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March 31, 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*

Re: March 23 and 24, 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 March 23 and 24, 2016, are presented in this report. Bi Weekly readings currently include instruments at I/P-001-13, I/P-002-13, I/P-003-A-10, I/P-004-13, I/P-009-13, B-101, B-102, B-105, B-105A, B-05-02, B-05-03, B-05-04, B-05-A-11, P-1, P-9N, TGR I-2, and TGR I-4.

Piezometer Readings

P-001-13, P-002-13, B-05-04, B-05-A-11 – Pore pressure readings at these locations indicate minor fluctuations in total head over the past two weeks with virtually no net change.

P-003-10 – Pore pressure readings indicate a decrease in total head of about 0.5 feet in all piezometers at this location.

P-004-13 – Piezometers at this location are still inaccessible.

P-009-13 – Readings in both piezometers at this location indicate variation in total head of more than a foot, but no change in the average total head.

B-05-02 – The piezometers at this location were recently uncovered. The last data download at this location was on August 1, 2014. The dataloggers continued to record during the time the instruments were buried and inaccessible. Pore pressure data indicates a decrease in total head in both piezometers that occurred between April and October 2014 in the shallow piezometer and between June and September 2014 in the deep piezometer. The total head in both piezometers then increased steadily throughout 2015 with increases of about 2 feet in the shallow piezometer and about 4 feet in the deep piezometer.

Beginning on February 14, 2016, the total head in both piezometers decreased rapidly by 10.3 feet in the shallow piezometer and 5.7 feet in the deep piezometer. This decrease continued until February 24, 2016, when total head in both piezometers began to increase again. Since February 2016, the total head has increased by 5.3 feet in the shallow piezometer and 2.5 feet in the deep piezometer. The large decrease in pore pressure that occurred on February 14 was the result of the excavation in this area. The increase that began on February 24 shows the pore pressures returning to equilibrium.

Inclinometer Readings

Inclinometer readings at I-001-13, I-002-13, I-003-10, B-101, B-102, B-05-04, B-05-A-11, P-1, P-9N, and TGR I-4 showed virtually no movement this two-week period. Displacements at the top of some slope tubes is due to construction disturbance or slight bending of the tube when readings are taken because some of the protective covers are only temporarily set in place.

I-004-13 – The inclinometer casing at this location is still inaccessible.

I-009-13 – Inclinometer readings at this location indicate slight movement in the positive A-axis direction above 40 feet. No movement was indicated in the B-axis direction.

B-105A – The inclinometer casing at this location is currently protected inside a section of corrugated pipe, with the top of the casing about 1 foot below grade. We will attach another extension to this casing and take a new baseline reading. The new extension will be cut to a length to match the depth intervals of past readings.

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,

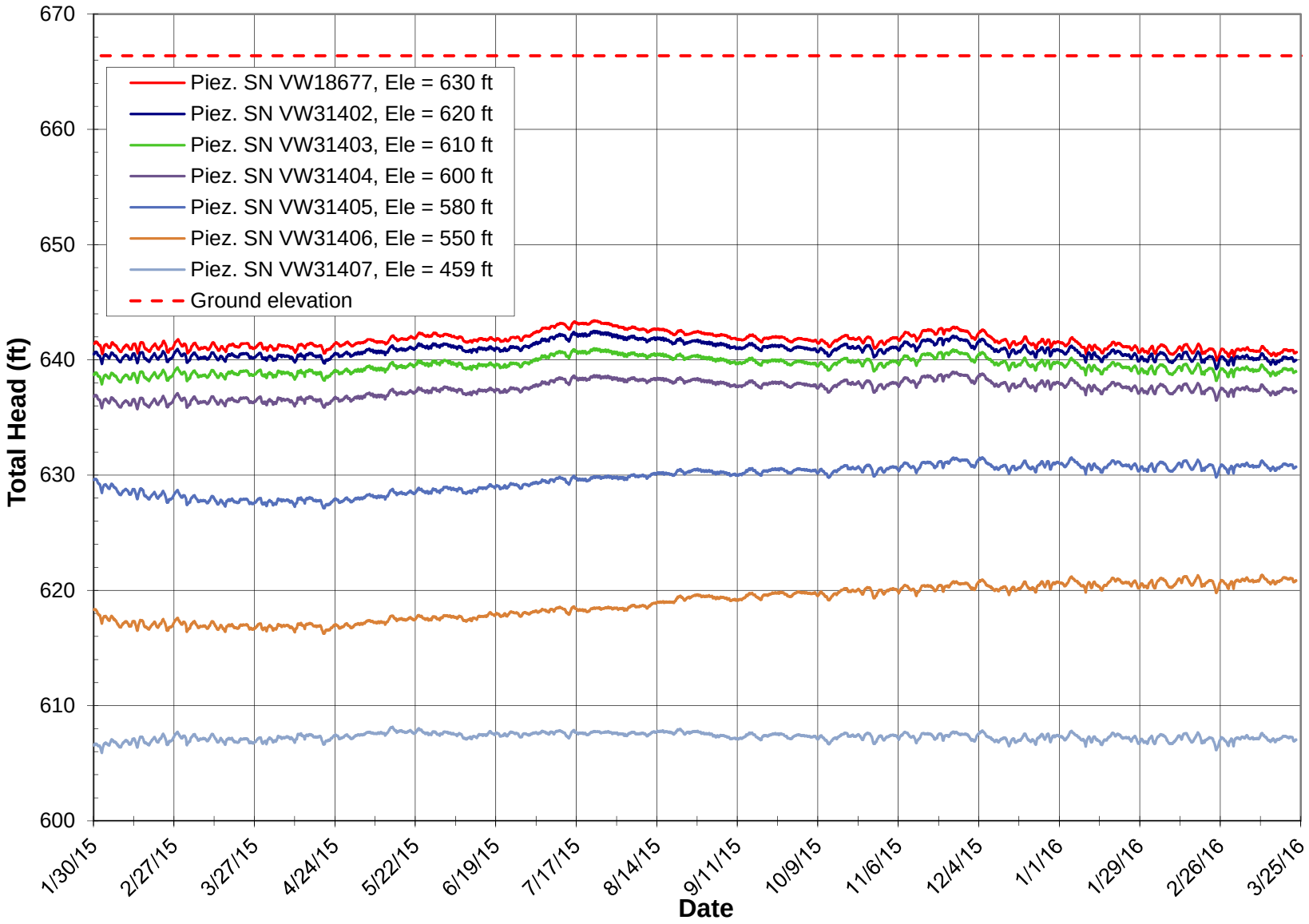
SME

Brendan P. Lieske, E.I.
Staff Engineer

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

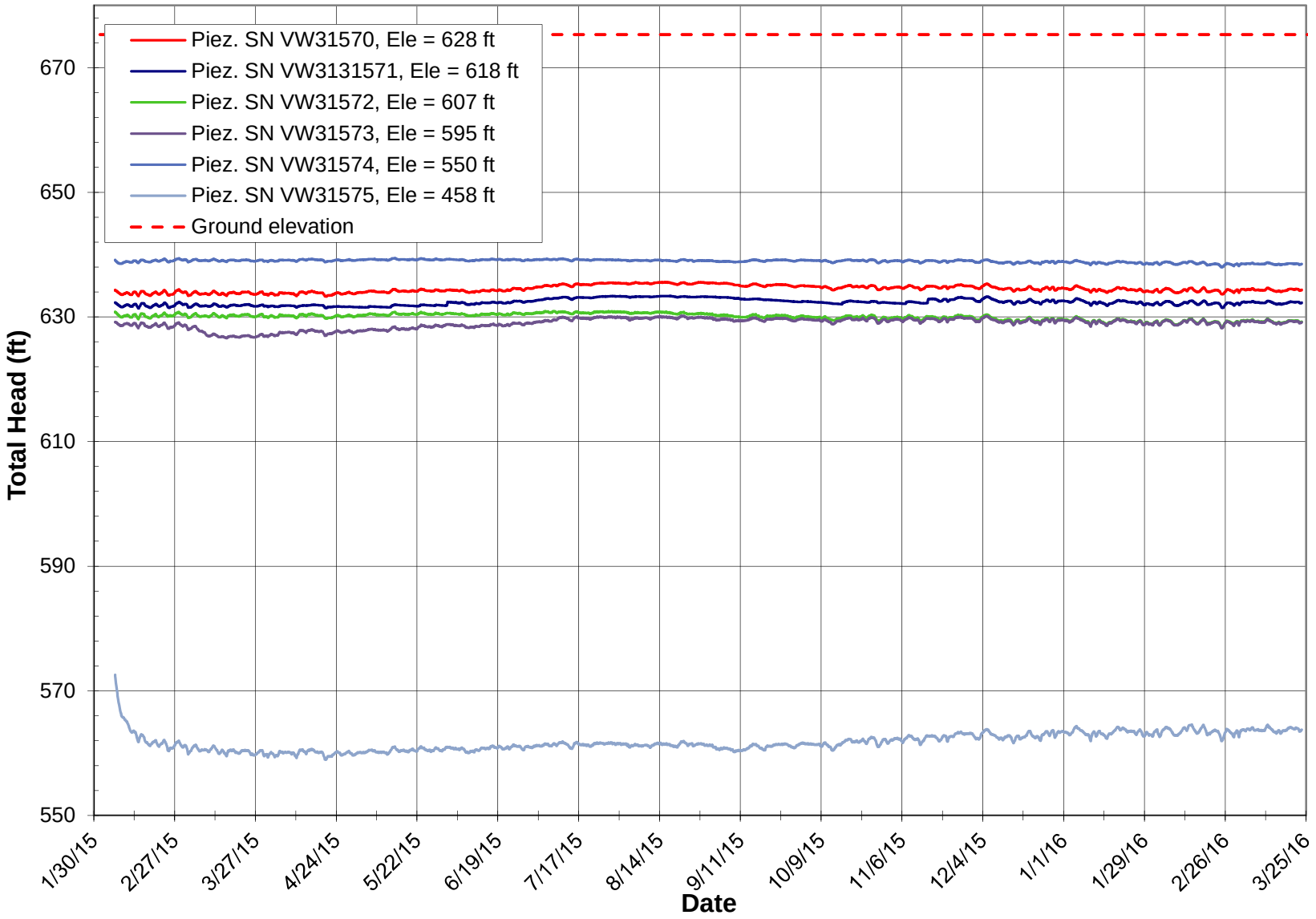
P-001-13 VW Piezometer Readings

Ground surface elevation = 666.4 ft



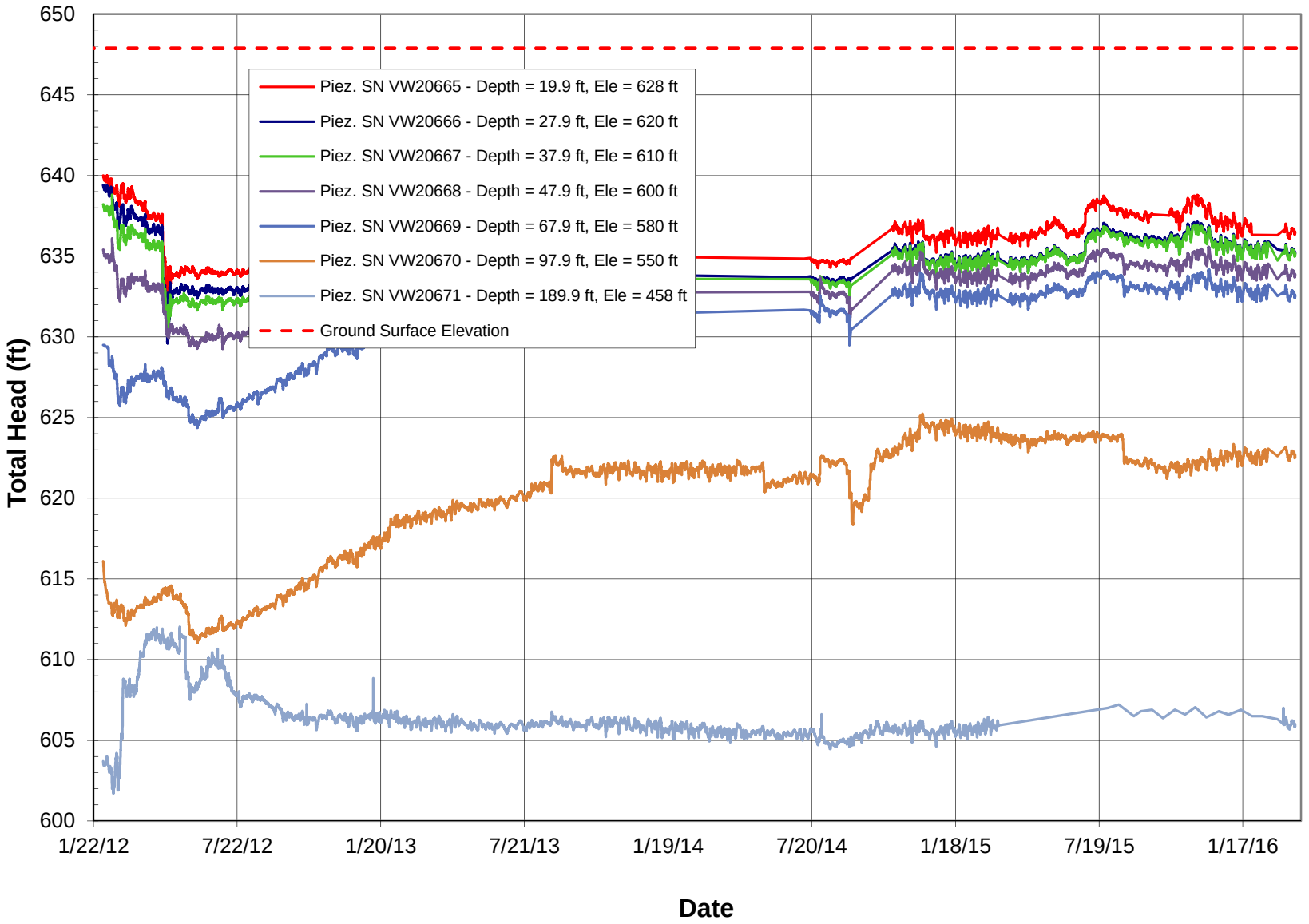
P-002-13 VW Piezometer Readings

Ground surface elevation = 675.29 ft



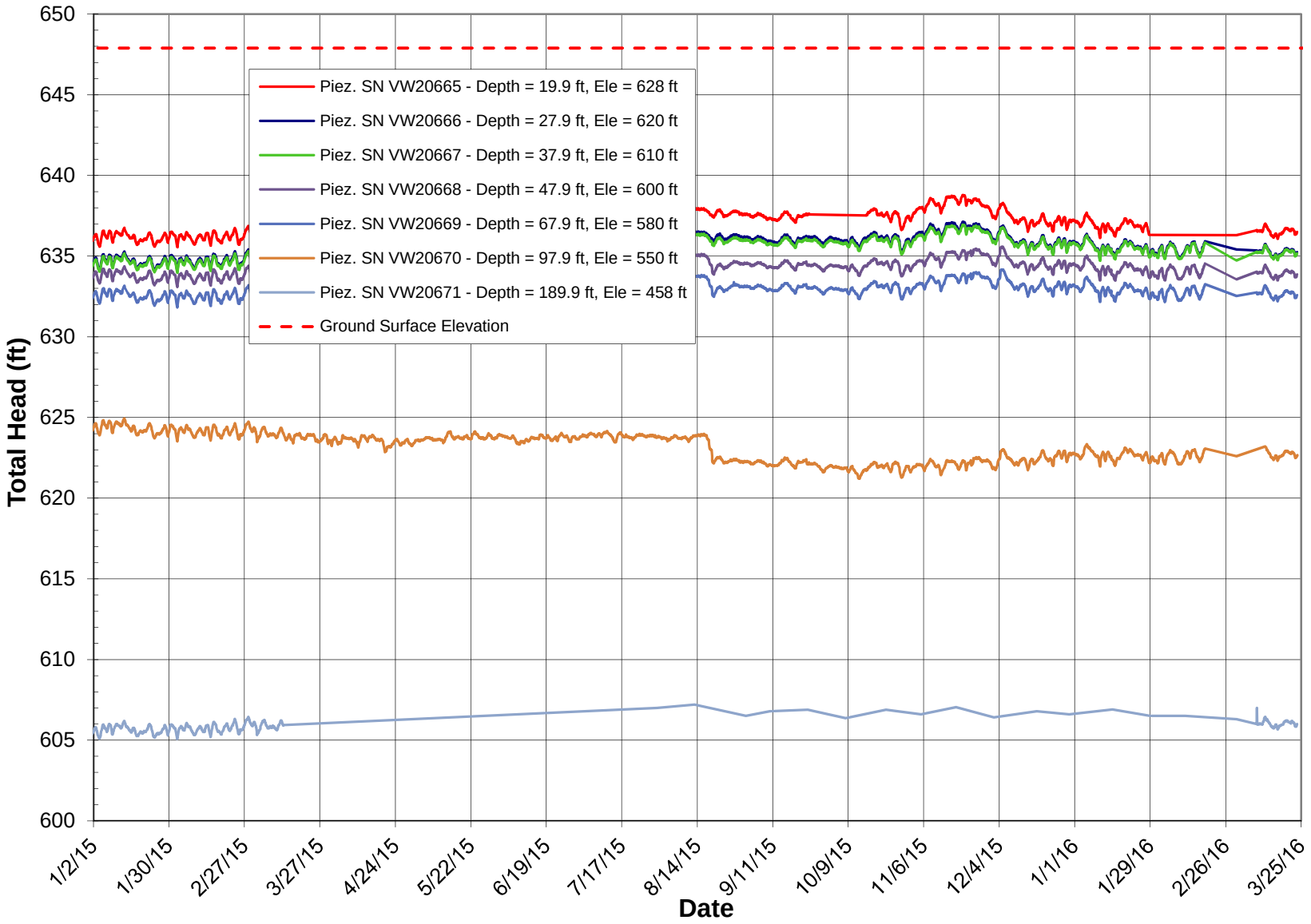
P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



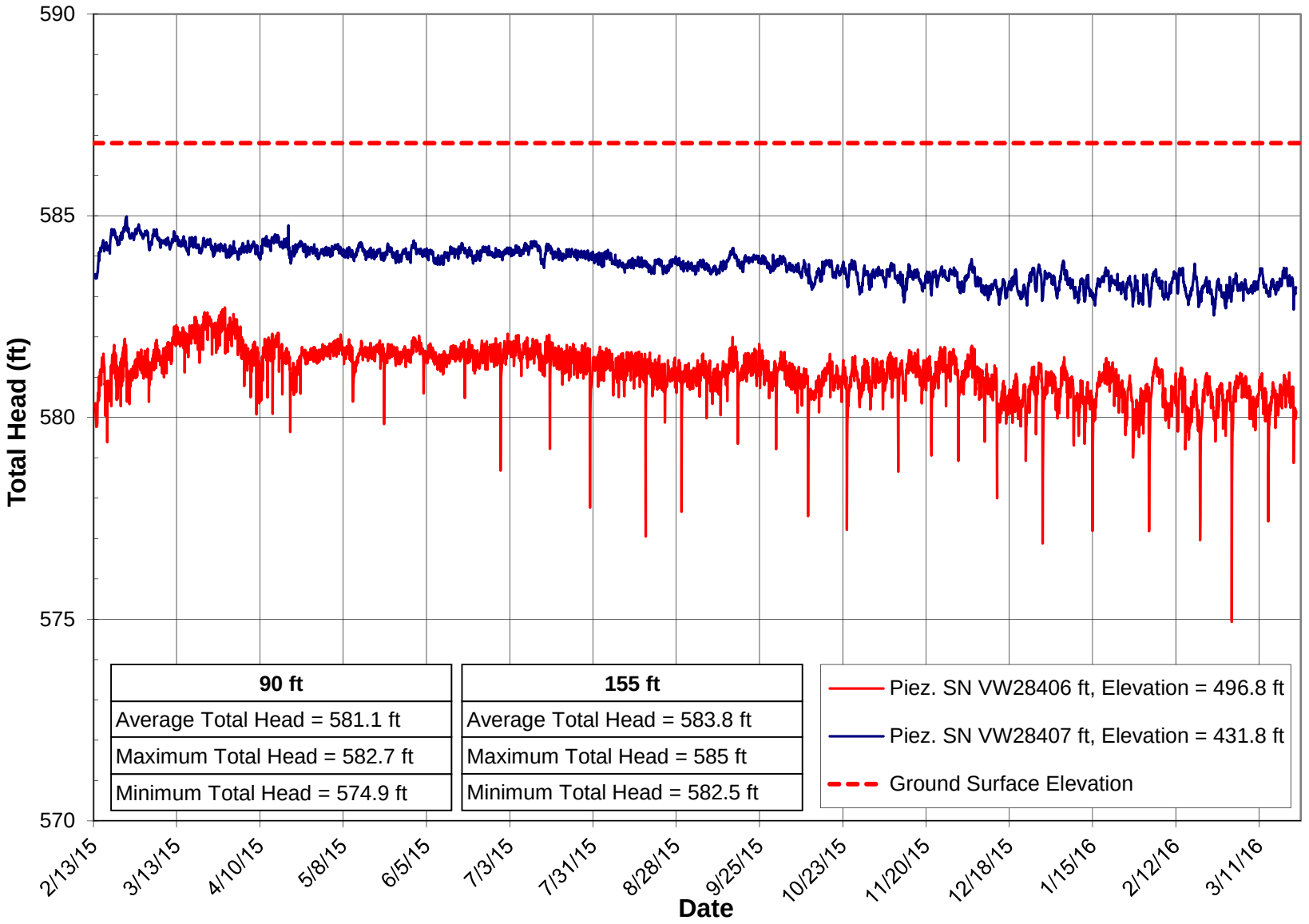
P-003-10 VW Piezometer Readings

Ground surface elevation = 647.9 ft



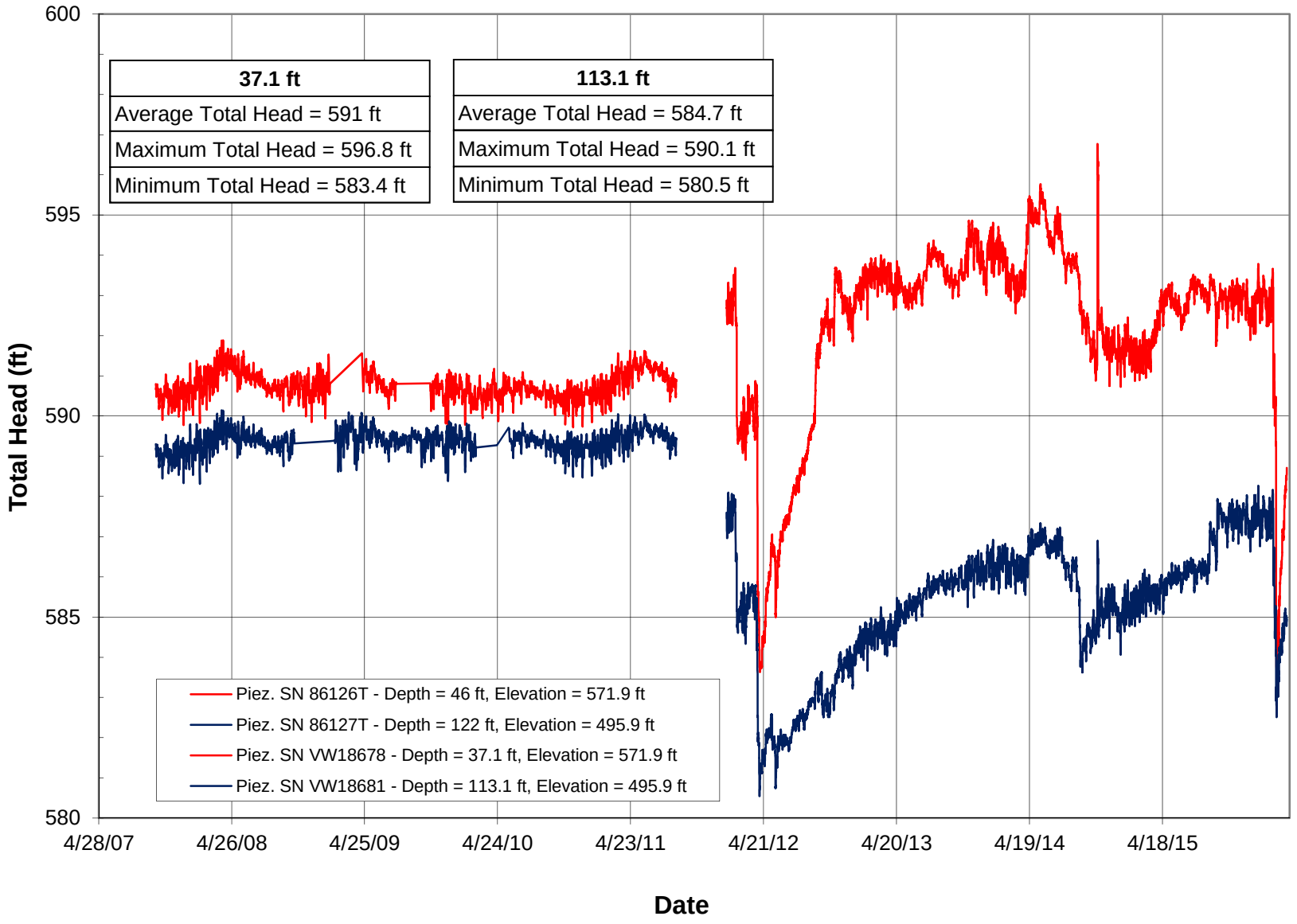
P-009-13 VW Piezometer Readings

Ground surface elevation = 586.6 ft



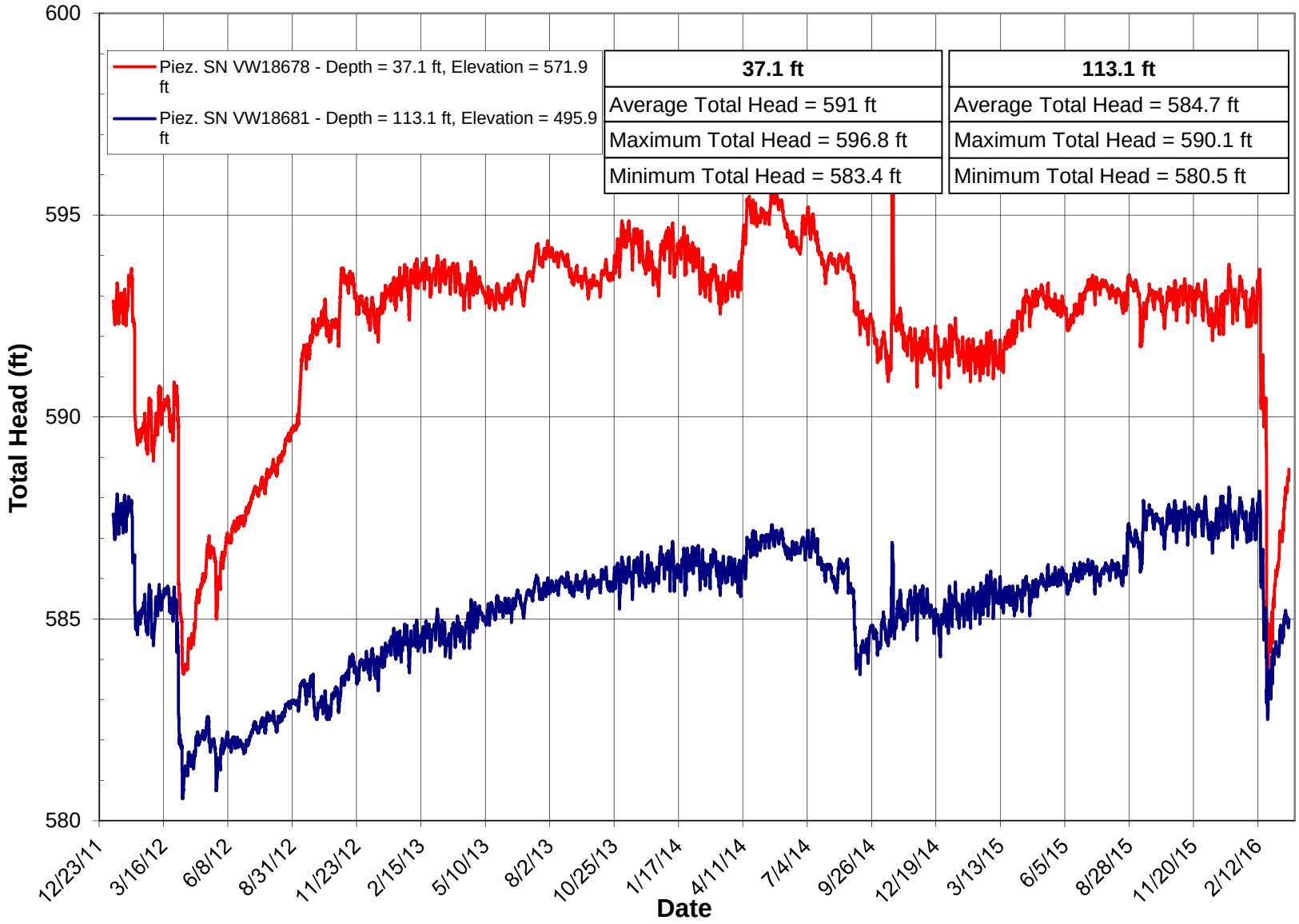
B-05-02 VW Piezometer Readings

Ground surface elevation = approx 609.0 ft



B-05-02 VW Piezometer Readings

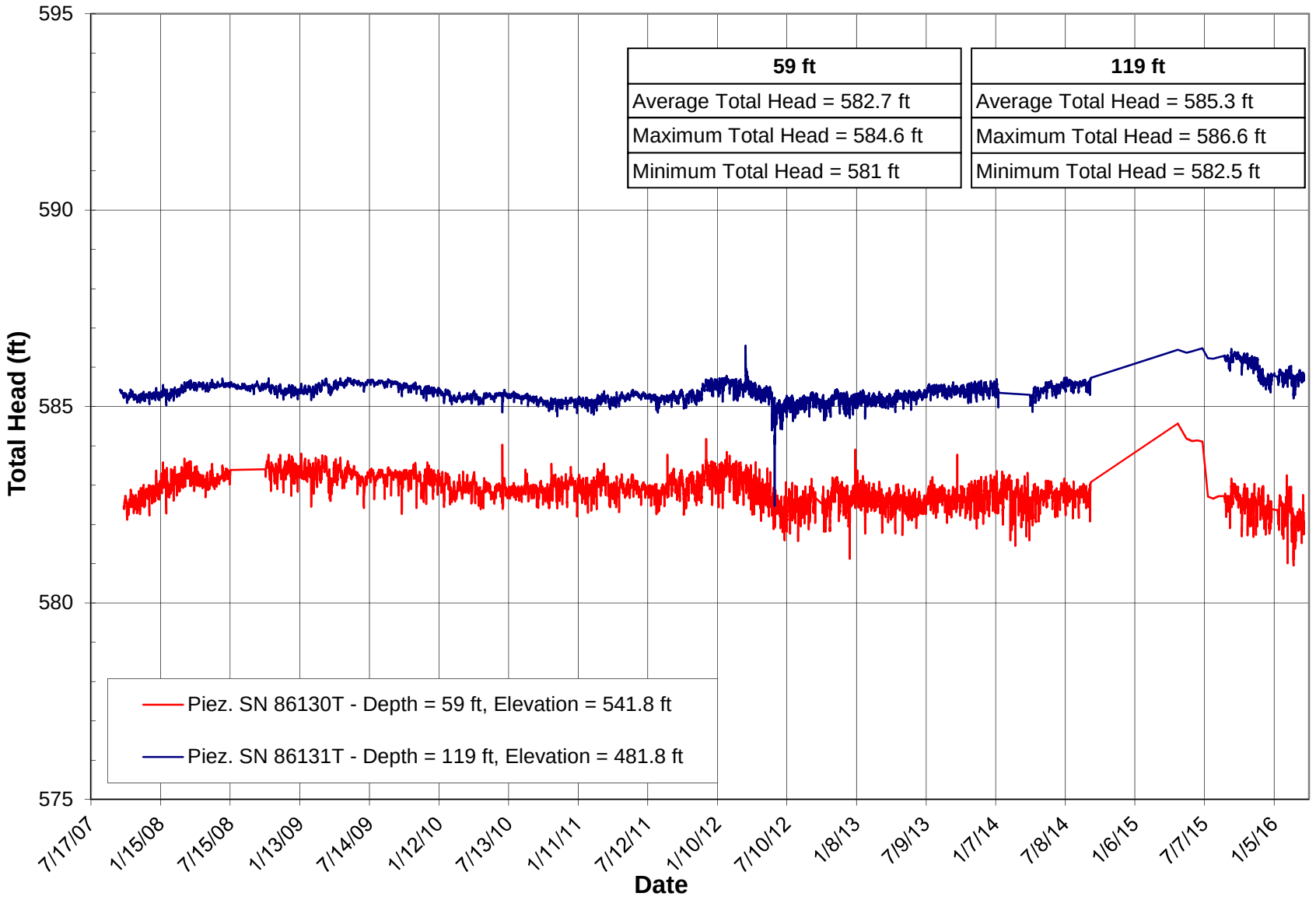
Ground surface elevation = approx 609.0 ft



37.1 ft	113.1 ft
Average Total Head = 591 ft	Average Total Head = 584.7 ft
Maximum Total Head = 596.8 ft	Maximum Total Head = 590.1 ft
Minimum Total Head = 583.4 ft	Minimum Total Head = 580.5 ft

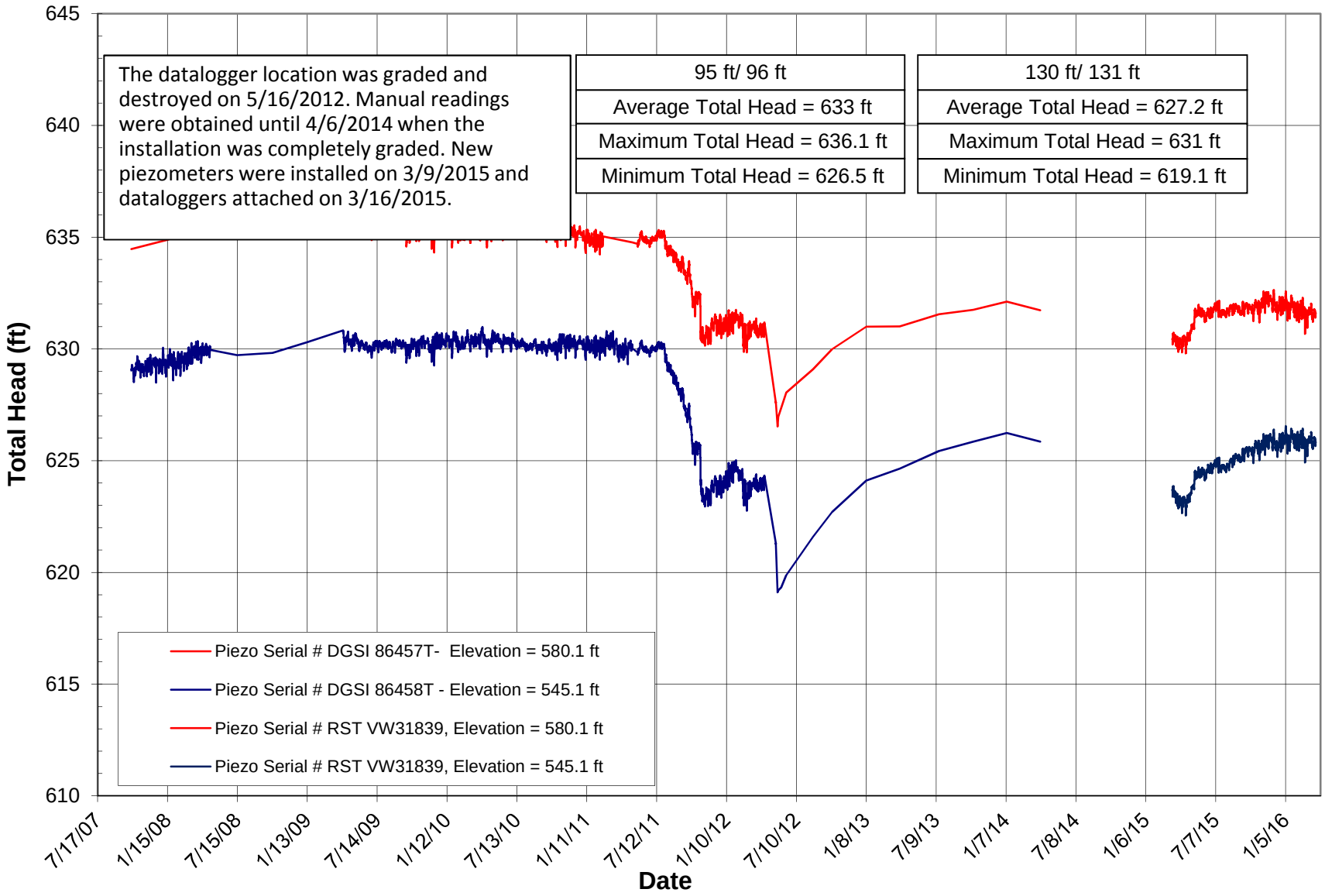
B-05-04 VW Piezometer Readings

Ground surface elevation = 600.8 ft



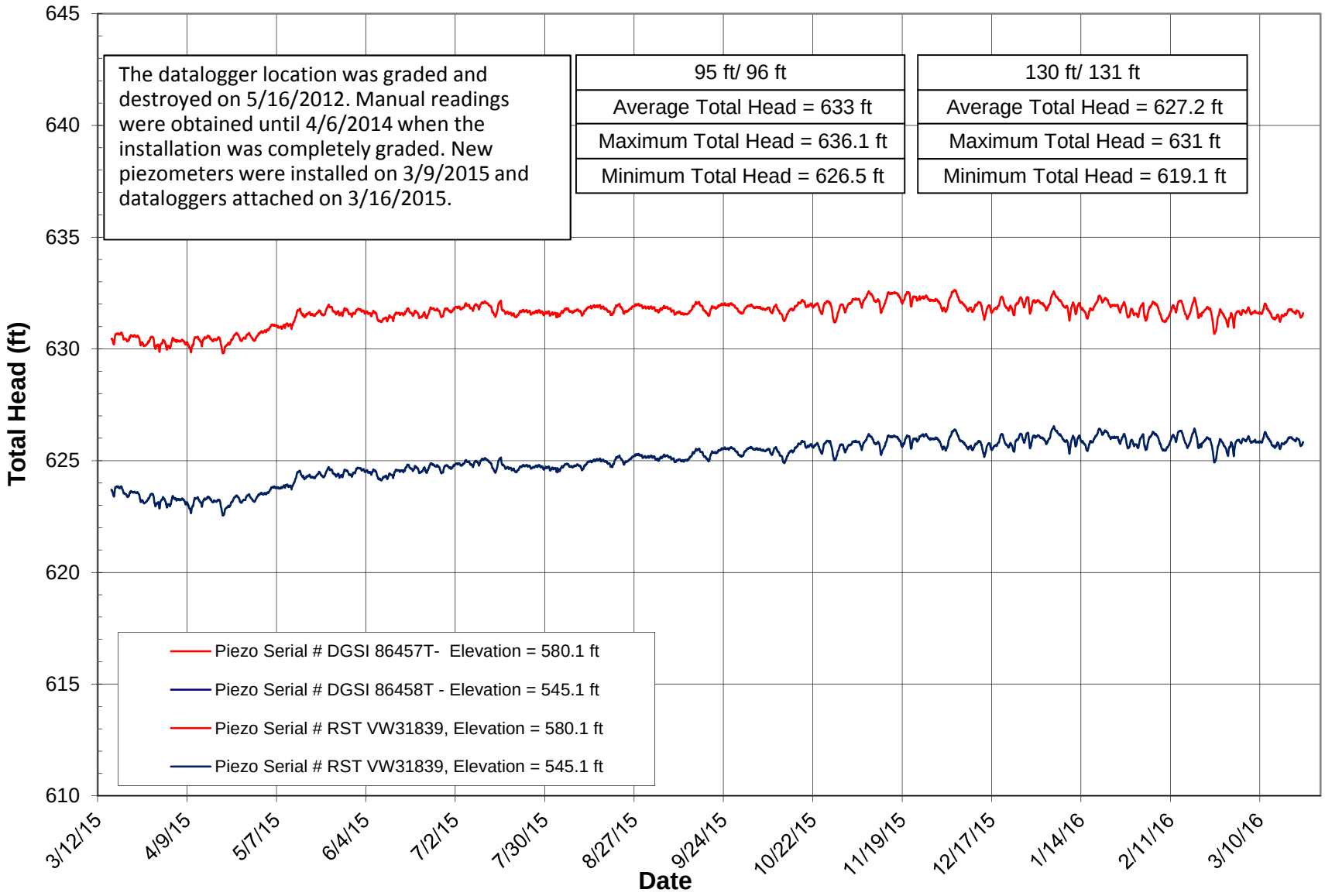
B-05-11/B-05-A-11 VW Piezometer Readings

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



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)



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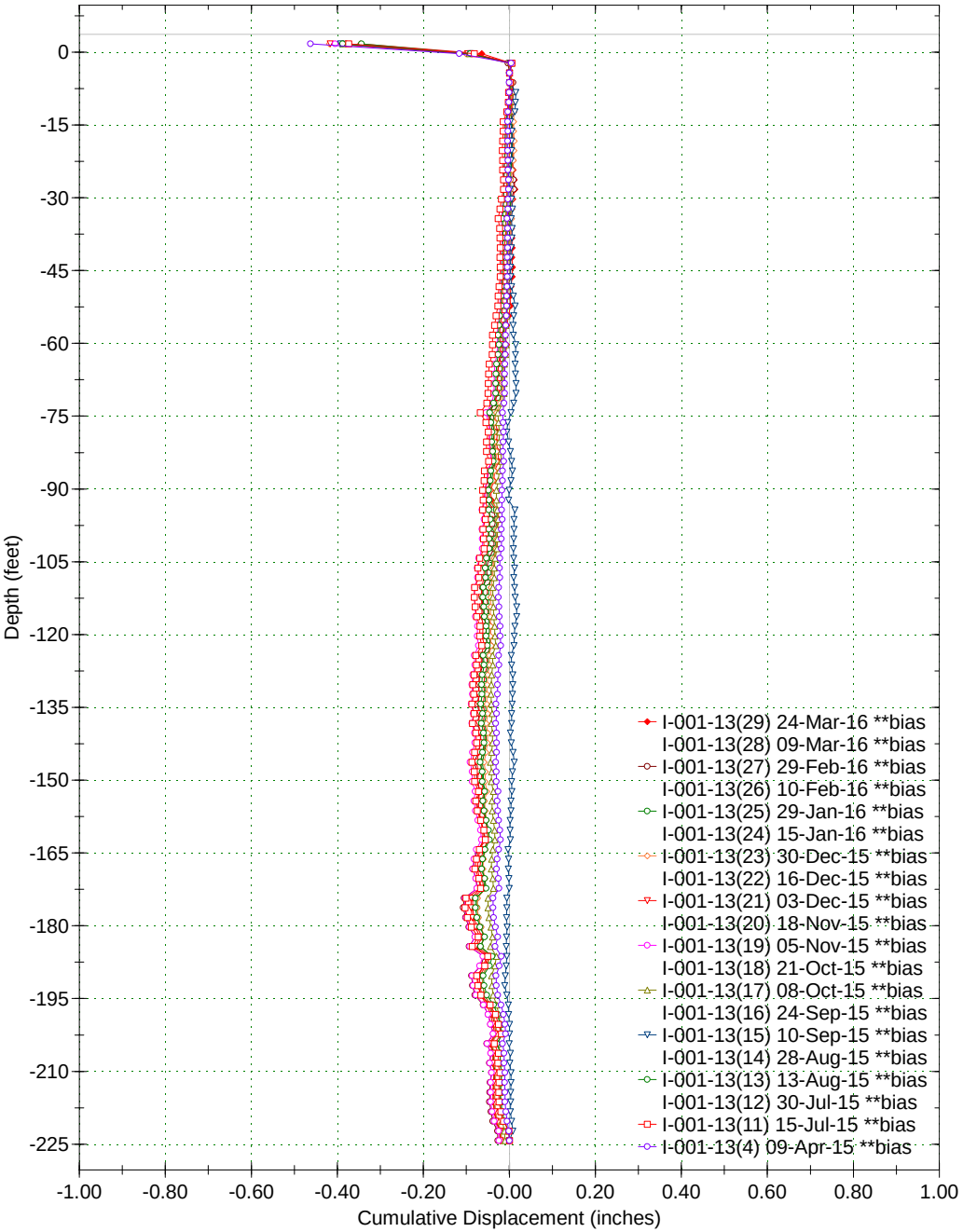
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

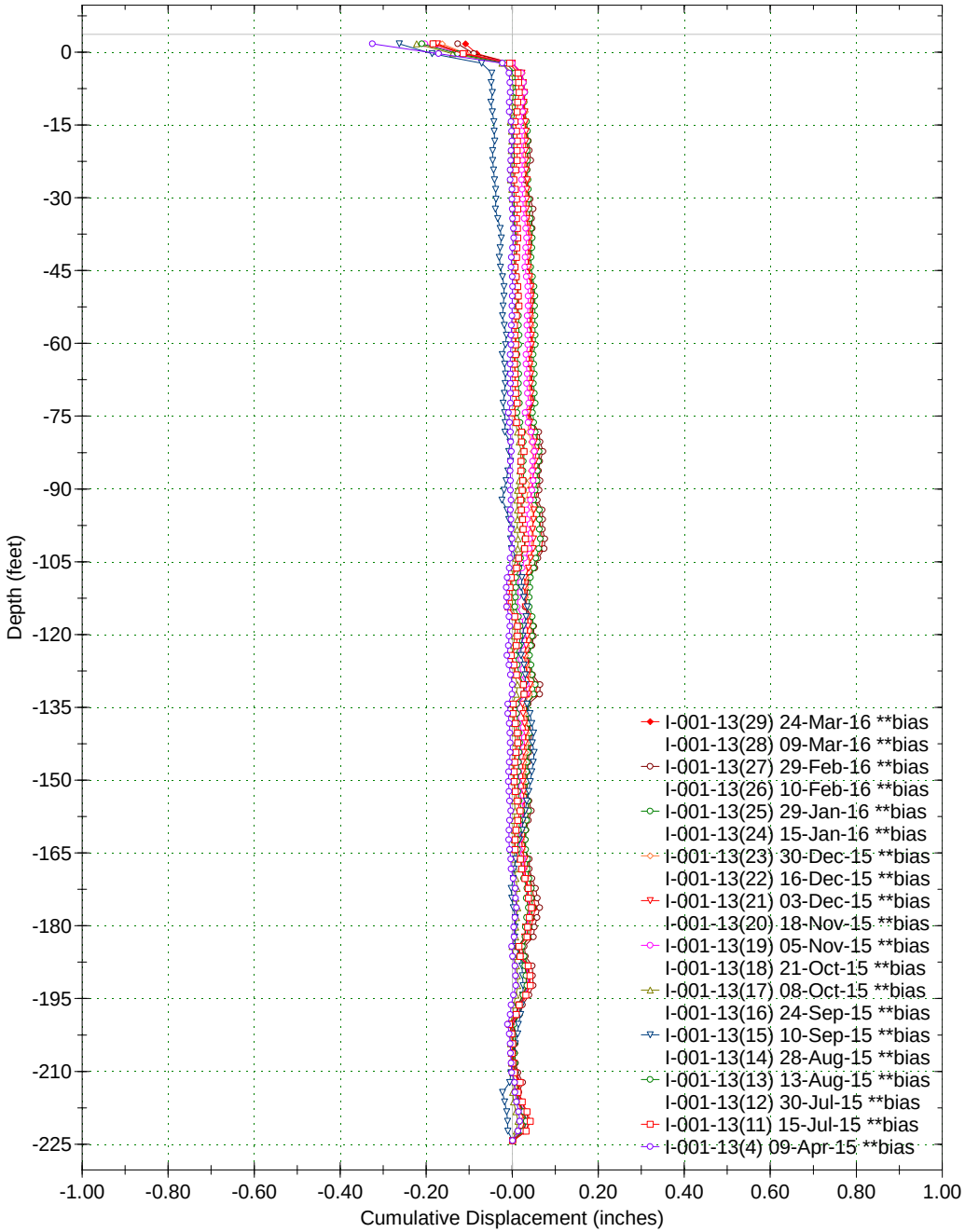
Borehole : I-001-13
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :

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

Axis - A



Axis - B



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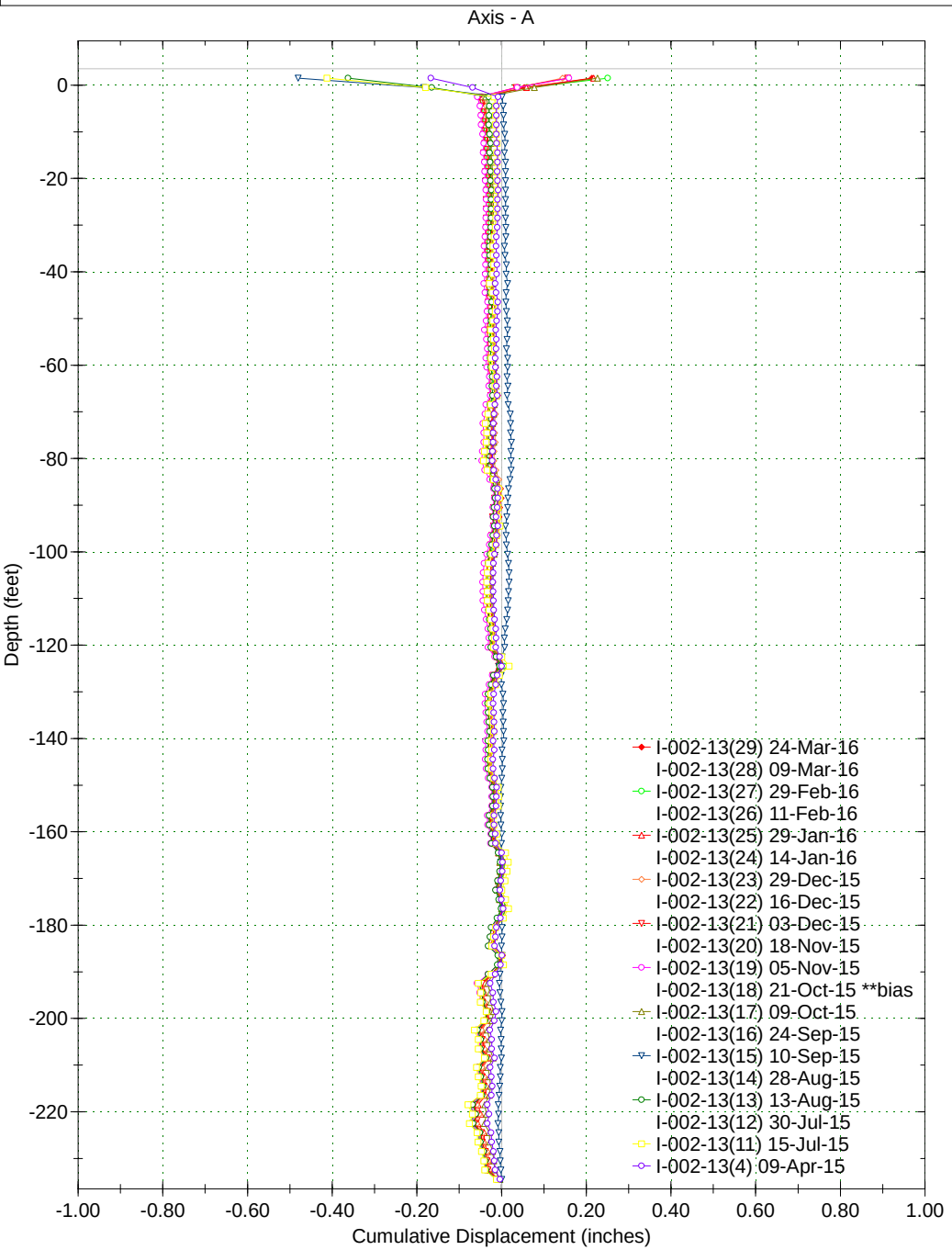
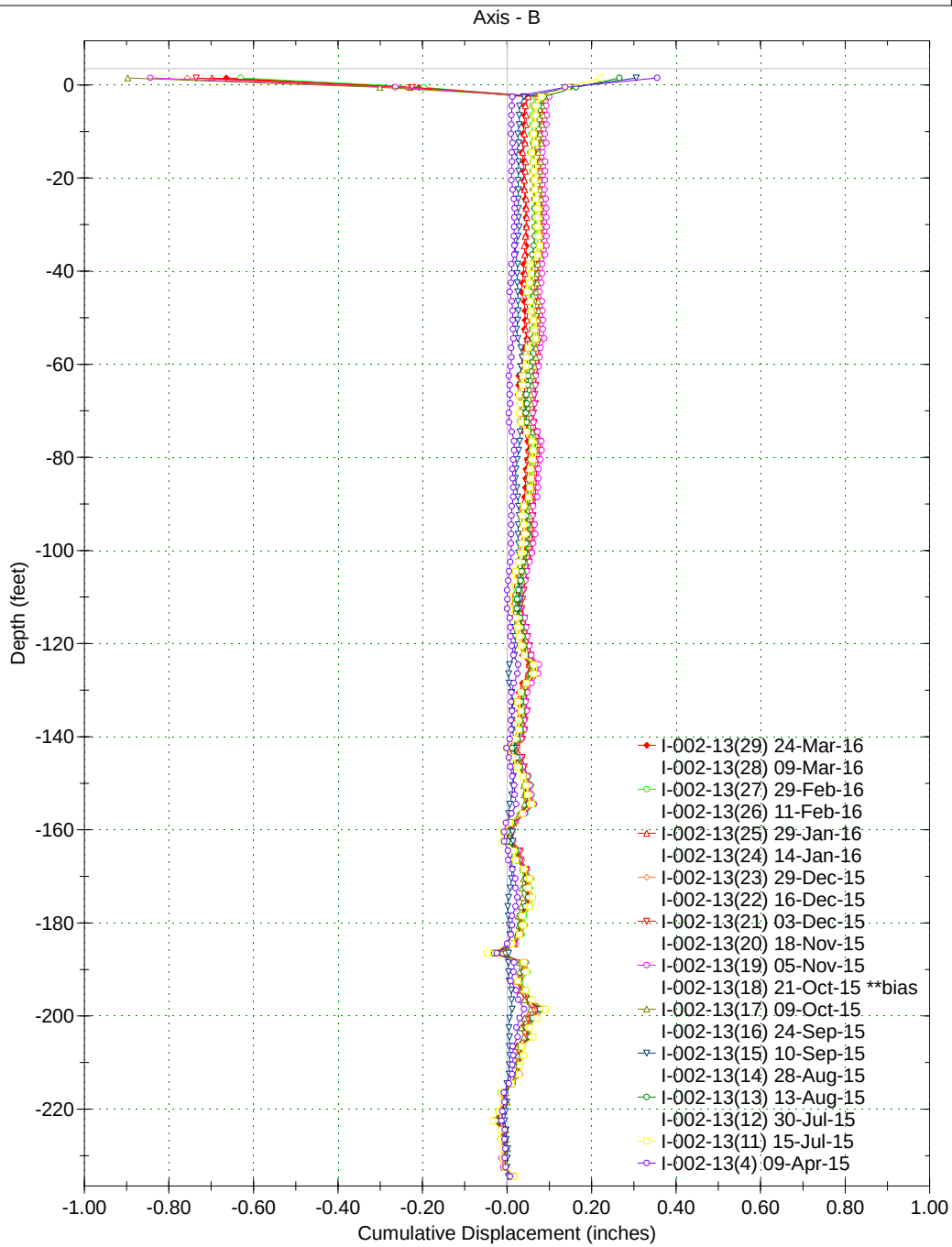
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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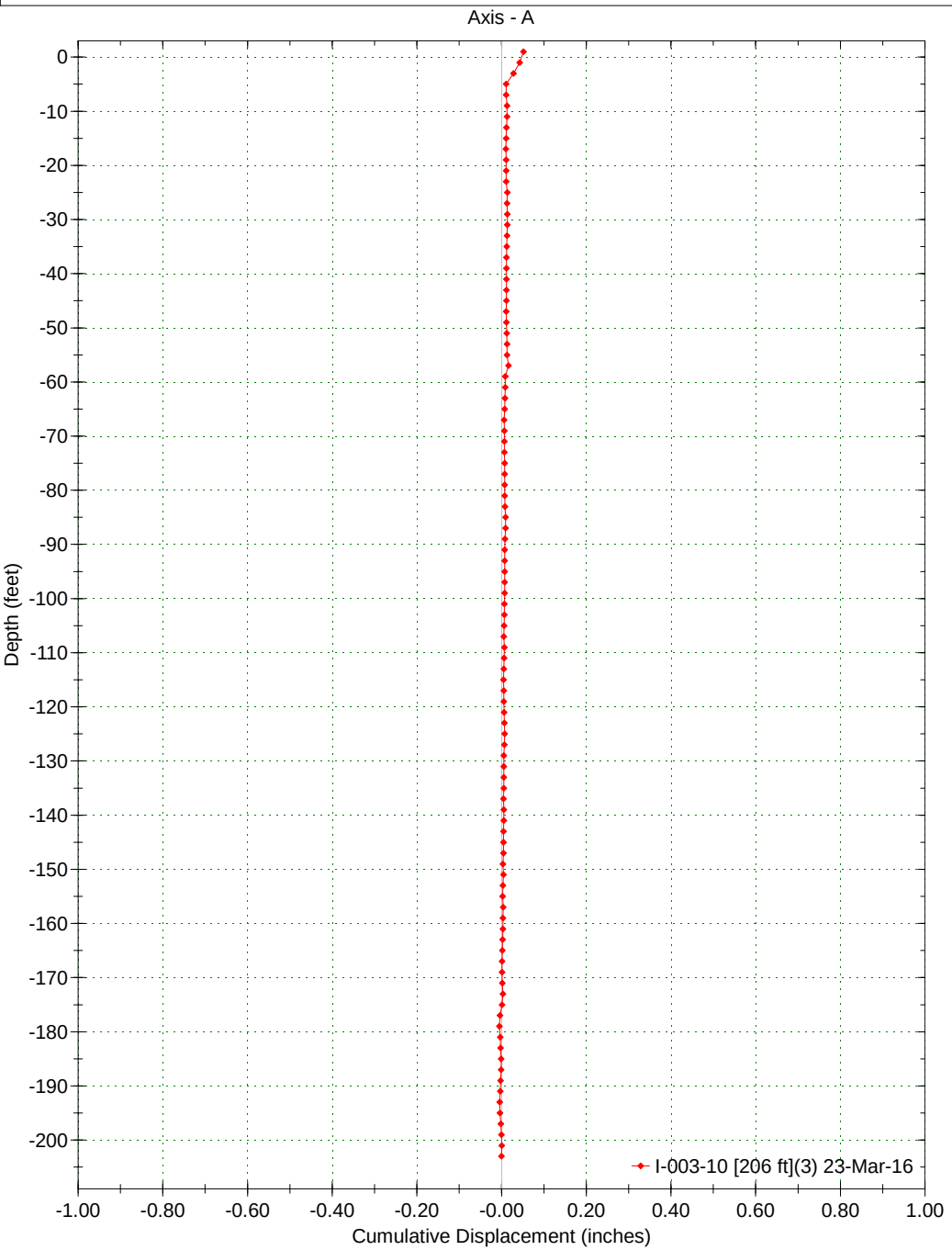
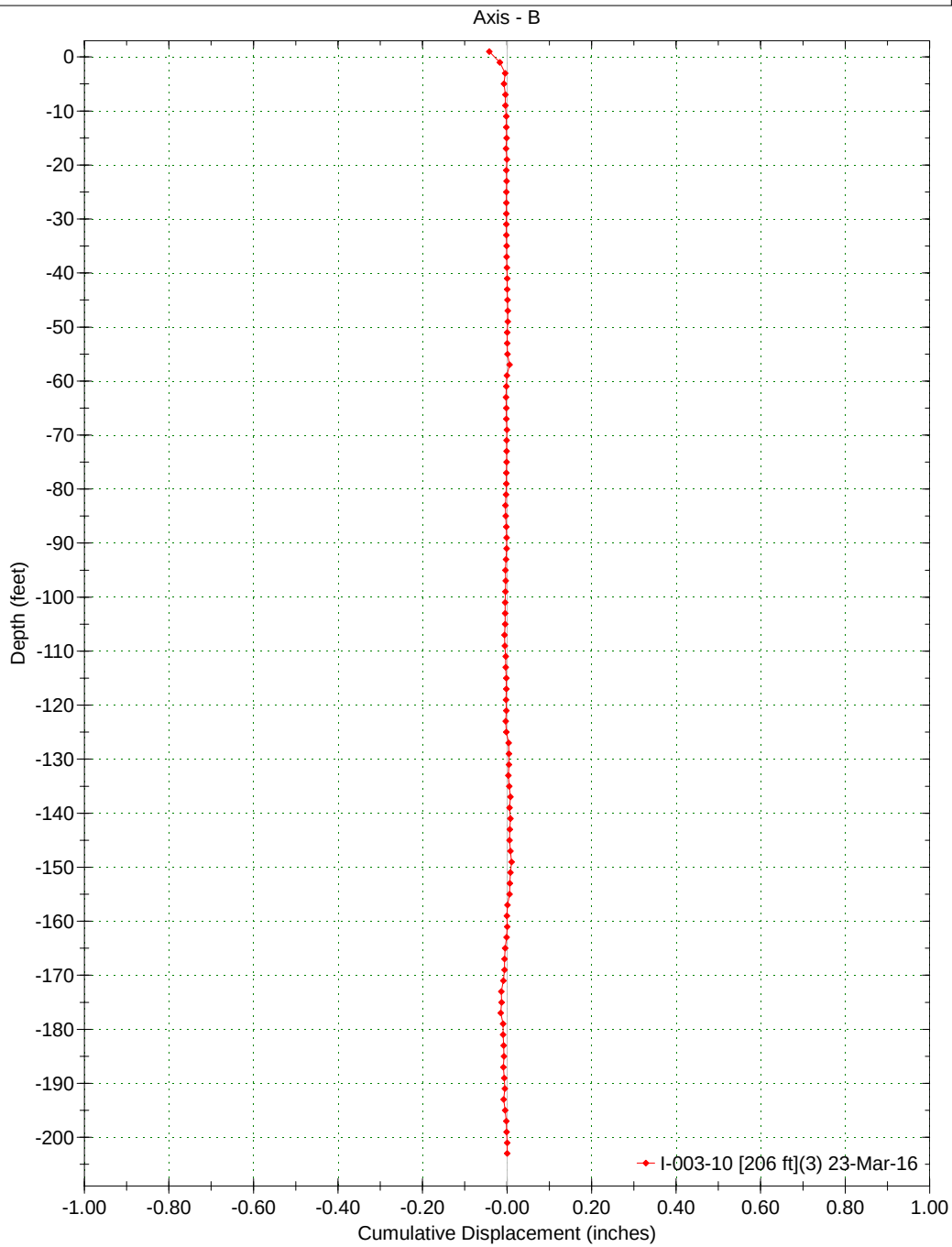
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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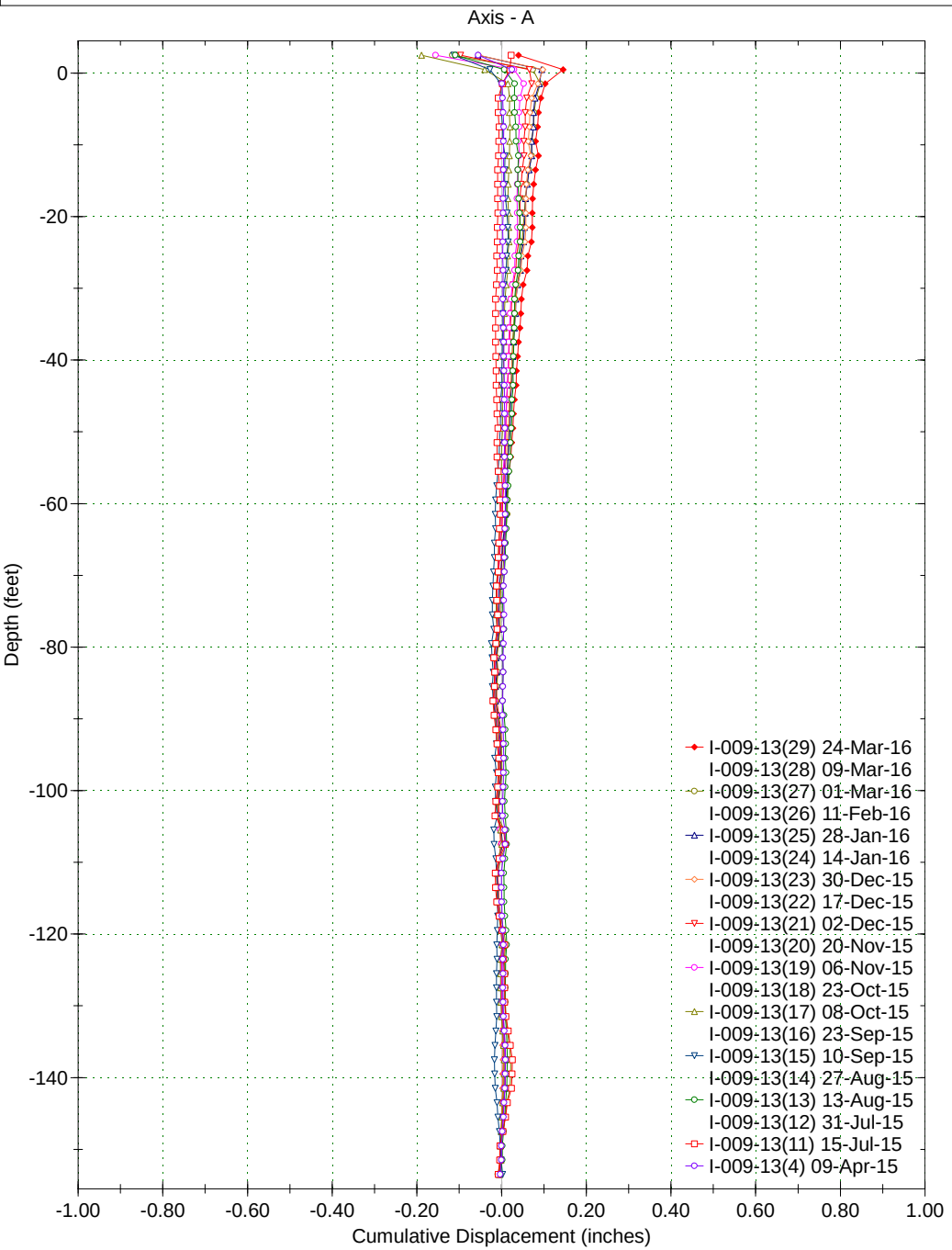
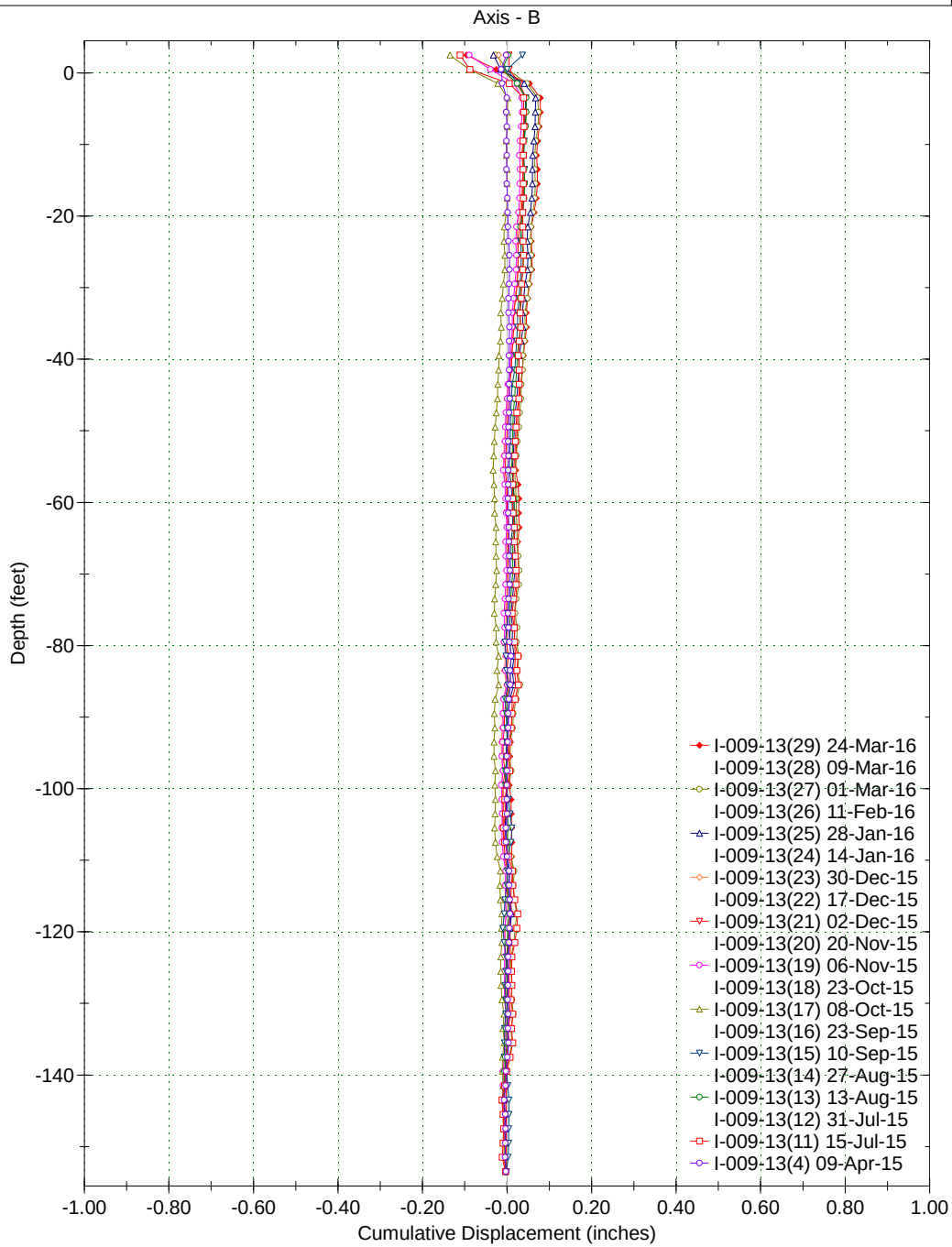
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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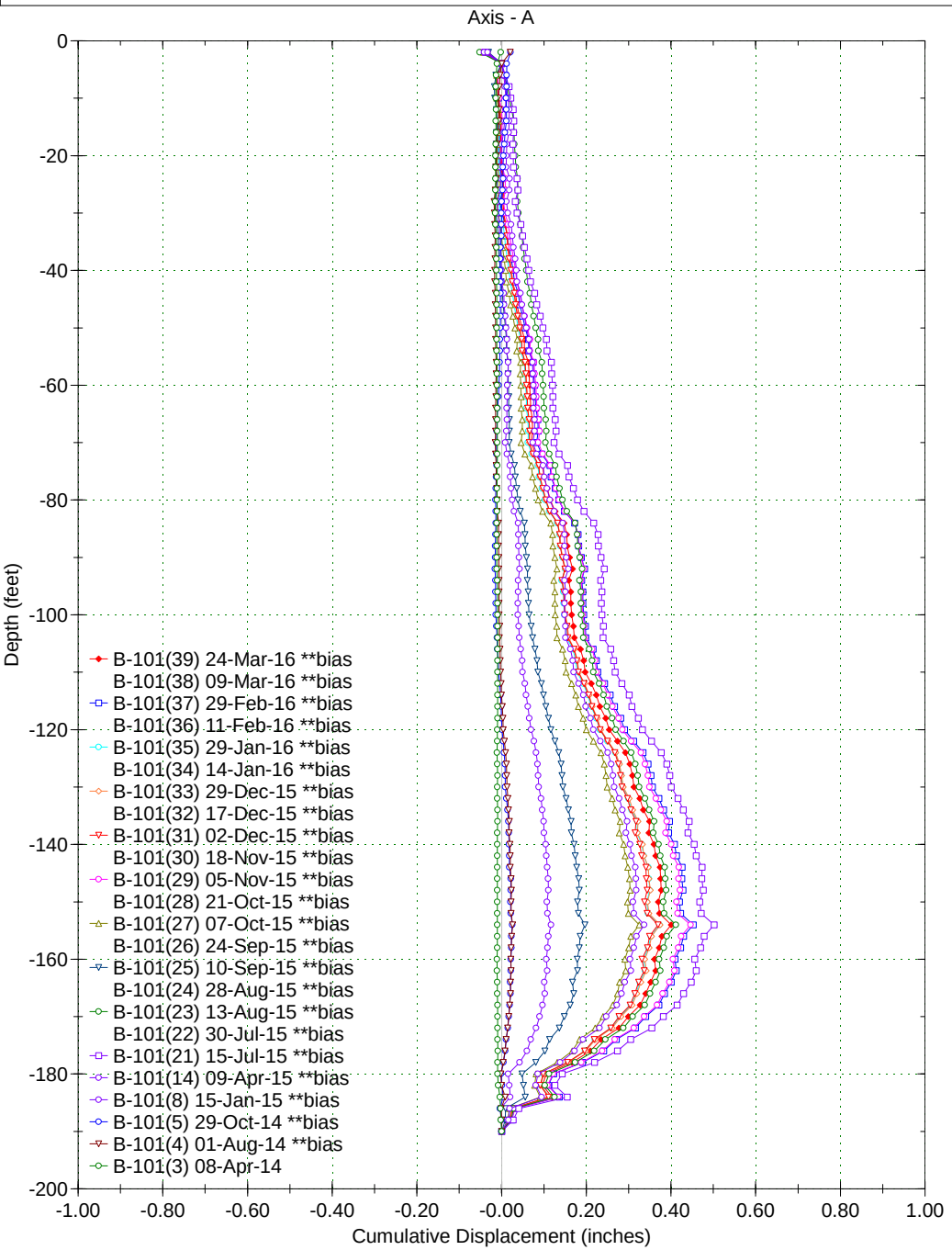
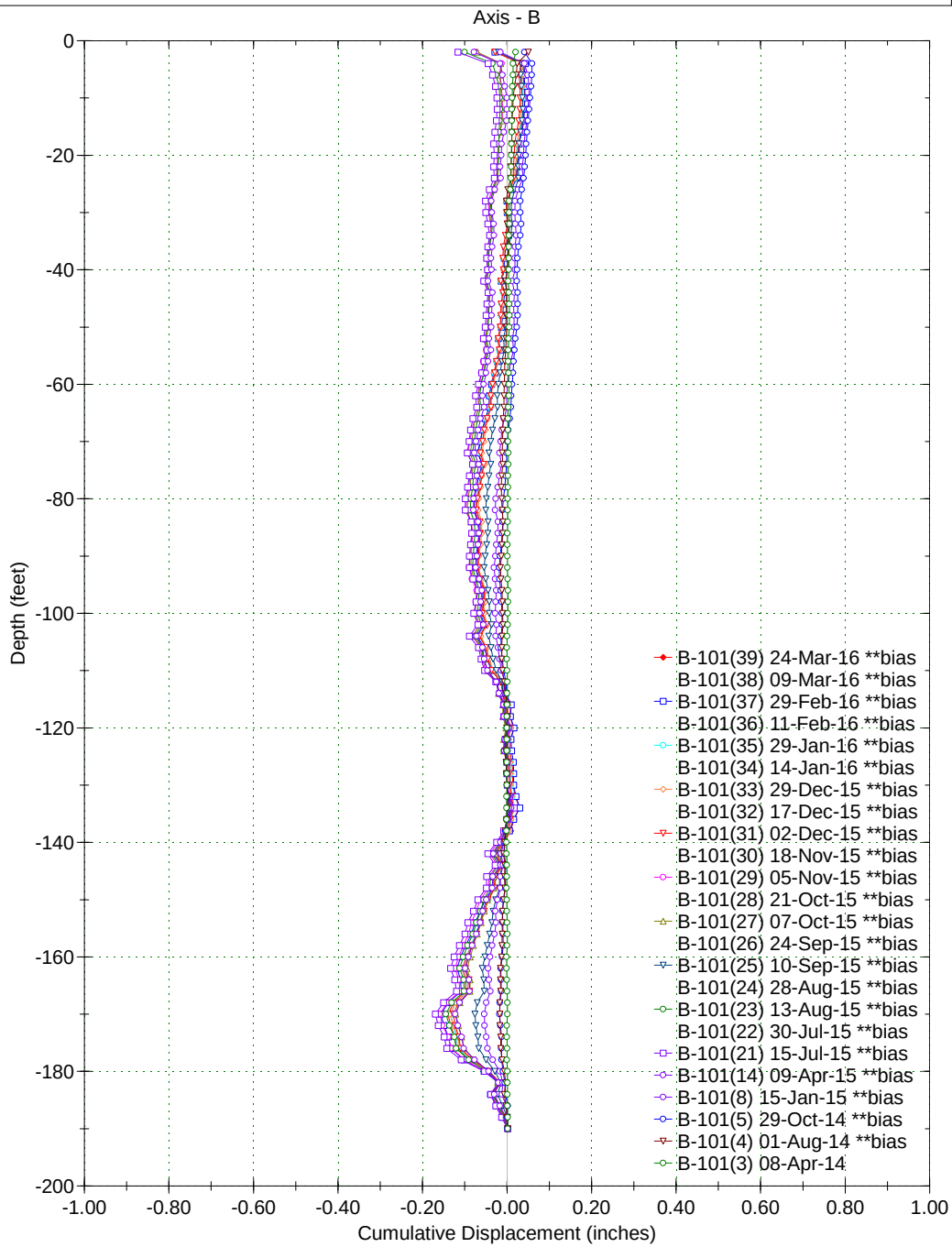
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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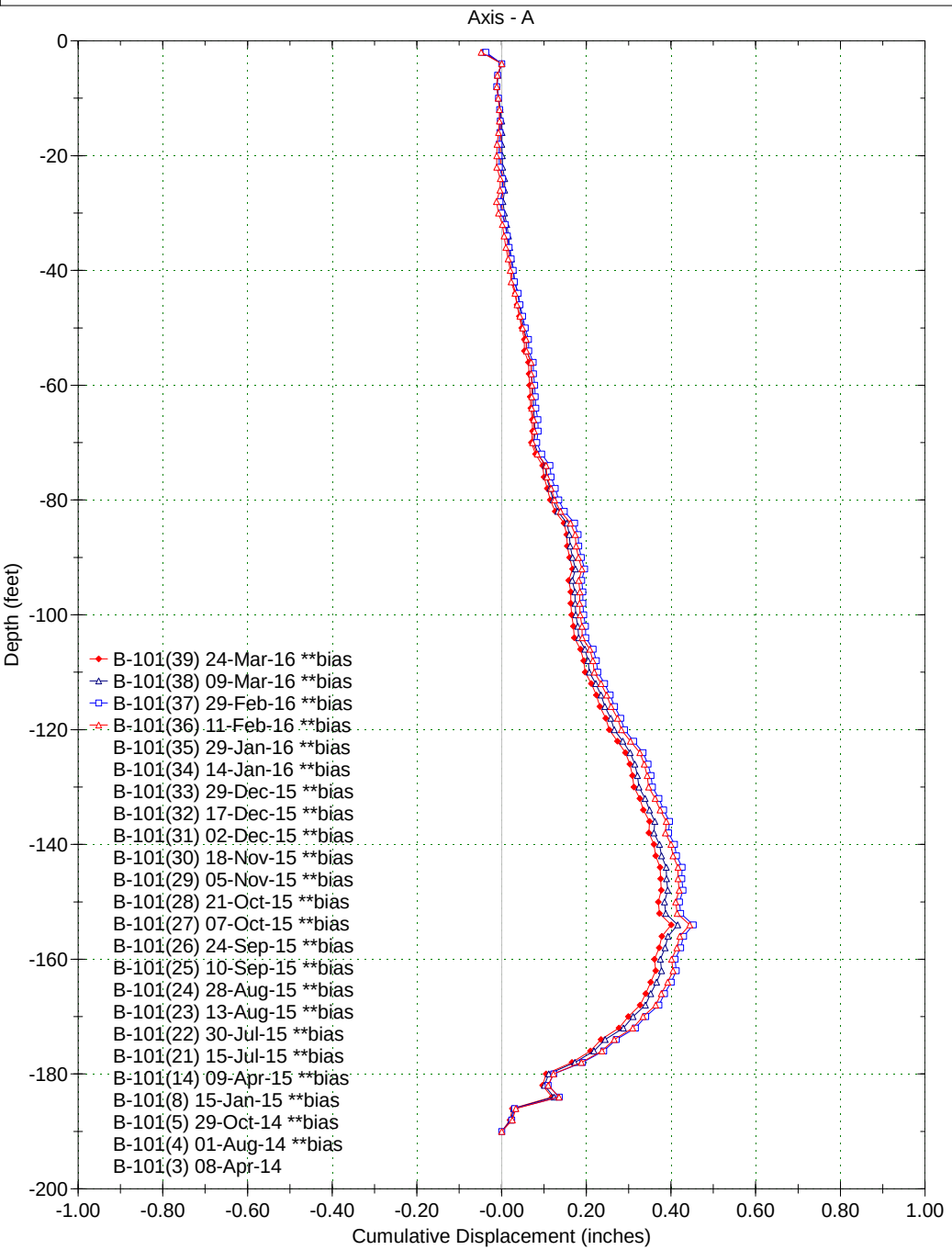
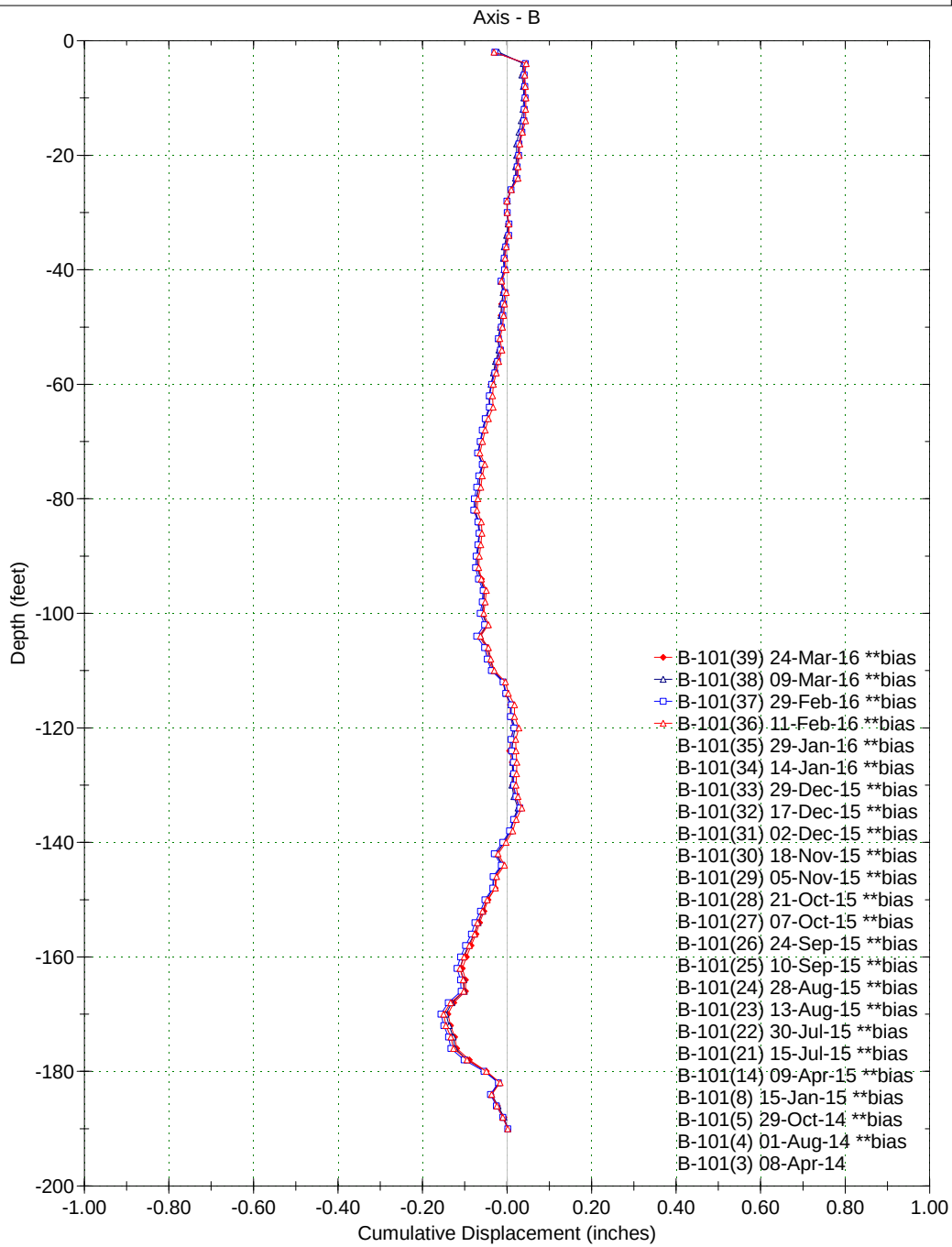
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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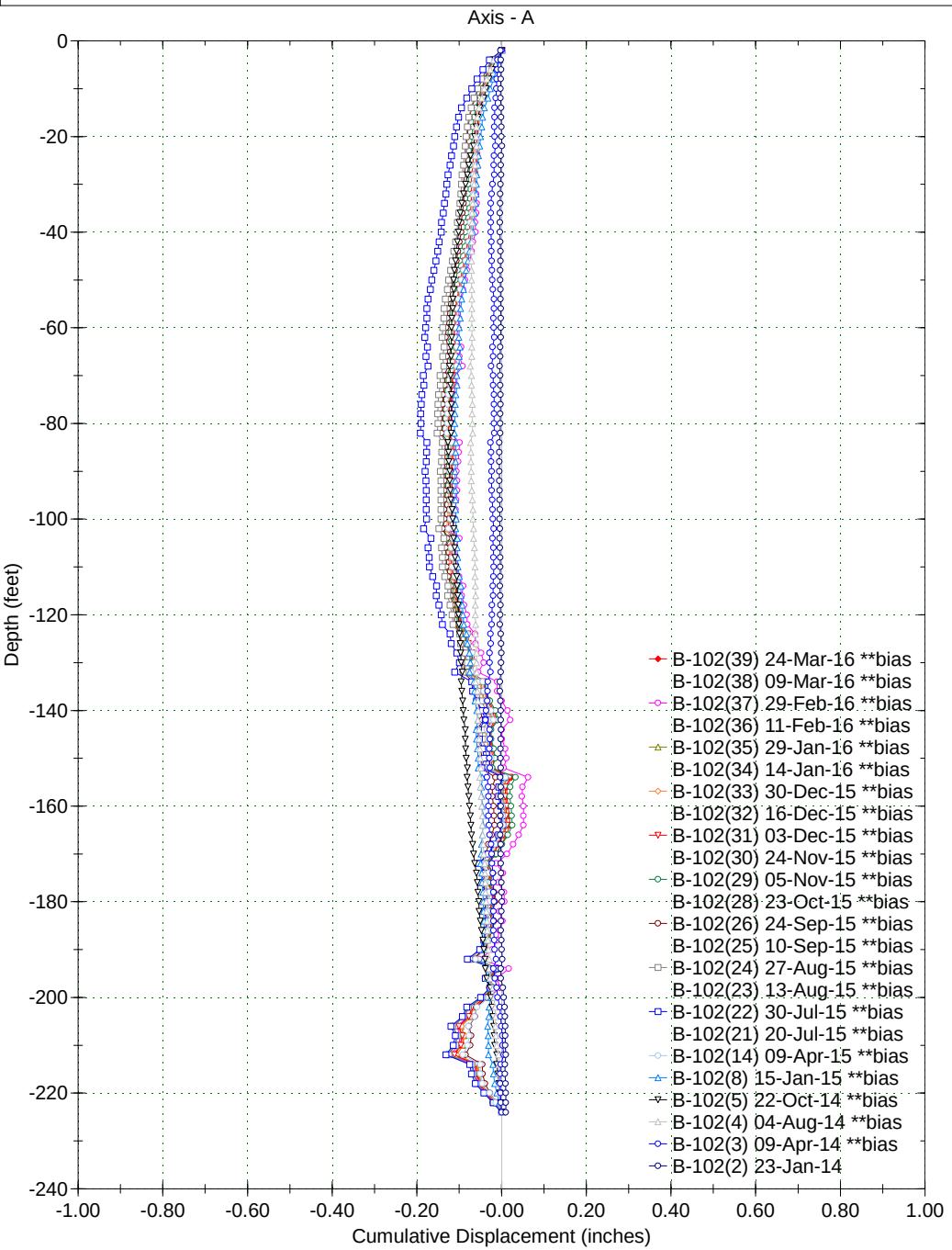
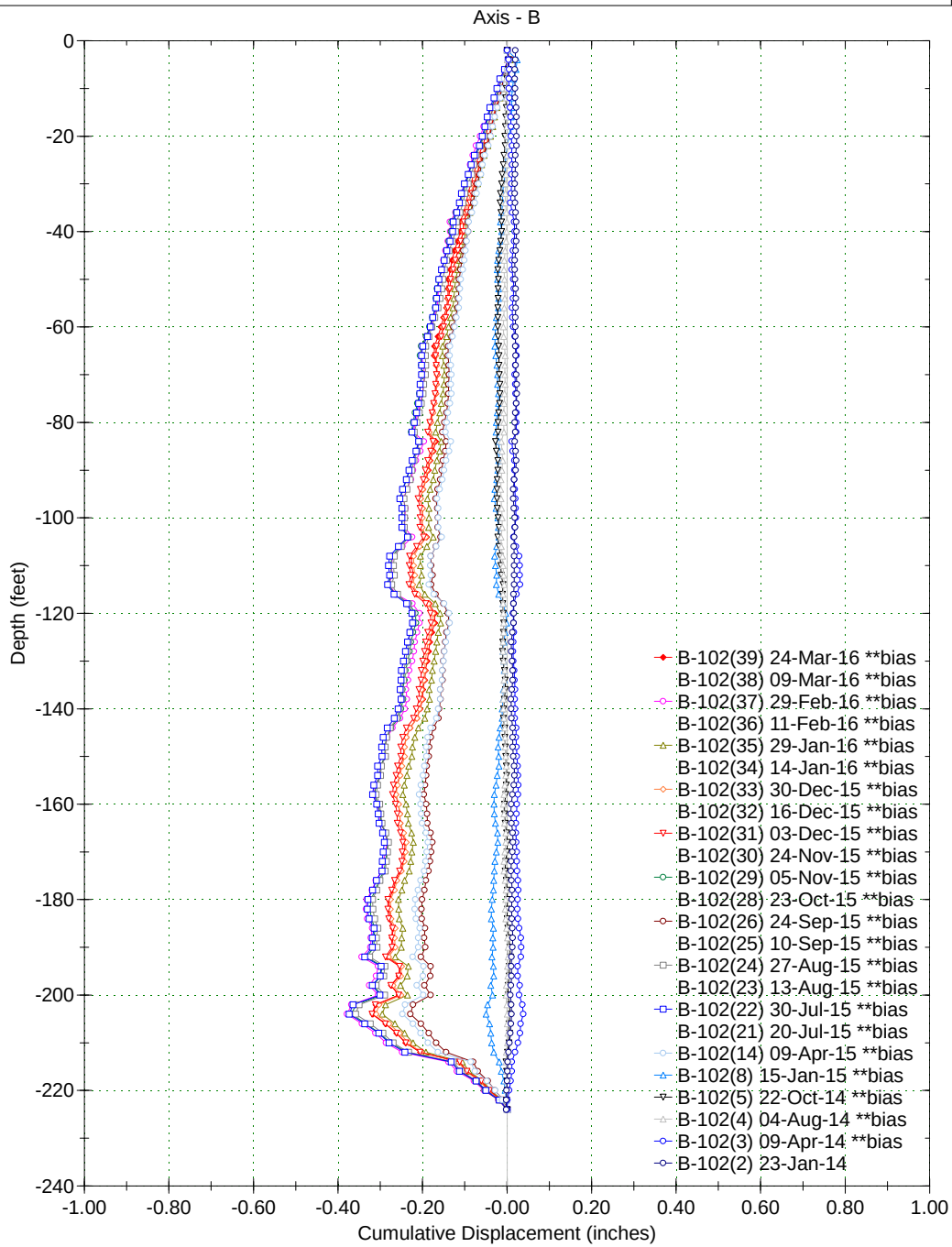
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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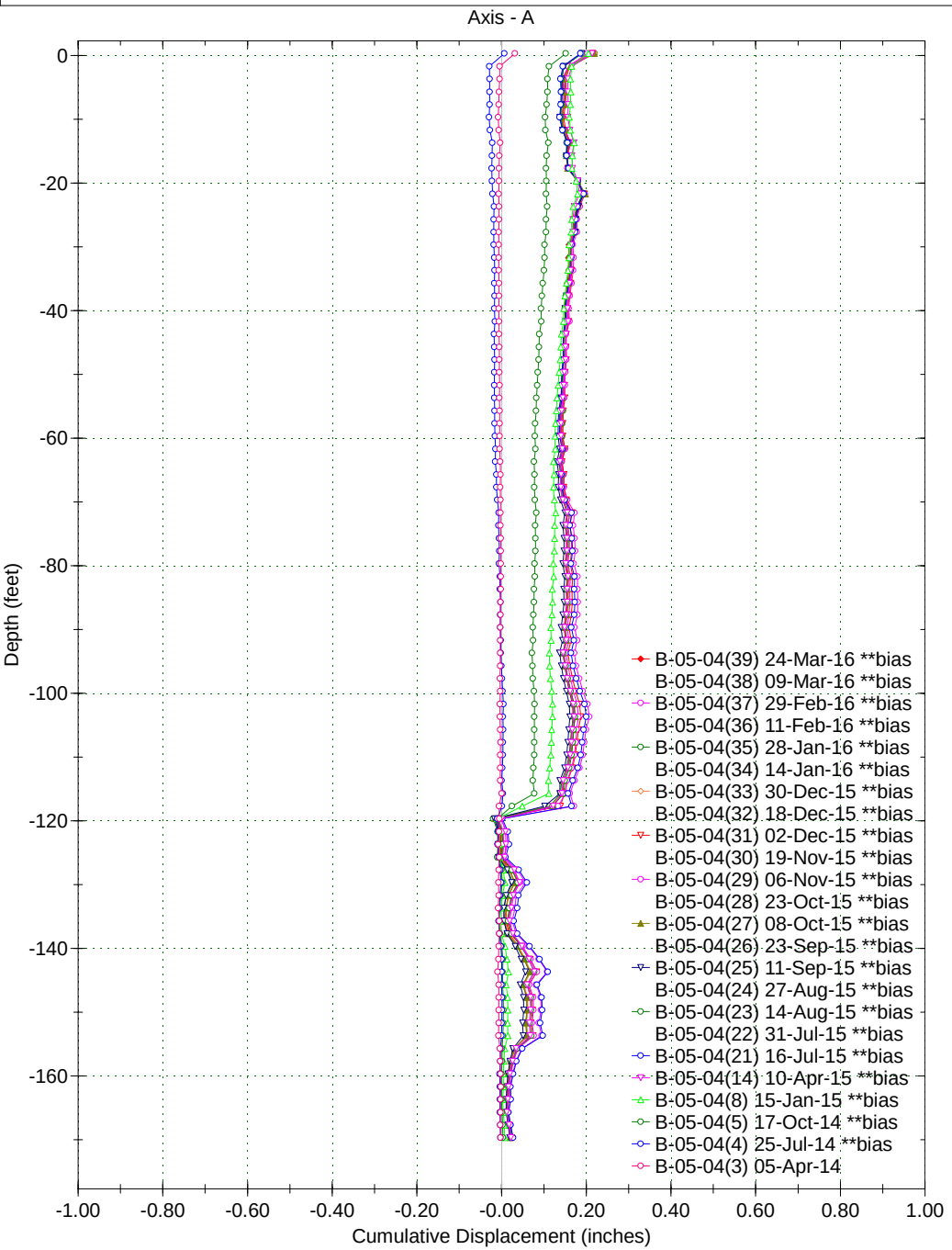
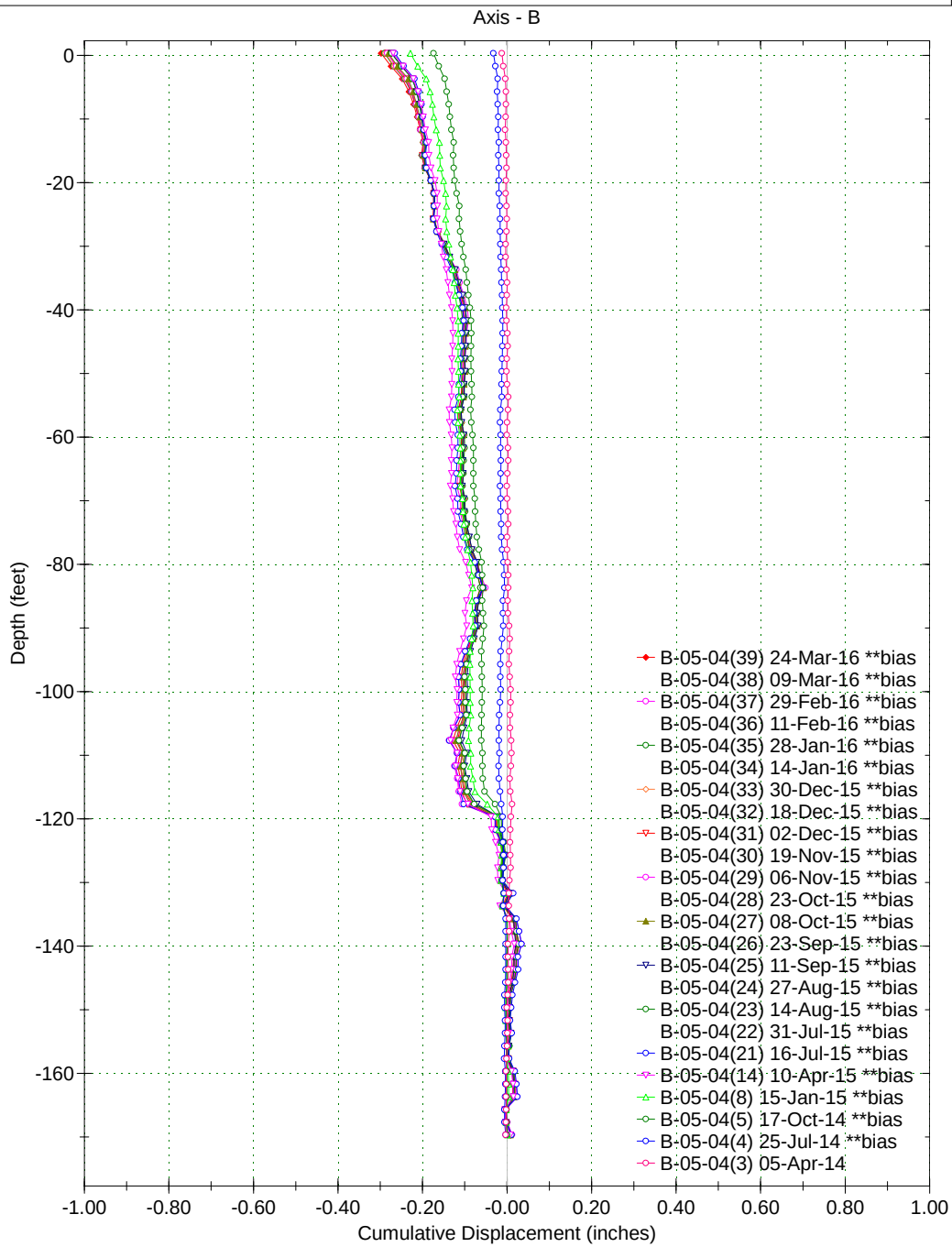
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

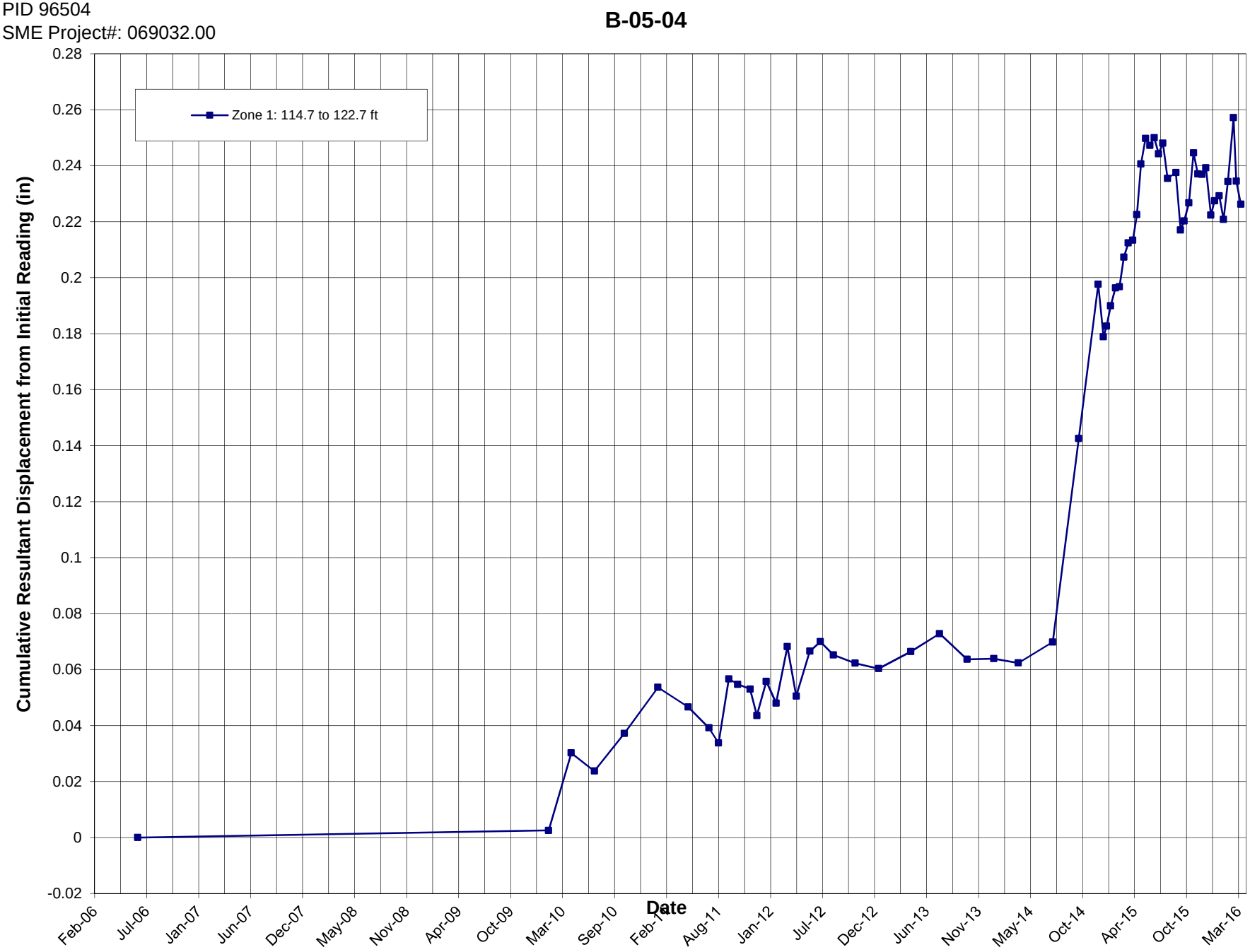
Borehole : B-05-04
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing : Sta. 133+51.67
Easting : 242.09' Rt of CL
Collar :

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



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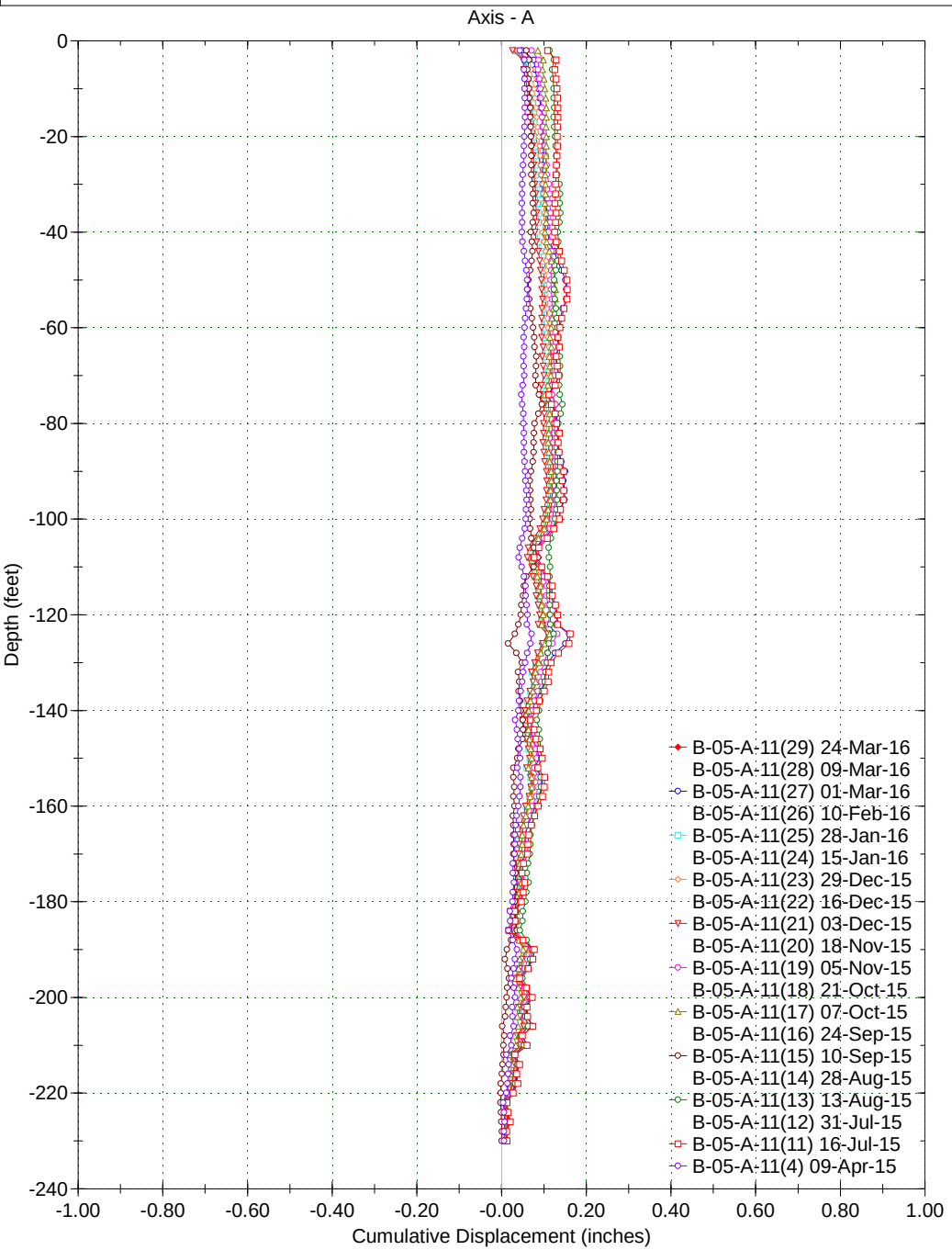
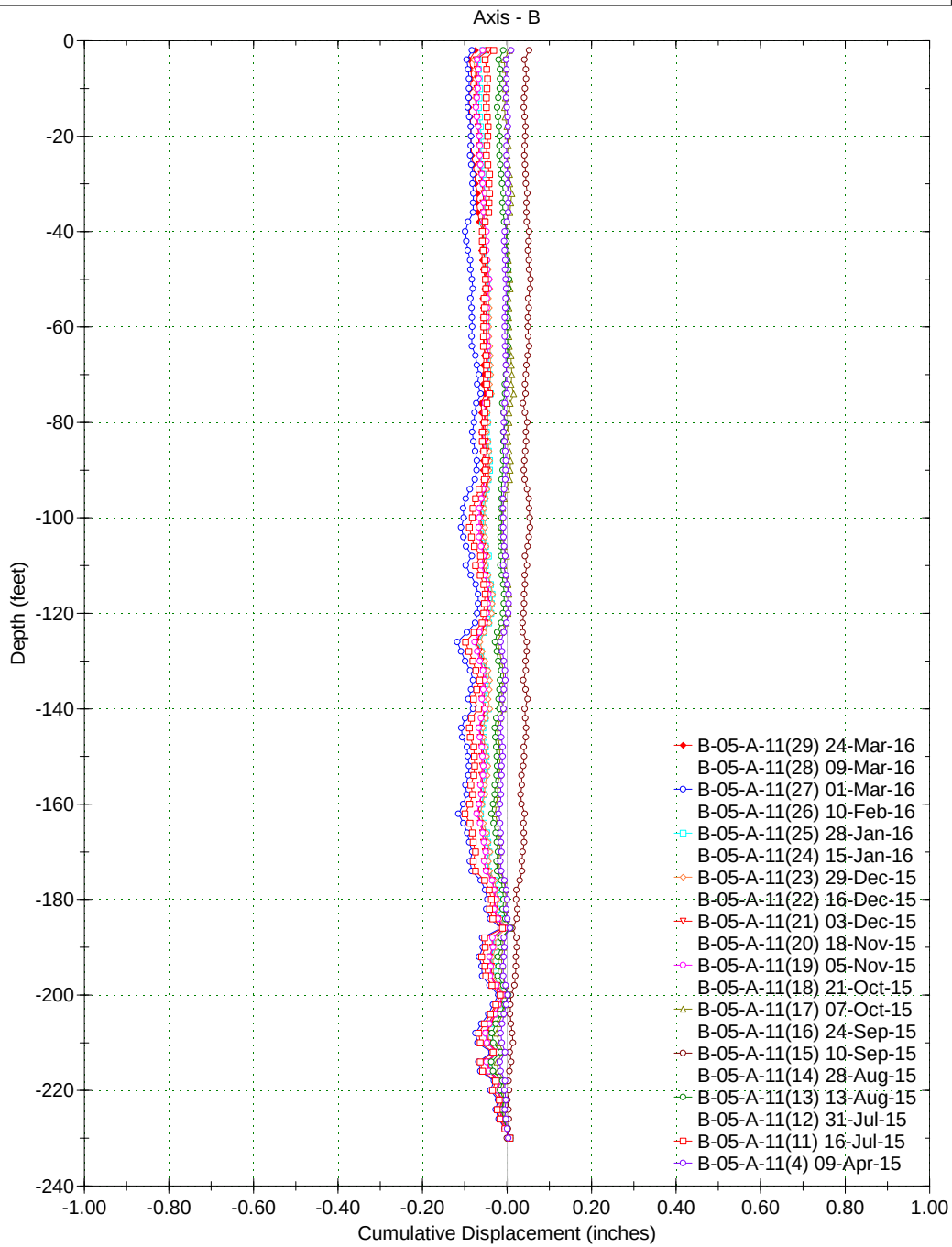
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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





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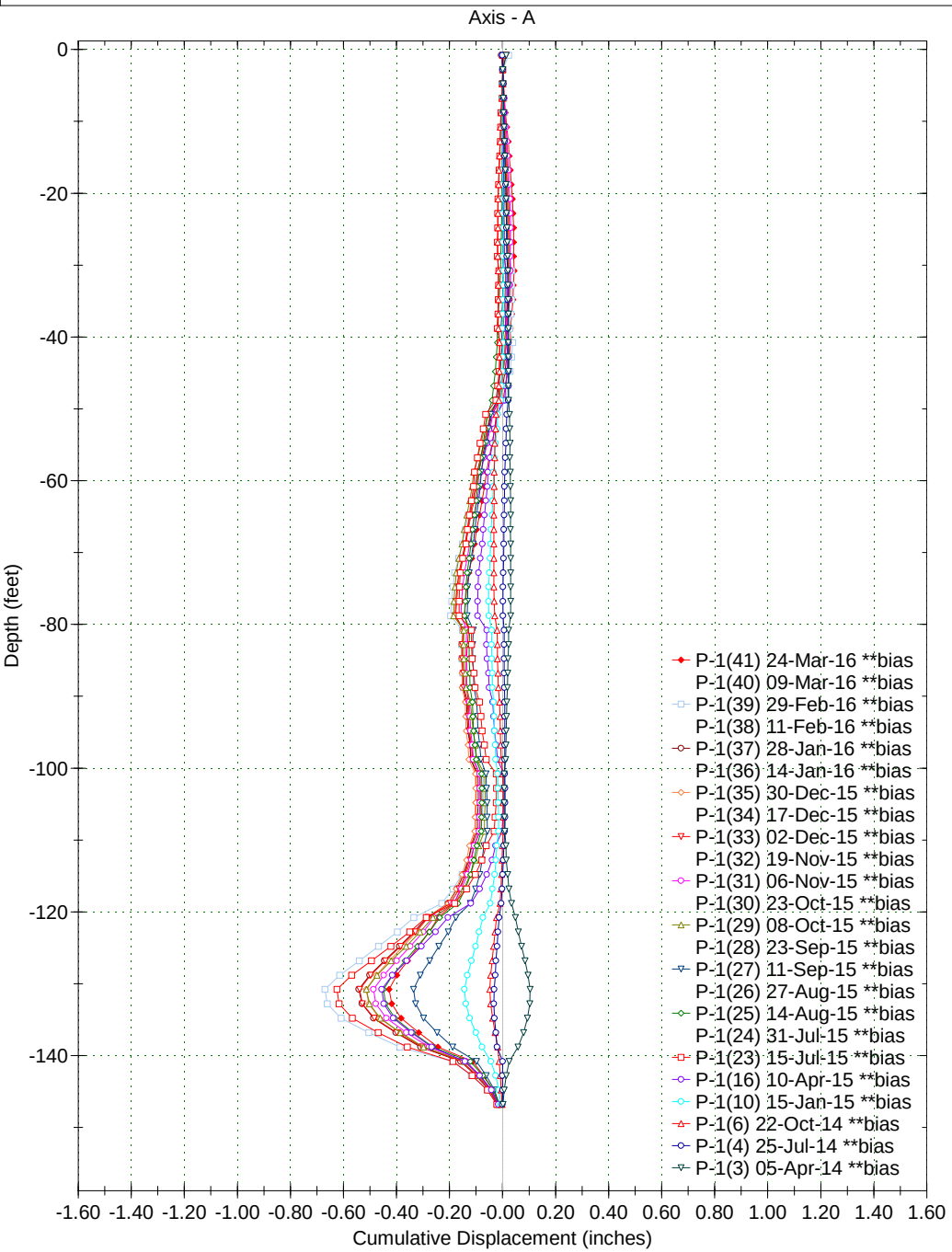
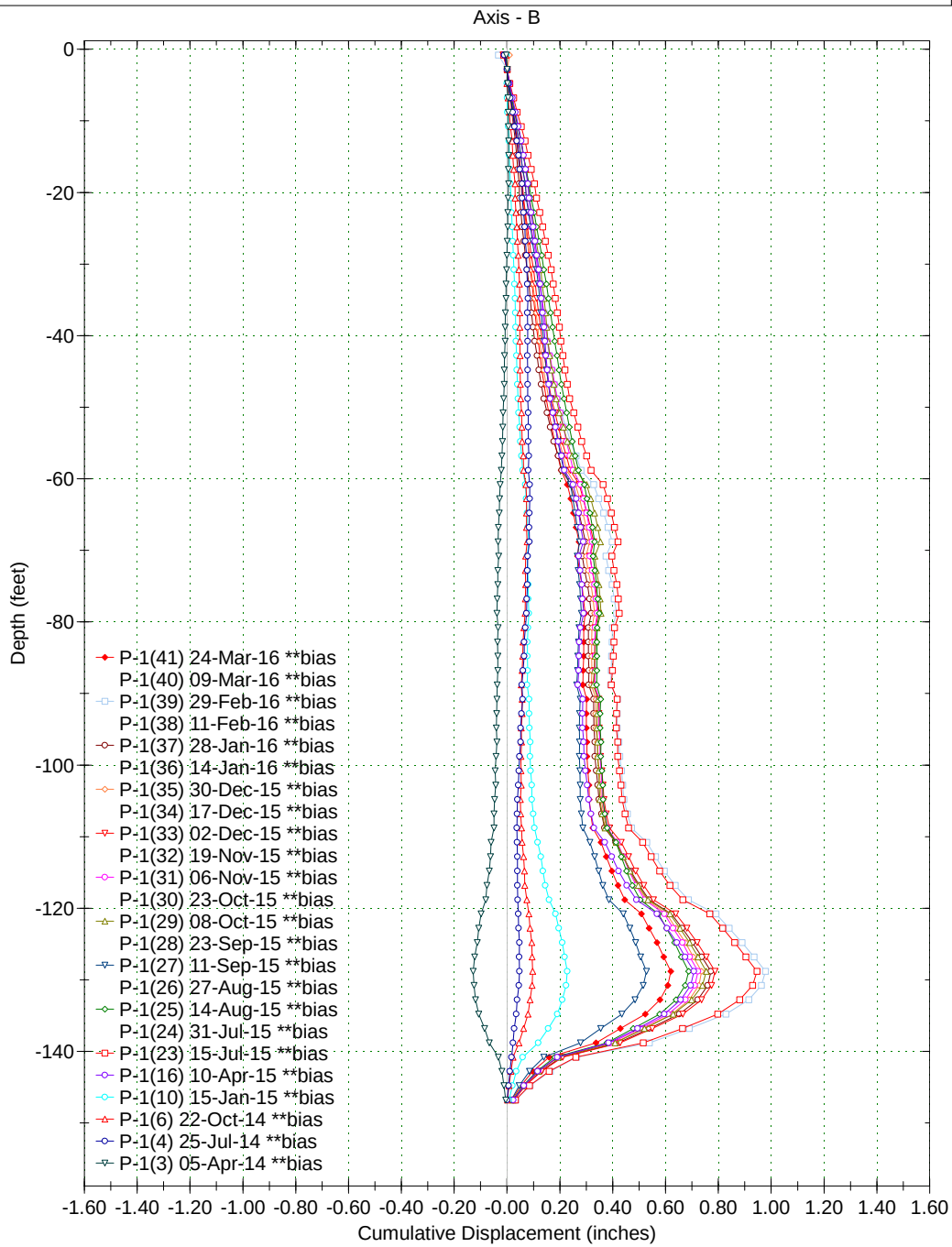
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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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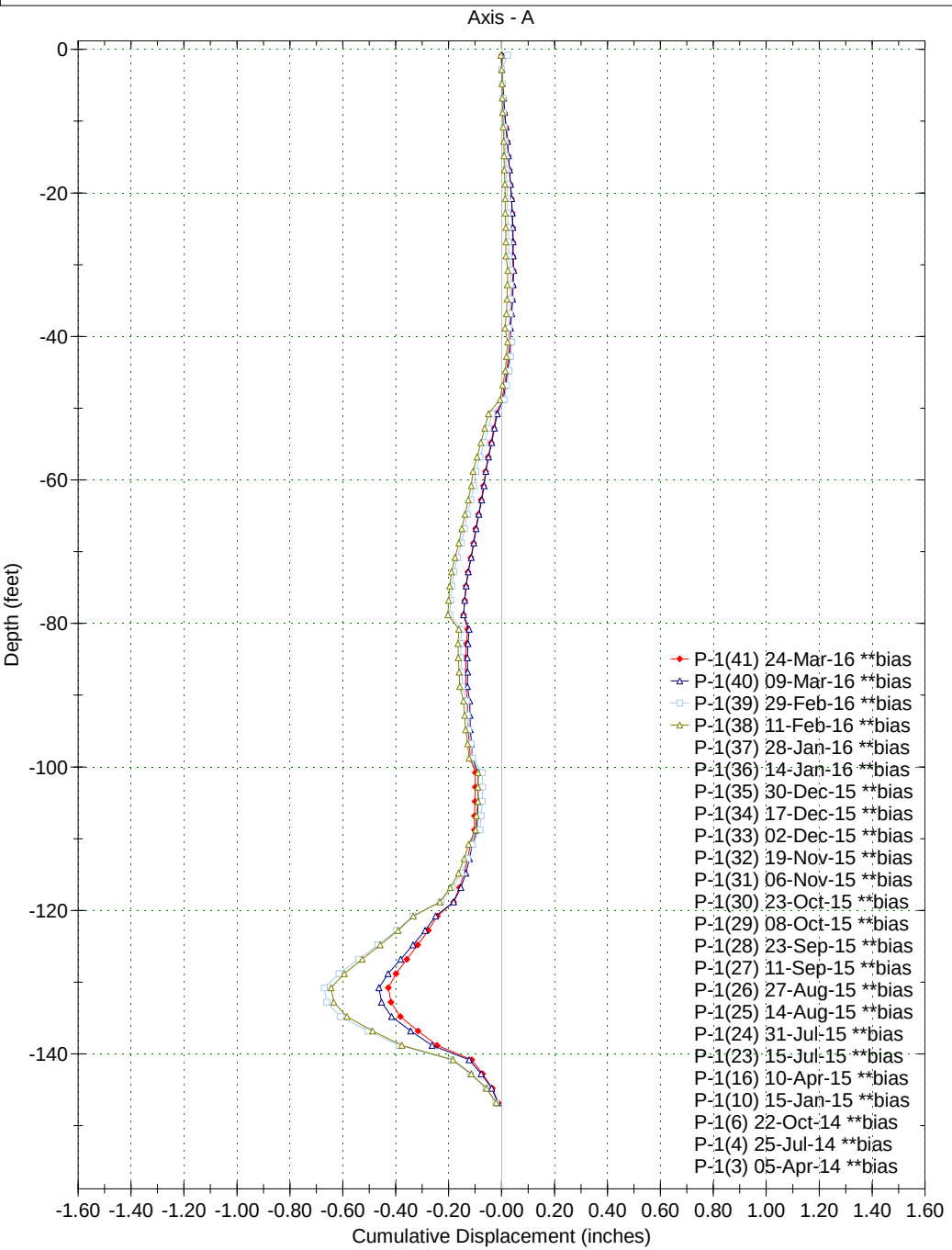
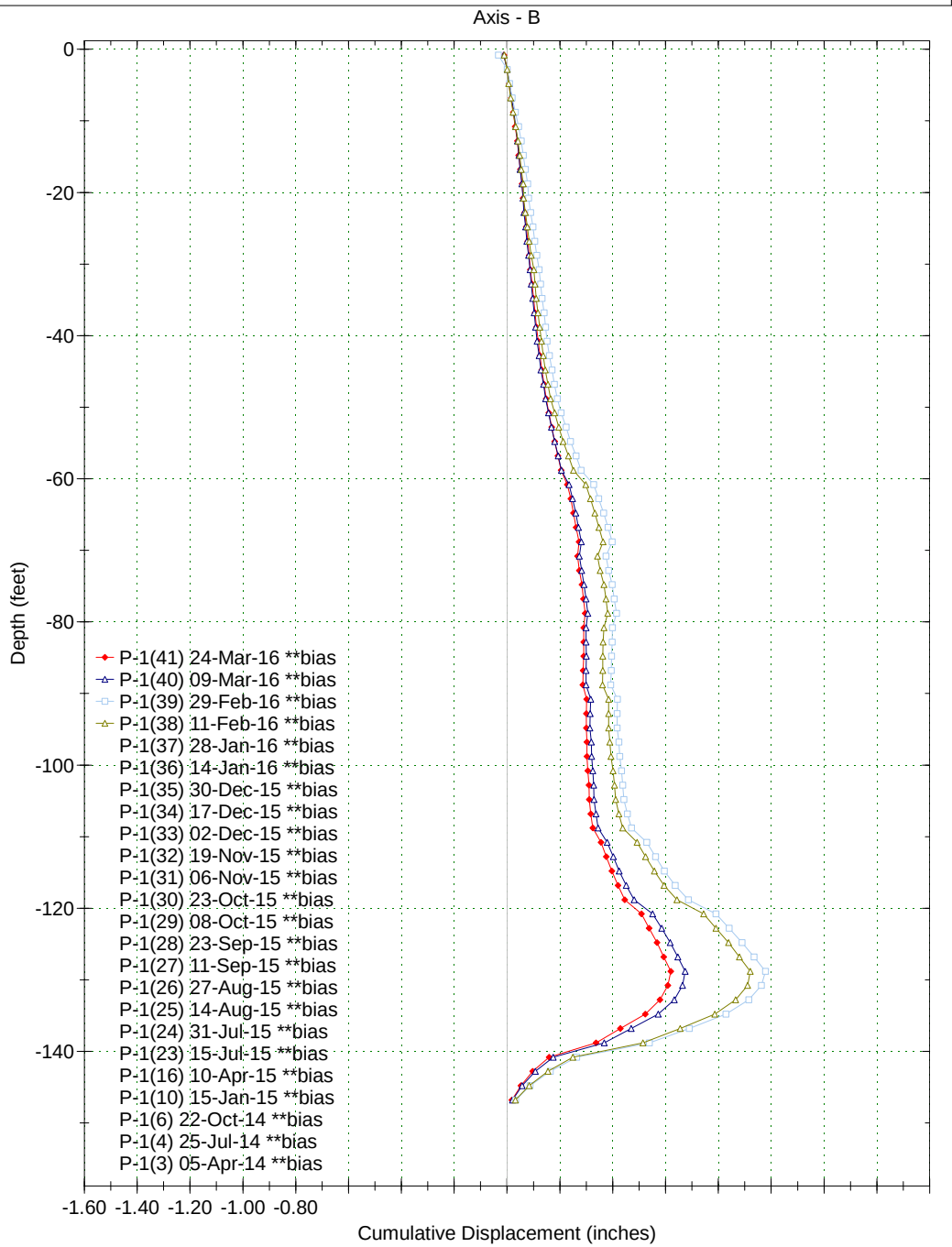
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

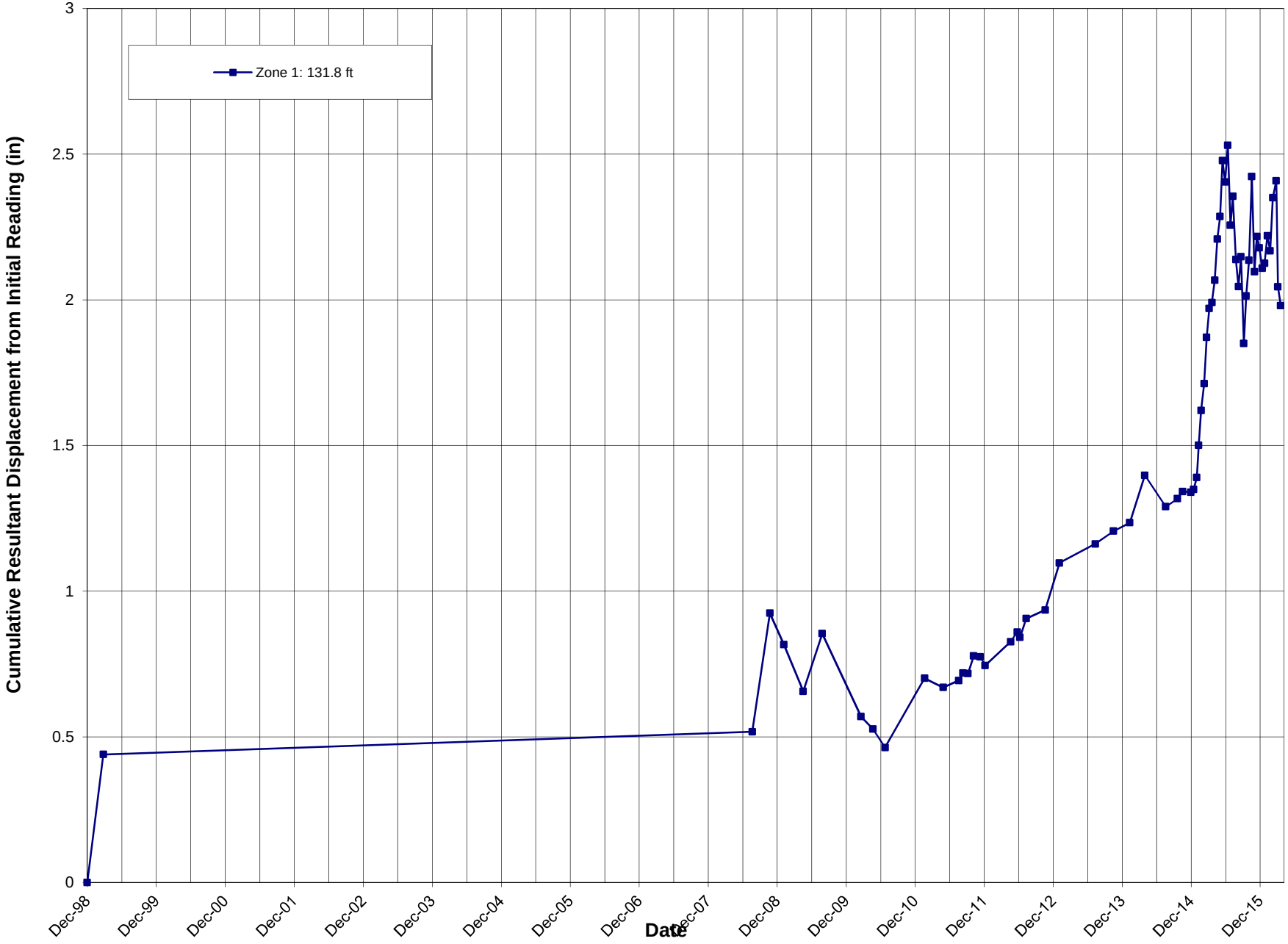
Borehole : P-1
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :

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





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



RST Instruments Ltd.

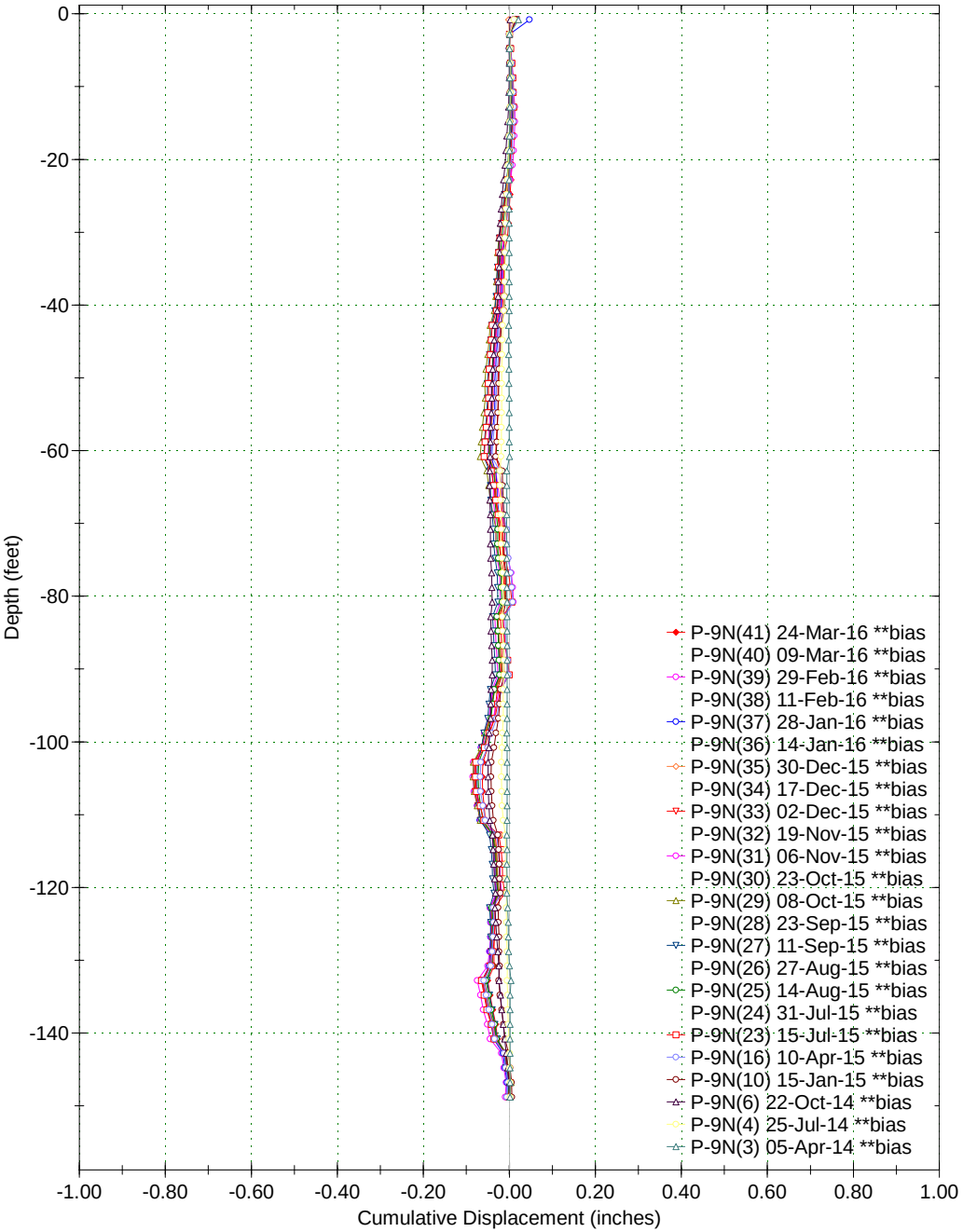
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

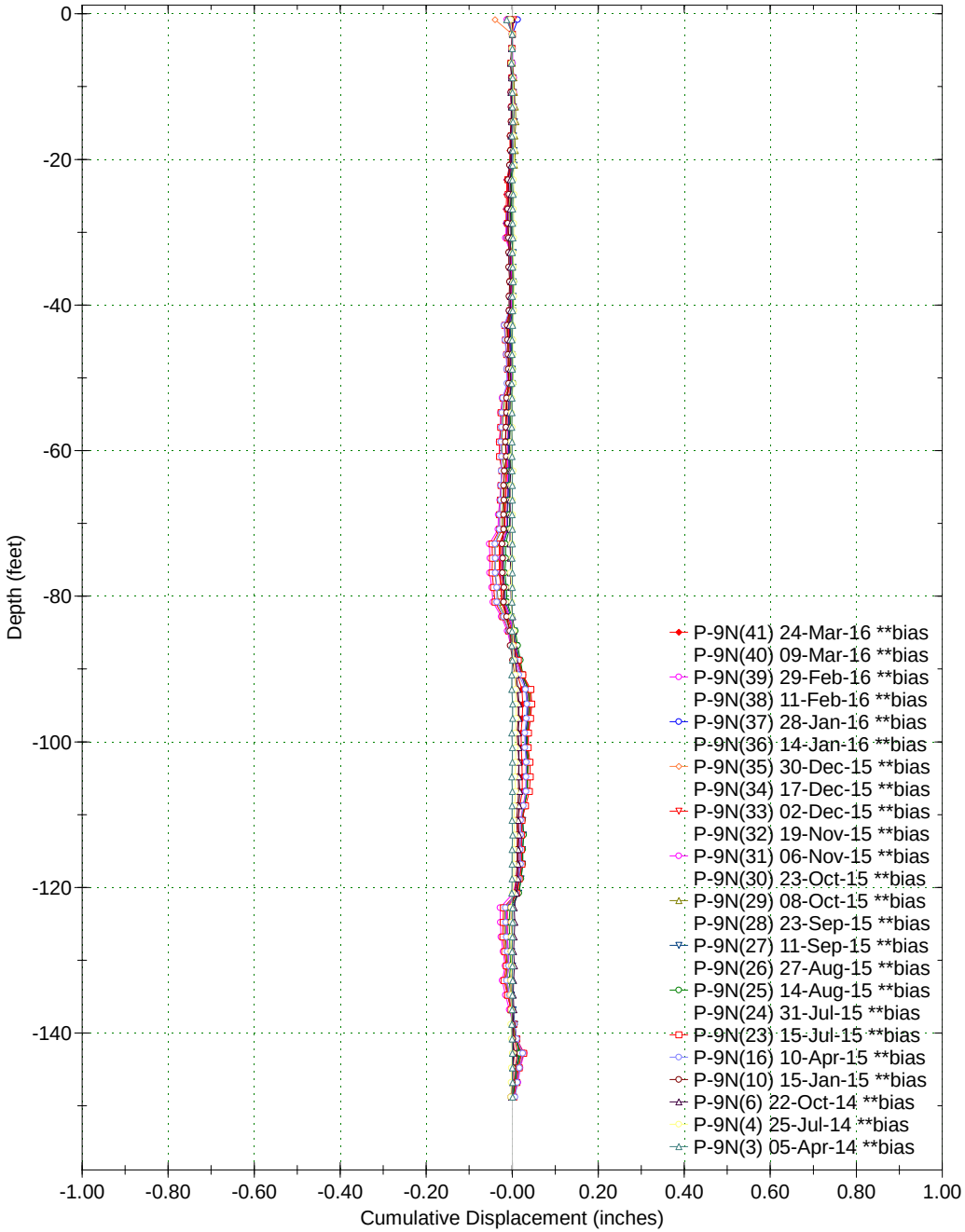
Borehole : P-9N
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :

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



RST Instruments Ltd.

CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

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