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February 5, 2016

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

Re: January 2016 Quarterly Report
CUY-90-15.24 Slope Monitoring
PID 96504
EDP Project No. 069032.00

Dear Mr. Lastovka:

Quarterly instrument readings for the CUY-90-15.24 Slope Monitoring project are presented in the attached report.

If you have any questions or comments regarding this report, please call.

Very truly yours,

SME

cosign

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

Attachments

Distribution via e-mail

JANUARY 2016 QUARTERLY REPORT

CUY-90-15.24 SLOPE MONITORING
PID 96504
CLEVELAND, OHIO
SME PROJECT NO. 069032.00

FEBRUARY 5, 2016

SME
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INTRODUCTION

Instrument readings and interpretations for January 2016 are presented in this report. Figures showing the arrangement of instrumentation are in Appendix A. Instrument plots are included in Appendix B. Labels like P-001-13 for the piezometers and I-001-13 for the inclinometer at that same location are used for all recently installed instruments. For earlier instruments, a label like B-101 is used for both the piezometers and inclinometers at the same location.

CRITICAL INSTRUMENTS READ BI-WEEKLY

Critical instruments are those that are judged to provide a clearer picture of slope performance. The following critical instruments are currently read and reported on a bi-weekly schedule.

Piezometers: P-001-13, P-002-13, P-003-10, P-004-13, P-009-13, B-05-03, B-05-04, and B-05-11. B-105 was included in the bi-weekly readings but was destroyed and is permanently out of service.

Inclinometers: I-001-13, I-002-13, I-003-A-10, I-004-13, I-009-13, B-05-04, B-05-A-11, B-101, B-102, Pier 1, Pier 9N, TGR I-2, and TGR I-4. During construction at the bulkhead B-105A is being read weekly.

Refer to the bi-weekly reports for details and comments on those instruments. This report will only cover those instruments that are not included in the bi-weekly reading schedule.

STATUS OF INSTRUMENTS

Table 1. Instruments currently out of service and needing repair or replacement.

Location	Inclinometer	Piezometers	Comment
B-105	N/A	Destroyed	Permanently out of service
B-105A	Temporary repair	N/A	Shortened casing is in use, casing will be extended after bulkhead is backfilled
B-05-03	Permanently out of service	Cables cut	Excavation to expose piezometer cables after crane is repositioned
B-303	N/A	Tubing cut	Recoverable after fill is removed
I/P-008-10	Temporarily inaccessible	Cables cut	Recoverable after fill is removed
I/P-004-13	Temporarily inaccessible	Access recently restored	Recoverable after fill is removed

B-105 – Tubing to the pneumatic piezometers at this location was damaged during excavation for repair of the bulkhead. We worked with TGR to locate the tubing, but were unable to find any trace of it. These piezometers should be considered destroyed and permanently out of service.

B-05-03. Cables for these piezometers were previously extended to the east fence line for protection during construction. However, the contractor dug through the cables on December 24, 2015, and the piezometers are now out of commission. In January we worked with TGR to locate these piezometers, but had to suspend these efforts because excavation threatened to undermine the crane pad positioned near or over the instruments. TGR will continue to search for the damaged cables and trace them back to the instruments when the crane is repositioned.

The top of the inclinometer at this location was damaged in April 2015 during the excavation for the adjacent storm sewer. This slope tube is abandoned as unreadable.

B-303 and I/P-008-10. A large amount of fill was placed over these instruments during the CCG1 contract. The inclinometer at I-008-10 is buried and inaccessible. The cables and tubing for the piezometers were extended to a clear area near the east fence but these extensions were cut during excavation for the gas line. These instruments will be restored to service after the fill is removed.

I/P-004-13. To protect these instruments TGR installed a section of pipe around the instruments and then filled around the pipe. In January, TGR made an opening in the pipe so we can access the dataloggers on the piezometers but the inclinometer will be inaccessible until the fill is removed.

B-105A. The inclinometer casing at this location was damaged during excavation behind the bulkhead. We were able to lower a dummy probe to the bottom of the remaining slope tube to verify that it was undamaged and free of debris. Fortunately, the casing separated cleanly at a joint and we were able to attach a short section of casing so that readings can continue until the area is backfilled.

PIEZOMETERS

P-001-10. Total head in both piezometers at P-001-10 increased by about 1 foot through the first half of this quarter then decreased by about the same amount with virtually no net change for the quarter.

P-002-10. Total head in both piezometers at P-002-10 fluctuated slightly over the past quarter, but show virtually no net change.

P-007-13. In both piezometers at P-007-13, pore pressure readings indicate only minor fluctuations in total head over the past quarter with no significant changes.

B-05-07. Pore pressures in the deepest piezometer continue to increase at a slow rate with an increase in total head of about 0.5 feet this quarter and about 3.8 feet since April 2014. Readings in the two shallower piezometers showed no significant change through the first two thirds of this quarter, but decreased slightly during December.

TGR P-3. Total head in the piezometers at this location were trending downwards for most of this past quarter. On December 23, 2015, total head increases of 3 to 5 feet are shown in all

three piezometers. This increase was likely caused by a large amount of fill placed in the area that we observed during our following biweekly visit. The pore pressures then began to decrease with the rate of decrease slowing with increasing depth. On January 4, 2016, the pore pressure data indicates small increases in all three piezometers.

INCLINOMETERS

I-001-10. Inclinometer readings at this location indicate virtually no movement since the April 2015 quarterly readings.

I-002-10. A slight reversal in the direction of previous displacements is indicated by this quarter's readings at I-002-10. Slight A-axis displacement towards the baseline is indicated from about 80 to 110 feet and from 140 to 180 feet. Slight B-axis displacement towards the baseline is indicated from about 10 to 40 feet and from 58 to 90 feet.

I-007-13. Movement is shown in the positive A-axis direction from the surface to about 50 feet. B-axis readings indicate a reversal back to the April 2015 baseline.

B-05-07. Inclinometer readings at this location indicate virtually no movement since the October 2015 quarterly readings.

P-3, P-8, P-10. Inclinometer readings at these locations indicate a reversal in the direction of movement this quarter. Displacements in both axes now align with readings taken between April and July 2015.

P-17. Inclinometer readings at this location indicate a slight displacement in the positive B-axis direction through most of the length of drilled shaft. No A-axis displacement is indicated this quarter.

STABILIZATION STRUCTURE

The general arrangement of the stabilization structure and its instrumentation is shown in Figures 2 and 3 in Appendix A. Both data loggers failed to record during part of this quarter. In Box 1, which stores data from the load cells, ground anchors, and driven piles, this occurred between September 12 and December 16, 2015. In Box 2, which stores data from the tiebeams and drilled piers, this occurred between October 19 and November 16, 2015. We are not sure what caused the data loggers to stop recording and or the reason for the different date ranges.

Load Cells

Seasonal variations are apparent in the plots for all of the load cells with the usual decrease in load seen during the winter months. Loads in Load Cells 1 and 9 have continued to trend downward since 2010. Load Cell 17 has increased slightly compared to past seasonal variations. The many spikes in the plots, especially for Load Cells 1 and 8, occur when one or more of the gauges in a load cell fail to record. Gage 4 in Load Cell 8 failed to record data starting on December 19, 2015, which is why a large decrease is shown in that plot. Table 2 shows which

gages were active in each of the load cells this quarter. A plot of the load cell data is included in Appendix B.

Table 2. Active gages (indicated by check mark) in load cells on the four instrumented anchors.

Load Cell	Gage					
	1	2	3	4	5	6
1	✓			✓	✓	✓
8	✓	✓	✓		✓	✓
9	✓	✓	✓	✓	✓	✓
17	✓	✓	✓	✓	✓	✓

Anchors

Loads recorded for all active strandmeters on the instrumented anchors remained virtually constant this past quarter with the exception of an occasional spike caused by gages failing to record. The plot for Gage 5 on Anchor 1 indicates a continued slight increase this quarter. The magnitude of the load is obviously incorrect since it is unrealistically high. Average loads this quarter for the load cells and active strandmeters are listed in Table 3. We also report the percent change in load from last quarter. Strandmeter gages that have failed are indicated by an "×" in the table.

Table 3. Average strandmeter loads and % change from last quarter, tension loads are positive.

Anchor	Load Cell (kips)	Strandmeter (kips)				
		1	2	3	4	5
1	449.6	-9.9	×	+/- 0	×	2031.5
% change		3.1	×	0	×	0.9
8	333.2	27.6	65.4	-176.8	×	×
% change		-3.2	0.0	0.2	×	×
9	455.0	-19.3	8.3	2.2	194.1	774.5
% change		-0.5	-2.4	4.8	0.0	0.4
17	371.7	-39.7	×	-25.6	×	231.5
% change		35.0	×	7.1	×	-0.5

Driven piles

Axial loads in all driven piles except Pile 1 decreased this quarter with changes ranging from about 16 to 43 kips. The axial load in Pile 1 increased by about 27 kips. The attached plot shows these changes to be sloped straight lines due to the lack of data during the time that the data loggers stopped recording. Since December 6, 2015, the axial load in Pile 1 has been decreasing. The axial load in Pile 34 increased by about 6 kips on December 29, 2015 and has remained constant since then. Axial loads in the remaining driven piles have remained constant since December 6, 2015. Several gages are skipping or recording obviously erroneous data including Gage 2 on Pile 1 and Gage 3 on Pile 17.

Strong axis bending moments in all of the driven piles decreased this quarter. The greatest decrease of 15 kip-feet occurred in Pile 1, and the moment is continuing to decrease. Decreases

in the remaining piles ranged from 2 to 6 kip-feet. Bending moments have remained constant since the beginning of December 2015. Weak axis bending moments this quarter decreased slightly in Piles 1, 17, and 34. Weak axis bending moments in Pile 19 are now included on the plot since the gages appear to be functioning normally again. Changes in weak axis bending moments in Pile 18 and 19 were negligible.

Tiebeams General

Data for all the tiebeams was more stable this quarter. Only a small amount of erratic data was deleted to "clean up" the plots in the attachments. Now a trend can more readily be seen. The following interpretations refer to these trends.

Tiebeams Anchor Side

The axial loads at the anchor end of the tiebeams increased this quarter reflecting seasonal variations like those seen in past years. Axial loads in Tiebeams 1 and 26 increased at a much faster rate than the remaining tiebeams. The greatest increase in strong axis bending moment occurred in Tiebeam 1 which increased by about 2 kip-feet. Strong axis bending moments in the other tiebeams increased slightly or remained the same. Changes in weak axis bending moments were negligible.

Tiebeams Drilled Pier Side

The axial loads at the drilled pier end of the tiebeams also increased this quarter following the seasonal trend. With the exception of Tiebeam 26 axial loads have gradually increased over the past several years. The load in Tiebeam 26 has gradually decreased. A similar trend is apparent in the strong axis bending moments. Weak axis bending moments increased in Tiebeam 1 and decreased in Tiebeam 26. Weak axis bending moments remained about the same in Tiebeams 12, 13, and 14.

Drilled Piers

The profile plots for both instrumented piers suggest a general increase in axial load over most of the length of the piers this quarter. Plots of axial load vs. time show that axial loads are near a seasonal high in Pier 1 and a seasonal low in Pier 9. These load vs. time plots continue to show a gradual increase in axial load over time in both shafts at all depths. Some erratic data was again recorded for the gages at 84 feet in Pier 1. This affects both the axial load and bending moment plots but the data does not appear to indicate a significant change from past trends at this depth.

Bending moments in Pier 1 are changing most at the shallow and deep ends of the pier with moments decreasing over time at 29, 35.5, an 114 feet, and increasing above 22.5 feet and below 74 feet. At depths between 42 and 74 feet the bending moments remain relatively constant. A similar trend occurs in Pier 9 where the bending moments remain relatively constant between 30 and 50 feet and are increasing at all other depths. Changes in Pier 1 this quarter at 16, 22.5, and 29 feet were greater than we have seen in the past.

AGGREGATE STOCKPILES

We observed and photographed the aggregate stockpiles on January 15, 2016. The photos are Figures 4 and 5 which are included in Appendix A. Only a small pile of aggregate closest to the right-of-way fence remains. This pile has been virtually unchanged since January 2014. The pile is about 8 feet high and covers only a small area of the property.

This completes the January 2016 quarterly report for the CUY-90-15.24 Slope Monitoring Project, ODOT PID 96504.

Report prepared by:

Brendan P. Lieske, E.I.
Staff Engineer

Report reviewed by:

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

APPENDIX A
ARRANGEMENT OF INSTRUMENTATION

REVISION	DATE	DESCRIPTION
A	11/21/13	REVISIONS BASED ON INSTRUMENTATION STATUS AFTER COMPLETION OF CCG1.

ADDENDUM	DATE
7	8/2/13
1	4/16/13

HORIZONTAL SCALE IN FEET
0 25 50 100

DRAWN CDS CHECKED JN

INSTRUMENTATION PLAN
CUYAHOGA RIVER WEST BANK

CUY-90-14.90

1 / 4

61 / 93

EX. RR ACCESS RD.
I-002-10
B-037-A-09
P-007-13
B-038-A-09
EX. N-S RAILROAD (ELEVATED TRACK)
Sta. 303+22.92
Sta. 302+22.92
B-05-07
℄ CONSTRUCTION TOWPATH TRAIL
ABBEY AVE.
PR. WALL 3
I-001-10
WEST 15TH ST.
℄ ACCESS RD.
B-05-13
PR. WALL 2
P-005-13
B-037-1-09
B-035-09
EX. WB PIER 3
EX. WB PIER 4
P-009-13
EX. WB PIER 5
DESTROYED
B-05-08
I-003-10
B-110
B-05-16
℄ CONSTRUCTION WB IR 90
B-05-12
B-05-01
PRC Sta. 307+53.15
I-010-12
P-006-13
B-05-02
B-108A
℄ CONSTRUCTION EB IR 90
B-05-11
I-004-10
B-107
PC Sta. 312+78.85
B-203
WEST END PIER NORTH
EX. PIER 1 NORTH
PRC Sta. 309+59.63
P-001-13
B-05-04
P-9N
ABANDONED OCT 2010
LEFT CALIPERED LOCATION
B-204
EX. PIER 1 SOUTH
PR. WALL 3
EX. PIER 2A
RIGHT CALIPERED LOCATION
I-008-10
PT Sta. 312+87.39
EX. DOCK WALL
EX. DRILLED SHAFT CAP
P-004-13
B-105A
B-105
EX. PIER 1A
B-303
PT Sta. 313+42.10
EX. ANCHOR CAP
EX. BURIED SHORING
EX. WEST END PIER SOUTH
B-05-03
CUYAHOGA RIVER
B-101
B-102
P-003-13
P-002-13
WEST 13TH ST.
PT
UNIVERSITY RD.
PR. WALL 2

LEGEND

P-001-13 — LOCATION OF PIEZOMETER AND/OR INCLINOMETER. THE LOCATION OF EACH INCLINOMETER IS WITHIN 5 FEET OF THE LOCATION OF THE PIEZOMETER.

B-05-01 — LOCATION OF INCLINOMETER/PIEZOMETER INSTALLED BY BBCM IN 2006 (B-05-01 THROUGH B-05-04, B-05-07, B-05-08, B-05-11 THROUGH B-05-13, AND B-05-16). THESE INSTRUMENTS ARE NOT AFFECTED BY THE GRADING AND REMAIN IN SERVICE.

B-105A — LOCATION OF REPLACEMENT INCLINOMETER INSTALLED BY BBCM IN 2006 (B-105A AND B-108A).

B-101 — LOCATION OF INCLINOMETER AND/OR PIEZOMETER INSTALLED BY BBCM BETWEEN 1994 AND 1999 (B-101, B-102, B-105, B-107, B-203, B-204, B-303, AND P-9N).

B-110 — LOCATION OF INCLINOMETER AT B-110, WHICH WAS DESTROYED BY EXCAVATION ACTIVITIES IN MARCH, 2006

I-010-12 — LOCATION OF INCLINOMETER INSTALLED DURING PIER 3 CONSTRUCTION, 2012

7 — LOCATION OF EXISTING INCLINOMETER AND/OR PIEZOMETER (I-001-10 THROUGH I-004-10 & I-008-10 AND P-001-10 THROUGH P-004-10 & P-008-10 INSTALLED AS PART OF THE CCG1 CONTRACT). THE LOCATION OF EACH PIEZOMETER IS WITHIN 5 FEET OF THE LOCATION OF THE INCLINOMETER. DEVELOPER IS RESPONSIBLE FOR THE REPLACEMENT INSTRUMENTATION, IF DAMAGED. (NOT USED: I-005-10 THROUGH I-007-10 & I-009-10 AND P-005-10 THROUGH P-007-10 & P-009-10).

I-001-10

A — LOCATION OF ABANDONED/DESTROYED INCLINOMETER AND/OR PIEZOMETER (B-05-01, B-05-12, B-05-16, B-035-0-09, B-037-1-09, AND B-037-A-09, B-038-A-09, B-107, B-108A, B-203, B-204, B-05-08)

INCLINOMETER AND/OR PIEZOMETER TO BE REPLACED. THE FUTURE INSTALLATION WILL HAVE THE SAME DESIGNATION PRECEDED BY LETTER 'A' (B-05-02, B-05-04, B-107, I-003-10)

NOTE:
THE DEVELOPER NEEDS TO PROTECT ALL THE INSTRUMENTS AND REPLACE ANY IF DAMAGED, PER SCOPE REQUIREMENTS.

P:\82119\geotechnical\sheets\82119ZP410 Addendum 7 - Revision A.dgn 11/21/2013 8:08:35 AM csteck

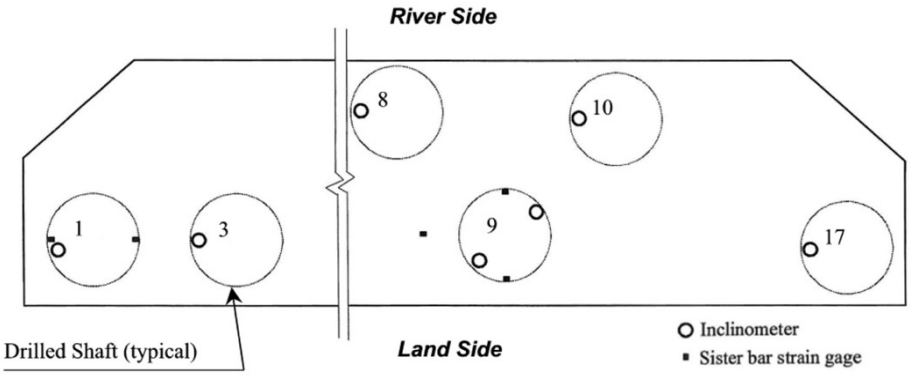


Figure 2. Pier cap with the location of inclinometers and strain gauges.

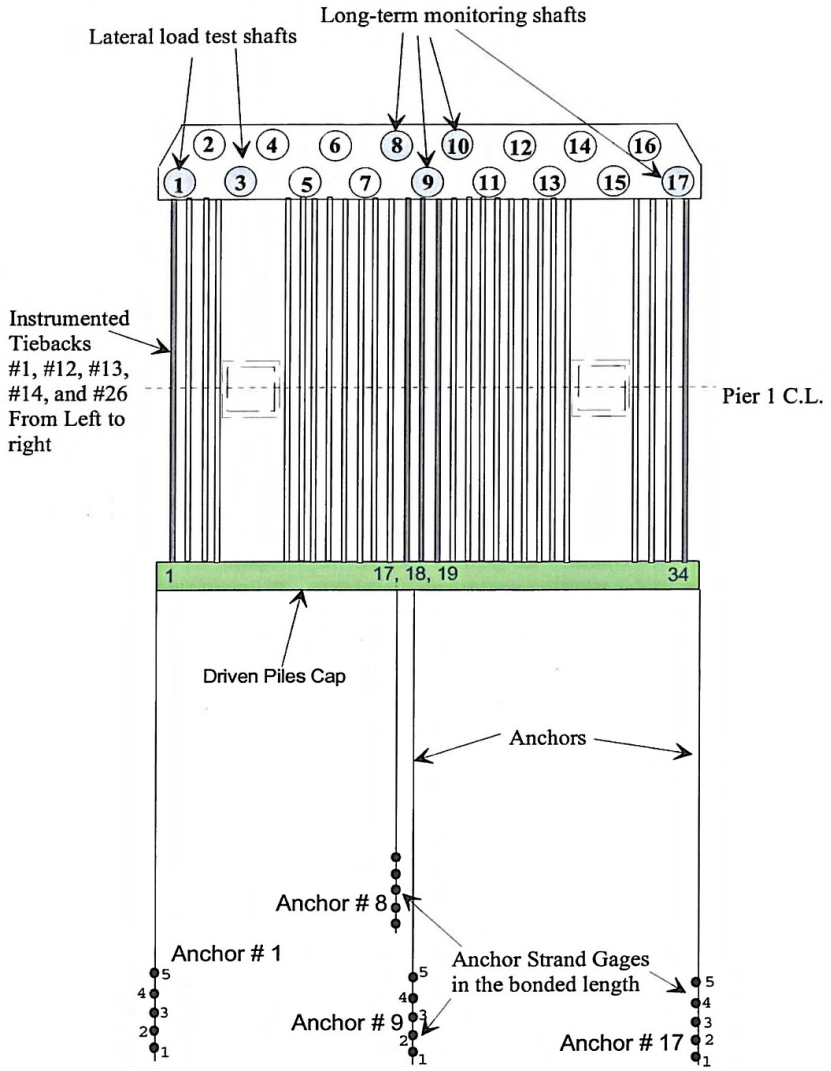


Figure 3. Plan of the stabilization system showing the locations of the instrumented foundation elements.

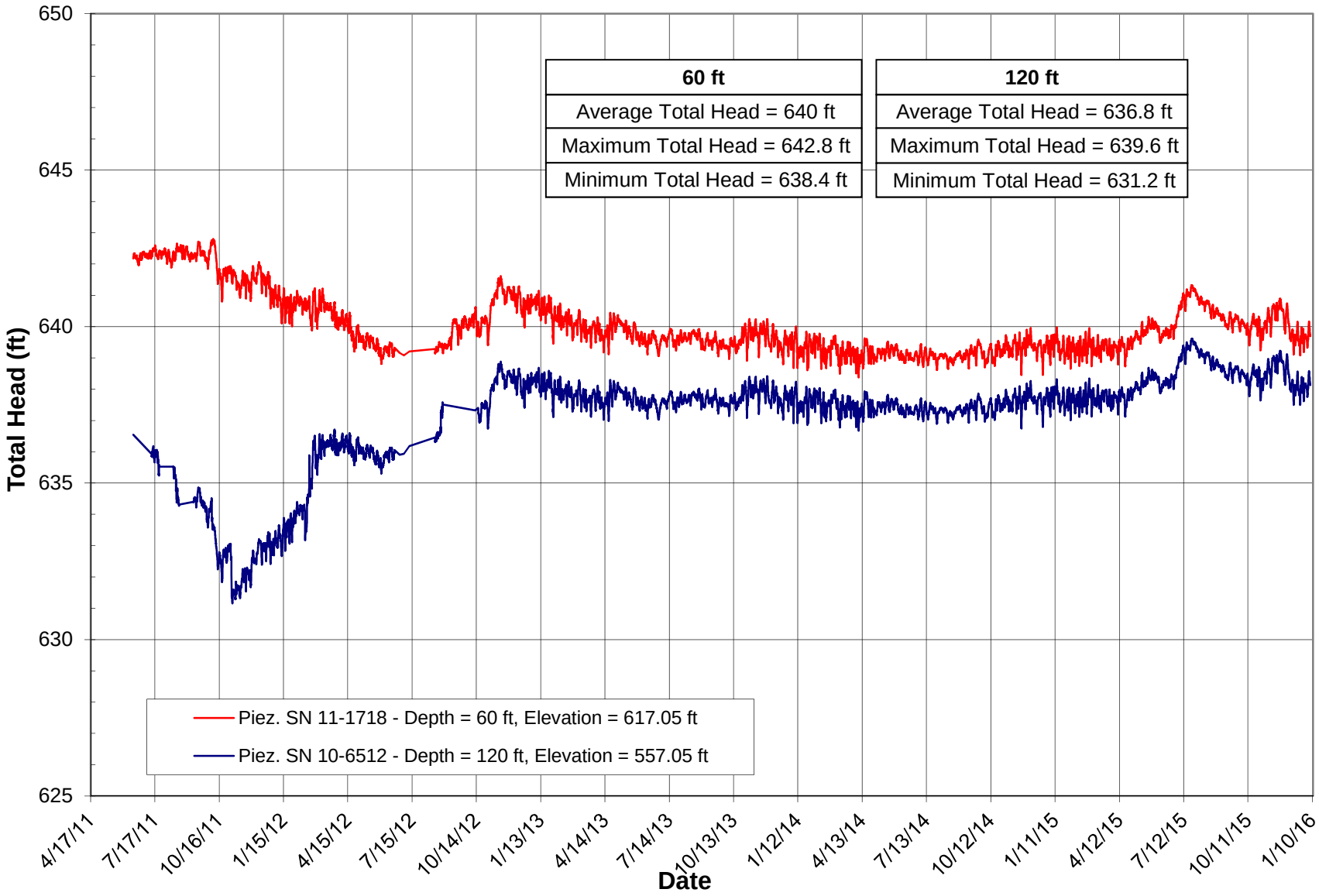
Figure 4. Aggregate stockpile east of the ODOT right-of-way (January 15, 2016)

Figure 5. Aggregate stockpile near ODOT's east right-of-way fence (January 15, 2016)

APPENDIX B
PLOTS OF INSTRUMENT READINGS
DISCUSSED IN THE REPORT

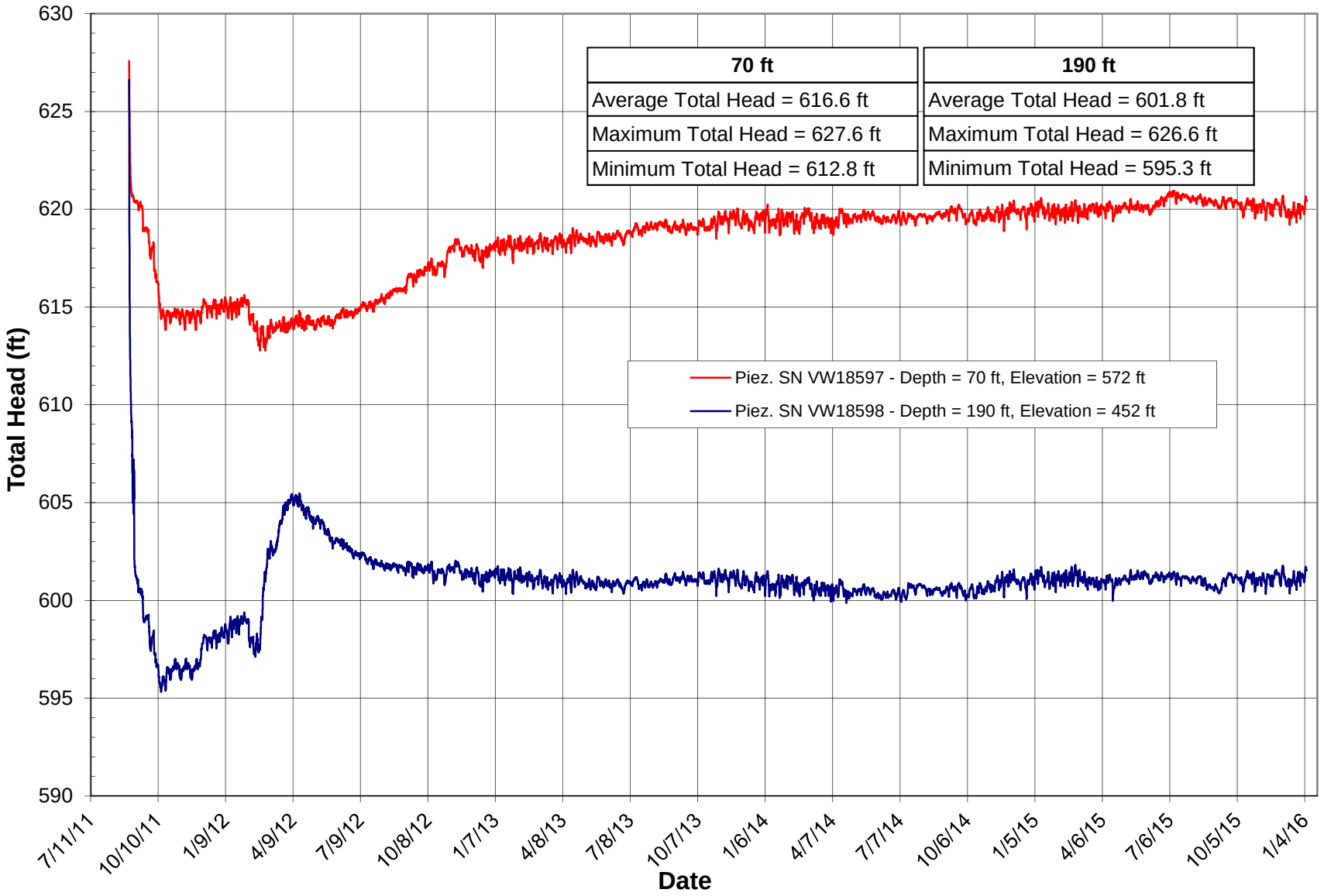
P-001-10 VW Piezometer Readings

Ground surface elevation = 677.05 ft



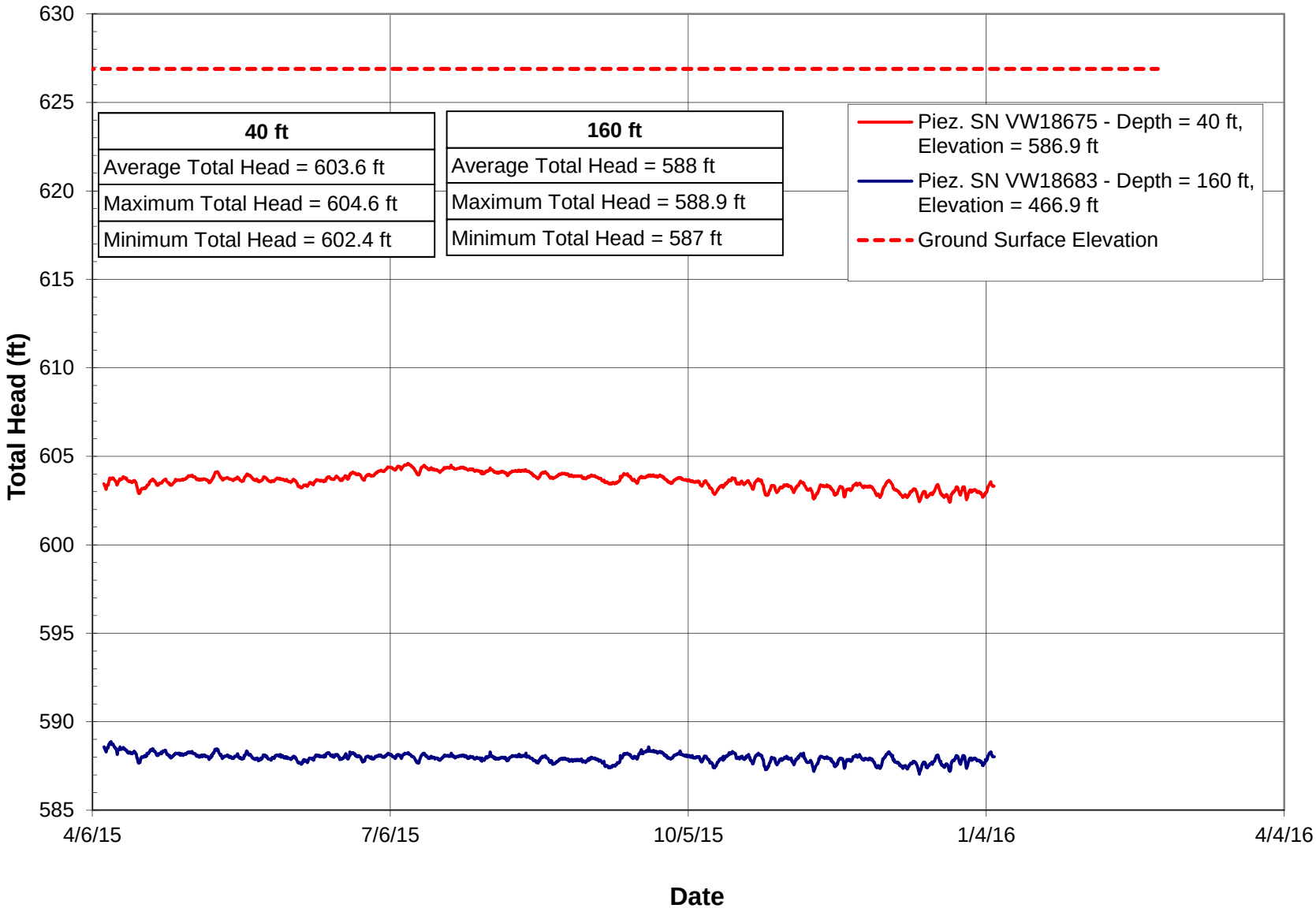
P-002-10 VW Piezometer Readings

Ground surface elevation = 644 ft



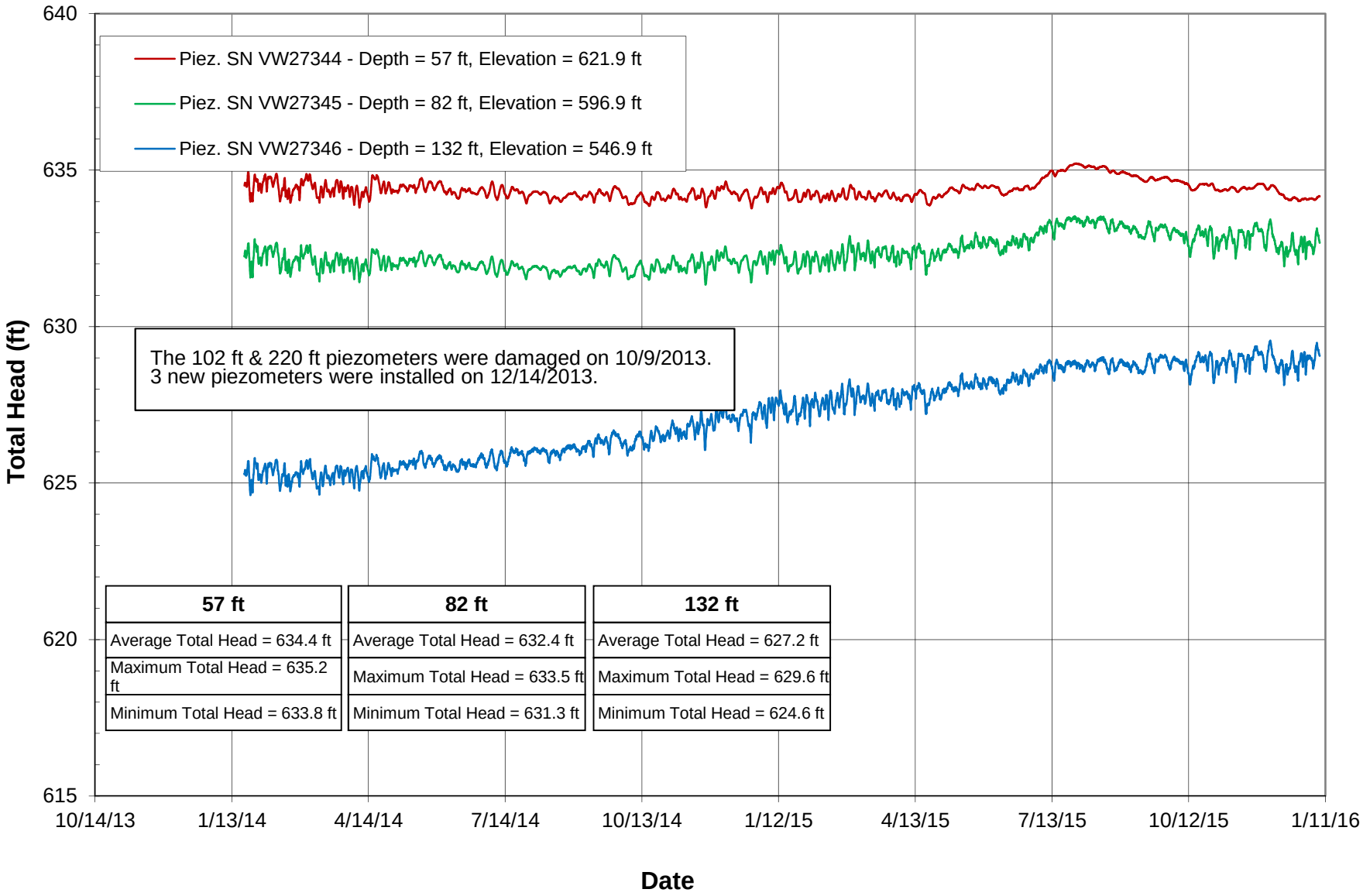
P-007-13 VW Piezometer Readings

Ground surface elevation = 626.9 ft



B-05-07 VW Piezometer Readings

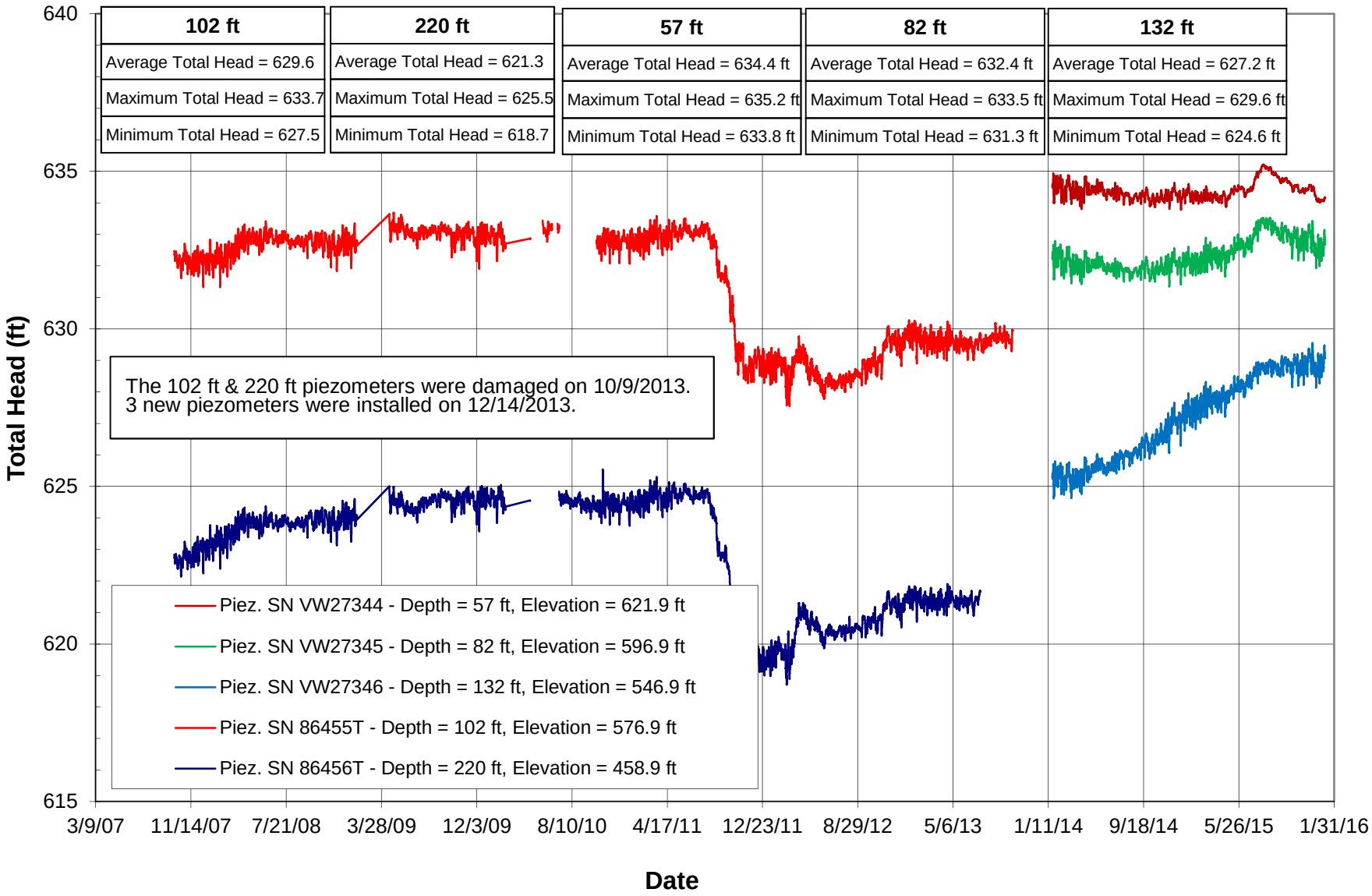
Ground surface elevation = 678.9 ft



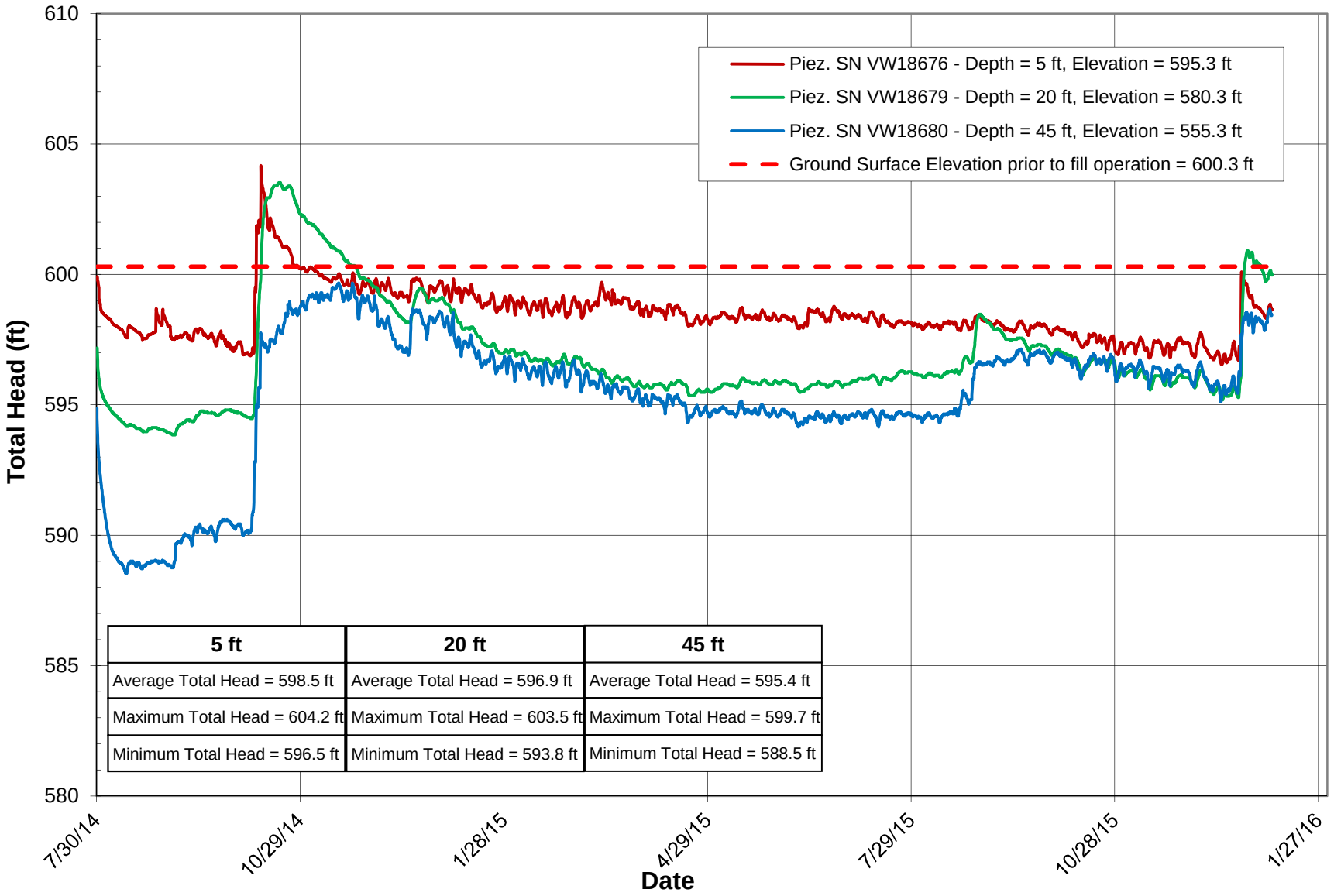
57 ft	82 ft	132 ft
Average Total Head = 634.4 ft	Average Total Head = 632.4 ft	Average Total Head = 627.2 ft
Maximum Total Head = 635.2 ft	Maximum Total Head = 633.5 ft	Maximum Total Head = 629.6 ft
Minimum Total Head = 633.8 ft	Minimum Total Head = 631.3 ft	Minimum Total Head = 624.6 ft

B-05-07 VW Piezometer Readings

Ground surface elevation = 678.9 ft



TGR P-3 VW Piezometer Readings



5 ft	20 ft	45 ft
Average Total Head = 598.5 ft	Average Total Head = 596.9 ft	Average Total Head = 595.4 ft
Maximum Total Head = 604.2 ft	Maximum Total Head = 603.5 ft	Maximum Total Head = 599.7 ft
Minimum Total Head = 596.5 ft	Minimum Total Head = 593.8 ft	Minimum Total Head = 588.5 ft

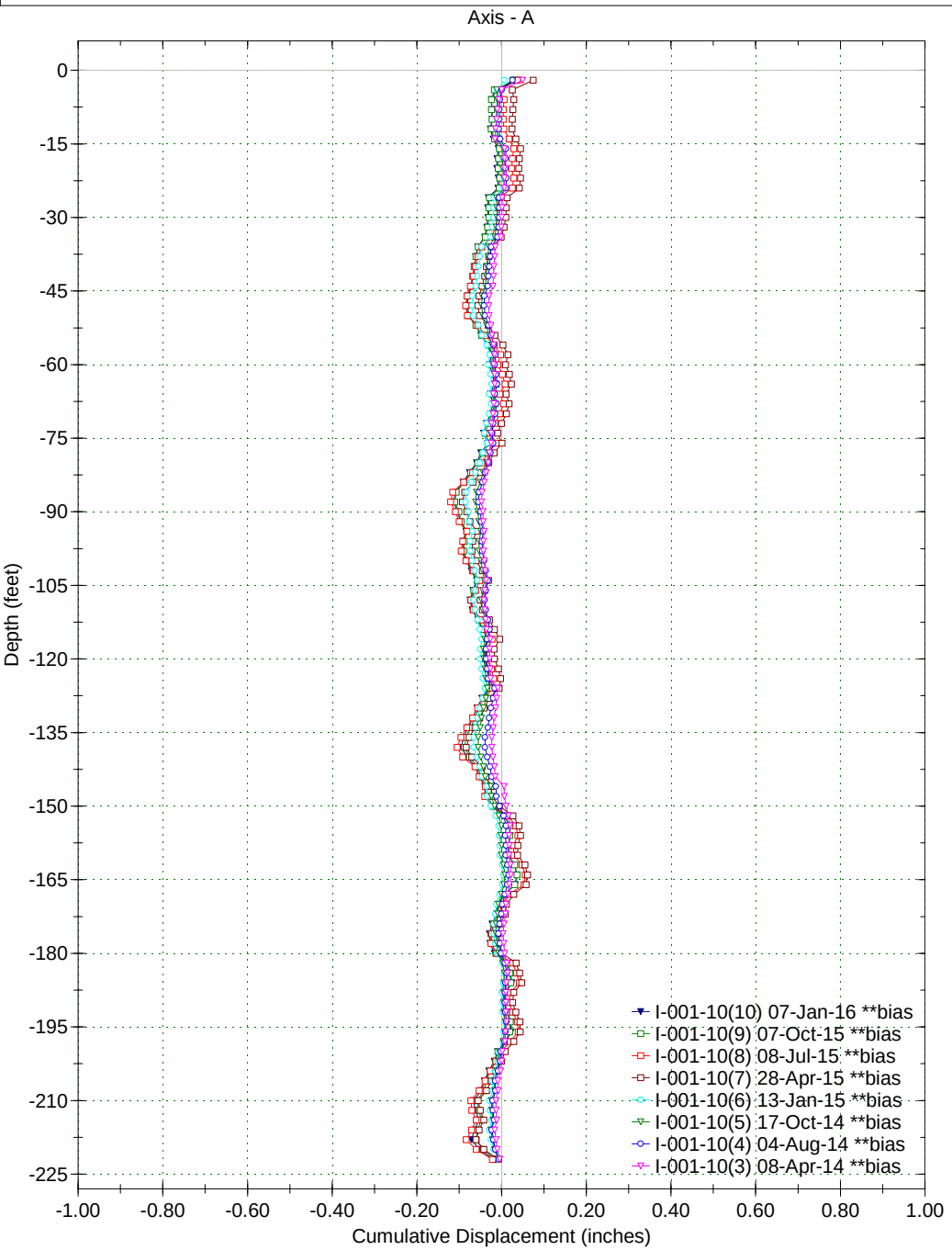
RST Instruments Ltd.

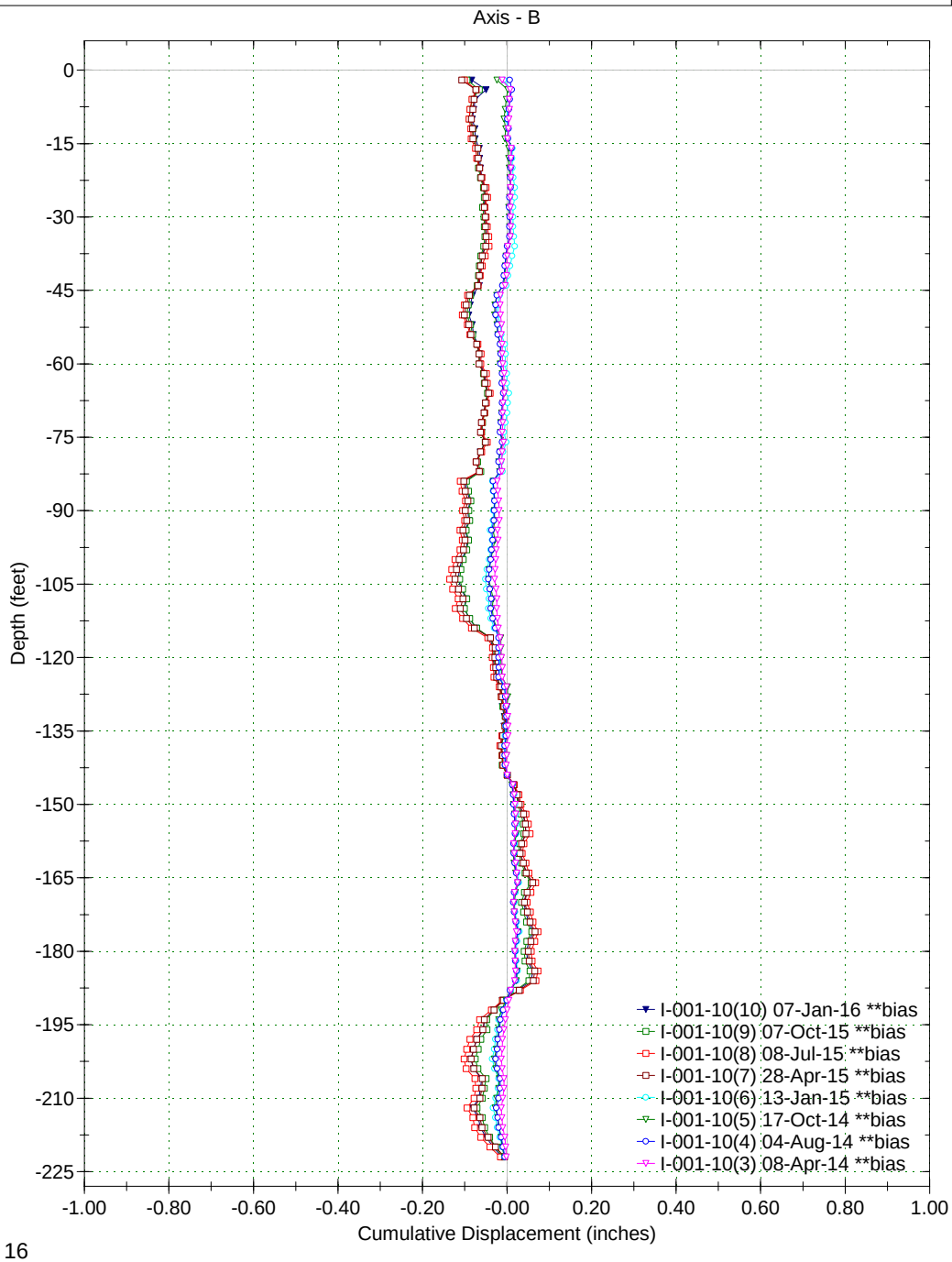
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

Borehole : I-001-10
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing : 663346.19
Easting : 2189917.266
Collar :

Spiral Correction : N/A
Collar Elevation : 0.0 feet
Borehole Total Depth : 222.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 10 07:36
Applied Azimuth : 0.0 degrees





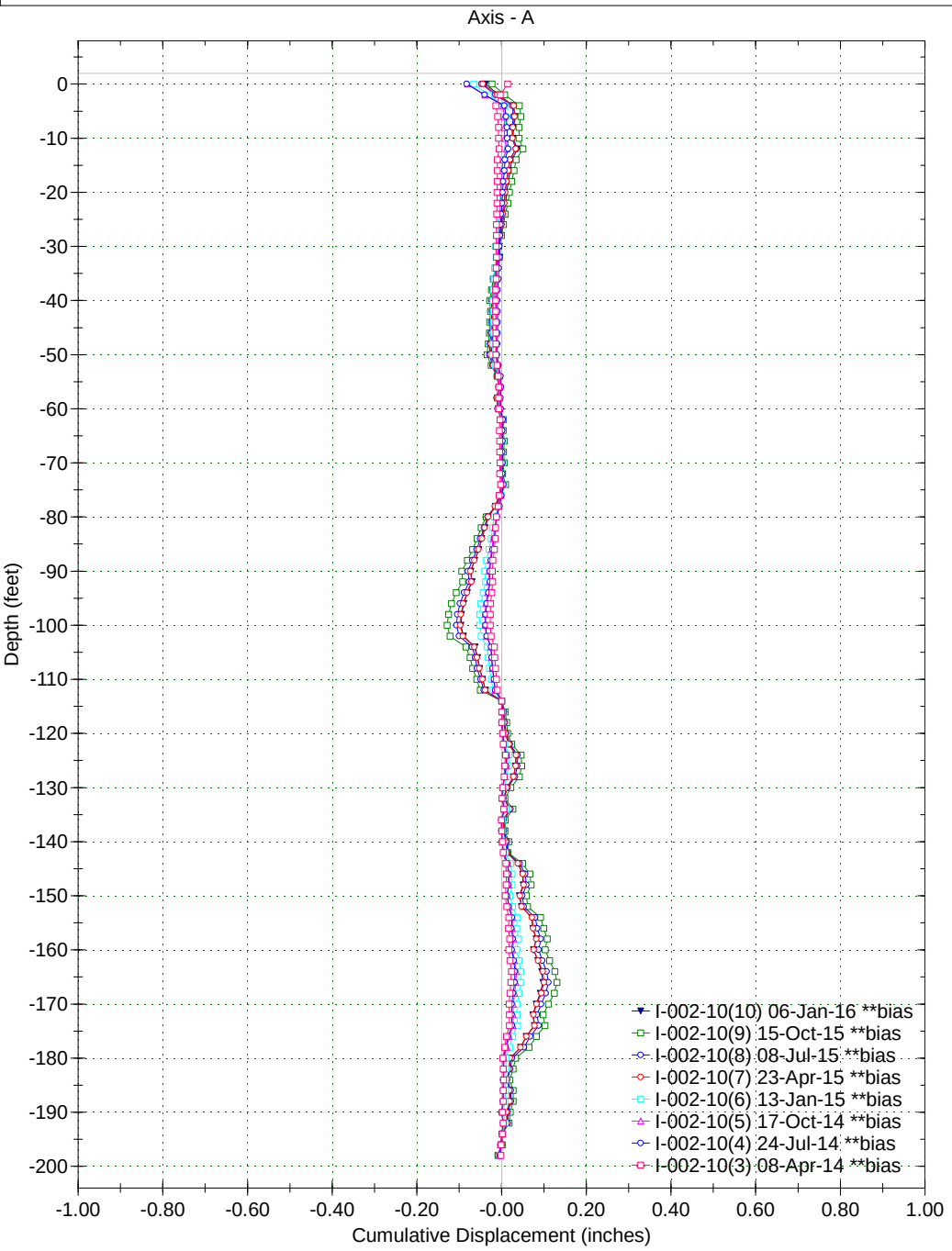
RST Instruments Ltd.

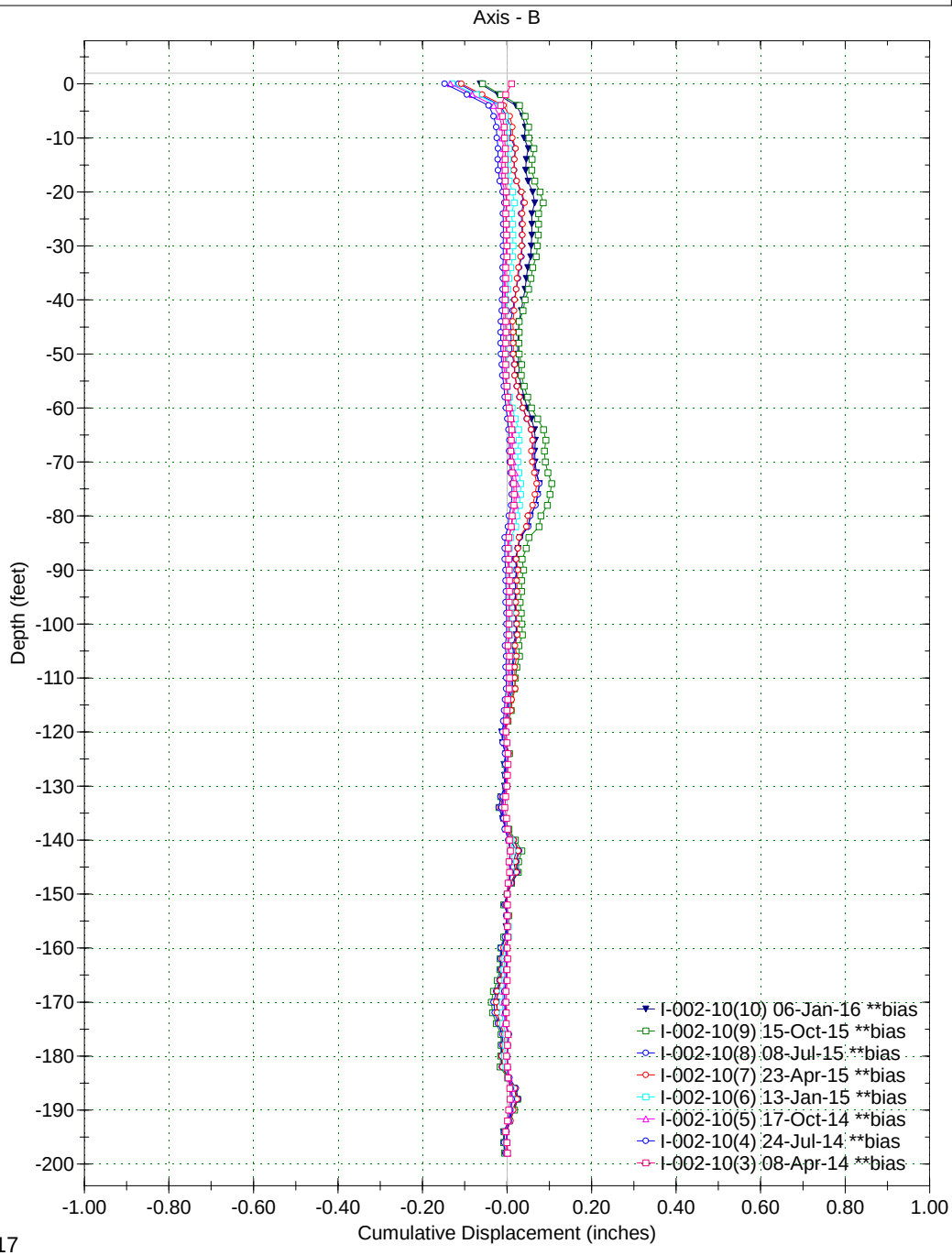
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

Borehole : I-002-10
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing : 663622.262
Easting : 2189778.413
Collar :

Spiral Correction : N/A
Collar Elevation : 2.0 feet
Borehole Total Depth : 200.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 09 09:59
Applied Azimuth : 0.0 degrees





RST Instruments Ltd.

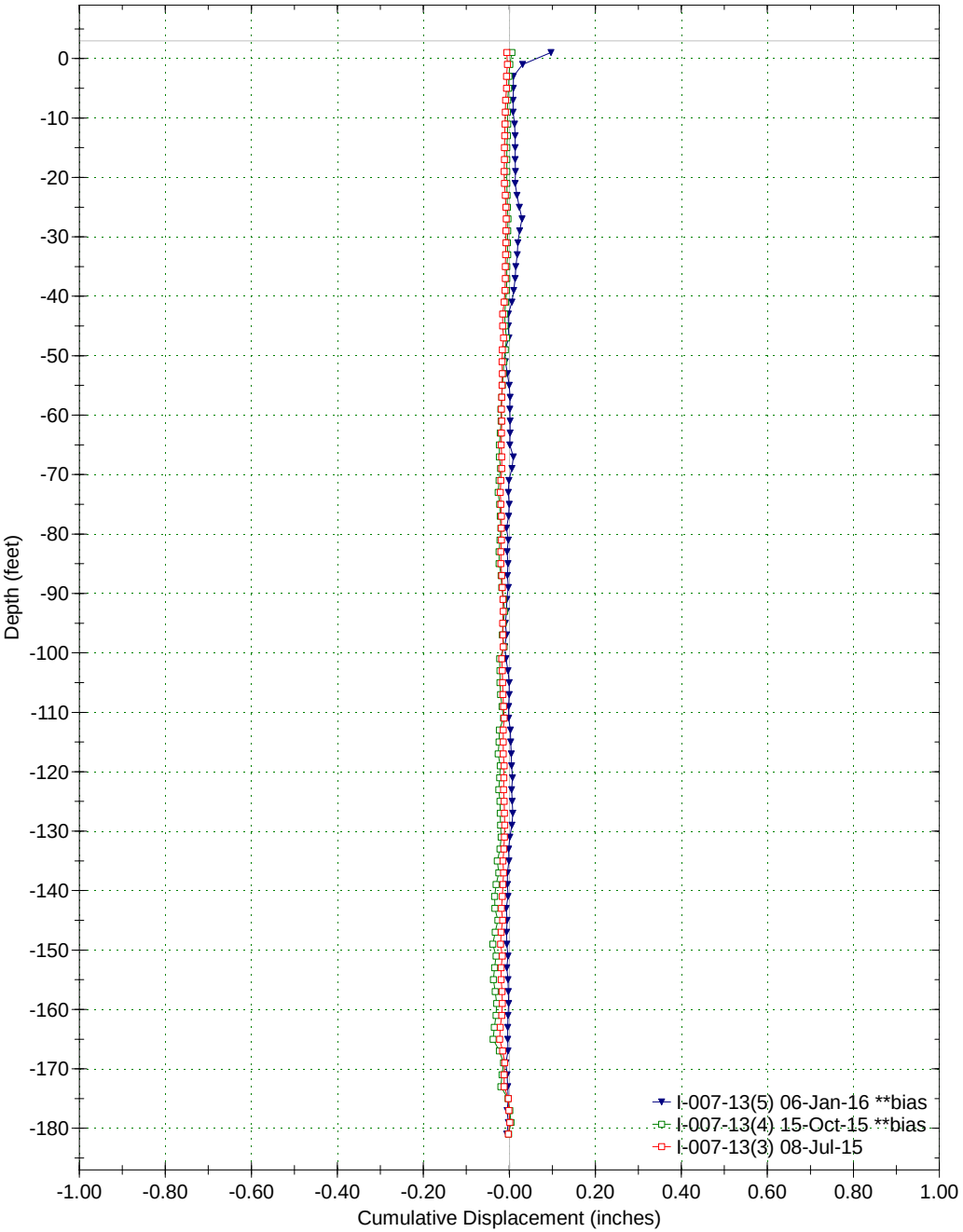
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

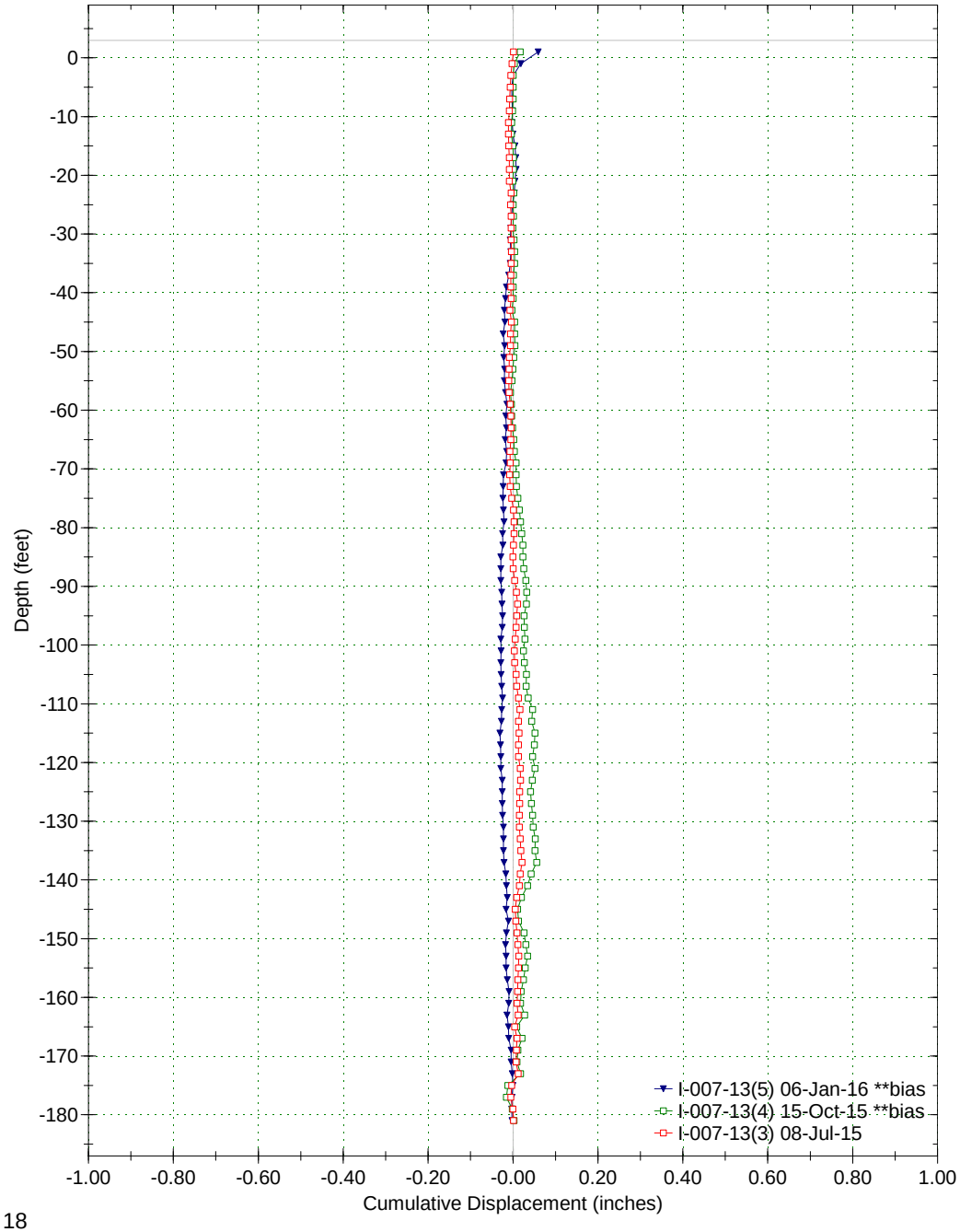
Borehole : I-007-13
Project : CUY-90-15-24
Location :
Northing :
Easting :
Collar :

Spiral Correction : N/A
Collar Elevation : 3.0 feet
Borehole Total Depth : 184.0 feet
A+ Groove Azimuth :
Base Reading : 2015 Apr 28 15:31
Applied Azimuth : 0.0 degrees

Axis - A



Axis - B



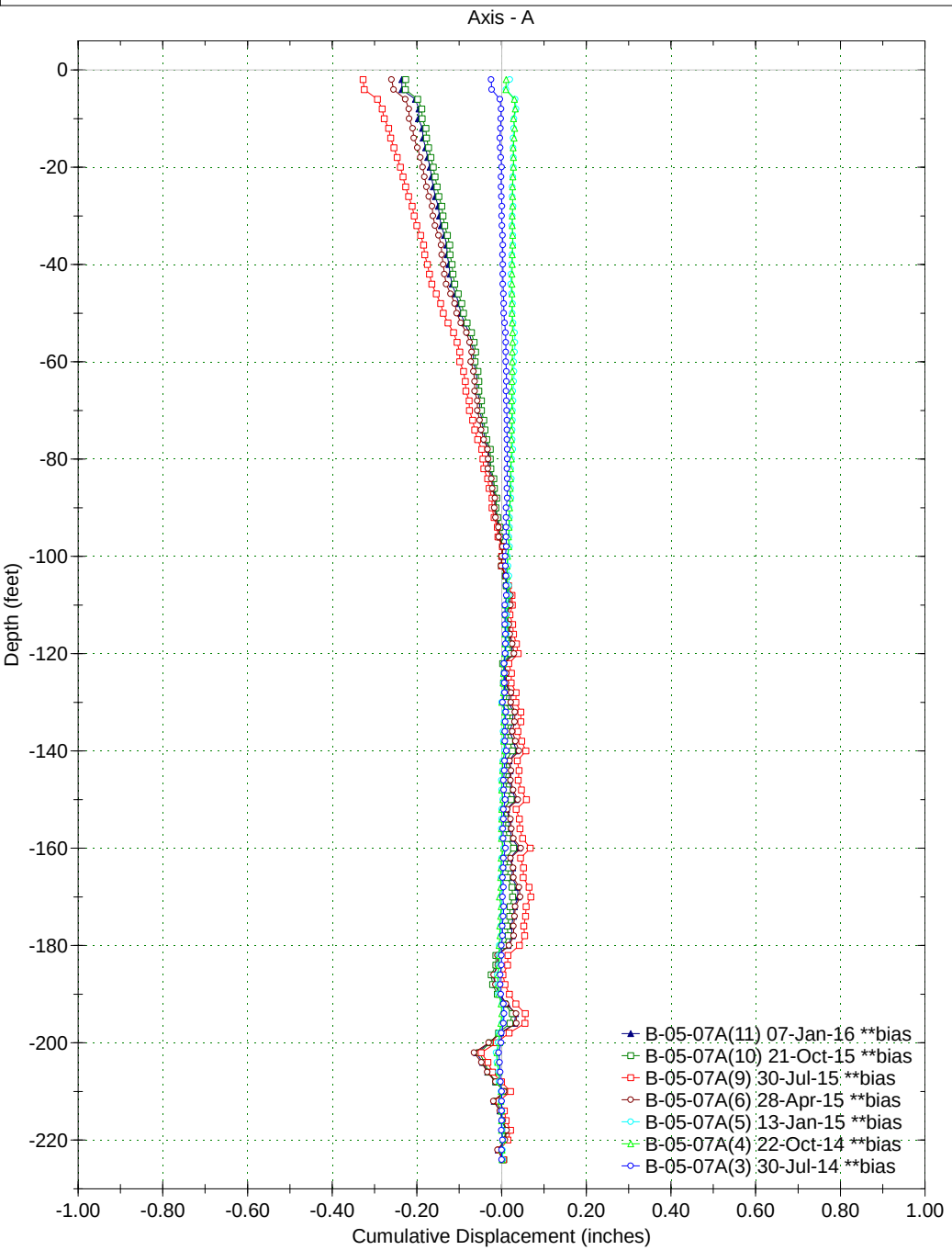
RST Instruments Ltd.

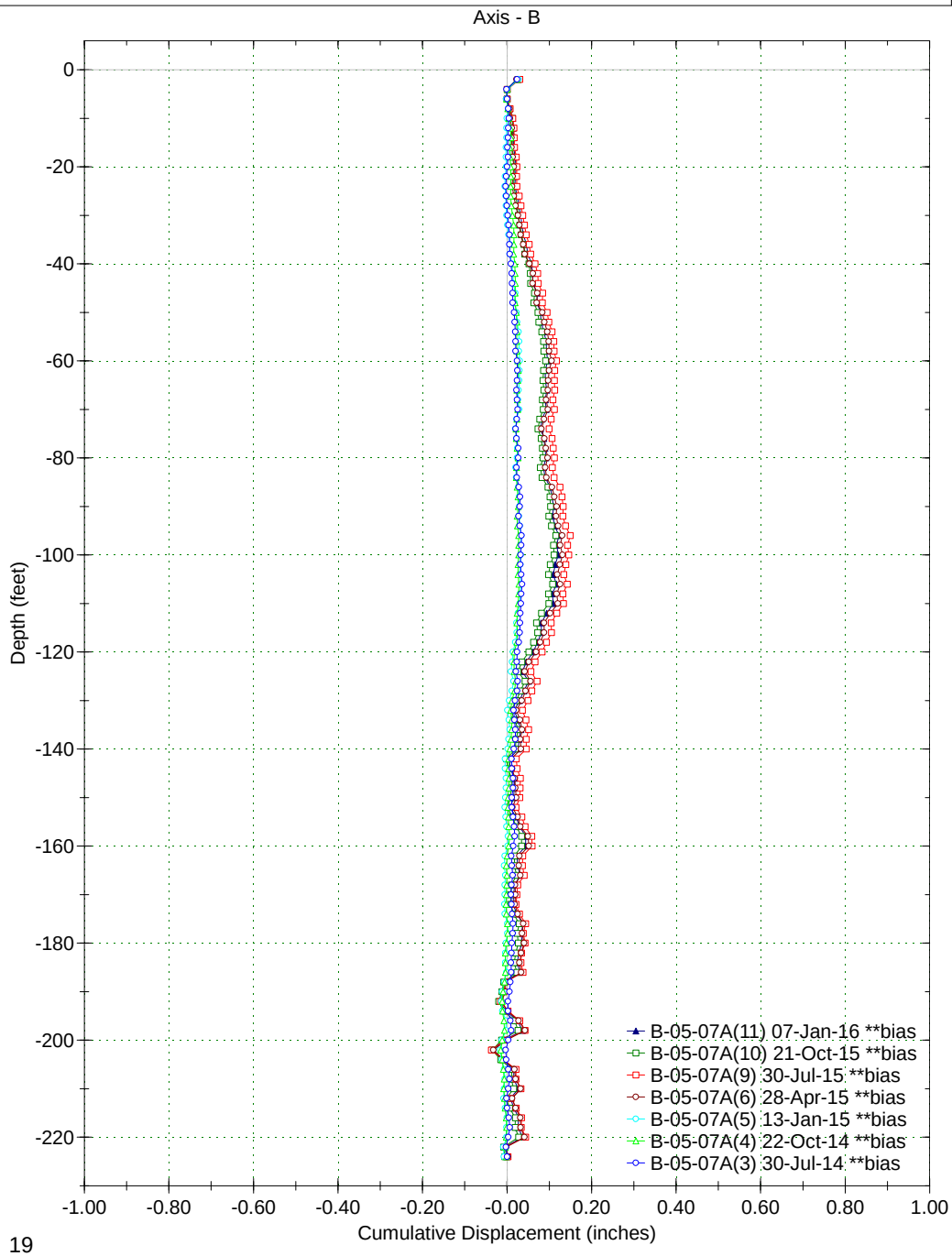
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

Borehole : B-05-07A
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing : 663369.991
Easting : 2189805.799
Collar :

Spiral Correction : N/A
Collar Elevation : 0.0 feet
Borehole Total Depth : 224.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Apr 11 09:50
Applied Azimuth : 0.0 degrees





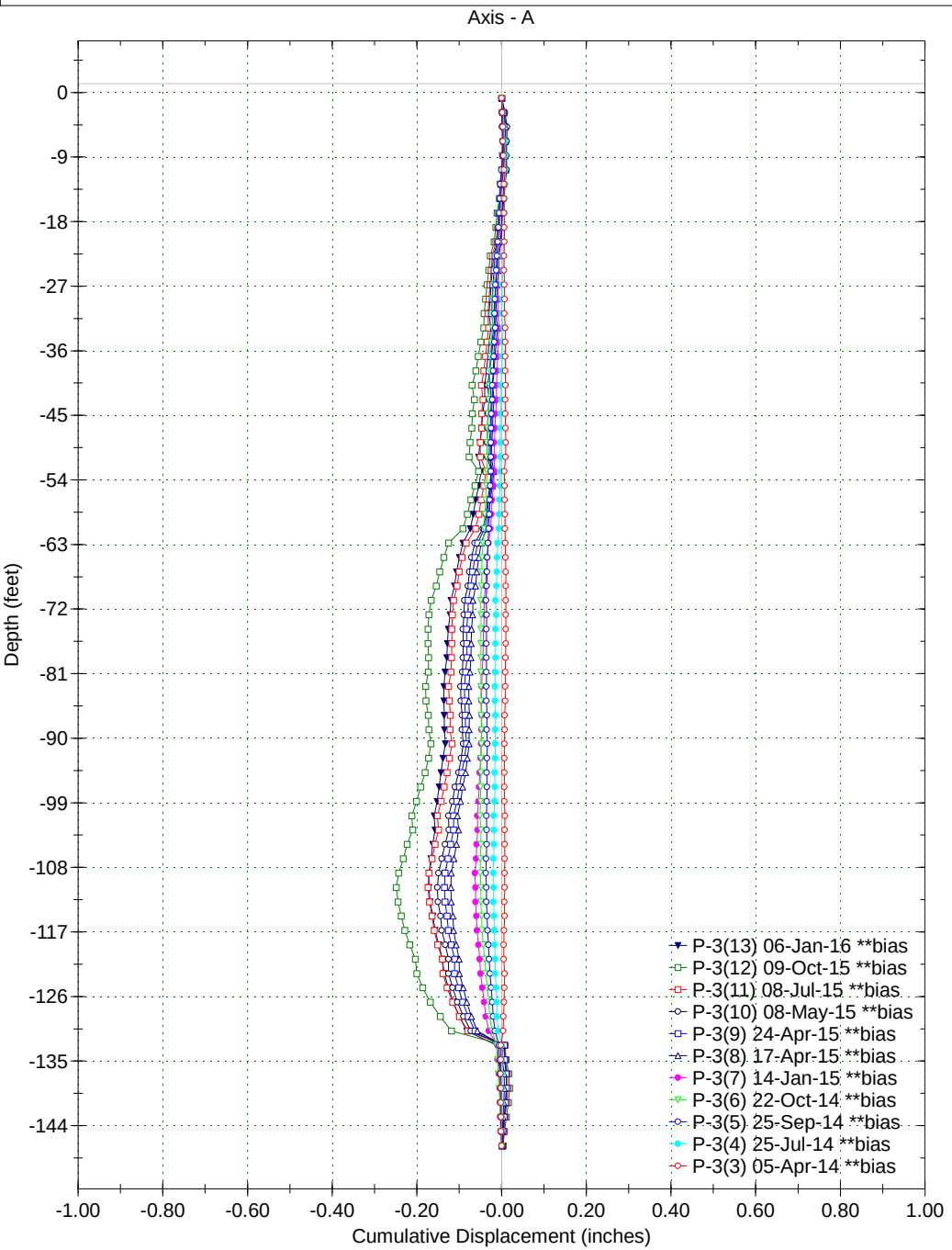
RST Instruments Ltd.

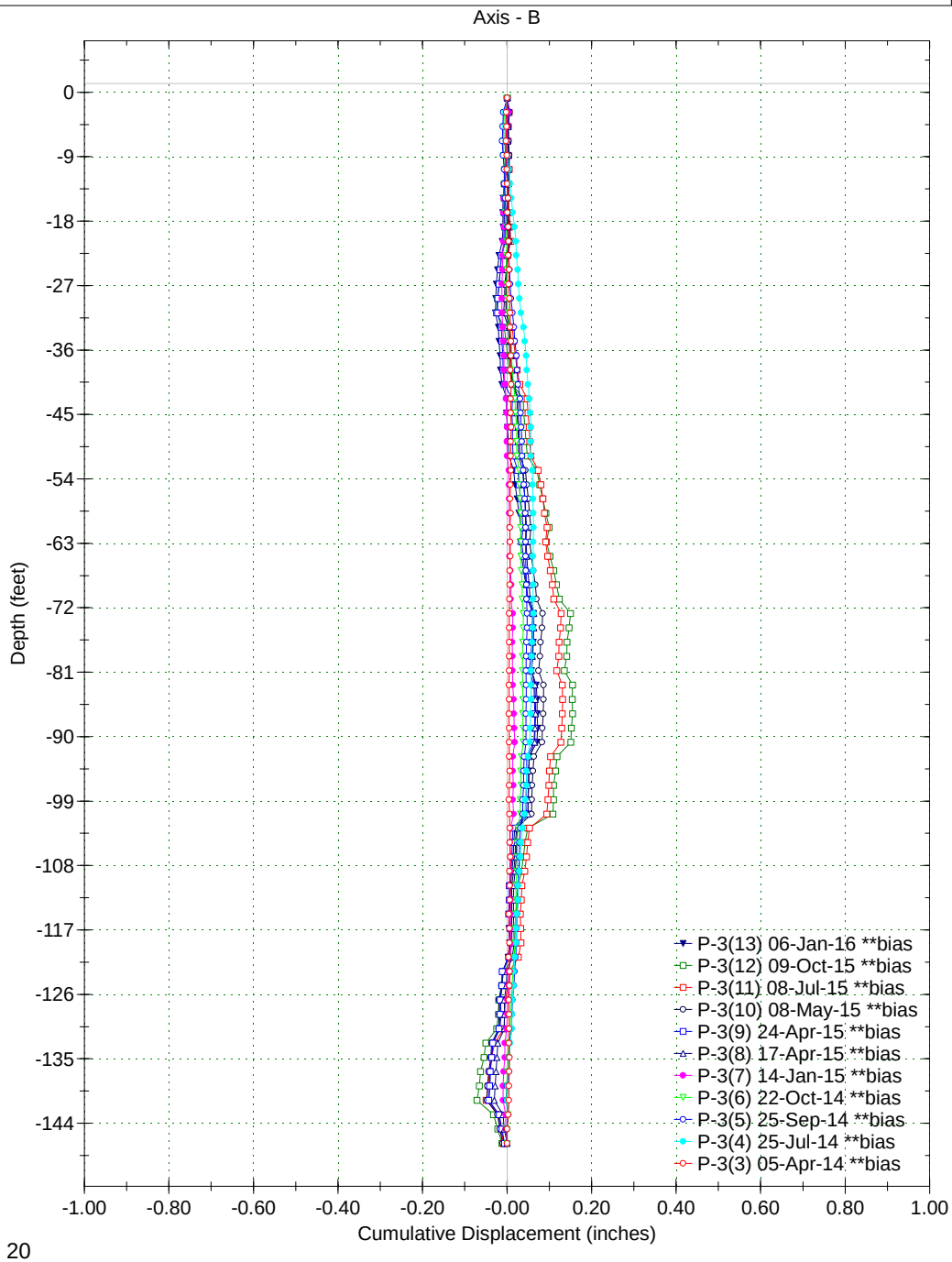
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

Borehole : P-3
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 21 10:48
Applied Azimuth : 0.0 degrees





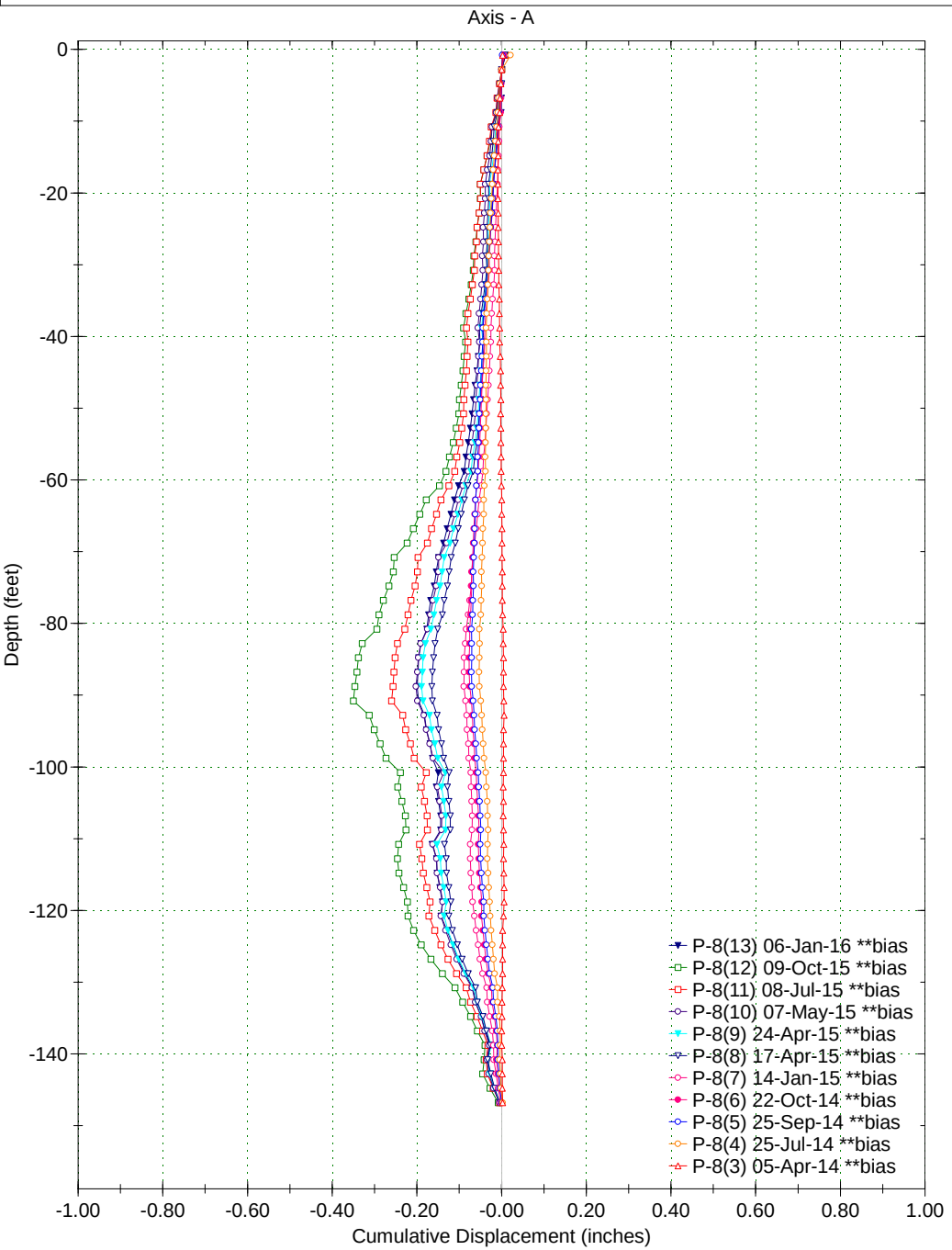
RST Instruments Ltd.

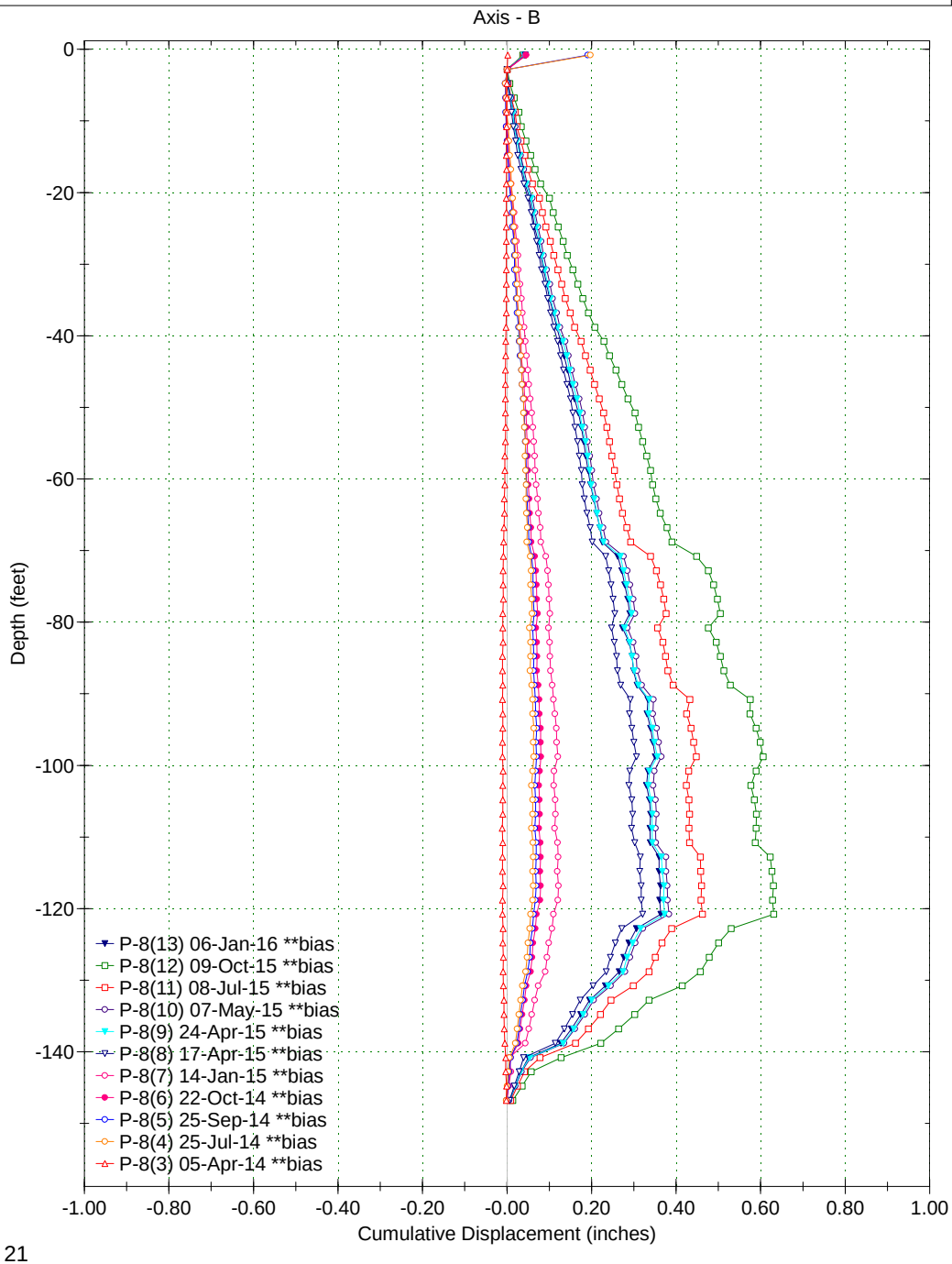
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

Borehole : P-8
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 16 10:23
Applied Azimuth : 0.0 degrees





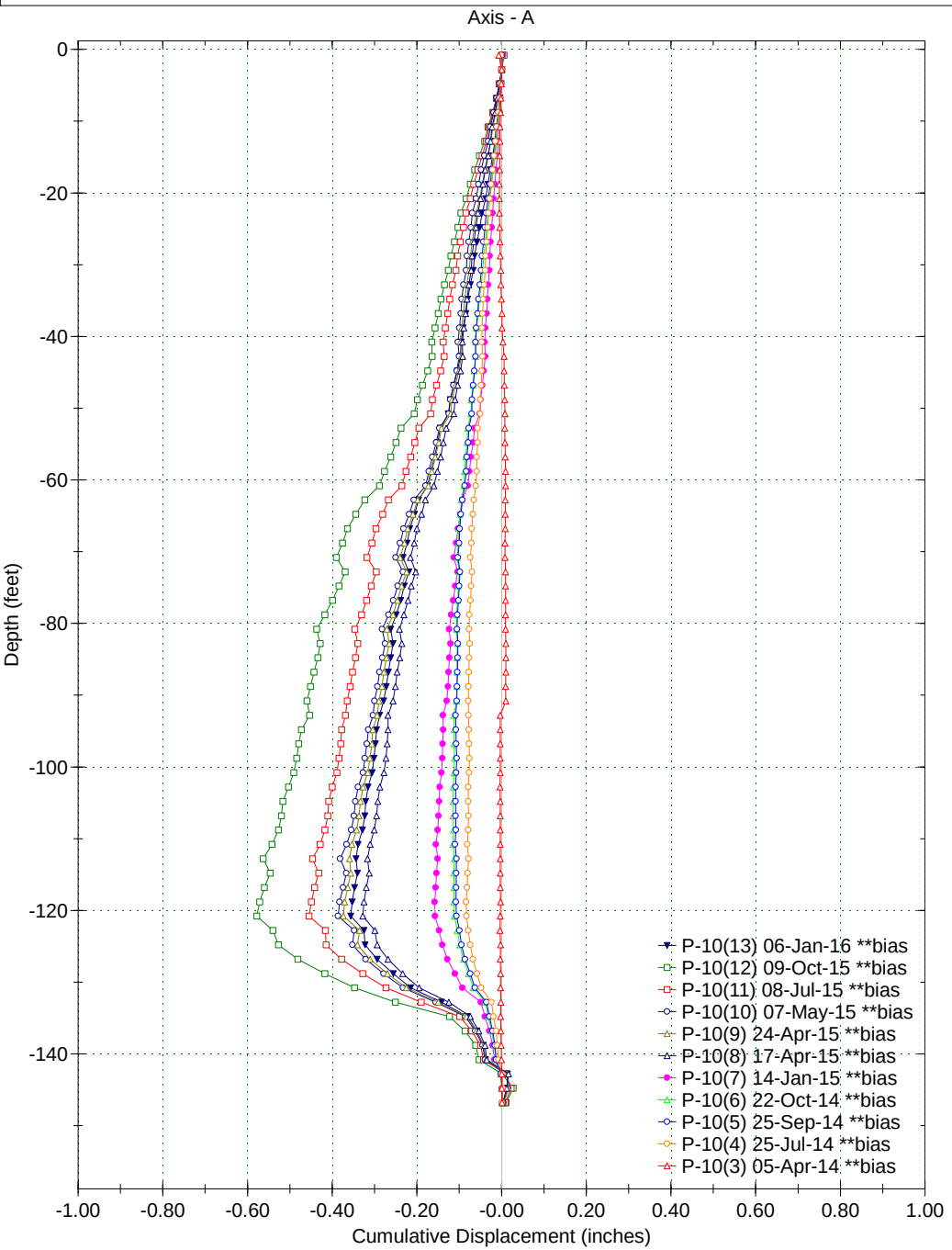
RST Instruments Ltd.

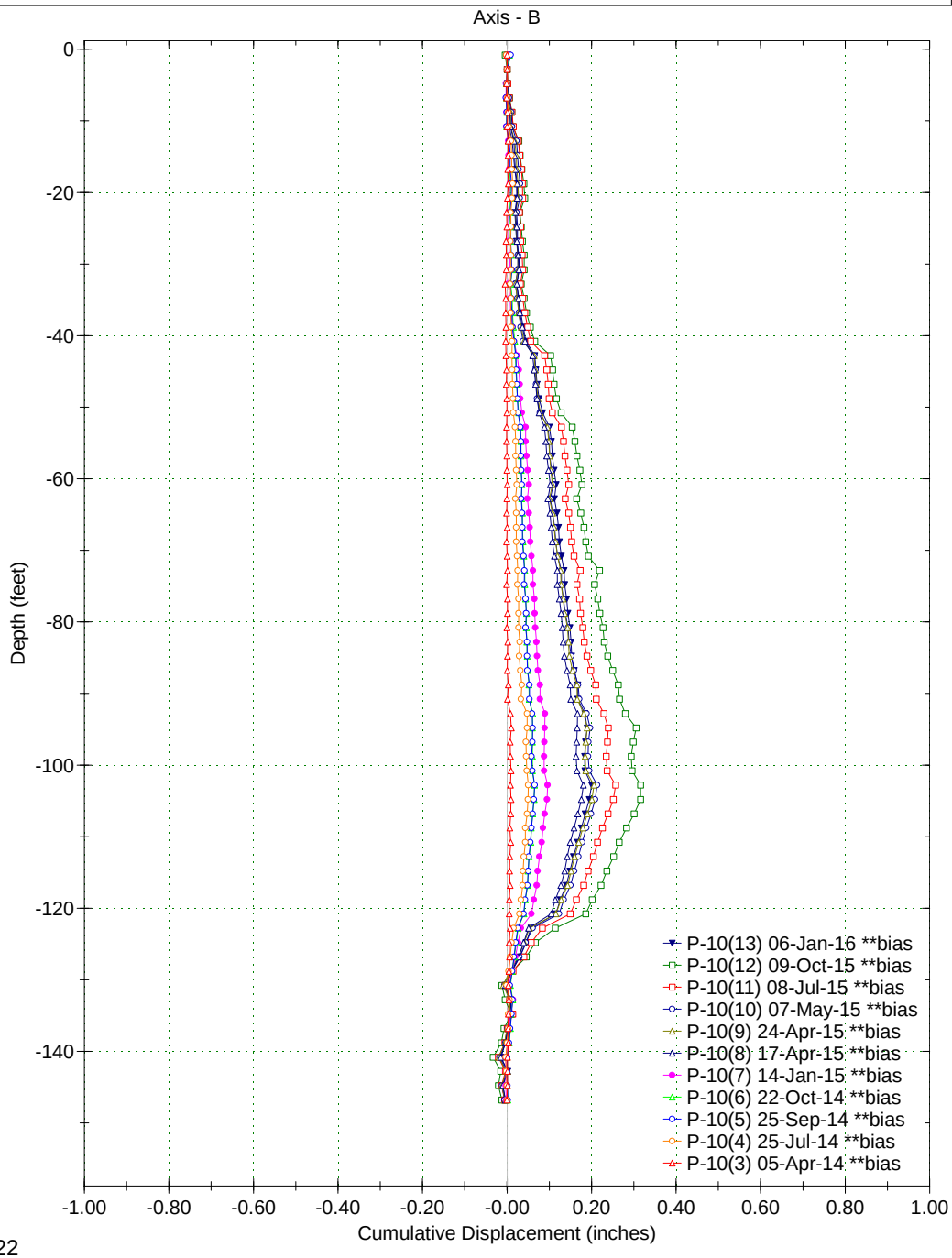
CUMULATIVE DISPLACEMENT

Inclinalysis v. 2.47.5

Borehole : P-10
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 16 06:45
Applied Azimuth : 0.0 degrees





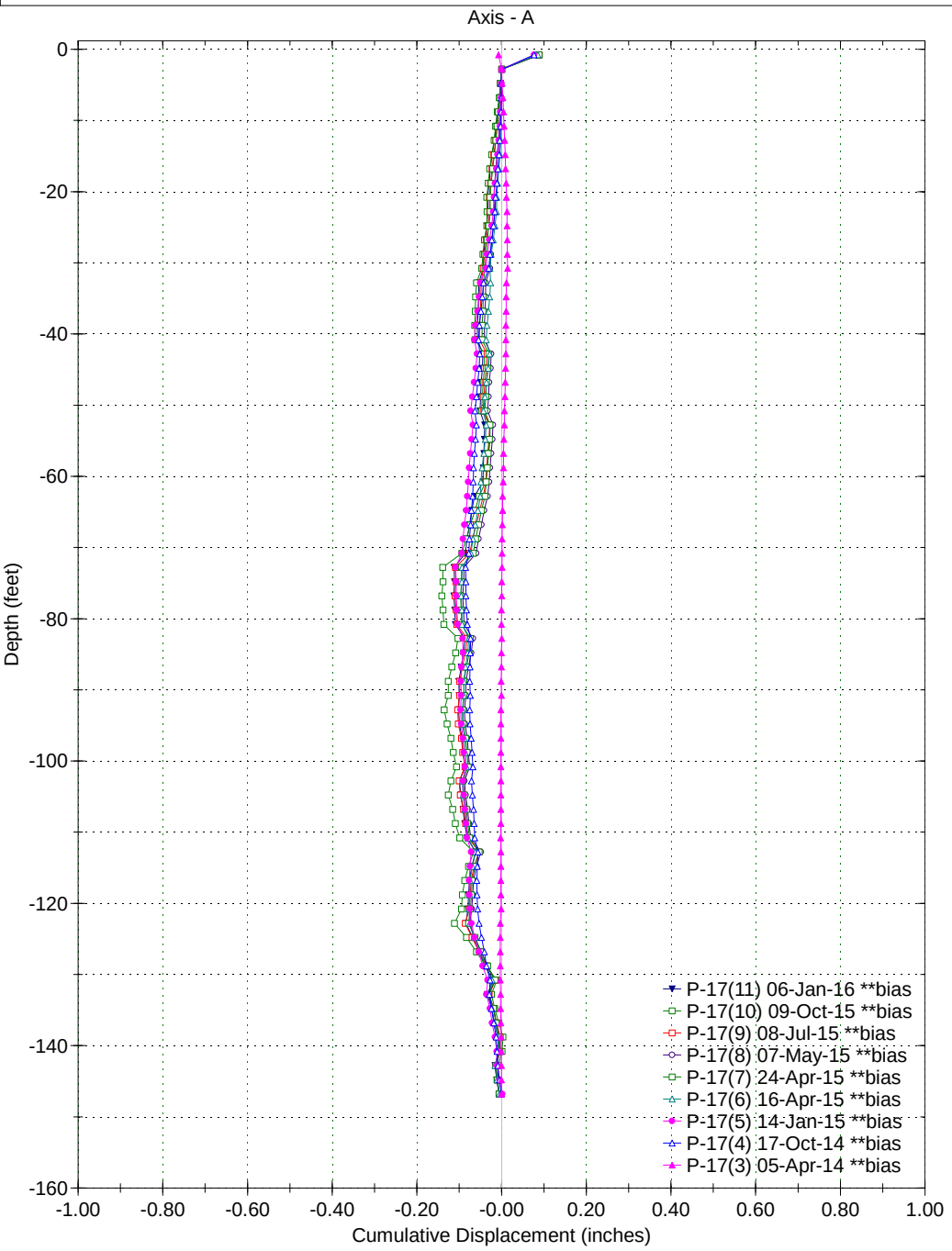
RST Instruments Ltd.

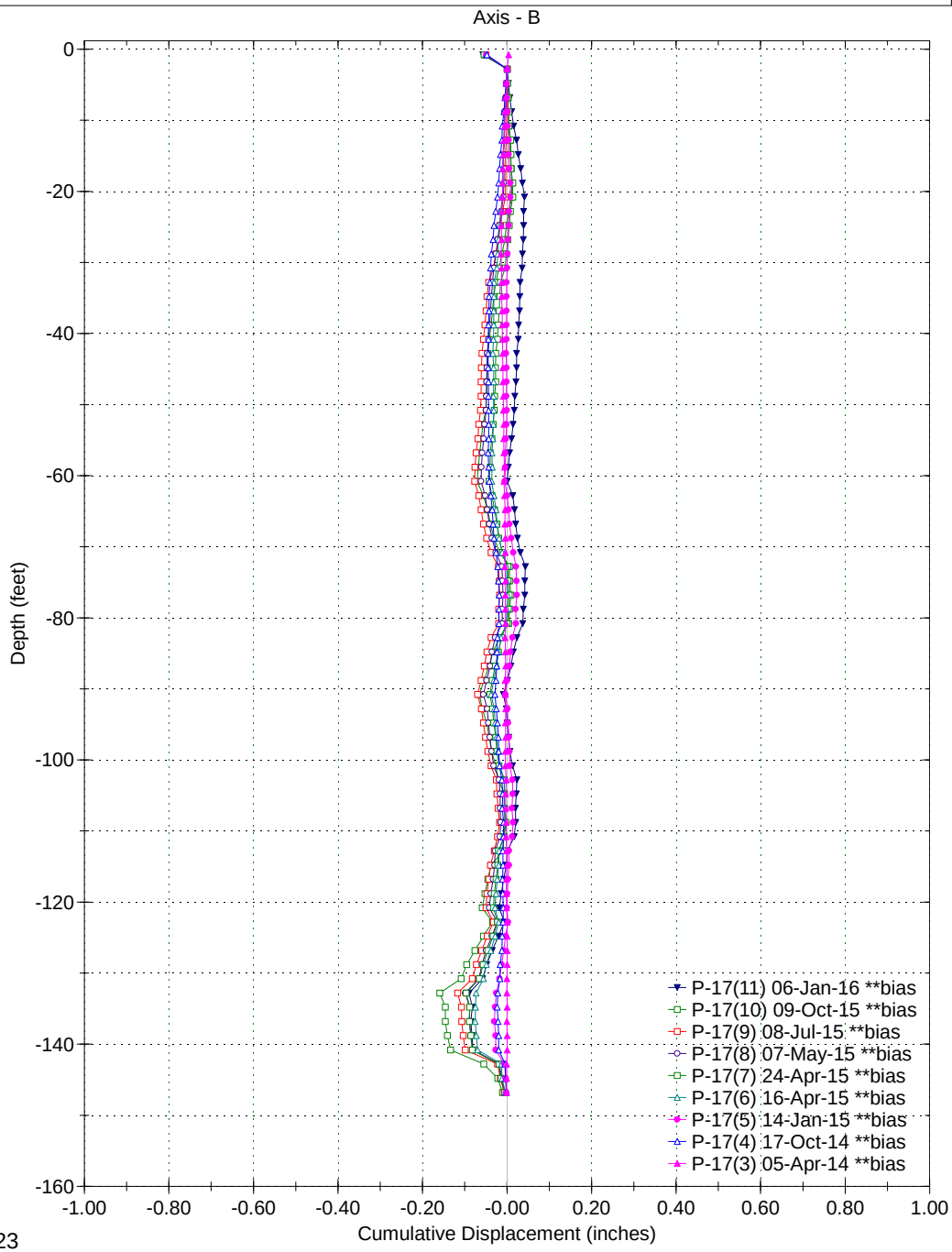
CUMULATIVE DISPLACEMENT

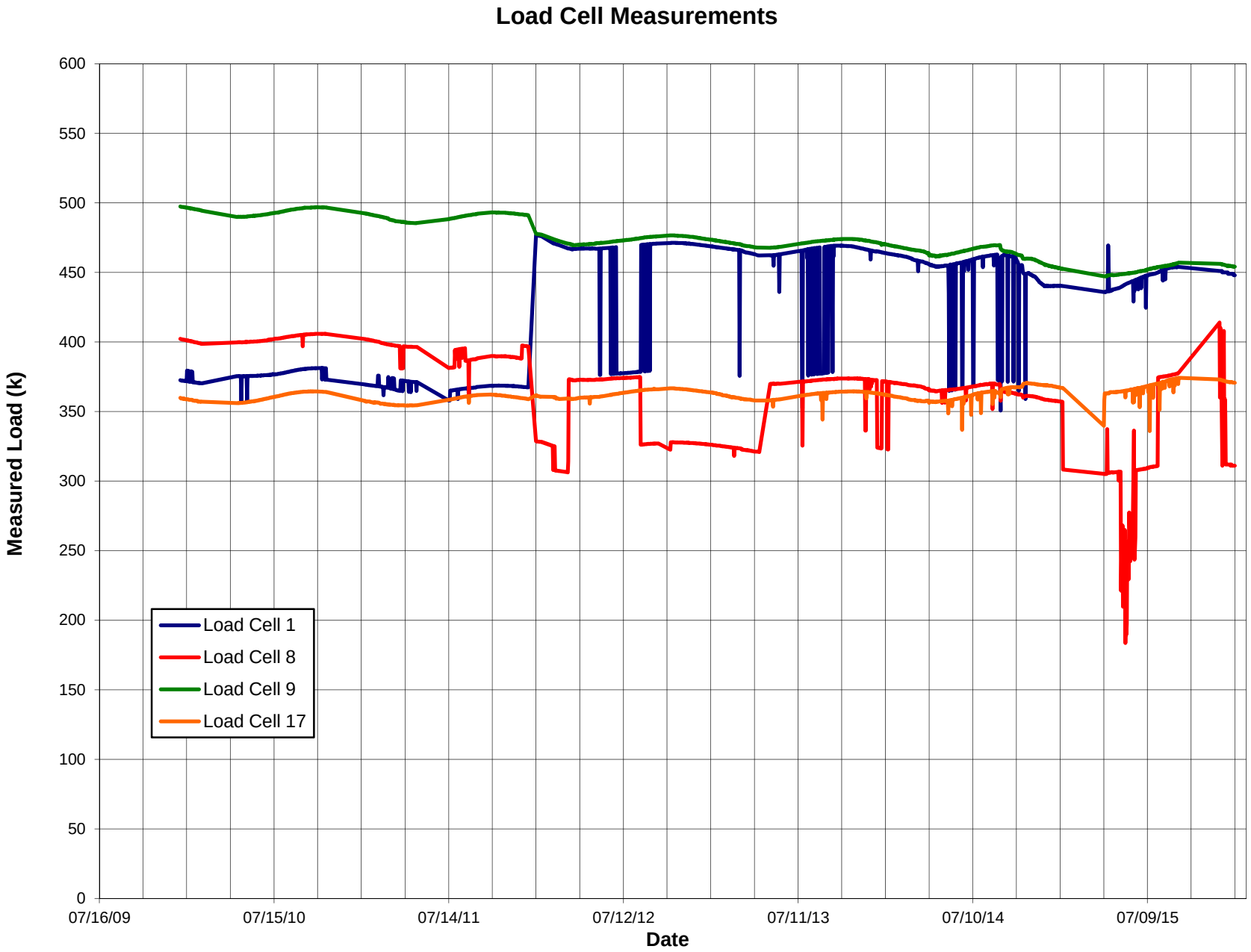
Inclinalysis v. 2.47.5

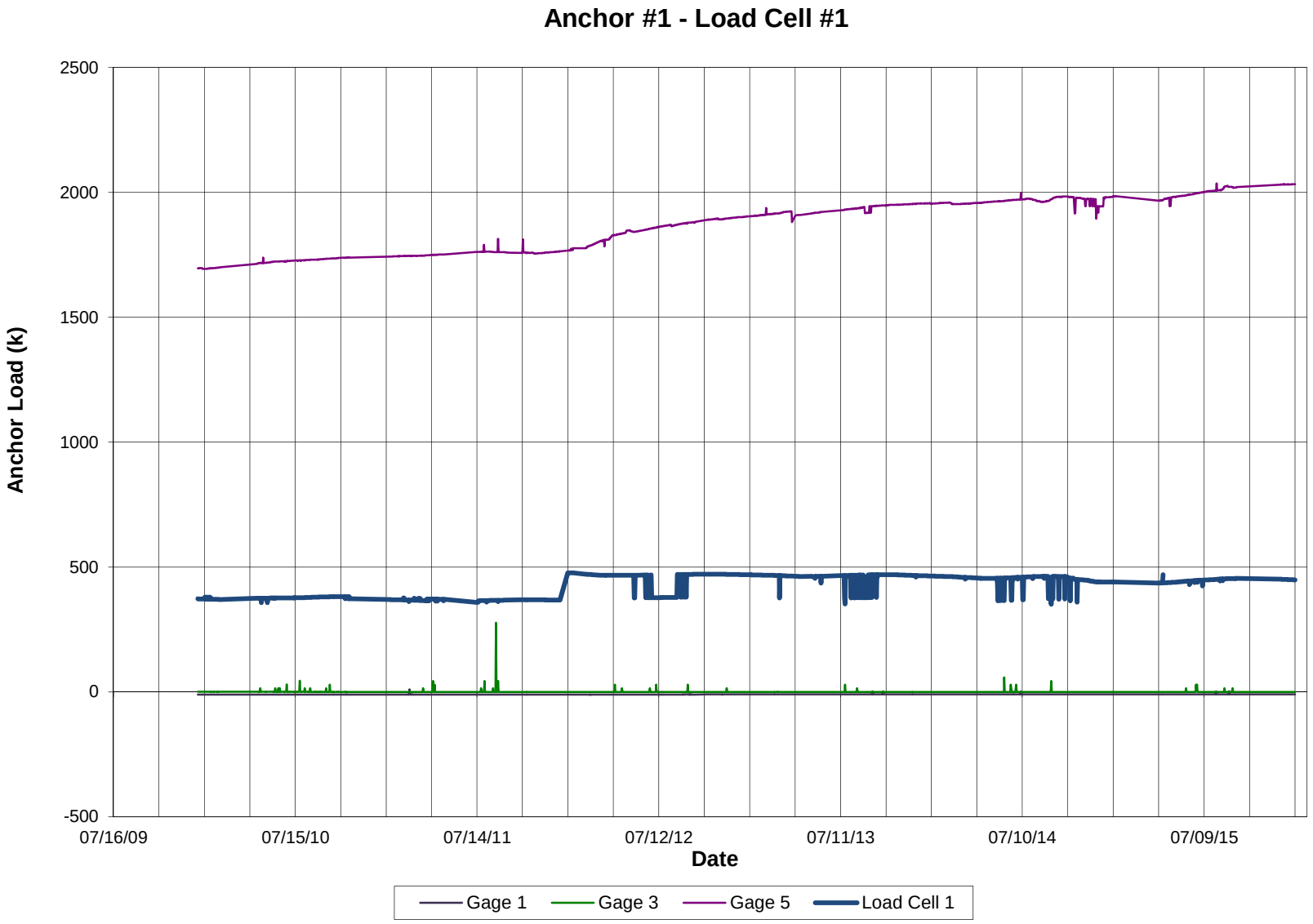
Borehole : P-17
Project : CUY-90-15-24
Location : Cleveland, Ohio
Northing :
Easting :
Collar :

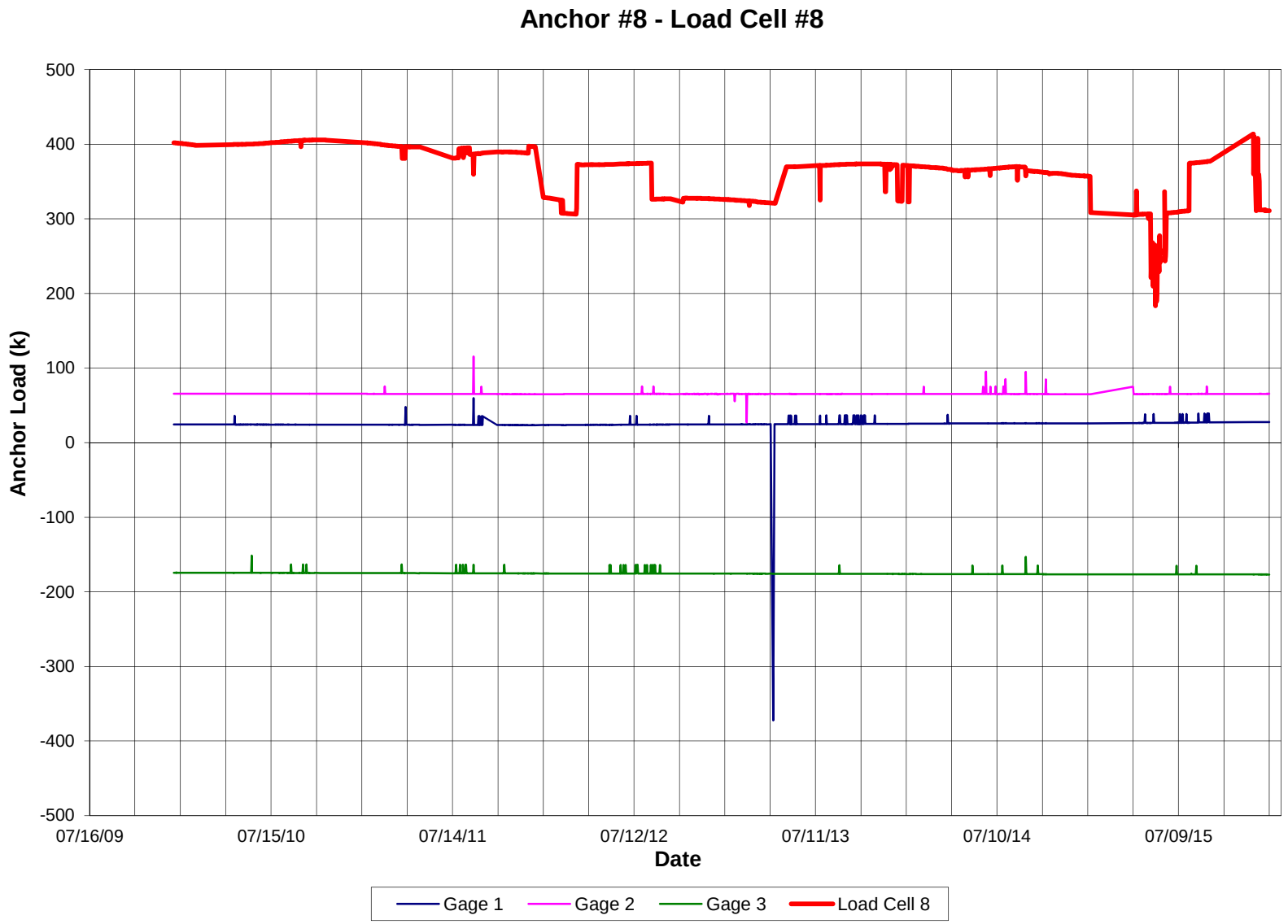
Spiral Correction : N/A
Collar Elevation : 1.2 feet
Borehole Total Depth : 148.0 feet
A+ Groove Azimuth :
Base Reading : 2014 Jan 15 12:02
Applied Azimuth : 0.0 degrees

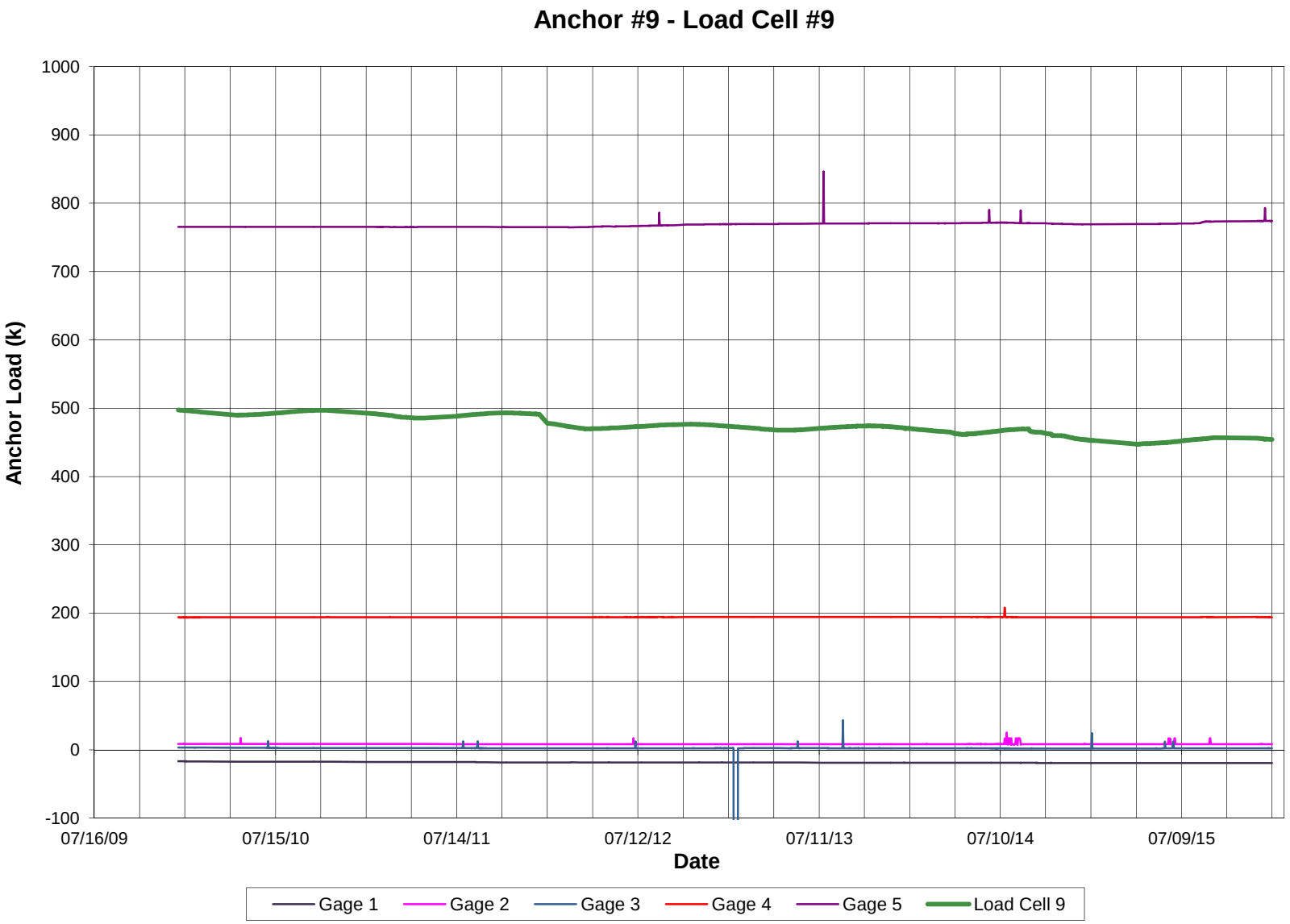


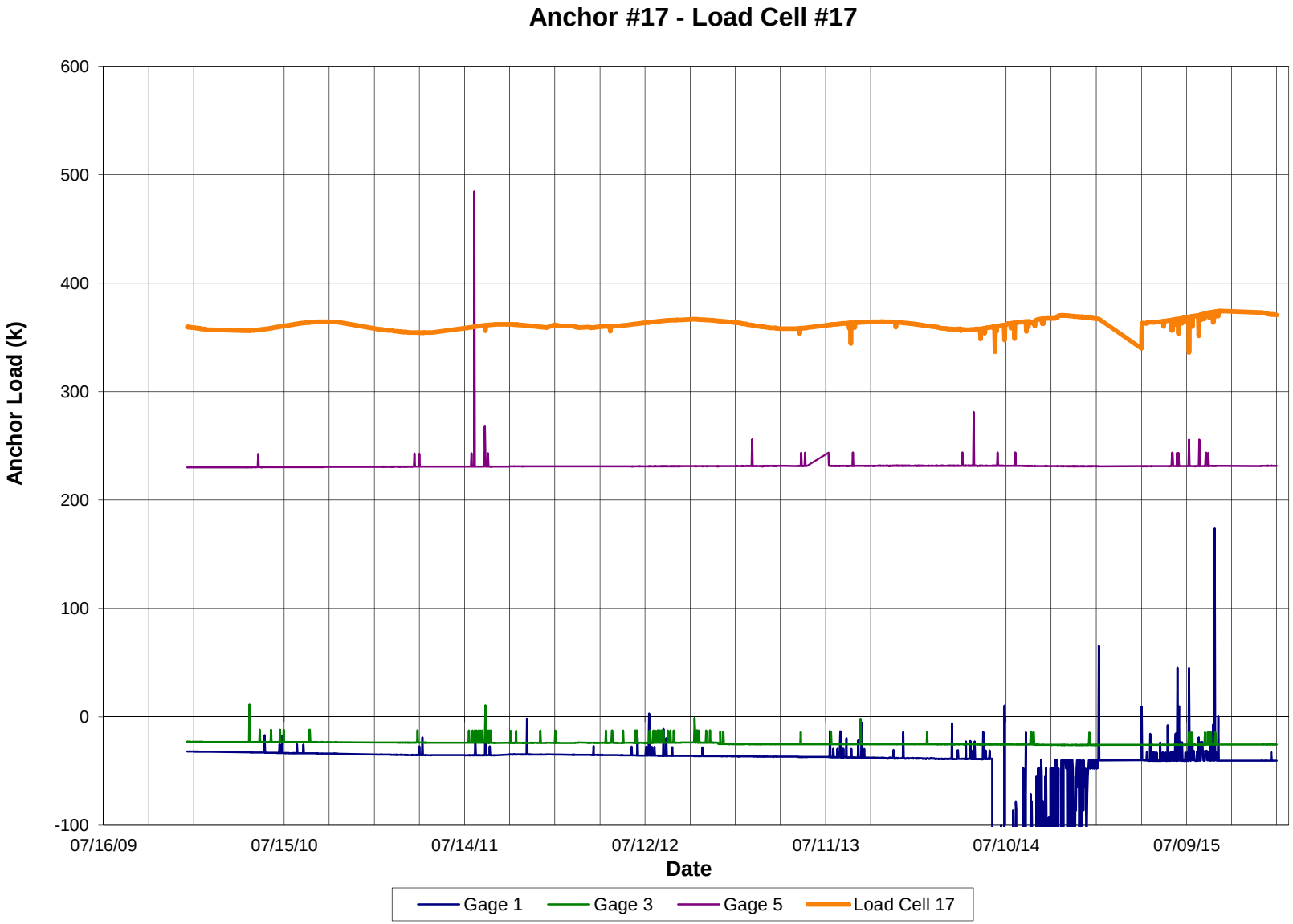



Load Cell Measurements
Measured Load (k)
600
550
500
450
400
350
300
250
200
150
100
50
0
07/16/09
07/15/10
07/14/11
07/12/12
07/11/13
07/10/14
07/09/15
Date
Load Cell 1
Load Cell 8
Load Cell 9
Load Cell 17

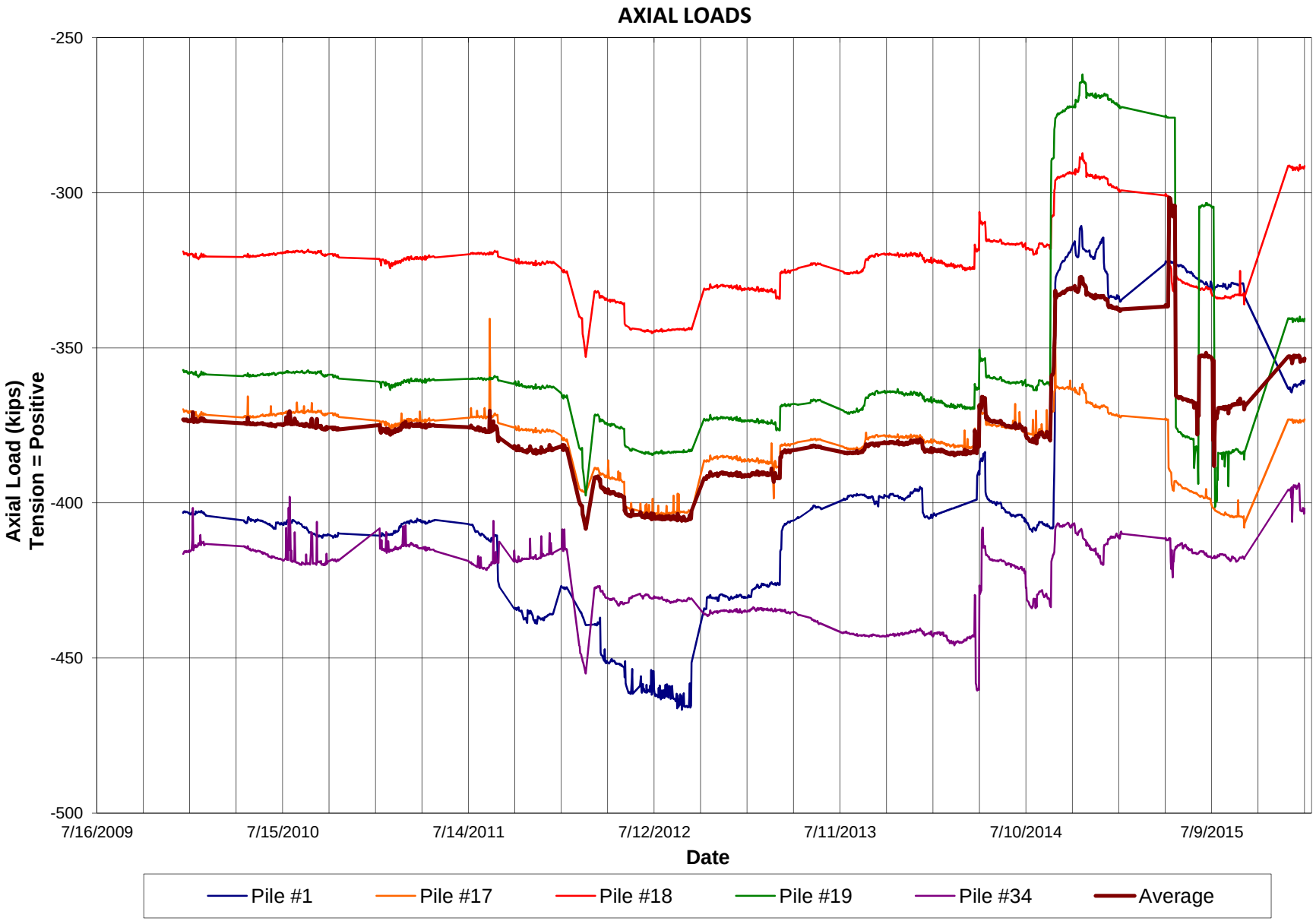

Anchor #1 - Load Cell #1
Anchor Load (k)
2500
2000
1500
1000
500
0
-500
07/16/09
07/15/10
07/14/11
07/12/12
07/11/13
07/10/14
07/09/15
Date
Gage 1
Gage 3
Gage 5
Load Cell 1


Anchor #8 - Load Cell #8
Anchor Load (k)
500
400
300
200
100
0
-100
-200
-300
-400
-500
07/16/09
07/15/10
07/14/11
07/12/12
07/11/13
07/10/14
07/09/15
Date
Gage 1
Gage 2
Gage 3
Load Cell 8


Anchor #9 - Load Cell #9
Anchor Load (k)
1000
900
800
700
600
500
400
300
200
100
0
-100
07/16/09
07/15/10
07/14/11
07/12/12
07/11/13
07/10/14
07/09/15
Date
Gage 1
Gage 2
Gage 3
Gage 4
Gage 5
Load Cell 9

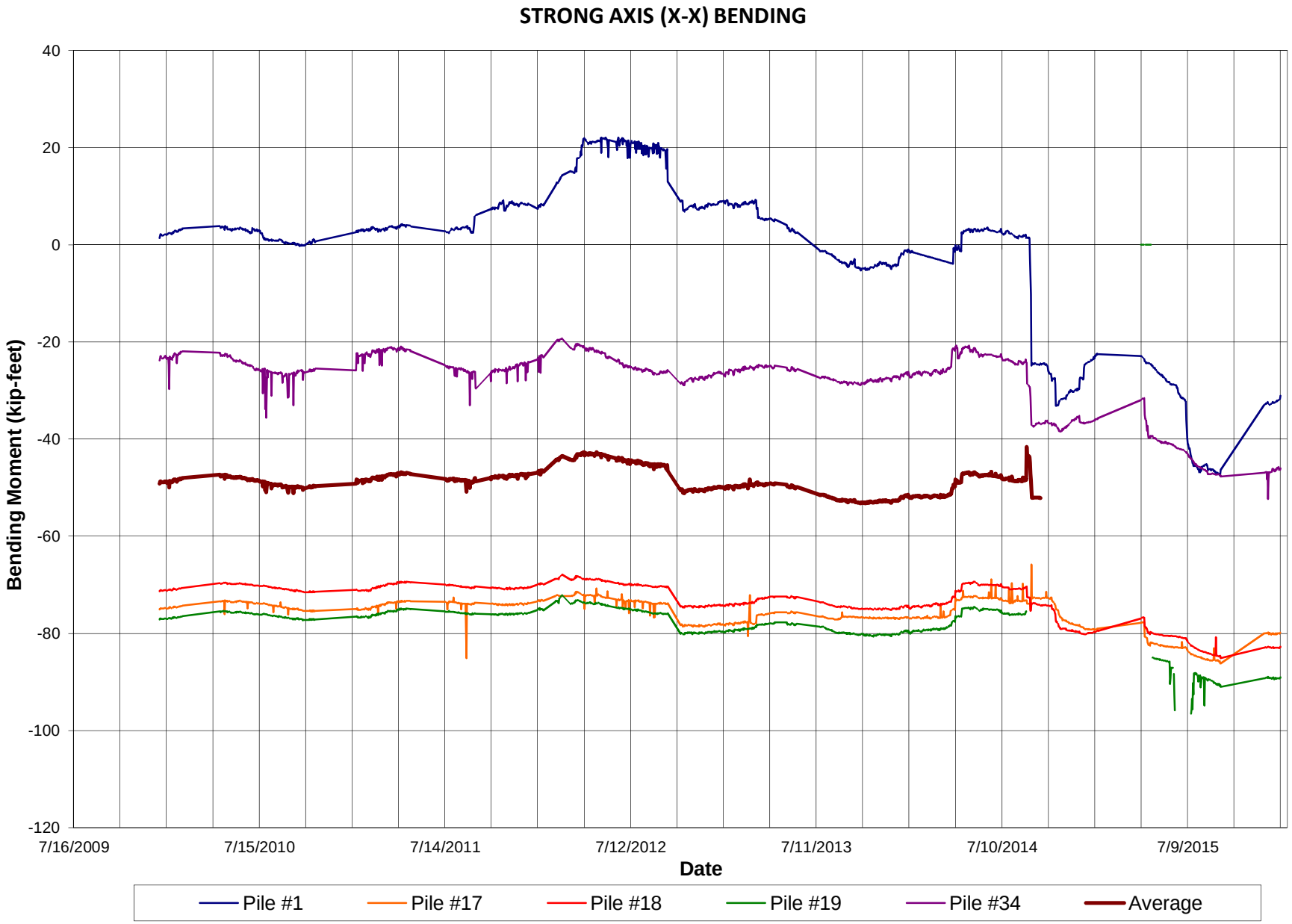

Anchor #17 - Load Cell #17
Anchor Load (k)
600
500
400
300
200
100
0
-100
07/16/09
07/15/10
07/14/11
07/12/12
07/11/13
07/10/14
07/09/15
Date
Gage 1
Gage 3
Gage 5
Load Cell 17

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



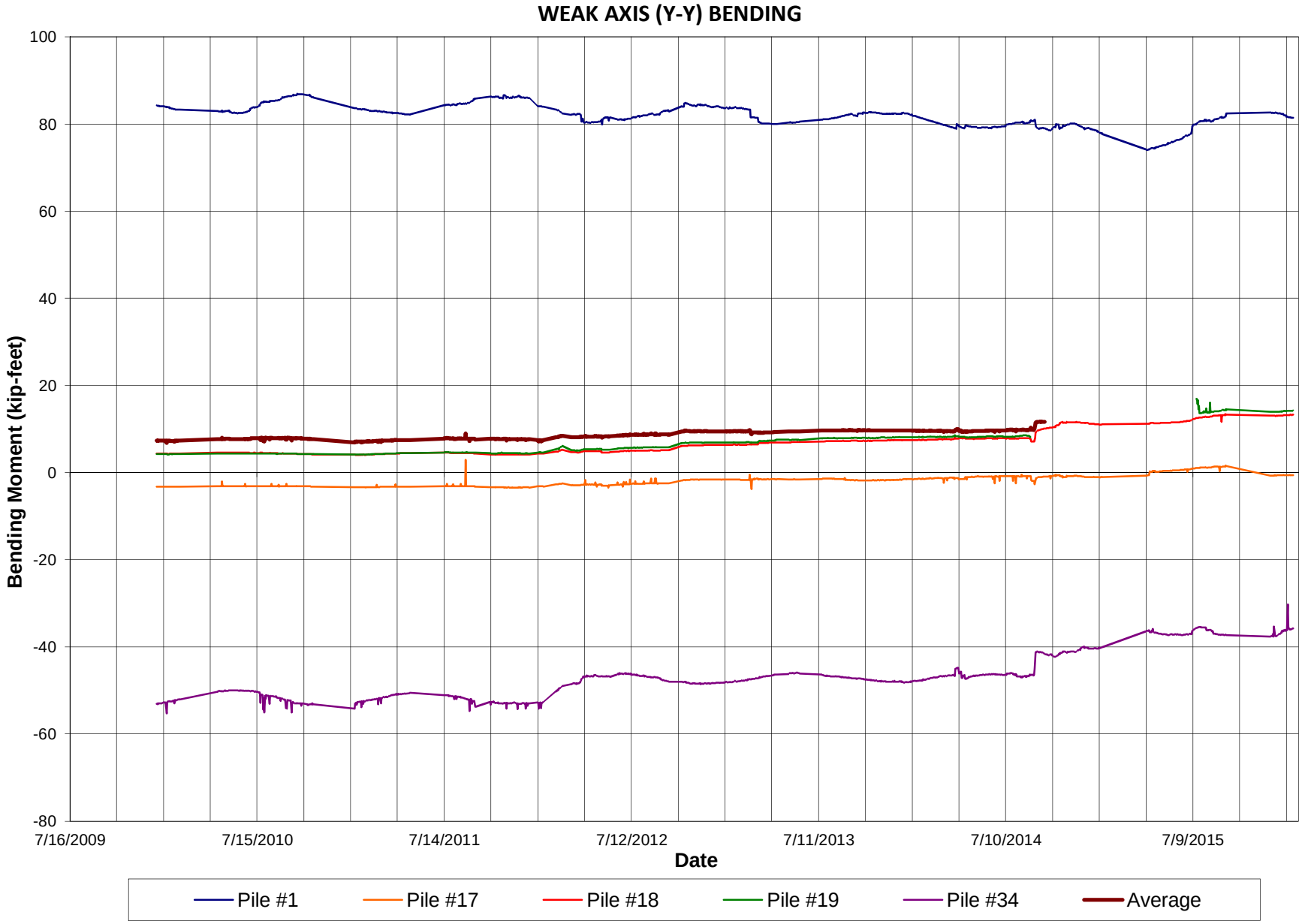
Driven Piles

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



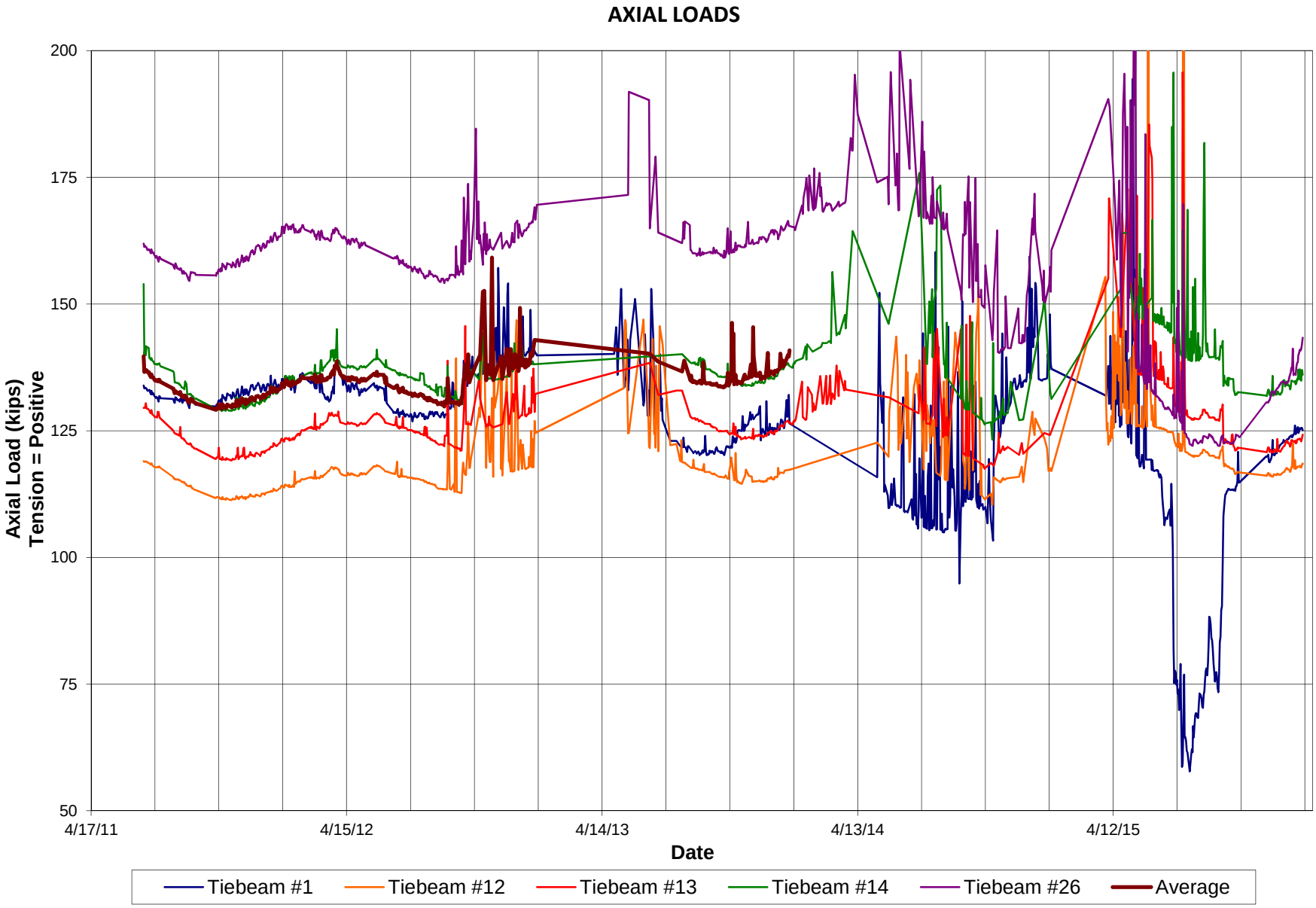
Driven Piles

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



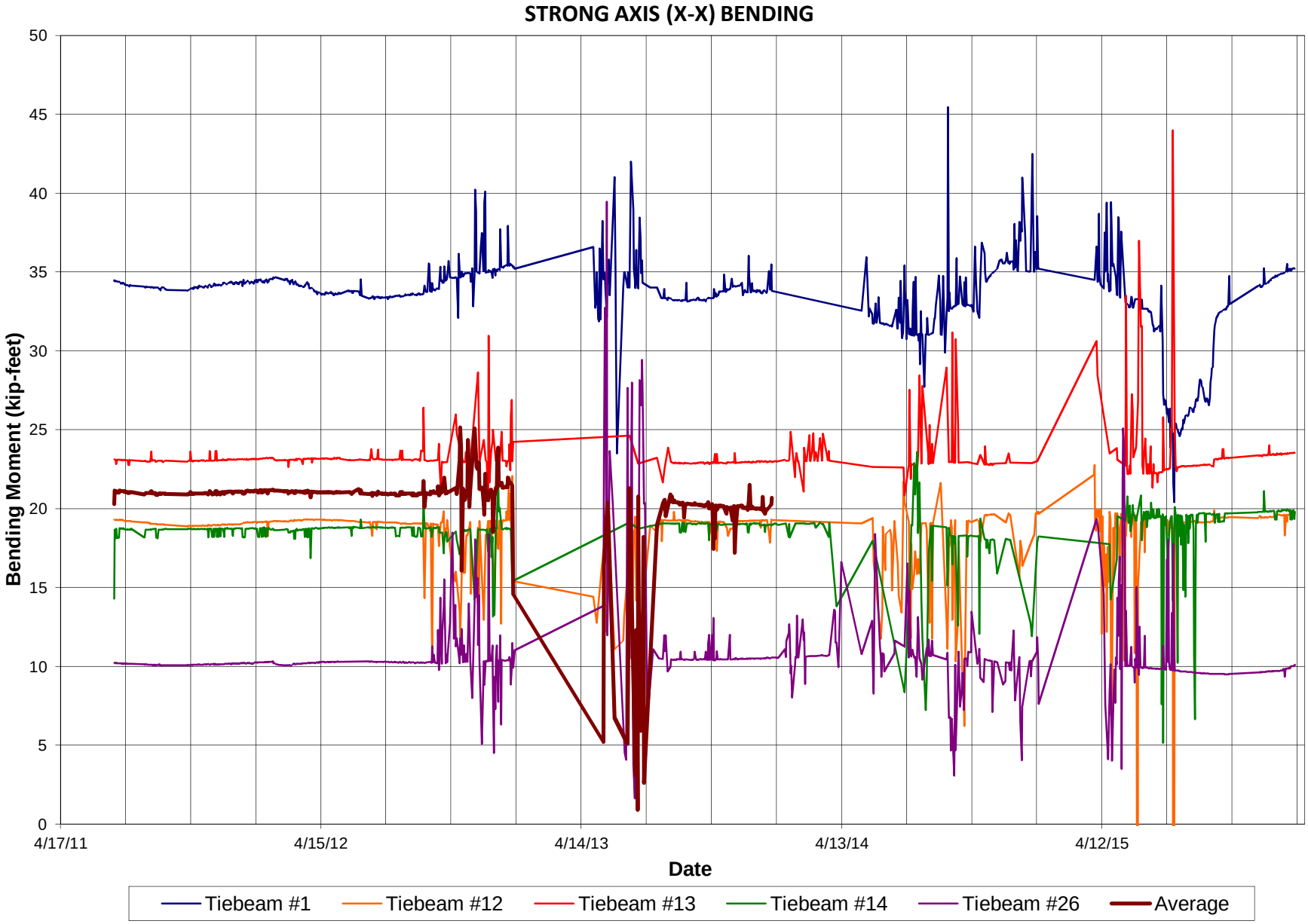
Driven Piles

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



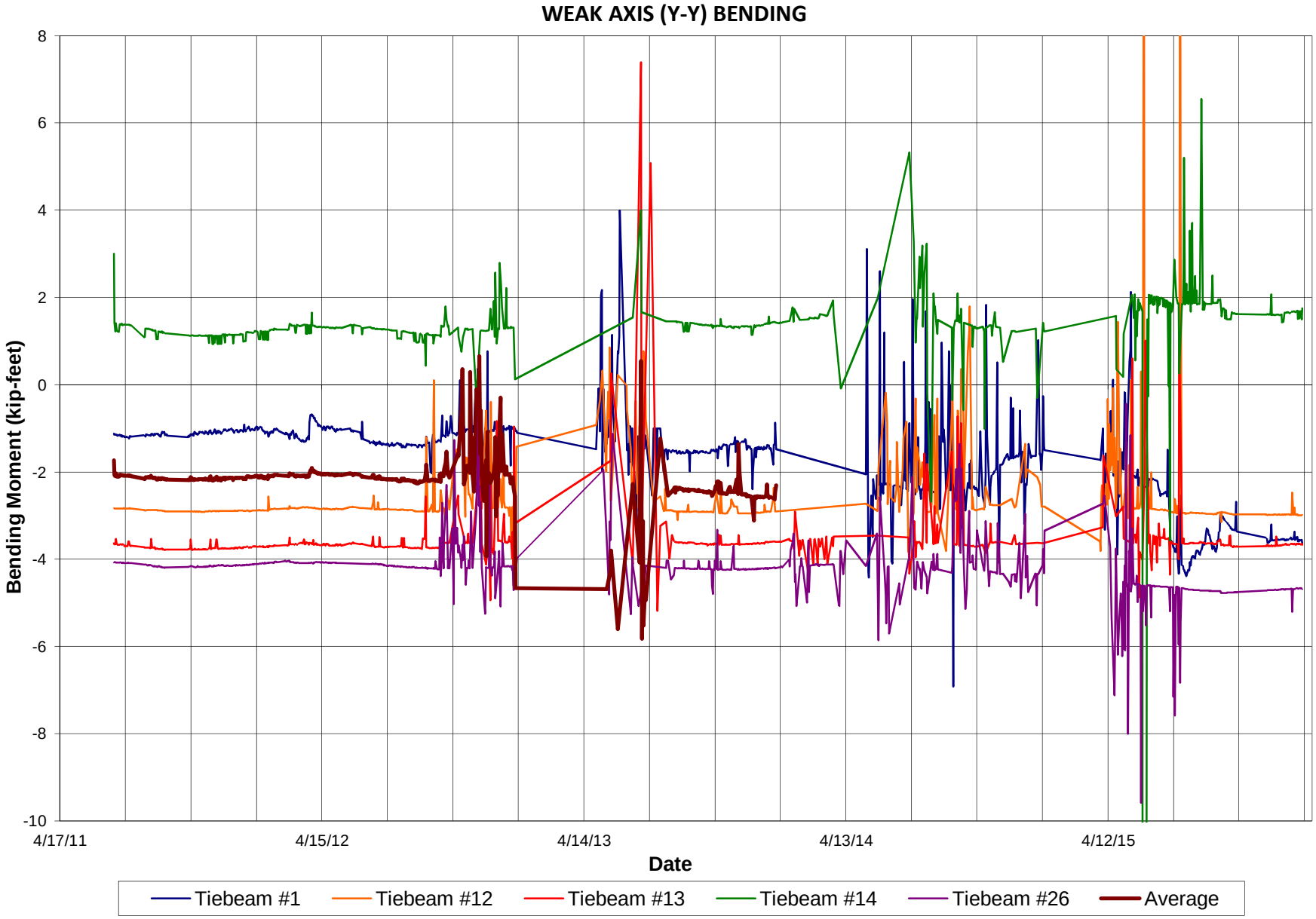
Tiebeams - Anchor Side

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



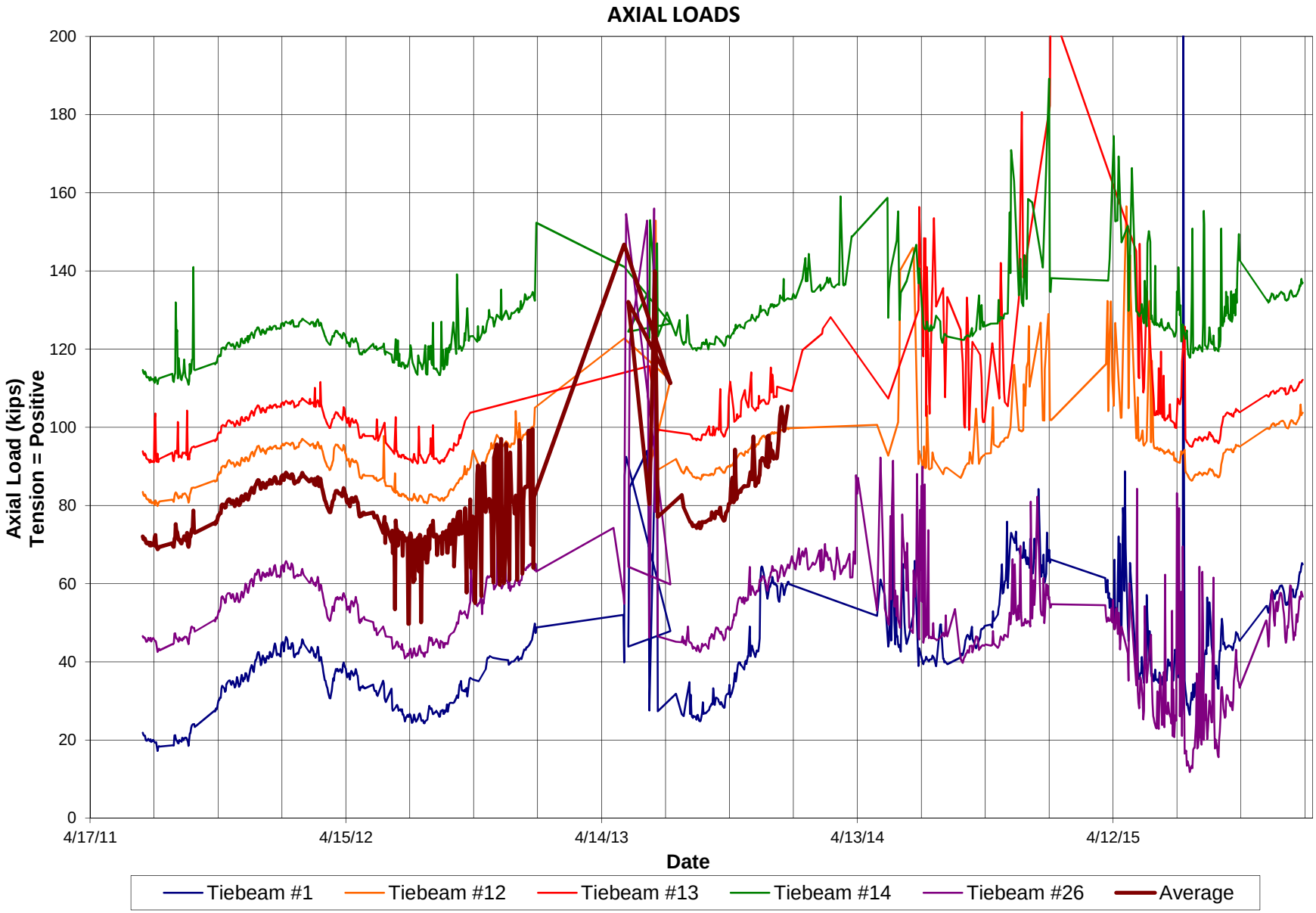
Tiebeams - Anchor Side

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



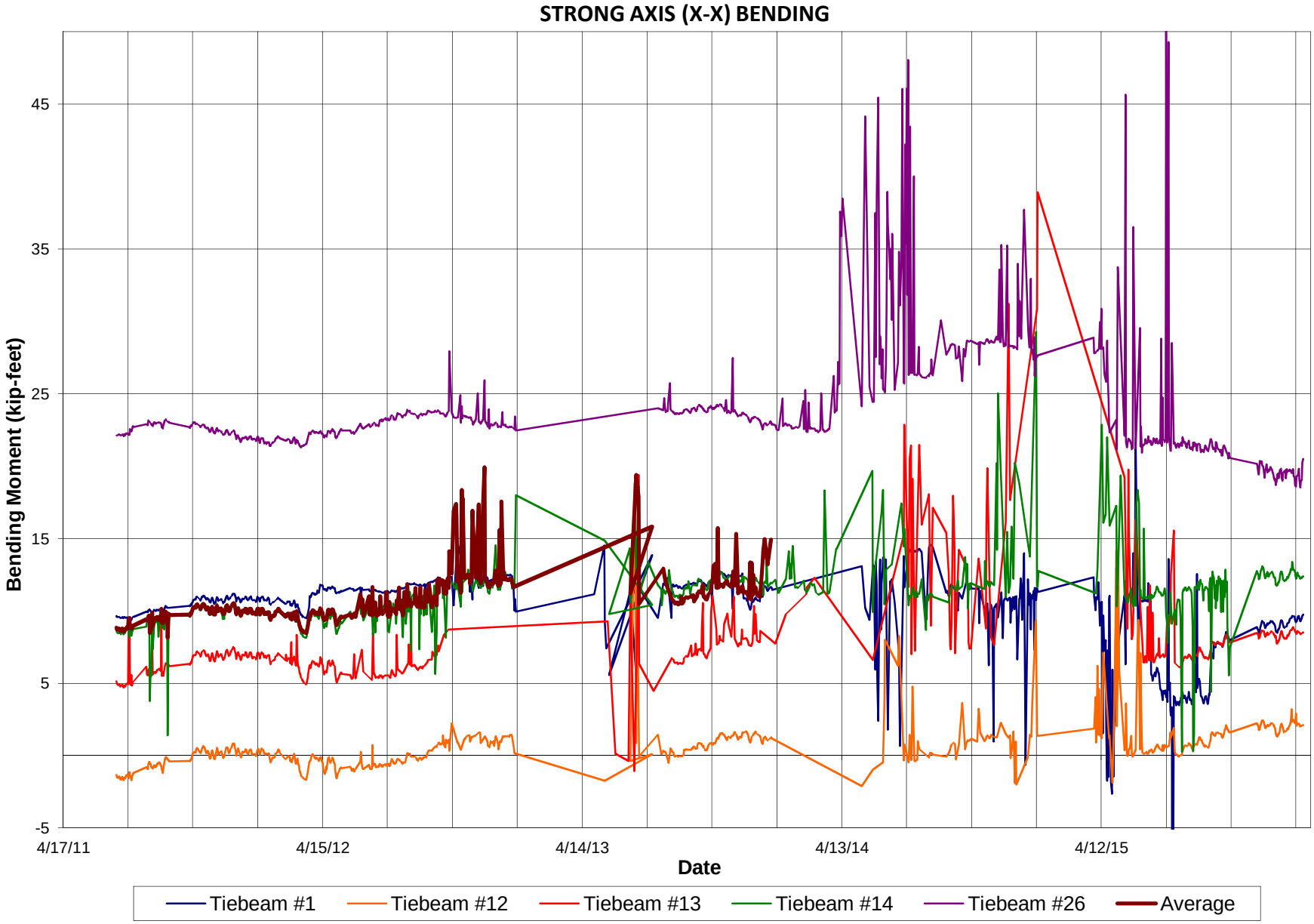
Tiebeams - Anchor Side

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



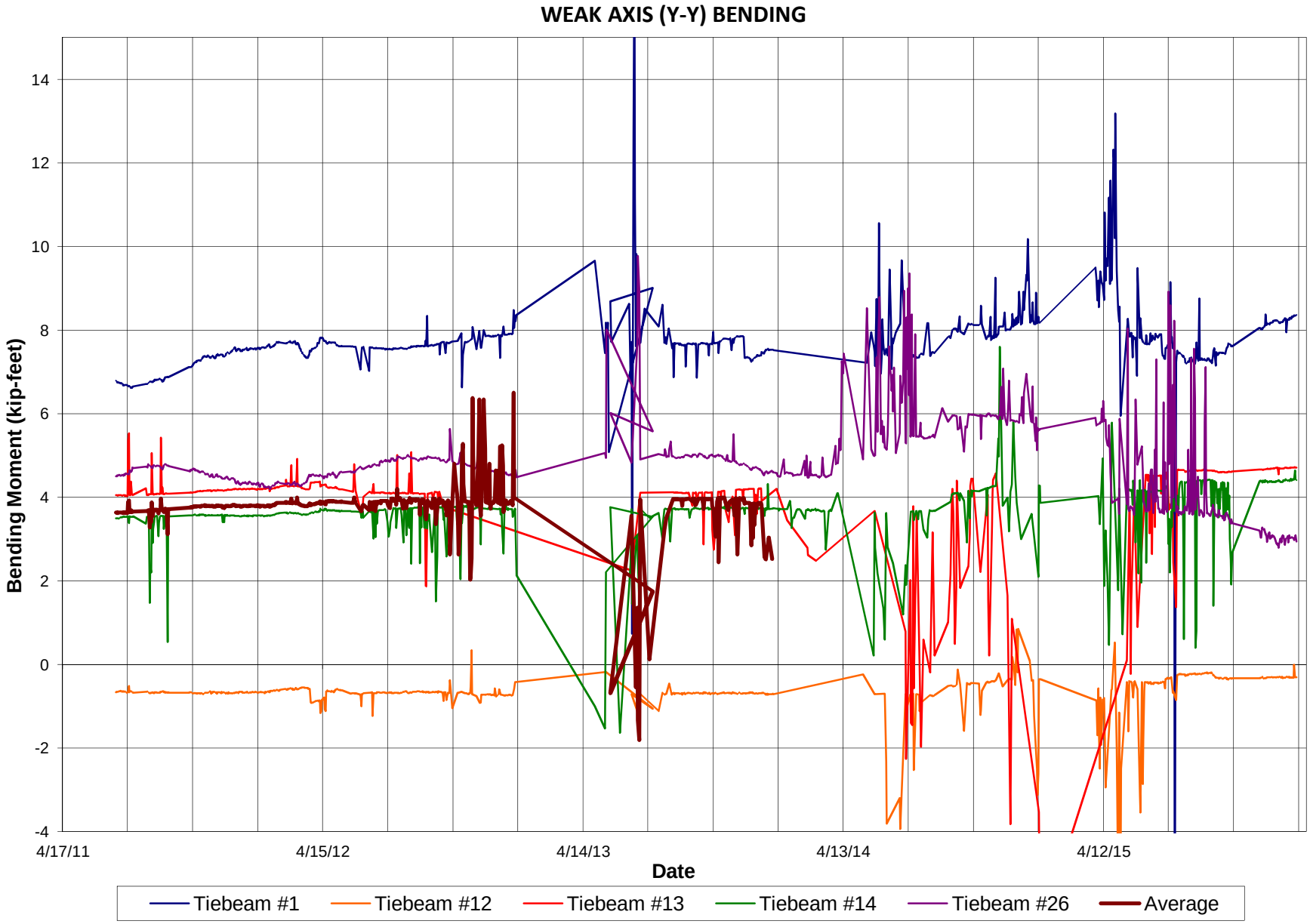
Tiebeams - Drilled Pier Side

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



Tiebeams - Drilled Pier Side

CUY-90-15.24 Slope Monitoring
Cleveland, Ohio
PID 96504
SME#: 069032.00



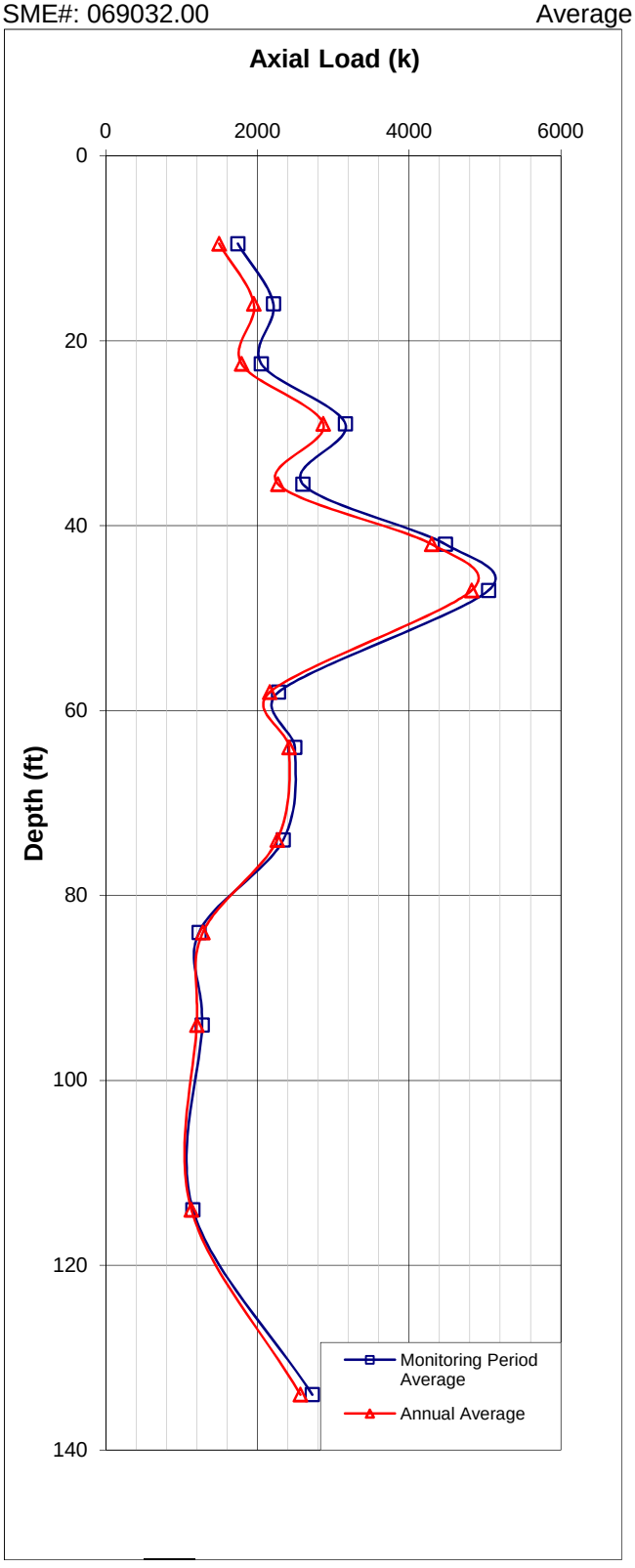
Tiebeams - Drilled Pier Side

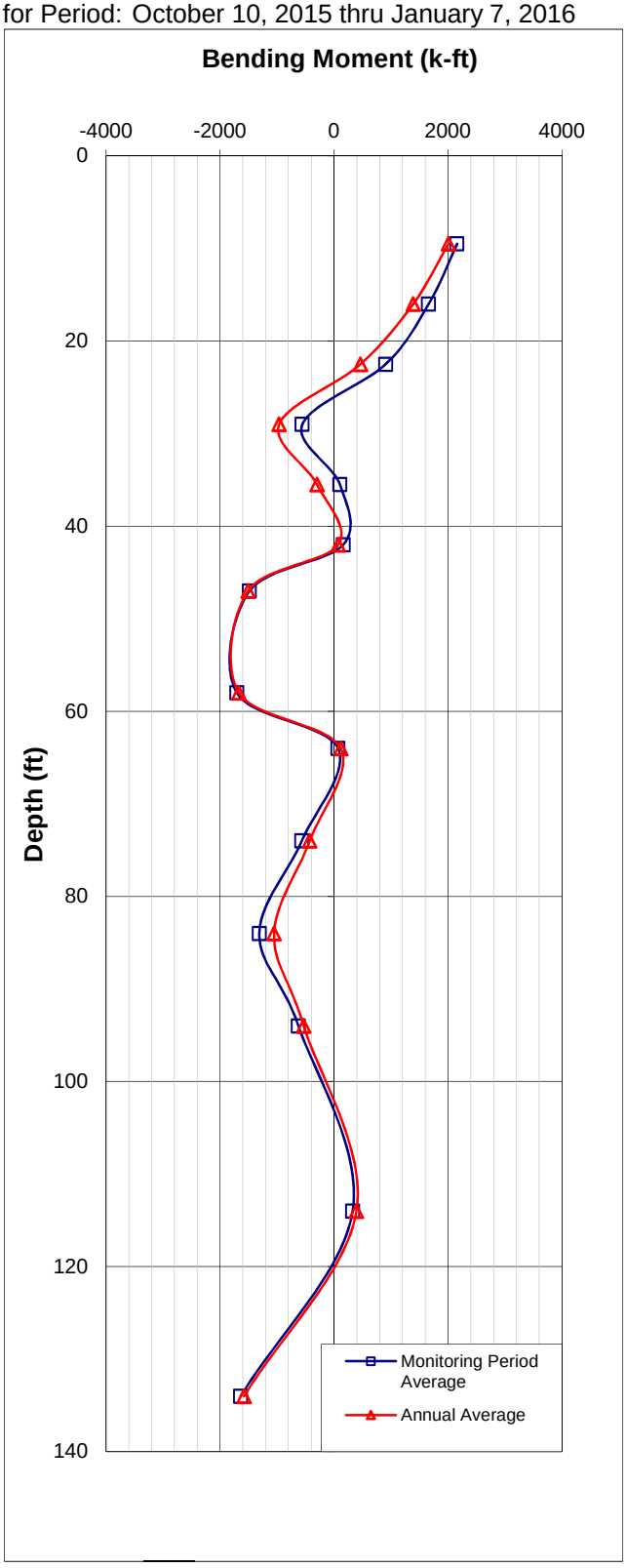
CUY-90-15.24 Slope Monitoring

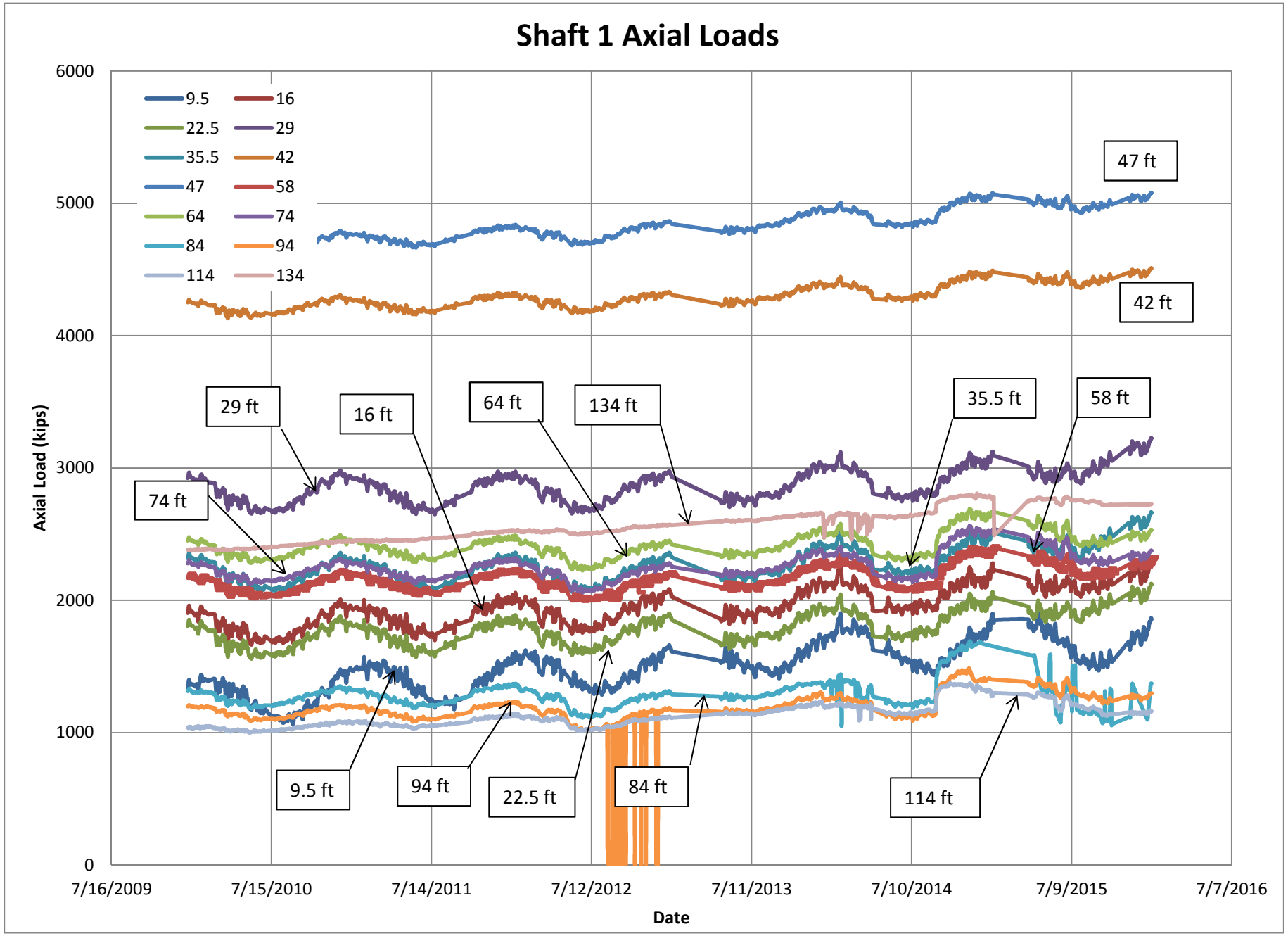
PID 96504 — Drilled Shaft #1

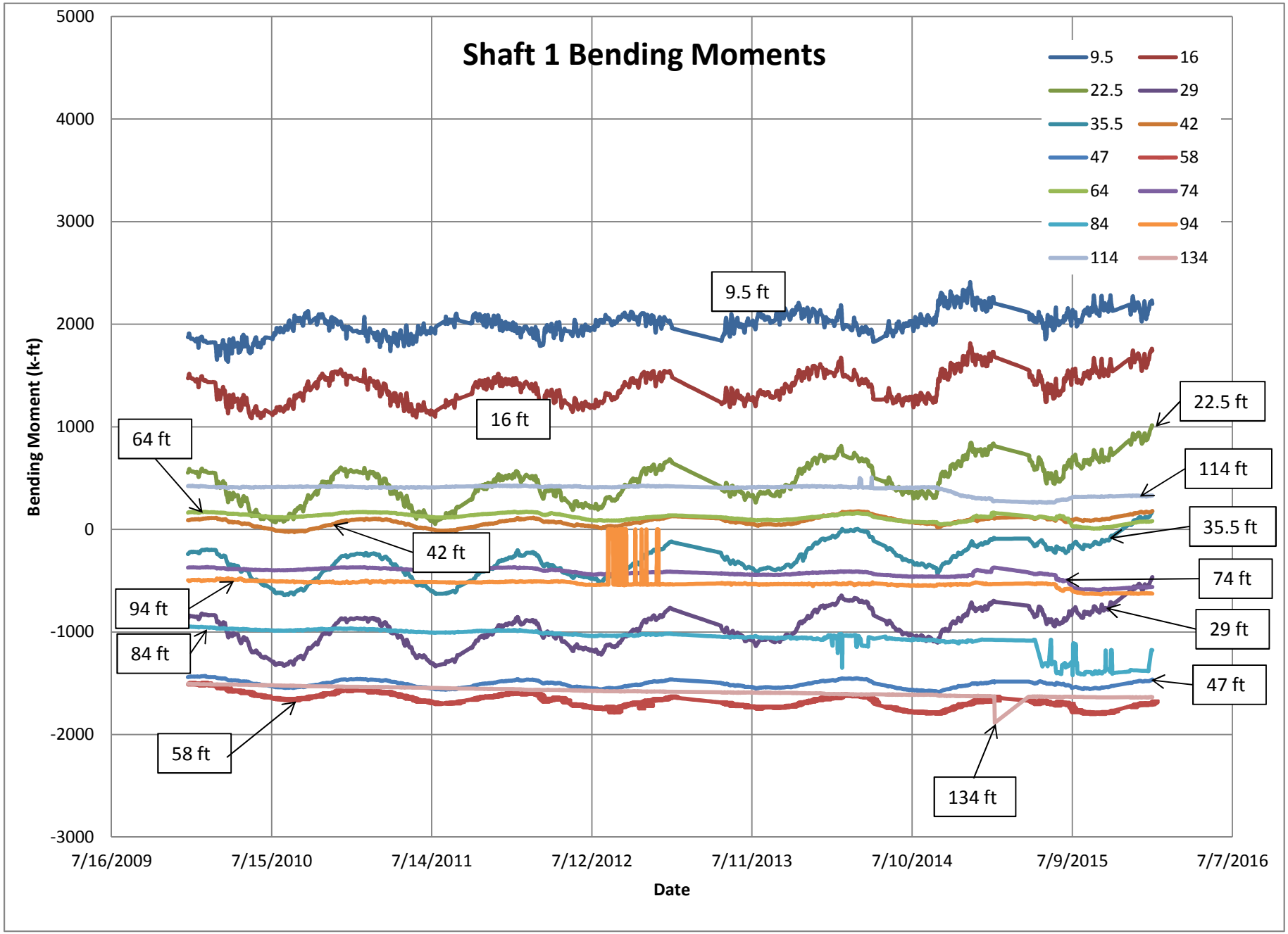
Cleveland, Ohio — (Weak Axis Bending)

SME#: 069032.00 — Average for Period: October 10, 2015 thru January 7, 2016






Shaft 1 Axial Loads
9.5
16
22.5
29
35.5
42
47
58
64
74
84
94
114
134
47 ft
42 ft
29 ft
16 ft
64 ft
134 ft
35.5 ft
58 ft
74 ft
9.5 ft
94 ft
22.5 ft
84 ft
114 ft
Axial Load (kips)
6000
5000
4000
3000
2000
1000
0
7/16/2009
7/15/2010
7/14/2011
7/12/2012
7/11/2013
7/10/2014
7/9/2015
7/7/2016
Date

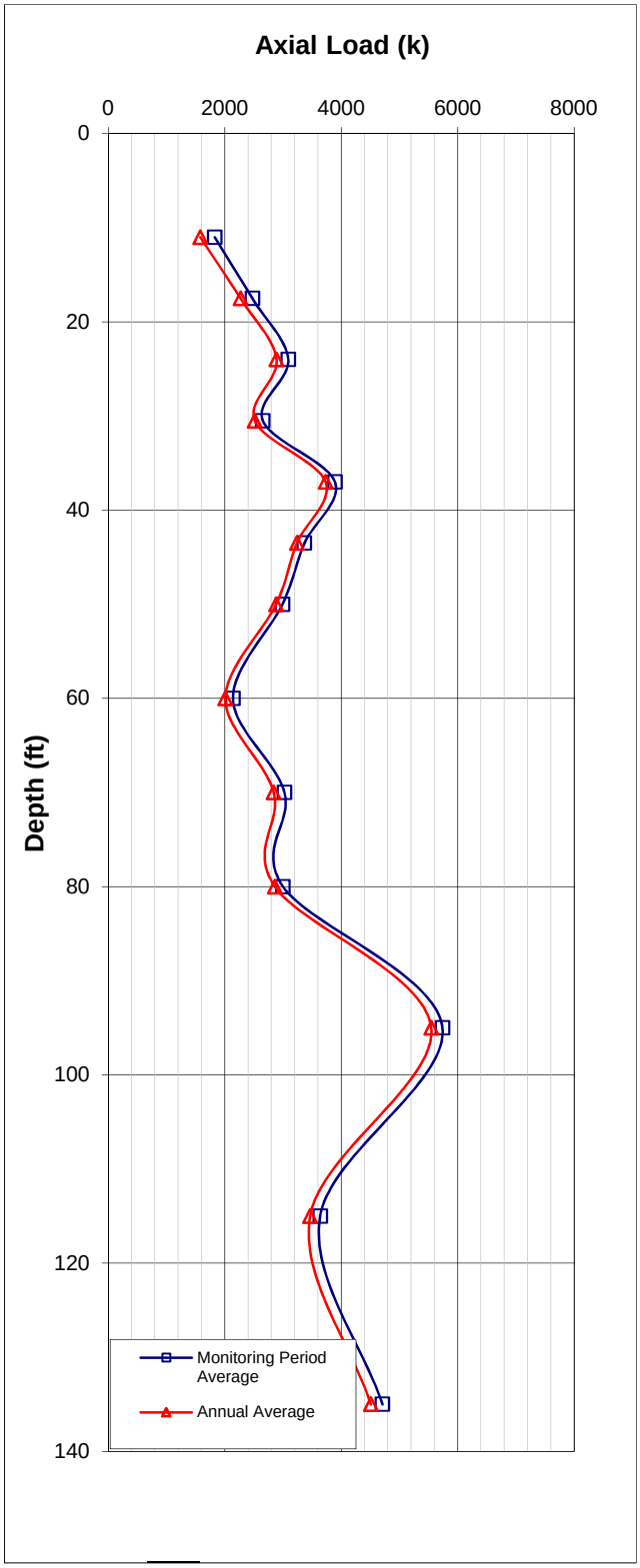

Shaft 1 Bending Moments
9.5
16
22.5
29
35.5
42
47
58
64
74
84
94
114
134
Bending Moment (k-ft)
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
7/16/2009
7/15/2010
7/14/2011
7/12/2012
7/11/2013
7/10/2014
7/9/2015
7/7/2016
Date
9.5 ft
16 ft
22.5 ft
64 ft
114 ft
42 ft
35.5 ft
74 ft
94 ft
29 ft
84 ft
47 ft
58 ft
134 ft

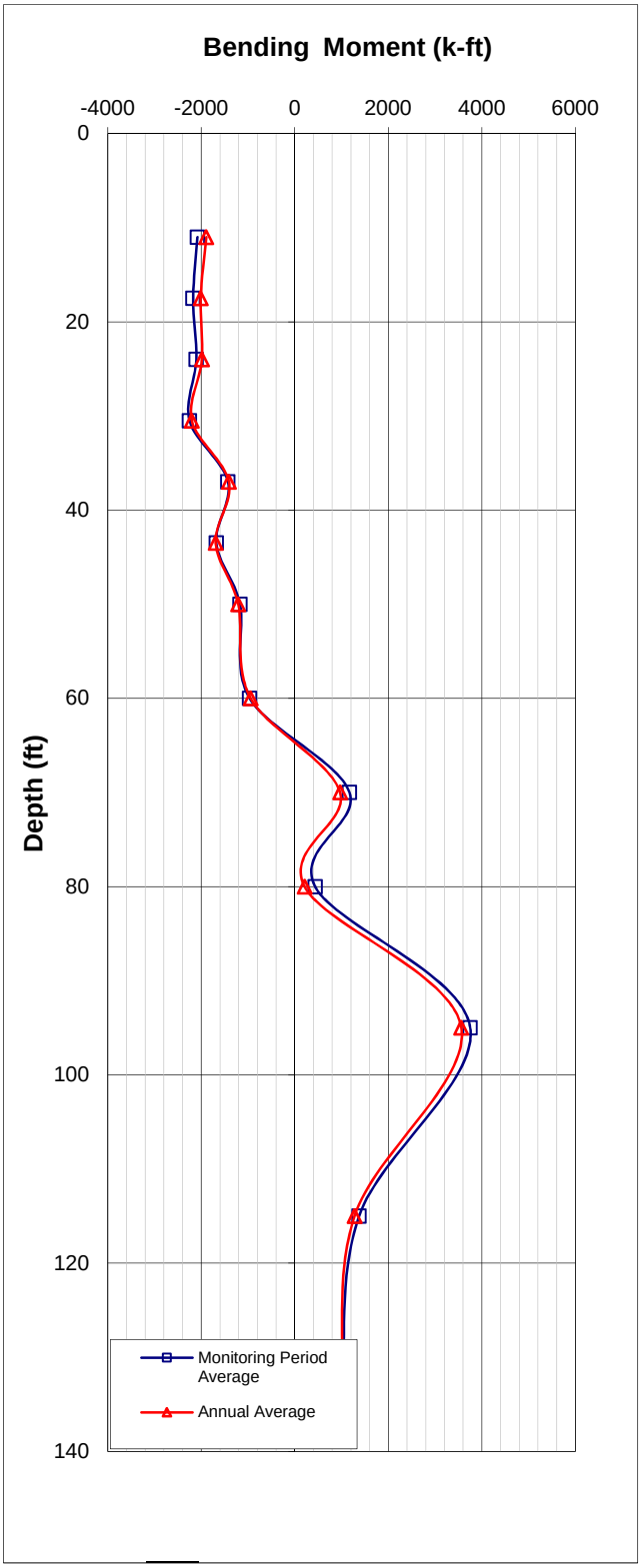
CUY-90-15.24 Slope Monitoring

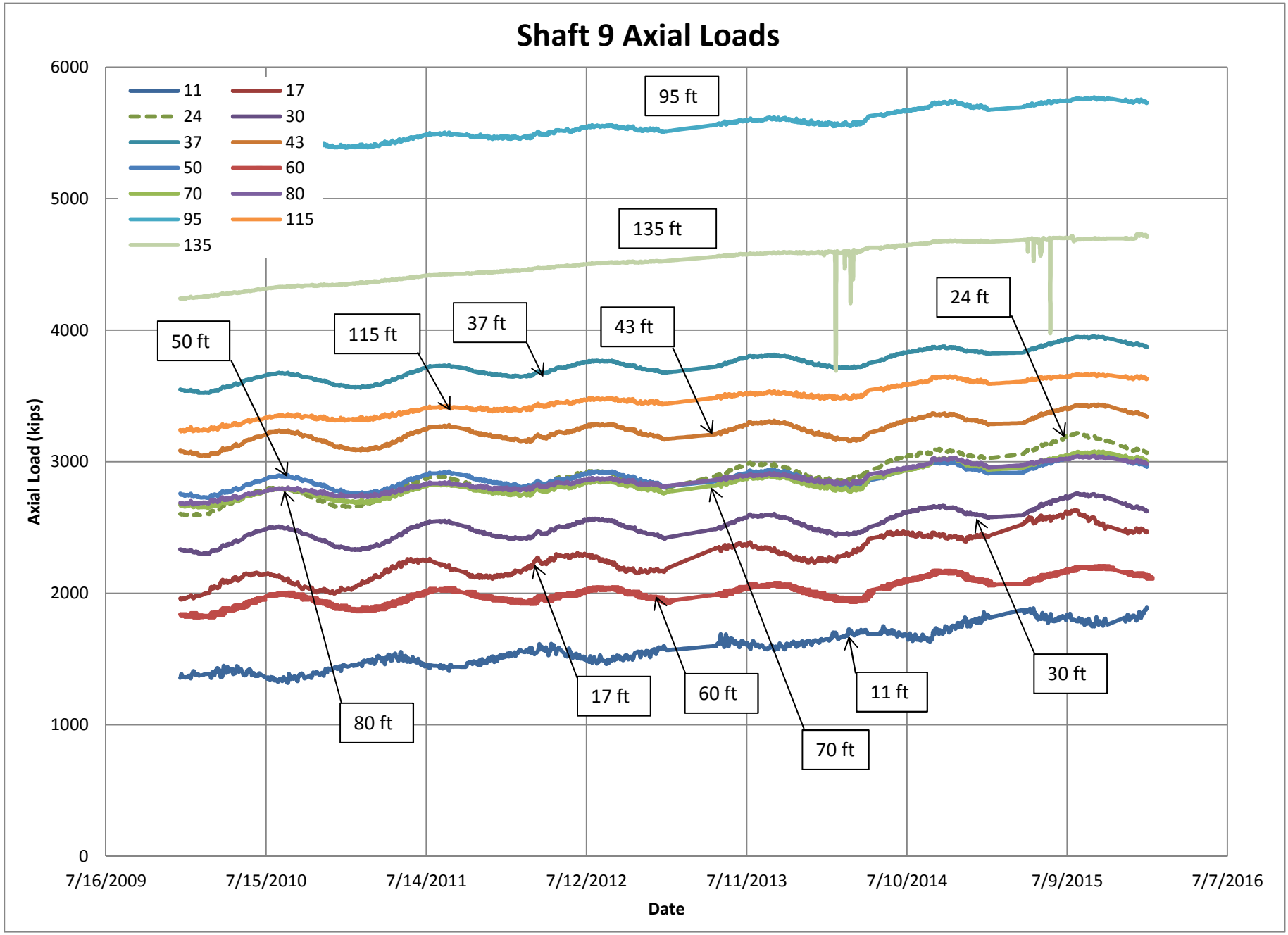
PID 76117 — Drilled Shaft #9

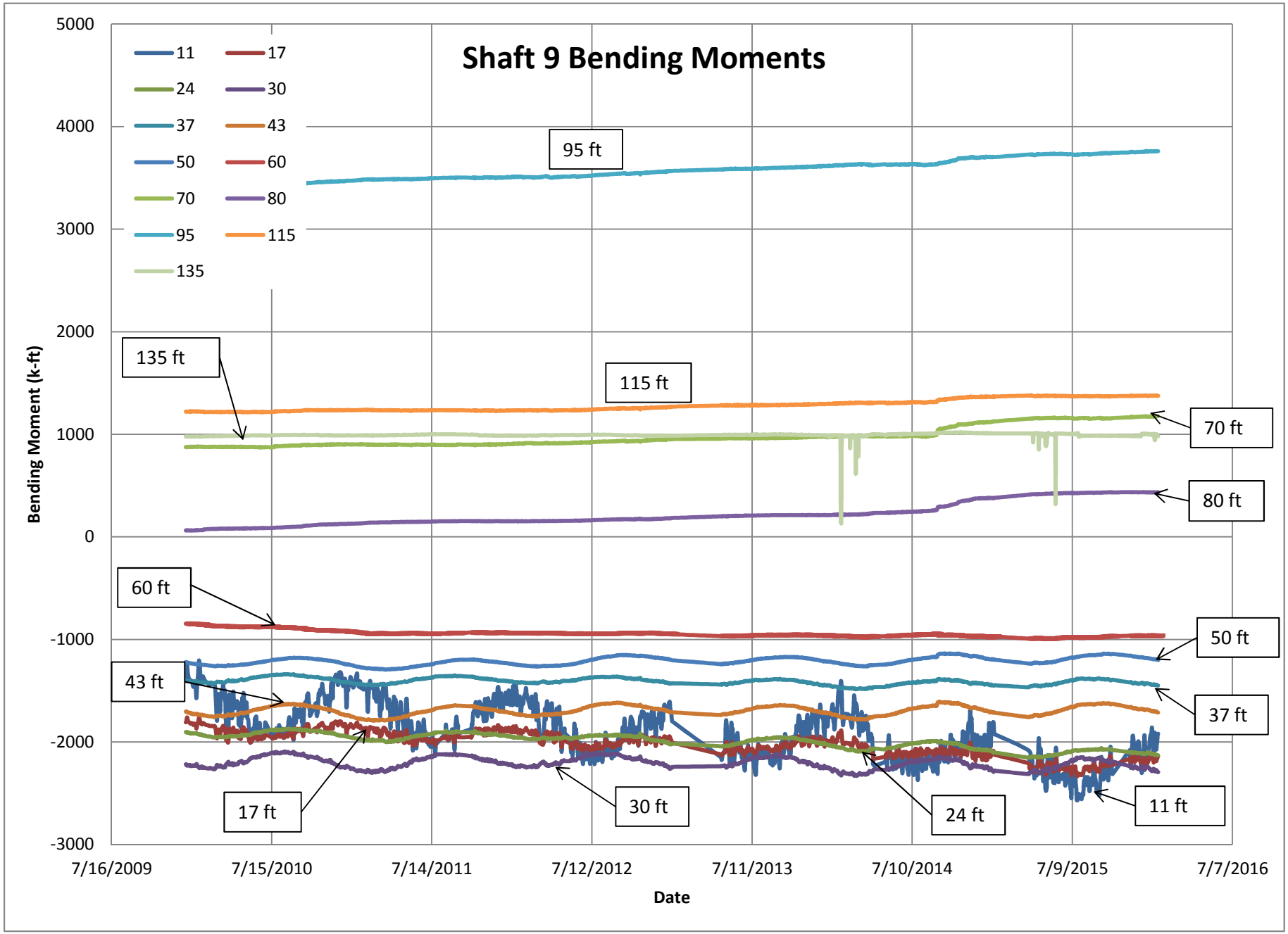
Cleveland, Ohio — Strong Axis Bending

EDP #09305G — Average for Period: October 10, 2015 thru January 7, 2016






Shaft 9 Axial Loads
6000
5000
4000
3000
2000
1000
0
Axial Load (kips)
7/16/2009
7/15/2010
7/14/2011
7/12/2012
7/11/2013
7/10/2014
7/9/2015
7/7/2016
Date
11
17
24
30
37
43
50
60
70
80
95
115
135
95 ft
135 ft
24 ft
50 ft
115 ft
37 ft
43 ft
80 ft
17 ft
60 ft
70 ft
11 ft
30 ft


Shaft 9 Bending Moments
11
17
24
30
37
43
50
60
70
80
95
115
135
95 ft
135 ft
115 ft
70 ft
80 ft
60 ft
50 ft
43 ft
37 ft
17 ft
30 ft
24 ft
11 ft
Bending Moment (k-ft)
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
7/16/2009
7/15/2010
7/14/2011
7/12/2012
7/11/2013
7/10/2014
7/9/2015
7/7/2016
Date