TRS Group, Inc.
PO Box 737
Longview, WA 98632

www.thermalrs.com

November 30, 2016

Mr. Daniel Ramras
Ramras Specialty Group
9032 42nd Ave NE
Seattle, Washington 98115
(206)-619-0560
dramras@comcast.net

Subject: ERH Status Report
Former Plastic Sales and Service Facility
6870 Woodlawn Ave NE
Seattle, WA 98115

Dear Mr. Ramras,

This letter report contains a brief description of the Electrical Resistance Heating (ERH) remediation operations performed at the former plastic sales and service facility located at 6870 Woodlawn Ave NE in Seattle, Washington. The time period addressed in this report is from November 22 through November 28, 2016.

ERH Application Summary

The ERH system operational parameters for this reporting period are presented in **Table 1.** Baseline data collected on October 31, 2016, prior to startup, are included for comparison. All features referred to herein may be located on **sheet Y-1**.

Table 1. ERH System Operating Parameters

ERH System Parameters	October 31, 2016	November 21, 2016	November 28, 2016
Weekly Average Power (kW)	0	212	213
Cumulative Energy Applied (kWh)	424*	107,644	143,574
Average Subsurface Temperature (°C)	16.6	69.5	80.5
Average Vapor System Flow Rate (scfm)	0	250**	250**

*Energy consumed during start up testing
**Based on operation of blower at 30Hz (half speed)

TRS personnel were onsite for portions of the reporting period. Tasks accomplished during the reporting period included:

- Daily Collection of system operations data and optimization of system performance;
- Completion of surface voltage surveys and confirmation no exposed voltage potentials exist above the TRS administrative levels.

- Routine system maintenance and operation.

The ERH system operated within normal system parameters during this reporting period.

On November 21st a break-in attempt was discovered by TRS staff. TRS was able to determine that the attempt most likely occurred around 4:00AM on November 20, 2016. The suspected perpetrator cut a cable lock across a gated opening and tripped the Honeywell perimeter security sensors which interrupted electrical power to the electrode field. TRS staff were autodialed with a notification, however the suspect did not access any area onsite where the videofied security cameras were deployed. Video footage was obtained by the neighboring Hearthstone building showing what appears to be the suspected perpetrator entering the site. No items were found to be missing along with no signs of any vandalism. A police report was completed by TRS staff with the Seattle Police Department (case number 16-421774).

On November 25th the site average temperature achieved 77 degrees Celsius (°C). SES initiated daily PID readings of the vapor recovery system as required by the air permit.

The system experienced a shut down from 7:30 am to approximately 2:00 pm as a result of a power loss to our field instrumentation. TRS personnel visited the site to restore power to the field instrumentation and restart the system.

Subsurface Temperatures

Treatment volume subsurface temperatures are monitored at four temperature monitoring point (TMP) locations each containing temperature sensors arrayed vertically. The average subsurface temperature within the treatment volume prior to the start of ERH power application was 16.7 degrees Celsius (°C). The average subsurface temperature within the treatment area at the end of this reporting period was 80.5°C, an increase of 11^0C since the last reporting period. The highest observed subsurface temperature for this reporting period was 99.6ºC, at a depth of 8 feet below grade surface (ft bgs) at TMP D4 on November 28, 2106.

Temperatures relative to depth for each TMP within the ERH treatment area are presented in **Figures 2a** through **2d.**

Temperatures outside of the ERH treatment zone are being monitored in four additional TMPs. These TMPs are located outside of the ERH treatment area and will be used to establish "ambient" subsurface soil temperatures. The purpose of this monitoring is to establish the temperature of the soil adjacent to the ERH treatment area post treatment. The site is to be excavated post ERH, and there is a regulatory requirement that the subsurface temperature be less than 30^0C prior to excavation. The baseline average temperature for these TMPs was 16.7^0C. The average weekly temperatures for each of the exterior TMPs are presented below in **Table 2**.

Table 2. Exterior TMP Data

Date	TMP 1 Avg (°C)	TMP 2 Avg (°C)	TMP 3 Avg (°C)	TMP 4 Avg (°C)
11/2/2016	16.7	17.0	16.8	17.3
11/14/2016	19.7	19.1	19.6	26.6
11/21/2016	22.0	21.3	22.3	34.3
11/28/2016	24.4	23.1	25.0	40.2

Power and Energy

The PCU averaged 213 kilowatts (kW) of applied power to the treatment volume during the reporting period. A total of 143,574 kilowatt-hours (kWh) of electrical energy have been applied to the subsurface as of November 28, 2016. This is approximately 55% of the estimated design energy of 260,000 kWh.

ERH Vapor Recovery and Treatment

The vapor stream flow rate after the vapor recovery blower averaged 250 standard cubic feet per minute (scfm) throughout the operating period. The average discharge temperature throughout the reporting period was 39.6^{0}C, as measured at the blower discharge port.

Vapor samples are collected by Sound Earth Strategies on Tuesdays and Fridays of each week as part of the air discharge permit requirements until the average soil temperature reaches 77 ^{0}C at which time collection will occur daily. An average soil temperature of 77 ^{0}C was achieved on November 25th. The photoionization data are contained in **Table 2**. The analytical data will be reported by Sound Earth Strategies and not included in this report. The data and information will be shared with and used to measure system performance (i.e. pounds of contaminant removed), air permit compliance, and to refine future system operations.

Table 2. Vapor Recovery Data

Date	Influent(ppmv)*	Midpoint(ppmv)*	Effluent(ppmv)*
11/4/16	315	0.3	0.4
11/8/16	352	0.5	0.9
11/11/16	395.5	1.3	0.9
11/15/16	247.3	0.5	0.5
11/18/16	721.0	0.9	1.1
11/22/16	>15,000	0.2	0.0
11/24/16	472.9	0.5	0.4
11/25/16	4,820	0.4	0.2
11/26/16	343.4	0.2	0.1
11/27/16	953.9	0.1	0.1
11/28/16	1,871	0.2	0.1

* collected with photo ionization detector

Water Usage

A total of 18,389 gallons of condensate and recovered water has been transferred to the 6,900 gallon holding tank to date. On November 15th a new condensate water totalizer was installed due to several issues with the existing totalizer.

During ERH, the area immediately surrounding the electrode may potentially lose soil moisture. TRS adds water to the electrode to prevent dry-out and maintain an electrical connection between the

electrodes and the surrounding formation. On November 14th the drip water was established to several electrodes showing signs of dry-out. A total of 2,371 gallons of drip water has been used to date.

Water is also consumed in the cooling loop used by the steam condenser. The cooling tower also requires a continuous blow down to reduce mineral build up. The makeup water (replaces water lost to evaporation, and tower blowdown to reduce mineral buildup) consumed to date is 13,640 gallons.

Table 4 contains a summary of the water discharge and consumption data.

Table **4. ERH System Water Usage Data**

Water Parameters	November 21. 2016	November 28, 2016
Cumulative Condensate Generated (gallons)	10,050	18,389
Cumulative Condenser Makeup Water (gallons)	8,590	13,640
Electrode Wetting System Water Consumption (gallons)	348	2,371

Planned Activities

TRS personnel are on site daily during normal weekly working hours to collect operations data, optimize the system, and perform weekly maintenance.

Should you have any questions concerning this report, or if you would like any additional information, please contact either me or Lynette Stauch by phone at (206) 234-7603 or (505)-281-9553 respectively.

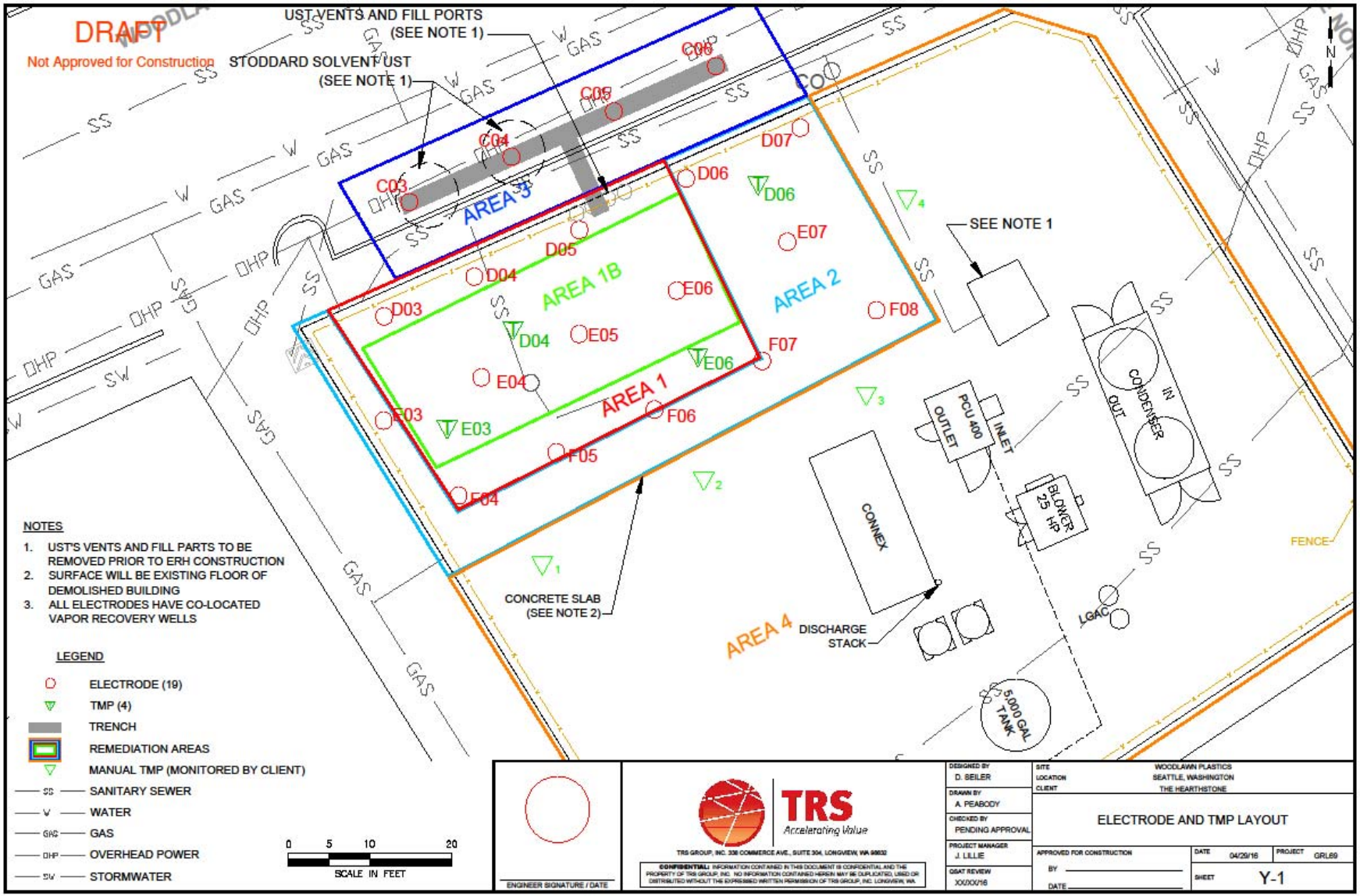
Sincerely,
TRS Group, Inc.

Steve Pistoll
Project Manager

Attachments: Figure 1 – Site Plan
Figure 2a through 2d –TMP Temperatures over time

cc: Lynette Stauch, TRS
Tim Warner, TRS

ATTACHMENTS



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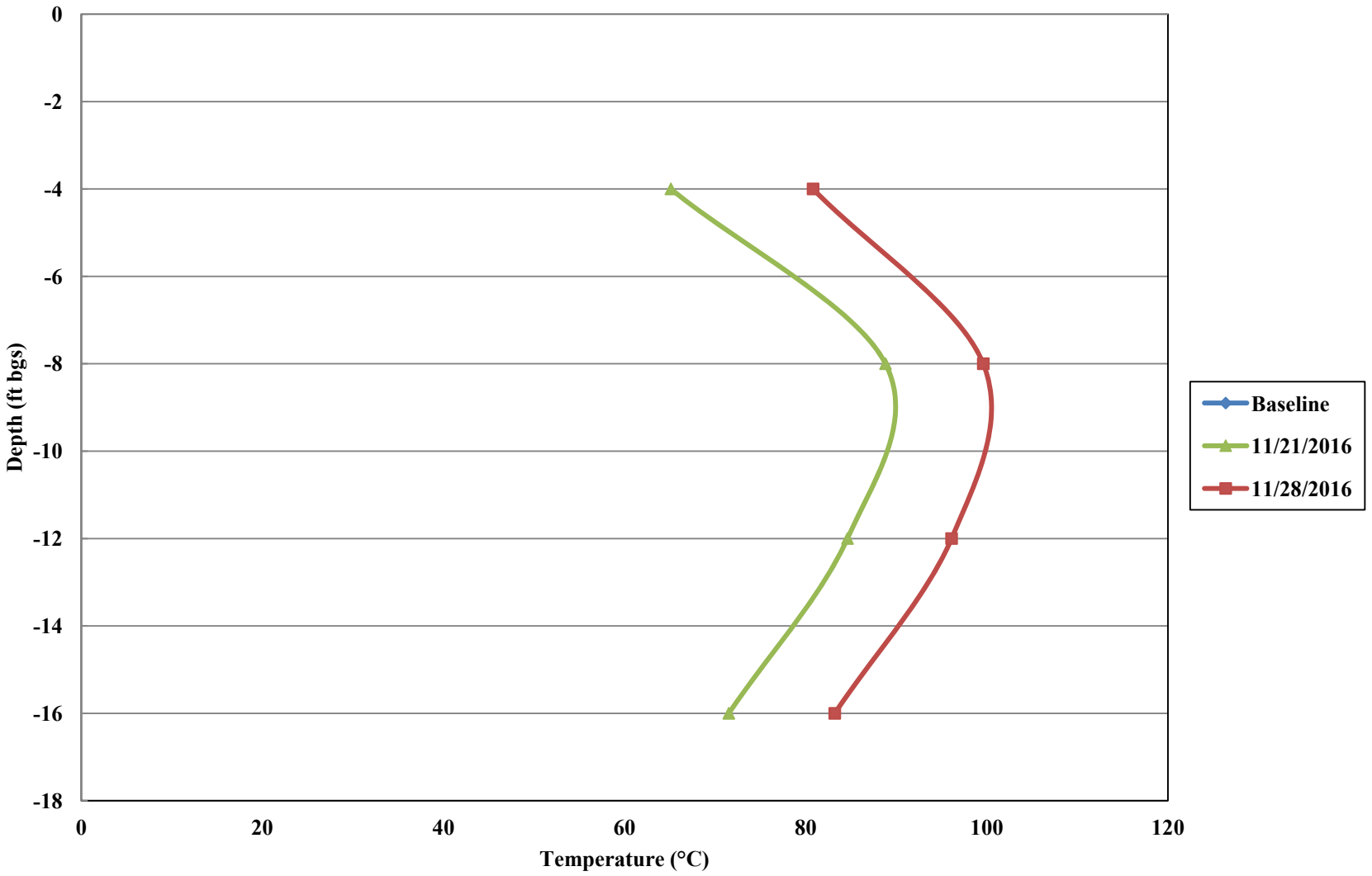

Figure 2a TMP D4

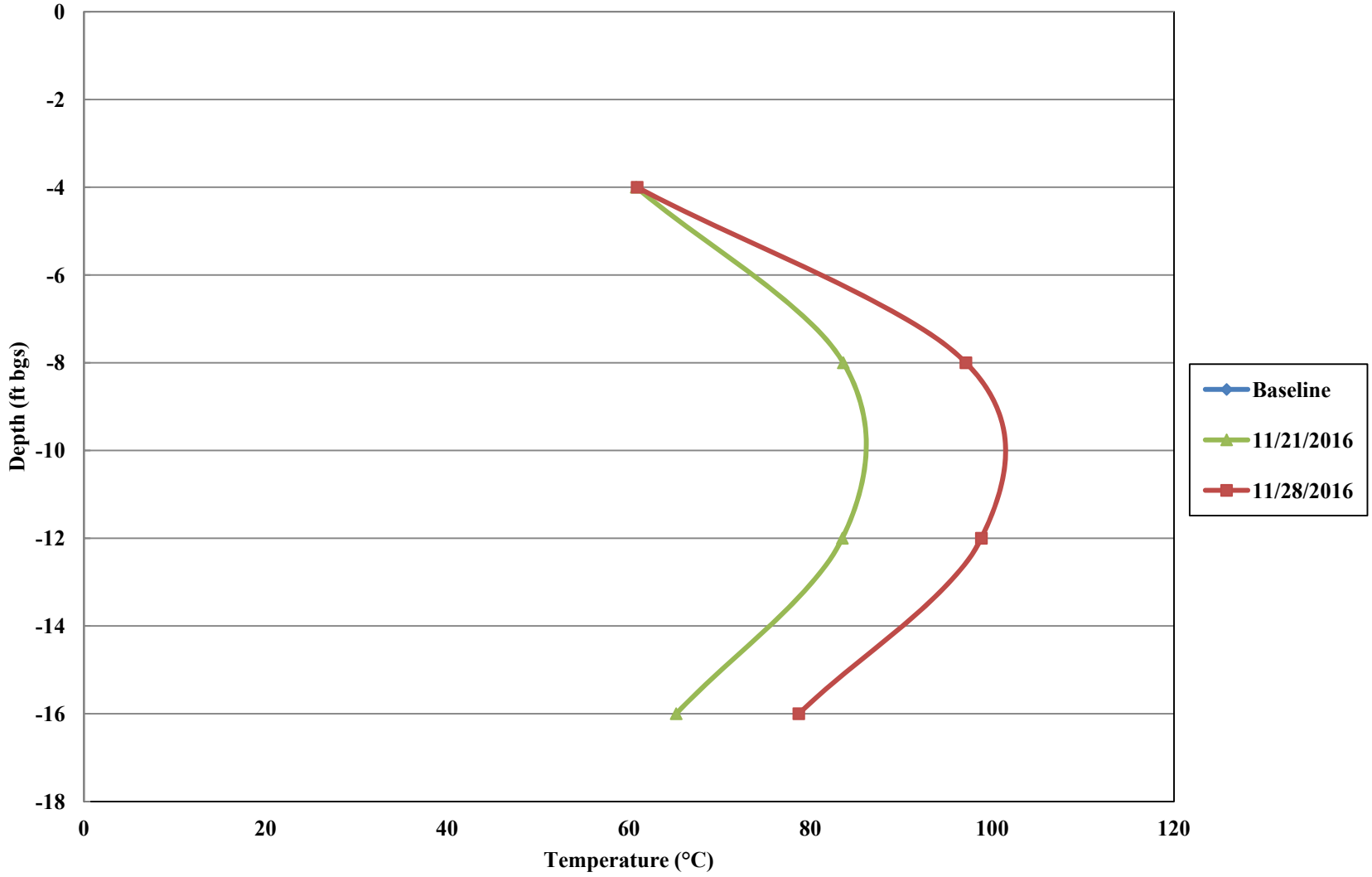

Figure 2b TMP D6

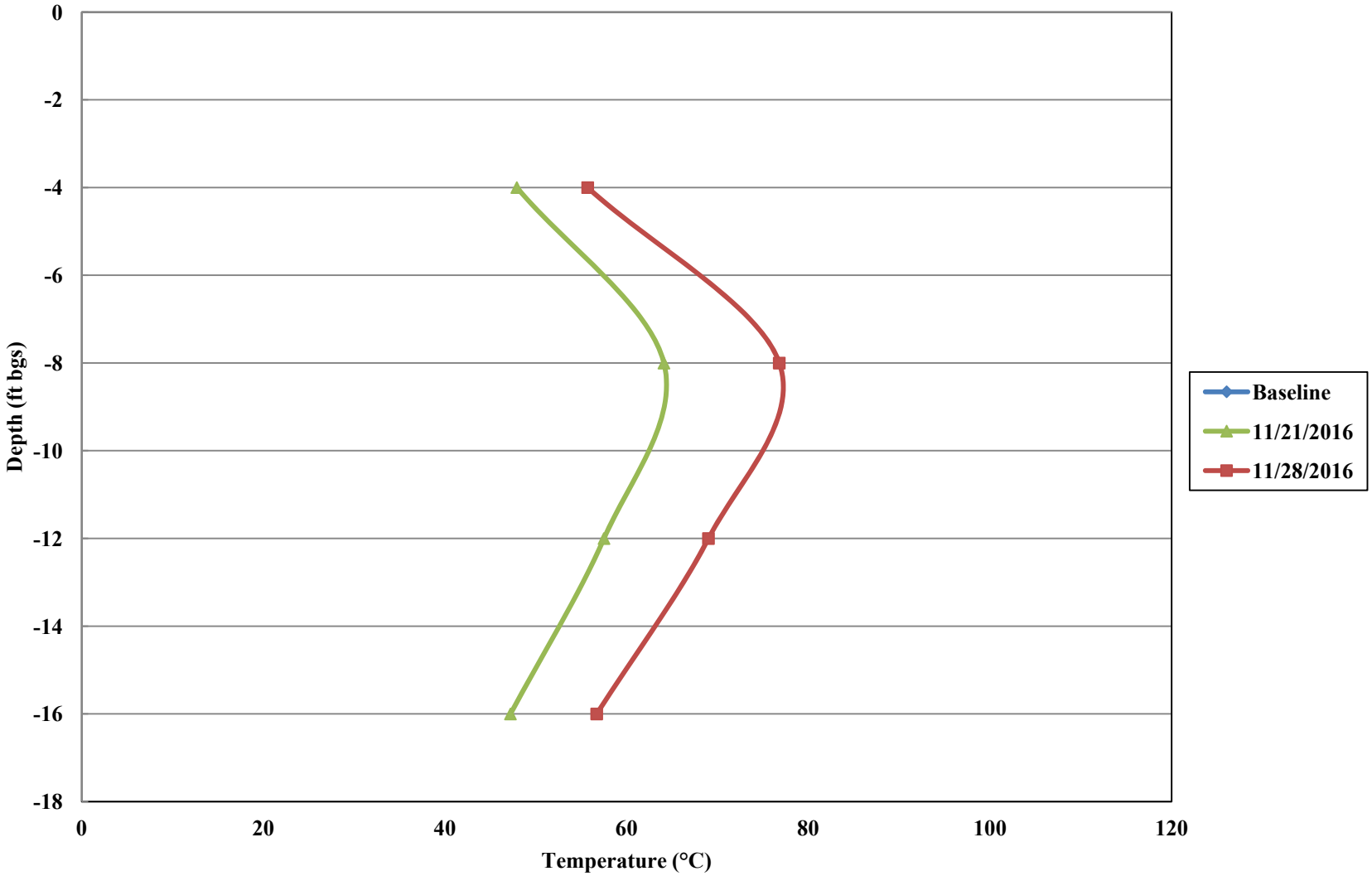

Figure 2c TMP E3

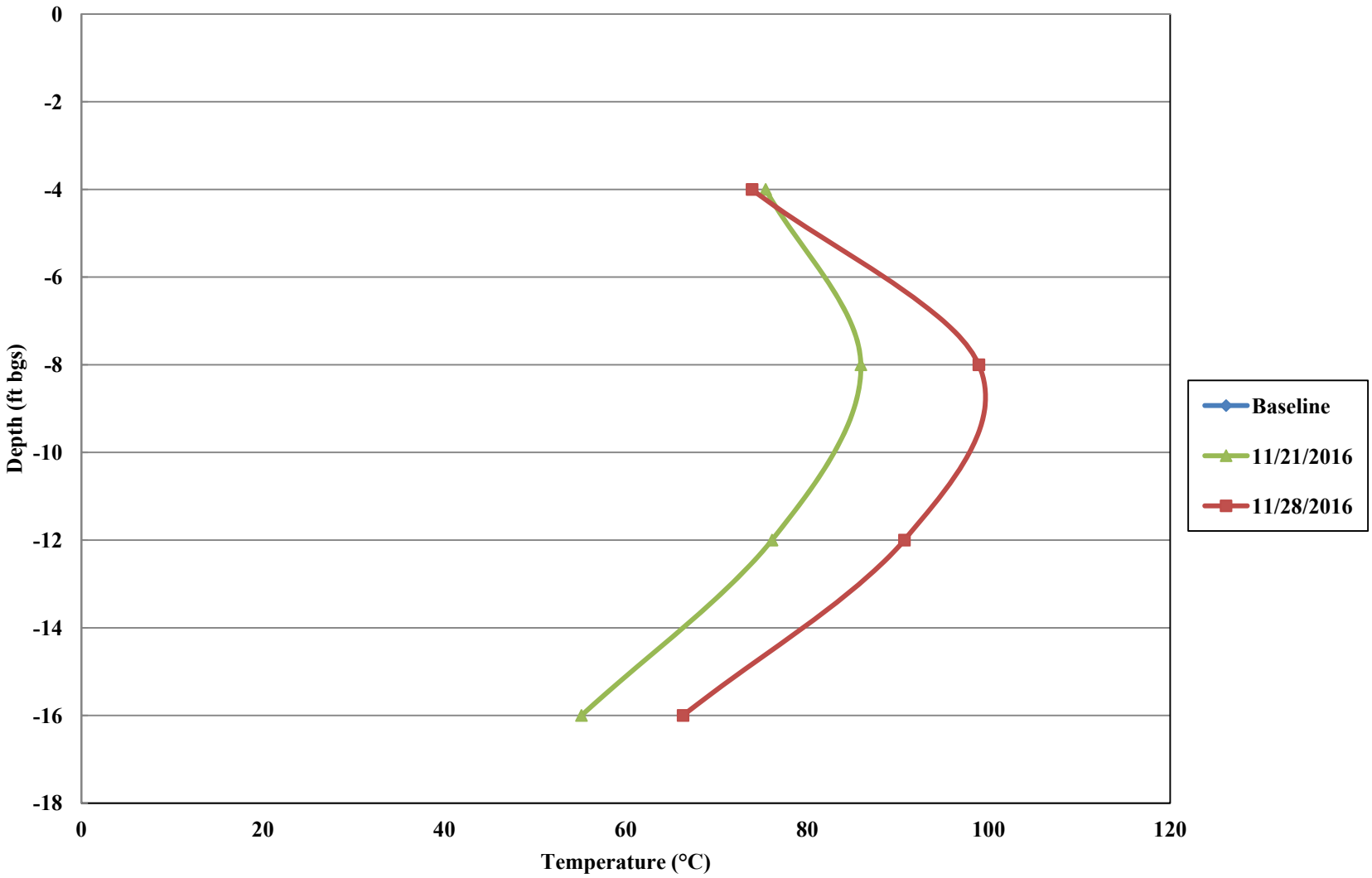

Figure 2d TMP E6