A & M Engineering and
Environmental Services, Inc.
Consulting - Design - Construction - Remediation

March 18, 2019

Ms. Martha Grafton
Environmental Program Specialist
Oklahoma Department of Environmental Quality
Land Protection Division
707 North Robinson
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

RE: Addendum to the Annual Groundwater Monitoring and Corrective Action Report (Calendar Year 2018)
Grand River Dam Authority Landfill
Grand River Energy Center
Mayes, Oklahoma
Solid Waste Permit No. 3549012

Dear Ms. Grafton:

Please find attached an electronic version of the Addendum to the Annual Groundwater Monitoring and Corrective Action Report for the above referenced facility. This Addendum is being submitted on behalf of the Grand River Dam Authority (GRDA) and in response to your verbal request to include the statistical analyses conducted on groundwater samples collected at the above referenced facility during calendar year 2018.

Per our conversation, it is noted that in the future, the statistical evaluations conducted during normal semi-annual groundwater monitoring activities and submitted to the Oklahoma Department of Environmental Quality (DEQ) in accordance with the Landfill Permit requirements, will likewise be incorporated into the Annual Groundwater Monitoring and Corrective Action Reports for the facility.

Please note that one hard copy and one electronic copy of this Addendum is being forwarded to the Grand River Dam Authority for inclusion into the facility operating records and for posting on the GRDA Coal Combustion Residuals web-site.

If you have any questions on this matter, or if you require any additional information, please do not hesitate to contact me.

Sincerely
A & M Engineering and Environmental Services, Inc.

Thomas A. Trebonik, P.G.
Senior Project Manager

Cc: Mike Bednar, GRDA

ADDENDUM TO
ANNUAL GROUNDWATER MONITORING
AND
CORRECTIVE ACTION REPORT
(CALENDAR YEAR 2018)

GRAND RIVER DAM AUTHORITY LANDFILL
GRAND RIVER ENERGY CENTER
MAYES COUNTY, OKLAHOMA
SOLID WASTE PERMIT NO. 3549012

PREPARED FOR:

GRAND RIVER DAM AUTHORITY
VINITA, OKLAHOMA

JANUARY 31, 2019

A&M PROJECT NO. 1986-035

PREPARED BY:

A&M ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
10010 E. 16TH STREET
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SECTION

SECTION 1.0

First 2018 Semi-Annual Groundwater Monitoring Statistical Evaluation and Time-Series Graphs

Concentrations (mg/l)

Parameter: Alkalinity

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 264
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 67
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	67	0 (0%)	12/15/1994	367	367
			12/14/1995	334	334
			3/6/1996	384	384
			4/25/1996	363	363
			10/2/1996	365	365
			12/10/1996	346	346
			3/11/1997	350	350
			4/15/1997	330	330
			8/14/1997	400	400
			12/4/1997	380	380
			3/31/1998	360	360
			6/23/1998	390	390
			8/11/1998	389	389
			12/8/1998	376	376
			3/9/1999	340	340
			6/8/1999	395	395
			8/19/1999	400	400
			12/14/1999	360	360
			3/7/2000	384	384
			6/23/2000	364	364
			12/12/2000	450	450
			3/27/2001	362	362
			6/28/2001	340	340
			9/10/2001	326	326
			12/18/2001	326	326
			3/19/2002	330	330
			6/26/2002	350	350
			9/18/2002	353	353
			12/11/2002	344	344
			3/13/2003	320	320
			6/25/2003	336	336
			9/26/2003	320	320
			12/10/2003	324	324
			3/9/2004	329	329
			6/24/2004	348	348
			9/15/2004	332	332
			12/15/2004	327	327
			3/16/2005	340	340
			6/15/2005	330	330
			9/21/2005	347	347
			12/21/2005	340	340
			3/15/2006	320	320
			6/21/2006	314	314
			12/20/2006	300	300

			6/12/2007	310	310
			12/17/2007	330	330
			6/11/2008	370	370
			12/3/2008	344	344
			6/17/2009	350	350
			12/9/2009	370	370
			6/17/2010	380	380
			12/22/2010	370	370
			6/29/2011	366	366
			12/7/2011	370	370
			6/6/2012	384	384
			12/12/2012	330	330
			6/19/2013	360	360
			12/11/2013	358	358
			6/11/2014	342	342
			12/3/2014	368	368
			6/17/2015	380	380
			12/1/2015	383	383
			6/22/2016	390	390
			12/20/2016	395.4	395.4
			6/6/2017	398	398
			11/7/2017	394	394
			2/27/2018	384	384

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	68	0 (0%)	12/15/1994	170	170
			12/14/1995	191	191
			3/6/1996	308	308
			4/25/1996	340	340
			10/2/1996	340	340
			12/10/1996	270	270
			3/11/1997	210	210
			4/15/1997	220	220
			8/14/1997	240	240
			12/4/1997	200	200
			3/31/1998	184	184
			6/23/1998	250	250
			8/11/1998	208	208
			12/8/1998	200	200
			3/9/1999	224	224
			6/8/1999	220	220
			8/19/1999	226	226
			12/14/1999	240	240
			3/7/2000	244	244
			6/23/2000	264	264
			12/12/2000	220	220
			3/27/2001	215	215
			6/28/2001	240	240
			9/10/2001	208	208
			12/18/2001	235	235
			3/19/2002	263	263
			6/26/2002	290	290
			9/18/2002	256	256
			12/11/2002	249	249

			3/13/2003	240	240
			6/25/2003	246	246
			9/26/2003	250	250
			12/10/2003	200	200
			3/9/2004	280	280
			6/24/2004	329	329
			9/15/2004	272	272
			12/15/2004	288	288
			3/16/2005	240	240
			6/15/2005	246	246
			9/21/2005	228	228
			12/21/2005	232	232
			3/15/2006	250	250
			6/21/2006	290	290
			12/20/2006	356	356
			2/21/2007	340	340
			6/12/2007	312	312
			12/17/2007	210	210
			6/11/2008	240	240
			12/3/2008	280	280
			6/17/2009	250	250
			12/9/2009	236	236
			6/17/2010	252	252
			12/22/2010	240	240
			6/29/2011	266	266
			12/7/2011	288	288
			6/6/2012	256	256
			12/12/2012	248	248
			6/19/2013	364	364
			12/11/2013	328	328
			6/11/2014	342	342
			12/3/2014	296	296
			6/17/2015	384	384
			12/1/2015	226	226
			6/22/2016	176	176
			12/20/2016	162.2	162.2
			6/6/2017	246	246
			11/7/2017	430	430
			2/27/2018	282	282
MW#93-3	67	0 (0%)	12/15/1994	240	240
			12/14/1995	206	206
			3/6/1996	226	226
			4/25/1996	228	228
			10/2/1996	240	240
			12/10/1996	225	225
			3/11/1997	210	210
			4/15/1997	200	200
			8/14/1997	255	255
			12/4/1997	140	140
			3/31/1998	240	240
			6/23/1998	225	225
			8/11/1998	224	224
			12/8/1998	214	214
			3/9/1999	234	234
			6/8/1999	236	236
			8/19/1999	260	260

			12/14/1999	300	300
			3/7/2000	264	264
			6/23/2000	244	244
			12/12/2000	320	320
			3/27/2001	254	254
			6/28/2001	255	255
			9/10/2001	332	332
			12/18/2001	230	230
			3/19/2002	255	255
			6/26/2002	250	250
			9/18/2002	268	268
			12/11/2002	268	268
			3/13/2003	247	247
			6/25/2003	252	252
			9/26/2003	244	244
			12/10/2003	271	271
			3/9/2004	284	284
			6/24/2004	309	309
			9/15/2004	264	264
			12/15/2004	254	254
			3/16/2005	290	290
			6/15/2005	268	268
			9/21/2005	264	264
			12/21/2005	246	246
			3/15/2006	227	227
			6/21/2006	253	253
			12/20/2006	250	250
			6/12/2007	280	280
			12/17/2007	290	290
			6/11/2008	300	300
			12/3/2008	226	226
			6/17/2009	240	240
			12/9/2009	214	214
			6/17/2010	296	296
			12/22/2010	230	230
			6/29/2011	256	256
			12/7/2011	244	244
			6/6/2012	288	288
			12/12/2012	226	226
			6/19/2013	316	316
			12/11/2013	262	262
			6/11/2014	338	338
			12/3/2014	262	262
			6/17/2015	388	388
			5/25/2016	440	440
			6/22/2016	330	330
			12/20/2016	330.4	330.4
			6/6/2017	304	304
			11/7/2017	409	409
			2/27/2018	368	368
MW#03-1	29	0 (0%)	6/24/2004	209	209
			9/15/2004	220	220
			12/15/2004	184	184
			3/16/2005	160	160
			6/15/2005	252	252
			9/21/2005	180	180

			12/20/2006	204	204
			6/12/2007	200	200
			12/17/2007	190	190
			6/11/2008	200	200
			12/3/2008	206	206
			6/17/2009	204	204
			12/9/2009	216	216
			6/17/2010	232	232
			12/22/2010	216	216
			6/29/2011	210	210
			12/7/2011	222	222
			6/6/2012	216	216
			6/19/2013	144	144
			12/11/2013	212	212
			6/11/2014	222	222
			12/3/2014	194	194
			6/17/2015	134	134
			12/1/2015	150	150
			6/22/2016	130	130
			12/20/2016	211.6	211.6
			6/6/2017	56	56
			11/7/2017	217	217
			2/27/2018	72	72
MW#03-2	33	0 (0%)	6/24/2004	235	235
			9/15/2004	200	200
			12/15/2004	222	222
			3/16/2005	220	220
			6/15/2005	252	252
			9/21/2005	224	224
			12/21/2005	230	230
			3/15/2006	220	220
			6/21/2006	228	228
			12/20/2006	220	220
			6/12/2007	228	228
			12/17/2007	200	200
			6/11/2008	200	200
			12/3/2008	210	210
			6/17/2009	200	200
			12/9/2009	208	208
			6/17/2010	216	216
			12/22/2010	230	230
			6/29/2011	224	224
			12/7/2011	236	236
			6/6/2012	230	230
			12/12/2012	242	242
			6/19/2013	232	232
			12/11/2013	230	230
			6/11/2014	92	92
			12/3/2014	76	76
			6/17/2015	220	220
			12/1/2015	214	214
			6/22/2016	204	204
			12/20/2016	199.4	199.4
			6/6/2017	192	192
			11/7/2017	192	192
			2/27/2018	196	196

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Alkalinity

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 31.722
Overall Std Dev = 29.7986
Overall Total = 8374.6
SS Wells = 14254.4
SS Total = 233533

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	14254.4	4	3563.59	4.20912
Error (within wells)	219279	259	846.636	
Totals	233533	263		

4.20912 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	10.1134
	12/14/1995	22.8866
	3/6/1996	27.1134
	4/25/1996	6.11343
	10/2/1996	8.11343
	12/10/1996	10.8866
	3/11/1997	6.88657
	4/15/1997	26.8866
	8/14/1997	43.1134
	12/4/1997	23.1134
	3/31/1998	3.11343
	6/23/1998	33.1134
	8/11/1998	32.1134
	12/8/1998	19.1134
	3/9/1999	16.8866
	6/8/1999	38.1134
	8/19/1999	43.1134
	12/14/1999	3.11343
	3/7/2000	27.1134
	6/23/2000	7.11343
	12/12/2000	93.1134
	3/27/2001	5.11343
	6/28/2001	16.8866
	9/10/2001	30.8866
	12/18/2001	30.8866
	3/19/2002	26.8866
	6/26/2002	6.88657
	9/18/2002	3.88657
	12/11/2002	12.8866
	3/13/2003	36.8866
	6/25/2003	20.8866
	9/26/2003	36.8866

12/10/2003	32.8866
3/9/2004	27.8866
6/24/2004	8.88657
9/15/2004	24.8866
12/15/2004	29.8866
3/16/2005	16.8866
6/15/2005	26.8866
9/21/2005	9.88657
12/21/2005	16.8866
3/15/2006	36.8866
6/21/2006	42.8866
12/20/2006	56.8866
6/12/2007	46.8866
12/17/2007	26.8866
6/11/2008	13.1134
12/3/2008	12.8866
6/17/2009	6.88657
12/9/2009	13.1134
6/17/2010	23.1134
12/22/2010	13.1134
6/29/2011	9.11343
12/7/2011	13.1134
6/6/2012	27.1134
12/12/2012	26.8866
6/19/2013	3.11343
12/11/2013	1.11343
6/11/2014	14.8866
12/3/2014	11.1134
6/17/2015	23.1134
12/1/2015	26.1134
6/22/2016	33.1134
12/20/2016	38.5134
6/6/2017	41.1134
11/7/2017	37.1134
2/27/2018	27.1134

Well: MW#93-2

Sample	Residual
12/15/1994	87.7382
12/14/1995	66.7382
3/6/1996	50.2618
4/25/1996	82.2618
10/2/1996	82.2618
12/10/1996	12.2618
3/11/1997	47.7382
4/15/1997	37.7382
8/14/1997	17.7382
12/4/1997	57.7382
3/31/1998	73.7382
6/23/1998	7.73824
8/11/1998	49.7382
12/8/1998	57.7382
3/9/1999	33.7382
6/8/1999	37.7382
8/19/1999	31.7382
12/14/1999	17.7382
3/7/2000	13.7382
6/23/2000	6.26176

12/12/2000	37.7382
3/27/2001	42.7382
6/28/2001	17.7382
9/10/2001	49.7382
12/18/2001	22.7382
3/19/2002	5.26176
6/26/2002	32.2618
9/18/2002	1.73824
12/11/2002	8.73824
3/13/2003	17.7382
6/25/2003	11.7382
9/26/2003	7.73824
12/10/2003	57.7382
3/9/2004	22.2618
6/24/2004	71.2618
9/15/2004	14.2618
12/15/2004	30.2618
3/16/2005	17.7382
6/15/2005	11.7382
9/21/2005	29.7382
12/21/2005	25.7382
3/15/2006	7.73824
6/21/2006	32.2618
12/20/2006	98.2618
2/21/2007	82.2618
6/12/2007	54.2618
12/17/2007	47.7382
6/11/2008	17.7382
12/3/2008	22.2618
6/17/2009	7.73824
12/9/2009	21.7382
6/17/2010	5.73824
12/22/2010	17.7382
6/29/2011	8.26176
12/7/2011	30.2618
6/6/2012	1.73824
12/12/2012	9.73824
6/19/2013	106.262
12/11/2013	70.2618
6/11/2014	84.2618
12/3/2014	38.2618
6/17/2015	126.262
12/1/2015	31.7382
6/22/2016	81.7382
12/20/2016	95.5382
6/6/2017	11.7382
11/7/2017	172.262
2/27/2018	24.2618

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	25.7224
	12/14/1995	59.7224
	3/6/1996	39.7224
	4/25/1996	37.7224
	10/2/1996	25.7224
	12/10/1996	40.7224
	3/11/1997	55.7224

4/15/1997	65.7224
8/14/1997	10.7224
12/4/1997	125.722
3/31/1998	25.7224
6/23/1998	40.7224
8/11/1998	41.7224
12/8/1998	51.7224
3/9/1999	31.7224
6/8/1999	29.7224
8/19/1999	5.72239
12/14/1999	34.2776
3/7/2000	1.72239
6/23/2000	21.7224
12/12/2000	54.2776
3/27/2001	11.7224
6/28/2001	10.7224
9/10/2001	66.2776
12/18/2001	35.7224
3/19/2002	10.7224
6/26/2002	15.7224
9/18/2002	2.27761
12/11/2002	2.27761
3/13/2003	18.7224
6/25/2003	13.7224
9/26/2003	21.7224
12/10/2003	5.27761
3/9/2004	18.2776
6/24/2004	43.2776
9/15/2004	1.72239
12/15/2004	11.7224
3/16/2005	24.2776
6/15/2005	2.27761
9/21/2005	1.72239
12/21/2005	19.7224
3/15/2006	38.7224
6/21/2006	12.7224
12/20/2006	15.7224
6/12/2007	14.2776
12/17/2007	24.2776
6/11/2008	34.2776
12/3/2008	39.7224
6/17/2009	25.7224
12/9/2009	51.7224
6/17/2010	30.2776
12/22/2010	35.7224
6/29/2011	9.72239
12/7/2011	21.7224
6/6/2012	22.2776
12/12/2012	39.7224
6/19/2013	50.2776
12/11/2013	3.72239
6/11/2014	72.2776
12/3/2014	3.72239
6/17/2015	122.278
5/25/2016	174.278
6/22/2016	64.2776
12/20/2016	64.6776

6/6/2017	38.2776
11/7/2017	143.278
2/27/2018	102.278

Well: MW#03-1	Sample	Residual
	6/24/2004	20.6
	9/15/2004	31.6
	12/15/2004	4.4
	3/16/2005	28.4
	6/15/2005	63.6
	9/21/2005	8.4
	12/20/2006	15.6
	6/12/2007	11.6
	12/17/2007	1.6
	6/11/2008	11.6
	12/3/2008	17.6
	6/17/2009	15.6
	12/9/2009	27.6
	6/17/2010	43.6
	12/22/2010	27.6
	6/29/2011	21.6
	12/7/2011	33.6
	6/6/2012	27.6
	6/19/2013	44.4
	12/11/2013	23.6
	6/11/2014	33.6
	12/3/2014	5.6
	6/17/2015	54.4
	12/1/2015	38.4
	6/22/2016	58.4
	12/20/2016	23.2
	6/6/2017	132.4
	11/7/2017	28.6
	2/27/2018	116.4

Well: MW#03-2	Sample	Residual
	6/24/2004	25.2303
	9/15/2004	9.7697
	12/15/2004	12.2303
	3/16/2005	10.2303
	6/15/2005	42.2303
	9/21/2005	14.2303
	12/21/2005	20.2303
	3/15/2006	10.2303
	6/21/2006	18.2303
	12/20/2006	10.2303
	6/12/2007	18.2303
	12/17/2007	9.7697
	6/11/2008	9.7697
	12/3/2008	0.230303
	6/17/2009	9.7697
	12/9/2009	1.7697
	6/17/2010	6.2303
	12/22/2010	20.2303
	6/29/2011	14.2303
	12/7/2011	26.2303

6/6/2012	20.2303
12/12/2012	32.2303
6/19/2013	22.2303
12/11/2013	20.2303
6/11/2014	117.77
12/3/2014	133.77
6/17/2015	10.2303
12/1/2015	4.2303
6/22/2016	5.7697
12/20/2016	10.3697
6/6/2017	17.7697
11/7/2017	17.7697
2/27/2018	13.7697

Shapiro-Francia Test of Normality

Parameter: Alkalinity

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 264

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	56	-2.74777	7.55021	-153.875
2	72	-2.45727	13.5884	-330.799
3	76	-2.29036	18.8342	-504.866
4	92	-2.17009	23.5435	-704.514
5	130	-2.09693	27.9406	-977.115
6	134	-2.01409	31.9972	-1247
7	140	-1.94314	35.7729	-1519.04
8	144	-1.88079	39.3103	-1789.88
9	150	-1.83843	42.6901	-2065.64
10	160	-1.78661	45.8821	-2351.5
11	162.2	-1.7392	48.9069	-2633.6
12	170	-1.6954	51.7813	-2921.81
13	176	-1.65463	54.5191	-3213.03
14	180	-1.62576	57.1622	-3505.67
15	184	-1.58927	59.6879	-3798.09
16	184	-1.55477	62.1053	-4084.17
17	190	-1.52203	64.4218	-4373.36
18	191	-1.49852	66.6674	-4659.57
19	192	-1.46838	68.8235	-4941.5
20	192	-1.43953	70.8958	-5217.89
21	194	-1.41183	72.8891	-5491.79
22	196	-1.38517	74.8078	-5763.28
23	199.4	-1.36581	76.6732	-6035.62
24	200	-1.34075	78.4708	-6303.77
25	200	-1.31652	80.204	-6567.08
26	200	-1.29303	81.876	-6825.68
27	200	-1.27588	83.5038	-7080.86
28	200	-1.25357	85.0753	-7331.57
29	200	-1.23187	86.5928	-7577.95
30	200	-1.21073	88.0586	-7820.09
31	200	-1.19522	89.4872	-8059.14
32	200	-1.17499	90.8678	-8294.13
33	200	-1.15522	92.2023	-8525.18
34	204	-1.1359	93.4926	-8756.9
35	204	-1.11699	94.7402	-8984.77
36	204	-1.10306	95.957	-9209.79
37	206	-1.08482	97.1338	-9433.26
38	206	-1.06694	98.2722	-9653.05
39	208	-1.04939	99.3734	-9871.32
40	208	-1.03643	100.448	-10086.9
41	208	-1.01943	101.487	-10298.9
42	209	-1.00271	102.492	-10508.5
43	210	-0.986272	103.465	-10715.6
44	210	-0.970094	104.406	-10919.3
45	210	-0.958125	105.324	-11120.6
46	210	-0.942375	106.212	-11318.5

47	210	-0.926859	107.071	-11513.1
48	211.6	-0.911562	107.902	-11706
49	212	-0.900227	108.713	-11896.8
50	214	-0.885291	109.496	-12086.3
51	214	-0.87055	110.254	-12272.6
52	214	-0.855996	110.987	-12455.8
53	215	-0.841621	111.695	-12636.7
54	216	-0.830953	112.386	-12816.2
55	216	-0.816874	113.053	-12992.6
56	216	-0.802956	113.698	-13166.1
57	216	-0.789191	114.321	-13336.5
58	217	-0.778966	114.927	-13505.6
59	220	-0.765456	115.513	-13674
60	220	-0.752084	116.079	-13839.4
61	220	-0.738846	116.625	-14002
62	220	-0.729003	117.156	-14162.4
63	220	-0.715986	117.669	-14319.9
64	220	-0.703089	118.163	-14474.6
65	220	-0.690309	118.64	-14626.4
66	220	-0.677639	119.099	-14775.5
67	222	-0.668209	119.545	-14923.9
68	222	-0.655726	119.975	-15069.4
69	222	-0.643345	120.389	-15212.2
70	224	-0.631062	120.788	-15353.6
71	224	-0.621911	121.174	-15492.9
72	224	-0.609791	121.546	-15629.5
73	224	-0.597761	121.903	-15763.4
74	225	-0.585815	122.247	-15895.2
75	225	-0.573953	122.576	-16024.4
76	226	-0.565108	122.895	-16152.1
77	226	-0.553384	123.202	-16277.1
78	226	-0.541736	123.495	-16399.6
79	226	-0.530162	123.776	-16519.4
80	226	-0.521527	124.048	-16637.2
81	227	-0.510074	124.308	-16753
82	228	-0.498687	124.557	-16866.7
83	228	-0.487364	124.795	-16977.9
84	228	-0.478914	125.024	-17087
85	228	-0.467699	125.243	-17193.7
86	230	-0.456542	125.451	-17298.7
87	230	-0.445443	125.65	-17401.1
88	230	-0.434397	125.838	-17501
89	230	-0.426148	126.02	-17599.1
90	230	-0.415193	126.192	-17694.6
91	230	-0.40429	126.356	-17787.5
92	232	-0.393433	126.51	-17878.8
93	232	-0.385321	126.659	-17968.2
94	232	-0.374544	126.799	-18055.1
95	234	-0.363809	126.932	-18140.2
96	235	-0.353118	127.056	-18223.2
97	235	-0.342466	127.174	-18303.7
98	236	-0.334503	127.285	-18382.6
99	236	-0.323919	127.39	-18459.1
100	236	-0.31337	127.489	-18533
101	240	-0.302855	127.58	-18605.7
102	240	-0.294992	127.667	-18676.5
103	240	-0.284535	127.748	-18744.8

104	240	-0.27411	127.823	-18810.6
105	240	-0.263715	127.893	-18873.9
106	240	-0.253347	127.957	-18934.7
107	240	-0.24559	128.017	-18993.6
108	240	-0.235269	128.073	-19050.1
109	240	-0.224974	128.123	-19104.1
110	240	-0.214702	128.169	-19155.6
111	240	-0.207012	128.212	-19205.3
112	242	-0.196779	128.251	-19252.9
113	244	-0.186567	128.286	-19298.5
114	244	-0.176374	128.317	-19341.5
115	244	-0.168741	128.345	-19382.7
116	244	-0.158579	128.371	-19421.4
117	246	-0.148434	128.393	-19457.9
118	246	-0.138305	128.412	-19491.9
119	246	-0.128189	128.428	-19523.4
120	246	-0.12061	128.443	-19553.1
121	247	-0.110516	128.455	-19580.4
122	248	-0.100433	128.465	-19605.3
123	249	-0.0903606	128.473	-19627.8
124	250	-0.0828129	128.48	-19648.5
125	250	-0.0727562	128.485	-19666.7
126	250	-0.0627062	128.489	-19682.4
127	250	-0.0526632	128.492	-19695.5
128	250	-0.0426257	128.494	-19706.2
129	250	-0.0350997	128.495	-19715
130	252	-0.0250691	128.496	-19721.3
131	252	-0.0150408	128.496	-19725.1
132	252	-0.00501359	128.496	-19726.3
133	252	0.00501359	128.496	-19725.1
134	253	0.0150408	128.496	-19721.3
135	254	0.0250691	128.497	-19714.9
136	254	0.0350997	128.498	-19706
137	255	0.0426257	128.5	-19695.1
138	255	0.0526632	128.503	-19681.7
139	255	0.0627062	128.507	-19665.7
140	256	0.0727562	128.512	-19647.1
141	256	0.0828129	128.519	-19625.9
142	256	0.0903606	128.527	-19602.7
143	260	0.100433	128.537	-19576.6
144	262	0.110516	128.549	-19547.7
145	262	0.12061	128.564	-19516.1
146	263	0.128189	128.58	-19482.4
147	264	0.138305	128.599	-19445.8
148	264	0.148434	128.621	-19406.7
149	264	0.158579	128.647	-19364.8
150	264	0.168741	128.675	-19320.2
151	266	0.176374	128.706	-19273.3
152	268	0.186567	128.741	-19223.3
153	268	0.196779	128.78	-19170.6
154	268	0.207012	128.822	-19115.1
155	270	0.214702	128.869	-19057.1
156	271	0.224974	128.919	-18996.2
157	272	0.235269	128.975	-18932.2
158	280	0.24559	129.035	-18863.4
159	280	0.253347	129.099	-18792.5
160	280	0.263715	129.169	-18718.6

161	282	0.27411	129.244	-18641.3
162	284	0.284535	129.325	-18560.5
163	288	0.294992	129.412	-18475.6
164	288	0.302855	129.503	-18388.4
165	288	0.31337	129.602	-18298.1
166	290	0.323919	129.707	-18204.2
167	290	0.334503	129.818	-18107.2
168	290	0.342466	129.936	-18007.8
169	290	0.353118	130.06	-17905.4
170	296	0.363809	130.193	-17797.8
171	296	0.374544	130.333	-17686.9
172	300	0.385321	130.482	-17571.3
173	300	0.393433	130.636	-17453.3
174	300	0.40429	130.8	-17332
175	304	0.415193	130.972	-17205.8
176	308	0.426148	131.154	-17074.5
177	309	0.434397	131.342	-16940.3
178	310	0.445443	131.541	-16802.2
179	312	0.456542	131.749	-16659.7
180	314	0.467699	131.968	-16512.9
181	316	0.478914	132.197	-16361.6
182	320	0.487364	132.435	-16205.6
183	320	0.498687	132.684	-16046
184	320	0.510074	132.944	-15882.8
185	320	0.521527	133.216	-15715.9
186	324	0.530162	133.497	-15544.1
187	326	0.541736	133.79	-15367.5
188	326	0.553384	134.097	-15187.1
189	327	0.565108	134.416	-15002.3
190	328	0.573953	134.745	-14814.1
191	329	0.585815	135.089	-14621.3
192	329	0.597761	135.446	-14424.7
193	330	0.609791	135.818	-14223.4
194	330	0.621911	136.204	-14018.2
195	330	0.631062	136.603	-13810
196	330	0.643345	137.017	-13597.7
197	330	0.655726	137.447	-13381.3
198	330	0.668209	137.893	-13160.8
199	330.4	0.677639	138.352	-12936.9
200	332	0.690309	138.829	-12707.7
201	332	0.703089	139.323	-12474.3
202	334	0.715986	139.836	-12235.1
203	336	0.729003	140.367	-11990.2
204	338	0.738846	140.913	-11740.4
205	340	0.752084	141.479	-11484.7
206	340	0.765456	142.065	-11224.5
207	340	0.778966	142.671	-10959.6
208	340	0.789191	143.294	-10691.3
209	340	0.802956	143.939	-10418.3
210	340	0.816874	144.606	-10140.6
211	340	0.830953	145.297	-9858.05
212	342	0.841621	146.005	-9570.21
213	342	0.855996	146.738	-9277.46
214	344	0.87055	147.496	-8977.99
215	344	0.885291	148.279	-8673.45
216	346	0.900227	149.09	-8361.97
217	347	0.911562	149.921	-8045.66

218	348	0.926859	150.78	-7723.11
219	350	0.942375	151.668	-7393.28
220	350	0.958125	152.586	-7057.94
221	350	0.970094	153.527	-6718.41
222	353	0.986272	154.5	-6370.25
223	356	1.00271	155.505	-6013.29
224	358	1.01943	156.544	-5648.33
225	360	1.03643	157.619	-5275.22
226	360	1.04939	158.72	-4897.44
227	360	1.06694	159.858	-4513.34
228	362	1.08482	161.035	-4120.63
229	363	1.10306	162.252	-3720.22
230	364	1.11699	163.499	-3313.64
231	364	1.1359	164.79	-2900.17
232	365	1.15522	166.124	-2478.52
233	366	1.17499	167.505	-2048.47
234	367	1.19522	168.933	-1609.82
235	368	1.21073	170.399	-1164.28
236	368	1.23187	171.917	-710.95
237	370	1.25357	173.488	-247.131
238	370	1.27588	175.116	224.943
239	370	1.29303	176.788	703.365
240	370	1.31652	178.521	1190.48
241	376	1.34075	180.319	1694.6
242	380	1.36581	182.184	2213.61
243	380	1.38517	184.103	2739.97
244	380	1.41183	186.096	3276.47
245	383	1.43953	188.168	3827.81
246	384	1.46838	190.325	4391.67
247	384	1.49852	192.57	4967.1
248	384	1.52203	194.887	5551.56
249	384	1.55477	197.304	6148.59
250	384	1.58927	199.83	6758.87
251	388	1.62576	202.473	7389.67
252	389	1.65463	205.211	8033.32
253	390	1.6954	208.085	8694.52
254	390	1.7392	211.11	9372.81
255	394	1.78661	214.302	10076.7
256	395	1.83843	217.682	10802.9
257	395.4	1.88079	221.219	11546.6
258	398	1.94314	224.995	12319.9
259	400	2.01409	229.051	13125.6
260	400	2.09693	233.449	13964.4
261	409	2.17009	238.158	14851.9
262	430	2.29036	243.404	15836.8
263	440	2.45727	249.442	16918

Sample Standard Deviation = 71.0807
Numerator = 2.86218e+008
Denominator = 3.31458e+008 = 263 249.442
W Statistic = 0.863512
5% Critical value of 0.976 exceeds 0.863512
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.863512
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Alkalinity

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 67
Maximum Background Concentration = 450
Confidence Level = 94.4%
False Positive Rate = 5.6%

Well	Date	Samples	Mean	Impacted
MW#93-2	2/27/2018	1	282	FALSE
MW#93-3	2/27/2018	1	368	FALSE
MW#03-1	2/27/2018	1	72	FALSE
MW#03-2	2/27/2018	1	196	FALSE

Concentrations (mg/L)

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 114
Total Non-Detect: 89
Percent Non-Detects: 78.0702%
Total Background Samples: 23
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	23	20 (86.9565%)	6/12/2007	0.0109	0.0109
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			12/12/2012	0.0068	0.0068
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0	ND<0
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	0.006	0.006

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#03-1	22	21 (95.4545%)	6/12/2007	ND<0.005	ND<0.005
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			6/19/2013	0.008	0.008
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005

			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0	ND<0
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	ND<0.005	ND<0.005
MW#03-2	23	22 (95.6522%)	6/12/2007	ND<0.005	ND<0.005
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			12/12/2012	ND<0.005	ND<0.005
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0.005	ND<0.005
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	0.008	0.008
MW#93-2	23	3 (13.0435%)	6/12/2007	0.0343	0.0343
			12/17/2007	0.0603	0.0603
			6/11/2008	0.051	0.051
			12/3/2008	0.033	0.033
			6/17/2009	0.0525	0.0525
			12/9/2009	0.0635	0.0635
			6/17/2010	0.0179	0.0179
			12/22/2010	0.0215	0.0215
			6/29/2011	0.061	0.061
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	0.0098	0.0098
			12/12/2012	0.0562	0.0562
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	0.0353	0.0353
			6/11/2014	0.0197	0.0197
			12/3/2014	0.0274	0.0274
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	0.03	0.03
			6/22/2016	0.047	0.047
			12/20/2016	0.06	0.06
			6/6/2017	0.038	0.038
			11/7/2017	0.028	0.028
			2/27/2018	0.024	0.024
MW#93-3	23	23 (100%)	6/12/2007	ND<0.005	ND<0.005
			12/17/2007	ND<0.005	ND<0.005

6/11/2008	ND<0.005	ND<0.005
12/3/2008	ND<0.005	ND<0.005
6/17/2009	ND<0.005	ND<0.005
12/9/2009	ND<0.005	ND<0.005
6/17/2010	ND<0.005	ND<0.005
12/22/2010	ND<0.005	ND<0.005
6/29/2011	ND<0.005	ND<0.005
12/7/2011	ND<0.005	ND<0.005
6/6/2012	ND<0.005	ND<0.005
12/12/2012	ND<0.005	ND<0.005
6/19/2013	ND<0.005	ND<0.005
12/11/2013	ND<0.005	ND<0.005
6/11/2014	ND<0.005	ND<0.005
12/3/2014	ND<0.005	ND<0.005
6/17/2015	ND<0.005	ND<0.005
12/1/2015	ND<0.005	ND<0.005
6/22/2016	ND<0.005	ND<0.005
12/20/2016	ND<0.0005	ND<0.0005
6/6/2017	ND<0.005	ND<0.005
11/7/2017	ND<0.005	ND<0.005
2/27/2018	ND<0.005	ND<0.005

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.0036939
Overall Std Dev = 0.00777565
Overall Total = 0.421105
SS Wells = 0.0043354
SS Total = 0.00683206

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	0.0043354	4	0.00108385	47.319
Error (within wells)	0.00249666	109	2.29052e-005	
Totals	0.00683206	113		

47.319 exceeds 2.44724; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	6/12/2007	0.00593478
	12/17/2007	3.47826e-005
	6/11/2008	3.47826e-005
	12/3/2008	3.47826e-005
	6/17/2009	3.47826e-005
	12/9/2009	3.47826e-005
	6/17/2010	3.47826e-005
	12/22/2010	3.47826e-005
	6/29/2011	3.47826e-005
	12/7/2011	3.47826e-005
	6/6/2012	3.47826e-005
	12/12/2012	0.00183478
	6/19/2013	3.47826e-005
	12/11/2013	3.47826e-005
	6/11/2014	3.47826e-005
	12/3/2014	3.47826e-005
	6/17/2015	3.47826e-005
	12/1/2015	3.47826e-005
	6/22/2016	0.00496522
	12/20/2016	0.00446522
	6/6/2017	3.47826e-005
	11/7/2017	3.47826e-005
	2/27/2018	0.00103478

Well: MW#03-1	Sample	Residual
	6/12/2007	0.000295455
	12/17/2007	0.000295455
	6/11/2008	0.000295455
	12/3/2008	0.000295455
	6/17/2009	0.000295455
	12/9/2009	0.000295455
	6/17/2010	0.000295455

12/22/2010	0.000295455
6/29/2011	0.000295455
12/7/2011	0.000295455
6/6/2012	0.000295455
6/19/2013	0.00329545
12/11/2013	0.000295455
6/11/2014	0.000295455
12/3/2014	0.000295455
6/17/2015	0.000295455
12/1/2015	0.000295455
6/22/2016	0.00470455
12/20/2016	0.00420455
6/6/2017	0.000295455
11/7/2017	0.000295455
2/27/2018	0.000295455

Well: MW#03-2

Sample	Residual
6/12/2007	6.52174e-005
12/17/2007	6.52174e-005
6/11/2008	6.52174e-005
12/3/2008	6.52174e-005
6/17/2009	6.52174e-005
12/9/2009	6.52174e-005
6/17/2010	6.52174e-005
12/22/2010	6.52174e-005
6/29/2011	6.52174e-005
12/7/2011	6.52174e-005
6/6/2012	6.52174e-005
12/12/2012	6.52174e-005
6/19/2013	6.52174e-005
12/11/2013	6.52174e-005
6/11/2014	6.52174e-005
12/3/2014	6.52174e-005
6/17/2015	6.52174e-005
12/1/2015	6.52174e-005
6/22/2016	6.52174e-005
12/20/2016	0.00443478
6/6/2017	6.52174e-005
11/7/2017	6.52174e-005
2/27/2018	0.00306522

Well: MW#93-2

Sample	Residual
6/12/2007	0.000152174
12/17/2007	0.0261522
6/11/2008	0.0168522
12/3/2008	0.00114783
6/17/2009	0.0183522
12/9/2009	0.0293522
6/17/2010	0.0162478
12/22/2010	0.0126478
6/29/2011	0.0268522
12/7/2011	0.0291478
6/6/2012	0.0243478
12/12/2012	0.0220522
6/19/2013	0.0291478
12/11/2013	0.00115217

6/11/2014	0.0144478
12/3/2014	0.00674783
6/17/2015	0.0291478
12/1/2015	0.00414783
6/22/2016	0.0128522
12/20/2016	0.0258522
6/6/2017	0.00385217
11/7/2017	0.00614783
2/27/2018	0.0101478

Well: MW#93-3

Sample	Residual
6/12/2007	0.000195652
12/17/2007	0.000195652
6/11/2008	0.000195652
12/3/2008	0.000195652
6/17/2009	0.000195652
12/9/2009	0.000195652
6/17/2010	0.000195652
12/22/2010	0.000195652
6/29/2011	0.000195652
12/7/2011	0.000195652
6/6/2012	0.000195652
12/12/2012	0.000195652
6/19/2013	0.000195652
12/11/2013	0.000195652
6/11/2014	0.000195652
12/3/2014	0.000195652
6/17/2015	0.000195652
12/1/2015	0.000195652
6/22/2016	0.000195652
12/20/2016	0.00430435
6/6/2017	0.000195652
11/7/2017	0.000195652
2/27/2018	0.000195652

Shapiro-Francia Test of Normality

Parameter: Arsenic

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 114

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	0	-2.40892	5.80292	0
2	0	-2.12007	10.2976	0
3	0.0005	-1.94314	14.0734	-0.000971568
4	0.0005	-1.82501	17.404	-0.00188407
5	0.0005	-1.71688	20.3517	-0.00274251
6	0.0005	-1.62576	22.9948	-0.00355539
7	0.005	-1.55477	25.4121	-0.0113293
8	0.005	-1.48328	27.6123	-0.0187457
9	0.005	-1.41865	29.6248	-0.0258389
10	0.005	-1.36581	31.4903	-0.032668
11	0.005	-1.31058	33.2079	-0.0392209
12	0.005	-1.25908	34.7932	-0.0455163
13	0.005	-1.21073	36.259	-0.0515699
14	0.005	-1.17	37.6279	-0.0574199
15	0.005	-1.12639	38.8967	-0.0630519
16	0.005	-1.08482	40.0735	-0.068476
17	0.005	-1.04939	41.1748	-0.0737229
18	0.005	-1.01104	42.1969	-0.0787781
19	0.005	-0.974114	43.1458	-0.0836487
20	0.005	-0.942375	44.0339	-0.0883605
21	0.005	-0.907769	44.858	-0.0928994
22	0.005	-0.874218	45.6222	-0.0972705
23	0.005	-0.841621	46.3305	-0.101479
24	0.005	-0.813379	46.9921	-0.105545
25	0.005	-0.782366	47.6042	-0.109457
26	0.005	-0.752084	48.1699	-0.113218
27	0.005	-0.725736	48.6965	-0.116846
28	0.005	-0.696684	49.1819	-0.12033
29	0.005	-0.668209	49.6284	-0.123671
30	0.005	-0.643345	50.0423	-0.126888
31	0.005	-0.615839	50.4216	-0.129967
32	0.005	-0.588793	50.7682	-0.132911
33	0.005	-0.565108	51.0876	-0.135736
34	0.005	-0.538836	51.3779	-0.13843
35	0.005	-0.51293	51.641	-0.140995
36	0.005	-0.487364	51.8786	-0.143432
37	0.005	-0.464904	52.0947	-0.145756
38	0.005	-0.439913	52.2882	-0.147956
39	0.005	-0.415193	52.4606	-0.150032
40	0.005	-0.393433	52.6154	-0.151999
41	0.005	-0.369171	52.7517	-0.153845
42	0.005	-0.345126	52.8708	-0.155571
43	0.005	-0.323919	52.9757	-0.15719
44	0.005	-0.300232	53.0659	-0.158691
45	0.005	-0.276714	53.1424	-0.160075
46	0.005	-0.253347	53.2066	-0.161342

47	0.005	-0.232693	53.2608	-0.162505
48	0.005	-0.209575	53.3047	-0.163553
49	0.005	-0.186567	53.3395	-0.164486
50	0.005	-0.166199	53.3671	-0.165317
51	0.005	-0.143367	53.3877	-0.166034
52	0.005	-0.12061	53.4022	-0.166637
53	0.005	-0.100433	53.4123	-0.167139
54	0.005	-0.0777834	53.4183	-0.167528
55	0.005	-0.0551734	53.4214	-0.167804
56	0.005	-0.0350997	53.4226	-0.167979
57	0.005	-0.0125328	53.4228	-0.168042
58	0.005	0.0125328	53.4229	-0.167979
59	0.005	0.0350997	53.4242	-0.167804
60	0.005	0.0551734	53.4272	-0.167528
61	0.005	0.0777834	53.4333	-0.167139
62	0.005	0.100433	53.4433	-0.166637
63	0.005	0.12061	53.4579	-0.166034
64	0.005	0.143367	53.4784	-0.165317
65	0.005	0.166199	53.5061	-0.164486
66	0.005	0.186567	53.5409	-0.163553
67	0.005	0.209575	53.5848	-0.162505
68	0.005	0.232693	53.6389	-0.161342
69	0.005	0.253347	53.7031	-0.160075
70	0.005	0.276714	53.7797	-0.158691
71	0.005	0.300232	53.8698	-0.15719
72	0.005	0.323919	53.9748	-0.155571
73	0.005	0.345126	54.0939	-0.153845
74	0.005	0.369171	54.2302	-0.151999
75	0.005	0.393433	54.385	-0.150032
76	0.005	0.415193	54.5573	-0.147956
77	0.005	0.439913	54.7509	-0.145756
78	0.005	0.464904	54.967	-0.143432
79	0.005	0.487364	55.2045	-0.140995
80	0.005	0.51293	55.4676	-0.13843
81	0.005	0.538836	55.758	-0.135736
82	0.005	0.565108	56.0773	-0.132911
83	0.005	0.588793	56.424	-0.129967
84	0.005	0.615839	56.8032	-0.126888
85	0.005	0.643345	57.2171	-0.123671
86	0.005	0.668209	57.6636	-0.12033
87	0.005	0.696684	58.149	-0.116846
88	0.005	0.725736	58.6757	-0.113218
89	0.005	0.752084	59.2413	-0.109457
90	0.006	0.782366	59.8534	-0.104763
91	0.0068	0.813379	60.515	-0.0992321
92	0.008	0.841621	61.2233	-0.0924992
93	0.008	0.874218	61.9876	-0.0855054
94	0.0098	0.907769	62.8116	-0.0766093
95	0.0109	0.942375	63.6997	-0.0663374
96	0.0179	0.974114	64.6486	-0.0489008
97	0.0197	1.01104	65.6708	-0.0289834
98	0.0215	1.04939	66.772	-0.00642155
99	0.024	1.08482	67.9489	0.0196142
100	0.0274	1.12639	69.2176	0.0504773
101	0.028	1.17	70.5865	0.0832373
102	0.03	1.21073	72.0524	0.119559
103	0.033	1.25908	73.6377	0.161109

104	0.0343	1.31058	75.3553	0.206062
105	0.0353	1.36581	77.2207	0.254275
106	0.038	1.41865	79.2333	0.308184
107	0.047	1.48328	81.4334	0.377898
108	0.051	1.55477	83.8507	0.457191
109	0.0525	1.62576	86.4938	0.542544
110	0.0562	1.71688	89.4415	0.639033
111	0.06	1.82501	92.7722	0.748533
112	0.0603	1.94314	96.548	0.865704
113	0.061	2.12007	101.043	0.995028

Sample Standard Deviation = 0.0146171
Numerator = 0.990081
Denominator = 2.43954 = 113 101.043
W Statistic = 0.405848
5% Critical value of 0.976 exceeds 0.405848
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.405848
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 78.0702%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 23
Maximum Background Concentration = 0.0109
Confidence Level = 85.2%
False Positive Rate = 14.8%

Well	Date	Samples	Mean	Impacted
MW#03-1	2/27/2018	1	0.005	FALSE
MW#03-2	2/27/2018	1	0.008	FALSE
MW#93-2	2/27/2018	1	0.024	TRUE
MW#93-3	2/27/2018	1	0.005	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 13.6364%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 22
Maximum Baseline Concentration = 0.0635
Confidence Level = 95.7%
False Positive Rate = 4.3%

Baseline Samples	Date	Result
	6/12/2007	0.0343
	12/17/2007	0.0603
	6/11/2008	0.051
	12/3/2008	0.033
	6/17/2009	0.0525
	12/9/2009	0.0635
	6/17/2010	0.0179
	12/22/2010	0.0215
	6/29/2011	0.061
	12/7/2011	ND<0.005
	6/6/2012	0.0098
	12/12/2012	0.0562
	6/19/2013	ND<0.005
	12/11/2013	0.0353
	6/11/2014	0.0197
	12/3/2014	0.0274
	6/17/2015	ND<0.005
	12/1/2015	0.03
	6/22/2016	0.047
	12/20/2016	0.06
	6/6/2017	0.038
	11/7/2017	0.028

Date	Samples	Mean	Impacted
2/27/2018	1	0.024	FALSE

Concentrations (mg/L)

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 50
Total Non-Detect: 18
Percent Non-Detects: 36%
Total Background Samples: 10
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	10	0 (0%)	10/11/2016	0.429	0.429
			12/20/2016	0.386	0.386
			2/16/2017	0.341	0.341
			3/8/2017	0.348	0.348
			5/9/2017	0.366	0.366
			6/6/2017	0.371	0.371
			8/22/2017	0.458	0.458
			9/22/2017	0.499	0.499
			11/7/2017	0.46	0.46
			2/27/2018	0.33	0.33

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#03-1	10	7 (70%)	10/11/2016	ND<0.025	ND<0.025
			12/20/2016	ND<0.025	ND<0.025
			2/16/2017	ND<0.025	ND<0.025
			3/8/2017	ND<0.025	ND<0.025
			5/9/2017	0.041	0.041
			6/6/2017	ND<0.025	ND<0.025
			8/22/2017	ND<0.025	ND<0.025
			9/22/2017	0.025	0.025
			11/7/2017	ND<0.1	ND<0.1
			2/27/2018	0.05	0.05
MW#03-2	10	9 (90%)	10/11/2016	ND<0.025	ND<0.025
			12/20/2016	ND<0.025	ND<0.025
			2/16/2017	ND<0.025	ND<0.025
			3/8/2017	ND<0.025	ND<0.025
			5/9/2017	0.032	0.032
			6/6/2017	ND<0.025	ND<0.025
			8/22/2017	ND<0.025	ND<0.025
			9/22/2017	ND<0.025	ND<0.025
			11/7/2017	ND<0.1	ND<0.1
			2/27/2018	ND<0.05	ND<0.05
MW#93-2	10	0 (0%)	10/11/2016	2.86	2.86
			12/20/2016	2.31	2.31
			2/16/2017	2.09	2.09
			3/8/2017	2.07	2.07
			5/9/2017	1.97	1.97
			6/6/2017	1.83	1.83
			8/22/2017	2.38	2.38

			9/22/2017	2.48	2.48
			11/7/2017	0.46	0.46
			2/27/2018	0.064	0.064
MW#93-3	10	2 (20%)	10/11/2016	0.079	0.079
			12/20/2016	0.08	0.08
			2/16/2017	0.126	0.126
			3/8/2017	0.09	0.09
			5/9/2017	0.139	0.139
			6/6/2017	ND<0.025	ND<0.025
			8/22/2017	0.119	0.119
			9/22/2017	0.118	0.118
			11/7/2017	ND<0.1	ND<0.1
			2/27/2018	0.089	0.089

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.149212
Overall Std Dev = 0.35253
Overall Total = 7.4606
SS Wells = 3.01928
SS Total = 6.0896

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	3.01928	4	0.75482	11.063
Error (within wells)	3.07031	45	0.0682292	
Totals	6.0896	49		

11.063 exceeds 2.52521; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	10/11/2016	0.0302
	12/20/2016	0.0128
	2/16/2017	0.0578
	3/8/2017	0.0508
	5/9/2017	0.0328
	6/6/2017	0.0278
	8/22/2017	0.0592
	9/22/2017	0.1002
	11/7/2017	0.0612
	2/27/2018	0.0688

Well: MW#03-1	Sample	Residual
	10/11/2016	0.0116
	12/20/2016	0.0116
	2/16/2017	0.0116
	3/8/2017	0.0116
	5/9/2017	0.0044
	6/6/2017	0.0116
	8/22/2017	0.0116
	9/22/2017	0.0116
	11/7/2017	0.0634
	2/27/2018	0.0134

Well: MW#03-2	Sample	Residual
	10/11/2016	0.0107
	12/20/2016	0.0107
	2/16/2017	0.0107
	3/8/2017	0.0107
	5/9/2017	0.0037
	6/6/2017	0.0107
	8/22/2017	0.0107

9/22/2017	0.0107
11/7/2017	0.0643
2/27/2018	0.0143

Well: MW#93-2	Sample	Residual
	10/11/2016	1.0086
	12/20/2016	0.4586
	2/16/2017	0.2386
	3/8/2017	0.2186
	5/9/2017	0.1186
	6/6/2017	0.0214
	8/22/2017	0.5286
	9/22/2017	0.6286
	11/7/2017	1.3914
	2/27/2018	1.7874

Well: MW#93-3	Sample	Residual
	10/11/2016	0.0175
	12/20/2016	0.0165
	2/16/2017	0.0295
	3/8/2017	0.0065
	5/9/2017	0.0425
	6/6/2017	0.0715
	8/22/2017	0.0225
	9/22/2017	0.0215
	11/7/2017	0.0035
	2/27/2018	0.0075

Shapiro-Wilks Test of Normality

Parameter: Boron

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 25; Samples = 50

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.025	2.86	2.835	0.3751	1.06341
2	0.025	2.48	2.455	0.2574	0.631917
3	0.025	2.38	2.355	0.226	0.53223
4	0.025	2.31	2.285	0.2032	0.464312
5	0.025	2.09	2.065	0.1847	0.381406
6	0.025	2.07	2.045	0.1691	0.345809
7	0.025	1.97	1.945	0.1554	0.302253
8	0.025	1.83	1.805	0.143	0.258115
9	0.025	0.499	0.474	0.1317	0.0624258
10	0.025	0.46	0.435	0.1212	0.052722
11	0.025	0.46	0.435	0.1113	0.0484155
12	0.025	0.458	0.433	0.102	0.044166
13	0.025	0.429	0.404	0.0932	0.0376528
14	0.025	0.386	0.361	0.0846	0.0305406
15	0.025	0.371	0.346	0.0764	0.0264344
16	0.032	0.366	0.334	0.0685	0.022879
17	0.041	0.348	0.307	0.0608	0.0186656
18	0.05	0.341	0.291	0.0532	0.0154812
19	0.05	0.33	0.28	0.0459	0.012852
20	0.064	0.139	0.075	0.0386	0.002895
21	0.079	0.126	0.047	0.0314	0.0014758
22	0.08	0.119	0.039	0.0244	0.0009516
23	0.089	0.118	0.029	0.0174	0.0005046
24	0.09	0.1	0.01	0.0104	0.000104
25	0.1	0.1	0	0.0035	0
26	0.1	0.1	0		
27	0.1	0.09	-0.01		
28	0.118	0.089	-0.029		
29	0.119	0.08	-0.039		
30	0.126	0.079	-0.047		
31	0.139	0.064	-0.075		
32	0.33	0.05	-0.28		
33	0.341	0.05	-0.291		
34	0.348	0.041	-0.307		
35	0.366	0.032	-0.334		
36	0.371	0.025	-0.346		
37	0.386	0.025	-0.361		
38	0.429	0.025	-0.404		
39	0.458	0.025	-0.433		
40	0.46	0.025	-0.435		
41	0.46	0.025	-0.435		
42	0.499	0.025	-0.474		
43	1.83	0.025	-1.805		
44	1.97	0.025	-1.945		
45	2.07	0.025	-2.045		
46	2.09	0.025	-2.065		

47	2.31	0.025	-2.285
48	2.38	0.025	-2.355
49	2.48	0.025	-2.455
50	2.86	0.025	-2.835

Sum of b values = 4.35762
Sample Standard Deviation = 0.801608
W Statistic = 0.603084
5% Critical value of 0.947 exceeds 0.603084
Evidence of non-normality at 95% level of significance
1% Critical value of 0.93 exceeds 0.603084
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 36%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 10
Maximum Background Concentration = 0.499
Confidence Level = 71.4%
False Positive Rate = 28.6%

Well	Date	Samples	Mean	Impacted
MW#03-1	2/27/2018	1	0.05	FALSE
MW#03-2	2/27/2018	1	0.05	FALSE
MW#93-2	2/27/2018	1	0.064	FALSE
MW#93-3	2/27/2018	1	0.089	FALSE

Concentrations (mg/l)

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 271
Total Non-Detect: 5
Percent Non-Detects: 1.84502%
Total Background Samples: 69
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	69	0 (0%)	12/15/1994	30	30
			3/14/1995	38	38
			6/21/1995	37	37
			12/14/1995	24	24
			3/6/1996	20	20
			4/25/1996	32	32
			10/2/1996	40	40
			12/10/1996	30	30
			3/11/1997	4	4
			4/15/1997	28	28
			8/14/1997	33	33
			12/4/1997	29	29
			3/31/1998	30	30
			6/23/1998	37	37
			8/11/1998	24	24
			12/8/1998	31	31
			3/9/1999	30	30
			6/8/1999	35	35
			8/19/1999	40	40
			12/14/1999	40	40
			3/7/2000	50	50
			6/23/2000	52	52
			12/12/2000	54	54
			3/27/2001	60	60
			6/28/2001	58	58
			9/10/2001	46	46
			12/18/2001	46	46
			3/19/2002	42	42
			6/26/2002	51	51
			9/18/2002	57	57
			12/11/2002	56	56
			3/13/2003	56	56
			6/25/2003	63	63
			9/26/2003	59	59
			12/10/2003	40	40
			3/9/2004	58	58
			6/24/2004	61	61
			9/15/2004	44	44
			12/15/2004	48	48
			3/16/2005	42	42
			6/15/2005	42	42
			9/21/2005	42	42
			12/21/2005	58	58
			3/15/2006	50	50

			6/21/2006	31	31
			12/20/2006	35	35
			6/12/2007	24	24
			12/17/2007	27	27
			6/11/2008	29	29
			12/3/2008	28	28
			6/17/2009	20	20
			12/9/2009	24	24
			6/17/2010	17	17
			12/22/2010	20	20
			6/29/2011	20.8	20.8
			12/7/2011	17.6	17.6
			6/6/2012	23.8	23.8
			12/12/2012	22.2	22.2
			6/19/2013	21.5	21.5
			12/11/2013	17.6	17.6
			6/11/2014	19.3	19.3
			12/3/2014	16.9	16.9
			6/17/2015	13	13
			12/1/2015	15.2	15.2
			6/22/2016	13	13
			12/20/2016	15.2	15.2
			6/6/2017	16.1	16.1
			11/7/2017	16.2	16.2
			2/27/2018	15.6	15.6

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	70	0 (0%)	12/15/1994	400	400
			3/14/1995	1500	1500
			6/21/1995	75	75
			12/14/1995	1749	1749
			3/6/1996	1674	1674
			4/25/1996	1999	1999
			10/2/1996	1553	1553
			12/10/1996	1560	1560
			3/11/1997	1634	1634
			4/15/1997	1700	1700
			8/14/1997	2149	2149
			12/4/1997	1769	1769
			3/31/1998	2000	2000
			6/23/1998	2099	2099
			8/11/1998	1874	1874
			12/8/1998	1922	1922
			3/9/1999	1700	1700
			6/8/1999	1739	1739
			8/19/1999	1800	1800
			12/14/1999	1800	1800
			3/7/2000	1328	1328
			6/23/2000	950	950
			12/12/2000	1789	1789
			3/27/2001	1749	1749
			6/28/2001	1799	1799
			9/10/2001	2050	2050
			12/18/2001	1600	1600

			3/19/2002	1730	1730
			6/26/2002	1699	1699
			9/18/2002	1674	1674
			12/11/2002	1613	1613
			3/13/2003	1510	1510
			6/25/2003	1800	1800
			9/26/2003	1616	1616
			12/10/2003	1509	1509
			3/9/2004	1800	1800
			6/24/2004	1892	1892
			9/15/2004	1435	1435
			12/15/2004	1600	1600
			3/16/2005	1325	1325
			6/15/2005	1400	1400
			9/21/2005	1412	1412
			12/21/2005	1550	1550
			3/15/2006	1375	1375
			6/21/2006	1500	1500
			12/20/2006	1250	1250
			2/21/2007	1250	1250
			6/12/2007	1350	1350
			12/17/2007	1399	1399
			6/11/2008	1210	1210
			12/3/2008	1584	1584
			6/17/2009	750	750
			12/9/2009	875	875
			6/17/2010	1500	1500
			12/22/2010	1600	1600
			6/29/2011	1670	1670
			12/7/2011	1510	1510
			6/6/2012	1610	1610
			12/12/2012	1750	1750
			6/19/2013	1390	1390
			12/11/2013	1410	1410
			6/11/2014	1360	1360
			12/3/2014	1520	1520
			6/17/2015	47.7	47.7
			12/1/2015	1760	1760
			6/22/2016	1300	1300
			12/20/2016	1690	1690
			6/6/2017	1580	1580
			11/7/2017	1160	1160
			2/27/2018	1270	1270
MW#93-3	69	0 (0%)	12/15/1994	440	440
			3/14/1995	420	420
			6/21/1995	420	420
			12/14/1995	406	406
			3/6/1996	368	368
			4/25/1996	384	384
			10/2/1996	430	430
			12/10/1996	377	377
			3/11/1997	375	375
			4/15/1997	400	400
			8/14/1997	916	916
			12/4/1997	249	249
			3/31/1998	275	275

6/23/1998	246	246
8/11/1998	500	500
12/8/1998	260	260
3/9/1999	280	280
6/8/1999	214	214
8/19/1999	260	260
12/14/1999	200	200
3/7/2000	232	232
6/23/2000	270	270
12/12/2000	196	196
3/27/2001	190	190
6/28/2001	180	180
9/10/2001	202	202
12/18/2001	149	149
3/19/2002	203	203
6/26/2002	180	180
9/18/2002	185	185
12/11/2002	178	178
3/13/2003	207	207
6/25/2003	190	190
9/26/2003	158	158
12/10/2003	140	140
3/9/2004	13	13
6/24/2004	160	160
9/15/2004	139	139
12/15/2004	122	122
3/16/2005	180	180
6/15/2005	150	150
9/21/2005	215	215
12/21/2005	180	180
3/15/2006	221	221
6/21/2006	210	210
12/20/2006	210	210
6/12/2007	110	110
12/17/2007	131	131
6/11/2008	144	144
12/3/2008	152	152
6/17/2009	120	120
12/9/2009	175	175
6/17/2010	150	150
12/22/2010	170	170
6/29/2011	170	170
12/7/2011	98.9	98.9
6/6/2012	194	194
12/12/2012	168	168
6/19/2013	194	194
12/11/2013	173	173
6/11/2014	254	254
12/3/2014	194	194
6/17/2015	168	168
12/1/2015	280	280
6/22/2016	518	518
12/20/2016	475	475
6/6/2017	113	113
11/7/2017	402	402
2/27/2018	435	435

MW#03-1	29	4 (13.7931%)	6/24/2004	10	10
			9/15/2004	22	22
			12/15/2004	6	6
			3/16/2005	4	4
			6/15/2005	6	6
			9/21/2005	5	5
			12/20/2006	5	5
			6/12/2007	4	4
			12/17/2007	3	3
			6/11/2008	11	11
			12/3/2008	11	11
			6/17/2009	4	4
			12/9/2009	32	32
			6/17/2010	5	5
			12/22/2010	8.7	8.7
			6/29/2011	4.86	4.86
			12/7/2011	5.88	5.88
			6/6/2012	9.36	9.36
			6/19/2013	ND<5	ND<5
			12/11/2013	ND<5	ND<5
			6/11/2014	44	44
			12/3/2014	ND<5	ND<5
			6/17/2015	ND<5	ND<5
			12/1/2015	0.777	0.777
			6/22/2016	0.628	0.628
			12/20/2016	0.786	0.786
			6/6/2017	0.887	0.887
			11/7/2017	1.13	1.13
			2/27/2018	1.07	1.07
MW#03-2	34	1 (2.94118%)	6/24/2004	36	36
			9/15/2004	4	4
			12/15/2004	28	28
			3/16/2005	30	30
			6/15/2005	30	30
			9/21/2005	27	27
			12/21/2005	26	26
			3/15/2006	27	27
			6/21/2006	23	23
			12/20/2006	35	35
			6/12/2007	30	30
			12/17/2007	20	20
			6/11/2008	41	41
			12/3/2008	46	46
			6/17/2009	60	60
			12/9/2009	45	45
			6/17/2010	33	33
			12/22/2010	29	29
			6/29/2011	28.4	28.4
			12/7/2011	23.5	23.5
			6/6/2012	29.3	29.3
			12/12/2012	28.3	28.3
			6/19/2013	32.1	32.1
			12/11/2013	32.8	32.8
			6/11/2014	ND<5	ND<5
			12/3/2014	51.2	51.2
			6/17/2015	54.7	54.7

12/1/2015	67.8	67.8
6/22/2016	79.7	79.7
10/11/2016	88.4	88.4
12/20/2016	126	126
6/6/2017	117	117
11/7/2017	288	288
2/27/2018	247	247

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 102.299
Overall Std Dev = 183.953
Overall Total = 27723.1
SS Wells = 2.80034e+006
SS Total = 9.13646e+006

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	2.80034e+006	4	700086	29.3907
Error (within wells)	6.33612e+006	266	23820	
Totals	9.13646e+006	270		

29.3907 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	4.28986
	3/14/1995	3.71014
	6/21/1995	2.71014
	12/14/1995	10.2899
	3/6/1996	14.2899
	4/25/1996	2.28986
	10/2/1996	5.71014
	12/10/1996	4.28986
	3/11/1997	30.2899
	4/15/1997	6.28986
	8/14/1997	1.28986
	12/4/1997	5.28986
	3/31/1998	4.28986
	6/23/1998	2.71014
	8/11/1998	10.2899
	12/8/1998	3.28986
	3/9/1999	4.28986
	6/8/1999	0.710145
	8/19/1999	5.71014
	12/14/1999	5.71014
	3/7/2000	15.7101
	6/23/2000	17.7101
	12/12/2000	19.7101
	3/27/2001	25.7101
	6/28/2001	23.7101
	9/10/2001	11.7101
	12/18/2001	11.7101
	3/19/2002	7.71014
	6/26/2002	16.7101
	9/18/2002	22.7101
	12/11/2002	21.7101
	3/13/2003	21.7101

6/25/2003	28.7101
9/26/2003	24.7101
12/10/2003	5.71014
3/9/2004	23.7101
6/24/2004	26.7101
9/15/2004	9.71014
12/15/2004	13.7101
3/16/2005	7.71014
6/15/2005	7.71014
9/21/2005	7.71014
12/21/2005	23.7101
3/15/2006	15.7101
6/21/2006	3.28986
12/20/2006	0.710145
6/12/2007	10.2899
12/17/2007	7.28986
6/11/2008	5.28986
12/3/2008	6.28986
6/17/2009	14.2899
12/9/2009	10.2899
6/17/2010	17.2899
12/22/2010	14.2899
6/29/2011	13.4899
12/7/2011	16.6899
6/6/2012	10.4899
12/12/2012	12.0899
6/19/2013	12.7899
12/11/2013	16.6899
6/11/2014	14.9899
12/3/2014	17.3899
6/17/2015	21.2899
12/1/2015	19.0899
6/22/2016	21.2899
12/20/2016	19.0899
6/6/2017	18.1899
11/7/2017	18.0899
2/27/2018	18.6899

Well: MW#93-2

Sample	Residual
12/15/1994	1117.1
3/14/1995	17.0957
6/21/1995	1442.1
12/14/1995	231.904
3/6/1996	156.904
4/25/1996	481.904
10/2/1996	35.9043
12/10/1996	42.9043
3/11/1997	116.904
4/15/1997	182.904
8/14/1997	631.904
12/4/1997	251.904
3/31/1998	482.904
6/23/1998	581.904
8/11/1998	356.904
12/8/1998	404.904
3/9/1999	182.904
6/8/1999	221.904

8/19/1999	282.904
12/14/1999	282.904
3/7/2000	189.096
6/23/2000	567.096
12/12/2000	271.904
3/27/2001	231.904
6/28/2001	281.904
9/10/2001	532.904
12/18/2001	82.9043
3/19/2002	212.904
6/26/2002	181.904
9/18/2002	156.904
12/11/2002	95.9043
3/13/2003	7.09571
6/25/2003	282.904
9/26/2003	98.9043
12/10/2003	8.09571
3/9/2004	282.904
6/24/2004	374.904
9/15/2004	82.0957
12/15/2004	82.9043
3/16/2005	192.096
6/15/2005	117.096
9/21/2005	105.096
12/21/2005	32.9043
3/15/2006	142.096
6/21/2006	17.0957
12/20/2006	267.096
2/21/2007	267.096
6/12/2007	167.096
12/17/2007	118.096
6/11/2008	307.096
12/3/2008	66.9043
6/17/2009	767.096
12/9/2009	642.096
6/17/2010	17.0957
12/22/2010	82.9043
6/29/2011	152.904
12/7/2011	7.09571
6/6/2012	92.9043
12/12/2012	232.904
6/19/2013	127.096
12/11/2013	107.096
6/11/2014	157.096
12/3/2014	2.90429
6/17/2015	1469.4
12/1/2015	242.904
6/22/2016	217.096
12/20/2016	172.904
6/6/2017	62.9043
11/7/2017	357.096
2/27/2018	247.096

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	192.625
	3/14/1995	172.625
	6/21/1995	172.625

12/14/1995	158.625
3/6/1996	120.625
4/25/1996	136.625
10/2/1996	182.625
12/10/1996	129.625
3/11/1997	127.625
4/15/1997	152.625
8/14/1997	668.625
12/4/1997	1.62464
3/31/1998	27.6246
6/23/1998	1.37536
8/11/1998	252.625
12/8/1998	12.6246
3/9/1999	32.6246
6/8/1999	33.3754
8/19/1999	12.6246
12/14/1999	47.3754
3/7/2000	15.3754
6/23/2000	22.6246
12/12/2000	51.3754
3/27/2001	57.3754
6/28/2001	67.3754
9/10/2001	45.3754
12/18/2001	98.3754
3/19/2002	44.3754
6/26/2002	67.3754
9/18/2002	62.3754
12/11/2002	69.3754
3/13/2003	40.3754
6/25/2003	57.3754
9/26/2003	89.3754
12/10/2003	107.375
3/9/2004	234.375
6/24/2004	87.3754
9/15/2004	108.375
12/15/2004	125.375
3/16/2005	67.3754
6/15/2005	97.3754
9/21/2005	32.3754
12/21/2005	67.3754
3/15/2006	26.3754
6/21/2006	37.3754
12/20/2006	37.3754
6/12/2007	137.375
12/17/2007	116.375
6/11/2008	103.375
12/3/2008	95.3754
6/17/2009	127.375
12/9/2009	72.3754
6/17/2010	97.3754
12/22/2010	77.3754
6/29/2011	77.3754
12/7/2011	148.475
6/6/2012	53.3754
12/12/2012	79.3754
6/19/2013	53.3754
12/11/2013	74.3754

6/11/2014	6.62464
12/3/2014	53.3754
6/17/2015	79.3754
12/1/2015	32.6246
6/22/2016	270.625
12/20/2016	227.625
6/6/2017	134.375
11/7/2017	154.625
2/27/2018	187.625

Well: MW#03-1	Sample	Residual
	6/24/2004	2.20421
	9/15/2004	14.2042
	12/15/2004	1.79579
	3/16/2005	3.79579
	6/15/2005	1.79579
	9/21/2005	2.79579
	12/20/2006	2.79579
	6/12/2007	3.79579
	12/17/2007	4.79579
	6/11/2008	3.20421
	12/3/2008	3.20421
	6/17/2009	3.79579
	12/9/2009	24.2042
	6/17/2010	2.79579
	12/22/2010	0.904207
	6/29/2011	2.93579
	12/7/2011	1.91579
	6/6/2012	1.56421
	6/19/2013	2.79579
	12/11/2013	2.79579
	6/11/2014	36.2042
	12/3/2014	2.79579
	6/17/2015	2.79579
	12/1/2015	7.01879
	6/22/2016	7.16779
	12/20/2016	7.00979
	6/6/2017	6.90879
	11/7/2017	6.66579
	2/27/2018	6.72579

Well: MW#03-2	Sample	Residual
	6/24/2004	18.9765
	9/15/2004	50.9765
	12/15/2004	26.9765
	3/16/2005	24.9765
	6/15/2005	24.9765
	9/21/2005	27.9765
	12/21/2005	28.9765
	3/15/2006	27.9765
	6/21/2006	31.9765
	12/20/2006	19.9765
	6/12/2007	24.9765
	12/17/2007	34.9765
	6/11/2008	13.9765
	12/3/2008	8.97647

6/17/2009	5.02353
12/9/2009	9.97647
6/17/2010	21.9765
12/22/2010	25.9765
6/29/2011	26.5765
12/7/2011	31.4765
6/6/2012	25.6765
12/12/2012	26.6765
6/19/2013	22.8765
12/11/2013	22.1765
6/11/2014	49.9765
12/3/2014	3.77647
6/17/2015	0.276471
12/1/2015	12.8235
6/22/2016	24.7235
10/11/2016	33.4235
12/20/2016	71.0235
6/6/2017	62.0235
11/7/2017	233.024
2/27/2018	192.024

Shapiro-Francia Test of Normality

Parameter: Chloride

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 271

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	0.628	-2.74777	7.55021	-1.7256
2	0.777	-2.45727	13.5884	-3.6349
3	0.786	-2.29036	18.8342	-5.43512
4	0.887	-2.19728	23.6622	-7.38411
5	1.07	-2.09693	28.0593	-9.62783
6	1.13	-2.01409	32.1159	-11.9038
7	3	-1.95996	35.9574	-17.7836
8	4	-1.8957	39.551	-25.3664
9	4	-1.83843	42.9308	-32.7201
10	4	-1.79912	46.1677	-39.9166
11	4	-1.75069	49.2326	-46.9193
12	4	-1.70604	52.1431	-53.7435
13	4.86	-1.67466	54.9476	-61.8824
14	5	-1.63524	57.6216	-70.0585
15	5	-1.59819	60.1758	-78.0495
16	5	-1.57179	62.6464	-85.9084
17	5	-1.5382	65.0124	-93.5995
18	5	-1.50626	67.2812	-101.131
19	5	-1.48328	69.4814	-108.547
20	5	-1.4538	71.5949	-115.816
21	5	-1.42554	73.6271	-122.944
22	5.88	-1.40507	75.6013	-131.206
23	6	-1.37866	77.502	-139.478
24	6	-1.35317	79.3331	-147.597
25	8.7	-1.33462	81.1143	-159.208
26	9.36	-1.31058	82.8319	-171.475
27	10	-1.28727	84.489	-184.348
28	11	-1.27024	86.1025	-198.32
29	11	-1.24809	87.6602	-212.049
30	13	-1.22653	89.1646	-227.994
31	13	-1.21073	90.6305	-243.734
32	13	-1.19012	92.0469	-259.205
33	15.2	-1.17	93.4158	-276.989
34	15.2	-1.15035	94.7391	-294.474
35	15.6	-1.1359	96.0293	-312.194
36	16.1	-1.11699	97.277	-330.178
37	16.2	-1.09847	98.4836	-347.973
38	16.9	-1.08482	99.6605	-366.307
39	17	-1.06694	100.799	-384.445
40	17.6	-1.04939	101.9	-402.914
41	17.6	-1.03643	102.974	-421.155
42	19.3	-1.01943	104.013	-440.83
43	20	-1.00271	105.019	-460.884
44	20	-0.990356	106	-480.691
45	20	-0.974114	106.949	-500.174
46	20	-0.958125	107.867	-519.336

47	20.8	-0.946291	108.762	-539.019
48	21.5	-0.930718	109.628	-559.029
49	22	-0.915365	110.466	-579.167
50	22.2	-0.903992	111.283	-599.236
51	23	-0.889006	112.074	-619.683
52	23.5	-0.874218	112.838	-640.227
53	23.8	-0.863249	113.583	-660.773
54	24	-0.848786	114.304	-681.143
55	24	-0.834498	115	-701.171
56	24	-0.823893	115.679	-720.945
57	24	-0.809896	116.335	-740.382
58	26	-0.796056	116.968	-761.08
59	27	-0.785774	117.586	-782.296
60	27	-0.772193	118.182	-803.145
61	27	-0.758753	118.758	-823.631
62	28	-0.748762	119.318	-844.597
63	28	-0.735557	119.86	-865.192
64	28	-0.722479	120.382	-885.422
65	28.3	-0.712751	120.89	-905.592
66	28.4	-0.699883	121.379	-925.469
67	29	-0.687131	121.852	-945.396
68	29	-0.67449	122.306	-964.956
69	29	-0.665079	122.749	-984.243
70	29.3	-0.652622	123.175	-1003.37
71	30	-0.640266	123.585	-1022.57
72	30	-0.631062	123.983	-1041.51
73	30	-0.618872	124.366	-1060.07
74	30	-0.606775	124.734	-1078.27
75	30	-0.597761	125.091	-1096.21
76	30	-0.585815	125.435	-1113.78
77	30	-0.573953	125.764	-1131
78	31	-0.565108	126.083	-1148.52
79	31	-0.553384	126.39	-1165.67
80	32	-0.541736	126.683	-1183.01
81	32	-0.533048	126.967	-1200.07
82	32.1	-0.521527	127.239	-1216.81
83	32.8	-0.510074	127.499	-1233.54
84	33	-0.501527	127.751	-1250.09
85	33	-0.490189	127.991	-1266.26
86	35	-0.478914	128.221	-1283.03
87	35	-0.470498	128.442	-1299.49
88	35	-0.459327	128.653	-1315.57
89	36	-0.448213	128.854	-1331.71
90	37	-0.439913	129.047	-1347.98
91	37	-0.428895	129.231	-1363.85
92	38	-0.417928	129.406	-1379.73
93	40	-0.409735	129.574	-1396.12
94	40	-0.398855	129.733	-1412.08
95	40	-0.388022	129.883	-1427.6
96	40	-0.379927	130.028	-1442.79
97	41	-0.369171	130.164	-1457.93
98	42	-0.358459	130.293	-1472.99
99	42	-0.350451	130.415	-1487.71
100	42	-0.33981	130.531	-1501.98
101	42	-0.329206	130.639	-1515.8
102	44	-0.318639	130.741	-1529.82
103	44	-0.310738	130.837	-1543.5

104	45	-0.300232	130.927	-1557.01
105	46	-0.28976	131.011	-1570.34
106	46	-0.281926	131.091	-1583.3
107	46	-0.271509	131.165	-1595.79
108	47.7	-0.26112	131.233	-1608.25
109	48	-0.253347	131.297	-1620.41
110	50	-0.243007	131.356	-1632.56
111	50	-0.232693	131.41	-1644.2
112	51	-0.224974	131.461	-1655.67
113	51.2	-0.214702	131.507	-1666.66
114	52	-0.204452	131.549	-1677.29
115	54	-0.196779	131.587	-1687.92
116	54.7	-0.186567	131.622	-1698.12
117	56	-0.176374	131.653	-1708
118	56	-0.168741	131.682	-1717.45
119	57	-0.158579	131.707	-1726.49
120	58	-0.148434	131.729	-1735.1
121	58	-0.140835	131.749	-1743.27
122	58	-0.130716	131.766	-1750.85
123	59	-0.12061	131.78	-1757.96
124	60	-0.113039	131.793	-1764.75
125	60	-0.102953	131.804	-1770.92
126	61	-0.0928787	131.812	-1776.59
127	63	-0.0853288	131.82	-1781.97
128	67.8	-0.0752698	131.825	-1787.07
129	75	-0.0652187	131.83	-1791.96
130	79.7	-0.0576847	131.833	-1796.56
131	88.4	-0.0476439	131.835	-1800.77
132	98.9	-0.0376076	131.837	-1804.49
133	110	-0.0300838	131.838	-1807.8
134	113	-0.0200544	131.838	-1810.06
135	117	-0.0100272	131.838	-1811.24
136	120	0	131.838	-1811.24
137	122	0.0100272	131.838	-1810.01
138	126	0.0200544	131.839	-1807.49
139	131	0.0300838	131.839	-1803.55
140	139	0.0376076	131.841	-1798.32
141	140	0.0476439	131.843	-1791.65
142	144	0.0576847	131.846	-1783.34
143	149	0.0652187	131.851	-1773.62
144	150	0.0752698	131.856	-1762.33
145	150	0.0853288	131.864	-1749.53
146	152	0.0928787	131.872	-1735.42
147	158	0.102953	131.883	-1719.15
148	160	0.113039	131.896	-1701.06
149	168	0.12061	131.91	-1680.8
150	168	0.130716	131.927	-1658.84
151	170	0.140835	131.947	-1634.9
152	170	0.148434	131.969	-1609.67
153	173	0.158579	131.994	-1582.23
154	175	0.168741	132.023	-1552.7
155	178	0.176374	132.054	-1521.31
156	180	0.186567	132.089	-1487.73
157	180	0.196779	132.127	-1452.31
158	180	0.204452	132.169	-1415.5
159	180	0.214702	132.215	-1376.86
160	185	0.224974	132.266	-1335.24

161	190	0.232693	132.32	-1291.03
162	190	0.243007	132.379	-1244.85
163	194	0.253347	132.443	-1195.7
164	194	0.26112	132.512	-1145.05
165	194	0.271509	132.585	-1092.37
166	196	0.281926	132.665	-1037.12
167	200	0.28976	132.749	-979.165
168	202	0.300232	132.839	-918.518
169	203	0.310738	132.935	-855.438
170	207	0.318639	133.037	-789.48
171	210	0.329206	133.145	-720.347
172	210	0.33981	133.261	-648.987
173	214	0.350451	133.384	-573.99
174	215	0.358459	133.512	-496.921
175	221	0.369171	133.648	-415.335
176	232	0.379927	133.793	-327.192
177	246	0.388022	133.943	-231.738
178	247	0.398855	134.102	-133.221
179	249	0.409735	134.27	-31.1969
180	254	0.417928	134.445	74.9567
181	260	0.428895	134.629	186.469
182	260	0.439913	134.822	300.847
183	270	0.448213	135.023	421.864
184	275	0.459327	135.234	548.179
185	280	0.470498	135.456	679.918
186	280	0.478914	135.685	814.014
187	288	0.490189	135.925	955.189
188	368	0.501527	136.177	1139.75
189	375	0.510074	136.437	1331.03
190	377	0.521527	136.709	1527.64
191	384	0.533048	136.993	1732.33
192	400	0.541736	137.287	1949.03
193	400	0.553384	137.593	2170.38
194	402	0.565108	137.912	2397.56
195	406	0.573953	138.242	2630.58
196	420	0.585815	138.585	2876.62
197	420	0.597761	138.942	3127.68
198	430	0.606775	139.31	3388.6
199	435	0.618872	139.693	3657.81
200	440	0.631062	140.091	3935.47
201	475	0.640266	140.501	4239.6
202	500	0.652622	140.927	4565.91
203	518	0.665079	141.37	4910.42
204	750	0.67449	141.825	5416.29
205	875	0.687131	142.297	6017.53
206	916	0.699883	142.787	6658.62
207	950	0.712751	143.295	7335.73
208	1160	0.722479	143.817	8173.81
209	1210	0.735557	144.358	9063.83
210	1250	0.748762	144.918	9999.79
211	1250	0.758753	145.494	10948.2
212	1270	0.772193	146.09	11928.9
213	1300	0.785774	146.708	12950.4
214	1325	0.796056	147.341	14005.2
215	1328	0.809896	147.997	15080.7
216	1350	0.823893	148.676	16193
217	1360	0.834498	149.373	17327.9

218	1375	0.848786	150.093	18495
219	1390	0.863249	150.838	19694.9
220	1399	0.874218	151.602	20917.9
221	1400	0.889006	152.393	22162.5
222	1410	0.903992	153.21	23437.2
223	1412	0.915365	154.048	24729.7
224	1435	0.930718	154.914	26065.2
225	1500	0.946291	155.81	27484.7
226	1500	0.958125	156.728	28921.9
227	1500	0.974114	157.676	30383
228	1509	0.990356	158.657	31877.5
229	1510	1.00271	159.663	33391.6
230	1510	1.01943	160.702	34930.9
231	1520	1.03643	161.776	36506.3
232	1550	1.04939	162.877	38132.8
233	1553	1.06694	164.016	39789.8
234	1560	1.08482	165.193	41482.1
235	1580	1.09847	166.399	43217.7
236	1584	1.11699	167.647	44987
237	1600	1.1359	168.937	46804.4
238	1600	1.15035	170.26	48645
239	1600	1.17	171.629	50517
240	1610	1.19012	173.046	52433.1
241	1613	1.21073	174.512	54386
242	1616	1.22653	176.016	56368.1
243	1634	1.24809	177.574	58407.4
244	1670	1.27024	179.187	60528.7
245	1674	1.28727	180.844	62683.6
246	1674	1.31058	182.562	64877.5
247	1690	1.33462	184.343	67133.1
248	1699	1.35317	186.174	69432.1
249	1700	1.37866	188.075	71775.8
250	1700	1.40507	190.049	74164.4
251	1730	1.42554	192.081	76630.6
252	1739	1.4538	194.195	79158.8
253	1749	1.48328	196.395	81753.1
254	1749	1.50626	198.664	84387.5
255	1750	1.5382	201.03	87079.4
256	1760	1.57179	203.5	89845.7
257	1769	1.59819	206.054	92672.9
258	1789	1.63524	208.728	95598.3
259	1799	1.67466	211.533	98611.1
260	1800	1.70604	214.444	101682
261	1800	1.75069	217.508	104833
262	1800	1.79912	220.745	108072
263	1800	1.83843	224.125	111381
264	1874	1.8957	227.719	114933
265	1892	1.95996	231.56	118642
266	1922	2.01409	235.617	122513
267	1999	2.09693	240.014	126704
268	2000	2.19728	244.842	131099
269	2050	2.29036	250.088	135794
270	2099	2.45727	256.126	140952

Sample Standard Deviation = 659.1
Numerator = 1.98675e+010
Denominator = 3.00413e+010 = 270 256.126

W Statistic = 0.661338
5% Critical value of 0.976 exceeds 0.661338
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.661338
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 1.84502%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 69
Maximum Background Concentration = 63
Confidence Level = 94.5%
False Positive Rate = 5.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	2/27/2018	1	1270	TRUE
MW#93-3	2/27/2018	1	435	TRUE
MW#03-1	2/27/2018	1	1.07	FALSE
MW#03-2	2/27/2018	1	247	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 69
Maximum Baseline Concentration = 2149
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	400
	3/14/1995	1500
	6/21/1995	75
	12/14/1995	1749
	3/6/1996	1674
	4/25/1996	1999
	10/2/1996	1553
	12/10/1996	1560
	3/11/1997	1634
	4/15/1997	1700
	8/14/1997	2149
	12/4/1997	1769
	3/31/1998	2000
	6/23/1998	2099
	8/11/1998	1874
	12/8/1998	1922
	3/9/1999	1700
	6/8/1999	1739
	8/19/1999	1800
	12/14/1999	1800
	3/7/2000	1328
	6/23/2000	950
	12/12/2000	1789
	3/27/2001	1749
	6/28/2001	1799
	9/10/2001	2050
	12/18/2001	1600
	3/19/2002	1730
	6/26/2002	1699
	9/18/2002	1674
	12/11/2002	1613
	3/13/2003	1510
	6/25/2003	1800
	9/26/2003	1616
	12/10/2003	1509
	3/9/2004	1800
	6/24/2004	1892
	9/15/2004	1435
	12/15/2004	1600
	3/16/2005	1325
	6/15/2005	1400

9/21/2005	1412
12/21/2005	1550
3/15/2006	1375
6/21/2006	1500
12/20/2006	1250
2/21/2007	1250
6/12/2007	1350
12/17/2007	1399
6/11/2008	1210
12/3/2008	1584
6/17/2009	750
12/9/2009	875
6/17/2010	1500
12/22/2010	1600
6/29/2011	1670
12/7/2011	1510
6/6/2012	1610
12/12/2012	1750
6/19/2013	1390
12/11/2013	1410
6/11/2014	1360
12/3/2014	1520
6/17/2015	47.7
12/1/2015	1760
6/22/2016	1300
12/20/2016	1690
6/6/2017	1580
11/7/2017	1160

Date	Samples	Mean	Impacted
2/27/2018	1	1270	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 68
Maximum Baseline Concentration = 916
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	440
	3/14/1995	420
	6/21/1995	420
	12/14/1995	406
	3/6/1996	368
	4/25/1996	384
	10/2/1996	430
	12/10/1996	377
	3/11/1997	375
	4/15/1997	400
	8/14/1997	916
	12/4/1997	249
	3/31/1998	275
	6/23/1998	246
	8/11/1998	500
	12/8/1998	260
	3/9/1999	280
	6/8/1999	214
	8/19/1999	260
	12/14/1999	200
	3/7/2000	232
	6/23/2000	270
	12/12/2000	196
	3/27/2001	190
	6/28/2001	180
	9/10/2001	202
	12/18/2001	149
	3/19/2002	203
	6/26/2002	180
	9/18/2002	185
	12/11/2002	178
	3/13/2003	207
	6/25/2003	190
	9/26/2003	158
	12/10/2003	140
	3/9/2004	13
	6/24/2004	160
	9/15/2004	139
	12/15/2004	122
	3/16/2005	180
	6/15/2005	150

9/21/2005	215
12/21/2005	180
3/15/2006	221
6/21/2006	210
12/20/2006	210
6/12/2007	110
12/17/2007	131
6/11/2008	144
12/3/2008	152
6/17/2009	120
12/9/2009	175
6/17/2010	150
12/22/2010	170
6/29/2011	170
12/7/2011	98.9
6/6/2012	194
12/12/2012	168
6/19/2013	194
12/11/2013	173
6/11/2014	254
12/3/2014	194
6/17/2015	168
12/1/2015	280
6/22/2016	518
12/20/2016	475
6/6/2017	113
11/7/2017	402

Date	Samples	Mean	Impacted
2/27/2018	1	435	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-2

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 3.0303%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 33
Maximum Baseline Concentration = 288
Confidence Level = 97.1%
False Positive Rate = 2.9%

Baseline Samples	Date	Result
	6/24/2004	36
	9/15/2004	4
	12/15/2004	28
	3/16/2005	30
	6/15/2005	30
	9/21/2005	27
	12/21/2005	26
	3/15/2006	27
	6/21/2006	23
	12/20/2006	35
	6/12/2007	30
	12/17/2007	20
	6/11/2008	41
	12/3/2008	46
	6/17/2009	60
	12/9/2009	45
	6/17/2010	33
	12/22/2010	29
	6/29/2011	28.4
	12/7/2011	23.5
	6/6/2012	29.3
	12/12/2012	28.3
	6/19/2013	32.1
	12/11/2013	32.8
	6/11/2014	ND<5
	12/3/2014	51.2
	6/17/2015	54.7
	12/1/2015	67.8
	6/22/2016	79.7
	10/11/2016	88.4
	12/20/2016	126
	6/6/2017	117
	11/7/2017	288

Date	Samples	Mean	Impacted
2/27/2018	1	247	FALSE

Concentrations (mg/L)

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 50
Total Non-Detect: 7
Percent Non-Detects: 14%
Total Background Samples: 10
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	10	0 (0%)	10/11/2016	0.1	0.1
			12/20/2016	0.2	0.2
			2/16/2017	0.16	0.16
			3/8/2017	0.19	0.19
			5/9/2017	0.13	0.13
			6/6/2017	0.14	0.14
			8/22/2017	0.1	0.1
			9/22/2017	0.11	0.11
			11/7/2017	0.12	0.12
			2/27/2018	0.16	0.16

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#03-1	10	2 (20%)	10/11/2016	ND<0.1	ND<0.1
			12/20/2016	0.18	0.18
			2/16/2017	0.13	0.13
			3/8/2017	0.19	0.19
			5/9/2017	0.1	0.1
			6/6/2017	ND<0.1	ND<0.1
			8/22/2017	0.1	0.1
			9/22/2017	0.1	0.1
			11/7/2017	0.12	0.12
			2/27/2018	0.1	0.1
MW#03-2	10	4 (40%)	10/11/2016	ND<0.1	ND<0.1
			12/20/2016	0.14	0.14
			2/16/2017	0.12	0.12
			3/8/2017	0.14	0.14
			5/9/2017	ND<0.1	ND<0.1
			6/6/2017	0.1	0.1
			8/22/2017	ND<0.1	ND<0.1
			9/22/2017	ND<0.1	ND<0.1
			11/7/2017	0.1	0.1
			2/27/2018	0.12	0.12
MW#93-2	10	1 (10%)	10/11/2016	0.81	0.81
			12/20/2016	1.06	1.06
			2/16/2017	0.68	0.68
			3/8/2017	0.79	0.79
			5/9/2017	0.7	0.7
			6/6/2017	0.68	0.68
			8/22/2017	0.35	0.35

			9/22/2017	0.51	0.51
			11/7/2017	0.12	0.12
			2/27/2018	ND<0.1	ND<0.1
MW#93-3	10	0 (0%)	10/11/2016	0.15	0.15
			12/20/2016	0.23	0.23
			2/16/2017	0.2	0.2
			3/8/2017	0.22	0.22
			5/9/2017	0.18	0.18
			6/6/2017	0.24	0.24
			8/22/2017	0.23	0.23
			9/22/2017	0.2	0.2
			11/7/2017	0.2	0.2
			2/27/2018	0.21	0.21

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.06768
Overall Std Dev = 0.116411
Overall Total = 3.384
SS Wells = 0.407793
SS Total = 0.664021

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	0.407793	4	0.101948	17.9047
Error (within wells)	0.256228	45	0.00569395	
Totals	0.664021	49		

17.9047 exceeds 2.52521; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	10/11/2016	0.041
	12/20/2016	0.059
	2/16/2017	0.019
	3/8/2017	0.049
	5/9/2017	0.011
	6/6/2017	0.001
	8/22/2017	0.041
	9/22/2017	0.031
	11/7/2017	0.021
	2/27/2018	0.019

Well: MW#03-1	Sample	Residual
	10/11/2016	0.022
	12/20/2016	0.058
	2/16/2017	0.008
	3/8/2017	0.068
	5/9/2017	0.022
	6/6/2017	0.022
	8/22/2017	0.022
	9/22/2017	0.022
	11/7/2017	0.002
	2/27/2018	0.022

Well: MW#03-2	Sample	Residual
	10/11/2016	0.012
	12/20/2016	0.028
	2/16/2017	0.008
	3/8/2017	0.028
	5/9/2017	0.012
	6/6/2017	0.012
	8/22/2017	0.012

9/22/2017	0.012
11/7/2017	0.012
2/27/2018	0.008

Well: MW#93-2	Sample	Residual
	10/11/2016	0.23
	12/20/2016	0.48
	2/16/2017	0.1
	3/8/2017	0.21
	5/9/2017	0.12
	6/6/2017	0.1
	8/22/2017	0.23
	9/22/2017	0.07
	11/7/2017	0.46
	2/27/2018	0.48

Well: MW#93-3	Sample	Residual
	10/11/2016	0.056
	12/20/2016	0.024
	2/16/2017	0.006
	3/8/2017	0.014
	5/9/2017	0.026
	6/6/2017	0.034
	8/22/2017	0.024
	9/22/2017	0.006
	11/7/2017	0.006
	2/27/2018	0.004

Shapiro-Wilks Test of Normality

Parameter: Fluoride

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 25; Samples = 50

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.1	1.06	0.96	0.3751	0.360096
2	0.1	0.81	0.71	0.2574	0.182754
3	0.1	0.79	0.69	0.226	0.15594
4	0.1	0.7	0.6	0.2032	0.12192
5	0.1	0.68	0.58	0.1847	0.107126
6	0.1	0.68	0.58	0.1691	0.098078
7	0.1	0.51	0.41	0.1554	0.063714
8	0.1	0.35	0.25	0.143	0.03575
9	0.1	0.24	0.14	0.1317	0.018438
10	0.1	0.23	0.13	0.1212	0.015756
11	0.1	0.23	0.13	0.1113	0.014469
12	0.1	0.22	0.12	0.102	0.01224
13	0.1	0.21	0.11	0.0932	0.010252
14	0.1	0.2	0.1	0.0846	0.00846
15	0.1	0.2	0.1	0.0764	0.00764
16	0.11	0.2	0.09	0.0685	0.006165
17	0.12	0.2	0.08	0.0608	0.004864
18	0.12	0.19	0.07	0.0532	0.003724
19	0.12	0.19	0.07	0.0459	0.003213
20	0.12	0.18	0.06	0.0386	0.002316
21	0.12	0.18	0.06	0.0314	0.001884
22	0.13	0.16	0.03	0.0244	0.000732
23	0.13	0.16	0.03	0.0174	0.000522
24	0.14	0.15	0.01	0.0104	0.000104
25	0.14	0.14	0	0.0035	0
26	0.14	0.14	0		
27	0.15	0.14	-0.01		
28	0.16	0.13	-0.03		
29	0.16	0.13	-0.03		
30	0.18	0.12	-0.06		
31	0.18	0.12	-0.06		
32	0.19	0.12	-0.07		
33	0.19	0.12	-0.07		
34	0.2	0.12	-0.08		
35	0.2	0.11	-0.09		
36	0.2	0.1	-0.1		
37	0.2	0.1	-0.1		
38	0.21	0.1	-0.11		
39	0.22	0.1	-0.12		
40	0.23	0.1	-0.13		
41	0.23	0.1	-0.13		
42	0.24	0.1	-0.14		
43	0.35	0.1	-0.25		
44	0.51	0.1	-0.41		
45	0.68	0.1	-0.58		
46	0.68	0.1	-0.58		

47	0.7	0.1	-0.6
48	0.79	0.1	-0.69
49	0.81	0.1	-0.71
50	1.06	0.1	-0.96

Sum of b values = 1.23616
Sample Standard Deviation = 0.224002
W Statistic = 0.621511
5% Critical value of 0.947 exceeds 0.621511
Evidence of non-normality at 95% level of significance
1% Critical value of 0.93 exceeds 0.621511
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 14%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 10
Maximum Background Concentration = 0.2
Confidence Level = 71.4%
False Positive Rate = 28.6%

Well	Date	Samples	Mean	Impacted
MW#03-1	2/27/2018	1	0.1	FALSE
MW#03-2	2/27/2018	1	0.12	FALSE
MW#93-2	2/27/2018	1	0.1	FALSE
MW#93-3	2/27/2018	1	0.21	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 9
Maximum Baseline Concentration = 0.24
Confidence Level = 90%
False Positive Rate = 10%

Baseline Samples	Date	Result
	10/11/2016	0.15
	12/20/2016	0.23
	2/16/2017	0.2
	3/8/2017	0.22
	5/9/2017	0.18
	6/6/2017	0.24
	8/22/2017	0.23
	9/22/2017	0.2
	11/7/2017	0.2

Date	Samples	Mean	Impacted
2/27/2018	1	0.21	FALSE

Concentrations (std)

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 272
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 69
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	69	0 (0%)	12/15/1994	6.67	6.67
			3/14/1995	6.72	6.72
			6/21/1995	6.58	6.58
			12/14/1995	6.72	6.72
			3/6/1996	6.72	6.72
			4/25/1996	6.79	6.79
			10/2/1996	6.61	6.61
			12/10/1996	6.51	6.51
			3/11/1997	6.77	6.77
			4/15/1997	6.66	6.66
			8/14/1997	6.66	6.66
			12/4/1997	6.78	6.78
			3/31/1998	6.87	6.87
			6/23/1998	6.5	6.5
			8/11/1998	7.05	7.05
			12/8/1998	6.62	6.62
			3/9/1999	6.6	6.6
			6/8/1999	6.93	6.93
			8/19/1999	6.54	6.54
			12/14/1999	6.55	6.55
			3/7/2000	6.59	6.59
			6/23/2000	6.52	6.52
			12/12/2000	6.56	6.56
			3/27/2001	6.6	6.6
			6/28/2001	6.59	6.59
			9/10/2001	6.76	6.76
			12/18/2001	6.76	6.76
			3/19/2002	6.93	6.93
			6/26/2002	6.85	6.85
			9/18/2002	6.62	6.62
			12/11/2002	6.58	6.58
			3/13/2003	6.66	6.66
			6/25/2003	6.94	6.94
			9/26/2003	6.42	6.42
			12/10/2003	6.64	6.64
			3/9/2004	6.68	6.68
			6/24/2004	6.53	6.53
			9/15/2004	6.43	6.43
			12/15/2004	6.61	6.61
			3/16/2005	6.57	6.57
			6/15/2005	6.53	6.53
			9/21/2005	6.65	6.65
			12/21/2005	6.61	6.61
			3/15/2006	6.64	6.64

			6/21/2006	6.85	6.85
			12/20/2006	6.67	6.67
			6/12/2007	6.58	6.58
			12/17/2007	6.33	6.33
			6/11/2008	6.7	6.7
			12/3/2008	6.5	6.5
			6/17/2009	6.8	6.8
			12/9/2009	6.6	6.6
			6/17/2010	6.5	6.5
			12/22/2010	6.55	6.55
			6/29/2011	6.5	6.5
			12/7/2011	6.41	6.41
			6/6/2012	6.23	6.23
			12/12/2012	6.61	6.61
			6/19/2013	6.58	6.58
			12/11/2013	6.57	6.57
			6/11/2014	6.1	6.1
			12/3/2014	6.69	6.69
			6/17/2015	6.38	6.38
			12/1/2015	6.45	6.45
			6/22/2016	6.59	6.59
			12/20/2016	6.28	6.28
			6/6/2017	6.69	6.69
			11/7/2017	6.21	6.21
			2/27/2018	6.47	6.47

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	72	0 (0%)	12/15/1994	8.54	8.54
			3/14/1995	8.82	8.82
			6/21/1995	8.68	8.68
			12/14/1995	8.16	8.16
			3/6/1996	9.37	9.37
			4/25/1996	9.14	9.14
			10/2/1996	8.94	8.94
			12/10/1996	9.27	9.27
			3/11/1997	8.95	8.95
			4/15/1997	9.25	9.25
			8/14/1997	8.67	8.67
			12/4/1997	8.77	8.77
			3/31/1998	9.32	9.32
			6/23/1998	8.87	8.87
			8/11/1998	9	9
			12/8/1998	8.9	8.9
			3/9/1999	9.39	9.39
			6/8/1999	9.25	9.25
			8/19/1999	9.15	9.15
			12/14/1999	8.98	8.98
			3/7/2000	9.2	9.2
			6/23/2000	9.18	9.18
			12/12/2000	9.18	9.18
			3/27/2001	9.29	9.29
			6/28/2001	9.22	9.22
			9/10/2001	9.1	9.1
			12/18/2001	9.4	9.4

			3/19/2002	9.54	9.54
			6/26/2002	9.44	9.44
			9/18/2002	9.24	9.24
			12/11/2002	9.16	9.16
			3/13/2003	9.28	9.28
			6/25/2003	9.27	9.27
			9/26/2003	9.32	9.32
			12/10/2003	9.25	9.25
			3/9/2004	9.37	9.37
			6/24/2004	9.24	9.24
			9/15/2004	9.32	9.32
			12/15/2004	9.26	9.26
			3/16/2005	9.23	9.23
			6/15/2005	9.1	9.1
			9/21/2005	9.25	9.25
			12/21/2005	9.31	9.31
			3/15/2006	9.47	9.47
			6/21/2006	9.4	9.4
			12/20/2006	9.18	9.18
			2/21/2007	9.2	9.2
			6/12/2007	9.1	9.1
			12/17/2007	9.3	9.3
			6/11/2008	9.4	9.4
			12/3/2008	9.7	9.7
			12/15/2008	9.6	9.6
			6/17/2009	9.8	9.8
			12/9/2009	9.8	9.8
			6/17/2010	9.6	9.6
			12/22/2010	9.5	9.5
			6/29/2011	9.4	9.4
			12/7/2011	9.5	9.5
			6/6/2012	9.68	9.68
			12/12/2012	10.02	10.02
			1/9/2013	9.51	9.51
			6/19/2013	9.4	9.4
			12/11/2013	9.46	9.46
			6/11/2014	8.55	8.55
			12/3/2014	8.95	8.95
			6/17/2015	9.13	9.13
			12/1/2015	9.37	9.37
			6/22/2016	9.28	9.28
			12/20/2016	9.72	9.72
			6/6/2017	9.29	9.29
			11/7/2017	8.86	8.86
			2/27/2018	9.04	9.04
MW#93-3	69	0 (0%)	12/15/1994	6.68	6.68
			3/14/1995	6.74	6.74
			6/21/1995	6.61	6.61
			12/14/1995	6.75	6.75
			3/6/1996	6.85	6.85
			4/25/1996	6.78	6.78
			10/2/1996	6.75	6.75
			12/10/1996	6.7	6.7
			3/11/1997	6.8	6.8
			4/15/1997	6.74	6.74
			8/14/1997	6.88	6.88

12/4/1997	6.88	6.88
3/31/1998	6.92	6.92
6/23/1998	6.76	6.76
8/11/1998	6.91	6.91
12/8/1998	6.93	6.93
3/9/1999	6.78	6.78
6/8/1999	6.85	6.85
8/19/1999	6.97	6.97
12/14/1999	6.8	6.8
3/7/2000	6.77	6.77
6/23/2000	6.82	6.82
12/12/2000	6.86	6.86
3/27/2001	6.79	6.79
6/28/2001	6.86	6.86
9/10/2001	7.04	7.04
12/18/2001	6.93	6.93
3/19/2002	7	7
6/26/2002	6.89	6.89
9/18/2002	7.96	7.96
12/11/2002	6.74	6.74
3/13/2003	6.87	6.87
6/25/2003	6.85	6.85
9/26/2003	6.77	6.77
12/10/2003	6.99	6.99
3/9/2004	7.45	7.45
6/24/2004	6.8	6.8
9/15/2004	6.7	6.7
12/15/2004	6.88	6.88
3/16/2005	6.69	6.69
6/15/2005	6.81	6.81
9/21/2005	6.85	6.85
12/21/2005	6.7	6.7
3/15/2006	7.07	7.07
6/21/2006	6.84	6.84
12/20/2006	6.93	6.93
6/12/2007	6.89	6.89
12/17/2007	6.8	6.8
6/11/2008	6.8	6.8
12/3/2008	6.8	6.8
6/17/2009	7.2	7.2
12/9/2009	6.9	6.9
6/17/2010	6.7	6.7
12/22/2010	6.82	6.82
6/29/2011	6.7	6.7
12/7/2011	6.77	6.77
6/6/2012	6.42	6.42
12/12/2012	6.85	6.85
6/19/2013	6.49	6.49
12/11/2013	7.07	7.07
6/11/2014	6.08	6.08
12/3/2014	6.8	6.8
6/17/2015	6.4	6.4
12/1/2015	6.6	6.6
6/22/2016	6.43	6.43
12/20/2016	6.27	6.27
6/6/2017	6.65	6.65
11/7/2017	6.46	6.46

			2/27/2018	6.49	6.49
MW#03-1	29	0 (0%)	6/24/2004	7.27	7.27
			9/15/2004	6.78	6.78
			12/15/2004	7.32	7.32
			3/16/2005	7.3	7.3
			6/15/2005	7.28	7.28
			9/21/2005	7.88	7.88
			12/20/2006	7	7
			6/12/2007	7.29	7.29
			12/17/2007	6.8	6.8
			6/11/2008	7.4	7.4
			12/3/2008	7.4	7.4
			6/17/2009	7.6	7.6
			12/9/2009	7.5	7.5
			6/17/2010	7.1	7.1
			12/22/2010	6.89	6.89
			6/29/2011	7.3	7.3
			12/7/2011	7.05	7.05
			6/6/2012	7.33	7.33
			6/19/2013	7.15	7.15
			12/11/2013	7.19	7.19
			6/11/2014	6.62	6.62
			12/3/2014	6.73	6.73
			6/17/2015	6.66	6.66
			12/1/2015	6.34	6.34
			6/22/2016	7.2	7.2
			12/20/2016	6.75	6.75
			6/6/2017	6.64	6.64
			11/7/2017	6.44	6.44
			2/27/2018	6.81	6.81
MW#03-2	33	0 (0%)	6/24/2004	6.84	6.84
			9/15/2004	7.17	7.17
			12/15/2004	6.86	6.86
			3/16/2005	6.8	6.8
			6/15/2005	6.87	6.87
			9/21/2005	6.87	6.87
			12/21/2005	6.83	6.83
			3/15/2006	6.88	6.88
			6/21/2006	6.78	6.78
			12/20/2006	6.88	6.88
			6/12/2007	6.87	6.87
			12/17/2007	6.7	6.7
			6/11/2008	6.9	6.9
			12/3/2008	6.8	6.8
			6/17/2009	7.3	7.3
			12/9/2009	6.8	6.8
			6/17/2010	6.8	6.8
			12/22/2010	7.2	7.2
			6/29/2011	6.7	6.7
			12/7/2011	6.69	6.69
			6/6/2012	6.73	6.73
			12/12/2012	6.82	6.82
			6/19/2013	6.88	6.88
			12/11/2013	6.72	6.72
			6/11/2014	7	7

12/3/2014	7.14	7.14
6/17/2015	6.45	6.45
12/1/2015	6.39	6.39
6/22/2016	6.75	6.75
12/20/2016	6.36	6.36
6/6/2017	6.73	6.73
11/7/2017	6.22	6.22
2/27/2018	6.47	6.47

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.180016
Overall Std Dev = 0.188842
Overall Total = 48.9643
SS Wells = 0.874864
SS Total = 9.66416

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	0.874864	4	0.218716	6.64412
Error (within wells)	8.7893	267	0.0329187	
Totals	9.66416	271		

6.64412 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	0.0618841
	3/14/1995	0.111884
	6/21/1995	0.0281159
	12/14/1995	0.111884
	3/6/1996	0.111884
	4/25/1996	0.181884
	10/2/1996	0.00188406
	12/10/1996	0.0981159
	3/11/1997	0.161884
	4/15/1997	0.0518841
	8/14/1997	0.0518841
	12/4/1997	0.171884
	3/31/1998	0.261884
	6/23/1998	0.108116
	8/11/1998	0.441884
	12/8/1998	0.0118841
	3/9/1999	0.00811594
	6/8/1999	0.321884
	8/19/1999	0.0681159
	12/14/1999	0.0581159
	3/7/2000	0.0181159
	6/23/2000	0.0881159
	12/12/2000	0.0481159
	3/27/2001	0.00811594
	6/28/2001	0.0181159
	9/10/2001	0.151884
	12/18/2001	0.151884
	3/19/2002	0.321884
	6/26/2002	0.241884
	9/18/2002	0.0118841
	12/11/2002	0.0281159
	3/13/2003	0.0518841

6/25/2003	0.331884
9/26/2003	0.188116
12/10/2003	0.0318841
3/9/2004	0.0718841
6/24/2004	0.0781159
9/15/2004	0.178116
12/15/2004	0.00188406
3/16/2005	0.0381159
6/15/2005	0.0781159
9/21/2005	0.0418841
12/21/2005	0.00188406
3/15/2006	0.0318841
6/21/2006	0.241884
12/20/2006	0.0618841
6/12/2007	0.0281159
12/17/2007	0.278116
6/11/2008	0.0918841
12/3/2008	0.108116
6/17/2009	0.191884
12/9/2009	0.00811594
6/17/2010	0.108116
12/22/2010	0.0581159
6/29/2011	0.108116
12/7/2011	0.198116
6/6/2012	0.378116
12/12/2012	0.00188406
6/19/2013	0.0281159
12/11/2013	0.0381159
6/11/2014	0.508116
12/3/2014	0.0818841
6/17/2015	0.228116
12/1/2015	0.158116
6/22/2016	0.0181159
12/20/2016	0.328116
6/6/2017	0.0818841
11/7/2017	0.398116
2/27/2018	0.138116

Well: MW#93-2

Sample	Residual
12/15/1994	0.693056
3/14/1995	0.413056
6/21/1995	0.553056
12/14/1995	1.07306
3/6/1996	0.136944
4/25/1996	0.0930556
10/2/1996	0.293056
12/10/1996	0.0369444
3/11/1997	0.283056
4/15/1997	0.0169444
8/14/1997	0.563056
12/4/1997	0.463056
3/31/1998	0.0869444
6/23/1998	0.363056
8/11/1998	0.233056
12/8/1998	0.333056
3/9/1999	0.156944
6/8/1999	0.0169444

8/19/1999	0.0830556
12/14/1999	0.253056
3/7/2000	0.0330556
6/23/2000	0.0530556
12/12/2000	0.0530556
3/27/2001	0.0569444
6/28/2001	0.0130556
9/10/2001	0.133056
12/18/2001	0.166944
3/19/2002	0.306944
6/26/2002	0.206944
9/18/2002	0.00694444
12/11/2002	0.0730556
3/13/2003	0.0469444
6/25/2003	0.0369444
9/26/2003	0.0869444
12/10/2003	0.0169444
3/9/2004	0.136944
6/24/2004	0.00694444
9/15/2004	0.0869444
12/15/2004	0.0269444
3/16/2005	0.00305556
6/15/2005	0.133056
9/21/2005	0.0169444
12/21/2005	0.0769444
3/15/2006	0.236944
6/21/2006	0.166944
12/20/2006	0.0530556
2/21/2007	0.0330556
6/12/2007	0.133056
12/17/2007	0.0669444
6/11/2008	0.166944
12/3/2008	0.466944
12/15/2008	0.366944
6/17/2009	0.566944
12/9/2009	0.566944
6/17/2010	0.366944
12/22/2010	0.266944
6/29/2011	0.166944
12/7/2011	0.266944
6/6/2012	0.446944
12/12/2012	0.786944
1/9/2013	0.276944
6/19/2013	0.166944
12/11/2013	0.226944
6/11/2014	0.683056
12/3/2014	0.283056
6/17/2015	0.103056
12/1/2015	0.136944
6/22/2016	0.0469444
12/20/2016	0.486944
6/6/2017	0.0569444
11/7/2017	0.373056
2/27/2018	0.193056

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	0.121884

3/14/1995	0.0618841
6/21/1995	0.191884
12/14/1995	0.0518841
3/6/1996	0.0481159
4/25/1996	0.0218841
10/2/1996	0.0518841
12/10/1996	0.101884
3/11/1997	0.00188406
4/15/1997	0.0618841
8/14/1997	0.0781159
12/4/1997	0.0781159
3/31/1998	0.118116
6/23/1998	0.0418841
8/11/1998	0.108116
12/8/1998	0.128116
3/9/1999	0.0218841
6/8/1999	0.0481159
8/19/1999	0.168116
12/14/1999	0.00188406
3/7/2000	0.0318841
6/23/2000	0.0181159
12/12/2000	0.0581159
3/27/2001	0.0118841
6/28/2001	0.0581159
9/10/2001	0.238116
12/18/2001	0.128116
3/19/2002	0.198116
6/26/2002	0.0881159
9/18/2002	1.15812
12/11/2002	0.0618841
3/13/2003	0.0681159
6/25/2003	0.0481159
9/26/2003	0.0318841
12/10/2003	0.188116
3/9/2004	0.648116
6/24/2004	0.00188406
9/15/2004	0.101884
12/15/2004	0.0781159
3/16/2005	0.111884
6/15/2005	0.00811594
9/21/2005	0.0481159
12/21/2005	0.101884
3/15/2006	0.268116
6/21/2006	0.0381159
12/20/2006	0.128116
6/12/2007	0.0881159
12/17/2007	0.00188406
6/11/2008	0.00188406
12/3/2008	0.00188406
6/17/2009	0.398116
12/9/2009	0.0981159
6/17/2010	0.101884
12/22/2010	0.0181159
6/29/2011	0.101884
12/7/2011	0.0318841
6/6/2012	0.381884
12/12/2012	0.0481159

6/19/2013	0.311884
12/11/2013	0.268116
6/11/2014	0.721884
12/3/2014	0.00188406
6/17/2015	0.401884
12/1/2015	0.201884
6/22/2016	0.371884
12/20/2016	0.531884
6/6/2017	0.151884
11/7/2017	0.341884
2/27/2018	0.311884

Well: MW#03-1	Sample	Residual
	6/24/2004	0.200345
	9/15/2004	0.289655
	12/15/2004	0.250345
	3/16/2005	0.230345
	6/15/2005	0.210345
	9/21/2005	0.810345
	12/20/2006	0.0696552
	6/12/2007	0.220345
	12/17/2007	0.269655
	6/11/2008	0.330345
	12/3/2008	0.330345
	6/17/2009	0.530345
	12/9/2009	0.430345
	6/17/2010	0.0303448
	12/22/2010	0.179655
	6/29/2011	0.230345
	12/7/2011	0.0196552
	6/6/2012	0.260345
	6/19/2013	0.0803448
	12/11/2013	0.120345
	6/11/2014	0.449655
	12/3/2014	0.339655
	6/17/2015	0.409655
	12/1/2015	0.729655
	6/22/2016	0.130345
	12/20/2016	0.319655
	6/6/2017	0.429655
	11/7/2017	0.629655
	2/27/2018	0.259655

Well: MW#03-2	Sample	Residual
	6/24/2004	0.0460606
	9/15/2004	0.376061
	12/15/2004	0.0660606
	3/16/2005	0.00606061
	6/15/2005	0.0760606
	9/21/2005	0.0760606
	12/21/2005	0.0360606
	3/15/2006	0.0860606
	6/21/2006	0.0139394
	12/20/2006	0.0860606
	6/12/2007	0.0760606
	12/17/2007	0.0939394

6/11/2008	0.106061
12/3/2008	0.00606061
6/17/2009	0.506061
12/9/2009	0.00606061
6/17/2010	0.00606061
12/22/2010	0.406061
6/29/2011	0.0939394
12/7/2011	0.103939
6/6/2012	0.0639394
12/12/2012	0.0260606
6/19/2013	0.0860606
12/11/2013	0.0739394
6/11/2014	0.206061
12/3/2014	0.346061
6/17/2015	0.343939
12/1/2015	0.403939
6/22/2016	0.0439394
12/20/2016	0.433939
6/6/2017	0.0639394
11/7/2017	0.573939
2/27/2018	0.323939

Shapiro-Francia Test of Normality

Parameter: ph

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 272

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	6.08	-2.74777	7.55021	-16.7064
2	6.1	-2.45727	13.5884	-31.6958
3	6.21	-2.32634	19.0003	-46.1424
4	6.22	-2.19728	23.8283	-59.8095
5	6.23	-2.09693	28.2255	-72.8734
6	6.27	-2.03352	32.3607	-85.6235
7	6.28	-1.95996	36.2021	-97.9321
8	6.33	-1.8957	39.7958	-109.932
9	6.34	-1.85218	43.2263	-121.675
10	6.36	-1.79912	46.4632	-133.117
11	6.38	-1.75069	49.5281	-144.286
12	6.39	-1.71688	52.4757	-155.257
13	6.4	-1.67466	55.2802	-165.975
14	6.41	-1.63524	57.9542	-176.457
15	6.42	-1.60725	60.5375	-186.776
16	6.42	-1.57179	63.008	-196.866
17	6.43	-1.5382	65.3741	-206.757
18	6.43	-1.5141	67.6666	-216.493
19	6.44	-1.48328	69.8667	-226.045
20	6.45	-1.4538	71.9802	-235.422
21	6.45	-1.4325	74.0323	-244.662
22	6.46	-1.40507	76.0066	-253.739
23	6.47	-1.37866	77.9072	-262.658
24	6.47	-1.35946	79.7554	-271.454
25	6.49	-1.33462	81.5366	-280.116
26	6.49	-1.31058	83.2542	-288.622
27	6.5	-1.29303	84.9262	-297.026
28	6.5	-1.27024	86.5397	-305.283
29	6.5	-1.24809	88.0974	-313.395
30	6.5	-1.23187	89.6149	-321.402
31	6.51	-1.21073	91.0807	-329.284
32	6.52	-1.19012	92.4971	-337.044
33	6.53	-1.17499	93.8777	-344.717
34	6.53	-1.15522	95.2123	-352.26
35	6.54	-1.1359	96.5025	-359.689
36	6.55	-1.12168	97.7607	-367.036
37	6.55	-1.10306	98.9774	-374.261
38	6.56	-1.08482	100.154	-381.377
39	6.57	-1.07138	101.302	-388.416
40	6.57	-1.05375	102.412	-395.339
41	6.58	-1.03643	103.487	-402.159
42	6.58	-1.02365	104.535	-408.895
43	6.58	-1.00687	105.548	-415.52
44	6.58	-0.990356	106.529	-422.037
45	6.59	-0.97815	107.486	-428.483
46	6.59	-0.9621	108.412	-434.823

47	6.59	-0.946291	109.307	-441.059
48	6.6	-0.93459	110.18	-447.227
49	6.6	-0.919183	111.025	-453.294
50	6.6	-0.903992	111.843	-459.26
51	6.6	-0.892733	112.64	-465.152
52	6.61	-0.877897	113.41	-470.955
53	6.61	-0.863249	114.155	-476.661
54	6.61	-0.852385	114.882	-482.295
55	6.61	-0.838054	115.584	-487.835
56	6.61	-0.823893	116.263	-493.281
57	6.62	-0.813379	116.925	-498.665
58	6.62	-0.7995	117.564	-503.958
59	6.62	-0.785774	118.181	-509.16
60	6.64	-0.775574	118.783	-514.31
61	6.64	-0.7621	119.364	-519.37
62	6.64	-0.748762	119.924	-524.342
63	6.65	-0.738846	120.47	-529.255
64	6.65	-0.725736	120.997	-534.081
65	6.66	-0.712751	121.505	-538.828
66	6.66	-0.703089	121.999	-543.511
67	6.66	-0.690309	122.476	-548.108
68	6.66	-0.677639	122.935	-552.621
69	6.67	-0.668209	123.381	-557.078
70	6.67	-0.655726	123.811	-561.452
71	6.68	-0.643345	124.225	-565.75
72	6.68	-0.634124	124.627	-569.986
73	6.69	-0.621911	125.014	-574.146
74	6.69	-0.609791	125.386	-578.226
75	6.69	-0.60076	125.747	-582.245
76	6.69	-0.588793	126.094	-586.184
77	6.7	-0.576911	126.426	-590.049
78	6.7	-0.568052	126.749	-593.855
79	6.7	-0.556308	127.059	-597.582
80	6.7	-0.544642	127.355	-601.231
81	6.7	-0.53594	127.643	-604.822
82	6.7	-0.524401	127.918	-608.336
83	6.7	-0.51293	128.181	-611.772
84	6.7	-0.504372	128.435	-615.152
85	6.72	-0.493018	128.678	-618.465
86	6.72	-0.481728	128.91	-621.702
87	6.72	-0.473299	129.134	-624.882
88	6.72	-0.462114	129.348	-627.988
89	6.73	-0.450985	129.551	-631.023
90	6.73	-0.442676	129.747	-634.002
91	6.73	-0.431644	129.933	-636.907
92	6.74	-0.423405	130.113	-639.761
93	6.74	-0.412463	130.283	-642.541
94	6.74	-0.401571	130.444	-645.247
95	6.75	-0.393433	130.599	-647.903
96	6.75	-0.382622	130.745	-650.486
97	6.75	-0.371856	130.883	-652.996
98	6.75	-0.363809	131.016	-655.452
99	6.76	-0.353118	131.141	-657.839
100	6.76	-0.342466	131.258	-660.154
101	6.76	-0.334503	131.37	-662.415
102	6.77	-0.323919	131.475	-664.608
103	6.77	-0.31337	131.573	-666.729

104	6.77	-0.305481	131.666	-668.797
105	6.77	-0.294992	131.753	-670.795
106	6.78	-0.284535	131.834	-672.724
107	6.78	-0.276714	131.911	-674.6
108	6.78	-0.266311	131.982	-676.405
109	6.78	-0.255936	132.047	-678.141
110	6.78	-0.248174	132.109	-679.823
111	6.79	-0.237847	132.165	-681.438
112	6.79	-0.227545	132.217	-682.983
113	6.8	-0.219834	132.265	-684.478
114	6.8	-0.209575	132.309	-685.903
115	6.8	-0.199336	132.349	-687.259
116	6.8	-0.191671	132.386	-688.562
117	6.8	-0.181468	132.419	-689.796
118	6.8	-0.171285	132.448	-690.961
119	6.8	-0.163659	132.475	-692.074
120	6.8	-0.153505	132.498	-693.118
121	6.8	-0.143367	132.519	-694.092
122	6.8	-0.135774	132.537	-695.016
123	6.8	-0.125661	132.553	-695.87
124	6.8	-0.115562	132.567	-696.656
125	6.8	-0.107995	132.578	-697.39
126	6.81	-0.0979139	132.588	-698.057
127	6.81	-0.0878447	132.596	-698.655
128	6.82	-0.0802981	132.602	-699.203
129	6.82	-0.0702426	132.607	-699.682
130	6.82	-0.0601949	132.611	-700.093
131	6.83	-0.0526632	132.613	-700.452
132	6.84	-0.0426257	132.615	-700.744
133	6.84	-0.0325917	132.616	-700.967
134	6.85	-0.0250691	132.617	-701.139
135	6.85	-0.0150408	132.617	-701.242
136	6.85	-0.00501359	132.617	-701.276
137	6.85	0.00501359	132.617	-701.242
138	6.85	0.0150408	132.617	-701.139
139	6.85	0.0250691	132.618	-700.967
140	6.85	0.0325917	132.619	-700.744
141	6.86	0.0426257	132.621	-700.451
142	6.86	0.0526632	132.624	-700.09
143	6.86	0.0601949	132.627	-699.677
144	6.87	0.0702426	132.632	-699.194
145	6.87	0.0802981	132.639	-698.643
146	6.87	0.0878447	132.646	-698.039
147	6.87	0.0979139	132.656	-697.367
148	6.87	0.107995	132.668	-696.625
149	6.88	0.115562	132.681	-695.83
150	6.88	0.125661	132.697	-694.965
151	6.88	0.135774	132.715	-694.031
152	6.88	0.143367	132.736	-693.045
153	6.88	0.153505	132.759	-691.988
154	6.88	0.163659	132.786	-690.862
155	6.89	0.171285	132.815	-689.682
156	6.89	0.181468	132.848	-688.432
157	6.89	0.191671	132.885	-687.111
158	6.9	0.199336	132.925	-685.736
159	6.9	0.209575	132.969	-684.29
160	6.91	0.219834	133.017	-682.771

161	6.92	0.227545	133.069	-681.196
162	6.93	0.237847	133.125	-679.548
163	6.93	0.248174	133.187	-677.828
164	6.93	0.255936	133.252	-676.054
165	6.93	0.266311	133.323	-674.209
166	6.93	0.276714	133.4	-672.291
167	6.94	0.284535	133.481	-670.317
168	6.97	0.294992	133.568	-668.261
169	6.99	0.305481	133.661	-666.125
170	7	0.31337	133.759	-663.932
171	7	0.323919	133.864	-661.664
172	7	0.334503	133.976	-659.323
173	7.04	0.342466	134.094	-656.912
174	7.05	0.353118	134.218	-654.422
175	7.05	0.363809	134.351	-651.857
176	7.07	0.371856	134.489	-649.228
177	7.07	0.382622	134.635	-646.523
178	7.1	0.393433	134.79	-643.73
179	7.14	0.401571	134.951	-640.863
180	7.15	0.412463	135.121	-637.914
181	7.17	0.423405	135.301	-634.878
182	7.19	0.431644	135.487	-631.774
183	7.2	0.442676	135.683	-628.587
184	7.2	0.450985	135.886	-625.34
185	7.2	0.462114	136.1	-622.013
186	7.27	0.473299	136.324	-618.572
187	7.28	0.481728	136.556	-615.065
188	7.29	0.493018	136.799	-611.471
189	7.3	0.504372	137.053	-607.789
190	7.3	0.51293	137.317	-604.044
191	7.3	0.524401	137.592	-600.216
192	7.32	0.53594	137.879	-596.293
193	7.33	0.544642	138.175	-592.301
194	7.4	0.556308	138.485	-588.184
195	7.4	0.568052	138.808	-583.981
196	7.45	0.576911	139.14	-579.683
197	7.5	0.588793	139.487	-575.267
198	7.6	0.60076	139.848	-570.701
199	7.88	0.609791	140.22	-565.896
200	7.96	0.621911	140.607	-560.945
201	8.16	0.634124	141.009	-555.771
202	8.54	0.643345	141.423	-550.277
203	8.55	0.655726	141.853	-544.67
204	8.67	0.668209	142.299	-538.877
205	8.68	0.677639	142.758	-532.995
206	8.77	0.690309	143.235	-526.941
207	8.82	0.703089	143.729	-520.74
208	8.86	0.712751	144.237	-514.425
209	8.87	0.725736	144.764	-507.988
210	8.9	0.738846	145.31	-501.412
211	8.94	0.748762	145.87	-494.718
212	8.95	0.7621	146.451	-487.897
213	8.95	0.775574	147.053	-480.956
214	8.98	0.785774	147.67	-473.899
215	9	0.7995	148.309	-466.704
216	9.04	0.813379	148.971	-459.351
217	9.1	0.823893	149.65	-451.854

218	9.1	0.838054	150.352	-444.227
219	9.1	0.852385	151.079	-436.471
220	9.13	0.863249	151.824	-428.589
221	9.14	0.877897	152.595	-420.565
222	9.15	0.892733	153.392	-412.397
223	9.16	0.903992	154.209	-404.116
224	9.18	0.919183	155.054	-395.678
225	9.18	0.93459	155.927	-387.098
226	9.18	0.946291	156.823	-378.411
227	9.2	0.9621	157.748	-369.56
228	9.2	0.97815	158.705	-360.561
229	9.22	0.990356	159.686	-351.43
230	9.23	1.00687	160.7	-342.137
231	9.24	1.02365	161.747	-332.678
232	9.24	1.03643	162.822	-323.102
233	9.25	1.05375	163.932	-313.354
234	9.25	1.07138	165.08	-303.444
235	9.25	1.08482	166.257	-293.41
236	9.25	1.10306	167.473	-283.206
237	9.26	1.12168	168.732	-272.819
238	9.27	1.1359	170.022	-262.29
239	9.27	1.15522	171.356	-251.581
240	9.28	1.17499	172.737	-240.677
241	9.28	1.19012	174.153	-229.633
242	9.29	1.21073	175.619	-218.385
243	9.29	1.23187	177.137	-206.941
244	9.3	1.24809	178.694	-195.334
245	9.31	1.27024	180.308	-183.508
246	9.32	1.29303	181.98	-171.457
247	9.32	1.31058	183.697	-159.242
248	9.32	1.33462	185.479	-146.803
249	9.37	1.35946	187.327	-134.065
250	9.37	1.37866	189.228	-121.147
251	9.37	1.40507	191.202	-107.982
252	9.39	1.4325	193.254	-94.5305
253	9.4	1.4538	195.367	-80.8647
254	9.4	1.48328	197.568	-66.9219
255	9.4	1.5141	199.86	-52.6893
256	9.4	1.5382	202.226	-38.2302
257	9.4	1.57179	204.697	-23.4554
258	9.44	1.60725	207.28	-8.28297
259	9.46	1.63524	209.954	7.18636
260	9.47	1.67466	212.758	23.0454
261	9.5	1.71688	215.706	39.3558
262	9.5	1.75069	218.771	55.9873
263	9.51	1.79912	222.008	73.0969
264	9.54	1.85218	225.438	90.7667
265	9.6	1.8957	229.032	108.965
266	9.6	1.95996	232.873	127.781
267	9.68	2.03352	237.009	147.465
268	9.7	2.09693	241.406	167.806
269	9.72	2.19728	246.234	189.163
270	9.8	2.32634	251.646	211.961
271	9.8	2.45727	257.684	236.043

Sample Standard Deviation = 1.12583
Numerator = 55716.2

Denominator = 88511.6 = 271 257.684
W Statistic = 0.629479
5% Critical value of 0.976 exceeds 0.629479
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.629479
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 69
Maximum Background Concentration = 7.05
Confidence Level = 94.5%
False Positive Rate = 5.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	2/27/2018	1	9.04	TRUE
MW#93-3	2/27/2018	1	6.49	FALSE
MW#03-1	2/27/2018	1	6.81	FALSE
MW#03-2	2/27/2018	1	6.47	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 71
Maximum Baseline Concentration = 10.02
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	8.54
	3/14/1995	8.82
	6/21/1995	8.68
	12/14/1995	8.16
	3/6/1996	9.37
	4/25/1996	9.14
	10/2/1996	8.94
	12/10/1996	9.27
	3/11/1997	8.95
	4/15/1997	9.25
	8/14/1997	8.67
	12/4/1997	8.77
	3/31/1998	9.32
	6/23/1998	8.87
	8/11/1998	9
	12/8/1998	8.9
	3/9/1999	9.39
	6/8/1999	9.25
	8/19/1999	9.15
	12/14/1999	8.98
	3/7/2000	9.2
	6/23/2000	9.18
	12/12/2000	9.18
	3/27/2001	9.29
	6/28/2001	9.22
	9/10/2001	9.1
	12/18/2001	9.4
	3/19/2002	9.54
	6/26/2002	9.44
	9/18/2002	9.24
	12/11/2002	9.16
	3/13/2003	9.28
	6/25/2003	9.27
	9/26/2003	9.32
	12/10/2003	9.25
	3/9/2004	9.37
	6/24/2004	9.24
	9/15/2004	9.32
	12/15/2004	9.26
	3/16/2005	9.23
	6/15/2005	9.1

9/21/2005	9.25
12/21/2005	9.31
3/15/2006	9.47
6/21/2006	9.4
12/20/2006	9.18
2/21/2007	9.2
6/12/2007	9.1
12/17/2007	9.3
6/11/2008	9.4
12/3/2008	9.7
12/15/2008	9.6
6/17/2009	9.8
12/9/2009	9.8
6/17/2010	9.6
12/22/2010	9.5
6/29/2011	9.4
12/7/2011	9.5
6/6/2012	9.68
12/12/2012	10.02
1/9/2013	9.51
6/19/2013	9.4
12/11/2013	9.46
6/11/2014	8.55
12/3/2014	8.95
6/17/2015	9.13
12/1/2015	9.37
6/22/2016	9.28
12/20/2016	9.72
6/6/2017	9.29
11/7/2017	8.86

Date	Samples	Mean	Impacted
2/27/2018	1	9.04	FALSE

Concentrations (mg/l)

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 212
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 49
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	49	0 (0%)	12/15/1994	54.7	54.7
			12/14/1995	51.9	51.9
			12/10/1996	51.6	51.6
			12/4/1997	51.2	51.2
			12/8/1998	47	47
			12/14/1999	64.4	64.4
			12/12/2000	100	100
			3/19/2002	112	112
			6/26/2002	95	95
			9/18/2002	78	78
			12/11/2002	83	83
			3/13/2003	94	94
			6/25/2003	113	113
			9/26/2003	84.6	84.6
			12/10/2003	98.1	98.1
			3/9/2004	95.4	95.4
			6/24/2004	94.7	94.7
			9/15/2004	71	71
			12/15/2004	92.3	92.3
			3/16/2005	86.3	86.3
			6/15/2005	77.4	77.4
			9/21/2005	92.8	92.8
			12/21/2005	81.9	81.9
			3/15/2006	99.7	99.7
			6/21/2006	82	82
			12/20/2006	85.1	85.1
			6/12/2007	74.9	74.9
			12/17/2007	81.8	81.8
			6/11/2008	56.5	56.5
			12/3/2008	75.2	75.2
			6/17/2009	67.4	67.4
			12/9/2009	76.9	76.9
			6/17/2010	55	55
			12/22/2010	70.5	70.5
			6/29/2011	55.4	55.4
			12/7/2011	69.1	69.1
			6/6/2012	55.6	55.6
			12/12/2012	58.9	58.9
			6/19/2013	70	70
			12/11/2013	72.9	72.9
			6/11/2014	56.5	56.5
			12/3/2014	69.4	69.4
			6/17/2015	69.7	69.7
			12/1/2015	57.5	57.5

			6/22/2016	66.9	66.9
			12/20/2016	54.8	54.8
			6/6/2017	58.4	58.4
			11/7/2017	45.2	45.2
			2/27/2018	59.6	59.6

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	50	0 (0%)	12/15/1994	2170	2170
			12/14/1995	2220	2220
			12/10/1996	2100	2100
			12/4/1997	2440	2440
			12/8/1998	2565	2565
			12/14/1999	2980	2980
			12/12/2000	2800	2800
			3/19/2002	2500	2500
			6/26/2002	2260	2260
			9/18/2002	2140	2140
			12/11/2002	2320	2320
			3/13/2003	2600	2600
			6/25/2003	1990	1990
			9/26/2003	1820	1820
			12/10/2003	1920	1920
			3/9/2004	2050	2050
			6/24/2004	2180	2180
			9/15/2004	1800	1800
			12/15/2004	2480	2480
			3/16/2005	2490	2490
			6/15/2005	2030	2030
			9/21/2005	2520	2520
			12/21/2005	2300	2300
			3/15/2006	2720	2720
			6/21/2006	2450	2450
			12/20/2006	2170	2170
			2/21/2007	2900	2900
			6/12/2007	1980	1980
			12/17/2007	2244	2244
			6/11/2008	2649	2649
			12/3/2008	2120	2120
			6/17/2009	2230	2230
			12/9/2009	2140	2140
			6/17/2010	2100	2100
			12/22/2010	2460	2460
			6/29/2011	2190	2190
			12/7/2011	2500	2500
			6/6/2012	2060	2060
			12/12/2012	2730	2730
			6/19/2013	2230	2230
			12/11/2013	2290	2290
			6/11/2014	1940	1940
			12/3/2014	2730	2730
			6/17/2015	270	270
			5/25/2016	1890	1890
			6/22/2016	2700	2700
			12/20/2016	2400	2400

			6/6/2017	2310	2310
			11/7/2017	2750	2750
			2/27/2018	2220	2220
MW#93-3	51	0 (0%)	12/15/1994	330	330
			12/14/1995	219	219
			12/10/1996	248	248
			12/4/1997	201	201
			12/8/1998	199	199
			12/14/1999	208	208
			12/12/2000	230	230
			12/18/2001	172	172
			3/19/2002	222	222
			6/26/2002	189	189
			9/18/2002	163	163
			12/11/2002	216	216
			3/13/2003	230	230
			6/25/2003	190	190
			9/26/2003	229	229
			12/10/2003	231	231
			3/9/2004	30.8	30.8
			6/24/2004	150	150
			9/15/2004	200	200
			12/15/2004	186	186
			3/16/2005	196	196
			6/15/2005	170	170
			9/21/2005	239	239
			12/21/2005	180	180
			3/15/2006	180	180
			6/21/2006	227	227
			12/20/2006	211	211
			6/12/2007	159	159
			12/17/2007	194	194
			6/11/2008	195	195
			12/3/2008	190	190
			6/17/2009	173	173
			12/9/2009	202	202
			6/17/2010	202	202
			12/22/2010	216	216
			6/29/2011	158	158
			12/7/2011	218	218
			6/6/2012	201	201
			12/12/2012	168	168
			6/19/2013	235	235
			12/11/2013	234	234
			6/11/2014	258	258
			12/3/2014	220	220
			6/17/2015	280	280
			12/1/2015	339	339
			6/22/2016	449	449
			10/11/2016	368	368
			12/20/2016	337	337
			6/6/2017	301	301
			11/7/2017	368	368
			2/27/2018	272	272
MW#03-1	29	0 (0%)	6/24/2004	10.2	10.2

			9/15/2004	42	42
			12/15/2004	8.04	8.04
			3/16/2005	5.99	5.99
			6/15/2005	7.3	7.3
			9/21/2005	14.1	14.1
			12/20/2006	8	8
			6/12/2007	7.96	7.96
			12/17/2007	9.88	9.88
			6/11/2008	5.71	5.71
			12/3/2008	7.01	7.01
			6/17/2009	7.34	7.34
			12/9/2009	6.77	6.77
			6/17/2010	9.31	9.31
			12/22/2010	7.11	7.11
			6/29/2011	7.04	7.04
			12/7/2011	8.87	8.87
			6/6/2012	7.94	7.94
			6/19/2013	10.3	10.3
			12/11/2013	9.78	9.78
			6/11/2014	55.9	55.9
			12/3/2014	9.8	9.8
			6/17/2015	9.7	9.7
			12/1/2015	12	12
			6/22/2016	8.59	8.59
			12/20/2016	7.94	7.94
			6/6/2017	6.56	6.56
			11/7/2017	17.6	17.6
			2/27/2018	16.8	16.8
MW#03-2	33	0 (0%)	6/24/2004	47.4	47.4
			9/15/2004	8.7	8.7
			12/15/2004	51.3	51.3
			3/16/2005	47	47
			6/15/2005	42.8	42.8
			9/21/2005	52.6	52.6
			12/21/2005	46.5	46.5
			3/15/2006	50.4	50.4
			6/21/2006	44.9	44.9
			12/20/2006	50.5	50.5
			6/12/2007	47	47
			12/17/2007	50.2	50.2
			6/11/2008	33.8	33.8
			12/3/2008	54.4	54.4
			6/17/2009	48.2	48.2
			12/9/2009	47.3	47.3
			6/17/2010	52.9	52.9
			12/22/2010	51.7	51.7
			6/29/2011	51	51
			12/7/2011	60.1	60.1
			6/6/2012	52	52
			12/12/2012	61.3	61.3
			6/19/2013	57.3	57.3
			12/11/2013	54	54
			6/11/2014	9.78	9.78
			12/3/2014	68	68
			6/17/2015	66.3	66.3
			12/1/2015	63.8	63.8

6/22/2016	76.8	76.8
12/20/2016	80.2	80.2
6/6/2017	96.8	96.8
11/7/2017	120	120
2/27/2018	104	104

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 81.9555
Overall Std Dev = 182.665
Overall Total = 17374.6
SS Wells = 2.44456e+006
SS Total = 7.04033e+006

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	2.44456e+006	4	611139	27.5265
Error (within wells)	4.59577e+006	207	22201.8	
Totals	7.04033e+006	211		

27.5265 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	19.0796
	12/14/1995	21.8796
	12/10/1996	22.1796
	12/4/1997	22.5796
	12/8/1998	26.7796
	12/14/1999	9.37959
	12/12/2000	26.2204
	3/19/2002	38.2204
	6/26/2002	21.2204
	9/18/2002	4.22041
	12/11/2002	9.22041
	3/13/2003	20.2204
	6/25/2003	39.2204
	9/26/2003	10.8204
	12/10/2003	24.3204
	3/9/2004	21.6204
	6/24/2004	20.9204
	9/15/2004	2.77959
	12/15/2004	18.5204
	3/16/2005	12.5204
	6/15/2005	3.62041
	9/21/2005	19.0204
	12/21/2005	8.12041
	3/15/2006	25.9204
	6/21/2006	8.22041
	12/20/2006	11.3204
	6/12/2007	1.12041
	12/17/2007	8.02041
	6/11/2008	17.2796
	12/3/2008	1.42041
	6/17/2009	6.37959
	12/9/2009	3.12041

6/17/2010	18.7796
12/22/2010	3.27959
6/29/2011	18.3796
12/7/2011	4.67959
6/6/2012	18.1796
12/12/2012	14.8796
6/19/2013	3.77959
12/11/2013	0.879592
6/11/2014	17.2796
12/3/2014	4.37959
6/17/2015	4.07959
12/1/2015	16.2796
6/22/2016	6.87959
12/20/2016	18.9796
6/6/2017	15.3796
11/7/2017	28.5796
2/27/2018	14.1796

Well: MW#93-2

Sample	Residual
12/15/1994	110.96
12/14/1995	60.96
12/10/1996	180.96
12/4/1997	159.04
12/8/1998	284.04
12/14/1999	699.04
12/12/2000	519.04
3/19/2002	219.04
6/26/2002	20.96
9/18/2002	140.96
12/11/2002	39.04
3/13/2003	319.04
6/25/2003	290.96
9/26/2003	460.96
12/10/2003	360.96
3/9/2004	230.96
6/24/2004	100.96
9/15/2004	480.96
12/15/2004	199.04
3/16/2005	209.04
6/15/2005	250.96
9/21/2005	239.04
12/21/2005	19.04
3/15/2006	439.04
6/21/2006	169.04
12/20/2006	110.96
2/21/2007	619.04
6/12/2007	300.96
12/17/2007	36.96
6/11/2008	368.04
12/3/2008	160.96
6/17/2009	50.96
12/9/2009	140.96
6/17/2010	180.96
12/22/2010	179.04
6/29/2011	90.96
12/7/2011	219.04
6/6/2012	220.96

12/12/2012	449.04
6/19/2013	50.96
12/11/2013	9.04
6/11/2014	340.96
12/3/2014	449.04
6/17/2015	2010.96
5/25/2016	390.96
6/22/2016	419.04
12/20/2016	119.04
6/6/2017	29.04
11/7/2017	469.04
2/27/2018	60.96

Well: MW#93-3

Sample	Residual
12/15/1994	106.788
12/14/1995	4.21176
12/10/1996	24.7882
12/4/1997	22.2118
12/8/1998	24.2118
12/14/1999	15.2118
12/12/2000	6.78824
12/18/2001	51.2118
3/19/2002	1.21176
6/26/2002	34.2118
9/18/2002	60.2118
12/11/2002	7.21176
3/13/2003	6.78824
6/25/2003	33.2118
9/26/2003	5.78824
12/10/2003	7.78824
3/9/2004	192.412
6/24/2004	73.2118
9/15/2004	23.2118
12/15/2004	37.2118
3/16/2005	27.2118
6/15/2005	53.2118
9/21/2005	15.7882
12/21/2005	43.2118
3/15/2006	43.2118
6/21/2006	3.78824
12/20/2006	12.2118
6/12/2007	64.2118
12/17/2007	29.2118
6/11/2008	28.2118
12/3/2008	33.2118
6/17/2009	50.2118
12/9/2009	21.2118
6/17/2010	21.2118
12/22/2010	7.21176
6/29/2011	65.2118
12/7/2011	5.21176
6/6/2012	22.2118
12/12/2012	55.2118
6/19/2013	11.7882
12/11/2013	10.7882
6/11/2014	34.7882
12/3/2014	3.21176

6/17/2015	56.7882
12/1/2015	115.788
6/22/2016	225.788
10/11/2016	144.788
12/20/2016	113.788
6/6/2017	77.7882
11/7/2017	144.788
2/27/2018	48.7882

Well: MW#03-1	Sample	Residual
	6/24/2004	1.71517
	9/15/2004	30.0848
	12/15/2004	3.87517
	3/16/2005	5.92517
	6/15/2005	4.61517
	9/21/2005	2.18483
	12/20/2006	3.91517
	6/12/2007	3.95517
	12/17/2007	2.03517
	6/11/2008	6.20517
	12/3/2008	4.90517
	6/17/2009	4.57517
	12/9/2009	5.14517
	6/17/2010	2.60517
	12/22/2010	4.80517
	6/29/2011	4.87517
	12/7/2011	3.04517
	6/6/2012	3.97517
	6/19/2013	1.61517
	12/11/2013	2.13517
	6/11/2014	43.9848
	12/3/2014	2.11517
	6/17/2015	2.21517
	12/1/2015	0.0848276
	6/22/2016	3.32517
	12/20/2016	3.97517
	6/6/2017	5.35517
	11/7/2017	5.68483
	2/27/2018	4.88483

Well: MW#03-2	Sample	Residual
	6/24/2004	8.6297
	9/15/2004	47.3297
	12/15/2004	4.7297
	3/16/2005	9.0297
	6/15/2005	13.2297
	9/21/2005	3.4297
	12/21/2005	9.5297
	3/15/2006	5.6297
	6/21/2006	11.1297
	12/20/2006	5.5297
	6/12/2007	9.0297
	12/17/2007	5.8297
	6/11/2008	22.2297
	12/3/2008	1.6297
	6/17/2009	7.8297

12/9/2009	8.7297
6/17/2010	3.1297
12/22/2010	4.3297
6/29/2011	5.0297
12/7/2011	4.0703
6/6/2012	4.0297
12/12/2012	5.2703
6/19/2013	1.2703
12/11/2013	2.0297
6/11/2014	46.2497
12/3/2014	11.9703
6/17/2015	10.2703
12/1/2015	7.7703
6/22/2016	20.7703
12/20/2016	24.1703
6/6/2017	40.7703
11/7/2017	63.9703
2/27/2018	47.9703

Shapiro-Francia Test of Normality

Parameter: Sodium

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 212

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	5.71	-2.65209	7.03356	-15.1434
2	5.99	-2.36561	12.6297	-29.3134
3	6.56	-2.19728	17.4578	-43.7276
4	6.77	-2.09693	21.8549	-57.9239
5	7.01	-1.99539	25.8365	-71.9116
6	7.04	-1.91103	29.4885	-85.3652
7	7.11	-1.85218	32.9191	-98.5342
8	7.3	-1.78661	36.111	-111.576
9	7.34	-1.72793	39.0968	-124.259
10	7.94	-1.68494	41.9358	-137.638
11	7.94	-1.63524	44.6098	-150.622
12	7.96	-1.58927	47.1356	-163.272
13	8	-1.54643	49.527	-175.644
14	8.04	-1.5141	51.8195	-187.817
15	8.59	-1.47579	53.9975	-200.494
16	8.7	-1.43953	56.0698	-213.018
17	8.87	-1.41183	58.063	-225.541
18	9.31	-1.37866	59.9637	-238.376
19	9.7	-1.34694	61.778	-251.442
20	9.78	-1.32251	63.527	-264.376
21	9.78	-1.29303	65.1989	-277.022
22	9.8	-1.26464	66.7982	-289.415
23	9.88	-1.24264	68.3424	-301.692
24	10.2	-1.21596	69.821	-314.095
25	10.3	-1.19012	71.2373	-326.353
26	12	-1.16505	72.5947	-340.334
27	14.1	-1.1455	73.9069	-356.486
28	16.8	-1.12168	75.165	-375.33
29	17.6	-1.09847	76.3716	-394.663
30	30.8	-1.08032	77.5387	-427.937
31	33.8	-1.05812	78.6584	-463.701
32	42	-1.03643	79.7326	-507.231
33	42.8	-1.01943	80.7718	-550.863
34	44.9	-0.998575	81.7689	-595.699
35	45.2	-0.97815	82.7257	-639.911
36	46.5	-0.958125	83.6437	-684.464
37	47	-0.942375	84.5318	-728.756
38	47	-0.923014	85.3837	-772.137
39	47	-0.903992	86.201	-814.625
40	47.3	-0.889006	86.9913	-856.675
41	47.4	-0.87055	87.7491	-897.939
42	48.2	-0.852385	88.4757	-939.024
43	50.2	-0.838054	89.178	-981.094
44	50.4	-0.820379	89.8511	-1022.44
45	50.5	-0.802956	90.4958	-1062.99
46	51	-0.789191	91.1186	-1103.24

47	51.2	-0.772193	91.7149	-1142.78
48	51.3	-0.755415	92.2856	-1181.53
49	51.6	-0.738846	92.8314	-1219.65
50	51.7	-0.725736	93.3581	-1257.17
51	51.9	-0.709522	93.8616	-1294
52	52	-0.693493	94.3425	-1330.06
53	52.6	-0.680797	94.806	-1365.87
54	52.9	-0.665079	95.2483	-1401.05
55	54	-0.649522	95.6702	-1436.13
56	54.4	-0.637192	96.0762	-1470.79
57	54.7	-0.621911	96.463	-1504.81
58	54.8	-0.606775	96.8312	-1538.06
59	55	-0.594766	97.1849	-1570.77
60	55.4	-0.579873	97.5212	-1602.9
61	55.6	-0.565108	97.8405	-1634.32
62	55.9	-0.550465	98.1435	-1665.09
63	56.5	-0.538836	98.4339	-1695.53
64	56.5	-0.524401	98.7088	-1725.16
65	57.3	-0.510074	98.969	-1754.39
66	57.5	-0.498687	99.2177	-1783.06
67	58.4	-0.484544	99.4525	-1811.36
68	58.9	-0.470498	99.6739	-1839.07
69	59.6	-0.459327	99.8848	-1866.45
70	60.1	-0.445443	100.083	-1893.22
71	61.3	-0.431644	100.27	-1919.68
72	63.8	-0.417928	100.444	-1946.34
73	64.4	-0.40701	100.61	-1972.55
74	66.3	-0.393433	100.765	-1998.64
75	66.9	-0.379927	100.909	-2024.06
76	67.4	-0.369171	101.045	-2048.94
77	68	-0.355788	101.172	-2073.13
78	69.1	-0.342466	101.289	-2096.8
79	69.4	-0.331854	101.399	-2119.83
80	69.7	-0.318639	101.501	-2142.04
81	70	-0.305481	101.594	-2163.42
82	70.5	-0.294992	101.681	-2184.22
83	71	-0.281926	101.761	-2204.23
84	72.9	-0.268908	101.833	-2223.84
85	74.9	-0.255936	101.898	-2243.01
86	75.2	-0.24559	101.959	-2261.47
87	76.8	-0.232693	102.013	-2279.34
88	76.9	-0.219834	102.061	-2296.25
89	77.4	-0.209575	102.105	-2312.47
90	78	-0.196779	102.144	-2327.82
91	80.2	-0.184017	102.178	-2342.58
92	81.8	-0.173829	102.208	-2356.8
93	81.9	-0.161119	102.234	-2369.99
94	82	-0.148434	102.256	-2382.16
95	83	-0.135774	102.274	-2393.43
96	84.6	-0.125661	102.29	-2404.06
97	85.1	-0.113039	102.303	-2413.68
98	86.3	-0.100433	102.313	-2422.35
99	92.3	-0.0903606	102.321	-2430.69
100	92.8	-0.0777834	102.327	-2437.91
101	94	-0.0652187	102.332	-2444.04
102	94.7	-0.0551734	102.335	-2449.27
103	95	-0.0426257	102.336	-2453.32

104	95.4	-0.0300838	102.337	-2456.19
105	96.8	-0.0200544	102.338	-2458.13
106	98.1	-0.00751925	102.338	-2458.86
107	99.7	0.00751925	102.338	-2458.11
108	100	0.0200544	102.338	-2456.11
109	104	0.0300838	102.339	-2452.98
110	112	0.0426257	102.341	-2448.21
111	113	0.0551734	102.344	-2441.97
112	120	0.0652187	102.348	-2434.15
113	150	0.0777834	102.354	-2422.48
114	158	0.0903606	102.362	-2408.2
115	159	0.100433	102.373	-2392.23
116	163	0.113039	102.385	-2373.81
117	168	0.125661	102.401	-2352.7
118	170	0.135774	102.42	-2329.61
119	172	0.148434	102.442	-2304.08
120	173	0.161119	102.468	-2276.21
121	180	0.173829	102.498	-2244.92
122	180	0.184017	102.532	-2211.8
123	186	0.196779	102.57	-2175.2
124	189	0.209575	102.614	-2135.59
125	190	0.219834	102.663	-2093.82
126	190	0.232693	102.717	-2049.61
127	194	0.24559	102.777	-2001.96
128	195	0.255936	102.843	-1952.05
129	196	0.268908	102.915	-1899.35
130	199	0.281926	102.994	-1843.25
131	200	0.294992	103.081	-1784.25
132	201	0.305481	103.175	-1722.85
133	201	0.318639	103.276	-1658.8
134	202	0.331854	103.386	-1591.76
135	202	0.342466	103.504	-1522.59
136	208	0.355788	103.63	-1448.58
137	211	0.369171	103.767	-1370.69
138	216	0.379927	103.911	-1288.62
139	216	0.393433	104.066	-1203.64
140	218	0.40701	104.231	-1114.91
141	219	0.417928	104.406	-1023.39
142	220	0.431644	104.592	-928.426
143	222	0.445443	104.791	-829.537
144	227	0.459327	105.002	-725.27
145	229	0.470498	105.223	-617.526
146	230	0.484544	105.458	-506.081
147	230	0.498687	105.707	-391.383
148	231	0.510074	105.967	-273.556
149	234	0.524401	106.242	-150.846
150	235	0.538836	106.532	-24.2198
151	239	0.550465	106.835	107.341
152	248	0.565108	107.154	247.488
153	258	0.579873	107.491	397.095
154	270	0.594766	107.844	557.682
155	272	0.606775	108.213	722.725
156	280	0.621911	108.599	896.86
157	301	0.637192	109.005	1088.66
158	330	0.649522	109.427	1303
159	337	0.665079	109.87	1527.13
160	339	0.680797	110.333	1757.92

161	368	0.693493	110.814	2013.12
162	368	0.709522	111.317	2274.23
163	449	0.725736	111.844	2600.08
164	1800	0.738846	112.39	3930.01
165	1820	0.755415	112.961	5304.86
166	1890	0.772193	113.557	6764.31
167	1920	0.789191	114.18	8279.55
168	1940	0.802956	114.824	9837.29
169	1980	0.820379	115.498	11461.6
170	1990	0.838054	116.2	13129.4
171	2030	0.852385	116.926	14859.7
172	2050	0.87055	117.684	16644.3
173	2060	0.889006	118.475	18475.7
174	2100	0.903992	119.292	20374.1
175	2100	0.923014	120.144	22312.4
176	2120	0.942375	121.032	24310.2
177	2140	0.958125	121.95	26360.6
178	2140	0.97815	122.907	28453.9
179	2170	0.998575	123.904	30620.8
180	2170	1.01943	124.943	32832.9
181	2180	1.03643	126.017	35092.4
182	2190	1.05812	127.137	37409.6
183	2220	1.08032	128.304	39808
184	2220	1.09847	129.511	42246.6
185	2230	1.12168	130.769	44747.9
186	2230	1.1455	132.081	47302.4
187	2244	1.16505	133.438	49916.7
188	2260	1.19012	134.855	52606.4
189	2290	1.21596	136.333	55391
190	2300	1.24264	137.877	58249
191	2310	1.26464	139.477	61170.4
192	2320	1.29303	141.149	64170.2
193	2400	1.32251	142.898	67344.2
194	2440	1.34694	144.712	70630.7
195	2450	1.37866	146.613	74008.4
196	2460	1.41183	148.606	77481.6
197	2480	1.43953	150.678	81051.6
198	2490	1.47579	152.856	84726.3
199	2500	1.5141	155.149	88511.6
200	2500	1.54643	157.54	92377.6
201	2520	1.58927	160.066	96382.6
202	2565	1.63524	162.74	100577
203	2600	1.68494	165.579	104958
204	2649	1.72793	168.564	109535
205	2700	1.78661	171.756	114359
206	2720	1.85218	175.187	119397
207	2730	1.91103	178.839	124614
208	2730	1.99539	182.821	130061
209	2750	2.09693	187.218	135828
210	2800	2.19728	192.046	141980
211	2900	2.36561	197.642	148841

Sample Standard Deviation = 949.611
Numerator = 2.21535e+010
Denominator = 3.76057e+010 = 211 197.642
W Statistic = 0.589101
5% Critical value of 0.976 exceeds 0.589101

Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.589101
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 49
Maximum Background Concentration = 113
Confidence Level = 92.5%
False Positive Rate = 7.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	2/27/2018	1	2220	TRUE
MW#93-3	2/27/2018	1	272	TRUE
MW#03-1	2/27/2018	1	16.8	FALSE
MW#03-2	2/27/2018	1	104	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 49
Maximum Baseline Concentration = 2980
Confidence Level = 98%
False Positive Rate = 2%

Baseline Samples	Date	Result
	12/15/1994	2170
	12/14/1995	2220
	12/10/1996	2100
	12/4/1997	2440
	12/8/1998	2565
	12/14/1999	2980
	12/12/2000	2800
	3/19/2002	2500
	6/26/2002	2260
	9/18/2002	2140
	12/11/2002	2320
	3/13/2003	2600
	6/25/2003	1990
	9/26/2003	1820
	12/10/2003	1920
	3/9/2004	2050
	6/24/2004	2180
	9/15/2004	1800
	12/15/2004	2480
	3/16/2005	2490
	6/15/2005	2030
	9/21/2005	2520
	12/21/2005	2300
	3/15/2006	2720
	6/21/2006	2450
	12/20/2006	2170
	2/21/2007	2900
	6/12/2007	1980
	12/17/2007	2244
	6/11/2008	2649
	12/3/2008	2120
	6/17/2009	2230
	12/9/2009	2140
	6/17/2010	2100
	12/22/2010	2460
	6/29/2011	2190
	12/7/2011	2500
	6/6/2012	2060
	12/12/2012	2730
	6/19/2013	2230
	12/11/2013	2290

6/11/2014	1940
12/3/2014	2730
6/17/2015	270
5/25/2016	1890
6/22/2016	2700
12/20/2016	2400
6/6/2017	2310
11/7/2017	2750

Date	Samples	Mean	Impacted
2/27/2018	1	2220	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 50
Maximum Baseline Concentration = 449
Confidence Level = 98%
False Positive Rate = 2%

Baseline Samples	Date	Result
	12/15/1994	330
	12/14/1995	219
	12/10/1996	248
	12/4/1997	201
	12/8/1998	199
	12/14/1999	208
	12/12/2000	230
	12/18/2001	172
	3/19/2002	222
	6/26/2002	189
	9/18/2002	163
	12/11/2002	216
	3/13/2003	230
	6/25/2003	190
	9/26/2003	229
	12/10/2003	231
	3/9/2004	30.8
	6/24/2004	150
	9/15/2004	200
	12/15/2004	186
	3/16/2005	196
	6/15/2005	170
	9/21/2005	239
	12/21/2005	180
	3/15/2006	180
	6/21/2006	227
	12/20/2006	211
	6/12/2007	159
	12/17/2007	194
	6/11/2008	195
	12/3/2008	190
	6/17/2009	173
	12/9/2009	202
	6/17/2010	202
	12/22/2010	216
	6/29/2011	158
	12/7/2011	218
	6/6/2012	201
	12/12/2012	168
	6/19/2013	235
	12/11/2013	234

6/11/2014	258
12/3/2014	220
6/17/2015	280
12/1/2015	339
6/22/2016	449
10/11/2016	368
12/20/2016	337
6/6/2017	301
11/7/2017	368

Date	Samples	Mean	Impacted
2/27/2018	1	272	FALSE

Concentrations (umhos/cm)

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 270
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 69
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	69	0 (0%)	12/15/1994	1080	1080
			3/14/1995	1103	1103
			6/21/1995	1154	1154
			12/14/1995	1109	1109
			3/6/1996	1010	1010
			4/25/1996	1063	1063
			10/2/1996	1169	1169
			12/10/1996	1187	1187
			3/11/1997	1077	1077
			4/15/1997	1070	1070
			8/14/1997	1217	1217
			12/4/1997	1170	1170
			3/31/1998	1092	1092
			6/23/1998	1210	1210
			8/11/1998	1273	1273
			12/8/1998	1888	1888
			3/9/1999	1080	1080
			6/8/1999	1301	1301
			8/19/1999	1301	1301
			12/14/1999	1270	1270
			3/7/2000	1290	1290
			6/23/2000	1393	1393
			12/12/2000	1309	1309
			3/27/2001	1469	1469
			6/28/2001	1560	1560
			9/10/2001	1374	1374
			12/18/2001	1374	1374
			3/19/2002	1326	1326
			6/26/2002	1516	1516
			9/18/2002	1423	1423
			12/11/2002	1515	1515
			3/13/2003	1332	1332
			6/25/2003	1608	1608
			9/26/2003	1602	1602
			12/10/2003	1620	1620
			3/9/2004	1630	1630
			6/24/2004	1620	1620
			9/15/2004	1618	1618
			12/15/2004	1586	1586
			3/16/2005	1521	1521
			6/15/2005	1531	1531
			9/21/2005	1441	1441
			12/21/2005	1030	1030
			3/15/2006	1318	1318

			6/21/2006	1547	1547
			12/20/2006	1370	1370
			6/12/2007	1466	1466
			12/17/2007	1327	1327
			6/11/2008	1334	1334
			12/3/2008	1352	1352
			6/17/2009	1301	1301
			12/9/2009	1218	1218
			6/17/2010	1179	1179
			12/22/2010	1270	1270
			6/29/2011	1275	1275
			12/7/2011	1236	1236
			6/6/2012	1185	1185
			12/12/2012	1227	1227
			6/19/2013	1366	1366
			12/11/2013	1329	1329
			6/11/2014	1200	1200
			12/3/2014	1230	1230
			6/17/2015	1210	1210
			12/1/2015	1230	1230
			6/22/2016	1185	1185
			12/20/2016	1186	1186
			6/6/2017	1289	1289
			11/7/2017	1458	1458
			2/27/2018	1235	1235

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	71	0 (0%)	12/15/1994	7950	7950
			3/14/1995	8217	8217
			6/21/1995	9210	9210
			12/14/1995	9000	9000
			3/6/1996	8820	8820
			4/25/1996	9310	9310
			10/2/1996	9420	9420
			12/10/1996	9590	9590
			3/11/1997	9250	9250
			4/15/1997	9690	9690
			8/14/1997	10660	10660
			12/4/1997	10240	10240
			3/31/1998	9237	9237
			6/23/1998	10400	10400
			8/11/1998	11460	11460
			12/8/1998	10280	10280
			3/9/1999	9240	9240
			6/8/1999	10850	10850
			8/19/1999	10873	10873
			12/14/1999	9690	9690
			3/7/2000	9340	9340
			6/23/2000	1034	1034
			12/12/2000	9080	9080
			3/27/2001	10260	10260
			6/28/2001	11600	11600
			9/10/2001	10700	10700
			12/18/2001	10660	10660

			3/19/2002	10197	10197
			6/26/2002	10590	10590
			9/18/2002	9690	9690
			12/11/2002	10283	10283
			3/13/2003	8920	8920
			6/25/2003	10590	10590
			9/26/2003	10693	10693
			12/10/2003	10550	10550
			3/9/2004	10620	10620
			6/24/2004	10494	10494
			9/15/2004	10340	10340
			12/15/2004	9940	9940
			3/16/2005	9690	9690
			6/15/2005	10010	10010
			9/21/2005	9660	9660
			12/21/2005	10000	10000
			3/15/2006	8650	8650
			6/21/2006	9830	9830
			12/20/2006	8310	8310
			2/21/2007	7660	7660
			6/12/2007	9590	9590
			12/17/2007	9100	9100
			6/11/2008	9600	9600
			12/3/2008	10520	10520
			12/15/2008	9070	9070
			6/17/2009	10690	10690
			12/9/2009	10050	10050
			6/17/2010	10020	10020
			12/22/2010	11230	11230
			6/29/2011	11110	11110
			12/7/2011	10770	10770
			6/6/2012	10490	10490
			12/12/2012	11460	11460
			6/19/2013	10500	10500
			12/11/2013	10650	10650
			6/11/2014	9940	9940
			12/3/2014	10900	10900
			6/17/2015	1270	1270
			12/1/2015	10560	10560
			6/22/2016	6710	6710
			12/20/2016	11400	11400
			6/6/2017	12590	12590
			11/7/2017	10.52	10.52
			2/27/2018	10.9	10.9
MW#93-3	69	0 (0%)	12/15/1994	1762	1762
			3/14/1995	1490	1490
			6/21/1995	1421	1421
			12/14/1995	1534	1534
			3/6/1996	1327	1327
			4/25/1996	1570	1570
			10/2/1996	1657	1657
			12/10/1996	1427	1427
			3/11/1997	1370	1370
			4/15/1997	1244	1244
			8/14/1997	1351	1351
			12/4/1997	1140	1140

3/31/1998	1172	1172
6/23/1998	1214	1214
8/11/1998	1296	1296
12/8/1998	1177	1177
3/9/1999	1137	1137
6/8/1999	1180	1180
8/19/1999	1253	1253
12/14/1999	1088	1088
3/7/2000	1250	1250
6/23/2000	1070	1070
12/12/2000	1051	1051
3/27/2001	1149	1149
6/28/2001	1155	1155
9/10/2001	1250	1250
12/18/2001	1064	1064
3/19/2002	1240	1240
6/26/2002	787	787
9/18/2002	1109	1109
12/11/2002	1125	1125
3/13/2003	1034	1034
6/25/2003	1111	1111
9/26/2003	1109	1109
12/10/2003	1173	1173
3/9/2004	881	881
6/24/2004	1129	1129
9/15/2004	1068	1068
12/15/2004	972	972
3/16/2005	1134	1134
6/15/2005	1080	1080
9/21/2005	1155	1155
12/21/2005	1140	1140
3/15/2006	1035	1035
6/21/2006	1226	1226
12/20/2006	1087	1087
6/12/2007	1031	1031
12/17/2007	910	910
6/11/2008	1023	1023
12/3/2008	1073	1073
6/17/2009	1073	1073
12/9/2009	1038	1038
6/17/2010	1108	1108
12/22/2010	1090	1090
6/29/2011	1178	1178
12/7/2011	930	930
6/6/2012	1203	1203
12/12/2012	1010	1010
6/19/2013	1438	1438
12/11/2013	1252	1252
6/11/2014	1500	1500
12/3/2014	1200	1200
6/17/2015	1480	1480
12/1/2015	1807	1807
10/11/2016	2005	2005
12/20/2016	2200	2200
6/6/2017	1743	1743
11/7/2017	2121	2121
2/27/2018	2372	2372

MW#03-1	28	0 (0%)	6/24/2004	497	497
			9/15/2004	687	687
			12/15/2004	514	514
			3/16/2005	422	422
			6/15/2005	465	465
			9/21/2005	517	517
			12/20/2006	447	447
			6/12/2007	630	630
			12/17/2007	540	540
			6/11/2008	467	467
			12/3/2008	649	649
			6/17/2009	519	519
			12/9/2009	469	469
			6/17/2010	500	500
			12/22/2010	504	504
			6/29/2011	463	463
			12/7/2011	501	501
			6/6/2012	457	457
			6/19/2013	373	373
			12/11/2013	476	476
			6/11/2014	826	826
			12/3/2014	409	409
			6/17/2015	267	267
			12/1/2015	385	385
			6/22/2016	320	320
			6/6/2017	198	198
			11/7/2017	444	444
			2/27/2018	186.1	186.1
MW#03-2	33	0 (0%)	6/24/2004	692	692
			9/15/2004	522	522
			12/15/2004	655	655
			3/16/2005	661	661
			6/15/2005	674	674
			9/21/2005	625	625
			12/21/2005	572	572
			3/15/2006	594	594
			6/21/2006	636	636
			12/20/2006	580	580
			6/12/2007	680	680
			12/17/2007	617	617
			6/11/2008	674	674
			12/3/2008	752	752
			6/17/2009	720	720
			12/9/2009	690	690
			6/17/2010	685	685
			12/22/2010	728	728
			6/29/2011	748	748
			12/7/2011	755	755
			6/6/2012	716	716
			12/12/2012	807	807
			6/19/2013	807	807
			12/11/2013	805	805
			6/11/2014	219	219
			12/3/2014	1540	1540
			6/17/2015	965	965

12/1/2015	967	967
6/22/2016	1074	1074
12/20/2016	1454	1454
6/6/2017	1498	1498
11/7/2017	2042	2042
2/27/2018	2080	2080

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 497.102
Overall Std Dev = 1138.8
Overall Total = 134217
SS Wells = 7.38343e+007
SS Total = 3.4886e+008

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	7.38343e+007	4	1.84586e+007	17.7857
Error (within wells)	2.75025e+008	265	1.03783e+006	
Totals	3.4886e+008	269		

17.7857 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	239.348
	3/14/1995	216.348
	6/21/1995	165.348
	12/14/1995	210.348
	3/6/1996	309.348
	4/25/1996	256.348
	10/2/1996	150.348
	12/10/1996	132.348
	3/11/1997	242.348
	4/15/1997	249.348
	8/14/1997	102.348
	12/4/1997	149.348
	3/31/1998	227.348
	6/23/1998	109.348
	8/11/1998	46.3478
	12/8/1998	568.652
	3/9/1999	239.348
	6/8/1999	18.3478
	8/19/1999	18.3478
	12/14/1999	49.3478
	3/7/2000	29.3478
	6/23/2000	73.6522
	12/12/2000	10.3478
	3/27/2001	149.652
	6/28/2001	240.652
	9/10/2001	54.6522
	12/18/2001	54.6522
	3/19/2002	6.65217
	6/26/2002	196.652
	9/18/2002	103.652
	12/11/2002	195.652
	3/13/2003	12.6522

6/25/2003	288.652
9/26/2003	282.652
12/10/2003	300.652
3/9/2004	310.652
6/24/2004	300.652
9/15/2004	298.652
12/15/2004	266.652
3/16/2005	201.652
6/15/2005	211.652
9/21/2005	121.652
12/21/2005	289.348
3/15/2006	1.34783
6/21/2006	227.652
12/20/2006	50.6522
6/12/2007	146.652
12/17/2007	7.65217
6/11/2008	14.6522
12/3/2008	32.6522
6/17/2009	18.3478
12/9/2009	101.348
6/17/2010	140.348
12/22/2010	49.3478
6/29/2011	44.3478
12/7/2011	83.3478
6/6/2012	134.348
12/12/2012	92.3478
6/19/2013	46.6522
12/11/2013	9.65217
6/11/2014	119.348
12/3/2014	89.3478
6/17/2015	109.348
12/1/2015	89.3478
6/22/2016	134.348
12/20/2016	133.348
6/6/2017	30.3478
11/7/2017	138.652
2/27/2018	84.3478

Well: MW#93-2	**Sample**	**Residual**
	12/15/1994	1500.98
	3/14/1995	1233.98
	6/21/1995	240.978
	12/14/1995	450.978
	3/6/1996	630.978
	4/25/1996	140.978
	10/2/1996	30.9777
	12/10/1996	139.022
	3/11/1997	200.978
	4/15/1997	239.022
	8/14/1997	1209.02
	12/4/1997	789.022
	3/31/1998	213.978
	6/23/1998	949.022
	8/11/1998	2009.02
	12/8/1998	829.022
	3/9/1999	210.978
	6/8/1999	1399.02

8/19/1999	1422.02
12/14/1999	239.022
3/7/2000	110.978
6/23/2000	8416.98
12/12/2000	370.978
3/27/2001	809.022
6/28/2001	2149.02
9/10/2001	1249.02
12/18/2001	1209.02
3/19/2002	746.022
6/26/2002	1139.02
9/18/2002	239.022
12/11/2002	832.022
3/13/2003	530.978
6/25/2003	1139.02
9/26/2003	1242.02
12/10/2003	1099.02
3/9/2004	1169.02
6/24/2004	1043.02
9/15/2004	889.022
12/15/2004	489.022
3/16/2005	239.022
6/15/2005	559.022
9/21/2005	209.022
12/21/2005	549.022
3/15/2006	800.978
6/21/2006	379.022
12/20/2006	1140.98
2/21/2007	1790.98
6/12/2007	139.022
12/17/2007	350.978
6/11/2008	149.022
12/3/2008	1069.02
12/15/2008	380.978
6/17/2009	1239.02
12/9/2009	599.022
6/17/2010	569.022
12/22/2010	1779.02
6/29/2011	1659.02
12/7/2011	1319.02
6/6/2012	1039.02
12/12/2012	2009.02
6/19/2013	1049.02
12/11/2013	1199.02
6/11/2014	489.022
12/3/2014	1449.02
6/17/2015	8180.98
12/1/2015	1109.02
6/22/2016	2740.98
12/20/2016	1949.02
6/6/2017	3139.02
11/7/2017	9440.46
2/27/2018	9440.08

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	498.536
	3/14/1995	226.536

6/21/1995	157.536
12/14/1995	270.536
3/6/1996	63.5362
4/25/1996	306.536
10/2/1996	393.536
12/10/1996	163.536
3/11/1997	106.536
4/15/1997	19.4638
8/14/1997	87.5362
12/4/1997	123.464
3/31/1998	91.4638
6/23/1998	49.4638
8/11/1998	32.5362
12/8/1998	86.4638
3/9/1999	126.464
6/8/1999	83.4638
8/19/1999	10.4638
12/14/1999	175.464
3/7/2000	13.4638
6/23/2000	193.464
12/12/2000	212.464
3/27/2001	114.464
6/28/2001	108.464
9/10/2001	13.4638
12/18/2001	199.464
3/19/2002	23.4638
6/26/2002	476.464
9/18/2002	154.464
12/11/2002	138.464
3/13/2003	229.464
6/25/2003	152.464
9/26/2003	154.464
12/10/2003	90.4638
3/9/2004	382.464
6/24/2004	134.464
9/15/2004	195.464
12/15/2004	291.464
3/16/2005	129.464
6/15/2005	183.464
9/21/2005	108.464
12/21/2005	123.464
3/15/2006	228.464
6/21/2006	37.4638
12/20/2006	176.464
6/12/2007	232.464
12/17/2007	353.464
6/11/2008	240.464
12/3/2008	190.464
6/17/2009	190.464
12/9/2009	225.464
6/17/2010	155.464
12/22/2010	173.464
6/29/2011	85.4638
12/7/2011	333.464
6/6/2012	60.4638
12/12/2012	253.464
6/19/2013	174.536

12/11/2013	11.4638
6/11/2014	236.536
12/3/2014	63.4638
6/17/2015	216.536
12/1/2015	543.536
10/11/2016	741.536
12/20/2016	936.536
6/6/2017	479.536
11/7/2017	857.536
2/27/2018	1108.54

Well: MW#03-1

Sample	Residual
6/24/2004	27.9964
9/15/2004	217.996
12/15/2004	44.9964
3/16/2005	47.0036
6/15/2005	4.00357
9/21/2005	47.9964
12/20/2006	22.0036
6/12/2007	160.996
12/17/2007	70.9964
6/11/2008	2.00357
12/3/2008	179.996
6/17/2009	49.9964
12/9/2009	0.00357143
6/17/2010	30.9964
12/22/2010	34.9964
6/29/2011	6.00357
12/7/2011	31.9964
6/6/2012	12.0036
6/19/2013	96.0036
12/11/2013	6.99643
6/11/2014	356.996
12/3/2014	60.0036
6/17/2015	202.004
12/1/2015	84.0036
6/22/2016	149.004
6/6/2017	271.004
11/7/2017	25.0036
2/27/2018	282.904

Well: MW#03-2

Sample	Residual
6/24/2004	163.576
9/15/2004	333.576
12/15/2004	200.576
3/16/2005	194.576
6/15/2005	181.576
9/21/2005	230.576
12/21/2005	283.576
3/15/2006	261.576
6/21/2006	219.576
12/20/2006	275.576
6/12/2007	175.576
12/17/2007	238.576
6/11/2008	181.576
12/3/2008	103.576

6/17/2009	135.576
12/9/2009	165.576
6/17/2010	170.576
12/22/2010	127.576
6/29/2011	107.576
12/7/2011	100.576
6/6/2012	139.576
12/12/2012	48.5758
6/19/2013	48.5758
12/11/2013	50.5758
6/11/2014	636.576
12/3/2014	684.424
6/17/2015	109.424
12/1/2015	111.424
6/22/2016	218.424
12/20/2016	598.424
6/6/2017	642.424
11/7/2017	1186.42
2/27/2018	1224.42

Shapiro-Francia Test of Normality

Parameter: Specific Conductance

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 270

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	10.52	-2.74777	7.55021	-28.9065
2	10.9	-2.45727	13.5884	-55.6908
3	186.1	-2.29036	18.8342	-481.927
4	198	-2.19728	23.6622	-916.99
5	219	-2.09693	28.0593	-1376.22
6	267	-2.01409	32.1159	-1913.98
7	320	-1.95996	35.9574	-2541.17
8	373	-1.8957	39.551	-3248.26
9	385	-1.83843	42.9308	-3956.06
10	409	-1.79912	46.1677	-4691.9
11	422	-1.75069	49.2326	-5430.69
12	444	-1.70604	52.1431	-6188.17
13	447	-1.67466	54.9476	-6936.74
14	457	-1.63524	57.6216	-7684.04
15	463	-1.59819	60.1758	-8424.01
16	465	-1.56322	62.6195	-9150.91
17	467	-1.5382	64.9856	-9869.25
18	469	-1.50626	67.2544	-10575.7
19	476	-1.47579	69.4324	-11278.2
20	497	-1.4538	71.5459	-12000.7
21	500	-1.42554	73.5781	-12713.5
22	501	-1.39838	75.5335	-13414.1
23	504	-1.37866	77.4342	-14108.9
24	514	-1.35317	79.2653	-14804.4
25	517	-1.32854	81.0303	-15491.3
26	519	-1.31058	82.7479	-16171.5
27	522	-1.28727	84.405	-16843.4
28	540	-1.26464	86.0043	-17526.3
29	572	-1.24264	87.5485	-18237.1
30	580	-1.22653	89.0529	-18948.5
31	594	-1.20553	90.5062	-19664.6
32	617	-1.18504	91.9105	-20395.8
33	625	-1.17	93.2794	-21127
34	630	-1.15035	94.6027	-21851.7
35	636	-1.13113	95.8821	-22571.1
36	649	-1.11699	97.1298	-23296.1
37	655	-1.09847	98.3364	-24015.6
38	661	-1.08032	99.5035	-24729.7
39	674	-1.06694	100.642	-25448.8
40	674	-1.04939	101.743	-26156.1
41	680	-1.03215	102.808	-26857.9
42	685	-1.01943	103.848	-27556.2
43	687	-1.00271	104.853	-28245.1
44	690	-0.986272	105.826	-28925.6
45	692	-0.970094	106.767	-29596.9
46	716	-0.958125	107.685	-30282.9

47	720	-0.942375	108.573	-30961.5
48	728	-0.926859	109.432	-31636.2
49	748	-0.915365	110.27	-32320.9
50	752	-0.900227	111.08	-32997.9
51	755	-0.885291	111.864	-33666.3
52	787	-0.874218	112.628	-34354.3
53	805	-0.859618	113.367	-35046.3
54	807	-0.845198	114.082	-35728.3
55	807	-0.834498	114.778	-36401.8
56	826	-0.820379	115.451	-37079.4
57	881	-0.806422	116.101	-37789.9
58	910	-0.792618	116.73	-38511.2
59	930	-0.782366	117.342	-39238.8
60	965	-0.768821	117.933	-39980.7
61	967	-0.755415	118.503	-40711.2
62	972	-0.745449	119.059	-41435.7
63	1010	-0.732275	119.595	-42175.3
64	1010	-0.719228	120.113	-42901.7
65	1023	-0.709522	120.616	-43627.6
66	1030	-0.696684	121.101	-44345.2
67	1031	-0.68396	121.569	-45050.3
68	1034	-0.67449	122.024	-45747.8
69	1034	-0.661955	122.462	-46432.2
70	1035	-0.649522	122.884	-47104.5
71	1038	-0.640266	123.294	-47769.1
72	1051	-0.628006	123.689	-48429.1
73	1063	-0.615839	124.068	-49083.7
74	1064	-0.603765	124.432	-49726.2
75	1068	-0.594766	124.786	-50361.4
76	1070	-0.582841	125.126	-50985
77	1070	-0.570999	125.452	-51596
78	1073	-0.56217	125.768	-52199.2
79	1073	-0.550465	126.071	-52789.8
80	1074	-0.538836	126.361	-53368.5
81	1077	-0.530162	126.642	-53939.5
82	1080	-0.518658	126.911	-54499.7
83	1080	-0.507221	127.169	-55047.5
84	1080	-0.498687	127.417	-55586.1
85	1087	-0.487364	127.655	-56115.8
86	1088	-0.476105	127.882	-56633.8
87	1090	-0.464904	128.098	-57140.6
88	1092	-0.456542	128.306	-57639.1
89	1103	-0.445443	128.504	-58130.4
90	1108	-0.434397	128.693	-58611.7
91	1109	-0.426148	128.875	-59084.3
92	1109	-0.415193	129.047	-59544.8
93	1109	-0.40429	129.211	-59993.2
94	1111	-0.396142	129.368	-60433.3
95	1125	-0.385321	129.516	-60866.8
96	1129	-0.374544	129.656	-61289.6
97	1134	-0.36649	129.791	-61705.2
98	1137	-0.355788	129.917	-62109.7
99	1140	-0.345126	130.036	-62503.2
100	1140	-0.334503	130.148	-62884.5
101	1149	-0.326561	130.255	-63259.7
102	1154	-0.316004	130.355	-63624.4
103	1155	-0.305481	130.448	-63977.2

104	1155	-0.297612	130.537	-64321
105	1169	-0.287147	130.619	-64656.7
106	1170	-0.276714	130.696	-64980.4
107	1172	-0.268908	130.768	-65295.6
108	1173	-0.258527	130.835	-65598.8
109	1177	-0.248174	130.896	-65890.9
110	1178	-0.240426	130.954	-66174.1
111	1179	-0.230118	131.007	-66445.5
112	1180	-0.219834	131.055	-66704.9
113	1185	-0.212137	131.1	-66956.2
114	1185	-0.201894	131.141	-67195.5
115	1186	-0.191671	131.178	-67422.8
116	1187	-0.181468	131.211	-67638.2
117	1200	-0.173829	131.241	-67846.8
118	1200	-0.163659	131.268	-68043.2
119	1203	-0.153505	131.291	-68227.9
120	1210	-0.1459	131.313	-68404.4
121	1210	-0.135774	131.331	-68568.7
122	1214	-0.125661	131.347	-68721.2
123	1217	-0.118085	131.361	-68864.9
124	1218	-0.107995	131.373	-68996.5
125	1226	-0.0979139	131.382	-69116.5
126	1227	-0.0903606	131.39	-69227.4
127	1230	-0.0802981	131.397	-69326.2
128	1230	-0.0702426	131.402	-69412.6
129	1235	-0.0601949	131.405	-69486.9
130	1236	-0.0526632	131.408	-69552
131	1240	-0.0426257	131.41	-69604.9
132	1244	-0.0325917	131.411	-69645.4
133	1250	-0.0250691	131.412	-69676.7
134	1250	-0.0150408	131.412	-69695.5
135	1252	-0.00501359	131.412	-69701.8
136	1253	0.00501359	131.412	-69695.5
137	1270	0.0150408	131.412	-69676.4
138	1270	0.0250691	131.413	-69644.6
139	1270	0.0325917	131.414	-69603.2
140	1273	0.0426257	131.416	-69548.9
141	1275	0.0526632	131.418	-69481.8
142	1289	0.0601949	131.422	-69404.2
143	1290	0.0702426	131.427	-69313.6
144	1296	0.0802981	131.433	-69209.5
145	1301	0.0903606	131.442	-69092
146	1301	0.0979139	131.451	-68964.6
147	1301	0.107995	131.463	-68824.1
148	1309	0.118085	131.477	-68669.5
149	1318	0.125661	131.493	-68503.9
150	1326	0.135774	131.511	-68323.8
151	1327	0.1459	131.532	-68130.2
152	1327	0.153505	131.556	-67926.5
153	1329	0.163659	131.583	-67709
154	1332	0.173829	131.613	-67477.5
155	1334	0.181468	131.646	-67235.4
156	1351	0.191671	131.683	-66976.5
157	1352	0.201894	131.723	-66703.5
158	1366	0.212137	131.768	-66413.7
159	1370	0.219834	131.817	-66112.5
160	1370	0.230118	131.87	-65797.3

161	1374	0.240426	131.927	-65466.9
162	1374	0.248174	131.989	-65126
163	1393	0.258527	132.056	-64765.8
164	1421	0.268908	132.128	-64383.7
165	1423	0.276714	132.205	-63989.9
166	1427	0.287147	132.287	-63580.2
167	1438	0.297612	132.376	-63152.2
168	1441	0.305481	132.469	-62712
169	1454	0.316004	132.569	-62252.5
170	1458	0.326561	132.676	-61776.4
171	1466	0.334503	132.787	-61286
172	1469	0.345126	132.907	-60779.1
173	1480	0.355788	133.033	-60252.5
174	1490	0.36649	133.167	-59706.4
175	1498	0.374544	133.308	-59145.3
176	1500	0.385321	133.456	-58567.4
177	1515	0.396142	133.613	-57967.2
178	1516	0.40429	133.777	-57354.3
179	1521	0.415193	133.949	-56722.8
180	1531	0.426148	134.131	-56070.4
181	1534	0.434397	134.319	-55404
182	1540	0.445443	134.518	-54718
183	1547	0.456542	134.726	-54011.7
184	1560	0.464904	134.942	-53286.5
185	1570	0.476105	135.169	-52539
186	1586	0.487364	135.406	-51766.1
187	1602	0.498687	135.655	-50967.2
188	1608	0.507221	135.912	-50151.5
189	1618	0.518658	136.181	-49312.4
190	1620	0.530162	136.462	-48453.5
191	1620	0.538836	136.753	-47580.6
192	1630	0.550465	137.056	-46683.3
193	1657	0.56217	137.372	-45751.8
194	1743	0.570999	137.698	-44756.6
195	1762	0.582841	138.038	-43729.6
196	1807	0.594766	138.391	-42654.8
197	1888	0.603765	138.756	-41514.9
198	2005	0.615839	139.135	-40280.2
199	2042	0.628006	139.53	-38997.8
200	2080	0.640266	139.939	-37666
201	2121	0.649522	140.361	-36288.4
202	2200	0.661955	140.8	-34832.1
203	2372	0.67449	141.254	-33232.2
204	6710	0.68396	141.722	-28642.8
205	7660	0.696684	142.208	-23306.2
206	7950	0.709522	142.711	-17665.5
207	8217	0.719228	143.228	-11755.6
208	8310	0.732275	143.765	-5670.43
209	8650	0.745449	144.32	777.704
210	8820	0.755415	144.891	7440.46
211	8920	0.768821	145.482	14298.3
212	9000	0.782366	146.094	21339.6
213	9070	0.792618	146.722	28528.7
214	9080	0.806422	147.373	35851
215	9100	0.820379	148.046	43316.4
216	9210	0.834498	148.742	51002.2
217	9237	0.845198	149.456	58809.3

218	9240	0.859618	150.195	66752.1
219	9250	0.874218	150.96	74838.6
220	9310	0.885291	151.743	83080.7
221	9340	0.900227	152.554	91488.8
222	9420	0.915365	153.392	100112
223	9590	0.926859	154.251	109000
224	9590	0.942375	155.139	118038
225	9600	0.958125	156.057	127236
226	9660	0.970094	156.998	136607
227	9690	0.986272	157.971	146164
228	9690	1.00271	158.976	155880
229	9690	1.01943	160.015	165758
230	9690	1.03215	161.081	175760
231	9830	1.04939	162.182	186075
232	9940	1.06694	163.32	196681
233	9940	1.08032	164.487	207419
234	10000	1.09847	165.694	218404
235	10010	1.11699	166.942	229585
236	10020	1.13113	168.221	240919
237	10050	1.15035	169.544	252480
238	10197	1.17	170.913	264410
239	10240	1.18504	172.318	276545
240	10260	1.20553	173.771	288914
241	10280	1.22653	175.275	301522
242	10283	1.24264	176.819	314300
243	10340	1.26464	178.419	327377
244	10400	1.28727	180.076	340764
245	10490	1.31058	181.793	354512
246	10494	1.32854	183.558	368454
247	10500	1.35317	185.39	382662
248	10520	1.37866	187.29	397166
249	10550	1.39838	189.246	411919
250	10560	1.42554	191.278	426973
251	10590	1.4538	193.391	442368
252	10590	1.47579	195.569	457997
253	10620	1.50626	197.838	473993
254	10650	1.5382	200.204	490375
255	10660	1.56322	202.648	507039
256	10660	1.59819	205.202	524076
257	10690	1.63524	207.876	541557
258	10693	1.67466	210.681	559464
259	10700	1.70604	213.591	577718
260	10770	1.75069	216.656	596573
261	10850	1.79912	219.893	616094
262	10873	1.83843	223.273	636083
263	10900	1.8957	226.866	656746
264	11110	1.95996	230.708	678521
265	11230	2.01409	234.764	701139
266	11400	2.09693	239.162	725045
267	11460	2.19728	243.99	750225
268	11460	2.29036	249.235	776473
269	11600	2.45727	255.274	804977

Sample Standard Deviation = 3894.65
Numerator = 6.47988e+011
Denominator = 1.04159e+012 = 269 255.274
W Statistic = 0.622116

5% Critical value of 0.976 exceeds 0.622116
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.622116
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 69
Maximum Background Concentration = 1888
Confidence Level = 94.5%
False Positive Rate = 5.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	2/27/2018	1	10.9	FALSE
MW#93-3	2/27/2018	1	2372	TRUE
MW#03-1	2/27/2018	1	186.1	FALSE
MW#03-2	2/27/2018	1	2080	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 68
Maximum Baseline Concentration = 2200
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	1762
	3/14/1995	1490
	6/21/1995	1421
	12/14/1995	1534
	3/6/1996	1327
	4/25/1996	1570
	10/2/1996	1657
	12/10/1996	1427
	3/11/1997	1370
	4/15/1997	1244
	8/14/1997	1351
	12/4/1997	1140
	3/31/1998	1172
	6/23/1998	1214
	8/11/1998	1296
	12/8/1998	1177
	3/9/1999	1137
	6/8/1999	1180
	8/19/1999	1253
	12/14/1999	1088
	3/7/2000	1250
	6/23/2000	1070
	12/12/2000	1051
	3/27/2001	1149
	6/28/2001	1155
	9/10/2001	1250
	12/18/2001	1064
	3/19/2002	1240
	6/26/2002	787
	9/18/2002	1109
	12/11/2002	1125
	3/13/2003	1034
	6/25/2003	1111
	9/26/2003	1109
	12/10/2003	1173
	3/9/2004	881
	6/24/2004	1129
	9/15/2004	1068
	12/15/2004	972
	3/16/2005	1134
	6/15/2005	1080

9/21/2005	1155
12/21/2005	1140
3/15/2006	1035
6/21/2006	1226
12/20/2006	1087
6/12/2007	1031
12/17/2007	910
6/11/2008	1023
12/3/2008	1073
6/17/2009	1073
12/9/2009	1038
6/17/2010	1108
12/22/2010	1090
6/29/2011	1178
12/7/2011	930
6/6/2012	1203
12/12/2012	1010
6/19/2013	1438
12/11/2013	1252
6/11/2014	1500
12/3/2014	1200
6/17/2015	1480
12/1/2015	1807
10/11/2016	2005
12/20/2016	2200
6/6/2017	1743
11/7/2017	2121

Date	Samples	Mean	Impacted
2/27/2018	1	2372	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-2

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 32
Maximum Baseline Concentration = 2042
Confidence Level = 97%
False Positive Rate = 3%

Baseline Samples	Date	Result
	6/24/2004	692
	9/15/2004	522
	12/15/2004	655
	3/16/2005	661
	6/15/2005	674
	9/21/2005	625
	12/21/2005	572
	3/15/2006	594
	6/21/2006	636
	12/20/2006	580
	6/12/2007	680
	12/17/2007	617
	6/11/2008	674
	12/3/2008	752
	6/17/2009	720
	12/9/2009	690
	6/17/2010	685
	12/22/2010	728
	6/29/2011	748
	12/7/2011	755
	6/6/2012	716
	12/12/2012	807
	6/19/2013	807
	12/11/2013	805
	6/11/2014	219
	12/3/2014	1540
	6/17/2015	965
	12/1/2015	967
	6/22/2016	1074
	12/20/2016	1454
	6/6/2017	1498
	11/7/2017	2042

Date	Samples	Mean	Impacted
2/27/2018	1	2080	TRUE

Concentrations (mg/l)

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 270
Total Non-Detect: 8
Percent Non-Detects: 2.96296%
Total Background Samples: 69
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	69	0 (0%)	12/15/1994	195	195
			3/14/1995	275	275
			6/21/1995	750	750
			12/14/1995	320	320
			3/6/1996	215	215
			4/25/1996	272	272
			10/2/1996	300	300
			12/10/1996	260	260
			3/11/1997	278	278
			4/15/1997	250	250
			8/14/1997	320	320
			12/4/1997	360	360
			3/31/1998	230	230
			6/23/1998	500	500
			8/11/1998	350	350
			12/8/1998	270	270
			3/9/1999	290	290
			6/8/1999	408	408
			8/19/1999	388	388
			12/14/1999	310	310
			3/7/2000	373	373
			6/23/2000	410	410
			12/12/2000	420	420
			3/27/2001	350	350
			6/28/2001	425	425
			9/10/2001	390	390
			12/18/2001	390	390
			3/19/2002	425	425
			6/26/2002	420	420
			9/18/2002	517	517
			12/11/2002	430	430
			3/13/2003	450	450
			6/25/2003	434	434
			9/26/2003	460	460
			12/10/2003	470	470
			3/9/2004	444	444
			6/24/2004	500	500
			9/15/2004	475	475
			12/15/2004	558	558
			3/16/2005	880	880
			6/15/2005	22	22
			9/21/2005	467	467
			12/21/2005	475	475
			3/15/2006	375	375

			6/21/2006	420	420
			12/20/2006	330	330
			6/12/2007	260	260
			12/17/2007	300	300
			6/11/2008	375	375
			12/3/2008	340	340
			6/17/2009	240	240
			12/9/2009	160	160
			6/17/2010	290	290
			12/22/2010	304	304
			6/29/2011	306	306
			12/7/2011	255	255
			6/6/2012	275	275
			12/12/2012	301	301
			6/19/2013	409	409
			12/11/2013	306	306
			6/11/2014	316	316
			12/3/2014	292	292
			6/17/2015	286	286
			12/1/2015	299	299
			6/22/2016	250	250
			12/20/2016	275	275
			6/6/2017	265	265
			11/7/2017	281	281
			2/27/2018	299	299

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	71	0 (0%)	12/15/1994	2000	2000
			3/14/1995	1550	1550
			6/21/1995	185	185
			12/14/1995	2367	2367
			3/6/1996	2150	2150
			4/25/1996	2000	2000
			10/2/1996	3267	3267
			12/10/1996	4000	4000
			3/11/1997	1700	1700
			4/15/1997	1500	1500
			8/14/1997	3650	3650
			12/4/1997	4300	4300
			3/31/1998	2500	2500
			6/23/1998	3250	3250
			8/11/1998	3050	3050
			12/8/1998	3050	3050
			3/9/1999	3600	3600
			6/8/1999	3150	3150
			8/19/1999	1897	1897
			12/14/1999	2500	2500
			3/7/2000	3400	3400
			6/23/2000	3400	3400
			12/12/2000	3000	3000
			3/27/2001	2133	2133
			6/28/2001	2750	2750
			9/10/2001	2650	2650
			12/18/2001	2950	2950

			3/19/2002	2967	2967
			6/26/2002	3050	3050
			9/18/2002	2900	2900
			12/11/2002	2933	2933
			3/13/2003	2900	2900
			6/25/2003	2700	2700
			9/26/2003	2767	2767
			12/10/2003	2700	2700
			3/9/2004	2550	2550
			6/24/2004	2650	2650
			9/15/2004	2700	2700
			12/15/2004	2950	2950
			3/16/2005	3200	3200
			6/15/2005	2650	2650
			9/21/2005	3200	3200
			12/21/2005	3200	3200
			3/15/2006	3000	3000
			6/21/2006	2700	2700
			12/20/2006	2500	2500
			2/21/2007	1900	1900
			6/12/2007	2400	2400
			12/17/2007	3100	3100
			6/11/2008	2350	2350
			12/3/2008	3300	3300
			12/15/2008	2400	2400
			6/17/2009	2300	2300
			12/9/2009	2200	2200
			6/17/2010	2900	2900
			12/22/2010	3460	3460
			6/29/2011	2630	2630
			12/7/2011	2520	2520
			6/6/2012	2360	2360
			12/12/2012	3240	3240
			6/19/2013	2510	2510
			12/11/2013	2460	2460
			6/11/2014	2790	2790
			12/3/2014	2940	2940
			6/17/2015	114	114
			12/1/2015	3600	3600
			6/22/2016	2620	2620
			12/20/2016	3800	3800
			6/6/2017	3630	3630
			11/7/2017	4340	4340
			2/27/2018	3870	3870
MW#93-3	69	8 (11.5942%)	12/15/1994	ND<10	ND<10
			3/14/1995	ND<10	ND<10
			6/21/1995	10	10
			12/14/1995	ND<10	ND<10
			3/6/1996	10	10
			4/25/1996	ND<10	ND<10
			10/2/1996	11	11
			12/10/1996	10	10
			3/11/1997	12	12
			4/15/1997	15	15
			8/14/1997	11	11
			12/4/1997	8	8

3/31/1998	45	45
6/23/1998	4	4
8/11/1998	9	9
12/8/1998	2	2
3/9/1999	ND<10	ND<10
6/8/1999	3	3
8/19/1999	ND<10	ND<10
12/14/1999	ND<10	ND<10
3/7/2000	13	13
6/23/2000	14	14
12/12/2000	7	7
3/27/2001	3	3
6/28/2001	ND<10	ND<10
9/10/2001	20	20
12/18/2001	19	19
3/19/2002	8	8
6/26/2002	8	8
9/18/2002	8	8
12/11/2002	6	6
3/13/2003	18	18
6/25/2003	13	13
9/26/2003	16	16
12/10/2003	34	34
3/9/2004	130	130
6/24/2004	24	24
9/15/2004	17	17
12/15/2004	26	26
3/16/2005	29	29
6/15/2005	26	26
9/21/2005	19	19
12/21/2005	23	23
3/15/2006	19	19
6/21/2006	21	21
12/20/2006	42	42
6/12/2007	3	3
12/17/2007	28	28
6/11/2008	27	27
12/3/2008	11	11
6/17/2009	16	16
12/9/2009	12	12
6/17/2010	45	45
12/22/2010	25.8	25.8
6/29/2011	34.2	34.2
12/7/2011	37.4	37.4
6/6/2012	38.3	38.3
12/12/2012	25.8	25.8
6/19/2013	61.6	61.6
12/11/2013	26.5	26.5
6/11/2014	56.2	56.2
12/3/2014	36	36
6/17/2015	109	109
12/1/2015	81	81
6/22/2016	58.5	58.5
12/20/2016	66.6	66.6
6/6/2017	18.2	18.2
11/7/2017	80.3	80.3
2/27/2018	64.2	64.2

MW#03-1	29	0 (0%)	6/24/2004	42	42
			9/15/2004	76	76
			12/15/2004	62	62
			3/16/2005	22	22
			6/15/2005	23	23
			9/21/2005	17	17
			12/20/2006	55	55
			6/12/2007	88	88
			12/17/2007	120	120
			6/11/2008	23	23
			12/3/2008	90	90
			6/17/2009	21	21
			12/9/2009	15	15
			6/17/2010	16	16
			12/22/2010	22.9	22.9
			6/29/2011	21.6	21.6
			12/7/2011	18.1	18.1
			6/6/2012	14.3	14.3
			6/19/2013	16.2	16.2
			12/11/2013	29.1	29.1
			6/11/2014	127	127
			12/3/2014	19.7	19.7
			6/17/2015	7.86	7.86
			12/1/2015	12.1	12.1
			6/22/2016	10.3	10.3
			12/20/2016	30.9	30.9
			6/6/2017	8.92	8.92
			11/7/2017	14.4	14.4
			2/27/2018	12.6	12.6
MW#03-2	32	0 (0%)	6/24/2004	72	72
			9/15/2004	32	32
			12/15/2004	54	54
			3/16/2005	78	78
			6/15/2005	23	23
			9/21/2005	80	80
			12/21/2005	72	72
			3/15/2006	30	30
			12/20/2006	34	34
			6/12/2007	68	68
			12/17/2007	130	130
			6/11/2008	67	67
			12/3/2008	210	210
			6/17/2009	84	84
			12/9/2009	80	80
			6/17/2010	106	106
			12/22/2010	98.9	98.9
			6/29/2011	101	101
			12/7/2011	98.8	98.8
			6/6/2012	107	107
			12/12/2012	111	111
			6/19/2013	113	113
			12/11/2013	106	106
			6/11/2014	10.3	10.3
			12/3/2014	158	158
			6/17/2015	179	179

12/1/2015	197	197
6/22/2016	254	254
12/20/2016	451	451
6/6/2017	332	332
11/7/2017	516	516
2/27/2018	468	468

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 180.521
Overall Std Dev = 341.246
Overall Total = 48740.8
SS Wells = 1.19462e+007
SS Total = 3.13247e+007

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	1.19462e+007	4	2.98655e+006	40.841
Error (within wells)	1.93785e+007	265	73126.4	
Totals	3.13247e+007	269		

40.841 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	160.58
	3/14/1995	80.5797
	6/21/1995	394.42
	12/14/1995	35.5797
	3/6/1996	140.58
	4/25/1996	83.5797
	10/2/1996	55.5797
	12/10/1996	95.5797
	3/11/1997	77.5797
	4/15/1997	105.58
	8/14/1997	35.5797
	12/4/1997	4.42029
	3/31/1998	125.58
	6/23/1998	144.42
	8/11/1998	5.57971
	12/8/1998	85.5797
	3/9/1999	65.5797
	6/8/1999	52.4203
	8/19/1999	32.4203
	12/14/1999	45.5797
	3/7/2000	17.4203
	6/23/2000	54.4203
	12/12/2000	64.4203
	3/27/2001	5.57971
	6/28/2001	69.4203
	9/10/2001	34.4203
	12/18/2001	34.4203
	3/19/2002	69.4203
	6/26/2002	64.4203
	9/18/2002	161.42
	12/11/2002	74.4203
	3/13/2003	94.4203

6/25/2003	78.4203
9/26/2003	104.42
12/10/2003	114.42
3/9/2004	88.4203
6/24/2004	144.42
9/15/2004	119.42
12/15/2004	202.42
3/16/2005	524.42
6/15/2005	333.58
9/21/2005	111.42
12/21/2005	119.42
3/15/2006	19.4203
6/21/2006	64.4203
12/20/2006	25.5797
6/12/2007	95.5797
12/17/2007	55.5797
6/11/2008	19.4203
12/3/2008	15.5797
6/17/2009	115.58
12/9/2009	195.58
6/17/2010	65.5797
12/22/2010	51.5797
6/29/2011	49.5797
12/7/2011	100.58
6/6/2012	80.5797
12/12/2012	54.5797
6/19/2013	53.4203
12/11/2013	49.5797
6/11/2014	39.5797
12/3/2014	63.5797
6/17/2015	69.5797
12/1/2015	56.5797
6/22/2016	105.58
12/20/2016	80.5797
6/6/2017	90.5797
11/7/2017	74.5797
2/27/2018	56.5797

Well: MW#93-2

Sample	Residual
12/15/1994	759.155
3/14/1995	1209.15
6/21/1995	2574.15
12/14/1995	392.155
3/6/1996	609.155
4/25/1996	759.155
10/2/1996	507.845
12/10/1996	1240.85
3/11/1997	1059.15
4/15/1997	1259.15
8/14/1997	890.845
12/4/1997	1540.85
3/31/1998	259.155
6/23/1998	490.845
8/11/1998	290.845
12/8/1998	290.845
3/9/1999	840.845
6/8/1999	390.845

8/19/1999	862.155
12/14/1999	259.155
3/7/2000	640.845
6/23/2000	640.845
12/12/2000	240.845
3/27/2001	626.155
6/28/2001	9.15493
9/10/2001	109.155
12/18/2001	190.845
3/19/2002	207.845
6/26/2002	290.845
9/18/2002	140.845
12/11/2002	173.845
3/13/2003	140.845
6/25/2003	59.1549
9/26/2003	7.84507
12/10/2003	59.1549
3/9/2004	209.155
6/24/2004	109.155
9/15/2004	59.1549
12/15/2004	190.845
3/16/2005	440.845
6/15/2005	109.155
9/21/2005	440.845
12/21/2005	440.845
3/15/2006	240.845
6/21/2006	59.1549
12/20/2006	259.155
2/21/2007	859.155
6/12/2007	359.155
12/17/2007	340.845
6/11/2008	409.155
12/3/2008	540.845
12/15/2008	359.155
6/17/2009	459.155
12/9/2009	559.155
6/17/2010	140.845
12/22/2010	700.845
6/29/2011	129.155
12/7/2011	239.155
6/6/2012	399.155
12/12/2012	480.845
6/19/2013	249.155
12/11/2013	299.155
6/11/2014	30.8451
12/3/2014	180.845
6/17/2015	2645.15
12/1/2015	840.845
6/22/2016	139.155
12/20/2016	1040.85
6/6/2017	870.845
11/7/2017	1580.85
2/27/2018	1110.85

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	15.429
	3/14/1995	15.429

6/21/1995	15.429
12/14/1995	15.429
3/6/1996	15.429
4/25/1996	15.429
10/2/1996	14.429
12/10/1996	15.429
3/11/1997	13.429
4/15/1997	10.429
8/14/1997	14.429
12/4/1997	17.429
3/31/1998	19.571
6/23/1998	21.429
8/11/1998	16.429
12/8/1998	23.429
3/9/1999	15.429
6/8/1999	22.429
8/19/1999	15.429
12/14/1999	15.429
3/7/2000	12.429
6/23/2000	11.429
12/12/2000	18.429
3/27/2001	22.429
6/28/2001	15.429
9/10/2001	5.42899
12/18/2001	6.42899
3/19/2002	17.429
6/26/2002	17.429
9/18/2002	17.429
12/11/2002	19.429
3/13/2003	7.42899
6/25/2003	12.429
9/26/2003	9.42899
12/10/2003	8.57101
3/9/2004	104.571
6/24/2004	1.42899
9/15/2004	8.42899
12/15/2004	0.571014
3/16/2005	3.57101
6/15/2005	0.571014
9/21/2005	6.42899
12/21/2005	2.42899
3/15/2006	6.42899
6/21/2006	4.42899
12/20/2006	16.571
6/12/2007	22.429
12/17/2007	2.57101
6/11/2008	1.57101
12/3/2008	14.429
6/17/2009	9.42899
12/9/2009	13.429
6/17/2010	19.571
12/22/2010	0.371014
6/29/2011	8.77101
12/7/2011	11.971
6/6/2012	12.871
12/12/2012	0.371014
6/19/2013	36.171

12/11/2013	1.07101
6/11/2014	30.771
12/3/2014	10.571
6/17/2015	83.571
12/1/2015	55.571
6/22/2016	33.071
12/20/2016	41.171
6/6/2017	7.22899
11/7/2017	54.871
2/27/2018	38.771

Well: MW#03-1	Sample	Residual
	6/24/2004	6.27655
	9/15/2004	40.2766
	12/15/2004	26.2766
	3/16/2005	13.7234
	6/15/2005	12.7234
	9/21/2005	18.7234
	12/20/2006	19.2766
	6/12/2007	52.2766
	12/17/2007	84.2766
	6/11/2008	12.7234
	12/3/2008	54.2766
	6/17/2009	14.7234
	12/9/2009	20.7234
	6/17/2010	19.7234
	12/22/2010	12.8234
	6/29/2011	14.1234
	12/7/2011	17.6234
	6/6/2012	21.4234
	6/19/2013	19.5234
	12/11/2013	6.62345
	6/11/2014	91.2766
	12/3/2014	16.0234
	6/17/2015	27.8634
	12/1/2015	23.6234
	6/22/2016	25.4234
	12/20/2016	4.82345
	6/6/2017	26.8034
	11/7/2017	21.3234
	2/27/2018	23.1234

Well: MW#03-2	Sample	Residual
	6/24/2004	69.2813
	9/15/2004	109.281
	12/15/2004	87.2813
	3/16/2005	63.2813
	6/15/2005	118.281
	9/21/2005	61.2813
	12/21/2005	69.2813
	3/15/2006	111.281
	12/20/2006	107.281
	6/12/2007	73.2813
	12/17/2007	11.2813
	6/11/2008	74.2813
	12/3/2008	68.7188

6/17/2009	57.2813
12/9/2009	61.2813
6/17/2010	35.2813
12/22/2010	42.3812
6/29/2011	40.2813
12/7/2011	42.4813
6/6/2012	34.2813
12/12/2012	30.2813
6/19/2013	28.2813
12/11/2013	35.2813
6/11/2014	130.981
12/3/2014	16.7188
6/17/2015	37.7188
12/1/2015	55.7188
6/22/2016	112.719
12/20/2016	309.719
6/6/2017	190.719
11/7/2017	374.719
2/27/2018	326.719

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 270

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	2	-2.74777	7.55021	-5.49553
2	3	-2.45727	13.5884	-12.8673
3	3	-2.29036	18.8342	-19.7384
4	3	-2.19728	23.6622	-26.3303
5	4	-2.09693	28.0593	-34.718
6	6	-2.01409	32.1159	-46.8026
7	7	-1.95996	35.9574	-60.5223
8	7.86	-1.8957	39.551	-75.4225
9	8	-1.83843	42.9308	-90.1299
10	8	-1.79912	46.1677	-104.523
11	8	-1.75069	49.2326	-118.528
12	8	-1.70604	52.1431	-132.177
13	8.92	-1.67466	54.9476	-147.115
14	9	-1.63524	57.6216	-161.832
15	10	-1.59819	60.1758	-177.814
16	10	-1.56322	62.6195	-193.446
17	10	-1.5382	64.9856	-208.828
18	10	-1.50626	67.2544	-223.89
19	10	-1.47579	69.4324	-238.648
20	10	-1.4538	71.5459	-253.186
21	10	-1.42554	73.5781	-267.442
22	10	-1.39838	75.5335	-281.426
23	10	-1.37866	77.4342	-295.212
24	10	-1.35317	79.2653	-308.744
25	10	-1.32854	81.0303	-322.029
26	10.3	-1.31058	82.7479	-335.528
27	10.3	-1.28727	84.405	-348.787
28	11	-1.26464	86.0043	-362.698
29	11	-1.24264	87.5485	-376.367
30	11	-1.22653	89.0529	-389.859
31	12	-1.20553	90.5062	-404.325
32	12	-1.18504	91.9105	-418.546
33	12.1	-1.17	93.2794	-432.703
34	12.6	-1.15035	94.6027	-447.197
35	13	-1.13113	95.8821	-461.902
36	13	-1.11699	97.1298	-476.423
37	14	-1.09847	98.3364	-491.802
38	14.3	-1.08032	99.5035	-507.25
39	14.4	-1.06694	100.642	-522.614
40	15	-1.04939	101.743	-538.355
41	15	-1.03215	102.808	-553.837
42	16	-1.01943	103.848	-570.148
43	16	-1.00271	104.853	-586.191
44	16	-0.986272	105.826	-601.972
45	16.2	-0.970094	106.767	-617.687
46	17	-0.958125	107.685	-633.975

47	17	-0.942375	108.573	-649.996
48	18	-0.926859	109.432	-666.679
49	18.1	-0.915365	110.27	-683.247
50	18.2	-0.900227	111.08	-699.631
51	19	-0.885291	111.864	-716.452
52	19	-0.874218	112.628	-733.062
53	19	-0.859618	113.367	-749.395
54	19.7	-0.845198	114.082	-766.045
55	20	-0.834498	114.778	-782.735
56	21	-0.820379	115.451	-799.963
57	21	-0.806422	116.101	-816.898
58	21.6	-0.792618	116.73	-834.019
59	22	-0.782366	117.342	-851.231
60	22	-0.768821	117.933	-868.145
61	22.9	-0.755415	118.503	-885.444
62	23	-0.745449	119.059	-902.589
63	23	-0.732275	119.595	-919.431
64	23	-0.719228	120.113	-935.974
65	23	-0.709522	120.616	-952.293
66	24	-0.696684	121.101	-969.013
67	25.8	-0.68396	121.569	-986.659
68	25.8	-0.67449	122.024	-1004.06
69	26	-0.661955	122.462	-1021.27
70	26	-0.649522	122.884	-1038.16
71	26.5	-0.640266	123.294	-1055.13
72	27	-0.628006	123.689	-1072.08
73	28	-0.615839	124.068	-1089.33
74	29	-0.603765	124.432	-1106.84
75	29.1	-0.594766	124.786	-1124.14
76	30	-0.582841	125.126	-1141.63
77	30.9	-0.570999	125.452	-1159.27
78	32	-0.56217	125.768	-1177.26
79	34	-0.550465	126.071	-1195.98
80	34	-0.538836	126.361	-1214.3
81	34.2	-0.530162	126.642	-1232.43
82	36	-0.518658	126.911	-1251.1
83	37.4	-0.507221	127.169	-1270.07
84	38.3	-0.498687	127.417	-1289.17
85	42	-0.487364	127.655	-1309.64
86	42	-0.476105	127.882	-1329.64
87	45	-0.464904	128.098	-1350.56
88	45	-0.456542	128.306	-1371.1
89	54	-0.445443	128.504	-1395.16
90	55	-0.434397	128.693	-1419.05
91	56.2	-0.426148	128.875	-1443
92	58.5	-0.415193	129.047	-1467.29
93	61.6	-0.40429	129.211	-1492.19
94	62	-0.396142	129.368	-1516.75
95	64.2	-0.385321	129.516	-1541.49
96	66.6	-0.374544	129.656	-1566.43
97	67	-0.36649	129.791	-1590.99
98	68	-0.355788	129.917	-1615.18
99	72	-0.345126	130.036	-1640.03
100	72	-0.334503	130.148	-1664.11
101	76	-0.326561	130.255	-1688.93
102	78	-0.316004	130.355	-1713.58
103	80	-0.305481	130.448	-1738.02

104	80	-0.297612	130.537	-1761.83
105	80.3	-0.287147	130.619	-1784.89
106	81	-0.276714	130.696	-1807.3
107	84	-0.268908	130.768	-1829.89
108	88	-0.258527	130.835	-1852.64
109	90	-0.248174	130.896	-1874.97
110	98.8	-0.240426	130.954	-1898.73
111	98.9	-0.230118	131.007	-1921.49
112	101	-0.219834	131.055	-1943.69
113	106	-0.212137	131.1	-1966.18
114	106	-0.201894	131.141	-1987.58
115	107	-0.191671	131.178	-2008.09
116	109	-0.181468	131.211	-2027.87
117	111	-0.173829	131.241	-2047.16
118	113	-0.163659	131.268	-2065.66
119	114	-0.153505	131.291	-2083.16
120	120	-0.1459	131.313	-2100.66
121	127	-0.135774	131.331	-2117.91
122	130	-0.125661	131.347	-2134.24
123	130	-0.118085	131.361	-2149.59
124	158	-0.107995	131.373	-2166.66
125	160	-0.0979139	131.382	-2182.32
126	179	-0.0903606	131.39	-2198.5
127	185	-0.0802981	131.397	-2213.35
128	195	-0.0702426	131.402	-2227.05
129	197	-0.0601949	131.405	-2238.91
130	210	-0.0526632	131.408	-2249.97
131	215	-0.0426257	131.41	-2259.13
132	230	-0.0325917	131.411	-2266.63
133	240	-0.0250691	131.412	-2272.64
134	250	-0.0150408	131.412	-2276.41
135	250	-0.00501359	131.412	-2277.66
136	254	0.00501359	131.412	-2276.38
137	255	0.0150408	131.412	-2272.55
138	260	0.0250691	131.413	-2266.03
139	260	0.0325917	131.414	-2257.56
140	265	0.0426257	131.416	-2246.26
141	270	0.0526632	131.418	-2232.04
142	272	0.0601949	131.422	-2215.67
143	275	0.0702426	131.427	-2196.35
144	275	0.0802981	131.433	-2174.27
145	275	0.0903606	131.442	-2149.42
146	278	0.0979139	131.451	-2122.2
147	281	0.107995	131.463	-2091.86
148	286	0.118085	131.477	-2058.08
149	290	0.125661	131.493	-2021.64
150	290	0.135774	131.511	-1982.27
151	292	0.1459	131.532	-1939.66
152	299	0.153505	131.556	-1893.77
153	299	0.163659	131.583	-1844.83
154	300	0.173829	131.613	-1792.68
155	300	0.181468	131.646	-1738.24
156	301	0.191671	131.683	-1680.55
157	304	0.201894	131.723	-1619.17
158	306	0.212137	131.768	-1554.26
159	306	0.219834	131.817	-1486.99
160	310	0.230118	131.87	-1415.65

161	316	0.240426	131.927	-1339.68
162	320	0.248174	131.989	-1260.26
163	320	0.258527	132.056	-1177.54
164	330	0.268908	132.128	-1088.8
165	332	0.276714	132.205	-996.927
166	340	0.287147	132.287	-899.297
167	350	0.297612	132.376	-795.133
168	350	0.305481	132.469	-688.214
169	360	0.316004	132.569	-574.453
170	373	0.326561	132.676	-452.645
171	375	0.334503	132.787	-327.207
172	375	0.345126	132.907	-197.785
173	388	0.355788	133.033	-59.7391
174	390	0.36649	133.167	83.192
175	390	0.374544	133.308	229.264
176	408	0.385321	133.456	386.475
177	409	0.396142	133.613	548.497
178	410	0.40429	133.777	714.256
179	420	0.415193	133.949	888.637
180	420	0.426148	134.131	1067.62
181	420	0.434397	134.319	1250.07
182	425	0.445443	134.518	1439.38
183	425	0.456542	134.726	1633.41
184	430	0.464904	134.942	1833.32
185	434	0.476105	135.169	2039.95
186	444	0.487364	135.406	2256.34
187	450	0.498687	135.655	2480.75
188	451	0.507221	135.912	2709.5
189	460	0.518658	136.181	2948.09
190	467	0.530162	136.462	3195.67
191	468	0.538836	136.753	3447.85
192	470	0.550465	137.056	3706.57
193	475	0.56217	137.372	3973.6
194	475	0.570999	137.698	4244.82
195	500	0.582841	138.038	4536.24
196	500	0.594766	138.391	4833.62
197	516	0.603765	138.756	5145.17
198	517	0.615839	139.135	5463.56
199	558	0.628006	139.53	5813.98
200	750	0.640266	139.939	6294.18
201	880	0.649522	140.361	6865.76
202	1500	0.661955	140.8	7858.7
203	1550	0.67449	141.254	8904.16
204	1700	0.68396	141.722	10066.9
205	1897	0.696684	142.208	11388.5
206	1900	0.709522	142.711	12736.6
207	2000	0.719228	143.228	14175
208	2000	0.732275	143.765	15639.6
209	2133	0.745449	144.32	17229.6
210	2150	0.755415	144.891	18853.8
211	2200	0.768821	145.482	20545.2
212	2300	0.782366	146.094	22344.6
213	2350	0.792618	146.722	24207.3
214	2360	0.806422	147.373	26110.4
215	2367	0.820379	148.046	28052.3
216	2400	0.834498	148.742	30055.1
217	2400	0.845198	149.456	32083.5

218	2460	0.859618	150.195	34198.2
219	2500	0.874218	150.96	36383.7
220	2500	0.885291	151.743	38597
221	2500	0.900227	152.554	40847.5
222	2510	0.915365	153.392	43145.1
223	2520	0.926859	154.251	45480.8
224	2550	0.942375	155.139	47883.9
225	2620	0.958125	156.057	50394.1
226	2630	0.970094	156.998	52945.5
227	2650	0.986272	157.971	55559.1
228	2650	1.00271	158.976	58216.3
229	2650	1.01943	160.015	60917.8
230	2700	1.03215	161.081	63704.6
231	2700	1.04939	162.182	66537.9
232	2700	1.06694	163.32	69418.7
233	2700	1.08032	164.487	72335.5
234	2750	1.09847	165.694	75356.3
235	2767	1.11699	166.942	78447
236	2790	1.13113	168.221	81602.9
237	2900	1.15035	169.544	84938.9
238	2900	1.17	170.913	88331.9
239	2900	1.18504	172.318	91768.5
240	2933	1.20553	173.771	95304.3
241	2940	1.22653	175.275	98910.3
242	2950	1.24264	176.819	102576
243	2950	1.26464	178.419	106307
244	2967	1.28727	180.076	110126
245	3000	1.31058	181.793	114058
246	3000	1.32854	183.558	118044
247	3050	1.35317	185.39	122171
248	3050	1.37866	187.29	126376
249	3050	1.39838	189.246	130641
250	3100	1.42554	191.278	135060
251	3150	1.4538	193.391	139639
252	3200	1.47579	195.569	144362
253	3200	1.50626	197.838	149182
254	3200	1.5382	200.204	154104
255	3240	1.56322	202.648	159169
256	3250	1.59819	205.202	164363
257	3267	1.63524	207.876	169705
258	3300	1.67466	210.681	175232
259	3400	1.70604	213.591	181032
260	3400	1.75069	216.656	186985
261	3460	1.79912	219.893	193210
262	3600	1.83843	223.273	199828
263	3600	1.8957	226.866	206652
264	3630	1.95996	230.708	213767
265	3650	2.01409	234.764	221119
266	3800	2.09693	239.162	229087
267	3870	2.19728	243.99	237590
268	4000	2.29036	249.235	246752
269	4300	2.45727	255.274	257318

Sample Standard Deviation = 1216.34
Numerator = 6.62126e+010
Denominator = 1.01594e+011 = 269 255.274
W Statistic = 0.651738

5% Critical value of 0.976 exceeds 0.651738
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.651738
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 2.96296%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 69
Maximum Background Concentration = 880
Confidence Level = 94.5%
False Positive Rate = 5.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	2/27/2018	1	3870	TRUE
MW#93-3	2/27/2018	1	64.2	FALSE
MW#03-1	2/27/2018	1	12.6	FALSE
MW#03-2	2/27/2018	1	468	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 70
Maximum Baseline Concentration = 4340
Confidence Level = 98.6%
False Positive Rate = 1.4%

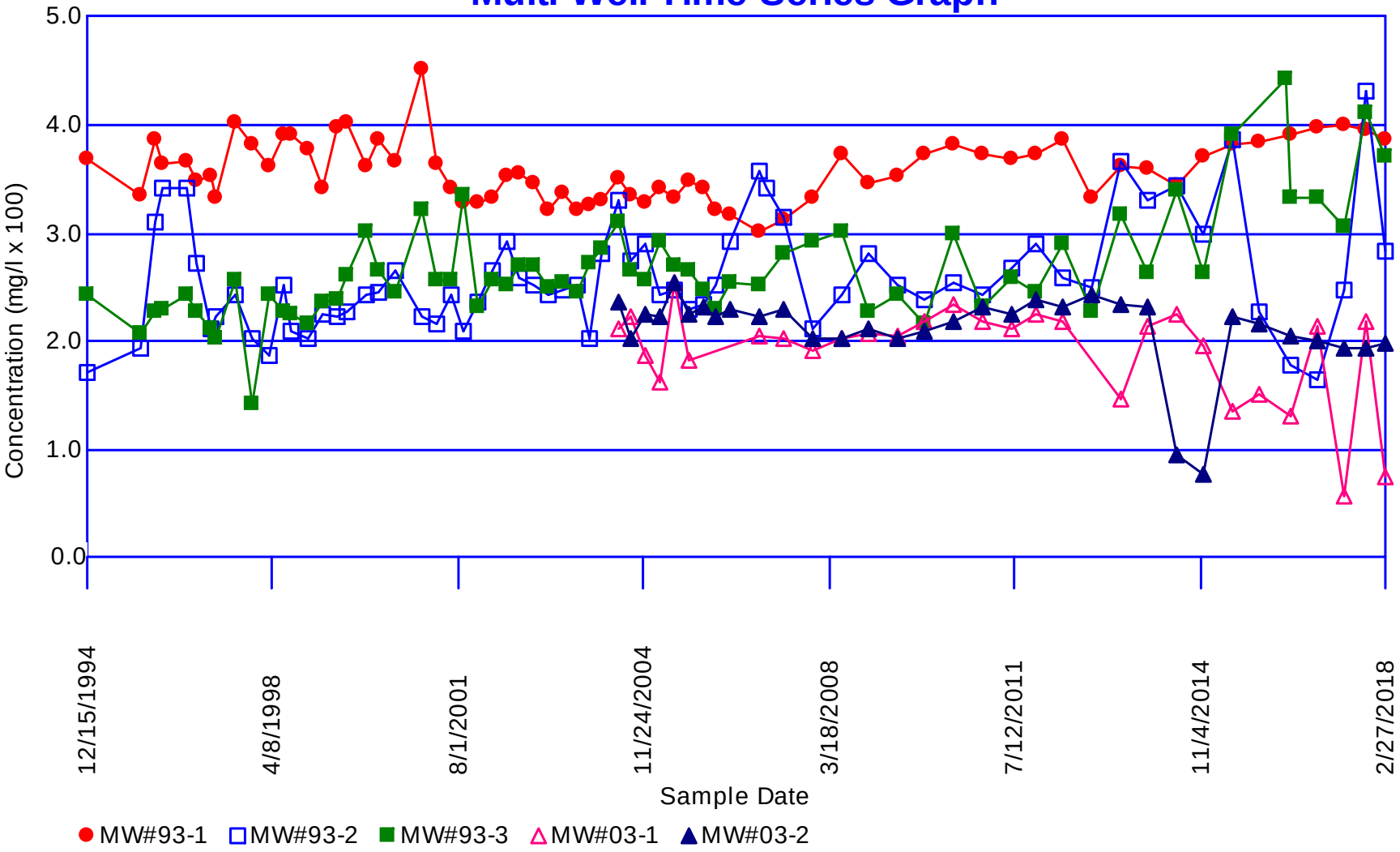
Baseline Samples	Date	Result
	12/15/1994	2000
	3/14/1995	1550
	6/21/1995	185
	12/14/1995	2367
	3/6/1996	2150
	4/25/1996	2000
	10/2/1996	3267
	12/10/1996	4000
	3/11/1997	1700
	4/15/1997	1500
	8/14/1997	3650
	12/4/1997	4300
	3/31/1998	2500
	6/23/1998	3250
	8/11/1998	3050
	12/8/1998	3050
	3/9/1999	3600
	6/8/1999	3150
	8/19/1999	1897
	12/14/1999	2500
	3/7/2000	3400
	6/23/2000	3400
	12/12/2000	3000
	3/27/2001	2133
	6/28/2001	2750
	9/10/2001	2650
	12/18/2001	2950
	3/19/2002	2967
	6/26/2002	3050
	9/18/2002	2900
	12/11/2002	2933
	3/13/2003	2900
	6/25/2003	2700
	9/26/2003	2767
	12/10/2003	2700
	3/9/2004	2550
	6/24/2004	2650
	9/15/2004	2700
	12/15/2004	2950
	3/16/2005	3200
	6/15/2005	2650

9/21/2005	3200
12/21/2005	3200
3/15/2006	3000
6/21/2006	2700
12/20/2006	2500
2/21/2007	1900
6/12/2007	2400
12/17/2007	3100
6/11/2008	2350
12/3/2008	3300
12/15/2008	2400
6/17/2009	2300
12/9/2009	2200
6/17/2010	2900
12/22/2010	3460
6/29/2011	2630
12/7/2011	2520
6/6/2012	2360
12/12/2012	3240
6/19/2013	2510
12/11/2013	2460
6/11/2014	2790
12/3/2014	2940
6/17/2015	114
12/1/2015	3600
6/22/2016	2620
12/20/2016	3800
6/6/2017	3630
11/7/2017	4340

Date	Samples	Mean	Impacted
2/27/2018	1	3870	FALSE

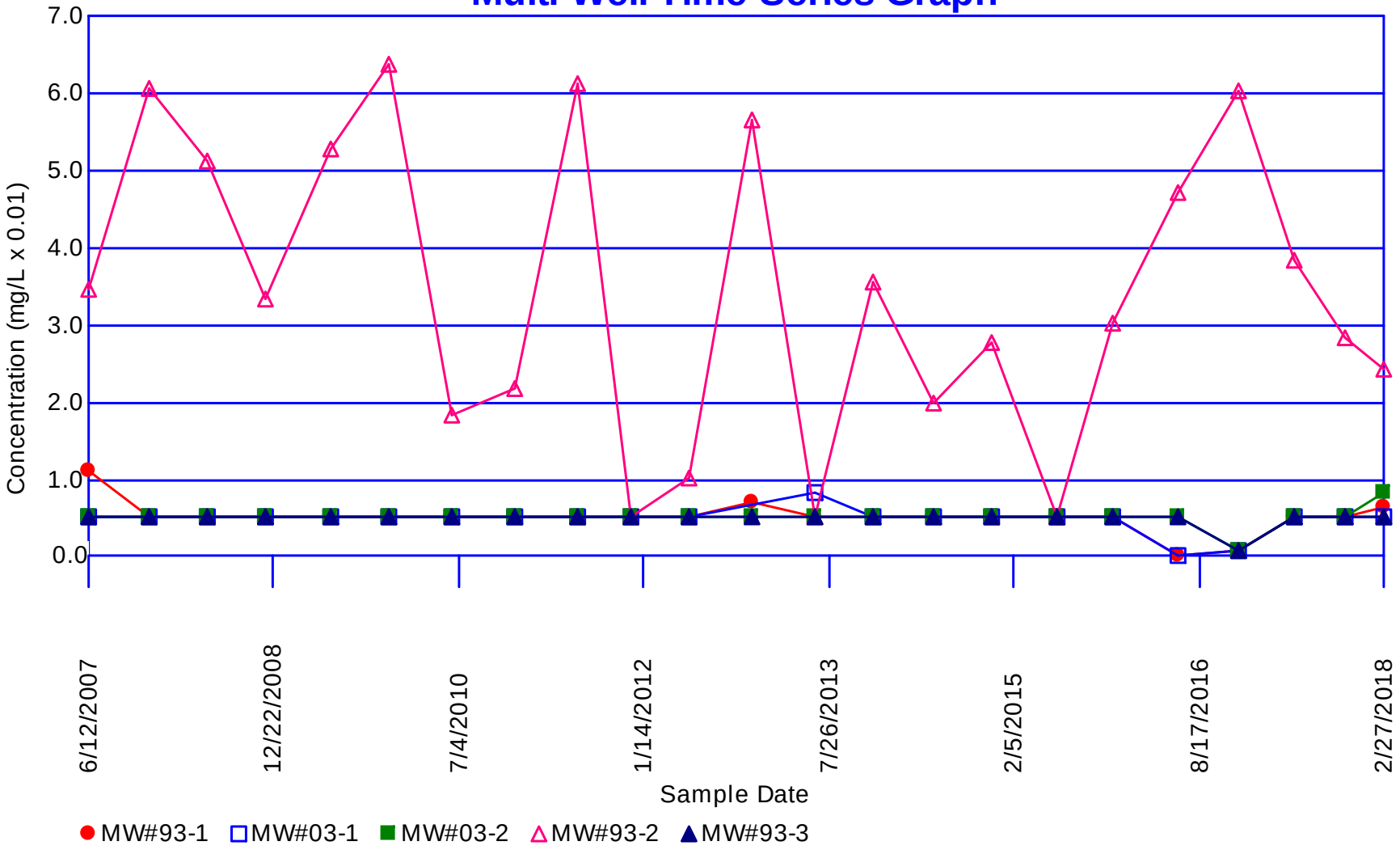
Alkalinity

Multi-Well Time-Series Graph



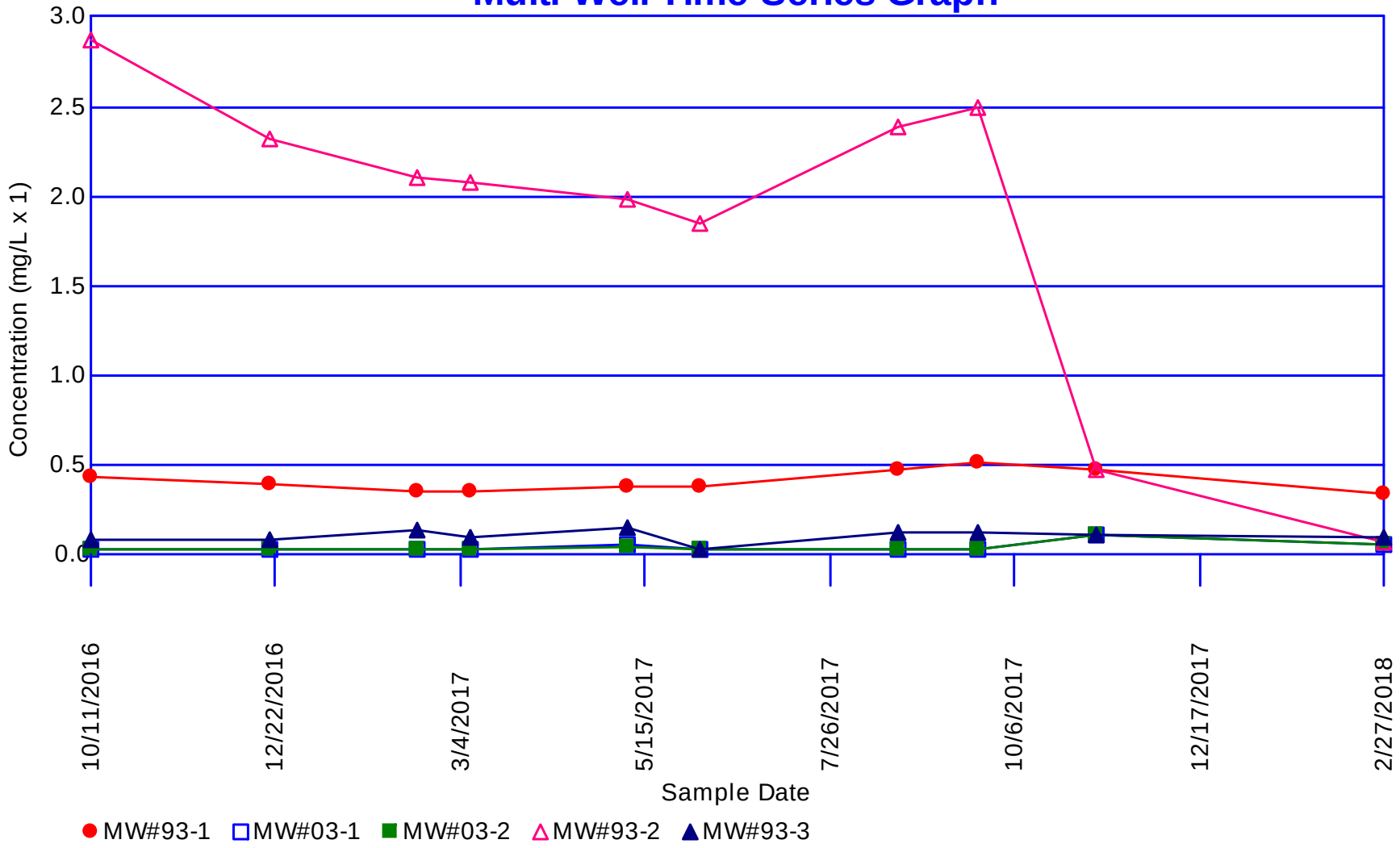
Arsenic

Multi-Well Time-Series Graph



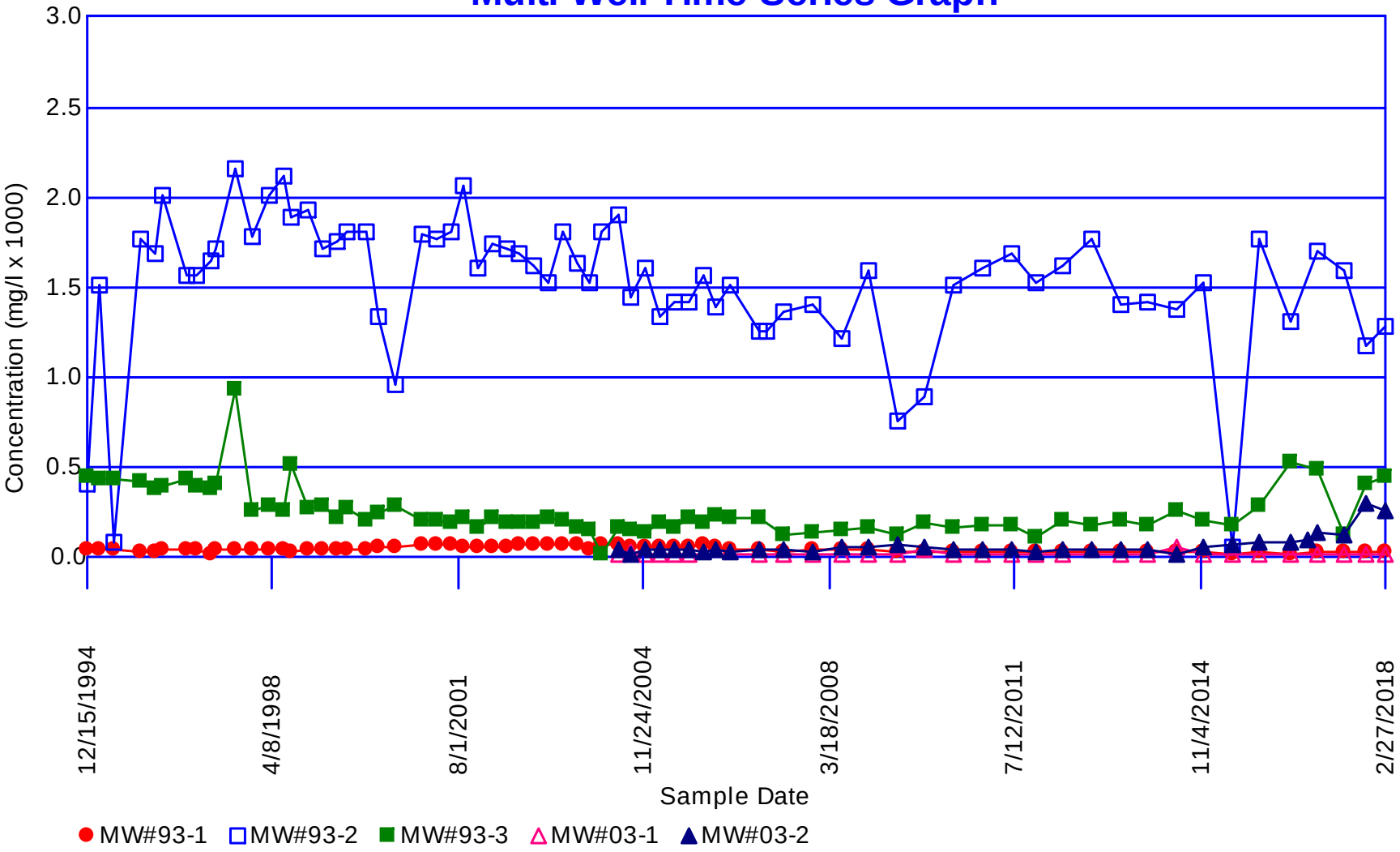
Boron

Multi-Well Time-Series Graph



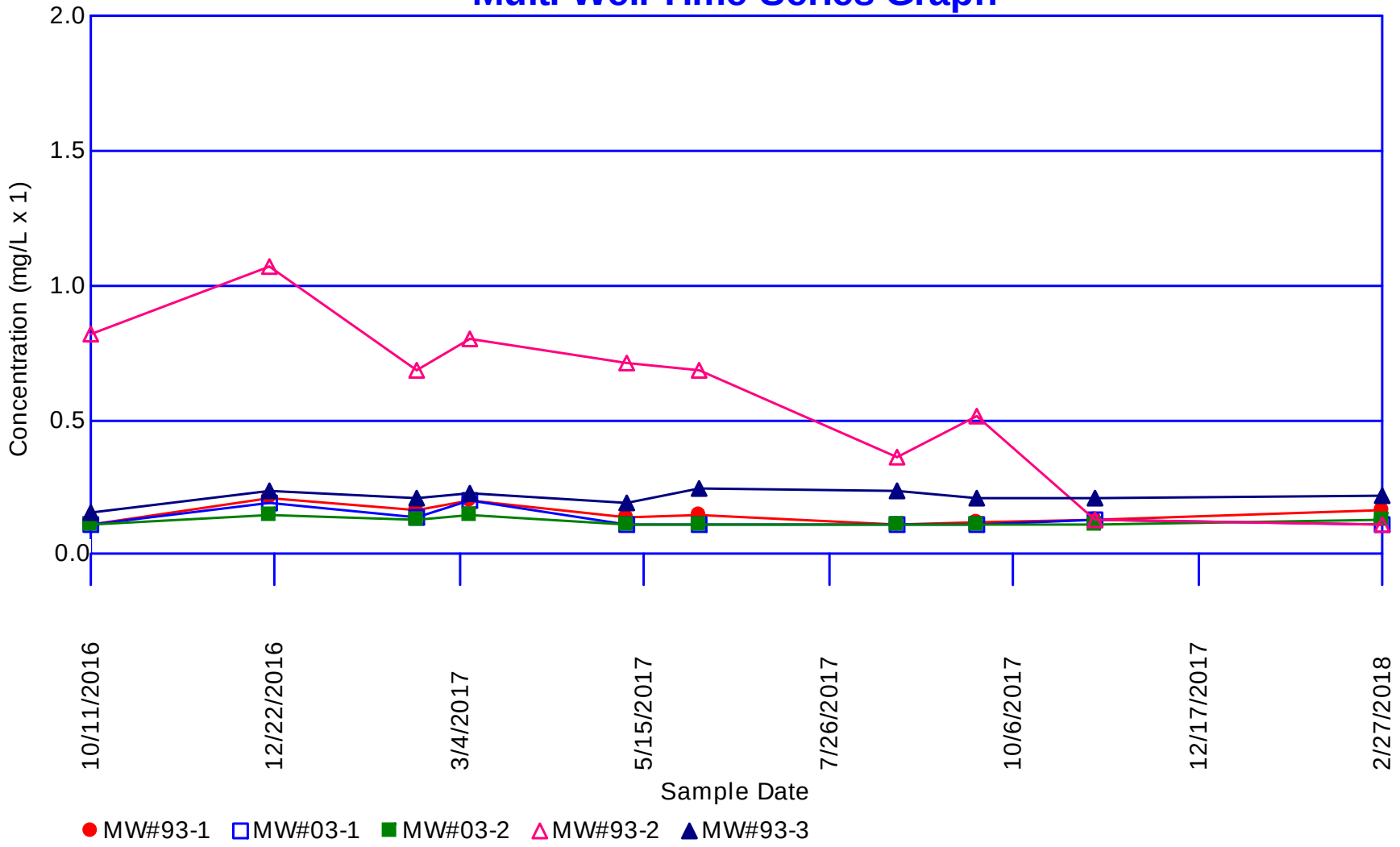
Chloride

Multi-Well Time-Series Graph



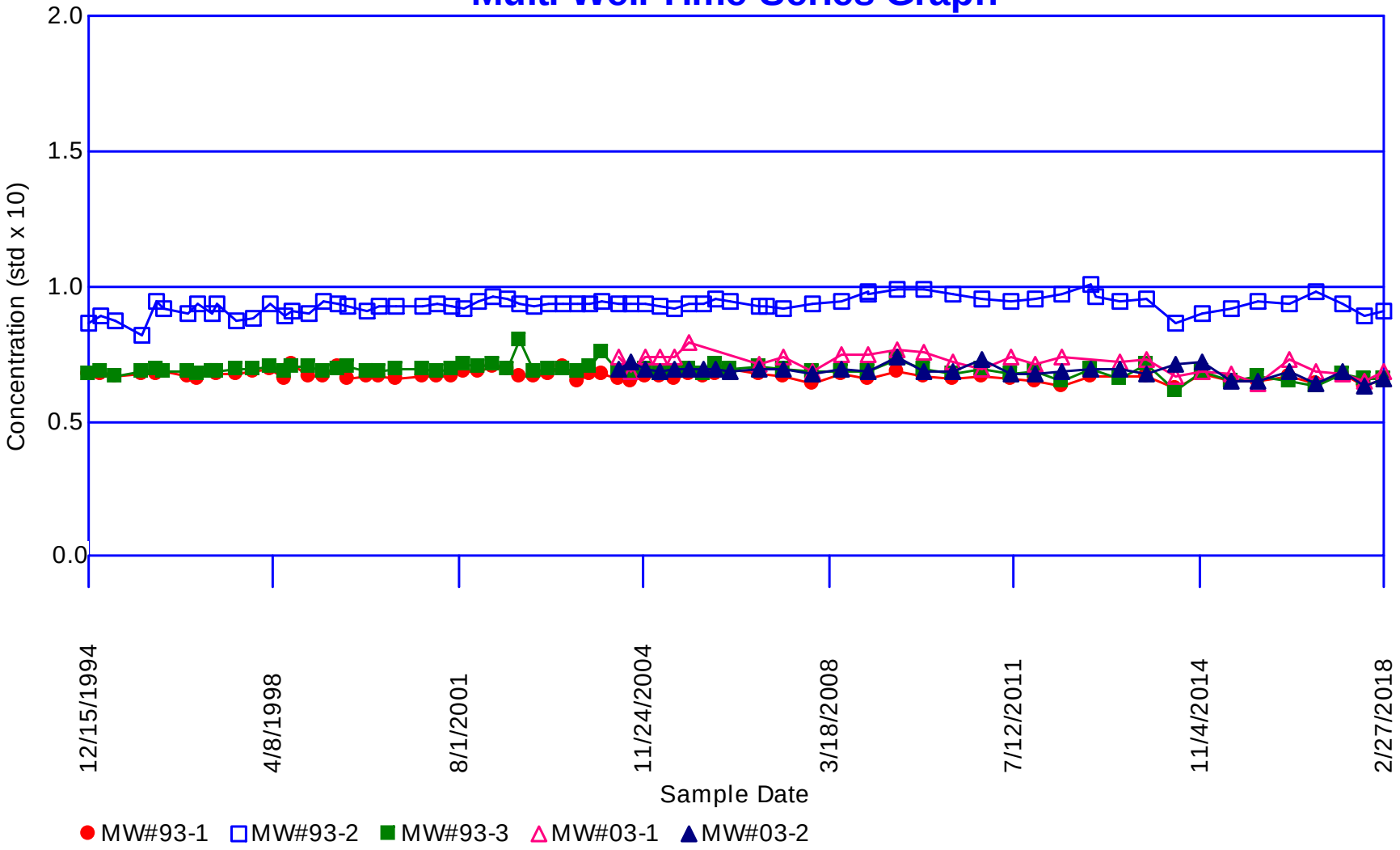
Fluoride

Multi-Well Time-Series Graph



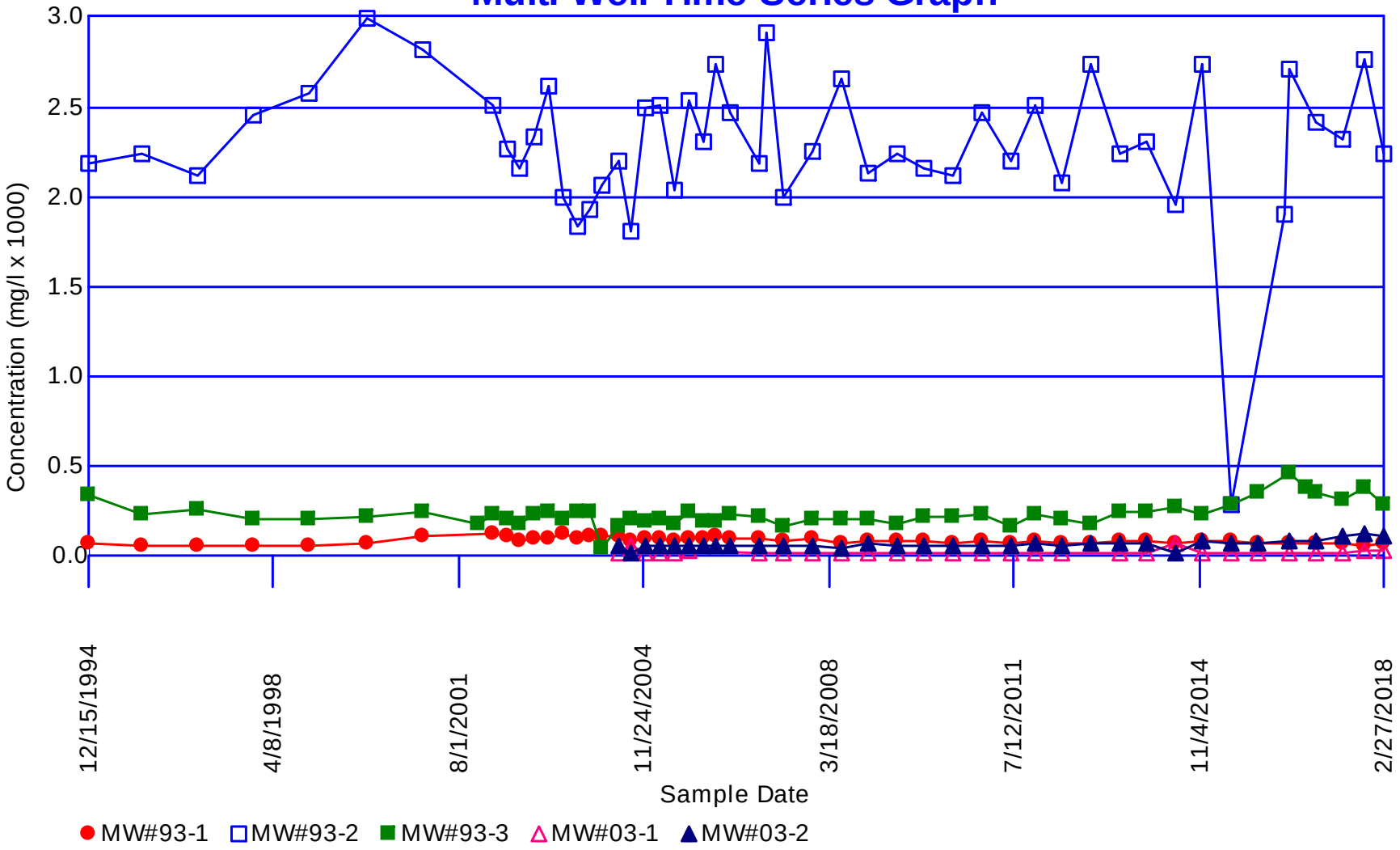
ph

Multi-Well Time-Series Graph



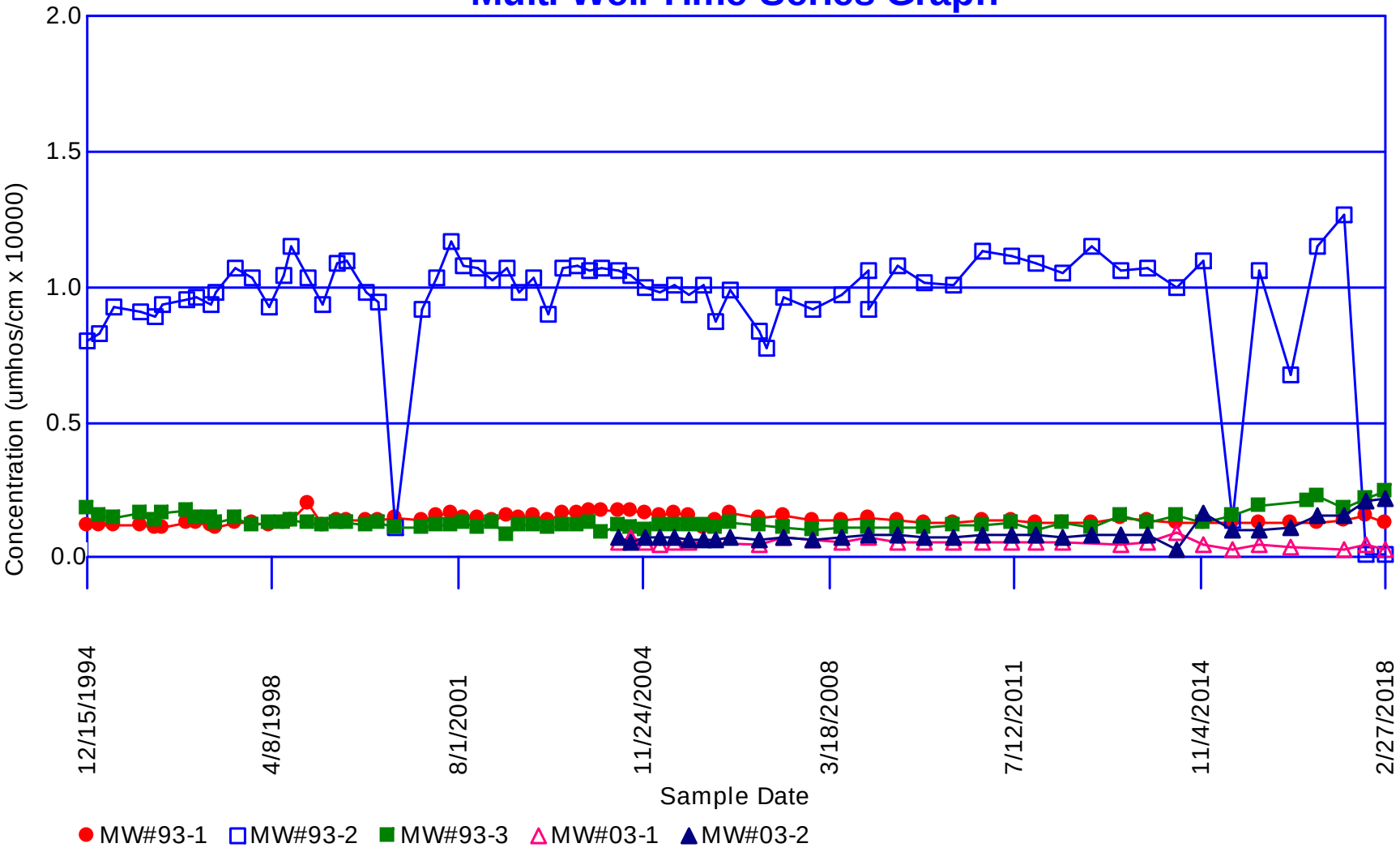
Sodium

Multi-Well Time-Series Graph



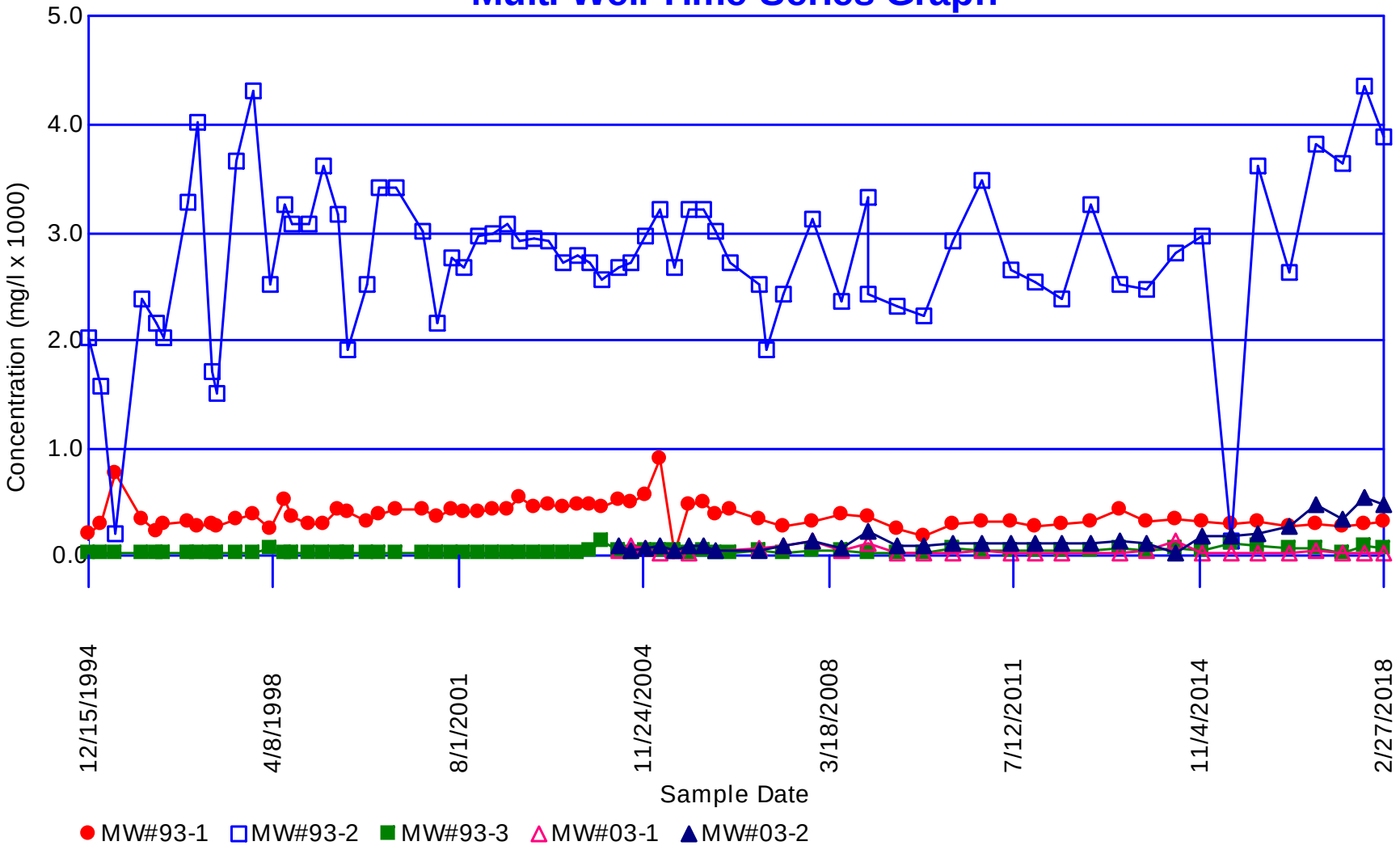
Specific Conductance

Multi-Well Time-Series Graph



Sulfate

Multi-Well Time-Series Graph



SECTION 2.0

Oklahoma Department of Environmental Quality Notice of Deficiency, Dated August 9, 2018

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

MARY FALLIN
Governor

August 9, 2018

CERTIFIED MAIL RETURN RECEIPT REQUESTED

Mr. Michael Bednar, Environmental Compliance Superintendent
Grand River Dam Authority
P.O. Box 70
Langley, OK 74350

Re: 1st 2018 Semi-Annual Groundwater Monitoring and Statistical Analysis Report;
Grand River Dam Authority (GRDA) Landfill, Mayes County;
Permit Number 3549012

NOTICE OF DEFICIENCY

Dear Mr. Bednar:

The Oklahoma Department of Environmental Quality (DEQ) received the results of the above referenced report dated May 21, 2018. Statistical analysis of the data was prepared by A & M Engineering. Groundwater samples were collected February 27, 2018, at the landfill and tested for Oklahoma Administrative Code (OAC) 252:517 Appendix A and B parameters as well as other constituents carried over from the previous monitoring program conducted under OAC 252:515 rules.

Groundwater flow is towards the southeast from MW93-1, the up-gradient well, towards down-gradient wells MW93-2, MW93-3, MW03-1 and MW03-2. During the February 27, 2018 groundwater sampling event inter-well statistical exceedances occurred in MW93-2, MW93-3, and MW03-2. These were further evaluated using intra-well statistical analyses. Specific conductance in MW93-3 (2372 µmhos/cm) and MW03-2 (2080 µmhos/cm) are the only well / constituent combinations to exceed both inter- and intra-well limits. DEQ identified the following deficiencies:

1. The specific conductivity exceedances must be addressed in accordance with OAC 252:517 regulations.

2. Since an elevated fluoride concentration in downgradient well MW93-3 triggered an inter-well exceedance but passed an intra-well test, a statistical analysis or hydrogeological assessment is necessary in this instance to show that elevated fluoride concentration above background is due to natural variability in groundwater quality, or some other source, and not a pre-existing impact from the landfill.

3. There are several instances where the specific conductivity value for MW93-2 may have been incorrectly reported (and used in the statistical analyses) in units of mmhos/cm instead of µmhos/cm; thus the value should be 1000 times greater in these instances.

4. Table 1 shows some of the metals as "dissolved" suggesting filtering, which is not allowed for compliance; but may be used for alternate source demonstration purposes. Please report the total metals concentrations.

5. It appeared that MW03-1 and MW03-2 were not tested for all parameters.

Please be reminded that background samples for all OAC 252:517 Appendix A and B parameters must be collected within a year and included in the groundwater monitoring program per the March 13, 2018 correspondence.

Please provide the requested data and explanations within sixty (60) days receipt of this letter. If you have any questions or comments, please contact Martha Grafton at (405) 702-5144.

Sincerely,

David Cotton for

Hillary Young, P.E.
Chief Engineer
Land Protection Division

HY/mg

cc: Tom Trebonik, A & M Engineering and Environmental Services, Inc.

SECTION 3.0

Transmittal of Results of Confirmation Sampling and Response to Notice of Deficiency

A & M Engineering and
Environmental Services, Inc.
Consulting - Design - Construction - Remediation

October 15, 2018

Ms. Hillary Young, P.E.
Engineering Manager
Land Protection Division
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

RE: Results of Confirmation Sampling
Grand River Dam Authority
Grand River Energy Center
Chouteau, OK
Permit No. 3549012

Dear Ms. Young:

In response to your Notice of Deficiency (NOD) letter dated August 9, 2018 regarding the First Semi-Annual Groundwater Sampling event for 2018 for the above referenced facility, A & M Engineering and Environmental Services, Inc. (A & M Engineering) conducted additional groundwater sampling activities (i.e., confirmation sampling) at only those wells and only for those constituents which exhibited statistical significance during the First Semi-annual event. If you recall, evaluation of the laboratory data obtained during the First Semi-annual event showed statistical significance for Specific Conductance at monitoring wells MW93-3 and MW03-2.

The confirmation samples were collected using the same techniques employed during the normal Semi-annual sampling activities and the samples were forwarded to Green Country Testing, Inc. of Tulsa, OK for analysis. The results obtained from the confirmation sampling were then substituted for the results obtained during the First Semi-annual sampling event and the new data evaluated for statistical significance.

The Shapiro-Francia Test of Normality, Levene's Test for Equal Variance and Prediction Limit Interval tests for inter-well analyses were utilized in the statistical analysis of these parameters. In the event the substituted results of analysis showed that inter-well analyses indicated the presence of an elevated parameter in the downgradient wells compared to historical data of the upgradient or background wells, an Intra-well Prediction Limit Interval test was again performed on the specific well or wells of interest.

Results of the statistical evaluations using the substituted confirmation sampling data have again indicated statistical significance for Specific Conductance in both wells. Copies of the laboratory report forms and statistical evaluation results for the confirmation samples are attached for your review.

Note that the results of the confirmation sampling and statistical evaluation of the confirmation sample results are herewith being provided to you and are likewise being made part of the facility operating record.

I would also like to take this opportunity to respond to the individual NODs as contained in your letter. For ease of review, I have included on the attached pages, the original deficiency comment received from DEQ and have provided A & M Engineering's response to the comment immediately below the cited comment. Please note that contained within the response to your Comment #1is a proposed alternative to instituting Assessment Monitoring in accordance with OAC 252:517.

Please review the attached information and if you have any questions on this matter, or if you require any additional information, please do not hesitate to contact me at (918) 665-6575.

Sincerely,
A&M Engineering and Environmental Services, Inc.

Thomas A. Trebonik, P.G.
Senior Project Manager

Enclosures

Cc: Mr. Robert Ladd, GREC
Mr. Mike Bednar, GRDA
Mr. Travis Hinshaw, GRDA

RESPONSES TO DEFICIENCY COMMENTS

First 2018 Semi-Annual Groundwater Monitoring and Statistical Analysis Report
Grand River Dam Authority Landfill
Mayes County, Oklahoma

COMMENT 1: The specific conductivity exceedances must be addressed in accordance with OAC 252:517 regulations.

RESPONSE: OAC 252:517-9-4(h)(6)A requires that:

> "the owner or operator of the CCR unit must determine whether or not there is a statistically significant increase over background values for each constituent required in the particular groundwater monitoring program that applies to the CCR unit, as determined under **OAC 252:517-9-5(a)** or **OAC 252:517-9-6(a)** [**bold** added for emphasis]."

OAC 252:517-9-5(a) requires that the detection monitoring program at the facility must at a minimum include groundwater monitoring for all constituents listed in Appendix A and OAC 252:517-9-6(a) requires that assessment monitoring be required whenever a statistically significant increase over background levels has been detected for one or more of the constituents listed in Appendix A OAC 252:517.

Current groundwater monitoring of wells at the facility includes all constituents listed in Appendix A of OAC252:517, as well some general water quality parameters previously required under the solid waste regulations (OAC252:515). While it is acknowledged that the specific conductance in MW93-3 and MW03-2 are statistically significant based on the historical sampling parameters and the inter-well and intra-well statistical evaluation conducted for the first semi-annual sampling event, specific conductance is *not* a parameter that is required by either Appendix A or Appendix B of OAC 252:517. Therefore, implementing Assessment Monitoring as required by OAC 252:517-9-6(a) to further evaluate groundwater for the Appendix B constituents will not appropriately address the observed Specific Conductance increase (i.e., Specific Conductance is not a required parameter for Assessment Monitoring under OAC 252:517).

As an alternative, and on behalf of GRDA, A & M Engineering would like to propose Assessment Monitoring be conducted on an accelerated basis for Specific Conductance only. Monitoring of wells MW93-3 and MW03-2 would be conducted on a quarterly basis for a period of one year with the results of the Assessment Monitoring provided to DEQ. GRDA will prepare a report updating DEQ of the findings and provide appropriate recommendations concerning groundwater at the facility.

If the quarterly monitoring concentrations for Specific Conductance are at or below statistically significant concentrations for two consecutive quarterly monitoring events, GRDA will notify

DEQ in writing and, upon approval from the DEQ, will return to the normal semi-annual detection monitoring. It is believed that addressing Specific Conductance exceedances in this accelerated manner will allow for proper evaluation of the observed increases.

If DEQ concurs with this proposed action, and if required, a separate Assessment Monitoring Plan outlining the procedures to be taken to address the observed increases in Specific Conductance will be prepared and forwarded to DEQ for review and approval.

COMMENT 2: Since an elevated fluoride concentration in downgradient well MW93-3 triggered an inter-well exceedance but passed and intra-well test, a statistical analysis or hydrogeological assessment is necessary in this instance to show that elevated fluoride concentration above background is due to natural variability in groundwater quality, or some other source, and not a pre-existing impact from the landfill.

RESPONSE: It is acknowledged that the highest concentration of fluoride observed in monitoring well MW93-3 (at 0.24 mg/L) appears elevated when compared to the highest concentration observed in upgradient monitoring well MW93-1 (at 0.20 mg/L). However, calculation of the Relative Percent Difference (RPD) of these two maximum concentrations is 18%; implying that the two concentrations are essentially the same. A RPD of less than 30% is generally considered an acceptable result for "duplicate" samples analyzed under strict laboratory conditions.

In addition, the fluoride concentration of groundwater in Oklahoma is known to vary significantly by aquifer and ranges from about 0.1 mg/L in the Rush Springs and Vamoosa-Ada aquifers to a high of about 10.0 mg/L in the Arbuckle-Timbered Hills aquifer[1]. And while no major aquifer is mapped as underlying the GRDA facility, nearby Alluvial and Terrace Deposit aquifers and the Roubidoux aquifer of northeastern Oklahoma are known to naturally vary from about 0.2 mg/L of fluoride to more than 2.0 mg/L.

The concentrations observed in the monitoring wells at the GRDA facility all appear to lie within the concentrations of fluoride commonly found in the groundwater of northeastern Oklahoma. In addition, the concentrations of fluoride observed are well within the Safe Drinking Water Act, National Primary Drinking Water Maximum Contaminant Level (MCL) for fluoride of 4.0 mg/L. A copy of the US Geological Survey Open-File Report which evaluated fluoride concentrations and a map showing the major aquifers of Oklahoma are attached for review.

COMMENT 3: There are several instances where the specific conductivity value for MW-93-2 may have been incorrectly reported (and used in the statistical analyses) in units of mmhos/cm instead of µmhos/cm; thus the value should be 1000 times greater in these instances.

[1]Horak, William F., and Stoner, Jerry D. 1987. Oklahoma Groundwater Quality: US Geological Survey Open-File Report 87-0743. 9p.

RESPONSE: It is agreed that it appears the wrong units were utilized in reporting specific conductivity values during certain sampling events. During preparation of the semi-annual groundwater monitoring reports where it appeared the wrong units were utilized, A & M Engineering unsuccessfully attempted to confirm the reported values from the laboratory were wrong but consequently had to use the values "as reported". A & M Engineering is currently contracted to conduct the semi-annual monitoring activities for the remainder of calendar year 2018 and will ensure the correct units are reported and utilized in the statistical evaluation.

COMMENT 4: Table 1 shows some of the metals as "dissolved" suggesting filtering, which is not allowed for compliance; but may be used for alternate demonstration purposes. Please report the total metals concentrations.

RESPONSE: It is understood that the new regulations governing the disposal of coal combustion residuals from electric utilities prohibit field filtering of groundwater samples (OAC 252:517-9-4(j)) and only total metal concentrations will be utilized for all future reporting and statistical evaluation activities. Field filtering of samples will not occur.

COMMENT 5: It appeared that MW03-1 and MW03-2 were not tested for all parameters.

RESPONSE: Monitoring wells MW03-1 and MW03-2 were installed in 2003 as compliance wells for the facility. A review of historical laboratory analysis and reporting documentation dating back to at least 2012, has indicated the constituent list utilized in reporting groundwater data for MW03-1 and MW03-2 has not changed and appears to have historically been limited to only those constituents being reported.

Note that a separate request to limit groundwater monitoring activities to only those constituents specified in the applicable CCR regulation (OAC 252:517-9-5(a)) is being prepared and is forthcoming. The request will ask for concurrence from DEQ to limit the semi-annual monitoring requirements to only those constituents specified in Appendix A of OAC 252:517; thereby eliminating the additional laboratory cost associated with analysis of groundwater for constituents not currently required by the regulations.

LABORATORY REPORT

FOR

CONFIRMATION SAMPLES

Green Country Testing, Inc.
6825 E 38th Street
Tulsa, OK 74145
TEL: 918-828-9977 FAX: 918-828-7756
Website: www.greencountrytesting.com

September 07, 2018

Ed Van Schaik
A & M Engineering
10010 E. 16th St.
Tulsa, OK 74128-4813
TEL: (918) 665-6575
FAX: (918) 665-6576

RE: GRDA Order No.: 1809084

Dear Ed Van Schaik:

Green Country Testing, Inc. received 2 sample(s) on 9/7/2018 for the analyses presented in the following report.

In accordance with your instructions, Green Country Testing conducted the analysis shown on the following pages on samples submitted by your company. The results relate only to the items tested. Unless otherwise noted, all analysis were conducted using EPA approved methodologies. Test reports meet all the NELAC requirements. All relevant sampling information is on the attached chain-of-custody form. The initials SUB as the analyst designate any testing sub-contracted by Green Country Testing.

Certifications/Accreditation: OK - 7604 - AR - ADEQ - KS - E-10232 - LA - 4002

A scope of Certified/Accredited parameters is available upon request. If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Brian Duzan
Laboratory Director

CC:
Accounts Payable

Original

Green Country Testing, Inc.
6825 E 38th Street
Tulsa, OK 74145
TEL: 918-828-9977 FAX: 918-828-7756
Website: www.greencountrytesting.com

Analytical Report

(continuous)

WO#: **1809084**

Date Reported: **9/7/2018**

CLIENT: A & M Engineering **Lab Order:** 1809084

Project: GRDA

Lab ID: 1809084-001 **Collection Date:** 9/6/2018 11:25:00 AM

Client Sample ID: MW 03-2 **Matrix:** AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SPECIFIC CONDUCTANCE				**E120.1, 1982**		Analyst: **BWD**
Specific Conductivity	2,620	10.0		µmhos/cm	10	9/7/2018 1:00:00 PM

Lab ID: 1809084-002 **Collection Date:** 9/6/2018 12:25:00 PM

Client Sample ID: MW 93-3 **Matrix:** AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SPECIFIC CONDUCTANCE				**E120.1, 1982**		Analyst: **BWD**
Specific Conductivity	2,380	10.0		µmhos/cm	10	9/7/2018 1:00:00 PM

Qualifiers:

H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
RL	Reporting Detection Limit
M	Manual Integration used to determine area response
PL	Permit Limit
W	Sample container temperature is out of limit as specified at testcode

Original

Green Country Testing, Inc.
6825 E 38th Street
Tulsa, OK 74145
TEL: 918-828-9977 FAX: 918-828-7756
Website: www.greencountrytesting.com

QC SUMMARY REPORT

WO#: **1809084**

07-Sep-18

Client: A & M Engineering
Project: GRDA **TestNo:** **E120.1, 1982**

Sample ID: **LCS-R33464** SampType: **LCS** TestCode: **COND** Units: **µmhos/cm** Prep Date: RunNo: **33464**
Client ID: **LCSW** Batch ID: **R33464** TestNo: **E120.1, 1982** Analysis Date: **9/7/2018** SeqNo: **360757**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Specific Conductivity	103	1.00	100.0	0	103	80	120				

Sample ID: **1808473-001ADUP** SampType: **DUP** TestCode: **COND** Units: **µmhos/cm** Prep Date: RunNo: **33464**
Client ID: **BatchQC** Batch ID: **R33464** TestNo: **E120.1, 1982** Analysis Date: **9/7/2018** SeqNo: **360759**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Specific Conductivity	1,190	2.00						1,180	0.507	3.45	

Qualifiers:

H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response	ND	Not Detected at the Reporting Limit
PL	Permit Limit	RL	Reporting Detection Limit	W	Sample container temperature is out of limit as sp

Original

Green Country TESTING

Chain of Custody Record

Laboratory Number: 1809084

Client Information:	Billing Information:	PO Number:	Project Name/Number:	Page 1 of 1
Company Name: A+M Engineering		1986-030-003	GRDA	
Contact Name: Ed VanSchaik		Quote Number:		Turn Time
Address:			Sampler's Signature	☐1 Day
		Required QC Level	Ed Van Schaik	☐2 Day
City, State Zip:		Std.		☒Standard
Phone Number: 918-665-6575 Ext: 227	Ext:	Bill Monthly	Shipping Method:	☐Other
Fax Number:		☐Yes	UPS / FedEx / Air	(Rush turn times will incur a surcharge.)
E-mail Address:		☐No	(Hand) / GCT / Mail	

Which Regulations Apply:
☐RCRA ☐Drinking Water
☐POTW ☐Distribution
☐NPDES ☐Special
☐USDA/FDA ☐State
☐RECAP/RISC ☐Other

Matrix Code:
AQ = Aqueous, O = Oil, DW = Drinking, SL = Sludge, WW = Waste, F = Food, MW = Monit. Well, SW = Swab, LQ = Liquid, SOL = Solid

Sample ID/Description	Date	Time	Grab / Composite	Matrix	Container Number	Container Type (P=Plastic, G=Glass, V=Vial)	Pres. (HCl, HNO_3, H_2SO_4, NaOH, $Na_2S_2O_3$)	Requested Tests: Sp. Cond.	Comments
MW 03-2	9-6-18	1125	G	AQ	1	P		X	5256
MW 93-3	9-6-18	1225	G	AQ	1	P		X	GREENCOUNTRYTESTING CHAIN OF CUSTODY ATTACHMENT 1 OF 1 PAGES

	Relinquished by	Date/Time	Received by	Date/Time
1	Ed Van Schaik	9-7-18 0921	[signature]	9/7/18 9:21
2				
3				
4				

Field Notes:

Received on ice? ☑Yes ☐No

Temp: 3.6

All samples submitted to Green Country Testing for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Green Country Testing reserves the right to return unused sample portions.

6825 E. 38th Street
Tulsa, OK 74145
918-828-9977
Fax: 918-828-7756

STATISTICAL EVLAUATION

OF

CONFIRMATION SAMPLES

Concentrations (umhos/cm)

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 270
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 69
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	69	0 (0%)	12/15/1994	1080	1080
			3/14/1995	1103	1103
			6/21/1995	1154	1154
			12/14/1995	1109	1109
			3/6/1996	1010	1010
			4/25/1996	1063	1063
			10/2/1996	1169	1169
			12/10/1996	1187	1187
			3/11/1997	1077	1077
			4/15/1997	1070	1070
			8/14/1997	1217	1217
			12/4/1997	1170	1170
			3/31/1998	1092	1092
			6/23/1998	1210	1210
			8/11/1998	1273	1273
			12/8/1998	1888	1888
			3/9/1999	1080	1080
			6/8/1999	1301	1301
			8/19/1999	1301	1301
			12/14/1999	1270	1270
			3/7/2000	1290	1290
			6/23/2000	1393	1393
			12/12/2000	1309	1309
			3/27/2001	1469	1469
			6/28/2001	1560	1560
			9/10/2001	1374	1374
			12/18/2001	1374	1374
			3/19/2002	1326	1326
			6/26/2002	1516	1516
			9/18/2002	1423	1423
			12/11/2002	1515	1515
			3/13/2003	1332	1332
			6/25/2003	1608	1608
			9/26/2003	1602	1602
			12/10/2003	1620	1620
			3/9/2004	1630	1630
			6/24/2004	1620	1620
			9/15/2004	1618	1618
			12/15/2004	1586	1586
			3/16/2005	1521	1521
			6/15/2005	1531	1531
			9/21/2005	1441	1441
			12/21/2005	1030	1030
			3/15/2006	1318	1318

			6/21/2006	1547	1547
			12/20/2006	1370	1370
			6/12/2007	1466	1466
			12/17/2007	1327	1327
			6/11/2008	1334	1334
			12/3/2008	1352	1352
			6/17/2009	1301	1301
			12/9/2009	1218	1218
			6/17/2010	1179	1179
			12/22/2010	1270	1270
			6/29/2011	1275	1275
			12/7/2011	1236	1236
			6/6/2012	1185	1185
			12/12/2012	1227	1227
			6/19/2013	1366	1366
			12/11/2013	1329	1329
			6/11/2014	1200	1200
			12/3/2014	1230	1230
			6/17/2015	1210	1210
			12/1/2015	1230	1230
			6/22/2016	1185	1185
			12/20/2016	1186	1186
			6/6/2017	1289	1289
			11/7/2017	1458	1458
			2/27/2018	1235	1235

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	71	0 (0%)	12/15/1994	7950	7950
			3/14/1995	8217	8217
			6/21/1995	9210	9210
			12/14/1995	9000	9000
			3/6/1996	8820	8820
			4/25/1996	9310	9310
			10/2/1996	9420	9420
			12/10/1996	9590	9590
			3/11/1997	9250	9250
			4/15/1997	9690	9690
			8/14/1997	10660	10660
			12/4/1997	10240	10240
			3/31/1998	9237	9237
			6/23/1998	10400	10400
			8/11/1998	11460	11460
			12/8/1998	10280	10280
			3/9/1999	9240	9240
			6/8/1999	10850	10850
			8/19/1999	10873	10873
			12/14/1999	9690	9690
			3/7/2000	9340	9340
			6/23/2000	1034	1034
			12/12/2000	9080	9080
			3/27/2001	10260	10260
			6/28/2001	11600	11600
			9/10/2001	10700	10700
			12/18/2001	10660	10660

			3/19/2002	10197	10197
			6/26/2002	10590	10590
			9/18/2002	9690	9690
			12/11/2002	10283	10283
			3/13/2003	8920	8920
			6/25/2003	10590	10590
			9/26/2003	10693	10693
			12/10/2003	10550	10550
			3/9/2004	10620	10620
			6/24/2004	10494	10494
			9/15/2004	10340	10340
			12/15/2004	9940	9940
			3/16/2005	9690	9690
			6/15/2005	10010	10010
			9/21/2005	9660	9660
			12/21/2005	10000	10000
			3/15/2006	8650	8650
			6/21/2006	9830	9830
			12/20/2006	8310	8310
			2/21/2007	7660	7660
			6/12/2007	9590	9590
			12/17/2007	9100	9100
			6/11/2008	9600	9600
			12/3/2008	10520	10520
			12/15/2008	9070	9070
			6/17/2009	10690	10690
			12/9/2009	10050	10050
			6/17/2010	10020	10020
			12/22/2010	11230	11230
			6/29/2011	11110	11110
			12/7/2011	10770	10770
			6/6/2012	10490	10490
			12/12/2012	11460	11460
			6/19/2013	10500	10500
			12/11/2013	10650	10650
			6/11/2014	9940	9940
			12/3/2014	10900	10900
			6/17/2015	1270	1270
			12/1/2015	10560	10560
			6/22/2016	6710	6710
			12/20/2016	11400	11400
			6/6/2017	12590	12590
			11/7/2017	10.52	10.52
			2/27/2018	10.9	10.9
MW#93-3	69	0 (0%)	12/15/1994	1762	1762
			3/14/1995	1490	1490
			6/21/1995	1421	1421
			12/14/1995	1534	1534
			3/6/1996	1327	1327
			4/25/1996	1570	1570
			10/2/1996	1657	1657
			12/10/1996	1427	1427
			3/11/1997	1370	1370
			4/15/1997	1244	1244
			8/14/1997	1351	1351
			12/4/1997	1140	1140

3/31/1998	1172	1172
6/23/1998	1214	1214
8/11/1998	1296	1296
12/8/1998	1177	1177
3/9/1999	1137	1137
6/8/1999	1180	1180
8/19/1999	1253	1253
12/14/1999	1088	1088
3/7/2000	1250	1250
6/23/2000	1070	1070
12/12/2000	1051	1051
3/27/2001	1149	1149
6/28/2001	1155	1155
9/10/2001	1250	1250
12/18/2001	1064	1064
3/19/2002	1240	1240
6/26/2002	787	787
9/18/2002	1109	1109
12/11/2002	1125	1125
3/13/2003	1034	1034
6/25/2003	1111	1111
9/26/2003	1109	1109
12/10/2003	1173	1173
3/9/2004	881	881
6/24/2004	1129	1129
9/15/2004	1068	1068
12/15/2004	972	972
3/16/2005	1134	1134
6/15/2005	1080	1080
9/21/2005	1155	1155
12/21/2005	1140	1140
3/15/2006	1035	1035
6/21/2006	1226	1226
12/20/2006	1087	1087
6/12/2007	1031	1031
12/17/2007	910	910
6/11/2008	1023	1023
12/3/2008	1073	1073
6/17/2009	1073	1073
12/9/2009	1038	1038
6/17/2010	1108	1108
12/22/2010	1090	1090
6/29/2011	1178	1178
12/7/2011	930	930
6/6/2012	1203	1203
12/12/2012	1010	1010
6/19/2013	1438	1438
12/11/2013	1252	1252
6/11/2014	1500	1500
12/3/2014	1200	1200
6/17/2015	1480	1480
12/1/2015	1807	1807
10/11/2016	2005	2005
12/20/2016	2200	2200
6/6/2017	1743	1743
11/7/2017	2121	2121
9/6/2018	2380	2380

MW#03-1	28	0 (0%)	6/24/2004	497	497
			9/15/2004	687	687
			12/15/2004	514	514
			3/16/2005	422	422
			6/15/2005	465	465
			9/21/2005	517	517
			12/20/2006	447	447
			6/12/2007	630	630
			12/17/2007	540	540
			6/11/2008	467	467
			12/3/2008	649	649
			6/17/2009	519	519
			12/9/2009	469	469
			6/17/2010	500	500
			12/22/2010	504	504
			6/29/2011	463	463
			12/7/2011	501	501
			6/6/2012	457	457
			6/19/2013	373	373
			12/11/2013	476	476
			6/11/2014	826	826
			12/3/2014	409	409
			6/17/2015	267	267
			12/1/2015	385	385
			6/22/2016	320	320
			6/6/2017	198	198
			11/7/2017	444	444
			2/27/2018	186.1	186.1
MW#03-2	33	0 (0%)	6/24/2004	692	692
			9/15/2004	522	522
			12/15/2004	655	655
			3/16/2005	661	661
			6/15/2005	674	674
			9/21/2005	625	625
			12/21/2005	572	572
			3/15/2006	594	594
			6/21/2006	636	636
			12/20/2006	580	580
			6/12/2007	680	680
			12/17/2007	617	617
			6/11/2008	674	674
			12/3/2008	752	752
			6/17/2009	720	720
			12/9/2009	690	690
			6/17/2010	685	685
			12/22/2010	728	728
			6/29/2011	748	748
			12/7/2011	755	755
			6/6/2012	716	716
			12/12/2012	807	807
			6/19/2013	807	807
			12/11/2013	805	805
			6/11/2014	219	219
			12/3/2014	1540	1540
			6/17/2015	965	965

12/1/2015	967	967
6/22/2016	1074	1074
12/20/2016	1454	1454
6/6/2017	1498	1498
11/7/2017	2042	2042
9/6/2018	2620	2620

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 207.105
Overall Std Dev = 221.928
Overall Total = 35414.9
SS Wells = 679126
SS Total = 8.37287e+006

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	679126	2	339563	7.41467
Error (within wells)	7.69374e+006	168	45796.1	
Totals	8.37287e+006	170		

7.41467 exceeds 3; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	239.348
	3/14/1995	216.348
	6/21/1995	165.348
	12/14/1995	210.348
	3/6/1996	309.348
	4/25/1996	256.348
	10/2/1996	150.348
	12/10/1996	132.348
	3/11/1997	242.348
	4/15/1997	249.348
	8/14/1997	102.348
	12/4/1997	149.348
	3/31/1998	227.348
	6/23/1998	109.348
	8/11/1998	46.3478
	12/8/1998	568.652
	3/9/1999	239.348
	6/8/1999	18.3478
	8/19/1999	18.3478
	12/14/1999	49.3478
	3/7/2000	29.3478
	6/23/2000	73.6522
	12/12/2000	10.3478
	3/27/2001	149.652
	6/28/2001	240.652
	9/10/2001	54.6522
	12/18/2001	54.6522
	3/19/2002	6.65217
	6/26/2002	196.652
	9/18/2002	103.652
	12/11/2002	195.652
	3/13/2003	12.6522

6/25/2003	288.652
9/26/2003	282.652
12/10/2003	300.652
3/9/2004	310.652
6/24/2004	300.652
9/15/2004	298.652
12/15/2004	266.652
3/16/2005	201.652
6/15/2005	211.652
9/21/2005	121.652
12/21/2005	289.348
3/15/2006	1.34783
6/21/2006	227.652
12/20/2006	50.6522
6/12/2007	146.652
12/17/2007	7.65217
6/11/2008	14.6522
12/3/2008	32.6522
6/17/2009	18.3478
12/9/2009	101.348
6/17/2010	140.348
12/22/2010	49.3478
6/29/2011	44.3478
12/7/2011	83.3478
6/6/2012	134.348
12/12/2012	92.3478
6/19/2013	46.6522
12/11/2013	9.65217
6/11/2014	119.348
12/3/2014	89.3478
6/17/2015	109.348
12/1/2015	89.3478
6/22/2016	134.348
12/20/2016	133.348
6/6/2017	30.3478
11/7/2017	138.652
2/27/2018	84.3478

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	498.42
	3/14/1995	226.42
	6/21/1995	157.42
	12/14/1995	270.42
	3/6/1996	63.4203
	4/25/1996	306.42
	10/2/1996	393.42
	12/10/1996	163.42
	3/11/1997	106.42
	4/15/1997	19.5797
	8/14/1997	87.4203
	12/4/1997	123.58
	3/31/1998	91.5797
	6/23/1998	49.5797
	8/11/1998	32.4203
	12/8/1998	86.5797
	3/9/1999	126.58
	6/8/1999	83.5797

8/19/1999	10.5797
12/14/1999	175.58
3/7/2000	13.5797
6/23/2000	193.58
12/12/2000	212.58
3/27/2001	114.58
6/28/2001	108.58
9/10/2001	13.5797
12/18/2001	199.58
3/19/2002	23.5797
6/26/2002	476.58
9/18/2002	154.58
12/11/2002	138.58
3/13/2003	229.58
6/25/2003	152.58
9/26/2003	154.58
12/10/2003	90.5797
3/9/2004	382.58
6/24/2004	134.58
9/15/2004	195.58
12/15/2004	291.58
3/16/2005	129.58
6/15/2005	183.58
9/21/2005	108.58
12/21/2005	123.58
3/15/2006	228.58
6/21/2006	37.5797
12/20/2006	176.58
6/12/2007	232.58
12/17/2007	353.58
6/11/2008	240.58
12/3/2008	190.58
6/17/2009	190.58
12/9/2009	225.58
6/17/2010	155.58
12/22/2010	173.58
6/29/2011	85.5797
12/7/2011	333.58
6/6/2012	60.5797
12/12/2012	253.58
6/19/2013	174.42
12/11/2013	11.5797
6/11/2014	236.42
12/3/2014	63.5797
6/17/2015	216.42
12/1/2015	543.42
10/11/2016	741.42
12/20/2016	936.42
6/6/2017	479.42
11/7/2017	857.42
9/6/2018	1116.42

Well: MW#03-2	**Sample**	**Residual**
	6/24/2004	179.939
	9/15/2004	349.939
	12/15/2004	216.939
	3/16/2005	210.939

6/15/2005	197.939
9/21/2005	246.939
12/21/2005	299.939
3/15/2006	277.939
6/21/2006	235.939
12/20/2006	291.939
6/12/2007	191.939
12/17/2007	254.939
6/11/2008	197.939
12/3/2008	119.939
6/17/2009	151.939
12/9/2009	181.939
6/17/2010	186.939
12/22/2010	143.939
6/29/2011	123.939
12/7/2011	116.939
6/6/2012	155.939
12/12/2012	64.9394
6/19/2013	64.9394
12/11/2013	66.9394
6/11/2014	652.939
12/3/2014	668.061
6/17/2015	93.0606
12/1/2015	95.0606
6/22/2016	202.061
12/20/2016	582.061
6/6/2017	626.061
11/7/2017	1170.06
9/6/2018	1748.06

Shapiro-Francia Test of Normality

Parameter: Specific Conductance

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 171

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	219	-2.57583	6.63492	-564.108
2	522	-2.29036	11.8807	-1759.68
3	572	-2.12007	16.3754	-2972.36
4	580	-1.99539	20.357	-4129.69
5	594	-1.8957	23.9506	-5255.73
6	617	-1.82501	27.2813	-6381.76
7	625	-1.75069	30.3462	-7475.94
8	636	-1.68494	33.1852	-8547.56
9	655	-1.62576	35.8283	-9612.43
10	661	-1.57179	38.2988	-10651.4
11	674	-1.53007	40.6399	-11682.6
12	674	-1.48328	42.8401	-12682.4
13	680	-1.43953	44.9123	-13661.3
14	685	-1.39838	46.8678	-14619.1
15	690	-1.35946	48.7159	-15557.2
16	692	-1.32251	50.4649	-16472.4
17	716	-1.29303	52.1368	-17398.2
18	720	-1.25908	53.7221	-18304.7
19	728	-1.22653	55.2265	-19197.6
20	748	-1.19522	56.6551	-20091.6
21	752	-1.16505	58.0124	-20967.8
22	755	-1.14069	59.3136	-21829
23	787	-1.11232	60.5508	-22704.4
24	805	-1.08482	61.7277	-23577.7
25	807	-1.05812	62.8473	-24431.6
26	807	-1.03215	63.9126	-25264.5
27	881	-1.01104	64.9348	-26155.2
28	910	-0.986272	65.9076	-27052.7
29	930	-0.9621	66.8332	-27947.5
30	965	-0.938476	67.7139	-28853.1
31	967	-0.915365	68.5518	-29738.3
32	972	-0.892733	69.3488	-30606
33	1010	-0.874218	70.1131	-31489
34	1010	-0.852385	70.8396	-32349.9
35	1023	-0.830953	71.5301	-33199.9
36	1030	-0.809896	72.186	-34034.1
37	1031	-0.789191	72.8089	-34847.8
38	1034	-0.772193	73.4051	-35646.2
39	1035	-0.752084	73.9708	-36424.7
40	1038	-0.732275	74.507	-37184.8
41	1051	-0.712751	75.015	-37933.9
42	1063	-0.693493	75.4959	-38671
43	1064	-0.67449	75.9509	-39388.7
44	1068	-0.658838	76.3849	-40092.3
45	1070	-0.640266	76.7949	-40777.4
46	1070	-0.621911	77.1817	-41442.9

47	1073	-0.603765	77.5462	-42090.7
48	1073	-0.585815	77.8894	-42719.3
49	1074	-0.570999	78.2154	-43332.5
50	1077	-0.553384	78.5216	-43928.5
51	1080	-0.53594	78.8089	-44507.3
52	1080	-0.518658	79.0779	-45067.5
53	1080	-0.501527	79.3294	-45609.1
54	1087	-0.487364	79.5669	-46138.9
55	1088	-0.470498	79.7883	-46650.8
56	1090	-0.453763	79.9942	-47145.4
57	1092	-0.437153	80.1853	-47622.8
58	1103	-0.420664	80.3623	-48086.8
59	1108	-0.40429	80.5257	-48534.7
60	1109	-0.390726	80.6784	-48968
61	1109	-0.374544	80.8187	-49383.4
62	1109	-0.358459	80.9472	-49780.9
63	1111	-0.342466	81.0644	-50161.4
64	1125	-0.326561	81.1711	-50528.8
65	1129	-0.31337	81.2693	-50882.6
66	1134	-0.297612	81.3579	-51220.1
67	1137	-0.281926	81.4373	-51540.6
68	1140	-0.266311	81.5083	-51844.2
69	1140	-0.250759	81.5711	-52130.1
70	1149	-0.237847	81.6277	-52403.4
71	1154	-0.222403	81.6772	-52660
72	1155	-0.207012	81.72	-52899.1
73	1155	-0.191671	81.7568	-53120.5
74	1169	-0.176374	81.7879	-53326.7
75	1170	-0.161119	81.8138	-53515.2
76	1172	-0.148434	81.8359	-53689.2
77	1173	-0.133244	81.8536	-53845.5
78	1177	-0.118085	81.8676	-53984.5
79	1178	-0.102953	81.8782	-54105.7
80	1179	-0.0878447	81.8859	-54209.3
81	1180	-0.0752698	81.8915	-54298.1
82	1185	-0.0601949	81.8952	-54369.5
83	1185	-0.0451348	81.8972	-54422.9
84	1186	-0.0300838	81.8981	-54458.6
85	1187	-0.0150408	81.8983	-54476.5
86	1200	0	81.8983	-54476.5
87	1200	0.0150408	81.8986	-54458.4
88	1203	0.0300838	81.8995	-54422.2
89	1210	0.0451348	81.9015	-54367.6
90	1210	0.0601949	81.9051	-54294.8
91	1214	0.0752698	81.9108	-54203.4
92	1217	0.0878447	81.9185	-54096.5
93	1218	0.102953	81.9291	-53971.1
94	1226	0.118085	81.9431	-53826.3
95	1227	0.133244	81.9608	-53662.8
96	1230	0.148434	81.9828	-53480.3
97	1230	0.161119	82.0088	-53282.1
98	1235	0.176374	82.0399	-53064.3
99	1236	0.191671	82.0766	-52827.4
100	1240	0.207012	82.1195	-52570.7
101	1244	0.222403	82.169	-52294
102	1250	0.237847	82.2255	-51996.7
103	1250	0.250759	82.2884	-51683.2

104	1252	0.266311	82.3593	-51349.8
105	1253	0.281926	82.4388	-50996.6
106	1270	0.297612	82.5274	-50618.6
107	1270	0.31337	82.6256	-50220.6
108	1273	0.326561	82.7322	-49804.9
109	1275	0.342466	82.8495	-49368.3
110	1289	0.358459	82.978	-48906.2
111	1290	0.374544	83.1183	-48423
112	1296	0.390726	83.271	-47916.7
113	1301	0.40429	83.4344	-47390.7
114	1301	0.420664	83.6114	-46843.4
115	1301	0.437153	83.8025	-46274.7
116	1309	0.453763	84.0084	-45680.7
117	1318	0.470498	84.2297	-45060.6
118	1326	0.487364	84.4673	-44414.3
119	1327	0.501527	84.7188	-43748.8
120	1327	0.518658	84.9878	-43060.5
121	1329	0.53594	85.275	-42348.3
122	1332	0.553384	85.5813	-41611.2
123	1334	0.570999	85.9073	-40849.5
124	1351	0.585815	86.2505	-40058
125	1352	0.603765	86.615	-39241.7
126	1366	0.621911	87.0018	-38392.2
127	1370	0.640266	87.4117	-37515
128	1370	0.658838	87.8458	-36612.4
129	1374	0.67449	88.3007	-35685.7
130	1374	0.693493	88.7817	-34732.8
131	1393	0.712751	89.2897	-33740
132	1421	0.732275	89.8259	-32699.4
133	1423	0.752084	90.3915	-31629.2
134	1427	0.772193	90.9878	-30527.3
135	1438	0.789191	91.6106	-29392.4
136	1441	0.809896	92.2666	-28225.3
137	1454	0.830953	92.9571	-27017.1
138	1458	0.852385	93.6836	-25774.4
139	1466	0.874218	94.4479	-24492.8
140	1469	0.892733	95.2448	-23181.3
141	1480	0.915365	96.0827	-21826.6
142	1490	0.938476	96.9635	-20428.3
143	1498	0.9621	97.8891	-18987
144	1500	0.986272	98.8618	-17507.6
145	1515	1.01104	99.884	-15975.9
146	1516	1.03215	100.949	-14411.2
147	1521	1.05812	102.069	-12801.8
148	1531	1.08482	103.246	-11140.9
149	1534	1.11232	104.483	-9434.6
150	1540	1.14069	105.784	-7677.94
151	1547	1.16505	107.142	-5875.61
152	1560	1.19522	108.57	-4011.06
153	1570	1.22653	110.075	-2085.41
154	1586	1.25908	111.66	-88.5073
155	1602	1.29303	113.332	1982.93
156	1608	1.32251	115.081	4109.52
157	1618	1.35946	116.929	6309.13
158	1620	1.39838	118.884	8574.5
159	1620	1.43953	120.957	10906.5
160	1630	1.48328	123.157	13324.3

161	1657	1.53007	125.498	15859.6
162	1743	1.57179	127.968	18599.2
163	1762	1.62576	130.611	21463.8
164	1807	1.68494	133.45	24508.5
165	1888	1.75069	136.515	27813.8
166	2005	1.82501	139.846	31472.9
167	2042	1.8957	143.44	35344
168	2121	1.99539	147.421	39576.2
169	2200	2.12007	151.916	44240.3
170	2380	2.29036	157.162	49691.4

Sample Standard Deviation = 347.275
Numerator = 2.46924e+009
Denominator = 3.22212e+009 = 170 157.162
W Statistic = 0.766339
5% Critical value of 0.976 exceeds 0.766339
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.766339
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 2
Future Samples (k) = 2
Recent Dates = 1
Background Samples (n) = 69
Maximum Background Concentration = 1888
Confidence Level = 97.2%
False Positive Rate = 2.8%

Well	Date	Samples	Mean	Impacted
MW#93-3	9/6/2018	1	2380	TRUE
MW#03-2	9/6/2018	1	2620	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 68
Maximum Baseline Concentration = 2200
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	1762
	3/14/1995	1490
	6/21/1995	1421
	12/14/1995	1534
	3/6/1996	1327
	4/25/1996	1570
	10/2/1996	1657
	12/10/1996	1427
	3/11/1997	1370
	4/15/1997	1244
	8/14/1997	1351
	12/4/1997	1140
	3/31/1998	1172
	6/23/1998	1214
	8/11/1998	1296
	12/8/1998	1177
	3/9/1999	1137
	6/8/1999	1180
	8/19/1999	1253
	12/14/1999	1088
	3/7/2000	1250
	6/23/2000	1070
	12/12/2000	1051
	3/27/2001	1149
	6/28/2001	1155
	9/10/2001	1250
	12/18/2001	1064
	3/19/2002	1240
	6/26/2002	787
	9/18/2002	1109
	12/11/2002	1125
	3/13/2003	1034
	6/25/2003	1111
	9/26/2003	1109
	12/10/2003	1173
	3/9/2004	881
	6/24/2004	1129
	9/15/2004	1068
	12/15/2004	972
	3/16/2005	1134
	6/15/2005	1080

9/21/2005	1155
12/21/2005	1140
3/15/2006	1035
6/21/2006	1226
12/20/2006	1087
6/12/2007	1031
12/17/2007	910
6/11/2008	1023
12/3/2008	1073
6/17/2009	1073
12/9/2009	1038
6/17/2010	1108
12/22/2010	1090
6/29/2011	1178
12/7/2011	930
6/6/2012	1203
12/12/2012	1010
6/19/2013	1438
12/11/2013	1252
6/11/2014	1500
12/3/2014	1200
6/17/2015	1480
12/1/2015	1807
10/11/2016	2005
12/20/2016	2200
6/6/2017	1743
11/7/2017	2121

Date	Samples	Mean	Impacted
9/6/2018	1	2380	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-2

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 32
Maximum Baseline Concentration = 2042
Confidence Level = 97%
False Positive Rate = 3%

Baseline Samples	Date	Result
	6/24/2004	692
	9/15/2004	522
	12/15/2004	655
	3/16/2005	661
	6/15/2005	674
	9/21/2005	625
	12/21/2005	572
	3/15/2006	594
	6/21/2006	636
	12/20/2006	580
	6/12/2007	680
	12/17/2007	617
	6/11/2008	674
	12/3/2008	752
	6/17/2009	720
	12/9/2009	690
	6/17/2010	685
	12/22/2010	728
	6/29/2011	748
	12/7/2011	755
	6/6/2012	716
	12/12/2012	807
	6/19/2013	807
	12/11/2013	805
	6/11/2014	219
	12/3/2014	1540
	6/17/2015	965
	12/1/2015	967
	6/22/2016	1074
	12/20/2016	1454
	6/6/2017	1498
	11/7/2017	2042

Date	Samples	Mean	Impacted
9/6/2018	1	2620	TRUE

US GEOLOGICAL SURVEY

OPEN-FILE REPORT 87-0746

OKLAHOMA GROUND-WATER QUALITY

By William F. Horak and Jerry D. Stoner

U.S. Geological Survey Open-File Report 87-0746

DEPARTMENT OF THE INTERIOR
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FOREWORD

This report contains summary information on ground-water quality in one of the 50 States, Puerto Rico, the Virgin Islands, or the Trust Territories of the Pacific Islands, Saipan, Guam, and American Samoa. The material is extracted from the manuscript of the *1986 National Water Summary*, and with the exception of the illustrations, which will be reproduced in multi-color in the *1986 National Water Summary*, the format and content of this report is identical to the State ground-water-quality descriptions to be published in the *1986 National Water Summary*. Release of this information before formal publication in the *1986 National Water Summary* permits the earliest access by the public.

Contents

Illustrations

OKLAHOMA
Ground-Water Quality

In Oklahoma, ground water is the major source of water for irrigation, the largest single use of water. The major population centers (fig. 1) rely primarily on surface water for public supply, but many of the smaller towns and rural water systems depend on ground water. Ground water accounts for about 28 percent of the total public water supply in Oklahoma (Solley and others, 1983, p. 10). Except for the Dog Creek-Blaine and the Arbuckle-Timbered Hills aquifers (fig. 2*A*), the principal aquifers provide water supplies that generally meet all Federal and State standards for drinking-water quality. Large sulfate concentrations, with a median value of 1,750 mg/L (milligrams per liter) in the Dog Creek-Blaine, and large fluoride concentrations, with a median value of 9.1 mg/L in the Arbuckle-Timbered Hills, preclude the general use of these two aquifers for public water supply. In all principal aquifers except the Arbuckle-Timbered Hills, the water is hard to very hard, with median hardness values ranging from 135 to 2,000 mg/L as calcium carbonate. All principal aquifers supply water of acceptable quality for irrigation of some types of crops.

Large nitrate (as nitrogen) concentrations are present in many of the State's aquifers, particularly in the shallow alluvium and terrace aquifers, but specific causes have not been identified. Evidence exists that ground water is contaminated in some areas by large sodium chloride concentrations resulting from oil and gas operations. Fifty hazardous-waste sites have been identified under the Federal Resource Conservation and Recovery Act (RCRA) of 1976 (fig. 3*A*). Of these 50 sites, ground-water-quality monitoring is required at 30. Four sites in Oklahoma have been included on the National Priorities List (NPL) of hazardous waste sites (U.S. Environmental Protection Agency, 1986c) for action or further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. Remedial action is almost completed at the CERCLA (Superfund) site in northeastern Oklahoma (fig. 3*A*). There are 11 underground injection control (UIC) Class I wells (U.S. Environmental Protection Agency, 1984) in Oklahoma (fig. 3*A*). The U.S. Department of Defense (DOD) has identified 29 hazardous-waste sites at 4 facilities in Oklahoma as having potential for contamination.

Although the urban population has continued to increase, Oklahoma has had a net loss in population since 1983 (Oklahoma Employment Security Commission, 1986, p. 4) because of the depressed economy. Contamination of shallow ground water may occur in the urban areas as an indirect result of population and industrial growth. Statewide, the potential for ground-water contamination resulting from agriculture and energy production has been decreased by a reduction in these activities.

WATER QUALITY IN PRINCIPAL AQUIFERS

Oklahoma has three principal types of aquifers—alluvial, unconsolidated and semiconsolidated, and bedrock (U.S. Geological Survey, 1985, p. 347). Ground water in Oklahoma is withdrawn predominantly for irrigation and public supply, and is the source for most self-supplied domestic users. Irrigation is the primary water use in the western part of the State and public supply is the primary water use in the central and eastern parts. During 1982, ground-water withdrawals accounted for 46 percent of the total water withdrawals (Stoner, 1985, p. 18). Irrigation withdrawals from the High Plains, Rush Springs, and Dog Creek-Blaine aquifers in the west (fig. 2*A*) accounted for about 60 percent of the total State ground-water withdrawals.

Dissolved-solids concentrations in Oklahoma ground water generally increase with depth. Except for the Dog Creek-Blaine and the Arbuckle-Timbered Hills aquifers, water suitable for public supply can be found in all the State's principal aquifers. However, not all areas or depths within these aquifers produce water suitable for public supply.

BACKGROUND WATER QUALITY

A graphic summary of selected water-quality variables compiled from the U.S. Geological Survey's National Water Data Storage and Retrieval System (WATSTORE) is presented in figure 2*B*. The summary is based on dissolved-solids, hardness, fluoride, chloride, and sulfate analyses of water samples collected from 1946 to 1986 from the principal aquifers in Oklahoma. Percentiles of these variables are compared to national standards that specify the maximum concentration or level of a contaminant in drinking-water supply as established by the U.S. Environmental Protection Agency (1986 a,b). The primary maximum contaminant level standards are health related and are legally enforceable. The secondary maximum contaminant level standards apply to esthetic qualities and are recommended guidelines. The primary drinking-water standards include a maximum concentration of 4.0 mg/L fluoride, and the secondary drinking-water standards include maximum concentrations of 500 mg/L dissolved solids, 2.0 mg/L fluoride, 250 mg/L chloride, and 250 mg/L sulfate.

The data presented in figure 2*B* were summarized by principal aquifer and were interpreted for each aquifer without distinction as to areal location or depth. Owing to insufficient data, the Keokuk-Reeds Spring and Antlers aquifers have not been included in this discussion. Nitrate (as nitrogen) data were not sufficient to produce statistical summaries for any of the principal aquifers.

Except for the Dog Creek-Blaine aquifer, the median dissolved-solids concentrations in the State's principal aquifers were smaller than 1,000 mg/L and ranged from 280 to 772 mg/L (fig. 2*B*). Hardness concentrations for most of Oklahoma's ground water generally were larger than 120 mg/L (hard water) and commonly were larger than 180 mg/L (very hard water). Some chloride and sulfate concentrations exceeded the drinking-water standards of 250 mg/L, rendering the water unsuitable for use as a public supply. Fluoride concentrations in water from some aquifers exceeded the 4.0 mg/L primary standard for the range in average annual temperature in Oklahoma of 58 to 64° F (Oklahoma Water Resources Board, 1984).

Alluvial and Terrace Aquifers

Water withdrawn from the alluvial and terrace aquifers is used principally for irrigation and domestic supply. Water from these aquifers ranged from a calcium-magnesium carbonate-bicarbonate type to a calcium-magnesium sulfate type (U.S. Geological Survey, 1985, p. 348). The median dissolved-solids concentration was 485 mg/L (fig. 2*B*), with about 20 percent of the concentrations exceeding 1,000 mg/L. The water was very hard, with a median hardness concentration of 340 mg/L; more than 80 percent of the concentrations were larger than 180 mg/L. Most of the chloride and sulfate concentrations were small; median values were 18 mg/L and 50 mg/L, respectively. Fewer than 10 percent of the chloride concentrations and 20 percent of the sulfate concentrations exceeded 250 mg/L. The median fluoride concentration was 0.3 mg/L, and the maximum was 0.9 mg/L. The water generally is suitable for use as a public supply. However, large chloride and sulfate concentrations found in some areas and at various depths decrease the suitability of the water for public supply.

High Plains Aquifer

The major use of water from this aquifer is for irrigation. Public water suppliers in this area also rely on the High Plains aquifer for potable water. The water is a calcium-magnesium chloride-sulfate type (fig. 4). The median dissolved-solids concentration was 364 mg/L (fig. 2*B*), with about 10 percent of the samples exceeding 1,000 mg/L. The water was very hard, with a median hardness concentration of 210 mg/L; 95 percent of the samples had concentrations larger than 180 mg/L. The chloride and sulfate concentrations were small; median concentrations were 19 mg/L and 61 mg/L, respectively. About 5 percent of the chloride and sulfate concentrations were larger than 250 mg/L. The median fluoride concentration was 1.4 mg/L, and about 25 percent of the concentrations exceeded 2.0 mg/L. Although the water is suitable for use as a public supply, chloride, sulfate, and fluoride concentrations can be large enough to make the water unsuitable in some areas.

Rush Springs Aquifer

The primary use for water withdrawn from the Rush Springs aquifer is irrigation. The water is a calcium-magnesium chloride-sulfate type (fig. 4). The median dissolved-solids concentration was 408 mg/L (fig. 2*B*), with about 25 percent of the concentrations greater than 1,000 mg/L. The water was very hard, with a median hardness concentration of 270 mg/L; 70 percent of the concentrations were larger than 180 mg/L. Chloride and sulfate concentrations were small; median values were 14 mg/L and 55 mg/L, respectively. Fewer than 5 percent of the chloride concentrations and about 30 percent of the sulfate concentrations were larger than 250 mg/L. The maximum fluoride concentration was 0.9 mg/L. The water generally is suitable for public supply, although chloride and sulfate concentrations exceed the drinking-water standards in some areas.

Dog Creek-Blaine Aquifer

Water from the Dog Creek-Blaine aquifer is used almost exclusively for irrigation. The chemistry of the water, a calcium-magnesium chloride-sulfate type (fig. 4), results from solution of the gypsum and dolomite in the aquifer. Water from this aquifer was slightly to moderately saline, with a median dissolved-solids concentration of 3,040 mg/L (fig. 2*B*). About 80 percent of the dissolved-solids concentrations were larger than 1,000 mg/L. The water was very hard, with a median hardness concentration of 2,000 mg/L; more than 90 percent of the values were larger than 180 mg/L. The median chloride concentration was 145 mg/L, and about 25 percent of the values exceeded 250 mg/L. Sulfate concentrations were large; the median value was 1,750 mg/L and more than 75 percent of the concentrations were larger than 250 mg/L. The maximum fluoride concentration was 0.7 mg/L. The water is unsuitable for use as a public-water supply.

Garber-Wellington Aquifer

The primary use for water withdrawn from the Garber-Wellington aquifer is for public supply and self-supplied domestic use. The water is a calcium-magnesium carbonate-bicarbonate type (fig. 4). The median dissolved-solids concentration was 372 mg/L (fig. 2*B*), with about 10 percent of the concentrations larger than 1,000 mg/L. The water was hard to very hard, with a median hardness concentration of 190 mg/L; more than 75 percent of the values were larger than 120 mg/L. Chloride and sulfate concentrations normally were small; median concentrations were 17 and 18 mg/L, respectively. About 10 percent of the chloride and 10 percent of the sulfate concentrations were larger than 250 mg/L. The median fluoride concentration was 0.1 mg/L, and fewer than 10 percent of the values were larger than 2.0 mg/L. The water in the aquifer normally is suitable for use as a potable water supply, but chloride, sulfate, and fluoride concentrations may exceed the drinking-water standards.

Vamoosa-Ada Aquifer

Water withdrawn from the relatively undeveloped Vamoosa-Ada aquifer is used primarily for drinking. The water is a sodium-potassium chloride-sulfate type (fig. 4), with a tendency toward a sodium-potassium mixed type. The median dissolved-solids concentration was 325 mg/L (fig. 2*B*), with 10 percent of the concentrations greater than 1,000 mg/L. The water ranged from soft to very hard, with a median hardness concentration of 135 mg/L; about 45 percent of the values were larger than 180 mg/L. Chloride and sulfate concentrations generally were small; median concentrations were 20 and 23 mg/L, respectively. About 10 percent of the chloride and 1 percent of the sulfate concentrations were larger than 250 mg/L. The maximum fluoride concentration was 1.3 mg/L. Except for areas of local contamination resulting from past oil and gas activities, the water is suitable for use as a public supply.

Roubidoux Aquifer

Water from the Roubidoux aquifer is withdrawn primarily for public-supply use, and the aquifer is the principal source of potable water for Ottawa County. The water is a mixed type with a tendency toward a sodium-potassium chloride-sulfate type (fig. 4). The median dissolved-solids concentration was 280 mg/L (fig. 2*B*), with about 5 percent of the concentrations larger than 1,000 mg/L. The water was hard, with a median hardness concentration of 140 mg/L; about 80 percent of the values were larger than 120 mg/L. Chloride and sulfate concentrations generally were small; median concentrations were 50 and 15 mg/L, respectively. About 15 percent of the chloride concentrations and 1 percent of the sulfate concentrations were larger than 250 mg/L. The median fluoride concentration was 0.7 mg/L; about 15 percent of the values were larger than 2.0 mg/L. The water normally is suitable for use as a public supply, although chloride, sulfate, and flouride concentrations exceeded the drinking-water standards in some areas.

Arbuckle-Simpson Aquifer

The Arbuckle-Simpson aquifer is used primarily for drinking water, but the aquifer is largely undeveloped. The water is a calcium-magnesium carbonate-bicarbonate type (fig. 4). The median dissolved-solids concentration was 369 mg/L (fig. 2*B*), with about 10 percent of the concentrations greater than 1,000 mg/L. The water was very hard, with a median hardness concentration of 330 mg/L; all hardness concentrations were larger than 180 mg/L. Chloride and sulfate concentrations were small; median concentrations were 21 and 18 mg/L, respectively. About 25 percent of the chloride and 10 percent of the sulfate concentrations were larger than 250 mg/L. The median fluoride concentration was 0.2 mg/L, with about 30 percent of the values larger than 2.0 mg/L. Much of the water in the aquifer is potable, but large concentrations of chloride and fluoride in some areas may make the water unsuitable for public supply.

Arbuckle-Timbered Hills Aquifer

The Arbuckle-Timbered Hills aquifer is largely undeveloped, but some water is withdrawn for domestic and irrigation use. The water is a sodium-potassium mixed type (fig. 4). The median dissolved-solids concentration was 772 mg/L (fig. 2*B*), with about 35 percent of the concentrations larger than 1,000 mg/L. The water was soft, with a median hardness concentration of 21 mg/L. Chloride concentrations generally were large, with a median concentration of 190 mg/L; about 40 percent of the chloride concentrations exceeded 250 mg/L. The median sulfate concentration was 70 mg/L, and about 25 percent of the values exceeded 250 mg/L. Fluoride concentrations were very large, with a median concentration of 9.1 mg/L; about 75 percent of the concentrations were larger than 2.0 mg/L. The water normally is unsuitable for public

supply because of the widespread occurrence of large chloride and fluoride concentrations.

Effects of Land Use on Water Quality

Changes in the quality of Oklahoma's ground water generally have not been documented by repeated sampling of specific wells. Poor ground-water quality may represent human-induced degradation or, more commonly in Oklahoma, impairment may be natural. With the limited information available, it is usually difficult to distinguish whether water-quality impairment is natural or human induced. Analyses for the class of contaminants that nearly always are attributable to human activities, such as organic compounds, are almost totally lacking for Oklahoma ground water.

Of the 11 major Oklahoma aquifers (fig. 2*A*), the Roubidoux is the only aquifer for which appreciable trace-metals data are available. Of the trace metals, cadmium exceeded the maximum contaminant level of 10 μg/L (micrograms per liter) (U.S. Environmental Protection Agency, 1986a) in 4 of 91 samples taken from the Roubidoux. Eleven of the 26 samples from the Roubidoux that were analyzed for gross alpha activity exceeded the maximum contaminant level of 15 picocuries per liter. Of the constituents covered by the drinking-water standards, chloride and sulfate most commonly exceeded the 250-mg/L limits. Sulfate concentrations in more than 75 percent of the samples from the Dog Creek-Blaine aquifer exceeded 250 mg/L,; for this reason the aquifer is represented as naturally impaired in figure 3*B*. The Arbuckle-Timbered Hills aquifer also is shown in figure 3*B* as naturally impaired, owing to the persistence of fluoride concentrations in excess of the drinking-water standard.

Many occurrences of substandard ground-water quality may not be attributed with confidence to specific causes or factors. Although available nitrate data were insufficient to produce statistics (fig. 2*B*), nitrate contamination commonly is measured in Oklahoma's ground water. Most of the nitrate data are stored in the files of various State agencies. Samples from one or more wells in virtually every major aquifer in the State have nitrate concentrations that exceed the 10-mg/L maximum contaminant level. The alluvial and terrace aquifers, because they tend to have shallow water tables and overlying soils with large permeability values, are particularly susceptible to nitrate contamination resulting from fertilizer application, septic-tank effluent, and industrial-process wastes. In addition, the outcrop areas of bedrock aquifers are susceptible to the same contaminants. Seventeen of the wells that yield contaminated water shown in figure 3*B* are public-supply wells with nitrate problems. The actual number of affected wells, both public and private, is larger, but accurate locations for the wells were not available. Gopal (1984) reported on an area in western Woodward County (fig. 3*B*) where nitrate concentrations exceeded 10 mg/L in at least one of several repetitive samples in 40 percent of the shallow wells tested. The contamination was attributed to various sources at specific sites.

Urbanization

The effects of urbanization on ground-water quality in Oklahoma are not well documented. The State's largest city, Oklahoma City, overlies the Garber-Wellington aquifer, which is a principal water-supply source for parts of the metropolitan area. Most of the available chemical data for the Garber-Wellington are from municipal wells completed in the deeper parts of the aquifer. Nitrate contamination is a common problem in the shallow areas of the aquifer. Data are lacking to determine if trace metals and organic compounds are present in the shallow zones of the aquifer that would be affected first by human activities. Arsenic, chromium, and selenium in excess of the drinking-water standards are common, but the source of these dissolved metals is presumed to be minerals that occur naturally in the aquifer.

Agricultural Practices

The major known effect of agriculture on ground-water quality in Oklahoma is nitrate contamination. Chemigation is practiced in several areas of Oklahoma, but ground-water contamination resulting from a system malfunction, accident, or misuse of the practice has not been documented. Also, there is no evidence that pesticides are present in Oklahoma's ground water. However, very few analyses for pesticides have been made as of March 1986. The Oklahoma State Department of Agriculture began a project in 1986 to sample for pesticides in shallow aquifers throughout Oklahoma. This project is the first systematic effort to look statewide for evidence of pesticides in ground water.

Oil and Gas Industry

One of the ground-water-quality issues of great concern in Oklahoma is the contamination potential of oil and gas exploration and production. Nearly 400,000 oil and gas wells have been drilled in Oklahoma since oil was first produced in 1891 (Northcutt, 1985). Until several years ago, the requirements for plugging abandoned wells were not stringent regarding the protection of freshwater aquifers. Many of the older unplugged or partly plugged wells may serve as conduits for saltwater movement from deep reservoirs into shallower freshwater aquifers. Leaking casings in old producing wells or saltwater-injection wells could have a similar effect. Imperfectly sealed drilling-fluid disposal pits and brine-evaporation pits also may contribute contaminants to ground water. The contaminants typically associated with oil and gas activity are chloride, chromium, and sodium. Other trace metals that are a part of the natural composition of the brines produced with the oil and gas, and metals that are used in drilling-fluid additives also may be introduced to freshwater zones.

Two published reports are known to relate activities of the oil and gas industry directly to demonstrated ground-water contamination. An investigation into the cause of apparent saltwater contamination of the Vamoosa-Ada aquifer and overlying streams in central Oklahoma indicated that the quality of ground water in the vicinity of 15 wells (fig. 3*B*) had been degraded by oilfield brines (Morton, 1984). Leakage from evaporation pits was the presumed cause of large chloride concentrations, as much as 9,000 mg/L, discovered in an area of several square miles in the southern part of the Cimarron Terrace aquifer in Logan County (fig. 3*B*) (Oklahoma Water Resources Board, 1975).

Waste Disposal

Early in 1986, State records showed that Oklahoma had 106 active municipal landfills (fig. 3*C*), and 50 RCRA sites for storage or disposal of hazardous waste, 4 CERCLA sites, and 11 UIC wells (fig. 3*A*). About 30 of the RCRA sites have permits for land disposal and must have ground-water monitoring networks in place. Ground-water contamination has not been detected at any of the RCRA sites; however, many do not yet (1986) have monitoring networks fully in place. Contamination has been documented at one of the CERCLA sites. There are two commercial waste-disposal facilities in Oklahoma. One, a land-disposal facility, is in Major County. The other facility (two disposal wells) is in Tulsa County. Both facilities also are RCRA sites.

As of September 1985, 29 hazardous-waste sites at 4 facilities in Oklahoma had been identified by the DOD as part of their Installation Restoration Program (IRP) as having potential for contamination (U.S. Department of Defense, 1986). The IRP, established in 1976, parallels the U.S. Environmental Protection Agency (EPA) Superfund program under CERCLA. The EPA presently ranks these sites under a hazard ranking system and may include them in the NPL. Of the 29 sites in the program, 3 sites contained contaminants but did not present a hazard to the environment. Three other sites, all at one facility (fig. 3*A*), were considered to present

a hazard significant enough to warrant response action in accordance with CERCLA. The remaining sites are scheduled for confirmation studies to determine if remedial action is required.

One of Oklahoma's CERCLA sites, the Tar Creek site in Ottawa County (fig. 3*A*), has posed a threat to ground-water quality in the Roudidoux aquifer, a major source of water for public supply in northeastern Oklahoma. Abandoned underground lead-zinc mines have filled with water and large concentrations of iron, zinc, and sulfate now are evident in the mine water. Other constituents present in lesser, but significant, concentrations include aluminum, arsenic, cadmium, cobalt, lead, manganese, and nickel. The mines are located in the Boone Formation. Hydraulic gradients in the area indicate that mine water will migrate laterally within the formation and may migrate downward into other formations, including the Roubidoux aquifer. Many abandoned wells, which once supplied water for mining and milling operations, penetrate the Roubidoux aquifer and now provide a conduit for the mine water to reach the Roubidoux aquifer. A major goal of a CERCLA remedial project that will conclude in 1986 is to plug all abandoned wells in the area that could convey water from the mine workings to the Roubidoux aquifer.

Feasibility studies at the CERCLA site in southern McClain County (fig. 3*A*), the Hardage/Criner site, have been completed, and the proposed cleanup plans were issued for public comment early in 1986. The U.S. Department of Justice filed a civil suit in June 1986 against 36 companies to arrange for and to pay for cleanup of the 60-acre site. From 1972 through 1980 the site was operated as an industrial waste-disposal facility, and more than 18 million gallons of liquid waste were accepted. The wastes include polychlorinated biphenyls, cyanides, solvents, acids, caustics, oil, paints, plating and etching solutions, waste ink, carbon black, pesticides, and sludges containing trace metals (U.S. Environmental Protection Agency, 1986d). Additional investigation at this site is planned to determine the extent, if any, of ground-water contamination.

As of June 1986, cleanup of the Sand Springs Petrochemical Complex near Tulsa (fig. 3*A*) was underway. Federal and State response actions were underway at the Compass Industries site, also near Tulsa, but cleanup activities had not begun (U.S. Environmental Protection Agency, 1986c).

A hydrogeologic investigation was begun in 1985 to determine if ground-water contamination had occurred near several former waste-disposal sites on Tinker Air Force Base in the Oklahoma City metropolitan area. A preliminary investigation indicates that trichloroethylene (TCE) is present in the Garber-Wellington aquifer in a localized area beneath one of the disposal sites (U.S. Army Corps of Engineers, Tulsa District, oral commun., 1986).

Potential for Water-Quality Changes

The two major land-use activities in Oklahoma, agriculture and energy production, are likely to decrease. To improve its economy, Oklahoma is seeking to diversify its economic base and lessen its dependence on agriculture and energy production. The potential for change in ground-water quality by this diversification will depend to a great extent on the types of industry that are attracted.

Reduction in agricultural activity, particularly in crop production, could decrease potential ground-water contamination. A decrease in crop production would reduce the application of fertilizer and pesticides, as well as reduce the amount of irrigation water applied to the land surface. The potential for increased nitrate contamination of ground water from agricultural activities probably will not increase soon. However, if crop production in Oklahoma increases, it could increase the potential for change in water quality.

Oil and gas exploration and production presently (1986) are curtailed in Oklahoma because of unfavorable market conditions. Pumping from many marginal production wells has ceased because of the economic unfeasibility of continued operation. The potential for acceleration of changes in ground-water quality due to energy production or exploration will be minimal while the current market conditions exist. The potential for water-quality changes from past oil and gas operations probably will not change appreciably.

GROUND-WATER-QUALITY MANAGEMENT

Seven Oklahoma State agencies share statutory authority for the management and protection of ground-water quality. The Oklahoma Department of Pollution Control, one of the seven agencies, has the primary duty of coordinating the activities of other State agencies relating to environmental pollution when duplication of effort is possible. The Department functions as a clearing house for pollution complaints, particularly if there is a jurisdictional question. The Department is administered by a board composed of the heads of seven other agencies (one of which has no ground-water management authority) with responsibilities relating to the prevention and control of water pollution.

The Oklahoma Water Resources Board is responsible for the allocation of water rights that are based on hydrologic investigations of the State's aquifers, including considerations of possible ground-water pollution. The board is authorized to classify the State's water according to beneficial uses and to promulgate water-quality standards to protect those uses. The board also establishes well-construction standards, primarily to protect ground-water quality.

The Oklahoma State Department of Health has broad authority stemming from its mandate to safeguard the health of the State's people. It has jurisdiction in any situation that could contaminate or has contaminated a drinking-water source. The Department has approval and regulatory authority for all public water supplies, solid waste-management facilities, and septic systems. It also regulates hazardous waste, including the RCRA sites, and all classes of UIC wells except Class II.

The Oklahoma Corporation Commission has sole jurisdiction over any production activities of the oil and gas industry that may affect ground water. It has the authority to issue rules and regulations to prevent pollution of ground water that may result from those activities. The Commission administers that part of the UIC program that deals with saltwater-disposal wells and enhanced-recovery injection wells (Class II wells). It also is responsible for inventories in Oklahoma that are required by the Underground Storage Tank program of the EPA (RCRA of 1976).

The Oklahoma State Department of Agriculture has jurisdiction over the labeling, sale, handling, and use of pesticides and herbicides. Statutory authority gives the Department some control over the eventual distribution of applied pesticides in the environment. The Department also regulates feedlots and may promulgate rules to prevent contamination of natural waters.

The Oklahoma Conservation Commission has jurisdiction over nonpoint-source pollution programs that are not specifically delegated to other authorities, but its enforcement role is limited. The Oklahoma Department of Mines is responsible for approval of mine permits and regulation of mining operations to assure minimal disturbance to the quantity and quality of water resources.

The Oklahoma Department of Pollution Control coordinates the efforts of several agencies to develop an integrated strategy for the protection of Oklahoma's ground water. An important interim result of that work has been the recognition that many of the water-quality data that are needed to implement an effective protection strategy—one that includes enforceable water-quality standards—currently are not available. A ground-water-quality monitoring pro-

gram begun in 1983 by the Oklahoma Water Resources Board has provided trace-metals data for areas where previously there were none, but analyses for organic compounds are few.

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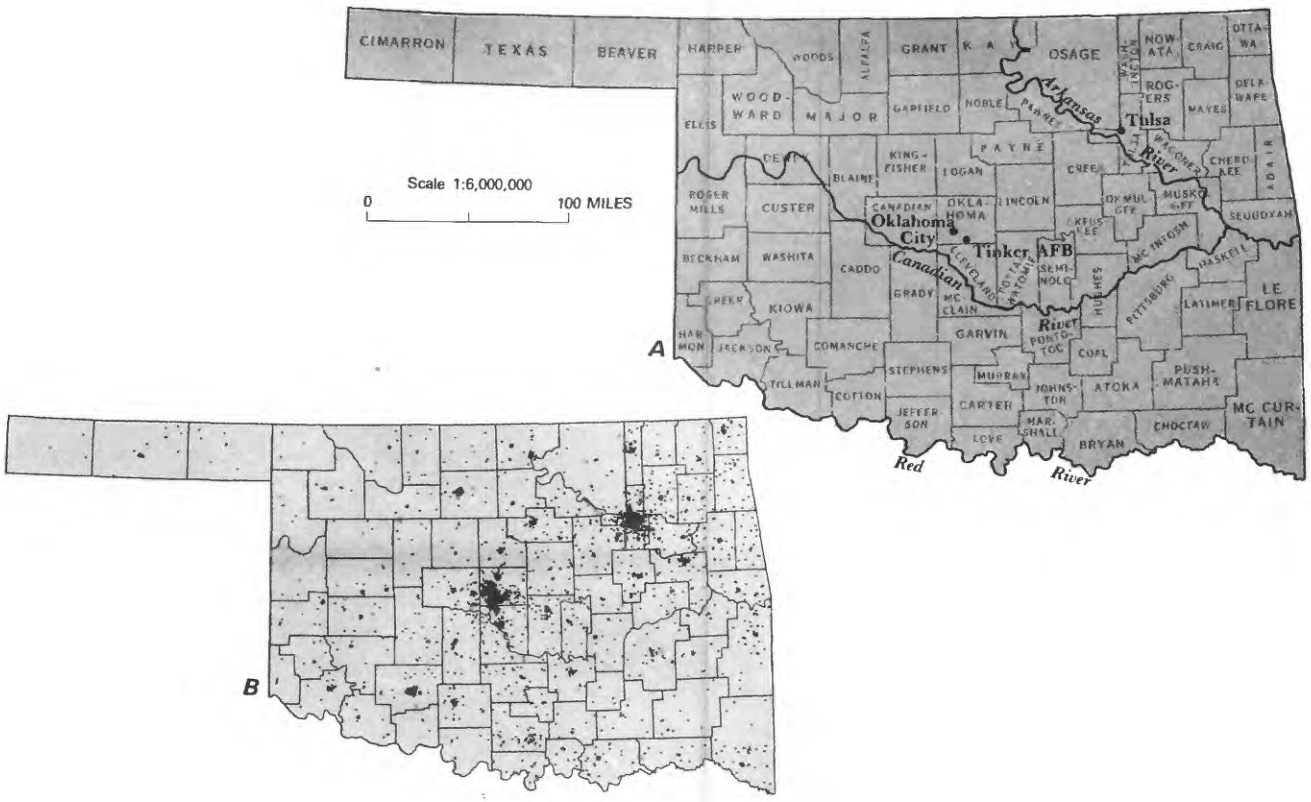


Figure 1. Selected geographic features and 1985 population distribution in Oklahoma. *A*, Counties, selected cities, and major drainages. *B*, Population distribution, 1985; each dot on the map represents 1,000 people. (Source: *B*, Data from U.S. Bureau of the Census 1980 decennial census files, adjusted to the 1985 U.S. Bureau of the Census data for county populations.)

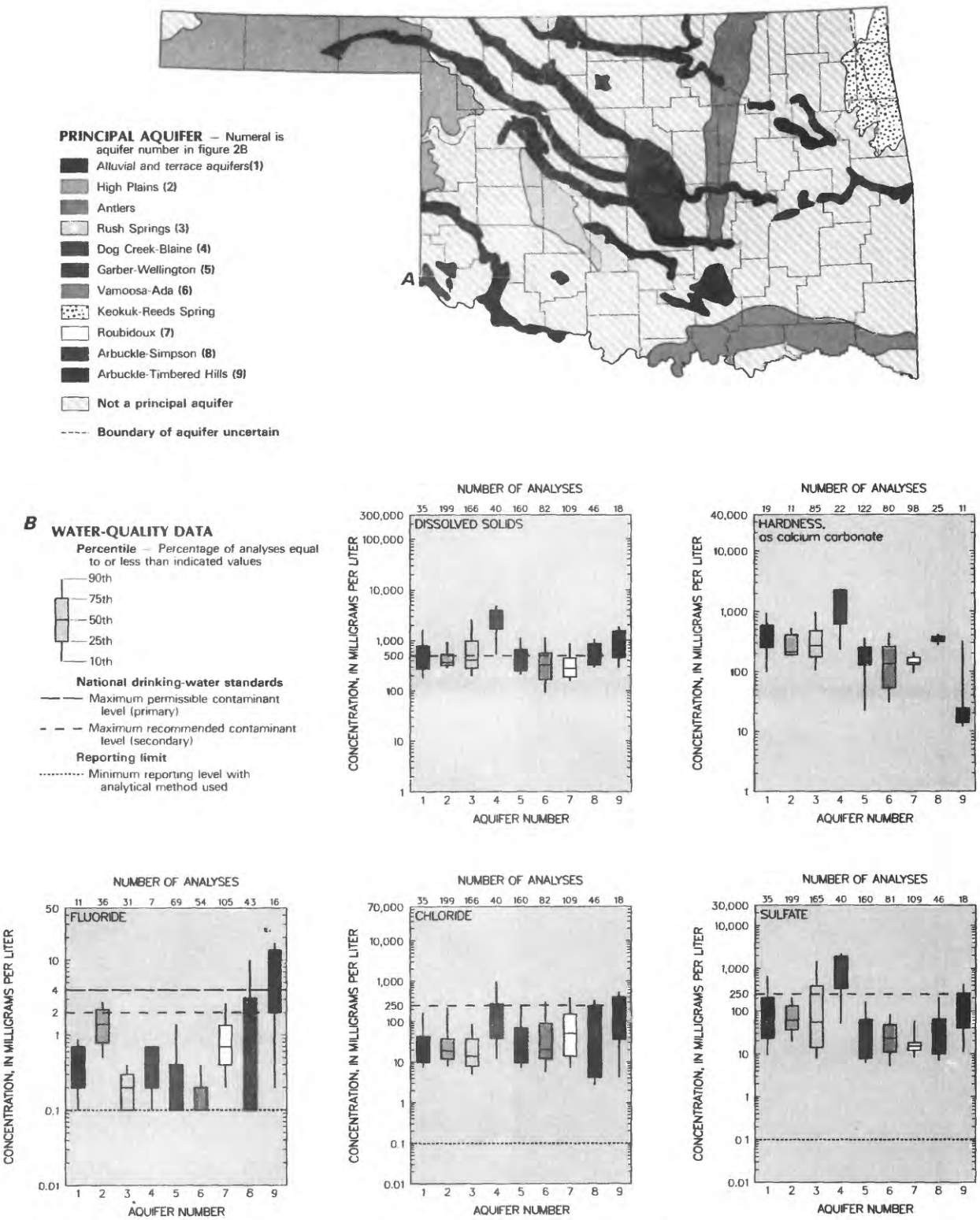


Figure 2. Principal aquifers and related water-quality data in Oklahoma. *A*, Principal aquifers. *B*, Selected water-quality constituents and properties, as of 1946-86. (Sources: *A*, Marcher, 1972. *B*, Analyses compiled from U.S. Geological Survey files; national drinking-water standards from U.S. Environmental Protection Agency, 1986 a,b.)

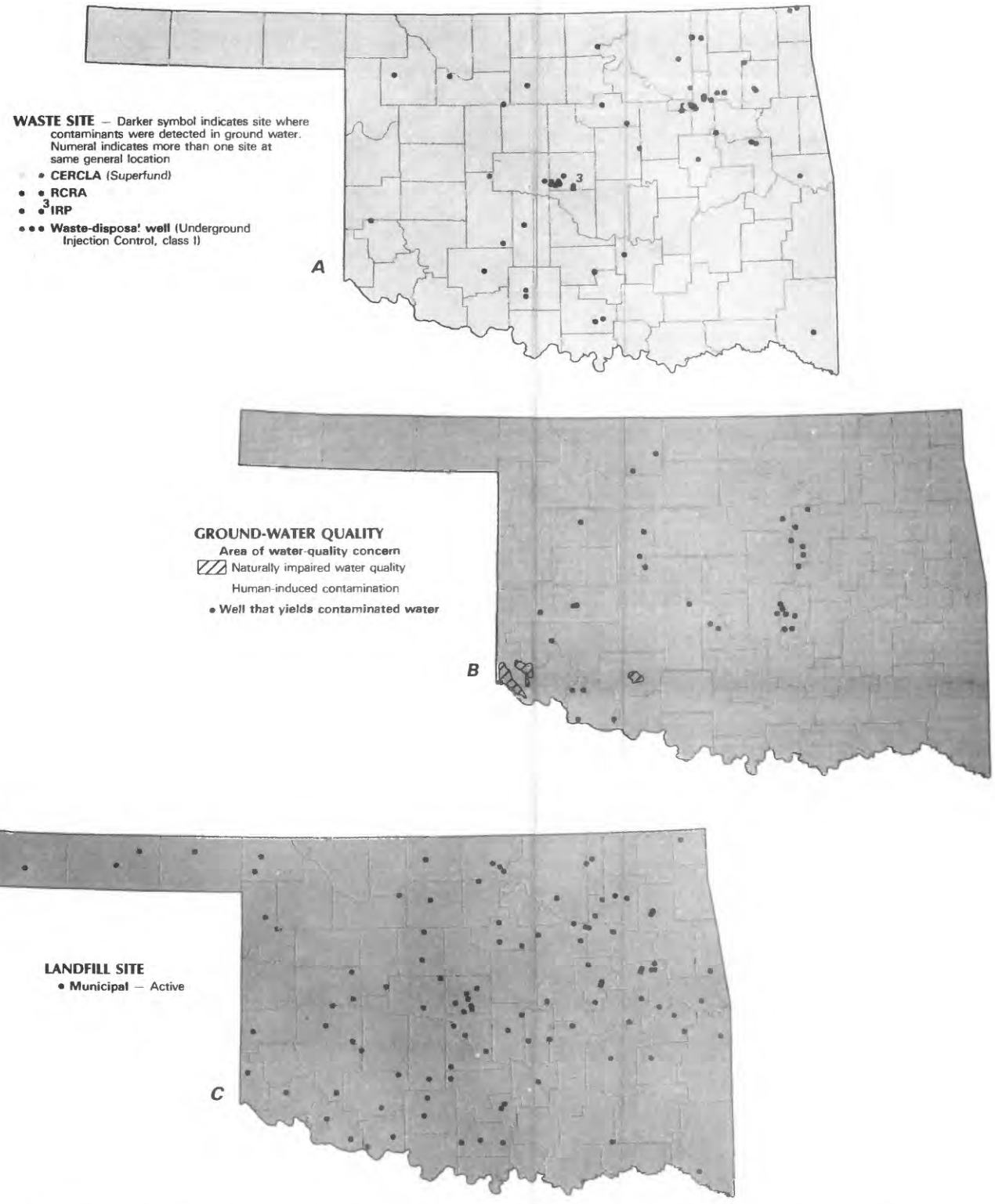
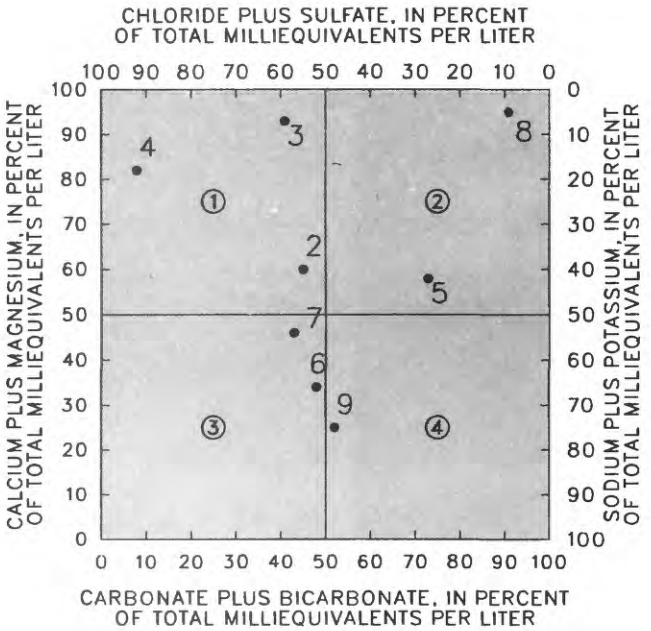


Figure 3. Selected waste sites and ground-water-quality information in Oklahoma. *A*, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites, as of August 1986; Resource Conservation and Recovery Act (RCRA) sites, as of August 1986; and Department of Defense Installation Restoration Program (IRP) sites, as of September 1985; and other selected waste sites, as of August 1986. *B*, Areas of naturally-impaired water quality, areas of human-induced contamination, and distribution of wells that yield contaminated water, as of August 1986. *C*, Municipal landfills, as of August 1986. (Sources: *A*, Oklahoma State Department of Health files; U.S. Department of Defense, 1986. *B*, U.S. Geological Survey, Oklahoma Water Resources Board, and Oklahoma State Department of Health files. *C*, Oklahoma State Department of Health files.)



EXPLANATION

2 HIGH PLAINS AQUIFER
3 RUSH SPRINGS AQUIFER
4 DOG CREEK-BLAINE AQUIFER
5 GARBER-WELLINGTON AQUIFER
6 VAMOOSA-ADA AQUIFER
7 ROUBIDOUX AQUIFER
8 ARBUCKLE-SIMPSON AQUIFER
9 ARBUCKLE-TIMBEROD HILLS AQUIFER

WATER TYPE

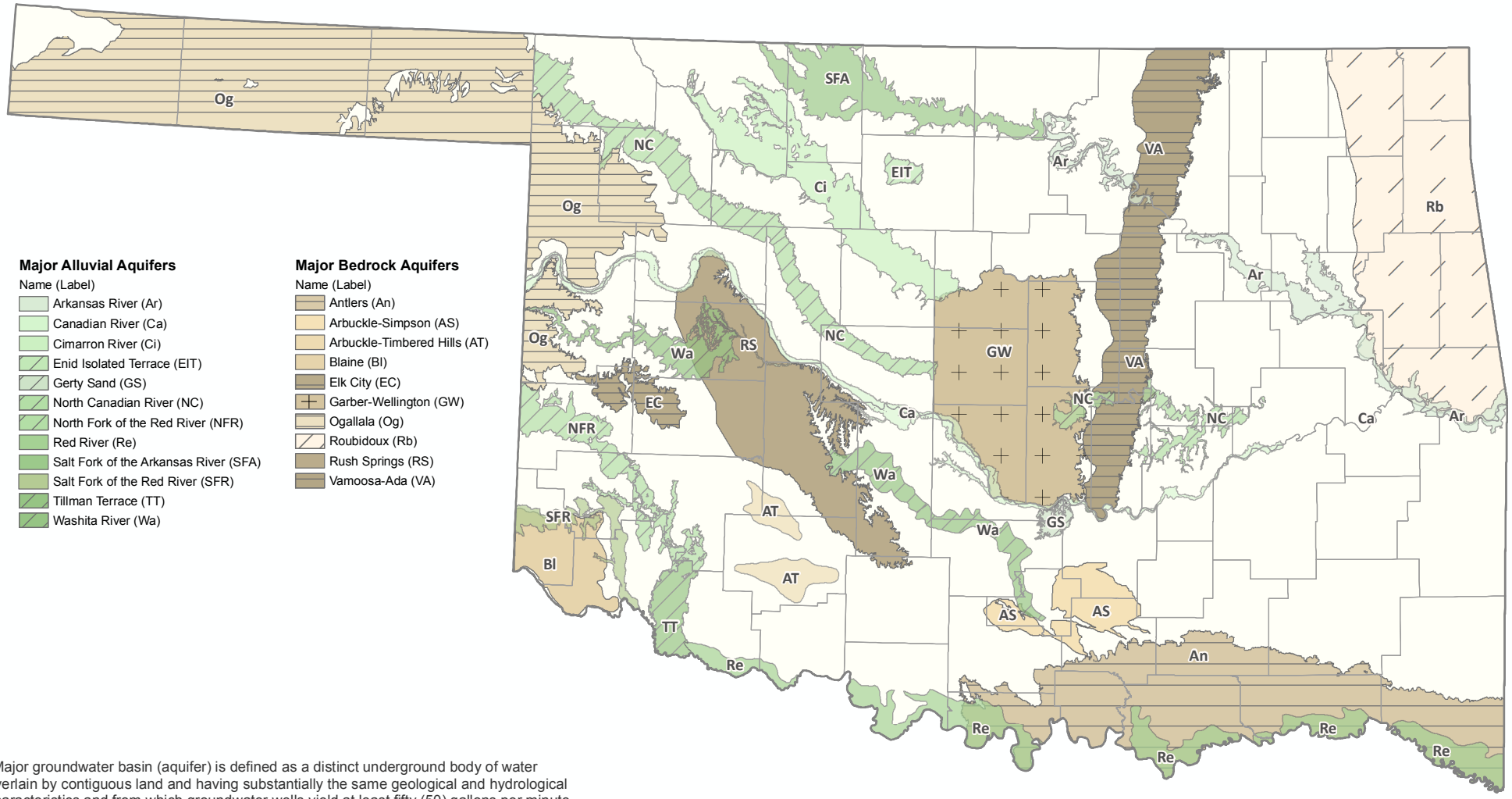
① CALCIUM-MAGNESIUM CHLORIDE-SULFATE
② CALCIUM-MAGNESIUM CARBONATE-BICARBONATE
③ SODIUM-POTASSIUM CHLORIDE-SULFATE
④ SODIUM-POTASSIUM CARBONATE-BICARBONATE

Figure 4. Water types of the principal aquifers in Oklahoma. Percentages are based on the average concentration of constituents. (Source: U.S. Geological Survey files.)

MAJOR AQUIFERS OF OKLAHOMA

Oklahoma Groundwater Resources

Major Aquifers of Oklahoma



Major Alluvial Aquifers

Name (Label)

- Arkansas River (Ar)
- Canadian River (Ca)
- Cimarron River (Ci)
- Enid Isolated Terrace (EIT)
- Gerty Sand (GS)
- North Canadian River (NC)
- North Fork of the Red River (NFR)
- Red River (Re)
- Salt Fork of the Arkansas River (SFA)
- Salt Fork of the Red River (SFR)
- Tillman Terrace (TT)
- Washita River (Wa)

Major Bedrock Aquifers

Name (Label)

- Antlers (An)
- Arbuckle-Simpson (AS)
- Arbuckle-Timbered Hills (AT)
- Blaine (Bl)
- Elk City (EC)
- Garber-Wellington (GW)
- Ogallala (Og)
- Roubidoux (Rb)
- Rush Springs (RS)
- Vamoosa-Ada (VA)

*Major groundwater basin (aquifer) is defined as a distinct underground body of water overlain by contiguous land and having substantially the same geological and hydrological characteristics and from which groundwater wells yield at least fifty (50) gallons per minute on the average basinwide if from a bedrock aquifer and at least one hundred fifty (150) gallons per minute on the average basinwide if from an alluvium and terrace aquifer, or as otherwise designated by the Board.

For more information please visit the OWRB's web site at: (http://www.owrb.ok.gov)

N W E S

0 50 Miles

State of Oklahoma
OWRB
Water Resources Board
the water agency

SECTION 4.0

Second 2018 Semi-Annual Groundwater Monitoring Statistical Evaluation and Time-Series Graphs

Concentrations (mg/l)

Parameter: Alkalinity

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 268
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 68
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	68	0 (0%)	12/15/1994	367	367
			12/14/1995	334	334
			3/6/1996	384	384
			4/25/1996	363	363
			10/2/1996	365	365
			12/10/1996	346	346
			3/11/1997	350	350
			4/15/1997	330	330
			8/14/1997	400	400
			12/4/1997	380	380
			3/31/1998	360	360
			6/23/1998	390	390
			8/11/1998	389	389
			12/8/1998	376	376
			3/9/1999	340	340
			6/8/1999	395	395
			8/19/1999	400	400
			12/14/1999	360	360
			3/7/2000	384	384
			6/23/2000	364	364
			12/12/2000	450	450
			3/27/2001	362	362
			6/28/2001	340	340
			9/10/2001	326	326
			12/18/2001	326	326
			3/19/2002	330	330
			6/26/2002	350	350
			9/18/2002	353	353
			12/11/2002	344	344
			3/13/2003	320	320
			6/25/2003	336	336
			9/26/2003	320	320
			12/10/2003	324	324
			3/9/2004	329	329
			6/24/2004	348	348
			9/15/2004	332	332
			12/15/2004	327	327
			3/16/2005	340	340
			6/15/2005	330	330
			9/21/2005	347	347
			12/21/2005	340	340
			3/15/2006	320	320
			6/21/2006	314	314
			12/20/2006	300	300

			6/12/2007	310	310
			12/17/2007	330	330
			6/11/2008	370	370
			12/3/2008	344	344
			6/17/2009	350	350
			12/9/2009	370	370
			6/17/2010	380	380
			12/22/2010	370	370
			6/29/2011	366	366
			12/7/2011	370	370
			6/6/2012	384	384
			12/12/2012	330	330
			6/19/2013	360	360
			12/11/2013	358	358
			6/11/2014	342	342
			12/3/2014	368	368
			6/17/2015	380	380
			12/1/2015	383	383
			6/22/2016	390	390
			12/20/2016	395.4	395.4
			6/6/2017	398	398
			11/7/2017	394	394
			2/27/2018	384	384
			9/27/2018	360	360

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	69	0 (0%)	12/15/1994	170	170
			12/14/1995	191	191
			3/6/1996	308	308
			4/25/1996	340	340
			10/2/1996	340	340
			12/10/1996	270	270
			3/11/1997	210	210
			4/15/1997	220	220
			8/14/1997	240	240
			12/4/1997	200	200
			3/31/1998	184	184
			6/23/1998	250	250
			8/11/1998	208	208
			12/8/1998	200	200
			3/9/1999	224	224
			6/8/1999	220	220
			8/19/1999	226	226
			12/14/1999	240	240
			3/7/2000	244	244
			6/23/2000	264	264
			12/12/2000	220	220
			3/27/2001	215	215
			6/28/2001	240	240
			9/10/2001	208	208
			12/18/2001	235	235
			3/19/2002	263	263
			6/26/2002	290	290
			9/18/2002	256	256

			12/11/2002	249	249
			3/13/2003	240	240
			6/25/2003	246	246
			9/26/2003	250	250
			12/10/2003	200	200
			3/9/2004	280	280
			6/24/2004	329	329
			9/15/2004	272	272
			12/15/2004	288	288
			3/16/2005	240	240
			6/15/2005	246	246
			9/21/2005	228	228
			12/21/2005	232	232
			3/15/2006	250	250
			6/21/2006	290	290
			12/20/2006	356	356
			2/21/2007	340	340
			6/12/2007	312	312
			12/17/2007	210	210
			6/11/2008	240	240
			12/3/2008	280	280
			6/17/2009	250	250
			12/9/2009	236	236
			6/17/2010	252	252
			12/22/2010	240	240
			6/29/2011	266	266
			12/7/2011	288	288
			6/6/2012	256	256
			12/12/2012	248	248
			6/19/2013	364	364
			12/11/2013	328	328
			6/11/2014	342	342
			12/3/2014	296	296
			6/17/2015	384	384
			12/1/2015	226	226
			6/22/2016	176	176
			12/20/2016	162.2	162.2
			6/6/2017	246	246
			11/7/2017	430	430
			2/27/2018	282	282
			9/27/2018	270	270
MW#93-3	68	0 (0%)	12/15/1994	240	240
			12/14/1995	206	206
			3/6/1996	226	226
			4/25/1996	228	228
			10/2/1996	240	240
			12/10/1996	225	225
			3/11/1997	210	210
			4/15/1997	200	200
			8/14/1997	255	255
			12/4/1997	140	140
			3/31/1998	240	240
			6/23/1998	225	225
			8/11/1998	224	224
			12/8/1998	214	214
			3/9/1999	234	234

			6/8/1999	236	236
			8/19/1999	260	260
			12/14/1999	300	300
			3/7/2000	264	264
			6/23/2000	244	244
			12/12/2000	320	320
			3/27/2001	254	254
			6/28/2001	255	255
			9/10/2001	332	332
			12/18/2001	230	230
			3/19/2002	255	255
			6/26/2002	250	250
			9/18/2002	268	268
			12/11/2002	268	268
			3/13/2003	247	247
			6/25/2003	252	252
			9/26/2003	244	244
			12/10/2003	271	271
			3/9/2004	284	284
			6/24/2004	309	309
			9/15/2004	264	264
			12/15/2004	254	254
			3/16/2005	290	290
			6/15/2005	268	268
			9/21/2005	264	264
			12/21/2005	246	246
			3/15/2006	227	227
			6/21/2006	253	253
			12/20/2006	250	250
			6/12/2007	280	280
			12/17/2007	290	290
			6/11/2008	300	300
			12/3/2008	226	226
			6/17/2009	240	240
			12/9/2009	214	214
			6/17/2010	296	296
			12/22/2010	230	230
			6/29/2011	256	256
			12/7/2011	244	244
			6/6/2012	288	288
			12/12/2012	226	226
			6/19/2013	316	316
			12/11/2013	262	262
			6/11/2014	338	338
			12/3/2014	262	262
			6/17/2015	388	388
			5/25/2016	440	440
			6/22/2016	330	330
			12/20/2016	330.4	330.4
			6/6/2017	304	304
			11/7/2017	409	409
			2/27/2018	368	368
			9/27/2018	375	375
MW#03-1	29	0 (0%)	6/24/2004	209	209
			9/15/2004	220	220
			12/15/2004	184	184

			3/16/2005	160	160
			6/15/2005	252	252
			9/21/2005	180	180
			12/20/2006	204	204
			6/12/2007	200	200
			12/17/2007	190	190
			6/11/2008	200	200
			12/3/2008	206	206
			6/17/2009	204	204
			12/9/2009	216	216
			6/17/2010	232	232
			12/22/2010	216	216
			6/29/2011	210	210
			12/7/2011	222	222
			6/6/2012	216	216
			6/19/2013	144	144
			12/11/2013	212	212
			6/11/2014	222	222
			12/3/2014	194	194
			6/17/2015	134	134
			12/1/2015	150	150
			6/22/2016	130	130
			12/20/2016	211.6	211.6
			6/6/2017	56	56
			11/7/2017	217	217
			2/27/2018	72	72
MW#03-2	34	0 (0%)	6/24/2004	235	235
			9/15/2004	200	200
			12/15/2004	222	222
			3/16/2005	220	220
			6/15/2005	252	252
			9/21/2005	224	224
			12/21/2005	230	230
			3/15/2006	220	220
			6/21/2006	228	228
			12/20/2006	220	220
			6/12/2007	228	228
			12/17/2007	200	200
			6/11/2008	200	200
			12/3/2008	210	210
			6/17/2009	200	200
			12/9/2009	208	208
			6/17/2010	216	216
			12/22/2010	230	230
			6/29/2011	224	224
			12/7/2011	236	236
			6/6/2012	230	230
			12/12/2012	242	242
			6/19/2013	232	232
			12/11/2013	230	230
			6/11/2014	92	92
			12/3/2014	76	76
			6/17/2015	220	220
			12/1/2015	214	214
			6/22/2016	204	204
			12/20/2016	199.4	199.4

			6/6/2017	192	192
			11/7/2017	192	192
			2/27/2018	196	196
			9/27/2018	185	185

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Alkalinity

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 31.9467
Overall Std Dev = 29.8682
Overall Total = 8561.71
SS Wells = 15330.9
SS Total = 238193

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	15330.9	4	3832.72	4.523
Error (within wells)	222862	263	847.385	
Totals	238193	267		

4.523 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	10.0676
	12/14/1995	22.9324
	3/6/1996	27.0676
	4/25/1996	6.06765
	10/2/1996	8.06765
	12/10/1996	10.9324
	3/11/1997	6.93235
	4/15/1997	26.9324
	8/14/1997	43.0676
	12/4/1997	23.0676
	3/31/1998	3.06765
	6/23/1998	33.0676
	8/11/1998	32.0676
	12/8/1998	19.0676
	3/9/1999	16.9324
	6/8/1999	38.0676
	8/19/1999	43.0676
	12/14/1999	3.06765
	3/7/2000	27.0676
	6/23/2000	7.06765
	12/12/2000	93.0676
	3/27/2001	5.06765
	6/28/2001	16.9324
	9/10/2001	30.9324
	12/18/2001	30.9324
	3/19/2002	26.9324
	6/26/2002	6.93235
	9/18/2002	3.93235
	12/11/2002	12.9324
	3/13/2003	36.9324
	6/25/2003	20.9324
	9/26/2003	36.9324

12/10/2003	32.9324
3/9/2004	27.9324
6/24/2004	8.93235
9/15/2004	24.9324
12/15/2004	29.9324
3/16/2005	16.9324
6/15/2005	26.9324
9/21/2005	9.93235
12/21/2005	16.9324
3/15/2006	36.9324
6/21/2006	42.9324
12/20/2006	56.9324
6/12/2007	46.9324
12/17/2007	26.9324
6/11/2008	13.0676
12/3/2008	12.9324
6/17/2009	6.93235
12/9/2009	13.0676
6/17/2010	23.0676
12/22/2010	13.0676
6/29/2011	9.06765
12/7/2011	13.0676
6/6/2012	27.0676
12/12/2012	26.9324
6/19/2013	3.06765
12/11/2013	1.06765
6/11/2014	14.9324
12/3/2014	11.0676
6/17/2015	23.0676
12/1/2015	26.0676
6/22/2016	33.0676
12/20/2016	38.4676
6/6/2017	41.0676
11/7/2017	37.0676
2/27/2018	27.0676
9/27/2018	3.06765

Well: MW#93-2

Sample	Residual
12/15/1994	87.9159
12/14/1995	66.9159
3/6/1996	50.0841
4/25/1996	82.0841
10/2/1996	82.0841
12/10/1996	12.0841
3/11/1997	47.9159
4/15/1997	37.9159
8/14/1997	17.9159
12/4/1997	57.9159
3/31/1998	73.9159
6/23/1998	7.91594
8/11/1998	49.9159
12/8/1998	57.9159
3/9/1999	33.9159
6/8/1999	37.9159
8/19/1999	31.9159
12/14/1999	17.9159
3/7/2000	13.9159

6/23/2000	6.08406
12/12/2000	37.9159
3/27/2001	42.9159
6/28/2001	17.9159
9/10/2001	49.9159
12/18/2001	22.9159
3/19/2002	5.08406
6/26/2002	32.0841
9/18/2002	1.91594
12/11/2002	8.91594
3/13/2003	17.9159
6/25/2003	11.9159
9/26/2003	7.91594
12/10/2003	57.9159
3/9/2004	22.0841
6/24/2004	71.0841
9/15/2004	14.0841
12/15/2004	30.0841
3/16/2005	17.9159
6/15/2005	11.9159
9/21/2005	29.9159
12/21/2005	25.9159
3/15/2006	7.91594
6/21/2006	32.0841
12/20/2006	98.0841
2/21/2007	82.0841
6/12/2007	54.0841
12/17/2007	47.9159
6/11/2008	17.9159
12/3/2008	22.0841
6/17/2009	7.91594
12/9/2009	21.9159
6/17/2010	5.91594
12/22/2010	17.9159
6/29/2011	8.08406
12/7/2011	30.0841
6/6/2012	1.91594
12/12/2012	9.91594
6/19/2013	106.084
12/11/2013	70.0841
6/11/2014	84.0841
12/3/2014	38.0841
6/17/2015	126.084
12/1/2015	31.9159
6/22/2016	81.9159
12/20/2016	95.7159
6/6/2017	11.9159
11/7/2017	172.084
2/27/2018	24.0841
9/27/2018	12.0841

Well: MW#93-3

Sample	Residual
12/15/1994	27.3294
12/14/1995	61.3294
3/6/1996	41.3294
4/25/1996	39.3294
10/2/1996	27.3294

12/10/1996	42.3294
3/11/1997	57.3294
4/15/1997	67.3294
8/14/1997	12.3294
12/4/1997	127.329
3/31/1998	27.3294
6/23/1998	42.3294
8/11/1998	43.3294
12/8/1998	53.3294
3/9/1999	33.3294
6/8/1999	31.3294
8/19/1999	7.32941
12/14/1999	32.6706
3/7/2000	3.32941
6/23/2000	23.3294
12/12/2000	52.6706
3/27/2001	13.3294
6/28/2001	12.3294
9/10/2001	64.6706
12/18/2001	37.3294
3/19/2002	12.3294
6/26/2002	17.3294
9/18/2002	0.670588
12/11/2002	0.670588
3/13/2003	20.3294
6/25/2003	15.3294
9/26/2003	23.3294
12/10/2003	3.67059
3/9/2004	16.6706
6/24/2004	41.6706
9/15/2004	3.32941
12/15/2004	13.3294
3/16/2005	22.6706
6/15/2005	0.670588
9/21/2005	3.32941
12/21/2005	21.3294
3/15/2006	40.3294
6/21/2006	14.3294
12/20/2006	17.3294
6/12/2007	12.6706
12/17/2007	22.6706
6/11/2008	32.6706
12/3/2008	41.3294
6/17/2009	27.3294
12/9/2009	53.3294
6/17/2010	28.6706
12/22/2010	37.3294
6/29/2011	11.3294
12/7/2011	23.3294
6/6/2012	20.6706
12/12/2012	41.3294
6/19/2013	48.6706
12/11/2013	5.32941
6/11/2014	70.6706
12/3/2014	5.32941
6/17/2015	120.671
5/25/2016	172.671

6/22/2016	62.6706
12/20/2016	63.0706
6/6/2017	36.6706
11/7/2017	141.671
2/27/2018	100.671
9/27/2018	107.671

Well: MW#03-1

Sample	Residual
6/24/2004	20.6
9/15/2004	31.6
12/15/2004	4.4
3/16/2005	28.4
6/15/2005	63.6
9/21/2005	8.4
12/20/2006	15.6
6/12/2007	11.6
12/17/2007	1.6
6/11/2008	11.6
12/3/2008	17.6
6/17/2009	15.6
12/9/2009	27.6
6/17/2010	43.6
12/22/2010	27.6
6/29/2011	21.6
12/7/2011	33.6
6/6/2012	27.6
6/19/2013	44.4
12/11/2013	23.6
6/11/2014	33.6
12/3/2014	5.6
6/17/2015	54.4
12/1/2015	38.4
6/22/2016	58.4
12/20/2016	23.2
6/6/2017	132.4
11/7/2017	28.6
2/27/2018	116.4

Well: MW#03-2

Sample	Residual
6/24/2004	25.9588
9/15/2004	9.04118
12/15/2004	12.9588
3/16/2005	10.9588
6/15/2005	42.9588
9/21/2005	14.9588
12/21/2005	20.9588
3/15/2006	10.9588
6/21/2006	18.9588
12/20/2006	10.9588
6/12/2007	18.9588
12/17/2007	9.04118
6/11/2008	9.04118
12/3/2008	0.958824
6/17/2009	9.04118
12/9/2009	1.04118
6/17/2010	6.95882

12/22/2010	20.9588
6/29/2011	14.9588
12/7/2011	26.9588
6/6/2012	20.9588
12/12/2012	32.9588
6/19/2013	22.9588
12/11/2013	20.9588
6/11/2014	117.041
12/3/2014	133.041
6/17/2015	10.9588
12/1/2015	4.95882
6/22/2016	5.04118
12/20/2016	9.64118
6/6/2017	17.0412
11/7/2017	17.0412
2/27/2018	13.0412
9/27/2018	24.0412

Shapiro-Francia Test of Normality

Parameter: Alkalinity

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 268

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	56	-2.74777	7.55021	-153.875
2	72	-2.45727	13.5884	-330.799
3	76	-2.29036	18.8342	-504.866
4	92	-2.19728	23.6622	-707.016
5	130	-2.09693	28.0593	-979.617
6	134	-2.01409	32.1159	-1249.51
7	140	-1.94314	35.8917	-1521.54
8	144	-1.8957	39.4854	-1794.53
9	150	-1.83843	42.8652	-2070.29
10	160	-1.78661	46.0571	-2356.15
11	162.2	-1.75069	49.122	-2640.11
12	170	-1.70604	52.0326	-2930.14
13	176	-1.66456	54.8034	-3223.1
14	180	-1.62576	57.4465	-3515.74
15	184	-1.59819	60.0007	-3809.8
16	184	-1.56322	62.4444	-4097.44
17	185	-1.53007	64.7855	-4380.5
18	190	-1.50626	67.0543	-4666.69
19	191	-1.47579	69.2323	-4948.56
20	192	-1.44663	71.325	-5226.32
21	192	-1.41865	73.3376	-5498.7
22	194	-1.39838	75.293	-5769.98
23	196	-1.3722	77.176	-6038.94
24	199.4	-1.34694	78.9902	-6307.51
25	200	-1.32854	80.7552	-6573.22
26	200	-1.30469	82.4575	-6834.16
27	200	-1.28155	84.0998	-7090.47
28	200	-1.25908	85.6851	-7342.29
29	200	-1.24264	87.2293	-7590.82
30	200	-1.22123	88.7207	-7835.06
31	200	-1.20036	90.1615	-8075.13
32	200	-1.18504	91.5659	-8312.14
33	200	-1.16505	92.9232	-8545.15
34	200	-1.1455	94.2354	-8774.25
35	204	-1.12639	95.5041	-9004.04
36	204	-1.11232	96.7414	-9230.95
37	204	-1.0939	97.938	-9454.1
38	206	-1.07584	99.0954	-9675.73
39	206	-1.06252	100.224	-9894.61
40	208	-1.04505	101.317	-10112
41	208	-1.02789	102.373	-10325.8
42	208	-1.01104	103.395	-10536.1
43	209	-0.998575	104.392	-10744.8
44	210	-0.982202	105.357	-10951
45	210	-0.966088	106.29	-11153.9
46	210	-0.950222	107.193	-11353.5

47	210	-0.938476	108.074	-11550.5
48	210	-0.923014	108.926	-11744.4
49	211.6	-0.907769	109.75	-11936.5
50	212	-0.896473	110.554	-12126.5
51	214	-0.881587	111.331	-12315.2
52	214	-0.866894	112.082	-12500.7
53	214	-0.852385	112.809	-12683.1
54	215	-0.841621	113.517	-12864
55	216	-0.827417	114.202	-13042.8
56	216	-0.813379	114.864	-13218.5
57	216	-0.802956	115.508	-13391.9
58	216	-0.789191	116.131	-13562.4
59	217	-0.775574	116.733	-13730.7
60	220	-0.7621	117.313	-13898.3
61	220	-0.752084	117.879	-14063.8
62	220	-0.738846	118.425	-14226.3
63	220	-0.725736	118.952	-14386
64	220	-0.715986	119.464	-14543.5
65	220	-0.703089	119.959	-14698.2
66	220	-0.690309	120.435	-14850.1
67	220	-0.677639	120.894	-14999.1
68	222	-0.668209	121.341	-15147.5
69	222	-0.655726	121.771	-15293
70	222	-0.643345	122.185	-15435.9
71	224	-0.634124	122.587	-15577.9
72	224	-0.621911	122.974	-15717.2
73	224	-0.609791	123.345	-15853.8
74	224	-0.597761	123.703	-15987.7
75	225	-0.588793	124.049	-16120.2
76	225	-0.576911	124.382	-16250
77	226	-0.565108	124.702	-16377.7
78	226	-0.556308	125.011	-16503.4
79	226	-0.544642	125.308	-16626.5
80	226	-0.533048	125.592	-16747
81	226	-0.521527	125.864	-16864.9
82	227	-0.51293	126.127	-16981.3
83	228	-0.501527	126.379	-17095.6
84	228	-0.490189	126.619	-17207.4
85	228	-0.481728	126.851	-17317.2
86	228	-0.470498	127.072	-17424.5
87	230	-0.459327	127.283	-17530.2
88	230	-0.448213	127.484	-17633.2
89	230	-0.439913	127.678	-17734.4
90	230	-0.428895	127.862	-17833.1
91	230	-0.417928	128.036	-17929.2
92	230	-0.40701	128.202	-18022.8
93	232	-0.398855	128.361	-18115.3
94	232	-0.388022	128.512	-18205.4
95	232	-0.377233	128.654	-18292.9
96	234	-0.369171	128.79	-18379.3
97	235	-0.358459	128.919	-18463.5
98	235	-0.347787	129.04	-18545.2
99	236	-0.337155	129.153	-18624.8
100	236	-0.329206	129.262	-18702.5
101	236	-0.318639	129.363	-18777.7
102	240	-0.308108	129.458	-18851.6
103	240	-0.300232	129.548	-18923.7

104	240	-0.28976	129.632	-18993.2
105	240	-0.279319	129.71	-19060.3
106	240	-0.268908	129.783	-19124.8
107	240	-0.26112	129.851	-19187.5
108	240	-0.250759	129.914	-19247.7
109	240	-0.240426	129.971	-19305.4
110	240	-0.232693	130.026	-19361.2
111	240	-0.222403	130.075	-19414.6
112	240	-0.212137	130.12	-19465.5
113	242	-0.201894	130.161	-19514.4
114	244	-0.194225	130.198	-19561.8
115	244	-0.184017	130.232	-19606.7
116	244	-0.173829	130.263	-19649.1
117	244	-0.166199	130.29	-19689.6
118	246	-0.156042	130.315	-19728
119	246	-0.1459	130.336	-19763.9
120	246	-0.135774	130.354	-19797.3
121	246	-0.128189	130.371	-19828.8
122	247	-0.118085	130.385	-19858
123	248	-0.107995	130.396	-19884.8
124	249	-0.100433	130.406	-19909.8
125	250	-0.0903606	130.415	-19932.4
126	250	-0.0802981	130.421	-19952.5
127	250	-0.0702426	130.426	-19970
128	250	-0.0627062	130.43	-19985.7
129	250	-0.0526632	130.433	-19998.9
130	250	-0.0426257	130.434	-20009.5
131	252	-0.0350997	130.436	-20018.4
132	252	-0.0250691	130.436	-20024.7
133	252	-0.0150408	130.437	-20028.5
134	252	-0.00501359	130.437	-20029.7
135	253	0.00501359	130.437	-20028.5
136	254	0.0150408	130.437	-20024.6
137	254	0.0250691	130.437	-20018.3
138	255	0.0350997	130.439	-20009.3
139	255	0.0426257	130.44	-19998.5
140	255	0.0526632	130.443	-19985
141	256	0.0627062	130.447	-19969
142	256	0.0702426	130.452	-19951
143	256	0.0802981	130.459	-19930.4
144	260	0.0903606	130.467	-19906.9
145	262	0.100433	130.477	-19880.6
146	262	0.107995	130.488	-19852.3
147	263	0.118085	130.502	-19821.3
148	264	0.128189	130.519	-19787.4
149	264	0.135774	130.537	-19751.6
150	264	0.1459	130.559	-19713.1
151	264	0.156042	130.583	-19671.9
152	266	0.166199	130.611	-19627.7
153	268	0.173829	130.641	-19581.1
154	268	0.184017	130.675	-19531.8
155	268	0.194225	130.712	-19479.7
156	270	0.201894	130.753	-19425.2
157	270	0.212137	130.798	-19367.9
158	271	0.222403	130.848	-19307.7
159	272	0.232693	130.902	-19244.4
160	280	0.240426	130.96	-19177

161	280	0.250759	131.022	-19106.8
162	280	0.26112	131.091	-19033.7
163	282	0.268908	131.163	-18957.9
164	284	0.279319	131.241	-18878.6
165	288	0.28976	131.325	-18795.1
166	288	0.300232	131.415	-18708.6
167	288	0.308108	131.51	-18619.9
168	290	0.318639	131.612	-18527.5
169	290	0.329206	131.72	-18432
170	290	0.337155	131.834	-18334.3
171	290	0.347787	131.955	-18233.4
172	296	0.358459	132.083	-18127.3
173	296	0.369171	132.219	-18018
174	300	0.377233	132.362	-17904.8
175	300	0.388022	132.512	-17788.4
176	300	0.398855	132.671	-17668.8
177	304	0.40701	132.837	-17545.1
178	308	0.417928	133.012	-17416.3
179	309	0.428895	133.196	-17283.8
180	310	0.439913	133.389	-17147.4
181	312	0.448213	133.59	-17007.6
182	314	0.459327	133.801	-16863.4
183	316	0.470498	134.022	-16714.7
184	320	0.481728	134.254	-16560.5
185	320	0.490189	134.495	-16403.7
186	320	0.501527	134.746	-16243.2
187	320	0.51293	135.009	-16079
188	324	0.521527	135.281	-15910.1
189	326	0.533048	135.565	-15736.3
190	326	0.544642	135.862	-15558.7
191	327	0.556308	136.172	-15376.8
192	328	0.565108	136.491	-15191.5
193	329	0.576911	136.824	-15001.7
194	329	0.588793	137.17	-14808
195	330	0.597761	137.528	-14610.7
196	330	0.609791	137.9	-14409.5
197	330	0.621911	138.286	-14204.2
198	330	0.634124	138.688	-13995
199	330	0.643345	139.102	-13782.7
200	330	0.655726	139.532	-13566.3
201	330.4	0.668209	139.979	-13345.5
202	332	0.677639	140.438	-13120.5
203	332	0.690309	140.914	-12891.3
204	334	0.703089	141.409	-12656.5
205	336	0.715986	141.921	-12415.9
206	338	0.725736	142.448	-12170.6
207	340	0.738846	142.994	-11919.4
208	340	0.752084	143.56	-11663.7
209	340	0.7621	144.14	-11404.6
210	340	0.775574	144.742	-11140.9
211	340	0.789191	145.365	-10872.6
212	340	0.802956	146.01	-10599.6
213	340	0.813379	146.671	-10323
214	342	0.827417	147.356	-10040.1
215	342	0.841621	148.064	-9752.23
216	344	0.852385	148.791	-9459.01
217	344	0.866894	149.542	-9160.8

218	346	0.881587	150.319	-8855.77
219	347	0.896473	151.123	-8544.69
220	348	0.907769	151.947	-8228.79
221	350	0.923014	152.799	-7905.73
222	350	0.938476	153.68	-7577.26
223	350	0.950222	154.583	-7244.69
224	353	0.966088	155.516	-6903.66
225	356	0.982202	156.481	-6553.99
226	358	0.998575	157.478	-6196.5
227	360	1.01104	158.5	-5832.53
228	360	1.02789	159.557	-5462.49
229	360	1.04505	160.649	-5086.27
230	360	1.06252	161.778	-4703.77
231	362	1.07584	162.935	-4314.31
232	363	1.0939	164.132	-3917.23
233	364	1.11232	165.369	-3512.34
234	364	1.12639	166.638	-3102.34
235	365	1.1455	167.95	-2684.23
236	366	1.16505	169.307	-2257.82
237	367	1.18504	170.712	-1822.91
238	368	1.20036	172.152	-1381.18
239	368	1.22123	173.644	-931.764
240	370	1.24264	175.188	-471.987
241	370	1.25908	176.773	-6.12547
242	370	1.28155	178.416	468.048
243	370	1.30469	180.118	950.782
244	375	1.32854	181.883	1448.98
245	376	1.34694	183.697	1955.43
246	380	1.3722	185.58	2476.87
247	380	1.39838	187.536	3008.25
248	380	1.41865	189.548	3547.34
249	383	1.44663	191.641	4101.4
250	384	1.47579	193.819	4668.11
251	384	1.50626	196.088	5246.51
252	384	1.53007	198.429	5834.06
253	384	1.56322	200.872	6434.33
254	384	1.59819	203.427	7048.04
255	388	1.62576	206.07	7678.83
256	389	1.66456	208.841	8326.35
257	390	1.70604	211.751	8991.71
258	390	1.75069	214.816	9674.47
259	394	1.78661	218.008	10378.4
260	395	1.83843	221.388	11104.6
261	395.4	1.8957	224.981	11854.1
262	398	1.94314	228.757	12627.5
263	400	2.01409	232.814	13433.1
264	400	2.09693	237.211	14271.9
265	409	2.19728	242.039	15170.6
266	430	2.29036	247.285	16155.5
267	440	2.45727	253.323	17236.7

Sample Standard Deviation = 71.2338
Numerator = 2.97102e+008
Denominator = 3.43208e+008 = 267 253.323
W Statistic = 0.865662
5% Critical value of 0.976 exceeds 0.865662
Evidence of non-normality at 95% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Alkalinity

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 68
Maximum Background Concentration = 450
Confidence Level = 94.4%
False Positive Rate = 5.6%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	270	FALSE
MW#93-3	9/27/2018	1	375	FALSE
MW#03-1	2/27/2018	1	72	FALSE
MW#03-2	9/27/2018	1	185	FALSE

Concentrations (mg/L)

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 118
Total Non-Detect: 92
Percent Non-Detects: 77.9661%
Total Background Samples: 24
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	24	21 (87.5%)	6/12/2007	0.0109	0.0109
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			12/12/2012	0.0068	0.0068
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0	ND<0
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	0.006	0.006
			9/27/2018	ND<0.005	ND<0.005

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	24	3 (12.5%)	6/12/2007	0.0343	0.0343
			12/17/2007	0.0603	0.0603
			6/11/2008	0.051	0.051
			12/3/2008	0.033	0.033
			6/17/2009	0.0525	0.0525
			12/9/2009	0.0635	0.0635
			6/17/2010	0.0179	0.0179
			12/22/2010	0.0215	0.0215
			6/29/2011	0.061	0.061
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	0.0098	0.0098
			12/12/2012	0.0562	0.0562
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	0.0353	0.0353
			6/11/2014	0.0197	0.0197

			12/3/2014	0.0274	0.0274
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	0.03	0.03
			6/22/2016	0.047	0.047
			12/20/2016	0.06	0.06
			6/6/2017	0.038	0.038
			11/7/2017	0.028	0.028
			2/27/2018	0.024	0.024
			9/27/2018	0.0389	0.0389
MW#93-3	24	24 (100%)	6/12/2007	ND<0.005	ND<0.005
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			12/12/2012	ND<0.005	ND<0.005
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0.005	ND<0.005
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	ND<0.005	ND<0.005
			9/27/2018	ND<0.005	ND<0.005
MW#03-1	22	21 (95.4545%)	6/12/2007	ND<0.005	ND<0.005
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			6/19/2013	0.008	0.008
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0	ND<0
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	ND<0.005	ND<0.005

MW#03-2	24	23 (95.8333%)	6/12/2007	ND<0.005	ND<0.005
			12/17/2007	ND<0.005	ND<0.005
			6/11/2008	ND<0.005	ND<0.005
			12/3/2008	ND<0.005	ND<0.005
			6/17/2009	ND<0.005	ND<0.005
			12/9/2009	ND<0.005	ND<0.005
			6/17/2010	ND<0.005	ND<0.005
			12/22/2010	ND<0.005	ND<0.005
			6/29/2011	ND<0.005	ND<0.005
			12/7/2011	ND<0.005	ND<0.005
			6/6/2012	ND<0.005	ND<0.005
			12/12/2012	ND<0.005	ND<0.005
			6/19/2013	ND<0.005	ND<0.005
			12/11/2013	ND<0.005	ND<0.005
			6/11/2014	ND<0.005	ND<0.005
			12/3/2014	ND<0.005	ND<0.005
			6/17/2015	ND<0.005	ND<0.005
			12/1/2015	ND<0.005	ND<0.005
			6/22/2016	ND<0.005	ND<0.005
			12/20/2016	ND<0.0005	ND<0.0005
			6/6/2017	ND<0.005	ND<0.005
			11/7/2017	ND<0.005	ND<0.005
			2/27/2018	0.008	0.008
			9/27/2018	ND<0.005	ND<0.005

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.00360997
Overall Std Dev = 0.0076636
Overall Total = 0.425977
SS Wells = 0.00425742
SS Total = 0.0068715

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	0.00425742	4	0.00106436	46.0094
Error (within wells)	0.00261408	113	2.31334e-005	
Totals	0.0068715	117		

46.0094 exceeds 2.44724; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	6/12/2007	0.00593333
	12/17/2007	3.33333e-005
	6/11/2008	3.33333e-005
	12/3/2008	3.33333e-005
	6/17/2009	3.33333e-005
	12/9/2009	3.33333e-005
	6/17/2010	3.33333e-005
	12/22/2010	3.33333e-005
	6/29/2011	3.33333e-005
	12/7/2011	3.33333e-005
	6/6/2012	3.33333e-005
	12/12/2012	0.00183333
	6/19/2013	3.33333e-005
	12/11/2013	3.33333e-005
	6/11/2014	3.33333e-005
	12/3/2014	3.33333e-005
	6/17/2015	3.33333e-005
	12/1/2015	3.33333e-005
	6/22/2016	0.00496667
	12/20/2016	0.00446667
	6/6/2017	3.33333e-005
	11/7/2017	3.33333e-005
	2/27/2018	0.00103333
	9/27/2018	3.33333e-005

Well: MW#93-2	Sample	Residual
	6/12/2007	4.58333e-005
	12/17/2007	0.0259542
	6/11/2008	0.0166542
	12/3/2008	0.00134583
	6/17/2009	0.0181542
	12/9/2009	0.0291542

6/17/2010	0.0164458
12/22/2010	0.0128458
6/29/2011	0.0266542
12/7/2011	0.0293458
6/6/2012	0.0245458
12/12/2012	0.0218542
6/19/2013	0.0293458
12/11/2013	0.000954167
6/11/2014	0.0146458
12/3/2014	0.00694583
6/17/2015	0.0293458
12/1/2015	0.00434583
6/22/2016	0.0126542
12/20/2016	0.0256542
6/6/2017	0.00365417
11/7/2017	0.00634583
2/27/2018	0.0103458
9/27/2018	0.00455417

Well: MW#93-3

Sample	Residual
6/12/2007	0.0001875
12/17/2007	0.0001875
6/11/2008	0.0001875
12/3/2008	0.0001875
6/17/2009	0.0001875
12/9/2009	0.0001875
6/17/2010	0.0001875
12/22/2010	0.0001875
6/29/2011	0.0001875
12/7/2011	0.0001875
6/6/2012	0.0001875
12/12/2012	0.0001875
6/19/2013	0.0001875
12/11/2013	0.0001875
6/11/2014	0.0001875
12/3/2014	0.0001875
6/17/2015	0.0001875
12/1/2015	0.0001875
6/22/2016	0.0001875
12/20/2016	0.0043125
6/6/2017	0.0001875
11/7/2017	0.0001875
2/27/2018	0.0001875
9/27/2018	0.0001875

Well: MW#03-1

Sample	Residual
6/12/2007	0.000295455
12/17/2007	0.000295455
6/11/2008	0.000295455
12/3/2008	0.000295455
6/17/2009	0.000295455
12/9/2009	0.000295455
6/17/2010	0.000295455
12/22/2010	0.000295455
6/29/2011	0.000295455
12/7/2011	0.000295455

6/6/2012	0.000295455
6/19/2013	0.00329545
12/11/2013	0.000295455
6/11/2014	0.000295455
12/3/2014	0.000295455
6/17/2015	0.000295455
12/1/2015	0.000295455
6/22/2016	0.00470455
12/20/2016	0.00420455
6/6/2017	0.000295455
11/7/2017	0.000295455
2/27/2018	0.000295455

Well: MW#03-2

Sample	Residual
6/12/2007	6.25e-005
12/17/2007	6.25e-005
6/11/2008	6.25e-005
12/3/2008	6.25e-005
6/17/2009	6.25e-005
12/9/2009	6.25e-005
6/17/2010	6.25e-005
12/22/2010	6.25e-005
6/29/2011	6.25e-005
12/7/2011	6.25e-005
6/6/2012	6.25e-005
12/12/2012	6.25e-005
6/19/2013	6.25e-005
12/11/2013	6.25e-005
6/11/2014	6.25e-005
12/3/2014	6.25e-005
6/17/2015	6.25e-005
12/1/2015	6.25e-005
6/22/2016	6.25e-005
12/20/2016	0.0044375
6/6/2017	6.25e-005
11/7/2017	6.25e-005
2/27/2018	0.0030625
9/27/2018	6.25e-005

Shapiro-Francia Test of Normality

Parameter: Arsenic

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 118

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	0	-2.40892	5.80292	0
2	0	-2.14441	10.4014	0
3	0.0005	-1.95996	14.2428	-0.000979981
4	0.0005	-1.83843	17.6226	-0.00189919
5	0.0005	-1.72793	20.6084	-0.00276316
6	0.0005	-1.64485	23.3139	-0.00358559
7	0.005	-1.57179	25.7845	-0.0114445
8	0.005	-1.49852	28.03	-0.0189371
9	0.005	-1.43953	30.1023	-0.0261348
10	0.005	-1.37866	32.0029	-0.033028
11	0.005	-1.32854	33.768	-0.0396707
12	0.005	-1.28155	35.4103	-0.0460785
13	0.005	-1.23187	36.9278	-0.0522378
14	0.005	-1.19012	38.3442	-0.0581884
15	0.005	-1.1455	39.6564	-0.0639159
16	0.005	-1.10768	40.8833	-0.0694543
17	0.005	-1.07138	42.0312	-0.0748112
18	0.005	-1.03215	43.0965	-0.079972
19	0.005	-0.998575	44.0937	-0.0849649
20	0.005	-0.9621	45.0193	-0.0897754
21	0.005	-0.930718	45.8856	-0.094429
22	0.005	-0.900227	46.696	-0.0989301
23	0.005	-0.866894	47.4475	-0.103265
24	0.005	-0.838054	48.1498	-0.107455
25	0.005	-0.806422	48.8001	-0.111487
26	0.005	-0.778966	49.4069	-0.115382
27	0.005	-0.752084	49.9725	-0.119142
28	0.005	-0.722479	50.4945	-0.122755
29	0.005	-0.696684	50.9799	-0.126238
30	0.005	-0.668209	51.4264	-0.129579
31	0.005	-0.643345	51.8403	-0.132796
32	0.005	-0.618872	52.2233	-0.13589
33	0.005	-0.591776	52.5735	-0.138849
34	0.005	-0.568052	52.8962	-0.141689
35	0.005	-0.541736	53.1897	-0.144398
36	0.005	-0.518658	53.4587	-0.146991
37	0.005	-0.49585	53.7045	-0.149471
38	0.005	-0.470498	53.9259	-0.151823
39	0.005	-0.448213	54.1268	-0.154064
40	0.005	-0.423405	54.3061	-0.156181
41	0.005	-0.401571	54.4673	-0.158189
42	0.005	-0.379927	54.6117	-0.160089
43	0.005	-0.355788	54.7382	-0.161868
44	0.005	-0.334503	54.8501	-0.16354
45	0.005	-0.310738	54.9467	-0.165094
46	0.005	-0.28976	55.0307	-0.166543

47	0.005	-0.268908	55.103	-0.167887
48	0.005	-0.24559	55.1633	-0.169115
49	0.005	-0.224974	55.2139	-0.17024
50	0.005	-0.201894	55.2547	-0.171249
51	0.005	-0.181468	55.2876	-0.172157
52	0.005	-0.161119	55.3135	-0.172962
53	0.005	-0.138305	55.3327	-0.173654
54	0.005	-0.118085	55.3466	-0.174244
55	0.005	-0.0953969	55.3557	-0.174721
56	0.005	-0.0752698	55.3614	-0.175098
57	0.005	-0.0551734	55.3644	-0.175373
58	0.005	-0.0325917	55.3655	-0.175536
59	0.005	-0.0125328	55.3657	-0.175599
60	0.005	0.0125328	55.3658	-0.175536
61	0.005	0.0325917	55.3669	-0.175373
62	0.005	0.0551734	55.3699	-0.175098
63	0.005	0.0752698	55.3756	-0.174721
64	0.005	0.0953969	55.3847	-0.174244
65	0.005	0.118085	55.3986	-0.173654
66	0.005	0.138305	55.4178	-0.172962
67	0.005	0.161119	55.4437	-0.172157
68	0.005	0.181468	55.4766	-0.171249
69	0.005	0.201894	55.5174	-0.17024
70	0.005	0.224974	55.568	-0.169115
71	0.005	0.24559	55.6283	-0.167887
72	0.005	0.268908	55.7006	-0.166543
73	0.005	0.28976	55.7846	-0.165094
74	0.005	0.310738	55.8812	-0.16354
75	0.005	0.334503	55.9931	-0.161868
76	0.005	0.355788	56.1196	-0.160089
77	0.005	0.379927	56.264	-0.158189
78	0.005	0.401571	56.4252	-0.156181
79	0.005	0.423405	56.6045	-0.154064
80	0.005	0.448213	56.8054	-0.151823
81	0.005	0.470498	57.0268	-0.149471
82	0.005	0.49585	57.2726	-0.146991
83	0.005	0.518658	57.5416	-0.144398
84	0.005	0.541736	57.8351	-0.141689
85	0.005	0.568052	58.1578	-0.138849
86	0.005	0.591776	58.508	-0.13589
87	0.005	0.618872	58.891	-0.132796
88	0.005	0.643345	59.3049	-0.129579
89	0.005	0.668209	59.7514	-0.126238
90	0.005	0.696684	60.2368	-0.122755
91	0.005	0.722479	60.7588	-0.119142
92	0.005	0.752084	61.3244	-0.115382
93	0.006	0.778966	61.9312	-0.110708
94	0.0068	0.806422	62.5815	-0.105224
95	0.008	0.838054	63.2838	-0.0985199
96	0.008	0.866894	64.0353	-0.0915847
97	0.0098	0.900227	64.8457	-0.0827625
98	0.0109	0.930718	65.712	-0.0726177
99	0.0179	0.9621	66.6376	-0.0553961
100	0.0197	0.998575	67.6348	-0.0357242
101	0.0215	1.03215	68.7001	-0.0135329
102	0.024	1.07138	69.848	0.0121802
103	0.0274	1.10768	71.0749	0.0425307

104	0.028	1.1455	72.3871	0.0746048
105	0.03	1.19012	73.8035	0.110308
106	0.033	1.23187	75.321	0.15096
107	0.0343	1.28155	76.9633	0.194917
108	0.0353	1.32854	78.7284	0.241815
109	0.038	1.37866	80.6291	0.294204
110	0.0389	1.43953	82.7013	0.350201
111	0.047	1.49852	84.9468	0.420631
112	0.051	1.57179	87.4174	0.500793
113	0.0525	1.64485	90.1229	0.587147
114	0.0562	1.72793	93.1087	0.684257
115	0.06	1.83843	96.4885	0.794563
116	0.0603	1.95996	100.33	0.912748
117	0.061	2.14441	104.928	1.04356

Sample Standard Deviation = 0.0146276
Numerator = 1.08901
Denominator = 2.62677 = 117 104.928
W Statistic = 0.414581
5% Critical value of 0.976 exceeds 0.414581
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.414581
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 77.9661%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 24
Maximum Background Concentration = 0.0109
Confidence Level = 85.7%
False Positive Rate = 14.3%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	0.0389	TRUE
MW#93-3	9/27/2018	1	0.005	FALSE
MW#03-1	2/27/2018	1	0.005	FALSE
MW#03-2	9/27/2018	1	0.005	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 13.0435%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 23
Maximum Baseline Concentration = 0.0635
Confidence Level = 95.8%
False Positive Rate = 4.2%

Baseline Samples	Date	Result
	6/12/2007	0.0343
	12/17/2007	0.0603
	6/11/2008	0.051
	12/3/2008	0.033
	6/17/2009	0.0525
	12/9/2009	0.0635
	6/17/2010	0.0179
	12/22/2010	0.0215
	6/29/2011	0.061
	12/7/2011	ND<0.005
	6/6/2012	0.0098
	12/12/2012	0.0562
	6/19/2013	ND<0.005
	12/11/2013	0.0353
	6/11/2014	0.0197
	12/3/2014	0.0274
	6/17/2015	ND<0.005
	12/1/2015	0.03
	6/22/2016	0.047
	12/20/2016	0.06
	6/6/2017	0.038
	11/7/2017	0.028
	2/27/2018	0.024

Date	Samples	Mean	Impacted
9/27/2018	1	0.0389	FALSE

Concentrations (mg/L)

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 54
Total Non-Detect: 20
Percent Non-Detects: 37.037%
Total Background Samples: 11
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	11	0 (0%)	10/11/2016	0.429	0.429
			12/20/2016	0.386	0.386
			2/16/2017	0.341	0.341
			3/8/2017	0.348	0.348
			5/9/2017	0.366	0.366
			6/6/2017	0.371	0.371
			8/22/2017	0.458	0.458
			9/22/2017	0.499	0.499
			11/7/2017	0.46	0.46
			2/27/2018	0.33	0.33
			9/27/2018	0.386	0.386

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#03-1	10	7 (70%)	10/11/2016	ND<0.025	ND<0.025
			12/20/2016	ND<0.025	ND<0.025
			2/16/2017	ND<0.025	ND<0.025
			3/8/2017	ND<0.025	ND<0.025
			5/9/2017	0.041	0.041
			6/6/2017	ND<0.025	ND<0.025
			8/22/2017	ND<0.025	ND<0.025
			9/22/2017	0.025	0.025
			11/7/2017	ND<0.1	ND<0.1
			2/27/2018	0.05	0.05
MW#03-2	11	10 (90.9091%)	10/11/2016	ND<0.025	ND<0.025
			12/20/2016	ND<0.025	ND<0.025
			2/16/2017	ND<0.025	ND<0.025
			3/8/2017	ND<0.025	ND<0.025
			5/9/2017	0.032	0.032
			6/6/2017	ND<0.025	ND<0.025
			8/22/2017	ND<0.025	ND<0.025
			9/22/2017	ND<0.025	ND<0.025
			11/7/2017	ND<0.1	ND<0.1
			2/27/2018	ND<0.05	ND<0.05
			9/27/2018	ND<0.1	ND<0.1
MW#93-2	11	0 (0%)	10/11/2016	2.86	2.86
			12/20/2016	2.31	2.31
			2/16/2017	2.09	2.09
			3/8/2017	2.07	2.07
			5/9/2017	1.97	1.97

			6/6/2017	1.83	1.83
			8/22/2017	2.38	2.38
			9/22/2017	2.48	2.48
			11/7/2017	0.46	0.46
			2/27/2018	0.064	0.064
			9/27/2018	2.01	2.01
MW#93-3	11	3 (27.2727%)	10/11/2016	0.079	0.079
			12/20/2016	0.08	0.08
			2/16/2017	0.126	0.126
			3/8/2017	0.09	0.09
			5/9/2017	0.139	0.139
			6/6/2017	ND<0.025	ND<0.025
			8/22/2017	0.119	0.119
			9/22/2017	0.118	0.118
			11/7/2017	ND<0.1	ND<0.1
			2/27/2018	0.089	0.089
			9/27/2018	ND<0.1	ND<0.1

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.141725
Overall Std Dev = 0.340503
Overall Total = 7.65313
SS Wells = 2.77823
SS Total = 6.14496

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	2.77823	4	0.694558	10.1087
Error (within wells)	3.36673	49	0.0687087	
Totals	6.14496	53		

10.1087 exceeds 2.52521; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	10/11/2016	0.0313636
	12/20/2016	0.0116364
	2/16/2017	0.0566364
	3/8/2017	0.0496364
	5/9/2017	0.0316364
	6/6/2017	0.0266364
	8/22/2017	0.0603636
	9/22/2017	0.101364
	11/7/2017	0.0623636
	2/27/2018	0.0676364
	9/27/2018	0.0116364

Well: MW#03-1	Sample	Residual
	10/11/2016	0.0116
	12/20/2016	0.0116
	2/16/2017	0.0116
	3/8/2017	0.0116
	5/9/2017	0.0044
	6/6/2017	0.0116
	8/22/2017	0.0116
	9/22/2017	0.0116
	11/7/2017	0.0634
	2/27/2018	0.0134

Well: MW#03-2	Sample	Residual
	10/11/2016	0.0165455
	12/20/2016	0.0165455
	2/16/2017	0.0165455
	3/8/2017	0.0165455
	5/9/2017	0.00954545
	6/6/2017	0.0165455

8/22/2017	0.0165455
9/22/2017	0.0165455
11/7/2017	0.0584545
2/27/2018	0.00845455
9/27/2018	0.0584545

Well: MW#93-2	Sample	Residual
	10/11/2016	0.994182
	12/20/2016	0.444182
	2/16/2017	0.224182
	3/8/2017	0.204182
	5/9/2017	0.104182
	6/6/2017	0.0358182
	8/22/2017	0.514182
	9/22/2017	0.614182
	11/7/2017	1.40582
	2/27/2018	1.80182
	9/27/2018	0.144182

Well: MW#93-3	Sample	Residual
	10/11/2016	0.0178182
	12/20/2016	0.0168182
	2/16/2017	0.0291818
	3/8/2017	0.00681818
	5/9/2017	0.0421818
	6/6/2017	0.0718182
	8/22/2017	0.0221818
	9/22/2017	0.0211818
	11/7/2017	0.00318182
	2/27/2018	0.00781818
	9/27/2018	0.00318182

Shapiro-Francia Test of Normality

Parameter: Boron

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 54

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	0.025	-2.09693	4.39712	-0.0524233
2	0.025	-1.79912	7.63394	-0.0974012
3	0.025	-1.60725	10.2172	-0.137582
4	0.025	-1.46106	12.3519	-0.174109
5	0.025	-1.34075	14.1495	-0.207628
6	0.025	-1.23187	15.667	-0.238424
7	0.025	-1.14069	16.9682	-0.266942
8	0.025	-1.05812	18.0878	-0.293395
9	0.025	-0.982202	19.0525	-0.31795
10	0.025	-0.911562	19.8835	-0.340739
11	0.025	-0.841621	20.5918	-0.361779
12	0.025	-0.778966	21.1986	-0.381253
13	0.025	-0.719228	21.7159	-0.399234
14	0.025	-0.661955	22.154	-0.415783
15	0.025	-0.606775	22.5222	-0.430952
16	0.032	-0.553384	22.8285	-0.448661
17	0.041	-0.498687	23.0771	-0.469107
18	0.05	-0.448213	23.278	-0.491517
19	0.05	-0.398855	23.4371	-0.51146
20	0.064	-0.350451	23.5599	-0.533889
21	0.079	-0.302855	23.6517	-0.557815
22	0.08	-0.253347	23.7158	-0.578082
23	0.089	-0.207012	23.7587	-0.596506
24	0.09	-0.161119	23.7847	-0.611007
25	0.1	-0.115562	23.798	-0.622563
26	0.1	-0.0702426	23.8029	-0.629588
27	0.1	-0.0250691	23.8036	-0.632095
28	0.1	0.0250691	23.8042	-0.629588
29	0.1	0.0702426	23.8091	-0.622563
30	0.118	0.115562	23.8225	-0.608927
31	0.119	0.161119	23.8485	-0.589754
32	0.126	0.207012	23.8913	-0.56367
33	0.139	0.253347	23.9555	-0.528455
34	0.33	0.302855	24.0472	-0.428513
35	0.341	0.350451	24.17	-0.309009
36	0.348	0.398855	24.3291	-0.170208
37	0.366	0.448213	24.53	-0.00616174
38	0.371	0.498687	24.7787	0.178851
39	0.386	0.553384	25.0849	0.392458
40	0.386	0.606775	25.4531	0.626673
41	0.429	0.661955	25.8913	0.910652
42	0.458	0.719228	26.4086	1.24006
43	0.46	0.778966	27.0154	1.59838
44	0.46	0.841621	27.7237	1.98553
45	0.499	0.911562	28.5546	2.4404
46	1.83	0.982202	29.5194	4.23783

47	1.97	1.05812	30.639	6.32233
48	2.01	1.14069	31.9402	8.61511
49	2.07	1.23187	33.4576	11.1651
50	2.09	1.34075	35.2553	13.9672
51	2.31	1.46106	37.39	17.3423
52	2.38	1.60725	39.9732	21.1675
53	2.48	1.79912	43.21	25.6294

Sample Standard Deviation = 0.802256
Numerator = 656.864
Denominator = 1473.96 = 53 43.21
W Statistic = 0.445645
5% Critical value of 0.958 exceeds 0.445645
Evidence of non-normality at 95% level of significance
1% Critical value of 0.94 exceeds 0.445645
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 37.037%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 11
Maximum Background Concentration = 0.499
Confidence Level = 73.3%
False Positive Rate = 26.7%

Well	Date	Samples	Mean	Impacted
MW#03-1	2/27/2018	1	0.05	FALSE
MW#03-2	9/27/2018	1	0.1	FALSE
MW#93-2	9/27/2018	1	2.01	TRUE
MW#93-3	9/27/2018	1	0.1	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 10
Maximum Baseline Concentration = 2.86
Confidence Level = 90.9%
False Positive Rate = 9.1%

Baseline Samples	Date	Result
	10/11/2016	2.86
	12/20/2016	2.31
	2/16/2017	2.09
	3/8/2017	2.07
	5/9/2017	1.97
	6/6/2017	1.83
	8/22/2017	2.38
	9/22/2017	2.48
	11/7/2017	0.46
	2/27/2018	0.064

Date	Samples	Mean	Impacted
9/27/2018	1	2.01	FALSE

Concentrations (mg/L)

Parameter: Calcium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 42
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 14
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	14	0 (0%)	6/6/2012	484	484
			12/12/2012	560	560
			6/19/2013	670	670
			12/11/2013	549	549
			6/11/2014	192	192
			12/3/2014	213	213
			6/17/2015	184	184
			12/1/2015	199	199
			6/22/2016	205	205
			12/20/2016	202	202
			6/6/2017	206	206
			11/7/2017	212	212
			2/27/2018	211	211
			9/27/2018	240	240

There are 2 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	14	0 (0%)	6/6/2012	78.9	78.9
			12/12/2012	101	101
			6/19/2013	100	100
			12/11/2013	88	88
			6/11/2014	41.8	41.8
			12/3/2014	53.8	53.8
			6/17/2015	2.29	2.29
			12/1/2015	42.8	42.8
			6/22/2016	40	40
			12/20/2016	41.8	41.8
			6/6/2017	45.2	45.2
			11/7/2017	68.5	68.5
			2/27/2018	74.7	74.7
			9/27/2018	68.9	68.9
MW#93-3	14	0 (0%)	6/6/2012	86.4	86.4
			12/12/2012	97	97
			6/19/2013	163	163
			12/11/2013	102	102
			6/11/2014	49.5	49.5
			12/3/2014	31.7	31.7
			6/17/2015	43.4	43.4
			12/1/2015	58	58
			6/22/2016	95.6	95.6
			12/20/2016	82.1	82.1

			6/6/2017	56	56
			11/7/2017	80.2	80.2
			2/27/2018	91.8	91.8
			9/27/2018	94.8	94.8

There are 2 unused wells

Well	Samples	ND	Date	Result	Original
MW#03-1	4	0 (0%)	5/24/2018	22.2	22.2
			6/19/2018	43.6	43.6
			7/19/2018	154	154
			8/22/2018	613	613
MW#03-2	6	0 (0%)	5/24/2018	197	197
			6/19/2018	291	291
			7/19/2018	338	338
			8/22/2018	325	325
			9/19/2018	303	303
			9/27/2018	352	352

Levene's Test for Equal of Variance

Parameter: Calcium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 64.238
Overall Std Dev = 76.3824
Overall Total = 2698
SS Wells = 142722
SS Total = 239205

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	142722	2	71361	28.8452
Error (within wells)	96483.2	39	2473.93	
Totals	239205	41		

28.8452 exceeds 3.23173; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	6/6/2012	174.929
	12/12/2012	250.929
	6/19/2013	360.929
	12/11/2013	239.929
	6/11/2014	117.071
	12/3/2014	96.0714
	6/17/2015	125.071
	12/1/2015	110.071
	6/22/2016	104.071
	12/20/2016	107.071
	6/6/2017	103.071
	11/7/2017	97.0714
	2/27/2018	98.0714
	9/27/2018	69.0714

Well: MW#93-2	Sample	Residual
	6/6/2012	18.3507
	12/12/2012	40.4507
	6/19/2013	39.4507
	12/11/2013	27.4507
	6/11/2014	18.7493
	12/3/2014	6.74929
	6/17/2015	58.2593
	12/1/2015	17.7493
	6/22/2016	20.5493
	12/20/2016	18.7493
	6/6/2017	15.3493
	11/7/2017	7.95071
	2/27/2018	14.1507
	9/27/2018	8.35071

Well: MW#93-3	Sample	Residual

6/6/2012	5.57857
12/12/2012	16.1786
6/19/2013	82.1786
12/11/2013	21.1786
6/11/2014	31.3214
12/3/2014	49.1214
6/17/2015	37.4214
12/1/2015	22.8214
6/22/2016	14.7786
12/20/2016	1.27857
6/6/2017	24.8214
11/7/2017	0.621429
2/27/2018	10.9786
9/27/2018	13.9786

Shapiro-Wilks Test of Normality

Parameter: Calcium

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 21; Samples = 42

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2.29	670	667.71	0.3917	261.542
2	31.7	560	528.3	0.2701	142.694
3	40	549	509	0.2345	119.36
4	41.8	484	442.2	0.2085	92.1987
5	41.8	240	198.2	0.1874	37.1427
6	42.8	213	170.2	0.1694	28.8319
7	43.4	212	168.6	0.1535	25.8801
8	45.2	211	165.8	0.1392	23.0794
9	49.5	206	156.5	0.1259	19.7034
10	53.8	205	151.2	0.1136	17.1763
11	56	202	146	0.102	14.892
12	58	199	141	0.0909	12.8169
13	68.5	192	123.5	0.0804	9.9294
14	68.9	184	115.1	0.0701	8.06851
15	74.7	163	88.3	0.0602	5.31566
16	78.9	102	23.1	0.0506	1.16886
17	80.2	101	20.8	0.0411	0.85488
18	82.1	100	17.9	0.0318	0.56922
19	86.4	97	10.6	0.0227	0.24062
20	88	95.6	7.6	0.0136	0.10336
21	91.8	94.8	3	0.0045	0.0135
22	94.8	91.8	-3		
23	95.6	88	-7.6		
24	97	86.4	-10.6		
25	100	82.1	-17.9		
26	101	80.2	-20.8		
27	102	78.9	-23.1		
28	163	74.7	-88.3		
29	184	68.9	-115.1		
30	192	68.5	-123.5		
31	199	58	-141		
32	202	56	-146		
33	205	53.8	-151.2		
34	206	49.5	-156.5		
35	211	45.2	-165.8		
36	212	43.4	-168.6		
37	213	42.8	-170.2		
38	240	41.8	-198.2		
39	484	41.8	-442.2		
40	549	40	-509		
41	560	31.7	-528.3		
42	670	2.29	-667.71		

Sum of b values = 821.582
Sample Standard Deviation = 151.882
W Statistic = 0.713686

5% Critical value of 0.942 exceeds 0.713686
Evidence of non-normality at 95% level of significance
1% Critical value of 0.922 exceeds 0.713686
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Calcium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 2
Future Samples (k) = 2
Recent Dates = 1
Background Samples (n) = 14
Maximum Background Concentration = 670
Confidence Level = 87.5%
False Positive Rate = 12.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	68.9	FALSE
MW#93-3	9/27/2018	1	94.8	FALSE

Concentrations (mg/l)

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 275
Total Non-Detect: 5
Percent Non-Detects: 1.81818%
Total Background Samples: 70
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	70	0 (0%)	12/15/1994	30	30
			3/14/1995	38	38
			6/21/1995	37	37
			12/14/1995	24	24
			3/6/1996	20	20
			4/25/1996	32	32
			10/2/1996	40	40
			12/10/1996	30	30
			3/11/1997	4	4
			4/15/1997	28	28
			8/14/1997	33	33
			12/4/1997	29	29
			3/31/1998	30	30
			6/23/1998	37	37
			8/11/1998	24	24
			12/8/1998	31	31
			3/9/1999	30	30
			6/8/1999	35	35
			8/19/1999	40	40
			12/14/1999	40	40
			3/7/2000	50	50
			6/23/2000	52	52
			12/12/2000	54	54
			3/27/2001	60	60
			6/28/2001	58	58
			9/10/2001	46	46
			12/18/2001	46	46
			3/19/2002	42	42
			6/26/2002	51	51
			9/18/2002	57	57
			12/11/2002	56	56
			3/13/2003	56	56
			6/25/2003	63	63
			9/26/2003	59	59
			12/10/2003	40	40
			3/9/2004	58	58
			6/24/2004	61	61
			9/15/2004	44	44
			12/15/2004	48	48
			3/16/2005	42	42
			6/15/2005	42	42
			9/21/2005	42	42
			12/21/2005	58	58
			3/15/2006	50	50

			6/21/2006	31	31
			12/20/2006	35	35
			6/12/2007	24	24
			12/17/2007	27	27
			6/11/2008	29	29
			12/3/2008	28	28
			6/17/2009	20	20
			12/9/2009	24	24
			6/17/2010	17	17
			12/22/2010	20	20
			6/29/2011	20.8	20.8
			12/7/2011	17.6	17.6
			6/6/2012	23.8	23.8
			12/12/2012	22.2	22.2
			6/19/2013	21.5	21.5
			12/11/2013	17.6	17.6
			6/11/2014	19.3	19.3
			12/3/2014	16.9	16.9
			6/17/2015	13	13
			12/1/2015	15.2	15.2
			6/22/2016	13	13
			12/20/2016	15.2	15.2
			6/6/2017	16.1	16.1
			11/7/2017	16.2	16.2
			2/27/2018	15.6	15.6
			9/27/2018	16.8	16.8

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	71	0 (0%)	12/15/1994	400	400
			3/14/1995	1500	1500
			6/21/1995	75	75
			12/14/1995	1749	1749
			3/6/1996	1674	1674
			4/25/1996	1999	1999
			10/2/1996	1553	1553
			12/10/1996	1560	1560
			3/11/1997	1634	1634
			4/15/1997	1700	1700
			8/14/1997	2149	2149
			12/4/1997	1769	1769
			3/31/1998	2000	2000
			6/23/1998	2099	2099
			8/11/1998	1874	1874
			12/8/1998	1922	1922
			3/9/1999	1700	1700
			6/8/1999	1739	1739
			8/19/1999	1800	1800
			12/14/1999	1800	1800
			3/7/2000	1328	1328
			6/23/2000	950	950
			12/12/2000	1789	1789
			3/27/2001	1749	1749
			6/28/2001	1799	1799
			9/10/2001	2050	2050

			12/18/2001	1600	1600
			3/19/2002	1730	1730
			6/26/2002	1699	1699
			9/18/2002	1674	1674
			12/11/2002	1613	1613
			3/13/2003	1510	1510
			6/25/2003	1800	1800
			9/26/2003	1616	1616
			12/10/2003	1509	1509
			3/9/2004	1800	1800
			6/24/2004	1892	1892
			9/15/2004	1435	1435
			12/15/2004	1600	1600
			3/16/2005	1325	1325
			6/15/2005	1400	1400
			9/21/2005	1412	1412
			12/21/2005	1550	1550
			3/15/2006	1375	1375
			6/21/2006	1500	1500
			12/20/2006	1250	1250
			2/21/2007	1250	1250
			6/12/2007	1350	1350
			12/17/2007	1399	1399
			6/11/2008	1210	1210
			12/3/2008	1584	1584
			6/17/2009	750	750
			12/9/2009	875	875
			6/17/2010	1500	1500
			12/22/2010	1600	1600
			6/29/2011	1670	1670
			12/7/2011	1510	1510
			6/6/2012	1610	1610
			12/12/2012	1750	1750
			6/19/2013	1390	1390
			12/11/2013	1410	1410
			6/11/2014	1360	1360
			12/3/2014	1520	1520
			6/17/2015	47.7	47.7
			12/1/2015	1760	1760
			6/22/2016	1300	1300
			12/20/2016	1690	1690
			6/6/2017	1580	1580
			11/7/2017	1160	1160
			2/27/2018	1270	1270
			9/27/2018	1250	1250
MW#93-3	70	0 (0%)	12/15/1994	440	440
			3/14/1995	420	420
			6/21/1995	420	420
			12/14/1995	406	406
			3/6/1996	368	368
			4/25/1996	384	384
			10/2/1996	430	430
			12/10/1996	377	377
			3/11/1997	375	375
			4/15/1997	400	400
			8/14/1997	916	916

12/4/1997	249	249
3/31/1998	275	275
6/23/1998	246	246
8/11/1998	500	500
12/8/1998	260	260
3/9/1999	280	280
6/8/1999	214	214
8/19/1999	260	260
12/14/1999	200	200
3/7/2000	232	232
6/23/2000	270	270
12/12/2000	196	196
3/27/2001	190	190
6/28/2001	180	180
9/10/2001	202	202
12/18/2001	149	149
3/19/2002	203	203
6/26/2002	180	180
9/18/2002	185	185
12/11/2002	178	178
3/13/2003	207	207
6/25/2003	190	190
9/26/2003	158	158
12/10/2003	140	140
3/9/2004	13	13
6/24/2004	160	160
9/15/2004	139	139
12/15/2004	122	122
3/16/2005	180	180
6/15/2005	150	150
9/21/2005	215	215
12/21/2005	180	180
3/15/2006	221	221
6/21/2006	210	210
12/20/2006	210	210
6/12/2007	110	110
12/17/2007	131	131
6/11/2008	144	144
12/3/2008	152	152
6/17/2009	120	120
12/9/2009	175	175
6/17/2010	150	150
12/22/2010	170	170
6/29/2011	170	170
12/7/2011	98.9	98.9
6/6/2012	194	194
12/12/2012	168	168
6/19/2013	194	194
12/11/2013	173	173
6/11/2014	254	254
12/3/2014	194	194
6/17/2015	168	168
12/1/2015	280	280
6/22/2016	518	518
12/20/2016	475	475
6/6/2017	113	113
11/7/2017	402	402

			2/27/2018	435	435
			9/27/2018	426	426
MW#03-1	29	4 (13.7931%)	6/24/2004	10	10
			9/15/2004	22	22
			12/15/2004	6	6
			3/16/2005	4	4
			6/15/2005	6	6
			9/21/2005	5	5
			12/20/2006	5	5
			6/12/2007	4	4
			12/17/2007	3	3
			6/11/2008	11	11
			12/3/2008	11	11
			6/17/2009	4	4
			12/9/2009	32	32
			6/17/2010	5	5
			12/22/2010	8.7	8.7
			6/29/2011	4.86	4.86
			12/7/2011	5.88	5.88
			6/6/2012	9.36	9.36
			6/19/2013	ND<5	ND<5
			12/11/2013	ND<5	ND<5
			6/11/2014	44	44
			12/3/2014	ND<5	ND<5
			6/17/2015	ND<5	ND<5
			12/1/2015	0.777	0.777
			6/22/2016	0.628	0.628
			12/20/2016	0.786	0.786
			6/6/2017	0.887	0.887
			11/7/2017	1.13	1.13
			2/27/2018	1.07	1.07
MW#03-2	35	1 (2.85714%)	6/24/2004	36	36
			9/15/2004	4	4
			12/15/2004	28	28
			3/16/2005	30	30
			6/15/2005	30	30
			9/21/2005	27	27
			12/21/2005	26	26
			3/15/2006	27	27
			6/21/2006	23	23
			12/20/2006	35	35
			6/12/2007	30	30
			12/17/2007	20	20
			6/11/2008	41	41
			12/3/2008	46	46
			6/17/2009	60	60
			12/9/2009	45	45
			6/17/2010	33	33
			12/22/2010	29	29
			6/29/2011	28.4	28.4
			12/7/2011	23.5	23.5
			6/6/2012	29.3	29.3
			12/12/2012	28.3	28.3
			6/19/2013	32.1	32.1
			12/11/2013	32.8	32.8

6/11/2014	ND<5	ND<5
12/3/2014	51.2	51.2
6/17/2015	54.7	54.7
12/1/2015	67.8	67.8
6/22/2016	79.7	79.7
10/11/2016	88.4	88.4
12/20/2016	126	126
6/6/2017	117	117
11/7/2017	288	288
2/27/2018	247	247
9/27/2018	283	283

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 104.076
Overall Std Dev = 182.704
Overall Total = 28620.9
SS Wells = 2.81448e+006
SS Total = 9.14637e+006

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	2.81448e+006	4	703620	30.0032
Error (within wells)	6.33189e+006	270	23451.5	
Totals	9.14637e+006	274		

30.0032 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	4.04
	3/14/1995	3.96
	6/21/1995	2.96
	12/14/1995	10.04
	3/6/1996	14.04
	4/25/1996	2.04
	10/2/1996	5.96
	12/10/1996	4.04
	3/11/1997	30.04
	4/15/1997	6.04
	8/14/1997	1.04
	12/4/1997	5.04
	3/31/1998	4.04
	6/23/1998	2.96
	8/11/1998	10.04
	12/8/1998	3.04
	3/9/1999	4.04
	6/8/1999	0.96
	8/19/1999	5.96
	12/14/1999	5.96
	3/7/2000	15.96
	6/23/2000	17.96
	12/12/2000	19.96
	3/27/2001	25.96
	6/28/2001	23.96
	9/10/2001	11.96
	12/18/2001	11.96
	3/19/2002	7.96
	6/26/2002	16.96
	9/18/2002	22.96
	12/11/2002	21.96
	3/13/2003	21.96

6/25/2003	28.96
9/26/2003	24.96
12/10/2003	5.96
3/9/2004	23.96
6/24/2004	26.96
9/15/2004	9.96
12/15/2004	13.96
3/16/2005	7.96
6/15/2005	7.96
9/21/2005	7.96
12/21/2005	23.96
3/15/2006	15.96
6/21/2006	3.04
12/20/2006	0.96
6/12/2007	10.04
12/17/2007	7.04
6/11/2008	5.04
12/3/2008	6.04
6/17/2009	14.04
12/9/2009	10.04
6/17/2010	17.04
12/22/2010	14.04
6/29/2011	13.24
12/7/2011	16.44
6/6/2012	10.24
12/12/2012	11.84
6/19/2013	12.54
12/11/2013	16.44
6/11/2014	14.74
12/3/2014	17.14
6/17/2015	21.04
12/1/2015	18.84
6/22/2016	21.04
12/20/2016	18.84
6/6/2017	17.94
11/7/2017	17.84
2/27/2018	18.44
9/27/2018	17.24

Well: MW#93-2

Sample	Residual
12/15/1994	1113.33
3/14/1995	13.3338
6/21/1995	1438.33
12/14/1995	235.666
3/6/1996	160.666
4/25/1996	485.666
10/2/1996	39.6662
12/10/1996	46.6662
3/11/1997	120.666
4/15/1997	186.666
8/14/1997	635.666
12/4/1997	255.666
3/31/1998	486.666
6/23/1998	585.666
8/11/1998	360.666
12/8/1998	408.666
3/9/1999	186.666

6/8/1999	225.666
8/19/1999	286.666
12/14/1999	286.666
3/7/2000	185.334
6/23/2000	563.334
12/12/2000	275.666
3/27/2001	235.666
6/28/2001	285.666
9/10/2001	536.666
12/18/2001	86.6662
3/19/2002	216.666
6/26/2002	185.666
9/18/2002	160.666
12/11/2002	99.6662
3/13/2003	3.3338
6/25/2003	286.666
9/26/2003	102.666
12/10/2003	4.3338
3/9/2004	286.666
6/24/2004	378.666
9/15/2004	78.3338
12/15/2004	86.6662
3/16/2005	188.334
6/15/2005	113.334
9/21/2005	101.334
12/21/2005	36.6662
3/15/2006	138.334
6/21/2006	13.3338
12/20/2006	263.334
2/21/2007	263.334
6/12/2007	163.334
12/17/2007	114.334
6/11/2008	303.334
12/3/2008	70.6662
6/17/2009	763.334
12/9/2009	638.334
6/17/2010	13.3338
12/22/2010	86.6662
6/29/2011	156.666
12/7/2011	3.3338
6/6/2012	96.6662
12/12/2012	236.666
6/19/2013	123.334
12/11/2013	103.334
6/11/2014	153.334
12/3/2014	6.6662
6/17/2015	1465.63
12/1/2015	246.666
6/22/2016	213.334
12/20/2016	176.666
6/6/2017	66.6662
11/7/2017	353.334
2/27/2018	243.334
9/27/2018	263.334

Well: MW#93-3	**Sample**	**Residual**
	12/15/1994	190.073

3/14/1995	170.073
6/21/1995	170.073
12/14/1995	156.073
3/6/1996	118.073
4/25/1996	134.073
10/2/1996	180.073
12/10/1996	127.073
3/11/1997	125.073
4/15/1997	150.073
8/14/1997	666.073
12/4/1997	0.927143
3/31/1998	25.0729
6/23/1998	3.92714
8/11/1998	250.073
12/8/1998	10.0729
3/9/1999	30.0729
6/8/1999	35.9271
8/19/1999	10.0729
12/14/1999	49.9271
3/7/2000	17.9271
6/23/2000	20.0729
12/12/2000	53.9271
3/27/2001	59.9271
6/28/2001	69.9271
9/10/2001	47.9271
12/18/2001	100.927
3/19/2002	46.9271
6/26/2002	69.9271
9/18/2002	64.9271
12/11/2002	71.9271
3/13/2003	42.9271
6/25/2003	59.9271
9/26/2003	91.9271
12/10/2003	109.927
3/9/2004	236.927
6/24/2004	89.9271
9/15/2004	110.927
12/15/2004	127.927
3/16/2005	69.9271
6/15/2005	99.9271
9/21/2005	34.9271
12/21/2005	69.9271
3/15/2006	28.9271
6/21/2006	39.9271
12/20/2006	39.9271
6/12/2007	139.927
12/17/2007	118.927
6/11/2008	105.927
12/3/2008	97.9271
6/17/2009	129.927
12/9/2009	74.9271
6/17/2010	99.9271
12/22/2010	79.9271
6/29/2011	79.9271
12/7/2011	151.027
6/6/2012	55.9271
12/12/2012	81.9271

6/19/2013	55.9271
12/11/2013	76.9271
6/11/2014	4.07286
12/3/2014	55.9271
6/17/2015	81.9271
12/1/2015	30.0729
6/22/2016	268.073
12/20/2016	225.073
6/6/2017	136.927
11/7/2017	152.073
2/27/2018	185.073
9/27/2018	176.073

Well: MW#03-1	**Sample**	**Residual**
	6/24/2004	2.20421
	9/15/2004	14.2042
	12/15/2004	1.79579
	3/16/2005	3.79579
	6/15/2005	1.79579
	9/21/2005	2.79579
	12/20/2006	2.79579
	6/12/2007	3.79579
	12/17/2007	4.79579
	6/11/2008	3.20421
	12/3/2008	3.20421
	6/17/2009	3.79579
	12/9/2009	24.2042
	6/17/2010	2.79579
	12/22/2010	0.904207
	6/29/2011	2.93579
	12/7/2011	1.91579
	6/6/2012	1.56421
	6/19/2013	2.79579
	12/11/2013	2.79579
	6/11/2014	36.2042
	12/3/2014	2.79579
	6/17/2015	2.79579
	12/1/2015	7.01879
	6/22/2016	7.16779
	12/20/2016	7.00979
	6/6/2017	6.90879
	11/7/2017	6.66579
	2/27/2018	6.72579

Well: MW#03-2	**Sample**	**Residual**
	6/24/2004	25.4914
	9/15/2004	57.4914
	12/15/2004	33.4914
	3/16/2005	31.4914
	6/15/2005	31.4914
	9/21/2005	34.4914
	12/21/2005	35.4914
	3/15/2006	34.4914
	6/21/2006	38.4914
	12/20/2006	26.4914
	6/12/2007	31.4914

12/17/2007	41.4914
6/11/2008	20.4914
12/3/2008	15.4914
6/17/2009	1.49143
12/9/2009	16.4914
6/17/2010	28.4914
12/22/2010	32.4914
6/29/2011	33.0914
12/7/2011	37.9914
6/6/2012	32.1914
12/12/2012	33.1914
6/19/2013	29.3914
12/11/2013	28.6914
6/11/2014	56.4914
12/3/2014	10.2914
6/17/2015	6.79143
12/1/2015	6.30857
6/22/2016	18.2086
10/11/2016	26.9086
12/20/2016	64.5086
6/6/2017	55.5086
11/7/2017	226.509
2/27/2018	185.509
9/27/2018	221.509

Shapiro-Francia Test of Normality

Parameter: Chloride

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 275

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	0.628	-2.74777	7.55021	-1.7256
2	0.777	-2.45727	13.5884	-3.6349
3	0.786	-2.32634	19.0003	-5.4634
4	0.887	-2.19728	23.8283	-7.41239
5	1.07	-2.09693	28.2255	-9.65611
6	1.13	-2.03352	32.3607	-11.954
7	3	-1.95996	36.2021	-17.8339
8	4	-1.91103	39.8541	-25.478
9	4	-1.85218	43.2847	-32.8867
10	4	-1.79912	46.5215	-40.0832
11	4	-1.76241	49.6276	-47.1328
12	4	-1.71688	52.5753	-54.0003
13	4.86	-1.67466	55.3798	-62.1392
14	5	-1.64485	58.0853	-70.3635
15	5	-1.60725	60.6686	-78.3997
16	5	-1.58047	63.1665	-86.302
17	5	-1.54643	65.5579	-94.0342
18	5	-1.5141	67.8504	-101.605
19	5	-1.49085	70.0731	-109.059
20	5	-1.46106	72.2078	-116.364
21	5	-1.4325	74.2598	-123.527
22	5.88	-1.41183	76.2531	-131.828
23	6	-1.38517	78.1718	-140.139
24	6	-1.36581	80.0372	-148.334
25	8.7	-1.34075	81.8348	-159.999
26	9.36	-1.31652	83.5681	-172.321
27	10	-1.29884	85.255	-185.31
28	11	-1.27588	86.8829	-199.344
29	11	-1.25357	88.4543	-213.134
30	13	-1.23724	89.9851	-229.218
31	13	-1.21596	91.4636	-245.025
32	13	-1.20036	92.9045	-260.63
33	15.2	-1.18	94.2969	-278.566
34	15.2	-1.16012	95.6428	-296.2
35	15.6	-1.1455	96.955	-314.07
36	16.1	-1.12639	98.2237	-332.204
37	16.2	-1.10768	99.4507	-350.149
38	16.8	-1.0939	100.647	-368.526
39	16.9	-1.07584	101.805	-386.708
40	17	-1.06252	102.934	-404.771
41	17.6	-1.04505	104.026	-423.164
42	17.6	-1.02789	105.082	-441.255
43	19.3	-1.01522	106.113	-460.848
44	20	-0.998575	107.11	-480.82
45	20	-0.982202	108.075	-500.464
46	20	-0.970094	109.016	-519.866

47	20	-0.954165	109.926	-538.949
48	20.8	-0.942375	110.814	-558.551
49	21.5	-0.926859	111.674	-578.478
50	22	-0.911562	112.504	-598.532
51	22.2	-0.900227	113.315	-618.517
52	23	-0.885291	114.099	-638.879
53	23.5	-0.87055	114.857	-659.337
54	23.8	-0.859618	115.595	-679.796
55	24	-0.845198	116.31	-700.081
56	24	-0.834498	117.006	-720.109
57	24	-0.820379	117.679	-739.798
58	24	-0.806422	118.33	-759.152
59	26	-0.796056	118.963	-779.849
60	27	-0.782366	119.575	-800.973
61	27	-0.768821	120.166	-821.731
62	27	-0.758753	120.742	-842.218
63	28	-0.745449	121.298	-863.09
64	28	-0.735557	121.839	-883.686
65	28	-0.722479	122.361	-903.915
66	28.3	-0.709522	122.864	-923.995
67	28.4	-0.699883	123.354	-943.871
68	29	-0.687131	123.826	-963.798
69	29	-0.67449	124.281	-983.358
70	29	-0.665079	124.724	-1002.65
71	29.3	-0.652622	125.149	-1021.77
72	30	-0.643345	125.563	-1041.07
73	30	-0.631062	125.962	-1060
74	30	-0.618872	126.345	-1078.57
75	30	-0.609791	126.716	-1096.86
76	30	-0.597761	127.074	-1114.79
77	30	-0.588793	127.42	-1132.46
78	30	-0.576911	127.753	-1149.76
79	31	-0.565108	128.073	-1167.28
80	31	-0.556308	128.382	-1184.53
81	32	-0.544642	128.679	-1201.96
82	32	-0.533048	128.963	-1219.01
83	32.1	-0.524401	129.238	-1235.85
84	32.8	-0.51293	129.501	-1252.67
85	33	-0.504372	129.755	-1269.32
86	33	-0.493018	129.998	-1285.58
87	35	-0.481728	130.23	-1302.45
88	35	-0.473299	130.454	-1319.01
89	35	-0.462114	130.668	-1335.18
90	36	-0.450985	130.871	-1351.42
91	37	-0.442676	131.067	-1367.8
92	37	-0.431644	131.254	-1383.77
93	38	-0.423405	131.433	-1399.86
94	40	-0.412463	131.603	-1416.36
95	40	-0.401571	131.764	-1432.42
96	40	-0.393433	131.919	-1448.16
97	40	-0.382622	132.066	-1463.46
98	41	-0.371856	132.204	-1478.71
99	42	-0.363809	132.336	-1493.99
100	42	-0.353118	132.461	-1508.82
101	42	-0.345126	132.58	-1523.32
102	42	-0.334503	132.692	-1537.36
103	44	-0.323919	132.797	-1551.62

104	44	-0.316004	132.897	-1565.52
105	45	-0.305481	132.99	-1579.27
106	46	-0.294992	133.077	-1592.84
107	46	-0.287147	133.159	-1606.05
108	46	-0.276714	133.236	-1618.77
109	47.7	-0.268908	133.308	-1631.6
110	48	-0.258527	133.375	-1644.01
111	50	-0.248174	133.437	-1656.42
112	50	-0.240426	133.495	-1668.44
113	51	-0.230118	133.547	-1680.18
114	51.2	-0.219834	133.596	-1691.43
115	52	-0.212137	133.641	-1702.46
116	54	-0.201894	133.682	-1713.37
117	54.7	-0.194225	133.719	-1723.99
118	56	-0.184017	133.753	-1734.3
119	56	-0.173829	133.783	-1744.03
120	57	-0.166199	133.811	-1753.5
121	58	-0.156042	133.835	-1762.55
122	58	-0.1459	133.857	-1771.02
123	58	-0.138305	133.876	-1779.04
124	59	-0.128189	133.892	-1786.6
125	60	-0.12061	133.907	-1793.84
126	60	-0.110516	133.919	-1800.47
127	61	-0.100433	133.929	-1806.59
128	63	-0.0928787	133.938	-1812.45
129	67.8	-0.0828129	133.945	-1818.06
130	75	-0.0727562	133.95	-1823.52
131	79.7	-0.0652187	133.954	-1828.72
132	88.4	-0.0551734	133.957	-1833.59
133	98.9	-0.0476439	133.959	-1838.3
134	110	-0.0376076	133.961	-1842.44
135	113	-0.0275759	133.962	-1845.56
136	117	-0.0200544	133.962	-1847.9
137	120	-0.0100272	133.962	-1849.11
138	122	0	133.962	-1849.11
139	126	0.0100272	133.962	-1847.84
140	131	0.0200544	133.963	-1845.22
141	139	0.0275759	133.963	-1841.38
142	140	0.0376076	133.965	-1836.12
143	144	0.0476439	133.967	-1829.26
144	149	0.0551734	133.97	-1821.04
145	150	0.0652187	133.974	-1811.25
146	150	0.0727562	133.98	-1800.34
147	152	0.0828129	133.986	-1787.75
148	158	0.0928787	133.995	-1773.08
149	160	0.100433	134.005	-1757.01
150	168	0.110516	134.017	-1738.44
151	168	0.12061	134.032	-1718.18
152	170	0.128189	134.048	-1696.39
153	170	0.138305	134.068	-1672.88
154	173	0.1459	134.089	-1647.63
155	175	0.156042	134.113	-1620.33
156	178	0.166199	134.141	-1590.74
157	180	0.173829	134.171	-1559.45
158	180	0.184017	134.205	-1526.33
159	180	0.194225	134.243	-1491.37
160	180	0.201894	134.283	-1455.03

161	185	0.212137	134.328	-1415.79
162	190	0.219834	134.377	-1374.02
163	190	0.230118	134.43	-1330.29
164	194	0.240426	134.487	-1283.65
165	194	0.248174	134.549	-1235.51
166	194	0.258527	134.616	-1185.35
167	196	0.268908	134.688	-1132.65
168	200	0.276714	134.765	-1077.3
169	202	0.287147	134.847	-1019.3
170	203	0.294992	134.934	-959.416
171	207	0.305481	135.028	-896.181
172	210	0.316004	135.127	-829.82
173	210	0.323919	135.232	-761.797
174	214	0.334503	135.344	-690.214
175	215	0.345126	135.463	-616.012
176	221	0.353118	135.588	-537.972
177	232	0.363809	135.72	-453.569
178	246	0.371856	135.859	-362.092
179	247	0.382622	136.005	-267.584
180	249	0.393433	136.16	-169.62
181	254	0.401571	136.321	-67.6206
182	260	0.412463	136.491	39.6197
183	260	0.423405	136.67	149.705
184	270	0.431644	136.857	266.249
185	275	0.442676	137.053	387.985
186	280	0.450985	137.256	514.261
187	280	0.462114	137.47	643.653
188	283	0.473299	137.694	777.596
189	288	0.481728	137.926	916.334
190	368	0.493018	138.169	1097.76
191	375	0.504372	138.423	1286.9
192	377	0.51293	138.686	1480.28
193	384	0.524401	138.961	1681.65
194	400	0.533048	139.245	1894.87
195	400	0.544642	139.542	2112.72
196	402	0.556308	139.852	2336.36
197	406	0.565108	140.171	2565.79
198	420	0.576911	140.504	2808.1
199	420	0.588793	140.85	3055.39
200	426	0.597761	141.208	3310.04
201	430	0.609791	141.58	3572.25
202	435	0.618872	141.963	3841.46
203	440	0.631062	142.361	4119.12
204	475	0.643345	142.775	4424.71
205	500	0.652622	143.201	4751.02
206	518	0.665079	143.643	5095.53
207	750	0.67449	144.098	5601.4
208	875	0.687131	144.57	6202.64
209	916	0.699883	145.06	6843.73
210	950	0.709522	145.563	7517.78
211	1160	0.722479	146.085	8355.86
212	1210	0.735557	146.626	9245.88
213	1250	0.745449	147.182	10177.7
214	1250	0.758753	147.758	11126.1
215	1250	0.768821	148.349	12087.2
216	1270	0.782366	148.961	13080.8
217	1300	0.796056	149.595	14115.6

218	1325	0.806422	150.245	15184.1
219	1328	0.820379	150.918	16273.6
220	1350	0.834498	151.614	17400.2
221	1360	0.845198	152.329	18549.6
222	1375	0.859618	153.068	19731.6
223	1390	0.87055	153.825	20941.7
224	1399	0.885291	154.609	22180.2
225	1400	0.900227	155.42	23440.5
226	1410	0.911562	156.251	24725.8
227	1412	0.926859	157.11	26034.6
228	1435	0.942375	157.998	27386.9
229	1500	0.954165	158.908	28818.1
230	1500	0.970094	159.849	30273.3
231	1500	0.982202	160.814	31746.6
232	1509	0.998575	161.811	33253.4
233	1510	1.01522	162.842	34786.4
234	1510	1.02789	163.898	36338.5
235	1520	1.04505	164.99	37927
236	1550	1.06252	166.119	39573.9
237	1553	1.07584	167.277	41244.7
238	1560	1.0939	168.473	42951.1
239	1580	1.10768	169.7	44701.3
240	1584	1.12639	170.969	46485.5
241	1600	1.1455	172.281	48318.3
242	1600	1.16012	173.627	50174.5
243	1600	1.18	175.02	52062.5
244	1610	1.20036	176.46	53995.1
245	1613	1.21596	177.939	55956.4
246	1616	1.23724	179.47	57955.8
247	1634	1.25357	181.041	60004.1
248	1670	1.27588	182.669	62134.8
249	1674	1.29884	184.356	64309.1
250	1674	1.31652	186.089	66512.9
251	1690	1.34075	187.887	68778.8
252	1699	1.36581	189.752	71099.3
253	1700	1.38517	191.671	73454.1
254	1700	1.41183	193.664	75854.2
255	1730	1.4325	195.716	78332.4
256	1739	1.46106	197.851	80873.2
257	1749	1.49085	200.074	83480.7
258	1749	1.5141	202.366	86128.9
259	1750	1.54643	204.758	88835.1
260	1760	1.58047	207.256	91616.8
261	1769	1.60725	209.839	94460
262	1789	1.64485	212.544	97402.6
263	1799	1.67466	215.349	100415
264	1800	1.71688	218.297	103506
265	1800	1.76241	221.403	106678
266	1800	1.79912	224.639	109916
267	1800	1.85218	228.07	113250
268	1874	1.91103	231.722	116832
269	1892	1.95996	235.563	120540
270	1922	2.03352	239.699	124448
271	1999	2.09693	244.096	128640
272	2000	2.19728	248.924	133035
273	2050	2.32634	254.336	137804
274	2099	2.45727	260.374	142962

Sample Standard Deviation = 656.639
Numerator = 2.0438e+010
Denominator = 3.0761e+010 = 274 260.374
W Statistic = 0.664412
5% Critical value of 0.976 exceeds 0.664412
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.664412
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 1.81818%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 70
Maximum Background Concentration = 63
Confidence Level = 94.6%
False Positive Rate = 5.4%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	1250	TRUE
MW#93-3	9/27/2018	1	426	TRUE
MW#03-1	2/27/2018	1	1.07	FALSE
MW#03-2	9/27/2018	1	283	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 70
Maximum Baseline Concentration = 2149
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	400
	3/14/1995	1500
	6/21/1995	75
	12/14/1995	1749
	3/6/1996	1674
	4/25/1996	1999
	10/2/1996	1553
	12/10/1996	1560
	3/11/1997	1634
	4/15/1997	1700
	8/14/1997	2149
	12/4/1997	1769
	3/31/1998	2000
	6/23/1998	2099
	8/11/1998	1874
	12/8/1998	1922
	3/9/1999	1700
	6/8/1999	1739
	8/19/1999	1800
	12/14/1999	1800
	3/7/2000	1328
	6/23/2000	950
	12/12/2000	1789
	3/27/2001	1749
	6/28/2001	1799
	9/10/2001	2050
	12/18/2001	1600
	3/19/2002	1730
	6/26/2002	1699
	9/18/2002	1674
	12/11/2002	1613
	3/13/2003	1510
	6/25/2003	1800
	9/26/2003	1616
	12/10/2003	1509
	3/9/2004	1800
	6/24/2004	1892
	9/15/2004	1435
	12/15/2004	1600
	3/16/2005	1325
	6/15/2005	1400

9/21/2005	1412
12/21/2005	1550
3/15/2006	1375
6/21/2006	1500
12/20/2006	1250
2/21/2007	1250
6/12/2007	1350
12/17/2007	1399
6/11/2008	1210
12/3/2008	1584
6/17/2009	750
12/9/2009	875
6/17/2010	1500
12/22/2010	1600
6/29/2011	1670
12/7/2011	1510
6/6/2012	1610
12/12/2012	1750
6/19/2013	1390
12/11/2013	1410
6/11/2014	1360
12/3/2014	1520
6/17/2015	47.7
12/1/2015	1760
6/22/2016	1300
12/20/2016	1690
6/6/2017	1580
11/7/2017	1160
2/27/2018	1270

Date	Samples	Mean	Impacted
9/27/2018	1	1250	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 69
Maximum Baseline Concentration = 916
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	440
	3/14/1995	420
	6/21/1995	420
	12/14/1995	406
	3/6/1996	368
	4/25/1996	384
	10/2/1996	430
	12/10/1996	377
	3/11/1997	375
	4/15/1997	400
	8/14/1997	916
	12/4/1997	249
	3/31/1998	275
	6/23/1998	246
	8/11/1998	500
	12/8/1998	260
	3/9/1999	280
	6/8/1999	214
	8/19/1999	260
	12/14/1999	200
	3/7/2000	232
	6/23/2000	270
	12/12/2000	196
	3/27/2001	190
	6/28/2001	180
	9/10/2001	202
	12/18/2001	149
	3/19/2002	203
	6/26/2002	180
	9/18/2002	185
	12/11/2002	178
	3/13/2003	207
	6/25/2003	190
	9/26/2003	158
	12/10/2003	140
	3/9/2004	13
	6/24/2004	160
	9/15/2004	139
	12/15/2004	122
	3/16/2005	180
	6/15/2005	150

9/21/2005	215
12/21/2005	180
3/15/2006	221
6/21/2006	210
12/20/2006	210
6/12/2007	110
12/17/2007	131
6/11/2008	144
12/3/2008	152
6/17/2009	120
12/9/2009	175
6/17/2010	150
12/22/2010	170
6/29/2011	170
12/7/2011	98.9
6/6/2012	194
12/12/2012	168
6/19/2013	194
12/11/2013	173
6/11/2014	254
12/3/2014	194
6/17/2015	168
12/1/2015	280
6/22/2016	518
12/20/2016	475
6/6/2017	113
11/7/2017	402
2/27/2018	435

Date	Samples	Mean	Impacted
9/27/2018	1	426	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-2

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 2.94118%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 34
Maximum Baseline Concentration = 288
Confidence Level = 97.1%
False Positive Rate = 2.9%

Baseline Samples	Date	Result
	6/24/2004	36
	9/15/2004	4
	12/15/2004	28
	3/16/2005	30
	6/15/2005	30
	9/21/2005	27
	12/21/2005	26
	3/15/2006	27
	6/21/2006	23
	12/20/2006	35
	6/12/2007	30
	12/17/2007	20
	6/11/2008	41
	12/3/2008	46
	6/17/2009	60
	12/9/2009	45
	6/17/2010	33
	12/22/2010	29
	6/29/2011	28.4
	12/7/2011	23.5
	6/6/2012	29.3
	12/12/2012	28.3
	6/19/2013	32.1
	12/11/2013	32.8
	6/11/2014	ND<5
	12/3/2014	51.2
	6/17/2015	54.7
	12/1/2015	67.8
	6/22/2016	79.7
	10/11/2016	88.4
	12/20/2016	126
	6/6/2017	117
	11/7/2017	288
	2/27/2018	247

Date	Samples	Mean	Impacted
9/27/2018	1	283	FALSE

Concentrations (mg/L)

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 54
Total Non-Detect: 7
Percent Non-Detects: 12.963%
Total Background Samples: 11
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	11	0 (0%)	10/11/2016	0.1	0.1
			12/20/2016	0.2	0.2
			2/16/2017	0.16	0.16
			3/8/2017	0.19	0.19
			5/9/2017	0.13	0.13
			6/6/2017	0.14	0.14
			8/22/2017	0.1	0.1
			9/22/2017	0.11	0.11
			11/7/2017	0.12	0.12
			2/27/2018	0.16	0.16
			9/19/2018	0.243	0.243

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	11	1 (9.09091%)	10/11/2016	0.81	0.81
			12/20/2016	1.06	1.06
			2/16/2017	0.68	0.68
			3/8/2017	0.79	0.79
			5/9/2017	0.7	0.7
			6/6/2017	0.68	0.68
			8/22/2017	0.35	0.35
			9/22/2017	0.51	0.51
			11/7/2017	0.12	0.12
			2/27/2018	ND<0.1	ND<0.1
			9/19/2018	1	1
MW#93-3	11	0 (0%)	10/11/2016	0.15	0.15
			12/20/2016	0.23	0.23
			2/16/2017	0.2	0.2
			3/8/2017	0.22	0.22
			5/9/2017	0.18	0.18
			6/6/2017	0.24	0.24
			8/22/2017	0.23	0.23
			9/22/2017	0.2	0.2
			11/7/2017	0.2	0.2
			2/27/2018	0.21	0.21
			9/19/2018	0.389	0.389
MW#03-1	10	2 (20%)	10/11/2016	ND<0.1	ND<0.1
			12/20/2016	0.18	0.18
			2/16/2017	0.13	0.13
			3/8/2017	0.19	0.19

			5/9/2017	0.1	0.1
			6/6/2017	ND<0.1	ND<0.1
			8/22/2017	0.1	0.1
			9/22/2017	0.1	0.1
			11/7/2017	0.12	0.12
			2/27/2018	0.1	0.1
MW#03-2	11	4 (36.3636%)	10/11/2016	ND<0.1	ND<0.1
			12/20/2016	0.14	0.14
			2/16/2017	0.12	0.12
			3/8/2017	0.14	0.14
			5/9/2017	ND<0.1	ND<0.1
			6/6/2017	0.1	0.1
			8/22/2017	ND<0.1	ND<0.1
			9/22/2017	ND<0.1	ND<0.1
			11/7/2017	0.1	0.1
			2/27/2018	0.12	0.12
			9/19/2018	0.21	0.21

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.0760774
Overall Std Dev = 0.122051
Overall Total = 4.10818
SS Wells = 0.43498
SS Total = 0.789507

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	0.43498	4	0.108745	15.0299
Error (within wells)	0.354527	49	0.00723525	
Totals	0.789507	53		

15.0299 exceeds 2.52521; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	10/11/2016	0.0502727
	12/20/2016	0.0497273
	2/16/2017	0.00972727
	3/8/2017	0.0397273
	5/9/2017	0.0202727
	6/6/2017	0.0102727
	8/22/2017	0.0502727
	9/22/2017	0.0402727
	11/7/2017	0.0302727
	2/27/2018	0.00972727
	9/19/2018	0.0927273

Well: MW#93-2	Sample	Residual
	10/11/2016	0.191818
	12/20/2016	0.441818
	2/16/2017	0.0618182
	3/8/2017	0.171818
	5/9/2017	0.0818182
	6/6/2017	0.0618182
	8/22/2017	0.268182
	9/22/2017	0.108182
	11/7/2017	0.498182
	2/27/2018	0.518182
	9/19/2018	0.381818

Well: MW#93-3	Sample	Residual
	10/11/2016	0.0726364
	12/20/2016	0.00736364
	2/16/2017	0.0226364
	3/8/2017	0.00263636
	5/9/2017	0.0426364

6/6/2017	0.0173636
8/22/2017	0.00736364
9/22/2017	0.0226364
11/7/2017	0.0226364
2/27/2018	0.0126364
9/19/2018	0.166364

Well: MW#03-1	**Sample**	**Residual**
	10/11/2016	0.022
	12/20/2016	0.058
	2/16/2017	0.008
	3/8/2017	0.068
	5/9/2017	0.022
	6/6/2017	0.022
	8/22/2017	0.022
	9/22/2017	0.022
	11/7/2017	0.002
	2/27/2018	0.022

Well: MW#03-2	**Sample**	**Residual**
	10/11/2016	0.0209091
	12/20/2016	0.0190909
	2/16/2017	0.000909091
	3/8/2017	0.0190909
	5/9/2017	0.0209091
	6/6/2017	0.0209091
	8/22/2017	0.0209091
	9/22/2017	0.0209091
	11/7/2017	0.0209091
	2/27/2018	0.000909091
	9/19/2018	0.0890909

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 54

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	0.1	-2.09693	4.39712	-0.209693
2	0.1	-1.79912	7.63394	-0.389605
3	0.1	-1.60725	10.2172	-0.55033
4	0.1	-1.46106	12.3519	-0.696436
5	0.1	-1.34075	14.1495	-0.830511
6	0.1	-1.23187	15.667	-0.953698
7	0.1	-1.14069	16.9682	-1.06777
8	0.1	-1.05812	18.0878	-1.17358
9	0.1	-0.982202	19.0525	-1.2718
10	0.1	-0.911562	19.8835	-1.36295
11	0.1	-0.841621	20.5918	-1.44712
12	0.1	-0.778966	21.1986	-1.52501
13	0.1	-0.719228	21.7159	-1.59694
14	0.1	-0.661955	22.154	-1.66313
15	0.1	-0.606775	22.5222	-1.72381
16	0.11	-0.553384	22.8285	-1.78468
17	0.12	-0.498687	23.0771	-1.84452
18	0.12	-0.448213	23.278	-1.89831
19	0.12	-0.398855	23.4371	-1.94617
20	0.12	-0.350451	23.5599	-1.98823
21	0.12	-0.302855	23.6517	-2.02457
22	0.13	-0.253347	23.7158	-2.0575
23	0.13	-0.207012	23.7587	-2.08442
24	0.14	-0.161119	23.7847	-2.10697
25	0.14	-0.115562	23.798	-2.12315
26	0.14	-0.0702426	23.8029	-2.13299
27	0.15	-0.0250691	23.8036	-2.13675
28	0.16	0.0250691	23.8042	-2.13273
29	0.16	0.0702426	23.8091	-2.1215
30	0.18	0.115562	23.8225	-2.10069
31	0.18	0.161119	23.8485	-2.07169
32	0.19	0.207012	23.8913	-2.03236
33	0.19	0.253347	23.9555	-1.98422
34	0.2	0.302855	24.0472	-1.92365
35	0.2	0.350451	24.17	-1.85356
36	0.2	0.398855	24.3291	-1.77379
37	0.2	0.448213	24.53	-1.68415
38	0.21	0.498687	24.7787	-1.57943
39	0.21	0.553384	25.0849	-1.46322
40	0.22	0.606775	25.4531	-1.32972
41	0.23	0.661955	25.8913	-1.17747
42	0.23	0.719228	26.4086	-1.01205
43	0.24	0.778966	27.0154	-0.8251
44	0.243	0.841621	27.7237	-0.620586
45	0.35	0.911562	28.5546	-0.30154
46	0.389	0.982202	29.5194	0.0805368

47	0.51	1.05812	30.639	0.620179
48	0.68	1.14069	31.9402	1.39585
49	0.68	1.23187	33.4576	2.23352
50	0.7	1.34075	35.2553	3.17204
51	0.79	1.46106	37.39	4.32628
52	0.81	1.60725	39.9732	5.62815
53	1	1.79912	43.21	7.42727

Sample Standard Deviation = 0.240201
Numerator = 55.1643
Denominator = 132.133 = 53 43.21
W Statistic = 0.41749
5% Critical value of 0.958 exceeds 0.41749
Evidence of non-normality at 95% level of significance
1% Critical value of 0.94 exceeds 0.41749
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 12.963%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 11
Maximum Background Concentration = 0.243
Confidence Level = 73.3%
False Positive Rate = 26.7%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/19/2018	1	1	TRUE
MW#93-3	9/19/2018	1	0.389	TRUE
MW#03-1	2/27/2018	1	0.1	FALSE
MW#03-2	9/19/2018	1	0.21	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 10%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 10
Maximum Baseline Concentration = 1.06
Confidence Level = 90.9%
False Positive Rate = 9.1%

Baseline Samples	Date	Result
	10/11/2016	0.81
	12/20/2016	1.06
	2/16/2017	0.68
	3/8/2017	0.79
	5/9/2017	0.7
	6/6/2017	0.68
	8/22/2017	0.35
	9/22/2017	0.51
	11/7/2017	0.12
	2/27/2018	ND<0.1

Date	Samples	Mean	Impacted
9/19/2018	1	1	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 10
Maximum Baseline Concentration = 0.24
Confidence Level = 90.9%
False Positive Rate = 9.1%

Baseline Samples	Date	Result
	10/11/2016	0.15
	12/20/2016	0.23
	2/16/2017	0.2
	3/8/2017	0.22
	5/9/2017	0.18
	6/6/2017	0.24
	8/22/2017	0.23
	9/22/2017	0.2
	11/7/2017	0.2
	2/27/2018	0.21

Date	Samples	Mean	Impacted
9/19/2018	1	0.389	TRUE

Concentrations (std)

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 277
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 70
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	70	0 (0%)	12/15/1994	6.67	6.67
			3/14/1995	6.72	6.72
			6/21/1995	6.58	6.58
			12/14/1995	6.72	6.72
			3/6/1996	6.72	6.72
			4/25/1996	6.79	6.79
			10/2/1996	6.61	6.61
			12/10/1996	6.51	6.51
			3/11/1997	6.77	6.77
			4/15/1997	6.66	6.66
			8/14/1997	6.66	6.66
			12/4/1997	6.78	6.78
			3/31/1998	6.87	6.87
			6/23/1998	6.5	6.5
			8/11/1998	7.05	7.05
			12/8/1998	6.62	6.62
			3/9/1999	6.6	6.6
			6/8/1999	6.93	6.93
			8/19/1999	6.54	6.54
			12/14/1999	6.55	6.55
			3/7/2000	6.59	6.59
			6/23/2000	6.52	6.52
			12/12/2000	6.56	6.56
			3/27/2001	6.6	6.6
			6/28/2001	6.59	6.59
			9/10/2001	6.76	6.76
			12/18/2001	6.76	6.76
			3/19/2002	6.93	6.93
			6/26/2002	6.85	6.85
			9/18/2002	6.62	6.62
			12/11/2002	6.58	6.58
			3/13/2003	6.66	6.66
			6/25/2003	6.94	6.94
			9/26/2003	6.42	6.42
			12/10/2003	6.64	6.64
			3/9/2004	6.68	6.68
			6/24/2004	6.53	6.53
			9/15/2004	6.43	6.43
			12/15/2004	6.61	6.61
			3/16/2005	6.57	6.57
			6/15/2005	6.53	6.53
			9/21/2005	6.65	6.65
			12/21/2005	6.61	6.61
			3/15/2006	6.64	6.64

			6/21/2006	6.85	6.85
			12/20/2006	6.67	6.67
			6/12/2007	6.58	6.58
			12/17/2007	6.33	6.33
			6/11/2008	6.7	6.7
			12/3/2008	6.5	6.5
			6/17/2009	6.8	6.8
			12/9/2009	6.6	6.6
			6/17/2010	6.5	6.5
			12/22/2010	6.55	6.55
			6/29/2011	6.5	6.5
			12/7/2011	6.41	6.41
			6/6/2012	6.23	6.23
			12/12/2012	6.61	6.61
			6/19/2013	6.58	6.58
			12/11/2013	6.57	6.57
			6/11/2014	6.1	6.1
			12/3/2014	6.69	6.69
			6/17/2015	6.38	6.38
			12/1/2015	6.45	6.45
			6/22/2016	6.59	6.59
			12/20/2016	6.28	6.28
			6/6/2017	6.69	6.69
			11/7/2017	6.21	6.21
			2/27/2018	6.47	6.47
			9/19/2018	6.62	6.62

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	73	0 (0%)	12/15/1994	8.54	8.54
			3/14/1995	8.82	8.82
			6/21/1995	8.68	8.68
			12/14/1995	8.16	8.16
			3/6/1996	9.37	9.37
			4/25/1996	9.14	9.14
			10/2/1996	8.94	8.94
			12/10/1996	9.27	9.27
			3/11/1997	8.95	8.95
			4/15/1997	9.25	9.25
			8/14/1997	8.67	8.67
			12/4/1997	8.77	8.77
			3/31/1998	9.32	9.32
			6/23/1998	8.87	8.87
			8/11/1998	9	9
			12/8/1998	8.9	8.9
			3/9/1999	9.39	9.39
			6/8/1999	9.25	9.25
			8/19/1999	9.15	9.15
			12/14/1999	8.98	8.98
			3/7/2000	9.2	9.2
			6/23/2000	9.18	9.18
			12/12/2000	9.18	9.18
			3/27/2001	9.29	9.29
			6/28/2001	9.22	9.22
			9/10/2001	9.1	9.1

			12/18/2001	9.4	9.4
			3/19/2002	9.54	9.54
			6/26/2002	9.44	9.44
			9/18/2002	9.24	9.24
			12/11/2002	9.16	9.16
			3/13/2003	9.28	9.28
			6/25/2003	9.27	9.27
			9/26/2003	9.32	9.32
			12/10/2003	9.25	9.25
			3/9/2004	9.37	9.37
			6/24/2004	9.24	9.24
			9/15/2004	9.32	9.32
			12/15/2004	9.26	9.26
			3/16/2005	9.23	9.23
			6/15/2005	9.1	9.1
			9/21/2005	9.25	9.25
			12/21/2005	9.31	9.31
			3/15/2006	9.47	9.47
			6/21/2006	9.4	9.4
			12/20/2006	9.18	9.18
			2/21/2007	9.2	9.2
			6/12/2007	9.1	9.1
			12/17/2007	9.3	9.3
			6/11/2008	9.4	9.4
			12/3/2008	9.7	9.7
			12/15/2008	9.6	9.6
			6/17/2009	9.8	9.8
			12/9/2009	9.8	9.8
			6/17/2010	9.6	9.6
			12/22/2010	9.5	9.5
			6/29/2011	9.4	9.4
			12/7/2011	9.5	9.5
			6/6/2012	9.68	9.68
			12/12/2012	10.02	10.02
			1/9/2013	9.51	9.51
			6/19/2013	9.4	9.4
			12/11/2013	9.46	9.46
			6/11/2014	8.55	8.55
			12/3/2014	8.95	8.95
			6/17/2015	9.13	9.13
			12/1/2015	9.37	9.37
			6/22/2016	9.28	9.28
			12/20/2016	9.72	9.72
			6/6/2017	9.29	9.29
			11/7/2017	8.86	8.86
			2/27/2018	9.04	9.04
			9/19/2018	9.09	9.09
MW#93-3	70	0 (0%)	12/15/1994	6.68	6.68
			3/14/1995	6.74	6.74
			6/21/1995	6.61	6.61
			12/14/1995	6.75	6.75
			3/6/1996	6.85	6.85
			4/25/1996	6.78	6.78
			10/2/1996	6.75	6.75
			12/10/1996	6.7	6.7
			3/11/1997	6.8	6.8

4/15/1997	6.74	6.74
8/14/1997	6.88	6.88
12/4/1997	6.88	6.88
3/31/1998	6.92	6.92
6/23/1998	6.76	6.76
8/11/1998	6.91	6.91
12/8/1998	6.93	6.93
3/9/1999	6.78	6.78
6/8/1999	6.85	6.85
8/19/1999	6.97	6.97
12/14/1999	6.8	6.8
3/7/2000	6.77	6.77
6/23/2000	6.82	6.82
12/12/2000	6.86	6.86
3/27/2001	6.79	6.79
6/28/2001	6.86	6.86
9/10/2001	7.04	7.04
12/18/2001	6.93	6.93
3/19/2002	7	7
6/26/2002	6.89	6.89
9/18/2002	7.96	7.96
12/11/2002	6.74	6.74
3/13/2003	6.87	6.87
6/25/2003	6.85	6.85
9/26/2003	6.77	6.77
12/10/2003	6.99	6.99
3/9/2004	7.45	7.45
6/24/2004	6.8	6.8
9/15/2004	6.7	6.7
12/15/2004	6.88	6.88
3/16/2005	6.69	6.69
6/15/2005	6.81	6.81
9/21/2005	6.85	6.85
12/21/2005	6.7	6.7
3/15/2006	7.07	7.07
6/21/2006	6.84	6.84
12/20/2006	6.93	6.93
6/12/2007	6.89	6.89
12/17/2007	6.8	6.8
6/11/2008	6.8	6.8
12/3/2008	6.8	6.8
6/17/2009	7.2	7.2
12/9/2009	6.9	6.9
6/17/2010	6.7	6.7
12/22/2010	6.82	6.82
6/29/2011	6.7	6.7
12/7/2011	6.77	6.77
6/6/2012	6.42	6.42
12/12/2012	6.85	6.85
6/19/2013	6.49	6.49
12/11/2013	7.07	7.07
6/11/2014	6.08	6.08
12/3/2014	6.8	6.8
6/17/2015	6.4	6.4
12/1/2015	6.6	6.6
6/22/2016	6.43	6.43
12/20/2016	6.27	6.27

			6/6/2017	6.65	6.65
			11/7/2017	6.46	6.46
			2/27/2018	6.49	6.49
			9/19/2018	6.55	6.55
MW#03-1	30	0 (0%)	6/24/2004	7.27	7.27
			9/15/2004	6.78	6.78
			12/15/2004	7.32	7.32
			3/16/2005	7.3	7.3
			6/15/2005	7.28	7.28
			9/21/2005	7.88	7.88
			12/20/2006	7	7
			6/12/2007	7.29	7.29
			12/17/2007	6.8	6.8
			6/11/2008	7.4	7.4
			12/3/2008	7.4	7.4
			6/17/2009	7.6	7.6
			12/9/2009	7.5	7.5
			6/17/2010	7.1	7.1
			12/22/2010	6.89	6.89
			6/29/2011	7.3	7.3
			12/7/2011	7.05	7.05
			6/6/2012	7.33	7.33
			6/19/2013	7.15	7.15
			12/11/2013	7.19	7.19
			6/11/2014	6.62	6.62
			12/3/2014	6.73	6.73
			6/17/2015	6.66	6.66
			12/1/2015	6.34	6.34
			6/22/2016	7.2	7.2
			12/20/2016	6.75	6.75
			6/6/2017	6.64	6.64
			11/7/2017	6.44	6.44
			2/27/2018	6.81	6.81
			9/19/2018	7.19	7.19
MW#03-2	34	0 (0%)	6/24/2004	6.84	6.84
			9/15/2004	7.17	7.17
			12/15/2004	6.86	6.86
			3/16/2005	6.8	6.8
			6/15/2005	6.87	6.87
			9/21/2005	6.87	6.87
			12/21/2005	6.83	6.83
			3/15/2006	6.88	6.88
			6/21/2006	6.78	6.78
			12/20/2006	6.88	6.88
			6/12/2007	6.87	6.87
			12/17/2007	6.7	6.7
			6/11/2008	6.9	6.9
			12/3/2008	6.8	6.8
			6/17/2009	7.3	7.3
			12/9/2009	6.8	6.8
			6/17/2010	6.8	6.8
			12/22/2010	7.2	7.2
			6/29/2011	6.7	6.7
			12/7/2011	6.69	6.69
			6/6/2012	6.73	6.73

12/12/2012	6.82	6.82
6/19/2013	6.88	6.88
12/11/2013	6.72	6.72
6/11/2014	7	7
12/3/2014	7.14	7.14
6/17/2015	6.45	6.45
12/1/2015	6.39	6.39
6/22/2016	6.75	6.75
12/20/2016	6.36	6.36
6/6/2017	6.73	6.73
11/7/2017	6.22	6.22
2/27/2018	6.47	6.47
9/19/2018	6.63	6.63

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 0.179395
Overall Std Dev = 0.187344
Overall Total = 49.6923
SS Wells = 0.848919
SS Total = 9.68695

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	0.848919	4	0.21223	6.5316
Error (within wells)	8.83803	272	0.0324927	
Totals	9.68695	276		

6.5316 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	0.0617143
	3/14/1995	0.111714
	6/21/1995	0.0282857
	12/14/1995	0.111714
	3/6/1996	0.111714
	4/25/1996	0.181714
	10/2/1996	0.00171429
	12/10/1996	0.0982857
	3/11/1997	0.161714
	4/15/1997	0.0517143
	8/14/1997	0.0517143
	12/4/1997	0.171714
	3/31/1998	0.261714
	6/23/1998	0.108286
	8/11/1998	0.441714
	12/8/1998	0.0117143
	3/9/1999	0.00828571
	6/8/1999	0.321714
	8/19/1999	0.0682857
	12/14/1999	0.0582857
	3/7/2000	0.0182857
	6/23/2000	0.0882857
	12/12/2000	0.0482857
	3/27/2001	0.00828571
	6/28/2001	0.0182857
	9/10/2001	0.151714
	12/18/2001	0.151714
	3/19/2002	0.321714
	6/26/2002	0.241714
	9/18/2002	0.0117143
	12/11/2002	0.0282857
	3/13/2003	0.0517143

6/25/2003	0.331714
9/26/2003	0.188286
12/10/2003	0.0317143
3/9/2004	0.0717143
6/24/2004	0.0782857
9/15/2004	0.178286
12/15/2004	0.00171429
3/16/2005	0.0382857
6/15/2005	0.0782857
9/21/2005	0.0417143
12/21/2005	0.00171429
3/15/2006	0.0317143
6/21/2006	0.241714
12/20/2006	0.0617143
6/12/2007	0.0282857
12/17/2007	0.278286
6/11/2008	0.0917143
12/3/2008	0.108286
6/17/2009	0.191714
12/9/2009	0.00828571
6/17/2010	0.108286
12/22/2010	0.0582857
6/29/2011	0.108286
12/7/2011	0.198286
6/6/2012	0.378286
12/12/2012	0.00171429
6/19/2013	0.0282857
12/11/2013	0.0382857
6/11/2014	0.508286
12/3/2014	0.0817143
6/17/2015	0.228286
12/1/2015	0.158286
6/22/2016	0.0182857
12/20/2016	0.328286
6/6/2017	0.0817143
11/7/2017	0.398286
2/27/2018	0.138286
9/19/2018	0.0117143

Well: MW#93-2

Sample	Residual
12/15/1994	0.691096
3/14/1995	0.411096
6/21/1995	0.551096
12/14/1995	1.0711
3/6/1996	0.138904
4/25/1996	0.0910959
10/2/1996	0.291096
12/10/1996	0.0389041
3/11/1997	0.281096
4/15/1997	0.0189041
8/14/1997	0.561096
12/4/1997	0.461096
3/31/1998	0.0889041
6/23/1998	0.361096
8/11/1998	0.231096
12/8/1998	0.331096
3/9/1999	0.158904

6/8/1999	0.0189041
8/19/1999	0.0810959
12/14/1999	0.251096
3/7/2000	0.0310959
6/23/2000	0.0510959
12/12/2000	0.0510959
3/27/2001	0.0589041
6/28/2001	0.0110959
9/10/2001	0.131096
12/18/2001	0.168904
3/19/2002	0.308904
6/26/2002	0.208904
9/18/2002	0.00890411
12/11/2002	0.0710959
3/13/2003	0.0489041
6/25/2003	0.0389041
9/26/2003	0.0889041
12/10/2003	0.0189041
3/9/2004	0.138904
6/24/2004	0.00890411
9/15/2004	0.0889041
12/15/2004	0.0289041
3/16/2005	0.00109589
6/15/2005	0.131096
9/21/2005	0.0189041
12/21/2005	0.0789041
3/15/2006	0.238904
6/21/2006	0.168904
12/20/2006	0.0510959
2/21/2007	0.0310959
6/12/2007	0.131096
12/17/2007	0.0689041
6/11/2008	0.168904
12/3/2008	0.468904
12/15/2008	0.368904
6/17/2009	0.568904
12/9/2009	0.568904
6/17/2010	0.368904
12/22/2010	0.268904
6/29/2011	0.168904
12/7/2011	0.268904
6/6/2012	0.448904
12/12/2012	0.788904
1/9/2013	0.278904
6/19/2013	0.168904
12/11/2013	0.228904
6/11/2014	0.681096
12/3/2014	0.281096
6/17/2015	0.101096
12/1/2015	0.138904
6/22/2016	0.0489041
12/20/2016	0.488904
6/6/2017	0.0589041
11/7/2017	0.371096
2/27/2018	0.191096
9/19/2018	0.141096

Well: MW#93-3

Sample	Residual
12/15/1994	0.118286
3/14/1995	0.0582857
6/21/1995	0.188286
12/14/1995	0.0482857
3/6/1996	0.0517143
4/25/1996	0.0182857
10/2/1996	0.0482857
12/10/1996	0.0982857
3/11/1997	0.00171429
4/15/1997	0.0582857
8/14/1997	0.0817143
12/4/1997	0.0817143
3/31/1998	0.121714
6/23/1998	0.0382857
8/11/1998	0.111714
12/8/1998	0.131714
3/9/1999	0.0182857
6/8/1999	0.0517143
8/19/1999	0.171714
12/14/1999	0.00171429
3/7/2000	0.0282857
6/23/2000	0.0217143
12/12/2000	0.0617143
3/27/2001	0.00828571
6/28/2001	0.0617143
9/10/2001	0.241714
12/18/2001	0.131714
3/19/2002	0.201714
6/26/2002	0.0917143
9/18/2002	1.16171
12/11/2002	0.0582857
3/13/2003	0.0717143
6/25/2003	0.0517143
9/26/2003	0.0282857
12/10/2003	0.191714
3/9/2004	0.651714
6/24/2004	0.00171429
9/15/2004	0.0982857
12/15/2004	0.0817143
3/16/2005	0.108286
6/15/2005	0.0117143
9/21/2005	0.0517143
12/21/2005	0.0982857
3/15/2006	0.271714
6/21/2006	0.0417143
12/20/2006	0.131714
6/12/2007	0.0917143
12/17/2007	0.00171429
6/11/2008	0.00171429
12/3/2008	0.00171429
6/17/2009	0.401714
12/9/2009	0.101714
6/17/2010	0.0982857
12/22/2010	0.0217143
6/29/2011	0.0982857
12/7/2011	0.0282857

6/6/2012	0.378286
12/12/2012	0.0517143
6/19/2013	0.308286
12/11/2013	0.271714
6/11/2014	0.718286
12/3/2014	0.00171429
6/17/2015	0.398286
12/1/2015	0.198286
6/22/2016	0.368286
12/20/2016	0.528286
6/6/2017	0.148286
11/7/2017	0.338286
2/27/2018	0.308286
9/19/2018	0.248286

Well: MW#03-1

Sample	Residual
6/24/2004	0.196333
9/15/2004	0.293667
12/15/2004	0.246333
3/16/2005	0.226333
6/15/2005	0.206333
9/21/2005	0.806333
12/20/2006	0.0736667
6/12/2007	0.216333
12/17/2007	0.273667
6/11/2008	0.326333
12/3/2008	0.326333
6/17/2009	0.526333
12/9/2009	0.426333
6/17/2010	0.0263333
12/22/2010	0.183667
6/29/2011	0.226333
12/7/2011	0.0236667
6/6/2012	0.256333
6/19/2013	0.0763333
12/11/2013	0.116333
6/11/2014	0.453667
12/3/2014	0.343667
6/17/2015	0.413667
12/1/2015	0.733667
6/22/2016	0.126333
12/20/2016	0.323667
6/6/2017	0.433667
11/7/2017	0.633667
2/27/2018	0.263667
9/19/2018	0.116333

Well: MW#03-2

Sample	Residual
6/24/2004	0.0508824
9/15/2004	0.380882
12/15/2004	0.0708824
3/16/2005	0.0108824
6/15/2005	0.0808824
9/21/2005	0.0808824
12/21/2005	0.0408824
3/15/2006	0.0908824

6/21/2006	0.00911765
12/20/2006	0.0908824
6/12/2007	0.0808824
12/17/2007	0.0891176
6/11/2008	0.110882
12/3/2008	0.0108824
6/17/2009	0.510882
12/9/2009	0.0108824
6/17/2010	0.0108824
12/22/2010	0.410882
6/29/2011	0.0891176
12/7/2011	0.0991176
6/6/2012	0.0591176
12/12/2012	0.0308824
6/19/2013	0.0908824
12/11/2013	0.0691176
6/11/2014	0.210882
12/3/2014	0.350882
6/17/2015	0.339118
12/1/2015	0.399118
6/22/2016	0.0391176
12/20/2016	0.429118
6/6/2017	0.0591176
11/7/2017	0.569118
2/27/2018	0.319118
9/19/2018	0.159118

Shapiro-Francia Test of Normality

Parameter: ph

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 277

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	6.08	-2.74777	7.55021	-16.7064
2	6.1	-2.45727	13.5884	-31.6958
3	6.21	-2.32634	19.0003	-46.1424
4	6.22	-2.19728	23.8283	-59.8095
5	6.23	-2.12007	28.323	-73.0175
6	6.27	-2.03352	32.4582	-85.7677
7	6.28	-1.95996	36.2997	-98.0762
8	6.33	-1.91103	39.9517	-110.173
9	6.34	-1.85218	43.3823	-121.916
10	6.36	-1.81191	46.6653	-133.44
11	6.38	-1.76241	49.7714	-144.684
12	6.39	-1.71688	52.7191	-155.655
13	6.4	-1.68494	55.5581	-166.438
14	6.41	-1.64485	58.2636	-176.982
15	6.42	-1.61644	60.8765	-187.359
16	6.42	-1.58047	63.3744	-197.506
17	6.43	-1.54643	65.7658	-207.449
18	6.43	-1.52203	68.0824	-217.236
19	6.44	-1.49085	70.3051	-226.837
20	6.45	-1.46838	72.4612	-236.308
21	6.45	-1.43953	74.5335	-245.593
22	6.46	-1.41183	76.5267	-254.714
23	6.47	-1.39175	78.4637	-263.718
24	6.47	-1.36581	80.3291	-272.555
25	6.49	-1.34694	82.1434	-281.297
26	6.49	-1.32251	83.8924	-289.88
27	6.5	-1.29884	85.5794	-298.322
28	6.5	-1.28155	87.2217	-306.652
29	6.5	-1.25908	88.807	-314.836
30	6.5	-1.24264	90.3512	-322.914
31	6.51	-1.22123	91.8426	-330.864
32	6.52	-1.20036	93.2834	-338.69
33	6.53	-1.18504	94.6878	-346.428
34	6.53	-1.16505	96.0451	-354.036
35	6.54	-1.15035	97.3684	-361.559
36	6.55	-1.13113	98.6479	-368.968
37	6.55	-1.11232	99.8851	-376.254
38	6.55	-1.09847	101.092	-383.449
39	6.56	-1.08032	102.259	-390.536
40	6.57	-1.06694	103.397	-397.546
41	6.57	-1.04939	104.498	-404.44
42	6.58	-1.03215	105.564	-411.232
43	6.58	-1.01943	106.603	-417.94
44	6.58	-1.00271	107.608	-424.537
45	6.58	-0.990356	108.589	-431.054
46	6.59	-0.974114	109.538	-437.473

47	6.59	-0.958125	110.456	-443.787
48	6.59	-0.946291	111.352	-450.023
49	6.6	-0.930718	112.218	-456.166
50	6.6	-0.919183	113.063	-462.233
51	6.6	-0.903992	113.88	-468.199
52	6.6	-0.889006	114.67	-474.067
53	6.61	-0.877897	115.441	-479.87
54	6.61	-0.863249	116.186	-485.576
55	6.61	-0.852385	116.913	-491.21
56	6.61	-0.838054	117.615	-496.749
57	6.61	-0.823893	118.294	-502.195
58	6.62	-0.813379	118.955	-507.58
59	6.62	-0.7995	119.595	-512.873
60	6.62	-0.789191	120.217	-518.097
61	6.62	-0.775574	120.819	-523.231
62	6.63	-0.7621	121.4	-528.284
63	6.64	-0.752084	121.965	-533.278
64	6.64	-0.738846	122.511	-538.184
65	6.64	-0.729003	123.043	-543.024
66	6.65	-0.715986	123.555	-547.786
67	6.65	-0.703089	124.05	-552.461
68	6.66	-0.693493	124.531	-557.08
69	6.66	-0.680797	124.994	-561.614
70	6.66	-0.671346	125.445	-566.085
71	6.66	-0.658838	125.879	-570.473
72	6.67	-0.649522	126.301	-574.805
73	6.67	-0.637192	126.707	-579.055
74	6.68	-0.624956	127.097	-583.23
75	6.68	-0.615839	127.477	-587.344
76	6.69	-0.603765	127.841	-591.383
77	6.69	-0.594766	128.195	-595.362
78	6.69	-0.582841	128.535	-599.261
79	6.69	-0.570999	128.861	-603.081
80	6.7	-0.56217	129.177	-606.848
81	6.7	-0.550465	129.48	-610.536
82	6.7	-0.541736	129.773	-614.166
83	6.7	-0.530162	130.054	-617.718
84	6.7	-0.518658	130.323	-621.193
85	6.7	-0.510074	130.583	-624.61
86	6.7	-0.498687	130.832	-627.951
87	6.7	-0.490189	131.072	-631.236
88	6.72	-0.478914	131.302	-634.454
89	6.72	-0.467699	131.521	-637.597
90	6.72	-0.459327	131.731	-640.684
91	6.72	-0.448213	131.932	-643.696
92	6.73	-0.439913	132.126	-646.656
93	6.73	-0.428895	132.31	-649.543
94	6.73	-0.417928	132.485	-652.355
95	6.74	-0.409735	132.652	-655.117
96	6.74	-0.398855	132.811	-657.805
97	6.74	-0.390726	132.964	-660.439
98	6.75	-0.379927	133.108	-663.003
99	6.75	-0.369171	133.245	-665.495
100	6.75	-0.361133	133.375	-667.933
101	6.75	-0.350451	133.498	-670.298
102	6.76	-0.342466	133.615	-672.613
103	6.76	-0.331854	133.725	-674.857

104	6.76	-0.321278	133.829	-677.029
105	6.77	-0.31337	133.927	-679.15
106	6.77	-0.302855	134.019	-681.2
107	6.77	-0.294992	134.106	-683.197
108	6.77	-0.284535	134.187	-685.124
109	6.78	-0.27411	134.262	-686.982
110	6.78	-0.266311	134.333	-688.788
111	6.78	-0.255936	134.398	-690.523
112	6.78	-0.248174	134.46	-692.206
113	6.78	-0.237847	134.516	-693.818
114	6.79	-0.227545	134.568	-695.363
115	6.79	-0.219834	134.616	-696.856
116	6.8	-0.209575	134.66	-698.281
117	6.8	-0.201894	134.701	-699.654
118	6.8	-0.191671	134.738	-700.957
119	6.8	-0.181468	134.771	-702.191
120	6.8	-0.173829	134.801	-703.373
121	6.8	-0.163659	134.828	-704.486
122	6.8	-0.156042	134.852	-705.547
123	6.8	-0.1459	134.873	-706.539
124	6.8	-0.135774	134.892	-707.463
125	6.8	-0.128189	134.908	-708.334
126	6.8	-0.118085	134.922	-709.137
127	6.8	-0.110516	134.934	-709.889
128	6.8	-0.100433	134.944	-710.572
129	6.81	-0.0903606	134.953	-711.187
130	6.81	-0.0828129	134.96	-711.751
131	6.82	-0.0727562	134.965	-712.247
132	6.82	-0.0652187	134.969	-712.692
133	6.82	-0.0551734	134.972	-713.068
134	6.83	-0.0451348	134.974	-713.377
135	6.84	-0.0376076	134.976	-713.634
136	6.84	-0.0275759	134.976	-713.823
137	6.85	-0.0200544	134.977	-713.96
138	6.85	-0.0100272	134.977	-714.029
139	6.85	0	134.977	-714.029
140	6.85	0.0100272	134.977	-713.96
141	6.85	0.0200544	134.977	-713.823
142	6.85	0.0275759	134.978	-713.634
143	6.85	0.0376076	134.979	-713.376
144	6.86	0.0451348	134.982	-713.066
145	6.86	0.0551734	134.985	-712.688
146	6.86	0.0652187	134.989	-712.241
147	6.87	0.0727562	134.994	-711.741
148	6.87	0.0828129	135.001	-711.172
149	6.87	0.0903606	135.009	-710.551
150	6.87	0.100433	135.019	-709.861
151	6.87	0.110516	135.031	-709.102
152	6.88	0.118085	135.045	-708.289
153	6.88	0.128189	135.062	-707.407
154	6.88	0.135774	135.08	-706.473
155	6.88	0.1459	135.102	-705.469
156	6.88	0.156042	135.126	-704.396
157	6.88	0.163659	135.153	-703.27
158	6.89	0.173829	135.183	-702.072
159	6.89	0.181468	135.216	-700.822
160	6.89	0.191671	135.253	-699.501

161	6.9	0.201894	135.293	-698.108
162	6.9	0.209575	135.337	-696.662
163	6.91	0.219834	135.386	-695.143
164	6.92	0.227545	135.437	-693.569
165	6.93	0.237847	135.494	-691.92
166	6.93	0.248174	135.555	-690.2
167	6.93	0.255936	135.621	-688.427
168	6.93	0.266311	135.692	-686.581
169	6.93	0.27411	135.767	-684.682
170	6.94	0.284535	135.848	-682.707
171	6.97	0.294992	135.935	-680.651
172	6.99	0.302855	136.027	-678.534
173	7	0.31337	136.125	-676.34
174	7	0.321278	136.228	-674.091
175	7	0.331854	136.338	-671.768
176	7.04	0.342466	136.456	-669.357
177	7.05	0.350451	136.578	-666.887
178	7.05	0.361133	136.709	-664.341
179	7.07	0.369171	136.845	-661.731
180	7.07	0.379927	136.989	-659.045
181	7.1	0.390726	137.142	-656.271
182	7.14	0.398855	137.301	-653.423
183	7.15	0.409735	137.469	-650.493
184	7.17	0.417928	137.644	-647.497
185	7.19	0.428895	137.828	-644.413
186	7.19	0.439913	138.021	-641.25
187	7.2	0.448213	138.222	-638.023
188	7.2	0.459327	138.433	-634.716
189	7.2	0.467699	138.652	-631.348
190	7.27	0.478914	138.881	-627.866
191	7.28	0.490189	139.121	-624.298
192	7.29	0.498687	139.37	-620.662
193	7.3	0.510074	139.63	-616.939
194	7.3	0.518658	139.899	-613.153
195	7.3	0.530162	140.18	-609.282
196	7.32	0.541736	140.474	-605.317
197	7.33	0.550465	140.777	-601.282
198	7.4	0.56217	141.093	-597.122
199	7.4	0.570999	141.419	-592.897
200	7.45	0.582841	141.759	-588.554
201	7.5	0.594766	142.112	-584.094
202	7.6	0.603765	142.477	-579.505
203	7.88	0.615839	142.856	-574.652
204	7.96	0.624956	143.247	-569.678
205	8.16	0.637192	143.653	-564.478
206	8.54	0.649522	144.075	-558.931
207	8.55	0.658838	144.509	-553.298
208	8.67	0.671346	144.959	-547.478
209	8.68	0.680797	145.423	-541.568
210	8.77	0.693493	145.904	-535.486
211	8.82	0.703089	146.398	-529.285
212	8.86	0.715986	146.911	-522.941
213	8.87	0.729003	147.442	-516.475
214	8.9	0.738846	147.988	-509.899
215	8.94	0.752084	148.554	-503.176
216	8.95	0.7621	149.135	-496.355
217	8.95	0.775574	149.736	-489.414

218	8.98	0.789191	150.359	-482.327
219	9	0.7995	150.998	-475.131
220	9.04	0.813379	151.66	-467.778
221	9.09	0.823893	152.339	-460.289
222	9.1	0.838054	153.041	-452.663
223	9.1	0.852385	153.767	-444.906
224	9.1	0.863249	154.513	-437.05
225	9.13	0.877897	155.283	-429.035
226	9.14	0.889006	156.074	-420.91
227	9.15	0.903992	156.891	-412.638
228	9.16	0.919183	157.736	-404.219
229	9.18	0.930718	158.602	-395.675
230	9.18	0.946291	159.497	-386.988
231	9.18	0.958125	160.415	-378.192
232	9.2	0.974114	161.364	-369.23
233	9.2	0.990356	162.345	-360.119
234	9.22	1.00271	163.351	-350.874
235	9.23	1.01943	164.39	-341.465
236	9.24	1.03215	165.455	-331.927
237	9.24	1.04939	166.556	-322.231
238	9.25	1.06694	167.695	-312.362
239	9.25	1.08032	168.862	-302.369
240	9.25	1.09847	170.068	-292.208
241	9.25	1.11232	171.306	-281.919
242	9.26	1.13113	172.585	-271.445
243	9.27	1.15035	173.909	-260.781
244	9.27	1.16505	175.266	-249.981
245	9.28	1.18504	176.67	-238.984
246	9.28	1.20036	178.111	-227.845
247	9.29	1.22123	179.602	-216.499
248	9.29	1.24264	181.147	-204.955
249	9.3	1.25908	182.732	-193.246
250	9.31	1.28155	184.374	-181.315
251	9.32	1.29884	186.061	-169.209
252	9.32	1.32251	187.81	-156.884
253	9.32	1.34694	189.624	-144.33
254	9.37	1.36581	191.49	-131.533
255	9.37	1.39175	193.427	-118.492
256	9.37	1.41183	195.42	-105.263
257	9.39	1.43953	197.492	-91.7459
258	9.4	1.46838	199.649	-77.9431
259	9.4	1.49085	201.871	-63.929
260	9.4	1.52203	204.188	-49.6219
261	9.4	1.54643	206.579	-35.0855
262	9.4	1.58047	209.077	-20.2291
263	9.44	1.61644	211.69	-4.96993
264	9.46	1.64485	214.396	10.5904
265	9.47	1.68494	217.235	26.5467
266	9.5	1.71688	220.182	42.8572
267	9.5	1.76241	223.288	59.6
268	9.51	1.81191	226.571	76.8313
269	9.54	1.85218	230.002	94.5011
270	9.6	1.91103	233.654	112.847
271	9.6	1.95996	237.495	131.663
272	9.68	2.03352	241.631	151.347
273	9.7	2.12007	246.125	171.912
274	9.72	2.19728	250.953	193.269

275	9.8	2.32634	256.365	216.068
276	9.8	2.45727	262.403	240.149

Sample Standard Deviation = 1.12346
Numerator = 57671.5
Denominator = 91409.8 = 276 262.403
W Statistic = 0.630911
5% Critical value of 0.976 exceeds 0.630911
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.630911
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 70
Maximum Background Concentration = 7.05
Confidence Level = 94.6%
False Positive Rate = 5.4%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/19/2018	1	9.09	TRUE
MW#93-3	9/19/2018	1	6.55	FALSE
MW#03-1	9/19/2018	1	7.19	TRUE
MW#03-2	9/19/2018	1	6.63	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 72
Maximum Baseline Concentration = 10.02
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	8.54
	3/14/1995	8.82
	6/21/1995	8.68
	12/14/1995	8.16
	3/6/1996	9.37
	4/25/1996	9.14
	10/2/1996	8.94
	12/10/1996	9.27
	3/11/1997	8.95
	4/15/1997	9.25
	8/14/1997	8.67
	12/4/1997	8.77
	3/31/1998	9.32
	6/23/1998	8.87
	8/11/1998	9
	12/8/1998	8.9
	3/9/1999	9.39
	6/8/1999	9.25
	8/19/1999	9.15
	12/14/1999	8.98
	3/7/2000	9.2
	6/23/2000	9.18
	12/12/2000	9.18
	3/27/2001	9.29
	6/28/2001	9.22
	9/10/2001	9.1
	12/18/2001	9.4
	3/19/2002	9.54
	6/26/2002	9.44
	9/18/2002	9.24
	12/11/2002	9.16
	3/13/2003	9.28
	6/25/2003	9.27
	9/26/2003	9.32
	12/10/2003	9.25
	3/9/2004	9.37
	6/24/2004	9.24
	9/15/2004	9.32
	12/15/2004	9.26
	3/16/2005	9.23
	6/15/2005	9.1

9/21/2005	9.25
12/21/2005	9.31
3/15/2006	9.47
6/21/2006	9.4
12/20/2006	9.18
2/21/2007	9.2
6/12/2007	9.1
12/17/2007	9.3
6/11/2008	9.4
12/3/2008	9.7
12/15/2008	9.6
6/17/2009	9.8
12/9/2009	9.8
6/17/2010	9.6
12/22/2010	9.5
6/29/2011	9.4
12/7/2011	9.5
6/6/2012	9.68
12/12/2012	10.02
1/9/2013	9.51
6/19/2013	9.4
12/11/2013	9.46
6/11/2014	8.55
12/3/2014	8.95
6/17/2015	9.13
12/1/2015	9.37
6/22/2016	9.28
12/20/2016	9.72
6/6/2017	9.29
11/7/2017	8.86
2/27/2018	9.04

Date	Samples	Mean	Impacted
9/19/2018	1	9.09	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-1

Parameter: ph

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 29
Maximum Baseline Concentration = 7.88
Confidence Level = 96.7%
False Positive Rate = 3.3%

Baseline Samples	Date	Result
	6/24/2004	7.27
	9/15/2004	6.78
	12/15/2004	7.32
	3/16/2005	7.3
	6/15/2005	7.28
	9/21/2005	7.88
	12/20/2006	7
	6/12/2007	7.29
	12/17/2007	6.8
	6/11/2008	7.4
	12/3/2008	7.4
	6/17/2009	7.6
	12/9/2009	7.5
	6/17/2010	7.1
	12/22/2010	6.89
	6/29/2011	7.3
	12/7/2011	7.05
	6/6/2012	7.33
	6/19/2013	7.15
	12/11/2013	7.19
	6/11/2014	6.62
	12/3/2014	6.73
	6/17/2015	6.66
	12/1/2015	6.34
	6/22/2016	7.2
	12/20/2016	6.75
	6/6/2017	6.64
	11/7/2017	6.44
	2/27/2018	6.81

Date	Samples	Mean	Impacted
9/19/2018	1	7.19	FALSE

Concentrations (mg/l)

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 216
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 50
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	50	0 (0%)	12/15/1994	54.7	54.7
			12/14/1995	51.9	51.9
			12/10/1996	51.6	51.6
			12/4/1997	51.2	51.2
			12/8/1998	47	47
			12/14/1999	64.4	64.4
			12/12/2000	100	100
			3/19/2002	112	112
			6/26/2002	95	95
			9/18/2002	78	78
			12/11/2002	83	83
			3/13/2003	94	94
			6/25/2003	113	113
			9/26/2003	84.6	84.6
			12/10/2003	98.1	98.1
			3/9/2004	95.4	95.4
			6/24/2004	94.7	94.7
			9/15/2004	71	71
			12/15/2004	92.3	92.3
			3/16/2005	86.3	86.3
			6/15/2005	77.4	77.4
			9/21/2005	92.8	92.8
			12/21/2005	81.9	81.9
			3/15/2006	99.7	99.7
			6/21/2006	82	82
			12/20/2006	85.1	85.1
			6/12/2007	74.9	74.9
			12/17/2007	81.8	81.8
			6/11/2008	56.5	56.5
			12/3/2008	75.2	75.2
			6/17/2009	67.4	67.4
			12/9/2009	76.9	76.9
			6/17/2010	55	55
			12/22/2010	70.5	70.5
			6/29/2011	55.4	55.4
			12/7/2011	69.1	69.1
			6/6/2012	55.6	55.6
			12/12/2012	58.9	58.9
			6/19/2013	70	70
			12/11/2013	72.9	72.9
			6/11/2014	56.5	56.5
			12/3/2014	69.4	69.4
			6/17/2015	69.7	69.7
			12/1/2015	57.5	57.5

			6/22/2016	66.9	66.9
			12/20/2016	54.8	54.8
			6/6/2017	58.4	58.4
			11/7/2017	45.2	45.2
			2/27/2018	59.6	59.6
			9/27/2018	68.2	68.2

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	51	0 (0%)	12/15/1994	2170	2170
			12/14/1995	2220	2220
			12/10/1996	2100	2100
			12/4/1997	2440	2440
			12/8/1998	2565	2565
			12/14/1999	2980	2980
			12/12/2000	2800	2800
			3/19/2002	2500	2500
			6/26/2002	2260	2260
			9/18/2002	2140	2140
			12/11/2002	2320	2320
			3/13/2003	2600	2600
			6/25/2003	1990	1990
			9/26/2003	1820	1820
			12/10/2003	1920	1920
			3/9/2004	2050	2050
			6/24/2004	2180	2180
			9/15/2004	1800	1800
			12/15/2004	2480	2480
			3/16/2005	2490	2490
			6/15/2005	2030	2030
			9/21/2005	2520	2520
			12/21/2005	2300	2300
			3/15/2006	2720	2720
			6/21/2006	2450	2450
			12/20/2006	2170	2170
			2/21/2007	2900	2900
			6/12/2007	1980	1980
			12/17/2007	2244	2244
			6/11/2008	2649	2649
			12/3/2008	2120	2120
			6/17/2009	2230	2230
			12/9/2009	2140	2140
			6/17/2010	2100	2100
			12/22/2010	2460	2460
			6/29/2011	2190	2190
			12/7/2011	2500	2500
			6/6/2012	2060	2060
			12/12/2012	2730	2730
			6/19/2013	2230	2230
			12/11/2013	2290	2290
			6/11/2014	1940	1940
			12/3/2014	2730	2730
			6/17/2015	270	270
			5/25/2016	1890	1890
			6/22/2016	2700	2700

			12/20/2016	2400	2400
			6/6/2017	2310	2310
			11/7/2017	2750	2750
			2/27/2018	2220	2220
			9/27/2018	2660	2660
MW#93-3	52	0 (0%)	12/15/1994	330	330
			12/14/1995	219	219
			12/10/1996	248	248
			12/4/1997	201	201
			12/8/1998	199	199
			12/14/1999	208	208
			12/12/2000	230	230
			12/18/2001	172	172
			3/19/2002	222	222
			6/26/2002	189	189
			9/18/2002	163	163
			12/11/2002	216	216
			3/13/2003	230	230
			6/25/2003	190	190
			9/26/2003	229	229
			12/10/2003	231	231
			3/9/2004	30.8	30.8
			6/24/2004	150	150
			9/15/2004	200	200
			12/15/2004	186	186
			3/16/2005	196	196
			6/15/2005	170	170
			9/21/2005	239	239
			12/21/2005	180	180
			3/15/2006	180	180
			6/21/2006	227	227
			12/20/2006	211	211
			6/12/2007	159	159
			12/17/2007	194	194
			6/11/2008	195	195
			12/3/2008	190	190
			6/17/2009	173	173
			12/9/2009	202	202
			6/17/2010	202	202
			12/22/2010	216	216
			6/29/2011	158	158
			12/7/2011	218	218
			6/6/2012	201	201
			12/12/2012	168	168
			6/19/2013	235	235
			12/11/2013	234	234
			6/11/2014	258	258
			12/3/2014	220	220
			6/17/2015	280	280
			12/1/2015	339	339
			6/22/2016	449	449
			10/11/2016	368	368
			12/20/2016	337	337
			6/6/2017	301	301
			11/7/2017	368	368
			2/27/2018	272	272

			9/27/2018	372	372
MW#03-1	29	0 (0%)	6/24/2004	10.2	10.2
			9/15/2004	42	42
			12/15/2004	8.04	8.04
			3/16/2005	5.99	5.99
			6/15/2005	7.3	7.3
			9/21/2005	14.1	14.1
			12/20/2006	8	8
			6/12/2007	7.96	7.96
			12/17/2007	9.88	9.88
			6/11/2008	5.71	5.71
			12/3/2008	7.01	7.01
			6/17/2009	7.34	7.34
			12/9/2009	6.77	6.77
			6/17/2010	9.31	9.31
			12/22/2010	7.11	7.11
			6/29/2011	7.04	7.04
			12/7/2011	8.87	8.87
			6/6/2012	7.94	7.94
			6/19/2013	10.3	10.3
			12/11/2013	9.78	9.78
			6/11/2014	55.9	55.9
			12/3/2014	9.8	9.8
			6/17/2015	9.7	9.7
			12/1/2015	12	12
			6/22/2016	8.59	8.59
			12/20/2016	7.94	7.94
			6/6/2017	6.56	6.56
			11/7/2017	17.6	17.6
			2/27/2018	16.8	16.8
MW#03-2	34	0 (0%)	6/24/2004	47.4	47.4
			9/15/2004	8.7	8.7
			12/15/2004	51.3	51.3
			3/16/2005	47	47
			6/15/2005	42.8	42.8
			9/21/2005	52.6	52.6
			12/21/2005	46.5	46.5
			3/15/2006	50.4	50.4
			6/21/2006	44.9	44.9
			12/20/2006	50.5	50.5
			6/12/2007	47	47
			12/17/2007	50.2	50.2
			6/11/2008	33.8	33.8
			12/3/2008	54.4	54.4
			6/17/2009	48.2	48.2
			12/9/2009	47.3	47.3
			6/17/2010	52.9	52.9
			12/22/2010	51.7	51.7
			6/29/2011	51	51
			12/7/2011	60.1	60.1
			6/6/2012	52	52
			12/12/2012	61.3	61.3
			6/19/2013	57.3	57.3
			12/11/2013	54	54
			6/11/2014	9.78	9.78

12/3/2014	68	68
6/17/2015	66.3	66.3
12/1/2015	63.8	63.8
6/22/2016	76.8	76.8
12/20/2016	80.2	80.2
6/6/2017	96.8	96.8
11/7/2017	120	120
2/27/2018	104	104
9/27/2018	128	128

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 83.5377
Overall Std Dev = 182.037
Overall Total = 18044.1
SS Wells = 2.51567e+006
SS Total = 7.12453e+006

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	2.51567e+006	4	628917	28.7927
Error (within wells)	4.60886e+006	211	21842.9	
Totals	7.12453e+006	215		

28.7927 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	18.968
	12/14/1995	21.768
	12/10/1996	22.068
	12/4/1997	22.468
	12/8/1998	26.668
	12/14/1999	9.268
	12/12/2000	26.332
	3/19/2002	38.332
	6/26/2002	21.332
	9/18/2002	4.332
	12/11/2002	9.332
	3/13/2003	20.332
	6/25/2003	39.332
	9/26/2003	10.932
	12/10/2003	24.432
	3/9/2004	21.732
	6/24/2004	21.032
	9/15/2004	2.668
	12/15/2004	18.632
	3/16/2005	12.632
	6/15/2005	3.732
	9/21/2005	19.132
	12/21/2005	8.232
	3/15/2006	26.032
	6/21/2006	8.332
	12/20/2006	11.432
	6/12/2007	1.232
	12/17/2007	8.132
	6/11/2008	17.168
	12/3/2008	1.532
	6/17/2009	6.268
	12/9/2009	3.232

6/17/2010	18.668
12/22/2010	3.168
6/29/2011	18.268
12/7/2011	4.568
6/6/2012	18.068
12/12/2012	14.768
6/19/2013	3.668
12/11/2013	0.768
6/11/2014	17.168
12/3/2014	4.268
6/17/2015	3.968
12/1/2015	16.168
6/22/2016	6.768
12/20/2016	18.868
6/6/2017	15.268
11/7/2017	28.468
2/27/2018	14.068
9/27/2018	5.468

Well: MW#93-2	**Sample**	**Residual**
	12/15/1994	118.392
	12/14/1995	68.3922
	12/10/1996	188.392
	12/4/1997	151.608
	12/8/1998	276.608
	12/14/1999	691.608
	12/12/2000	511.608
	3/19/2002	211.608
	6/26/2002	28.3922
	9/18/2002	148.392
	12/11/2002	31.6078
	3/13/2003	311.608
	6/25/2003	298.392
	9/26/2003	468.392
	12/10/2003	368.392
	3/9/2004	238.392
	6/24/2004	108.392
	9/15/2004	488.392
	12/15/2004	191.608
	3/16/2005	201.608
	6/15/2005	258.392
	9/21/2005	231.608
	12/21/2005	11.6078
	3/15/2006	431.608
	6/21/2006	161.608
	12/20/2006	118.392
	2/21/2007	611.608
	6/12/2007	308.392
	12/17/2007	44.3922
	6/11/2008	360.608
	12/3/2008	168.392
	6/17/2009	58.3922
	12/9/2009	148.392
	6/17/2010	188.392
	12/22/2010	171.608
	6/29/2011	98.3922
	12/7/2011	211.608

6/6/2012	228.392
12/12/2012	441.608
6/19/2013	58.3922
12/11/2013	1.60784
6/11/2014	348.392
12/3/2014	441.608
6/17/2015	2018.39
5/25/2016	398.392
6/22/2016	411.608
12/20/2016	111.608
6/6/2017	21.6078
11/7/2017	461.608
2/27/2018	68.3922
9/27/2018	371.608

Well: MW#93-3

Sample	Residual
12/15/1994	103.927
12/14/1995	7.07308
12/10/1996	21.9269
12/4/1997	25.0731
12/8/1998	27.0731
12/14/1999	18.0731
12/12/2000	3.92692
12/18/2001	54.0731
3/19/2002	4.07308
6/26/2002	37.0731
9/18/2002	63.0731
12/11/2002	10.0731
3/13/2003	3.92692
6/25/2003	36.0731
9/26/2003	2.92692
12/10/2003	4.92692
3/9/2004	195.273
6/24/2004	76.0731
9/15/2004	26.0731
12/15/2004	40.0731
3/16/2005	30.0731
6/15/2005	56.0731
9/21/2005	12.9269
12/21/2005	46.0731
3/15/2006	46.0731
6/21/2006	0.926923
12/20/2006	15.0731
6/12/2007	67.0731
12/17/2007	32.0731
6/11/2008	31.0731
12/3/2008	36.0731
6/17/2009	53.0731
12/9/2009	24.0731
6/17/2010	24.0731
12/22/2010	10.0731
6/29/2011	68.0731
12/7/2011	8.07308
6/6/2012	25.0731
12/12/2012	58.0731
6/19/2013	8.92692
12/11/2013	7.92692

6/11/2014	31.9269
12/3/2014	6.07308
6/17/2015	53.9269
12/1/2015	112.927
6/22/2016	222.927
10/11/2016	141.927
12/20/2016	110.927
6/6/2017	74.9269
11/7/2017	141.927
2/27/2018	45.9269
9/27/2018	145.927

Well: MW#03-1

Sample	Residual
6/24/2004	1.71517
9/15/2004	30.0848
12/15/2004	3.87517
3/16/2005	5.92517
6/15/2005	4.61517
9/21/2005	2.18483
12/20/2006	3.91517
6/12/2007	3.95517
12/17/2007	2.03517
6/11/2008	6.20517
12/3/2008	4.90517
6/17/2009	4.57517
12/9/2009	5.14517
6/17/2010	2.60517
12/22/2010	4.80517
6/29/2011	4.87517
12/7/2011	3.04517
6/6/2012	3.97517
6/19/2013	1.61517
12/11/2013	2.13517
6/11/2014	43.9848
12/3/2014	2.11517
6/17/2015	2.21517
12/1/2015	0.0848276
6/22/2016	3.32517
12/20/2016	3.97517
6/6/2017	5.35517
11/7/2017	5.68483
2/27/2018	4.88483

Well: MW#03-2

Sample	Residual
6/24/2004	10.7465
9/15/2004	49.4465
12/15/2004	6.84647
3/16/2005	11.1465
6/15/2005	15.3465
9/21/2005	5.54647
12/21/2005	11.6465
3/15/2006	7.74647
6/21/2006	13.2465
12/20/2006	7.64647
6/12/2007	11.1465
12/17/2007	7.94647

6/11/2008	24.3465
12/3/2008	3.74647
6/17/2009	9.94647
12/9/2009	10.8465
6/17/2010	5.24647
12/22/2010	6.44647
6/29/2011	7.14647
12/7/2011	1.95353
6/6/2012	6.14647
12/12/2012	3.15353
6/19/2013	0.846471
12/11/2013	4.14647
6/11/2014	48.3665
12/3/2014	9.85353
6/17/2015	8.15353
12/1/2015	5.65353
6/22/2016	18.6535
12/20/2016	22.0535
6/6/2017	38.6535
11/7/2017	61.8535
2/27/2018	45.8535
9/27/2018	69.8535

Shapiro-Francia Test of Normality

Parameter: Sodium

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 216

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	5.71	-2.65209	7.03356	-15.1434
2	5.99	-2.36561	12.6297	-29.3134
3	6.56	-2.22621	17.5857	-43.9174
4	6.77	-2.09693	21.9828	-58.1136
5	7.01	-1.99539	25.9644	-72.1013
6	7.04	-1.92684	29.6771	-85.6662
7	7.11	-1.85218	33.1077	-98.8352
8	7.3	-1.79912	36.3445	-111.969
9	7.34	-1.7392	39.3693	-124.734
10	7.94	-1.68494	42.2083	-138.113
11	7.94	-1.64485	44.9139	-151.173
12	7.96	-1.59819	47.4681	-163.895
13	8	-1.56322	49.9117	-176.4
14	8.04	-1.52203	52.2283	-188.638
15	8.59	-1.48328	54.4285	-201.379
16	8.7	-1.4538	56.542	-214.027
17	8.87	-1.41865	58.5546	-226.611
18	9.31	-1.39175	60.4915	-239.568
19	9.7	-1.35946	62.3397	-252.754
20	9.78	-1.32854	64.1047	-265.748
21	9.78	-1.30469	65.8069	-278.507
22	9.8	-1.27588	67.4348	-291.011
23	9.88	-1.25357	69.0062	-303.396
24	10.2	-1.22653	70.5106	-315.907
25	10.3	-1.20036	71.9514	-328.27
26	12	-1.18	73.3438	-342.431
27	14.1	-1.15522	74.6784	-358.719
28	16.8	-1.13113	75.9578	-377.722
29	17.6	-1.11232	77.1951	-397.299
30	30.8	-1.08935	78.3818	-430.851
31	33.8	-1.07138	79.5296	-467.064
32	42	-1.04939	80.6308	-511.138
33	42.8	-1.02789	81.6874	-555.132
34	44.9	-1.01104	82.7096	-600.527
35	45.2	-0.990356	83.6904	-645.291
36	46.5	-0.974114	84.6393	-690.587
37	47	-0.954165	85.5497	-735.433
38	47	-0.93459	86.4232	-779.359
39	47	-0.919183	87.2681	-822.561
40	47.3	-0.900227	88.0785	-865.141
41	47.4	-0.885291	88.8622	-907.104
42	48.2	-0.866894	89.6137	-948.888
43	50.2	-0.848786	90.3342	-991.497
44	50.4	-0.834498	91.0305	-1033.56
45	50.5	-0.816874	91.6978	-1074.81
46	51	-0.802956	92.3426	-1115.76

47	51.2	-0.785774	92.96	-1155.99
48	51.3	-0.768821	93.5511	-1195.43
49	51.6	-0.755415	94.1217	-1234.41
50	51.7	-0.738846	94.6676	-1272.61
51	51.9	-0.722479	95.1896	-1310.11
52	52	-0.709522	95.693	-1347
53	52.6	-0.693493	96.174	-1383.48
54	52.9	-0.680797	96.6375	-1419.49
55	54	-0.665079	97.0798	-1455.41
56	54.4	-0.649522	97.5017	-1490.74
57	54.7	-0.637192	97.9077	-1525.6
58	54.8	-0.621911	98.2944	-1559.68
59	55	-0.609791	98.6663	-1593.21
60	55.4	-0.594766	99.02	-1626.16
61	55.6	-0.579873	99.3563	-1658.41
62	55.9	-0.568052	99.679	-1690.16
63	56.5	-0.553384	99.9852	-1721.43
64	56.5	-0.541736	100.279	-1752.03
65	57.3	-0.52728	100.557	-1782.25
66	57.5	-0.51293	100.82	-1811.74
67	58.4	-0.501527	101.071	-1841.03
68	58.9	-0.487364	101.309	-1869.74
69	59.6	-0.476105	101.536	-1898.11
70	60.1	-0.462114	101.749	-1925.88
71	61.3	-0.448213	101.95	-1953.36
72	63.8	-0.437153	102.141	-1981.25
73	64.4	-0.423405	102.32	-2008.52
74	66.3	-0.409735	102.488	-2035.68
75	66.9	-0.398855	102.647	-2062.37
76	67.4	-0.385321	102.796	-2088.34
77	68	-0.374544	102.936	-2113.81
78	68.2	-0.361133	103.066	-2138.44
79	69.1	-0.347787	103.187	-2162.47
80	69.4	-0.337155	103.301	-2185.87
81	69.7	-0.323919	103.406	-2208.44
82	70	-0.31337	103.504	-2230.38
83	70.5	-0.300232	103.594	-2251.55
84	71	-0.287147	103.677	-2271.93
85	72.9	-0.276714	103.753	-2292.11
86	74.9	-0.263715	103.823	-2311.86
87	75.2	-0.253347	103.887	-2330.91
88	76.8	-0.240426	103.945	-2349.37
89	76.9	-0.227545	103.997	-2366.87
90	77.4	-0.217267	104.044	-2383.69
91	78	-0.204452	104.086	-2399.64
92	80.2	-0.194225	104.123	-2415.21
93	81.8	-0.181468	104.156	-2430.06
94	81.9	-0.168741	104.185	-2443.88
95	82	-0.158579	104.21	-2456.88
96	83	-0.1459	104.231	-2468.99
97	84.6	-0.133244	104.249	-2480.26
98	85.1	-0.123135	104.264	-2490.74
99	86.3	-0.110516	104.276	-2500.28
100	92.3	-0.100433	104.287	-2509.55
101	92.8	-0.0878447	104.294	-2517.7
102	94	-0.0752698	104.3	-2524.78
103	94.7	-0.0652187	104.304	-2530.95

104	95	-0.0526632	104.307	-2535.96
105	95.4	-0.0426257	104.309	-2540.02
106	96.8	-0.0300838	104.31	-2542.93
107	98.1	-0.0175476	104.31	-2544.66
108	99.7	-0.00751925	104.31	-2545.4
109	100	0.00751925	104.31	-2544.65
110	104	0.0175476	104.31	-2542.83
111	112	0.0300838	104.311	-2539.46
112	113	0.0426257	104.313	-2534.64
113	120	0.0526632	104.316	-2528.32
114	128	0.0652187	104.32	-2519.97
115	150	0.0752698	104.326	-2508.68
116	158	0.0878447	104.334	-2494.8
117	159	0.100433	104.344	-2478.84
118	163	0.110516	104.356	-2460.82
119	168	0.123135	104.371	-2440.13
120	170	0.133244	104.389	-2417.48
121	172	0.1459	104.41	-2392.39
122	173	0.158579	104.435	-2364.95
123	180	0.168741	104.464	-2334.58
124	180	0.181468	104.497	-2301.92
125	186	0.194225	104.534	-2265.79
126	189	0.204452	104.576	-2227.15
127	190	0.217267	104.623	-2185.87
128	190	0.227545	104.675	-2142.63
129	194	0.240426	104.733	-2095.99
130	195	0.253347	104.797	-2046.59
131	196	0.263715	104.867	-1994.9
132	199	0.276714	104.943	-1939.84
133	200	0.287147	105.026	-1882.41
134	201	0.300232	105.116	-1822.06
135	201	0.31337	105.214	-1759.07
136	202	0.323919	105.319	-1693.64
137	202	0.337155	105.433	-1625.54
138	208	0.347787	105.554	-1553.2
139	211	0.361133	105.684	-1477
140	216	0.374544	105.824	-1396.09
141	216	0.385321	105.973	-1312.87
142	218	0.398855	106.132	-1225.91
143	219	0.409735	106.3	-1136.18
144	220	0.423405	106.479	-1043.03
145	222	0.437153	106.67	-945.986
146	227	0.448213	106.871	-844.242
147	229	0.462114	107.084	-738.417
148	230	0.476105	107.311	-628.913
149	230	0.487364	107.549	-516.82
150	231	0.501527	107.8	-400.967
151	234	0.51293	108.063	-280.941
152	235	0.52728	108.341	-157.031
153	239	0.541736	108.635	-27.5556
154	248	0.553384	108.941	109.684
155	258	0.568052	109.264	256.241
156	270	0.579873	109.6	412.807
157	272	0.594766	109.954	574.583
158	280	0.609791	110.326	745.325
159	301	0.621911	110.712	932.52
160	330	0.637192	111.118	1142.79

161	337	0.649522	111.54	1361.68
162	339	0.665079	111.983	1587.14
163	368	0.680797	112.446	1837.68
164	368	0.693493	112.927	2092.88
165	372	0.709522	113.43	2356.83
166	449	0.722479	113.952	2681.22
167	1800	0.738846	114.498	4011.14
168	1820	0.755415	115.069	5386
169	1890	0.768821	115.66	6839.07
170	1920	0.785774	116.277	8347.75
171	1940	0.802956	116.922	9905.49
172	1980	0.816874	117.589	11522.9
173	1990	0.834498	118.286	13183.6
174	2030	0.848786	119.006	14906.6
175	2050	0.866894	119.758	16683.7
176	2060	0.885291	120.542	18507.4
177	2100	0.900227	121.352	20397.9
178	2100	0.919183	122.197	22328.2
179	2120	0.93459	123.07	24309.5
180	2140	0.954165	123.981	26351.4
181	2140	0.974114	124.93	28436
182	2170	0.990356	125.91	30585.1
183	2170	1.01104	126.933	32779
184	2180	1.02789	127.989	35019.9
185	2190	1.04939	129.09	37318
186	2220	1.07138	130.238	39696.5
187	2220	1.08935	131.425	42114.8
188	2230	1.11232	132.662	44595.3
189	2230	1.13113	133.942	47117.7
190	2244	1.15522	135.276	49710
191	2260	1.18	136.669	52376.8
192	2290	1.20036	138.109	55125.7
193	2300	1.22653	139.614	57946.7
194	2310	1.25357	141.185	60842.4
195	2320	1.27588	142.813	63802.5
196	2400	1.30469	144.515	66933.7
197	2440	1.32854	146.28	70175.3
198	2450	1.35946	148.128	73506
199	2460	1.39175	150.065	76929.7
200	2480	1.41865	152.078	80448
201	2490	1.4538	154.192	84067.9
202	2500	1.48328	156.392	87776.1
203	2500	1.52203	158.708	91581.2
204	2520	1.56322	161.152	95520.6
205	2565	1.59819	163.706	99619.9
206	2600	1.64485	166.412	103897
207	2649	1.68494	169.251	108360
208	2660	1.7392	172.276	112986
209	2700	1.79912	175.512	117844
210	2720	1.85218	178.943	122882
211	2730	1.92684	182.656	128142
212	2730	1.99539	186.637	133589
213	2750	2.09693	191.034	139356
214	2800	2.22621	195.99	145589
215	2900	2.36561	201.586	152450

Sample Standard Deviation = 952.451

Numerator = 2.32409e+010
Denominator = 3.93175e+010 = 215 201.586
W Statistic = 0.591109
5% Critical value of 0.976 exceeds 0.591109
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.591109
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 50
Maximum Background Concentration = 113
Confidence Level = 92.6%
False Positive Rate = 7.4%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	2660	TRUE
MW#93-3	9/27/2018	1	372	TRUE
MW#03-1	2/27/2018	1	16.8	FALSE
MW#03-2	9/27/2018	1	128	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 50
Maximum Baseline Concentration = 2980
Confidence Level = 98%
False Positive Rate = 2%

Baseline Samples	Date	Result
	12/15/1994	2170
	12/14/1995	2220
	12/10/1996	2100
	12/4/1997	2440
	12/8/1998	2565
	12/14/1999	2980
	12/12/2000	2800
	3/19/2002	2500
	6/26/2002	2260
	9/18/2002	2140
	12/11/2002	2320
	3/13/2003	2600
	6/25/2003	1990
	9/26/2003	1820
	12/10/2003	1920
	3/9/2004	2050
	6/24/2004	2180
	9/15/2004	1800
	12/15/2004	2480
	3/16/2005	2490
	6/15/2005	2030
	9/21/2005	2520
	12/21/2005	2300
	3/15/2006	2720
	6/21/2006	2450
	12/20/2006	2170
	2/21/2007	2900
	6/12/2007	1980
	12/17/2007	2244
	6/11/2008	2649
	12/3/2008	2120
	6/17/2009	2230
	12/9/2009	2140
	6/17/2010	2100
	12/22/2010	2460
	6/29/2011	2190
	12/7/2011	2500
	6/6/2012	2060
	12/12/2012	2730
	6/19/2013	2230
	12/11/2013	2290

6/11/2014	1940
12/3/2014	2730
6/17/2015	270
5/25/2016	1890
6/22/2016	2700
12/20/2016	2400
6/6/2017	2310
11/7/2017	2750
2/27/2018	2220

Date	Samples	Mean	Impacted
9/27/2018	1	2660	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 51
Maximum Baseline Concentration = 449
Confidence Level = 98.1%
False Positive Rate = 1.9%

Baseline Samples	Date	Result
	12/15/1994	330
	12/14/1995	219
	12/10/1996	248
	12/4/1997	201
	12/8/1998	199
	12/14/1999	208
	12/12/2000	230
	12/18/2001	172
	3/19/2002	222
	6/26/2002	189
	9/18/2002	163
	12/11/2002	216
	3/13/2003	230
	6/25/2003	190
	9/26/2003	229
	12/10/2003	231
	3/9/2004	30.8
	6/24/2004	150
	9/15/2004	200
	12/15/2004	186
	3/16/2005	196
	6/15/2005	170
	9/21/2005	239
	12/21/2005	180
	3/15/2006	180
	6/21/2006	227
	12/20/2006	211
	6/12/2007	159
	12/17/2007	194
	6/11/2008	195
	12/3/2008	190
	6/17/2009	173
	12/9/2009	202
	6/17/2010	202
	12/22/2010	216
	6/29/2011	158
	12/7/2011	218
	6/6/2012	201
	12/12/2012	168
	6/19/2013	235
	12/11/2013	234

6/11/2014	258
12/3/2014	220
6/17/2015	280
12/1/2015	339
6/22/2016	449
10/11/2016	368
12/20/2016	337
6/6/2017	301
11/7/2017	368
2/27/2018	272

Date	Samples	Mean	Impacted
9/27/2018	1	372	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-2

Parameter: Sodium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 33
Maximum Baseline Concentration = 120
Confidence Level = 97.1%
False Positive Rate = 2.9%

Baseline Samples	Date	Result
	6/24/2004	47.4
	9/15/2004	8.7
	12/15/2004	51.3
	3/16/2005	47
	6/15/2005	42.8
	9/21/2005	52.6
	12/21/2005	46.5
	3/15/2006	50.4
	6/21/2006	44.9
	12/20/2006	50.5
	6/12/2007	47
	12/17/2007	50.2
	6/11/2008	33.8
	12/3/2008	54.4
	6/17/2009	48.2
	12/9/2009	47.3
	6/17/2010	52.9
	12/22/2010	51.7
	6/29/2011	51
	12/7/2011	60.1
	6/6/2012	52
	12/12/2012	61.3
	6/19/2013	57.3
	12/11/2013	54
	6/11/2014	9.78
	12/3/2014	68
	6/17/2015	66.3
	12/1/2015	63.8
	6/22/2016	76.8
	12/20/2016	80.2
	6/6/2017	96.8
	11/7/2017	120
	2/27/2018	104

Date	Samples	Mean	Impacted
9/27/2018	1	128	TRUE

Concentrations (umhos/cm)

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 275
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 70
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	70	0 (0%)	12/15/1994	1080	1080
			3/14/1995	1103	1103
			6/21/1995	1154	1154
			12/14/1995	1109	1109
			3/6/1996	1010	1010
			4/25/1996	1063	1063
			10/2/1996	1169	1169
			12/10/1996	1187	1187
			3/11/1997	1077	1077
			4/15/1997	1070	1070
			8/14/1997	1217	1217
			12/4/1997	1170	1170
			3/31/1998	1092	1092
			6/23/1998	1210	1210
			8/11/1998	1273	1273
			12/8/1998	1888	1888
			3/9/1999	1080	1080
			6/8/1999	1301	1301
			8/19/1999	1301	1301
			12/14/1999	1270	1270
			3/7/2000	1290	1290
			6/23/2000	1393	1393
			12/12/2000	1309	1309
			3/27/2001	1469	1469
			6/28/2001	1560	1560
			9/10/2001	1374	1374
			12/18/2001	1374	1374
			3/19/2002	1326	1326
			6/26/2002	1516	1516
			9/18/2002	1423	1423
			12/11/2002	1515	1515
			3/13/2003	1332	1332
			6/25/2003	1608	1608
			9/26/2003	1602	1602
			12/10/2003	1620	1620
			3/9/2004	1630	1630
			6/24/2004	1620	1620
			9/15/2004	1618	1618
			12/15/2004	1586	1586
			3/16/2005	1521	1521
			6/15/2005	1531	1531
			9/21/2005	1441	1441
			12/21/2005	1030	1030
			3/15/2006	1318	1318

			6/21/2006	1547	1547
			12/20/2006	1370	1370
			6/12/2007	1466	1466
			12/17/2007	1327	1327
			6/11/2008	1334	1334
			12/3/2008	1352	1352
			6/17/2009	1301	1301
			12/9/2009	1218	1218
			6/17/2010	1179	1179
			12/22/2010	1270	1270
			6/29/2011	1275	1275
			12/7/2011	1236	1236
			6/6/2012	1185	1185
			12/12/2012	1227	1227
			6/19/2013	1366	1366
			12/11/2013	1329	1329
			6/11/2014	1200	1200
			12/3/2014	1230	1230
			6/17/2015	1210	1210
			12/1/2015	1230	1230
			6/22/2016	1185	1185
			12/20/2016	1186	1186
			6/6/2017	1289	1289
			11/7/2017	1458	1458
			2/27/2018	1235	1235
			9/19/2018	1520	1520

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	72	0 (0%)	12/15/1994	7950	7950
			3/14/1995	8217	8217
			6/21/1995	9210	9210
			12/14/1995	9000	9000
			3/6/1996	8820	8820
			4/25/1996	9310	9310
			10/2/1996	9420	9420
			12/10/1996	9590	9590
			3/11/1997	9250	9250
			4/15/1997	9690	9690
			8/14/1997	10660	10660
			12/4/1997	10240	10240
			3/31/1998	9237	9237
			6/23/1998	10400	10400
			8/11/1998	11460	11460
			12/8/1998	10280	10280
			3/9/1999	9240	9240
			6/8/1999	10850	10850
			8/19/1999	10873	10873
			12/14/1999	9690	9690
			3/7/2000	9340	9340
			6/23/2000	1034	1034
			12/12/2000	9080	9080
			3/27/2001	10260	10260
			6/28/2001	11600	11600
			9/10/2001	10700	10700

			12/18/2001	10660	10660
			3/19/2002	10197	10197
			6/26/2002	10590	10590
			9/18/2002	9690	9690
			12/11/2002	10283	10283
			3/13/2003	8920	8920
			6/25/2003	10590	10590
			9/26/2003	10693	10693
			12/10/2003	10550	10550
			3/9/2004	10620	10620
			6/24/2004	10494	10494
			9/15/2004	10340	10340
			12/15/2004	9940	9940
			3/16/2005	9690	9690
			6/15/2005	10010	10010
			9/21/2005	9660	9660
			12/21/2005	10000	10000
			3/15/2006	8650	8650
			6/21/2006	9830	9830
			12/20/2006	8310	8310
			2/21/2007	7660	7660
			6/12/2007	9590	9590
			12/17/2007	9100	9100
			6/11/2008	9600	9600
			12/3/2008	10520	10520
			12/15/2008	9070	9070
			6/17/2009	10690	10690
			12/9/2009	10050	10050
			6/17/2010	10020	10020
			12/22/2010	11230	11230
			6/29/2011	11110	11110
			12/7/2011	10770	10770
			6/6/2012	10490	10490
			12/12/2012	11460	11460
			6/19/2013	10500	10500
			12/11/2013	10650	10650
			6/11/2014	9940	9940
			12/3/2014	10900	10900
			6/17/2015	1270	1270
			12/1/2015	10560	10560
			6/22/2016	6710	6710
			12/20/2016	11400	11400
			6/6/2017	12590	12590
			11/7/2017	10.52	10.52
			2/27/2018	10.9	10.9
			9/19/2018	15700	15700
MW#93-3	70	0 (0%)	12/15/1994	1762	1762
			3/14/1995	1490	1490
			6/21/1995	1421	1421
			12/14/1995	1534	1534
			3/6/1996	1327	1327
			4/25/1996	1570	1570
			10/2/1996	1657	1657
			12/10/1996	1427	1427
			3/11/1997	1370	1370
			4/15/1997	1244	1244

8/14/1997	1351	1351
12/4/1997	1140	1140
3/31/1998	1172	1172
6/23/1998	1214	1214
8/11/1998	1296	1296
12/8/1998	1177	1177
3/9/1999	1137	1137
6/8/1999	1180	1180
8/19/1999	1253	1253
12/14/1999	1088	1088
3/7/2000	1250	1250
6/23/2000	1070	1070
12/12/2000	1051	1051
3/27/2001	1149	1149
6/28/2001	1155	1155
9/10/2001	1250	1250
12/18/2001	1064	1064
3/19/2002	1240	1240
6/26/2002	787	787
9/18/2002	1109	1109
12/11/2002	1125	1125
3/13/2003	1034	1034
6/25/2003	1111	1111
9/26/2003	1109	1109
12/10/2003	1173	1173
3/9/2004	881	881
6/24/2004	1129	1129
9/15/2004	1068	1068
12/15/2004	972	972
3/16/2005	1134	1134
6/15/2005	1080	1080
9/21/2005	1155	1155
12/21/2005	1140	1140
3/15/2006	1035	1035
6/21/2006	1226	1226
12/20/2006	1087	1087
6/12/2007	1031	1031
12/17/2007	910	910
6/11/2008	1023	1023
12/3/2008	1073	1073
6/17/2009	1073	1073
12/9/2009	1038	1038
6/17/2010	1108	1108
12/22/2010	1090	1090
6/29/2011	1178	1178
12/7/2011	930	930
6/6/2012	1203	1203
12/12/2012	1010	1010
6/19/2013	1438	1438
12/11/2013	1252	1252
6/11/2014	1500	1500
12/3/2014	1200	1200
6/17/2015	1480	1480
12/1/2015	1807	1807
10/11/2016	2005	2005
12/20/2016	2200	2200
6/6/2017	1743	1743

			11/7/2017	2121	2121
			9/6/2018	2380	2380
			9/19/2018	2110	2110
MW#03-1	29	0 (0%)	6/24/2004	497	497
			9/15/2004	687	687
			12/15/2004	514	514
			3/16/2005	422	422
			6/15/2005	465	465
			9/21/2005	517	517
			12/20/2006	447	447
			6/12/2007	630	630
			12/17/2007	540	540
			6/11/2008	467	467
			12/3/2008	649	649
			6/17/2009	519	519
			12/9/2009	469	469
			6/17/2010	500	500
			12/22/2010	504	504
			6/29/2011	463	463
			12/7/2011	501	501
			6/6/2012	457	457
			6/19/2013	373	373
			12/11/2013	476	476
			6/11/2014	826	826
			12/3/2014	409	409
			6/17/2015	267	267
			12/1/2015	385	385
			6/22/2016	320	320
			6/6/2017	198	198
			11/7/2017	444	444
			2/27/2018	186.1	186.1
			9/19/2018	573	573
MW#03-2	34	0 (0%)	6/24/2004	692	692
			9/15/2004	522	522
			12/15/2004	655	655
			3/16/2005	661	661
			6/15/2005	674	674
			9/21/2005	625	625
			12/21/2005	572	572
			3/15/2006	594	594
			6/21/2006	636	636
			12/20/2006	580	580
			6/12/2007	680	680
			12/17/2007	617	617
			6/11/2008	674	674
			12/3/2008	752	752
			6/17/2009	720	720
			12/9/2009	690	690
			6/17/2010	685	685
			12/22/2010	728	728
			6/29/2011	748	748
			12/7/2011	755	755
			6/6/2012	716	716
			12/12/2012	807	807
			6/19/2013	807	807

12/11/2013	805	805
6/11/2014	219	219
12/3/2014	1540	1540
6/17/2015	965	965
12/1/2015	967	967
6/22/2016	1074	1074
12/20/2016	1454	1454
6/6/2017	1498	1498
11/7/2017	2042	2042
9/6/2018	2620	2620
9/19/2018	2880	2880

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 521.849
Overall Std Dev = 1186.13
Overall Total = 143509
SS Wells = 7.78128e+007
SS Total = 3.8549e+008

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	7.78128e+007	4	1.94532e+007	17.071
Error (within wells)	3.07677e+008	270	1.13955e+006	
Totals	3.8549e+008	274		

17.071 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	242.214
	3/14/1995	219.214
	6/21/1995	168.214
	12/14/1995	213.214
	3/6/1996	312.214
	4/25/1996	259.214
	10/2/1996	153.214
	12/10/1996	135.214
	3/11/1997	245.214
	4/15/1997	252.214
	8/14/1997	105.214
	12/4/1997	152.214
	3/31/1998	230.214
	6/23/1998	112.214
	8/11/1998	49.2143
	12/8/1998	565.786
	3/9/1999	242.214
	6/8/1999	21.2143
	8/19/1999	21.2143
	12/14/1999	52.2143
	3/7/2000	32.2143
	6/23/2000	70.7857
	12/12/2000	13.2143
	3/27/2001	146.786
	6/28/2001	237.786
	9/10/2001	51.7857
	12/18/2001	51.7857
	3/19/2002	3.78571
	6/26/2002	193.786
	9/18/2002	100.786
	12/11/2002	192.786
	3/13/2003	9.78571

6/25/2003	285.786
9/26/2003	279.786
12/10/2003	297.786
3/9/2004	307.786
6/24/2004	297.786
9/15/2004	295.786
12/15/2004	263.786
3/16/2005	198.786
6/15/2005	208.786
9/21/2005	118.786
12/21/2005	292.214
3/15/2006	4.21429
6/21/2006	224.786
12/20/2006	47.7857
6/12/2007	143.786
12/17/2007	4.78571
6/11/2008	11.7857
12/3/2008	29.7857
6/17/2009	21.2143
12/9/2009	104.214
6/17/2010	143.214
12/22/2010	52.2143
6/29/2011	47.2143
12/7/2011	86.2143
6/6/2012	137.214
12/12/2012	95.2143
6/19/2013	43.7857
12/11/2013	6.78571
6/11/2014	122.214
12/3/2014	92.2143
6/17/2015	112.214
12/1/2015	92.2143
6/22/2016	137.214
12/20/2016	136.214
6/6/2017	33.2143
11/7/2017	135.786
2/27/2018	87.2143
9/19/2018	197.786

Well: MW#93-2

Sample	Residual
12/15/1994	1587.77
3/14/1995	1320.77
6/21/1995	327.77
12/14/1995	537.77
3/6/1996	717.77
4/25/1996	227.77
10/2/1996	117.77
12/10/1996	52.2303
3/11/1997	287.77
4/15/1997	152.23
8/14/1997	1122.23
12/4/1997	702.23
3/31/1998	300.77
6/23/1998	862.23
8/11/1998	1922.23
12/8/1998	742.23
3/9/1999	297.77

6/8/1999	1312.23
8/19/1999	1335.23
12/14/1999	152.23
3/7/2000	197.77
6/23/2000	8503.77
12/12/2000	457.77
3/27/2001	722.23
6/28/2001	2062.23
9/10/2001	1162.23
12/18/2001	1122.23
3/19/2002	659.23
6/26/2002	1052.23
9/18/2002	152.23
12/11/2002	745.23
3/13/2003	617.77
6/25/2003	1052.23
9/26/2003	1155.23
12/10/2003	1012.23
3/9/2004	1082.23
6/24/2004	956.23
9/15/2004	802.23
12/15/2004	402.23
3/16/2005	152.23
6/15/2005	472.23
9/21/2005	122.23
12/21/2005	462.23
3/15/2006	887.77
6/21/2006	292.23
12/20/2006	1227.77
2/21/2007	1877.77
6/12/2007	52.2303
12/17/2007	437.77
6/11/2008	62.2303
12/3/2008	982.23
12/15/2008	467.77
6/17/2009	1152.23
12/9/2009	512.23
6/17/2010	482.23
12/22/2010	1692.23
6/29/2011	1572.23
12/7/2011	1232.23
6/6/2012	952.23
12/12/2012	1922.23
6/19/2013	962.23
12/11/2013	1112.23
6/11/2014	402.23
12/3/2014	1362.23
6/17/2015	8267.77
12/1/2015	1022.23
6/22/2016	2827.77
12/20/2016	1862.23
6/6/2017	3052.23
11/7/2017	9527.25
2/27/2018	9526.87
9/19/2018	6162.23

Well: MW#93-3	**Sample**	**Residual**

12/15/1994	486.329
3/14/1995	214.329
6/21/1995	145.329
12/14/1995	258.329
3/6/1996	51.3286
4/25/1996	294.329
10/2/1996	381.329
12/10/1996	151.329
3/11/1997	94.3286
4/15/1997	31.6714
8/14/1997	75.3286
12/4/1997	135.671
3/31/1998	103.671
6/23/1998	61.6714
8/11/1998	20.3286
12/8/1998	98.6714
3/9/1999	138.671
6/8/1999	95.6714
8/19/1999	22.6714
12/14/1999	187.671
3/7/2000	25.6714
6/23/2000	205.671
12/12/2000	224.671
3/27/2001	126.671
6/28/2001	120.671
9/10/2001	25.6714
12/18/2001	211.671
3/19/2002	35.6714
6/26/2002	488.671
9/18/2002	166.671
12/11/2002	150.671
3/13/2003	241.671
6/25/2003	164.671
9/26/2003	166.671
12/10/2003	102.671
3/9/2004	394.671
6/24/2004	146.671
9/15/2004	207.671
12/15/2004	303.671
3/16/2005	141.671
6/15/2005	195.671
9/21/2005	120.671
12/21/2005	135.671
3/15/2006	240.671
6/21/2006	49.6714
12/20/2006	188.671
6/12/2007	244.671
12/17/2007	365.671
6/11/2008	252.671
12/3/2008	202.671
6/17/2009	202.671
12/9/2009	237.671
6/17/2010	167.671
12/22/2010	185.671
6/29/2011	97.6714
12/7/2011	345.671
6/6/2012	72.6714

12/12/2012	265.671
6/19/2013	162.329
12/11/2013	23.6714
6/11/2014	224.329
12/3/2014	75.6714
6/17/2015	204.329
12/1/2015	531.329
10/11/2016	729.329
12/20/2016	924.329
6/6/2017	467.329
11/7/2017	845.329
9/6/2018	1104.33
9/19/2018	834.329

Well: MW#03-1

Sample	Residual
6/24/2004	24.4103
9/15/2004	214.41
12/15/2004	41.4103
3/16/2005	50.5897
6/15/2005	7.58966
9/21/2005	44.4103
12/20/2006	25.5897
6/12/2007	157.41
12/17/2007	67.4103
6/11/2008	5.58966
12/3/2008	176.41
6/17/2009	46.4103
12/9/2009	3.58966
6/17/2010	27.4103
12/22/2010	31.4103
6/29/2011	9.58966
12/7/2011	28.4103
6/6/2012	15.5897
6/19/2013	99.5897
12/11/2013	3.41034
6/11/2014	353.41
12/3/2014	63.5897
6/17/2015	205.59
12/1/2015	87.5897
6/22/2016	152.59
6/6/2017	274.59
11/7/2017	28.5897
2/27/2018	286.49
9/19/2018	100.41

Well: MW#03-2

Sample	Residual
6/24/2004	239
9/15/2004	409
12/15/2004	276
3/16/2005	270
6/15/2005	257
9/21/2005	306
12/21/2005	359
3/15/2006	337
6/21/2006	295
12/20/2006	351

6/12/2007	251
12/17/2007	314
6/11/2008	257
12/3/2008	179
6/17/2009	211
12/9/2009	241
6/17/2010	246
12/22/2010	203
6/29/2011	183
12/7/2011	176
6/6/2012	215
12/12/2012	124
6/19/2013	124
12/11/2013	126
6/11/2014	712
12/3/2014	609
6/17/2015	34
12/1/2015	36
6/22/2016	143
12/20/2016	523
6/6/2017	567
11/7/2017	1111
9/6/2018	1689
9/19/2018	1949

Shapiro-Francia Test of Normality

Parameter: Specific Conductance

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 275

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	10.52	-2.74777	7.55021	-28.9065
2	10.9	-2.45727	13.5884	-55.6908
3	186.1	-2.32634	19.0003	-488.623
4	198	-2.19728	23.8283	-923.685
5	219	-2.09693	28.2255	-1382.91
6	267	-2.03352	32.3607	-1925.86
7	320	-1.95996	36.2021	-2553.05
8	373	-1.91103	39.8541	-3265.87
9	385	-1.85218	43.2847	-3978.95
10	409	-1.79912	46.5215	-4714.79
11	422	-1.76241	49.6276	-5458.53
12	444	-1.71688	52.5753	-6220.83
13	447	-1.67466	55.3798	-6969.4
14	457	-1.64485	58.0853	-7721.1
15	463	-1.60725	60.6686	-8465.25
16	465	-1.58047	63.1665	-9200.17
17	467	-1.54643	65.5579	-9922.35
18	469	-1.5141	67.8504	-10632.5
19	476	-1.49085	70.0731	-11342.1
20	497	-1.46106	72.2078	-12068.3
21	500	-1.4325	74.2598	-12784.5
22	501	-1.41183	76.2531	-13491.8
23	504	-1.38517	78.1718	-14190
24	514	-1.36581	80.0372	-14892
25	517	-1.34075	81.8348	-15585.2
26	519	-1.31652	83.5681	-16268.4
27	522	-1.29884	85.255	-16946.4
28	540	-1.27588	86.8829	-17635.4
29	572	-1.25357	88.4543	-18352.4
30	573	-1.23724	89.9851	-19061.4
31	580	-1.21596	91.4636	-19766.6
32	594	-1.20036	92.9045	-20479.6
33	617	-1.18	94.2969	-21207.7
34	625	-1.16012	95.6428	-21932.8
35	630	-1.1455	96.955	-22654.5
36	636	-1.12639	98.2237	-23370.8
37	649	-1.10768	99.4507	-24089.7
38	655	-1.0939	100.647	-24806.2
39	661	-1.07584	101.805	-25517.4
40	674	-1.06252	102.934	-26233.5
41	674	-1.04505	104.026	-26937.9
42	680	-1.02789	105.082	-27636.8
43	685	-1.01522	106.113	-28332.2
44	687	-0.998575	107.11	-29018.3
45	690	-0.982202	108.075	-29696
46	692	-0.970094	109.016	-30367.3

47	716	-0.954165	109.926	-31050.5
48	720	-0.942375	110.814	-31729
49	728	-0.926859	111.674	-32403.7
50	748	-0.911562	112.504	-33085.6
51	752	-0.900227	113.315	-33762.6
52	755	-0.885291	114.099	-34431
53	787	-0.87055	114.857	-35116.1
54	805	-0.859618	115.595	-35808.1
55	807	-0.845198	116.31	-36490.1
56	807	-0.834498	117.006	-37163.6
57	826	-0.820379	117.679	-37841.2
58	881	-0.806422	118.33	-38551.7
59	910	-0.796056	118.963	-39276.1
60	930	-0.782366	119.575	-40003.7
61	965	-0.768821	120.166	-40745.6
62	967	-0.758753	120.742	-41479.3
63	972	-0.745449	121.298	-42203.9
64	1010	-0.735557	121.839	-42946.8
65	1010	-0.722479	122.361	-43676.5
66	1023	-0.709522	122.864	-44402.3
67	1030	-0.699883	123.354	-45123.2
68	1031	-0.687131	123.826	-45831.7
69	1034	-0.67449	124.281	-46529.1
70	1034	-0.665079	124.724	-47216.8
71	1035	-0.652622	125.149	-47892.2
72	1038	-0.643345	125.563	-48560
73	1051	-0.631062	125.962	-49223.3
74	1063	-0.618872	126.345	-49881.1
75	1064	-0.609791	126.716	-50529.9
76	1068	-0.597761	127.074	-51168.4
77	1070	-0.588793	127.42	-51798.4
78	1070	-0.576911	127.753	-52415.7
79	1073	-0.565108	128.073	-53022
80	1073	-0.556308	128.382	-53618.9
81	1074	-0.544642	128.679	-54203.9
82	1077	-0.533048	128.963	-54778
83	1080	-0.524401	129.238	-55344.3
84	1080	-0.51293	129.501	-55898.3
85	1080	-0.504372	129.755	-56443
86	1087	-0.493018	129.998	-56978.9
87	1088	-0.481728	130.23	-57503
88	1090	-0.473299	130.454	-58018.9
89	1092	-0.462114	130.668	-58523.6
90	1103	-0.450985	130.871	-59021
91	1108	-0.442676	131.067	-59511.5
92	1109	-0.431644	131.254	-59990.2
93	1109	-0.423405	131.433	-60459.7
94	1109	-0.412463	131.603	-60917.2
95	1111	-0.401571	131.764	-61363.3
96	1125	-0.393433	131.919	-61805.9
97	1129	-0.382622	132.066	-62237.9
98	1134	-0.371856	132.204	-62659.6
99	1137	-0.363809	132.336	-63073.2
100	1140	-0.353118	132.461	-63475.8
101	1140	-0.345126	132.58	-63869.2
102	1149	-0.334503	132.692	-64253.6
103	1154	-0.323919	132.797	-64627.4

104	1155	-0.316004	132.897	-64992.4
105	1155	-0.305481	132.99	-65345.2
106	1169	-0.294992	133.077	-65690
107	1170	-0.287147	133.159	-66026
108	1172	-0.276714	133.236	-66350.3
109	1173	-0.268908	133.308	-66665.7
110	1177	-0.258527	133.375	-66970
111	1178	-0.248174	133.437	-67262.4
112	1179	-0.240426	133.495	-67545.8
113	1180	-0.230118	133.547	-67817.4
114	1185	-0.219834	133.596	-68077.9
115	1185	-0.212137	133.641	-68329.3
116	1186	-0.201894	133.682	-68568.7
117	1187	-0.194225	133.719	-68799.3
118	1200	-0.184017	133.753	-69020.1
119	1200	-0.173829	133.783	-69228.7
120	1203	-0.166199	133.811	-69428.6
121	1210	-0.156042	133.835	-69617.4
122	1210	-0.1459	133.857	-69794
123	1214	-0.138305	133.876	-69961.9
124	1217	-0.128189	133.892	-70117.9
125	1218	-0.12061	133.907	-70264.8
126	1226	-0.110516	133.919	-70400.3
127	1227	-0.100433	133.929	-70523.5
128	1230	-0.0928787	133.938	-70637.7
129	1230	-0.0828129	133.945	-70739.6
130	1235	-0.0727562	133.95	-70829.4
131	1236	-0.0652187	133.954	-70910.1
132	1240	-0.0551734	133.957	-70978.5
133	1244	-0.0476439	133.959	-71037.7
134	1250	-0.0376076	133.961	-71084.8
135	1250	-0.0275759	133.962	-71119.2
136	1252	-0.0200544	133.962	-71144.3
137	1253	-0.0100272	133.962	-71156.9
138	1270	0	133.962	-71156.9
139	1270	0.0100272	133.962	-71144.2
140	1270	0.0200544	133.963	-71118.7
141	1273	0.0275759	133.963	-71083.6
142	1275	0.0376076	133.965	-71035.6
143	1289	0.0476439	133.967	-70974.2
144	1290	0.0551734	133.97	-70903.1
145	1296	0.0652187	133.974	-70818.5
146	1301	0.0727562	133.98	-70723.9
147	1301	0.0828129	133.986	-70616.1
148	1301	0.0928787	133.995	-70495.3
149	1309	0.100433	134.005	-70363.8
150	1318	0.110516	134.017	-70218.2
151	1326	0.12061	134.032	-70058.2
152	1327	0.128189	134.048	-69888.1
153	1327	0.138305	134.068	-69704.6
154	1329	0.1459	134.089	-69510.7
155	1332	0.156042	134.113	-69302.9
156	1334	0.166199	134.141	-69081.1
157	1351	0.173829	134.171	-68846.3
158	1352	0.184017	134.205	-68597.5
159	1366	0.194225	134.243	-68332.2
160	1370	0.201894	134.283	-68055.6

161	1370	0.212137	134.328	-67765
162	1374	0.219834	134.377	-67462.9
163	1374	0.230118	134.43	-67146.7
164	1393	0.240426	134.487	-66811.8
165	1421	0.248174	134.549	-66459.2
166	1423	0.258527	134.616	-66091.3
167	1427	0.268908	134.688	-65707.6
168	1438	0.276714	134.765	-65309.6
169	1441	0.287147	134.847	-64895.9
170	1454	0.294992	134.934	-64466.9
171	1458	0.305481	135.028	-64021.6
172	1466	0.316004	135.127	-63558.3
173	1469	0.323919	135.232	-63082.5
174	1480	0.334503	135.344	-62587.4
175	1490	0.345126	135.463	-62073.2
176	1498	0.353118	135.588	-61544.2
177	1500	0.363809	135.72	-60998.5
178	1515	0.371856	135.859	-60435.1
179	1516	0.382622	136.005	-59855.1
180	1520	0.393433	136.16	-59257
181	1521	0.401571	136.321	-58646.2
182	1531	0.412463	136.491	-58014.8
183	1534	0.423405	136.67	-57365.3
184	1540	0.431644	136.857	-56700.5
185	1547	0.442676	137.053	-56015.7
186	1560	0.450985	137.256	-55312.2
187	1570	0.462114	137.47	-54586.7
188	1586	0.473299	137.694	-53836
189	1602	0.481728	137.926	-53064.3
190	1608	0.493018	138.169	-52271.5
191	1618	0.504372	138.423	-51455.4
192	1620	0.51293	138.686	-50624.5
193	1620	0.524401	138.961	-49775
194	1630	0.533048	139.245	-48906.1
195	1657	0.544642	139.542	-48003.6
196	1743	0.556308	139.852	-47034
197	1762	0.565108	140.171	-46038.2
198	1807	0.576911	140.504	-44995.8
199	1888	0.588793	140.85	-43884.1
200	2005	0.597761	141.208	-42685.6
201	2042	0.609791	141.58	-41440.4
202	2110	0.618872	141.963	-40134.6
203	2121	0.631062	142.361	-38796.1
204	2200	0.643345	142.775	-37380.8
205	2380	0.652622	143.201	-35827.5
206	2620	0.665079	143.643	-34085
207	2880	0.67449	144.098	-32142.5
208	6710	0.687131	144.57	-27531.8
209	7660	0.699883	145.06	-22170.7
210	7950	0.709522	145.563	-16530
211	8217	0.722479	146.085	-10593.4
212	8310	0.735557	146.626	-4480.94
213	8650	0.745449	147.182	1967.2
214	8820	0.758753	147.758	8659.4
215	8920	0.768821	148.349	15517.3
216	9000	0.782366	148.961	22558.6
217	9070	0.796056	149.595	29778.8

218	9080	0.806422	150.245	37101.1
219	9100	0.820379	150.918	44566.6
220	9210	0.834498	151.614	52252.3
221	9237	0.845198	152.329	60059.4
222	9240	0.859618	153.068	68002.2
223	9250	0.87055	153.825	76054.8
224	9310	0.885291	154.609	84296.9
225	9340	0.900227	155.42	92705
226	9420	0.911562	156.251	101292
227	9590	0.926859	157.11	110180
228	9590	0.942375	157.998	119218
229	9600	0.954165	158.908	128378
230	9660	0.970094	159.849	137749
231	9690	0.982202	160.814	147267
232	9690	0.998575	161.811	156943
233	9690	1.01522	162.842	166780
234	9690	1.02789	163.898	176740
235	9830	1.04505	164.99	187013
236	9940	1.06252	166.119	197575
237	9940	1.07584	167.277	208269
238	10000	1.0939	168.473	219208
239	10010	1.10768	169.7	230295
240	10020	1.12639	170.969	241582
241	10050	1.1455	172.281	253094
242	10197	1.16012	173.627	264924
243	10240	1.18	175.02	277007
244	10260	1.20036	176.46	289323
245	10280	1.21596	177.939	301823
246	10283	1.23724	179.47	314545
247	10340	1.25357	181.041	327507
248	10400	1.27588	182.669	340776
249	10490	1.29884	184.356	354401
250	10494	1.31652	186.089	368217
251	10500	1.34075	187.887	382295
252	10520	1.36581	189.752	396663
253	10550	1.38517	191.671	411276
254	10560	1.41183	193.664	426185
255	10590	1.4325	195.716	441356
256	10590	1.46106	197.851	456828
257	10620	1.49085	200.074	472661
258	10650	1.5141	202.366	488786
259	10660	1.54643	204.758	505271
260	10660	1.58047	207.256	522119
261	10690	1.60725	209.839	539301
262	10693	1.64485	212.544	556889
263	10700	1.67466	215.349	574808
264	10770	1.71688	218.297	593299
265	10850	1.76241	221.403	612421
266	10873	1.79912	224.639	631983
267	10900	1.85218	228.07	652171
268	11110	1.91103	231.722	673403
269	11230	1.95996	235.563	695413
270	11400	2.03352	239.699	718595
271	11460	2.09693	244.096	742626
272	11460	2.19728	248.924	767807
273	11600	2.32634	254.336	794793
274	12590	2.45727	260.374	825730

Sample Standard Deviation = 3936.1
Numerator = 6.8183e+011
Denominator = 1.1053e+012 = 274 260.374
W Statistic = 0.616873
5% Critical value of 0.976 exceeds 0.616873
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.616873
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 70
Maximum Background Concentration = 1888
Confidence Level = 94.6%
False Positive Rate = 5.4%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/19/2018	1	15700	TRUE
MW#93-3	9/19/2018	1	2110	TRUE
MW#03-1	9/19/2018	1	573	FALSE
MW#03-2	9/19/2018	1	2880	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 71
Maximum Baseline Concentration = 12590
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	7950
	3/14/1995	8217
	6/21/1995	9210
	12/14/1995	9000
	3/6/1996	8820
	4/25/1996	9310
	10/2/1996	9420
	12/10/1996	9590
	3/11/1997	9250
	4/15/1997	9690
	8/14/1997	10660
	12/4/1997	10240
	3/31/1998	9237
	6/23/1998	10400
	8/11/1998	11460
	12/8/1998	10280
	3/9/1999	9240
	6/8/1999	10850
	8/19/1999	10873
	12/14/1999	9690
	3/7/2000	9340
	6/23/2000	1034
	12/12/2000	9080
	3/27/2001	10260
	6/28/2001	11600
	9/10/2001	10700
	12/18/2001	10660
	3/19/2002	10197
	6/26/2002	10590
	9/18/2002	9690
	12/11/2002	10283
	3/13/2003	8920
	6/25/2003	10590
	9/26/2003	10693
	12/10/2003	10550
	3/9/2004	10620
	6/24/2004	10494
	9/15/2004	10340
	12/15/2004	9940
	3/16/2005	9690
	6/15/2005	10010

9/21/2005	9660
12/21/2005	10000
3/15/2006	8650
6/21/2006	9830
12/20/2006	8310
2/21/2007	7660
6/12/2007	9590
12/17/2007	9100
6/11/2008	9600
12/3/2008	10520
12/15/2008	9070
6/17/2009	10690
12/9/2009	10050
6/17/2010	10020
12/22/2010	11230
6/29/2011	11110
12/7/2011	10770
6/6/2012	10490
12/12/2012	11460
6/19/2013	10500
12/11/2013	10650
6/11/2014	9940
12/3/2014	10900
6/17/2015	1270
12/1/2015	10560
6/22/2016	6710
12/20/2016	11400
6/6/2017	12590
11/7/2017	10.52
2/27/2018	10.9

Date	Samples	Mean	Impacted
9/19/2018	1	15700	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 69
Maximum Baseline Concentration = 2380
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	1762
	3/14/1995	1490
	6/21/1995	1421
	12/14/1995	1534
	3/6/1996	1327
	4/25/1996	1570
	10/2/1996	1657
	12/10/1996	1427
	3/11/1997	1370
	4/15/1997	1244
	8/14/1997	1351
	12/4/1997	1140
	3/31/1998	1172
	6/23/1998	1214
	8/11/1998	1296
	12/8/1998	1177
	3/9/1999	1137
	6/8/1999	1180
	8/19/1999	1253
	12/14/1999	1088
	3/7/2000	1250
	6/23/2000	1070
	12/12/2000	1051
	3/27/2001	1149
	6/28/2001	1155
	9/10/2001	1250
	12/18/2001	1064
	3/19/2002	1240
	6/26/2002	787
	9/18/2002	1109
	12/11/2002	1125
	3/13/2003	1034
	6/25/2003	1111
	9/26/2003	1109
	12/10/2003	1173
	3/9/2004	881
	6/24/2004	1129
	9/15/2004	1068
	12/15/2004	972
	3/16/2005	1134
	6/15/2005	1080

9/21/2005	1155
12/21/2005	1140
3/15/2006	1035
6/21/2006	1226
12/20/2006	1087
6/12/2007	1031
12/17/2007	910
6/11/2008	1023
12/3/2008	1073
6/17/2009	1073
12/9/2009	1038
6/17/2010	1108
12/22/2010	1090
6/29/2011	1178
12/7/2011	930
6/6/2012	1203
12/12/2012	1010
6/19/2013	1438
12/11/2013	1252
6/11/2014	1500
12/3/2014	1200
6/17/2015	1480
12/1/2015	1807
10/11/2016	2005
12/20/2016	2200
6/6/2017	1743
11/7/2017	2121
9/6/2018	2380

Date	Samples	Mean	Impacted
9/19/2018	1	2110	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#03-2

Parameter: Specific Conductance

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 33
Maximum Baseline Concentration = 2620
Confidence Level = 97.1%
False Positive Rate = 2.9%

Baseline Samples	Date	Result
	6/24/2004	692
	9/15/2004	522
	12/15/2004	655
	3/16/2005	661
	6/15/2005	674
	9/21/2005	625
	12/21/2005	572
	3/15/2006	594
	6/21/2006	636
	12/20/2006	580
	6/12/2007	680
	12/17/2007	617
	6/11/2008	674
	12/3/2008	752
	6/17/2009	720
	12/9/2009	690
	6/17/2010	685
	12/22/2010	728
	6/29/2011	748
	12/7/2011	755
	6/6/2012	716
	12/12/2012	807
	6/19/2013	807
	12/11/2013	805
	6/11/2014	219
	12/3/2014	1540
	6/17/2015	965
	12/1/2015	967
	6/22/2016	1074
	12/20/2016	1454
	6/6/2017	1498
	11/7/2017	2042
	9/6/2018	2620

Date	Samples	Mean	Impacted
9/19/2018	1	2880	TRUE

Concentrations (mg/l)

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 274
Total Non-Detect: 8
Percent Non-Detects: 2.91971%
Total Background Samples: 70
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	70	0 (0%)	12/15/1994	195	195
			3/14/1995	275	275
			6/21/1995	750	750
			12/14/1995	320	320
			3/6/1996	215	215
			4/25/1996	272	272
			10/2/1996	300	300
			12/10/1996	260	260
			3/11/1997	278	278
			4/15/1997	250	250
			8/14/1997	320	320
			12/4/1997	360	360
			3/31/1998	230	230
			6/23/1998	500	500
			8/11/1998	350	350
			12/8/1998	270	270
			3/9/1999	290	290
			6/8/1999	408	408
			8/19/1999	388	388
			12/14/1999	310	310
			3/7/2000	373	373
			6/23/2000	410	410
			12/12/2000	420	420
			3/27/2001	350	350
			6/28/2001	425	425
			9/10/2001	390	390
			12/18/2001	390	390
			3/19/2002	425	425
			6/26/2002	420	420
			9/18/2002	517	517
			12/11/2002	430	430
			3/13/2003	450	450
			6/25/2003	434	434
			9/26/2003	460	460
			12/10/2003	470	470
			3/9/2004	444	444
			6/24/2004	500	500
			9/15/2004	475	475
			12/15/2004	558	558
			3/16/2005	880	880
			6/15/2005	22	22
			9/21/2005	467	467
			12/21/2005	475	475
			3/15/2006	375	375

			6/21/2006	420	420
			12/20/2006	330	330
			6/12/2007	260	260
			12/17/2007	300	300
			6/11/2008	375	375
			12/3/2008	340	340
			6/17/2009	240	240
			12/9/2009	160	160
			6/17/2010	290	290
			12/22/2010	304	304
			6/29/2011	306	306
			12/7/2011	255	255
			6/6/2012	275	275
			12/12/2012	301	301
			6/19/2013	409	409
			12/11/2013	306	306
			6/11/2014	316	316
			12/3/2014	292	292
			6/17/2015	286	286
			12/1/2015	299	299
			6/22/2016	250	250
			12/20/2016	275	275
			6/6/2017	265	265
			11/7/2017	281	281
			2/27/2018	299	299
			9/27/2018	305	305

There are 4 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	72	0 (0%)	12/15/1994	2000	2000
			3/14/1995	1550	1550
			6/21/1995	185	185
			12/14/1995	2367	2367
			3/6/1996	2150	2150
			4/25/1996	2000	2000
			10/2/1996	3267	3267
			12/10/1996	4000	4000
			3/11/1997	1700	1700
			4/15/1997	1500	1500
			8/14/1997	3650	3650
			12/4/1997	4300	4300
			3/31/1998	2500	2500
			6/23/1998	3250	3250
			8/11/1998	3050	3050
			12/8/1998	3050	3050
			3/9/1999	3600	3600
			6/8/1999	3150	3150
			8/19/1999	1897	1897
			12/14/1999	2500	2500
			3/7/2000	3400	3400
			6/23/2000	3400	3400
			12/12/2000	3000	3000
			3/27/2001	2133	2133
			6/28/2001	2750	2750
			9/10/2001	2650	2650

			12/18/2001	2950	2950
			3/19/2002	2967	2967
			6/26/2002	3050	3050
			9/18/2002	2900	2900
			12/11/2002	2933	2933
			3/13/2003	2900	2900
			6/25/2003	2700	2700
			9/26/2003	2767	2767
			12/10/2003	2700	2700
			3/9/2004	2550	2550
			6/24/2004	2650	2650
			9/15/2004	2700	2700
			12/15/2004	2950	2950
			3/16/2005	3200	3200
			6/15/2005	2650	2650
			9/21/2005	3200	3200
			12/21/2005	3200	3200
			3/15/2006	3000	3000
			6/21/2006	2700	2700
			12/20/2006	2500	2500
			2/21/2007	1900	1900
			6/12/2007	2400	2400
			12/17/2007	3100	3100
			6/11/2008	2350	2350
			12/3/2008	3300	3300
			12/15/2008	2400	2400
			6/17/2009	2300	2300
			12/9/2009	2200	2200
			6/17/2010	2900	2900
			12/22/2010	3460	3460
			6/29/2011	2630	2630
			12/7/2011	2520	2520
			6/6/2012	2360	2360
			12/12/2012	3240	3240
			6/19/2013	2510	2510
			12/11/2013	2460	2460
			6/11/2014	2790	2790
			12/3/2014	2940	2940
			6/17/2015	114	114
			12/1/2015	3600	3600
			6/22/2016	2620	2620
			12/20/2016	3800	3800
			6/6/2017	3630	3630
			11/7/2017	4340	4340
			2/27/2018	3870	3870
			9/27/2018	3680	3680
MW#93-3	70	8 (11.4286%)	12/15/1994	ND<10	ND<10
			3/14/1995	ND<10	ND<10
			6/21/1995	10	10
			12/14/1995	ND<10	ND<10
			3/6/1996	10	10
			4/25/1996	ND<10	ND<10
			10/2/1996	11	11
			12/10/1996	10	10
			3/11/1997	12	12
			4/15/1997	15	15

8/14/1997	11	11
12/4/1997	8	8
3/31/1998	45	45
6/23/1998	4	4
8/11/1998	9	9
12/8/1998	2	2
3/9/1999	ND<10	ND<10
6/8/1999	3	3
8/19/1999	ND<10	ND<10
12/14/1999	ND<10	ND<10
3/7/2000	13	13
6/23/2000	14	14
12/12/2000	7	7
3/27/2001	3	3
6/28/2001	ND<10	ND<10
9/10/2001	20	20
12/18/2001	19	19
3/19/2002	8	8
6/26/2002	8	8
9/18/2002	8	8
12/11/2002	6	6
3/13/2003	18	18
6/25/2003	13	13
9/26/2003	16	16
12/10/2003	34	34
3/9/2004	130	130
6/24/2004	24	24
9/15/2004	17	17
12/15/2004	26	26
3/16/2005	29	29
6/15/2005	26	26
9/21/2005	19	19
12/21/2005	23	23
3/15/2006	19	19
6/21/2006	21	21
12/20/2006	42	42
6/12/2007	3	3
12/17/2007	28	28
6/11/2008	27	27
12/3/2008	11	11
6/17/2009	16	16
12/9/2009	12	12
6/17/2010	45	45
12/22/2010	25.8	25.8
6/29/2011	34.2	34.2
12/7/2011	37.4	37.4
6/6/2012	38.3	38.3
12/12/2012	25.8	25.8
6/19/2013	61.6	61.6
12/11/2013	26.5	26.5
6/11/2014	56.2	56.2
12/3/2014	36	36
6/17/2015	109	109
12/1/2015	81	81
6/22/2016	58.5	58.5
12/20/2016	66.6	66.6
6/6/2017	18.2	18.2

			11/7/2017	80.3	80.3
			2/27/2018	64.2	64.2
			9/27/2018	75.8	75.8
MW#03-1	29	0 (0%)	6/24/2004	42	42
			9/15/2004	76	76
			12/15/2004	62	62
			3/16/2005	22	22
			6/15/2005	23	23
			9/21/2005	17	17
			12/20/2006	55	55
			6/12/2007	88	88
			12/17/2007	120	120
			6/11/2008	23	23
			12/3/2008	90	90
			6/17/2009	21	21
			12/9/2009	15	15
			6/17/2010	16	16
			12/22/2010	22.9	22.9
			6/29/2011	21.6	21.6
			12/7/2011	18.1	18.1
			6/6/2012	14.3	14.3
			6/19/2013	16.2	16.2
			12/11/2013	29.1	29.1
			6/11/2014	127	127
			12/3/2014	19.7	19.7
			6/17/2015	7.86	7.86
			12/1/2015	12.1	12.1
			6/22/2016	10.3	10.3
			12/20/2016	30.9	30.9
			6/6/2017	8.92	8.92
			11/7/2017	14.4	14.4
			2/27/2018	12.6	12.6
MW#03-2	33	0 (0%)	6/24/2004	72	72
			9/15/2004	32	32
			12/15/2004	54	54
			3/16/2005	78	78
			6/15/2005	23	23
			9/21/2005	80	80
			12/21/2005	72	72
			3/15/2006	30	30
			12/20/2006	34	34
			6/12/2007	68	68
			12/17/2007	130	130
			6/11/2008	67	67
			12/3/2008	210	210
			6/17/2009	84	84
			12/9/2009	80	80
			6/17/2010	106	106
			12/22/2010	98.9	98.9
			6/29/2011	101	101
			12/7/2011	98.8	98.8
			6/6/2012	107	107
			12/12/2012	111	111
			6/19/2013	113	113
			12/11/2013	106	106

6/11/2014	10.3	10.3
12/3/2014	158	158
6/17/2015	179	179
12/1/2015	197	197
6/22/2016	254	254
12/20/2016	451	451
6/6/2017	332	332
11/7/2017	516	516
2/27/2018	468	468
9/27/2018	426	426

There are 0 unused wells

Well	Samples	ND	Date	Result	Original

Levene's Test for Equal of Variance

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 183.035
Overall Std Dev = 341.639
Overall Total = 50151.5
SS Wells = 1.2315e+007
SS Total = 3.18638e+007

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	1.2315e+007	4	3.07875e+006	42.365
Error (within wells)	1.95488e+007	269	72672.1	
Totals	3.18638e+007	273		

42.365 exceeds 2.37; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	12/15/1994	159.857
	3/14/1995	79.8571
	6/21/1995	395.143
	12/14/1995	34.8571
	3/6/1996	139.857
	4/25/1996	82.8571
	10/2/1996	54.8571
	12/10/1996	94.8571
	3/11/1997	76.8571
	4/15/1997	104.857
	8/14/1997	34.8571
	12/4/1997	5.14286
	3/31/1998	124.857
	6/23/1998	145.143
	8/11/1998	4.85714
	12/8/1998	84.8571
	3/9/1999	64.8571
	6/8/1999	53.1429
	8/19/1999	33.1429
	12/14/1999	44.8571
	3/7/2000	18.1429
	6/23/2000	55.1429
	12/12/2000	65.1429
	3/27/2001	4.85714
	6/28/2001	70.1429
	9/10/2001	35.1429
	12/18/2001	35.1429
	3/19/2002	70.1429
	6/26/2002	65.1429
	9/18/2002	162.143
	12/11/2002	75.1429
	3/13/2003	95.1429

6/25/2003	79.1429
9/26/2003	105.143
12/10/2003	115.143
3/9/2004	89.1429
6/24/2004	145.143
9/15/2004	120.143
12/15/2004	203.143
3/16/2005	525.143
6/15/2005	332.857
9/21/2005	112.143
12/21/2005	120.143
3/15/2006	20.1429
6/21/2006	65.1429
12/20/2006	24.8571
6/12/2007	94.8571
12/17/2007	54.8571
6/11/2008	20.1429
12/3/2008	14.8571
6/17/2009	114.857
12/9/2009	194.857
6/17/2010	64.8571
12/22/2010	50.8571
6/29/2011	48.8571
12/7/2011	99.8571
6/6/2012	79.8571
12/12/2012	53.8571
6/19/2013	54.1429
12/11/2013	48.8571
6/11/2014	38.8571
12/3/2014	62.8571
6/17/2015	68.8571
12/1/2015	55.8571
6/22/2016	104.857
12/20/2016	79.8571
6/6/2017	89.8571
11/7/2017	73.8571
2/27/2018	55.8571
9/27/2018	49.8571

Well: MW#93-2

Sample	Residual
12/15/1994	771.944
3/14/1995	1221.94
6/21/1995	2586.94
12/14/1995	404.944
3/6/1996	621.944
4/25/1996	771.944
10/2/1996	495.056
12/10/1996	1228.06
3/11/1997	1071.94
4/15/1997	1271.94
8/14/1997	878.056
12/4/1997	1528.06
3/31/1998	271.944
6/23/1998	478.056
8/11/1998	278.056
12/8/1998	278.056
3/9/1999	828.056

6/8/1999	378.056
8/19/1999	874.944
12/14/1999	271.944
3/7/2000	628.056
6/23/2000	628.056
12/12/2000	228.056
3/27/2001	638.944
6/28/2001	21.9444
9/10/2001	121.944
12/18/2001	178.056
3/19/2002	195.056
6/26/2002	278.056
9/18/2002	128.056
12/11/2002	161.056
3/13/2003	128.056
6/25/2003	71.9444
9/26/2003	4.94444
12/10/2003	71.9444
3/9/2004	221.944
6/24/2004	121.944
9/15/2004	71.9444
12/15/2004	178.056
3/16/2005	428.056
6/15/2005	121.944
9/21/2005	428.056
12/21/2005	428.056
3/15/2006	228.056
6/21/2006	71.9444
12/20/2006	271.944
2/21/2007	871.944
6/12/2007	371.944
12/17/2007	328.056
6/11/2008	421.944
12/3/2008	528.056
12/15/2008	371.944
6/17/2009	471.944
12/9/2009	571.944
6/17/2010	128.056
12/22/2010	688.056
6/29/2011	141.944
12/7/2011	251.944
6/6/2012	411.944
12/12/2012	468.056
6/19/2013	261.944
12/11/2013	311.944
6/11/2014	18.0556
12/3/2014	168.056
6/17/2015	2657.94
12/1/2015	828.056
6/22/2016	151.944
12/20/2016	1028.06
6/6/2017	858.056
11/7/2017	1568.06
2/27/2018	1098.06
9/27/2018	908.056

Well: MW#93-3	**Sample**	**Residual**

12/15/1994	16.1486
3/14/1995	16.1486
6/21/1995	16.1486
12/14/1995	16.1486
3/6/1996	16.1486
4/25/1996	16.1486
10/2/1996	15.1486
12/10/1996	16.1486
3/11/1997	14.1486
4/15/1997	11.1486
8/14/1997	15.1486
12/4/1997	18.1486
3/31/1998	18.8514
6/23/1998	22.1486
8/11/1998	17.1486
12/8/1998	24.1486
3/9/1999	16.1486
6/8/1999	23.1486
8/19/1999	16.1486
12/14/1999	16.1486
3/7/2000	13.1486
6/23/2000	12.1486
12/12/2000	19.1486
3/27/2001	23.1486
6/28/2001	16.1486
9/10/2001	6.14857
12/18/2001	7.14857
3/19/2002	18.1486
6/26/2002	18.1486
9/18/2002	18.1486
12/11/2002	20.1486
3/13/2003	8.14857
6/25/2003	13.1486
9/26/2003	10.1486
12/10/2003	7.85143
3/9/2004	103.851
6/24/2004	2.14857
9/15/2004	9.14857
12/15/2004	0.148571
3/16/2005	2.85143
6/15/2005	0.148571
9/21/2005	7.14857
12/21/2005	3.14857
3/15/2006	7.14857
6/21/2006	5.14857
12/20/2006	15.8514
6/12/2007	23.1486
12/17/2007	1.85143
6/11/2008	0.851429
12/3/2008	15.1486
6/17/2009	10.1486
12/9/2009	14.1486
6/17/2010	18.8514
12/22/2010	0.348571
6/29/2011	8.05143
12/7/2011	11.2514
6/6/2012	12.1514

12/12/2012	0.348571
6/19/2013	35.4514
12/11/2013	0.351429
6/11/2014	30.0514
12/3/2014	9.85143
6/17/2015	82.8514
12/1/2015	54.8514
6/22/2016	32.3514
12/20/2016	40.4514
6/6/2017	7.94857
11/7/2017	54.1514
2/27/2018	38.0514
9/27/2018	49.6514

Well: MW#03-1

Sample	Residual
6/24/2004	6.27655
9/15/2004	40.2766
12/15/2004	26.2766
3/16/2005	13.7234
6/15/2005	12.7234
9/21/2005	18.7234
12/20/2006	19.2766
6/12/2007	52.2766
12/17/2007	84.2766
6/11/2008	12.7234
12/3/2008	54.2766
6/17/2009	14.7234
12/9/2009	20.7234
6/17/2010	19.7234
12/22/2010	12.8234
6/29/2011	14.1234
12/7/2011	17.6234
6/6/2012	21.4234
6/19/2013	19.5234
12/11/2013	6.62345
6/11/2014	91.2766
12/3/2014	16.0234
6/17/2015	27.8634
12/1/2015	23.6234
6/22/2016	25.4234
12/20/2016	4.82345
6/6/2017	26.8034
11/7/2017	21.3234
2/27/2018	23.1234

Well: MW#03-2

Sample	Residual
6/24/2004	77.9091
9/15/2004	117.909
12/15/2004	95.9091
3/16/2005	71.9091
6/15/2005	126.909
9/21/2005	69.9091
12/21/2005	77.9091
3/15/2006	119.909
12/20/2006	115.909
6/12/2007	81.9091

12/17/2007	19.9091
6/11/2008	82.9091
12/3/2008	60.0909
6/17/2009	65.9091
12/9/2009	69.9091
6/17/2010	43.9091
12/22/2010	51.0091
6/29/2011	48.9091
12/7/2011	51.1091
6/6/2012	42.9091
12/12/2012	38.9091
6/19/2013	36.9091
12/11/2013	43.9091
6/11/2014	139.609
12/3/2014	8.09091
6/17/2015	29.0909
12/1/2015	47.0909
6/22/2016	104.091
12/20/2016	301.091
6/6/2017	182.091
11/7/2017	366.091
2/27/2018	318.091
9/27/2018	276.091

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Sample Size = 274

i	x(i)	m(i)	sum(m^2)	sum(mx)
0	0	0	0	0
1	2	-2.74777	7.55021	-5.49553
2	3	-2.45727	13.5884	-12.8673
3	3	-2.32634	19.0003	-19.8464
4	3	-2.19728	23.8283	-26.4382
5	4	-2.09693	28.2255	-34.826
6	6	-2.03352	32.3607	-47.0271
7	7	-1.95996	36.2021	-60.7468
8	7.86	-1.8957	39.7958	-75.647
9	8	-1.85218	43.2263	-90.4644
10	8	-1.79912	46.4632	-104.857
11	8	-1.75069	49.5281	-118.863
12	8	-1.71688	52.4757	-132.598
13	8.92	-1.67466	55.2802	-147.536
14	9	-1.64485	57.9858	-162.34
15	10	-1.60725	60.569	-178.412
16	10	-1.57179	63.0396	-194.13
17	10	-1.54643	65.431	-209.594
18	10	-1.5141	67.7235	-224.735
19	10	-1.48328	69.9236	-239.568
20	10	-1.46106	72.0583	-254.179
21	10	-1.4325	74.1104	-268.504
22	10	-1.40507	76.0846	-282.554
23	10	-1.38517	78.0033	-296.406
24	10	-1.35946	79.8515	-310.001
25	10	-1.34075	81.6491	-323.408
26	10.3	-1.31652	83.3823	-336.969
27	10.3	-1.29303	85.0543	-350.287
28	11	-1.27588	86.6821	-364.321
29	11	-1.25357	88.2535	-378.111
30	11	-1.23187	89.771	-391.661
31	12	-1.21596	91.2496	-406.253
32	12	-1.19522	92.6781	-420.595
33	12.1	-1.17499	94.0587	-434.813
34	12.6	-1.16012	95.4046	-449.43
35	13	-1.14069	96.7058	-464.259
36	13	-1.12639	97.9745	-478.902
37	14	-1.10768	99.2015	-494.41
38	14.3	-1.08935	100.388	-509.987
39	14.4	-1.07584	101.546	-525.479
40	15	-1.05812	102.665	-541.351
41	15	-1.04073	103.748	-556.962
42	16	-1.02789	104.805	-573.409
43	16	-1.01104	105.827	-589.585
44	16	-0.994457	106.816	-605.496
45	16.2	-0.982202	107.781	-621.408
46	17	-0.966088	108.714	-637.832

47	17	-0.954165	109.625	-654.052
48	18	-0.938476	110.505	-670.945
49	18.1	-0.923014	111.357	-687.652
50	18.2	-0.911562	112.188	-704.242
51	19	-0.896473	112.992	-721.275
52	19	-0.881587	113.769	-738.025
53	19	-0.87055	114.527	-754.566
54	19.7	-0.855996	115.26	-771.429
55	20	-0.841621	115.968	-788.261
56	21	-0.830953	116.658	-805.711
57	21	-0.816874	117.326	-822.865
58	21.6	-0.806422	117.976	-840.284
59	22	-0.792618	118.604	-857.722
60	22	-0.778966	119.211	-874.859
61	22.9	-0.768821	119.802	-892.465
62	23	-0.755415	120.373	-909.84
63	23	-0.742143	120.924	-926.909
64	23	-0.732275	121.46	-943.751
65	23	-0.719228	121.977	-960.293
66	24	-0.706302	122.476	-977.245
67	25.8	-0.696684	122.961	-995.219
68	25.8	-0.68396	123.429	-1012.87
69	26	-0.67449	123.884	-1030.4
70	26	-0.661955	124.322	-1047.61
71	26.5	-0.649522	124.744	-1064.83
72	27	-0.640266	125.154	-1082.11
73	28	-0.628006	125.548	-1099.7
74	29	-0.615839	125.928	-1117.56
75	29.1	-0.606775	126.296	-1135.21
76	30	-0.594766	126.65	-1153.06
77	30.9	-0.582841	126.989	-1171.07
78	32	-0.573953	127.319	-1189.43
79	34	-0.56217	127.635	-1208.55
80	34	-0.553384	127.941	-1227.36
81	34.2	-0.541736	128.235	-1245.89
82	36	-0.530162	128.516	-1264.97
83	37.4	-0.521527	128.788	-1284.48
84	38.3	-0.510074	129.048	-1304.02
85	42	-0.498687	129.296	-1324.96
86	42	-0.490189	129.537	-1345.55
87	45	-0.478914	129.766	-1367.1
88	45	-0.467699	129.985	-1388.15
89	54	-0.459327	130.196	-1412.95
90	55	-0.448213	130.397	-1437.6
91	56.2	-0.439913	130.59	-1462.32
92	58.5	-0.428895	130.774	-1487.41
93	61.6	-0.417928	130.949	-1513.16
94	62	-0.409735	131.117	-1538.56
95	64.2	-0.398855	131.276	-1564.17
96	66.6	-0.388022	131.426	-1590.01
97	67	-0.379927	131.571	-1615.47
98	68	-0.369171	131.707	-1640.57
99	72	-0.358459	131.835	-1666.38
100	72	-0.350451	131.958	-1691.61
101	75.8	-0.33981	132.074	-1717.37
102	76	-0.331854	132.184	-1742.59
103	78	-0.321278	132.287	-1767.65

104	80	-0.310738	132.384	-1792.51
105	80	-0.302855	132.475	-1816.74
106	80.3	-0.292375	132.561	-1840.21
107	81	-0.281926	132.64	-1863.05
108	84	-0.27411	132.715	-1886.08
109	88	-0.263715	132.785	-1909.28
110	90	-0.253347	132.849	-1932.08
111	98.8	-0.24559	132.91	-1956.35
112	98.9	-0.235269	132.965	-1979.62
113	101	-0.227545	133.017	-2002.6
114	106	-0.217267	133.064	-2025.63
115	106	-0.207012	133.107	-2047.57
116	107	-0.199336	133.146	-2068.9
117	109	-0.189118	133.182	-2089.52
118	111	-0.17892	133.214	-2109.38
119	113	-0.171285	133.244	-2128.73
120	114	-0.161119	133.27	-2147.1
121	120	-0.150969	133.292	-2165.21
122	127	-0.143367	133.313	-2183.42
123	130	-0.133244	133.331	-2200.74
124	130	-0.125661	133.346	-2217.08
125	158	-0.115562	133.36	-2235.34
126	160	-0.105474	133.371	-2252.21
127	179	-0.0979139	133.38	-2269.74
128	185	-0.0878447	133.388	-2285.99
129	195	-0.0777834	133.394	-2301.16
130	197	-0.0702426	133.399	-2315
131	210	-0.0601949	133.403	-2327.64
132	215	-0.0501541	133.405	-2338.42
133	230	-0.0426257	133.407	-2348.23
134	240	-0.0325917	133.408	-2356.05
135	250	-0.0250691	133.409	-2362.32
136	250	-0.0150408	133.409	-2366.08
137	254	-0.00501359	133.409	-2367.35
138	255	0.00501359	133.409	-2366.07
139	260	0.0150408	133.409	-2362.16
140	260	0.0250691	133.41	-2355.64
141	265	0.0325917	133.411	-2347
142	270	0.0426257	133.413	-2335.5
143	272	0.0501541	133.415	-2321.85
144	275	0.0601949	133.419	-2305.3
145	275	0.0702426	133.424	-2285.98
146	275	0.0777834	133.43	-2264.59
147	278	0.0878447	133.438	-2240.17
148	281	0.0979139	133.447	-2212.66
149	286	0.105474	133.458	-2182.49
150	290	0.115562	133.472	-2148.98
151	290	0.125661	133.488	-2112.54
152	292	0.133244	133.505	-2073.63
153	299	0.143367	133.526	-2030.76
154	299	0.150969	133.549	-1985.62
155	300	0.161119	133.575	-1937.29
156	300	0.171285	133.604	-1885.9
157	301	0.17892	133.636	-1832.05
158	304	0.189118	133.672	-1774.56
159	305	0.199336	133.711	-1713.76
160	306	0.207012	133.754	-1650.41

161	306	0.217267	133.802	-1583.93
162	310	0.227545	133.853	-1513.39
163	316	0.235269	133.909	-1439.05
164	320	0.24559	133.969	-1360.46
165	320	0.253347	134.033	-1279.39
166	330	0.263715	134.103	-1192.36
167	332	0.27411	134.178	-1101.35
168	340	0.281926	134.257	-1005.5
169	350	0.292375	134.343	-903.169
170	350	0.302855	134.435	-797.169
171	360	0.310738	134.531	-685.304
172	373	0.321278	134.634	-565.467
173	375	0.331854	134.744	-441.022
174	375	0.33981	134.86	-313.593
175	388	0.350451	134.983	-177.618
176	390	0.358459	135.111	-37.819
177	390	0.369171	135.247	106.158
178	408	0.379927	135.392	261.168
179	409	0.388022	135.542	419.869
180	410	0.398855	135.701	583.399
181	420	0.409735	135.869	755.488
182	420	0.417928	136.044	931.018
183	420	0.428895	136.228	1111.15
184	425	0.439913	136.422	1298.12
185	425	0.448213	136.622	1488.61
186	426	0.459327	136.833	1684.28
187	430	0.467699	137.052	1885.39
188	434	0.478914	137.281	2093.24
189	444	0.490189	137.522	2310.88
190	450	0.498687	137.77	2535.29
191	451	0.510074	138.031	2765.34
192	460	0.521527	138.303	3005.24
193	467	0.530162	138.584	3252.82
194	468	0.541736	138.877	3506.36
195	470	0.553384	139.183	3766.45
196	475	0.56217	139.499	4033.48
197	475	0.573953	139.829	4306.11
198	500	0.582841	140.169	4597.53
199	500	0.594766	140.522	4894.91
200	516	0.606775	140.89	5208
201	517	0.615839	141.27	5526.39
202	558	0.628006	141.664	5876.82
203	750	0.640266	142.074	6357.02
204	880	0.649522	142.496	6928.6
205	1500	0.661955	142.934	7921.53
206	1550	0.67449	143.389	8966.99
207	1700	0.68396	143.857	10129.7
208	1897	0.696684	144.342	11451.3
209	1900	0.706302	144.841	12793.3
210	2000	0.719228	145.358	14231.8
211	2000	0.732275	145.895	15696.3
212	2133	0.742143	146.445	17279.3
213	2150	0.755415	147.016	18903.5
214	2200	0.768821	147.607	20594.9
215	2300	0.778966	148.214	22386.5
216	2350	0.792618	148.842	24249.1
217	2360	0.806422	149.492	26152.3

218	2367	0.816874	150.16	28085.8
219	2400	0.830953	150.85	30080.1
220	2400	0.841621	151.559	32100
221	2460	0.855996	152.291	34205.8
222	2500	0.87055	153.049	36382.1
223	2500	0.881587	153.826	38586.1
224	2500	0.896473	154.63	40827.3
225	2510	0.911562	155.461	43115.3
226	2520	0.923014	156.313	45441.3
227	2550	0.938476	157.194	47834.4
228	2620	0.954165	158.104	50334.3
229	2630	0.966088	159.037	52875.1
230	2650	0.982202	160.002	55478
231	2650	0.994457	160.991	58113.3
232	2650	1.01104	162.013	60792.5
233	2700	1.02789	163.07	63567.8
234	2700	1.04073	164.153	66377.8
235	2700	1.05812	165.273	69234.7
236	2700	1.07584	166.43	72139.5
237	2750	1.08935	167.617	75135.2
238	2767	1.10768	168.844	78200.2
239	2790	1.12639	170.112	81342.8
240	2900	1.14069	171.414	84650.8
241	2900	1.16012	172.759	88015.1
242	2900	1.17499	174.14	91422.6
243	2933	1.19522	175.569	94928.2
244	2940	1.21596	177.047	98503.1
245	2950	1.23187	178.565	102137
246	2950	1.25357	180.136	105835
247	2967	1.27588	181.764	109621
248	3000	1.29303	183.436	113500
249	3000	1.31652	185.169	117449
250	3050	1.34075	186.967	121539
251	3050	1.35946	188.815	125685
252	3050	1.38517	190.734	129910
253	3100	1.40507	192.708	134265
254	3150	1.4325	194.76	138778
255	3200	1.46106	196.895	143453
256	3200	1.48328	199.095	148200
257	3200	1.5141	201.387	153045
258	3240	1.54643	203.779	158055
259	3250	1.57179	206.249	163164
260	3267	1.60725	208.832	168415
261	3300	1.64485	211.538	173843
262	3400	1.67466	214.342	179536
263	3400	1.71688	217.29	185374
264	3460	1.75069	220.355	191431
265	3600	1.79912	223.592	197908
266	3600	1.85218	227.022	204576
267	3630	1.8957	230.616	211457
268	3650	1.95996	234.458	218611
269	3680	2.03352	238.593	226094
270	3800	2.09693	242.99	234063
271	3870	2.19728	247.818	242566
272	4000	2.32634	253.23	251872
273	4300	2.45727	259.268	262438

Sample Standard Deviation = 1221.11
Numerator = 6.88736e+010
Denominator = 1.05542e+011 = 273 259.268
W Statistic = 0.652573
5% Critical value of 0.976 exceeds 0.652573
Evidence of non-normality at 95% level of significance
1% Critical value of 0.967 exceeds 0.652573
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 2.91971%
Number of comparisons = 4
Future Samples (k) = 4
Recent Dates = 1
Background Samples (n) = 70
Maximum Background Concentration = 880
Confidence Level = 94.6%
False Positive Rate = 5.4%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	3680	TRUE
MW#93-3	9/27/2018	1	75.8	FALSE
MW#03-1	2/27/2018	1	12.6	FALSE
MW#03-2	9/27/2018	1	426	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 71
Maximum Baseline Concentration = 4340
Confidence Level = 98.6%
False Positive Rate = 1.4%

Baseline Samples	Date	Result
	12/15/1994	2000
	3/14/1995	1550
	6/21/1995	185
	12/14/1995	2367
	3/6/1996	2150
	4/25/1996	2000
	10/2/1996	3267
	12/10/1996	4000
	3/11/1997	1700
	4/15/1997	1500
	8/14/1997	3650
	12/4/1997	4300
	3/31/1998	2500
	6/23/1998	3250
	8/11/1998	3050
	12/8/1998	3050
	3/9/1999	3600
	6/8/1999	3150
	8/19/1999	1897
	12/14/1999	2500
	3/7/2000	3400
	6/23/2000	3400
	12/12/2000	3000
	3/27/2001	2133
	6/28/2001	2750
	9/10/2001	2650
	12/18/2001	2950
	3/19/2002	2967
	6/26/2002	3050
	9/18/2002	2900
	12/11/2002	2933
	3/13/2003	2900
	6/25/2003	2700
	9/26/2003	2767
	12/10/2003	2700
	3/9/2004	2550
	6/24/2004	2650
	9/15/2004	2700
	12/15/2004	2950
	3/16/2005	3200
	6/15/2005	2650

9/21/2005	3200
12/21/2005	3200
3/15/2006	3000
6/21/2006	2700
12/20/2006	2500
2/21/2007	1900
6/12/2007	2400
12/17/2007	3100
6/11/2008	2350
12/3/2008	3300
12/15/2008	2400
6/17/2009	2300
12/9/2009	2200
6/17/2010	2900
12/22/2010	3460
6/29/2011	2630
12/7/2011	2520
6/6/2012	2360
12/12/2012	3240
6/19/2013	2510
12/11/2013	2460
6/11/2014	2790
12/3/2014	2940
6/17/2015	114
12/1/2015	3600
6/22/2016	2620
12/20/2016	3800
6/6/2017	3630
11/7/2017	4340
2/27/2018	3870

Date	Samples	Mean	Impacted
9/27/2018	1	3680	FALSE

Concentrations (mg/L)

Parameter: Total Dissolved Solids

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Samples: 42
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Samples: 14
There is 1 background well

Well	Samples	ND	Date	Result	Original
MW#93-1	14	0 (0%)	6/6/2012	868	868
			12/12/2012	880	880
			6/19/2013	942	942
			12/11/2013	961	961
			6/11/2014	971	971
			12/3/2014	907	907
			6/17/2015	882	882
			12/1/2015	860	860
			6/22/2016	840	840
			12/20/2016	838	838
			6/6/2017	810	810
			11/7/2017	878	878
			2/27/2018	830	830
			9/27/2018	1050	1050

There are 2 compliance wells

Well	Samples	ND	Date	Result	Original
MW#93-2	14	0 (0%)	6/6/2012	7530	7530
			12/12/2012	7920	7920
			6/19/2013	7280	7280
			12/11/2013	7440	7440
			6/11/2014	7160	7160
			12/3/2014	7700	7700
			6/17/2015	730	730
			12/1/2015	7950	7950
			6/22/2016	3160	3160
			12/20/2016	8780	8780
			6/6/2017	7350	7350
			11/7/2017	7820	7820
			2/27/2018	7560	7560
			9/27/2018	8890	8890
MW#93-3	14	0 (0%)	6/6/2012	834	834
			12/12/2012	669	669
			6/19/2013	861	861
			12/11/2013	697	697
			6/11/2014	986	986
			12/3/2014	743	743
			6/17/2015	911	911
			12/1/2015	1050	1050
			6/22/2016	1390	1390
			12/20/2016	1189	1189

	6/6/2017	780	780
	11/7/2017	1250	1250
	2/27/2018	1190	1190
	9/27/2018	1420	1420

There is 1 unused well

Well	Samples	ND	Date	Result	Original
MW#03-2	1	0 (0%)	9/27/2018	1630	1630

Levene's Test for Equal of Variance

Parameter: Total Dissolved Solids

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Overall Mean = 565.153
Overall Std Dev = 1127.97
Overall Total = 23736.4
SS Wells = 1.5871e+007
SS Total = 5.2165e+007

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Wells	1.5871e+007	2	7.93549e+006	8.52713
Error (within wells)	3.62941e+007	39	930617	
Totals	5.2165e+007	41		

8.52713 exceeds 3.23173; assumption of equal variance should be rejected

Well: MW#93-1	Sample	Residual
	6/6/2012	26.0714
	12/12/2012	14.0714
	6/19/2013	47.9286
	12/11/2013	66.9286
	6/11/2014	76.9286
	12/3/2014	12.9286
	6/17/2015	12.0714
	12/1/2015	34.0714
	6/22/2016	54.0714
	12/20/2016	56.0714
	6/6/2017	84.0714
	11/7/2017	16.0714
	2/27/2018	64.0714
	9/27/2018	155.929

Well: MW#93-2	Sample	Residual
	6/6/2012	582.143
	12/12/2012	972.143
	6/19/2013	332.143
	12/11/2013	492.143
	6/11/2014	212.143
	12/3/2014	752.143
	6/17/2015	6217.86
	12/1/2015	1002.14
	6/22/2016	3787.86
	12/20/2016	1832.14
	6/6/2017	402.143
	11/7/2017	872.143
	2/27/2018	612.143
	9/27/2018	1942.14

Well: MW#93-3	Sample	Residual

6/6/2012	163.857
12/12/2012	328.857
6/19/2013	136.857
12/11/2013	300.857
6/11/2014	11.8571
12/3/2014	254.857
6/17/2015	86.8571
12/1/2015	52.1429
6/22/2016	392.143
12/20/2016	191.143
6/6/2017	217.857
11/7/2017	252.143
2/27/2018	192.143
9/27/2018	422.143

Shapiro-Wilks Test of Normality

Parameter: Total Dissolved Solids

All Wells

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 21; Samples = 42

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	669	8890	8221	0.3917	3220.17
2	697	8780	8083	0.2701	2183.22
3	730	7950	7220	0.2345	1693.09
4	743	7920	7177	0.2085	1496.4
5	780	7820	7040	0.1874	1319.3
6	810	7700	6890	0.1694	1167.17
7	830	7560	6730	0.1535	1033.06
8	834	7530	6696	0.1392	932.083
9	838	7440	6602	0.1259	831.192
10	840	7350	6510	0.1136	739.536
11	860	7280	6420	0.102	654.84
12	861	7160	6299	0.0909	572.579
13	868	3160	2292	0.0804	184.277
14	878	1420	542	0.0701	37.9942
15	880	1390	510	0.0602	30.702
16	882	1250	368	0.0506	18.6208
17	907	1190	283	0.0411	11.6313
18	911	1189	278	0.0318	8.8404
19	942	1050	108	0.0227	2.4516
20	961	1050	89	0.0136	1.2104
21	971	986	15	0.0045	0.0675
22	986	971	-15		
23	1050	961	-89		
24	1050	942	-108		
25	1189	911	-278		
26	1190	907	-283		
27	1250	882	-368		
28	1390	880	-510		
29	1420	878	-542		
30	3160	868	-2292		
31	7160	861	-6299		
32	7280	860	-6420		
33	7350	840	-6510		
34	7440	838	-6602		
35	7530	834	-6696		
36	7560	830	-6730		
37	7700	810	-6890		
38	7820	780	-7040		
39	7920	743	-7177		
40	7950	730	-7220		
41	8780	697	-8083		
42	8890	669	-8221		

Sum of b values = 16138.4
Sample Standard Deviation = 3130.76
W Statistic = 0.648096

5% Critical value of 0.942 exceeds 0.648096
Evidence of non-normality at 95% level of significance
1% Critical value of 0.922 exceeds 0.648096
Evidence of non-normality at 99% level of significance

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Total Dissolved Solids

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Number of comparisons = 2
Future Samples (k) = 2
Recent Dates = 1
Background Samples (n) = 14
Maximum Background Concentration = 1050
Confidence Level = 87.5%
False Positive Rate = 12.5%

Well	Date	Samples	Mean	Impacted
MW#93-2	9/27/2018	1	8890	TRUE
MW#93-3	9/27/2018	1	1420	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-2

Parameter: Total Dissolved Solids

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 13
Maximum Baseline Concentration = 8780
Confidence Level = 92.9%
False Positive Rate = 7.1%

Baseline Samples	Date	Result
	6/6/2012	7530
	12/12/2012	7920
	6/19/2013	7280
	12/11/2013	7440
	6/11/2014	7160
	12/3/2014	7700
	6/17/2015	730
	12/1/2015	7950
	6/22/2016	3160
	12/20/2016	8780
	6/6/2017	7350
	11/7/2017	7820
	2/27/2018	7560

Date	Samples	Mean	Impacted
9/27/2018	1	8890	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW#93-3

Parameter: Total Dissolved Solids

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

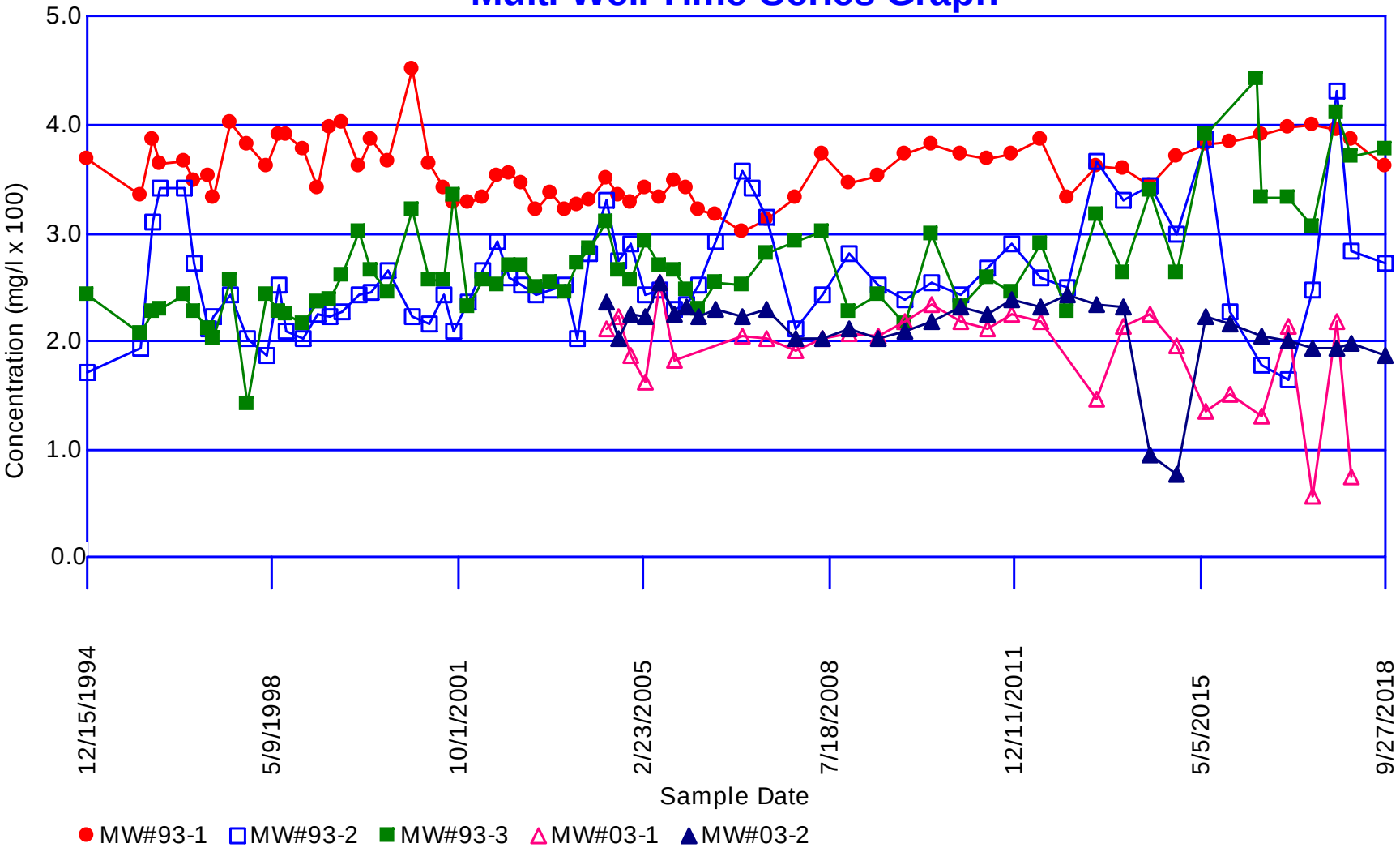
Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Samples (n) = 13
Maximum Baseline Concentration = 1390
Confidence Level = 92.9%
False Positive Rate = 7.1%

Baseline Samples	Date	Result
	6/6/2012	834
	12/12/2012	669
	6/19/2013	861
	12/11/2013	697
	6/11/2014	986
	12/3/2014	743
	6/17/2015	911
	12/1/2015	1050
	6/22/2016	1390
	12/20/2016	1189
	6/6/2017	780
	11/7/2017	1250
	2/27/2018	1190

Date	Samples	Mean	Impacted
9/27/2018	1	1420	TRUE

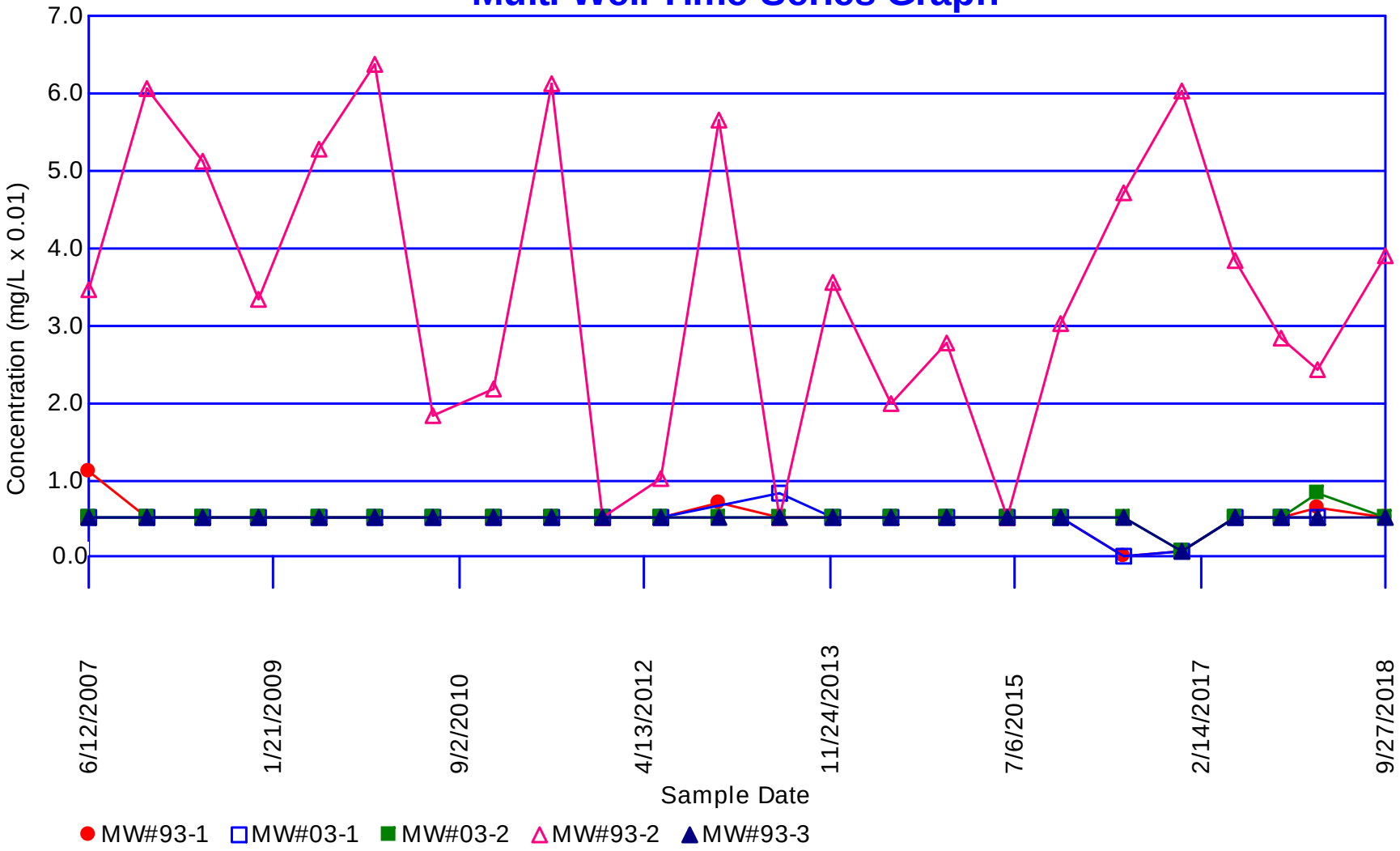
Alkalinity

Multi-Well Time-Series Graph



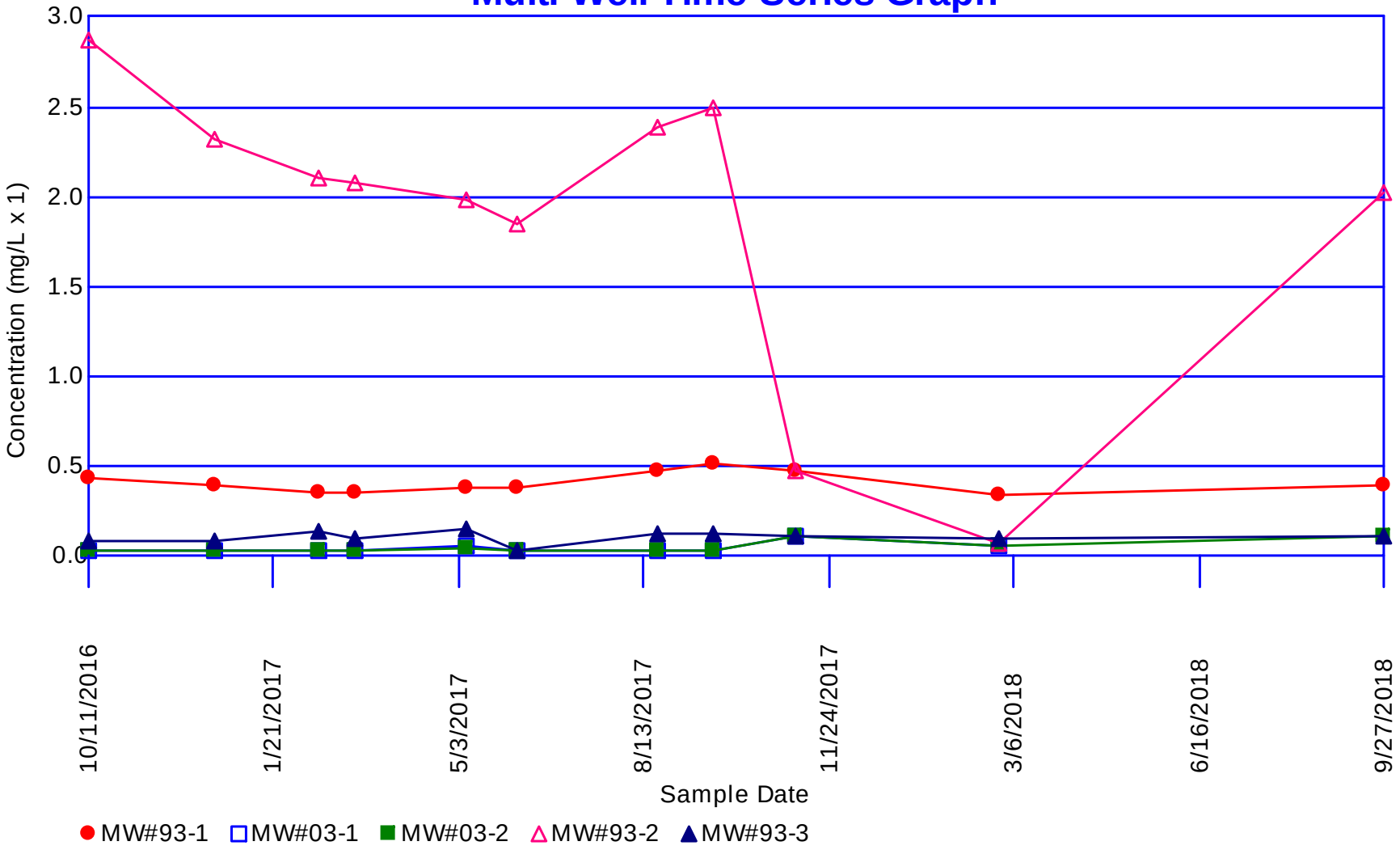
Arsenic

Multi-Well Time-Series Graph



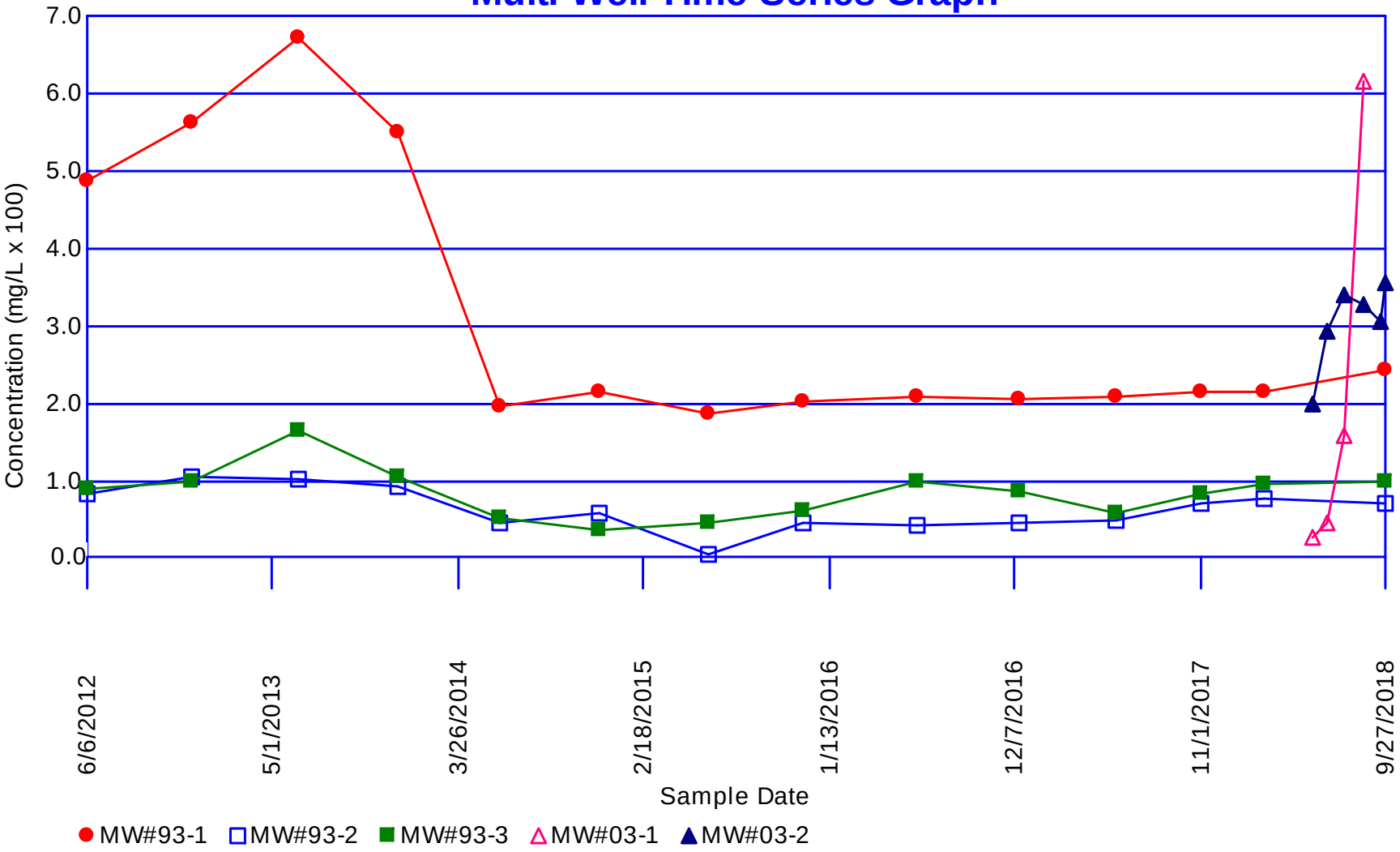
Boron

Multi-Well Time-Series Graph



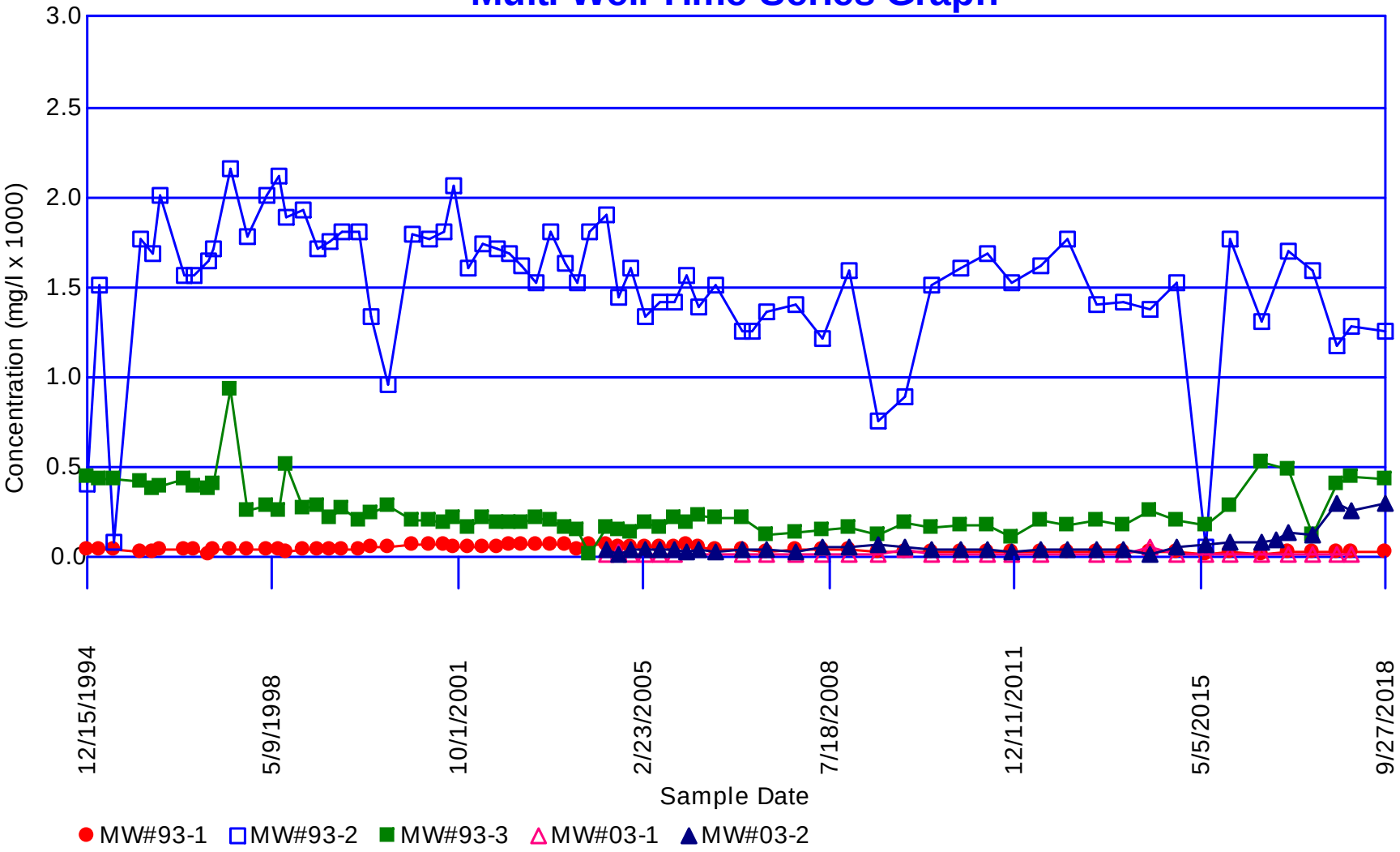
Calcium

Multi-Well Time-Series Graph



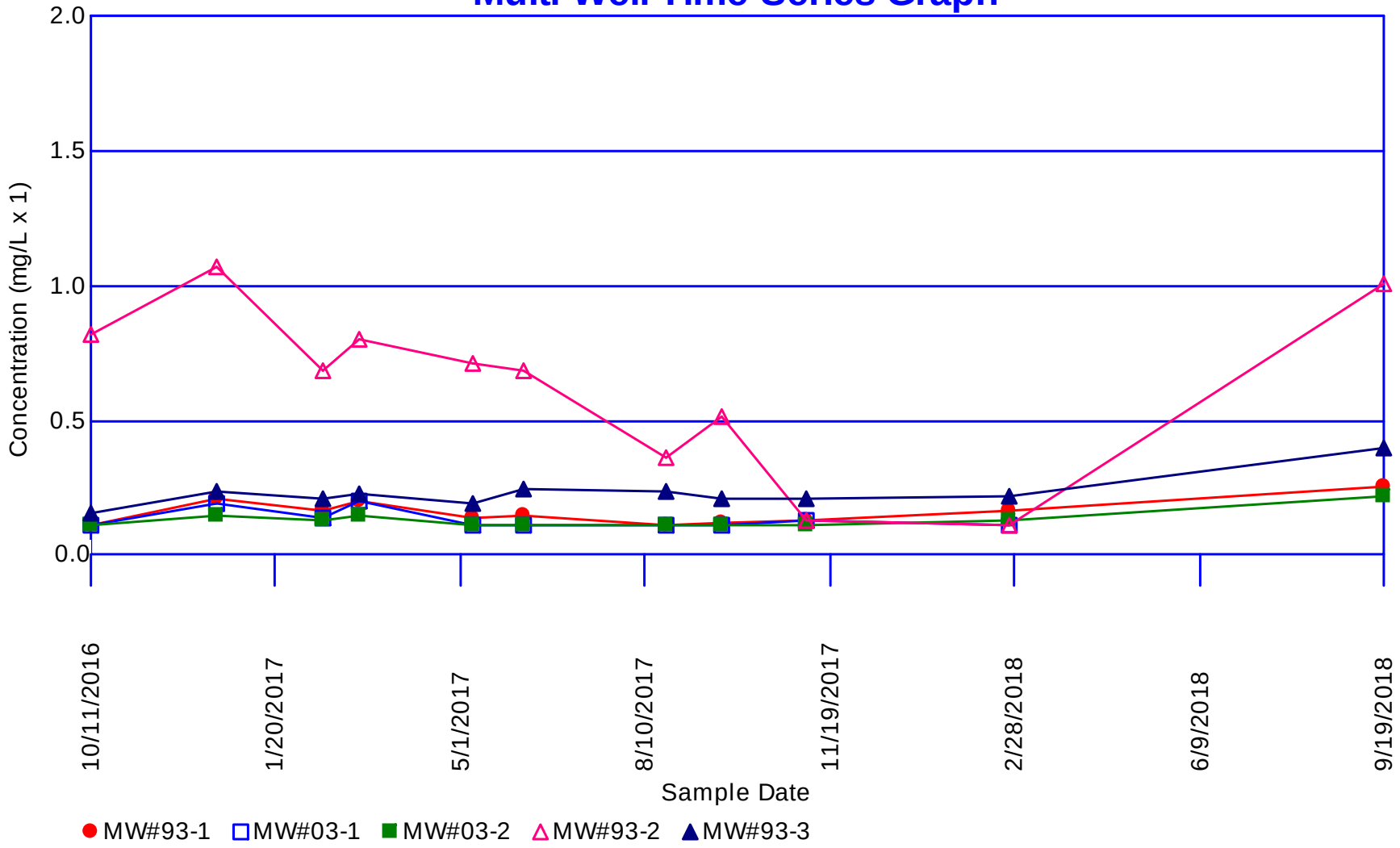
Chloride

Multi-Well Time-Series Graph



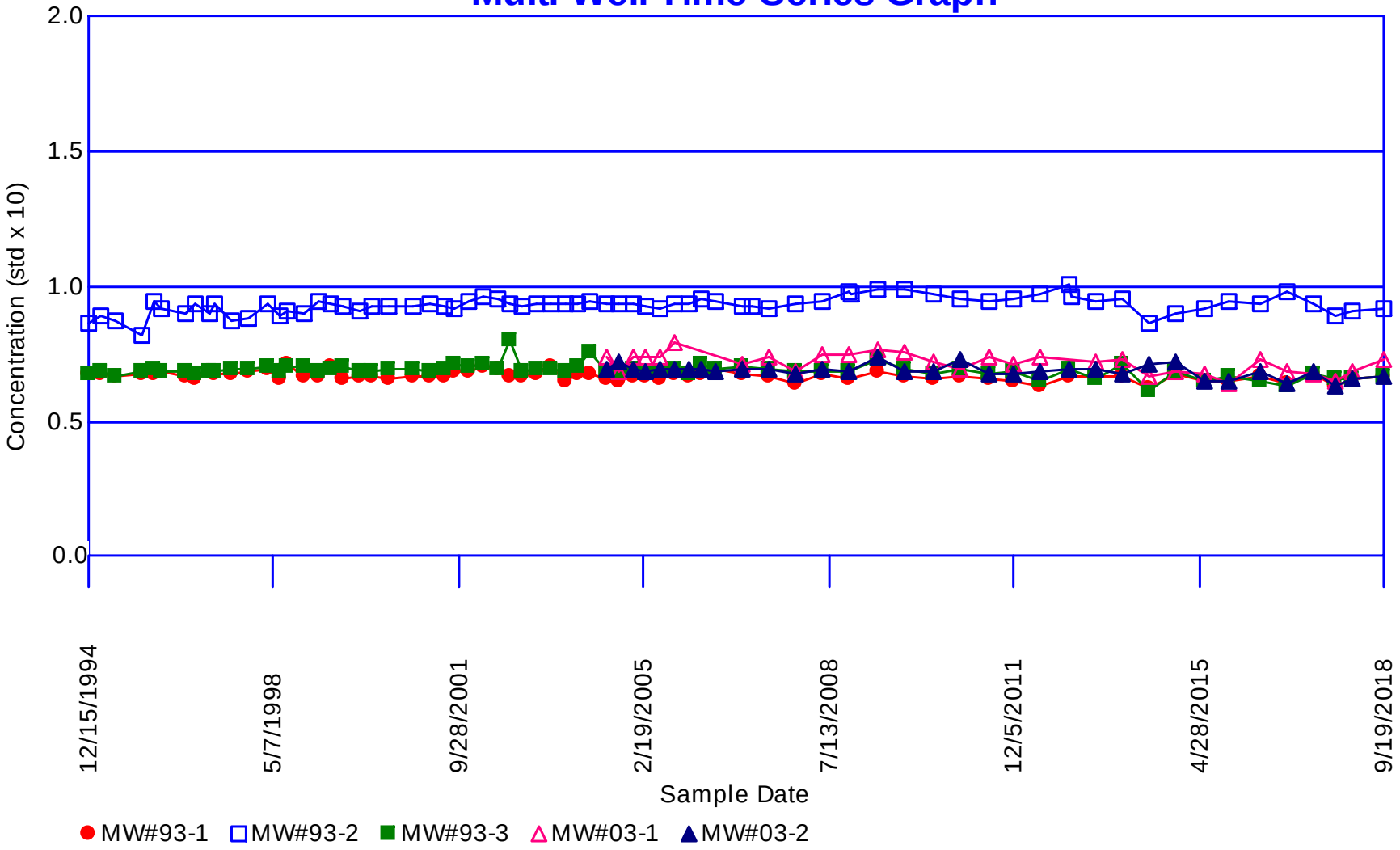
Fluoride

Multi-Well Time-Series Graph



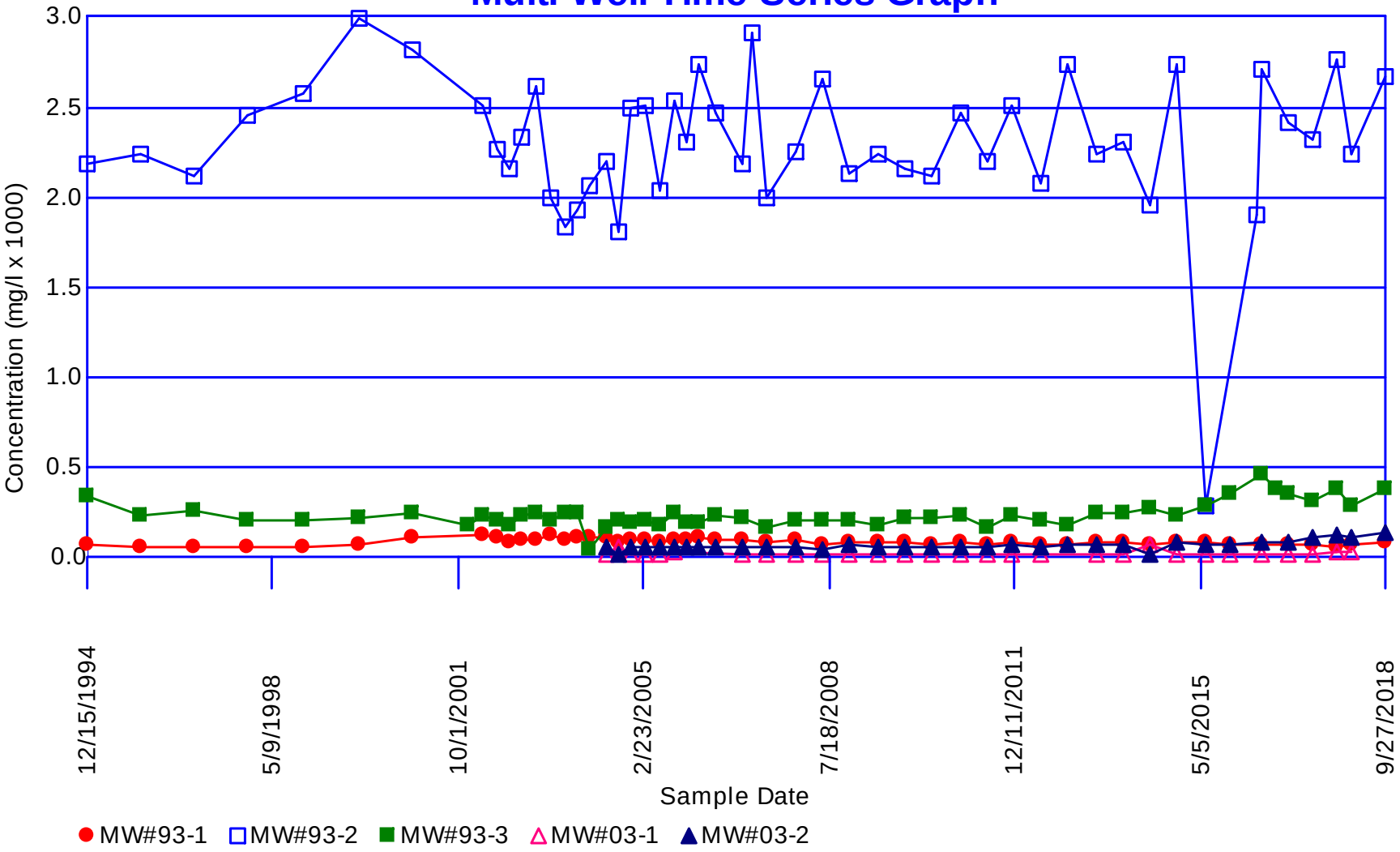
ph

Multi-Well Time-Series Graph



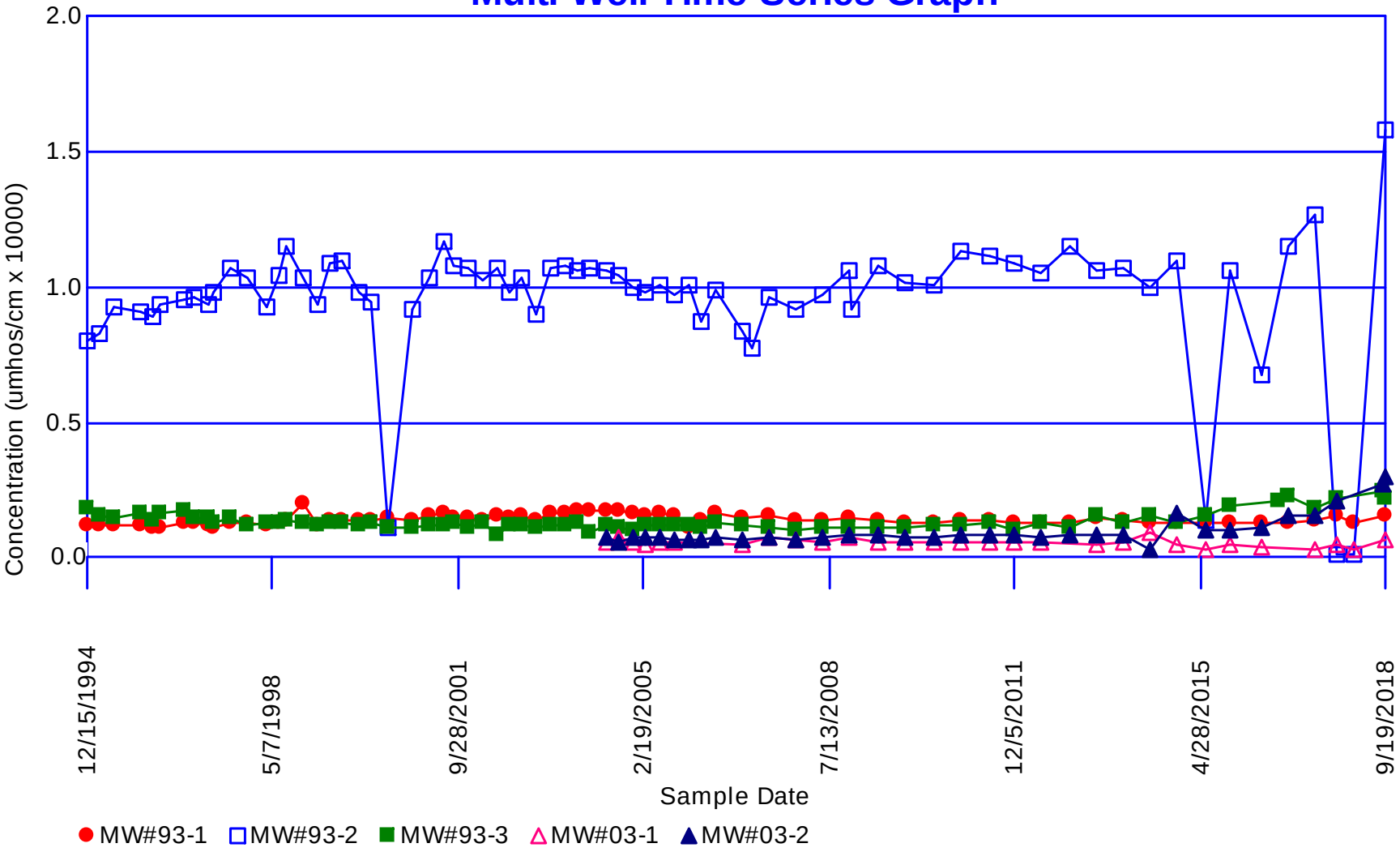
Sodium

Multi-Well Time-Series Graph



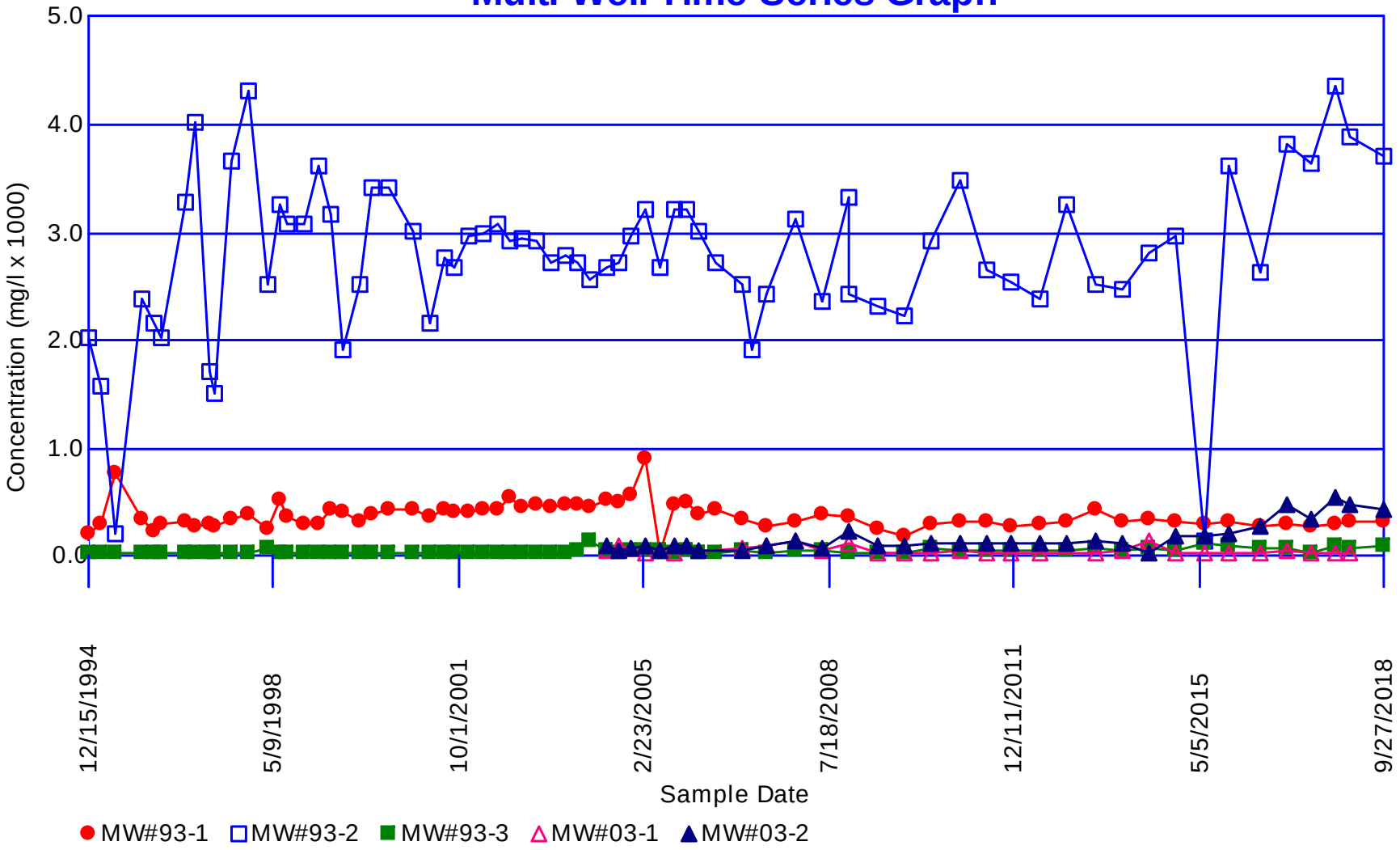
Specific Conductance

Multi-Well Time-Series Graph



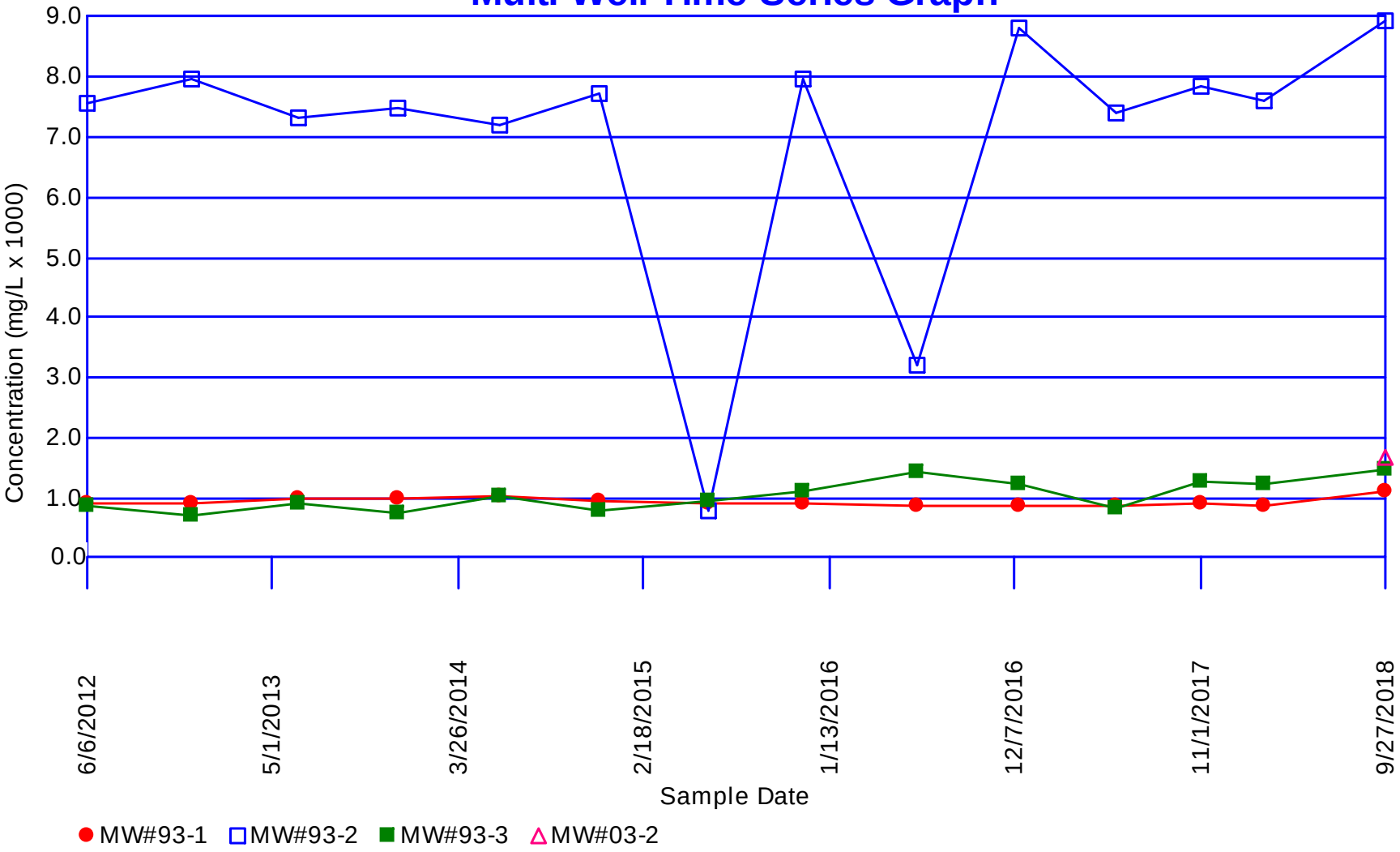
Sulfate

Multi-Well Time-Series Graph



Total Dissolved Solids

Multi-Well Time-Series Graph



Section 5.0

Oklahoma Department of Environmental Quality Acknowledgement of Receipt of Confirmation Sampling and Request for Assessment Monitoring Program Plan, Dated February 7, 2019

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

KEVIN STITT
Governor

February 7, 2019

Mr. Michael Bednar, Environmental Compliance Superintendent
Grand River Dam Authority
P.O. Box 70
Langley, OK 74350

Re: Results of Confirmation Sampling; Grand River Dam Authority (GRDA) Landfill; Mayes County; Permit Number 3549012

Dear Mr. Bednar:

The Department of Environmental Quality (DEQ) received the subject report on October 17, 2018. The report was submitted in response to DEQ correspondence dated August 9, 2018. Confirmation sampling was conducted on September 7, 2018 for specific conductivity in MW 93-3 and MW-03-2. The results of the sampling confirmed the statistically significant increase above background of specific conductivity.

The report requests the quarterly sampling of just specific conductivity for one year in assessment monitoring due to specific conductivity not being included in the Oklahoma Administrative Code (OAC) 252:517 regulations for monitoring. According to OAC 252:517-9-4(i), GRDA must determine whether or not there is a statistically significant increase over background values for each constituent required in the particular groundwater monitoring program. Since specific conductivity is a constituent of the detection monitoring program and confirmed statistically significant increases above background levels have occurred in MW93-3 and MW03-2, an assessment monitoring plan meeting the requirements of OAC 252:517-9-6 is required to be submitted to DEQ for approval per OAC 252:517-9-5(e)(1), unless an alternate source as specified in OAC 252:517-9-5(e)(2) can be demonstrated.

The report states a request to limit groundwater monitoring activities to only those constituents specified in OAC 252:517-9-5(a) is forthcoming. Per OAC 252:517-9-5 "At a minimum, a detection monitoring program must include groundwater monitoring for all constituents listed in Appendix A to this Chapter [517]". GRDA may request a reduced list of constituents in the detection monitoring program that are not included in Appendix A for DEQ approval followed by modification of the Groundwater Sampling and Analysis Plan; however, GRDA must continue to monitor any constituent that has received an inter-well exceedance in the past, including alkalinity, sodium, and specific conductivity. Given that specific conductivity has had

statistical exceedances, DEQ cannot approve reducing the groundwater monitoring constituent list for this constituent.

The report also included a response to DEQ's request for a hydrogeological assessment for the inter-well exceedance of fluoride in MW93-3. Documentation was submitted to show the variation in fluoride concentration at the site is natural variation in groundwater within the area. DEQ acknowledges the information submitted. Fluoride concentrations will be closely monitored in future sampling events for any upward trends in concentration or exceedances of background values.

The report mentioned that GRDA was unable to clarify the several instances where the specific conductivity value for MW93-2 may have been incorrectly reported in units of mmhos/cm instead of µmhos/cm. Since it remains unclear, please make sure the values in Table 4 "Quarterly Test Results" are consistent with the values used in the statistical analyses (i.e., the two most recent sample results).

Please submit an assessment monitoring plan meeting the requirements of OAC 252:517-9-6 within ninety (90) days of receipt of this letter. If you have any questions, please contact Martha Grafton of my staff at (405) 702-5144.

Sincerely,

Hillary Young, P.E.
Chief Engineer
Land Protection Division

HY/mg

Cc: Tom Trebonik, A & M Engineering and Environmental Services, Inc.