Bridgeton Landfill, LLC

Weekly Data Submittal

Week of February 11, 2018 – February 17, 2018

Required by Section 52.F of Agreed Order, Case No. 13SL-CC01088
Effective May 13, 2013

Contents:

Attachment A – Leachate Levels in Leachate Collection Sumps
Attachment B – Temperature Monitoring Probe Analytical Charts
Attachment C – Gas Interceptor Wellhead Temperature Graphs
Attachment D – Neck-Area Gas Extraction Wellhead Temperature Graphs

Provided Separately:

- **– Leachate Level in Leachate Collection Sump Raw Data Excel Spreadsheet**
- **– Temperature Monitoring Probe Raw Data Excel Spreadsheet**
- **– Heat Extraction System TMP Raw Data Excel Spreadsheet**
- **– Gas Interceptor Well Reading Raw Data Excel Spreadsheet**
- **– Neck-Area Gas Extraction Well Data Excel Spreadsheet**

February 23, 2018

Commentary on Data

February 23, 2018

Attachment A – Leachate Levels in Leachate Collection Sumps

Downhole discharge piping and the pump for LCS-1D was replaced the week of 2/5/18. Pump was non-operational after startup activities. Pump replacement is pending parts arrival.

The pump in LCS-2D was non-operational during the weekly reporting period.

The Blackhawk pneumatic pumps in LCS-3D were replaced with a QED AP-4 pneumatic pump on 2/15/18. Liquid level was measured manually.

The level sensor in LCS-4B is currently operational and responsive. Liquid level was not recorded by the level sensor during the weekly reporting period. LCS-4B is equipped with a flow meter that displayed no flow during the weekly reporting period. Therefore, it can be concluded that the liquid level was below the bottom of the pump and level sensor in LCS-4B.

LCS-5B and LCS-6B were fully operational during the weekly reporting period.

Attachment B - Temperature Monitoring Probe Analytical Charts

The following Temperature Monitoring Probes (TMPs) indicated generally consistent profiles to previous observations: TMP-1, -2R, -3, -3R, -4, -4R, -6, -9, -11R, -14R, -16R, -17, -18, -21, -22, -23, -24, -25R, -26, -27, -28R, -29, -33, -34, -35, -36, -37, -38, -39, -40, -41, -42, -43, -44, -45, -46, -47, -48, and -49.

TMP readings for evaluation of the Heat Extraction System (HES) are provided as attachment "Heat Extraction System TMP Raw Data Excel Spreadsheet," but are not discussed in this report.

Attachment C - Gas Interceptor Wellhead Temperature Graphs

As part of the HES, there are currently cooling water circulation loops installed in twelve Gas Interceptor Wells (GIWs) (GIW-02 through GIW-13). The remaining well (GIW-01) had a measured gas temperature within its historical operating limits.

Attachment D – Neck Area Gas Extraction Well Data

Weekly gas temperature data is collected for select Gas Extraction Wells (GEWs) located in the neck area of the landfill. These wells include GEW-008, -009, -010, -038, -039, -040, 041R, -043R, -053, -054, -055, -056R, -109, and -110.

North Quarry Oxygen Levels

GEW-1A is noted as having an oxygen concentration greater than 2.0% since its installation in December 2015.

The area in which GEW-1A is installed is very saturated. Bridgeton has installed a sump near GEW-1A and increased the force main capacity during the North Quarry capping projects in an effort to lower the potentiometric surface in the area to improve gas quality and reduce ambient air intrusion at the

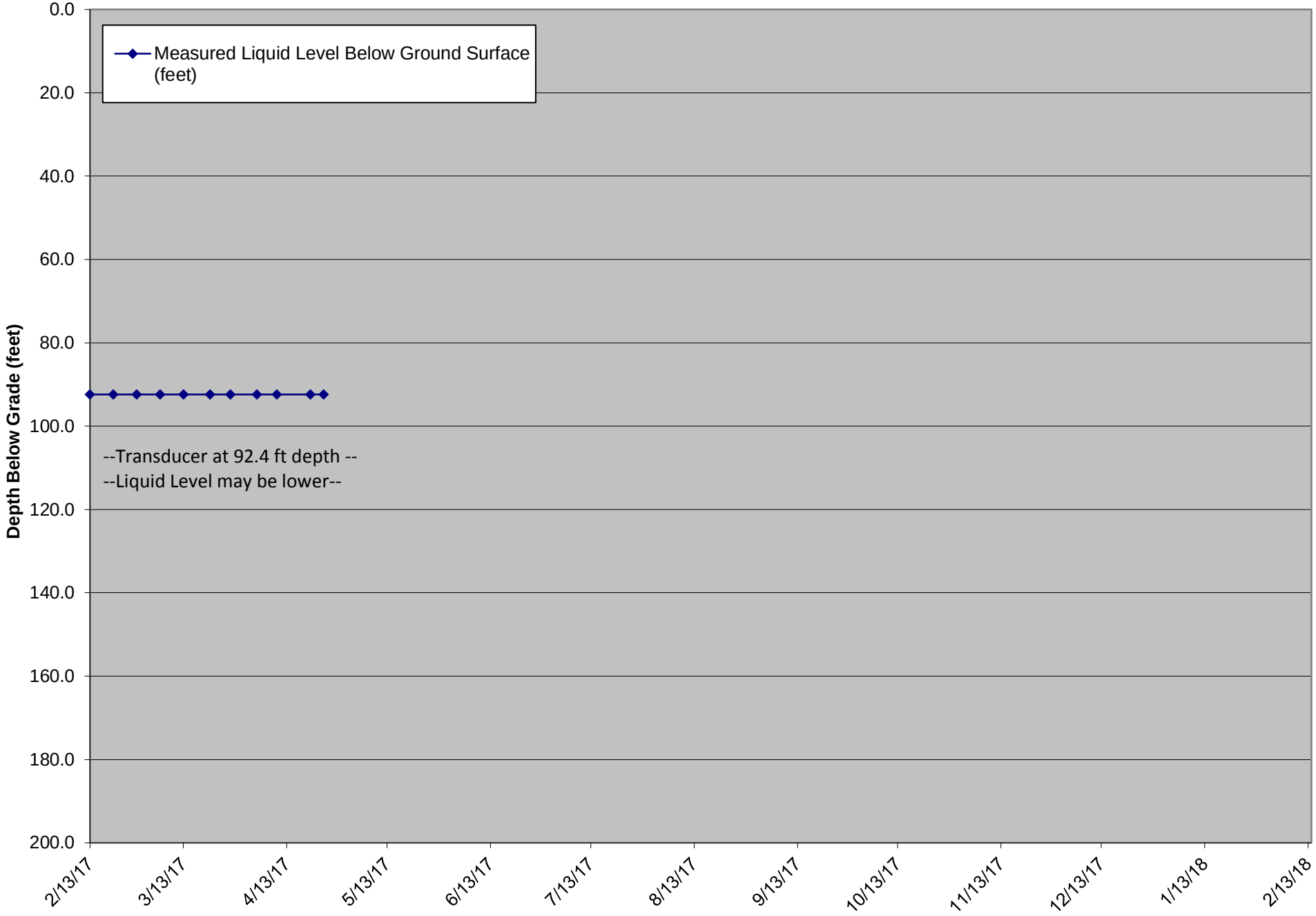
well. In addition, Bridgeton tested a 5 hp electric pump in GEW-1A to provide increased capacity in an effort to sufficiently dewater the well and expose perforations. However, rapid recharge prevented exposure of perforations.

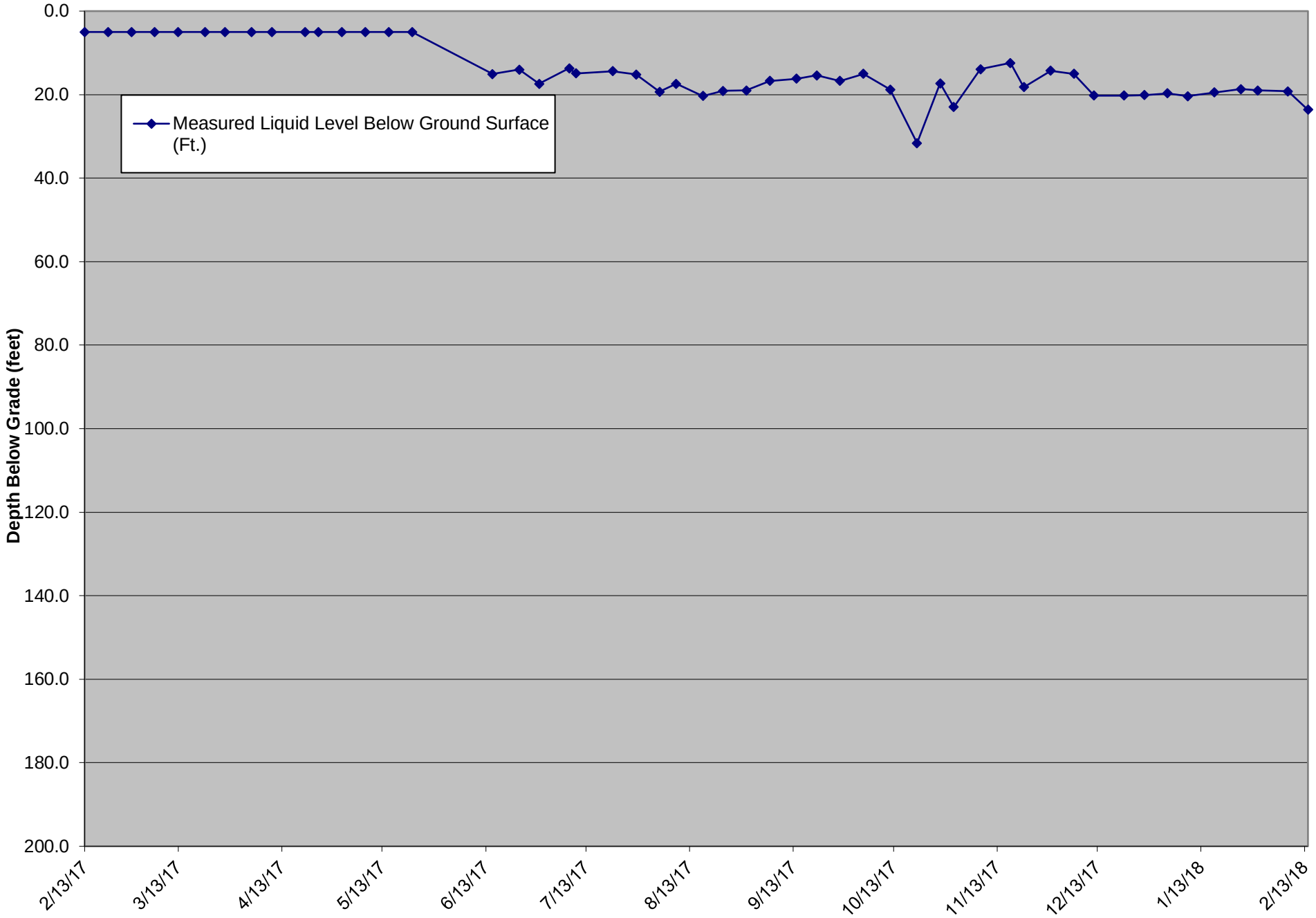
As an alternative measure, Bridgeton is preparing a design to extend the EVOH to the north in the vicinity of GEW-1A to control surface exceedances of methane and to collect landfill gas through additional landfill gas controls associated with the EVOH cap. This conceptual design was discussed in correspondence to St. Louis County Department of Public Health-Air Pollution Control Program (SLCDPH/APCP) dated February 9, 2018. The February 9, 2018 letter requested that SLCDPH/APCP consider the extension of the North Quarry EVOH cap system and additional gas collection controls as a replacement to GEW-1A. If the approach is approved by SLCDPH/APCP, Bridgeton will provide a project schedule, monitoring frequency, and design detail within ninety (90) days of obtaining concurrence. Further, the February 9, 2018 letter requested an additional ninety (90) days for the area in the vicinity of GEW-1A to be addressed for adequate monitoring requirements to allow time to complete design, procurement, and construction schedules. SLCDPH/APCP responded to the February 9, 2018 request letter in correspondence dated February 13, 2018. SLCDPH/APCP indicated that they consider the EVOH liner extension to be a replacement for GEW-1A or best available alternative to a gas extraction well. The February 13, 2018 SLCDPH/APCP letter approved the 90-day extension for correcting the oxygen parameter exceedance at GEW-1A (due May 13, 2018).

ATTACHMENT A

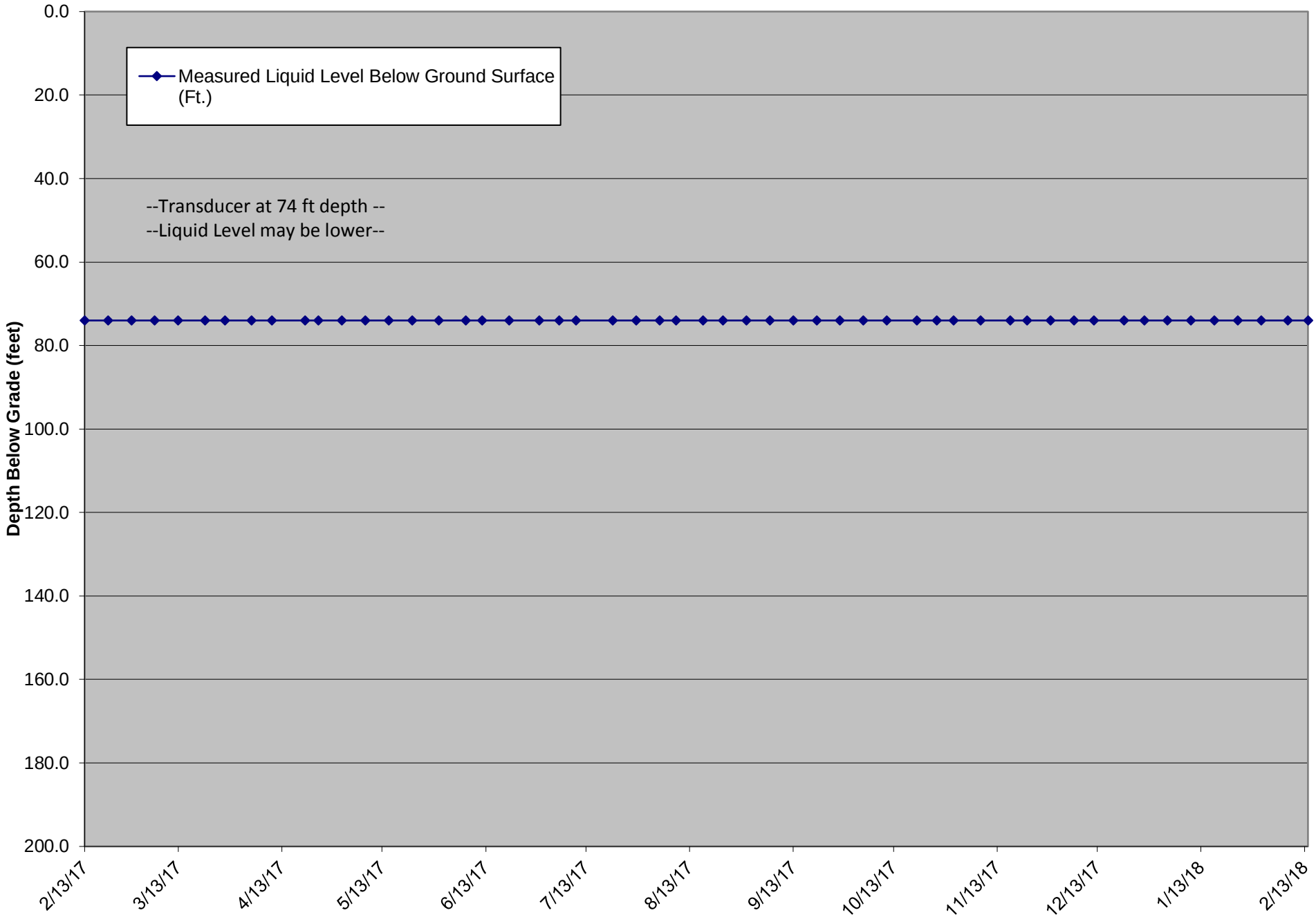
LEACHATE LEVELS IN LEACHATE COLLECTION SUMPS

LCS-1D Liquid Level Below Ground Surface

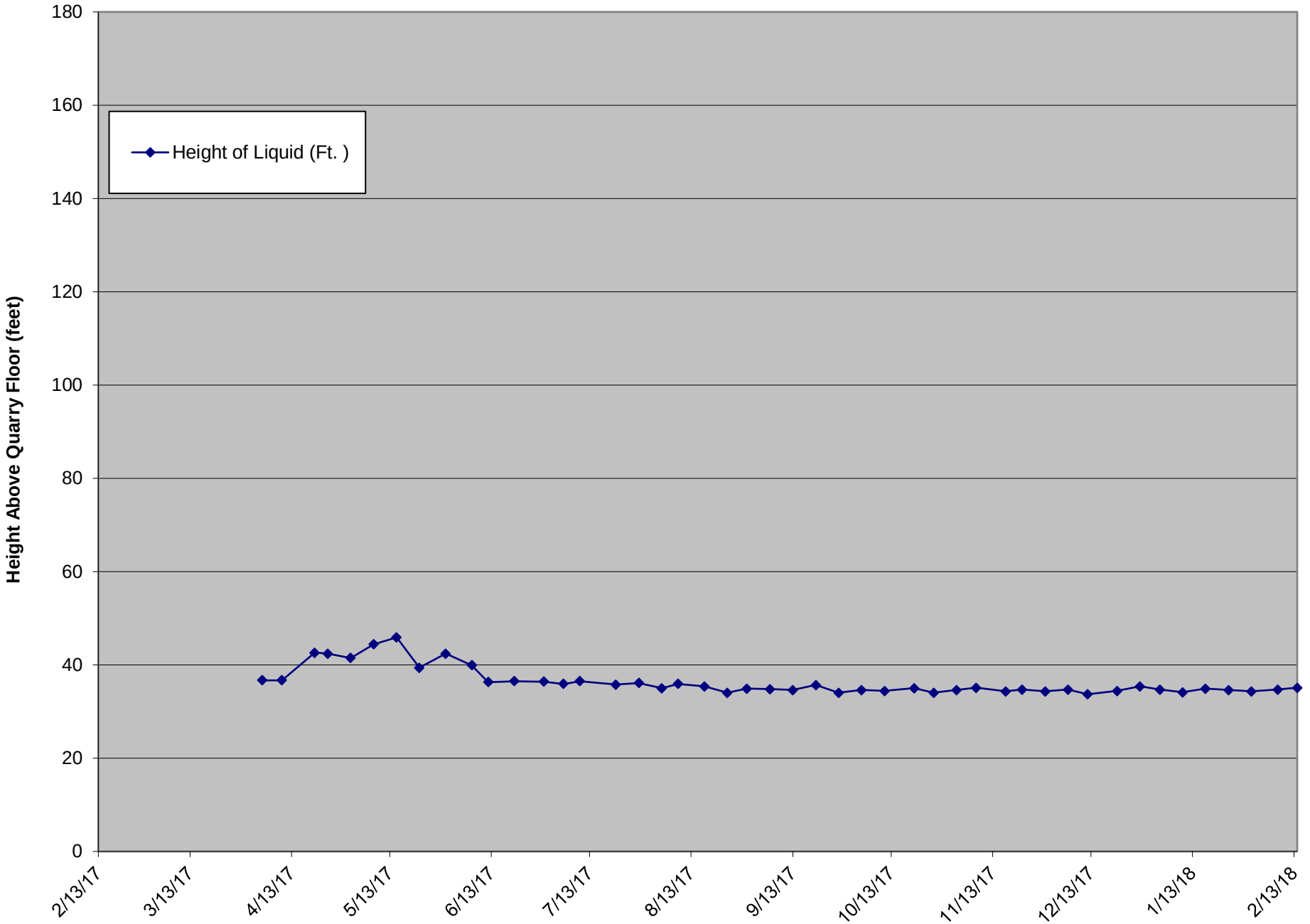



LCS-3D Liquid Level Below Ground Surface
Depth Below Grade (feet)
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
Measured Liquid Level Below Ground Surface (Ft.)
2/13/17
3/13/17
4/13/17
5/13/17
6/13/17
7/13/17
8/13/17
9/13/17
10/13/17
11/13/17
12/13/17
1/13/18
2/13/18

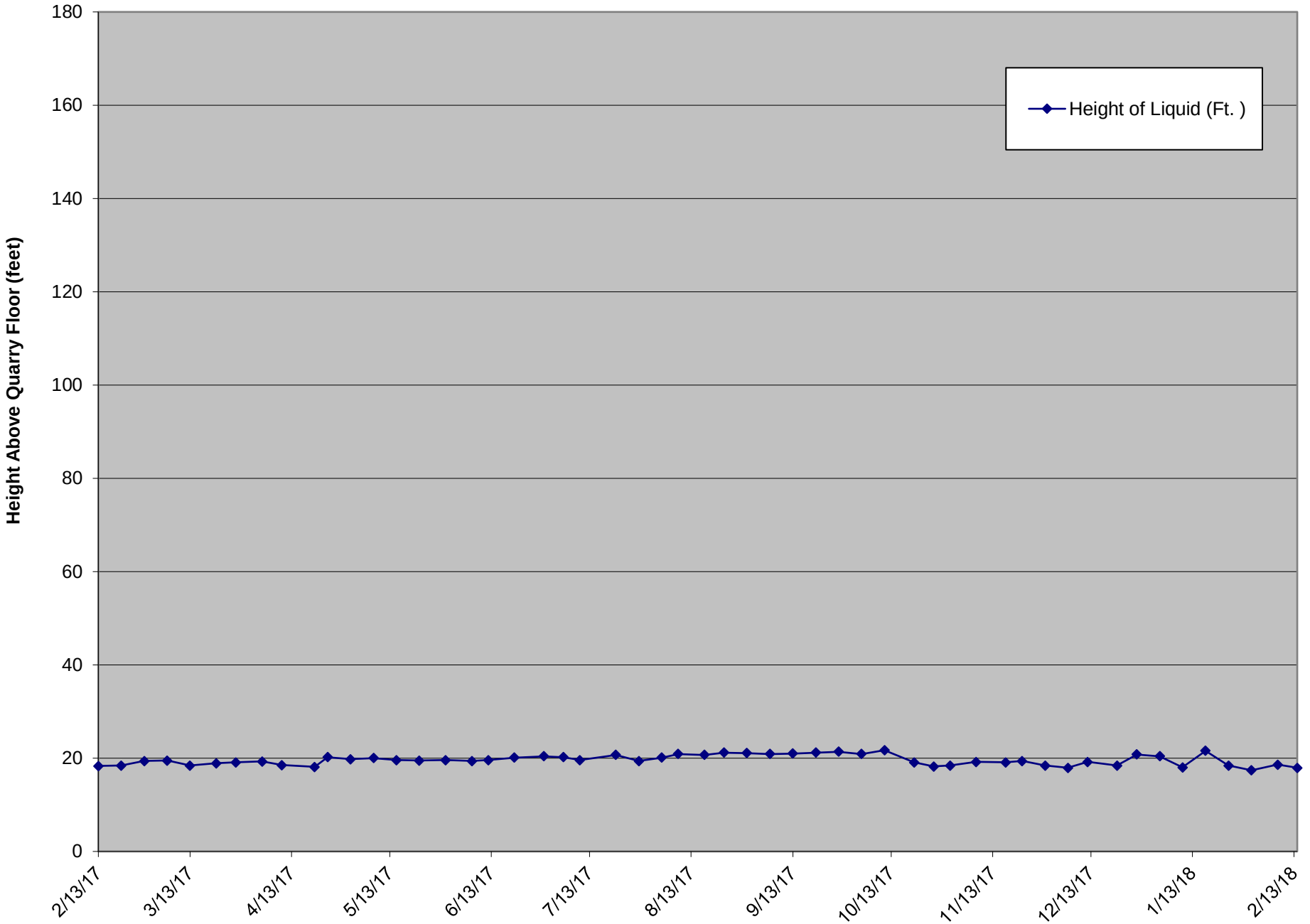
LCS-4B Liquid Level Below Ground Surface



LCS-5B Liquid Level Above Quarry Floor

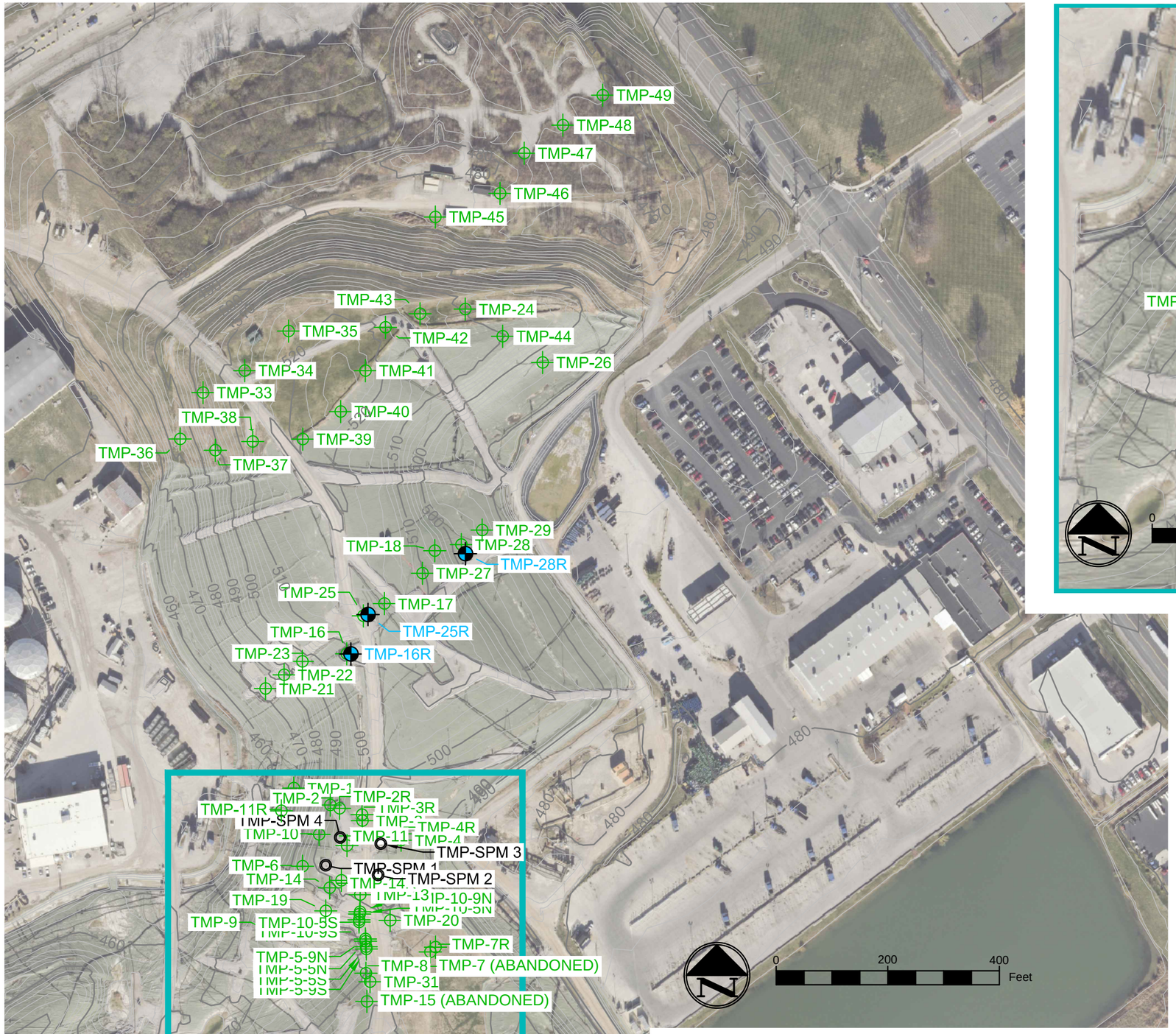


LCS-6B Liquid Level Above Quarry Floor



ATTACHMENT B

TEMPERATURE MONITORING PROBE ANALYTICAL CHARTS



NECK AREA INSET

LEGEND

500	12-1-2017 AERIAL TOPOGRAPHY (2' CONTOUR)
500	12-1-2017 AERIAL TOPOGRAPHY (10' CONTOUR)
TMP-13	INSTALLED TMP LOCATION
TMP-SPM 1	TMP-SPM (ASBUILT OCTOBER 13, 2016)
TMP-16R	REPLACEMENT TMP INSTALLED IN 2017

NOTE:

1.) AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS, INC. AND IS DATED DECEMBER 1, 2017

BRIDGETON LANDFILL, LLC
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MISSOURI 63044

BRIDGETON LANDFILL

TMP LOCATIONS

PROJECT NUMBER: BT-124

C:\Users\plins\Dropbox (Feezor Engineering)\Bridgeton (Team Folder Conflict)\BT-113 Task - Action Plan Figure 1\Weekly Report Updated TMP Drawing

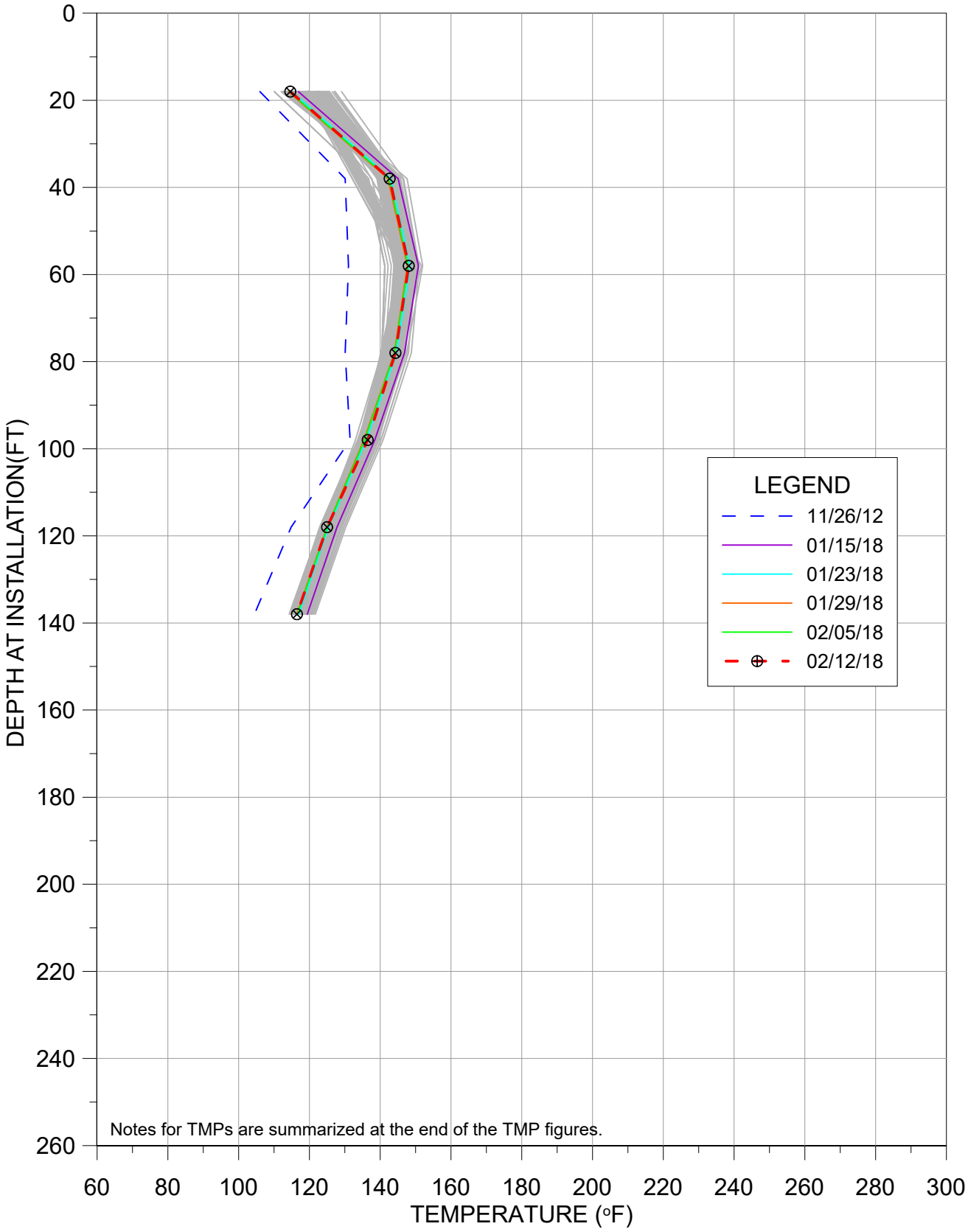
Engineering for a Better World
FEEZOR ENGINEERING, INC.

FEBRUARY 2018
DESIGNED BY: PML
APPROVED BY: ---

REVISION	DATE

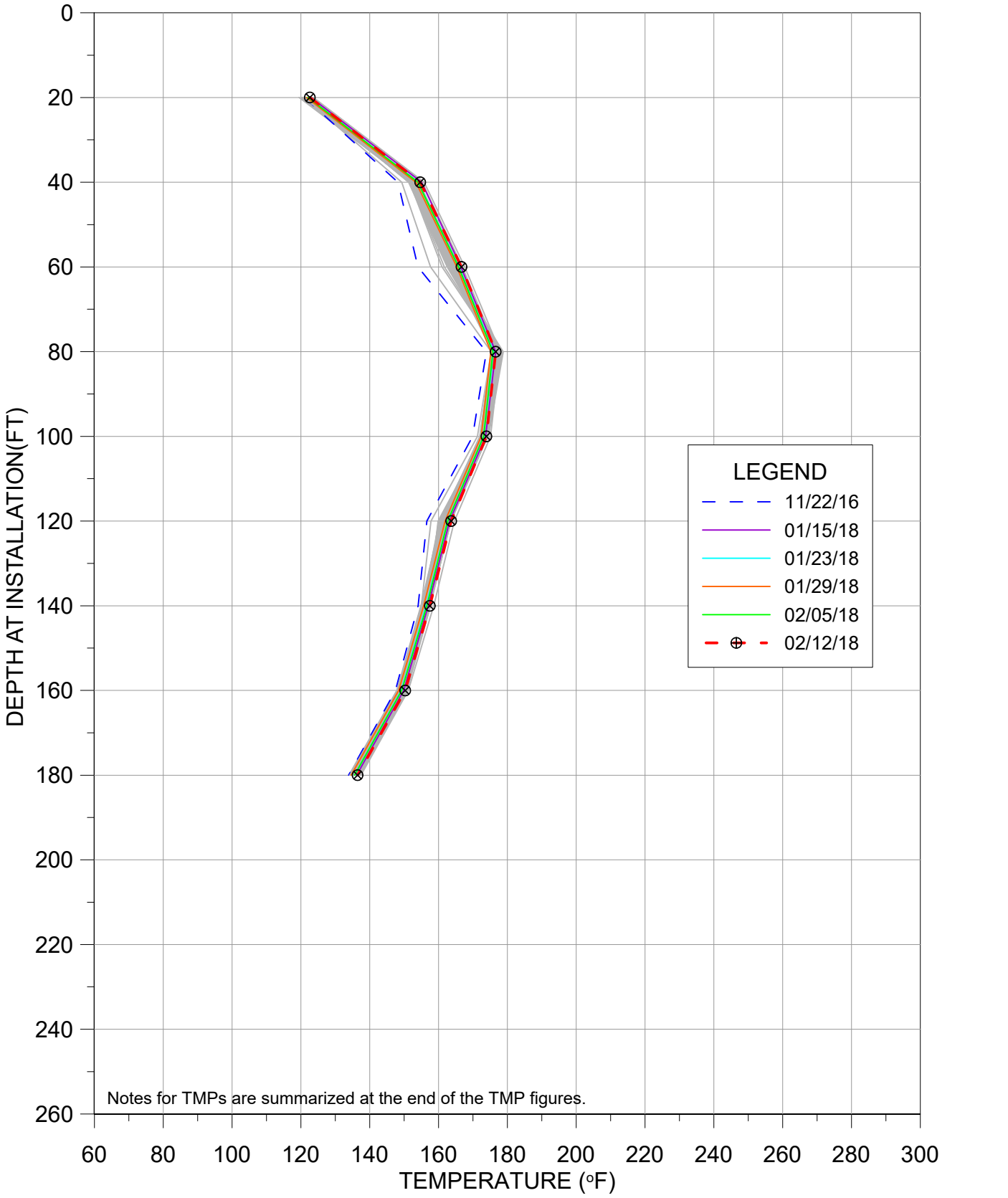
DRAWING NO.: - - -

TMP-1



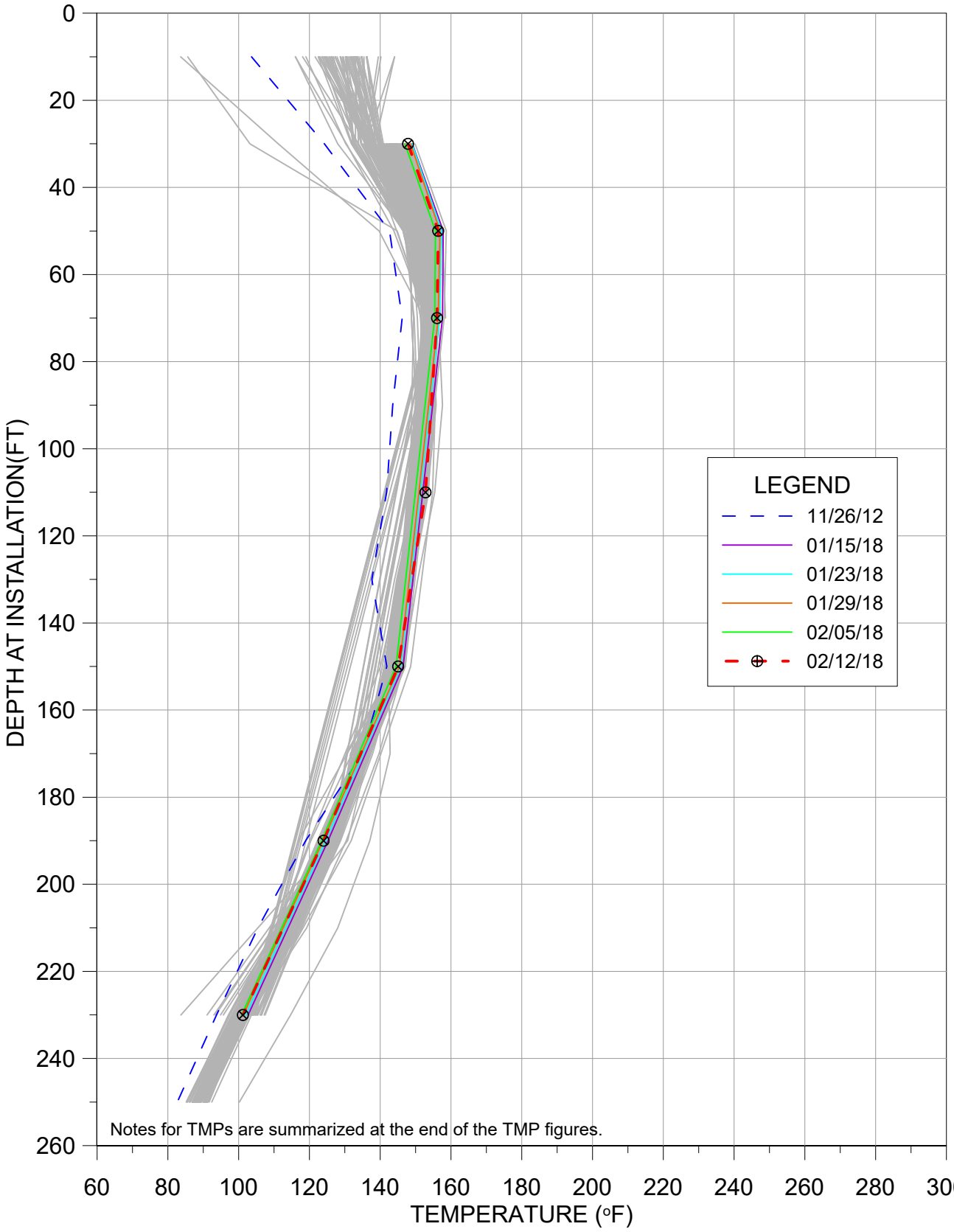
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-2R



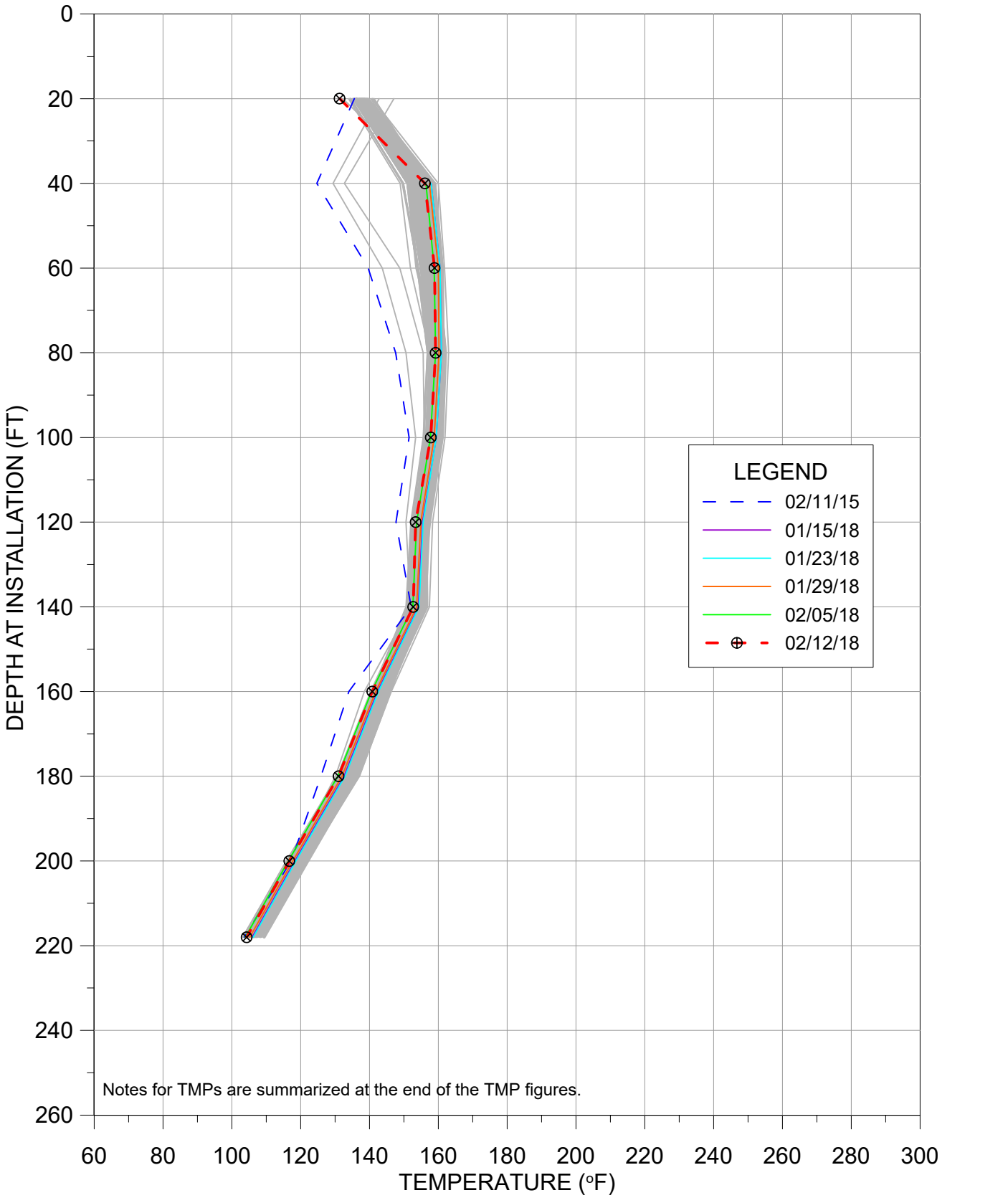
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-3



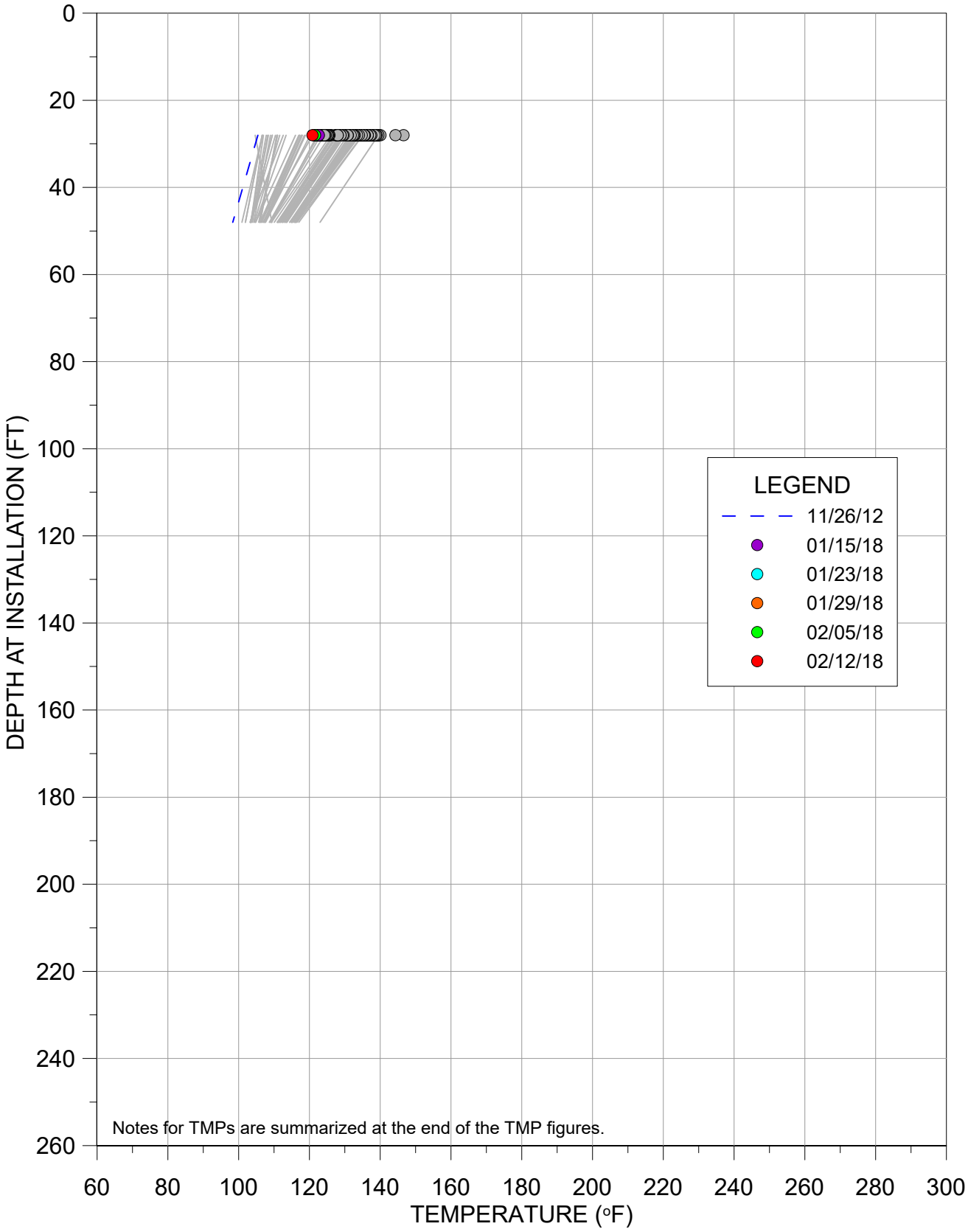
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-3R



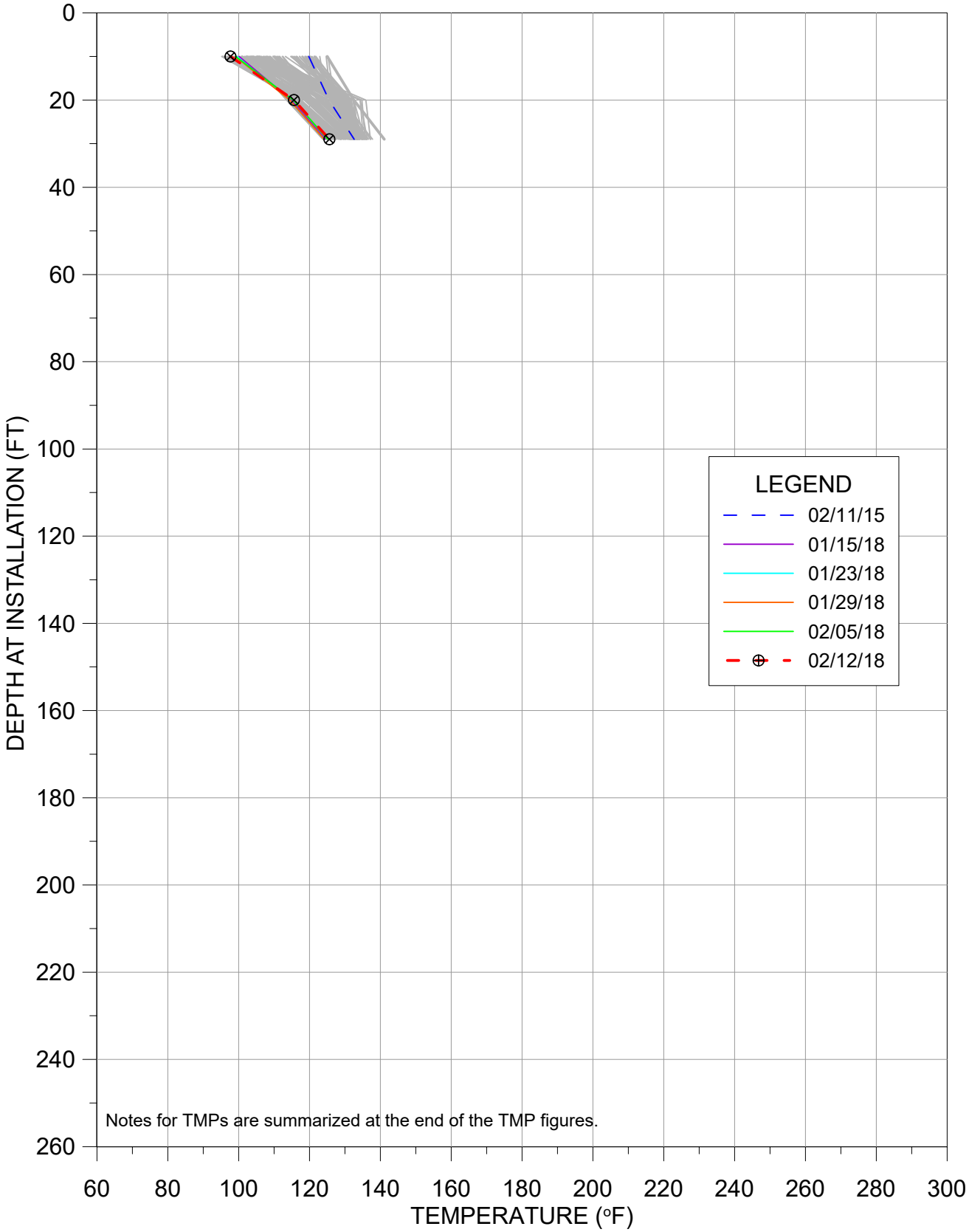
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-4



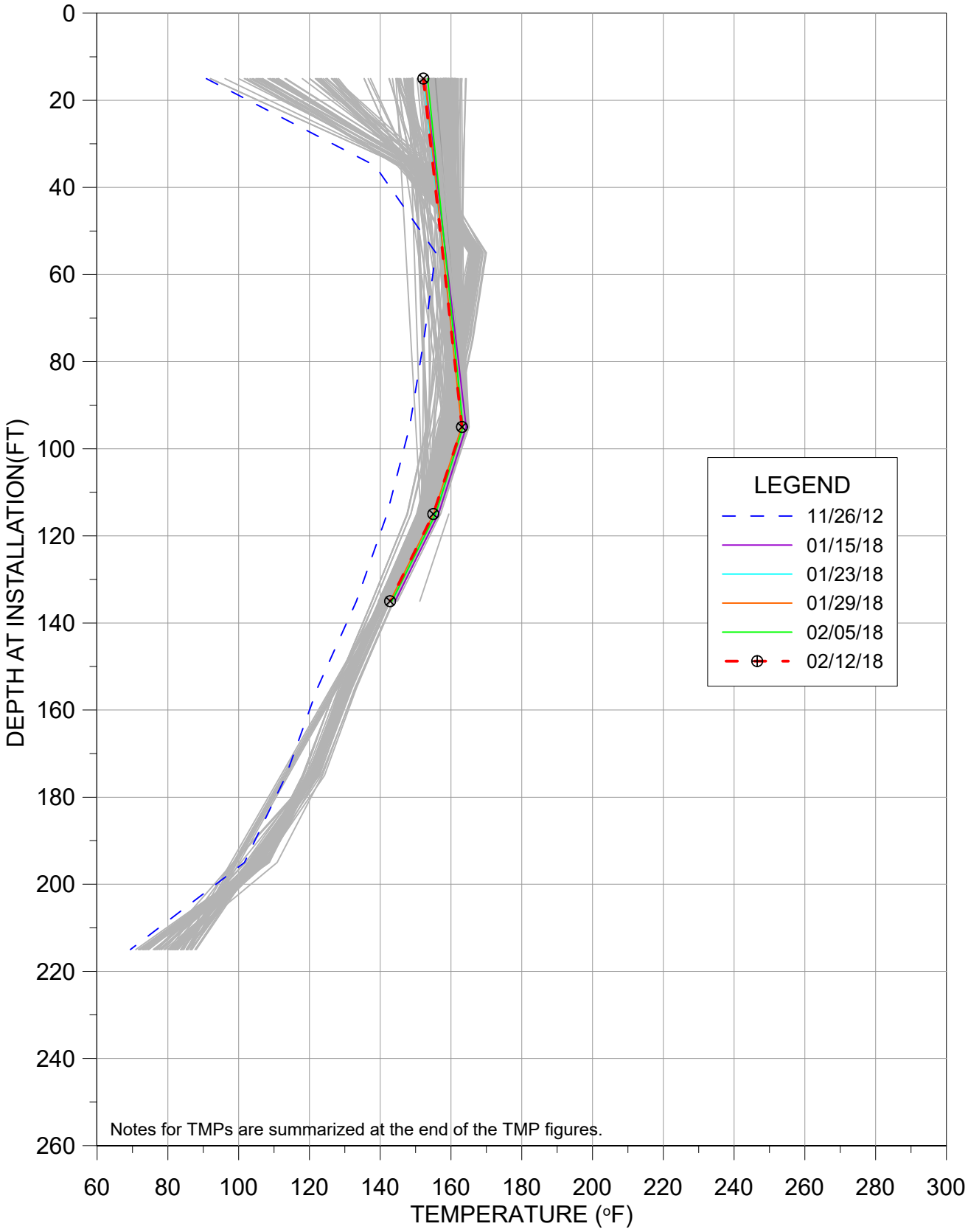
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-4R



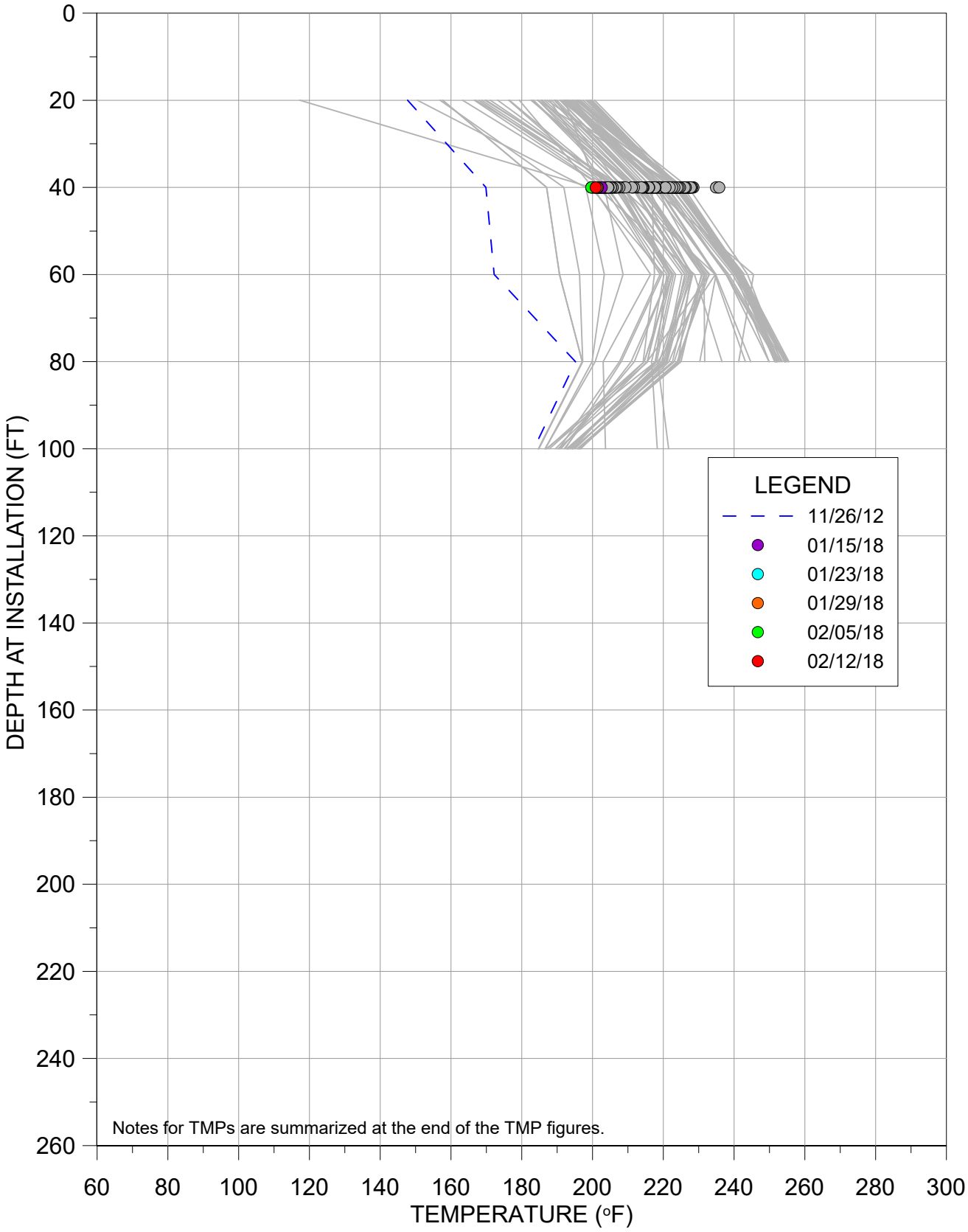
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-6



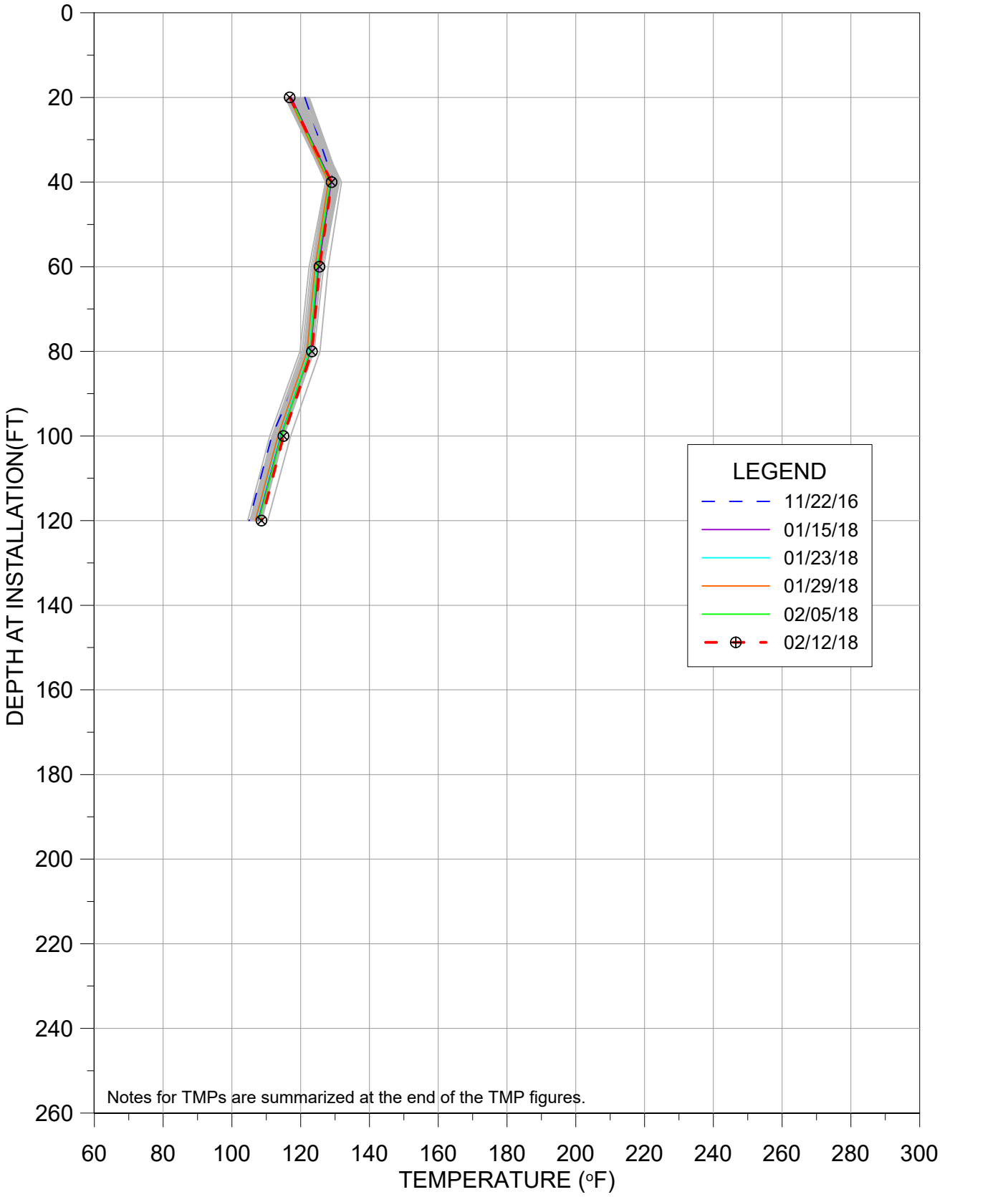
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-9



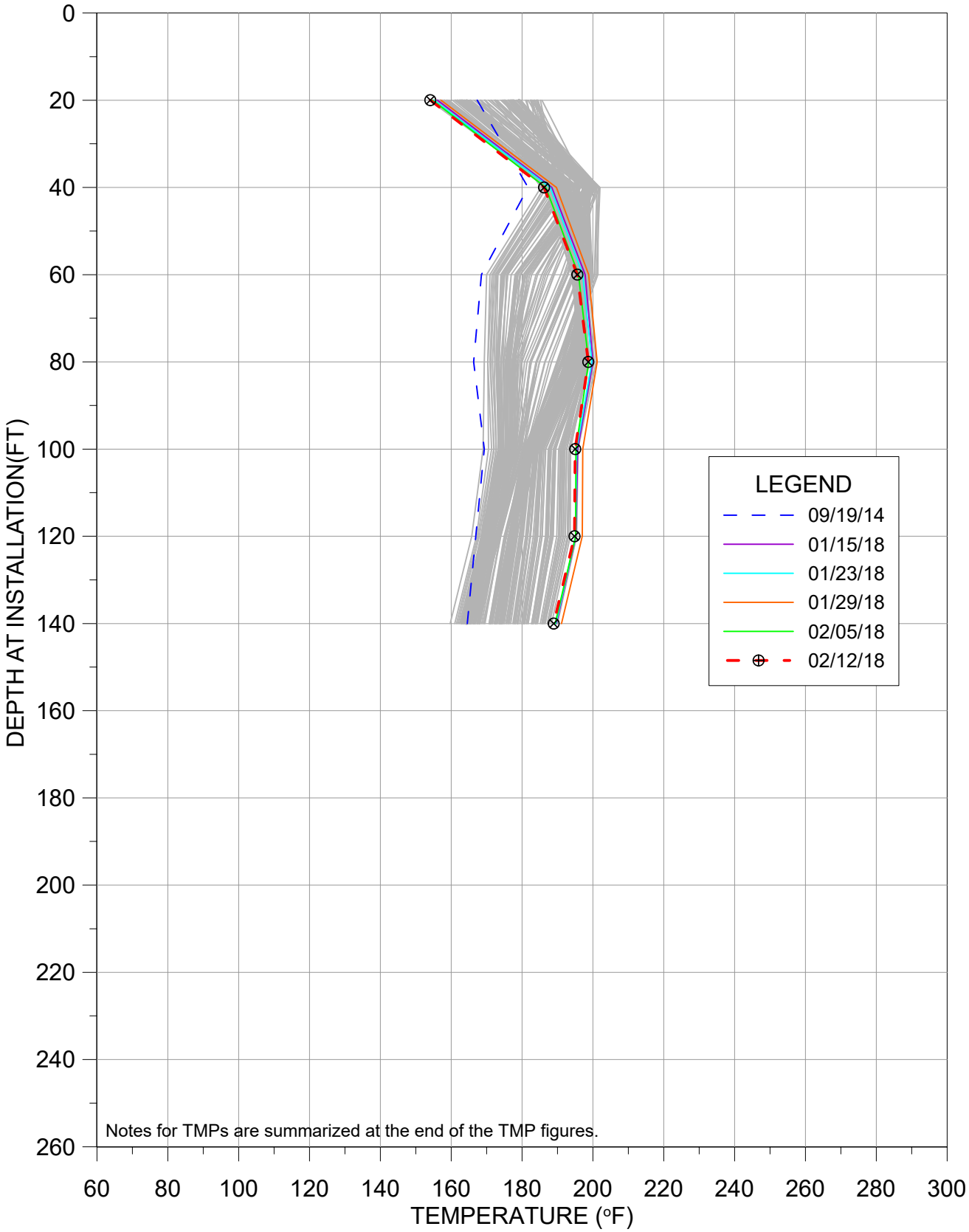
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-11R



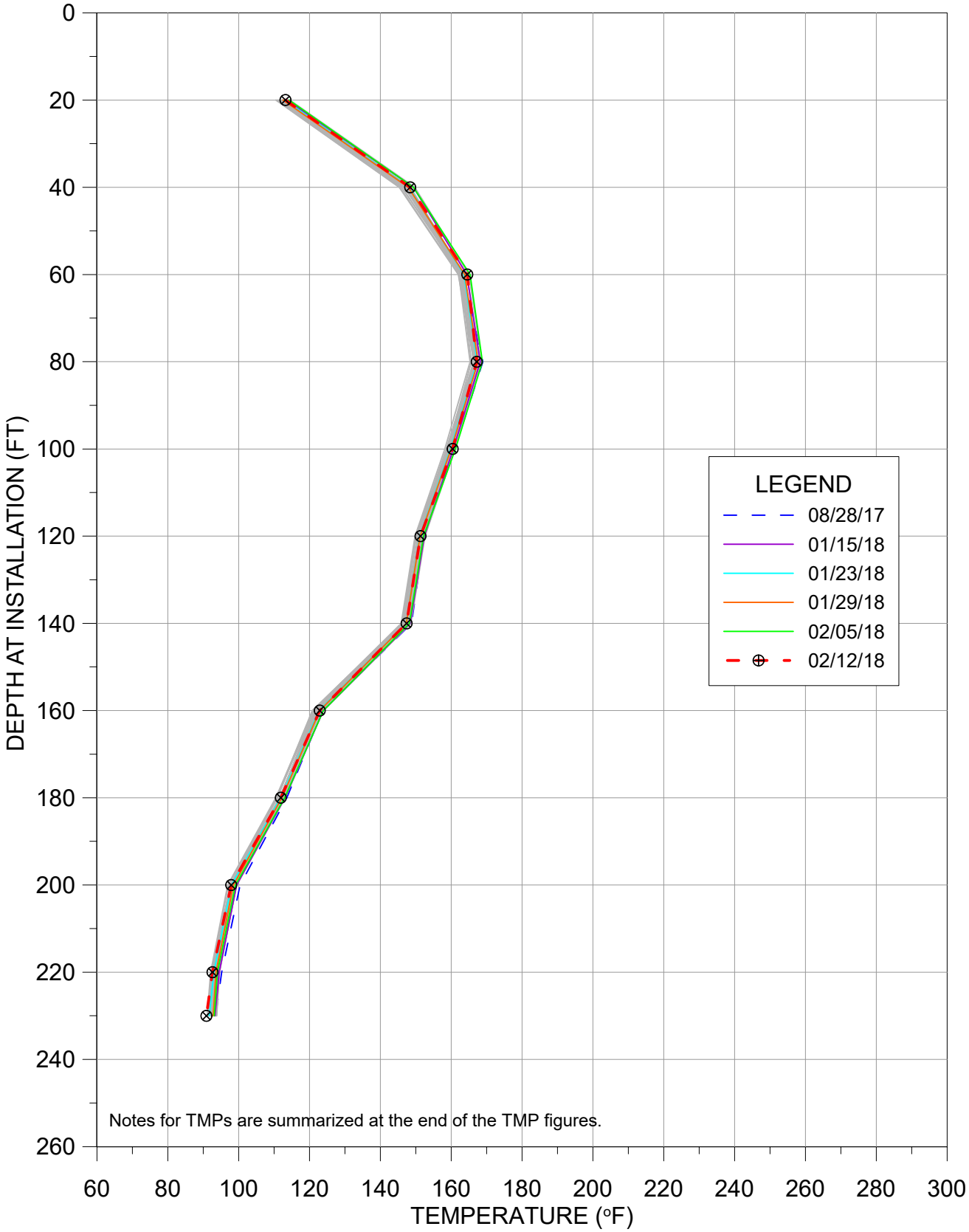
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-14R



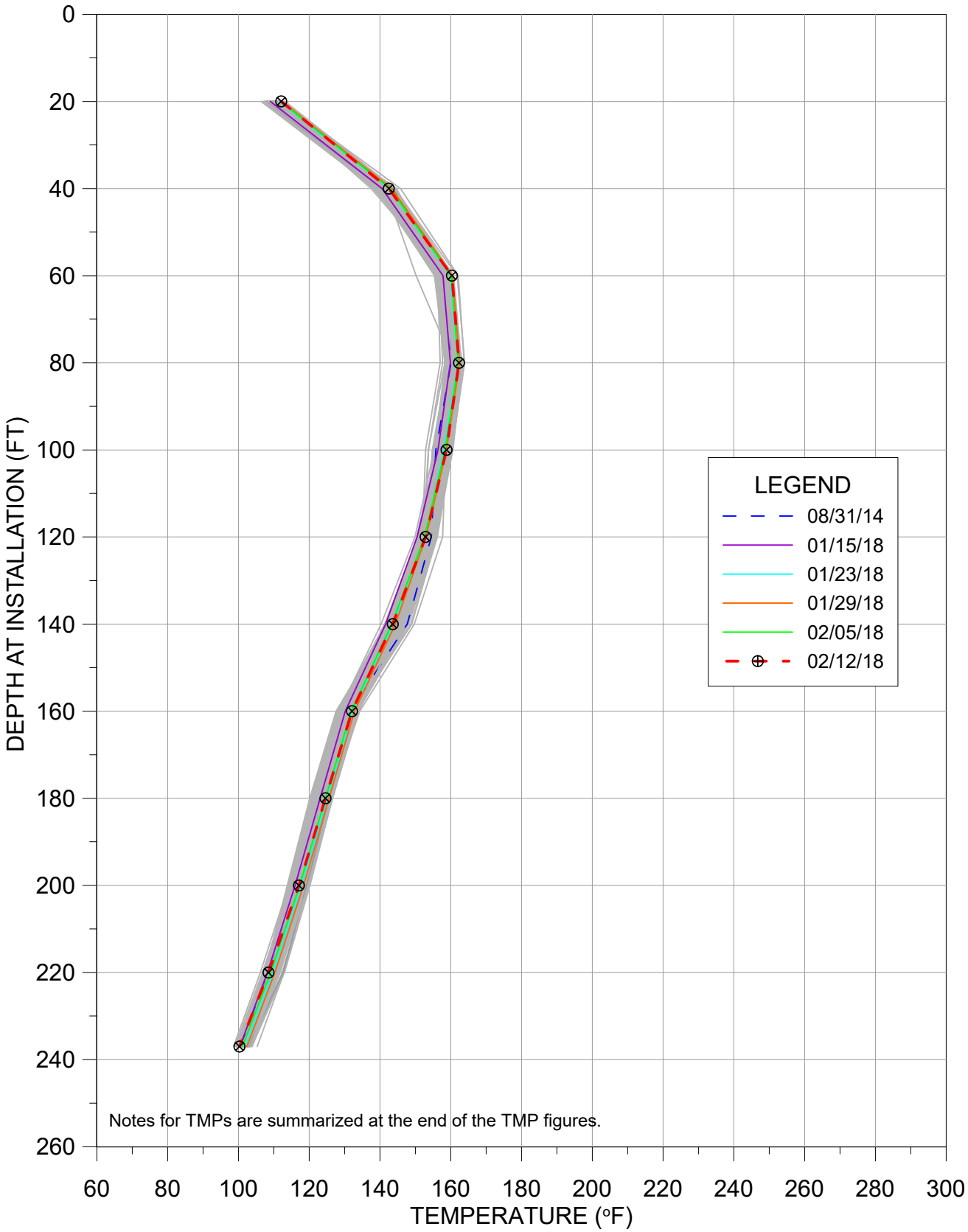
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-16R



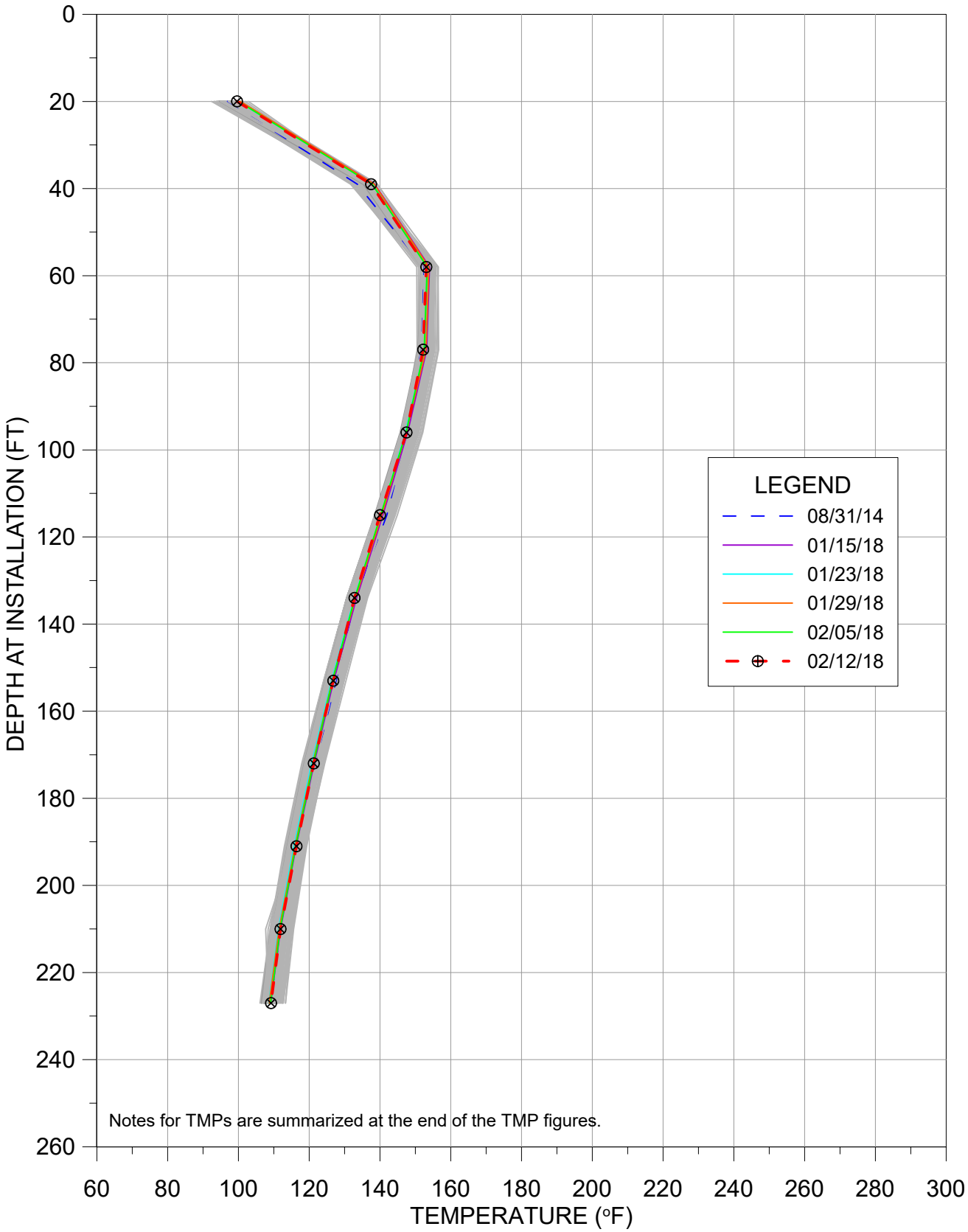
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-17



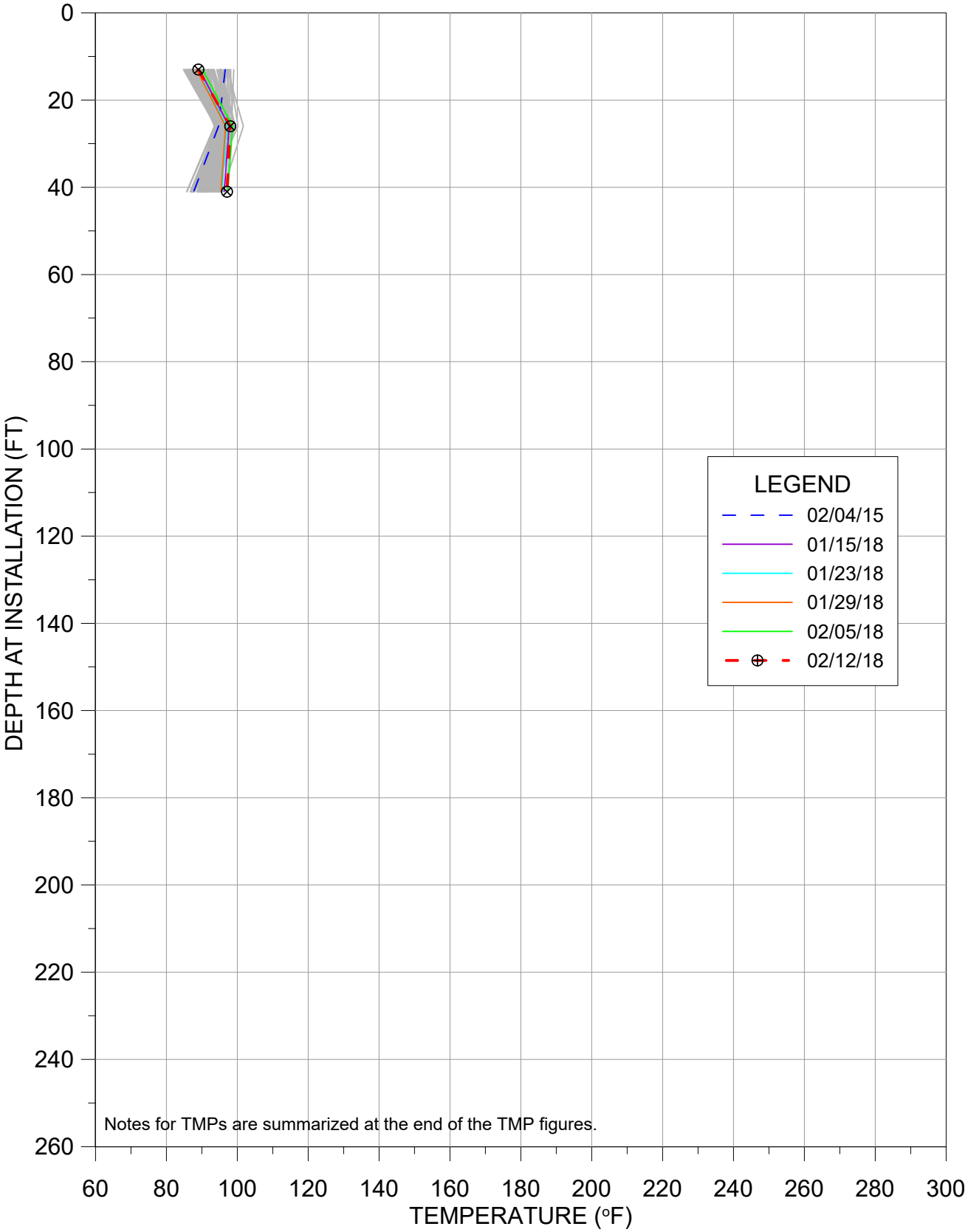
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-18



TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-21



TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

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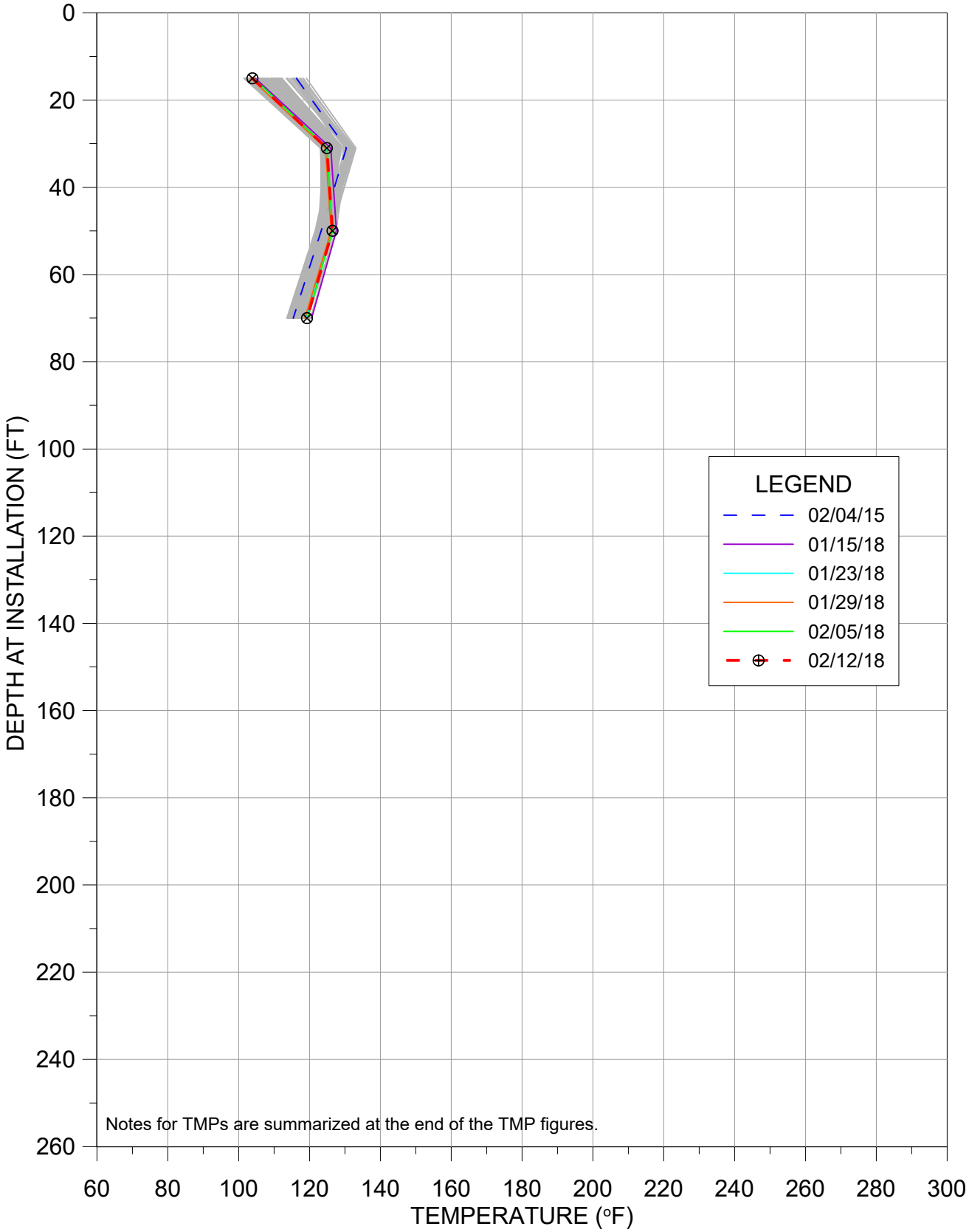

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

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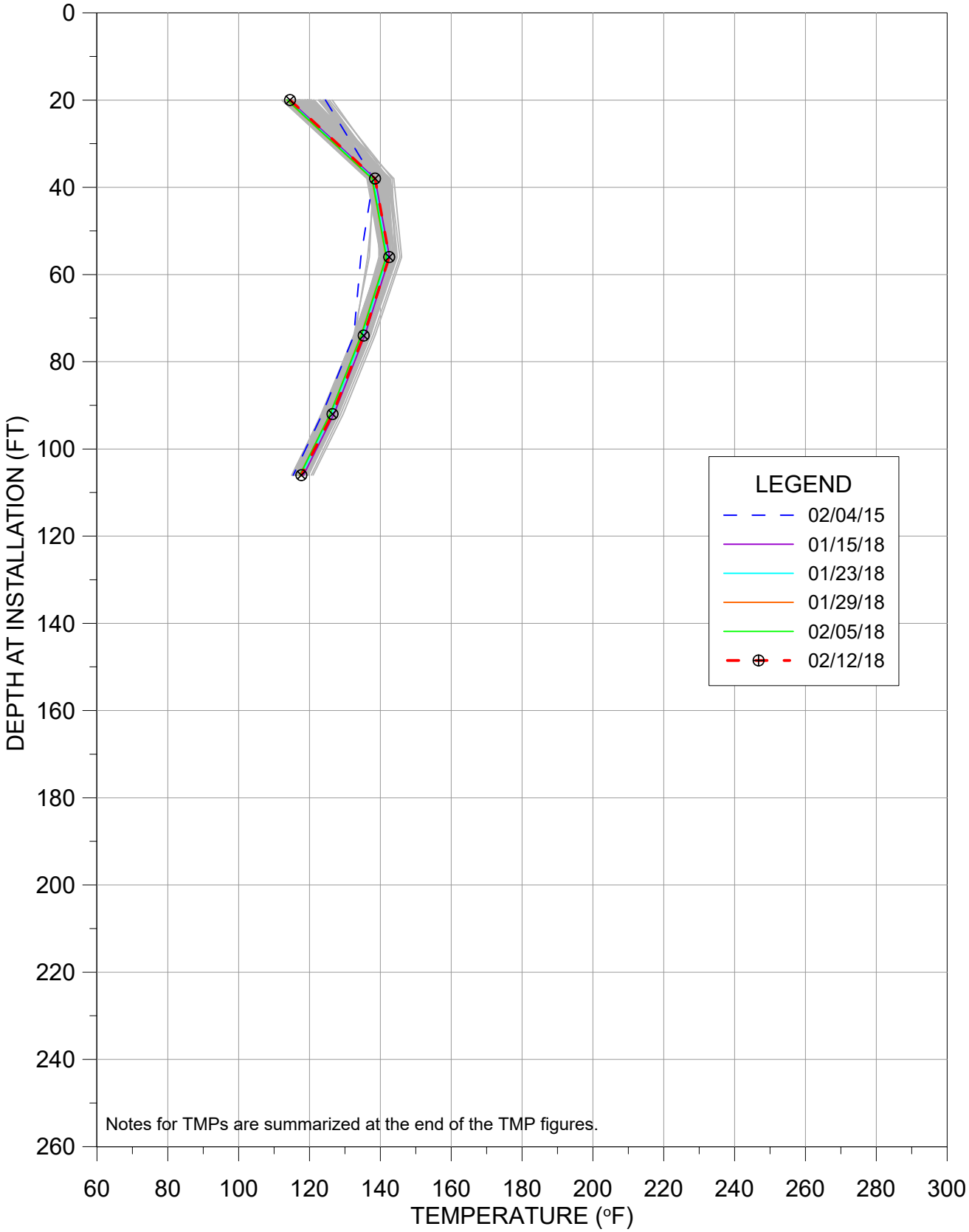
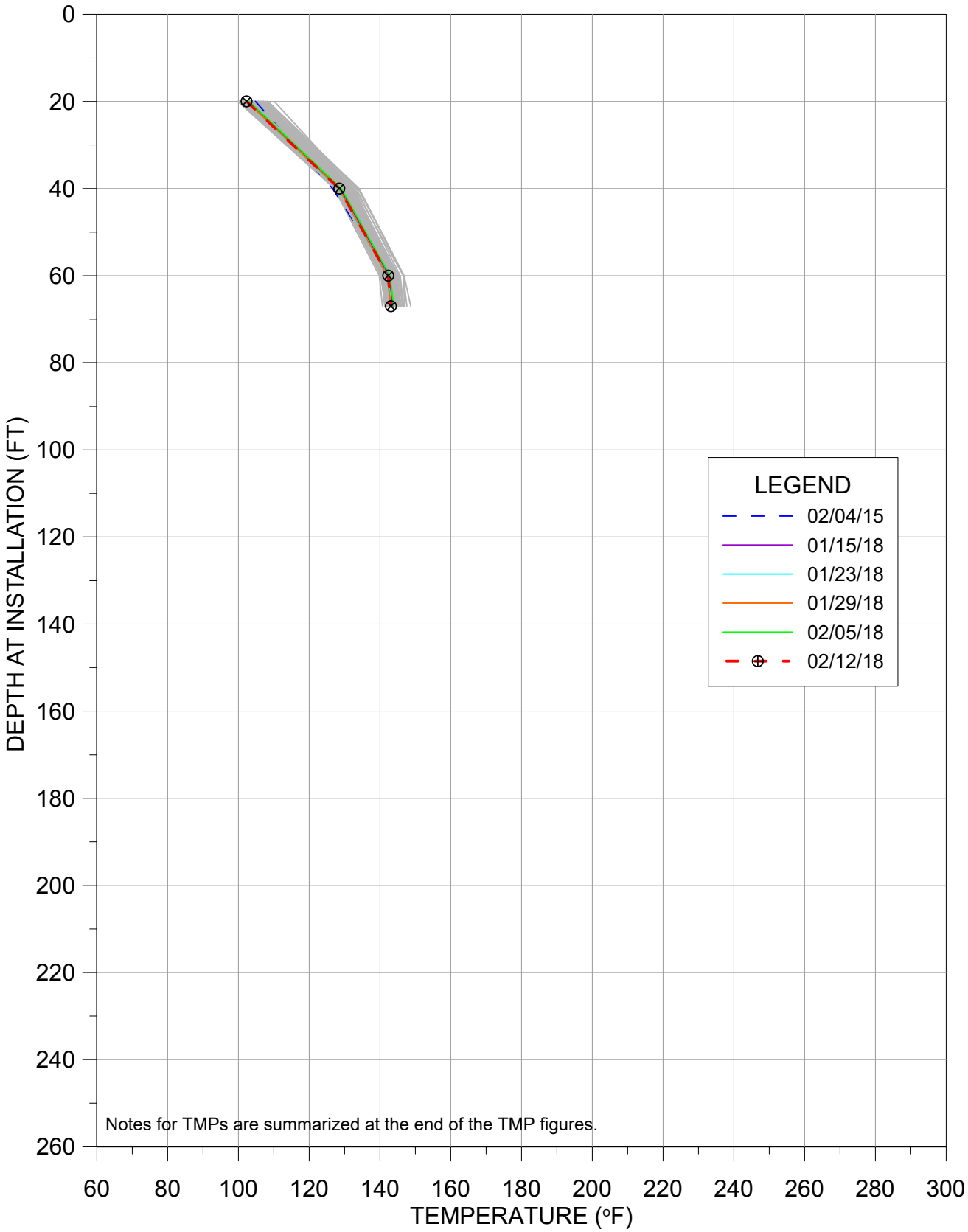


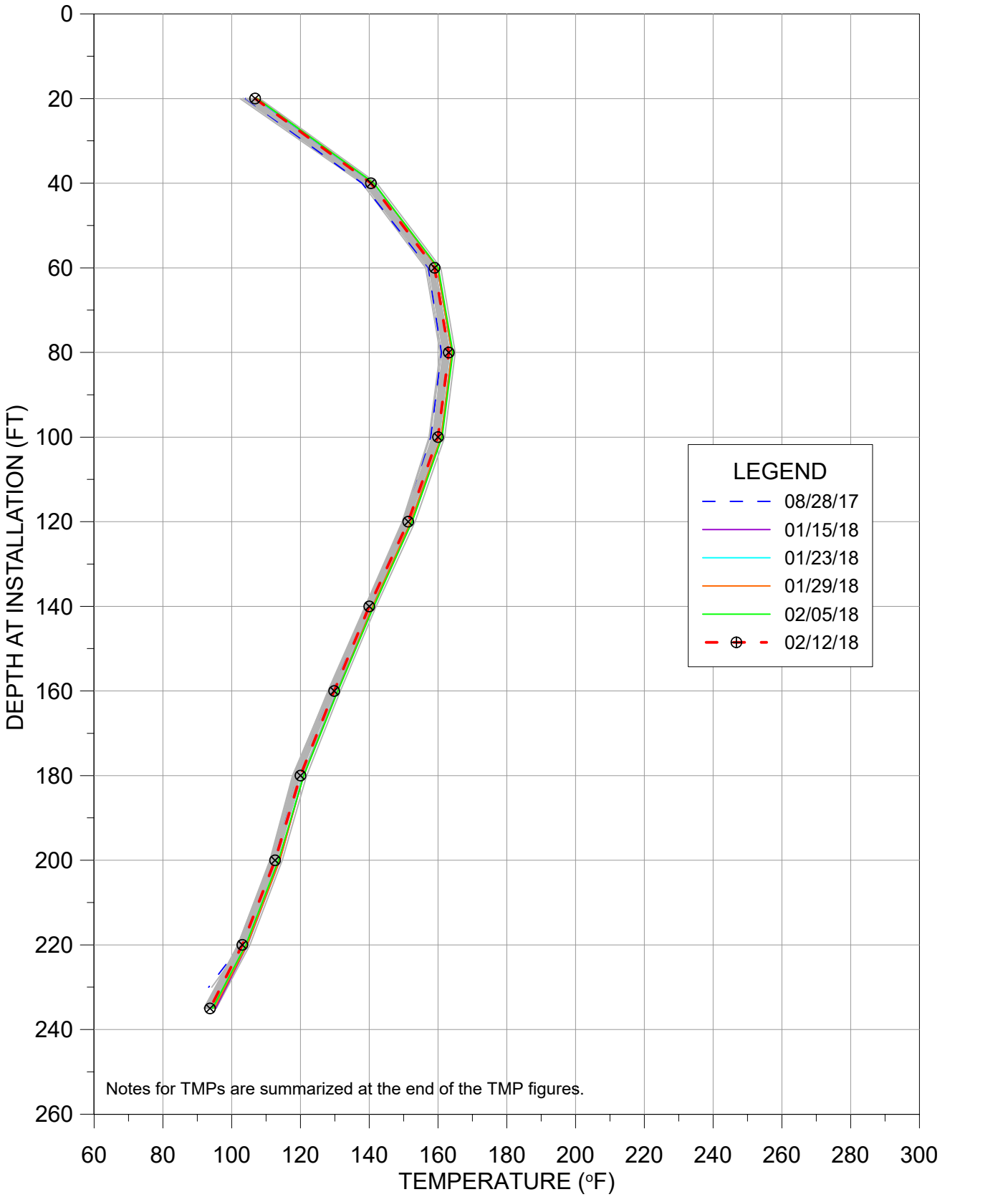
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-24



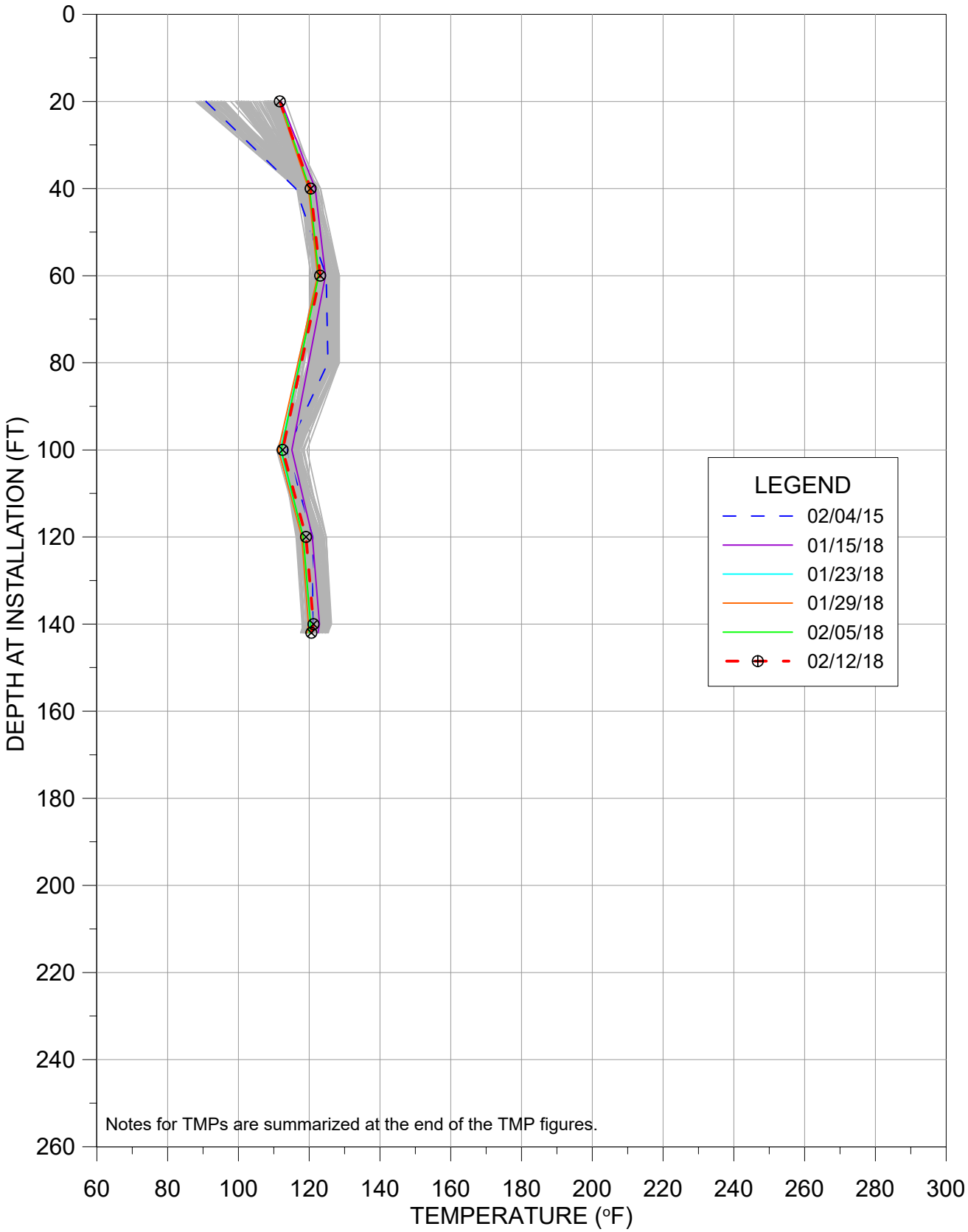
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-25R



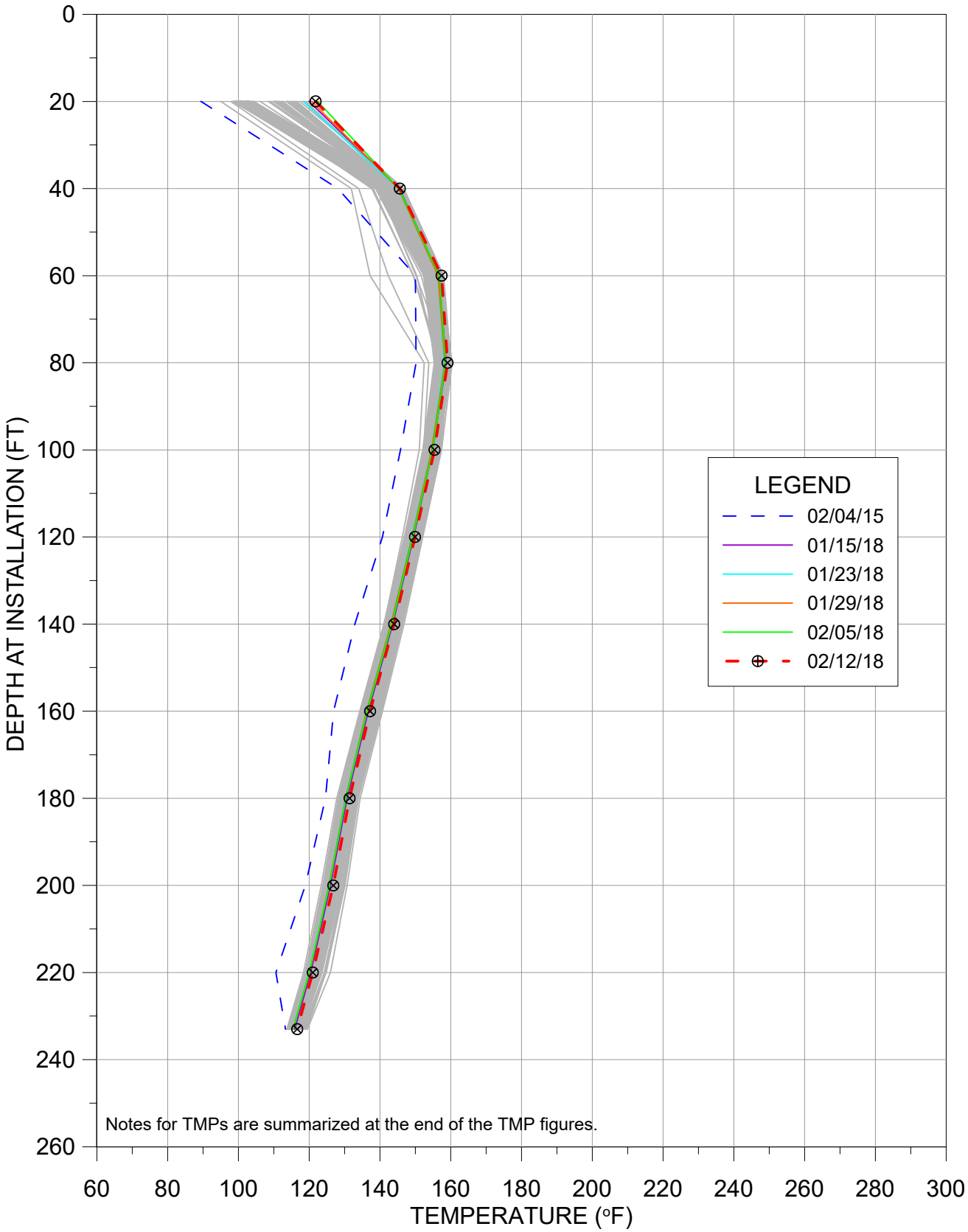
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-26



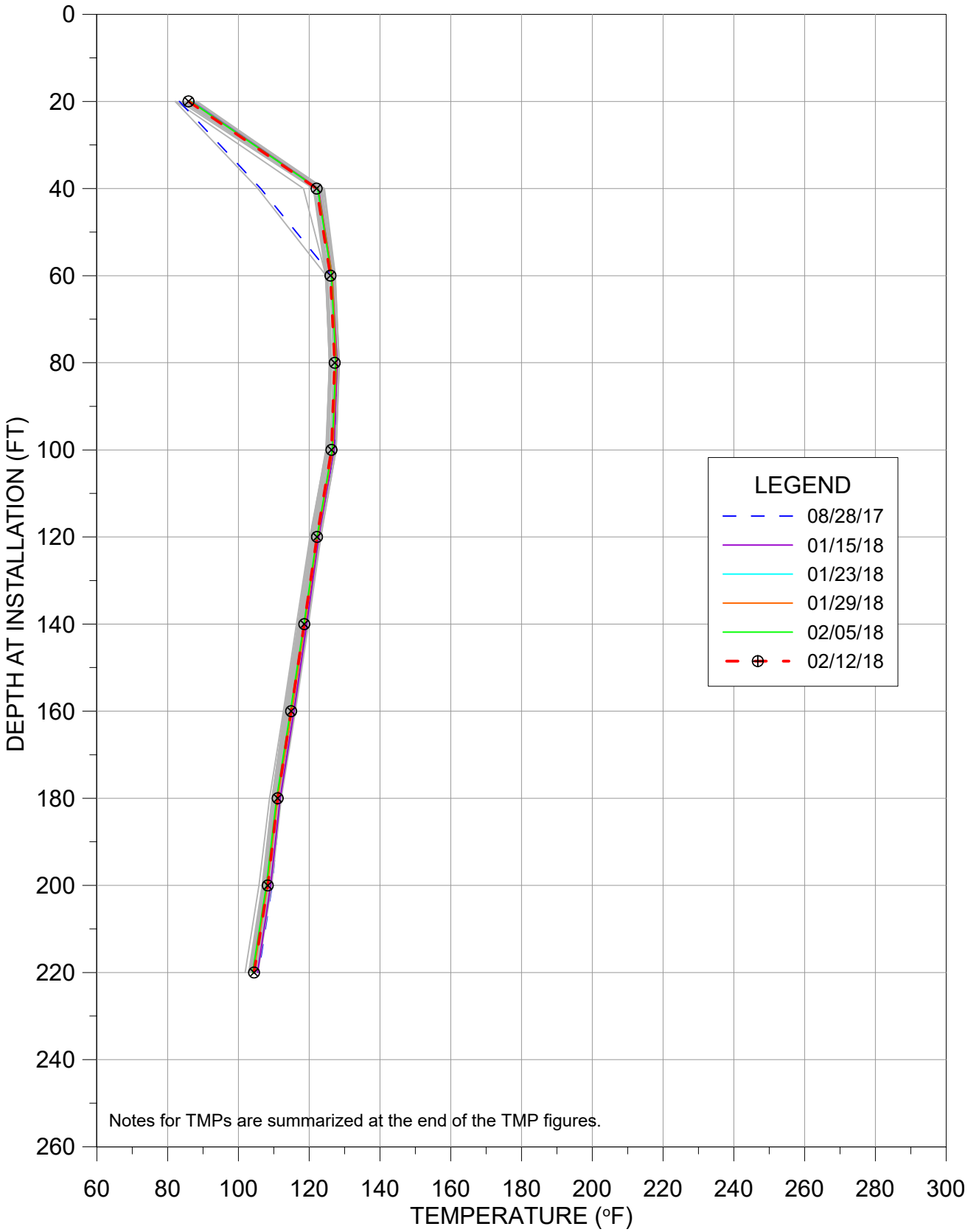
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-27



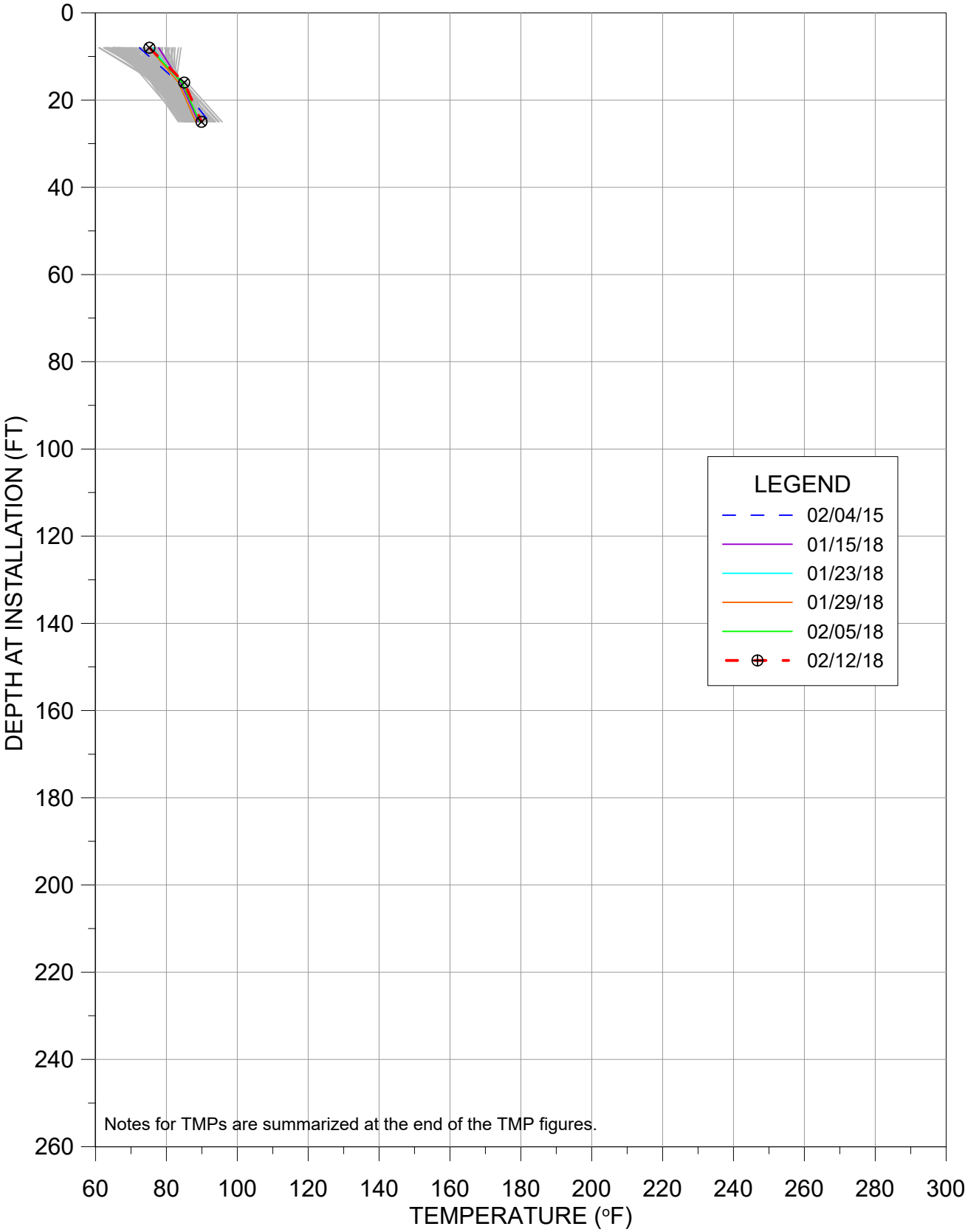
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-28R



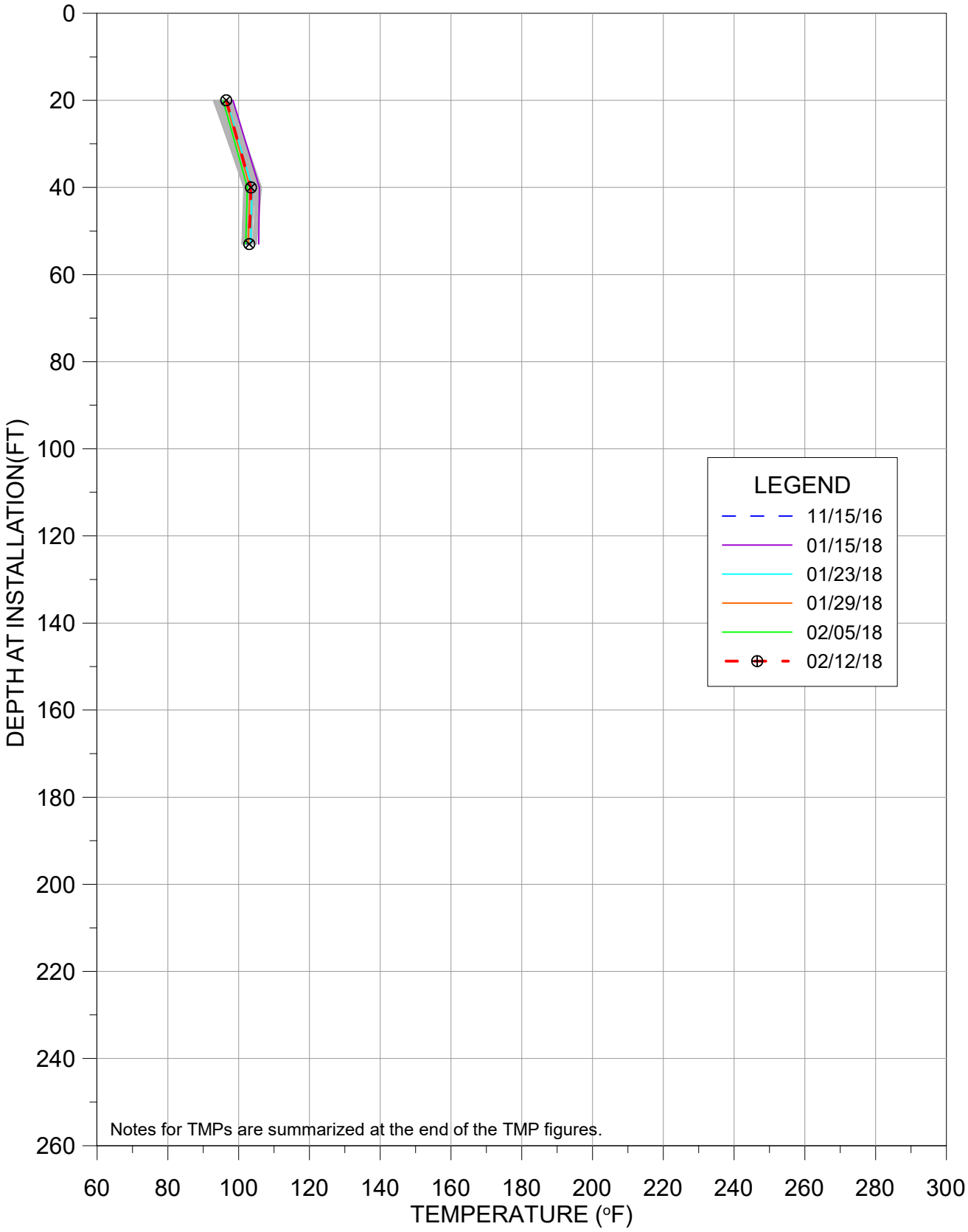
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-29



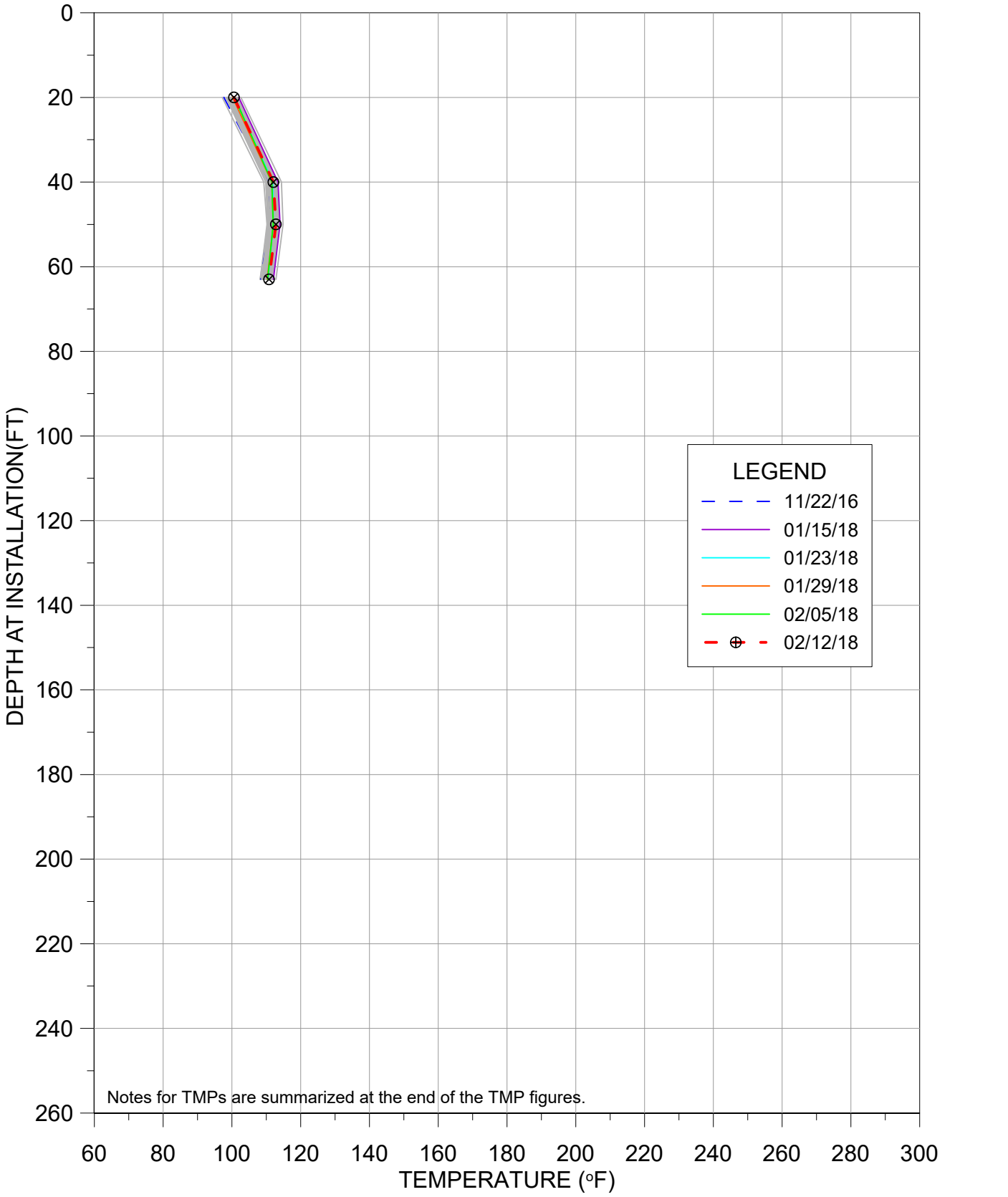
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-33



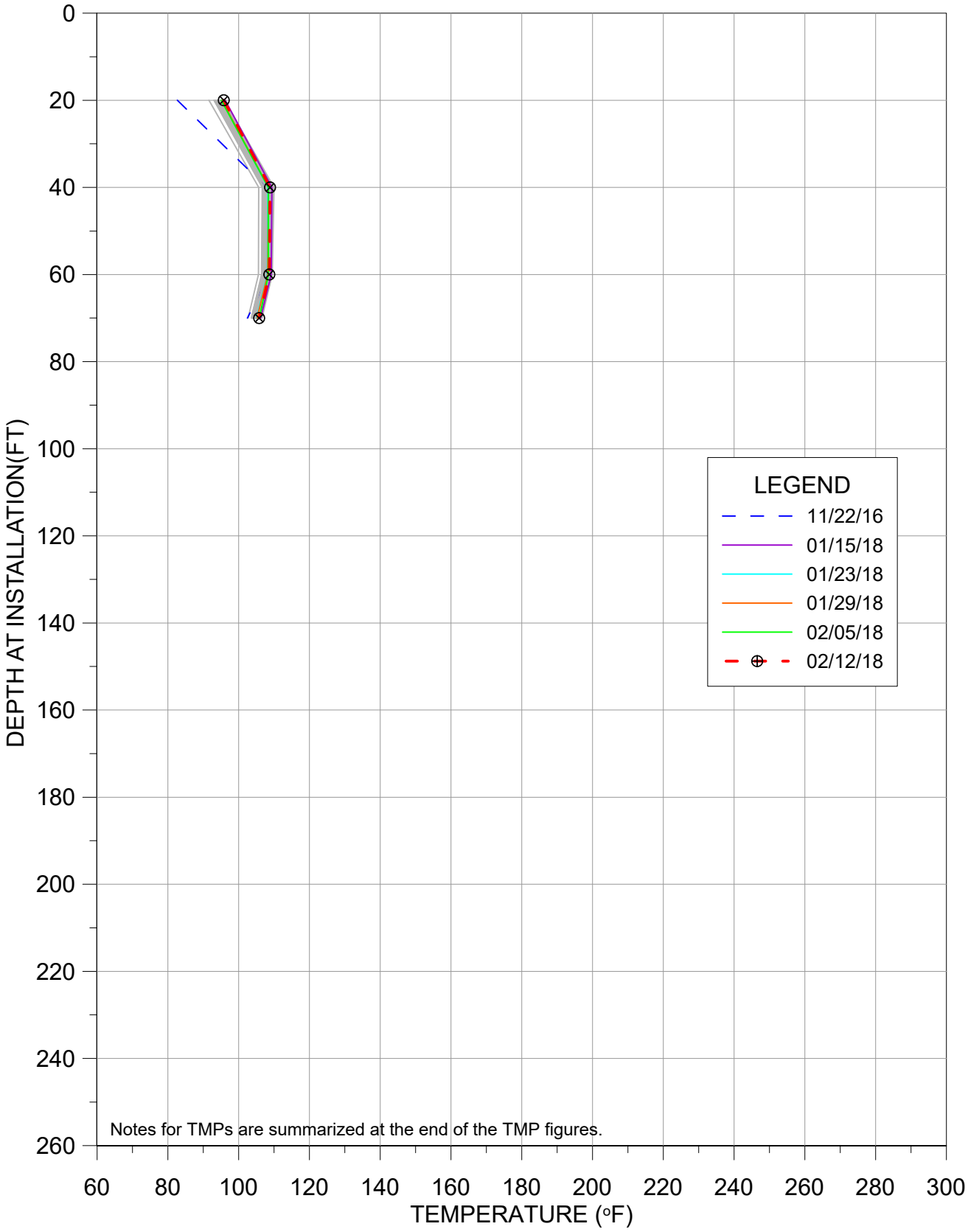
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-34



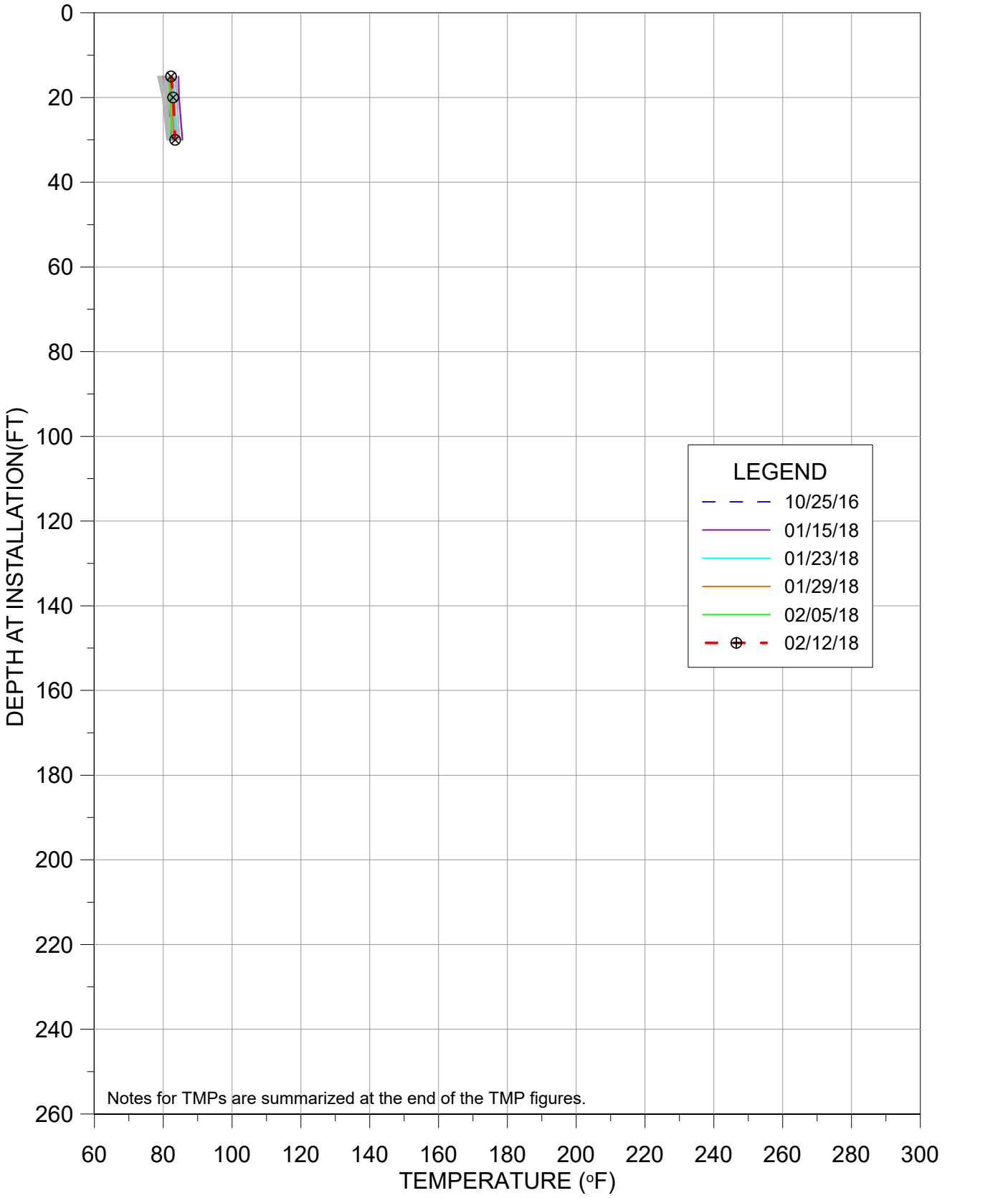
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-35



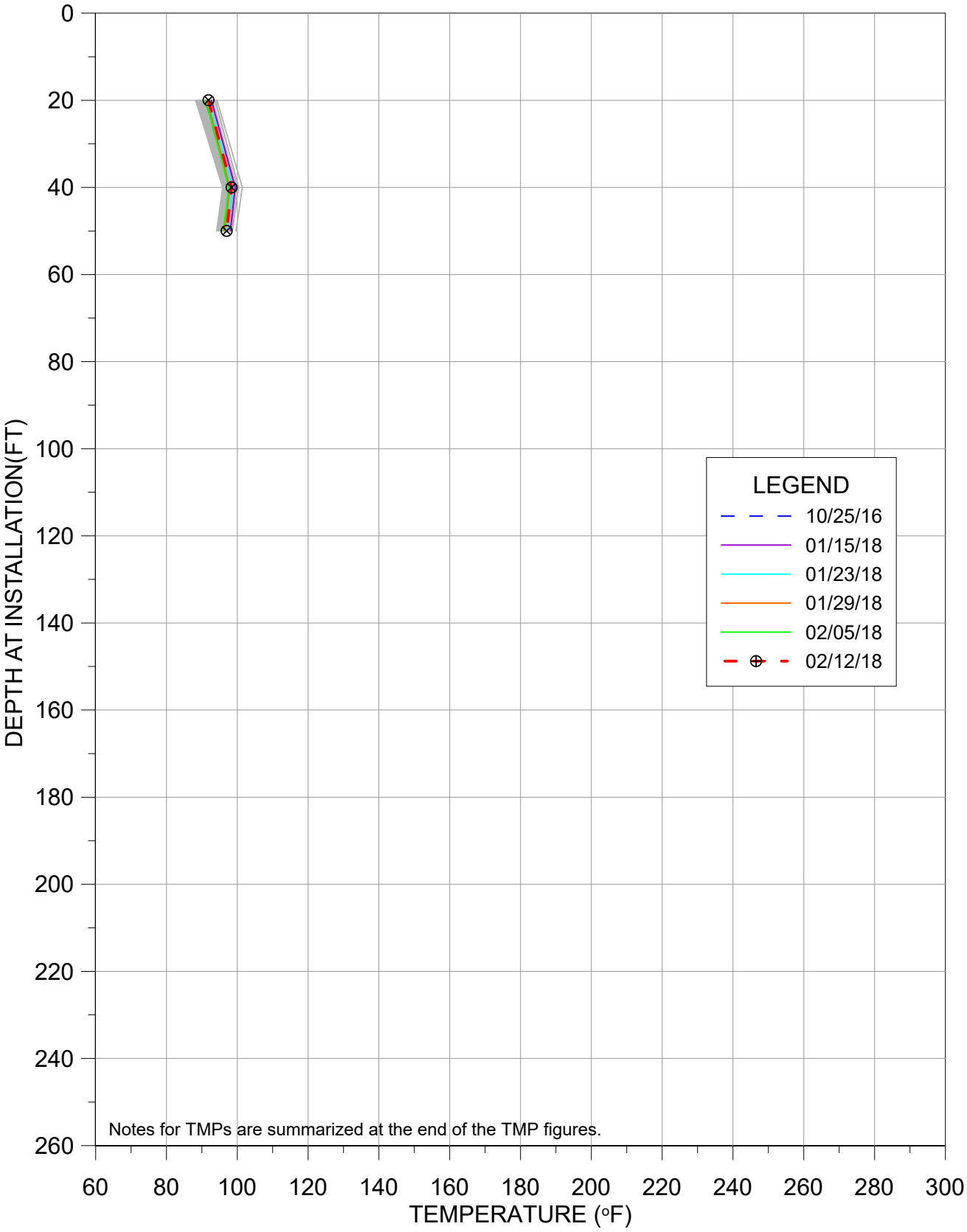
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-36



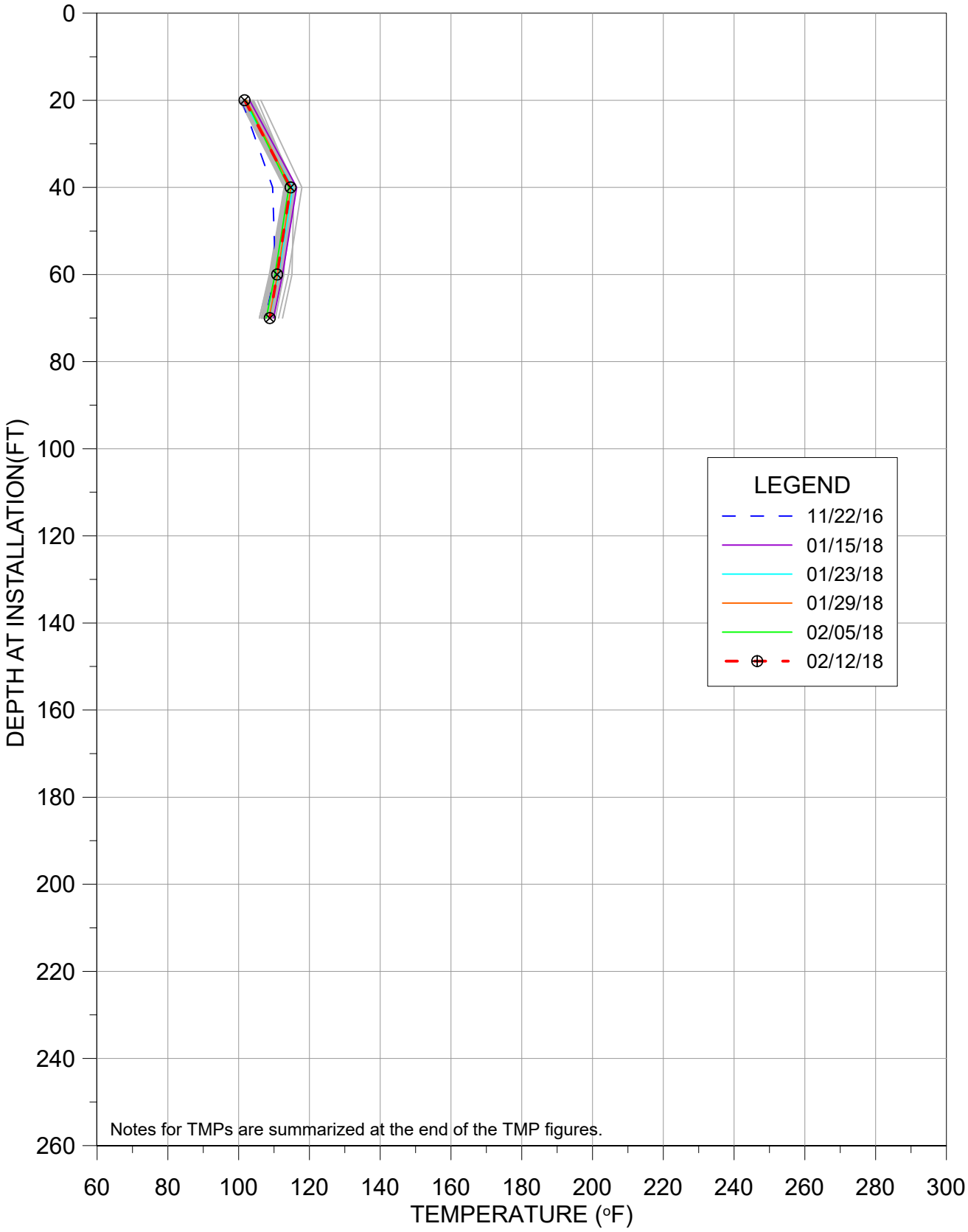
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-37



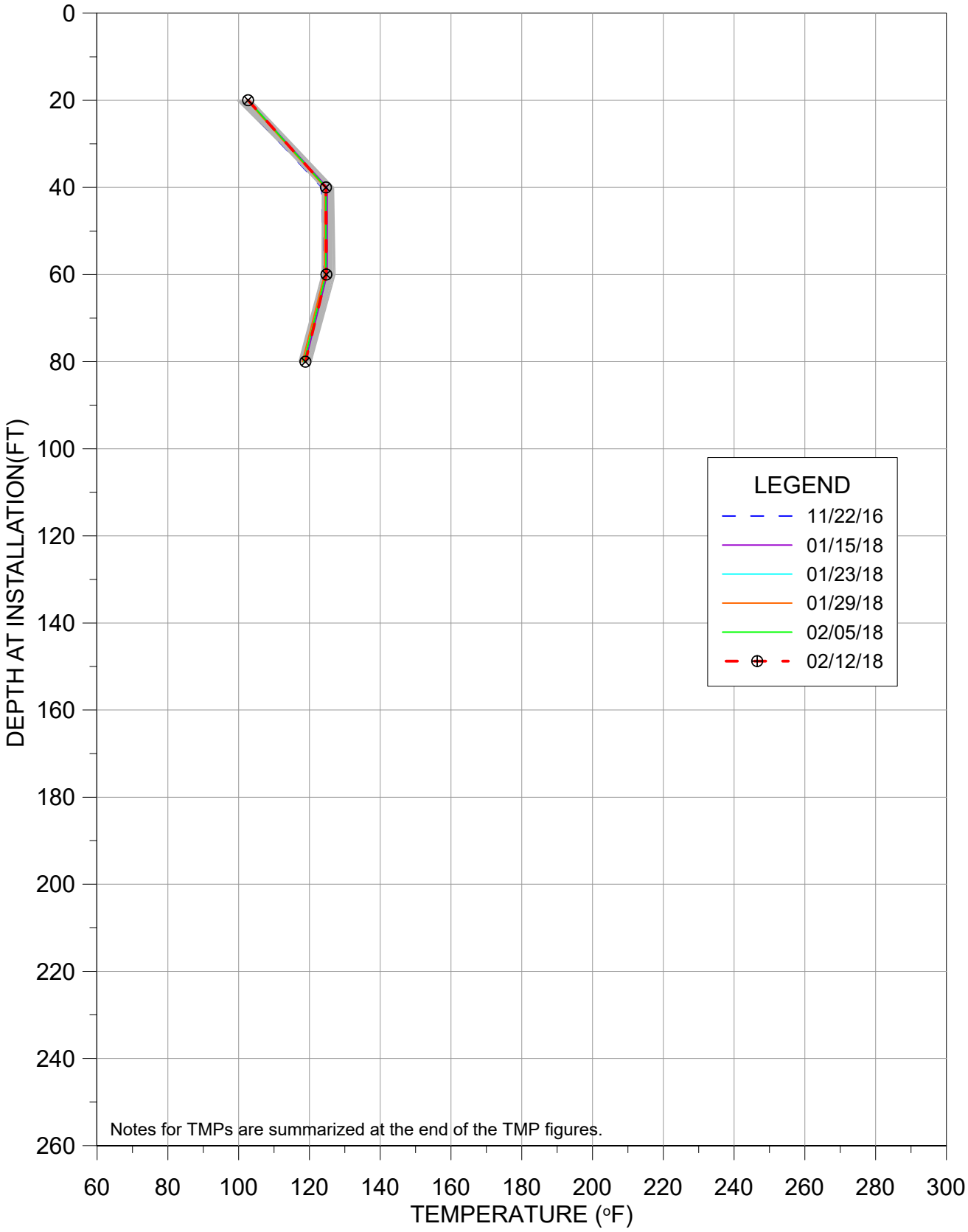
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-38



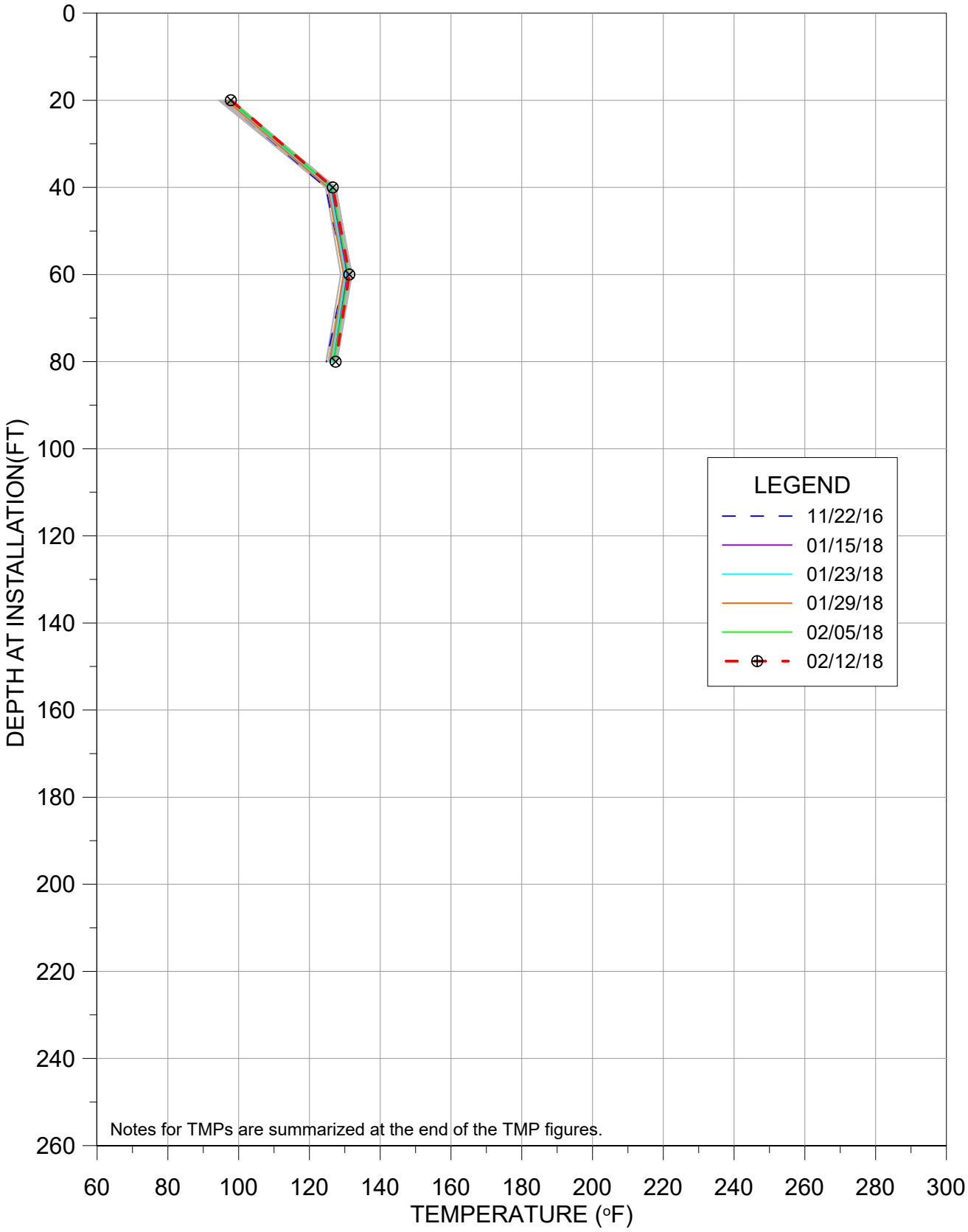
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-39



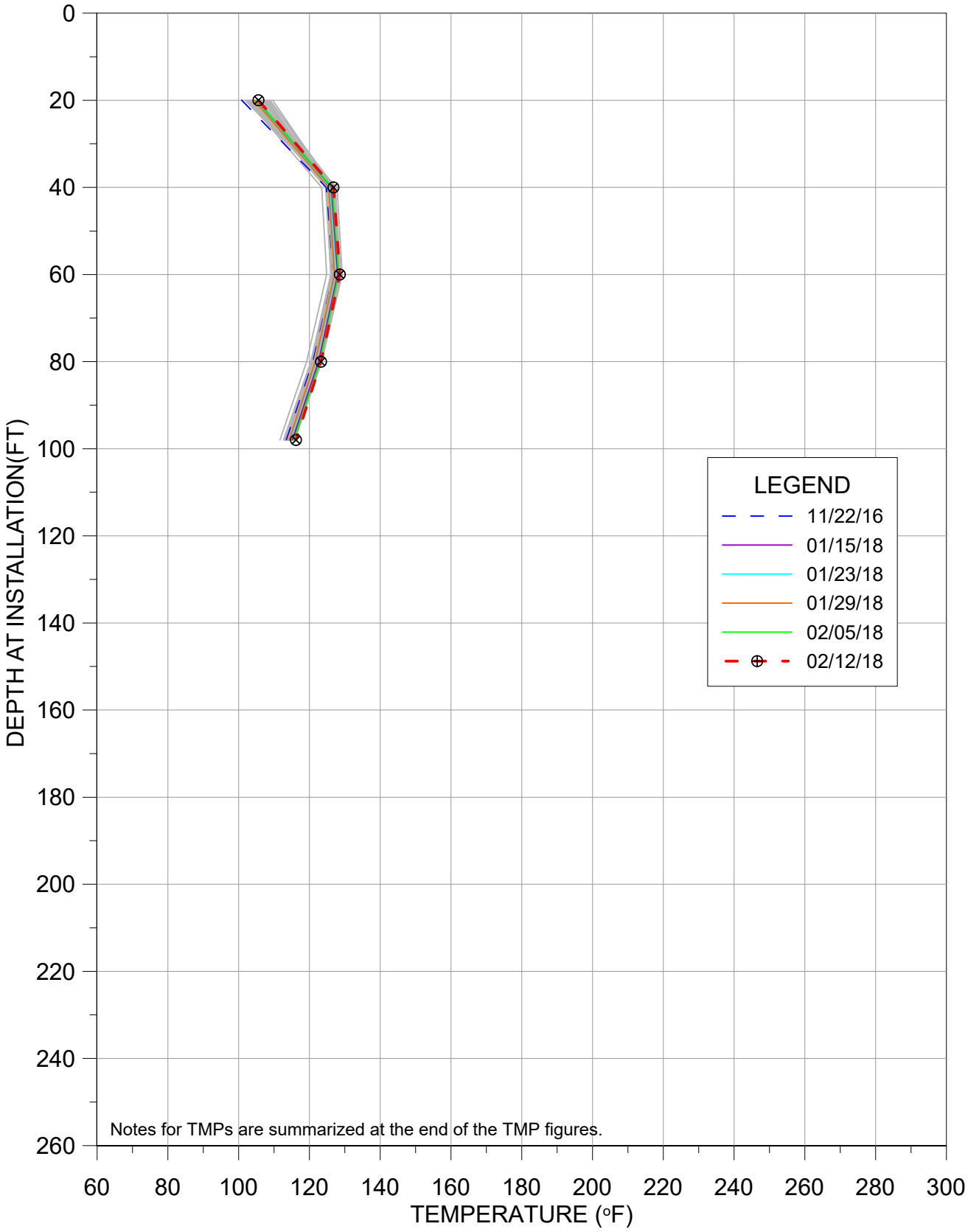
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-40



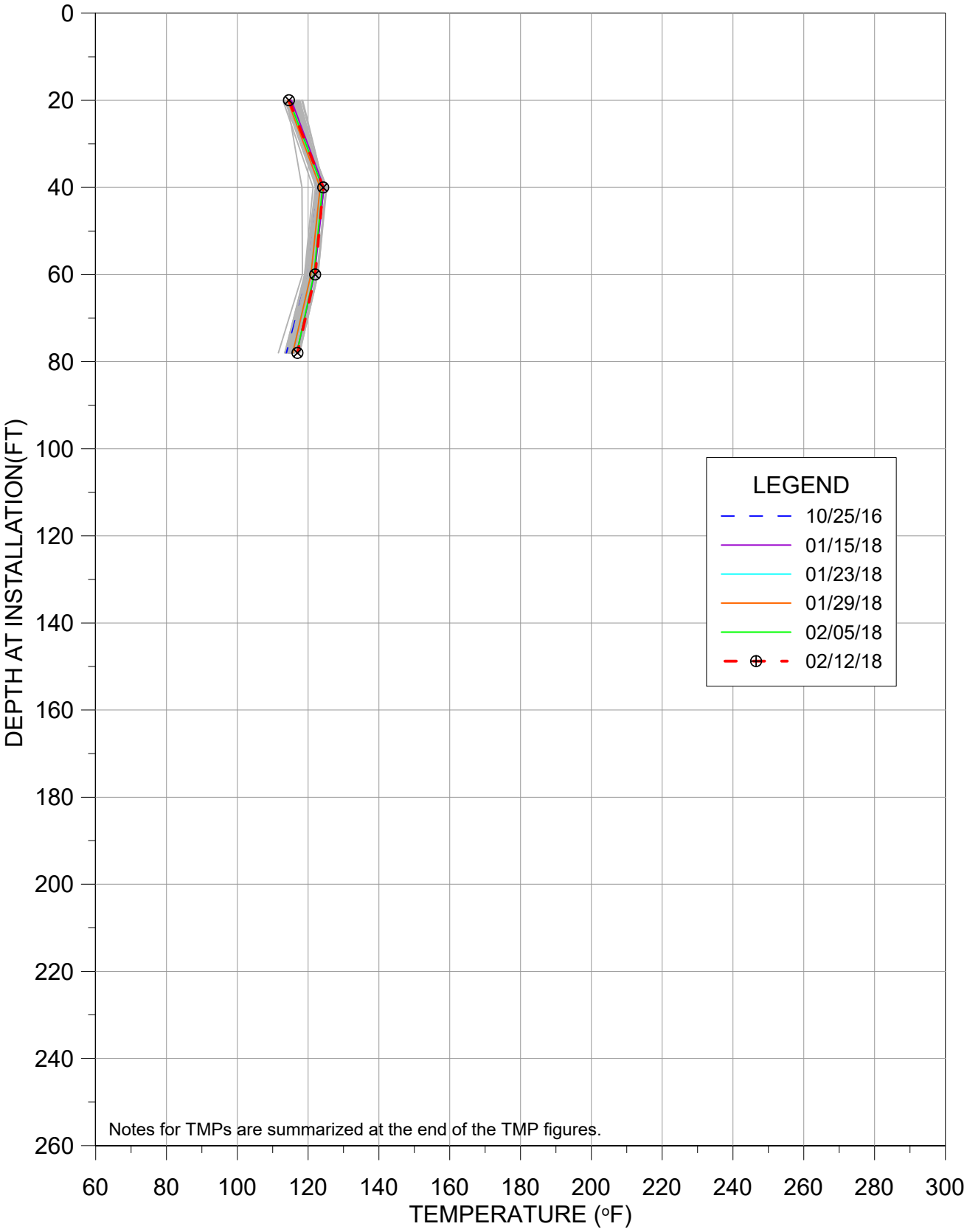
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-41



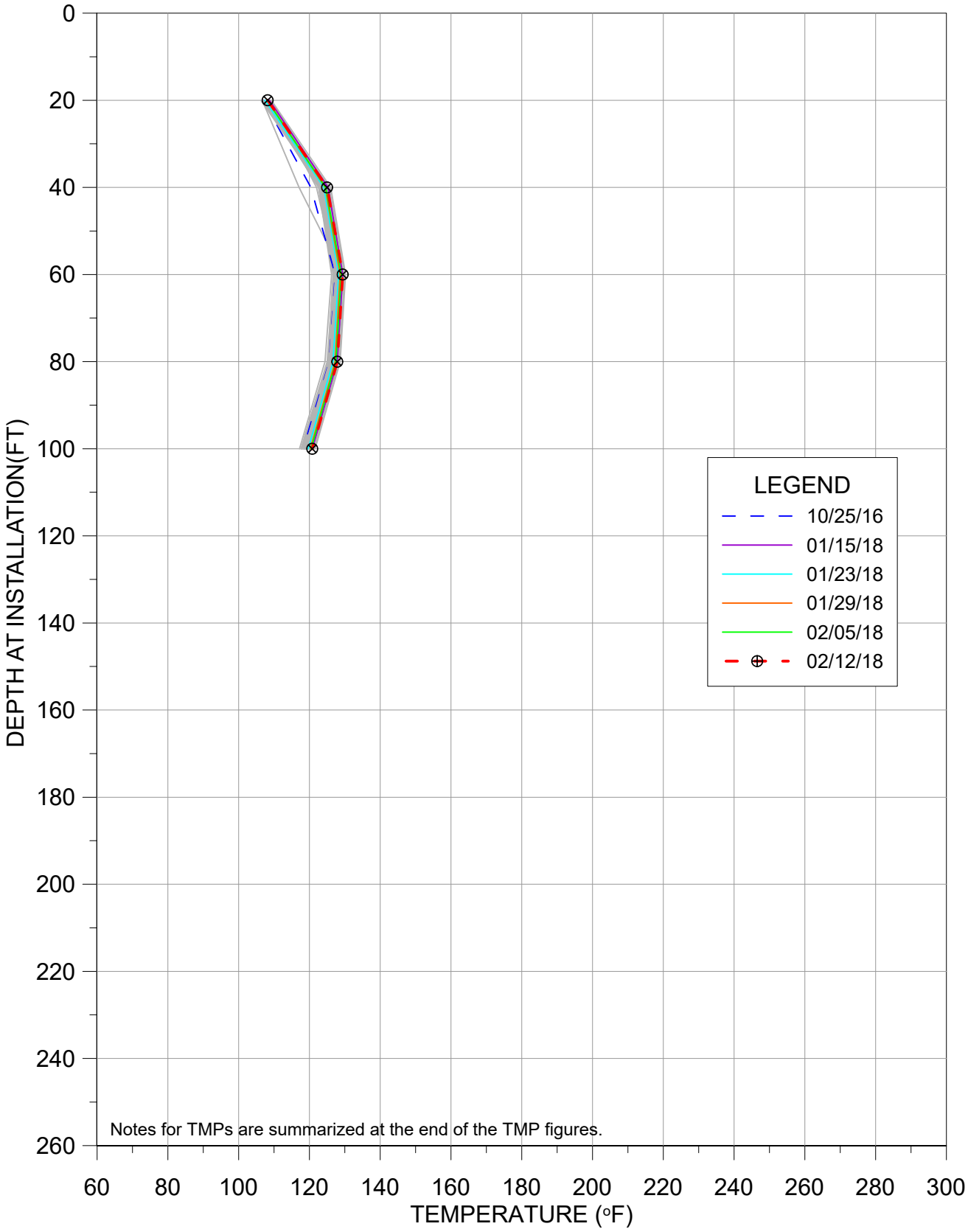
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-42



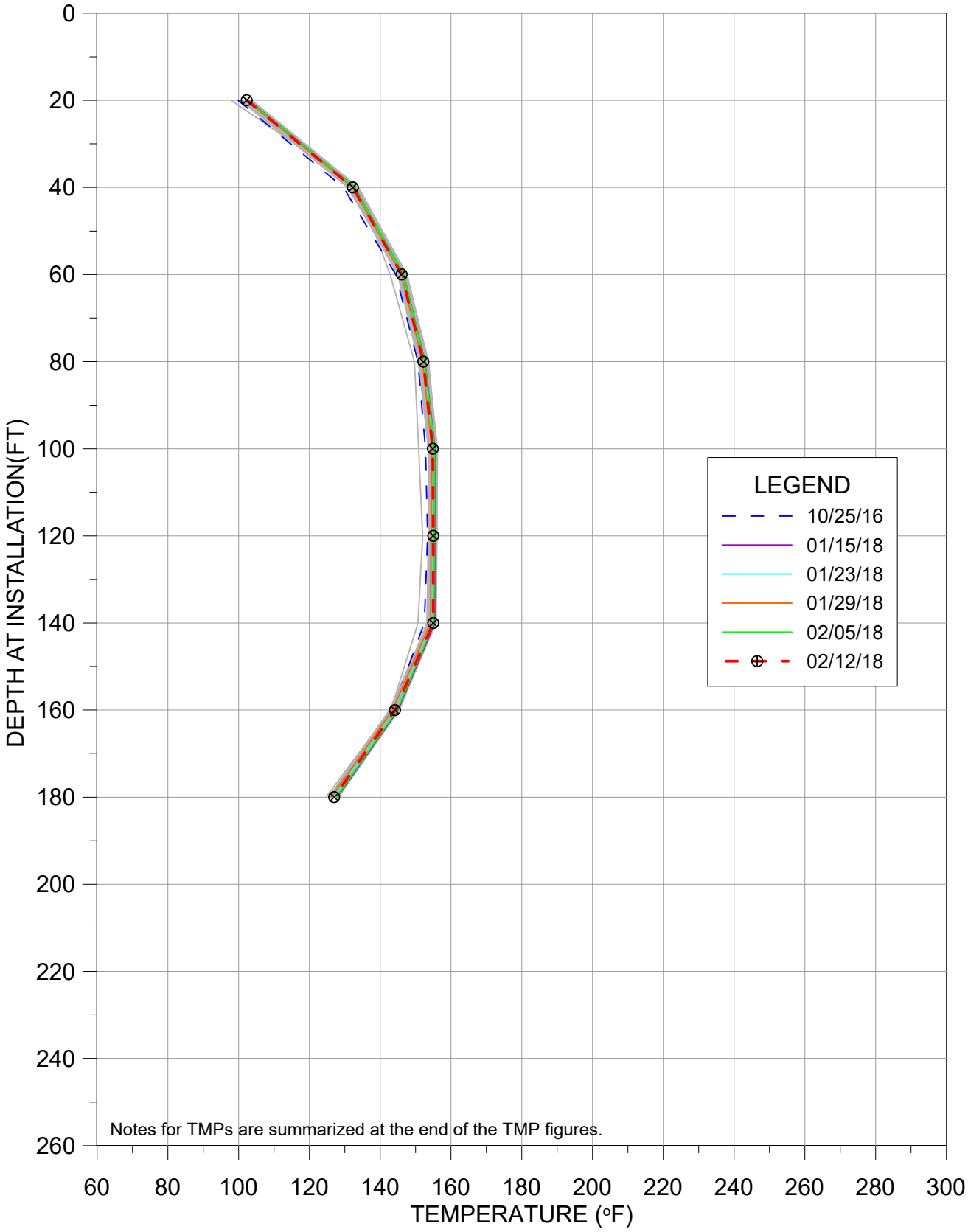
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-43



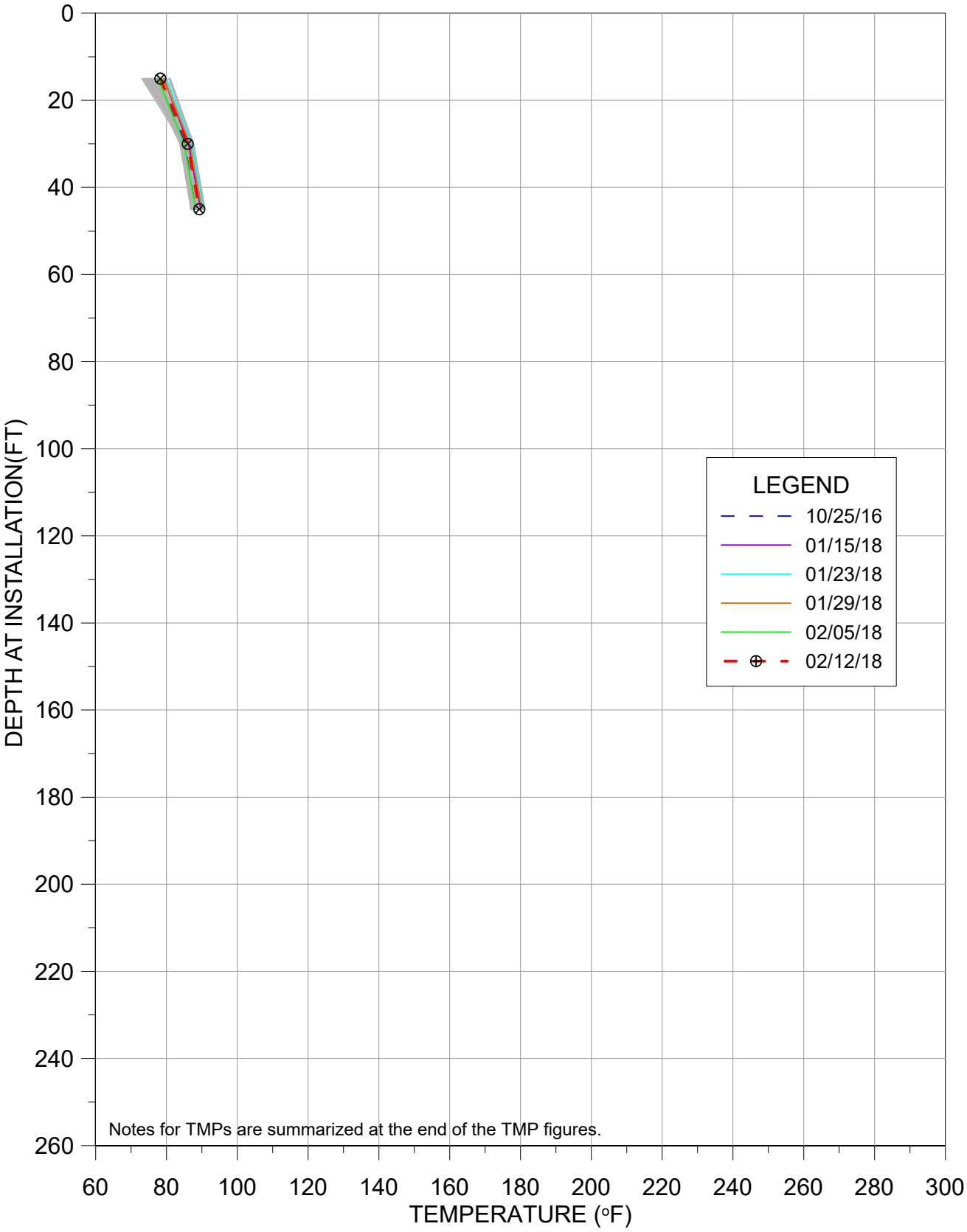
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-44



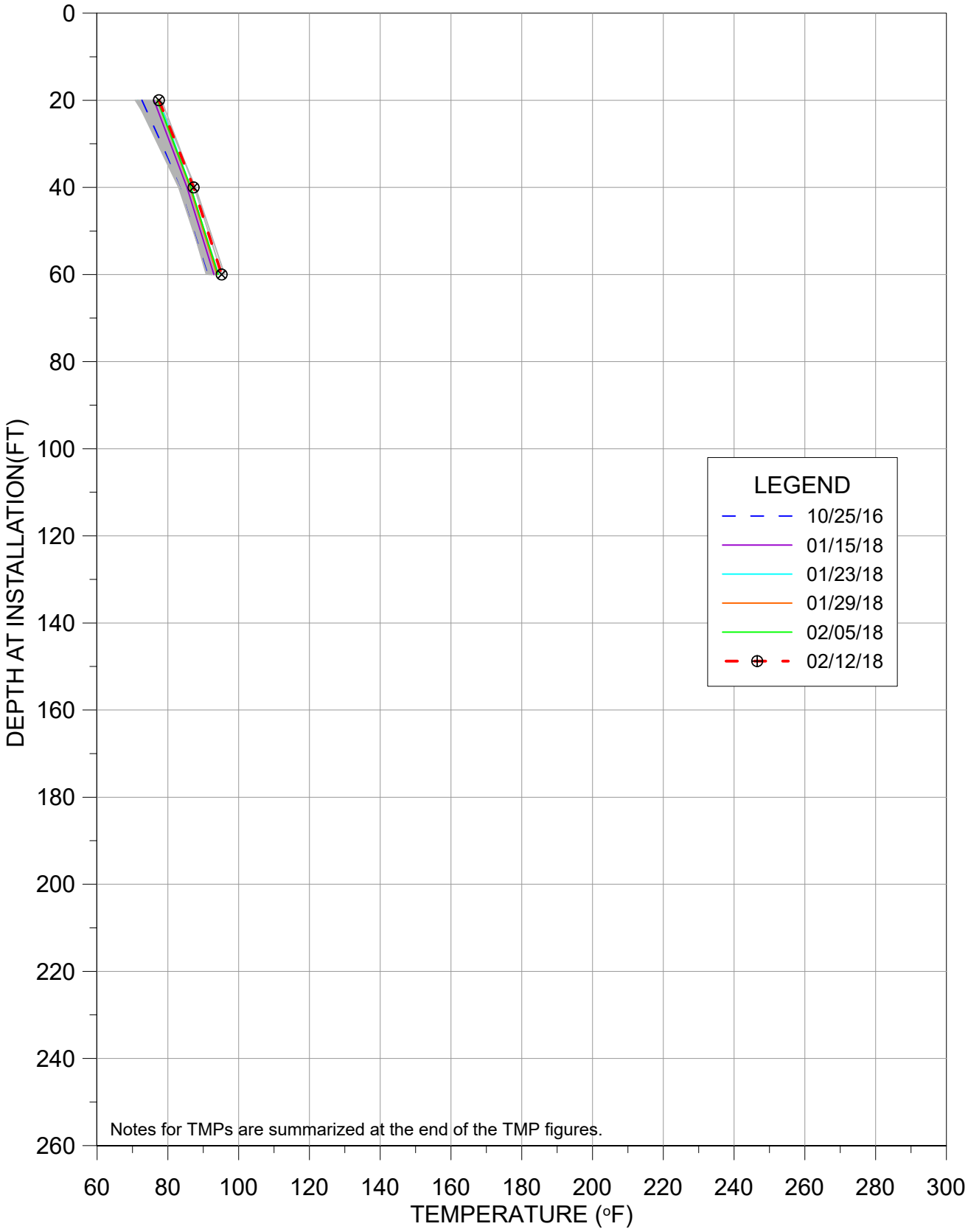
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-45



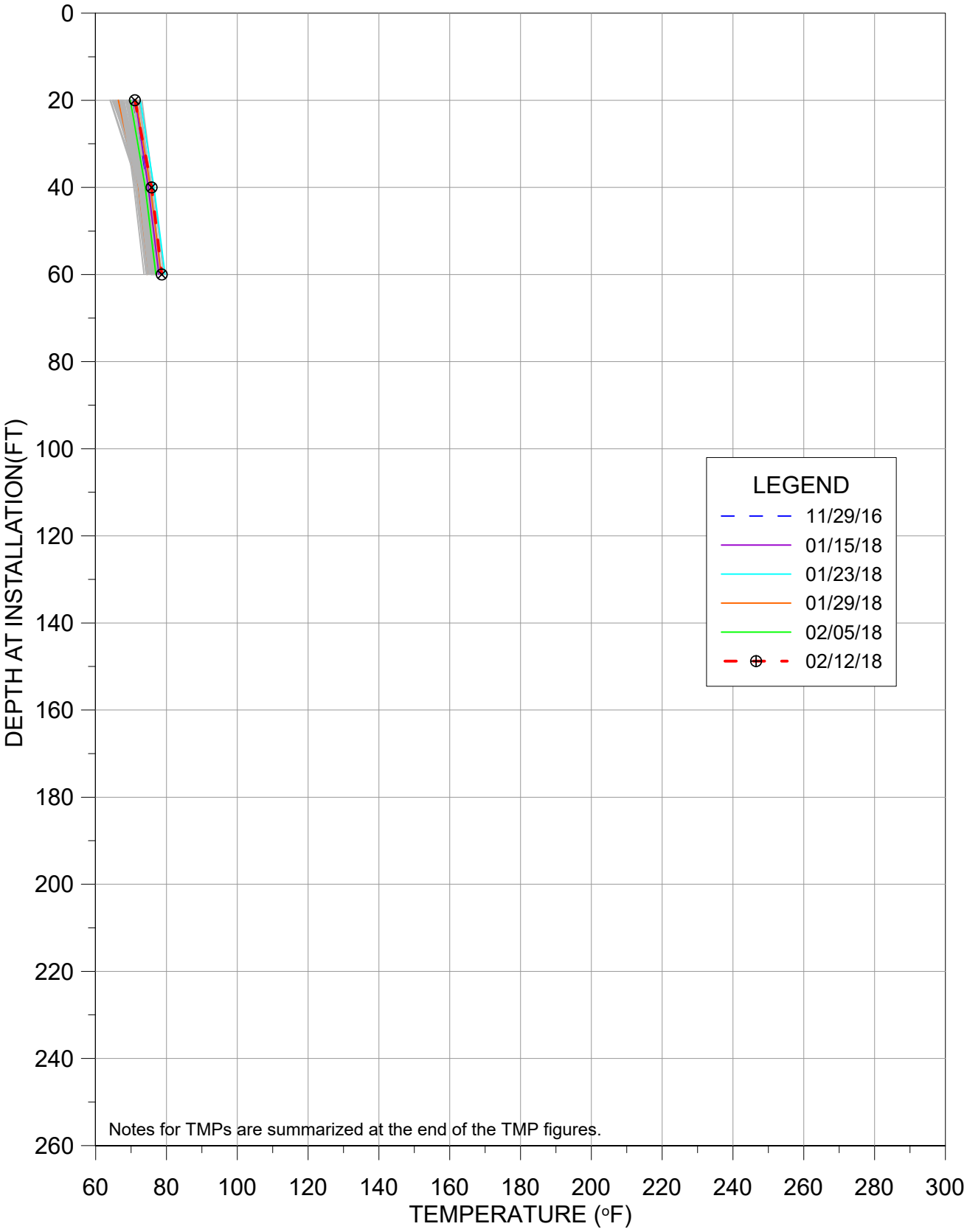
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-46



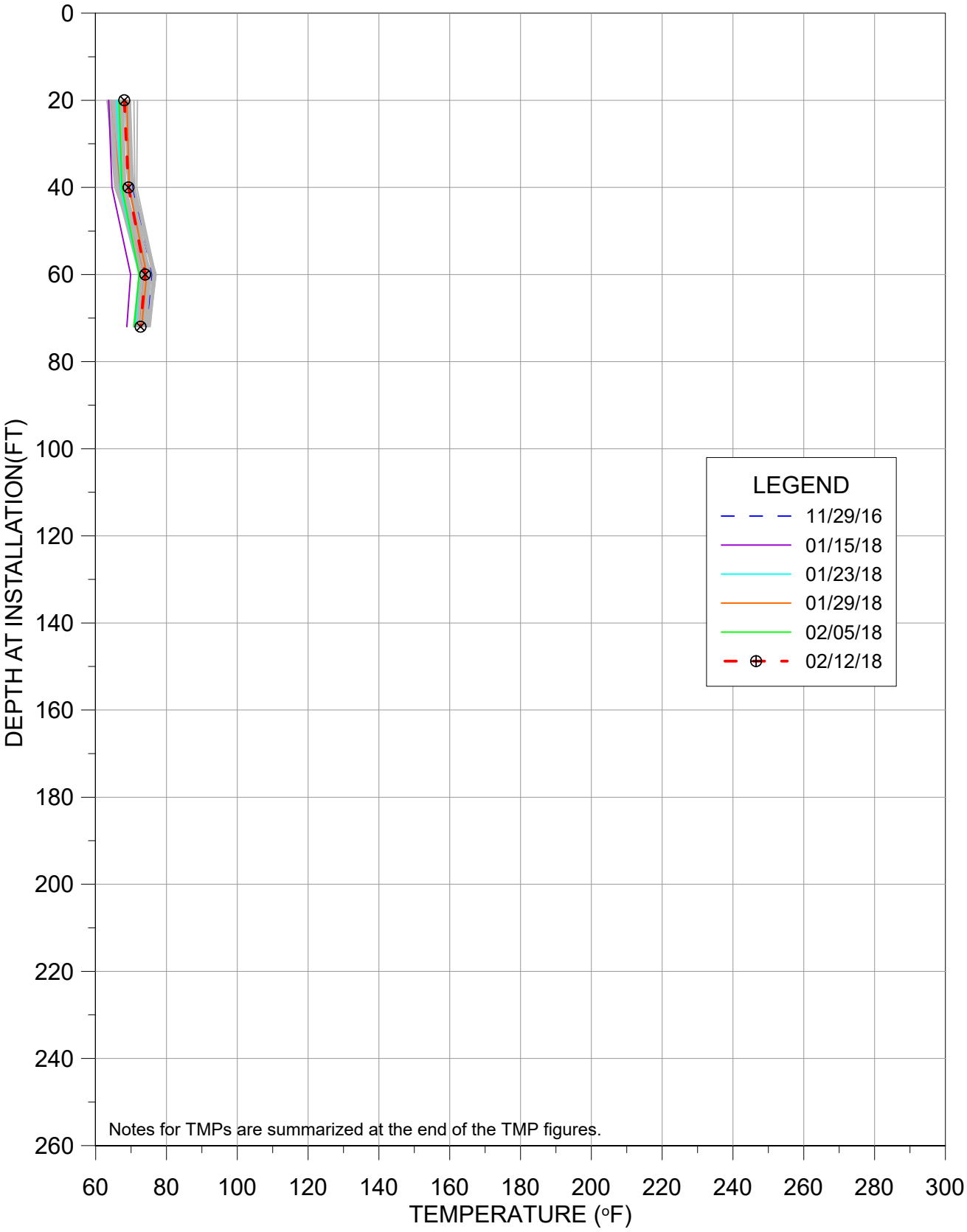
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-47



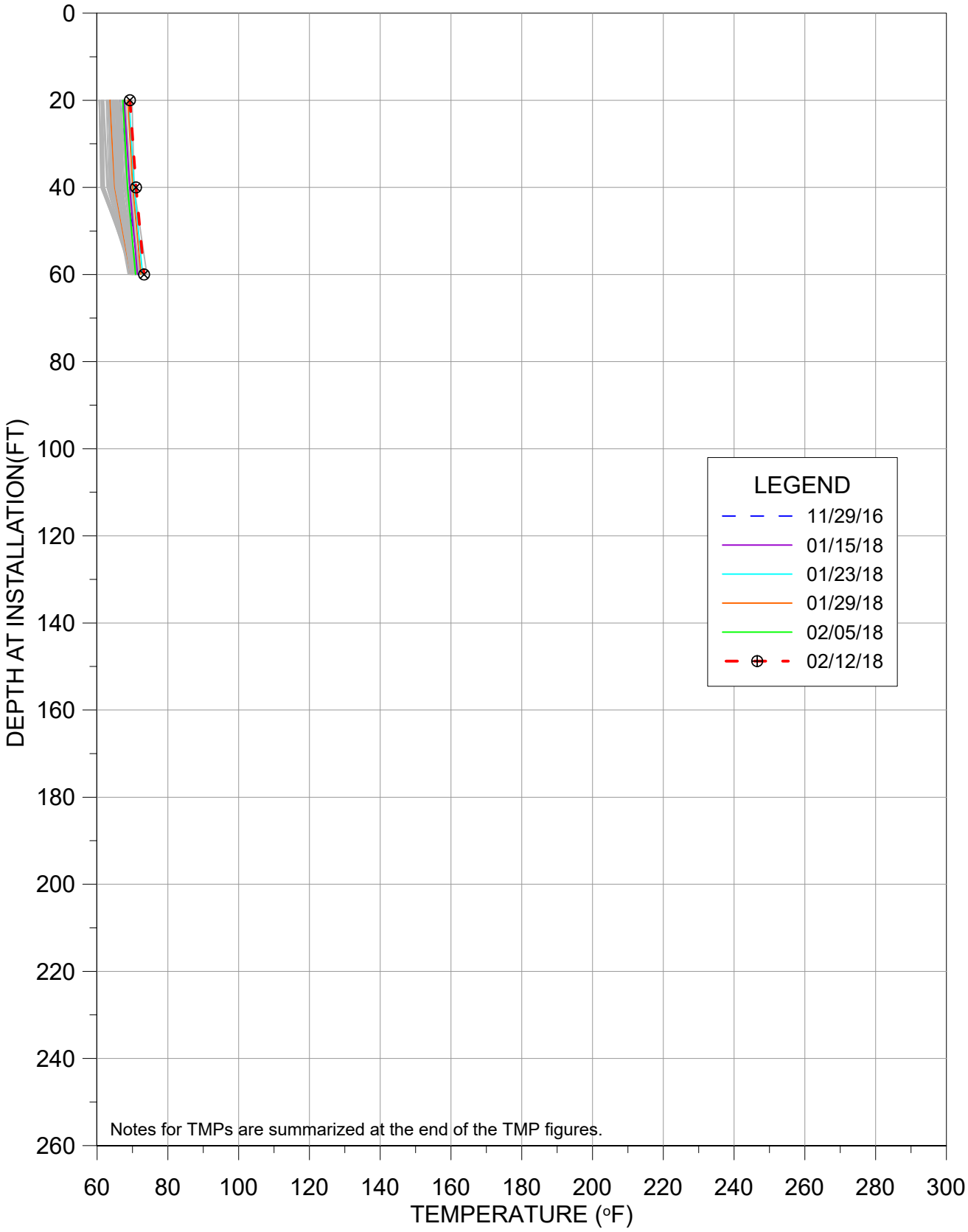
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-48



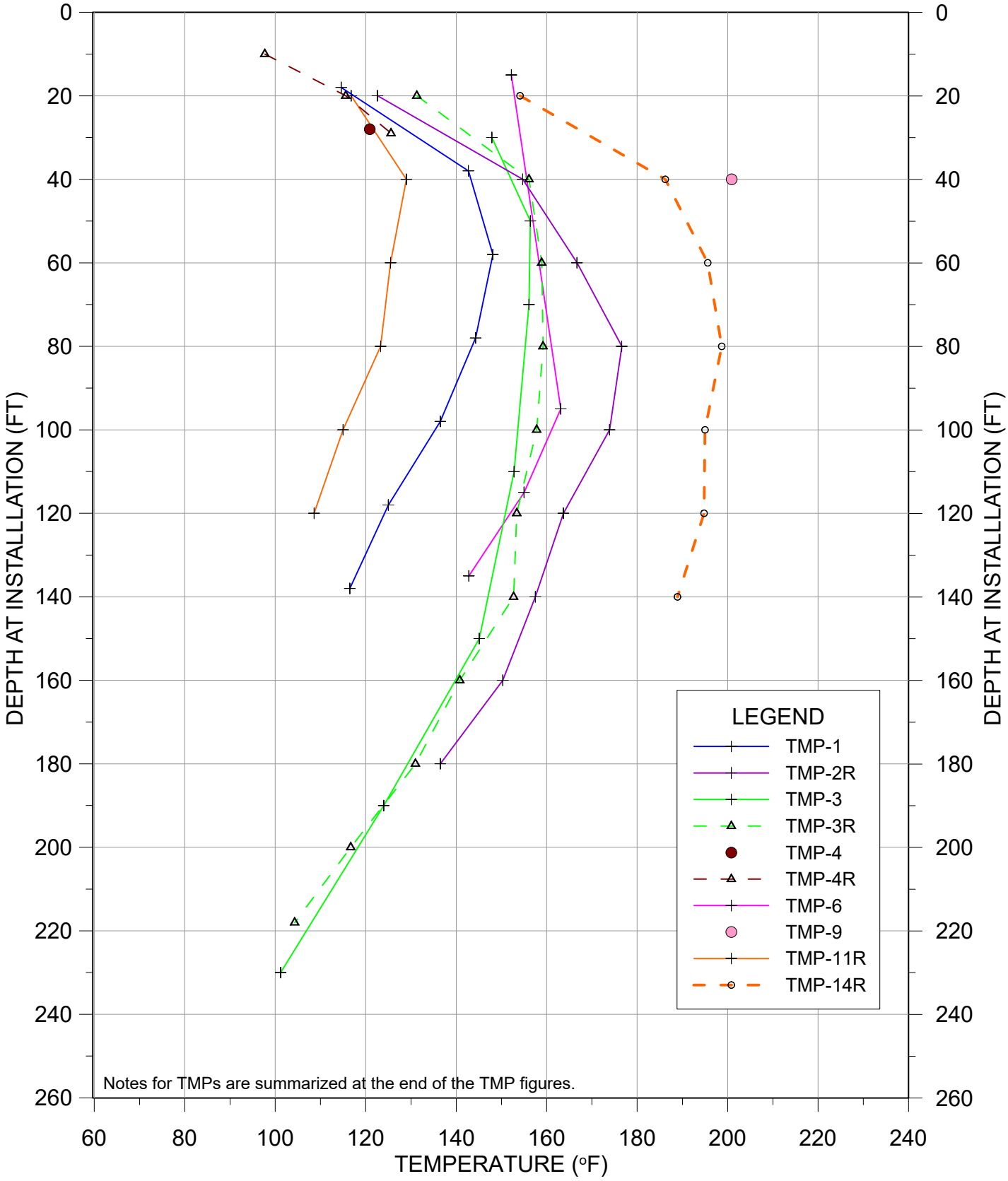
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

TMP-49



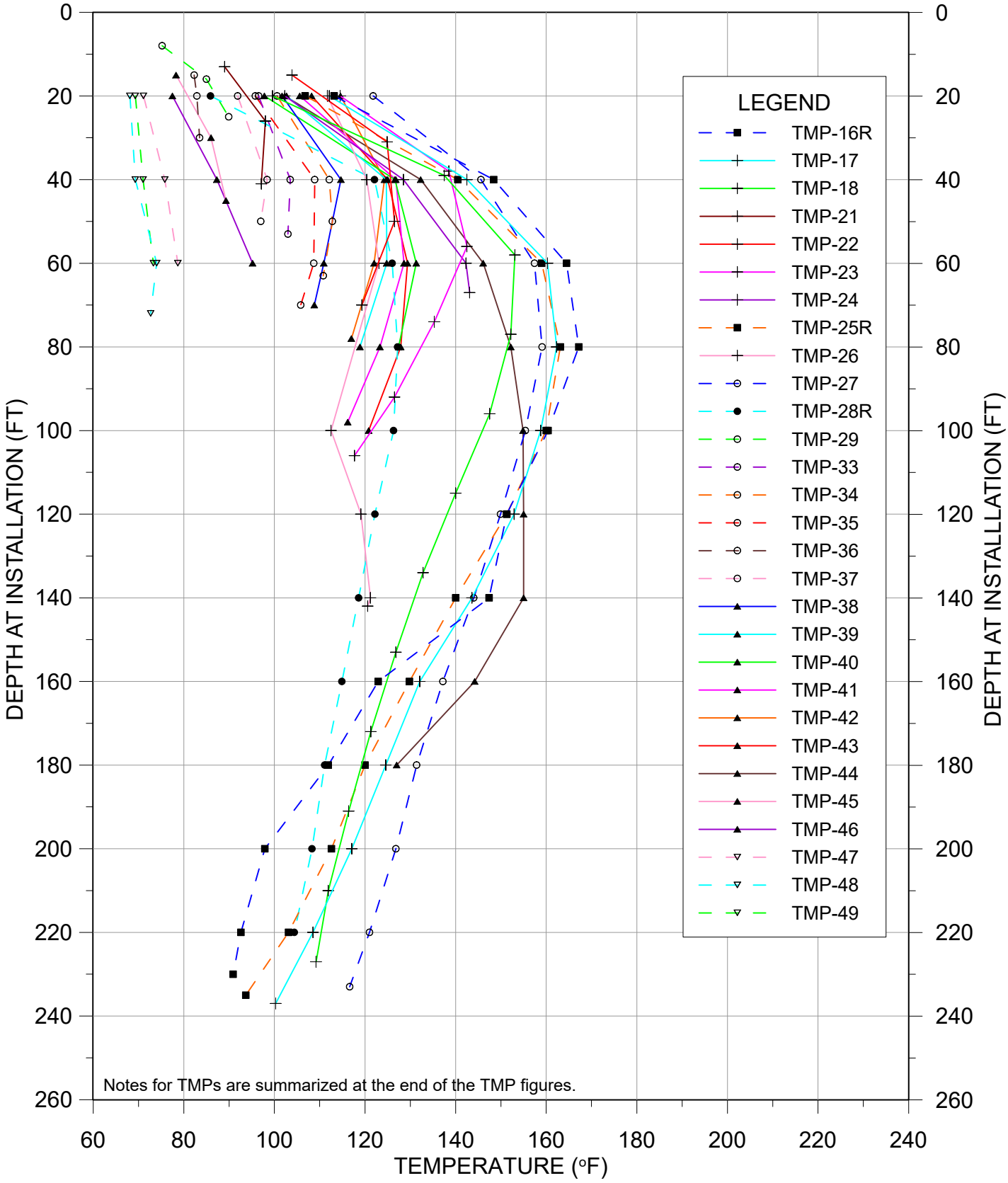
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

2/12/2018



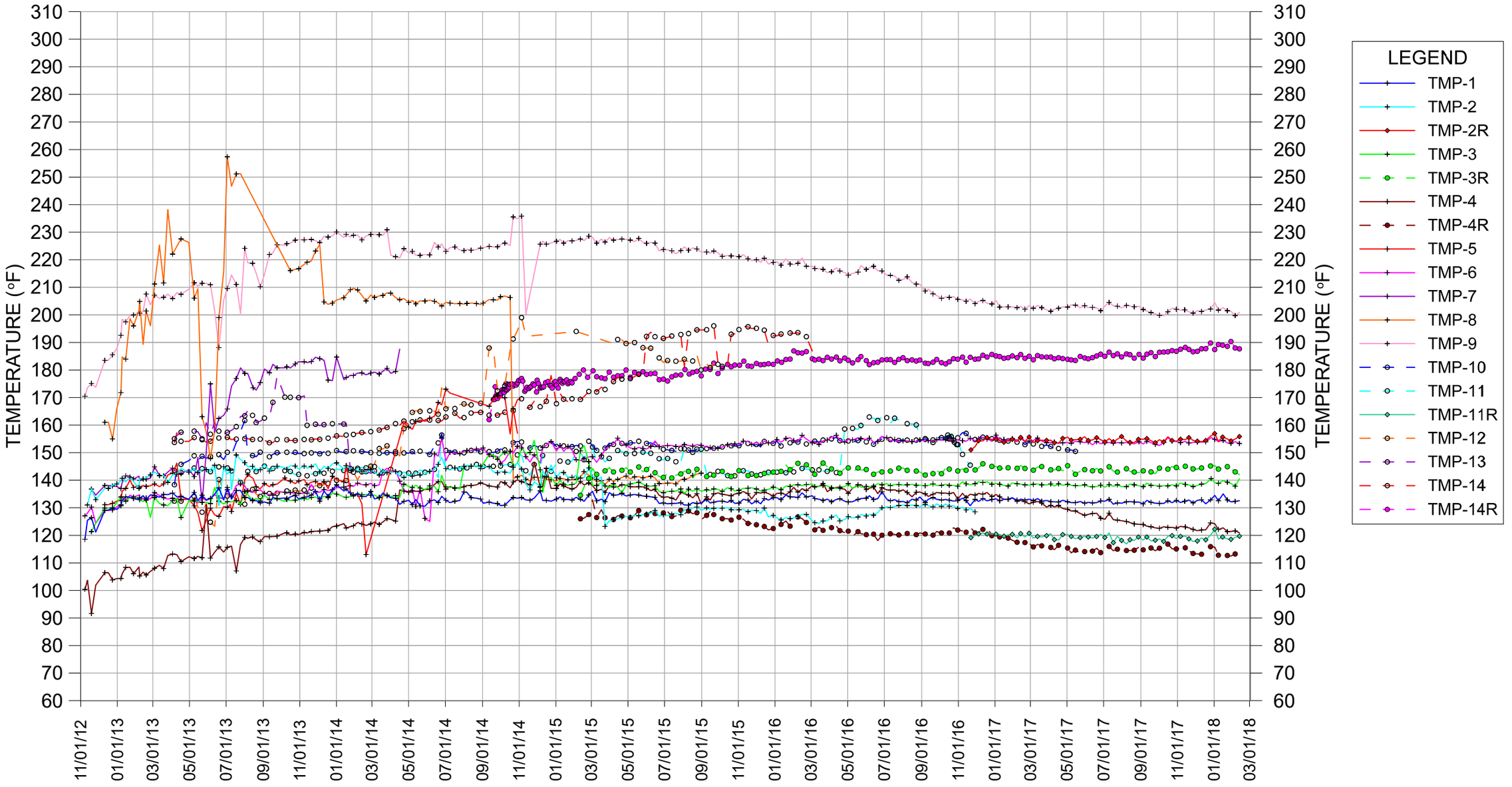
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

2/12/2018 - NORTH QUARRY



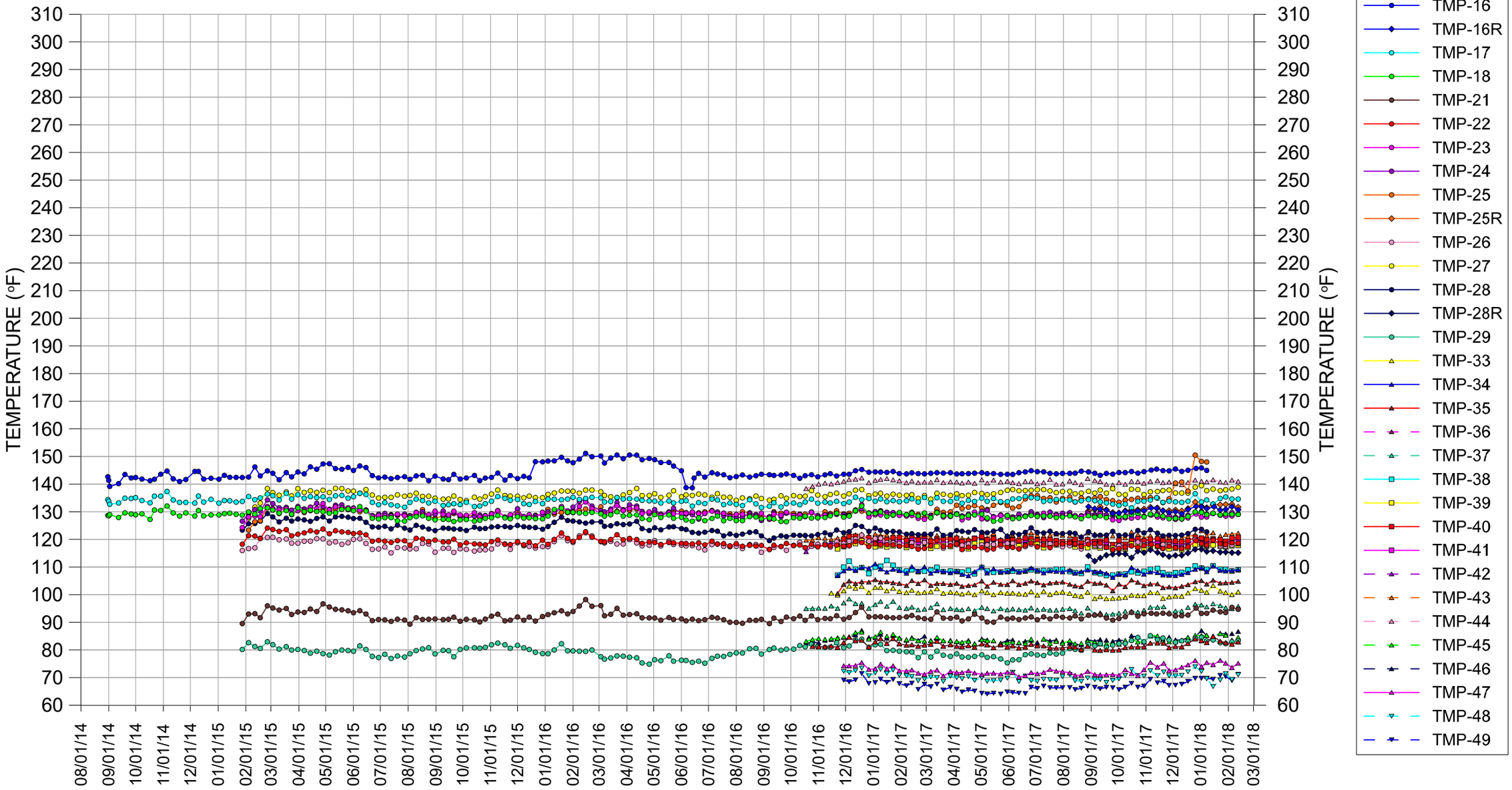
TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

AVERAGE TEMPERATURES



TEMPERATURE VS TIME
BRIDGETON LANDFILL

AVERAGE TEMPERATURES - NORTH QUARRY

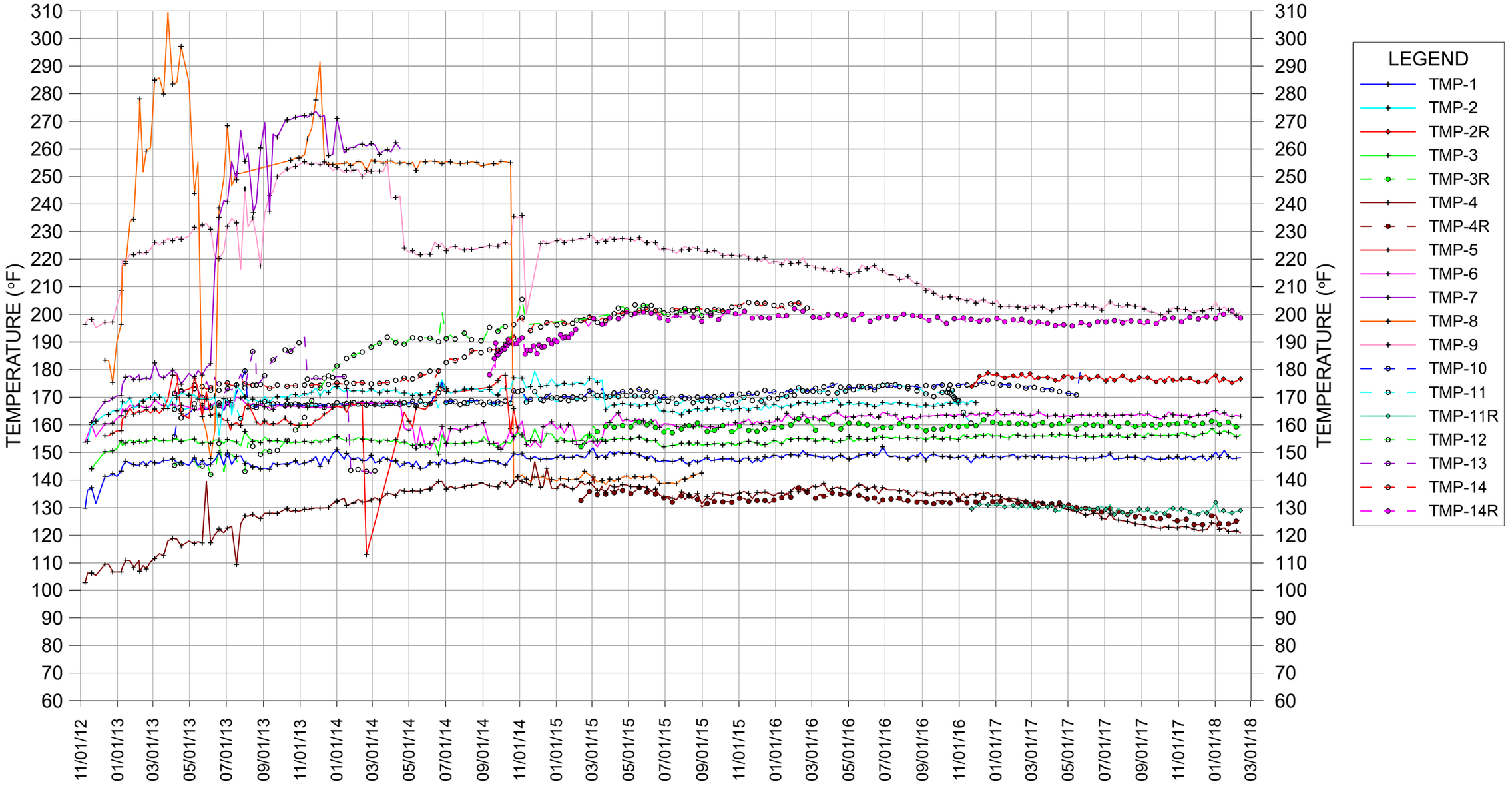


LEGEND

- TMP-16
- TMP-16R
- TMP-17
- TMP-18
- TMP-21
- TMP-22
- TMP-23
- TMP-24
- TMP-25
- TMP-25R
- TMP-26
- TMP-27
- TMP-28
- TMP-28R
- TMP-29
- TMP-33
- TMP-34
- TMP-35
- TMP-36
- TMP-37
- TMP-38
- TMP-39
- TMP-40
- TMP-41
- TMP-42
- TMP-43
- TMP-44
- TMP-45
- TMP-46
- TMP-47
- TMP-48
- TMP-49

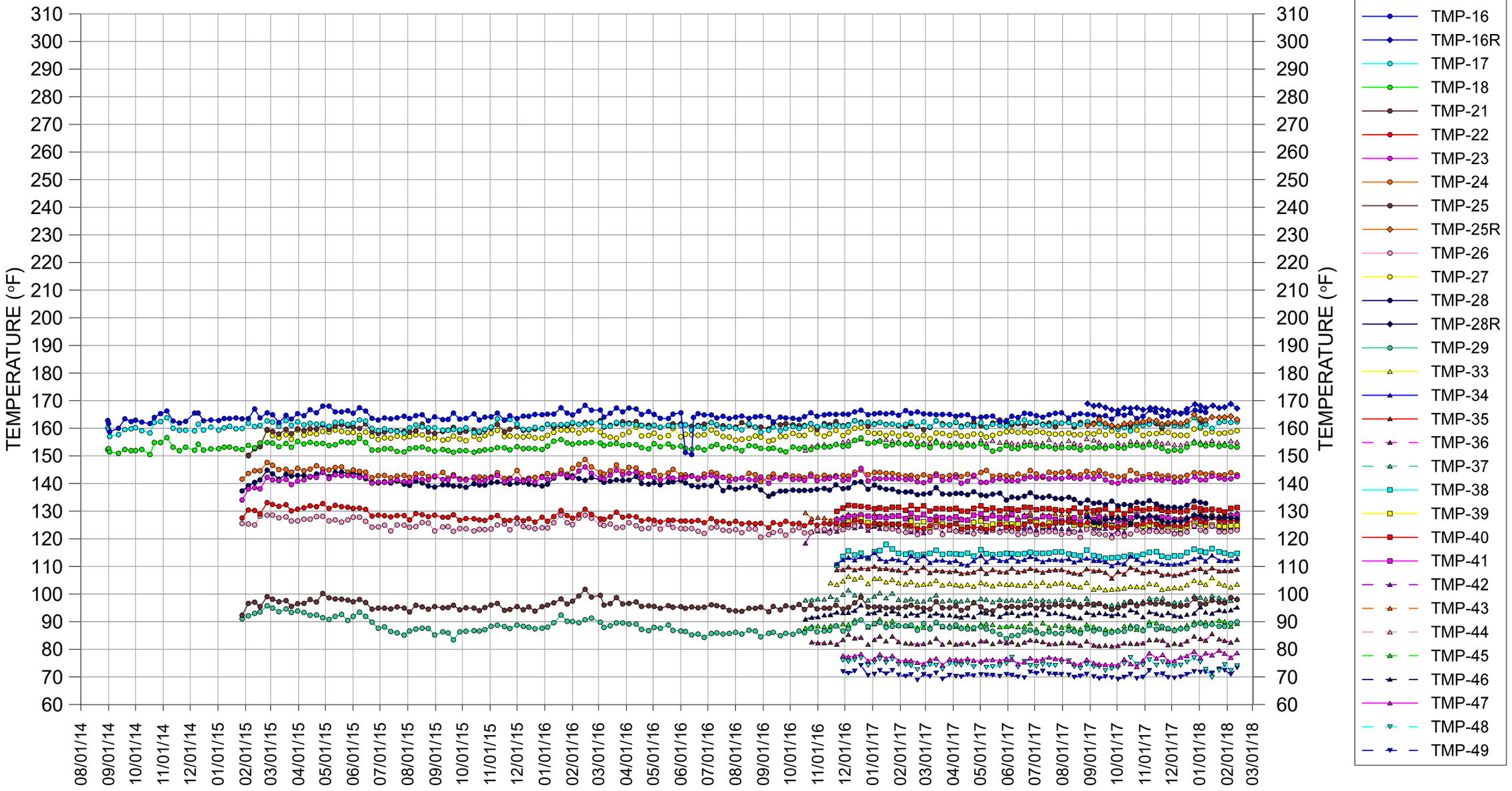
TEMPERATURE VS TIME
BRIDGETON LANDFILL

MAXIMUM TEMPERATURES



TEMPERATURE VS TIME
BRIDGETON LANDFILL

MAXIMUM TEMPERATURES - NORTH QUARRY



TEMPERATURE VS TIME
BRIDGETON LANDFILL

TMP BRIDGETON LANDFILL NOTES

TMP notes that are new for the reporting week are in **bold.**

TMP-1: NONE

TMP-2:

1. TMP-2 has been replaced by TMP-2R and will no longer be monitored or included in the presentation.

TMP-2R:

1. Data reported on 11/29/2016 was inadvertently left as the 11/22/2016 data. This was corrected on 12/5/2016 reading submittal.

TMP-3:

1. No reliable temperature readings have been obtained at 170 ft depth since 1/29/2014, except on 3/13/2014.
2. The connectivity tests on 4/11/2014 conducted by CEC showed that units at 10, 90, 130, 210 and 250 ft depths are no longer reliable.
3. The connectivity tests on 10/28/2014 conducted by Feezor Engineering showed that units at 10, 90, 110, 130, 210 and 250 ft depths are not reliable.

TMP-3R:

1. The unit at 20 ft depth had a fluctuating resistance since 9/25/2017. Therefore the temperature is determined to be unreliable.

TMP-4:

1. The connectivity tests on 4/11/2014 conducted by CEC showed that the unit at 48 ft depth is no longer reliable.

TMP-4R: NONE

TMP-5: TMP NO LONGER IN SERVICE– Verified by Connectivity testing by Feezor Engineering in March 2015.

TMP-6:

1. The connectivity tests on 4/11/2014 conducted by CEC showed that units at 35, 55, 75, 155, 175, and 195 ft depths are no longer reliable.
2. No reliable temperature readings have been obtained at the unit at 215 ft depth since 6/13/2014.

TMP-7R: TMP NO LONGER IN SERVICE

TMP-8: TMP NO LONGER IN SERVICE

TMP-9:

1. Unit at 100 ft depth had an inaccurate temperature reading on 8/1/2013 and no reading since 8/6/2013.
2. The connectivity tests on 4/11/2014 conducted by CEC showed that units at 20, 60, 80, and 100 ft depths are no longer reliable.

TMP-10:

1. All units were verified by connectivity testing by Feezor Engineering on 6/1/2017 to be unreliable.

TMP-11:

1. All units were verified by connectivity testing by Feezor Engineering on 11/23/2016 to be unreliable.
2. TMP-11 is no longer in service and will not be included in the presentation.

TMP-11R: NONE

TMP-12:

2. All units were verified by connectivity testing by Feezor Engineering in October 2015 to be unreliable.

TMP-13: TMP NO LONGER IN SERVICE

TMP-14:

1. All units were verified by connectivity testing by Feezor Engineering in March 2016 to be unreliable.

TMP-14R:

1. Due to the connectivity test results by Feezor Engineering on TMP-14 (see note above), TMP-14R is added to this reporting data set as of 3/7/2016.

TMP-15: TMP WAS NEVER IN SERVICE

TMP-16:

1. TMP-16 has been replaced by TMP-16R and will no longer be included in the presentation.

TMP-16R: NONE

TMP-17: NONE

TMP-18: NONE

TMP-19: NOT PART OF THIS SUBMITTAL (HEAT EXTRACTION TMP)

TMP-20: NOT PART OF THIS SUBMITTAL (HEAT EXTRACTION TMP)

TMP-21: NONE

TMP-22: NONE

TMP-23: NONE

TMP-24: NONE

TMP-25:

1. TMP-25 has been replaced by TMP-25R and will no longer be included in the presentation.

TMP-25R: NONE

TMP-26:

1. Resistance on unit at 80 ft dropped 12.9 ohms (11/06/2017) and subsequent resistance reading continue to be low. Upon further investigation by Feezor Engineering, this unit is determined to be unreliable.

TMP-27: NONE

TMP-28:

1. TMP-28 has been replaced by TMP-28R and will no longer be included in the presentation.

TMP-28R: NONE

TMP-29: NONE

TMP-33: NONE

TMP-34: NONE

TMP-35: NONE

TMP-36: NONE

TMP-37: NONE

TMP-38: NONE

TMP-39: NONE

TMP-40: NONE

TMP-41: NONE

TMP-42: NONE

TMP-43: NONE

TMP-44: NONE

TMP-45: NONE

TMP-46: NONE

TMP-47: NONE

TMP-48: NONE

TMP-49: NONE

TMP vs DEPTH and TMP vs ELEVATION (for **02/12/18**):

1. There were no reliable temperature readings for TMP-13 since 3/19/2014.
2. There were no reliable temperature readings for TMP-7R, as determined by the connectivity test on 4/11/2014.
3. There were no reliable temperature readings for TMP-5 since 11/5/2014.
4. There were no reliable temperature readings for TMP-12 since 9/28/2015.
5. There were no reliable temperature readings for TMP-8 since 9/9/2015.
6. There were no reliable temperature readings for TMP-14, confirmed since 3/7/2016.
7. There were no reliable temperature readings for TMP-11 as determined by the connectivity test on 11/23/2016.
8. TMP-2 has been replaced by TMP-2R and will no longer be monitored.
9. TMP-11 is no longer in service and will not be included in the presentation.
10. There were no reliable temperature readings for TMP-10 since 5/30/2017.
11. TMP-16, 25, and 28 have been replaced by TMP-16R, 25R, and 28R and will be no longer reported since 1/15/2018.

ATTACHMENT C

GAS INTERCEPTOR WELLHEAD TEMPERATURE GRAPHS

NOTE:

1.) AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS, INC. AND IS DATED DECEMBER 1, 2017

0 200 400 Feet

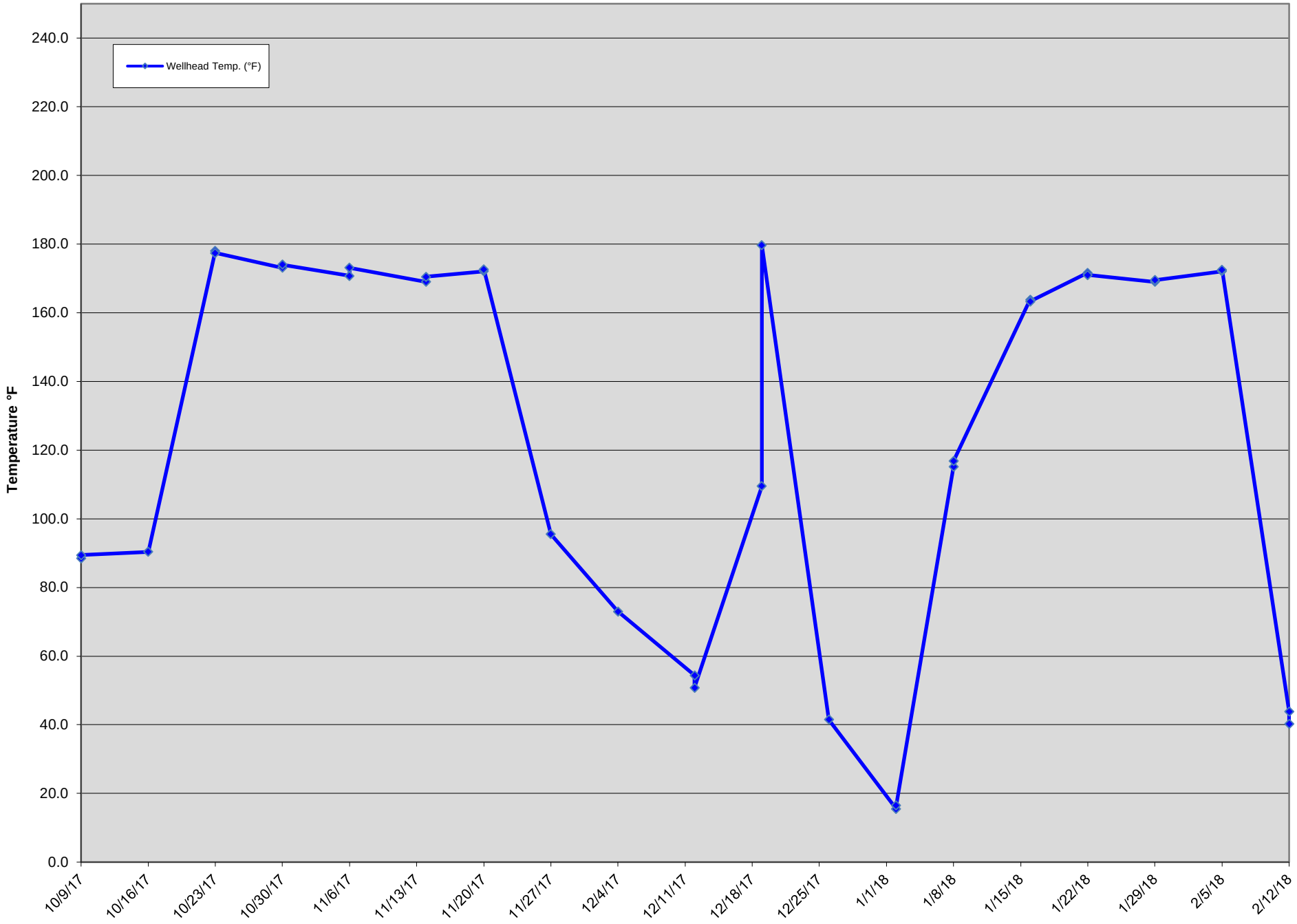
N

BRIDGETON LANDFILL, LLC 13570 SAINT CHARLES ROCK RD BRIDGETON, MO 63044	BRIDGETON LANDFILL MONTHLY REPORTING	Engineering for a Better World FEEZOR ENGINEERING, INC.	JANUARY 2018 DESIGNED BY: PML APPROVED BY: --- REVISION DATE	DRAWING NO.: 004

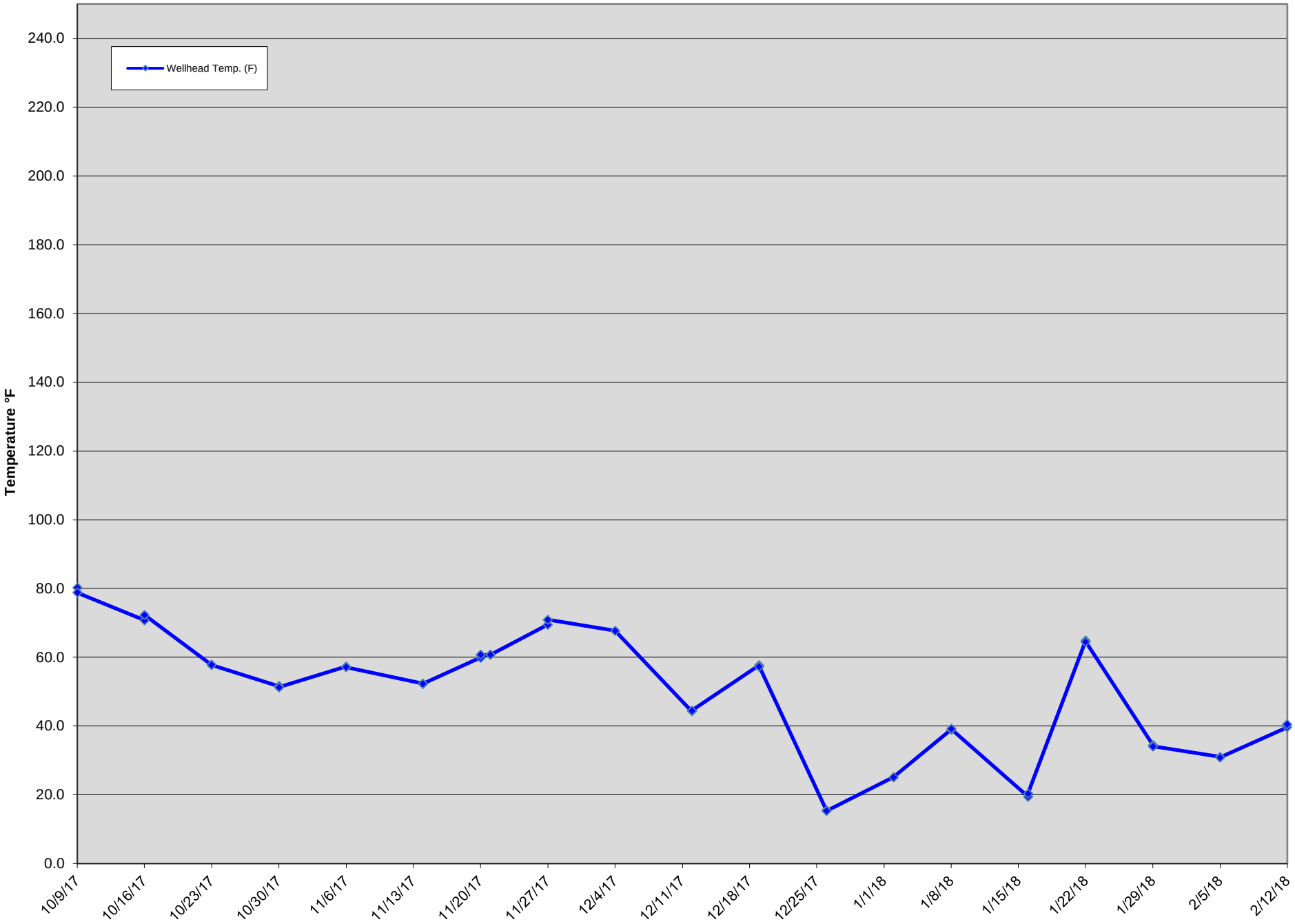
GAS EXTRACTION WELLS - JANUARY 2018

PROJECT NUMBER: BT-145 | FILE PATH: C:\Users\plins\Dropbox (Feezor Engineering)\BT-145 Agreed Order Reporting\Surfer Updates\civil 3D\January 2018\January 2018.dwg

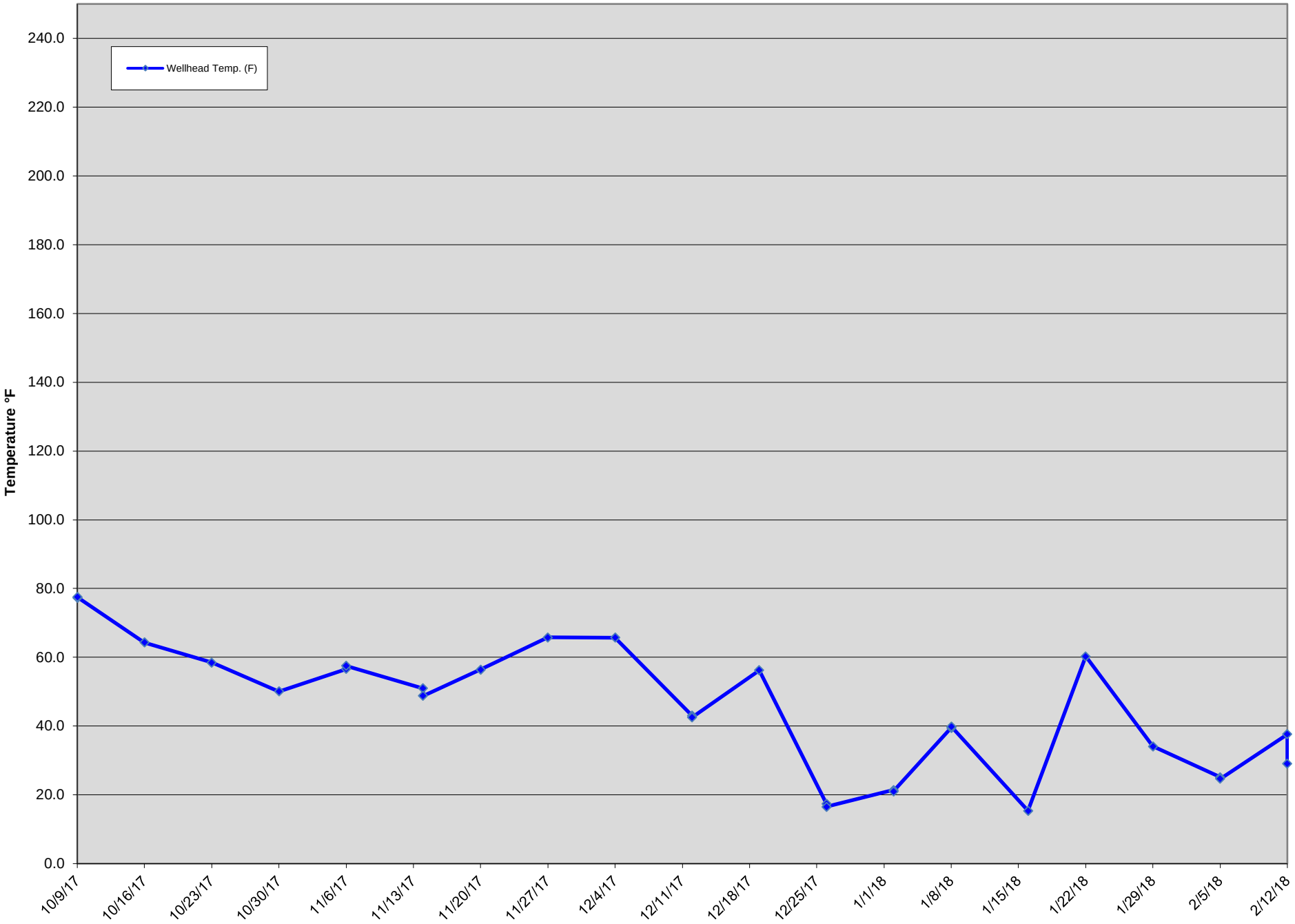
GIW-1 Wellhead Temperatures



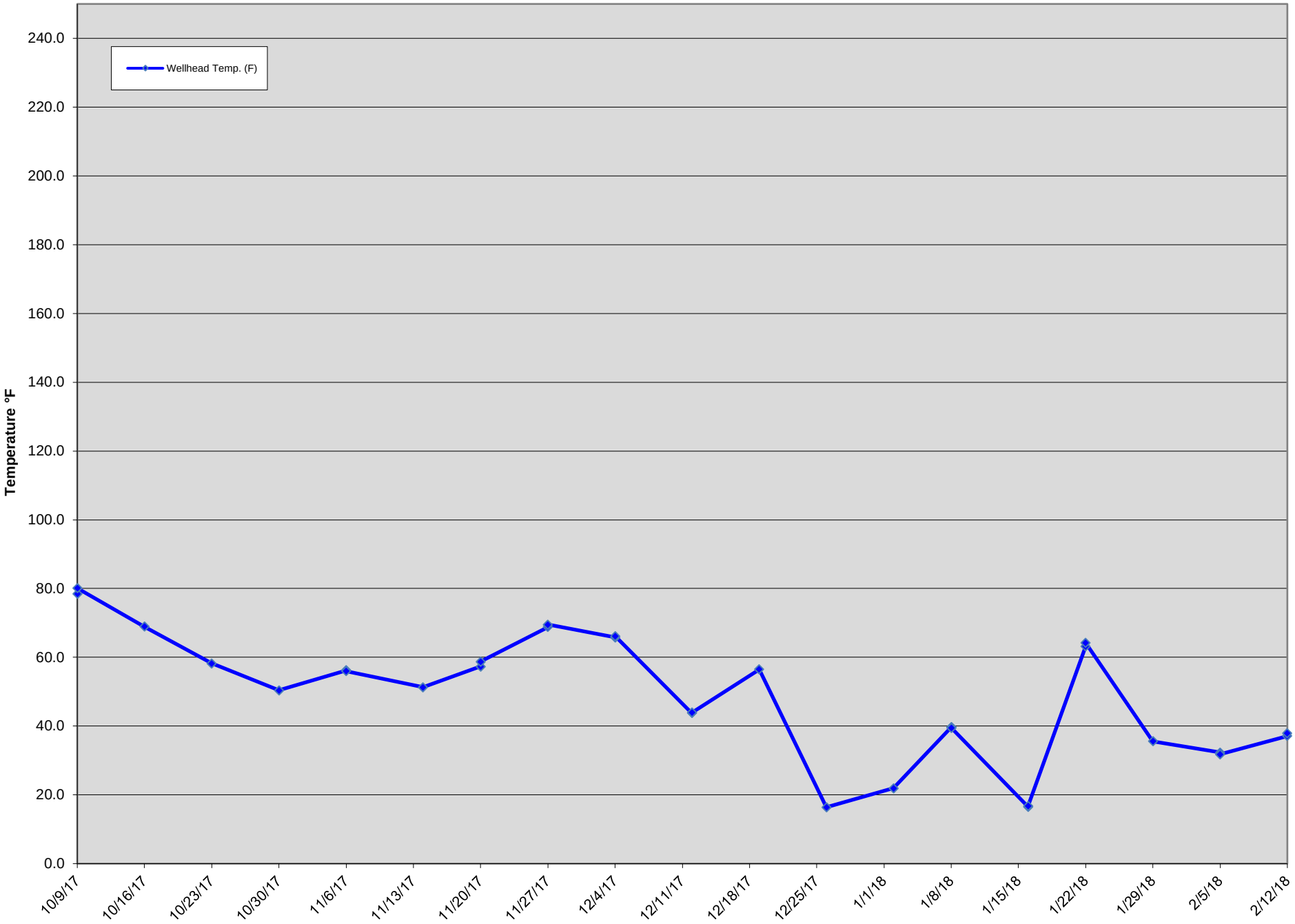
GIW-2 Wellhead Temperatures



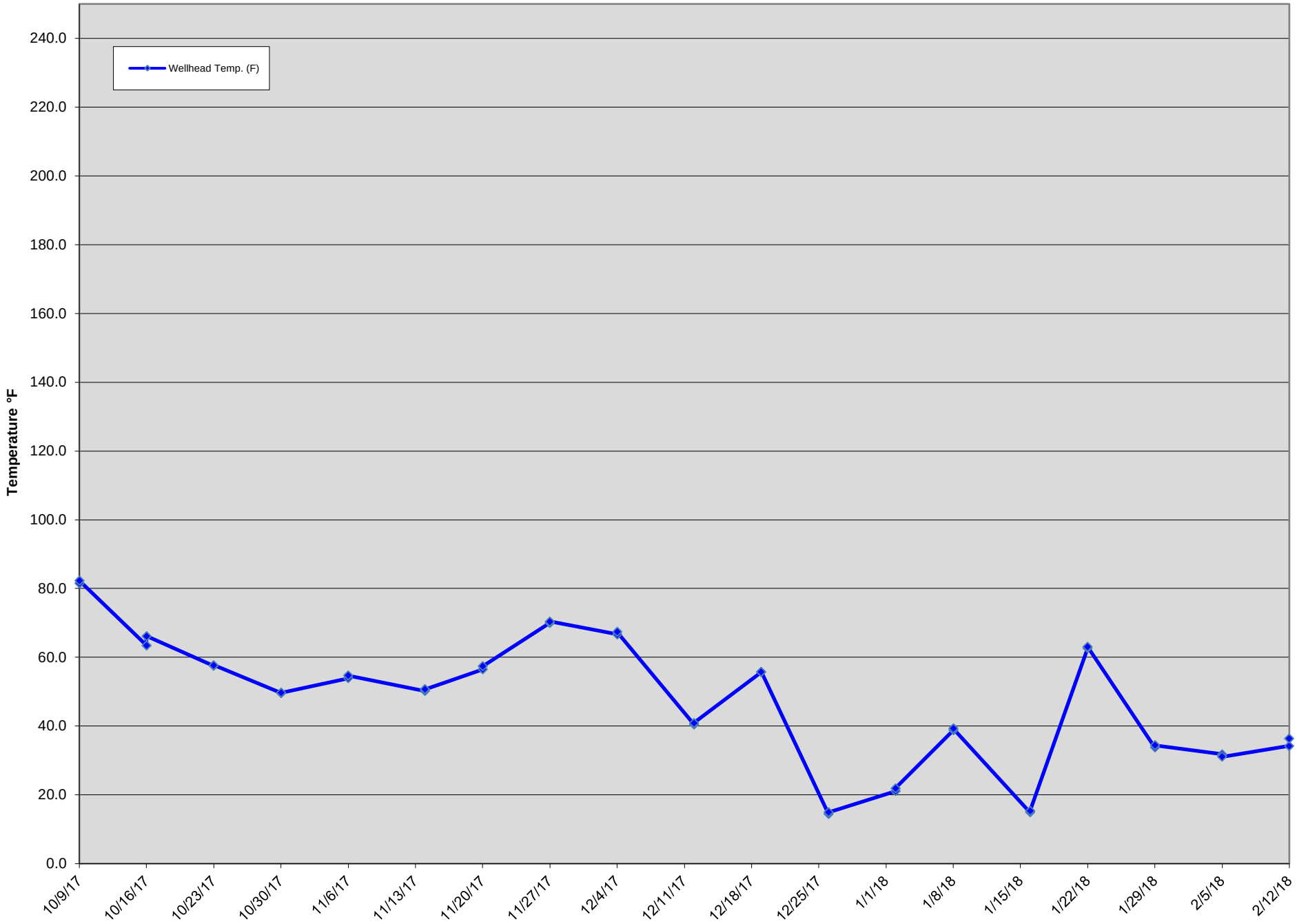
GIW-3 Wellhead Temperatures



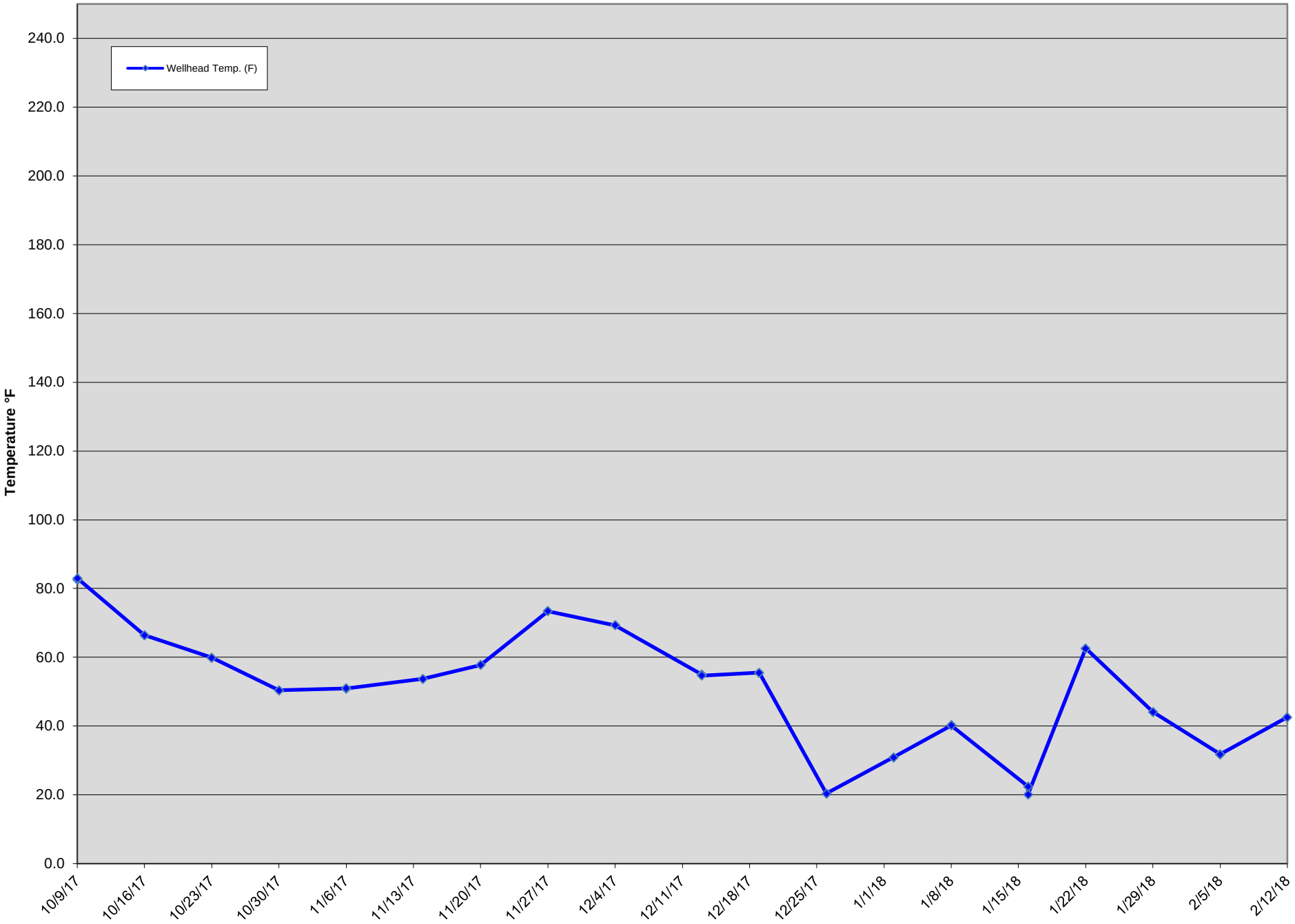
GIW-4 Wellhead Temperatures



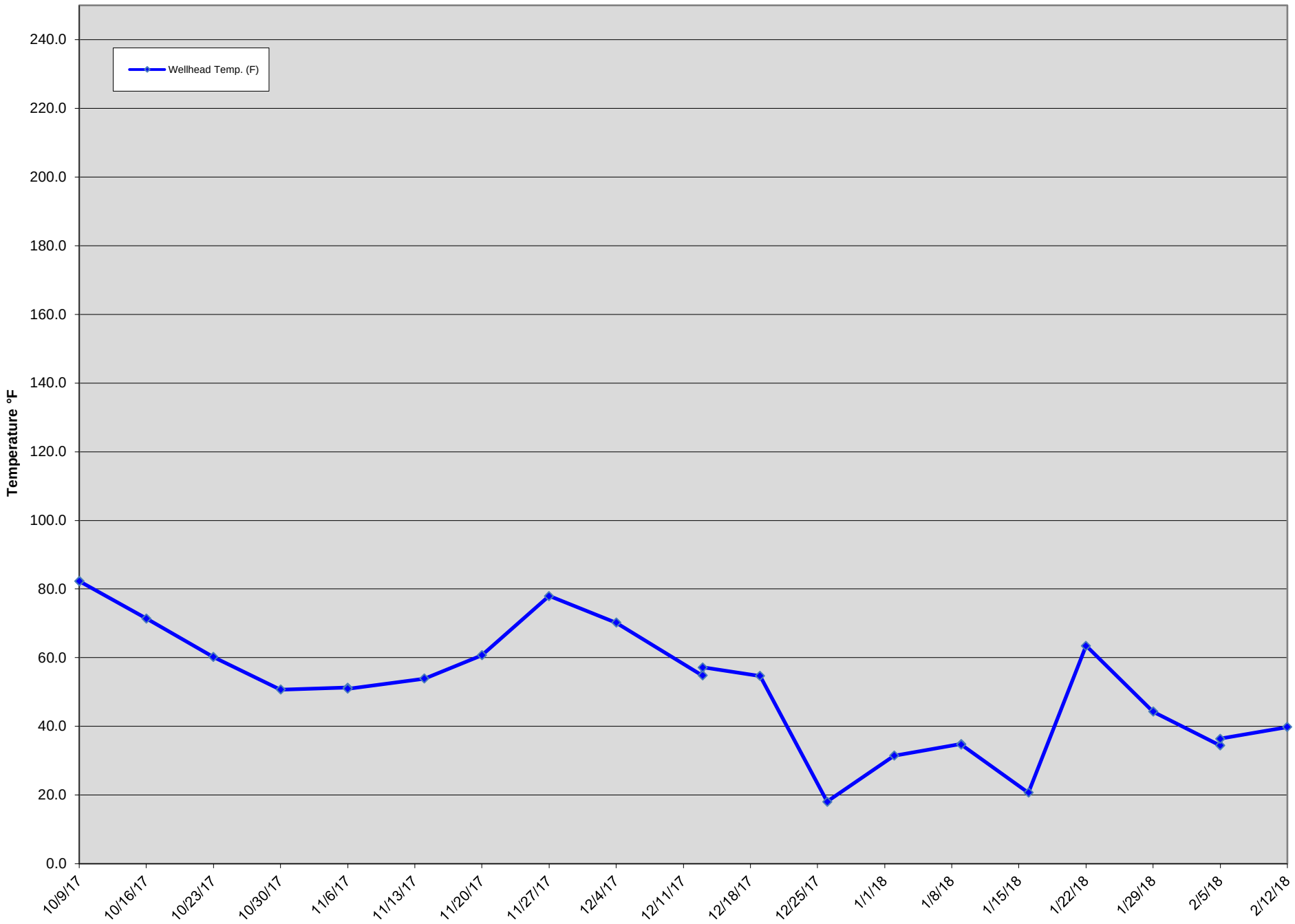
GIW-5 Wellhead Temperatures



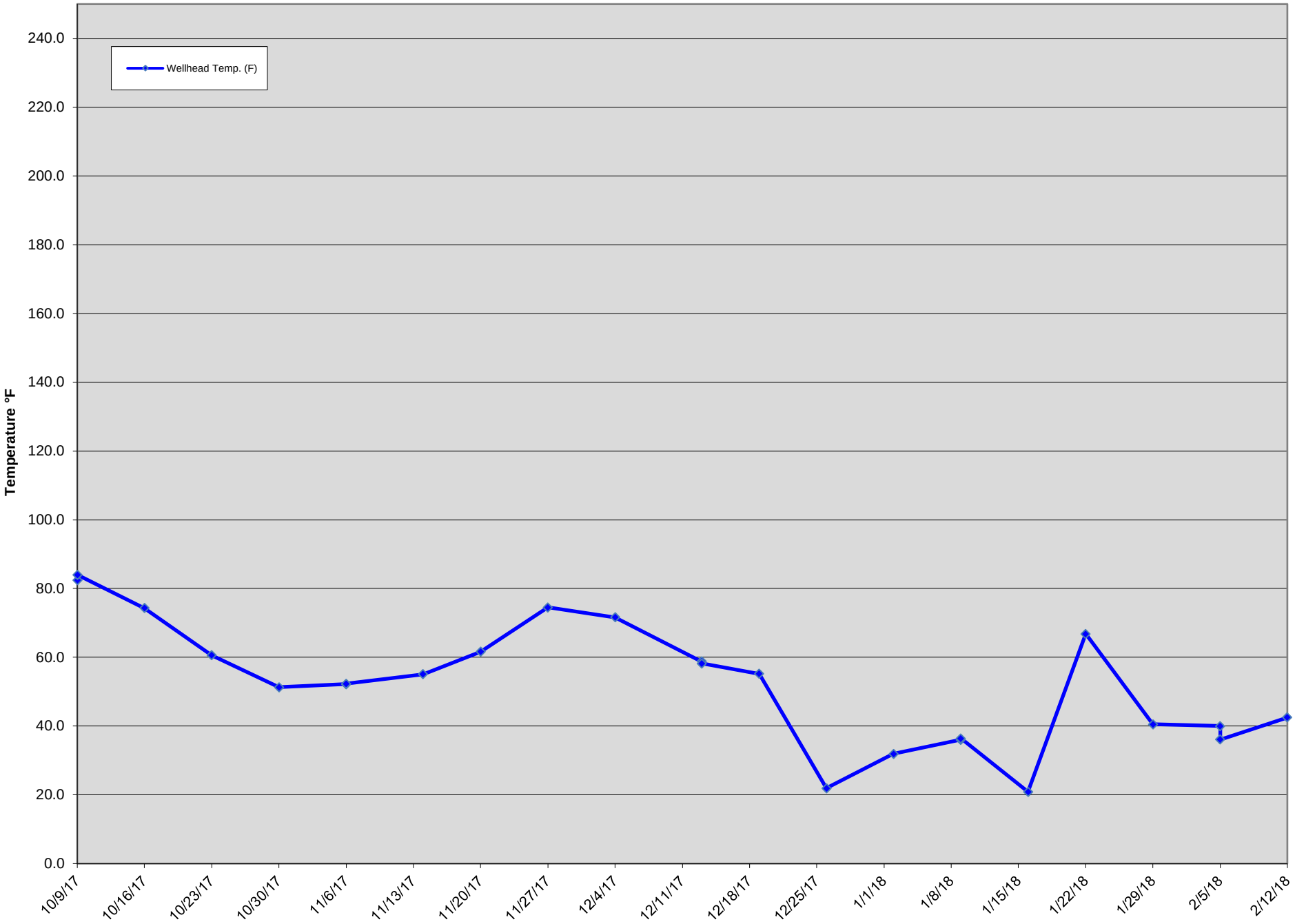
GIW-6 Wellhead Temperatures



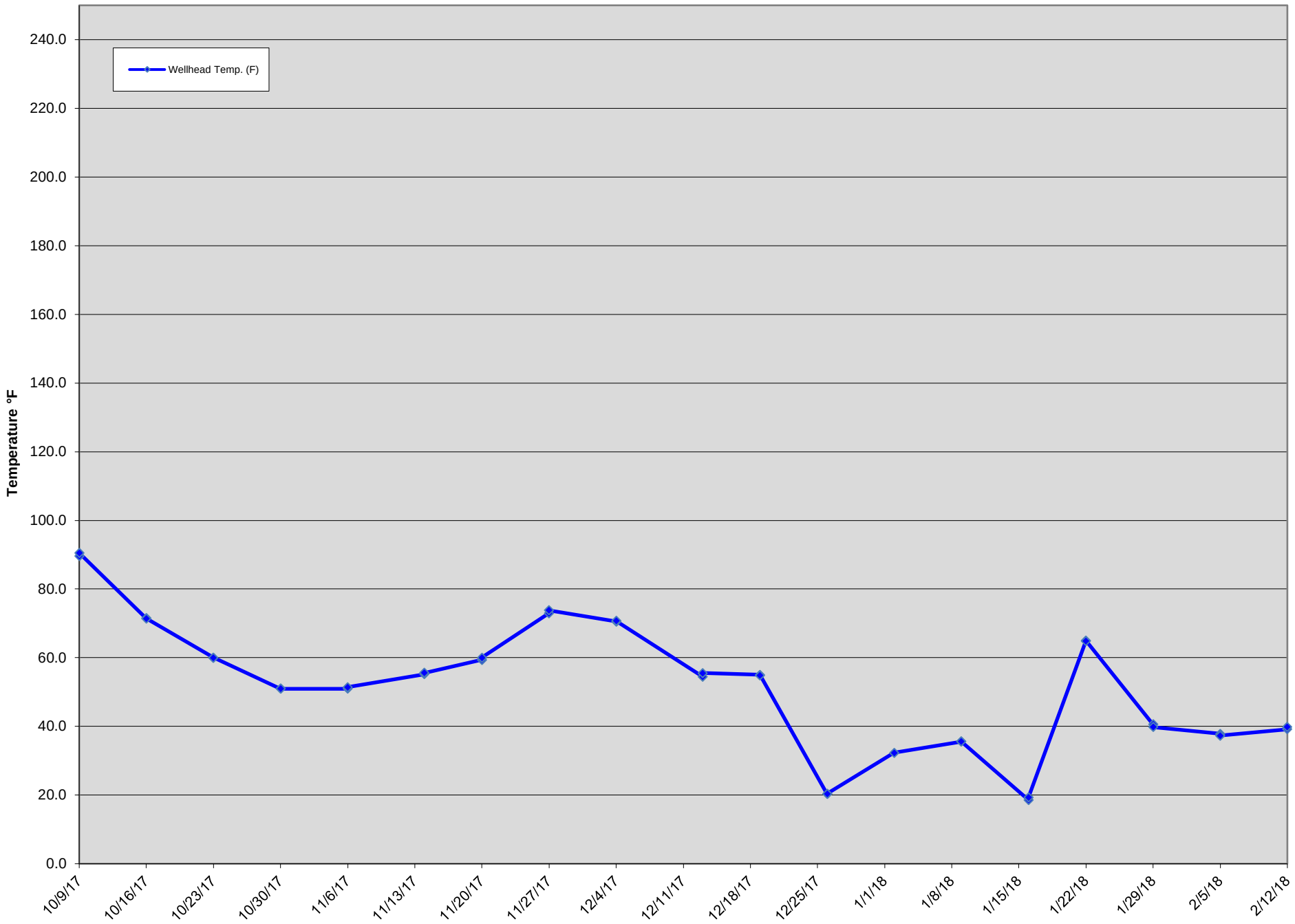
GIW-7 Wellhead Temperatures



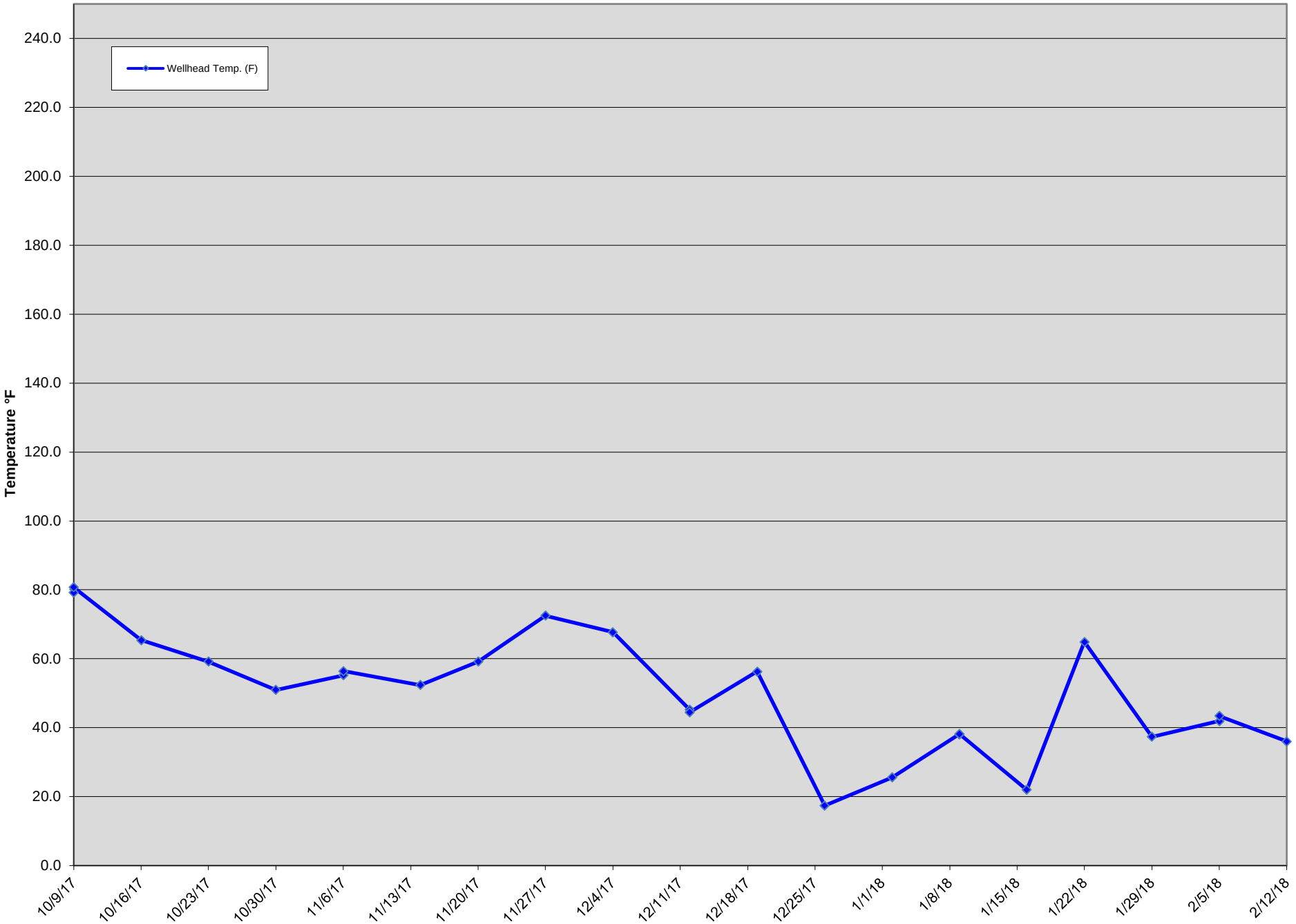
GIW-8 Wellhead Temperatures



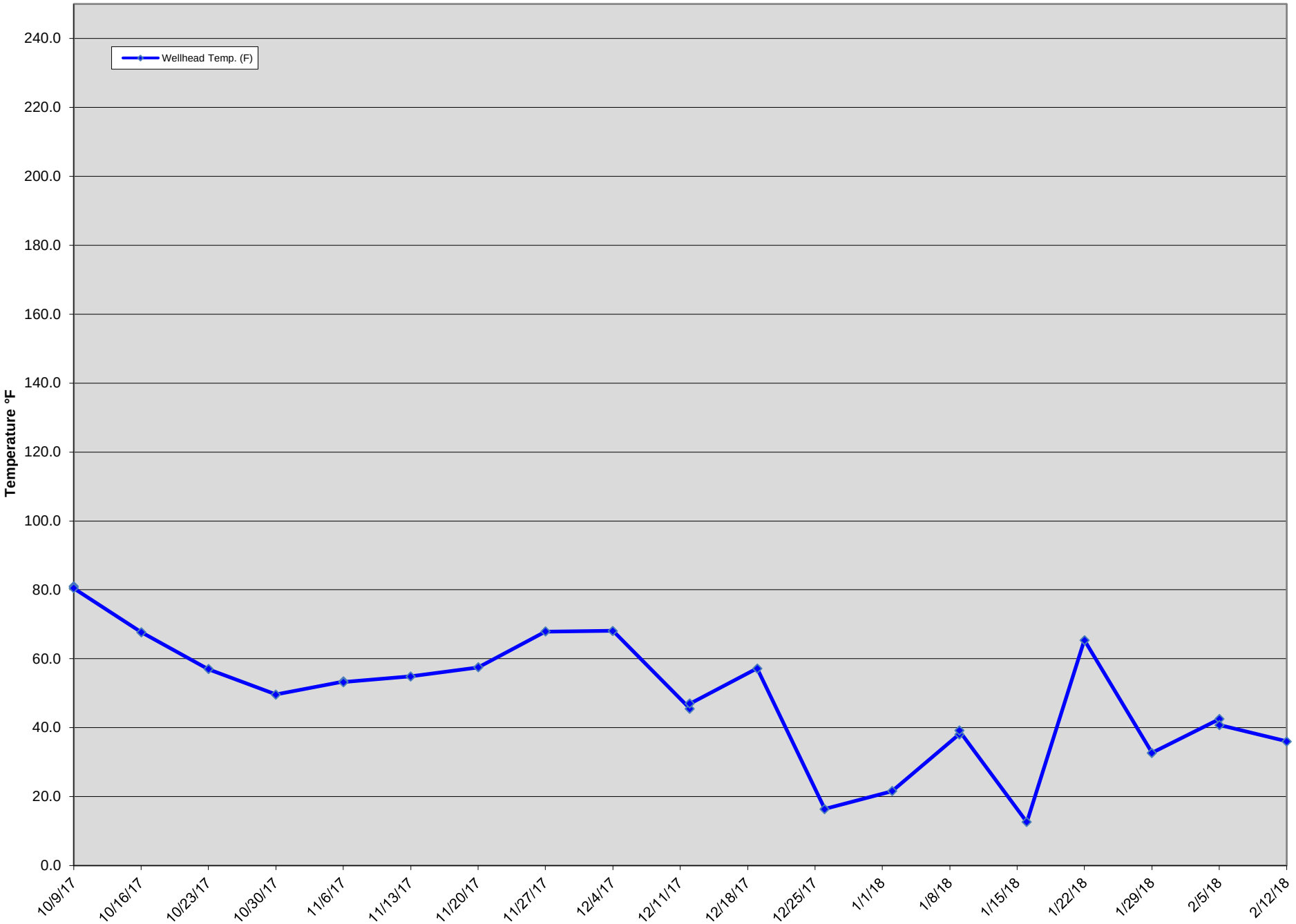
GIW-9 Wellhead Temperatures



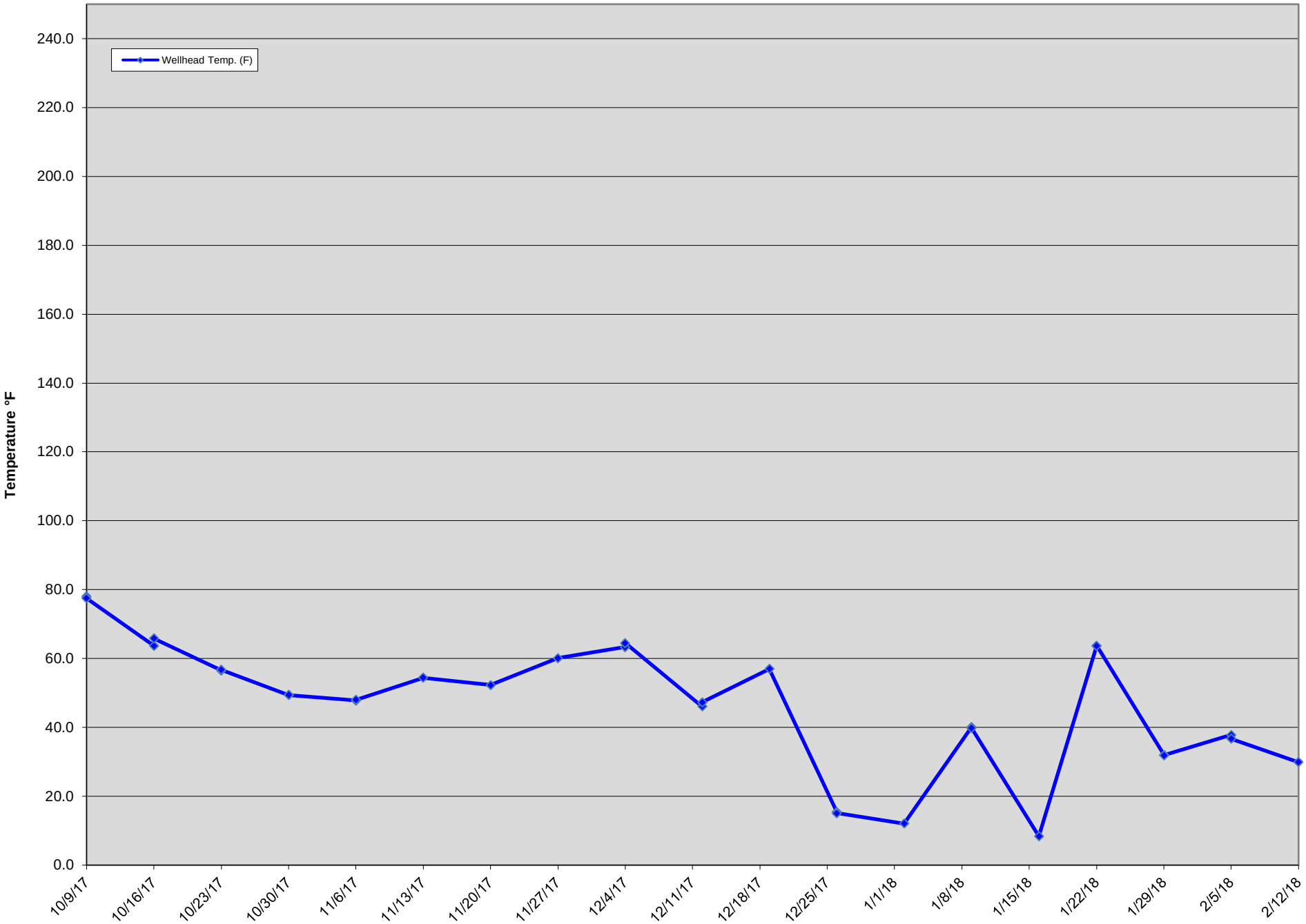
GIW-10 Wellhead Temperatures



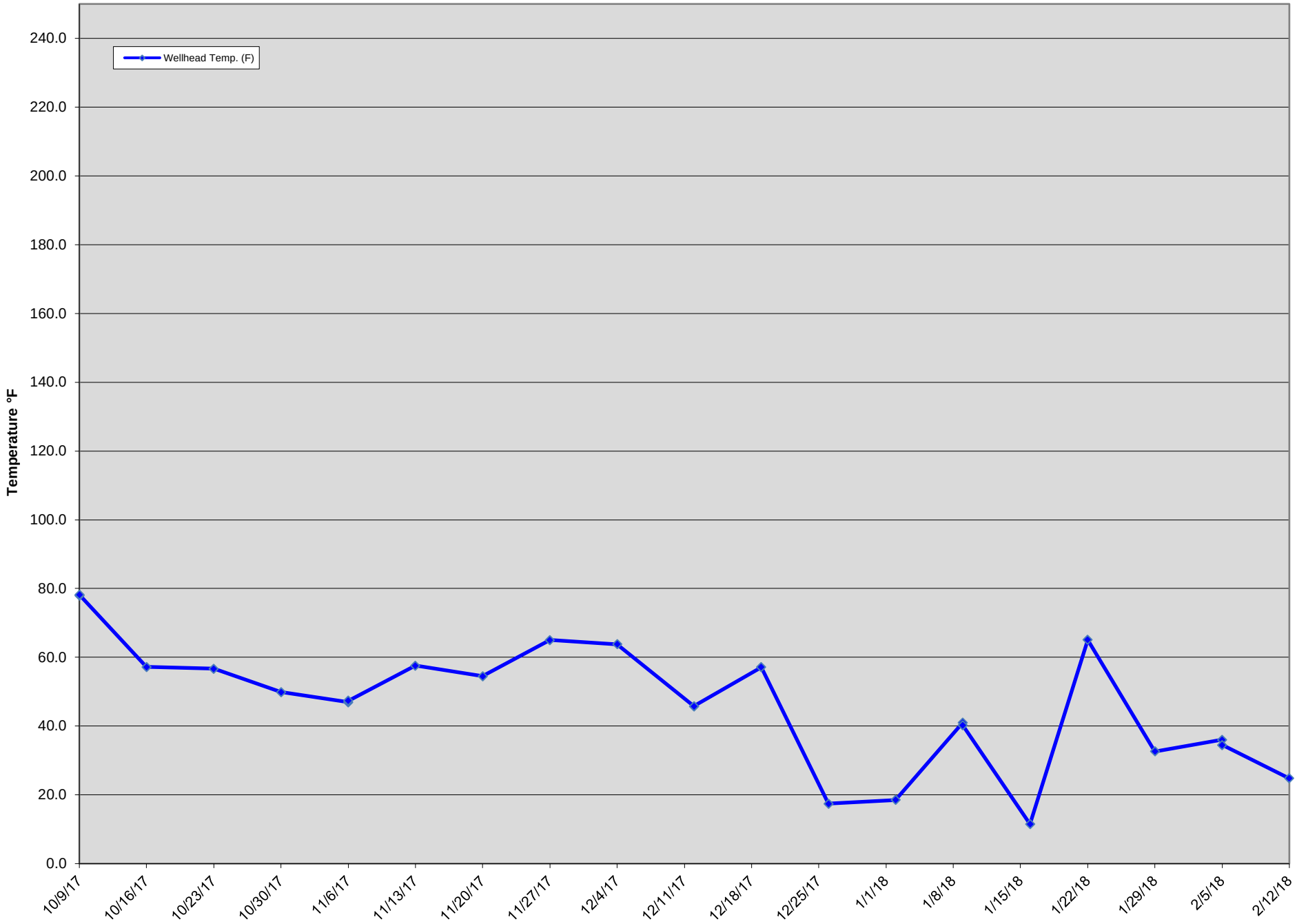
GIW-11 Wellhead Temperatures



GIW-12 Wellhead Temperatures



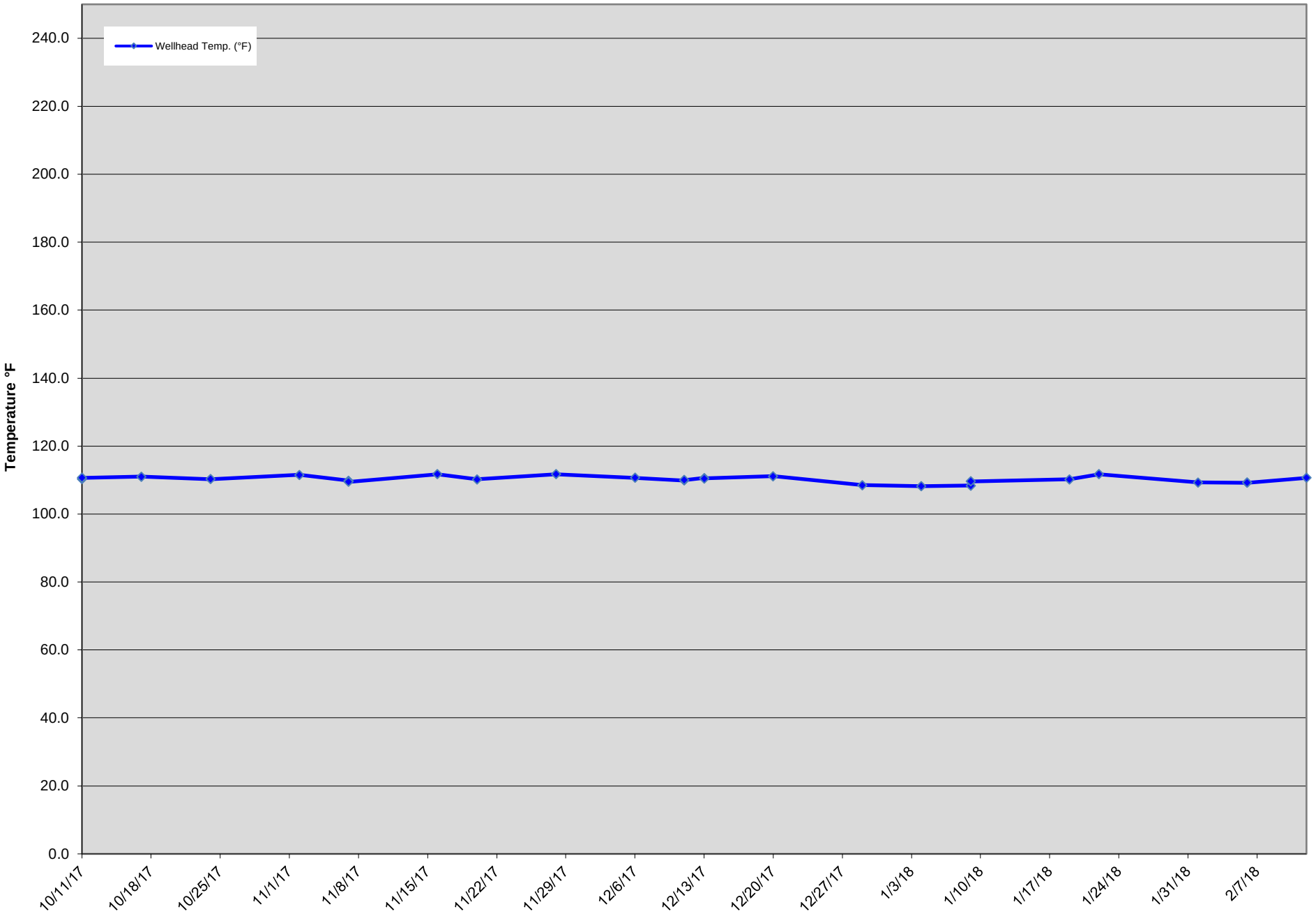
GIW-13 Wellhead Temperatures



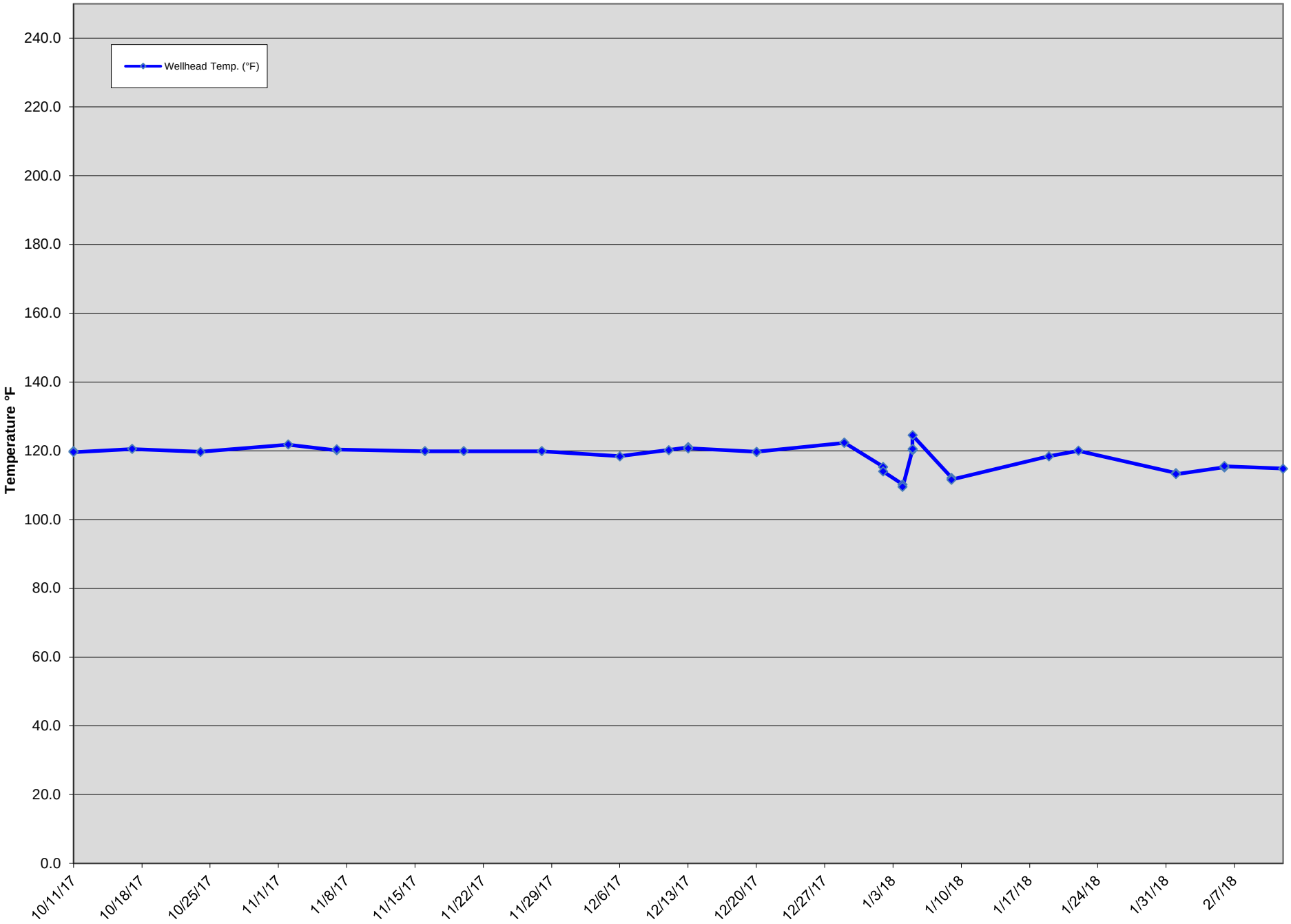
ATTACHMENT D

NECK-AREA GAS EXTRACTION WELL DATA

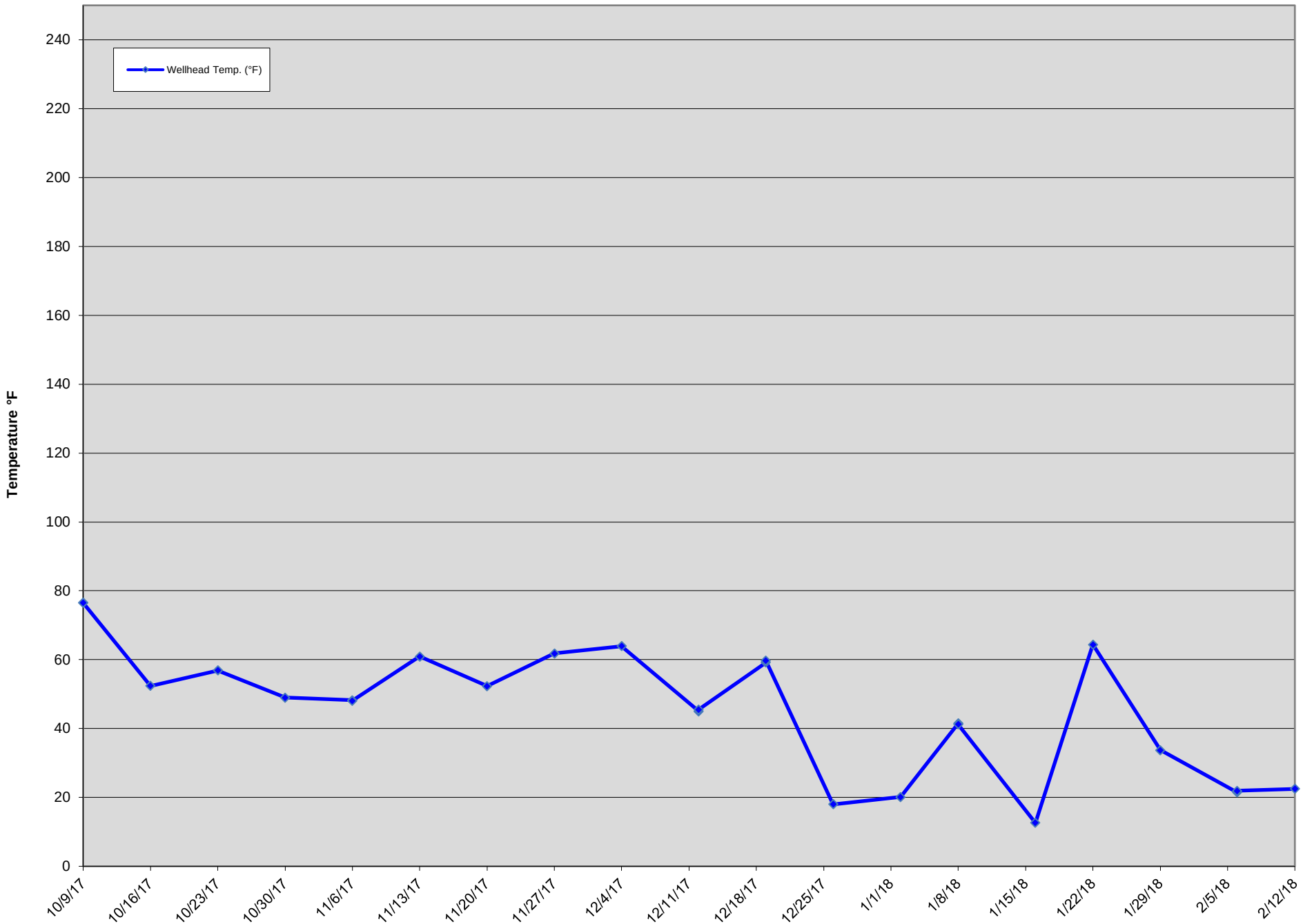
GEW-008 Wellhead Temperatures



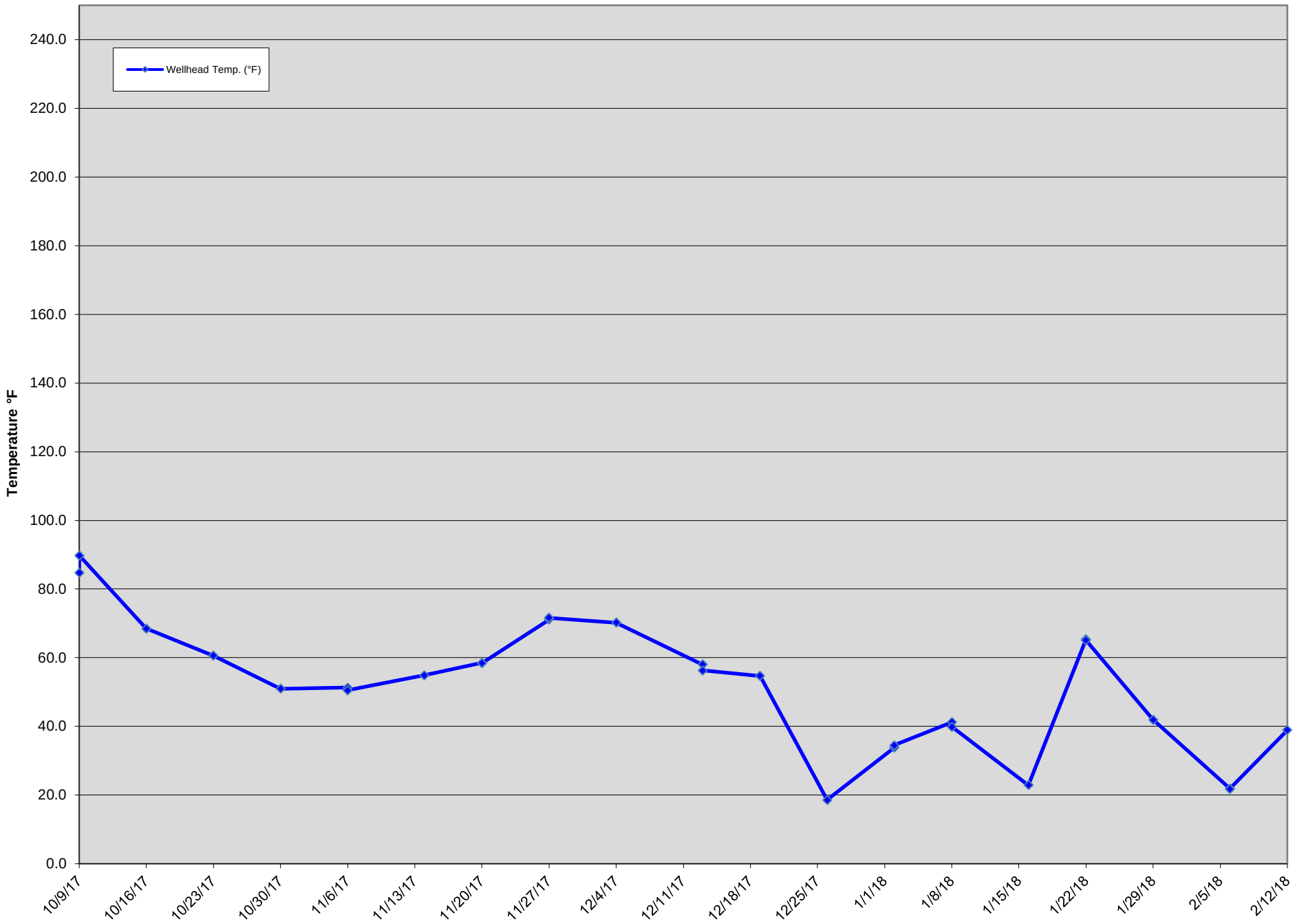
GEW-009 Wellhead Temperatures



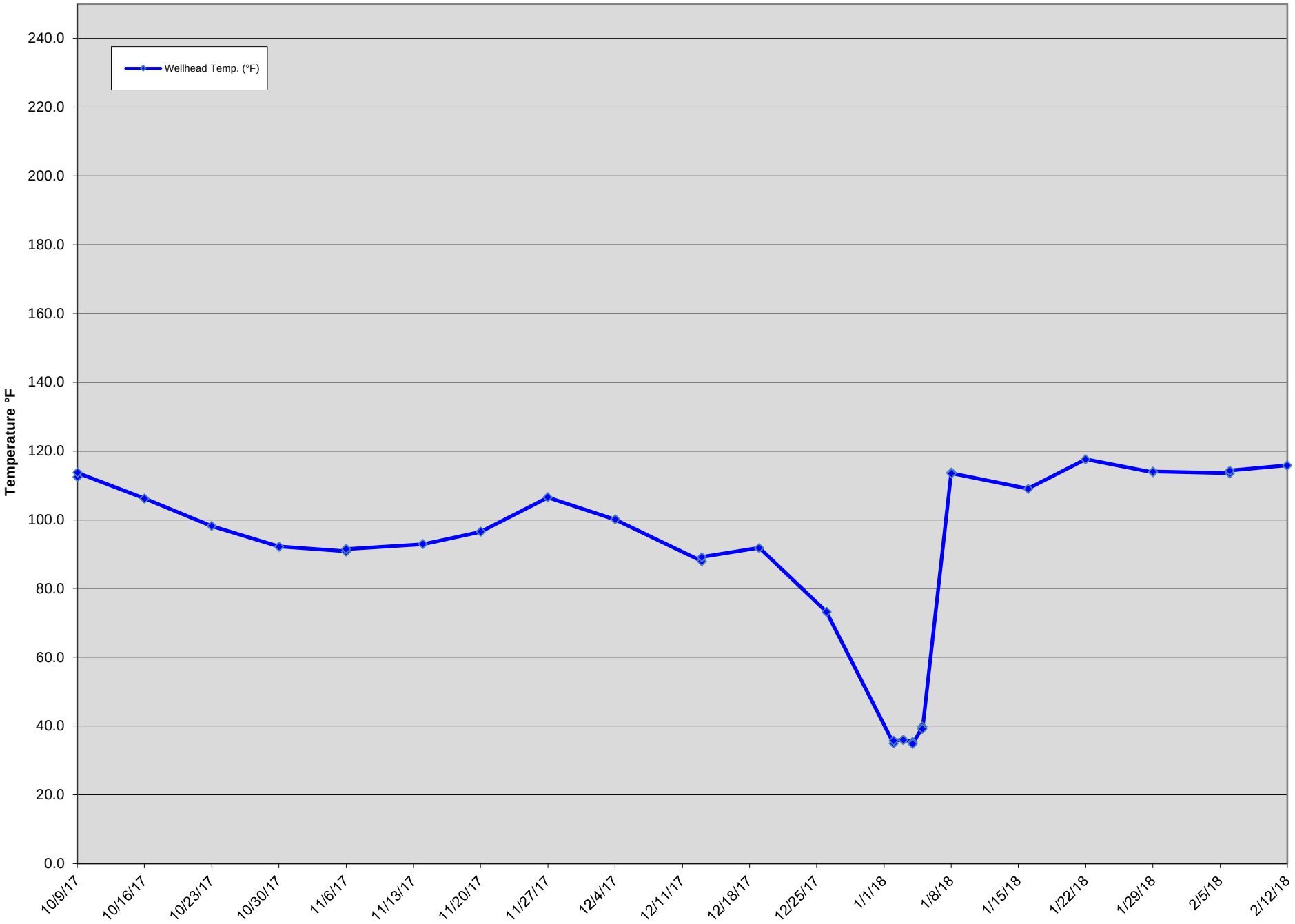
GEW-010 Wellhead Temperatures



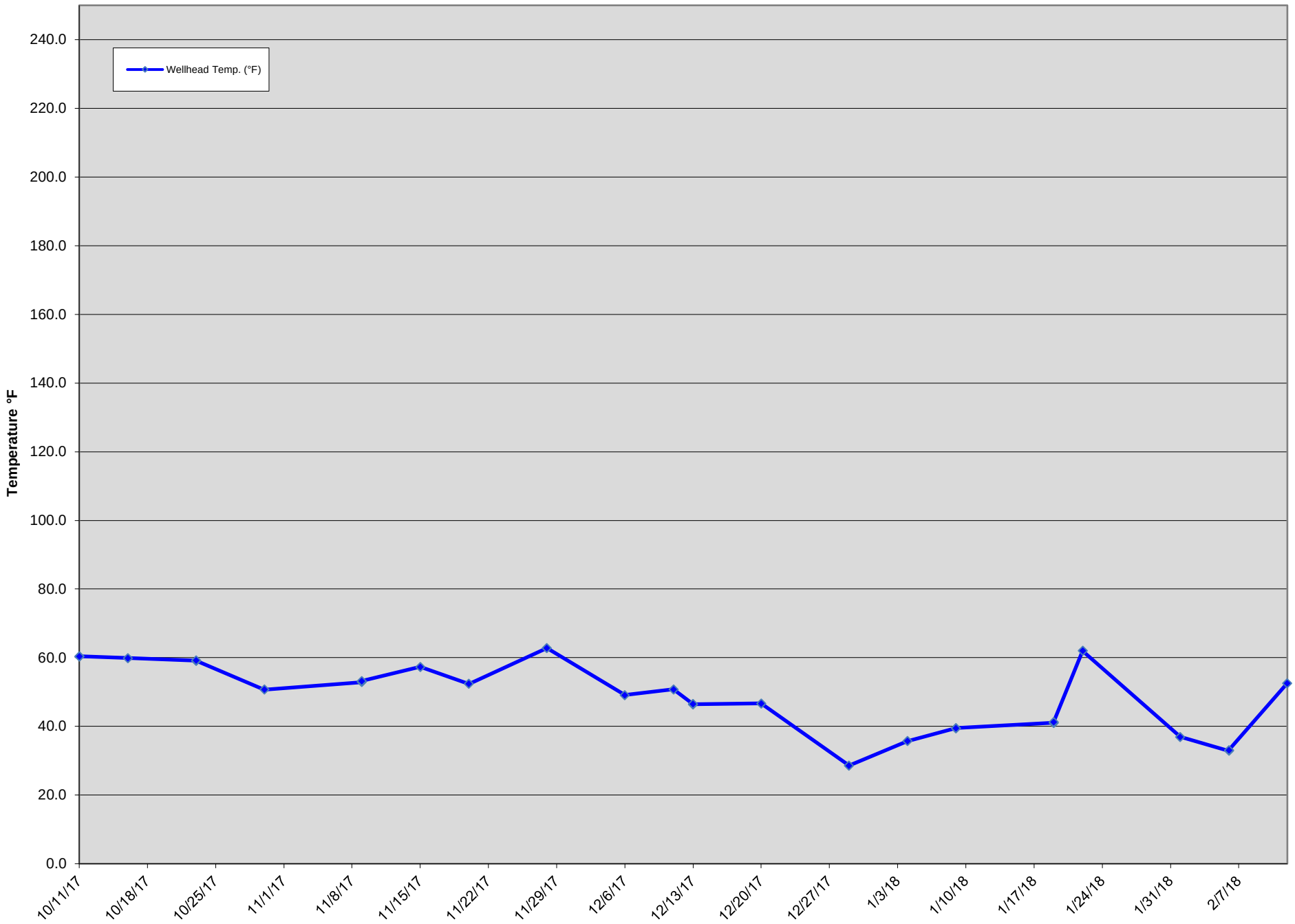
GEW-038 Wellhead Temperatures



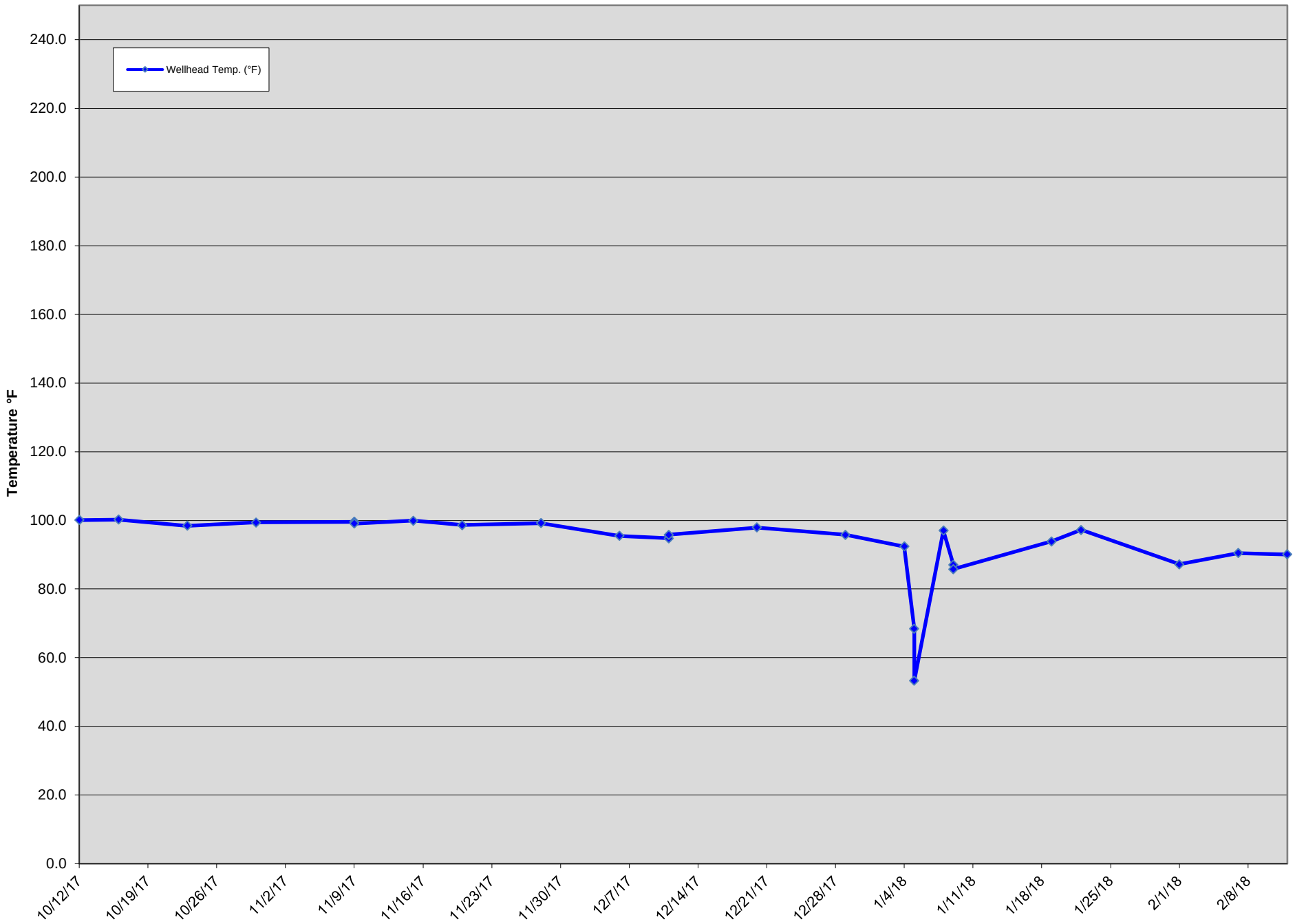
GEW-039 Wellhead Temperatures



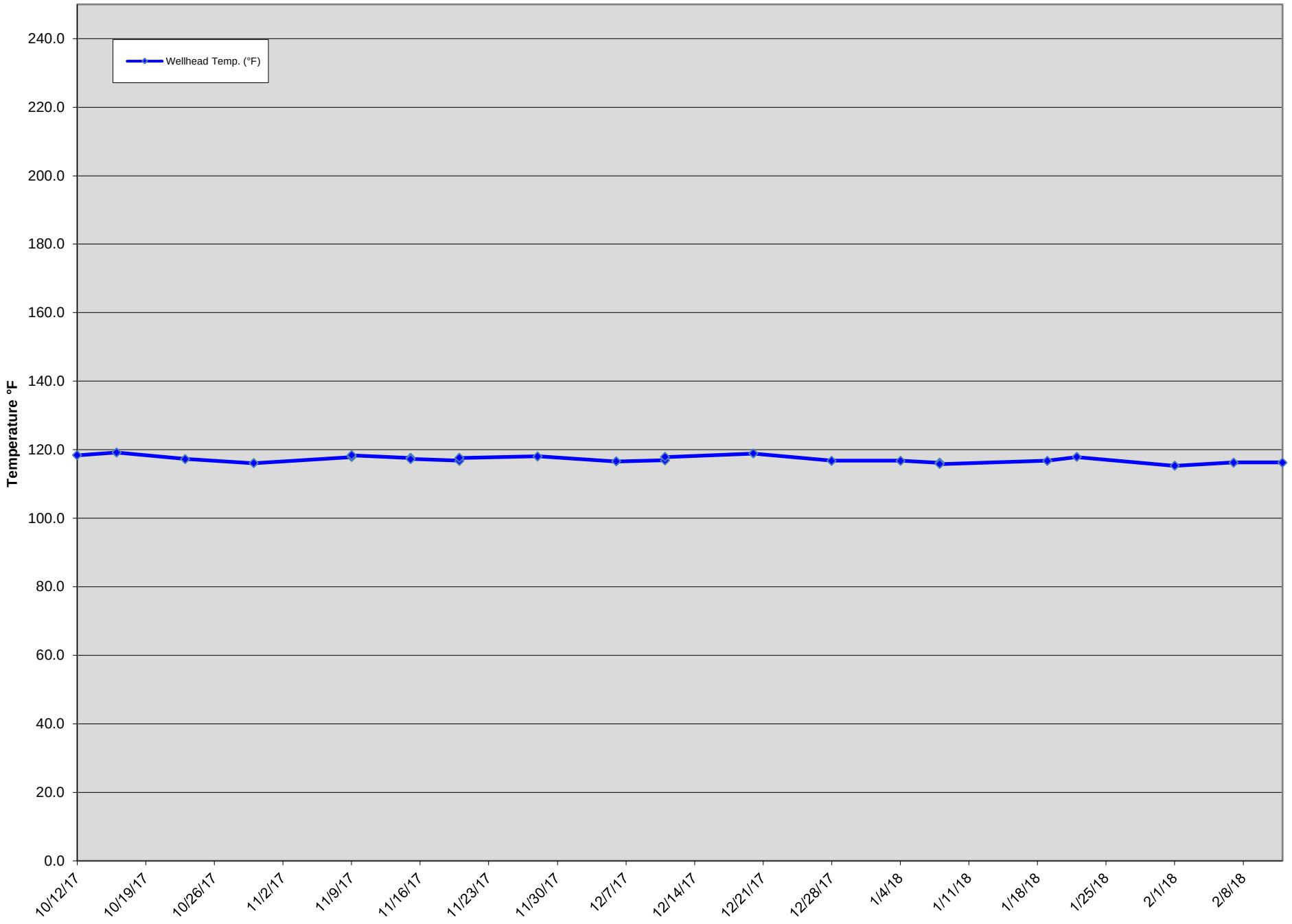
GEW-040 Wellhead Temperatures



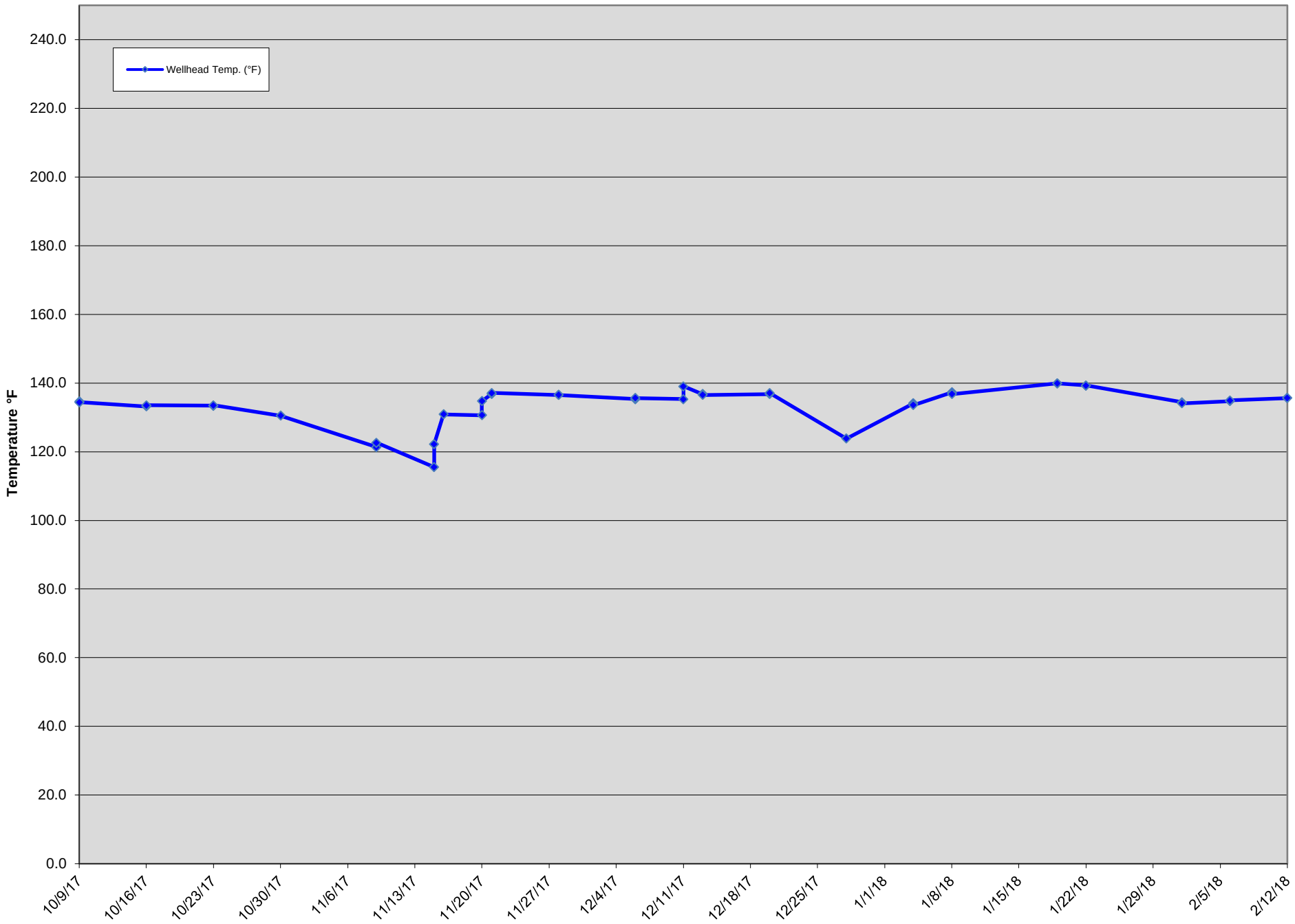
GEW-041R Wellhead Temperatures



GEW-043R Wellhead Temperatures



GEW-053 Wellhead Temperatures



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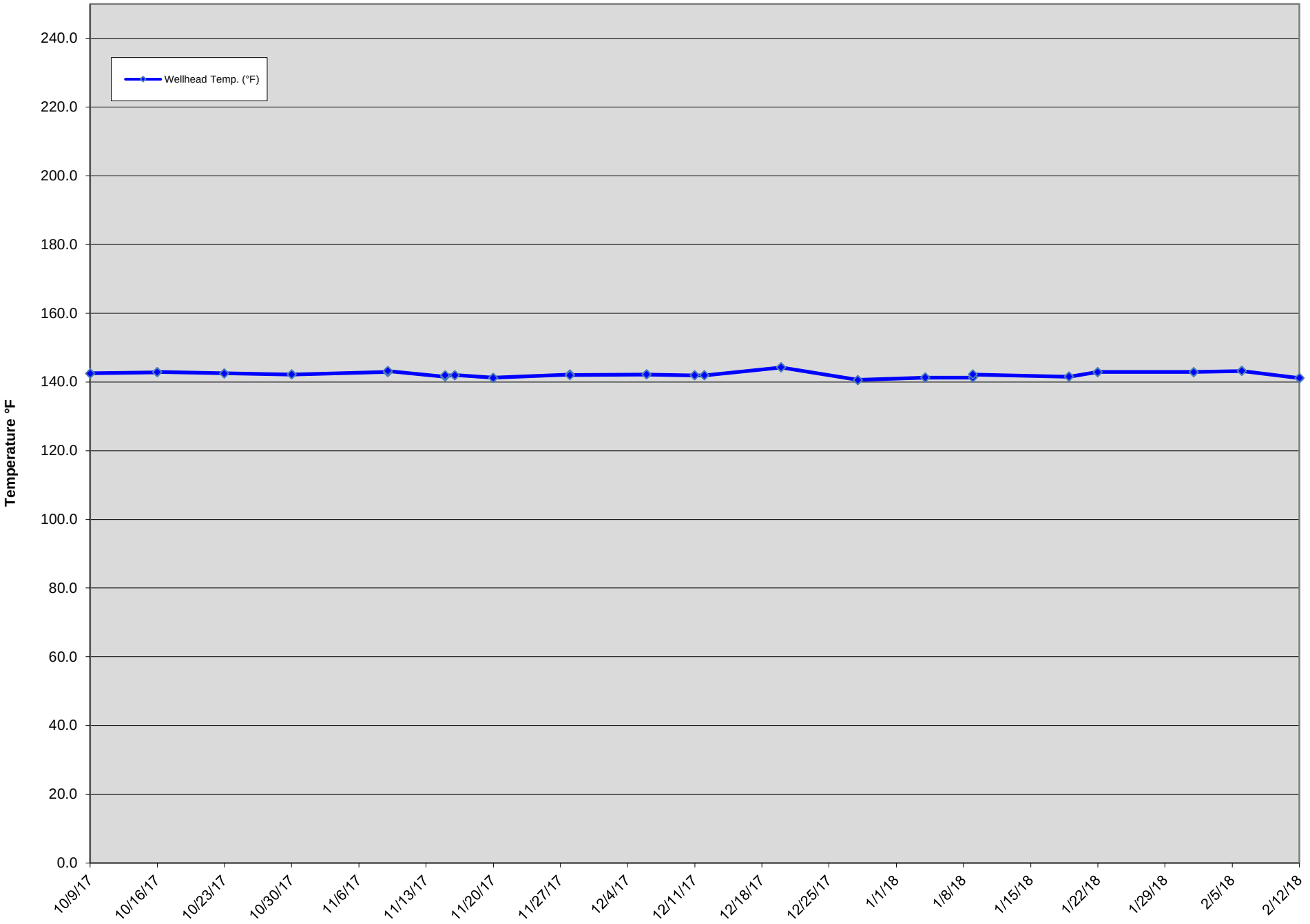

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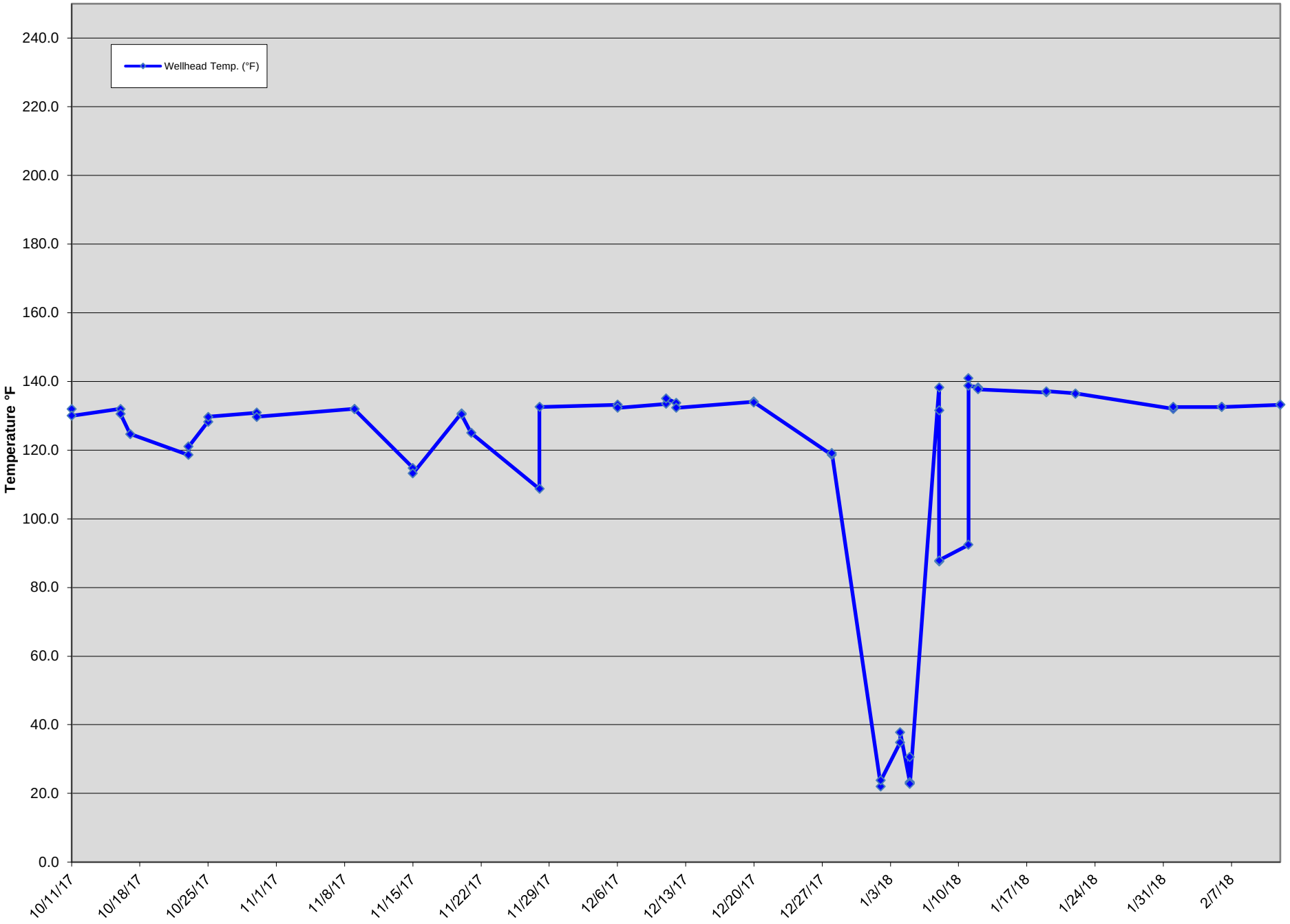
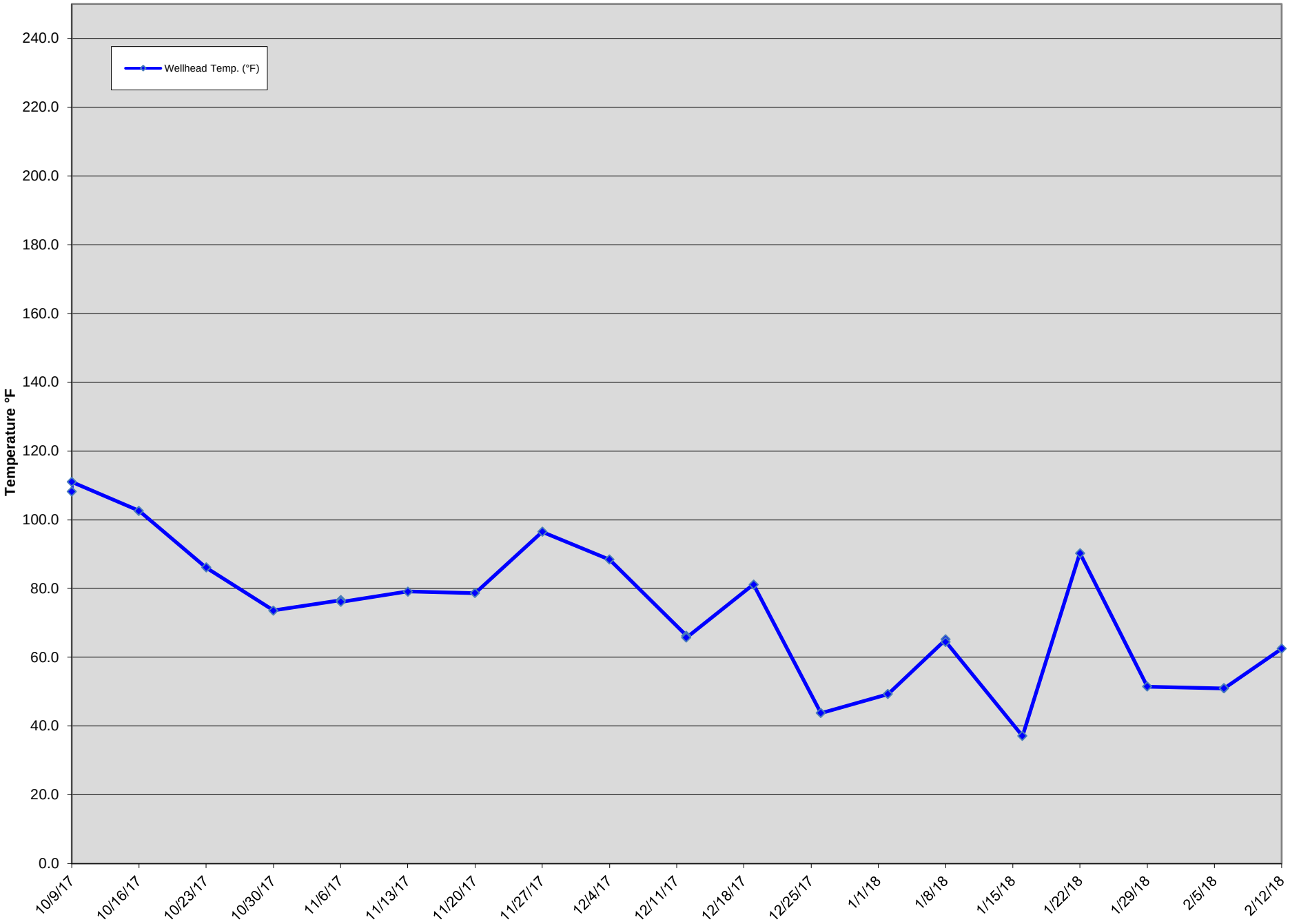
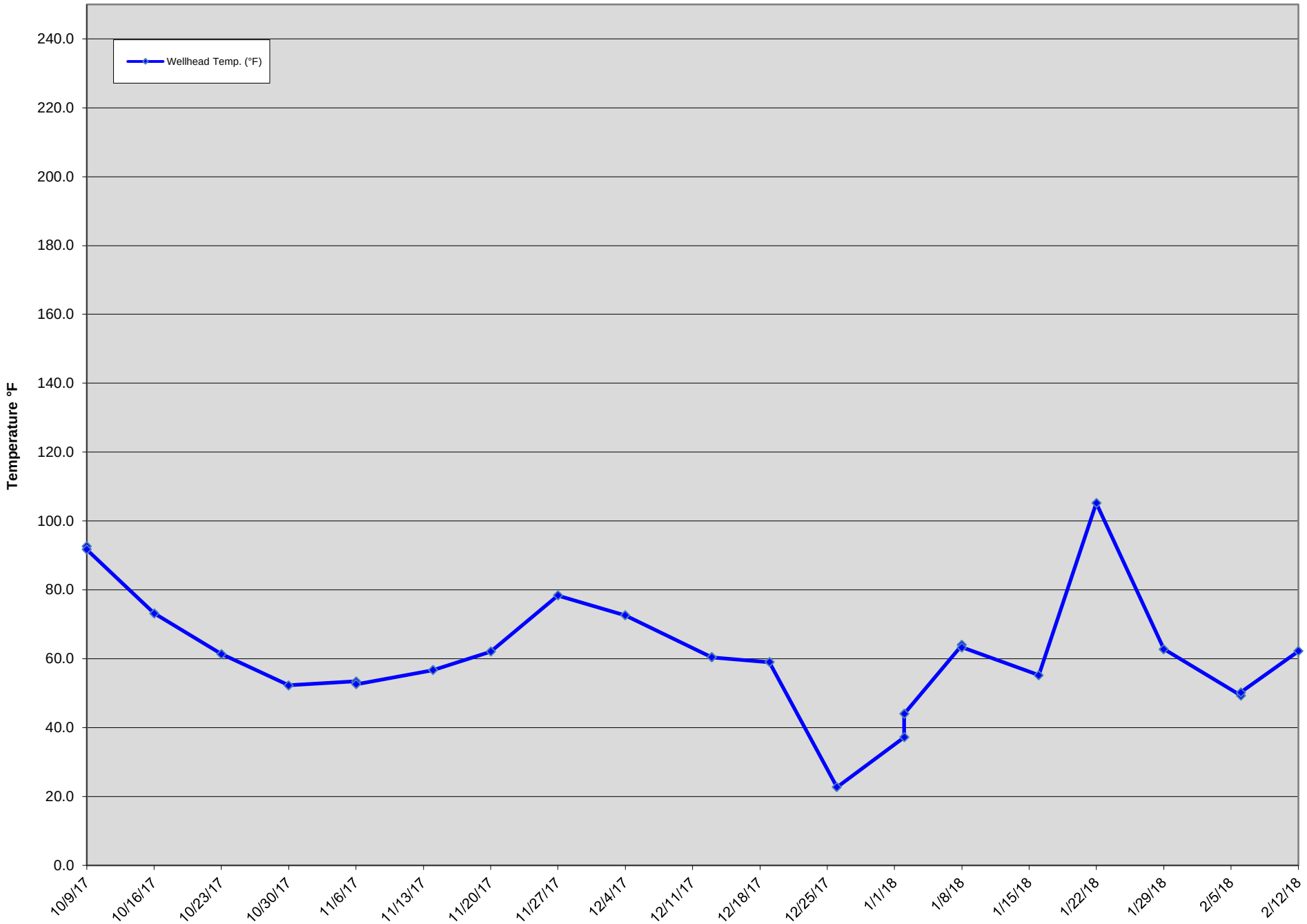
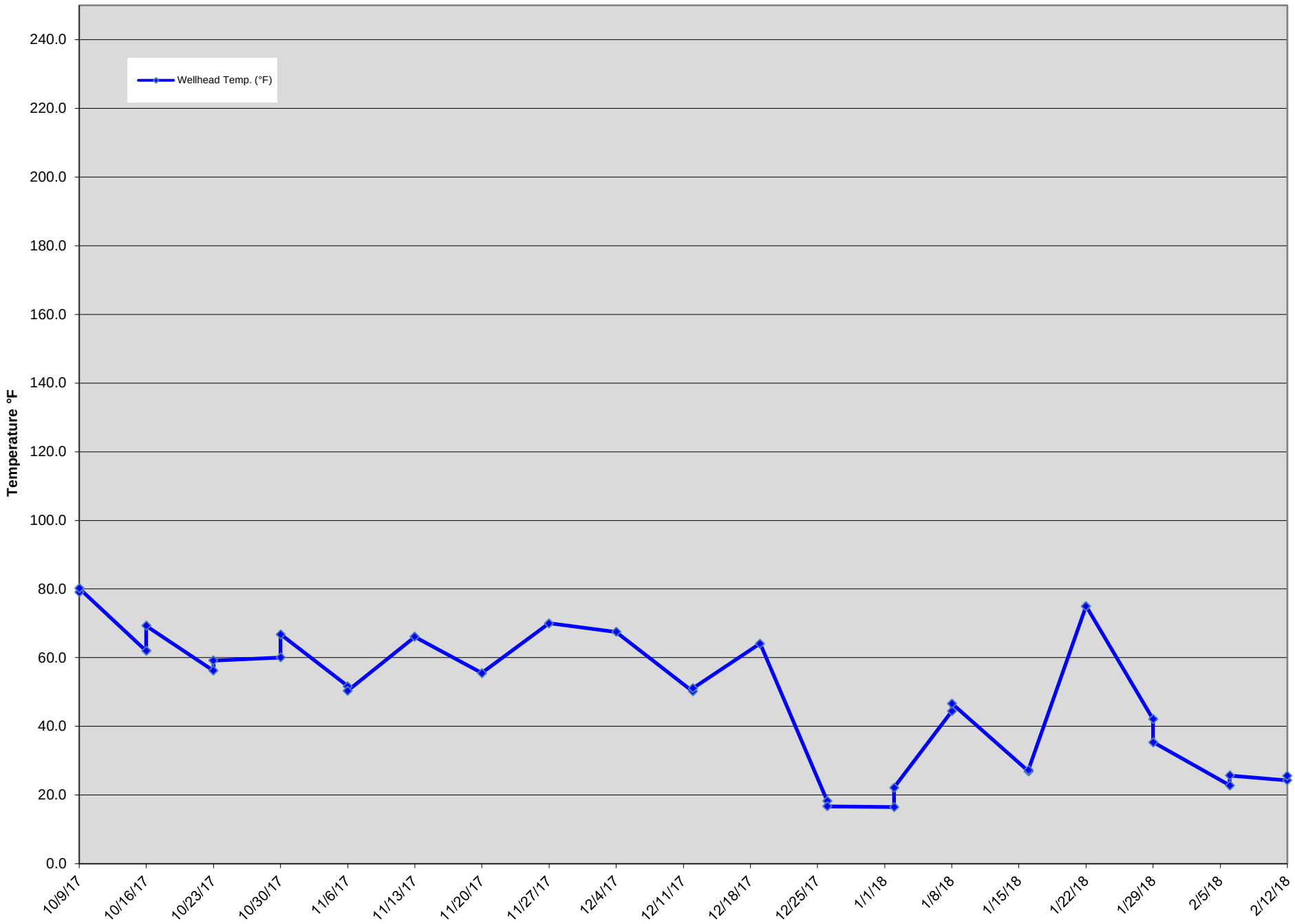


GEW-056R Wellhead Temperatures



GEW-109 Wellhead Temperatures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