# Bridgeton Landfill, LLC

## Weekly Data Submittal

**Week of June 28, 2015 – July 5, 2015**

**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**

**July 10, 2015**

# Commentary on Data

July 10, 2015

**Attachment A – Leachate Levels in Leachate Collection Sumps**

Leachate Collection Sump (LCS)-1D, -3D, -4B, -5A, and -6B were partially or fully operational during the weekly reporting period.

The pump in LCS-2D was off during the weekly monitoring event due to "over current".

**Attachment B - Temperature Monitoring Probe Analytical Charts**

The following TMPs indicated generally consistent profiles to previous observations: TMP-1, -2, -3, -3R, -4, -4R, -6, -8, -9, -10, -11, -12, -14, -16, -17, -18, -21, -22, -23, -24, -25, -26, -27, -28, and -29.

TMP readings for evaluation of the Heat Extraction System (HES) are attached, but not evaluated in this commentary.

**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). Gas temperatures in GIW-09,-11,-12,-13 have decreased 60 to 90 degrees this past week, due to being added to the HES.

The remaining well without a HES installed (GIW-01), historical gas flow temperatures were observed.

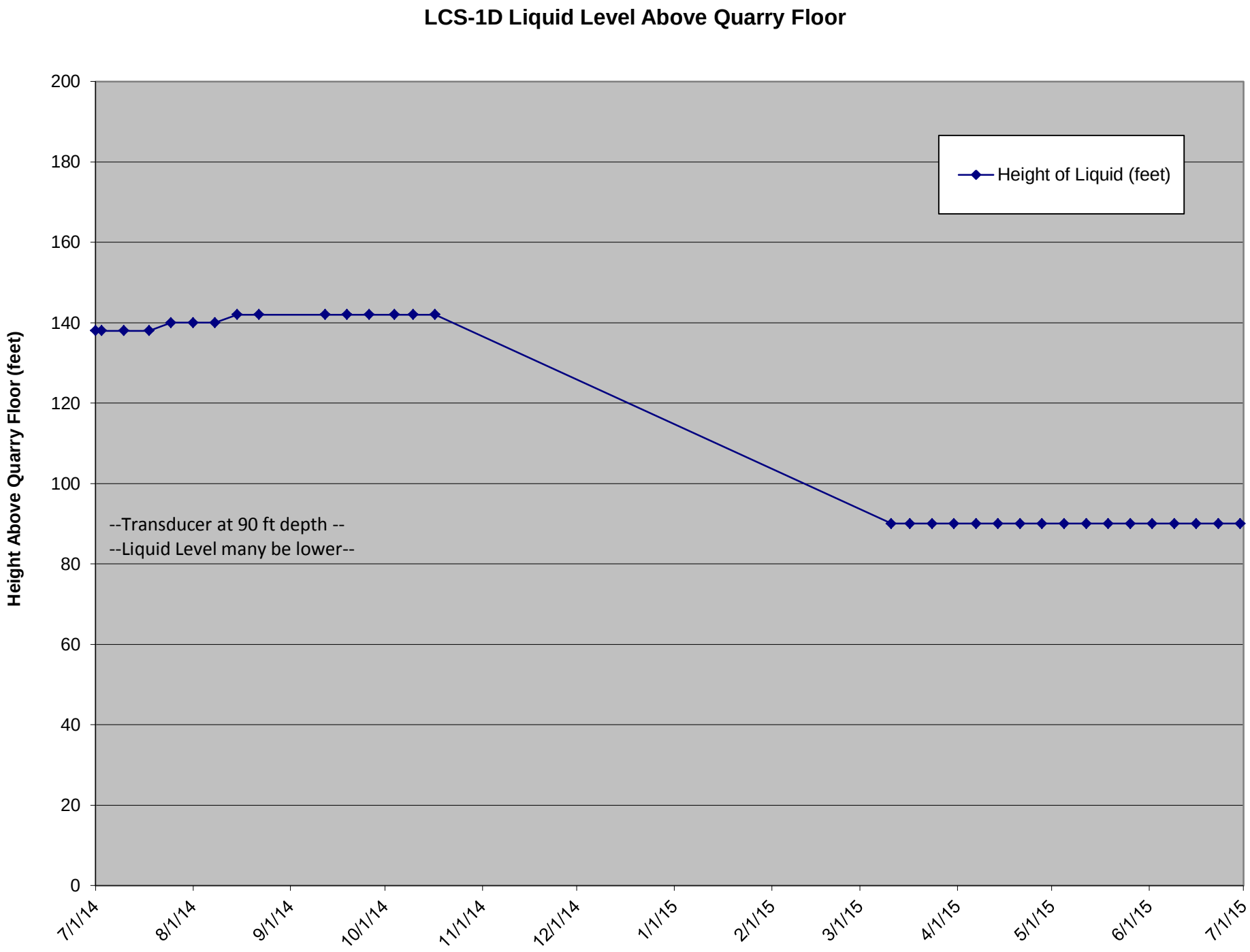
**Attachment D – Neck Area Gas Extraction Well Data**

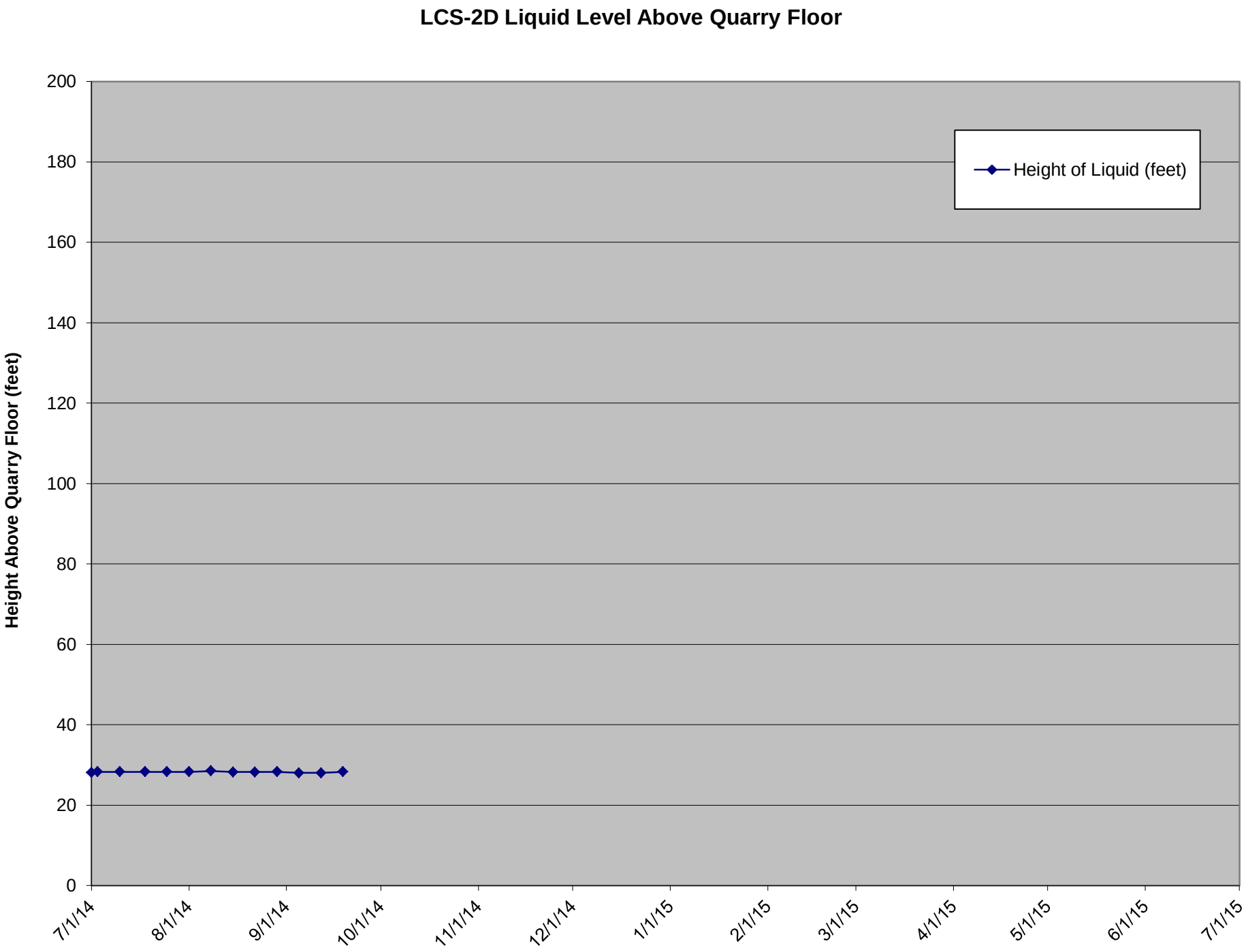
Weekly gas temperature data is being collected for select gas extraction wells (GEWs) located in the neck area of the landfill. These wells include GEW-008, -009, -010, -038, -039, -040, -041R, -043R, -053, -054, -055, -056R, -109, and -110.

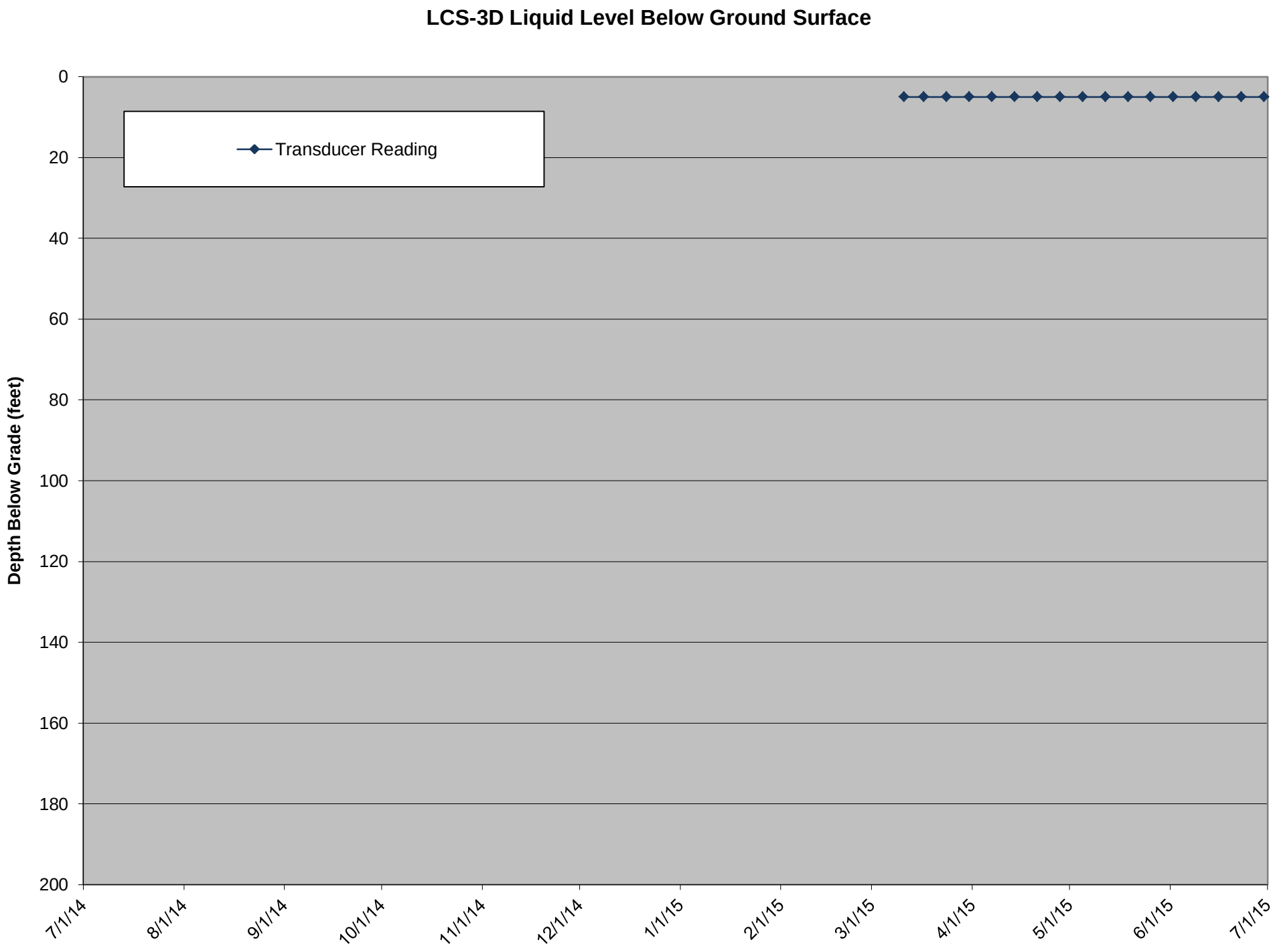
Over the past week all 14 wells were monitored and all well temperatures were consistent with historical gas flow temperatures.

# ATTACHMENT A

# LEACHATE LEVELS IN LEACHATE COLLECTION SUMPS


LCS-1D Liquid Level Above Quarry Floor
Height Above Quarry Floor (feet)
200
180
160
140
120
100
80
60
40
20
0
7/1/14
8/1/14
9/1/14
10/1/14
11/1/14
12/1/14
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
Height of Liquid (feet)
--Transducer at 90 ft depth --
--Liquid Level many be lower--


LCS-2D Liquid Level Above Quarry Floor
Height Above Quarry Floor (feet)
200
180
160
140
120
100
80
60
40
20
0
7/1/14
8/1/14
9/1/14
10/1/14
11/1/14
12/1/14
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
Height of Liquid (feet)


LCS-3D Liquid Level Below Ground Surface
Transducer Reading
Depth Below Grade (feet)
0
20
40
60
80
100
120
140
160
180
200
7/1/14
8/1/14
9/1/14
10/1/14
11/1/14
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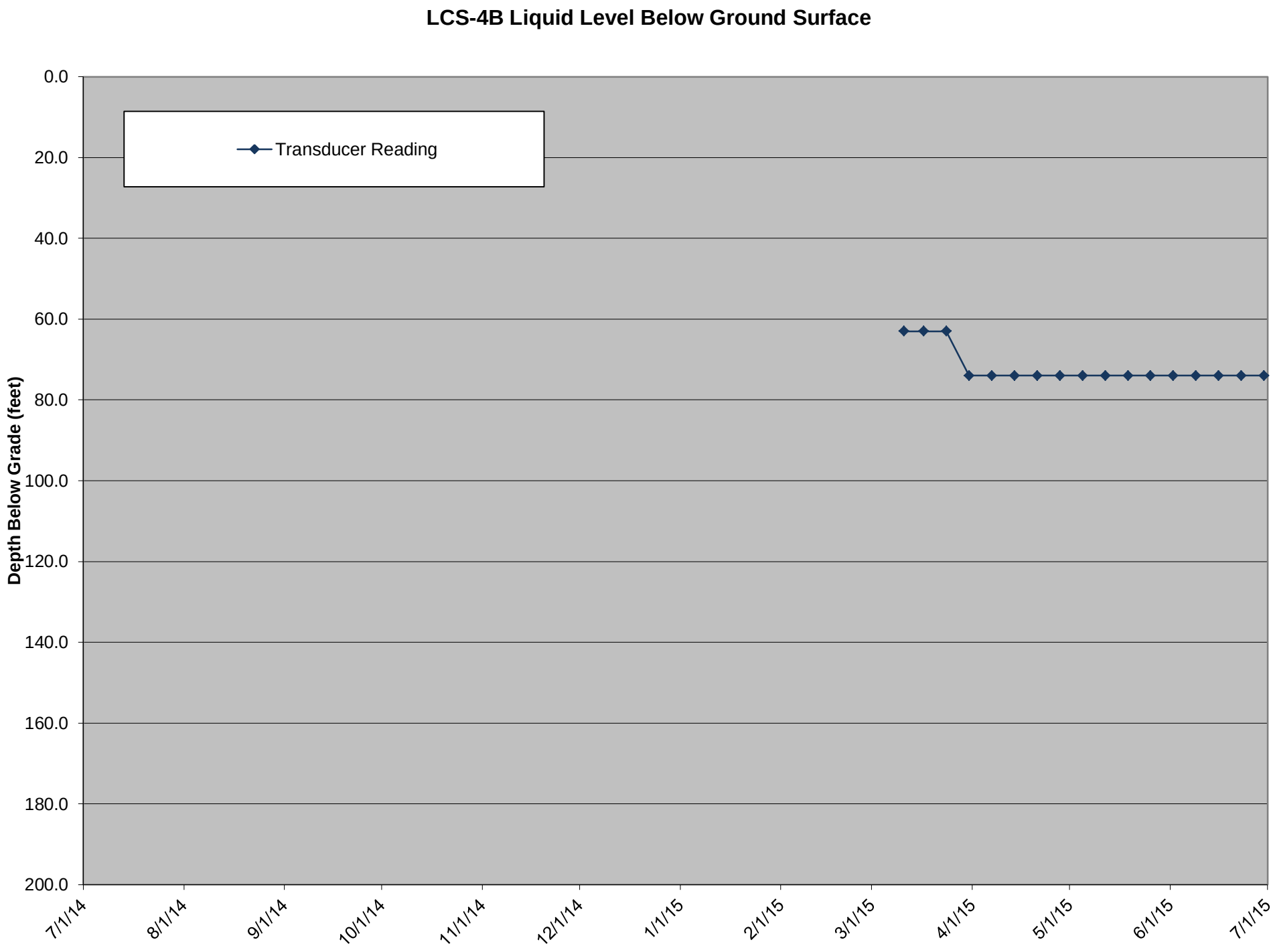
6/1/15
7/1/15


LCS-4B Liquid Level Below Ground Surface
Transducer Reading
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
7/1/14
8/1/14
9/1/14
10/1/14
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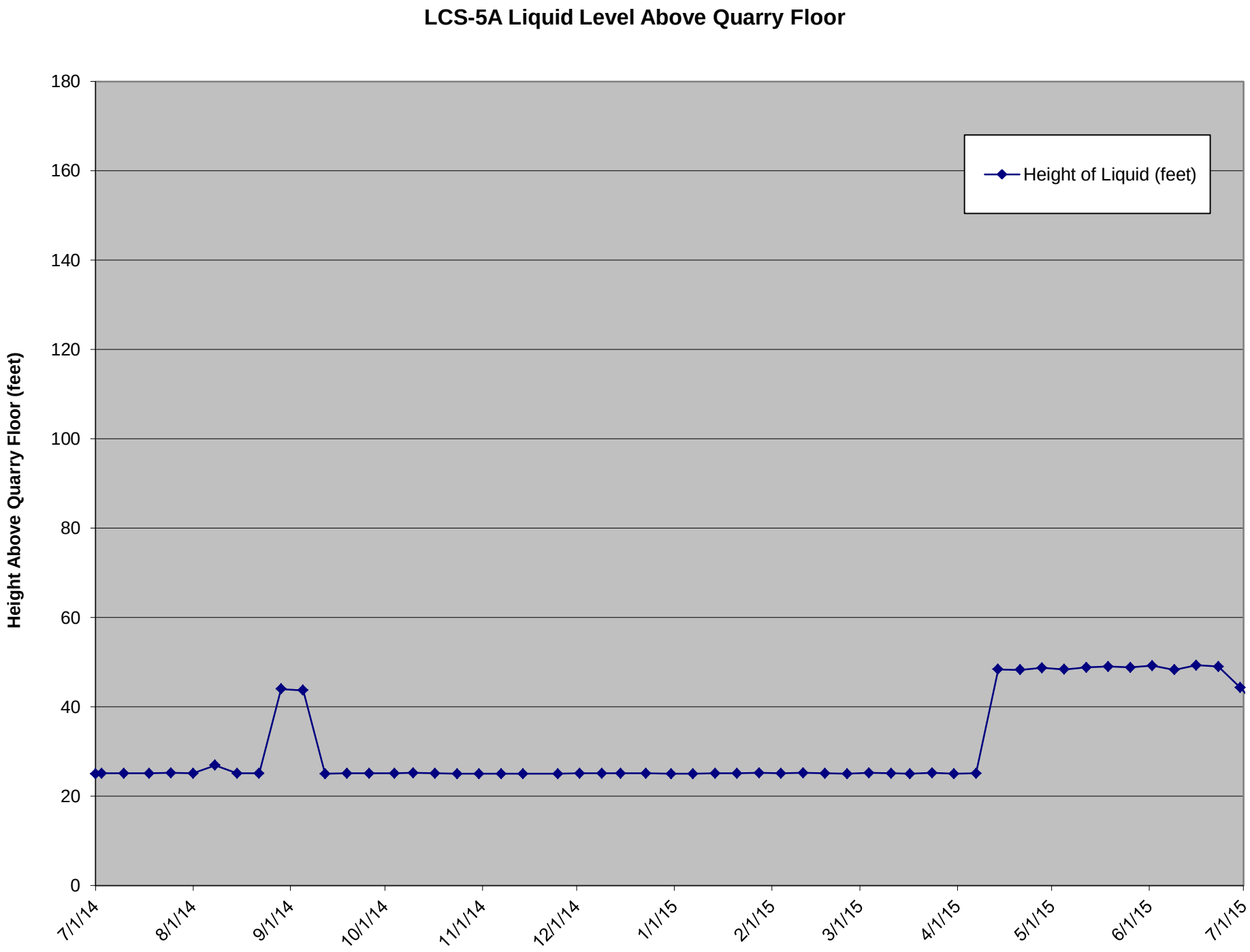
6/1/15
7/1/15


LCS-5A Liquid Level Above Quarry Floor
Height Above Quarry Floor (feet)
180
160
140
120
100
80
60
40
20
0
7/1/14
8/1/14
9/1/14
10/1/14
11/1/14
12/1/14
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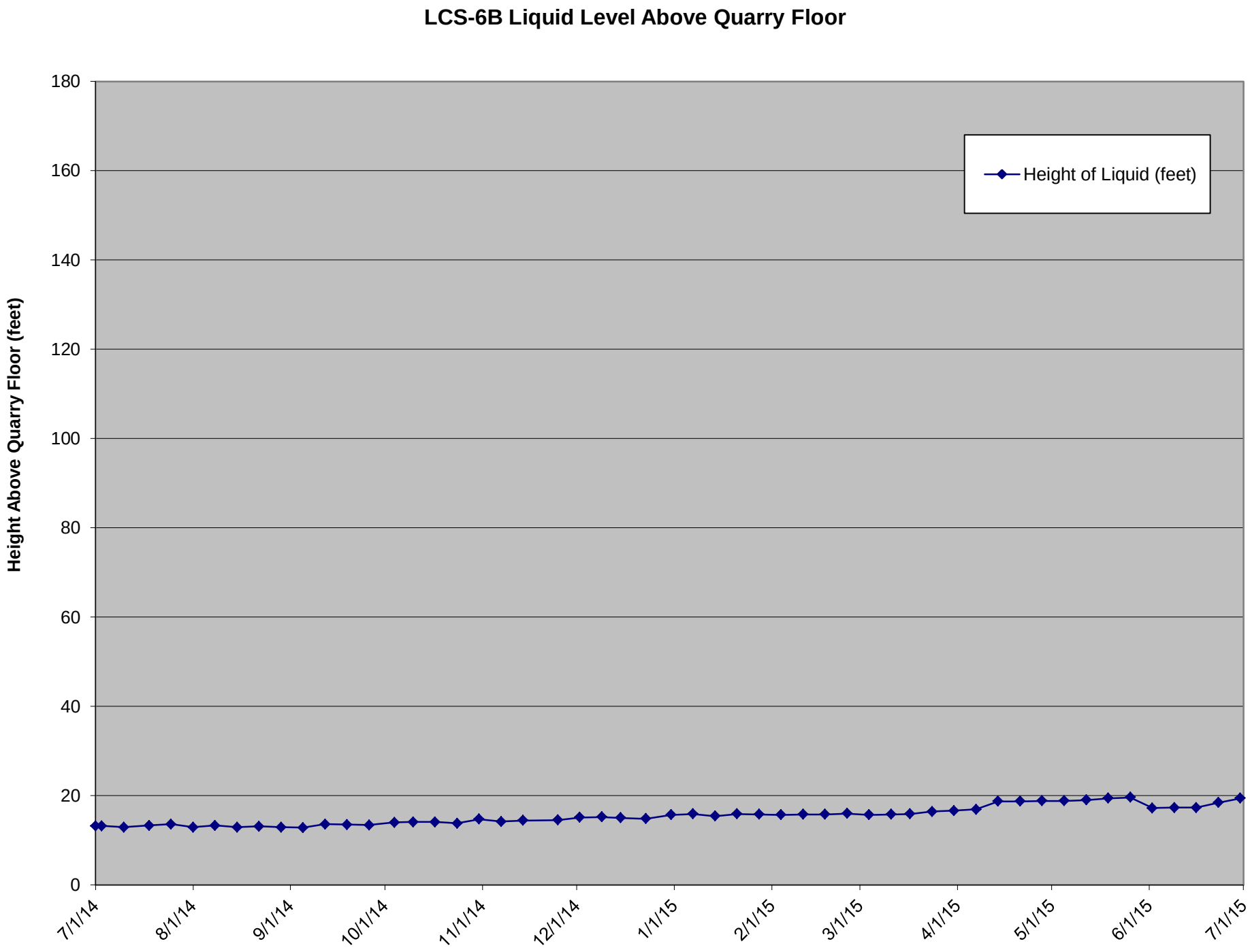
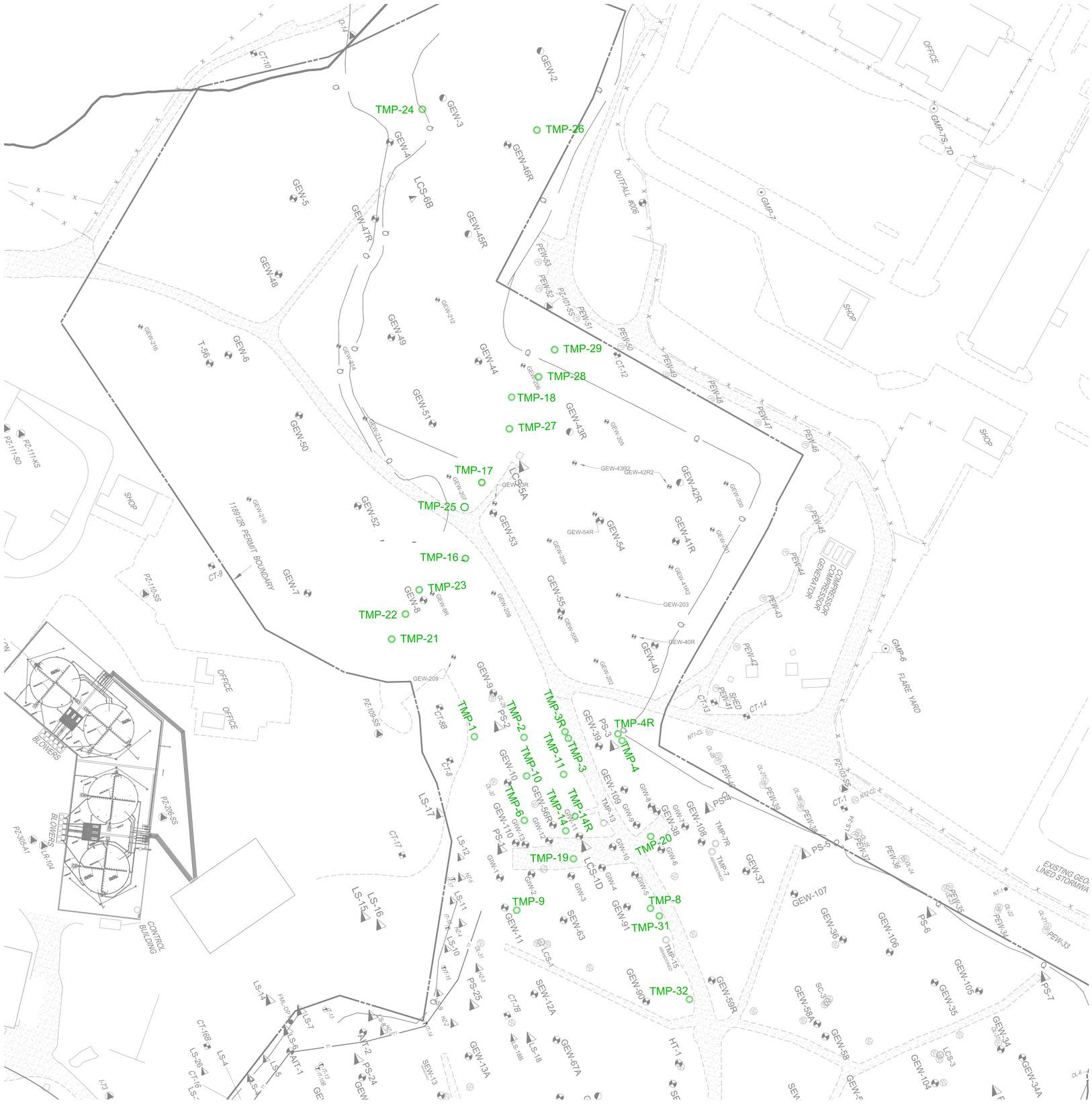
4/1/15
5/1/15
6/1/15
7/1/15
Height of Liquid (feet)


LCS-6B Liquid Level Above Quarry Floor
Height Above Quarry Floor (feet)
180
160
140
120
100
80
60
40
20
0
7/1/14
8/1/14
9/1/14
10/1/14
11/1/14
12/1/14
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
Height of Liquid (feet)

# ATTACHMENT B

# TEMPERATURE MONITORING PROBE ANALYTICAL CHARTS

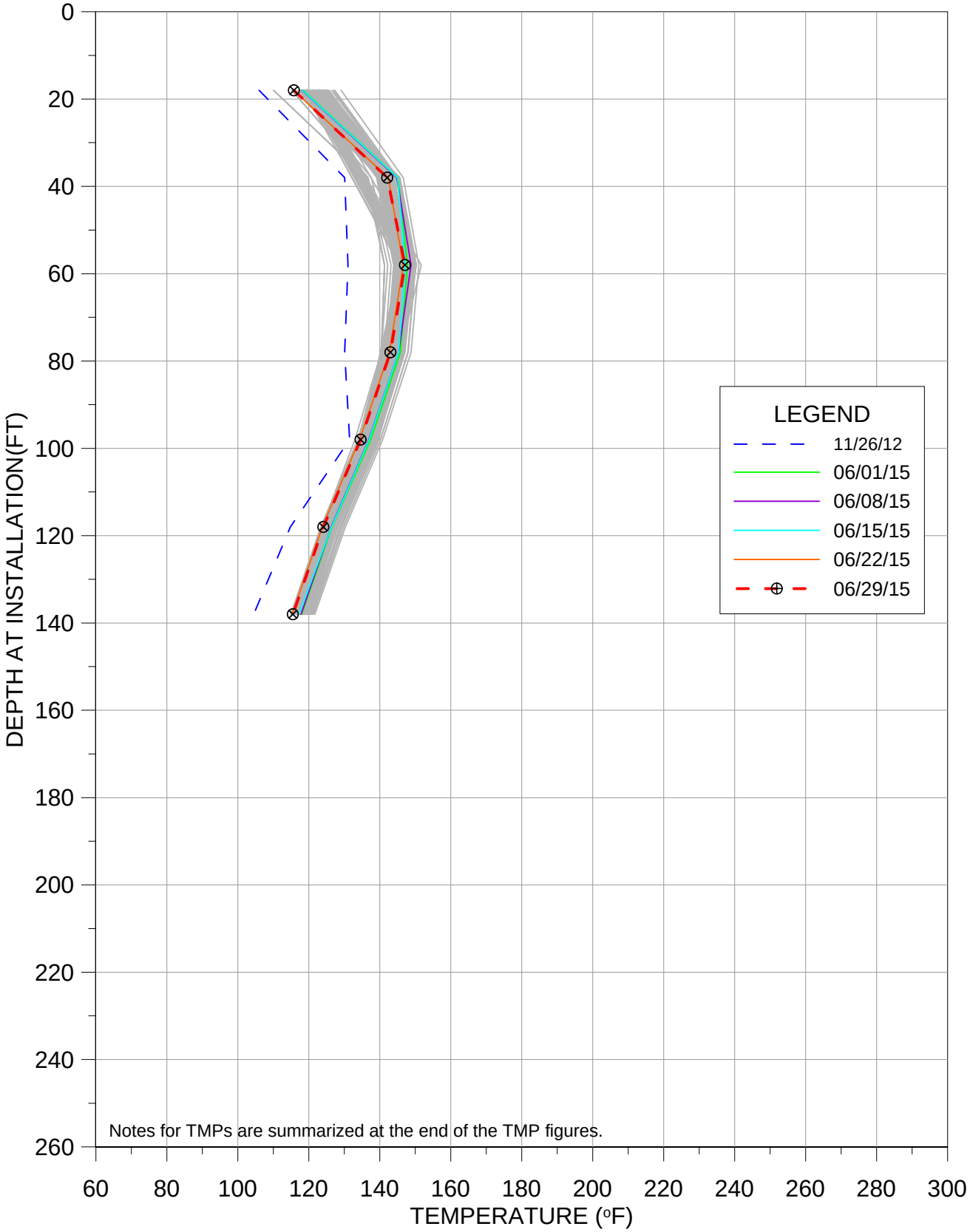



## LEGEND

TMP-24 — TEMPERATURE MONITORING PROBE (EXISTING)

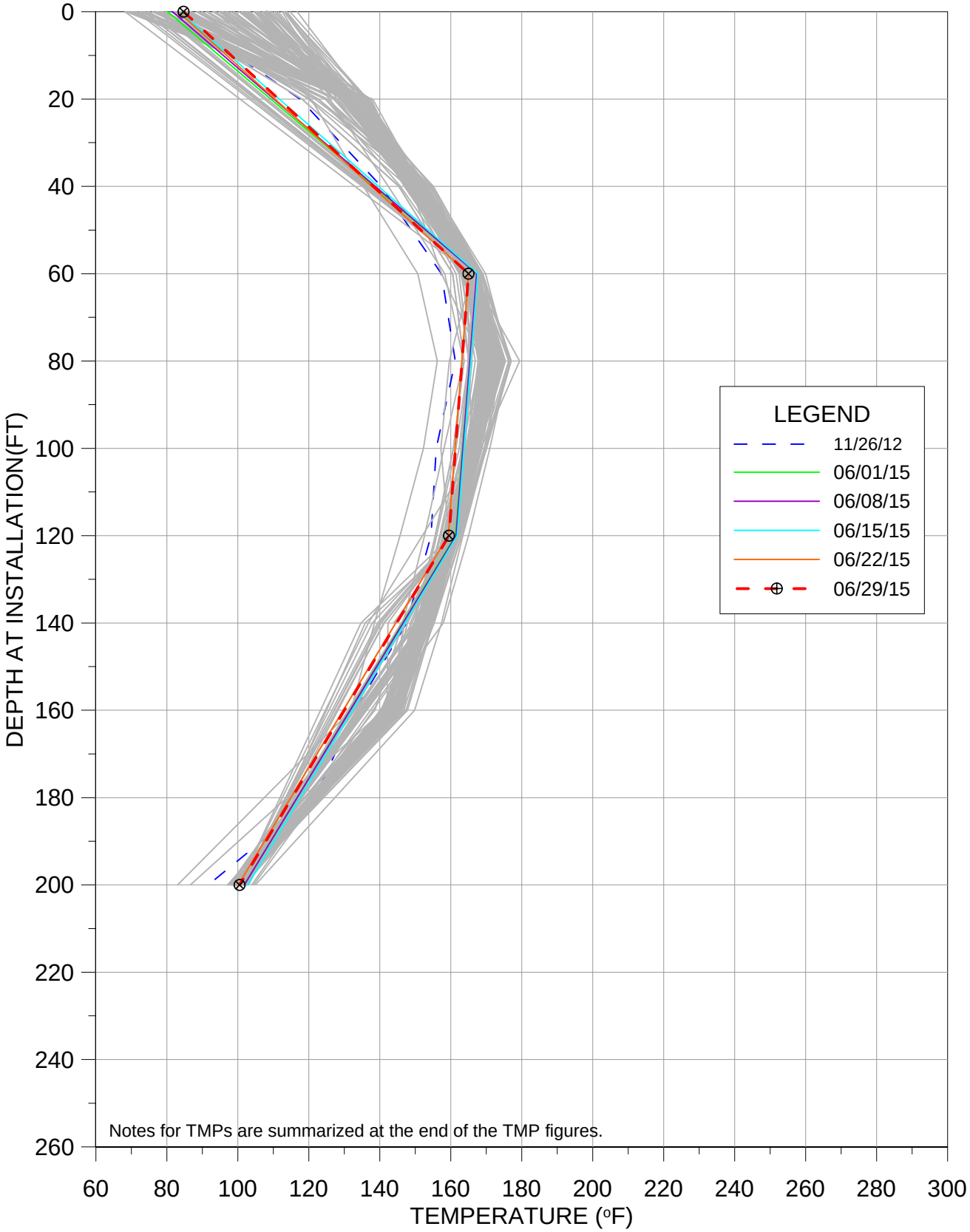
| | | | |
|---|---|---|---|
| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL | FEEZOR ENGINEERING, INC. Engineering for a Better World | FEBRUARY 2015<br>DESIGNED BY: DMK<br>APPROVED BY: ALK |
| **WEEKLY TMP MONITORING** | | | DRAWING NO.: **001** |
| PROJECT NUMBER: BT-041 FILE PATH: | | REVISION | DATE |

# TMP-1



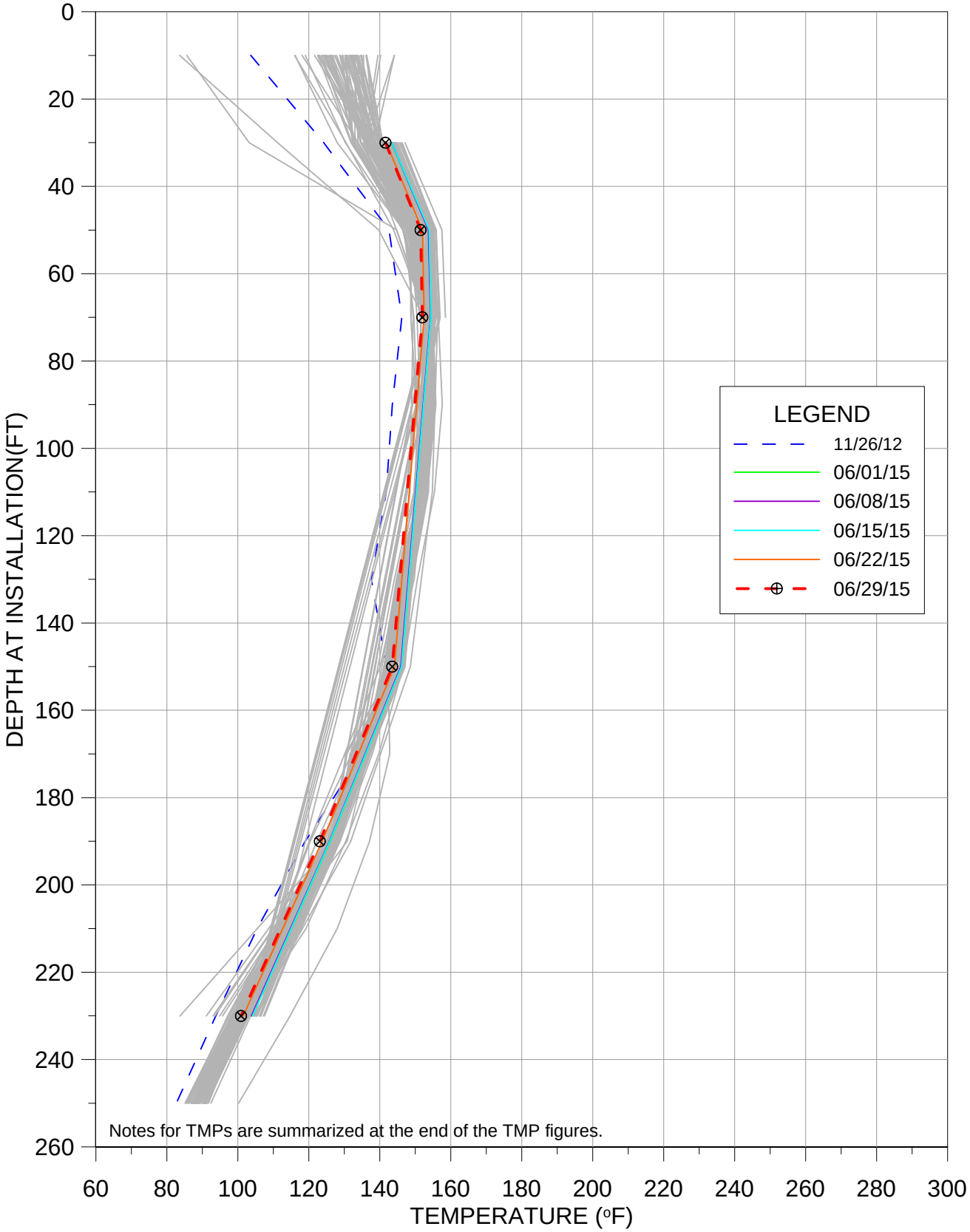

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-2



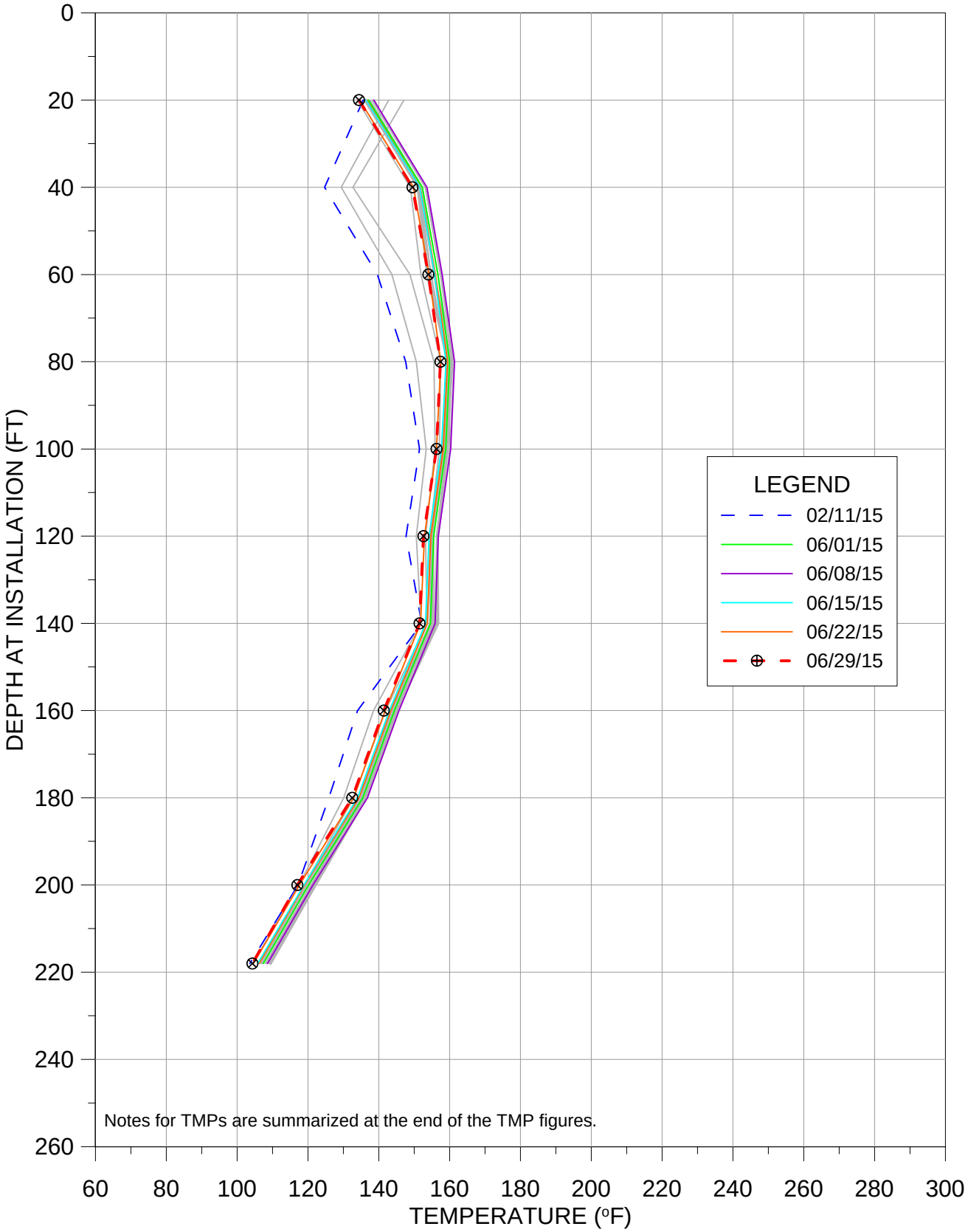

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-3



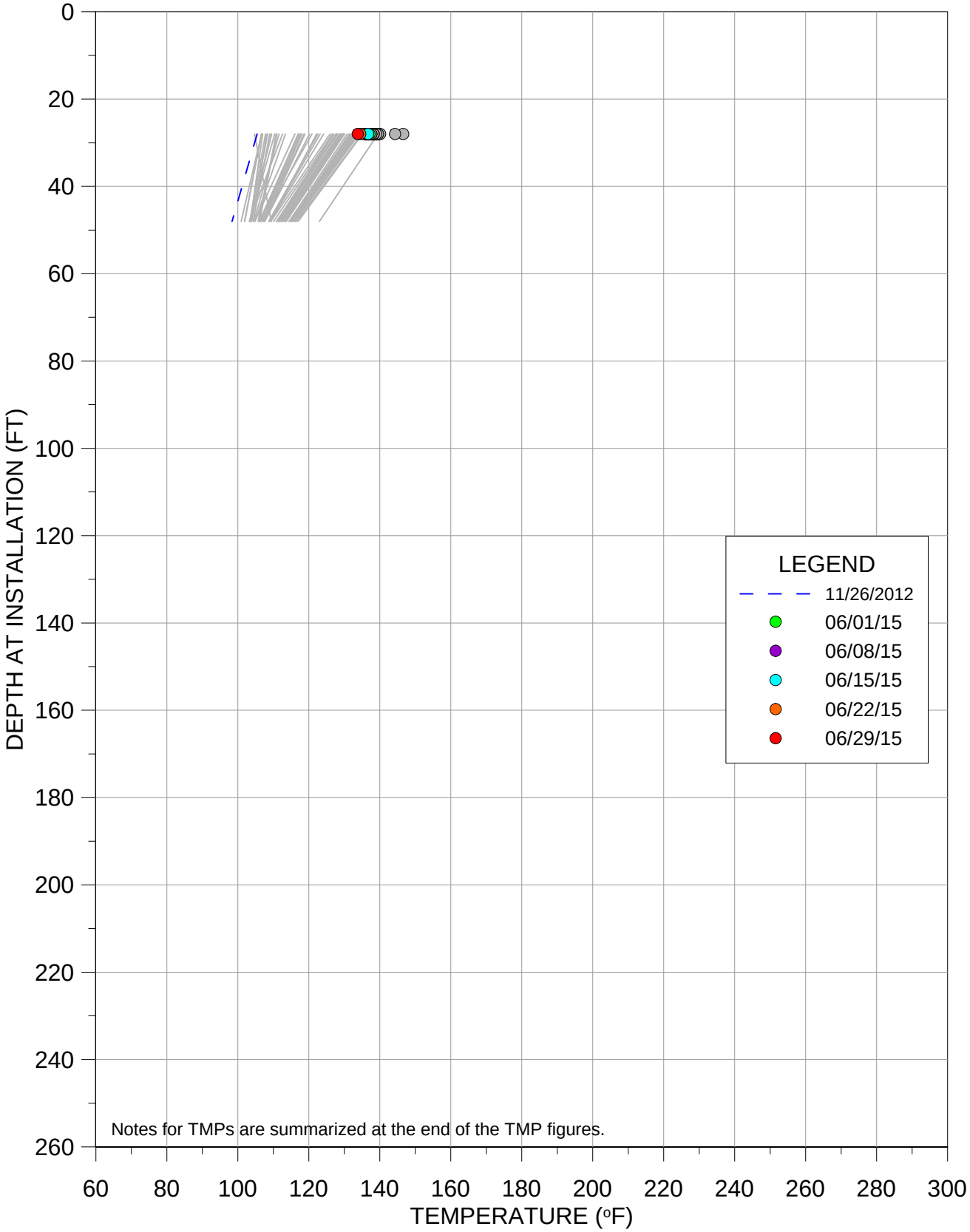

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-3R



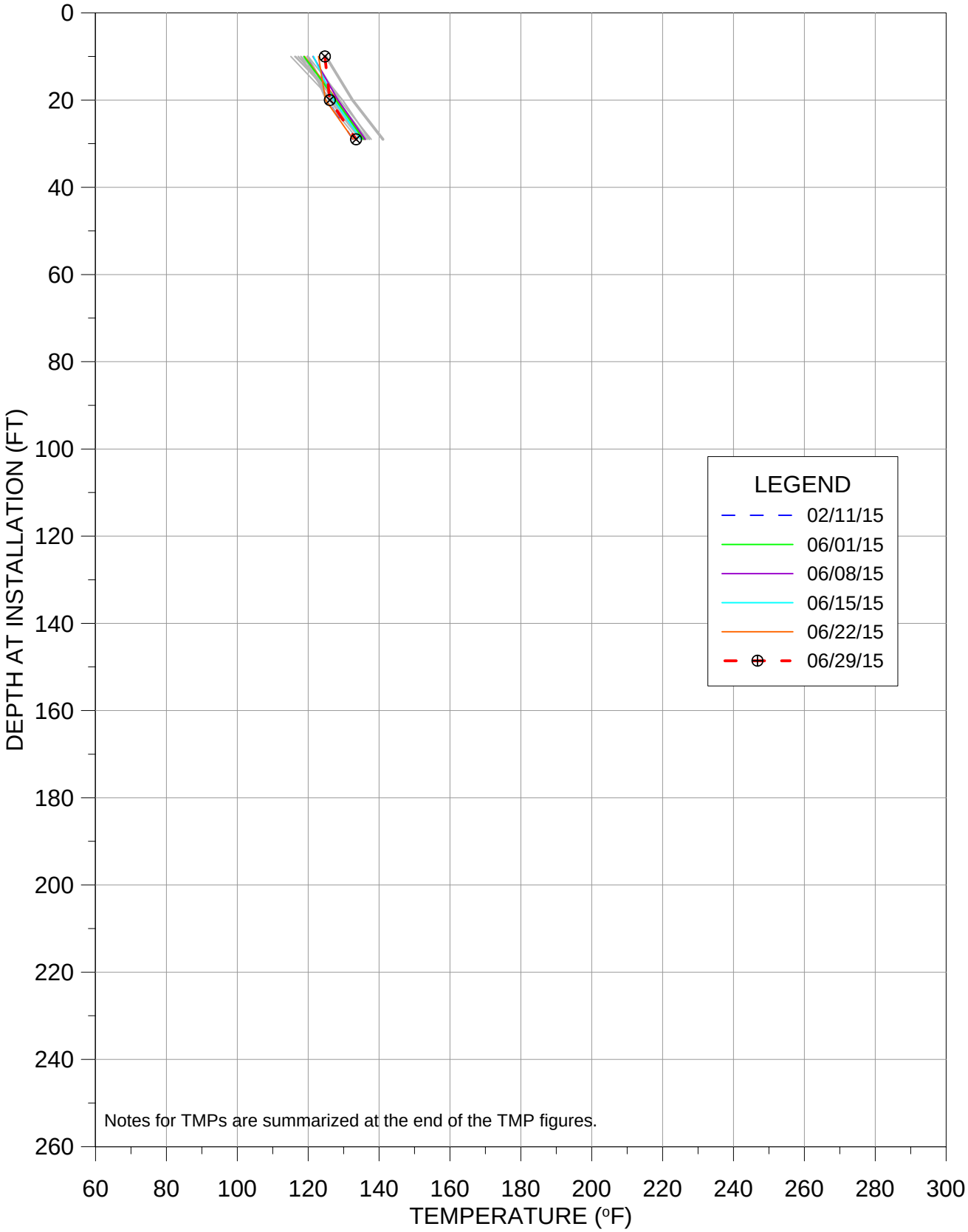

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-4



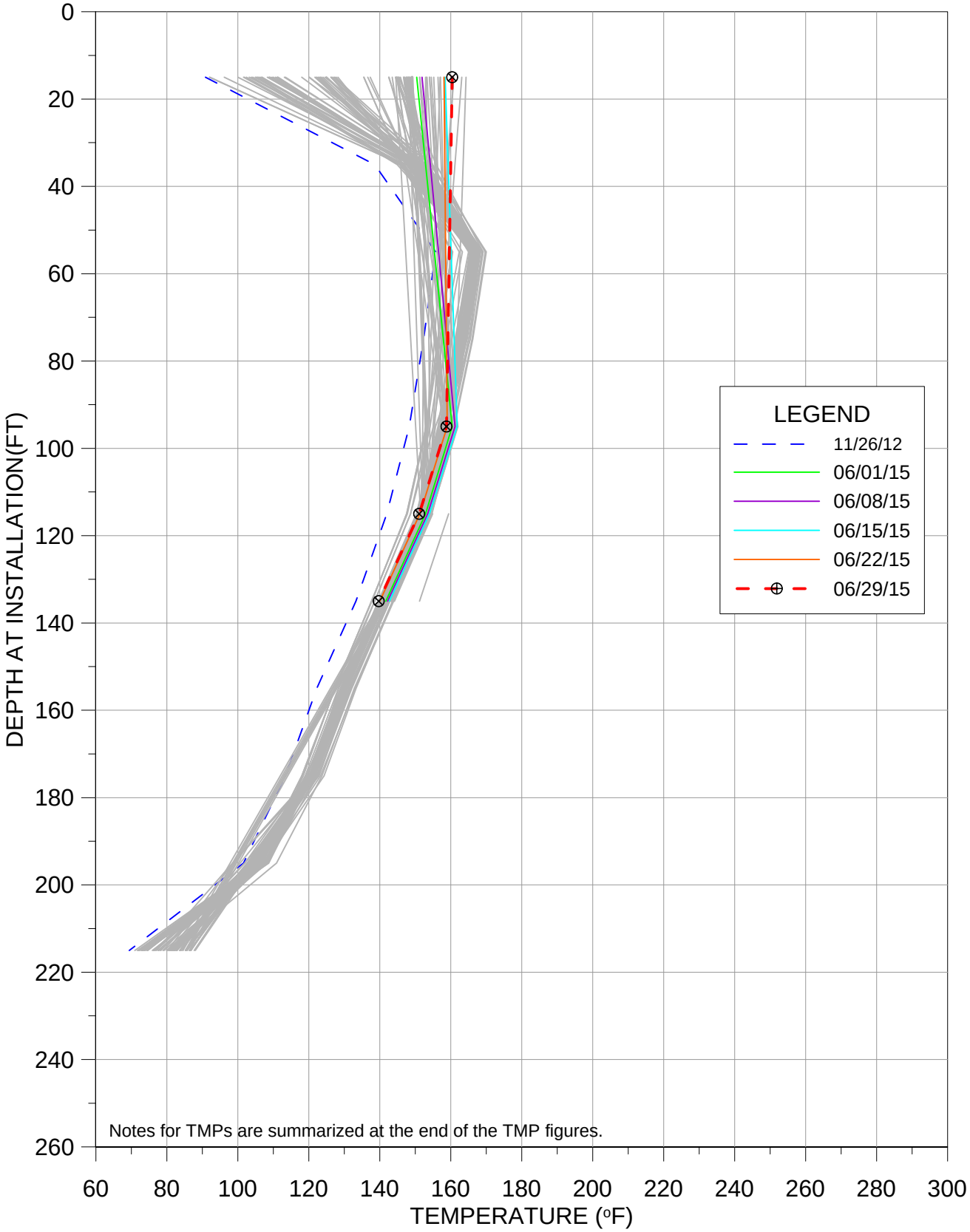

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-4R



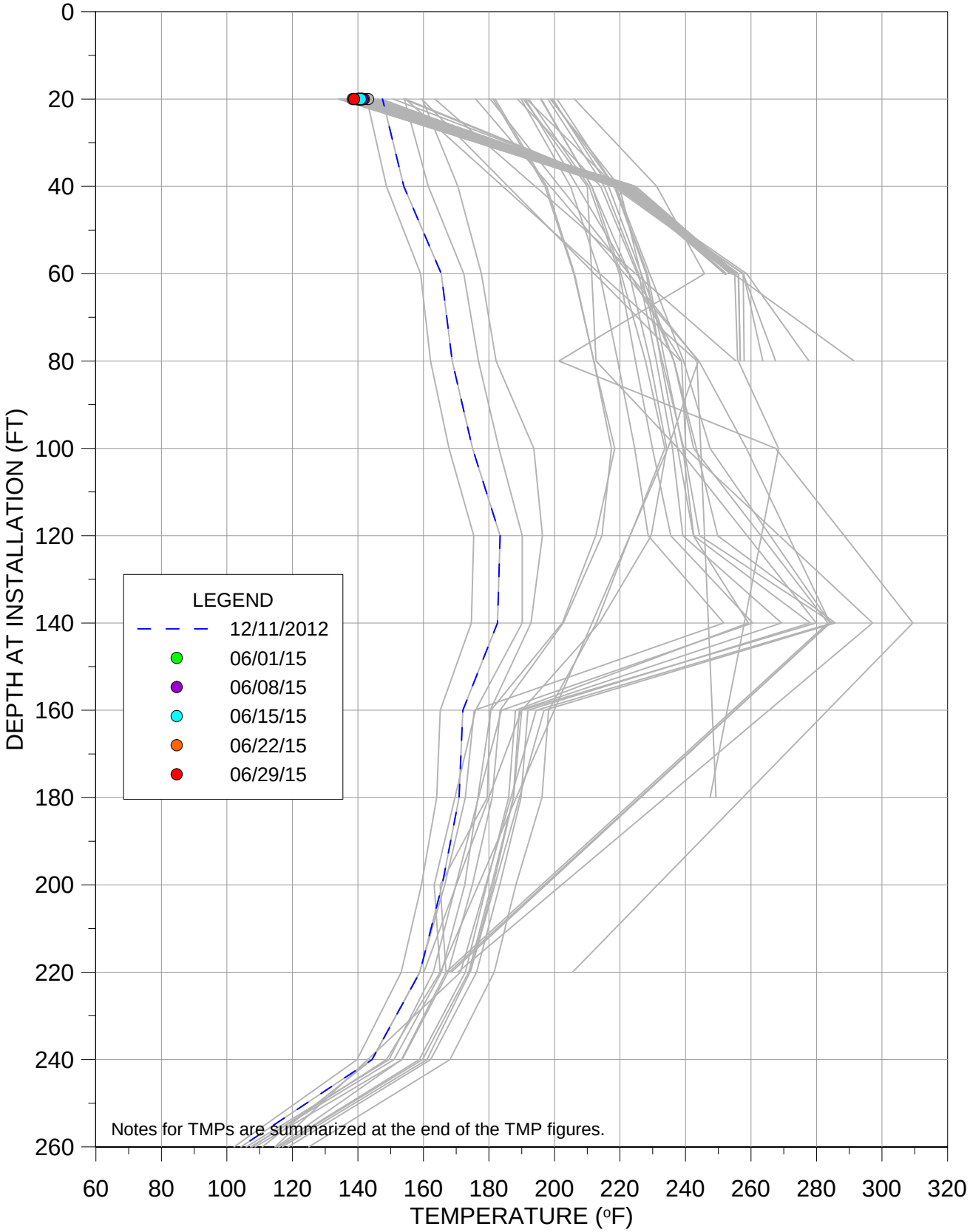

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-6



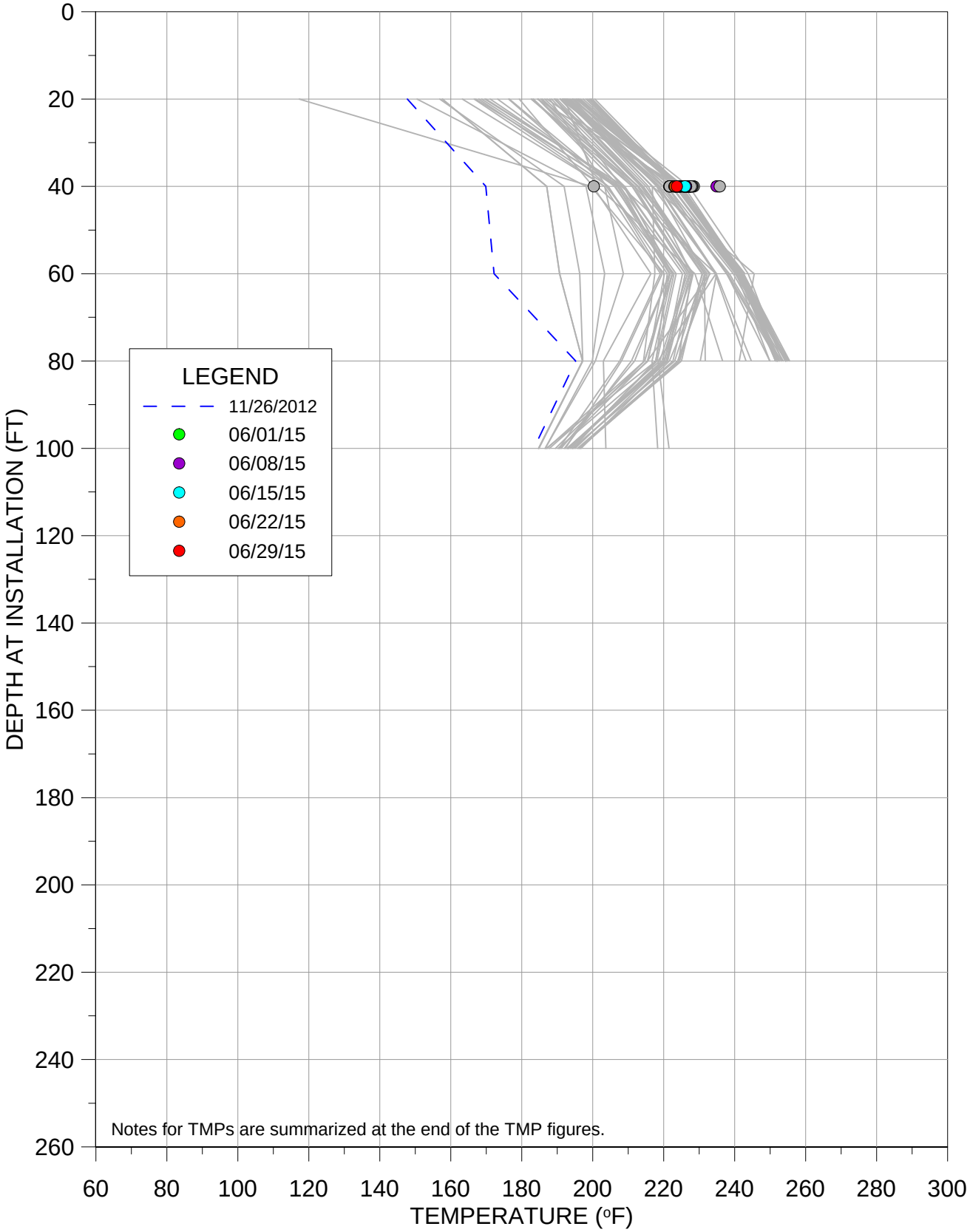

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-8



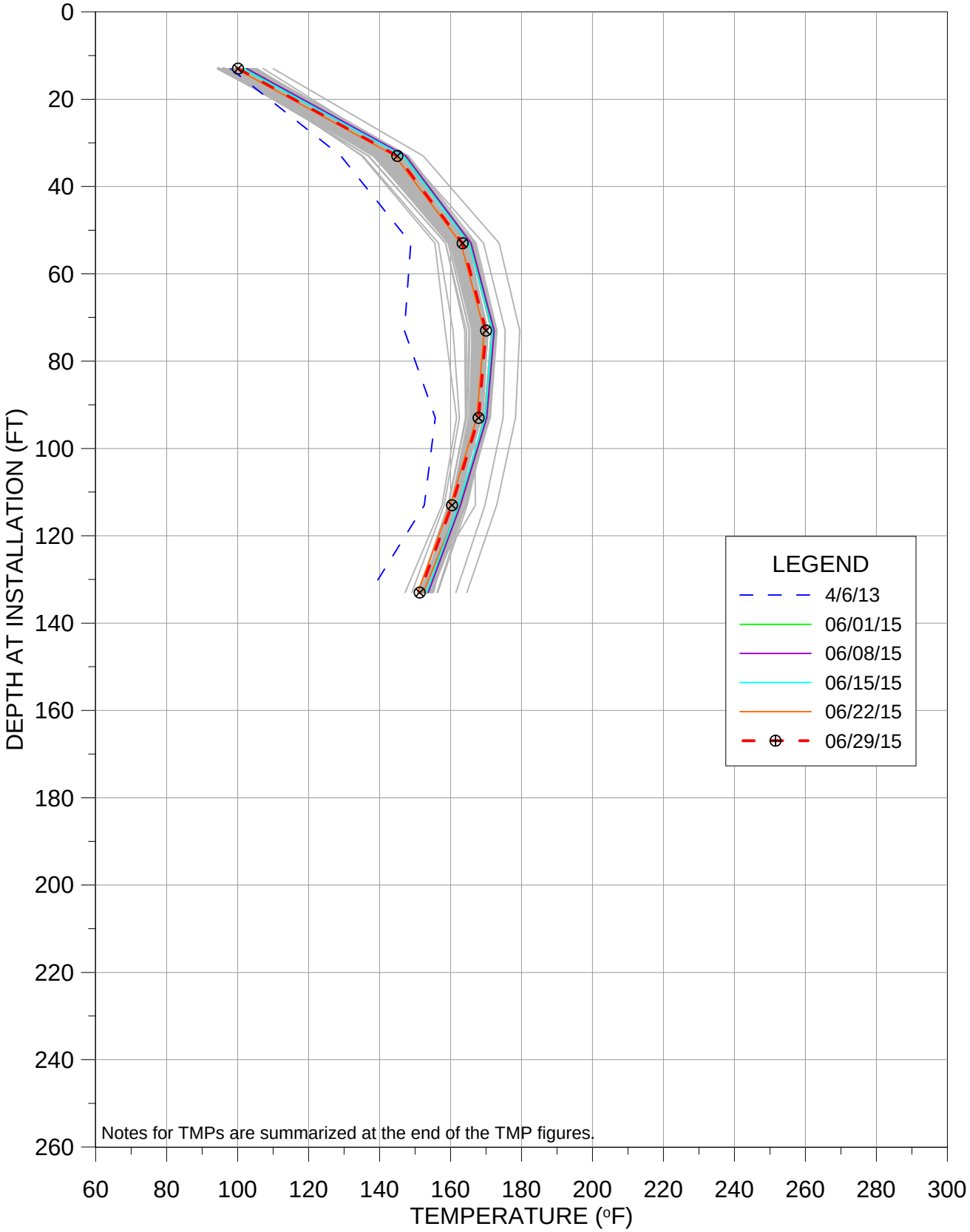

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-9



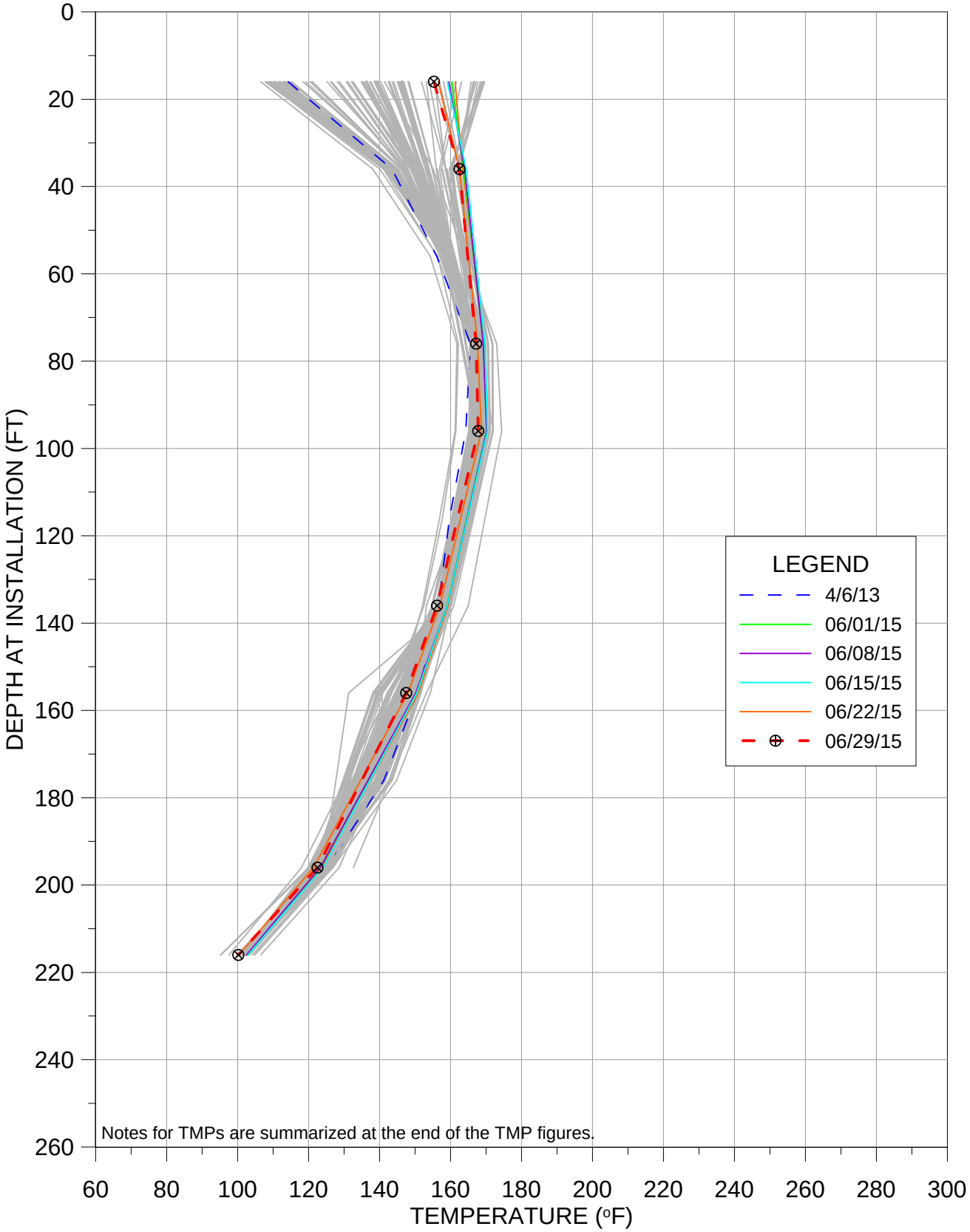

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-10



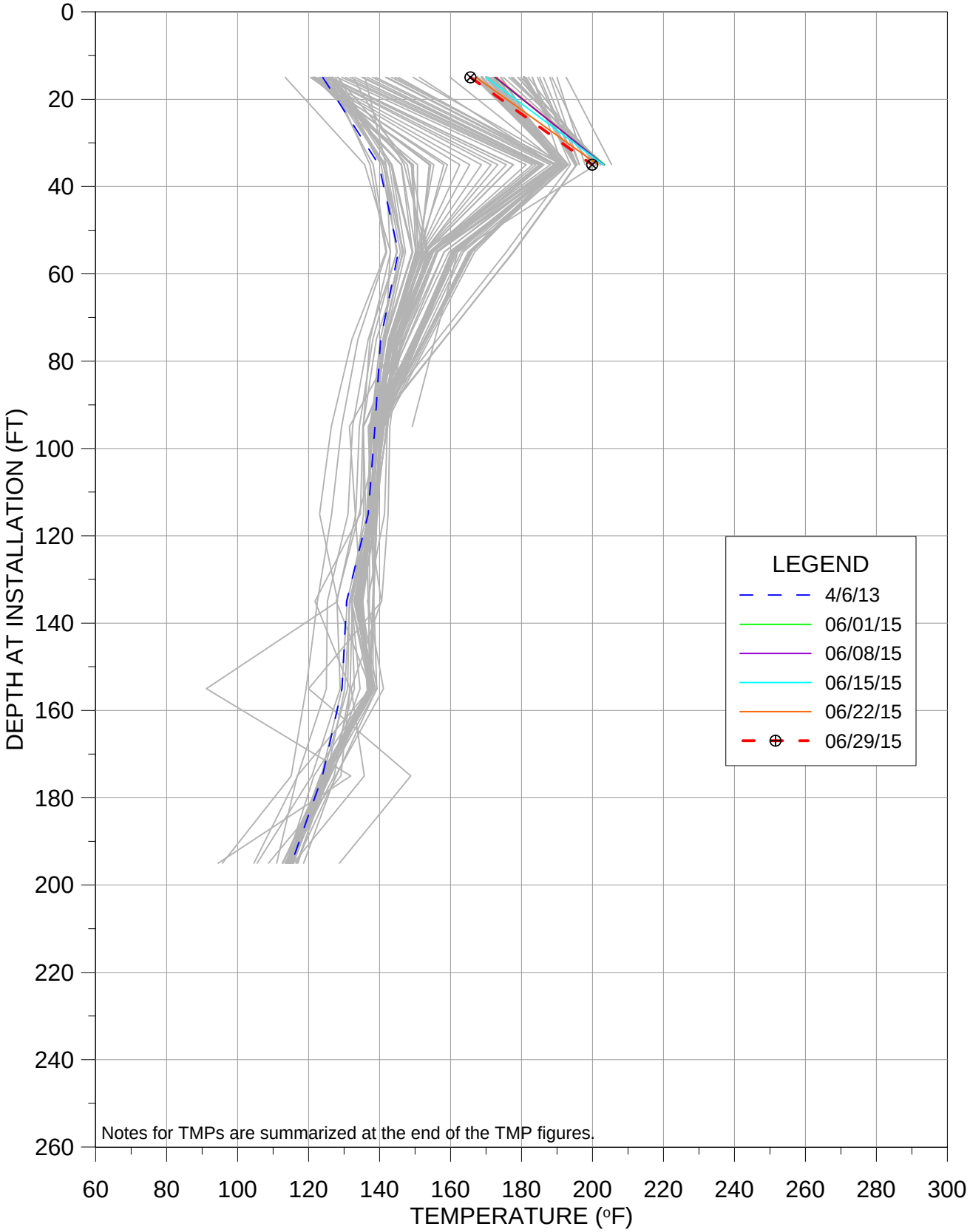

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-11



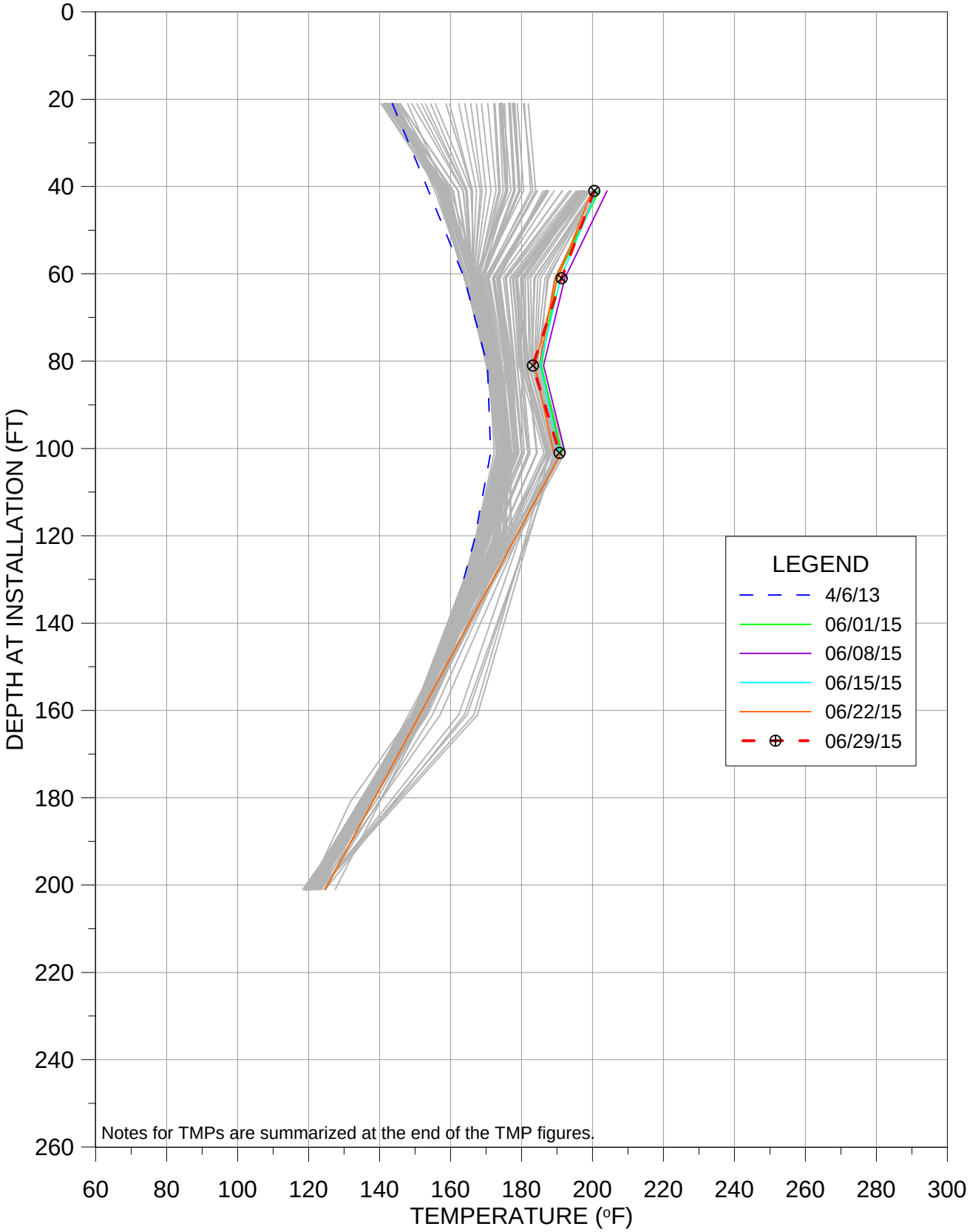

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-12



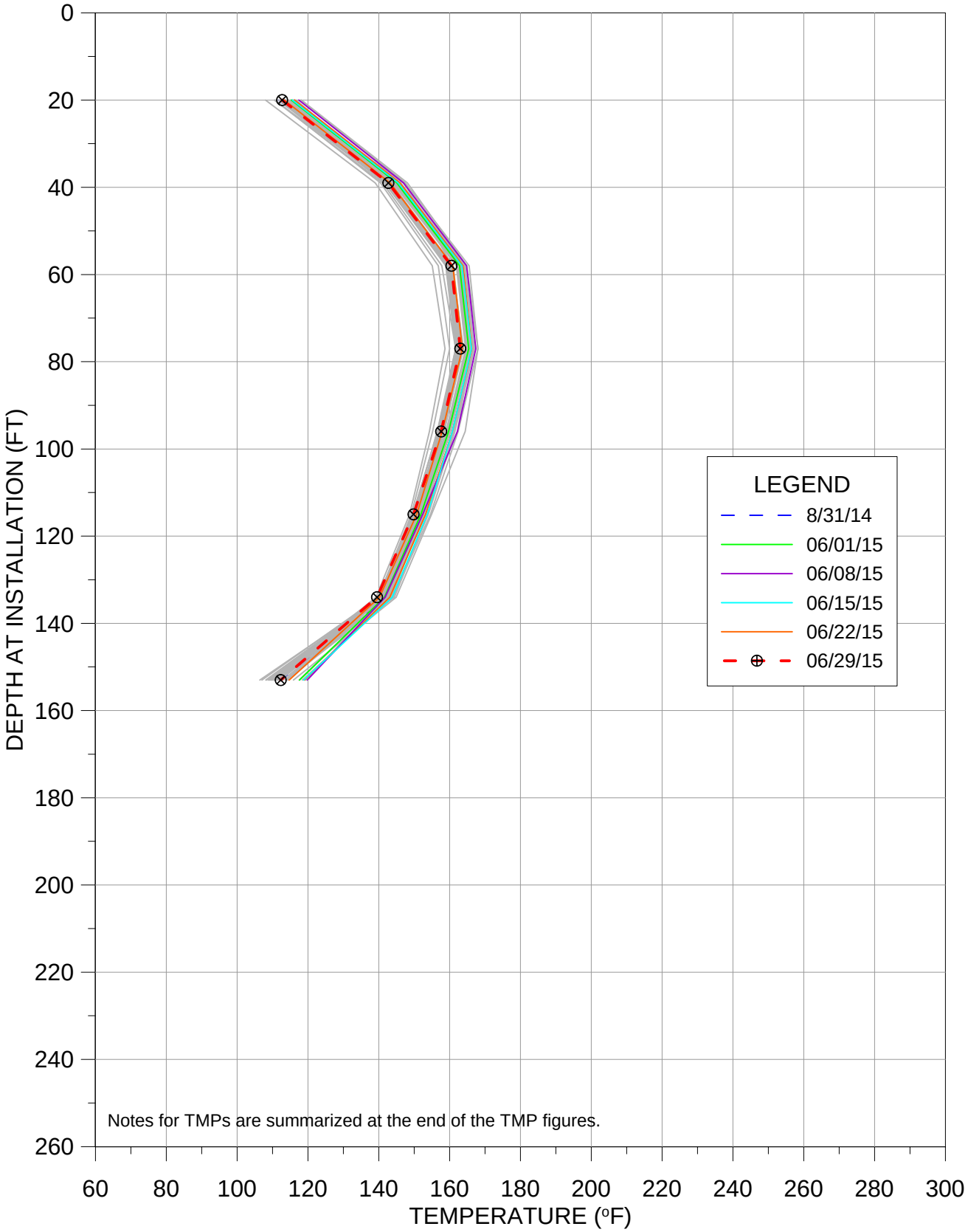

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-14



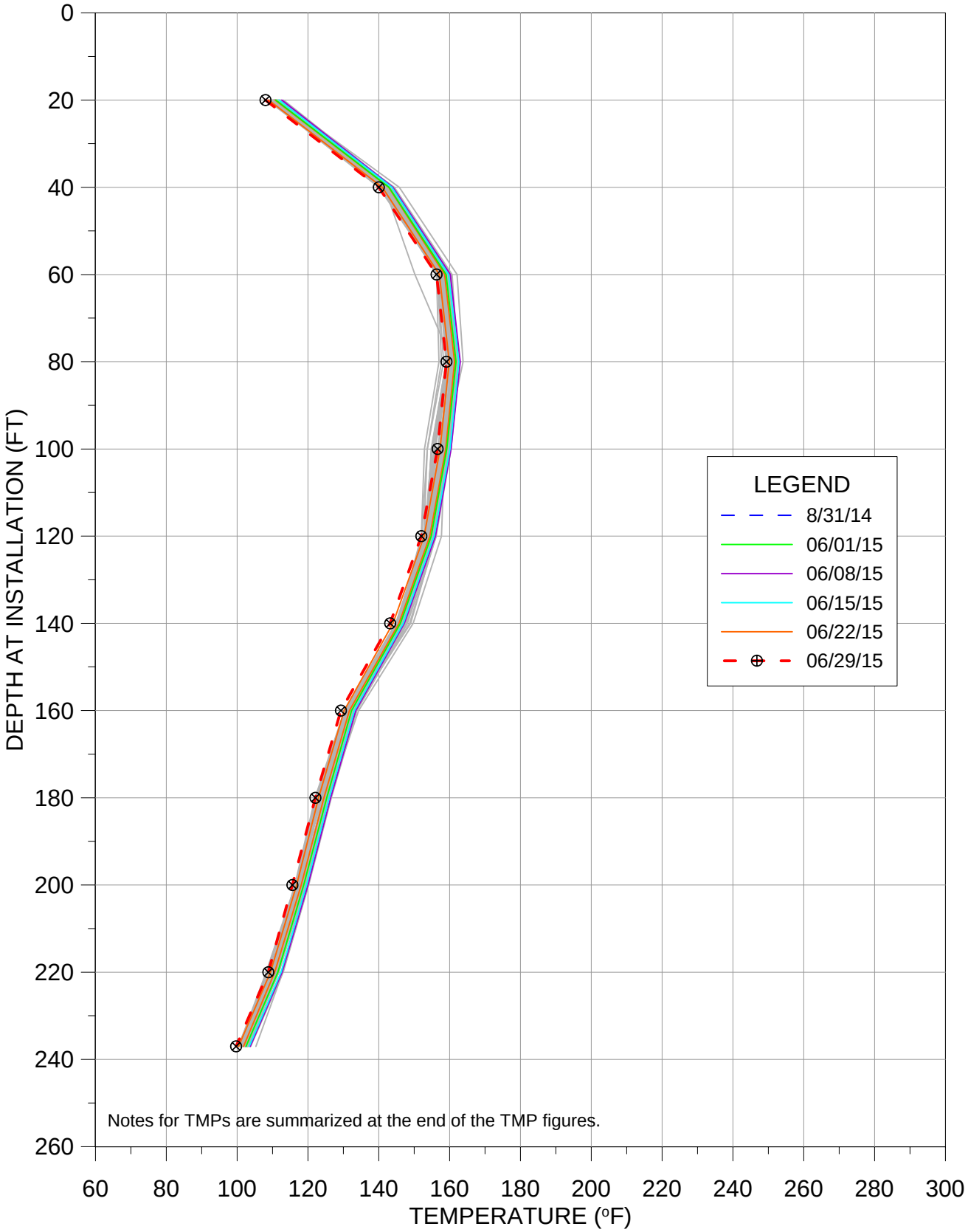

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-16



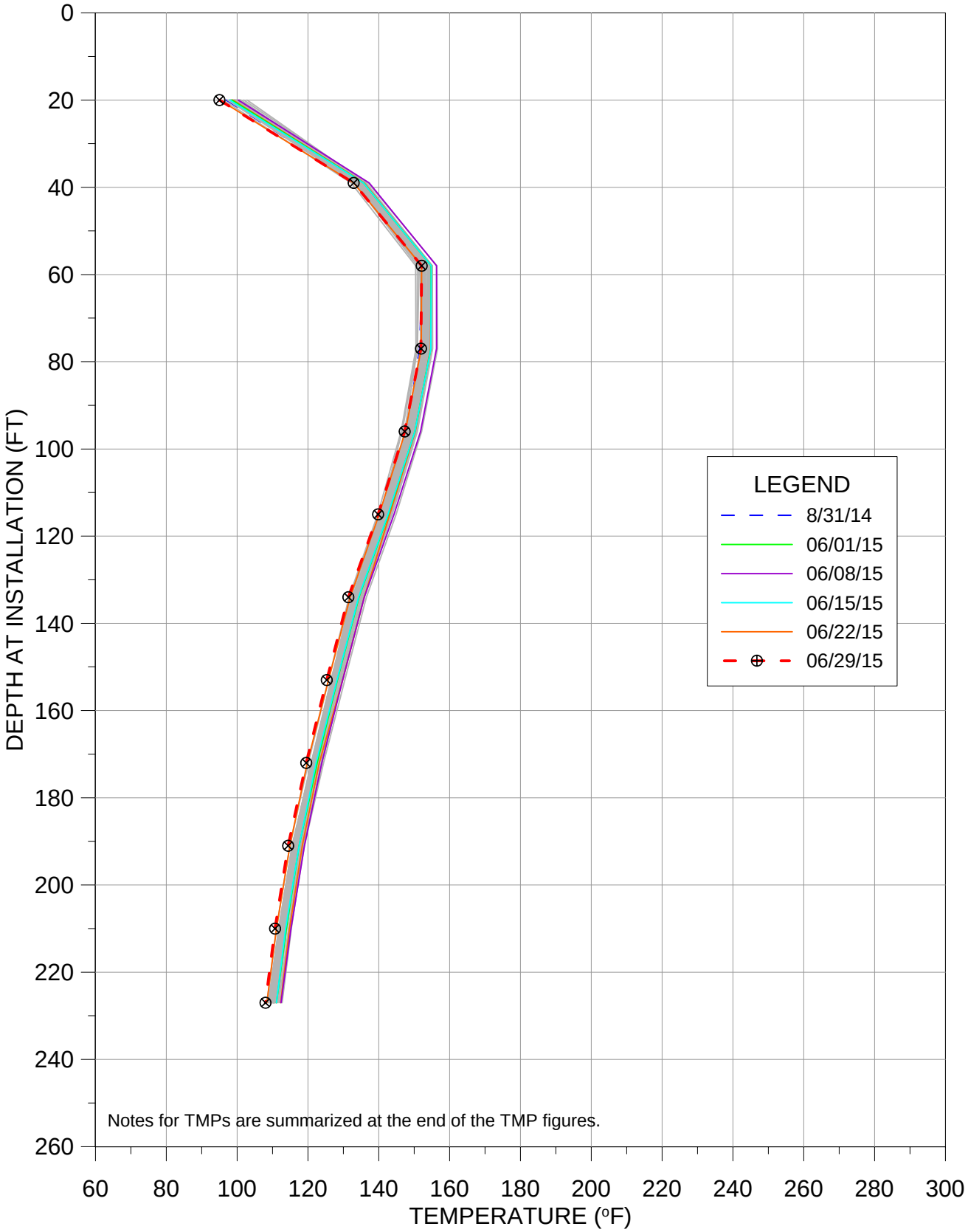

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-17



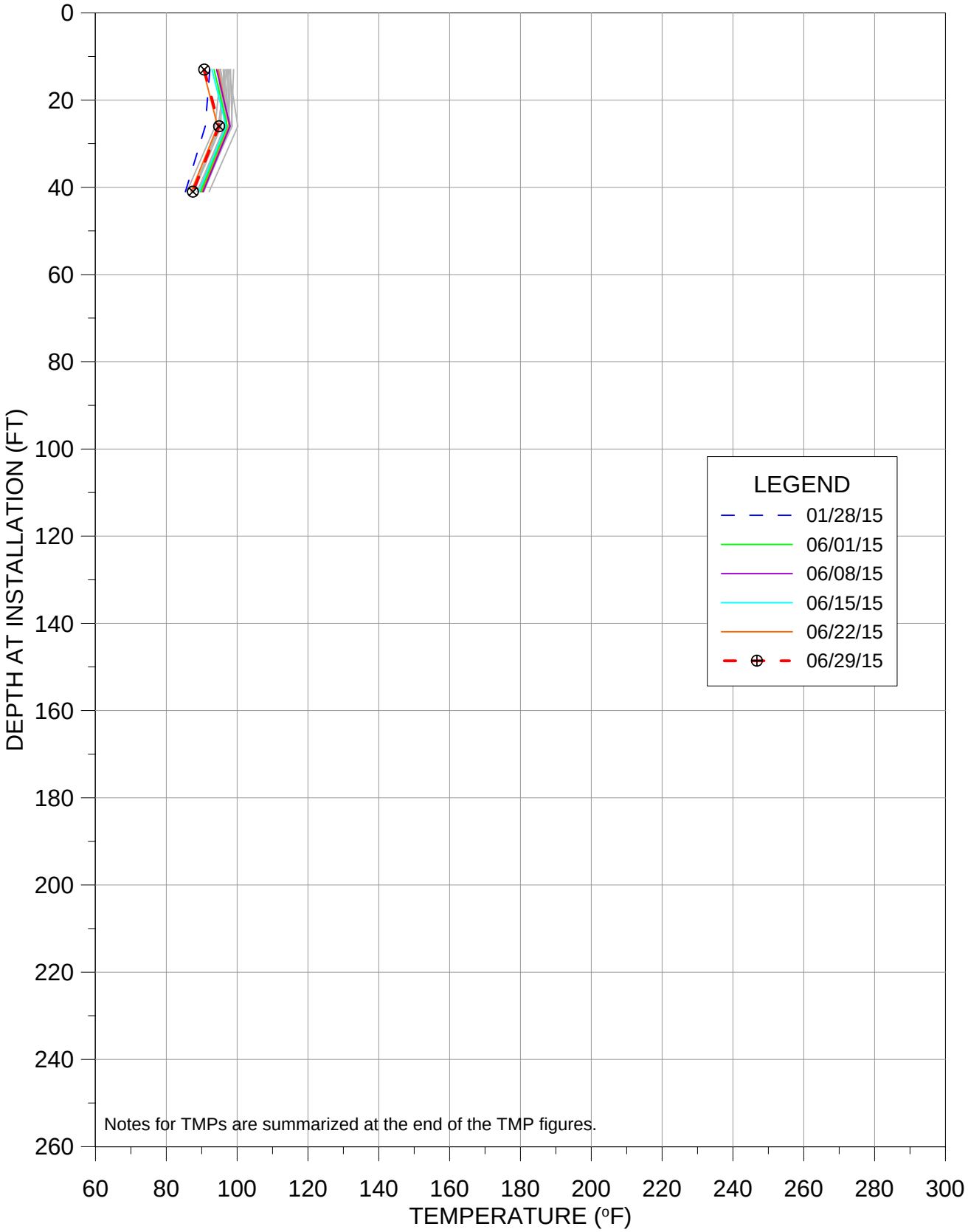

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-18



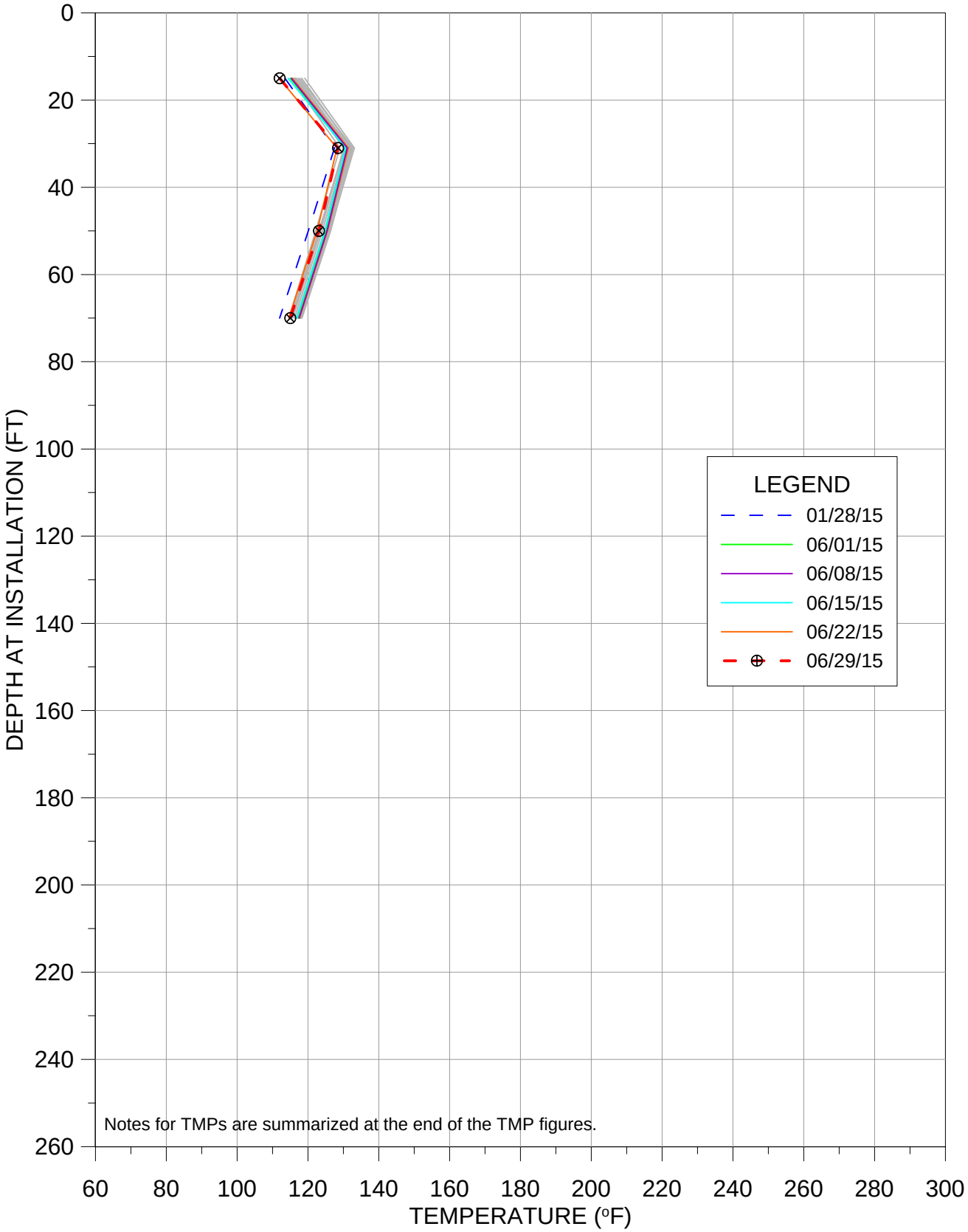

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-21



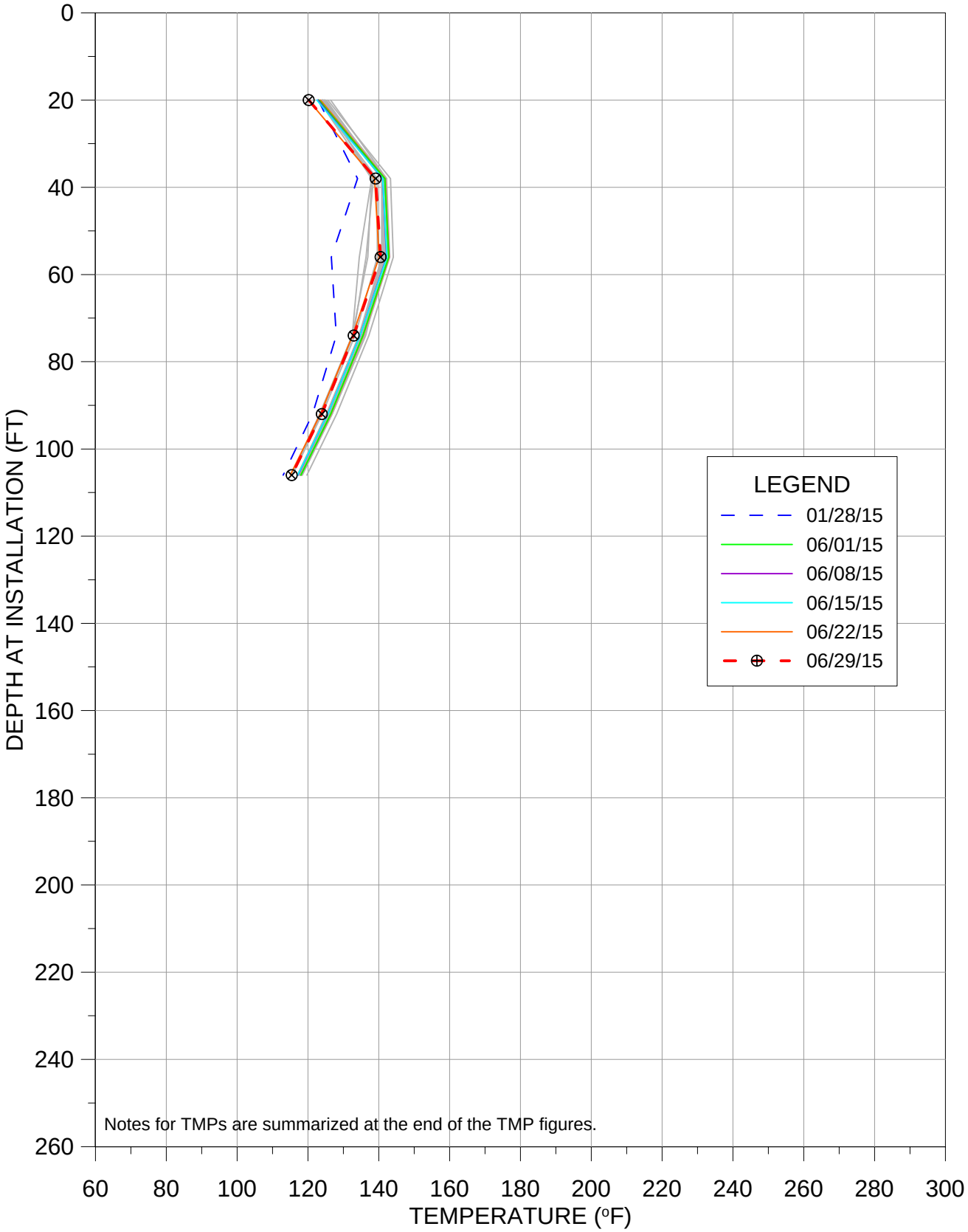

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-22



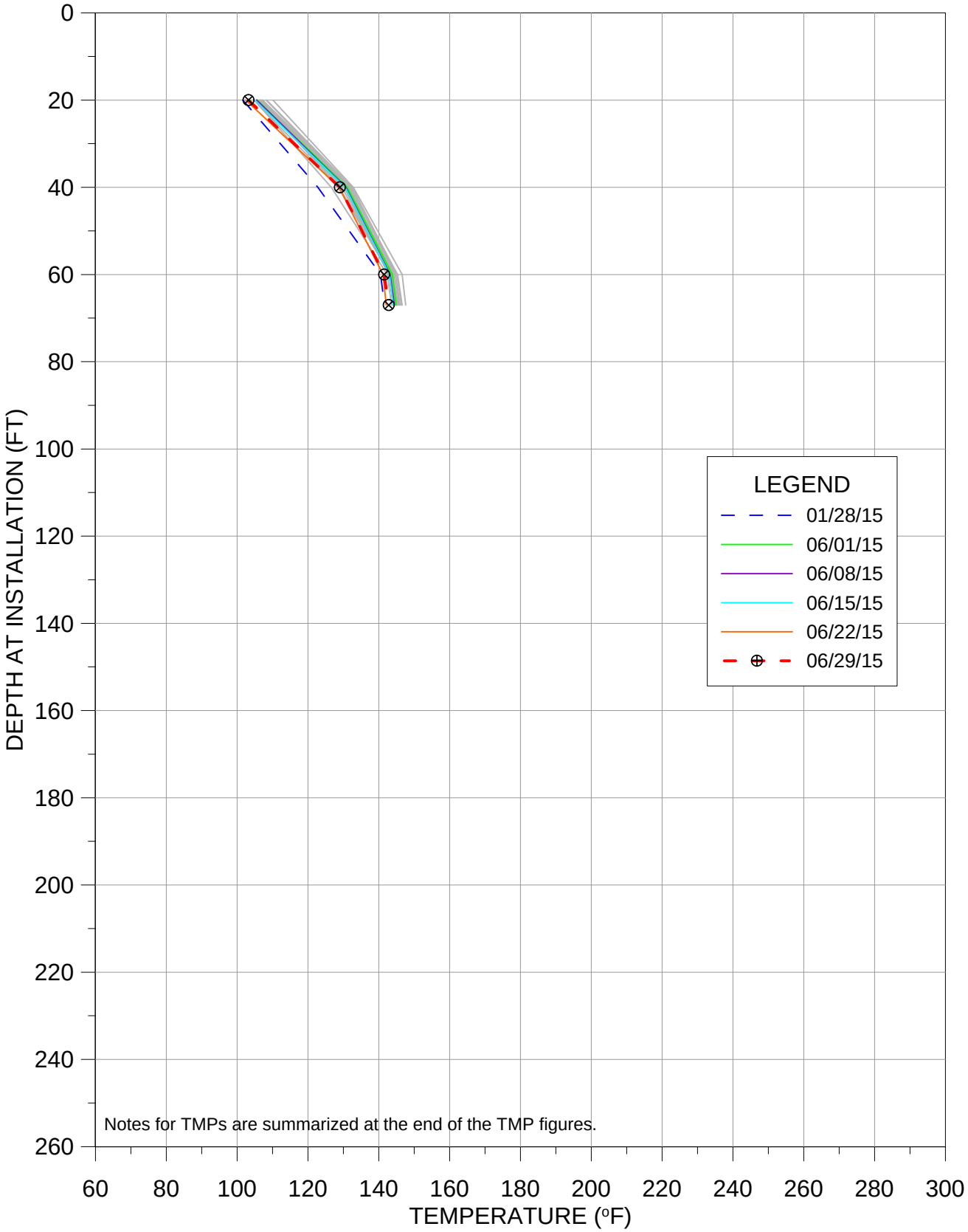

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-23



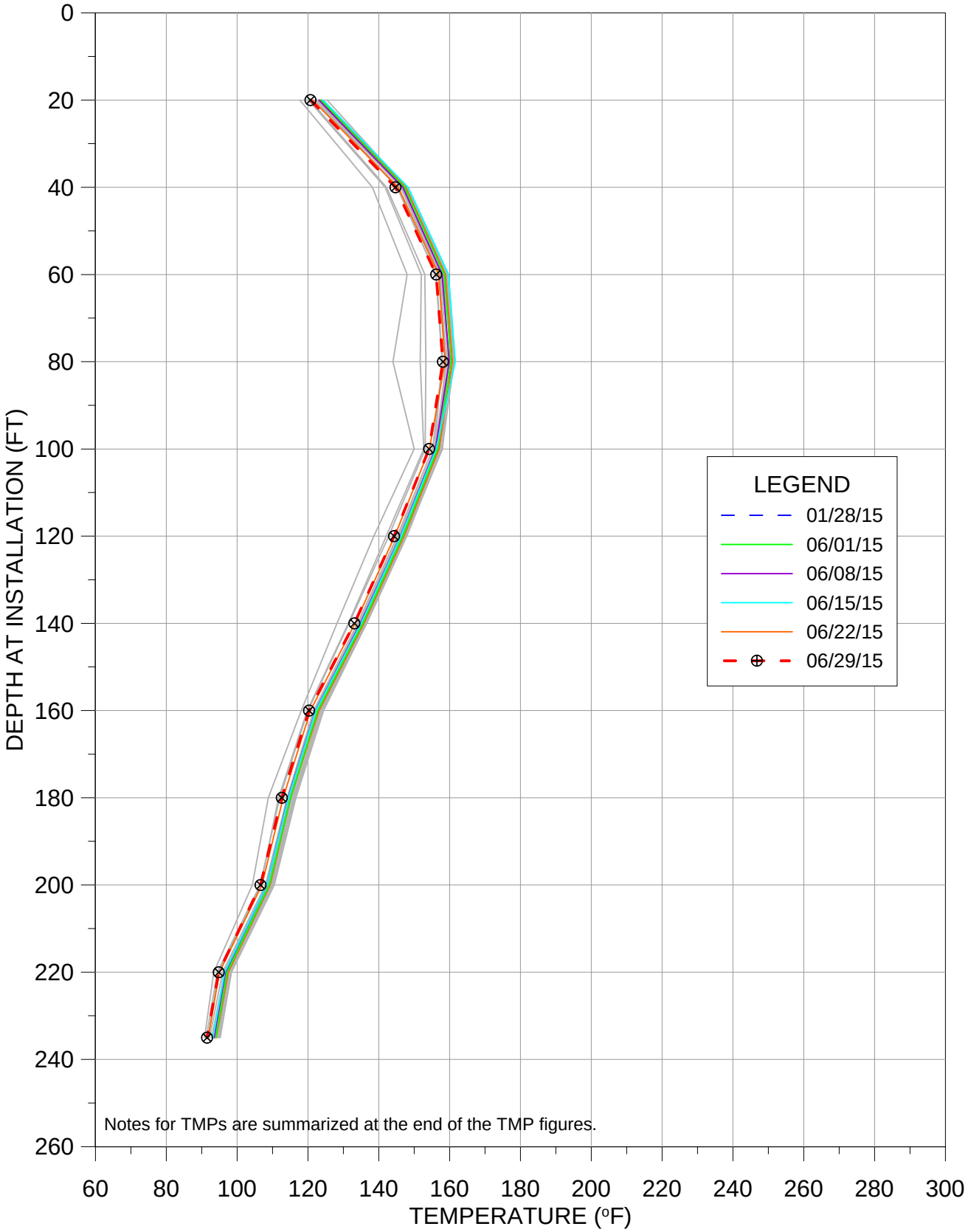

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-24



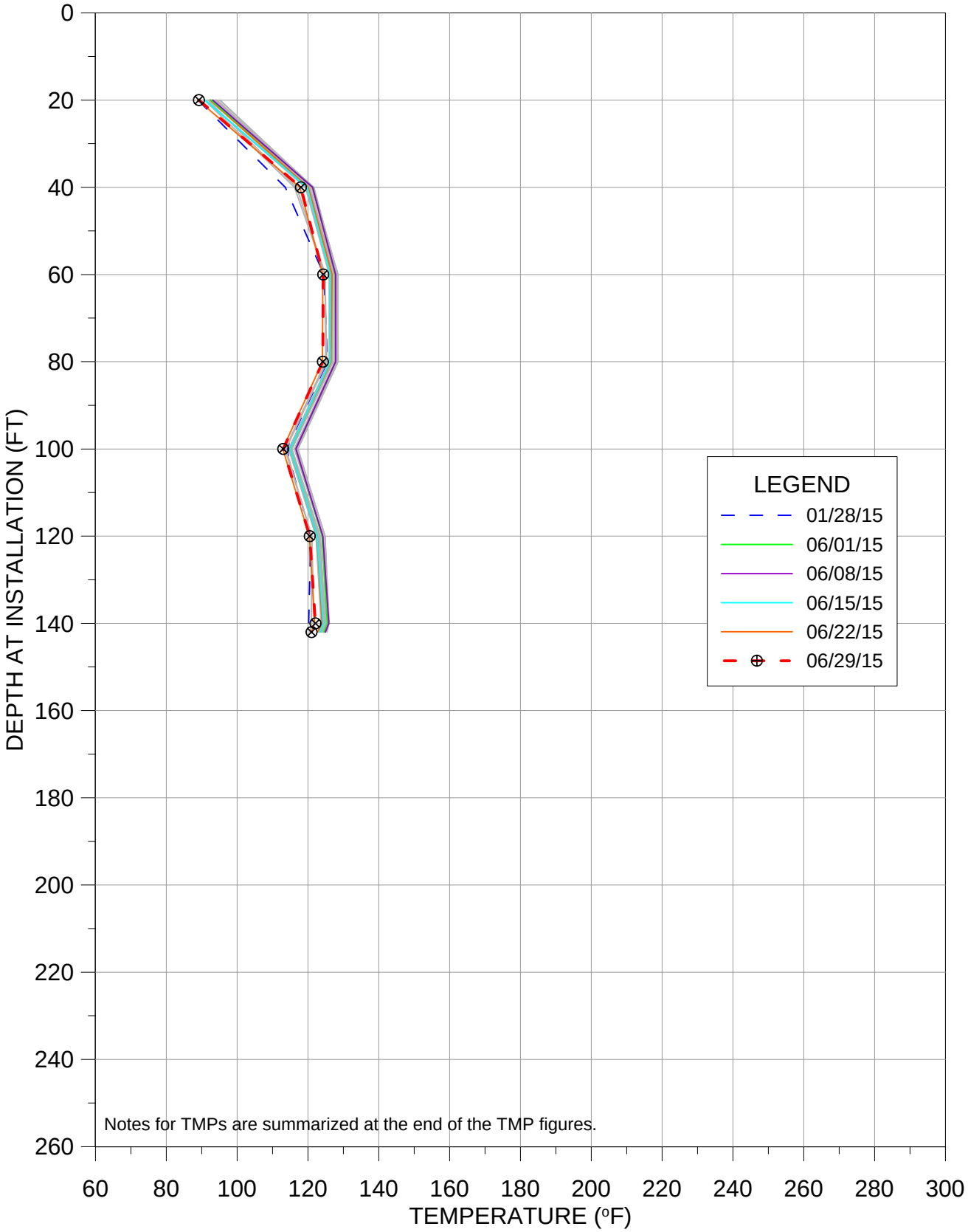

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-25



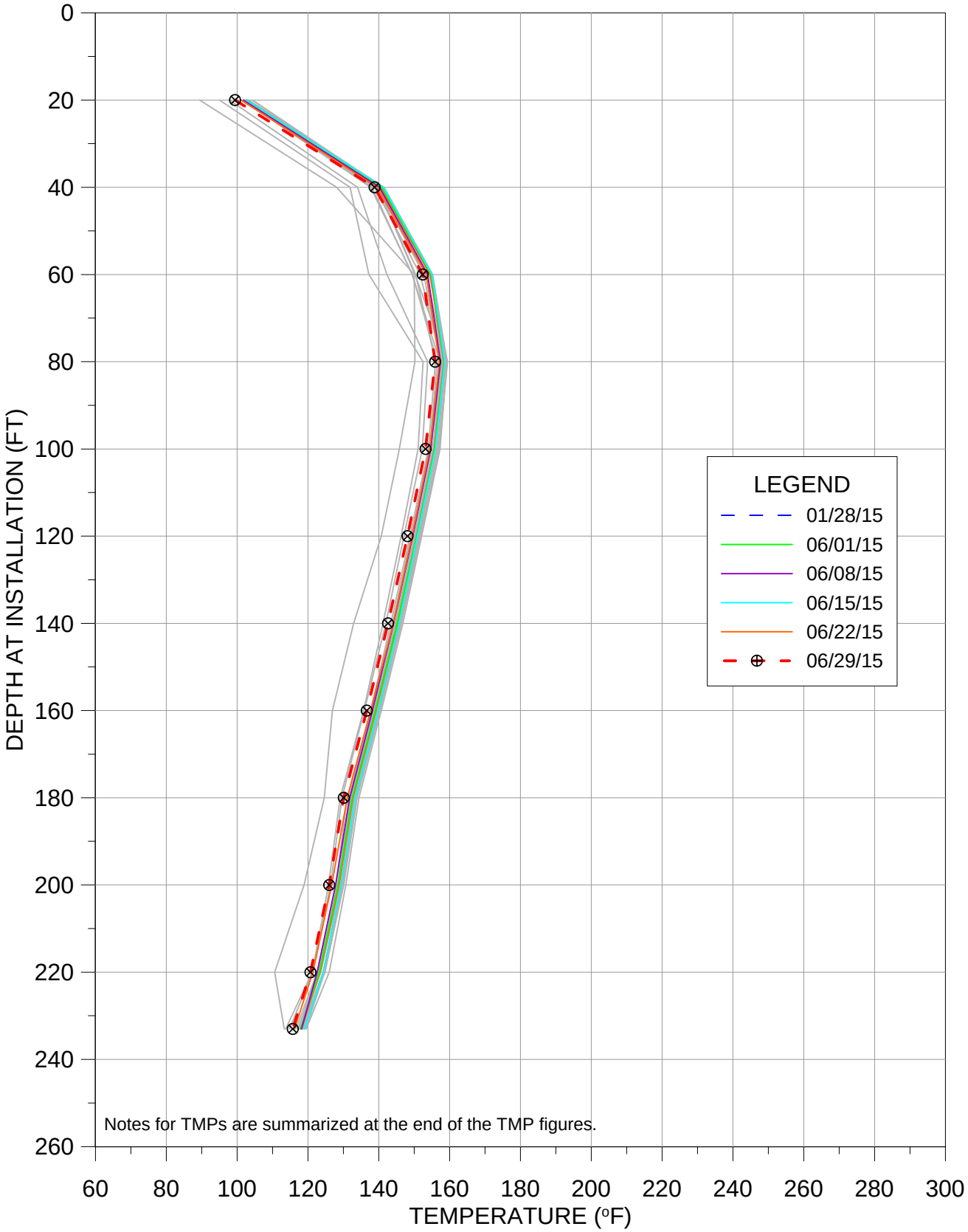

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-26



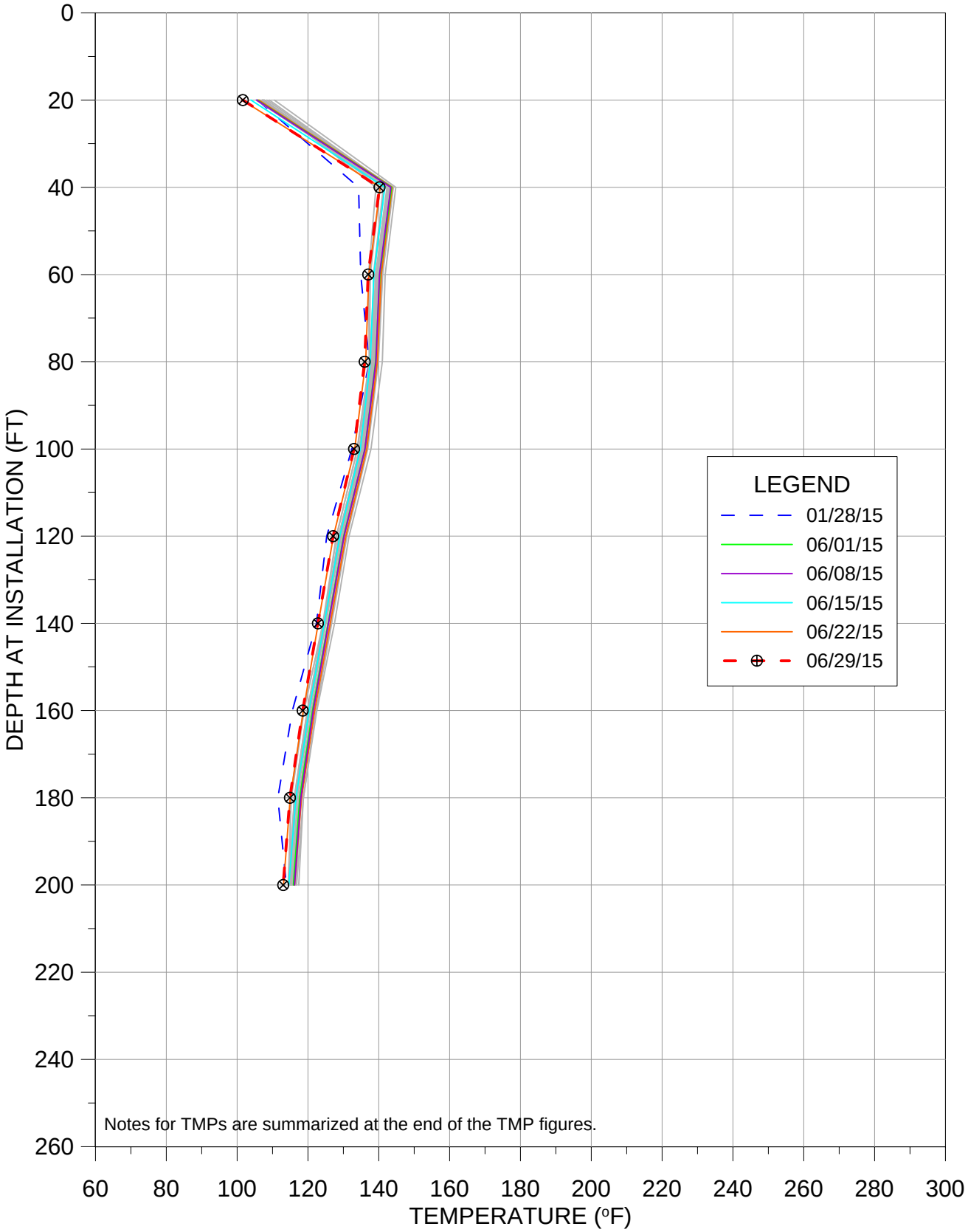

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-27



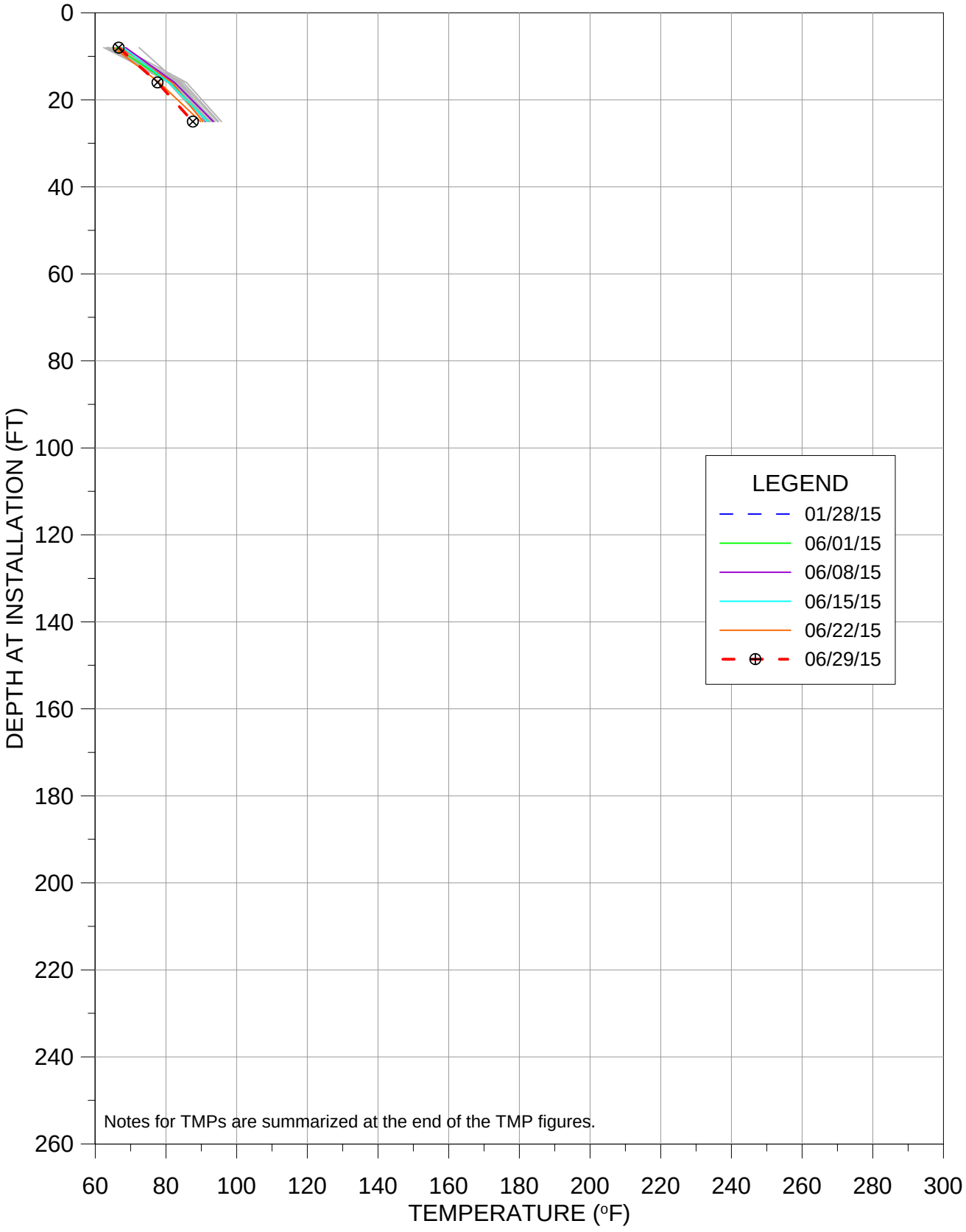

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-28



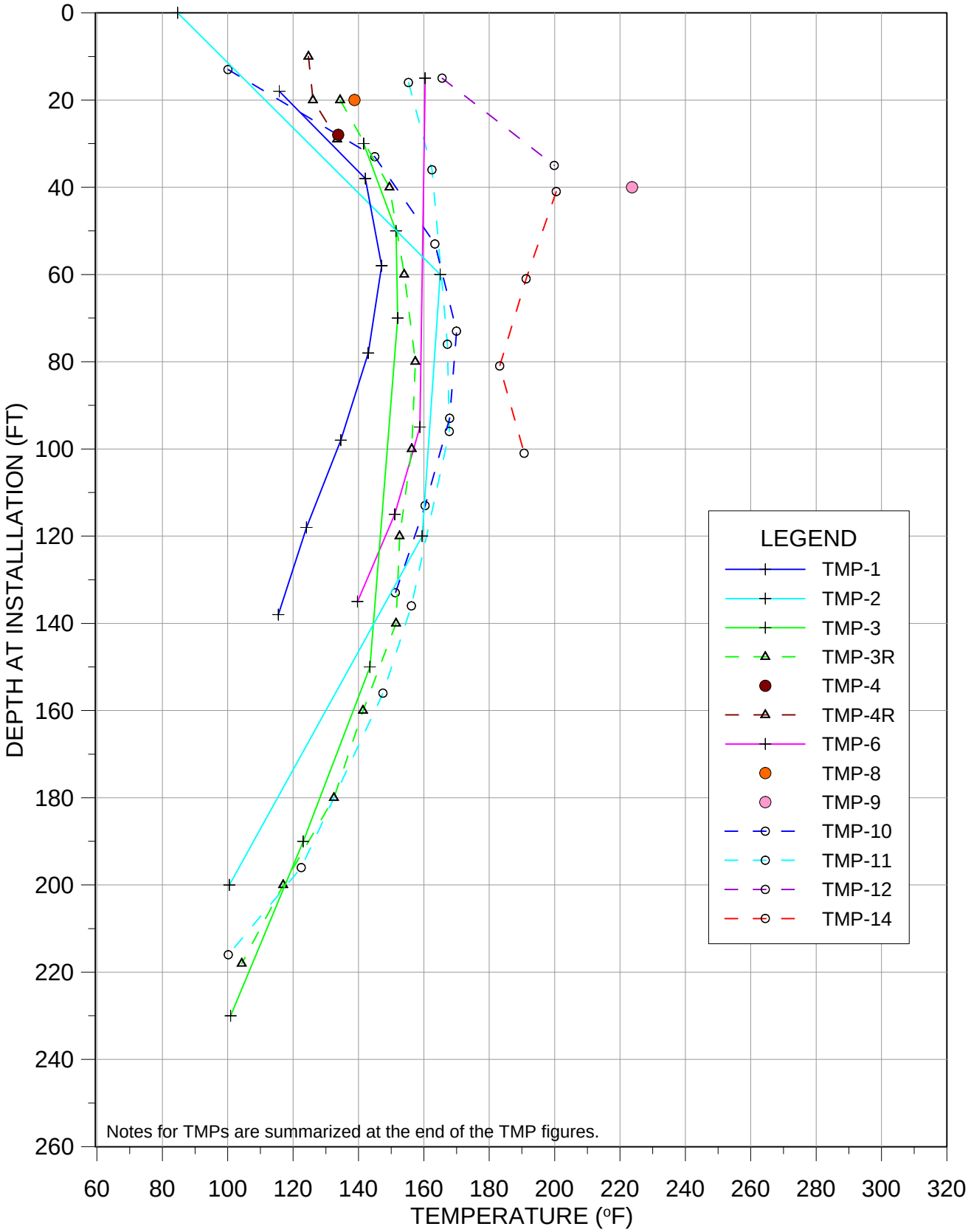

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# TMP-29



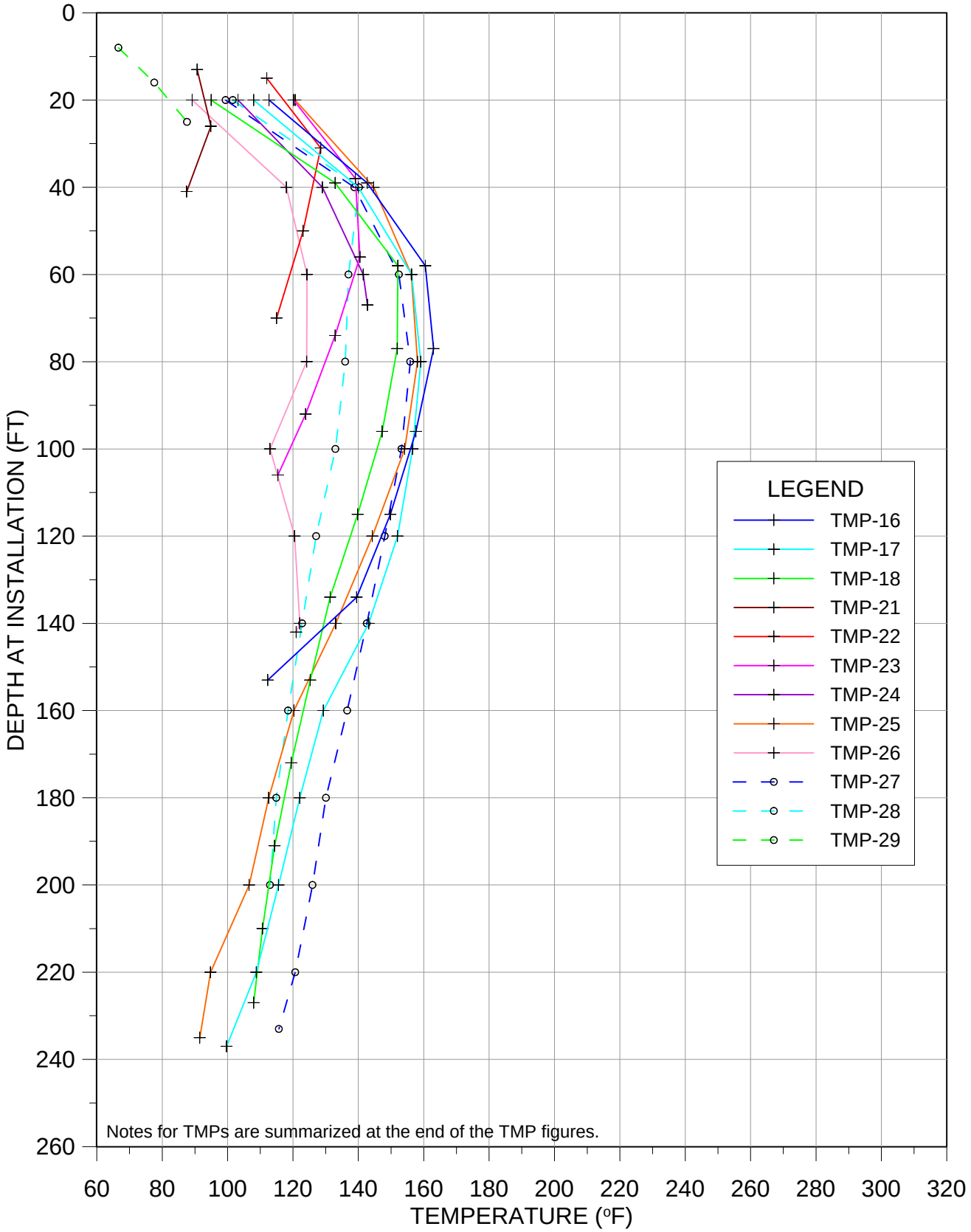

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# 6/29/2015



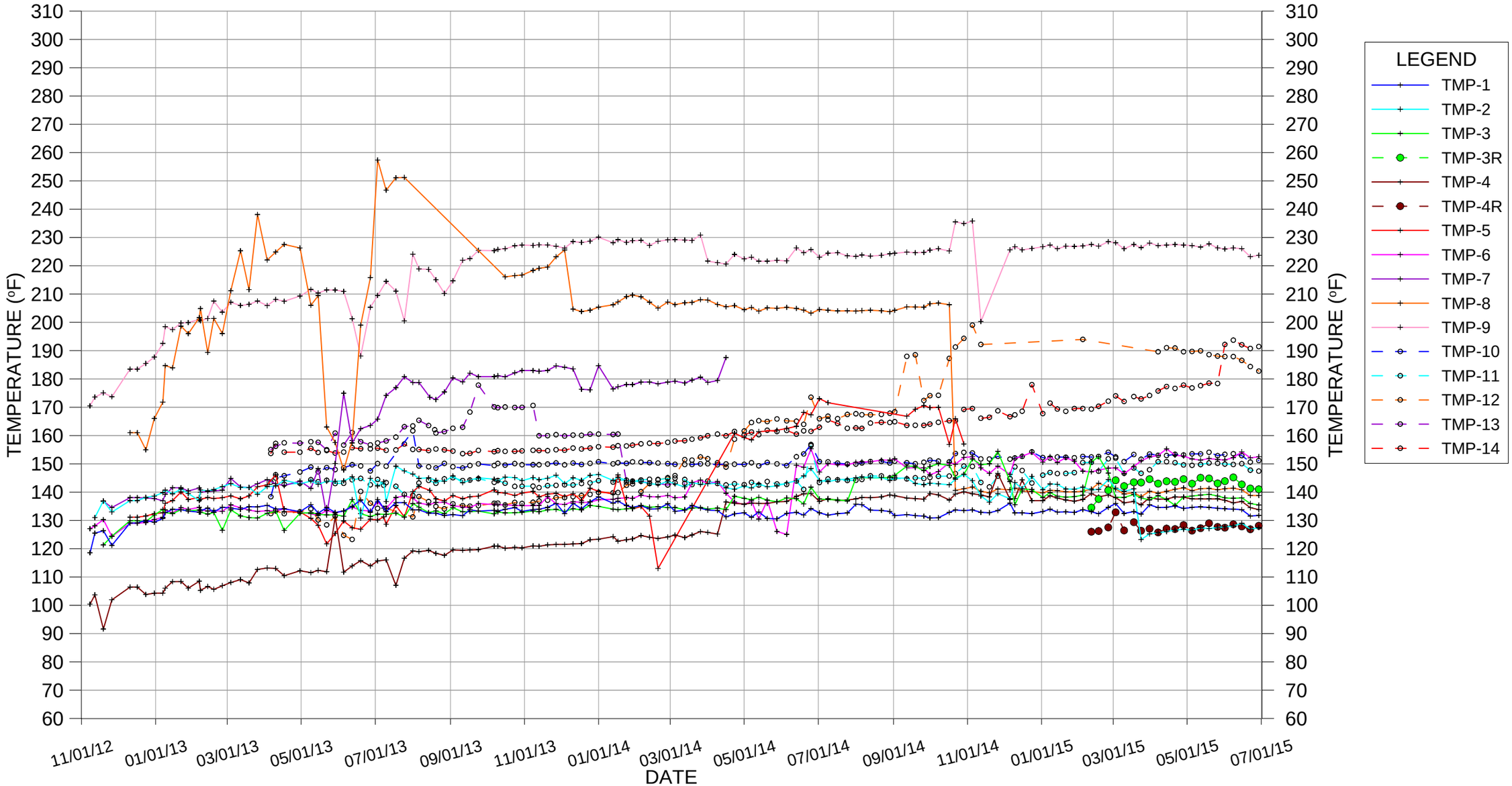

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# 6/29/2015 - NORTH QUARRY



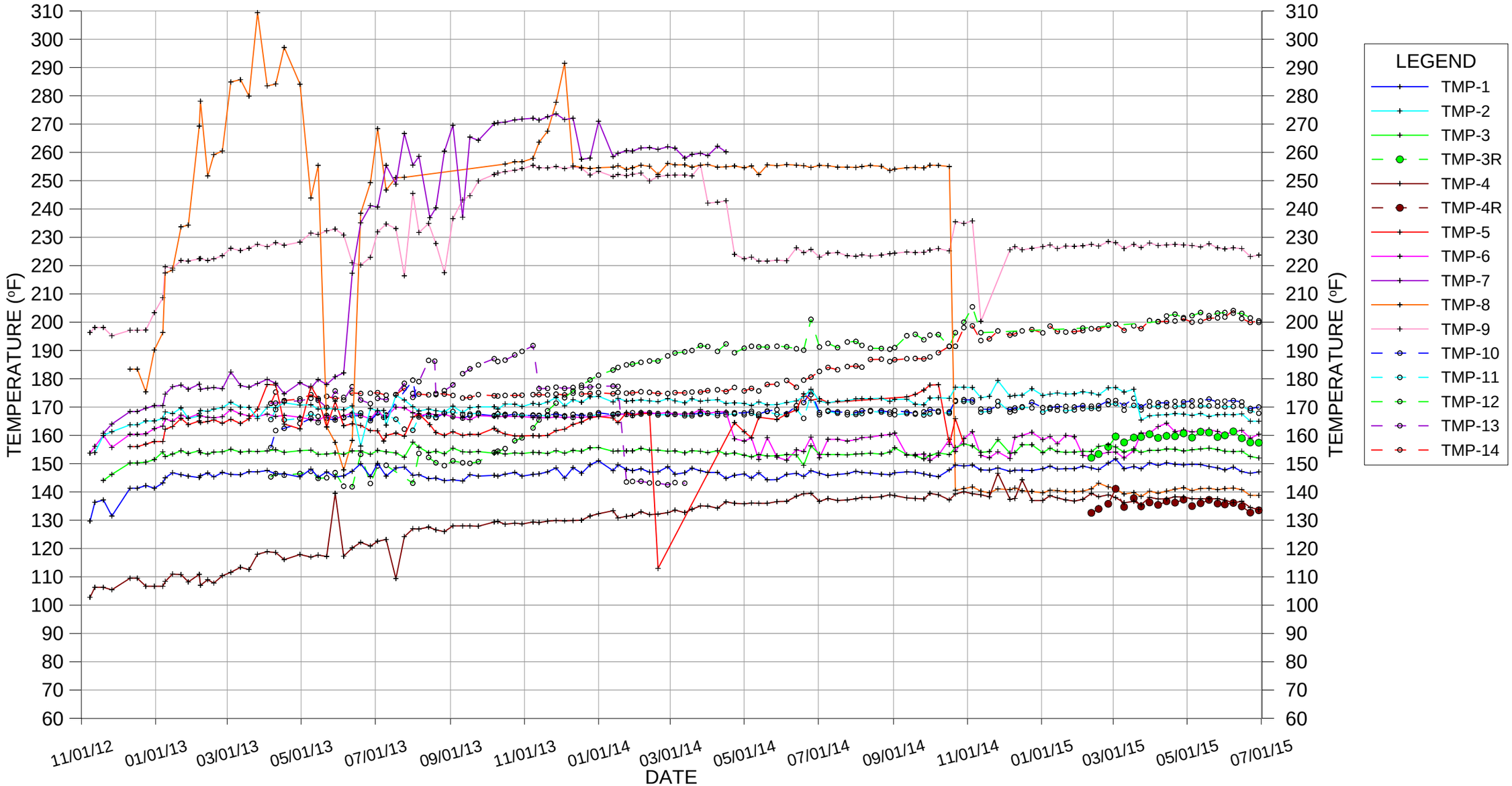

TEMPERATURE VS DEPTH
BRIDGETON LANDFILL

# AVERAGE TEMPERATURES



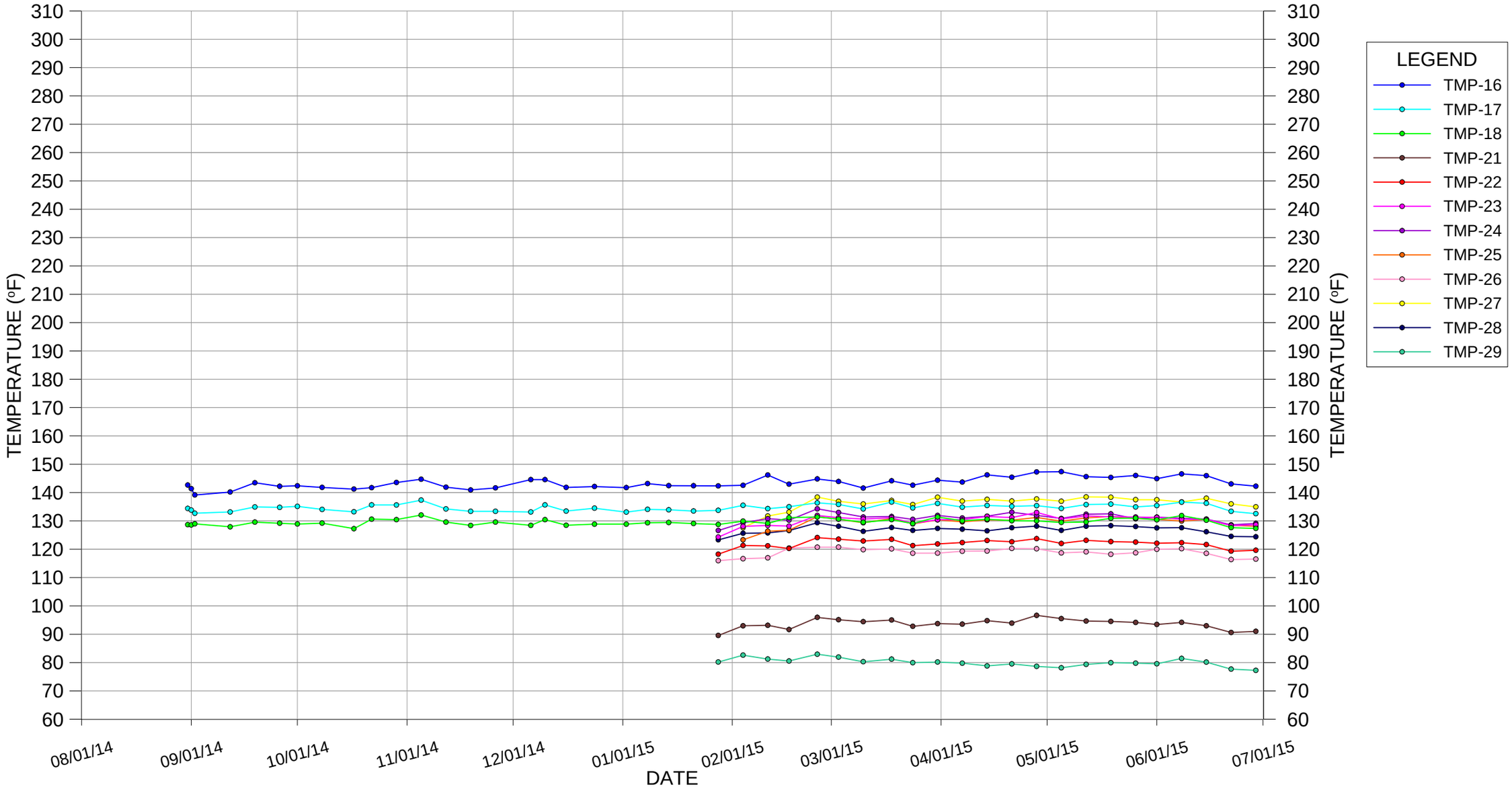

TEMPERATURE VS TIME
BRIDGETON LANDFILL

# MAXIMUM TEMPERATURES



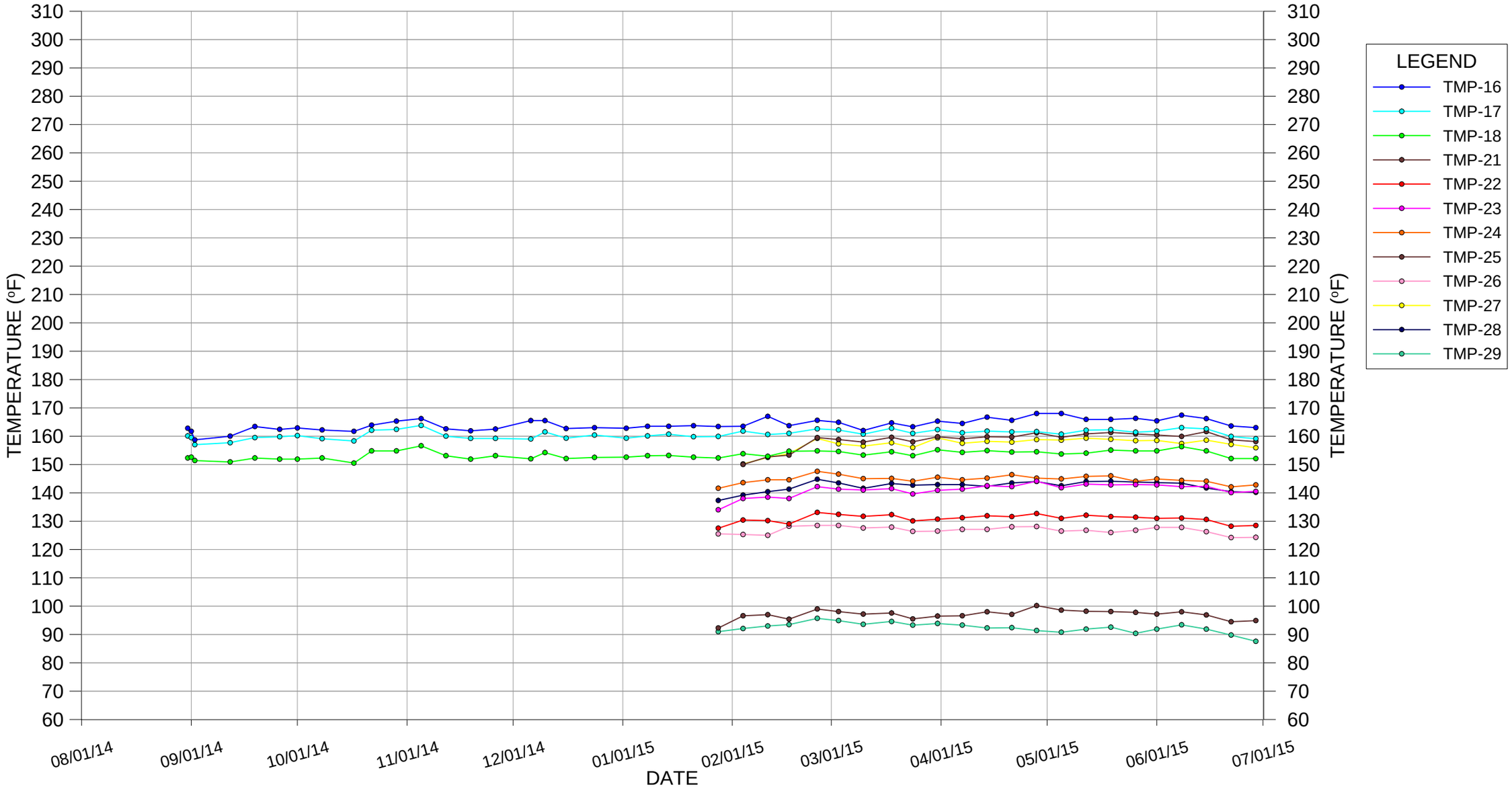

TEMPERATURE VS TIME
BRIDGETON LANDFILL

# AVERAGE TEMPERATURES - NORTH QUARRY




TEMPERATURE VS TIME
BRIDGETON LANDFILL

# MAXIMUM TEMPERATURES - NORTH QUARRY




TEMPERATURE VS TIME
BRIDGETON LANDFILL

TMP BRIDGETON LANDFILL NOTES

TMP-1:

1. No reliable temperature readings at 138 ft depth from 8/1/2014 to 3/24/2015.
2. No reliable temperature readings at 78 ft depth from 8/13/2014 to 3/24/2015.
3. No reliable temperature readings at 38 ft depth from 8/2/2014 to 3/24/2015.

TMP-2:

1. Unit at 180 ft depth had resistance reading above allowable and is no longer working. No reliable reading has been obtained since 11/26/2012.
2. The resistance reading was high and no temperature readings were obtained at 160 ft depth since 6/19/2014.
3. Unit at 120 ft depth had high resistance readings that were fluctuating on 10/22/14 & from 11/5-12/6/2014 and on 12/16/2014.
4. Unit at 60 ft depth had fluctuating high resistance readings from 11/12/14 – 12/6/14 and no resistance reading between 2/11/2015 and 2/25/15, therefore the temperatures are unreliable during those dates.
5. The conductivity tests on 3/19/15 conducted by Feezor Engineering showed that units at 20’, 40’, 80’, 100’, 140’ are no longer reliable.

TMP-3:

1. No reliable temperature readings have been obtained at 170' depth since 1/29/2014, except on 3/13/2014.
2. The conductivity tests on 4/11/14 conducted by CEC showed that units at 10', 90', 130’, 210' and 250' are no longer reliable.
3. No reliable temperature readings were obtained at 230' depth from 8/01/2014 – 12/6/14 and 2/11/15 – 2/25/15.
4. No reliable temperature readings were obtained at 190' depth from 9/12 to 10/17/14, from 11/5 to 11/26/14 and on 12/16/14.
5. The conductivity tests on 10/28/14 conducted by Feezor Engineering showed that units at 10', 90', 110', 130', 210' and 250' are not reliable.
6. The unit at 150' no temperature or unreliable readings between 9/12/14 and 3/3/15.
7. The unit at 230' had unreliable or no readings from 10/22/-12/6/2014, between 2/11/15 – 2/25/15.
8. The unit at 190' had unreliable or no readings from 12/16/14 – 2/17/15.

TMP-3R: NONE

TMP-4:

1. The conductivity tests on 4/11/14 conducted by CEC showed that the unit at 48' depth is no longer reliable.

TMP-4R: NONE

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

TMP-6:

1. Unit at 195 ft depth had a resistance reading above acceptable on 11/20/2013.
2. Unit at 155 and depth had resistance readings above acceptable since 3/19/2014. No temperature readings were obtained.
3. Units at 195 ft depths had resistance readings above acceptable and no temperature readings obtained from 3/19/2014 to 4/11/2014.
4. The conductivity tests on 4/11/14 conducted by CEC showed that units at 35', 55', 75', 155', 175', and 195' depths are no longer reliable.
5. No reliable temperature readings were obtained at the unit at 95' on 5/13/14, 5/28-7/2/14, 10/1-10/8/14, 10/22/14, 11/12-12/6/14, 1/14/15 & 2/4/15–4/7/15. The temperatures between 12/16/14-1/8/15 are questionable due to high/fluctuating resistivity.
6. No reliable temperature readings were obtained at the 15' unit on 5/28-6/13/14, 6/25/14, 8/1-9/2/14, 10/1-10/8/14, 11/19-12/6/14, 1/2/15, & between 1/28/15 – 3/18/15. The temperature obtained on 12/16/14 is questionable due to high resistivity.
7. No reliable temperature readings were obtained at the unit at 215' since 6/13/14.

TMP-7R: TMP NO LONGER IN SERVICE

TMP-8:

1. Lines connecting data over distance of > 40' are to identify the data set and should not be used for temperature estimation.
2. The presented TMP readings represent the thermocouples that were operational on those dates.
3. No acceptable readings were obtained between 7/25/13 to 10/10/13.
4. Acceptable readings were obtained resuming on 10/16/13 from 20' to 80' depths.
5. Resistance of the unit at 80' indicates the reading is not reliable since 12/04/13.
6. The conductivity tests on 10/28/14 conducted by Feezor Engineering showed that units at 40' and 60' are not reliable.

TMP-9:

1. All units had resistivity readings higher than acceptable levels on 7/3, 7/18, 7/25, 8/14, 8/20, 8/27, and 9/3/2013. Values shown on and between those dates are for informational purposes and should not be considered reliable. Resistivity readings since 9/11/2013 were acceptable for all units except 100'.
2. Unit at 100' depth had an inaccurate temperature reading on 8/1/2013 and no reading since 8/6/2013.

3. Unit at 80' depth had a high resistivity and no temperature readings on 4/1/2014.
4. The conductivity tests on 4/11/14 conducted by CEC showed that units at 20', 60', 80', and 100' depths are no longer reliable.
5. Unit at 40' depth had a resistance lower than credible on 11/12/14. The unit requires assessment.
6. Unit at 40' depth had a resistance which is fluctuating from week to week between 11/19 & 11/26/14. The readings are considered unreliable during that time.

TMP-10:

1. Resistance readings for 7/18 and 7/25/2013 were acceptable; however the temperature readings appear inaccurate. This issue appears to be resolved as of the 8/1/2013 readings.
2. No reliable temperature reading was obtained at 113’ depth between 3/3/15 and 3/18/15.

TMP-11:

1. None of the units had acceptable resistivity readings on 7/3/2013. The units at TMP-11 were subsequently re-read on 7/8/2013. Resistance readings for 7/8/2013 were acceptable.
2. All units had resistivity readings higher than acceptable levels on 7/18/2013. Values shown for that date are for informational purposes and should not be considered reliable.
3. All units had acceptable resistance readings starting on 7/25/13, except a high resistance reading at 116' depth since 10/30/13.
4. No temperature reading was obtained at 176' since 1/17/2014.
5. The unit at 156' depth had high or questionable resistance since 1/17/14. No temperatures were obtained between 1/17/14 and 5/13/14, on 6/19/14, between 8/13/14 and 10/17/2014, and since 2/11/15. Readings were either not obtained or deemed unreliable between 8/13/14 and 3/31/15, except for on 10/22/14 and 12/10/14.
6. The unit at 56' depth had a high resistance reading since 3/19/14 & no temperatures were obtained.
7. The conductivity tests on 4/11/14 conducted by CEC showed that units at 56', 116', and 176' depths are no longer reliable.
8. No temperature was obtained on 6/25/14 at 216' depth.
9. The conductivity tests on 10/28/14 conducted by Feezor Engineering showed that units at 56', 116' and 176' are not reliable.
10. The Unit at 76' depth had either no readings or unreasonable readings between 11/12 & 12/6/14, 12/24/14, on 1/14/15, on 2/17/15 and from 3/10/15 – 3/31/15.
11. The Unit at 16' depth had either no readings or unreasonable readings between 11/19 & 12/6/14 and 12/16/14 – 1/28/15.

TMP-12:

1. No reliable readings between 2/4/15 and 3/31/15.
2. All units except at depth 15’ and 35’ verified by Conductivity testing by Feezor Engineering in March 2015 to be unreliable.

TMP-13: TMP NO LONGER IN SERVICE

TMP-14:

1. The unit at 181 ft depth had resistance readings that were out of readable limit and no temperature readings obtained since 7/9/2014.
2. The unit at 101 ft depth had resistance readings that were out of readable limit and no temperature readings from 7/9/2014 to 7/17/2014.
3. The unit at 121 ft depth had resistance readings out of readable limit and no temperature readings since 7/25/2014.
4. The unit at 141 ft depth had a high resistance reading and no temperature reading obtained since 8/01/2014.
5. The unit at 21 ft depth had low resistance readings and unreliable temperature readings since 7/25/2014.
6. The unit at 201 ft depth had no temperature or resistance reading obtained on 12/24/2014 and since 6/1/15.
7. The unit at 161 ft depth had no resistivity reading obtained and an unreliable temperature since 4/7/15.

TMP-14R: NOT PART OF THIS SUBMITTAL (HEAT EXTRACTION TMP)

TMP-15: TMP WAS NEVER IN SERVICE

TMP-16: 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: NONE

TMP-26: NONE

TMP-27: NONE

TMP-28:

1. The unit at 217 ft depth has had no resistance or temperature readings since installation.

TMP-29: NONE

TMP vs DEPTH and TMP vs ELEVATION (for 6/29/2015):

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 conductivity test on 4/11/14.
3. There were no reliable temperature readings for TMP-5 from 7/17-9/2/2014 and since 11/5/14.
4. There were no reliable temperature readings for TMP-9 from 11/19 - 12/26/2014.
5. There were no reliable temperature readings for TMP-12 from 11/19/2014 – 3/31/15, except 2/4/15.

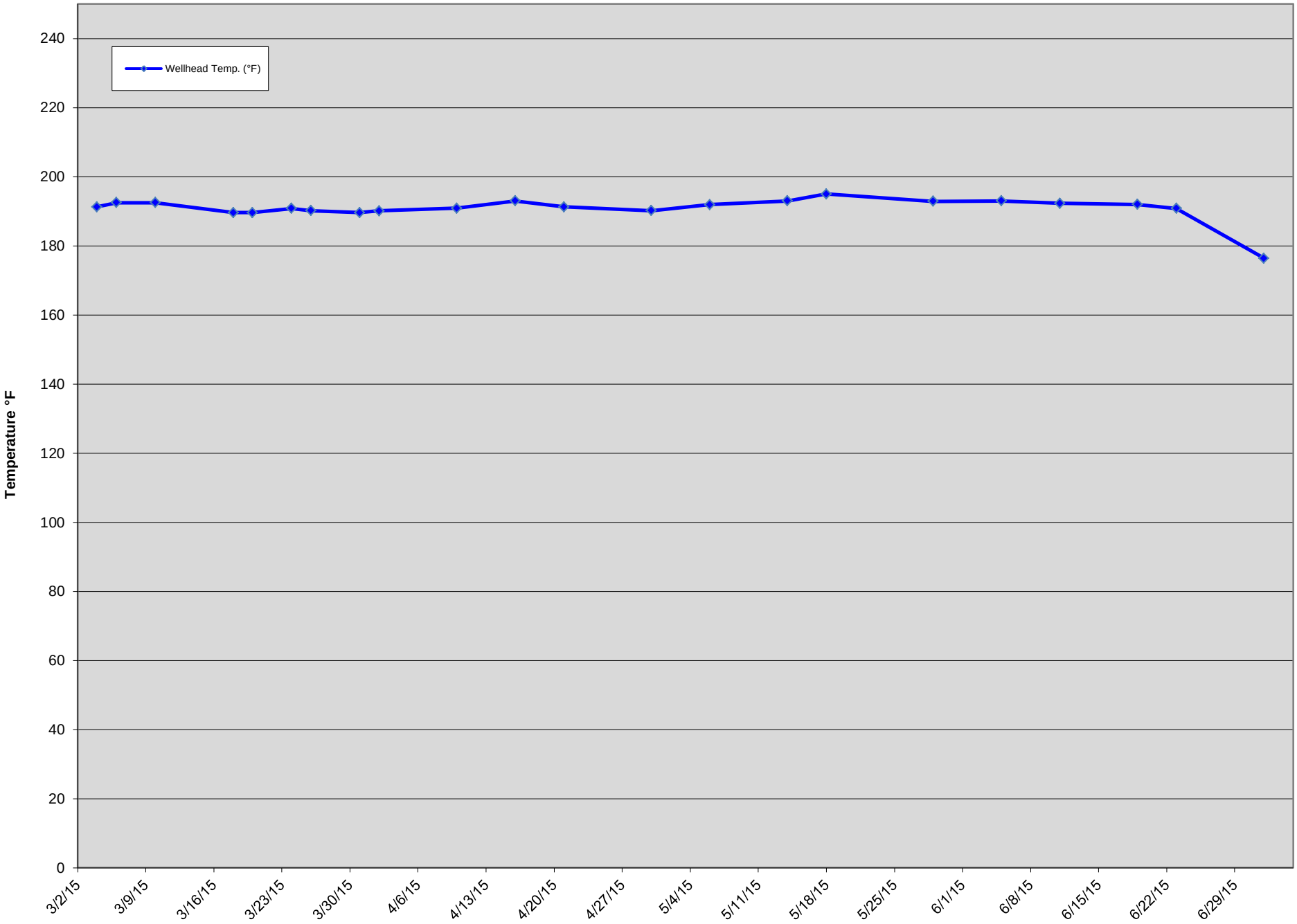
# ATTACHMENT C

# GAS INTERCEPTOR WELLHEAD TEMPERATURE GRAPHS

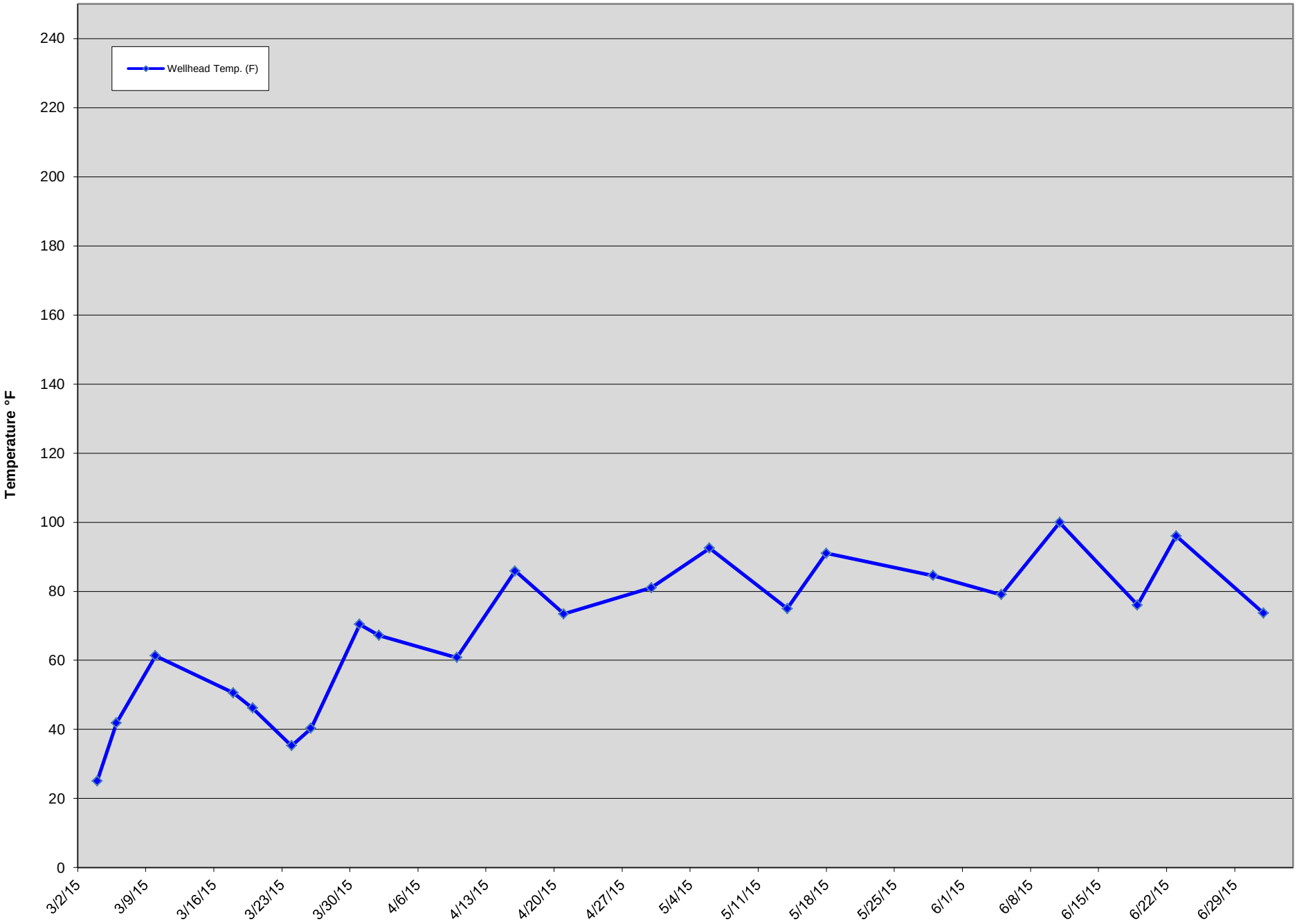
**Gas Extraction Wells - Bridgeton Landfill**

SCS ENGINEERS

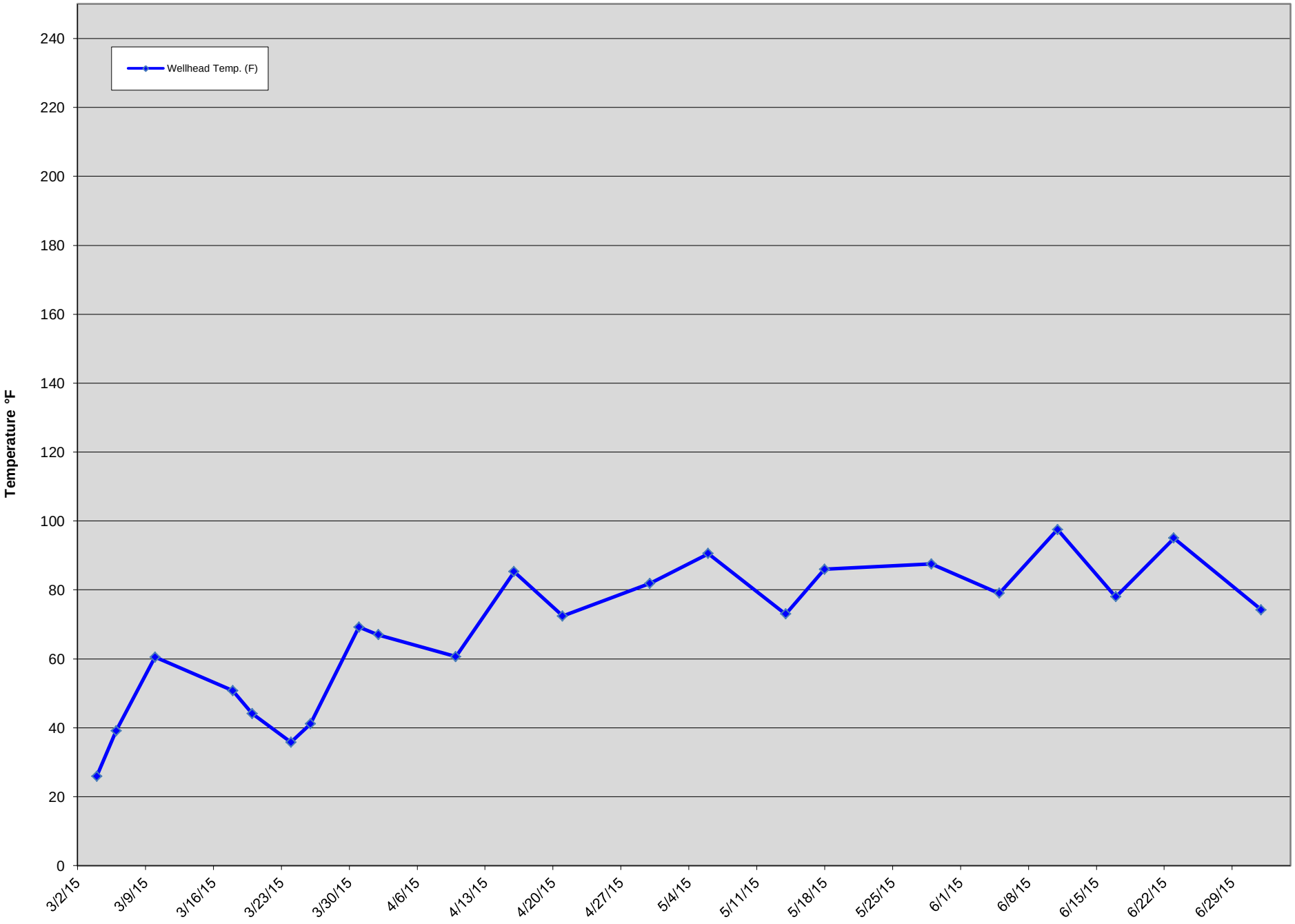
# GIW-1 Wellhead Temperatures



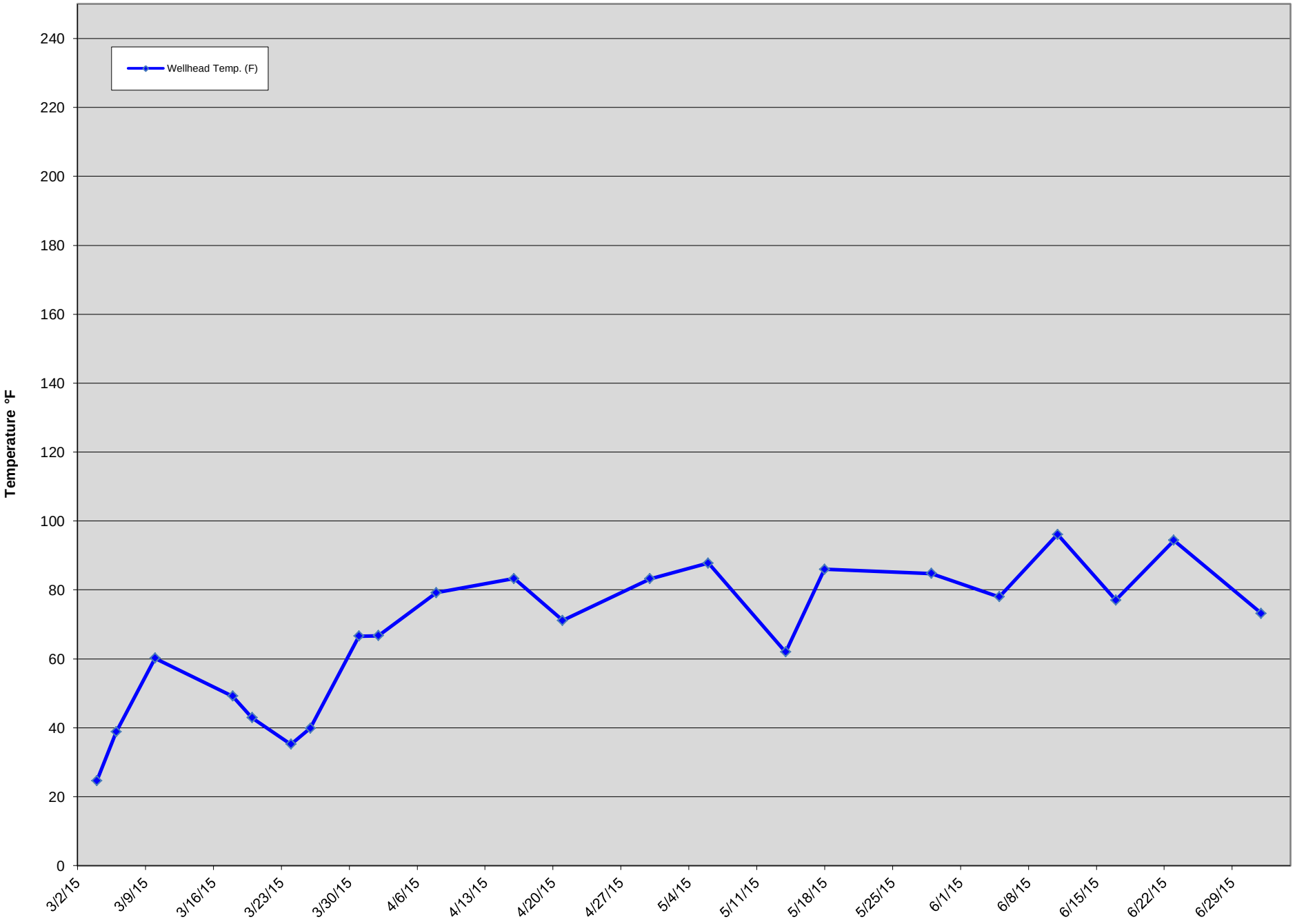
# GIW-2 Wellhead Temperatures



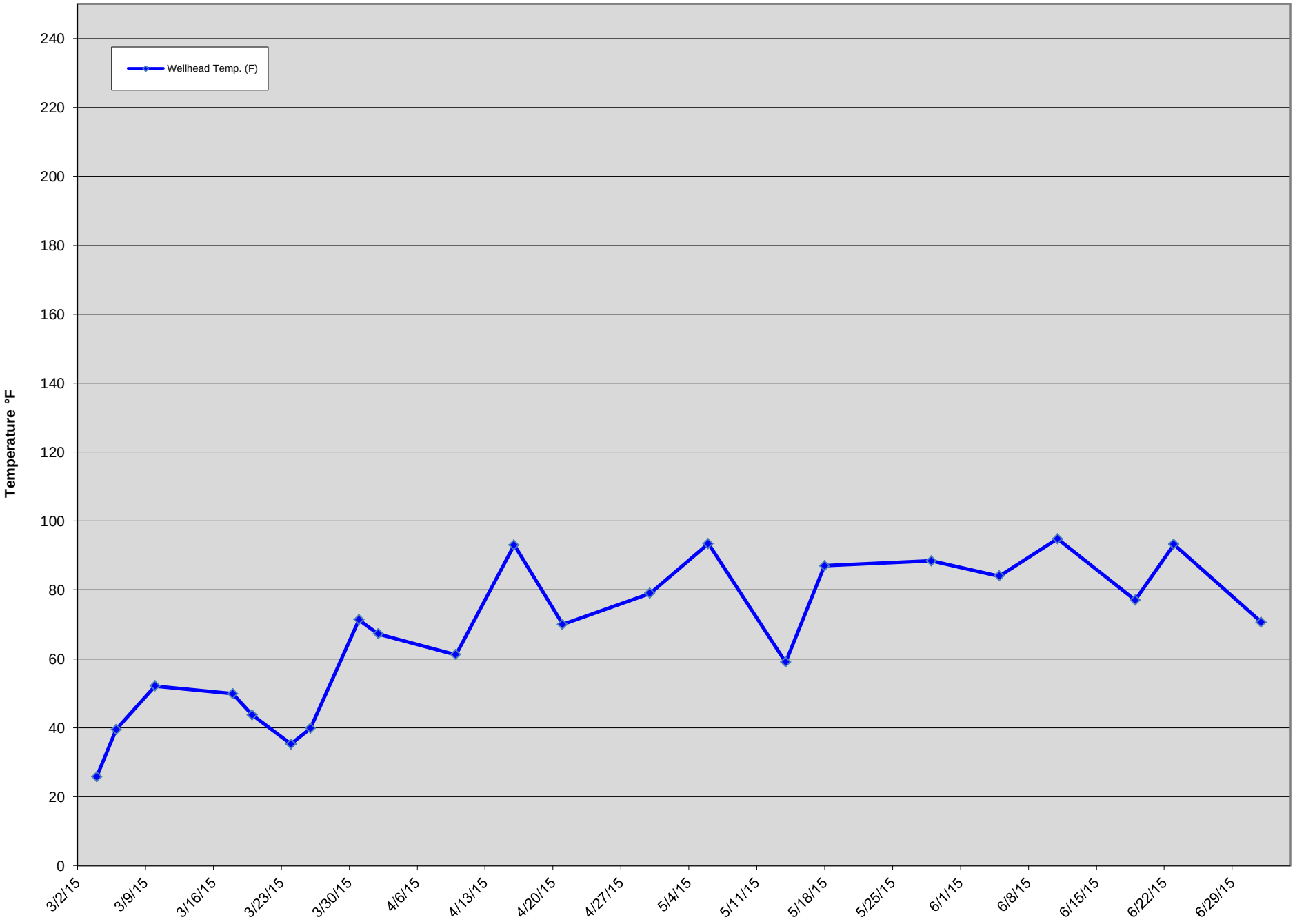
# GIW-3 Wellhead Temperatures



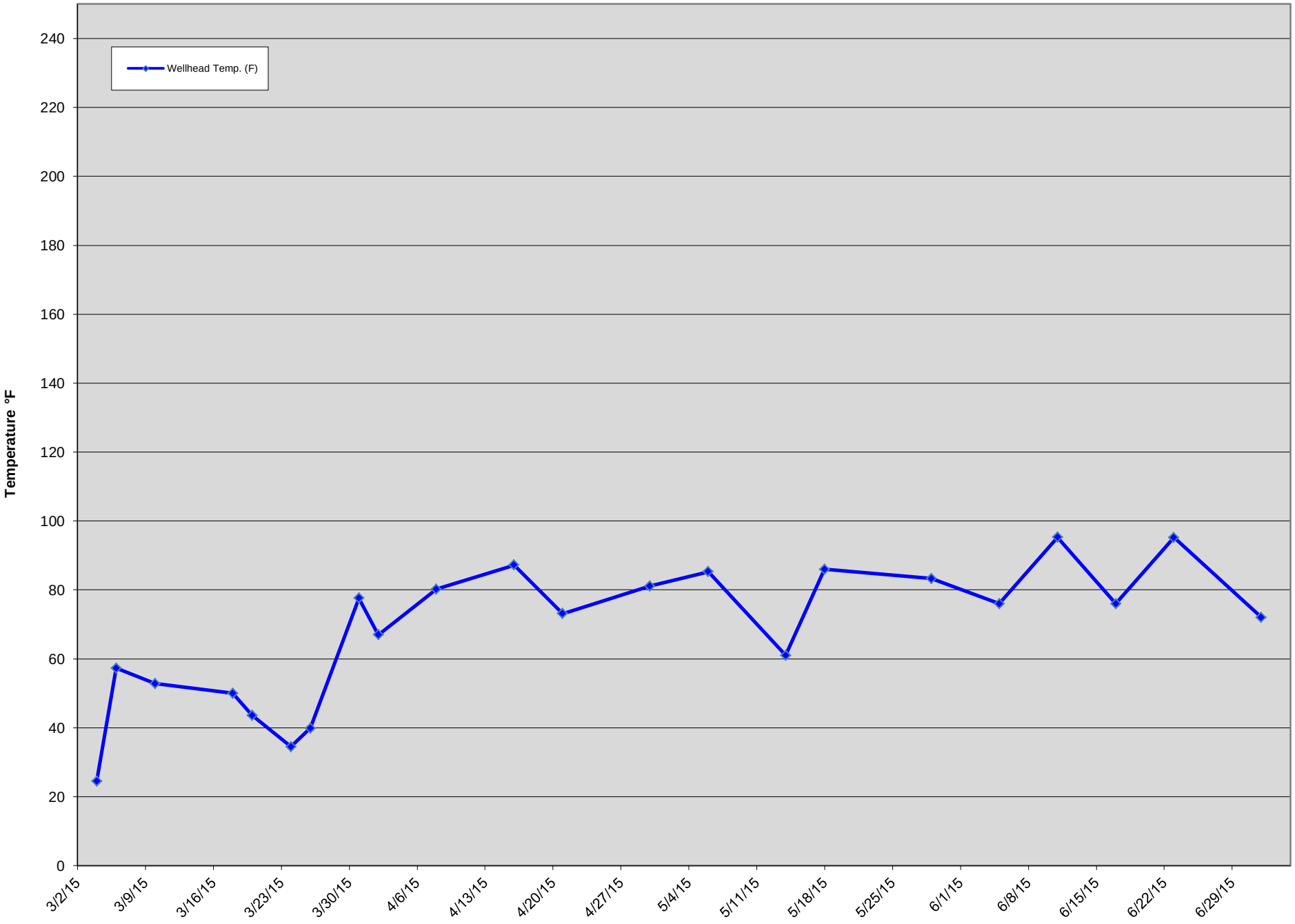
# GIW-4 Wellhead Temperatures



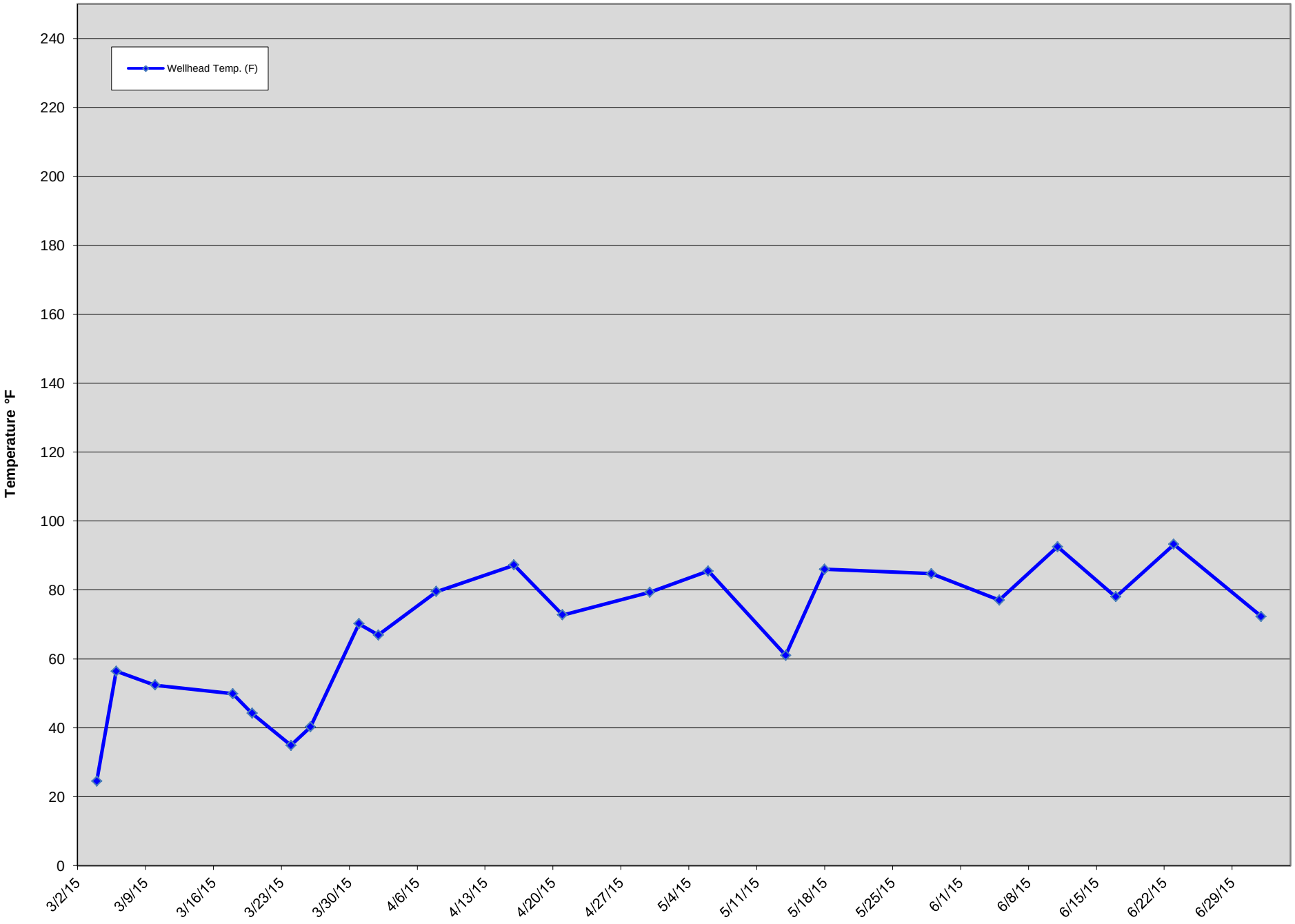
# GIW-5 Wellhead Temperatures



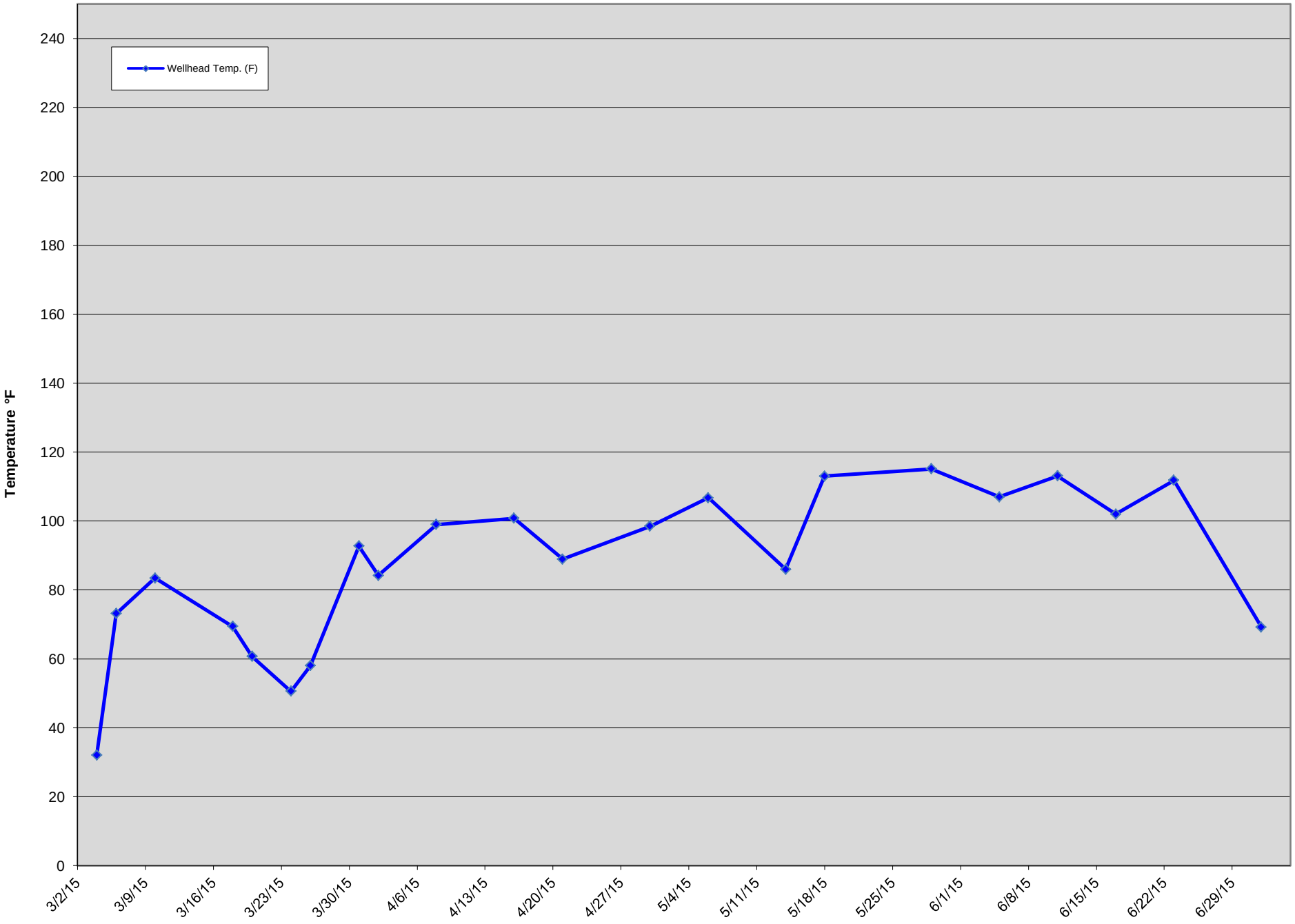
# GIW-6 Wellhead Temperatures



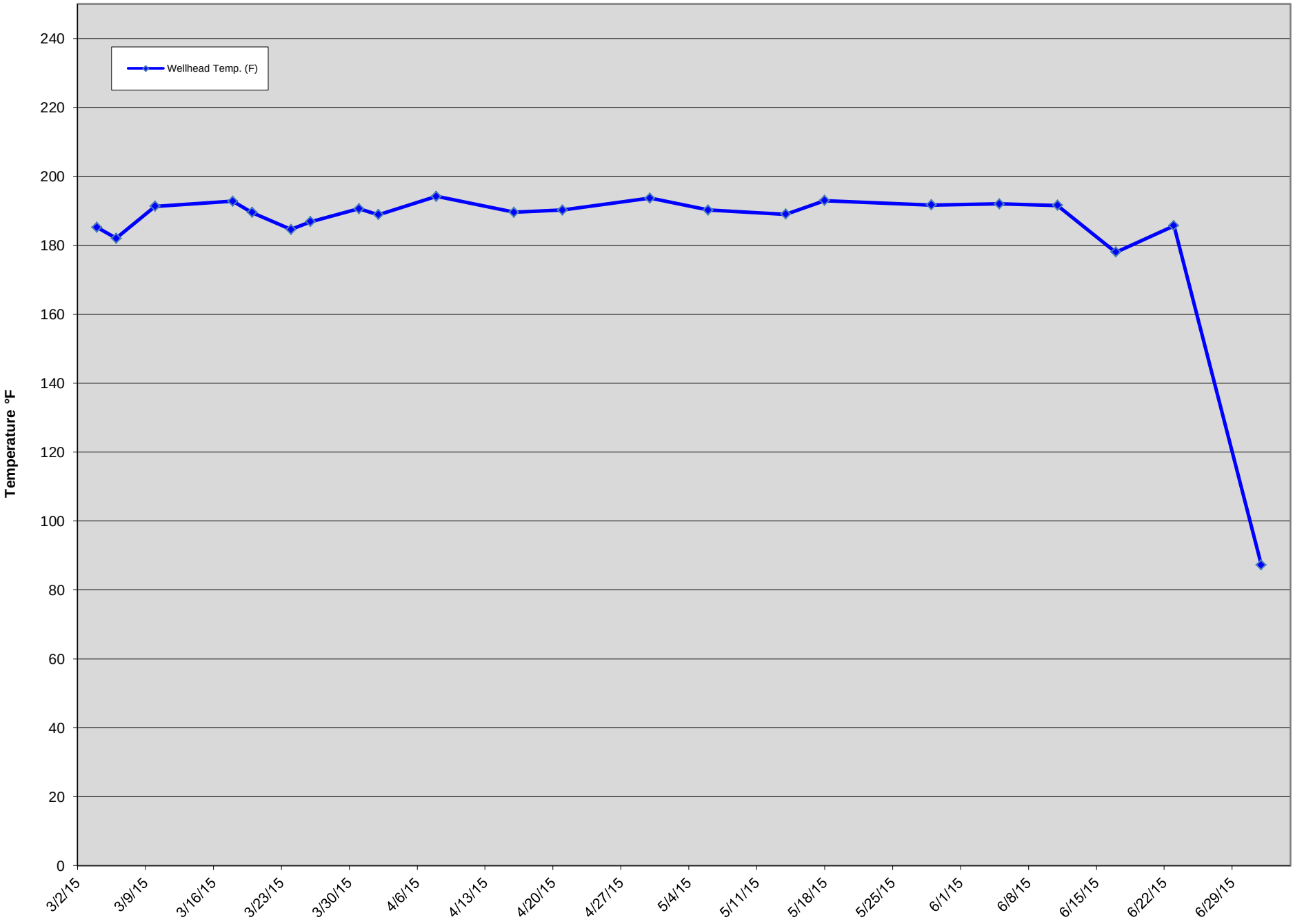
# GIW-7 Wellhead Temperatures



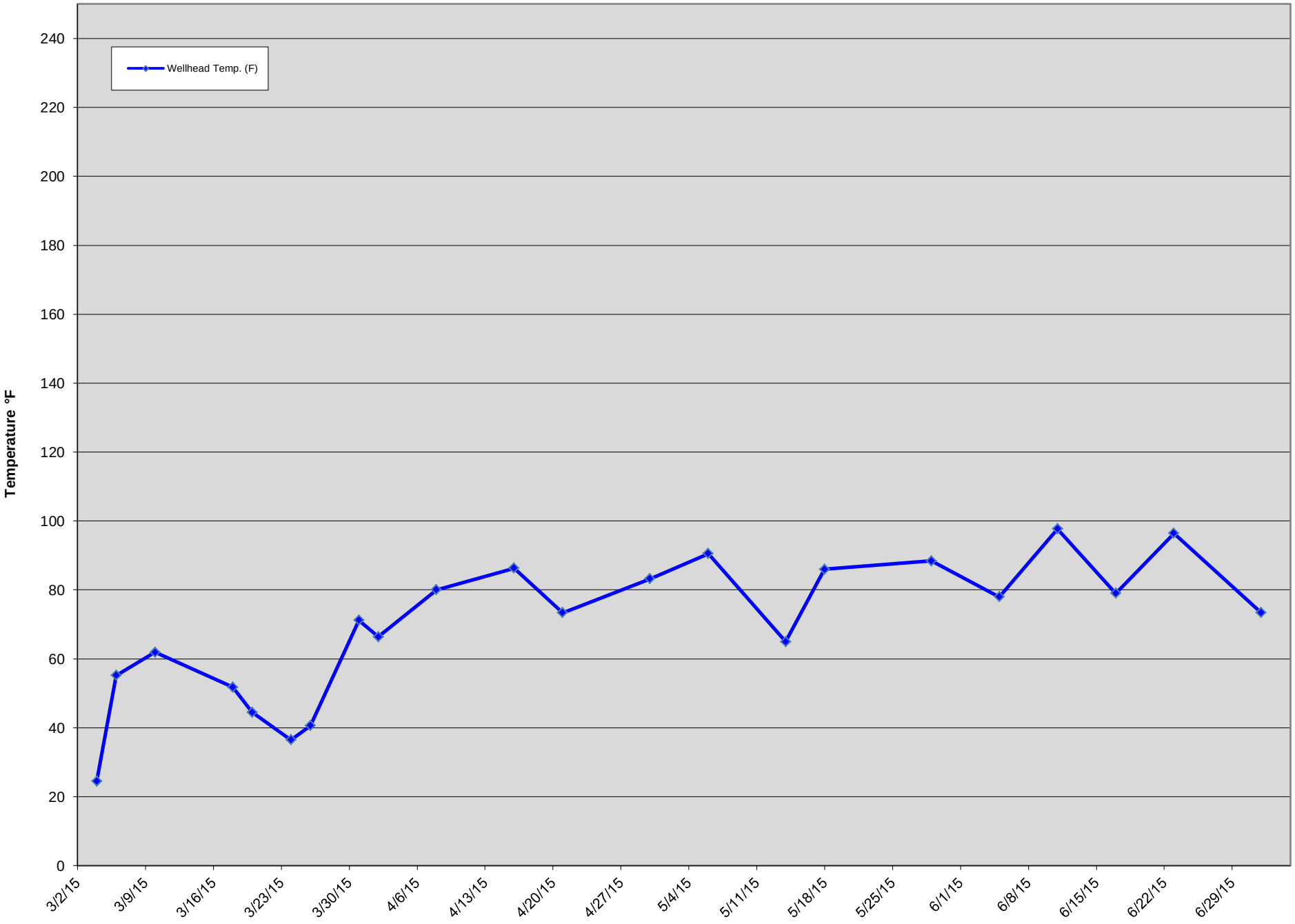
# GIW-8 Wellhead Temperatures



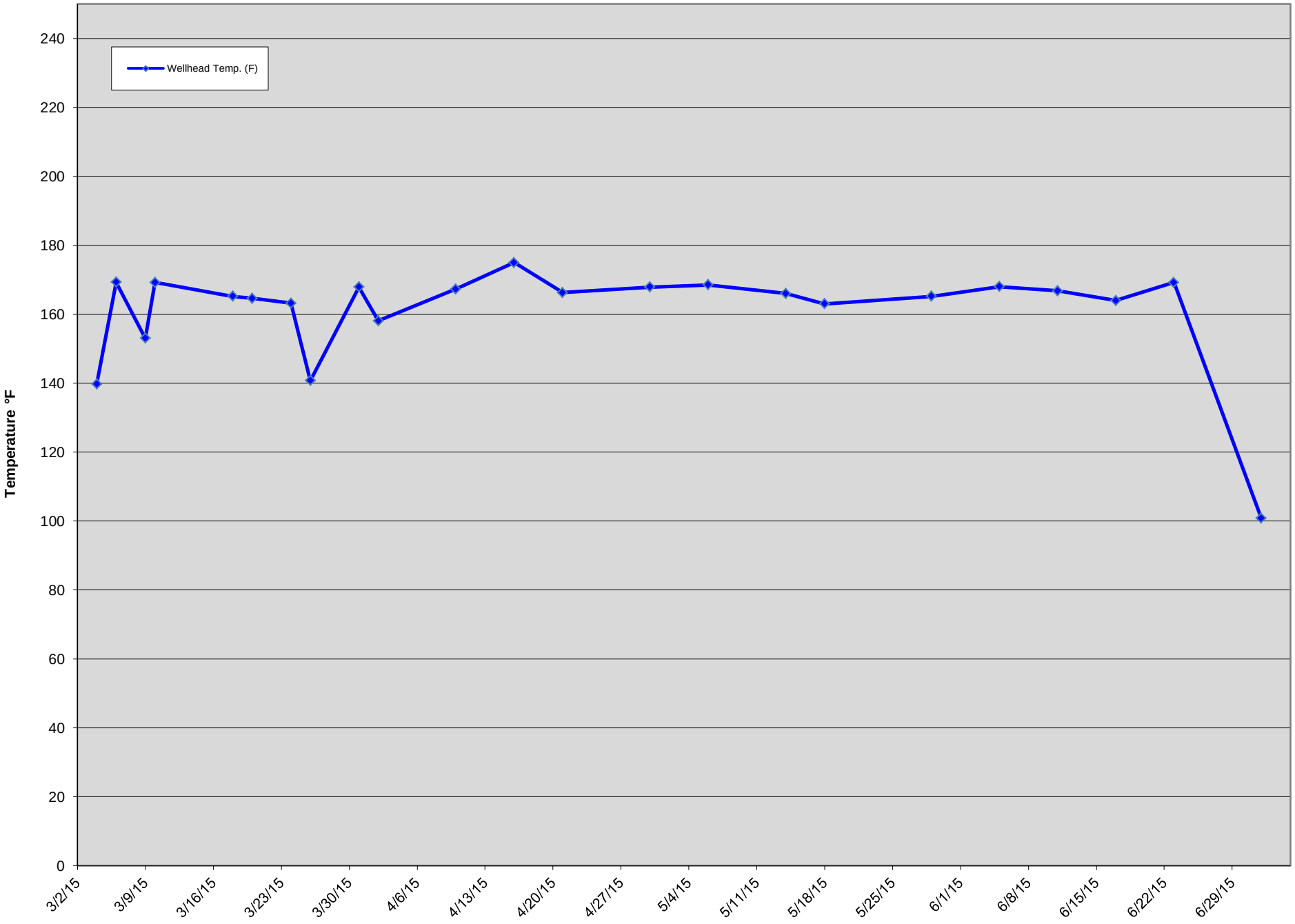
# GIW-9 Wellhead Temperatures



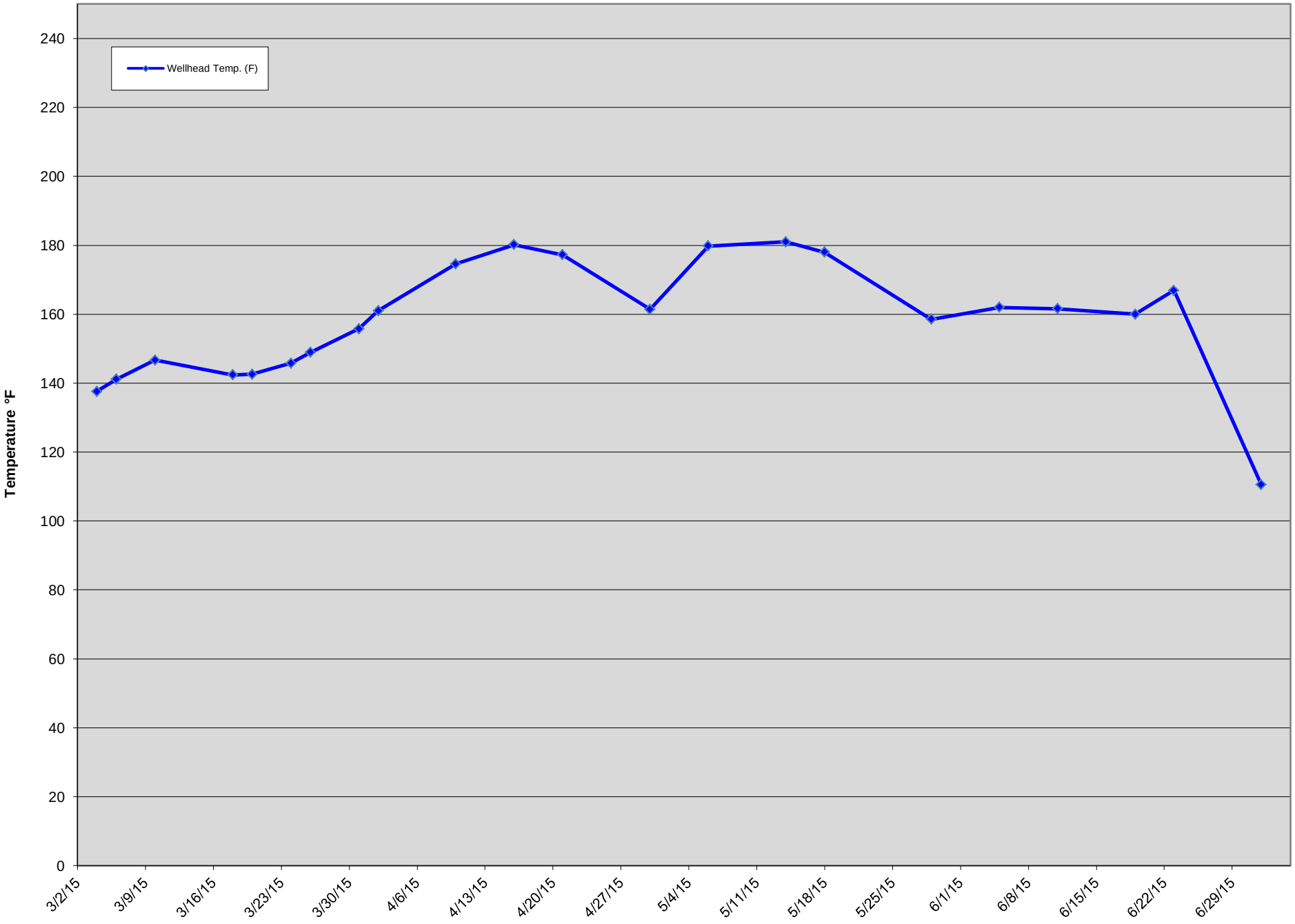
# GIW-10 Wellhead Temperatures



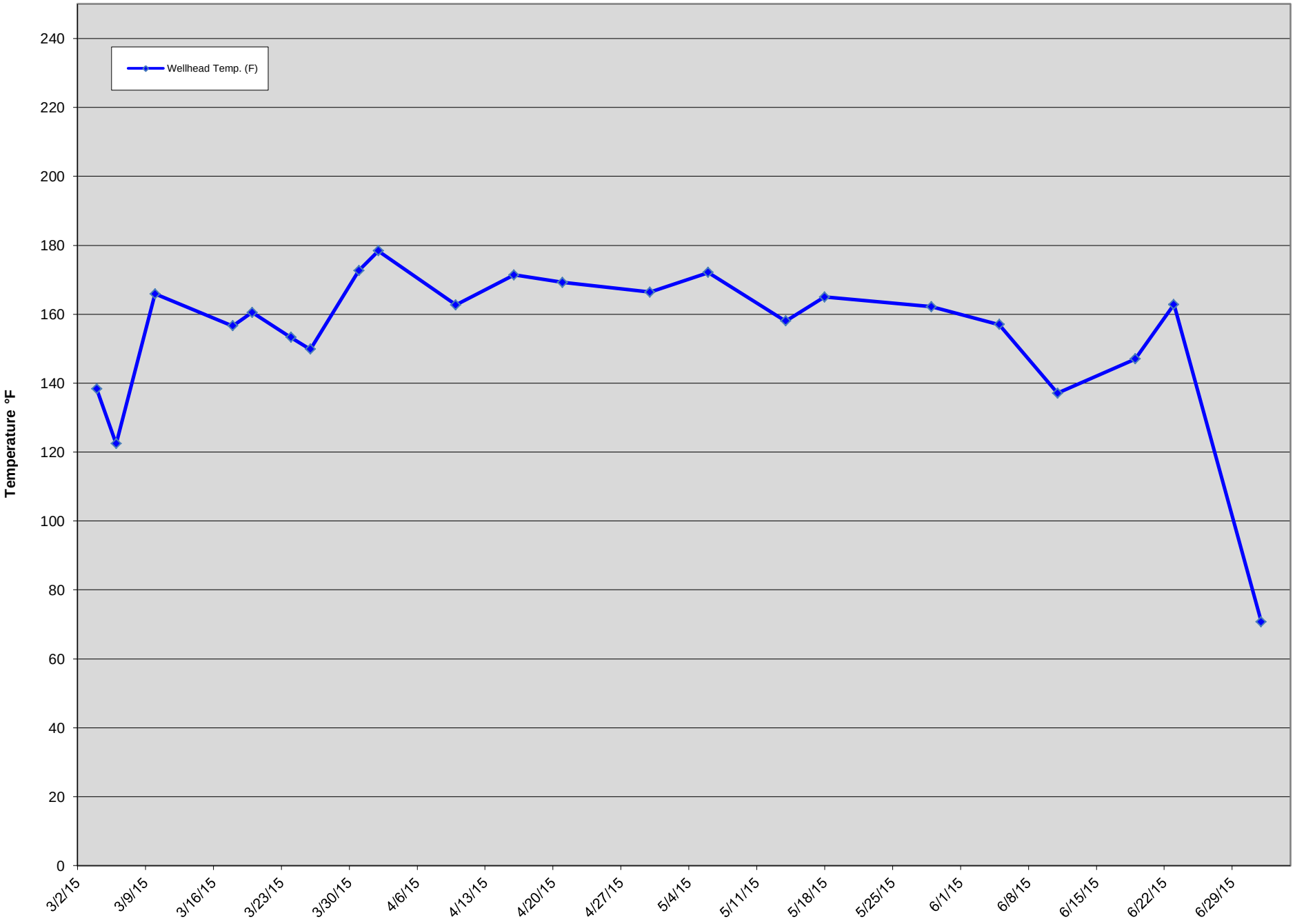
# GIW-11 Wellhead Temperatures



# GIW-12 Wellhead Temperatures



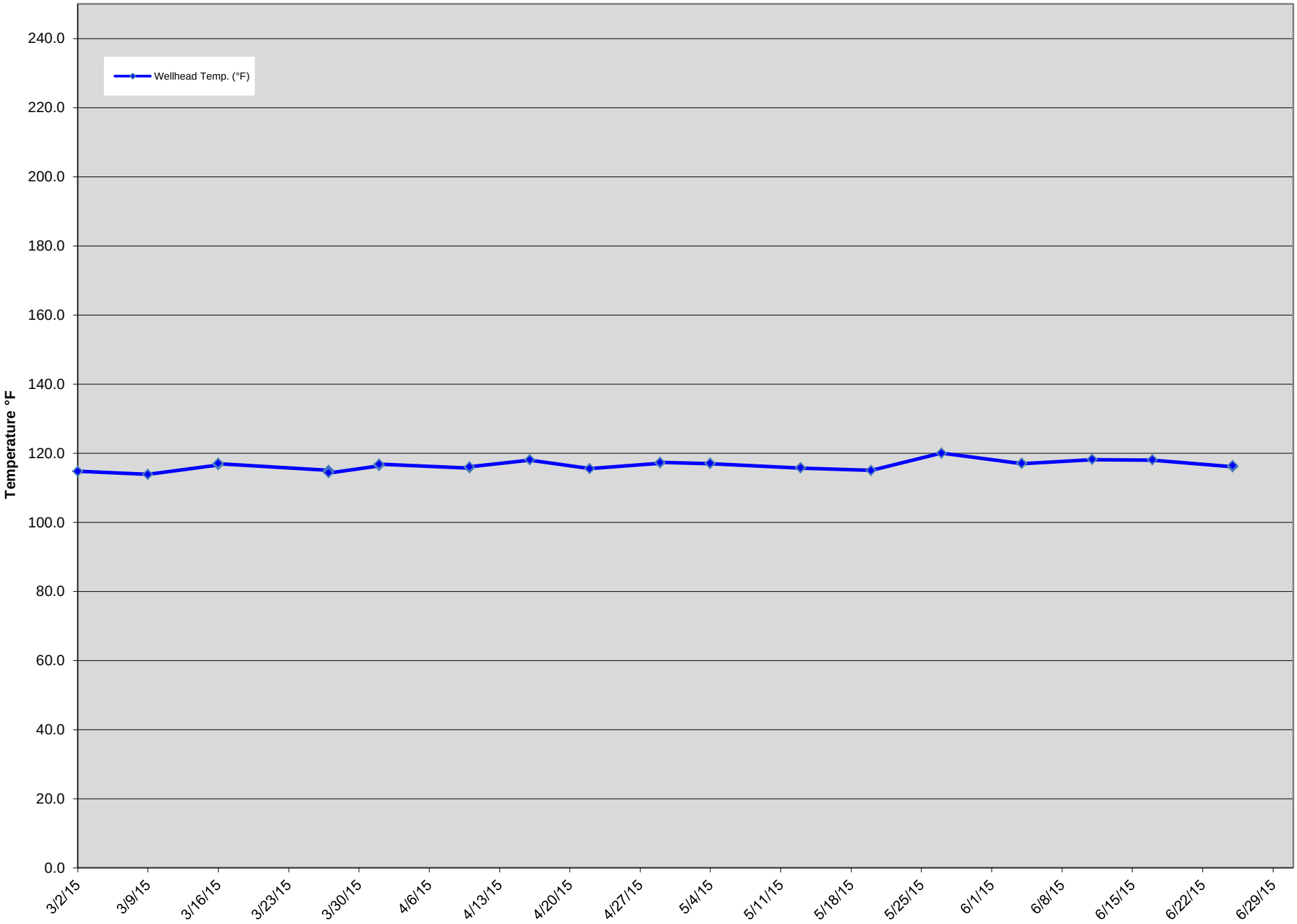
# GIW-13 Wellhead Temperatures



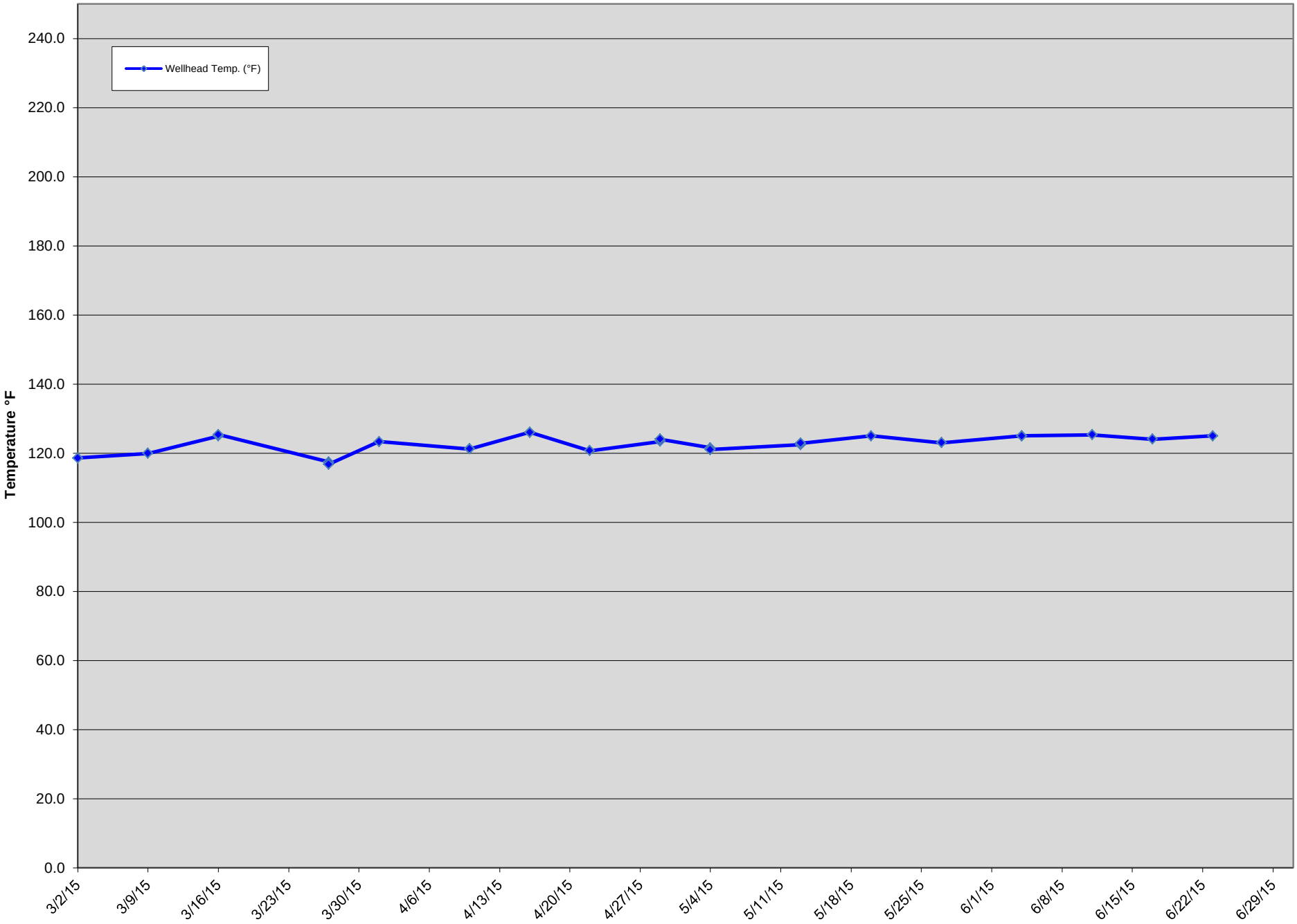
# ATTACHMENT D

# NECK-AREA GAS EXTRACTION WELL DATA

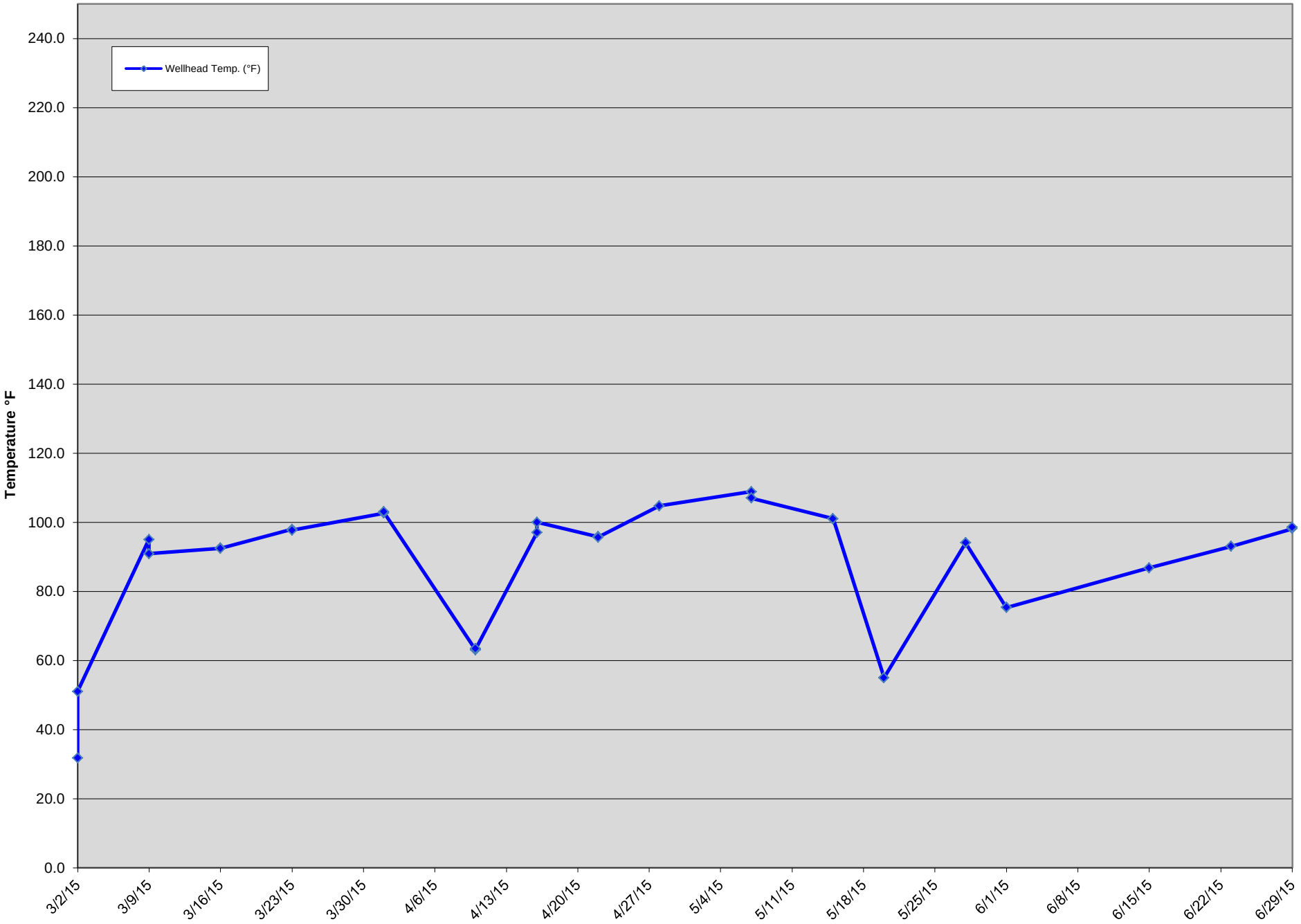
# GEW-008 Wellhead Temperatures



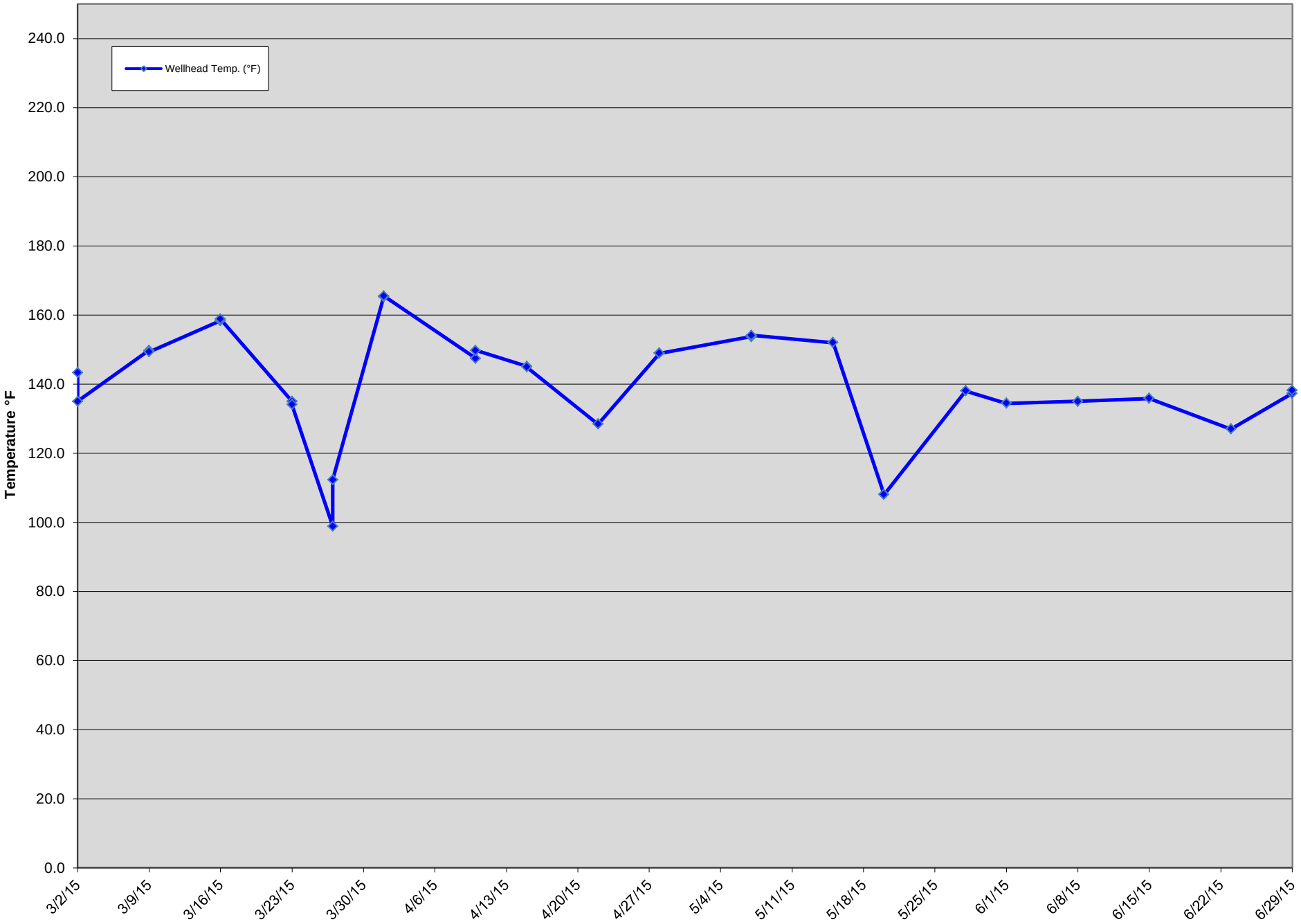
# GEW-009 Wellhead Temperatures



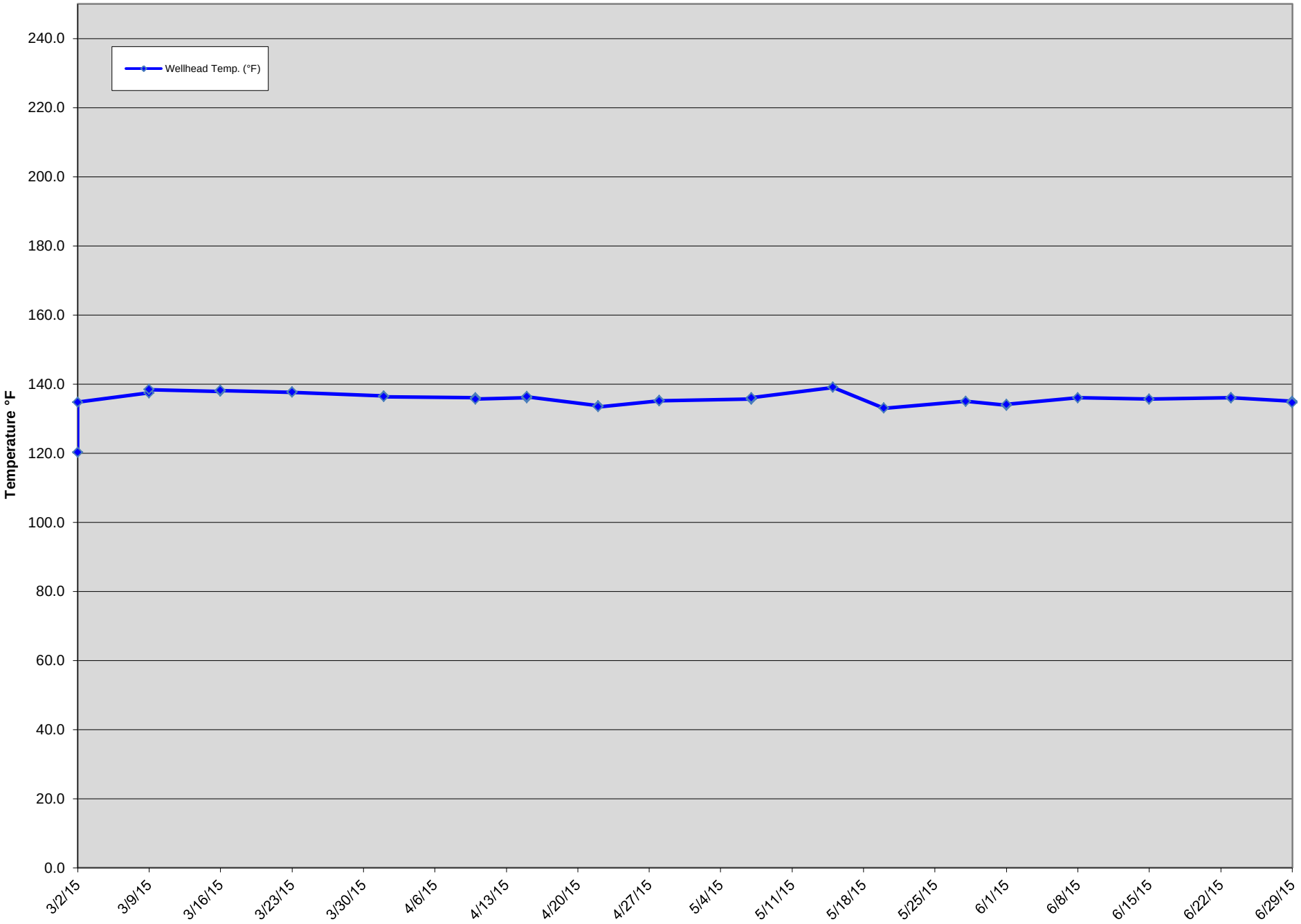
# GEW-010 Wellhead Temperatures



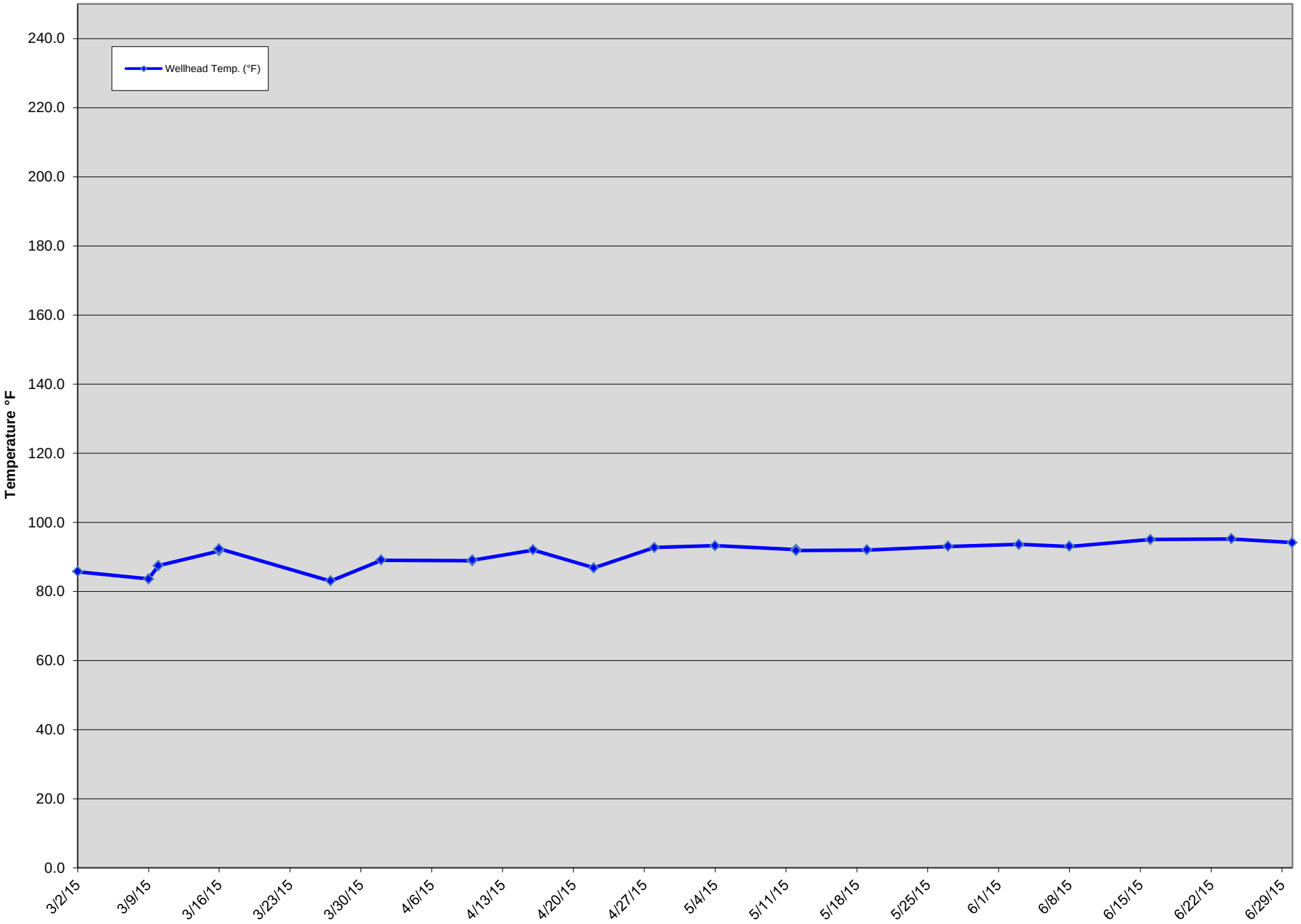
# GEW-038 Wellhead Temperatures



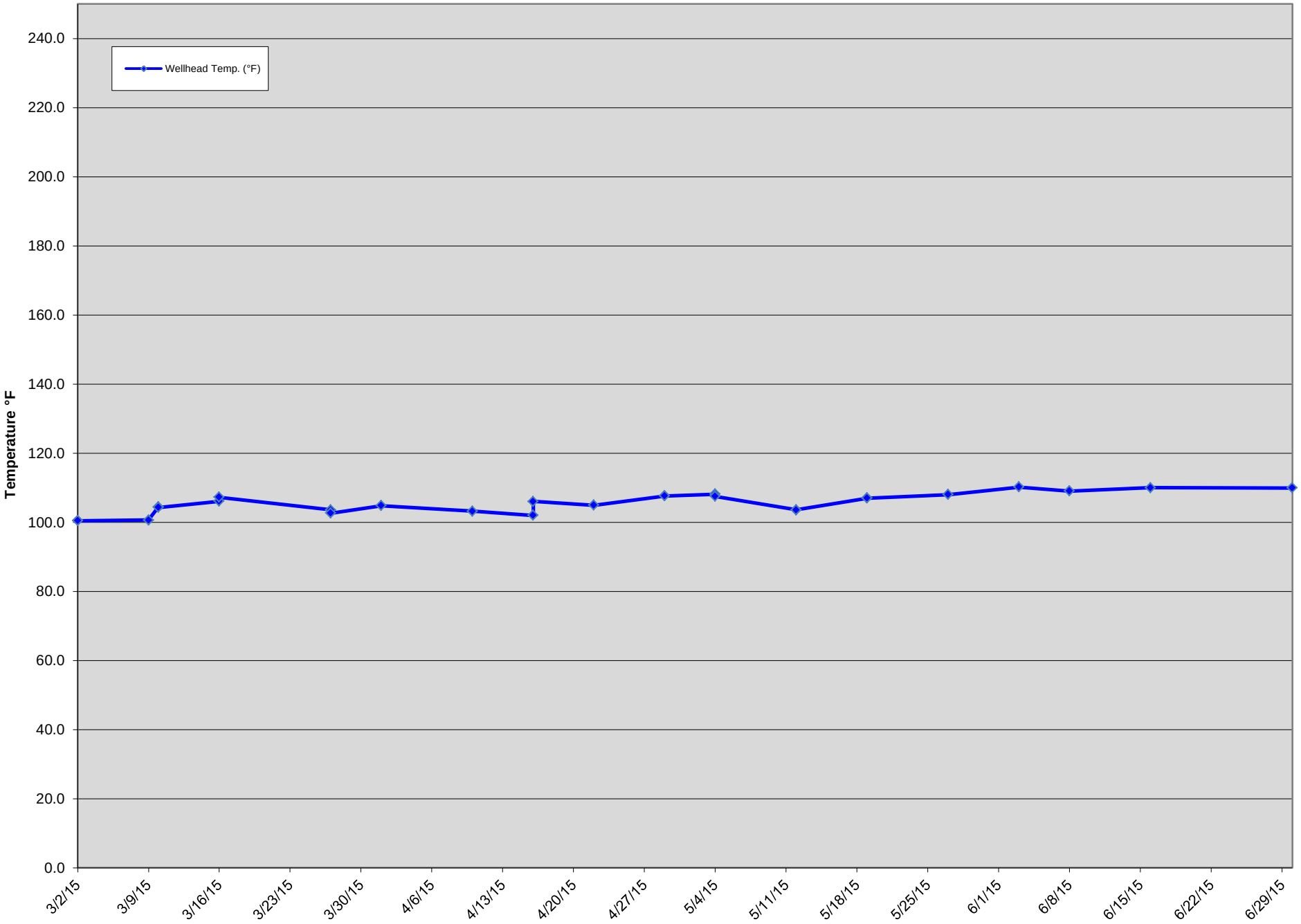
# GEW-039 Wellhead Temperatures



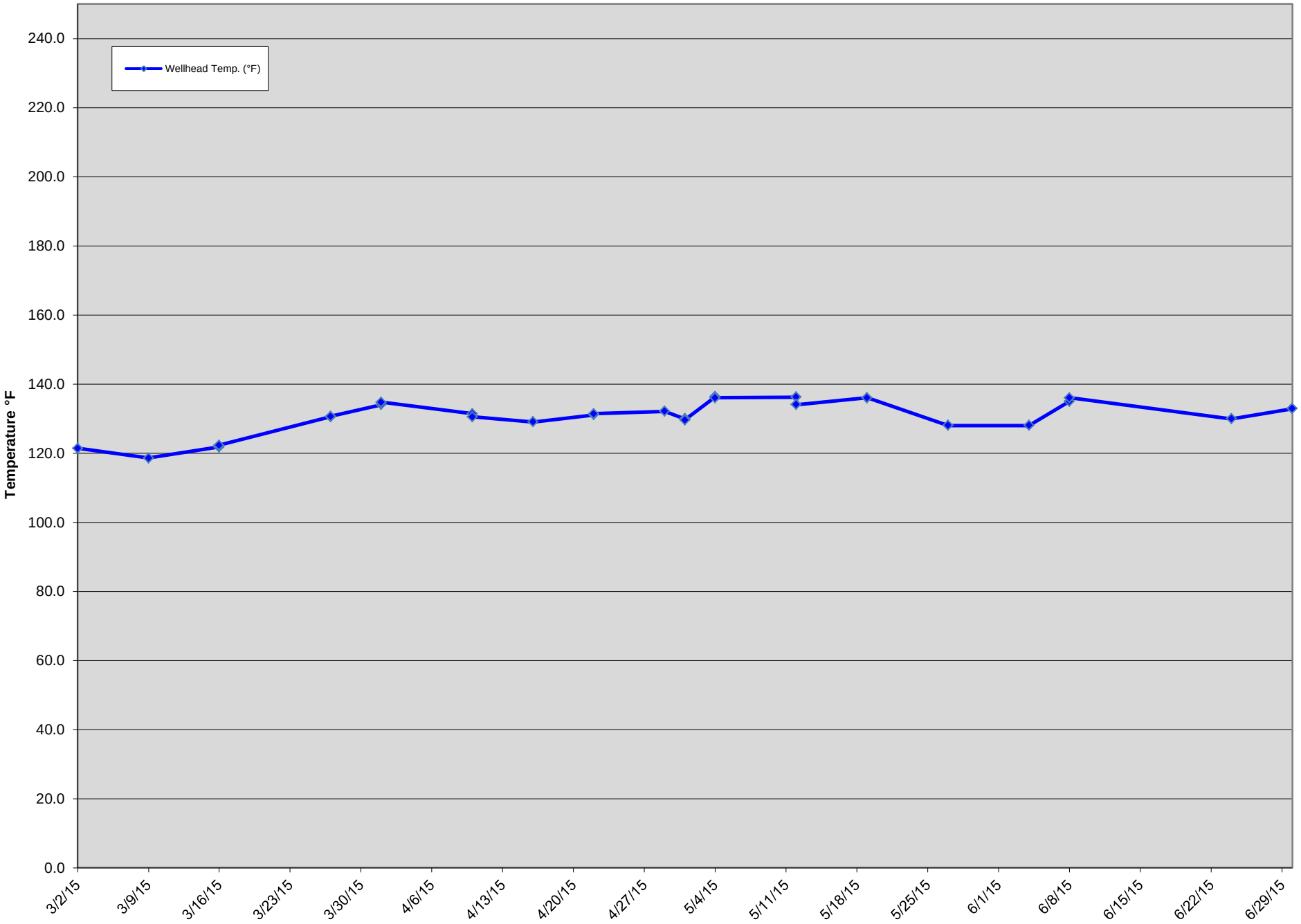
# GEW-040 Wellhead Temperatures



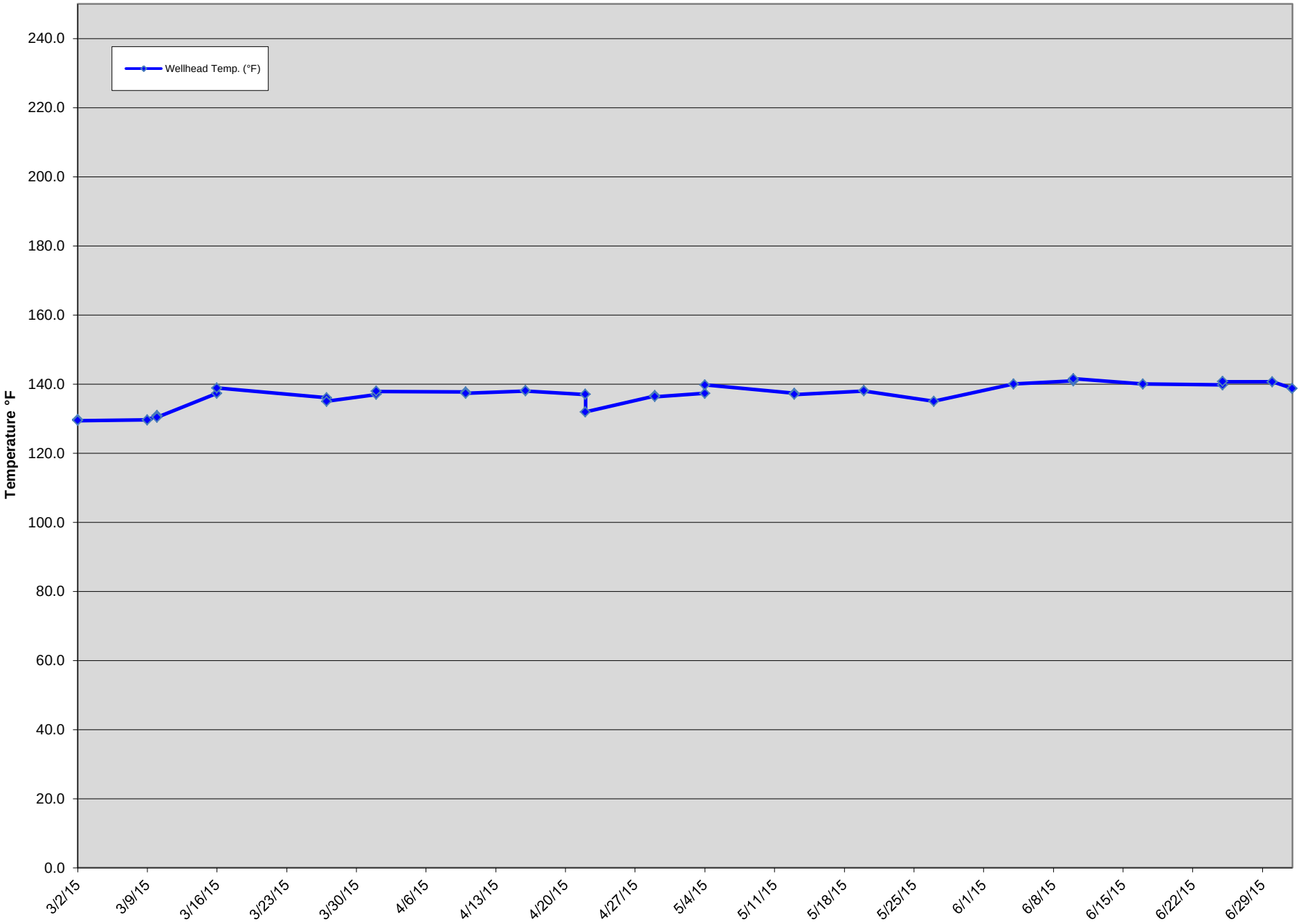
# GEW-041R Wellhead Temperatures



# GEW-043R Wellhead Temperatures



# GEW-053 Wellhead Temperatures



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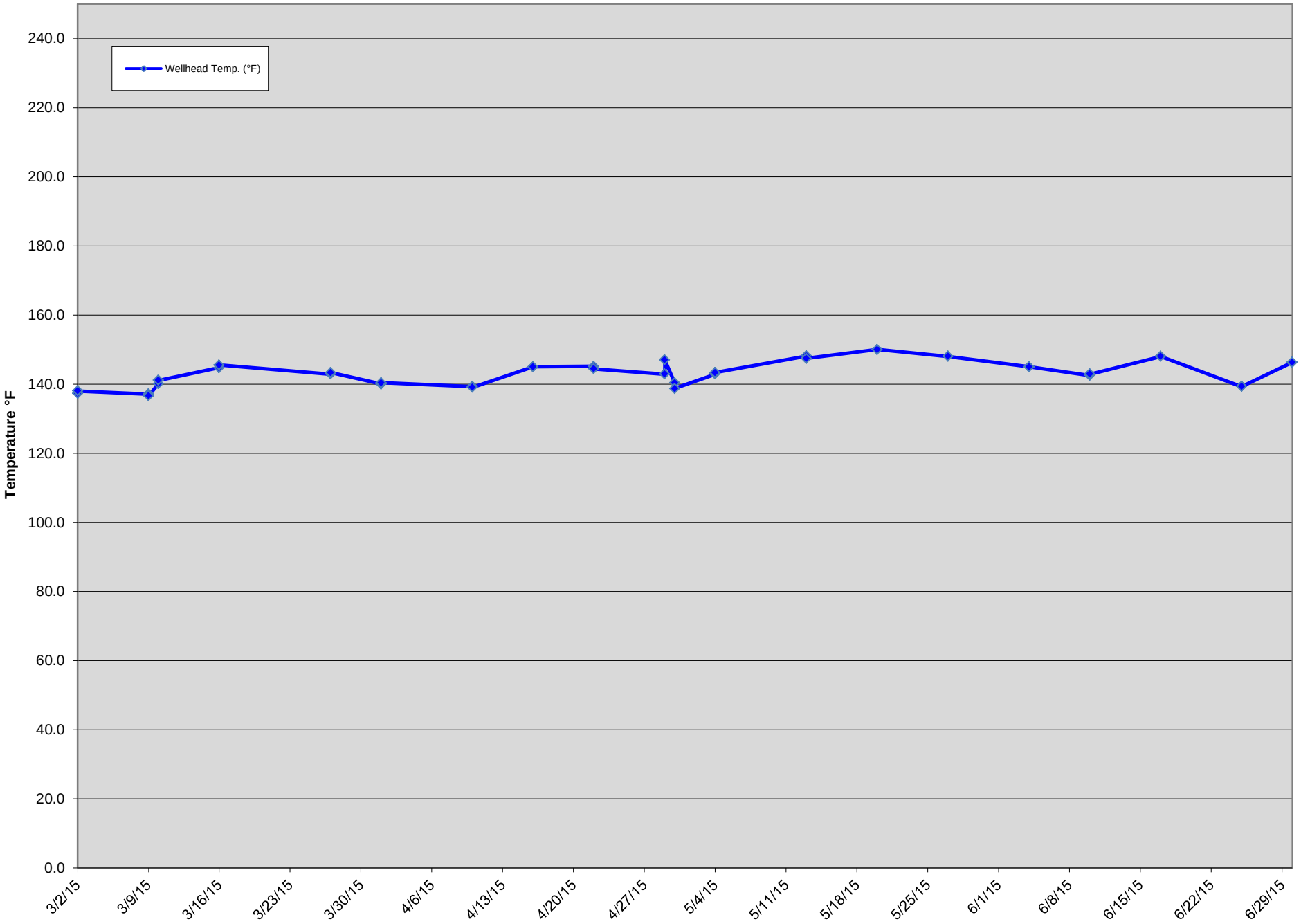

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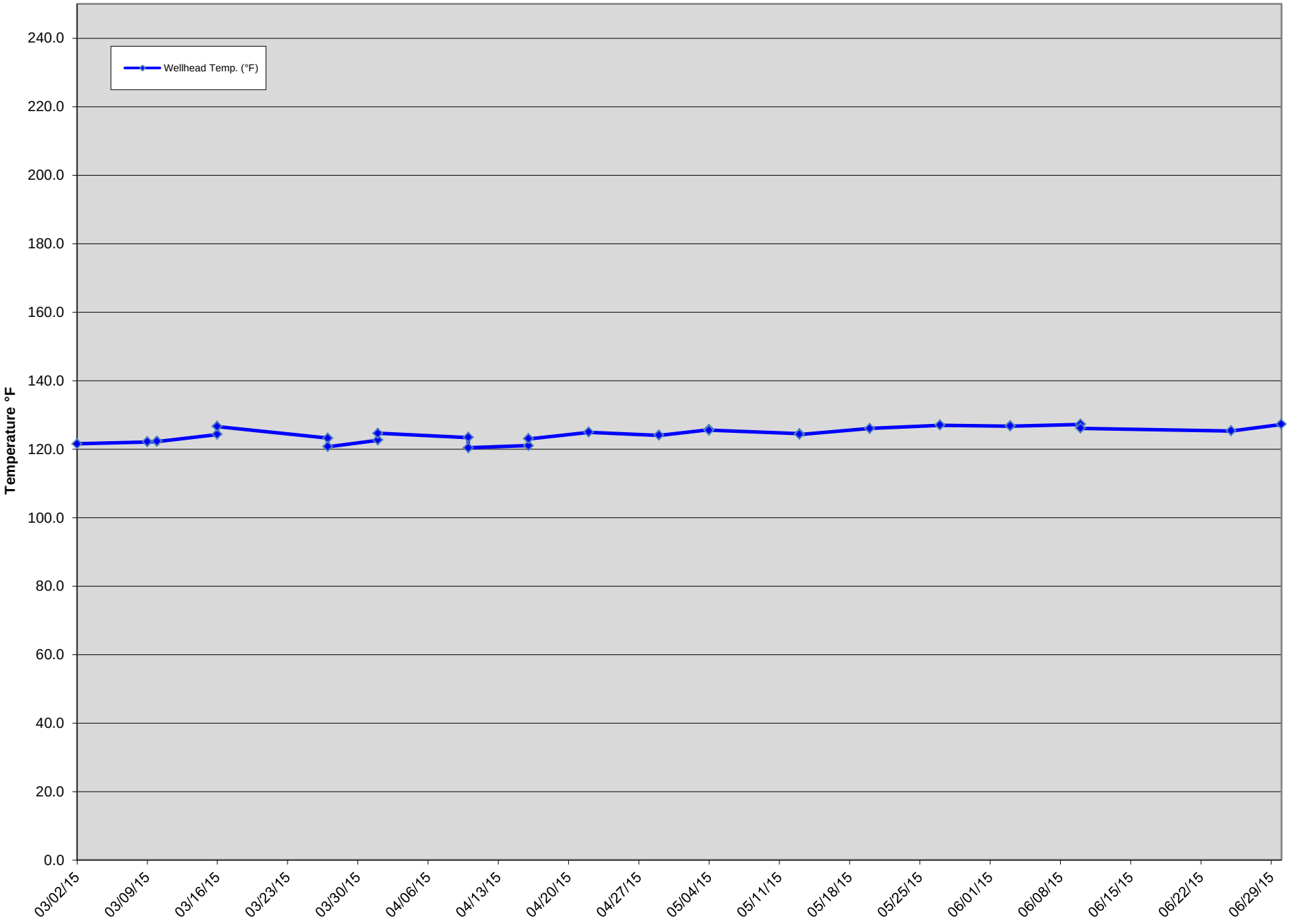
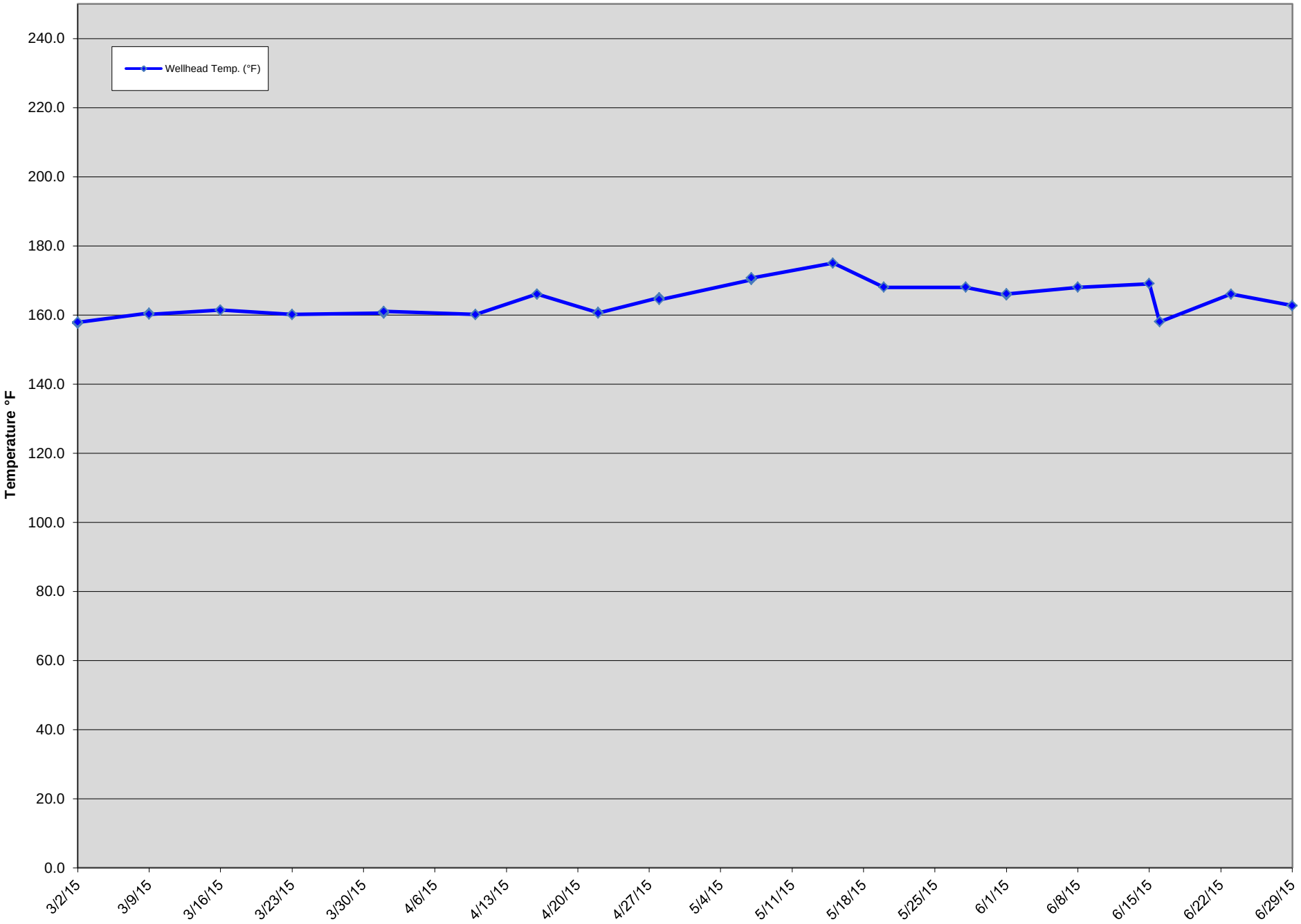
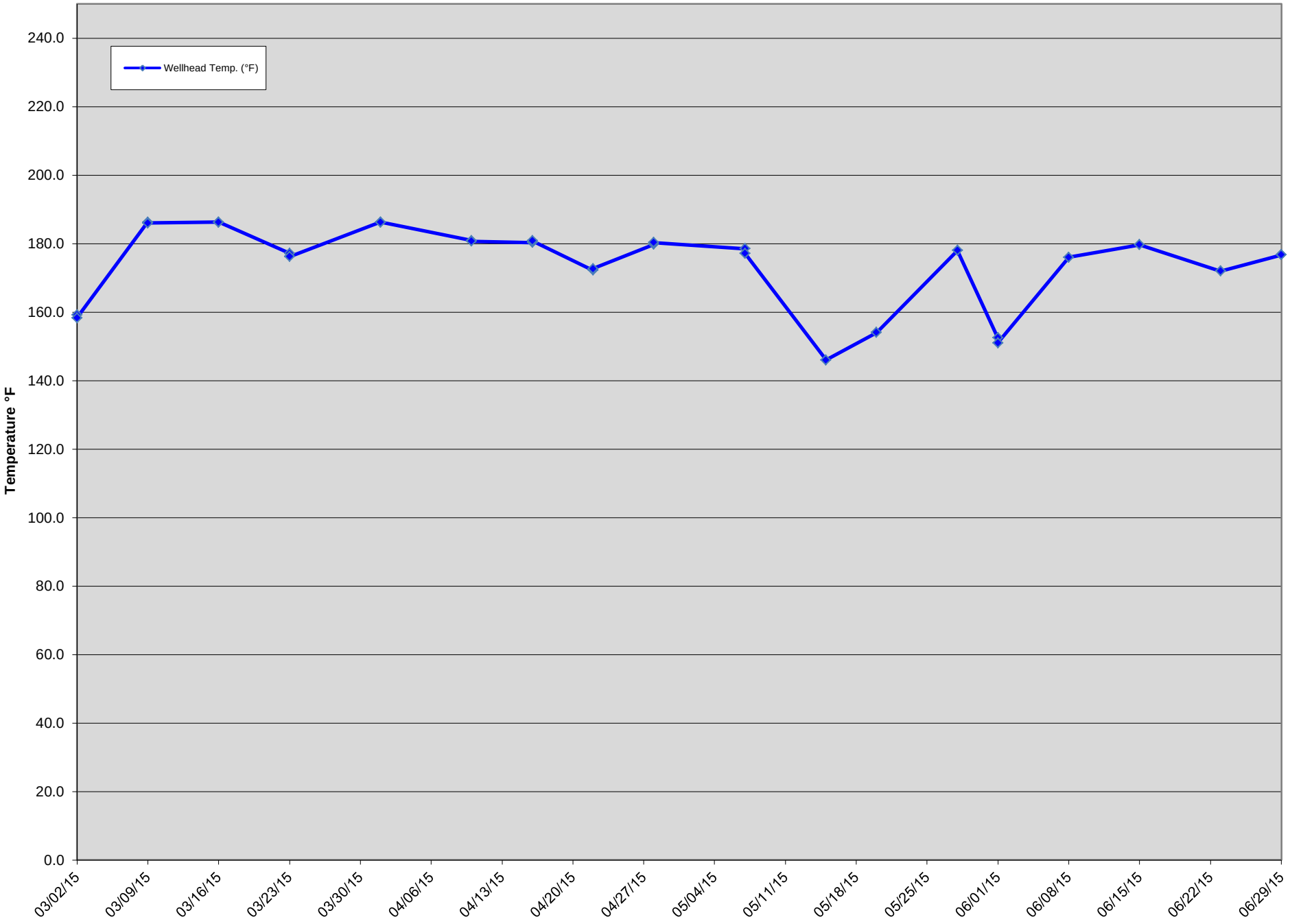
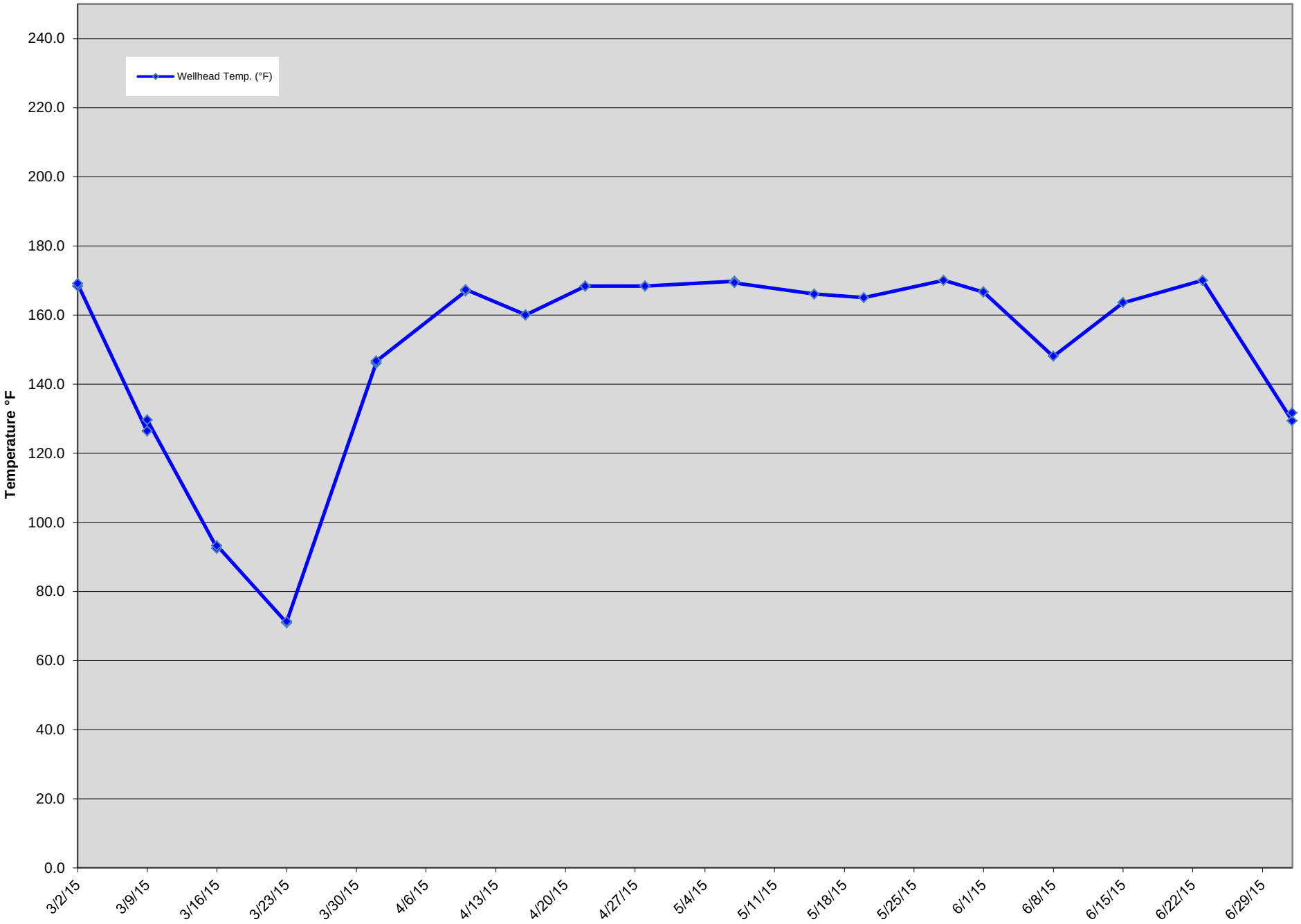


# GEW-056R Wellhead Temperatures



# GEW-109 Wellhead Temperatures



# GEW-110 Wellhead Temperatures