Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation
I-40 Exit 39
Jamestown, NM 87347

June 14, 2023

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

RE: Response to Approval with Modifications
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
EPA ID# NMD000333211
HWB-WRG-21-022

Dear Mr. Cobrain:

Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) is submitting this response to approval with modifications contained in the New Mexico Environment Department (NMED) *Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan* letter dated March 22, 2023. A timeline of the report is as follows:

- Investigation Work Plan, submitted November 30, 2021
- *Disapproval*, received March 18, 2022
- Response to Disapproval, submitted June 10, 2022
- *Approval with Modifications*, received March 22, 2023

The response to comments is provided in Attachment A. This submittal includes two hard copies of the report and a CD with an electronic copy of the redlined report and the revised report (Attachment B). The electronic copies will also be submitted by email to NMED.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at (505) 879-7643.

Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation
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

Timothy J. Peterkoski
Director of Environment and Climate Strategy
Marathon Petroleum Company LP

Enclosures

cc: L. Andress, NMED HWB
S. Wells, NMOCD
L. King, EPA Region 6
K. Luka, Marathon Petroleum Corporation
J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro

ATTACHMENT A

RESPONSE TO COMMENTS

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 1:	**Response 1:**
The Permittee's response to Disapproval Comment 6, the Permittee states "Section 4.1, paragraph 2 has been revised to state, "[photoionization detector] PID readings will be collected at 5-[foot] ft intervals, beginning with a surface sample (taken at 6 to 12 inches [below ground surface] bgs)." In Section 4.1 (Sample Collection Procedures), last paragraph, Item 2, the Permittee states "Collect PID readings at the surface and then every 5 ft", the text "(taken at 6 to 12 inches bgs)" was not added to the text of the Report. Revise the text accordingly and provide a replacement page.	Section 4.1, last paragraph, item 2, has been revised to include "(taken at 6 to 12 inches bgs)." Additionally, the second paragraph of Section 3.0 has been revised to include "(taken at 6 to 12 inches bgs)."
Comment 2:	**Response 2:**
The Permittee's response to Disapproval Comment 8 states "The PID should be checked to ensure that the PID has the appropriate lamp strength for the investigation. The most common lamp used in a PID is a 10.6 electron volt (eV) lamp, which will ionize compounds with ionization potentials from 8.0 eV to 10.6 eV. The range of 8.0 eV to 10.6 eV is representative of gasoline- and diesel-type constituents. For example, benzene, naphthalene, and toluene have ionization potentials of 9.25 eV, 8.13 eV, and 8.82 eV, respectively... A list of ionization potentials for a variety of compounds has been published by RAE systems, the manufacturer of the PID most used by Trihydro." PIDs with higher lamp strengths (i.e., 10.6 eV) are more likely to foul during use due to moisture and dust in the soils sampled, resulting in inaccurate PID readings. The Permittee must use a 9.5 eV lamp to ensure more accurate PID readings. Revise the text accordingly and provide a replacement page.	The Refinery respectfully disagrees with this comment. In an email dated April 11, 2023, the New Mexico Environment Department (NMED) wrote, "As stated in the work plan, benzene, naphthalene, and toluene have lower eV potentials than 9.5eV, as do xylenes. If there are contaminants which require a higher lamp strength, these contaminants must be identified in the work plan." When asked if there was any latitude in Comment #2 so that the Refinery may continue using a 10.6 electron volt (eV) photoionization detector (PID), NMED's response was, "Only if there is a legitimate concern that site specific contaminants would be missed in a field screening with the 9.5 eV lamp. It is a balance between having a higher lamp strength to detect more compounds and fouling the lamp, getting inaccurate readings, resulting in sending non-representative sample to the lab for analysis." However, the language referenced by NMED Comment 2 and the email response was an example given in Appendix B "Standard Operating Procedure – Soil Sampling." The ionization potentials for benzene, naphthalene, and toluene were included in the "Standard Operating

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
	Procedure – Soil Sampling" as examples of common refinery contaminants and were never portrayed as an exhaustive list of specific constituents of concern for Area of Concern (AOC) 26 and AOC 27. As listed in Table 2 of this "Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan," the Refinery is proposing analysis of volatile organic compounds (VOCs) by Method 8260. The Refinery acknowledges that higher strength lamps have a higher tendency to drift. However, Section IV.J.2.d.vi of the Refinery's RCRA Permit states "A photo-ionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the NMED shall be used for VOC field screening." Additionally, a 10.6 eV PID is the industry-standard due to its ability to detect a wide range of VOCs. Because this is the first investigation into AOC 26 and AOC 27, the constituents of concern have not been determined. Therefore, there is a legitimate concern that using a 9.5 eV PID would result in AOC-specific contaminants being missed and sending non-representative samples to the lab for analysis. In order to send samples that are representative of a wide range of VOCs and are therefore more representative of any potential contamination in AOC 26 and AOC 27, the Refinery will use a 10.6 eV PID, and field staff will conduct daily calibrations. Additional calibrations will be conducted as needed.

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 3:	**Response 3:**
The Permittee's response to Disapproval Comment 9 states "Section 4.0, page 2, bullet 2 of Appendix B [Standard Operating Procedure - Soil Sampling] has been revised to state, "Soil sampling devices (e.g., hand auger, hand shovel, drill rig, etc.)." This bullet is not meant to be an exhaustive list, and other soil sampling devices may be used if deemed appropriate." The Permittee must refrain from using generalized SOP's in work plans. The SOP provided in Appendix B does not provide details specific to the work plan. In this case, collecting soil samples from a Geoprobe® direct push drill core sleeve is not described. However, other soil sampling techniques not relevant to the work plan are included, such as using a "drive sampler equipped with clean brass or stainless steel sampling rings". Revise Section 4.0 to describe the sample collection methods for this scope of work and provide replacement pages as necessary. In future work plans, the Permittee must state exactly what they plan to do in the text of the work plan, rather than refer to general SOP's, in accordance with RCRA Permit Section IV.J.1 (Standard Operating Procedures).	Section 4.1, second paragraph, has been revised to include, "Soil samples will be collected from representative locations using a Geoprobe direct push drill rig with rods and acetate liners." Additionally, Section 4.0, bullet 2 of Appendix B has been revised to state, "Soil sampling devices (e.g., hand auger, hand shovel, Geoprobe direct push drill rig core sleeves, etc.)."

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 4:	**Response 4:**
The Permittee's response to Disapproval Comment 10, the Permittee states "The text in the Work Plan, Section 4.1 (Sample Collection Procedures), page 7 of 10, paragraph 2, has been revised to state, "PID readings will be collected at 5-ft intervals, beginning with a surface sample (taken at 6 to 12 inches bgs). At each 5-ft interval, the sample will be collected from the sampling equipment and split into two aliquots. Aliquot #1 will be placed into a plastic bag and used for PID screening. Aliquot #2 will be placed into a second plastic bag, sealed, placed in a cooler, and stored on ice for potential VOC laboratory analysis. Aliquot #1 materials will not be submitted for laboratory analysis." The clarification provided is adequate. However, Aliquot #2 must be placed in the appropriate sample container(s) with appropriate preservative(s), if applicable, pending selection for laboratory analysis to ensure minimal loss of petroleum hydrocarbons from volatilization (e.g., extracted into an En Core® soil sampling device). Revise the text accordingly and provide a replacement page.	Section 4.1, second paragraph, has been revised to state, "Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride) …" Section 4.1, fourth paragraph, has been revised to state, "Aliquot #2 sample containers from the selected depths will be labeled and placed in a cooler." Additionally, Appendix B, Section 5.0, fourth paragraph, has been revised to state, "Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride) …" Appendix B, Section 5.0, sixth paragraph, has been revised to state, "After collecting the PID readings, aliquot #2 sample containers from selected sample intervals will be labeled and placed in a cooler."

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 5:	**Response 5:**
Appendix B (Standard Operating Procedure - Soil Sampling), Section 5.0 (Sample Collection), second paragraph, page 1, states "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 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." The Permittee must revise Section 4.0 to provide sample collection details specific to this scope of work and provide replacement pages as necessary. In future work plans, the Permittee must state exactly what they plan to do in the text of the work plan, and not refer to general SOP's. See Comment 3 above.	Section 4.1, second paragraph has been revised to include, "Soil samples will be collected from representative locations using a Geoprobe direct push drill rig with rods and acetate liners." Additionally, the language quoted by NMED in Comment 5 has been removed from Appendix B, Section 5.0, second paragraph. Appendix B, Section 5.0, second paragraph now reads, "Soil samples will be collected from representative locations using a Geoprobe direct push drill rig with rods and acetate liners."

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 6:	**Response 6:**
Appendix B (Standard Operating Procedure - Soil Sampling), Section 5.0 (Sample Collection), third paragraph, page 3, states "If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory." The Permittee must revise Section 4.0 to describe how close the additional cores and resulting samples will be from each other both horizontally and vertically. The Permittee must also state if the samples sent for analysis will be collected as composite samples as a result of this process. Provide replacement pages as necessary. In future work plans, the Permittee must describe specific sample collection procedures in the text of the work plan, and not rely on general SOP's. See Comment 3 above.	Section 4.1, second paragraph has been revised to include, "If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. If necessary, additional cores will be collected from within 6 lateral inches of the original boring, and additional sample volume will be collected from the same depth interval as the original boring. It should be noted that samples collected in this manner will be collected as composite samples." Additionally, Appendix B, Section 5.0, third paragraph has been revised to state, "If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. If necessary, additional cores will be collected from within 6 lateral inches of the original boring, and additional sample volume will be collected from the same depth interval as the original boring. It should be noted that samples collected in this manner will be collected as composite samples."

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 7:	**Response 7:**
Appendix B (Standard Operating Procedure - Soil Sampling), Section 5.0 (Sample Collection), page 3, fourth paragraph states "Aliquot #2 will be placed into a second plastic bag, sealed, placed in a cooler, and stored on ice for potential laboratory analysis." Aliquot #2 must be placed in the appropriate sample container(s) with appropriate preservative(s), if applicable, pending selection for laboratory analysis to ensure minimal loss of petroleum hydrocarbon contamination through volatilization (e.g., extracted into an En Core® soil sampling device). See Comment 4 above.	Appendix B, Section 5.0, fourth paragraph, has been revised to state, "Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride) …" Appendix B, Section 5.0, sixth paragraph, has been revised to state, "After collecting the PID readings, aliquot #2 sample containers from selected sample intervals will be labeled and placed in a cooler." Additionally, Section 4.1, third paragraph, has been revised to state, "Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride) …" Section 4.1, fourth paragraph, has been revised to state, "Aliquot #2 sample containers from the selected depths will be labeled and placed in a cooler."
Comment 8:	**Response 8:**
Appendix B (Standard Operating Procedure - Soil Sampling), Section 5.0 (Sample Collection), page 4, first paragraph states "Sampling devices will be decontaminated between sampling locations..." Revise Section 4.0 to clarify if sampling devices will be decontaminated between sample intervals (i.e., sample depth) within the same sampling location (i.e., boring location). Provide replacement pages as necessary. In future work plans, the Permittee must describe specific sample collection procedures in the text of the work plan, and not rely on general SOP's. See Comment 3 above.	Section 4.1, second paragraph and Appendix B, Section 5.0, seventh paragraph have been revised to include, "Components of the Geoprobe direct push drill rig that come into contact with soil (e.g., the cutting shoe) will be decontaminated between sampling locations; the drill rig will not be decontaminated between sampling intervals at the same location due to the acetate liners."

Response to New Mexico Environment Department (NMED) to Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery [Refinery]) Comment Letter "Approval with Modifications, Area of Concern 26 – Process Units and Area of Concern 27 – Boiler and Cooling Unit Area Investigation Work Plan" (March 22, 2023)

NMED Comments	Refinery Responses
Comment 9:	**Response 9:**
In Table 2 (Proposed Soil and LNAPL Sample Constituent List) the Permittee lists constituents for LNAPL analysis. Add Selenium to the list of LNAPL analyses and provide a replacement table.	Total Selenium has been added to the list of light non-aqueous phase liquid analyses in Table 2. A replacement table is provided in Attachment B.

ATTACHMENT B1

(PLEASE SEE ATTACHED CD)

ELECTRONIC RED-LINE/STRIKE-OUT REPORT

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

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Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

Revised June 10, 2022

Revised July 1, 2023

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 Comment 4 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, collection of a maximum of 96 soil samples, and collection of 6 light non-aqueous phase liquid (LNAPL) samples from nearby groundwater monitoring wells, if sufficient LNAPL is present. Soil samples will be collected using a Geoprobe direct-push drill rig, and LNAPL samples will be collected using disposable bailers. Soil and LNAPL samples will be analyzed for their respective constituents listed in Table 2. The Refinery will prepare an investigation report summarizing the sampling results and investigation conclusions within 120 days of the receipt of the analytical data.

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A. LIF Logs

B. Standard Operating Procedure – Soil Sampling

C. Example Boring Log

List of Acronyms

%	percent
amsl	above mean sea level
AOC	Area of Concern
bgs	below ground surface
COC	chain of custody
ft	foot or feet
LIF	laser-induced fluorescence
LNAPL	light non-aqueous phase liquid
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
VOC	volatile organic compounds

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 Comment 4 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 6 light non-aqueous phase liquid (LNAPL) samples from nearby groundwater monitoring wells, if sufficient LNAPL is present. Soil samples will be collected using a Geoprobe direct-push drill rig, and LNAPL samples will be collected using disposable bailers. Soil and LNAPL samples will be analyzed for their respective constituents listed in Table 2. These constituents were selected as indicator parameters based on previous soil, groundwater, and LIF investigations in the vicinity of AOC 26 and AOC 27, as well as nearby AOC 35. The results from this investigation will be used for future engineering remediation evaluations.

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 merox 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.

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). If there is field evidence of impacts (e.g., visual, olfactory, or PID readings) between 35 ft bgs and 40 ft bgs, the boring will be extended to a depth where field evidence of impacts is no longer present. Soil will be collected at 5-ft intervals for PID field-screening, beginning with a surface sample (taken at 6 to 12 inches bgs). Analytical samples will be collected from 6 to 12 inches bgs, just above the water table, the bottom of boring, and in the zone with the highest PID reading. Soil samples will be analyzed for constituents listed in Table 2. These constituents were selected as indicator parameters based on previous soil, groundwater, and LIF investigations in the vicinity of AOC 26 and AOC 27, as well as nearby AOC 35. The results from this investigation will be used for future engineering remediation evaluations. Analytical results will be compared to their respective NMED Residential, Construction Worker, and Industrial Soil Screening Levels (SSL), as applicable.

If sufficient sample volume is present during the sampling event, LNAPL samples will be collected from monitoring wells MKTF-37, MKTF-38, MKTF-39, MKTF-47, MKTF-48, and OW-61 with a disposable bailer. The December 2021 fluid level gauging data is provided in Table 3. The purpose for sampling the LNAPL in nearby groundwater monitoring wells is to determine if the LNAPL present in those wells is related to AOC 26 or AOC 27. LNAPL samples will be analyzed for constituents listed in Table 2.

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.

Soil samples will be collected from representative locations using a Geoprobe direct push drill rig with rods and acetate liners. If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. If necessary, additional cores will be collected from within 6 lateral inches of the original boring, and additional sample volume will be collected from the same depth interval as the original boring. It should be noted that samples collected in this manner will be collected as composite samples. Components of the Geoprobe direct push drill rig that come into contact with soil (e.g., the cutting shoe) will be decontaminated between sampling locations; the drill rig will not be decontaminated between sampling intervals at the same location due to the acetate liners.

PID readings will be collected at 5-ft intervals, beginning with a surface sample (taken at 6 to 12 inches bgs). At each 5-ft interval, the sample will be collected from the sampling equipment and split into two aliquots. Aliquot #1 will be placed into a plastic bag and used for PID screening. Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride) ~~a second plastic bag~~, sealed, placed in a cooler, and stored on ice for potential VOC laboratory analysis. Aliquot #1 materials will not be submitted for laboratory analysis.

Aliquot #1 will be shaken gently to expose the soil to the air trapped in the container. Aliquot #1 will be allowed to rest while vapors equilibrate. Headspace vapors will be measured by inserting the probe of the PID in a small opening in Aliquot #1's container (plastic 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 warmed in a heated building and/or vehicle before screening.

After collecting the PID readings, samples will be selected from 6 to 12 inches bgs, just above the water table, the bottom of the boring, and the interval with the highest PID reading. Aliquot #2 sample containers ~~materials~~ from the selected depths will be ~~transferred into the appropriate sample jars,~~ labeled~~,~~ and placed in a cooler. Before shipment, each cooler will be packed with ice and a laboratory-provided trip blank. Enough ice and protective packing material will be used to cool the samples to 4 degrees Celsius and ensure that the container remains intact prior to final packing and shipment. 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. Install 24 soil borings, visual screening/logging, and collection of soil samples.
2. Collect PID readings at the surface (taken at 6 to 12 inches bgs) and then every 5 ft
3. Collect analytical samples from:
    - 6 to 12 inches bgs
    - Just above the water table
    - The bottom of boring
    - The zone with the highest PID reading.
4. Collect 6 LNAPL samples. Samples will be collected from monitoring wells MKTF-37, MKTF-38, MKTF-39, MKTF-47, MKTF-48, and OW-61, if sufficient volume is present.
5. Submit samples to an accredited laboratory. Soil and LNAPL samples will be analyzed for their respective constituents listed in Table 2.
6. Compare analytical soil data with applicable NMED Residential, Construction Worker, and Industrial SSLs, as applicable.

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 Residential, Construction Worker, and Industrial SSLs, as applicable. 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 - VOCs, 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.

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.

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.

Figures

Tables

TABLE 2. PROPOSED SOIL AND LNAPL SAMPLE CONSTITUENT LIST
AOC 26 AND AOC 27 INVESTIGATION WORK PLAN
WESTERN REFINING SOUTHWEST LLC, MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Sample Matrix	Constituents	Method
Soil	VOCs	8260
	SVOCs	8270
	1,2-dichloroethane	8011
	1,4-dioxane	8270SIM
	TPH-DRO	8015B
	TPH-GRO	8015B
	TPH-MRO	8015B
	Skinner List Metals	6010/6020
	Total Iron	6010/6020
	Total Manganese	6010/6020
	Total Chloride	300.0
LNAPL	BTEX	8260
	SVOCs	8270
	MTBE	8270
	TPH-DRO	8015B
	TPH-GRO	8015B
	TPH-MRO	8015B
	Total Arsenic	6010/6020
	Total Chromium	6010/6020
	Total Lead	6010/6020
	Total Selenium	6010/6020

AOC - Area of Concern
BTEX - Benzene, toluene, ethylbenzene, and total xylenes
DRO - Diesel range organics
GRO - Gasoline range organics
LNAPL - Light non-aqueous phase liquid
MRO - Motor oil range organics
MTBE - Methyl tert-butyl ether
SIM - Selected Ion Monitoring
SVOC - Semi-volatile organic compounds
TPH - Total petroleum hydrocarbons
VOC - Volatile organic compounds

Appendix A – LIF Logs

Appendix B – Standard Operating Procedure – Soil Sampling

memorandum

To: Sampling Team Members
From: Project Manager
Date: revised July 1, 2023~~June 10, 2022~~
Re: Standard Operating Procedure – Soil Sampling for the AOC 26 & 27 Investigation

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.

The PID should be checked to ensure that the PID has the appropriate lamp strength for the investigation. The most common lamp used in a PID is a 10.6 electron volt (eV) lamp, which will ionize compounds with ionization potentials from 8.0 eV to 10.6 eV. The range of 8.0 eV to 10.6 eV is representative of gasoline- and diesel-type constituents. For example, benzene, naphthalene, and toluene have ionization

potentials of 9.25 eV, 8.13 eV, and 8.82 eV, respectively (see link below). A list of ionization potentials for a variety of compounds has been published by RAE systems, the manufacturer of the PID most used by Trihydro. The list can be found at the following link: https://gastech.com/sites/default/files/RAE%20Systems%20Technical%20Note%20106%20v14%20Correction%20Factors.pdf.

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 (e.g., hand auger, hand shovel, Geoprobe direct push drill rig core sleeves, etc.)
- 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 Geoprobe direct push drill rig with rods and acetate liners. ~~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 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. If necessary, additional cores will be collected from within 6 lateral inches of the original boring, and additional sample volume will be collected from the same depth interval as the original boring. It should be noted that samples collected in this manner will be collected as composite samples. 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, the sample will be split into two aliquots. Aliquot #1 will be placed into a plastic bag and used for PID screening. Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride)~~a second plastic bag~~, sealed, placed in a cooler, and stored on ice for potential laboratory analysis. Aliquot #1 materials will not be submitted for laboratory analysis.

The bag containing Aliquot #1 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 PID readings, aliquot #2 sample containers ~~materials~~ from selected sample intervals will be ~~transferred into the appropriate sample jars,~~ 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 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. Components of the Geoprobe direct push drill rig that come into contact with soil (e.g., the cutting shoe) will be decontaminated between sampling locations; the drill rig will not be decontaminated between sampling intervals at the same location due to the acetate liners. 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

Appendix C – Example Boring Log

ATTACHMENT B2

ELECTRONIC REVISED REPORT

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

Revised June 10, 2022

Revised July 1, 2023

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 Comment 4 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, collection of a maximum of 96 soil samples, and collection of 6 light non-aqueous phase liquid (LNAPL) samples from nearby groundwater monitoring wells, if sufficient LNAPL is present. Soil samples will be collected using a Geoprobe direct-push drill rig, and LNAPL samples will be collected using disposable bailers. Soil and LNAPL samples will be analyzed for their respective constituents listed in Table 2. The Refinery will prepare an investigation report summarizing the sampling results and investigation conclusions within 120 days of the receipt of the analytical data.

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A. LIF Logs

B. Standard Operating Procedure – Soil Sampling

C. Example Boring Log

List of Acronyms

%	percent
amsl	above mean sea level
AOC	Area of Concern
bgs	below ground surface
COC	chain of custody
ft	foot or feet
LIF	laser-induced fluorescence
LNAPL	light non-aqueous phase liquid
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
VOC	volatile organic compounds

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 Comment 4 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 6 light non-aqueous phase liquid (LNAPL) samples from nearby groundwater monitoring wells, if sufficient LNAPL is present. Soil samples will be collected using a Geoprobe direct-push drill rig, and LNAPL samples will be collected using disposable bailers. Soil and LNAPL samples will be analyzed for their respective constituents listed in Table 2. These constituents were selected as indicator parameters based on previous soil, groundwater, and LIF investigations in the vicinity of AOC 26 and AOC 27, as well as nearby AOC 35. The results from this investigation will be used for future engineering remediation evaluations.

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 merox 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.

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). If there is field evidence of impacts (e.g., visual, olfactory, or PID readings) between 35 ft bgs and 40 ft bgs, the boring will be extended to a depth where field evidence of impacts is no longer present. Soil will be collected at 5-ft intervals for PID field-screening, beginning with a surface sample (taken at 6 to 12 inches bgs). Analytical samples will be collected from 6 to 12 inches bgs, just above the water table, the bottom of boring, and in the zone with the highest PID reading. Soil samples will be analyzed for constituents listed in Table 2. These constituents were selected as indicator parameters based on previous soil, groundwater, and LIF investigations in the vicinity of AOC 26 and AOC 27, as well as nearby AOC 35. The results from this investigation will be used for future engineering remediation evaluations. Analytical results will be compared to their respective NMED Residential, Construction Worker, and Industrial Soil Screening Levels (SSL), as applicable.

If sufficient sample volume is present during the sampling event, LNAPL samples will be collected from monitoring wells MKTF-37, MKTF-38, MKTF-39, MKTF-47, MKTF-48, and OW-61 with a disposable bailer. The December 2021 fluid level gauging data is provided in Table 3. The purpose for sampling the LNAPL in nearby groundwater monitoring wells is to determine if the LNAPL present in those wells is related to AOC 26 or AOC 27. LNAPL samples will be analyzed for constituents listed in Table 2.

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.

Soil samples will be collected from representative locations using a Geoprobe direct push drill rig with rods and acetate liners. If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. If necessary, additional cores will be collected from within 6 lateral inches of the original boring, and additional sample volume will be collected from the same depth interval as the original boring. It should be noted that samples collected in this manner will be collected as composite samples. Components of the Geoprobe direct push drill rig that come into contact with soil (e.g., the cutting shoe) will be decontaminated between sampling locations; the drill rig will not be decontaminated between sampling intervals at the same location due to the acetate liners.

PID readings will be collected at 5-ft intervals, beginning with a surface sample (taken at 6 to 12 inches bgs). At each 5-ft interval, the sample will be collected from the sampling equipment and split into two aliquots. Aliquot #1 will be placed into a plastic bag and used for PID screening. Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride), sealed, placed in a cooler, and stored on ice for potential VOC laboratory analysis. Aliquot #1 materials will not be submitted for laboratory analysis.

Aliquot #1 will be shaken gently to expose the soil to the air trapped in the container. Aliquot #1 will be allowed to rest while vapors equilibrate. Headspace vapors will be measured by inserting the probe of the PID in a small opening in Aliquot #1's container (plastic 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 warmed in a heated building and/or vehicle before screening.

After collecting the PID readings, samples will be selected from 6 to 12 inches bgs, just above the water table, the bottom of the boring, and the interval with the highest PID reading. Aliquot #2 sample containers from the selected depths will be labeled and placed in a cooler. Before shipment, each cooler will be packed with ice and a laboratory-provided trip blank. Enough ice and protective packing material will be used to cool the samples to 4 degrees Celsius and ensure that the container remains intact prior to final packing and shipment. 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. Install 24 soil borings, visual screening/logging, and collection of soil samples.
2. Collect PID readings at the surface (taken at 6 to 12 inches bgs) and then every 5 ft
3. Collect analytical samples from:
    - 6 to 12 inches bgs
    - Just above the water table
    - The bottom of boring
    - The zone with the highest PID reading.
4. Collect 6 LNAPL samples. Samples will be collected from monitoring wells MKTF-37, MKTF-38, MKTF-39, MKTF-47, MKTF-48, and OW-61, if sufficient volume is present.
5. Submit samples to an accredited laboratory. Soil and LNAPL samples will be analyzed for their respective constituents listed in Table 2.
6. Compare analytical soil data with applicable NMED Residential, Construction Worker, and Industrial SSLs, as applicable.

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 Residential, Construction Worker, and Industrial SSLs, as applicable. 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 - VOCs, 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.

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.

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.

Figures

EXPLANATION

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

NOTE:

AOC - AREA OF CONCERN

N

0 400'

Trihydro CORPORATION

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

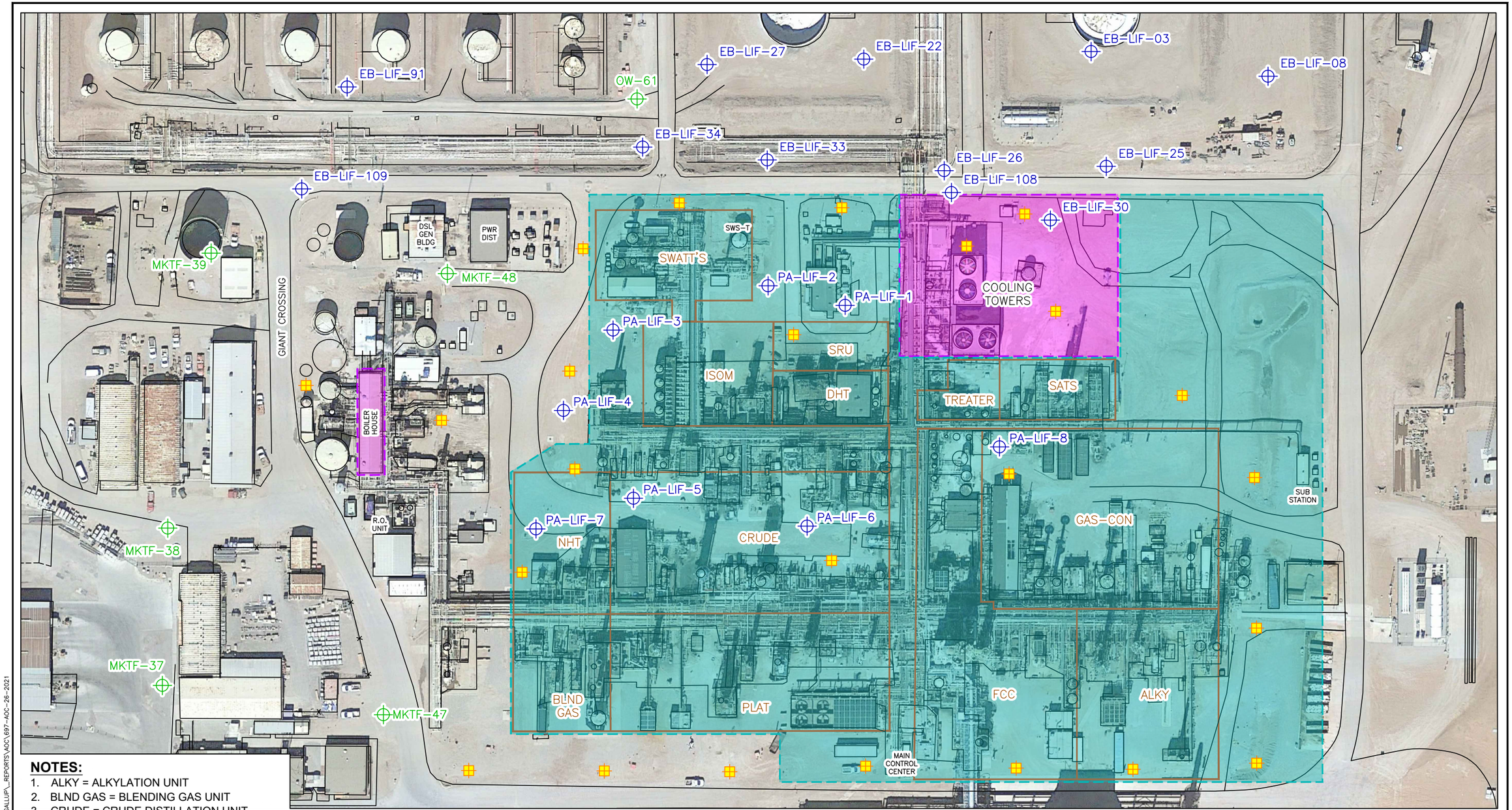


Image Citation: Google Earth Pro Imagery, Publication: March 2016.

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 = NAPTHA 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 = TREATER UNIT

EXPLANATION

MKTF-47	PROPOSED LNAPL SAMPLE LOCATION AND DESIGNATION
	PROPOSED SOIL BORING LOCATION
PA-LIF-7	LIF BORING LOCATION AND DESIGNATION
	FENCE
	BUILDING OR OTHER STRUCTURE

	AOC 26 - PROCESS UNITS
	AOC 27 - BOILER AND COOLING UNIT AREA
	PROCESS UNIT AREAS
AOC	AREA OF CONCERN
LIF	LASER-INDUCED FLUORESCENCE
LNAPL	LIGHT NON-AQUEOUS PHASE LIQUID

N

0 100'

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

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

\\TRIHYDRO.COM\CLIENTS\VTON\MARATHON\CADD\GALLUP_REPORTS\AOC\697-AOC-26-2021

Tables

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

TABLE 2. PROPOSED SOIL AND LNAPL SAMPLE CONSTITUENT LIST
AOC 26 AND AOC 27 INVESTIGATION WORK PLAN
WESTERN REFINING SOUTHWEST LLC, MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Sample Matrix	Constitents	Method
Soil	VOCs	8260
	SVOCs	8270
	1,2-dichloroethane	8011
	1,4-dioxane	8270SIM
	TPH-DRO	8015B
	TPH-GRO	8015B
	TPH-MRO	8015B
	Skinner List Metals	6010/6020
	Total Iron	6010/6020
	Total Manganese	6010/6020
	Total Chloride	300.0
LNAPL	BTEX	8260
	SVOCs	8270
	MTBE	8270
	TPH-DRO	8015B
	TPH-GRO	8015B
	TPH-MRO	8015B
	Total Arsenic	6010/6020
	Total Chromium	6010/6020
	Total Lead	6010/6020
	Total Selenium	6010/6020

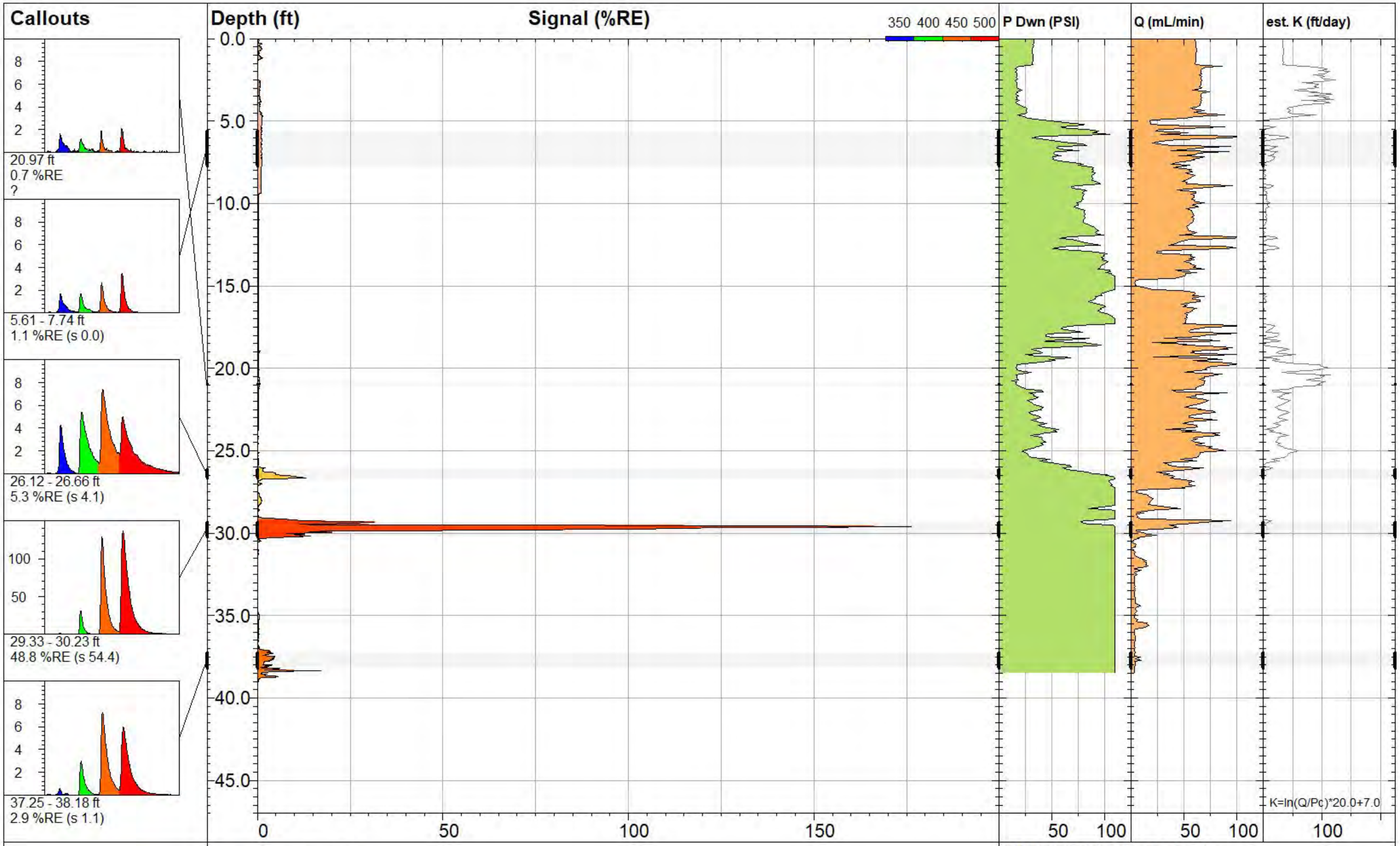
AOC - Area of Concern
BTEX - Benzene, toluene, ethylbenzene, and total xylenes
DRO - Diesel range organics
GRO - Gasoline range organics
LNAPL - Light non-aqueous phase liquid
MRO - Motor oil range organics
MTBE - Methyl tert-butyl ether
SIM - Selected Ion Monitoring
SVOC - Semi-volatile organic compounds
TPH - Total petroleum hydrocarbons
VOC - Volatile organic compounds

TABLE 3. DECEMBER 2021 FLUID LEVEL MONITORING
AOC 26 AND AOC 27 INVESTIGATION WORK PLAN
WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Location	Date Measured	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (ft)	Water Elevation (ft-amsl)	Measuring Point Elevation (ft-amsl)
MKTF-38	12/02/2021	ND	10.70	NA	6944.19	6954.89
OW-61	12/02/2021	21.69	22.38	0.69	6941.19	6963.57
MKTF-39	12/03/2021	9.66	10.05	0.39	6943.70	6953.75
MKTF-47	12/03/2021	10.97	11.01	0.04	6948.08	6959.09
MKTF-48	12/03/2021	14.34	14.88	0.54	6946.85	6961.73
MKTF-37	12/09/2021	10.30	10.37	0.07	6948.50	6958.87

amsl - Above mean sea level
AOC - Area of Concern
bmp - Below measuring point
ft - Foot or feet
LNAPL - Light non-aqueous phase liquid

Appendix A – LIF Logs



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EB-LIF-03

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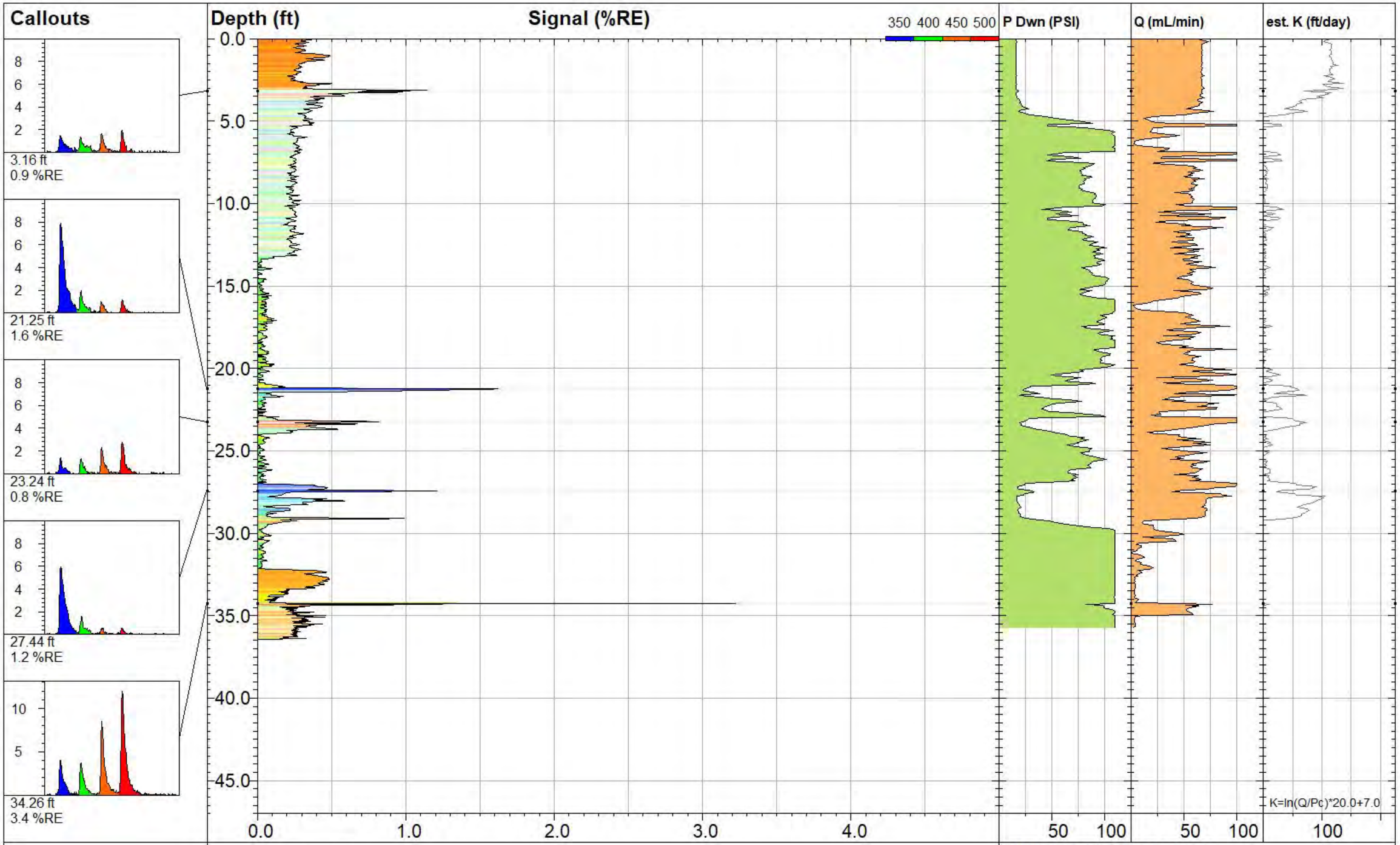
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **39.13 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **179.2 %RE @ 29.60 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-20 09:46 MST**



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EB-LIF-08

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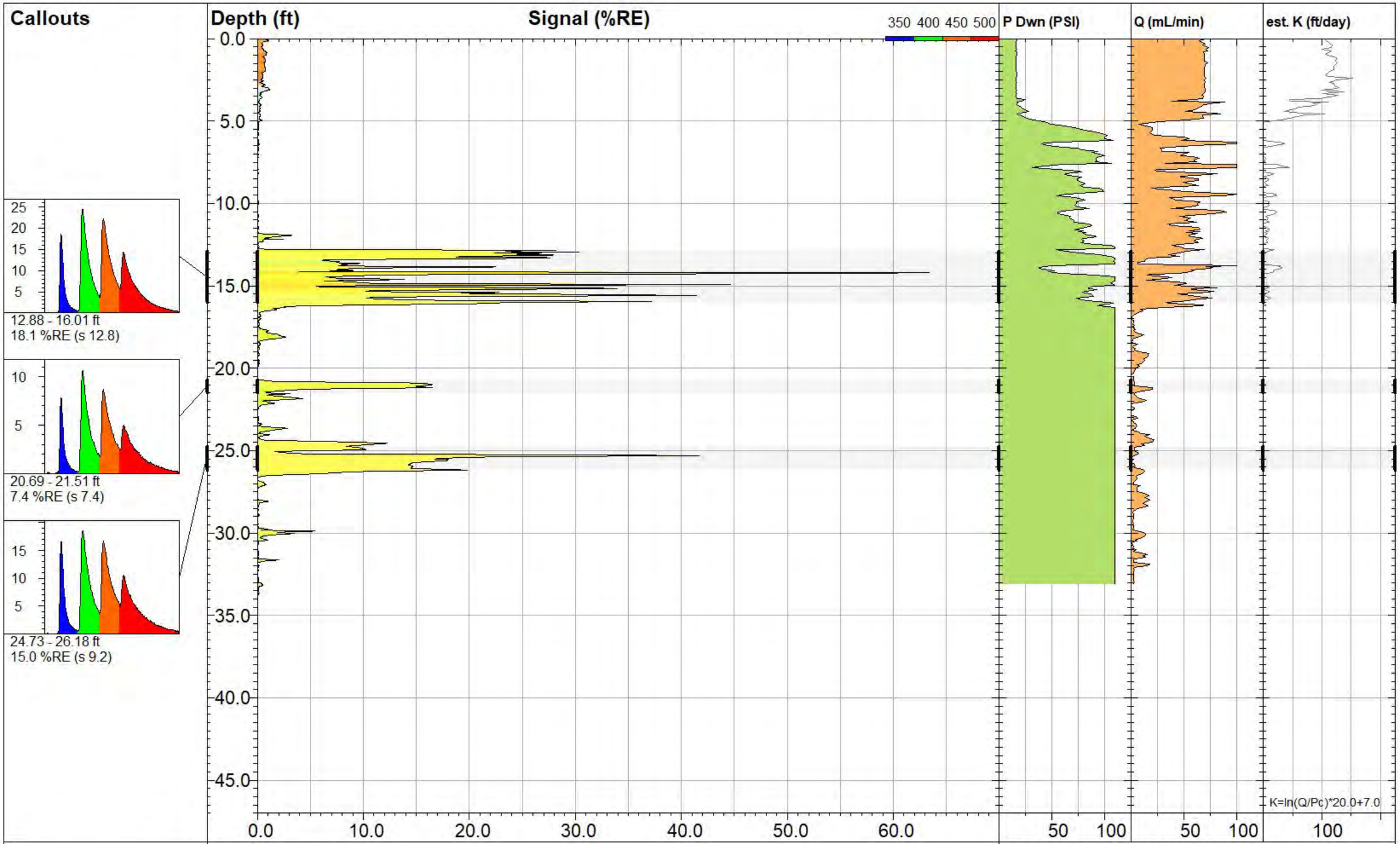
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **36.43 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **3.4 %RE @ 34.26 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-20 10:46 MST**



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EB-LIF-22

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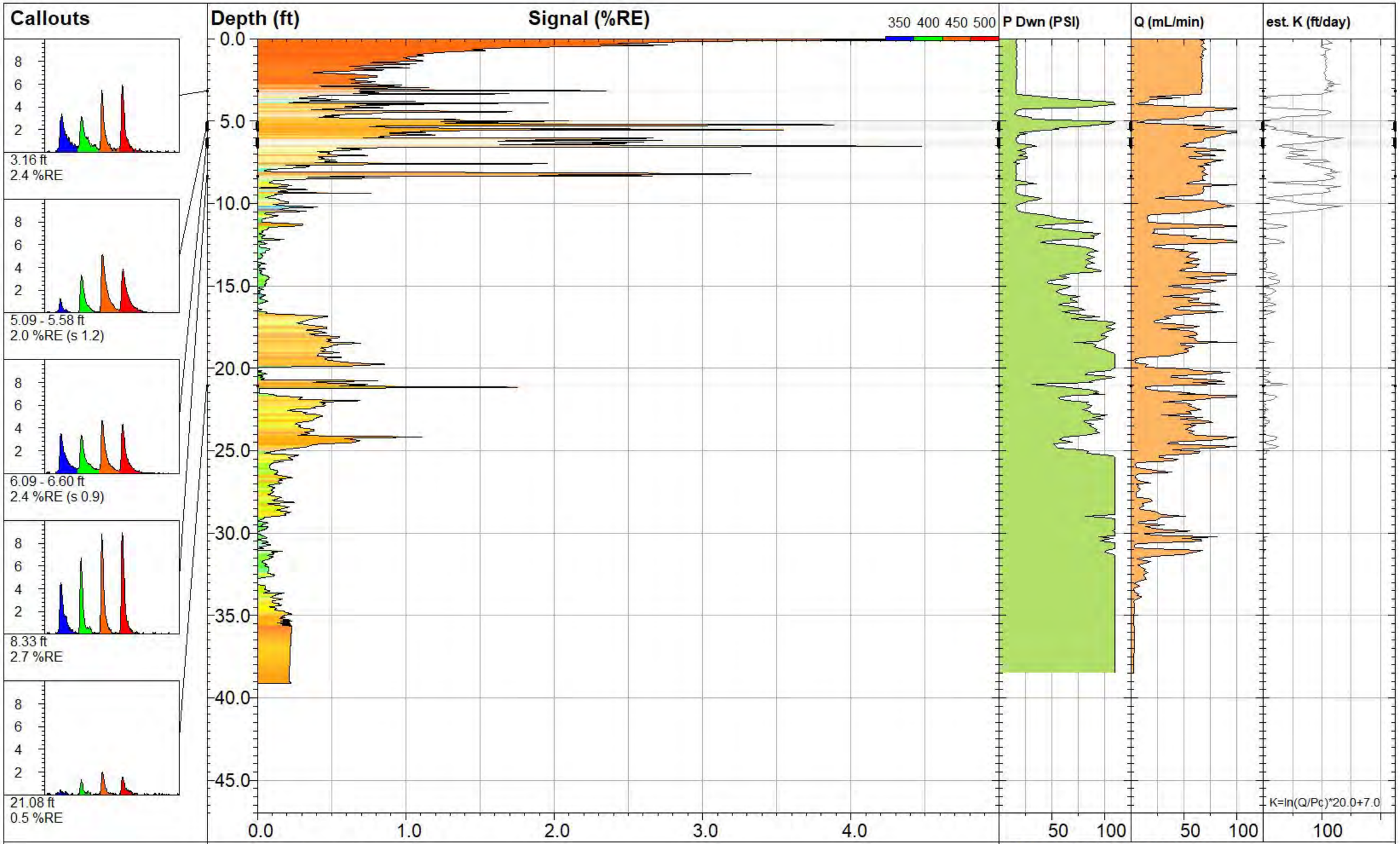
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **33.78 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **63.7 %RE @ 14.19 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-22 15:56 MST**



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EB-LIF-25

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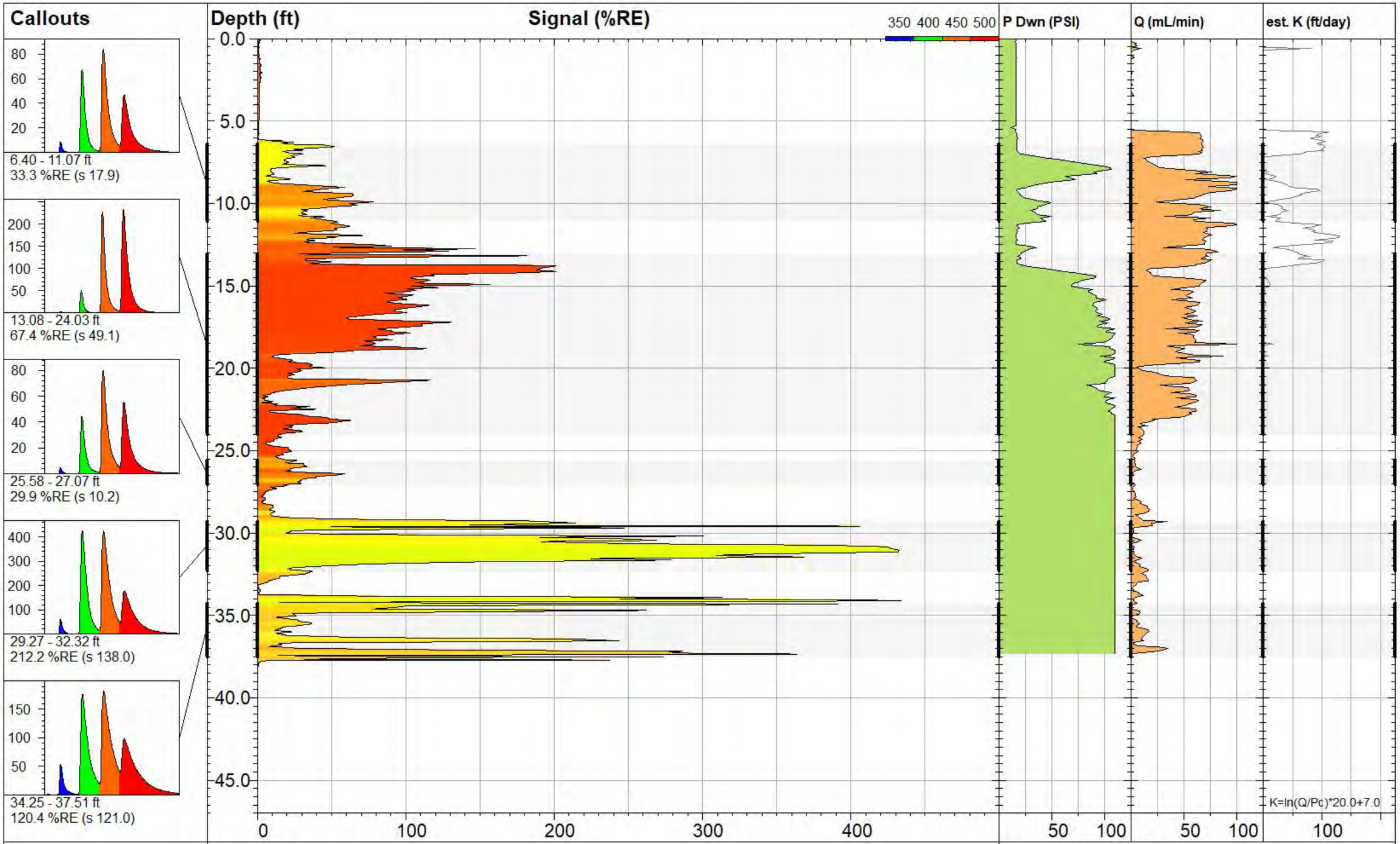
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **39.13 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **4.5 %RE @ 6.52 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-21 13:49 MST**



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EB-LIF-26

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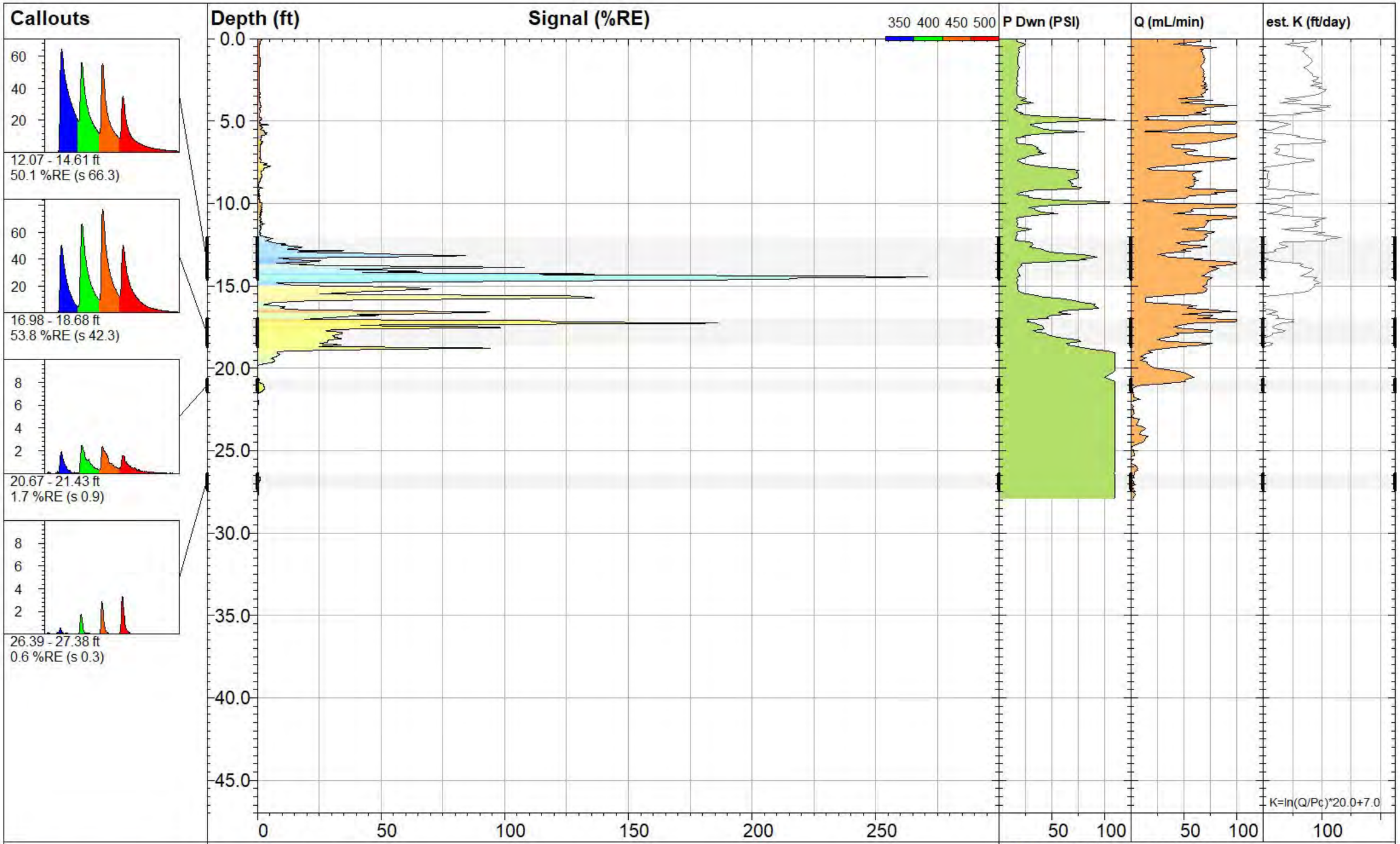
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **38.08 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **435.9 %RE @ 34.12 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-21 13:16 MST**



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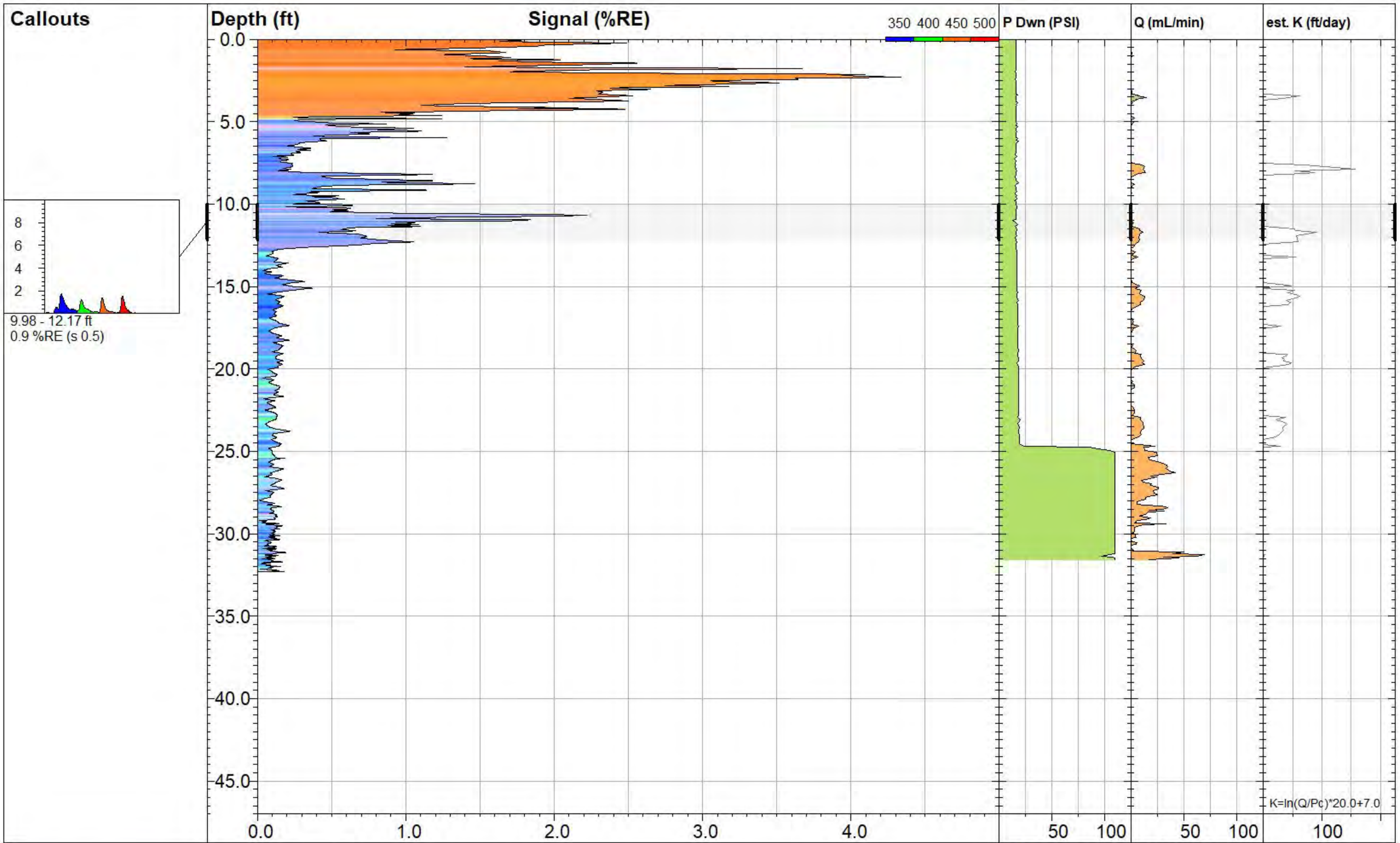
	Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **28.65 ft**
	Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **272.2 %RE @ 14.46 ft**
	Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-22 16:28 MST**



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EB-LIF-30

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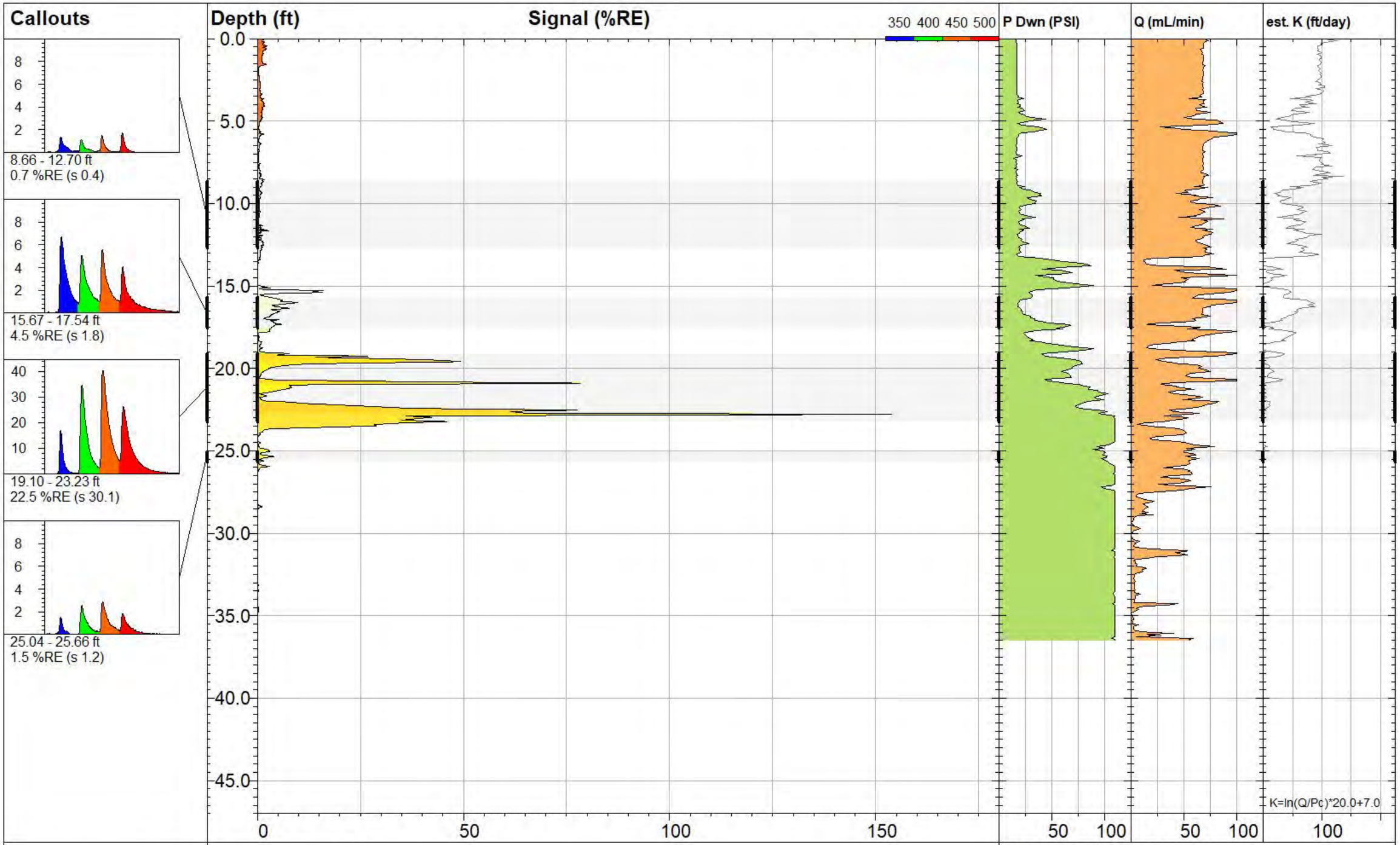
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.30 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **4.3 %RE @ 2.30 ft**
Operator / Unit: **BG / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-25 08:06 MST**



EB-LIF-33

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Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **37.23 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **156.1 %RE @ 22.79 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-21 11:11 MST**

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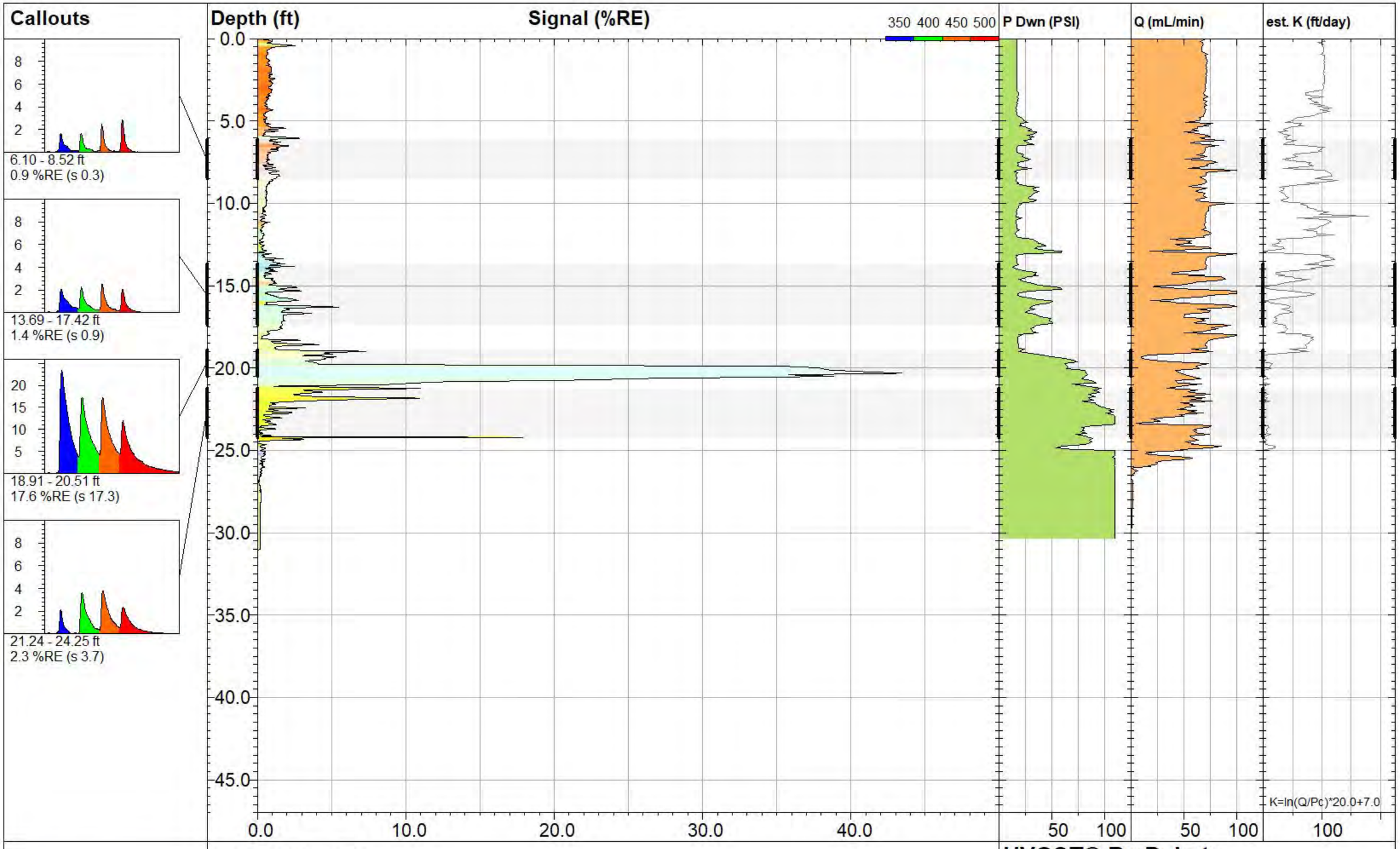

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EB-LIF-34

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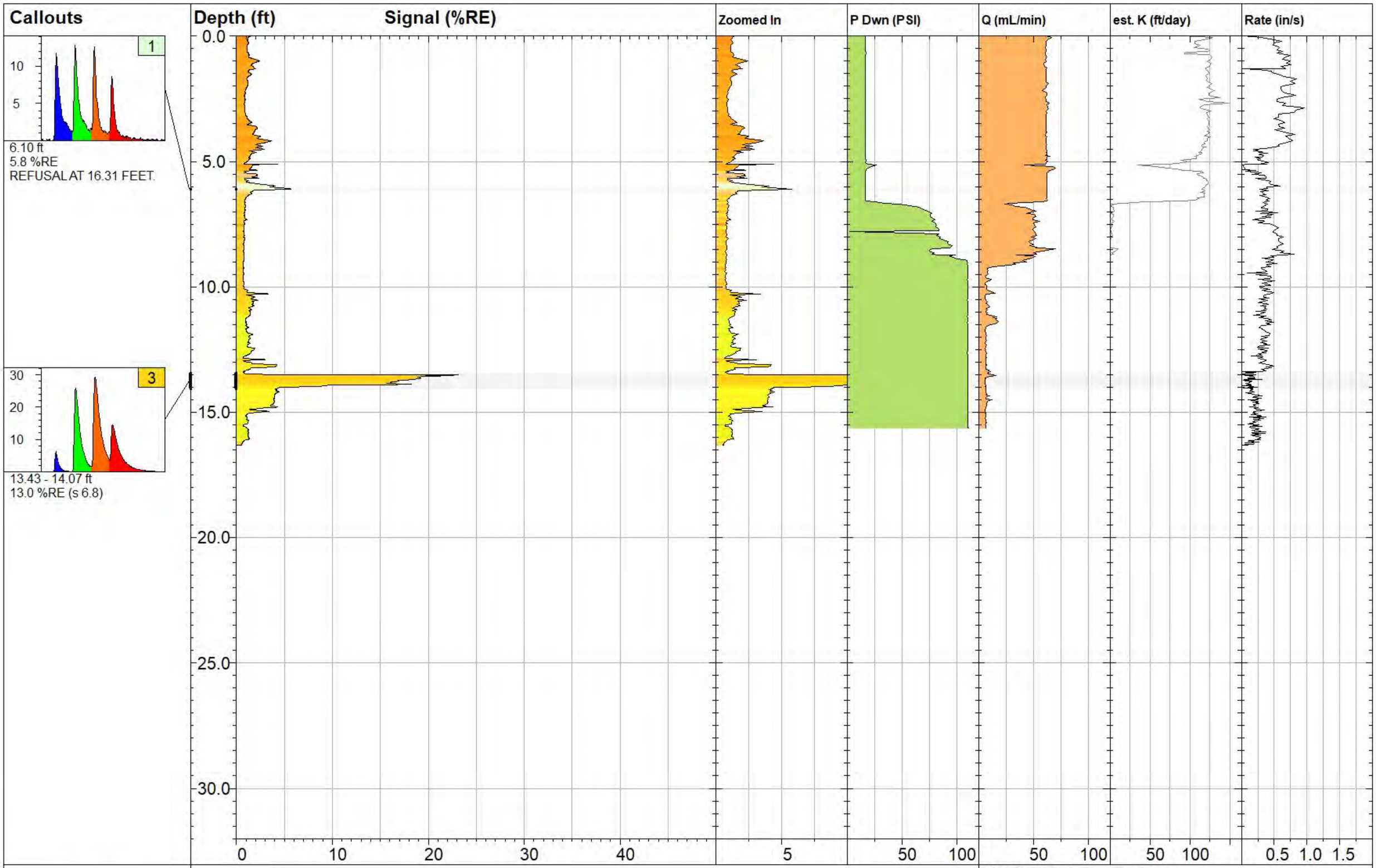
Site: **Eastern Boundry LIF Investigation**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **31.02 ft**
Client / Job: **Trihydro / 0408.19**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **43.4 %RE @ 20.32 ft**
Operator / Unit: **DS / CP / UVOST1003**	*Elevation:* **Unavailable**	*Date & Time:* **2019-11-21 09:41 MST**



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EB-LIF-91

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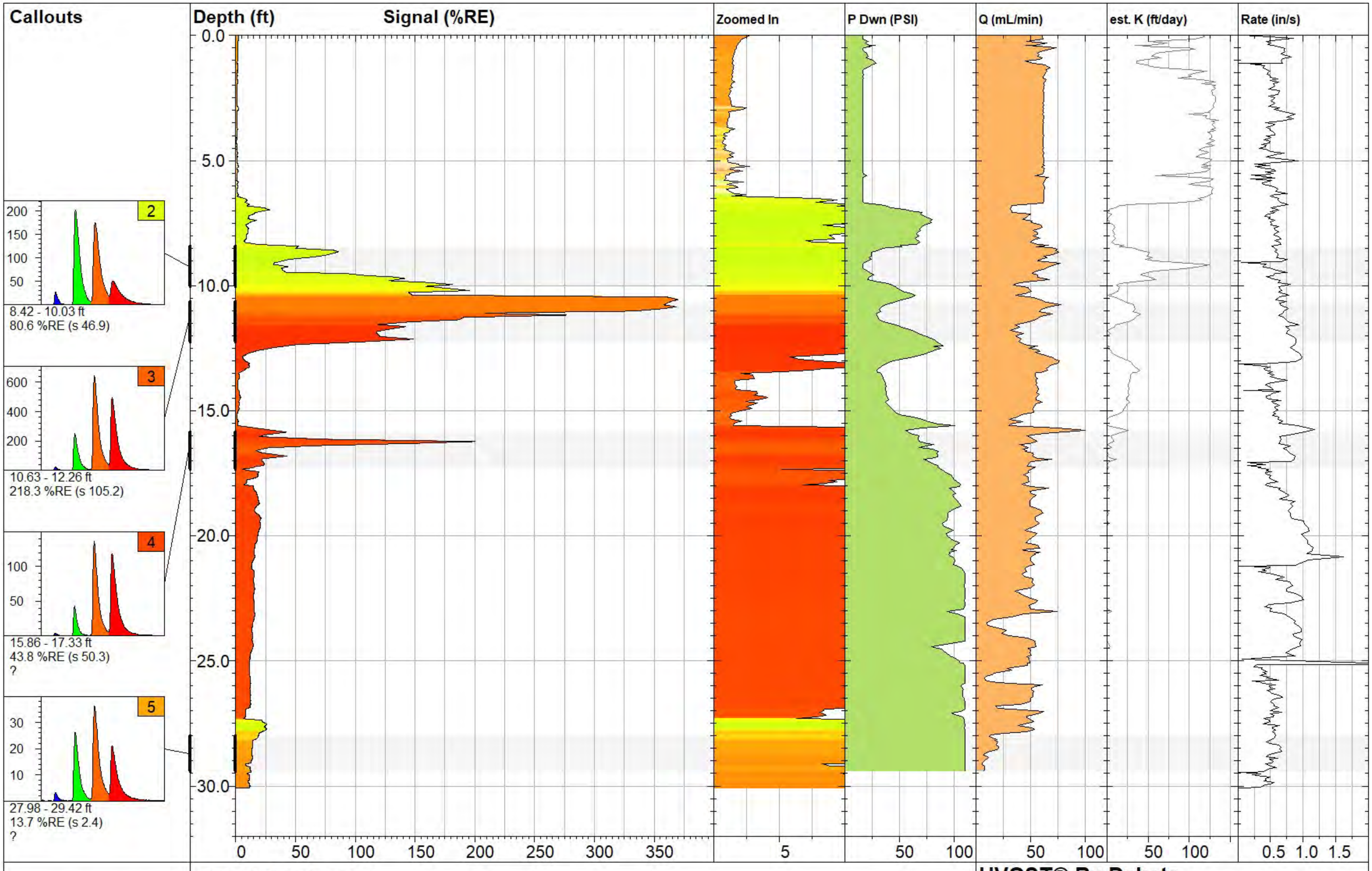
Site: **Marathon Gallup Refinery**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **16.31 ft**
Client / Job: **Trihydro / 0049B.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **23.3 %RE @ 13.51 ft**
Operator / Unit: **BG / UVOST1612**	Elevation: **Unavailable**	Date & Time: **2021-05-13 08:19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



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EB-LIF-108

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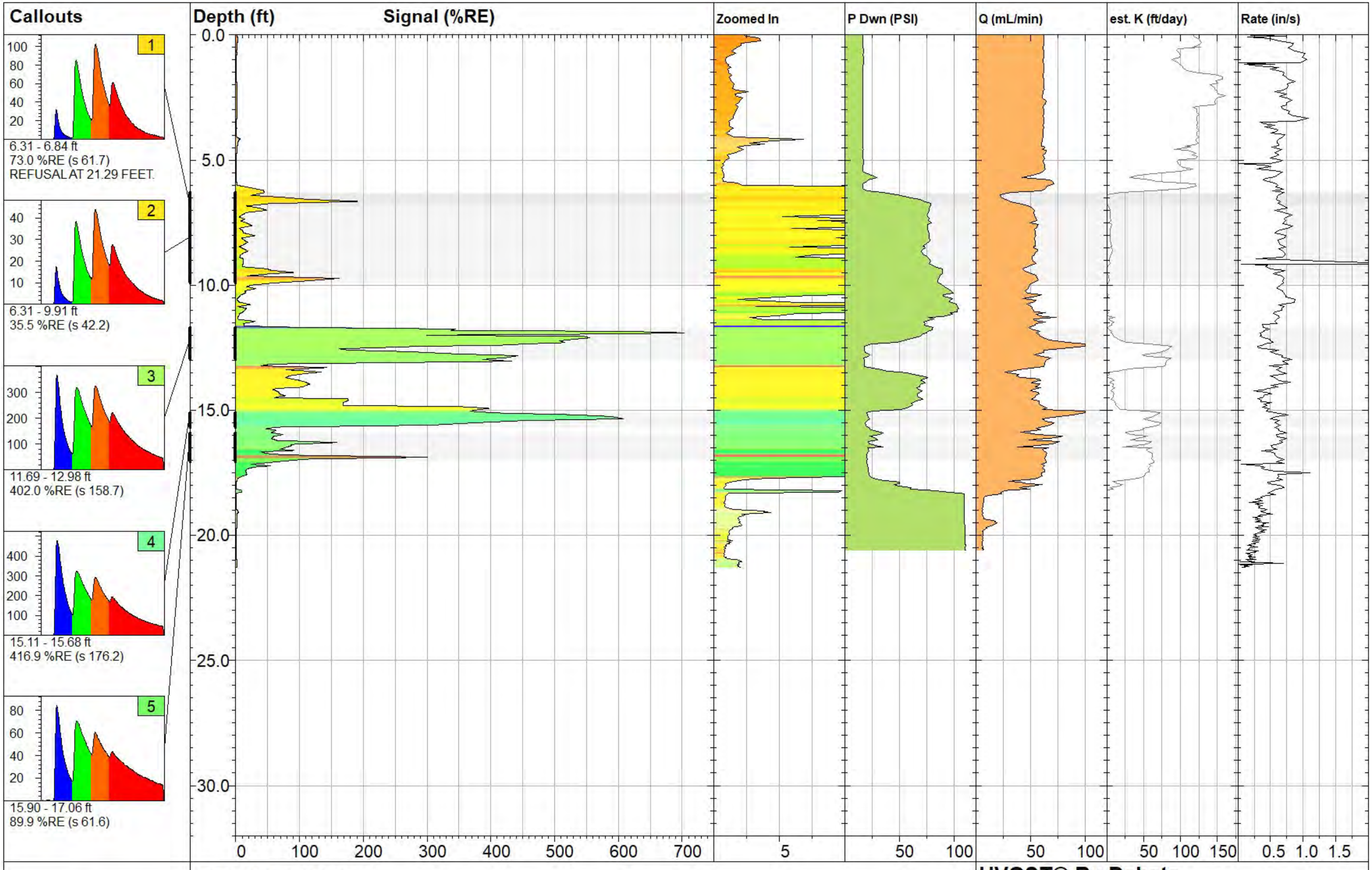
Site: **Marathon Gallup Refinery**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **30.08 ft**
Client / Job: **Trihydro / 0049B.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **370.0 %RE @ 10.56 ft**
Operator / Unit: **BG / UVOST1612**	Elevation: **Unavailable**	Date & Time: **2021-05-13 10:25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



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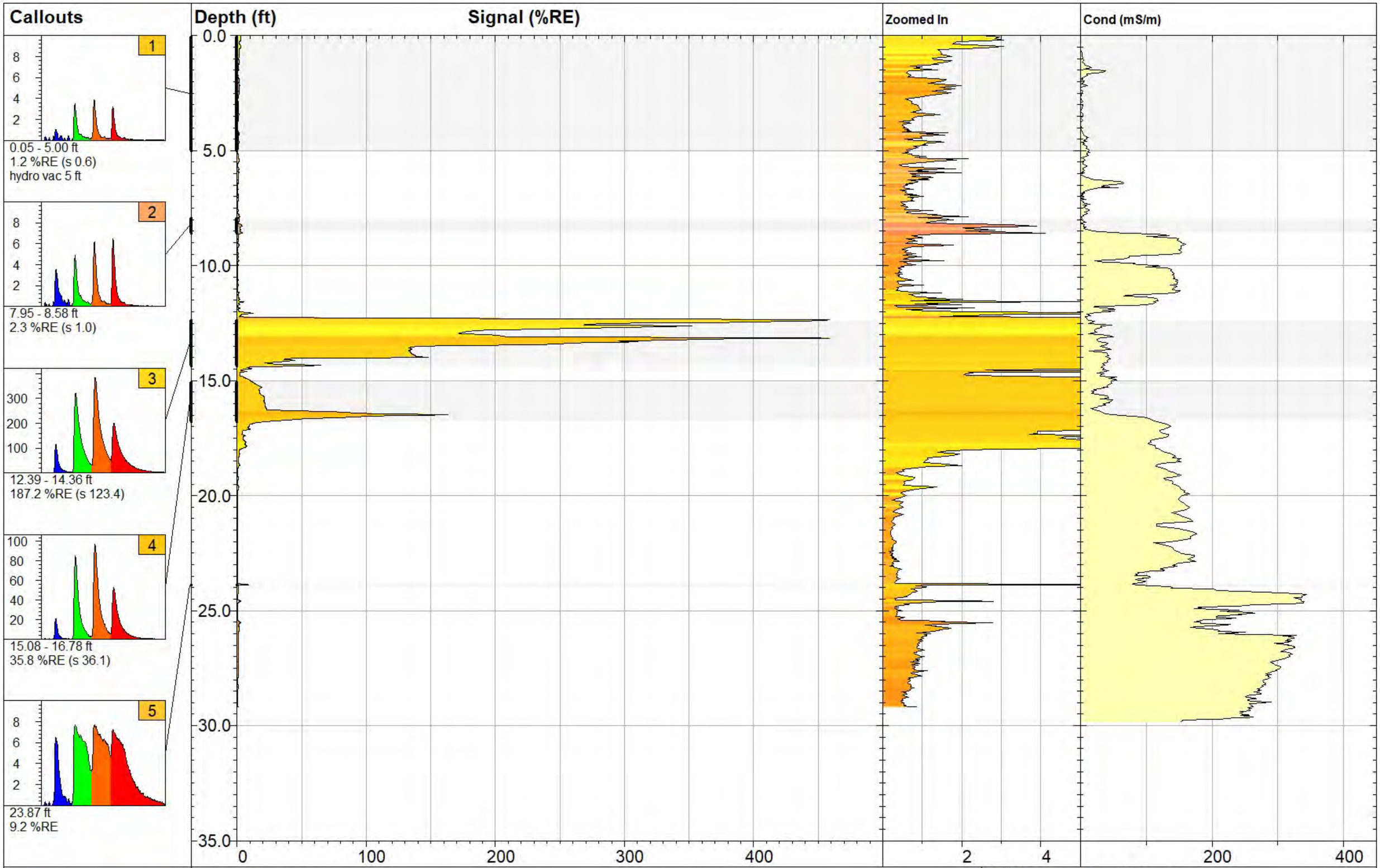
Site: **Marathon Gallup Refinery**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **21.29 ft**
Client / Job: **Trihydro / 0049B.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **703.6 %RE @ 11.91 ft**
Operator / Unit: **BG / UVOST1612**	Elevation: **Unavailable**	Date & Time: **2021-05-13 07:41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



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PA-LIF-01

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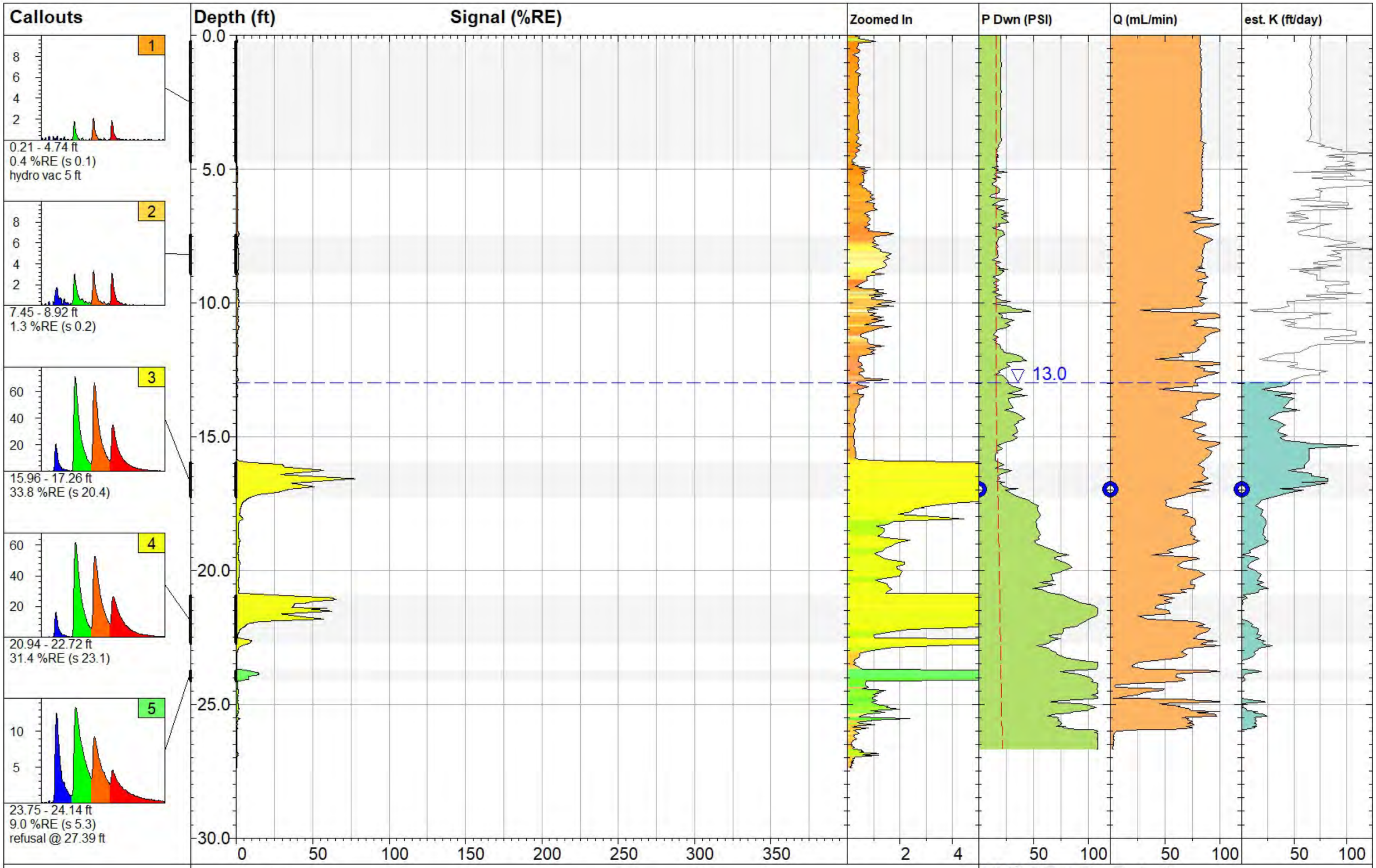
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **29.19 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **464.7 %RE @ 13.15 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-05 11:56 MST**



PA-LIF-02

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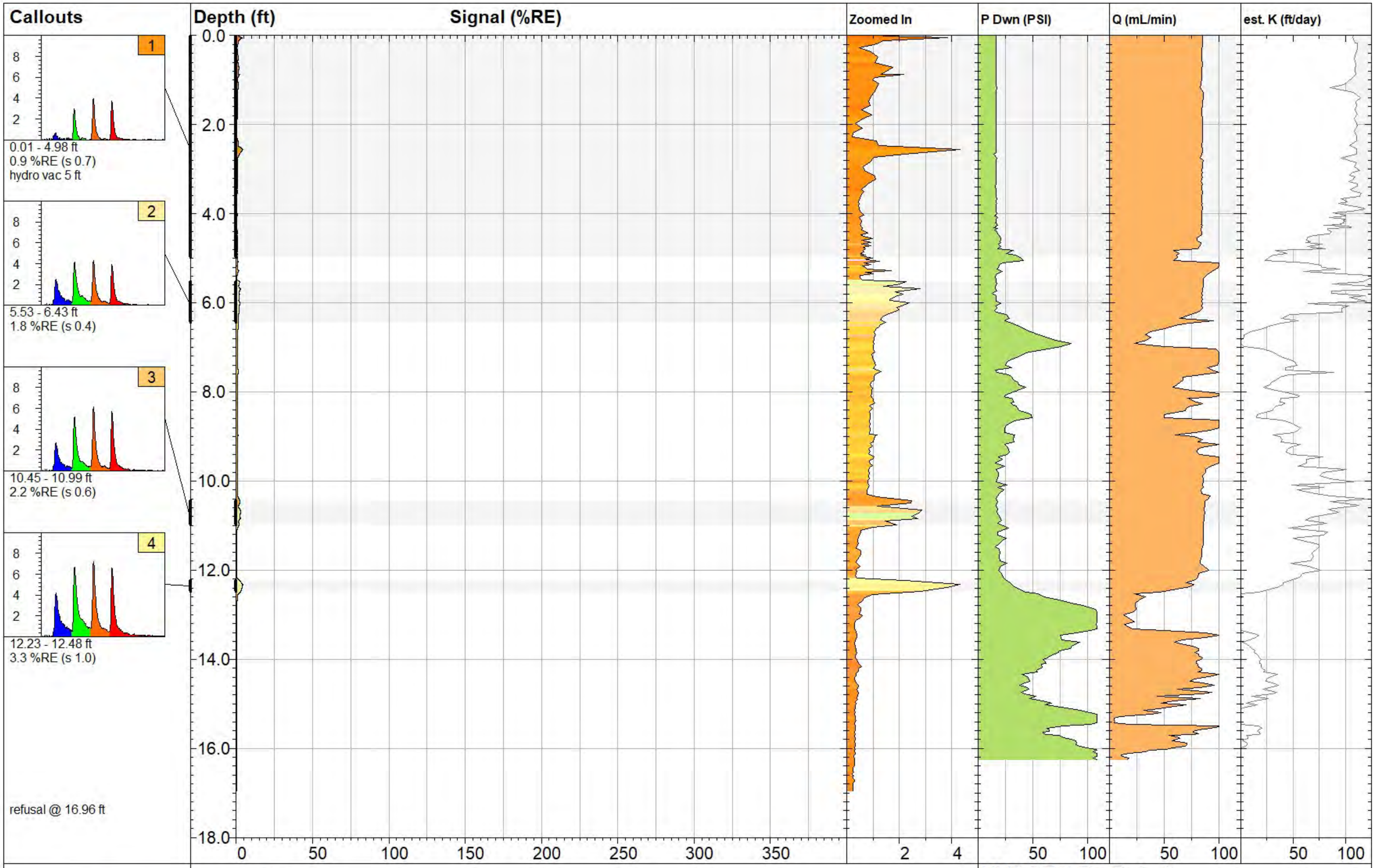
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **27.39 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **77.7 %RE @ 16.57 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-01 10:05 MST**



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PA-LIF-03

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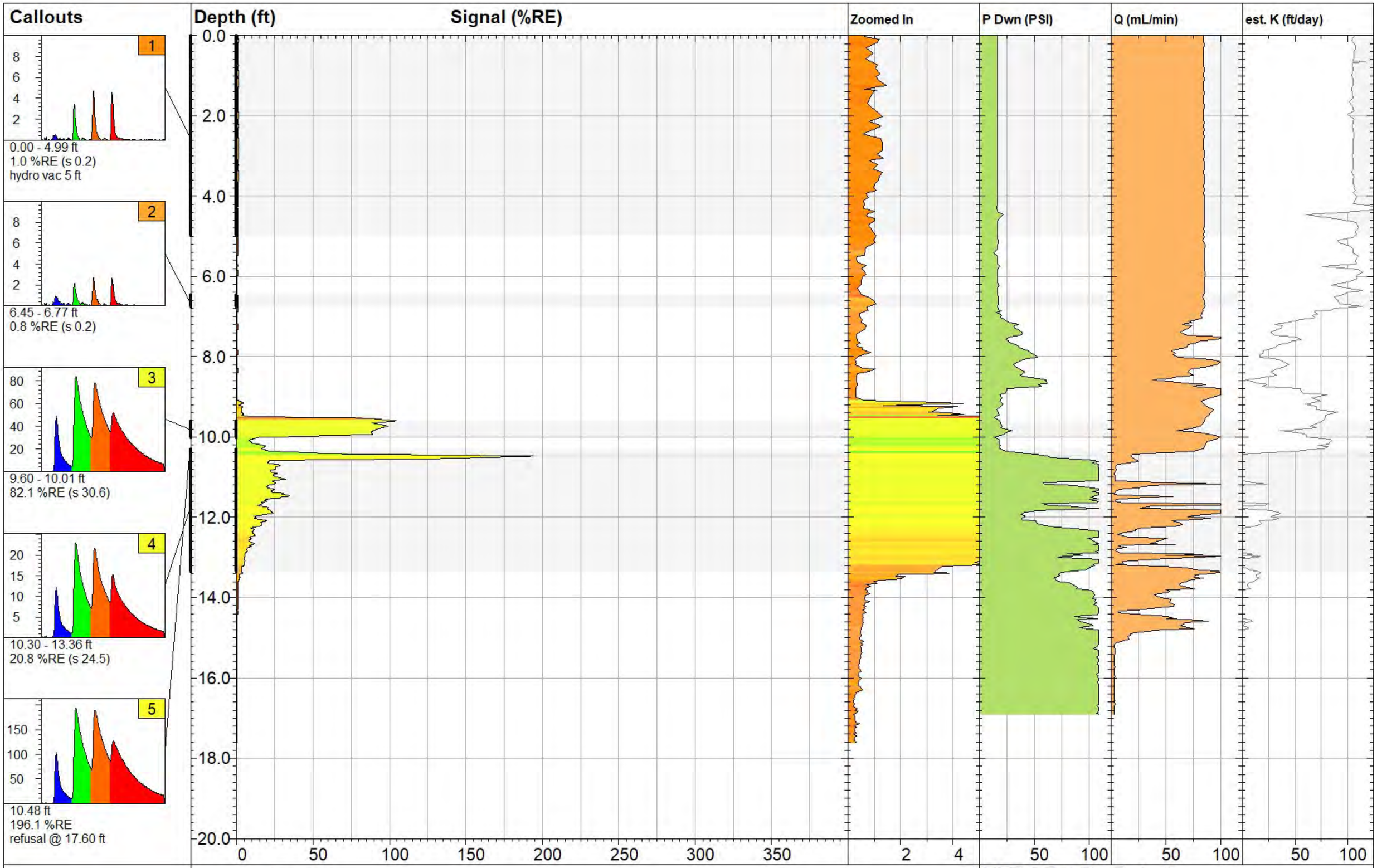
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **16.96 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **4.3 %RE @ 2.55 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-01 11:12 MST**



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PA-LIF-04

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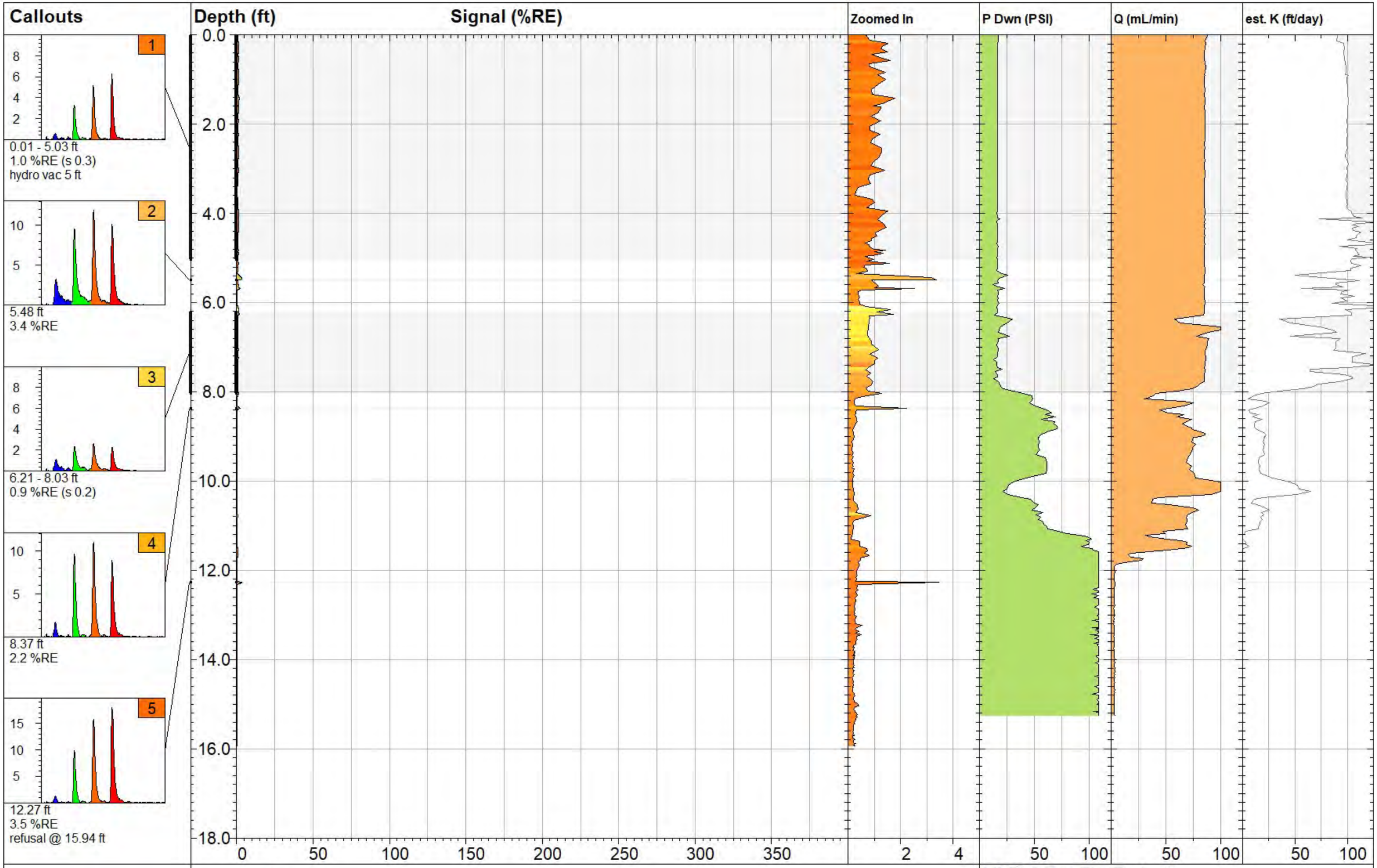
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **17.60 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **196.1 %RE @ 10.48 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-01 11:46 MST**



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PA-LIF-05

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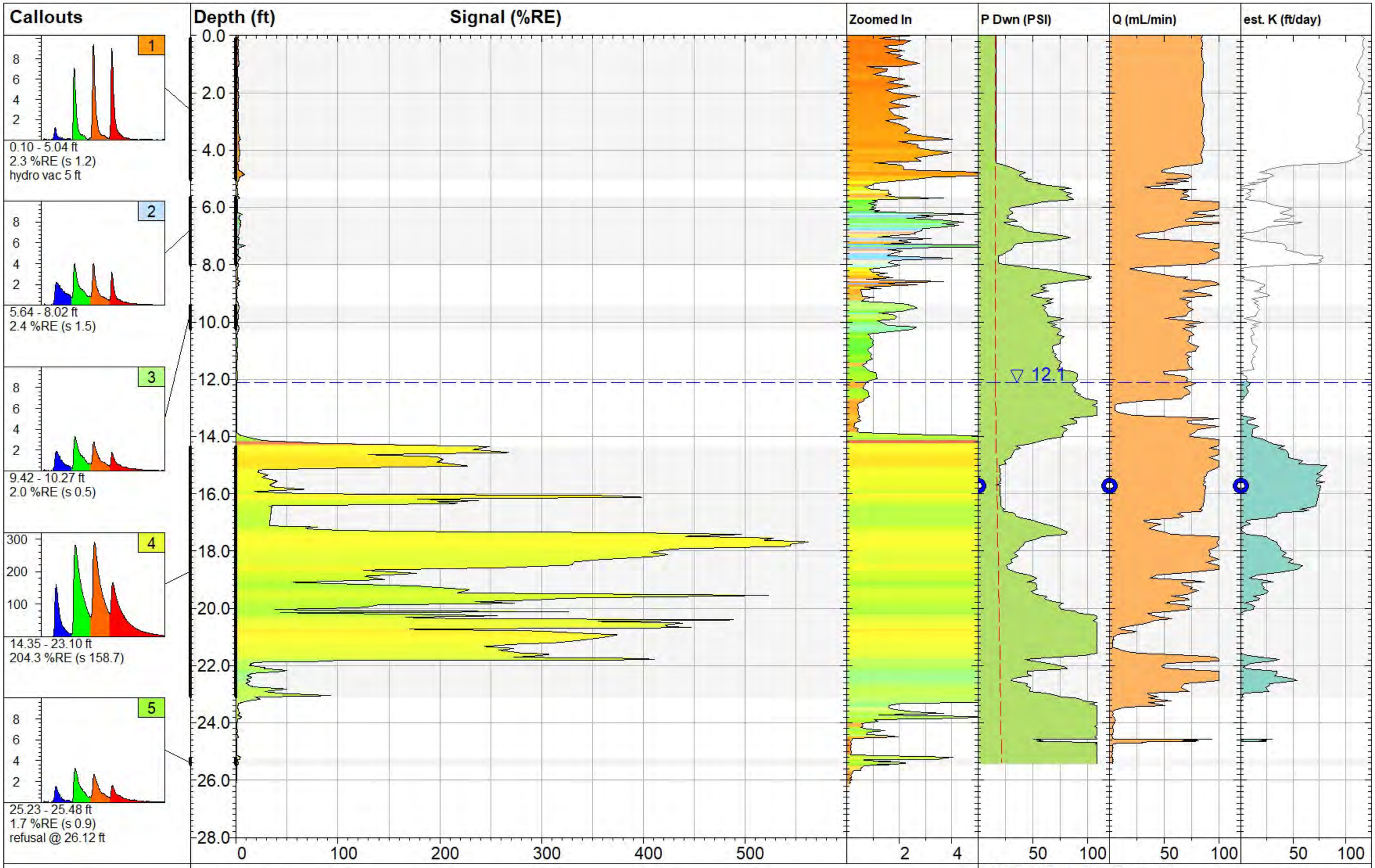
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **15.94 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **3.5 %RE @ 12.27 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-01 12:30 MST**



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PA-LIF-06

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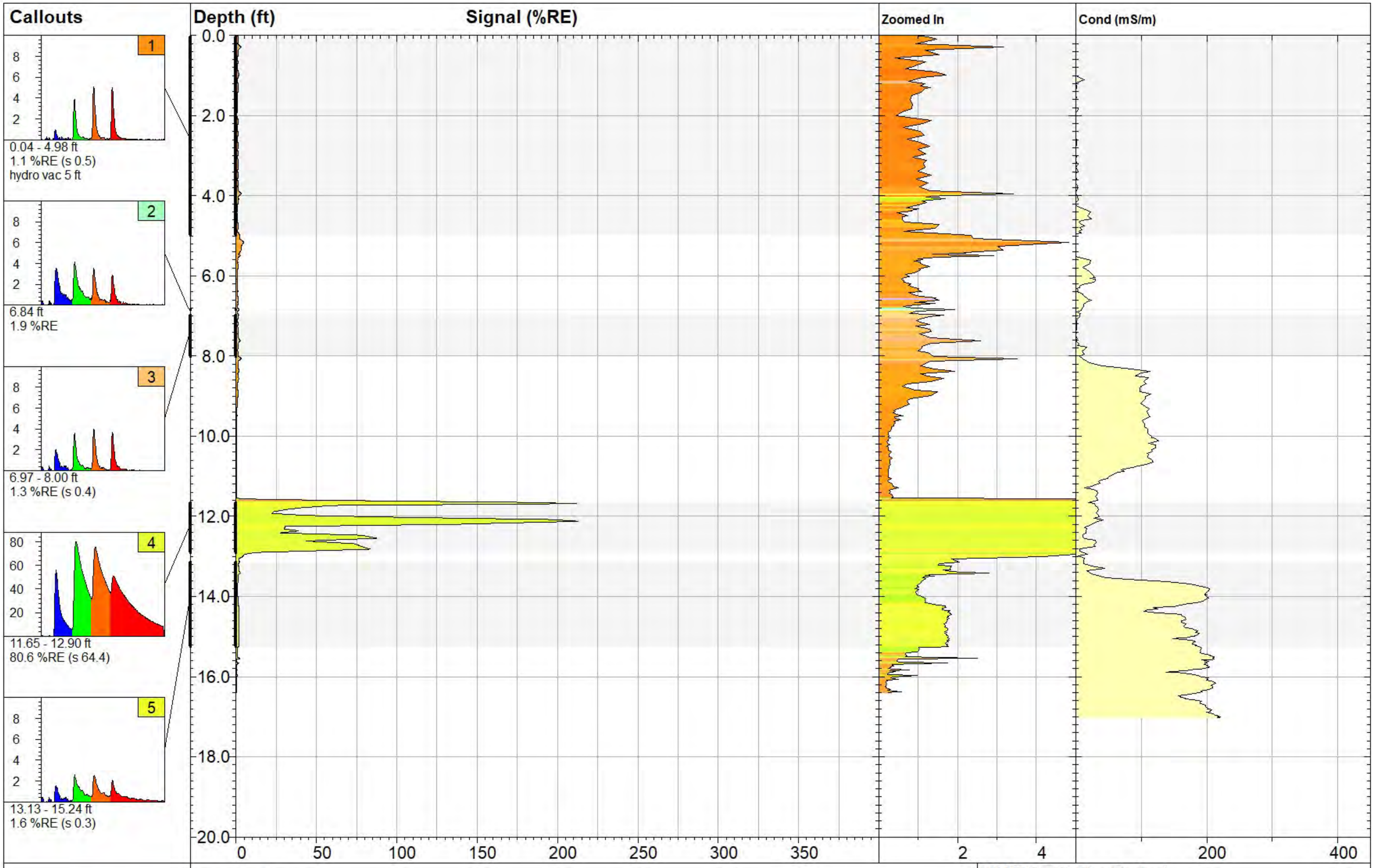
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **26.12 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **562.8 %RE @ 17.68 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-01 13:34 MST**



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PA-LIF-07

UVOST® By Dakota
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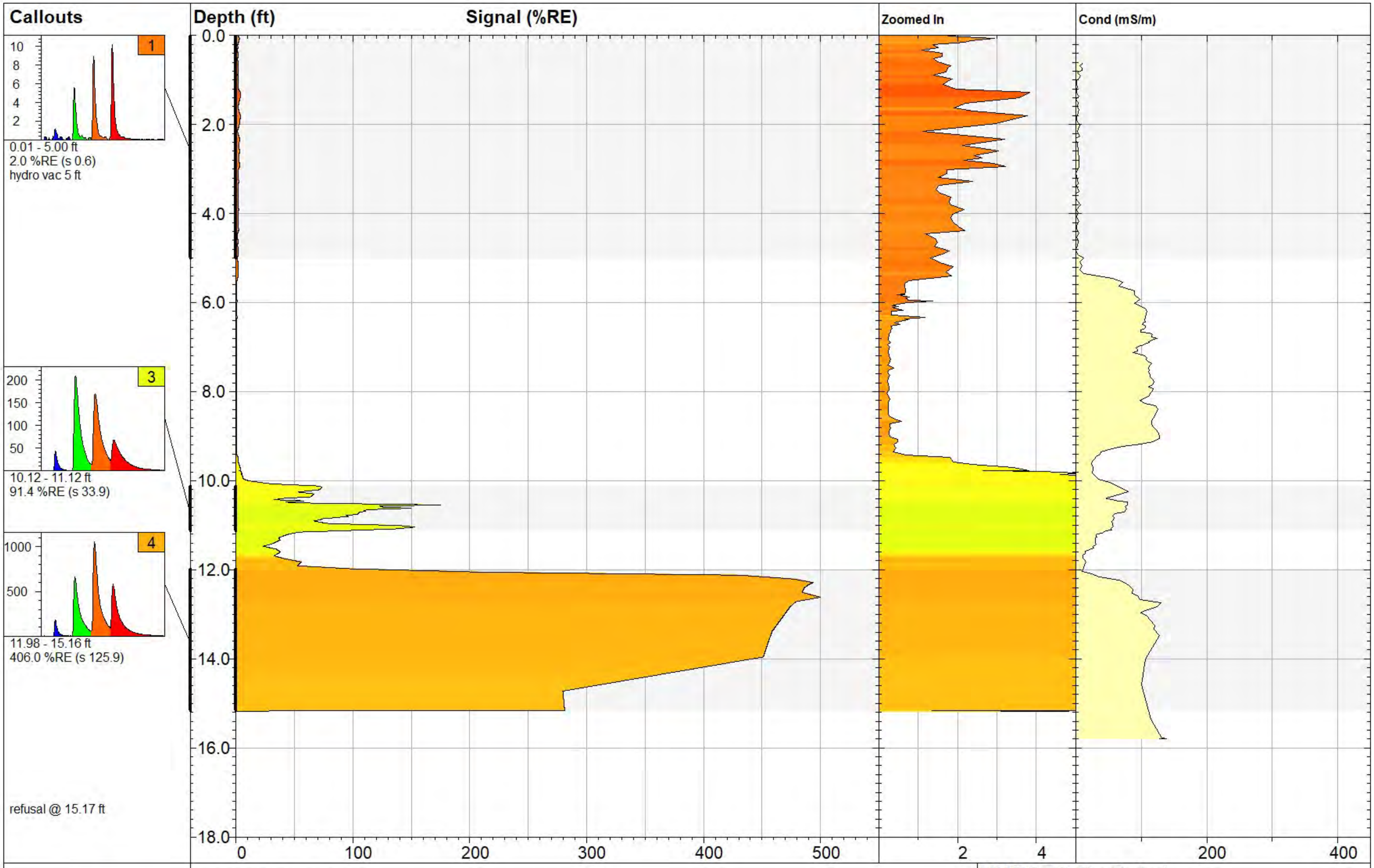
Site: **Marathon Marketing Tank Farm**	Y Coord.(Lat/North): **Unavailable**	Final Depth: **16.40 ft**
Client / Job: **TriHydro / 0049.21**	X Coord.(Long/East): **Unavailable**	Max Signal: **213.7 %RE @ 11.68 ft**
Operator / Unit: **A. Nagle / UVOST1613**	Elevation: **Unavailable**	Date & Time: **2021-02-05 12:41 MST**



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PA-LIF-08

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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**

Appendix B – Standard Operating Procedure – Soil Sampling

memorandum

To:	Sampling Team Members
From:	Project Manager
Date:	revised July 1, 2023
Re:	Standard Operating Procedure – Soil Sampling for the AOC 26 & 27 Investigation

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.

The PID should be checked to ensure that the PID has the appropriate lamp strength for the investigation. The most common lamp used in a PID is a 10.6 electron volt (eV) lamp, which will ionize compounds with ionization potentials from 8.0 eV to 10.6 eV. The range of 8.0 eV to 10.6 eV is representative of gasoline- and diesel-type constituents. For example, benzene, naphthalene, and toluene have ionization

potentials of 9.25 eV, 8.13 eV, and 8.82 eV, respectively (see link below). A list of ionization potentials for a variety of compounds has been published by RAE systems, the manufacturer of the PID most used by Trihydro. The list can be found at the following link: https://gastech.com/sites/default/files/RAE%20Systems%20Technical%20Note%20106%20v14%20Correction%20Factors.pdf.

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 (e.g., hand auger, hand shovel, Geoprobe direct push drill rig core sleeves, etc.)
- 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 Geoprobe direct push drill rig with rods and acetate liners.

If necessary, several cores may be collected from each location to provide adequate sample volume for the laboratory. If necessary, additional cores will be collected from within 6 lateral inches of the original boring, and additional sample volume will be collected from the same depth interval as the original boring. It should be noted that samples collected in this manner will be collected as composite samples. 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, the sample will be split into two aliquots. Aliquot #1 will be placed into a plastic bag and used for PID screening. Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride), sealed, placed in a cooler, and stored on ice for potential laboratory analysis. Aliquot #1 materials will not be submitted for laboratory analysis.

The bag containing Aliquot #1 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 PID readings, aliquot #2 sample containers from selected sample intervals will be 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 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. Components of the Geoprobe direct push drill rig that come into contact with soil (e.g., the cutting shoe) will be decontaminated between sampling locations; the drill rig will not be decontaminated between sampling intervals at the same location due to the acetate liners. 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

Appendix C – Example Boring Log

Trihydro CORPORATION

Lithology Log

Sheet ___ of ___

LOCID

Project Name	Project Number	Site ID

Drilling Company	Driller	Ground Elevation	Total Drilled Depth

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 Type	Driving Wt.	Drop	Geologist/Engineer	Checked by/Date

Weather	Other Personnel Present
Site Conditions	

Location Description (include sketch in field logbook)

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

Trihydro CORPORATION

Lithology Log (continued) Sheet ___ of ___

LOCID

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

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https://www.emnrd.nm.gov/ocd/contact-us

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

CONDITIONS

Action 227782

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 227782
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
joel.stone	Approved for OCD record retention purposes.	2/14/2025