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August 23, 2016

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](mailto:Dave.Lastovka@dot.state.oh.us)

Re: August 11, 12, and 15, 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 August 11, 12, and 15, 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, 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, TGR I-2, and TGR I-4. Changes reported for the individual instruments are for the previous two-week period unless noted otherwise.

### **Piezometer Readings**

P-002-13, P-004-13, B-05-02, B-05-A-03, B-05-04 – Pore pressure readings at these locations fluctuated by less than 0.5 feet, but show virtually no net change in total head.

**P-001-13** – Seven piezometers are installed at this location. Five of the seven fluctuated by less than 0.5 feet. Piezometers at elevations 550 feet and 580 feet have continued to trend upward since October 2015.

**P-003-10** – Seven piezometers are installed at this location. Total head in the four shallowest piezometers increased by about 0.6 feet this period. Readings in the other piezometers show slight increases in total head.

**P-009-13** – Total head in the shallow piezometer at this location increased by about 1 foot. Readings in the deep piezometer show virtually no change in total head.

**B-105-A** – The total head in the shallow piezometer increased by about 0.2 feet. total head has been trending upward since mid-June 2016. Total head in the deep piezometer decreased only slightly this period but has

continued to trend downward since the beginning of June 2016. Since June 3, 2016 the change has been about 0.3 feet.

**B-05-A-11** – Pore pressure readings indicate an increase in total head of about 0.6 feet in the shallow piezometer and about 0.3 feet in the deep piezometer at this location.

### **Inclinometer Readings**

Inclinometer readings at I-001-13, I-002-13, I-003-10, I-009-13, B-101, B-102, B-105A, B-05-02, B-05-A-03, B-05-04, P-1, P-9N, and TGR I-4 showed virtually no movement. Displacement at the top of some slope tubes is due to surface disturbance adjacent to the installation or flexing of the inclinometer tube as readings were taken in instances where the protective covers have not yet been concreted in place because of the ongoing construction activity.

**B-05-A-11** – Inclinometer readings at this location indicate movement in the positive A-axis direction from the surface to about 10 feet. This movement is due to the excavation of the slope adjacent to this location for the construction of the gabion basket wall.

**TGR I-2** – This location is still inaccessible.

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

Very truly yours,

SME

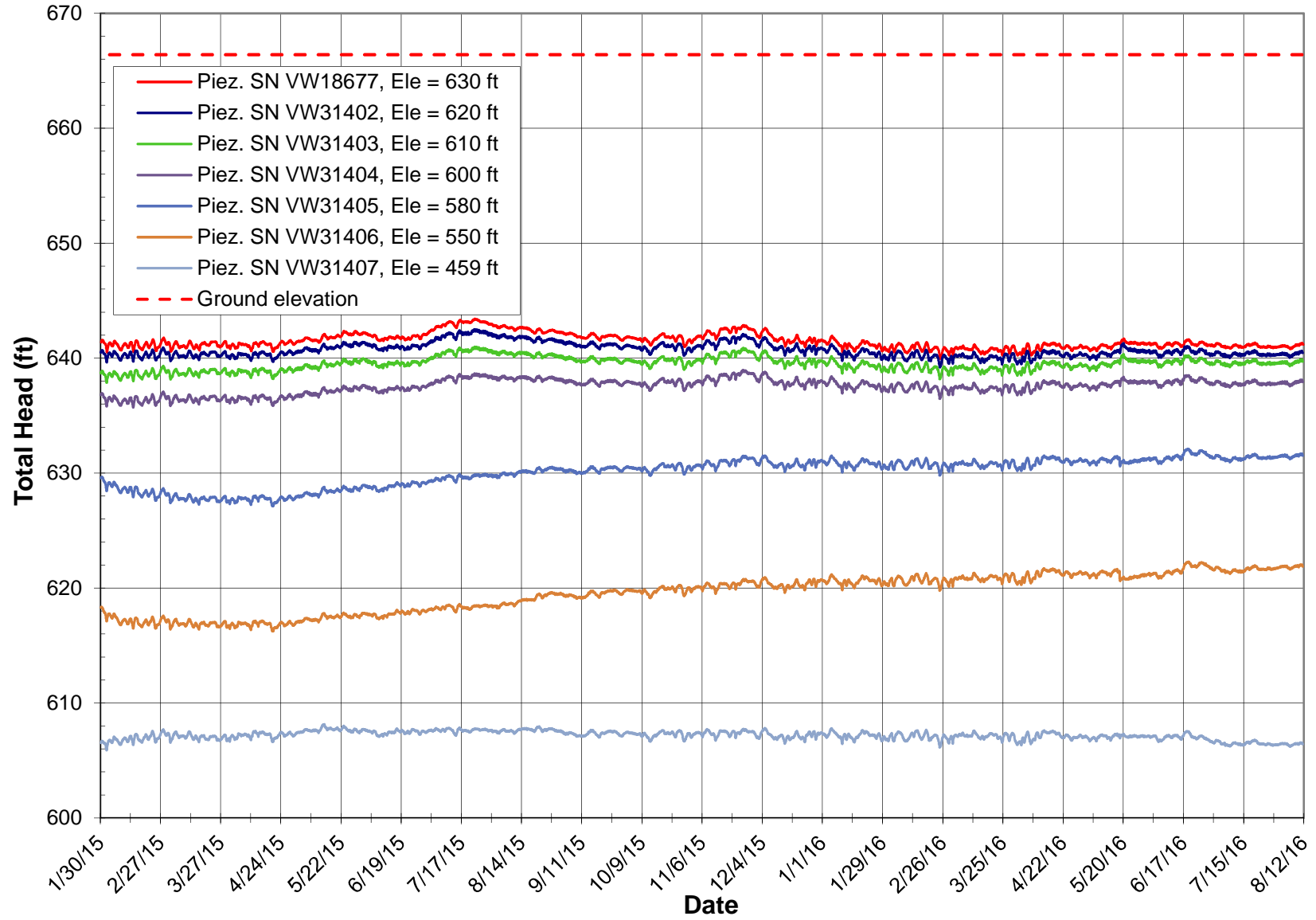
Brendan P. Lieske, P.E.  
Senior Staff Engineer

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

Copied to distribution list.

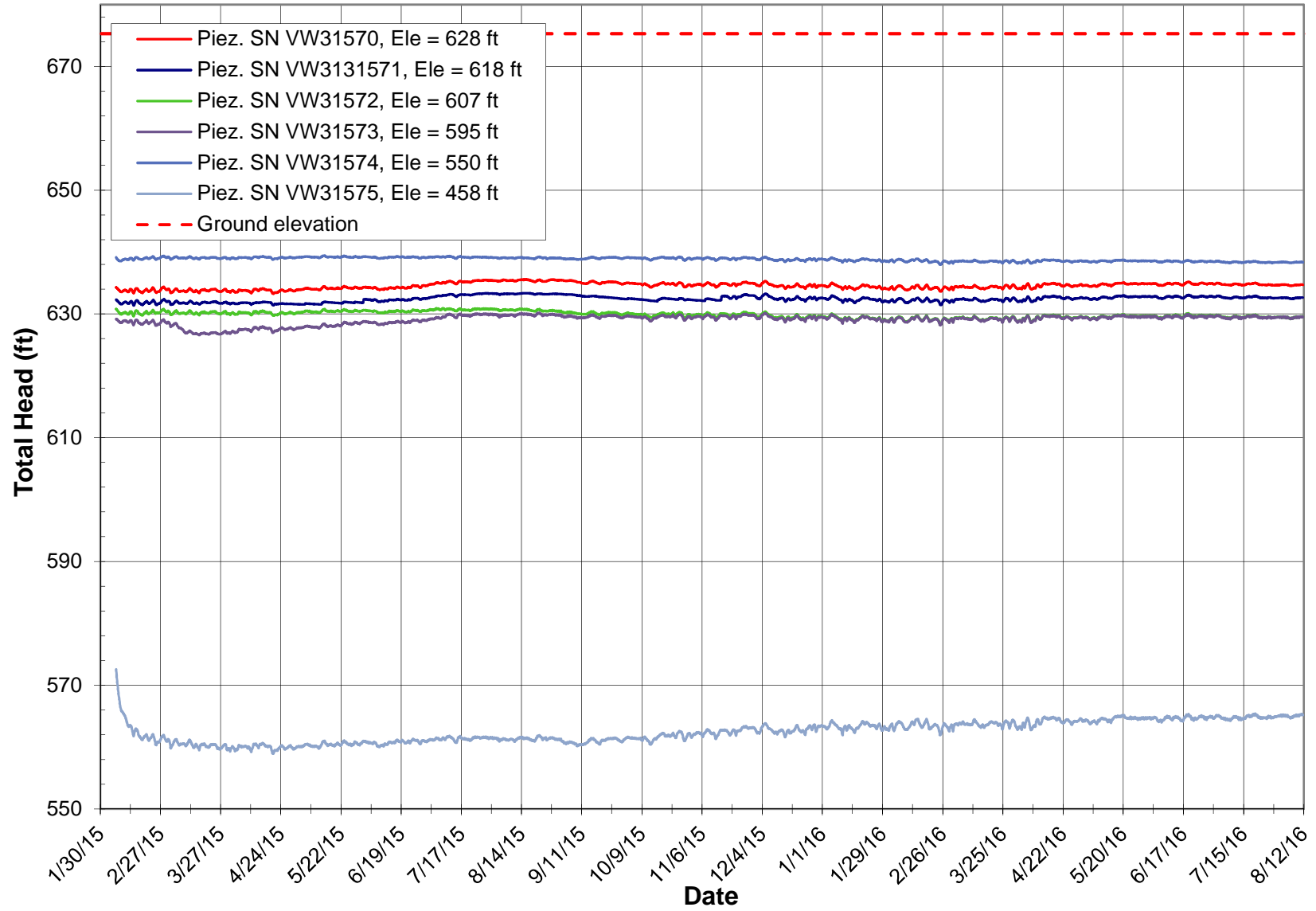
# P-001-13 VW Piezometer Readings

Ground surface elevation = 666.4 ft



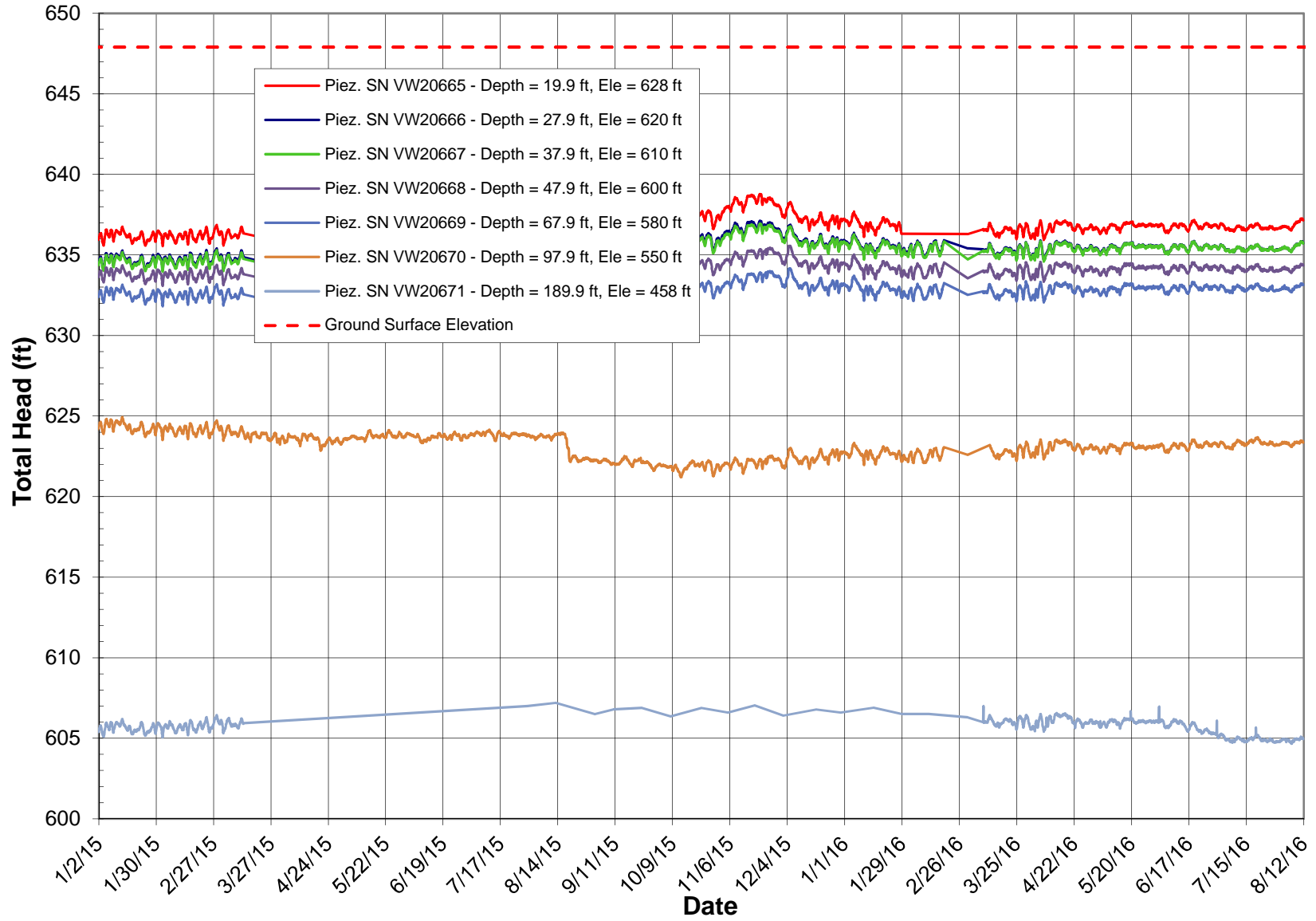
# P-002-13 VW Piezometer Readings

Ground surface elevation = 675.29 ft



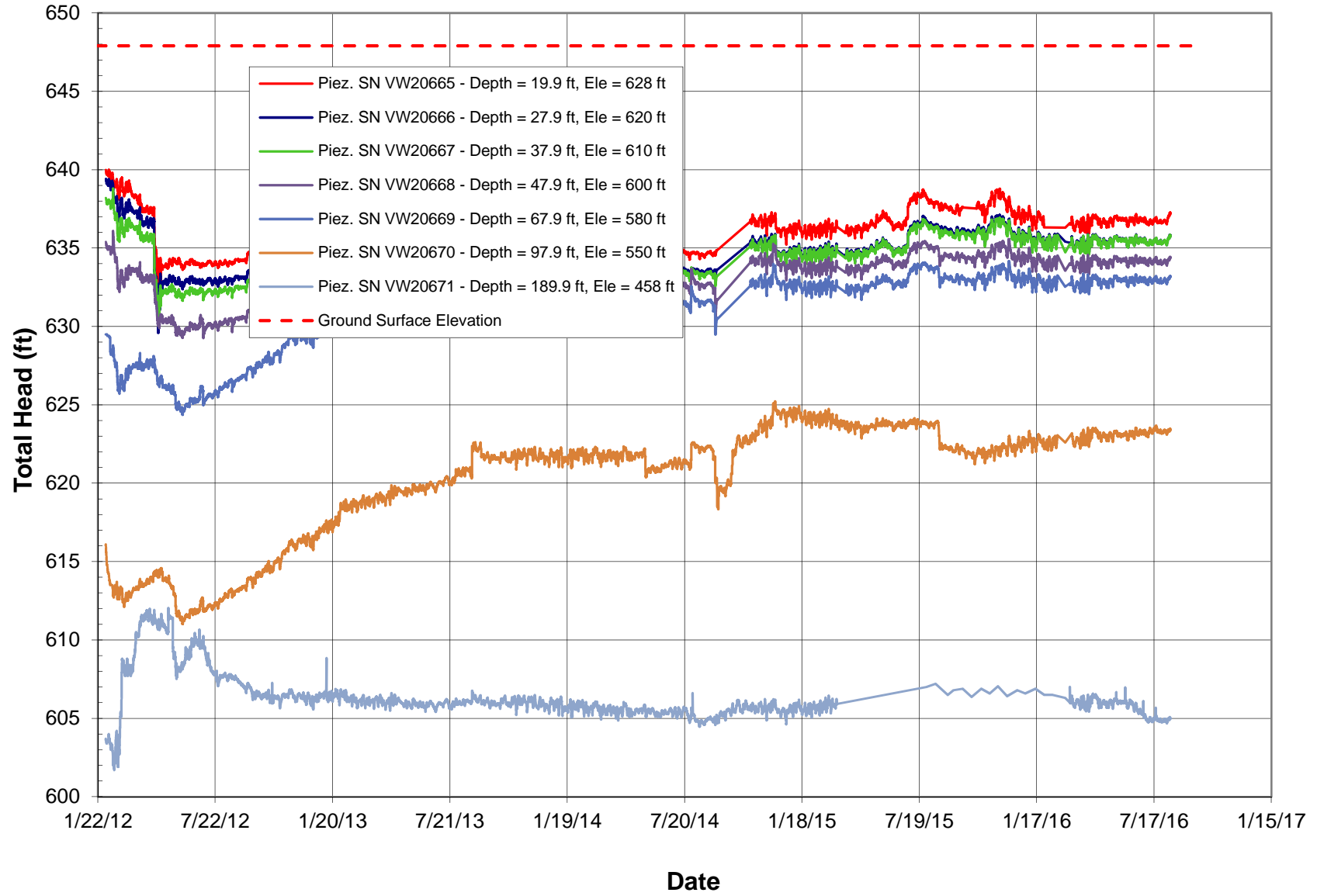
# P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



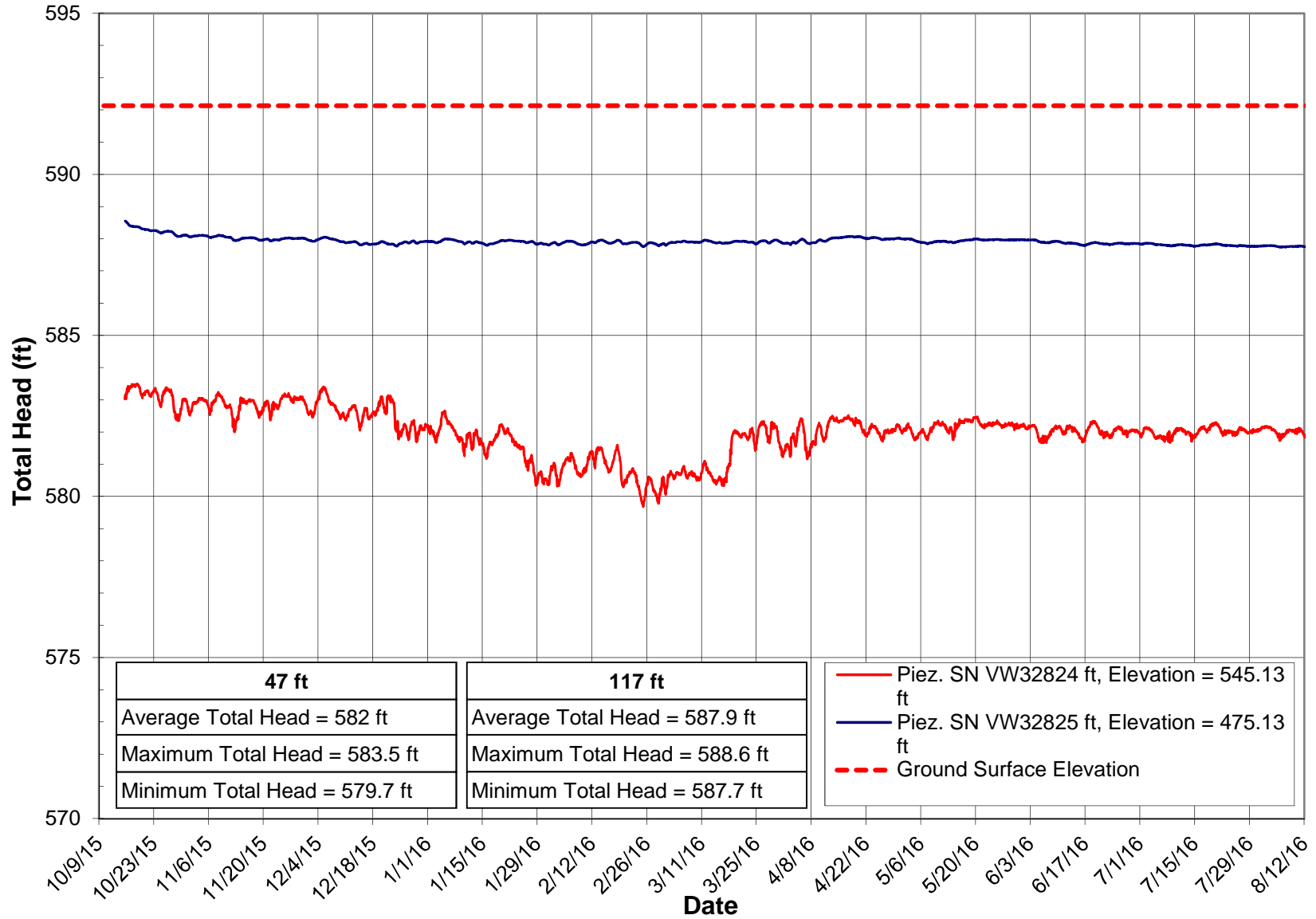
# P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



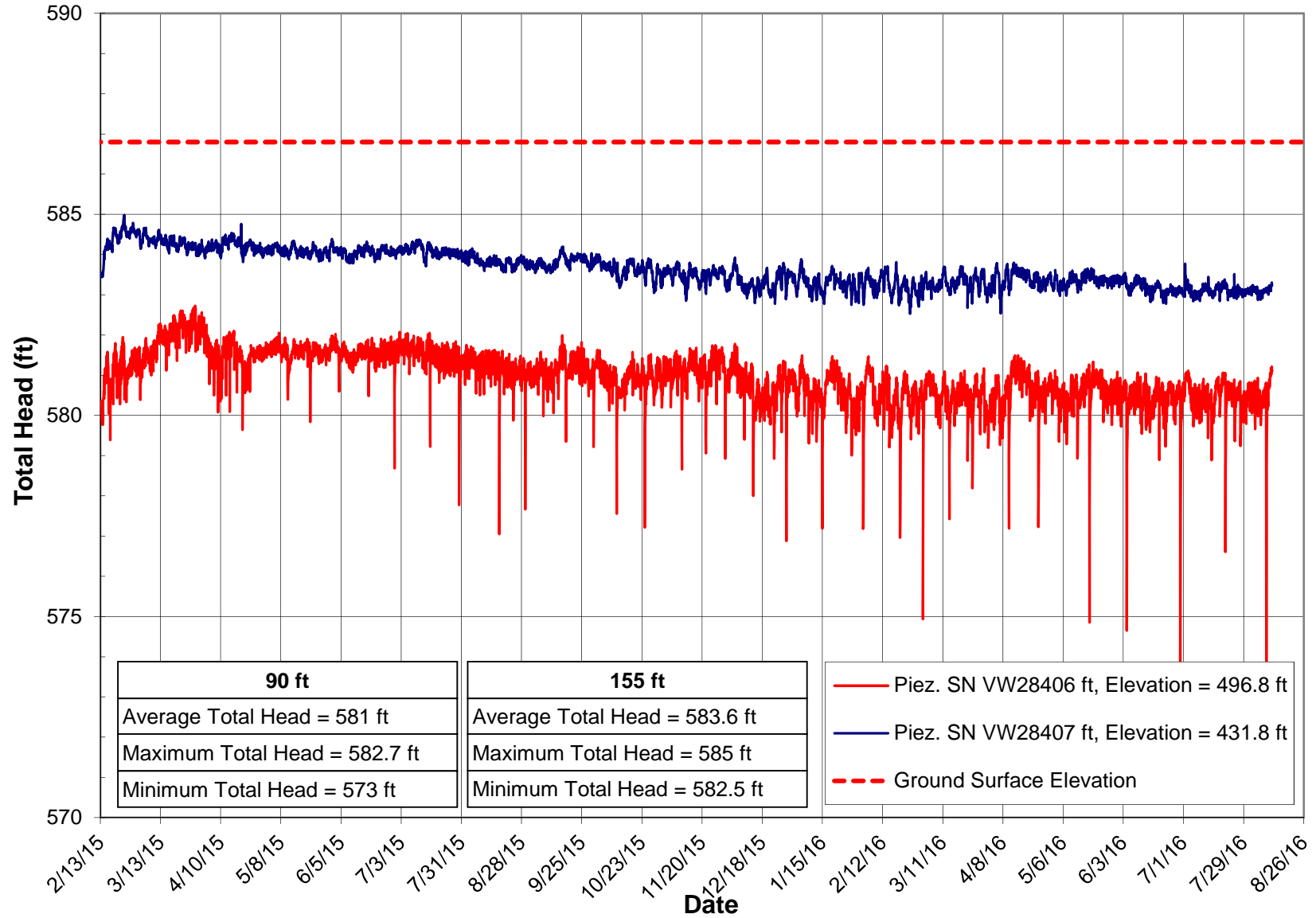
# P-004-13 VW Piezometer Readings

Ground surface elevation = 592.13 ft



# P-009-13 VW Piezometer Readings

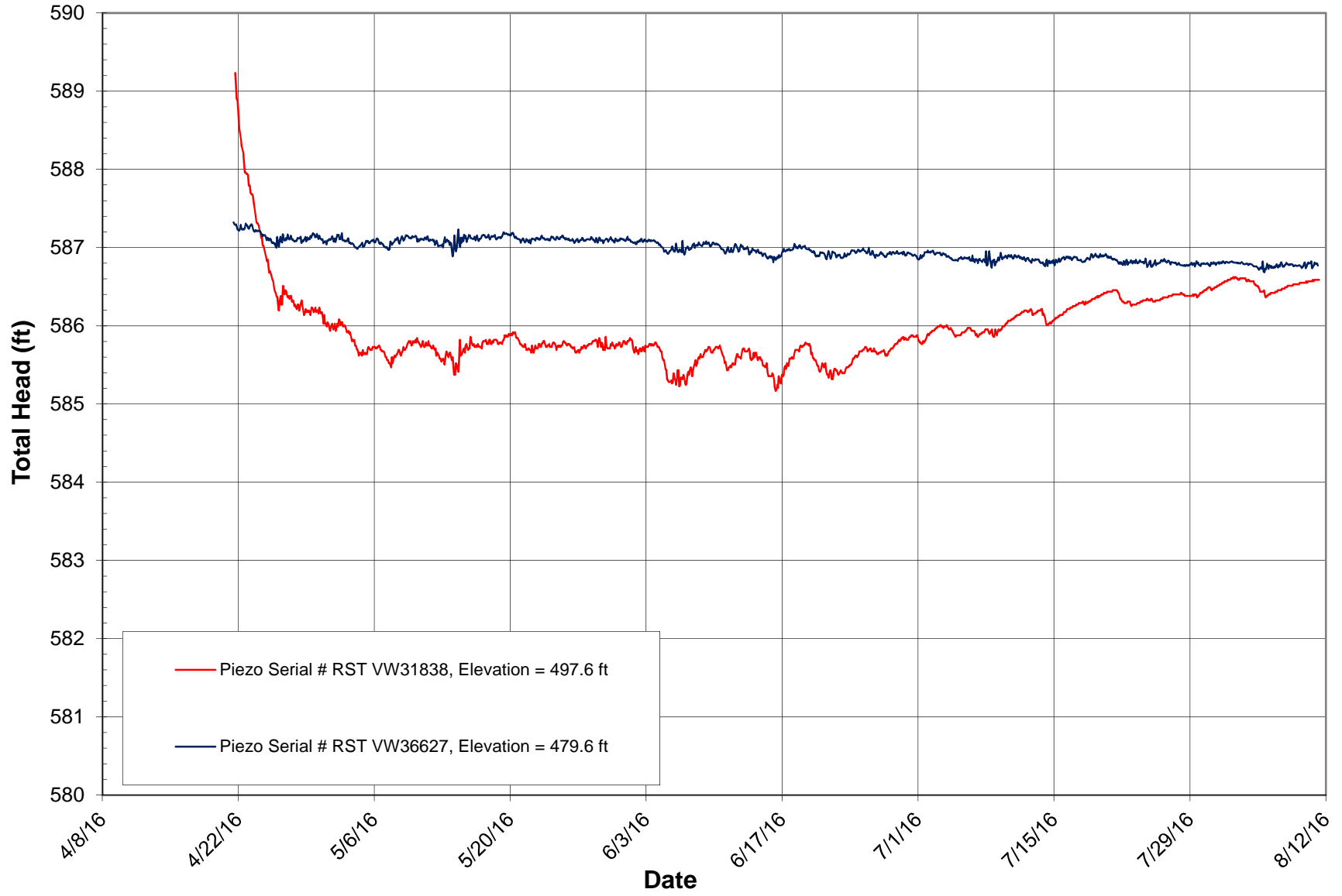
Ground surface elevation = 586.6 ft





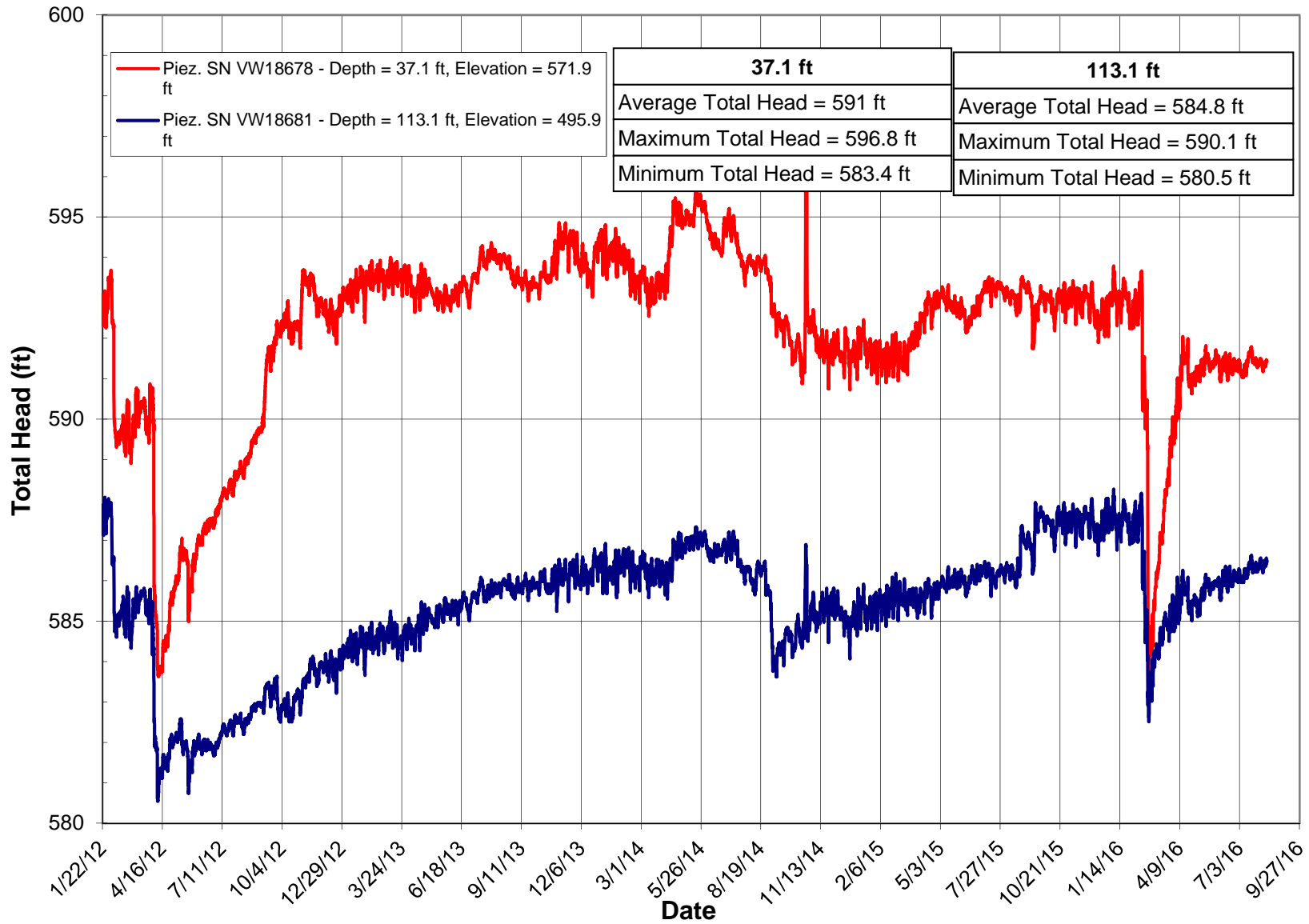
# B-105A VW Piezometer Readings

Ground surface elevation = 585.6 ft



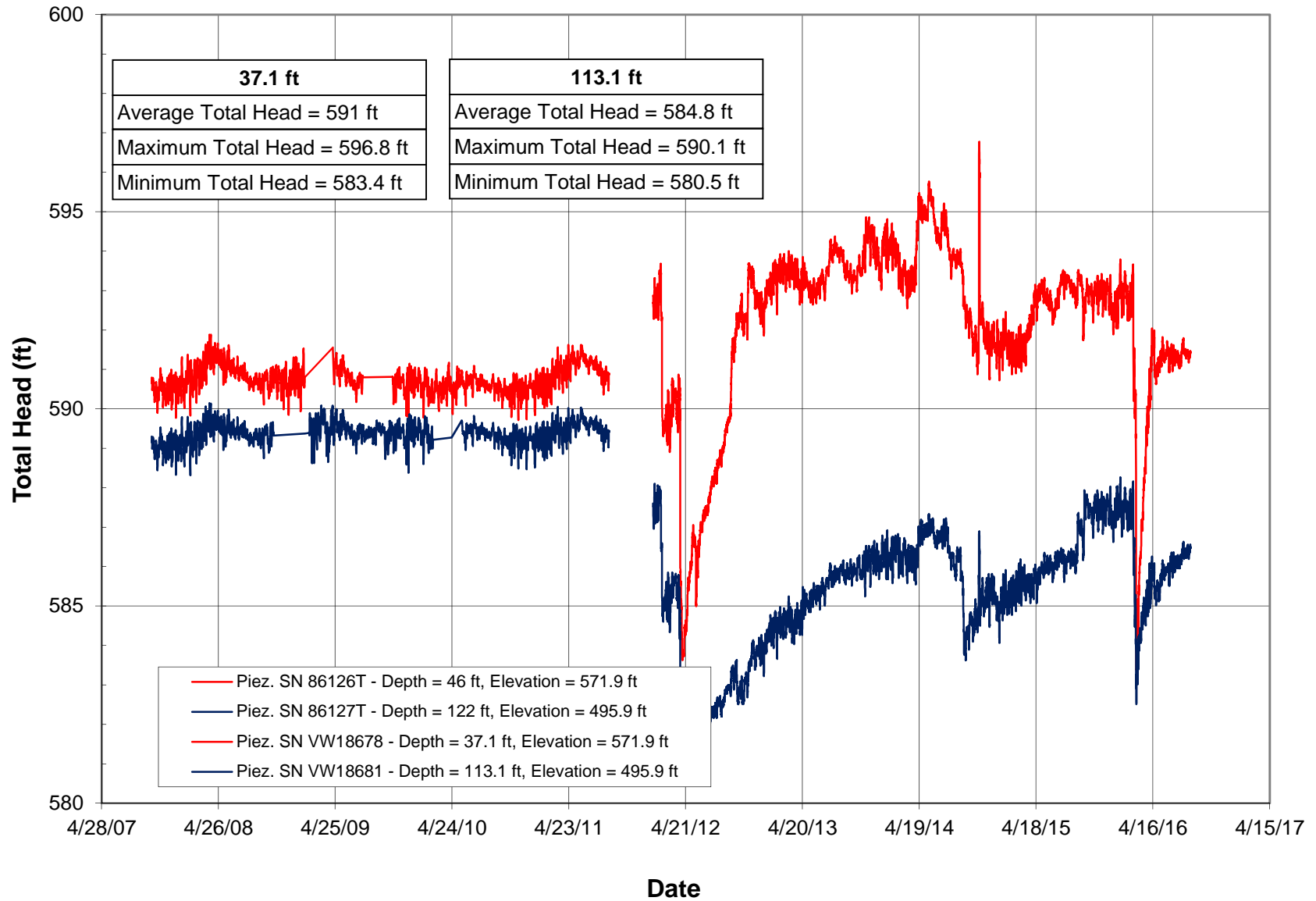
# B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



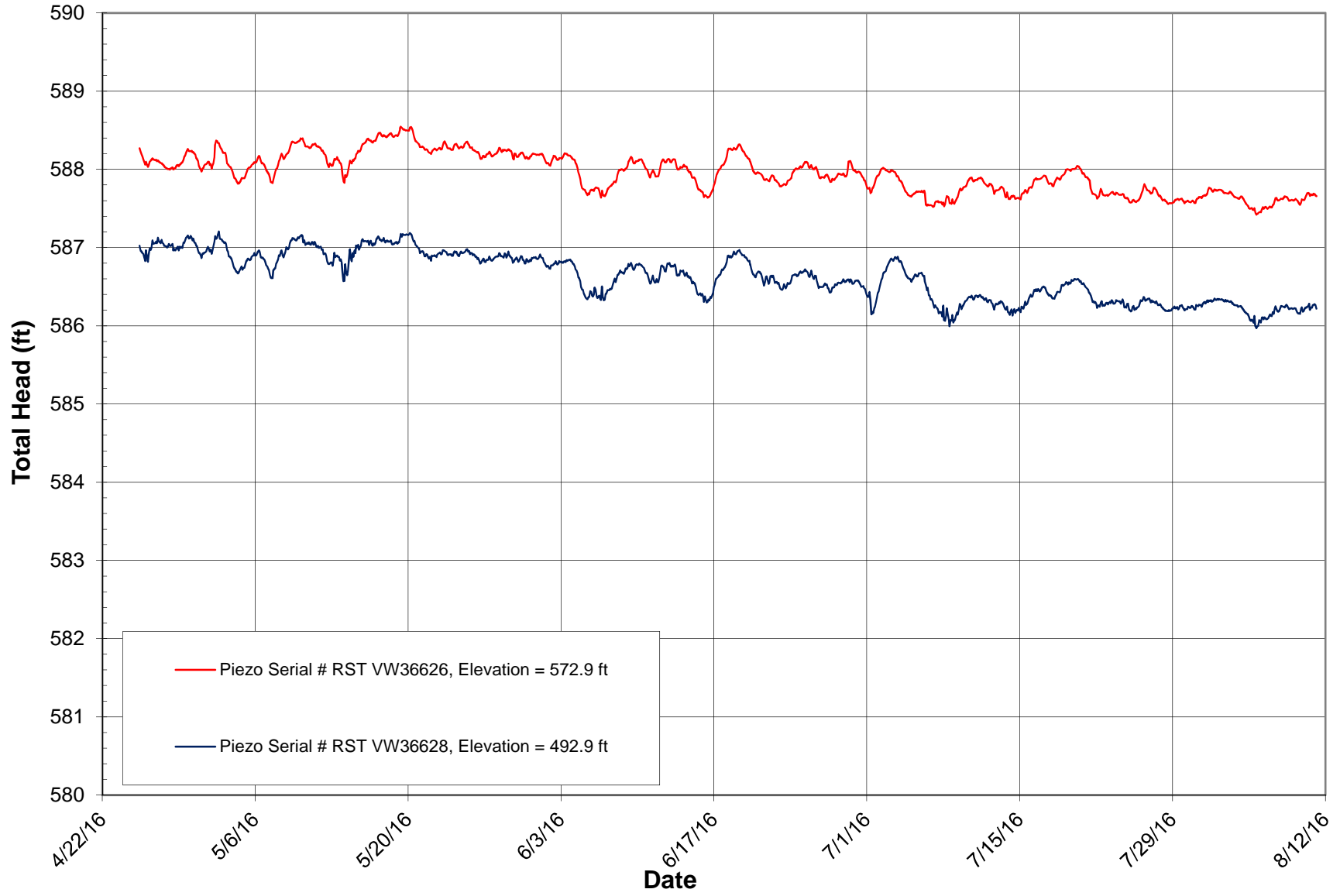
# B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



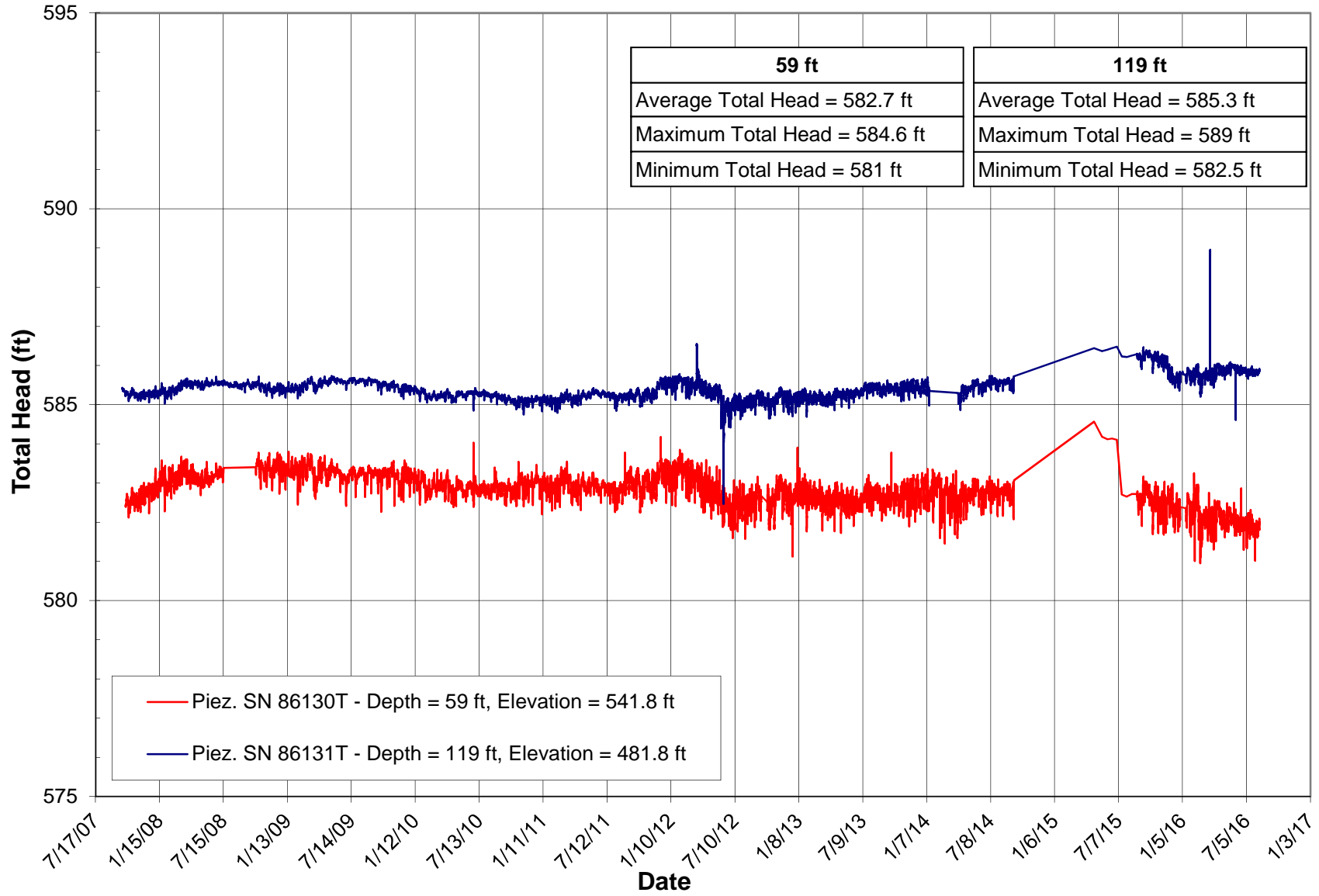
# B-05-A-03 VW Piezometer Readings

Ground surface elevation = 599.9 ft



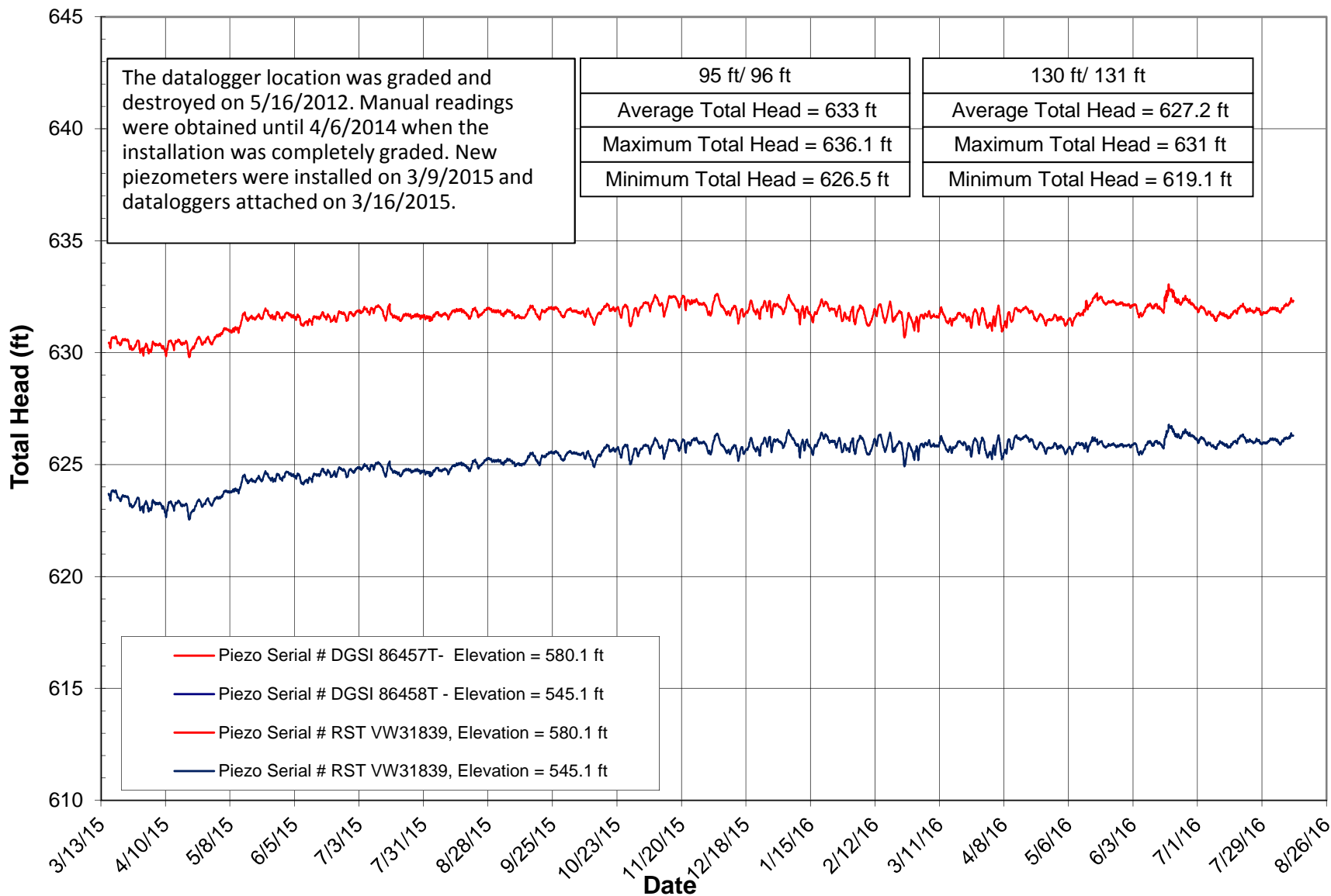
# B-05-04 VW Piezometer Readings

Ground surface elevation = 600.8 ft



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

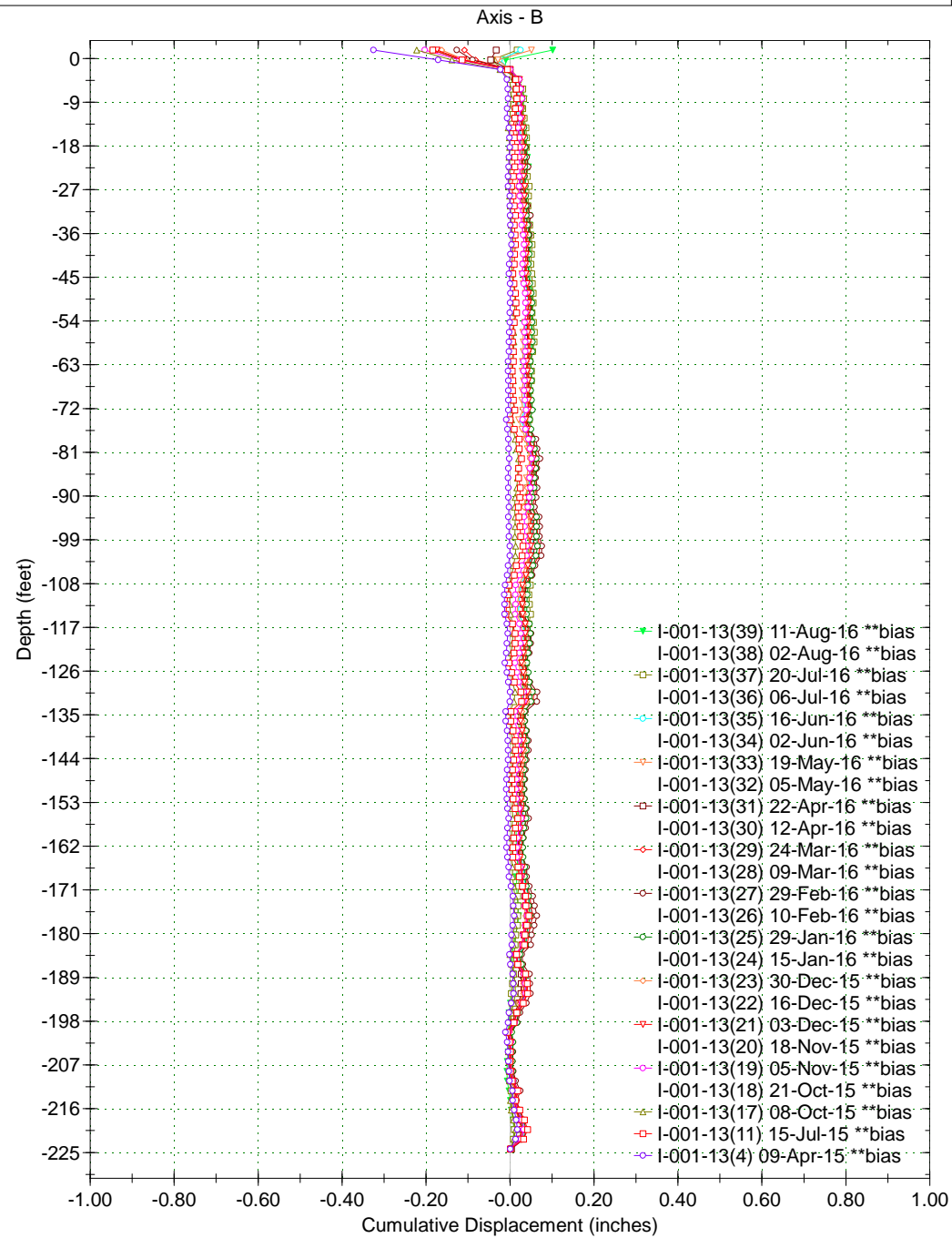
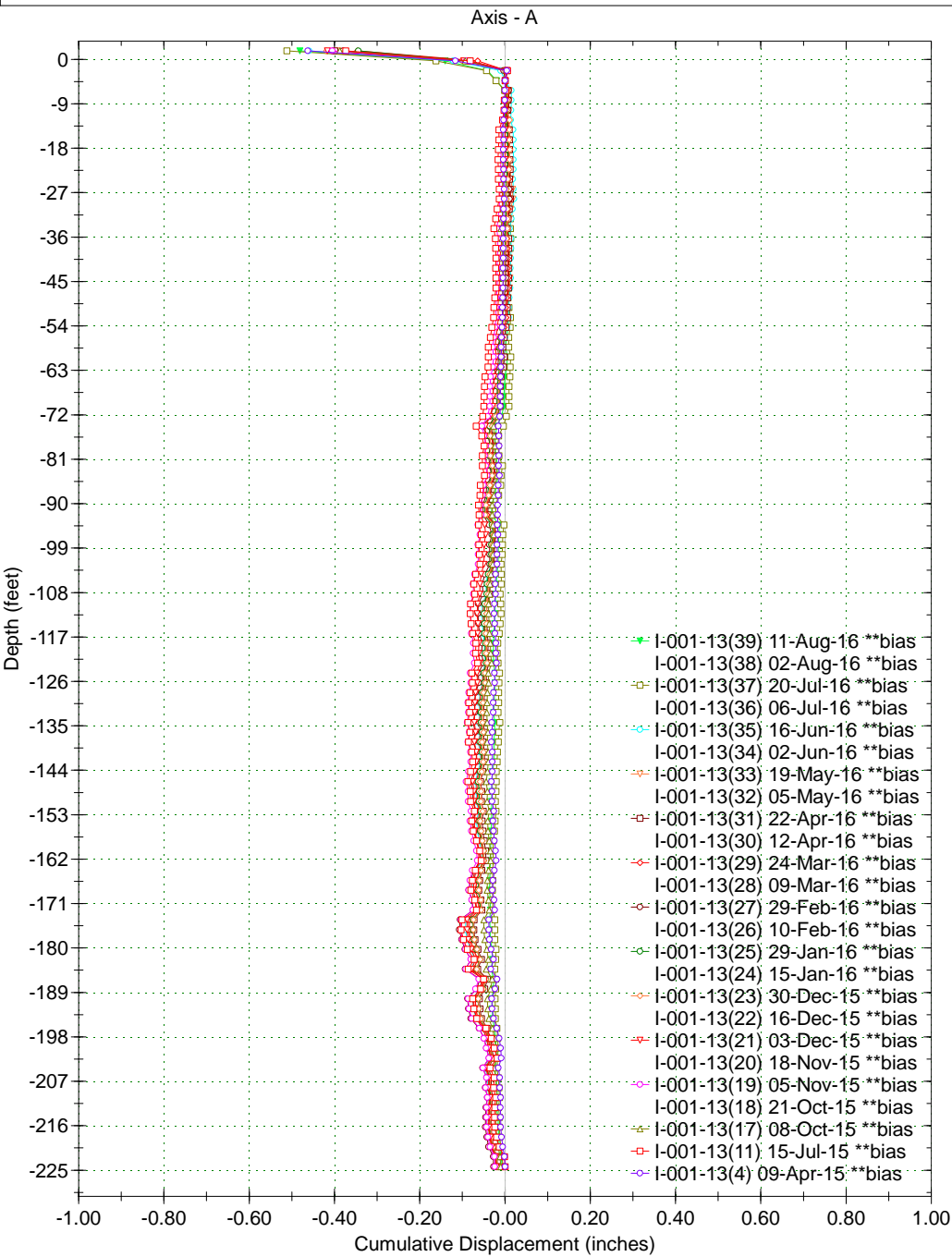
Ground surface elevation = 675.1 ft (B-05-11) / 676.1 ft (B-05-A-11)



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



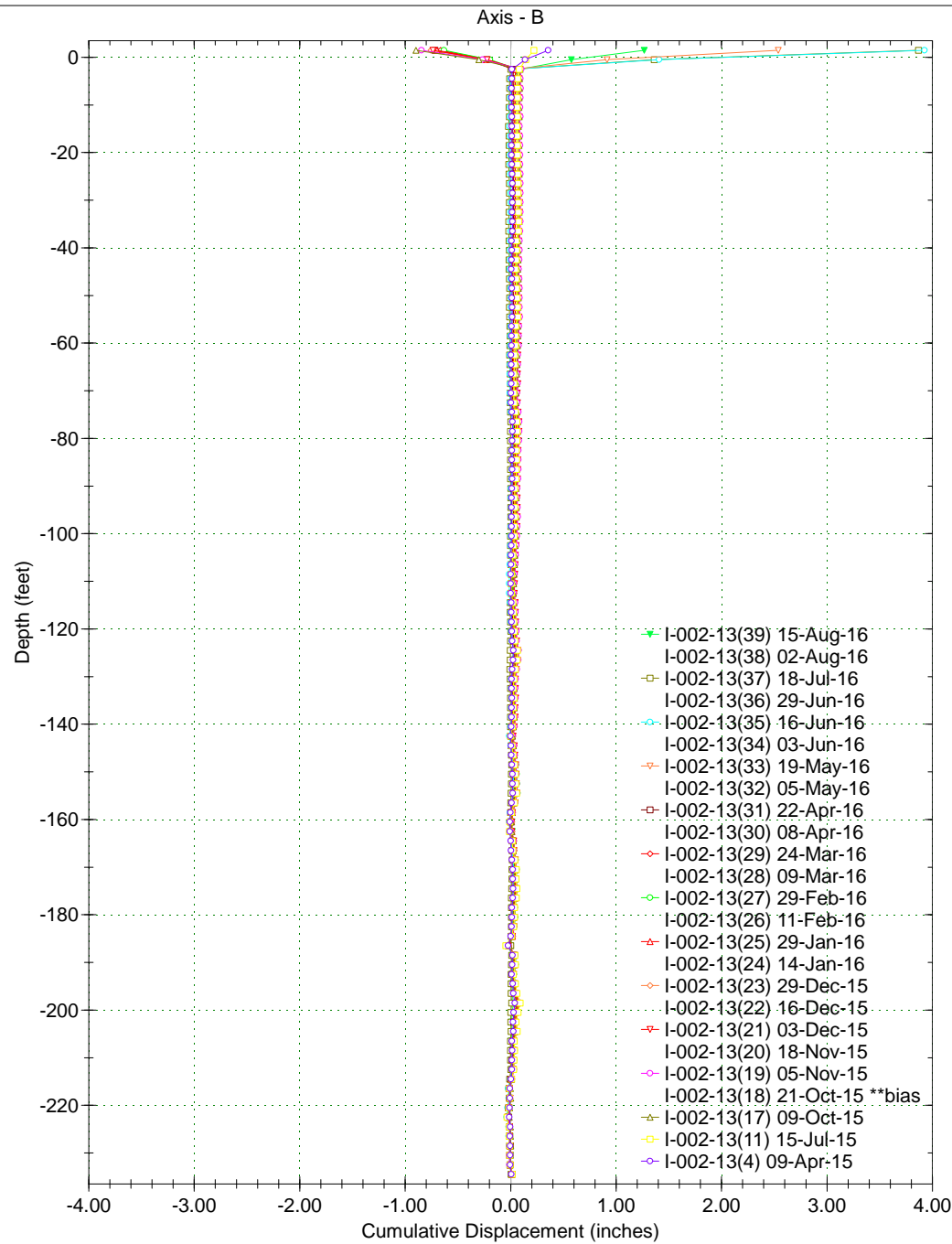
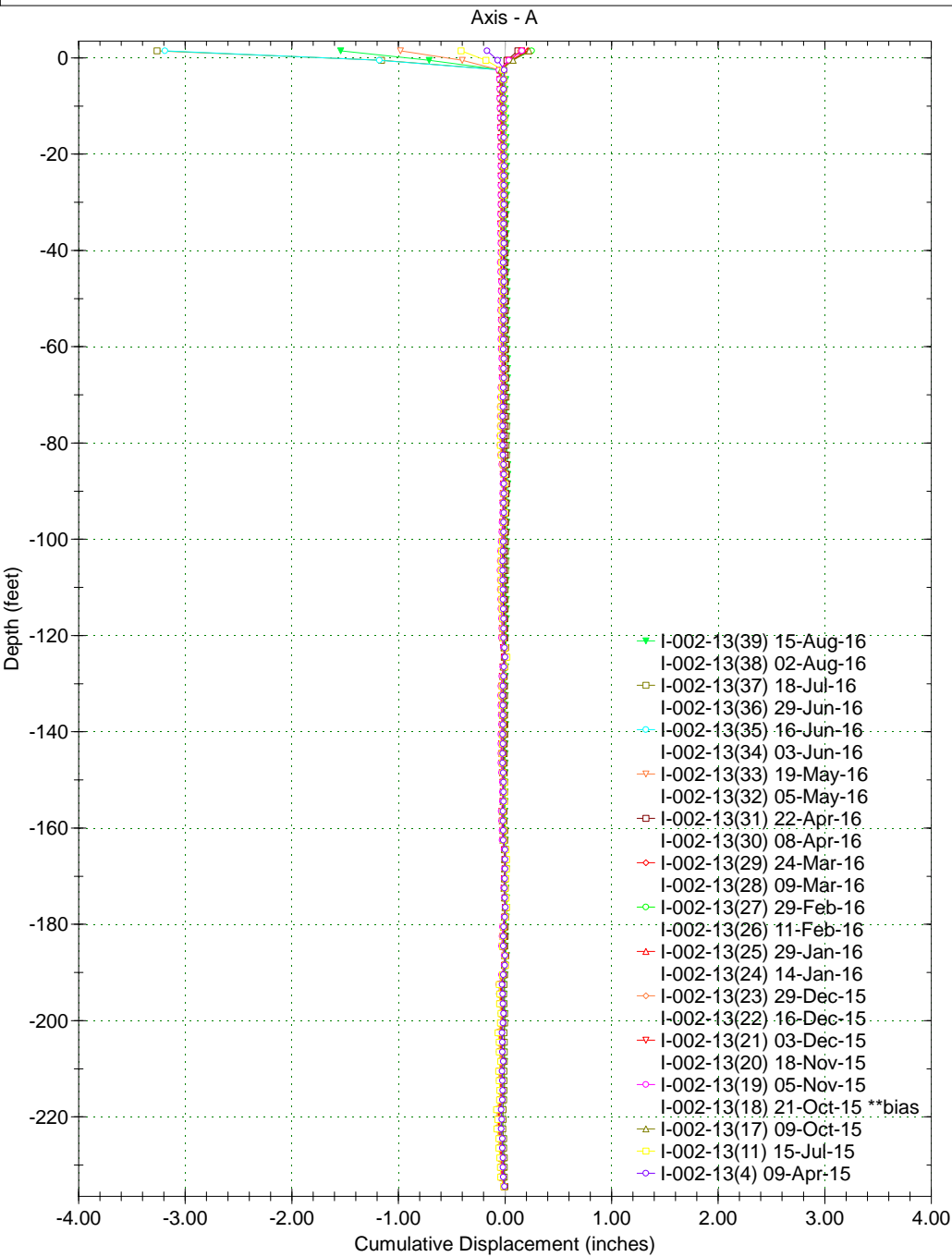
Spiral Correction : N/A  
Collar Elevation : 3.7 feet  
Borehole Total Depth : 228.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Mar 03 11:14  
Applied Azimuth : 0.0 degrees



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 : 238.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Mar 03 10:04  
Applied Azimuth : 0.0 degrees

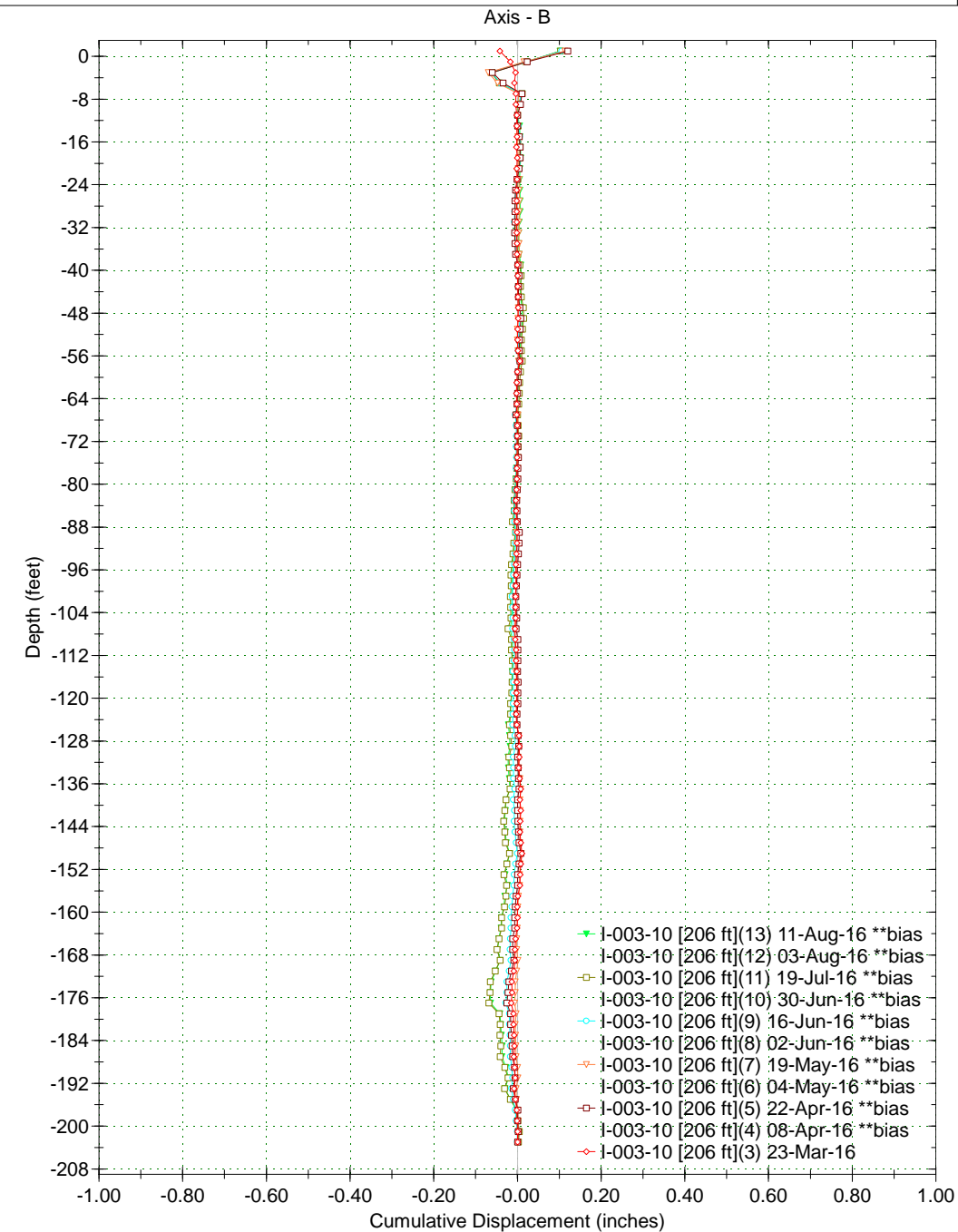
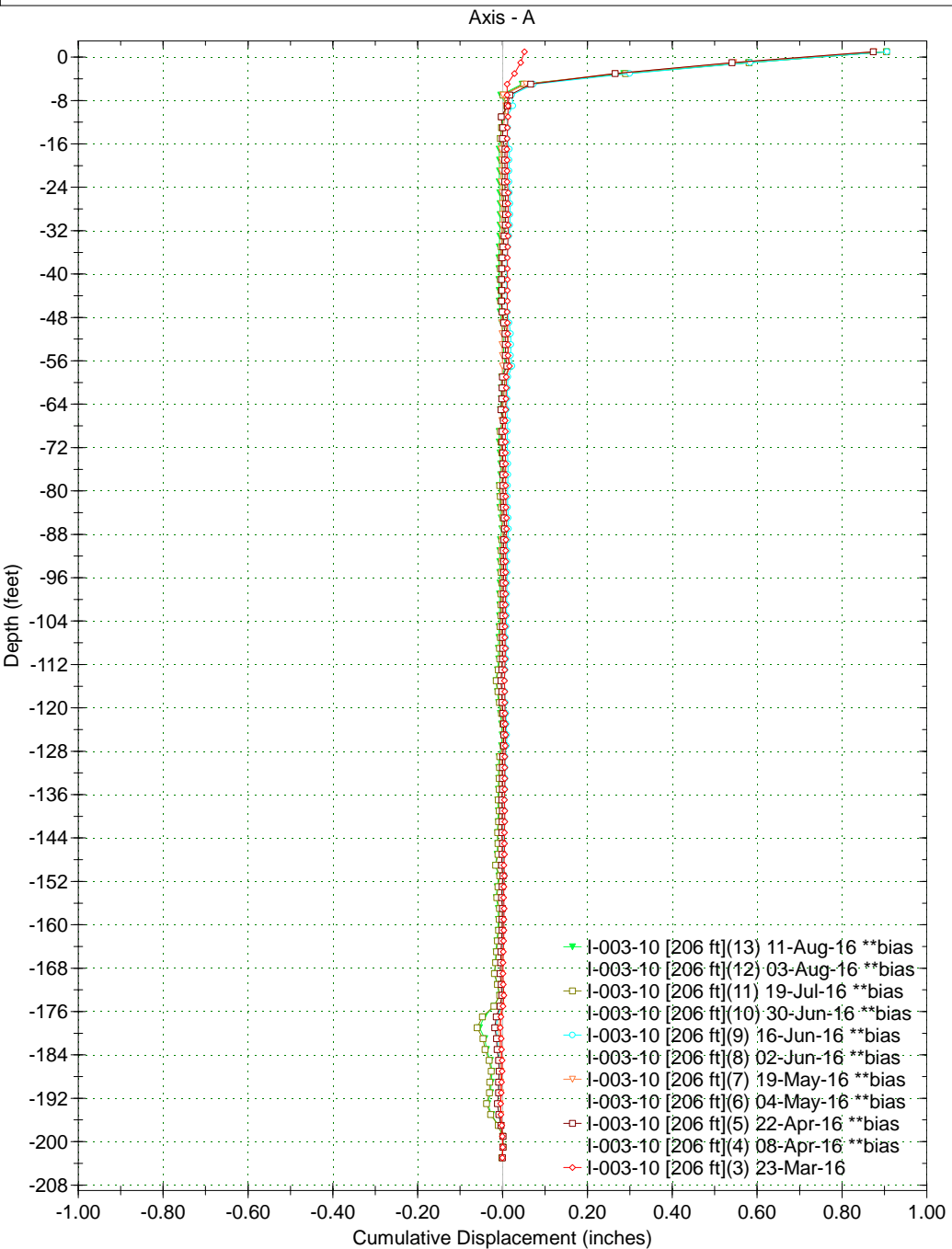




Borehole : I-003-10 [206 ft]  
Project : CUY-90-15-24  
Location :  
Northing :  
Easting :  
Collar :



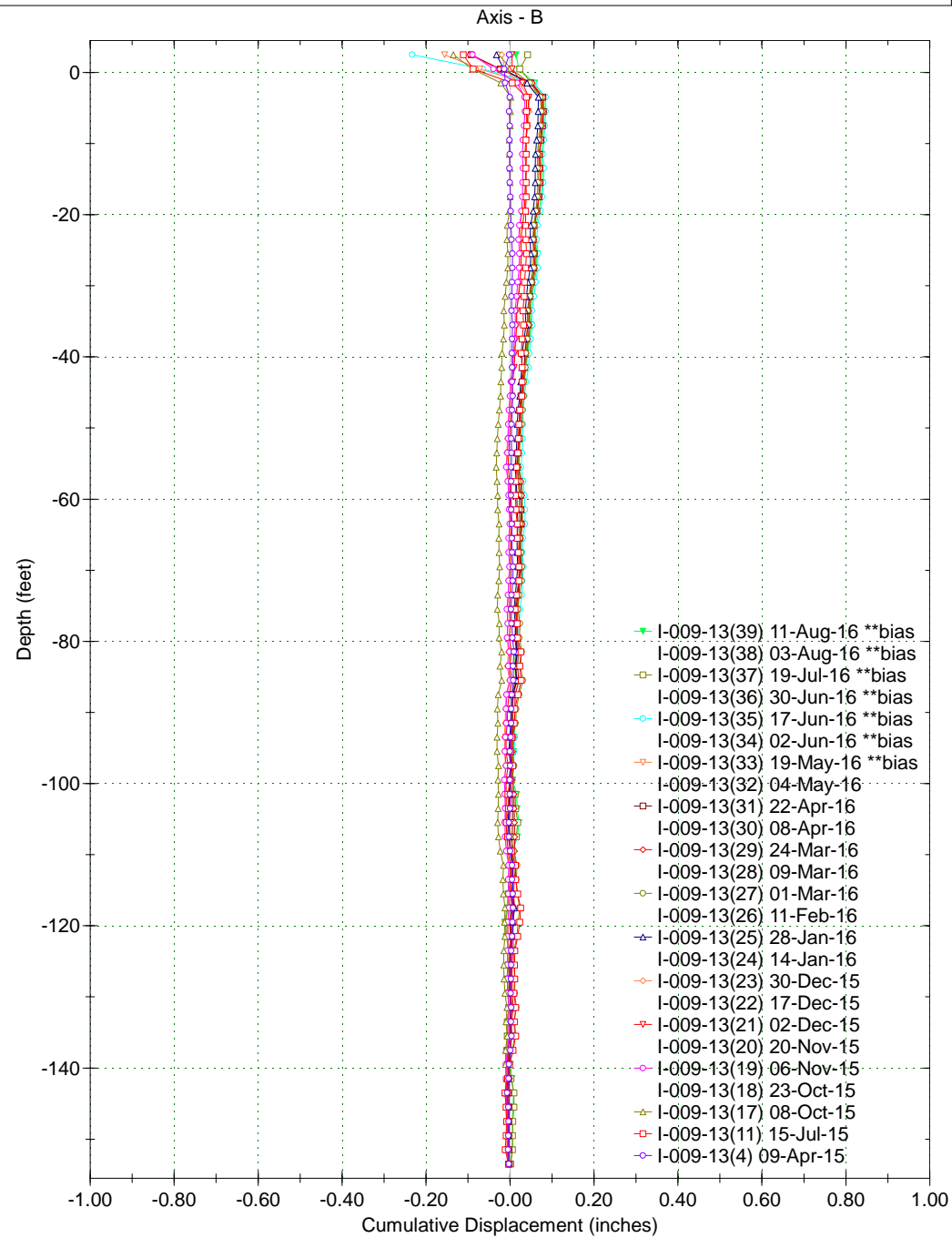
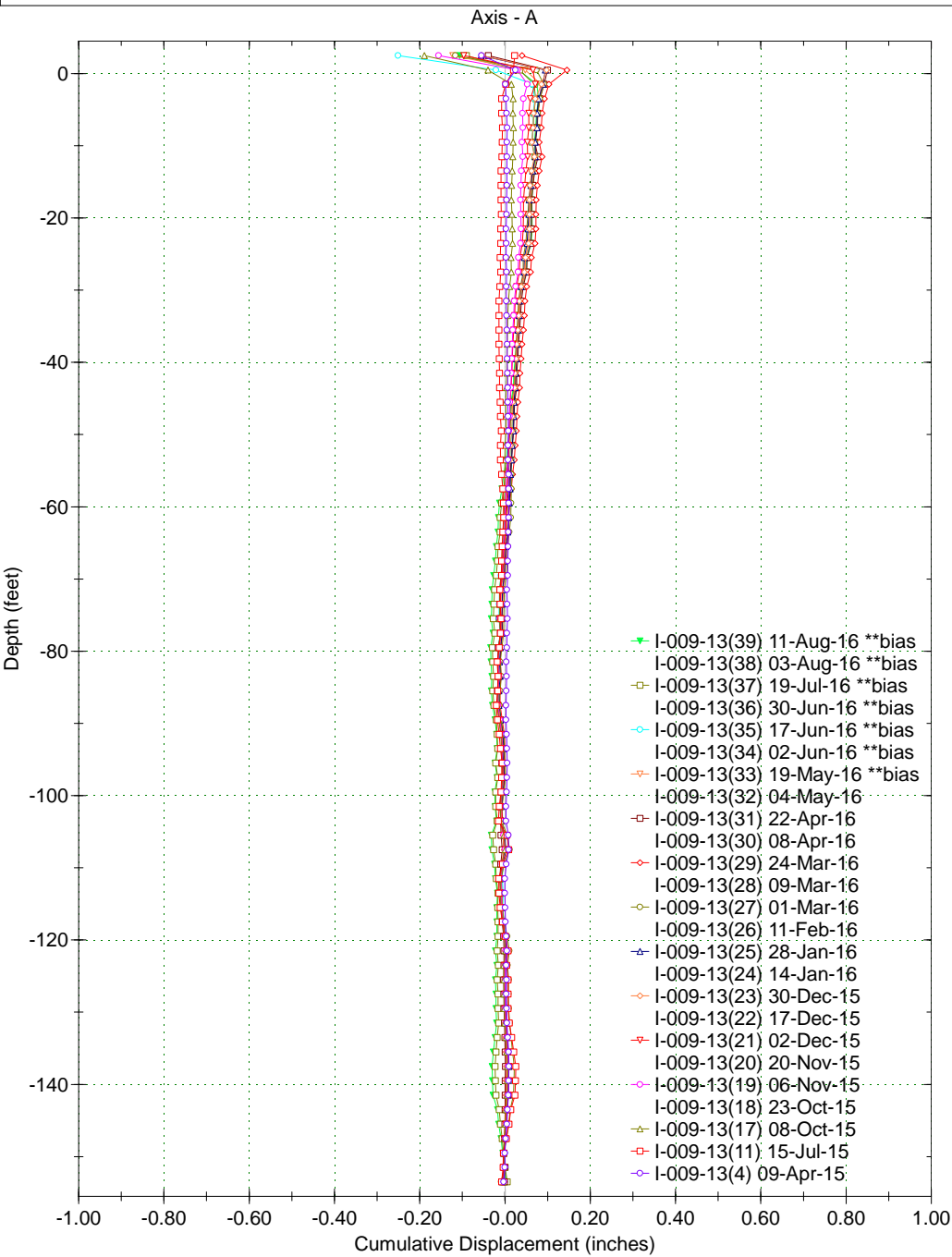
Spiral Correction : N/A  
Collar Elevation : 3.0 feet  
Borehole Total Depth : 206.0 feet  
A+ Groove Azimuth :  
Base Reading : 2016 Mar 08 15:42  
Applied Azimuth : 0.0 degrees



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



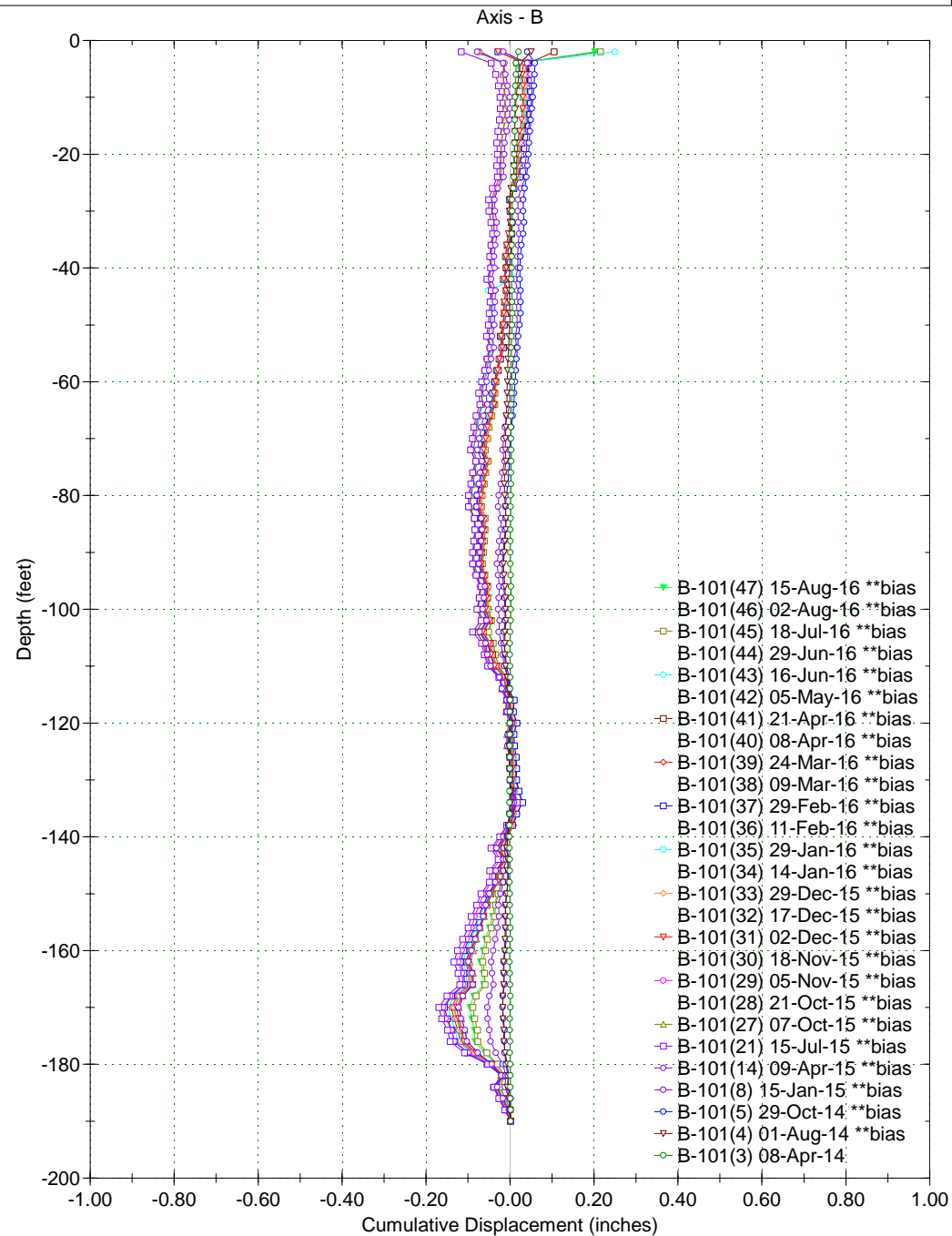
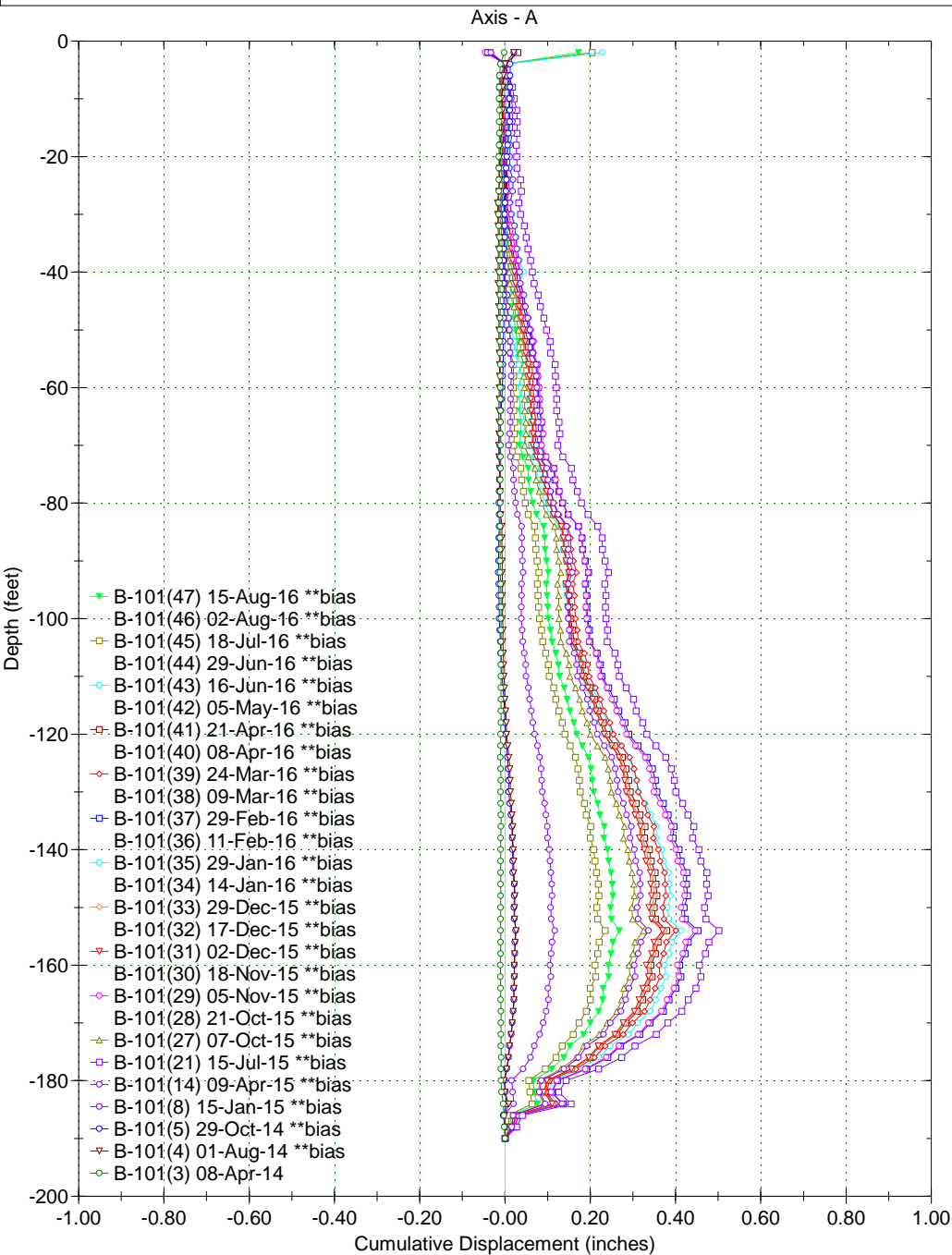
Spiral Correction : N/A  
Collar Elevation : 4.5 feet  
Borehole Total Depth : 158.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Mar 18 15:56  
Applied Azimuth : 0.0 degrees



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



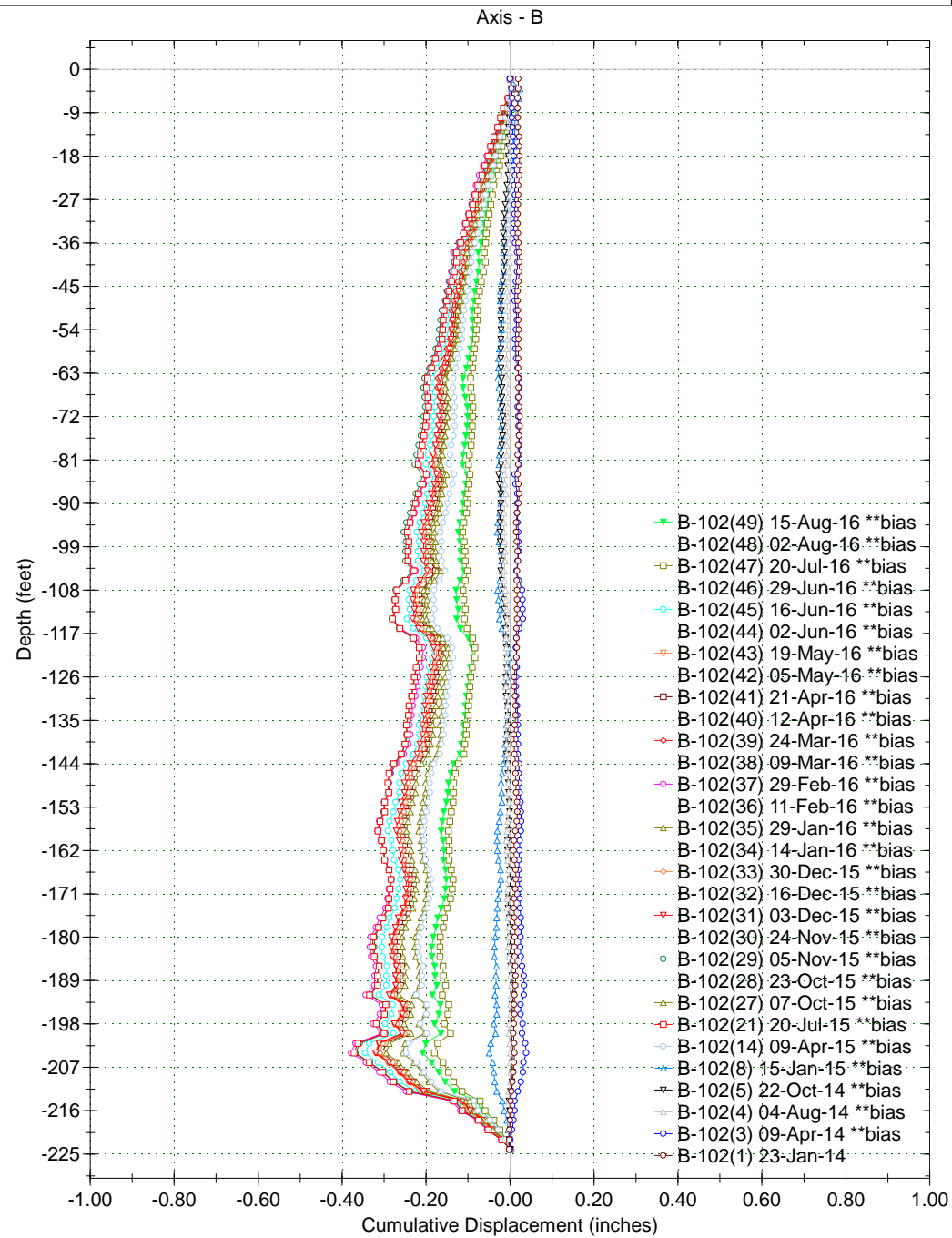
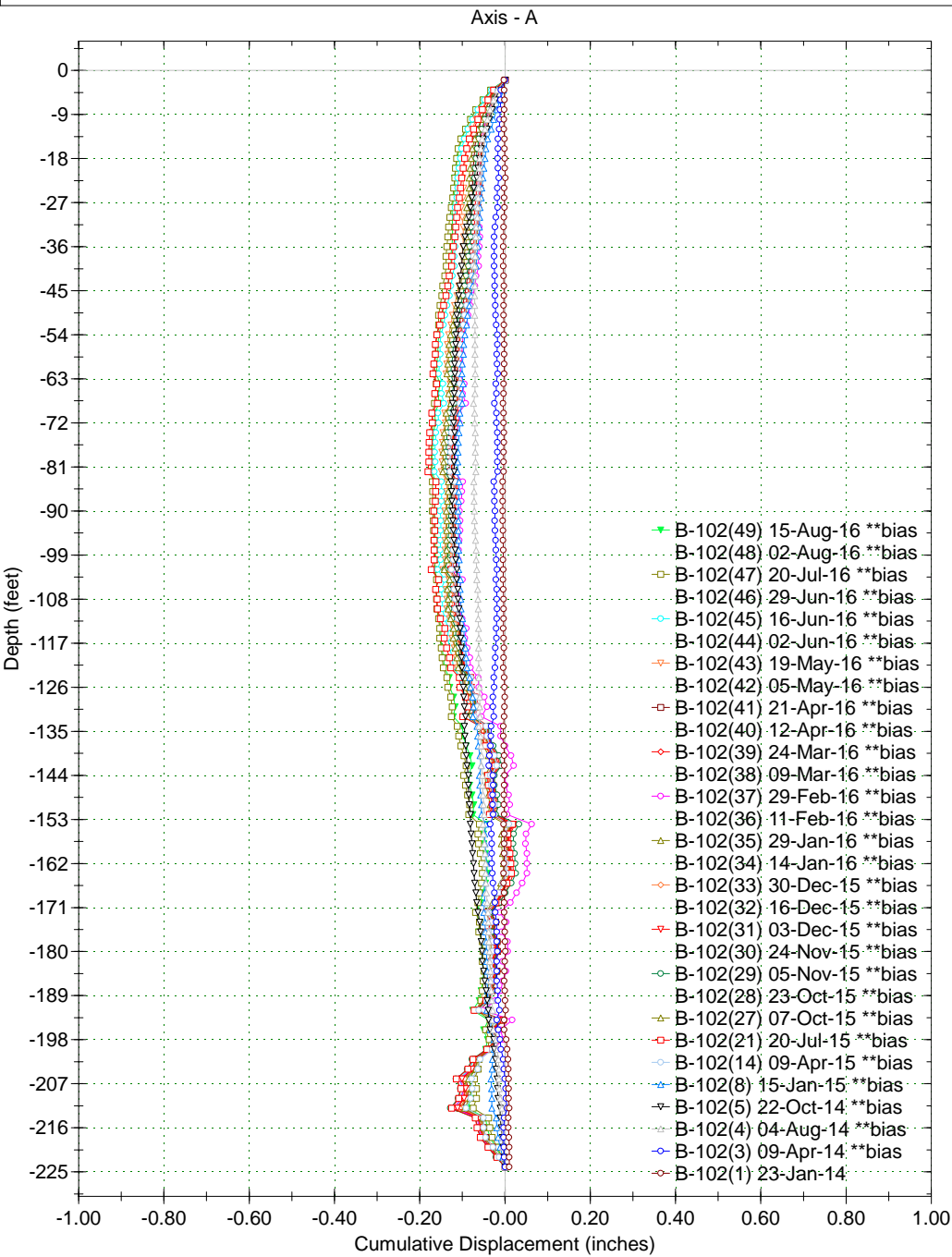
Spiral Correction : N/A  
 Collar Elevation : 0.0 feet  
 Borehole Total Depth : 190.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 22 09:01  
 Applied Azimuth : 0.0 degrees



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



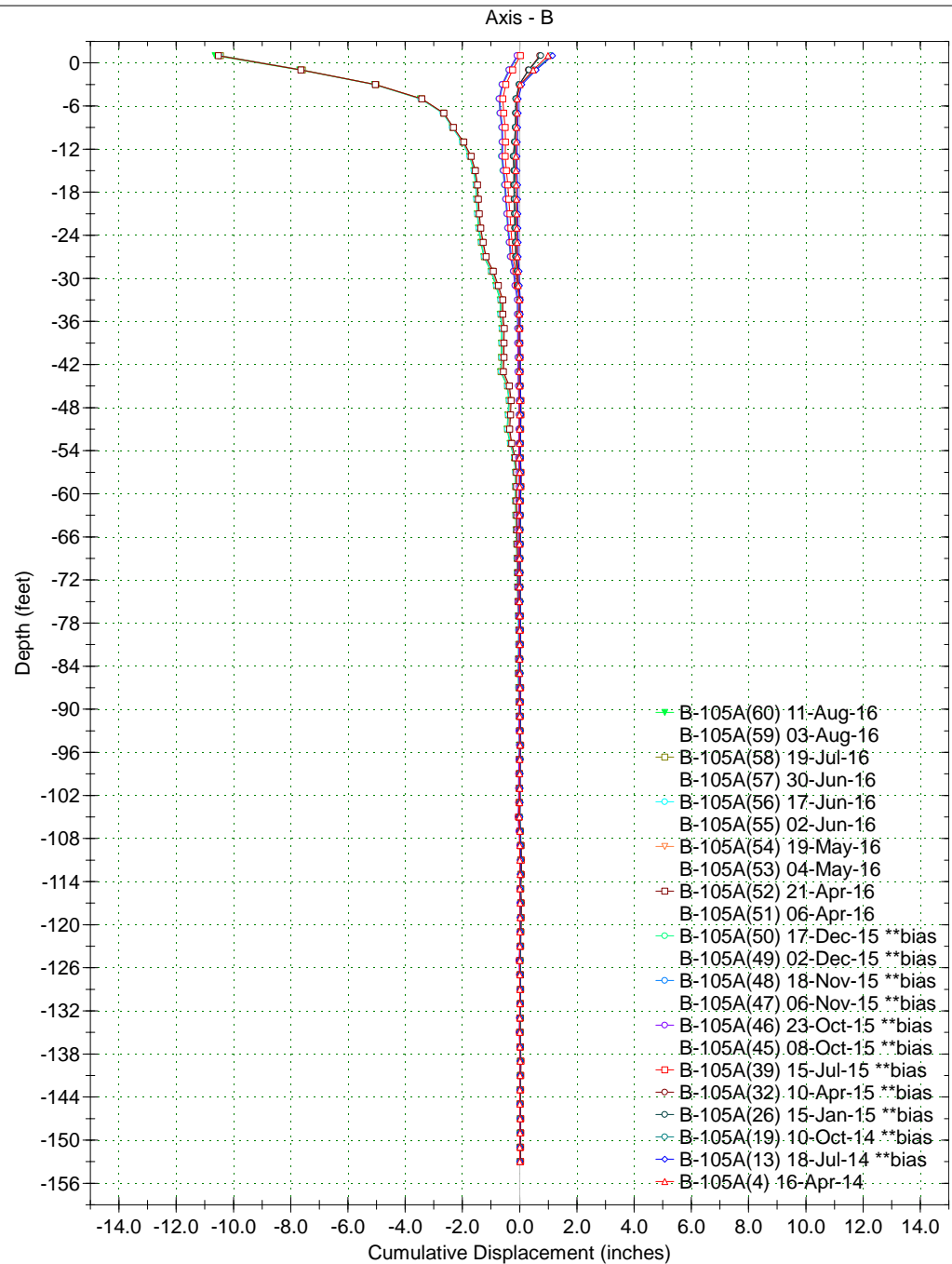
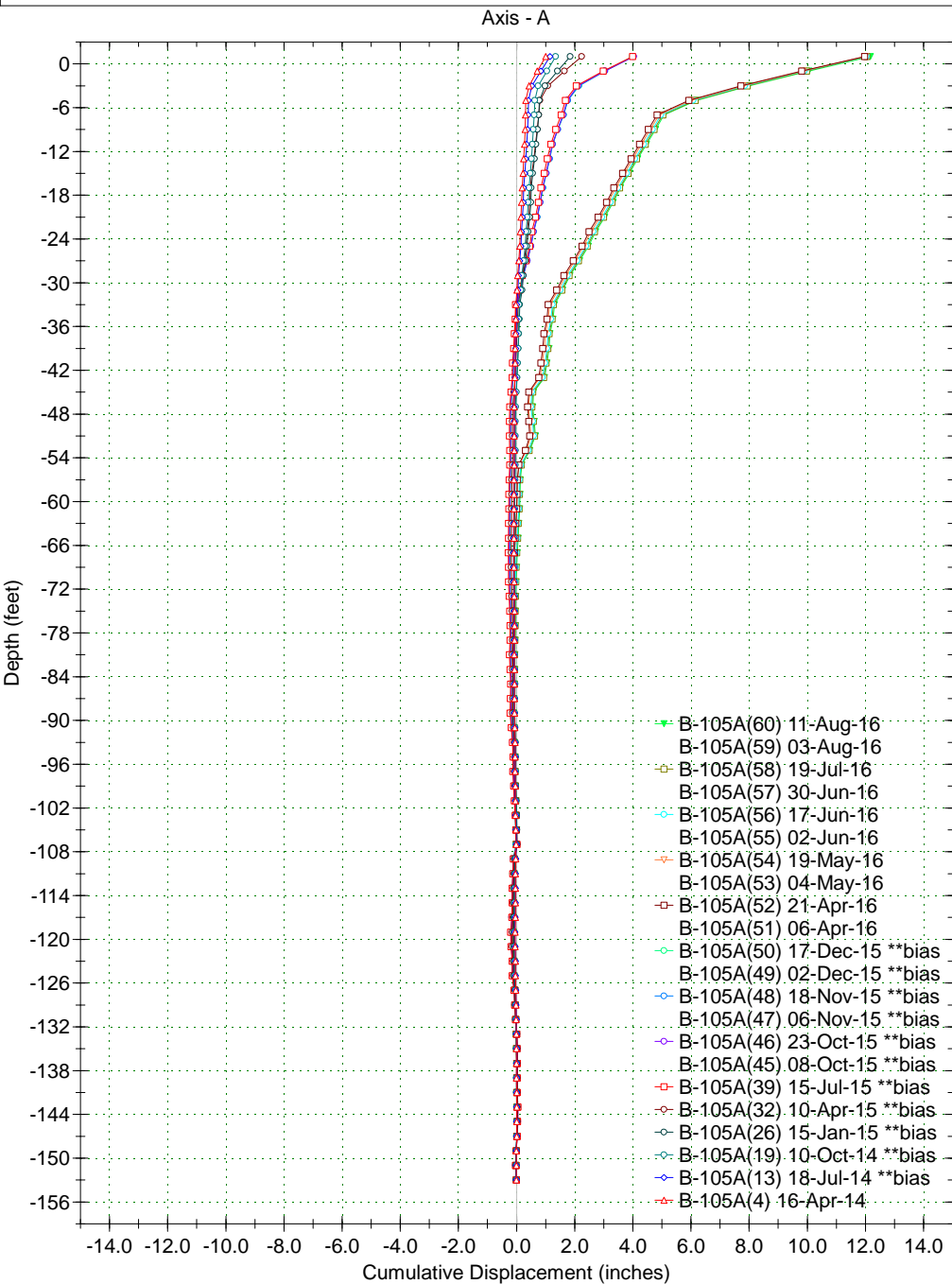
Spiral Correction : N/A  
Collar Elevation : 0.0 feet  
Borehole Total Depth : 224.0 feet  
A+ Groove Azimuth :  
Base Reading : 2014 Jan 23 08:21  
Applied Azimuth : 0.0 degrees



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

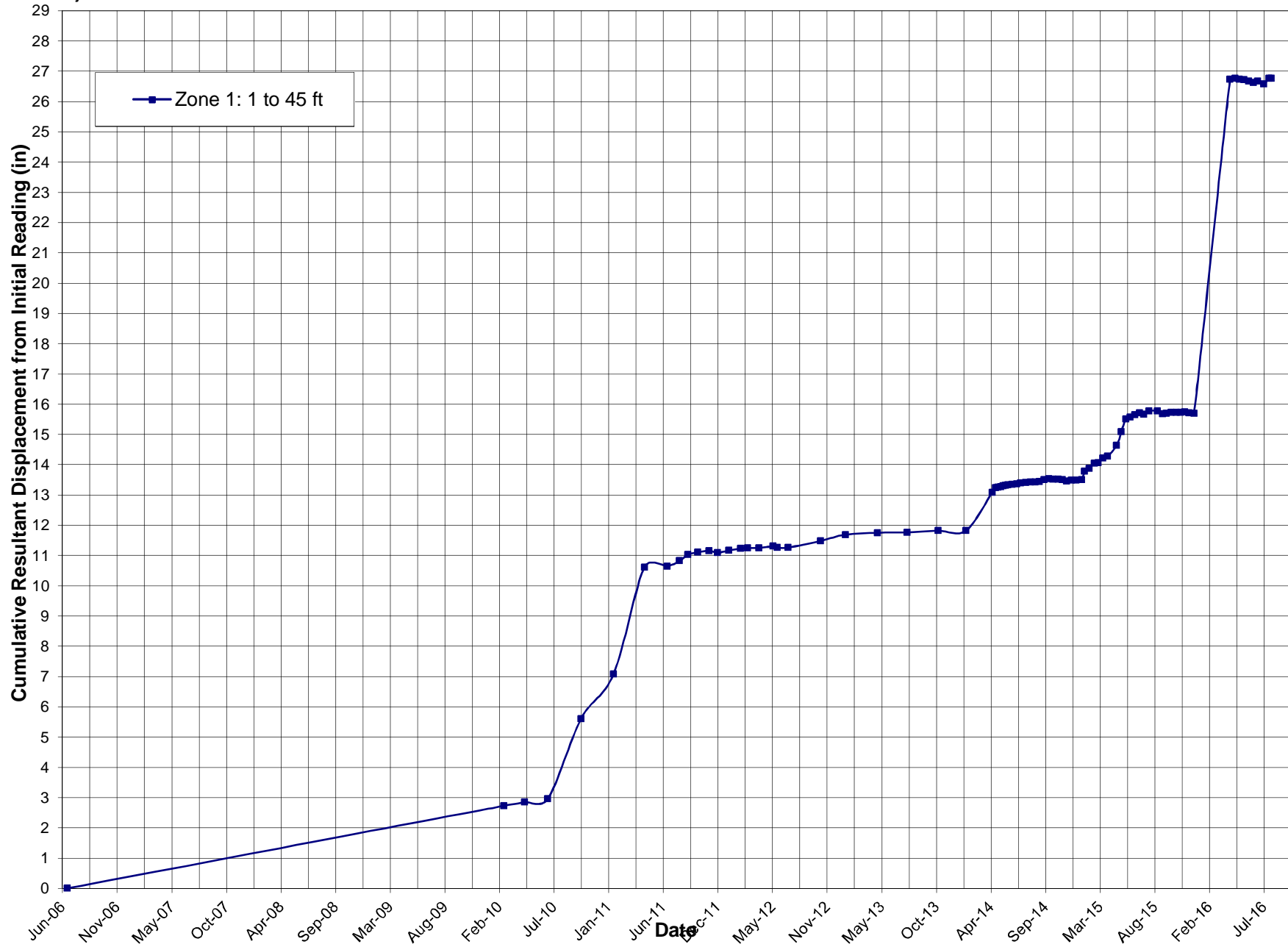


Spiral Correction : N/A  
 Collar Elevation : 3.0 feet  
 Borehole Total Depth : 156.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 15 09:19  
 Applied Azimuth : 0.0 degrees



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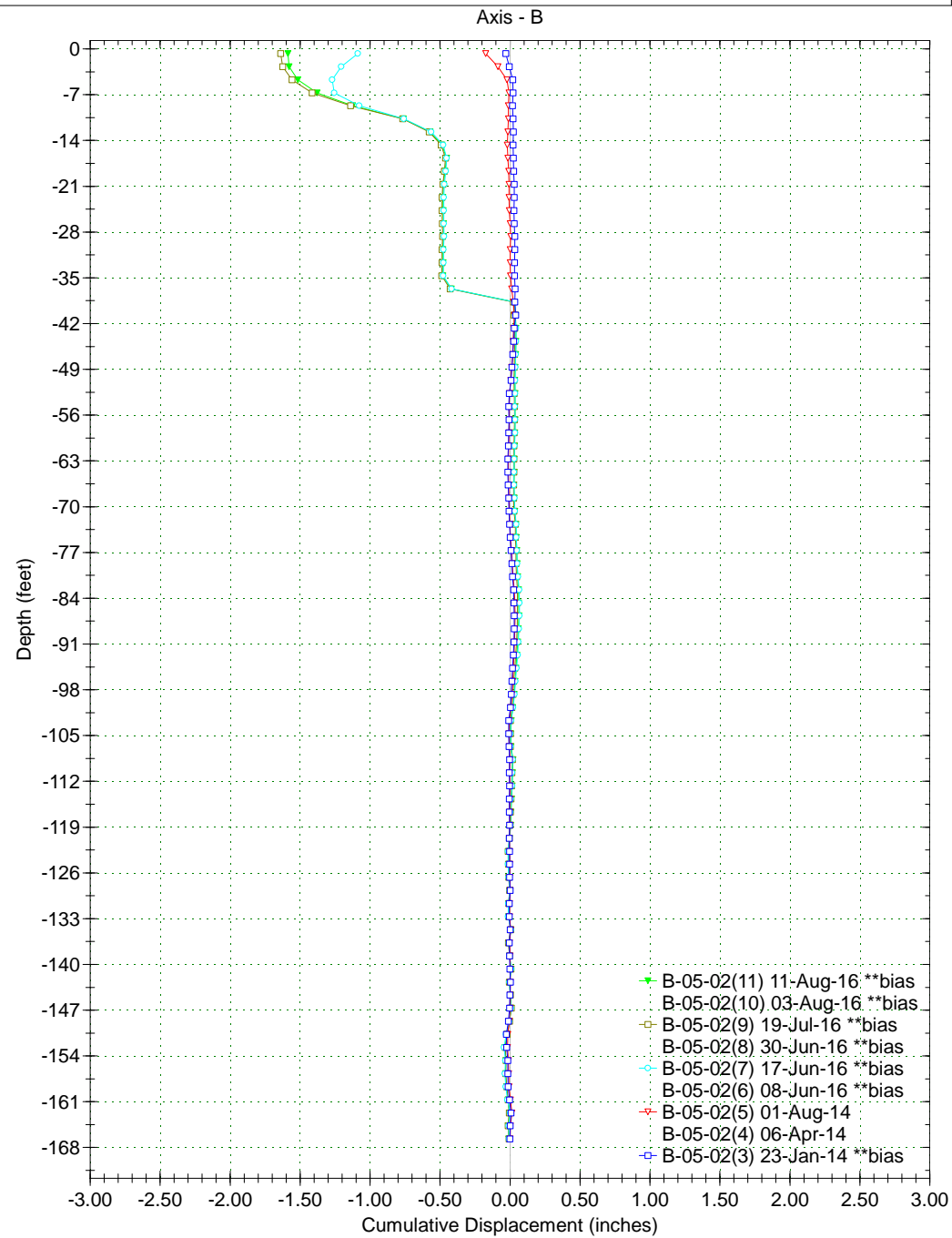
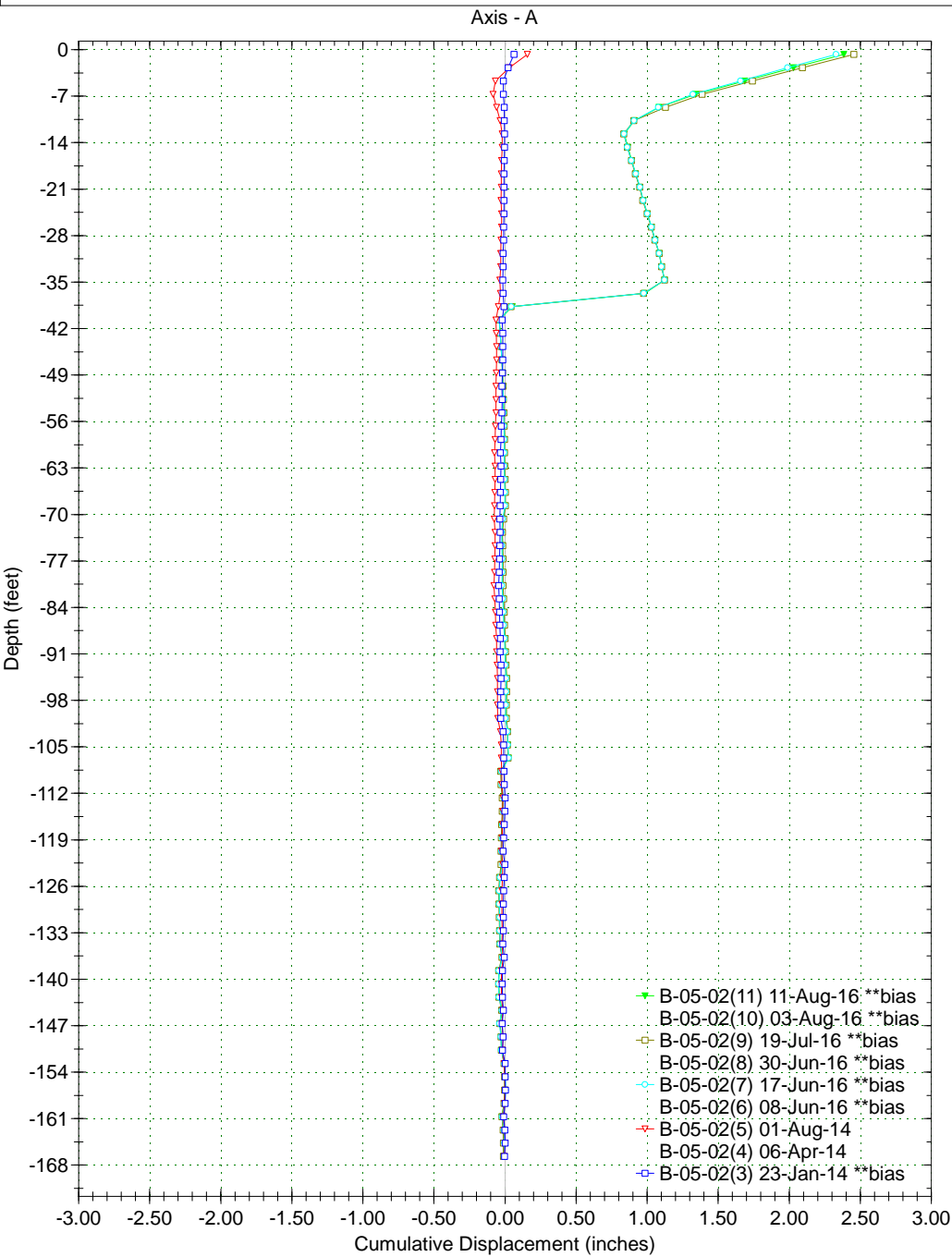
### B-105A



Borehole : B-05-02A  
 Project : CUY-90-15-24  
 Location : Cleveland, Ohio  
 Northing : 663737.939  
 Easting : 2190289.081  
 Collar :

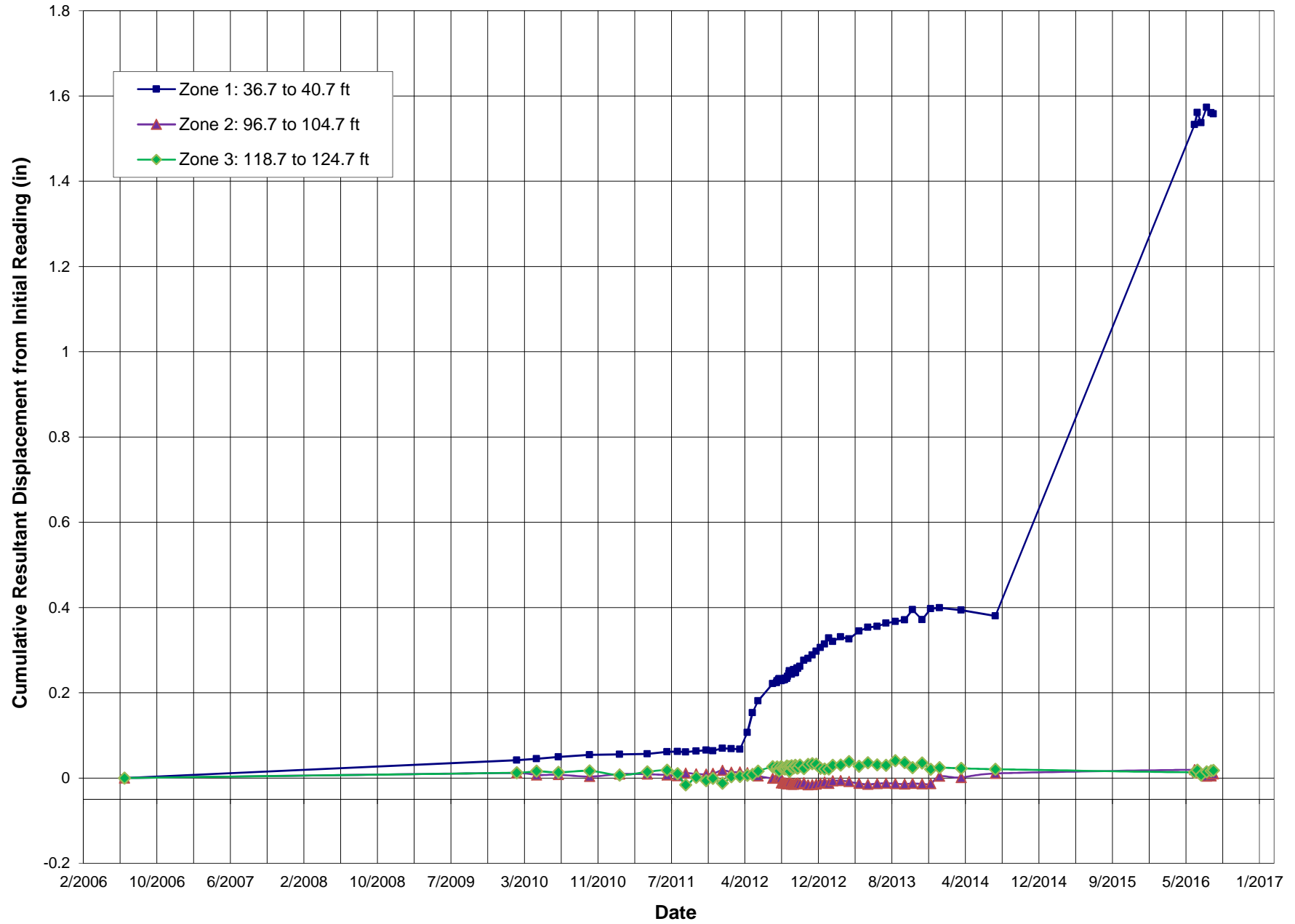


Spiral Correction : N/A  
 Collar Elevation : 1.3 feet  
 Borehole Total Depth : 168.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2013 Dec 24 11:12  
 Applied Azimuth : 0.0 degrees



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### B-05-02

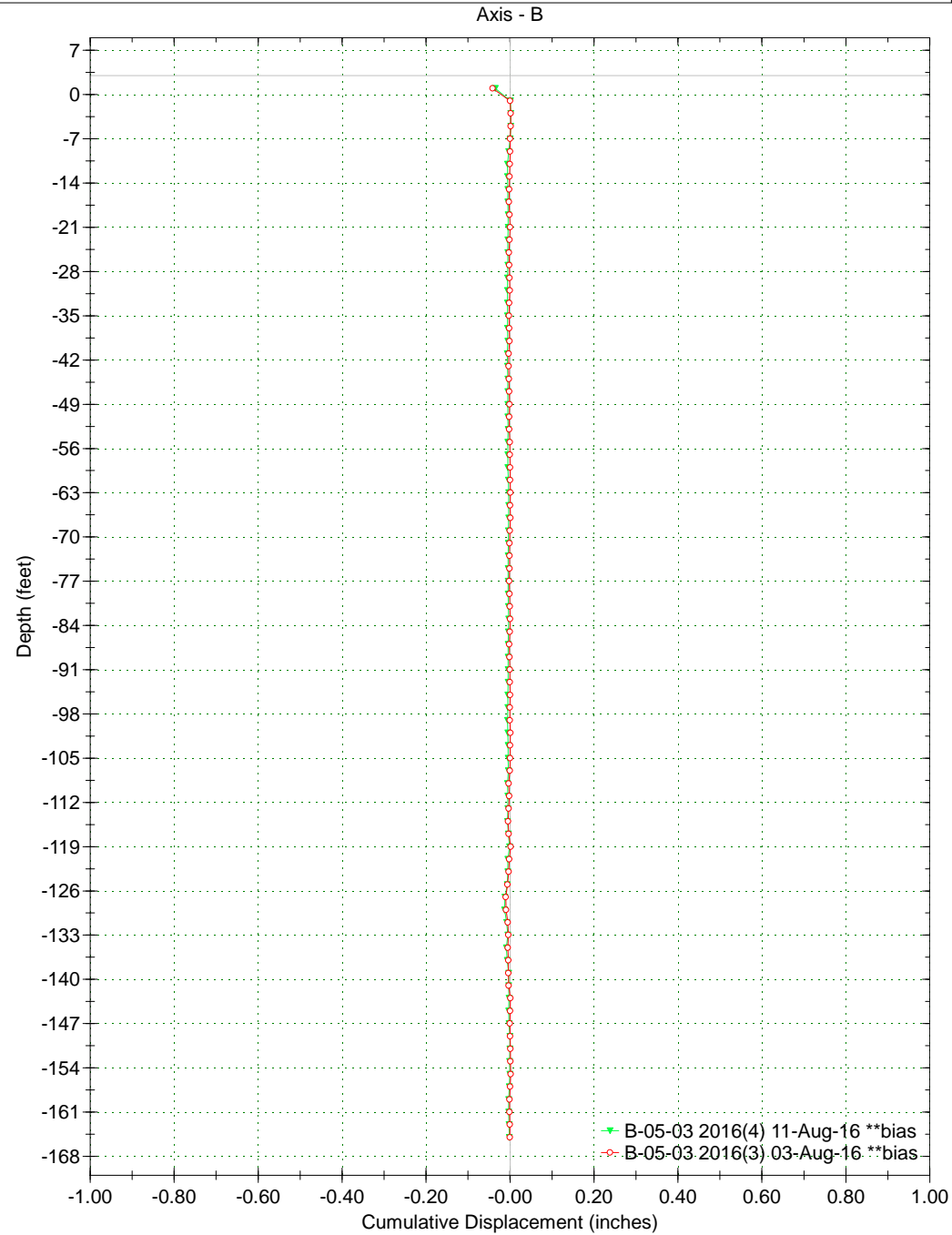
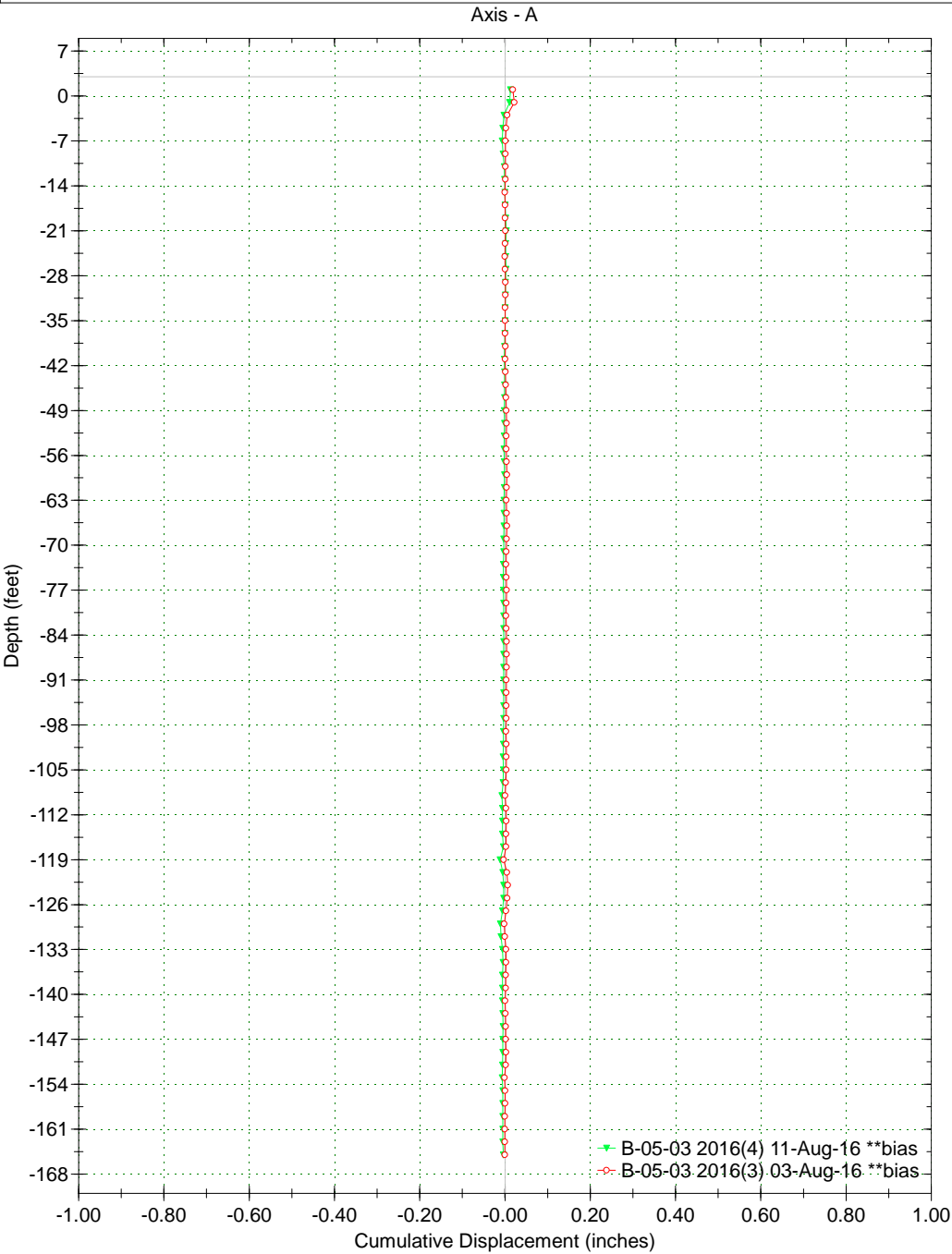




Borehole : B-05-03-A  
Project : CUY-90-15-24  
Location :  
Northing :  
Easting :  
Collar :



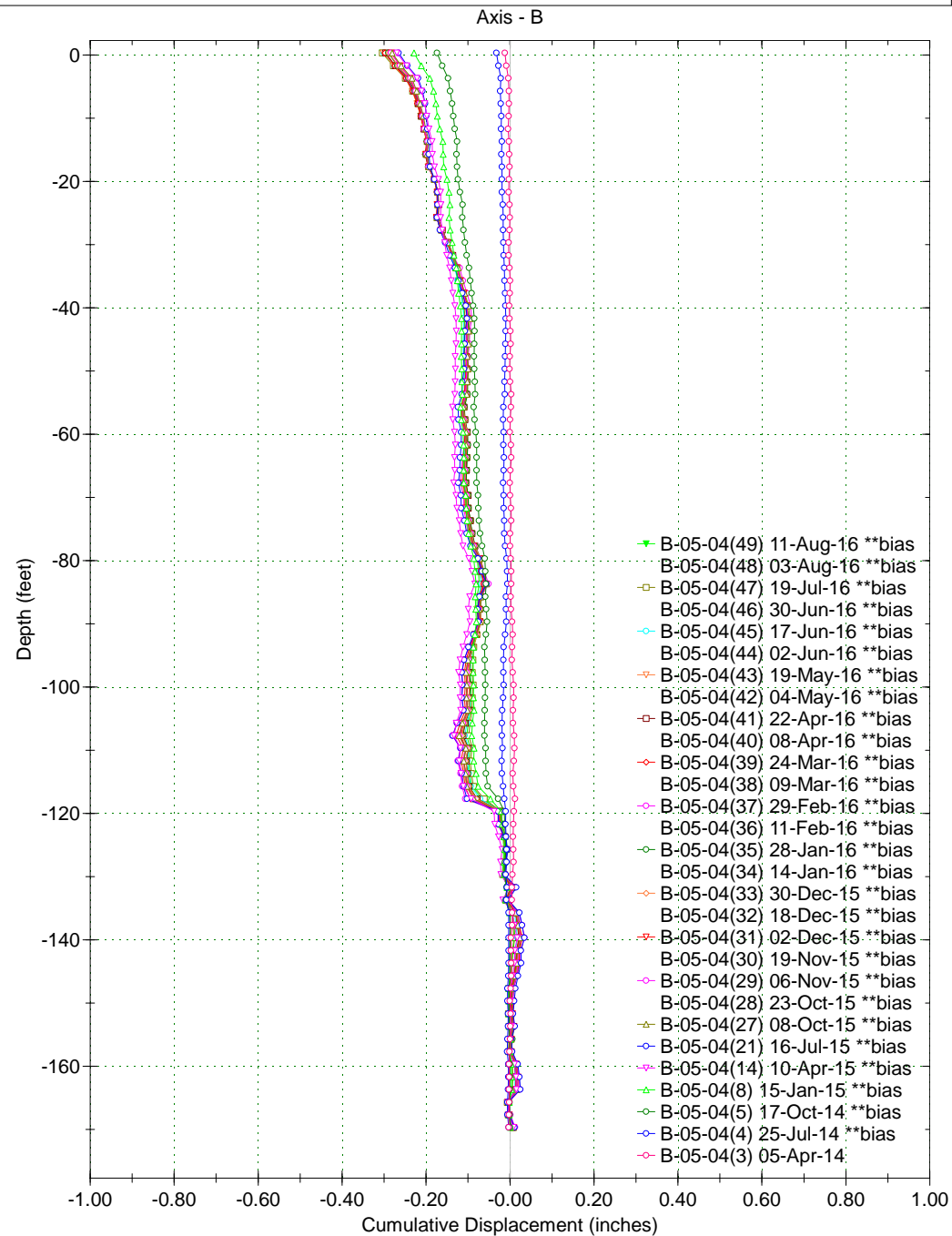
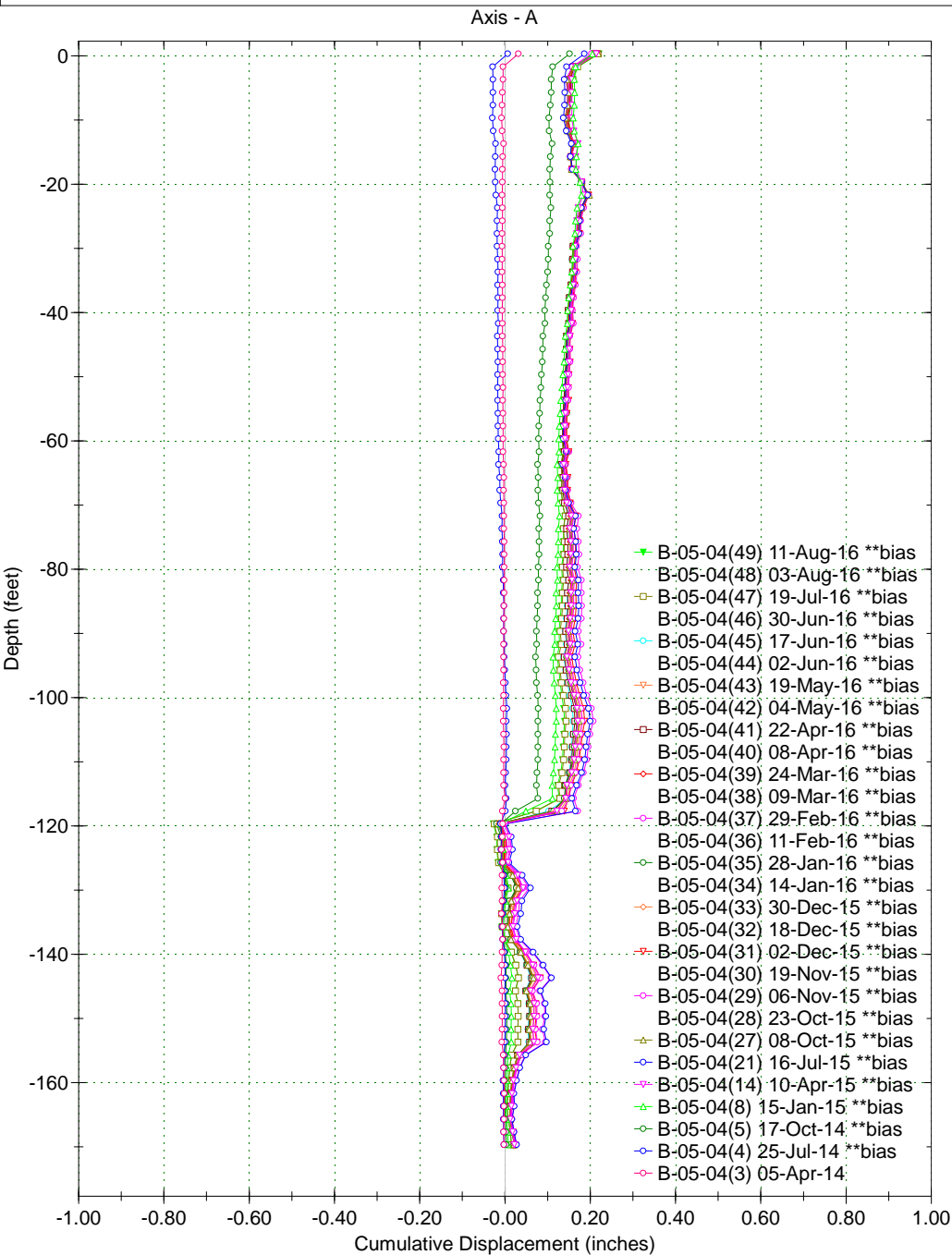
Spiral Correction : N/A  
Collar Elevation : 3.0 feet  
Borehole Total Depth : 168.0 feet  
A+ Groove Azimuth :  
Base Reading : 2016 Jul 19 09:08  
Applied Azimuth : 0.0 degrees



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

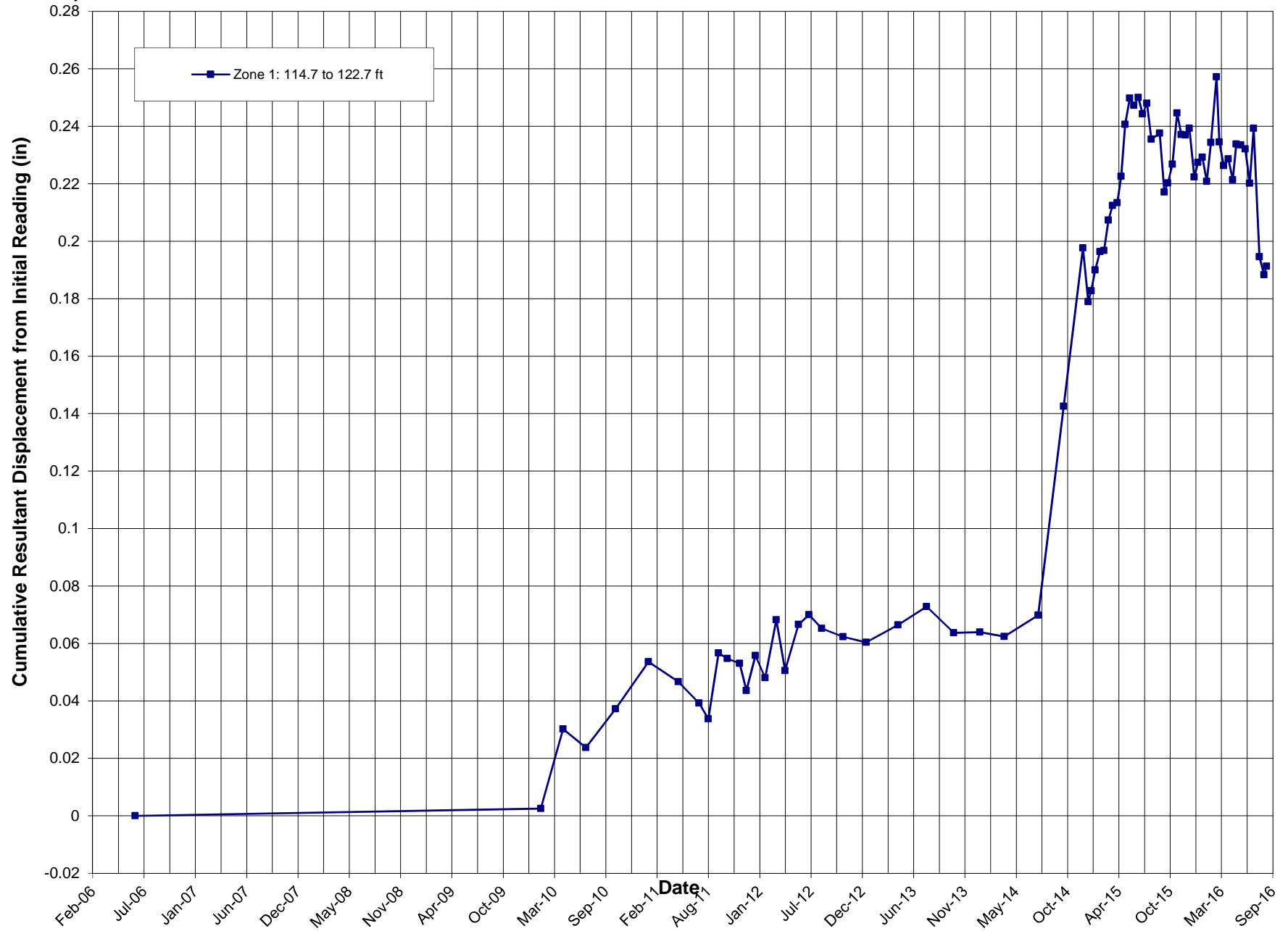


Spiral Correction : N/A  
 Collar Elevation : 2.3 feet  
 Borehole Total Depth : 172.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 22 12:30  
 Applied Azimuth : 0.0 degrees



CUY-90-15.24  
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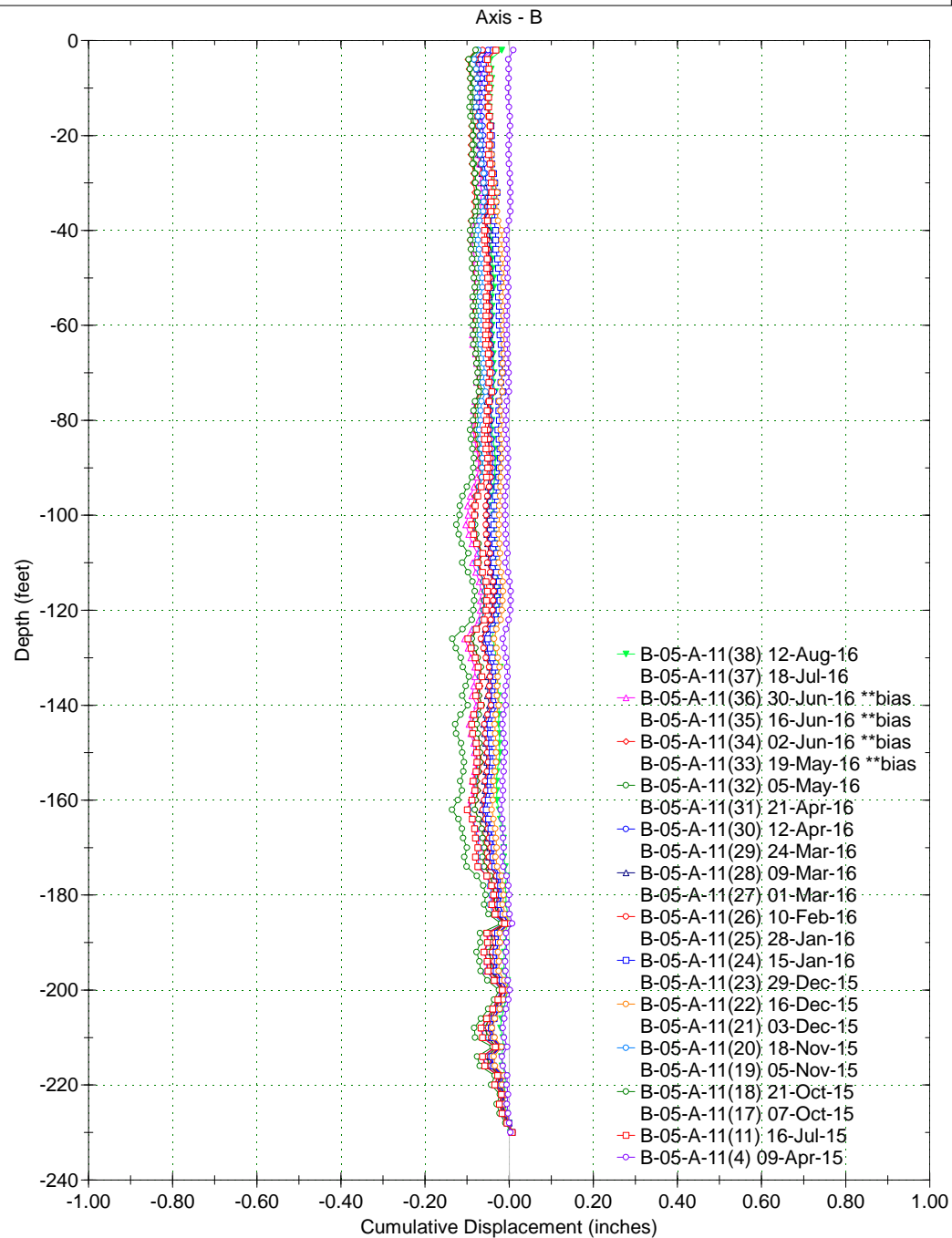
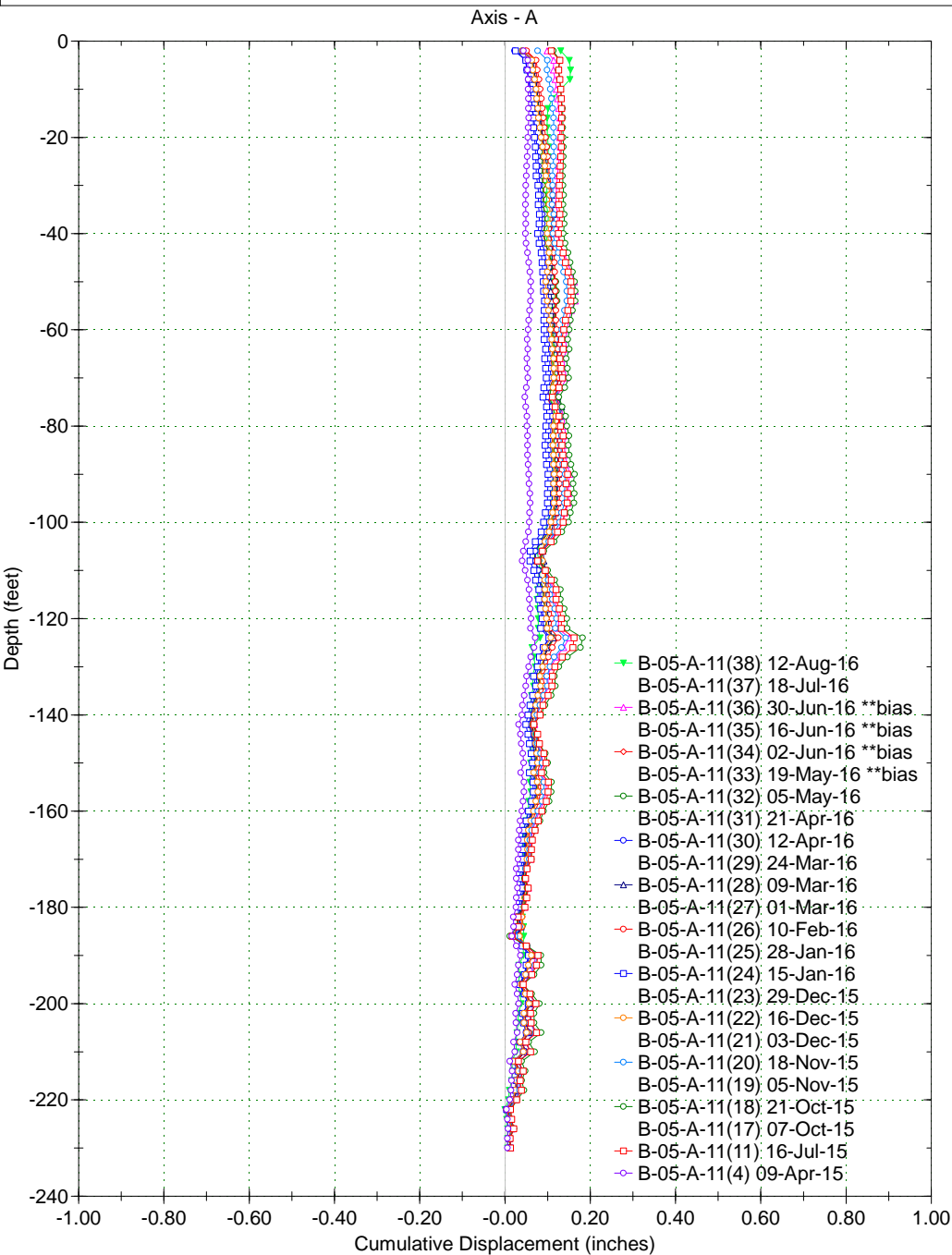
### B-05-04



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



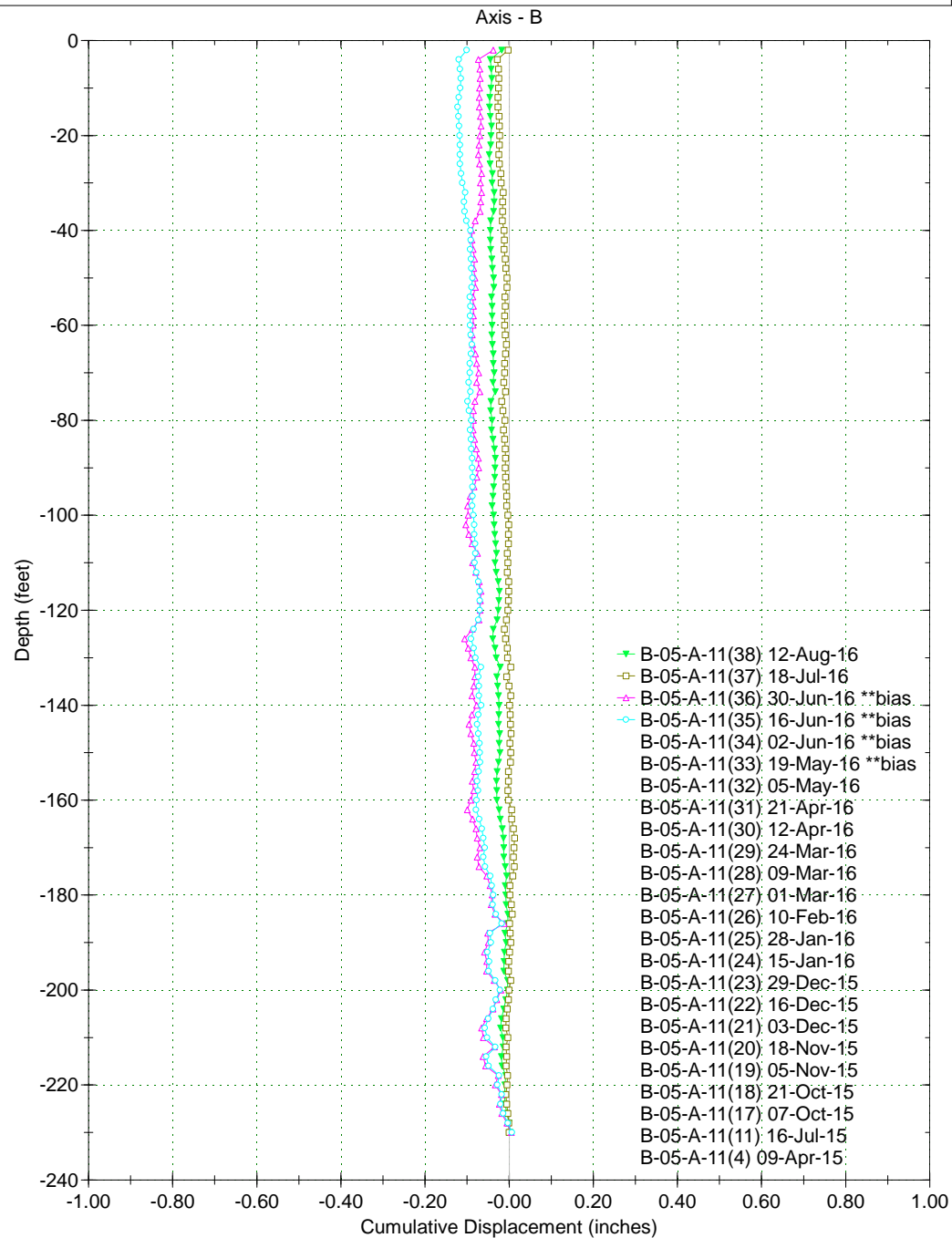
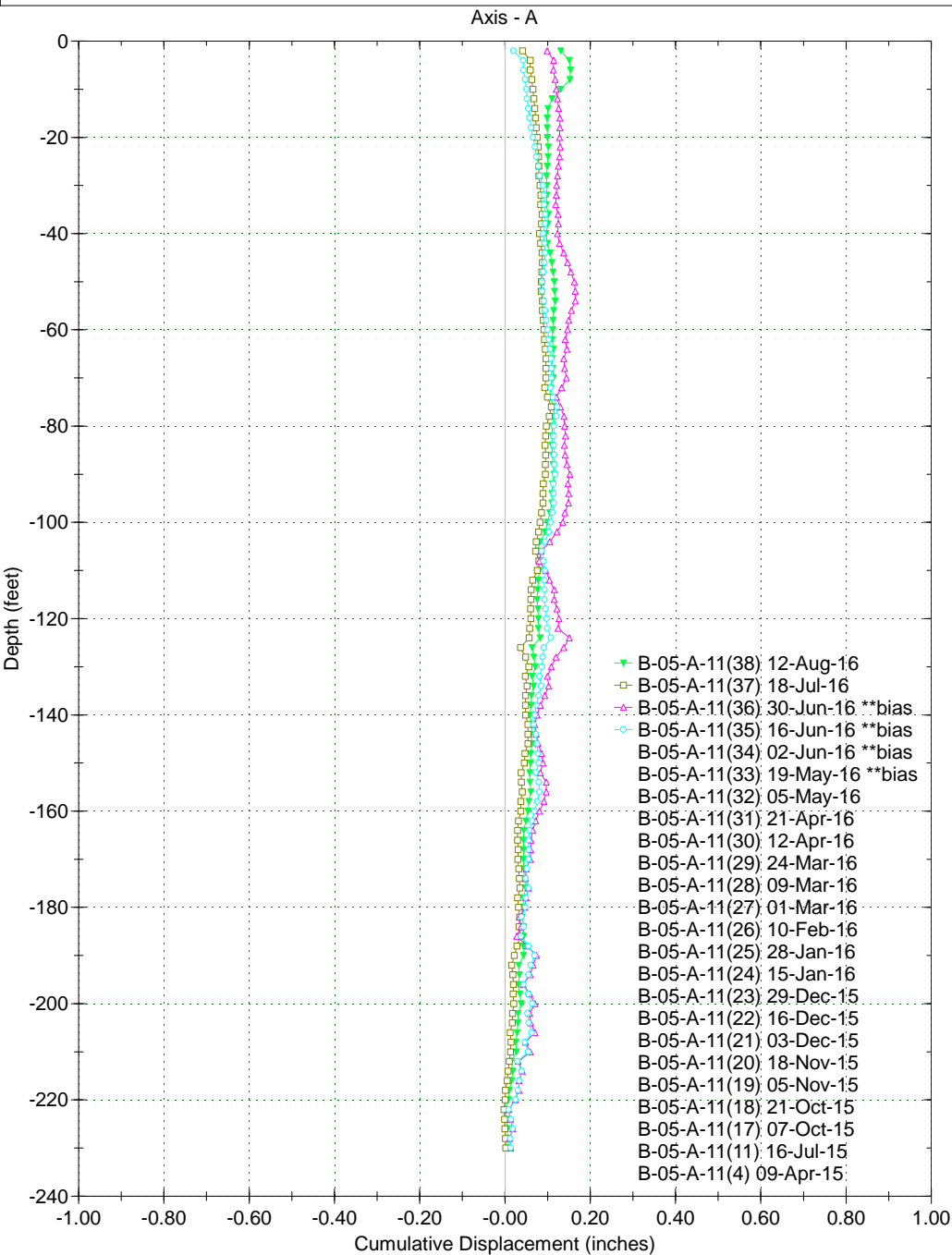
Spiral Correction : N/A  
 Collar Elevation : 0.0 feet  
 Borehole Total Depth : 230.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2015 Mar 19 09:08  
 Applied Azimuth : 0.0 degrees



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



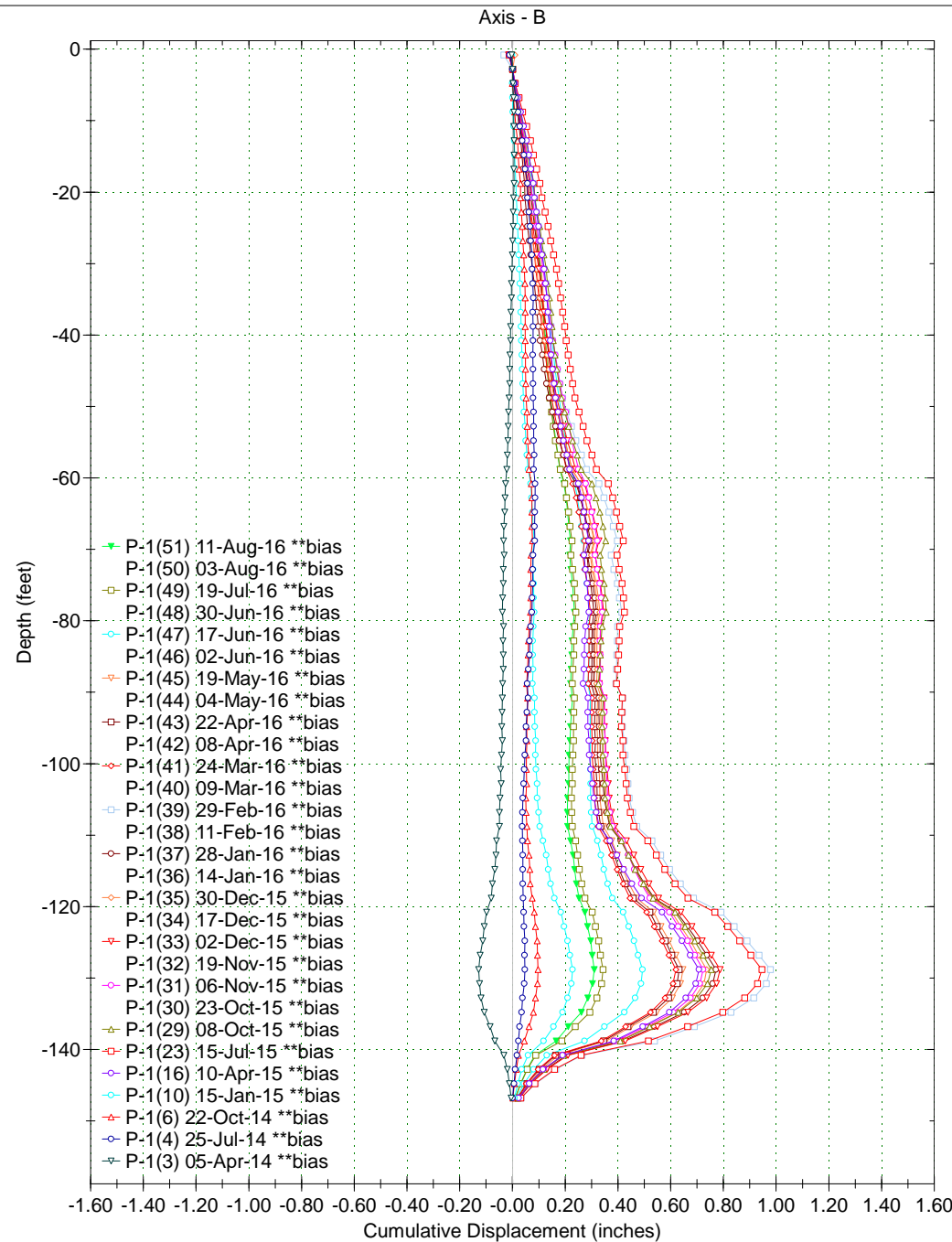
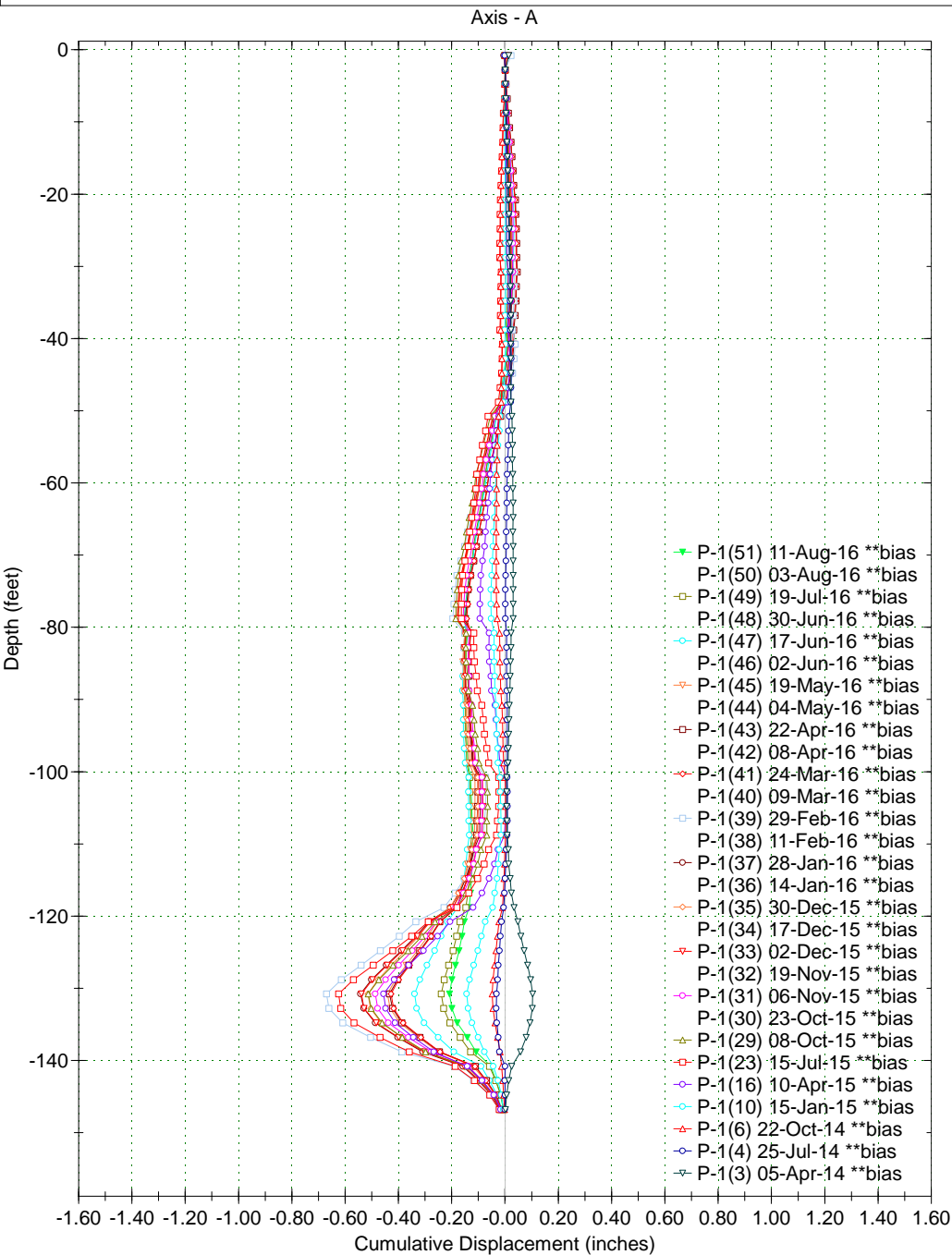
Spiral Correction : N/A  
 Collar Elevation : 0.0 feet  
 Borehole Total Depth : 230.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2015 Mar 19 09:08  
 Applied Azimuth : 0.0 degrees



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

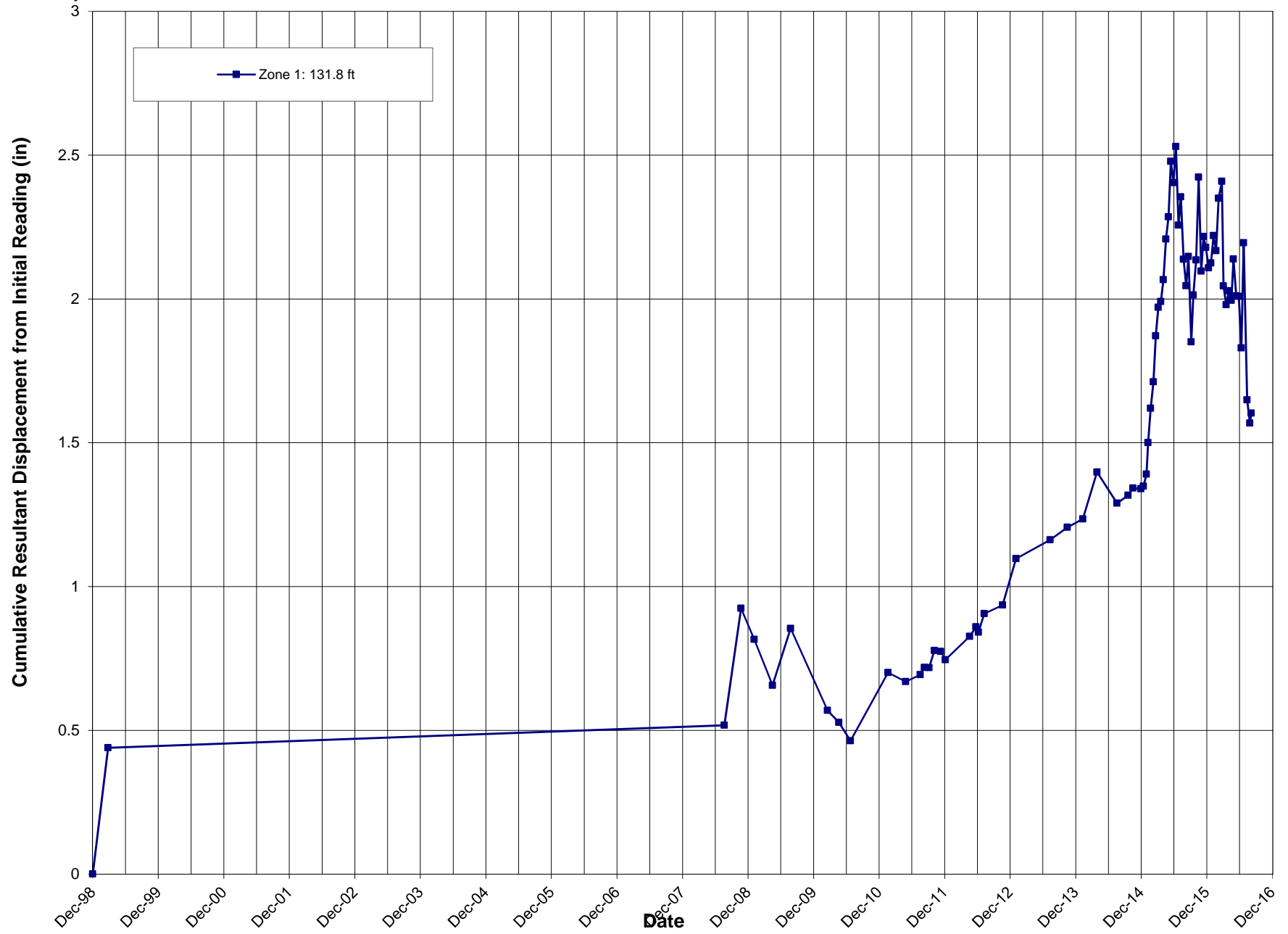


Spiral Correction : N/A  
 Collar Elevation : 1.2 feet  
 Borehole Total Depth : 148.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 22 10:47  
 Applied Azimuth : 0.0 degrees



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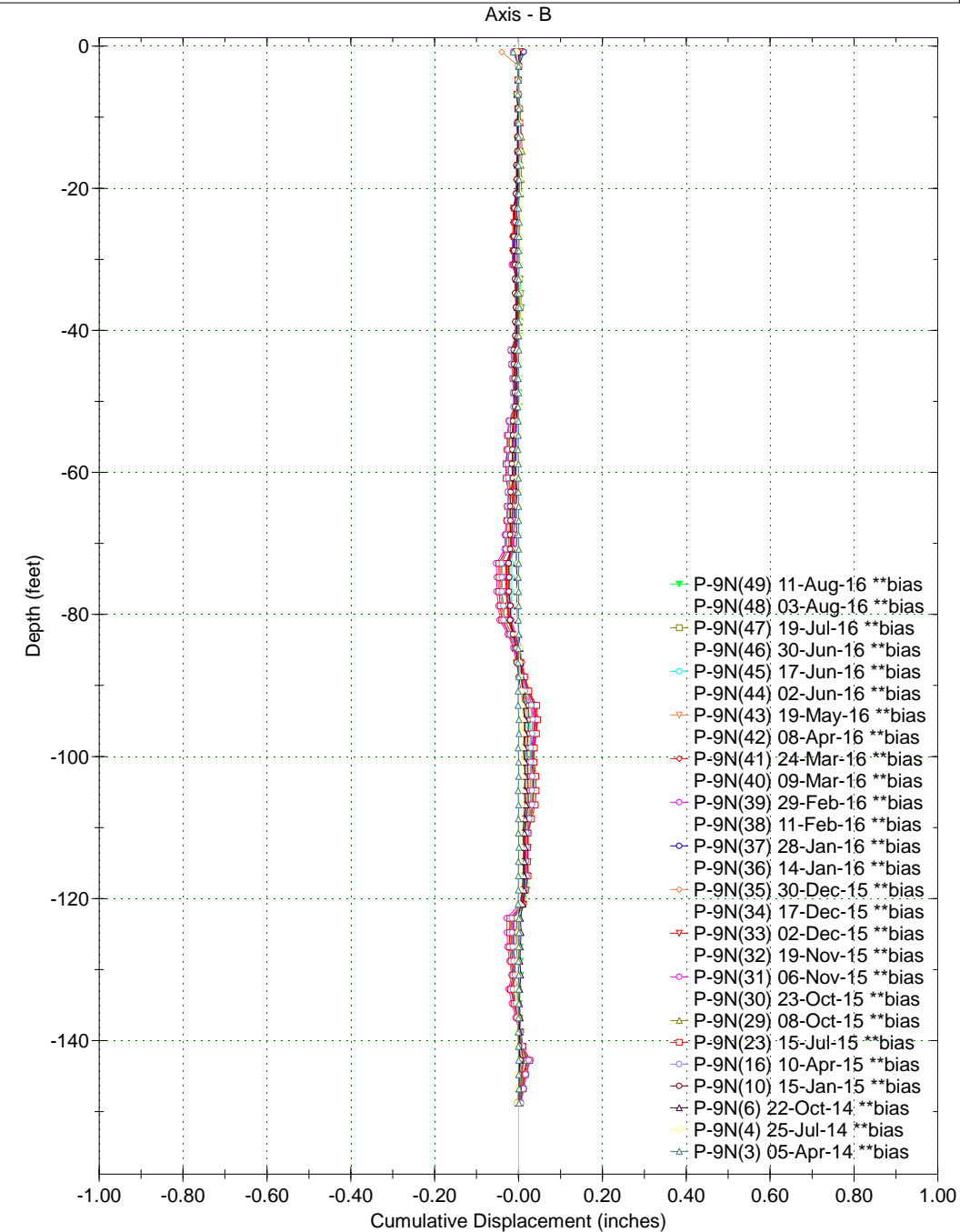
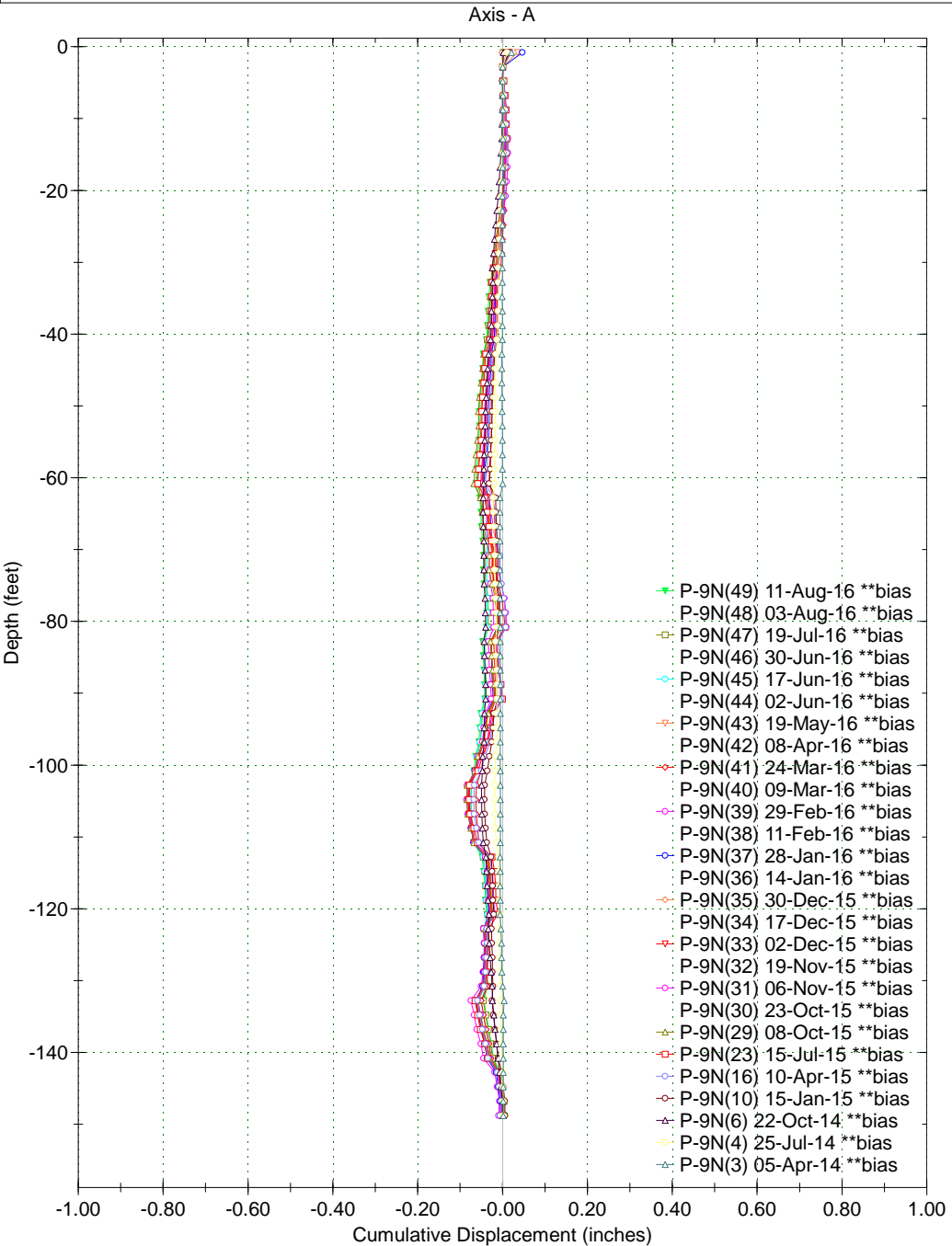
### P-1



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



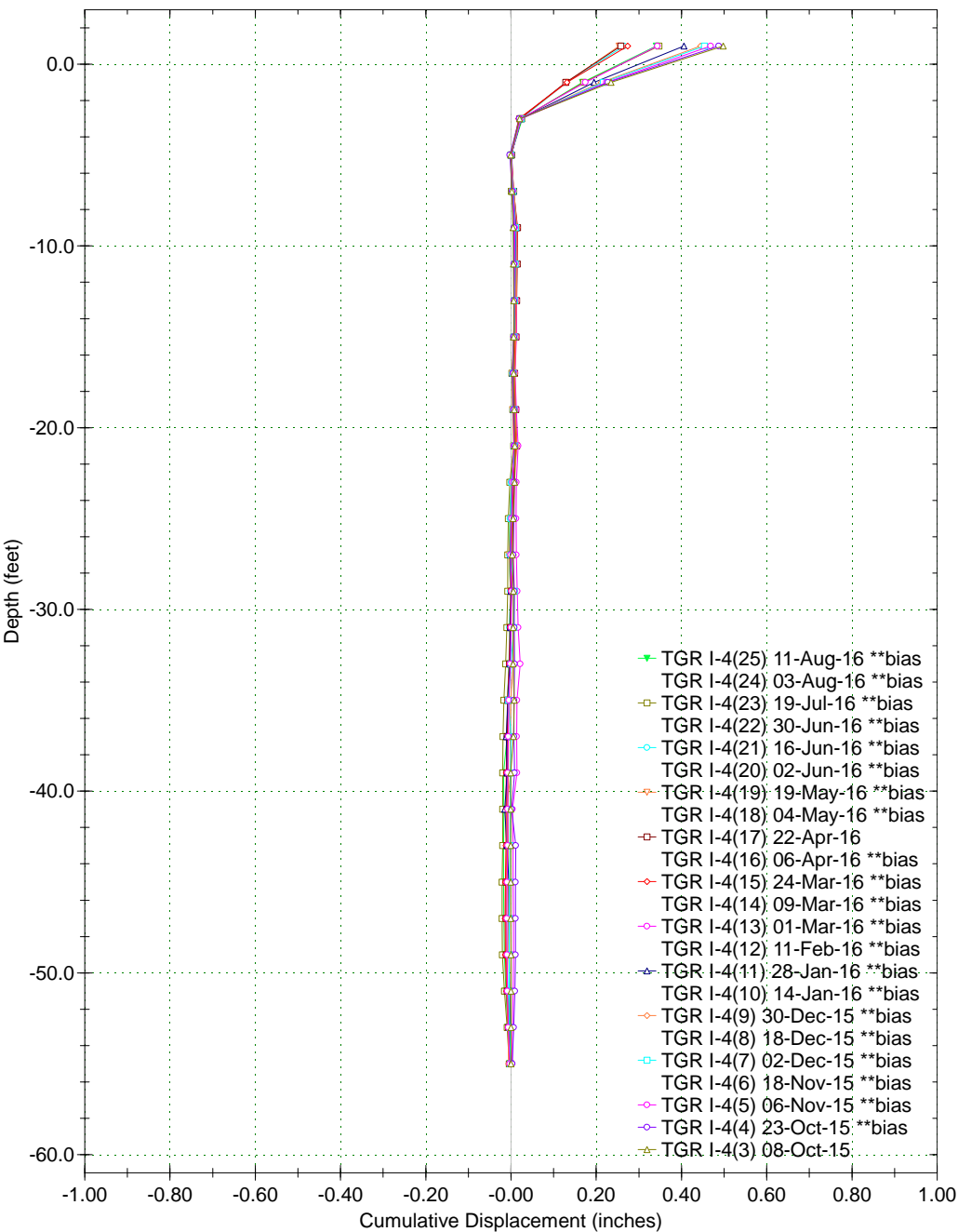


Borehole : TGR I-4  
Project : CUY-90-15-24  
Location :  
Northing :  
Easting :  
Collar :



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

