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September 14, 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 29 and 30, 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 29 and 30, 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-001-13, P-002-13, P-009-13, B-105A, B-05-02, 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-003-10** – Total head in all but the deepest piezometer appear to have trended upward slightly this period. Total head in the piezometer at elevation 550 feet has been trending upward since October 2015.

**P-004-13** – Pore pressure readings at this location indicate a 1 foot increase in total head in the piezometer at elevation 545 feet (shallow) that occurred between August 20 and 23. Pore pressures continued to increase slowly through the end of the two-week period with the total increase reaching 1.2 feet. The deep piezometer showed no change.

**B-05-02** – Total head in both piezometers at this location increased by about 0.5 feet.

**B-05-A-03** – On about August 22, pore pressures in both piezometers at this location increased sharply. The total head increase was 1.4 feet in the shallow piezometer and 0.9 feet in the deep piezometer. Pore pressures recorded in the shallow piezometer then decreased slightly. Pore pressures in the deep piezometer continued to increase but at a much slower rate. Net increases were 0.9 feet and 0.7 feet in the shallow and deep piezometers, respectively.

**B-05-A-11** – Pore pressure readings at this location indicate an increase in total head of about 0.6 feet in the shallow piezometer and about 0.7 feet in the deep piezometer. Total head in these piezometers has been increasing at a steady rate since the beginning of July 2016.

### **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.

**I-004-13** – Inclinometer readings at this location indicate movement from the surface to about 24 feet. The maximum displacement, which occurs at the surface, is 1.3 inches in the positive A-axis direction and 0.6 inches in the positive B-axis direction.

**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

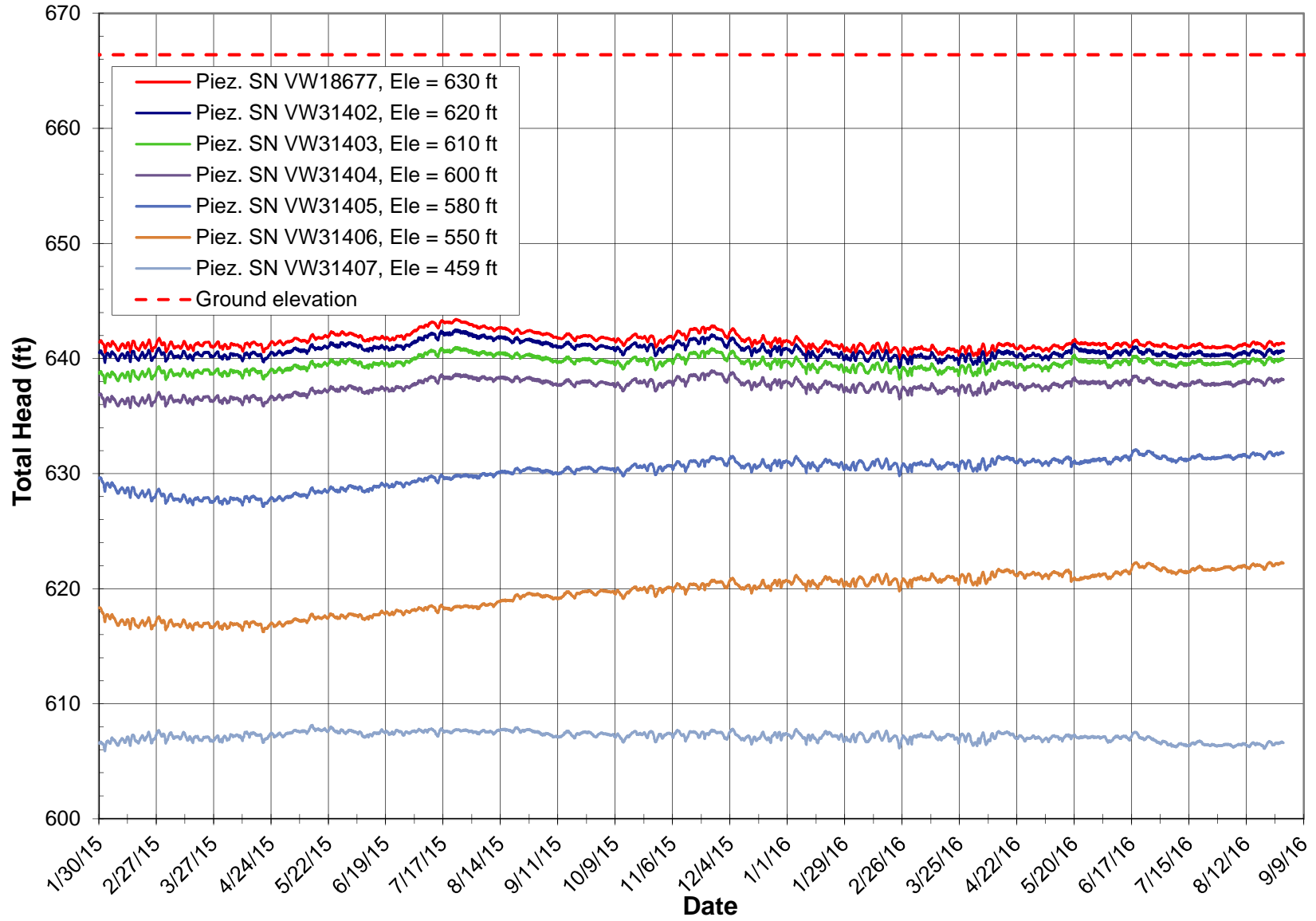
Brendan P. Lieske, P.E.  
Senior Staff Engineer

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

Copies sent to distribution list.

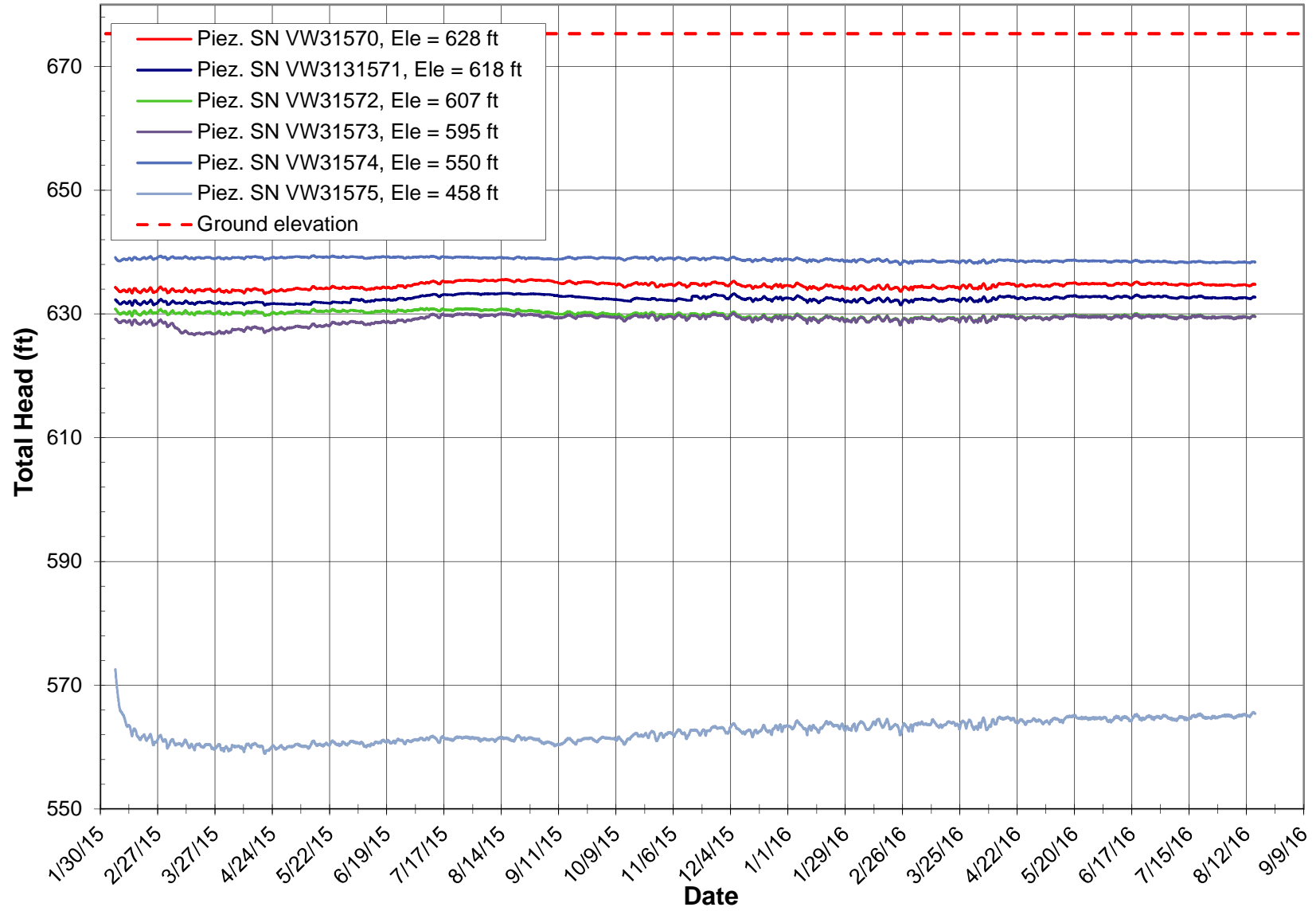
# P-001-13 VW Piezometer Readings

Ground surface elevation = 666.4 ft



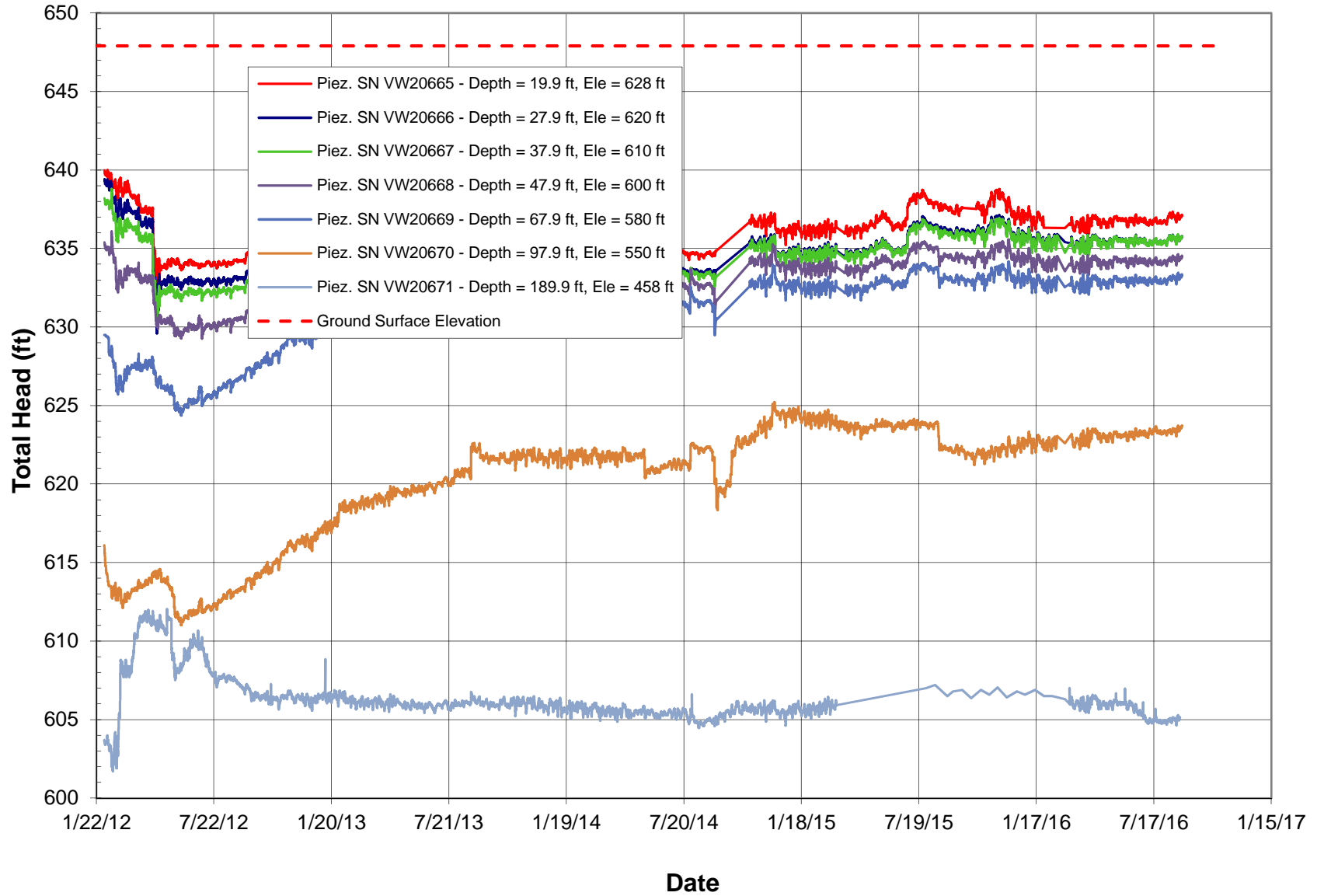
# P-002-13 VW Piezometer Readings

Ground surface elevation = 675.29 ft



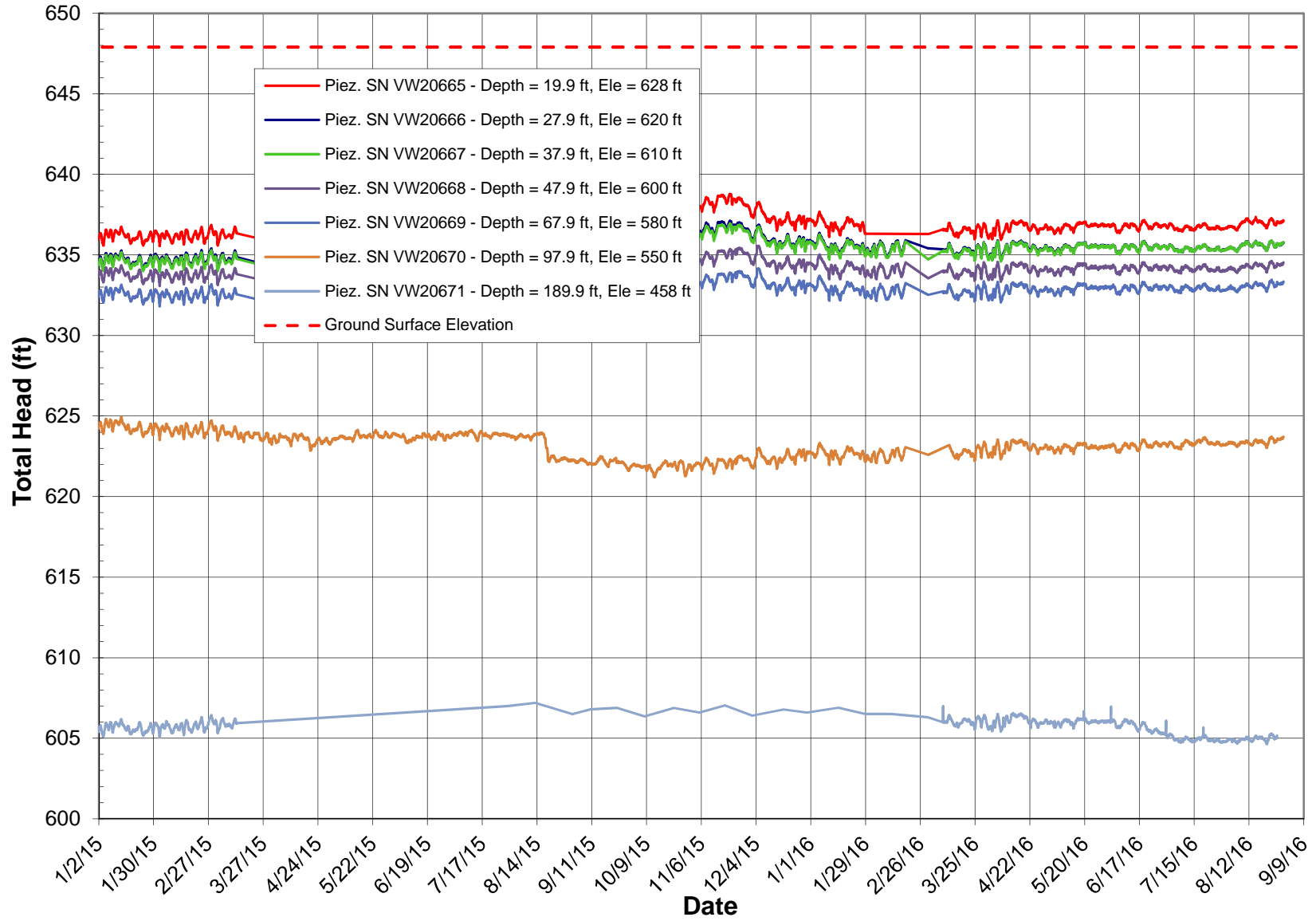
# P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



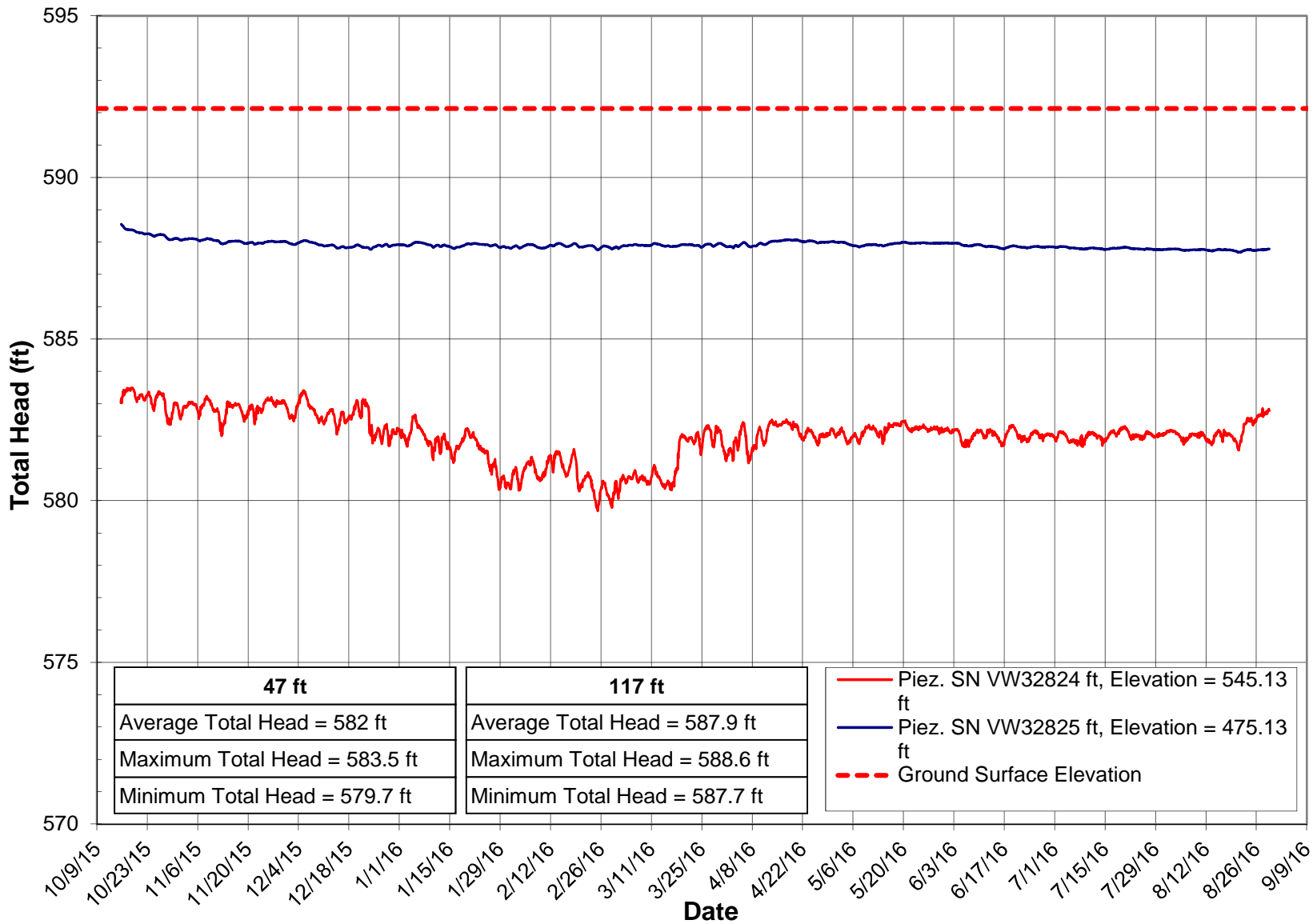
# P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



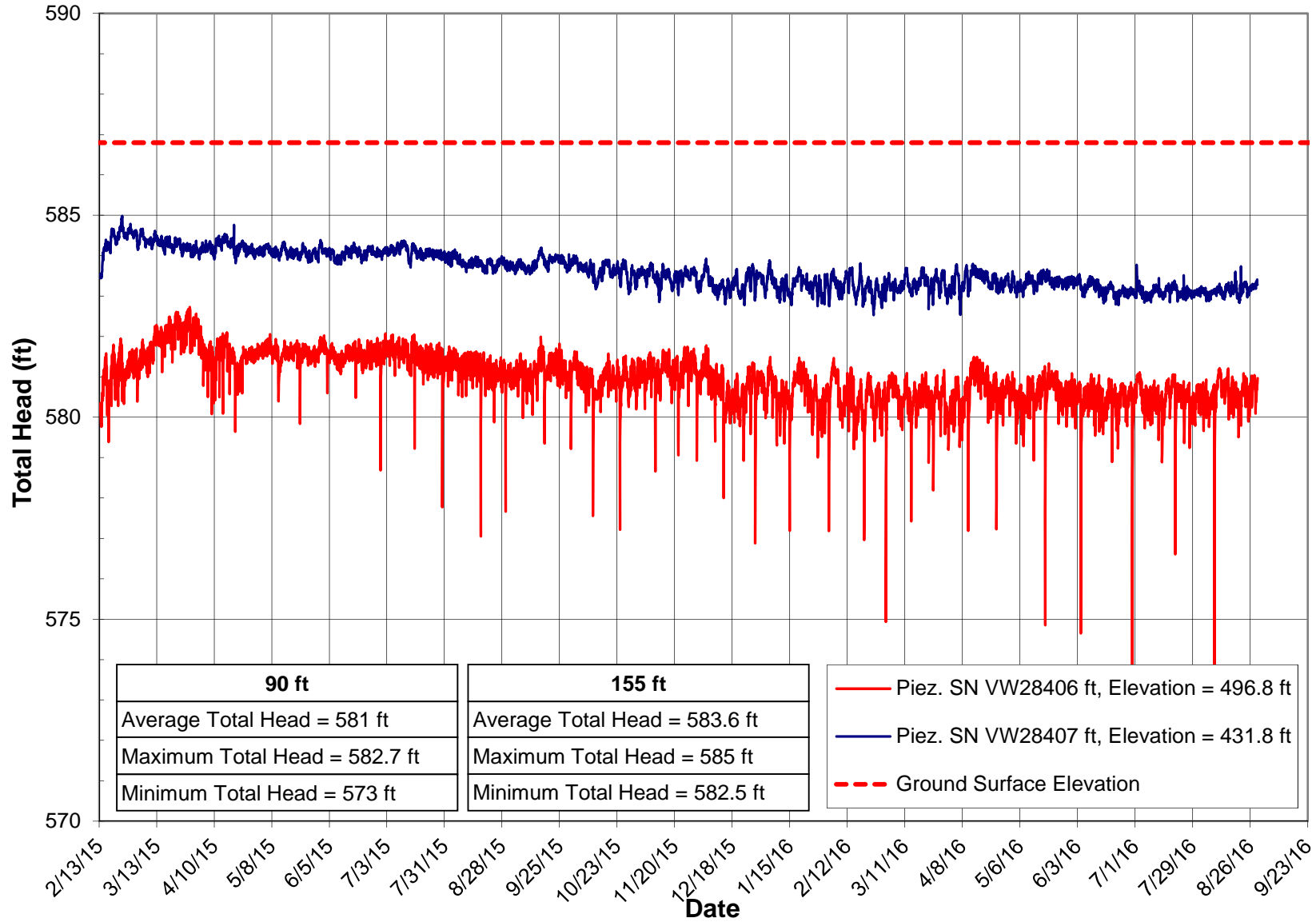
# P-004-13 VW Piezometer Readings

Ground surface elevation = 592.13 ft



# P-009-13 VW Piezometer Readings

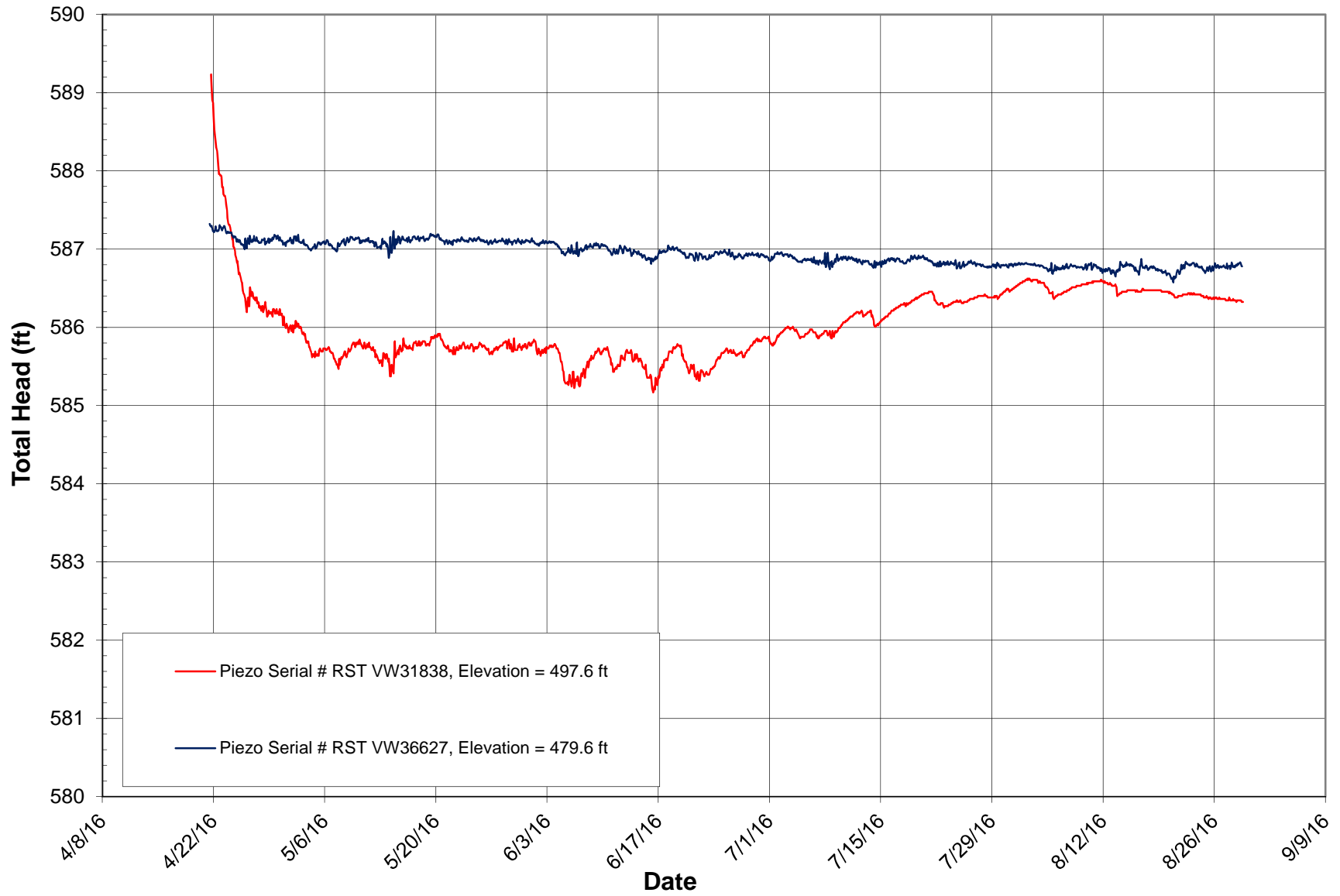
Ground surface elevation = 586.6 ft





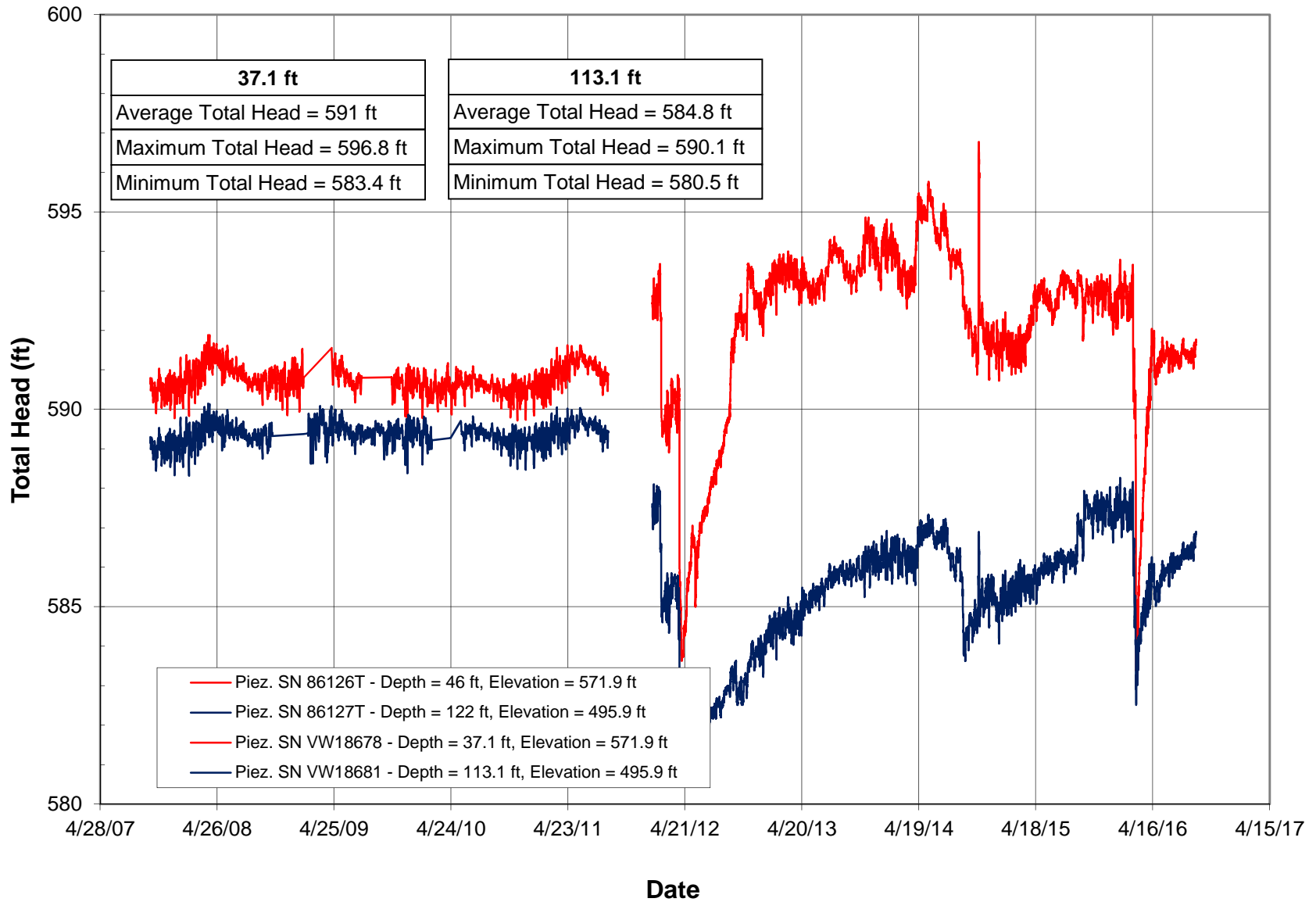
# B-105A VW Piezometer Readings

Ground surface elevation = 585.6 ft



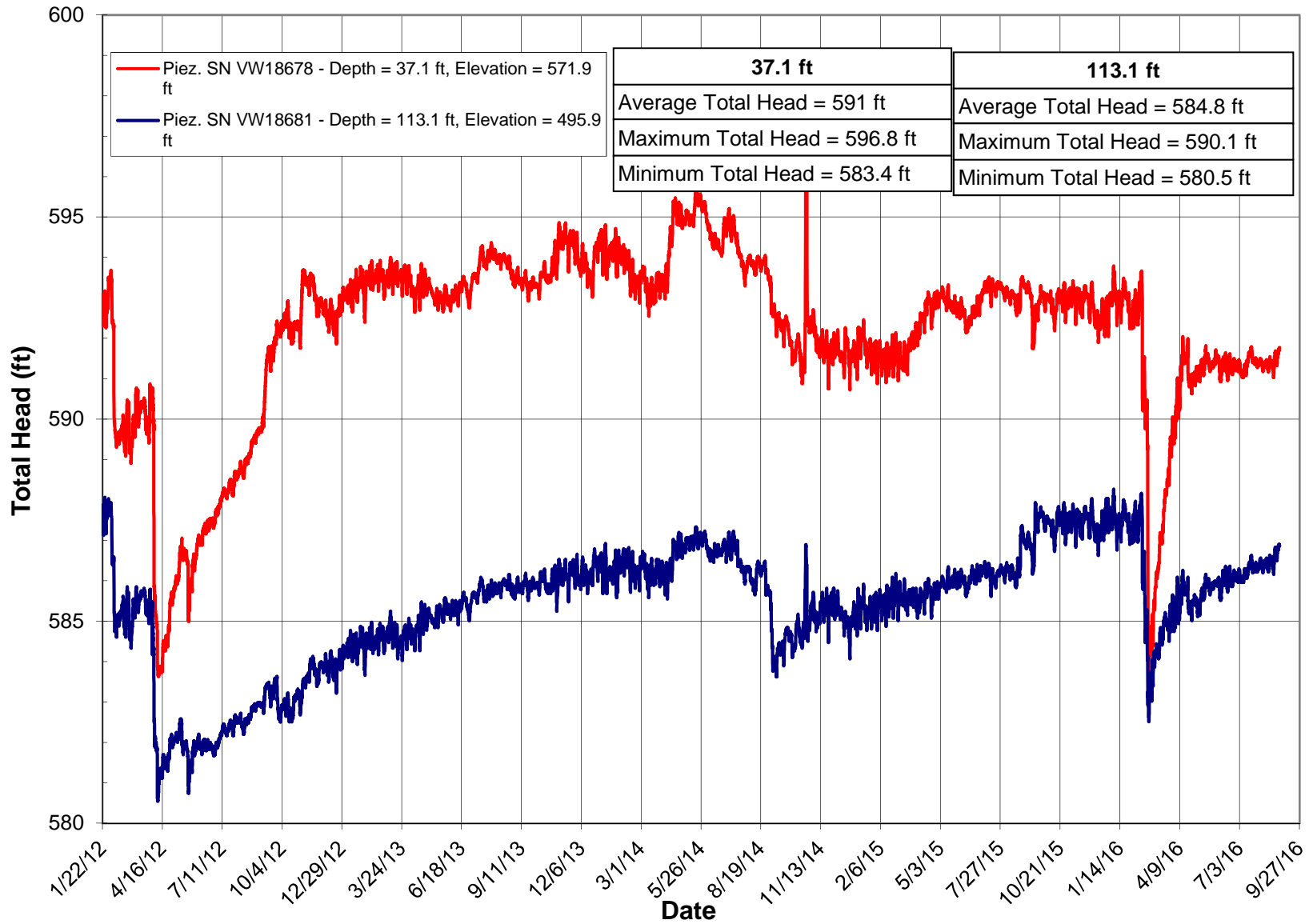
# B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



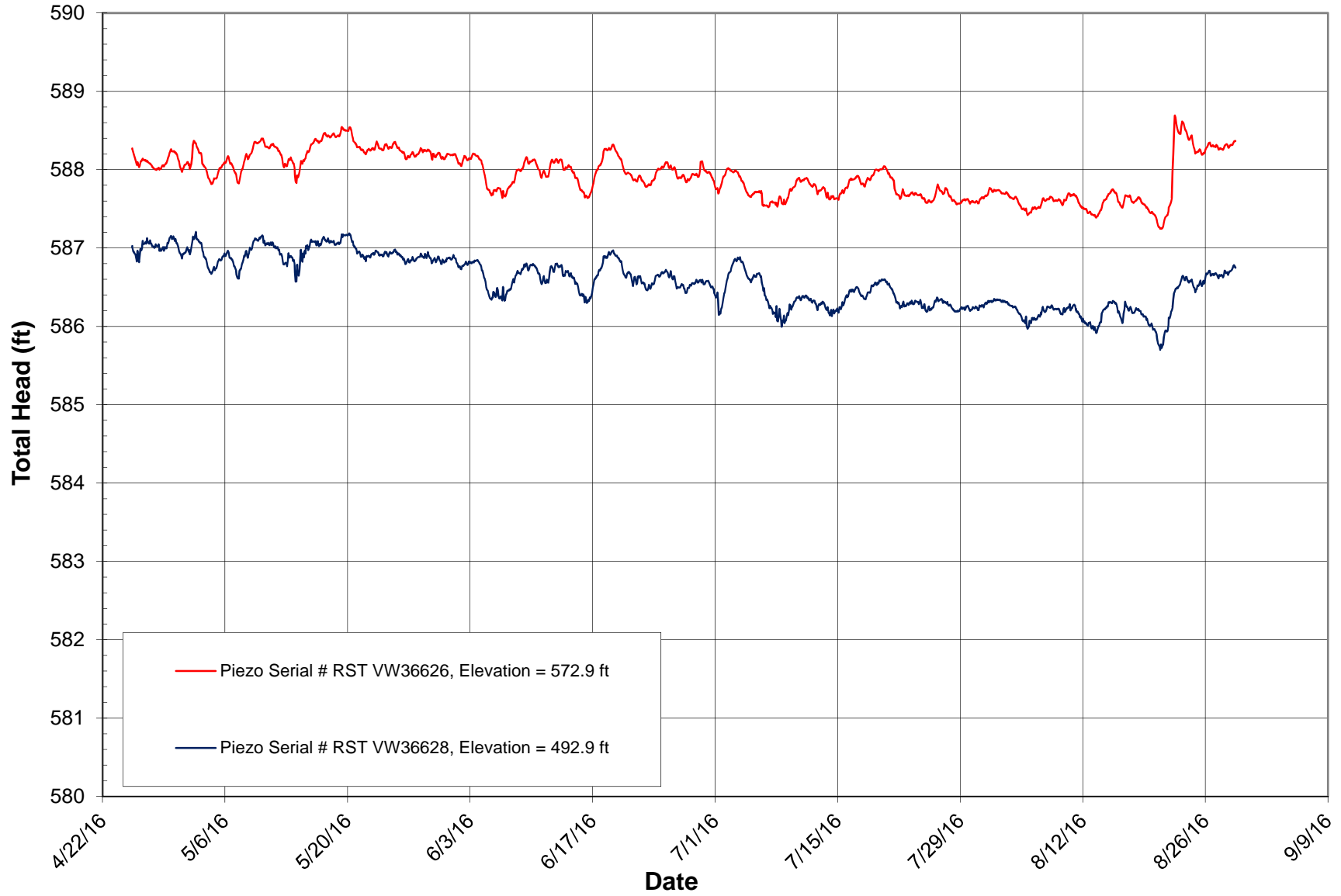
# B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



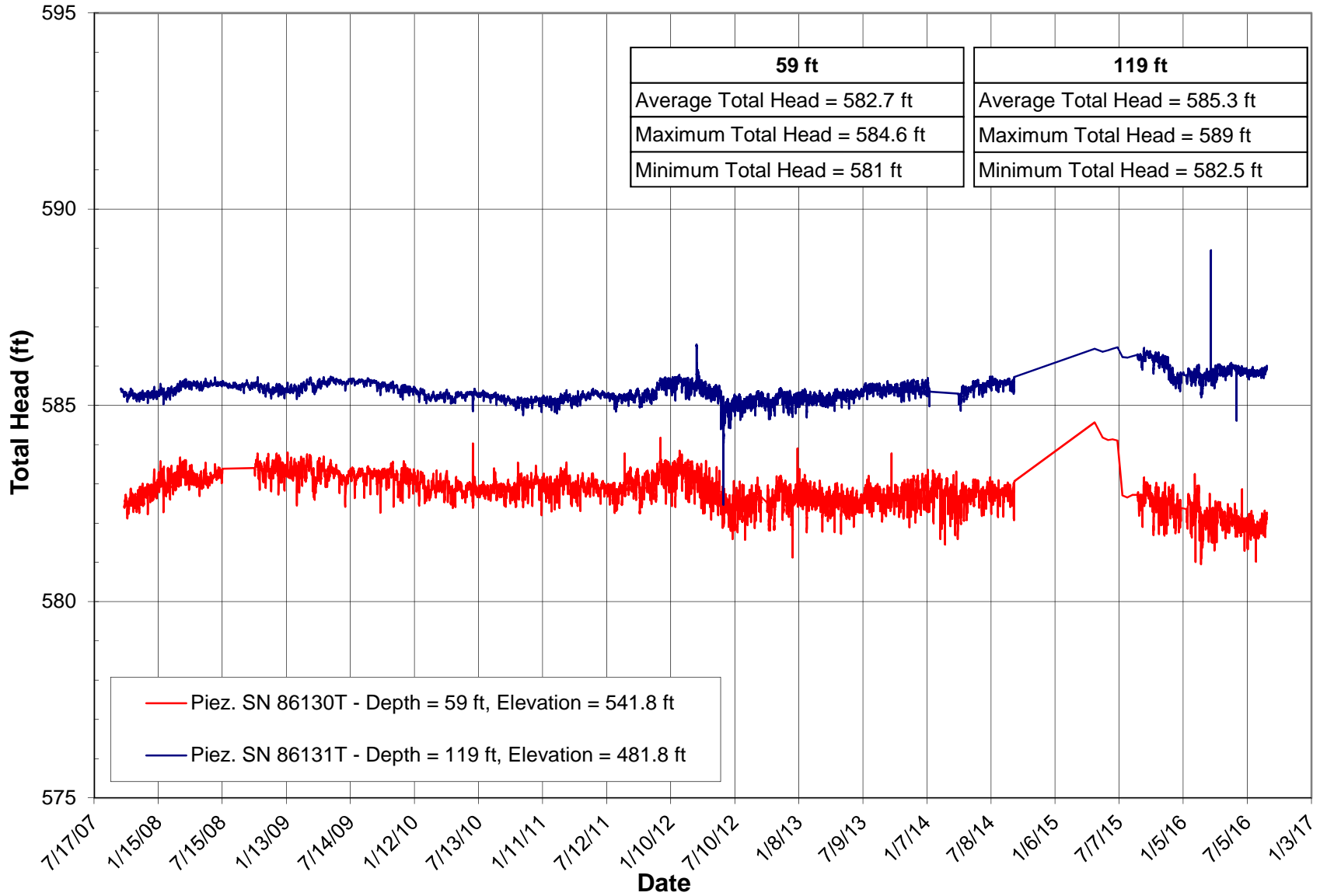
# B-05-A-03 VW Piezometer Readings

Ground surface elevation = 599.9 ft



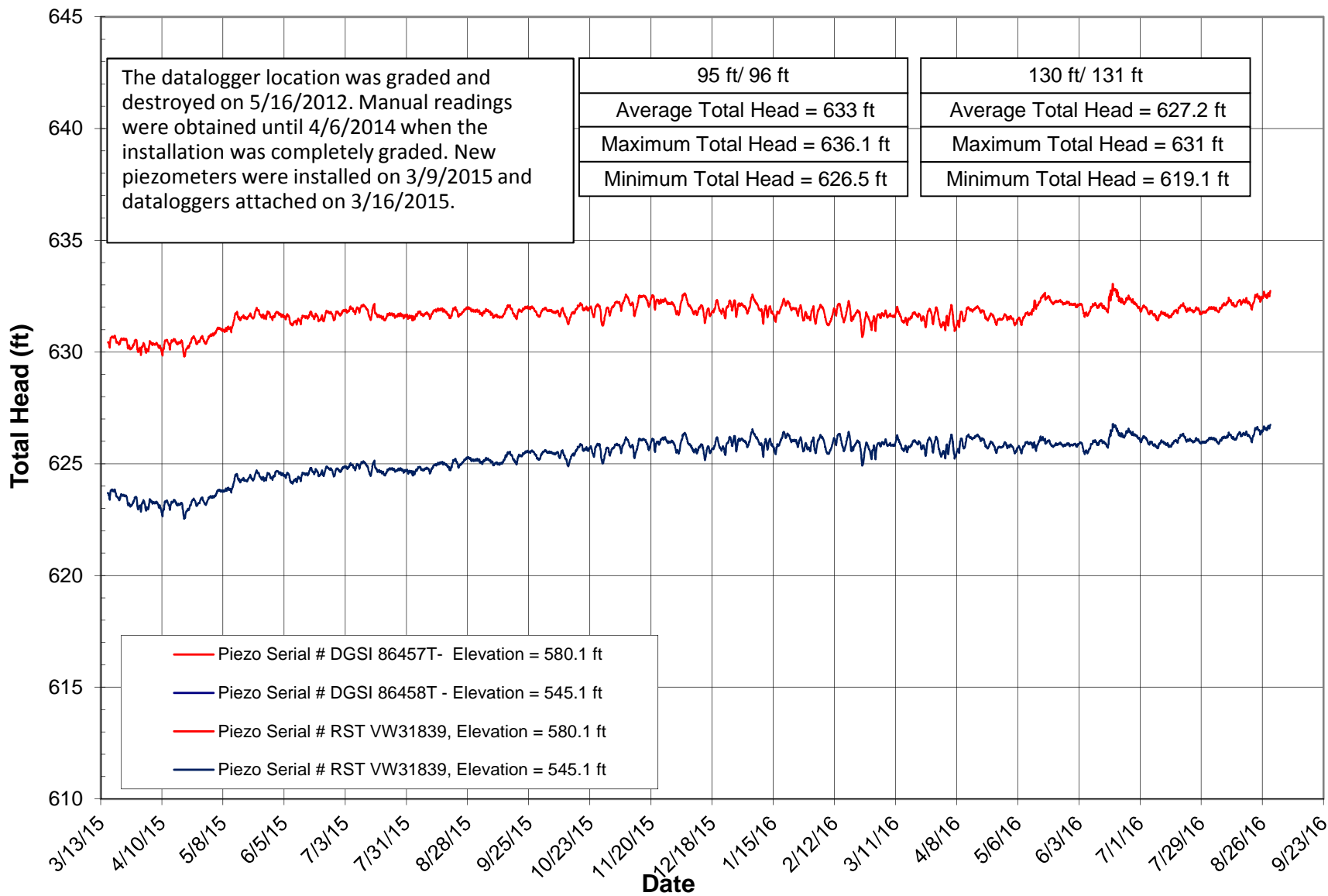
# B-05-04 VW Piezometer Readings

Ground surface elevation = 600.8 ft



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

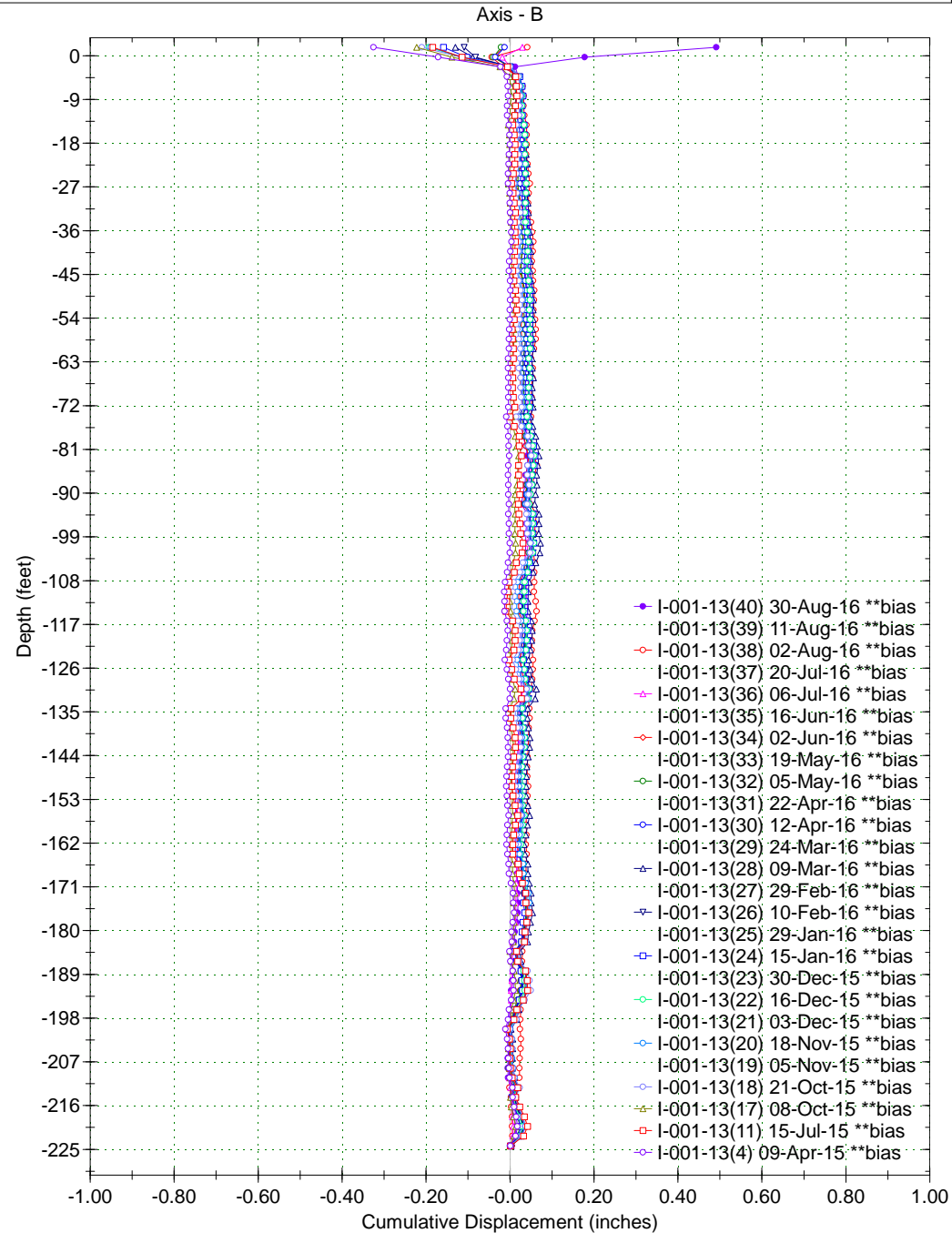
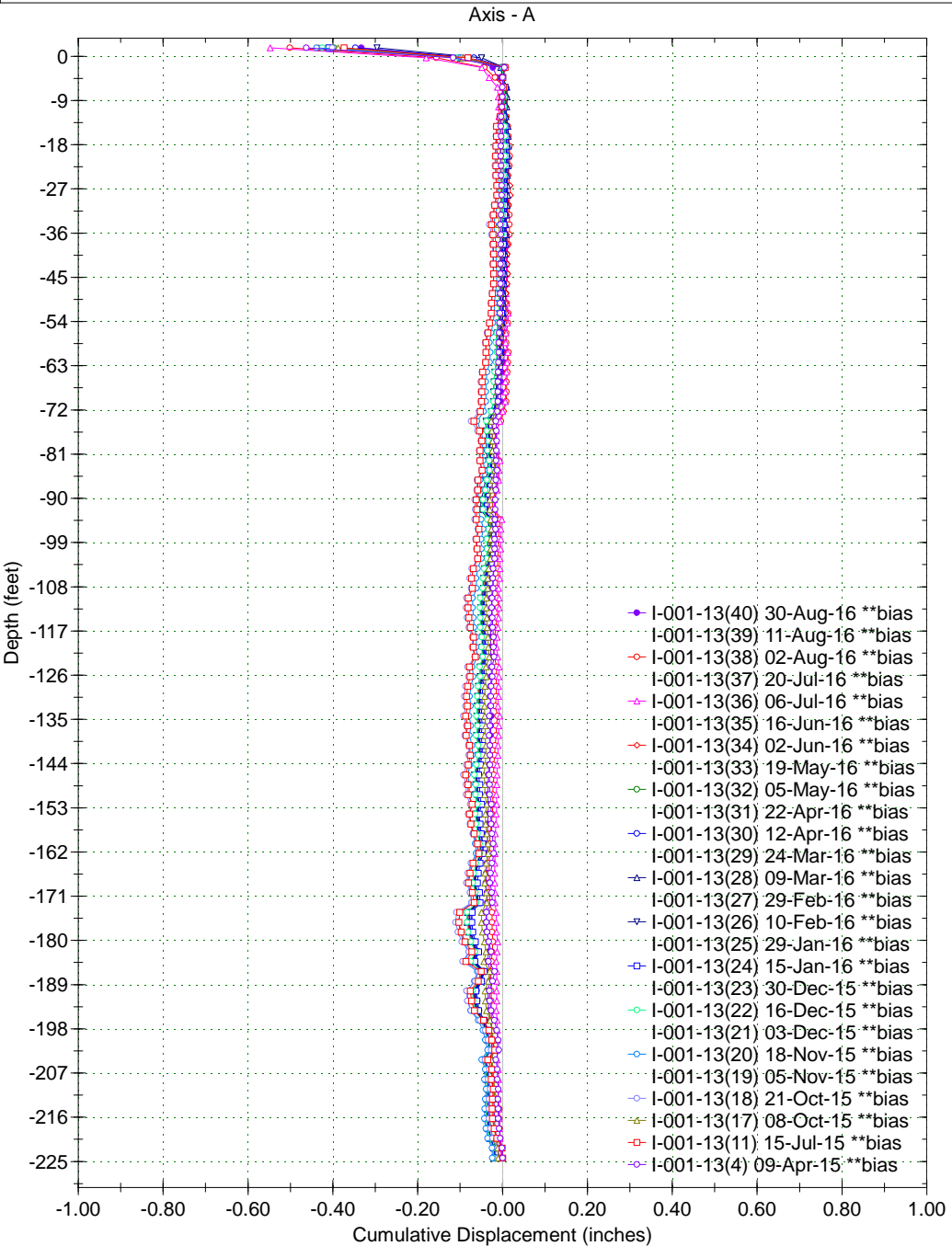
Ground surface elevation = 675.1 ft (B-05-11) / 676.1 ft (B-05-A-11)



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



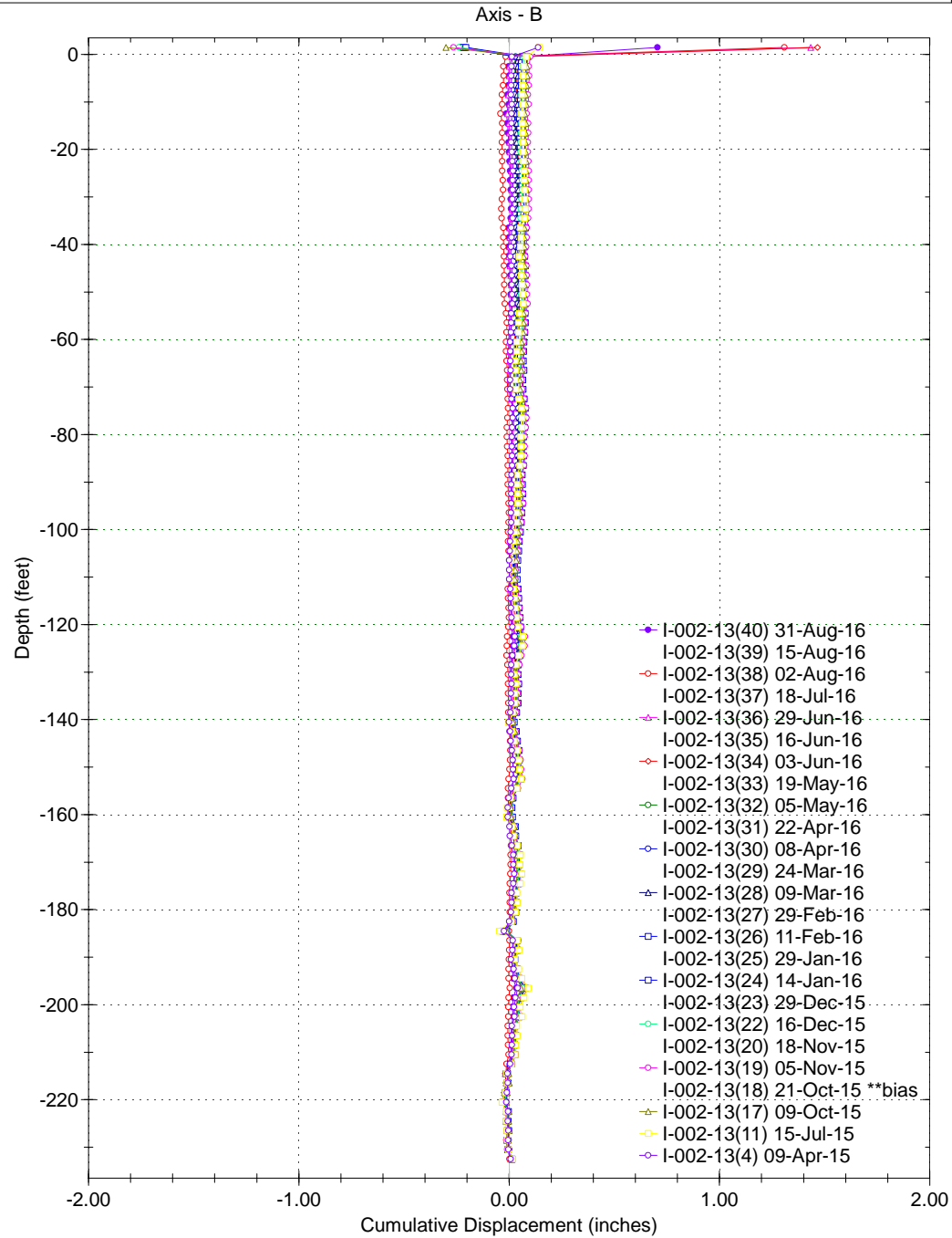
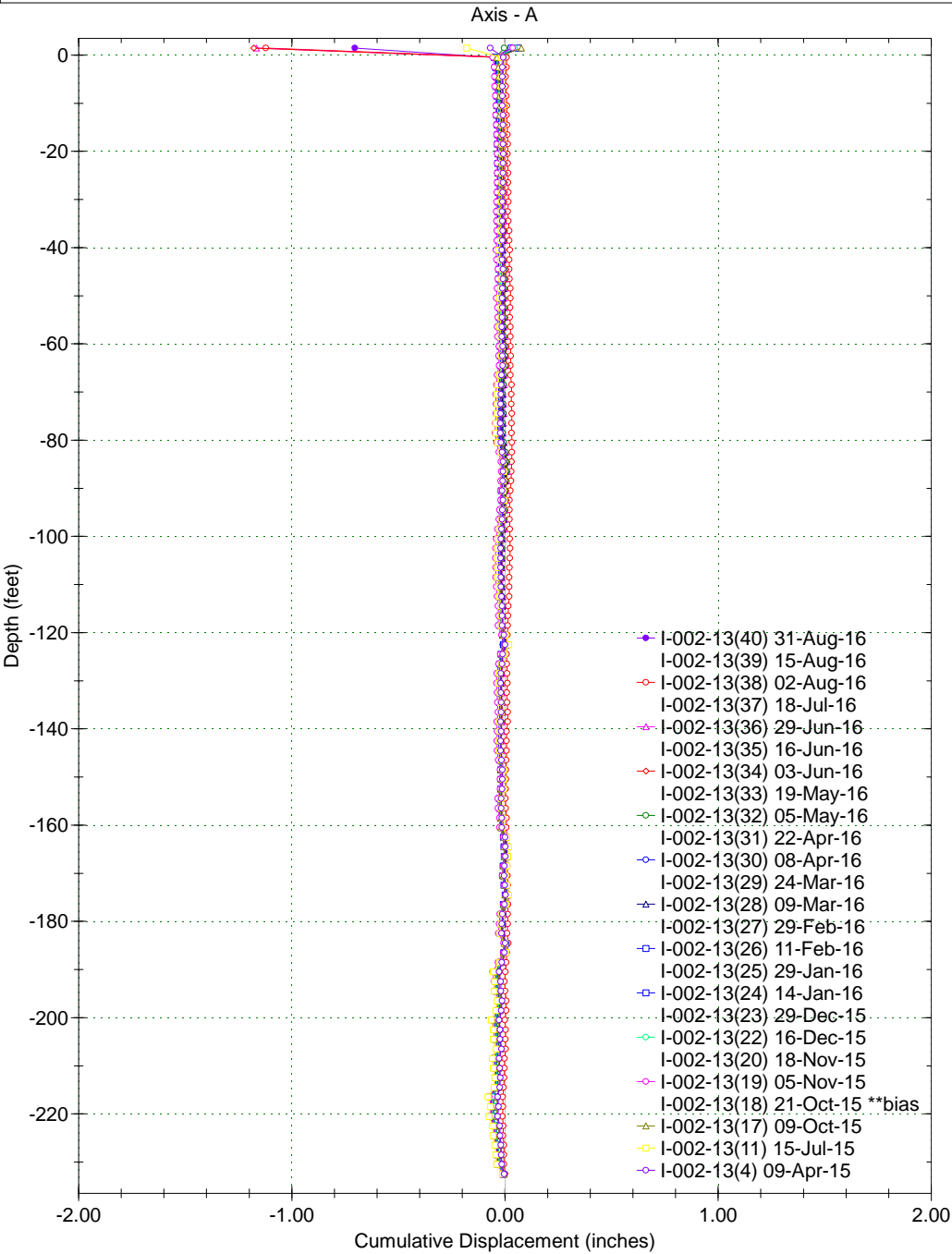
Spiral Correction : N/A  
Collar Elevation : 3.7 feet  
Borehole Total Depth : 228.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Mar 03 11:14  
Applied Azimuth : 0.0 degrees



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

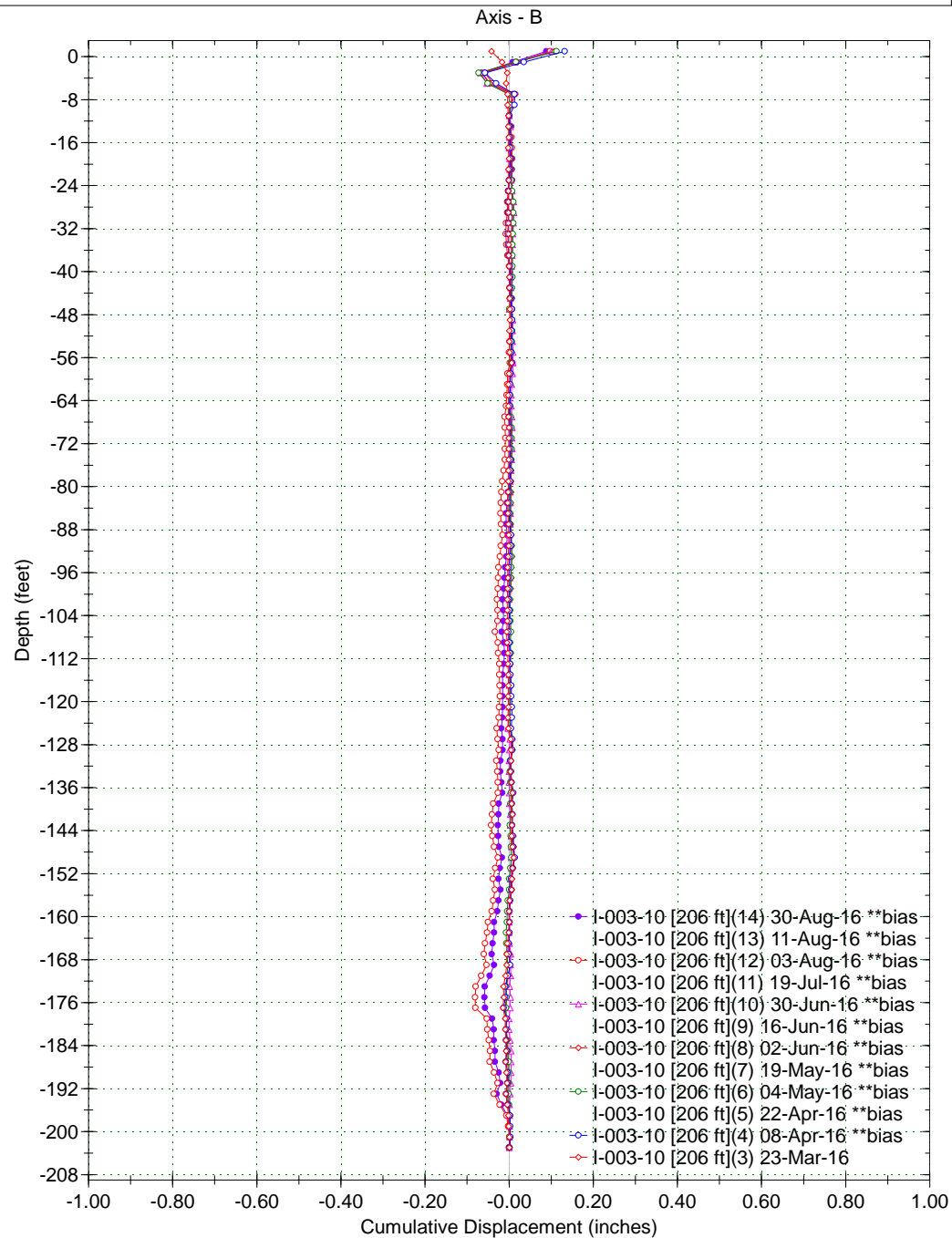
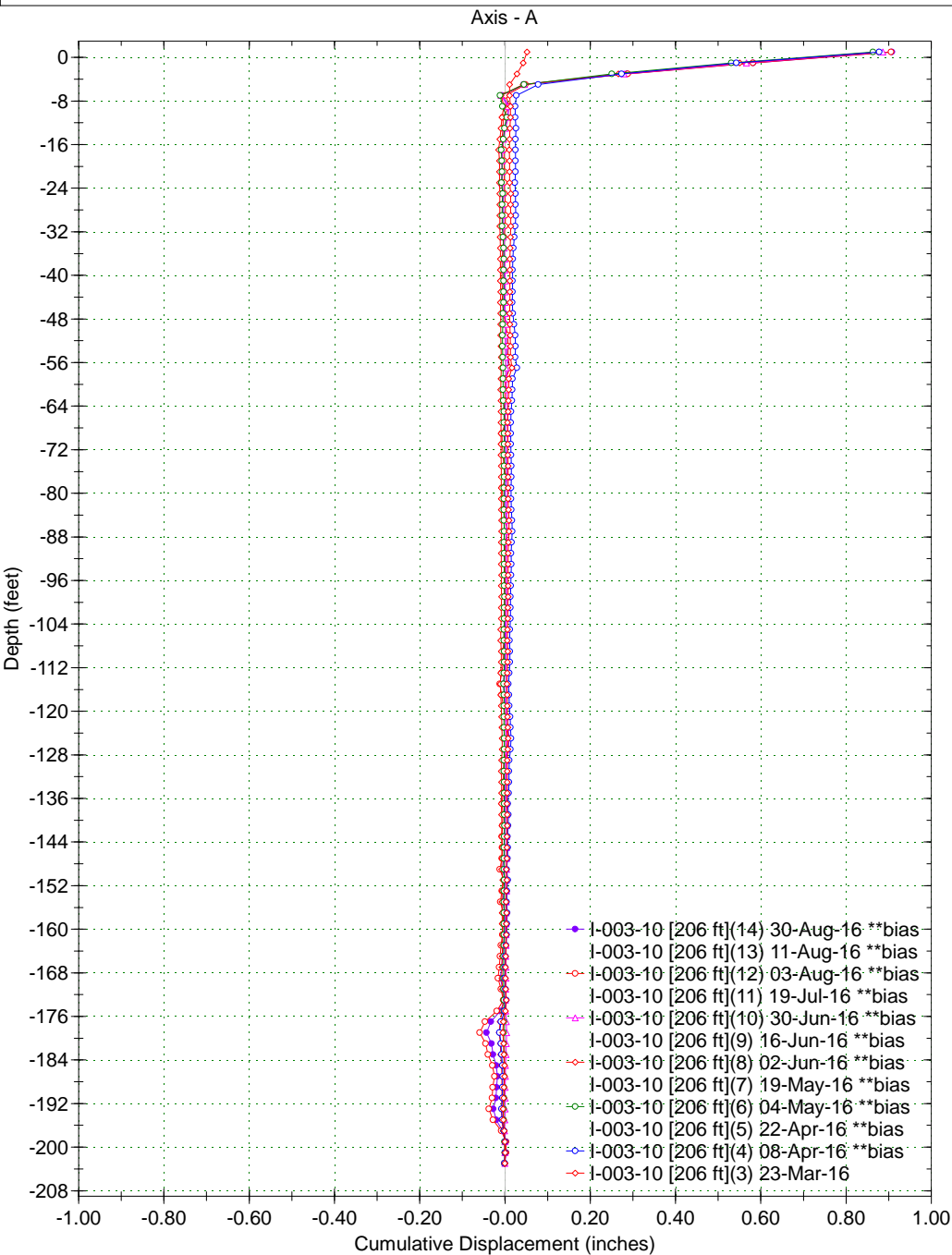




Borehole : I-003-10 [206 ft]  
Project : CUY-90-15-24  
Location :  
Northing :  
Easting :  
Collar :



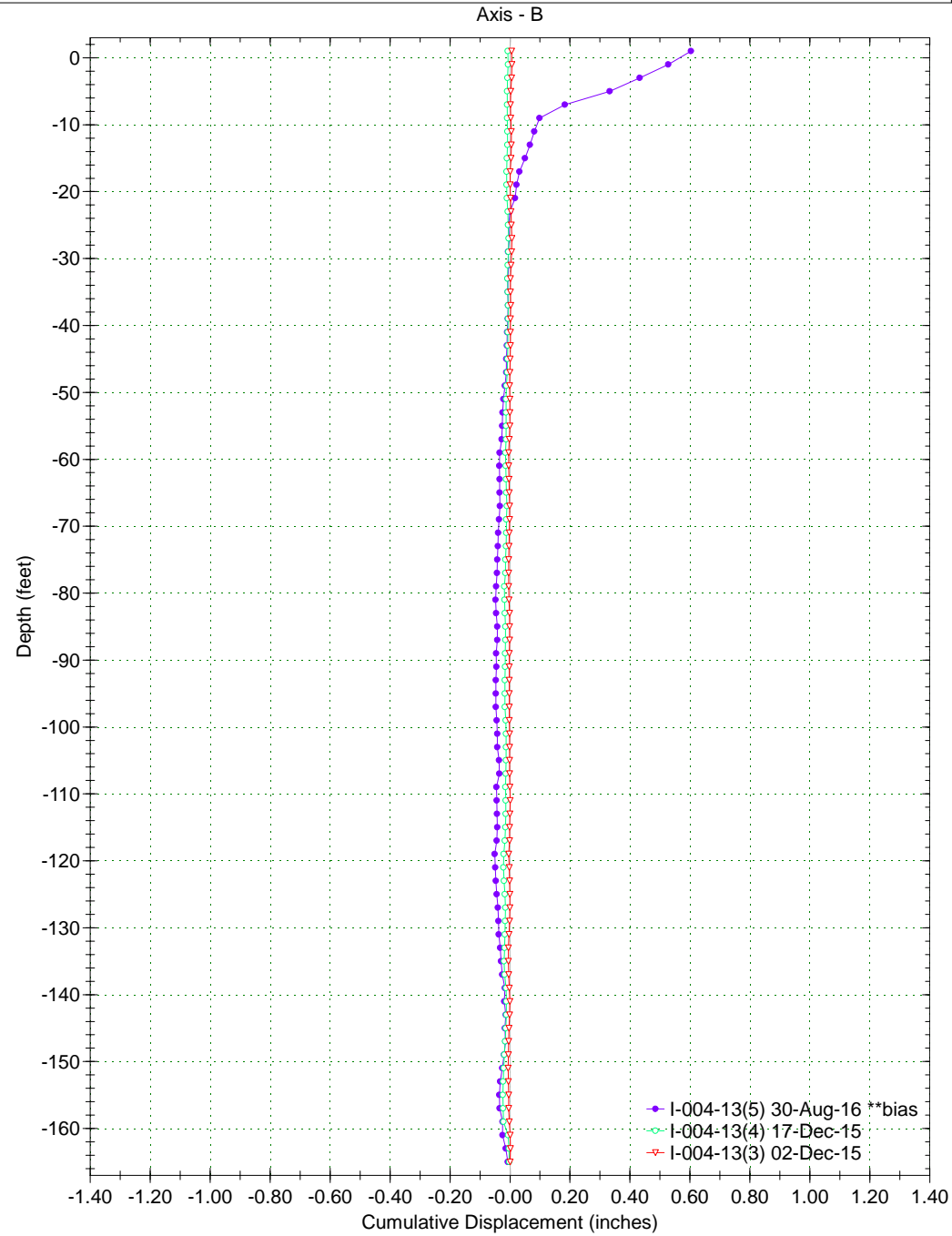
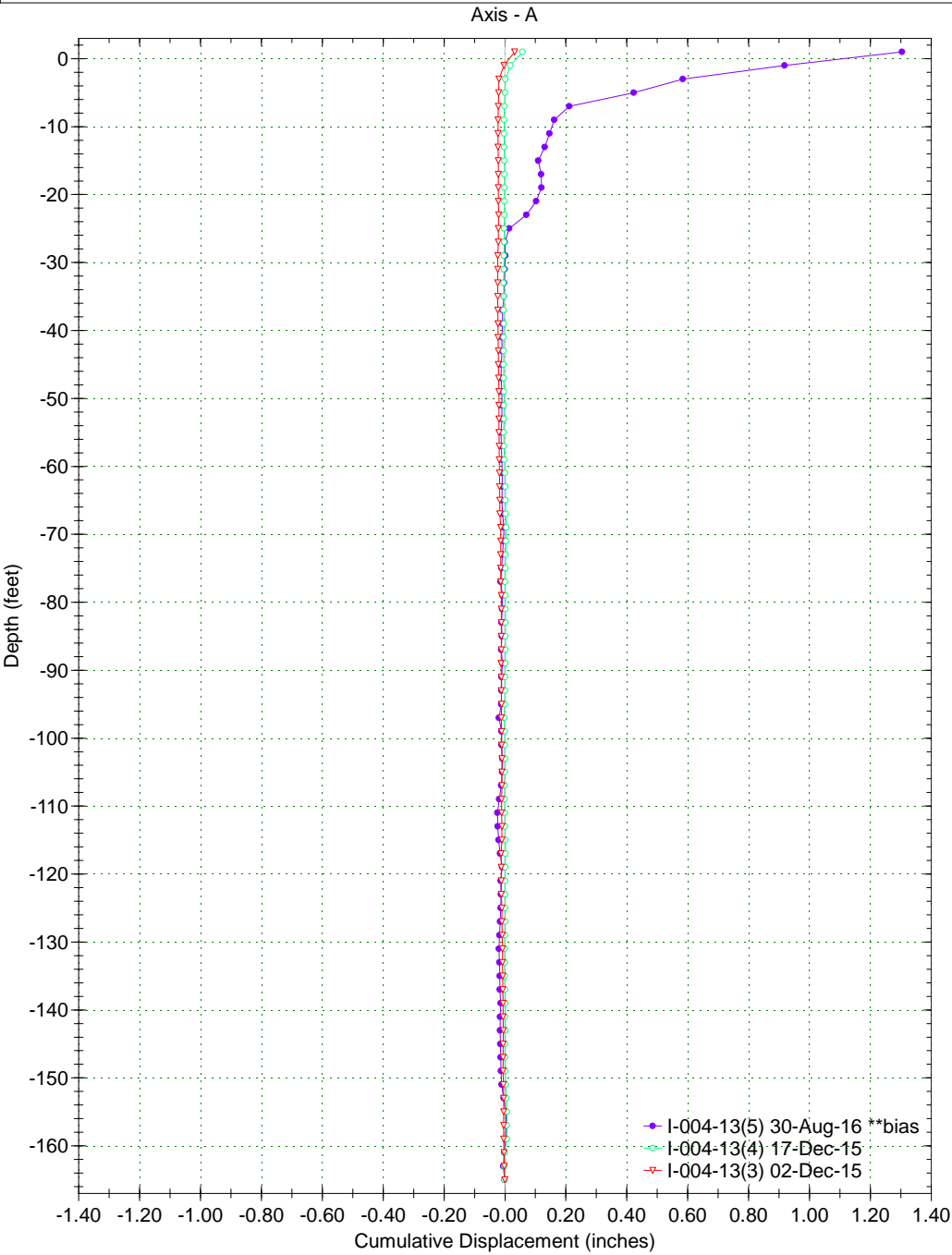
Spiral Correction : N/A  
Collar Elevation : 3.0 feet  
Borehole Total Depth : 206.0 feet  
A+ Groove Azimuth :  
Base Reading : 2016 Mar 08 15:42  
Applied Azimuth : 0.0 degrees



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



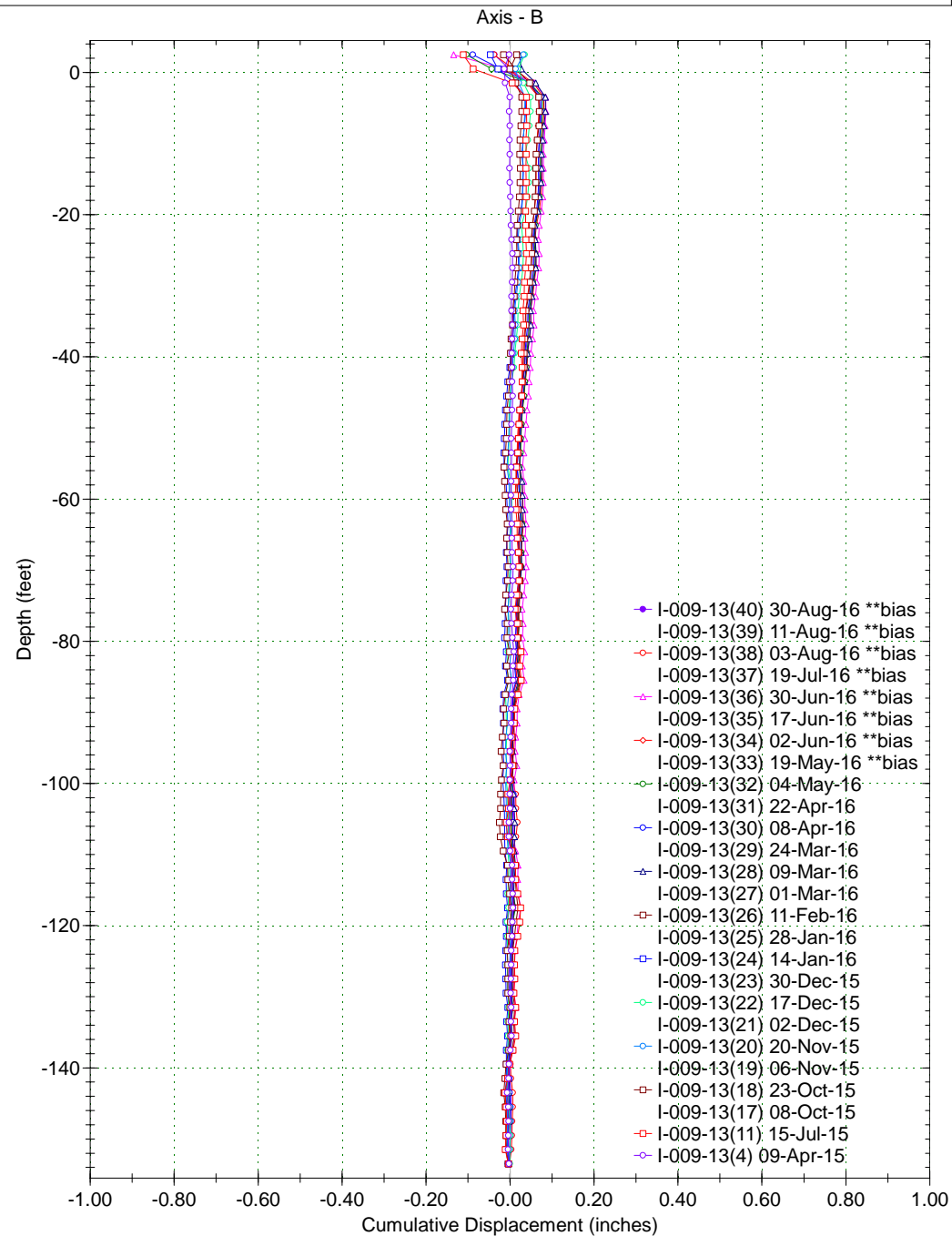
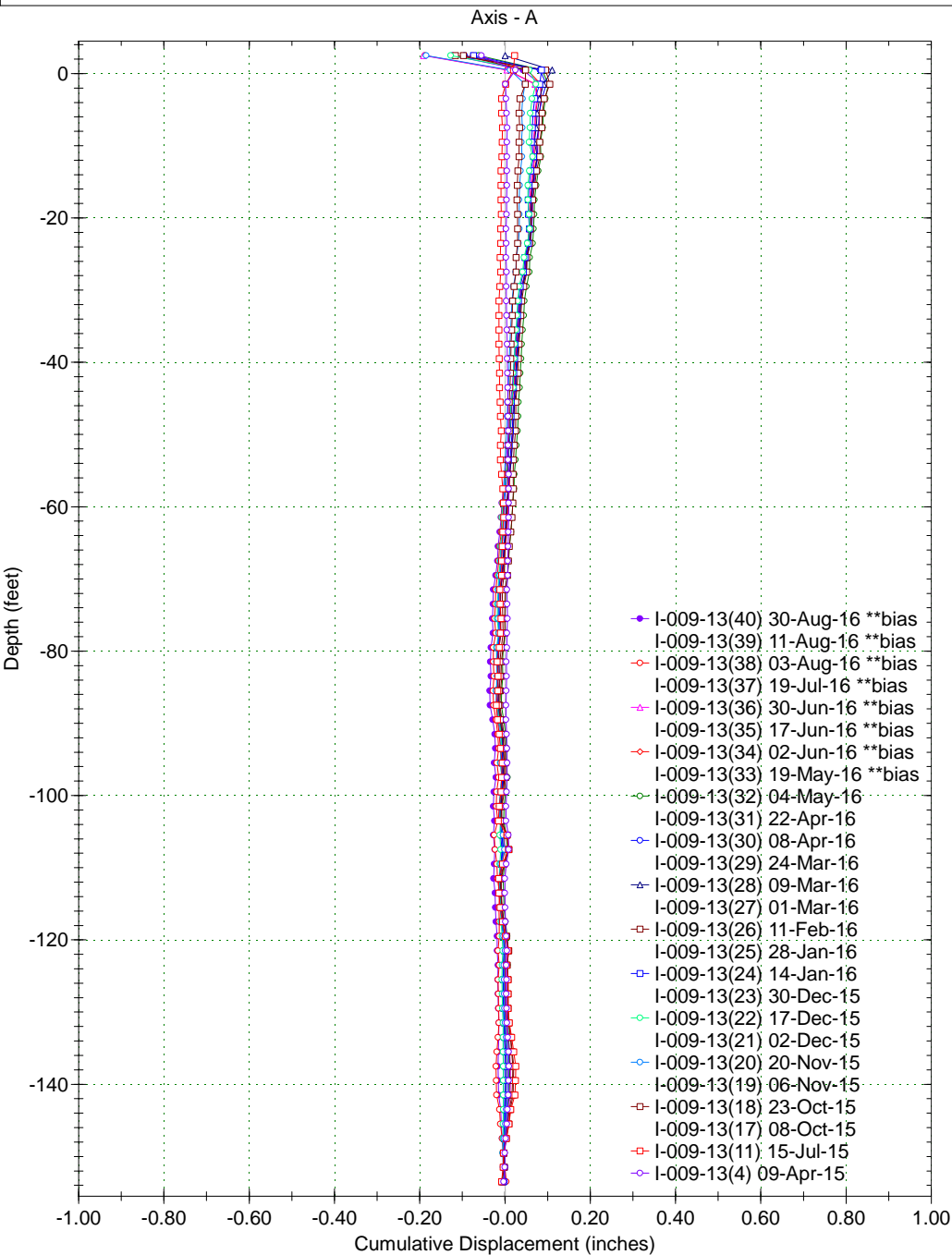
Spiral Correction : N/A  
Collar Elevation : 3.0 feet  
Borehole Total Depth : 168.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Nov 20 09:09  
Applied Azimuth : 0.0 degrees



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



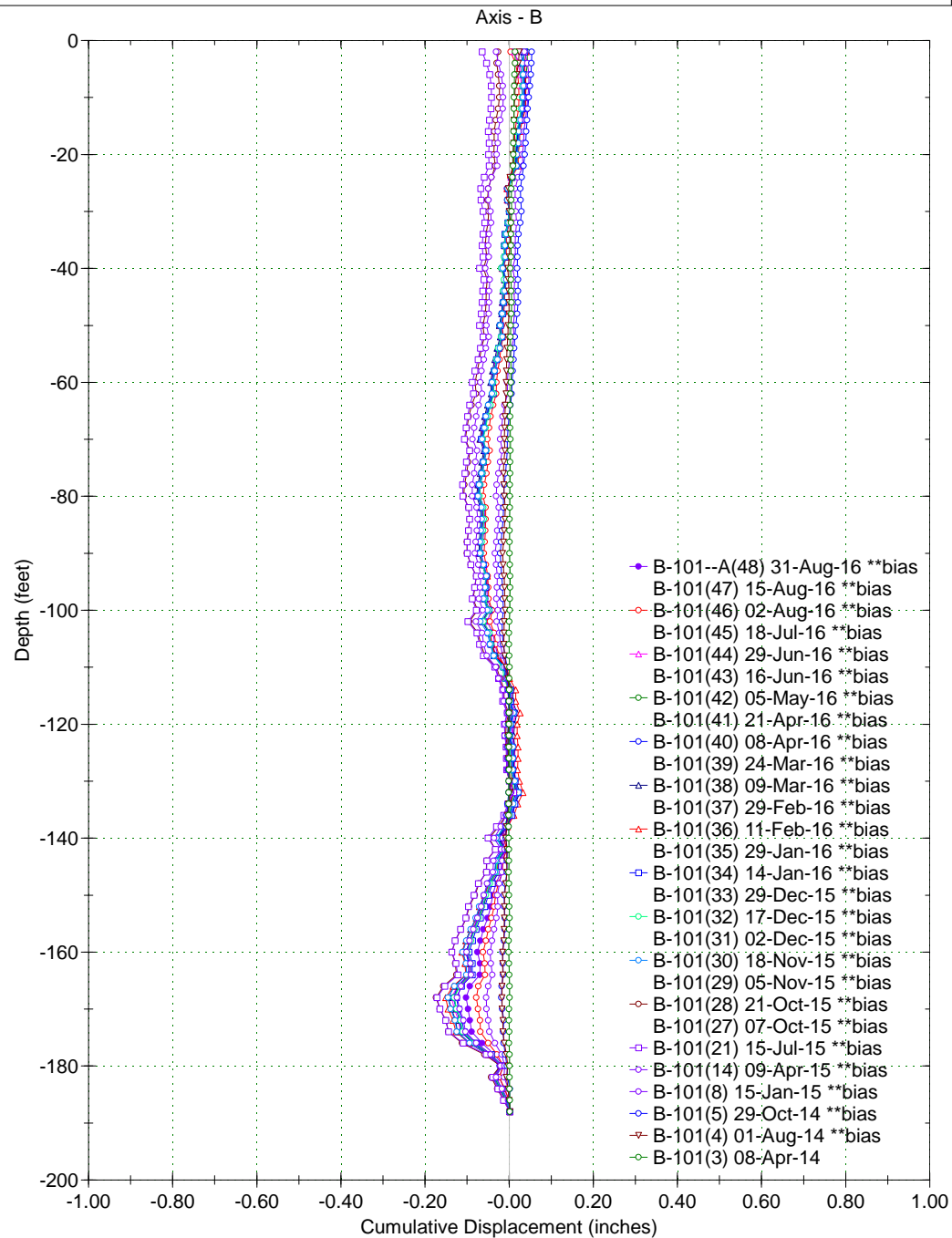
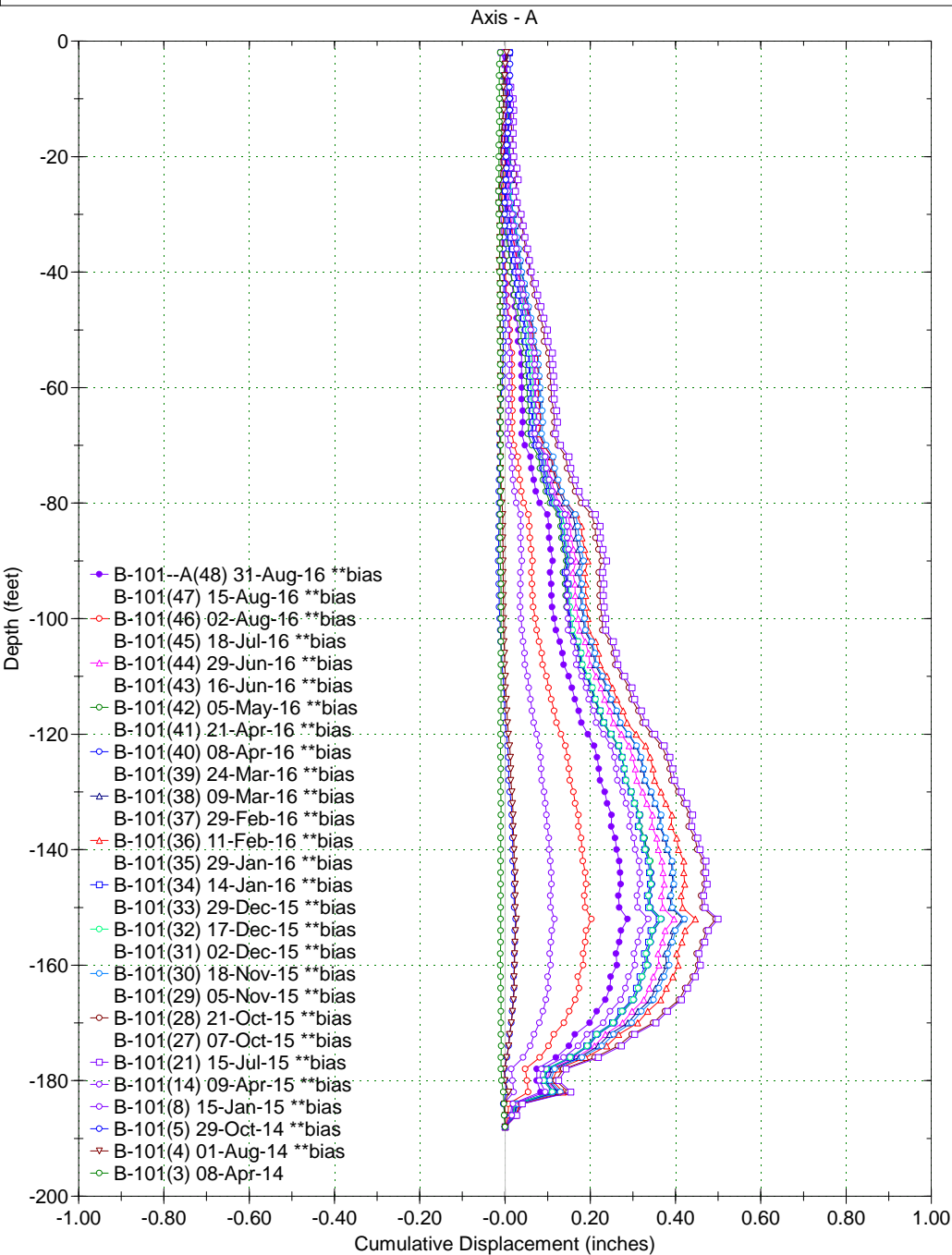
Spiral Correction : N/A  
Collar Elevation : 4.5 feet  
Borehole Total Depth : 158.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Mar 18 15:56  
Applied Azimuth : 0.0 degrees



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



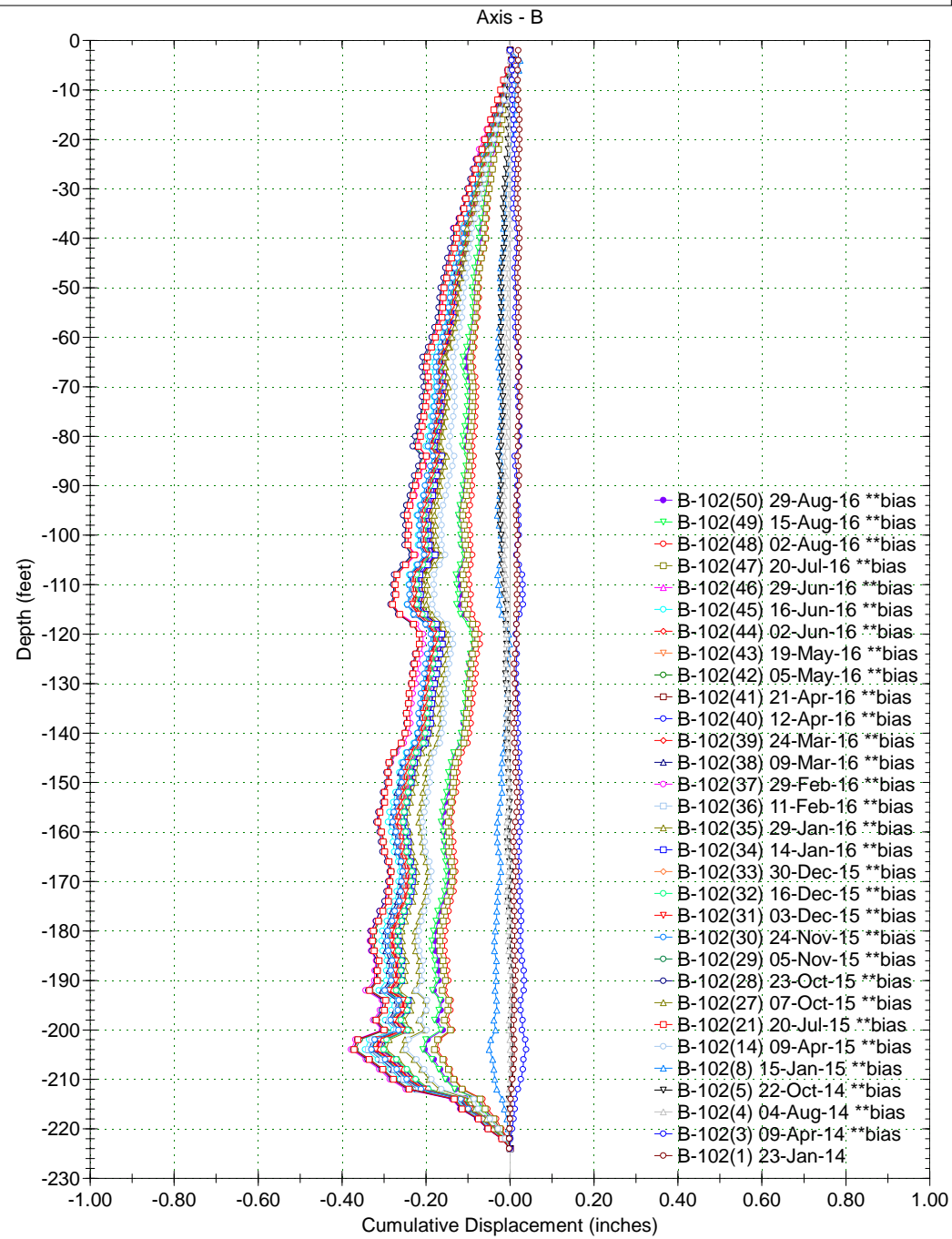
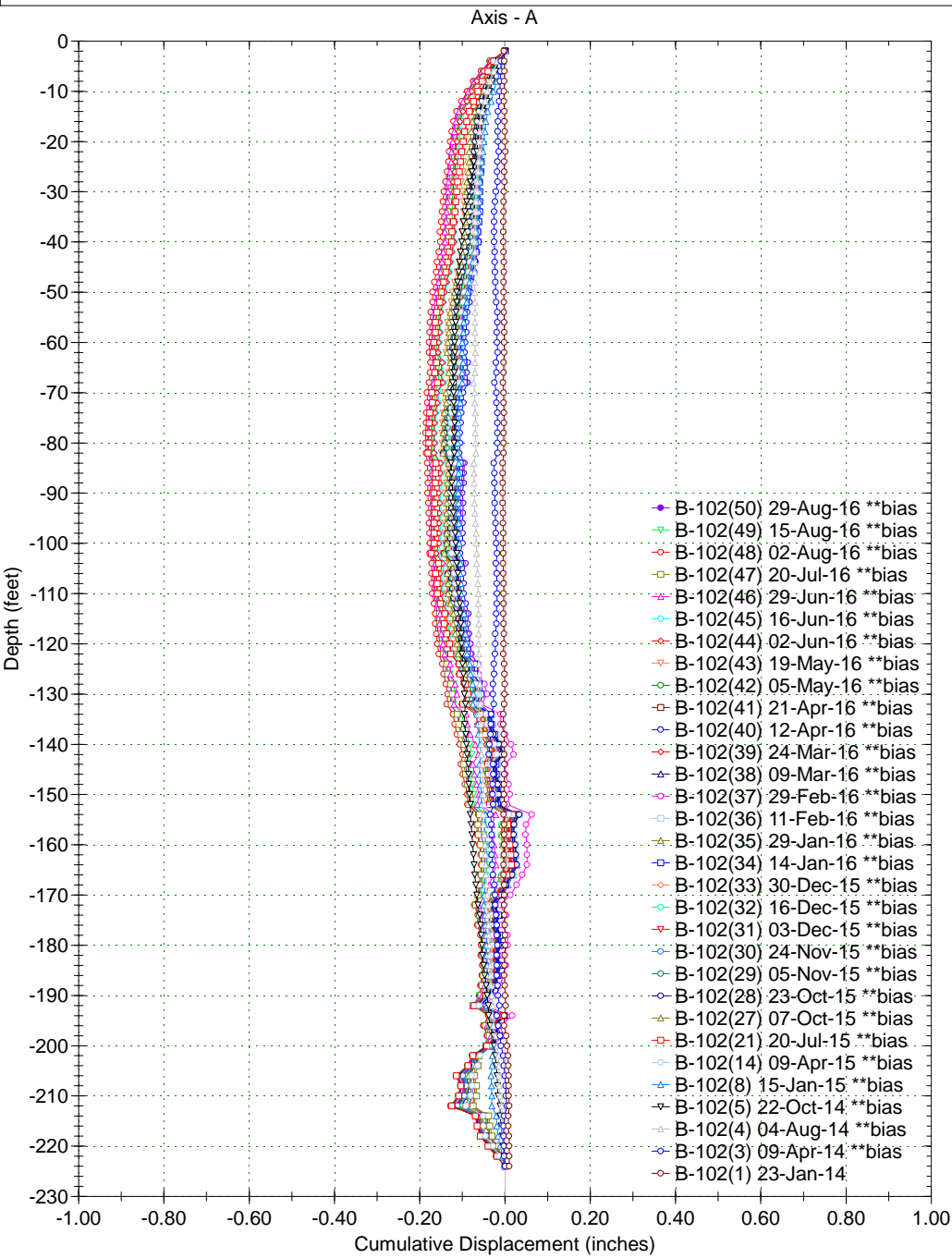
Spiral Correction : N/A  
Collar Elevation : 0.0 feet  
Borehole Total Depth : 188.0 feet  
A+ Groove Azimuth :  
Base Reading : 2014 Jan 22 09:01  
Applied Azimuth : 0.0 degrees



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



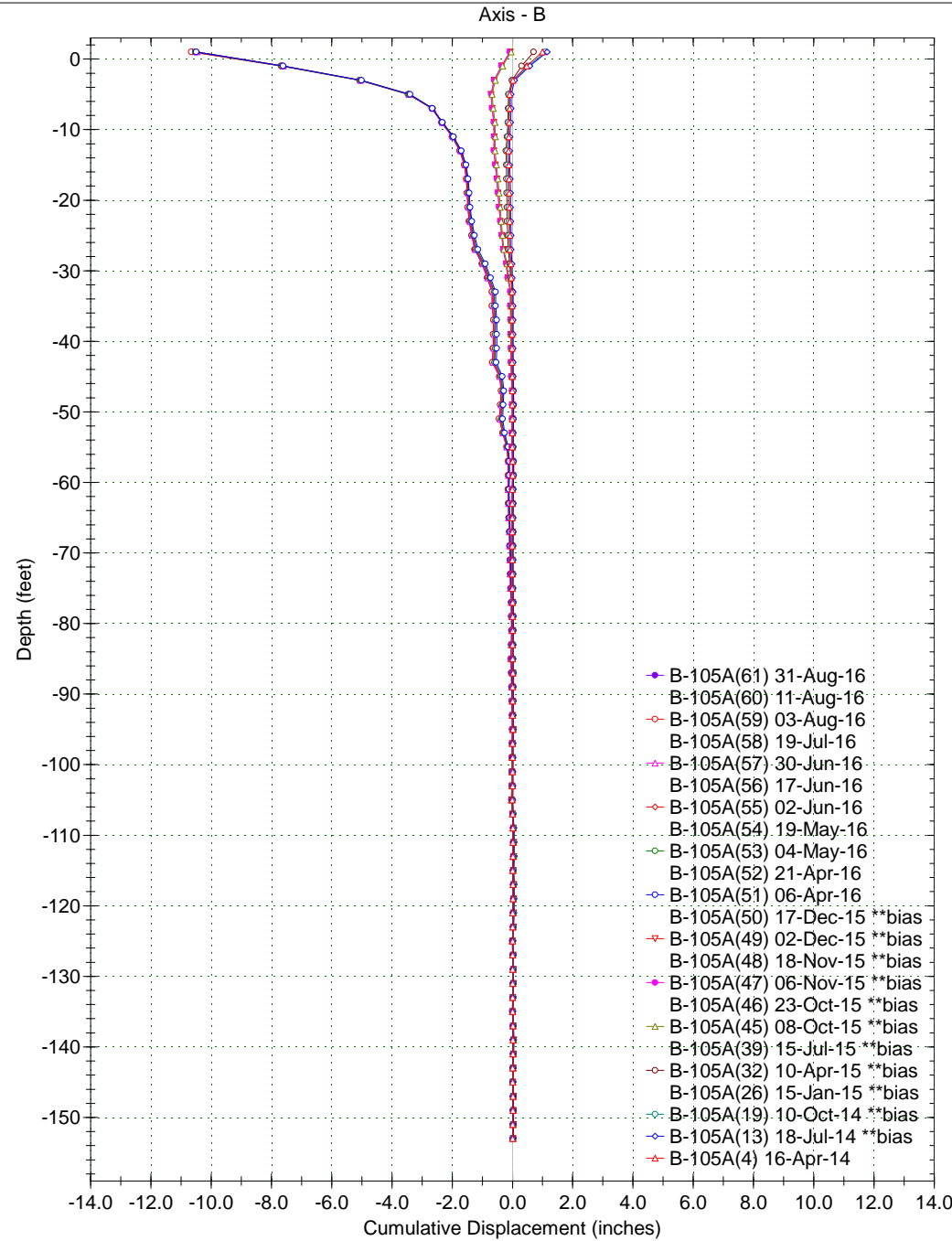
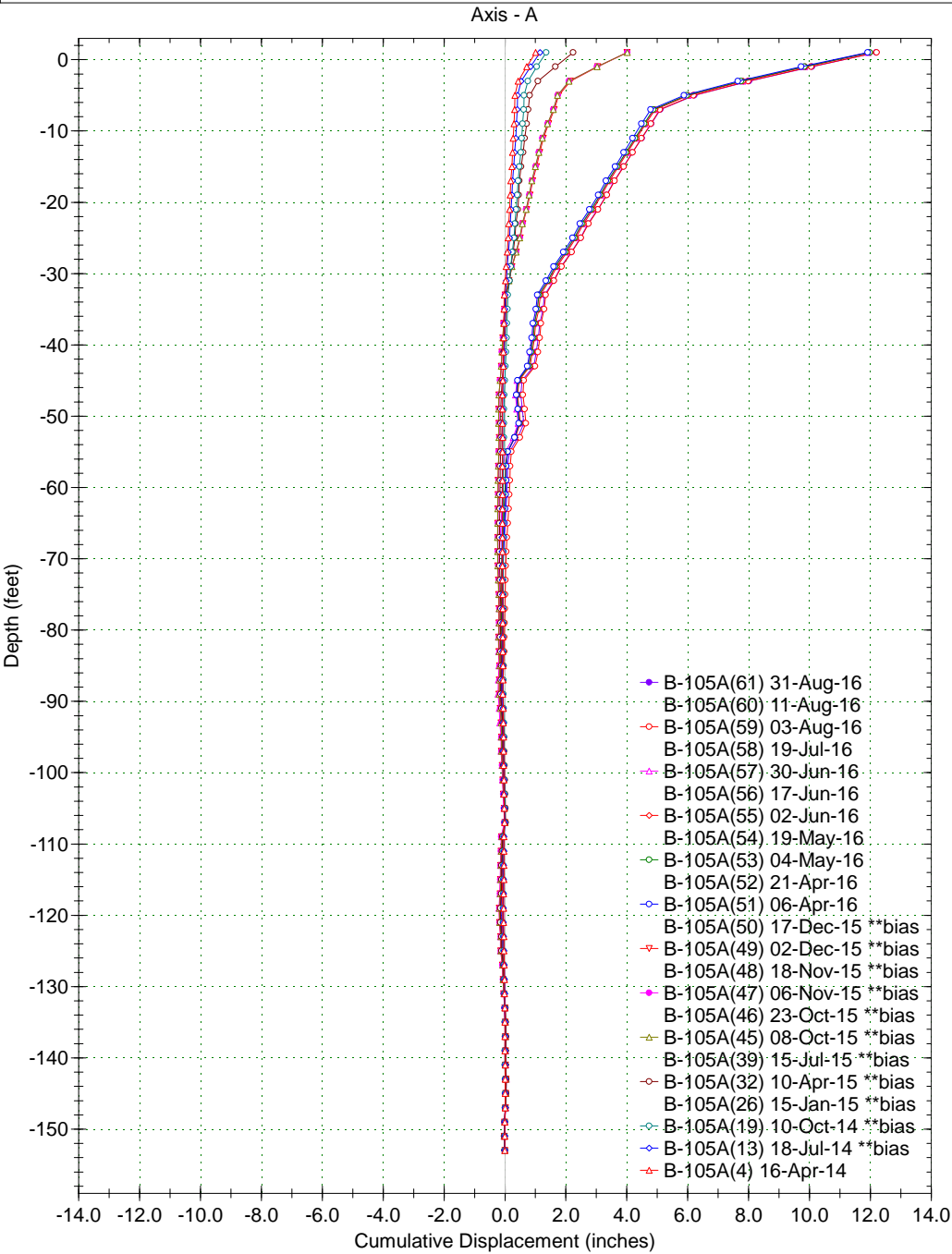
Spiral Correction : N/A  
 Collar Elevation : 0.0 feet  
 Borehole Total Depth : 224.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 23 08:21  
 Applied Azimuth : 0.0 degrees



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

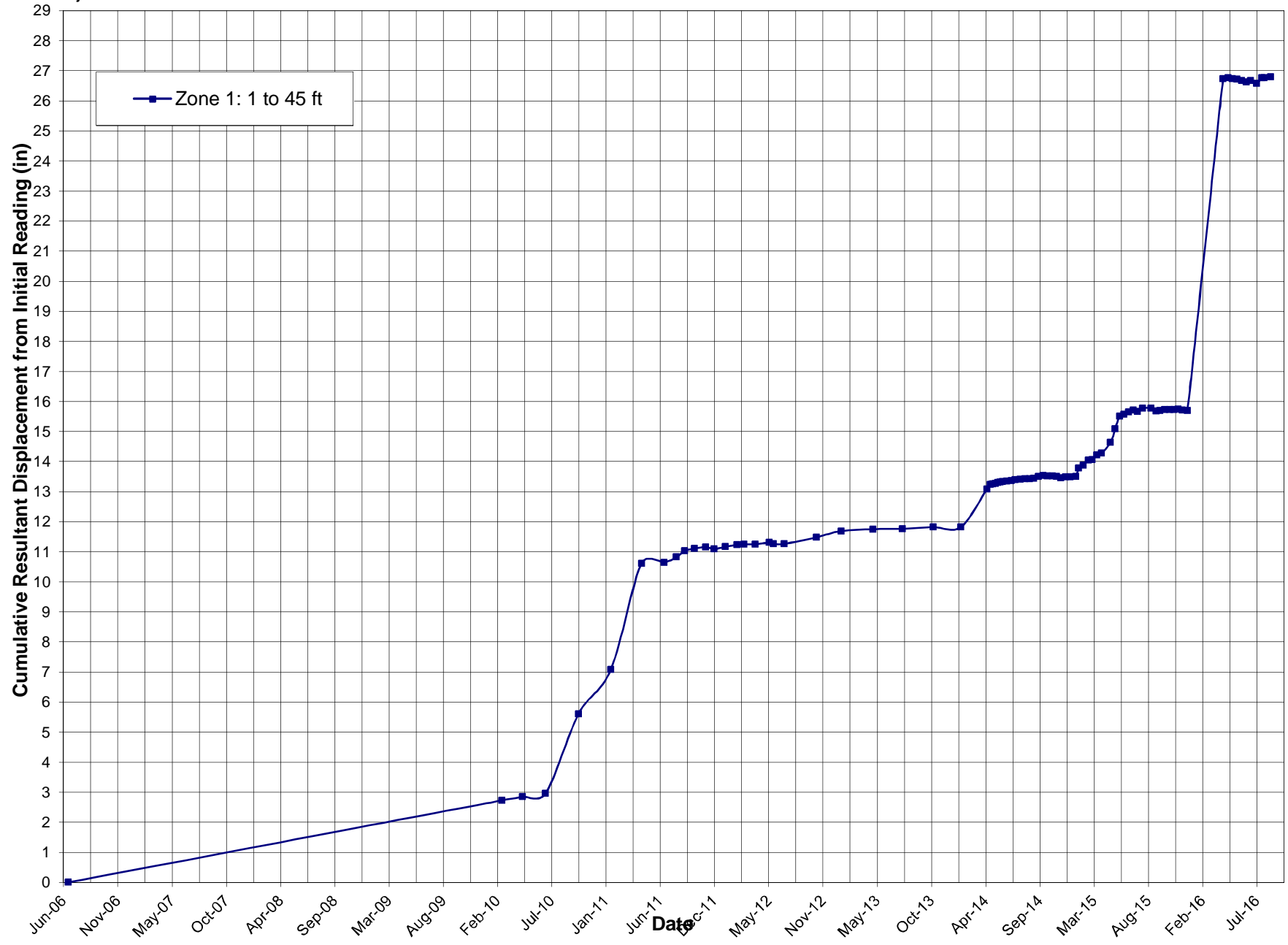


Spiral Correction : N/A  
 Collar Elevation : 3.0 feet  
 Borehole Total Depth : 156.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 15 09:19  
 Applied Azimuth : 0.0 degrees



CUY-90-15.24  
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### B-105A

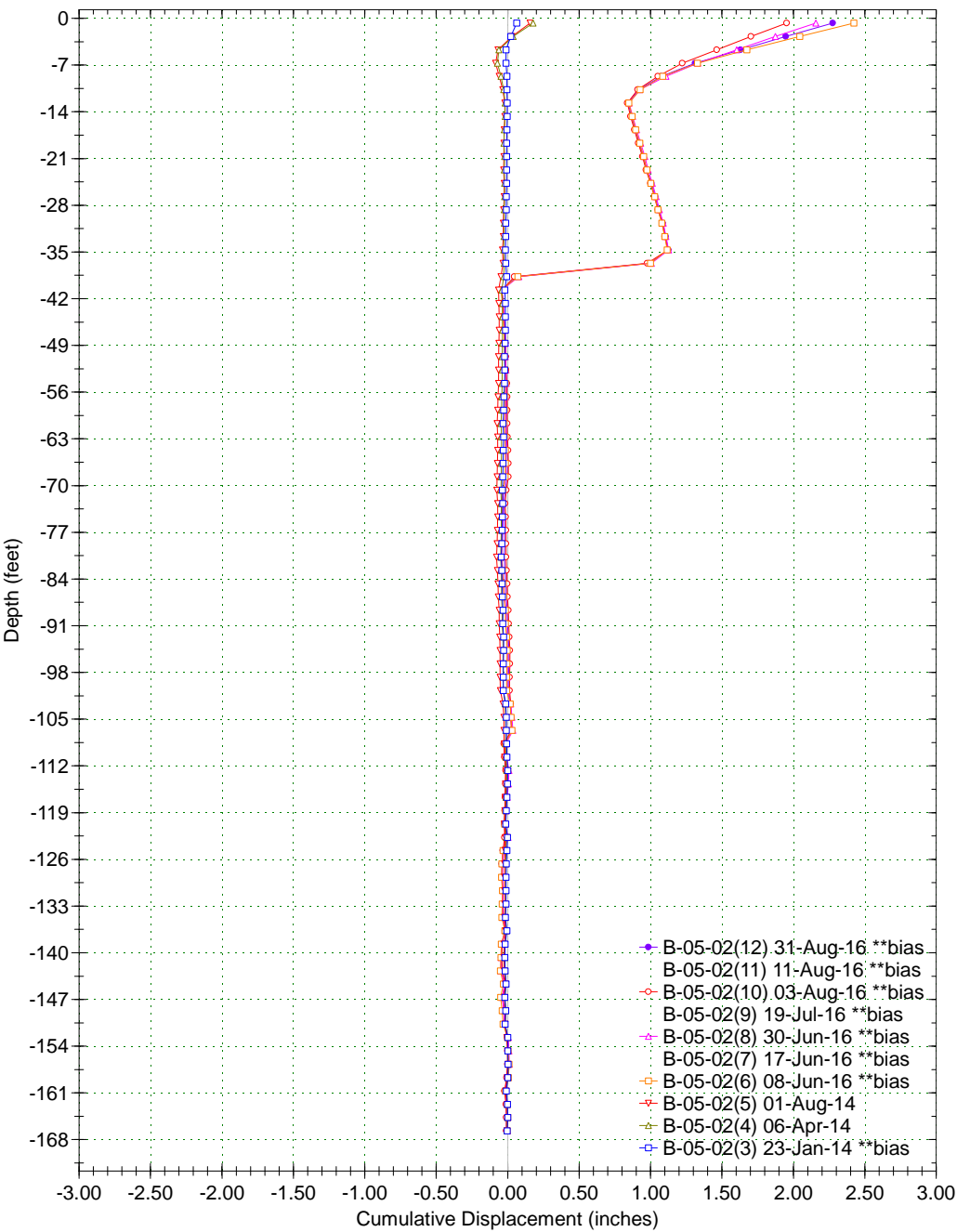


Borehole : B-05-02A  
Project : CUY-90-15-24  
Location : Cleveland, Ohio  
Northing : 663737.939  
Easting : 2190289.081  
Collar :

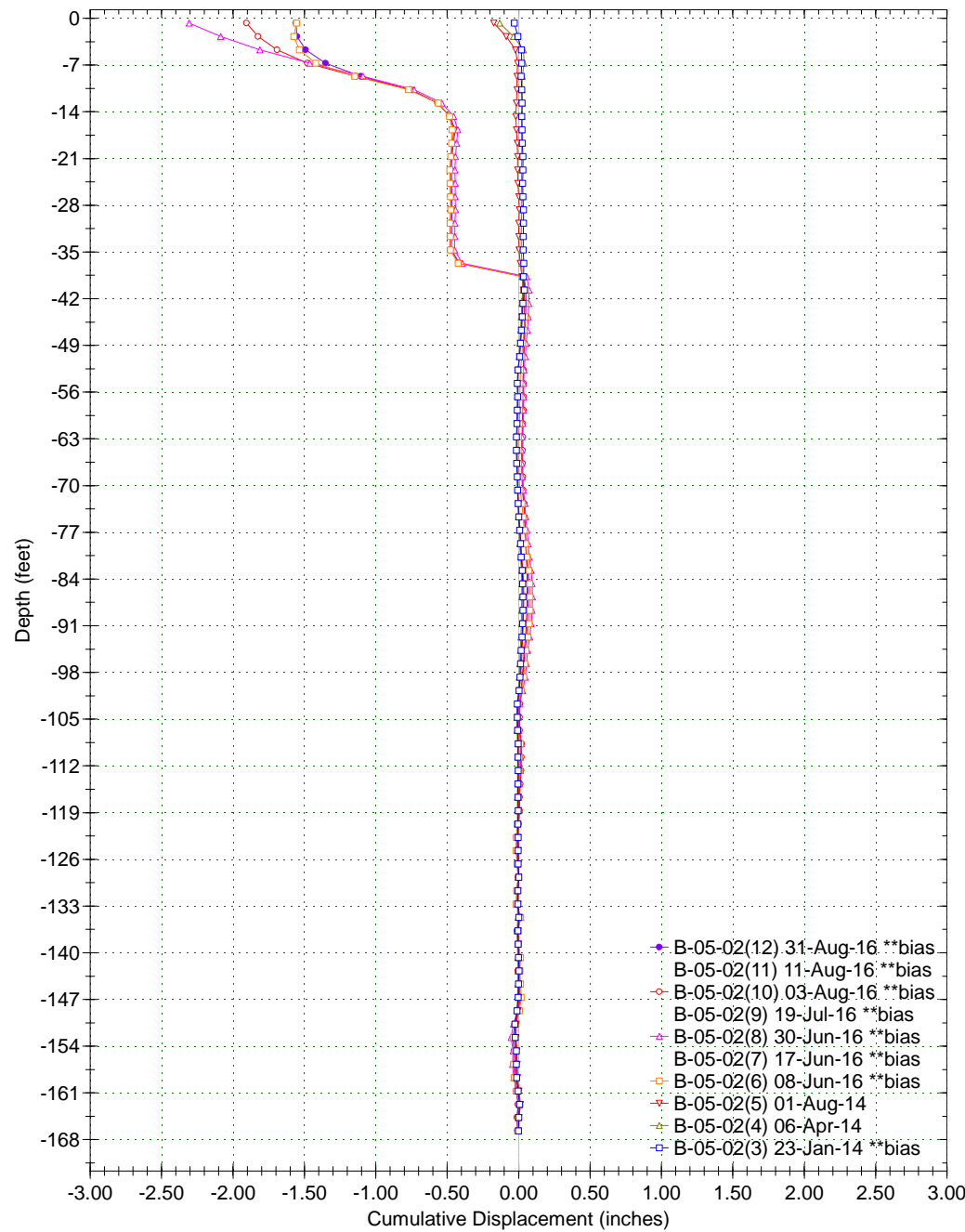


Spiral Correction : N/A  
Collar Elevation : 1.3 feet  
Borehole Total Depth : 168.0 feet  
A+ Groove Azimuth :  
Base Reading : 2013 Dec 24 11:12  
Applied Azimuth : 0.0 degrees

Axis - A



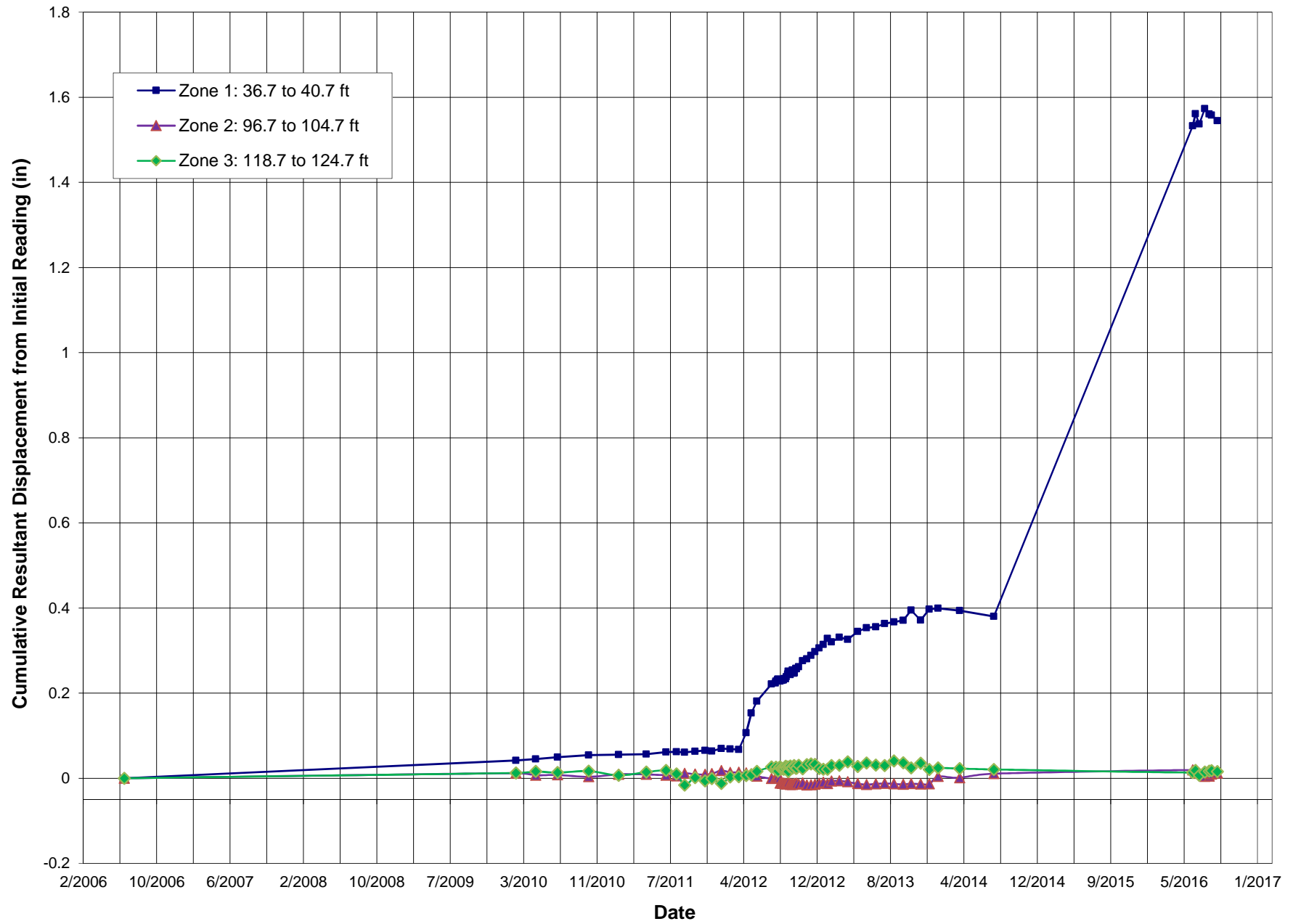
Axis - B





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

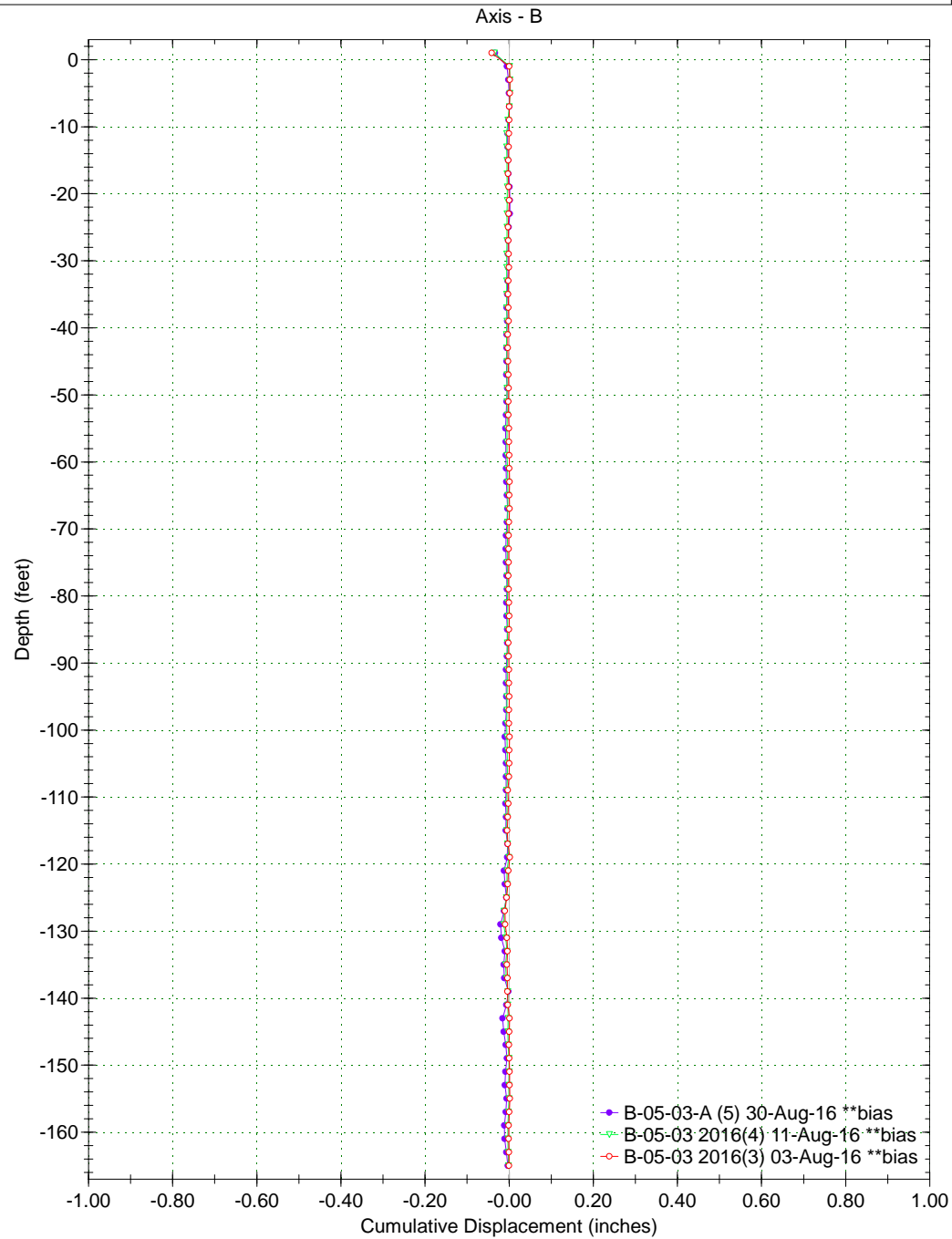
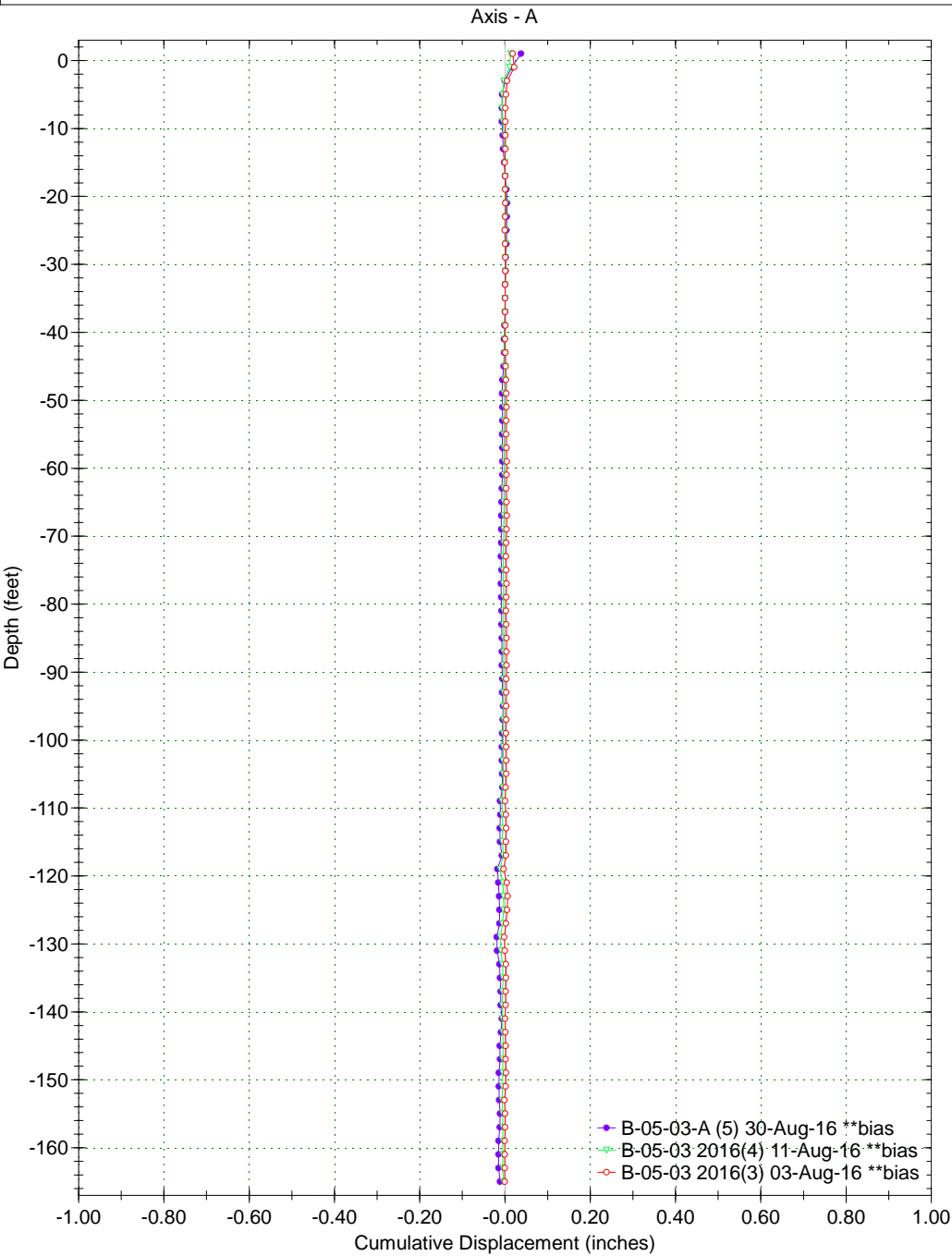
### B-05-02



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



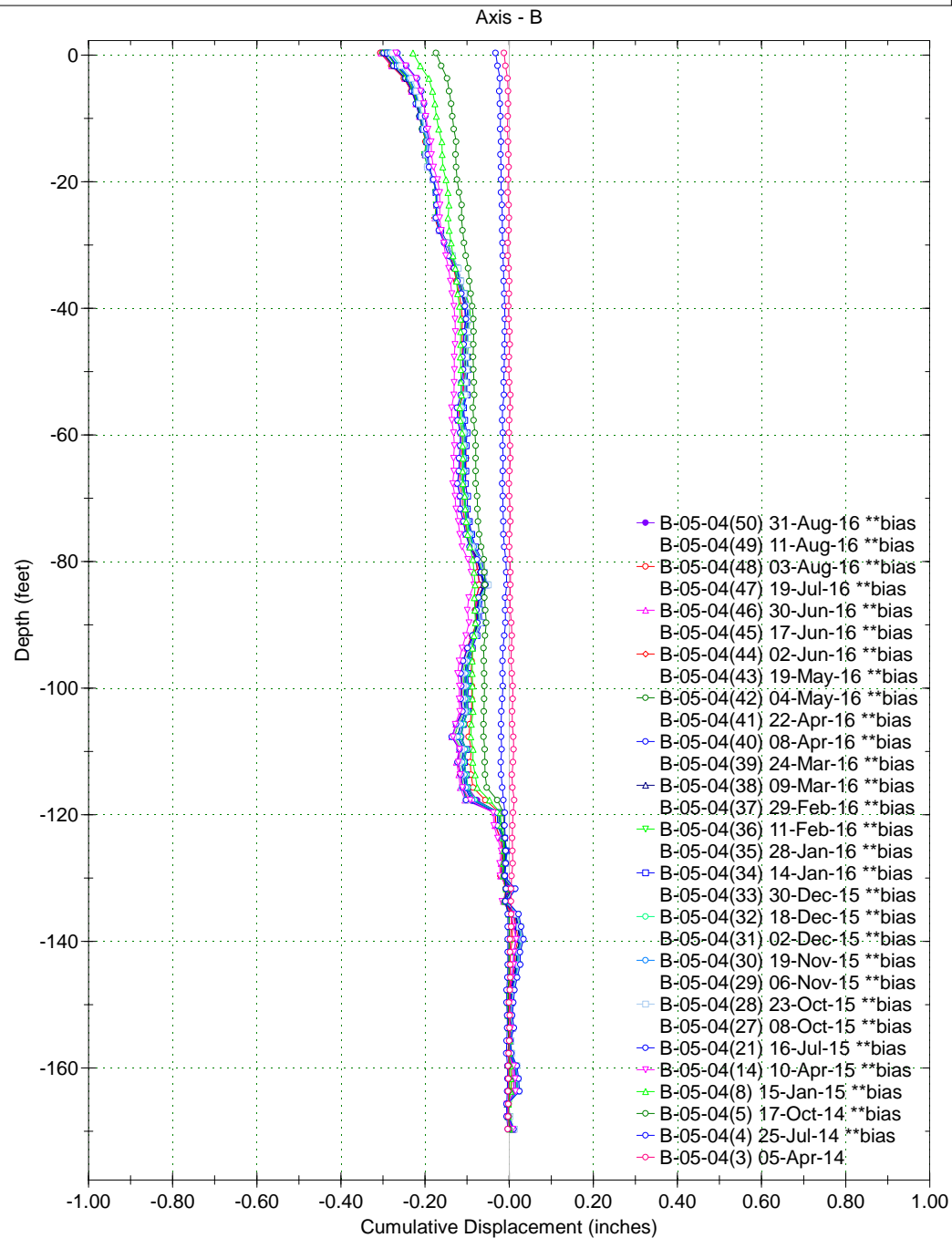
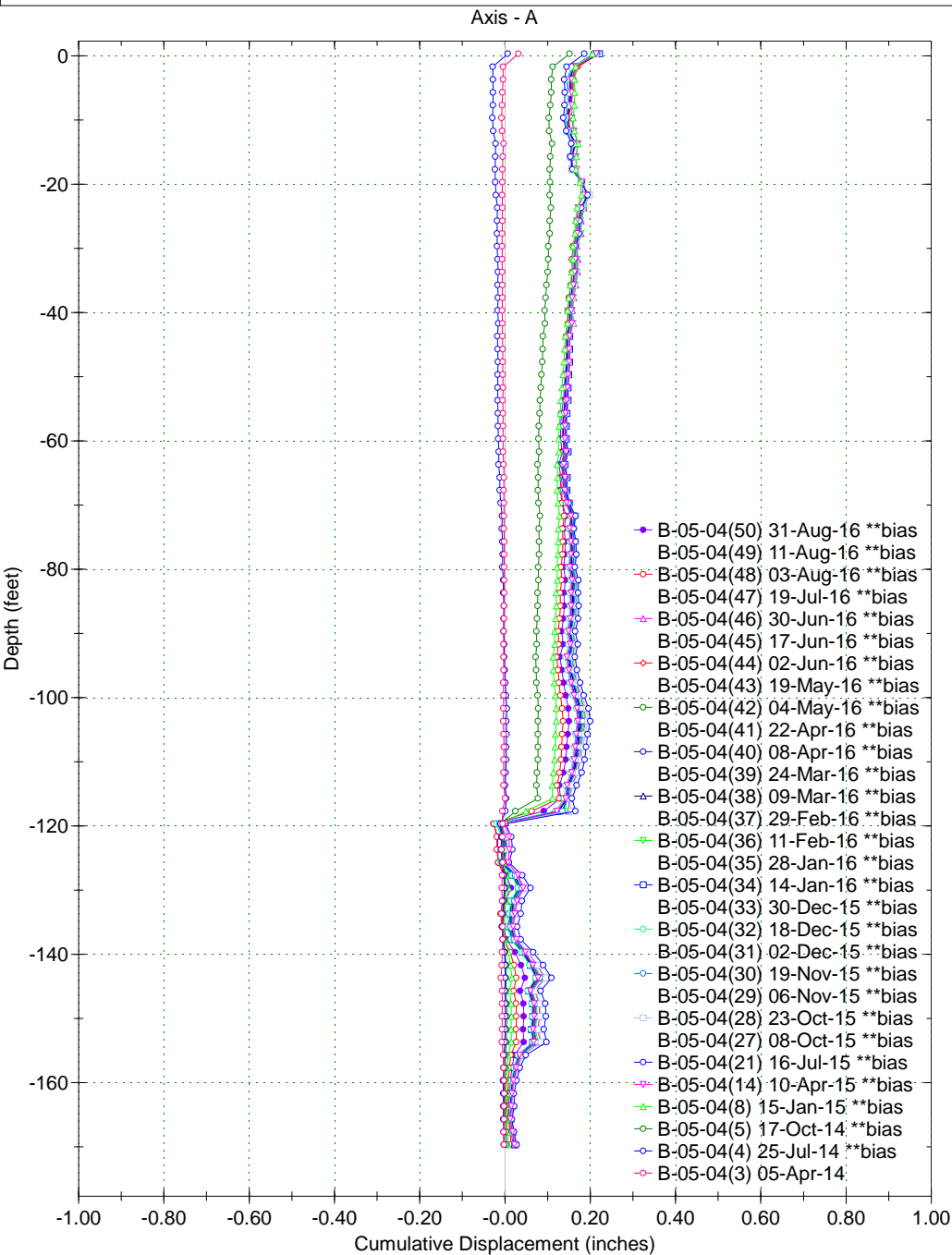
Spiral Correction : N/A  
Collar Elevation : 3.0 feet  
Borehole Total Depth : 168.0 feet  
A+ Groove Azimuth :  
Base Reading : 2016 Jul 19 09:08  
Applied Azimuth : 0.0 degrees



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

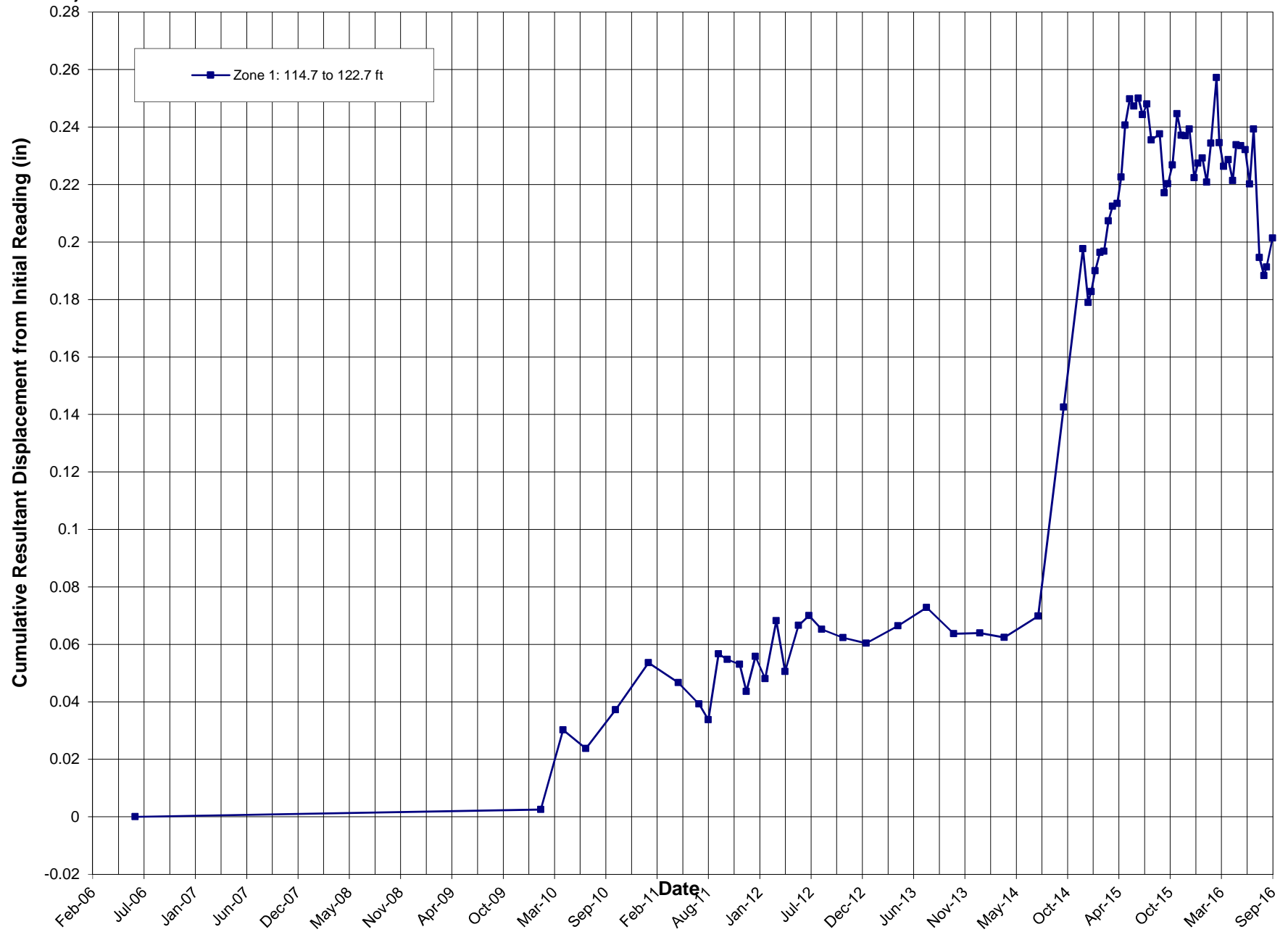


Spiral Correction : N/A  
 Collar Elevation : 2.3 feet  
 Borehole Total Depth : 172.0 feet  
 A+ Groove Azimuth :  
 Base Reading : 2014 Jan 22 12:30  
 Applied Azimuth : 0.0 degrees



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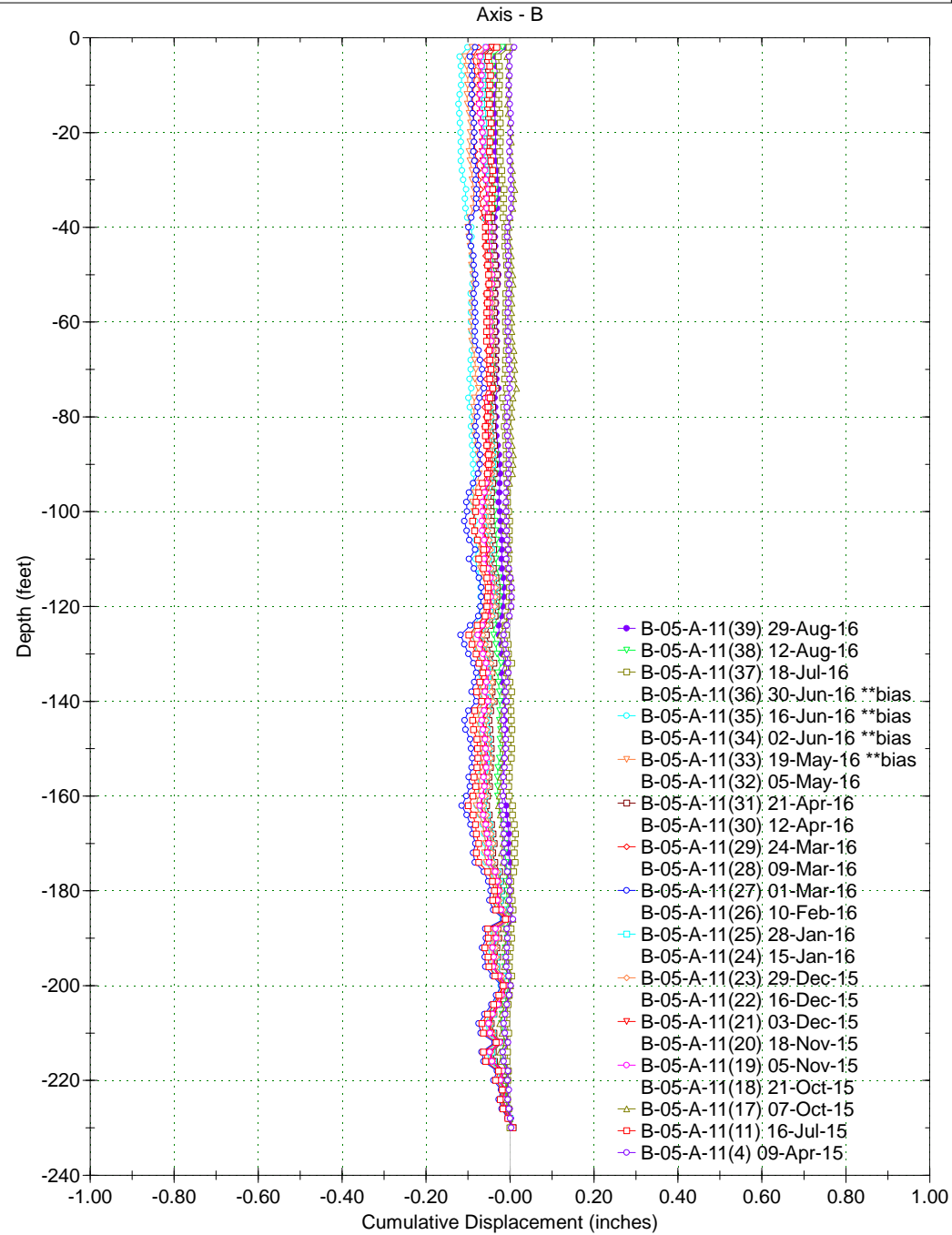
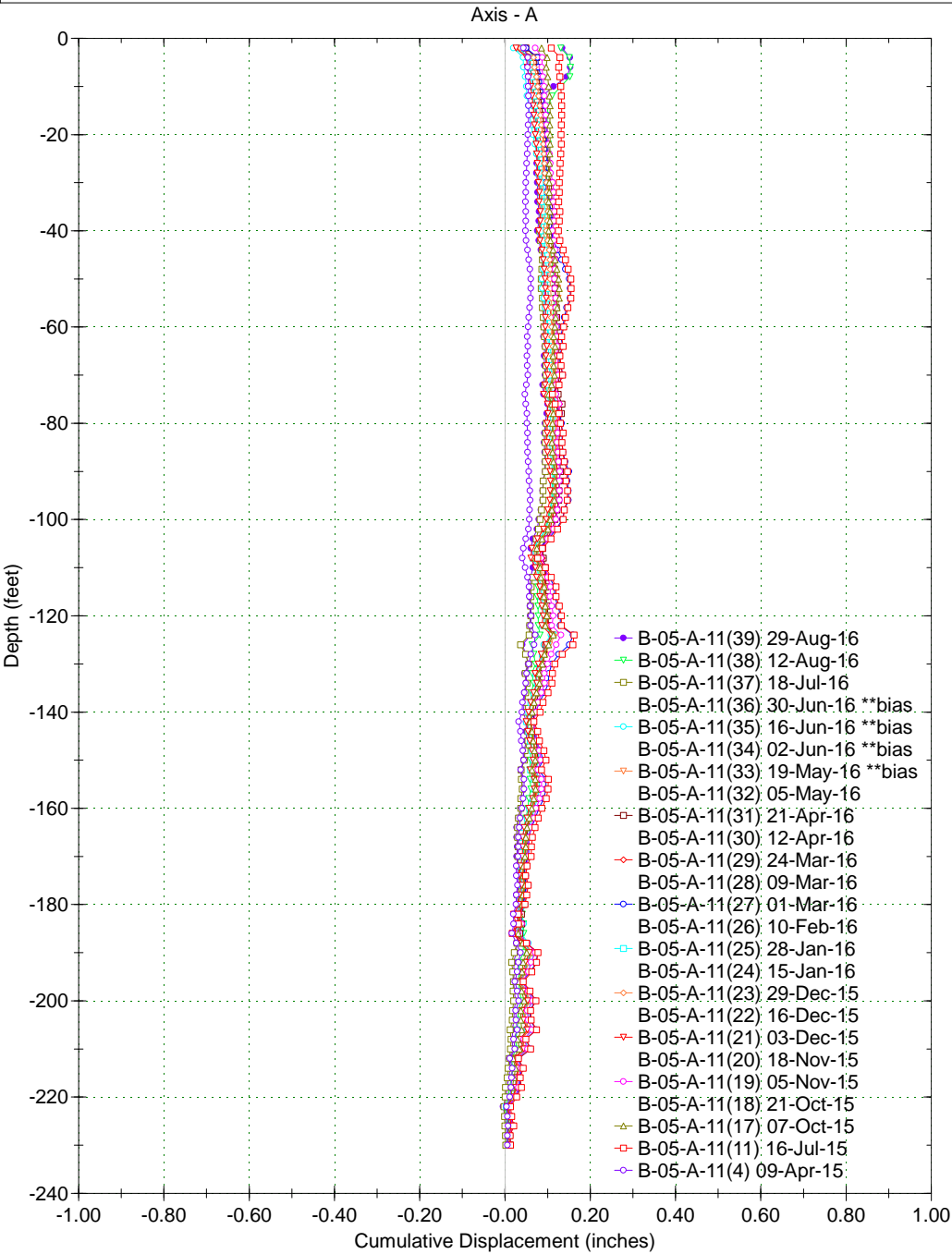
### B-05-04



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



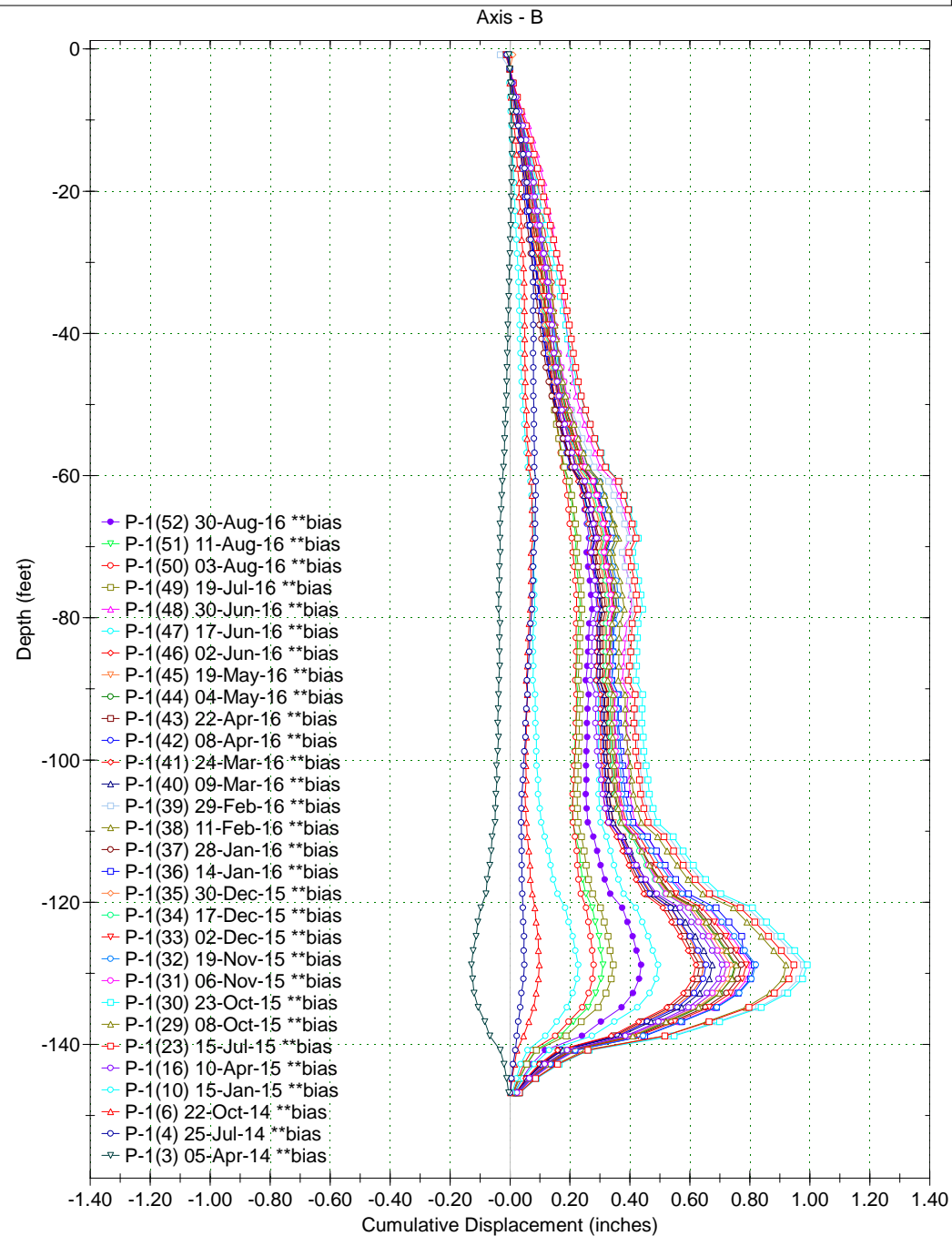
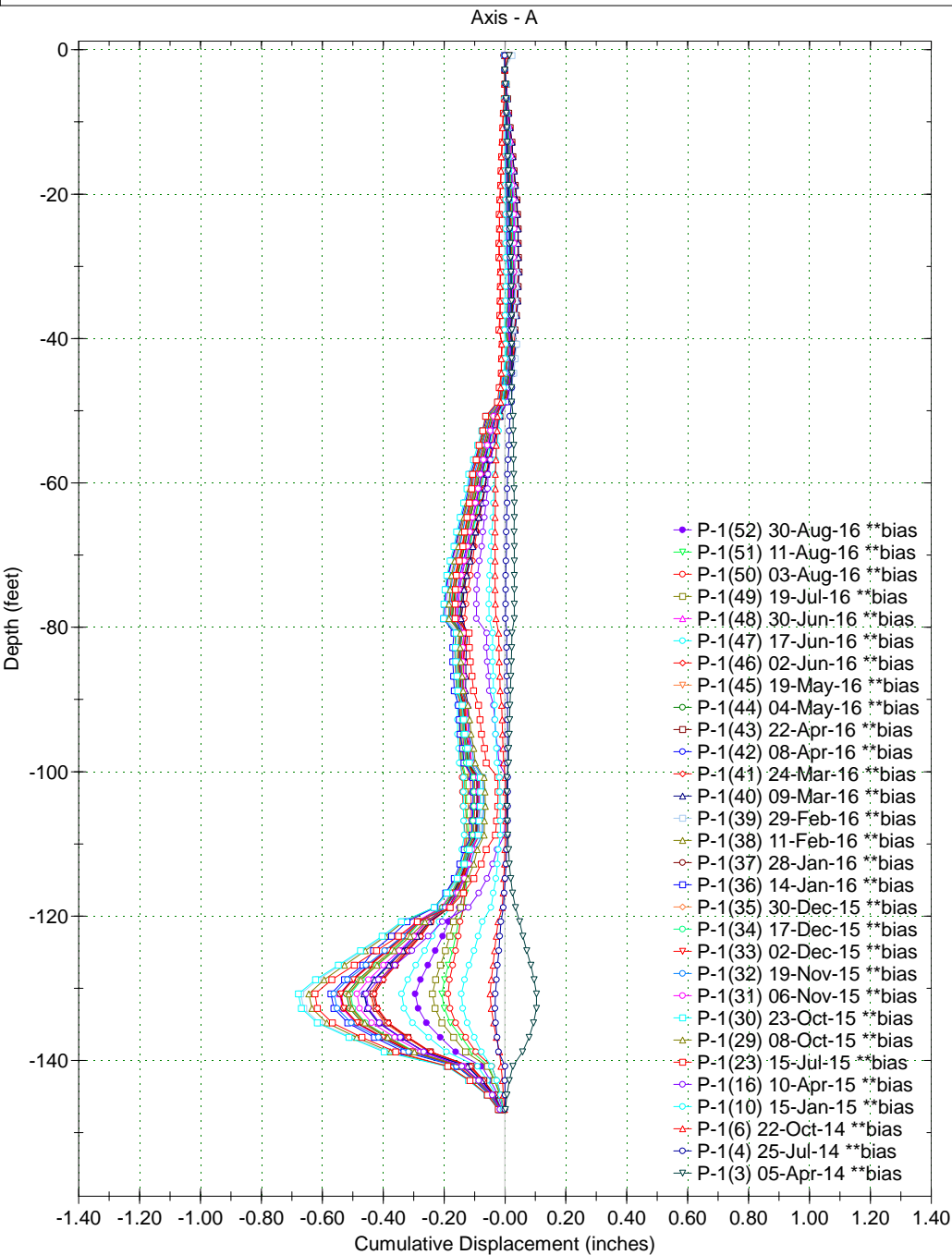
Spiral Correction : N/A  
Collar Elevation : 0.0 feet  
Borehole Total Depth : 230.0 feet  
A+ Groove Azimuth :  
Base Reading : 2015 Mar 19 09:08  
Applied Azimuth : 0.0 degrees



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

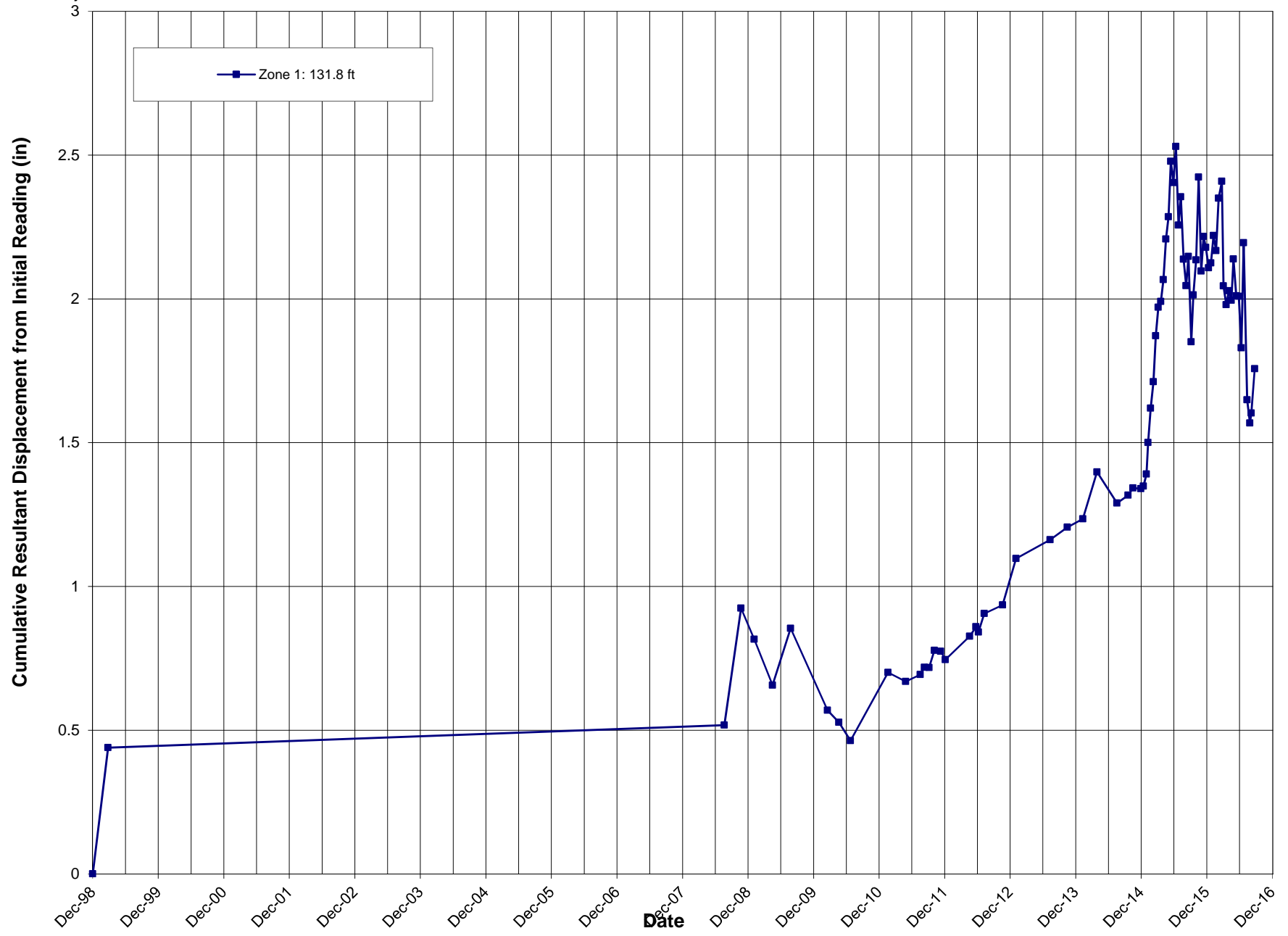


Spiral Correction : N/A  
Collar Elevation : 1.2 feet  
Borehole Total Depth : 148.0 feet  
A+ Groove Azimuth :  
Base Reading : 2014 Jan 22 10:47  
Applied Azimuth : 0.0 degrees



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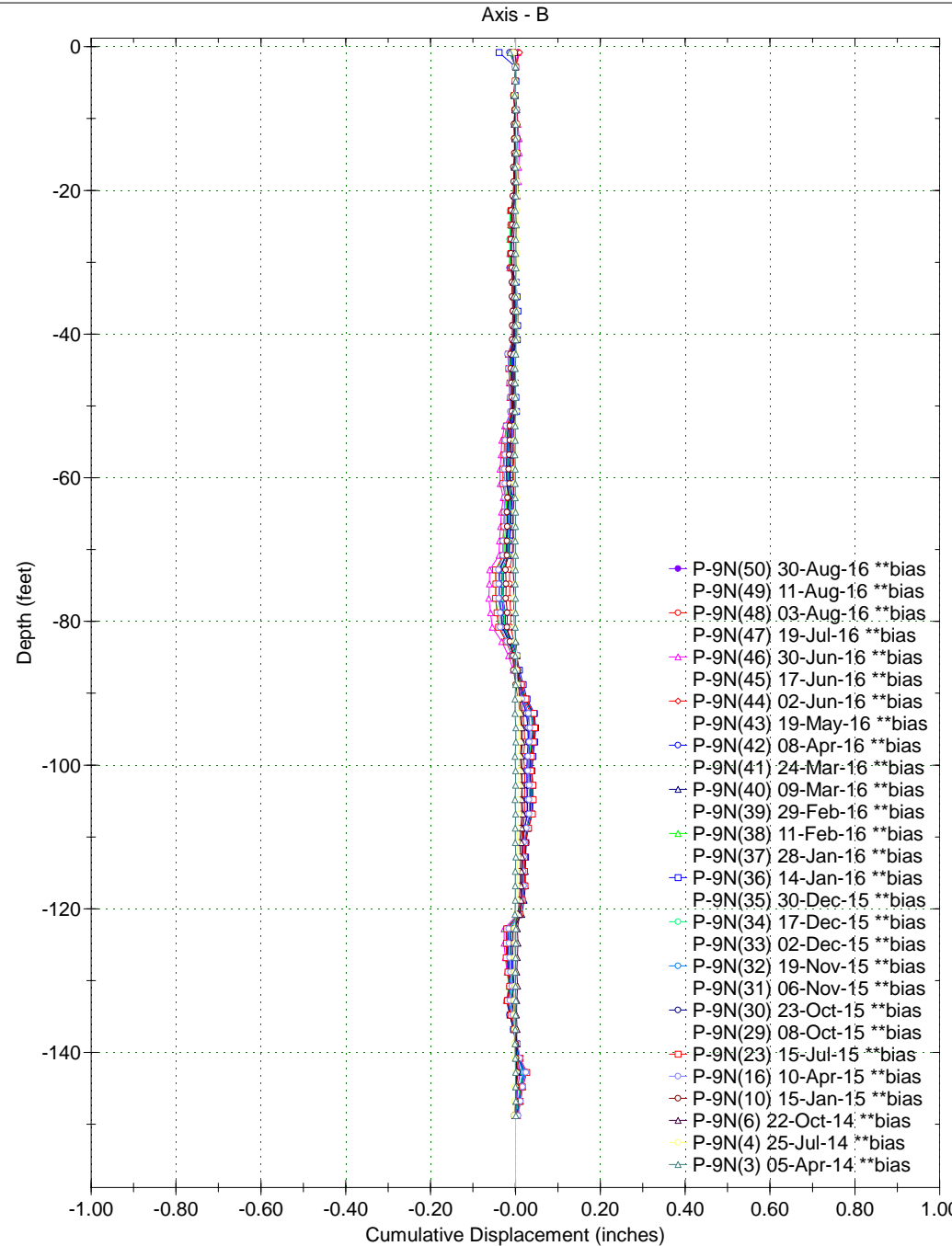
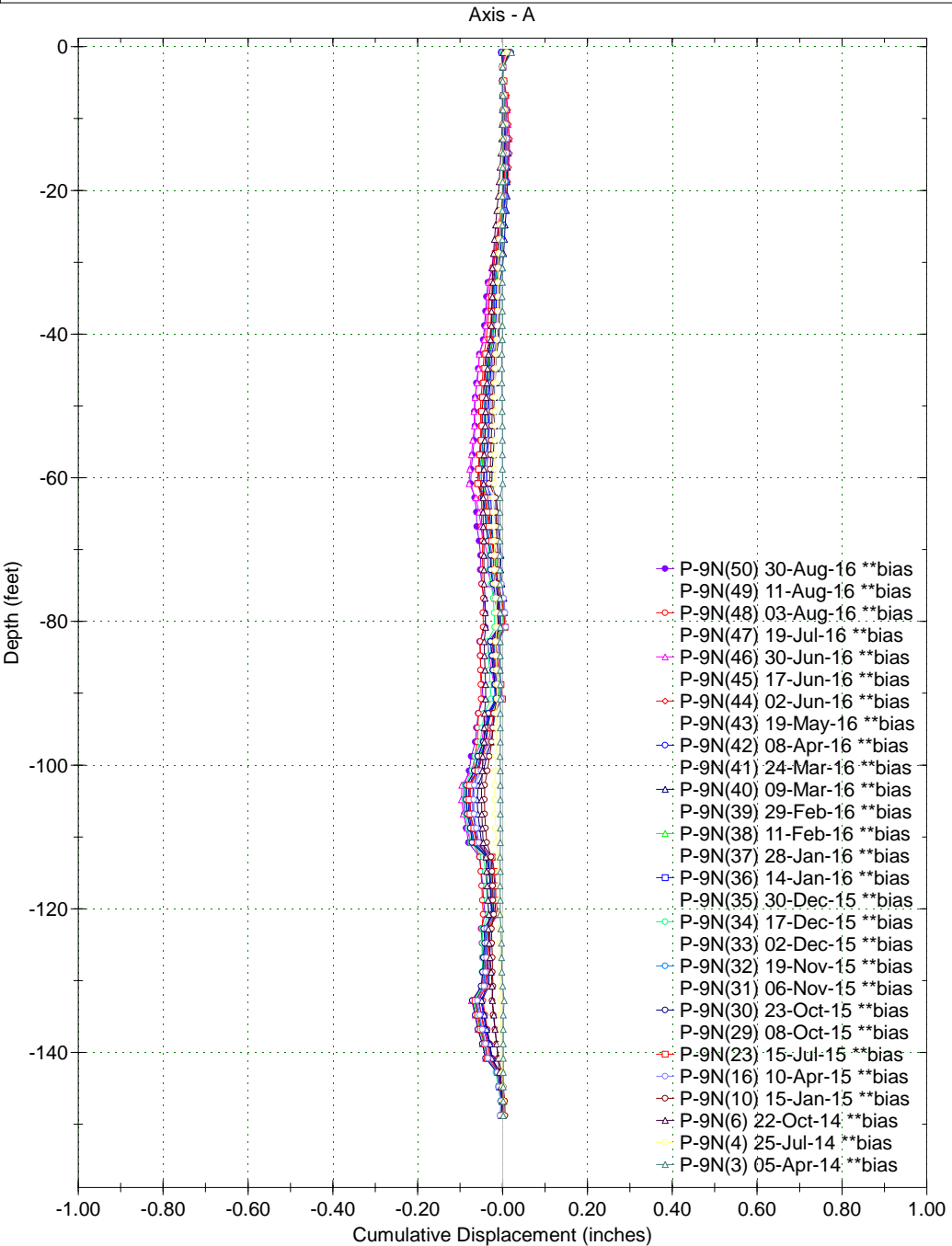
P-1



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

