



Western Refining Southwest LLC

A subsidiary of Marathon Petroleum Corporation

I-40 Exit 39

Jamestown, NM 87347

November 30, 2021

Mr. Kevin Pierard, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

**RE: Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan
Western Refining Southwest LLC, Marathon Gallup Refinery
EPA ID #NMD000333211
HWB-WRG-20-003**

Dear Mr. Pierard:

Attached please find the Investigation Work Plan for the Area of Concern (AOC) 26 – Process Units and AOC 27 – Boiler and Cooling Unit Area as requested in:

1. Comment 9 of the New Mexico Environment Department (NMED) “Disapproval, Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report” letter dated June 2, 2021,
2. “AOC 26 (Process Units)” and “AOC 27 (Boiler and Cooling Unit Area)” paragraphs of the NMED “Determination of Area of Concern (AOC) Entry to the Permit” letter dated August 19, 2021, and
3. Comments 4 and 16 of the NMED “Disapproval, Revised Investigation Work Plan No. 2 Area of Concern 35” letter dated October 20, 2021.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at (505) 722-0205.



Western Refining Southwest LLC

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I-40 Exit 39

Jamestown, NM 87347

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction of supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Western Refining Southwest LLC, Marathon Gallup Refinery

A handwritten signature in black ink that reads "Ruth A. Cade".

Ruth Cade
Vice President

Enclosure

cc: D. Cobrain, NMED HWB
M. Suzuki, NMED HWB
L. Barr, NMOCD
K. Luka, Marathon Petroleum Corporation

L. King, EPA Region 6
J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro Corporation

Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan



**Western Refining Southwest LLC
(D/B/A Marathon Gallup Refinery)**

Gallup, New Mexico

EPA ID# NMD000333211

November 30, 2021



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

Executive Summary

Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) (Refinery) is submitting this Work Plan for soil investigation in the vicinity of Area of Concern (AOC) 26 – Process Units and AOC 27 – Boiler and Cooling Unit Area. The New Mexico Environment Department (NMED) requested further investigation in the AOC 26 area based on the laser-induced fluorescence (LIF) results in Comment 9 of the “Disapproval, Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report” letter dated June 2, 2021 (NMED 2021a). Investigation into AOC 26 and AOC 27 was also requested in “AOC 26 (Process Units)” and “AOC 27 (Boiler and Cooling Unit Area)” paragraphs of the “Determination of Area of Concern (AOC) Entry to the Permit” letter dated August 19, 2021 (NMED 2021b) and Comments 4 and 16 of the “Disapproval, Revised Investigation Work Plan No. 2 Area of Concern 35” letter dated October 20, 2021 (NMED 2021c). Specifically, Comment 9 requested that an AOC 26 investigation work plan be submitted to NMED by November 30, 2021.

As summarized in the LIF report (Western 2021), there are gasoline- and diesel-indicative LIF responses northwest and northeast of AOC 26. This Work Plan proposes to evaluate the gasoline and diesel occurrences in AOC 26. This Work Plan includes installation of 24 soil borings and collection of 2 light non-aqueous phase liquid (LNAPL) samples from nearby groundwater monitoring wells. Soil samples will be collected using a geoprobe direct-push drill rig, and LNAPL samples will be collected using disposable bailers. All samples will be analyzed for methyl tert-butyl ether, benzene, toluene, ethylbenzene, and total xylenes, total petroleum hydrocarbons (TPH) – diesel range organics, TPH – gasoline range organics, total arsenic, total chromium, and total lead. The Refinery will prepare an investigation report summarizing the sampling results and investigation conclusions within 120 days of the receipt of the analytical data.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
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Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

List of Acronyms

%	percent
amsl	above mean sea level
AOC	Area of Concern
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
COC	chain of custody
DRO	diesel range organics
ft	foot or feet
GRO	gasoline range organics
LIF	laser-induced fluorescence
LNAPL	light non-aqueous phase liquid
MTBE	methyl tert-butyl ether
NMED	New Mexico Environment Department
PID	photoionization detector
QA/QC	quality assurance/quality control
Refinery	Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery
SSL	soil screening level
TPH	total petroleum hydrocarbons
VOC	volatile organic compounds



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

1.0 Introduction

The Western Refining Southwest LLC, (D/B/A Marathon Gallup Refinery) (Refinery) is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Refinery property covers approximately 810 acres.

This Work Plan is for the investigation of soils around Area of Concern (AOC) 26 – Process Units and AOC 27 – Boiler and Cooling Unit Area (Figure 1). The New Mexico Environment Department (NMED) requested further investigation in the AOC 26 area based on the laser-induced fluorescence (LIF) results in Comment 9 of the “Disapproval, Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report” letter dated June 2, 2021 (NMED 2021a). Investigation into AOC 26 and AOC 27 was also requested in “AOC 26 (Process Units)” and “AOC 27 (Boiler and Cooling Unit Area)” paragraphs of the “Determination of Area of Concern (AOC) Entry to the Permit” letter dated August 19, 2021 (NMED 2021b) and Comments 4 and 16 of the “Disapproval, Revised Investigation Work Plan No. 2 Area of Concern 35” letter dated October 20, 2021 (NMED 2021c). Specifically, Comment 9 requested that an AOC 26 investigation work plan be submitted to NMED by November 30, 2021.

The “Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report,” concluded there are gasoline- and diesel-indicative LIF responses to the northwest and northeast from AOC 26 (Western 2021). LIF logs in the vicinity of AOC 26 are provided as Appendix A and soil samples collected during the LIF investigation in the vicinity of AOC 26 are summarized in Table 1.

The “Determination of Area of Concern (AOC) Entry to the Permit” states that the “absence of residual contamination in the AOC has not been confirmed” referring to AOC 27. It should be noted that there are no documented releases directly associated with AOC 27 (Western 2015).

This Work Plan proposes a sampling plan to evaluate the diesel and gasoline occurrences in AOC 26 and to evaluate the absence of residual contamination in AOC 27. The sampling plan includes installation of 24 soil borings, collection of a maximum of 96 soil samples, and collection of 2 light non-aqueous phase liquid (LNAPL) samples from nearby groundwater monitoring wells. Soil samples will be collected using a geoprobe direct-push drill rig, and LNAPL samples will be collected using disposable bailers. All samples will be analyzed for methyl tert-butyl ether (MTBE), benzene, toluene, ethylbenzene, and total xylenes (BTEX), total petroleum hydrocarbons (TPH) – diesel range organics (DRO), TPH - gasoline range organics (GRO), total arsenic, total chromium, and total lead. These constituents were selected as indicator parameters based on previous soil, groundwater, and LIF investigations in the vicinity of AOC 26 and AOC 27. The results from this investigation will be used for future engineering remediation evaluations.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

2.0 Site Conditions

The Refinery has been indefinitely idled since August 2020. Historically, the Refinery generally processed crude oil transported to the facility by pipeline or tanker truck. During active operation, various process units were operated at the Refinery, including alkylation (Alky), blending gas (Blnd Gas), crude distillation (Crude), diesel hydro-treating (DHT), fluid catalytic cracker (FCC), gas conditioning (Gas-Con), isomerization (ISOM), naphtha hydro-treating (NHT), reformer (PLAT), saturated gas (SATS), sulfur recovery (SRU), ammonium thiosulfate (Swatt's) and mercox treater (Treater) units, as shown on Figure 2. Refinery operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

2.1 Surface Conditions

Local site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the refinery property range from 6,860 feet (ft) above mean sea level (amsl) to 7,040 ft amsl. The AOC 26 and AOC 27 area is approximately 6,960 ft amsl.

2.2 Subsurface Conditions

The shallow subsurface soil (alluvium) is comprised of clay and silt with some inter-bedded sand layers. Beneath the alluvium is the Petrified Forest Member of the Chinle Group, which primarily consists of interbedded mudstone, siltstone, and sandstone. The Alluvium/Chinle interface is as little as 15 ft below ground surface (bgs) to over 32 ft bgs.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

3.0 Scope of Activities

The investigative activities proposed in this Work Plan will be completed to gain knowledge of the subsurface in the areas of AOC 26 and AOC 27. The investigation activities will help evaluate the diesel and gasoline occurrences in AOC 26 and evaluate the absence of residual contamination in AOC 27. Pending NMED approval, the Refinery anticipates investigation work to be completed during 2022.

Soil borings will be completed with a geoprobe direct-push drill rig at 24 locations around AOC 26 and AOC 27 (Figure 2). Based on LIF responses in this area (Appendix A), soil borings will be completed to a total depth of 40 ft bgs or until refusal, whichever occurs first. Soil borings will be screened in the field for presence of volatile organic compounds (VOCs) using a photoionization detector (PID). Soil will be collected at 5-ft intervals for PID field-screening, beginning with a surface sample. Analytical samples will be collected from the surface, just above the water table, the bottom of boring, and in the zone with the highest PID reading. Soil samples will be analyzed for MTBE and BTEX by Method 8260; TPH-DRO and TPH-GRO by Method 8015; and total arsenic, total lead, and total chromium by Method 6010. These constituents were selected as indicator parameters based on previous soil, groundwater, and LIF investigations in the vicinity of AOC 26 and AOC 27. The results from this investigation will be used for future engineering remediation evaluations. Analytical results will be compared to their respective NMED Residential and Industrial Soil Screening Levels (SSL).

LNAPL samples will be collected from monitoring wells OW-61 and MKTF-39 with a disposable bailer. During the June 2021 fluid level event, LNAPL measured 2.27 ft thick and 0.79 ft thick in OW-61 and MKTF-39, respectively. LNAPL samples will be analyzed for the same constituents as the soil samples.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

4.0 Investigation Methods

Soils obtained will be visually inspected and classified in general accordance with American Society for Testing and Materials D2487 (Unified Soil Classification System) and D2488 (Description and Identification of Soils). Detailed boring logs will be compiled in the field by qualified staff. Samples will be field screened using a PID for evidence of VOCs. PID results will be recorded on the boring logs and used to identify additional sample intervals.

4.1 Sample Collection Procedures

Samples will be collected in accordance with the “Standard Operating Procedure – Soil Sampling” (Appendix B). Details related to sample collection will be documented on the boring log field forms (Appendix C). General observations recorded on the field forms for each soil sample location will include sampling start and end times, weather, site conditions, sampling team members, and other personnel present. Sample-specific information will include field sample identification, time of sample collection, sample start and end depth, collection method, sample type (i.e., composite or aliquot), soil classification and characteristics, any deviations from or clarification of sampling procedures, and other observations.

PID readings will be collected at 5-ft intervals, beginning with a surface sample. Headspace vapor screening targets VOC and involves placing a soil sample in a plastic sample bag allowing space for ambient air. The plastic sample bag will be sealed and shaken gently to expose the soil to the air trapped in the container. The sealed bag will be allowed to rest while vapors equilibrate. Vapors present within the sample bag's headspace will be measured by inserting the probe of the PID in a small opening in the bag. The maximum value and the ambient air temperature will be recorded on the field boring log for each interval. Note that if samples are cold (i.e., below 32 degrees Fahrenheit), they will be sealed in airtight bags and warmed in a heated building and/or vehicle before screening.

After collecting the PID reading, sample jars will be filled, labeled, and placed in a cooler. Before shipment, each cooler will be packed with ice and a laboratory-provided trip blank. A chain of custody (COC) form will accompany each sample shipment. Coolers will be sealed and delivered to an accredited laboratory.

A summary of the proposed sampling activities is provided below:

1. Installation of 24 soil borings, visual screening/logging, and collection of soil samples. Samples will be collected from:
 - 5-ft intervals beginning at the surface (0 to 6 inches bgs)
 - Just above the water table
 - The bottom of boring
 - The zone with the highest PID reading.
2. Collection of PID readings at the surface and then every 5 ft



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

3. Collection of 2 LNAPL samples. Samples will be collected from:
 - Monitoring wells OW-61 and MKTF-39
4. Submit samples to an accredited laboratory. Samples will be analyzed for:
 - MTBE and BTEX by Method 8260
 - TPH-DRO and TPH-GRO by Method 8015
 - Total arsenic, total lead, and total chromium by Method 6010
5. Compare analytical soil data with applicable NMED Residential and Industrial SSLs.

4.2 Data Quality and Validation

Quality assurance/quality control (QA/QC) samples will be collected during sampling to monitor the validity of the sample collection procedures. Field duplicates will be collected at a rate of 10 percent (%) or at a minimum of 1 per day. Equipment blanks will be collected from re-usable equipment at a rate of 10% or at a minimum of 1 per day. One trip blank per cooler will accompany the samples to the laboratory. The field duplicates, equipment blank samples, and trip blanks will be submitted to the laboratory along with the soil samples. QA/QC samples will be recorded on the field forms and the COCs. All data will undergo Tier II data validation.

4.3 Data Evaluation and Waste Management

The soil analytical results will be compared to applicable NMED Industrial SSLs. The results will be presented to NMED in a subsequent investigation report. Soil recovered during sampling will be placed in drums, labeled, and stored on the 90-Day Pad. Waste characterization will be conducted prior to disposal. Waste characterization analysis will include testing for Method 8260 - volatile organic compounds, Method 8270 - semi-volatile organic compounds, and Resource Conservation and Recovery Act-8 Metals. Any wastes determined to be hazardous will be disposed of within 90 days.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

5.0 Schedule

Pending NMED approval, the Refinery anticipates the investigation to be completed during 2022. Once the investigation has been completed, the Refinery will prepare an investigation report summarizing the sampling results and investigation conclusions within 120 days of the receipt of the analytical data.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

6.0 References

New Mexico Environment Department (NMED). 2021a. Disapproval, Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-21-007. June 2.

NMED. 2021b. Determination of Area of Concern (AOC) Entry to the Permit, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-MISC. August 19.

NMED. 2021c. Disapproval, Revised Investigation Work Plan No. 2 Area of Concern 35, Western Refining Southwest Inc., Gallup Refinery, McKinley County, Gallup, New Mexico, EPA ID #NMD000333211, HWB-WRG-009. October 20.

Western Refining Southwest LLC (Western). 2015. RCRA Permit – Supplemental Information, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-13-001

Western. 2021. Marketing Tank Farm Laser-Induced Fluorescence/Hydraulic Profiling Investigation Report, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery. November 1.



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

Figures

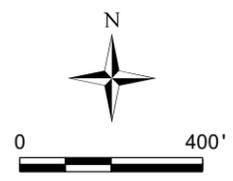


EXPLANATION

 AOC 26 - PROCESS UNITS AND AOC 27 - BOILER AND COOLING UNIT AREA

NOTE:

AOC - AREA OF CONCERN




1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 1

SITE LOCATION

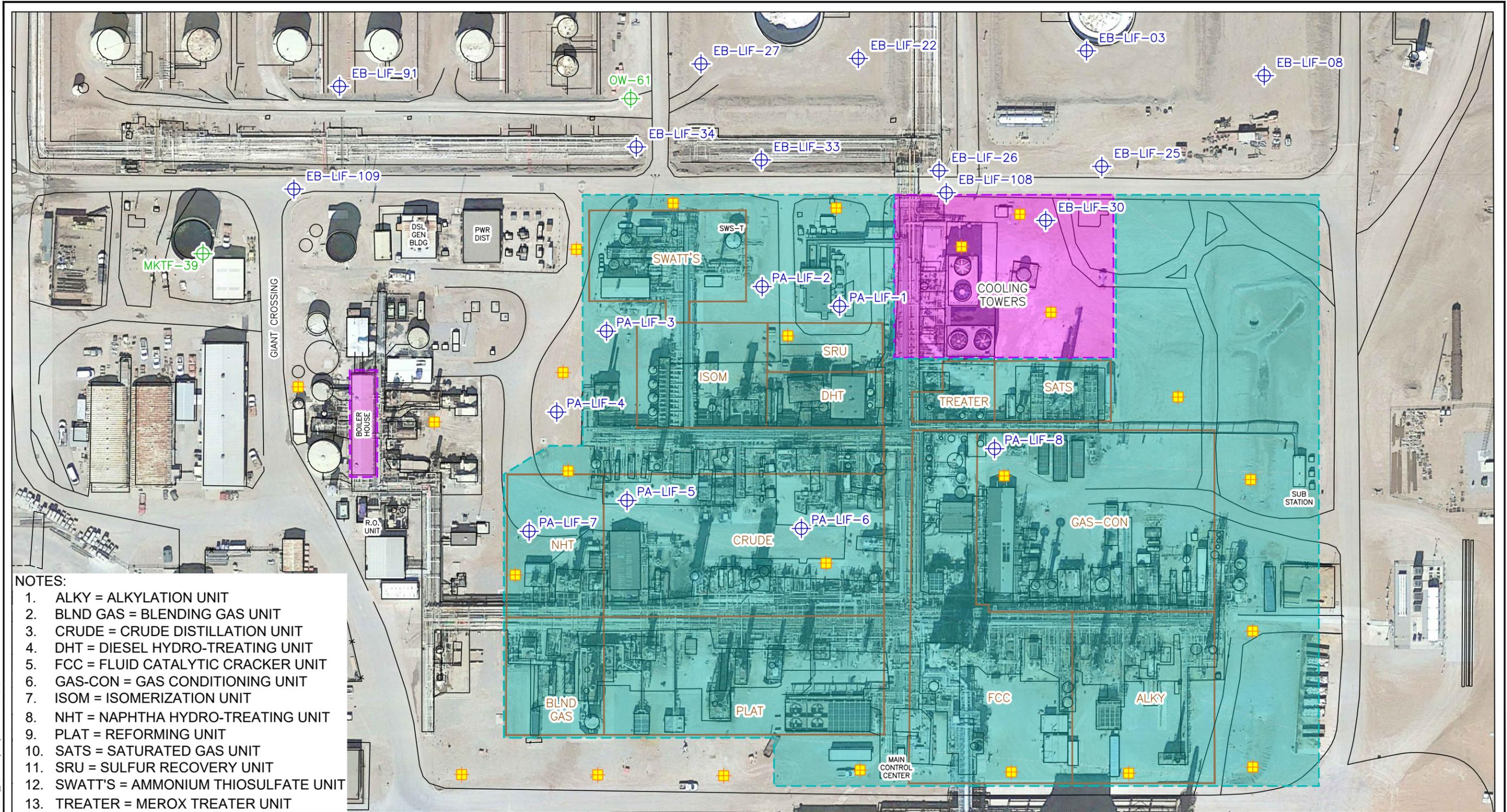
AOC 26 AND AOC 27 INVESTIGATION WORK PLAN

WESTERN REFINING SOUTHWEST LLC MARATHON

GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: KEJ	Checked By: EC	Scale: 1" = 400'	Date: 10/5/21	File: 1_SiteLoc_AOC26_WP_Fig1.mxd
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\\TRIHYRO.COM\CLIENTS\MARATHON\GIS\GALLUP\MAPPING\AOC26_28_PROCESS\UNIT\REPORTS\2021_WORKPLAN1_SITELOC_AOC26_WP_FIG1.MXD



- NOTES:**
1. ALKY = ALKYLATION UNIT
 2. BLND GAS = BLENDING GAS UNIT
 3. CRUDE = CRUDE DISTILLATION UNIT
 4. DHT = DIESEL HYDRO-TREATING UNIT
 5. FCC = FLUID CATALYTIC CRACKER UNIT
 6. GAS-CON = GAS CONDITIONING UNIT
 7. ISOM = ISOMERIZATION UNIT
 8. NHT = NAPHTHA HYDRO-TREATING UNIT
 9. PLAT = REFORMING UNIT
 10. SATS = SATURATED GAS UNIT
 11. SRU = SULFUR RECOVERY UNIT
 12. SWATT'S = AMMONIUM THIOSULFATE UNIT
 13. TREATER = MEROX TREATER UNIT

Image Citation: Google Earth Pro Imagery, Publication: March 2016.

EXPLANATION

<p> MKTf-39 PROPOSED LNAPL SAMPLE LOCATION AND DESIGNATION</p> <p> PROPOSED SOIL BORING LOCATION</p> <p> PA-LIF-7 LIF BORING LOCATION AND DESIGNATION</p> <p> FENCE</p> <p> BUILDING OR OTHER STRUCTURE</p>	<p> AOC 26 - PROCESS UNITS</p> <p> AOC 27 - BOILER AND COOLING UNIT AREA</p> <p> PROCESS UNIT AREAS</p> <p>AOC AREA OF CONCERN</p> <p>LIF LASER-INDUCED FLUORESCENCE</p> <p>LNAPL LIGHT NON-AQUEOUS PHASE LIQUID</p>
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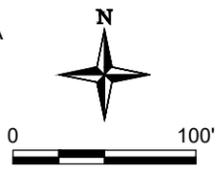


FIGURE 2

PROPOSED SAMPLING LOCATIONS
AOC 26 AND AOC 27 INVESTIGATION WORK PLAN

WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP Checked By: EC Scale: 1" = 100' Date: 11/3/21 File: 697-AOC-26-2021

\\TRIHYRO.COM\CLIENTS\VTOM\REFINERY\GALLUP\REPORTS\AOC\697-AOC-26-2021



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

Table

**TABLE 1. SOIL SAMPLE RESULTS
AOC 26 AND AOC 27 INVESTIGATION WORK PLAN
WESTERN REFINING SOUTHWEST LLC, MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO**

Sample ID	Date Sampled	Sample Depth (ft bgs)	TPH-DRO (mg/kg)	TPH-GRO (mg/kg)
EB-LIF-34	11/25/2019	20 - 21	1300	210
PA-LIF-07	2/5/2021	11 - 13	130	300
PA-LIF-07	2/5/2021	13 - 14	11	82
EB-LIF-108	5/14/2021	10 - 11	2500	110
EB-LIF-109	5/14/2021	11.5 - 12	630	24
EB-LIF-109	5/14/2021	15 - 15.5	730	17
NMED Industrial SSL:			3000	500

Notes:

AOC - Area of Concern

bgs - Below ground surface

DRO - Diesel range organics

ft - Feet

GRO - Gasoline range organics

ID - Identification

mg/kg - Milligrams per kilogram

NMED - New Mexico Environment Department

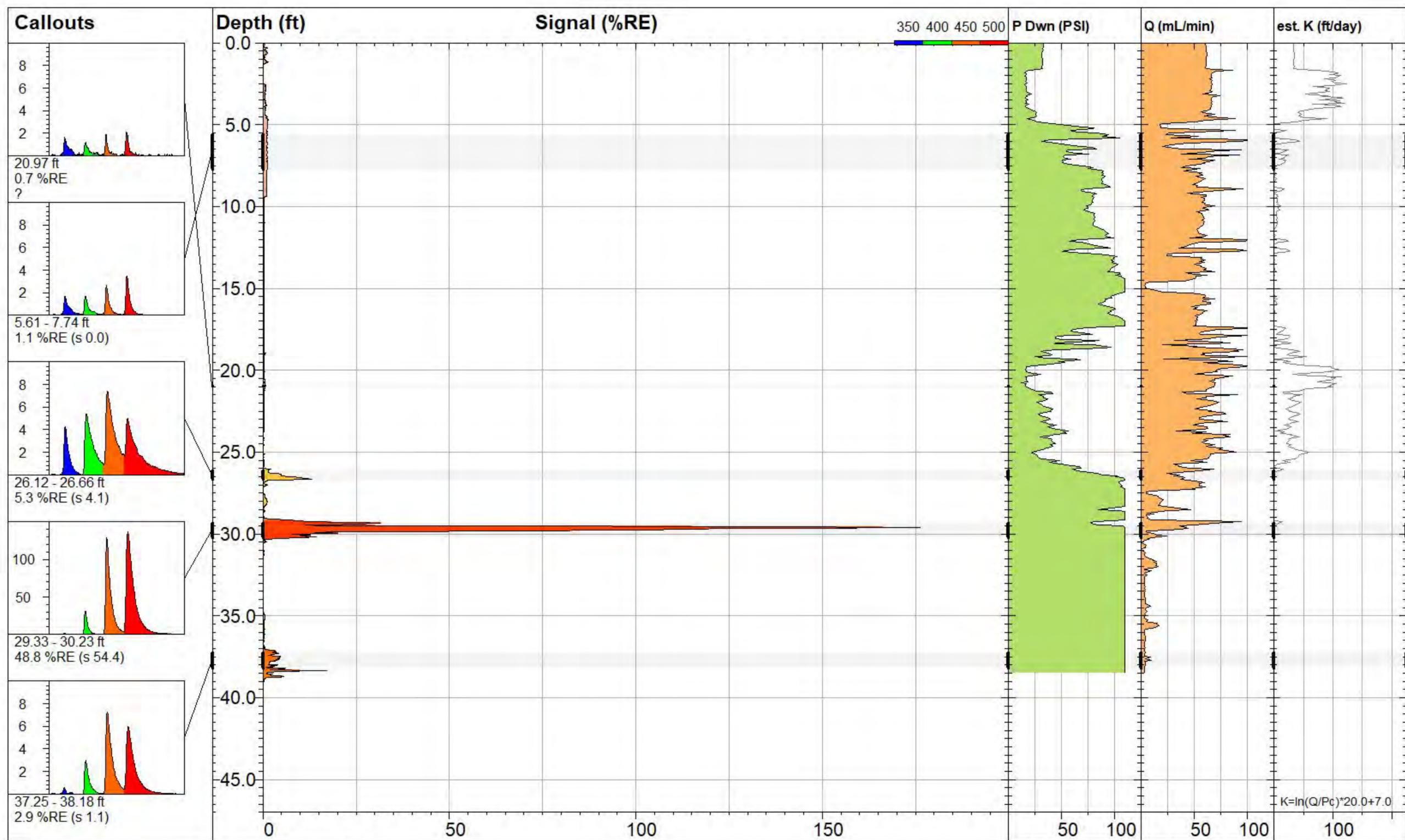
SSL - Soil Screening Level

TPH - Total petroleum hydrocarbons

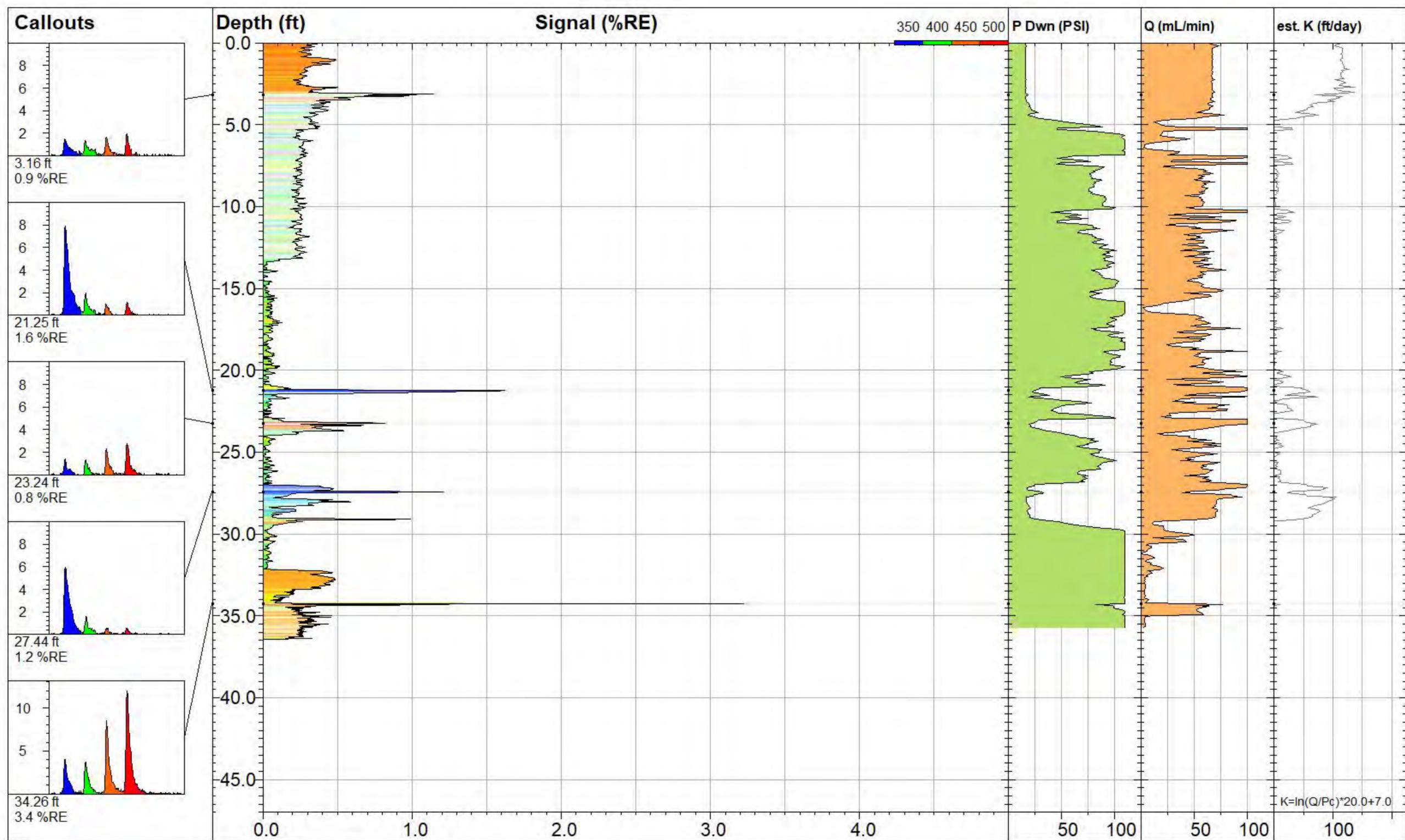


Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

Appendix A – LIF Logs

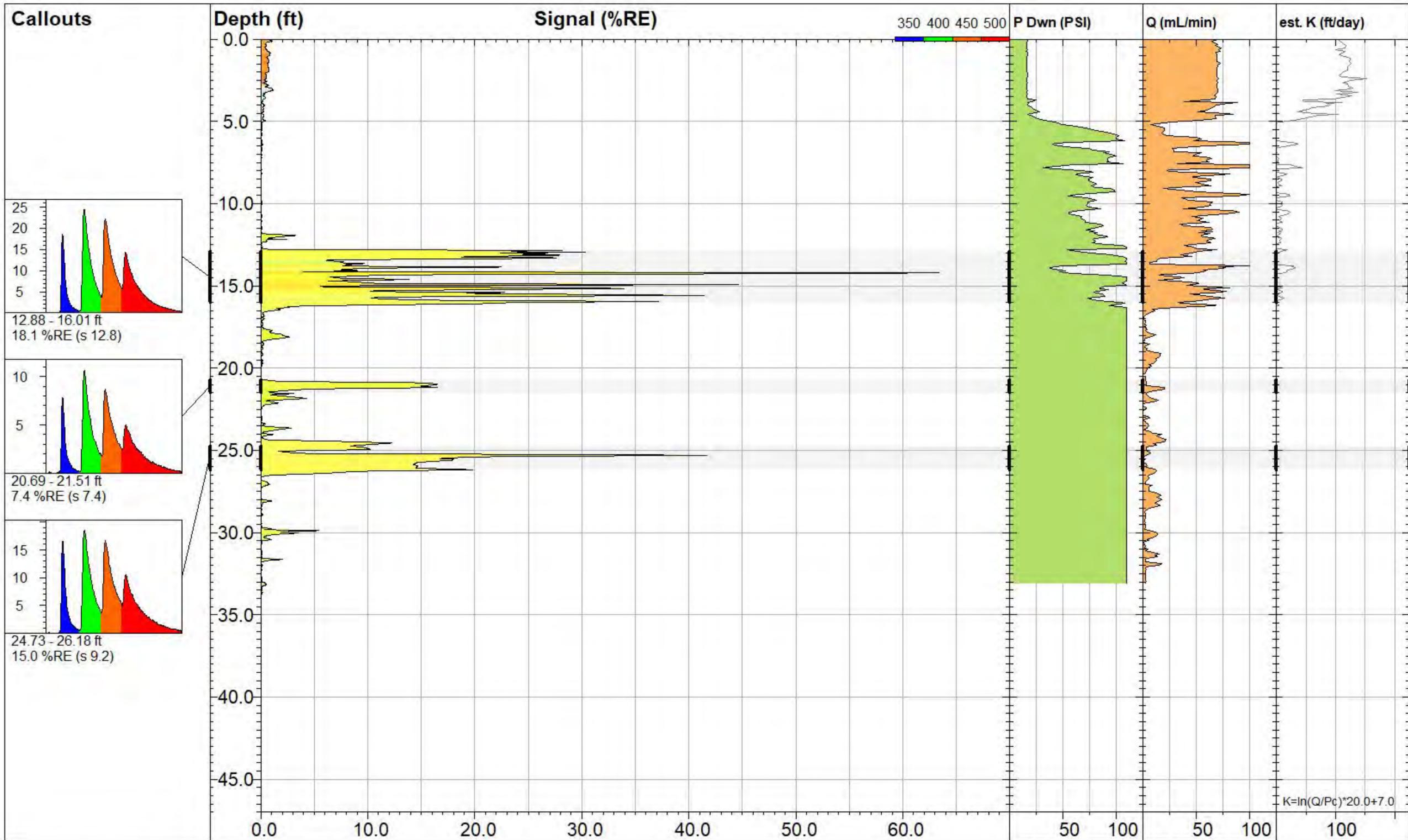


 DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM	EB-LIF-03		UVOST® By Dakota www.DakotaTechnologies.com		
	Site: Eastern Boundry LIF Investigation		Y Coord.(Lat-N) / System: Unavailable / NA		
	Client / Job: Trihydro / 0408.19		X Coord.(Lng-E) / Fix: Unavailable / NA		
	Operator / Unit: DS / CP / UVOST1003		Elevation: Unavailable		
		Final depth: 39.13 ft		Max signal: 179.2 %RE @ 29.60 ft	
				Date & Time: 2019-11-20 09:46 MST	

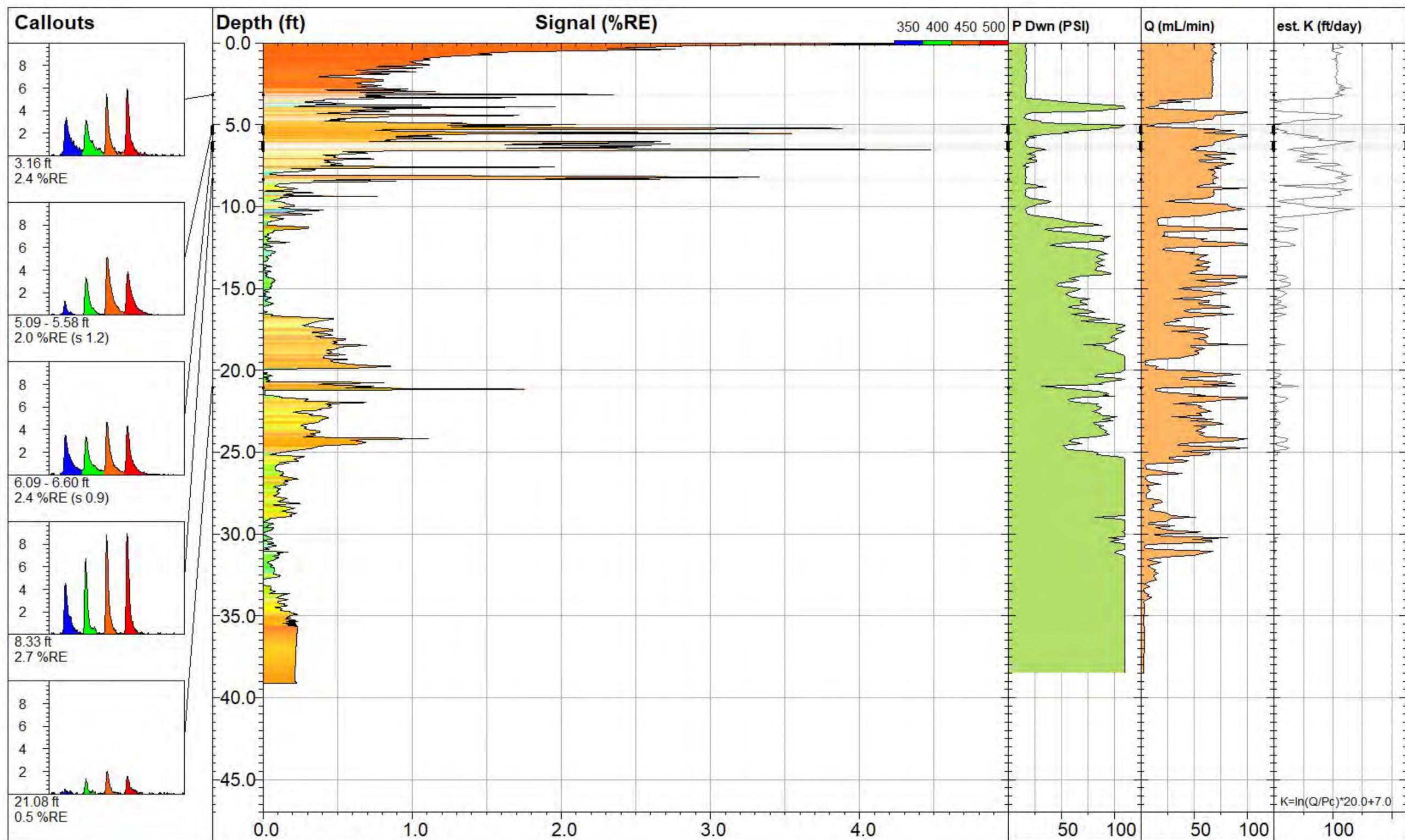


$K = \ln(Q/Pc) * 20.0 + 7.0$

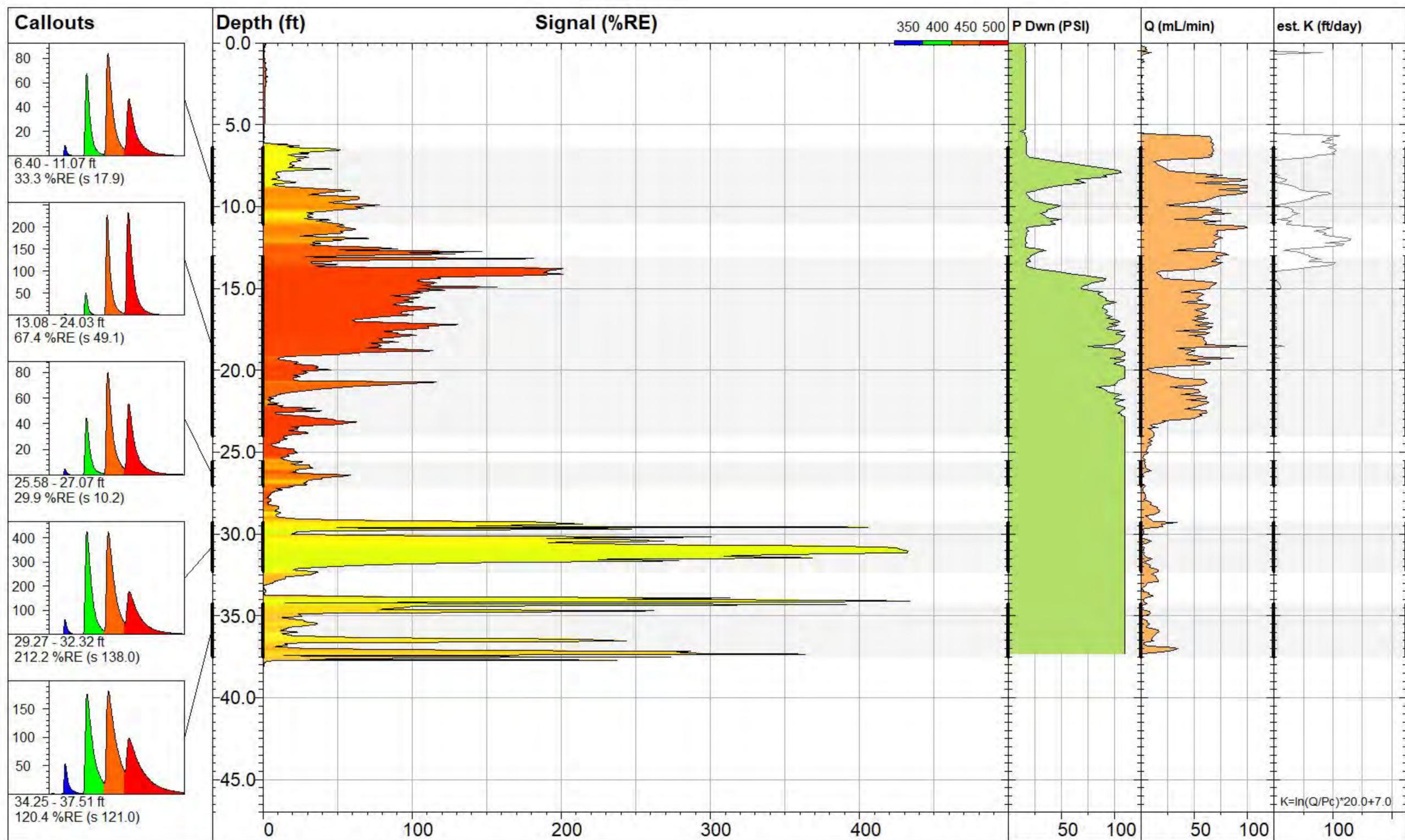
 <p>DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM</p>	EB-LIF-08		UVOST® By Dakota www.DakotaTechnologies.com		
	Site: Eastern Boundry LIF Investigation		Y Coord.(Lat-N) / System: Unavailable / NA		Final depth: 36.43 ft
	Client / Job: Trihydro / 0408.19		X Coord.(Lng-E) / Fix: Unavailable / NA		Max signal: 3.4 %RE @ 34.26 ft
	Operator / Unit: DS / CP / UVOST1003		Elevation: Unavailable		Date & Time: 2019-11-20 10:46 MST



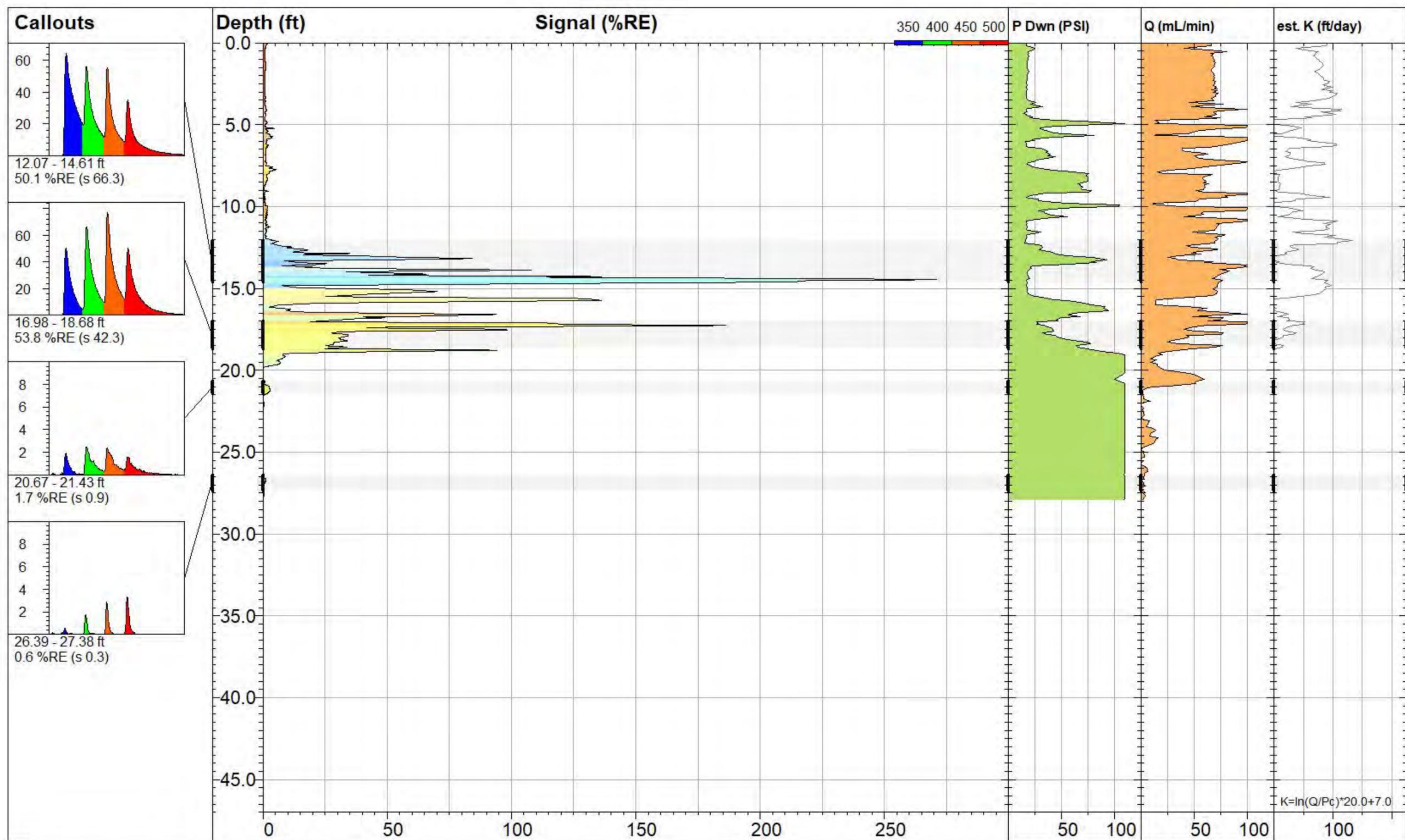
 DAKOTA TECHNOLOGIES <small>WWW.DAKOTATECHNOLOGIES.COM</small>	EB-LIF-22		UVOST® By Dakota www.DakotaTechnologies.com
	<i>Site:</i> Eastern Boundry LIF Investigation	<i>Y Coord.(Lat-N) / System:</i> Unavailable / NA	<i>Final depth:</i> 33.78 ft
	<i>Client / Job:</i> Trihydro / 0408.19	<i>X Coord.(Lng-E) / Fix:</i> Unavailable / NA	<i>Max signal:</i> 63.7 %RE @ 14.19 ft
	<i>Operator / Unit:</i> DS / CP / UVOST1003	<i>Elevation:</i> Unavailable	<i>Date & Time:</i> 2019-11-22 15:56 MST



 DAKOTA TECHNOLOGIES <small>WWW.DAKOTATECHNOLOGIES.COM</small>	EB-LIF-25		UVOST® By Dakota <small>www.DakotaTechnologies.com</small>	
	<i>Site:</i> Eastern Boundry LIF Investigation		<i>Y Coord.(Lat-N) / System:</i> Unavailable / NA	
	<i>Client / Job:</i> Trihydro / 0408.19		<i>X Coord.(Lng-E) / Fix:</i> Unavailable / NA	
	<i>Operator / Unit:</i> DS / CP / UVOST1003		<i>Elevation:</i> Unavailable	
		<i>Final depth:</i> 39.13 ft		<i>Max signal:</i> 4.5 %RE @ 6.52 ft
				<i>Date & Time:</i> 2019-11-21 13:49 MST

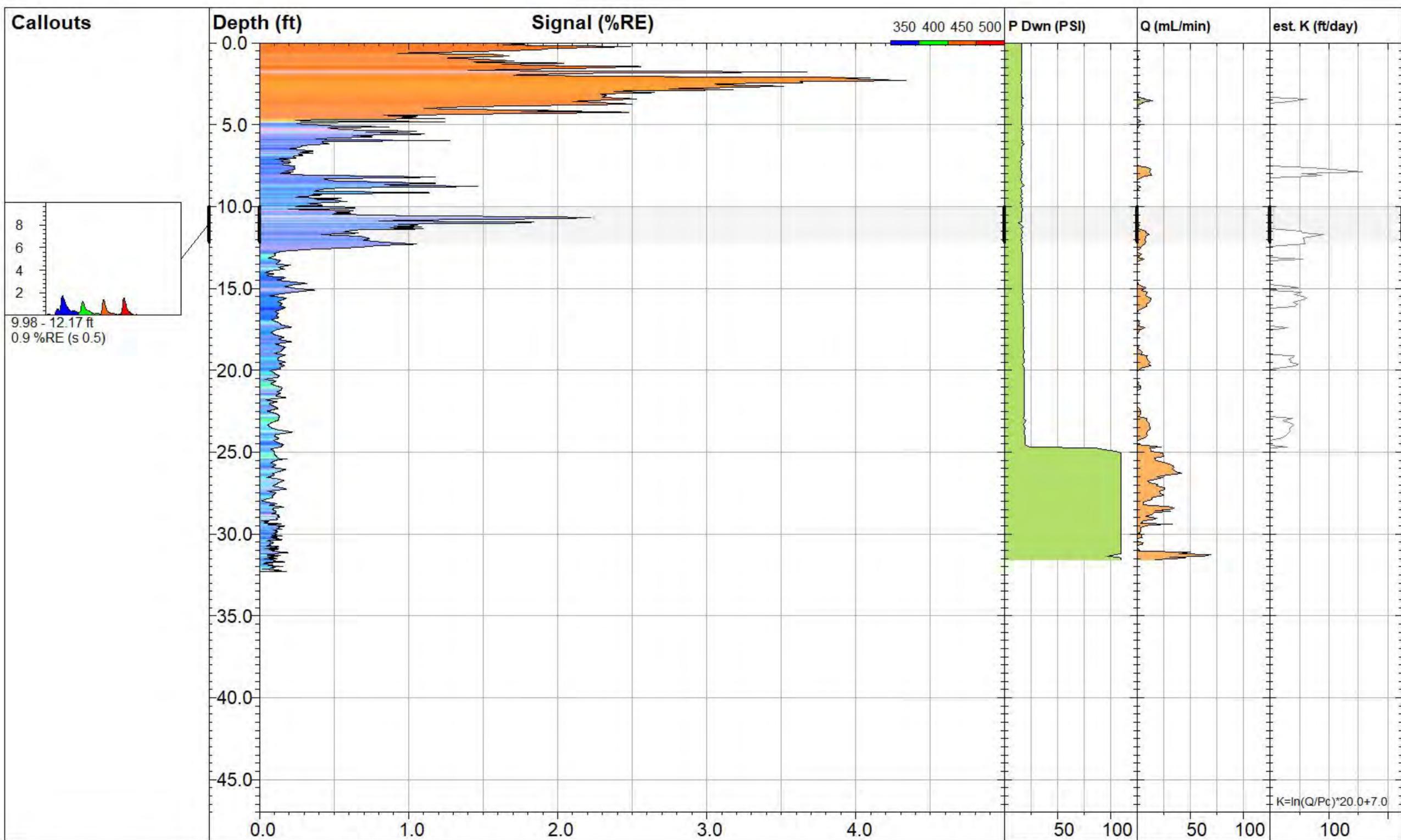


 DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM	EB-LIF-26		UVOST® By Dakota www.DakotaTechnologies.com	
	Site: Eastern Boundry LIF Investigation	Y Coord.(Lat-N) / System: Unavailable / NA	Final depth: 38.08 ft	
	Client / Job: Trihydro / 0408.19	X Coord.(Lng-E) / Fix: Unavailable / NA	Max signal: 435.9 %RE @ 34.12 ft	
	Operator / Unit: DS / CP / UVOST1003	Elevation: Unavailable	Date & Time: 2019-11-21 13:16 MST	

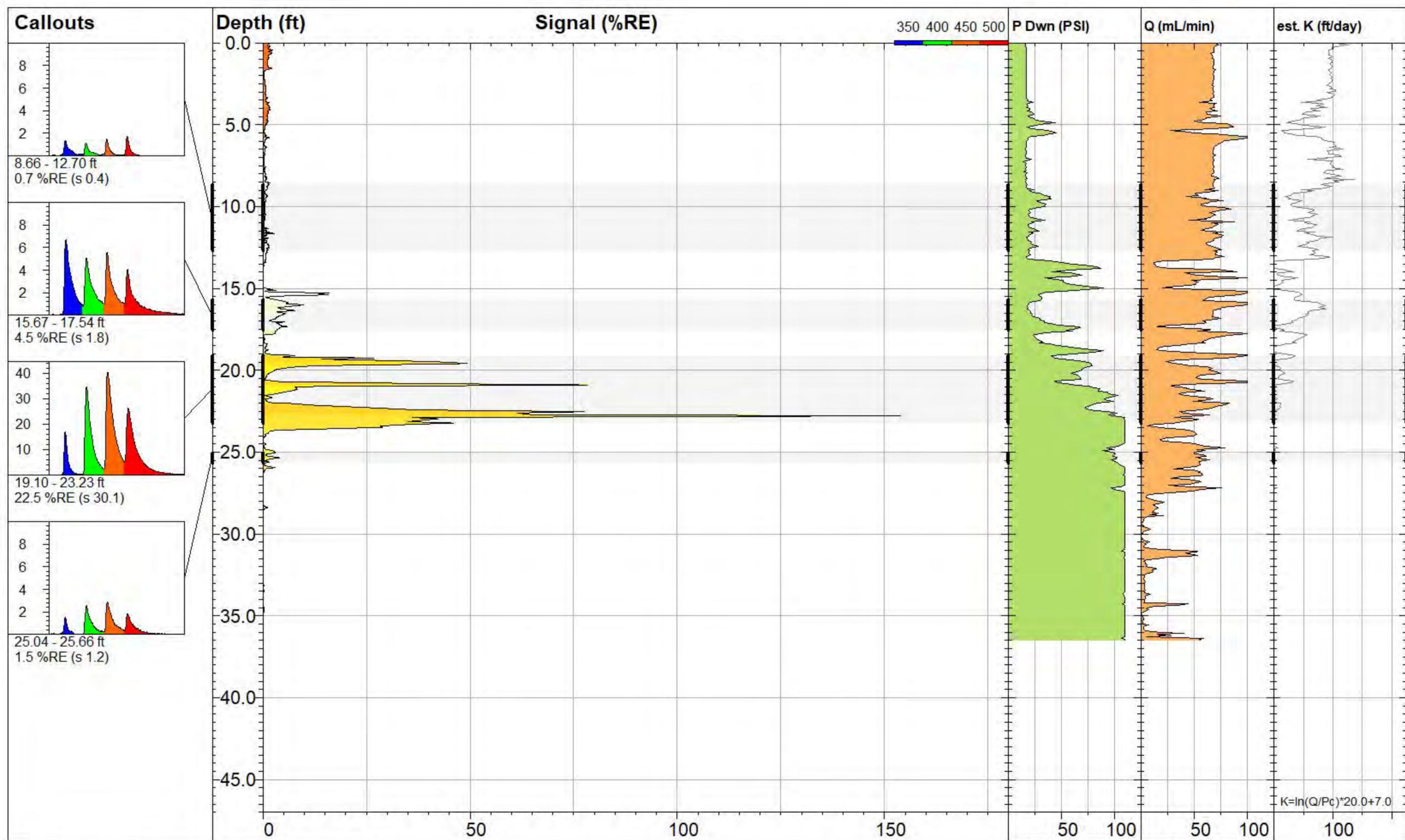


$K = \ln(Q/Pc) * 20.0 + 7.0$

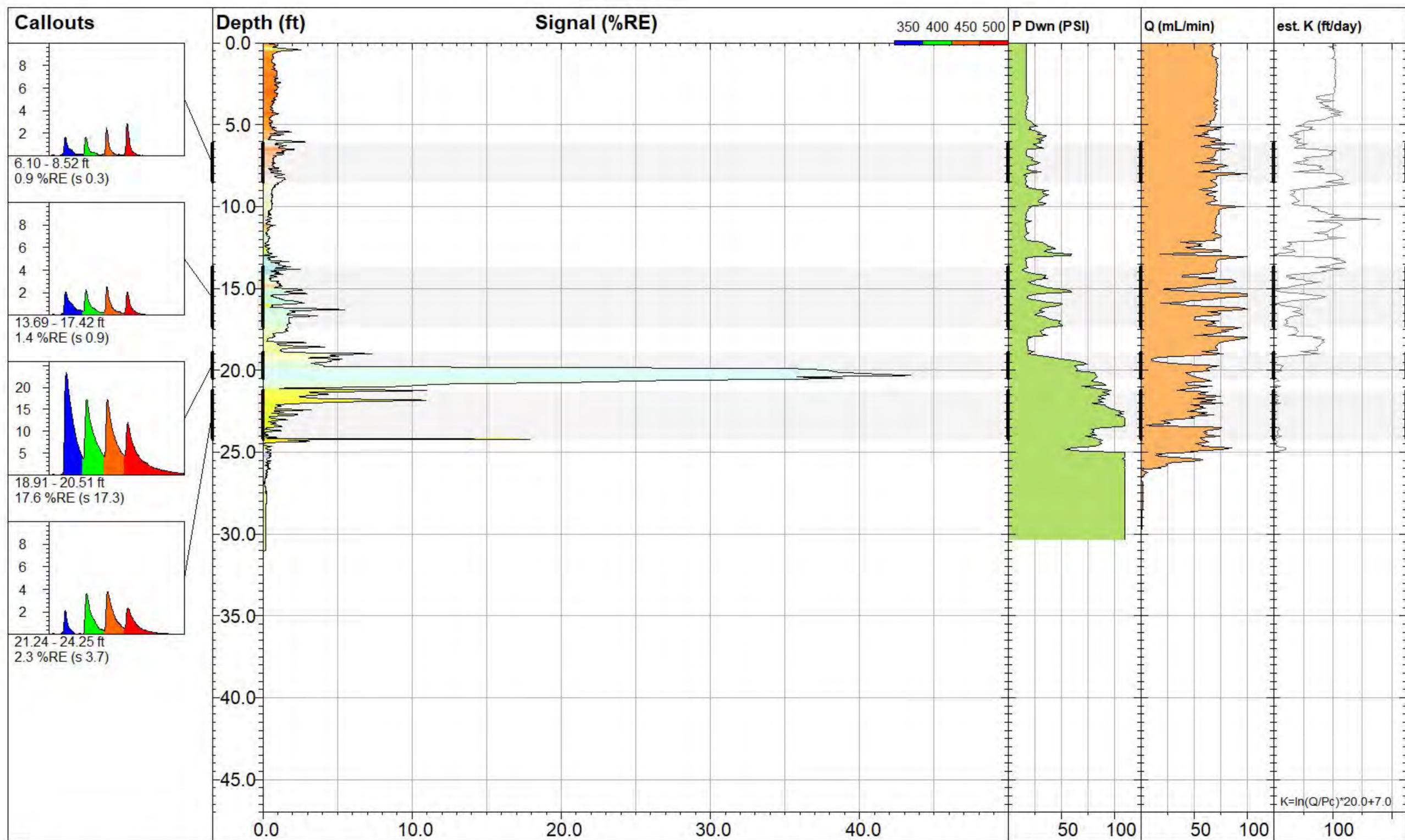
 DAKOTA TECHNOLOGIES <small>WWW.DAKOTATECHNOLOGIES.COM</small>	EB-LIF-27		UVOST® By Dakota www.DakotaTechnologies.com
	<i>Site:</i> Eastern Boundry LIF Investigation	<i>Y Coord.(Lat-N) / System:</i> Unavailable / NA	<i>Final depth:</i> 28.65 ft
	<i>Client / Job:</i> Trihydro / 0408.19	<i>X Coord.(Lng-E) / Fix:</i> Unavailable / NA	<i>Max signal:</i> 272.2 %RE @ 14.46 ft
	<i>Operator / Unit:</i> DS / CP / UVOST1003	<i>Elevation:</i> Unavailable	<i>Date & Time:</i> 2019-11-22 16:28 MST



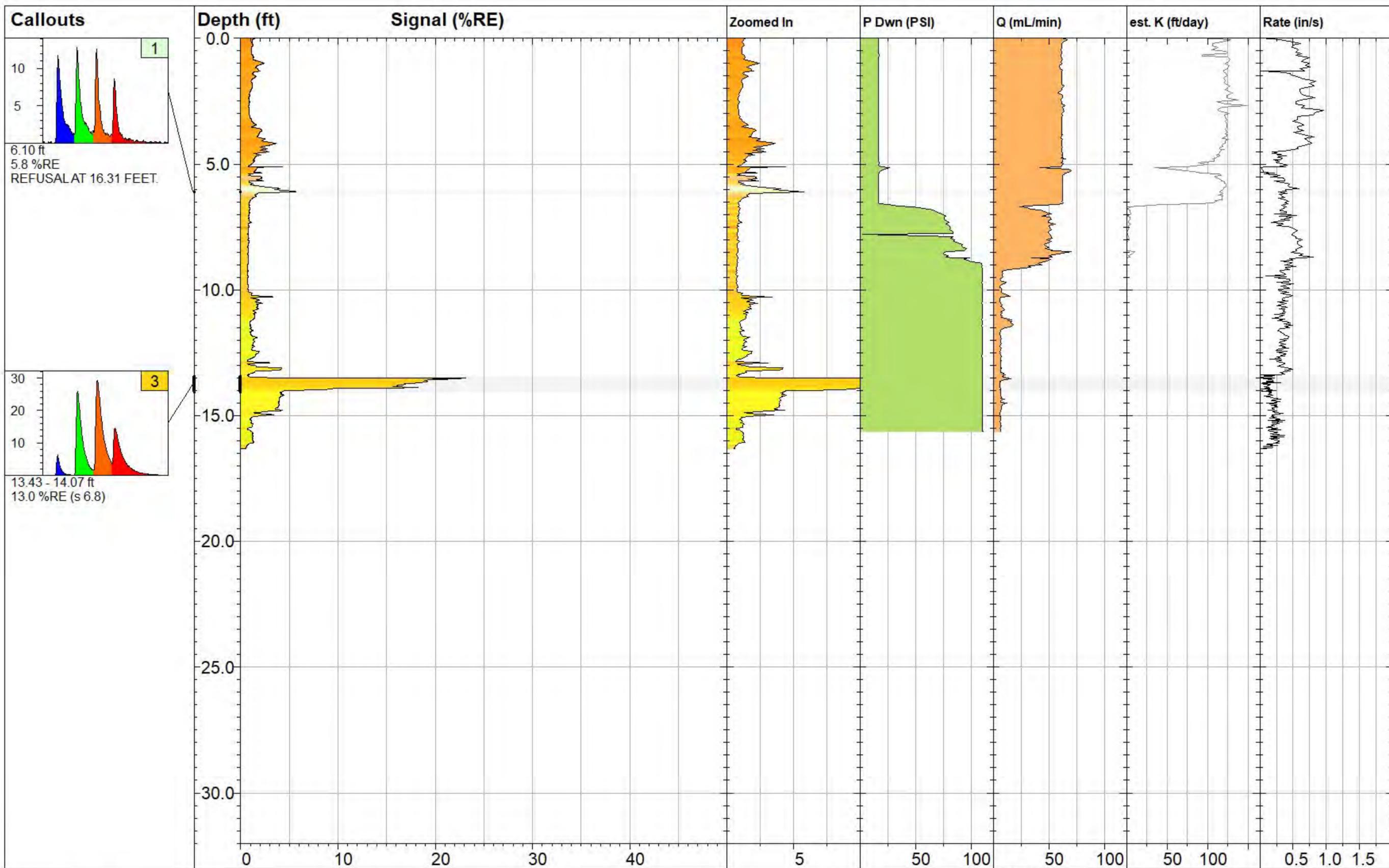
 <p>DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM</p>	<p>EB-LIF-30</p>		<p>UVOST® By Dakota www.DakotaTechnologies.com</p>		
	<p>Site: Eastern Boundry LIF Investigation</p>		<p>Y Coord.(Lat-N) / System: Unavailable / NA</p>		<p>Final depth: 32.30 ft</p>
	<p>Client / Job: Trihydro / 0408.19</p>		<p>X Coord.(Lng-E) / Fix: Unavailable / NA</p>		<p>Max signal: 4.3 %RE @ 2.30 ft</p>
	<p>Operator / Unit: BG / CP / UVOST1003</p>		<p>Elevation: Unavailable</p>		<p>Date & Time: 2019-11-25 08:06 MST</p>



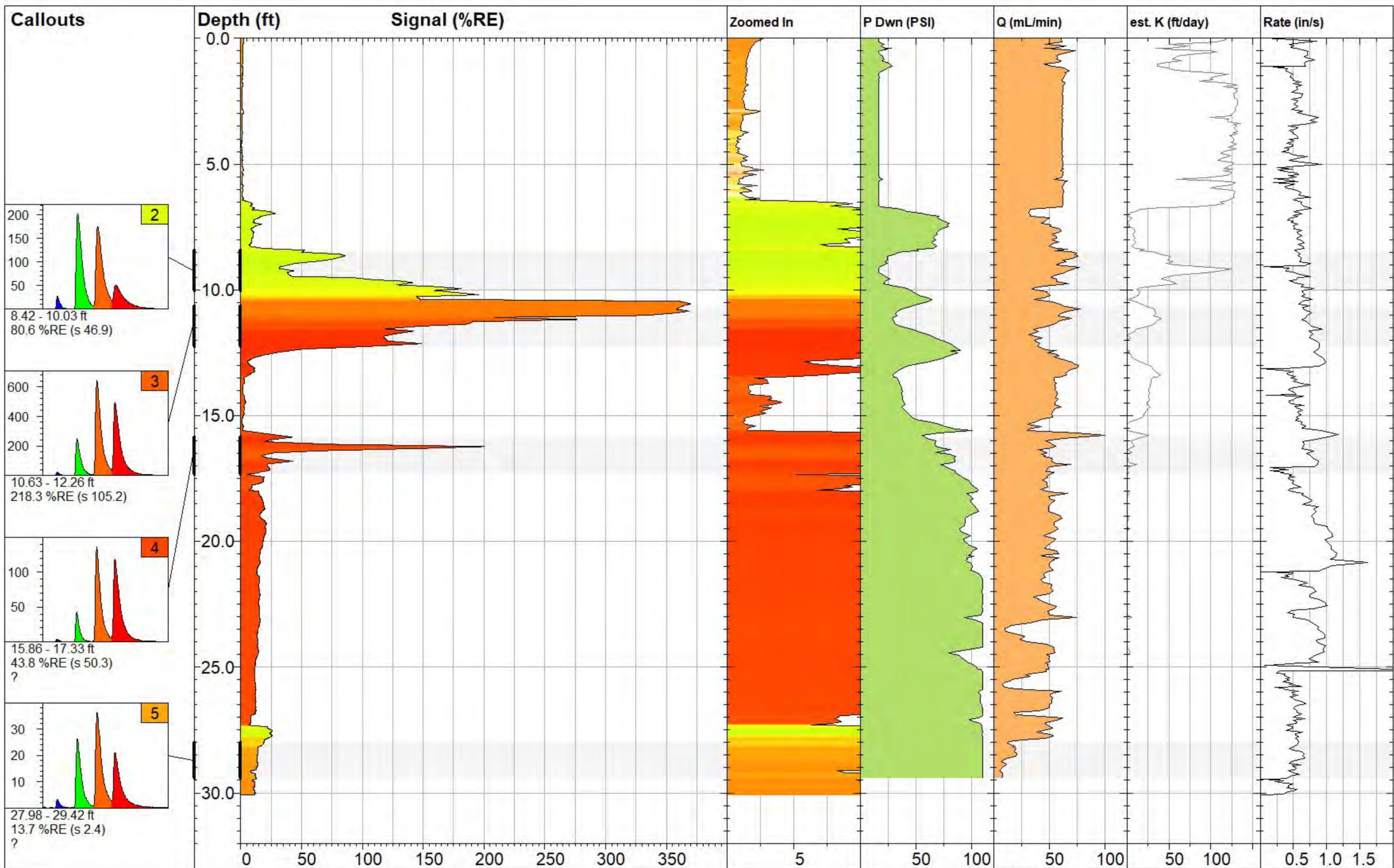
 <p>DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM</p>	EB-LIF-33		UVOST® By Dakota www.DakotaTechnologies.com		
	<i>Site:</i> Eastern Boundry LIF Investigation		<i>Y Coord.(Lat-N) / System:</i> Unavailable / NA		<i>Final depth:</i> 37.23 ft
	<i>Client / Job:</i> Trihydro / 0408.19		<i>X Coord.(Lng-E) / Fix:</i> Unavailable / NA		<i>Max signal:</i> 156.1 %RE @ 22.79 ft
	<i>Operator / Unit:</i> DS / CP / UVOST1003		<i>Elevation:</i> Unavailable		<i>Date & Time:</i> 2019-11-21 11:11 MST



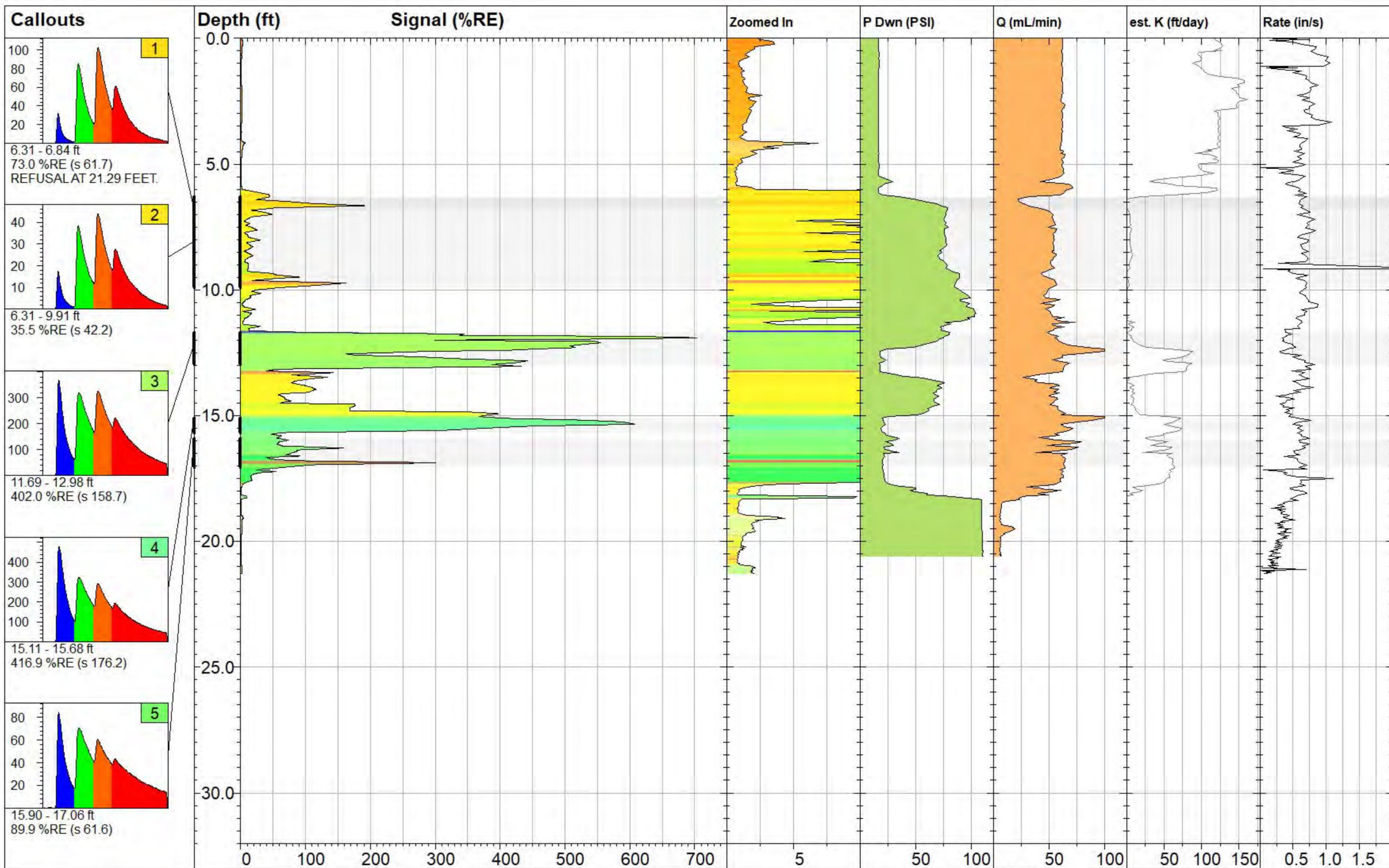
 DAKOTA TECHNOLOGIES <small>WWW.DAKOTATECHNOLOGIES.COM</small>	EB-LIF-34		UVOST® By Dakota <small>www.DakotaTechnologies.com</small>	
	<i>Site:</i> Eastern Boundry LIF Investigation		<i>Y Coord.(Lat-N) / System:</i> Unavailable / NA	
	<i>Client / Job:</i> Trihydro / 0408.19		<i>X Coord.(Lng-E) / Fix:</i> Unavailable / NA	
	<i>Operator / Unit:</i> DS / CP / UVOST1003		<i>Elevation:</i> Unavailable	
				<i>Final depth:</i> 31.02 ft
				<i>Max signal:</i> 43.4 %RE @ 20.32 ft
				<i>Date & Time:</i> 2019-11-21 09:41 MST



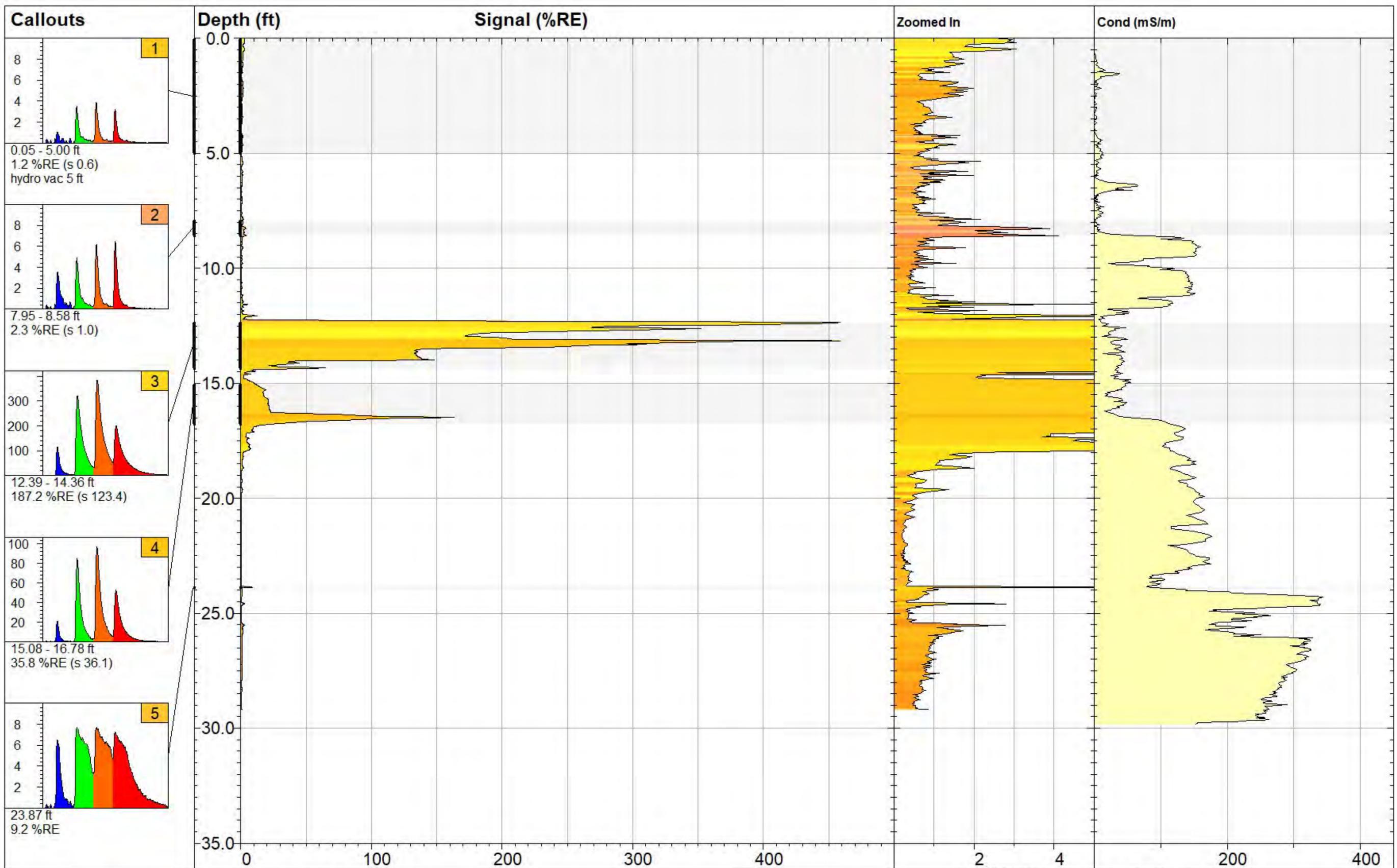
EB-LIF-91		UVOST® By Dakota www.DakotaTechnologies.com	
Site: Marathon Gallup Refinery	Y Coord.(Lat/North): Unavailable	Final Depth: 16.31 ft	
Client / Job: Trihydro / 0049B.21	X Coord.(Long/East): Unavailable	Max Signal: 23.3 %RE @ 13.51 ft	
Operator / Unit: BG / UVOST1612	Elevation: Unavailable	Date & Time: 2021-05-13 08:19 MDT	



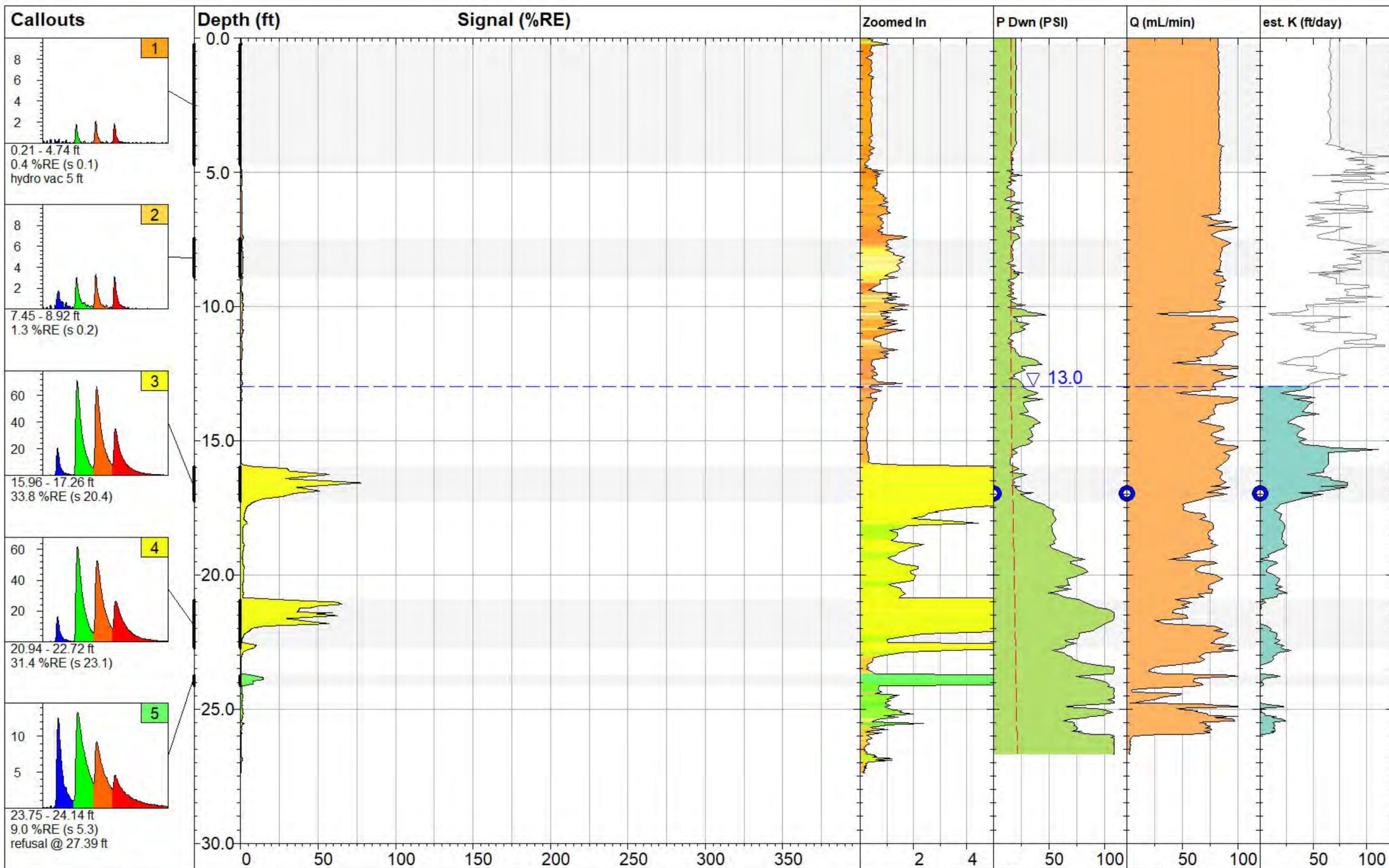
EB-LIF-108		UVOST® By Dakota www.DakotaTechnologies.com	
Site: Marathon Gallup Refinery	Y Coord.(Lat/North): Unavailable	Final Depth: 30.08 ft	
Client / Job: Trihydro / 0049B.21	X Coord.(Long/East): Unavailable	Max Signal: 370.0 %RE @ 10.56 ft	
Operator / Unit: BG / UVOST1612	Elevation: Unavailable	Date & Time: 2021-05-13 10:25 MDT	



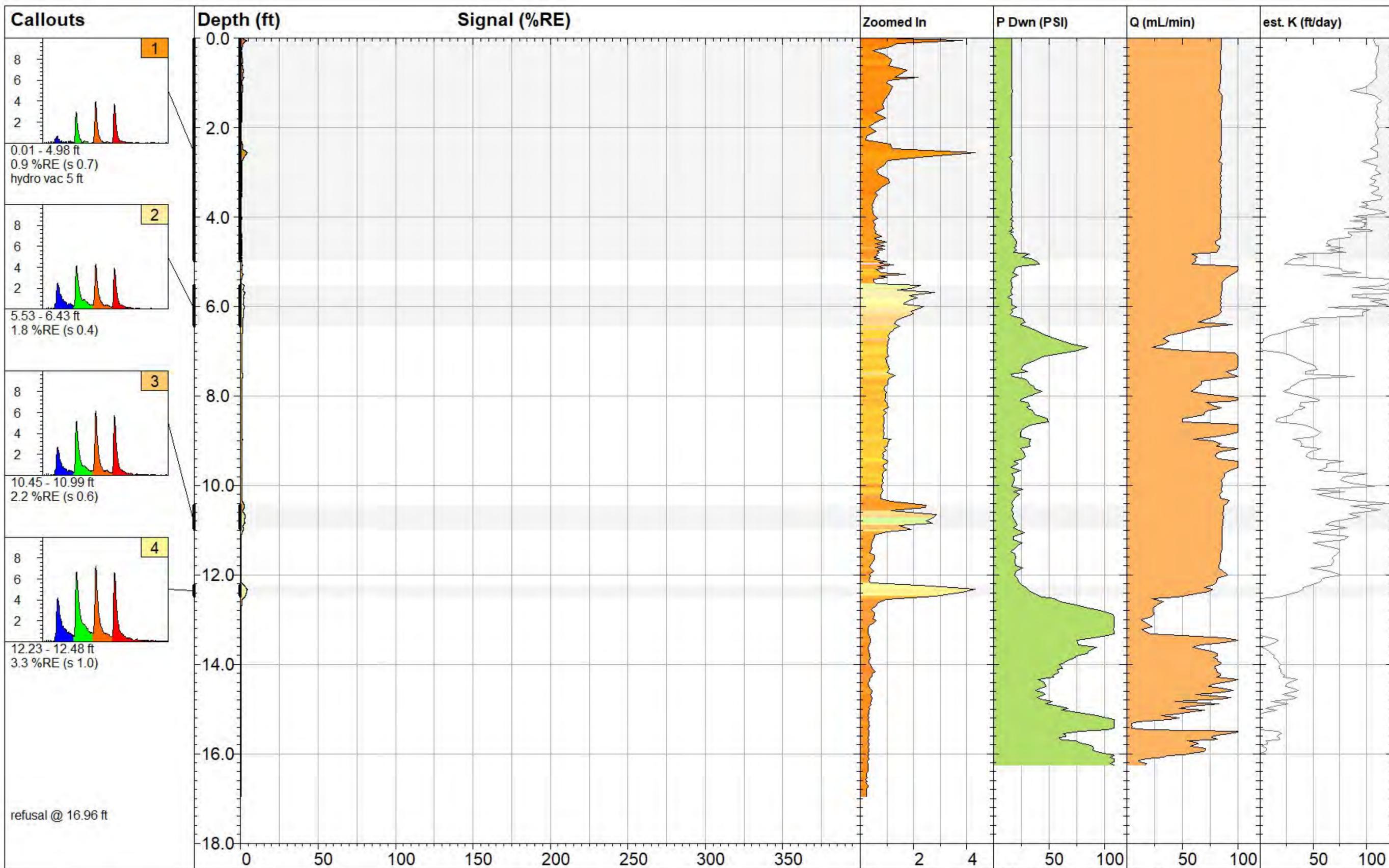
EB-LIF-109		UVOST® By Dakota www.DakotaTechnologies.com	
Site: Marathon Gallup Refinery	Y Coord.(Lat/North): Unavailable	Final Depth: 21.29 ft	
Client / Job: Trihydro / 0049B.21	X Coord.(Long/East): Unavailable	Max Signal: 703.6 %RE @ 11.91 ft	
Operator / Unit: BG / UVOST1612	Elevation: Unavailable	Date & Time: 2021-05-13 07:41 MDT	



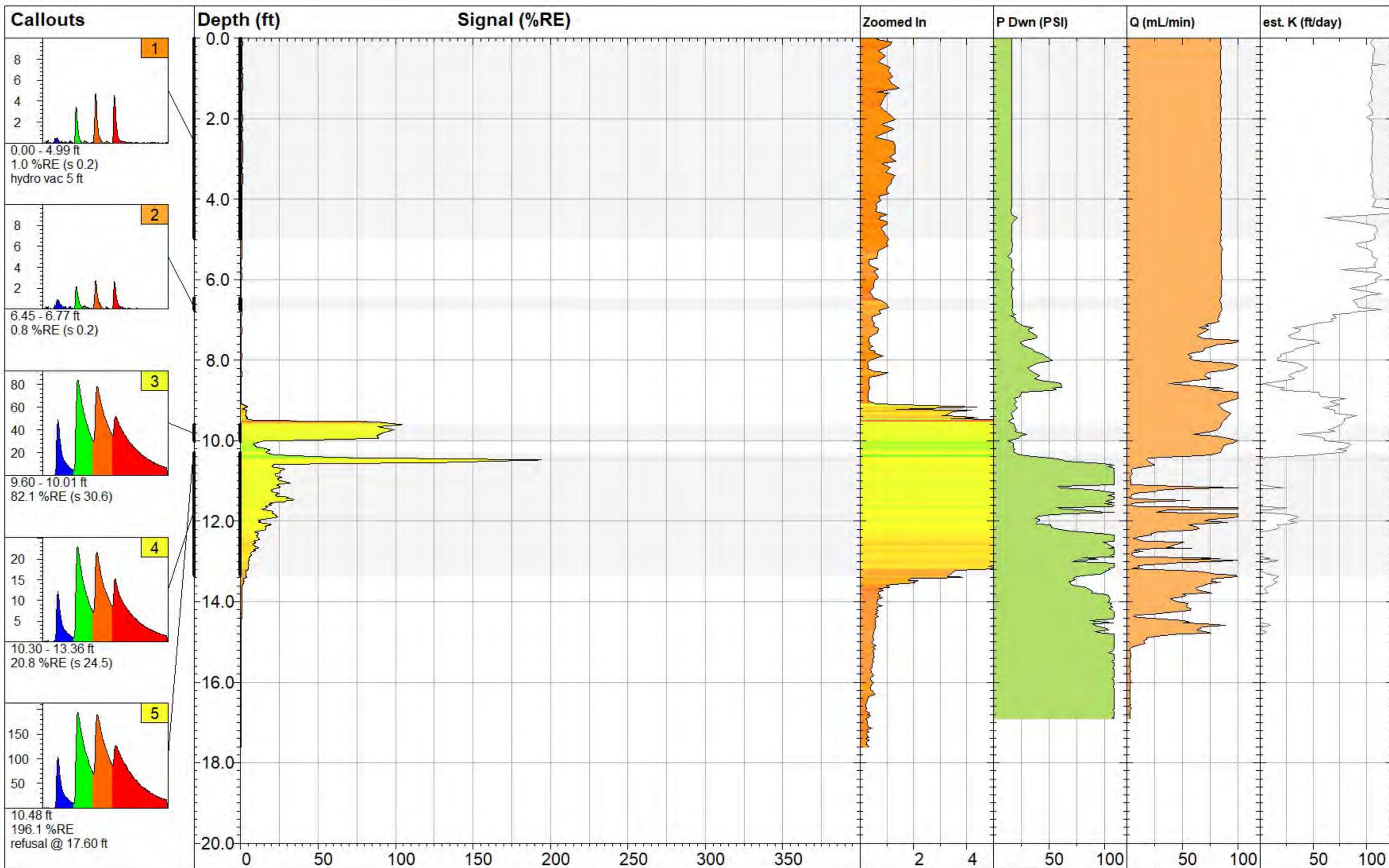
 DAKOTA TECHNOLOGIES www.DAKOTATECHNOLOGIES.COM	PA-LIF-01		UVOST® By Dakota www.DakotaTechnologies.com		
	Site: Marathon Marketing Tank Farm		Y Coord.(Lat/North): Unavailable		Final Depth: 29.19 ft
	Client / Job: TriHydro / 0049.21		X Coord.(Long/East): Unavailable		Max Signal: 464.7 %RE @ 13.15 ft
	Operator / Unit: A. Nagle / UVOST1613		Elevation: Unavailable		Date & Time: 2021-02-05 11:56 MST



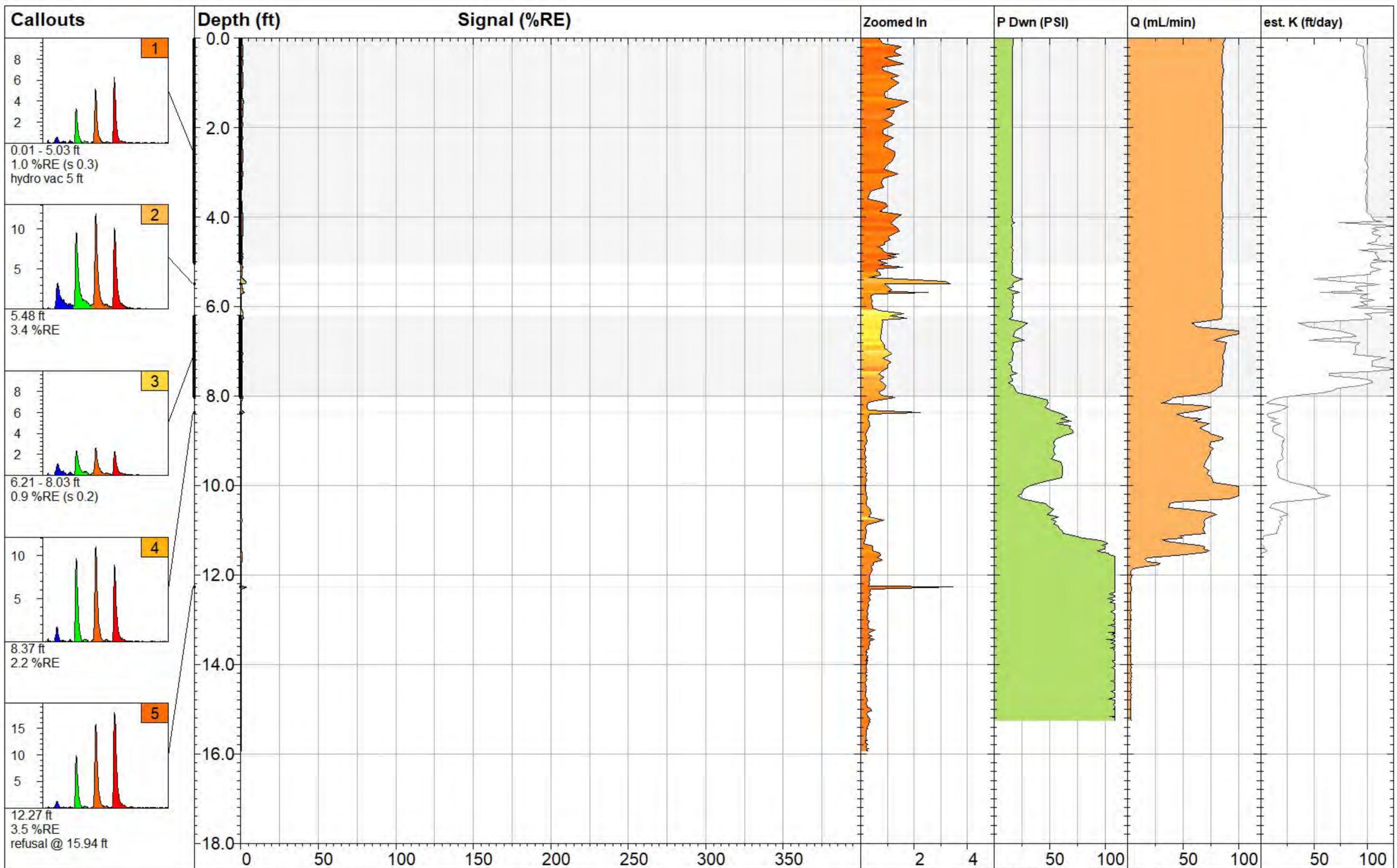
 <p>DAKOTA TECHNOLOGIES www.DAKOTATECHNOLOGIES.COM</p>	PA-LIF-02		UVOST® By Dakota www.DakotaTechnologies.com	
	Site: Marathon Marketing Tank Farm	Y Coord.(Lat/North): Unavailable	Final Depth: 27.39 ft	
	Client / Job: TriHydro / 0049.21	X Coord.(Long/East): Unavailable	Max Signal: 77.7 %RE @ 16.57 ft	
	Operator / Unit: A. Nagle / UVOST1613	Elevation: Unavailable	Date & Time: 2021-02-01 10:05 MST	



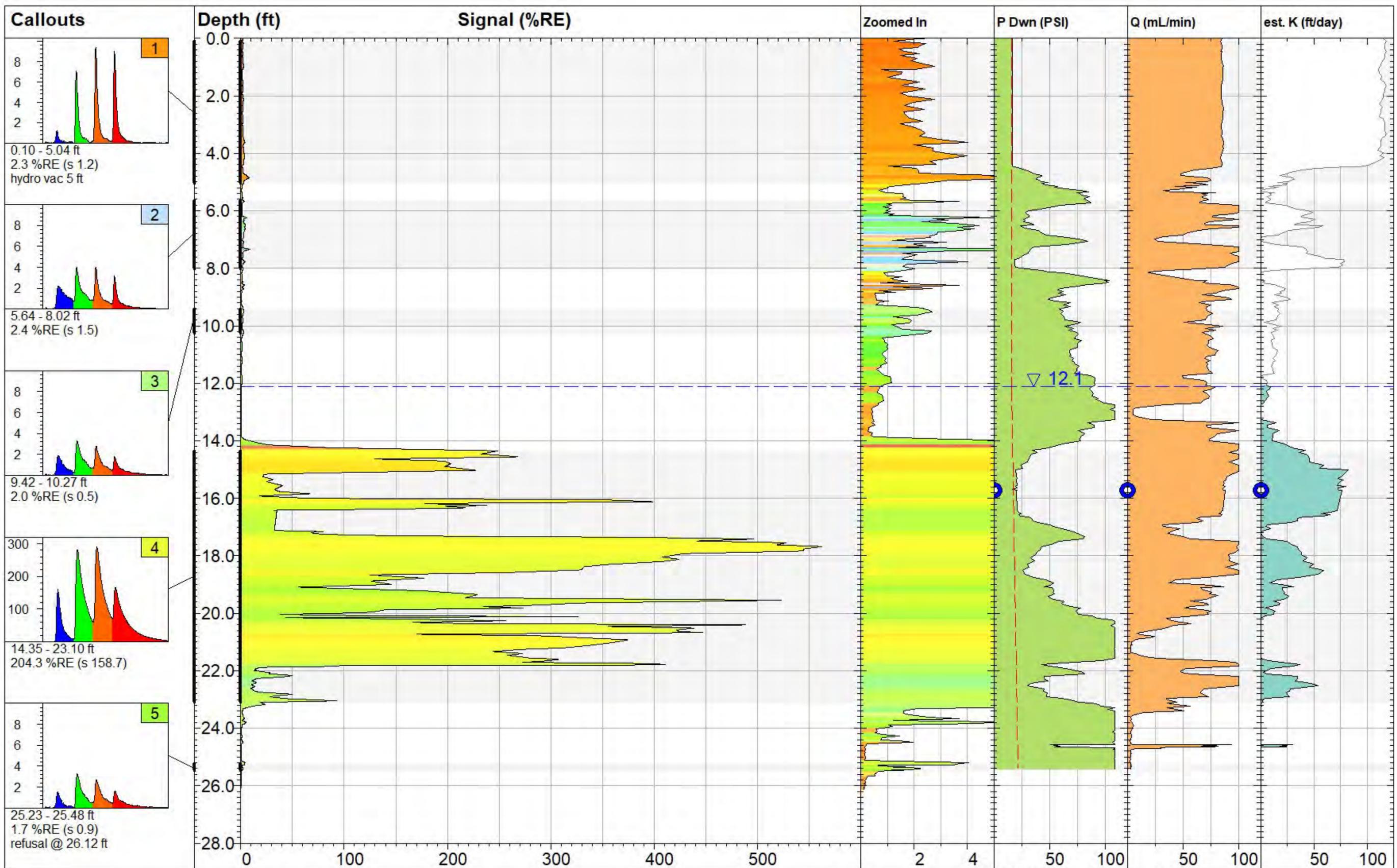
 <p>DAKOTA TECHNOLOGIES www.DAKOTATECHNOLOGIES.COM</p>	PA-LIF-03		UVOST® By Dakota www.DakotaTechnologies.com		
	Site: Marathon Marketing Tank Farm		Y Coord.(Lat/North): Unavailable		Final Depth: 16.96 ft
	Client / Job: TriHydro / 0049.21		X Coord.(Long/East): Unavailable		Max Signal: 4.3 %RE @ 2.55 ft
	Operator / Unit: A. Nagle / UVOST1613		Elevation: Unavailable		Date & Time: 2021-02-01 11:12 MST



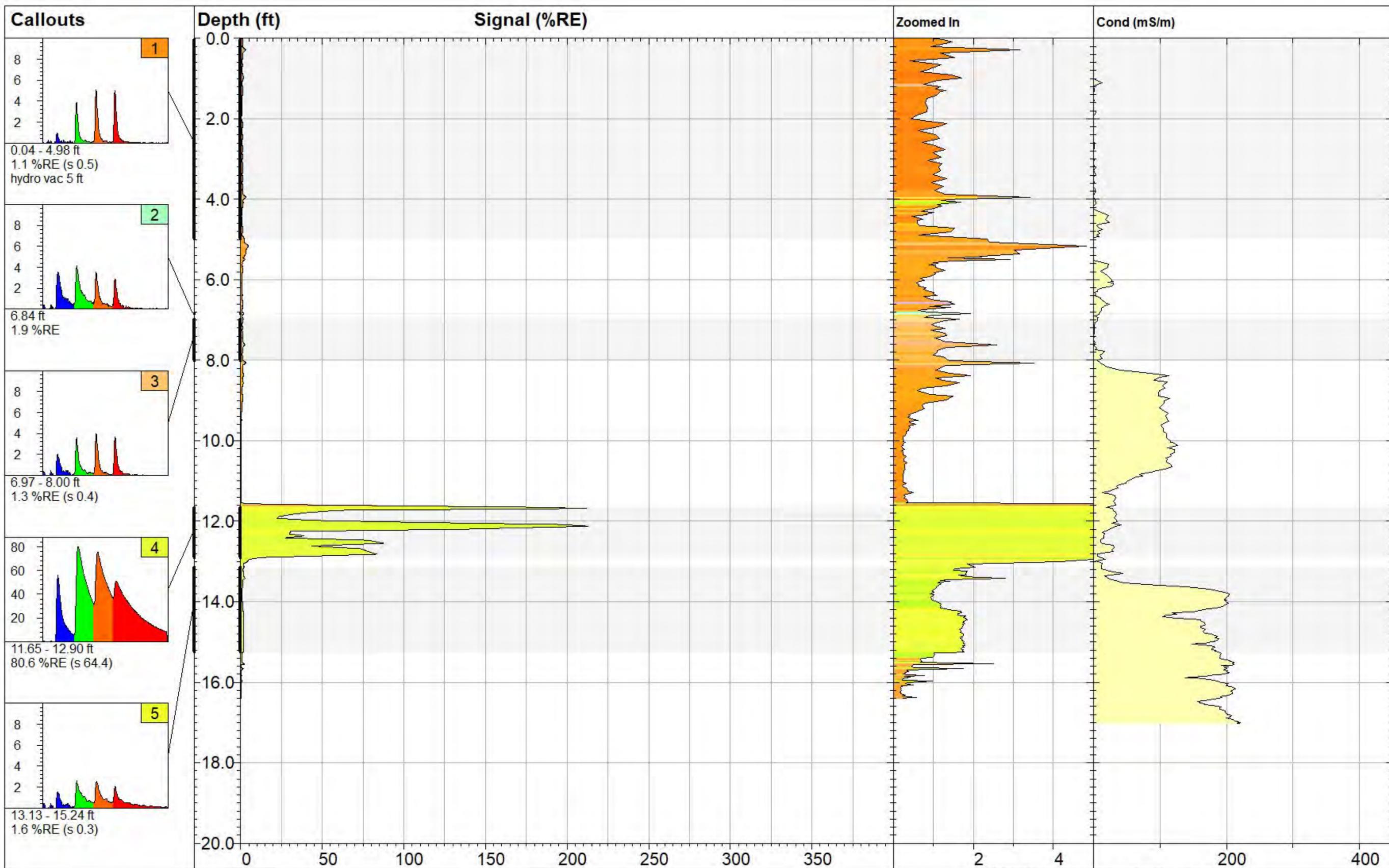
 DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM	PA-LIF-04		UVOST® By Dakota www.DakotaTechnologies.com	
	Site: Marathon Marketing Tank Farm	Y Coord.(Lat/North): Unavailable	Final Depth: 17.60 ft	
	Client / Job: TriHydro / 0049.21	X Coord.(Long/East): Unavailable	Max Signal: 196.1 %RE @ 10.48 ft	
	Operator / Unit: A. Nagle / UVOST1613	Elevation: Unavailable	Date & Time: 2021-02-01 11:46 MST	



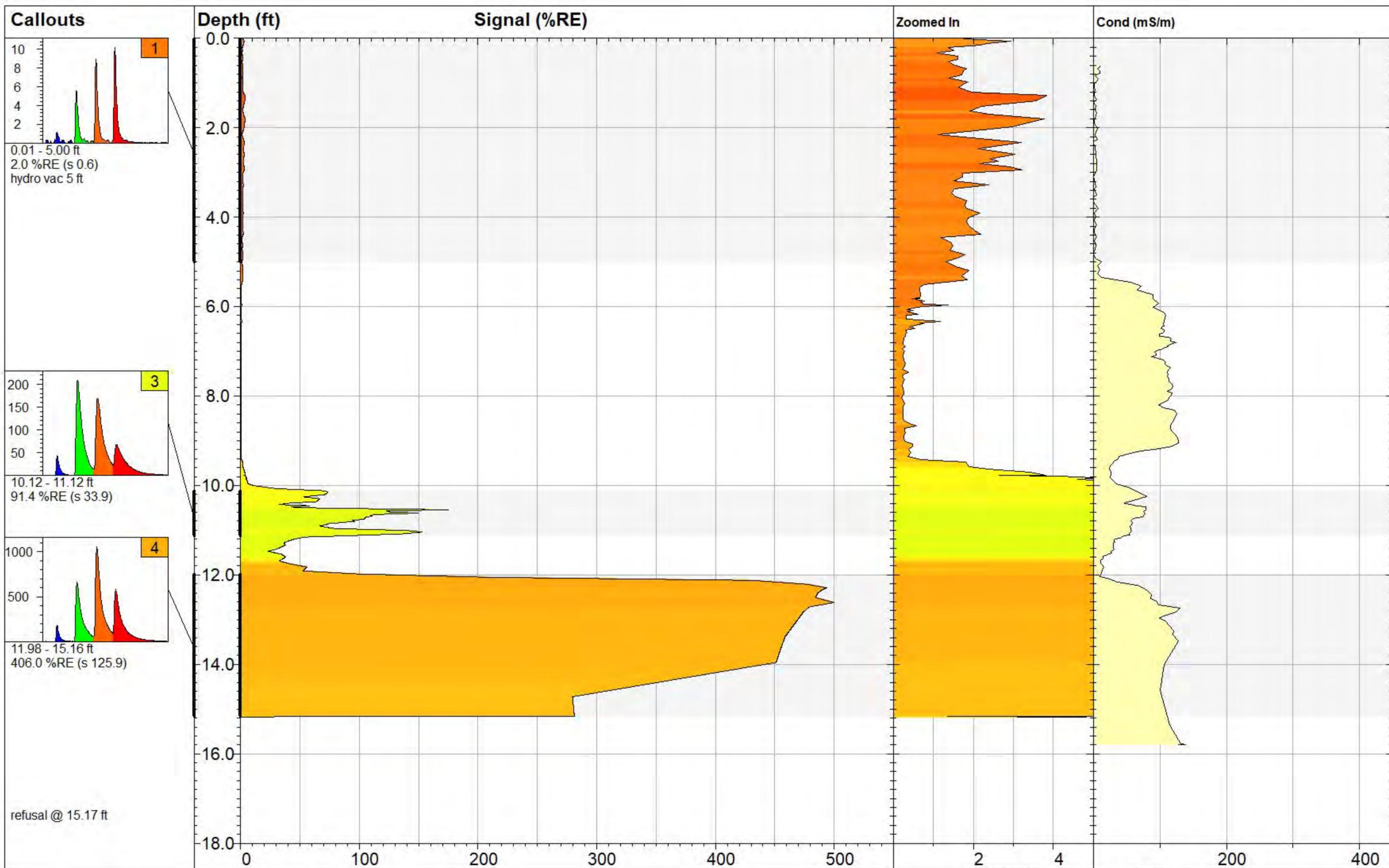
 DAKOTA TECHNOLOGIES WWW.DAKOTATECHNOLOGIES.COM	PA-LIF-05		UVOST® By Dakota www.DakotaTechnologies.com	
	Site: Marathon Marketing Tank Farm	Y Coord.(Lat/North): Unavailable	Final Depth: 15.94 ft	
	Client / Job: TriHydro / 0049.21	X Coord.(Long/East): Unavailable	Max Signal: 3.5 %RE @ 12.27 ft	
	Operator / Unit: A. Nagle / UVOST1613	Elevation: Unavailable	Date & Time: 2021-02-01 12:30 MST	



 <p>DAKOTA TECHNOLOGIES www.DAKOTATECHNOLOGIES.COM</p>	<p>PA-LIF-06</p>		<p>UVOST® By Dakota www.DakotaTechnologies.com</p>	
	<p>Site: Marathon Marketing Tank Farm</p>	<p>Y Coord.(Lat/North): Unavailable</p>	<p>Final Depth: 26.12 ft</p>	
	<p>Client / Job: TriHydro / 0049.21</p>	<p>X Coord.(Long/East): Unavailable</p>	<p>Max Signal: 562.8 %RE @ 17.68 ft</p>	
	<p>Operator / Unit: A. Nagle / UVOST1613</p>	<p>Elevation: Unavailable</p>	<p>Date & Time: 2021-02-01 13:34 MST</p>	



 <p>DAKOTA TECHNOLOGIES www.DAKOTATECHNOLOGIES.COM</p>	<p>PA-LIF-07</p>		<p>UVOST® By Dakota www.DakotaTechnologies.com</p>
	<p>Site: Marathon Marketing Tank Farm</p>	<p>Y Coord.(Lat/North): Unavailable</p>	<p>Final Depth: 16.40 ft</p>
	<p>Client / Job: TriHydro / 0049.21</p>	<p>X Coord.(Long/East): Unavailable</p>	<p>Max Signal: 213.7 %RE @ 11.68 ft</p>
	<p>Operator / Unit: A. Nagle / UVOST1613</p>	<p>Elevation: Unavailable</p>	<p>Date & Time: 2021-02-05 12:41 MST</p>



PA-LIF-08		UVOST® By Dakota www.DakotaTechnologies.com	
Site: Marathon Marketing Tank Farm	Y Coord.(Lat/North): Unavailable	Final Depth: 15.17 ft	
Client / Job: TriHydro / 0049.21	X Coord.(Long/East): Unavailable	Max Signal: 500.0 %RE @ 12.62 ft	
Operator / Unit: A. Nagle / UVOST1613	Elevation: Unavailable	Date & Time: 2021-02-05 11:15 MST	



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

Appendix B – Standard Operating Procedure – Soil Sampling



memorandum

To: Sampling Team Members
From: Project Manager
Date: October 27, 2021
Re: Standard Operating Procedure – Soil Sampling

1.0 INTRODUCTION

Soil sampling related to site characterization and site clean-up is expected to involve source sampling of potentially impacted soils for characterization and profiling. Soil sampling is expected to occur around the Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) (Refinery) Process Area.

All personnel involved in soil sampling projects are required to review this Standard Operating Procedure (SOP) before sampling to ensure the continued generation of reliable data. This SOP is based on experience gained from collecting soil samples and the latest information available in guidance manuals. This SOP may be updated as additional experience and information are acquired.

2.0 PRE-FIELD ACTIVITIES

Several activities will be conducted prior to departure for the project site. A project team will be assigned and the members will begin coordinating the sample collection event with the Refinery. Field equipment will be checked and organized. Access to the areas to be sampled will be checked, and provisions made to pack the necessary equipment for delivery to the project site.

3.0 PREPARATION

The Project Manager will review the current sampling and analysis plans and work plans to determine if any documents need to be brought to the site during monitoring. The Project Manager will also evaluate whether any changes have been made in the sampling and analytical procedures and notify the appropriate personnel.

The Sampling Team Members will review available surface water level data before leaving for the sampling site. This preparation ensures that the proper equipment and personnel are available at the site. All field screening equipment will be inspected prior to departure, ensuring that it is in proper working order. For soil sampling, the only field monitoring equipment used will be a photoionization detector (PID) and it should be calibrated and operated according to manufacturer's recommendations.



Sampling Team Members
October 27, 2021
Page 3

4.0 EQUIPMENT

The following equipment is recommended for soil sampling:

- Required personal protective equipment (PPE), listed in the site-specific health and safety plan (HASP)
- Soil sampling devices (i.e., hand auger)
- Sampling beaker, bottles, labels, and preservatives
- Gloves
- Chain-of-custody/sample-analysis-request forms
- PID
- Global Positioning System (GPS) unit
- Opaque Cooler(s) and bagged ice or frozen Blue Ice
- Detergent or solvent for cleaning monitoring equipment
- Brushes dedicated for decontamination
- Decontamination containers dedicated for wash, rinse 1, and rinse 2
- Paper towels
- Trash bags
- Field logbook

5.0 SAMPLE COLLECTION

A critical aspect of any sampling program is selection and implementation of an appropriate sampling technique. Selection of equipment and technique should be appropriate for the volume of material required and the type of analysis to be performed. In general, the sampling equipment and technique will be chosen to minimize, to the extent possible, the amount of handling a sample will undergo prior to analysis. In many cases, the material to be sampled will be easy to access, and simple "grab" samples collected using a shovel, trowel, or drive sampler are appropriate. In other cases, such as underwater or heavily saturated samples, the soils may be difficult to access, and sampling will involve the use of specialized soil sampling equipment. Specific analytical requirements and sampling frequencies are specified in the work plan.

Soil samples located in dry areas will be collected from representative locations using a decontaminated drive sampler equipped with clean brass or stainless steel sampling rings, a thin-walled tube sampler, or a shovel or hand trowel. The sampling device will be driven completely into the material manually or using a manually operated auger, drive hammer, or mallet. The sampling device will then be extracted from the material using a shovel or trowel as needed. If used, filled sampling rings or the thin walled tube will



Sampling Team Members
October 27, 2021
Page 3

then be removed from the sampling device and immediately sealed on both ends with teflon sheeting and plastic caps. Otherwise, the material will be placed directly from the trowel or other appropriate sampling device into a clean glass jar. The jar will be filled completely to minimize headspace (by tamping during filling), and immediately sealed with a teflon-lined lid.

If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. The sample containers will be labeled with indelible ink. Filled sample containers should be wiped dry and placed in a cooler with ice (or equivalent) for storage at the time of collection. Enough ice and protective packing material should be used to cool the samples to 4 degrees Celsius and ensure that the container remains intact prior to final packing and shipment.

Field screening may involve the use of a PID. In this case, material will be placed from the trowel or other appropriate sampling device into a bag. The PID will be inserted into the bag and the reading taken. The bag will be sealed and shaken gently to expose the soil to the air trapped in the container. The sealed container will be allowed to rest while vapors equilibrate. Vapors present within the sample bag's headspace will be measured by inserting the probe of the instrument in a small opening in the bag. The maximum value and the ambient air temperature will be recorded on the field boring log for each interval. Note that if samples are cold (i.e., below 32 degrees Fahrenheit) they will be sealed in airtight bags and warmed in a heated building and/or vehicle before screening. All samples shall be screened at as close to the same temperature as possible to obtain consistent results.

After collecting the reading, additional material will be collected and placed into a clean glass jar as described above. Before shipment, each cooler will be packed with ice and a laboratory-provided trip blank. A chain of custody form will accompany each sample shipment. Coolers will be sealed and delivered to an accredited laboratory.

Sampling devices will be decontaminated between sampling locations using a four-stage decontamination system consisting of a two detergent/water washes and two deionized water rinses. Sample locations will be recorded with a GPS unit in order to accurately map the sampling locations.

Field logbooks, Soil Sampling Field Log, and photograph logs will provide a written record of field data gathered, field observations, field equipment calibrations, the samples collected for analysis, and sample custody. Color photographs will be used to substantiate and augment the field notes, if necessary. Field records will be maintained in the project file.

697-086-002



Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit
Area Investigation Work Plan

Appendix C – Example Boring Log



Lithology Log

Sheet _____ of _____

LOCID _____

Project Name		Project Number		Site ID	
Drilling Company		Driller		Ground Elevation	
Drilling Equipment		Drilling Method		Borehole Diameter	
Date/Time Drilling Started		Date/Time Total Depth Reached			
Type of Sampling Device				Water Level (bgs)	
				First _____ Final _____	
Sample Hammer				Geologist/Engineer	
Type _____ Driving Wt. _____ Drop _____				Checked by/Date _____	
Weather _____				Other Personnel Present _____	
Site Conditions _____					
Location Description (include sketch in field logbook)					

Depth	Interval	Recovery	Blow Counts	Description <small>(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)</small>	ASTM Code	Lithology	Water Content	Estimate % of			Remarks <small>(Include all sample types, times, and depth, odor, organic vapor measurements, etc.)</small>
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1											
2											
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Lithology Log (continued)

Sheet of

LOCID

Depth	Interval	Recovery	Blow Counts	Description <small>(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)</small>	ASTM Code	Lithology	Water Content	Estimate % of			Remarks <small>(Include all sample types & depth, odor, organic vapor measurements, etc.)</small>
								Gr	Sa	Fi	

District I
 1625 N. French Dr., Hobbs, NM 88240
 Phone:(575) 393-6161 Fax:(575) 393-0720

District II
 811 S. First St., Artesia, NM 88210
 Phone:(575) 748-1283 Fax:(575) 748-9720

District III
 1000 Rio Brazos Rd., Aztec, NM 87410
 Phone:(505) 334-6178 Fax:(505) 334-6170

District IV
 1220 S. St Francis Dr., Santa Fe, NM 87505
 Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS
 Action 64821

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 64821
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
scwells	Accepted for Record Retention Purposes-Only	11/22/2022