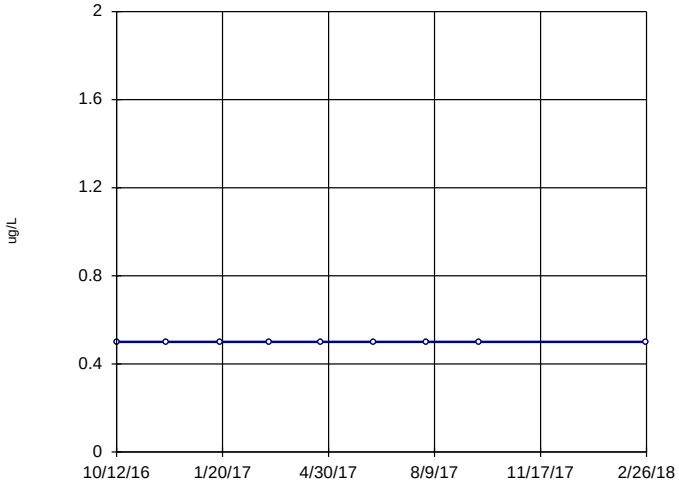
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Antimony [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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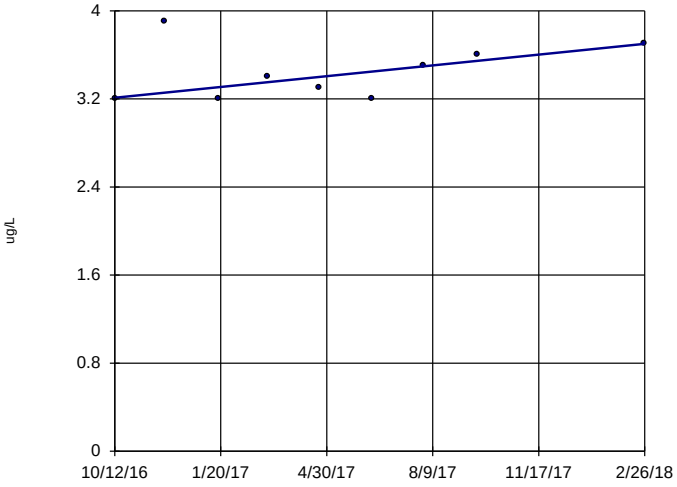
Sen's Slope Estimator

MW-1



n = 9

Slope = 0.3556 units per year.

Mann-Kendall statistic = 13 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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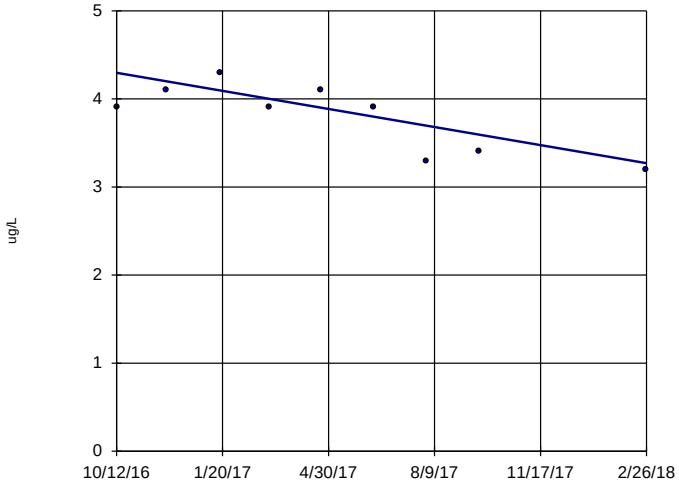
Sen's Slope Estimator

MW-2



n = 9

Slope = -0.7462 units per year.

Mann-Kendall statistic = -20 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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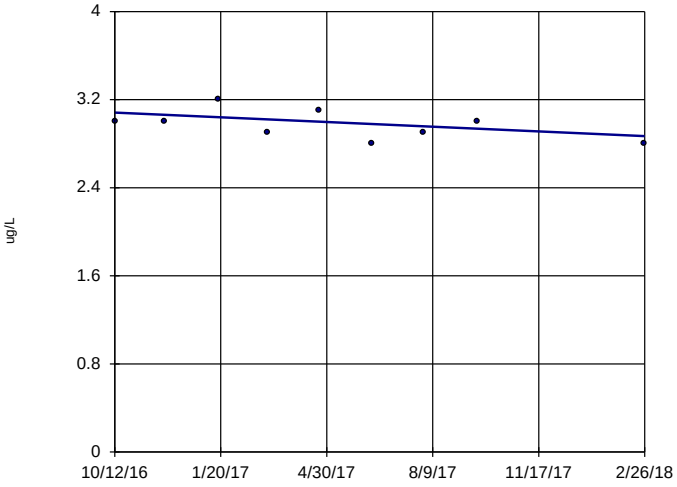
Sen's Slope Estimator

MW-3



n = 9

Slope = -0.1547 units per year.

Mann-Kendall statistic = -13 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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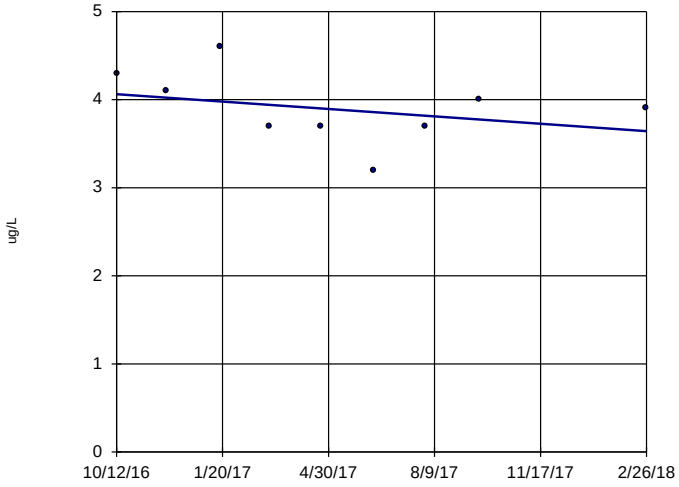
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = -0.305 units per year.

Mann-Kendall statistic = -11 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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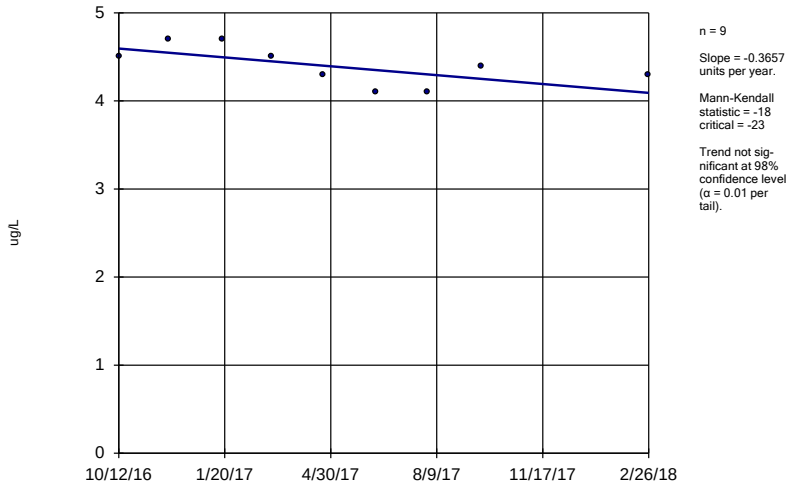
Sen's Slope Estimator

MW-5



n = 9

Slope = -0.3657 units per year.

Mann-Kendall statistic = -18 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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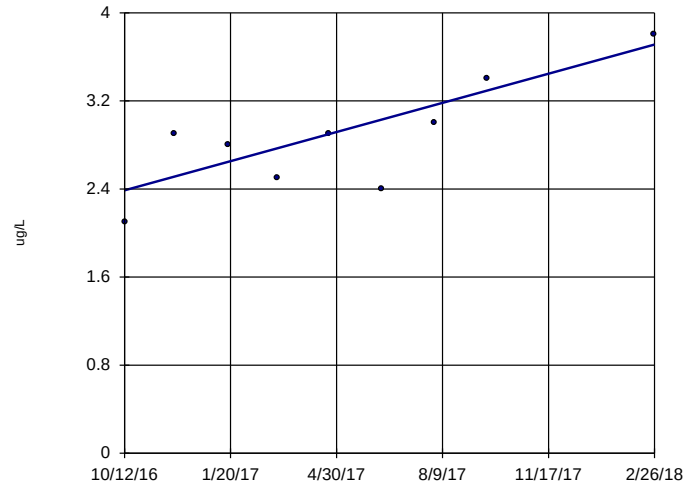
Sen's Slope Estimator

MW-6



n = 9

Slope = 0.9626 units per year.

Mann-Kendall statistic = 21 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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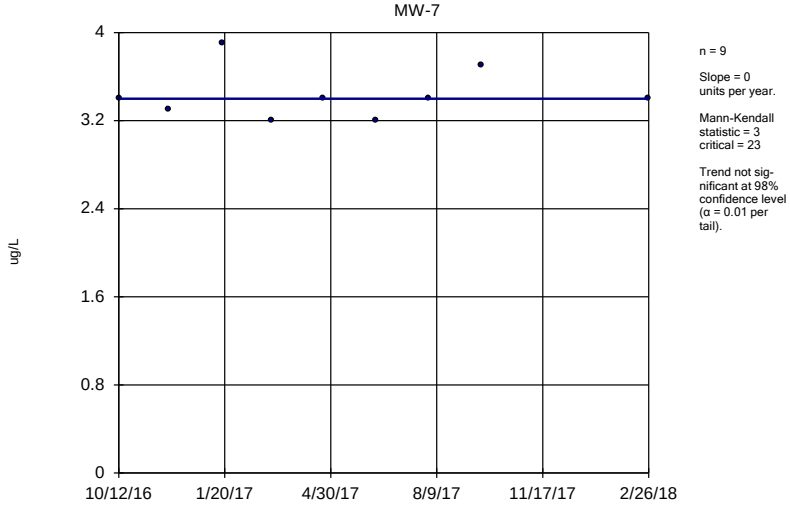
Sen's Slope Estimator

MW-7



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 3 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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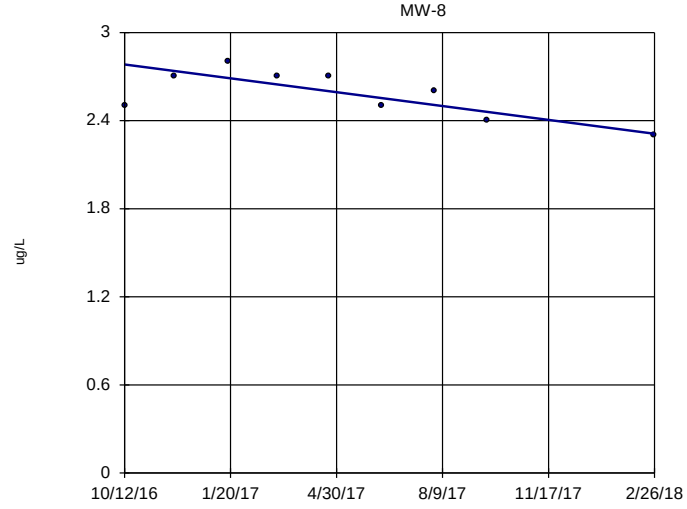
Sen's Slope Estimator

MW-8



n = 9

Slope = -0.3429 units per year.

Mann-Kendall statistic = -18 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Arsenic [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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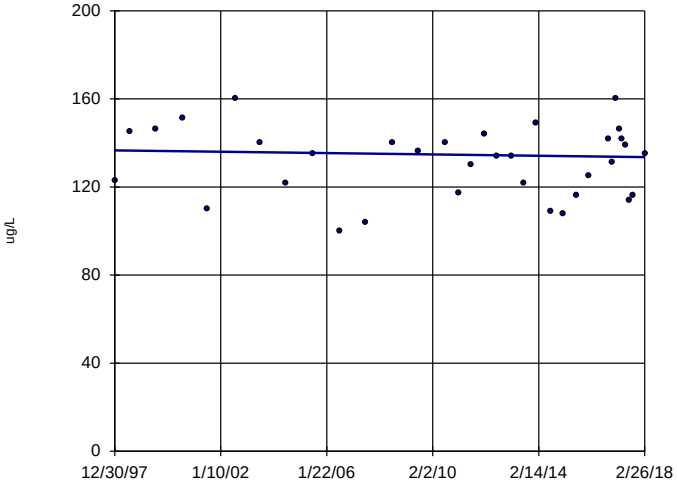
Sen's Slope Estimator

MW-1



n = 34

Slope = -0.1532 units per year.

Mann-Kendall statistic = -34 critical = -158

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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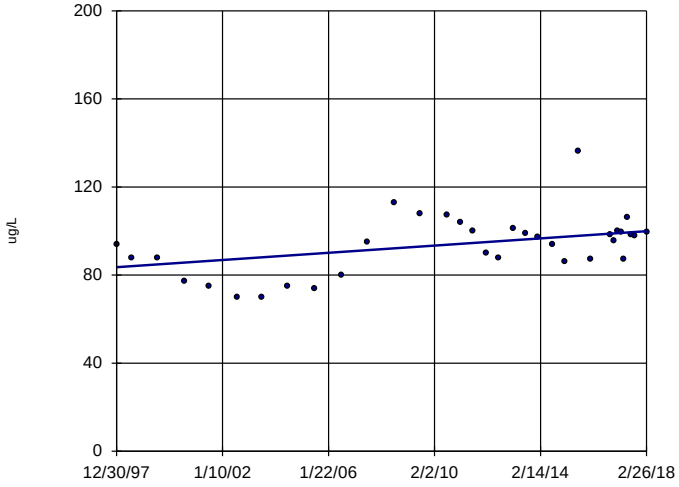
Sen's Slope Estimator

MW-2



n = 34

Slope = 0.8124 units per year.

Mann-Kendall statistic = 145 critical = 158

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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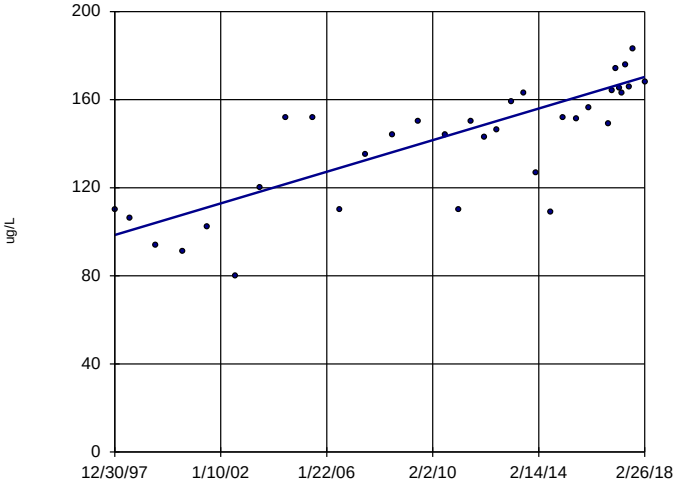
Sen's Slope Estimator

MW-3



n = 34

Slope = 3.559 units per year.

Mann-Kendall statistic = 356 critical = 158

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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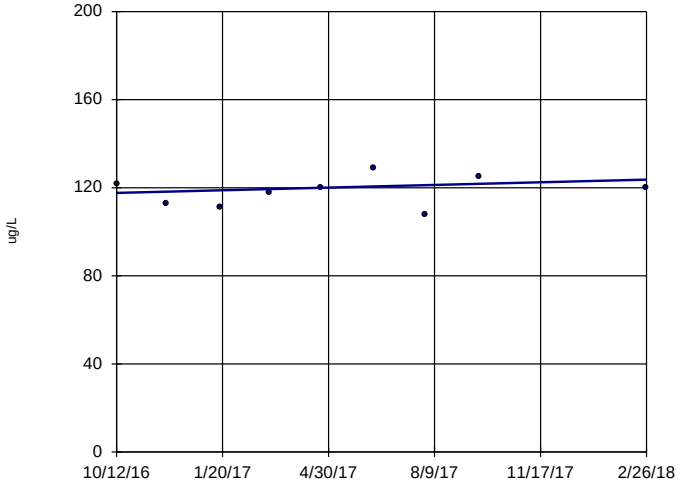
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 4.404 units per year.

Mann-Kendall statistic = 5 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

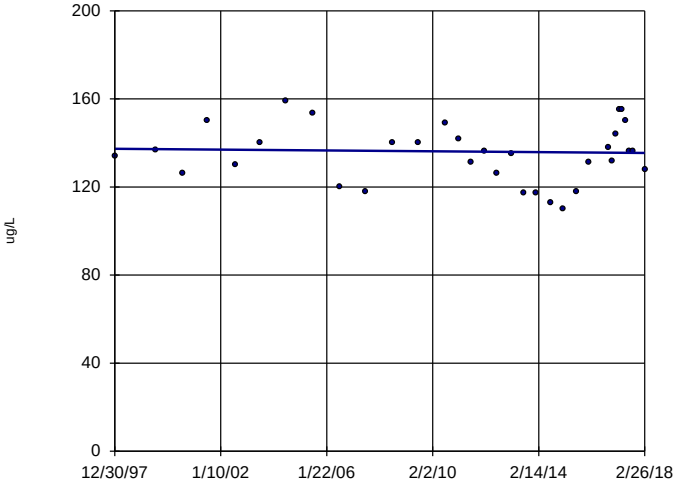
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 33

Slope = -0.09282 units per year.

Mann-Kendall statistic = -18 critical = -151

Trend not significant at 98% confidence level (α = 0.01 per tail).

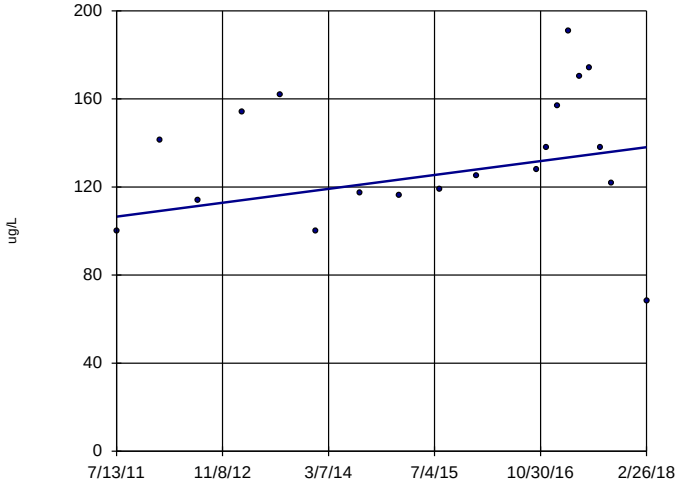
Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 19

Slope = 4.758 units per year.

Mann-Kendall statistic = 43 critical = 68

Trend not significant at 98% confidence level (α = 0.01 per tail).

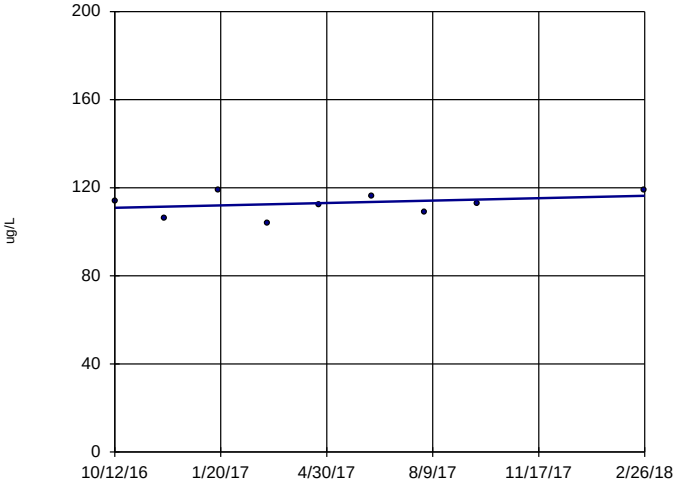
Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 3.932 units per year.

Mann-Kendall statistic = 7 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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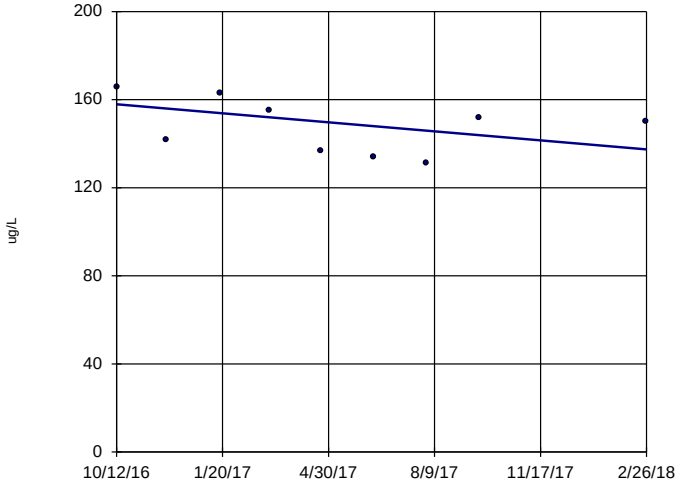
Sen's Slope Estimator

MW-8



n = 9

Slope = -14.9 units per year.

Mann-Kendall statistic = -16 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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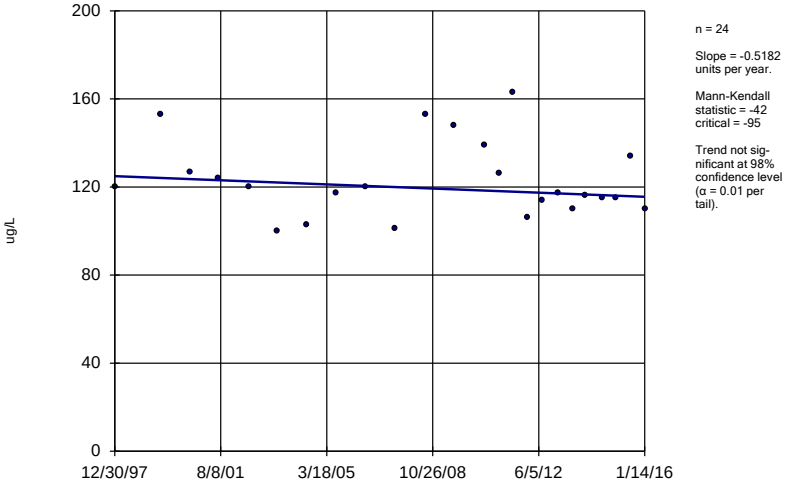
Sen's Slope Estimator

MW-4 (bg)



n = 24

Slope = -0.5182 units per year.

Mann-Kendall statistic = -42 critical = -95

Trend not significant at 98% confidence level (α = 0.01 per tail).

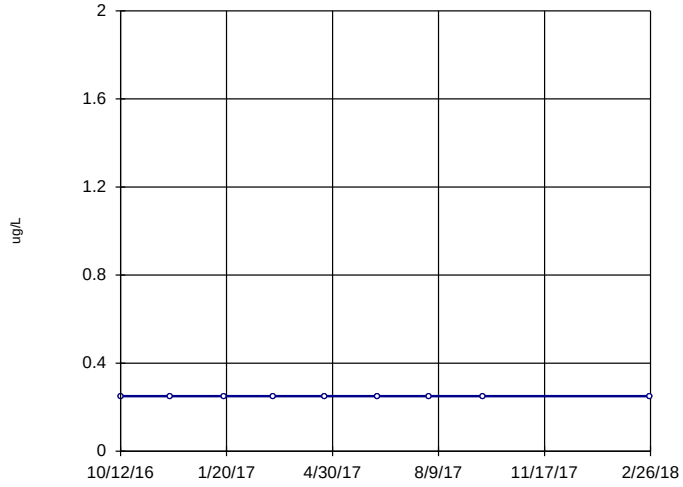
Constituent: Barium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

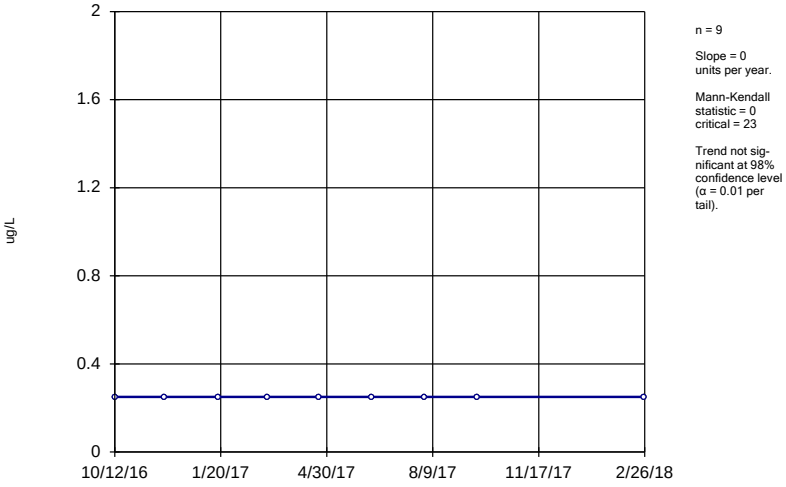
Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

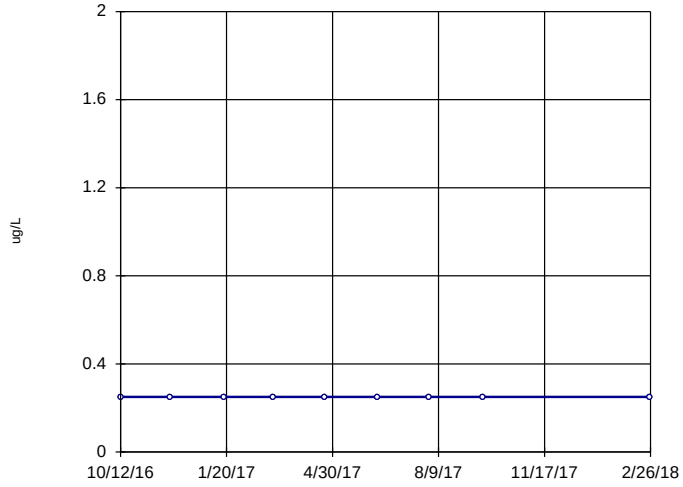
Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

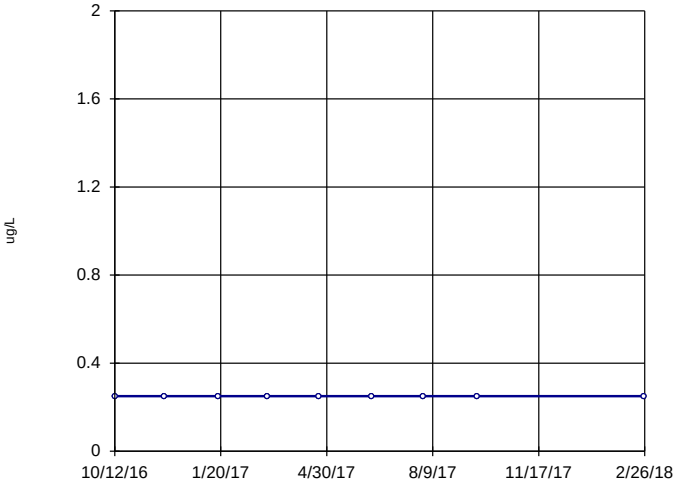
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

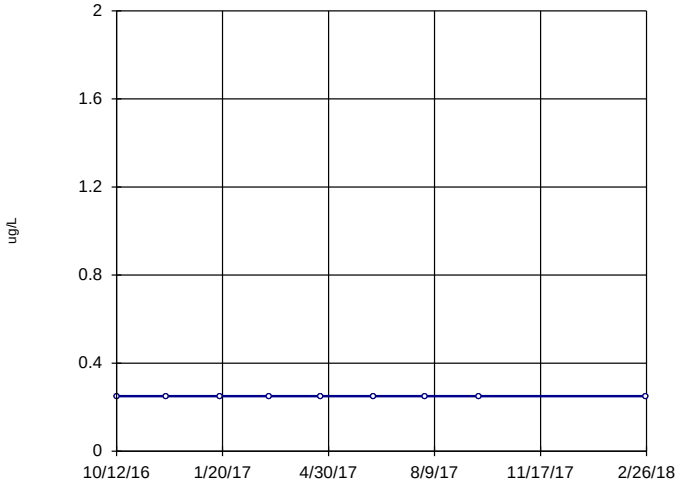
Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

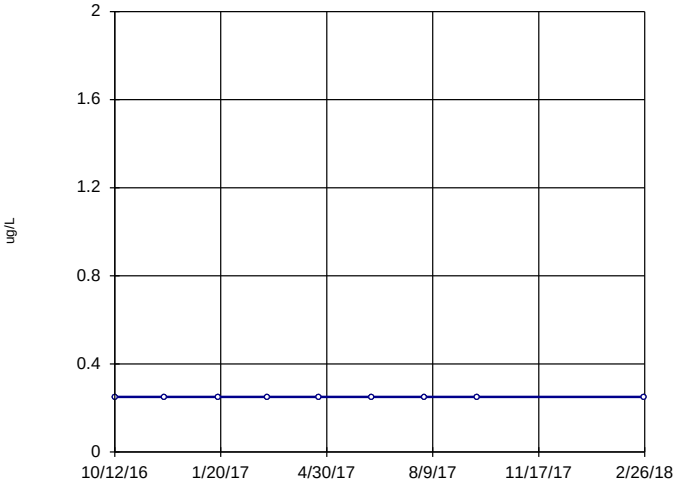
Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

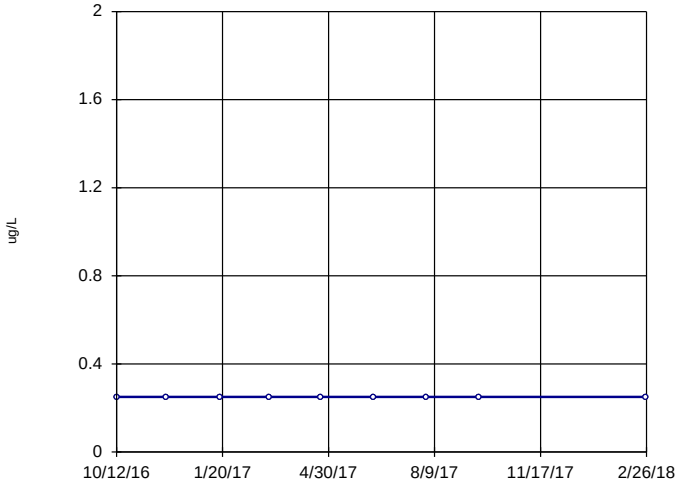
Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

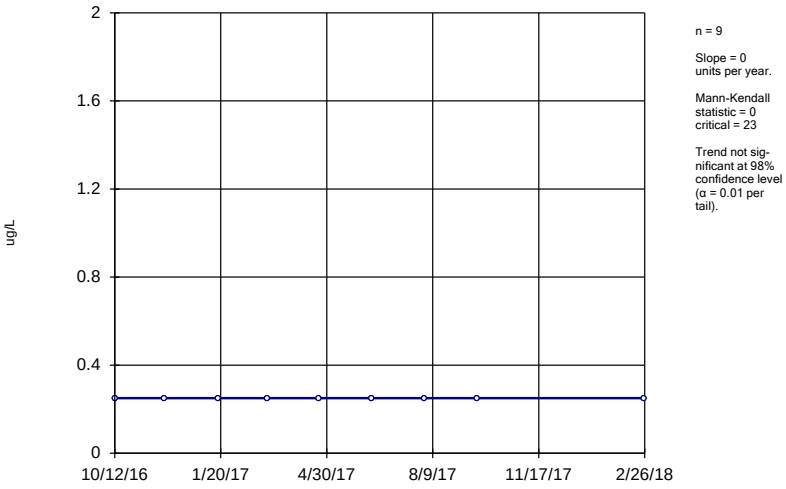
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

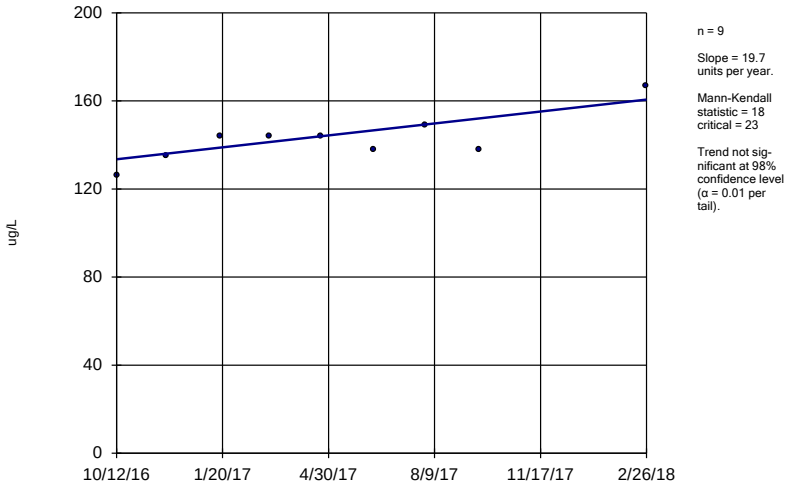
Constituent: BERYLIUM Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 9

Slope = 19.7 units per year.

Mann-Kendall statistic = 18 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

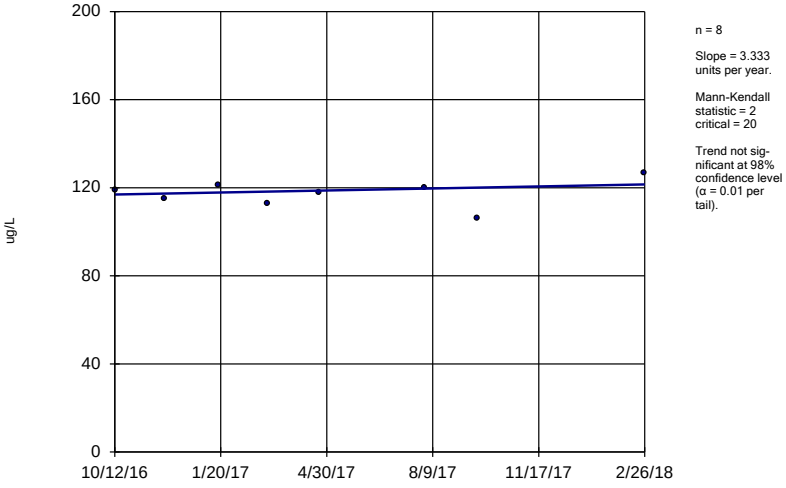
Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 8

Slope = 3.333 units per year.

Mann-Kendall statistic = 2 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

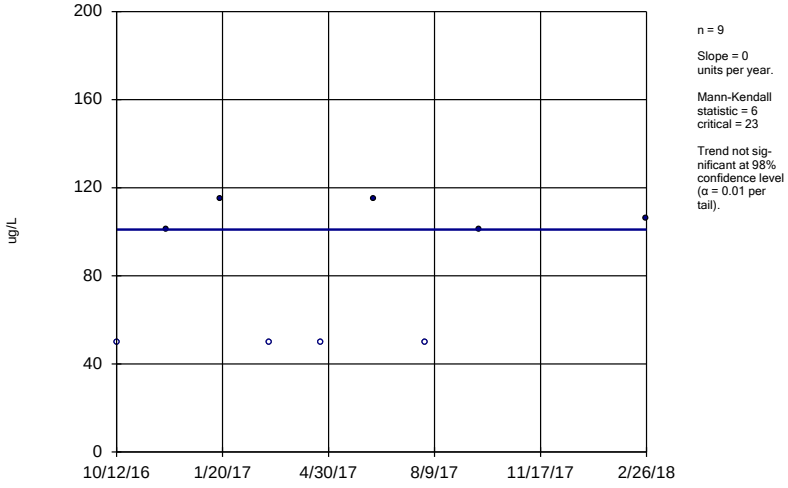
Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 6 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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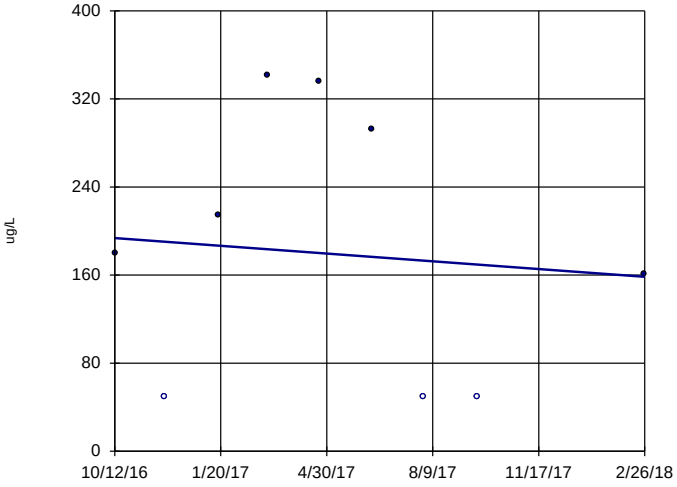
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = -25.53 units per year.

Mann-Kendall statistic = -5 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

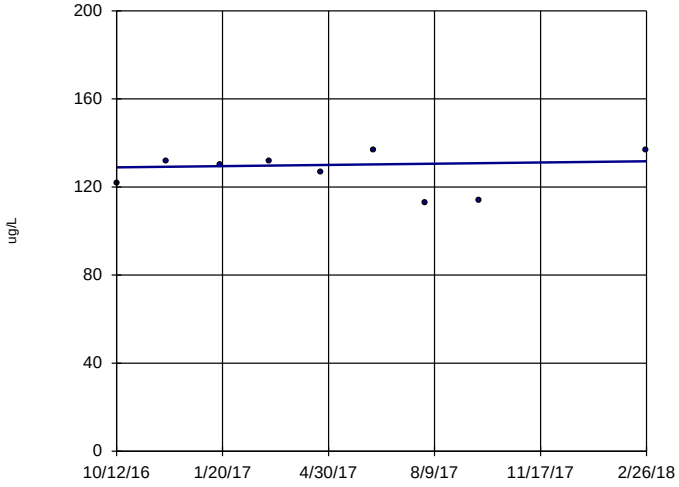
Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 9

Slope = 2.005 units per year.

Mann-Kendall statistic = 2 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

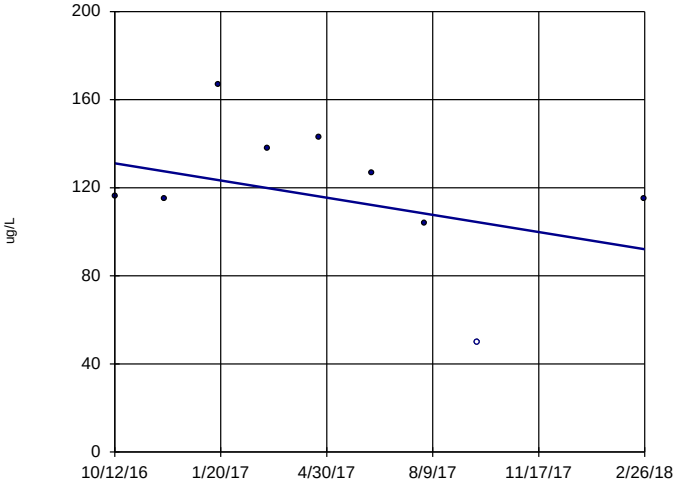
Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = -28.35 units per year.

Mann-Kendall statistic = -13 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

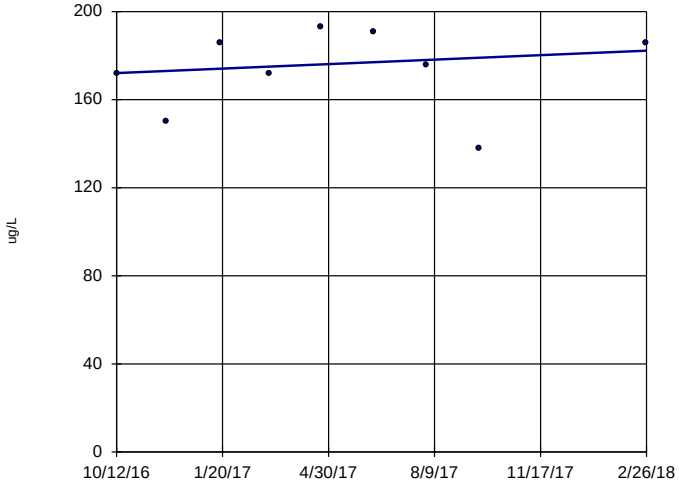
Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 7.424 units per year.

Mann-Kendall statistic = 4 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

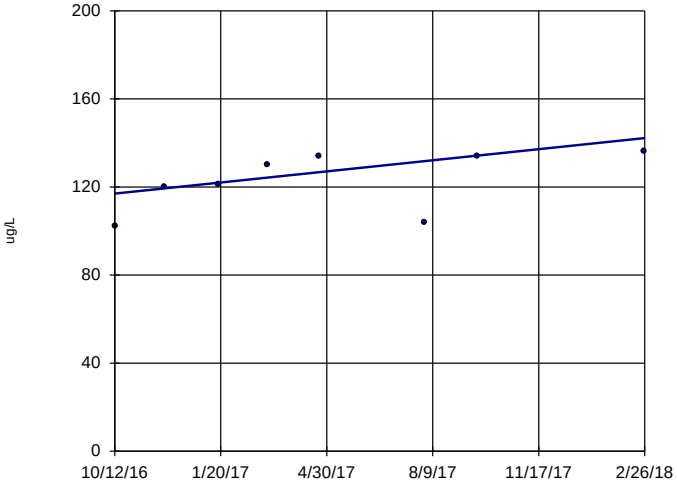
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 8

Slope = 18.32 units per year.

Mann-Kendall statistic = 19 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

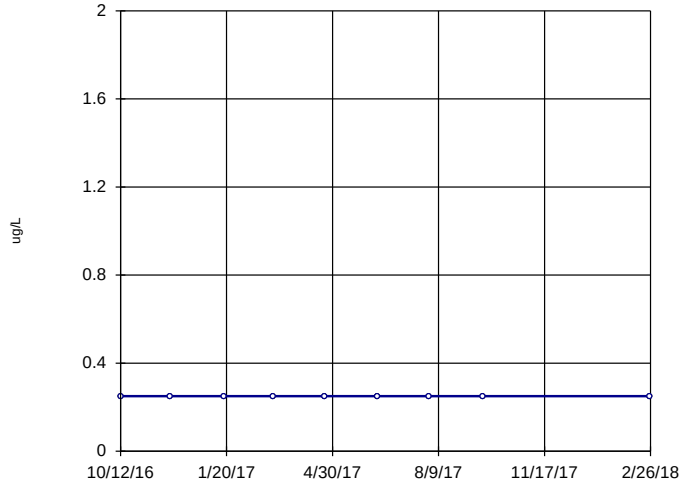
Constituent: Boron Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

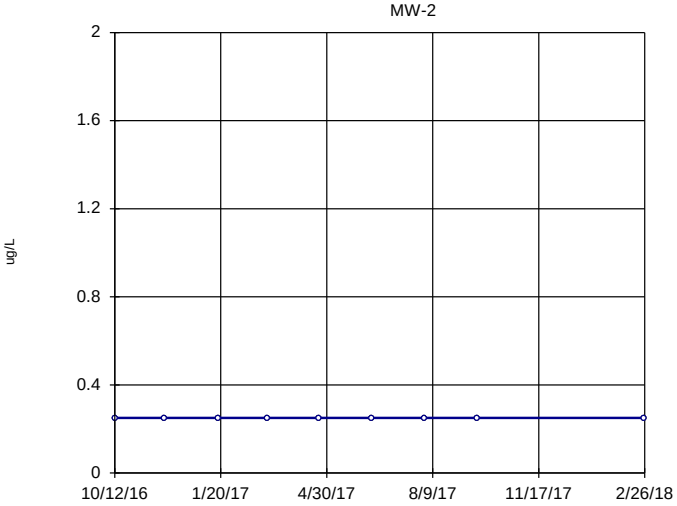
Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

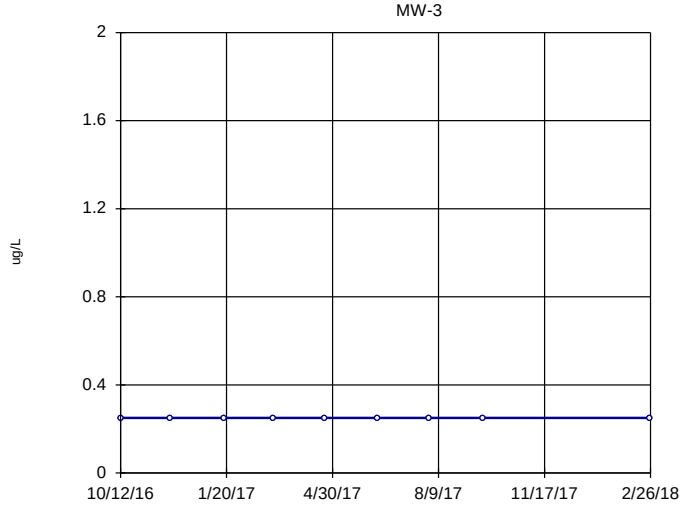
Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

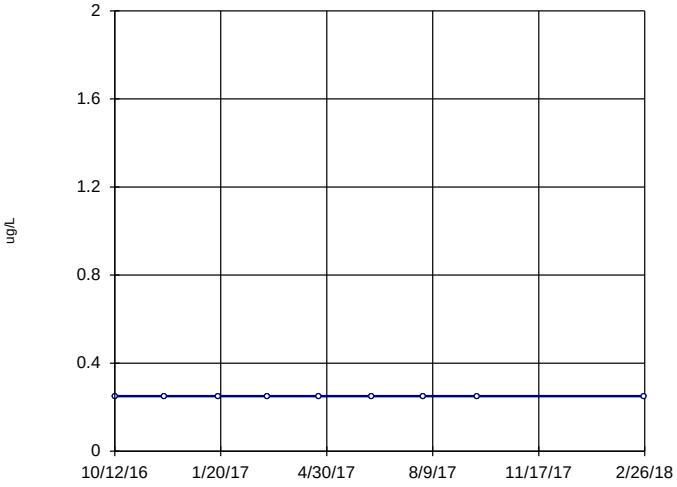
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

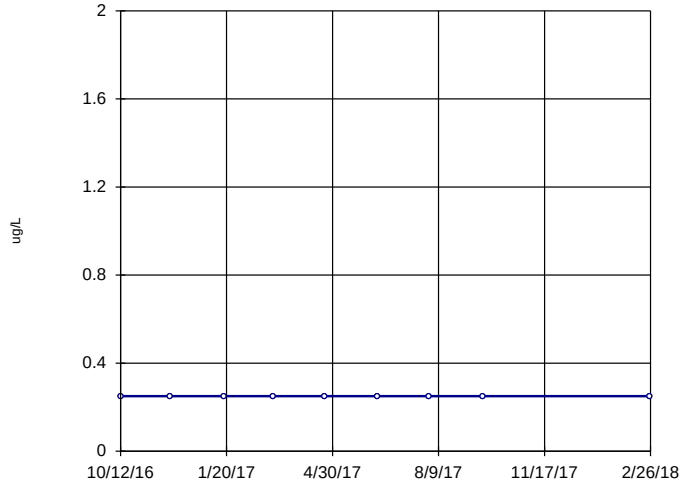
Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

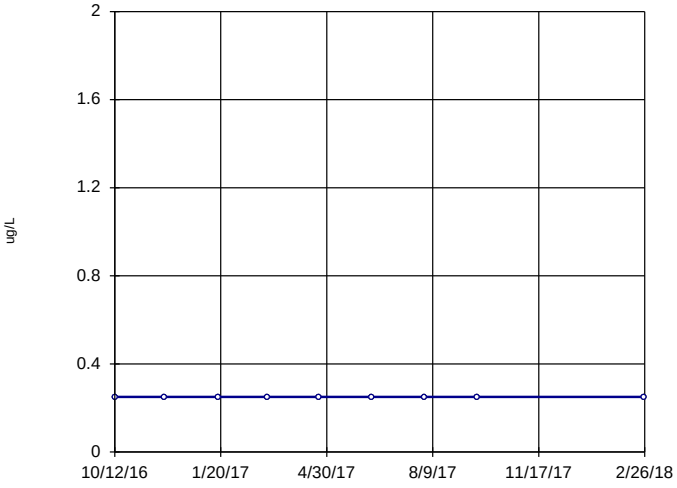
Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

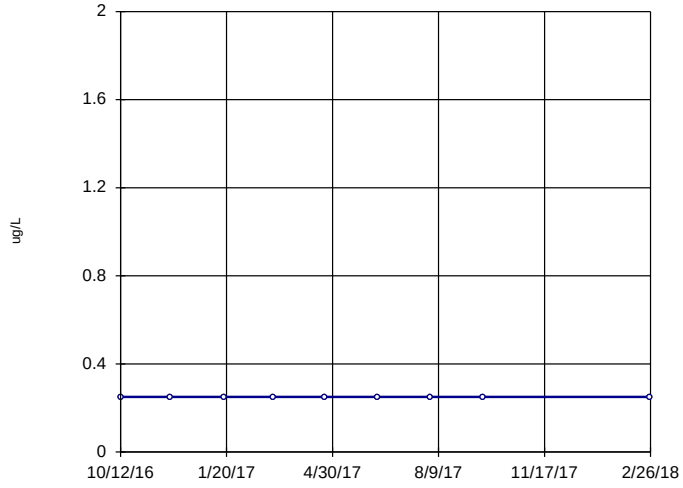
Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

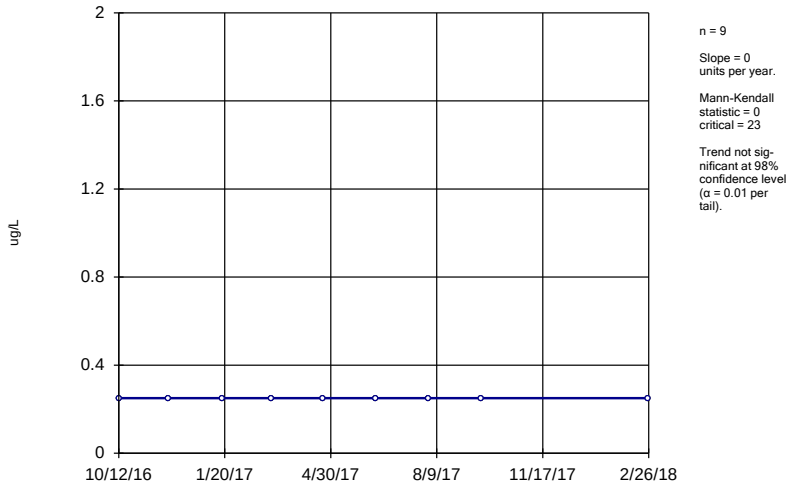
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

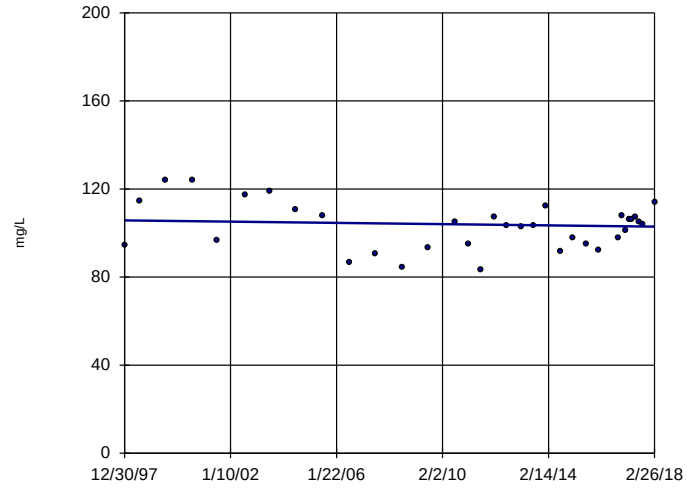
Constituent: Cadmium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 34

Slope = -0.141 units per year.

Mann-Kendall statistic = -18 critical = -158

Trend not significant at 98% confidence level (α = 0.01 per tail).

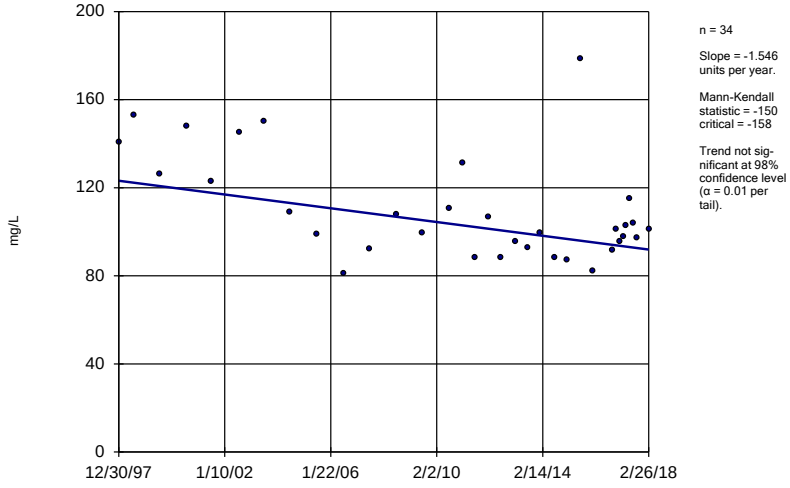
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 34

Slope = -1.546 units per year.

Mann-Kendall statistic = -150 critical = -158

Trend not significant at 98% confidence level (α = 0.01 per tail).

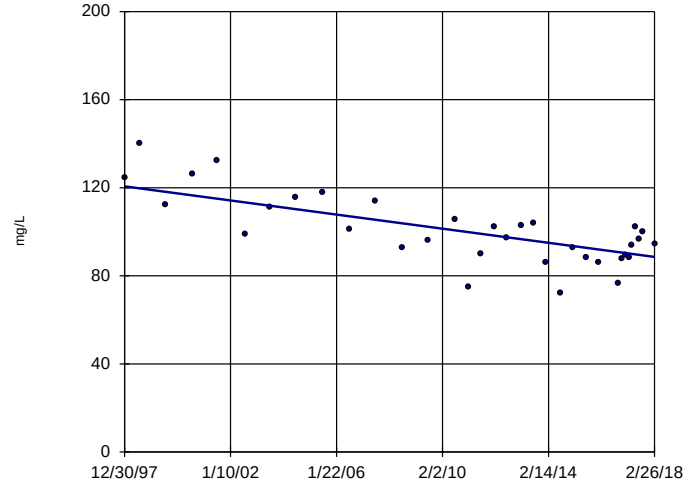
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-3



n = 34

Slope = -1.586 units per year.

Mann-Kendall statistic = -247 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

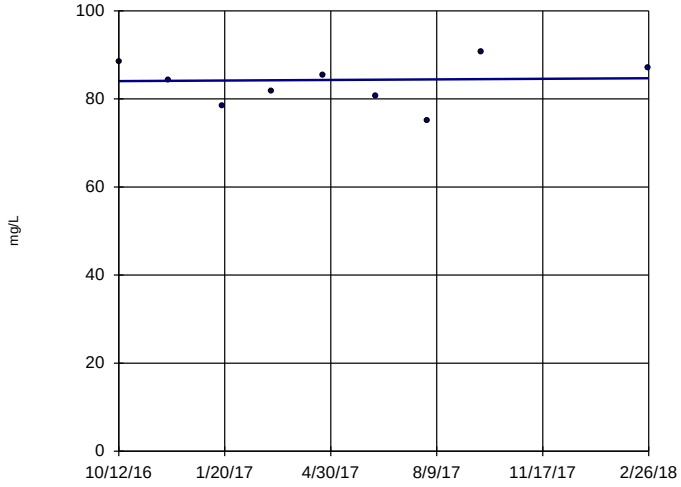
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0.462 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

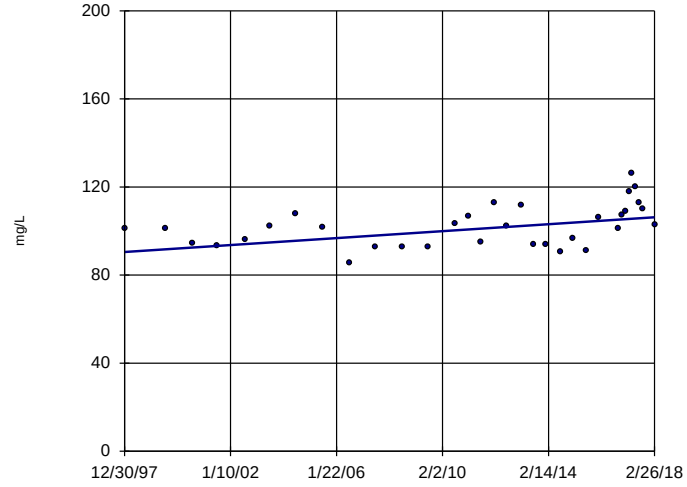
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 33

Slope = 0.7812 units per year.

Mann-Kendall statistic = 178 critical = 151

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

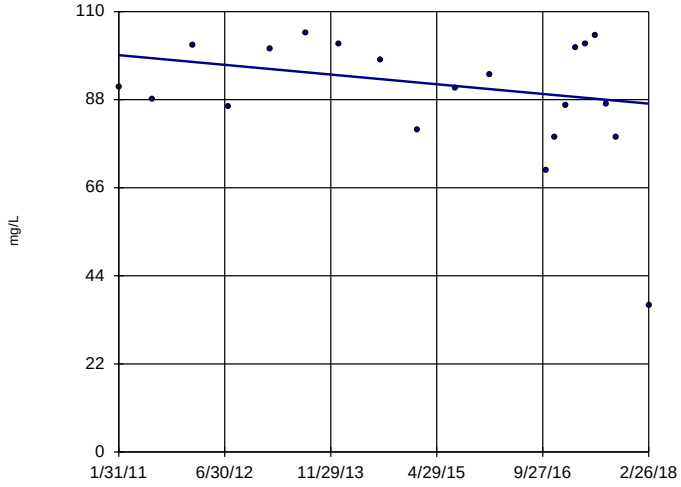
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 20

Slope = -1.709 units per year.

Mann-Kendall statistic = -37 critical = -73

Trend not significant at 98% confidence level (α = 0.01 per tail).

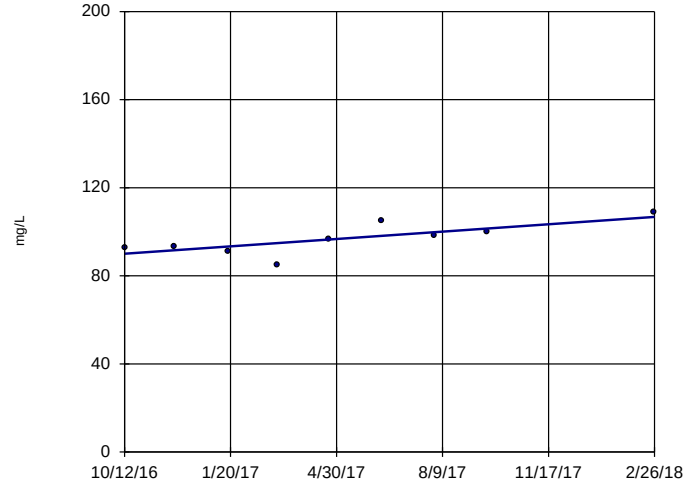
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 12.17 units per year.

Mann-Kendall statistic = 22 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

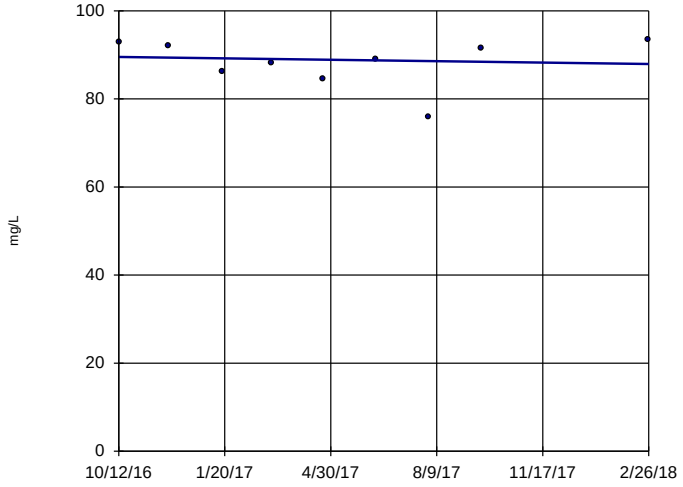
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = -1.176 units per year.

Mann-Kendall statistic = -2 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

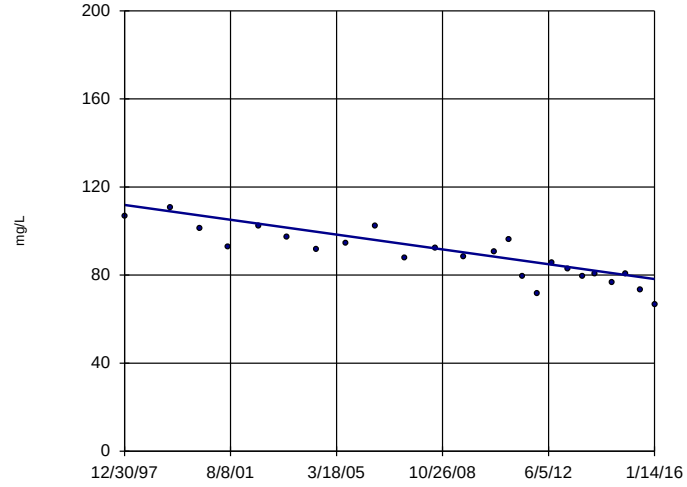
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4 (bg)



n = 24

Slope = -1.863 units per year.

Mann-Kendall statistic = -199 critical = -95

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

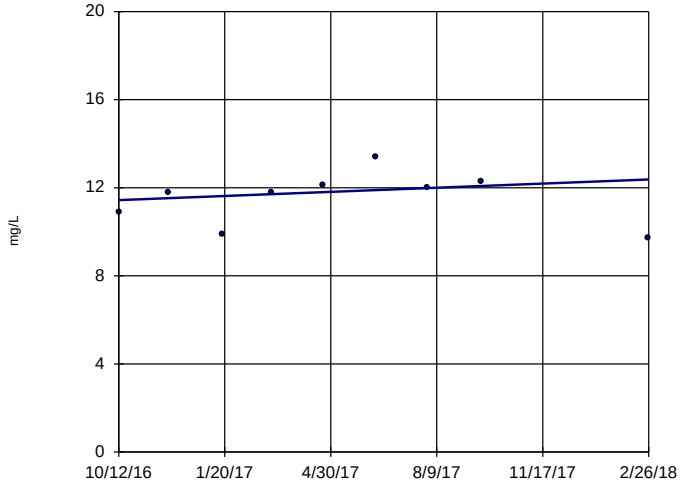
Constituent: Calcium Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 9

Slope = 0.6807 units per year.

Mann-Kendall statistic = 9 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

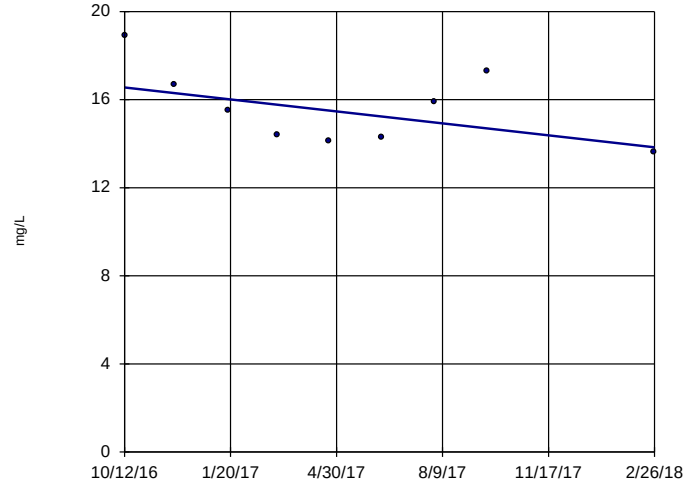
Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 9

Slope = -1.976 units per year.

Mann-Kendall statistic = -14 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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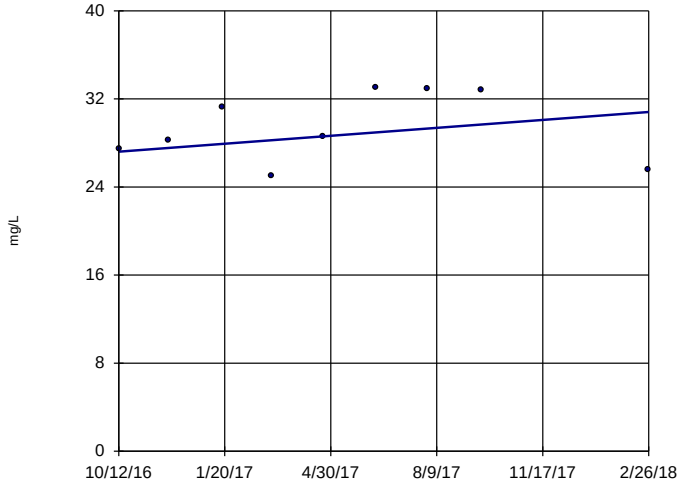
Sen's Slope Estimator

MW-3



n = 9

Slope = 2.623 units per year.

Mann-Kendall statistic = 8 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

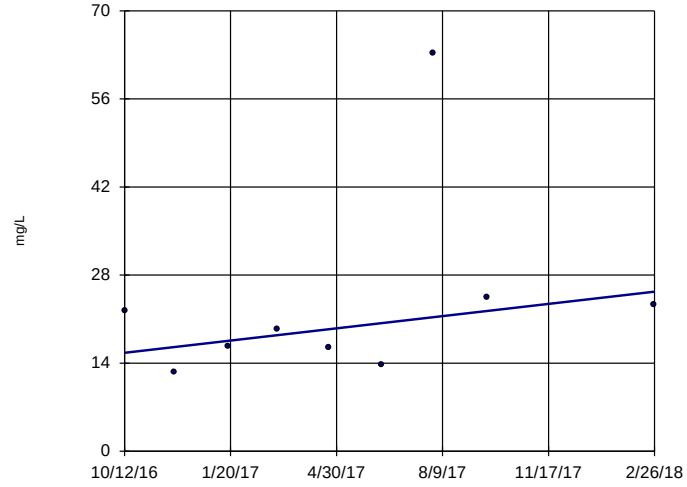
Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 7.07 units per year.

Mann-Kendall statistic = 10 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

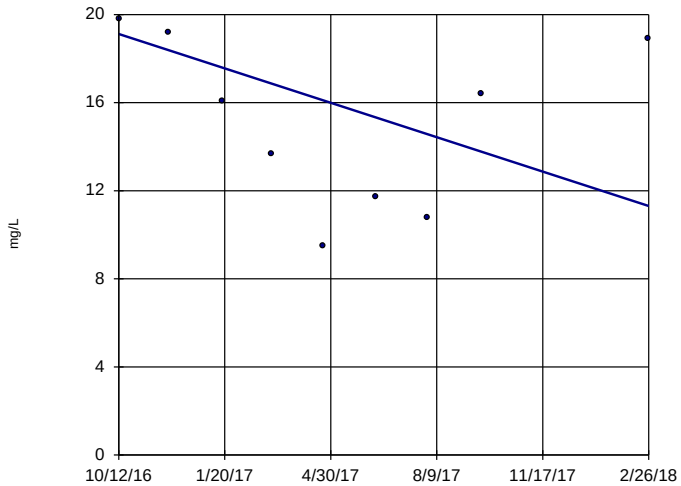
Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 9

Slope = -5.682 units per year.

Mann-Kendall statistic = -10 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

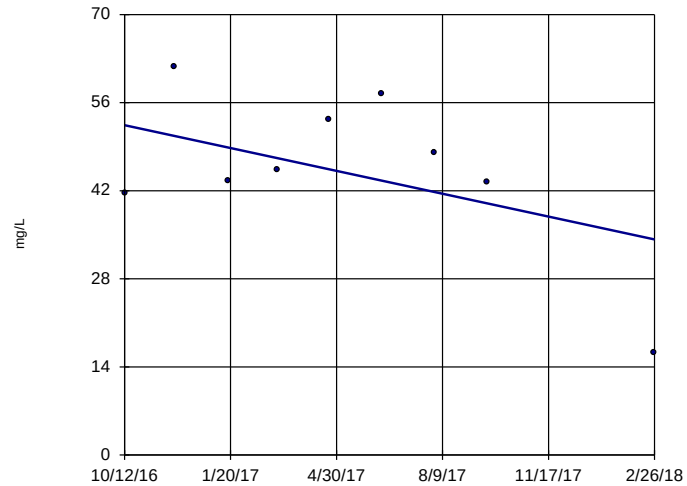
Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 9

Slope = -13.2 units per year.

Mann-Kendall statistic = -6 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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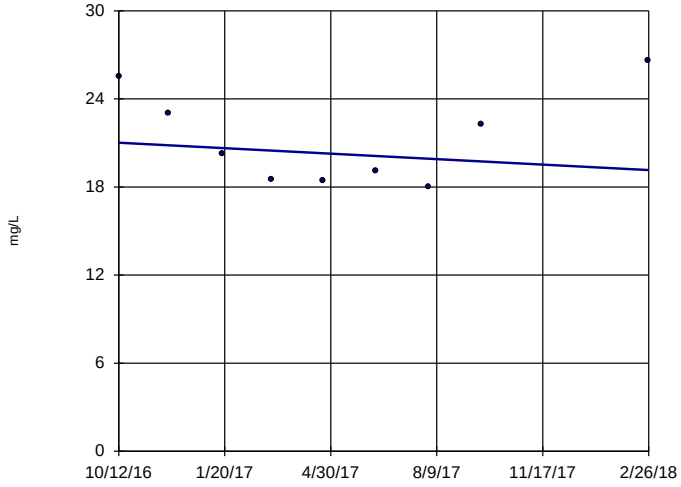
Sen's Slope Estimator

MW-7



n = 9

Slope = -1.354 units per year.

Mann-Kendall statistic = -6 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

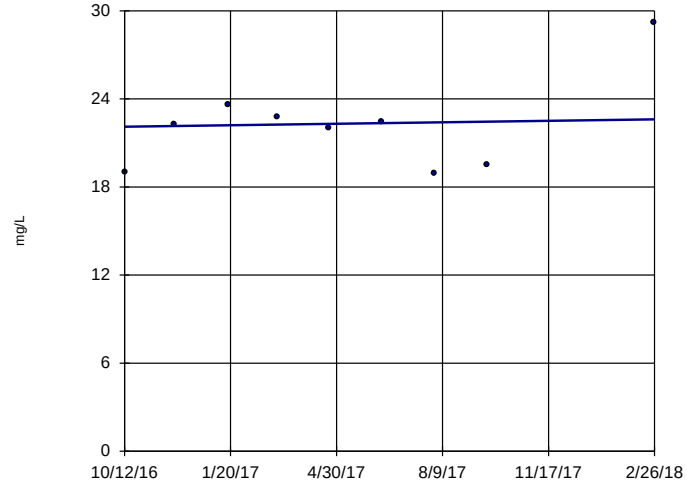
Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = 0.3591 units per year.

Mann-Kendall statistic = 2 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

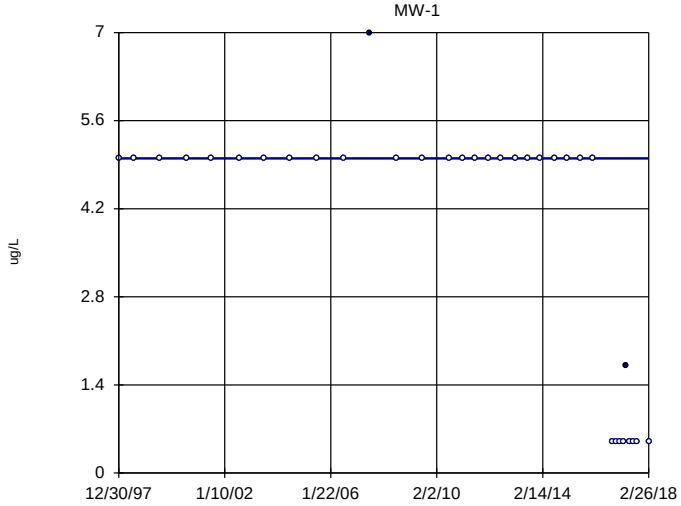
Constituent: Chloride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 34

Slope = 0 units per year.

Mann-Kendall statistic = -229 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

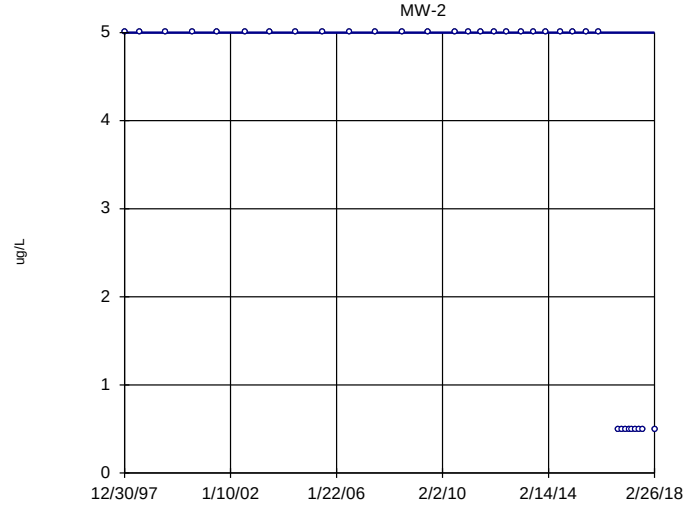
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 34

Slope = 0 units per year.

Mann-Kendall statistic = -225 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

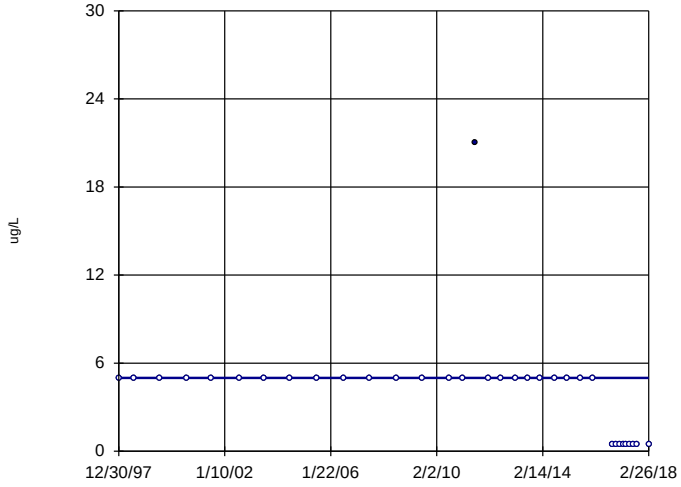
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 34

Slope = 0
units per year.

Mann-Kendall
statistic = -219
critical = -158

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

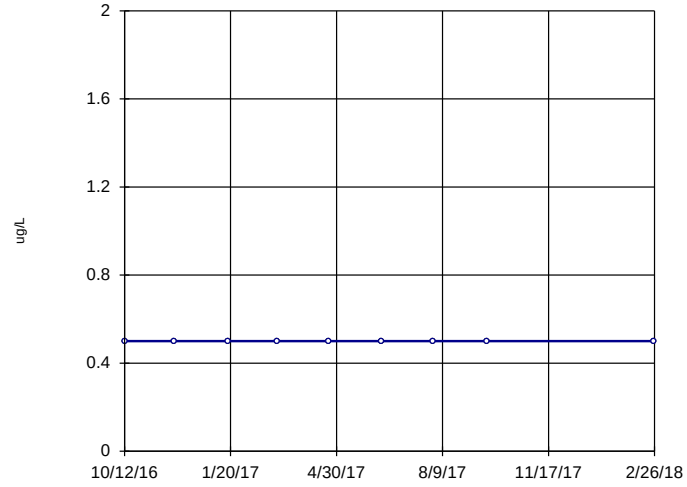
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

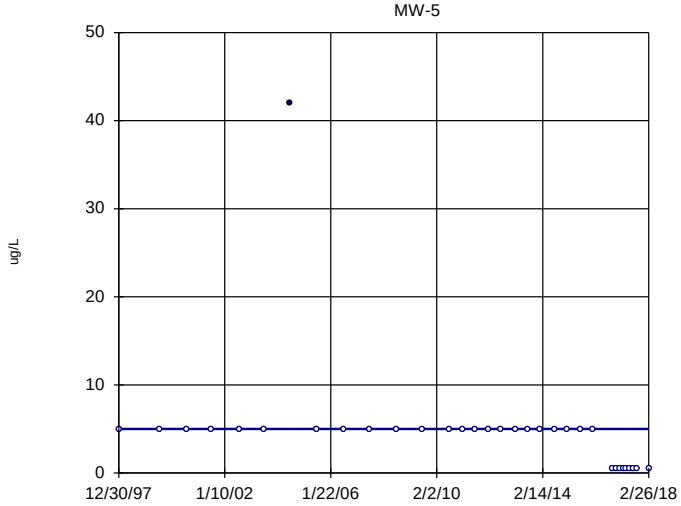
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 33

Slope = 0
units per year.

Mann-Kendall
statistic = -227
critical = -151

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

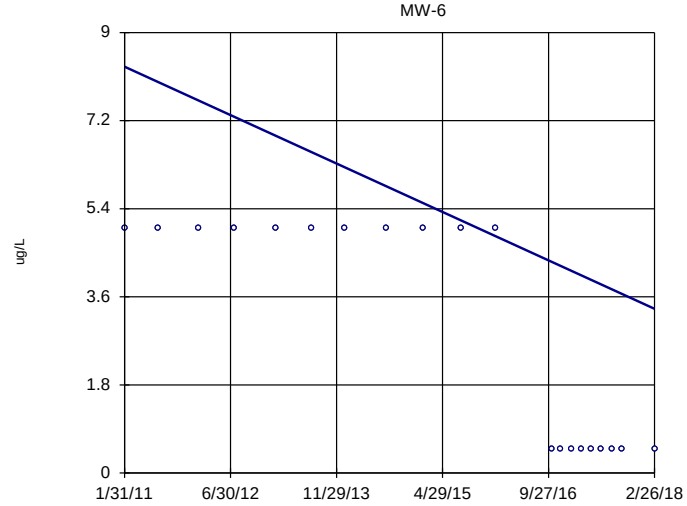
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 20

Slope = -0.6993
units per year.

Mann-Kendall
statistic = -99
critical = -73

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

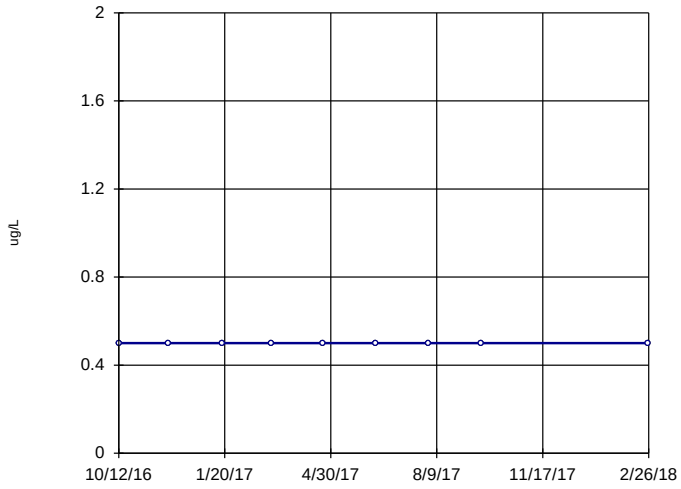
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

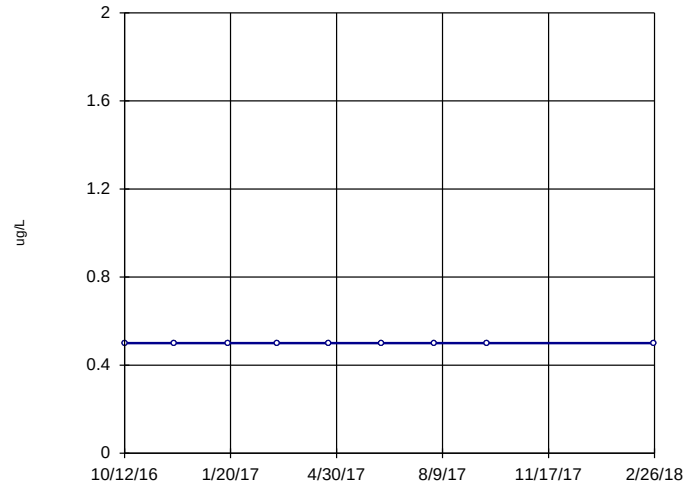
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

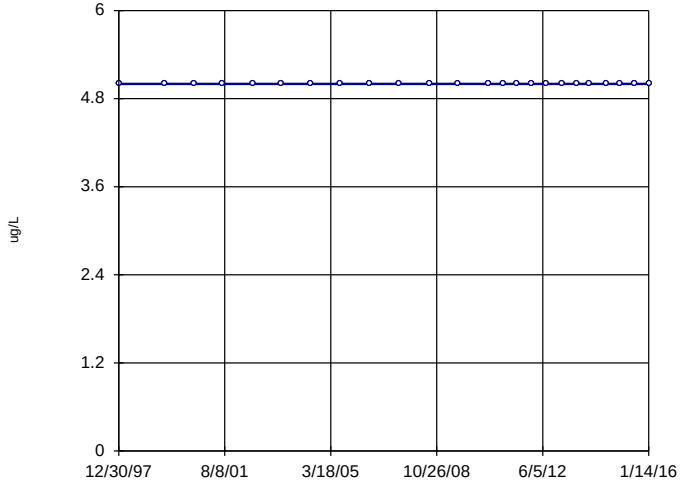
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4 (bg)



n = 24

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 95

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

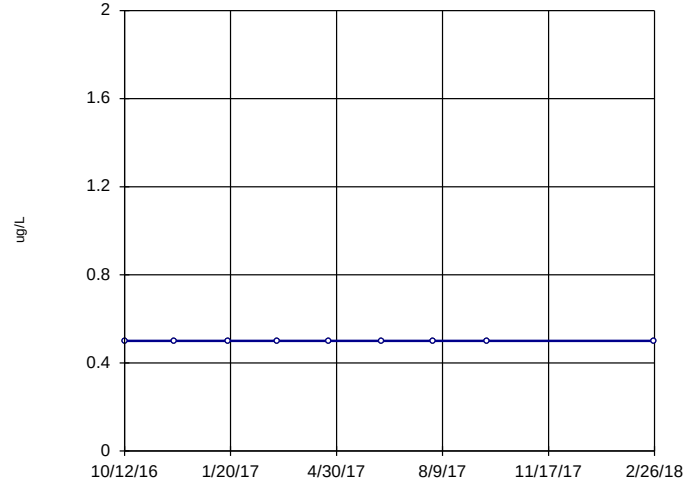
Constituent: Chromium [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

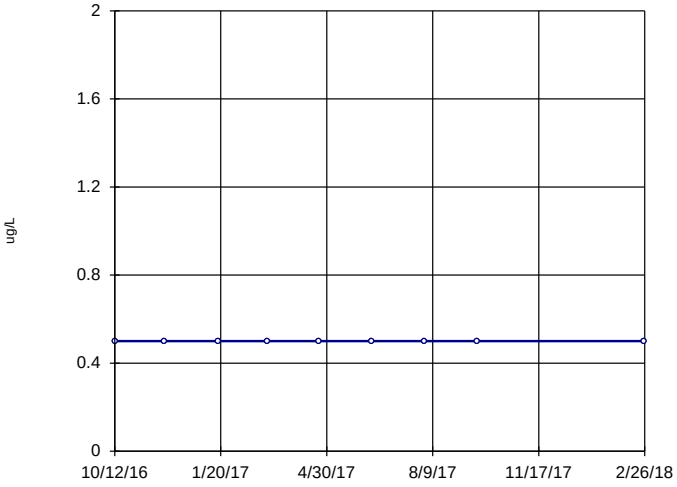
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

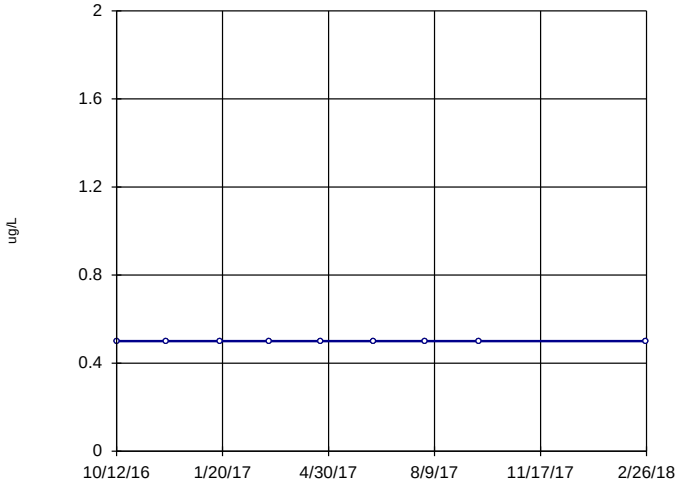
Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

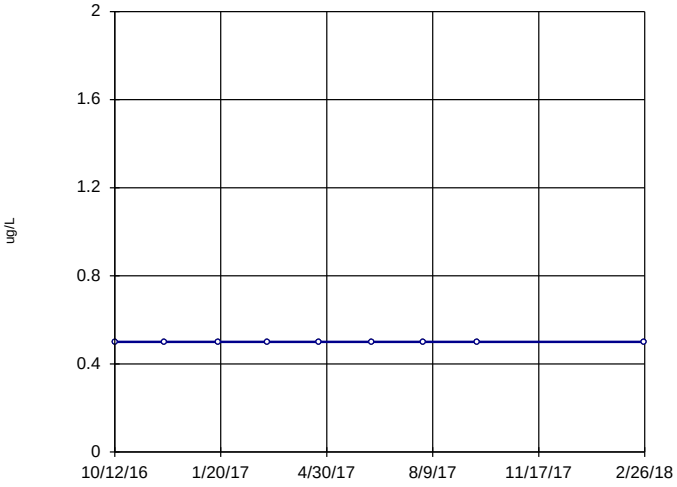
Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

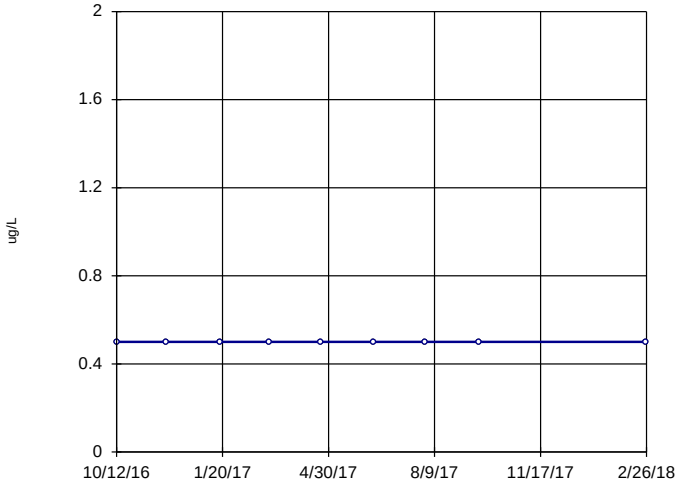
Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

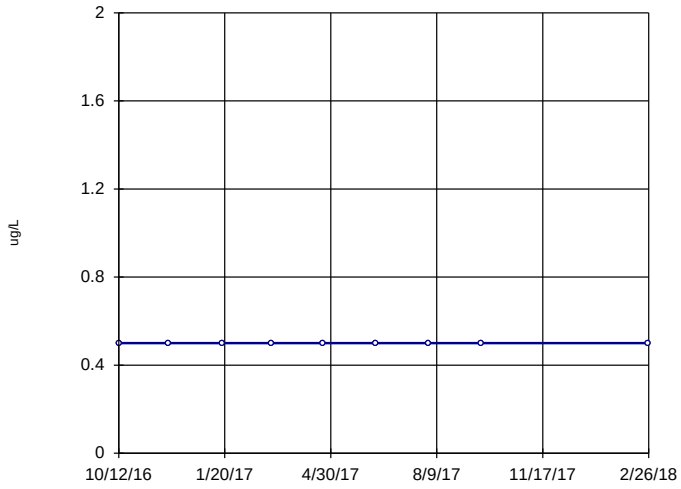
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

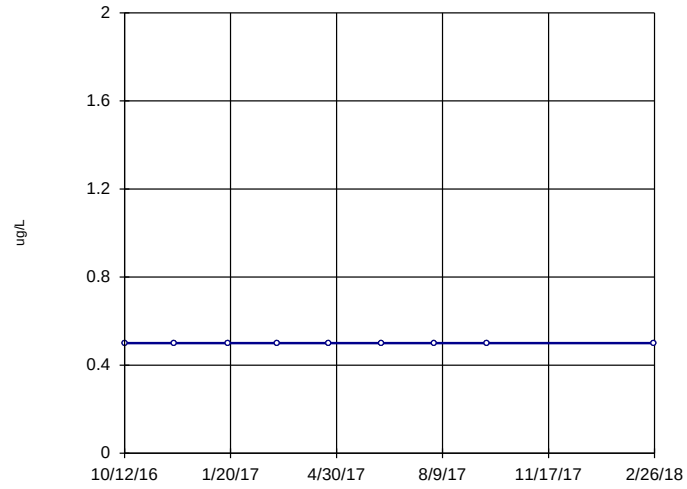
Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

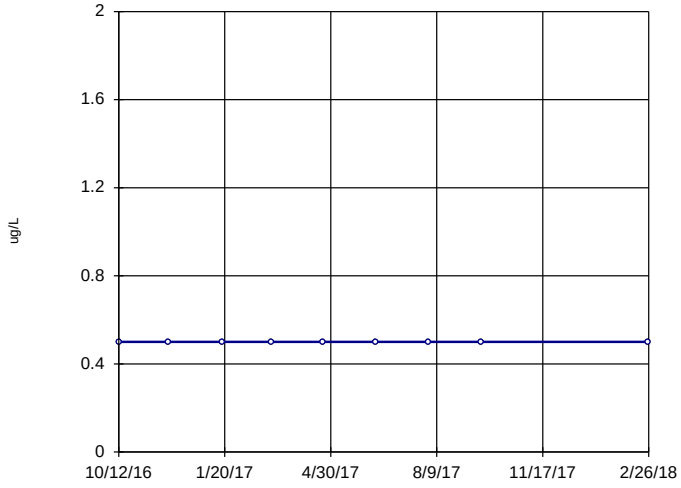
Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

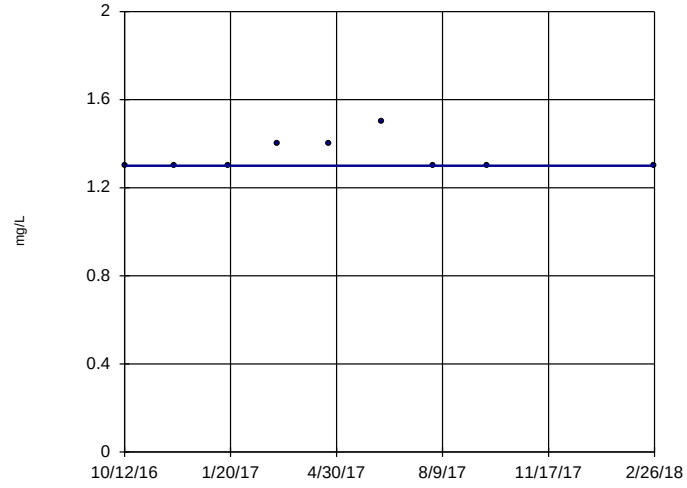
Constituent: Cobalt [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 2
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

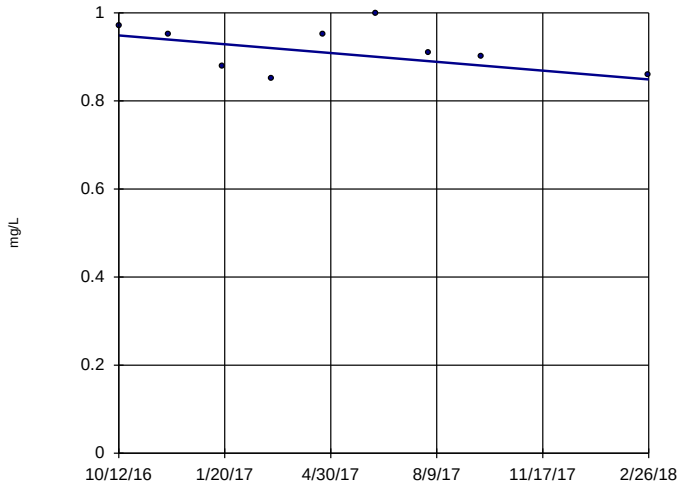
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 9

Slope = -0.0726 units per year.

Mann-Kendall statistic = -11 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

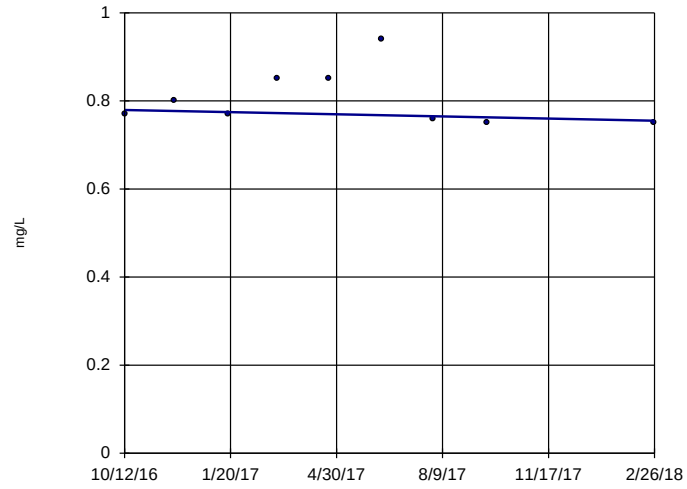
Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-3



n = 9

Slope = -0.01773 units per year.

Mann-Kendall statistic = -9 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

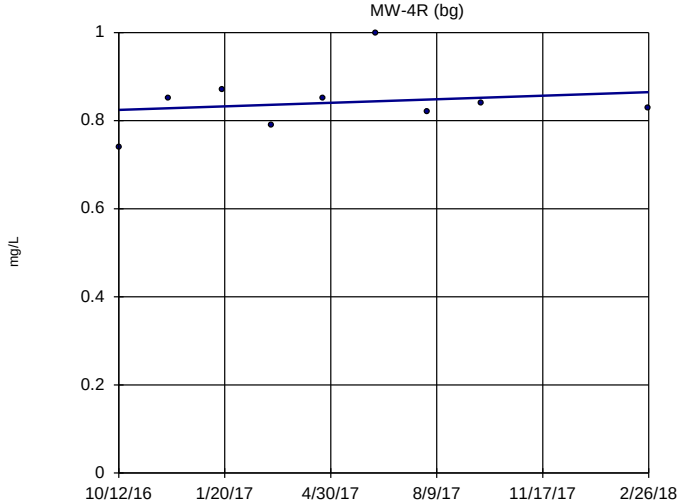
Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0.02914 units per year.

Mann-Kendall statistic = 3 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

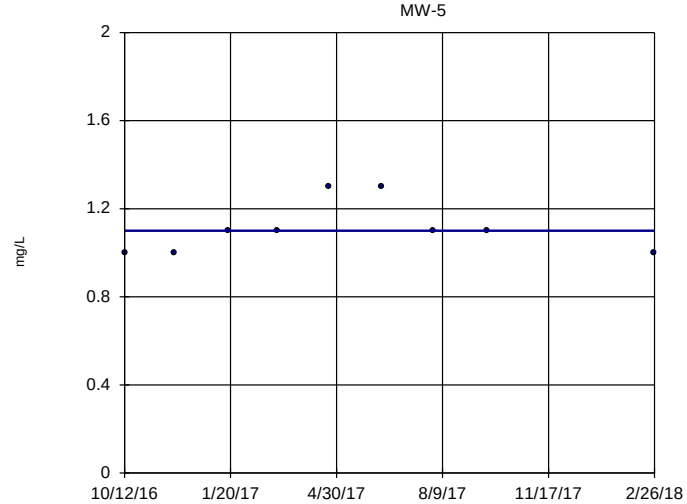
Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 6 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

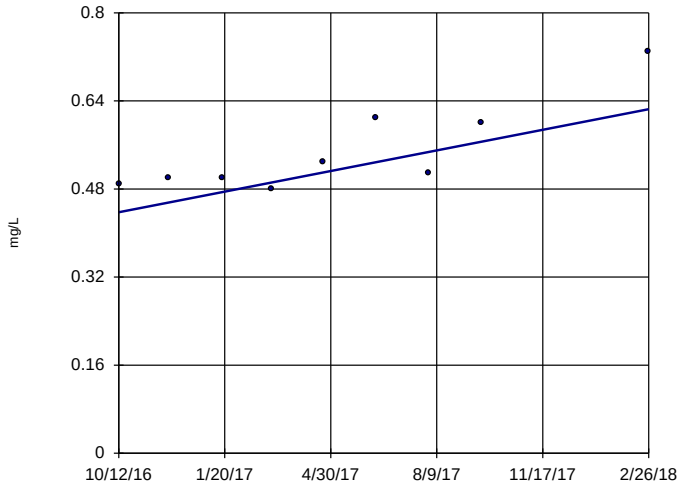
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 9

Slope = 0.1361 units per year.

Mann-Kendall statistic = 23 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

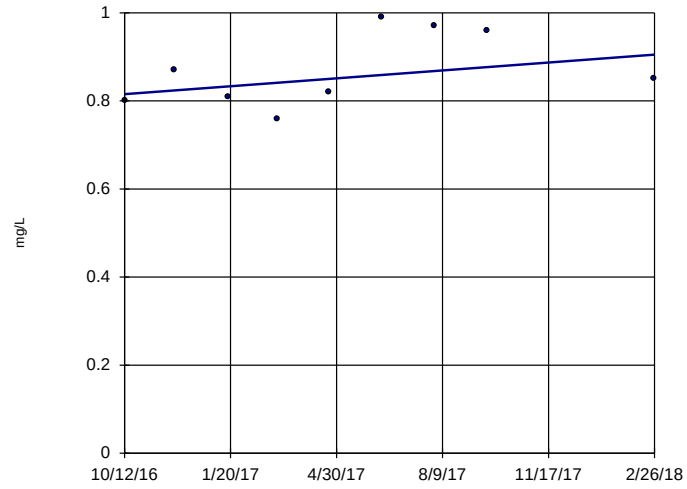
Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 0.06502 units per year.

Mann-Kendall statistic = 12 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

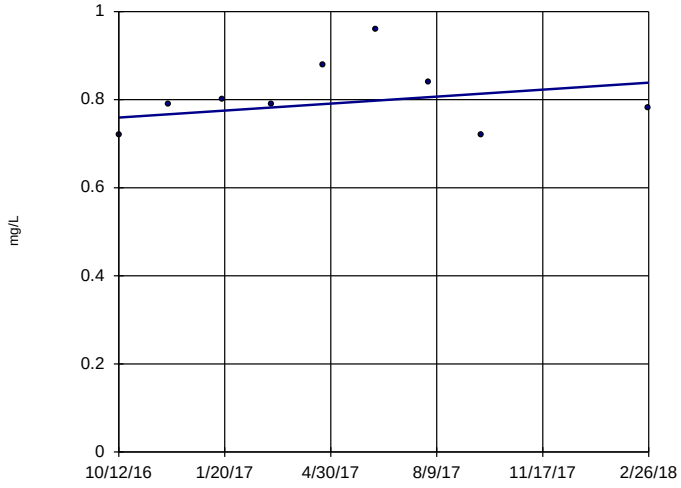
Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = 0.0576 units per year.

Mann-Kendall statistic = 4 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

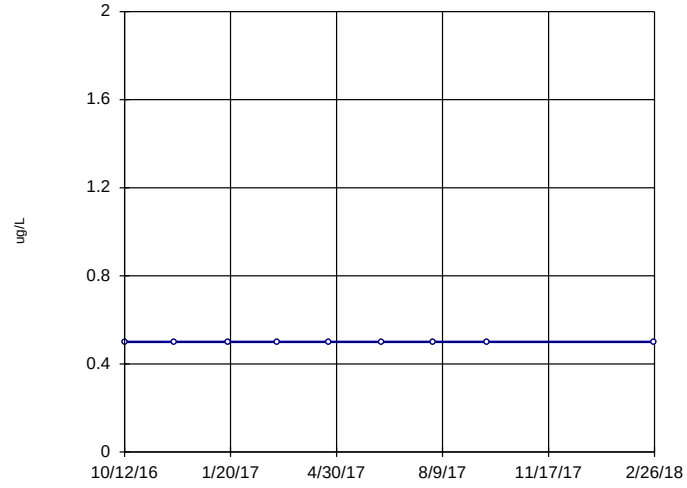
Constituent: Fluoride Analysis Run 6/20/2018 9:49 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lead [total] Analysis Run 6/20/2018 9:49 AM View: Outliers

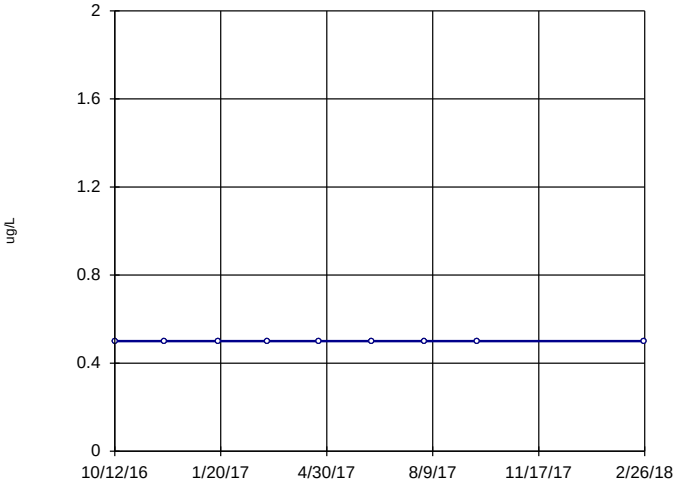
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

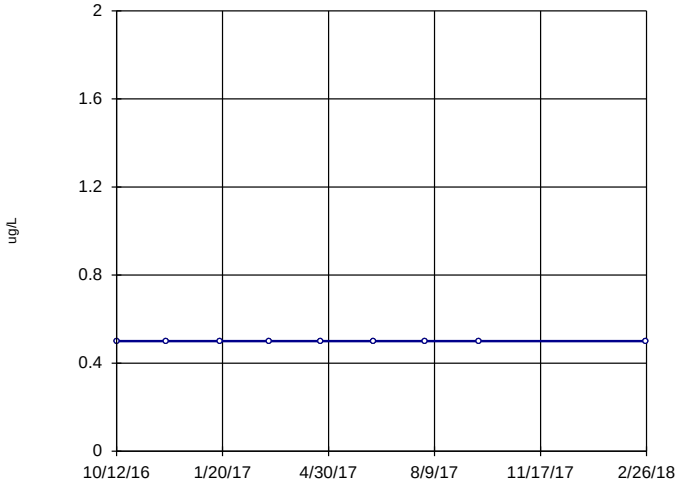
Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

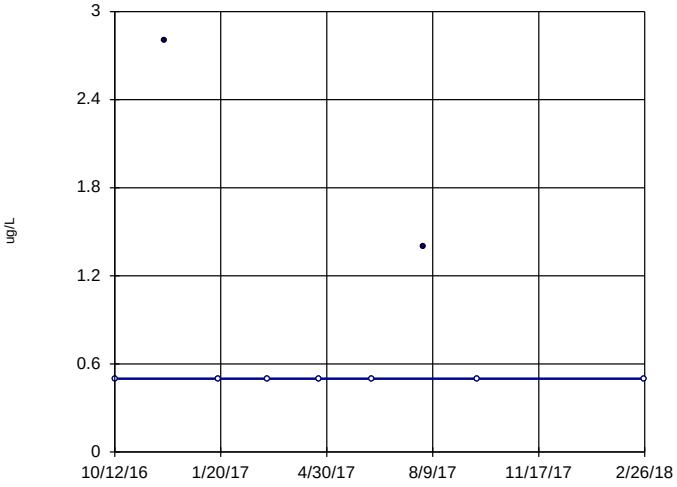
Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = -3
critical = -23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

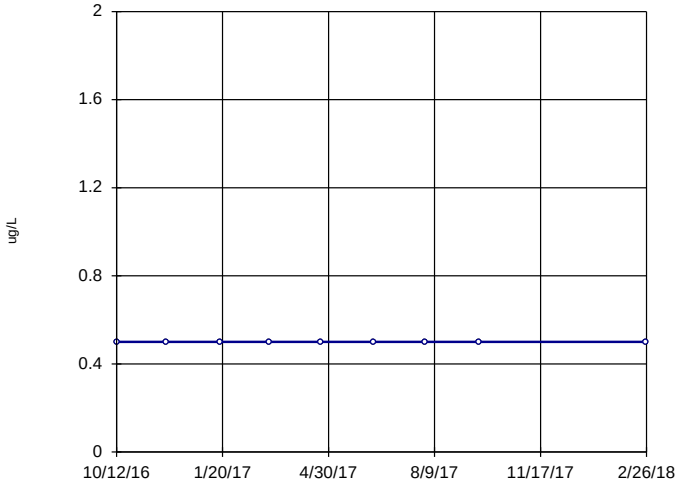
Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

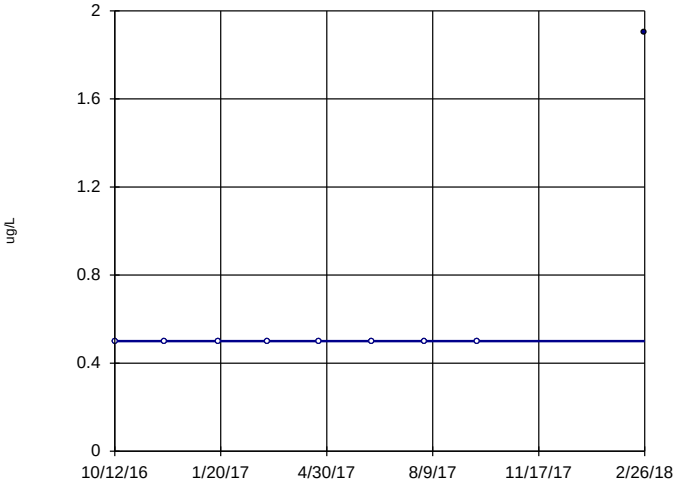
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 8 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

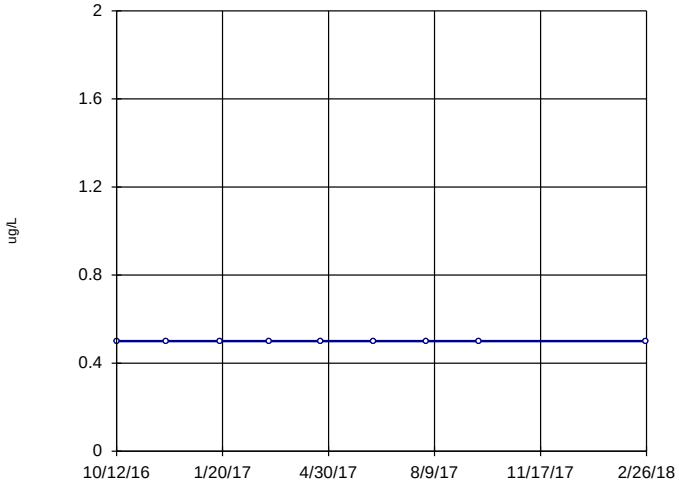
Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

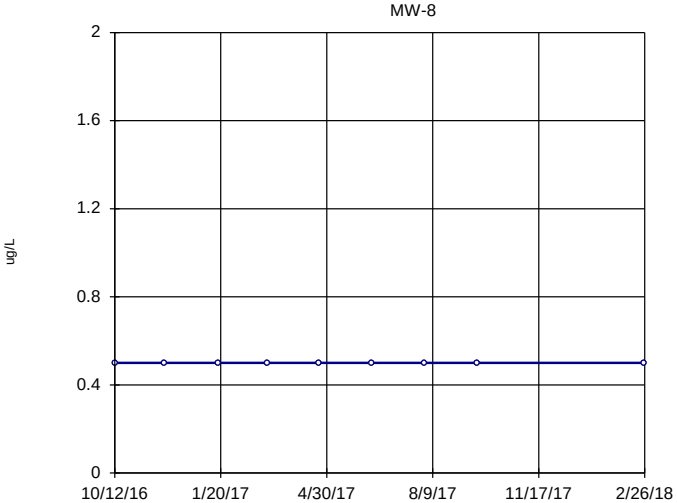
Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

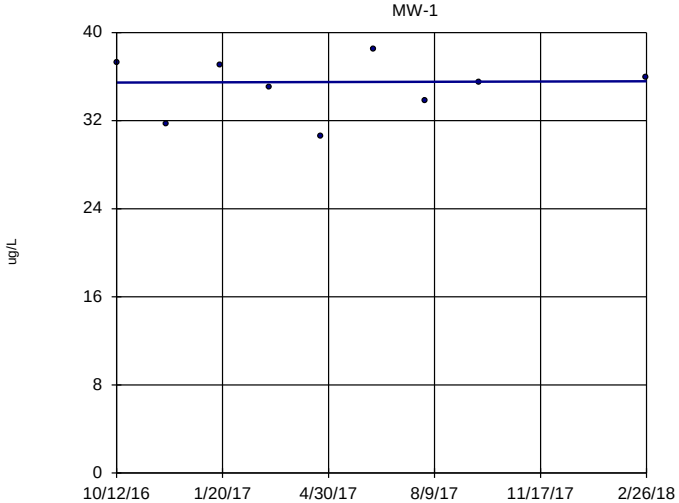
Constituent: Lead [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 9

Slope = 0.08667 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

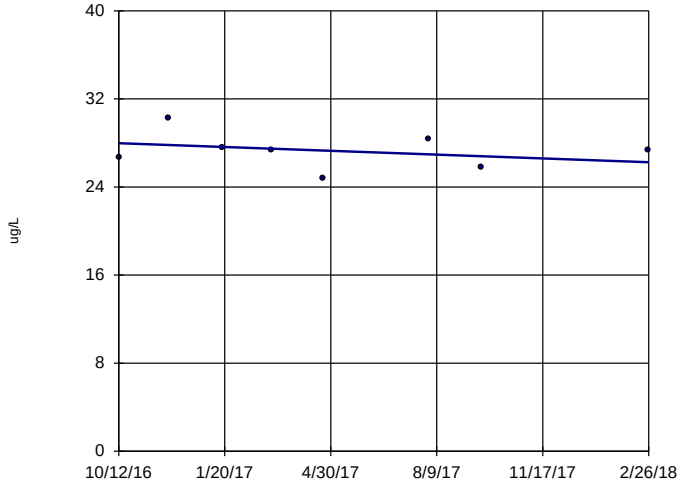
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 8

Slope = -1.255 units per year.

Mann-Kendall statistic = -5 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

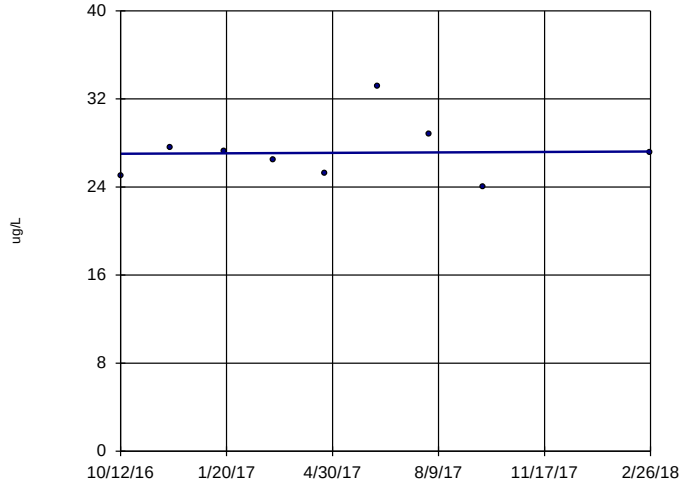
Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-3



n = 9

Slope = 0.143 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

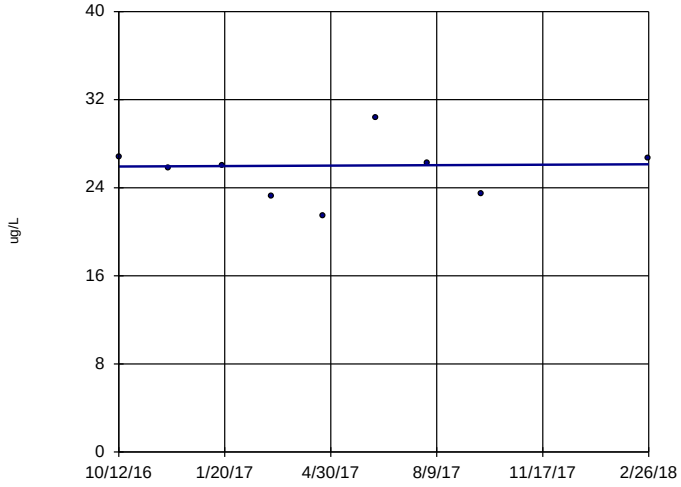
Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0.148 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

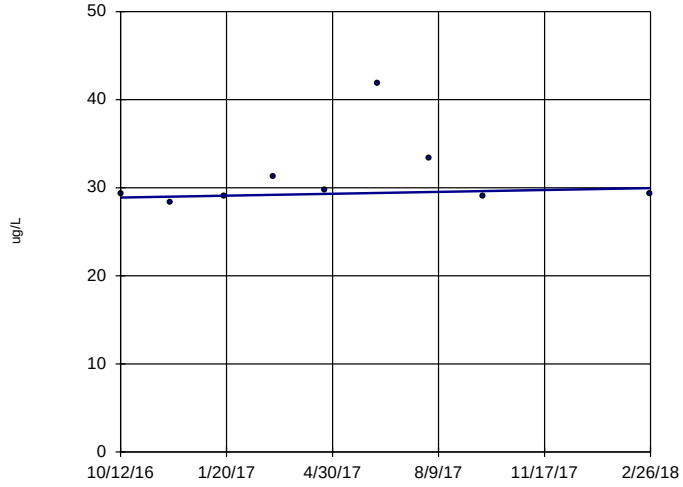
Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 9

Slope = 0.7774 units per year.

Mann-Kendall statistic = 7 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

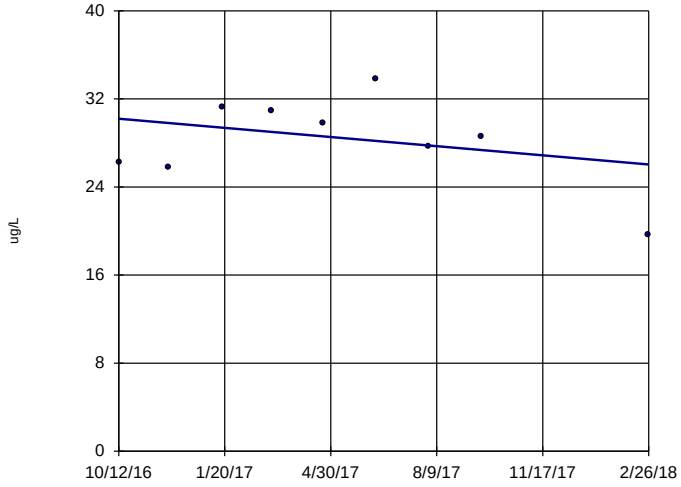
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 9

Slope = -3.023 units per year.

Mann-Kendall statistic = -4 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

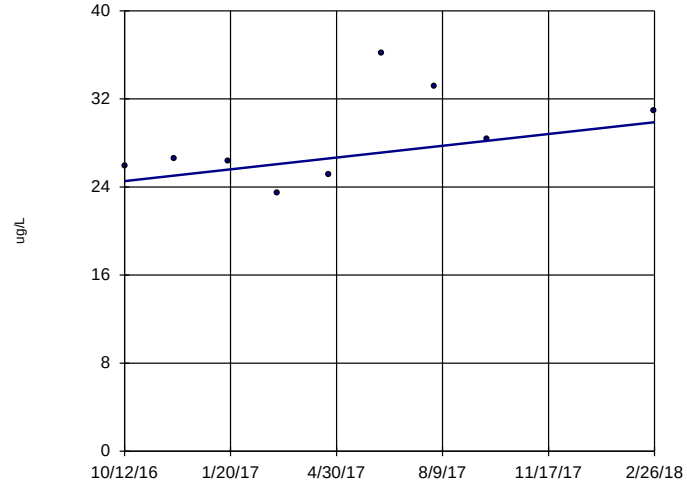
Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 3.896 units per year.

Mann-Kendall statistic = 12 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

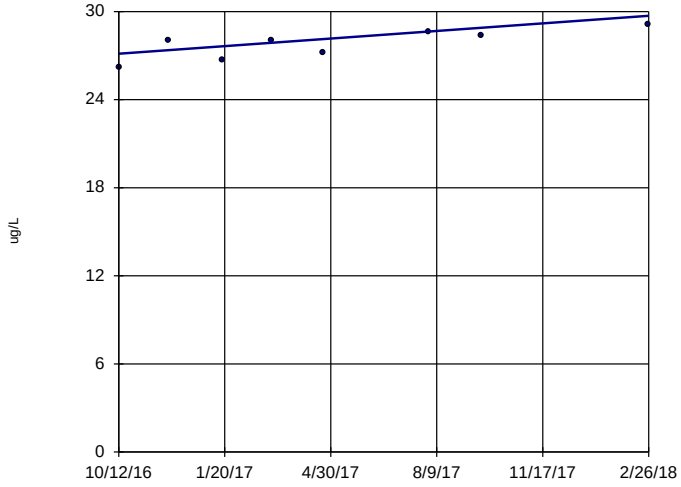
Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 8

Slope = 1.872 units per year.

Mann-Kendall statistic = 19 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

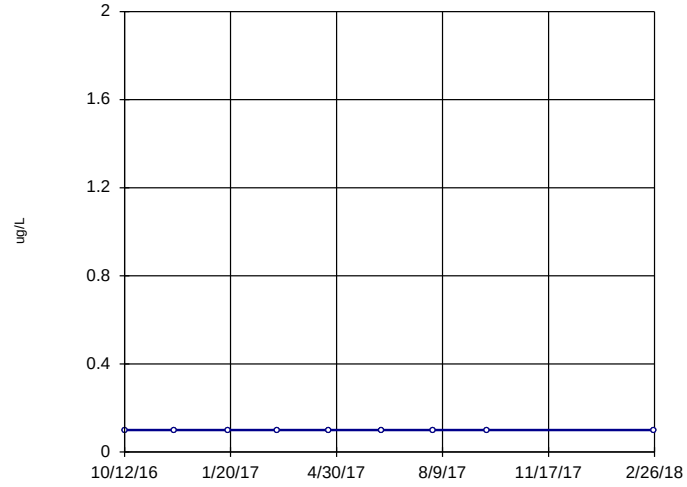
Constituent: Lithium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

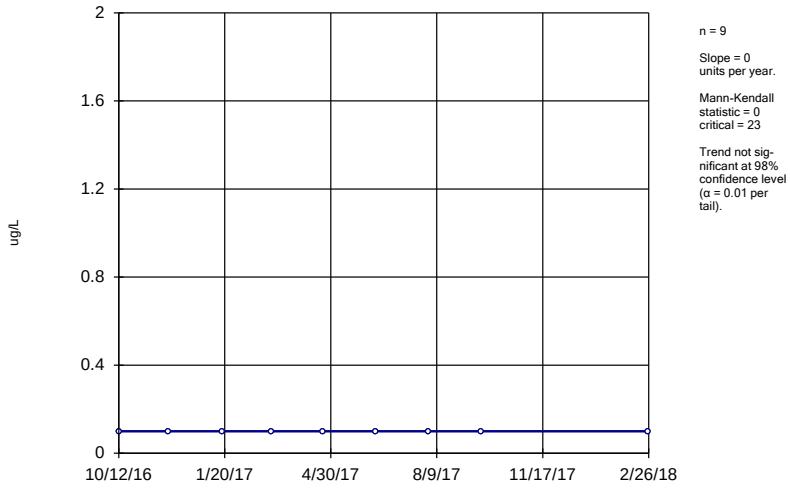
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

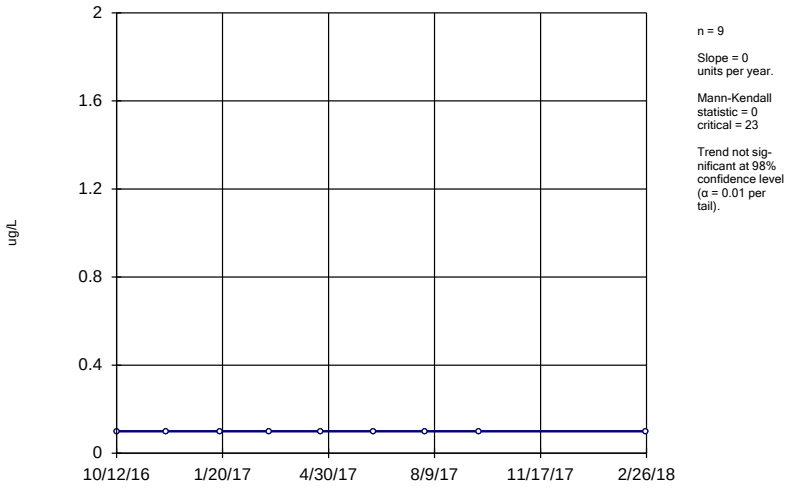
Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

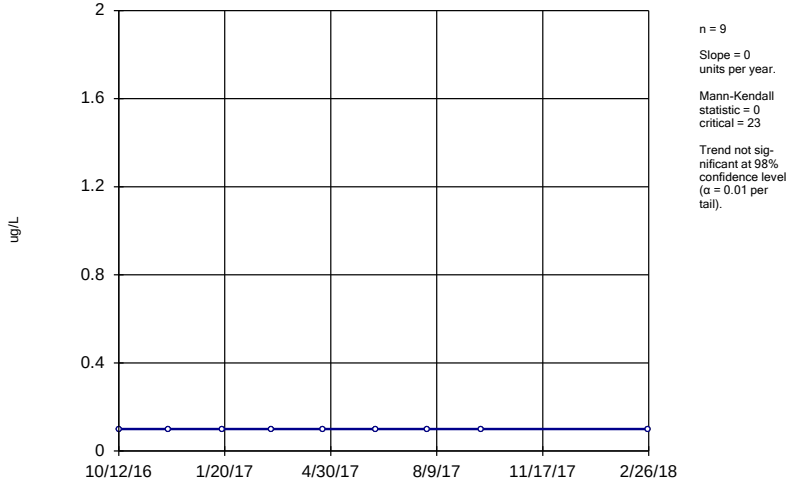
Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

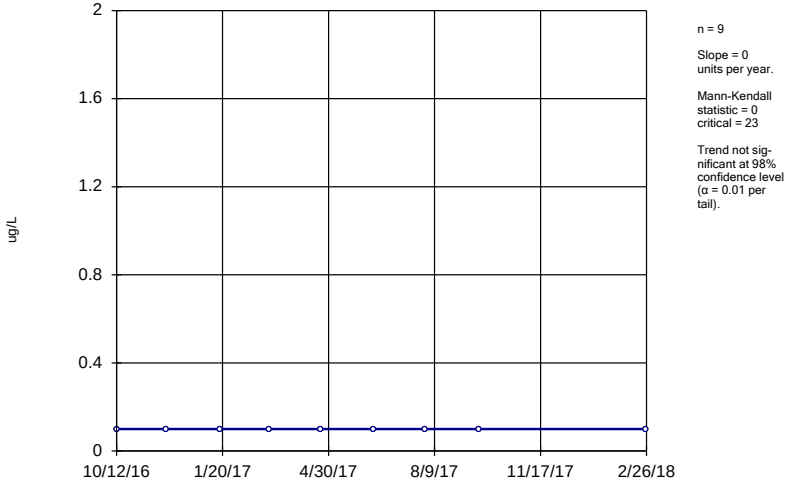
Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

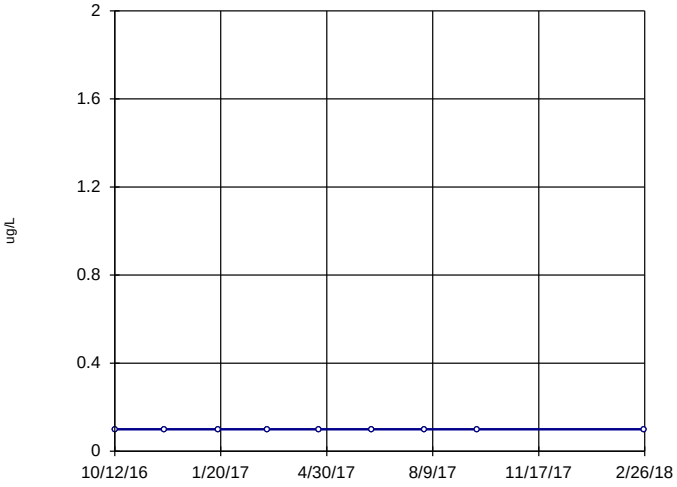
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

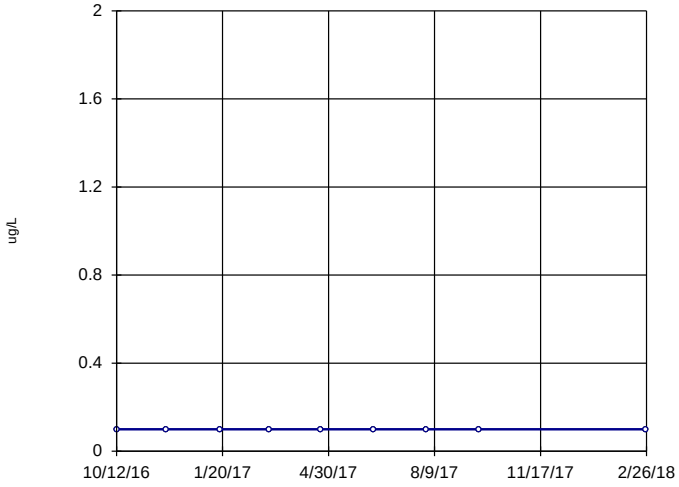
Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

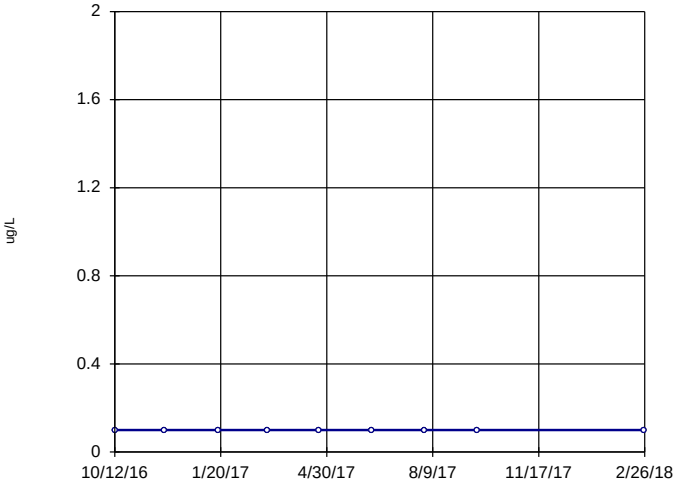
Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

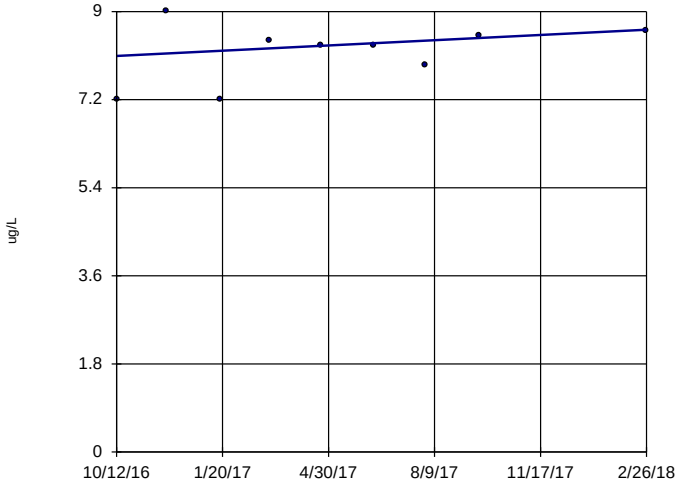
Constituent: Mercury Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 9

Slope = 0.3891
units per year.

Mann-Kendall
statistic = 10
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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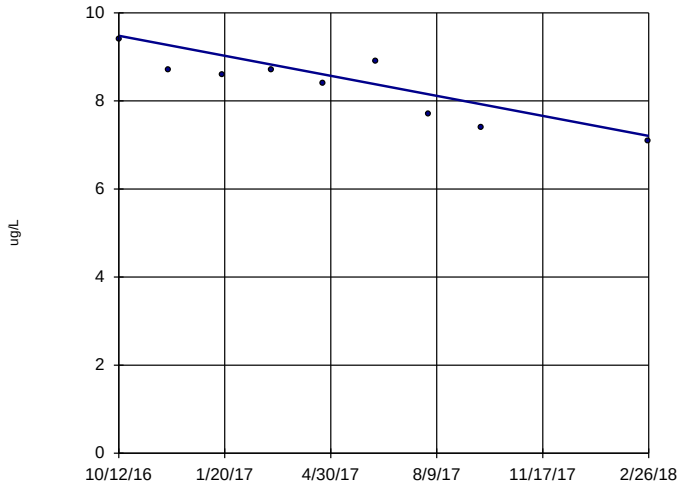
Sen's Slope Estimator

MW-2



n = 9

Slope = -1.654 units per year.

Mann-Kendall statistic = -25 critical = -23

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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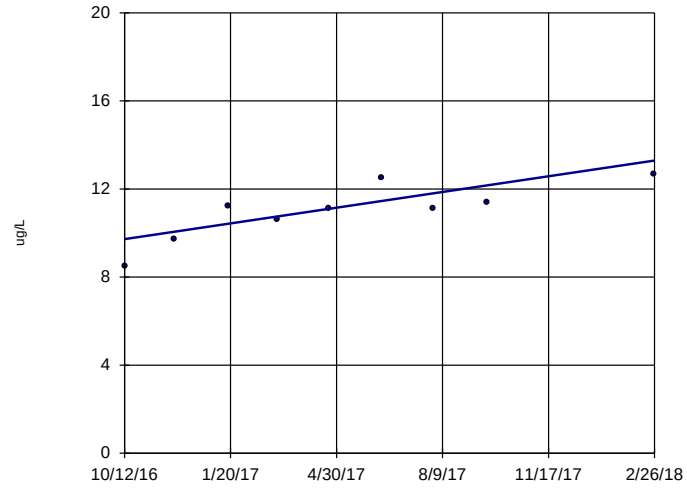
Sen's Slope Estimator

MW-3



n = 9

Slope = 2.594 units per year.

Mann-Kendall statistic = 25 critical = 23

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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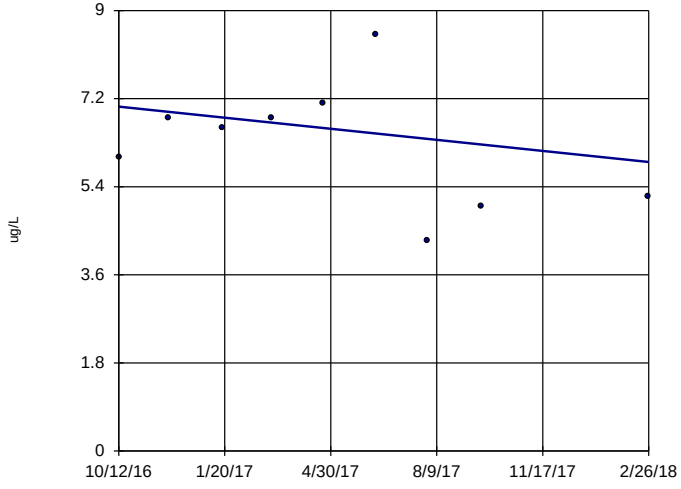
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = -0.8229 units per year.

Mann-Kendall statistic = -3 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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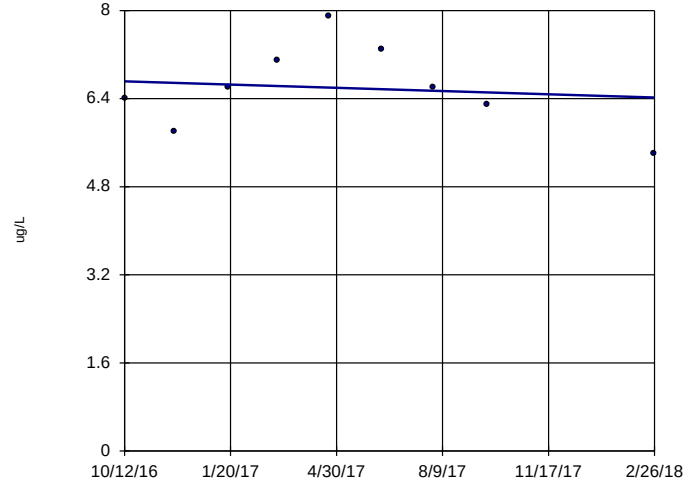
Sen's Slope Estimator

MW-5



n = 9

Slope = -0.2136 units per year.

Mann-Kendall statistic = -3 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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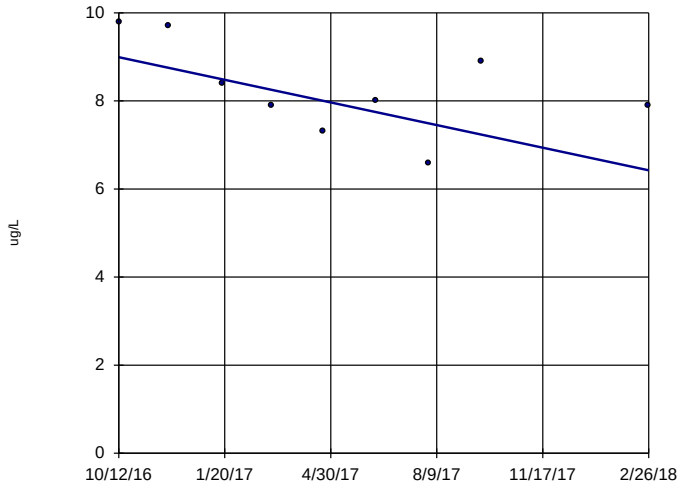
Sen's Slope Estimator

MW-6



n = 9

Slope = -1.87 units per year.

Mann-Kendall statistic = -17 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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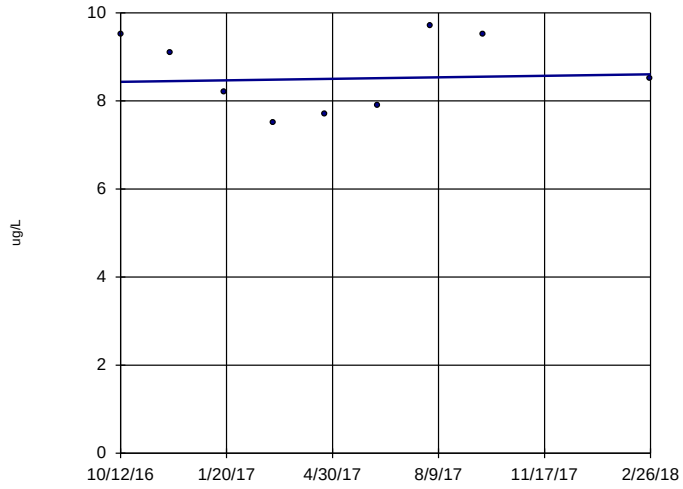
Sen's Slope Estimator

MW-7



n = 9

Slope = 0.1246 units per year.

Mann-Kendall statistic = 1 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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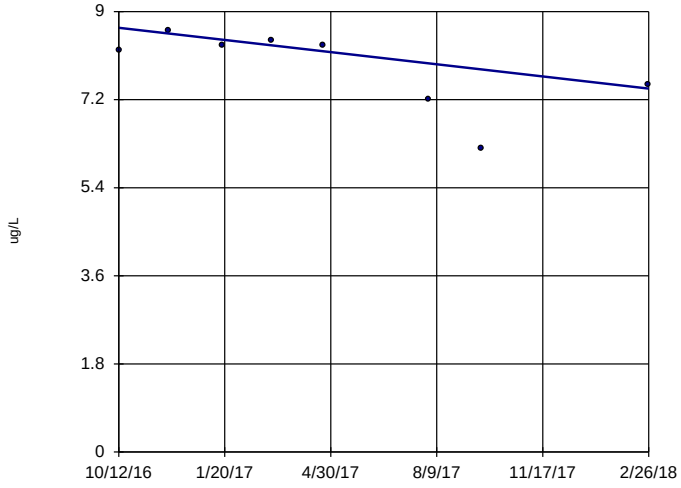
Sen's Slope Estimator

MW-8



n = 8

Slope = -0.9013 units per year.

Mann-Kendall statistic = -13 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Molybdenum Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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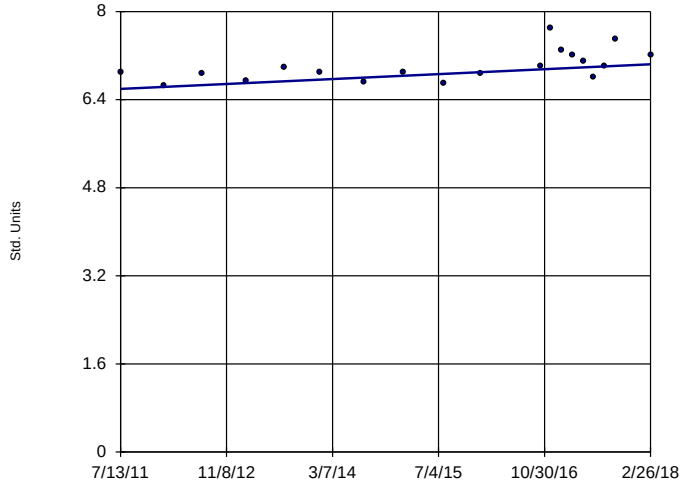
Sen's Slope Estimator

MW-1



n = 19

Slope = 0.06789 units per year.

Mann-Kendall statistic = 71 critical = 68

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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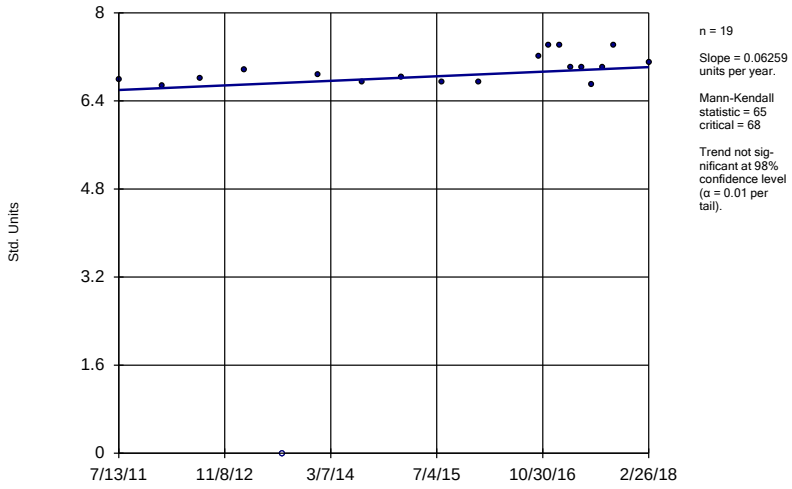
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 19

Slope = 0.06259 units per year.

Mann-Kendall statistic = 65 critical = 68

Trend not significant at 98% confidence level (α = 0.01 per tail).

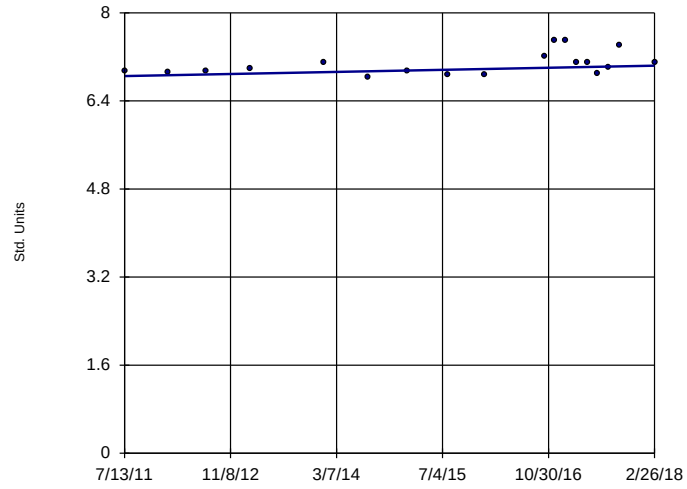
Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-3



n = 18

Slope = 0.02848 units per year.

Mann-Kendall statistic = 47 critical = 63

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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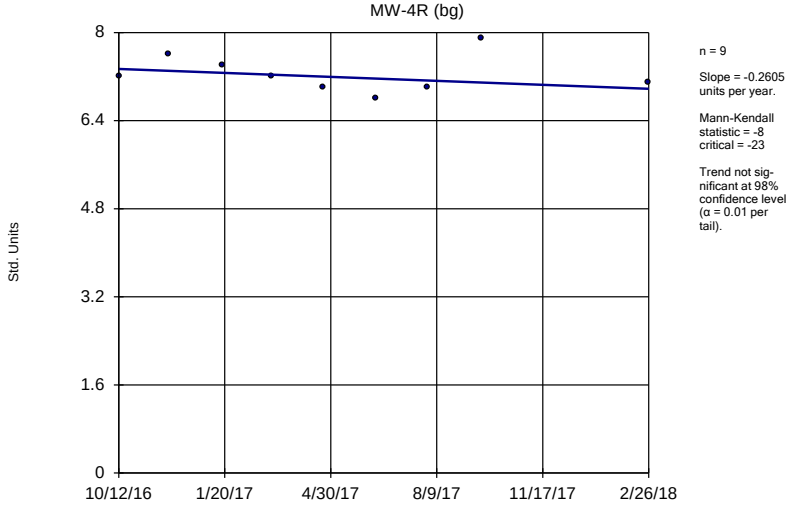
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = -0.2605 units per year.

Mann-Kendall statistic = -8 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

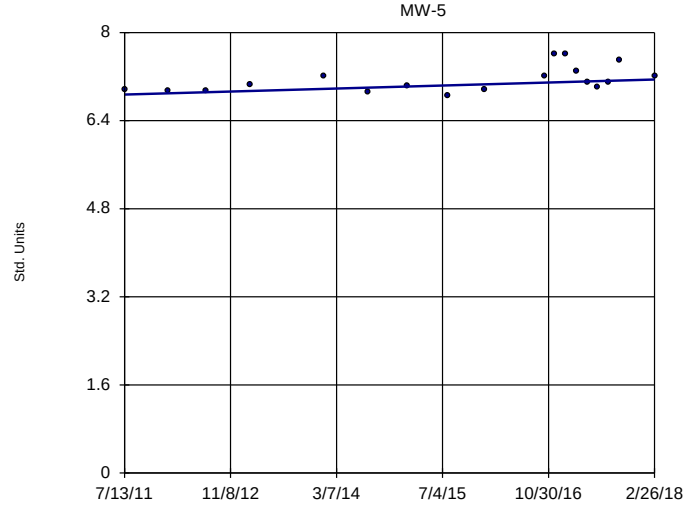
Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 18

Slope = 0.04109 units per year.

Mann-Kendall statistic = 55 critical = 63

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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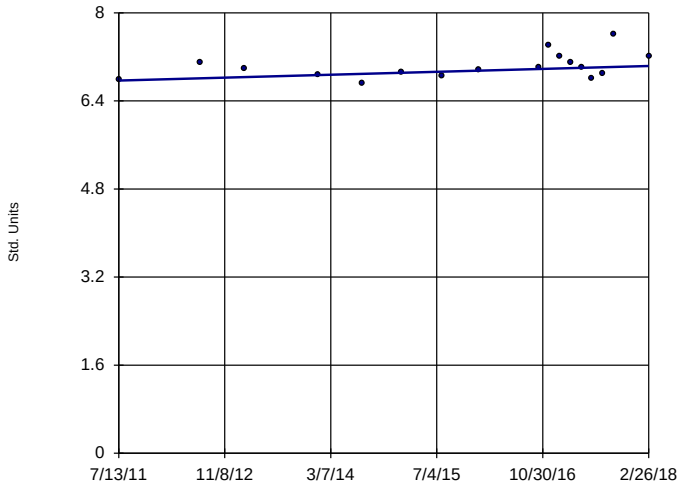
Sen's Slope Estimator

MW-6



n = 17

Slope = 0.04018 units per year.

Mann-Kendall statistic = 43 critical = 58

Trend not significant at 98% confidence level (α = 0.01 per tail).

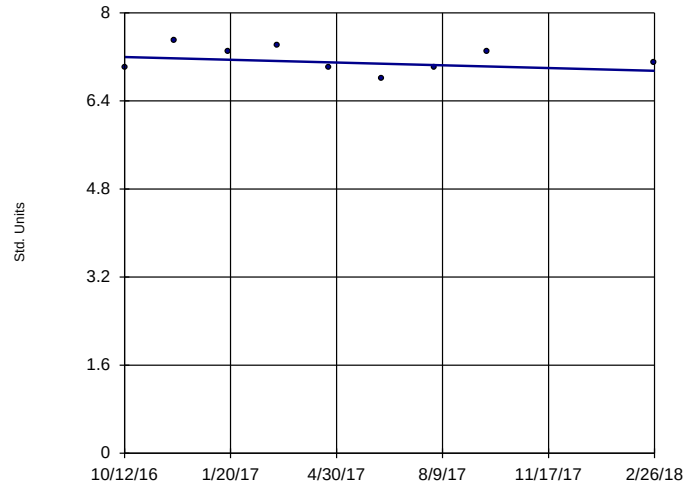
Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = -0.1825 units per year.

Mann-Kendall statistic = -6 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

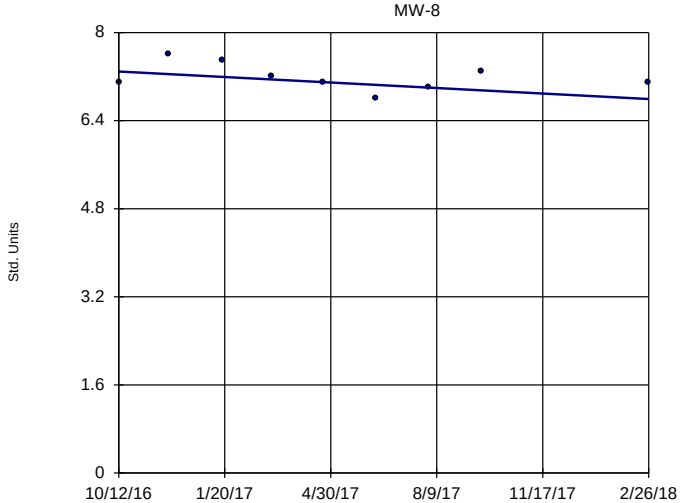
Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = -0.365 units per year.

Mann-Kendall statistic = -11 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

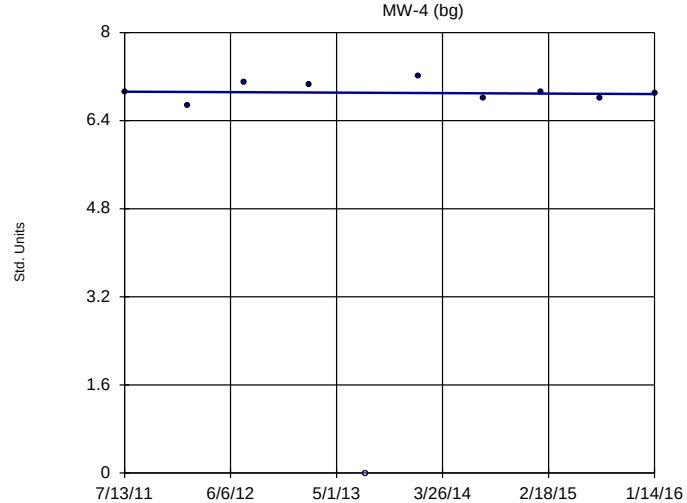
Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4 (bg)



n = 10

Slope = -0.01003 units per year.

Mann-Kendall statistic = -4 critical = -27

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 6/20/2018 9:50 AM View: Outliers

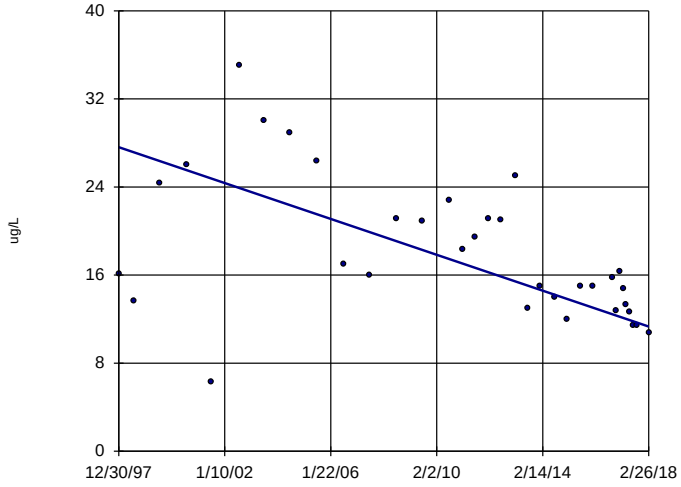
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 34

Slope = -0.8078 units per year.

Mann-Kendall statistic = -271 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

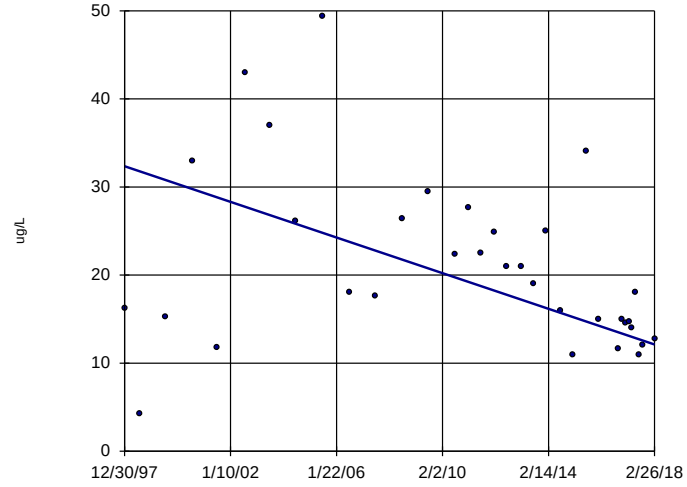
Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 34

Slope = -1.003 units per year.

Mann-Kendall statistic = -196 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

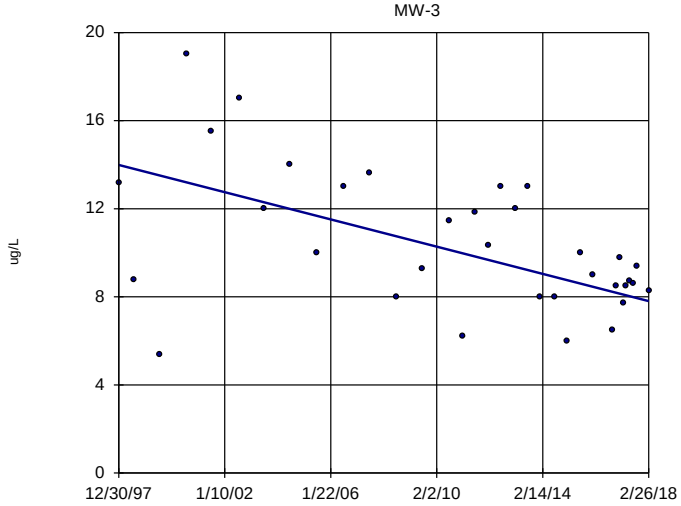
Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-3



n = 34

Slope = -0.3066 units per year.

Mann-Kendall statistic = -198 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

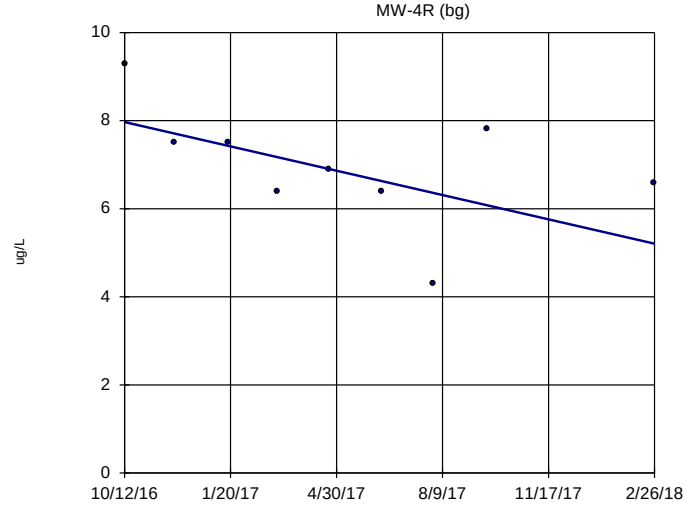
Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = -2.006 units per year.

Mann-Kendall statistic = -14 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

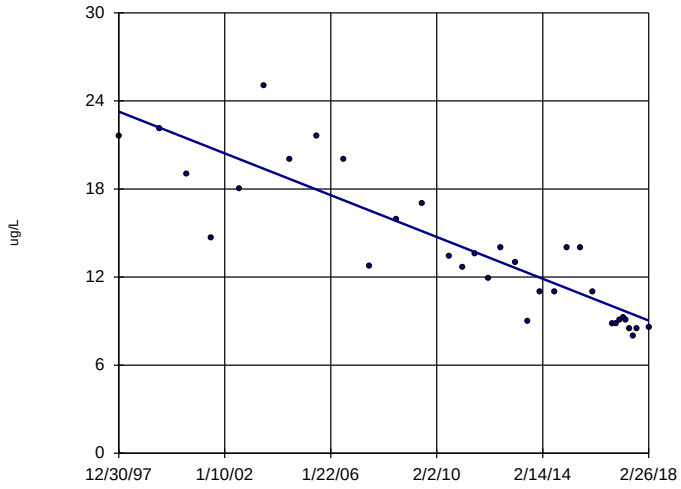
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 33

Slope = -0.7055 units per year.

Mann-Kendall statistic = -379 critical = -151

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

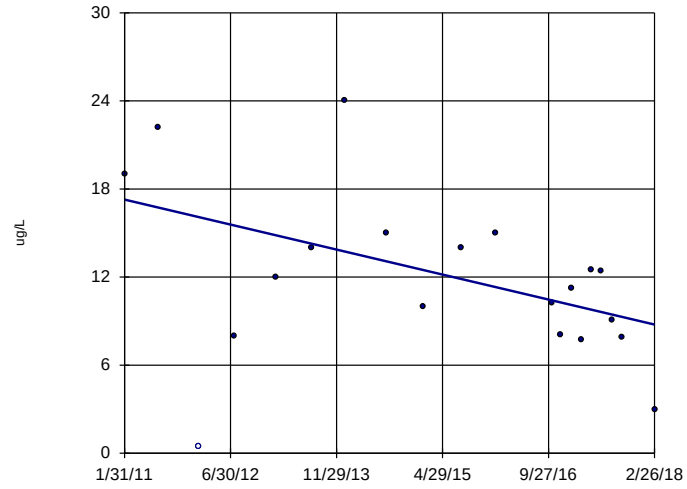
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 20

Slope = -1.203 units per year.

Mann-Kendall statistic = -62 critical = -73

Trend not significant at 98% confidence level (α = 0.01 per tail).

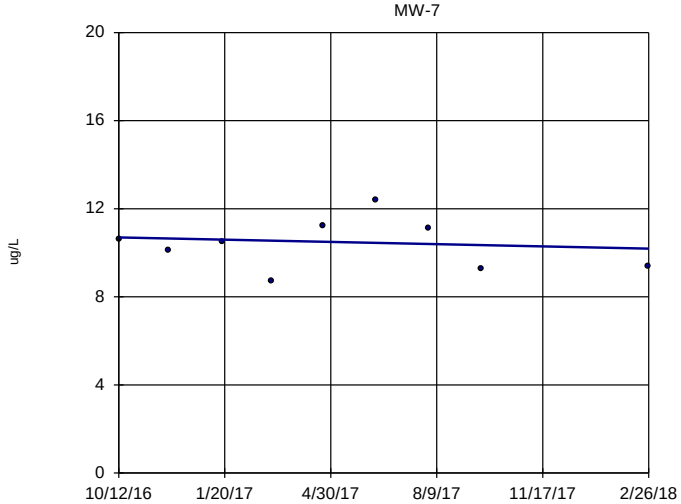
Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = -0.3706 units per year.

Mann-Kendall statistic = -2 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

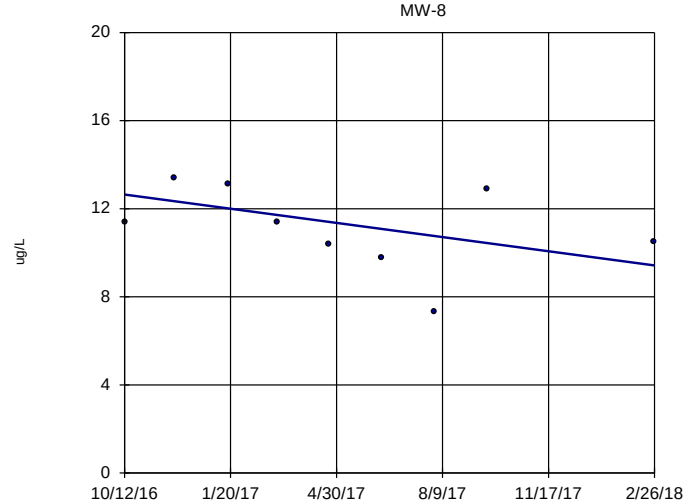
Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = -2.338 units per year.

Mann-Kendall statistic = -15 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

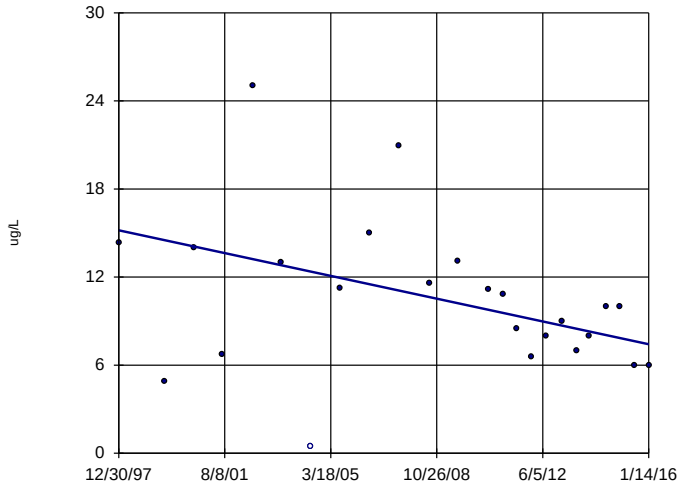
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4 (bg)



n = 24

Slope = -0.4298 units per year.

Mann-Kendall statistic = -97
critical = -95

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Selenium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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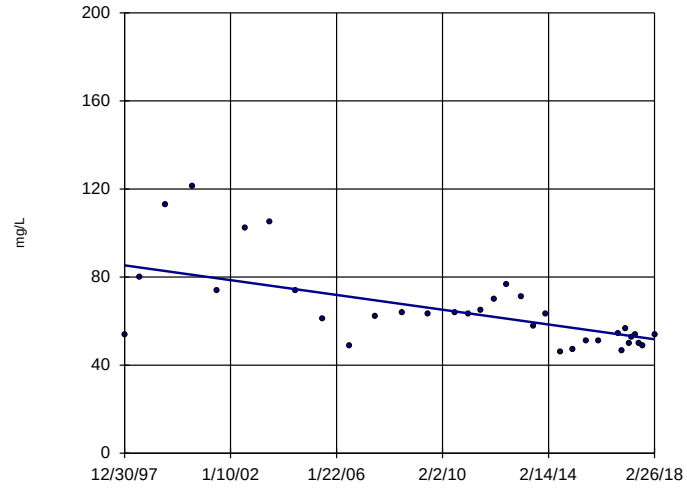
Sen's Slope Estimator

MW-1



n = 34

Slope = -1.664 units per year.

Mann-Kendall statistic = -271
critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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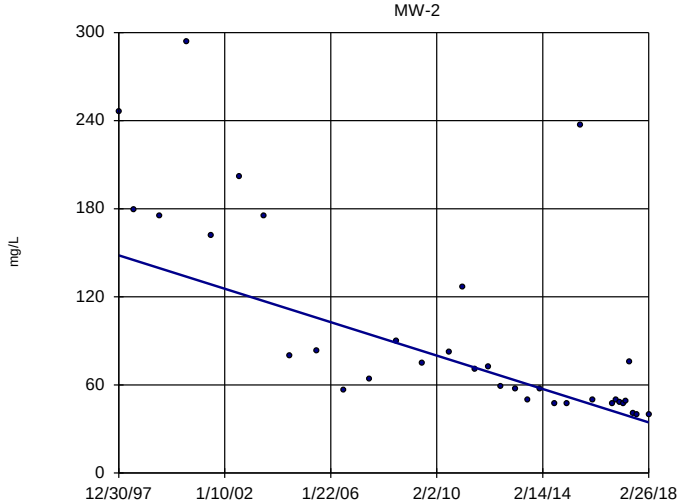
Sen's Slope Estimator

MW-2



n = 34

Slope = -5.641 units per year.

Mann-Kendall statistic = -381
critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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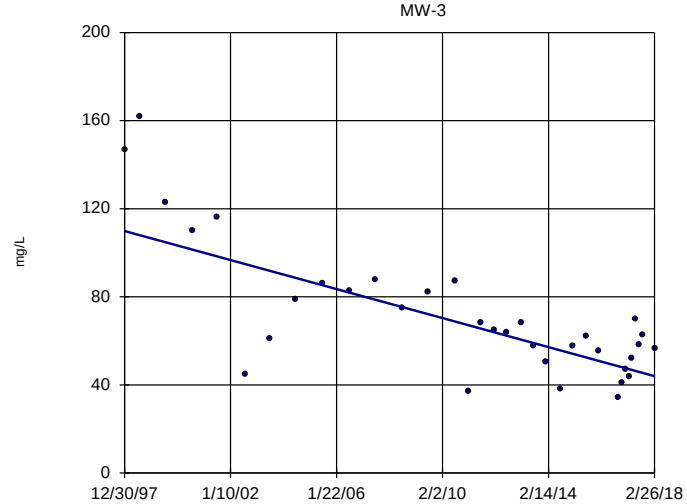
Sen's Slope Estimator

MW-3



n = 34

Slope = -3.265 units per year.

Mann-Kendall statistic = -285
critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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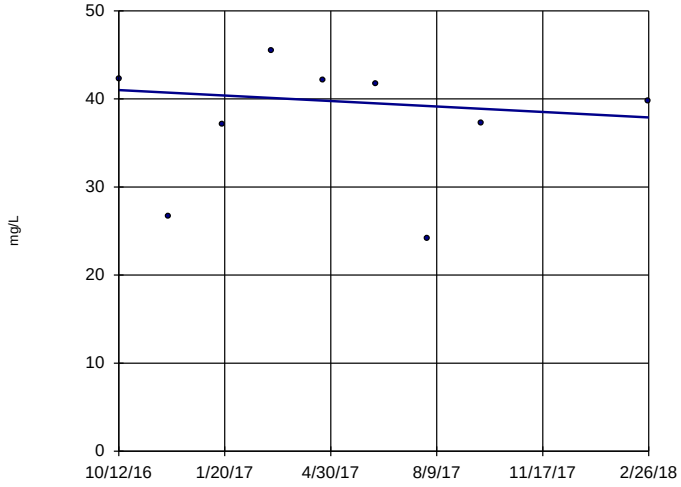
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = -2.248 units per year.

Mann-Kendall statistic = -6 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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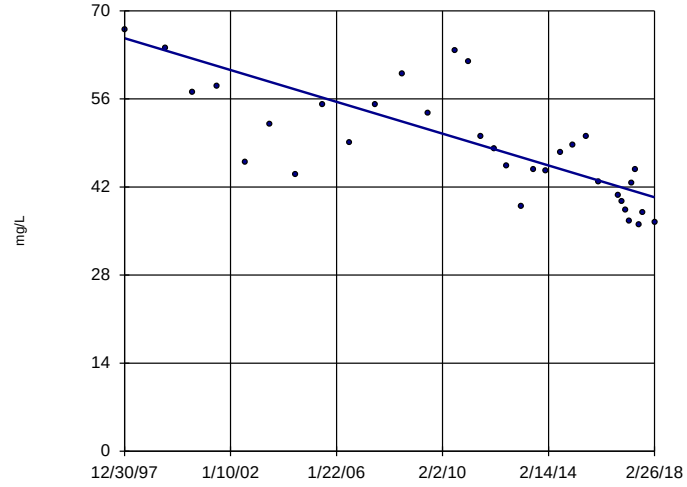
Sen's Slope Estimator

MW-5



n = 33

Slope = -1.254 units per year.

Mann-Kendall statistic = -331 critical = -151

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

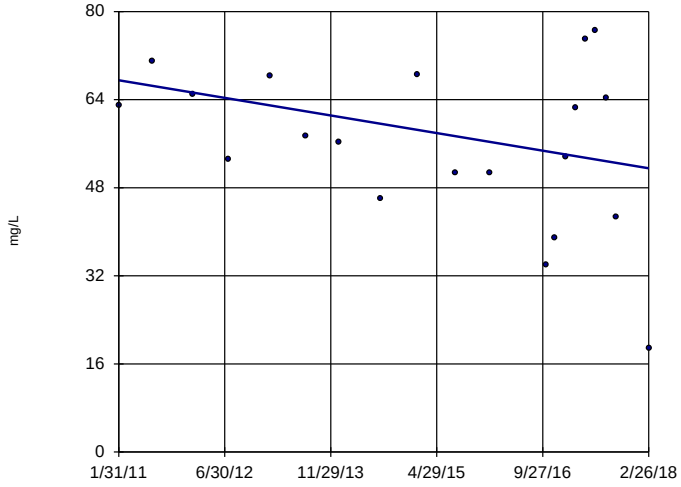
Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 20

Slope = -2.262 units per year.

Mann-Kendall statistic = -36 critical = -73

Trend not significant at 98% confidence level (α = 0.01 per tail).

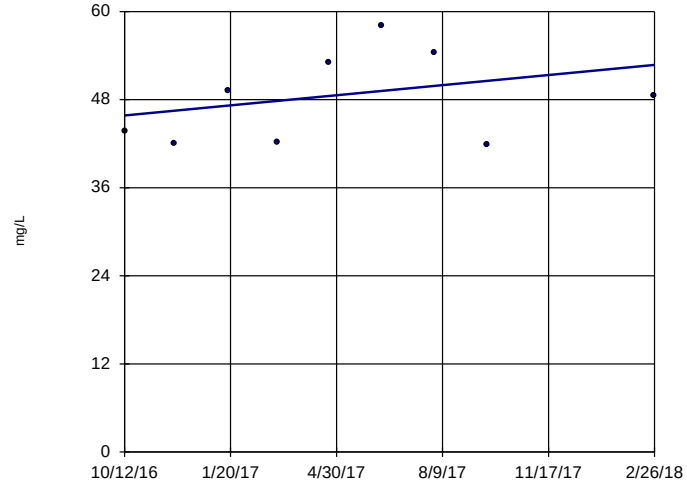
Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 5.004 units per year.

Mann-Kendall statistic = 6 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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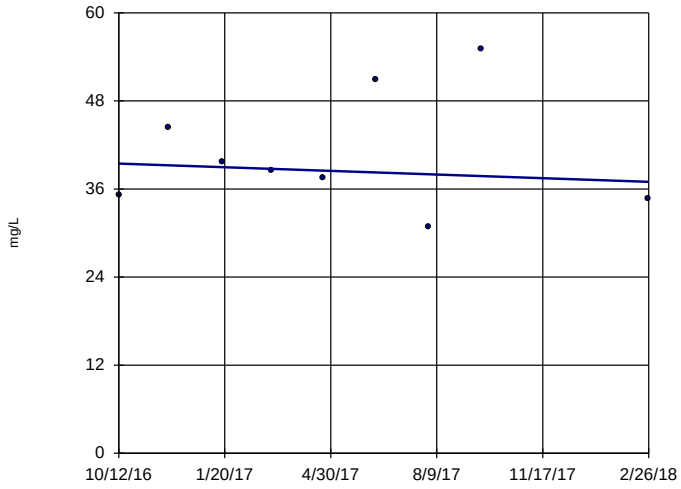
Sen's Slope Estimator

MW-8



n = 9

Slope = -1.805 units per year.

Mann-Kendall statistic = -2 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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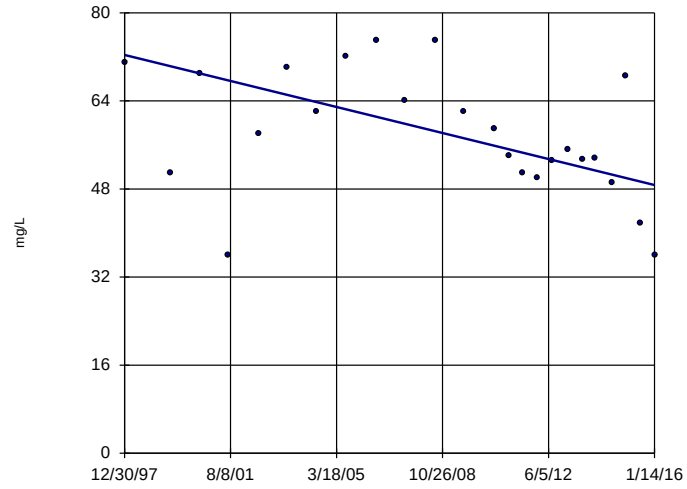
Sen's Slope Estimator

MW-4 (bg)



n = 24

Slope = -1.309 units per year.

Mann-Kendall statistic = -99 critical = -95

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

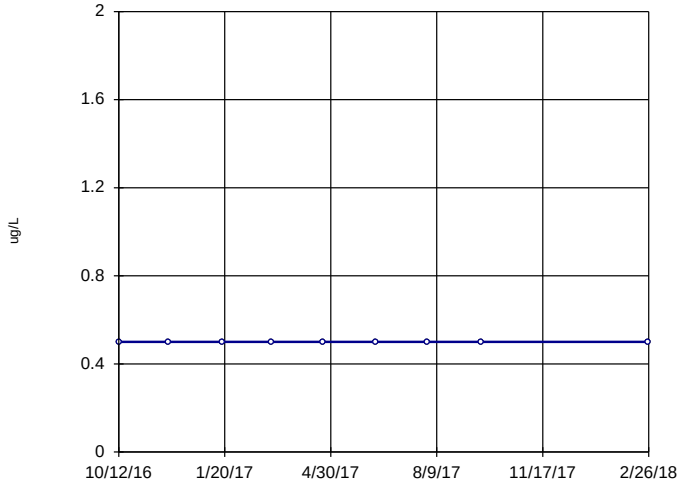
Constituent: Sulfate Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-1



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

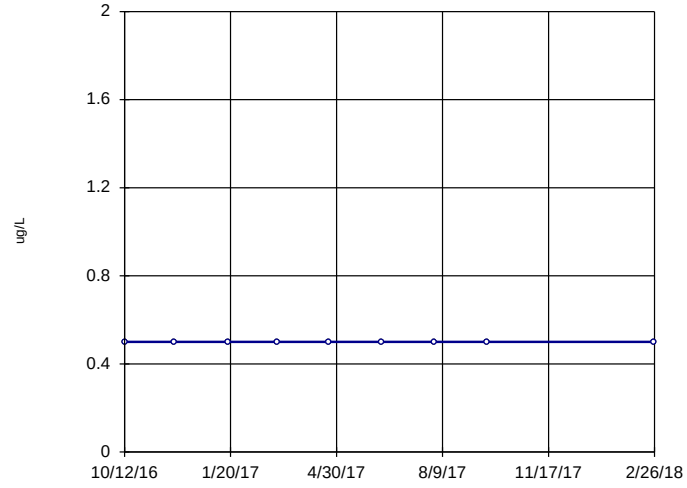
Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-2



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

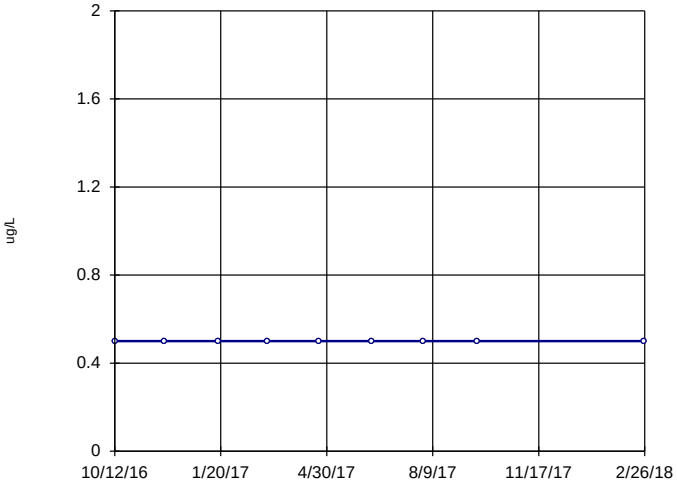
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-3



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

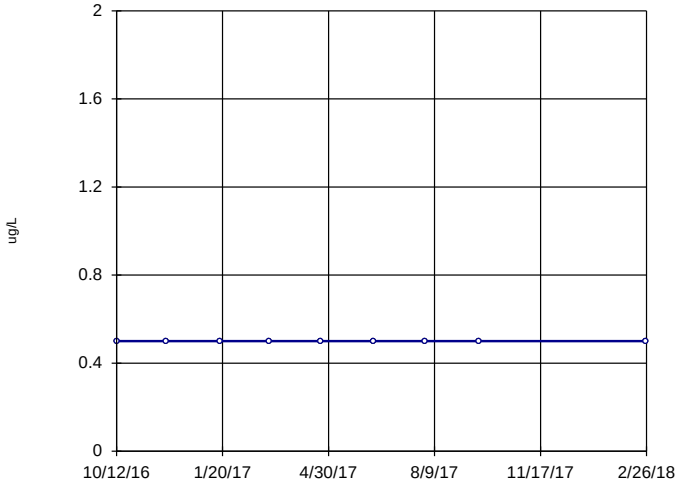
Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

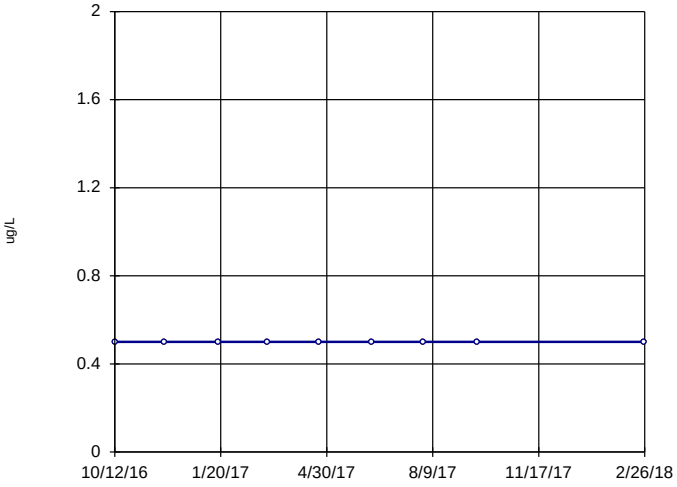
Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-5



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

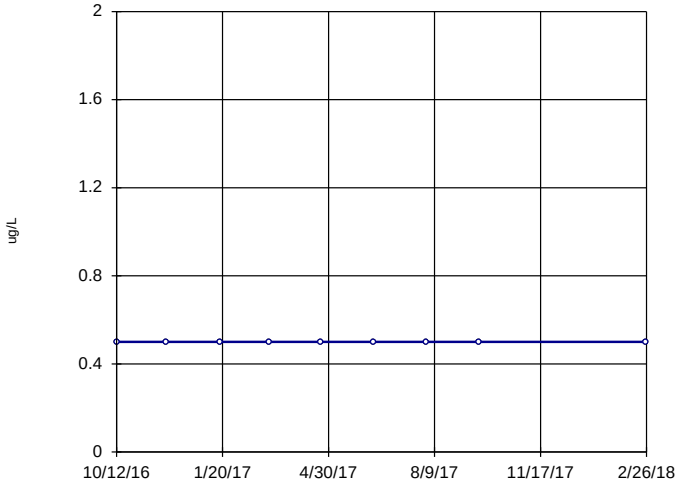
Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-6



n = 9

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 23

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

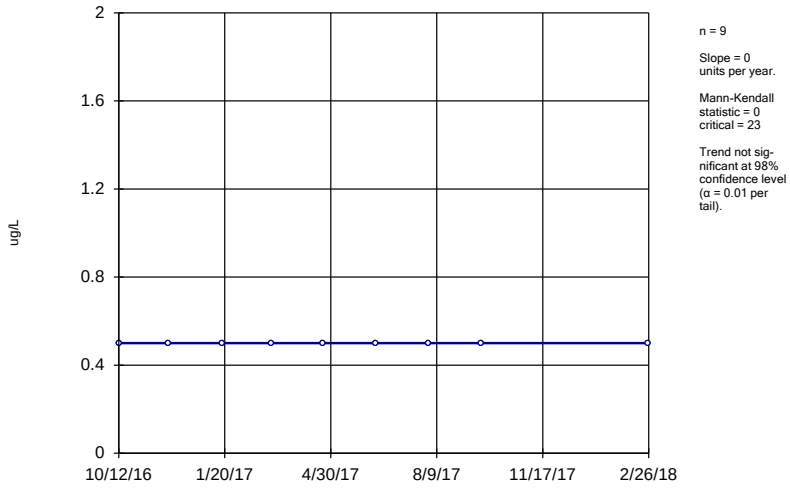
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-7



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

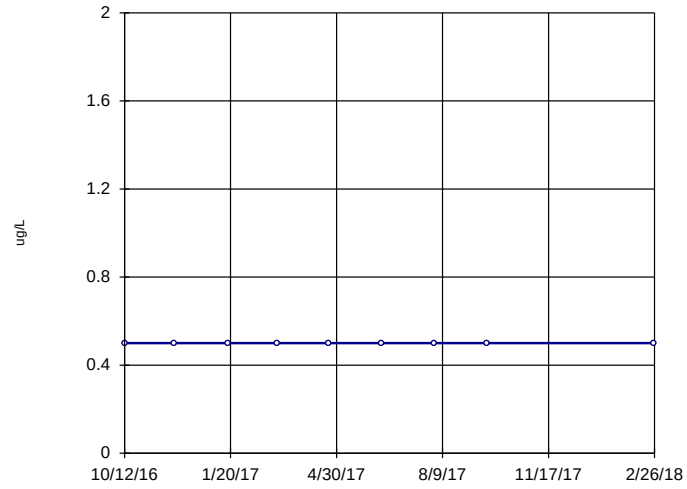
Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-8



n = 9

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

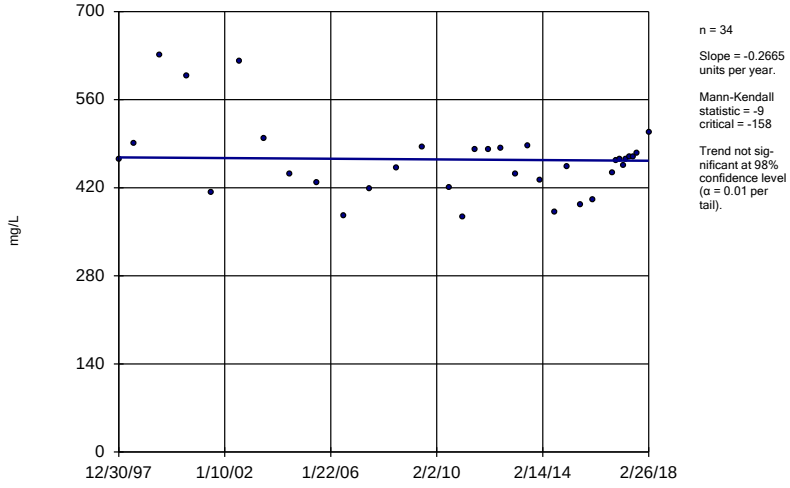
Constituent: Thallium [total] Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 34

Slope = -0.2665 units per year.

Mann-Kendall statistic = -9 critical = -158

Trend not significant at 98% confidence level (α = 0.01 per tail).

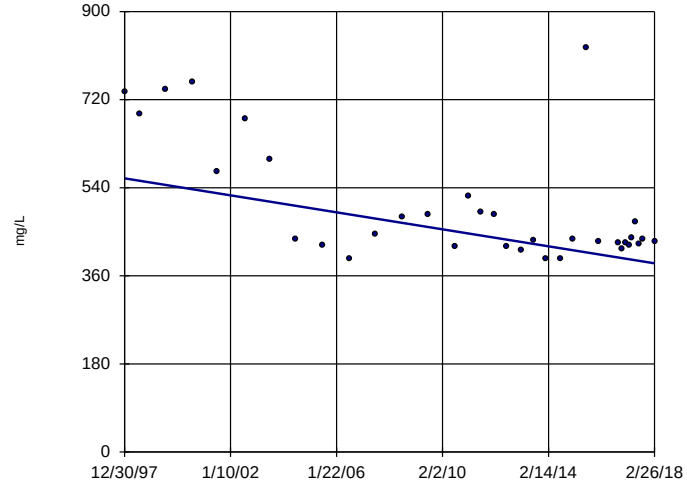
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 34

Slope = -8.606 units per year.

Mann-Kendall statistic = -193 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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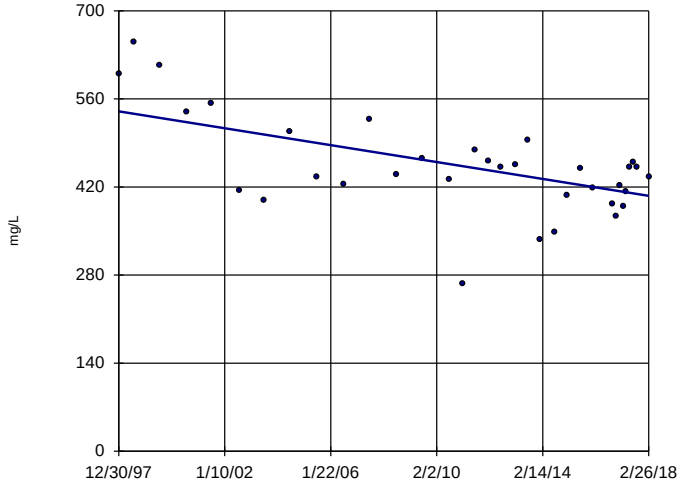
Sen's Slope Estimator

MW-3



n = 34

Slope = -6.652 units per year.

Mann-Kendall statistic = -188 critical = -158

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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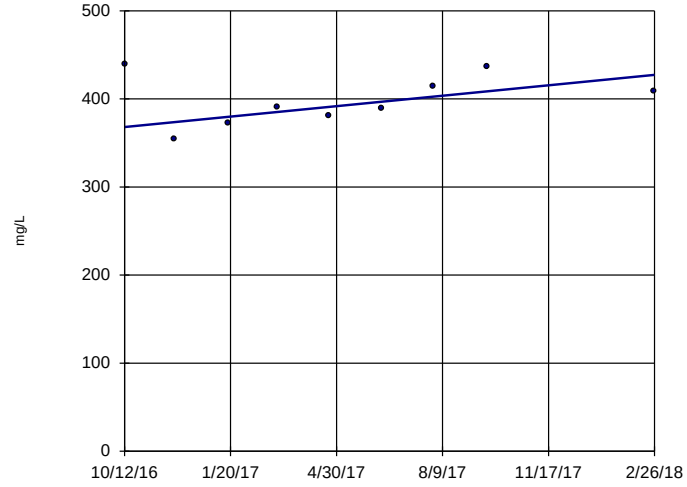
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 43.06 units per year.

Mann-Kendall statistic = 12 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

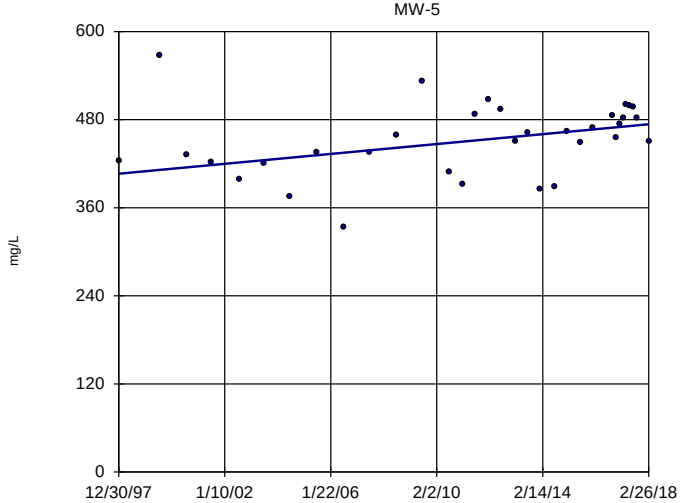
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-5



n = 33

Slope = 3.343 units per year.

Mann-Kendall statistic = 153 critical = 151

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

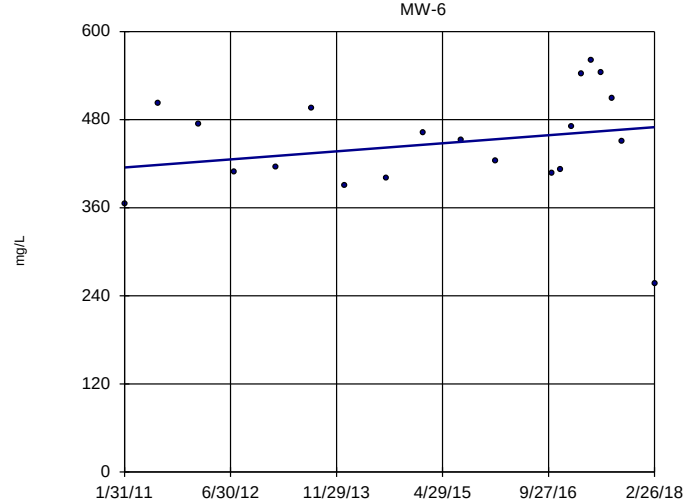
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-6



n = 20

Slope = 7.754 units per year.

Mann-Kendall statistic = 32 critical = 73

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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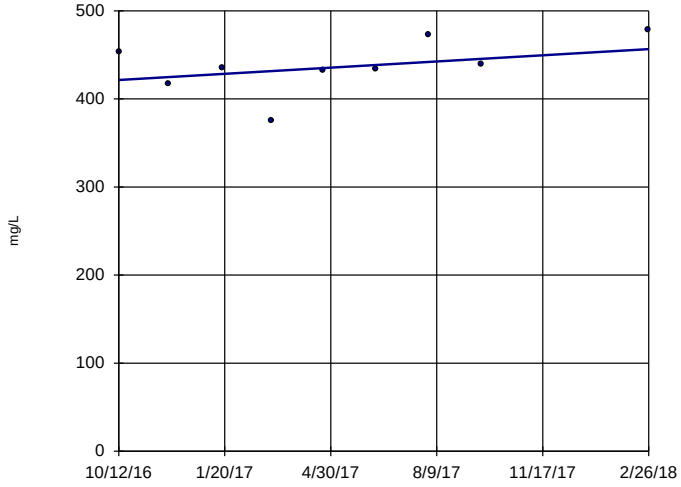
Sen's Slope Estimator

MW-7



n = 9

Slope = 25.4 units per year.

Mann-Kendall statistic = 14 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

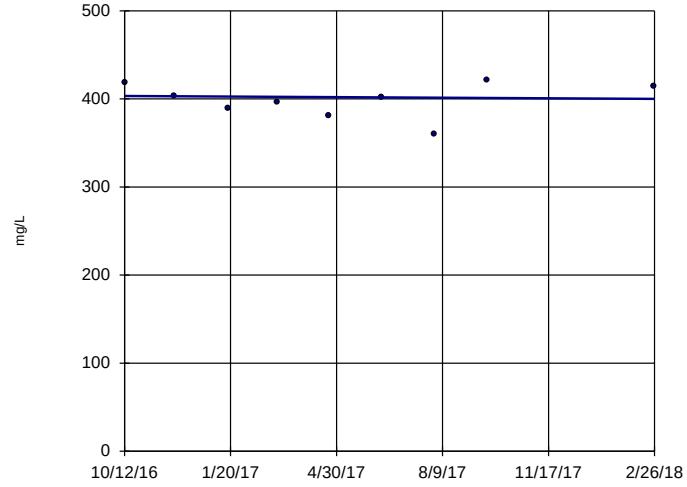
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = -2.385 units per year.

Mann-Kendall statistic = -2 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

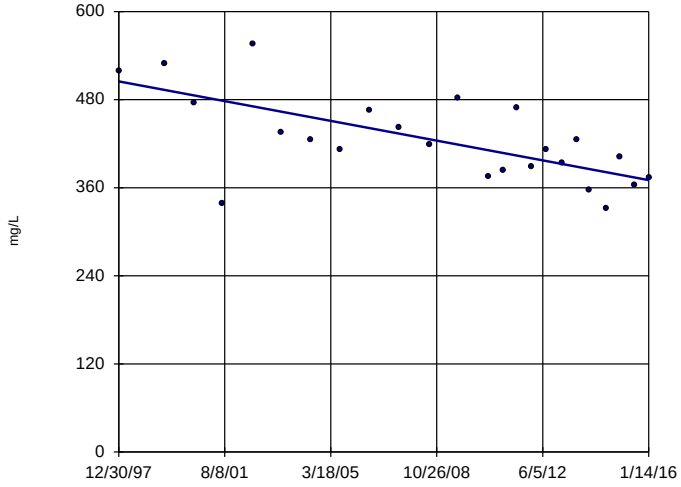
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-4 (bg)



n = 24

Slope = -7.449 units per year.

Mann-Kendall statistic = -130 critical = -95

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

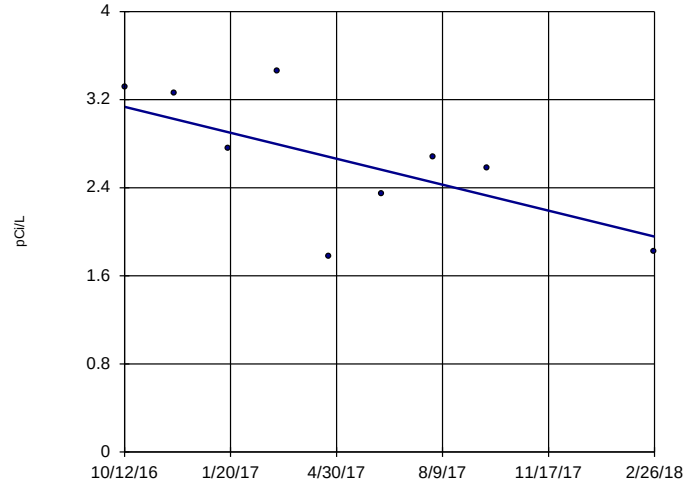
Constituent: Total Dissolved Solids Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-1



n = 9

Slope = -0.8567 units per year.

Mann-Kendall statistic = -18 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

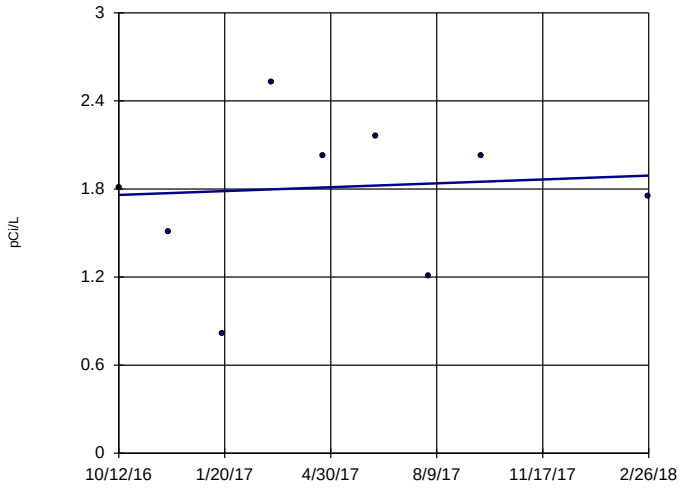
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-2



n = 9

Slope = 0.09626 units per year.

Mann-Kendall statistic = 1 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

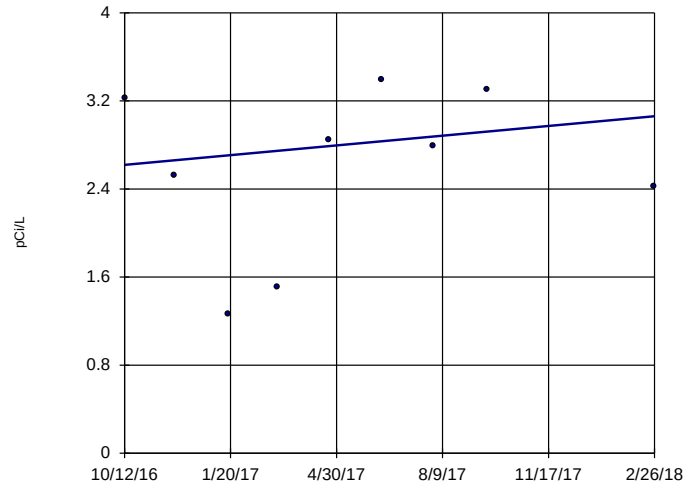
Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-3



n = 9

Slope = 0.3213 units per year.

Mann-Kendall statistic = 4 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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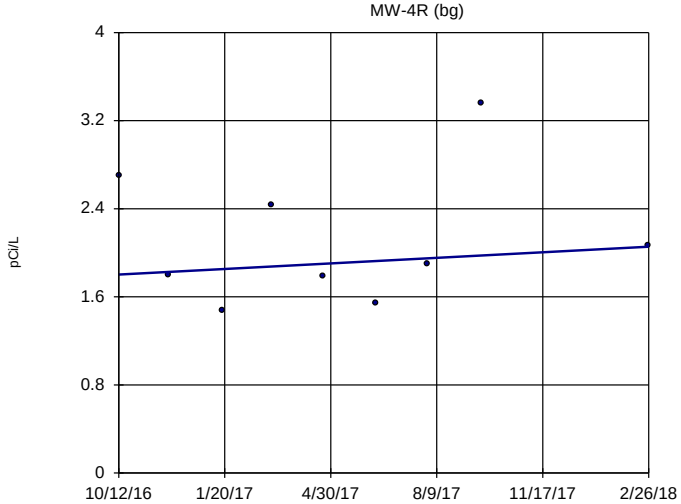
Sen's Slope Estimator

MW-4R (bg)



n = 9

Slope = 0.1838 units per year.

Mann-Kendall statistic = 4 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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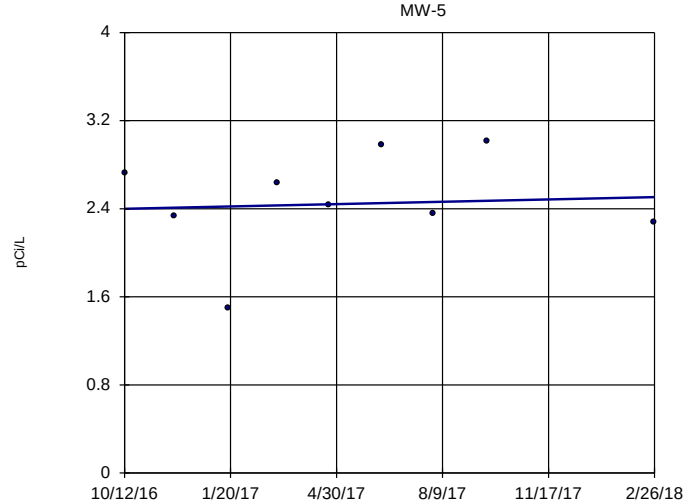
Sen's Slope Estimator

MW-5



n = 9

Slope = 0.0771 units per year.

Mann-Kendall statistic = 2 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

REC'D NDEQ - (8/27/2018) - (20180058179)

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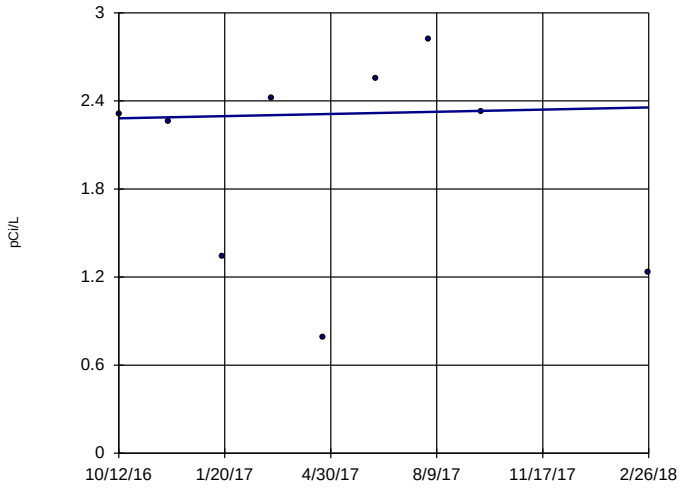
Sen's Slope Estimator

MW-6



n = 9

Slope = 0.0538 units per year.

Mann-Kendall statistic = 2 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

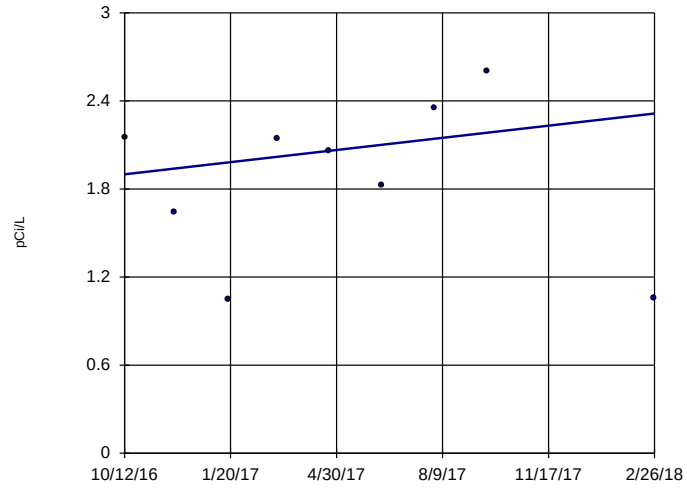
Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-7



n = 9

Slope = 0.3015 units per year.

Mann-Kendall statistic = 4 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

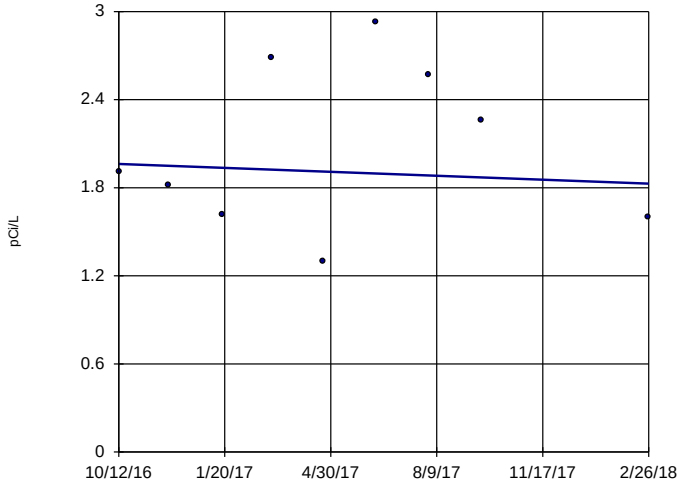
Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Sen's Slope Estimator

MW-8



n = 9

Slope = -0.09728 units per year.

Mann-Kendall statistic = -2 critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Total Radium Analysis Run 6/20/2018 9:50 AM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

A2 June 2018 Groundwater Monitoring Program Report

FREMONT
Department of Utilities

Operated by the
Board for Public Works

400 EAST MILITARY AVENUE P.O. BOX 1468 FREMONT, NE 68025

October 26, 2018

RECEIVED

OCT 30 2018

Nebraska Dept of Environmental Quality
By: _____DEQ#182_____

State of Nebraska
Department of Environmental Quality
Remediation Section

Attn:
Nancy Harris
Groundwater Geologist
Waste Management Division
Suite 400, The Atrium
1200 N. Street
P.O. Box 98922
Lincoln, NE 68509-8922

Dear Ms. Harris:

Enclosed is one copy of the Groundwater Monitoring Program Report for the **Fremont Utilities FFCA Monofill IIS 48518, Permit # NE0203777** for your review. The report is based on the requirements of the Coal Combustion Residuals Regulation for assessment monitoring and the above referenced permit. The report represents the sampling round completed on June 14, 2018. If you have any questions concerning this report please feel free to call or email Tony Sedlacek.

Sincerely,

Tony Sedlacek

Tony Sedlacek
Environmental Engineering Technician
Lon D. Wright Power Plant
Fremont Department of Utilities
2701 E. 1st St
Fremont, NE 68025
Phone (402) 727-2651
Fax (402) 727-2640
tony.sedlacek@fremontne.gov

Enclosures

2018007452 2

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Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: City of Fremont
Pace Project No.: 60272886

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60272886001	MW-1	Water	06/14/18 10:52	06/19/18 06:35
60272886002	MW-2	Water	06/14/18 11:51	06/19/18 06:35
60272886003	MW-3	Water	06/14/18 09:32	06/19/18 06:35
60272886004	MW-4R	Water	06/14/18 08:56	06/19/18 06:35
60272886005	MW-5	Water	06/14/18 10:10	06/19/18 06:35
60272886006	MW-6	Water	06/14/18 13:40	06/19/18 06:35
60272886007	MW-7	Water	06/14/18 13:05	06/19/18 06:35
60272886008	MW-8	Water	06/14/18 12:30	06/19/18 06:35
60272886009	DUPLICATE	Water	06/14/18 23:59	06/19/18 06:35

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SAMPLE ANALYTE COUNT

Project: City of Fremont
Pace Project No.: 60272886

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60272886001	MW-1	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886002	MW-2	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886003	MW-3	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886004	MW-4R	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886005	MW-5	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886006	MW-6	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	5	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886007	MW-7	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886008	MW-8	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K

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SAMPLE ANALYTE COUNT

Project: City of Fremont
Pace Project No.: 60272886

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K
60272886009	**DUPLICATE**	EPA 6010	AGO, TDS	3	PASI-K
		EPA 6020	JGP	4	PASI-K
		SM 2540C	JDA	1	PASI-K
		EPA 9040	ZMH	1	PASI-K
		EPA 9056	WNM	3	PASI-K

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SAMPLE SUMMARY

Project: City of Fremont
Pace Project No.: 60272875

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60272875001	MW-1	Water	06/14/18 10:52	06/19/18 06:35
60272875002	MW-2	Water	06/14/18 11:51	06/19/18 06:35
60272875003	MW-3	Water	06/14/18 09:32	06/19/18 06:35
60272875004	MW-4R	Water	06/14/18 08:56	06/19/18 06:35
60272875005	MW-5	Water	06/14/18 10:10	06/19/18 06:35
60272875006	MW-6	Water	06/14/18 13:40	06/19/18 06:35
60272875007	MW-7	Water	06/14/18 13:05	06/19/18 06:35
60272875008	MW-8	Water	06/14/18 12:30	06/19/18 06:35
60272875009	DUPLICATE	Water	06/14/18 23:59	06/19/18 06:35

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SAMPLE ANALYTE COUNT

Project: City of Fremont
Pace Project No.: 60272875

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60272875001	MW-1	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875002	MW-2	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875003	MW-3	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875004	MW-4R	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875005	MW-5	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875006	MW-6	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875007	MW-7	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875008	MW-8	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272875009	DUPLICATE	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-1 **Lab ID: 60272886001** Collected: 06/14/18 10:52 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**154**	ug/L	100	1	06/20/18 16:25	06/23/18 13:09	7440-42-8	
Calcium	**110**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:09	7440-70-2	M1
Lithium	**33.9**	ug/L	10.0	1	06/20/18 16:25	06/27/18 12:24	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**3.9**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:23	7440-38-2	
Barium	**135**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:23	7440-39-3	
Molybdenum	**8.4**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:23	7439-98-7	
Selenium	**10.8**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:23	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**528**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.0**	Std. Units	0.10	1		06/21/18 12:39		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**9.9**	mg/L	1.0	1		06/25/18 10:01	16887-00-6	
Fluoride	**1.2**	mg/L	0.20	1		06/25/18 10:01	16984-48-8	
Sulfate	**50.4**	mg/L	5.0	5		06/26/18 00:11	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-2 **Lab ID: 60272886002** Collected: 06/14/18 11:51 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**128**	ug/L	100	1	06/20/18 16:25	06/23/18 13:19	7440-42-8	
Calcium	**99.4**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:19	7440-70-2	
Lithium	**27.8**	ug/L	10.0	1	06/20/18 16:25	06/27/18 12:36	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**3.6**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:25	7440-38-2	
Barium	**102**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:25	7440-39-3	
Molybdenum	**8.2**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:25	7439-98-7	
Selenium	**13.1**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:25	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**456**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.0**	Std. Units	0.10	1		06/21/18 12:41		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**13.0**	mg/L	1.0	1		06/25/18 10:46	16887-00-6	
Fluoride	**0.83**	mg/L	0.20	1		06/25/18 10:46	16984-48-8	
Sulfate	**44.2**	mg/L	5.0	5		06/26/18 00:55	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-3 **Lab ID: 60272886003** Collected: 06/14/18 09:32 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**104**	ug/L	100	1	06/20/18 16:25	06/23/18 13:22	7440-42-8	
Calcium	**96.8**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:22	7440-70-2	
Lithium	**28.1**	ug/L	10.0	1	06/20/18 16:25	06/27/18 12:41	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**3.0**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:29	7440-38-2	
Barium	**178**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:29	7440-39-3	
Molybdenum	**12.6**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:29	7439-98-7	
Selenium	**9.8**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:29	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**489**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.0**	Std. Units	0.10	1		06/21/18 12:36		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**30.2**	mg/L	5.0	5		06/26/18 01:25	16887-00-6	
Fluoride	**0.67**	mg/L	0.20	1		06/25/18 11:45	16984-48-8	
Sulfate	**53.5**	mg/L	5.0	5		06/26/18 01:25	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-4R **Lab ID: 60272886004** Collected: 06/14/18 08:56 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**152**	ug/L	100	1	06/20/18 16:25	06/23/18 13:24	7440-42-8	
Calcium	**87.0**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:24	7440-70-2	
Lithium	**27.0**	ug/L	10.0	1	06/20/18 16:25	06/27/18 12:45	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**4.1**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:31	7440-38-2	
Barium	**134**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:31	7440-39-3	
Molybdenum	**5.5**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:31	7439-98-7	
Selenium	**8.0**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:31	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**438**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		06/21/18 12:34		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**25.2**	mg/L	2.0	2		06/26/18 01:40	16887-00-6	
Fluoride	**0.80**	mg/L	0.20	1		06/25/18 12:00	16984-48-8	
Sulfate	**38.8**	mg/L	2.0	2		06/26/18 01:40	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-5 **Lab ID: 60272886005** Collected: 06/14/18 10:10 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**141**	ug/L	100	1	06/20/18 16:25	06/23/18 13:26	7440-42-8	
Calcium	**97.4**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:26	7440-70-2	
Lithium	**27.0**	ug/L	10.0	1	06/20/18 16:25	06/27/18 12:49	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**4.6**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:32	7440-38-2	
Barium	**127**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:32	7440-39-3	
Molybdenum	**5.0**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:32	7439-98-7	
Selenium	**8.4**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:32	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**445**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.4**	Std. Units	0.10	1		06/21/18 12:38		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**25.2**	mg/L	2.0	2		06/26/18 02:40	16887-00-6	
Fluoride	**1.0**	mg/L	0.20	1		06/25/18 12:15	16984-48-8	
Sulfate	**38.4**	mg/L	2.0	2		06/26/18 02:40	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-6 **Lab ID: 60272886006** Collected: 06/14/18 13:40 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	ND	ug/L	100	1	06/20/18 16:25	06/23/18 13:28	7440-42-8	
Calcium	**52.2**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:28	7440-70-2	
Lithium	**19.2**	ug/L	10.0	1	06/20/18 16:25	06/27/18 12:53	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**3.2**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:34	7440-38-2	
Barium	**101**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:34	7440-39-3	
Lead	ND	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:34	7439-92-1	
Molybdenum	**4.9**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:34	7439-98-7	
Selenium	**5.5**	ug/L	1.0	1	06/20/18 16:25	07/02/18 14:34	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**365**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**6.9**	Std. Units	0.10	1		06/21/18 12:49		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**51.6**	mg/L	5.0	5		06/26/18 03:09	16887-00-6	
Fluoride	**0.52**	mg/L	0.20	1		06/25/18 12:30	16984-48-8	
Sulfate	**22.5**	mg/L	2.0	2		06/26/18 03:24	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-7 **Lab ID: 60272886007** Collected: 06/14/18 13:05 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**187**	ug/L	100	1	06/20/18 16:25	06/23/18 13:31	7440-42-8	
Calcium	**104**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:31	7440-70-2	
Lithium	**30.6**	ug/L	10.0	1	06/20/18 16:25	06/27/18 13:06	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**3.5**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:23	7440-38-2	
Barium	**129**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:23	7440-39-3	
Molybdenum	**8.3**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:23	7439-98-7	
Selenium	**10.3**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:23	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**512**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.3**	Std. Units	0.10	1		06/21/18 12:46		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**47.9**	mg/L	5.0	5		06/26/18 03:39	16887-00-6	
Fluoride	**0.76**	mg/L	0.20	1		06/25/18 12:45	16984-48-8	
Sulfate	**48.4**	mg/L	5.0	5		06/26/18 03:39	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: MW-8 **Lab ID: 60272886008** Collected: 06/14/18 12:30 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	**227**	ug/L	100	1	06/20/18 16:25	06/23/18 13:33	7440-42-8	
Calcium	**86.5**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:33	7440-70-2	
Lithium	**28.0**	ug/L	10.0	1	06/20/18 16:25	06/27/18 13:11	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**2.5**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:25	7440-38-2	
Barium	**143**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:25	7440-39-3	
Molybdenum	**7.6**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:25	7439-98-7	
Selenium	**12.9**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:25	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**406**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.1**	Std. Units	0.10	1		06/21/18 12:43		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**27.6**	mg/L	2.0	2		06/26/18 03:54	16887-00-6	
Fluoride	**0.71**	mg/L	0.20	1		06/25/18 13:00	16984-48-8	
Sulfate	**38.0**	mg/L	5.0	5		06/26/18 04:09	14808-79-8	

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ANALYTICAL RESULTS

Project: City of Fremont
Pace Project No.: 60272886

Sample: DUPLICATE **Lab ID: 60272886009** Collected: 06/14/18 23:59 Received: 06/19/18 06:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Boron	ND	ug/L	100	1	06/20/18 16:25	06/23/18 13:35	7440-42-8	
Calcium	**51.0**	mg/L	0.20	1	06/20/18 16:25	06/23/18 13:35	7440-70-2	
Lithium	**20.3**	ug/L	10.0	1	06/20/18 16:25	06/27/18 13:15	7439-93-2	
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Arsenic	**3.2**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:27	7440-38-2	
Barium	**103**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:27	7440-39-3	
Molybdenum	**5.1**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:27	7439-98-7	
Selenium	**5.5**	ug/L	1.0	1	06/20/18 16:25	06/29/18 16:27	7782-49-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**354**	mg/L	5.0	1		06/21/18 10:56		
9040 pH	Analytical Method: EPA 9040							
pH	**7.9**	Std. Units	0.10	1		06/27/18 12:25		H6
9056 IC Anions	Analytical Method: EPA 9056							
Chloride	**50.5**	mg/L	5.0	5		06/26/18 04:24	16887-00-6	
Fluoride	**0.52**	mg/L	0.20	1		06/25/18 13:15	16984-48-8	
Sulfate	**22.0**	mg/L	2.0	2		06/26/18 04:39	14808-79-8	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-1 **Lab ID: 60272875001** Collected: 06/14/18 10:52 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.743 ± 0.493 (0.649)** **C:NA T:86%**	pCi/L	07/09/18 11:05	13982-63-3	
Radium-228	EPA 904.0	**1.56 ± 0.556 (0.817)** **C:77% T:79%**	pCi/L	07/11/18 14:43	15262-20-1	
Total Radium	Total Radium Calculation	**2.30 ± 1.05 (1.47)**	pCi/L	07/12/18 11:22	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-2 **Lab ID: 60272875002** Collected: 06/14/18 11:51 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.581 ± 0.506 (0.767)** **C:NA T:90%**	pCi/L	07/09/18 11:50	13982-63-3	
Radium-228	EPA 904.0	**1.13 ± 0.490 (0.795)** **C:81% T:75%**	pCi/L	07/11/18 14:43	15262-20-1	
Total Radium	Total Radium Calculation	**1.71 ± 0.996 (1.56)**	pCi/L	07/12/18 11:22	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-3 **Lab ID: 60272875003** Collected: 06/14/18 09:32 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.282 ± 0.430 (0.740)** **C:NA T:80%**	pCi/L	07/09/18 11:05	13982-63-3	
Radium-228	EPA 904.0	**1.98 ± 0.604 (0.758)** **C:79% T:79%**	pCi/L	07/11/18 14:43	15262-20-1	
Total Radium	Total Radium Calculation	**2.26 ± 1.03 (1.50)**	pCi/L	07/12/18 11:22	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-4R **Lab ID: 60272875004** Collected: 06/14/18 08:56 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.439 ± 0.481 (0.774)** **C:NA T:92%**	pCi/L	07/09/18 11:05	13982-63-3	
Radium-228	EPA 904.0	**1.24 ± 0.611 (1.10)** **C:80% T:71%**	pCi/L	07/11/18 14:43	15262-20-1	
Total Radium	Total Radium Calculation	**1.68 ± 1.09 (1.87)**	pCi/L	07/12/18 11:22	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-5 **Lab ID: 60272875005** Collected: 06/14/18 10:10 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.205 ± 0.471 (0.853)** **C:NA T:85%**	pCi/L	07/09/18 11:05	13982-63-3	
Radium-228	EPA 904.0	**1.82 ± 0.566 (0.711)** **C:81% T:83%**	pCi/L	07/11/18 14:43	15262-20-1	
Total Radium	Total Radium Calculation	**2.03 ± 1.04 (1.56)**	pCi/L	07/12/18 11:22	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-6 **Lab ID: 60272875006** Collected: 06/14/18 13:40 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.564 ± 0.486 (0.723)** **C:NA T:85%**	pCi/L	07/09/18 11:20	13982-63-3	
Radium-228	EPA 904.0	**0.901 ± 0.424 (0.713)** **C:78% T:81%**	pCi/L	07/11/18 14:43	15262-20-1	
Total Radium	Total Radium Calculation	**1.47 ± 0.910 (1.44)**	pCi/L	07/12/18 11:22	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-7 **Lab ID: 60272875007** Collected: 06/14/18 13:05 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.651 ± 0.457 (0.584)** **C:NA T:77%**	pCi/L	07/09/18 11:20	13982-63-3	
Radium-228	EPA 904.0	**1.51 ± 0.547 (0.817)** **C:80% T:78%**	pCi/L	07/11/18 14:44	15262-20-1	
Total Radium	Total Radium Calculation	**2.16 ± 1.00 (1.40)**	pCi/L	07/12/18 11:24	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: MW-8 **Lab ID: 60272875008** Collected: 06/14/18 12:30 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.211 ± 0.506 (0.978) C:NA T:77%**	pCi/L	07/13/18 10:24	13982-63-3	
Radium-228	EPA 904.0	**1.28 ± 0.487 (0.736) C:80% T:79%**	pCi/L	07/11/18 14:44	15262-20-1	
Total Radium	Total Radium Calculation	**1.49 ± 0.993 (1.71)**	pCi/L	07/13/18 13:27	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

Sample: DUPLICATE **Lab ID: 60272875009** Collected: 06/14/18 23:59 Received: 06/19/18 06:35 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.397 ± 0.437 (0.699)** **C:NA T:86%**	pCi/L	07/09/18 11:20	13982-63-3	
Radium-228	EPA 904.0	**1.01 ± 0.441 (0.738)** **C:83% T:85%**	pCi/L	07/11/18 14:44	15262-20-1	
Total Radium	Total Radium Calculation	**1.41 ± 0.878 (1.44)**	pCi/L	07/12/18 11:24	7440-14-4	

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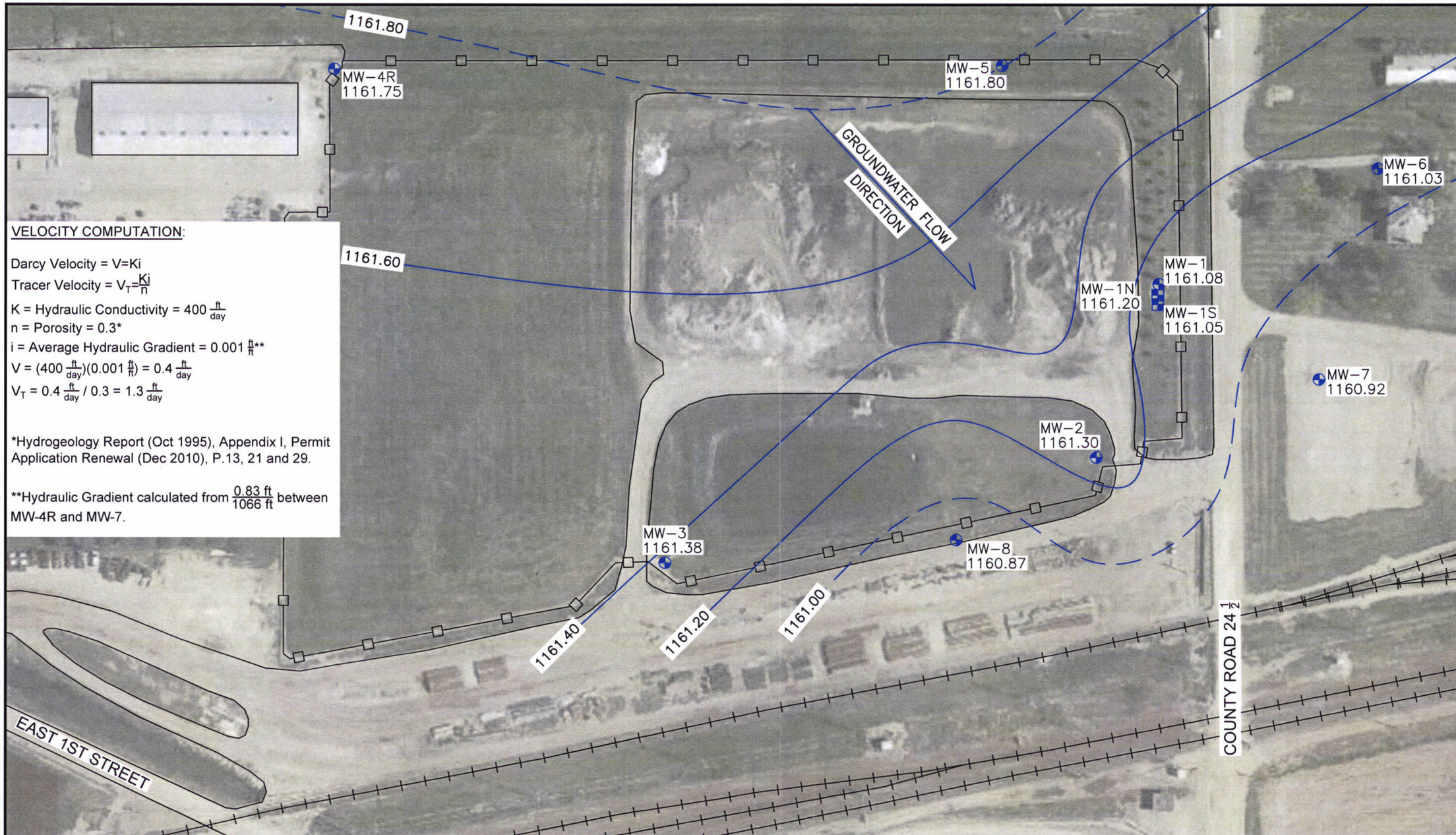

VELOCITY COMPUTATION:

Darcy Velocity = V=Ki

Tracer Velocity = $V_T = \frac{Ki}{n}$

K = Hydraulic Conductivity = 400 $\frac{ft}{day}$

n = Porosity = 0.3*

i = Average Hydraulic Gradient = 0.001 $\frac{ft}{ft}$**

V = (400 $\frac{ft}{day}$)(0.001 $\frac{ft}{ft}$) = 0.4 $\frac{ft}{day}$

V_T = 0.4 $\frac{ft}{day}$ / 0.3 = 1.3 $\frac{ft}{day}$

*Hydrogeology Report (Oct 1995), Appendix I, Permit Application Renewal (Dec 2010), P.13, 21 and 29.

**Hydraulic Gradient calculated from $\frac{0.83\ ft}{1066\ ft}$ between MW-4R and MW-7.

LEGEND

- RAILROAD TRACKS
- FENCE
- MONITORING WELL
- PIEZOMETER
- GROUNDWATER CONTOURS
- ESTIMATED GROUNDWATER CONTOURS
- 1162.00 FEET ABOVE MEAN SEA LEVEL

NOTES:

1. Depths to groundwater measured 6/14/2018.
2. Groundwater data from MW-1N and MW-1S not utilized in calculation of groundwater contours.

100 0 100 200

SCALE FEET

REV.	DATE	CK. BY
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

SHEET TITLE
GROUNDWATER FLOW DIRECTION MAP

PROJECT TITLE
BACKGROUND GROUNDWATER SAMPLING

CLIENT
FREMONT DEPARTMENT OF UTILITIES
LON D. WRIGHT POWER PLANT
FREMONT, NEBRASKA

SCS ENGINEERS
14755 GROVER STREET
OMAHA, NEBRASKA 68144
PH: (402) 884-6202 FAX: (402) 884-6203

PROJ. NO. 27218066.00 | DWN. BY: ZEM | Q/A RVW BY: CJ
DSN. BY: KB | CHK. BY: CJ | PROJ. MGR: BRS

CADD FILE: Q2 GROUNDWATER CONTOURS.DWG

DATE: 6/22/18

FIGURE NO. 1

T:\27218066.00\Data and Calculations\Groundwater\DWG\Q2 Groundwater Contours.dwg Jun 22, 2018 - 10:25am Layout Name: 11x17 By: 4277zem

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-1
Date(s): 6.14.18

Field Team Members
Name: B. Stephens Affiliation: SCS Engineers
Name: Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 76 °F (Mean) Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad Good
Casing
Protective Casing - Paint chipping
Reference Mark/Identification

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18/10:29
Total Depth: feet below TOC
Static Water Level: 19.84 feet below TOC
TD - SWL: water column (ft.)

Purging Activities
Purged By: B. Stephens Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other (circle one)
Purge Volume Calculation: Min Purge Volume: mL
Initial Parameter Readings: Temp (°C) 16.97 pH 7.14 ORP 174
Sp. Cond. 0.842 Turbidity 0.0 DO 10.82
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
10:37	1500	300	15.12	7.02	180	0.867	0.0	8.23	19.84
10:42	3000	300	14.92	7.02	183	0.861	0.0	7.33	19.84
10:47	4500	300	14.86	7.02	188	0.860	0.0	7.37	19.84

Sampling Activities
Sampled By: B. Stephens Sample Date/Time: 6.14.18/10:52
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 14.86 pH 7.02 ORP 188
Sp. Cond. 0.860 Turbidity 0.0 DO 7.37
Water Level 19.84 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)
WL for MW-1N = 20.73'
WL for MW-1S = 20.72'

Electronic Form Completed By: **Date:**

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-2
Date(s): 6.14.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 81 °F (Mean) — Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing: - Paint chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18 / 11:29
Total Depth: ____ feet below TOC
Static Water Level: 16.16 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: — Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 17.09 pH 7.20 ORP 171
Sp. Cond. 0.738 Turbidity 0.0 DO 12.20
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
11:36	1500	300	14.49	7.01	177	0.769	0.0	9.27	16.16
11:41	3000	300	14.15	7.01	179	0.774	0.0	7.59	16.16
11:46	4500	300	14.13	6.99	182	0.776	0.0	6.83	16.16

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 6.14.18 / 11:51
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 14.13 pH 6.99 ORP 182
Sp. Cond. 0.776 Turbidity 0.0 DO 6.83
Water Level 16.16 (feet below TOC)

Observations/Comments: (i.e.. equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-3
Date(s): 6.14.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 74 °F (Mean) — Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing: – Cap fits poorly
Protective Casing: – Paint chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18 / 09:09
Total Depth: ____ feet below TOC
Static Water Level: 17.43 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: — Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 14.87 pH 7.18 ORP 154
Sp. Cond. 0.776 Turbidity 0.0 DO 6.90
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
09:17	1500	300	13.87	7.07	161	0.797	0.0	6.15	17.43
09:22	3000	300	13.71	7.06	168	0.804	0.0	6.26	17.43
09:27	4500	300	13.65	7.06	173	0.808	0.0	6.11	17.43

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 6.14.18 / 09:32
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 13.65 pH 7.06 ORP 173
Sp. Cond. 0.808 Turbidity 0.0 DO 6.11
Water Level 17.43 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-4R
Date(s): 6.14.18

Field Team Members
Name: B. Stephens Affiliation: SCS Engineers
Name: Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 72 °F (Mean) Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad Good
Casing
Protective Casing
Reference Mark/Identification

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18/08:34
Total Depth: feet below TOC
Static Water Level: 16.54 feet below TOC
TD - SWL: water column (ft.)

Purging Activities
Purged By: B. Stephens Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other (circle one)
Purge Volume Calculation: Min Purge Volume: mL
Initial Parameter Readings: Temp (°C) 16.08 pH 8.12 ORP 64
Sp. Cond. 0.752 Turbidity 0.0 DO 6.62
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
08:41	1500	300	13.63	7.32	103	0.772	0.0	6.24	16.55
08:46	3000	300	13.18	7.23	126	0.770	0.0	6.30	16.55
08:51	4500	300	13.04	7.23	139	0.769	0.0	6.25	16.55

Sampling Activities
Sampled By: B. Stephens Sample Date/Time: 6.14.18/08:56
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 13.04 pH 7.23 ORP 139
Sp. Cond. 0.769 Turbidity 0.0 DO 6.25
Water Level 16.55 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: **Date:**

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-5
Date(s): 6.14.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 76 °F (Mean) — Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing: - Paint Chipping
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18/09:47
Total Depth: ____ feet below TOC
Static Water Level: 16.26 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: — Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 15.75 pH 7.21 ORP 170
Sp. Cond. 0.779 Turbidity 0.0 DO 8.23
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
09:55	1500	300	14.28	7.16	174	0.788	0.0	6.25	16.26
10:00	3000	300	14.29	7.14	176	0.788	0.0	6.04	16.26
10:05	4500	300	14.21	7.13	178	0.789	0.0	5.80	16.26

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 6.14.18/10:10
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 14.21 pH 7.13 ORP 178
Sp. Cond. 0.789 Turbidity 0.0 DO 5.80
Water Level 16.26 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-6
Date(s): 6.14.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 84 °F (Mean) — Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18/13:20
Total Depth: ____ feet below TOC
Static Water Level: 16.75 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 17.42 pH 7.00 ORP 177
Sp. Cond. 0.476 Turbidity 0.0 DO 10.40
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
13:25	1500	300	14.16	6.88	178	0.599	0.0	6.97	16.75
13:30	3000	300	13.91	6.84	180	0.633	0.0	5.11	16.75
13:35	4500	300	13.60	6.83	181	0.646	0.0	5.29	16.75

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 6.14.18/13:40
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 13.60 pH 6.83 ORP 181
Sp. Cond. 0.646 Turbidity 0.0 DO 5.29
Water Level 16.75 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)
Duplicate sample taken here at "23:59"

Electronic Form Completed By: ____ **Date:** ____

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-7
Date(s): 6.14.18

Field Team Members
Name: B. Stephens — Affiliation: SCS Engineers
Name: — Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 84 °F (Mean) — Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy — Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad: Good
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Date/Time Measured: 6.14.18/12:44
Total Depth: ____ feet below TOC
Static Water Level: 16.43 feet below TOC
TD - SWL: ____ water column (ft.)

Purging Activities
Purged By: B. Stephens — Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other ____ (circle one)
Purge Volume Calculation: ____ Min Purge Volume: ____ mL
Initial Parameter Readings: Temp (°C) 16.58 pH 6.94 ORP 172
Sp. Cond. 0.802 Turbidity 0.0 DO 9.79
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
12:50	1500	300	13.62	6.95	177	0.876	0.0	8.30	16.43
12:55	3000	300	13.33	6.94	179	0.884	0.0	7.76	16.43
13:00	4500	300	13.15	6.94	181	0.891	0.0	7.60	16.43

Sampling Activities
Sampled By: B. Stephens — Sample Date/Time: 6.14.18/13:05
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 13.15 pH 6.94 ORP 181
Sp. Cond. 0.891 Turbidity 0.0 DO 7.60
Water Level 16.43 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: ____ **Date:** ____

Field Data Sheet

Project Name: FDU GW Sampling
Project Location: Fremont, NE
Project Number:

Monitoring Point: MW-8
Date(s): 6.14.18

Field Team Members
Name: B. Stephens Affiliation: SCS Engineers
Name: Affiliation: SCS Engineers

Weather Conditions
Mean Temp: 81 °F (Mean) Wind Direction: N (S) (E) W (circle two if needed)
Precipitation: (None) Light Heavy Sky: Cloudy (Sunny) Partly

Well Observations
Well Pad Good
Casing
Protective Casing
Reference Mark/Identification

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements
Total Depth: feet below TOC
Static Water Level: 16.67 feet below TOC
Date/Time Measured: 6.14.18/12:10 TD - SWL: water column (ft.)

Purging Activities
Purged By: B. Stephens Purge Date: 6.14.18
Purge Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Well Diameter: 1-inch 2-inch 3-inch (4-inch) Other (circle one)
Purge Volume Calculation: Min Purge Volume: mL
Initial Parameter Readings: Temp (°C) 16.91 pH 7.12 ORP 174
Sp. Cond. 0.709 Turbidity 0.0 DO 12.52
Physical appearance of purge water: Clear

Purge Time	Cumulative Purge Vol. (mL)	Purge Rate (ml/m)	Temp (°C)	pH	ORP (mV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Water Level (ft below TOC)
12:15	1500	300	14.47	6.97	179	0.728	0.0	8.53	16.67
12:20	3000	300	14.13	6.95	179	0.729	0.0	6.96	16.67
12:25	4500	300	14.04	6.94	179	0.730	0.0	6.77	16.67

Sampling Activities
Sampled By: B. Stephens Sample Date/Time: 6.14.18/12:30
Sample Method: Bailer (Dedicated Pump) Non-Dedicated Pump Peristaltic Pump (circle one)
Sample Parameters: Temp (°C) 14.04 pH 6.94 ORP 179
Sp. Cond. 0.730 Turbidity 0.0 DO 6.77
Water Level 16.67 (feet below TOC)

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

Electronic Form Completed By: **Date:**

Project Name: FDN GW Sampling
Project Location: Fremont, NE
Project Number: 27218066.00

Date: 6.14.18
Weather Information: AM - Sunny, low 70's, 5-10 mph SE wind
PM - Sunny, mid 80's, 5-10 mph SE wind
Personnel Onsite: B. Stephens (SCS)
Equipment Onsite: F-250 (SCS)
Field Equipment: Horiba U-52 → S/N W8DE77M6
↳ Calibrated 6.12.18
QED MP10 Bladder Pump Controller
↳ S/N 2417
Nitrogen Cylinders (#2)

Work Comments/Observations
08:15 - SCS (B. Stephens) onsite at MW-4R
09:01 - Moved to MW-3.
09:38 - Moved to MW-5.
10:16 - Moved to MW-1.
11:19 - Moved to MW-2.
11:56 - Moved to MW-8.
12:34 - Moved to MW-7
13:06 - Moved to MW-6. Duplicate taken here at "23:59"
13:53 - SCS offsite.
End of Log B. Stephens, Project Scientist

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QUALITY CONTROL DATA

Project: City of Fremont
Pace Project No.: 60272886

QC Batch: 530920 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

METHOD BLANK: 2174543 Matrix: Water
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	ND	100	06/23/18 13:06	
Calcium	mg/L	ND	0.20	06/23/18 13:06	
Lithium	ug/L	ND	10.0	06/27/18 12:16	

LABORATORY CONTROL SAMPLE: 2174544

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	988	99	80-120	
Calcium	mg/L	10	9.9	99	80-120	
Lithium	ug/L	1000	917	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2174545 2174546

Parameter	Units	60272886001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	154	1000	1000	1120	1110	96	96	75-125	0	20	
Calcium	mg/L	110	10	10	118	117	76	73	75-125	0	20	M1
Lithium	ug/L	33.9	1000	1000	976	966	94	93	75-125	1	20	

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QUALITY CONTROL DATA

Project: City of Fremont
Pace Project No.: 60272886

QC Batch: 530921 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

METHOD BLANK: 2174547 Matrix: Water
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	ND	1.0	07/02/18 14:20	
Barium	ug/L	ND	1.0	07/02/18 14:20	
Lead	ug/L	ND	1.0	07/02/18 14:20	
Molybdenum	ug/L	ND	1.0	07/02/18 14:20	
Selenium	ug/L	ND	1.0	07/02/18 14:20	

LABORATORY CONTROL SAMPLE: 2174548

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	40	40.7	102	80-120	
Barium	ug/L	40	39.7	99	80-120	
Lead	ug/L	40	39.5	99	80-120	
Molybdenum	ug/L	40	41.1	103	80-120	
Selenium	ug/L	40	39.3	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2174549 2174550

Parameter	Units	60272886002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	3.6	40	40	46.0	45.5	106	105	75-125	1	20	
Barium	ug/L	102	40	40	144	144	105	105	75-125	0	20	
Lead	ug/L	ND	40	40	37.0	36.6	92	91	75-125	1	20	
Molybdenum	ug/L	8.2	40	40	51.9	51.7	109	109	75-125	0	20	
Selenium	ug/L	13.1	40	40	52.0	51.6	97	96	75-125	1	20	

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QUALITY CONTROL DATA

Project: City of Fremont
Pace Project No.: 60272886

QC Batch: 531004 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

METHOD BLANK: 2174964 | Matrix: Water
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	06/21/18 10:56	

LABORATORY CONTROL SAMPLE: 2174965

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	989	99	80-120	

SAMPLE DUPLICATE: 2174966

Parameter	Units	60272677001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	712	710	0	10	

SAMPLE DUPLICATE: 2174967

Parameter	Units	60272886009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	354	355	0	10	

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QUALITY CONTROL DATA

Project: City of Fremont
Pace Project No.: 60272886

QC Batch: 530993 Analysis Method: EPA 9040
QC Batch Method: EPA 9040 Analysis Description: 9040 pH
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008

SAMPLE DUPLICATE: 2174923

Parameter	Units	60271800010 Result	Dup Result	RPD	Max RPD	Qualifiers
pH	Std. Units	7.7	7.6	2	10	H6

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(913)599-5665

QUALITY CONTROL DATA

Project: City of Fremont
Pace Project No.: 60272886

QC Batch: 531912
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Associated Lab Samples: 60272886009

SAMPLE DUPLICATE: 2178372

Parameter	Units	60272886009 Result	Dup Result	RPD	Max RPD	Qualifiers
pH	Std. Units	7.9	7.9	1	10	H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: City of Fremont
Pace Project No.: 60272886

QC Batch: 531415 Analysis Method: EPA 9056
QC Batch Method: EPA 9056 Analysis Description: 9056 IC Anions
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

METHOD BLANK: 2176870 Matrix: Water
Associated Lab Samples: 60272886001, 60272886002, 60272886003, 60272886004, 60272886005, 60272886006, 60272886007, 60272886008, 60272886009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	06/25/18 09:31	
Fluoride	mg/L	ND	0.20	06/25/18 09:31	
Sulfate	mg/L	ND	1.0	06/25/18 09:31	

LABORATORY CONTROL SAMPLE: 2176871

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	80-120	
Fluoride	mg/L	2.5	2.4	97	80-120	
Sulfate	mg/L	5	4.8	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2176872 2176873

Parameter	Units	60272886001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	9.9	5	5	14.8	15.0	99	103	80-120	1	15	
Fluoride	mg/L	1.2	2.5	2.5	3.6	3.7	96	102	80-120	4	15	

SAMPLE DUPLICATE: 2176874

Parameter	Units	60272886002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	13.0	13.1	1	15	
Fluoride	mg/L	0.83	0.82	1	15	
Sulfate	mg/L	44.2	43.8	1	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

QC Batch: 303694 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60272875001, 60272875002, 60272875003, 60272875004, 60272875005, 60272875006, 60272875007, 60272875008, 60272875009

METHOD BLANK: 1486133 Matrix: Water
Associated Lab Samples: 60272875001, 60272875002, 60272875003, 60272875004, 60272875005, 60272875006, 60272875007, 60272875008, 60272875009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.261 ± 0.321 (0.680) C:82% T:81%	pCi/L	07/11/18 14:43	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: City of Fremont
Pace Project No.: 60272875

QC Batch: 303592 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60272875001, 60272875002, 60272875003, 60272875004, 60272875005, 60272875006, 60272875007, 60272875008, 60272875009

METHOD BLANK: 1485809 Matrix: Water
Associated Lab Samples: 60272875001, 60272875002, 60272875003, 60272875004, 60272875005, 60272875006, 60272875007, 60272875008, 60272875009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0463 ± 0.301 (0.607) C:NA T:95%	pCi/L	07/09/18 10:30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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FREMONT DEPARTMENT OF UTILITIES
GROUNDWATER LEVEL MEASUREMENTS FOR
JUNE 2018 CCR ASSESSMENT MONITORING SAMPLING EVENT

Well No.	Well Type	Top of Casing Elev*	Date	Static Water Level (FT) **	Groundwater Elev
1	Dn. Gradient	1180.68	6/14/2018	19.84	1160.84
1N	Dn. Gradient	1181.71	6/14/2018	20.73	1165.55
1S	Dn. Gradient	1181.60	6/14/2018	20.72	1164.17
2	Dn. Gradient	1177.09	6/14/2018	16.16	1160.55
3	Dn. Gradient	1178.53	6/14/2018	17.43	1162.27
4R	Up Gradient	1177.77	6/14/2018	16.54	1161.23
5	Dn. Gradient	1177.61	6/14/2018	16.26	1161.35
6	Dn. Gradient	1177.61	6/14/2018	16.75	1160.86
7	Dn. Gradient	1177.30	6/14/2018	16.43	1160.87
8	Dn. Gradient	1177.37	6/14/2018	16.67	1160.70

* Top of Casing Elevation (top of square casing with lid open) surveyed January 14, 2011 by Dodd Engineering & Surveying, LLC. for monitoring wells 1, 1N, 1S, 2, 3, and 5.
Monitoring wells 4R, 6, 7 and 8 were surveyed September 20, 2016 by APEX Land Surveying LLC.

** Static water level measurement from top of steel casing were collected during well sampling

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

2214439

Section A Required Client Information:

Company: SCS Engineers
Address: 14755 Grover St
Omaha, NE 68144
Email To: mmiller@scsengineers.com
Phone: 402-884-6202 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Michael Miller
Copy To: Chuck Joyce (cjoyce@scsengineers.com)
Bret Stephes (bstephes@scsengineers.com)
Purchase Order No.:
Project Name: City of Fremont
Project Number:

Section C Invoice Information:

Attention: Michael Miller
Company Name: SCS Engineers
Address:
Pace Quote Reference:
Pace Project Manager: Trudy Gipson
Pace Profile #: 9797 Line #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NE

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N): 6010 - Total Metals B-Ca-Li	9056 Cl - F - SO4	2540C TDS	9040 pH	6020 Total Metals*	6020 Total Metals - Pb	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1	WT	G			6.14.18	10:52		3	1		2						X	X	X	X	X			
2	MW-2	↓	↓			↓	11:51		3	1		2						X	X	X	X	X			
3	MW-3	↓	↓			↓	09:32		3	1		2						X	X	X	X	X			
4	MW-4R	↓	↓			↓	08:56		3	1		2						X	X	X	X	X			
5	MW-5	↓	↓			↓	10:10		3	1		2						X	X	X	X	X			
6	MW-6	↓	↓			↓	13:40		3	1		2						X	X	X	X	X	X		
7	MW-7	↓	↓			↓	13:05		3	1		2						X	X	X	X	X			
8	MW-8	↓	↓			↓	12:30		3	1		2						X	X	X	X	X			
9	Duplicate	↓	↓			↓	23:59		3	1		2						X	X	X	X	X			
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*As-Ba-Mo-Se	Bret Stephes / SCS	6.18.18	15:00				

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Bret Stephes
SIGNATURE of SAMPLER: Bret Stephes
DATE Signed (MM/DD/YY): 6.18.18

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company:	SCS Engineers
Address:	14755 Grover Street
	Omaha NE 68144
Email To:	mmiller@scsengineers.com
Phone: 402-884-6202	Fax:
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Michael Miller
Copy To:	Chuck Joyce (cjoyce@scsengineers.com)
	Bret Stephens (bstephens@scsengineers.com)
Purchase Order No.:	
Project Name:	City of Fremont
Project Number:	

Section C Invoice Information:

Attention:	Michael Miller
Company Name:	SCS Engineers
Address:	
Pace Quote Reference:	
Pace Project Manager:	Trudy Gipson 913-563-1405
Pace Profile #:	9797 Line 2

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NE

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	903.1 Radium-226*	904.0 Radium-228*	Total Radium*	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1	WT	G	xxx	xxx	6.14.18	10:52		2			2							X	X	X	N	
2	MW-2	WT	G	xxx	xxx	6.14.18	11:51		2			2							X	X	X		
3	MW-3	WT	G	xxx	xxx	6.14.18	09:32		2			2							X	X	X		
4	MW-4R	WT	G	xxx	xxx	6.14.18	08:56		2			2							X	X	X		
5	MW-5	WT	G	xxx	xxx	6.14.18	10:10		2			2							X	X	X		
6	MW-6	WT	G	xxx	xxx	6.14.18	13:40		2			2							X	X	X		
7	MW-7	WT	G	xxx	xxx	6.14.18	13:05		2			2							X	X	X		
8	MW-8	WT	G	xxx	xxx	6.14.18	12:30		2			2							X	X	X		
9	DUPLICATE	WT	G	xxx	xxx	6.14.18	23:59		2			2							X	X	X		
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Ship To: 9008 Lorel Boulevard, Lenexa KS 66219	Bret Stephens / SCS	6.18.18	15:00				
*Subcontract Pace PA (2-1L plastic HNO3)							

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Bret Stephens

SIGNATURE of SAMPLER: Bret Stephens

DATE Signed (MM/DD/YY): 6.18.18

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Chain of Custody

☐ Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: NE

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www.pacelabs.com

Workorder: 60272875 **Workorder Name:** City of Fremont **Owner Received Date:** 6/19/2018 **Results Requested By:** 7/12/2018

Report To

Trudy Gipson
Pace Analytical Kansas
9608 Loiret Blvd.
Lenexa, KS 66219
Phone 1(913)563-1405

Subcontract To

Pace Analytical Pittsburgh
1638 Roseytown Road
Suites 2,3, & 4
Greensburg, PA 15601
Phone (724)850-5600

Requested Analysis

WO#: 30256868

30256868

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3	903.1 Radium-226	904.0 Radium-228 & Total Radium	LAB USE ONLY
1	MW-1	PS	6/14/2018 10:52	60272875001	Water	2	X	X	001
2	MW-2	PS	6/14/2018 11:51	60272875002	Water	2	X	X	002
3	MW-3	PS	6/14/2018 09:32	60272875003	Water	2	X	X	003
4	MW-4R	PS	6/14/2018 08:56	60272875004	Water	2	X	X	004
5	MW-5	PS	6/14/2018 10:10	60272875005	Water	2	X	X	005
6	MW-6	PS	6/14/2018 13:40	60272875006	Water	2	X	X	006
7	MW-7	PS	6/14/2018 13:05	60272875007	Water	2	X	X	007
8	MW-8	PS	6/14/2018 12:30	60272875008	Water	2	X	X	008
9	DUPLICATE	PS	6/14/2018 23:59	60272875009	Water	2	X	X	009

Transfers	Released By	Date/Time	Received By	Date/Time
1	E Brockett 1Pas.	6/20/18 1630	Mohlenshum/Pac	6-21-18/1010
2				
3				

Comments

Cooler Temperature on Receipt N/A °C | **Custody Seal** Y or (N) | **Received on Ice** Y or (N) | **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

SCS ENGINEERS

Lon D. Wright Power Plant

Statistical Summary of June 2018 Data

Presented To:

City of Fremont Department of Utilities
401 E Military Road
Fremont, Nebraska 68025

Presented By:

SCS ENGINEERS
14755 Grover Street
Omaha, NE 68144
(402) 884-6202

October 2018
File No. 27218066.00

Offices Nationwide
www.scsengineers.com

Statistical Summary of June 2018 Data

Presented To:

City of Fremont Department of Utilities
401 E Military Road
Fremont, Nebraska 68025

Presented By:

SCS ENGINEERS
14755 Grover Street
Omaha, NE 68144
(402) 884-6202

October 2018
File No. 27218066.00

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1.2 Outlier Analysis 2
1.3 Interwell Prediction Limits 2
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Table 3. Statistical Summary **4**

Attachments

A.1 Time Series Plots – June 2018 Data
A.2 Outlier Analysis – June 2018 Data
A.3 Interwell Prediction Limits – June 2018 Data
A.4 Intrawell Prediction Limits – June 2018 Data
A.5 Sen's Slope/Mann-Kendall Trend Analysis – June 2018 Data

JUNE 2018 DATA STATISTICAL SUMMARY

Statistical analysis consisted of methods outlined in the 40 CFR Part 257, Subpart D (CCR rule) and the EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance (Unified Guidance) dated March 2009 using Sanitas™ Statistical Software version 9.6.10. Appendix III and select Appendix IV constituents sampled during the June 2018 monitoring event were statistically analyzed using time series plots, outlier analyses, interwell prediction limit analyses, intrawell prediction limit analyses, and Sen's slope trend analyses. The statistical results have been summarized in **Table 3** found in **Section 1.6**.

1.1 TIME SERIES PLOTS

Time series plots were prepared for Appendix III and Appendix IV constituents to show the concentration variations over time. Time series graphs are included in **Attachment A.1**.

1.2 OUTLIER ANALYSIS

An outlier analysis was performed on all available data for each Appendix III and IV constituent at both upgradient and downgradient monitoring wells. A statistical outlier is a value that is extremely different from the other values in the data set. The outlier tests identify data points that do not appear to fit the distribution of the rest of the data set and determines if they differ significantly from the rest of the data set. A value is considered suspect if it is an order of magnitude larger or smaller than the rest of the data. The Tukey's Outlier Test was employed for both normal and non-normal data. Once a value is identified as a statistical outlier, it is checked for possible lab instrument failure, field collection problems, or data entry errors. However, outliers may exist naturally in the data if there is an extremely wide inherent or temporal variability in the data. The Unified Guidance states that unless a likely error can be identified, the outlier should not be removed. Outlier analysis results are included in **Attachment A.2**.

1.3 INTERWELL PREDICTION LIMITS

An interwell prediction limit analysis compares data collected from compliance (downgradient) monitoring wells with data collected from background (upgradient) monitoring wells. Upgradient monitoring well data is used to calculate the interwell prediction limit and is used to determine if a single data point is statistically representative of a group of data points. If a data point exceeds the calculated interwell prediction limit, then an initial exceedance is noted; however, this may not indicate a statistically significant increase (SSI). The distribution of the data was calculated by applying the Shapiro-Wilk test for normality, or the Ladder of Powers (Helsel & Hirsh, 1992) for transformed data. A parametric prediction limit was constructed for data determined to have a normal or transformed normal distribution. A non-parametric prediction limit was calculated for data not transformed normal or containing 51 percent to 90 percent non-detect results.

Interwell prediction limits were used for downgradient monitoring wells to compare the current data collected to the historical data from abandoned upgradient well MW-4 and the recent data from replacement upgradient well MW-4R. Interwell prediction limits were used to statistically evaluate constituents and wells without an established background prior to October 2016. **Table 1** below identifies the constituent/well pairs that were evaluated using interwell prediction limits.

Table 1. Constituents and Wells Evaluated Using Interwell Prediction Limits

Constituents	Wells
All constituents	MW-6, MW-7, and MW-8
Antimony, Arsenic, Beryllium, Boron, Cadmium, Chloride, Cobalt, Fluoride, Lead Lithium, Mercury, Molybdenum, Radium 226 and 228 combined, and Thallium	MW-1, MW-2, MW-3, and MW-5

Three interwell statistical exceedances were identified for the downgradient monitoring wells during the June 2018 sampling event. The interwell prediction limit results are included in **Attachment A.3**.

1.4 INTRAWELL PREDICTION LIMITS

The intrawell comparison utilizes prediction intervals for statistical comparison of constituents. An intrawell prediction limit analysis compares the historical data of a well to its own compliance data. The historical data is used to calculate the prediction limit that is compared to the compliance data point. If a compliance data point exceeds the calculated prediction limit, then an initial exceedance is noted; however, this may not indicate a statistical significant increase (SSI). The distribution of the data was calculated by applying the Shaprio-Wilk test for normality or the Ladder of Powers (Helsel & Hirsh, 1992) for transformed data. A parametric prediction limit was constructed for data determined to have a normal or transformed normal distribution. A non-parametric prediction limit was calculated for data not transformed normal or containing 51 percent to 90 percent non-detect results.

Intrawell prediction limits were used to statistically evaluate the upgradient well and constituents with an established background prior to October 2016. **Table 2** below identifies the constituent/well pairs that were evaluated using interwell prediction limits.

Table 2. Constituents and Wells Evaluated Using Intrawell Prediction Limits

Constituents	Wells
All constituents	MW-4R
Barium, Calcium, Chromium, pH, Sulfate, Selenium, and Total Dissolved Solids	MW-1, MW-2, MW-3, and MW-5

No intrawell exceedances were identified during the June 2018 sampling event for the constituent/well pairs listed in **Table 2**. Intrawell prediction limit analysis results are included in **Attachment A.4**.

1.5 SEN'S SLOPE/MANN-KENDALL TREND ANALYSIS

Sen's Slope/Mann-Kendall statistical analysis was performed on the detected constituent/well pairs from the June 2018 sampling event to determine trends in the concentration of these constituents. A trend is the general increase or decrease in observed values of a variable over time. A trend analysis can be used to determine the significance of an apparent trend and to estimate the magnitude of that trend. The Mann-Kendall test is nonparametric, meaning that it does not depend on an assumption of a particular underlying distribution. The test uses only the relative magnitude of data rather than actual values. Therefore, missing values are allowed, and values that are recorded as non-detects by the laboratory can still be used in the statistical analysis by assigning values equal to half their reporting limits. Sen's Slope is a simple nonparametric procedure developed to estimate the true slope. The advantage of this method over linear regression is that it is not greatly affected by gross data errors or outliers, and can be computed when data is missing. Trends were performed at the 98% confidence level. Sen's Slope/Mann-Kendall analysis results are included in **Attachment A.5**.

1.6 STATISTICAL SUMMARY

The statistical analyses results from the June 2018 sampling event have been summarized in **Table 3** below. Three prediction limit exceedances were verified as SSIs for fluoride and lithium at well MW-1 and molybdenum at well MW-3. The concentrations of these exceedances have decreased since the February 2018 sampling event. The fluoride and lithium exceedances at well MW-1 did not have statistically significant trends nor exceed NDEQ Title 118 Groundwater Quality Standards. Molybdenum at well MW-3 did have a statistically significant increasing trend. However, the molybdenum concentration at MW-3 did not exceed EPA GWPS identified in the *Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final* Rule (July 17, 2018). The monitoring wells will remain in assessment monitoring at this time.

Table 3. Statistical Summary

Well	Detected Parameters	Result	Interwell Exceedance?[1]	Intrawell Exceedance?[2]	Significant Trend?	GWPS Exceedance?[3]
MW-1	Arsenic (ug/L)	3.9	No	n/a	No	No
	Barium (ug/L)	135	n/a	No	No	No
	Boron (ug/L)	154	No	n/a	No	No[4]
	Calcium (mg/L)	110	n/a	No	No	No[4]
	Chloride (mg/L)	9.9	No	n/a	No	No
	Fluoride (mg/L)	1.2	**Yes**	n/a	No	No
	Lithium (ug/L)	33.9	**Yes**	n/a	No	No
	Molybdenum (ug/L)	8.4	No	n/a	No	No
	pH (S.U.)	7.0	n/a	No	+	No
	Selenium (ug/L)	10.8	n/a	No	-	No
	Sulfate (mg/L)	50.4	n/a	No	-	No
	Total Dissolved Solids (mg/L)	528	n/a	No	No	**Yes**
MW-2	Arsenic (ug/L)	3.6	No	n/a	No	No
	Barium (ug/L)	102	n/a	No	+	No
	Boron (ug/L)	128	No	n/a	No	No[4]
	Calcium (mg/L)	99.4	n/a	No	No	No[4]
	Chloride (mg/L)	13.0	No	n/a	No	No
	Fluoride (mg/L)	0.83	No	n/a	No	No
	Lithium (ug/L)	27.8	No	n/a	No	No
	Molybdenum (ug/L)	8.2	No	n/a	-	No
	pH (S.U.)	7.0	n/a	No	No	No
	Selenium (ug/L)	13.1	n/a	No	-	No
	Sulfate (mg/L)	44.2	n/a	No	-	No
	Total Dissolved Solids (mg/L)	456	n/a	No	-	No
MW-3	Arsenic (ug/L)	3.0	No	n/a	No	No
	Barium (ug/L)	178	n/a	No	+	No
	Boron (ug/L)	104	No	n/a	No	No[4]
	Calcium (mg/L)	96.8	n/a	No	-	No[4]
	Chloride (mg/L)	30.2	No	n/a	No	No
	Fluoride (mg/L)	0.67	No	n/a	No	No
	Lithium (ug/L)	28.1	No	n/a	No	No
	Molybdenum (ug/L)	12.6	**Yes**	n/a	+	No
	pH (S.U.)	7.0	n/a	No	No	No
	Selenium (ug/L)	9.8	n/a	No	-	No
	Sulfate (mg/L)	53.5	n/a	No	-	No
	Total Dissolved Solids (mg/L)	489	n/a	No	-	No
MW-4R	Arsenic (ug/L)	4.1	n/a	No	No	No
	Barium (ug/L)	134	n/a	No	No	No
	Boron (ug/L)	152	n/a	No	No	No[4]
	Calcium (mg/L)	87.0	n/a	No	No	No[4]
	Chloride (mg/L)	25.2	n/a	No	No	No
	Fluoride (mg/L)	0.80	n/a	No	No	No
	Lithium (ug/L)	27.0	n/a	No	No	No
	Molybdenum (ug/L)	5.5	n/a	No	No	No
	pH (S.U.)	7.1	n/a	No	No	No
	Selenium (ug/L)	8.0	n/a	No	No	No
	Sulfate (mg/L)	38.8	n/a	No	No	No
	Total Dissolved Solids (mg/L)	438	n/a	No	No	No

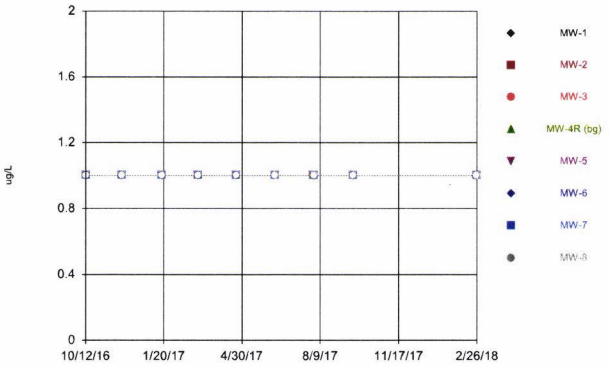
Well	Detected Parameters	Result	Interwell Exceedance?[1]	Intrawell Exceedance?[2]	Significant Trend?	GWPS Exceedance?[3]
MW-5	Arsenic (ug/L)	4.6	No	n/a	No	No
	Barium (ug/L)	127	n/a	No	No	No
	Boron (ug/L)	141	No	n/a	No	No[4]
	Calcium (mg/L)	97.4	n/a	No	+	No[4]
	Chloride (mg/L)	25.5	No	n/a	No	No
	Fluoride (mg/L)	1.0	No	n/a	No	No
	Lithium (ug/L)	27.0	No	n/a	No	No
	Molybdenum (ug/L)	5.0	No	n/a	No	No
	pH (S.U.)	7.4	n/a	No	No	No
	Selenium (ug/L)	8.4	n/a	No	-	No
	Sulfate (mg/L)	38.4	n/a	No	-	No
	Total Dissolved Solids (mg/L)	445	n/a	No	No	No
MW-6	Arsenic (ug/L)	3.2	No	n/a	No	No
	Barium (ug/L)	101	No	n/a	No	No
	Calcium (mg/L)	52.2	No	n/a	No	No[4]
	Chloride (mg/L)	51.6	No	n/a	No	No
	Fluoride (mg/L)	0.52	No	n/a	No	No
	Lithium (ug/L)	19.2	No	n/a	No	No
	Molybdenum (ug/L)	4.9	No	n/a	No	No
	pH (S.U.)	6.9	No	n/a	No	No
	Selenium (ug/L)	5.5	No	n/a	No	No
	Sulfate (mg/L)	22.5	No	n/a	No	No
	Total Dissolved Solids (mg/L)	365	No	n/a	No	No
MW-7	Arsenic (ug/L)	3.5	No	n/a	No	No
	Barium (ug/L)	129	No	n/a	No	No
	Boron (ug/L)	187	No	n/a	No	No[4]
	Calcium (mg/L)	104	No	n/a	No	No[4]
	Chloride (mg/L)	47.9	No	n/a	No	No
	Fluoride (mg/L)	0.76	No	n/a	No	No
	Lithium (ug/L)	30.6	No	n/a	No	No
	Molybdenum (ug/L)	8.3	No	n/a	No	No
	pH (S.U.)	7.3	No	n/a	No	No
	Selenium (ug/L)	10.3	No	n/a	No	No
	Sulfate (mg/L)	48.4	No	n/a	No	No
	Total Dissolved Solids (mg/L)	512	No	n/a	No	**Yes**
MW-8	Arsenic (ug/L)	2.5	No	n/a	No	No
	Barium (ug/L)	143	No	n/a	No	No
	Boron (ug/L)	227	No	n/a	+	No[4]
	Calcium (mg/L)	86.5	No	n/a	No	No[4]
	Chloride (mg/L)	27.6	No	n/a	No	No
	Fluoride (mg/L)	0.71	No	n/a	No	No
	Lithium (ug/L)	28.0	No	n/a	No	No
	Molybdenum (ug/L)	7.6	No	n/a	No	No
	pH (S.U.)	7.1	No	n/a	No	No
	Selenium (ug/L)	12.9	No	n/a	No	No
	Sulfate (mg/L)	38.0	No	n/a	No	No
	Total Dissolved Solids (mg/L)	406	No	n/a	No	No

[1]Constituent/well pairs noted by n/a were not analyzed using interwell prediction limits. See Table 1.
[2]Constituent/well pairs noted by n/a were not analyzed using intrawell prediction limits. See Table 2.
[3]GWPS exceedances were established by the NDEQ Title 118 Groundwater Quality Standards or the EPA *Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part one); Final Rule* (July 17, 2018).
[4]No GWPS has been established.

A.1 TIME SERIES PLOTS – JUNE 2018

Sanitas™ v.9.6.10 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Antimony [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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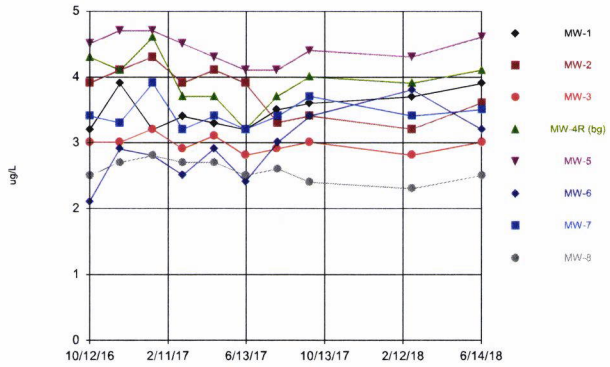
Time Series



Constituent: Arsenic [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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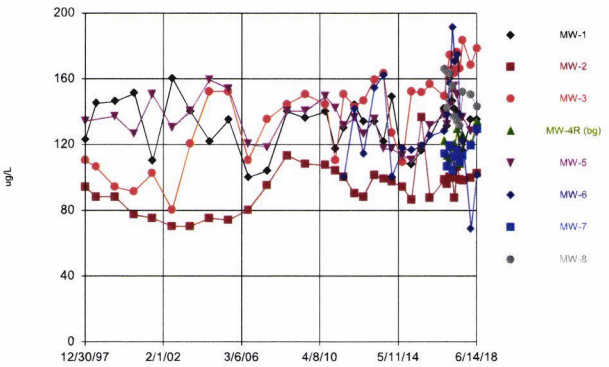
Time Series



Constituent: Barium [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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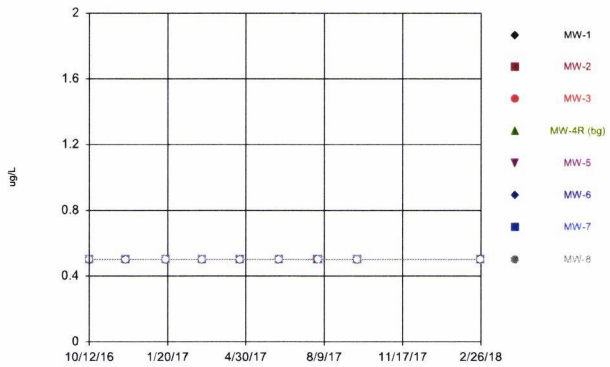
Time Series



Constituent: BERYLIUM Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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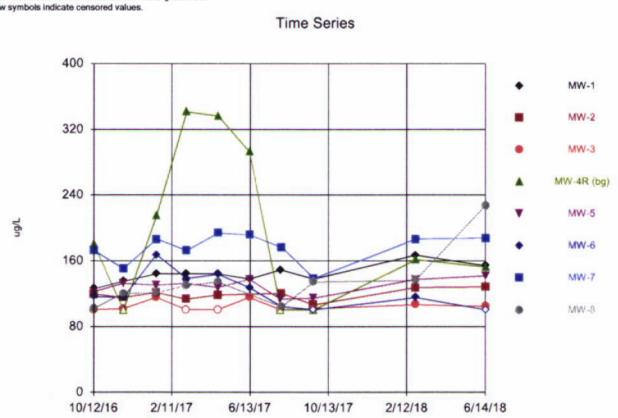

Constituent: Boron Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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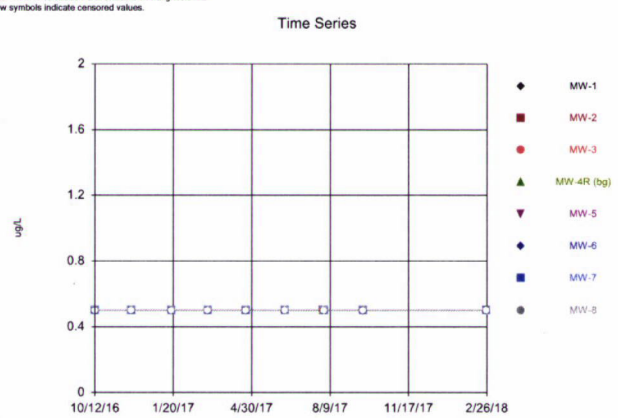
Hollow symbols indicate censored values.



Constituent: Cadmium [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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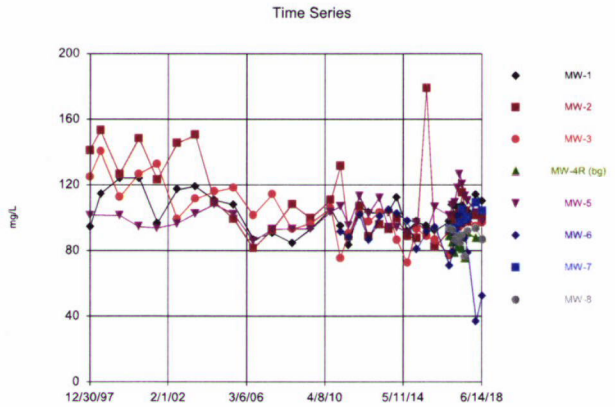

Constituent: Calcium Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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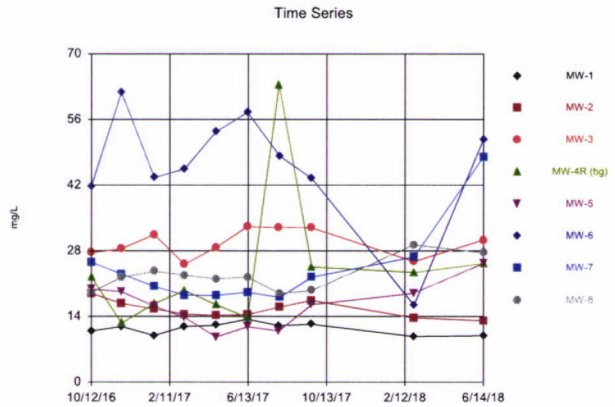

Constituent: Chloride Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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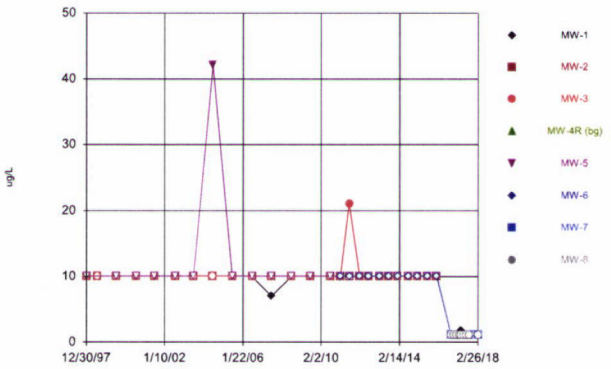
Time Series



Constituent: Chromium [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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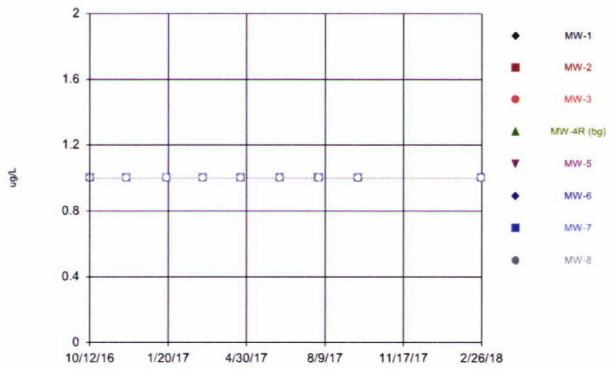
Time Series



Constituent: Cobalt [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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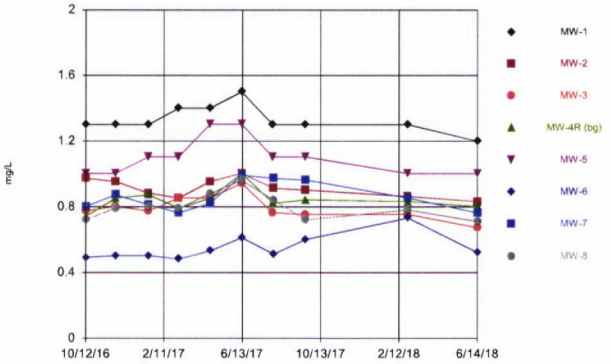
Time Series



Constituent: Fluoride Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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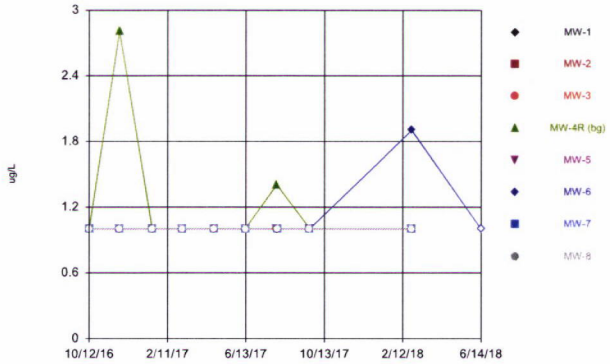
Hollow symbols indicate censored values.

Time Series



Constituent: Lead [total] Analysis Run 10/22/2018 2:26 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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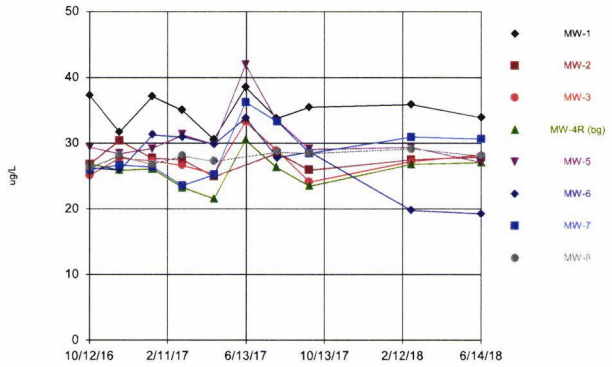
Time Series



Constituent: Lithium Analysis Run 10/22/2018 2:27 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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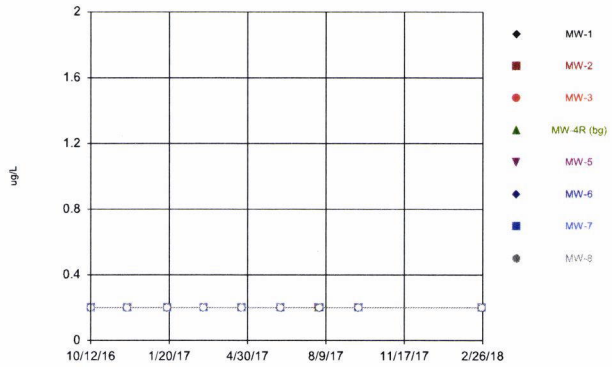
Hollow symbols indicate censored values.

Time Series



Constituent: Mercury Analysis Run 10/22/2018 2:27 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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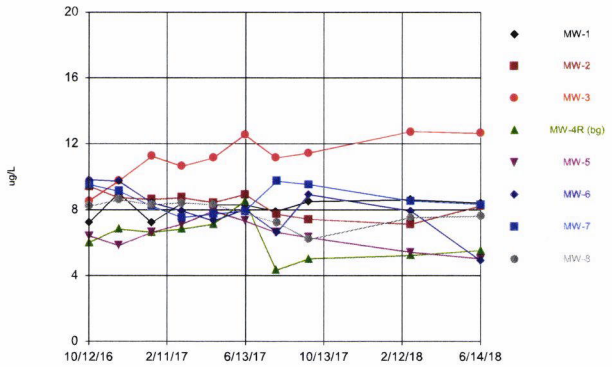
Time Series

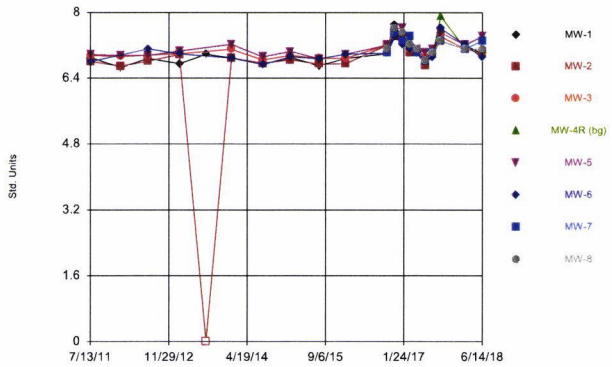


Constituent: Molybdenum Analysis Run 10/22/2018 2:27 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.6.10 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Time Series



Constituent: pH Analysis Run 10/22/2018 2:27 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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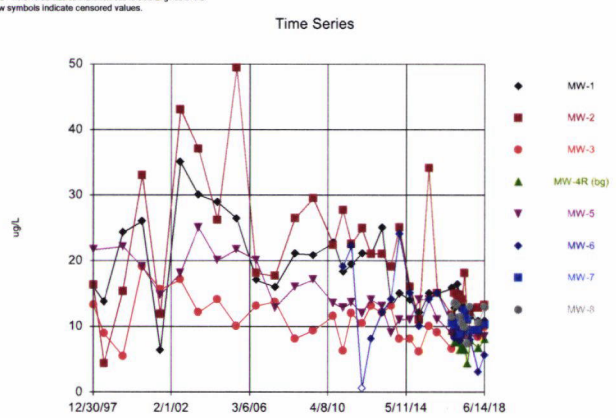
Hollow symbols indicate censored values.



Constituent: Selenium [total] Analysis Run 10/22/2018 2:27 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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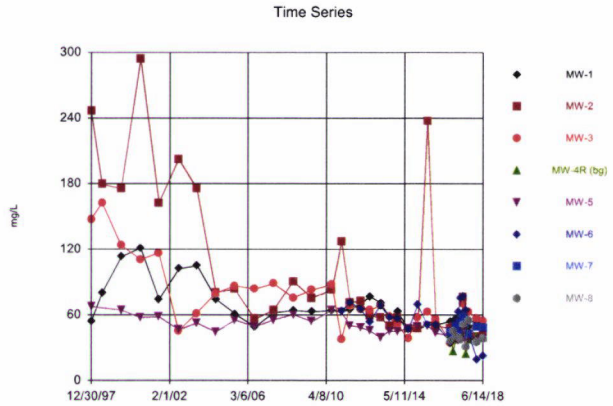

Constituent: Sulfate Analysis Run 10/22/2018 2:27 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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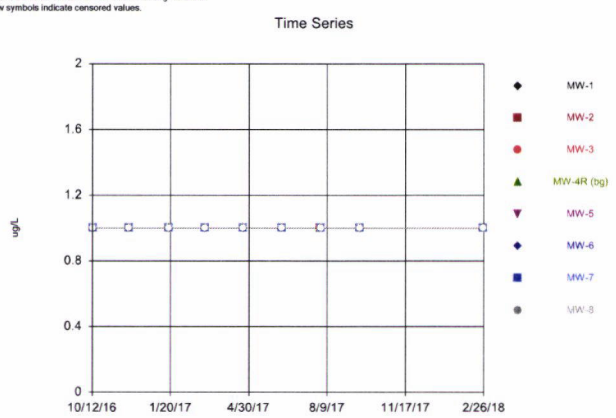
Hollow symbols indicate censored values.



Constituent: Thallium [total] Analysis Run 10/22/2018 2:27 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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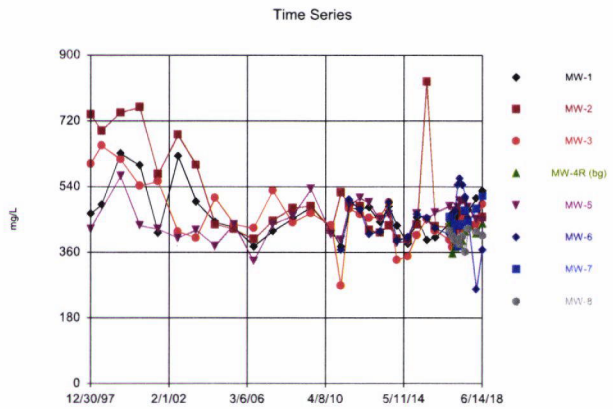
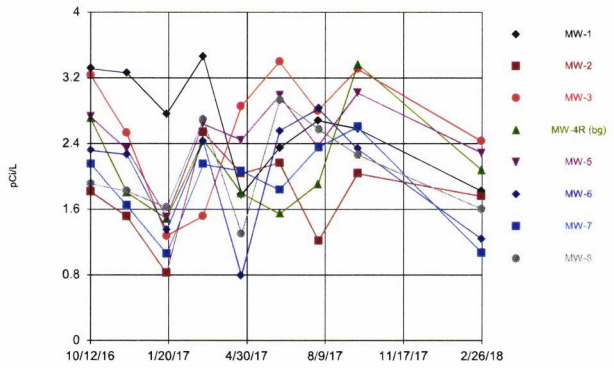


Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:27 PM View: Time Series
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.6.10 Sanitas software licensed to SCS Engineers, UG

Time Series



Constituent: Total Radium Analysis Run 10/22/2018 2:27 PM View: Time Series

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

A.2 OUTLIER ANALYSIS – JUNE 2018

Outlier Analysis

Fremont Dept. of Utilities Client. SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/22/2018, 3:04 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony [total] (ug/L)	MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-6	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Antimony [total] (ug/L)	MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Arsenic [total] (ug/L)	MW-1	No	n/a	n/a	NP	NaN	10	3.49	0.2767	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-2	No	n/a	n/a	NP	NaN	10	3.77	0.3743	x^4	ShapiroWilk
Arsenic [total] (ug/L)	MW-3	No	n/a	n/a	NP	NaN	10	2.97	0.1252	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	10	3.93	0.386	x^2	ShapiroWilk
Arsenic [total] (ug/L)	MW-5	No	n/a	n/a	NP	NaN	10	4.42	0.2201	x^4	ShapiroWilk
Arsenic [total] (ug/L)	MW-6	No	n/a	n/a	NP	NaN	10	2.9	0.4967	sqrt(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-7	No	n/a	n/a	NP	NaN	10	3.44	0.2171	ln(x)	ShapiroWilk
Arsenic [total] (ug/L)	MW-8	No	n/a	n/a	NP	NaN	10	2.57	0.1567	x^3	ShapiroWilk
Barium [total] (ug/L)	MW-1	No	n/a	n/a	NP	NaN	35	131.4	15.53	x^2	ShapiroWilk
Barium [total] (ug/L)	MW-2	No	n/a	n/a	NP	NaN	35	93.72	13.41	x^(1/3)	ShapiroWilk
Barium [total] (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	35	141.2	27.61	unknown	ShapiroWilk
Barium [total] (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	10	120	8.055	ln(x)	ShapiroWilk
Barium [total] (ug/L)	MW-5	No	n/a	n/a	NP	NaN	34	134.5	12.89	normal	ShapiroWilk
Barium [total] (ug/L)	MW-6	No	n/a	n/a	NP	NaN	20	131.8	29.95	normal	ShapiroWilk
Barium [total] (ug/L)	MW-7	No	n/a	n/a	NP	NaN	10	114.1	7.249	ln(x)	ShapiroWilk
Barium [total] (ug/L)	MW-8	No	n/a	n/a	NP	NaN	10	147.3	11.93	ln(x)	ShapiroWilk
Barium [total] (ug/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	123	17.22	ln(x)	ShapiroWilk
BERYLIUM (ug/L)	MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-6	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
BERYLIUM (ug/L)	MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Boron (ug/L)	MW-1	No	n/a	n/a	NP	NaN	10	143.9	11.21	ln(x)	ShapiroWilk
Boron (ug/L)	MW-2	No	n/a	n/a	NP	NaN	9	118.6	6.803	x^3	ShapiroWilk
Boron (ug/L)	MW-3	No	n/a	n/a	NP (nrm)	NaN	10	104.2	6.033	unknown	ShapiroWilk
Boron (ug/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	10	197.6	94.99	ln(x)	ShapiroWilk
Boron (ug/L)	MW-5	No	n/a	n/a	NP	NaN	10	128.5	9.56	x^6	ShapiroWilk
Boron (ug/L)	MW-6	No	n/a	n/a	NP	NaN	10	122.5	21.53	ln(x)	ShapiroWilk
Boron (ug/L)	MW-7	No	n/a	n/a	NP	NaN	10	175.1	18.19	x^6	ShapiroWilk
Boron (ug/L)	MW-8	No	n/a	n/a	NP	NaN	9	134.2	37.01	ln(x)	ShapiroWilk
Cadmium [total] (ug/L)	MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-6	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Cadmium [total] (ug/L)	MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	0.5	0	unknown	ShapiroWilk
Calcium (mg/L)	MW-1	No	n/a	n/a	NP	NaN	35	103.2	10.45	sqrt(x)	ShapiroWilk

Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/22/2018, 3:04 PM

Constituent		Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Calcium (mg/L)		MW-2	No	n/a	n/a	NP (nrm)	NaN	35	109.4	23.37	unknown	ShapiroWilk
Calcium (mg/L)		MW-3	No	n/a	n/a	NP	NaN	35	100.3	15.52	ln(x)	ShapiroWilk
Calcium (mg/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	83.88	4.802	x^6	ShapiroWilk
Calcium (mg/L)		MW-5	No	n/a	n/a	NP	NaN	34	102.1	9.326	ln(x)	ShapiroWilk
Calcium (mg/L)		MW-6	No	n/a	n/a	NP	NaN	21	87.37	17.41	x^4	ShapiroWilk
Calcium (mg/L)		MW-7	No	n/a	n/a	NP	NaN	10	97.44	7.317	normal	ShapiroWilk
Calcium (mg/L)		MW-8	No	n/a	n/a	NP	NaN	10	87.99	5.239	x^6	ShapiroWilk
Calcium (mg/L)		MW-4 (bg)	No	n/a	n/a	NP	NaN	24	88.7	11.45	normal	ShapiroWilk
Chloride (mg/L)		MW-1	No	n/a	n/a	NP	NaN	10	11.38	1.23	x^3	ShapiroWilk
Chloride (mg/L)		MW-2	No	n/a	n/a	NP	NaN	10	15.37	1.847	ln(x)	ShapiroWilk
Chloride (mg/L)		MW-3	No	n/a	n/a	NP	NaN	10	29.52	2.984	normal	ShapiroWilk
Chloride (mg/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	23.73	14.57	ln(x)	ShapiroWilk
Chloride (mg/L)		MW-5	No	n/a	n/a	NP	NaN	10	16.13	4.84	x^(1/3)	ShapiroWilk
Chloride (mg/L)		MW-6	No	n/a	n/a	NP	NaN	10	46.22	12.38	x^3	ShapiroWilk
Chloride (mg/L)		MW-7	No	n/a	n/a	NP	NaN	10	23.96	8.941	ln(x)	ShapiroWilk
Chloride (mg/L)		MW-8	No	n/a	n/a	NP	NaN	10	22.73	3.435	ln(x)	ShapiroWilk
Chromium [total] (ug/L)		MW-1	No	n/a	n/a	NP (nrm)	NaN	34	7.55	3.976	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-2	n/a	n/a	n/a	NP (nrm)	NaN	34	7.618	4.03	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-3	n/a	n/a	n/a	NP (nrm)	NaN	34	7.941	4.625	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-5	n/a	n/a	n/a	NP (nrm)	NaN	33	8.515	7.246	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-6	n/a	n/a	n/a	NP (nrm)	NaN	20	5.95	4.594	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Chromium [total] (ug/L)		MW-4 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	24	10	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-6	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Cobalt [total] (ug/L)		MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Fluoride (mg/L)		MW-1	No	n/a	n/a	NP	NaN	10	1.33	0.08233	ln(x)	ShapiroWilk
Fluoride (mg/L)		MW-2	No	n/a	n/a	NP	NaN	10	0.91	0.05617	ln(x)	ShapiroWilk
Fluoride (mg/L)		MW-3	No	n/a	n/a	NP	NaN	10	0.791	0.07385	ln(x)	ShapiroWilk
Fluoride (mg/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	0.839	0.06773	ln(x)	ShapiroWilk
Fluoride (mg/L)		MW-5	No	n/a	n/a	NP (nrm)	NaN	10	1.1	0.1155	unknown	ShapiroWilk
Fluoride (mg/L)		MW-6	No	n/a	n/a	NP	NaN	10	0.547	0.07804	ln(x)	ShapiroWilk
Fluoride (mg/L)		MW-7	No	n/a	n/a	NP	NaN	10	0.859	0.08621	ln(x)	ShapiroWilk
Fluoride (mg/L)		MW-8	No	n/a	n/a	NP	NaN	10	0.799	0.07824	ln(x)	ShapiroWilk
Lead [total] (ug/L)		MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Lead [total] (ug/L)		MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Lead [total] (ug/L)		MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Lead [total] (ug/L)	No outlier flagged	**MW-4R (bg)**	**Yes**	**2.8**	**11/28/2016**	**NP (nrm)**	**NaN**	**9**	**1.244**	**0.5981**	**unknown**	**ShapiroWilk**
Lead [total] (ug/L)		MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Lead [total] (ug/L)		MW-6	n/a	n/a	n/a	NP (nrm)	NaN	10	1.09	0.2846	unknown	ShapiroWilk
Lead [total] (ug/L)		MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Lead [total] (ug/L)		MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Lithium (ug/L)		MW-1	No	n/a	n/a	NP	NaN	10	34.93	2.491	x^4	ShapiroWilk

Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/22/2018, 3:04 PM

Constituent		Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Lithium (ug/L)		MW-2	No	n/a	n/a	NP	NaN	9	27.36	1.557	ln(x)	ShapiroWilk
Lithium (ug/L)		MW-3	No	n/a	n/a	NP	NaN	10	27.27	2.562	ln(x)	ShapiroWilk
Lithium (ug/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	25.7	2.484	sqrt(x)	ShapiroWilk
Lithium (ug/L)		MW-5	No	n/a	n/a	NP	NaN	10	30.82	4.251	ln(x)	ShapiroWilk
Lithium (ug/L)		MW-6	No	n/a	n/a	NP	NaN	10	27.29	4.777	x^4	ShapiroWilk
Lithium (ug/L)		MW-7	No	n/a	n/a	NP	NaN	10	28.67	3.987	ln(x)	ShapiroWilk
Lithium (ug/L)		MW-8	No	n/a	n/a	NP	NaN	9	27.8	0.9314	x^6	ShapiroWilk
Mercury (ug/L)		MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-6	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Mercury (ug/L)		MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	0.2	0	unknown	ShapiroWilk
Molybdenum (ug/L)		MW-1	No	n/a	n/a	NP	NaN	10	8.18	0.5846	x^6	ShapiroWilk
Molybdenum (ug/L)		MW-2	No	n/a	n/a	NP	NaN	10	8.31	0.7156	x^4	ShapiroWilk
Molybdenum (ug/L)		MW-3	No	n/a	n/a	NP	NaN	10	11.14	1.326	x^3	ShapiroWilk
Molybdenum (ug/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	6.18	1.227	x^(1/3)	ShapiroWilk
Molybdenum (ug/L)		MW-5	No	n/a	n/a	NP	NaN	10	6.44	0.8784	normal	ShapiroWilk
Molybdenum (ug/L)		MW-6	No	n/a	n/a	NP	NaN	10	7.94	1.458	x^2	ShapiroWilk
Molybdenum (ug/L)		MW-7	No	n/a	n/a	NP	NaN	10	8.59	0.8062	ln(x)	ShapiroWilk
Molybdenum (ug/L)		MW-8	No	n/a	n/a	NP	NaN	9	7.811	0.7672	x^6	ShapiroWilk
pH (Std. Units)		MW-1	No	n/a	n/a	NP	NaN	20	7.003	0.269	ln(x)	ShapiroWilk
pH (Std. Units)	Outlier flagged	**MW-2**	**Yes**	**0**	**7/29/2013**	**NP (nrm)**	**NaN**	**20**	**6.619**	**1.575**	**unknown**	**ShapiroWilk**
pH (Std. Units)		MW-3	No	n/a	n/a	NP (nrm)	NaN	19	7.062	0.2049	unknown	ShapiroWilk
pH (Std. Units)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	7.23	0.3234	ln(x)	ShapiroWilk
pH (Std. Units)		MW-5	No	n/a	n/a	NP	NaN	19	7.152	0.232	ln(x)	ShapiroWilk
pH (Std. Units)		MW-6	No	n/a	n/a	NP	NaN	18	7.017	0.2224	ln(x)	ShapiroWilk
pH (Std. Units)		MW-7	No	n/a	n/a	NP	NaN	10	7.17	0.2214	x^4	ShapiroWilk
pH (Std. Units)		MW-8	No	n/a	n/a	NP	NaN	10	7.18	0.2348	ln(x)	ShapiroWilk
pH (Std. Units)		MW-4 (bg)	No	n/a	n/a	NP (nrm)	NaN	10	6.237	2.197	unknown	ShapiroWilk
Selenium [total] (ug/L)		MW-1	No	n/a	n/a	NP	NaN	35	17.81	6.395	ln(x)	ShapiroWilk
Selenium [total] (ug/L)		MW-2	No	n/a	n/a	NP	NaN	35	20.66	9.767	x^(1/3)	ShapiroWilk
Selenium [total] (ug/L)		MW-3	No	n/a	n/a	NP	NaN	35	10.39	3.119	ln(x)	ShapiroWilk
Selenium [total] (ug/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	7.07	1.315	x^2	ShapiroWilk
Selenium [total] (ug/L)		MW-5	No	n/a	n/a	NP (nrm)	NaN	34	13.63	4.82	unknown	ShapiroWilk
Selenium [total] (ug/L)		MW-6	No	n/a	n/a	NP	NaN	21	11.49	5.727	normal	ShapiroWilk
Selenium [total] (ug/L)		MW-7	No	n/a	n/a	NP	NaN	10	10.36	1.073	ln(x)	ShapiroWilk
Selenium [total] (ug/L)		MW-8	No	n/a	n/a	NP	NaN	10	11.31	1.9	x^3	ShapiroWilk
Selenium [total] (ug/L)		MW-4 (bg)	No	n/a	n/a	NP	NaN	24	10.47	5.168	sqrt(x)	ShapiroWilk
Sulfate (mg/L)		MW-1	No	n/a	n/a	NP (nrm)	NaN	35	64.67	19.12	unknown	ShapiroWilk
Sulfate (mg/L)		MW-2	No	n/a	n/a	NP (nrm)	NaN	35	94.8	68.55	unknown	ShapiroWilk
Sulfate (mg/L)		MW-3	No	n/a	n/a	NP	NaN	35	71.04	29.86	ln(x)	ShapiroWilk
Sulfate (mg/L)		MW-4R (bg)	No	n/a	n/a	NP	NaN	10	37.53	6.906	x^5	ShapiroWilk
Sulfate (mg/L)		MW-5	No	n/a	n/a	NP	NaN	34	48.18	8.806	ln(x)	ShapiroWilk
Sulfate (mg/L)		MW-6	No	n/a	n/a	NP	NaN	21	54.23	16.01	x^2	ShapiroWilk
Sulfate (mg/L)		MW-7	No	n/a	n/a	NP	NaN	10	48.14	5.715	sqrt(x)	ShapiroWilk
Sulfate (mg/L)		MW-8	No	n/a	n/a	NP	NaN	10	40.48	7.538	ln(x)	ShapiroWilk
Sulfate (mg/L)		MW-4 (bg)	No	n/a	n/a	NP	NaN	24	57.9	11.32	normal	ShapiroWilk

Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/22/2018, 3:04 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Thallium [total] (ug/L)	MW-1	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-2	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-3	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-4R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-5	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-6	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-7	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Thallium [total] (ug/L)	MW-8	n/a	n/a	n/a	NP (nrm)	NaN	9	1	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1	No	n/a	n/a	NP (nrm)	NaN	35	465.1	60.01	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-2	No	n/a	n/a	NP (nrm)	NaN	35	498.7	120.8	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-3	No	n/a	n/a	NP	NaN	35	452.7	77.23	sqrt(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	10	402.6	29.8	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-5	No	n/a	n/a	NP	NaN	34	451.8	48.19	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-6	No	n/a	n/a	NP	NaN	21	443.2	71.76	x^2	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-7	No	n/a	n/a	NP	NaN	10	445	37.14	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-8	No	n/a	n/a	NP	NaN	10	399.1	18.69	x^6	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-4 (bg)	No	n/a	n/a	NP	NaN	24	423.9	59.19	ln(x)	ShapiroWilk
Total Radium (pCi/L)	MW-1	No	n/a	n/a	NP	NaN	9	2.667	0.6139	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-2	No	n/a	n/a	NP	NaN	9	1.76	0.5198	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-3	No	n/a	n/a	NP	NaN	9	2.587	0.7586	x^3	ShapiroWilk
Total Radium (pCi/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	9	2.12	0.6108	ln(x)	ShapiroWilk
Total Radium (pCi/L)	MW-5	No	n/a	n/a	NP	NaN	9	2.472	0.4541	x^3	ShapiroWilk
Total Radium (pCi/L)	MW-6	No	n/a	n/a	NP	NaN	9	2.005	0.6999	x^4	ShapiroWilk
Total Radium (pCi/L)	MW-7	No	n/a	n/a	NP	NaN	9	1.876	0.5401	x^3	ShapiroWilk
Total Radium (pCi/L)	MW-8	No	n/a	n/a	NP	NaN	9	2.078	0.5606	ln(x)	ShapiroWilk

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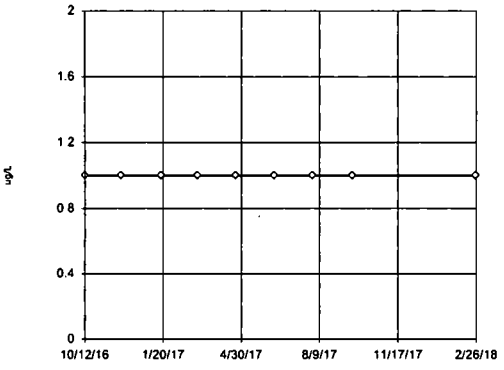
Tukey's Outlier Screening

MW-1



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

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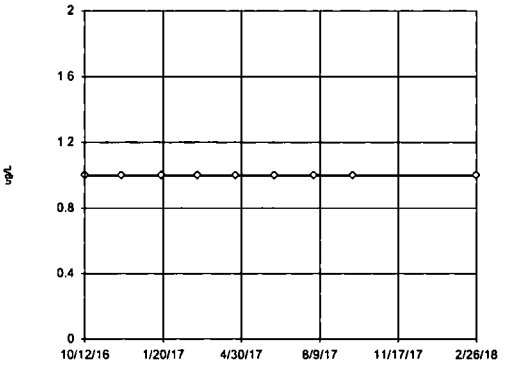
Tukey's Outlier Screening

MW-2



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal.

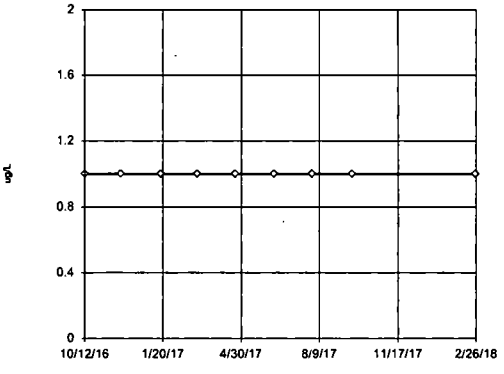
Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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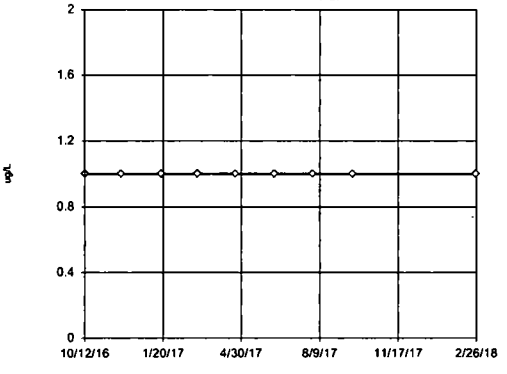
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

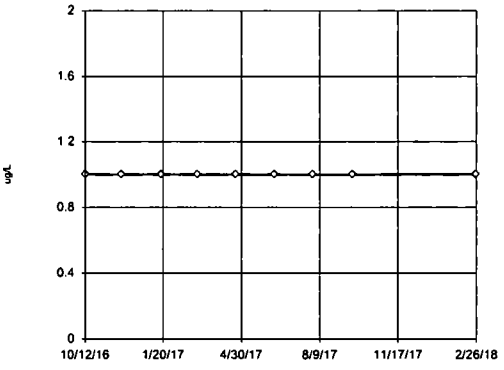
Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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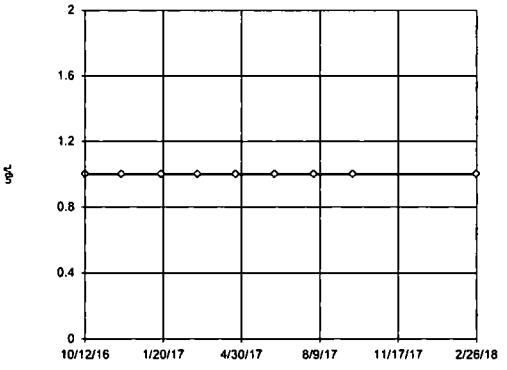
Tukey's Outlier Screening

MW-6



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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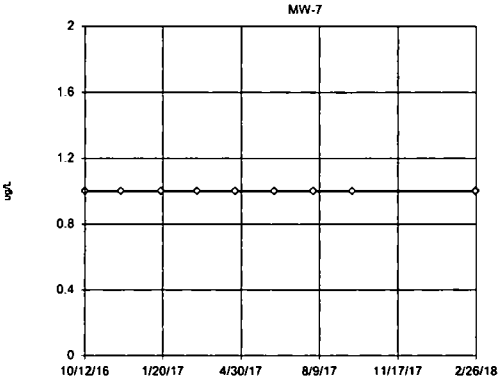
Tukey's Outlier Screening

MW-7



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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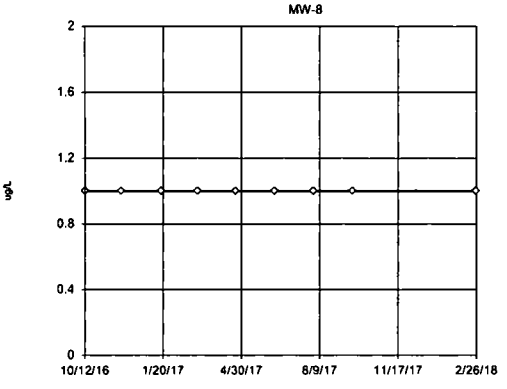
Tukey's Outlier Screening

MW-8



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Antimony [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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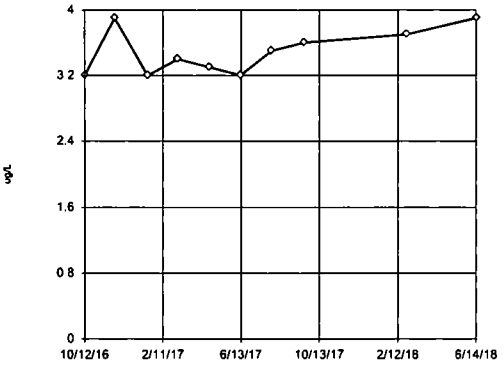
Tukey's Outlier Screening

MW-1



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 6.355, low cutoff = 1.913, based on IQR multiplier of 3

Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

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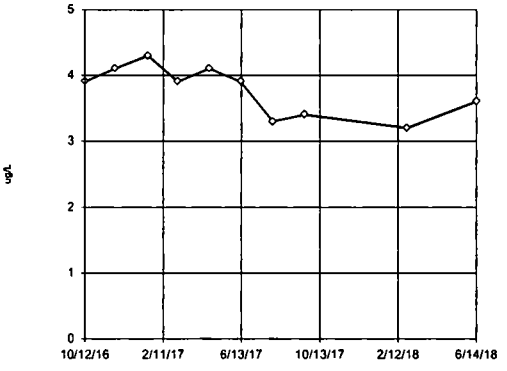
Tukey's Outlier Screening

MW-2



n = 10

No outliers found Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 5 237, low cutoff = -4.304 based on IQR multiplier of 3

Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

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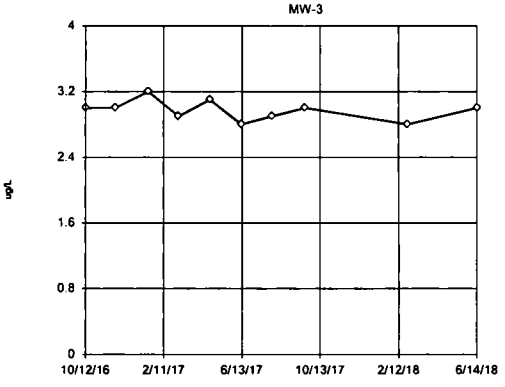
Tukey's Outlier Screening

MW-3



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 3 738, low cutoff = 2.325, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

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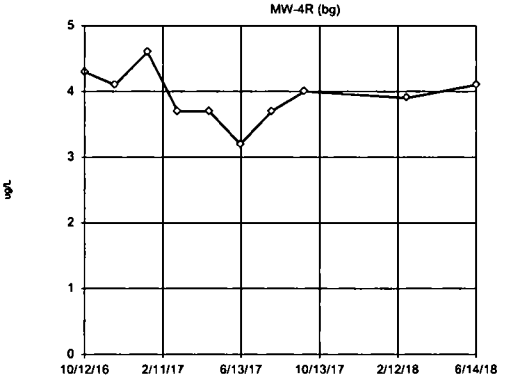
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 5 434, low cutoff = 1.345, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

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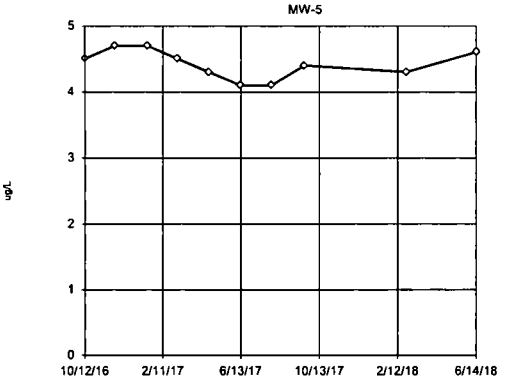
Tukey's Outlier Screening

MW-5



n = 10

No outliers found
Tukey's method selected by user

Data were x^4 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 5.529, low cutoff = -3.526, based on IQR multiplier of 3.

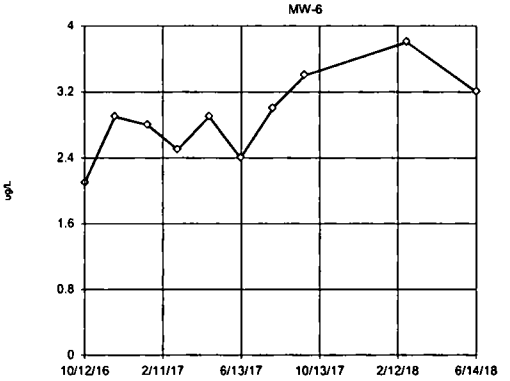
Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 10

No outliers found.
Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.605, low cutoff = 0.6586, based on IQR multiplier of 3.

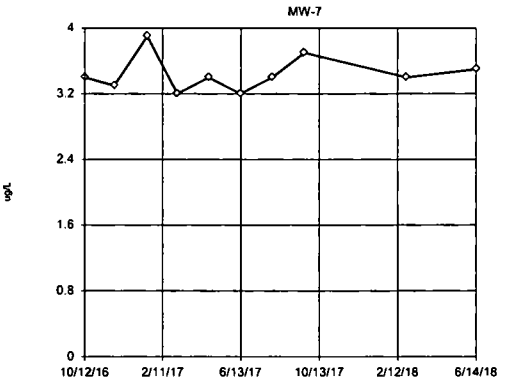
Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.887, low cutoff = 2.393, based on IQR multiplier of 3

Constituent: Arsenic [total] Analysis Run 10/22/2018 2:54 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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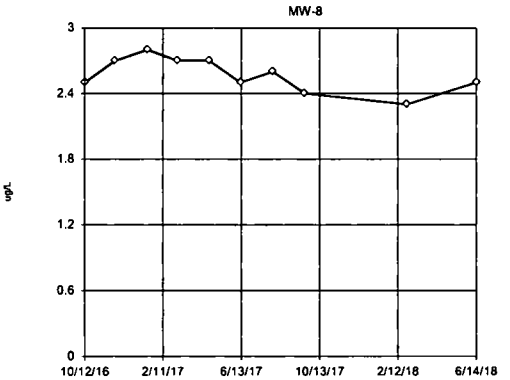
Tukey's Outlier Screening

MW-8



n = 10

No outliers found.
Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 3.257, low cutoff = -0.5325, based on IQR multiplier of 3.

Constituent: Arsenic [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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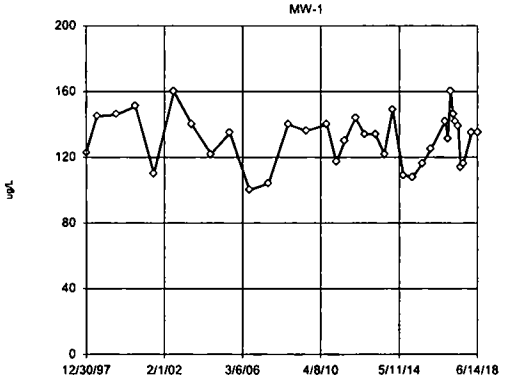
Tukey's Outlier Screening

MW-1



n = 35

No outliers found Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 199, low cutoff = -75.74, based on IQR multiplier of 3

Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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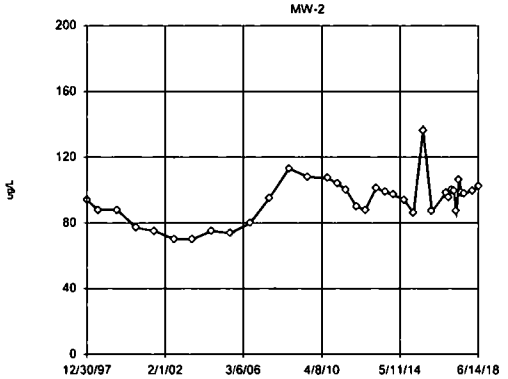
Tukey's Outlier Screening

MW-2



n = 35

No outliers found Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 146.6, low cutoff = 54.85, based on IQR multiplier of 3

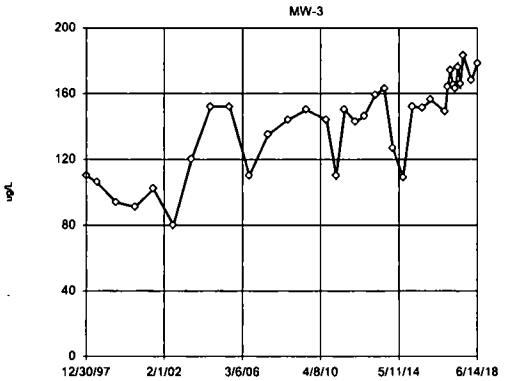
Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 35

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 237.1, low cutoff = -197.2, based on IQR multiplier of 3

Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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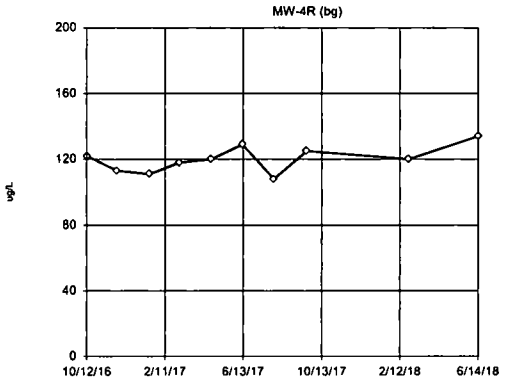
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 185.1, low cutoff = 76.83, based on IQR multiplier of 3

Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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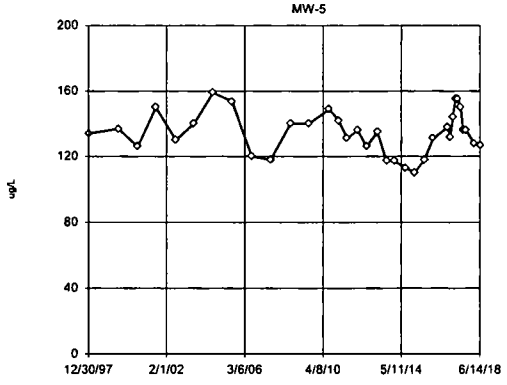
Tukey's Outlier Screening

MW-5



n = 34

No outliers found Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data

High cutoff = 194, low cutoff = 75, based on IQR multiplier of 3

Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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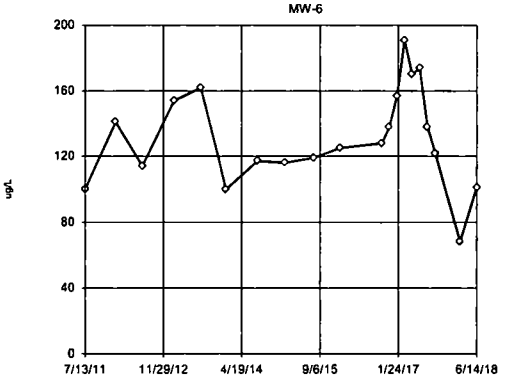
Tukey's Outlier Screening

MW-6



n = 20

No outliers found Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 277, low cutoff = -65, based on IQR multiplier of 3

Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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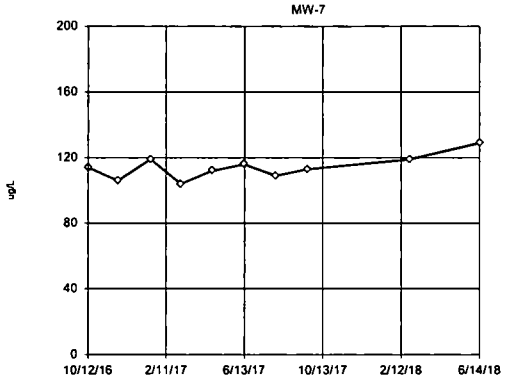
Tukey's Outlier Screening

MW-7



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 161 5, low cutoff = 79 22, based on IQR multiplier of 3

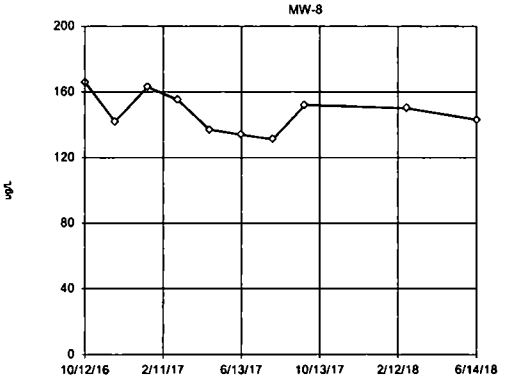
Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 256 6, low cutoff = 83 92, based on IQR multiplier of 3.

Constituent: Barium [total] Analysis Run 10/22/2018 2.55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

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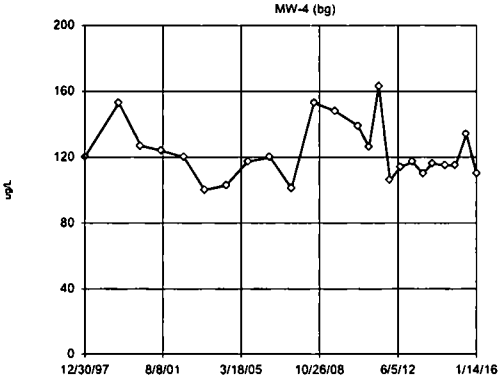
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 206.2, low cutoff = 70.83, based on IQR multiplier of 3

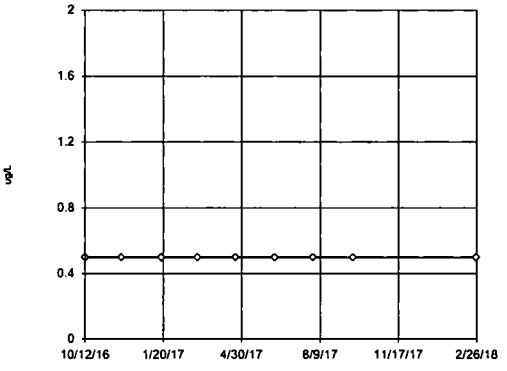
Constituent: Barium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal.

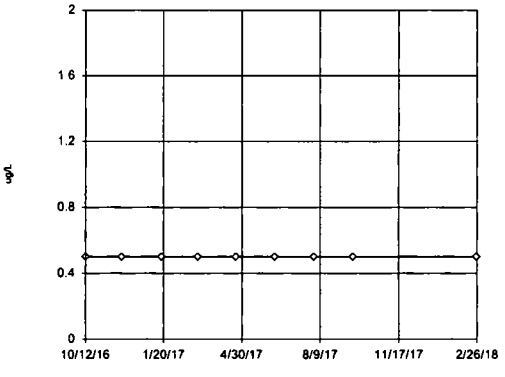
Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found,
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

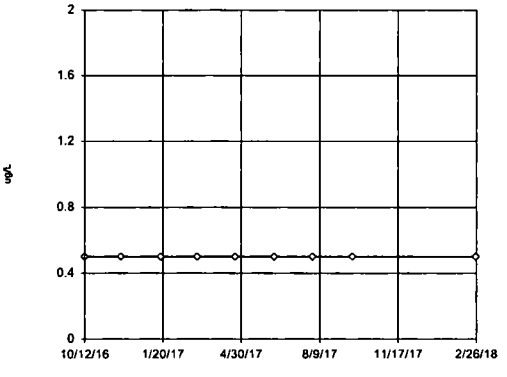
Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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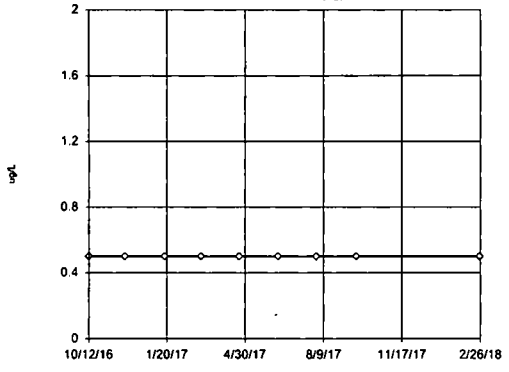
Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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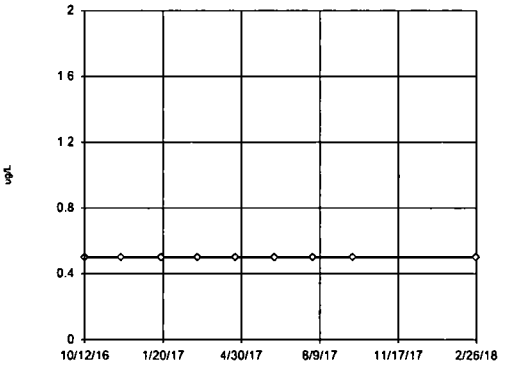
Tukey's Outlier Screening

MW-5



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal.

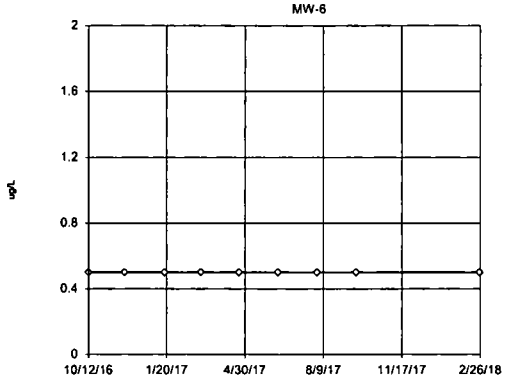
Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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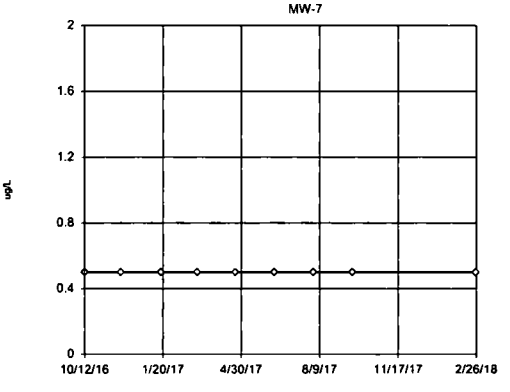
Tukey's Outlier Screening

MW-7



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

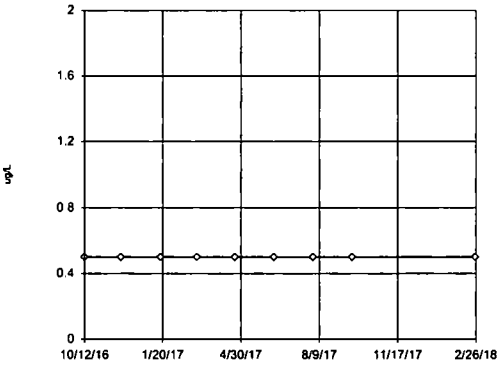
Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal

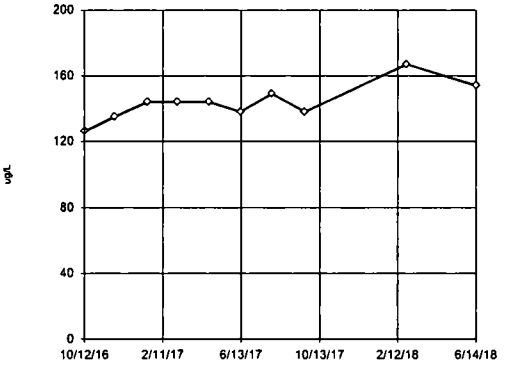
Constituent: BERYLIUM Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 207.1, low cutoff = 99.85, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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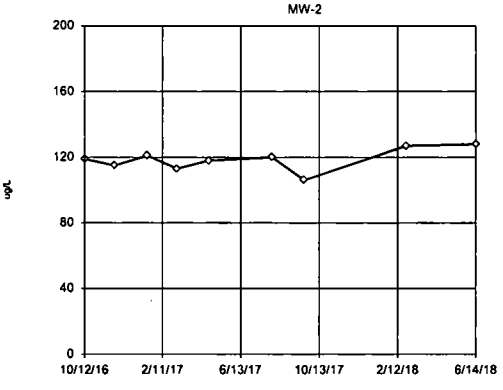
Tukey's Outlier Screening

MW-2



n = 9

No outliers found.
Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 147.3, low cutoff = 58.25 based on IQR multiplier of 3

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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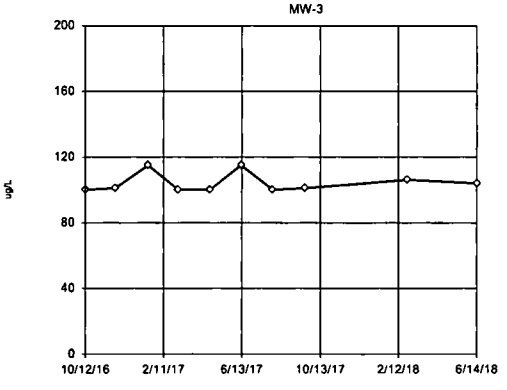
Tukey's Outlier Screening

MW-3



n = 10

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 148.6, low cutoff = 74.3, based on IQR multiplier of 3

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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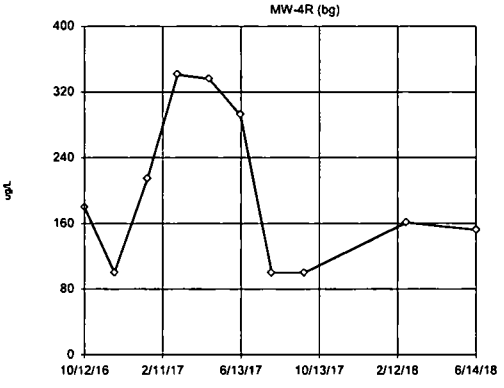
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 9626, low cutoff = 3 254, based on IQR multiplier of 3

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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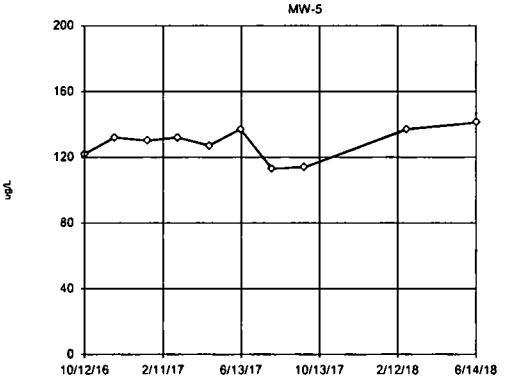
Tukey's Outlier Screening

MW-5



n = 10

No outliers found
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 162 2, low cutoff = -143 8, based on IQR multiplier of 3

Constituent: Boron Analysis Run 10/22/2018 2 55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

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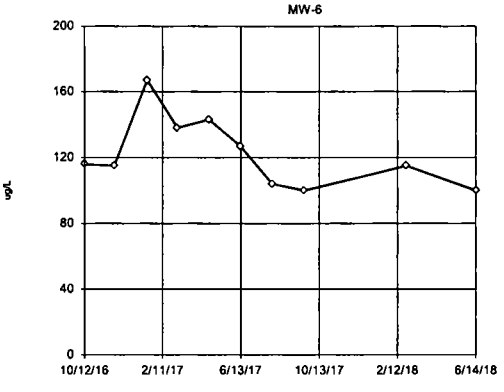
Tukey's Outlier Screening

MW-6



n = 10

No outliers found.
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 367.2, low cutoff = 39 02, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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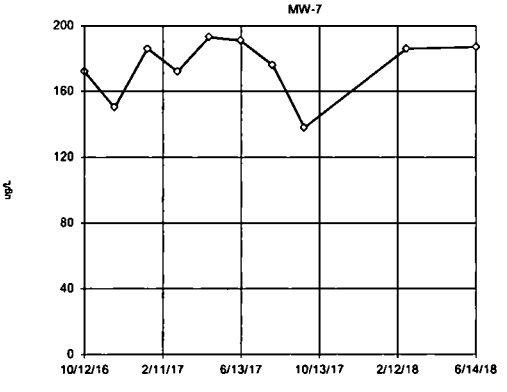
Tukey's Outlier Screening

MW-7



n = 10

No outliers found
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 224.1, low cutoff = -199 2, based on IQR multiplier of 3

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

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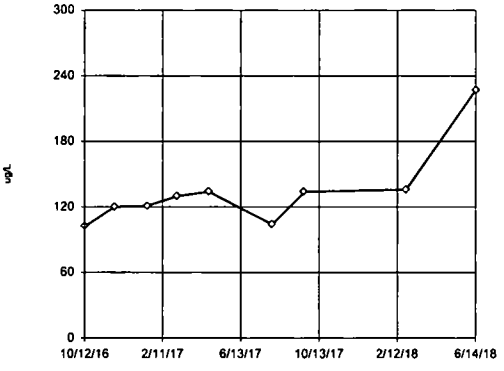
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 238.2, low cutoff = 63 31, based on IQR multiplier of 3

Constituent: Boron Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client. SCS Engineers Data Fremont Department of Utilities Groundwater

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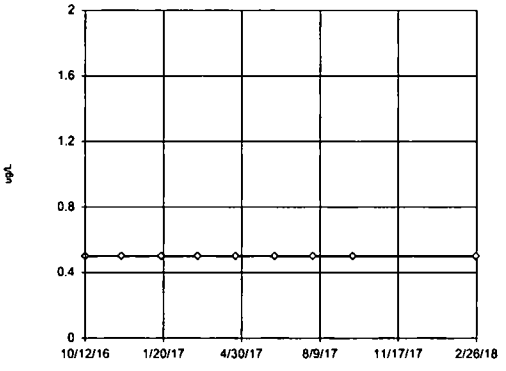
Tukey's Outlier Screening

MW-1



n = 9

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data. Fremont Department of Utilities Groundwater

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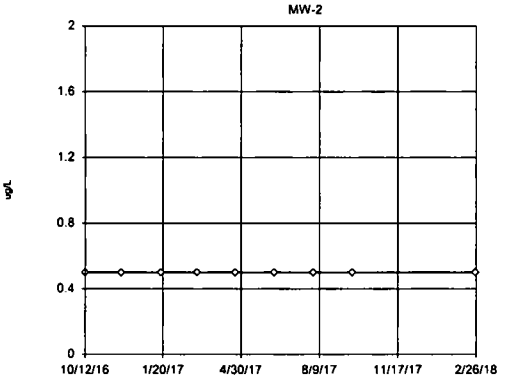
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal

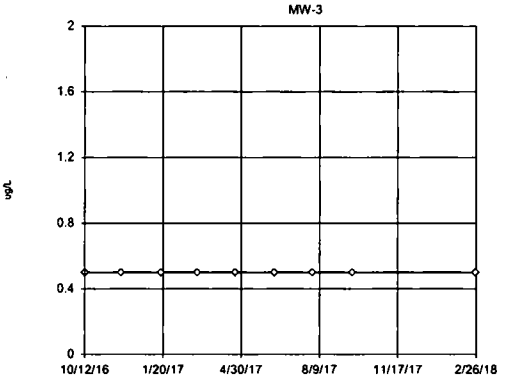
Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

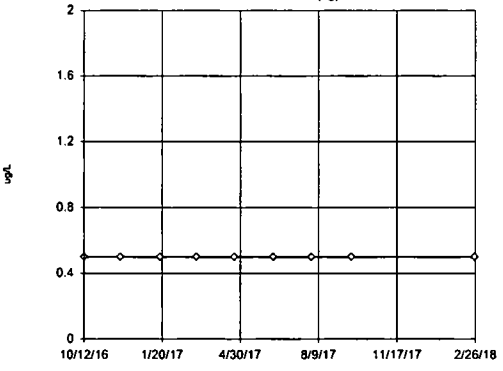
Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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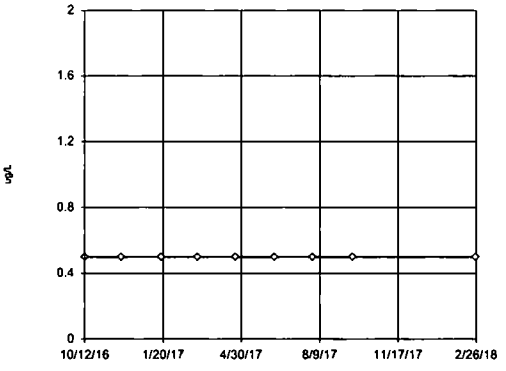
Tukey's Outlier Screening

MW-5



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

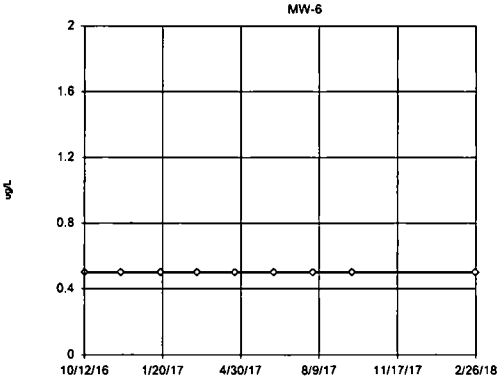
Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

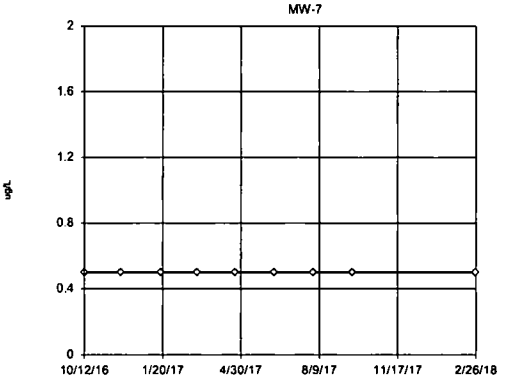
Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal.

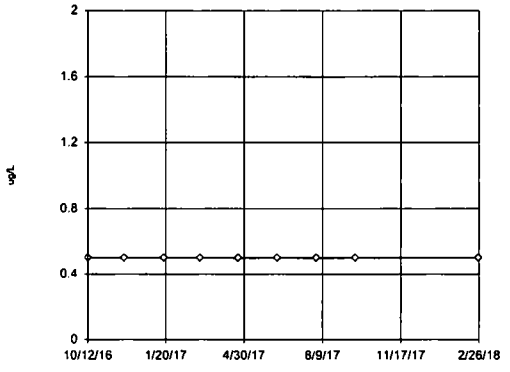
Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Cadmium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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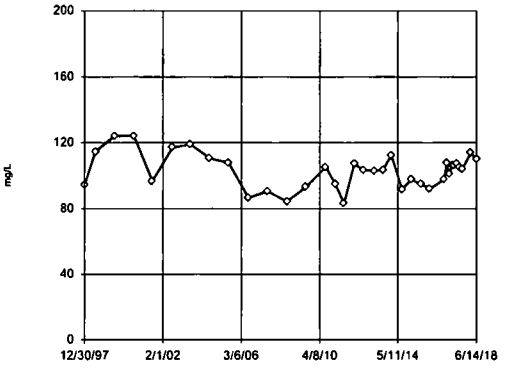
Tukey's Outlier Screening

MW-1



n = 35

No outliers found.
Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 162.7, low cutoff = 55 72, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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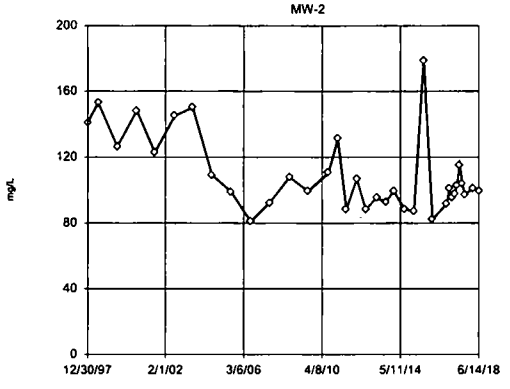
Tukey's Outlier Screening

MW-2



n = 35

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 286 9, low cutoff = 39 65, based on IQR multiplier of 3

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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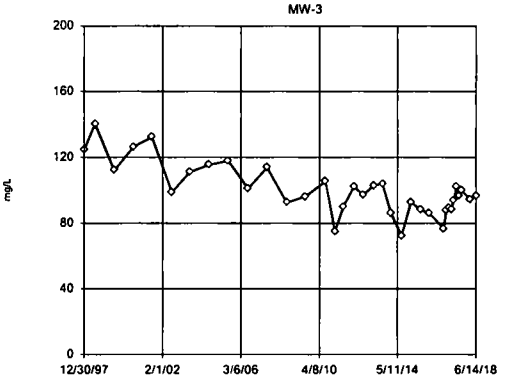
Tukey's Outlier Screening

MW-3



n = 35

No outliers found.
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 212 5, low cutoff = 46.71, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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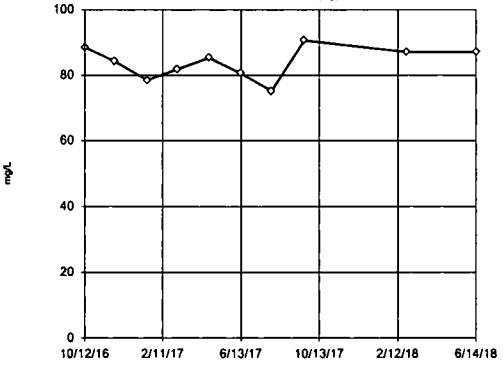
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found Tukey's method selected by user

Data were x^6 transformed to acheive best W statistic (graph shown in original units)

High cutoff = 101.1, low cutoff = -84.14, based on IQR multiplier of 3

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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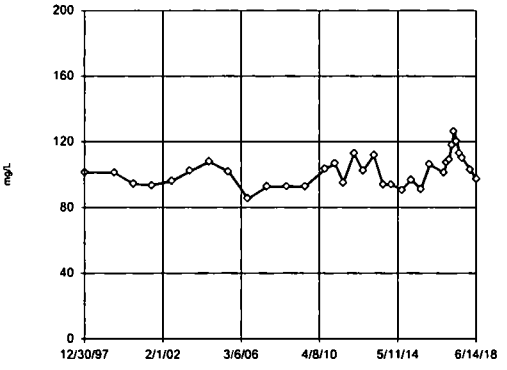
Tukey's Outlier Screening

MW-5



n = 34

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 168.5, low cutoff = 61.13, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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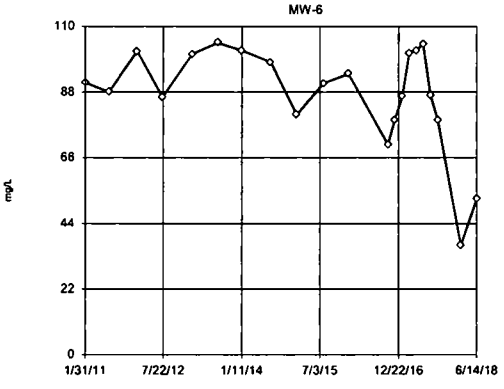
Tukey's Outlier Screening

MW-6



n = 21

No outliers found. Tukey's method selected by user

Data were x^4 transformed to acheive best W statistic (graph shown in original units)

High cutoff = 131.8, low cutoff = -111.8, based on IQR multiplier of 3

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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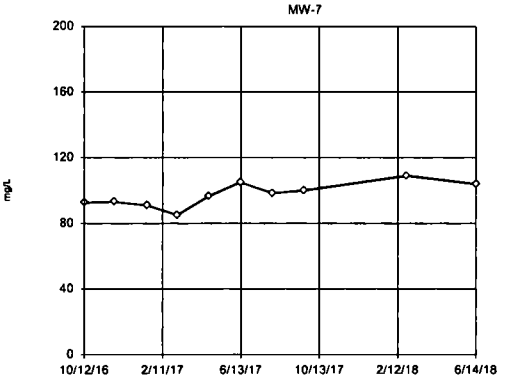
Tukey's Outlier Screening

MW-7



n = 10

No outliers found. Tukey's method selected by user

Ladder of Powers transformations did not improve normality; analysis run on raw data

High cutoff = 142.8, low cutoff = 53.5, based on IQR multiplier of 3

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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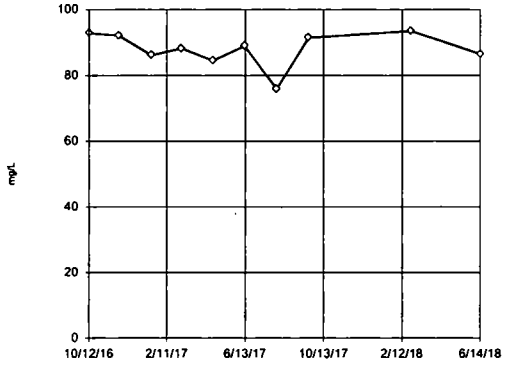
Tukey's Outlier Screening

MW-8



n = 10

No outliers found
Tukey's method selected by user

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 105, low cutoff = -83 16, based on IQR multiplier of 3

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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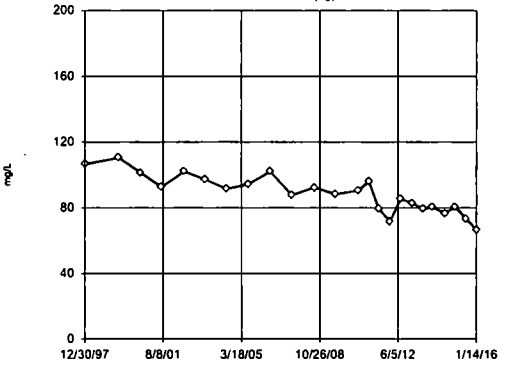
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found
Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data

High cutoff = 147 4, low cutoff = 29 08, based on IQR multiplier of 3

Constituent: Calcium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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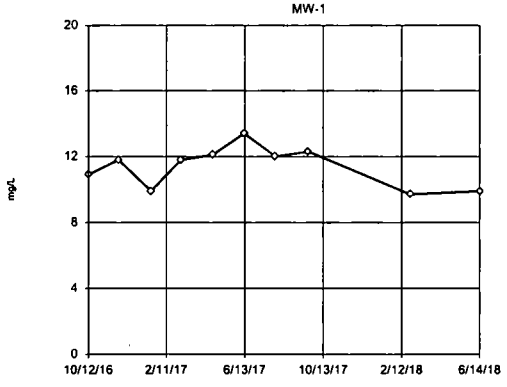
Tukey's Outlier Screening

MW-1



n = 10

No outliers found
Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 16 33, low cutoff = -11 62, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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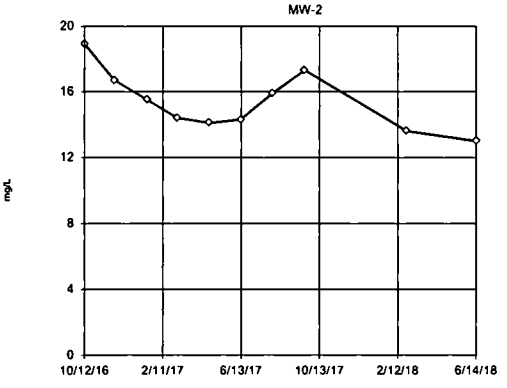
Tukey's Outlier Screening

MW-2



n = 10

No outliers found.
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 31 43, low cutoff = 7.488, based on IQR multiplier of 3

Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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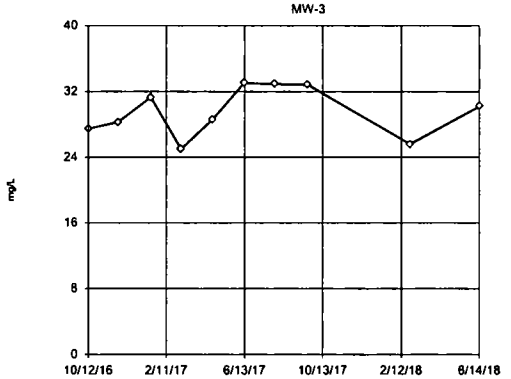
Tukey's Outlier Screening

MW-3



n = 10

No outliers found
Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 51.75, low cutoff = 7.65, based on IQR multiplier of 3.

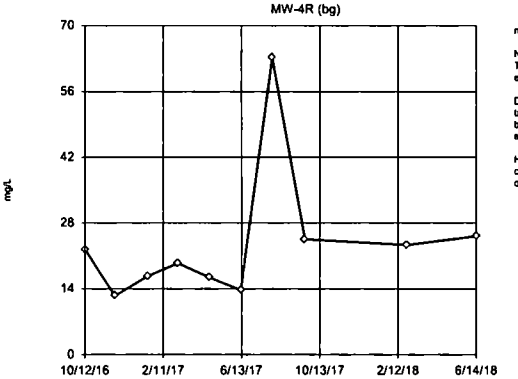
Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 113.2, low cutoff = 3.291, based on IQR multiplier of 3.

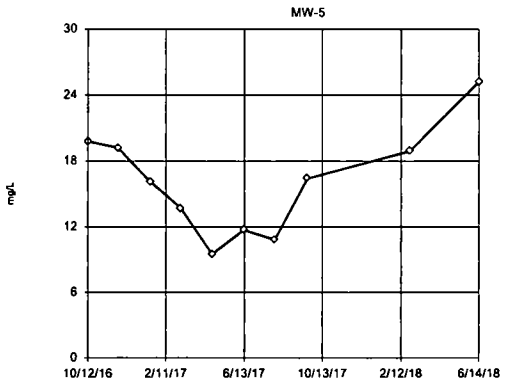
Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 10

No outliers found
Tukey's method selected by user

Data were cube root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 66.2, low cutoff = 0.6969, based on IQR multiplier of 3.

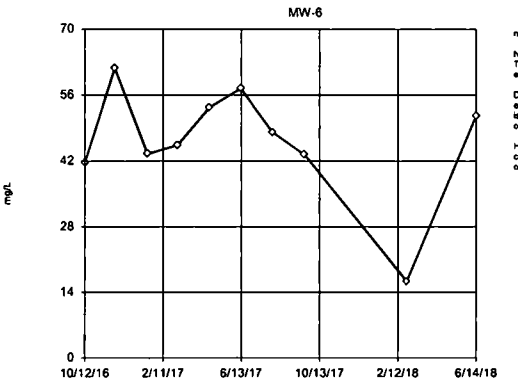
Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 10

No outliers found.
Tukey's method selected by user

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 76.71, low cutoff = -58.91, based on IQR multiplier of 3

Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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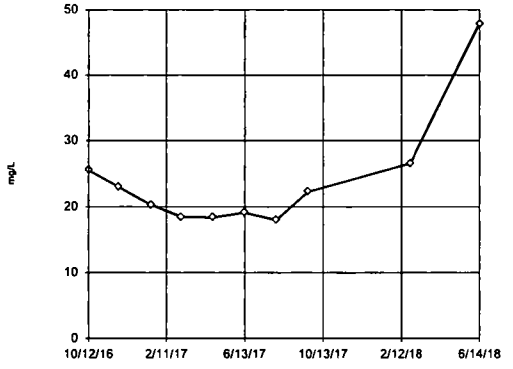
Tukey's Outlier Screening

MW-7



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 73.26, low cutoff = 6.559, based on IQR multiplier of 3

Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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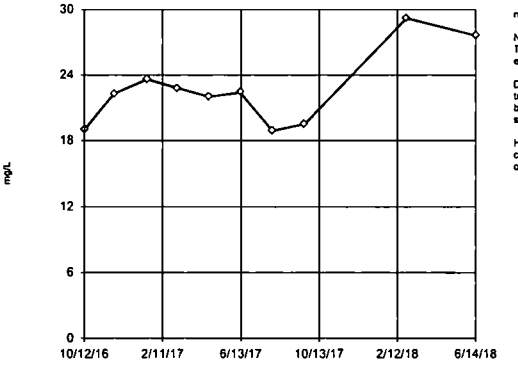
Tukey's Outlier Screening

MW-8



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 59.49, low cutoff = 8.257, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client. SCS Engineers Data Fremont Department of Utilities Groundwater

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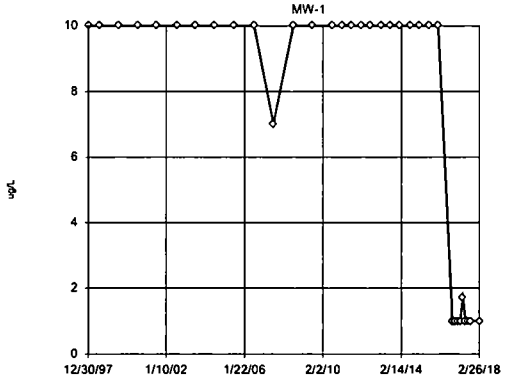
Tukey's Outlier Screening

MW-1



n = 34

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 19 85, low cutoff = -17 09, based on IQR multiplier of 3.

Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client. SCS Engineers Data: Fremont Department of Utilities Groundwater

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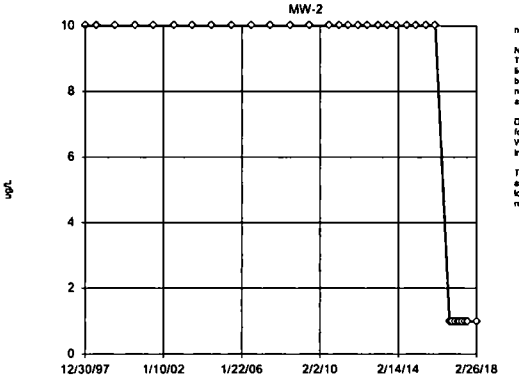
Tukey's Outlier Screening

MW-2



n = 34

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were square transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because both the lower and upper quartiles represent reporting limits

Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data. Fremont Department of Utilities Groundwater

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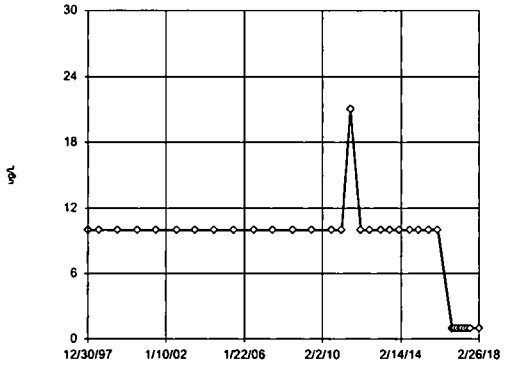
Tukey's Outlier Screening

MW-3



n = 34

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because both the lower and upper quartiles represent reporting limits

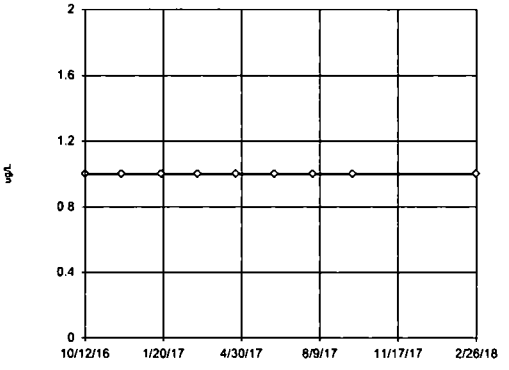
Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

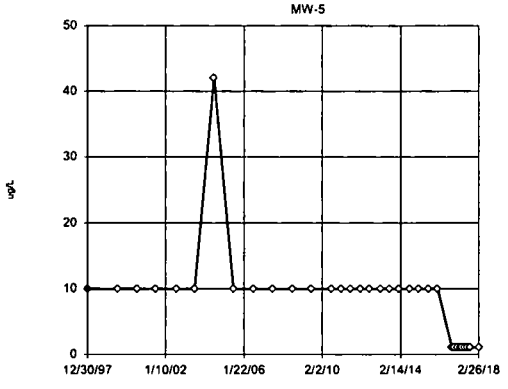
Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data. Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 33

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were cube root transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

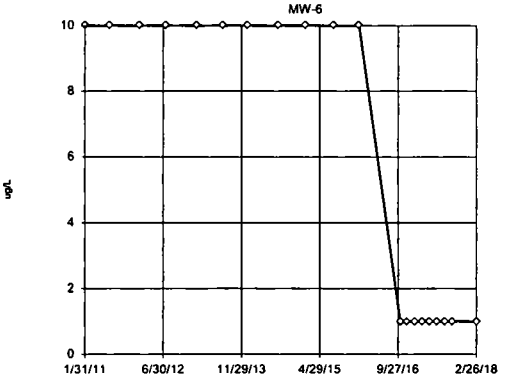
Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 20

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because both the lower and upper quartiles represent reporting limits

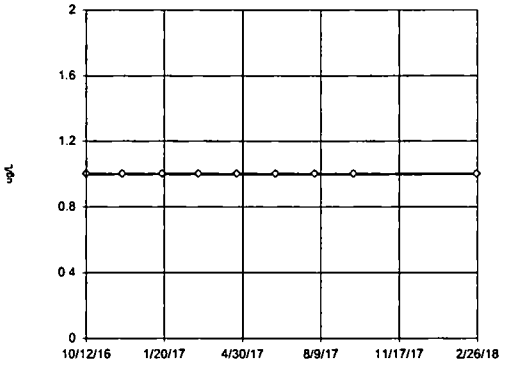
Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client. SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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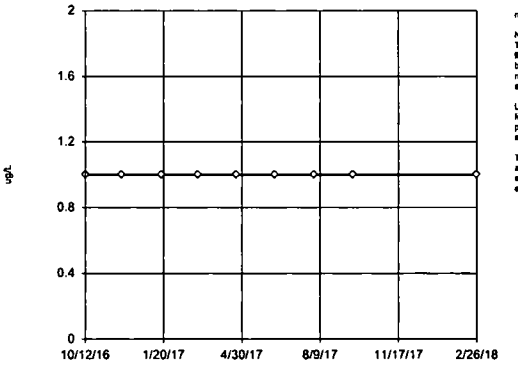
Tukey's Outlier Screening

MW-8



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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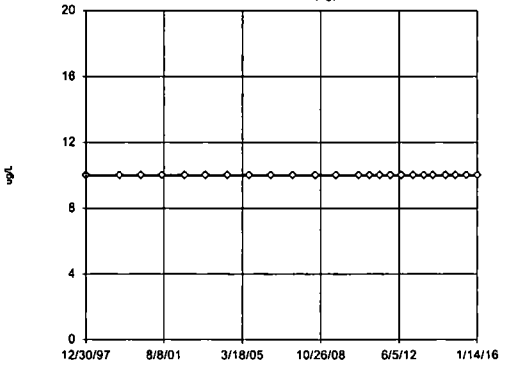
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Chromium [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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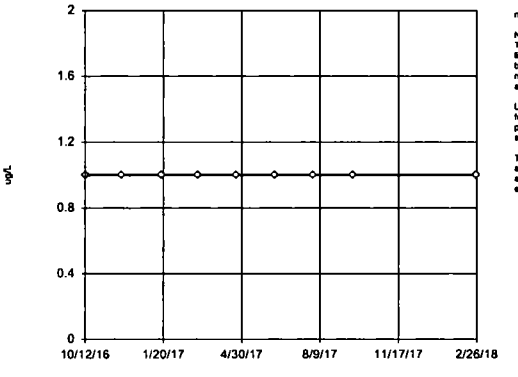
Tukey's Outlier Screening

MW-1



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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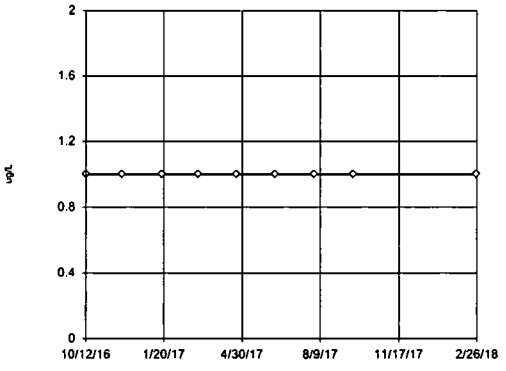
Tukey's Outlier Screening

MW-2



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal

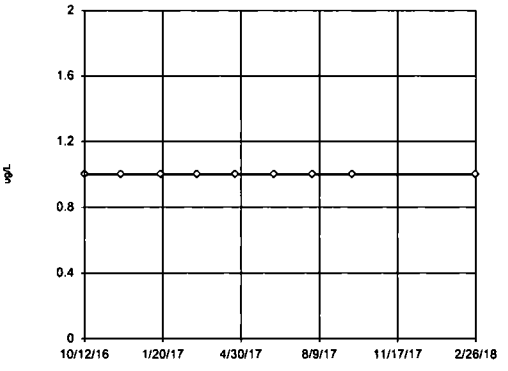
Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

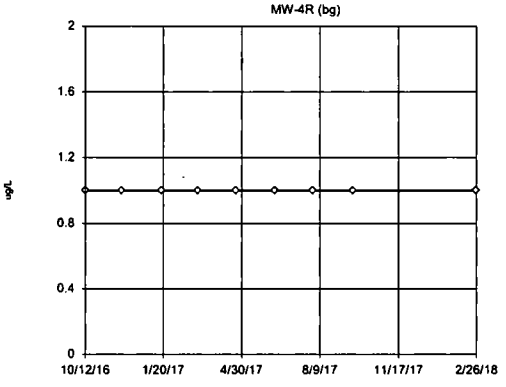
Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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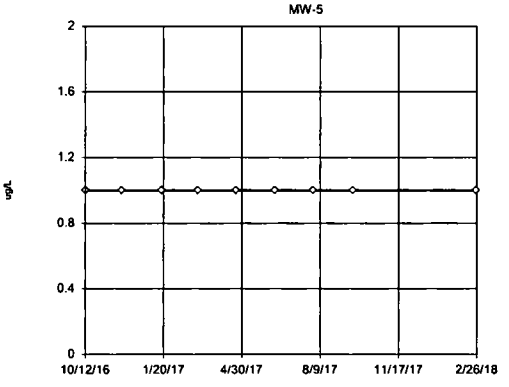
Tukey's Outlier Screening

MW-5



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

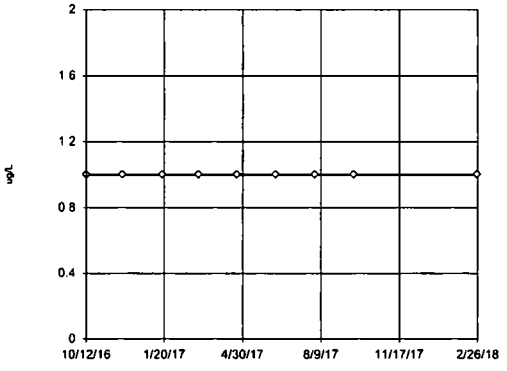
Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

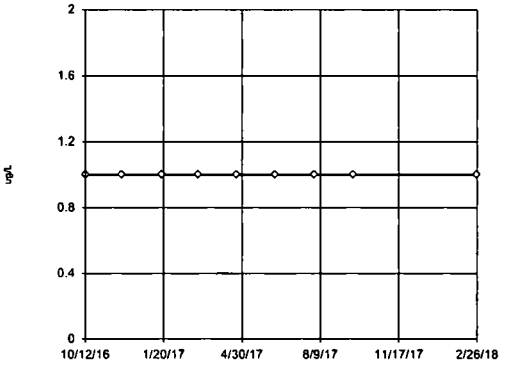
Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

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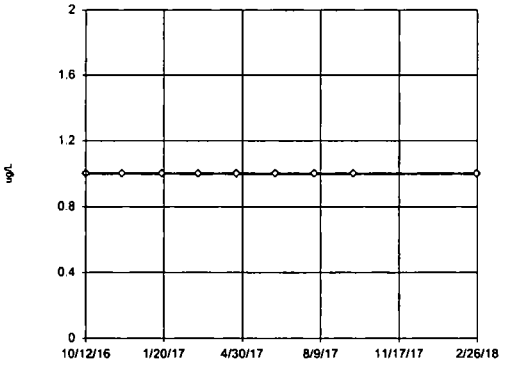
Tukey's Outlier Screening

MW-8



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

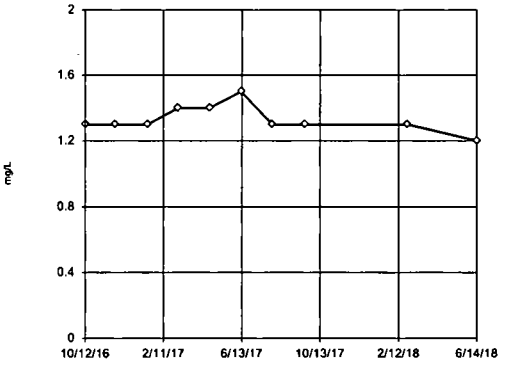
Constituent: Cobalt [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data. Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.749, low cutoff = 1.041, based on IQR multiplier of 3

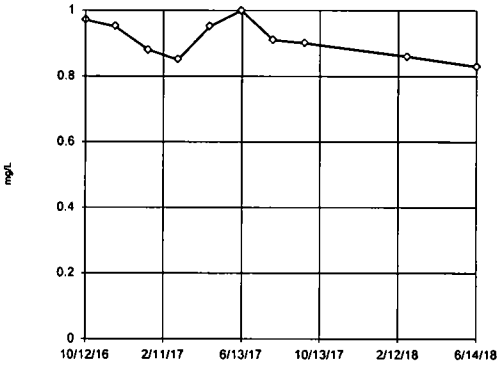
Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 1.359, low cutoff = 0.6041, based on IQR multiplier of 3

Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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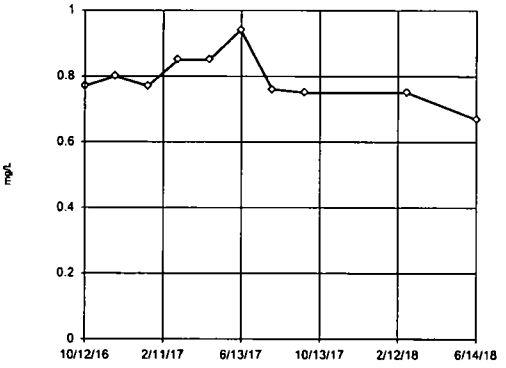
Tukey's Outlier Screening

MW-3



n = 10

No outliers found. Tukey's method selected by user

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 1.237, low cutoff = 0.5152, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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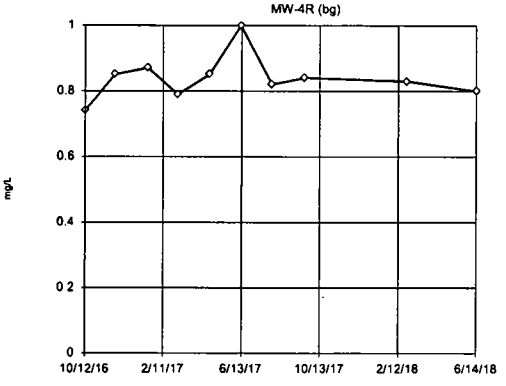
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 1.088, low cutoff = 0.6281, based on IQR multiplier of 3

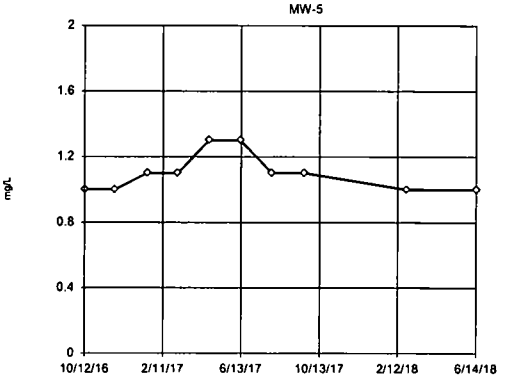
Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 10

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 2.045, low cutoff = 0.5848, based on IQR multiplier of 3

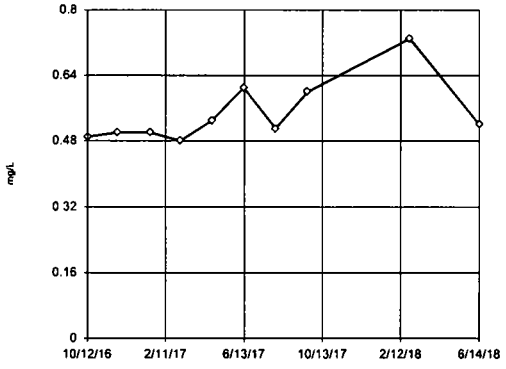
Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 10

No outliers found. Tukey's method selected by user

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 1.105, low cutoff = 0.2711, based on IQR multiplier of 3

Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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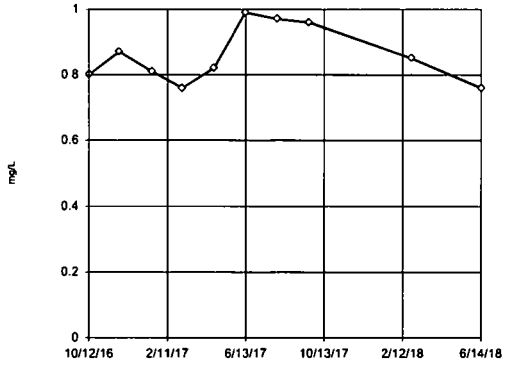
Tukey's Outlier Screening

MW-7



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 1.829, low cutoff = 0 4114, based on IQR multiplier of 3

Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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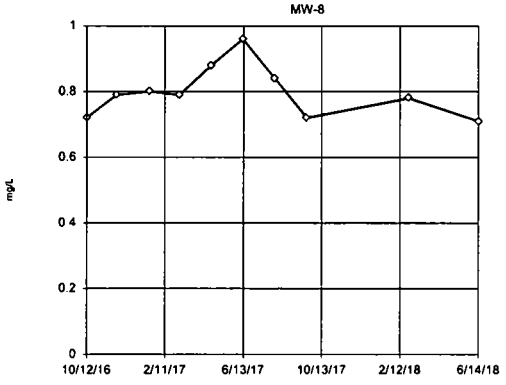
Tukey's Outlier Screening

MW-8



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 1.464, low cutoff = 0.4229, based on IQR multiplier of 3

Constituent: Fluoride Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client. SCS Engineers Data Fremont Department of Utilities Groundwater

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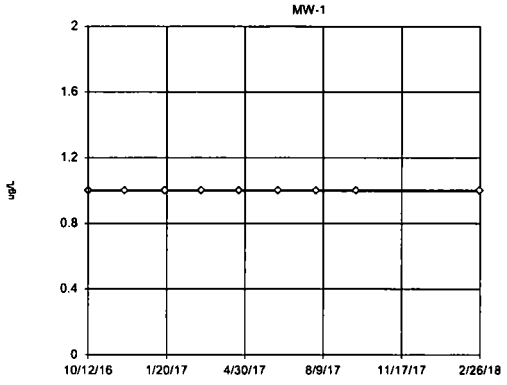
Tukey's Outlier Screening

MW-1



n = 9

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client. SCS Engineers Data: Fremont Department of Utilities Groundwater

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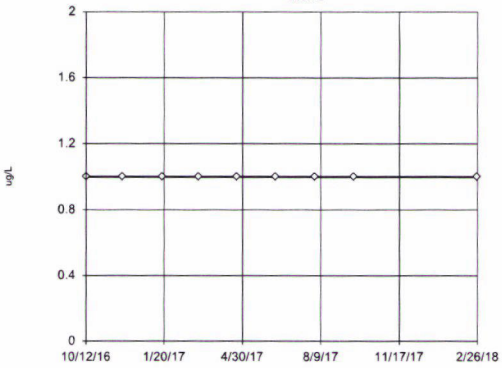
Tukey's Outlier Screening

MW-2



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

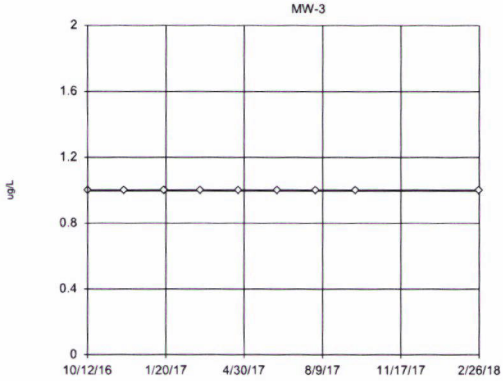
Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.6.10 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

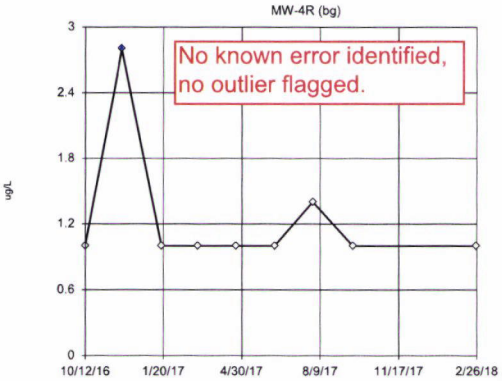
Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v.9.6.10 Sanitas software licensed to SCS Engineers. UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

Outlier is drawn as solid. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.96, low cutoff = 0.6037, based on IQR multiplier of 3.

Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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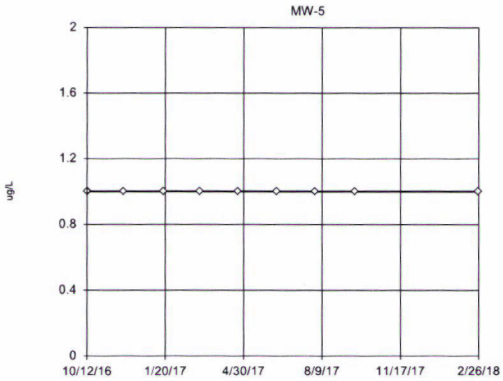
Tukey's Outlier Screening

MW-5



n = 9

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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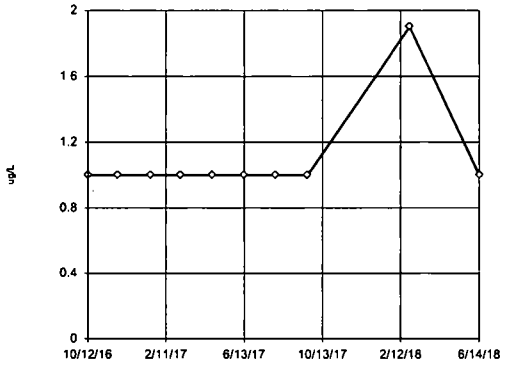
Tukey's Outlier Screening

MW-6



n = 10

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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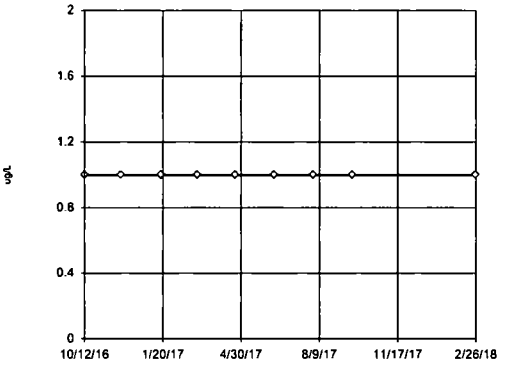
Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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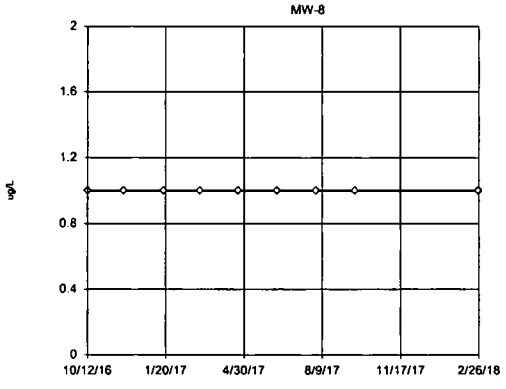
Tukey's Outlier Screening

MW-8



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

Constituent: Lead [total] Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data. Fremont Department of Utilities Groundwater

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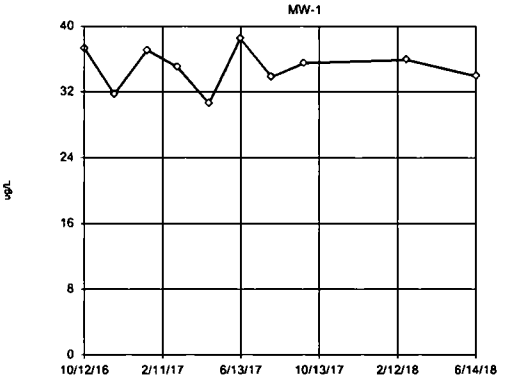
Tukey's Outlier Screening

MW-1



n = 10

No outliers found.
Tukey's method selected by user

Data were x^4 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 45 24, low cutoff = -32 5, based on IQR multiplier of 3

Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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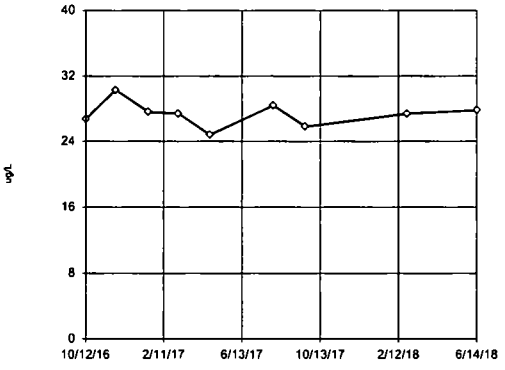
Tukey's Outlier Screening

MW-2



n = 9

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 34.48, low cutoff = 21.39, based on IQR multiplier of 3

Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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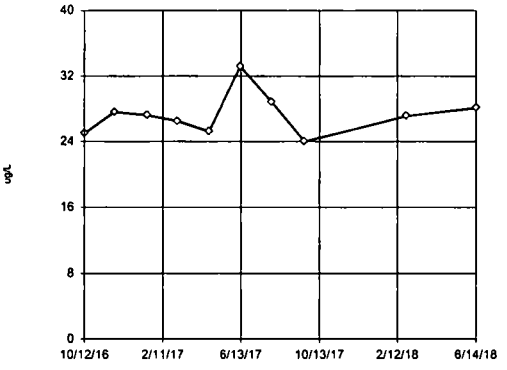
Tukey's Outlier Screening

MW-3



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 41.42, low cutoff = 17.24, based on IQR multiplier of 3.

Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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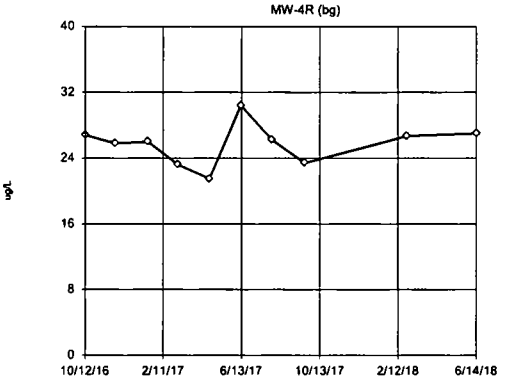
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found. Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 39.25, low cutoff = 14.05, based on IQR multiplier of 3

Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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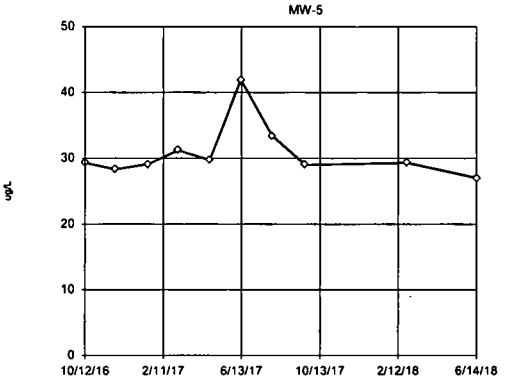
Tukey's Outlier Screening

MW-5



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 46.19, low cutoff = 20.02, based on IQR multiplier of 3.

Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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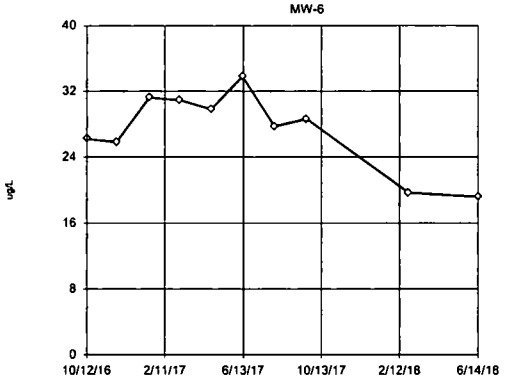
Tukey's Outlier Screening

MW-6



n = 10

No outliers found
Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 41 01, low cutoff = -35.57, based on IQR multiplier of 3

Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client. SCS Engineers Data Fremont Department of Utilities Groundwater

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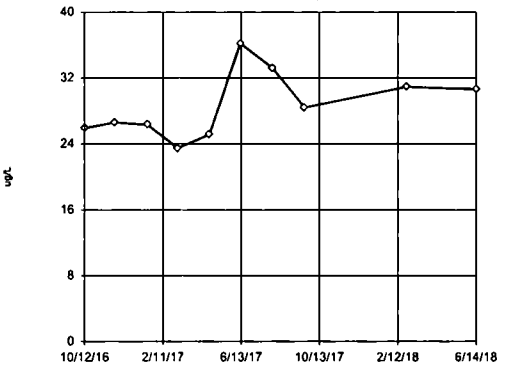
Tukey's Outlier Screening

MW-7



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 63.49, low cutoff = 12 86, based on IQR multiplier of 3.

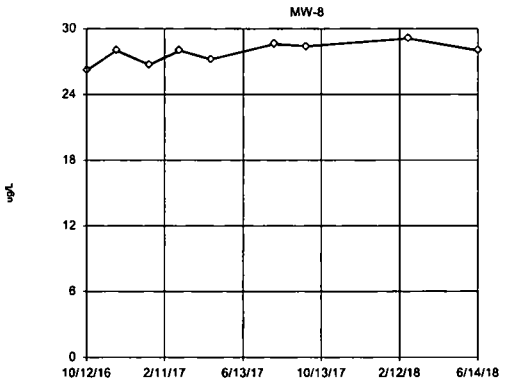
Constituent: Lithium Analysis Run 10/22/2018 2.55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 31 59, low cutoff = -20 46 based on IQR multiplier of 3

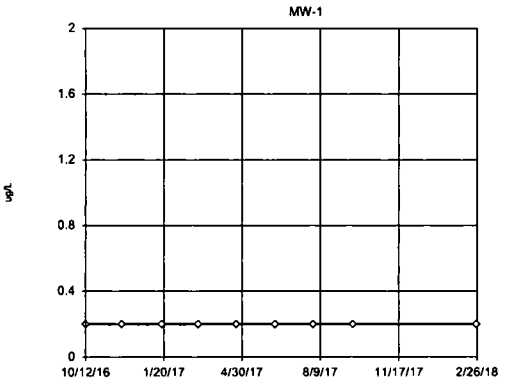
Constituent: Lithium Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

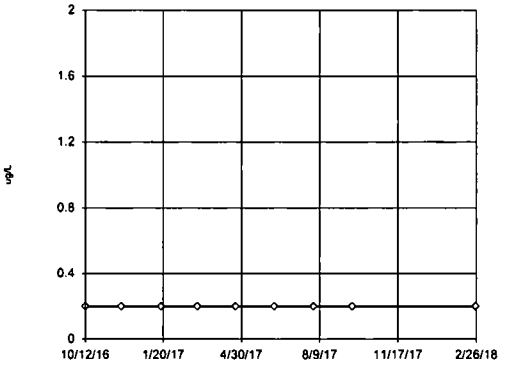
Constituent: Mercury Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client. SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

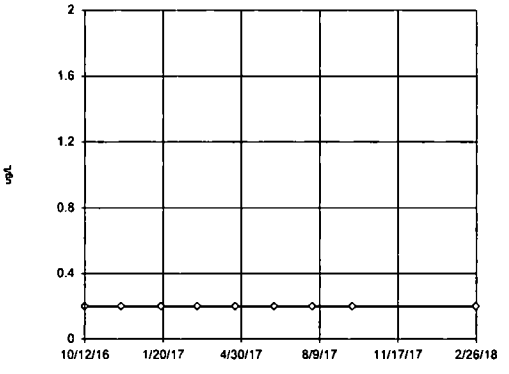
Constituent: Mercury Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal

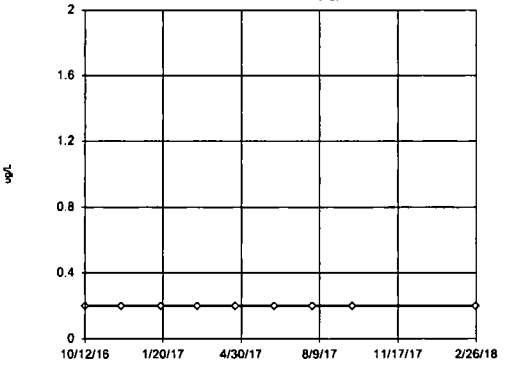
Constituent. Mercury Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

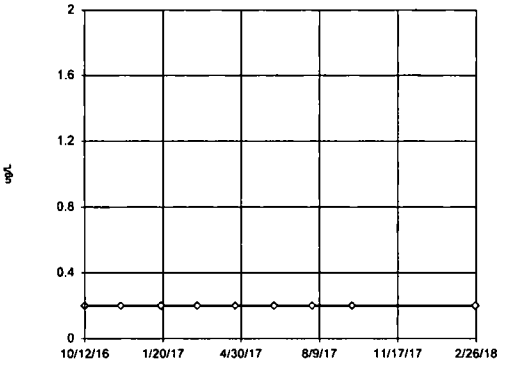
Constituent: Mercury Analysis Run 10/22/2018 2.55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

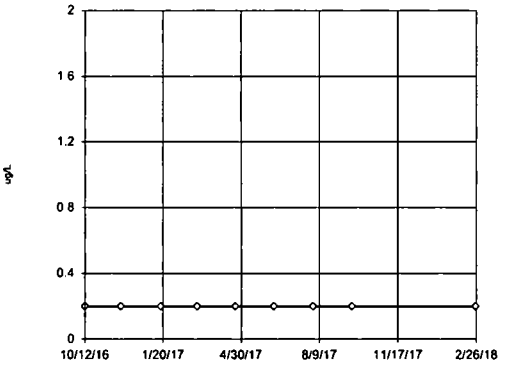
Constituent: Mercury Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

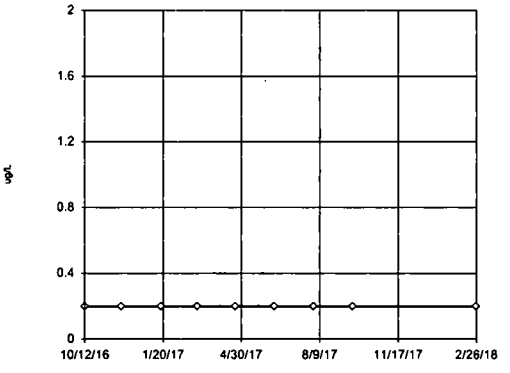
Constituent: Mercury Analysis Run 10/22/2018 2:55 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal.

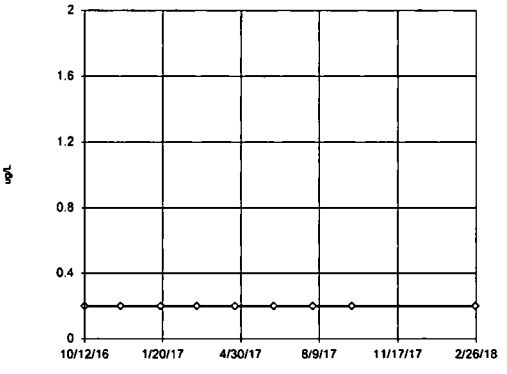
Constituent: Mercury Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

The results were invalidated, because the lower and upper quartiles are equal

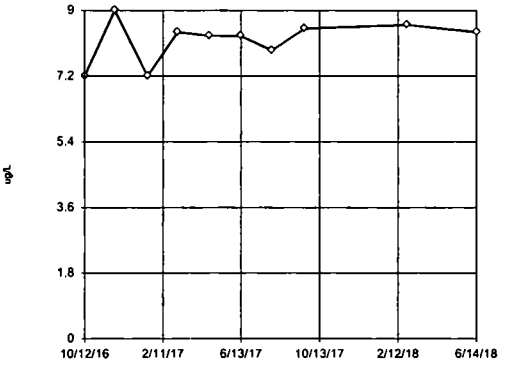
Constituent: Mercury Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 10

No outliers found.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 9.983, low cutoff = -8.611, based on IQR multiplier of 3.

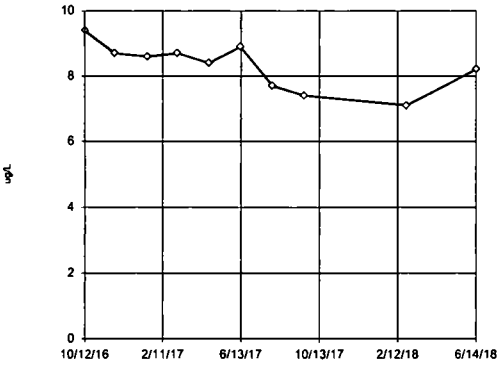
Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 10

No outliers found
Tukey's method selected by user

Data were x^4 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 10 92, low cutoff = -8 399, based on IQR multiplier of 3

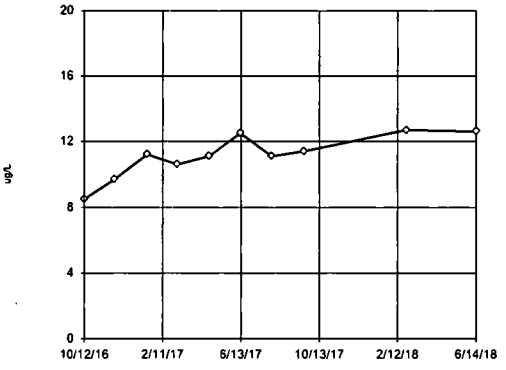
Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 10

No outliers found
Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 18 51, low cutoff = -11.99, based on IQR multiplier of 3

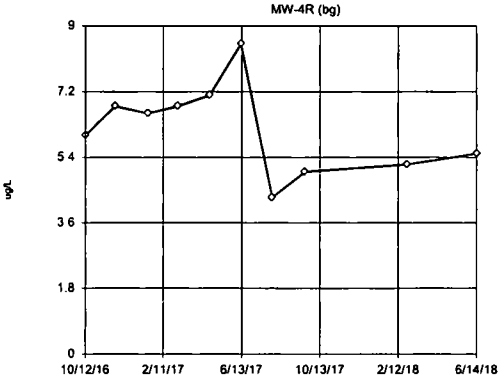
Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found.
Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 15 06, low cutoff = 1.561, based on IQR multiplier of 3

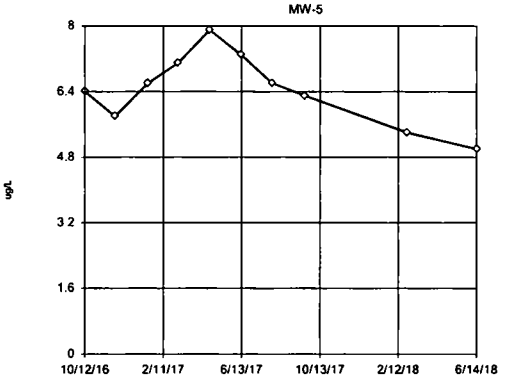
Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 10

No outliers found
Tukey's method selected by user

Ladder of Powers transformations did not improve normality; analysis run on raw data

High cutoff = 12, low cutoff = 0 8 based on IQR multiplier of 3

Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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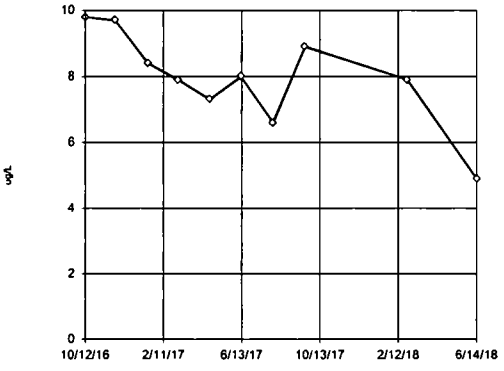
Tukey's Outlier Screening

MW-6



n = 10

No outliers found Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 14 19, low cutoff = -8 139, based on IQR multiplier of 3

Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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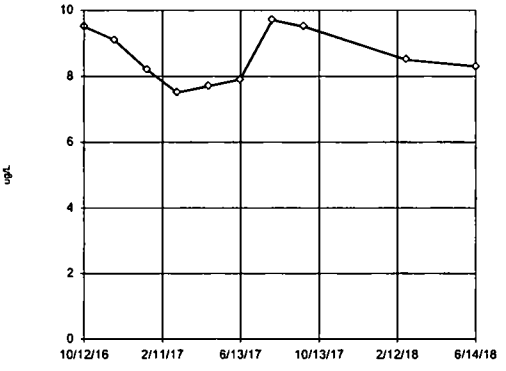
Tukey's Outlier Screening

MW-7



n = 10

No outliers found Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 17.17, low cutoff = 4 316, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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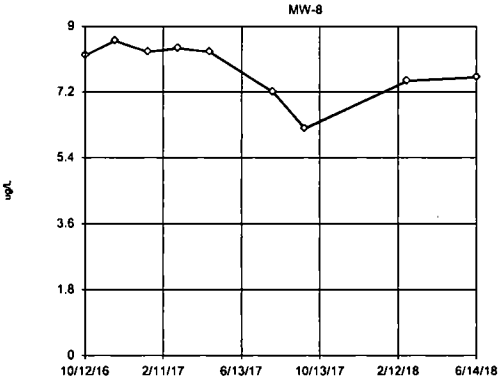
Tukey's Outlier Screening

MW-8



n = 9

No outliers found. Tukey's method selected by user

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 9 79, low cutoff = -8 521, based on IQR multiplier of 3

Constituent: Molybdenum Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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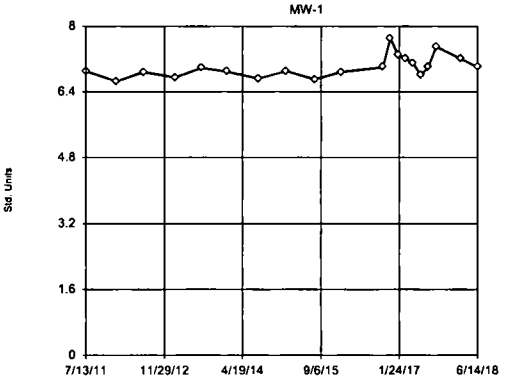
Tukey's Outlier Screening

MW-1



n = 20

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 8 166, low cutoff = 5 988, based on IQR multiplier of 3.

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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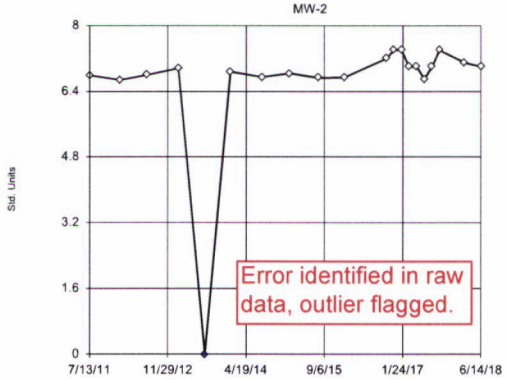
Tukey's Outlier Screening

MW-2



n = 20

Outlier is drawn as solid. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.704, low cutoff = 4.476, based on IQR multiplier of 3.

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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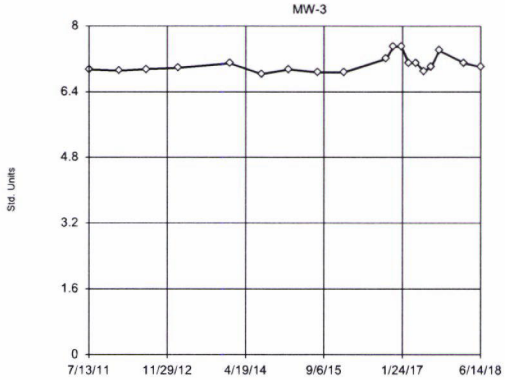
Tukey's Outlier Screening

MW-3



n = 19

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.702, low cutoff = 6.37, based on IQR multiplier of 3.

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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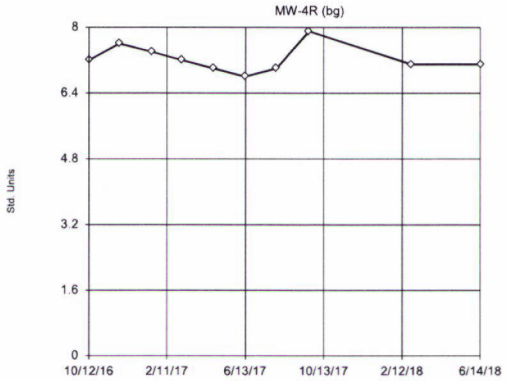
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.221, low cutoff = 5.693, based on IQR multiplier of 3.

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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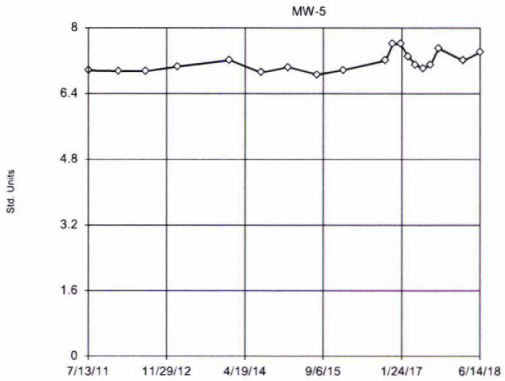
Tukey's Outlier Screening

MW-5



n = 19

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.423, low cutoff = 6.032, based on IQR multiplier of 3.

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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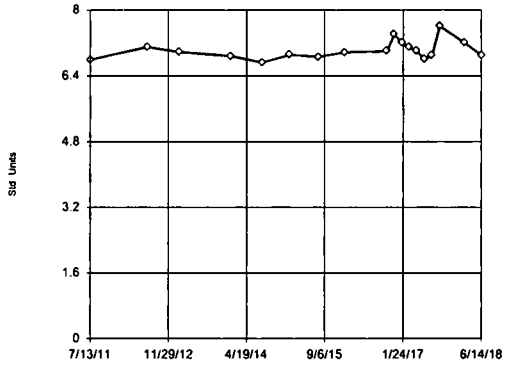
Tukey's Outlier Screening

MW-6



n = 18

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 8.06, low cutoff = 6.095, based on IQR multiplier of 3

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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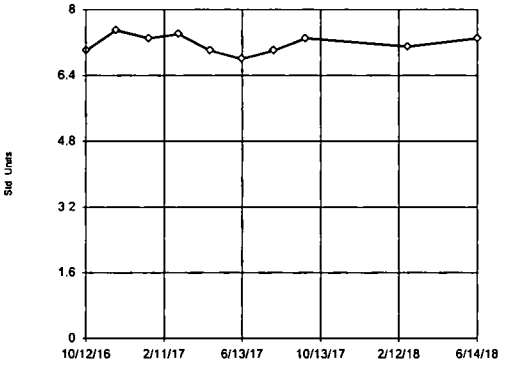
Tukey's Outlier Screening

MW-7



n = 10

No outliers found. Tukey's method selected by user.

Data were x^4 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 8.178, low cutoff = 5.394, based on IQR multiplier of 3

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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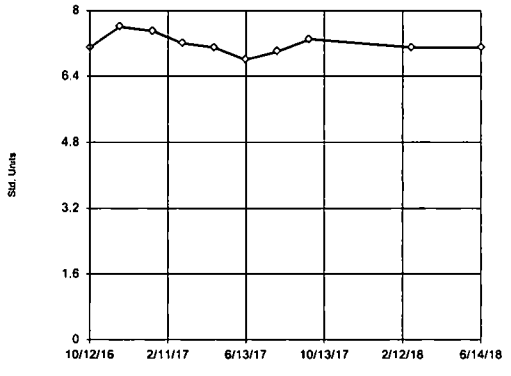
Tukey's Outlier Screening

MW-8



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 8.555, low cutoff = 6.097, based on IQR multiplier of 3

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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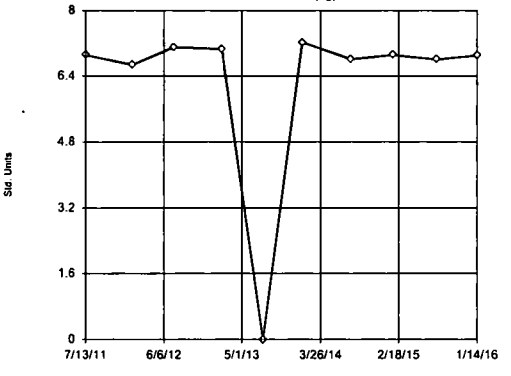
Tukey's Outlier Screening

MW-4 (bg)



n = 10

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.778, low cutoff = -3.679, based on IQR multiplier of 3

Constituent: pH Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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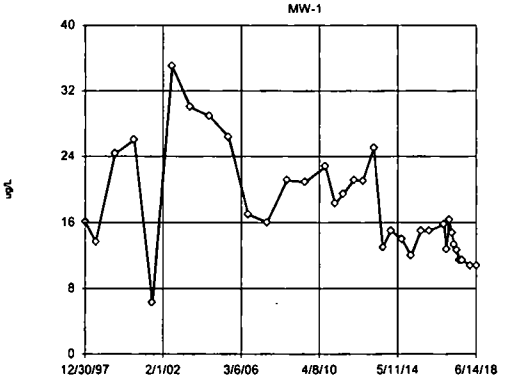
Tukey's Outlier Screening

MW-1



n = 35

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 91.25, low cutoff = 3.015, based on IQR multiplier of 3

Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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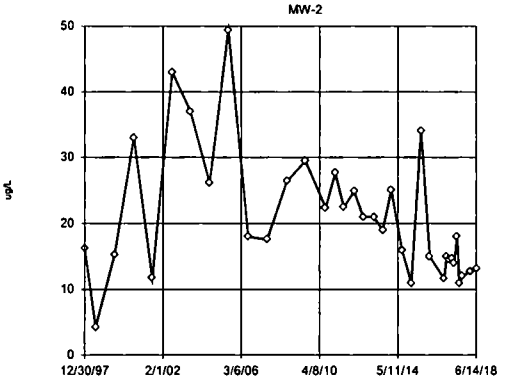
Tukey's Outlier Screening

MW-2



n = 35

No outliers found
Tukey's method selected by user.

Data were cube root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 99.56, low cutoff = 0.408, based on IQR multiplier of 3

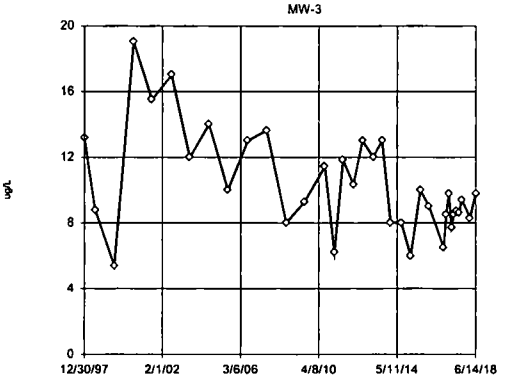
Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 35

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 49.95, low cutoff = 2.16, based on IQR multiplier of 3

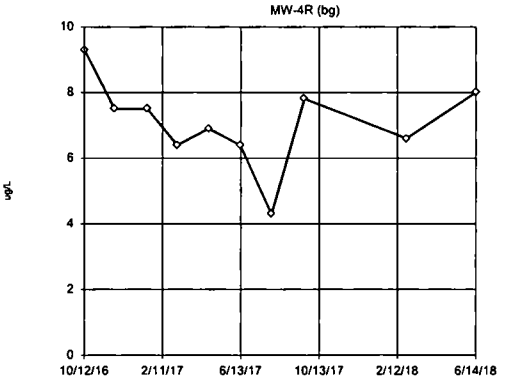
Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found
Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 11.28, low cutoff = -4.839, based on IQR multiplier of 3

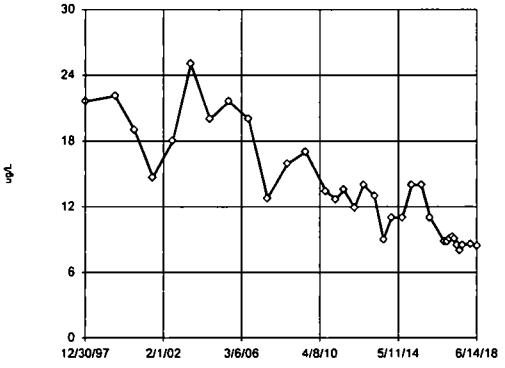
Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 34

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 126 5, low cutoff = 1 252, based on IQR multiplier of 3

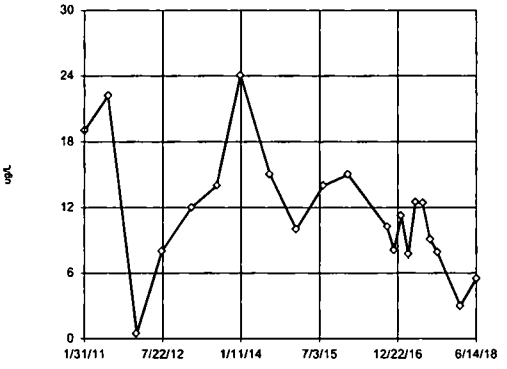
Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 21

No outliers found
Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data

High cutoff = 34.15, low cutoff = -11 7, based on IQR multiplier of 3

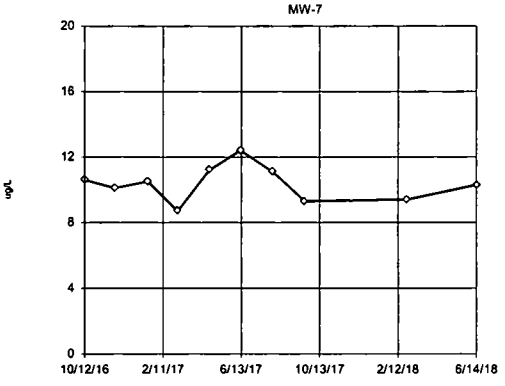
Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 18.91, low cutoff = 5 513, based on IQR multiplier of 3

Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data. Fremont Department of Utilities Groundwater

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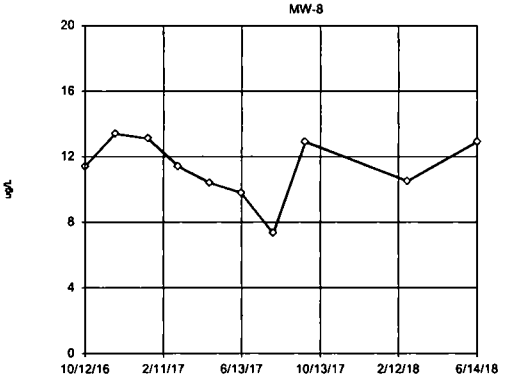
Tukey's Outlier Screening

MW-8



n = 10

No outliers found
Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 17 65, low cutoff = -13 5 based on IQR multiplier of 3.

Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

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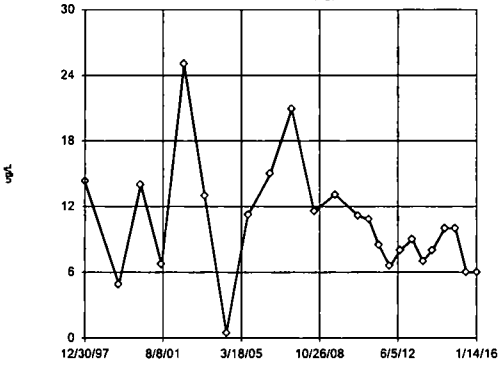
Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 43.58, low cutoff = -0.1377, based on IQR multiplier of 3

Constituent: Selenium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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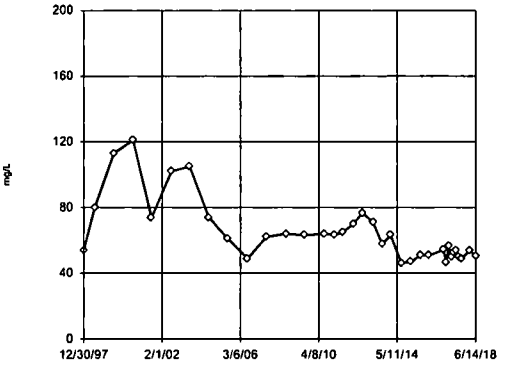
Tukey's Outlier Screening

MW-1



n = 35

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 193.8, low cutoff = 16.61, based on IQR multiplier of 3

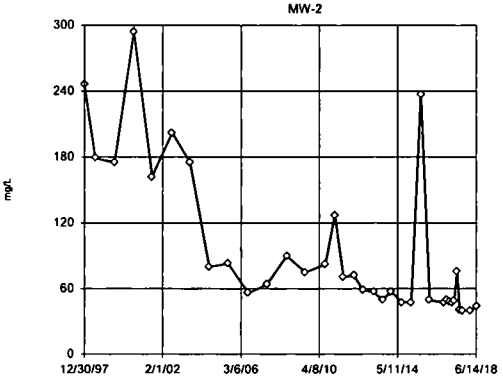
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 35

No outliers found Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 2294, low cutoff = 2.679, based on IQR multiplier of 3

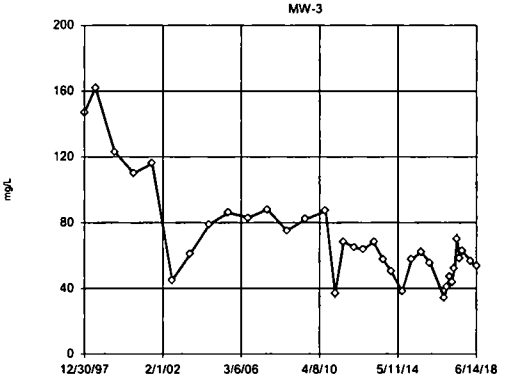
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 35

No outliers found Tukey's method selected by user

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 335.6, low cutoff = 12.89, based on IQR multiplier of 3.

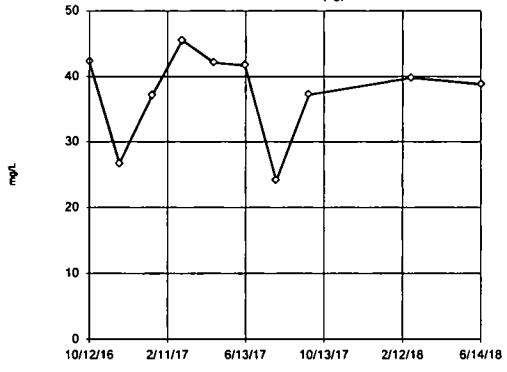
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found. Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 52.78, low cutoff = -47.18, based on IQR multiplier of 3.

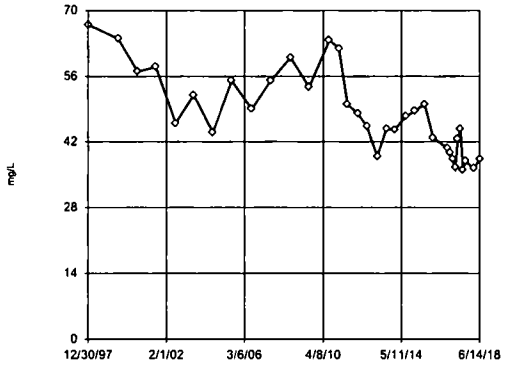
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 34

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 141.4, low cutoff = 15.62, based on IQR multiplier of 3

Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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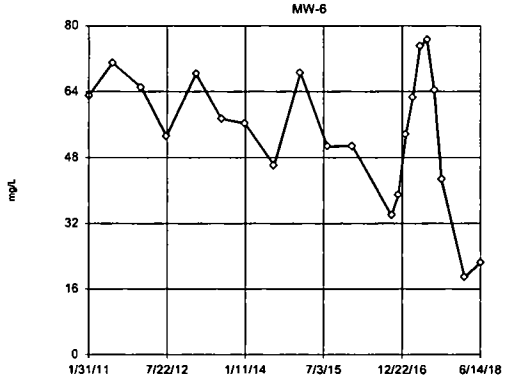
Tukey's Outlier Screening

MW-6



n = 21

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 108.9, low cutoff = -73.86, based on IQR multiplier of 3.

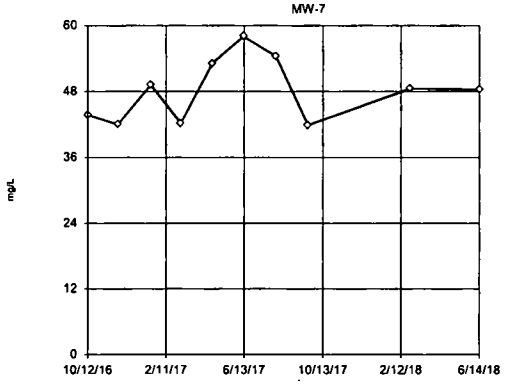
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 10

No outliers found. Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 97.22, low cutoff = 15.68, based on IQR multiplier of 3.

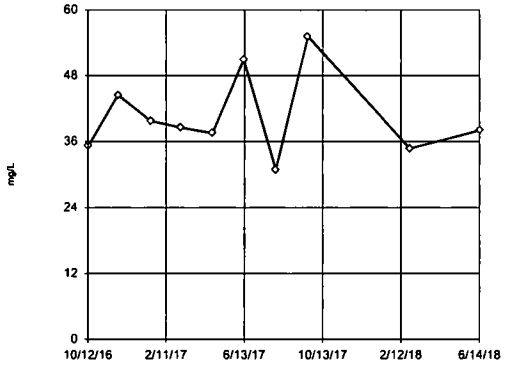
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 10

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 120.2, low cutoff = 13 81, based on IQR multiplier of 3

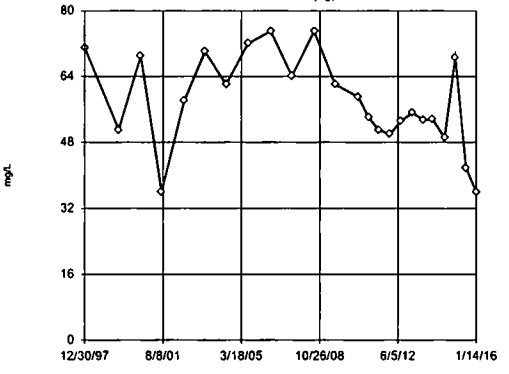
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found
Tukey's method selected by user

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 122 2, low cutoff = -2 4, based on IQR multiplier of 3.

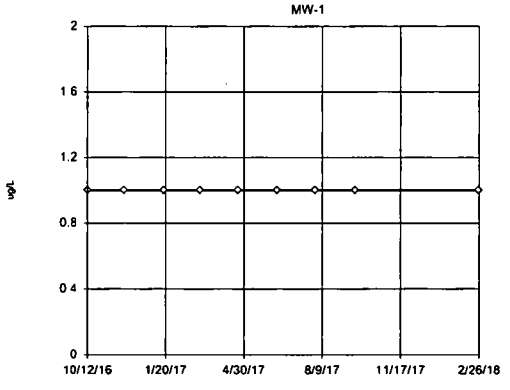
Constituent: Sulfate Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

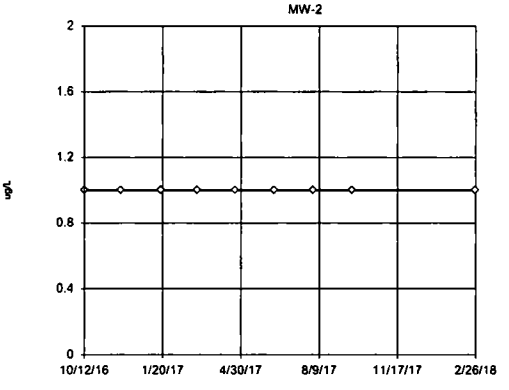
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal.

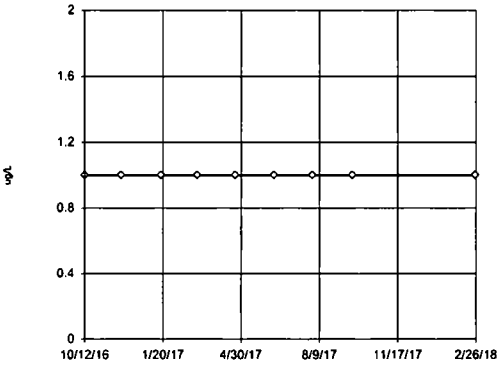
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

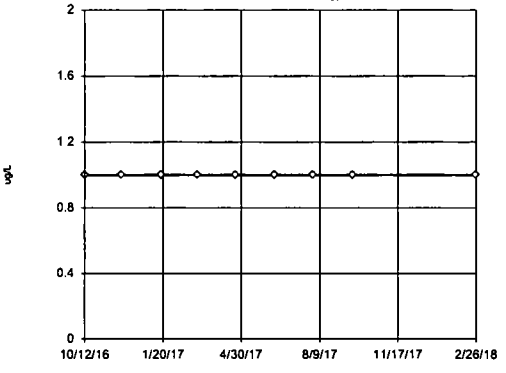
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

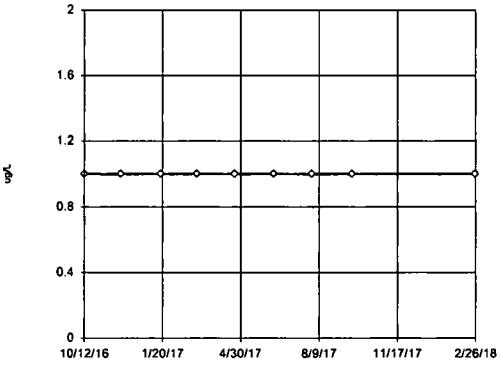
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

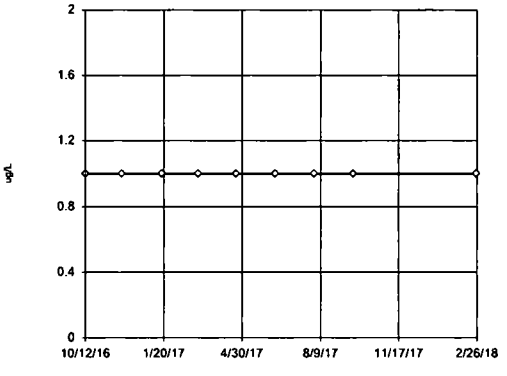
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal.

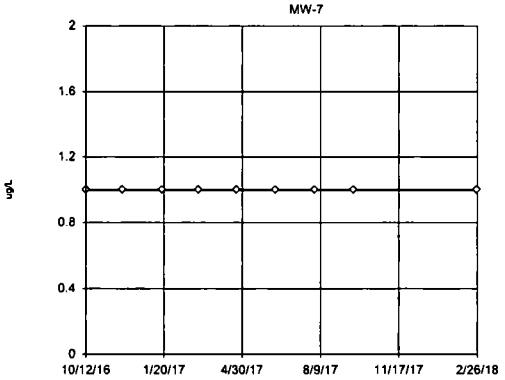
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

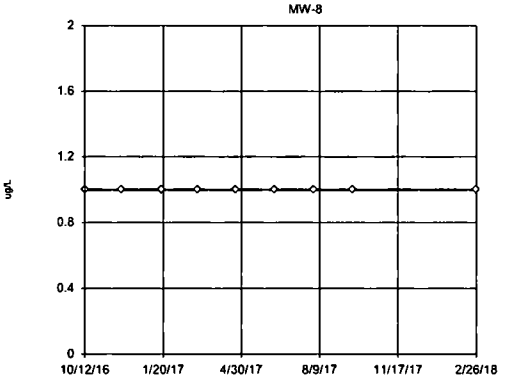
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data

The results were invalidated, because the lower and upper quartiles are equal

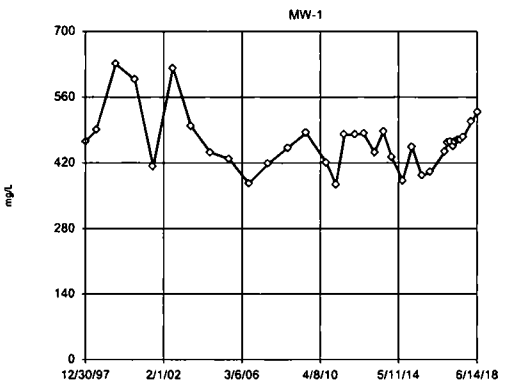
Constituent: Thallium [total] Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 35

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 699 9, low cutoff = 298, based on IQR multiplier of 3

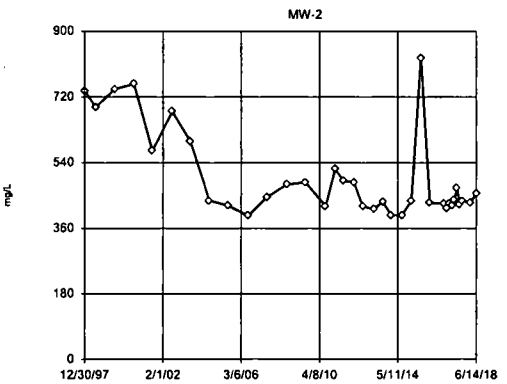
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 35

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0 05 alpha level

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 981, low cutoff = 225 1, based on IQR multiplier of 3

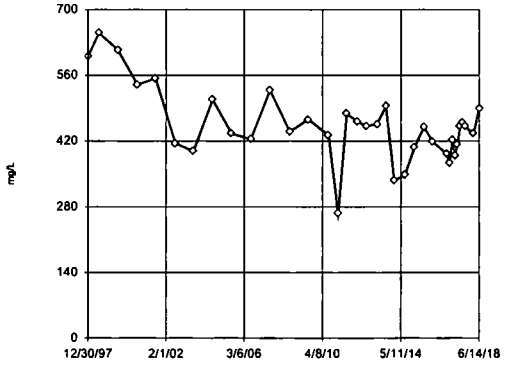
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 35

No outliers found Tukey's method selected by user.

Data were square root transformed to achieve best W statistic (graph shown in original units)

High cutoff = 759.6, low cutoff = 220.6, based on IQR multiplier of 3

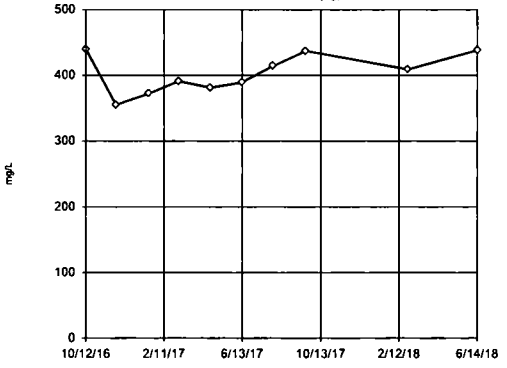
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 686.6, low cutoff = 239.9, based on IQR multiplier of 3.

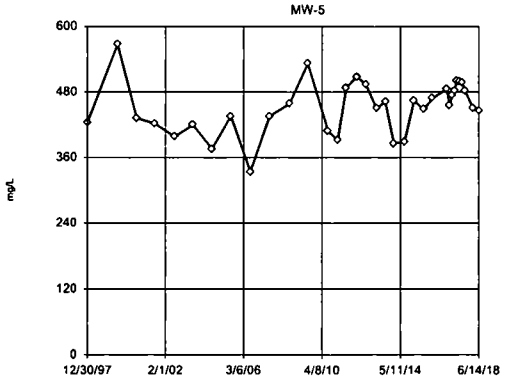
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 34

No outliers found. Tukey's method selected by user

Ladder of Powers transformations did not improve normality; analyses run on raw data

High cutoff = 685, low cutoff = 223, based on IQR multiplier of 3

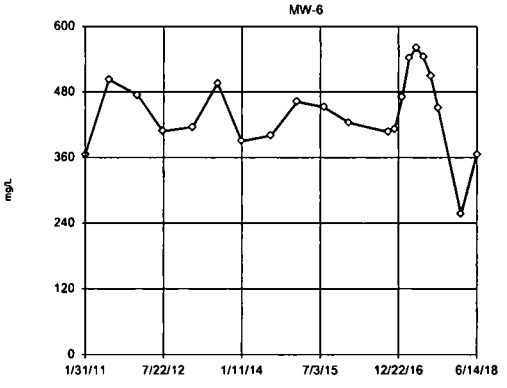
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 21

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 712.4, low cutoff = -309.4, based on IQR multiplier of 3

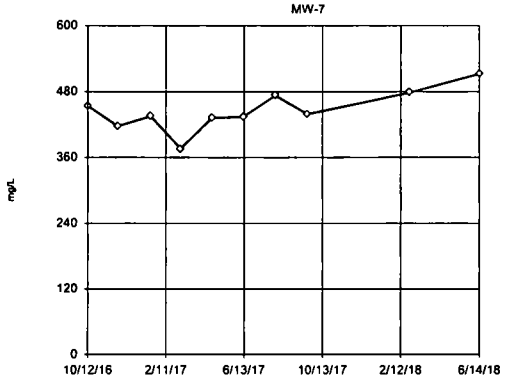
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 10

No outliers found Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analyses run on raw data

High cutoff = 628 5, low cutoff = 271.5 based on IQR multiplier of 3

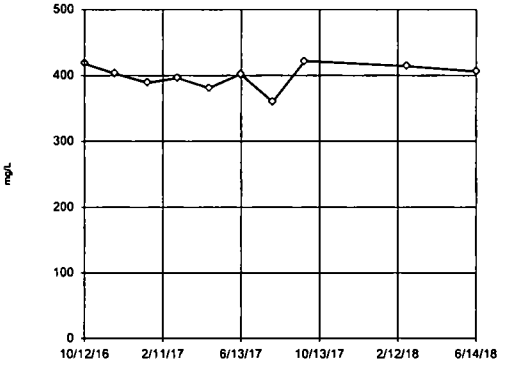
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 10

No outliers found Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units)

High cutoff = 471.3, low cutoff = -368 6, based on IQR multiplier of 3

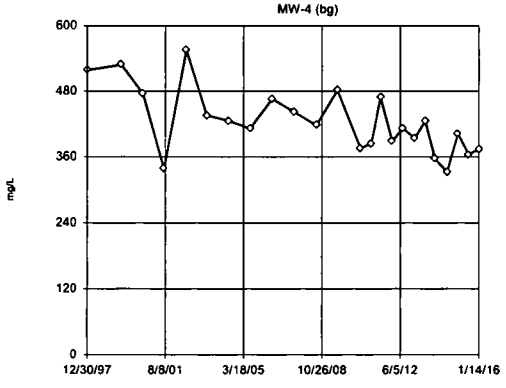
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4 (bg)



n = 24

No outliers found. Tukey's method selected by user

Data were natural log transformed to achieve best W statistic (graph shown in original units)

High cutoff = 868 9, low cutoff = 204.7, based on IQR multiplier of 3

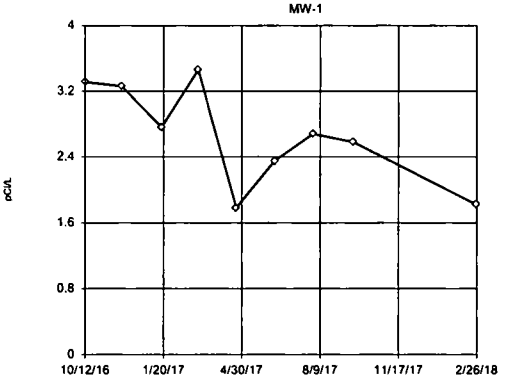
Constituent: Total Dissolved Solids Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data. Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-1



n = 9

No outliers found Tukey's method selected by user

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 5 469, low cutoff = -3 835, based on IQR multiplier of 3

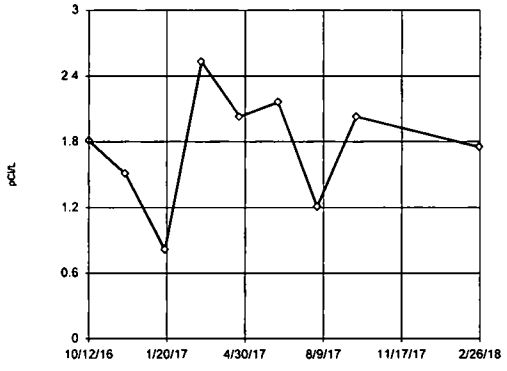
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client SCS Engineers Data. Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-2



n = 9

No outliers found Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units)

High cutoff = 3.458, low cutoff = -2.388, based on IQR multiplier of 3

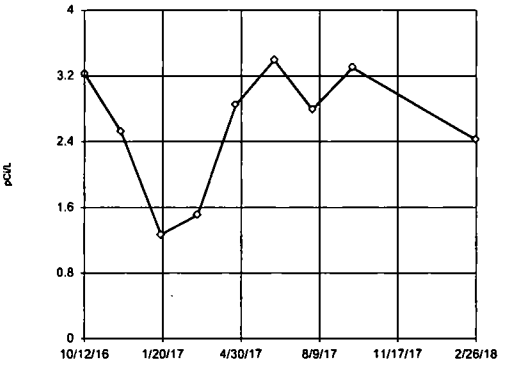
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-3



n = 9

No outliers found Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.832, low cutoff = -4.106, based on IQR multiplier of 3

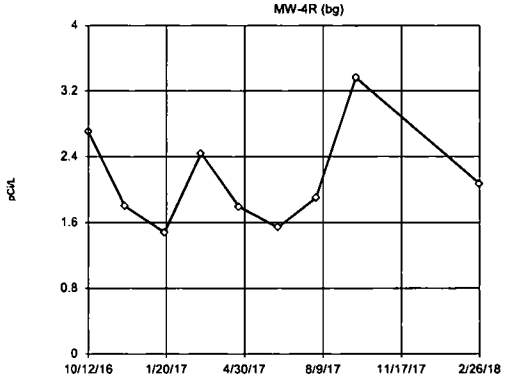
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-4R (bg)



n = 9

No outliers found Tukey's method selected by user

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.483, low cutoff = 0.4494, based on IQR multiplier of 3.

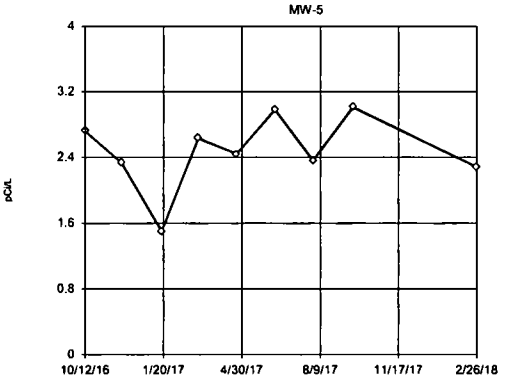
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-5



n = 9

No outliers found Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units)

High cutoff = 3.635, low cutoff = -2.754, based on IQR multiplier of 3

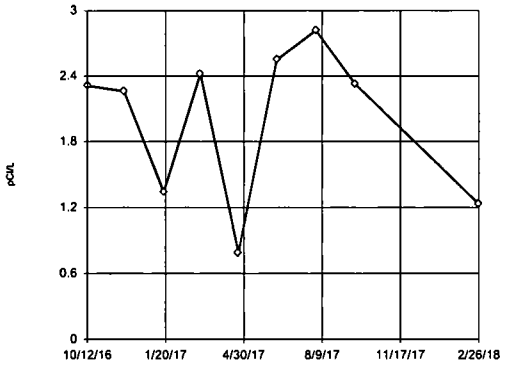
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-6



n = 9

No outliers found
Tukey's method selected by user

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.469, low cutoff = -3.192, based on IQR multiplier of 3.

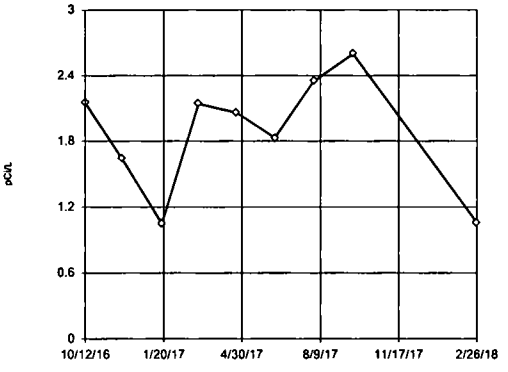
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-7



n = 9

No outliers found
Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.345, low cutoff = -2.851, based on IQR multiplier of 3

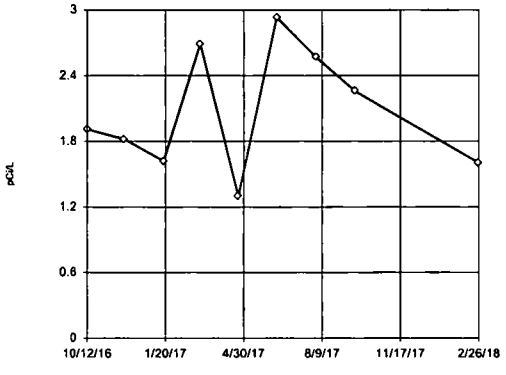
Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Tukey's Outlier Screening

MW-8



n = 9

No outliers found
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 11.45, low cutoff = 0.3696, based on IQR multiplier of 3

Constituent: Total Radium Analysis Run 10/22/2018 2:56 PM View: Outliers

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

A.3 INTERWELL PREDICTION LIMITS – JUNE 2018

Interwell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/23/2018, 4:53 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic [total] (ug/L)	MW-1	5.136	n/a	6/14/2018	3.9	No	10	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-2	5.136	n/a	6/14/2018	3.6	No	10	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-3	5.136	n/a	6/14/2018	3	No	10	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-5	5.136	n/a	6/14/2018	4.6	No	10	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-6	5.136	n/a	6/14/2018	3.2	No	10	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-7	5.136	n/a	6/14/2018	3.5	No	10	0	No	0.000...	Param 1 of 2
Arsenic [total] (ug/L)	MW-8	5.136	n/a	6/14/2018	2.5	No	10	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-6	156.8	n/a	6/14/2018	101	No	34	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-7	156.8	n/a	6/14/2018	129	No	34	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-8	156.8	n/a	6/14/2018	143	No	34	0	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-1	479.1	n/a	6/14/2018	154	No	10	30	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-2	479.1	n/a	6/14/2018	128	No	10	30	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-3	479.1	n/a	6/14/2018	104	No	10	30	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-5	479.1	n/a	6/14/2018	141	No	10	30	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-7	479.1	n/a	6/14/2018	187	No	10	30	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-3	1.051	n/a	6/14/2018	0.67	No	10	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-5	1.051	n/a	6/14/2018	1	No	10	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-6	1.051	n/a	6/14/2018	0.52	No	10	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-7	1.051	n/a	6/14/2018	0.76	No	10	0	No	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-8	1.051	n/a	6/14/2018	0.71	No	10	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	**MW-1**	**33.46**	**n/a**	**6/14/2018**	**33.9**	**Yes**	**10**	**0**	**No**	**0.000...**	Param 1 of 2
Lithium (ug/L)	MW-2	33.46	n/a	6/14/2018	27.8	No	10	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-3	33.46	n/a	6/14/2018	28.1	No	10	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-5	33.46	n/a	6/14/2018	27	No	10	0	No	0.000..	Param 1 of 2
Lithium (ug/L)	MW-6	33.46	n/a	6/14/2018	19.2	No	10	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-7	33.46	n/a	6/14/2018	30.6	No	10	0	No	0.000.	Param 1 of 2
Lithium (ug/L)	MW-8	33.46	n/a	6/14/2018	28	No	10	0	No	0.000 ..	Param 1 of 2
Molybdenum (ug/L)	MW-1	10.01	n/a	6/14/2018	8.4	No	10	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-2	10.01	n/a	6/14/2018	8.2	No	10	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	**MW-3**	**10.01**	**n/a**	**6/14/2018**	**12.6**	**Yes**	**10**	**0**	**No**	**0.000...**	Param 1 of 2
Molybdenum (ug/L)	MW-5	10.01	n/a	6/14/2018	5	No	10	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-6	10.01	n/a	6/14/2018	4.9	No	10	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-7	10.01	n/a	6/14/2018	8.3	No	10	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-8	10.01	n/a	6/14/2018	7.6	No	10	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-6	7.882	4.428	6/14/2018	6.9	No	20	5	x^6	0.000 ..	Param 1 of 2
pH (Std. Units)	MW-7	7.882	4.428	6/14/2018	7.3	No	20	5	x^6	0.000...	Param 1 of 2
pH (Std. Units)	MW-8	7.882	4.428	6/14/2018	7.1	No	20	5	x^6	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-6	22.26	n/a	6/14/2018	5.5	No	34	2.941	sqrt(x)	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-7	22.26	n/a	6/14/2018	10.3	No	34	2.941	sqrt(x)	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-8	22.26	n/a	6/14/2018	12.9	No	34	2.941	sqrt(x)	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-6	83.83	n/a	6/14/2018	22.5	No	34	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-7	83.83	n/a	6/14/2018	48.4	No	34	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-8	83.83	n/a	6/14/2018	38	No	34	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-6	539.4	n/a	6/14/2018	365	No	34	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-7	539.4	n/a	6/14/2018	512	No	34	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-8	539.4	n/a	6/14/2018	406	No	34	0	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-8	479.1	n/a	6/14/2018	227	No	10	30	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-6	110.7	n/a	6/14/2018	52.2	No	34	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-7	110.7	n/a	6/14/2018	104	No	34	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-8	110.7	n/a	6/14/2018	86.5	No	34	0	No	0.000...	Param 1 of 2

Interwell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/23/2018, 4:53 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Chloride (mg/L)	MW-1	77.3	n/a	6/14/2018	9.9	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-2	77.3	n/a	6/14/2018	13	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-3	77.3	n/a	6/14/2018	30.2	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-5	77.3	n/a	6/14/2018	25.2	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-6	77.3	n/a	6/14/2018	51.6	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-7	77.3	n/a	6/14/2018	47.9	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Chloride (mg/L)	MW-8	77.3	n/a	6/14/2018	27.6	No	10	0	x^(1/3)	0.000...	Param 1 of 2
Fluoride (mg/L)	**MW-1**	**1.051**	**n/a**	**6/14/2018**	**1.2**	**Yes**	**10**	**0**	**No**	**0.000...**	Param 1 of 2
Fluoride (mg/L)	MW-2	1.051	n/a	6/14/2018	0.83	No	10	0	No	0.000...	Param 1 of 2

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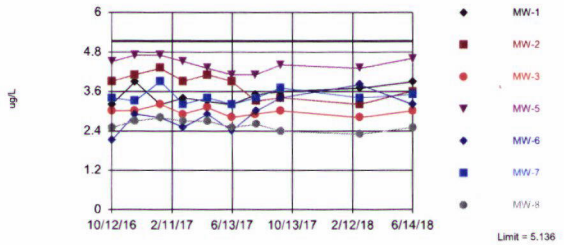
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=3.93, Std. Dev.=0.386, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9683, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Arsenic [total] Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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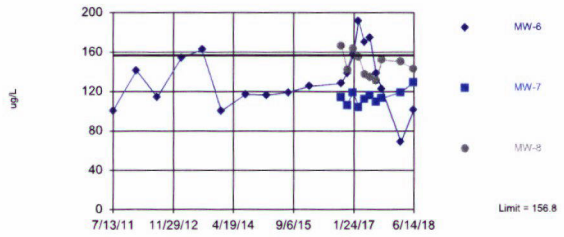
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=122.1, Std. Dev.=15.04, n=34. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9129, critical = 0.908. Kappa = 2.309 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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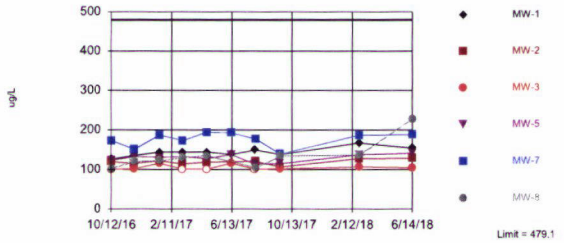
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=197.6, Std. Dev.=90.11, n=10, 30% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8676, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 6 points to limit. Assumes 1 future value. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Boron Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limit

Prediction Limit

Interwell Parametric

Background Data Summary: Mean=87.29, Std. Dev.=10.13, n=34. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.985, critical = 0.908. Kappa = 2.309 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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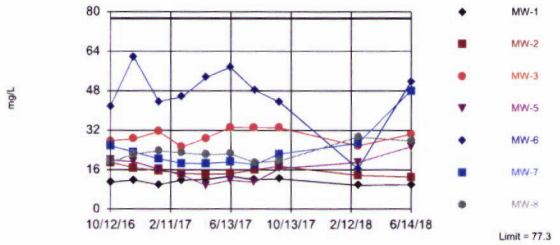
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=2.799, Std. Dev.=0.4675, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7961, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Chloride Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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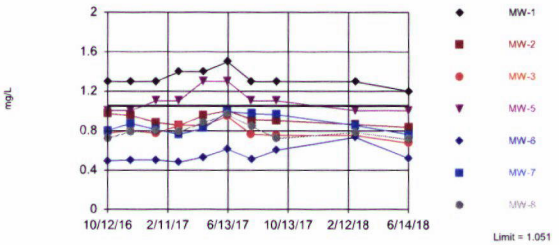
Exceeds Limit: MW-1

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.839, Std. Dev.=0.06773, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8772, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Fluoride Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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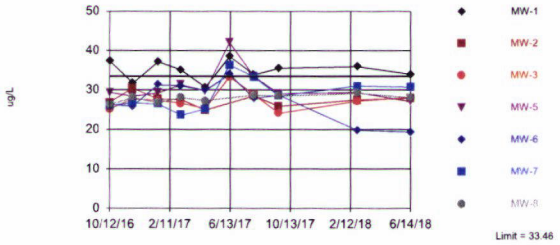
Exceeds Limit: MW-1

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=25.7, Std. Dev.=2.484, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9349, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Lithium Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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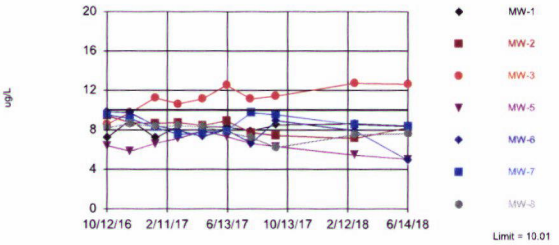
Exceeds Limit: MW-3

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=6.18, Std. Dev.=1.227, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9705, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Molybdenum Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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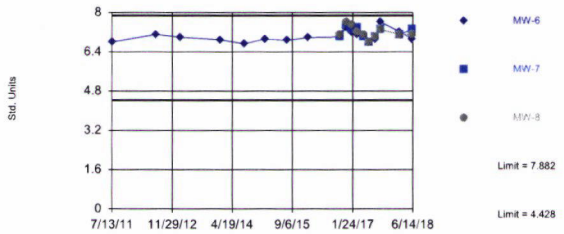
Within Limits

Prediction Limit

Interwell Parametric



Background Data Summary (based on x^6 transformation): Mean=123691, Std. Dev.=46264, n=20, 5% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8789, critical = 0.868. Kappa = 2.511 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0001792. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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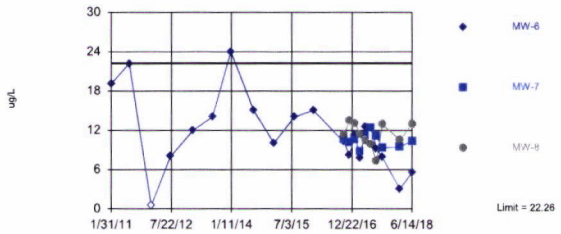
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (based on square root transformation): Mean=2.987, Std. Dev.=0.7497, n=34, 2.941% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9366, critical = 0.908. Kappa = 2.309 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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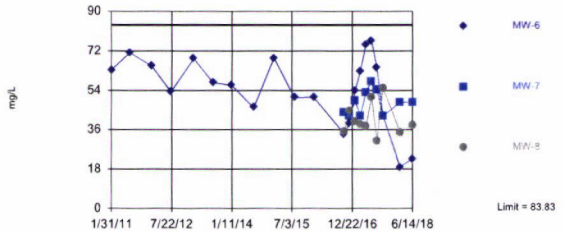
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=51.91, Std. Dev.=13.82, n=34. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9606, critical = 0.908. Kappa = 2.309 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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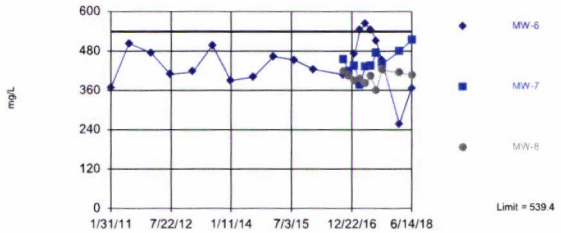
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=417.6, Std. Dev.=52.73, n=34. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9524, critical = 0.908. Kappa = 2.309 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 3 points to limit. Assumes 4 future values. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 10/23/2018 4:52 PM View: INTERWELL - required dg w

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

A.4 INTRAWELL PREDICTION LIMITS – JUNE 2018

Intrawell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/23/2018, 5:03 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Barium [total] (ug/L)	MW-1	168.4	n/a	6/14/2018	135	No	33	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-2	125.2	n/a	6/14/2018	102	No	33	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-3	202.6	n/a	6/14/2018	178	No	33	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-5	165.7	n/a	6/14/2018	127	No	32	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-1	127.1	n/a	6/14/2018	110	No	33	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-2	172.1	n/a	6/14/2018	99.4	No	33	0	ln(x)	0.000...	Param 1 of 2
Calcium (mg/L)	MW-3	137.6	n/a	6/14/2018	96.8	No	33	0	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-5	119.9	n/a	6/14/2018	101.4	No	32	0	No	0.000...	Param 1 of 2 Deseas
pH (Std. Units)	MW-1	7.717	6.266	6/14/2018	7	No	18	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-2	7.914	4.812	6/14/2018	7.794	No	18	5.556	x^4	0.000...	Param 1 of 2 Deseas
pH (Std. Units)	MW-3	7.5	6.83	6/14/2018	7	No	17	0	n/a	0.01183	NP (normality) 1 of 2
pH (Std. Units)	MW-5	7.756	6.512	6/14/2018	7.4	No	17	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-1	32.97	n/a	6/14/2018	10.8	No	33	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-2	44.08	n/a	6/14/2018	13.1	No	33	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-1	630	n/a	6/14/2018	528	No	33	0	n/a	0.001701	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-2	826	n/a	6/14/2018	456	No	33	0	n/a	0.001701	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-3	620.4	n/a	6/14/2018	462	No	33	0	No	0.000...	Param 1 of 2 Deseas
Total Dissolved Solids (mg/L)	MW-5	568	n/a	6/14/2018	445	No	32	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-3	17.89	n/a	6/14/2018	9.8	No	33	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-5	25.12	n/a	6/14/2018	8.4	No	32	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-1	121	n/a	6/14/2018	50.4	No	33	0	n/a	0.001701	NP (normality) 1 of 2
Sulfate (mg/L)	MW-2	277.1	n/a	6/14/2018	22.2	No	33	0	sqrt(x)	0.000...	Param 1 of 2 Deseas
Sulfate (mg/L)	MW-3	149.3	n/a	6/14/2018	53.5	No	33	0	sqrt(x)	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-5	68.99	n/a	6/14/2018	38.4	No	32	0	No	0.000...	Param 1 of 2

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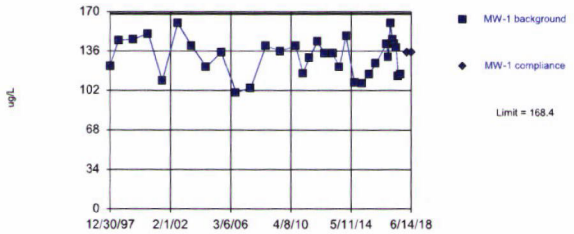
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=131.2, Std. Dev.=15.98, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9621, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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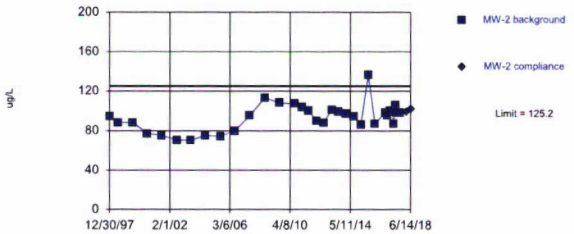
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=93.3, Std. Dev.=13.7, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9454, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=139.3, Std. Dev.=27.23, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9282, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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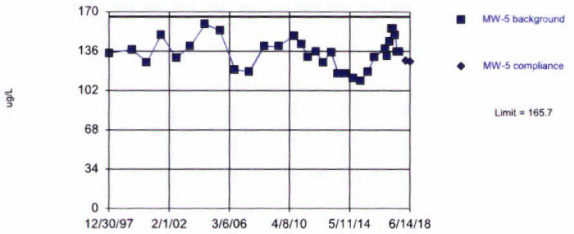
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=135, Std. Dev.=13.18, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9643, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=102.6, Std. Dev.=10.51, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9721, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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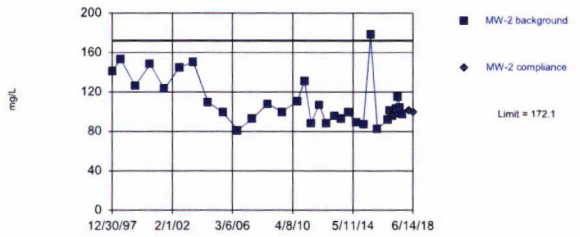
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=4.679, Std. Dev.=0.2016, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9175, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=100.6, Std. Dev.=15.94, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9657, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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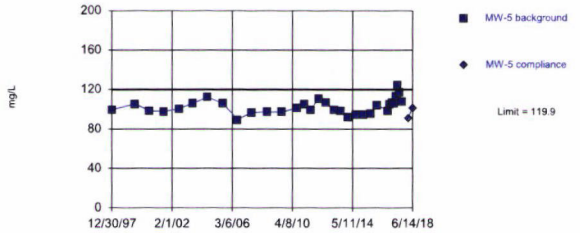
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=102.4, Std. Dev.=7.478, n=32. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9496, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limits

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=6.992, Std. Dev.=0.2801, n=18. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8894, critical = 0.858. Kappa = 2.59 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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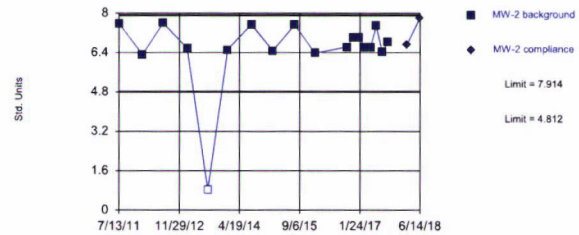
Hollow symbols indicate censored values.

Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^4 transformation): Mean=2229, Std. Dev.=653.7, n=18, 5.556% NDs. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8765, critical = 0.858. Kappa = 2.59 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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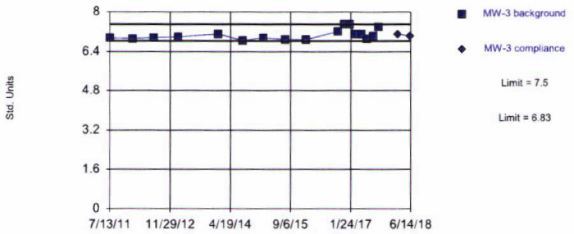
Within Limits

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. Limits are highest and lowest of 17 background values. Well-constituent pair annual alpha = 0.02359. Individual comparison alpha = 0.01183 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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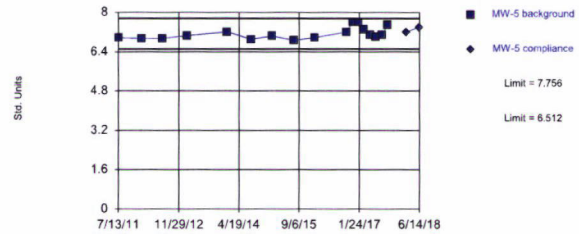
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.134, Std. Dev.=0.2371, n=17. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8612, critical = 0.851. Kappa = 2.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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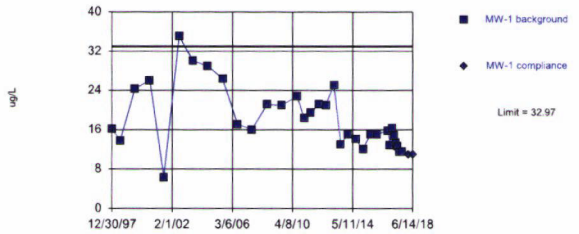
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=18.23, Std. Dev.=6.34, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9452, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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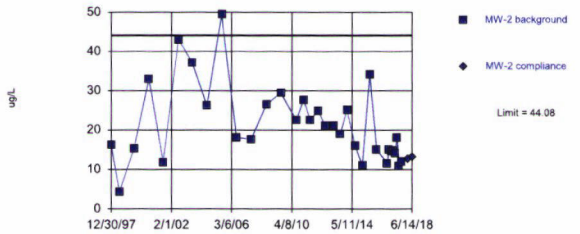
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=21.13, Std. Dev.=9.867, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9246, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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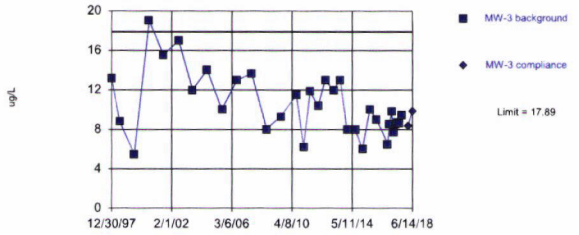
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=10.47, Std. Dev.=3.191, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9503, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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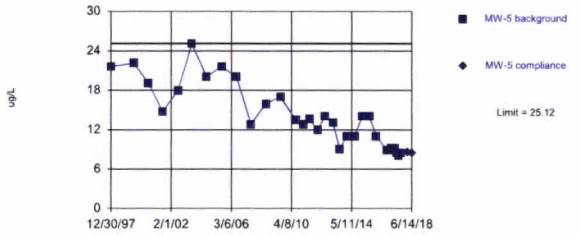
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=13.95, Std. Dev.=4.789, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9116, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within 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 33 background values. Well-constituent pair annual alpha = 0.003399. Individual comparison alpha = 0.001701 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Seasonality was not detected with 95% confidence.

Constituent: Sulfate Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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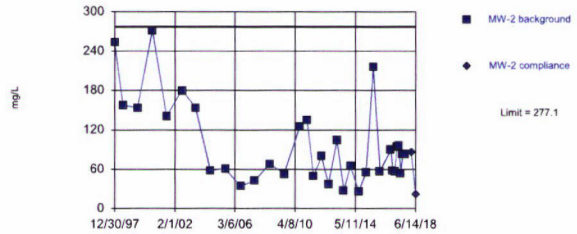
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=9.415, Std. Dev.=3.111, n=33. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9311, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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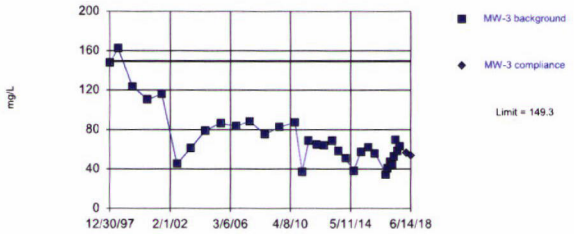
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on square root transformation): Mean=8.324, Std. Dev.=1.675, n=33. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9341, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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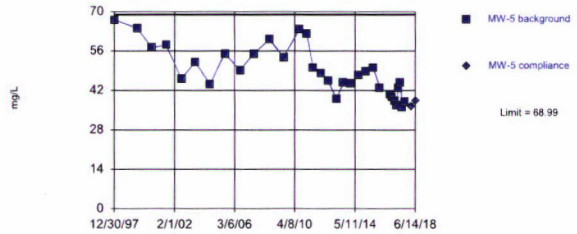
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=48.85, Std. Dev.=8.628, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9509, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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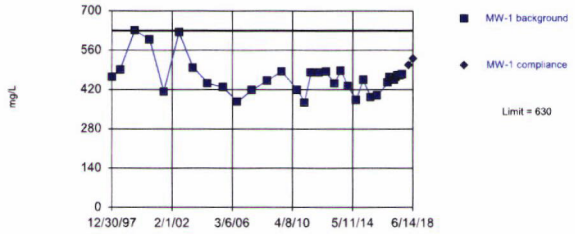
Within Limit

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 33 background values. Well-constituent pair annual alpha = 0.003399. Individual comparison alpha = 0.001701 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Seasonality was not detected with 95% confidence.

Constituent: Total Dissolved Solids Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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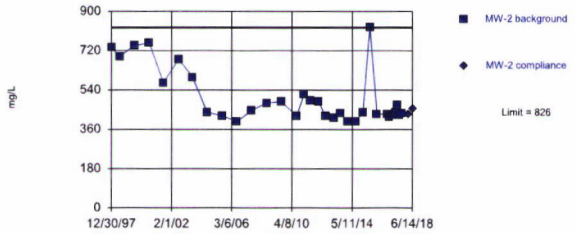
Within Limit

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 33 background values. Well-constituent pair annual alpha = 0.003399. Individual comparison alpha = 0.001701 (1 of 2). Tukey's outlier screening was performed on the background data. No background outliers were found. Seasonality was not detected with 95% confidence.

Constituent: Total Dissolved Solids Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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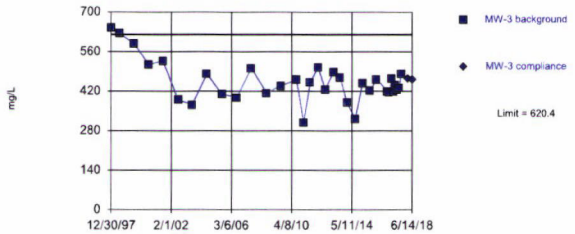
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=452, Std. Dev.=72.42, n=33. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9424, critical = 0.906. Kappa = 2.325 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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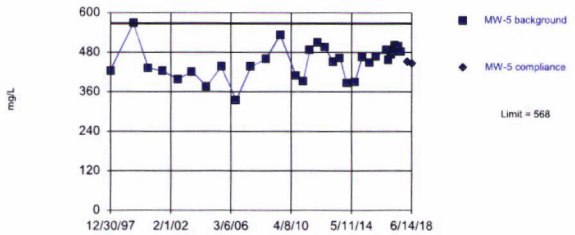
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=452, Std. Dev.=49.71, n=32. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.99, critical = 0.904. Kappa = 2.333 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 10/23/2018 4:59 PM View: INTRAWELL - allowed wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Intrawell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/23/2018, 5:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic [total] (ug/L)	MW-4R	5.479	n/a	6/14/2018	4.1	No	8	0	No	0.000...	Param 1 of 2
Barium [total] (ug/L)	MW-4R	144.4	n/a	6/14/2018	134	No	8	0	No	0.000...	Param 1 of 2
Boron (ug/L)	MW-4R	563.2	n/a	6/14/2018	152	No	8	37.5	No	0.000...	Param 1 of 2
Calcium (mg/L)	MW-4R	101.6	n/a	6/14/2018	87	No	8	0	No	0.000...	Param 1 of 2
Chloride (mg/L)	MW-4R	102.8	n/a	6/14/2018	25.2	No	8	0	x^(1/3)	0.000...	Param 1 of 2
Fluoride (mg/L)	MW-4R	1.117	n/a	6/14/2018	0.8	No	8	0	No	0.000...	Param 1 of 2
Lithium (ug/L)	MW-4R	35.3	n/a	6/14/2018	27	No	8	0	No	0.000...	Param 1 of 2
Molybdenum (ug/L)	MW-4R	11.09	n/a	6/14/2018	5.5	No	8	0	No	0.000...	Param 1 of 2
pH (Std. Units)	MW-4R	8.561	5.964	6/14/2018	7.1	No	8	0	No	0.000...	Param 1 of 2
Selenium [total] (ug/L)	MW-4R	12.22	n/a	6/14/2018	8	No	8	0	No	0.000...	Param 1 of 2
Sulfate (mg/L)	MW-4R	65.19	n/a	6/14/2018	38.8	No	8	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	MW-4R	507.6	n/a	6/14/2018	438	No	8	0	No	0.000...	Param 1 of 2

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Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=3.913, Std. Dev.=0.4324, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9648, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Arsenic [total] Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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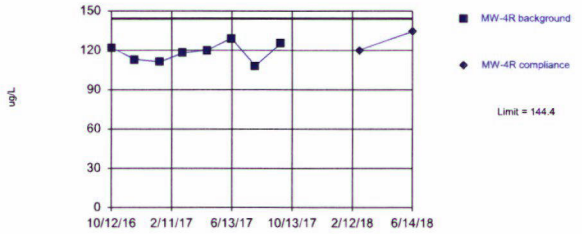
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=118.3, Std. Dev.=7.206, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9744, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Barium [total] Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary (after Kaplan-Meier Adjustment): Mean=207.9, Std. Dev.=98.07, n=8, 37.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8511, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Boron Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=83.1, Std. Dev.=5.116, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9865, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Calcium Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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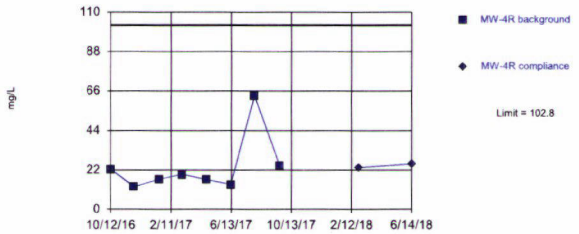
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on cube root transformation): Mean=2.775, Std. Dev.=0.5267, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7714, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Chloride Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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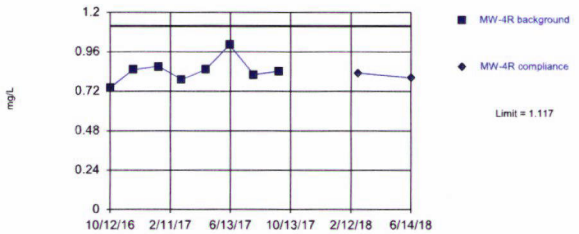
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.845, Std. Dev.=0.07502, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9014, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Fluoride Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Within Limit

Prediction Limit

Intrawell Parametric

Background Data Summary: Mean=25.41, Std. Dev.=2.73, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9459, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Lithium Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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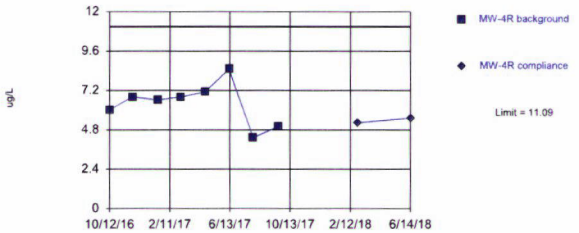
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.388, Std. Dev.=1.298, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9559, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Molybdenum Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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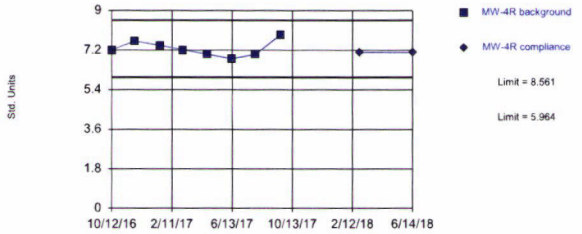
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.263, Std. Dev.=0.3583, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9526, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: pH Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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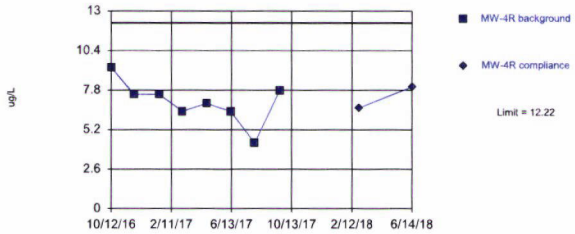
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.013, Std. Dev.=1.437, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9446, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Selenium [total] Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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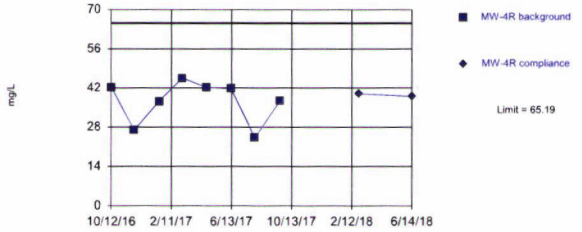
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=37.09, Std. Dev.=7.755, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8586, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Sulfate Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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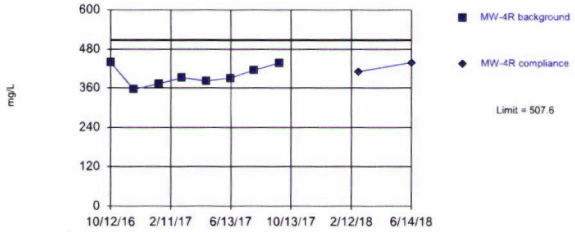
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=397.4, Std. Dev.=30.43, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9355, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Dissolved Solids Analysis Run 10/23/2018 5:04 PM View: INTRAWELL - bkg wells

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

A.5 SEN'S SLOPE/MANN-KENDALL TREND ANALYSIS – JUNE 2018

Trend Test

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/23/2018, 1:31 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Arsenic [total] (ug/L)	MW-1	0.3802	21	27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-2	-0.509	-23	-27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-3	-0.1022	-11	-27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-4R (bg)	-0.1233	-7	-27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-5	-0.1843	-13	-27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-6	0.722	26	27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-7	0.05984	8	27	No	10	0	n/a	n/a	0.02	NP
Arsenic [total] (ug/L)	MW-8	-0.2139	-21	-27	No	10	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-1	-0.1477	-31	-166	No	35	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	**MW-2**	**0.919**	**167**	**166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Barium [total] (ug/L)	**MW-3**	**3.693**	**388**	**166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Barium [total] (ug/L)	MW-4R (bg)	10.51	14	27	No	10	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-5	-0.1662	-33	-158	No	34	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-6	3.179	30	73	No	20	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-7	8.632	16	27	No	10	0	n/a	n/a	0.02	NP
Barium [total] (ug/L)	MW-8	-12.41	-17	-27	No	10	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-1	15.91	25	27	No	10	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-2	5.619	10	23	No	9	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-3	1.064	9	27	No	10	40	n/a	n/a	0.02	NP
Boron (ug/L)	MW-4R (bg)	-30.42	-8	-27	No	10	30	n/a	n/a	0.02	NP
Boron (ug/L)	MW-5	6.324	11	27	No	10	0	n/a	n/a	0.02	NP
Boron (ug/L)	MW-7	8.975	9	27	No	10	0	n/a	n/a	0.02	NP
Boron (ug/L)	**MW-8**	**34.41**	**27**	**23**	**Yes**	**9**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-1	0	0	166	No	35	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-2	-1.453	-152	-166	No	35	0	n/a	n/a	0.02	NP
Calcium (mg/L)	**MW-3**	**-1.547**	**-251**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-4R (bg)	1.75	4	27	No	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	**MW-5**	**0.6586**	**171**	**158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-6	-2.302	-55	-78	No	21	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7	8.508	27	27	No	10	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-8	-1.49	-5	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-1	0.298	3	27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2	-2.028	-23	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3	1.616	9	27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4R (bg)	6.06	17	27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	-0.2407	-1	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	-1.492	-3	-27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7	2.235	3	27	No	10	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-8	2.98	9	27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-1	0	-7	-27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2	-0.07474	-20	-27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3	-0.04011	-18	-27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4R (bg)	-0.01233	-2	-27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	0	0	27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	0.07526	24	27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7	0.03614	4	27	No	10	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-8	-0.00...	-5	-27	No	10	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-1	-0.8634	-3	-27	No	10	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-2	-0.09035	-1	-23	No	9	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-3	0.6134	5	27	No	10	0	n/a	n/a	0.02	NP

Trend Test

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/23/2018, 1:31 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Lithium (ug/L)	MW-4R (bg)	0.5959	7	27	No	10	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-5	-0.149	-2	-27	No	10	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-6	-4.24	-13	-27	No	10	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-7	3.129	15	27	No	10	0	n/a	n/a	0.02	NP
Lithium (ug/L)	MW-8	1.101	19	23	No	9	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-1	0.2296	12	27	No	10	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	**MW-2**	**-1.355**	**-28**	**-27**	**Yes**	**10**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Molybdenum (ug/L)	**MW-3**	**2.096**	**32**	**27**	**Yes**	**10**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Molybdenum (ug/L)	MW-4R (bg)	-0.7842	-6	-27	No	10	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-5	-0 8377	-12	-27	No	10	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-6	-2.495	-26	-27	No	10	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-7	0	0	27	No	10	0	n/a	n/a	0.02	NP
Molybdenum (ug/L)	MW-8	-0 7338	-15	-23	No	9	0	n/a	n/a	0.02	NP
pH (Std. Units)	**MW-1**	**0.05638**	**76**	**73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (Std. Units)	MW-2	0.05335	71	73	No	20	5	n/a	n/a	0.02	NP
pH (Std. Units)	MW-3	0.02544	48	68	No	19	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-4R (bg)	-0.1022	-10	-27	No	10	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-5	0.05514	67	68	No	19	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-6	0.03387	37	63	No	18	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-7	0	-3	-27	No	10	0	n/a	n/a	0.02	NP
pH (Std. Units)	MW-8	-0.2734	-13	-27	No	10	0	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	**MW-1**	**-0.85**	**-302**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	**MW-2**	**-1.062**	**-216**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	**MW-3**	**-0.2865**	**-197**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	MW-4R (bg)	-0.7779	-7	-27	No	10	0	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	**MW-5**	**-0.6916**	**-410**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Selenium [total] (ug/L)	MW-6	-1.506	-78	-78	No	21	4.762	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	MW-7	-0.1795	-3	-27	No	10	0	n/a	n/a	0.02	NP
Selenium [total] (ug/L)	MW-8	-0.6544	-11	-27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-1**	**-1.664**	**-291**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-2**	**-5.445**	**-409**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-3**	**-3.185**	**-301**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	MW-4R (bg)	-2.094	-7	-27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-5**	**-1.257**	**-355**	**-158**	**Yes**	**34**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	MW-6	-3.1	-54	-78	No	21	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7	3.49	5	27	No	10	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-8	-0 3925	-3	-27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-1	0.4698	19	166	No	35	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	**MW-2**	**-8.167**	**-187**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids (mg/L)	**MW-3**	**-5.806**	**-170**	**-166**	**Yes**	**35**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids (mg/L)	MW-4R (bg)	43.32	19	27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5	3.164	146	158	No	34	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6	4.859	14	78	No	21	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7	38.85	23	27	No	10	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-8	1.945	1	27	No	10	0	n/a	n/a	0.02	NP

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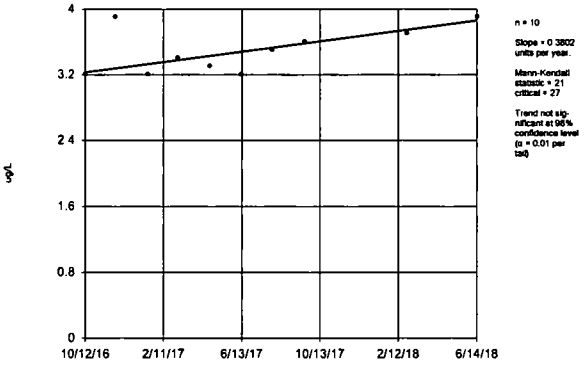
Sen's Slope Estimator

MW-1



Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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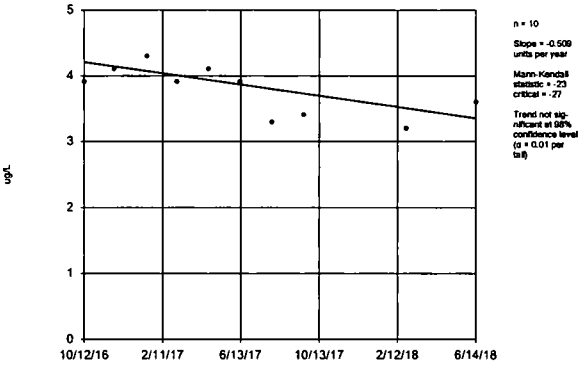
Sen's Slope Estimator

MW-2



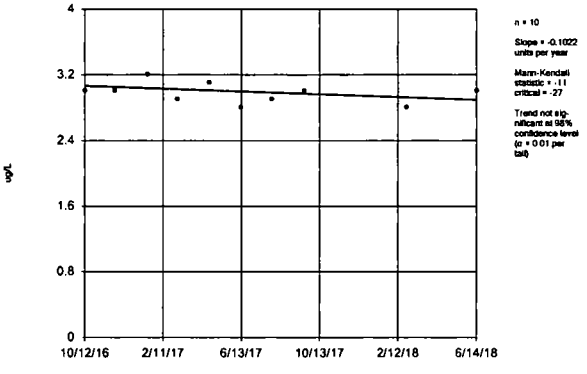
Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-3



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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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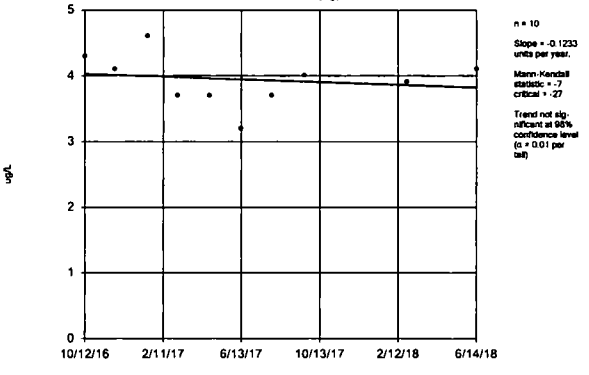
Sen's Slope Estimator

MW-4R (bg)



Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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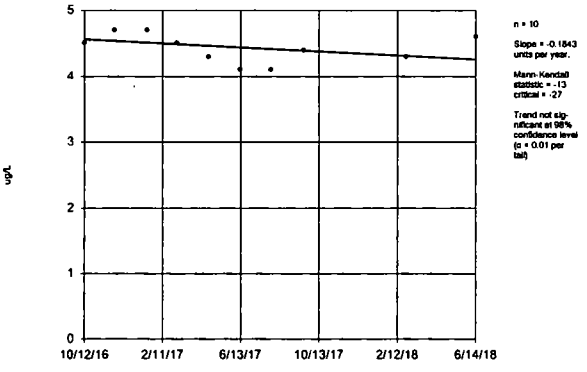
Sen's Slope Estimator

MW-5



Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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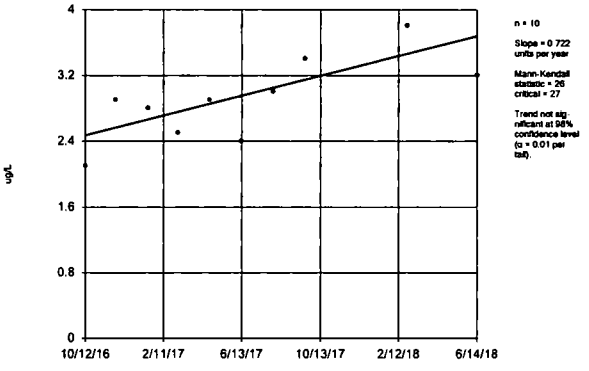
Sen's Slope Estimator

MW-6



Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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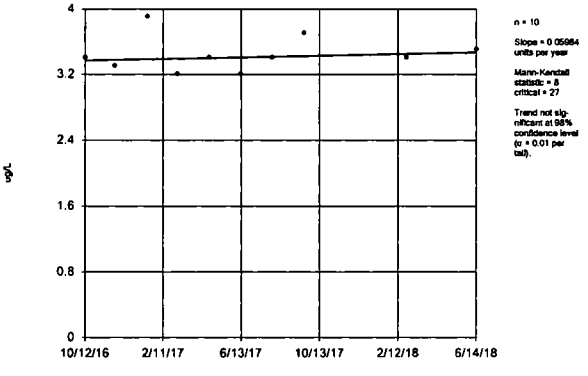
Sen's Slope Estimator

MW-7



Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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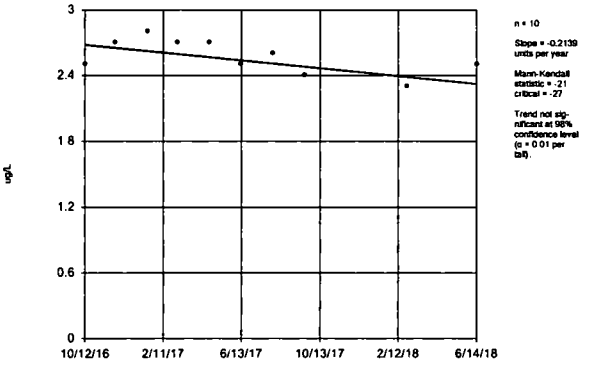
Sen's Slope Estimator

MW-8



Constituent: Arsenic [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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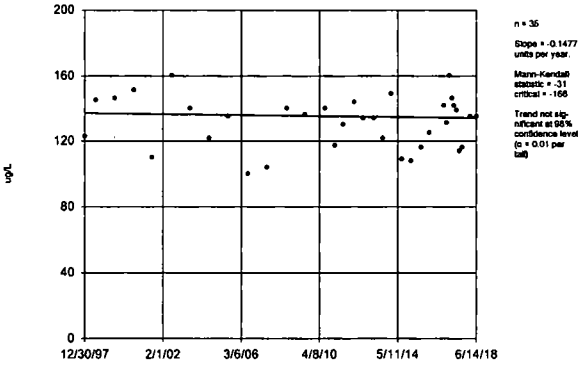
Sen's Slope Estimator

MW-1



Constituent: Barium [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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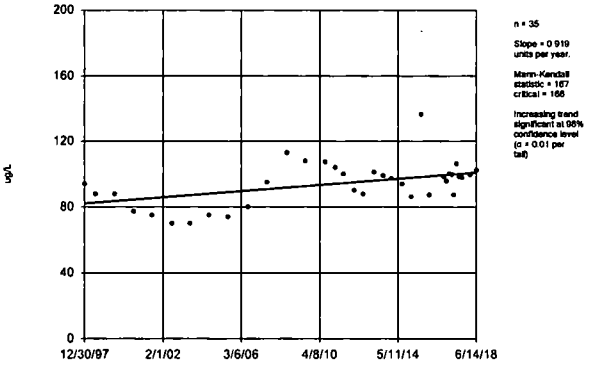
Sen's Slope Estimator

MW-2



Constituent: Barium [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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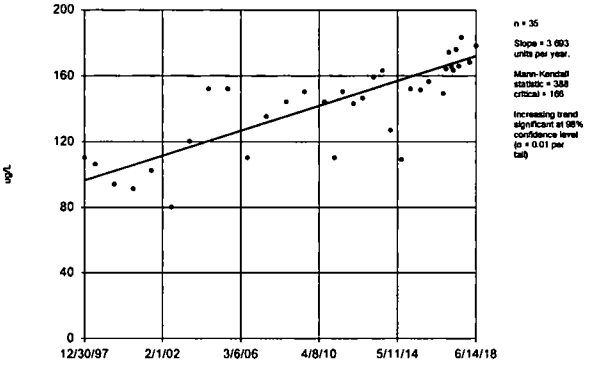
Sen's Slope Estimator

MW-3



Constituent: Barium [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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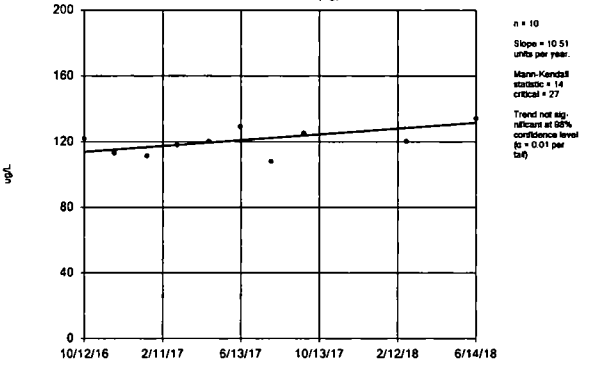
Sen's Slope Estimator

MW-4R (bg)



Constituent: Barium [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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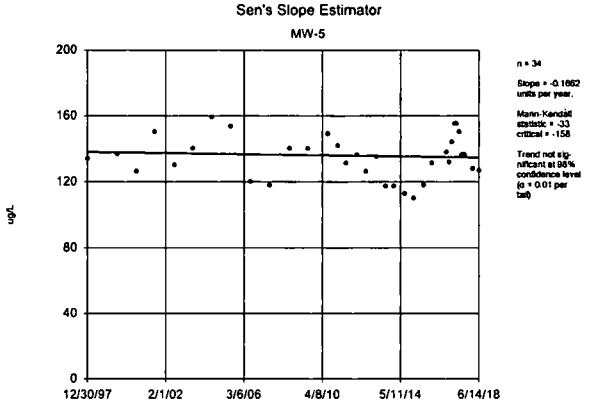

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Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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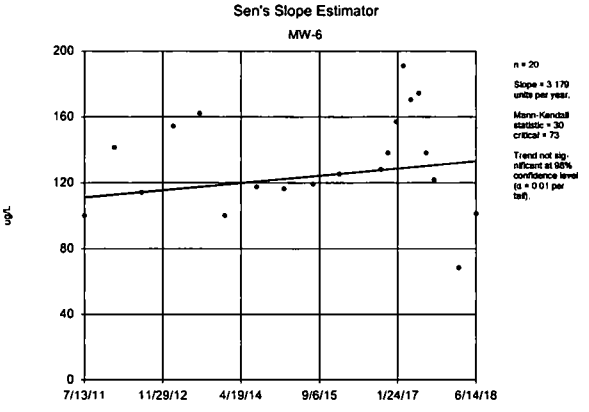

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Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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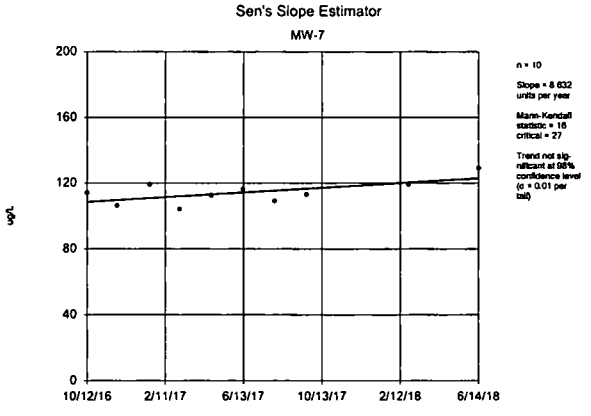

Constituent: Barium [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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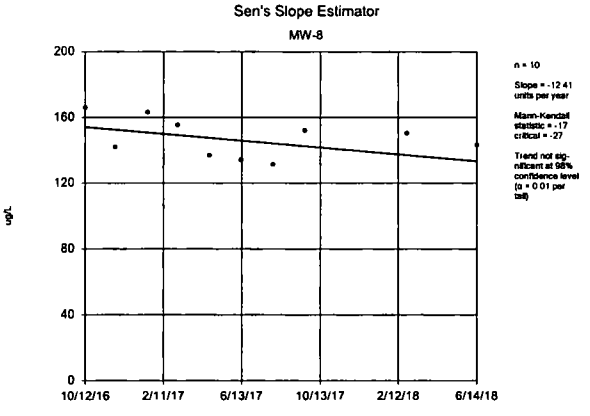

Constituent: Barium [total] Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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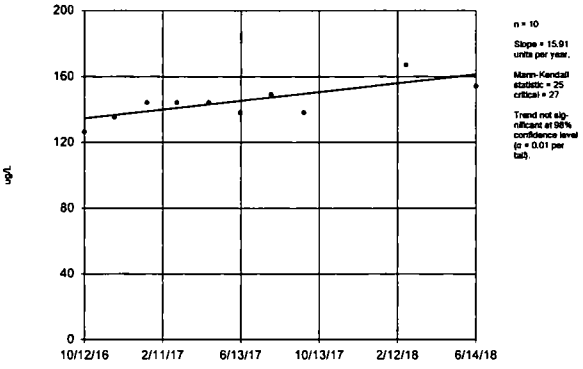
Sen's Slope Estimator

MW-1



Constituent: Boron Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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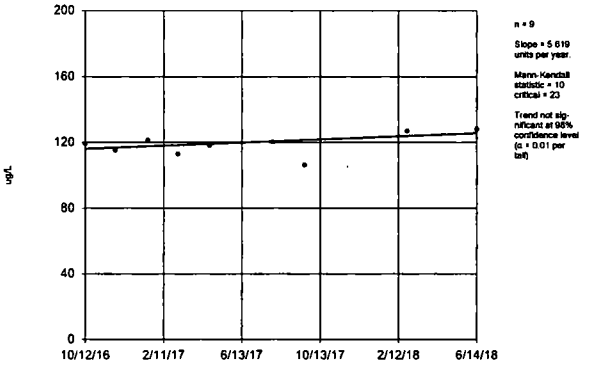
Sen's Slope Estimator

MW-2



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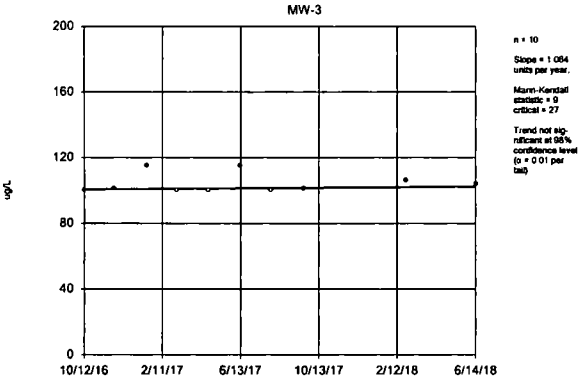
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG
Hollow symbols indicate censored values

Sen's Slope Estimator

MW-3



Constituent: Boron Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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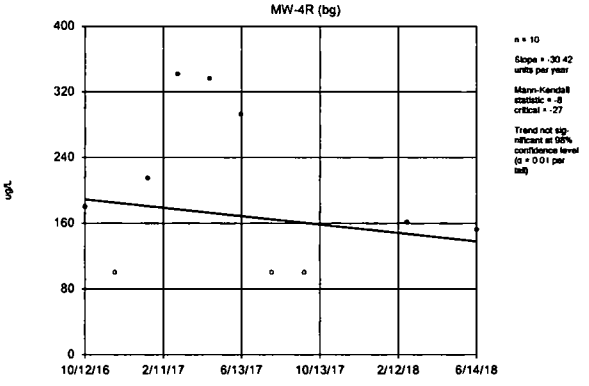
Hollow symbols indicate censored values

Sen's Slope Estimator

MW-4R (bg)



Constituent: Boron Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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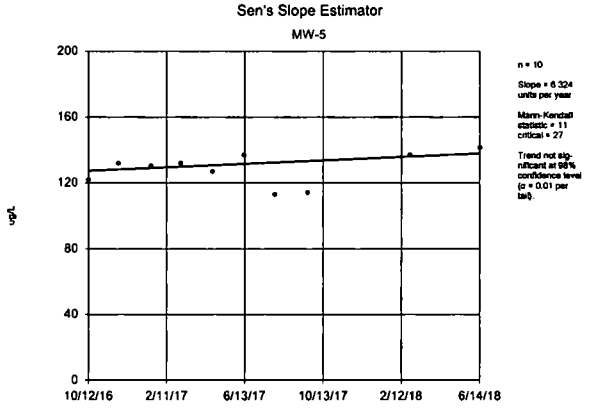

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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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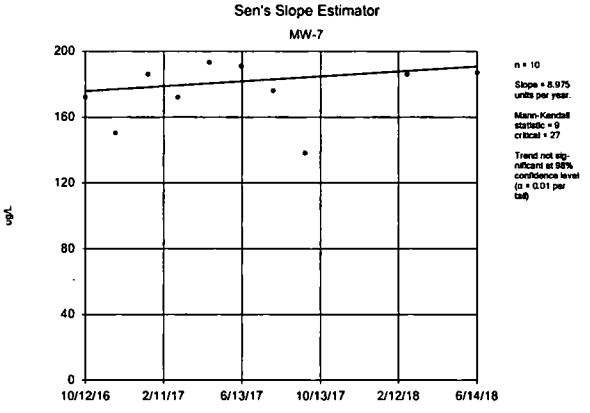

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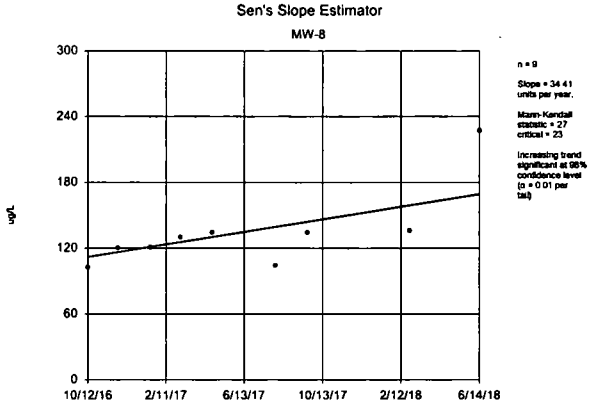
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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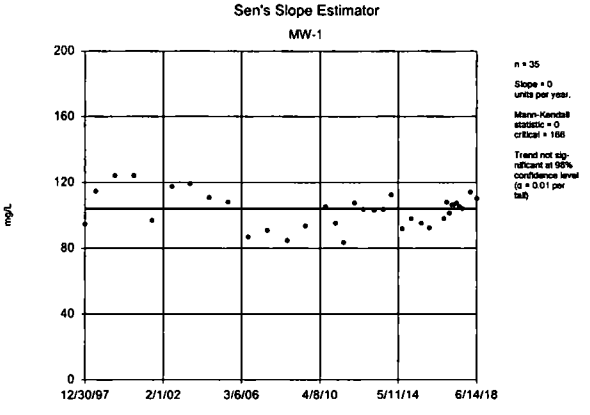
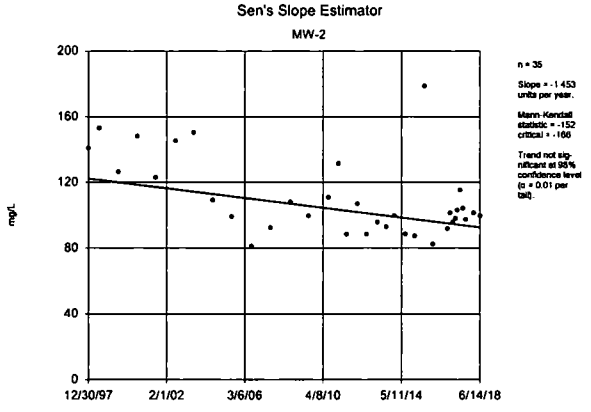
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Calcium Analysis Run 10/23/2018 1:29 PM View: TREND TEST
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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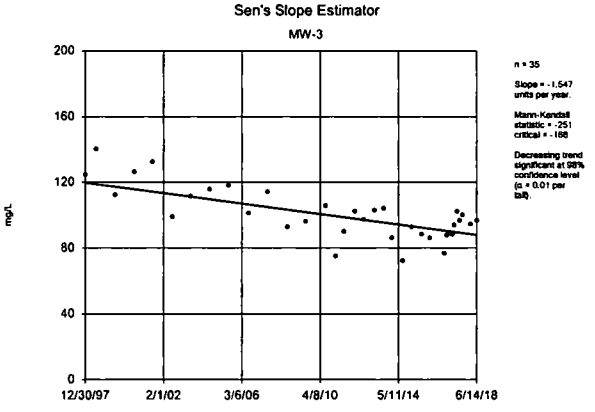
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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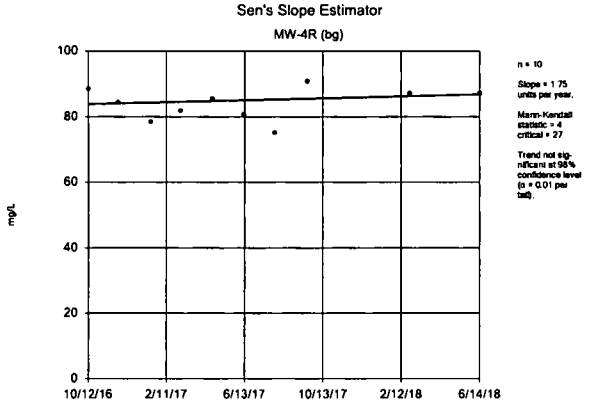
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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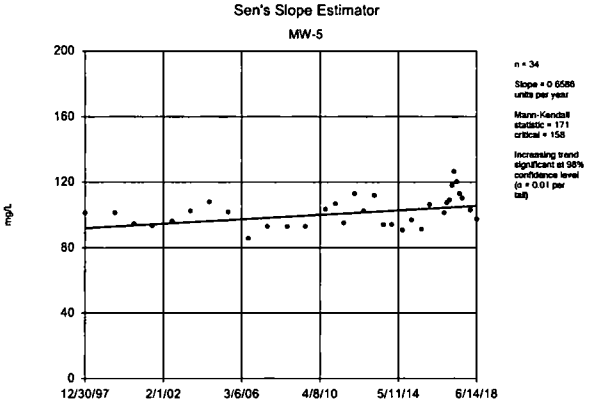
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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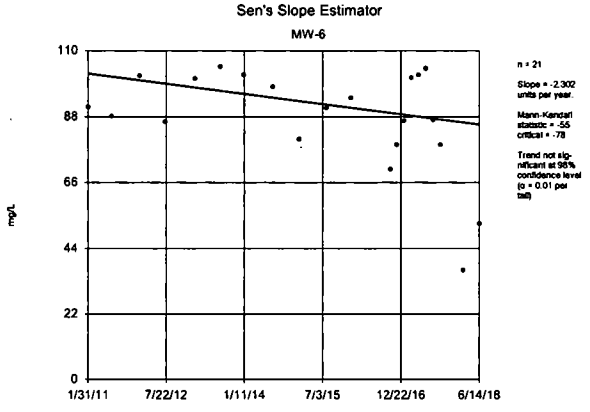
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



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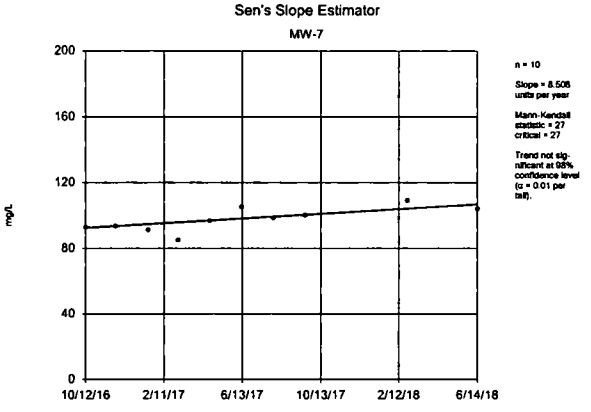
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

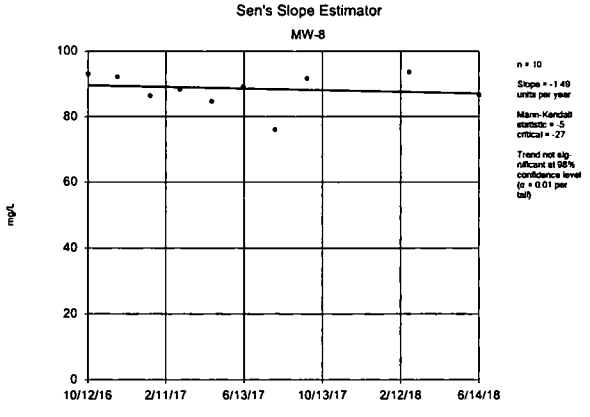
Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



Constituent: Calcium Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

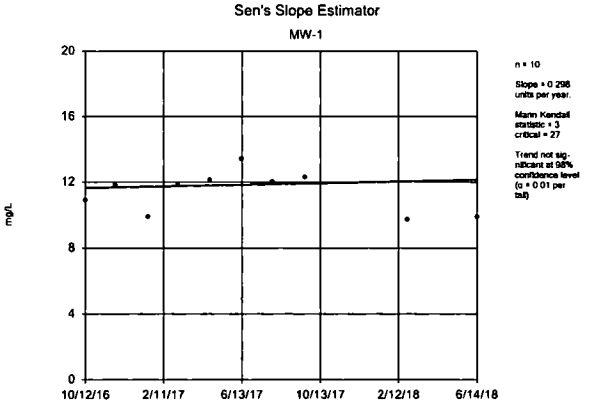
Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



Constituent: Calcium Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



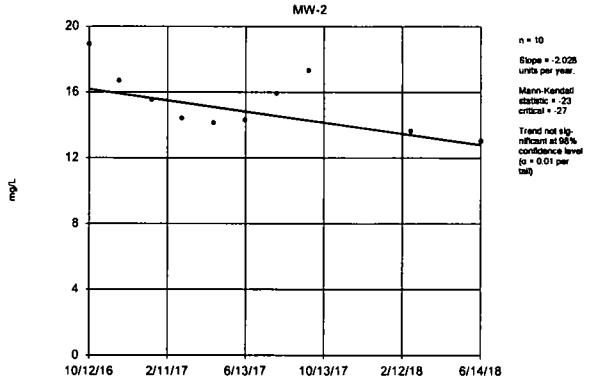
Constituent: Chloride Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-2



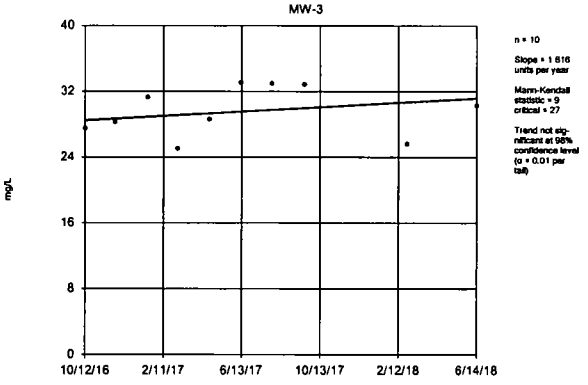
Constituent: Chloride Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-3



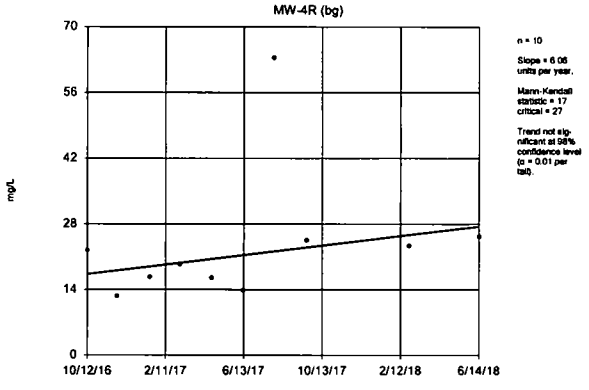
Constituent: Chloride Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-4R (bg)



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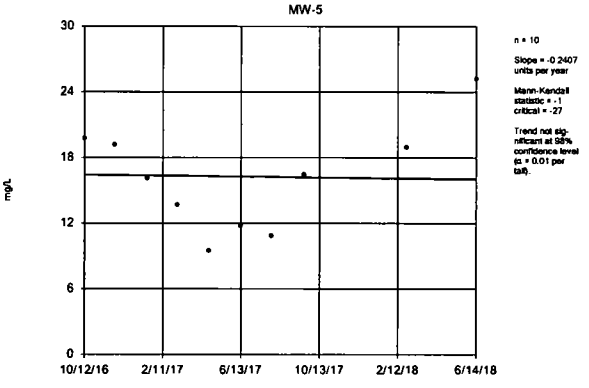
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-5



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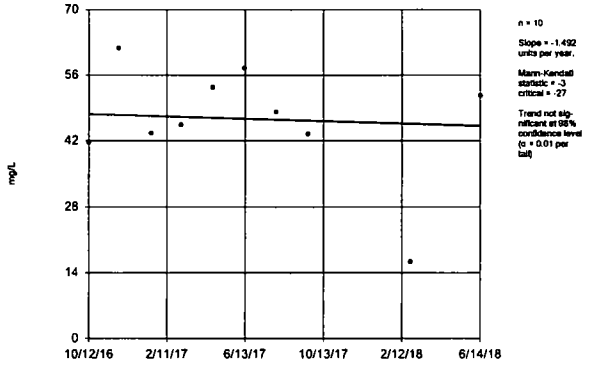
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-6



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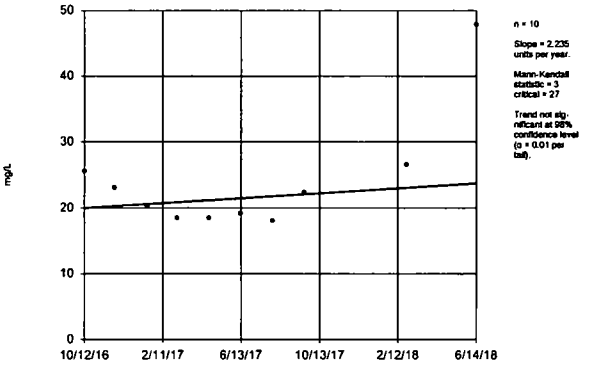
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-7



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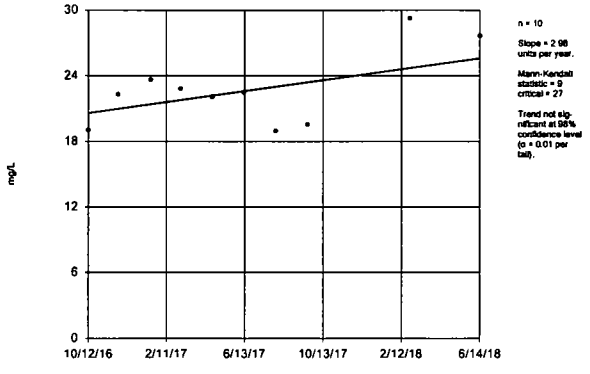
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-8



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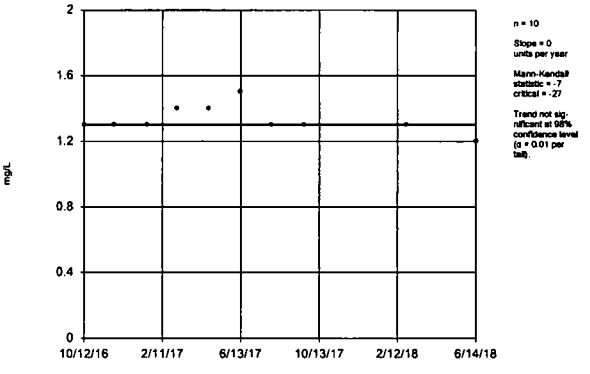
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-1



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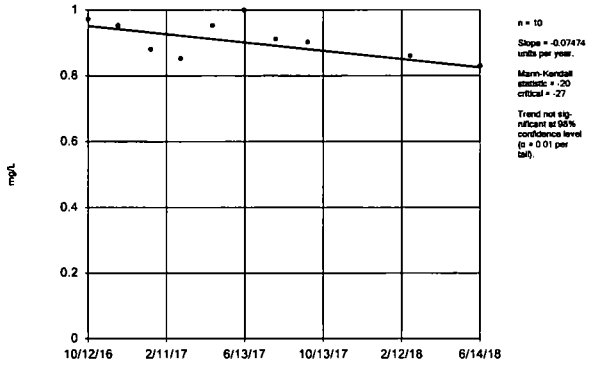
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UO

Sen's Slope Estimator

MW-2



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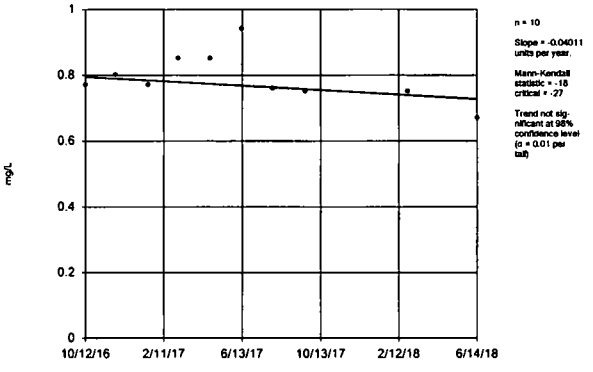
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UO

Sen's Slope Estimator

MW-3



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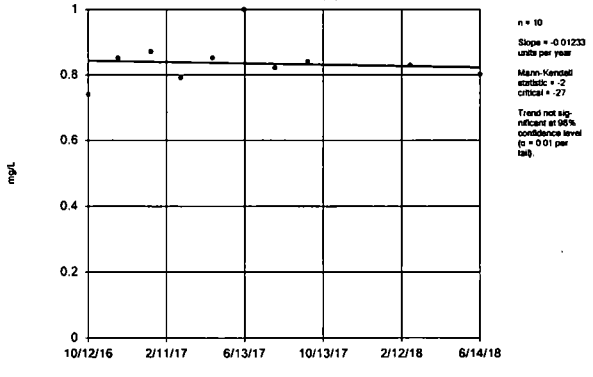
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UO

Sen's Slope Estimator

MW-4R (bg)



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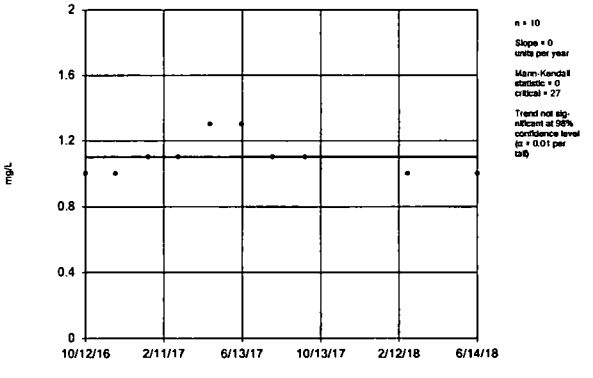
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UO

Sen's Slope Estimator

MW-5



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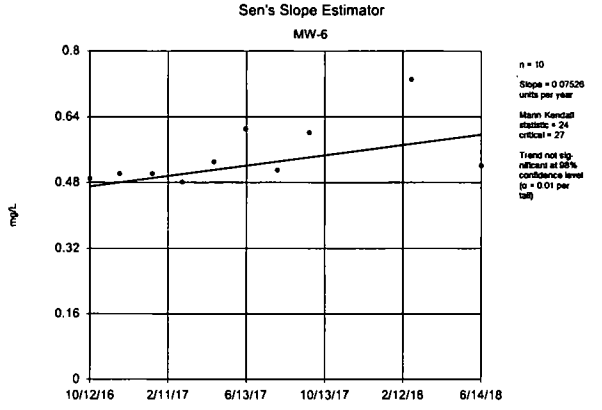
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



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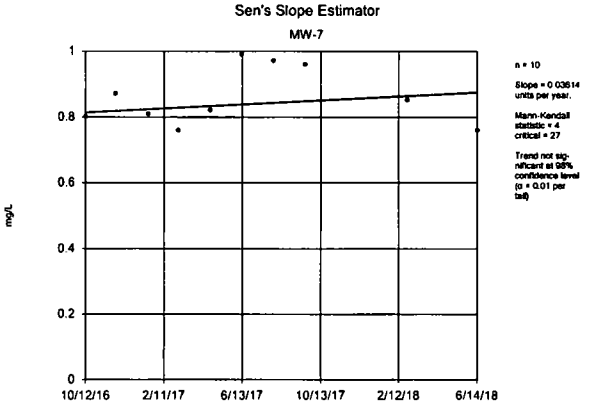
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



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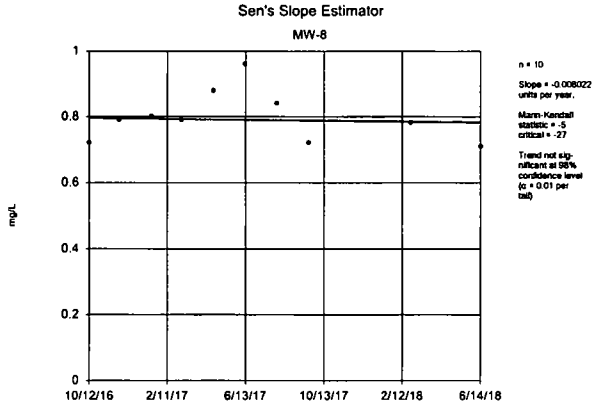
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



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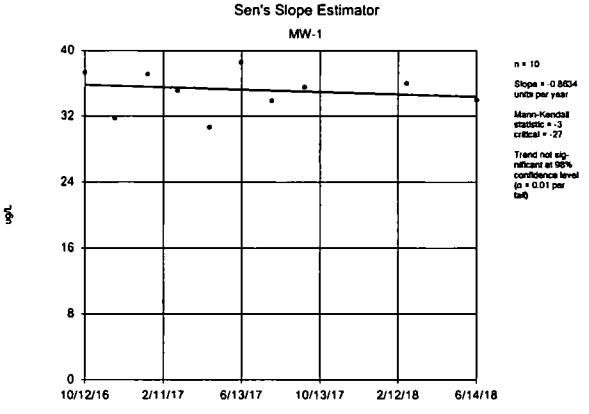
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

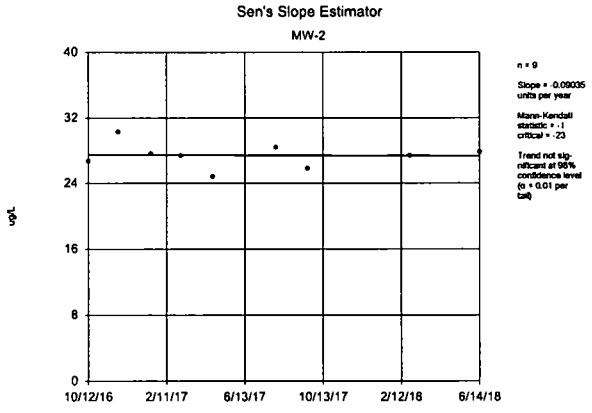
Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers, UG



Constituent: Lithium Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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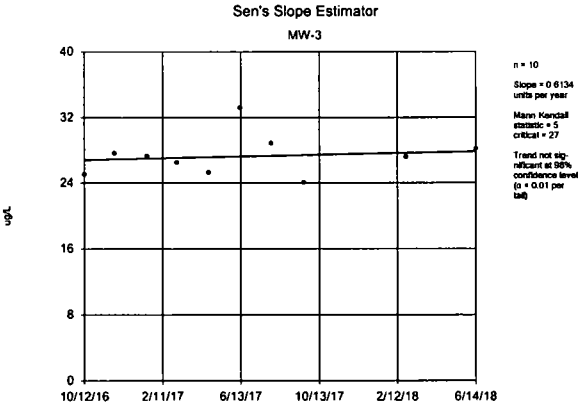
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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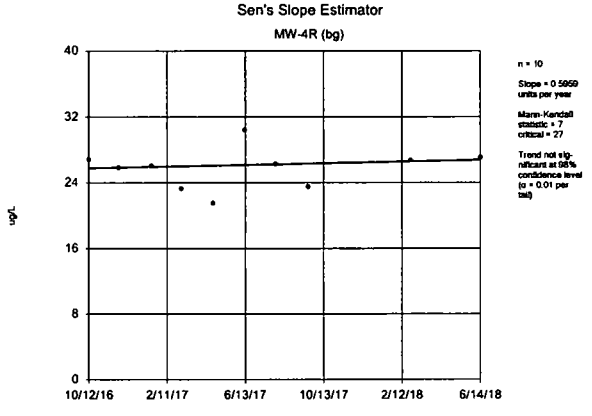
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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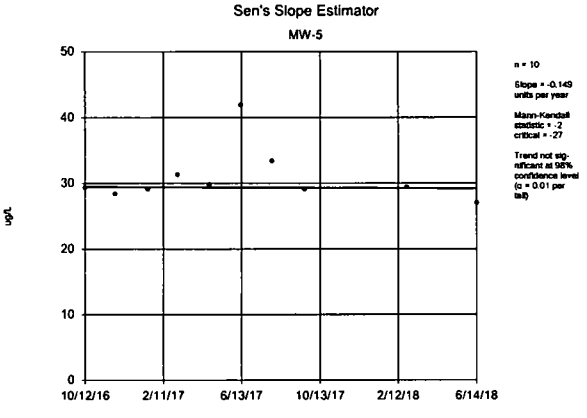
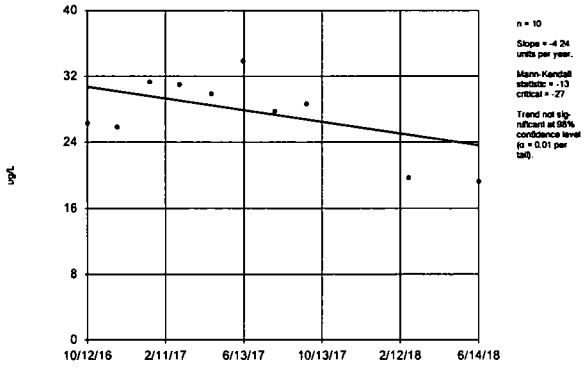


Constituent: Lithium Analysis Run 10/23/2018 1:29 PM View: TREND TEST
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-6



n = 10

Slope = -4 24 units per year.

Mann-Kendall statistic = -13 critical = -27

Trend not significant at 98% confidence level (α = 0.01 per tail).

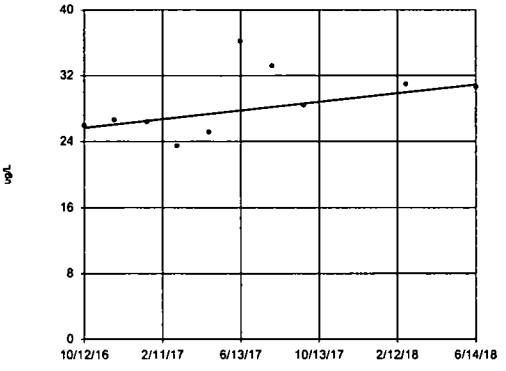
Constituent: Lithium Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-7



n = 10

Slope = 3 129 units per year

Mann-Kendall statistic = 15 critical = 27

Trend not significant at 98% confidence level (α = 0.01 per tail).

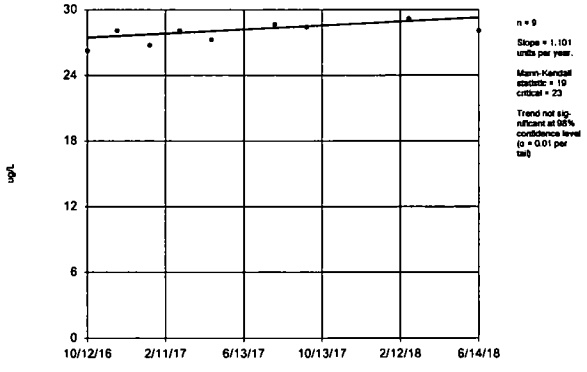
Constituent: Lithium Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-8



n = 9

Slope = 1.101 units per year.

Mann-Kendall statistic = 19 critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail)

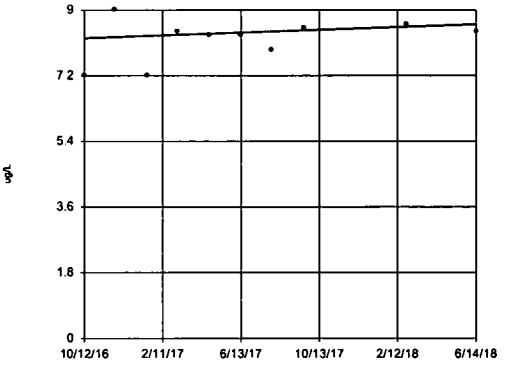
Constituent: Lithium Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-1



n = 10

Slope = 0 2298 units per year

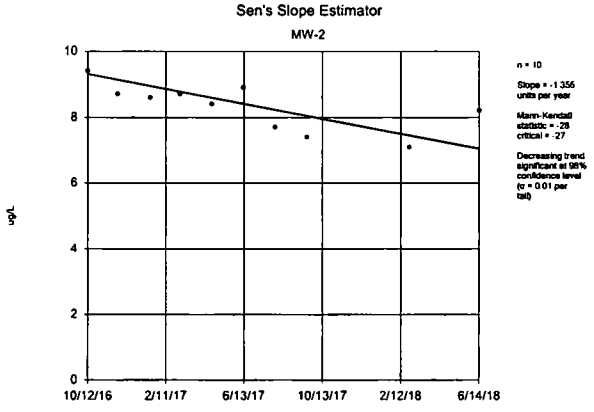
Mann-Kendall statistic = 12 critical = 27

Trend not significant at 98% confidence level (α = 0.01 per tail)

Constituent: Molybdenum Analysis Run 10/23/2018 1:29 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data. Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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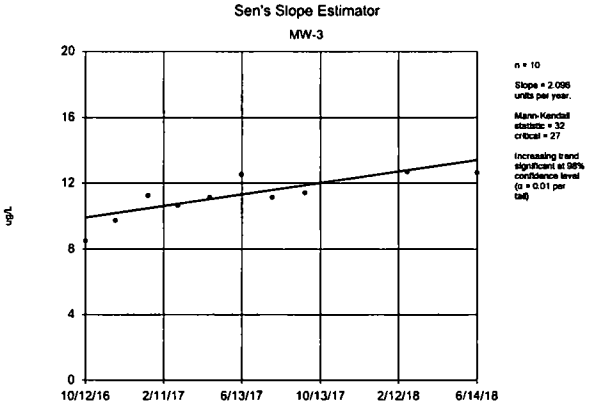
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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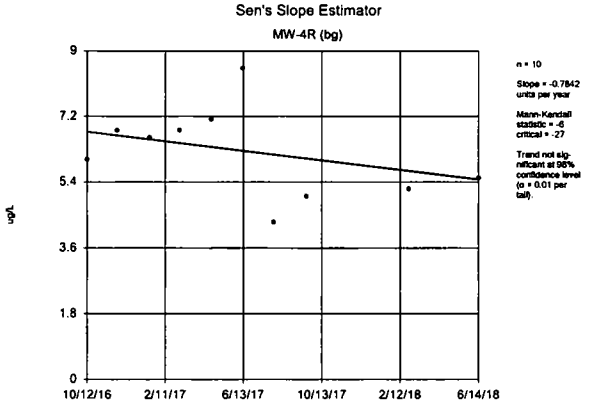
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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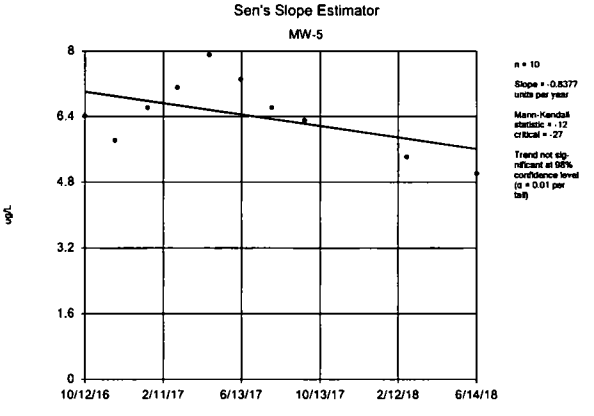
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9.6.10 Sanitas software licensed to SCS Engineers UG



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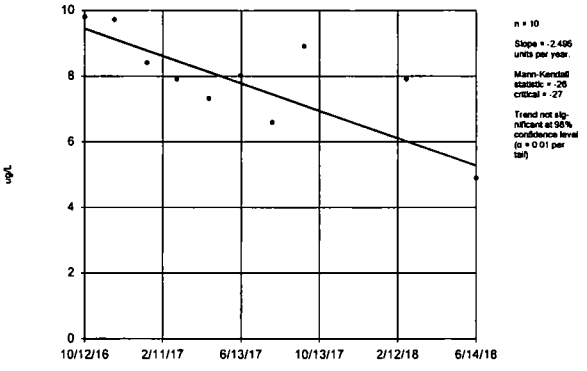
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-6



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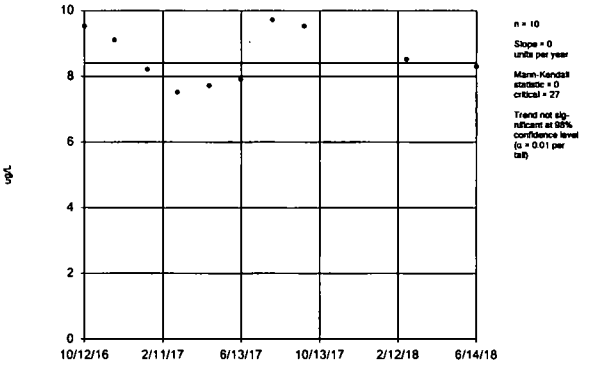
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-7



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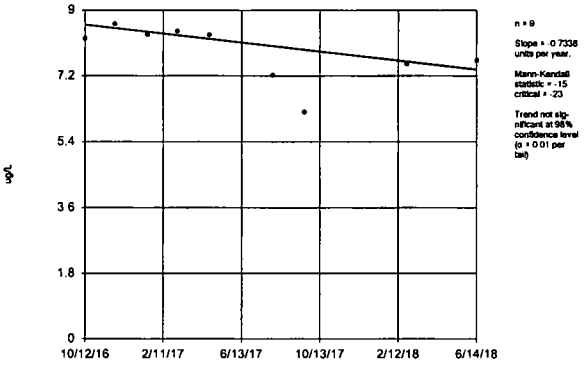
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-8



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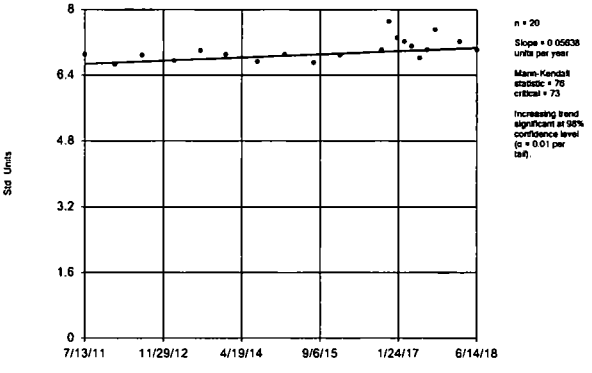
Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-1



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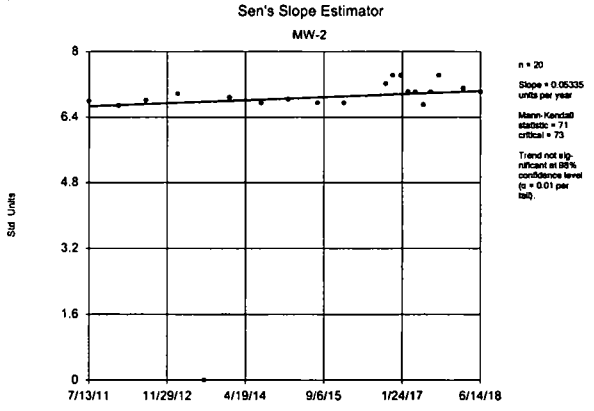
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG
Hollow symbols indicate censored values.



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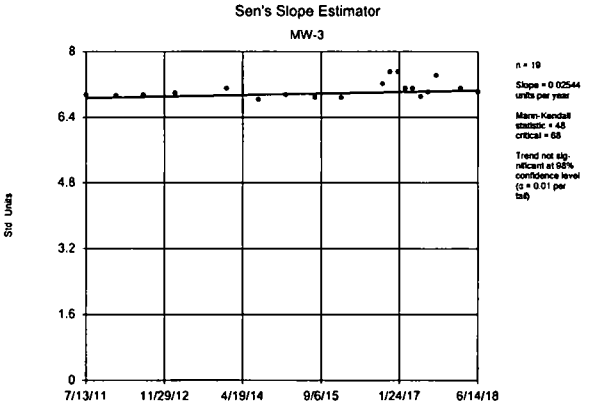
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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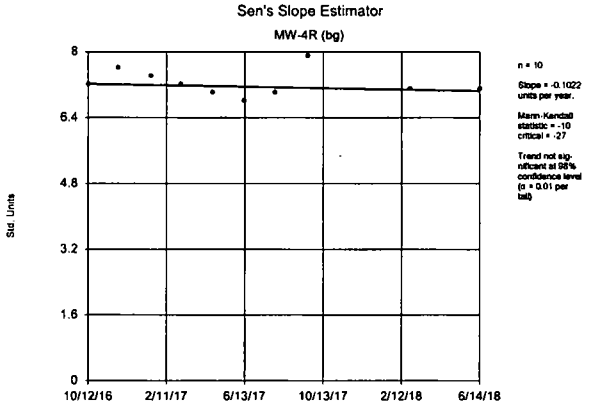
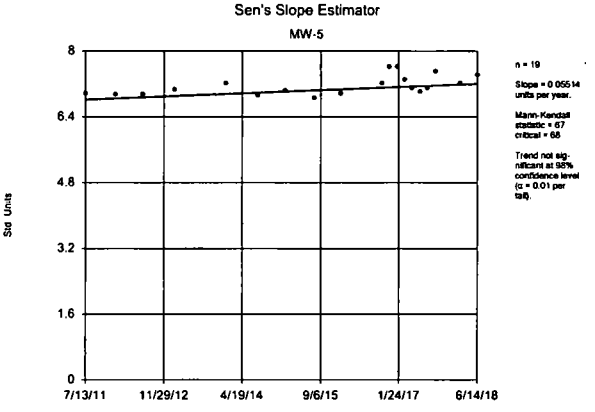
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: pH Analysis Run 10/23/2018 1:30 PM View: TREND TEST
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

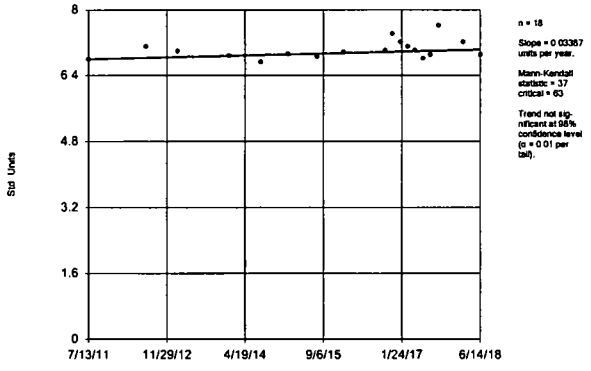


Constituent: pH Analysis Run 10/23/2018 1:30 PM View: TREND TEST
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-6



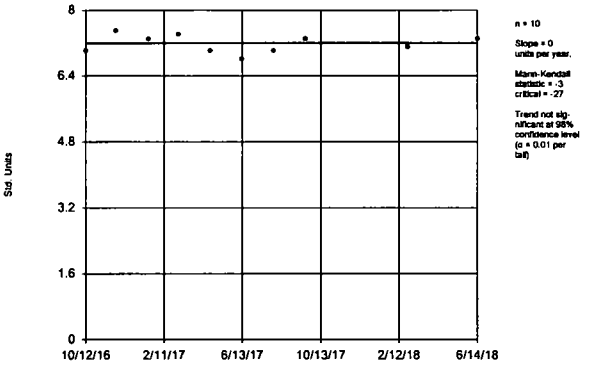
Constituent: pH Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-7



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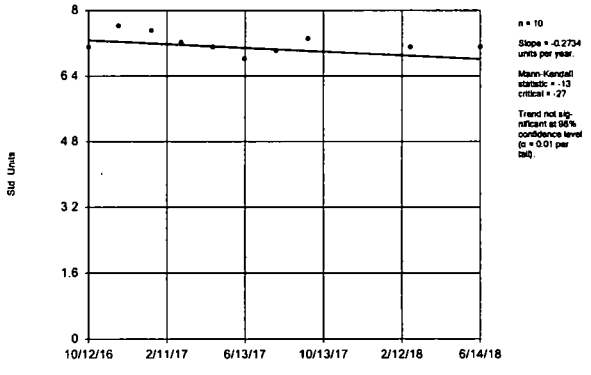
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-8



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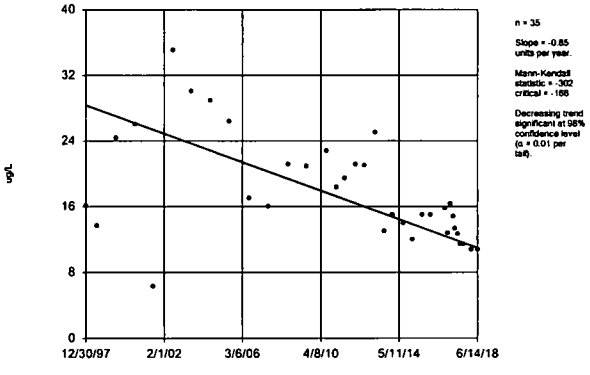
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG

Sen's Slope Estimator

MW-1



Constituent: Selenium [total] Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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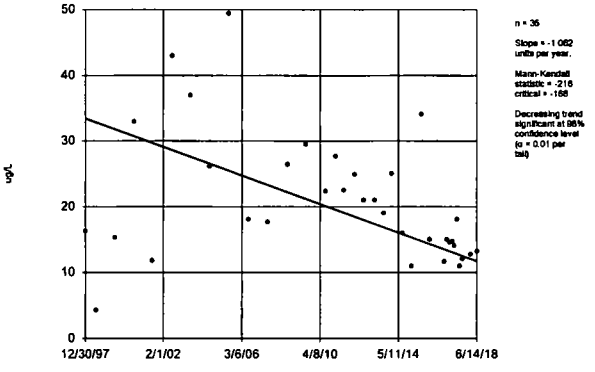
Sen's Slope Estimator

MW-2



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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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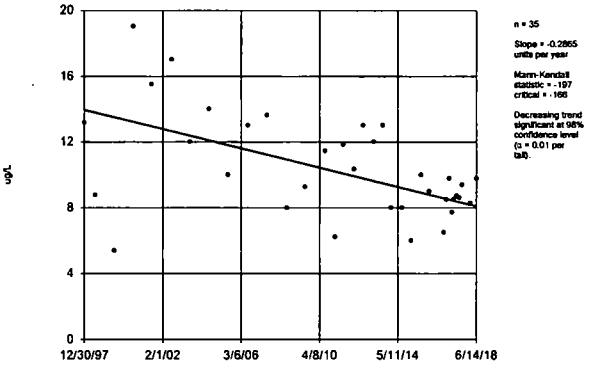
Sen's Slope Estimator

MW-3



Constituent: Selenium [total] Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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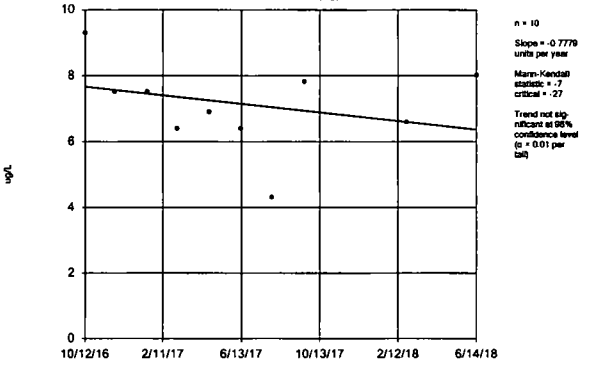
Sen's Slope Estimator

MW-4R (bg)



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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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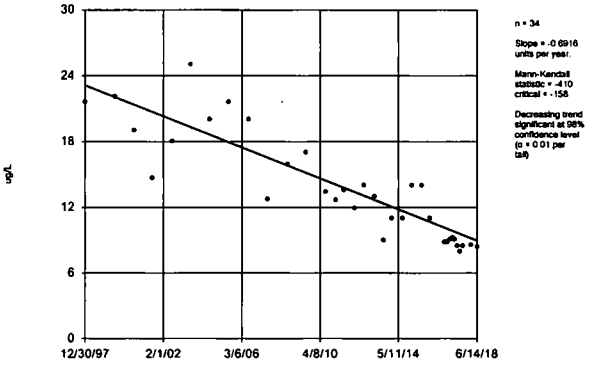
Sen's Slope Estimator

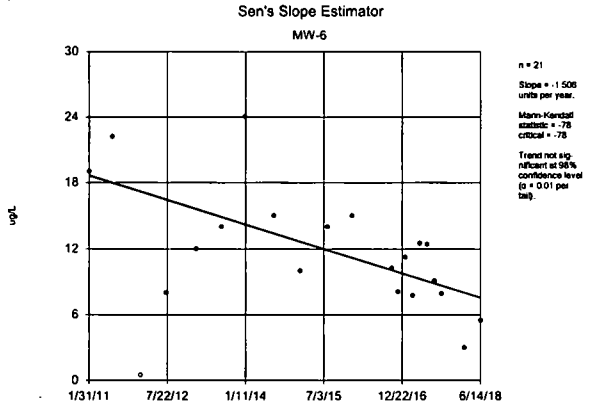
MW-5



Constituent: Selenium [total] Analysis Run 10/23/2018 1:30 PM View: TREND TEST

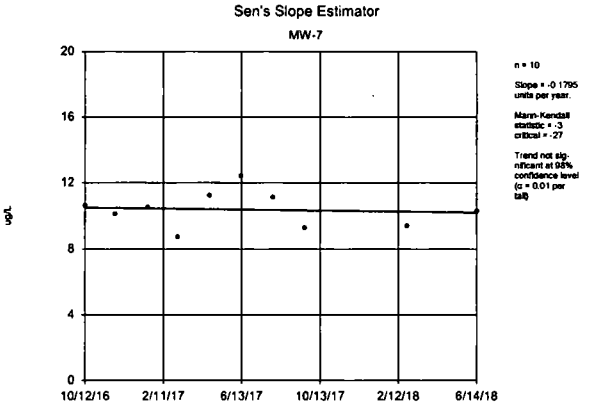
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG
Hollow symbols indicate censored values



Constituent: Selenium [total] Analysis Run 10/23/2018 1:30 PM View: TREND TEST
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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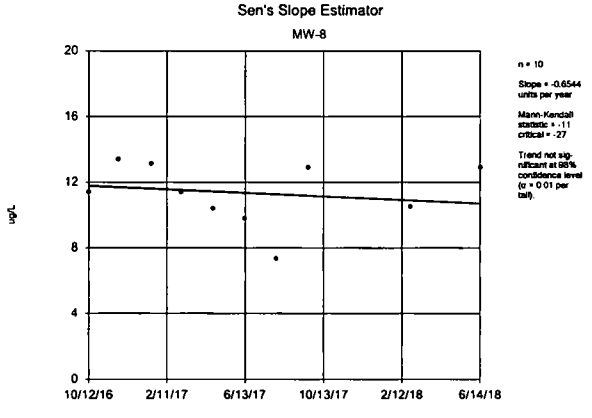
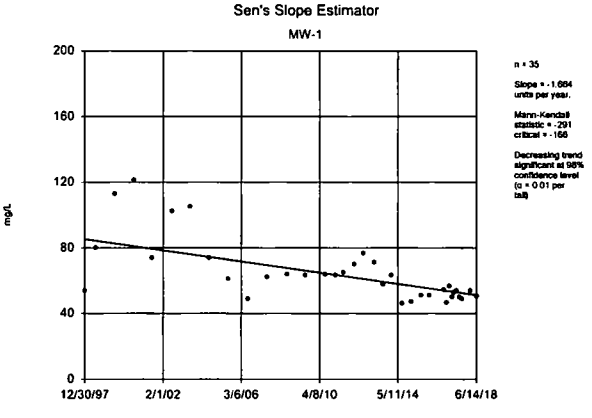
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



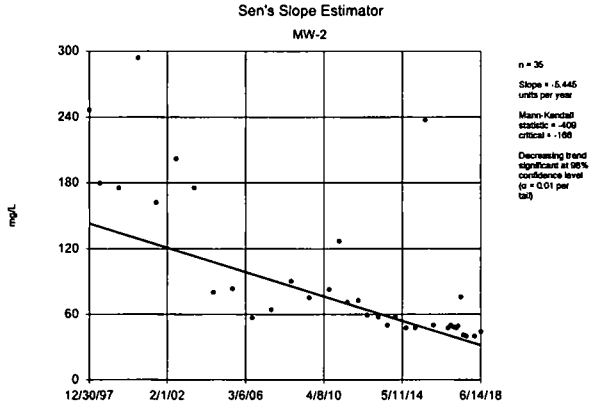
Constituent: Selenium [total] Analysis Run 10/23/2018 1:30 PM View: TREND TEST
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Sulfate Analysis Run 10/23/2018 1:30 PM View: TREND TEST
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

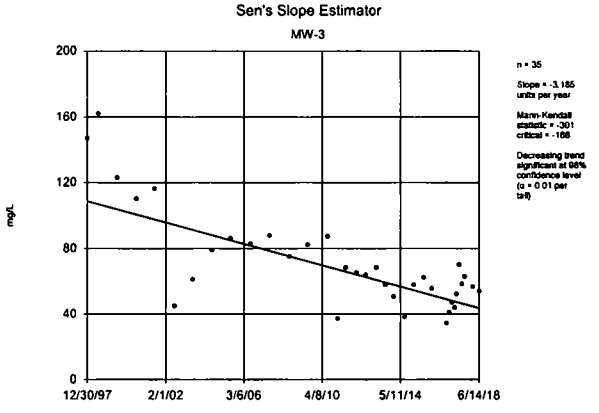
Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Sulfate Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

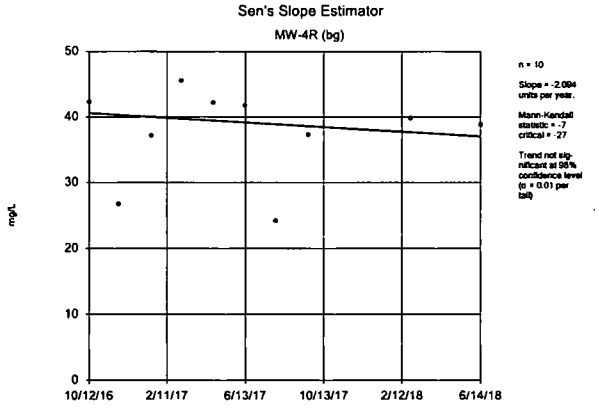
Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Sulfate Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

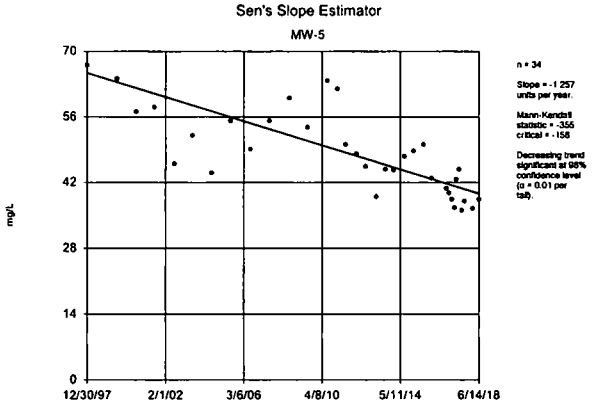
Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Sulfate Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data Fremont Department of Utilities Groundwater

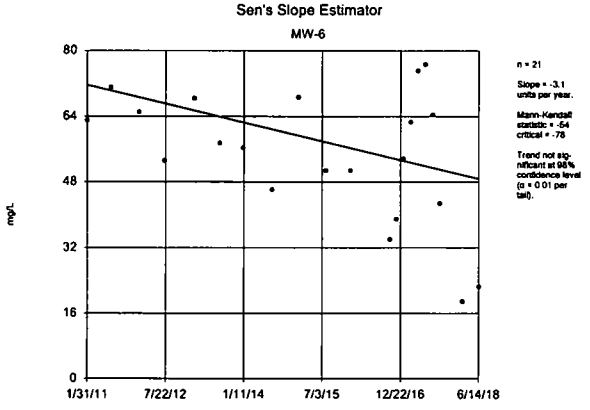
Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Sulfate Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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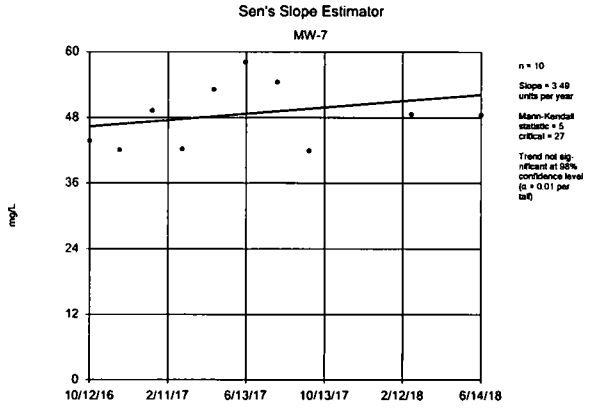
Fremont Dept of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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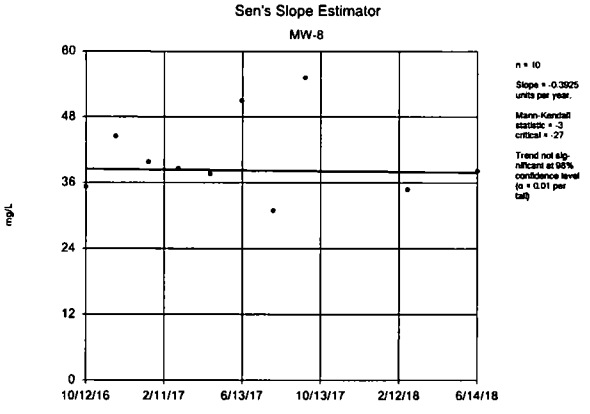
Fremont Dept. of Utilities Client SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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Fremont Dept of Utilities Client. SCS Engineers Data: Fremont Department of Utilities Groundwater

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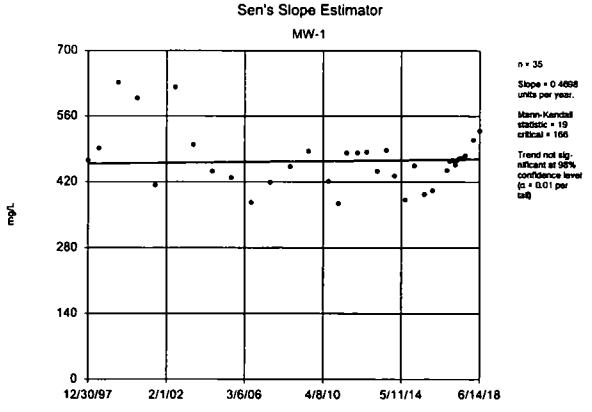
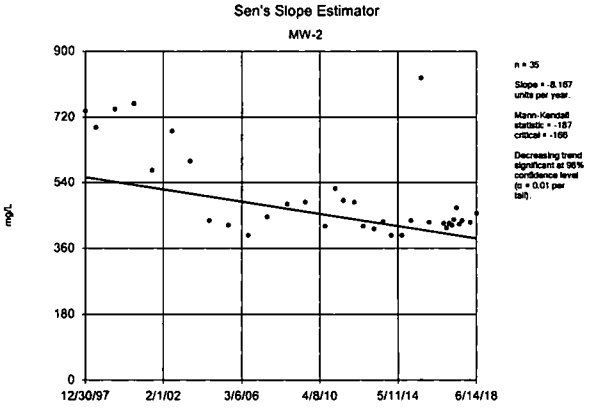


Constituent: Total Dissolved Solids Analysis Run 10/23/2018 1:30 PM View: TREND TEST
Fremont Dept of Utilities Client SCS Engineers Data Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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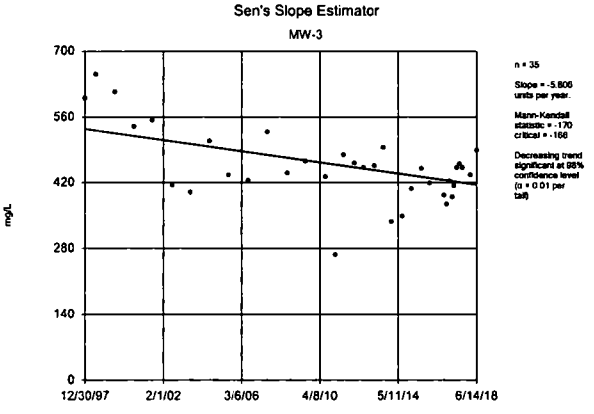

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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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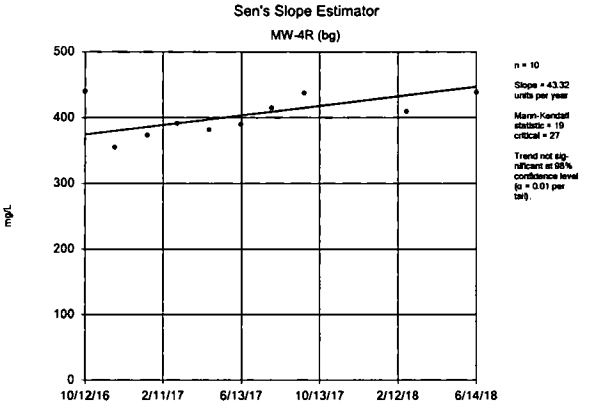

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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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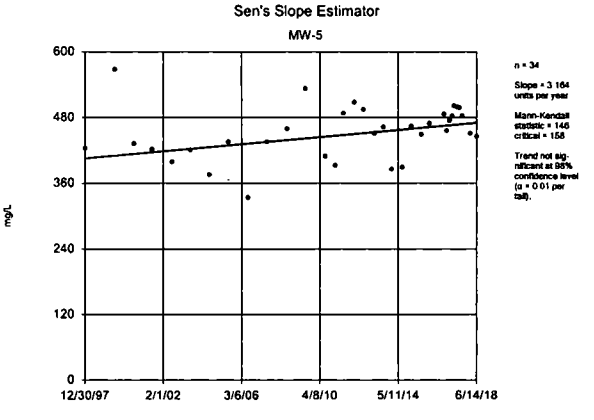

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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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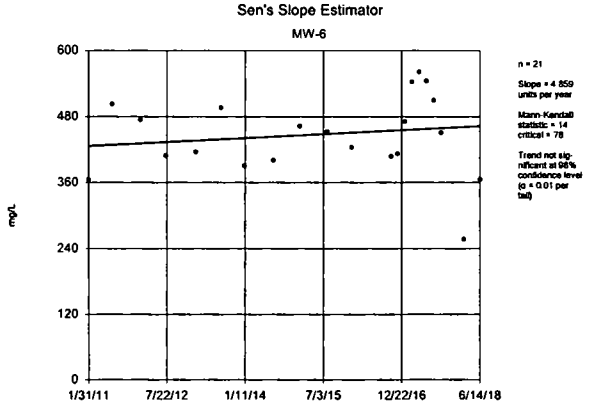

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Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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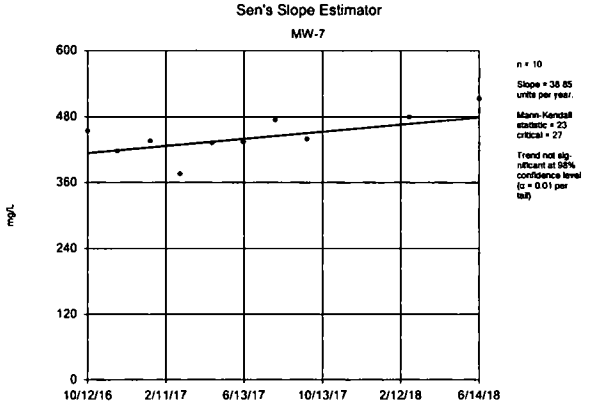

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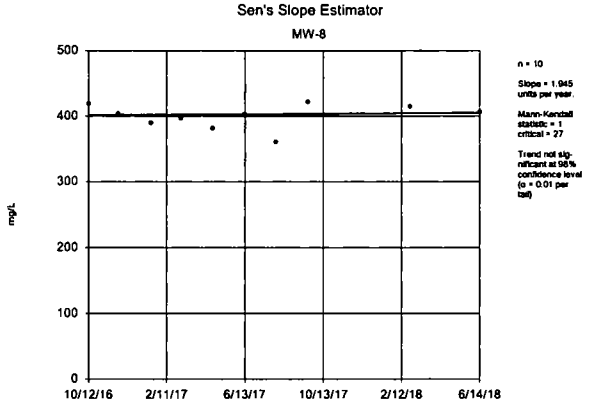
Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Sanitas™ v 9 6 10 Sanitas software licensed to SCS Engineers UG



Constituent: Total Dissolved Solids Analysis Run 10/23/2018 1:30 PM View: TREND TEST

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

FREMONT
Department of Utilities

Operated by the
Board for Public Works

400 EAST MILITARY AVENUE P.O. BOX 1468 FREMONT, NE 68025

October 31, 2018

State of Nebraska
Department of Environmental Quality
Remediation Section

RECEIVED

NOV - 5 2018

Nebraska Dept of Environmental Quality
By: _____DEQ#182_____

Attn:
Nancy Harris
Groundwater Geologist
Waste Management Division
Suite 400, The Atrium
1200 N. Street
P.O. Box 98922
Lincoln, NE 68509-8922

Dear Ms. Harris:

Enclosed is one copy of an addendum to the Groundwater Monitoring Program Report for the **Fremont Utilities FFCA Monofill IIS 48518, Permit # NE0203777** for your review. The attached addendum includes the statistical report for the radium analysis completed for the June 14, 2018 sample round that was not included in the original report submittal dated October 26, 2018. If you have any questions concerning this report please feel free to call or email Tony Sedlacek.

Sincerely,

Tony Sedlacek

Tony Sedlacek
Environmental Engineering Technician
Lon D. Wright Power Plant
Fremont Department of Utilities
2701 E. 1st St
Fremont, NE 68025
Phone (402) 727-2651
Fax (402) 727-2640
tony.sedlacek@fremontne.gov

Enclosures

2018007621E

1.0 TOTAL RADIUM STATISTICAL SUMMARY

No statistical exceedances were identified for total radium. The statistical results have been summarized in **Table 1** below. The total radium statistical analysis results are included in **Attachment A.1**. No changes to the June 2018 data statistical summary conclusions are necessary.

Table 1. Total Radium Statistical Summary

Well	Detected Parameters	Result	Interwell Exceedance?[1]	Intrawell Exceedance?[2]	Significant Trend?	GWPS Exceedance?[3]
MW-1	Total Radium (pCi/L)	2.30	No	n/a	No	No[4]
MW-2		1.71	No	n/a	No	No[4]
MW-3		2.26	No	n/a	No	No[4]
MW-4R		1.68	n/a	No	No	No[4]
MW-5		2.03	No	n/a	No	No[4]
MW-6		1.47	No	n/a	No	No[4]
MW-7		2.16	No	n/a	No	No[4]
MW-8		1.49	No	n/a	No	No[4]

[1]Constituent/well pairs noted by n/a were not analyzed using interwell prediction limits. See Table 1 in *Statistical Summary of June 2018 Data Report*.

[2]Constituent/well pairs noted by n/a were not analyzed using intrawell prediction limits. See Table 2 in *Statistical Summary of June 2018 Data Report*.

[3]GWPS exceedances were established by the NDEQ Title 118 Groundwater Quality Standards or the EPA *Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part one); Final Rule* (July 17, 2018).

[4]No GWPS has been established.

A.1 STATISTICAL SUMMARY – JUNE 2018 TOTAL RADIUM DATA

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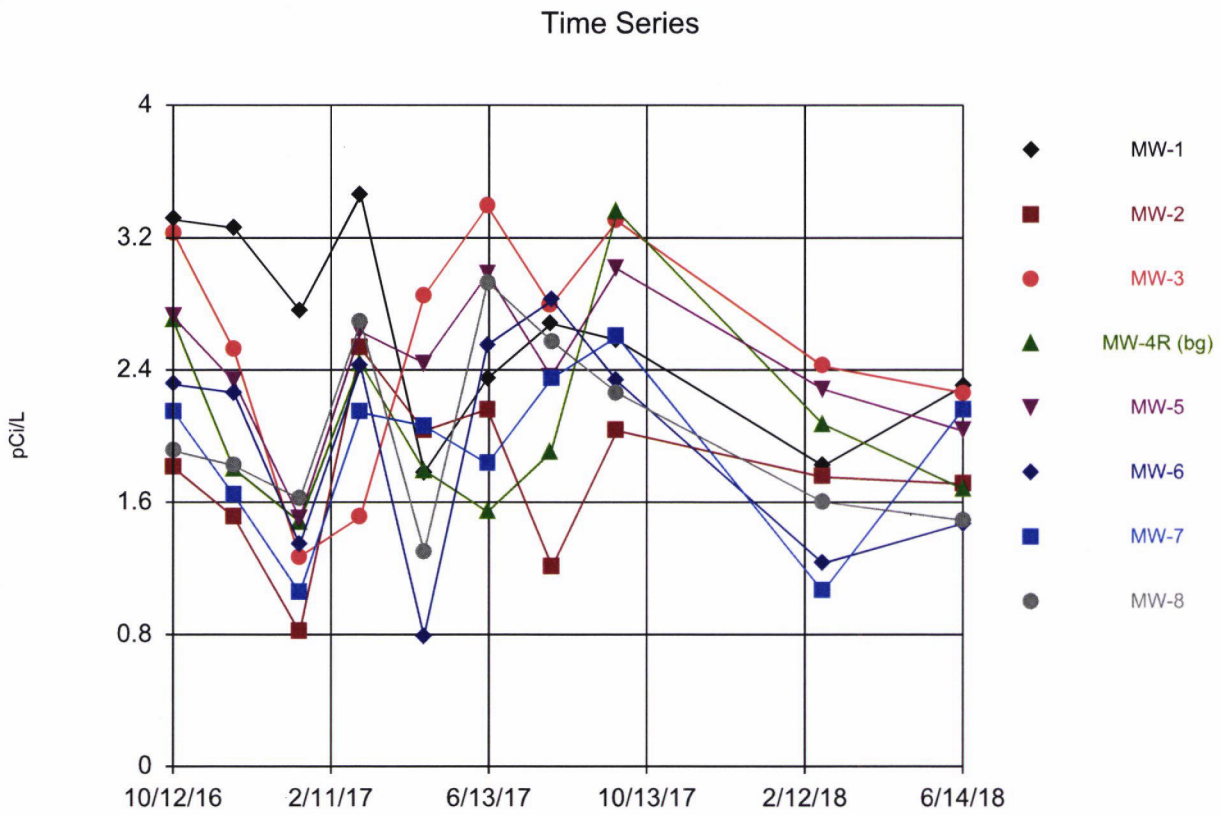

Constituent: Total Radium Analysis Run 10/29/2018 9:54 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Outlier Analysis

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/29/2018, 9:56 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Total Radium (pCi/L)	MW-1	No	n/a	n/a	NP	NaN	10	2.63	0.5903	normal	ShapiroWilk
Total Radium (pCi/L)	MW-2	No	n/a	n/a	NP	NaN	10	1.755	0.4903	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-3	No	n/a	n/a	NP	NaN	10	2.554	0.7226	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-4R (bg)	No	n/a	n/a	NP	NaN	10	2.076	0.5924	ln(x)	ShapiroWilk
Total Radium (pCi/L)	MW-5	No	n/a	n/a	NP	NaN	10	2.428	0.4504	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-6	No	n/a	n/a	NP	NaN	10	1.952	0.6812	x^2	ShapiroWilk
Total Radium (pCi/L)	MW-7	No	n/a	n/a	NP	NaN	10	1.904	0.5171	x^3	ShapiroWilk
Total Radium (pCi/L)	MW-8	No	n/a	n/a	NP	NaN	10	2.019	0.5602	ln(x)	ShapiroWilk

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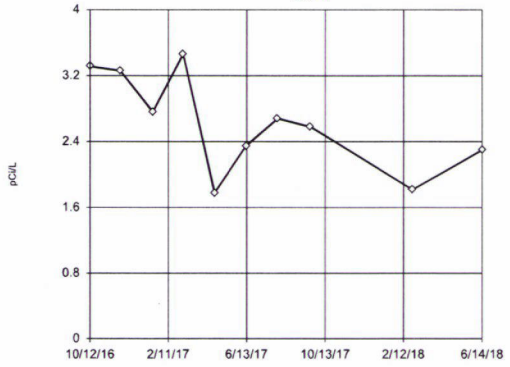
Tukey's Outlier Screening

MW-1



n = 10

No outliers found. Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 6.96, low cutoff = -1.615, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Tukey's Outlier Screening

MW-2

n = 10

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.458, low cutoff = -2.386, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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Tukey's Outlier Screening

MW-3

n = 10

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 5.618, low cutoff = -4.148, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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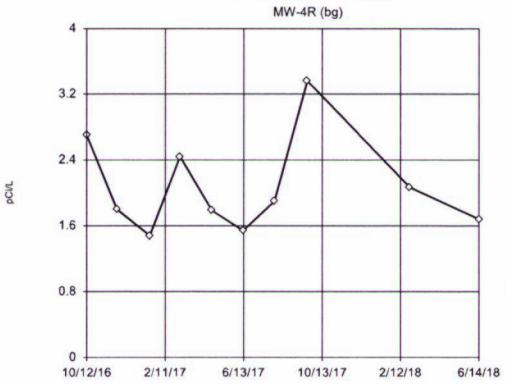
Tukey's Outlier Screening

MW-4R (bg)



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 10.43, low cutoff = 0.3958, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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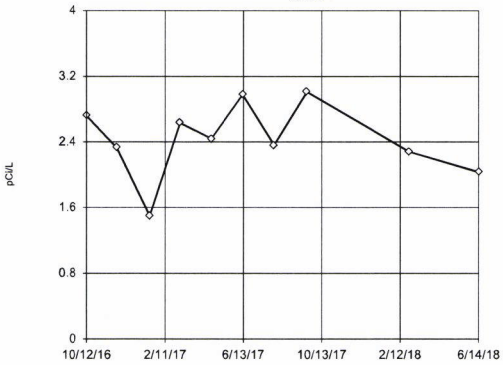
Tukey's Outlier Screening

MW-5



n = 10

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.31, low cutoff = -2.404, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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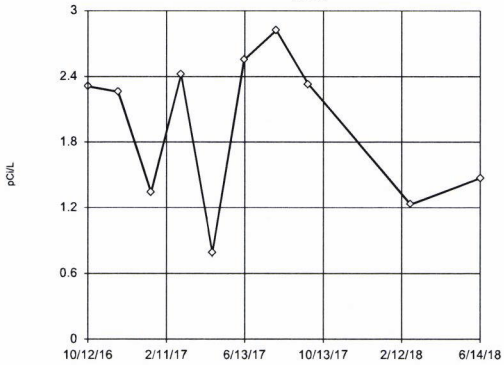
Tukey's Outlier Screening

MW-6



n = 10

No outliers found. Tukey's method selected by user.

Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.445, low cutoff = -3.453, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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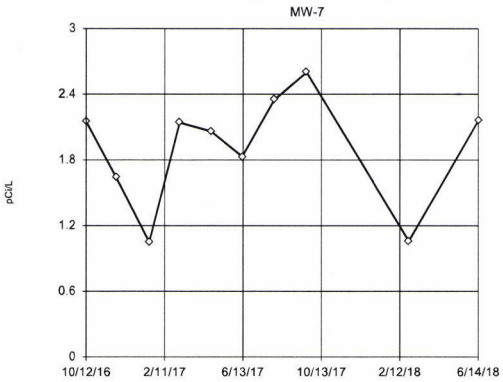
Tukey's Outlier Screening

MW-7



n = 10

No outliers found. Tukey's method selected by user.

Data were cube transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.353, low cutoff = -2.859, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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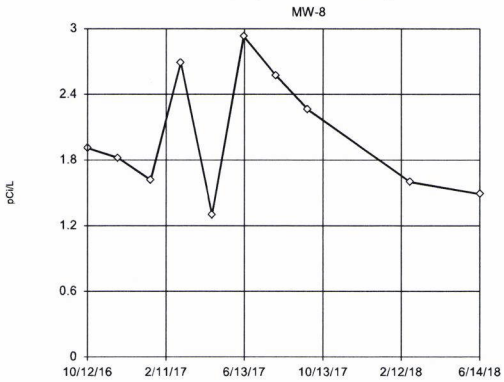
Tukey's Outlier Screening

MW-8



n = 10

No outliers found. Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 12.98, low cutoff = 0.3127, based on IQR multiplier of 3.

Constituent: Total Radium Analysis Run 10/29/2018 9:55 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Interwell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/29/2018, 9:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Total Radium (pCi/L)	MW-1	3.927	n/a	6/14/2018	2.3	No	10	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-2	3.927	n/a	6/14/2018	1.71	No	10	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-3	3.927	n/a	6/14/2018	2.26	No	10	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-5	3.927	n/a	6/14/2018	2.03	No	10	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-6	3.927	n/a	6/14/2018	1.47	No	10	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-7	3.927	n/a	6/14/2018	2.16	No	10	0	No	0.000...	Param 1 of 2
Total Radium (pCi/L)	MW-8	3.927	n/a	6/14/2018	1.49	No	10	0	No	0.000...	Param 1 of 2

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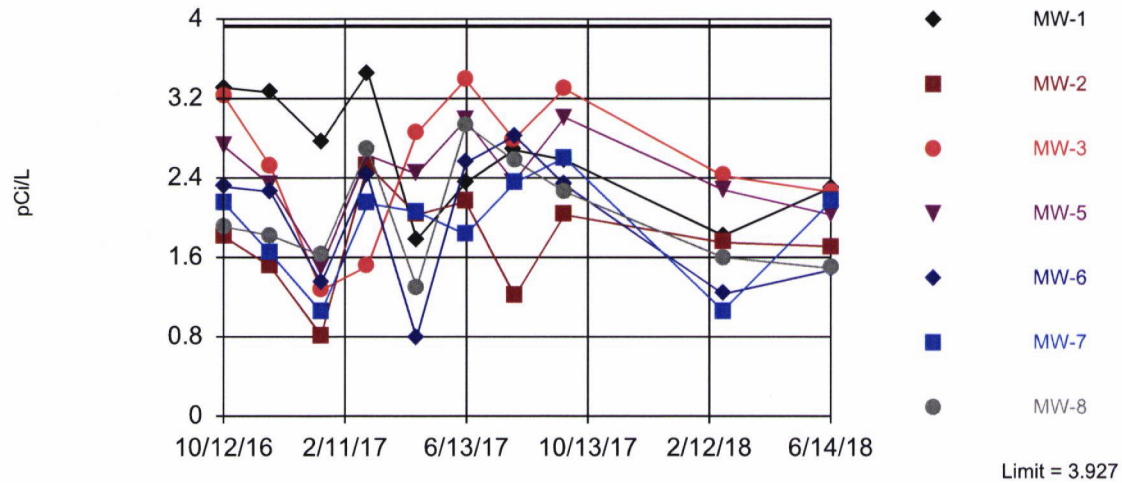
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=2.076, Std. Dev.=0.5924, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8741, critical = 0.781. Kappa = 3.124 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Radium Analysis Run 10/29/2018 9:58 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Intrawell Prediction Limit

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/29/2018, 9:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Total Radium (pCi/L)	MW-4R	4.491	n/a	6/14/2018	1.68	No	8	0	No	0.000...	Param 1 of 2

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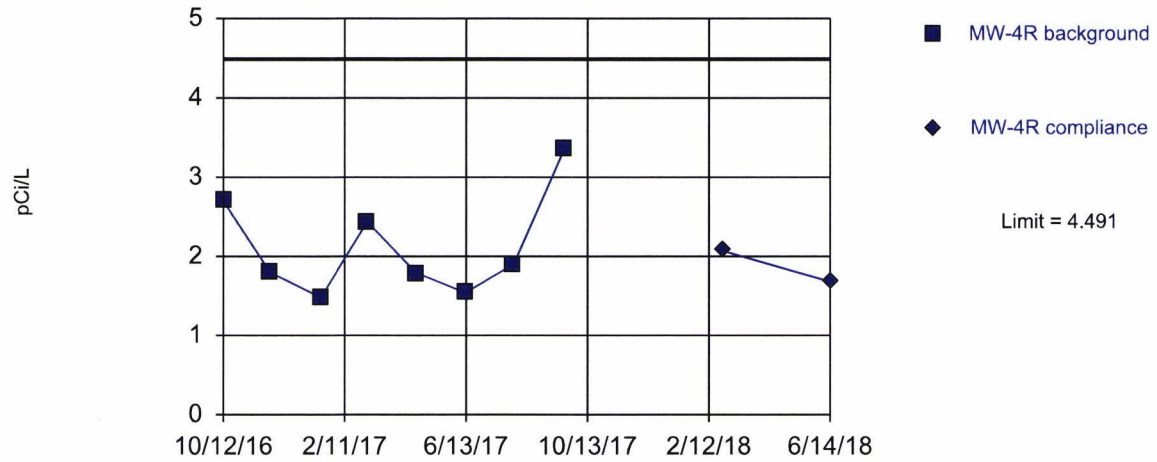
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=2.126, Std. Dev.=0.6527, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8842, critical = 0.749. Kappa = 3.624 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003583. Tukey's outlier screening was performed on the background data. No background outliers were found.

Constituent: Total Radium Analysis Run 10/29/2018 9:59 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

Trend Test

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater Printed 10/29/2018, 10:45 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Total Radium (pCi/L)	MW-1	-0.7768	-23	-27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-2	-0.04363	-2	-27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-3	-0.08022	-1	-27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-4R (bg)	-0.02483	-1	-27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-5	-0.1896	-5	-27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-6	-0.09938	-1	-27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-7	0.2491	9	27	No	10	0	n/a	n/a	0.02	NP
Total Radium (pCi/L)	MW-8	-0.2254	-9	-27	No	10	0	n/a	n/a	0.02	NP

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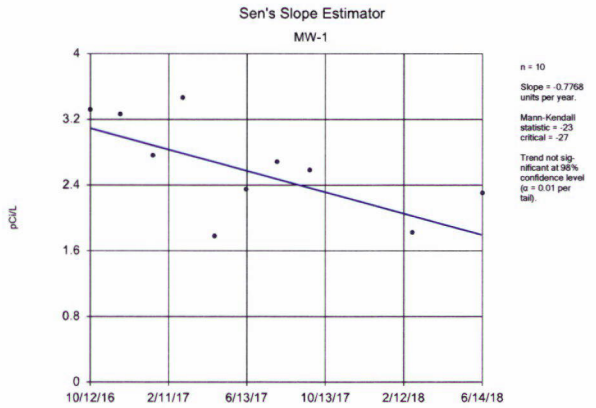

Constituent: Total Radium Analysis Run 10/29/2018 10:44 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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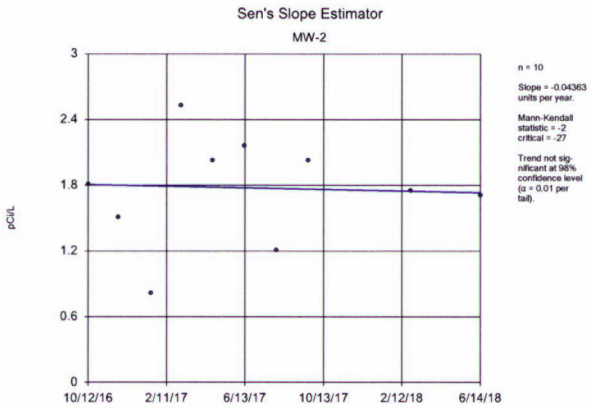

Constituent: Total Radium Analysis Run 10/29/2018 10:44 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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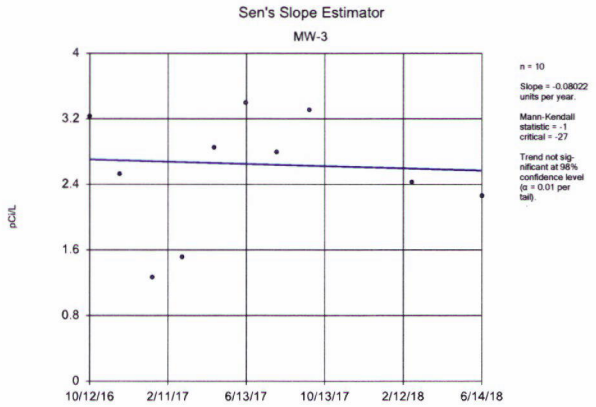

Constituent: Total Radium Analysis Run 10/29/2018 10:44 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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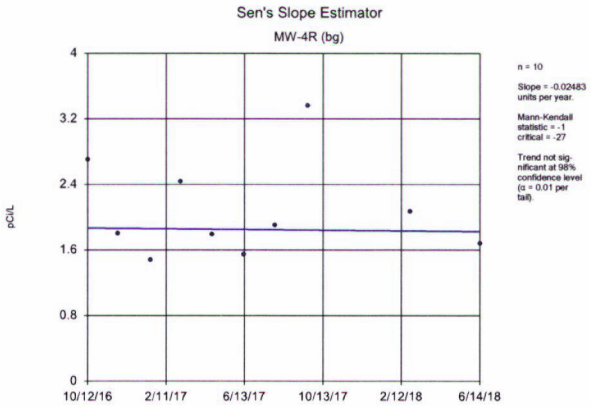

Constituent: Total Radium Analysis Run 10/29/2018 10:44 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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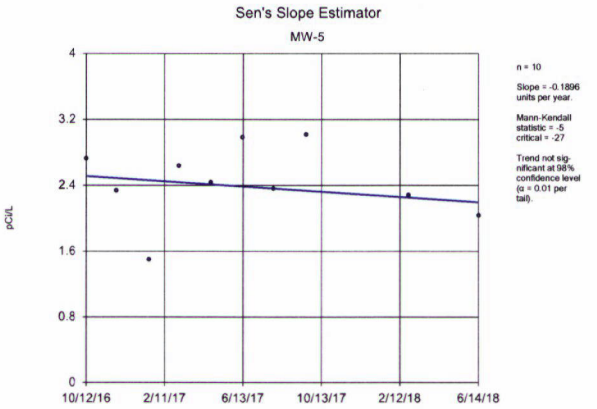

Constituent: Total Radium Analysis Run 10/29/2018 10:44 AM

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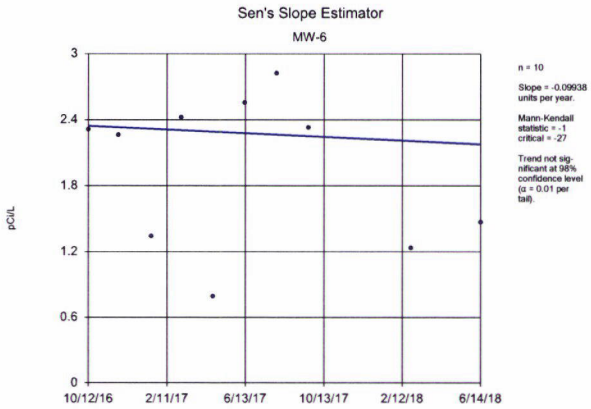

Constituent: Total Radium Analysis Run 10/29/2018 10:44 AM

Fremont Dept. of Utilities Client: SCS Engineers Data: Fremont Department of Utilities Groundwater

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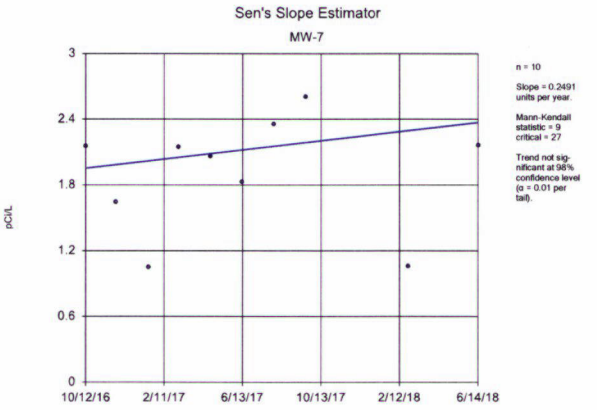

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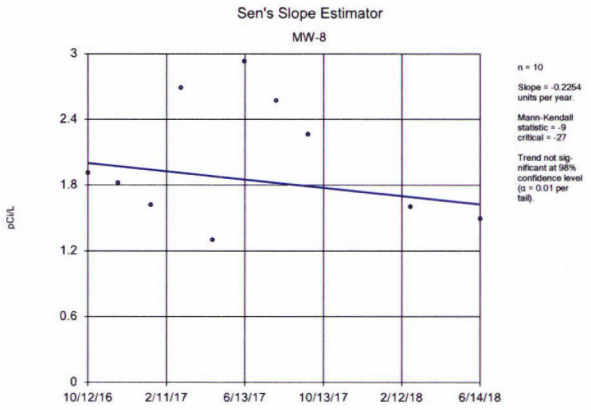

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