March 10, 2025
File No. 01204123.21-13

Mr. Baitong Chen
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: Monthly Reaction Committee Determination on Reaction Area Boundary
Chiquita Canyon Landfill – Castaic, California

Dear Mr. Chen:

In accordance with Condition Nos. 9a and 9b of the Modified Stipulated Order for Abatement (SOFA) pertaining to the Chiquita Canyon Landfill (Landfill or Facility) (Case No. 6177-4), the Reaction Committee has reviewed newly acquired applicable data recorded during the month of February 2025, considered revisions of the estimated extent of elevated temperature landfill (ETLF) conditions exhibited at the subject Facility (referred to as the "Reaction Area" limits), and has prepared this determination on potentially revising the Reaction Area map.

Attachment A presents the Drawing, titled "Reaction Area Map", prepared by SCS Engineers (SCS) and dated 3/6/25. The Drawing depicts the Reaction Area boundary as prescribed in Condition No. 9a, which corresponds to the limits of Cells 1/2A, 2B/3, 4, and Module 2B/3/4 P2, as a solid black line. The Drawing also depicts the estimated extent of ETLF conditions being experienced at the site based on the Reaction Committee's review of scientific data as a dashed magenta line.

The rationale that serves as the basis for considering adjustments and modifications to the Reaction Area boundary (or the determination to maintain the decreed boundary), include the following:

- LFG wellhead temperatures in excess of approximately 160 degrees Fahrenheit.
- Poor gas quality (defined as methane levels of less than 30 percent) in conjunction with methane-to-carbon dioxide (CH_4:CO_2) ratios less than 1.0.
- The concentration of hydrogen (H_2) in the LFG measured greater than 2 percent by volume.
- The concentration of carbon monoxide (CO) in the LFG measured greater than 2,000 ppm.
- Accelerated settlement of the landfill surface, defined as approximately 18 inches or greater within a 60-day period, and cracks in landfill cover. This corresponds to a strain value (i.e., settlement rate) rate of 3 percent per year for areas with a 300-foot waste column depth, which we believe is a reasonable average depth in the subject area of interest.
- First-hand observations of Landfill and/or SCS engineering, construction, and operations and maintenance (O&M) field personnel who are on-site related to: 1) atypical excess leachate quantities (presence and quantity of liquids); 2) instances of pressurized liquids emitting from the landfill surface, from boreholes during drilling, and from LFG wells; and, 3) the characteristics of the odors originating from the select areas of the waste footprint (often

described as “chemical-like” and distinctly different from typical LFG or landfill working face odors).

- Observations of subsurface waste conditions and characteristics as noted on borehole drilling logs for recently installed new wells and/or probes.

- Subsurface temperatures recorded at the in-situ waste temperature probes during February 2025.

- Temperature of gas or liquids measured at depth within the LFG well riser pipe (using an automated transmitter or manual field instrumentation).

- Since there were no drilling activities for new waste temperature probes during February 2025, there was no new data related to subsurface temperature and pressures associated with drilling.

CONSIDERATIONS FOR POTENTIAL ADJUSTMENTS TO THE ESTIMATED EXTENT OF ETLF CONDITIONS (DASHED MAGENTA LINE)

Near CV-24079 & TP-8

Recall that well CV-24079 and temperature monitoring probe no. 8 (“TP-8”) were temporarily decommissioned in October 2024 and, upon recommissioning in January 2025, the initial temperatures recorded at the deeper intervals within TP-8, as well as the LFG temperatures recorded at the wellhead in CV-24079, were significantly greater than previous data. However, during February, substantial temperature decreases were measured in the probe (the deepest interval exhibited a temperature reduction of approximately 50 degrees Fahrenheit). Similarly, the wellhead LFG temperature decreased significantly over six weeks, with a value of 151 degrees Fahrenheit on February 28th. Accordingly, at this time, the Reaction Committee believes that no adjustment to the estimated extent of ETLF conditions in this discrete location is warranted, since the data recorded in February does not appear to signal a potential expansion of the subsurface reaction.

Near CV-24062

Though the LFG temperature recorded at the wellhead in CV-24062 increased by 22 degrees Fahrenheit over a 2-day period, it then decreased by 10 degrees over a 7-day period. While the hydrogen content is greater than 2 percent, the methane concentration measured in late February was 34 percent, suggesting that methanogenesis is still prevalent within the surrounding waste mass. This well is equipped with a dewatering pump and the abrupt temperature fluctuations are likely associated with the ongoing liquid removal activities. Accordingly, the Reaction Committee does not believe that any adjustment to the estimated extent of ETLF conditions in this discrete location is warranted at this time, since the data recorded in February does not appear to consistently signal a potential expansion of the subsurface reaction.

TEMPERATURE MONITORING PROBE DATA

The Reaction Committee reviewed the temperature measurements recorded during February 2025 by the in-situ temperature monitoring probes. As of February 2025, four (4) of the twenty-eight (28) probes (TP-2, 3, 9, and 15) are located within the current estimated extent of ETLF conditions (dashed magenta line). Of the remaining twenty-four (24) probes positioned outside of the boundary, twelve (12) probes are positioned within relatively close proximity (within 200 feet) of this boundary. It is the Committee's opinion that the temperatures recorded by the 24 probes outside of the boundary during February 2025 are not indicative of a subsurface reaction and do not substantiate a decision to adjust the boundary of the reaction area at this time. We will continue to observe the measurements being recorded by TP-8 (and the corresponding co-located well CV-24079) to evaluate whether the decreasing trend in temperature is maintained over the next several weeks.

HYDROGEN CONCENTRATIONS

The Reaction Committee also evaluated the concentration of hydrogen in landfill gas (LFG) during February 2025. Recall that certain wells positioned to the south and east of the reaction area boundary (where dewatering pumping was reactivated) have periodically demonstrated some increased hydrogen content in the LFG during the Reaction Committee's review of the data in previous months, which similarly was the case for the February data. The Reaction Committee noted in its review of the data that these wells did not exhibit elevated temperatures, except for isolated instances at wells CV-24083 and CV-24084. The increased temperatures observed at these two wells were abrupt and either demonstrated corresponding decreases in temperature or were not yet confirmed beyond a single monitoring event. As such, sustained values have not been exhibited at this time. Other than these isolated values at these two wells, there was no evidence of the increased heat that is typical with ETLF conditions present at the wells exhibiting atypical hydrogen concentrations. As noted previously, the Committee suspects this increased hydrogen content may be attributable to substantial dewatering being accomplished throughout the Reaction Area and may be associated with gas movement from within the Reaction Area by existing horizontal collectors in close proximity. Thus, the presence of elevated hydrogen in these isolated locations does not suggest that ETLF conditions are expanding south and east of the delineated boundary. Accordingly, the Reaction Committee does not believe an adjustment to the boundary of the reaction area is merited at this time.

CONCLUSION

As presented on the Drawing included as **Attachment A**, the estimated extent of ETLF conditions (dashed magenta line) is fully contained within the Reaction Area boundary decreed in the SOFA (solid black line). Because the ETLF conditions are fully contained within the Reaction Area boundary and have not expanded into a new cell, the Reaction Committee finds no basis to modify the Reaction Area boundary as prescribed in Condition 9a at this time.

There was no dissenting opinion among the Reaction Committee members regarding this monthly determination. Supporting data is presented on the Drawing included as **Attachment A.** The maximum temperature measurements recorded at the 28 in-situ waste temperature monitoring probes during February are presented in **Attachment B** in graphical format. The landfill gas wellhead temperatures recorded at the extraction wells in the vicinity of the data-driven reaction area

boundary are reflected on the isothermal gradient range map presented as **Attachment C**. The carbon monoxide (CO) concentrations measured at the landfill gas wellheads are depicted on the range map presented as **Attachment D**. The electronic database and recordkeeping platform enables these measurements to be downloaded into a tabular spreadsheet format, which can be submitted to the South Coast Air Quality Management District under separate cover, if requested.

Please contact either of the undersigned if you have questions or require additional information.

Sincerely,

Robert E. Dick, PE, BCEE
Senior Vice President
SCS Engineers

Patrick S. Sullivan, BCES, CCP
Senior Vice President
SCS Engineers

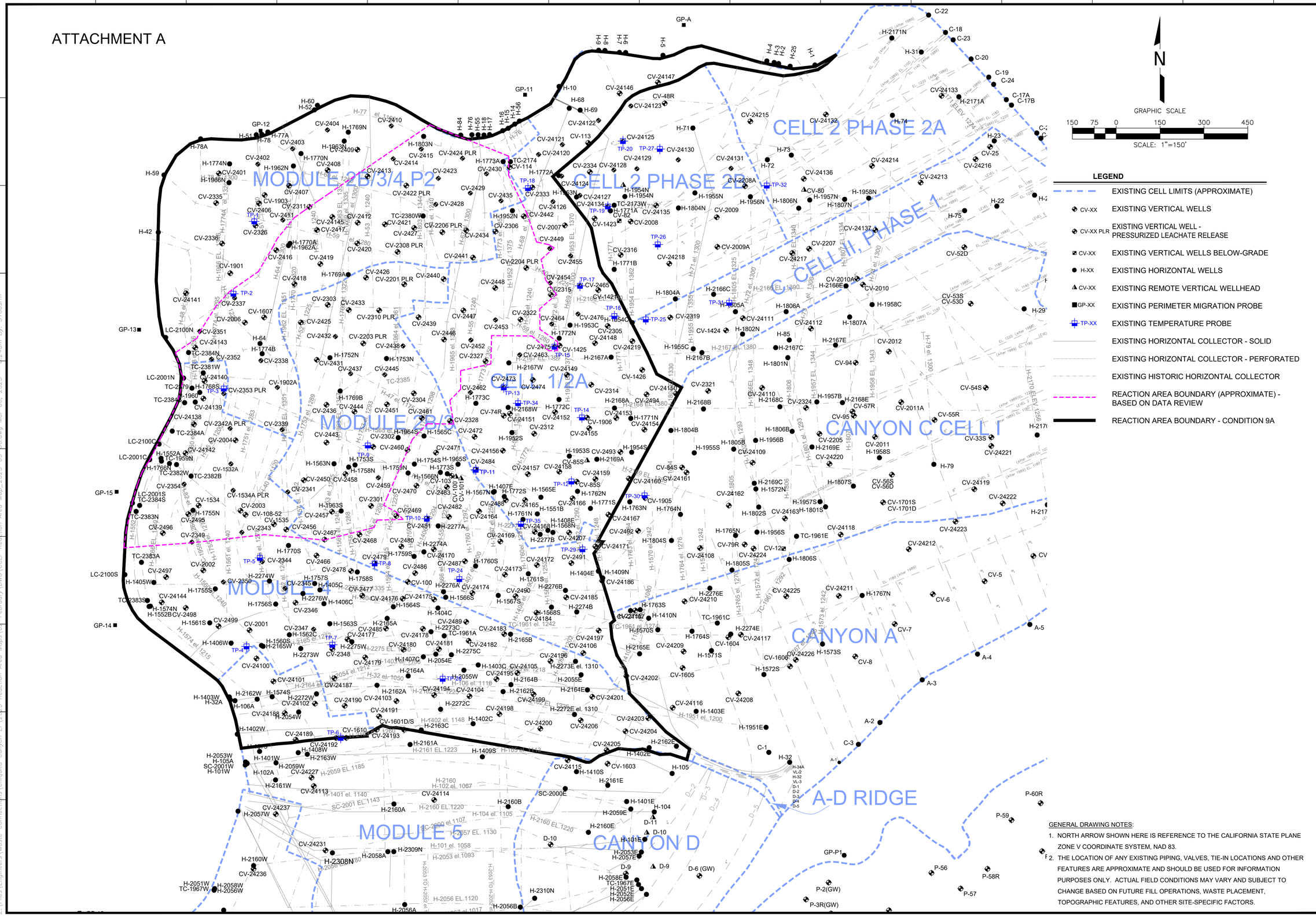
RED/PSS

cc: Nathaniel Dickel, SCAQMD
Christina Ojeda, SCAQMD
Pablo Sanchez Soria, PhD, CIH, CTEH
Neal Bolton, PE, Blue Ridge Services, Inc.
Richard Pleus, PhD, Intertox
Srividhya Viswanathan, PE, SCS Engineers

Enclosures:

Attachment A – Reaction Area Map
Attachment B – In-Situ Waste Temperature Monitoring Probe Data
Attachment C – Isothermal Gradient Range Map
Attachment D – Wellhead Carbon Monoxide Range Map

ATTACHMENT A



GENERAL DRAWING NOTES:

1. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
2. THE LOCATION OF ANY EXISTING PIPING, VALVES, TIE-IN LOCATIONS AND OTHER FEATURES ARE APPROXIMATE AND SHOULD BE USED FOR INFORMATION PURPOSES ONLY. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

NO.	REVISION	DATE

SHEET TITLE: REACTION AREA MAP FEBRUARY, 2025

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
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PROJ. NO. 01204123.41 | DSN. BY: - | DWN. BY: SRM | CHK. BY: WCH | ACAD. FILE ENGINEERS | APP. BY: WCH

DATE: 03/06/2025

SCALE: AS SHOWN

SHEET: 1

Z:\Files\Engineers\Waste Connections\Chiquita Canyon LF\2025 Reaction Area Maps\Q1_February\DWG\CCLF Reaction Area Map_2025-03_p6.dwg Mar 06, 2025 - 8:24am By: 5160srm

ATTACHMENT B

Solid Waste Borehole Maximum Temperature Profiles Over 6 Weeks

for 1/23/2025 to 3/5/2025

From February 27, 2025, through March 5, 2025, there were no recorded temperature increases and one recorded temperature decrease that triggered the notification limits set forth in the LEA's October 4, 2024 letter. Additionally, as noted previously and discussed further below, TP-08 was brought back online in January and initially registered elevated temperatures that have since decreased significantly. The temperature decreases associated with TMP-08 are due to the heat extraction by re-connecting the vacuum and pump to the nearby wells after the area was filled in.

Additionally, as of February 7, 2025, eight new TMPs (TMP-25, TMP-26, TMP-27, TMP-29, TMP-30, TMP-31, TMP-32, and TMP-34) have been installed and are online. None of these eight new TMPs indicate reaction temperatures occurring outside of the currently delineated data-driven reaction area boundary, and the three TMPs that were able to be drilled to within 20 feet of the liner (TMP-27, TMP-31, and TMP-32) show significantly cooler temperatures at the deepest thermocouple, as expected due to the cooling from the underlying earth. This data further supports the previous conclusions of cooler temperatures near the liner and the liner's integrity being uncompromised by elevated temperatures.

Chiquita provides the following updates:

- TP-08
  - TP-08 was taken offline on October 3rd for filling operations related to the west toe excavation.
  - TP-08 was brought back online on January 10th. The gas and liquid collection infrastructure was also offline in the same area, and the nearby gas wells and pumps were also brought back online on January 10th. Initial temperature readings of TP-08 were higher than the historical average before TP-08 was taken offline.
  - As noted in previous updates, filling operations occurred over the prior several months, in which time Chiquita noticed other areas of the reaction area continuing to experience accelerated settlement. It is likely that the accelerated settlement pushed leachate into the TP-08/CV-2479 borehole, which because it was offline, did not allow for the removal of this leachate and landfill gas. With the TMP and well back online, gas and liquids extraction has resumed.
  - As also noted in previous updates, drilling activities for TP-24, geographically nearby, achieved a depth of 297 feet without encountering significantly elevated temperatures, further supporting that the increased temperature readings are due to the presence of localized leachate accumulation limited to the TP-08 borehole.
  - A continued reduction in temperatures has been recorded in the 15-foot, 30-foot, 45-foot, 100-foot, 125-foot, and 150-foot thermocouples since the previous week:
    - 15-foot thermocouple showed a decrease of 30°F degrees from 177°F to 147°F from January 16th to March 5th.
    - 30-foot thermocouple showed a decrease of 36°F degrees from 190°F to 154°F from January 10th to March 5th.
    - 5-foot thermocouple showed a decrease of 37°F degrees from 192°F to 155°F from January 10th to March 5th.
    - 100-foot thermocouple showed a decrease of 60°F degrees from 215°F to 155°F from January 10th to March 5th.
    - 125-foot thermocouple showed a decrease of 82°F degrees from 232°F to 150°F from January 10th to March 5th.
    - 150-foot thermocouple showed a decrease of 69°F degrees from 230°F to 161°F from January 10th to March 5th.
- TP-15
  - 30-foot thermocouple showed a decrease in maximum temperature of 20°F from 182°F to 162°F from February 26th to March 5th.

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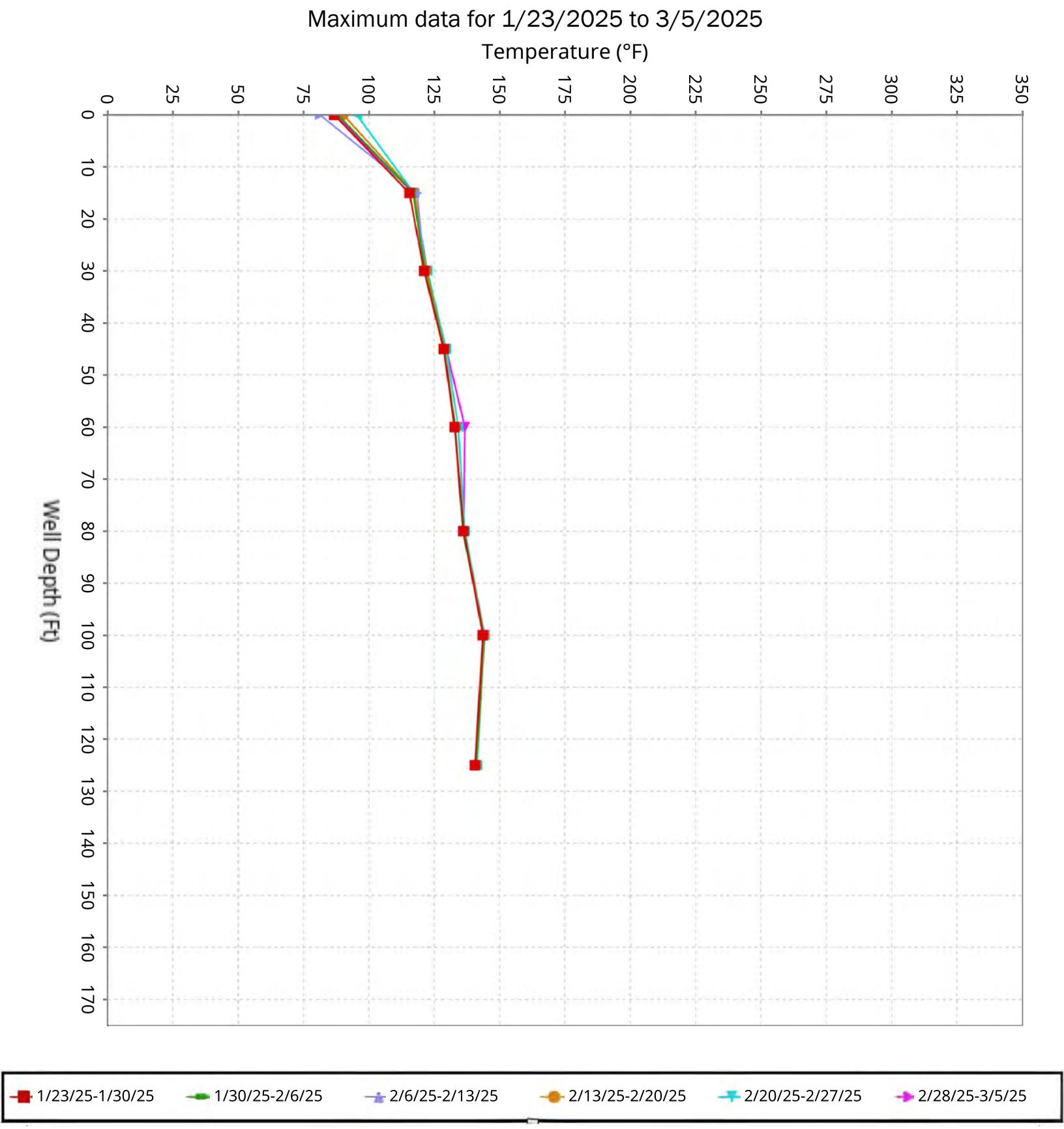
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-1



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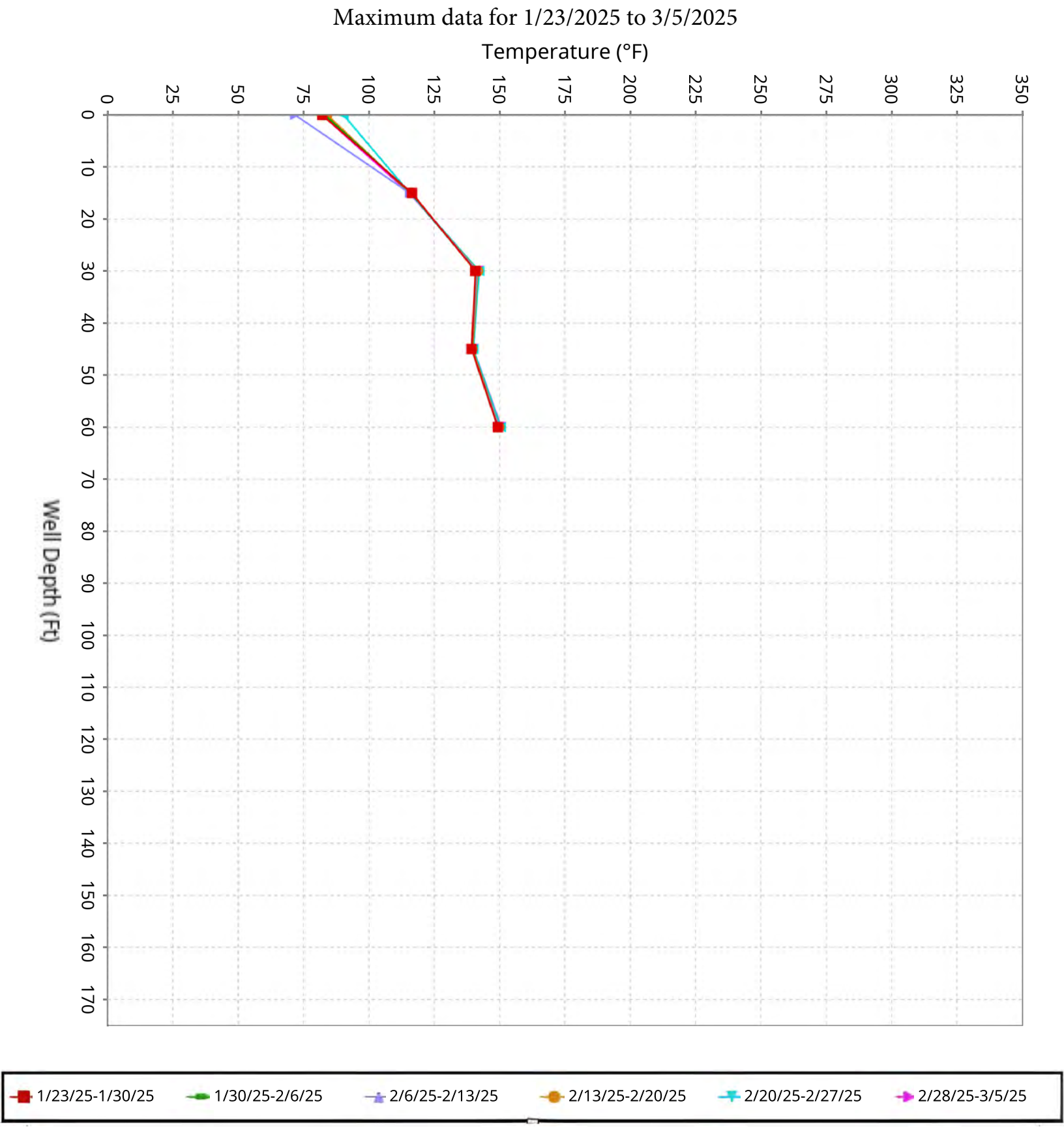
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-2



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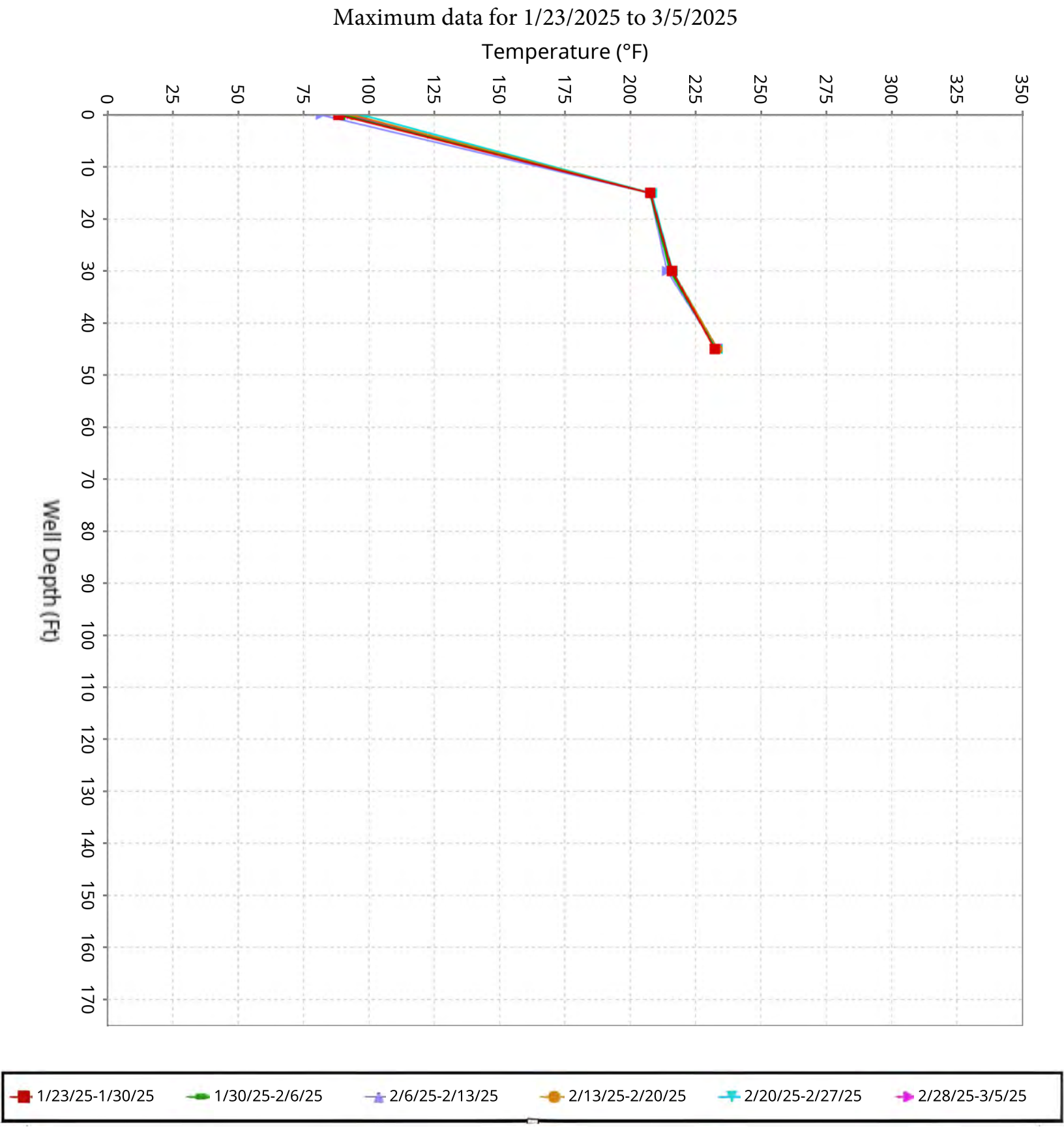
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-3



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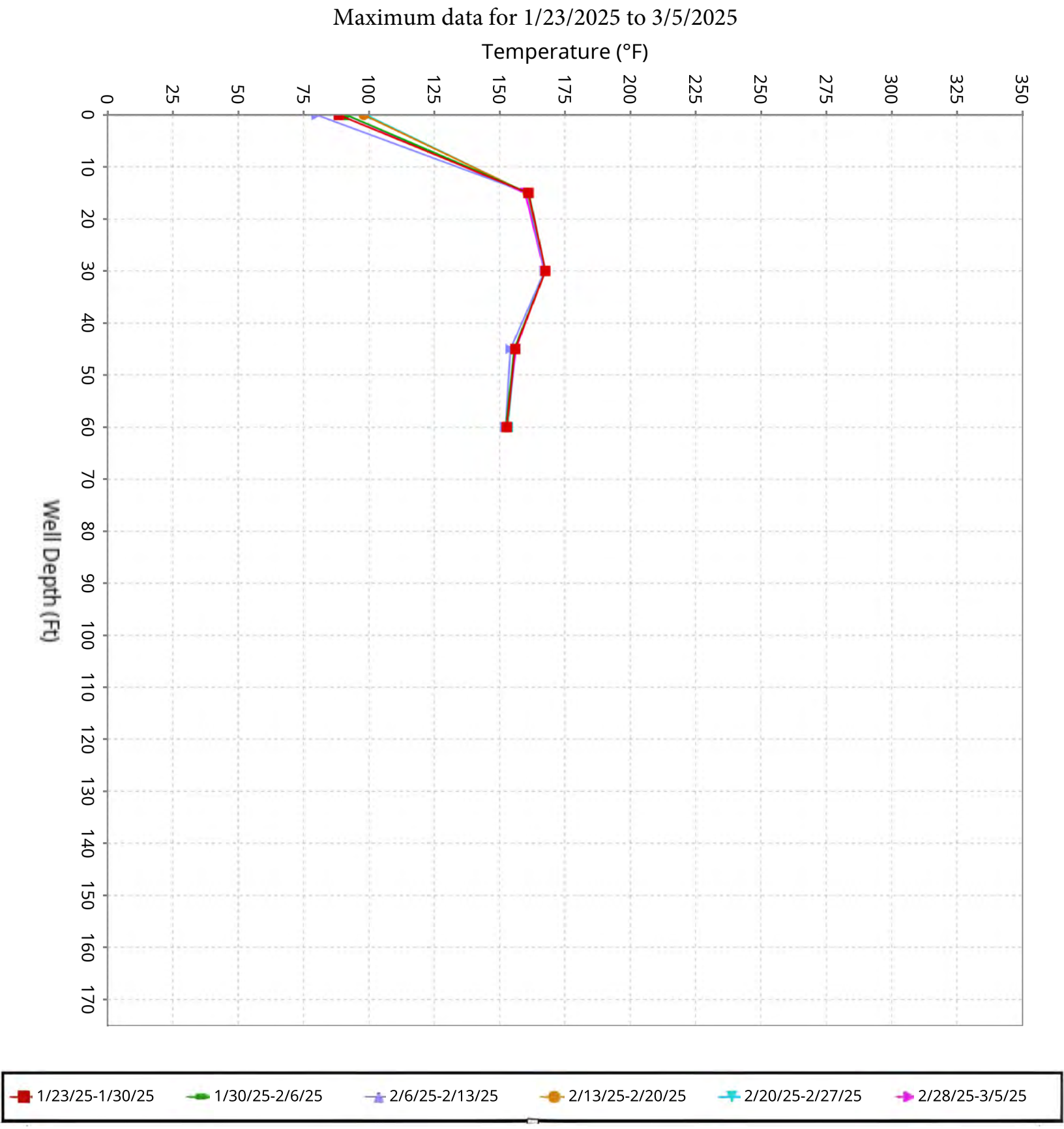
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-4



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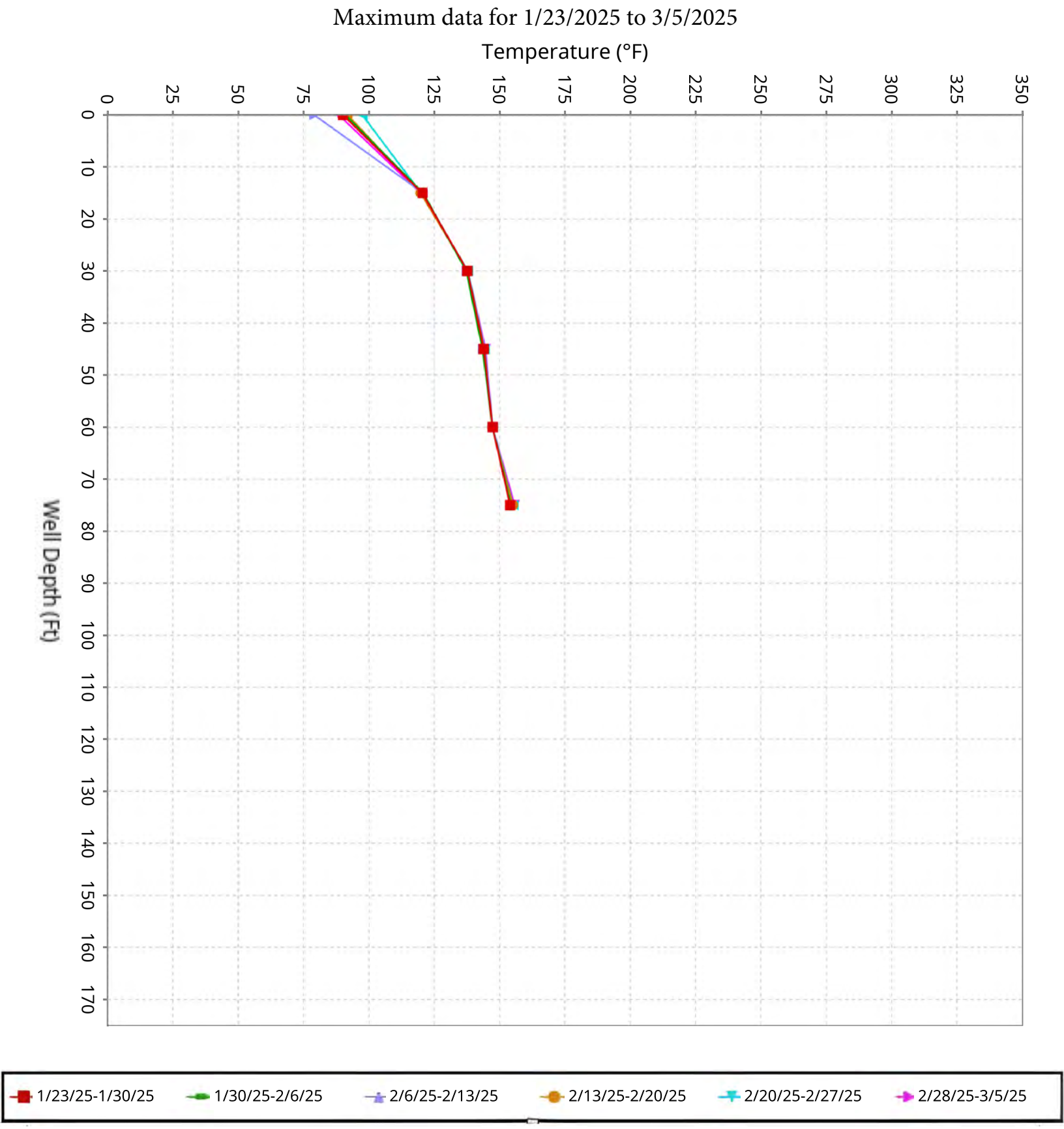
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-5



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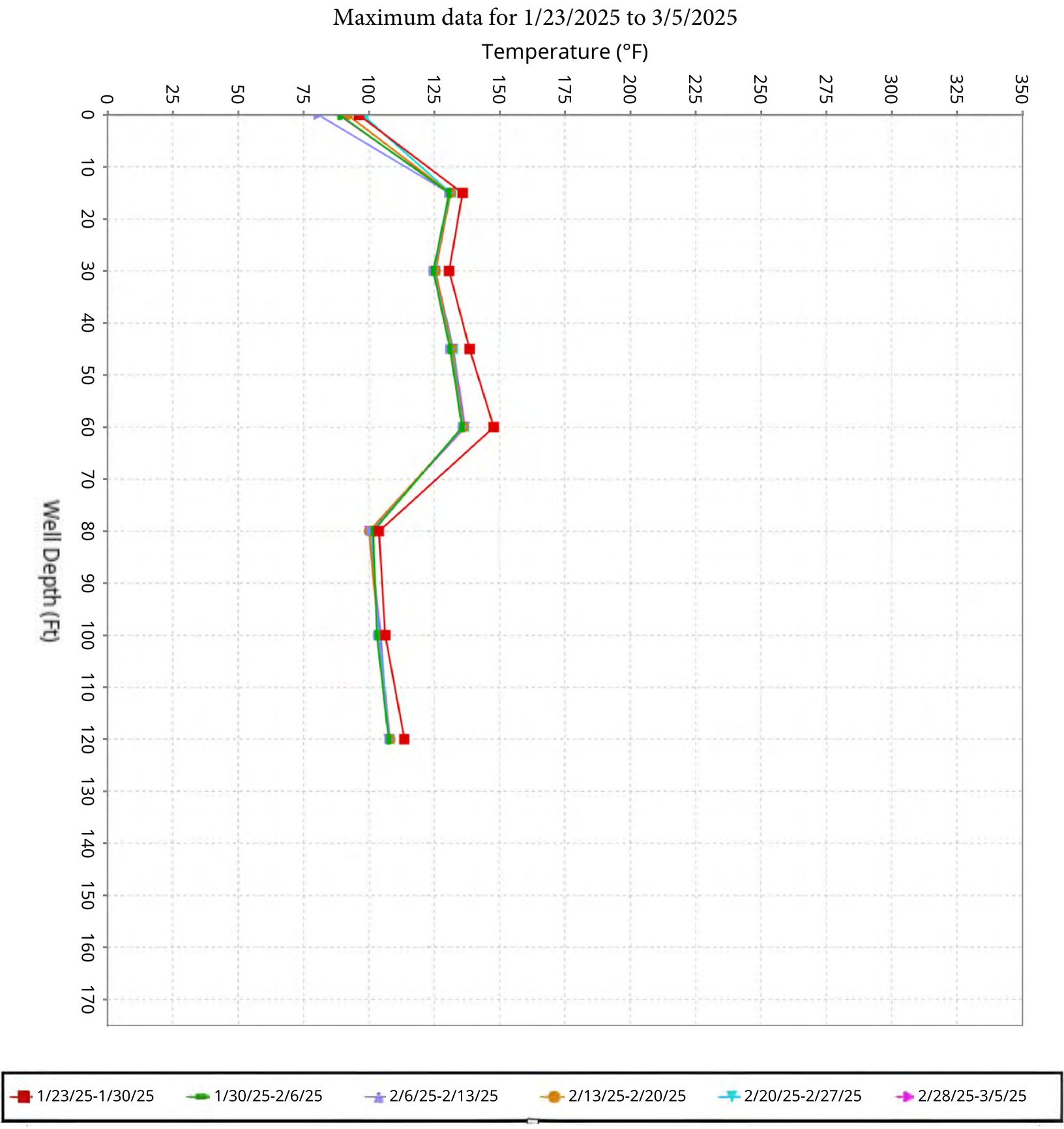
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-6



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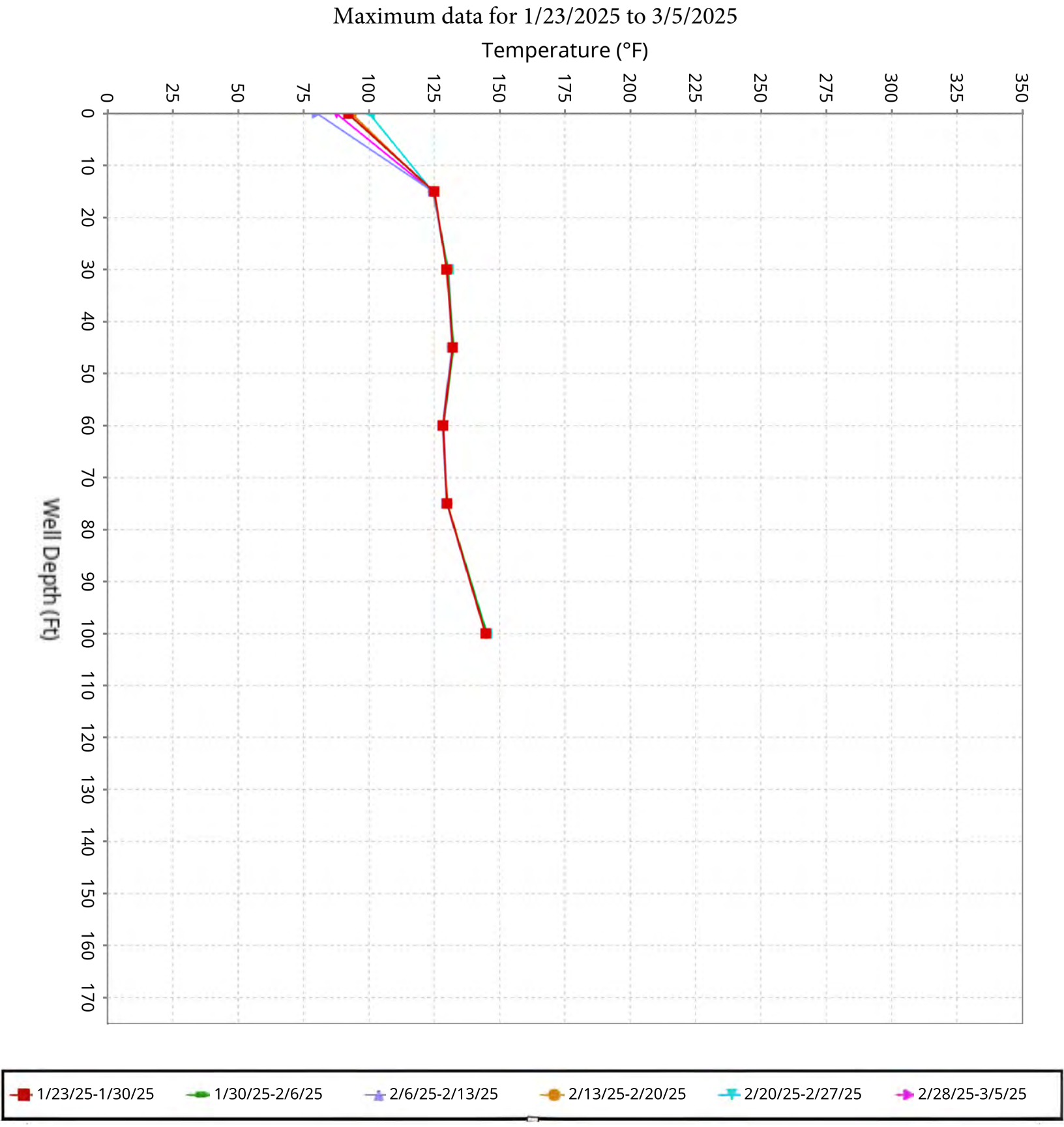
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-7



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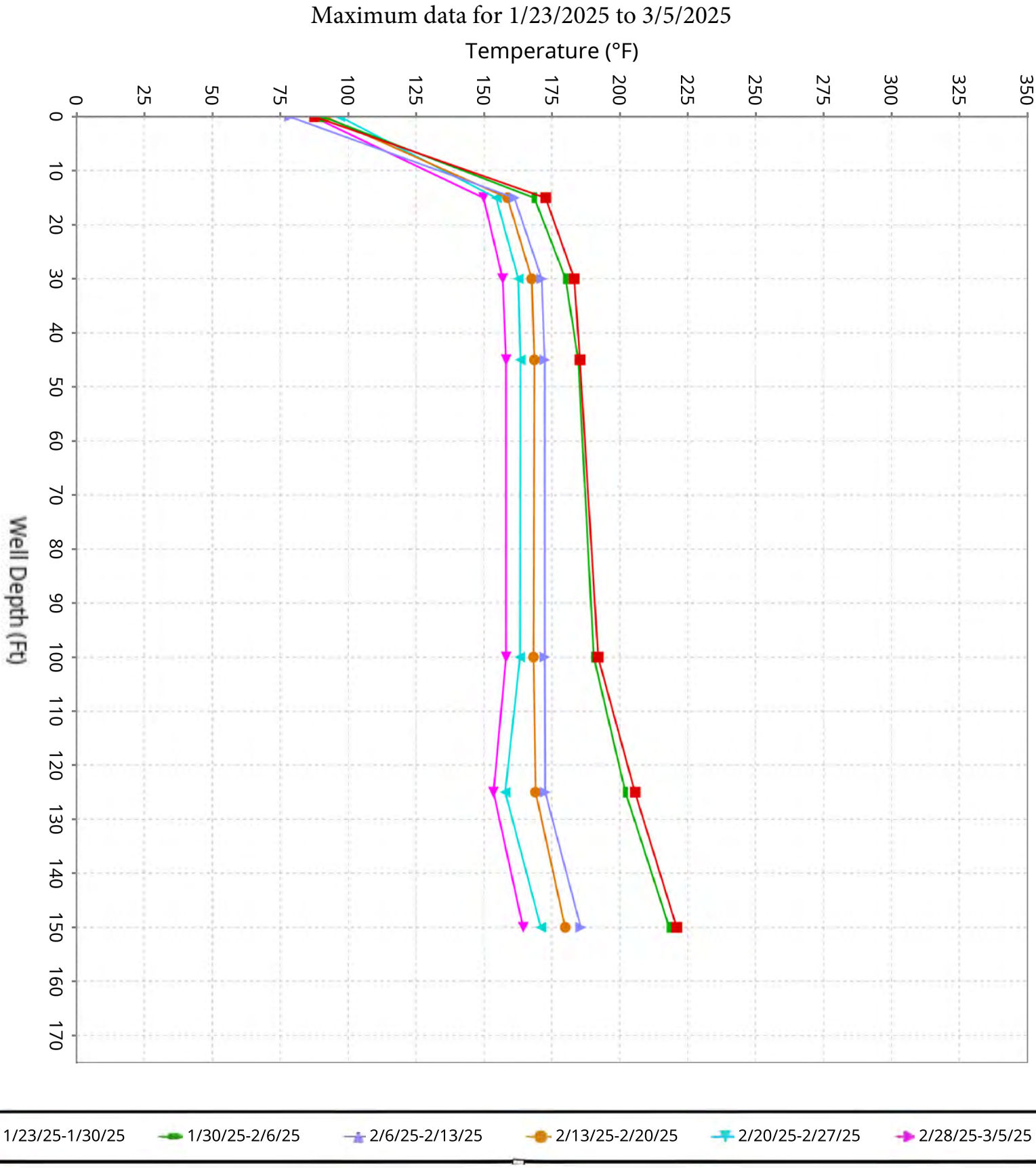
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-8



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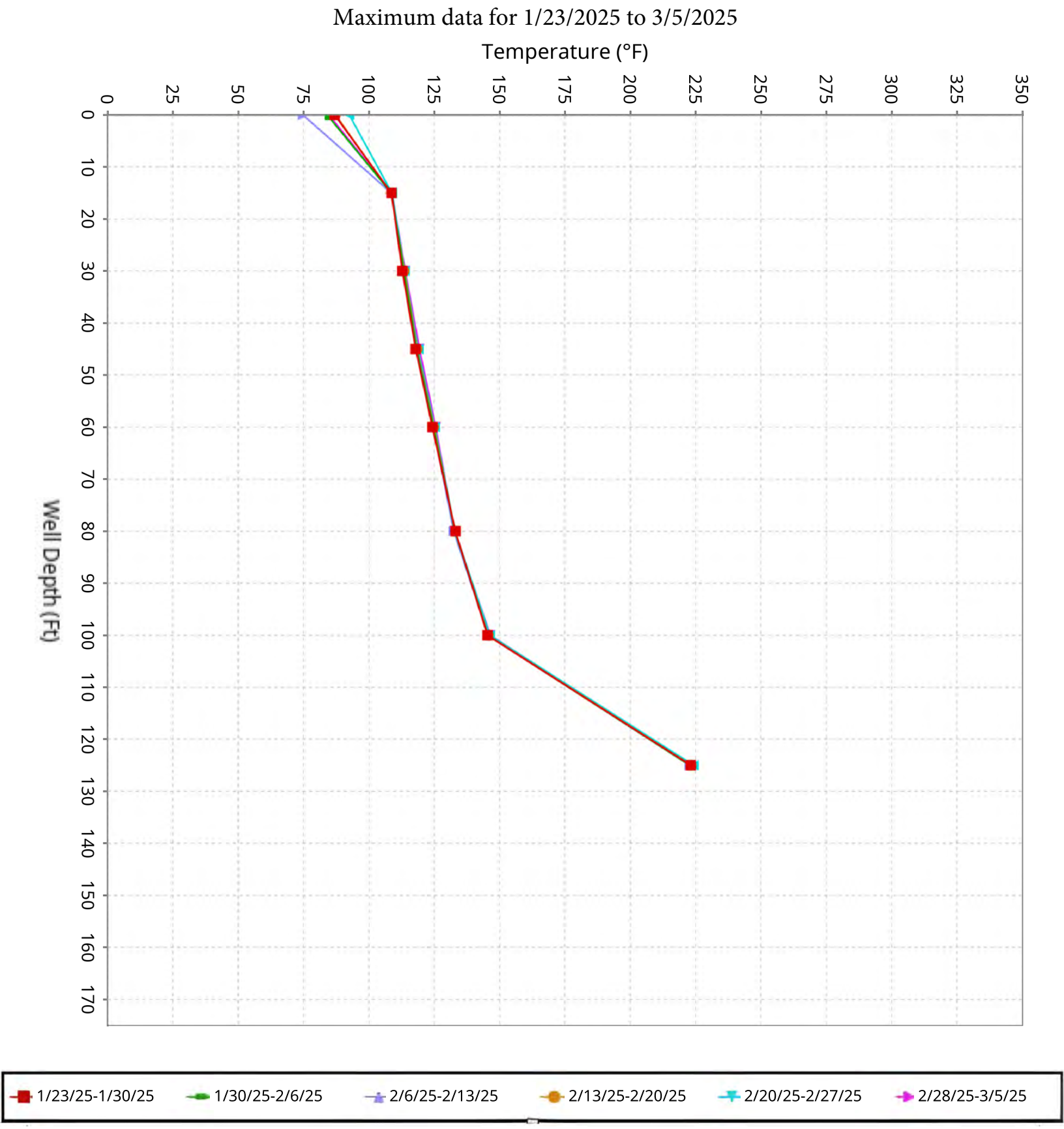

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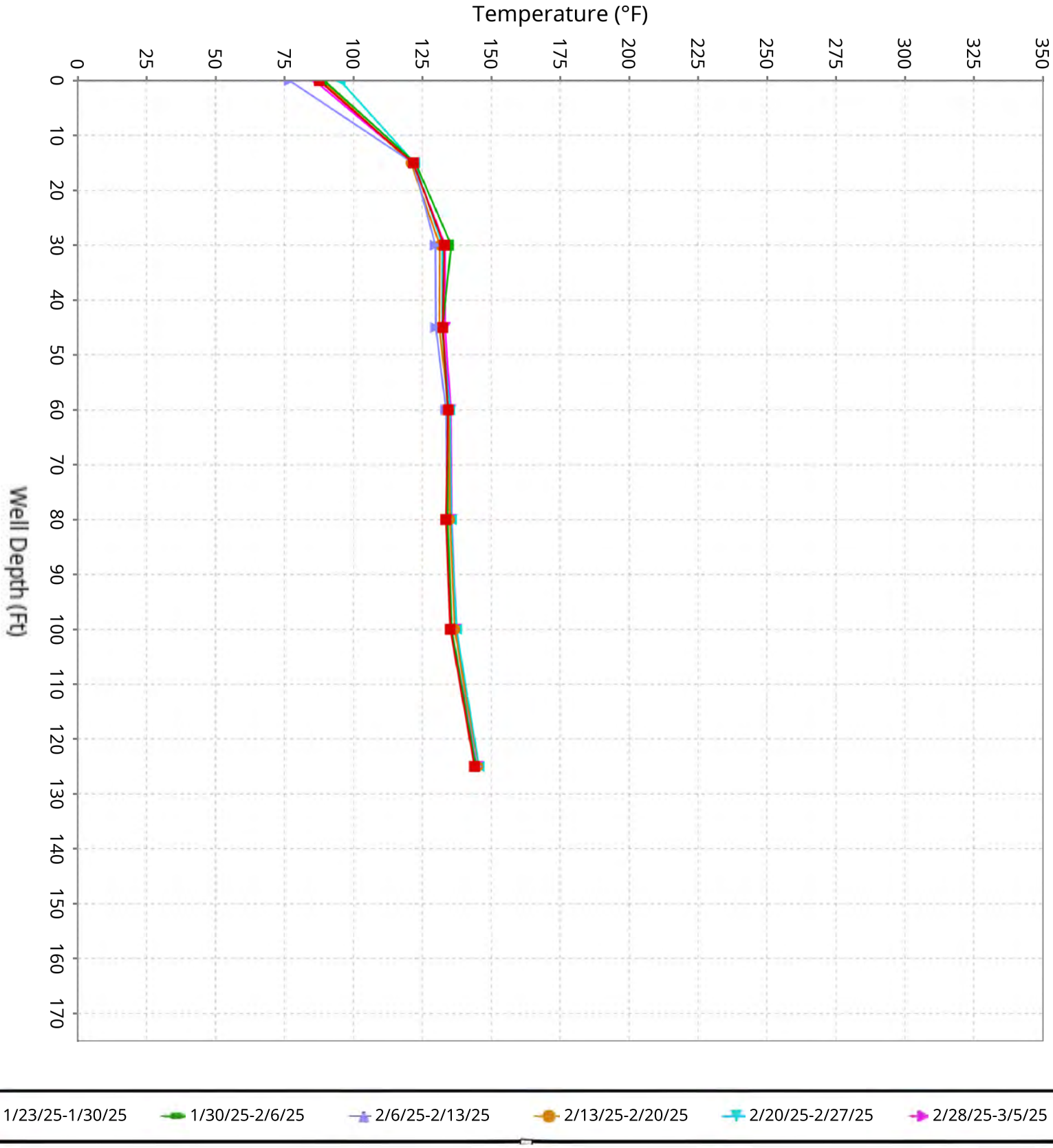
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-10

Maximum data for 1/23/2025 to 3/5/2025



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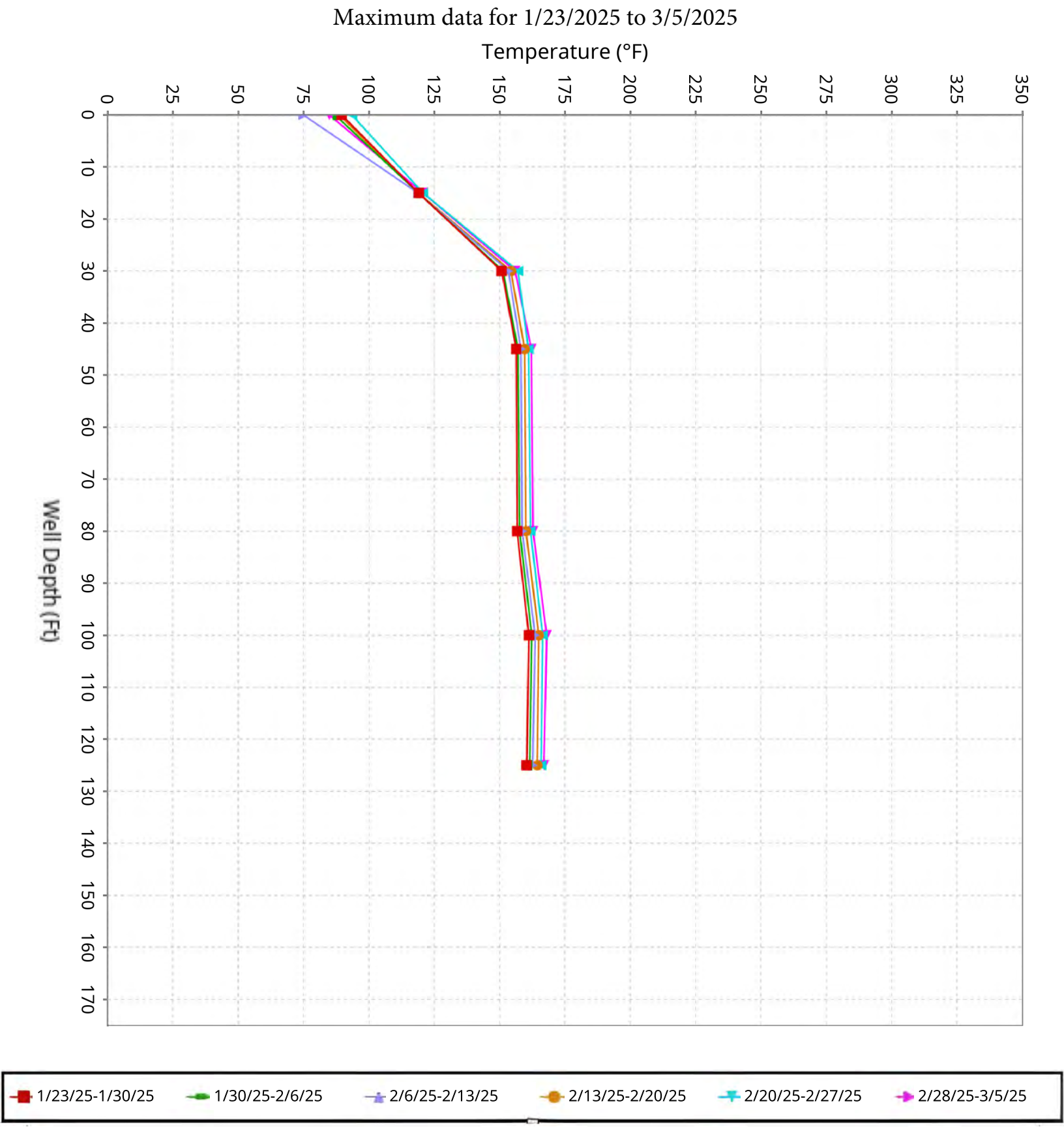
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-11



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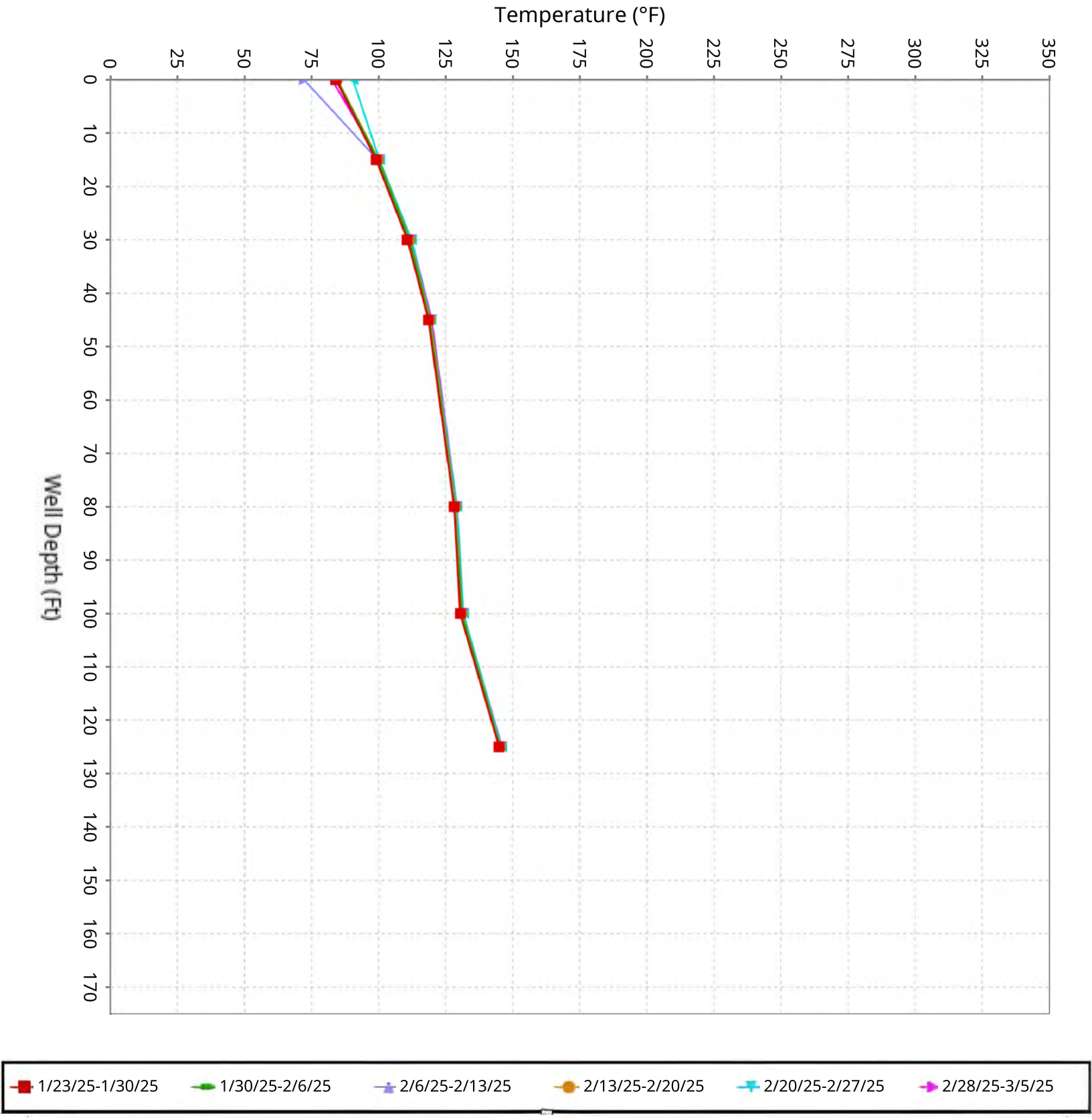
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-12

Maximum data for 1/23/2025 to 3/5/2025



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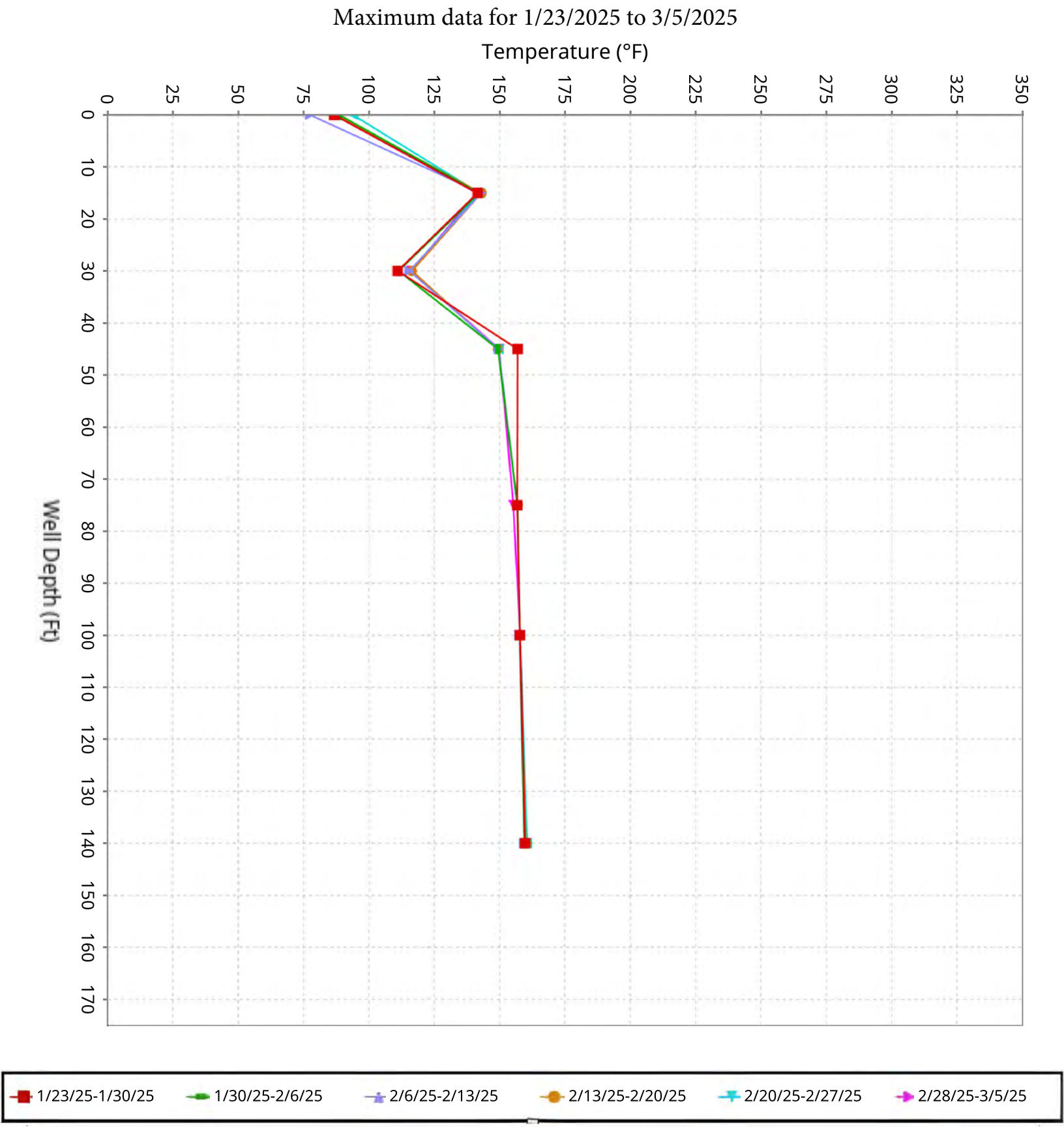
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-13



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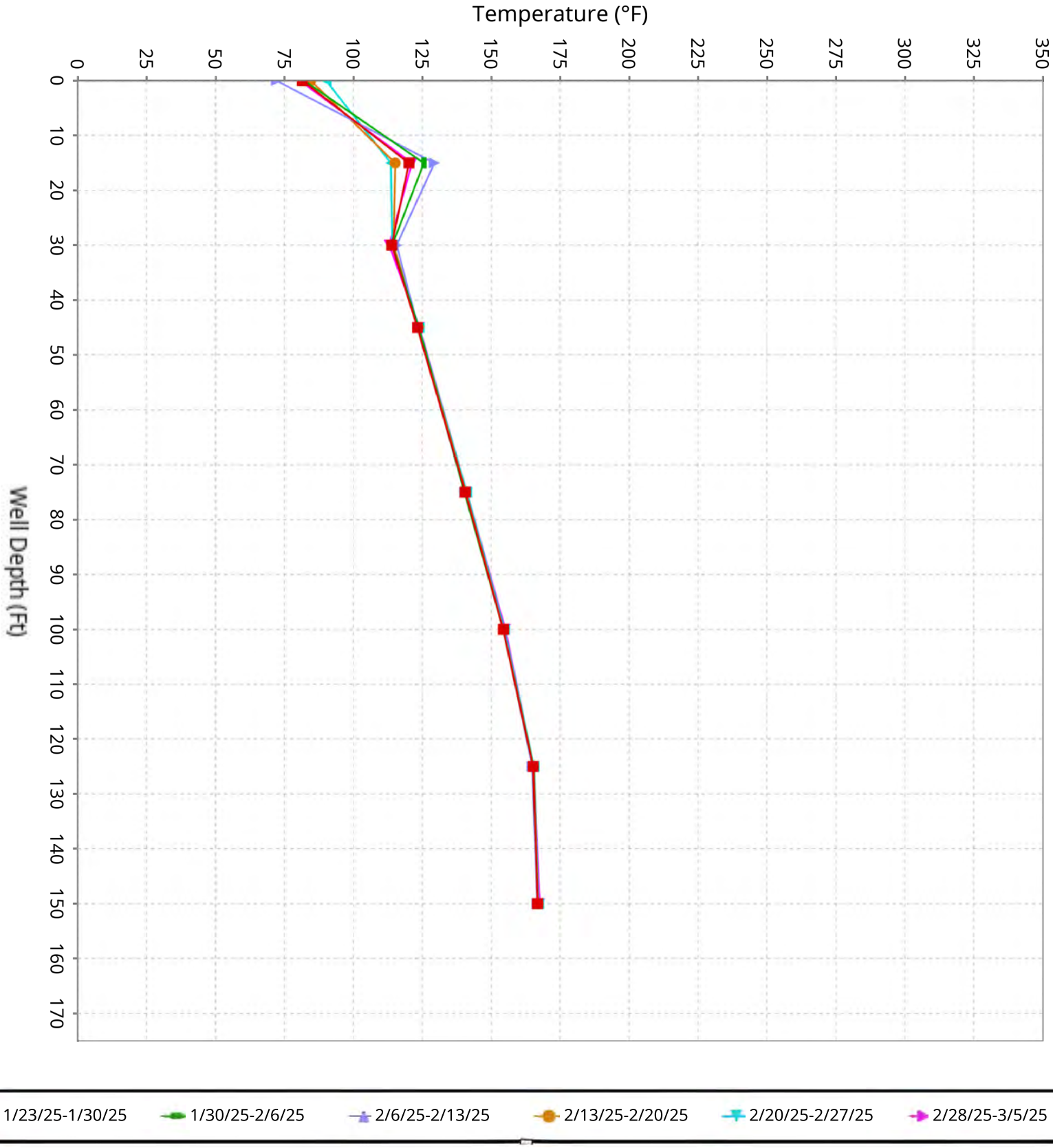
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-14

Maximum data for 1/23/2025 to 3/5/2025



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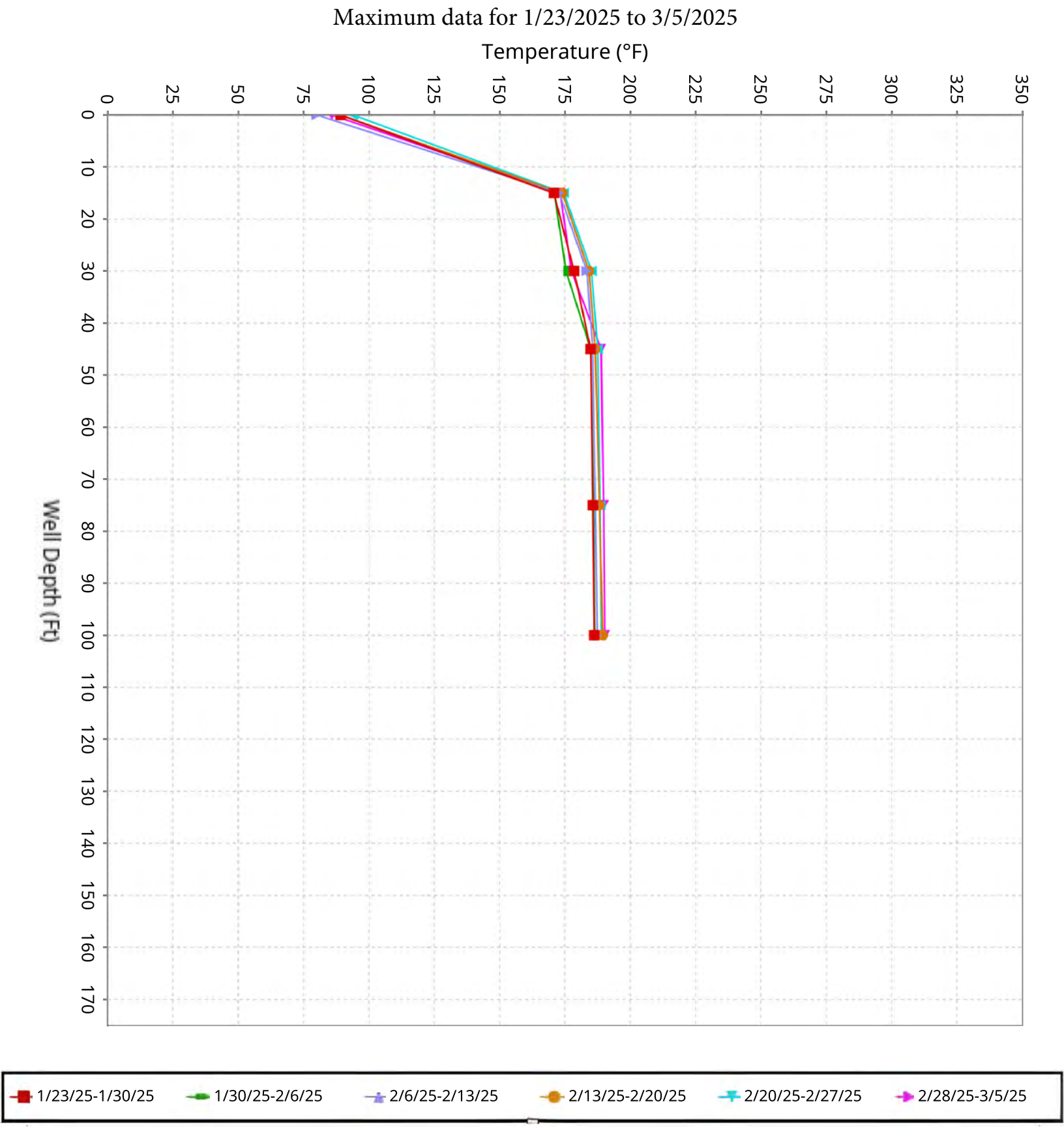
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-15



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Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-16

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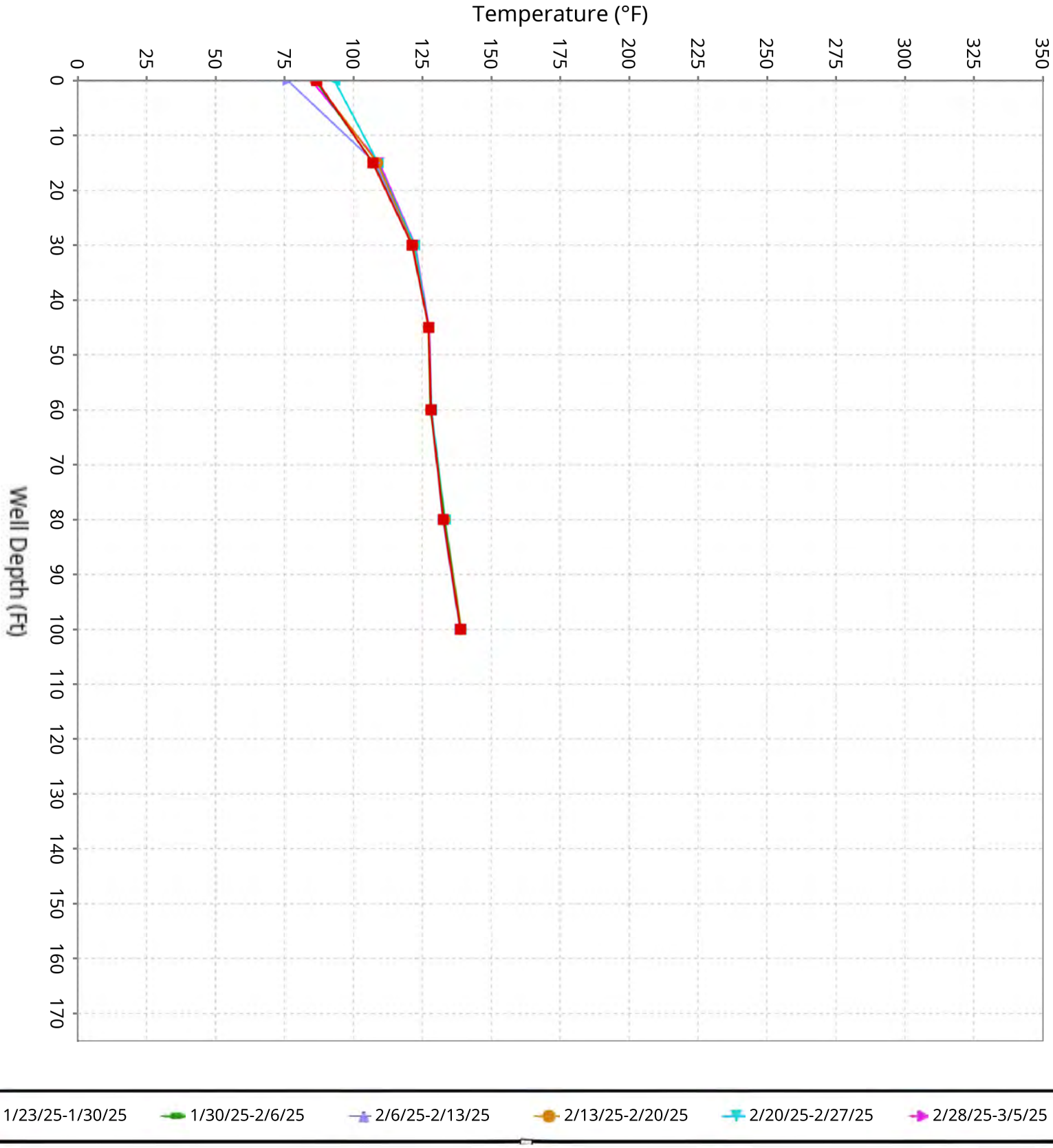

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Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-17

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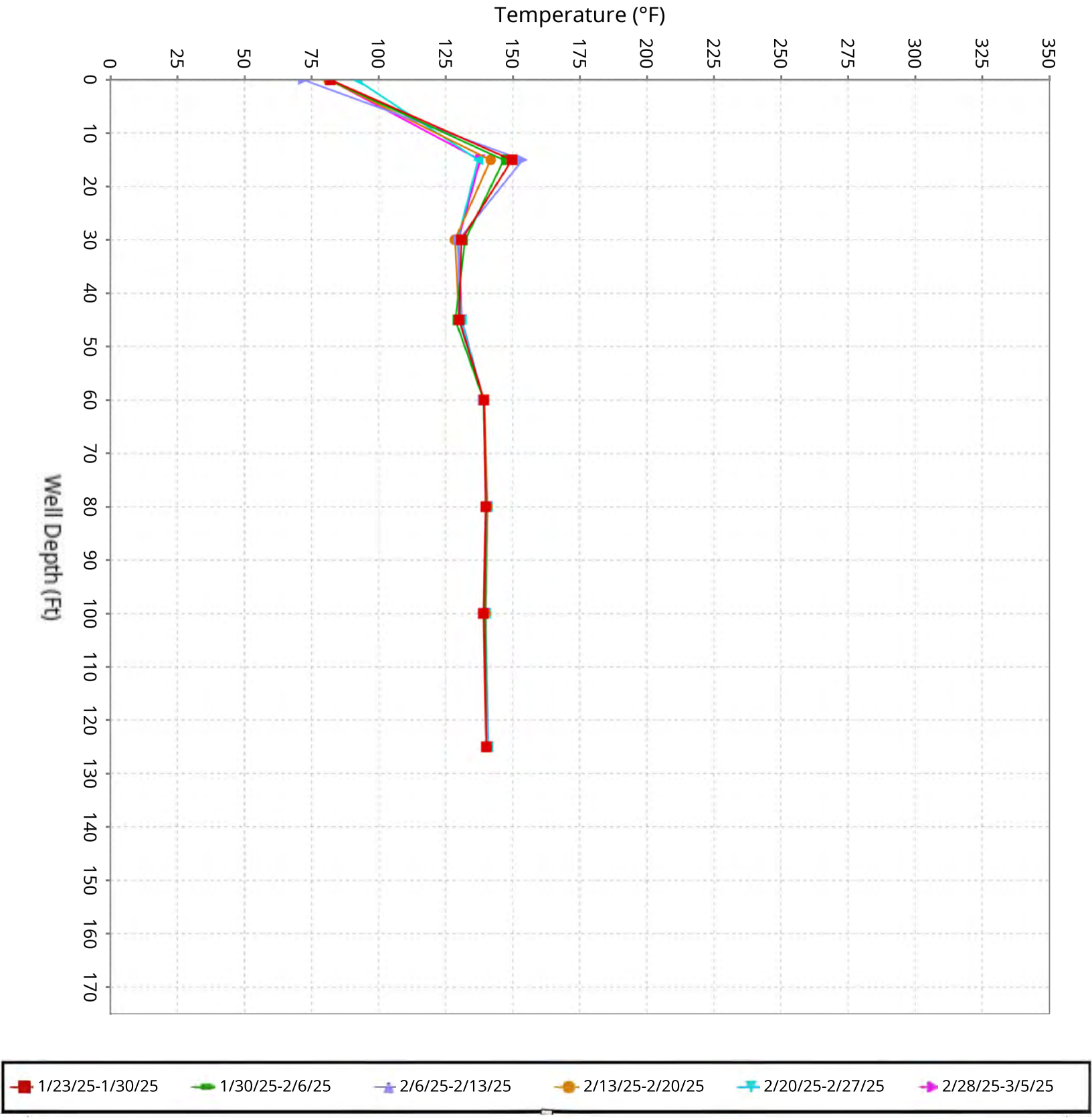

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Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-18

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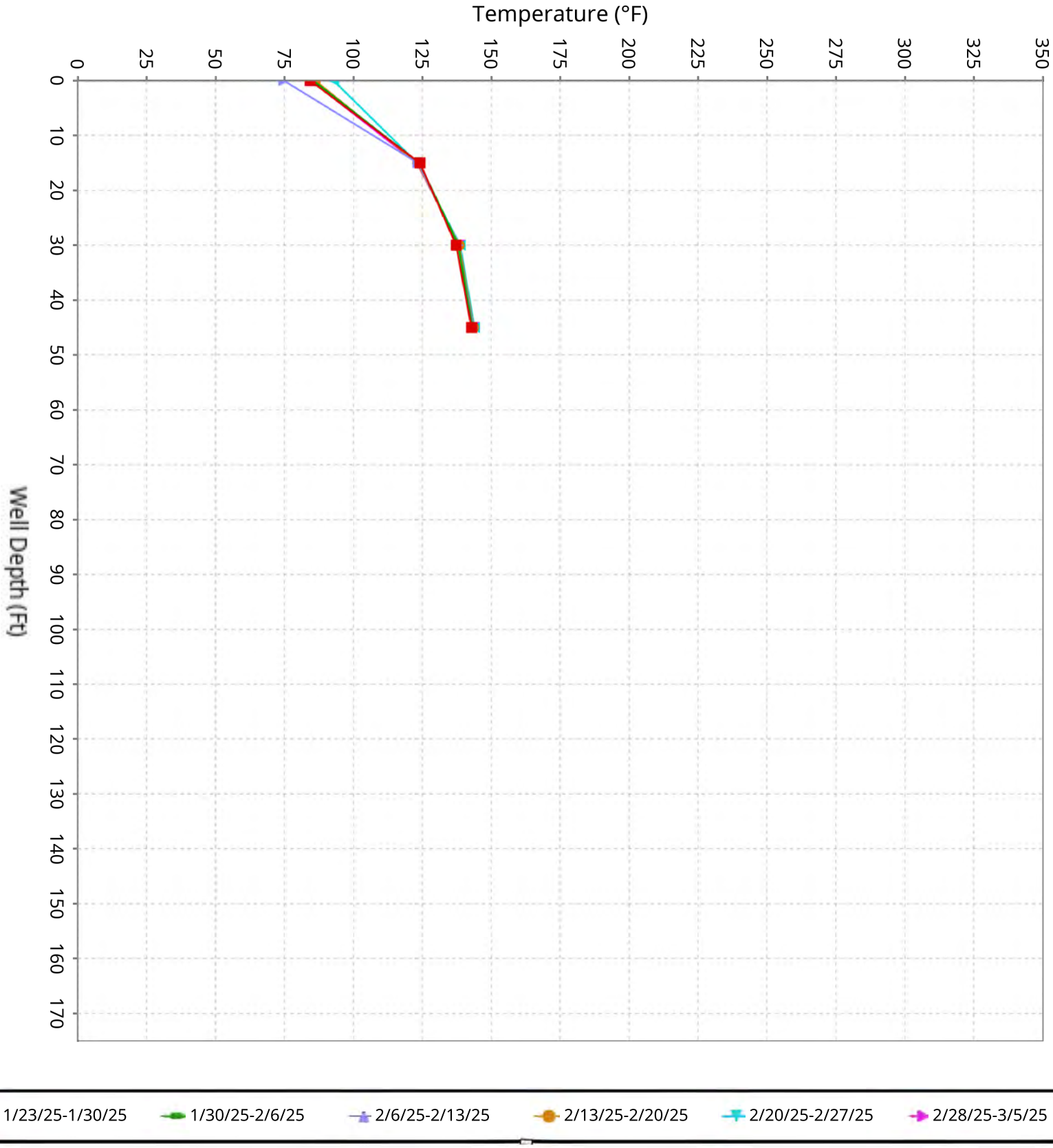

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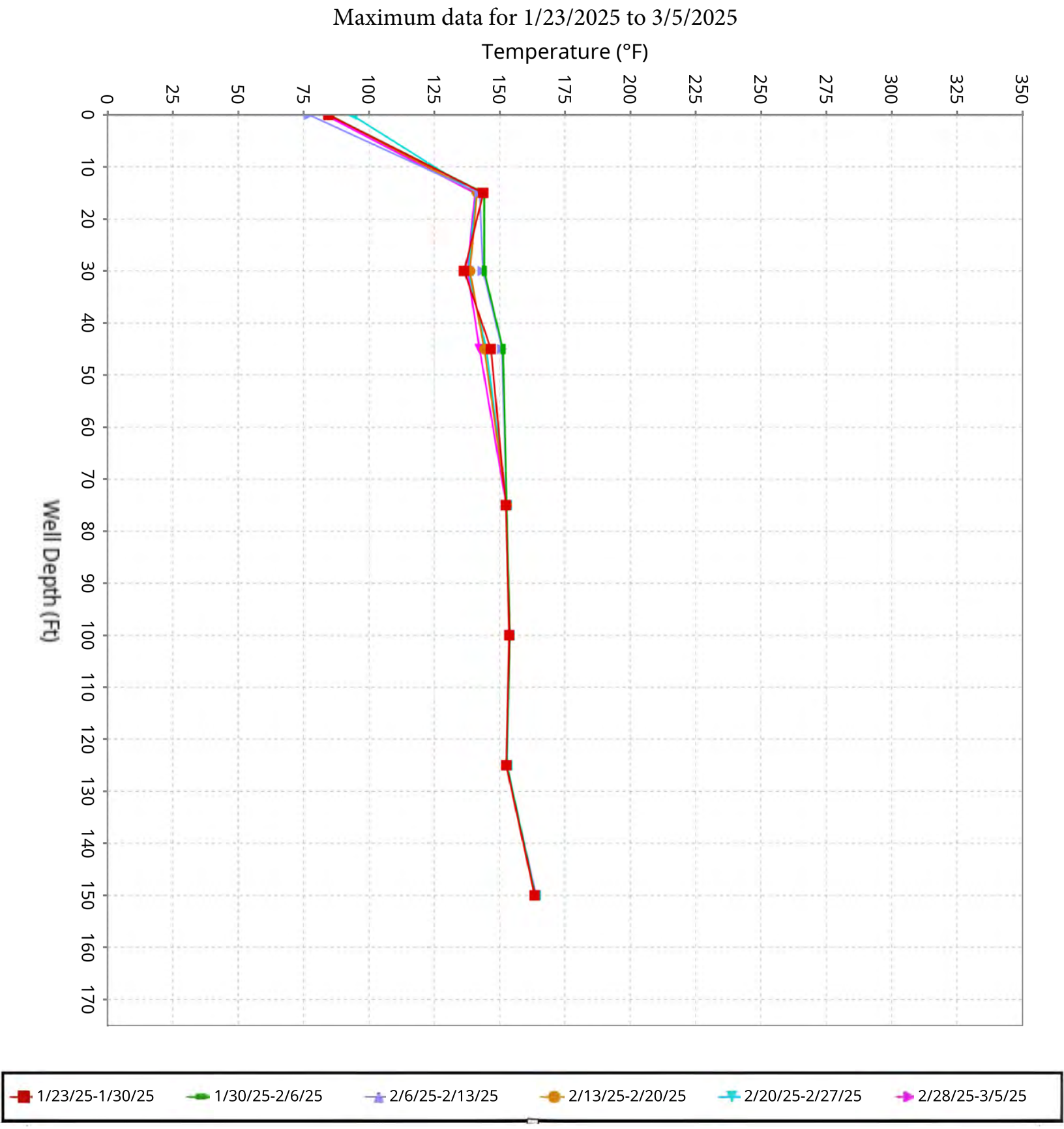
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-19



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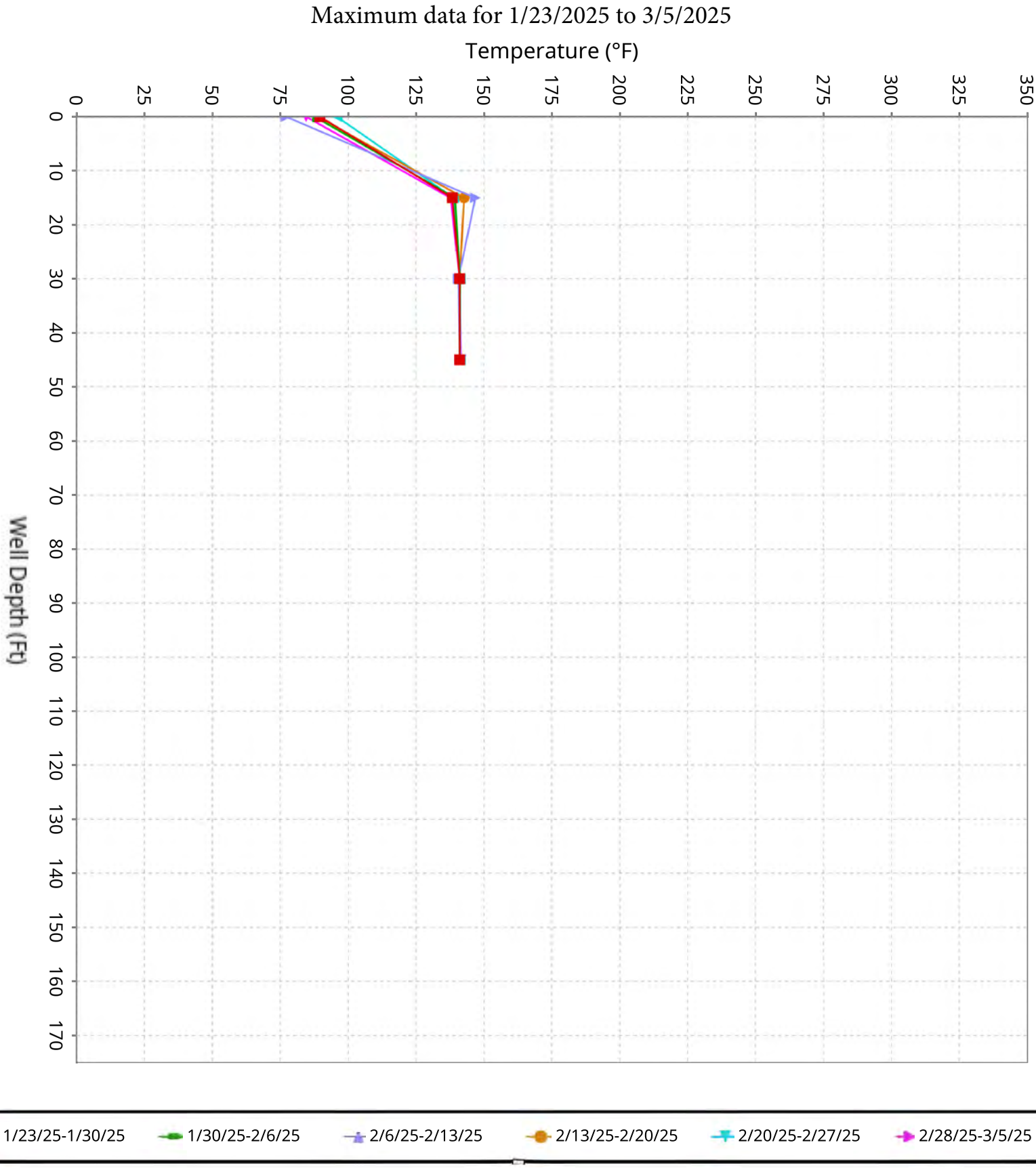
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-20



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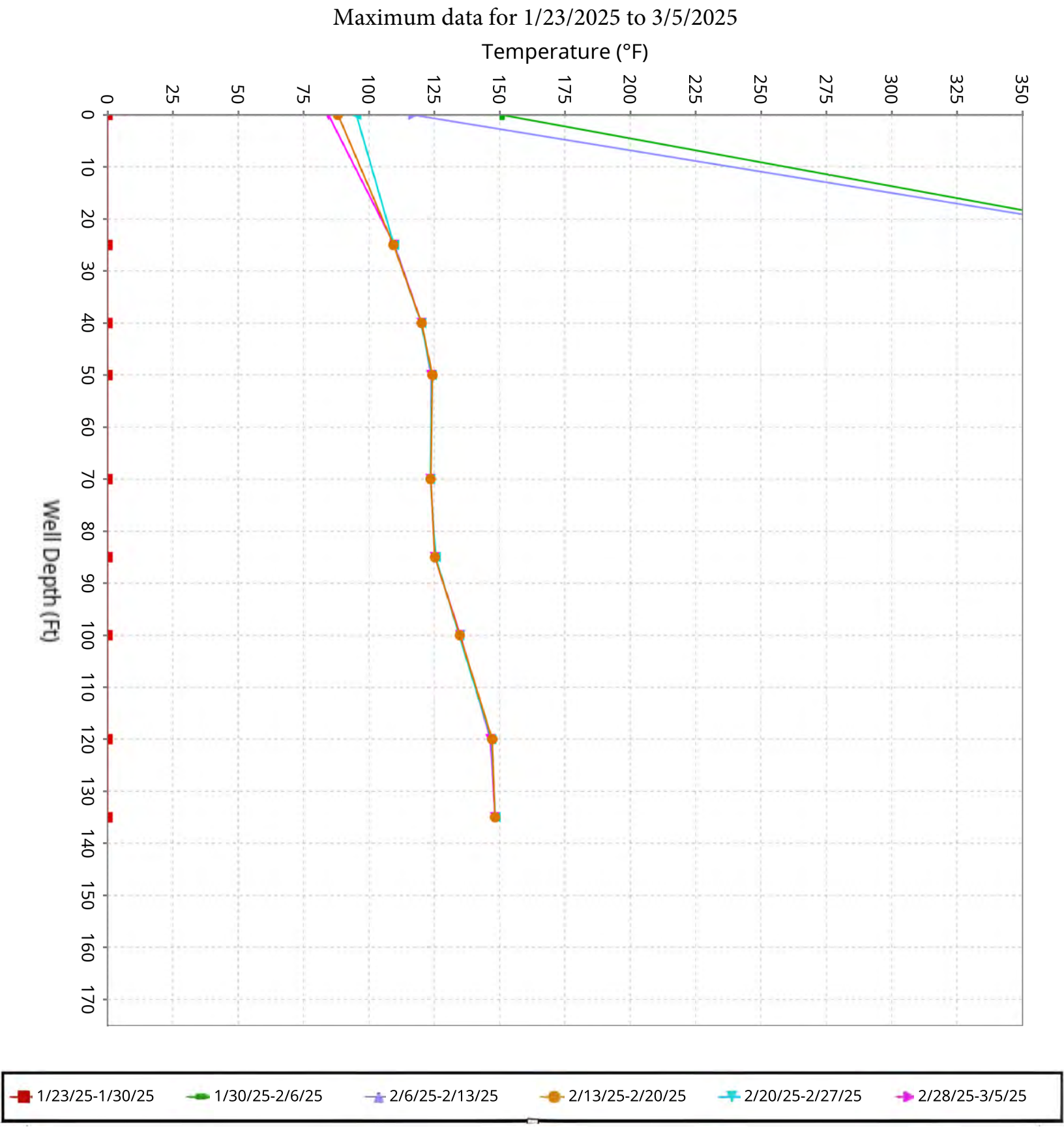
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-25



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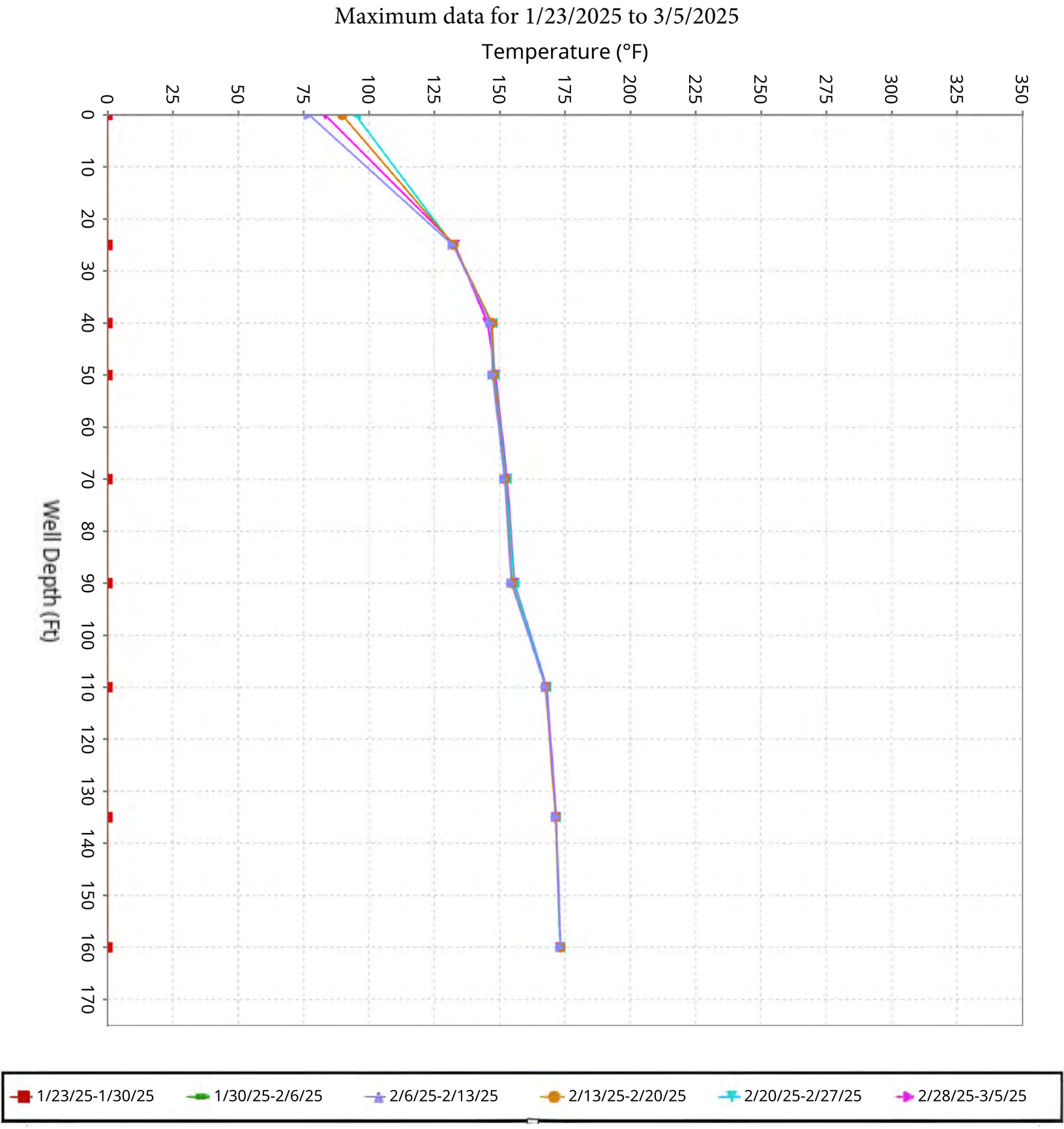
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-26



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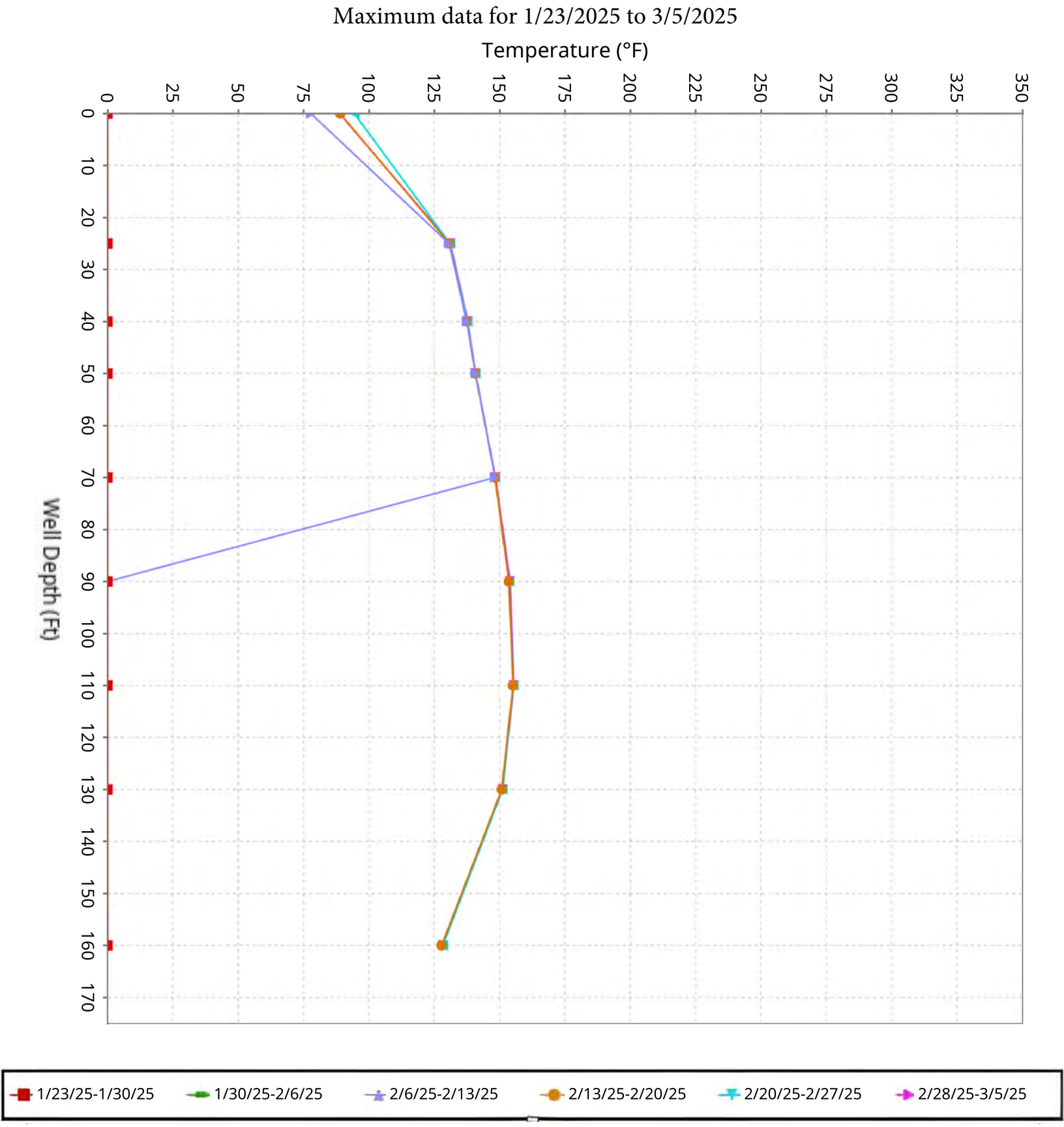
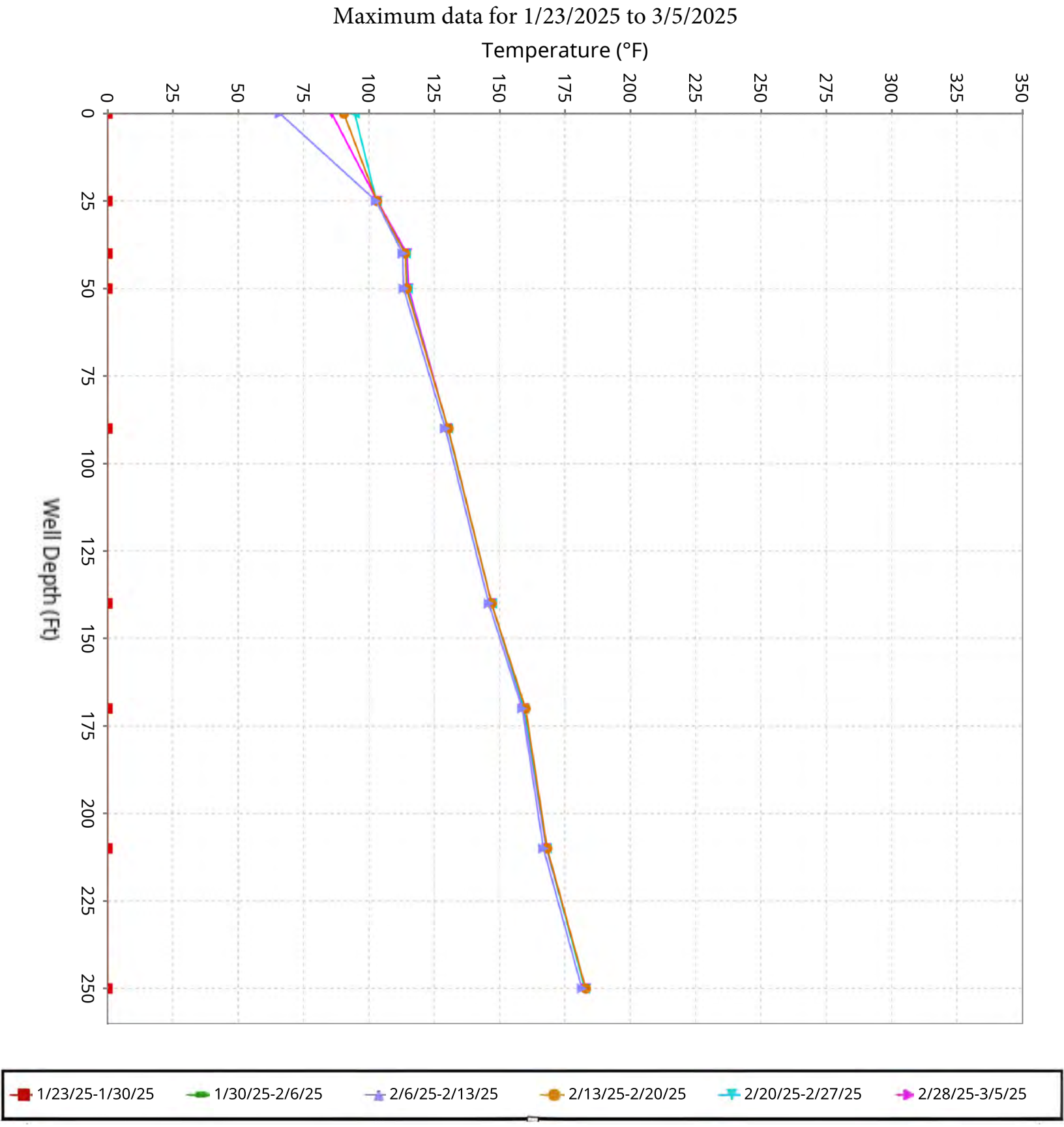
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-27



SCS ENGINEERS

Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-29



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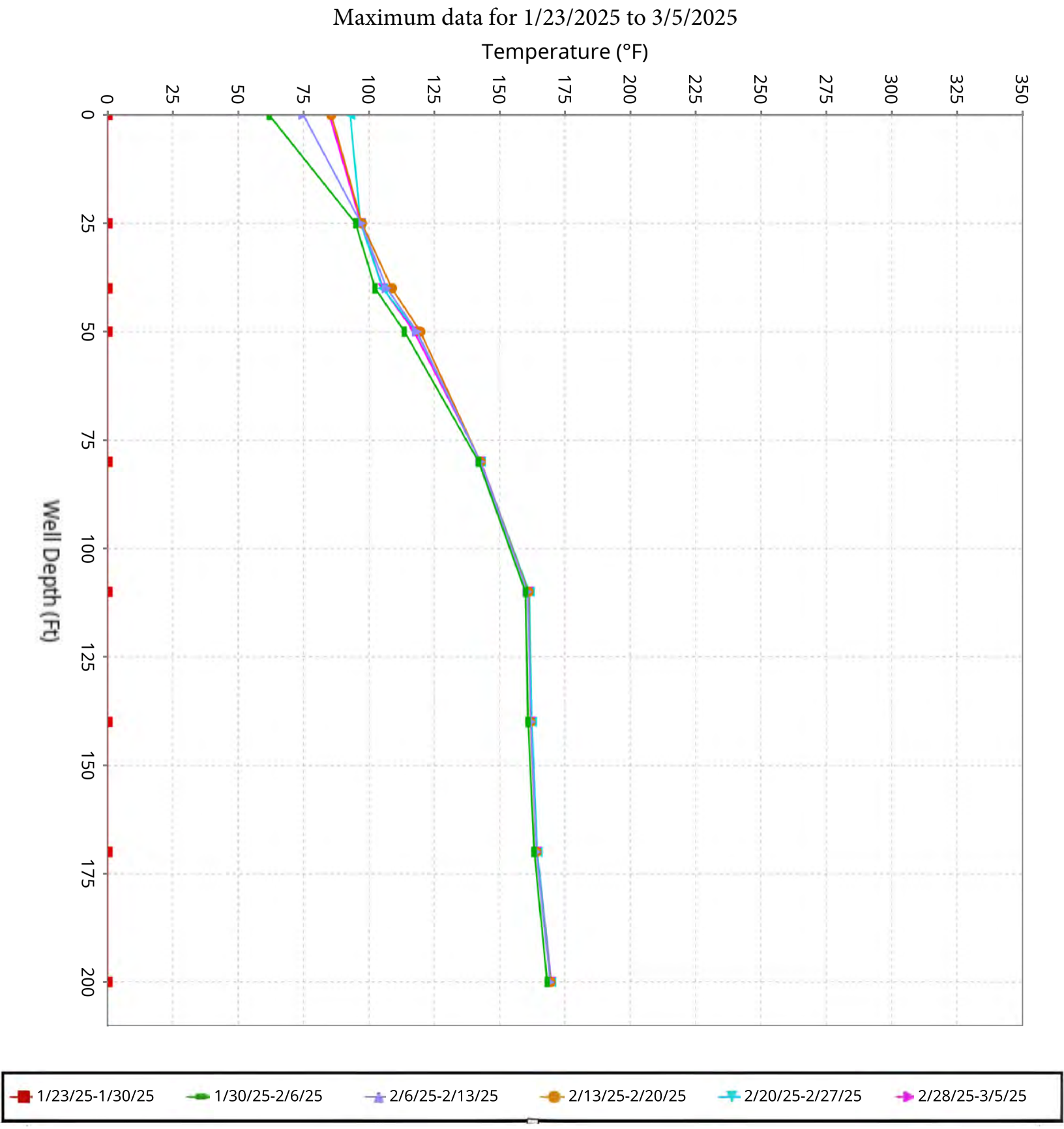
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-30



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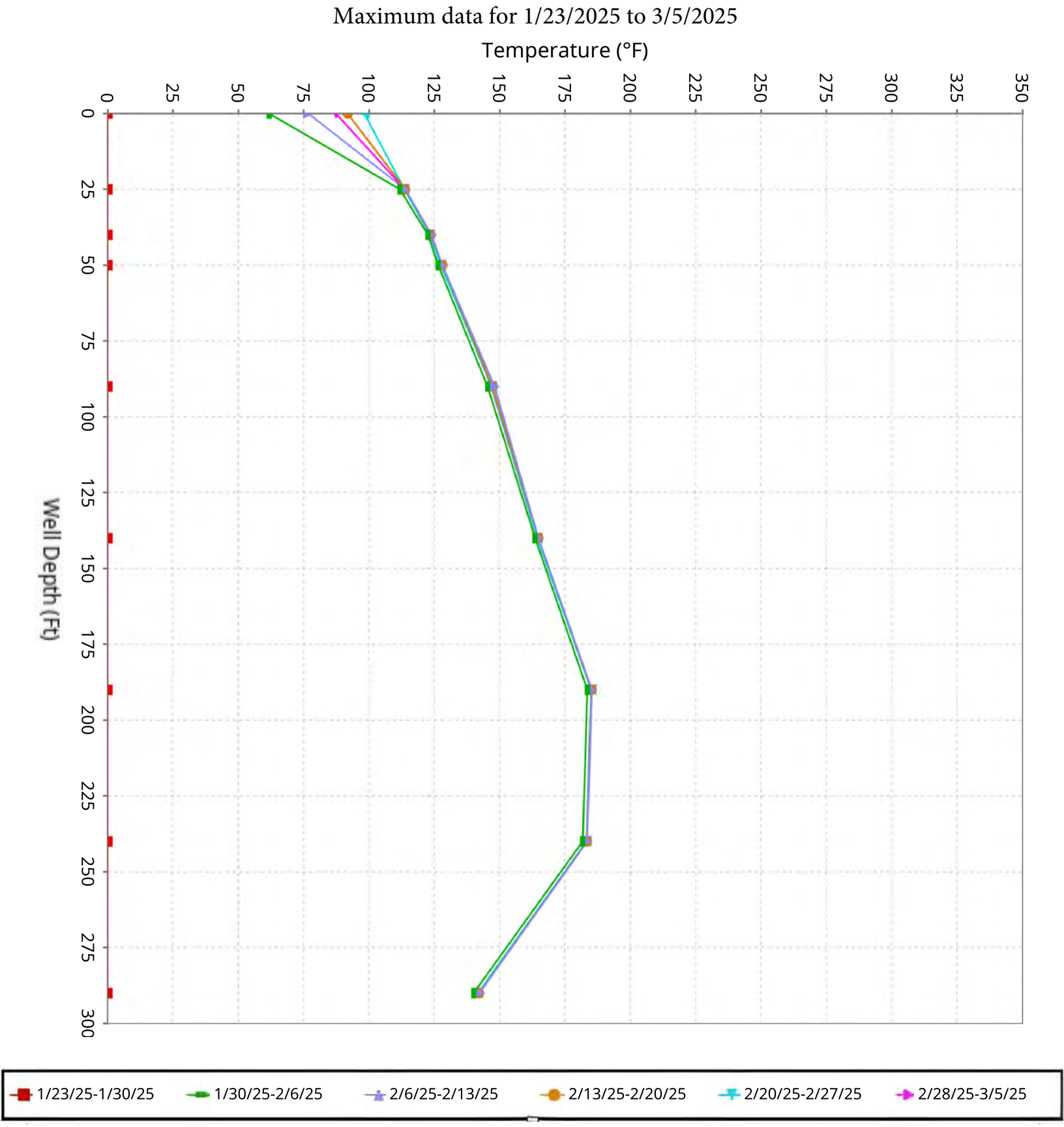
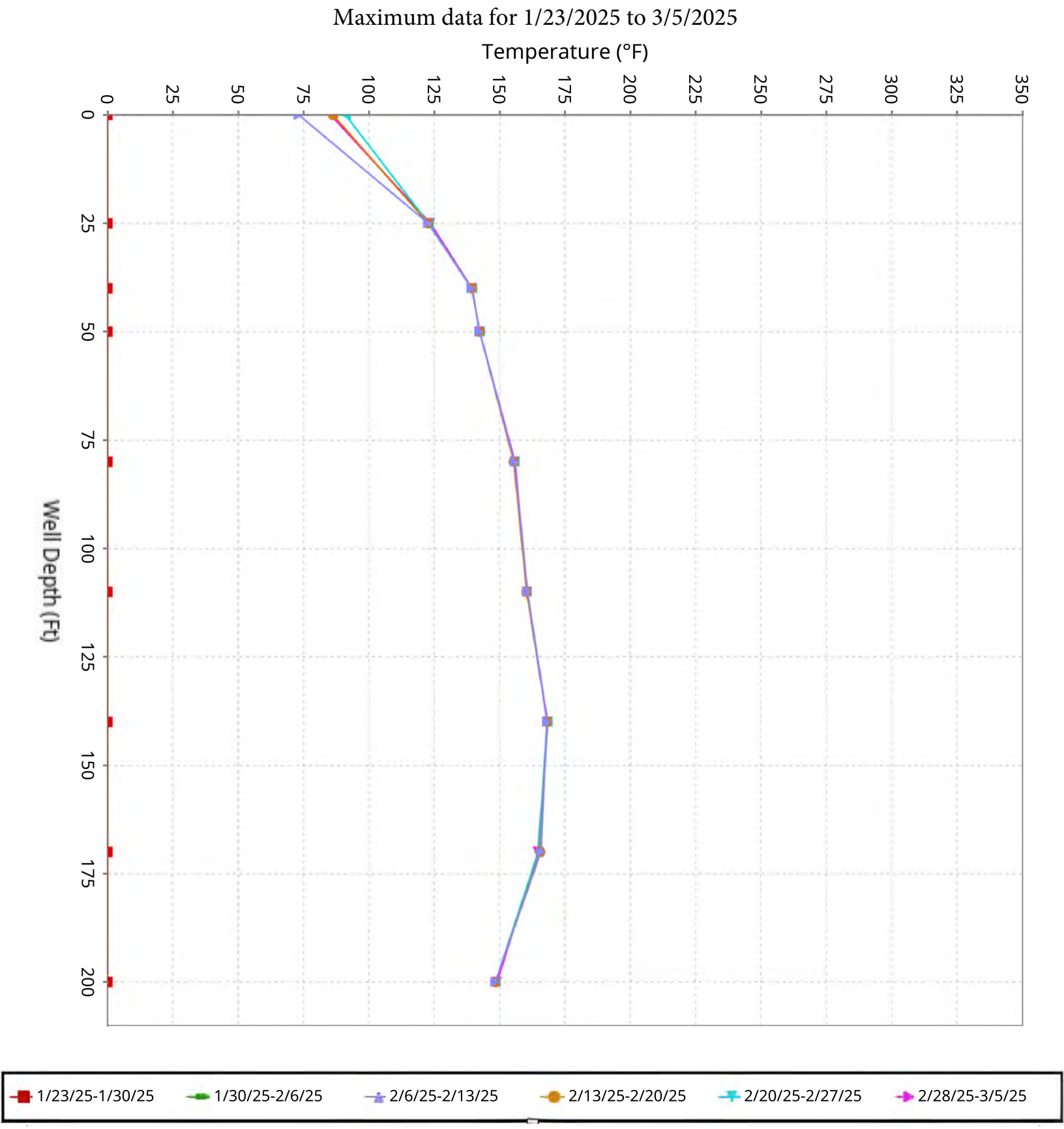
Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-31



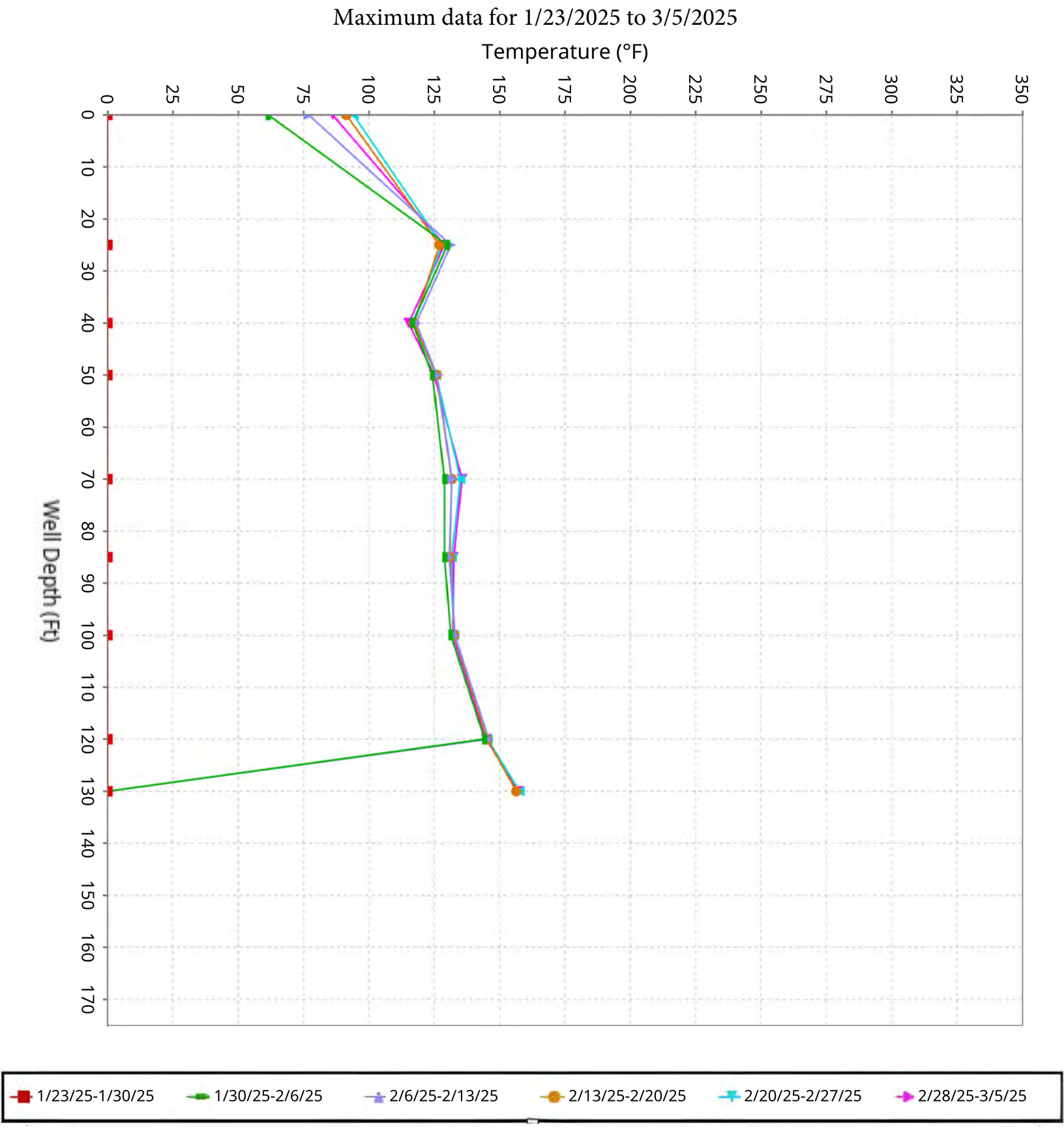
SCS ENGINEERS

Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-32



SCS ENGINEERS

Vertical Temperature Profiles from Temperature Probes at Chiquita Landfill for TP-34



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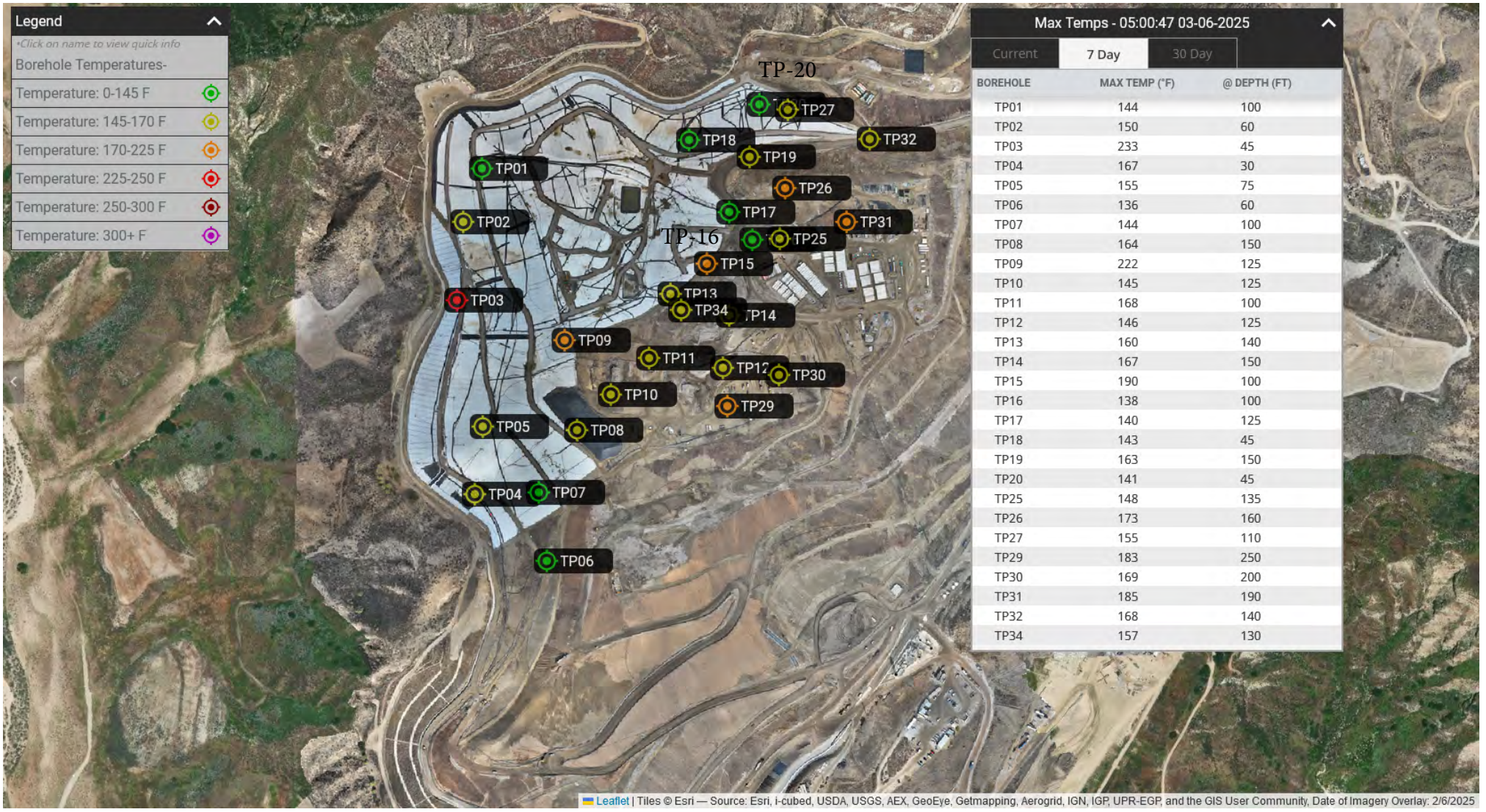
Maximum Vertical Temperature Map from Temperature Probes at Chiquita Landfill

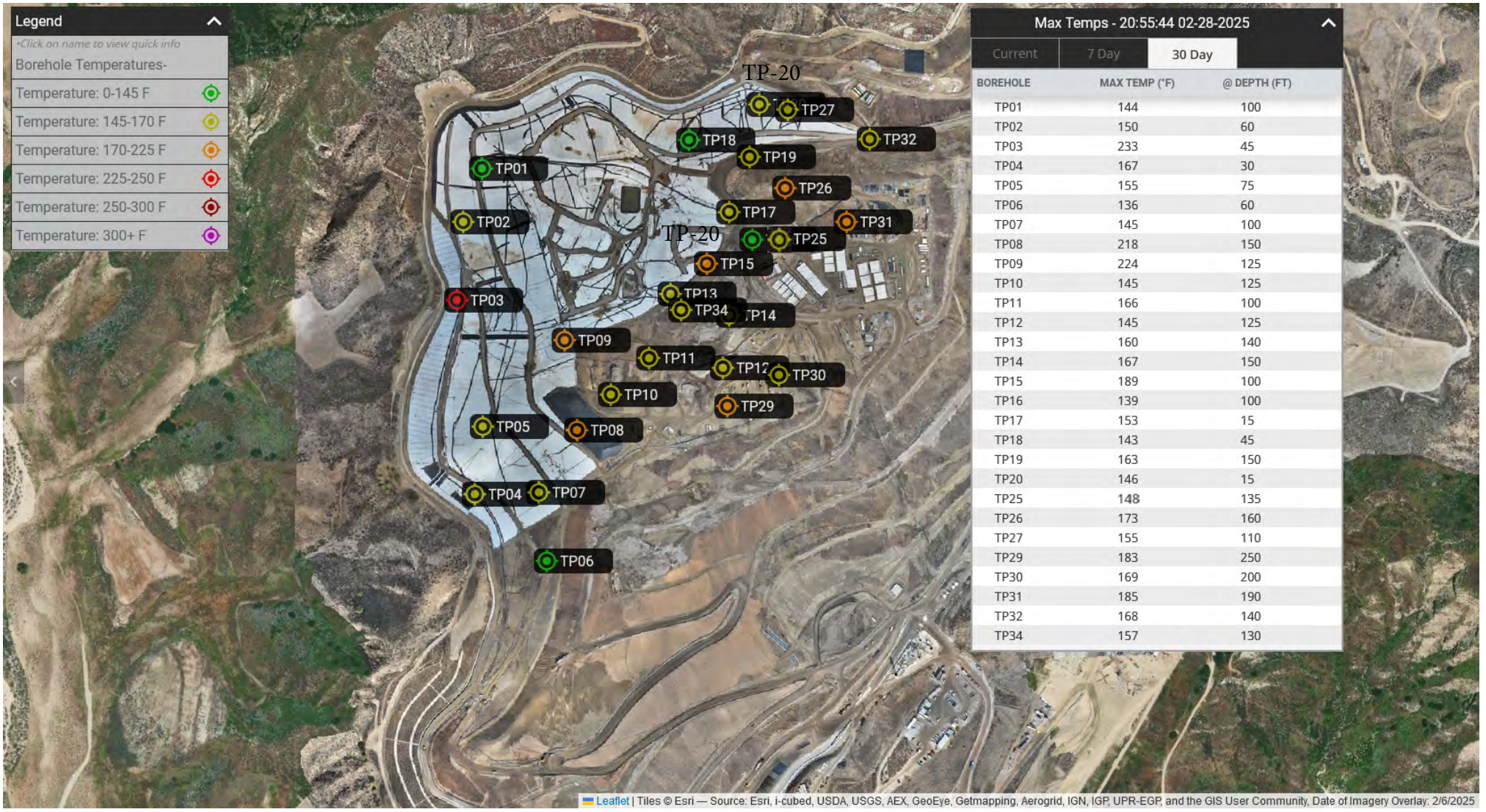


Max Temps - 05:00:47 03-06-2025

Current | 7 Day | 30 Day

BOREHOLE	MAX TEMP (°F)	@ DEPTH (FT)
TP01	144	100
TP02	150	60
TP03	233	45
TP04	167	30
TP05	155	75
TP06	136	60
TP07	144	100
TP08	164	150
TP09	222	125
TP10	145	125
TP11	168	100
TP12	146	125
TP13	160	140
TP14	167	150
TP15	190	100
TP16	138	100
TP17	140	125
TP18	143	45
TP19	163	150
TP20	141	45
TP25	148	135
TP26	173	160
TP27	155	110
TP29	183	250
TP30	169	200
TP31	185	190
TP32	168	140
TP34	157	130

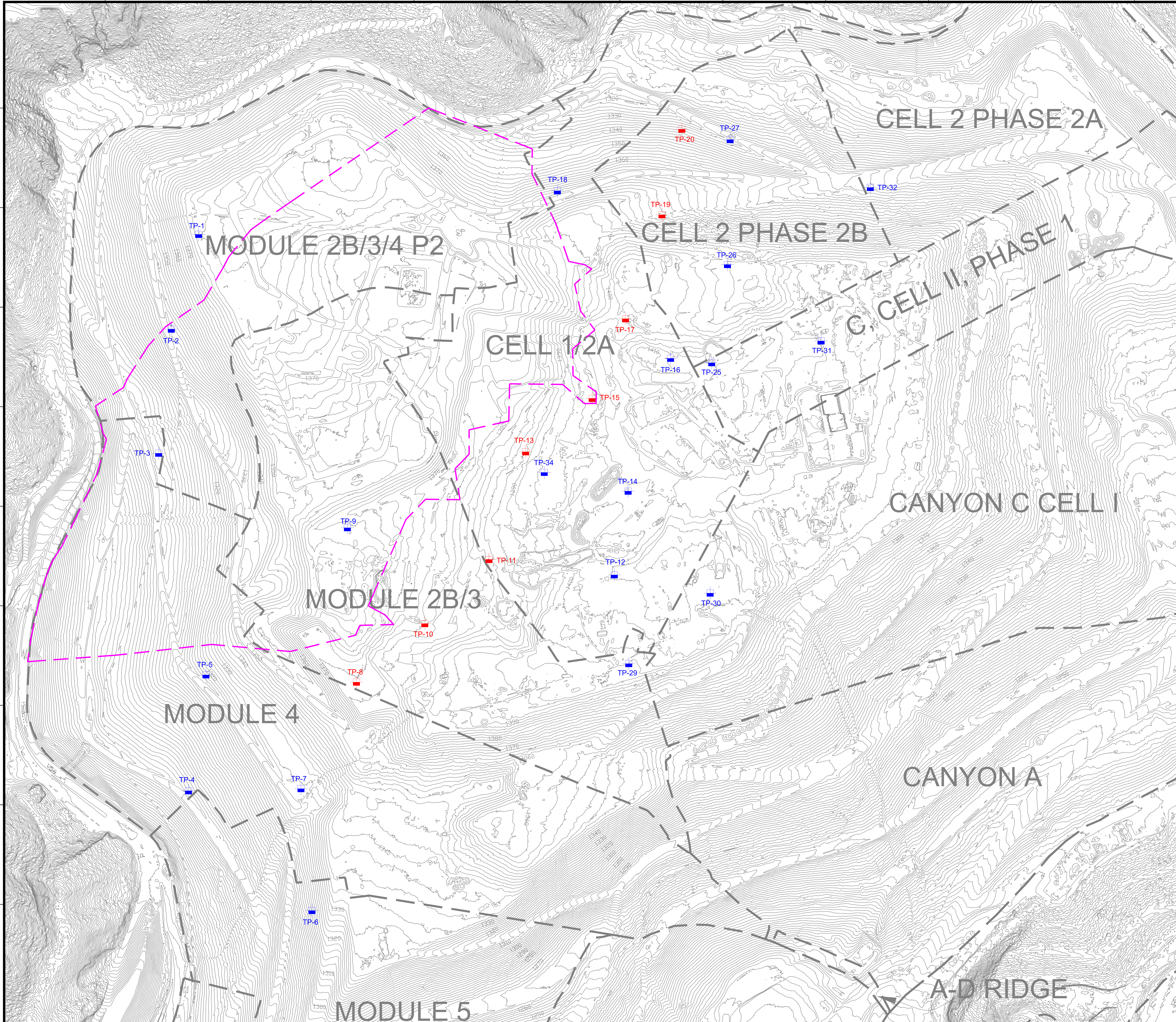
Thirty Day Maximum Vertical Temperature Map from Temperature Probes at Chiquita Landfill



Max Temps - 20:55:44 02-28-2025

Current | 7 Day | 30 Day

BOREHOLE	MAX TEMP (°F)	@ DEPTH (FT)
TP01	144	100
TP02	150	60
TP03	233	45
TP04	167	30
TP05	155	75
TP06	136	60
TP07	145	100
TP08	218	150
TP09	224	125
TP10	145	125
TP11	166	100
TP12	145	125
TP13	160	140
TP14	167	150
TP15	189	100
TP16	139	100
TP17	153	15
TP18	143	45
TP19	163	150
TP20	146	15
TP25	148	135
TP26	173	160
TP27	155	110
TP29	183	250
TP30	169	200
TP31	185	190
TP32	168	140
TP34	157	130



N

GRAPHIC SCALE

130 65 0 130 260 390

SCALE: 1"=130'

LEGEND

1150	EXISTING TOPOGRAPHIC CONTOUR
	EXISTING CELL LIMITS (APPROXIMATE)
TP-XX	INSTALLED TEMPERATURE PROBES - STANDALONE
TP-XX	INSTALLED TEMPERATURE PROBES - INSTALLED WITHIN WELL CASING
	REACTION AREA BOUNDARY (APPROXIMATE) - BASED ON DATA REVIEW

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLER. AERIAL PHOTOGRAPHY DATED FEBRUARY 06, 2025.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.

NO.	REVISION	DATE

SHEET TITLE: TEMPERATURE PROBE INSTALLATION MAP

PROJECT TITLE: TEMPERATURE PROBE INSTALLATION PROJECT
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

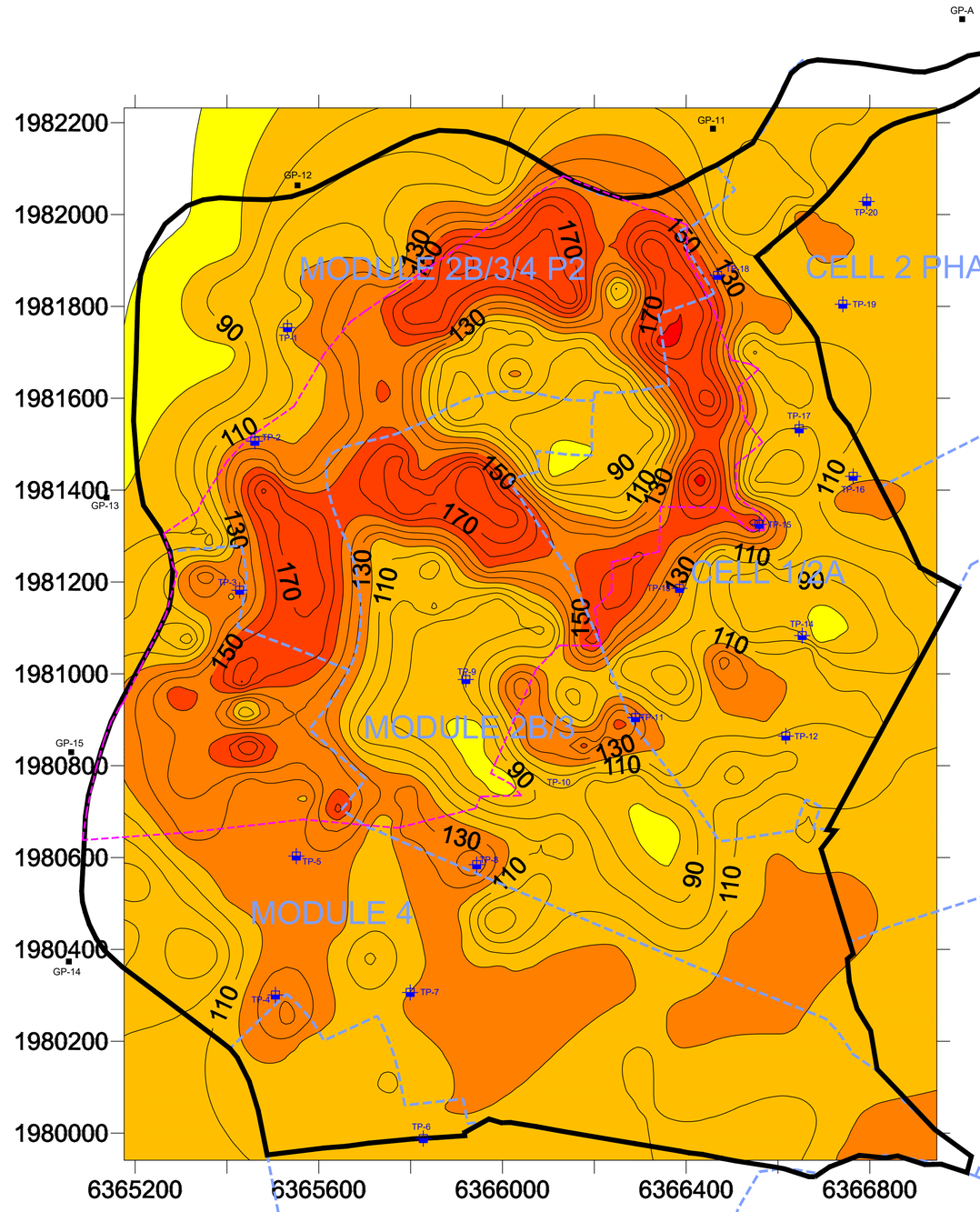
SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
8799 BALBOA AVENUE SUITE 290
SAN DIEGO, CA 92123
(858) 571-5500 FAX. (562) 427-0805

PROJ. NO. 01204123.41 | DWN. BY: SRM | CHK. BY: JH/WCH | DSN. BY: JH/SRM | APP. BY: WCH | ACAD FILE: F:/ENGINEERS

DATE: 02/20/2025

SCALE: AS SHOWN

SHEET: 1



N

GRAPHIC SCALE

150 75 0 150 300 450

SCALE: 1"=150'

LEGEND

- EXISTING CELL LIMITS (APPROXIMATE)
- REACTION AREA BOUNDARY (APPROXIMATE) - BASED ON DATA REVIEW
- REACTION AREA BOUNDARY - CONDITION 9A
- GP-XX EXISTING PERIMETER MIGRATION PROBE
- TP-XX EXISTING TEMPERATURE PROBE

GENERAL DRAWING NOTES:

1. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
2. THE LOCATION OF ANY EXISTING PIPING, VALVES, TIE-IN LOCATIONS AND OTHER FEATURES ARE APPROXIMATE AND SHOULD BE USED FOR INFORMATION PURPOSES ONLY. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

DATE

REVISION

NO.

SHEET TITLE: ISOTHERMAL GRADIENT MAP MARCH 2025

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

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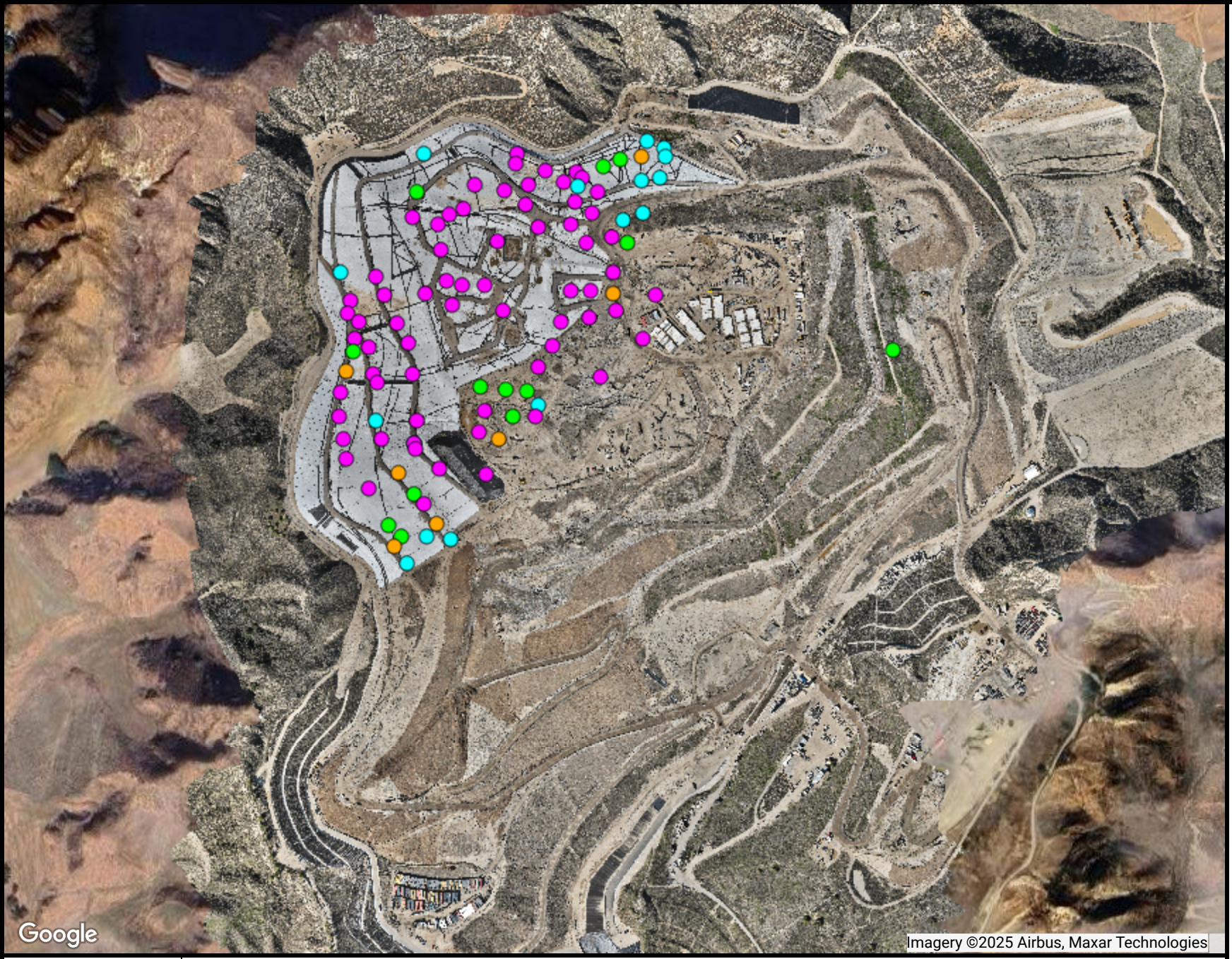
ACAD FILE: ENGINEERS
APP. BY: -
DWN. BY: ETG
CHK. BY:
PROJ. NO. 01204123.41
DSN. BY: -

DATE: 03/04/2025

SCALE: AS SHOWN

SHEET: 1



Ranges Mapped

		# Points
>= 0 and < 100		16
>= 100 and < 500		13
>= 500 and < 1000		7
>= 1000 and < 1000000		67

Point Type Legend

well

N

SCSeTools

Chiquita Canyon Landfill

Range Map

Parameter: CO (mid range)

Analysis Method: Average

Date Range: 02/01/2025 - 02/28/2025

Map generation date : 03/08/2025