GW - __007__

Subsidence Monitoring Reports

Chavez, Carl J, EMNRD

From: Parker, Kenneth J <Kenneth.J.Parker@andeavor.com>
Sent: Friday, February 9, 2018 9:31 AM
To: Martinez, Patricia L, EMNRD; Chavez, Carl J, EMNRD
Subject: Subsidence Survey
Attachments: SUBSIDENCEREPORT_013118.pdf

Sorry for the inconvenience. Report wasn't complete when the C-131B report was due.
Please attach to Western's Annual LPG Storage well report.

Thank you,
Ken Parker

PETTIGREW
& ASSOCIATES PA
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DEFINING QUALITY SINCE 1965

Ken Parker, Western Refining
PO Box 1345
Jal, New Mexico, 88252
575-392-2632

18 January, 2018

RE: GW-7 Jal LPG Storage Facility
Annual Subsidence Survey Report

SUBSIDENCE MONUMENT MONITORING

On January 18, 2018 a field survey was conducted to check for changes in monitoring location elevations at the Western Refining Facility located at the intersection of NM18 and Deep Wells Road near Jal, NM.

This survey was conducted using a Trimble DiNi digital level, which reads a bar code off of a special rod in order to determine difference in elevation from a known control point. This level is very accurate and the use helps to eliminate human reading errors. The data is stored onboard and may be transferred directly into the computer software at the office for analysis of results, ensuring greater accuracy.

Control Point CP2 (elevation 3297.82 above mean sea level (MSL)) has historically been the Reference Primary Elevation Point for determining elevations on this project. As in the past, a level loop was run thru the project with side shots as needed to check the different monuments, benchmarks, and control points at this site.

Observations were made on all available points and tabulated to compare the elevations to the base elevations established on May 13, 2009. See Table A for these results. Additionally, the results for the last 9 years have been tabulated and appear in Table B. Each monitoring point has also been plotted on a trend chart to aid in visually monitoring the changes in elevation of the monitoring points.

Prior to this survey, the elevations on the monitoring points were determined utilizing an automatic level, which is more prone to instrument operator reading errors than the DiNi that will now be used for all future monitoring at this site. See site map attached.

The surveyed elevations along with deltas from established values as follows:

NAME	BASE ELEVATION 5/13/2009	ELEVATION 01/18/2018	CHANGE IN ELEVATION
CP-1	3293.47	3293.46	-0.01
CP-2	3297.82	3297.82	No Change
CP-3	3293.56	3293.54	-0.02
SM-1	3292.27	3292.26	-0.01
SM-2	3294.56	3294.54	-0.02
SM-3	3294.85	3294.84	-0.01
SM-4	3294.86	3294.84	-0.02
SMF-1 (Mid Flange)	3295.62	3295.60	-0.02
SMF-1 (Lower Flange)	3293.67	3293.66	-0.01
SMF-2 (Mid Flange)	3297.42	3297.42	No Change
SMF-2 (Lower Flange)	3295.52	3295.52	No Change
SMF-3 (Mid Flange)	3298.18	3298.16	-0.01
SMF-3 (Lower Flange)	3296.44	3296.42	-0.02
SMF-4 (Lower Flange)	3295.99	3295.96	-0.03
BM-1	3294.30	3294.30	No Change
BM-2	3296.62	3296.63	0.01
BM-3	3297.73	3297.73	No Change

Table A

Monitoring Points and Elevations

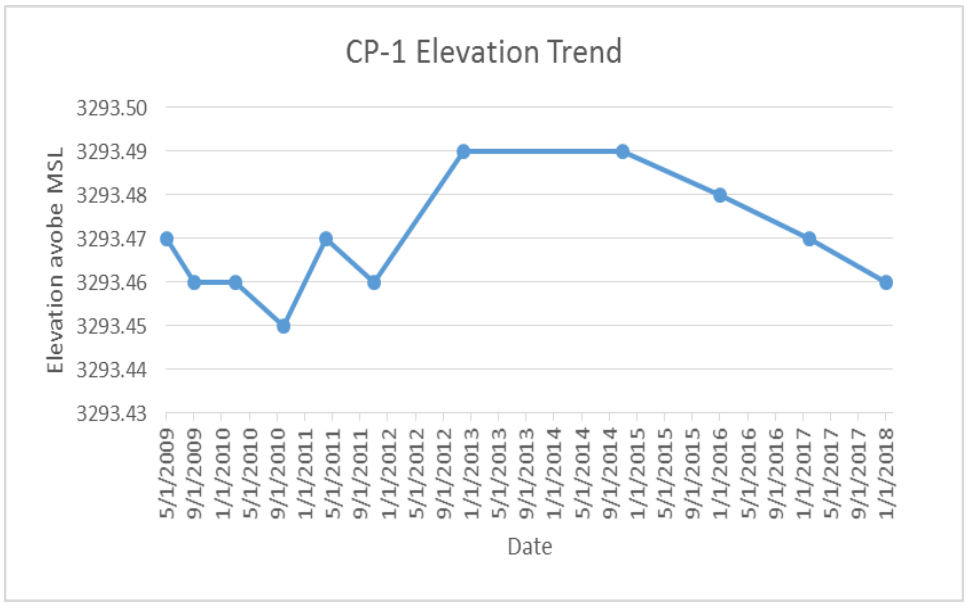
Point	5/13/2009	9/25/2009	3/9/2010	10/29/2010	4/15/2011	11/10/2011	12/21/2012	11/12/2014	1/14/2016	2/15/2017	1/18/2018
CP-1	3293.47	3293.46	3293.46	3293.45	3293.47	3293.46	3293.49	3293.49	3293.48	3293.47	3293.46
CP-2 *	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82
CP-3	3293.56	3293.54	3293.55	3293.56	3293.56	3293.55	3293.57	3293.57	3293.55	3293.56	3293.54
SM-1	3292.27	3292.26	3292.27	3292.27	3292.28	3292.26	3292.29	3292.29	3292.27	3292.27	3292.26
SM-2	3294.56	3294.56	3294.56	3294.56	3294.56	3294.56	3294.57	3294.57	3294.57	3294.54	3294.54
SM-3	3294.85	3294.83	3294.85	3294.84	3294.86	3294.85	3294.86	3294.86	3294.86	3294.86	3294.84
SM-4	3294.86	3294.84	3294.86	3294.86	3294.87	3294.85	3294.87	3294.87	3294.89	3294.87	3294.84
SMF-1 MID	3295.62	3295.62	3295.61	3295.64	3295.64	3295.61	3295.65	3295.65	3295.63	3295.62	3295.60
SMF-1 LOW	3293.67	3293.67	3293.66	3293.69	3293.70	3293.66	3293.71	3293.71	3293.70	3293.67	3293.66
SMF-2 MID	3297.42	3297.43	3297.42	3297.43	3297.43	3297.43	3297.45	3297.45	3297.43	3297.42	3297.42
SMF-2 LOW	3295.52	3295.53	3295.52	3295.53	3295.53	3295.53	3295.55	3295.55	3295.51	3295.53	3295.52
SMF-3 MID	3298.17	3298.17	3298.16	3298.16	3298.19	3298.17	3298.17	3298.17	3298.18	3298.17	3298.16
SMF-3 LOW	3296.44	3296.43	3296.43	3296.42	3296.44	3296.43	3296.44	3296.44	3296.44	3296.43	3296.42
SMF-4 MID	3297.73	3297.72	3297.73	3297.73	3297.74	3297.72	3297.74	3297.74			
SMF-4 LOW	3295.99	3295.98	3295.99	3296.00	3296.00	3295.98	3296.00	3296.00	3296.00	3296.00	3295.96
BM-1	3294.30	3294.30	3294.30	3294.31	3294.31	3294.30	3294.33	3294.33	3294.31	3294.30	3294.30
BM-2	3296.62	3296.62	3296.62	3296.63	3296.63	3296.63	3296.64	3296.64	3296.61	3296.64	3296.63
BM-3	3297.73	3297.73	3297.73	3297.73	3297.73	3297.73	3297.73	3297.73	3297.74	3297.73	3297.73

Table B

Conclusions

The survey was conducted and results analyzed, using the elevations originally established on May 13, 2009 as the base elevations for each point. The readings were consistent with a stable surface as there was little to no difference in elevations of any monitoring point, the most being on SMF-4 LOW with a change of 0.03 feet downward. Similar deviations were found in CP-3, SM-4, SMF-1 MID, and SMF-3 LOW all with a change of 0.02 feet downward. The rest of the points were within tolerance of the readings for the DiNi level, showing 0.01 feet of difference or less, which is an unremarkable elevation change.

The area appears stable with little movement either up or downward over the past 9 years of monitoring. The greatest deviations in elevation at the SM-4 and SMF-1 LOW locations are around 0.05 feet, or about ½ inch from observed low elevation to observed high elevation, some of which was likely due to instrument, operator reading error, and procedural preferences. Most differences were 0.03 feet (about 3/8 inch) or less over the 9 year monitoring period. Trend charts for each monitoring, control, and bench mark point are attached as Exhibits herein.


CP-1 Elevation Trend
Elevation avobe MSL
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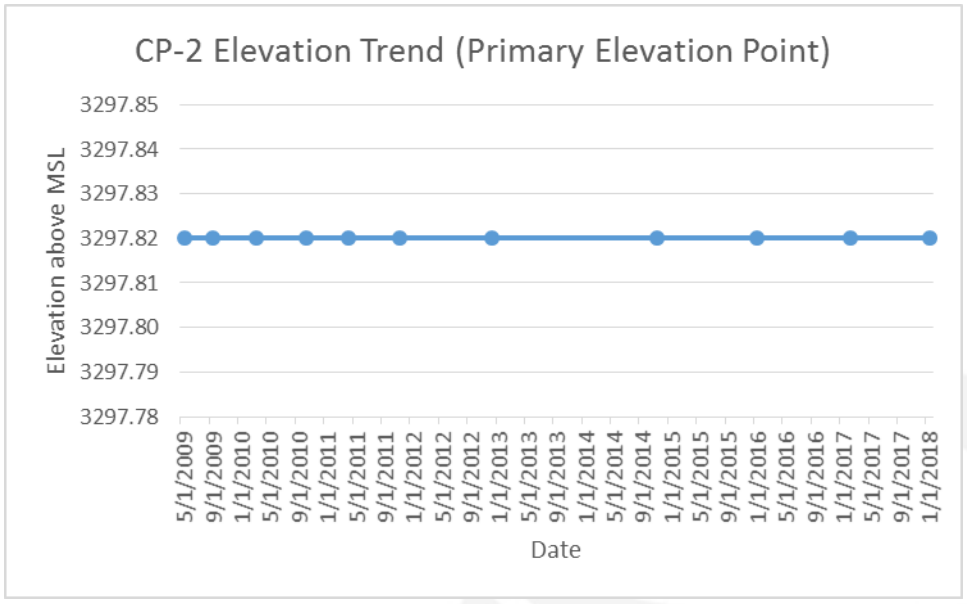
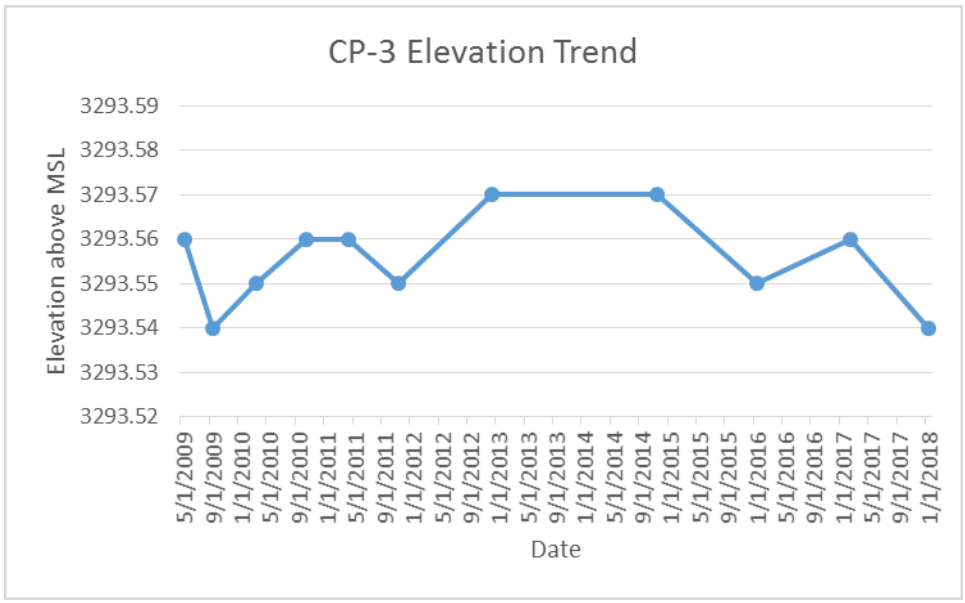
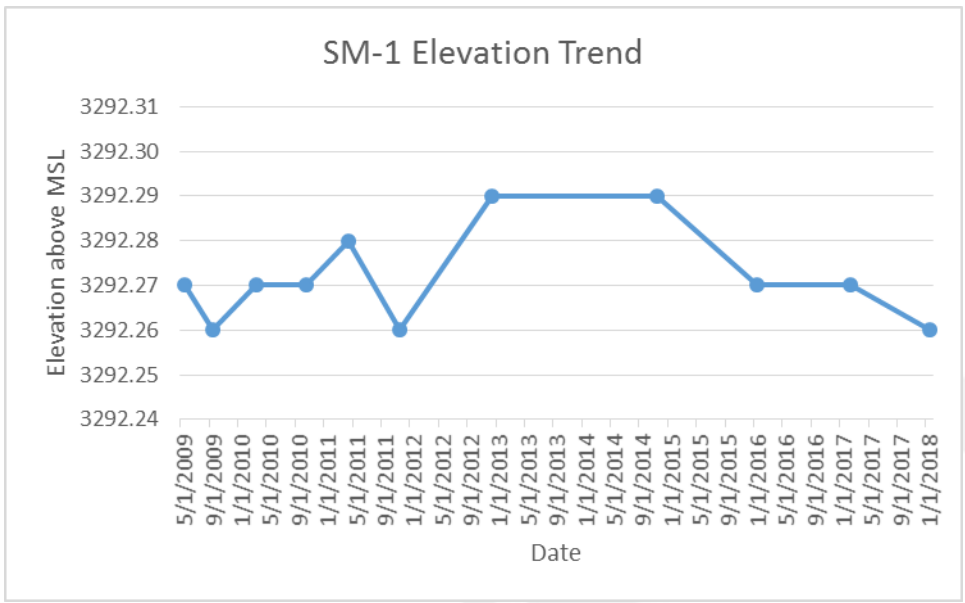
3293.49
3293.48
3293.47
3293.46
3293.45
3293.44
3293.43
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
1/1/2015
5/1/2015
9/1/2015
1/1/2016
5/1/2016
9/1/2016
1/1/2017
5/1/2017
9/1/2017
1/1/2018
Date


CP-2 Elevation Trend (Primary Elevation Point)
Elevation above MSL
3297.85
3297.84
3297.83
3297.82
3297.81
3297.80
3297.79
3297.78
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
1/1/2015
5/1/2015
9/1/2015
1/1/2016
5/1/2016
9/1/2016
1/1/2017
5/1/2017
9/1/2017
1/1/2018
Date


CP-3 Elevation Trend
Elevation above MSL
3293.59
3293.58
3293.57
3293.56
3293.55
3293.54
3293.53
3293.52
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
1/1/2015
5/1/2015
9/1/2015
1/1/2016
5/1/2016
9/1/2016
1/1/2017
5/1/2017
9/1/2017
1/1/2018
Date


SM-1 Elevation Trend
Elevation above MSL
3292.31
3292.30
3292.29
3292.28
3292.27
3292.26
3292.25
3292.24
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
1/1/2015
5/1/2015
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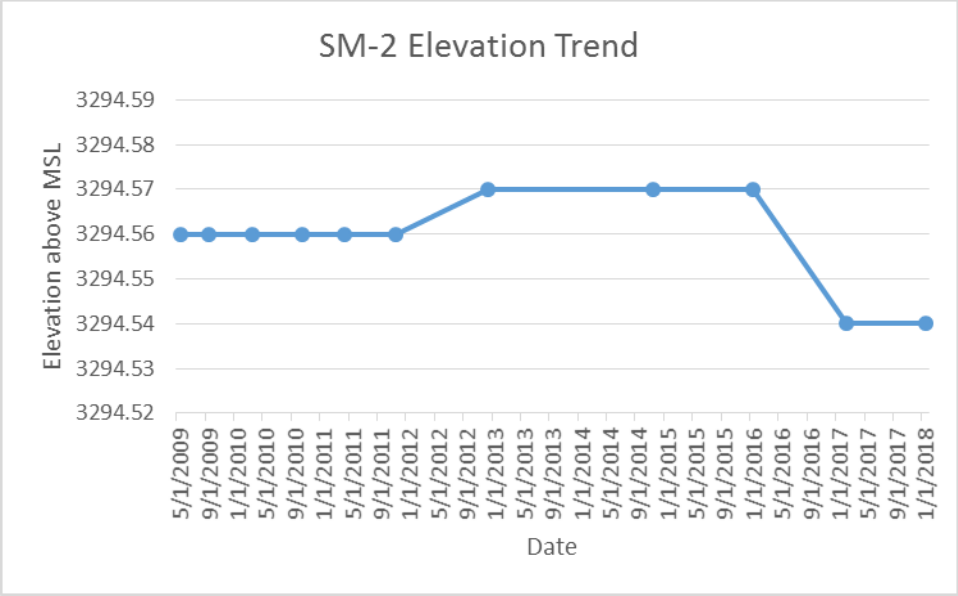
5/1/2017
9/1/2017
1/1/2018
Date


SM-2 Elevation Trend
Elevation above MSL
3294.59
3294.58
3294.57
3294.56
3294.55
3294.54
3294.53
3294.52
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
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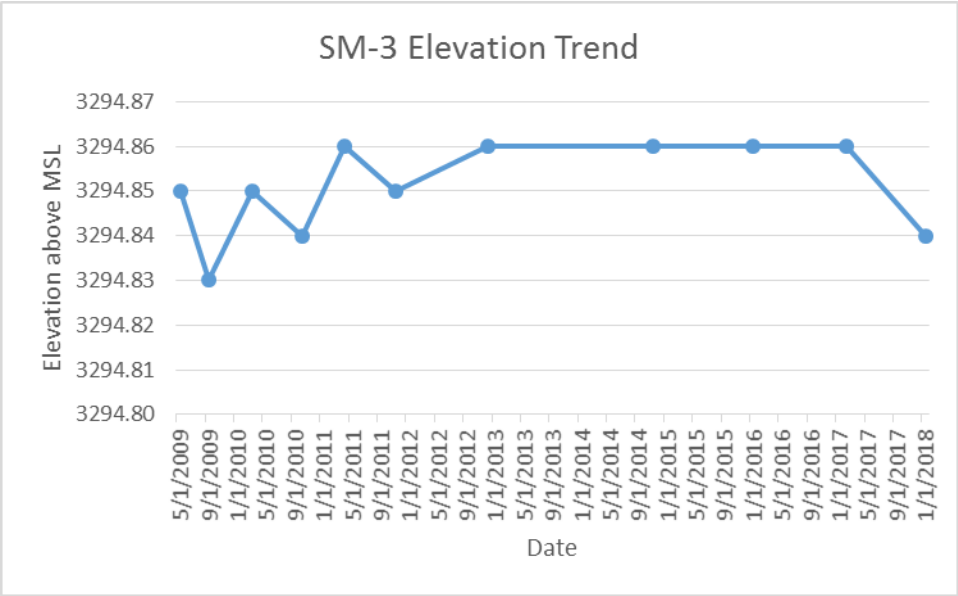
1/1/2018
Date


SM-3 Elevation Trend
Elevation above MSL
3294.87
3294.86
3294.85
3294.84
3294.83
3294.82
3294.81
3294.80
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
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5/1/2015
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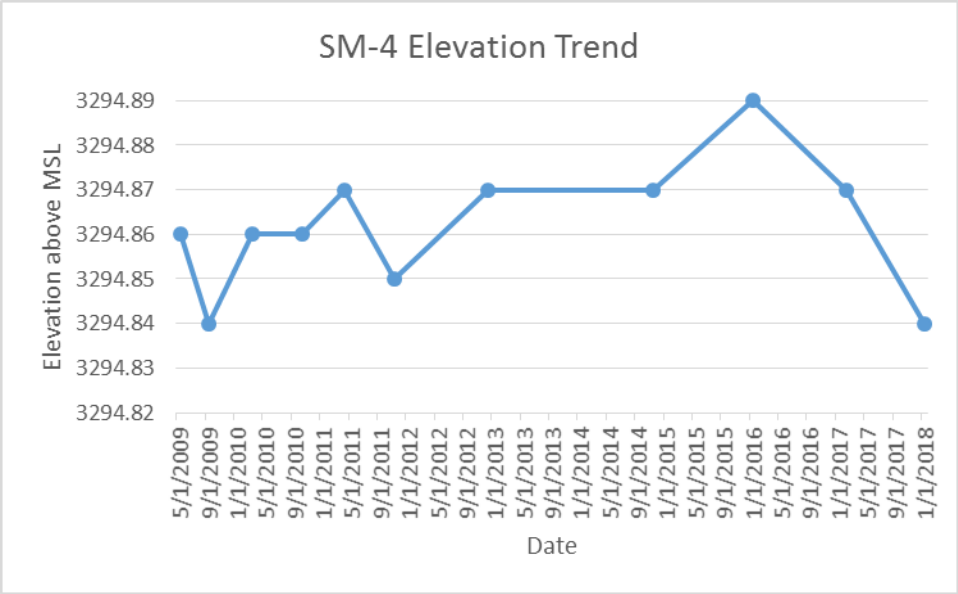
1/1/2018
Date


SM-4 Elevation Trend
Elevation above MSL
3294.89
3294.88
3294.87
3294.86
3294.85
3294.84
3294.83
3294.82
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
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1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
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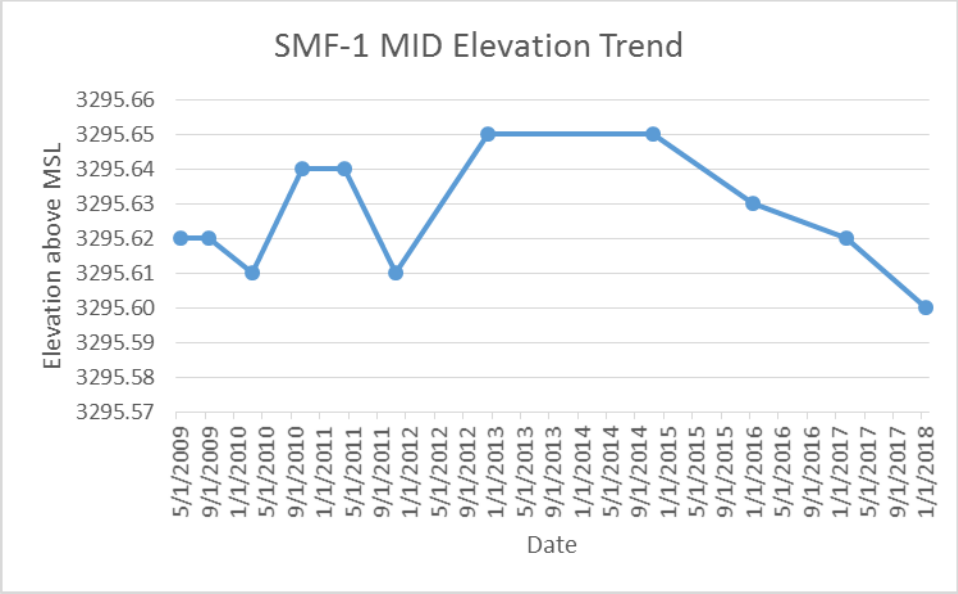
SMF-1 MID Elevation Trend
Elevation above MSL
3295.66
3295.65
3295.64
3295.63
3295.62
3295.61
3295.60
3295.59
3295.58
3295.57
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
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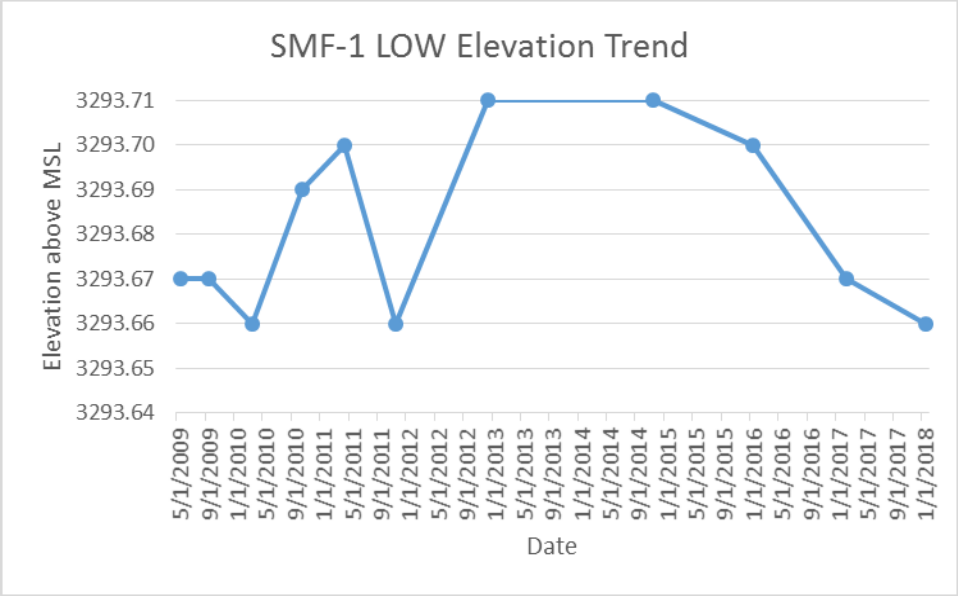
SMF-1 LOW Elevation Trend
Elevation above MSL
3293.71
3293.70
3293.69
3293.68
3293.67
3293.66
3293.65
3293.64
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
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1/1/2013
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5/1/2015
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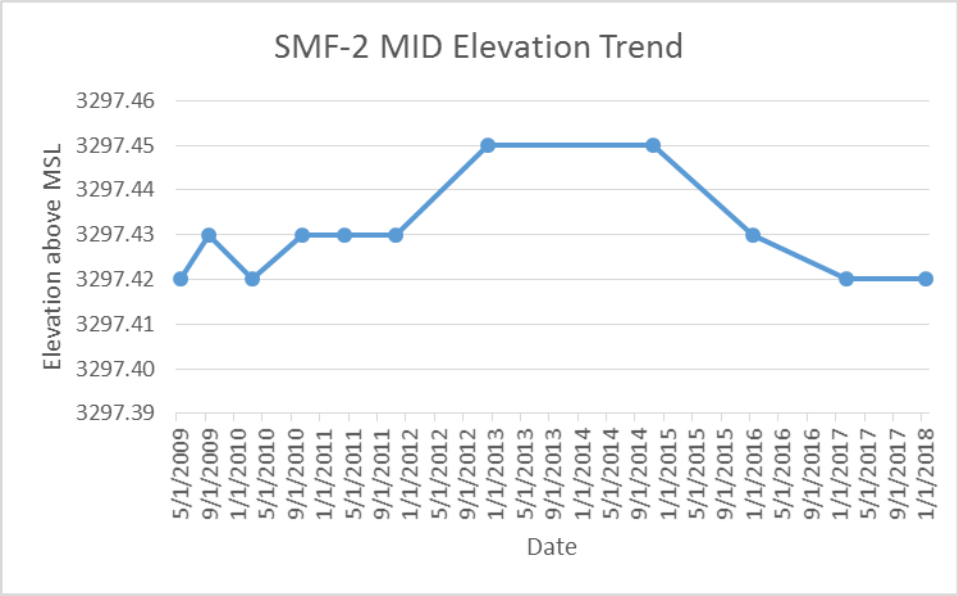
Date


SMF-2 MID Elevation Trend
Elevation above MSL
3297.46
3297.45
3297.44
3297.43
3297.42
3297.41
3297.40
3297.39
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
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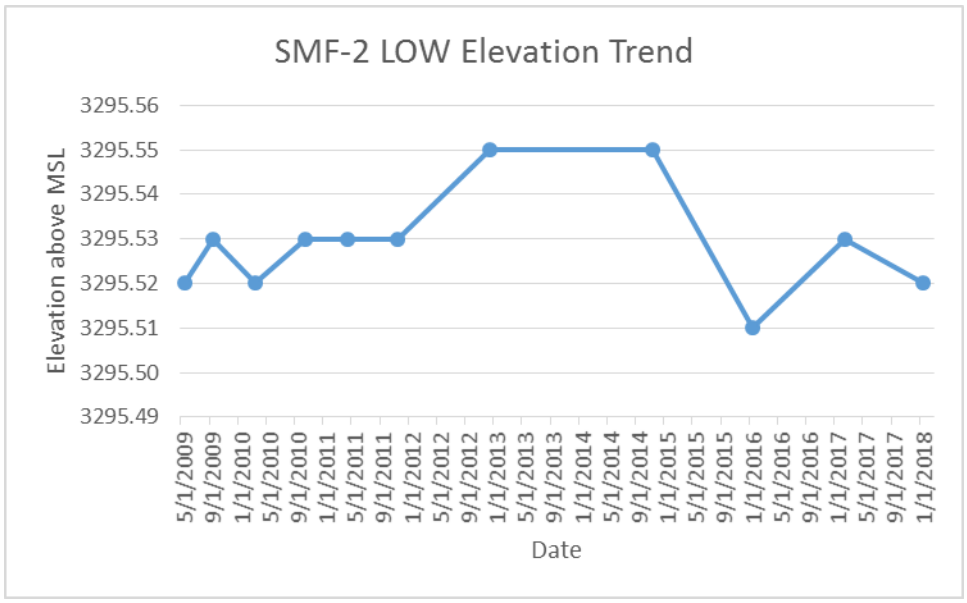
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Elevation above MSL
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3295.55
3295.54
3295.53
3295.52
3295.51
3295.50
3295.49
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
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5/1/2015
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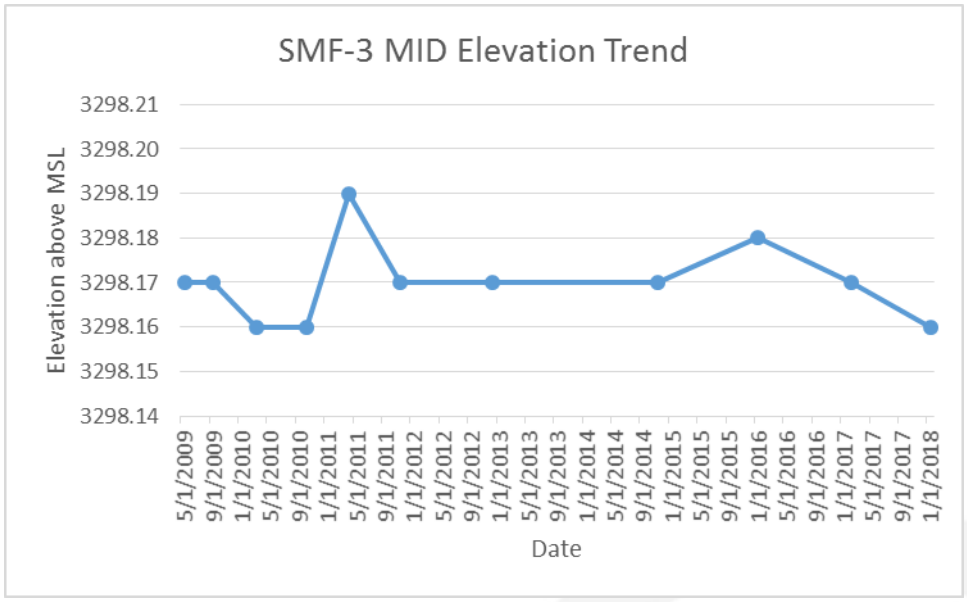
SMF-3 MID Elevation Trend
Elevation above MSL
3298.21
3298.20
3298.19
3298.18
3298.17
3298.16
3298.15
3298.14
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
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5/1/2015
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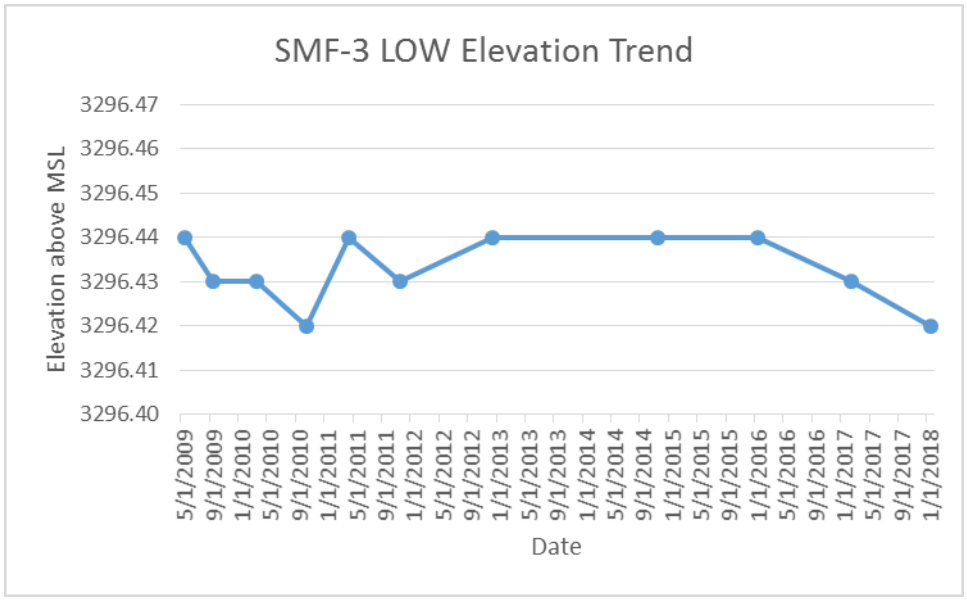
SMF-3 LOW Elevation Trend
Elevation above MSL
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3296.44
3296.43
3296.42
3296.41
3296.40
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
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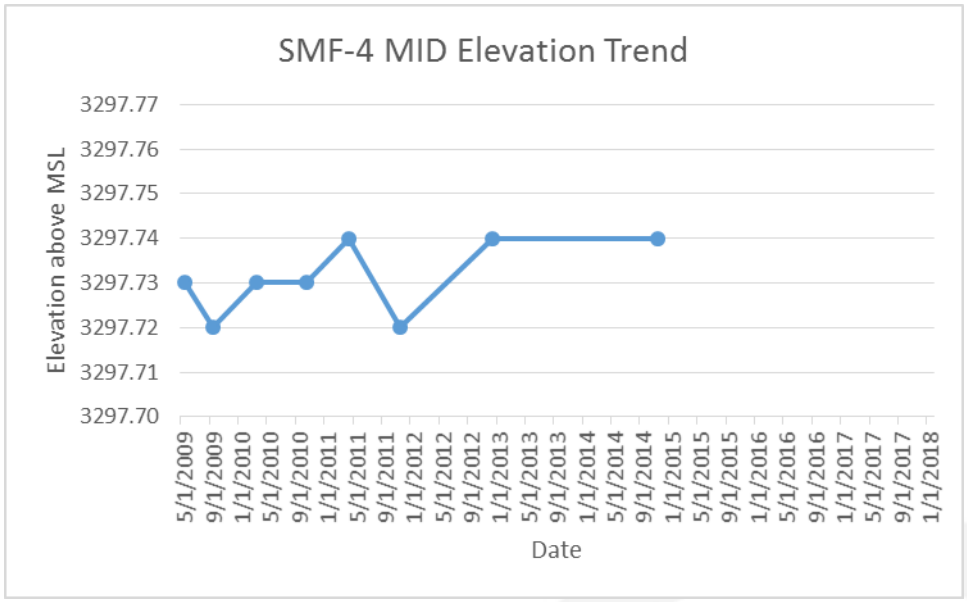
SMF-4 MID Elevation Trend
Elevation above MSL
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3297.76
3297.75
3297.74
3297.73
3297.72
3297.71
3297.70
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
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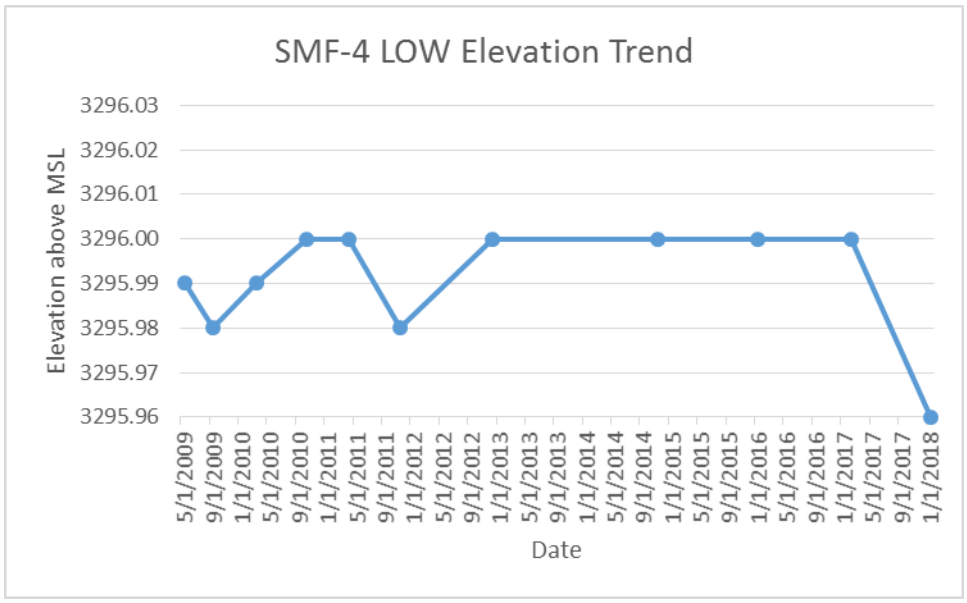
SMF-4 LOW Elevation Trend
Elevation above MSL
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3296.02
3296.01
3296.00
3295.99
3295.98
3295.97
3295.96
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
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5/1/2012
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9/1/2014
1/1/2015
5/1/2015
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9/1/2016
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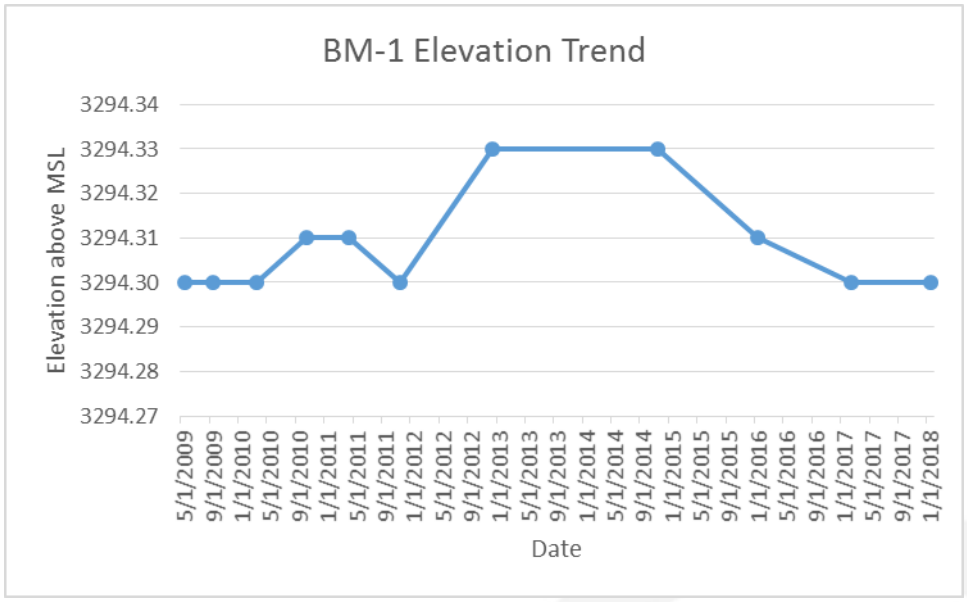
5/1/2017
9/1/2017
1/1/2018
Date


BM-1 Elevation Trend
Elevation above MSL
3294.34
3294.33
3294.32
3294.31
3294.30
3294.29
3294.28
3294.27
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
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1/1/2015
5/1/2015
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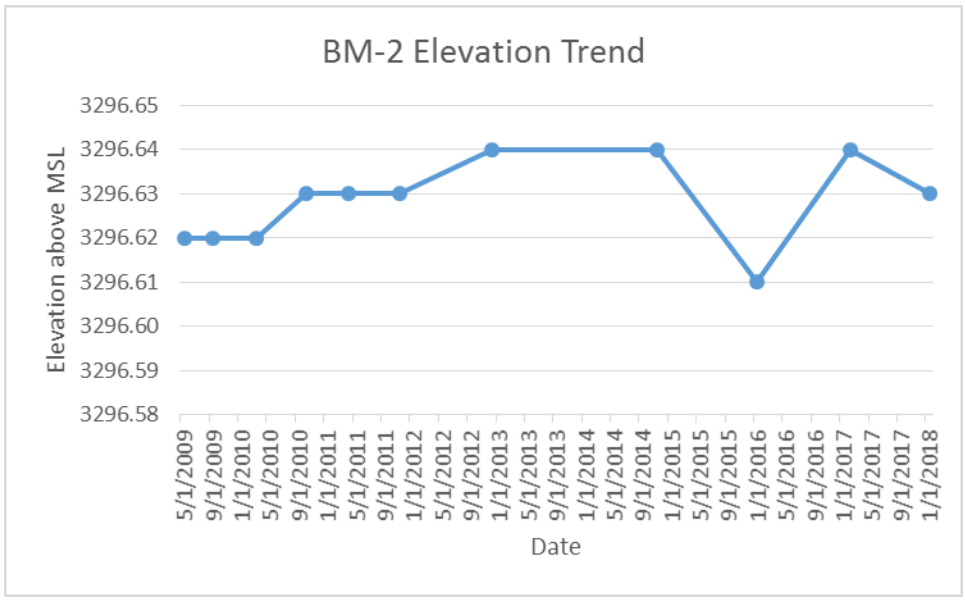
5/1/2017
9/1/2017
1/1/2018
Date


BM-2 Elevation Trend
Elevation above MSL
3296.65
3296.64
3296.63
3296.62
3296.61
3296.60
3296.59
3296.58
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
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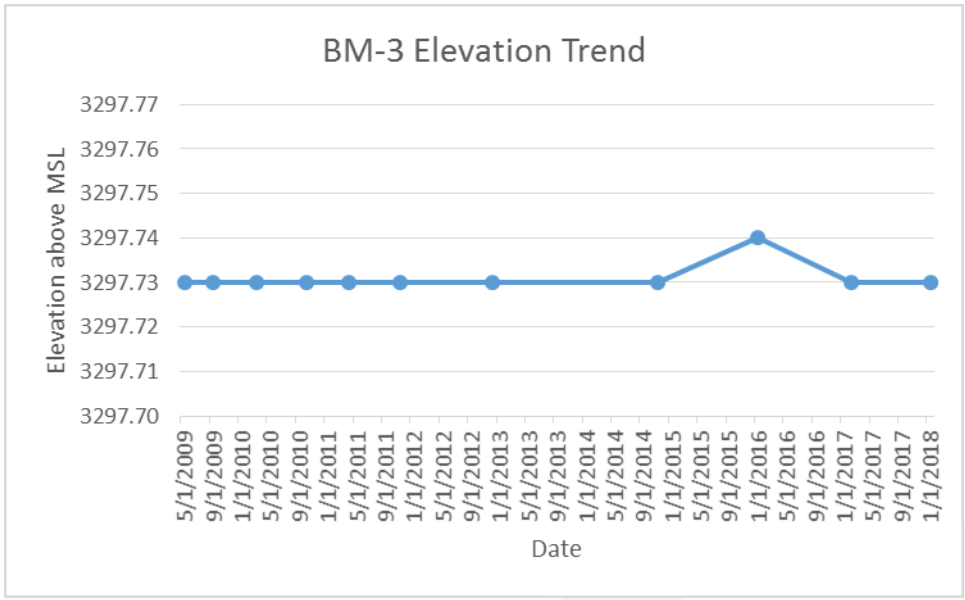
1/1/2018
Date


BM-3 Elevation Trend
Elevation above MSL
3297.77
3297.76
3297.75
3297.74
3297.73
3297.72
3297.71
3297.70
5/1/2009
9/1/2009
1/1/2010
5/1/2010
9/1/2010
1/1/2011
5/1/2011
9/1/2011
1/1/2012
5/1/2012
9/1/2012
1/1/2013
5/1/2013
9/1/2013
1/1/2014
5/1/2014
9/1/2014
1/1/2015
5/1/2015
9/1/2015
1/1/2016
5/1/2016
9/1/2016
1/1/2017
5/1/2017
9/1/2017
1/1/2018
Date

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Wednesday, March 1, 2017 9:09 AM
To: 'Parker, Ken'
Cc: Griswold, Jim, EMNRD
Subject: RE: GW-7 Western Jal LPG Storage Facility Subsidence Monitoring Submittal from Pettigrew

Ken:

Good morning.

OCD comments on the Pettigrew & Associates document are:

1) It is not a report.
2) A map with the survey monument locations was not provided.
3) The historic numerical mean sea level data of surveyed monument locations was not provided.
4) A chart of mean sea-level elevations per monument (feet) to the nearest 1/100th of a foot vs. survey date. A summary of max. deflection per monument location should be stated.
5) A summary or evaluation of the observations and results from each monument survey elevational changes is required with conclusions. For example, is there a trend observed at any monument location? Is there isostatic rebound affects observed?
6) Provide a description of survey monitoring equipment and accuracy and any changes for future monitoring to improve accuracy of data.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Parker, Ken [mailto:Ken.Parker@wnr.com]
Sent: Tuesday, February 28, 2017 2:22 PM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Subject: Fw: Subsidence Report

From: Caitlyn McNabb <CMcNabb@pettigrew.us>
Sent: Tuesday, February 28, 2017 12:18 PM
To: Parker, Ken
Cc: Jeremy Baker
Subject: Subsidence Report

Ken,

Please find the attached subsidence report. Let me know if I can help you with anything else.

Thanks!

Caitlyn Y. McNabb | GIS Specialist

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& ASSOCIATES PA
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100 E. Navajo Dr. Suite 100 Hobbs, NM 88240
575.393.9827 ext. 48
575.393.1543 fax
cmcnabb@pettigrew.us
www.pettigrew.us

Chavez, Carl J, EMNRD

From: Parker, Ken <Ken.Parker@wnr.com>
Sent: Tuesday, February 28, 2017 2:22 PM
To: Chavez, Carl J, EMNRD
Subject: Fw: Subsidence Report
Attachments: SUBSIDENCEREPORT_02152017.pdf

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Cc: Jeremy Baker
Subject: Subsidence Report

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Ken Parker, Western Refining
PO Box 1345
Jal, New Mexico, 88252
575-392-2632

15 February, 2017

RE: Survey Report
Western Refining Subsidence Monitoring

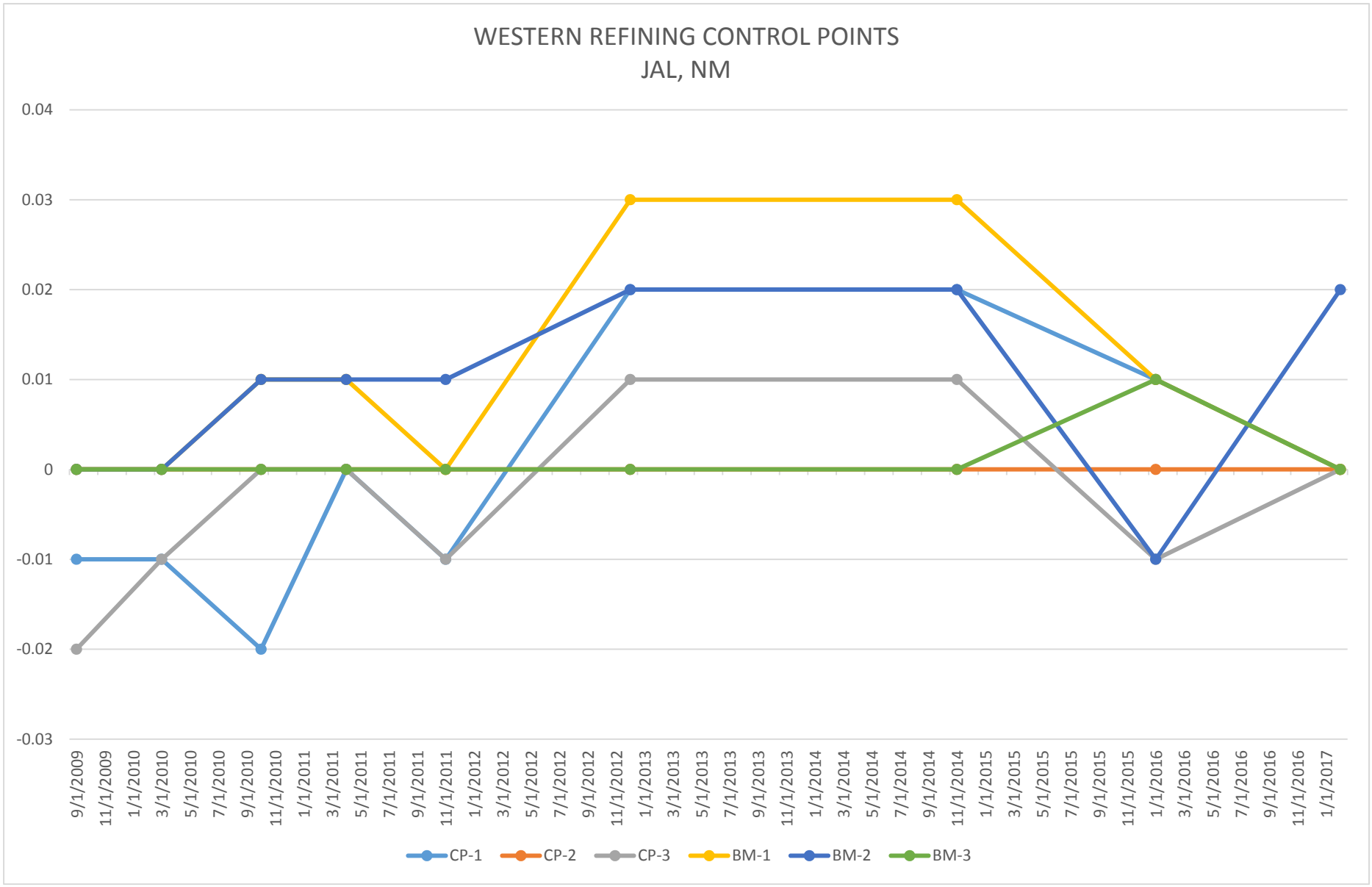
Dear Mr. Parker,

Please review this report of survey findings for the subject project. Please comment as necessary.

SUBSIDENCE MONUMENT MONITORING

The surveyed elevations along with deltas from established values as follows:

NAME	BASE ELEVATION 5/13/2009	ELEVATION 02/15/2017	CHANGE IN ELEVATION
CP-1	3293.47	3293.47	No Change
CP-2	3297.82	3297.82	No Change
CP-3	3293.56	3293.56	No Change
SM-1	3292.27	3292.27	No Change
SM-2	3294.56	3294.54	- 0.02
SM-3	3294.85	3294.86	+ 0.01
SM-4	3294.86	3294.87	+ 0.01
SMF-1 (Mid Flange)	3295.62	3295.62	No Change
SMF-1 (Lower Flange)	3293.67	3293.67	No Change
SMF-2 (Mid Flange)	3297.42	3297.42	No Change
SMF-2 (Lower Flange)	3295.52	3295.53	+0.01
SMF-3 (Mid Flange)	3298.18	3298.17	No Change
SMF-3 (Lower Flange)	3296.44	3296.43	- 0.01
SMF-4 (Lower Flange)	3295.99	3296.00	+ 0.01
BM-1	3294.30	3294.30	No Change
BM-2	3296.62	3296.64	+0.02
BM-3	3297.73	3297.73	No Change


WESTERN REFINING CONTROL POINTS
JAL, NM
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
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11/1/2015
1/1/2016
3/1/2016
5/1/2016
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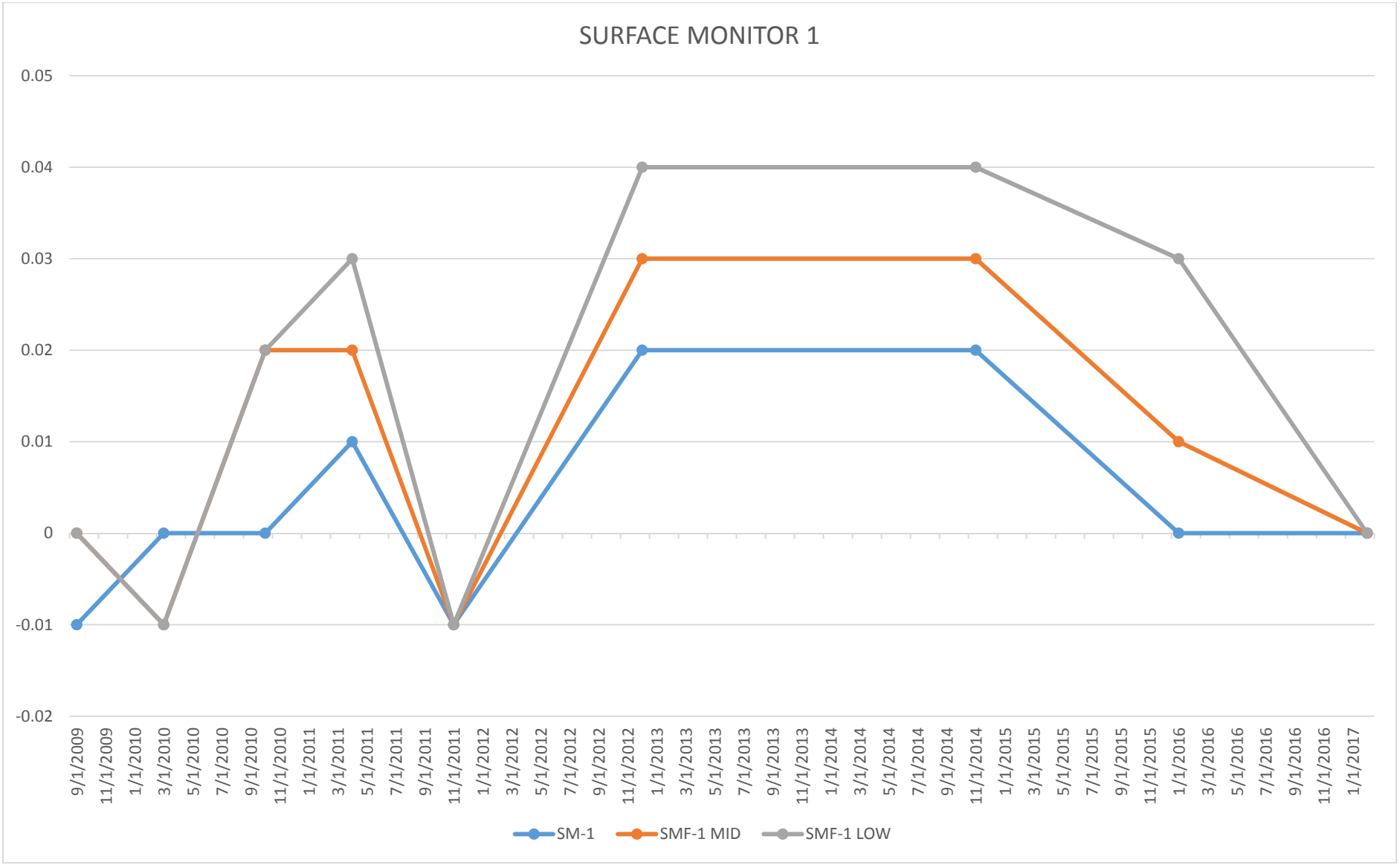
CP-1
CP-2
CP-3
BM-1
BM-2
BM-3


SURFACE MONITOR 1
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
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5/1/2015
7/1/2015
9/1/2015
11/1/2015
1/1/2016
3/1/2016
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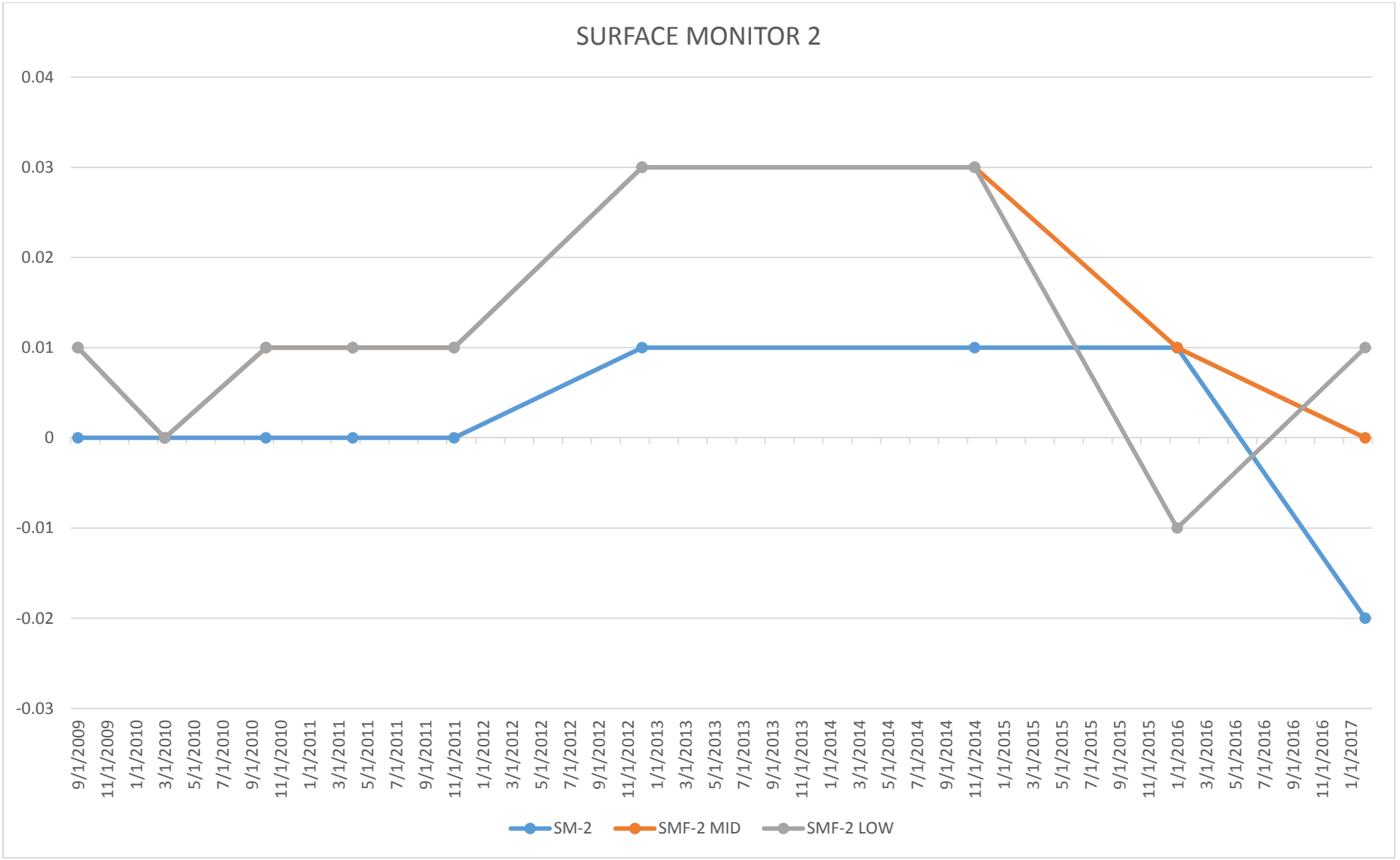
7/1/2016
9/1/2016
11/1/2016
1/1/2017
SM-1
SMF-1 MID
SMF-1 LOW


SURFACE MONITOR 2
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0.03
0.02
0.01
0
-0.01
-0.02
-0.03
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
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9/1/2015
11/1/2015
1/1/2016
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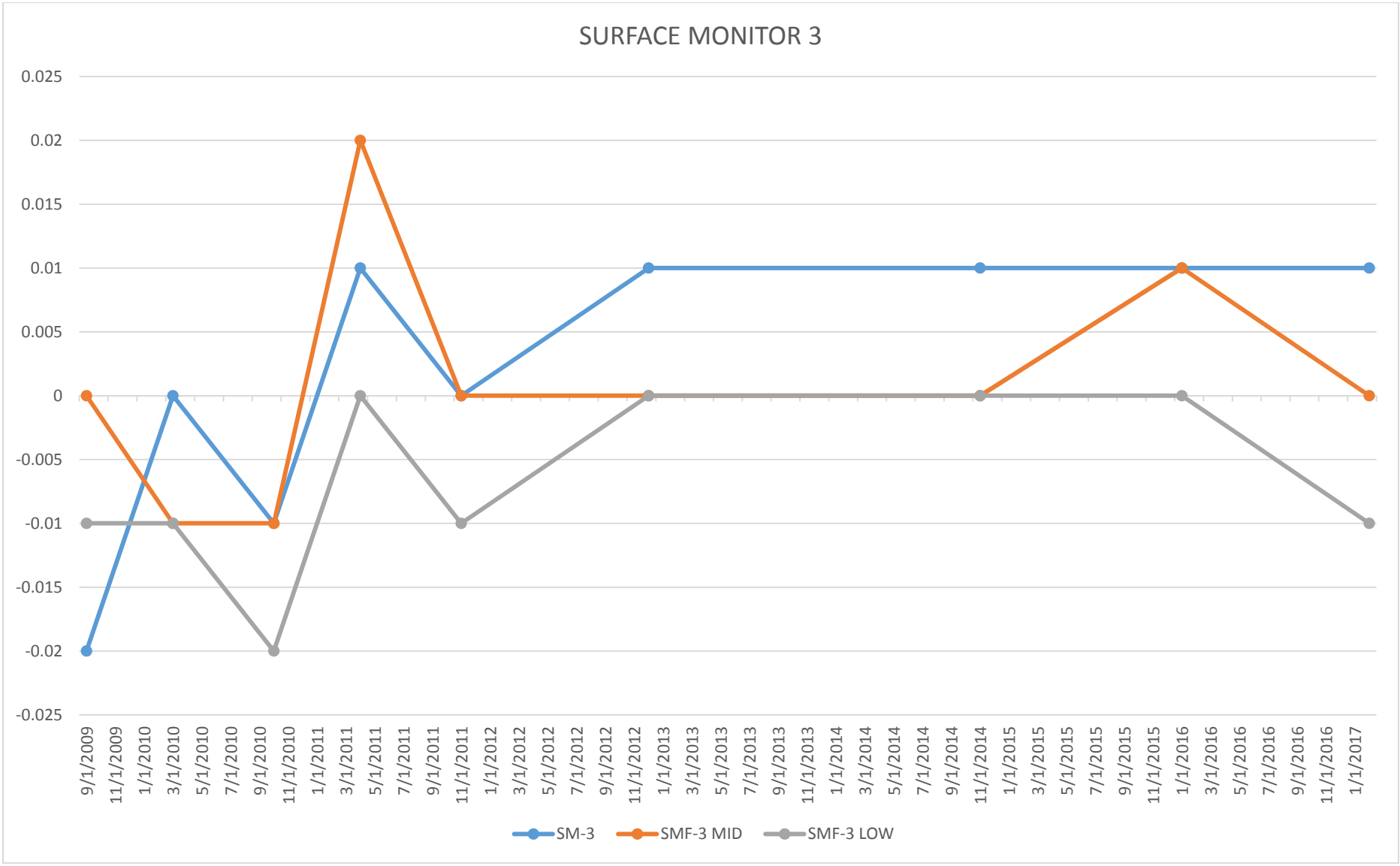
7/1/2016
9/1/2016
11/1/2016
1/1/2017
SM-2
SMF-2 MID
SMF-2 LOW


SURFACE MONITOR 3
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
-0.015
-0.02
-0.025
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
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11/1/2015
1/1/2016
3/1/2016
5/1/2016
7/1/2016
9/1/2016
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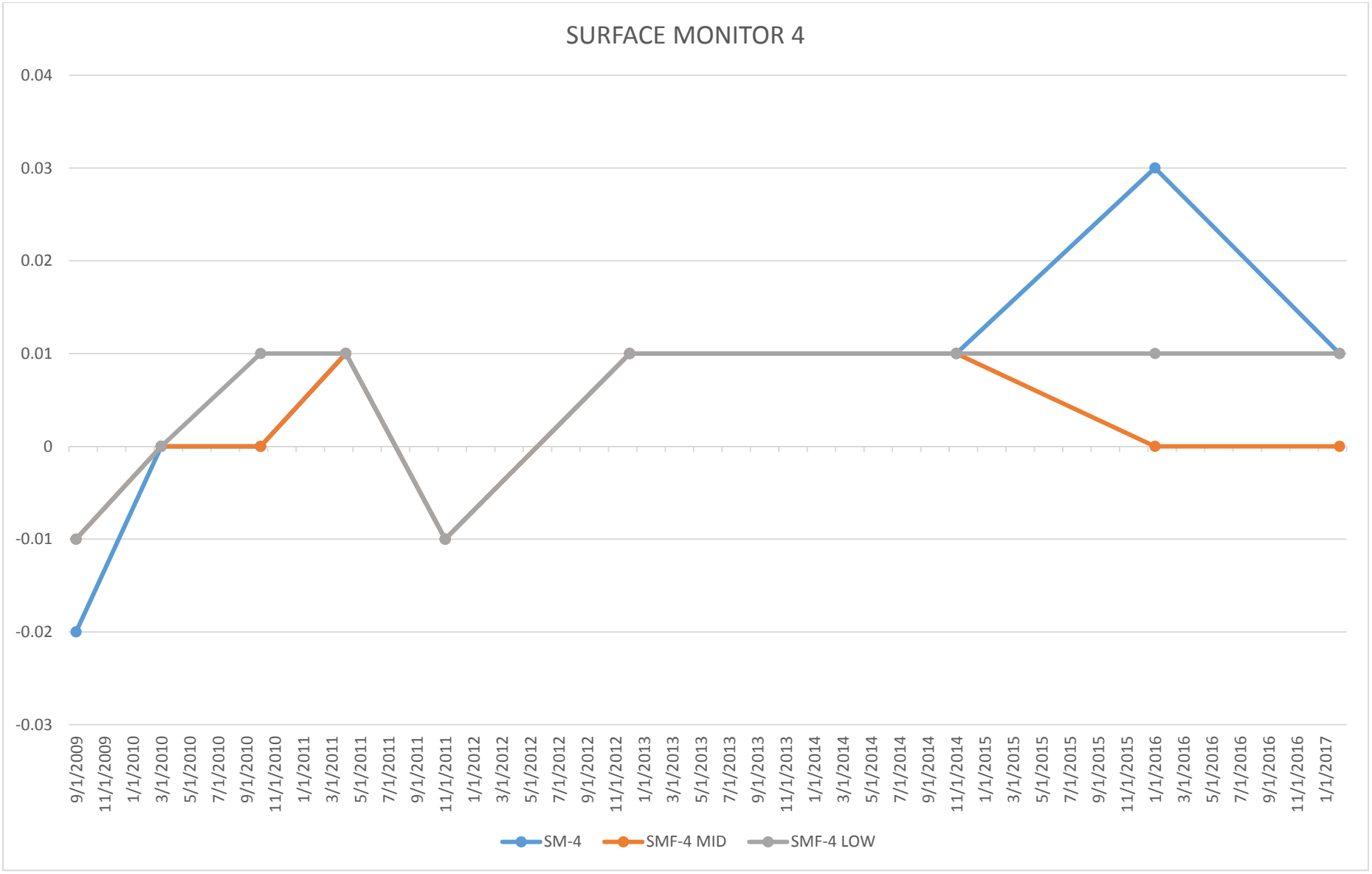
1/1/2017
SM-3
SMF-3 MID
SMF-3 LOW


SURFACE MONITOR 4
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0.03
0.02
0.01
0
-0.01
-0.02
-0.03
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
9/1/2011
11/1/2011
1/1/2012
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1/1/2013
3/1/2013
5/1/2013
7/1/2013
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1/1/2014
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7/1/2014
9/1/2014
11/1/2014
1/1/2015
3/1/2015
5/1/2015
7/1/2015
9/1/2015
11/1/2015
1/1/2016
3/1/2016
5/1/2016
7/1/2016
9/1/2016
11/1/2016
1/1/2017
SM-4
SMF-4 MID
SMF-4 LOW

Chavez, Carl J, EMNRD

From: Parker, Ken <Ken.Parker@wnr.com>
Sent: Tuesday, February 28, 2017 2:22 PM
To: Chavez, Carl J, EMNRD
Subject: Fw: Subsidence Report
Attachments: SUBSIDENCEREPORT_02152017.pdf

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Sent: Tuesday, February 28, 2017 12:18 PM
To: Parker, Ken
Cc: Jeremy Baker
Subject: Subsidence Report

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PO Box 1345
Jal, New Mexico, 88252
575-392-2632

15 February, 2017

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Western Refining Subsidence Monitoring

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CP-3	3293.56	3293.56	No Change
SM-1	3292.27	3292.27	No Change
SM-2	3294.56	3294.54	- 0.02
SM-3	3294.85	3294.86	+ 0.01
SM-4	3294.86	3294.87	+ 0.01
SMF-1 (Mid Flange)	3295.62	3295.62	No Change
SMF-1 (Lower Flange)	3293.67	3293.67	No Change
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SMF-2 (Lower Flange)	3295.52	3295.53	+0.01
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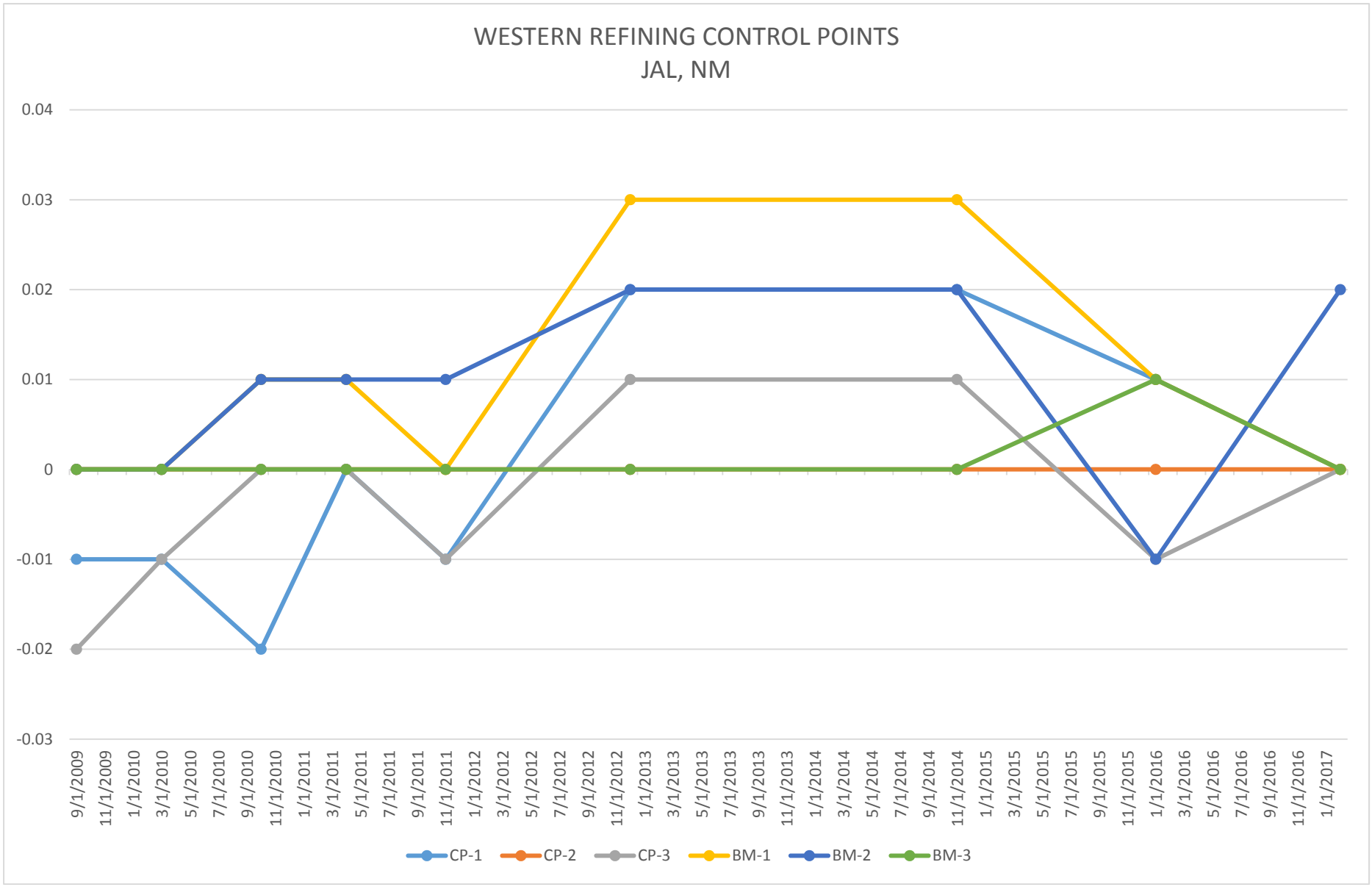
SMF-3 (Lower Flange)	3296.44	3296.43	- 0.01
SMF-4 (Lower Flange)	3295.99	3296.00	+ 0.01
BM-1	3294.30	3294.30	No Change
BM-2	3296.62	3296.64	+0.02
BM-3	3297.73	3297.73	No Change


WESTERN REFINING CONTROL POINTS
JAL, NM
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
9/1/2009
11/1/2009
1/1/2010
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3/1/2016
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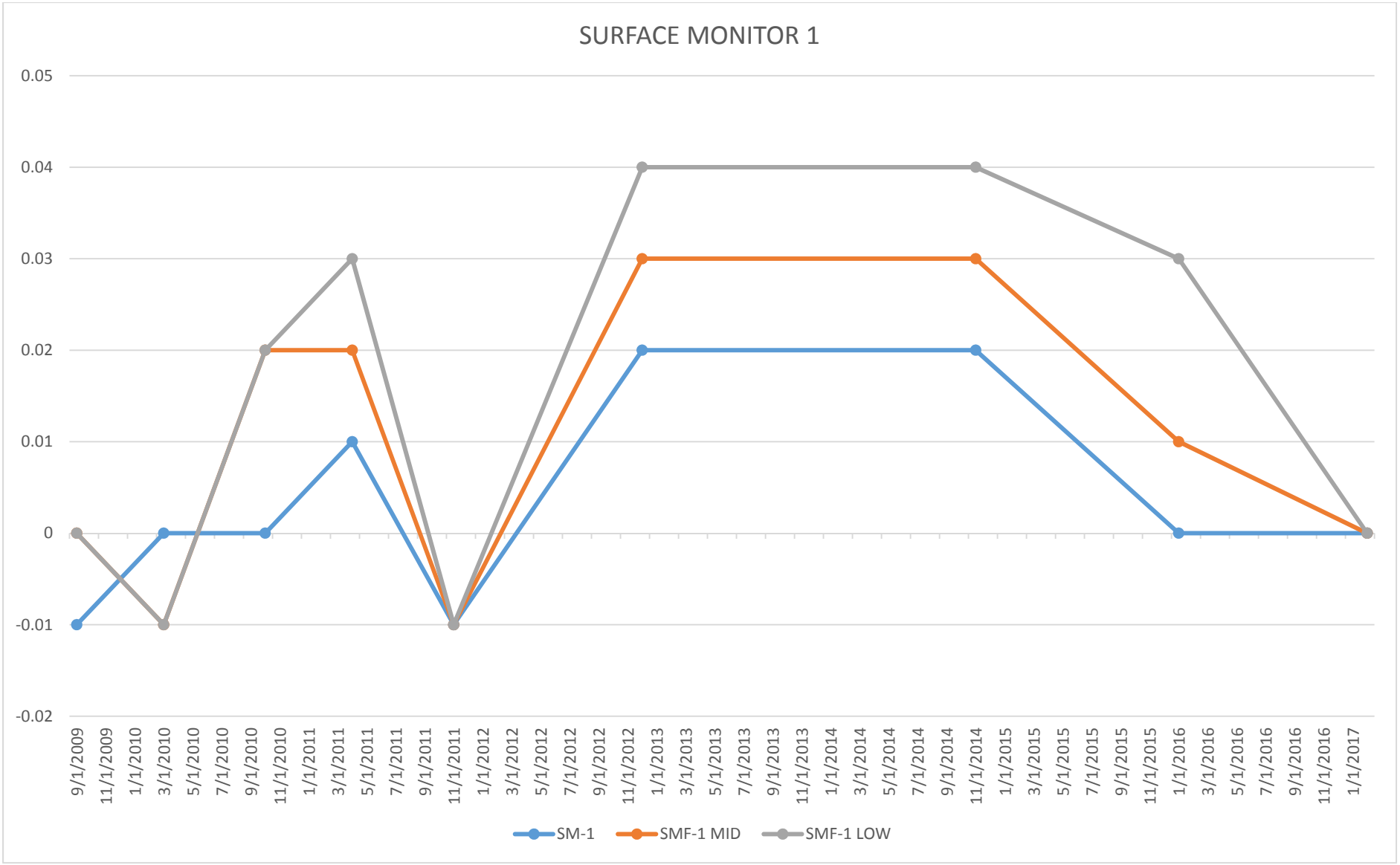
CP-1
CP-2
CP-3
BM-1
BM-2
BM-3


SURFACE MONITOR 1
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
9/1/2009
11/1/2009
1/1/2010
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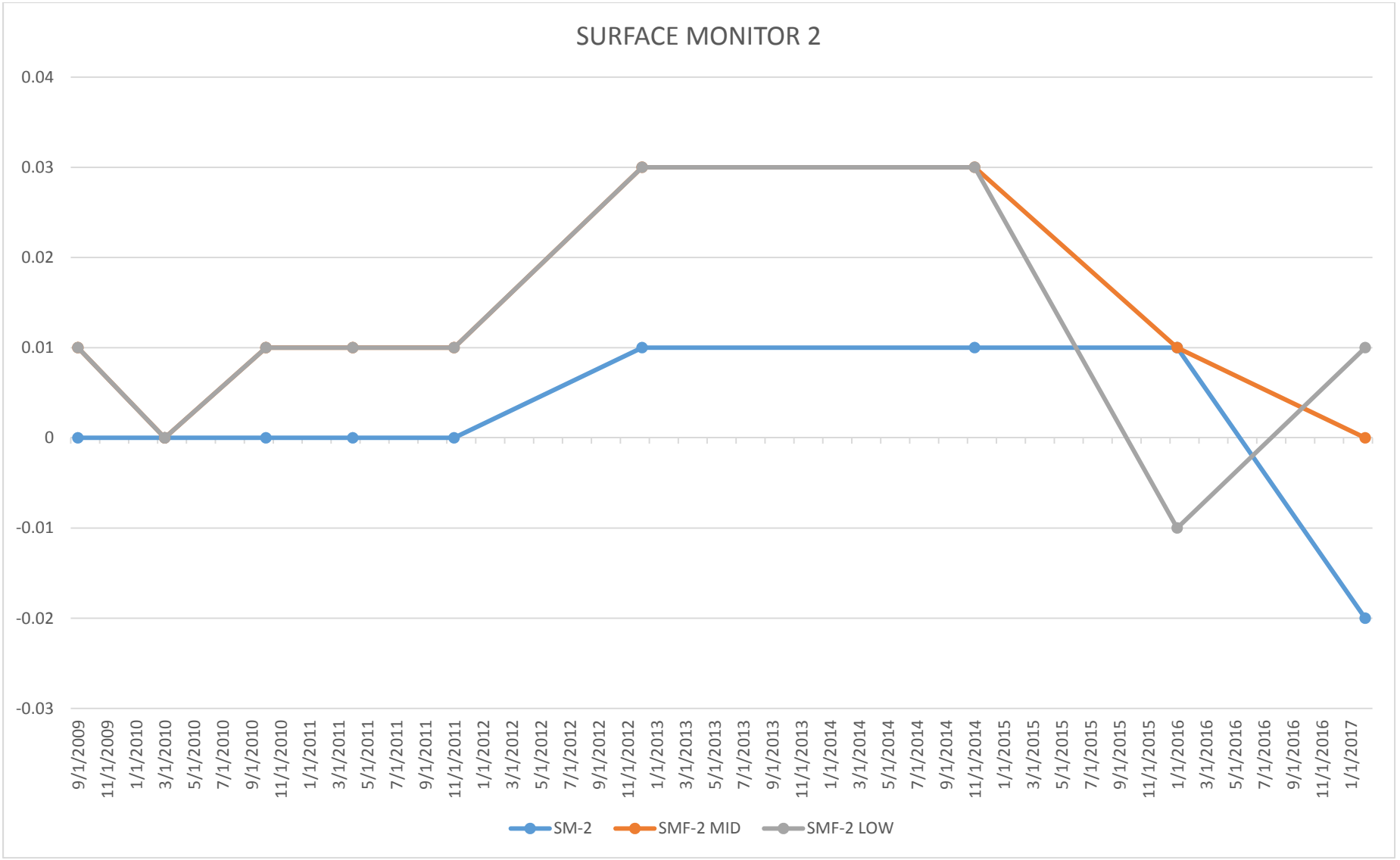
11/1/2016
1/1/2017
SM-1
SMF-1 MID
SMF-1 LOW


SURFACE MONITOR 2
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
9/1/2009
11/1/2009
1/1/2010
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7/1/2015
9/1/2015
11/1/2015
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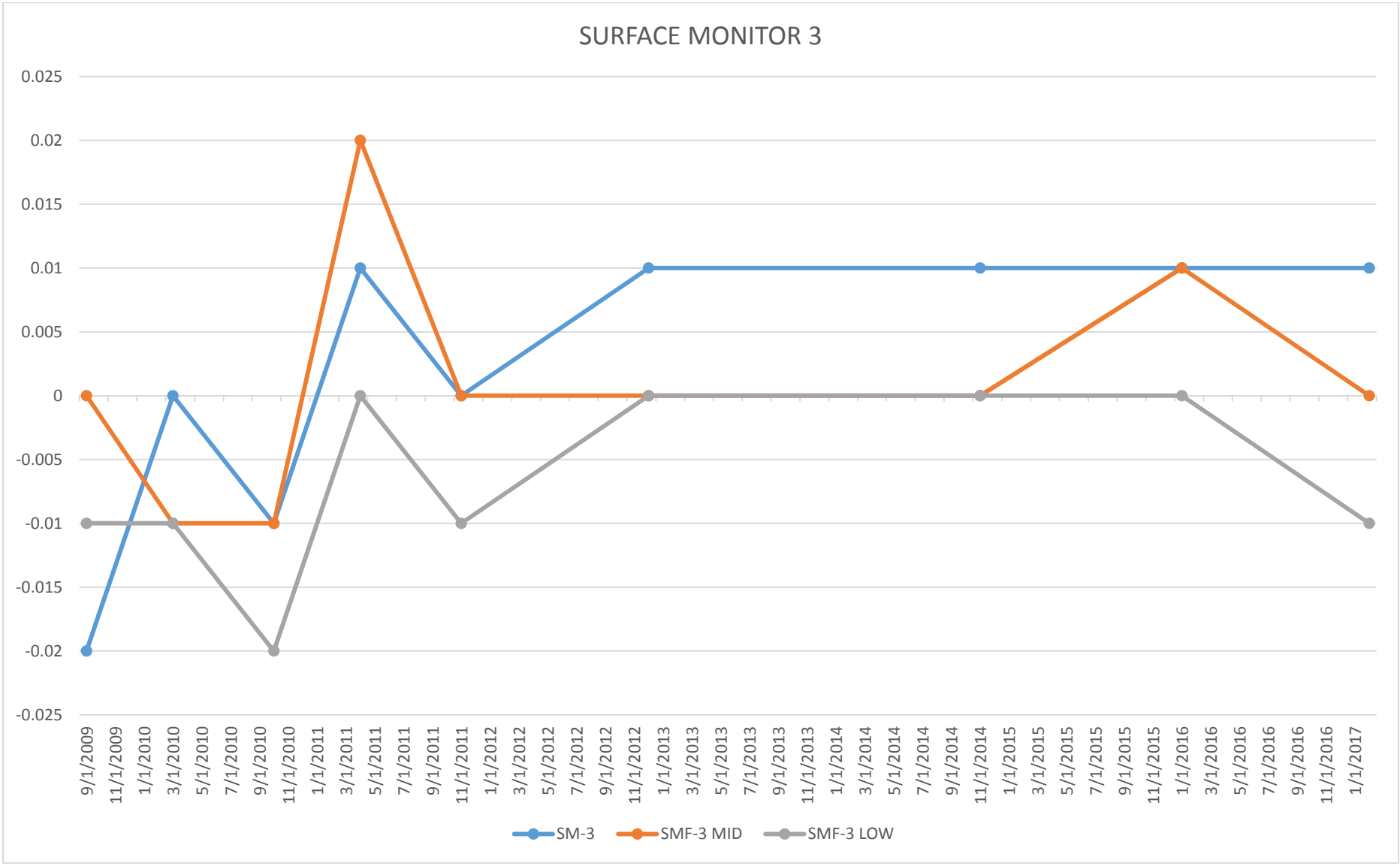
11/1/2016
1/1/2017
SM-2
SMF-2 MID
SMF-2 LOW


SURFACE MONITOR 3
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
-0.015
-0.02
-0.025
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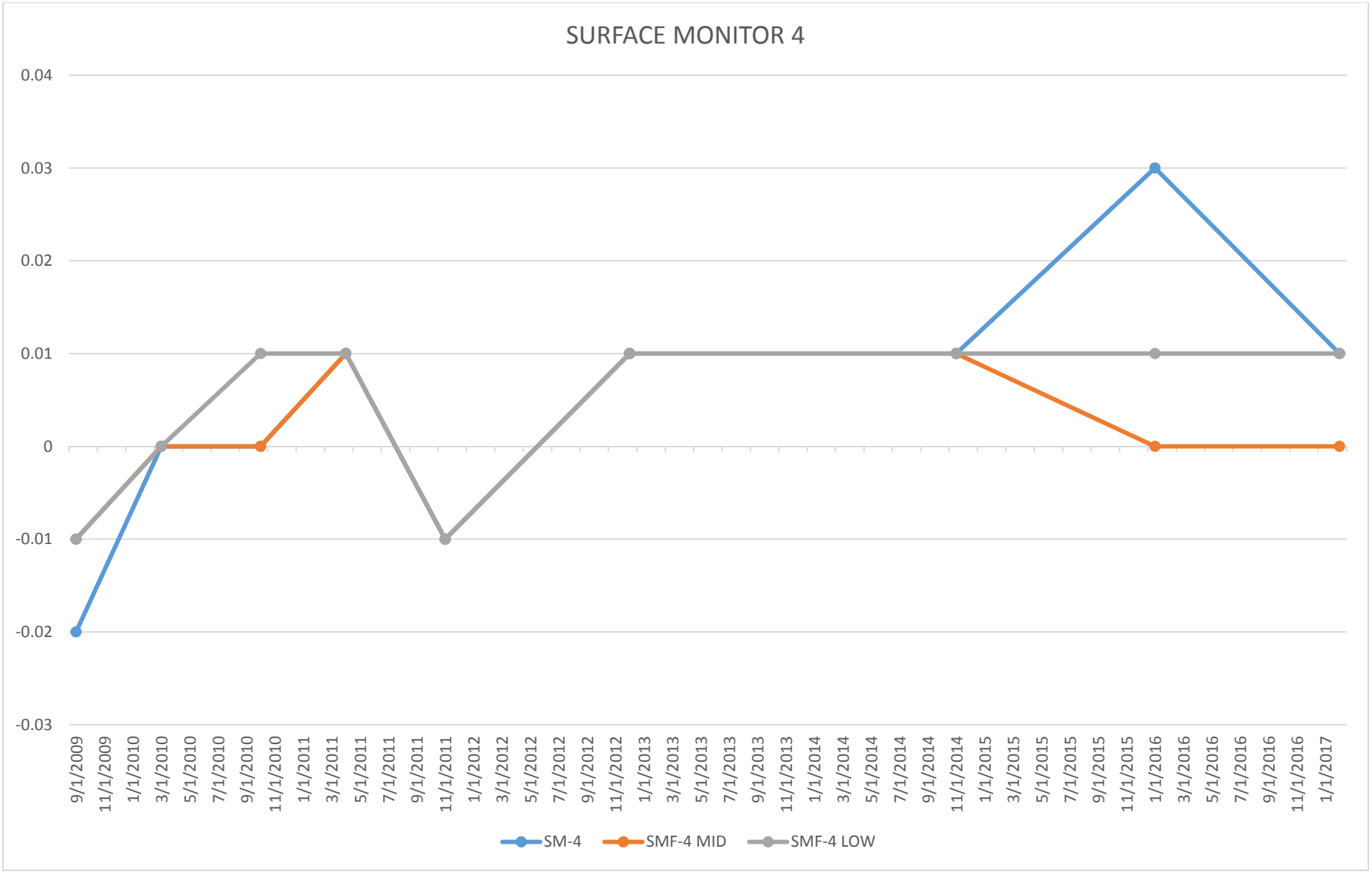
7/1/2015
9/1/2015
11/1/2015
1/1/2016
3/1/2016
5/1/2016
7/1/2016
9/1/2016
11/1/2016
1/1/2017
SM-3
SMF-3 MID
SMF-3 LOW


SURFACE MONITOR 4
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
9/1/2009
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1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
9/1/2011
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1/1/2015
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5/1/2015
7/1/2015
9/1/2015
11/1/2015
1/1/2016
3/1/2016
5/1/2016
7/1/2016
9/1/2016
11/1/2016
1/1/2017
SM-4
SMF-4 MID
SMF-4 LOW

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, March 14, 2017 10:49 AM
To: 'Parker, Ken'
Cc: Griswold, Jim, EMNRD; Brown, Maxey G, EMNRD
Subject: RE: Western Refinery Jal LPG Storage Facility Subsidence Monitoring Report
Attachments: SUBSIDENCEREPORT_03072017.pdf

Ken:

The New Mexico Oil Conservation Division (OCD) is in receipt of the above subject report.

OCD notices that Pettigrew recently switched to using a Trimble DiNi digital level, which reads a bar code off of a special rod in order to determine difference in elevation from a known control point. This level is very accurate and the use helps to eliminate human reading errors.

OCD recommends that Western develop an SOP for all future facility subsidence surveys to promote duplication of the survey method and greater accuracy in the survey results.

From our phone call this morning, OCD understands Western's desire to change from bi-annual surveying to annual surveying, and OCD approves.

OCD hereby approves the report and concurs with the conclusions of the report that no noticeable trend in monument elevation at monitoring points over time (~ 8 yrs) could be observed indicating subsidence is currently a concern at the facility.

Please contact me if you have questions. Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD **and see "Publications")**

From: Parker, Ken [mailto:Ken.Parker@wnr.com]
Sent: Thursday, March 9, 2017 8:15 AM
To: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Subject: Fw: Western Refinery Jal LPG Storage Facility

Carl,

Please review the subsidence report and notify me if OCD will approve the report.

Ken

From: Jeremy Baker <JBaker@pettigrew.us>
Sent: Tuesday, March 7, 2017 9:55 AM
To: CarlJ.Chavez@state.nm.us; Parker, Ken
Subject: Western Refinery Jal LPG Storage Facility

Gentlemen,

Please see attached subsidence report for your use.

Jeremy Baker, PE | Senior Project Manager

PETTIGREW & ASSOCIATES PA

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100 E. Navajo Drive, Suite 100, Hobbs, NM 88240
575.393.9827 ext. 56
575.393.1543 fax
575.631.2182 cell
jbaker@pettigrew.us
www.pettigrew.us

PETTIGREW & ASSOCIATES PA

ENGINEERING | SURVEYING | TESTING

DEFINING QUALITY SINCE 1965

Ken Parker, Western Refining
PO Box 1345
Jal, New Mexico, 88252
575-392-2632

15 February, 2017

RE: GW-7 Jal LPG Storage Facility
Annual Subsidence Survey Report

SUBSIDENCE MONUMENT MONITORING

On February 15, 2017 a field survey was conducted to check for changes in monitoring location elevations at the Western Refining Facility located at the intersection of NM18 and Deep Wells Road near Jal, NM.

This survey was conducted using a Trimble DiNi digital level, which reads a bar code off of a special rod in order to determine difference in elevation from a known control point. This level is very accurate and the use helps to eliminate human reading errors. The data is stored onboard and may be transferred directly into the computer software at the office for analysis of results, ensuring greater accuracy.

Control Point CP2 (elevation 3297.82 above mean sea level (MSL)) has historically been the Reference Primary Elevation Point for determining elevations on this project. As in the past, a level loop was run thru the project with side shots as needed to check the different monuments, benchmarks, and control points at this site.

Observations were made on all available points and tabulated to compare the elevations to the base elevations established on May 13, 2009. See Table A for these results. Additionally, the results for the last 8 years have been tabulated and appear in Table B. Each monitoring point has also been plotted on a trend chart to aid in a visual on the amount of movement of the points.

Prior to this survey, the elevations on the monitoring points were determined utilizing an automatic level, which is more prone to instrument operator reading errors than the DiNi that will now be used for all future monitoring at this site.

The surveyed elevations along with deltas from established values as follows:

NAME	BASE ELEVATION 5/13/2009	ELEVATION 02/15/2017	CHANGE IN ELEVATION
CP-1	3293.47	3293.47	No Change
CP-2	3297.82	3297.82	No Change
CP-3	3293.56	3293.56	No Change
SM-1	3292.27	3292.27	No Change
SM-2	3294.56	3294.54	- 0.02
SM-3	3294.85	3294.86	+ 0.01
SM-4	3294.86	3294.87	+ 0.01
SMF-1 (Mid Flange)	3295.62	3295.62	No Change
SMF-1 (Lower Flange)	3293.67	3293.67	No Change
SMF-2 (Mid Flange)	3297.42	3297.42	No Change
SMF-2 (Lower Flange)	3295.52	3295.53	+0.01
SMF-3 (Mid Flange)	3298.18	3298.17	No Change
SMF-3 (Lower Flange)	3296.44	3296.43	- 0.01
SMF-4 (Lower Flange)	3295.99	3296.00	+ 0.01
BM-1	3294.30	3294.30	No Change
BM-2	3296.62	3296.64	+0.02
BM-3	3297.73	3297.73	No Change

Table A

Monitoring Points and Elevations

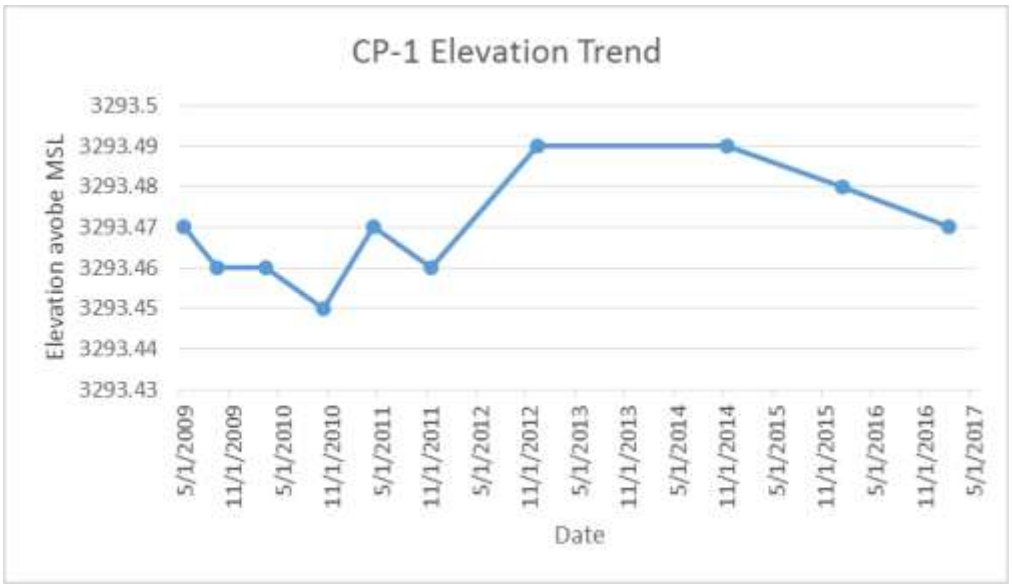
Point	5/13/2009	9/25/2009	3/9/2010	10/29/2010	4/15/2011	11/10/2011	12/21/2012	11/12/2014	1/14/2016	2/15/2017
CP-1	3293.47	3293.46	3293.46	3293.45	3293.47	3293.46	3293.49	3293.49	3293.48	3293.47
CP-2	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82	3297.82
CP-3	3293.56	3293.54	3293.55	3293.56	3293.56	3293.55	3293.57	3293.57	3293.55	3293.56
SM-1	3292.27	3292.26	3292.27	3292.27	3292.28	3292.26	3292.29	3292.29	3292.27	3292.27
SM-2	3294.56	3294.56	3294.56	3294.56	3294.56	3294.56	3294.57	3294.57	3294.57	3294.54
SM-3	3294.85	3294.83	3294.85	3294.84	3294.86	3294.85	3294.86	3294.86	3294.86	3294.86
SM-4	3294.86	3294.84	3294.86	3294.86	3294.87	3294.85	3294.87	3294.87	3294.89	3294.87
SMF-1 MID	3295.62	3295.62	3295.61	3295.64	3295.64	3295.61	3295.65	3295.65	3295.63	3295.62
SMF-1 LOW	3293.67	3293.67	3293.66	3293.69	3293.7	3293.66	3293.71	3293.71	3293.7	3293.67
SMF-2 MID	3297.42	3297.43	3297.42	3297.43	3297.43	3297.43	3297.45	3297.45	3297.43	3297.42
SMF-2 LOW	3295.52	3295.53	3295.52	3295.53	3295.53	3295.53	3295.55	3295.55	3295.51	3295.53
SMF-3 MID	3298.17	3298.17	3298.16	3298.16	3298.19	3298.17	3298.17	3298.17	3298.18	3298.17
SMF-3 LOW	3296.44	3296.43	3296.43	3296.42	3296.44	3296.43	3296.44	3296.44	3296.44	3296.43
SMF-4 MID	3297.73	3297.72	3297.73	3297.73	3297.74	3297.72	3297.74	3297.74		
SMF-4 LOW	3295.99	3295.98	3295.99	3296	3296	3295.98	3296	3296	3296	3296
BM-1	3294.3	3294.3	3294.3	3294.31	3294.31	3294.3	3294.33	3294.33	3294.31	3294.3
BM-2	3296.62	3296.62	3296.62	3296.63	3296.63	3296.63	3296.64	3296.64	3296.61	3296.64
BM-3	3297.73	3297.73	3297.73	3297.73	3297.73	3297.73	3297.73	3297.73	3297.74	3297.73

Table B

Conclusions

The survey was conducted and results analyzed, using the elevations originally established on May 13, 2009 as the base elevations for each point. The readings were consistent with a stable surface as there was little to no difference in elevations of any monitoring point, the most being on SM-2 with a change of 0.02 feet down. This is most nearly ¼ inch. Similar deviation was found in BM-2 with a change of 0.02 upwards. The rest of the points were within tolerance of the readings for the DiNi level, showing 0.01 feet of difference or less, which is an unremarkable elevation change.

The area appears stable with little movement either up or downward over the past 8 years of monitoring. The maximum differences in elevation at the SM-4 and SMF-1 LOW locations are around 0.05 feet, or about ½ inch from observed low elevation to observed high elevation, some of which was likely due to instrument and operator reading error. Most differences were 0.03 feet (about 3/8 inch) or less over the 8 year monitoring period. Trend charts for each monitoring, control, and bench mark point are attached as Exhibits herein.


CP-1 Elevation Trend
Elevation avobe MSL
3293.5
3293.49
3293.48
3293.47
3293.46
3293.45
3293.44
3293.43
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
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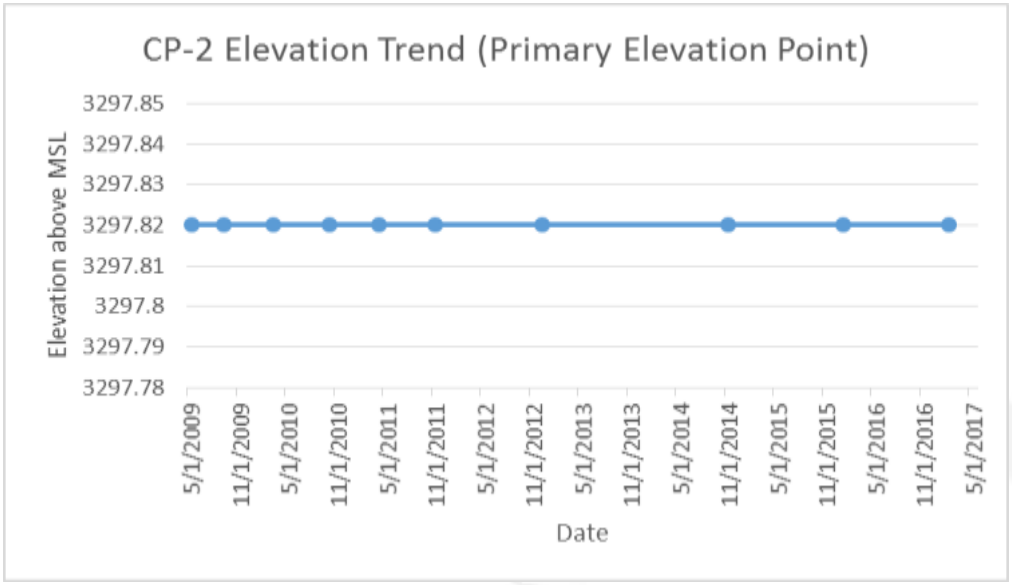
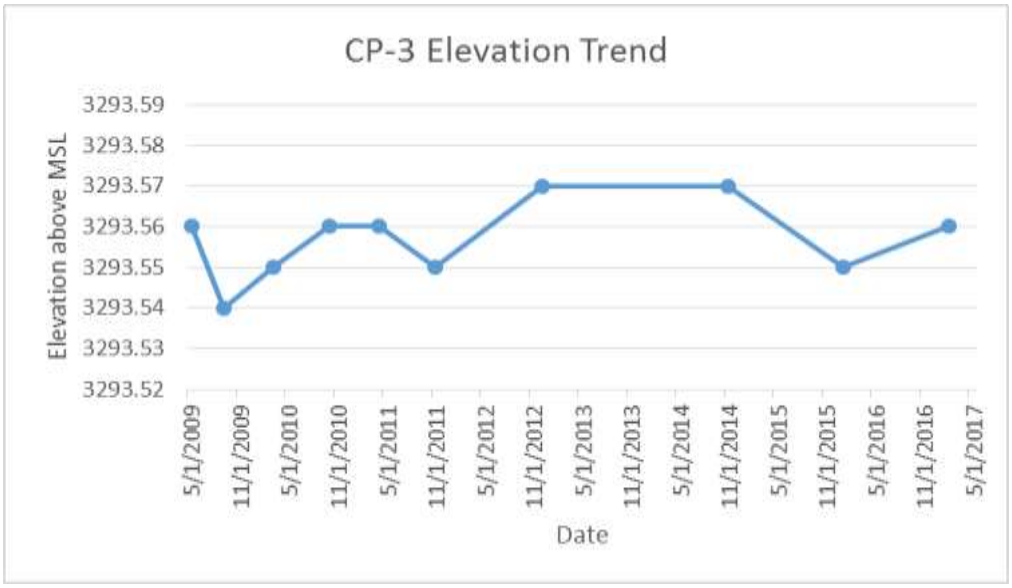
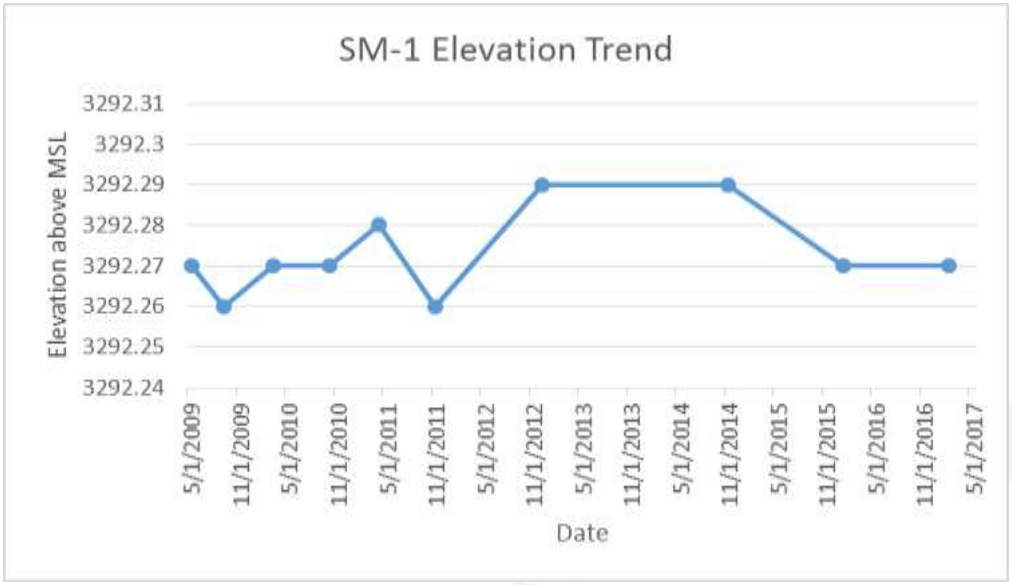
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


CP-2 Elevation Trend (Primary Elevation Point)
Elevation above MSL
3297.85
3297.84
3297.83
3297.82
3297.81
3297.8
3297.79
3297.78
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


CP-3 Elevation Trend
Elevation above MSL
3293.59
3293.58
3293.57
3293.56
3293.55
3293.54
3293.53
3293.52
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


SM-1 Elevation Trend
Elevation above MSL
3292.31
3292.3
3292.29
3292.28
3292.27
3292.26
3292.25
3292.24
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
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5/1/2015
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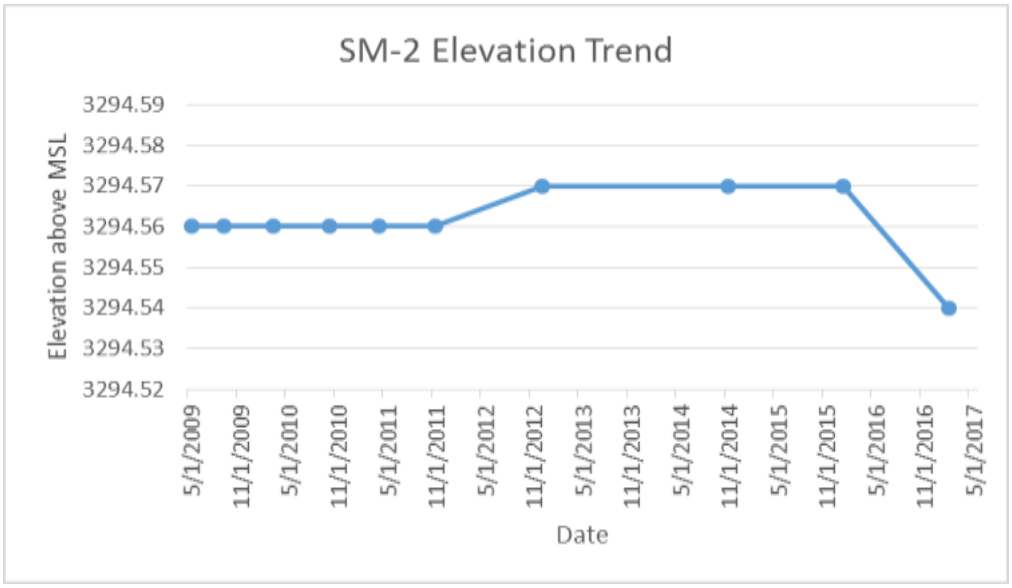
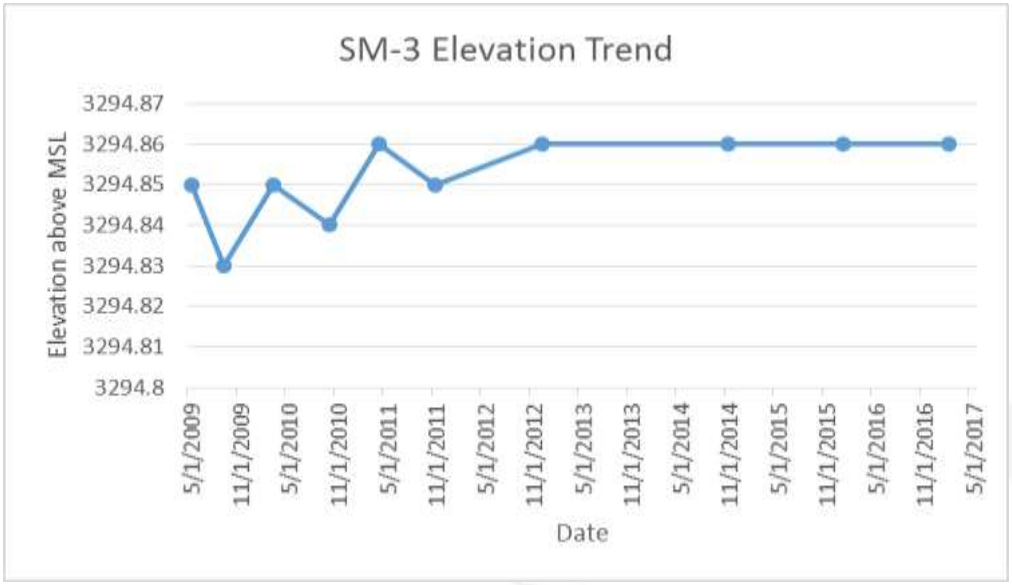
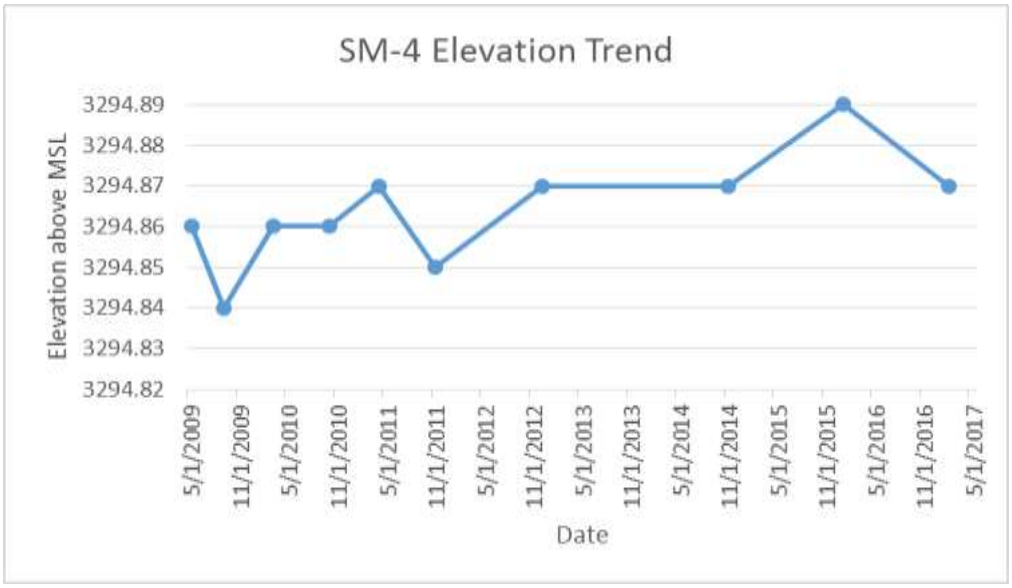
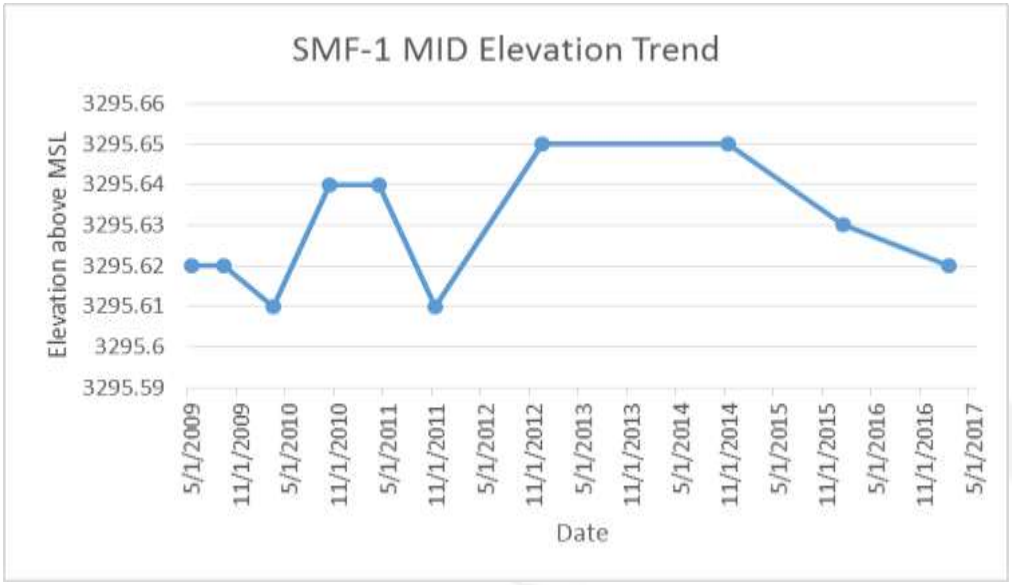
5/1/2016
11/1/2016
5/1/2017
Date


SM-2 Elevation Trend
Elevation above MSL
3294.59
3294.58
3294.57
3294.56
3294.55
3294.54
3294.53
3294.52
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


SM-3 Elevation Trend
Elevation above MSL
3294.87
3294.86
3294.85
3294.84
3294.83
3294.82
3294.81
3294.8
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


SM-4 Elevation Trend
Elevation above MSL
3294.89
3294.88
3294.87
3294.86
3294.85
3294.84
3294.83
3294.82
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


SMF-1 MID Elevation Trend
Elevation above MSL
3295.66
3295.65
3295.64
3295.63
3295.62
3295.61
3295.6
3295.59
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
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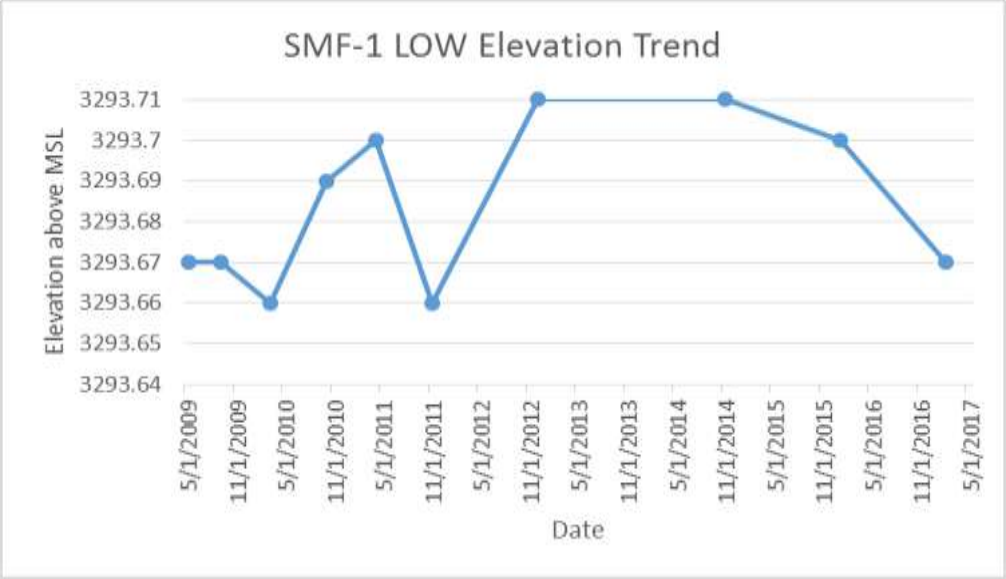
5/1/2017
Date


SMF-1 LOW Elevation Trend
Elevation above MSL
3293.71
3293.7
3293.69
3293.68
3293.67
3293.66
3293.65
3293.64
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
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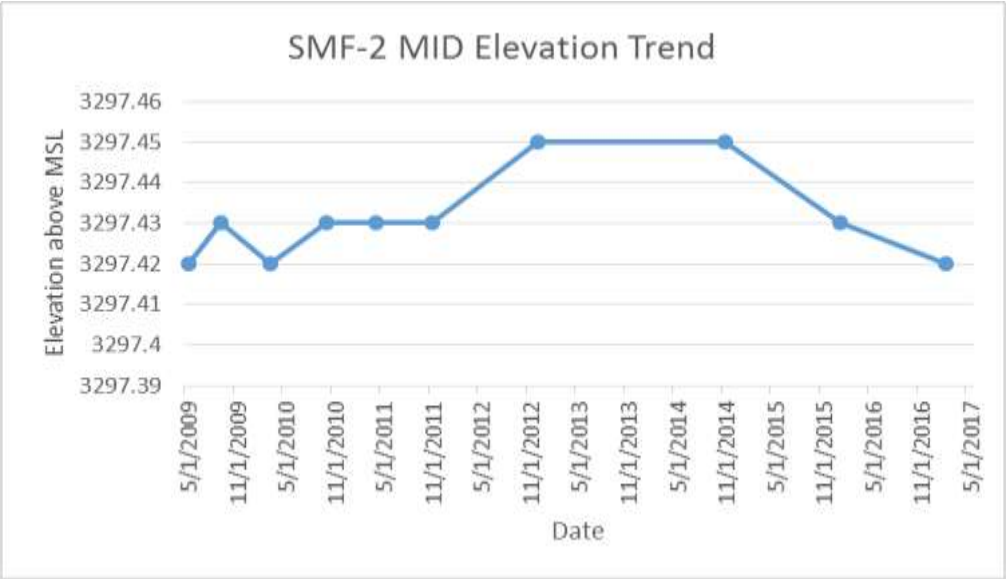
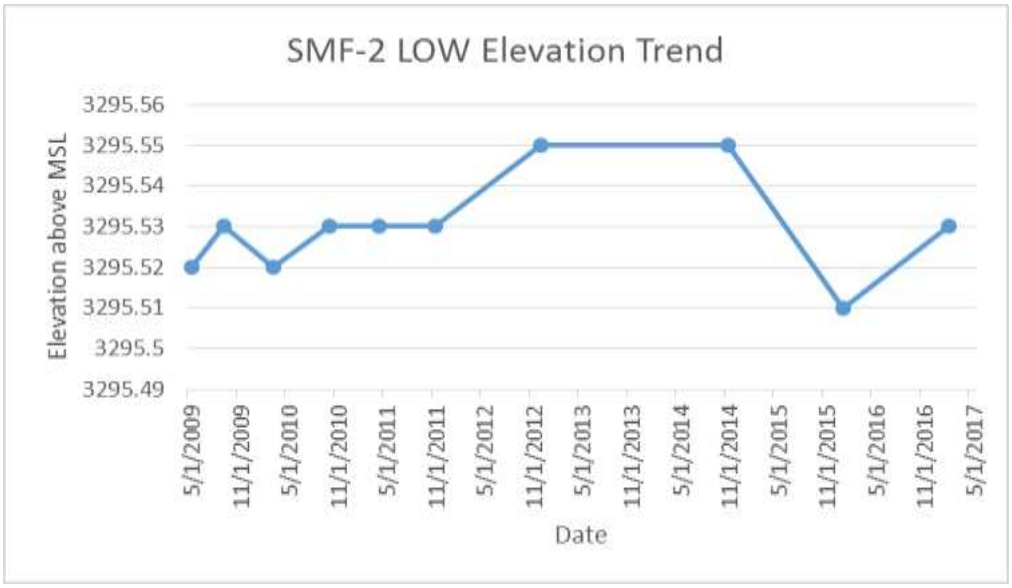

SMF-2 MID Elevation Trend
Elevation above MSL
3297.46
3297.45
3297.44
3297.43
3297.42
3297.41
3297.4
3297.39
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


SMF-2 LOW Elevation Trend
Elevation above MSL
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3295.55
3295.54
3295.53
3295.52
3295.51
3295.5
3295.49
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
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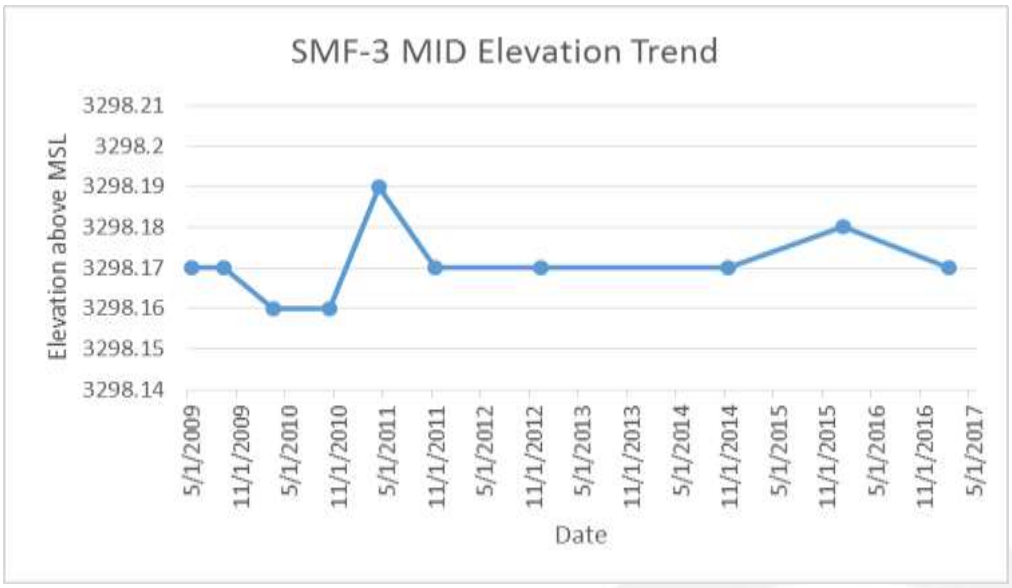
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


SMF-3 MID Elevation Trend
Elevation above MSL
3298.21
3298.2
3298.19
3298.18
3298.17
3298.16
3298.15
3298.14
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
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5/1/2017
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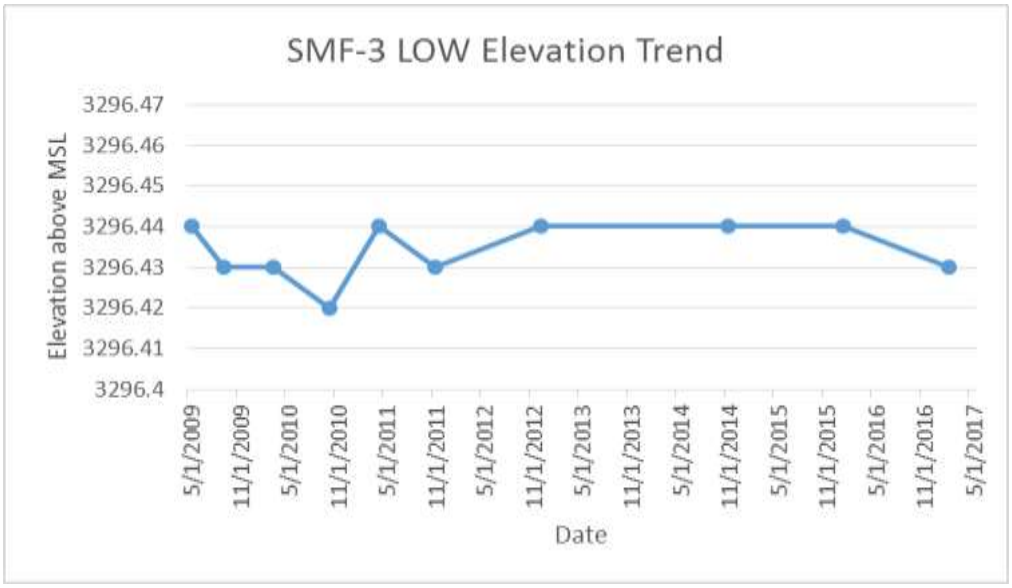
SMF-3 LOW Elevation Trend
Elevation above MSL
3296.47
3296.46
3296.45
3296.44
3296.43
3296.42
3296.41
3296.4
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
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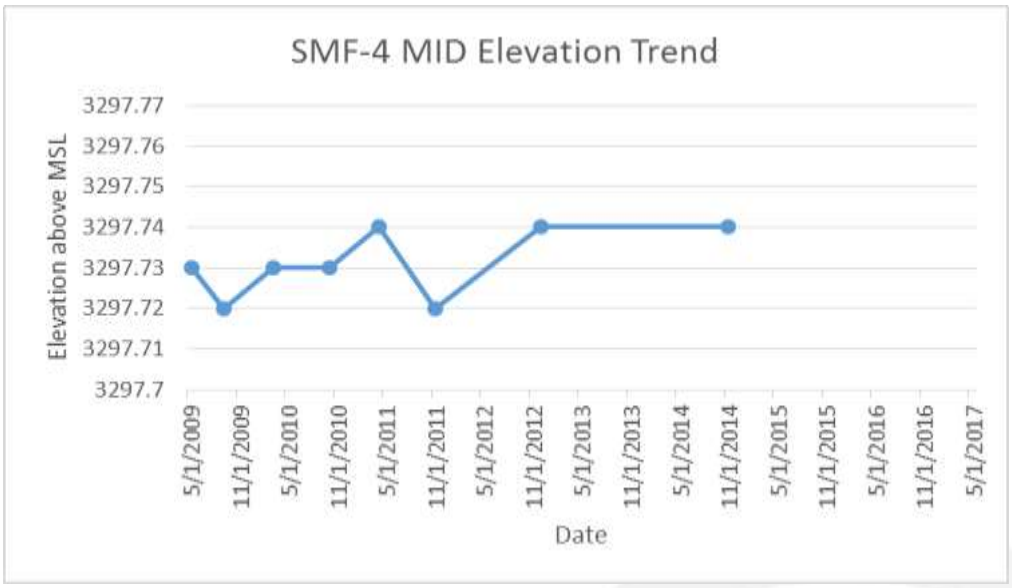
SMF-4 MID Elevation Trend
Elevation above MSL
3297.77
3297.76
3297.75
3297.74
3297.73
3297.72
3297.71
3297.7
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
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5/1/2017
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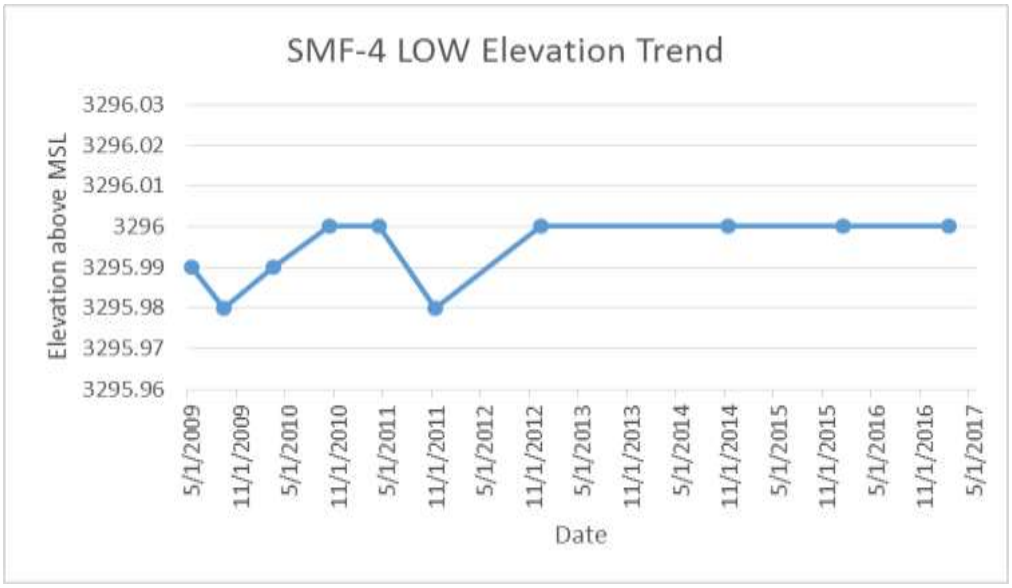
SMF-4 LOW Elevation Trend
Elevation above MSL
3296.03
3296.02
3296.01
3296
3295.99
3295.98
3295.97
3295.96
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
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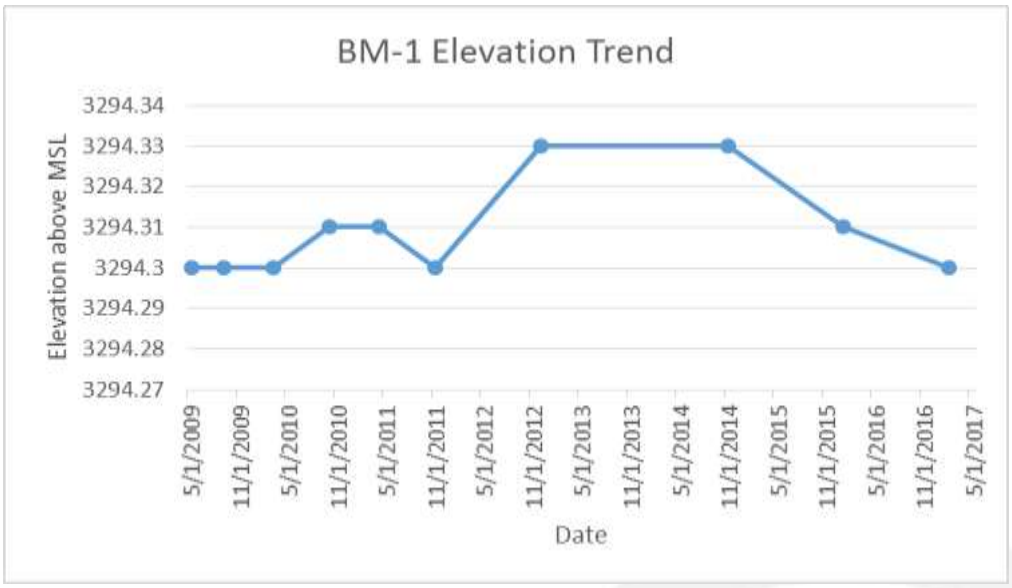
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


BM-1 Elevation Trend
Elevation above MSL
3294.34
3294.33
3294.32
3294.31
3294.3
3294.29
3294.28
3294.27
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
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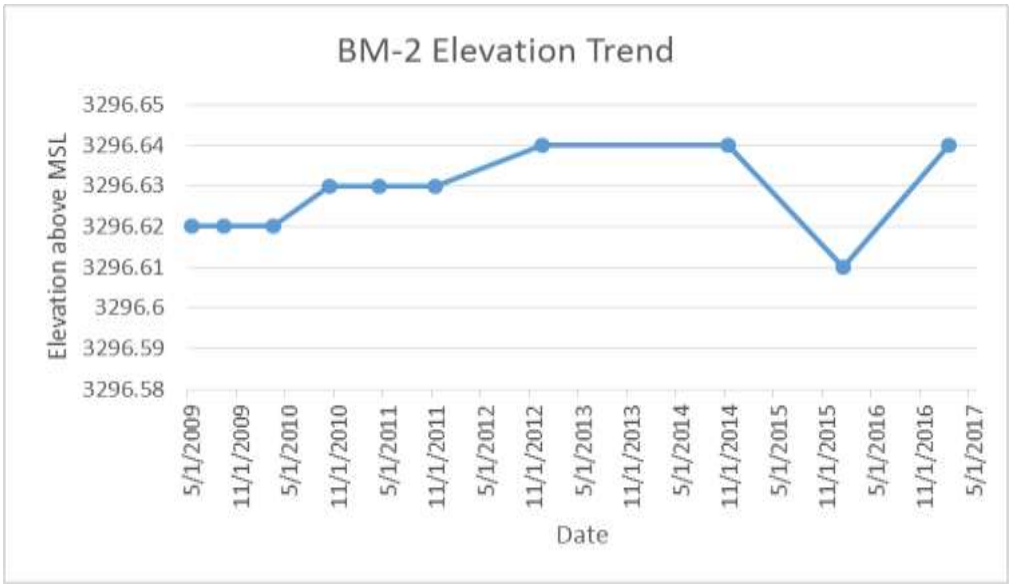
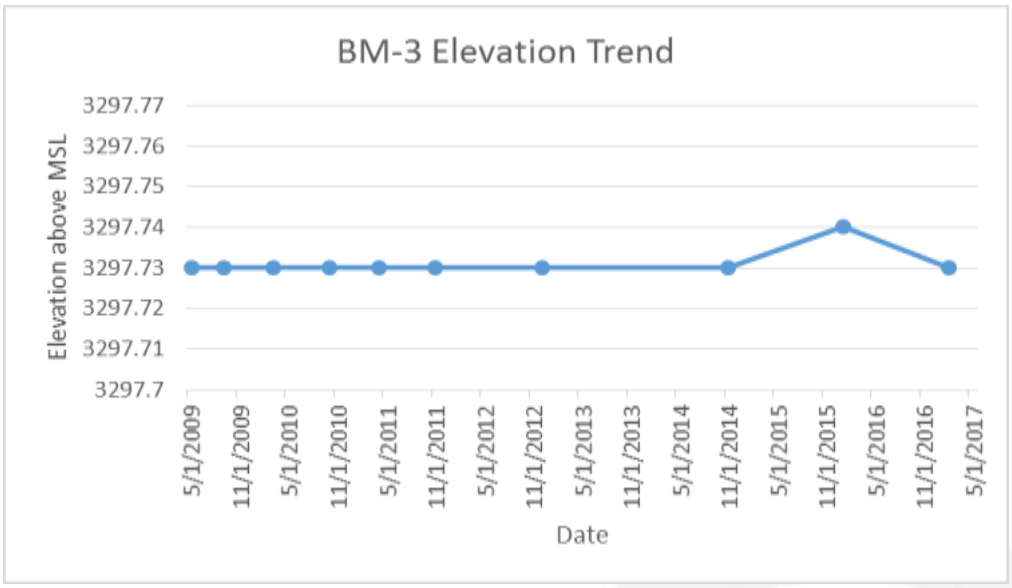
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


BM-2 Elevation Trend
Elevation above MSL
3296.65
3296.64
3296.63
3296.62
3296.61
3296.6
3296.59
3296.58
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
5/1/2014
11/1/2014
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date


BM-3 Elevation Trend
Elevation above MSL
3297.77
3297.76
3297.75
3297.74
3297.73
3297.72
3297.71
3297.7
5/1/2009
11/1/2009
5/1/2010
11/1/2010
5/1/2011
11/1/2011
5/1/2012
11/1/2012
5/1/2013
11/1/2013
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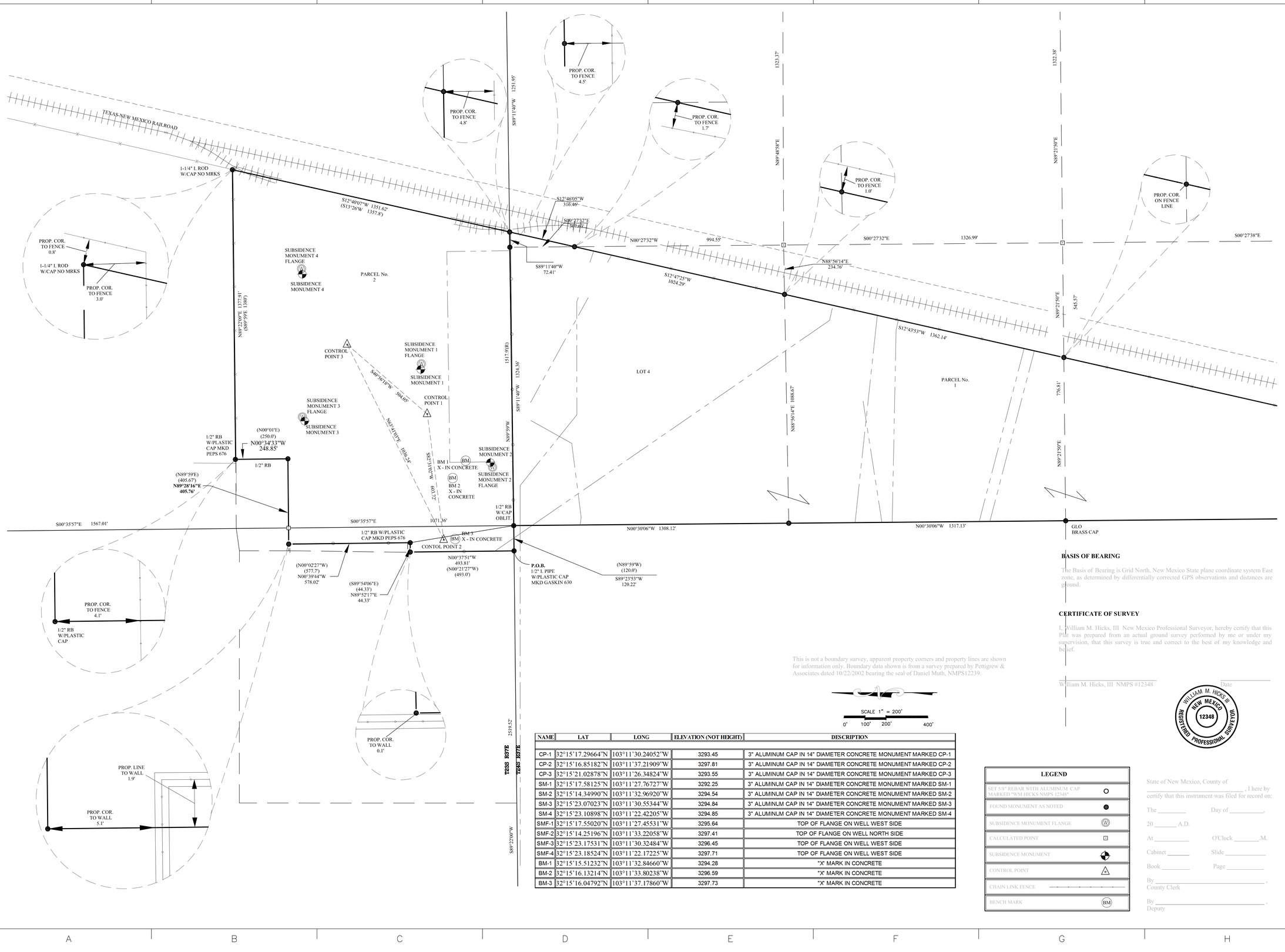
5/1/2015
11/1/2015
5/1/2016
11/1/2016
5/1/2017
Date



NAME	LAT	LONG	ELEVATION (NOT HEIGHT)	DESCRIPTION
CP-1	32°15'17.29664"N	103°11'30.24052"W	3293.45	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED CP-1
CP-2	32°15'16.85182"N	103°11'37.21909"W	3297.81	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED CP-2
CP-3	32°15'21.02878"N	103°11'26.34824"W	3293.55	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED CP-3
SM-1	32°15'17.58125"N	103°11'27.76727"W	3292.25	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED SM-1
SM-2	32°15'14.34990"N	103°11'32.96920"W	3294.54	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED SM-2
SM-3	32°15'23.07023"N	103°11'30.55344"W	3294.84	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED SM-3
SM-4	32°15'23.10898"N	103°11'22.42205"W	3294.85	3" ALUMINUM CAP IN 14" DIAMETER CONCRETE MONUMENT MARKED SM-4
SMF-1	32°15'17.55020"N	103°11'27.45531"W	3295.64	TOP OF FLANGE ON WELL WEST SIDE
SMF-2	32°15'14.25196"N	103°11'33.22058"W	3297.41	TOP OF FLANGE ON WELL NORTH SIDE
SMF-3	32°15'23.17531"N	103°11'30.32484"W	3296.45	TOP OF FLANGE ON WELL WEST SIDE
SMF-4	32°15'23.18524"N	103°11'22.17225"W	3297.71	TOP OF FLANGE ON WELL WEST SIDE
BM-1	32°15'15.51232"N	103°11'32.84660"W	3294.28	"X" MARK IN CONCRETE
BM-2	32°15'16.13214"N	103°11'33.80238"W	3296.59	"X" MARK IN CONCRETE
BM-3	32°15'16.04792"N	103°11'37.17860"W	3297.73	"X" MARK IN CONCRETE

This is not a boundary survey, apparent property corners and property lines are shown for information only. Boundary data shown is from a survey prepared by Pettigrew & Associates dated 10/22/2002 bearing the seal of Daniel Muth, NMPS12239.

SCALE 1" = 200'
0' 100' 200' 400'

LEGEND

SET 5/8" REBAR WITH ALUMINUM CAP MARKED "WM HICKS NMPS 12348"	○
FOUND MONUMENT AS NOTED	●
SUBSIDENCE MONUMENT FLANGE	Ⓦ
CALCULATED POINT	⊡
SUBSIDENCE MONUMENT	⌖
CONTROL POINT	△
CHAIN LINK FENCE	-x-x-x-x-x-
BENCH MARK	BM

BASIS OF BEARING

The Basis of Bearing is Grid North, New Mexico State plane coordinate system East zone, as determined by differentially corrected GPS observations and distances are ground.

CERTIFICATE OF SURVEY

I, William M. Hicks, III New Mexico Professional Surveyor, hereby certify that this Plat was prepared from an actual ground survey performed by me or under my supervision, that this survey is true and correct to the best of my knowledge and belief.

William M. Hicks, III NMPS #12348 Date

WILLIAM M. HICKS III NEW MEXICO 12348 REGISTERED PROFESSIONAL SURVEYOR

State of New Mexico, County of _____, I here by certify that this instrument was filed for record on:

The _____ Day of _____,

20 _____ A.D.

At _____ O'Clock _____M.

Cabinet _____ Slide _____

Book _____ Page _____

By _____, County Clerk

By _____, Deputy

INDEXING INFO FOR COUNTY CLERK

OWNER: WESTERN REFINING

LOC: PART OF SECTION 5, T24S, R37E, AND SECTIONS 31 & 32, T23S, R37E, N.M.P.M. JAL, NEW MEXICO

PLAT OF SUBSIDENCE MONITORING STATIONS FOR WESTERN REFINING COMPANY

MONITOR STATION LOCATION

SHEET NO. S101

SEQUENCE NO. 1 OF 1

No.	Symbol	Description	Date	Appr.
1		Revise to correct subsidence monument elevations	5/14/2009	

DRAWN BY: kel

PROJECT NO: 2008-1061

APPROVED BY: TH

FILE PATH: ACAD\Monitor Wells\Jaq Monitor Station Locations N..dwg

Pettigrew & Associates, P.A.
A Professional Engineering, Surveying & Testing Company, New Mexico
1110 N. Grimes, Hobbs, N.M. 88240
(505) 393-9827
www.pettigrew.us

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, January 31, 2017 4:06 PM
To: Parker, Ken (Ken.Parker@wnr.com)
Cc: Griswold, Jim, EMNRD
Subject: GW-7 Jal LPG Storage Facility Annual Report 2016

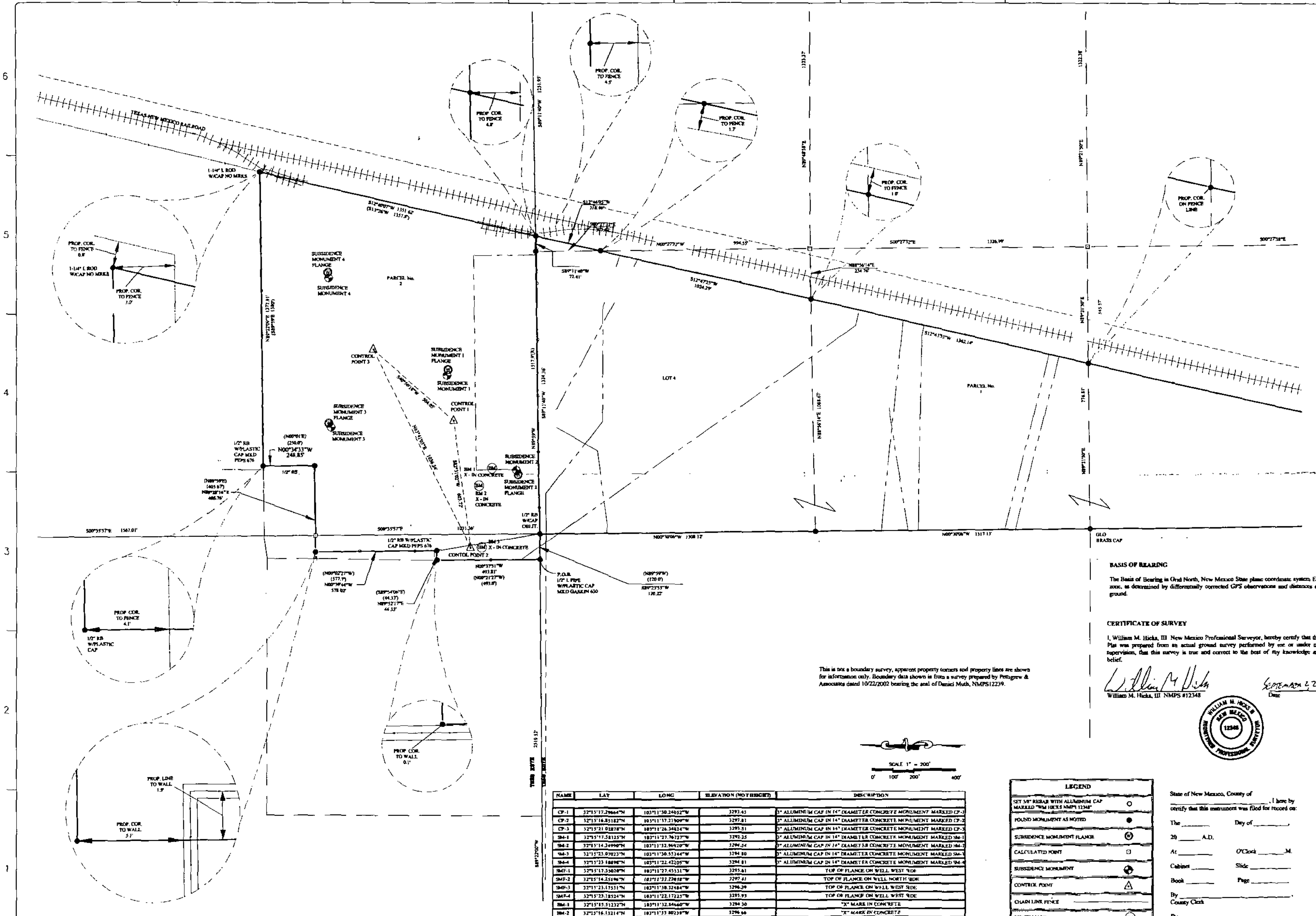
Ken:

The New Mexico Oil Conservation Division (OCD) has reviewed the above subject submittal and notice that subsidence monitoring data results was submitted from 12/21/2012 over 5 years ago.

Please submit more current subsidence monitoring records to OCD within 30 days of receipt of this e-mail.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD **and see "Publications")**



BASIS OF BEARING

The Basis of Bearing is Grid North, New Mexico State plane coordinate system East zone, as determined by differentially corrected GPS observations and distances are ground.

CERTIFICATE OF SURVEY

I, William M. Hicks, III New Mexico Professional Surveyor, hereby certify that this Plat was prepared from an actual ground survey performed by me or under my supervision, that this survey is true and correct to the best of my knowledge and belief.

William M. Hicks, III NMPS #12348

September 2, 2008
Date

WILLIAM M. HICKS III NEW MEXICO 12348 REGISTERED PROFESSIONAL SURVEYOR

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0' 100' 200' 400'

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LEGEND	
SET 5/8" REBAR WITH ALUMINUM CAP MARKED "WM HICKS NMPS 12348"	○
FOUND MONUMENT AS NOTED	●
SUBSIDENCE MONUMENT FLANGE	Ⓦ
CALCULATED POINT	□
SUBSIDENCE MONUMENT	⊕
CONTROL POINT	△
CHAIN LINK FENCE	——
BENCH MARK	(BM)

State of New Mexico, County of ______________________, I here by certify that this instrument was filed for record on:

The ________ Day of __________,

20 ______ A.D.

At __________ O'Clock ______M.

Cabinet ______ Slide ____________

Book _______ Page ____________

By ______________________________,
County Clerk

By ______________________________,
Deputy

REVISIONS

Symbol	Description	Date	Appr.

DATE: 09/02/2008
DRAWN BY: Nat
APPROVED BY: TH
PROJECT NO: 2008.1061
FILE PATH: ACAD\Monitor Wells\dwg\Monitor Station Locations N..dwg

Pettigrew & Associates, P.A.
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INDEXING INFO FOR COUNTY CLERK
OWNER: WESTERN REFINING
LOC: PART OF SECTION 5, T26S, R37E, PART OF SECTIONS 31 & 32, T25S, R37E, N.M.P.M., JAL, NEW MEXICO

PLAT OF SUBSIDENCE MONITORING STATIONS FOR
WESTERN REFINING COMPANY
MONITOR STATION LOCATION

SHEET NO. S101

SEQUENCE NO. 1 OF 1

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO. 30-025-35954

5. Indicate Type of Lease STATE X FEE ☐

6. State Oil & Gas Lease No.

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name
State LPG Storage Well

1. Type of Well: Oil Well ☐ Gas Well X Other LPG Storage

8. Well Number 1

2. Name of Operator
Western Refining Company, LP

9. OGRID Number 248440

3. Address of Operator
PO Box 1345 Jal, New Mexico 88252

10. Pool name or Wildcat Salado

4. Well Location
Unit Letter M : 450 feet from the South line and 780 feet from the West line
Section 32 Township 23S Range 37E NMPM Lea County

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*

Pit or Below-grade Tank Application ☐ or Closure ☐

Pit type_____ Depth to Groundwater_____ Distance from nearest fresh water well_____ Distance from nearest surface water_____

Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	☐	PLUG AND ABANDON	☐	REMEDIAL WORK	X	ALTERING CASING	☐
TEMPORARILY ABANDON	☐	CHANGE PLANS	☐	COMMENCE DRILLING OPNS.	☐	P AND A	☐
PULL OR ALTER CASING	☐	MULTIPLE COMPL	☐	CASING/CEMENT JOB	☐		
OTHER:	☐			OTHER:			☐

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

The following activities were completed:

1-13-09
Perforated tubing with 80 holes from 1800 ft to 1804 ft.

1-17-09
Perforated tubing with 96 holes from 1796 ft. to 1800 ft.

Well one was put into service after perforating tubing on January 13, 2009. After operating well 1 for the next several days, it was determined that well 1 was not taking enough brine water.

We moved up hole another 4 feet and perforated the tubing between 1796 and 1800 feet. The well was put into service and is currently working within its normal parameters.

Well Diameter

Sonar to 1750 FT. = 29,049.5 Barrels per cubic ft.

Overfill Cavern (Controlled) 6-26-01= 1796 FT. 201,013 barrel per cubic ft.

201,013-29,049.5= 171,963.5 barrels in 46 feet of height.

171,963.5/46 ft= 3,738.34 barrels per cubic ft.

3,738.34 * 5.615= 20,990.779 cubic feet per foot.

Diameter Calculation

Volume/.785=radius

20,990.7791/.785= sqrt. (26,739.846)=163.523 ft.

Diameter= **81.76 ft.**

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE_____ TITLE Manager DATE 1-27-09

Type or print name Ken Parker E-mail address: ken.parker@wnr.com Telephone No. 575-395-2632

For State Use Only

APPROVED BY:_____ TITLE_____ DATE_____

Conditions of Approval (if any):