



9375 Chillicothe Road
Kirtland, OH 44094-8501

T (440) 256-6500

www.sme-usa.com

January 12, 2017

David Lastovka, P.E.
ODOT District 12 Transportation Engineer
Ohio Department of Transportation
5500 Transportation Boulevard
Garfield Heights, Ohio 44125-5396

E-mail to: Dave.Lastovka@dot.state.oh.us

Re: December 19, 20, and 21, 2016 Bi-Weekly Readings
CUY-90-15.24 Slope Monitoring
PID 96504
SME Project No. 069032.00

Dear Mr. Lastovka:

Bi-weekly instrument readings for the I-90 west slope taken on December 19, 20, and 21, 2016, are presented in this report. Bi-weekly readings currently include instruments at I/P-001-13, I/P-002-13, I/P-003-10, P-003-13, I/P-004-13, I/P-009-13, B-101, B-102, B-105A, B-05-02, B-05-A-03, B-05-04, B-05-A-11, P-1, P-9N, and TGR I-4. Changes reported for the individual instruments are for the previous two-week period unless noted otherwise.

Piezometer Readings

Pore pressure readings at P-001-13, P-002-13, P-003-10, P-004-13, P-009-13, B-105A, and B-05-04 fluctuated by less than 1 foot and show virtually no net change in total head for the period.

P-002-13 – The multichannel data logger failed to record pore pressures for the piezometer at elevation 628 feet during this reading cycle. We think this is due to a connection issue within the data logger since the temperature readings for this piezometer appear to be good. We repaired the connection and will check the status again prior to the next readings. Pore pressure readings in the other piezometers at this location show virtually no change.

P-003-13 – A plot showing the pore pressure readings for this location is now included in the bi-weekly reports. The delayed start for the piezometers at elevation 460 and 628 feet is due to the data loggers being used temporarily at other locations where the original data loggers had failed and were being repaired. Readings in all piezometers show virtually no change since data recording began.

B-05-02 – Pore pressures in both piezometers at this location continued to decrease rapidly during this reading period by 3.6 feet in the shallow piezometer and by 1.8 feet in the deep piezometer. These changes are likely due to earthwork operations in the area of these instruments.

B-05-A-03 – Pore pressures in both piezometers varied by slightly more than a foot during the last few days of this two-week period. Compared to the last two-week period, pore pressures remained higher but were decreasing at the end of the period.

B-05-A-11 – The data logger for the deep piezometer stopped working about halfway through this reading cycle. Prior to that, the pore pressure readings showed a slight increase. We believe the issue with the datalogger was caused by a faulty battery, which we have now replaced. Pore pressure readings in the shallow piezometer show virtually no change.

Inclinometer Readings

Inclinometer readings at I-001-13, I-002-13, I-003-10, I-004-13, I-009-13, B-101, B-102, B-105A, B-05-A-03, B-05-04, B-05-A-11, P-1, P-9N, and TGR I-4 showed virtually no movement this period. In some cases, the plots indicated displacement at the top of the casing. This is due to disturbance of the area around the casing that occurred during construction. Protective covers have not yet been permanently concreted in place because of the ongoing construction near these instruments.

I-008-10 – The inclinometer casing at I-008-10 was recently uncovered. During excavation or grading operations, the casing was bent and ripped off just below the surface. With the top of the casing open and unprotected, grading and/or surface runoff caused the casing to fill with soil. We repaired the casing first by flushing soil from the casing with a high pressure water stream, and then splicing on a new 20-foot section of casing to extend above grade. We were unable to clear the bottom 6 feet of the casing, which is likely filled with gravel too large to flush out. In order to plot new and old readings together, we are not plotting the bottom 6 feet of the old readings and we have added artificial data points to the top 6 feet. We have included the absolute plot with this report, which shows alignment of the old and new readings below 58 feet. The cumulative plot of the old readings shows about 0.1 inches of displacement in the positive A-axis and positive B-axis direction near 58 feet, which occurred between April and July 2014. The cumulative plot of all readings at this location shows additional displacement at this depth of about 1.5 inches in the A-axis direction and about 1 inch in the B-axis direction, which occurred between July 2014 and December 2016.

B-05-02 – The soil near this instrument was recently cut to final grade. Close excavation of the soil immediately surrounding the instrument has yet to be completed. We cut off the top 4 feet of the inclinometer casing, so that the top is at a reachable height for readings. Additional casing may need to be removed once all surrounding soil is cut to final grade. Currently the top 8 feet of the plot are artificial so the new data can be plotted with historical data. Readings show slight movement in the positive A-axis direction from the surface to about 10 feet (20 feet on the plot) probably due to the cuts made around the instrument.

B-05-A-03 – Two plots are included for this location. The second shows only the last three readings.

This concludes our report of bi-weekly instrument readings. Please call or email with any questions.

Very truly yours,

SME

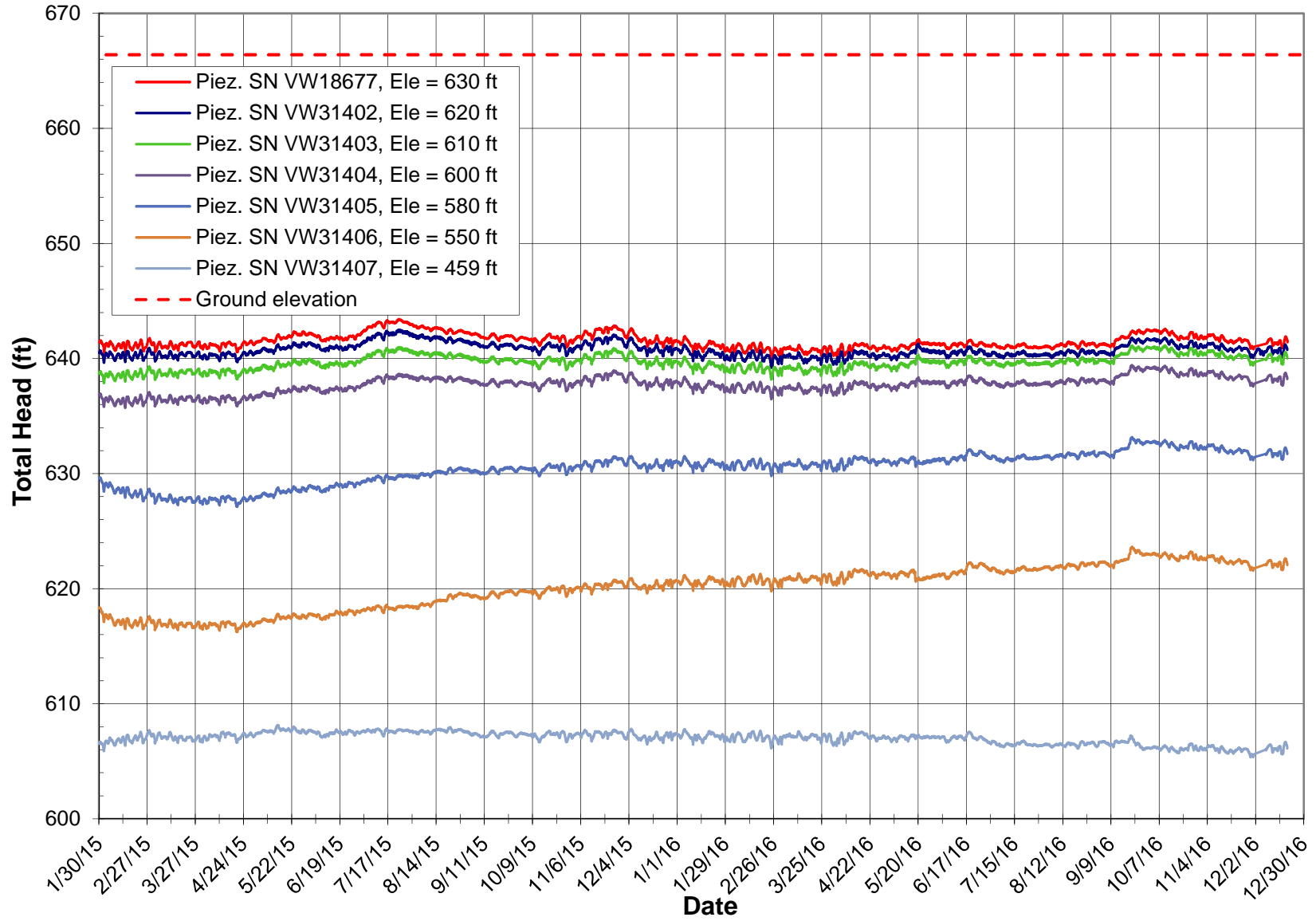
Brendan P. Lieske, P.E.
Senior Staff Engineer

Alan J. Esser, P.E., D.GE
Chief Consultant

Copies sent to distribution list.

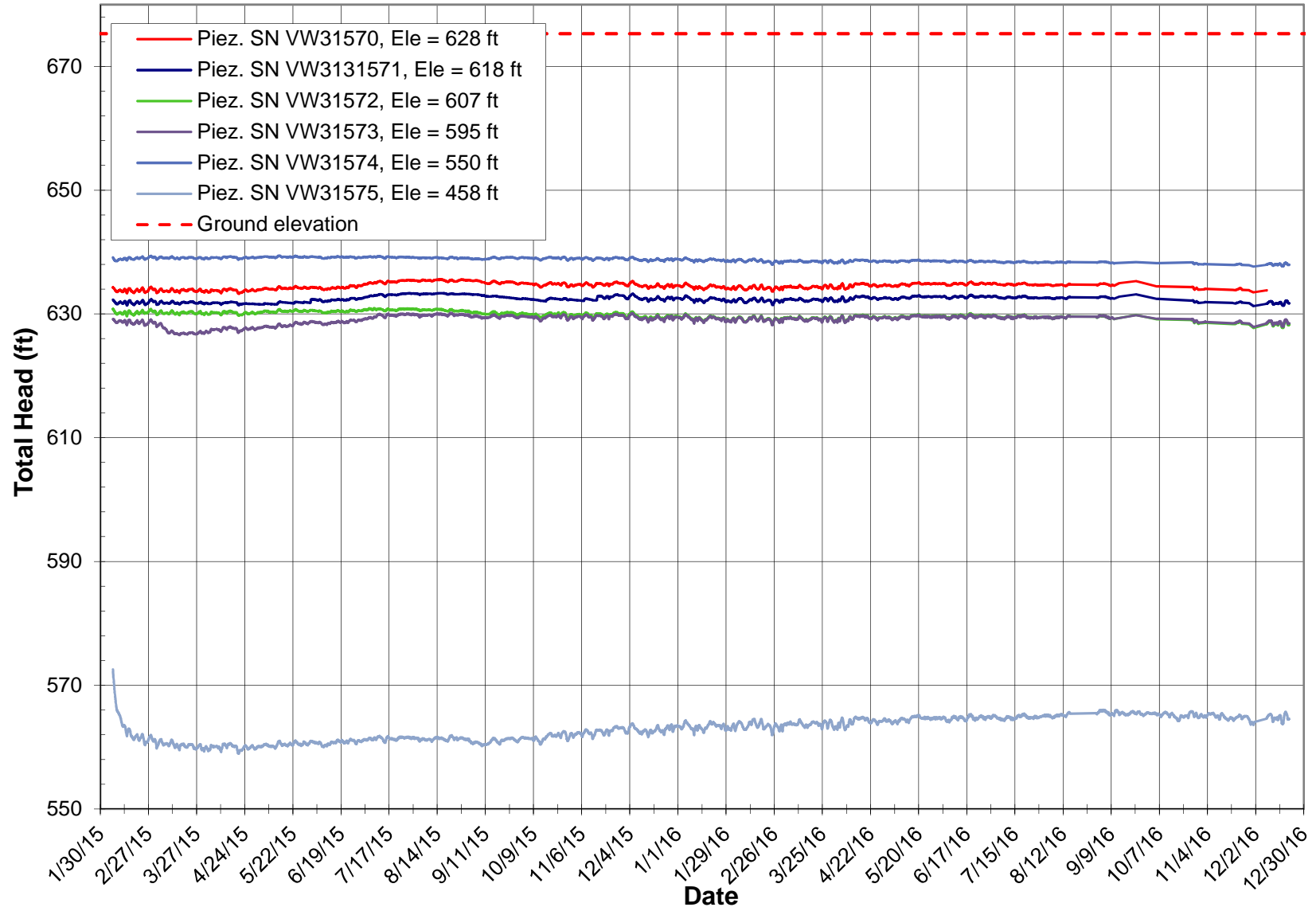
P-001-13 VW Piezometer Readings

Ground surface elevation = 666.4 ft



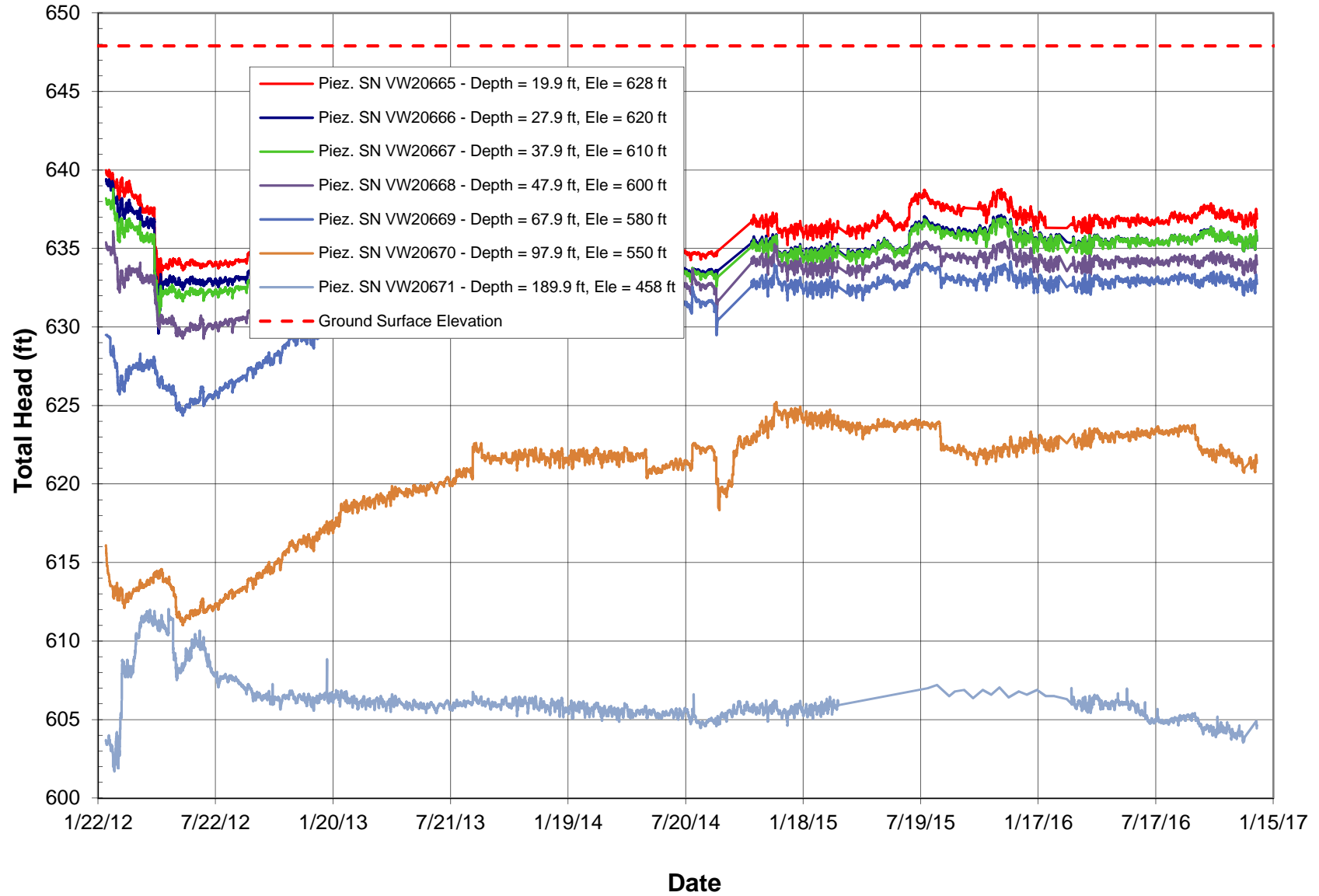
P-002-13 VW Piezometer Readings

Ground surface elevation = 675.29 ft



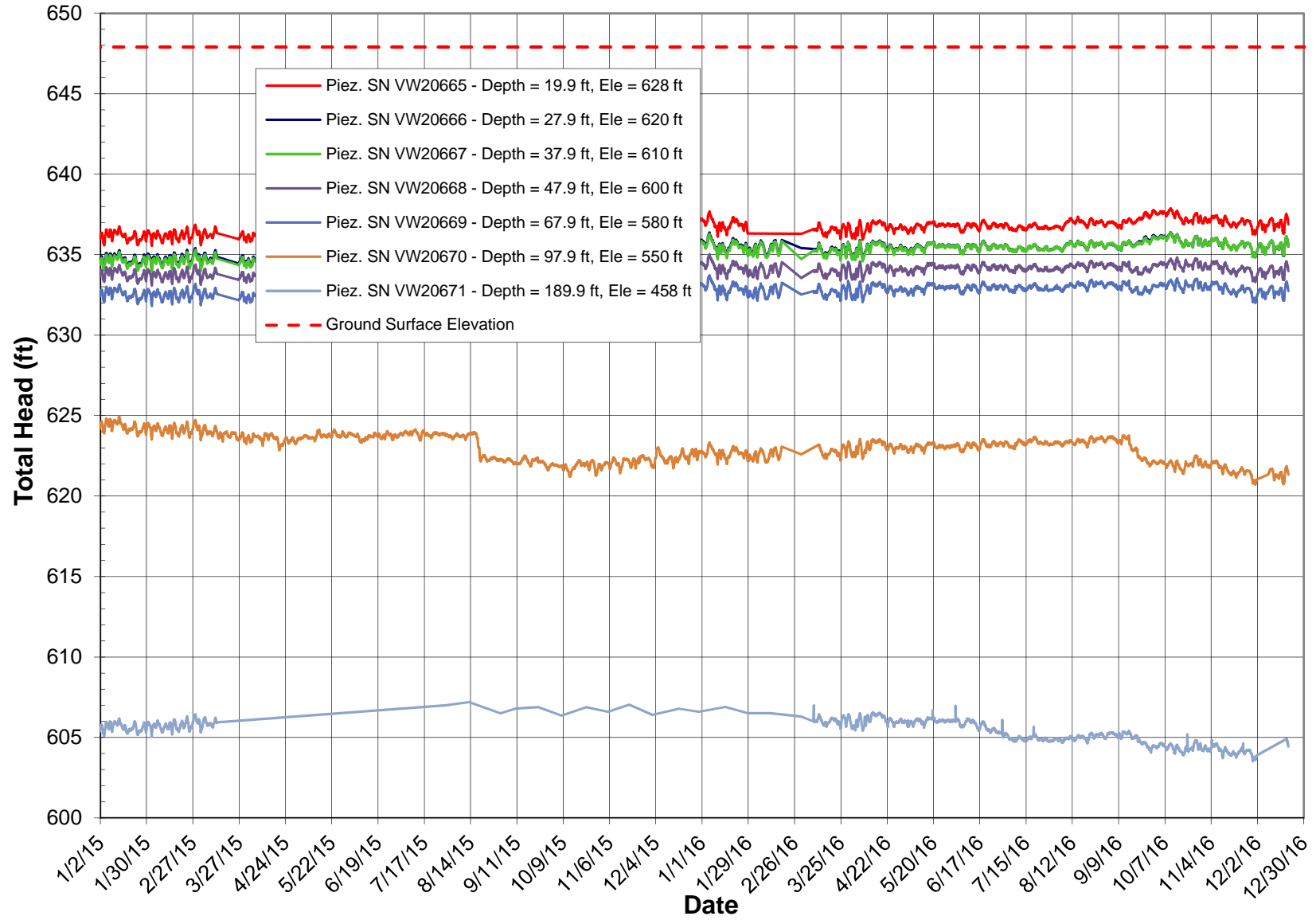
P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



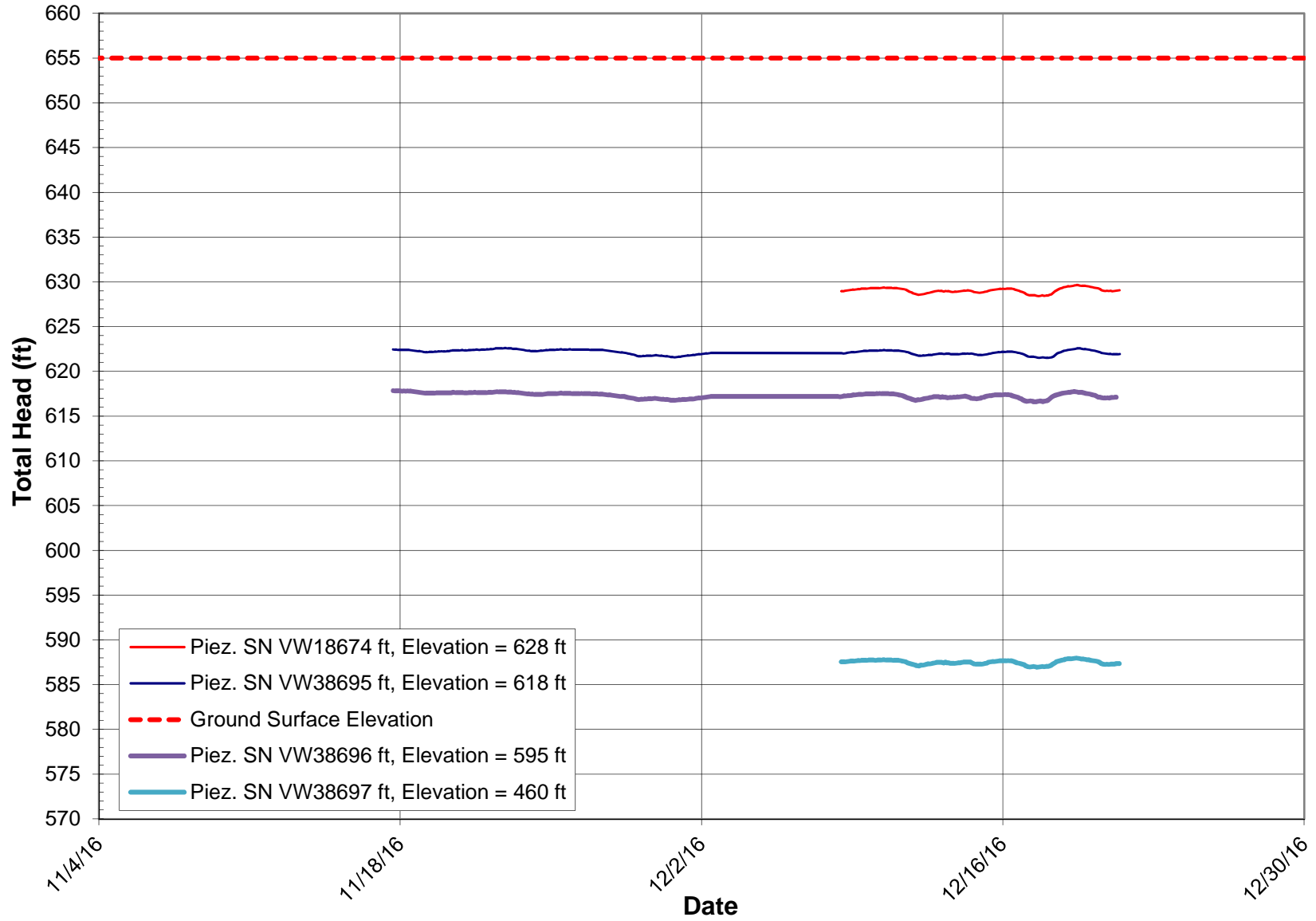
P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



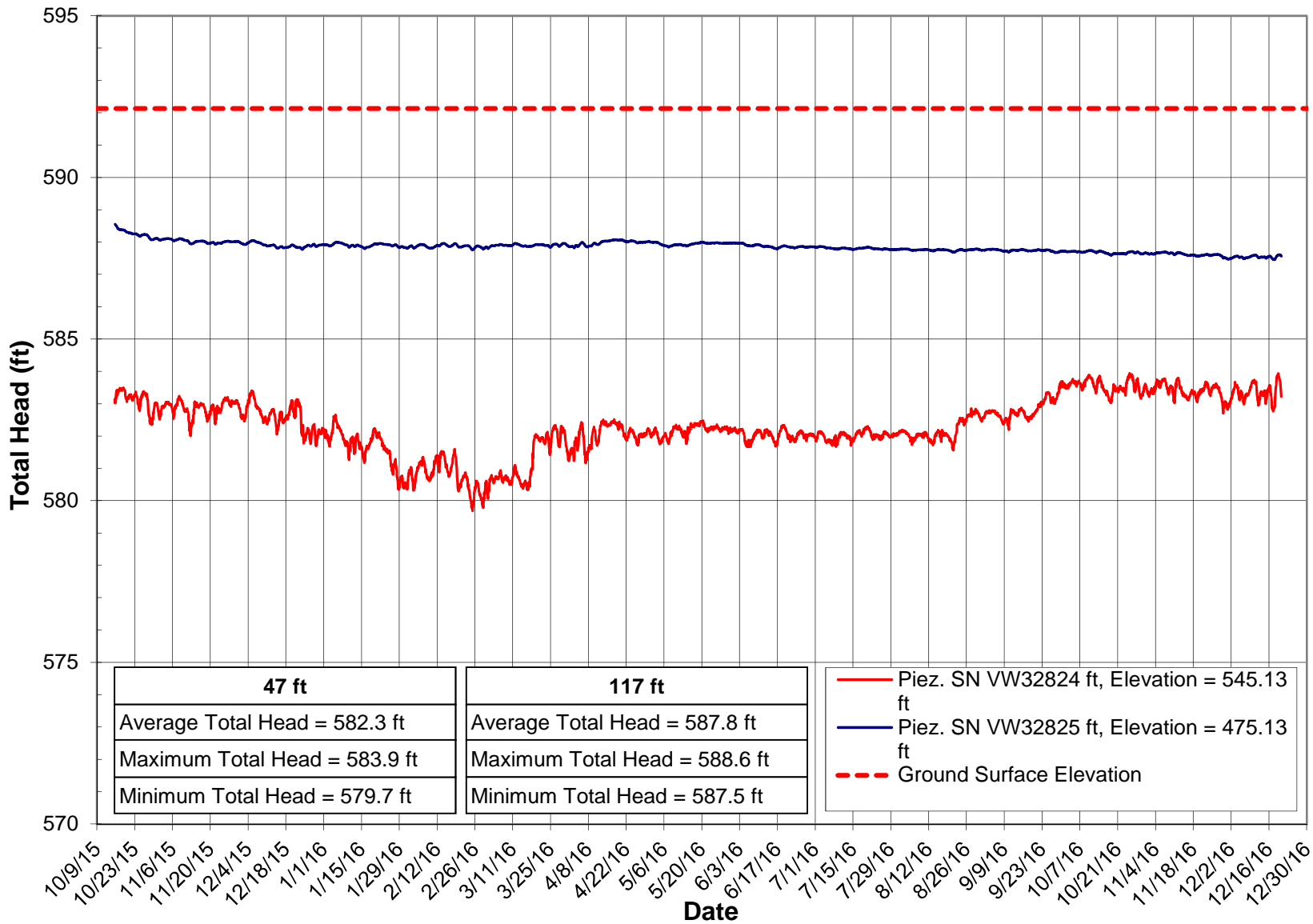
P-003-13 VW Piezometer Readings

Ground surface elevation = 655 ft



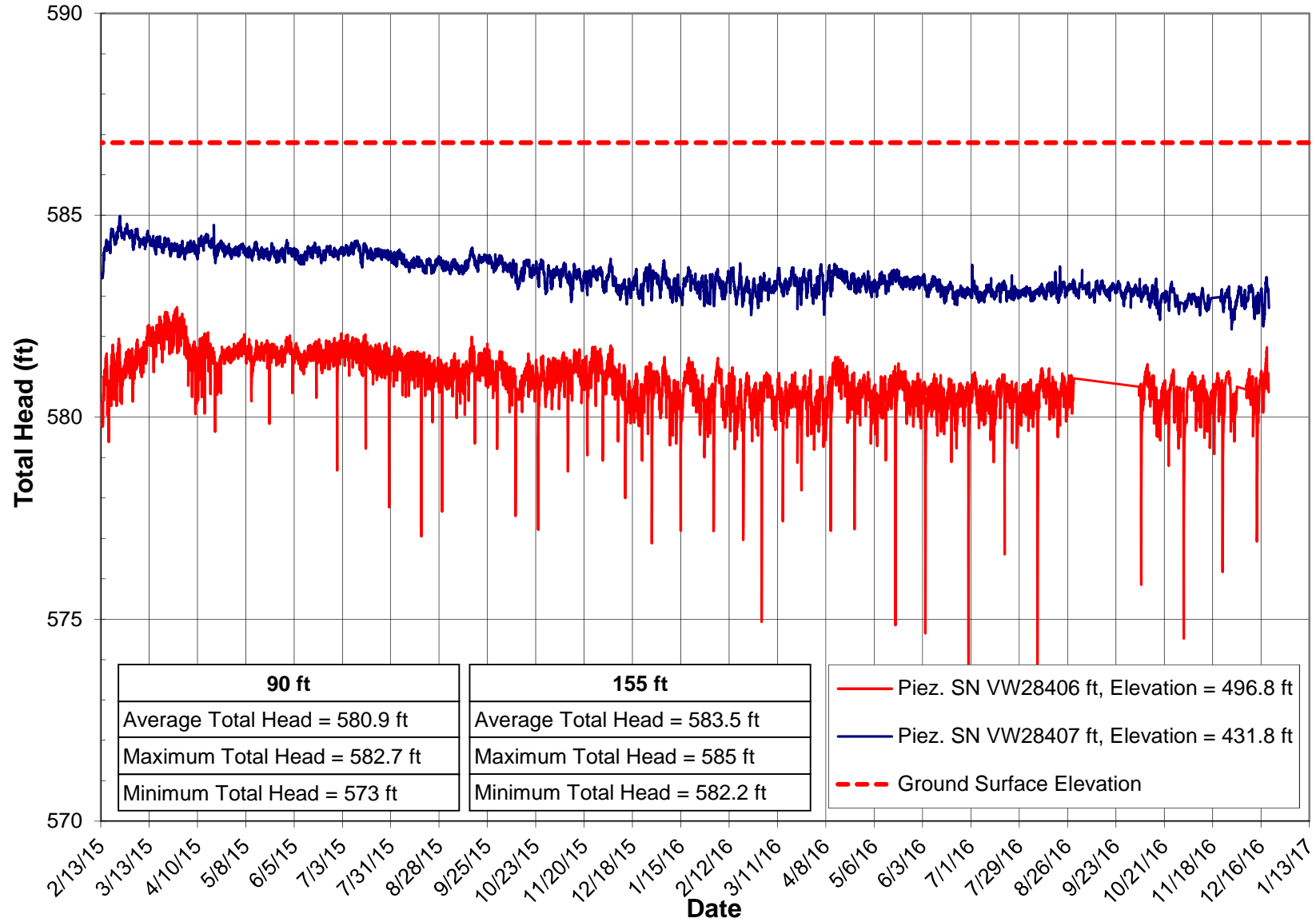
P-004-13 VW Piezometer Readings

Ground surface elevation = 592.13 ft



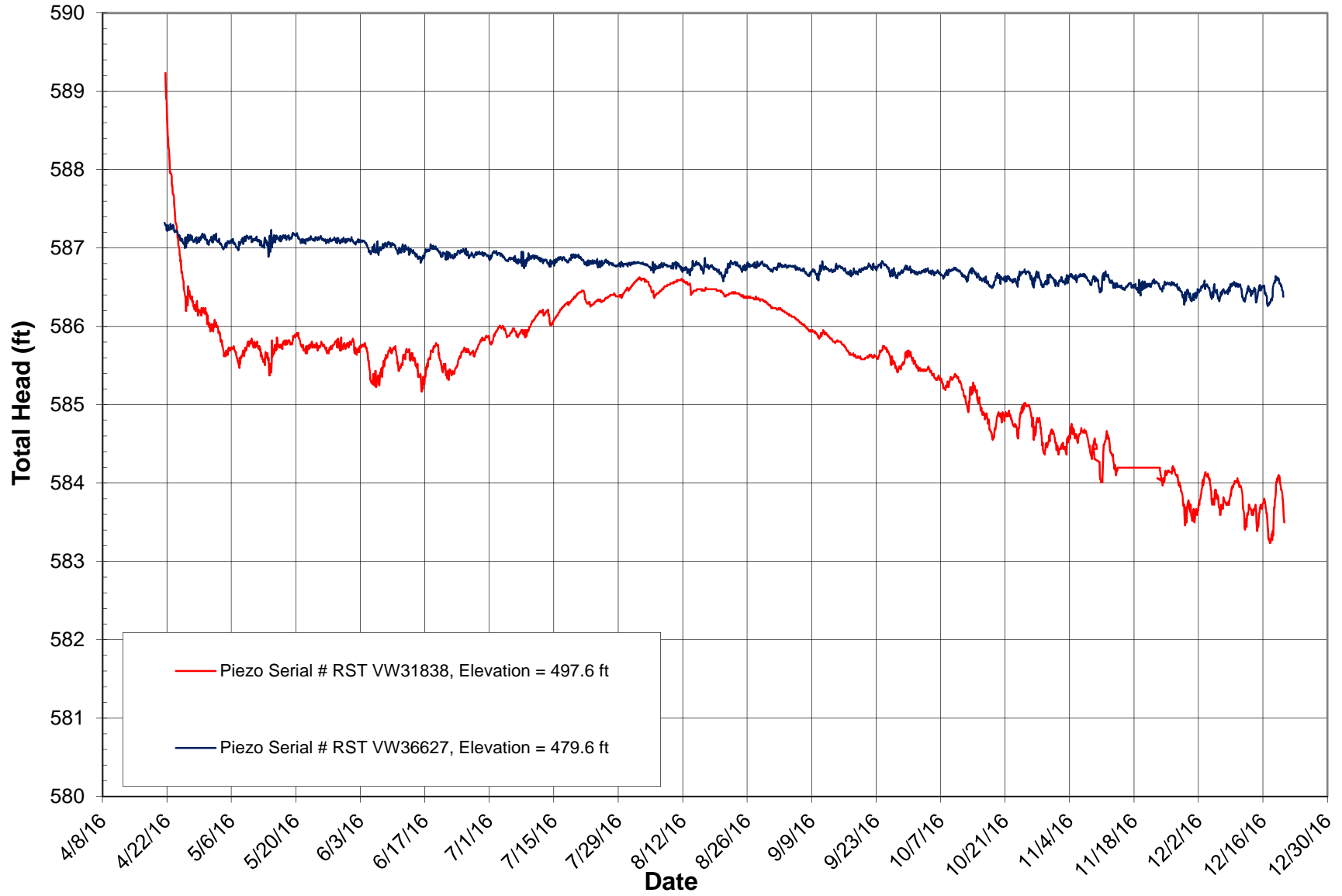
P-009-13 VW Piezometer Readings

Ground surface elevation = 586.6 ft



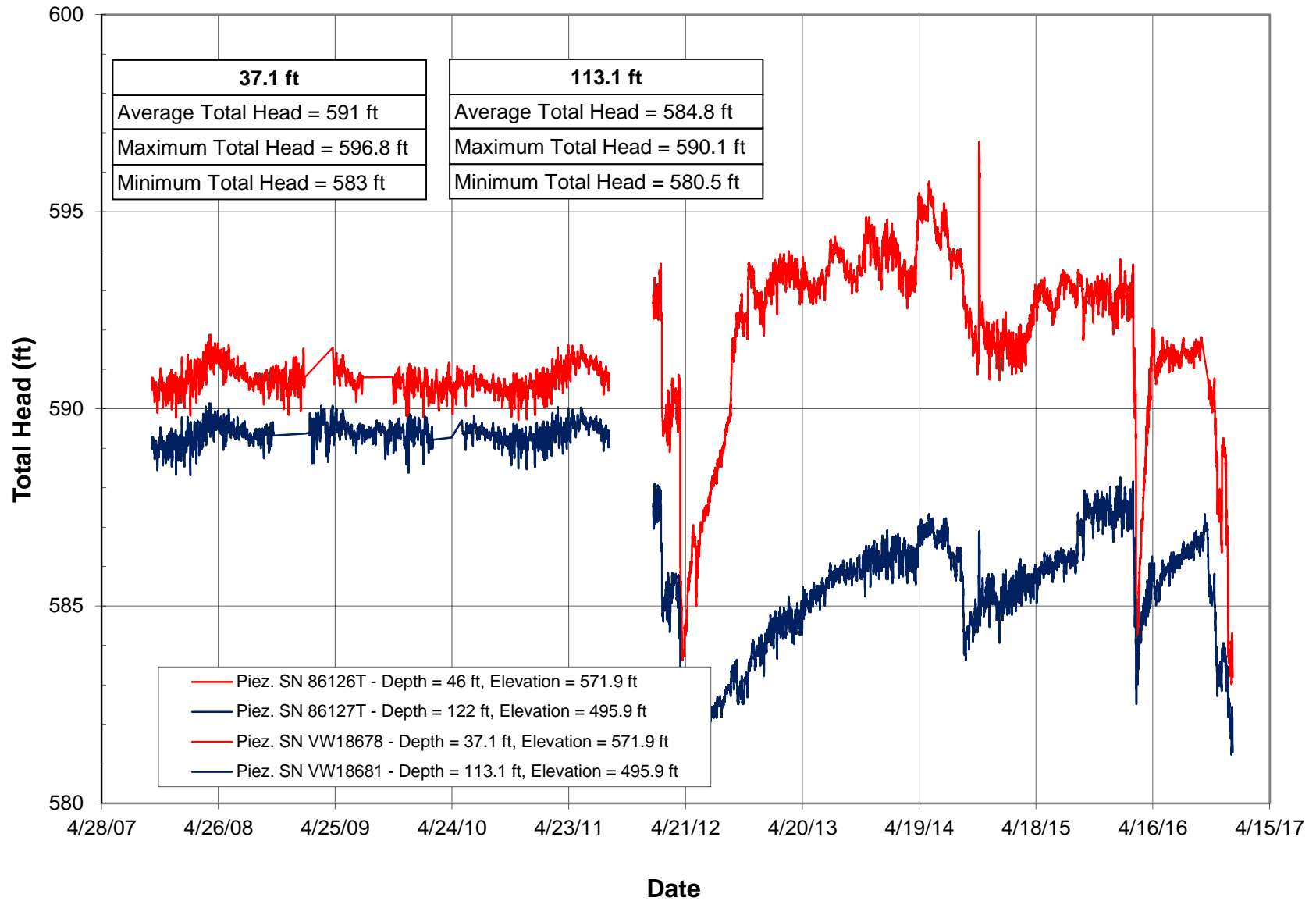
B-105A VW Piezometer Readings

Ground surface elevation = 585.6 ft



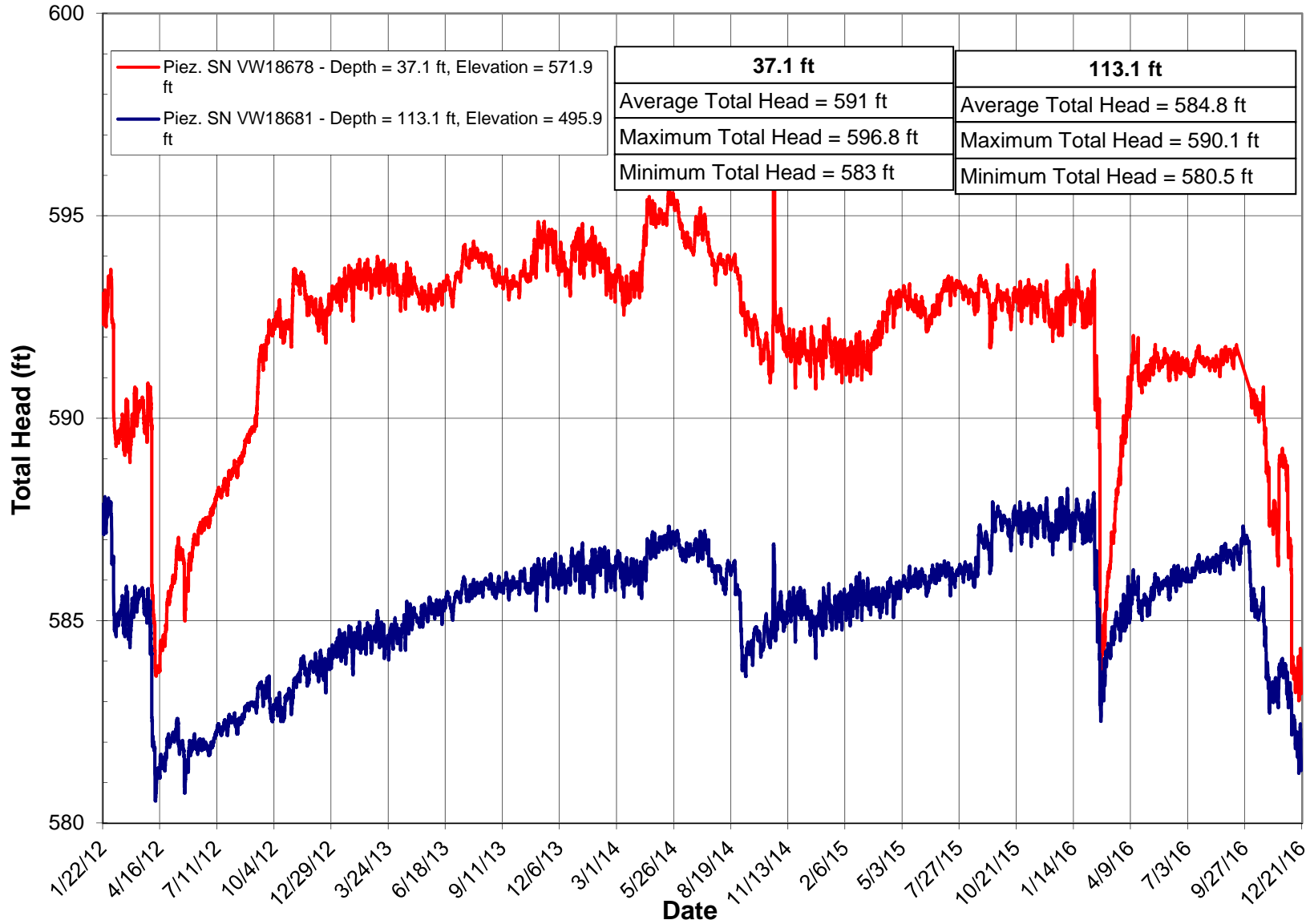
B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



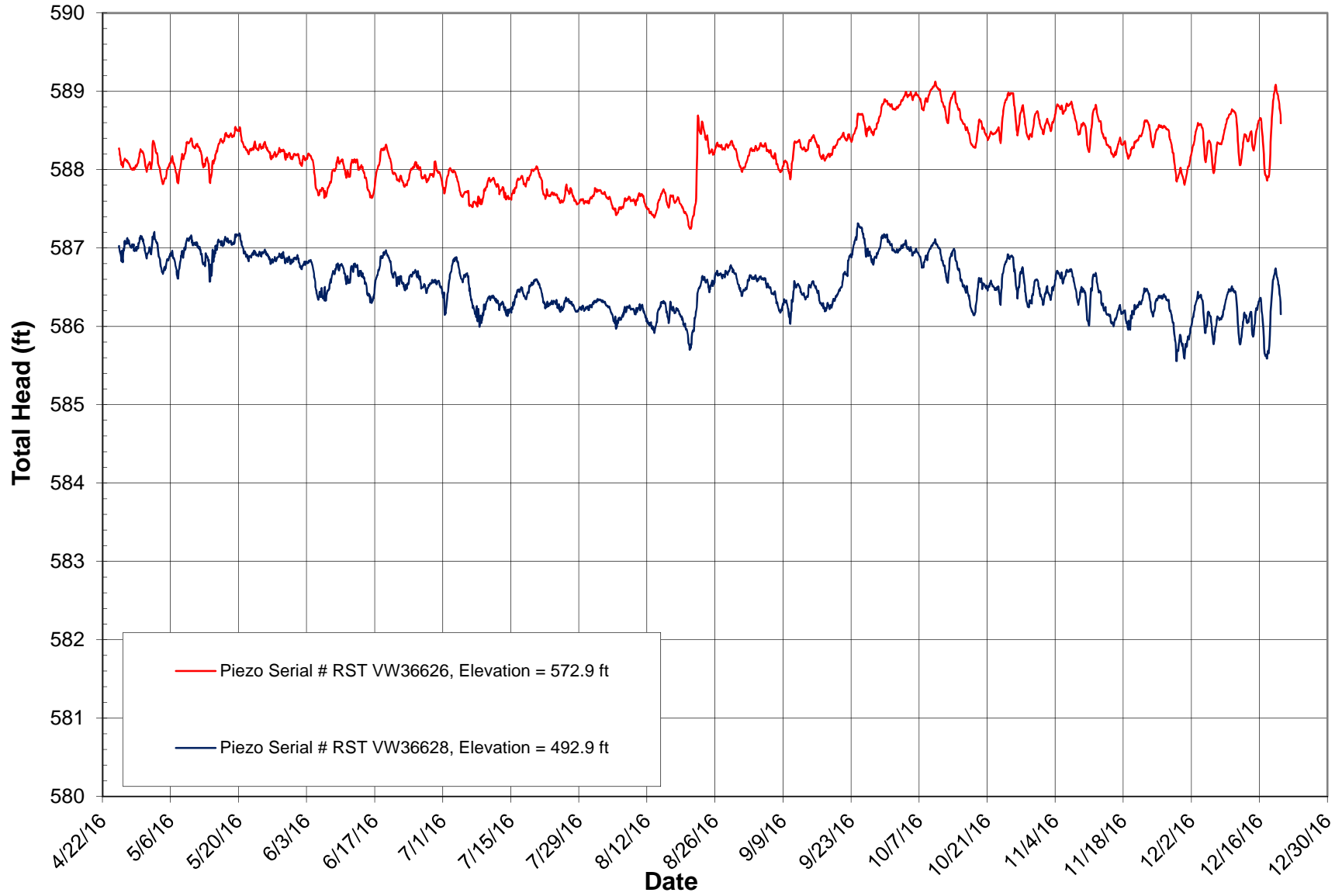
B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



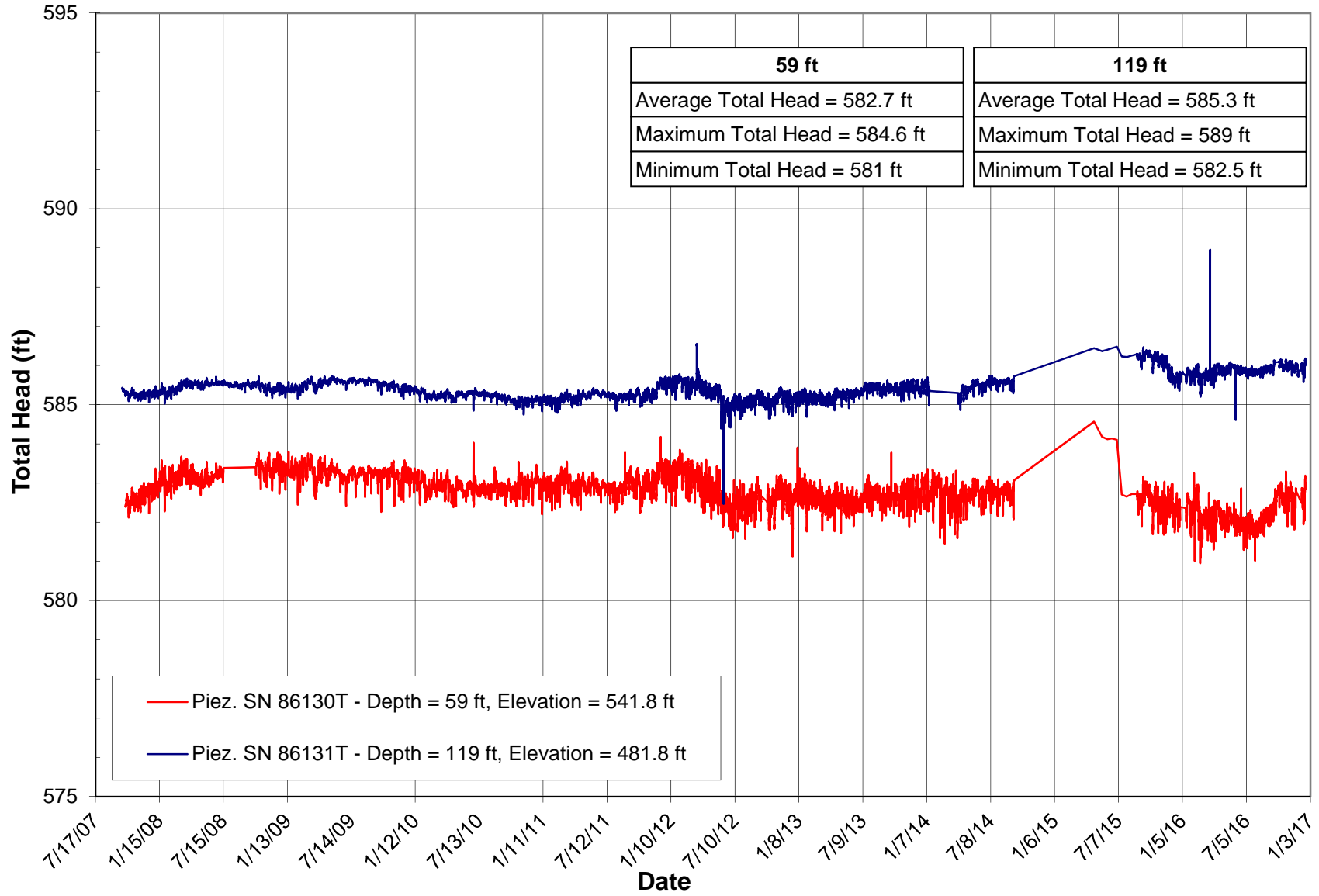
B-05-A-03 VW Piezometer Readings

Ground surface elevation = 599.9 ft



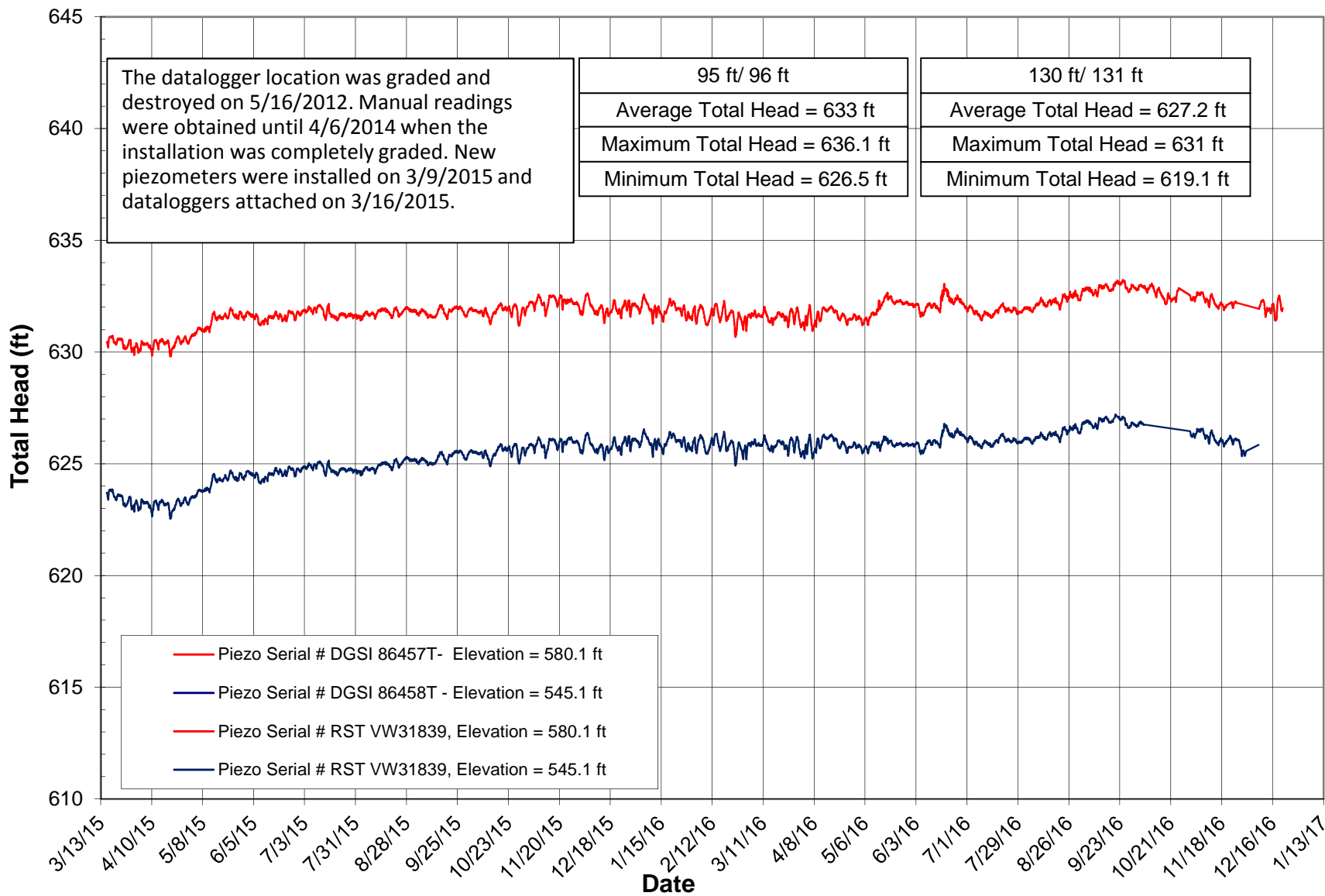
B-05-04 VW Piezometer Readings

Ground surface elevation = 600.8 ft



B-05-11/B-05-A-11 VW Piezometer Readings

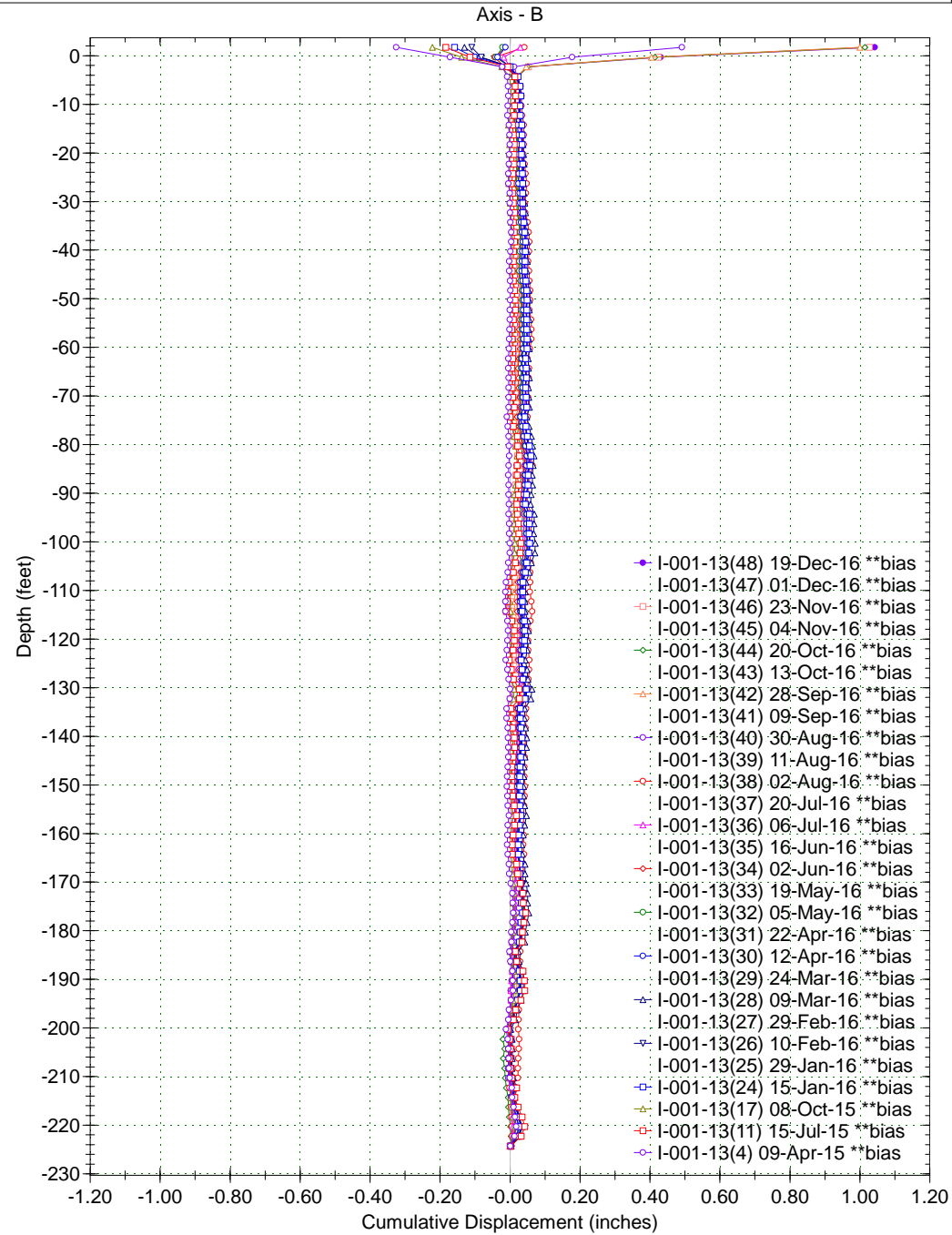
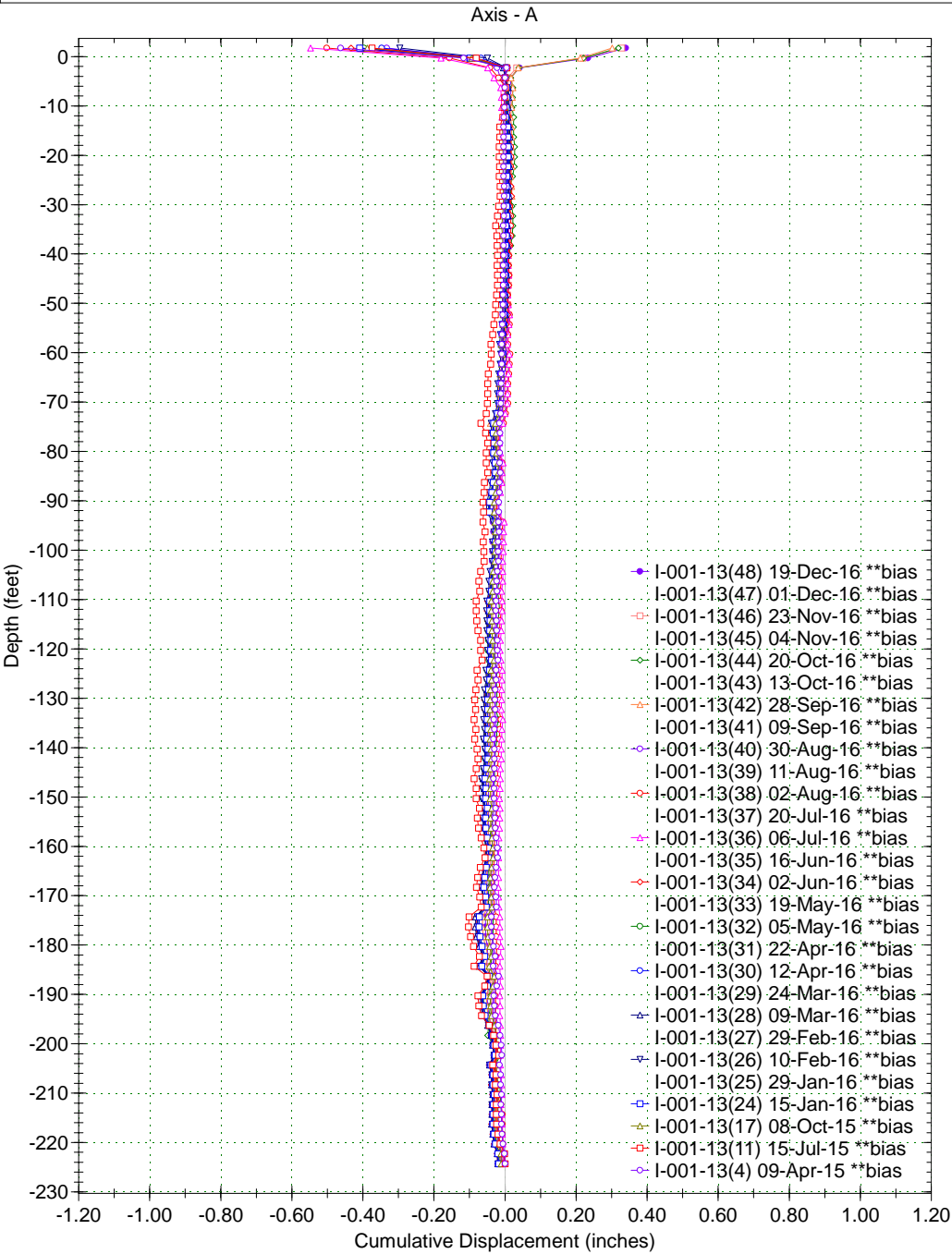
Ground surface elevation = 675.1 ft (B-05-11) / 676.1 ft (B-05-A-11)



Borehole : I-001-13
 Project : CUY-90-15-24
 Location : Cleveland, Ohio
 Northing :
 Easting :
 Collar :



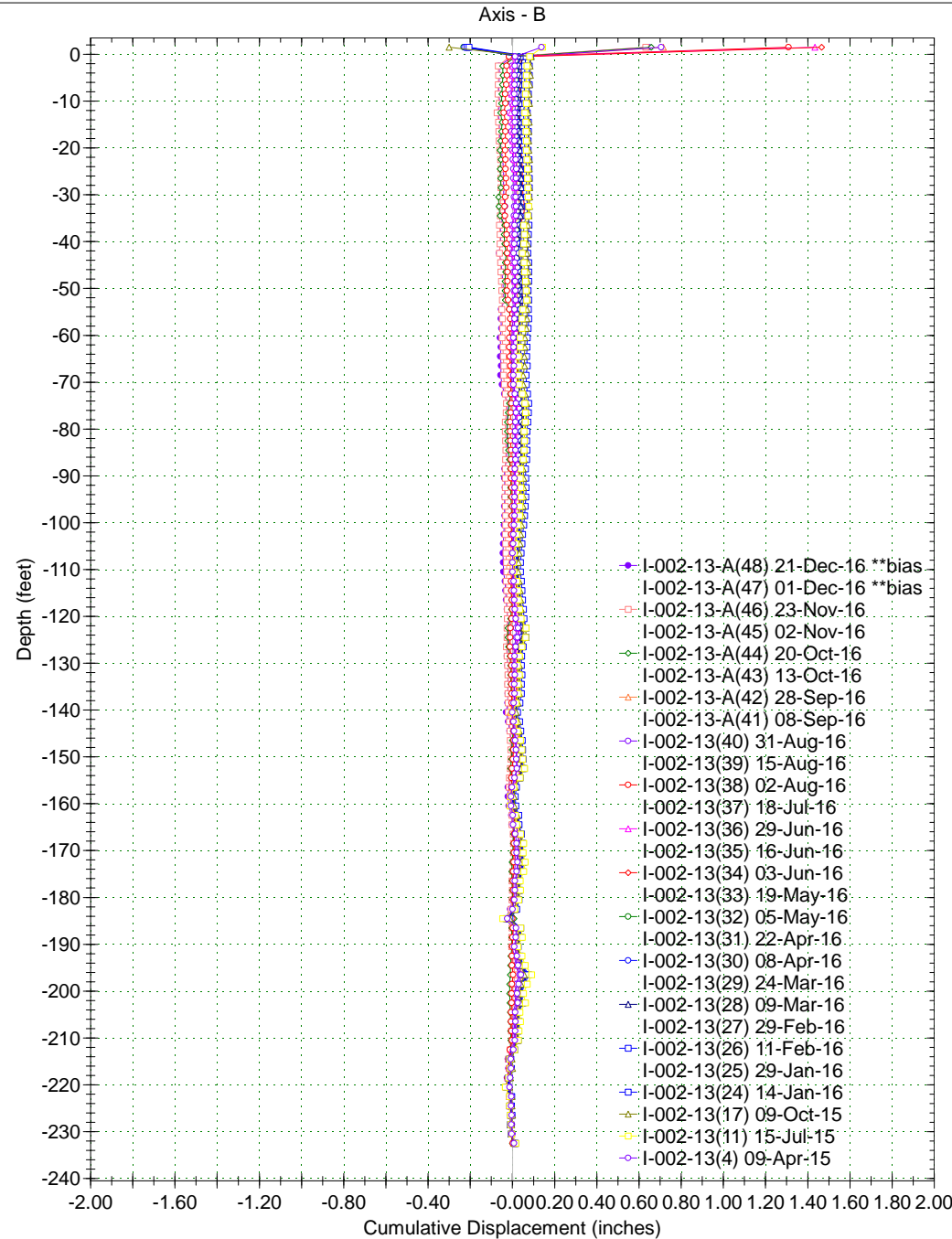
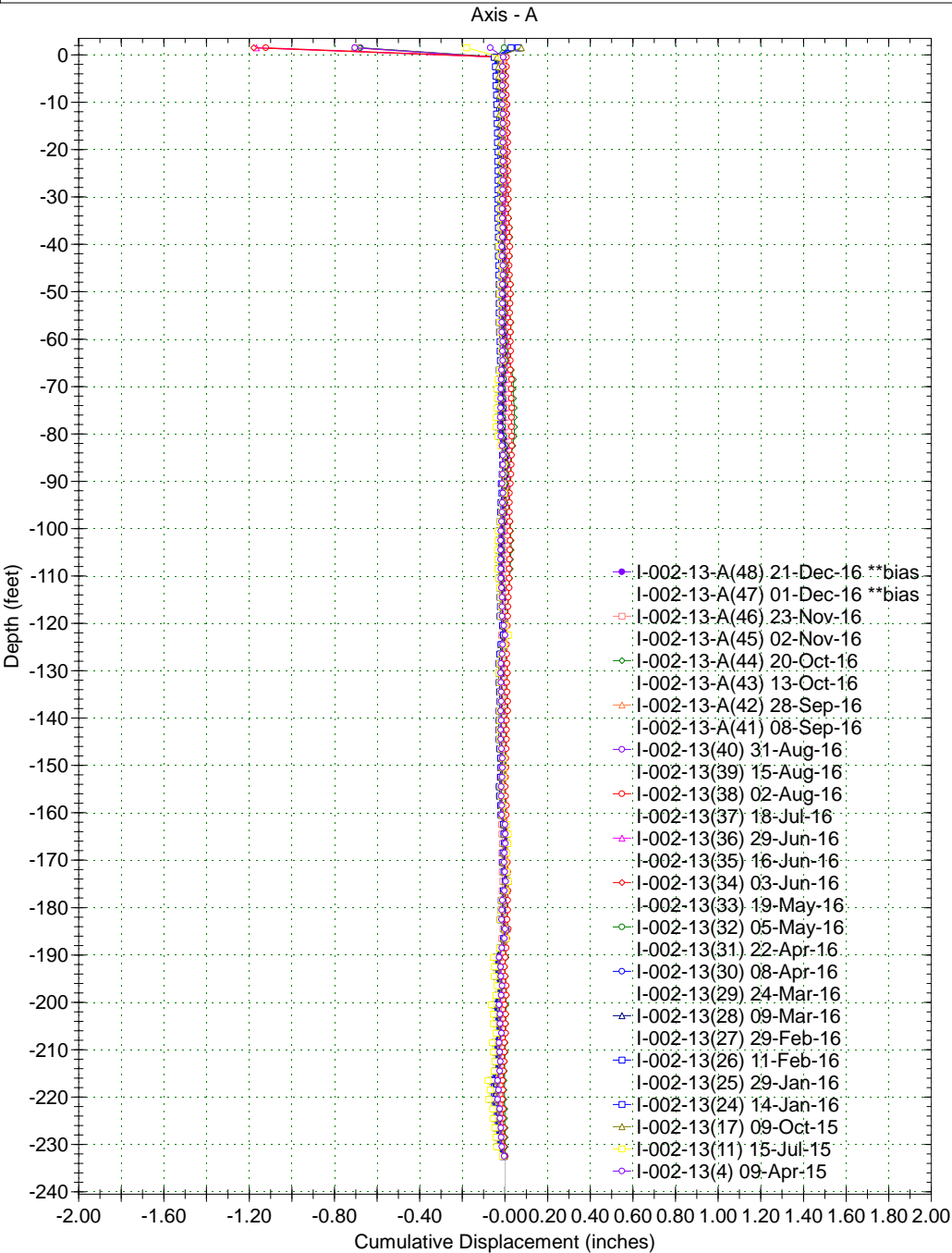
Spiral Correction : N/A
 Collar Elevation : 3.7 feet
 Borehole Total Depth : 228.0 feet
 A+ Groove Azimuth :
 Base Reading : 2015 Mar 03 11:14
 Applied Azimuth : 0.0 degrees



Borehole : I-002-13
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :



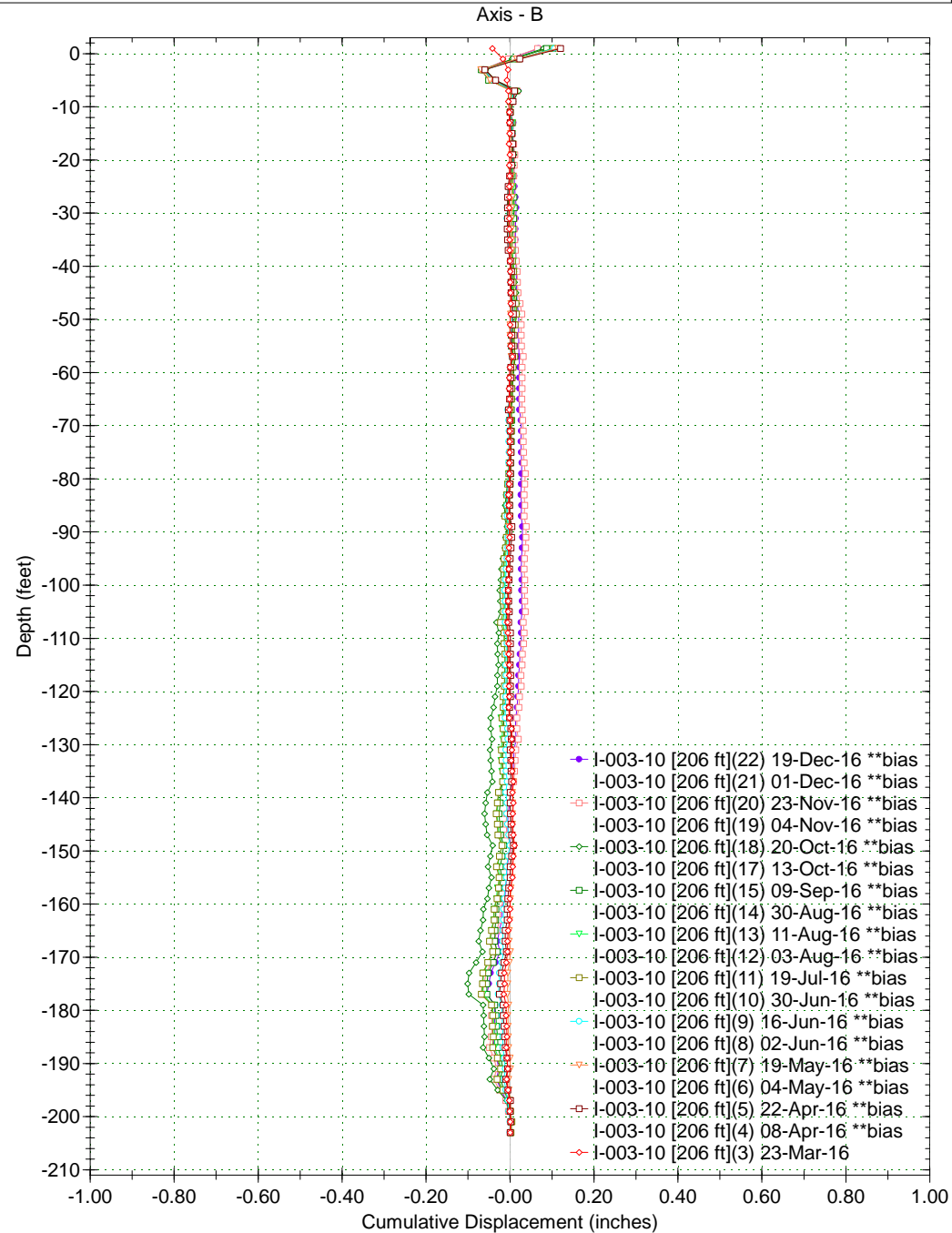
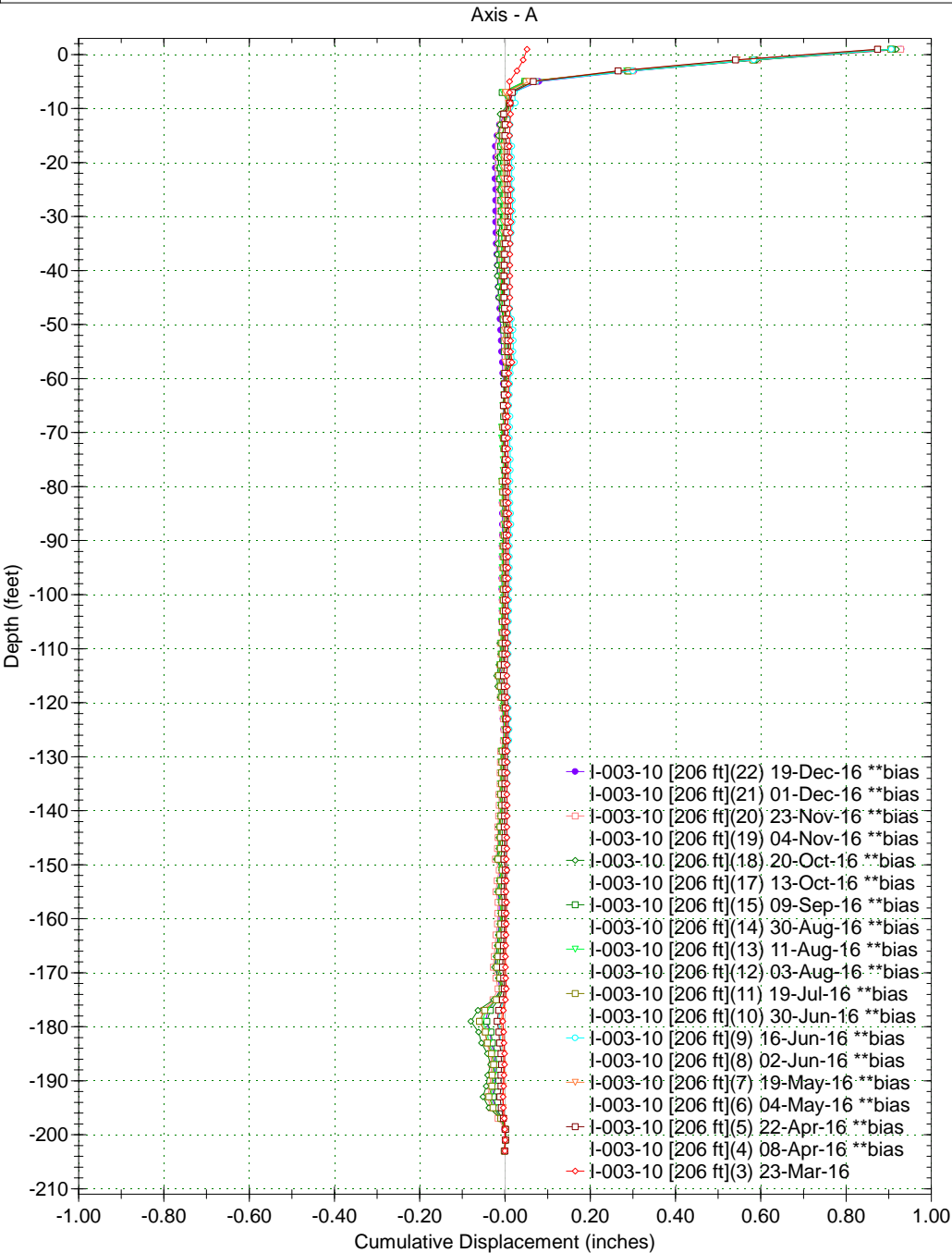
Spiral Correction : N/A
Collar Elevation : 3.5 feet
Borehole Total Depth : 236.0 feet
A+ Groove Azimuth :
Base Reading : 2015 Mar 03 10:04
Applied Azimuth : 0.0 degrees



Borehole : I-003-10 [206 ft]
Project : CUY-90-15-24
Location :
Northing :
Easting :
Collar :



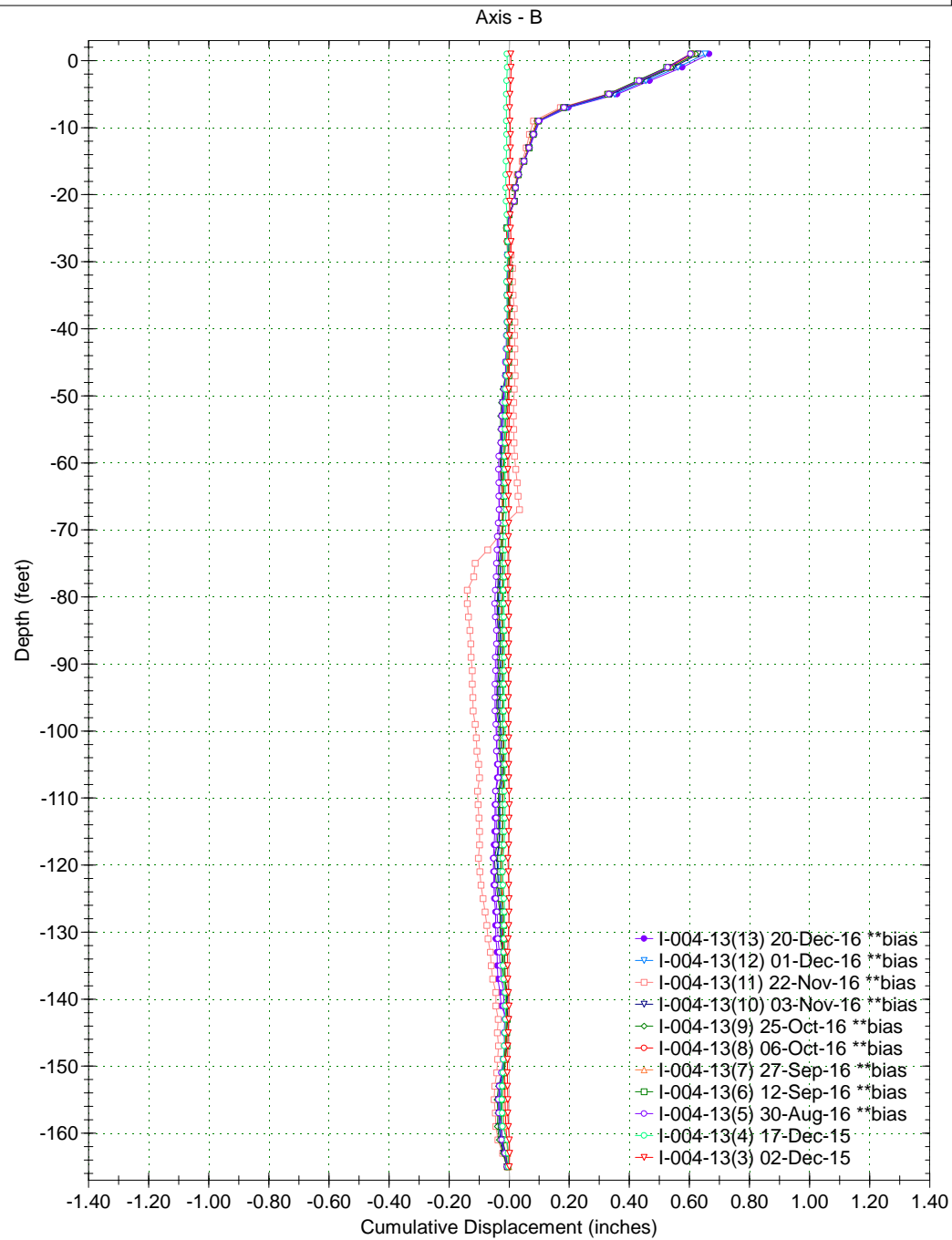
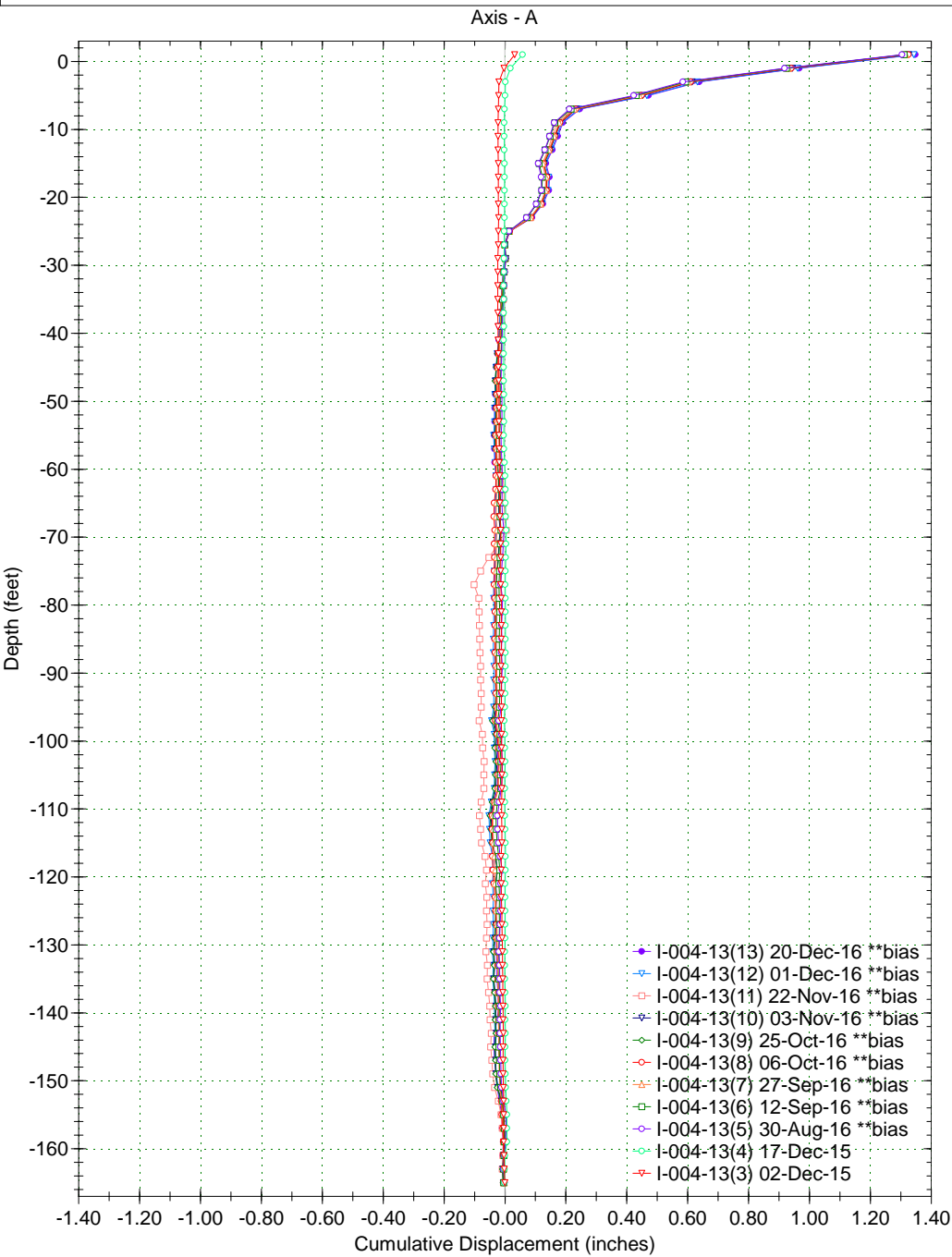
Spiral Correction : N/A
Collar Elevation : 3.0 feet
Borehole Total Depth : 206.0 feet
A+ Groove Azimuth :
Base Reading : 2016 Mar 08 15:42
Applied Azimuth : 0.0 degrees



Borehole : I-004-13
Project : CUY-90-15-24
Location :
Northing :
Easting :
Collar :



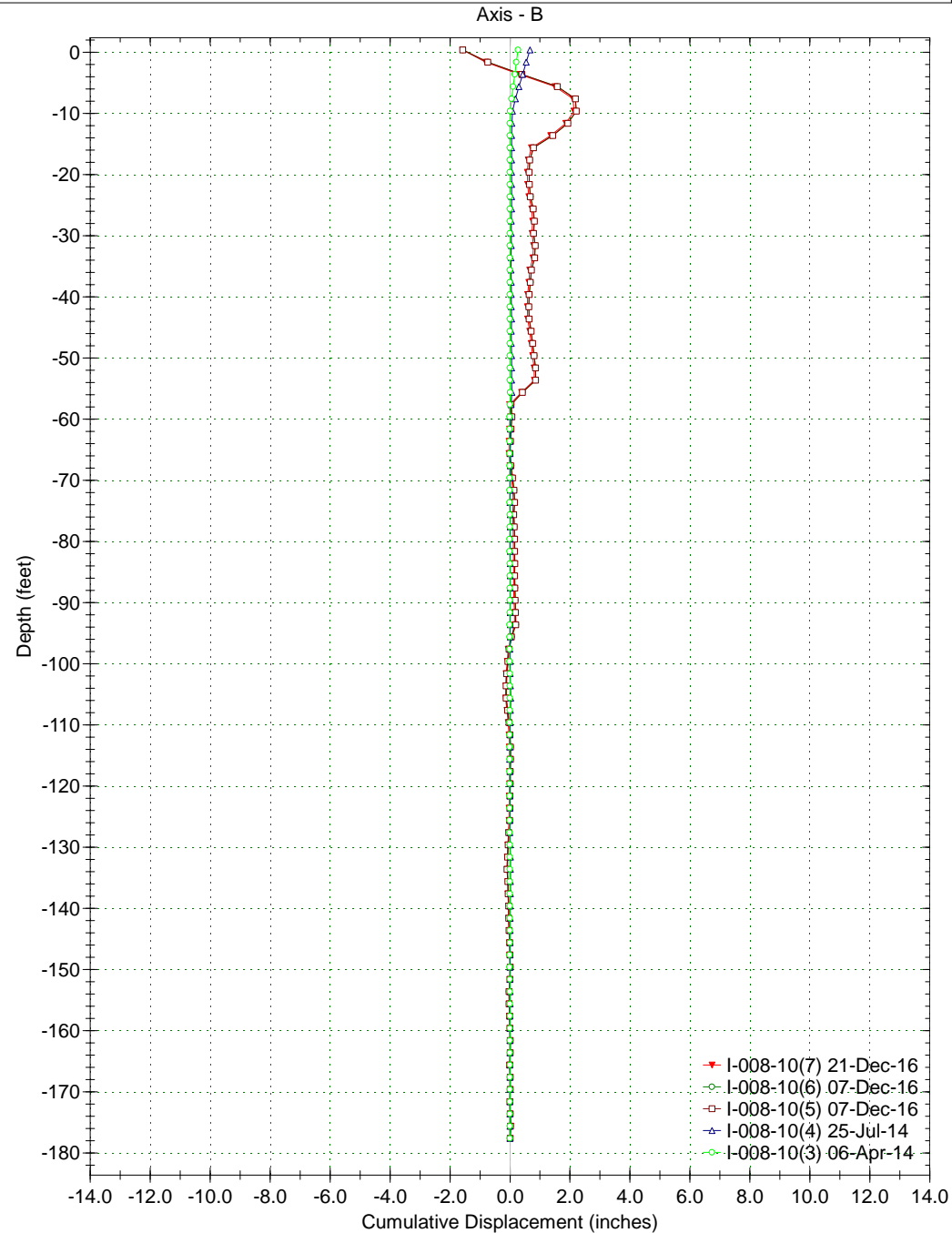
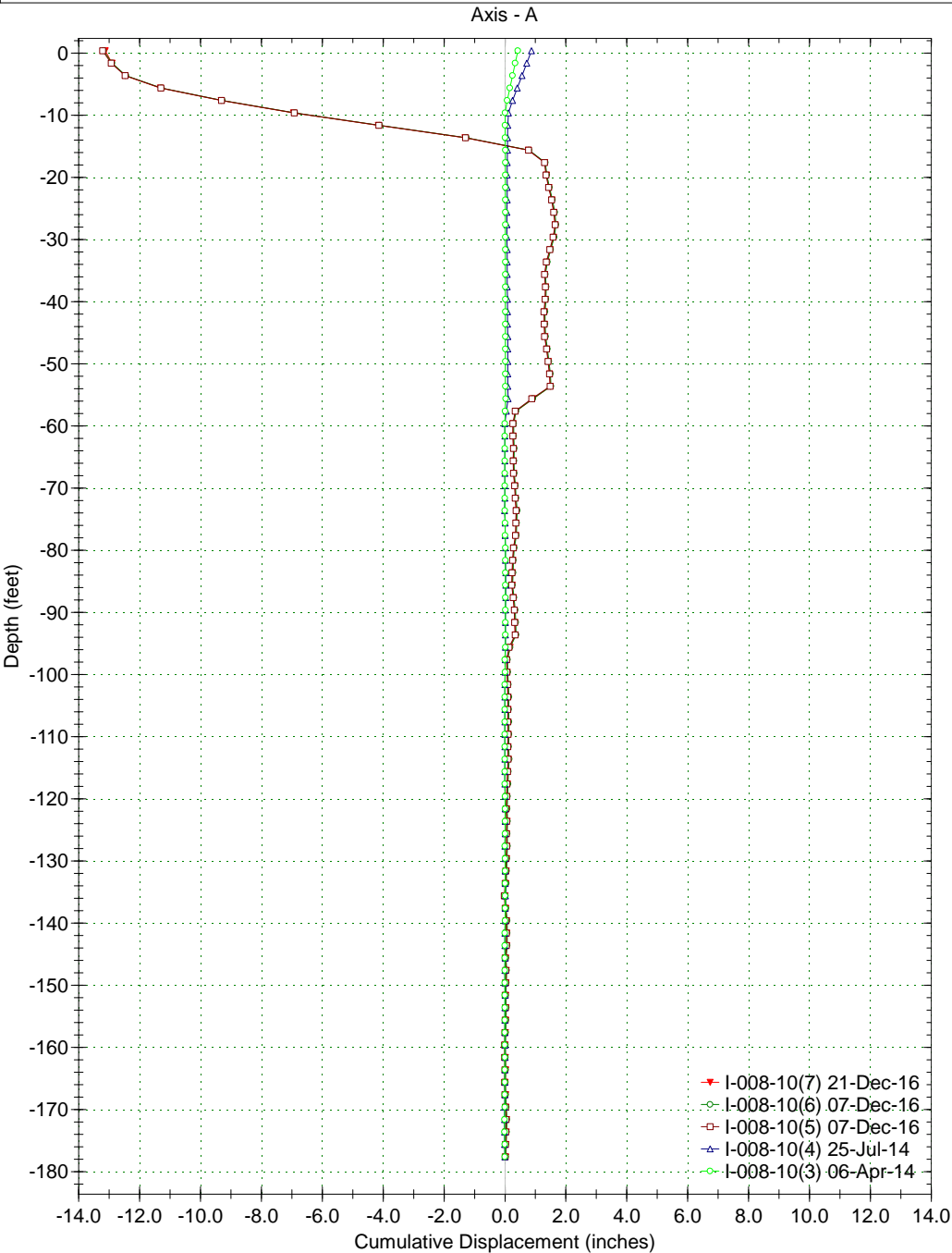
Spiral Correction : N/A
Collar Elevation : 3.0 feet
Borehole Total Depth : 168.0 feet
A+ Groove Azimuth :
Base Reading : 2015 Nov 20 09:09
Applied Azimuth : 0.0 degrees



Borehole : I-008-10
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :



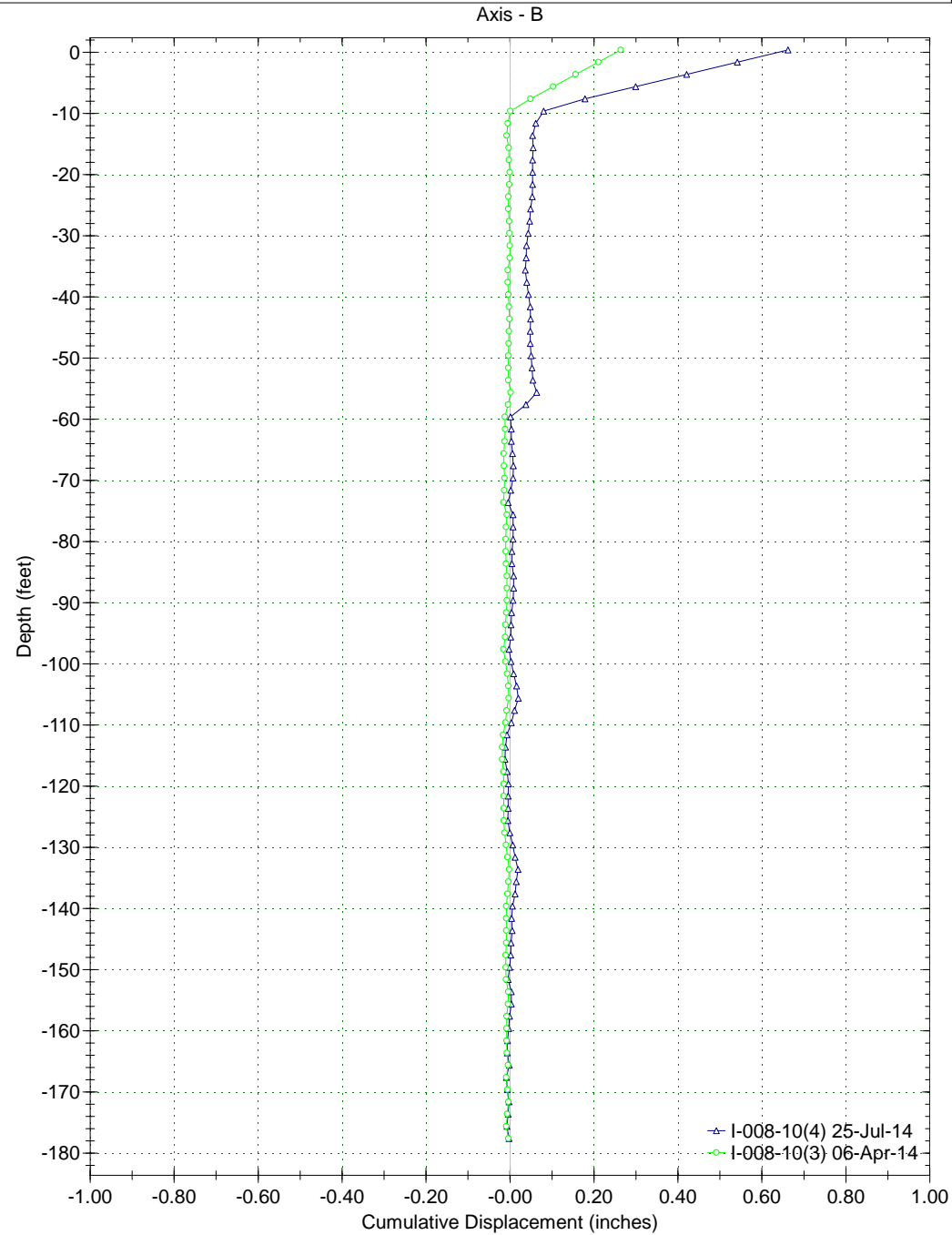
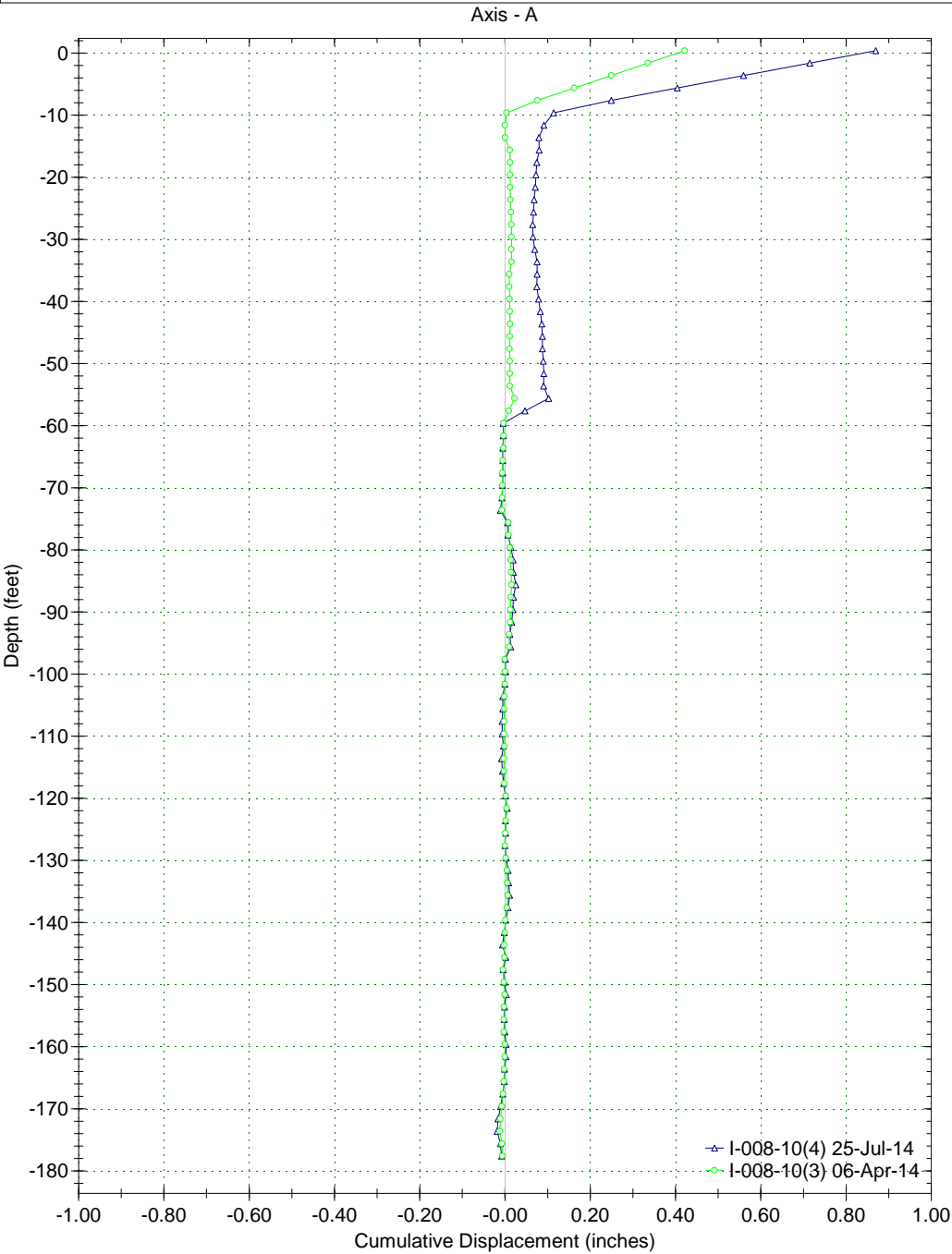
Spiral Correction : N/A
Collar Elevation : 2.4 feet
Borehole Total Depth : 180.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 14 07:26
Applied Azimuth : 0.0 degrees



Borehole : I-008-10
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :



Spiral Correction : N/A
Collar Elevation : 2.4 feet
Borehole Total Depth : 180.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 14 07:26
Applied Azimuth : 0.0 degrees

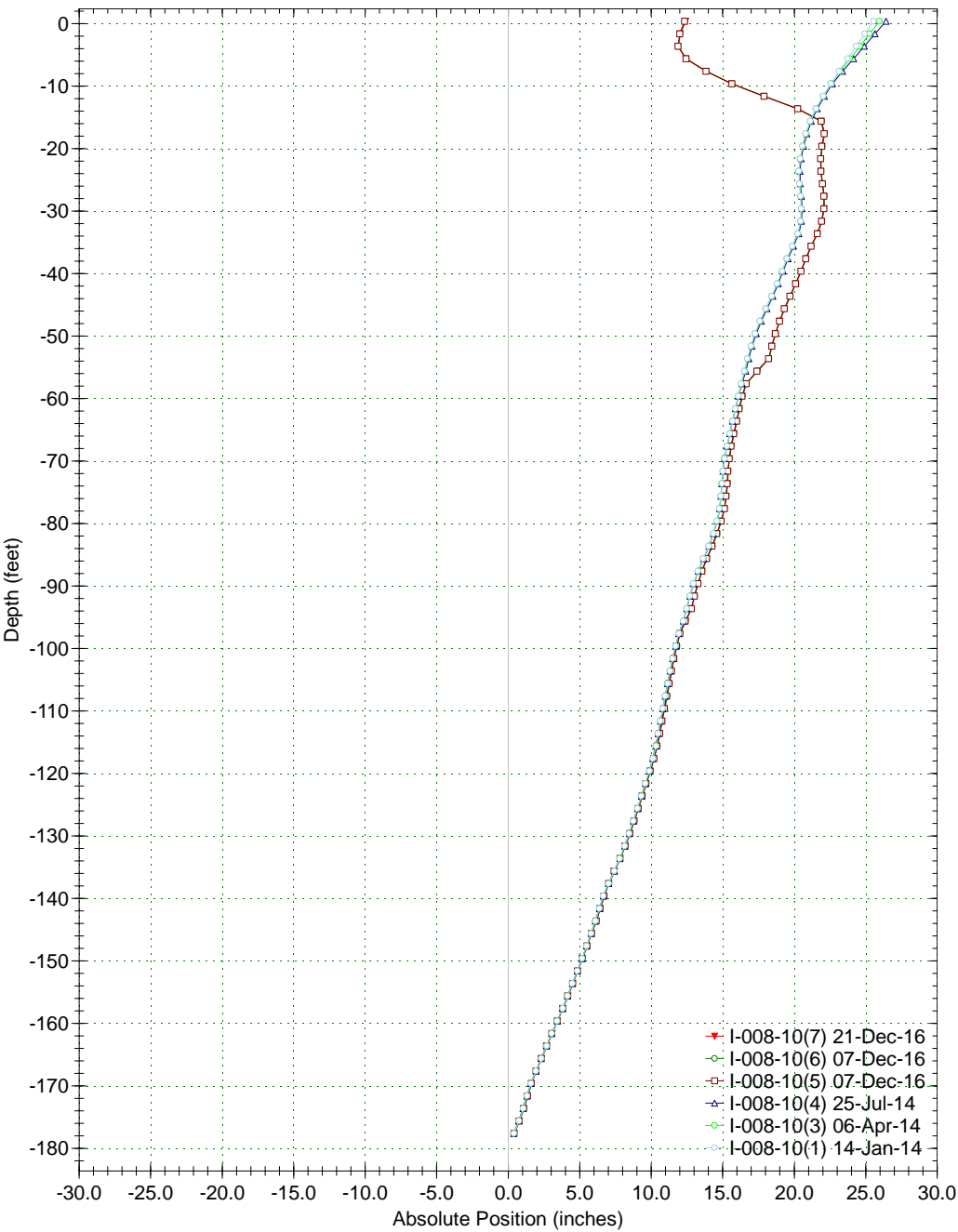


Borehole : I-008-10
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :

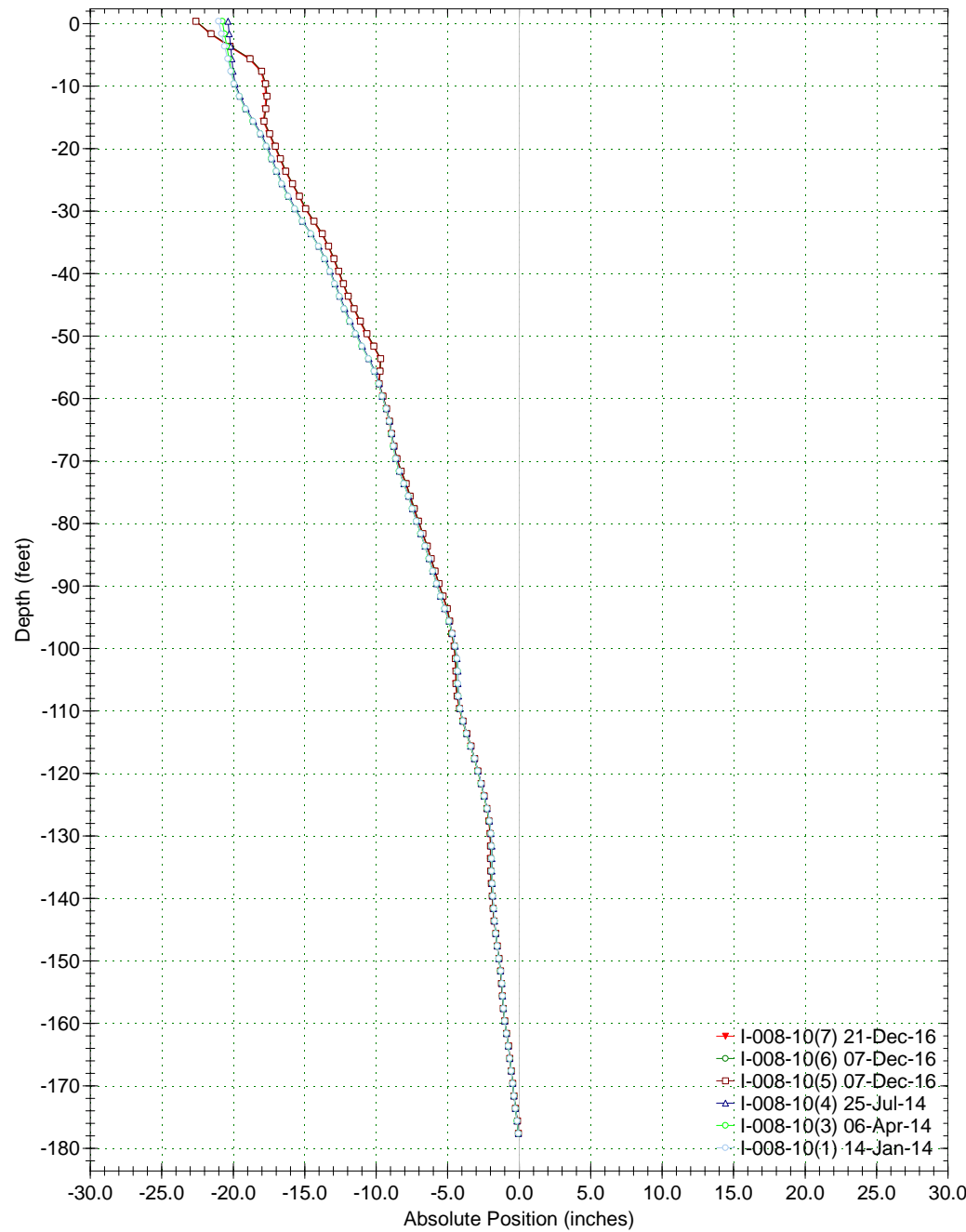


Spiral Correction : N/A
Collar Elevation : 2.4 feet
Borehole Total Depth : 180.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 14 07:26
Applied Azimuth : 0.0 degrees

Axis - A



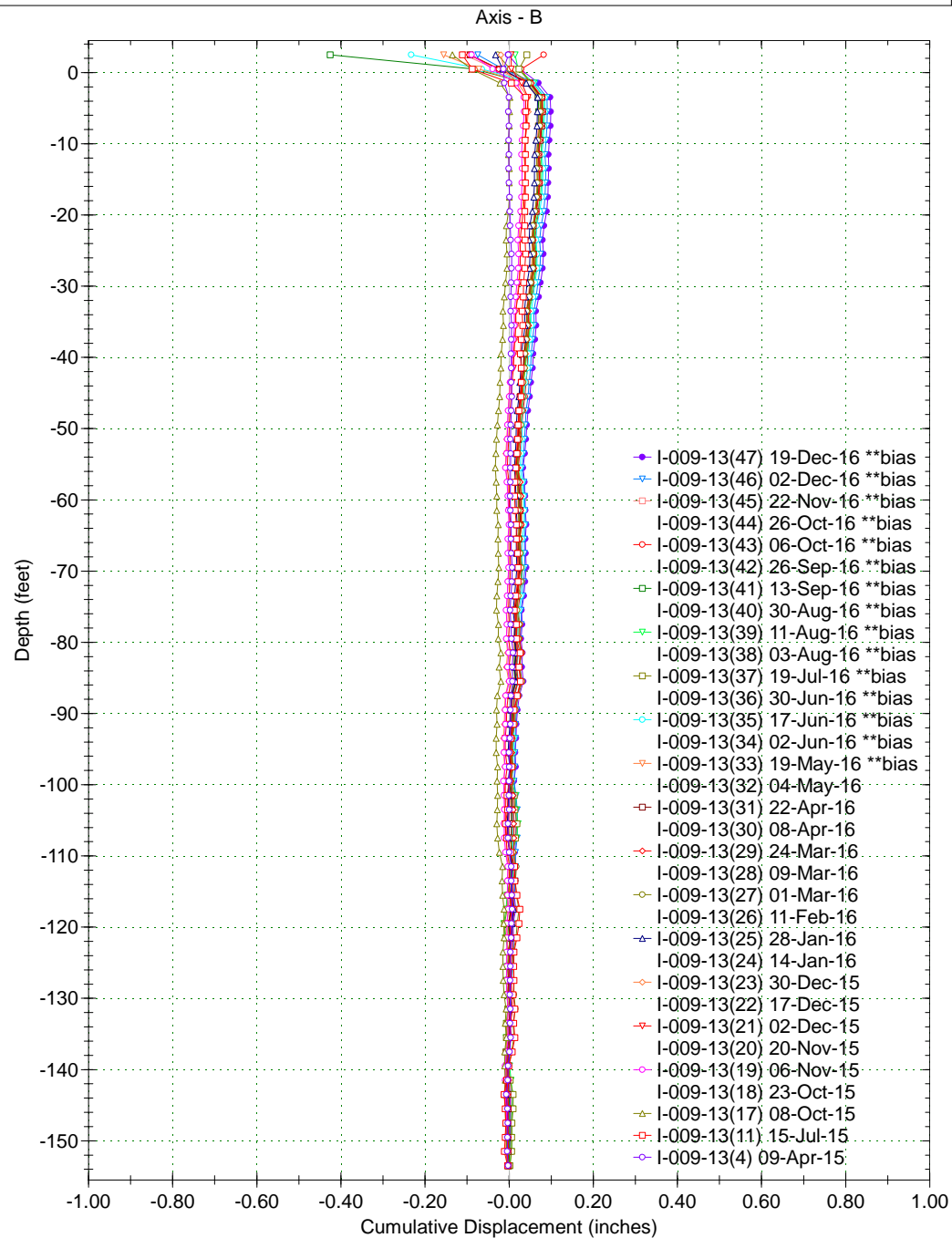
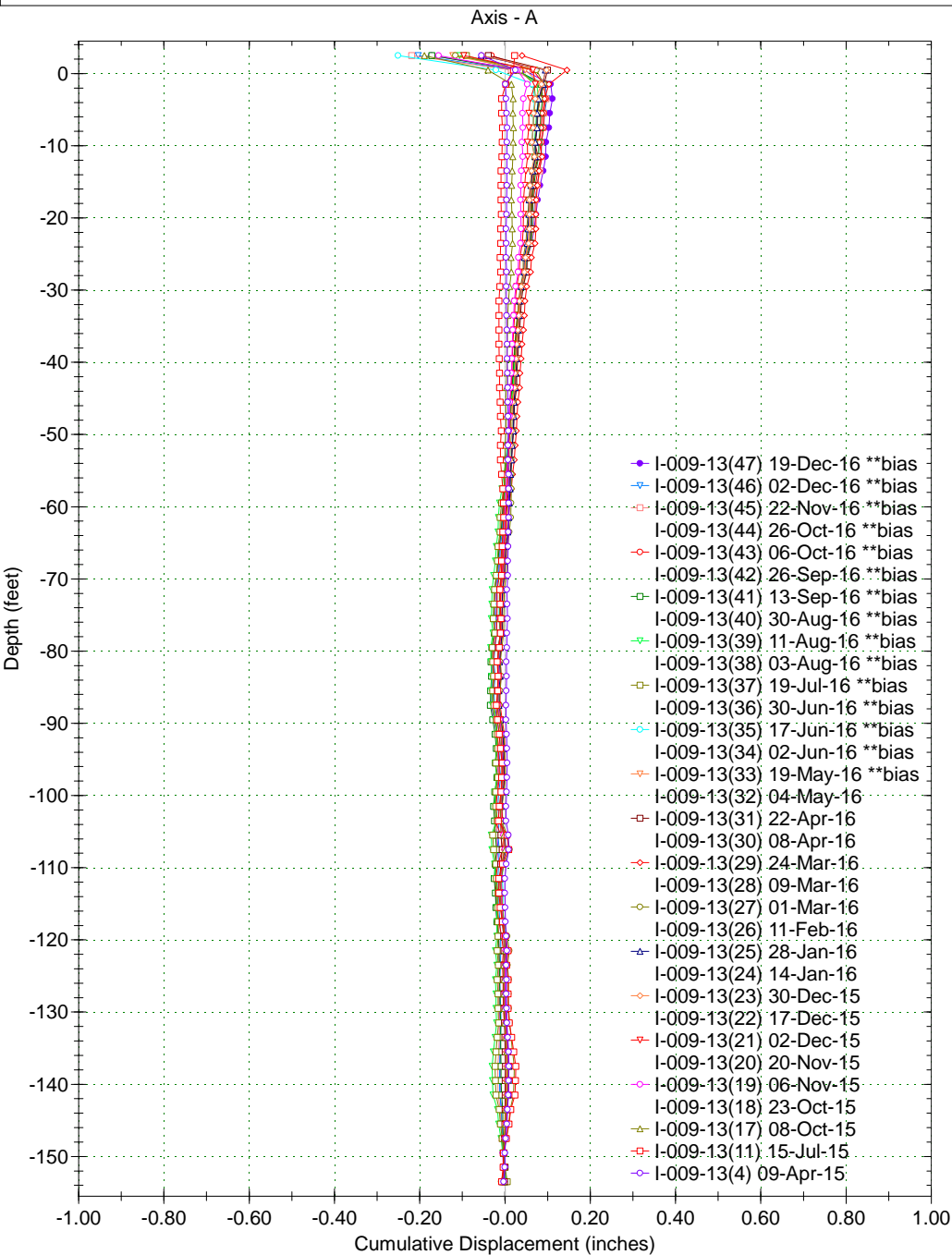
Axis - B



Borehole : I-009-13
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :



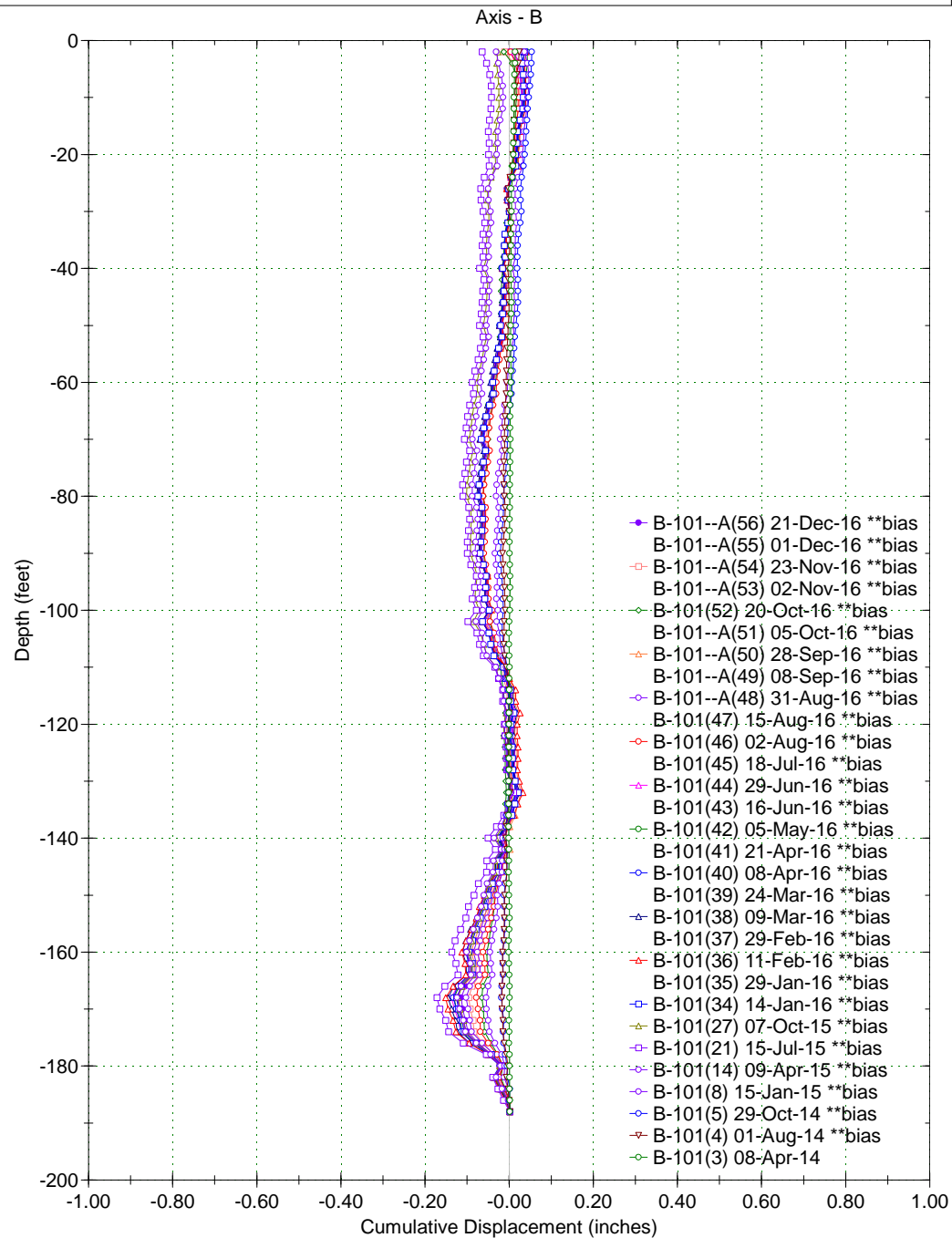
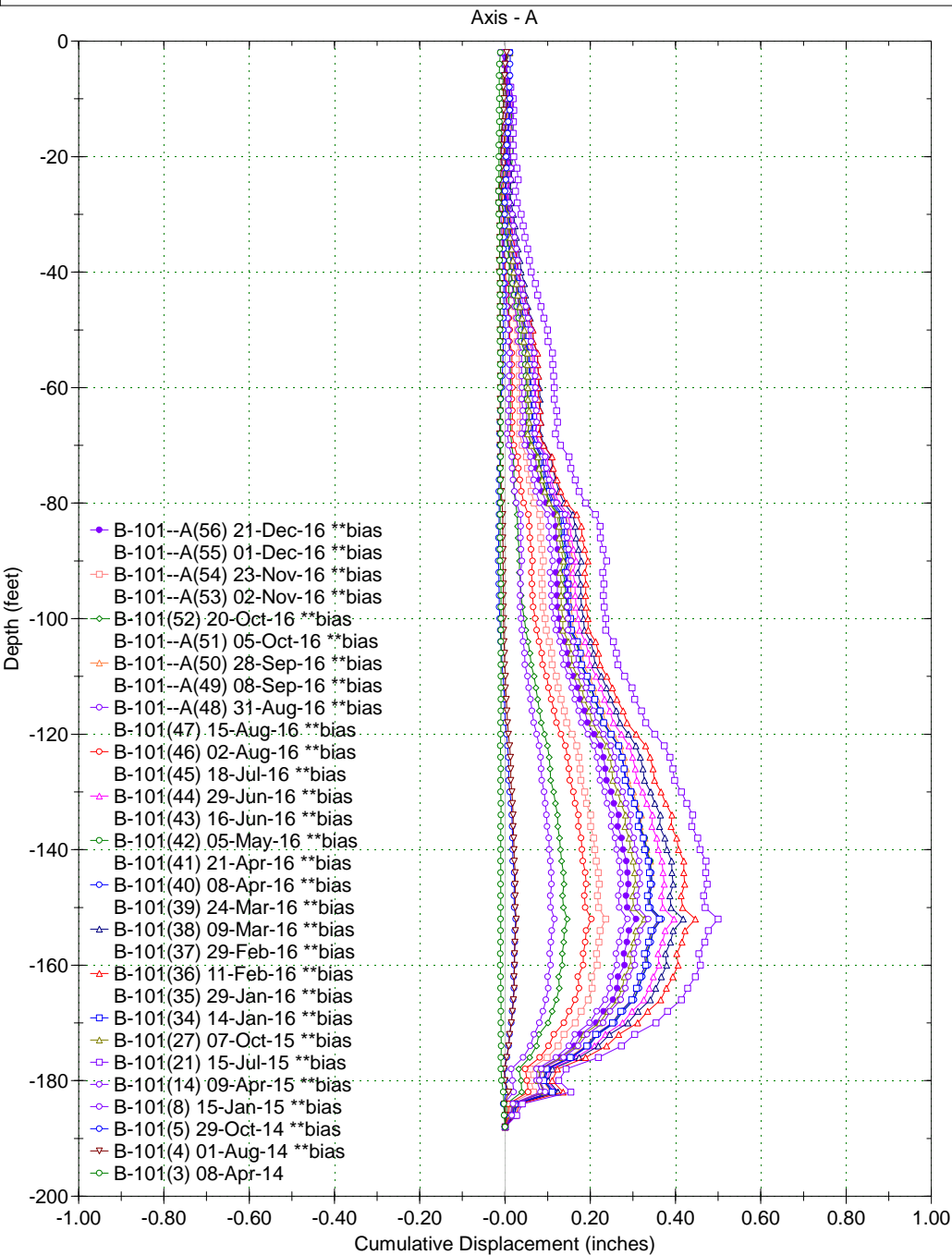
Spiral Correction : N/A
Collar Elevation : 4.5 feet
Borehole Total Depth : 158.0 feet
A+ Groove Azimuth :
Base Reading : 2015 Mar 18 15:56
Applied Azimuth : 0.0 degrees



Borehole : B-101
 Project : CUY-90-15-24
 Location : Cleveland, Ohio
 Northing : Sta. 15+06.50
 Easting : 120.7' Rt of CL
 Collar :



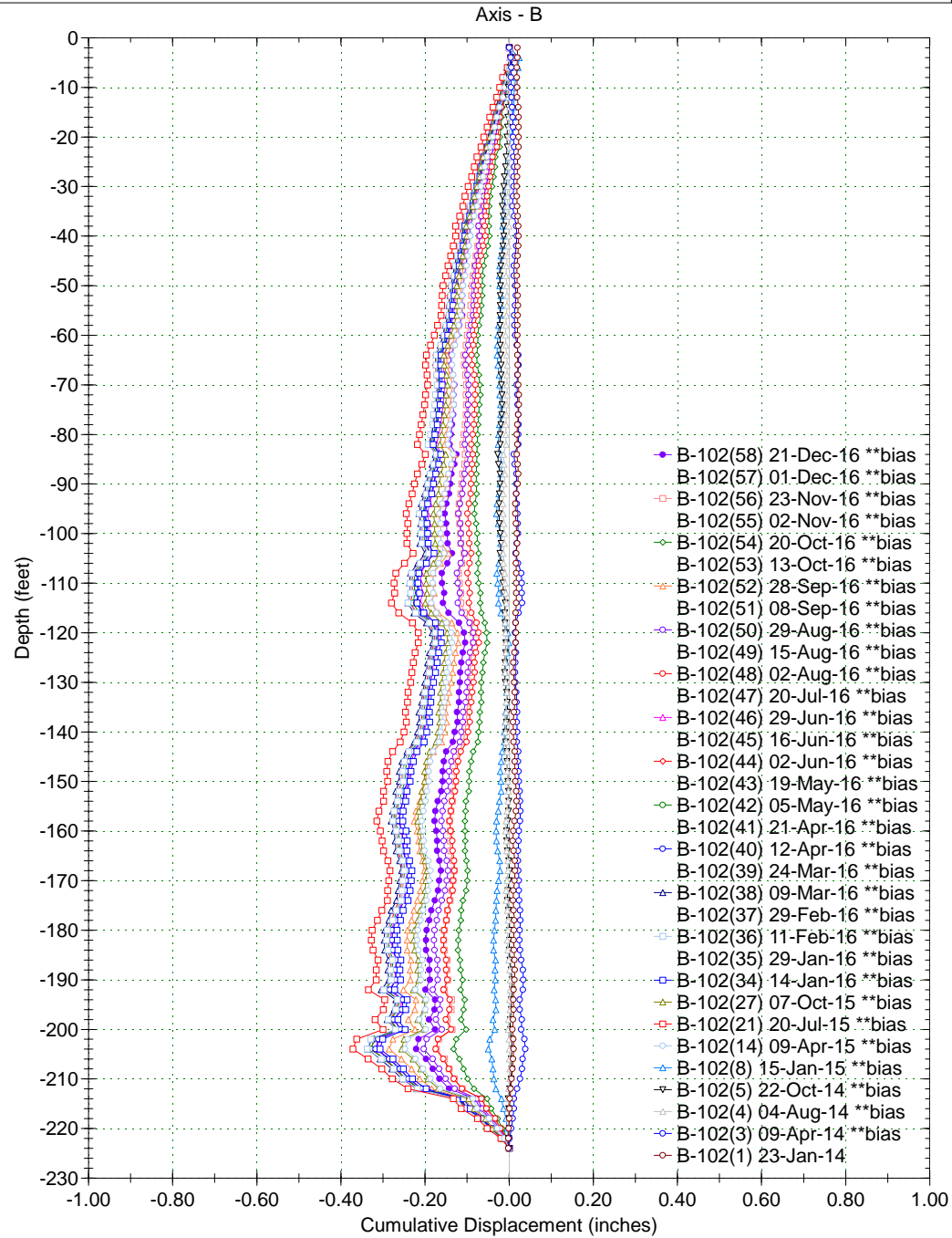
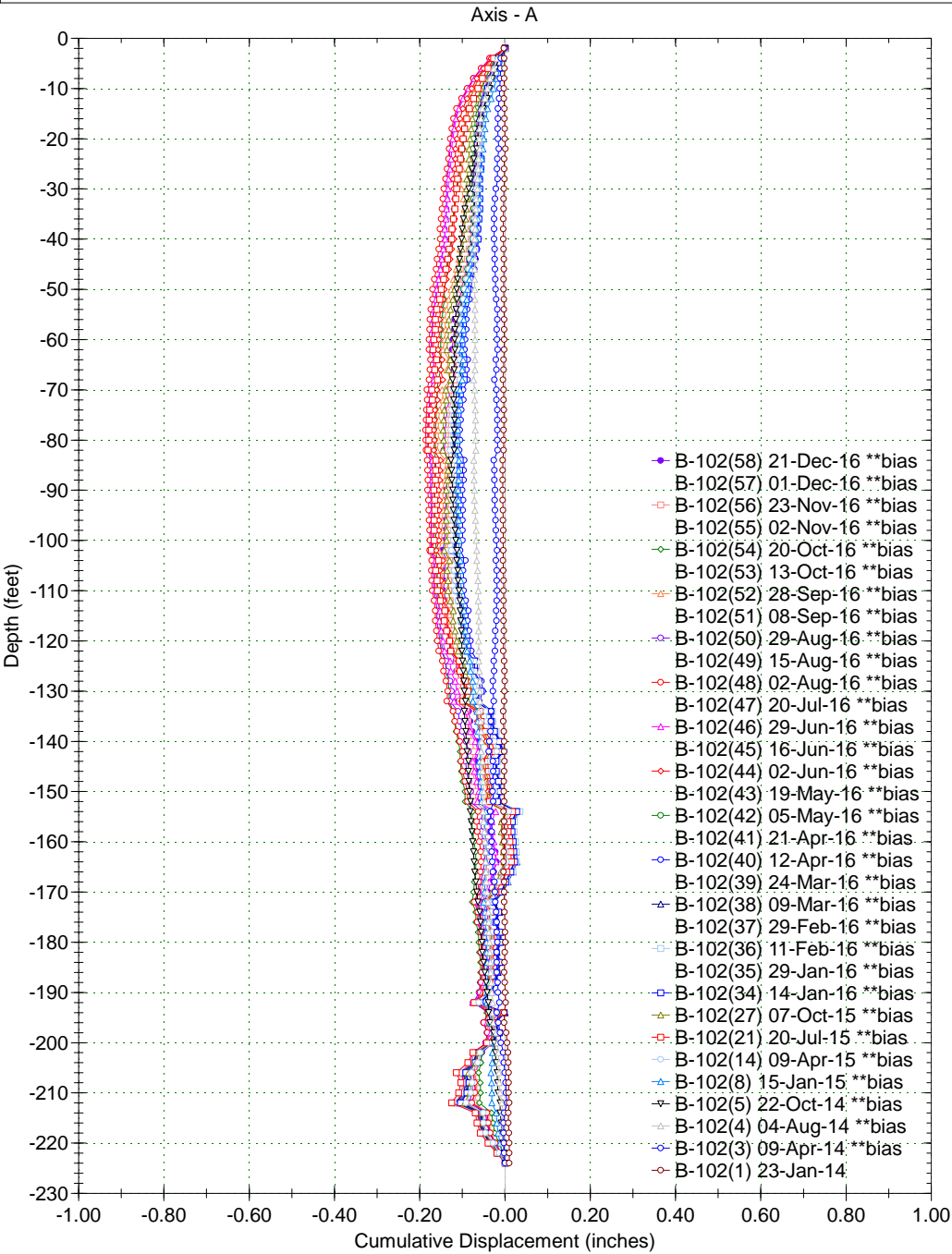
Spiral Correction : N/A
 Collar Elevation : 0.0 feet
 Borehole Total Depth : 188.0 feet
 A+ Groove Azimuth :
 Base Reading : 2014 Jan 22 09:01
 Applied Azimuth : 0.0 degrees



Borehole : B-102
 Project : CUY-90-15-24
 Location : Cleveland, Ohio
 Northing : Sta. 15+95.34
 Easting : 134.7' Rt of CL
 Collar :



Spiral Correction : N/A
 Collar Elevation : 0.0 feet
 Borehole Total Depth : 224.0 feet
 A+ Groove Azimuth :
 Base Reading : 2014 Jan 23 08:21
 Applied Azimuth : 0.0 degrees



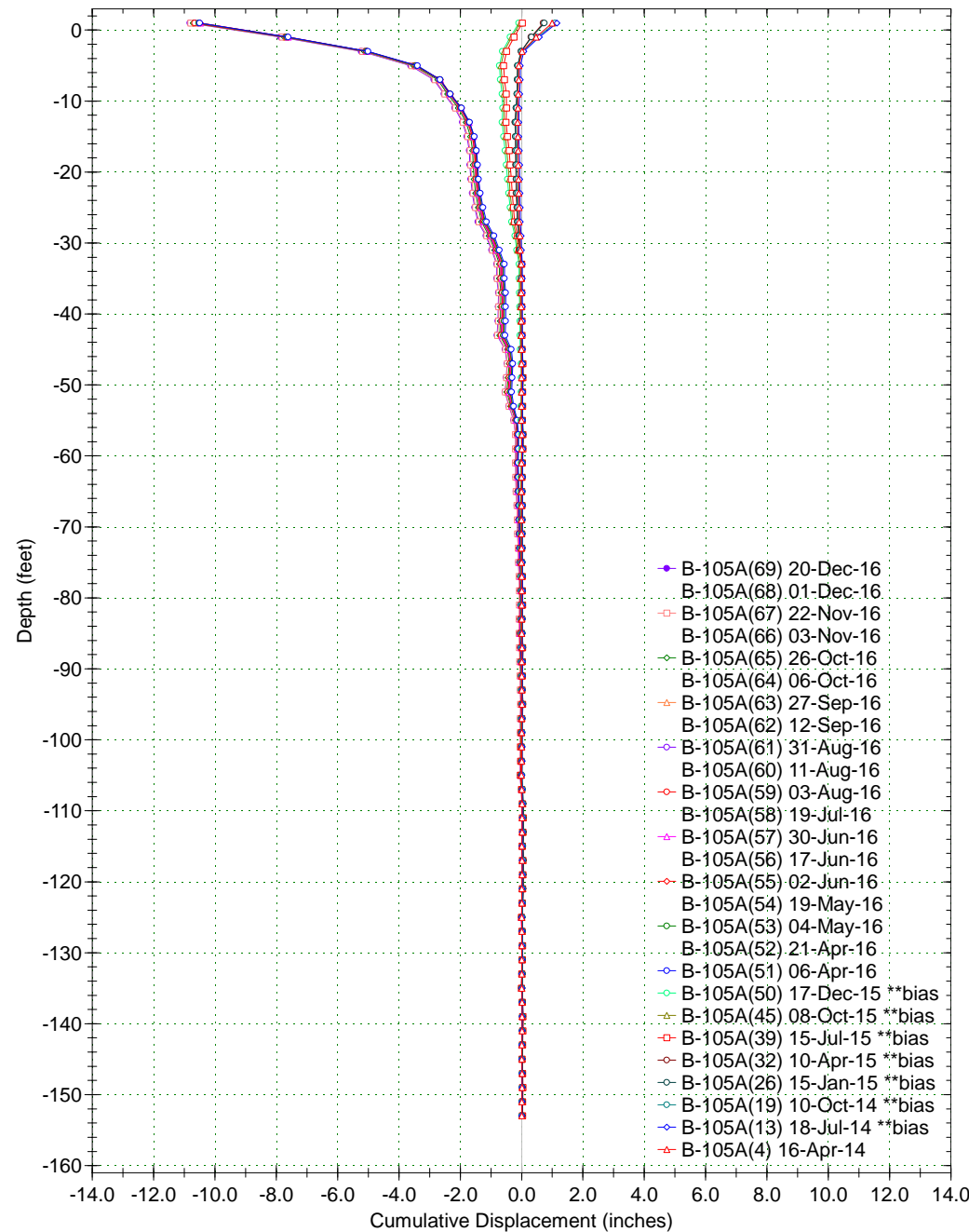
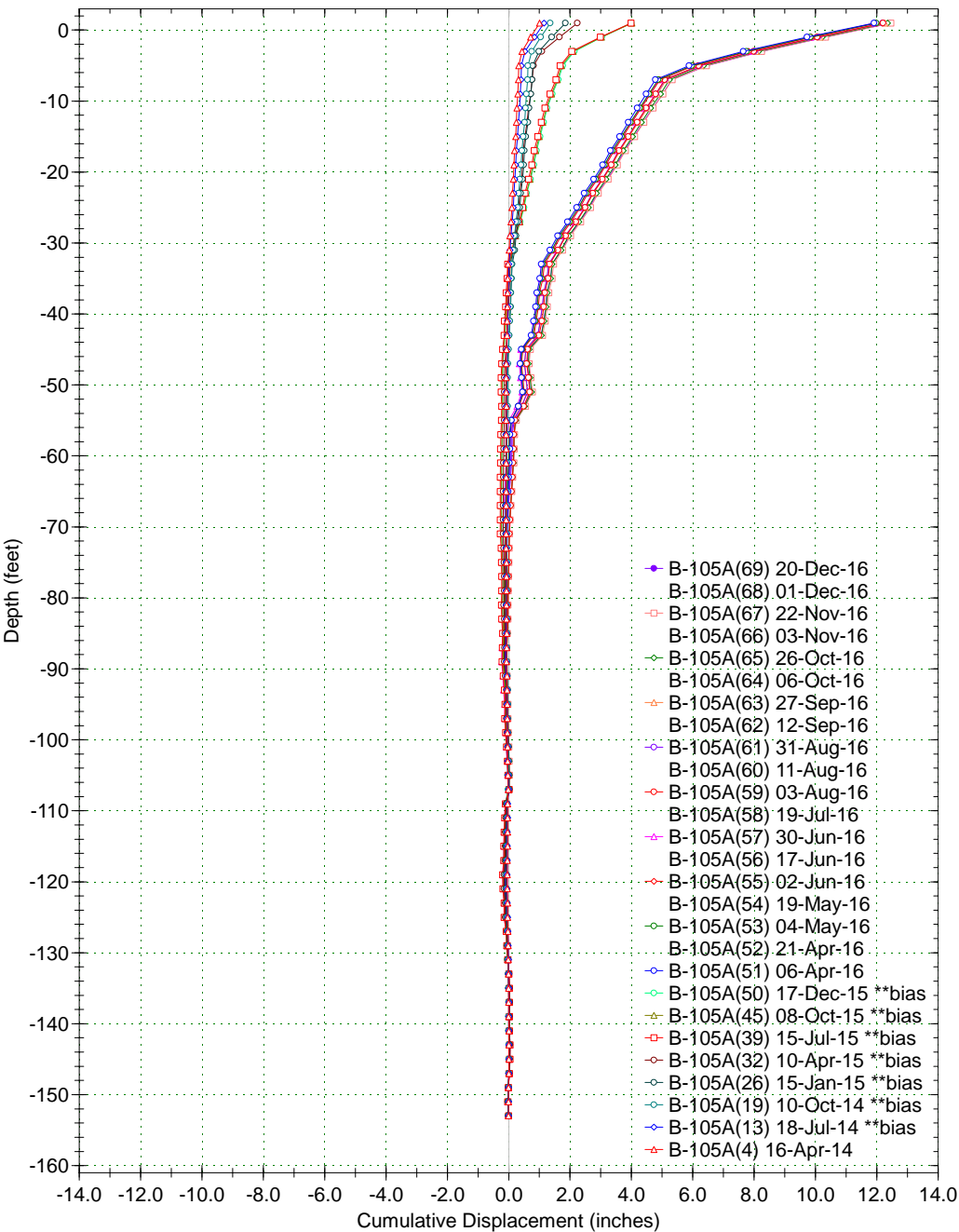
Borehole : B-105A
 Project : CUY-90-15-24
 Location : Cleveland, Ohio
 Northing : Sta. 19+11.38
 Easting : 90.9' Rt of CL
 Collar :



Spiral Correction : N/A
 Collar Elevation : 3.0 feet
 Borehole Total Depth : 156.0 feet
 A+ Groove Azimuth :
 Base Reading : 2014 Jan 15 09:19
 Applied Azimuth : 0.0 degrees

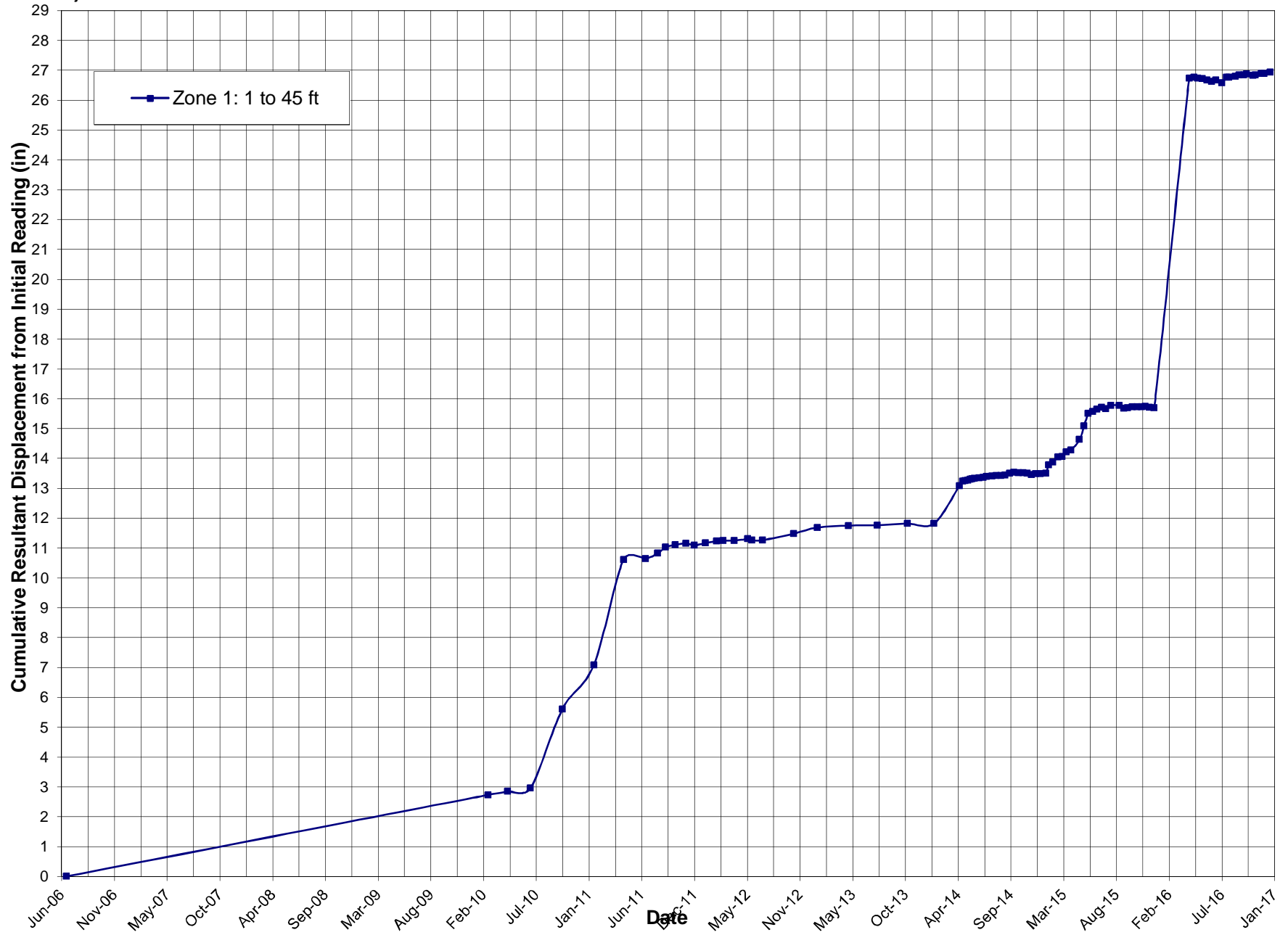
Axis - A

Axis - B



CUY-90-15.24
PID 96504
SME Project#: 069032.00

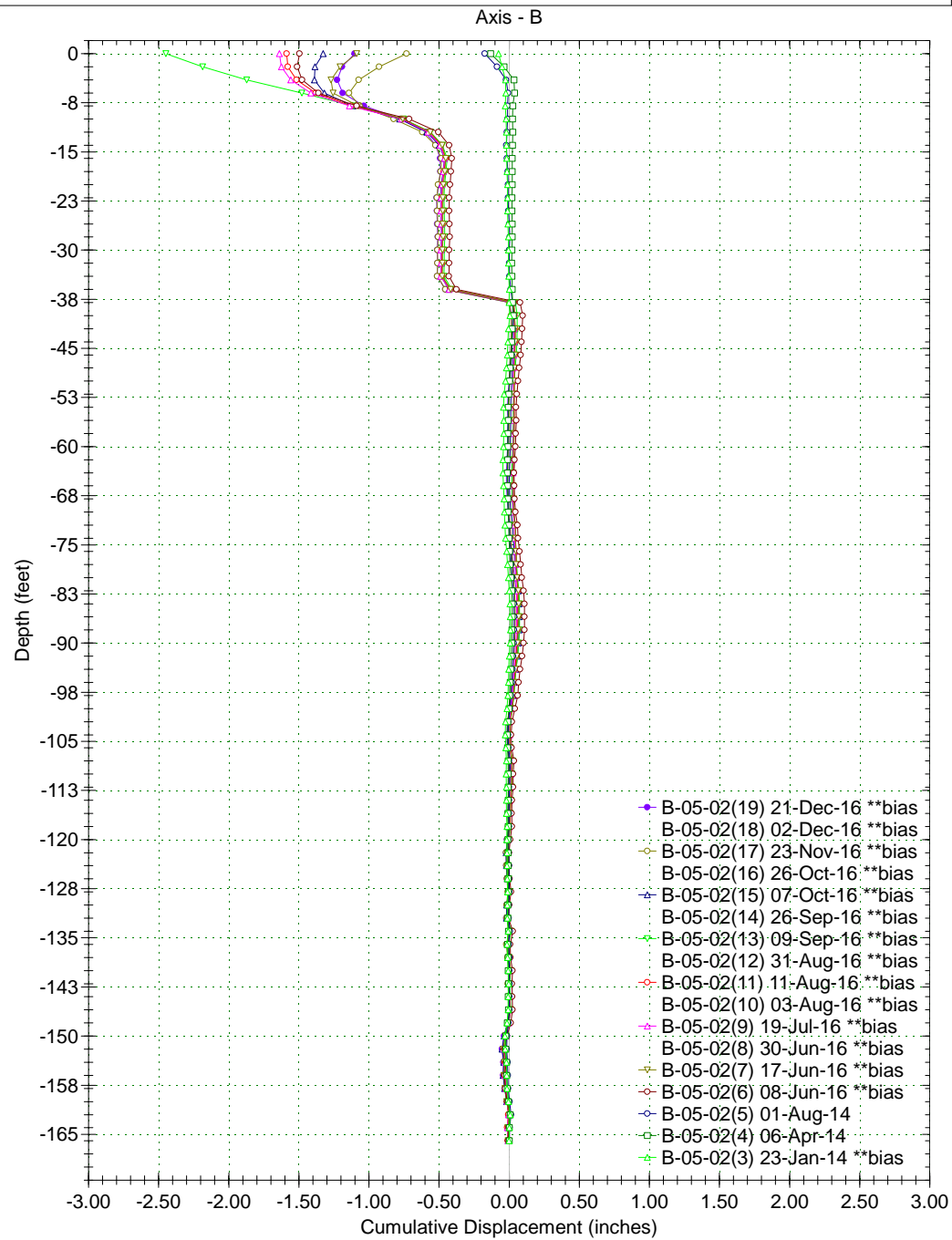
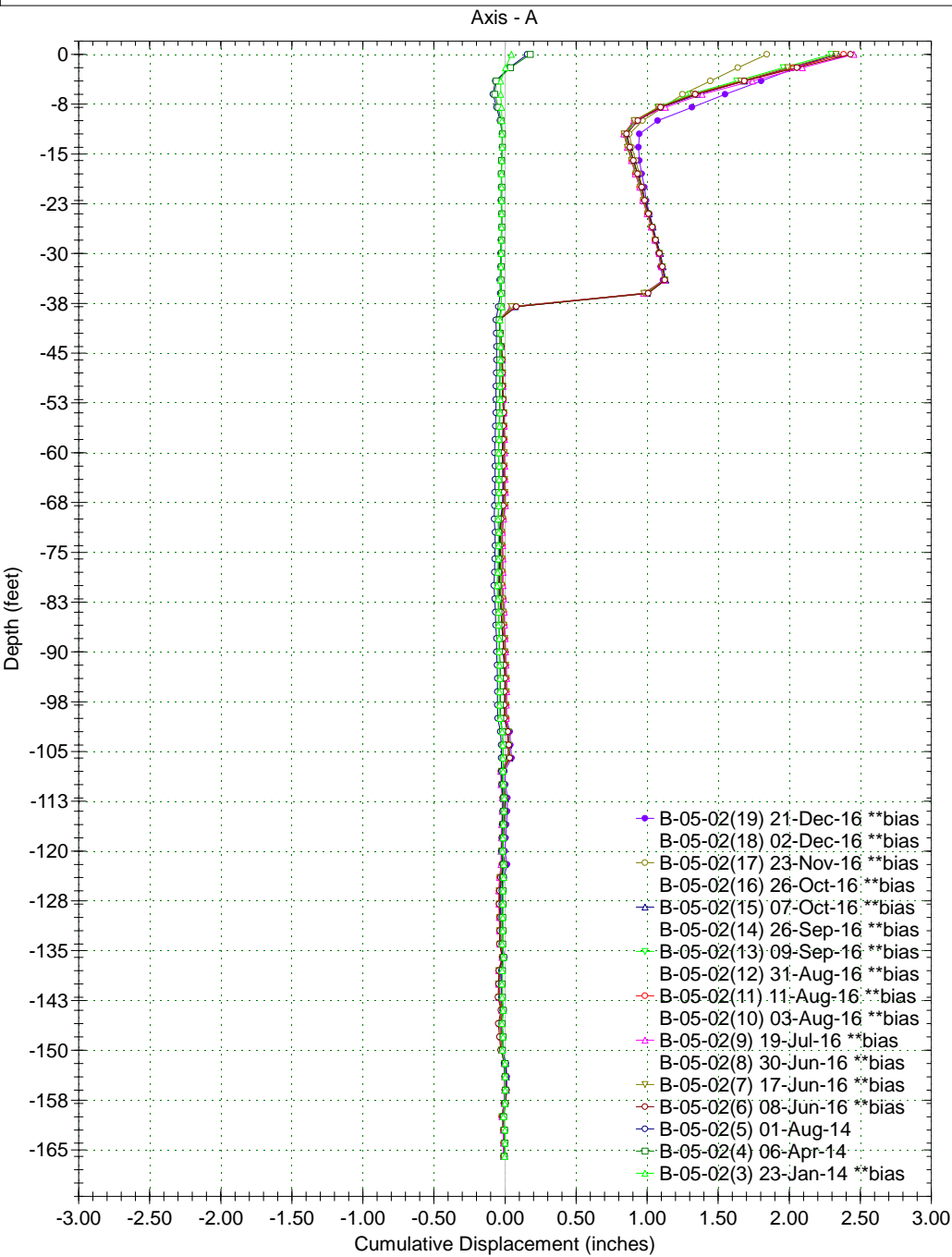
B-105A



Borehole : B-05-02
Project :
Location : Cleveland, Ohio
Northing : 663737.939
Easting : 2190289.081
Collar :

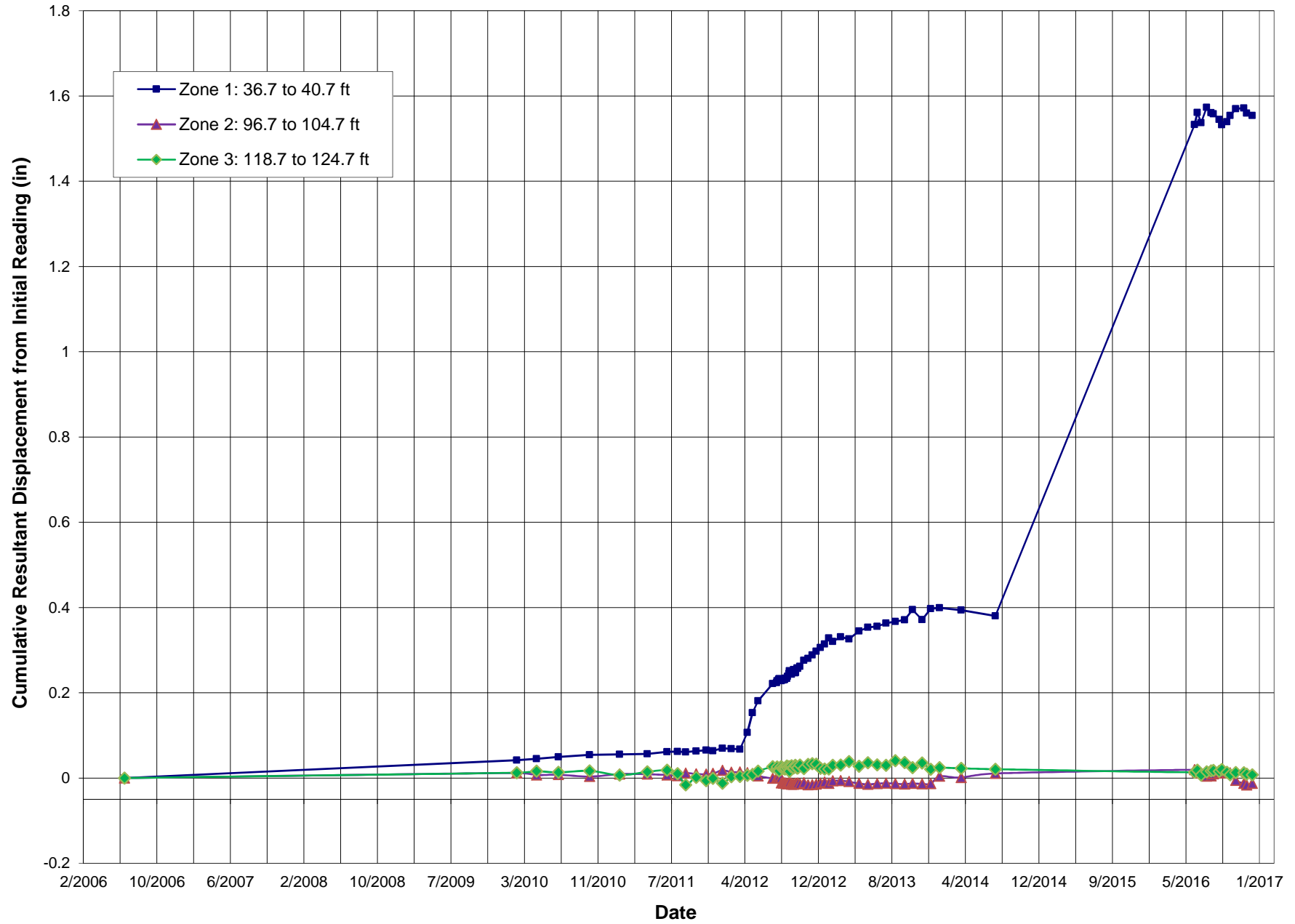


Spiral Correction : N/A
Collar Elevation : 2.0 feet
Borehole Total Depth : 168.0 feet
A+ Groove Azimuth :
Base Reading : 2013 Dec 24 11:12
Applied Azimuth : 0.0 degrees



CUY-90-15.24
PID 63504
SME Project#: 069032.00

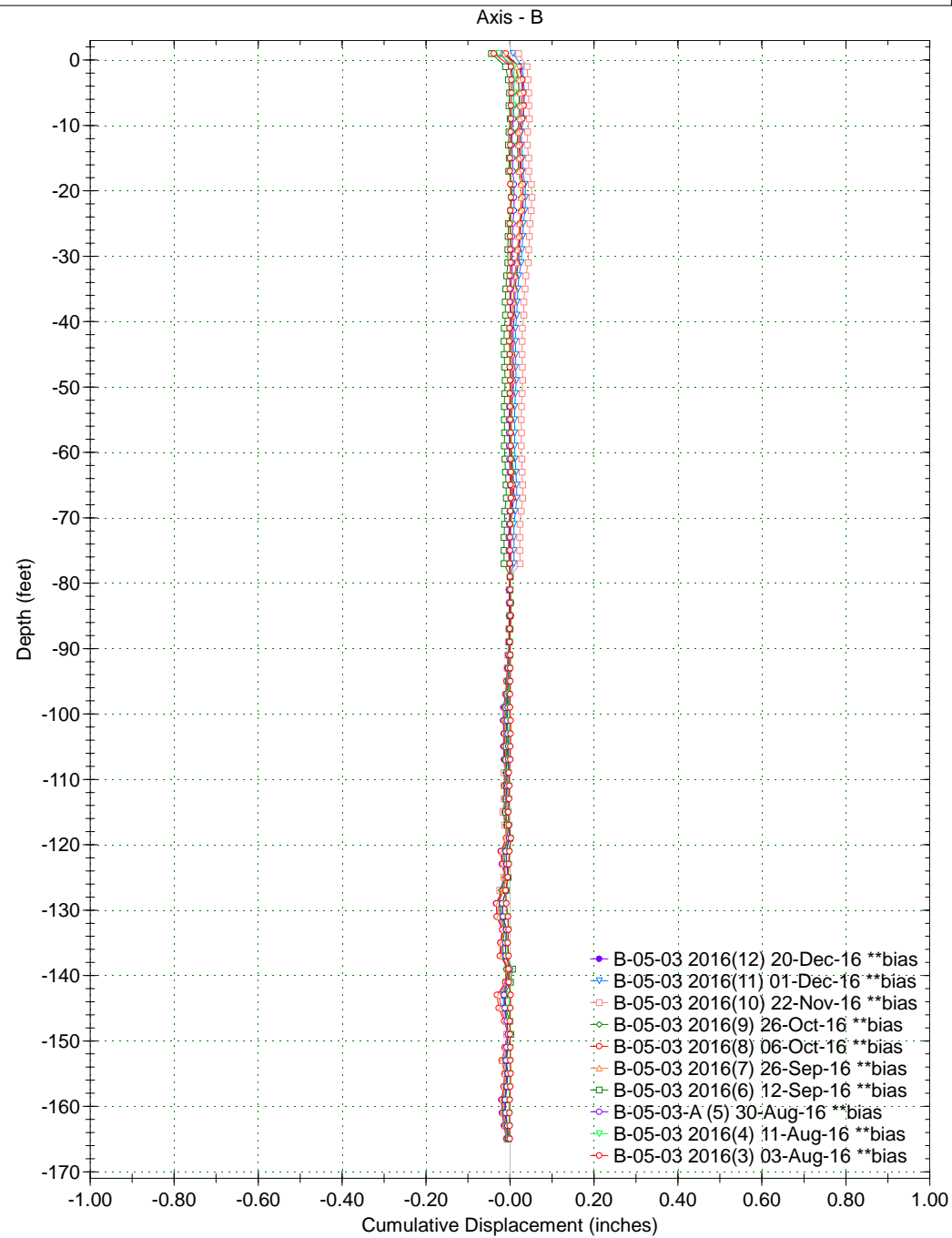
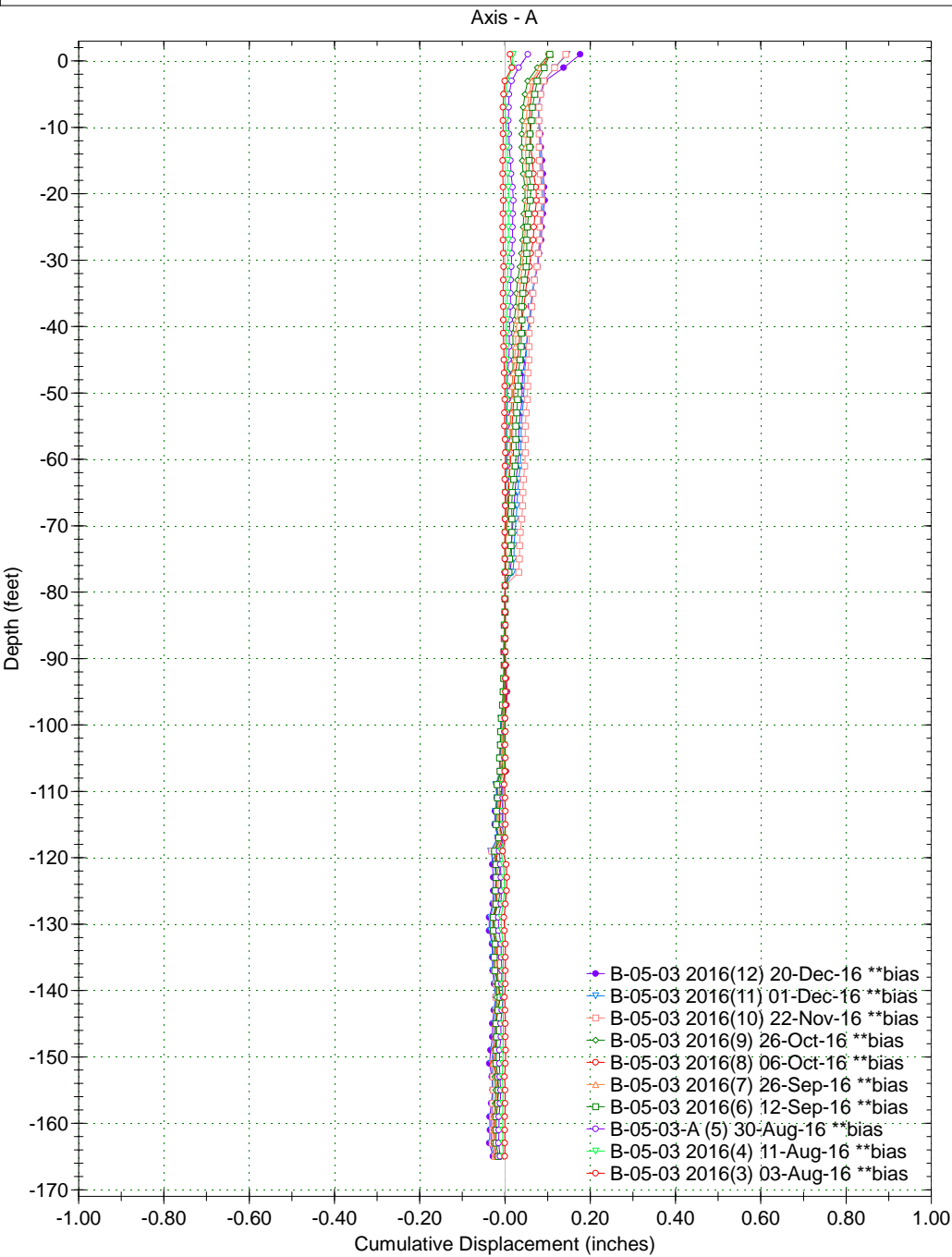
B-05-02



Borehole : B-05-03-A
Project : CUY-90-15-24
Location :
Northing :
Easting :
Collar :



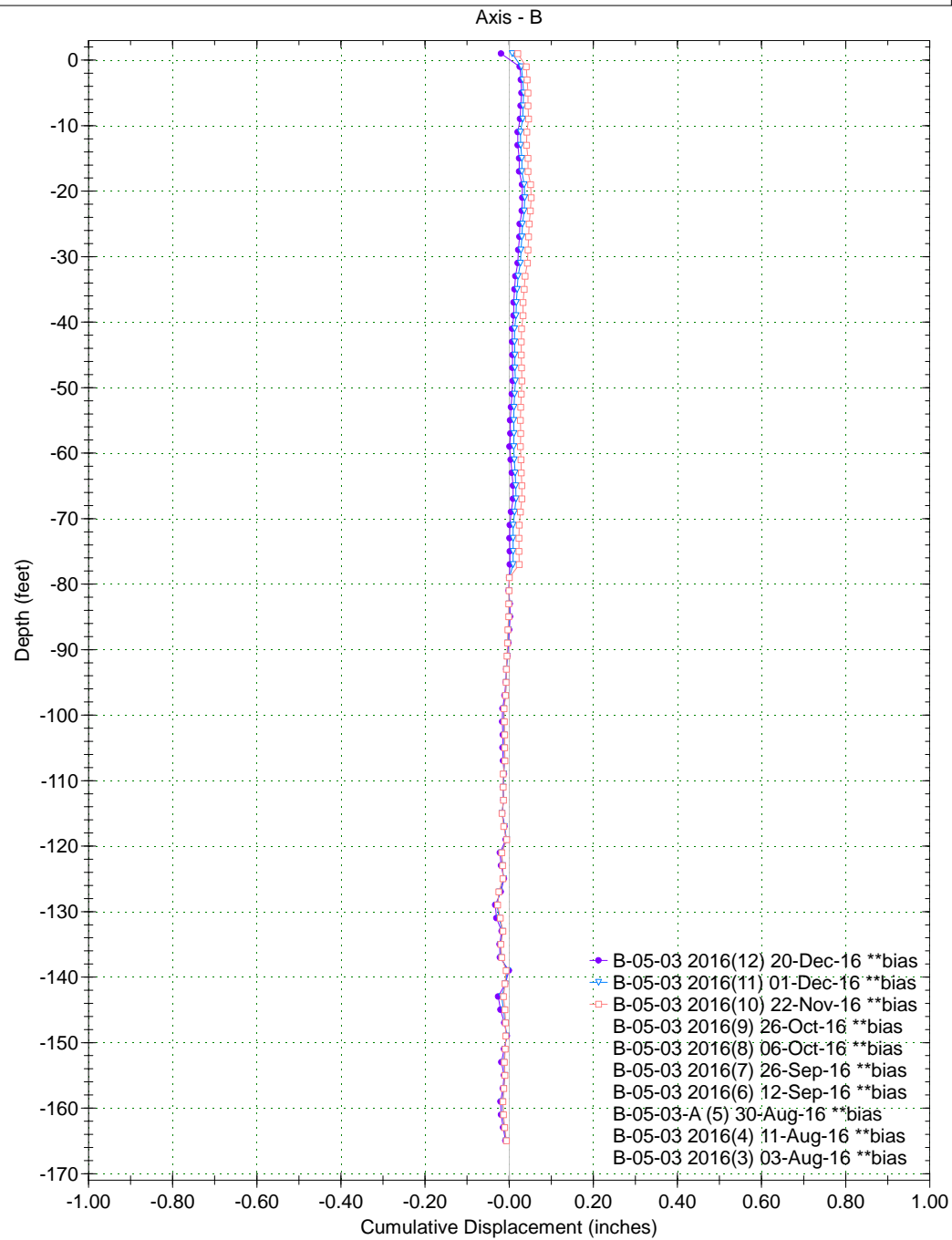
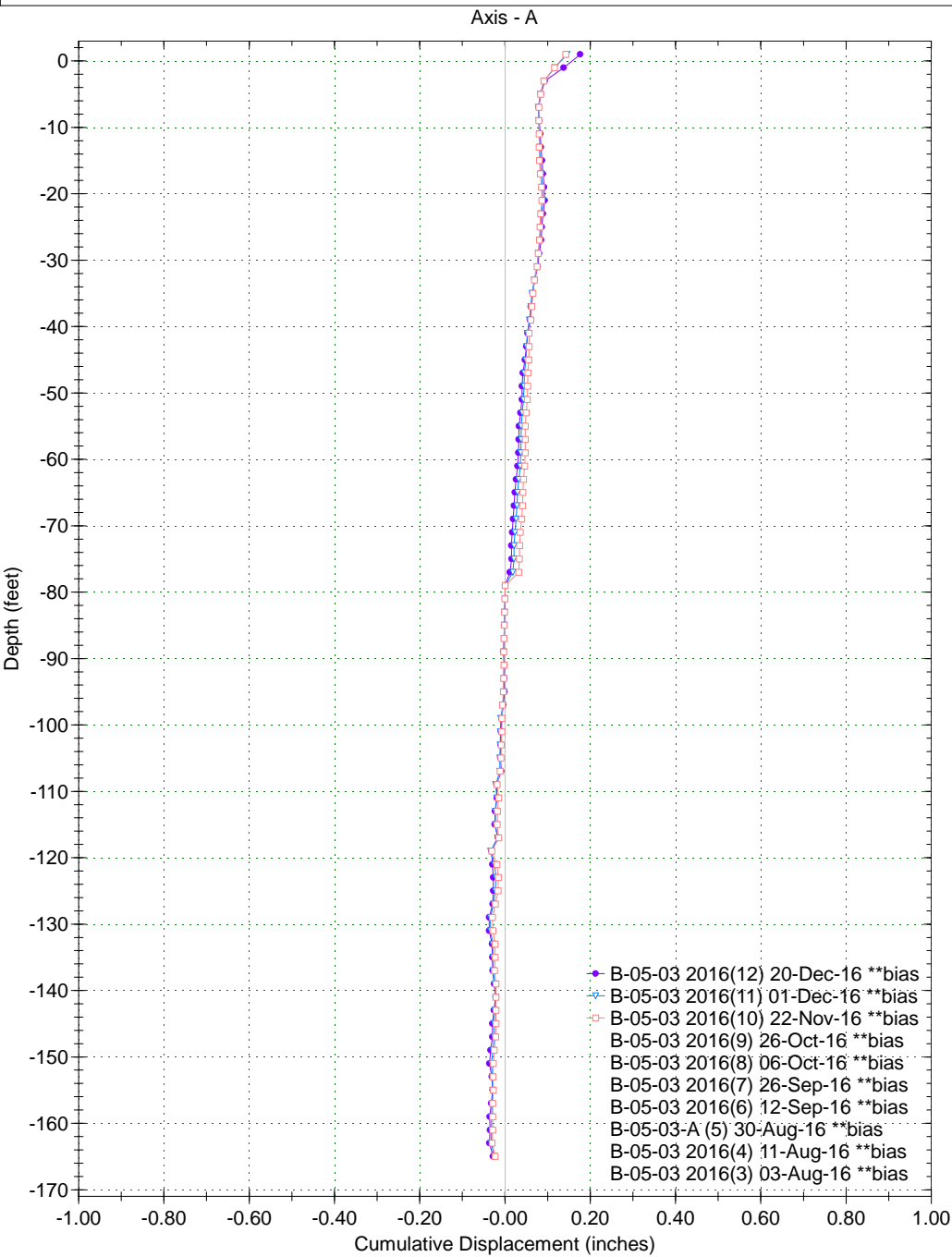
Spiral Correction : N/A
Collar Elevation : 3.0 feet
Borehole Total Depth : 168.0 feet
A+ Groove Azimuth :
Base Reading : 2016 Jul 19 09:08
Applied Azimuth : 0.0 degrees



Borehole : B-05-03-A
Project : CUY-90-15-24
Location :
Northing :
Easting :
Collar :



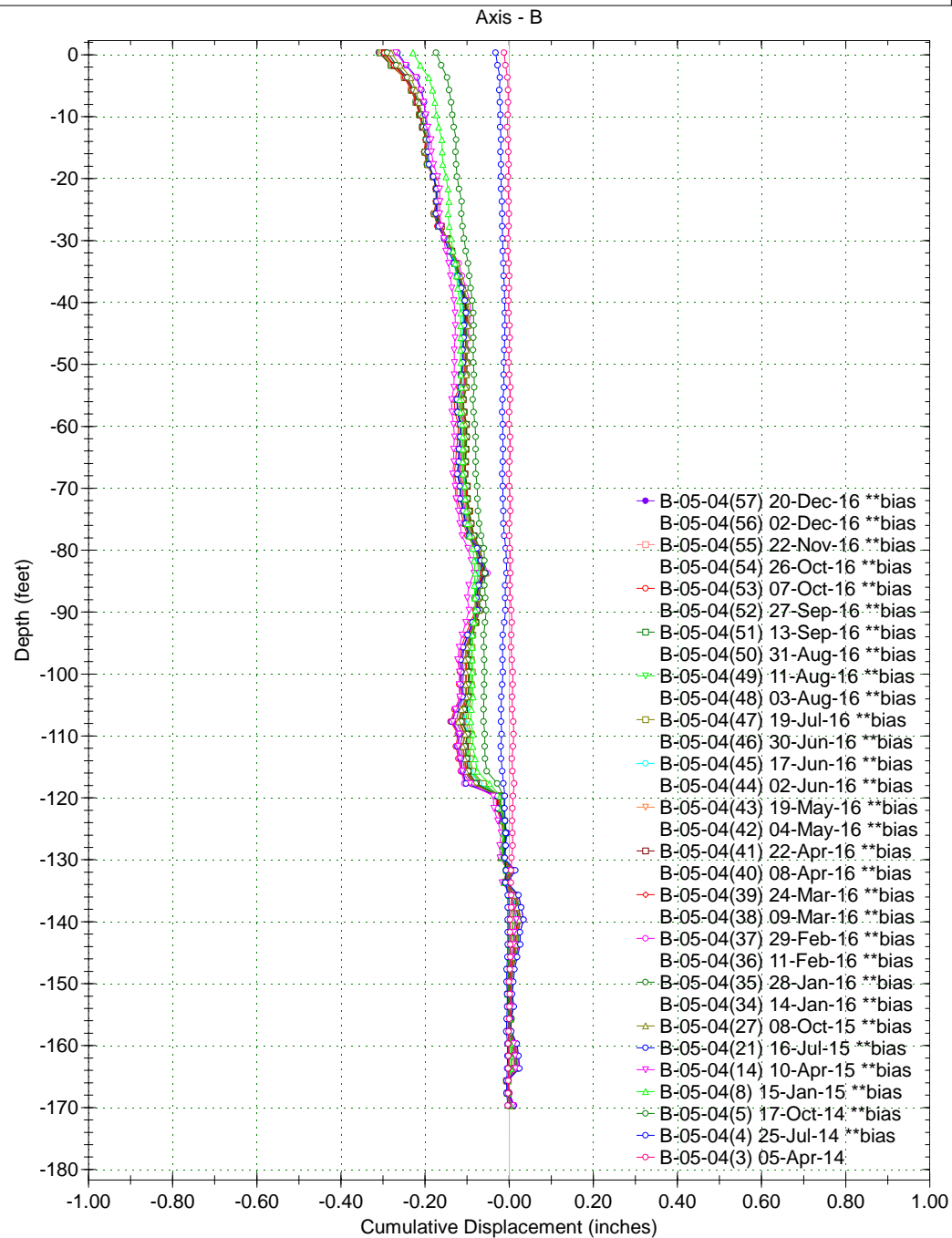
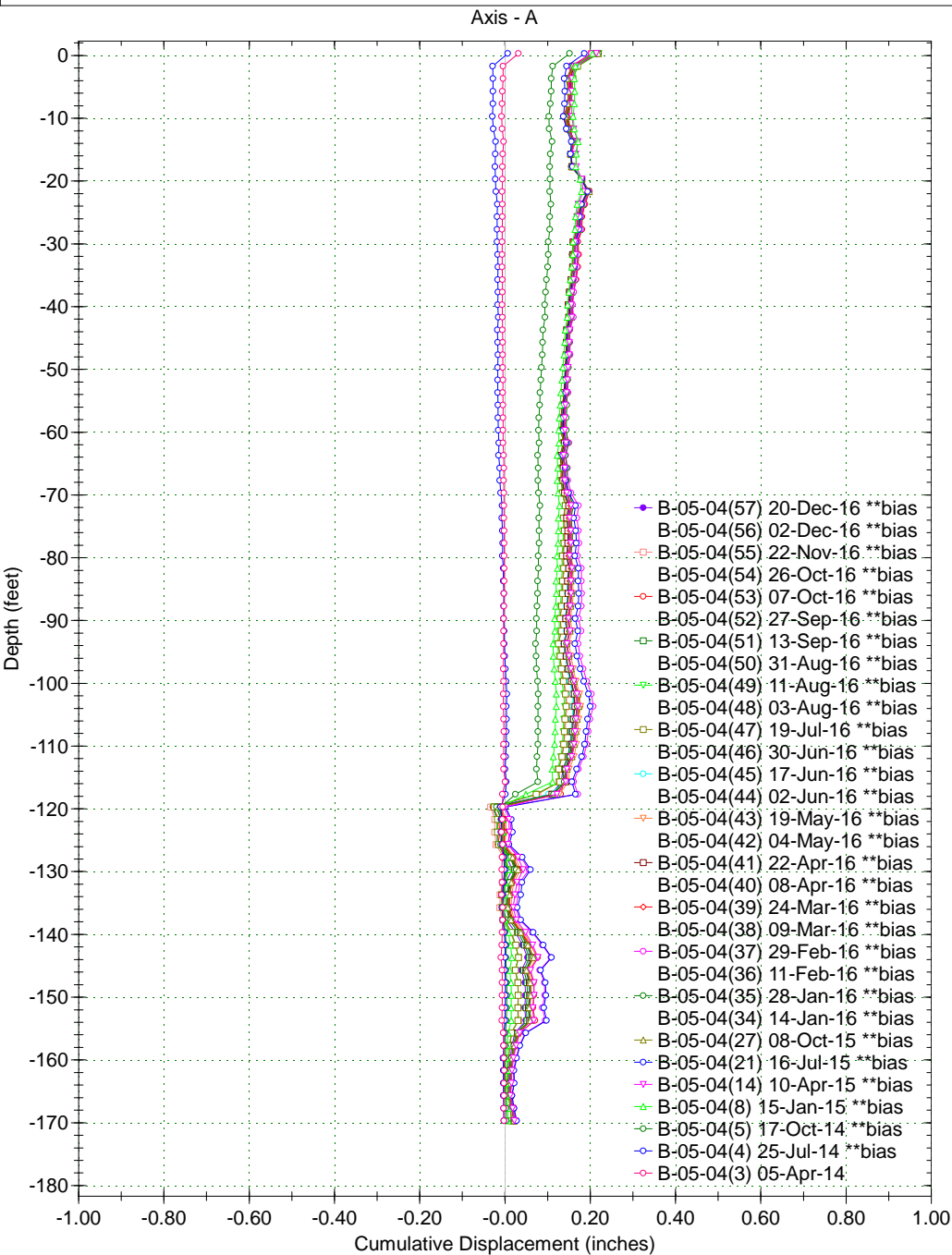
Spiral Correction : N/A
Collar Elevation : 3.0 feet
Borehole Total Depth : 168.0 feet
A+ Groove Azimuth :
Base Reading : 2016 Jul 19 09:08
Applied Azimuth : 0.0 degrees



Borehole : B-05-04
 Project : CUY-90-15-24
 Location : Cleveland, Ohio
 Northing : Sta. 133+51.67
 Easting : 242.09' Rt of CL
 Collar :

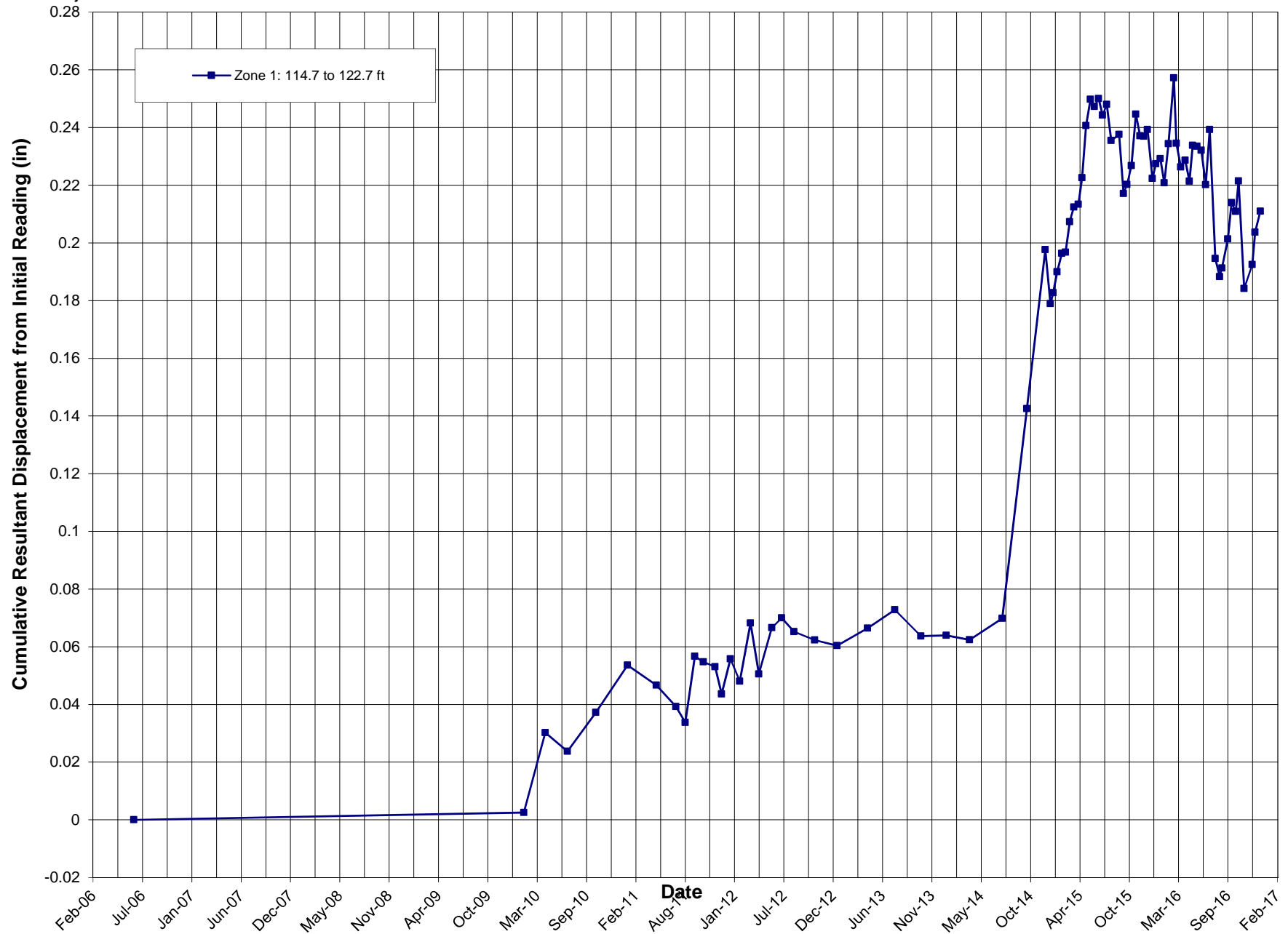


Spiral Correction : N/A
 Collar Elevation : 2.3 feet
 Borehole Total Depth : 172.0 feet
 A+ Groove Azimuth :
 Base Reading : 2014 Jan 22 12:30
 Applied Azimuth : 0.0 degrees



CUY-90-15.24
PID 96504
SME Project#: 069032.00

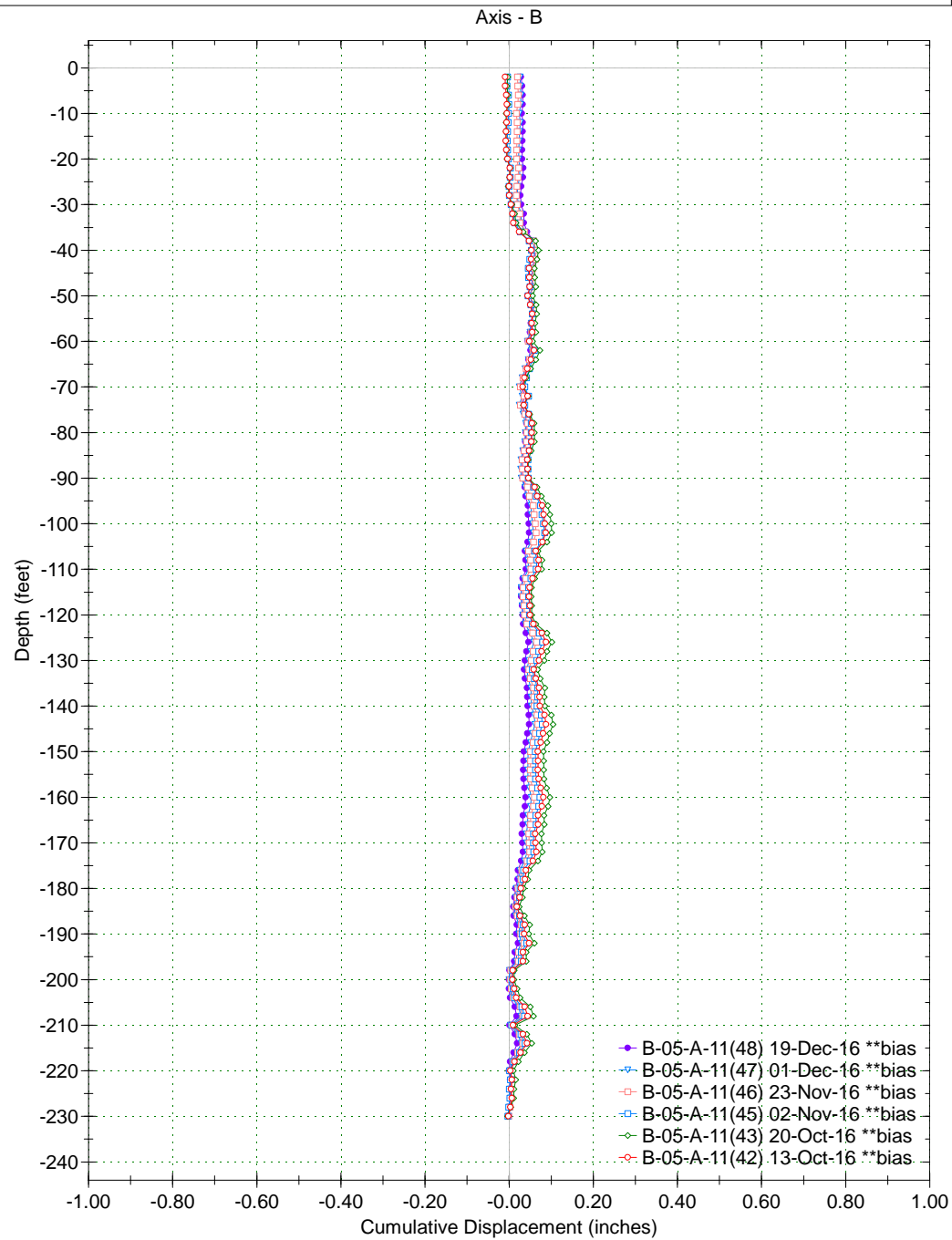
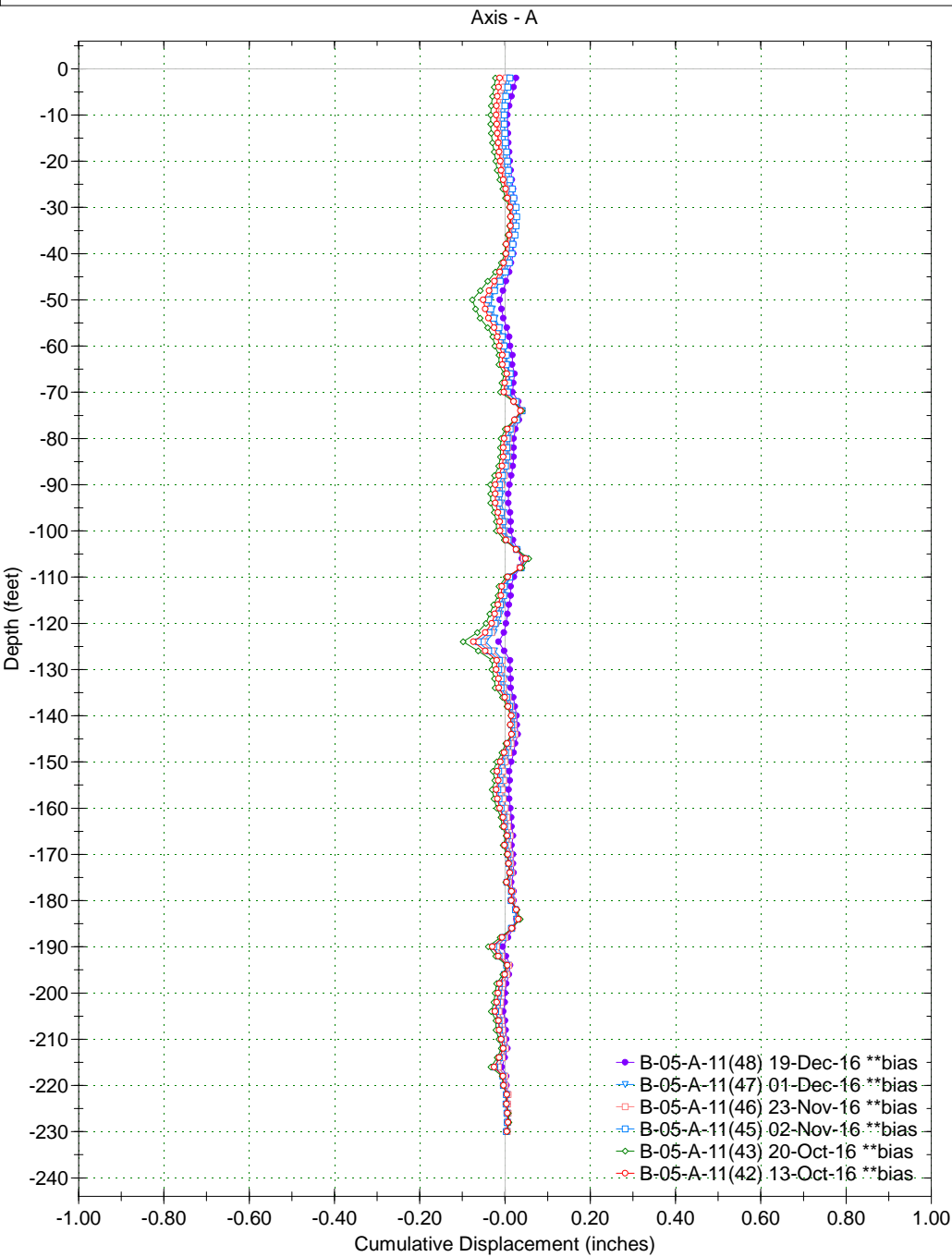
B-05-04



Borehole : B-05-A-11 230 ft
Project : CUY-90-15-24
Location :
Northing :
Easting :
Collar :



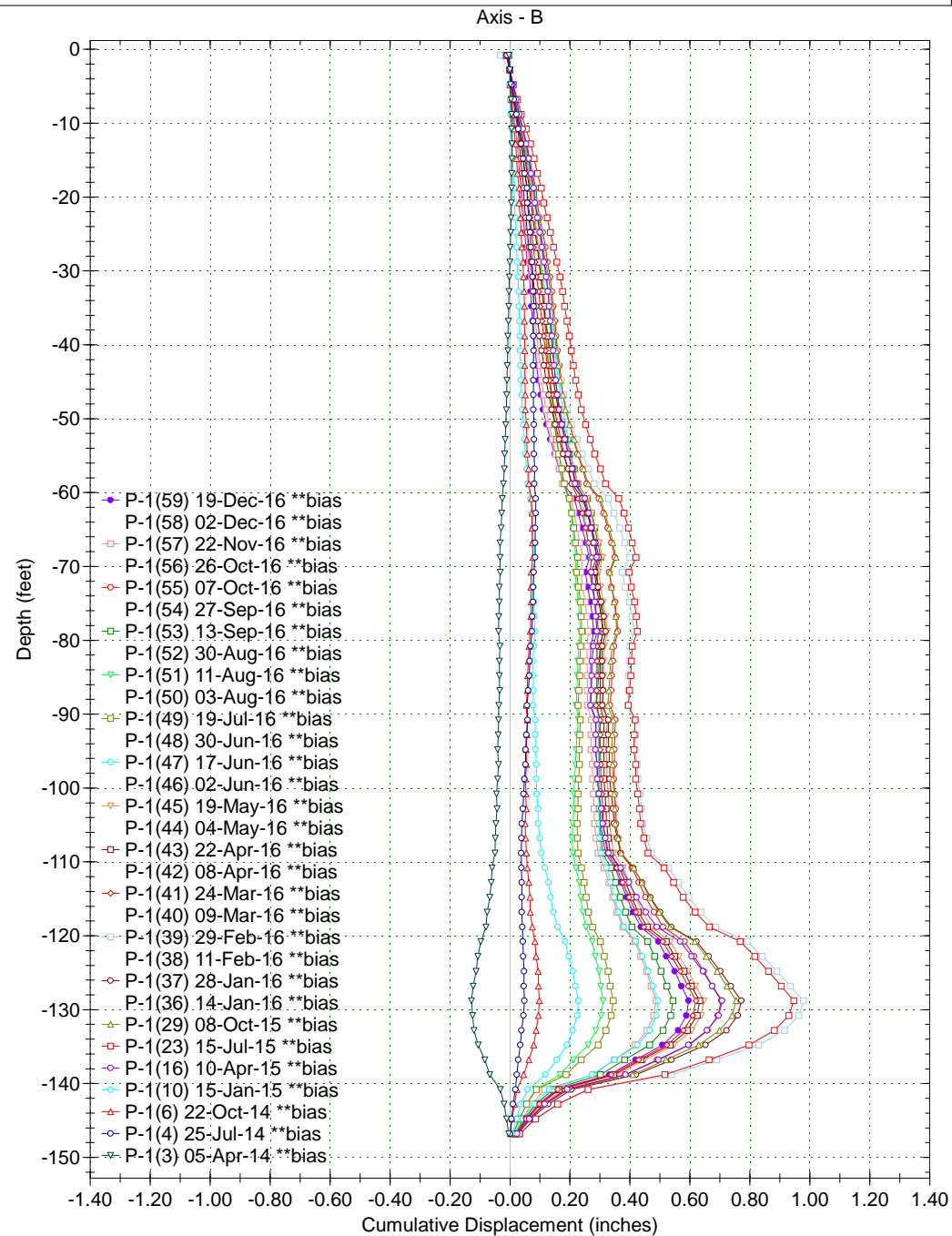
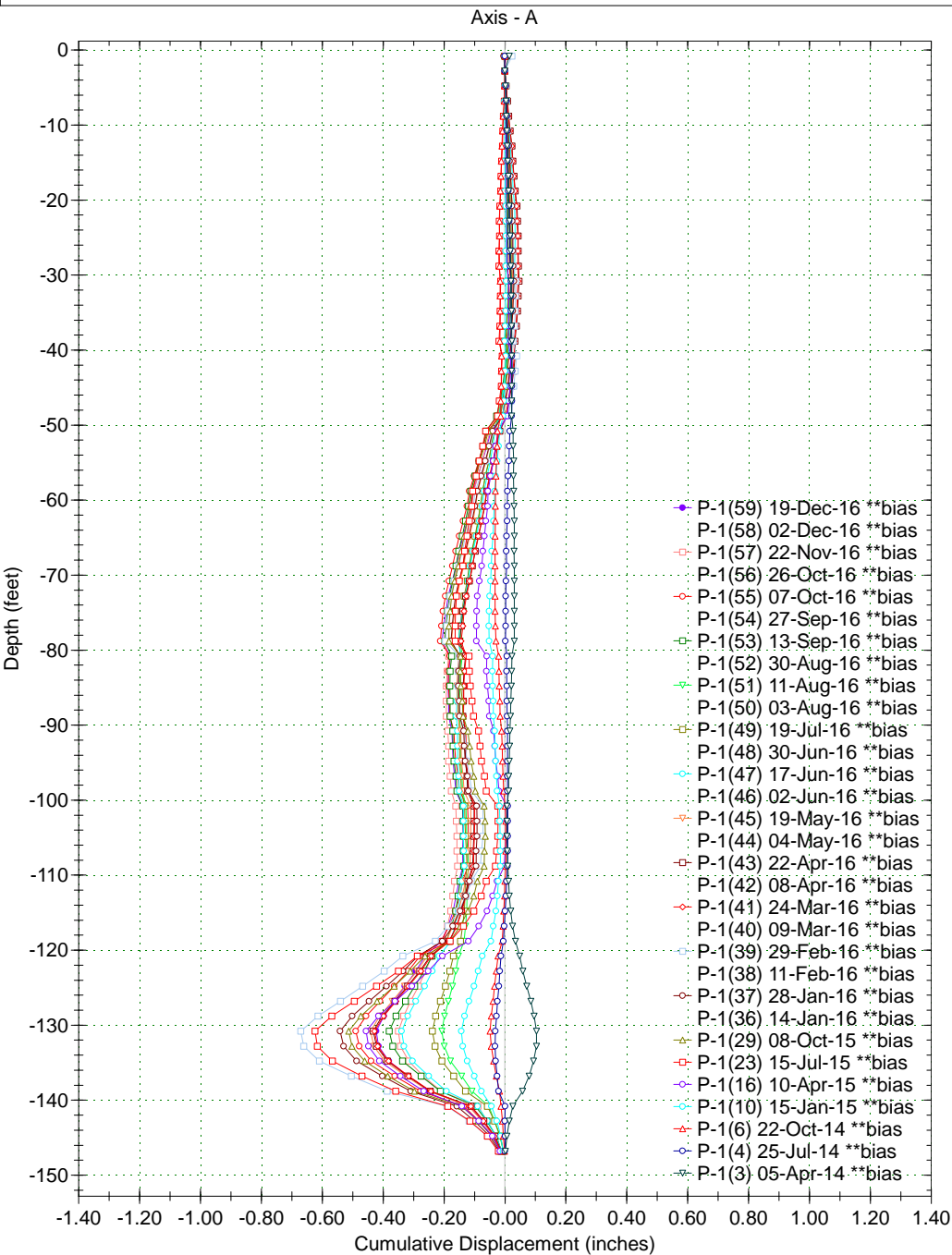
Spiral Correction : N/A
Collar Elevation : 0.0 feet
Borehole Total Depth : 230.0 feet
A+ Groove Azimuth :
Base Reading : 2016 Sep 28 08:37
Applied Azimuth : 0.0 degrees



Borehole : P-1
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :

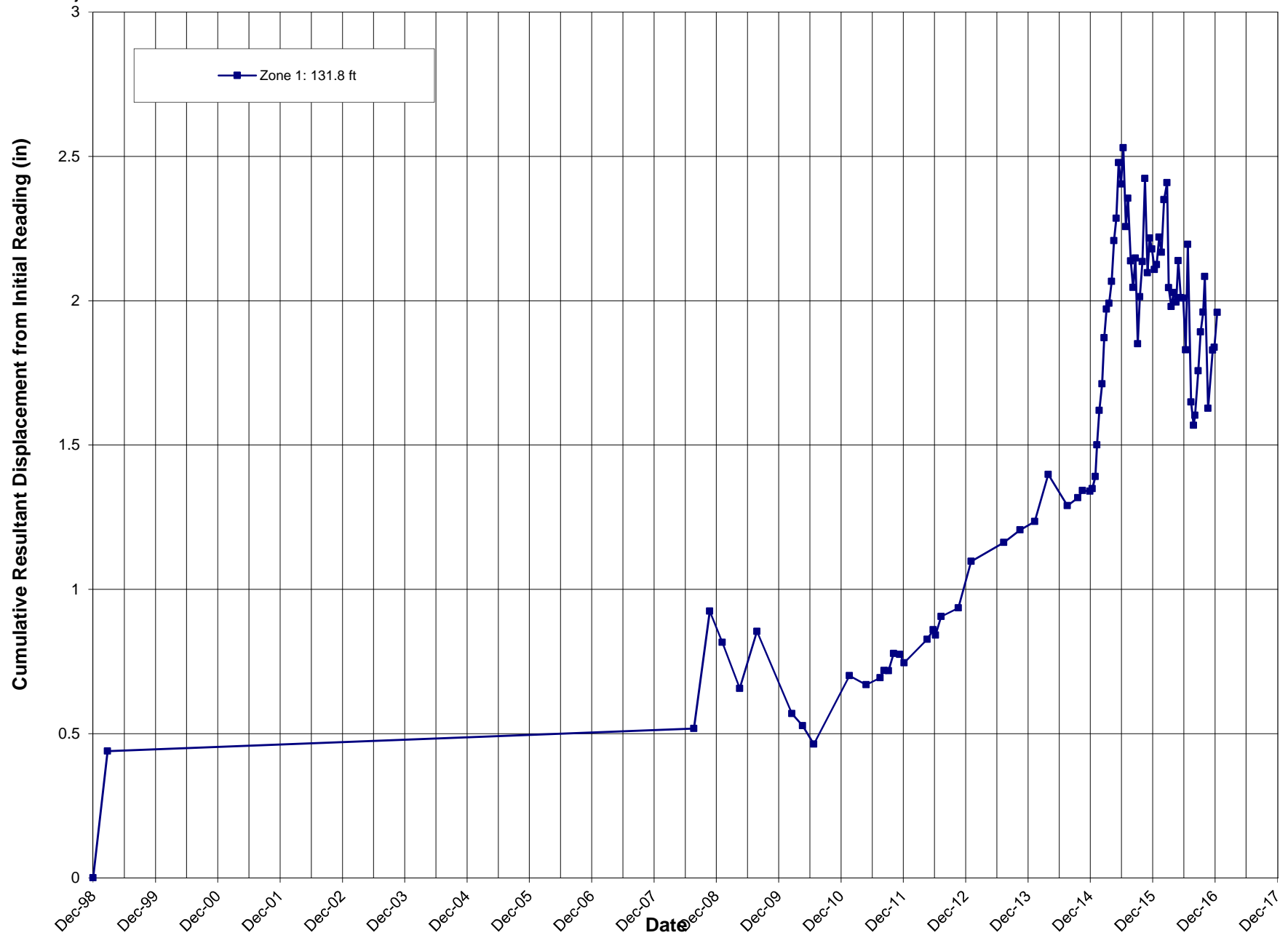


Spiral Correction : N/A
Collar Elevation : 1.2 feet
Borehole Total Depth : 148.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 22 10:47
Applied Azimuth : 0.0 degrees



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SME Project#: 069032.00

P-1



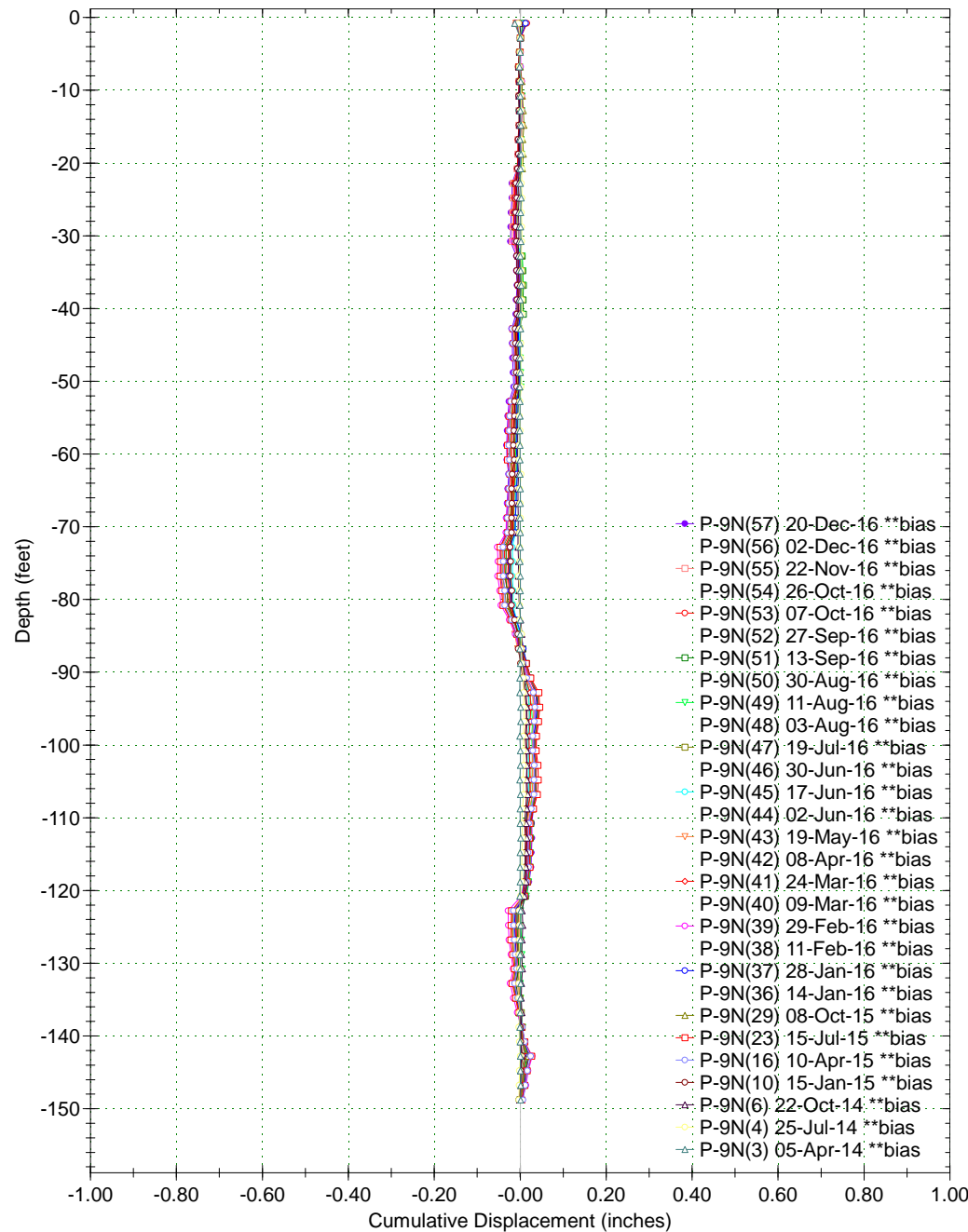
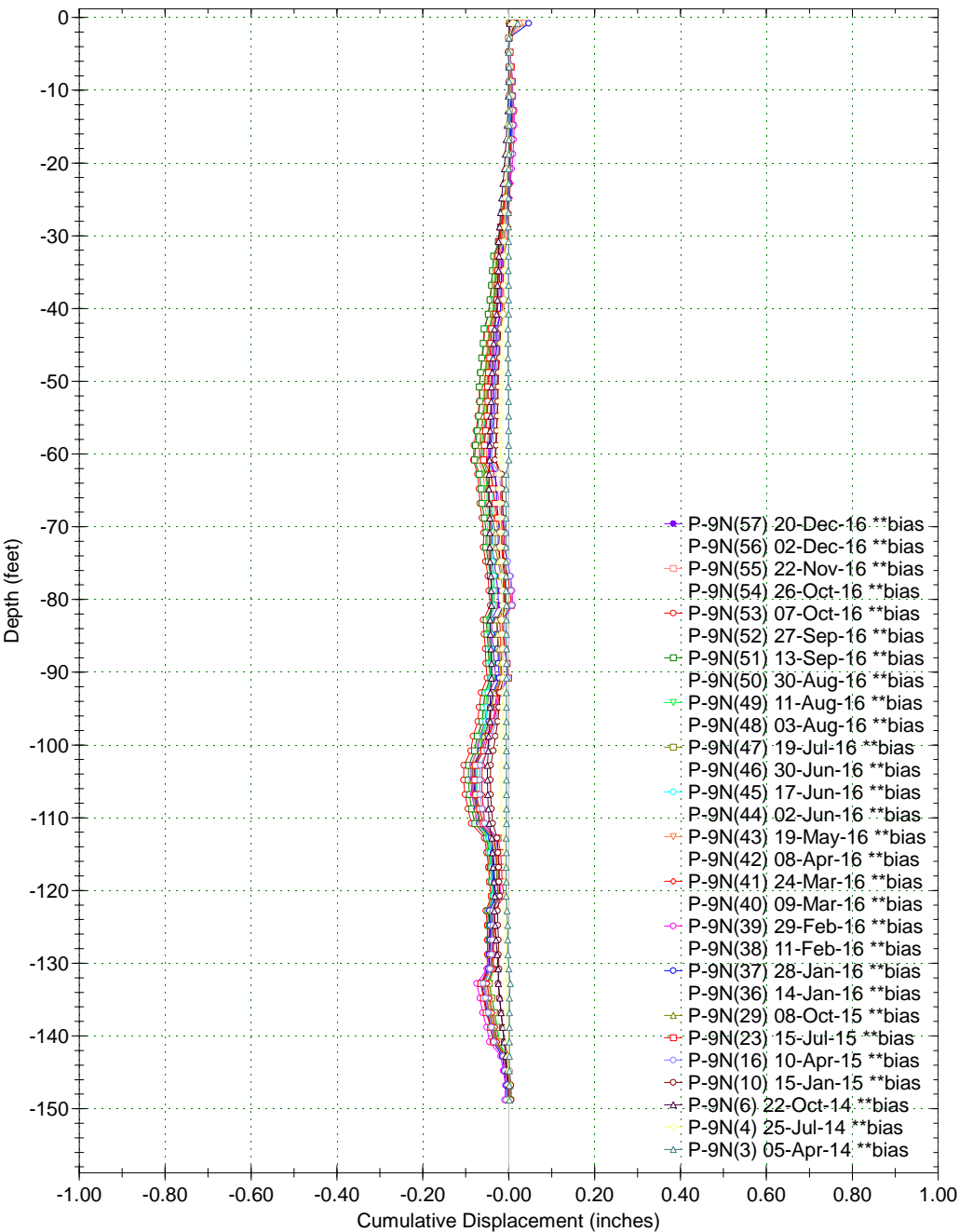
Borehole : P-9N
 Project : CUY-90-15-24
 Location : Cleveland, Ohio
 Northing :
 Easting :
 Collar :



Spiral Correction : N/A
 Collar Elevation : 1.2 feet
 Borehole Total Depth : 150.0 feet
 A+ Groove Azimuth :
 Base Reading : 2014 Jan 16 09:28
 Applied Azimuth : 0.0 degrees

Axis - A

Axis - B



Borehole : TGR I-4
 Project : CUY-90-15-24
 Location :
 Northing :
 Easting :
 Collar :



Spiral Correction : N/A
 Collar Elevation : 3.0 feet
 Borehole Total Depth : 58.0 feet
 A+ Groove Azimuth :
 Base Reading : 2015 Sep 23 10:39
 Applied Azimuth : 0.0 degrees

Axis - A

Axis - B

