2013 Wyckoff Upland NAPL Field Investigation Technical Memorandum

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This technical memorandum documents and presents initial results from the Wyckoff Upland Non-Aqueous Phase Liquid (NAPL) Field Investigation (the Upland Investigation) conducted by CH2M HILL for the U.S. Environmental Protection Agency (EPA) as part of the Wyckoff/Eagle Harbor Superfund Site Operable Unit-2/Operable Unit-4 Focused Feasibility Study (FFS). This technical memorandum presents site data collected using Dakota Technologies' Tar-specific Green Optical Scanning Tool (TarGOST). TarGOST is a Laser-Induced Fluorescence (LIF) field tool used to semi-quantitatively determine the relative distribution of NAPL in the subsurface. The TarGOST data generated from this field investigation will be used to support preparation of the FFS including remedial target area identification, technology screening, and alternatives analysis.

CH2M HILL conducted the site TarGOST investigation activities during two separate phases in January through March 2013 in accordance with procedures outlined in the *Wyckoff Upland NAPL Investigation Quality Assurance Project Plan* (QAPP) (CH2M HILL, 2013a). Specific objectives of this field investigation relevant to TarGOST data collection included:

- Evaluate the horizontal and vertical extent of NAPL within the Project Area;
- Assess NAPL occurrence in relation to hydrostratigraphy; and
- Evaluate the mobility of NAPL at the site and the potential for NAPL to migrate through the aquitard and/or sheet pile wall.

This initial evaluation of the TarGOST data set focuses on the first objective, evaluating the horizontal and vertical extent of NAPL within the Project Area. In addition, the EPA, Sundance Environmental and Energy Specialists, Ltd. (Sundance), and CH2M HILL are working in conjunction to model the TarGOST dataset in 3 dimensions using geostatistical interpolation methods. A draft report of the results from this evaluation will be completed in fall 2013.

This technical memorandum is divided into the following sections:

- **Section 1 – Background** describes the Upland NAPL Investigation Project Area and provides an overview of the field investigation components.
- **Section 2 – Deviations from the QAPP** documents minor variations from planned procedures.
- **Section 3 – Quality Assurance and Quality Control** describes methods, procedures, documentation, and quality checks for the field investigation and data interpretation.
- **Section 4 – Investigation Results Summary** reports findings and observations from the project work.
- **Section 5 – Conclusions** summarizes conclusions and discusses remedy selection implications.

- **Section 6 – References** presents works cited in this document.

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1 Background

This section presents an overview of the Project Area as well as a detailed description of the components of the field investigation conducted.

1.1 Project Area Description

The Wyckoff/Eagle Harbor Superfund Site encompasses the contaminated areas of Eagle Harbor and adjoining uplands of the former Wyckoff wood-treating facility. The Superfund Site is divided into four operable units (OUs):

- East Harbor OU (OU-1) – subtidal and intertidal sediments in Eagle Harbor adjacent to Wyckoff Point.
- Soil OU (OU-2) – surface and unsaturated subsurface soil in the former Wyckoff wood treating process and storage area.
- West Harbor OU (OU-3) – sediments and uplands of former shipyard.
- Groundwater OU (OU-4) – groundwater and soil in the saturated zone beneath the soil OU.

The Soil and Groundwater OUs consist of the approximately 19-acre upland area affected by releases of wood treating chemicals during the 85-year operating history of the Wyckoff facility. The Project Area that was the focus of the upland NAPL field investigation is an approximately 8-acre portion of the Soil and Groundwater OUs where wood treatment operations were centered and where large volumes of subsurface NAPL have been observed in wells and borings. Further descriptions of the site setting, historical activities, and other background information are provided in the Data Quality Objectives appendix of the QAPP (CH2M HILL, 2013a).

1.2 Field Investigation Overview

The upland investigation included the following field activities:

- **TarGOST LIF Probing (Phase 1 – January 14 through February 8, 2013).** An initial round of LIF field screening using the TarGOST probing tool to qualitatively assess presence or absence of potential NAPL, as guided by historical NAPL occurrences.
- **TarGOST LIF Probing (Phase 2 – February 25 through March 22, 2013).** A second round of TarGOST investigation to extend the Phase 1 grid and evaluate spatial data gaps, based on results of Phase 1.
- **Confirmation Soil Coring (Phase 1 and Phase 2).** Soil cores were collected through either sonic or direct push drilling methods and visually logged, and then selected intervals were analyzed ex-situ using the TarGOST probing tool to verify LIF probing results and correlate to visual NAPL observations.

TarGOST replicate probes were completed at selected locations to evaluate LIF signal response variability. Table 1-1 presents a summary of the explorations completed in comparison to QAPP target objectives.

1.2.1 TarGOST Phase 1 and Phase 2 LIF Probes

The QAPP (CH2M HILL, 2013a) specified 50 initial target boring locations for Phase 1 at the Upland Investigation site. Phase 1 TarGOST probes were advanced at 77 locations at the site (Figure 1-1 and Table 1-2) because sufficient progress was made on the initial target borings, as specified in the QAPP, so additional boring locations were added. TarGOST field data is presented in Appendix A, including raw field logs (Appendix A-1) and daily calibration records (Appendix A-3). Field notes are included in Appendix B. Seven field replicates were also

completed for a total of 84 Phase 1 TarGOST probes. As anticipated by the QAPP, the Phase 1 locations were adaptively shifted in the field to optimize data gathering activities for general areal coverage outward from and between known historical NAPL occurrences. Phase 1 TarGOST locations were further adjusted in the field based on real-time TarGOST results and site conditions at the time of work. As examples of site conditions encountered, boring locations were adjusted in the field based on the presence of existing foundations, shallow refusal depth, and access issues related to topography and site drainage. In accordance with QAPP objectives, the Phase 1 TarGOST probes were advanced to refusal, expected to be the glacial till layer, at the majority of the exploration locations. Exceptions included 2013T-010, 2013T-013, 2013T-050, and 2013T-051, where the probe was approaching the expected bottom depth of the aquitard. Probing was discontinued to prevent probing through the bottom of the aquitard and creating a preferential flow path through the aquitard.

Phase 2 TarGOST probes were completed following the Phase 1 field effort (Figure 1-1 and Table 1-2). The objective of the Phase 2 TarGOST probes was to achieve additional coverage and delineation of NAPL in soil between and beyond the Phase 1 locations. The locations for the Phase 2 TarGOST probes were selected utilizing Phase 1 results to provide step-out or fill-in coverage. A total of 64 Phase 2 locations were completed. Twelve borings were conducted outside of the sheet pile wall and the Former Process Area. These borings were performed on the West Beach along the exterior of the sheet pile wall and stepped out from the wall to investigate potential continuity with elevated TarGOST responses on the interior side of the wall. These borings are identified on Figure 1-1. As for Phase 1, the nominal target depth of the Phase 2 TarGOST borings was refusal, expected to be the glacial till. All Phase 2 cores were advanced to refusal.

1.2.2 Confirmation Soil Cores

Confirmation soil cores were advanced at 10 selected TarGOST Phase 1 locations and 10 Phase 2 locations (Figure 1-1 and Table 1-3). Soil and NAPL descriptions are presented on the Direct Push and/or Rotosonic Soil Core Logs presented in Appendix C. All cores were logged in accordance with procedures described in the QAPP Field Procedures appendix as follows.

1.2.2.1 Visual NAPL Observations

Soil cores were visually examined for the presence of NAPL. The following descriptions of NAPL were used to document the extent of NAPL observations:

- *No visible evidence of NAPL* – No visible evidence of oil on soil sample
- *Sheen* – Sheen as described by the sheen testing methodology described below
- *Oil Stained* – Visible brown or black staining on soil. Can be visible as mottling or in bands. Typically associated with fine-grained soils.
- *Oil Coated* – Visible brown or black oil coating soil grains. Typically associated with coarse-grained soils.
- *Oil Wetted* – Visible brown or black oil wetting the soil sample. Oil appeared as a liquid and was not held by soil grains.

Sheen screening is a method that can be effective in detecting petroleum-based products in concentrations lower than regulatory cleanup guidelines. Water sheen testing involved the placement of soil in water, then observation of the water surface for signs of sheen. Sheens were classified according to the following descriptions provided in the QAPP (CH2M HILL, 2013a):

- *No Sheen* – No visible sheen on water surface
- *Slight Sheen* – Light colorless film; spotty to globular; spread is irregular, not rapid; areas of no sheen remain; film dissipates rapidly
- *Moderate Sheen* – Light to heavy film, may have some color or iridescence, globular to stringy, spread is irregular to flowing; few remaining areas of no sheen on water surface
- *Heavy Sheen* – Heavy colorful film with iridescence; stringy, spread is rapid; sheen flows off the sample; most of water surface may be covered with sheen

1.2.2.2 Soil Lithologies and Geologic Units

Soil cores for the Upland Investigation were logged in the field in accordance with the QAPP Field Procedures. Field logging included identification of soil types using the American Society of Testing and Materials (ASTM) D2488-09a method, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Lithologies were further divided into geologic units consistent with criteria developed by CH2M HILL during the *Final Remedial Investigation (RI) Report for the Wyckoff Soil and Groundwater Operable Units* (CH2M HILL, 1997), and by the U.S. Army Corps of Engineers (USACE) for the *Off-Shore Field Investigation Report for the Barrier Wall Design Project* (USACE, 1998). These geologic units were subsequently described with minor modifications in the USACE's *Comprehensive Report, Wyckoff NAPL Field Exploration, Soil and Groundwater Operable Units* (2000) and in CH2M HILL's *Soil Boring and Monitoring Well Construction Summary* (CH2M HILL, 2009).

Geologic units and descriptions applicable to the Upland Project Area are as follows:

- **Fill:** Brown, fine sand containing wood debris, anthropogenic debris, and infrequent shell fragments. Fill materials may be associated with historical shoreline development and modification activities.
- **Surficial Marine Sediment:** Dark olive, harbor bottom silt and clay, commonly with abundant wood chips and wood and plant debris.
- **Marine Silt:** Olive-gray silty sand with thin layers of gravel, to silt or clay, and containing abundant shell fragments.
- **Marine Sand and Gravel:** Gray to dark gray, loose to dense sand and gravel with local cobbles, and low silt content and common shell fragments.
- **Marine Sand and Gravel (Gravel Zones):** Marine Sand and Gravel zones with dominant gravel and local cobbles, transitional into less coarse sediments.
- **Marine Sand:** Dark greenish gray to medium dark, dense to very dense sand with little silt or gravel.

Zones of dominantly Wood Pulp and Wood Debris were also added as geologic units in the Project Area in the *2012 Field Investigation Technical Memorandum – Wyckoff OU-1 Focused Feasibility Study* (CH2M HILL, 2013b). These zones are characterized by dark gray/brown to black decomposing fibrous or pulpy wood.

Direct push and rotosonic sediment coring logs from the current Upland Investigation are provided in Appendix C-1 of this technical memorandum. CH2M HILL reviewed the lithologic information from the historical exploration logs to assign the geologic unit designations to the current investigation boring logs.

1.3 Borehole Abandonment

Each TarGOST boring, soil boring, and sample core collection location was abandoned by filling from the total depth of the hole to the ground surface with Class G cement with 30% silica flour mixed as described in the QAPP Field Procedures (CH2M HILL, 2013a). The only exceptions were the TarGOST and confirmation borings advanced on the West Beach. These were using a bentonite slurry.

1.4 Decontamination and Investigation-Derived Waste

Reusable NAPL investigation equipment including hand tools, TarGOST probe tips, and push probe drilling equipment was decontaminated in accordance with methods described in the QAPP Field Procedures.

- Disposable equipment and accessories including personal protective equipment (PPE), soil core liners, and soiled paper towels were managed as investigation-derived waste (IDW) for off-site disposal. IDW was placed in labeled drums on the east decontamination pad on the Wyckoff uplands. The drummed IDW is currently awaiting disposal as RCRA-listed Hazardous Waste.
- The rods, tires, and undercarriage of the direct push drill rig were decontaminated at the Wyckoff upland east decontamination pad prior to each exit of the vehicle from the exclusion zone. Wash pad decontamination

utilized a steam cleaner capable of 2,000 pound per square inch pressure and a temperature of greater than 212 degrees Fahrenheit. Decontamination fluids were disposed of through the on-site treatment system.

- Relatively small quantities NAPL-contaminated soil generated during the subsurface investigation were deposited in the Wyckoff uplands within the exclusion zone. These disposal locations are beyond the limits of site roads, walking paths, or other access corridors.

2 Deviations from the QAPP

This section describes changes enacted in the field to the borehole nomenclature and the decision to postpone NAPL mobility analysis as described in the QAPP (CH2M HILL, 2013a).

2.1 Borehole Nomenclature

Borehole nomenclature was changed slightly in the field to better represent the activities being performed. In the QAPP, field replicate probes were to be designated as -00Xa to denote association with primary TarGOST location -00X. The nomenclature was changed in the field to -00XR to denote that the probe was a Replicate of location -00X. Visual confirmation borings were to be designated as 2013-DP-00X to indicate direct push. However, only a portion of the visual confirmation borings were conducted with a direct push rig and the rest were completed with a sonic drill rig. Also, since collection of mobility cores, planned to be designated 2013SC-00X, was delayed to a later portion of the project, the visual confirmation boreholes were designated 2013SC-00X to designate that they were a soil core, rather than a TarGOST probe borehole.

2.2 Replicate TarGOST Probes and Soil Core Frequency

The QAPP specifies that field confirmation replicate TarGOST probes and soil cores from direct-push or sonic drilling equipment were to be completed at approximately 10 percent of the TarGOST probe locations. Seven replicate locations and ten soil cores were advanced during Phase I TarGOST activities. As soil cores were deemed more valuable than replicates, for the Phase II TarGOST activities ten soil cores but no replicate locations were advanced. Consequently soil cores were collected at a 14 percent frequency, while replicates were collected at a 5 percent frequency relative to the 10 percent frequency target.

3 Quality Assurance and Quality Control

Procedural methods, documentation, and quality checks for field investigation and data interpretation tasks were conducted as described in the QAPP and QAPP Field Procedures. Quality assurance and quality control (QA/QC) measures were implemented in accordance with these documents. This section provides additional description of TarGOST calibration procedures and data usability.

3.1 TarGOST Equipment Calibration

The calibration procedure for the TarGOST equipment involved both qualitative and quantitative field calibration of the reference emitter (RE), measurement of potential background interference, and real-time field review of the waveform output. These procedures are described in more detail in the following subsections.

3.1.1 Standard LIF Reference Emitter (RE) Field Calibration Procedure

The following description represents Dakota Technologies' standard operating procedure for RE field calibration. Dakota Technologies performed RE calibration as a standard field quality assurance procedure prior to each TarGOST probe. Prior to conducting each TarGOST probe, two calibration measurements are recorded: one for RE and one for background. RE calibration is performed to verify that TarGOST signal response is within a suitable range relative to standard RE material placed on the TarGOST detector window for LIF transmission. The RE is a calibration for the response of the LIF system to the standard fluorescence signature, not a method of converting

fluorescence to a known concentration. The RE material used is a standard synthetic substance with consistent fluorescence properties. Dakota performs calibration for two main purposes:

- **Qualitative examination of the performance of the TarGOST instrumentation.** The Dakota operator reviews the RE response waveform to verify that it conforms to the expected waveform shape. This confirms that the TarGOST signal channels (filters, etc.) are intact and functioning. A distorted RE waveform indicates potential damage of the detection system optics.
- **Quantitative calibration of the TarGOST instrumentation.** The operator sets the proper signal intensity for the RE standard by adjusting laser energy as needed to maintain the signal within an optimal light detection range. TarGOST signal measurements during probing are normalized to a percentage of the standard RE fluorescing and scattering substance. For example, a 100% RE reading means that a measured material has a fluorescence/scatter signal identical to that of the RE. A 200% RE means a substance has a fluorescence/scatter signal twice that of RE.

The typical range of TarGOST RE response falls between 1,000 and 2,000 picovolt-seconds (pVs). These units represent a measure of waveform area. Precise RE intensity "tuning" to a certain value is not needed because all signals are reported as a percentage of the reference emitter signal output (%RE). Daily RE field calibration records are presented in Appendix A-3.

3.1.2 Background Measurement

The background measure assesses the optical quality of the instrumentation setup. Sources of signal in the background include fiber and filter auto-fluorescence, mirror and window fluorescence, and scatter from worn windows. The background waveform has no mathematical impact on the data collected (i.e., it is not subtracted) and is measured only as a data quality parameter to verify that there are no significant defects on the optics mirror, window, fiber, and related components.

Background values can vary widely. In terms of area, the values can range from 0 to 50 pVs. As the background increases beyond the 50 pVs threshold for TarGOST, equipment wear may be indicated, with a new window and a reassembly of the probe potentially needed. However, the 50 pVs threshold is a general quality guidance criterion based on judgment of Dakota, and there is no hard cut-off value. Only a few exceedances of the 50 pVs background guideline were noted during this investigation (Appendix A-3), but these exceedances were not deemed by Dakota to represent significant defects in the instrument setup optical quality.

3.1.3 Waveform Review

Dakota reviewed the raw TarGOST logs in the field for obvious aberrations or indicators of spurious signal response, unexpected conditions, equipment malfunction, potential interferences, or other problems. Limited interference from selected types of shell fragments and other organic material such as wood debris were observed. Except for potential organic interference, no other field QA issues were noted (Randy St. Germain/Dakota Technologies, personal communication, February through April 2013). No additional interpretive refinement of the raw TarGOST logs to address organic interference issues and evaluate the NAPL types present was determined to be necessary for the Upland TarGOST dataset (Randy St. Germain/Dakota Technologies, email communication, 2013). The raw TarGOST field logs are presented in Appendix A-1.

3.2 Replicate TarGOST Probes

Replicate TarGOST probes were completed at selected locations to evaluate the near-field consistency and variability of TarGOST signal response. A total of 7 replicates were completed at 9 percent of the Phase I TarGOST probe locations (Table 1-1). Phase 1 TarGOST replicates included locations 2013T-001/001R, 002/002R, 027/027R, 036/036R, 037/037R, 056/056R, and 068/068R. Though replicate probes were generally performed on the same day as the original probes, some replicates (2013T-002/002R, 036/036R, 037/037R, and 068/068R) were completed on days following the original probes due to field scheduling.

"Butterfly" figures depicting mirror images of the primary probe logs and adjacent or nearby replicate are presented in Appendix A-2.TarGOST logs from the replicates were visually compared to logs from the primary

probes to assess TarGOST signal consistency and variability. Three primary metrics of reproducibility were evaluated on the TarGOST logs: presence, magnitude, and offset.

- **Presence –** Review of the butterfly plots in Appendix A-2 shows consistent correlation between the presence of NAPL in the parent and replicate probes. While evaluating the presence or absence of NAPL is subjective, as described in the next section, the plots show consistently elevated TarGOST response levels indicating the presence of NAPL.
- **Magnitude –** There is variability evident between the plots in regards to the magnitude of %RE responses. While the depths of elevated NAPL and the presence are relatively comparable, the spikes may vary by 100%RE or more. For example, the elevated NAPL response in boring 002/002R at a depth of approximately 16 feet below ground surface (ft bgs) is 110%RE in 002 and 275%RE in 002R.
- **Offset –** Another factor to consider in the reproducibility between the parent and replicate probes is the offset between NAPL responses. In most of the borings some apparent vertical offset is observed in the NAPL responses. For example, in 027 and 027R, the elevated NAPL response at 38 to 39.5 ft bgs in 027 likely corresponds to the NAPL response observed at 34 to 36 ft bgs in 027R. This offset could have been due to the presence of cobbles, etc. that the probe had to maneuver around, or slight deviations from vertical during probe advancement.

Review of the TarGOST replicate probe results indicates that the TarGOST signal response is reliably reproducible, but subject to inherent variability based on irregular distribution of NAPL, even on a relatively local scale.

3.3 Confirmation Soil Cores

Direct push or rotosonic soil cores were advanced at selected TarGOST probe locations to evaluate visual NAPL presence/absence in relation to TarGOST signal response. Soil core locations captured TarGOST signal responses over a range of suspected range of NAPL impact conditions. A total of 20 soil cores were completed at 14 percent of the TarGOST probe locations (Table 1-1). This frequency exceeded the minimum 10 percent frequency required by the QAPP. Phase 1 soil cores included locations 2013-SC-001, -002, -006, -036, -041, -045, -046, -055, -068, and -072. Phase 2 soil cores included locations 2013-SC-013, -014, -054, -070, -101, -106, -119, -127, -152, and -155. Soil coring logs are presented in Appendix C-1.

Ex-situ confirmation TarGOST results and visual NAPL observations from the soil cores were combined in one graphic to compare TarGOST probing and replicate probe results. These summaries are presented in Appendix C-3. Table 3-1 summarizes comparative results of NAPL presence indicated by TarGOST signal response, TarGOST replicates, and soil core visual observations. Visual NAPL in soil cores exhibited variable “correlation” with TarGOST log signals, as summarized below for selected locations:

- Locations 013, 046, and 068 are examples of locations with reasonably good association of TarGOST and soil core NAPL occurrence data.
- Other locations exhibited relatively good correlation of visible NAPL with TarGOST signal response at one or some depth intervals, but not at other depth intervals. Examples include locations 002/002R, 054, and 072.

The above examples demonstrate that soil coring observations are generally consistent with TarGOST probing results, but tend to exhibit some variability. This is not unexpected, given the inherent variability of subsurface stratigraphic conditions and inferred NAPL distribution.

Additional factors also affect comparison of NAPL observations in the soil cores with TarGOST results:

- Heaving sand may inhibit soil recovery in direct push cores, potentially leading to under-representation of NAPL occurrence in these zones.
- Coring can compress the soil within a sampling interval and may smear or mobilize NAPL away from the point of origin, potentially leading to redistribution or loss of NAPL.

- NAPL observations are subjective and based on the descriptive criteria identified in the QAPP. NAPL coatings, wetted areas, globules, and other accumulations can quickly dissipate into more diffuse sheens, and not be observed as actual NAPL occurrences.
- Drill tooling can encounter buried debris or cobbles which may result in angled offset of direct push tooling as the boring is advanced. This may result in significant offset between the TarGOST probe and the soil core at greater depths.

NAPL observations from the soil cores should be interpreted with a view to these constraints, but are otherwise suitable as one line of evidence for supporting the validity of TarGOST investigation results. Additional description of the soil types encountered during coring is presented in Section 4.

4 Investigation Results Summary

Upland investigation data were compiled from field logging records presented in the appendices of this technical memorandum. Following QA review, the investigation data were evaluated to determine the %RE indicating presence or absence of NAPL, inferred NAPL extent and distribution, and preliminary association of NAPL with soil type.

4.1 Comparison of TarGOST to Confirmation Boring NAPL Observations

In raw form, the TarGOST data do not explicitly indicate presence or absence of NAPL. Interpretation is needed to select a %RE value that represents a transition or cutoff between the presence or absence of NAPL. To accomplish this, three data types were analyzed to evaluate the cutoff between the presence or absence of NAPL: the raw in-situ TarGOST data logs, the visual NAPL observations recorded for the co-located confirmation borings, and the ex-situ TarGOST readings performed on selected intervals of the confirmation boring cores. Overall, 20 confirmation cores were completed in Phases 1 and 2 of sampling, totaling 1,039 total feet of confirmation cores. Of these, 58 percent recovery was achieved for the entire dataset, totaling 603 ft of comparable data with in-situ subsurface TarGOST readings. 281 ex-situ soil samples were analyzed for TarGOST readings as well as logged for soil type and NAPL observations. Each soil sample has multiple individual TarGOST readings for a total of 5,660 individual readings.

It is important to note that the evaluation of each data type has its limitations. For instance, the evaluation of raw in-situ TarGOST data logs primarily relies on professional judgment, comparisons between the in-situ TarGOST readings and the co-located confirmation boring visual observations were limited to intervals of core recovery, and ex-situ TarGOST readings are likely biased towards the presence of NAPL since more samples were taken where positive visual NAPL observations were made. These inherent limitations were considered in the analysis of the data sets. In general, visual observations were considered to be the most reliable of the data sets despite some inherent limitations in this assumption. To accommodate for some of these limitations, less emphasis was placed on the specific NAPL observations than on the general presence or absence indicated by visual observations due to variability in logger interpretation. In addition, the methods used to compare TarGOST readings with visual observations were intended to take into account the potential offset between readings and observations which may occur due to natural variation in NAPL distribution on a local scale and the possible challenges of soil coring as listed in Section 3.3.Three different approaches were explored to determine the TarGOST response signal cutoff appropriate to delineate the presence versus absence of NAPL:

1. **Visual comparison of in-situ TarGOST response to visual NAPL observations from confirmation soil cores.** As noted above, this method relies on professional judgment to select the %RE differentiating presence versus absence of NAPL through a comparative review of TarGOST logs versus soil core NAPL observations.
2. **General statistical comparison of all in-situ TarGOST response intervals with corresponding visual NAPL observations from soil cores.** This approach included a graphical analysis using box and whisker plots with two different grouping combinations of visual NAPL observation classes. In addition, an assessment was

performed to best match the ratio of presence and absence of NAPL observed in soil cores with that observed in in-situ TarGOST readings. This analysis was performed to balance the count of false positives versus false negatives.

3. **General statistical comparison of all ex-situ TarGOST response intervals with corresponding visual NAPL observations from confirmation soil cores.** This process was the same as that performed for the in-situ TarGOST with both a graphical approach with box and whisker plots and a ratio balancing analysis for false positives versus false negatives.

Each of the three approaches was intended to provide a line of evidence in selecting the most representative cutoff value of %RE that distinguishes between NAPL presence and absence.

4.1.1 Visual Comparison

The first approach involved creating images that contained all three types of data: the raw in-situ TarGOST, the visual NAPL observations from the co-located soil cores, and the average ex-situ readings from selected intervals of the confirmation cores. The visual NAPL observations were plotted down the vertical axis of the %RE response in-situ TarGOST logs while the average ex-situ measurements were plotted on top of the in-situ graphs as dots at their respective depths. These plots were then visually assessed and professional judgment was used to determine a cutoff value delineating presence versus absence of NAPL. The plots were assessed for how well the visual and in-situ TarGOST data compared to one another, and how well they both compared to the in-situ TarGOST data.

In general, the visual observations were considered to be the most reliable, and the in-situ data were considered to be accurate when they matched the visual observations and possibly inaccurate when they did not. The ex-situ data were used to verify the visual observations and assess the comparability of the in-situ data. General offset between the datasets was factored into the assessment. In conducting the visual assessment, it was found that the areas where no NAPL was observed in the confirmation core were the easiest to compare with the in-situ TarGOST. Generally, the highest reasonable %RE response in these intervals was chosen as the cutoff between presence and absence of NAPL. Each plot contains an explanation of the selected cutoff value and the cutoff value is projected onto the plot for reference. Figure 4-1 presents TarGOST borings at location 2013-001 as an example of this approach. The selected cutoff values from each plot range from 4%RE to 25%RE, with an average value of 9.5%RE (Appendix C-3).

4.1.2 In-Situ TarGOST Statistical Analysis

The second method for assessing the cutoff %RE included two statistical analyses comparing the visual NAPL observations with the in-situ TarGOST data. Replicate TarGOST probes were included in the analysis as several of the locations selected for confirmation borings were also locations of TarGOST replicates. Raw TarGOST measurements were defined for discrete points at inconsistent intervals. This required post-processing of the data to correlate the visual NAPL observations from the soil core with the TarGOST measurements. Each TarGOST point measurement was individually matched with the corresponding visual NAPL description based on the depth of the point measurement and the visual NAPL interval within which it aligned. TarGOST readings falling within intervals of the core representing “no recovery” were discarded in the analysis. Visual NAPL observation descriptions varied by field logger and therefore were simplified for consistency and ease of analysis. Intervals were often identified with various combinations of descriptions including sheen and staining, coating, or wetting descriptions. NAPL observations were simplified by selecting the most conservative (strongest indicator of NAPL) term for each interval. From least strong to strongest, these were slight sheen, moderate sheen, heavy sheen, oil stained, oil coated, and oil wetted. Descriptions of “product globules” were interpreted as “oil wetted.”

4.1.2.1 Box Plots

Following the processing of the data, the individual %RE response measurements were then grouped into their corresponding NAPL observation classes. Then the statistical program ProUCL was used to generate box and whisker plots of the datasets. These plots show the box including the lower, median, and upper quartiles for each class of NAPL observation in %RE. They also show the whiskers that are extended to the furthest data point that is not categorized as an outlier. It is important to note that in preparation of the plots, ProUCL classifies data a

potential outlier when its value is at a distance greater than 1.5 times the interquartile range from the closest end of the box. Two box and whisker plots were generated for the dataset: one with the %RE data divided into all of the possible NAPL classes, and one that compared the datasets indicating the presence and absence of NAPL (Figure 4-2). This plot combines all of the classes indicating NAPL presence into one category, thus eliminating variation in visual interpretation.

A review of the individual NAPL class plots indicates extensive overlap of the %RE quartile ranges between the different classes. As a consequence NAPL observations cannot be correlated with higher in-situ TarGOST response readings to identify areas of the site with greater NAPL impacts.

The plot showing the larger groupings of present and absent NAPL indicate very little overlap between %RE quartile ranges of the two classes (Figure 4-2). Because the two classes are relatively distinct, the NAPL observations coupled with the TarGOST responses can be used to select a %RE that differentiates between the presence and absence of NAPL. From this analysis, the median value for the TarGOST associated with no visible NAPL is 2%RE, while the median value indicating NAPL presence is 10%RE (Figure 4-2). This suggests that NAPL presence/absence cutoff ranges between these two median values.

4.1.2.2 Analysis to Balance False Positives and Negatives

The last approach of assessing the cutoff value with the in-situ dataset was to assess what %RE cutoff resulted in the best match between the in-situ TarGOST and the visual NAPL observations. For this analysis, the dataset with the correlated NAPL observations and individual TarGOST measurements was used. To assess how well the two datasets matched, a range of %REs was applied as potential cutoff values for the in-situ dataset. For each potential cutoff value, all individual TarGOST measurements above the cutoff were coded as “NAPL present” and those below as “NAPL absent.” Then each measurement was compared to the corresponding visual NAPL observation previously matched to the point. The total dataset contained 18,586 individual TarGOST measurements with corresponding visual NAPL observations.

Overall, a high degree of agreement between the two datasets was observed (Figure 4-3 – see middle table). The highest agreement was found for a %RE cutoff range of 5%RE to 27%RE between 80 percent and 83 percent. The %REs with the highest percent agreements were 7%RE, 10%RE, and 13%RE at 82.8, 83.3, and 82.3 percent agreement, respectively. Next, the TarGOST and visual observations that did not match were considered.

There are a number of reasons why the TarGOST and visual observations may not match, including:

- Adjacent borings may be vertically offset if one or both are not plumb with the surface. These offsets can be exaggerated the deeper the boring penetrates into the surface.
- Drill tooling can encounter buried debris or cobbles which may result in angled offset of direct push tooling as the boring is advanced. This may result in significant offset between the TarGOST probe and the soil core at greater depths.
- Small variations in the lithology exist that change the NAPL distribution over small distance intervals. NAPL, especially dense non-aqueous phase liquid (DNAPL), architecture is very sensitive to changes in pore entry pressure, which results in DNAPL pooling on media of lower permeability.
- Verification of NAPL presence is subjective, based on the consistency of observations, both between different core segments and between different logging personnel, and the tendency for NAPL to quickly dissipate from recovered cores in some cases.
- Direct push coring may underestimate NAPL occurrence because of poor sample recovery.
- Potential compression of direct push cores may distort the sampled interval and smear or mobilize NAPL away from the sampled section.

In order to account for these factors, the values that failed to correlate were taken into consideration. The dataset consists of both false negatives (TarGOST measurements which after the selected cutoff was applied indicated no NAPL, while the visual observations indicated NAPL presence) and false positives (TarGOST measurements that

indicated NAPL presence, while visual observations indicated NAPL absence). For example, an elevated %RE may be spread across an interval of visual NAPL presence and NAPL absence (such as in 2013T-036 at a depth of 12 to 15 ft bgs [Appendix C-3]) or, conversely, visual observations may indicate NAPL presence where some, but not all, %REs are elevated (such as in 2013T-013 at a depth of 12 to 14.5 ft bgs [Appendix C-3]). While the elevated %RE readings may correctly correspond to the areas of observed NAPL presence, direct correlation by depth results in both false negative and false positive readings. In order to account for this error, selecting a %RE that results in a balance between false negative and false positive readings may introduce the minimum amount of bias to the dataset interpretation. Therefore, a %RE cutoff that achieved the best balance between false negatives and false positives was selected as the optimal %RE cutoff distinguishing between NAPL presence and absence. In the case of the in-situ TarGOST dataset, 7%RE achieved a balance of 9 percent false negatives and 8 percent false positives and thus could be considered the most favorable %RE to compare the in-situ TarGOST with the visual observation dataset and account for dataset limitations (Figure 4-3).

4.1.3 Ex-Situ TarGOST Statistical Analysis

The ex-situ TarGOST dataset and the visual NAPL observations are easier to correlate than the in-situ TarGOST and the visual NAPL observations, since the observations and readings were performed on the same material. This analysis eliminates many of the potential sources of error described above.

The primary limitations remaining when comparing these datasets include the following:

- The subjectivity of visual NAPL presence evaluation based on the consistency of observations and the tendency for NAPL to quickly dissipate from recovered cores in some cases.
- The ex-situ TarGOST measurements are taken on a small subset of the confirmation soil core.
- TarGOST readings were more often performed where NAPL was observed, potentially biasing the dataset toward NAPL presence (42 percent present to 58 percent absent when matched with visual observations).

4.1.3.1 Box Plots

The method for developing the box plots was the same for the ex-situ dataset as for the in-situ dataset described above. Two plots are presented, one of all the NAPL classes and one with only NAPL presence and absence distinguished (Figure 4-4). For this dataset there was better differentiation and less overlap between the different NAPL classes, but still some ambiguity. The strongest NAPL signature, “oil wetted,” corresponded with a median of 37%RE, which was the highest median value. However, “oil staining” had a lower median value at 7%RE than either %REs corresponding to “moderate” or “heavy sheen,” both at 13%RE. The %REs associated with absence of NAPL also showed less data variability than those in the in-situ dataset, which is likely an indication of the sources of error previously listed.

The second plot comparing NAPL presence and absence presents a slightly higher median value indicating NAPL presence at 15%RE, compared with NAPL absence at 2%RE (Figure 4-4). The higher NAPL presence value may be attributed to the dataset bias toward intervals with NAPL compared to the ex-situ dataset.

4.1.3.2 Analysis to Balance False Positives and Negatives

The final analysis based on achieving the best correlation between the two datasets and thereby selecting the optimal cutoff between presence and absence of NAPL was performed in the same manner as that for the in-situ dataset (Figure 4-5). For the ex-situ data, a range of %REs from 4%RE to 27%RE resulted in an agreement between the ex-situ data and the visual NAPL observations ranging from 69 percent to 79 percent. The closest matches were for 4%RE, 5%RE, and 10%RE at 78.2, 79.2, and 78.0 percent, respectively.

The values in disagreement, the false negatives and false positives, were then analyzed for which %RE resulted in the best balance between the two conditions. Of the three %REs that resulted in the highest agreement between the datasets, 5%RE resulted in the closest ratio between the false negatives and false positives at 11 percent and 10 percent, respectively (Figure 4-5).

4.1.4 Inferred NAPL Presence

This section has presented the methods used to evaluate the three TarGOST data sets in an effort to determine transition or cutoff between the presence or absence of NAPL. As described, each of the methods has its limitations, such as reliance on professional judgment, limitation due to core recovery, or sample bias. The conclusions from each method are as follows:

- On visual comparison, the selected cutoff values from each plot range from 4%RE to 25%RE, with an average value of 9.5%RE.
- On in-situ TarGOST statistical analyses:
  - With the graphical box plot for NAPL presence versus absence, the median value for the TarGOST associated with no visible NAPL is 2%RE, while the median value indicating NAPL presence is 10%RE. This suggests that NAPL presence/absence cutoff ranges between these two median values.
  - With the analysis to balance false positives with false negatives, the 7%RE cutoff achieved a balance of 9 percent false negatives and 8 percent false positives and thus could be considered the most favorable %RE to compare the in-situ TarGOST.
- On ex-situ TarGOST statistical analyses:
  - With the graphical box plot for NAPL presence versus absence, the median value for the TarGOST associated with no visible NAPL is 2%RE, while the median value indicating NAPL presence is 15%RE. The higher NAPL presence value compared to the in-situ balancing method may be attributed to the dataset bias toward intervals with NAPL compared to the ex-situ dataset.
  - With the analysis to balance false positives with false negatives, the 5%RE resulted in the closest ratio between the false negatives and false positives at 11 percent and 10 percent.

Based on combined review of the above analyses, a TarGOST %RE response cutoff value between 5%RE and 10%RE can be justifiably selected as representing the presence of NAPL. For the purposes of evaluation of the full TarGOST dataset documented in this technical memorandum, TarGOST responses of 5%RE and greater are conservatively inferred to indicate that NAPL is present at measured locations.

4.2 NAPL Extent and Distribution

Three methods were used to evaluate NAPL extent and distribution throughout the Upland Area: A gross interpolation of shallow and deep maximum %RE responses, mapping with fence diagrams and a Thiessen polygon volume and thickness evaluation. The resulting NAPL extent and distribution is compared against site historical features, potential source areas, and early remedial actions (see Figure 4-6) to provide further insight regarding site conditions.

4.2.1 Gross Interpolation of Shallow and Deep Maximum %RE Responses

This evaluation was utilized during fieldwork to guide selection of additional TarGOST probe locations beyond the 42 initial and secondary borings identified in the QAPP. Described as “heat maps” during the interim meeting between Phase 1 and 2 fieldwork events, this evaluation was prepared by selecting the maximum %RE responses in the shallow zone and at the deeper “near aquitard” zone from the TarGOST logs. These values were then mapped and used to interpolate response fields across the site (Figures 4-7 and 4-8). Following completion of the Phase 2 TarGOST investigation, the maps were updated with the complete dataset and used as a basis to select fence diagram locations and probe locations to include on the fence diagrams.

Because this interpolates a 3-dimensional dataset into two 2-dimensional surfaces, these heat maps should only be considered a gross estimate of NAPL distribution. Observations from the heat maps are as follows:

- In the shallow zone the highest responses emanate from the former retort areas and extend westward toward the former Floating Dock and past the sheet pile wall, eastward but bifurcating to encompass the Naphthalene Block Excavation Area and the Old Sump, and northward to encompass the former Shop Building

(see Figure 4-6 for cross-reference with historic features and potential source areas). There is also a high response area centered on the former West Dock, as well as one boring (2013T-152) to the south.

- In the deeper zone near the aquitard the highest responses are concentrated in the central and western portion of the site in the areas of the former lagoon, transfer pit, and retorts with their associated sumps. The eastern half of the site is consistently below the response threshold of 100%RE. High response areas are also present offshore where additional probes were added upon observing high responses along the western edge of the sheet pile wall.
- For both relative elevations the cutoff of the 5%RE as a maximum reading has not been fully delineated to the south, as access in this area is problematic due to underground utilities associated with the treatment facility. The higher response at 2013T-152 is also not delineated due to limited access.

4.2.2 Fence Diagram Evaluation

Fence diagrams were created to evaluate the distribution of NAPL across the Upland Project Area. Figures 4-9 and 4-10 show the locations of the fence diagrams overlaying the shallow zone and near aquitard heat maps as well as potential source areas and prior remediation excavation areas from 1992 through 1994 (digitized from Ecology and Environment, Inc., 1995). Figure 4-11 presents an overview of the information on each of the subsequent diagrams, and Figures 4-12 through 4-20 show LIF signals for selected probing locations along 12 transects. The primary transects (A through F) were chosen such that they radiate outward from a centrally located TarGOST probe location at the site (2013T-005). Three sub-transects stemming from transects D and F were added for greater spatial coverage and to aid in identifying potential flow paths. Transect G was added to evaluate NAPL impacts along the interior perimeter of the sheet pile wall. All LIF response graphs are scaled the same with vertical response grid lines at an interval of 25%RE and a maximum response of 150%RE.

Relevant observations from the TarGOST log fence diagrams are as follows:

- In general NAPL appears to be thickest in the center of the site where greater TarGOST responses are located, then transitions to thinner lenses with lesser responses as the fence diagrams move radially away from the center of the site and potential source areas.
- Beyond the site center and potential sources the NAPL lenses are vertically distributed but not in any obvious patterns with depth. This distribution is likely a result of multiple source areas, preferential pathways associated with interbedded lithologies, and interaction with variable fluid densities resulting from the transition from freshwater to saltwater and operation of the groundwater extraction system. Further evaluation of NAPL distribution relative to site stratigraphy and groundwater elevations is planned once a 3-D geologic model of the site is available.
- Deeper (near aquitard) TarGOST signal detections appear to terminate at or above TarGOST boring refusal depths. In general where comparable lithology is available TarGOST refusal is coincident with or slightly below transition from the Upper Aquifer to the Glacial Till layer. These factors suggest that the glacial till layer is effectively restricting the migration of NAPL to deeper elevations.
- Along the site's west side and north end, elevated TarGOST readings were measured adjacent to the sheet pile wall at depth at and above the glacial till layer. In these areas the sheet pile wall driven depths are greater than the deepest TarGOST signal detections.

4.2.3 Thiessen Polygon Evaluation

An evaluation to estimate the total volume of NAPL-impacted soil at the site was conducted using the TarGOST response data coupled with a Thiessen polygon analysis. The raw response data from each TarGOST location was first converted from discrete point data to thickness data. This was accomplished by applying each discrete response measurement to the interval represented by the midpoints between each discrete response depth. Once readings were paired with thicknesses instead of discrete depths, the total thickness of specific TarGOST response levels at each location could be summed. For this analysis, the thickness at each location representing a response greater than or equal to 5%RE, 10%RE, 15%RE, 25%RE, 50%RE, and 100%RE were calculated.

The next step of the evaluation required the development of Thiessen polygons represented by the TarGOST locations. The "Create Thiessen Polygons" tool in Spatial Analyst in ArcGIS was used to develop the Thiessen polygon map. The polygons were created from the input point locations of the primary[1] surveyed TarGOST locations. The polygons were created such that any point within each polygon is closer to the associated TarGOST location than any other TarGOST location nearby. Only TarGOST locations within the sheet pile boundary wall were included in the dataset to create the polygons. The polygons created from TarGOST locations not bounded by other exterior TarGOST locations extended beyond the bounds of the sheet pile wall. Therefore, a post-processing step was performed to crop the exterior polygons to the bounds of the sheet pile wall and within approximately 25 feet of the TarGOST locations at the south end of the site. The resulting polygons used in the analysis are shown in Figure 4-21. The area contained within each Thiessen polygon was then calculated using ArcGIS.

The volume of material within each polygon above the response category was determined by multiplying the corresponding Thiessen polygon areas by the summed thickness of readings greater than or equal to the response category. The total volume of soil sampled within the sheet pile wall as calculated from the ground surface to the bottom of all probes was calculated to be 755,018 cubic yards. The total NAPL-impacted volume was estimated by summing the volumes for each response category for all TarGOST locations. There are limitations of this volumetric estimation approach. There is an implicit assumption that the TarGOST NAPL measurements accurately represent the entirety of the associated Thiessen polygon area. This assumption may not be applicable, particularly on the exterior areas of the site, and likely results in an overestimation of NAPL-impacted volumes.

Figure 4-22 and Table 4-1 present the total sampled volume in comparison with the total NAPL-impacted volume for each response category. As observed an increase in the TarGOST response results in a significant reduction in NAPL-impacted response volumes. To support GIS visualization, each TarGOST location volume was determined as a percent of the total NAPL-impacted volume for each response category. This allows for the presentation of the Thiessen polygons color-coded by NAPL-impacted volume of each polygon location to the total NAPL-impacted volume for the site within each response class. Figure 4-23 presents the resulting graphic for the 5%RE response category. (Note: similar graphics for the other response categories are included in Appendix D for further reference.) The 5%RE response category indicates that NAPL is present extensively across the site. However, many of the Thiessen polygons indicate very limited percent of the total volume. For instance 15 of the 128 Thiessen polygons have percent NAPL-impacted volumes at less than 0.1 percent of the total 167,071 cubic yards impacted by NAPL.

In addition to the volumetric analysis, an evaluation of the total summed thickness for each response class were also mapped and color-coded by their corresponding Thiessen polygons (See Appendix D). This simplistic but direct approach for evaluating the TarGOST data includes contributions from all depth intervals greater than the selected response class. Figure 4-24 presents the resulting graphic for the 5%RE response category. Prospective areas for each thickness classification are also provided. As an example 13 of the 128 Thiessen polygons have summed thicknesses greater than 20 feet (the red polygons on Figure 4-24) and encompass a combined area of approximately 1 acre.

Figure 4-25 shows the 5%RE response category color-coded by total summed thickness overlaid with the potential source areas identified in previous site characterization efforts. The thickest accumulations of NAPL-impacted material (greater than 20 feet thick) appear to be concentrated in the center of the site near the Retort area as well as to the east by the Naphthalene Block Excavation Area. Lesser but still significant thickness accumulations appear to be associated with other potential sources such as the Old Sump to the east, the shop building to the north, the sump associated with a concrete pit for an outhouse also to the north, the discharge point from a buried drain to the west, and the former floating dock also to the west.

[1] Replicate locations were not used in the determination of the Thiessen polygon boundaries. However, corresponding replicate data were used in the determination of the volume of NAPL-impacted material and the total length of impacted material in each polygon. Replicate data were integrated by averaging the data from the parent and replicate probes.

4.3 Association of NAPL with Soil Type

Using the confirmation boring data, this section presents a preliminary evaluation of the potential association of NAPL with soil type. This preliminary evaluation assumes that the confirmation borings statistically represent the soil type and NAPL distribution in the Upper Aquifer. To confirm this, further evaluation should be conducted using the 3-D geology and TarGOST model being developed by Sundance once the model files are available for review.

As described in Section 1.2.2, confirmation soil cores were advanced at 20 locations and the soil cores were logged and visually inspected for the presence of NAPL. The confirmation boring locations, presented on Figure 4-26, provide a good spatial coverage of the site. The advancement depth of the 20 confirmation borings varied from 11 to 81.5 feet bgs, with an average advancement depth of 49.5 feet bgs. Of the 1,039.3 total feet advanced, 598.5 feet of soil cores were recovered and logged. Unfortunately the confirmation boring recovery rates were likely limited by heaving sands and soil compression. Compared with the total TarGOST footage at 7,324 feet, the recovered soil from the confirmation borings represents approximately 8 percent of the material in the Upper Aquifer sampled by TarGOST.

Upon review of the boring logs, the soil types observed in the confirmation soil cores are consistent with the lithologies and geologic units identified in previous studies and described in Section 1.2.2.2. Figure 4-27 presents the confirmation boring lithology and NAPL-impacted soil core lengths by historical geologic unit. The first graphic represents the confirmation boring footage by soil type and NAPL absence and presence. The second graphic to the right represents the lithology type as a percent of total recovered confirmation boring footage. The third graphic at the bottom represents the presence of NAPL as a percentage of total NAPL footage observed, segregated by lithologic unit.

Of the 598.5 feet of recovered soil cores, NAPL was observed in 119 feet, or 20 percent of the sampled material. This is generally consistent with the results of the volumetric analysis presented in the previous section for the 5% RE TarGOST response category, where NAPL is considered present in 22% of volume sampled in the Upper Aquifer.

Because potential NAPL migration is partially dependent on capillary forces, the grain size distribution of site soil is expected to influence the distribution of NAPL in the Upper Aquifer. NAPL is expected to migrate primarily within coarse-grained material in response to hydrodynamic and fluid density forces. To evaluate the potential effect of capillary forces, historical lithologic units were regrouped into select USCS classes which are differentiated by grain size distribution. Figure 4-28 presents similar graphics as Figure 4-27, but instead shows the lithology and NAPL-impacted soil core lengths by the selected Unified Soil Classification System (USCS) soil classes. The relative distribution of the selected USCS classes is as follows:

- 65 percent of recovered confirmation boring soil is coarser-grained material consisting of sand (53.2 percent) and sandy gravel to gravel (12.2 percent).
- 25 percent of the recovered confirmation boring soil is silty sand to sandy silt, and is considered a transitional gradational class.
- 9 percent of recovered confirmation boring soil is fine-grained material consisting of silt to clay.

When compared with NAPL presence by USCS class, there is a tendency for NAPL to preferentially inhabit coarser-grained soil as evidenced by the increased percentages of NAPL by soil type relative to the general prevalence of soil type in the Upper Aquifer.

- 81 percent of NAPL was observed in coarser-grained material consisting of sand (66 percent) and sandy gravel to gravel (15 percent).
- 11 percent of NAPL was observed in silty sand to sandy silt.
- 7 percent of NAPL was observed in fine-grained material consisting of silt to clay.

This provides preliminary confirmation of expectations for NAPL distribution based on migration forces. Once available the 3-D geology and TarGOST model will be reviewed and similarly evaluated.

5 Conclusions

This upland investigation included the advancement of 141 TarGOST probes and 20 confirmation borings over two investigation phases. Minor deviations from the QAPP include alteration of the borehole nomenclature and a change in frequency for replicate TarGOST probes and confirmation borings. NAPL mobility analysis (an optional task in the QAPP) was delayed pending further data analysis and consideration. The resulting data presented in this report were evaluated for quality and usability. Conclusions from the quality assurance and quality control review are as follows:

- TarGOST replicate probe results indicate that the TarGOST signal response is reliably reproducible, but subject to inherent variability based on irregular distribution of NAPL, even on a relatively local scale.
- NAPL observations from the soil cores are generally consistent with TarGOST probing results, but tend to exhibit some variability due to the inherent variability of subsurface stratigraphic conditions and inferred NAPL distribution.

The data collected should be interpreted with a view to these constraints, but are otherwise suitable for further data analysis.

The investigation and data evaluation results are presented in Section 4 and include a comparison of TarGOST results to soil core NAPL observations, a summary of NAPL extent and distribution, and the association of NAPL with soil type. Based on the comparison of TarGOST results to soil core NAPL observations, a TarGOST %RE response cutoff value between 5%RE and 10%RE can be justifiably selected as representing the presence of NAPL. For the purposes of evaluating the full TarGOST dataset in this memorandum, TarGOST responses of 5%RE and greater are conservatively inferred to indicate that NAPL is present at measured locations. Of the three methods used to evaluate NAPL extent and distribution, both the gross interpolation and Thiessen polygon evaluation methods suggest that NAPL is present across a wide geographic area of the site. However the fence diagrams and Thiessen polygon volumetric analysis indicate that NAPL is distributed over much more discrete vertical horizons in the subsurface. The evaluation of NAPL association with soil type indicates a tendency for NAPL to preferentially inhabit coarser-grained soil. These observed NAPL characteristics have the potential to affect remedy selection and design by allowing possible compartmentalization of the site for implementation of remedial alternatives.

6 References

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Tables

TABLE 1-1

Upland Field Investigation Summary

Wyckoff Upland Field Investigation

	Nominal Target Explorations per QAPP	**Explorations Completed**	
Phase 1 TarGOST Probes (Excluding Replicates) January 14 through February 8, 2013	50	77	2013T-001 through 010, 2013T-012 through 020, 2013T-022, 2013T-024 through 027, 2013T-029 through 037, 2013T-039 through 48, 2013T-050 through 056, 2013T-058 through 074, 2013T-076 through 085.
Phase 2 TarGOST Probes (Excluding Replicates) February 25 through March 22, 2013	50	64	2013T-100 through 163
Total TarGOST Probes	100	141	
TarGOST Field Replicates	10% of TarGOST Probe Locations (up to 10)	5% of TarGOST Probe locations (7)	Phase 1 Replicates (7): 001, 002, 027, 036, 037, 056, 068
Confirmation Soil Cores	10% of TarGOST Probe Locations (up to 10)	14% of TarGOST Probe locations (20)	Phase 1 (10 cores): 2013-SC-001, 002, 006, 036, 041, 045, 046, 055, 068, 072 Phase 2 (10 cores): 2013-SC-013, 014, 054, 070, 101, 106, 119, 127, 152, 155

TABLE 1-2

TarGOST LIF Probe Depths, Surface Elevations, and Coordinates

Wyckoff Upland Field Investigation

TarGOST Probe Number	Date Completed	Depth in Feet Below Ground Surface	Estimated Surface Elevation in Feet (NAVD 88)	State Plane Coordinates (NAD 83)		GPS Data Source
				Northing	Easting	
TarGOST Phase 1						
2013-T-001	1/15/13	50.12	15.598	229424.174	1229067.298	Field Reconfirmed
2013T-001R	1/15/13	45.89	15.670	229426.202	1229068.288	Field Reconfirmed
2013T-002	1/14/13	70.58	15.019	229365.289	1229404.444	Field Reconfirmed
2013T-002R	1/31/13	61.43	15.109	229363.039	1229404.880	Field Reconfirmed
2013T-003	1/14/13	57.84	16.000	229265.666	1229391.798	Field Reconfirmed
2013T-004	1/15/13	57.68	14.761	229390.890	1229260.259	Field Reconfirmed
2013T-005	1/15/13	39.99	15.883	229485.707	1229052.262	Field Reconfirmed
2013T-006	1/15/13	55.16	14.219	229512.162	1229197.727	Field Reconfirmed
2013T-007	1/15/13	64.32	15.640	229589.616	1229265.912	Field Reconfirmed
2013T-008	1/29/13	41.33	15.657	229346.452	1229280.054	Field Reconfirmed
2013T-009	1/30/13	60.19	15.261	229413.408	1229346.016	Field Reconfirmed
2013T-010	1/23/13	81.43	19.293	229473.058	1229400.329	Field Reconfirmed
2013T-012	2/1/13	57.17	15.464	229314.930	1229403.687	Field Reconfirmed
2013T-013	1/23/13	49.77	17.204	229239.153	1229413.555	Field Reconfirmed
2013T-014	2/8/13	32.03	19.341	229318.842	1229148.938	Field Reconfirmed
2013T-015	1/31/13	35.79	14.687	229402.690	1229192.571	Field Reconfirmed
2013T-016	1/25/13	40.83	15.788	229408.846	1229135.492	Field Reconfirmed
2013T-017	1/25/13	32.86	16.182	229388.726	1229057.253	Field Reconfirmed
2013T-018	1/24/13	29.07	16.044	229320.547	1229001.469	Field Reconfirmed
2013T-019	1/23/13	29.91	16.098	229334.225	1228932.310	Field Reconfirmed
2013T-020	1/25/13	32.65	16.041	229378.379	1228993.585	Field Reconfirmed
2013T-022	1/31/13	36.68	14.037	229449.502	1229143.910	Field Reconfirmed
2013T-024	1/22/13	45.54	19.070	229471.997	1228924.046	Field Reconfirmed
2013T-025	1/22/13	53.22	18.127	229551.684	1229001.133	Field Reconfirmed
2013T-026	1/22/13	48.61	15.718	229562.433	1229070.393	Field Reconfirmed
2013T-027	1/24/13	54.13	14.169	229579.049	1229184.548	Field Reconfirmed
2013T-027R	1/24/13	60.73	14.177	229576.610	1229185.873	Field Reconfirmed
2013T-029	1/30/13	61.78	15.824	229484.540	1229306.265	Field Reconfirmed
2013T-030	1/24/13	73.33	15.644	229548.609	1229294.536	Field Reconfirmed
2013T-031	1/24/13	76.51	16.304	229606.238	1229329.517	Field Reconfirmed
2013T-032	1/23/13	79.70	15.836	229658.855	1229307.000	Field Reconfirmed
2013T-033	1/23/13	67.02	14.708	229671.474	1229221.064	Field Reconfirmed
2013T-034	1/22/13	64.28	15.233	229627.376	1229110.234	Field Reconfirmed
2013T-035	1/31/13	44.29	14.143	229433.185	1229223.170	Field Reconfirmed
2013T-036	1/23/13	85.31	17.898	229563.212	1229372.390	Field Reconfirmed
2013T-036R	1/31/13	77.14	17.884	229560.776	1229373.189	Field Reconfirmed
2013T-037	1/21/13	57.90	20.718	229569.697	1228956.946	Field Reconfirmed
2013T-037R	1/22/13	55.43	20.878	229571.633	1228954.990	Field Reconfirmed
2013T-039	1/21/13	70.46	18.239	229710.216	1228962.878	Field Reconfirmed
2013T-040	1/17/13	82.03	21.610	229773.352	1229037.924	Field Reconfirmed
2013T-041	1/16/13	75.08	19.337	229795.266	1229119.480	Field Reconfirmed
2013T-042	1/16/13	77.74	19.615	229796.904	1229184.519	Field Reconfirmed
2013T-043	1/17/13	77.23	19.146	229748.676	1229231.350	Field Reconfirmed
2013T-044	1/16/13	81.72	23.115	229739.385	1229302.432	Field Reconfirmed
2013T-045	1/17/13	85.69	23.333	229666.545	1229339.769	Field Reconfirmed
2013T-046	1/22/13	43.65	18.542	229476.390	1228829.603	Field Reconfirmed
2013T-047	1/21/13	75.61	15.908	229725.011	1229097.024	Field Reconfirmed
2013T-048	1/21/13	63.82	15.334	229710.751	1229148.583	Field Reconfirmed
2013T-050	1/24/13	37.31	18.382	229062.642	1229423.512	Field Reconfirmed
2013T-051	1/24/13	47.99	17.040	229145.242	1229469.804	Field Reconfirmed
2013T-052	1/25/13	70.27	15.033	229675.673	1229251.185	Field Reconfirmed

TABLE 1-2

TarGOST LIF Probe Depths, Surface Elevations, and Coordinates

Wyckoff Upland Field Investigation

TarGOST Probe Number	Date Completed	Depth in Feet Below Ground Surface	Estimated Surface Elevation in Feet (NAVD 88)	State Plane Coordinates (NAD 83)		GPS Data Source
				Northing	Easting	
2013T-053	1/28/13	54.95	14.892	229589.218	1229158.268	Field Reconfirmed
2013T-054	1/28/13	59.56	17.384	229669.220	1229059.951	Field Reconfirmed
2013T-055	1/28/13	69.57	17.925	229726.158	1228992.893	Field Reconfirmed
2013T-056	1/25/13	37.02	15.868	229414.270	1228880.682	Field Reconfirmed
2013T-056R	1/25/13	36.92	15.545	229416.510	1228879.582	Field Reconfirmed
2013T-058	1/25/13	35.42	16.265	229370.400	1228851.351	Field Reconfirmed
2013T-059	1/25/13	28.31	16.273	229306.672	1228914.599	Field Reconfirmed
2013T-060	1/25/13	24.43	17.000	229272.912	1228960.130	Field Reconfirmed
2013T-061	1/28/13	64.06	16.086	229685.561	1229095.909	Field Reconfirmed
2013T-062	1/28/13	51.57	16.117	229648.491	1229156.607	Field Reconfirmed
2013T-063	1/29/13	74.65	17.772	229731.765	1229224.853	Field Reconfirmed
2013T-064	1/29/13	63.90	18.862	229760.763	1229168.012	Field Reconfirmed
2013T-065	1/29/13	69.02	15.959	229757.470	1229088.976	Field Reconfirmed
2013T-066	1/30/13	32.75	18.255	229321.729	1228811.121	Field Reconfirmed
2013T-067	1/30/13	28.75	18.756	229274.622	1228764.370	Field Reconfirmed
2013T-068	1/30/13	25.45	18.989	229236.861	1228805.411	Field Reconfirmed
2013T-068R	2/1/13	25.22	18.975	229237.985	1228804.260	Field Reconfirmed
2013T-069	1/30/13	25.79	18.278	229267.355	1228874.517	Field Reconfirmed
2013T-070	1/30/13	25.62	17.642	229279.729	1228922.217	Field Reconfirmed
2013T-071	1/30/13	17.44	19.822	229190.511	1228709.205	Field Reconfirmed
2013T-072	1/30/13	50.39	15.635	229582.926	1229087.349	Field Reconfirmed
2013T-073	1/31/13	24.92	16.811	229240.592	1229248.126	Field Reconfirmed
2013T-074	1/31/13	43.96	15.923	229261.329	1229354.340	Field Reconfirmed
2013T-076	2/1/13	83.46	18.580	229519.787	1229385.049	Field Reconfirmed
2013T-077	2/1/13	52.55	15.871	229277.154	1229457.716	Field Reconfirmed
2013T-078	2/8/13	23.74	19.581	229222.169	1228966.497	Field Reconfirmed
2013T-079	2/8/13	21.84	19.871	229217.319	1229080.456	Field Reconfirmed
2013T-080	2/8/13	19.45	19.925	229211.496	1229009.874	Field Reconfirmed
2013T-081	2/8/13	25.50	19.359	229285.236	1229050.570	Field Reconfirmed
2013T-082	2/8/13	26.55	19.487	229248.092	1229139.218	Field Reconfirmed
2013T-083	2/8/13	16.06	19.666	229188.204	1228771.742	Field Reconfirmed
2013T-084	2/8/13	23.21	18.907	229212.802	1228902.151	Field Reconfirmed
2013T-085	2/8/13	8.54	19.069	229129.737	1228780.263	Field Reconfirmed
TarGOST Phase 2						
2013T-100	2/27/13	23.95	24.008	229232.036	1228650.592	Field Reconfirmed
2013T-101	3/5/13	25.89	19.088	229303.978	1228643.597	Field Reconfirmed
2013T-102	2/28/13	34.02	16.050	229426.526	1228833.080	Field Reconfirmed
2013T-103	2/28/13	36.49	15.777	229440.013	1228984.866	Field Reconfirmed
2013T-104	2/28/13	45.71	22.646	229511.937	1228895.779	Field Reconfirmed
2013T-105	2/28/13	44.90	14.439	229506.215	1229114.095	Field Reconfirmed
2013T-106	2/28/13	77.90	17.994	229816.536	1229103.804	Field Reconfirmed
2013T-107	3/1/13	80.10	18.596	229823.561	1229147.597	Field Reconfirmed
2013T-108	3/1/13	77.05	18.264	229802.853	1229070.481	Field Reconfirmed
2013T-109	3/1/13	69.34	19.960	229800.808	1229217.340	Field Reconfirmed
2013T-110	3/1/13	70.29	22.786	229712.544	1229295.329	Field Reconfirmed
2013T-111	3/1/13	80.54	19.619	229773.849	1229208.344	Field Reconfirmed
2013T-112	3/1/13	65.75	15.017	229701.413	1229195.557	Field Reconfirmed
2013T-113	3/4/13	6.31	18.033	229030.849	1228697.399	Field Reconfirmed
2013T-114	3/4/13	9.85	17.884	229033.429	1228632.957	Field Reconfirmed
2013T-115	3/4/13	23.87	15.568	229283.810	1228560.359	Field Reconfirmed
2013T-116	3/4/13	32.59	15.072	229358.90	1228606.91	Field Located Using GPS
2013T-117	3/4/13	36.82	14.871	229428.133	1228673.258	Field Reconfirmed

TABLE 1-2

TarGOST LIF Probe Depths, Surface Elevations, and Coordinates

Wyckoff Upland Field Investigation

TarGOST Probe Number	Date Completed	Depth in Feet Below Ground Surface	Estimated Surface Elevation in Feet (NAVD 88)	State Plane Coordinates (NAD 83)		GPS Data Source
				Northing	Easting	
2013T-118	3/4/13	41.33	14.735	229494.17	1228732.51	Field Located Using GPS
2013T-119	3/4/13	47.95	14.326	229526.051	1228780.908	Field Reconfirmed
2013T-120	3/4/13	52.77	14.357	229576.769	1228836.503	Field Reconfirmed
2013T-121	3/5/13	38.51	19.222	229376.200	1228692.744	Field Reconfirmed
2013T-122	3/5/13	36.64	19.207	229421.370	1228759.961	Field Reconfirmed
2013T-123	3/5/13	30.44	20.496	229339.782	1228754.902	Field Reconfirmed
2013T-124	3/5/13	38.09	20.633	229380.717	1228796.318	Field Reconfirmed
2013T-125	3/5/13	30.16	20.502	229286.787	1228709.849	Field Reconfirmed
2013T-126	3/6/13	52.57	12.763	229621.902	1228872.781	Field Reconfirmed
2013T-127	3/6/13	59.37	14.012	229669.700	1228831.150	Field Located Using GPS
2013T-128	3/6/13	61.04	13.935	229619.212	1228773.327	Field Reconfirmed
2013T-129	3/6/13	34.75	11.790	229564.290	1228729.130	Field Located Using GPS
2013T-130	3/6/13	34.07	12.045	229517.630	1228702.170	Field Located Using GPS
2013T-131	3/6/13	40.85	9.292	229450.310	1228633.770	Field Located Using GPS
2013T-132	3/7/13	22.98	18.828	229214.872	1229190.831	Field Reconfirmed
2013T-133	3/7/13	31.55	15.540	229330.418	1229219.530	Field Reconfirmed
2013T-134	3/7/13	30.45	17.552	229209.609	1229311.234	Field Reconfirmed
2013T-135	3/7/13	69.53	16.047	229524.277	1229340.162	Field Reconfirmed
2013T-136	3/7/13	73.93	15.985	229492.535	1229359.217	Field Reconfirmed
2013T-137	3/7/13	72.60	16.110	229583.558	1229301.595	Field Reconfirmed
2013T-138	3/8/13	62.38	16.025	229331.762	1229448.914	Field Reconfirmed
2013T-139	3/8/13	69.40	16.700	229416.291	1229419.409	Field Reconfirmed
2013T-140	3/8/13	63.14	18.932	229665.845	1228980.370	Field Reconfirmed
2013T-141	3/8/13	53.81	17.491	229619.762	1229041.028	Field Reconfirmed
2013T-142	3/8/13	41.69	16.773	229436.373	1228803.423	Field Reconfirmed
2013T-143	3/8/13	52.83	15.324	229321.887	1229376.301	Field Reconfirmed
2013T-144	3/8/13	37.83	15.154	229387.749	1229213.304	Field Reconfirmed
2013T-145	3/11/13	37.28	14.952	229354.284	1229253.699	Field Reconfirmed
2013T-146	3/11/13	49.11	14.188	229542.122	1229174.062	Field Reconfirmed
2013T-147	3/11/13	57.02	16.319	229624.956	1229133.014	Field Reconfirmed
2013T-148	3/11/13	56.67	15.974	229670.924	1229161.171	Field Reconfirmed
2013T-149	3/11/13	41.66	15.714	229450.105	1229083.489	Field Reconfirmed
2013T-150	3/11/13	45.89	16.124	229531.484	1229040.264	Field Reconfirmed
2013T-151	3/11/13	39.22	14.919	229614.765	1229240.478	Field Reconfirmed
2013T-152	3/11/13	23.18	18.362	229179.425	1229188.108	Field Reconfirmed
2013T-153	3/12/13	21.18	23.212	229188.019	1228591.591	Field Reconfirmed
2013T-154	3/12/13	19.91	23.669	229190.033	1228657.771	Field Reconfirmed
2013T-155	3/12/13	71.53	16.938	229755.991	1229130.532	Field Reconfirmed
2013T-156	3/12/13	74.02	18.148	229785.496	1229072.513	Field Reconfirmed
2013T-157	3/12/13	73.79	19.618	229774.266	1229014.329	Field Reconfirmed
2013T-158	3/12/13	68.79	17.762	229711.026	1229072.565	Field Reconfirmed
2013T-159	3/12/13	77.01	22.121	229770.537	1229277.826	Field Reconfirmed
2013T-160	3/13/13	32.79	22.820	229741.907	1229318.723	Field Reconfirmed
2013T-161	3/13/13	61.63	23.246	229471.128	1229266.791	Field Reconfirmed
2013T-162	3/13/13	67.07	16.477	229375.258	1229450.301	Field Reconfirmed
2013T-163	3/13/13	85.58	17.214	229606.890	1229375.669	Field Reconfirmed

Note:

Entries in GPS Data Source Columns are as follows:

"Field Reconfirmed" means the survey crew used the marked borehole location to confirm the GPS coordinates.

"Field Located using GPS" means the locations were not surveyed – either because the markers were washed away before the surveyors arrived (beach locations), or the boreholes were drilled after the survey was completed. The listed coordinates are based on a field reading with the handheld GPS unit.

TABLE 1-3

Confirmation Soil Core Depths, Surface Elevations, and Coordinates

Wyckoff Upland Field Investigation

Soil Core Number	Date Completed	Depth in Feet Below Ground Surface	Estimated Surface Elevation in Feet (NAVD 88)	State Plane Coordinates (NAD 83)		GPS Data Source
				Northing	Easting	
TarGOST Phase 1						
2013-SC-001	2/18/13	35	15.657	229425.211	1229067.314	Field Reconfirmed
2013-SC-002	2/19/13	60	14.991	229363.006	1229403.046	Field Reconfirmed
2013-SC-006	2/25/13	50	14.142	229511.487	1229196.135	Field Reconfirmed
2013-SC-036	2/22/13	64	17.841	229564.613	1229370.296	Field Reconfirmed
2013-SC-041	2/6/13	78	19.258	229794.813	1229118.478	Field Reconfirmed
2013-SC-045	2/8/13	80	23.313	229668.799	1229340.724	Field Reconfirmed
2013-SC-046	2/4/13	42	18.900	229478.926	1228830.471	Field Reconfirmed
2013-SC-055	2/27/13	67.5	17.785	229724.391	1228990.111	Field Reconfirmed
2013-SC-068	2/27/13	23.5	18.977	229239.023	1228805.761	Field Reconfirmed
2013-SC-072	2/26/13	51	15.600	229581.804	1229085.835	Field Reconfirmed
TarGOST Phase 2						
2013-SC-013	3/20/13	52	17.140	229241.207	1229412.811	Field Reconfirmed
2013-SC-014	3/22/13	39.5	19.341	229675.23	1229055.98	Field Located Using GPS; elevation estimated from 2013T-014
2013-SC-054	3/19/13	60	17.350	229671.717	1229058.109	Field Reconfirmed
2013-SC-070	3/20/13	27	17.493	229280.932	1228922.522	Field Reconfirmed
2013-SC-101	3/18/13	27	19.315	229306.216	1228644.157	Field Reconfirmed
2013-SC-106	3/21/13	81.5	17.775	229818.457	1229102.640	Field Reconfirmed
2013-SC-119	3/15/13	30	14.138	229526.912	1228779.339	Field Reconfirmed
2013-SC-127	3/14/13	63	13.244	229668.224	1228836.380	Field Reconfirmed
2013-SC-152	3/15/13	28	18.747	229177.426	1229188.511	Field Reconfirmed
2013-SC-155	3/19/13	69.3	16.914	229756.411	1229128.685	Field Reconfirmed

Note:

Entries in GPS Data Source column are as follows:

"Field Reconfirmed" means the survey crew used the marked borehole location to confirm the GPS coordinates.

"Field Located using GPS" means the locations were not surveyed – either because the markers were washed away before the surveyors arrived (beach locations), or the boreholes were drilled after the survey was completed. The listed coordinates are based on a field reading with the handheld GPS unit.

TABLE 3-1

Comparison of TarGOST and Soil Core NAPL Indicators

Wyckoff Upland Field Investigation

Table entries indicate number of visual NAPL occurrences by soil geologic unit

TarGOST Probe/ Soil Core	Approximate Depth Zones with Proximal Visible NAPL[1]	Depth Zones with Poorly-Correlated Visible NAPL[1] and TarGOST NAPL indicators
Phase 1		
2013T-001/001R 2013-SC-001	4.0-5.4 8.0-10.0 12.0-12.4 16.0-18.8 20.0-21.9 24.0-26.4 28.7-29.9 32.0-34.5	None Identified
2013T-002/002R 2013-SC-002	8.5 9.0 14.1-15.8 16.0-21.8 26.6-27.0 28.0-29.0	36.6-26.8 feet: visible NAPL but TarGOST signals at background
2013T-006 2013-SC-006	13.0-13.3 13.8-14.8 16.9-17.1 17.9-18.0 20.0-22.3 24.0-28.0 30.3-30.4	None Identified
2013T-036/036R 2013-SC-036	12.0-12.4 14.0-14.05 18.1-18.2 18.4-18.6 36.0-37.1	None Identified
2013T-041 2013-SC-041	66.2-66.5	None Identified
2013T-045 2013-SC-045	15.0-18.9 20.9-24.5 27.0-27.4	None Identified
2013T-046 2013-SC-046	29.2-30.0 31.1 33.0 35.0-37.0	None Identified
2013T-055 2013-SC-055	60.6-61.5	None Identified
2013T-068/068R 2013-SC-068	None	None Identified
2013T-072 2013-SC-072	9.0-9.9 12.0-13.6 16.2-16.3 20.0-20.3 36.6 37.0-37.8 38.7-.8.9 40.7-40.9 41.0-43.6 44.9-45.0 48.0-48.75	20.0-20.3: visible NAPL but TarGOST signals at background
Phase 2		
2013T-013	13.4-13.6	None Identified

TABLE 3-1

Comparison of TarGOST and Soil Core NAPL Indicators

Wyckoff Upland Field Investigation

Table entries indicate number of visual NAPL occurrences by soil geologic unit

TarGOST Probe/ Soil Core	Approximate Depth Zones with Proximal Visible NAPL[1]	Depth Zones with Poorly-Correlated Visible NAPL[1] and TarGOST NAPL indicators
2013-SC-013		
2013T-014 2013-SC-014	21.25-21.3	None Identified
2013T-054 2013-SC-054	45.8-46.0 56.3-56.6	17.1-17.2 feet: moderate TarGOST signals but visible NAPL absent 45.8-45.9 feet: visible NAPL but TarGOST signals at background
2013T-070 2013-SC-070	17.5-17.8	None Identified
2013T-101 2013-SC-101	18.5-18.8 21.0-21.2 21.9-22.0	None Identified
2013T-106 2013-SC-106	72.0-73.2	None Identified
2013T-119 2013-SC-119	28.2-28.3	None Identified
2013T-127 2013-SC-127	20.5-20.8 24.0-24.4 49.5-50.5	None Identified
2013T-152/152v2 2013-SC-152	None	6.0-6.2 and 8.5-8.6 feet: moderate TarGOST signals but visible NAPL absent
2013T-155 2013-SC-155	9.0-9.7 20.5-20.8 24.0-24.3 56.5-56.6	None Identified

Note:

[1]NAPL Indicators: oil-coating, oil-wetting, and product globules (excludes sheen). NAPL indicators are coincident with, or present just above or below TarGOST signal zone(s).

TABLE 4-1

Preliminary NAPL Impacted Volumetric Analysis - Upland Area Behind Sheet Pile Wall Only

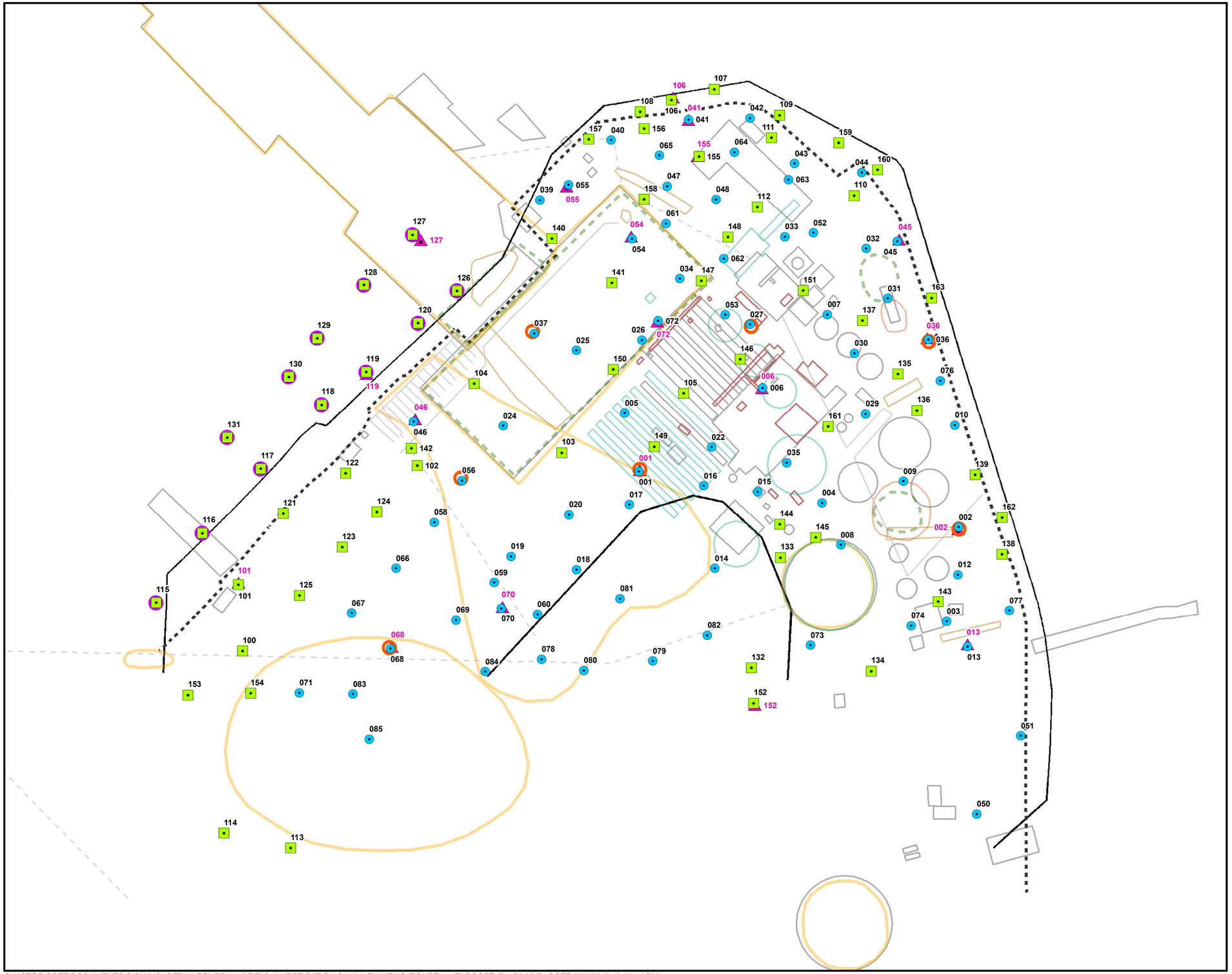
Wyckoff Upland Field Investigation

Volume Sampled	5% RE	10% RE	15% RE	25% RE	50% RE	100% RE	Units
755,018	167,071	109,069	82,563	52,777	21,739	7,109	Cubic Yards
100%	22%	14%	11%	7%	3%	1%	Percent of Volume Sampled

Note:

The raw response data from each TarGOST reading was converted from a discrete elevation to a thickness interval. Each discrete response measurement was applied to the interval represented by the midpoints between each discrete response depth. For example, for paired depths (Xi) and responses (Yi), (X1, Y1), (X2, Y2), and (X3, Y3), response Y1 at the top of the boring would apply to interval 0 to (X1+X2)/2, Y2 would apply to the interval (X1+X2)/2 to (X2 + X3)/2, and so on. The interval was then converted to a thickness corresponding to each reading.

Figures



LEGEND

TarGOST Location and Phase

- Phase 1 TarGOST
- Phase 2 TarGOST
- Replicate TarGOST
- West Beach TarGOST Location
- Confirmation Boring
- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Site Remediation Excavation Performed in 1992 through 1994
- Bulk Head Prior to Current Sheet Pile Wall
- Current Sheet Pile Wall

Sources:
Bulk Head Prior to Current Sheet Pile Wall
digitized from current sheet pile wall design drawings
(USACE, 2000)
Some sumps and trenches were digitized from
"Figure 1 Site Location" (Environment and Ecology, 1995)
Sumps and Trenches were digitized from
"Figure B Area 1 Trenches and Sumps";
"Figure C Area 2 Drums, Sumps, 7 Tanks"; "Figure D
Area 3 Containers, Drums, Sumps, Tanks & Trenches"
(Environment and Ecology, 1995)
Secondary NAPL Source Locations digitized from
"Figure 2-1 Wycoff Site Vicinity Map" (CH2M HILL, 1993)
Trenching observations digitized from 1989 hand markup.
Prioritizing of source areas conducted 2012.
Prior remediation excavation areas from 1992 through 1994
digitized from Ecology and Environment, Inc., 1995.

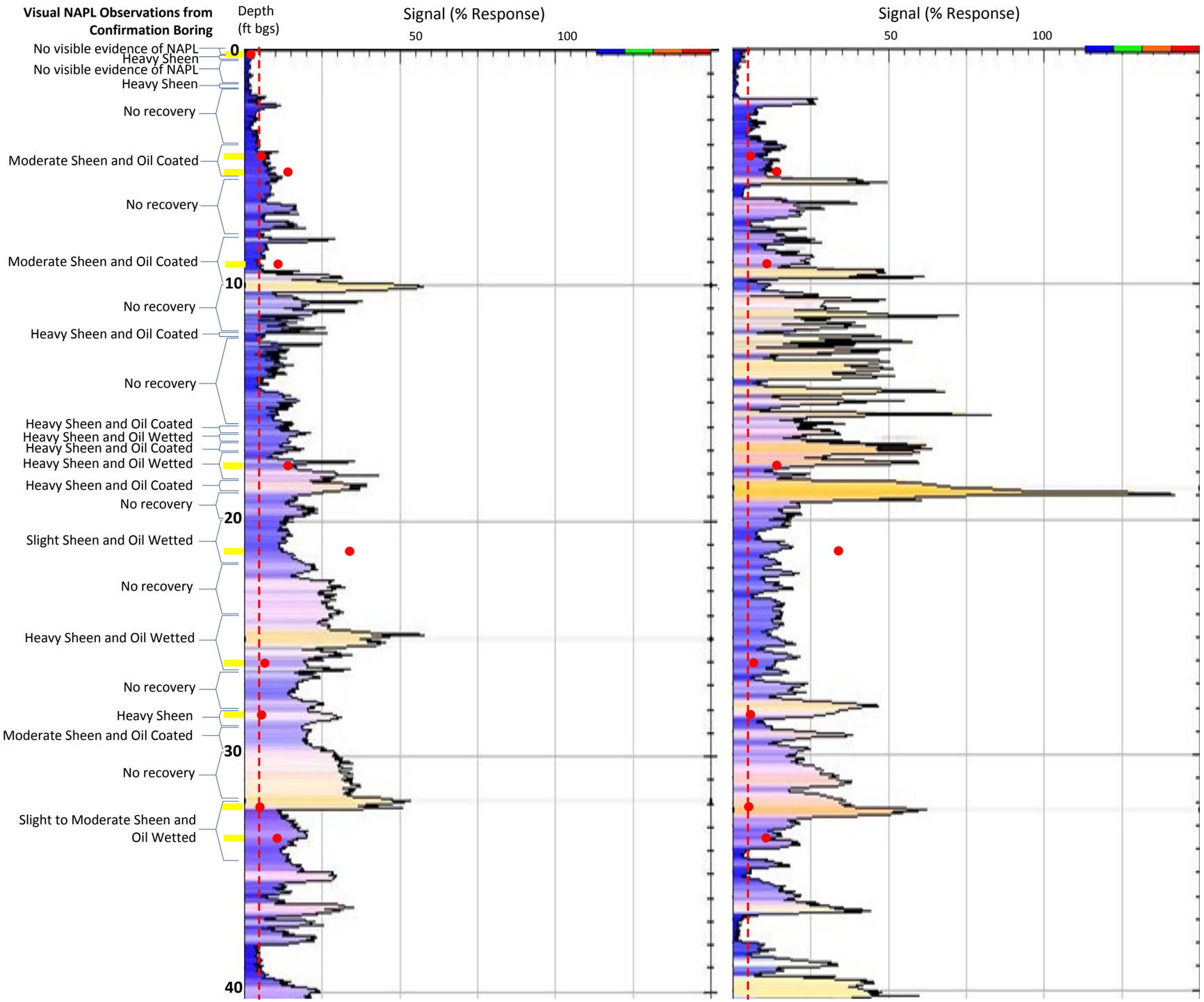
N

0 60 120 240 Feet

Figure 1-1
TarGOST Field Investigation Locations
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE1-1_TARGOST_P1_P2.MXD GGEE 6/25/2013 12:36:41 PM

TarGOST Confirmation Boring 2013SC-001 and 001R



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

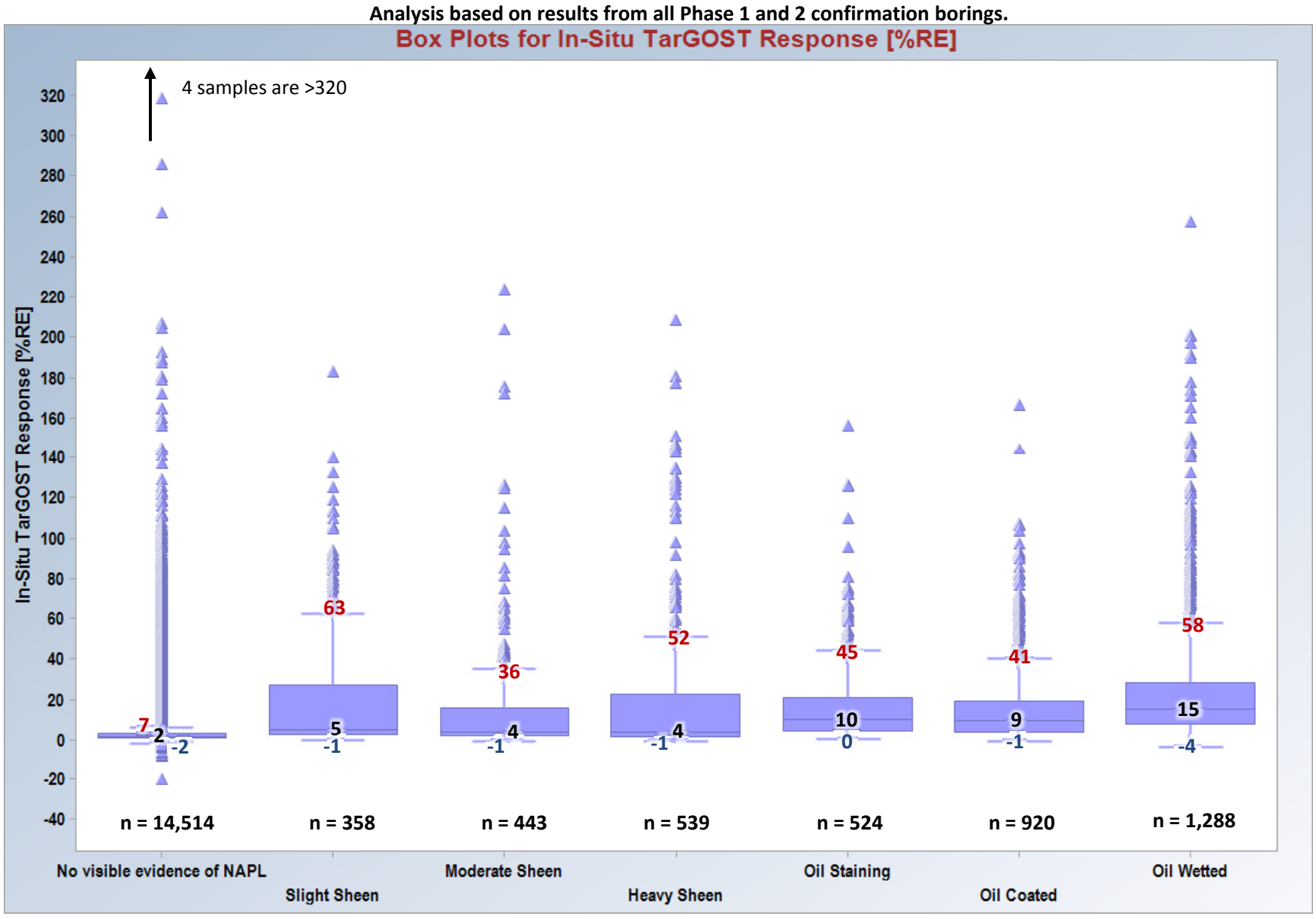
≥%RE Chosen to Indicate NAPL Presence = 5

This value was chosen based on the top 2 feet of the log. This is the only portion of the log which had intervals of no visible NAPL. The rest of the visual observations all had some indication of NAPL presence. Though some portions of the top of the log still include sheen at very low %RE values, a more conservative value of 5%RE was chosen to indicate NAPL presence.

Figure 4-1
Example Visual NAPL Evaluation
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

A. TarGOST Responses Grouped by All Visual NAPL Classes

Analysis based on results from all Phase 1 and 2 confirmation borings.

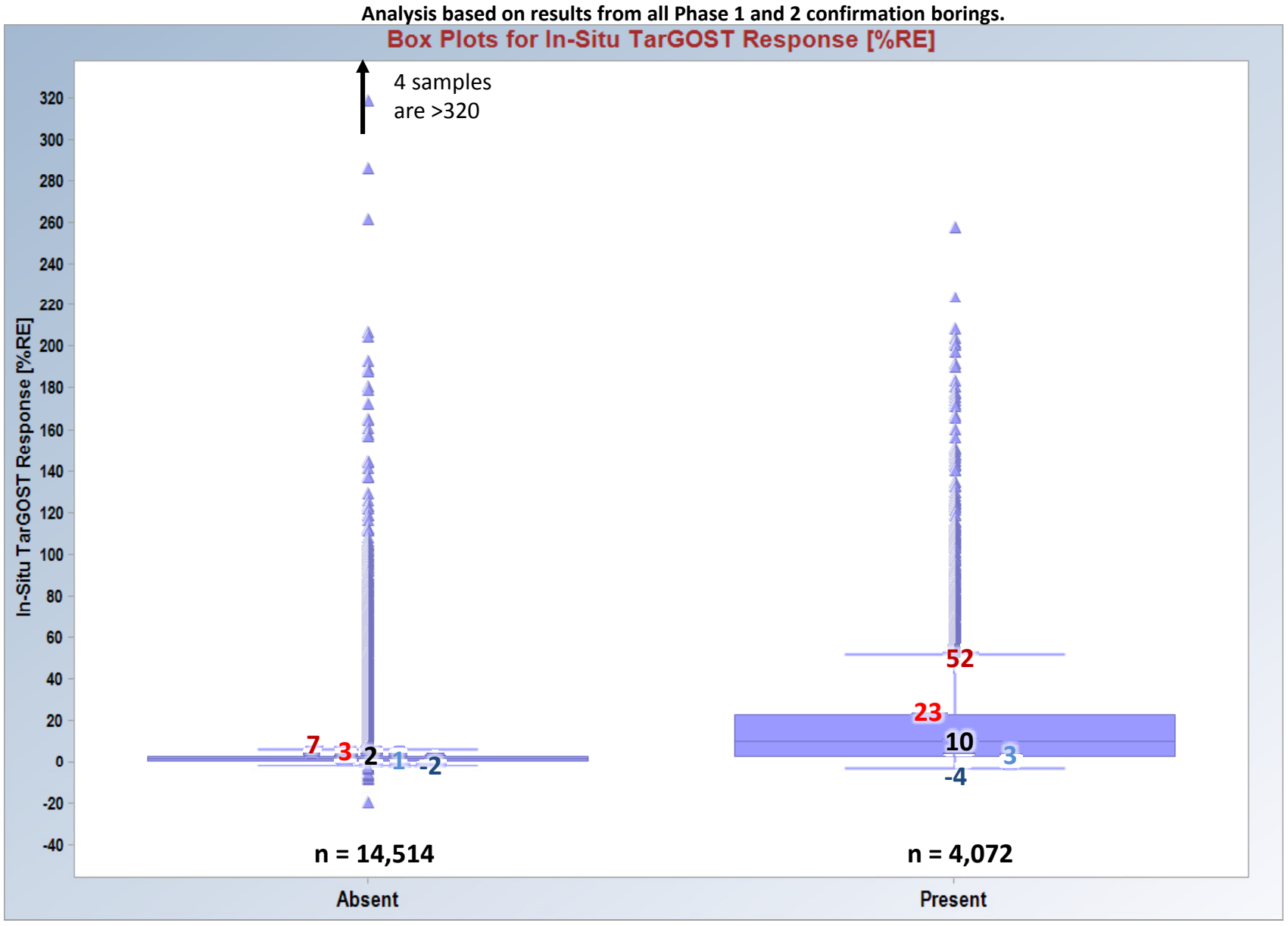


= minimum ## = median ## = maximum

B. TarGOST Responses Grouped by Presence or Absence of NAPL

(All positive identification categories above combined)

Analysis based on results from all Phase 1 and 2 confirmation borings.



= minimum ## = lower quartile (Q1) ## = median (Q2) ## = upper quartile (Q3) ## = maximum

Figure 4-2

Box Plots of In-Situ TarGOST Response [%RE] Grouped by Visual NAPL Observations in Co-Located Confirmation Borings

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

	Comparison of In-Situ TarGOST to Visual Observations (Count of TarGOST readings)	Cutoff TarGOST Response [%RE] between presence and absence of NAPL					
		5%	**7%**	**10%**	**13%**	**20%**	**27%**
	NAPL Present in Both	2,683	2,439	2,097	1,725	1,172	853
	NAPL Absent in Both	12,346	12,946	13,376	13,577	13,804	13,950
False Negative	NAPL Absent in TarGOST, Present in Visual Observations	1,389	1,633	1,975	2,347	2,900	3,219
False Positive	NAPL Present in TarGOST, Absent in Visual Observations	2,168	1,568	1,138	937	710	564
	Total	**18,586**	**18,586**	**18,586**	**18,586**	**18,586**	**18,586**

	Comparison of In-Situ TarGOST to Visual Observations (Percent)	Cutoff TarGOST Response [%RE] between presence and absence of NAPL					
		5%	**7%**	**10%**	**13%**	**20%**	**27%**
	NAPL Present in Both	14%	13%	11%	9%	6%	5%
	NAPL Absent in Both	66%	70%	72%	73%	74%	75%
	Agreement	80.9%	82.8%	83.3%	82.3%	80.6%	79.6%
False Negative	NAPL Absent in TarGOST, Present in Visual Observations	7%	9%	11%	13%	16%	17%
False Positive	NAPL Present in TarGOST, Absent in Visual Observations	12%	8%	6%	5%	4%	3%
	Disagreement	19.1%	17.2%	16.7%	17.7%	19.4%	20.4%

Circled values show the optimal %RE cutoff between presence and absence of NAPL for acheiving agreement in between the in-situ TarGOST and the visual NAPL observations as well as the best balance between false positives and false negatives. Selecting the %RE that acheives the best balance prevents introducing bias to the dataset as many factors may prevent a perfect match between in-situ TarGOST readings and colocated visual observation of confirmation borings.

Figure 4-3

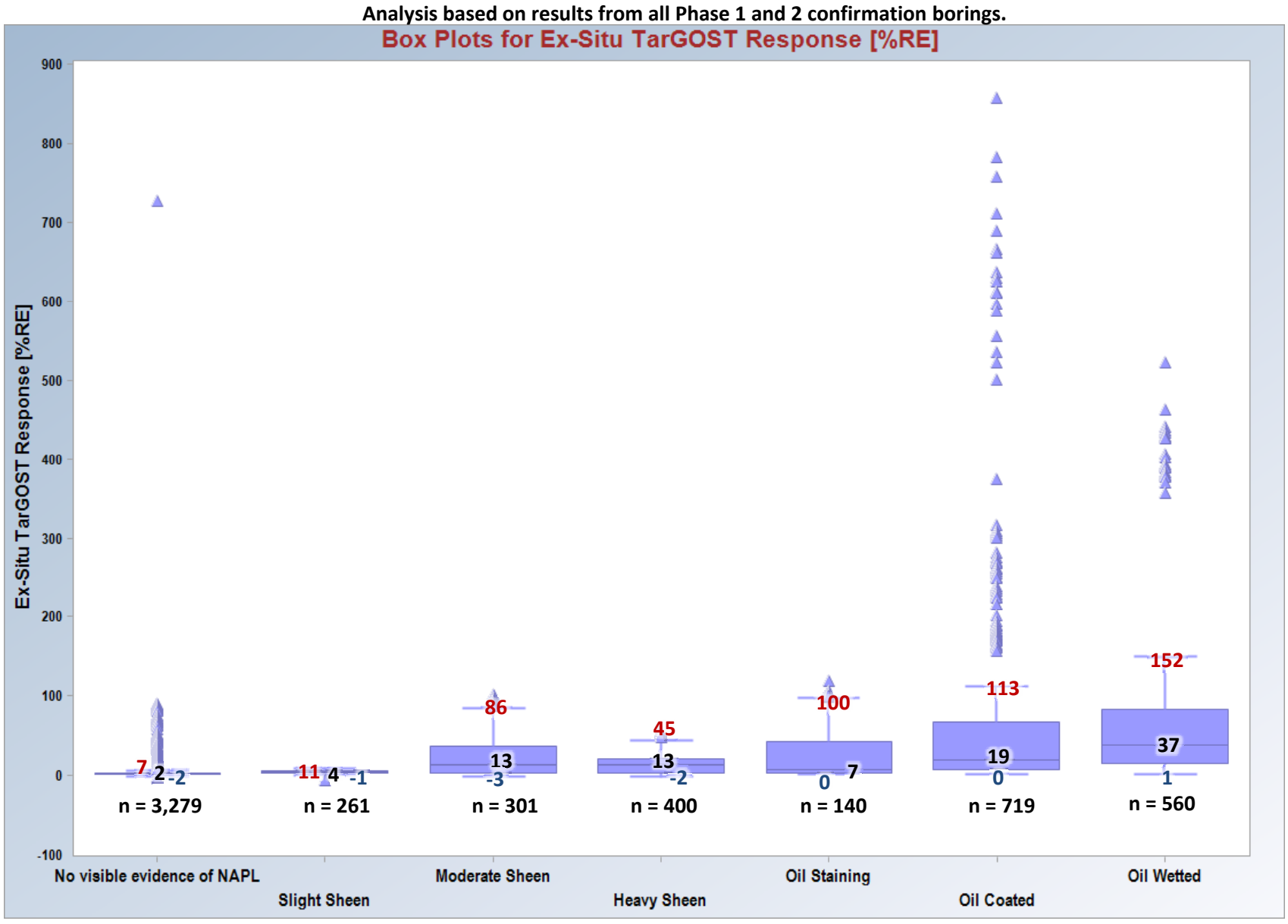
In-Situ TarGOST Statistical Comparison with Co-Located Visual NAPL Observations from Confirmation Boring Logs in Order to Select Best %RE indicating Cutoff between Presence and Absence of NAPL

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

A. TarGOST Responses Grouped by All Visual NAPL Classes

Analysis based on results from all Phase 1 and 2 confirmation borings.

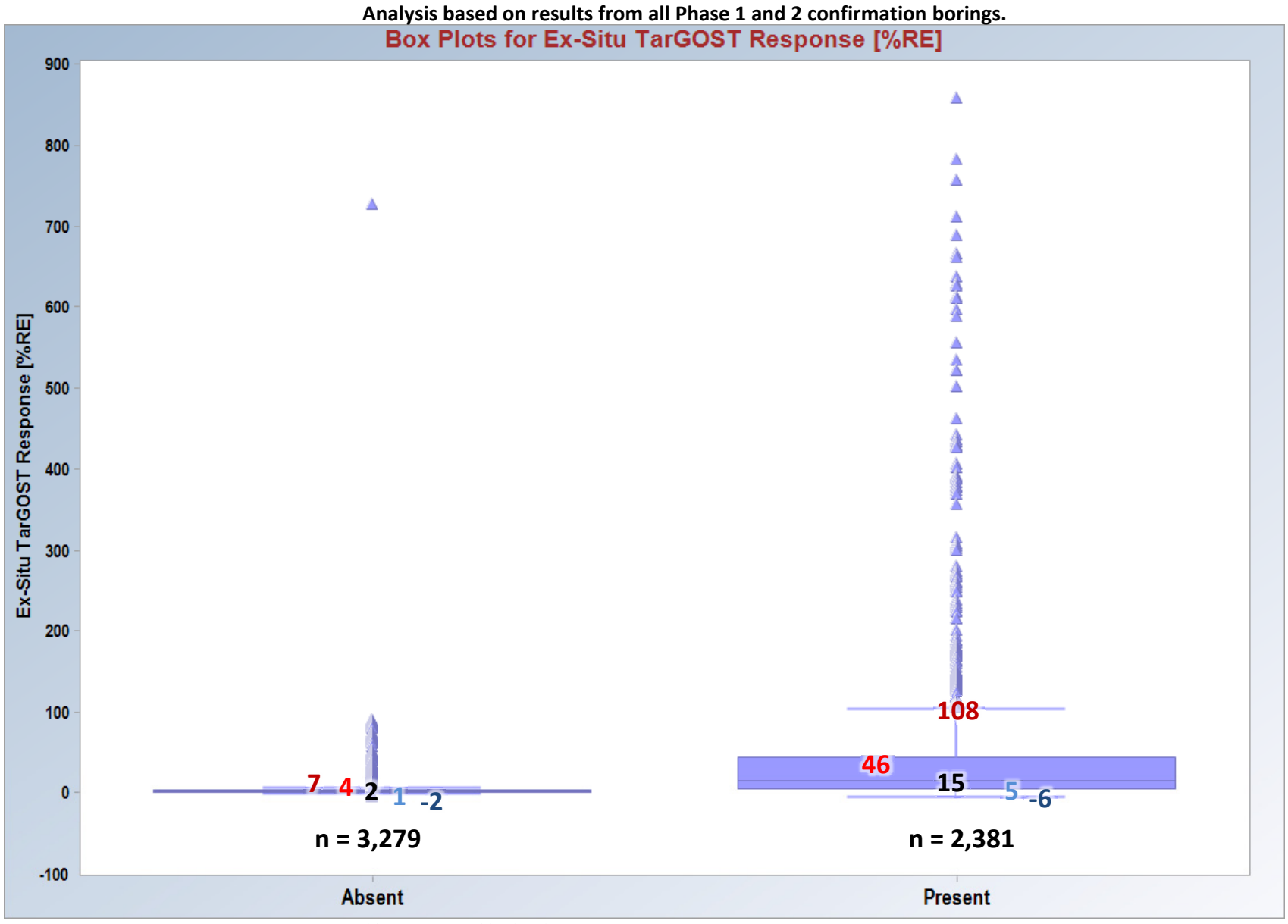


= minimum ## = median ## = maximum

B. TarGOST Responses Grouped by Presence or Absence of NAPL

(All positive identification categories above combined)

Analysis based on results from all Phase 1 and 2 confirmation borings.



= minimum ## = lower quartile (Q1) ## = median (Q2) ## = upper quartile (Q3) ## = maximum

Figure 4-4

Box Plots of Ex-Situ TarGOST Response [%RE] Grouped by Visual NAPL Observations in Co-located Confirmation Borings

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

	Comparison of Ex-Situ TarGOST to Visual Observations (Number of TarGOST readings)	Cutoff TarGOST Response [%RE] between presence and absence of NAPL					
		4%	**5%**	**7%**	**10%**	**20%**	**27%**
	NAPL Present in Both	1,905	1,771	1,552	1,433	969	840
	NAPL Absent in Both	2,521	2,712	2,863	2,931	3,023	3,092
False Negative	NAPL Absent in TarGOST, Present in Visual Observations	496	630	849	968	1,432	1,561
False Positive	NAPL Present in TarGOST, Absent in Visual Observations	738	547	396	328	236	167
	Total	**5,660**	**5,660**	**5,660**	**5,660**	**5,660**	**5,660**

	Comparison of Ex-Situ TarGOST to Visual Observations (Percent)	Cutoff TarGOST Response [%RE] between presence and absence of NAPL					
		4%	**5%**	**7%**	**10%**	**20%**	**27%**
	NAPL Present in Both	34%	31%	27%	25%	17%	15%
	NAPL Absent in Both	45%	48%	51%	52%	53%	55%
	Agreement	78.2%	79.2%	78.0%	77.1%	70.5%	69.5%
False Negative	NAPL Absent in TarGOST, Present in Visual Observations	9%	11%	15%	17%	25%	28%
False Positive	NAPL Present in TarGOST, Absent in Visual Observations	13%	10%	7%	6%	4%	3%
	Disagreement	21.8%	20.8%	22.0%	22.9%	29.5%	30.5%

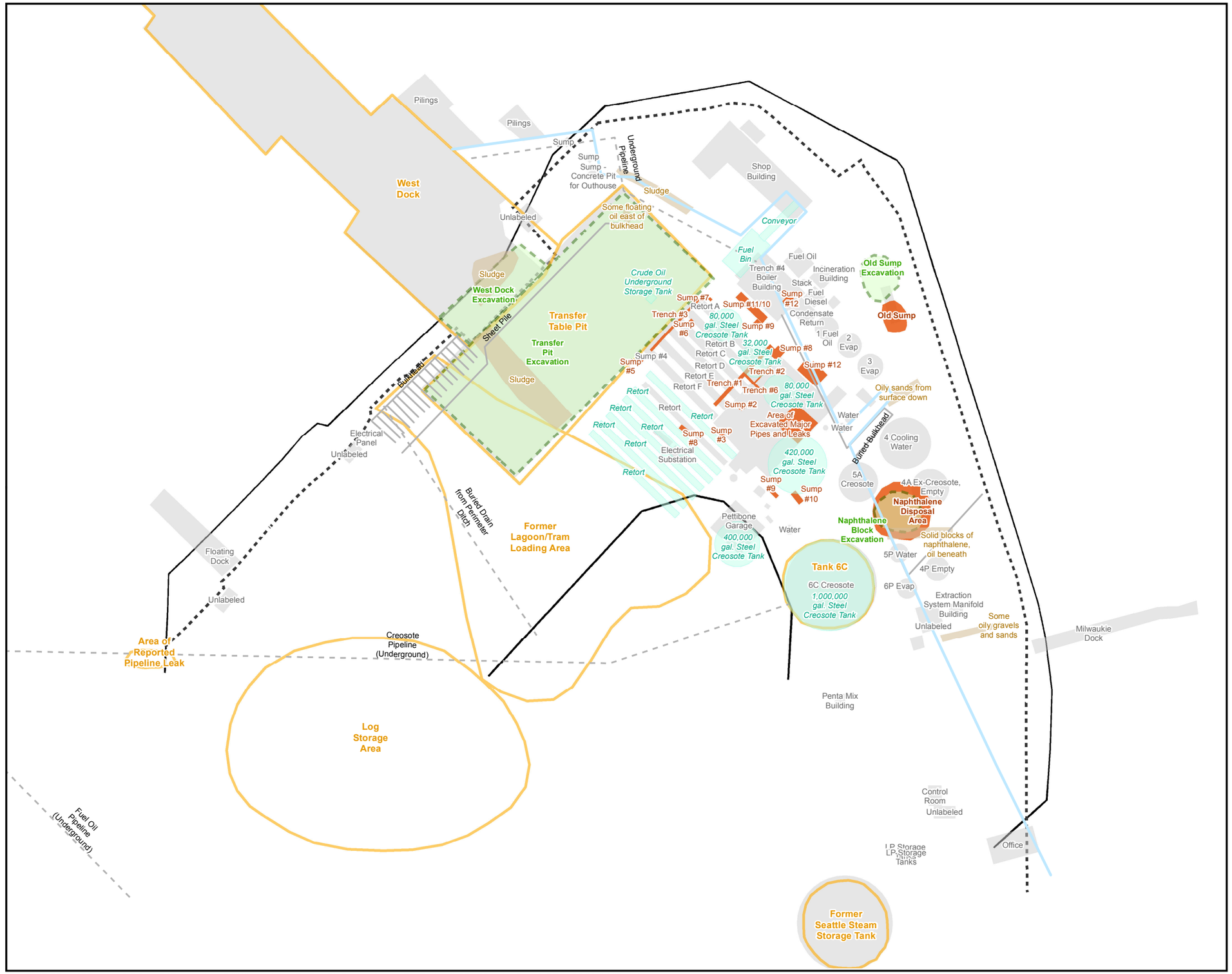
Circled values show the optimal %RE cutoff between presence and absence of NAPL for acheiving agreement in between the en-situ TarGOST and the visual NAPL observations as well as the best balance between false positives and false negatives. Selecting the %RE that acheives the best balance prevents introducing bias to the dataset as many factors may prevent a perfect match between ex-situ TarGOST readings and co-located visual observation of confirmation borings.

Figure 4-5

Ex-Situ TarGOST Statistical Comparison with Co-Located Visual NAPL Observations from Confirmation Boring Logs in Order to Select Best %RE indicating Cutoff between Presence and Absence of NAPL

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site



LEGEND

- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Site Remediation Excavation Performed in 1992 through 1994
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Facility Shoreline as of 1917
- Bulk Head Prior to Current Sheet Pile Wall
- Current Sheet Pile Wall

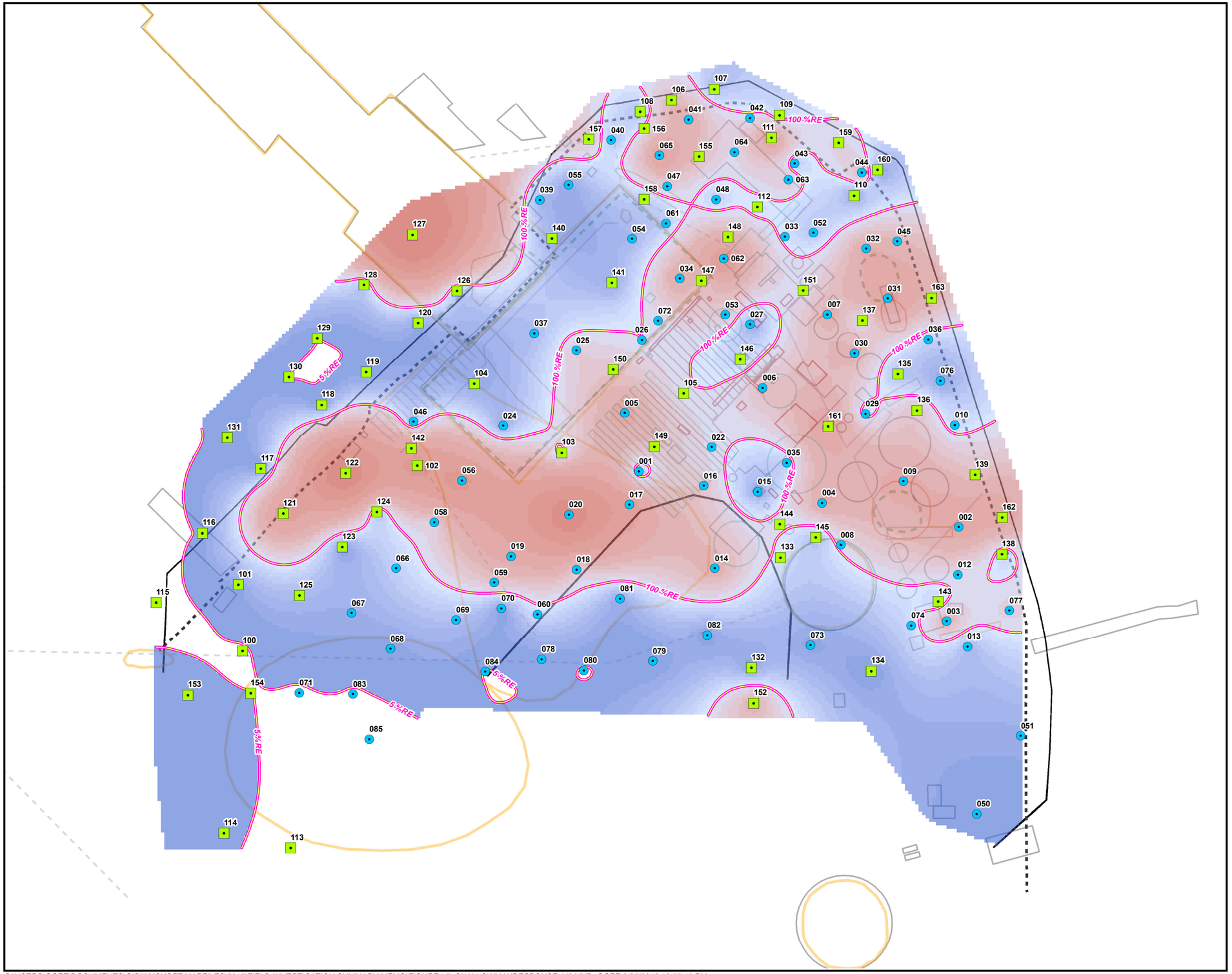
Sources:
Bulk Head Prior to Current Sheet Pile Wall digitized from current sheet pile wall design drawings (USACE, 2000)
Some sumps and trenches were digitized from "Figure 1 Site Location" (Environment and Ecology, 1995)
Sumps and Trenches were digitized from "Figure B Area 1 Trenches and Sumps"; "Figure C Area 2 Drums, Sumps, 7 Tanks"; "Figure D Area 3 Containers, Drums, Sumps, Tanks & Trenches" (Environment and Ecology, 1995)
Secondary NAPL Source Locations digitized from "Figure 2-1 Wycoff Site Vicinity Map" (CH2M HILL, 1993)
Trenching observations digitized from 1989 hand markup.
Prioritizing of source areas conducted 2012.

N

0 50 100 200 Feet

Figure 4-6
Potential Source Areas and Site Features
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE1-2_SOURCEAREAS.MXD GGEE 6/5/2013 4:07:14 PM



LEGEND

Maximum %RE Contours of 5% and 100%

Maximum %RE Response - Shallow Zone

Low: -11%

Mid: 100%

High: 1,515%

TarGOST Location and Phase

- Phase 1 TarGOST
- Phase 2 TarGOST
- Confirmation Boring
- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Site Remediation Excavation Performed in 1992 through 1994
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Bulk Head Prior to Current Sheet Pile Wall
- Current Sheet Pile Wall

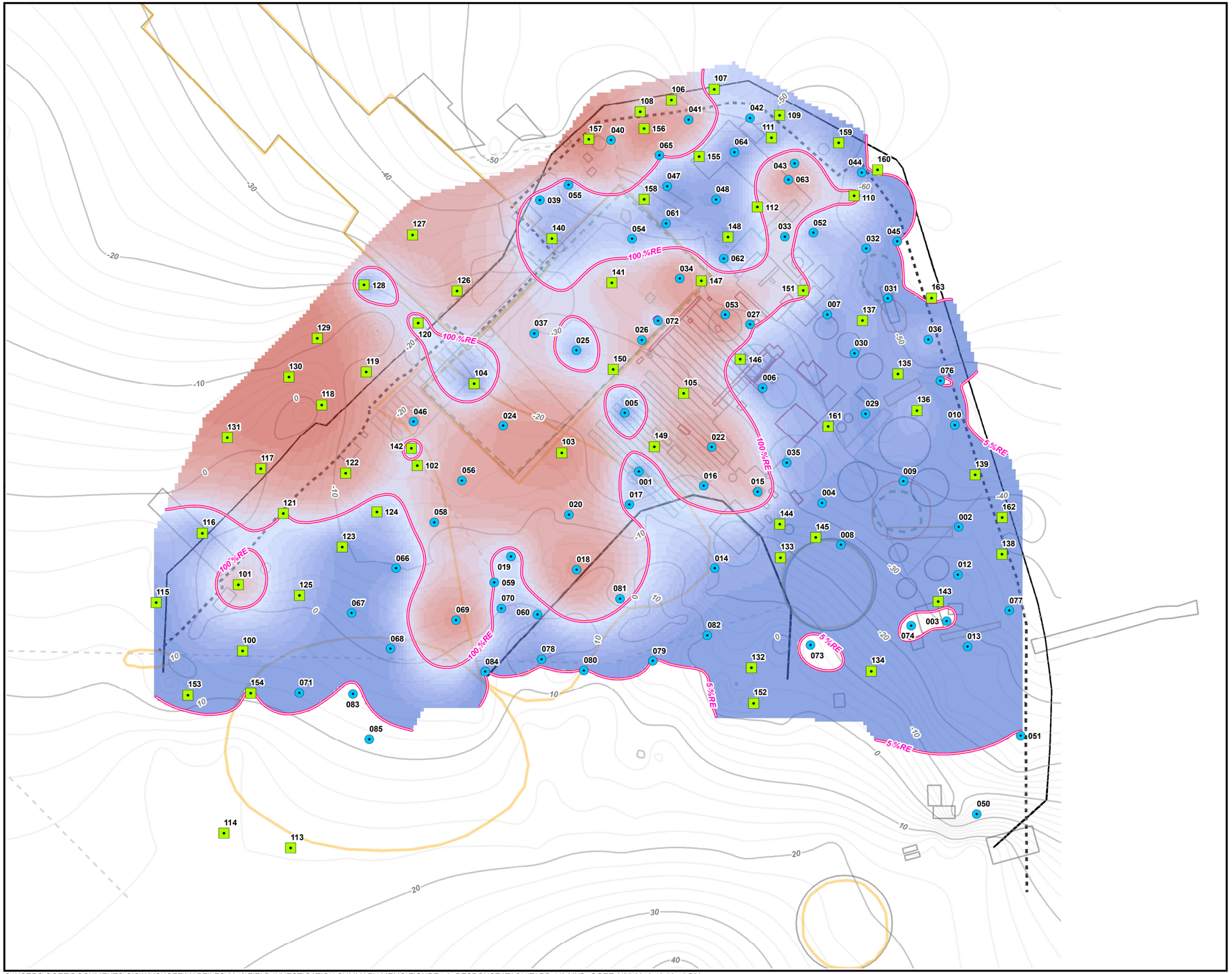
Sources:
Bulk Head Prior to Current Sheet Pile Wall
digitized from current sheet pile wall design drawings
(USACE, 2000)
Some sumps and trenches were digitized from
"Figure 1 Site Location" (Environment and Ecology, 1995)
Sumps and Trenches were digitized from
"Figure B Area 1 Trenches and Sumps";
"Figure C Area 2 Drums, Sumps, 7 Tanks"; "Figure D
Area 3 Containers, Drums, Sumps, Tanks & Trenches"
(Environment and Ecology, 1995)
Secondary NAPL Source Locations digitized from
"Figure 2-1 Wycoff Site Vicinity Map" (CH2M HILL, 1993)
Trenching observations digitized from 1989 hand markup.
Prioritizing of source areas conducted 2012.
Prior remediation excavation areas from 1992 through 1994
digitized from Ecology and Environment, Inc., 1995.

N

0 60 120 240 Feet

Figure 4-7
Phase 1 and 2 TarGOST Results
Maximum %RE Response - Shallow Zone
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-7_SHALLOWMAXRESPONSE_V2.MXD GGEE 6/25/2013 12:55:46 PM



LEGEND

Maximum %RE Contours of 5% and 100%

Maximum %RE Response - Near Aquitard

- Low: -11%
- Mid: 100%
- High: 1,515%

TarGOST Location and Phase

- Phase 1 TarGOST
- Phase 2 TarGOST
- Confirmation Boring
- Trenching and other features of interest identified in April 1989 Map
- Historic Features Identified from 1917 Sandborn Map
- Site Remediation Excavation Performed in 1992 through 1994
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Historic Features
- Bulk Head Prior to Current Sheet Pile Wall
- Current Sheet Pile Wall
- Aquitard Surface Elevation (ft MLLW) 10 ft CI
- Aquitard Surface Elevation (ft MLLW) 2 ft CI

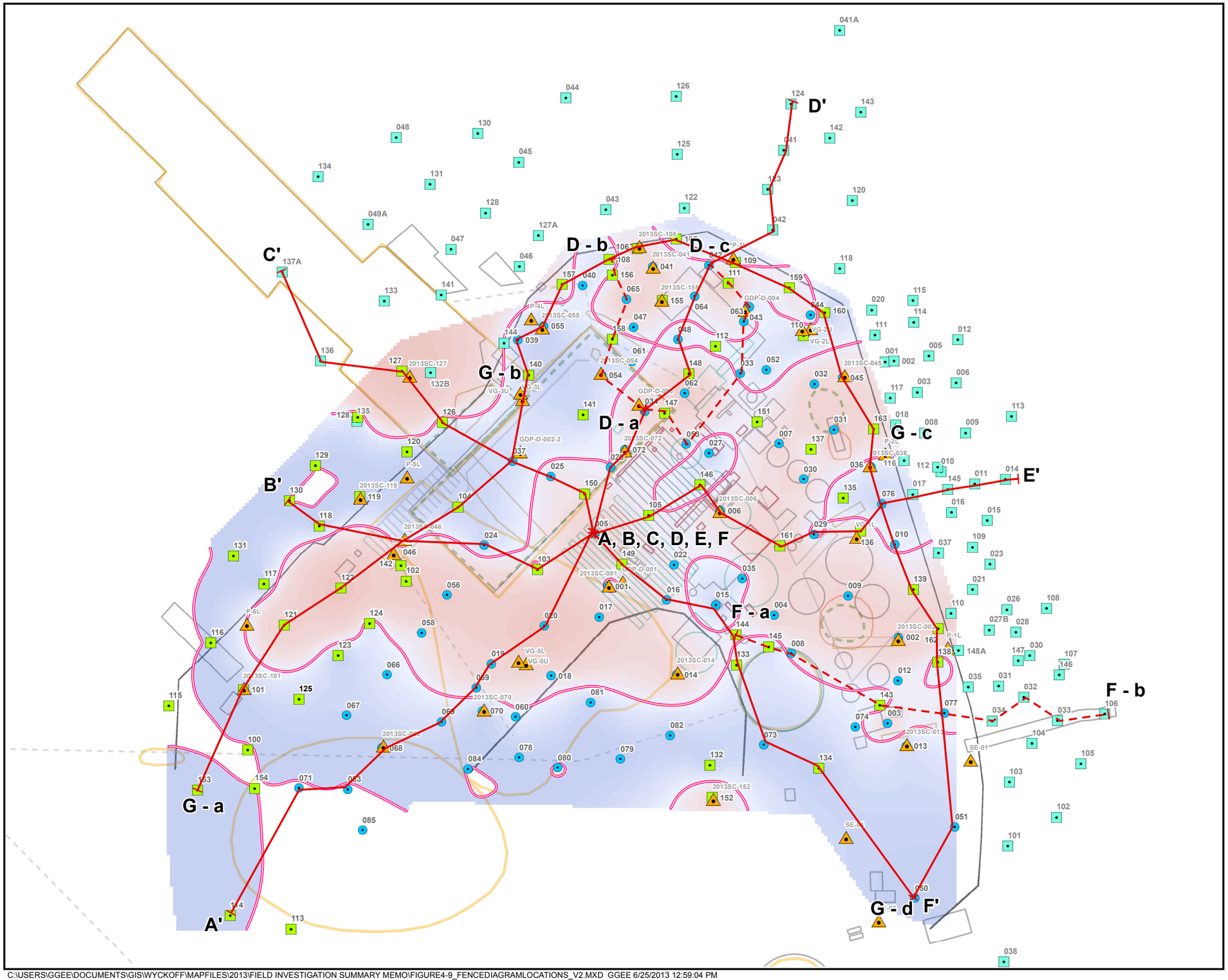
Sources:
Bulk Head Prior to Current Sheet Pile Wall
digitized from current sheet pile wall design drawings
(USACE, 2000)
Some sumps and trenches were digitized from
"Figure 1 Site Location" (Environment and Ecology, 1995)
Sumps and Trenches were digitized from
"Figure B Area 1 Trenches and Sumps";
"Figure C Area 2 Drums, Sumps, 7 Tanks"; "Figure D
Area 3 Containers, Drums, Sumps, Tanks & Trenches"
(Environment and Ecology, 1995)
Secondary NAPL Source Locations digitized from
"Figure 2-1 Wycoff Site Vicinity Map" (CH2M HILL, 1993)
Trenching observations digitized from 1989 hand markup.
Prioritizing of source areas conducted 2012.
Prior remediation excavation areas from 1992 through 1994
digitized from Ecology and Environment, Inc., 1995.

N

0 60 120 240 Feet

Figure 4-8
Phase 1 and 2 TarGOST Results
Maximum %RE Response - Near Aquitard
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-8_RESPONSEATAQUITARD_V2.MXD GGEE 6/25/2013 12:56:45 PM



LEGEND

- Maximum %RE Contours of 5% and 100%

Maximum %RE Response - Shallow Zone

- Low: -11%
- Mid: 100%
- High: 1,515%
- Fence Diagram Location, dashed line indicates sub-location

TarGOST Location and Phase

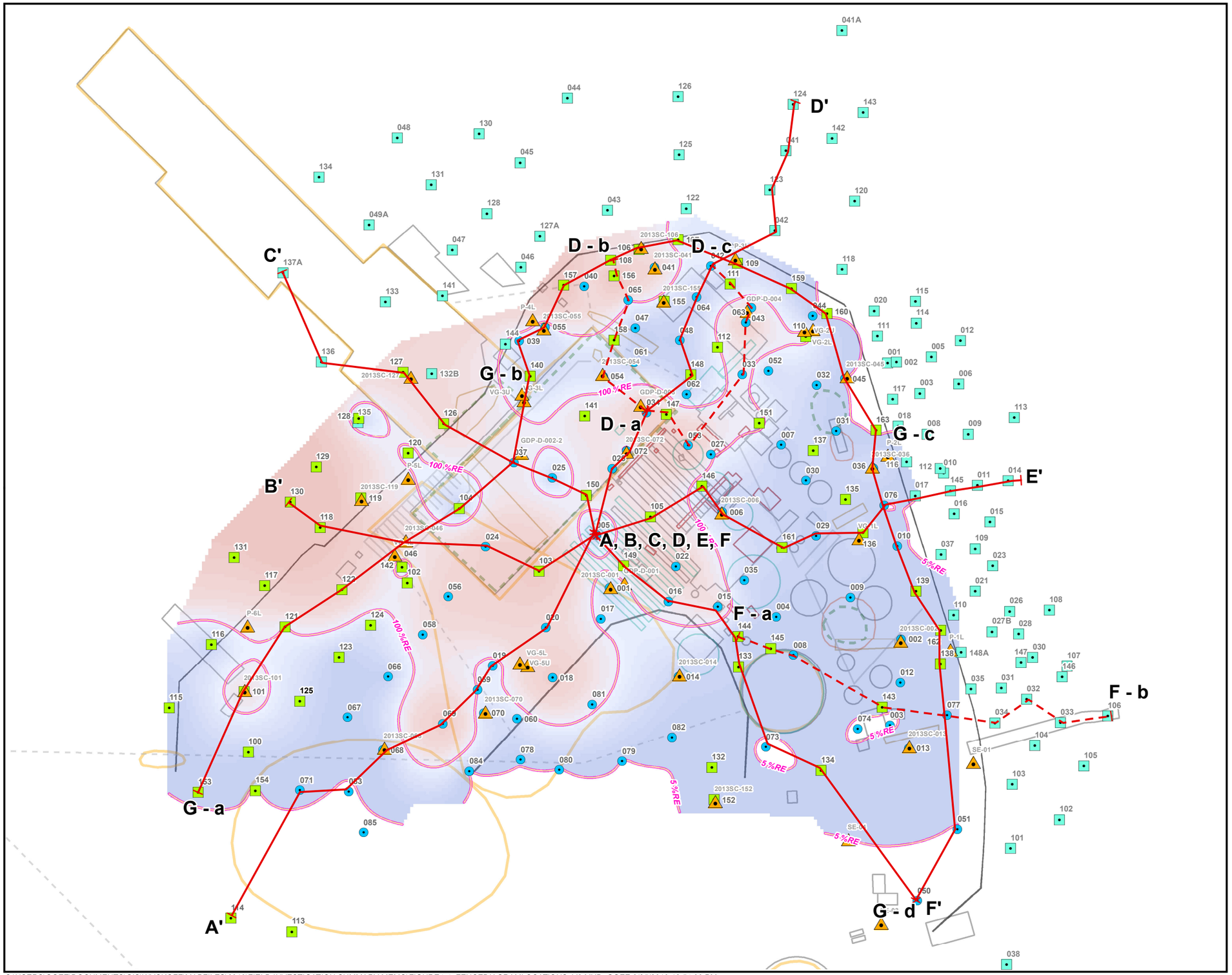
- Phase 1 TarGOST
- Phase 2 TarGOST
- Offshore Targost
- Recent Borings with Glacial Till Depth Information
- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Site Remediation Excavation Performed in 1992 through 1994
- Buried Bulkhead (Same as 1917 Shoreline) and Sheet Pile Wall in Transfer Pit
- Historic Underground Pipelines
- Sheet Pile Wall

N

0 50 100 200 Feet

Figure 4-9
Fence Diagram Locations
Phase 1 and 2 TarGOST Results
Maximum %RE Response - Shallow Zone
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-9_FENCEDIAGRAMLOCATIONS_V2.MXD GGEE 6/25/2013 12:59:04 PM



LEGEND

Maximum %RE Contours of 5% and 100%

Maximum %RE Response - Near Aquitard

Low: -11%
Mid: 100%
High: 1,515%

Fence Diagram Location, dashed line indicates sub-location

TarGOST Location and Phase

- Phase 1 TarGOST
- Phase 2 TarGOST
- Offshore Targost
- Recent Borings with Glacial Till Depth Information
- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Site Remediation Excavation Performed in 1992 through 1994
- Buried Bulkhead (Same as 1917 Shoreline) and Sheet Pile Wall in Transfer Pit
- Historic Underground Pipelines
- Sheet Pile Wall

N

0 50 100 200 Feet

Figure 4-10
Fence Diagram Locations
Phase 1 and 2 TarGOST Results
Maximum %RE Response - Near Aquitard
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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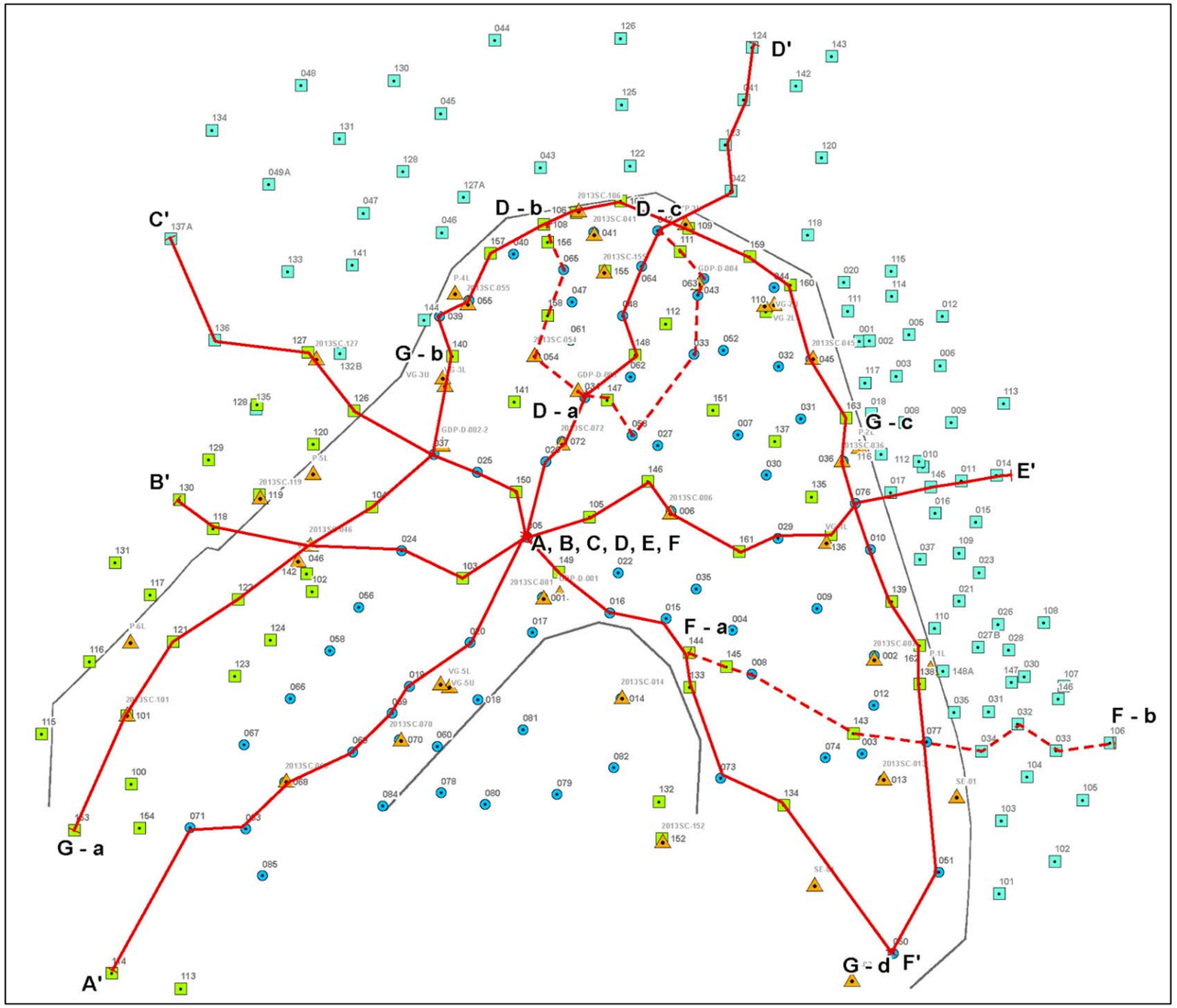
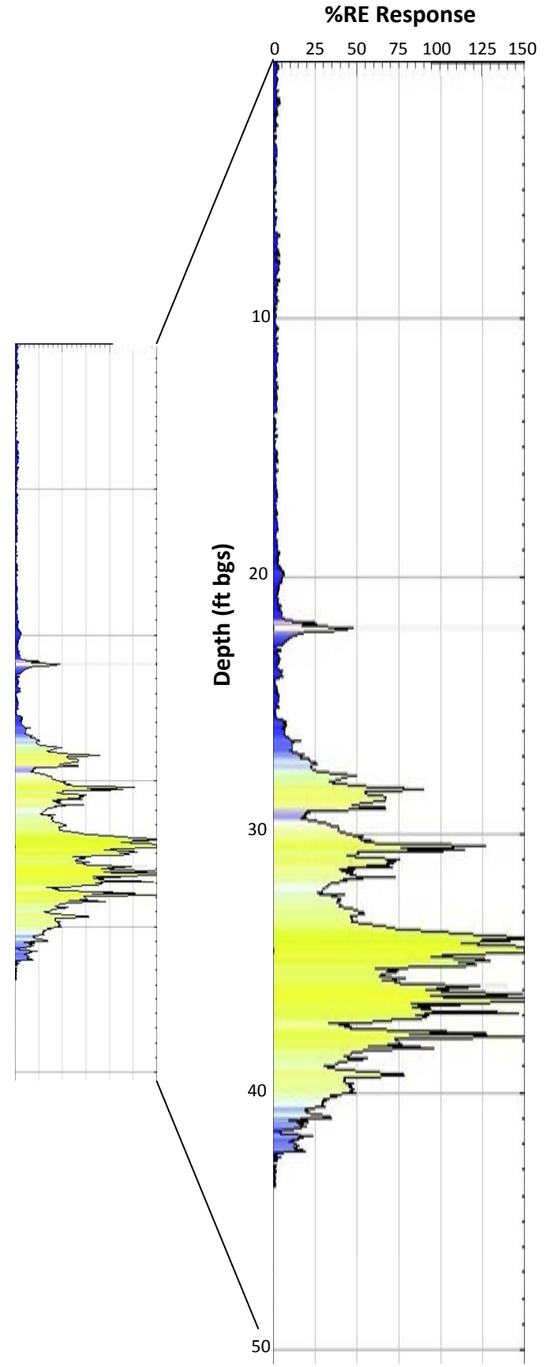
Fence diagrams A through F radiate out from a TarGOST location central to the site (2013T-005). Fence diagram G (a through c) parallels the sheet pile wall on the upland portion of the site.
Dashed sub-fence diagrams are intended to follow potential flow paths of NAPL to the sheet pile wall.





LEGEND FOR FENCE DIAGRAM ELEMENTS

- Ground surface extracted from GIS
- Sheet Pile Wall
- Glacial till depth indicated by recent boring <20 ft from fence
- Depth to refusal of recent boring <20 ft from fence

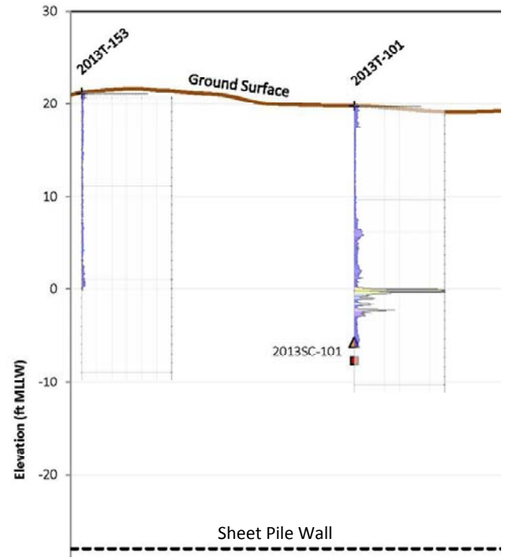


Figure 4-11
Legend for Fence Diagrams
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

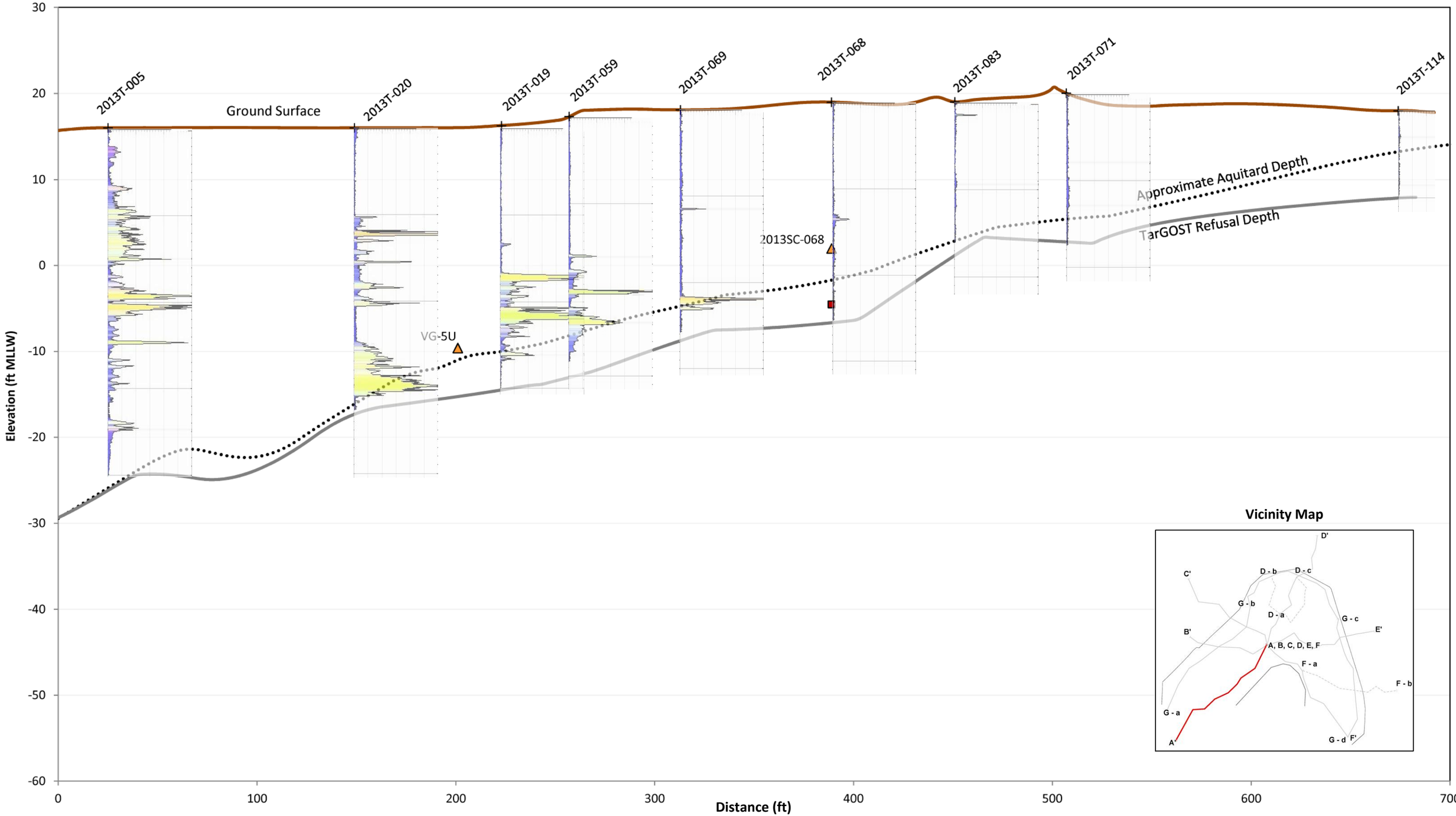


Figure 4-12

Fence Diagram A-A' with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

B E - Approximate Site Center W B'

Transfer Pit Excavation – 1992 to 1994

2013T-005 2013T-103 2013T-024 2013T-046 2013T-118 2013T-130

Ground Surface

Sheet Pile Wall

Approximate Aquitard Depth

2013SC-046

TarGOST Refusal Depth

Elevation (ft MLLW)

30 20 10 0 -10 -20 -30 -40 -50 -60

0 100 200 300 400 500 600 700

Distance (ft)

Vicinity Map

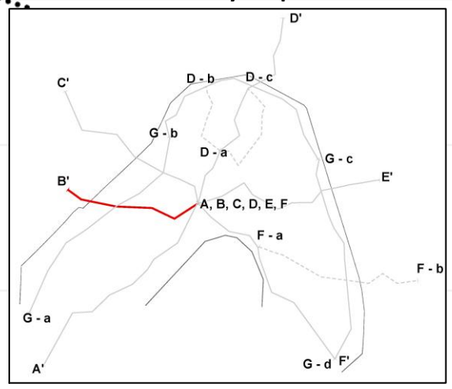


Figure 4-13

Fence Diagram B-B' with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

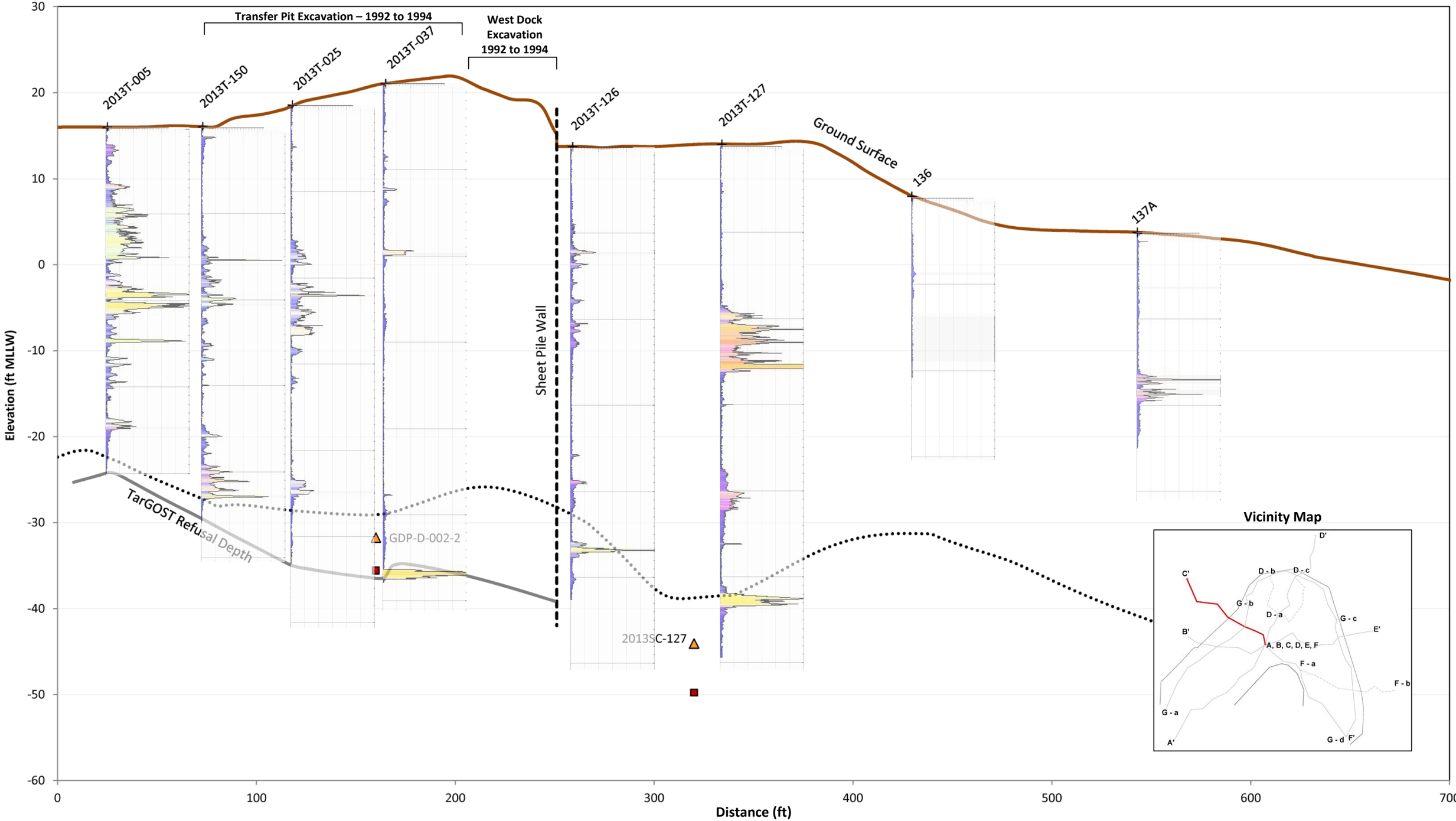


Figure 4-14

Fence Diagram C-C' with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

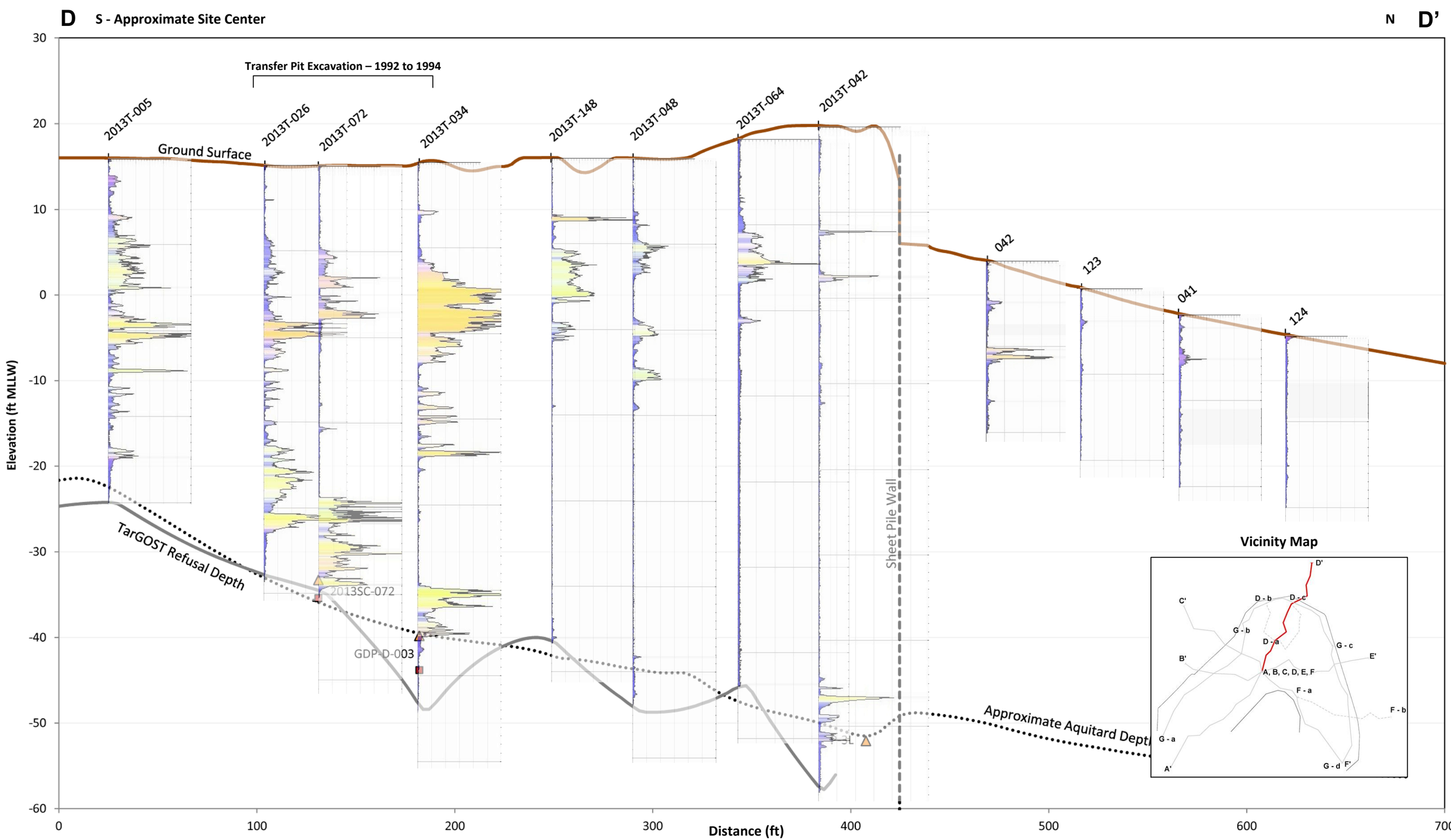


Figure 4-15

Fence Diagram D-D' with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

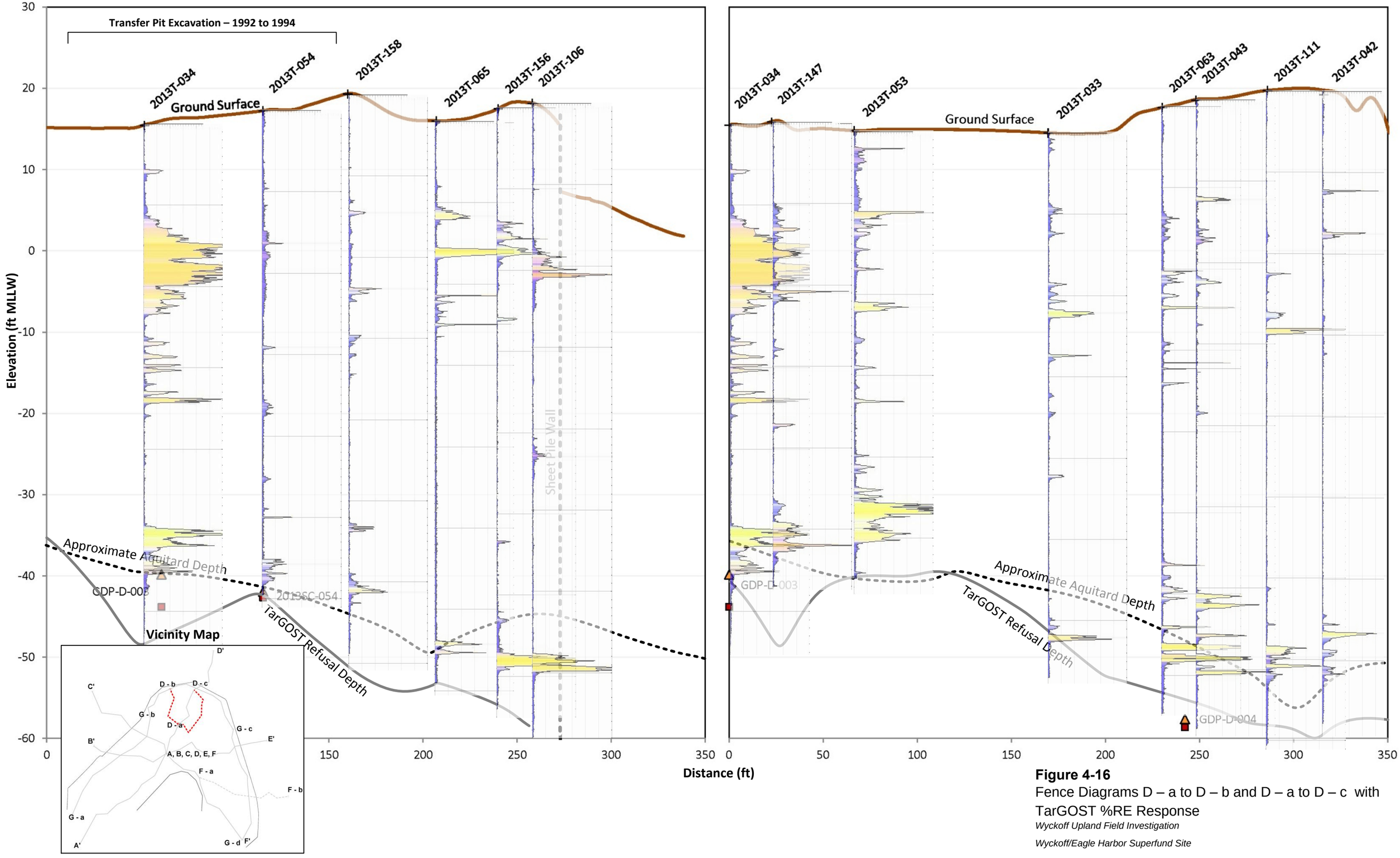


Figure 4-16
Fence Diagrams D – a to D – b and D – a to D – c with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

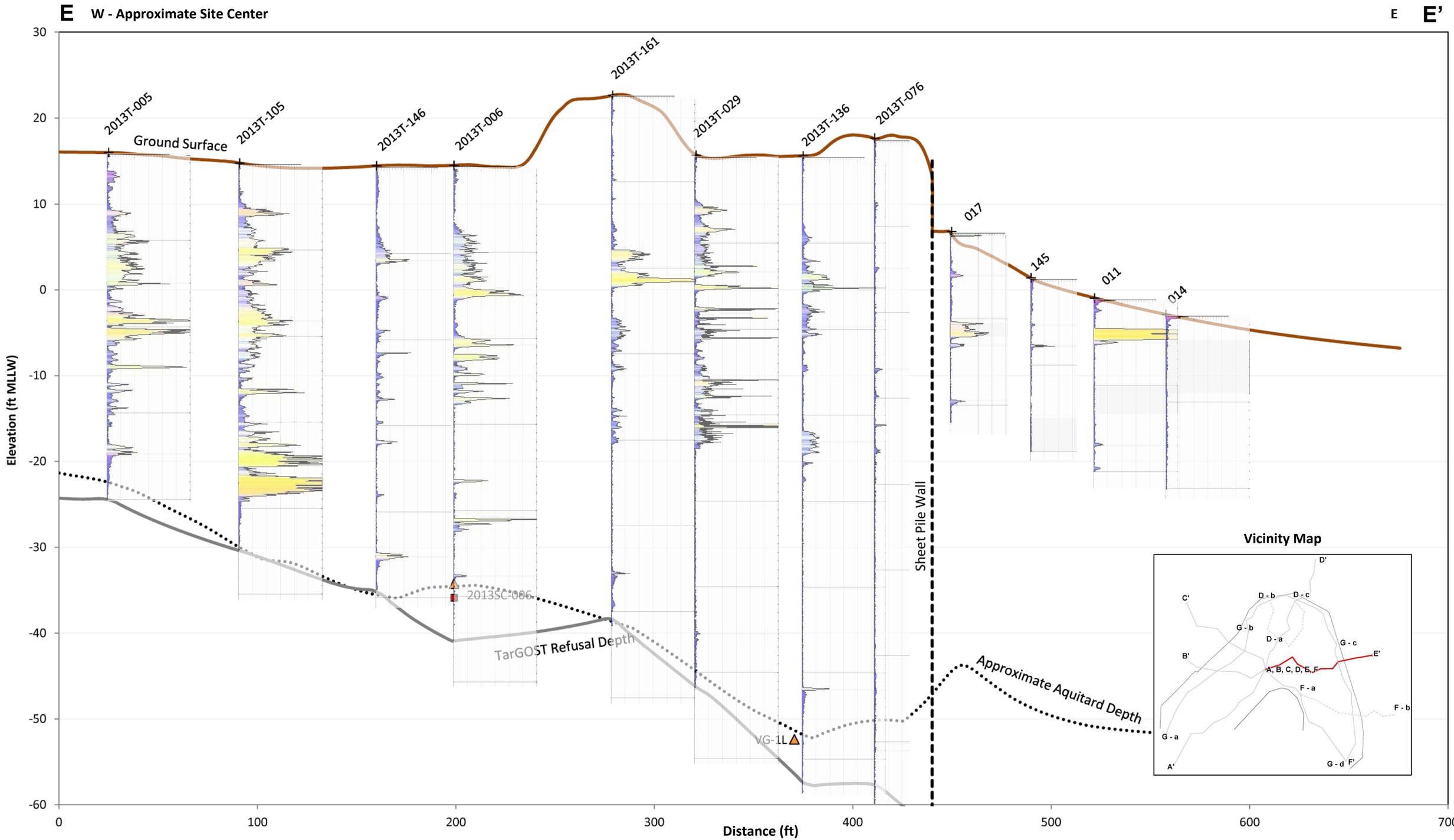


Figure 4-17

Fence Diagram E-E' with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

F NW - Approximate Site Center

SE **F'**

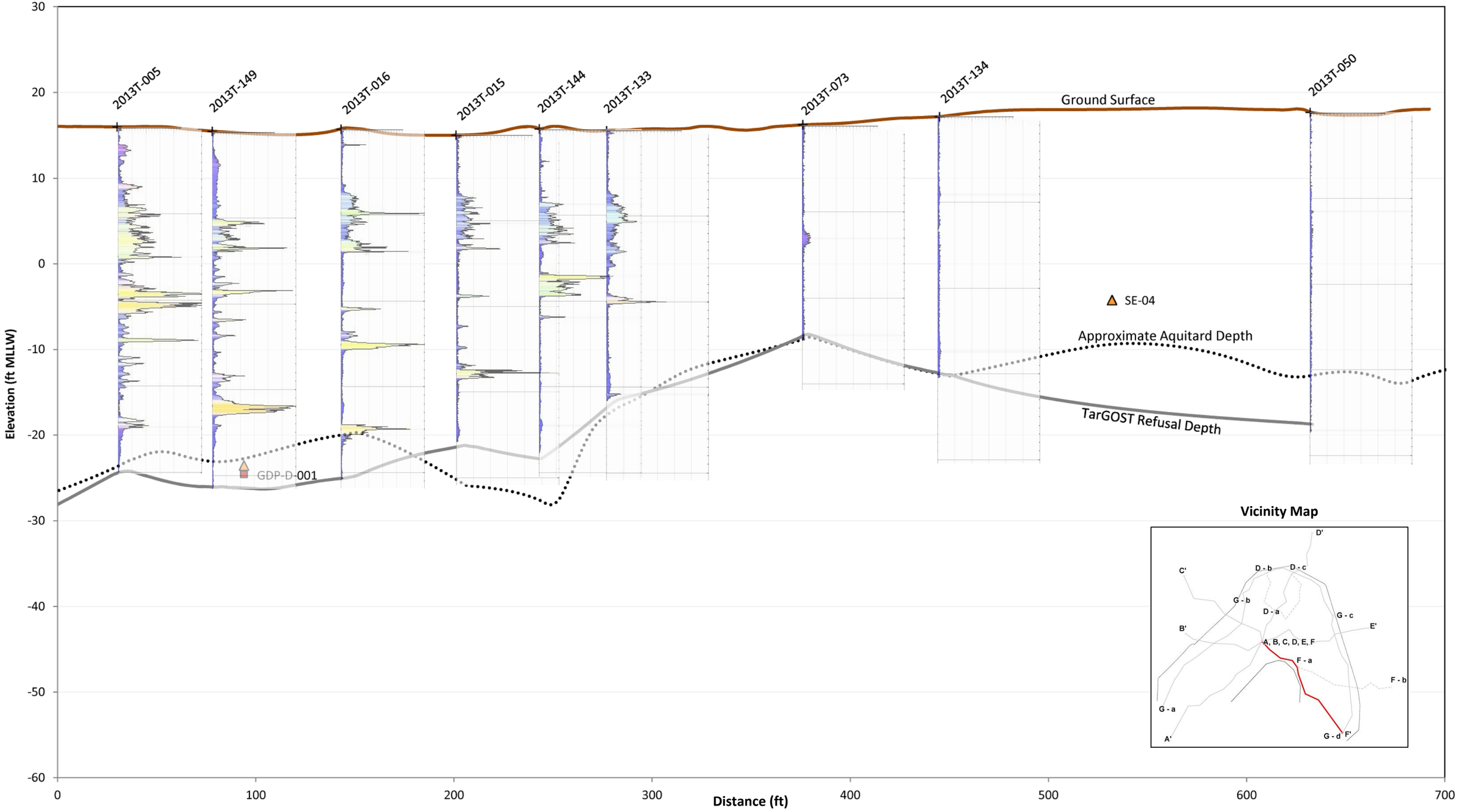


Figure 4-18

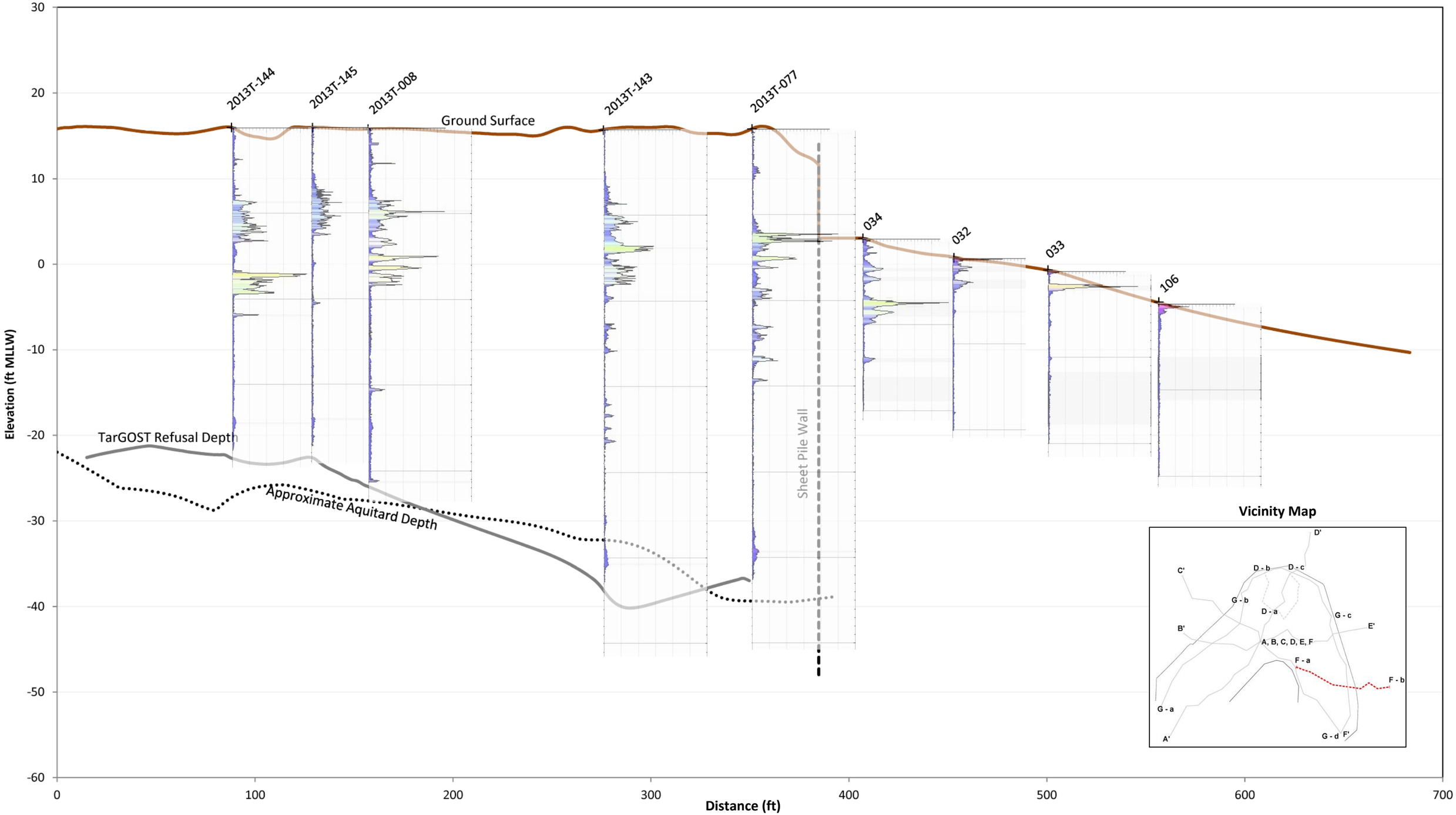
Fence Diagram F-F' with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

F - a W – Intersection with F-F'

E **F - b**



Vicinity Map

Figure 4-19

Fence Diagram F – a to F - b with TarGOST %RE Response

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site

PANEL 1

G-a SW — NE **G-b**

Transfer Pit Excavation – 1992 to 1994

2013T-153 | 2013T-101 **2013SC-101** | 2013T-121 | 2013T-122 | **CW13**, TEF = 2%, TEF[1] = 54% **CW14** **VG-4L**, TEF = 35% 2013T-046 **2013SC-046** | 2013T-104 | 2013T-037 **GDP-D-002-2** | **VG-3L**, TEF = 36% **VG-3U**, TEF = 22% | 2013T-140

Ground Surface

Non-pumping water table

TarGOST Refusal Depth

Approximate Aquitard Depth

30 ft

57 ft

Sheet Pile Wall Driven Elevation

53 ft

56 ft

77 ft

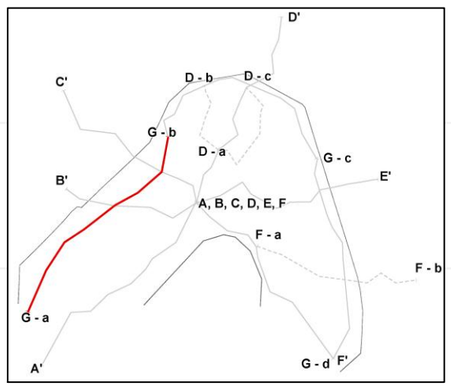
81 ft

42 ft

Elevation (ft MLLW)

Distance (ft)

Vicinity Map



Groundwater Level Non-pumping Conditions (measured September 3, 2012)

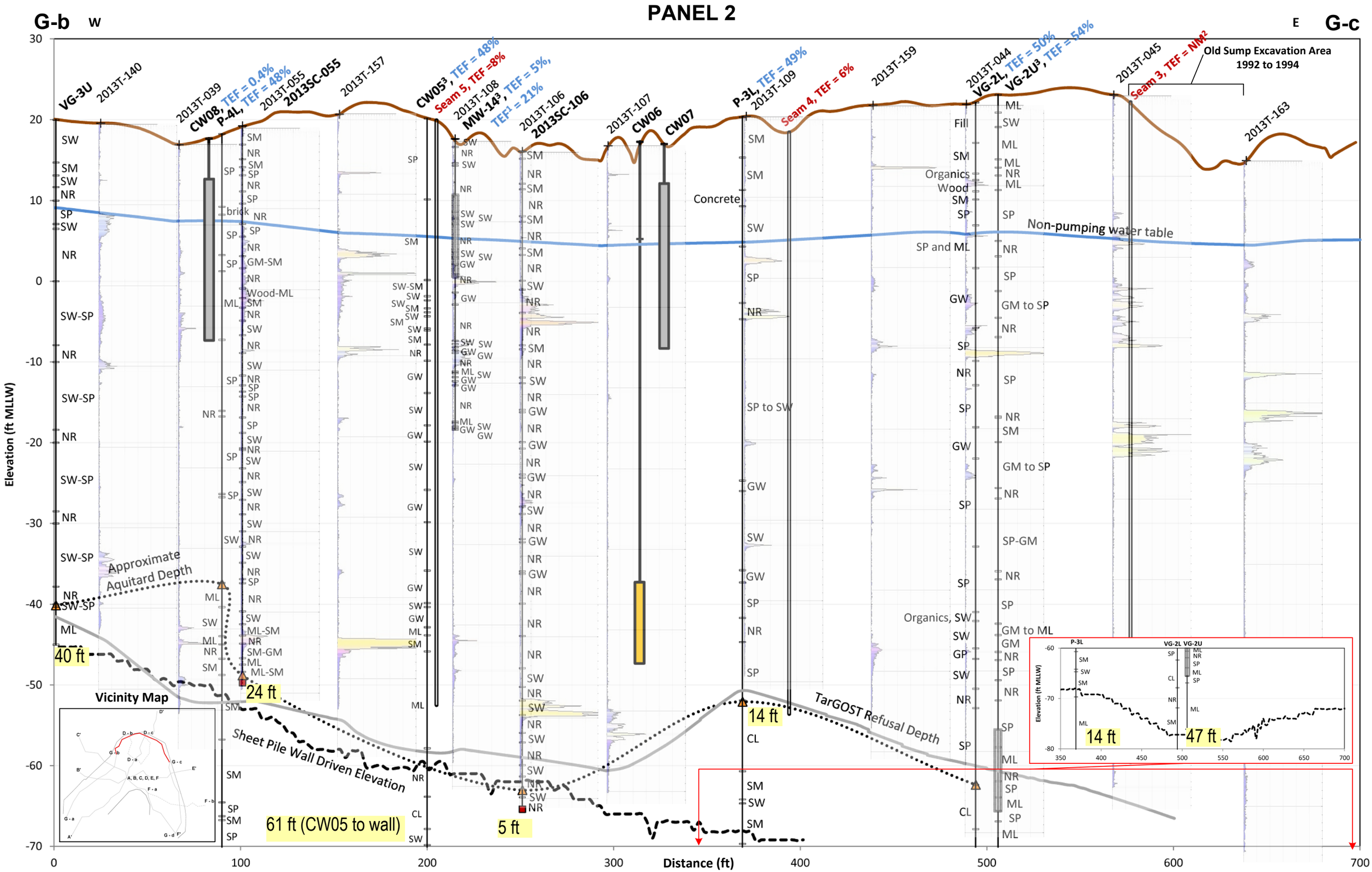
Monitoring well screened interval
Orange color-code = NAPL was observed in well during water level monitoring (9/12); Gray color-code = NAPL was not observed in well during water level monitoring (9/12)

Notes:
TEF = Tidal Efficiency Factor
[1]Historical TEF measured prior to sheet pile wall installation.
[2]Tidal efficiency could not be measured from available data.
[3]Projection distance from feature to sheet pile wall.

Figure 20 (Panels 1 – 3)
Fence Diagram G-a to G-b to G-c to G-d with TarGOST %RE Response

Wyckoff Sheet Pile Wall Investigation

Wyckoff/Eagle Harbor Superfund Site



PANEL 2
G-b
W
E
G-c
Elevation (ft MLLW)
Distance (ft)
VG-3U
2013T-140
2013T-039
CW08, TEF = 0.4%
P-4L, TEF = 48%
2013T-055
2013SC-055
2013T-157
CW05³, TEF = 48%
Seam 5, TEF =8%
2013T-108
MW-14³, TEF = 5%,
TEF¹ = 21%
2013T-106
2013SC-106
2013T-107
CW06
CW07
P-3L, TEF = 49%
2013T-109
Seam 4, TEF = 6%
2013T-159
2013T-044
VG-2L, TEF = 50%
VG-2U³, TEF = 54%
2013T-045
Seam 3, TEF = NM²
Old Sump Excavation Area
1992 to 1994
2013T-163
Non-pumping water table
Approximate
Aquitard Depth
Sheet Pile Wall Driven Elevation
TarGOST Refusal Depth
40 ft
24 ft
61 ft (CW05 to wall)
5 ft
14 ft
14 ft
47 ft
Vicinity Map
Concrete
Organics
Wood
Fill
SP and ML
GM to SP
SP to SW
SP-GM
GM to ML
Organics, SW

PANEL 3

G-c N — S G-d

Elevation (ft MLLW)

Distance (ft)

2013T-163 | P-2L, TEF = 51% | 2013T-036 | 2013SC-036 | 2013T-076 | PO13, TEF = 4% | VG-1L[3], TEF = 46% | 2013T-010 | Seam 2, TEF = 3% | CW10 | 2013T-139 | 2013T-162 | EW-07 | P-1L, TEF = 54% | 2013T-138 | Seam 1, TEF = 9% | 2013T-077 | RPW7 | PO18 | CW02, TEF = 53% | CW03, TEF = 27% | 2013T-051 | SE-02[3], TEF = 52% | 2013T-050 | PZ-03, TEF = 24%

Ground Surface

Non-pumping water table

TarGOST Refusal Depth

Sheet Pile Wall Driven Elevation

Approximate Aquitard Depth

42 ft

19 ft - SE-02 to wall

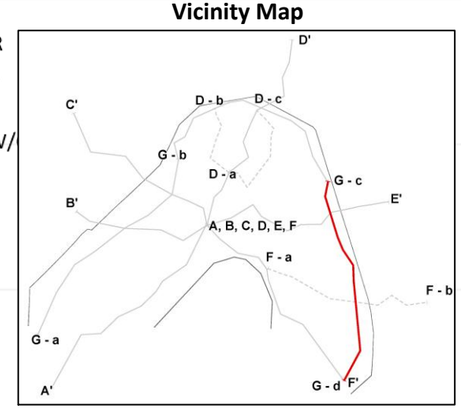
45 ft

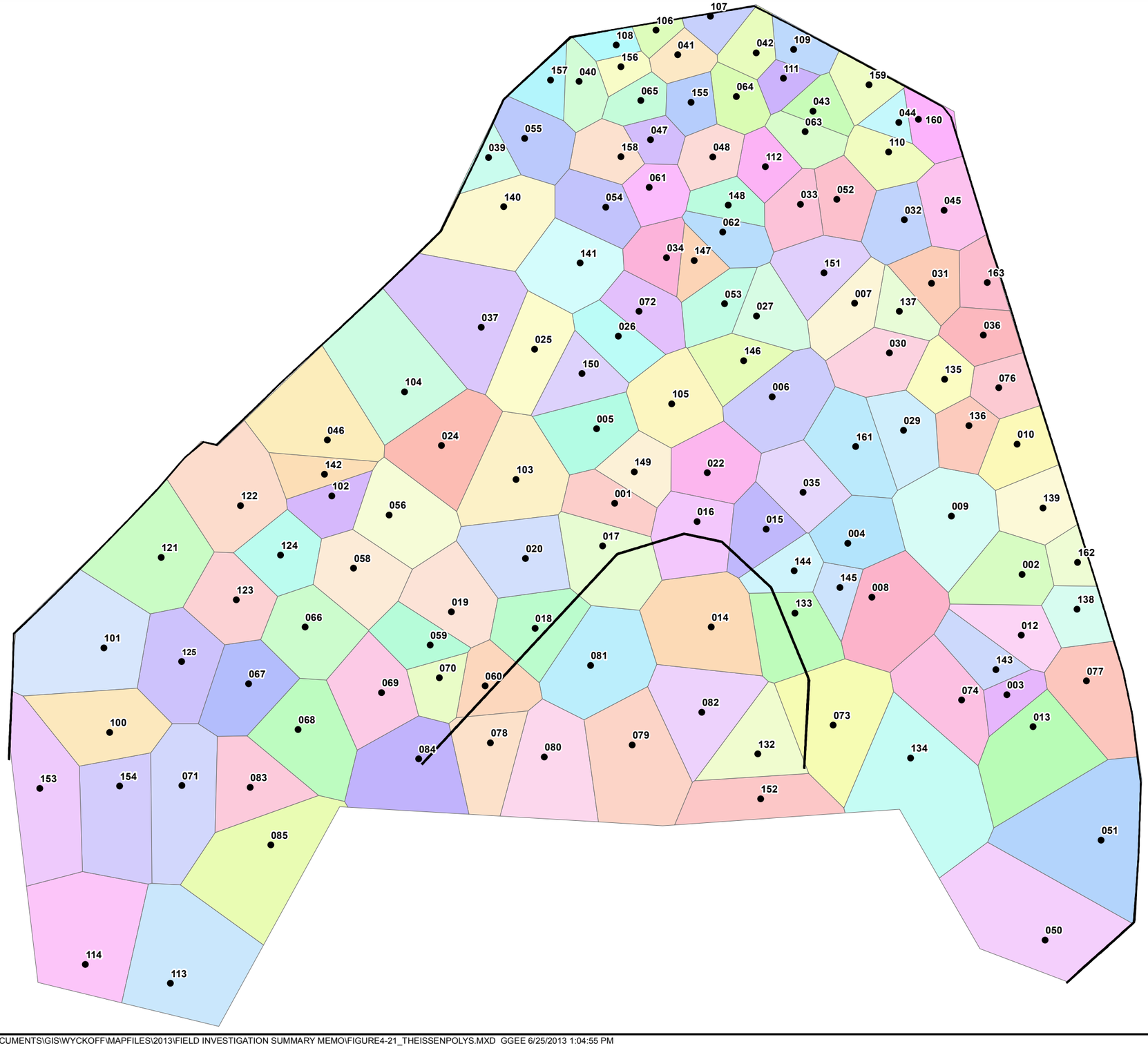
8 ft - P-1L to wall

70 ft - VG-1L to wall

10 ft

Vicinity Map





LEGEND

- TarGOST Phase 1 and 2
- Theissen Polygon
- Sheet Pile Wall

Note
Labels for TarGOST Phase 1 and 2 locations shown without 2013T-* prefix.

N

0 50 100 200 Feet

Figure 4-21
Thiessen Polygons for Volume Estimate Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-21_THEISSENPOLYS.MXD GGEE 6/25/2013 1:04:55 PM

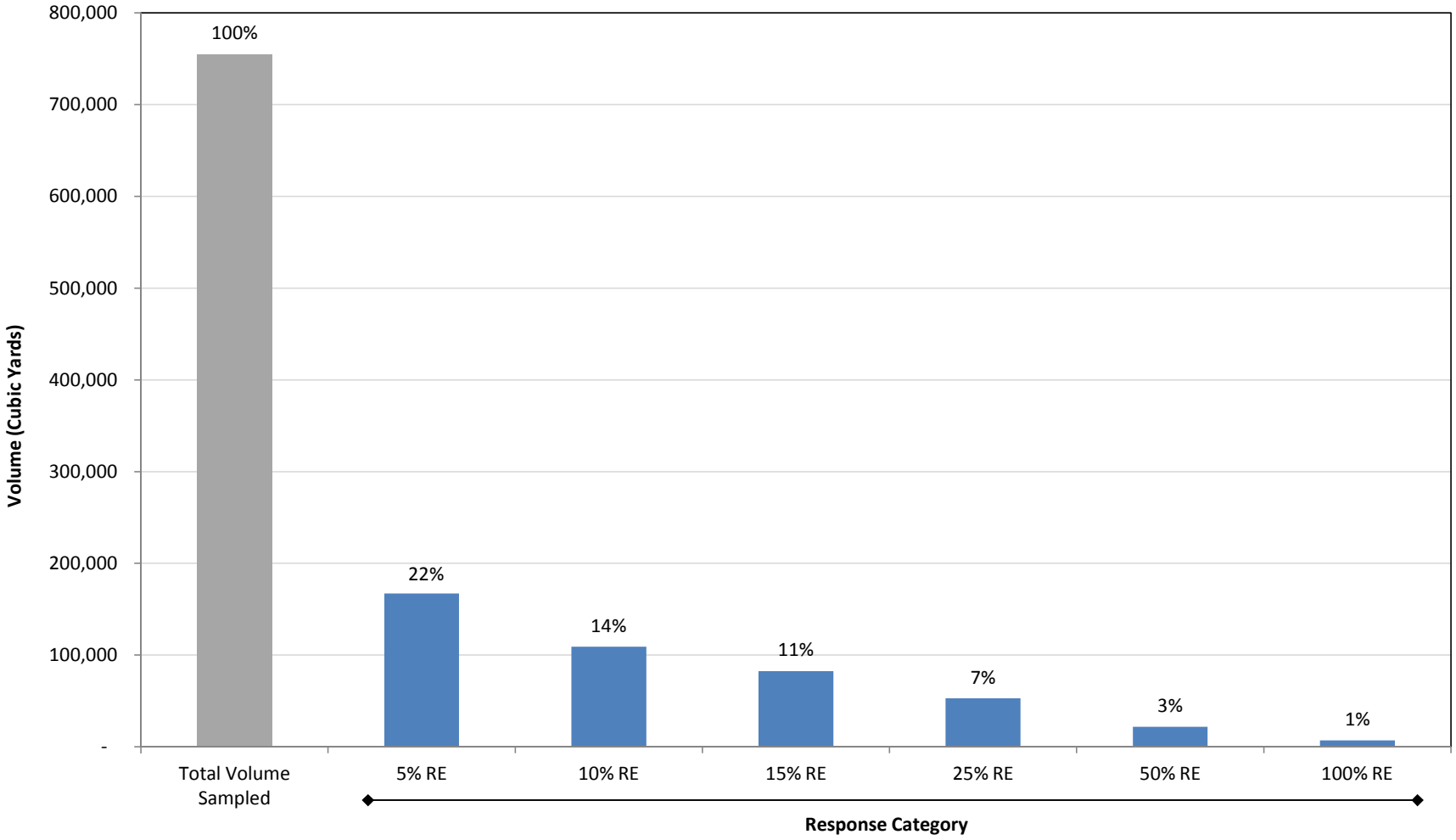
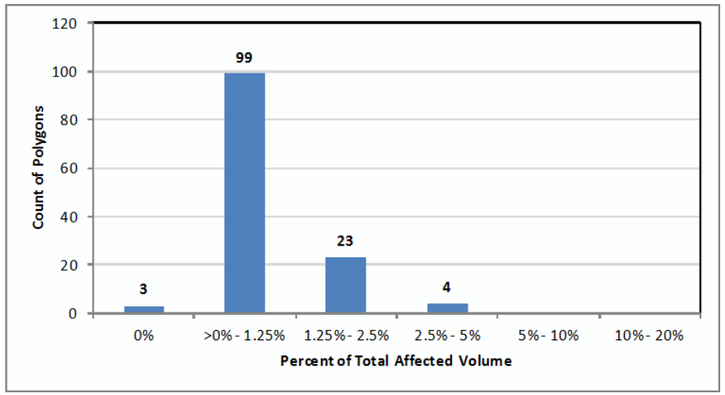


Figure 4-22

Total Sampled Volume Compared with the Total NAPL-Impacted Volume by Response Category

Wyckoff Upland Field Investigation

Wyckoff/Eagle Harbor Superfund Site



5%RE

LEGEND

Percent of Total Affected Volume
(Area of polygons within each class)

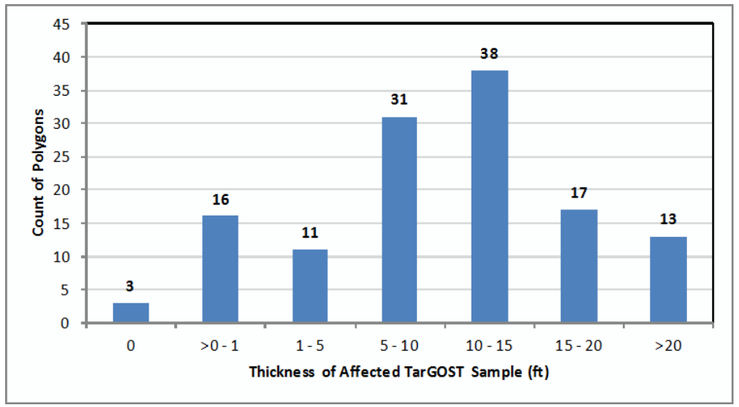
0%	(0.6 acres)
>0% - 1.25%	(7.7 acres)
1.25% - 2.5%	(2.3 acres)
2.5% - 5%	(0.5 acres)
5% - 10%	(0 acres)
10% - 20%	(0 acres)
Sheet Pile Wall	

N

0 50 100 200 Feet

Figure 4-23
Thiessen Polygon Volume Estimate
5%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-23_THEISSENPOLYS5RE.MXD GGEE 9/6/2013 9:11:37 AM



5%RE

LEGEND

Thickness of Affected TarGOST Sample (ft)

(Area of polygons within each class)

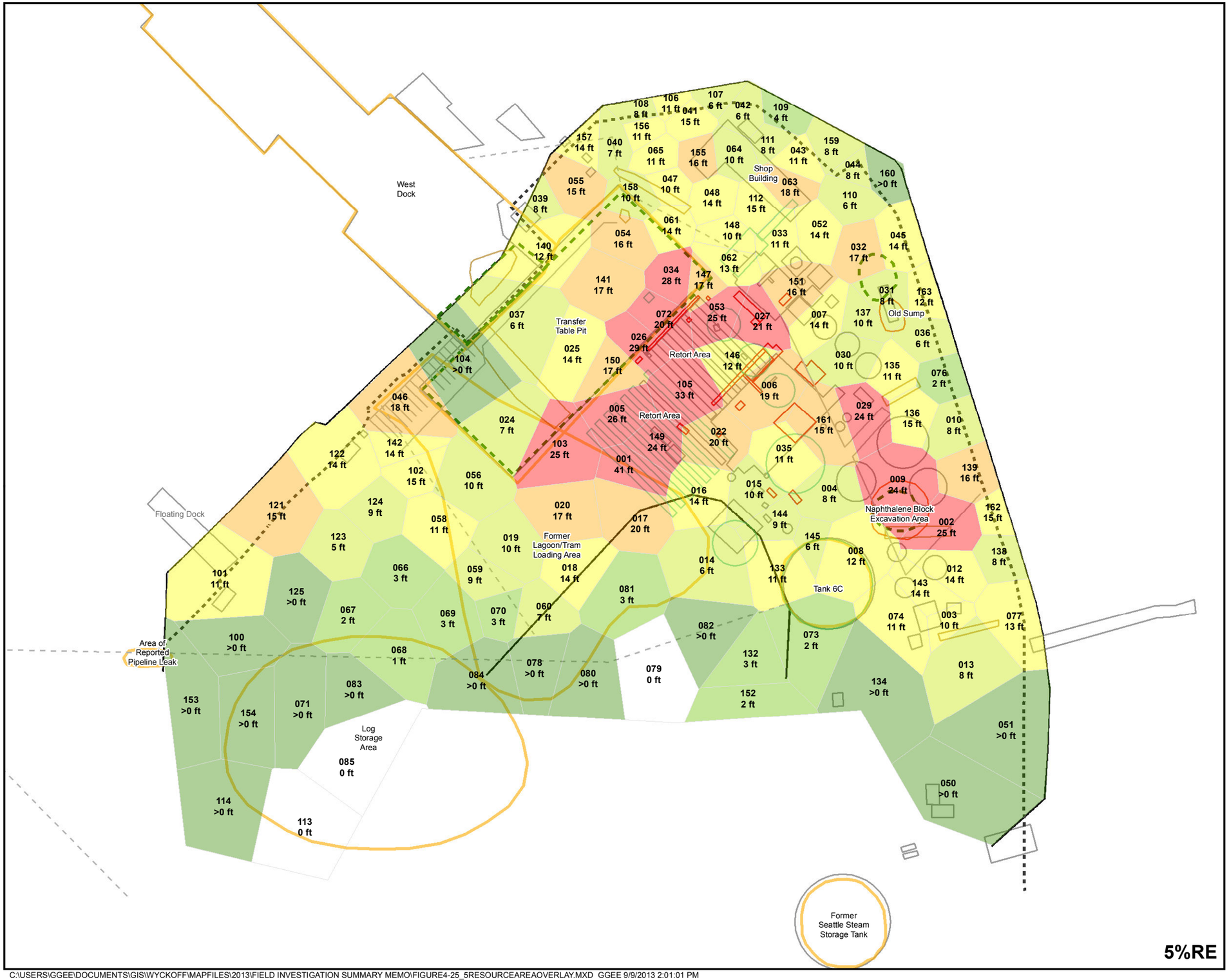
0	(0.6 acres)
>0 - 1	(2.3 acres)
1 - 5	(1.0 acres)
5 - 10	(2.1 acres)
10 - 15	(2.6 acres)
15 - 20	(1.4 acres)
>20	(1.0 acres)
Sheet Pile Wall	

N

0 50 100 200 Feet

Figure 4-24
Thickness of Affected TarGOST Samples
5%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-24_THEISSENTHICK5RE.MXD GGEE 9/6/2013 8:54:02 AM



LEGEND

Thickness of Affected TarGOST Sample (ft)

(Area of polygons within each class)

- 0 (0.6 acres)
- >0 - 1 (2.3 acres)
- 1 - 5 (1.0 acres)
- 5 - 10 (2.1 acres)
- 10 - 15 (2.6 acres)
- 15 - 20 (1.4 acres)
- >20 (1.0 acres)
- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Site Remediation Excavation Performed in 1992 through 1994
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Bulk Head Prior to Current Sheet Pile Wall
- Current Sheet Pile Wall

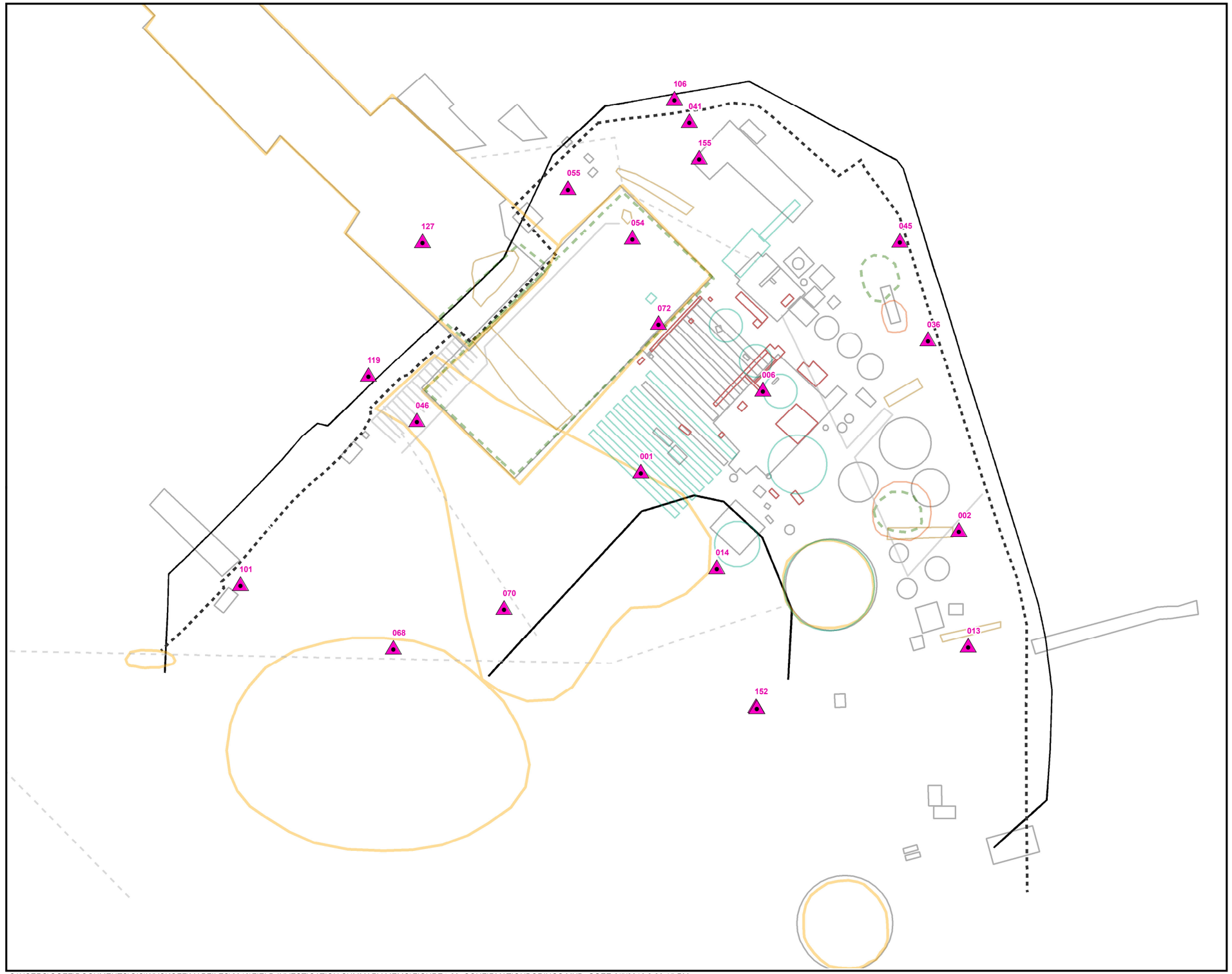
Sources:
Bulk Head Prior to Current Sheet Pile Wall digitized from current sheet pile wall design drawings (USACE, 2000)
Some sumps and trenches were digitized from "Figure 1 Site Location" (Environment and Ecology, 1995)
Sumps and Trenches were digitized from "Figure B Area 1 Trenches and Sumps"; "Figure C Area 2 Drums, Sumps, 7 Tanks"; "Figure D Area 3 Containers, Drums, Sumps, Tanks & Trenches" (Environment and Ecology, 1995)
Secondary NAPL Source Locations digitized from "Figure 2-1 Wycoff Site Vicinity Map" (CH2M HILL, 1993)
Trenching observations digitized from 1989 hand markup.
Prioritizing of source areas conducted 2012.
Prior remediation excavation areas from 1992 through 1994 digitized from Ecology and Environment, Inc., 1995.

N

0 60 120 240 Feet

Figure 4-25
Thickness of Affected TarGOST Samples
5%RE with Source Areas Shown
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-25_5RESOURCEAREAOVERLAY.MXD GGEE 9/9/2013 2:01:01 PM



LEGEND

- Confirmation Boring
- Historic Features
- Historic Features Identified from 1917 Sandborn Map
- Site Remediation Excavation Performed in 1992 through 1994
- Potential Primary NAPL Sources (Sumps, Trenches, and other features with observed contamination)
- Potential Secondary NAPL Source Areas
- Trenching and other features of interest identified in April 1989 Map
- Bulk Head Prior to Current Sheet Pile Wall
- Current Sheet Pile Wall

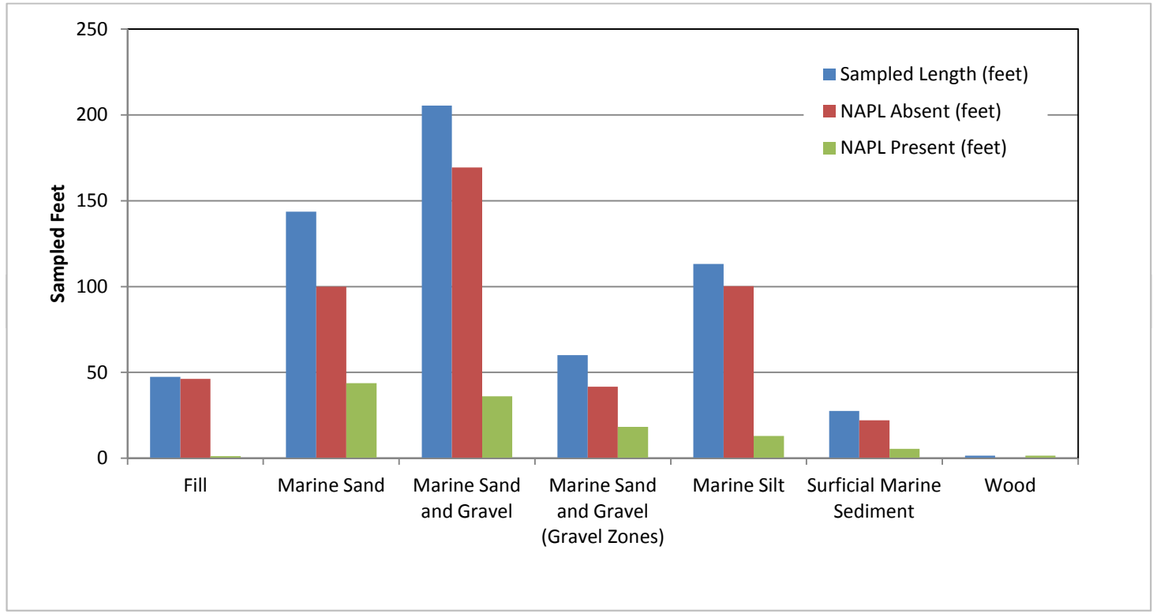
Sources:
Bulk Head Prior to Current Sheet Pile Wall
digitized from current sheet pile wall design drawings
(USACE, 2000)
Some sumps and trenches were digitized from
"Figure 1 Site Location" (Environment and Ecology, 1995)
Sumps and Trenches were digitized from
"Figure B Area 1 Trenches and Sumps";
"Figure C Area 2 Drums, Sumps, 7 Tanks"; "Figure D
Area 3 Containers, Drums, Sumps, Tanks & Trenches"
(Environment and Ecology, 1995)
Secondary NAPL Source Locations digitized from
"Figure 2-1 Wycoff Site Vicinity Map" (CH2M HILL, 1993)
Trenching observations digitized from 1989 hand markup.
Prioritizing of source areas conducted 2012.
Prior remediation excavation areas from 1992 through 1994
digitized from Ecology and Environment, Inc., 1995.

N

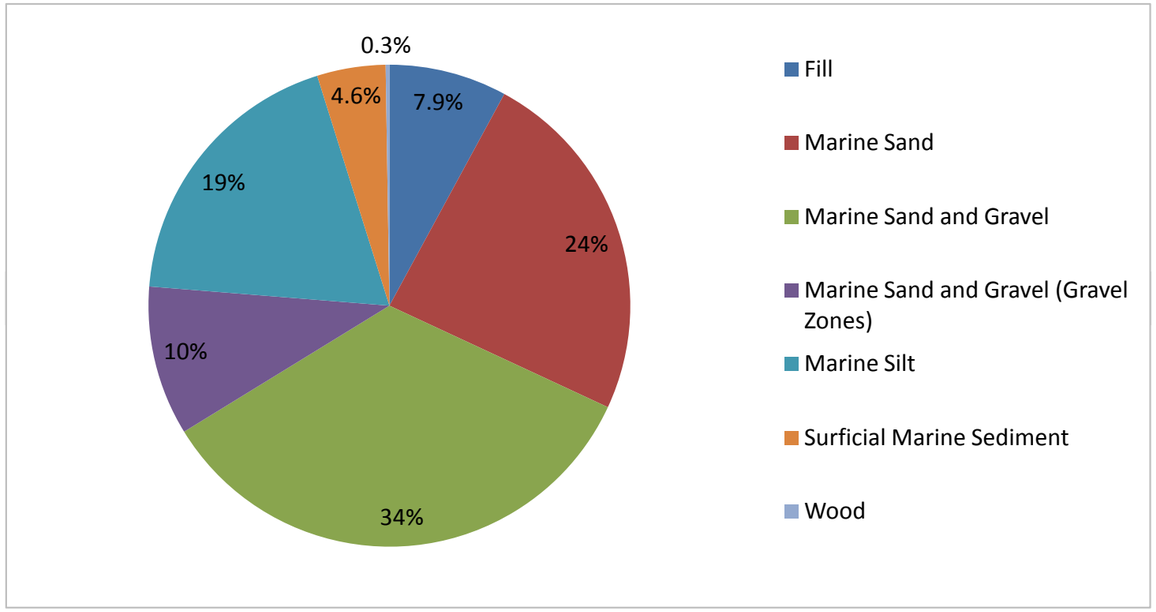
0 60 120 240 Feet

Figure 4-26
Confirmation Boring Locations
TarGOST Field Investigation
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

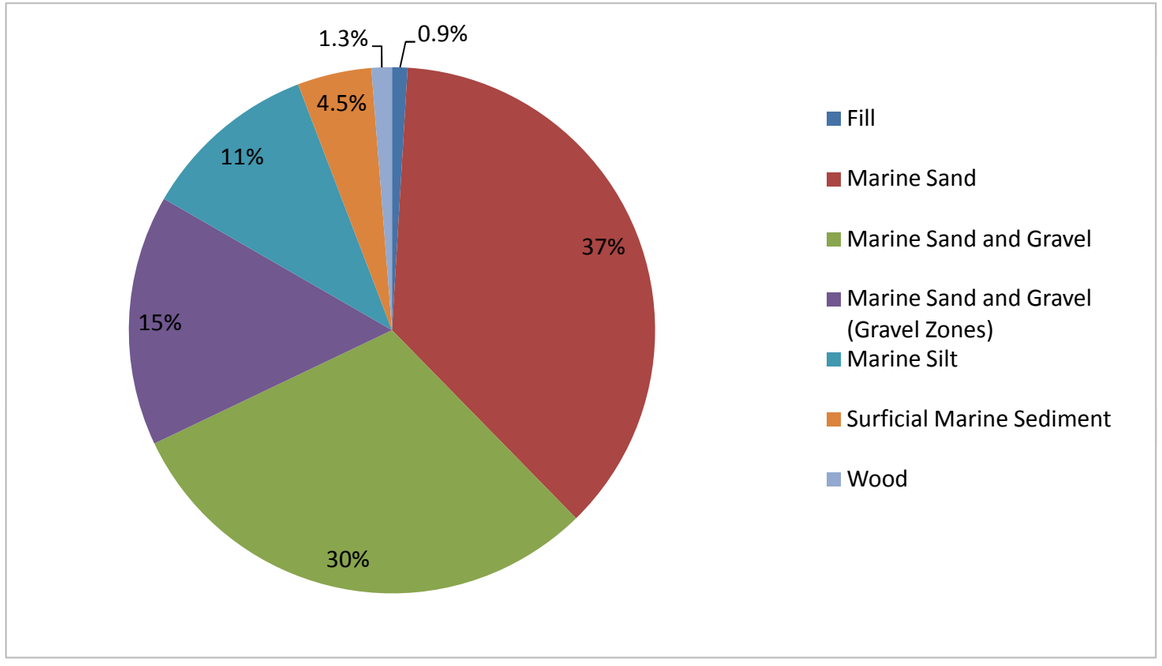
C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURE4-20_CONFIRMATIONBORINGS.MXD GGEE 6/5/2013 2:20:15 PM



Summary of Lithology and NAPL Absence/Presence by feet



Summary of Lithology by Percentage of Confirmation Boring Footage

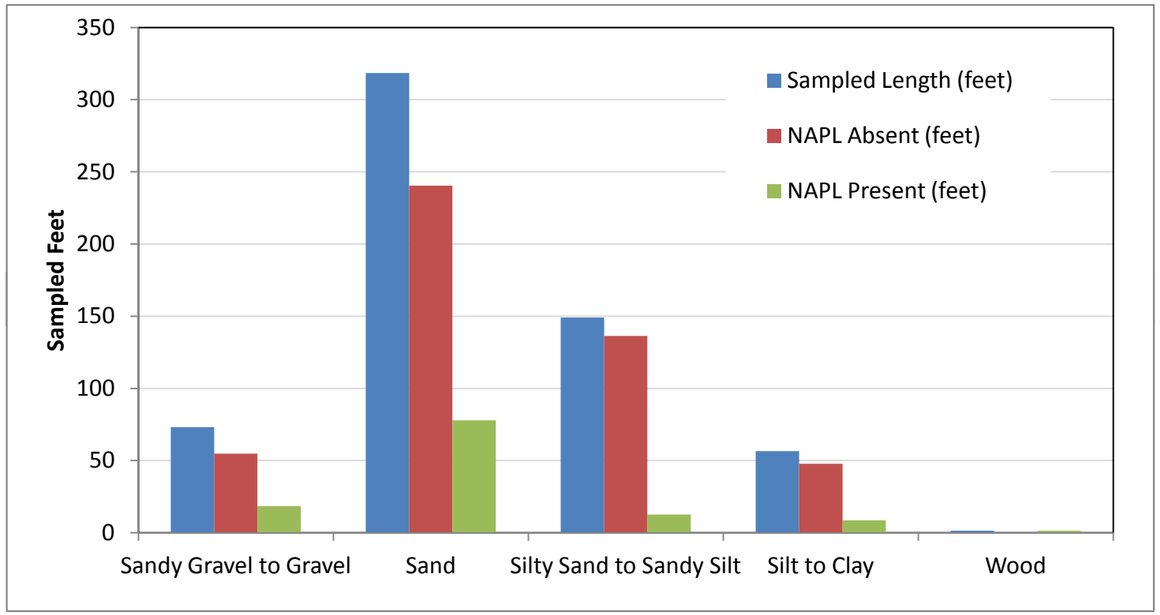


Summary of NAPL Presence in Lithology by Total Observed NAPL

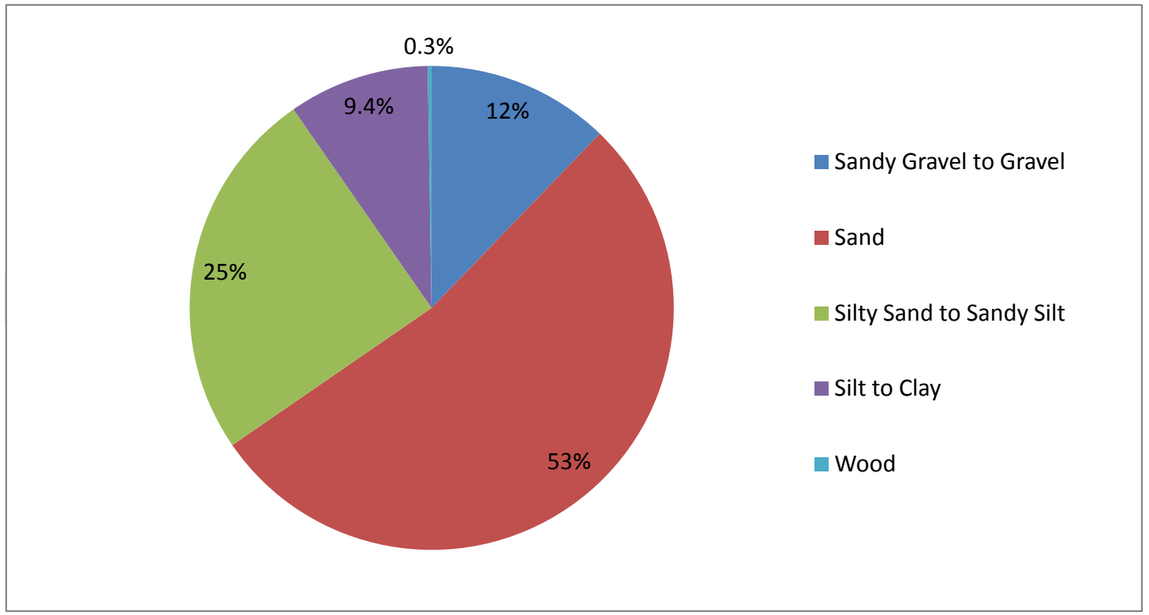
Data Table

Lithology	Sampled Length (feet)	NAPL Absent (feet)	NAPL Present (feet)
Fill	47	46	1.1
Marine Sand	144	100	44
Marine Sand and Gravel	205	169	36
Marine Sand and Gravel (Gravel Zones)	60	42	18
Marine Silt	113	100	13
Surficial Marine Sediment	27	22	5.4
Wood	1.5	0	1.5
Grand Total	**598**	**479**	**119**

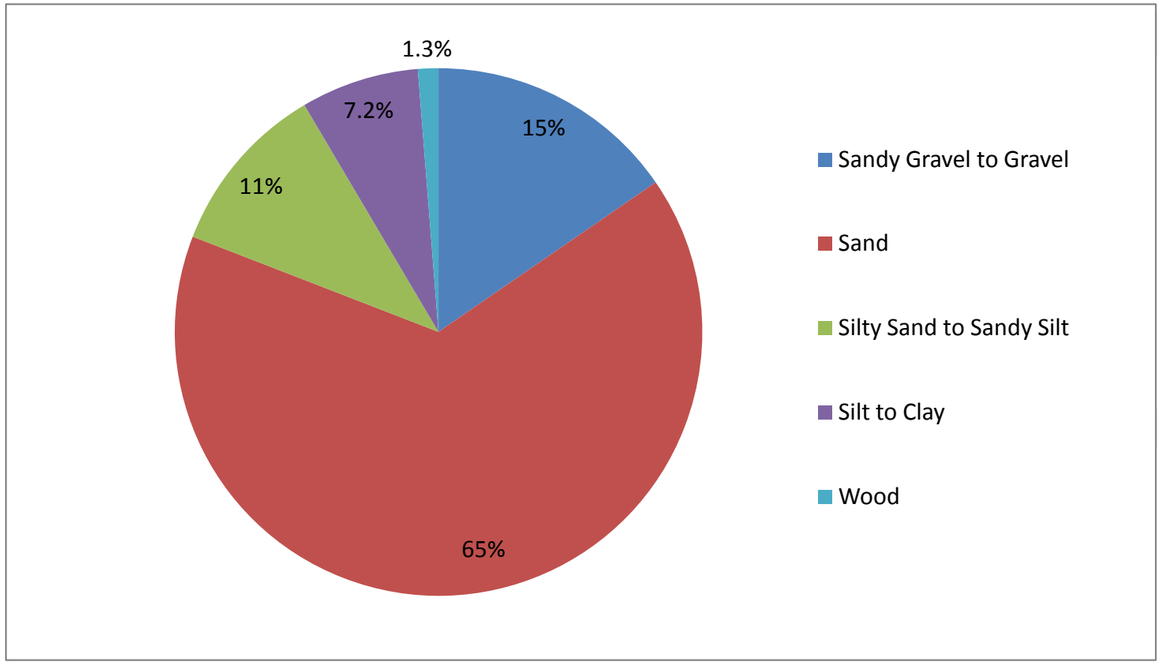
Figure 4-27
Confirmation Boring Lithology and NAPL Observations
by Historical Geologic Unit Descriptions
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site



Summary of Lithology and NAPL Absence/Presence by feet



Summary of Lithology by Percentage of Confirmation Boring Footage



Summary of NAPL Presence in Lithology by Total Observed NAPL

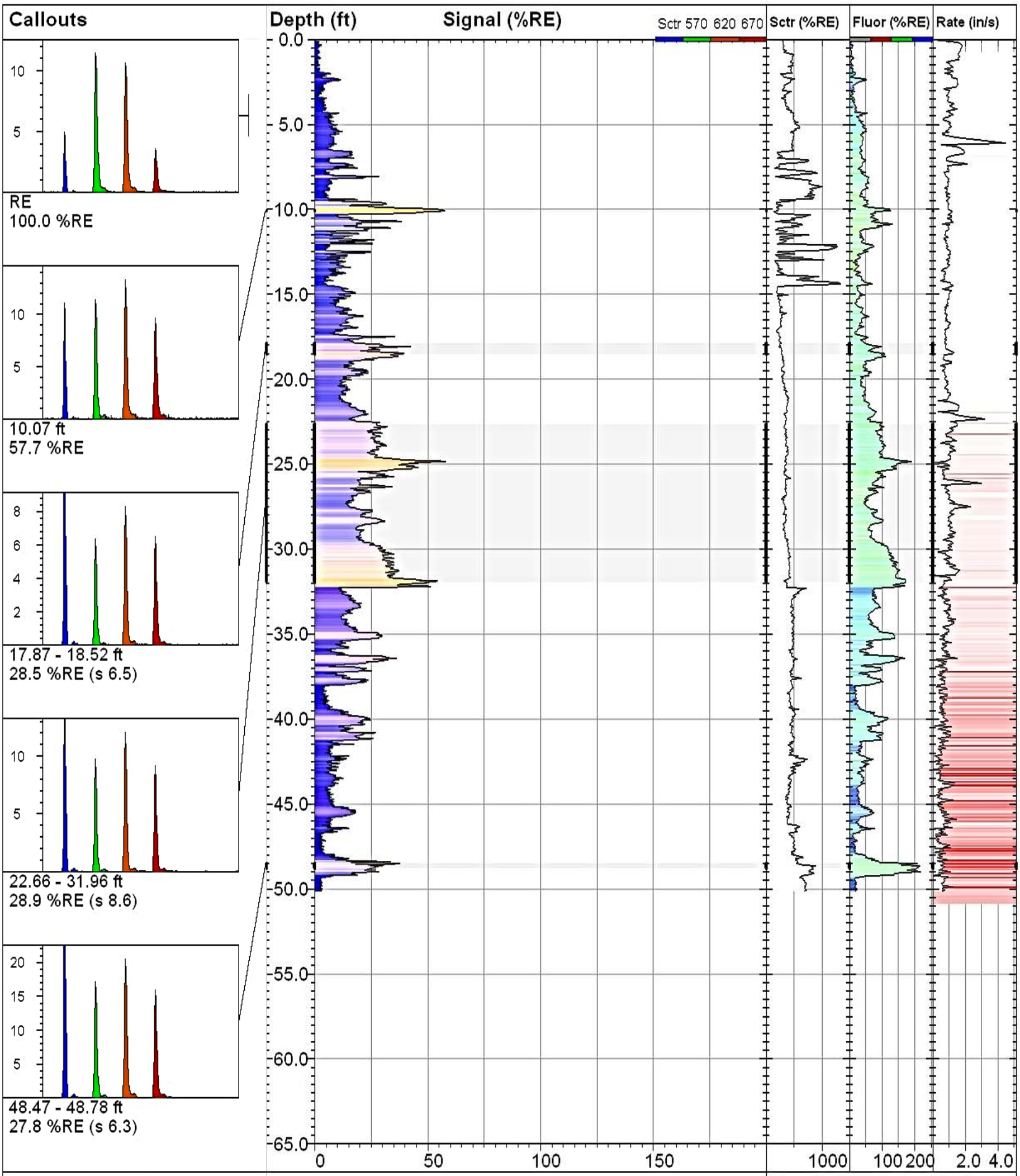
Data Table

Lithology	Sampled Length (feet)	NAPL Absent (feet)	NAPL Present (feet)
Sandy Gravel to Gravel	73	55	18
Sand	318	240	78
Silty Sand to Sandy Silt	149	136	13
Silt to Clay	56	48	8.6
Wood	1.5	0.0	1.5
Grand Total	**598**	**479**	**119**

Figure 4-28
Confirmation Boring Lithology and NAPL Observations
by Selected USCS Soil Classes
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

Appendix A
TarGOST Exploration Data

Appendix A-1
Raw TarGOST Data Logs



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2013T-001

TarGOST By Dakota
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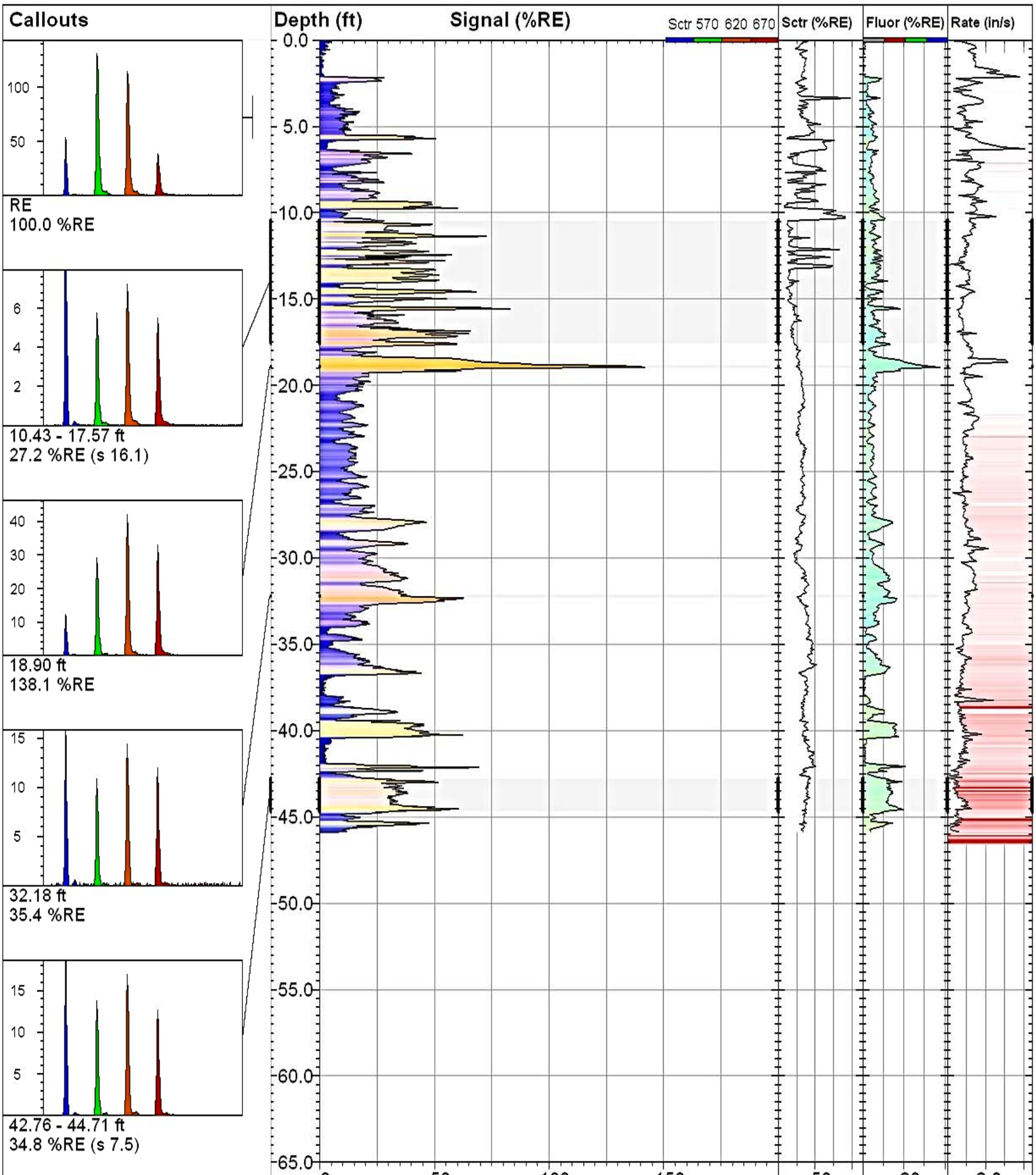
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **50.12 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **58.2 %RE @ 24.85 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-15 13:56 PST**



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2013T-001R

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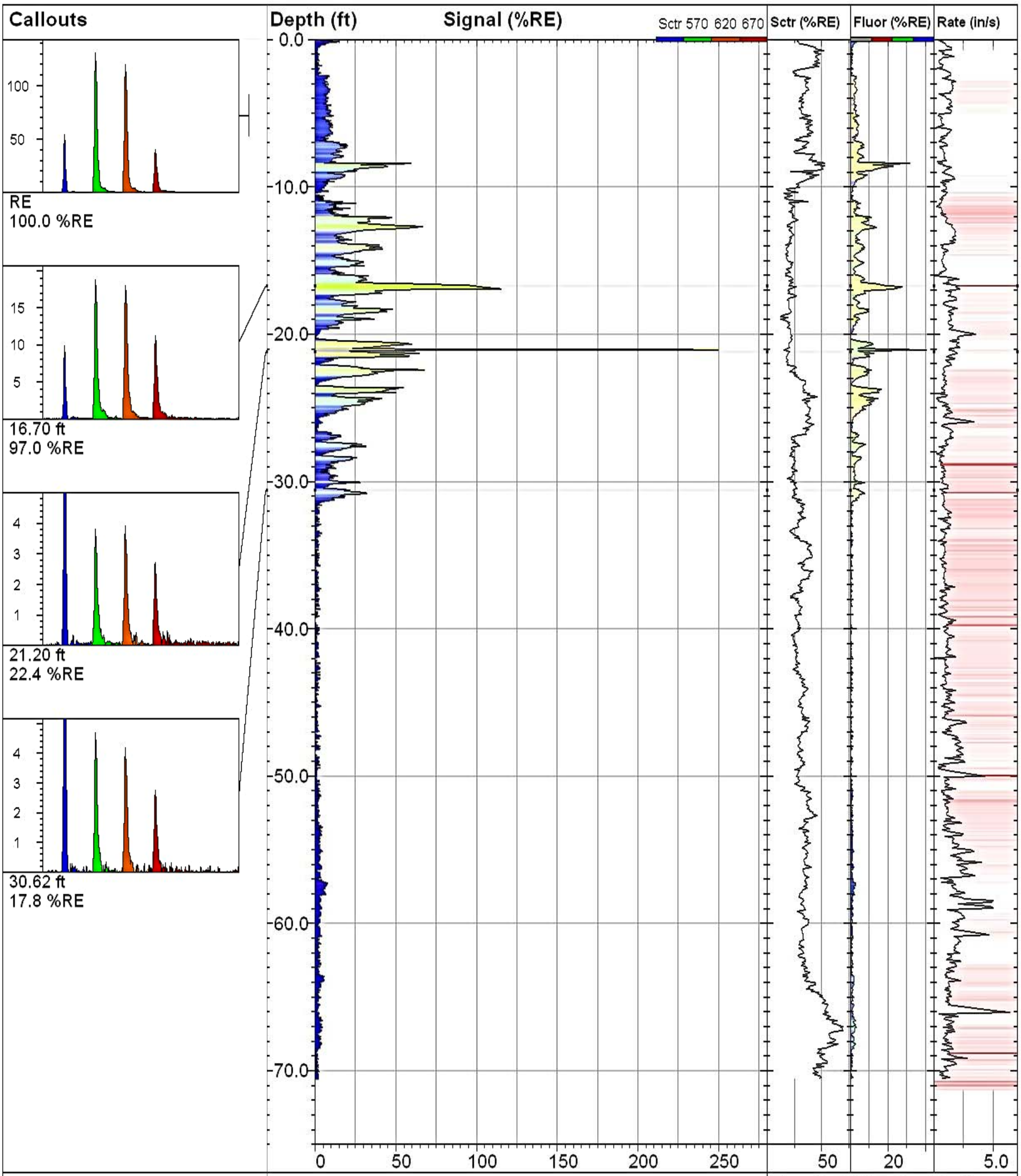
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **45.89 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **142.1 %RE @ 18.96 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-15 14:48 PST**



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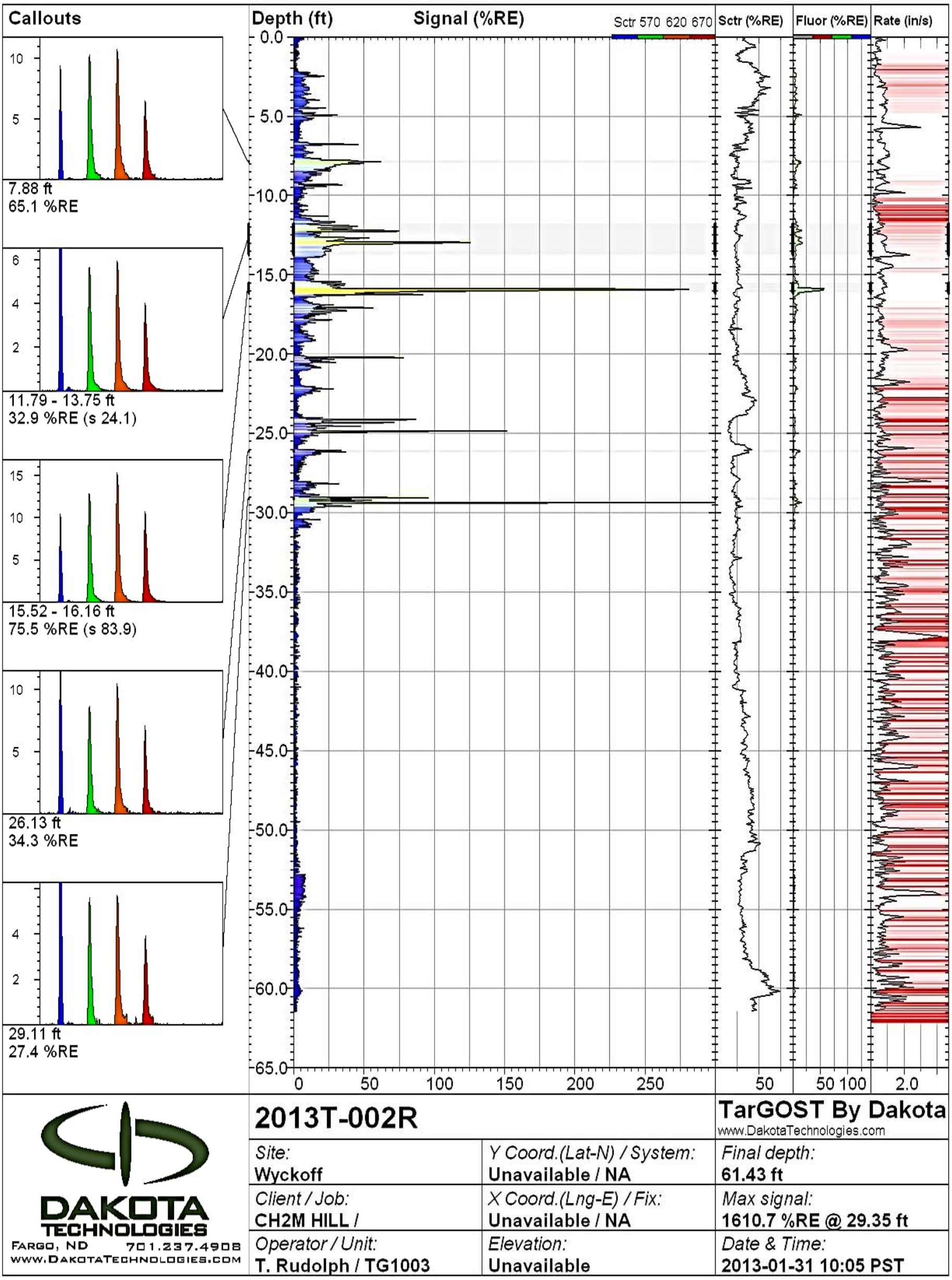
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **70.58 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **257.6 %RE @ 21.06 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-14 13:54 PST**



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2013T-002R

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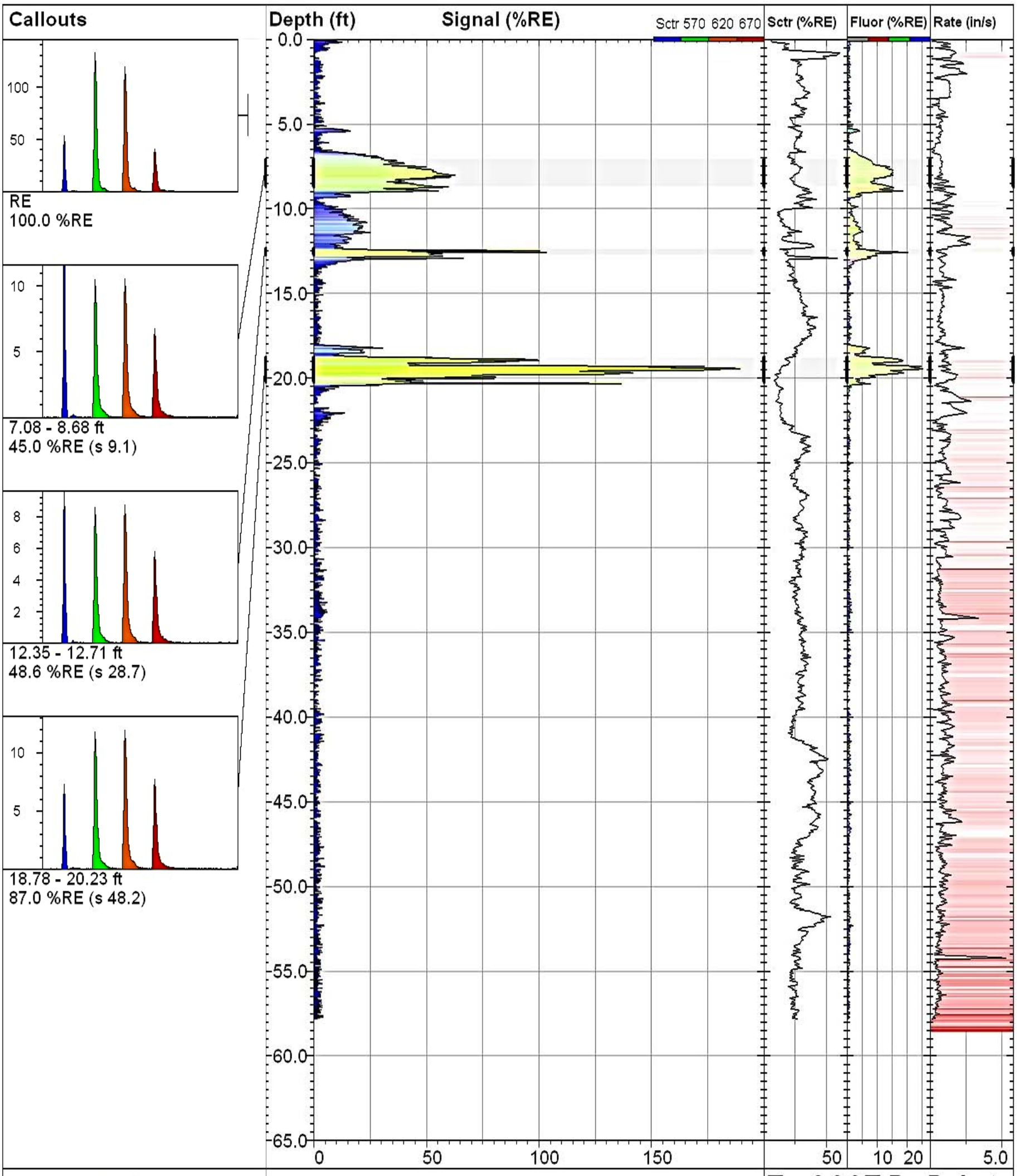
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **61.43 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **1610.7 %RE @ 29.35 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 10:05 PST**



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2013T-003

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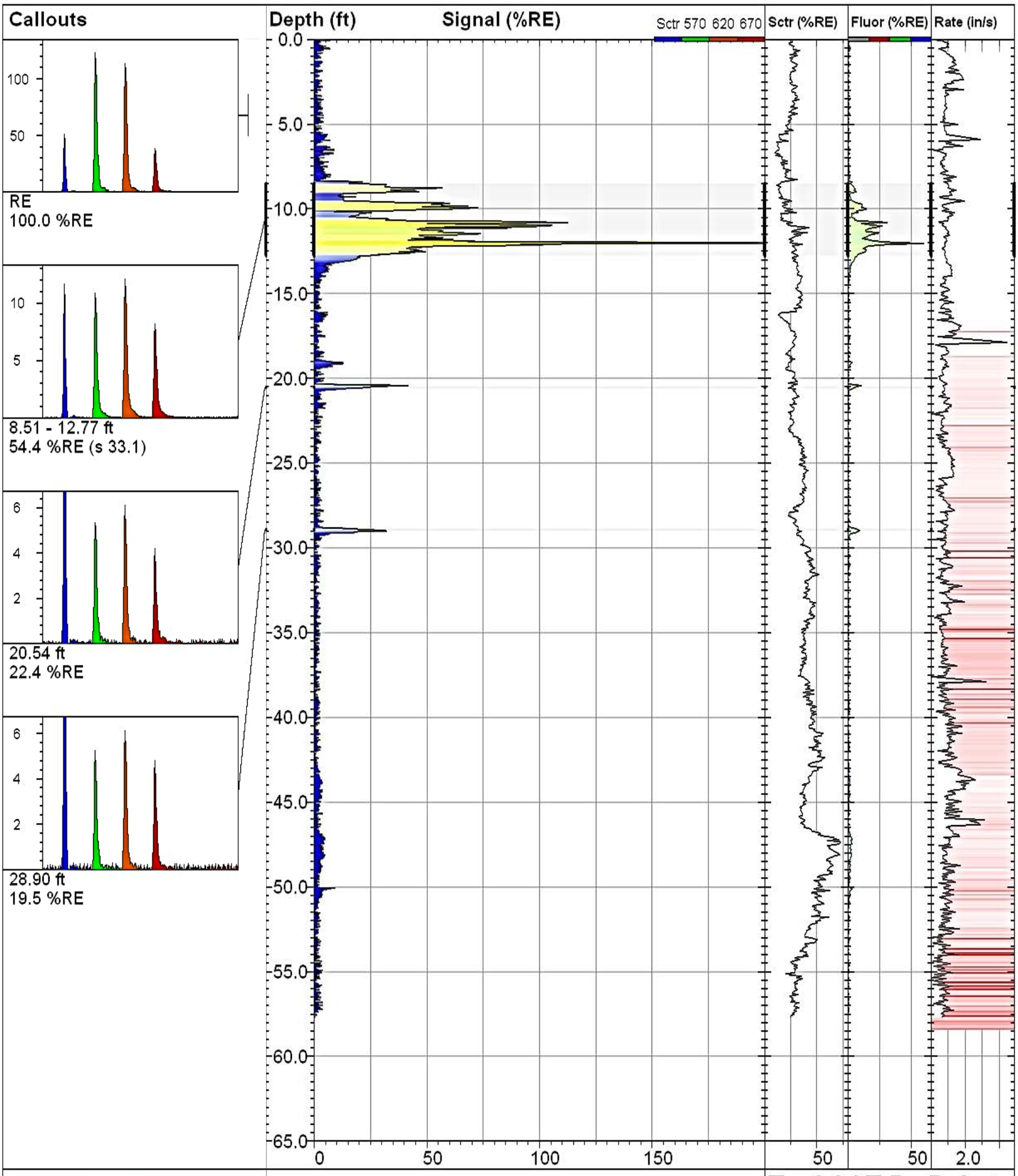
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **57.84 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **189.5 %RE @ 19.43 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-14 13:37 CST**



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2013T-004

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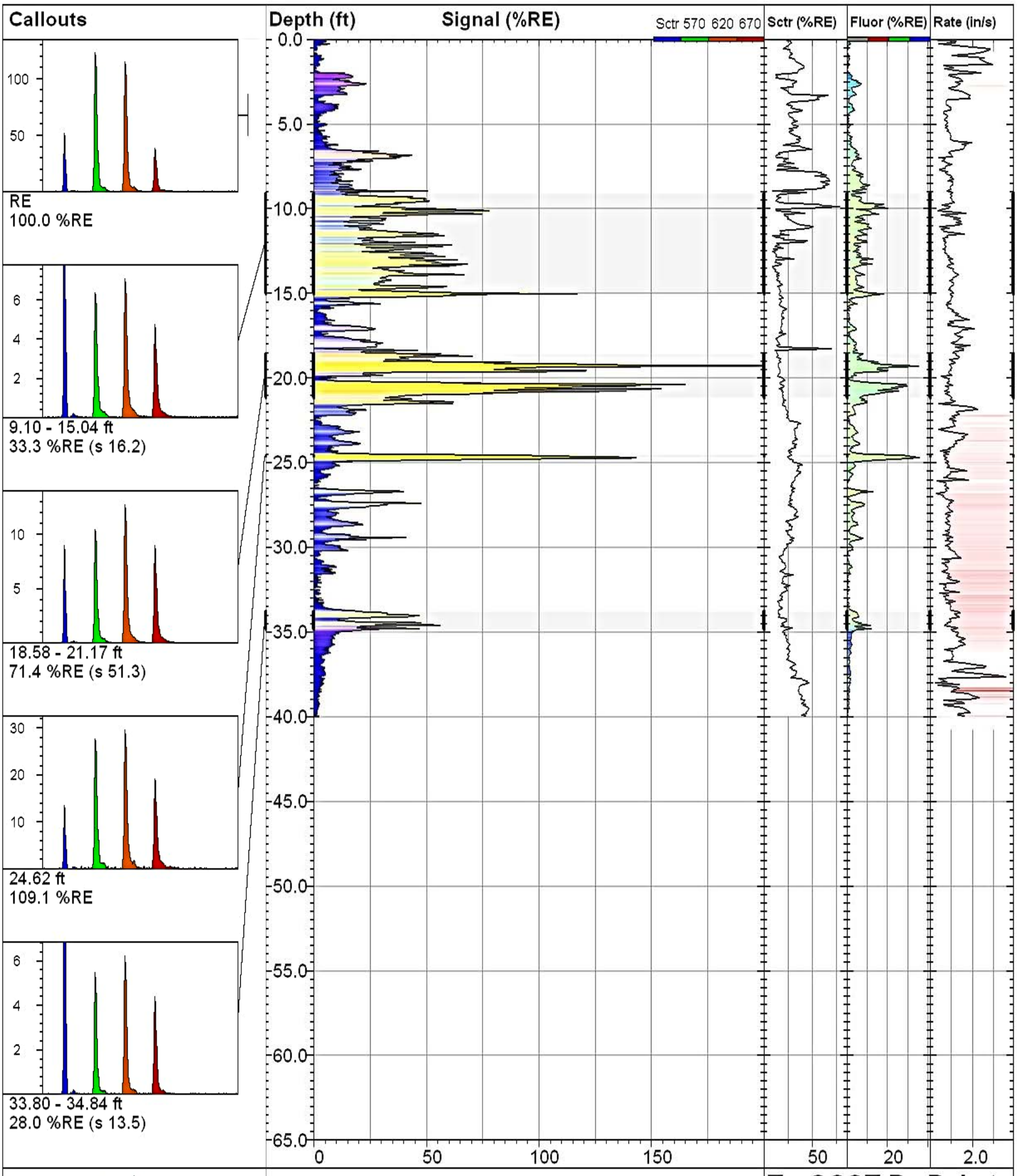
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **57.68 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **220.6 %RE @ 12.02 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-15 08:35 PST**



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2013T-005

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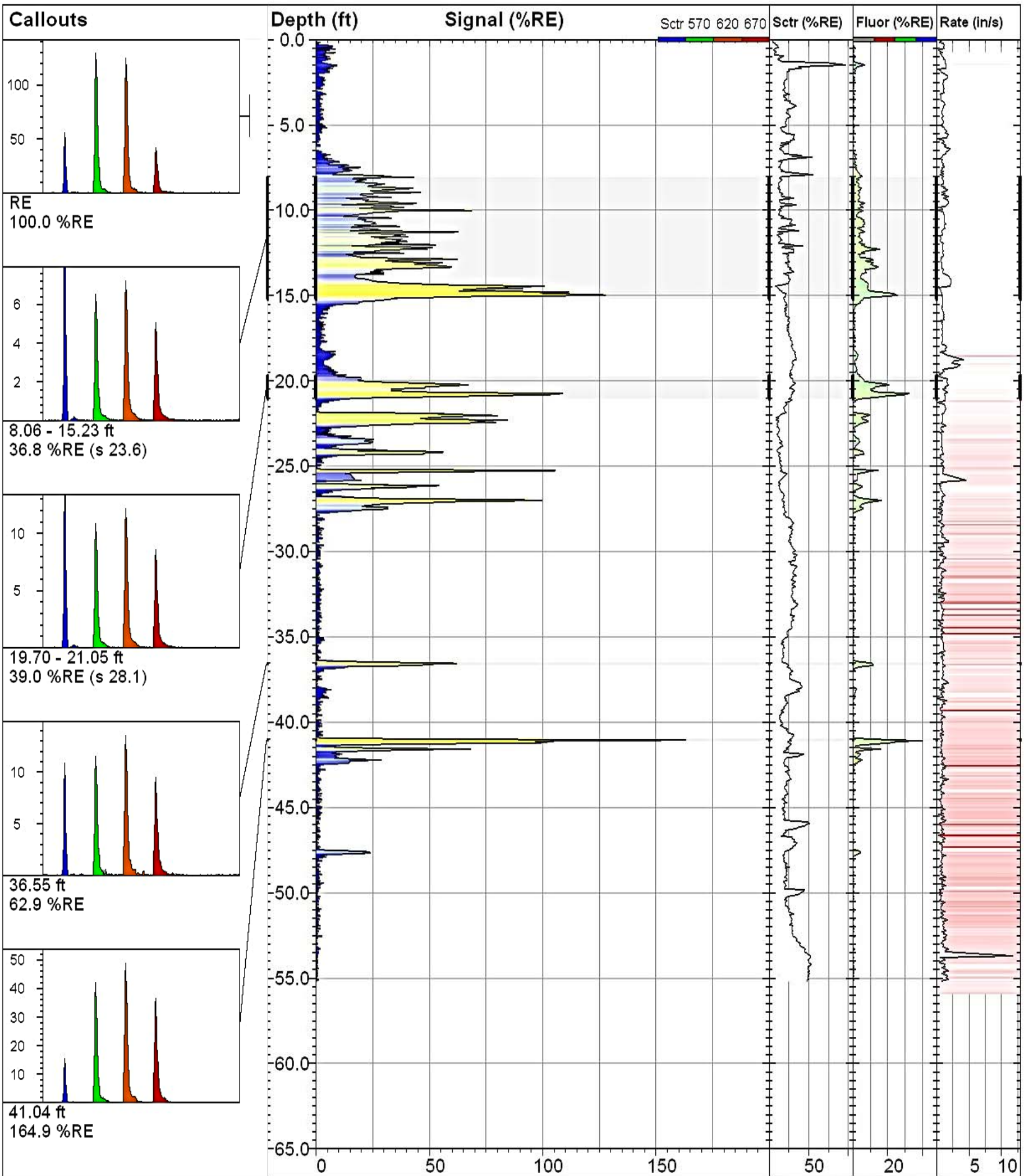
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **39.99 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **244.1 %RE @ 19.29 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-15 15:35 PST**



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2013T-006

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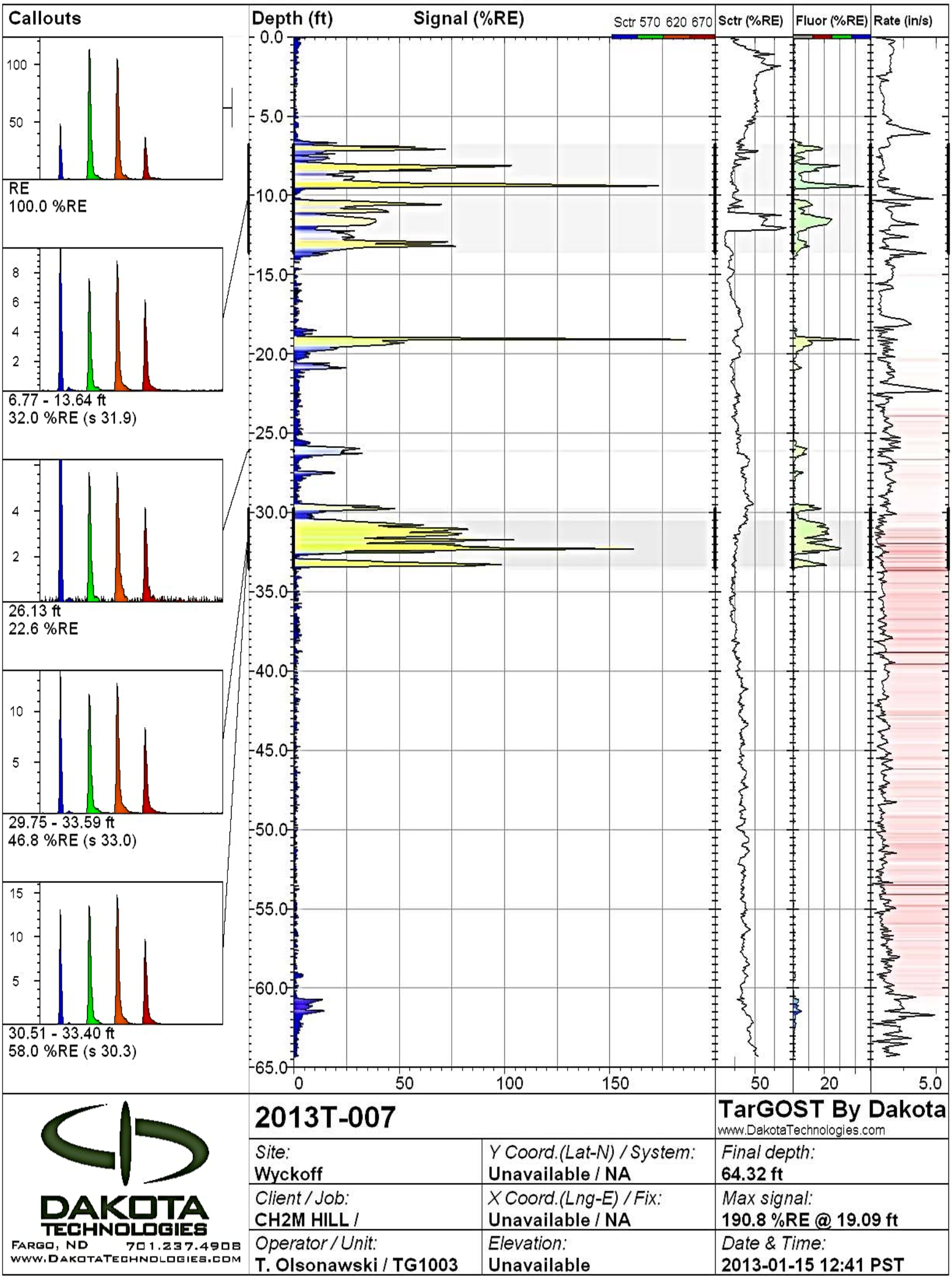
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **55.16 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **164.9 %RE @ 41.04 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-15 10:07 PST**



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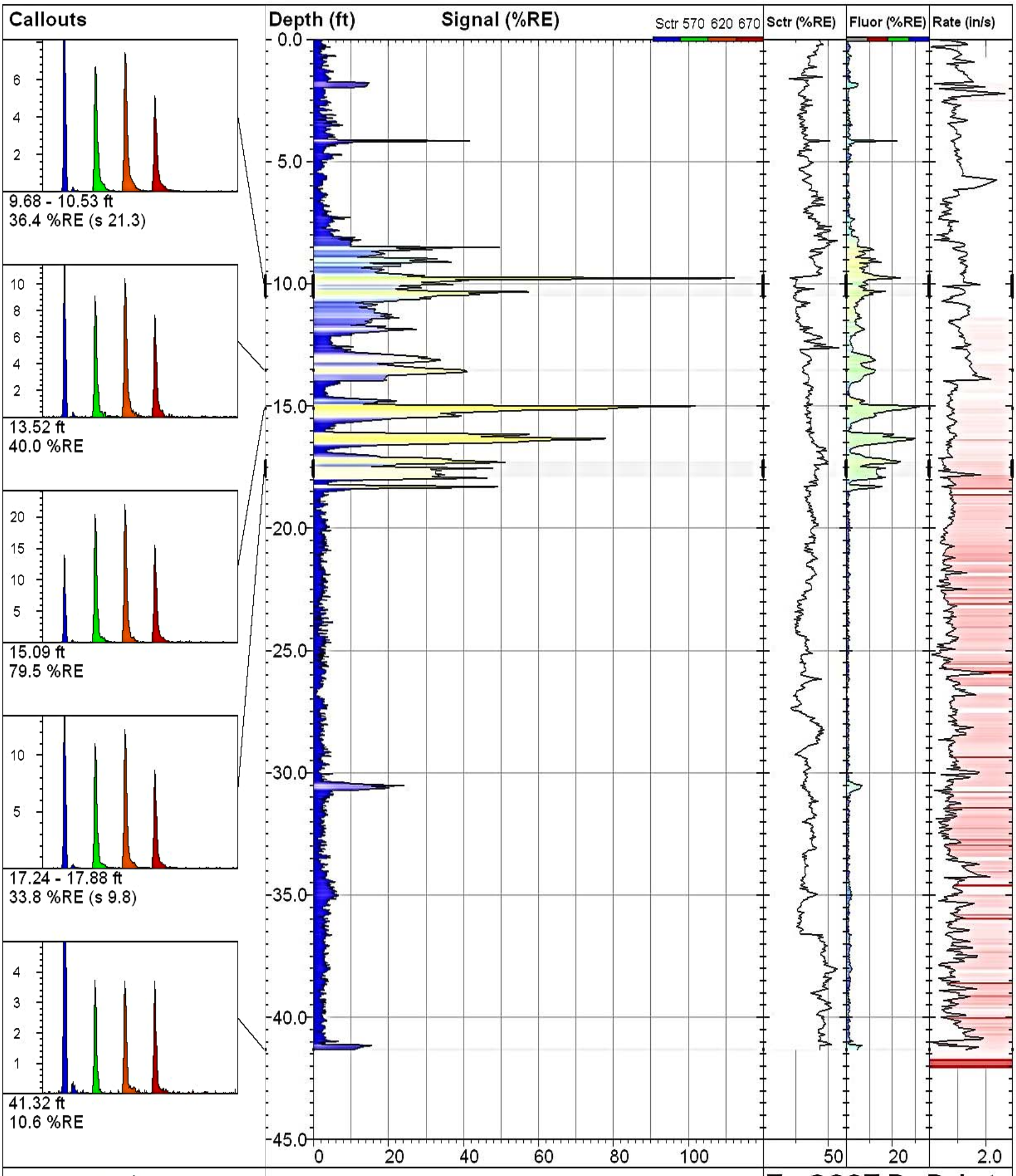
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **64.32 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **190.8 %RE @ 19.09 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-15 12:41 PST**



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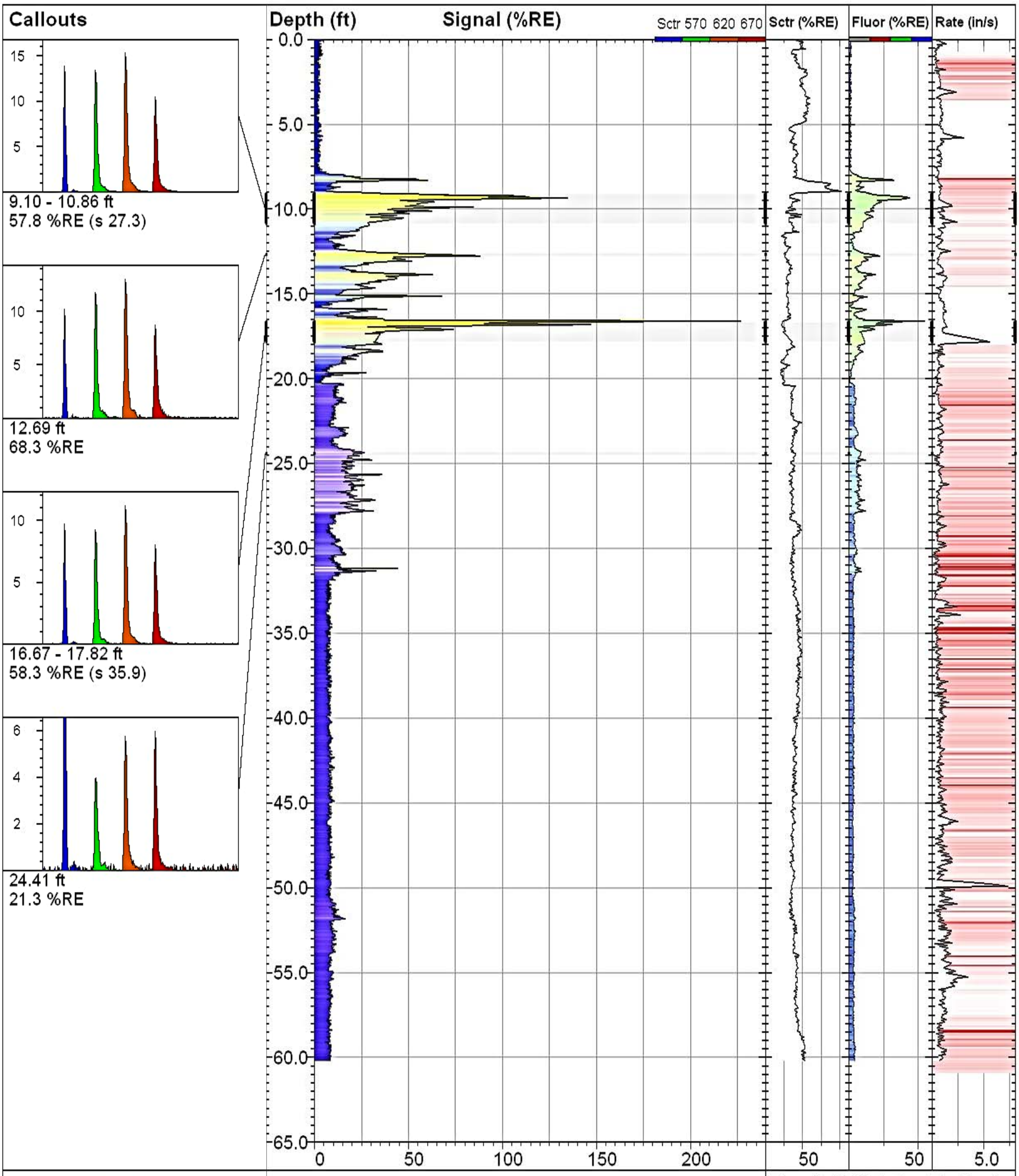
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **41.33 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **112.2 %RE @ 9.78 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-29 15:28 PST**



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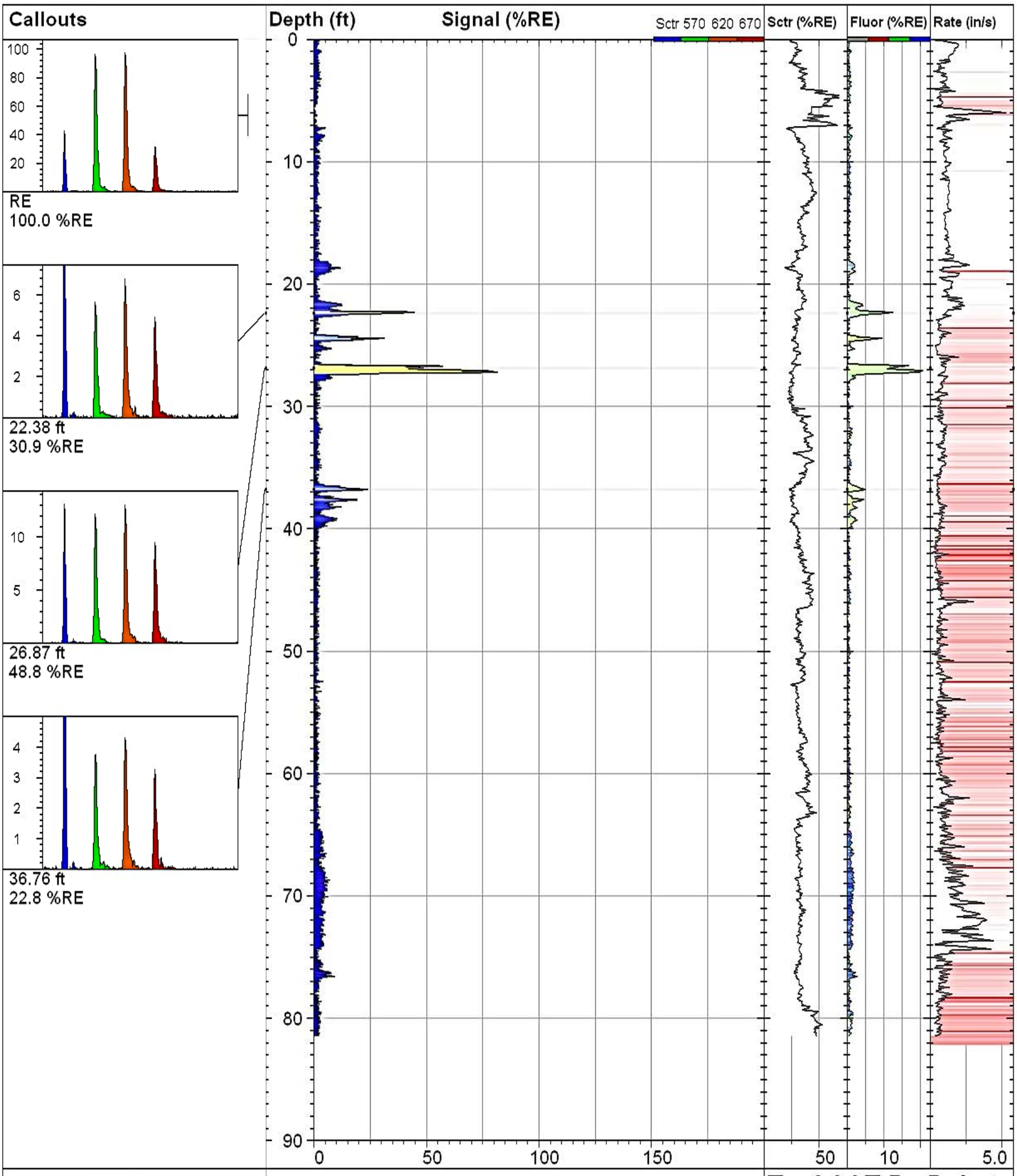
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **60.19 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **227.2 %RE @ 16.60 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 12:37 PST**



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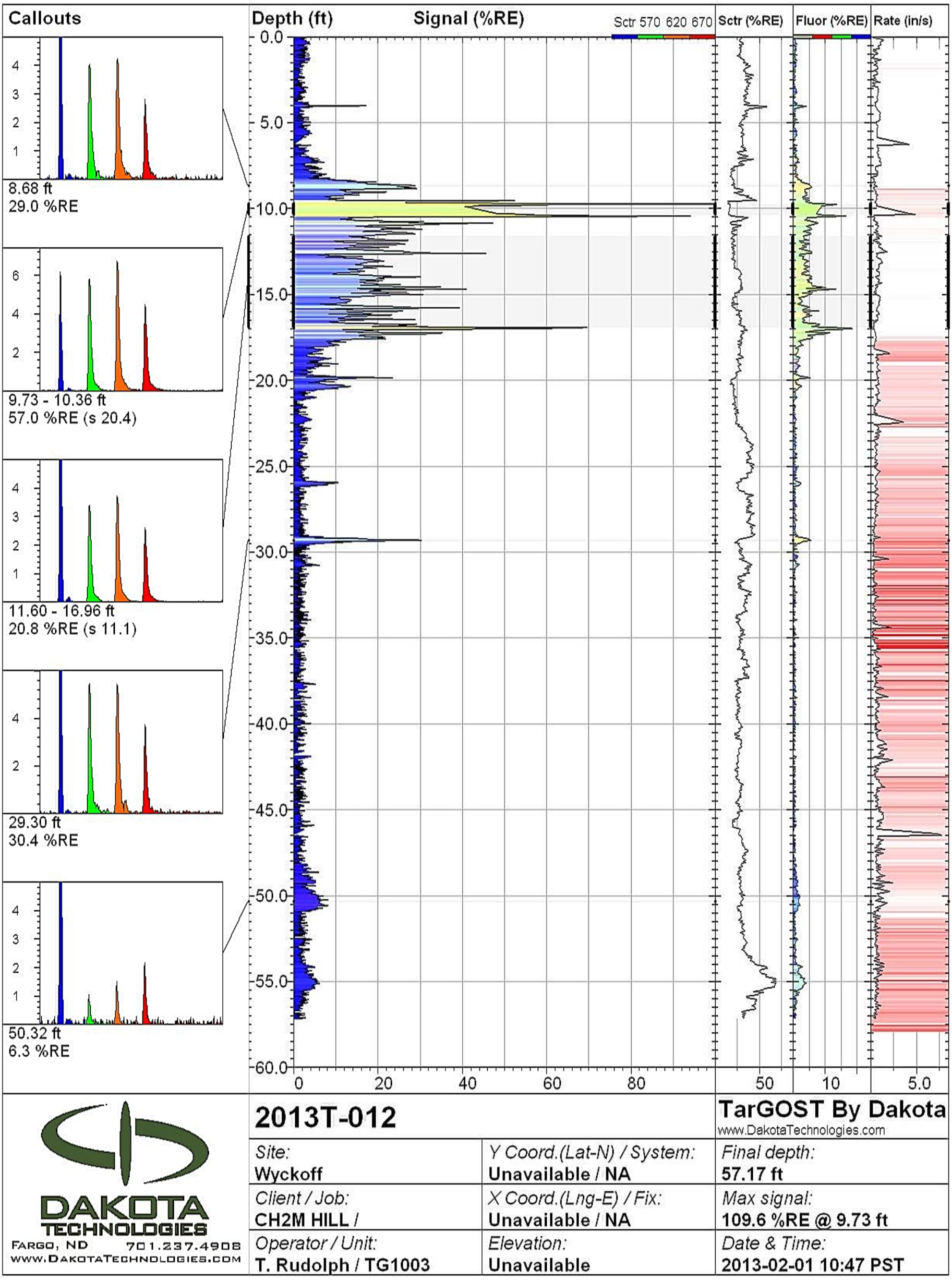
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **81.43 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **81.6 %RE @ 27.17 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-23 09:40 PST**



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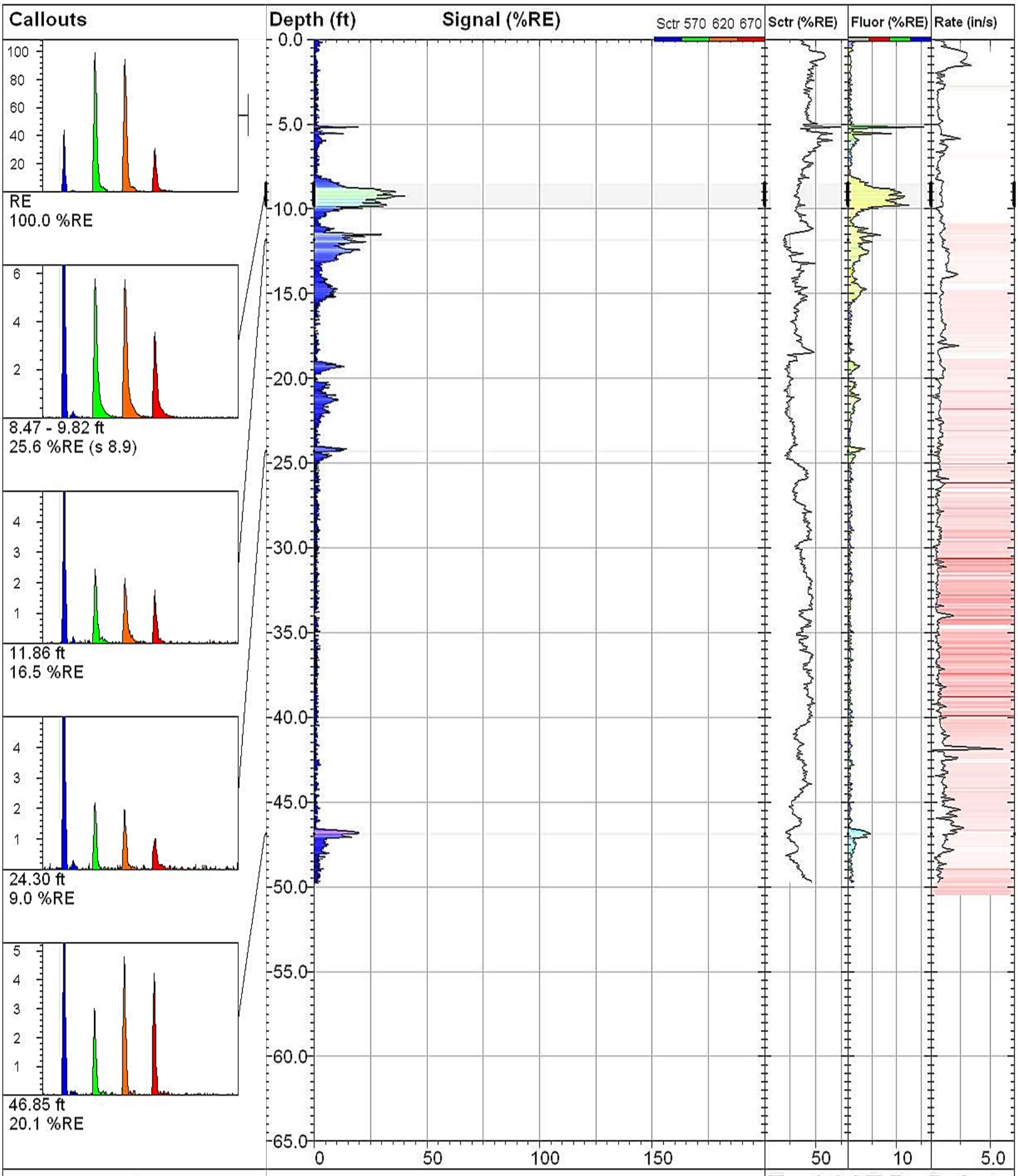
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **57.17 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **109.6 %RE @ 9.73 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-01 10:47 PST**



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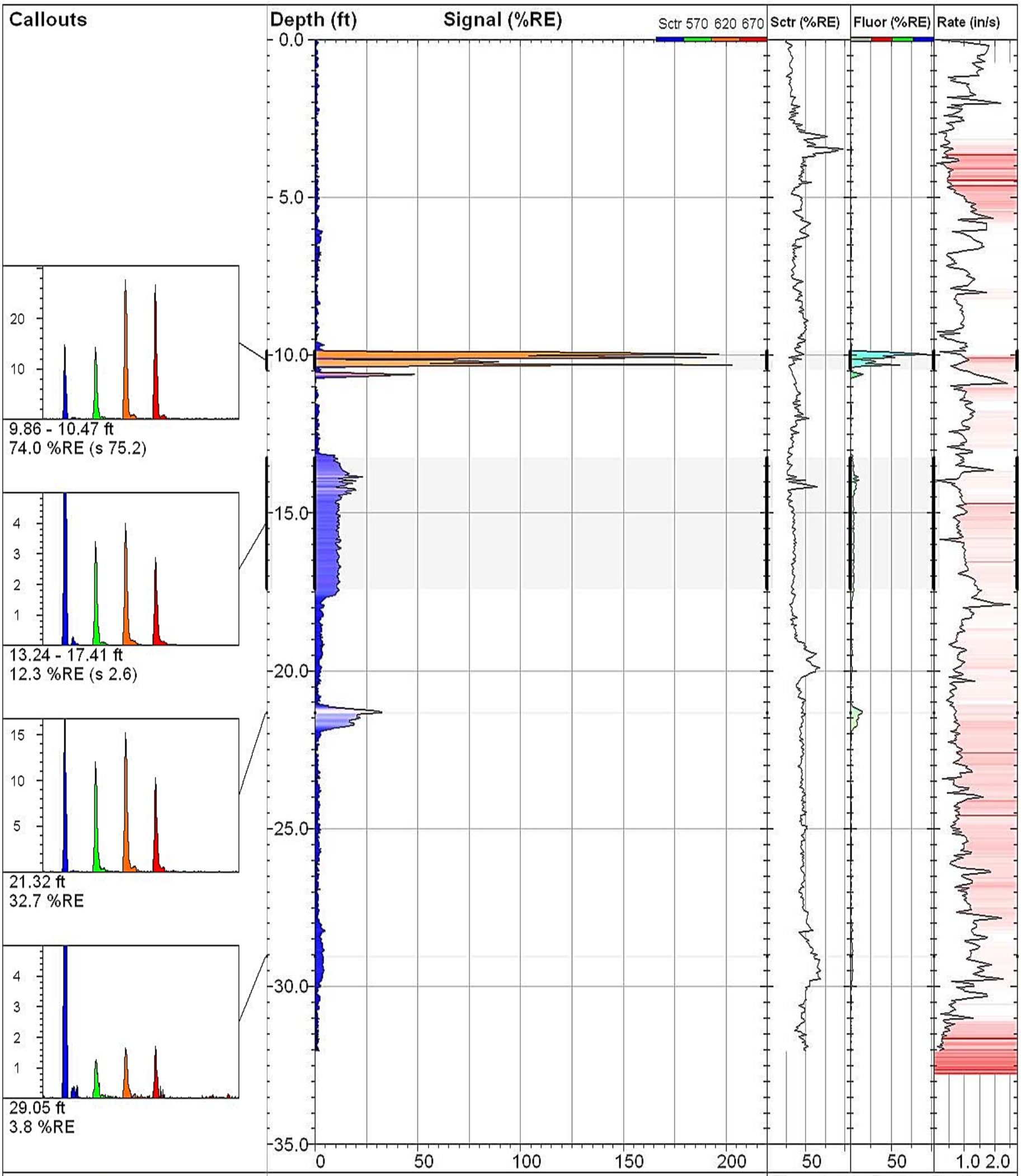
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **49.77 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **40.8 %RE @ 9.24 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-23 15:22 PST**



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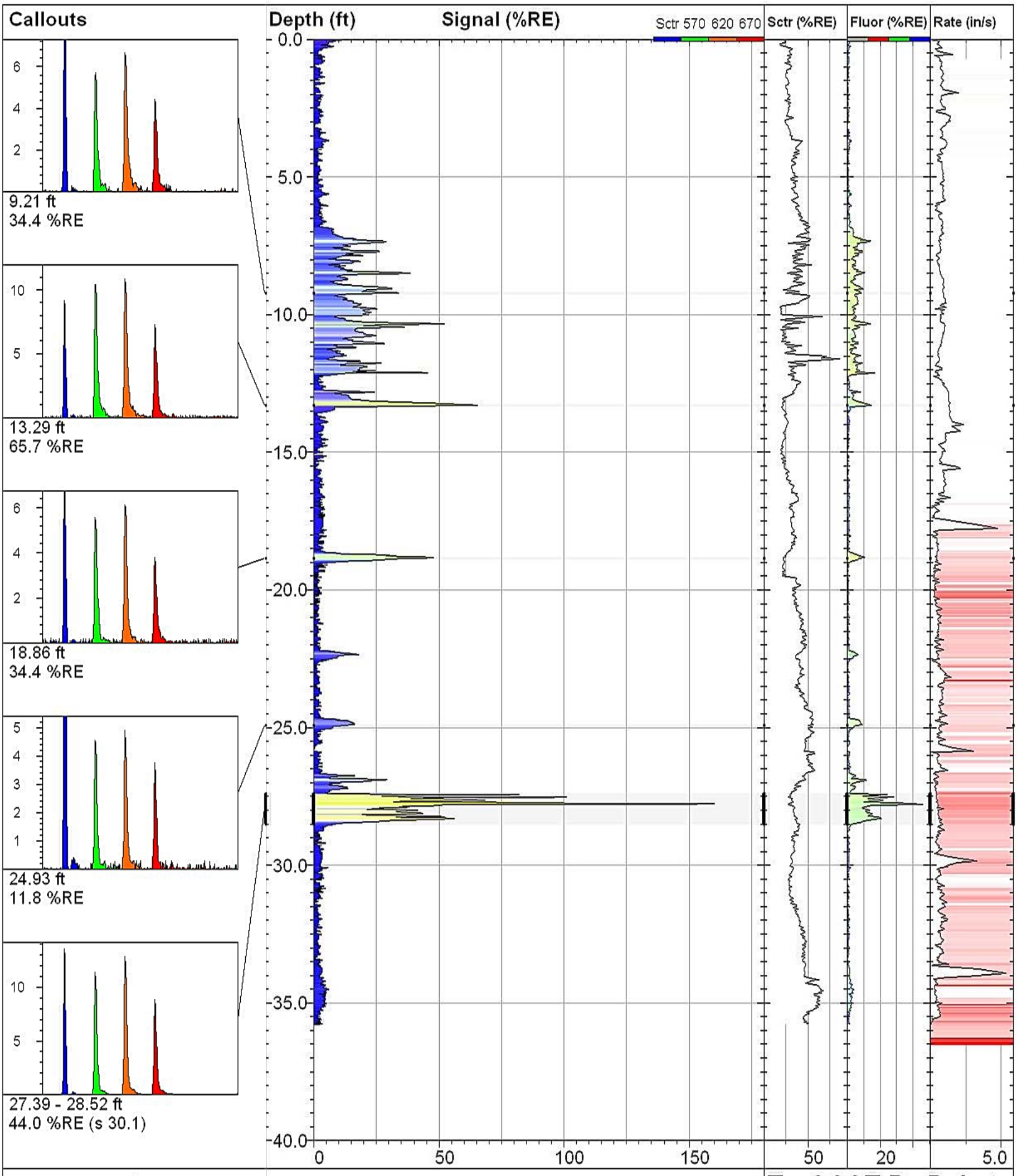
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.03 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **204.2 %RE @ 10.31 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 11:34 PST**



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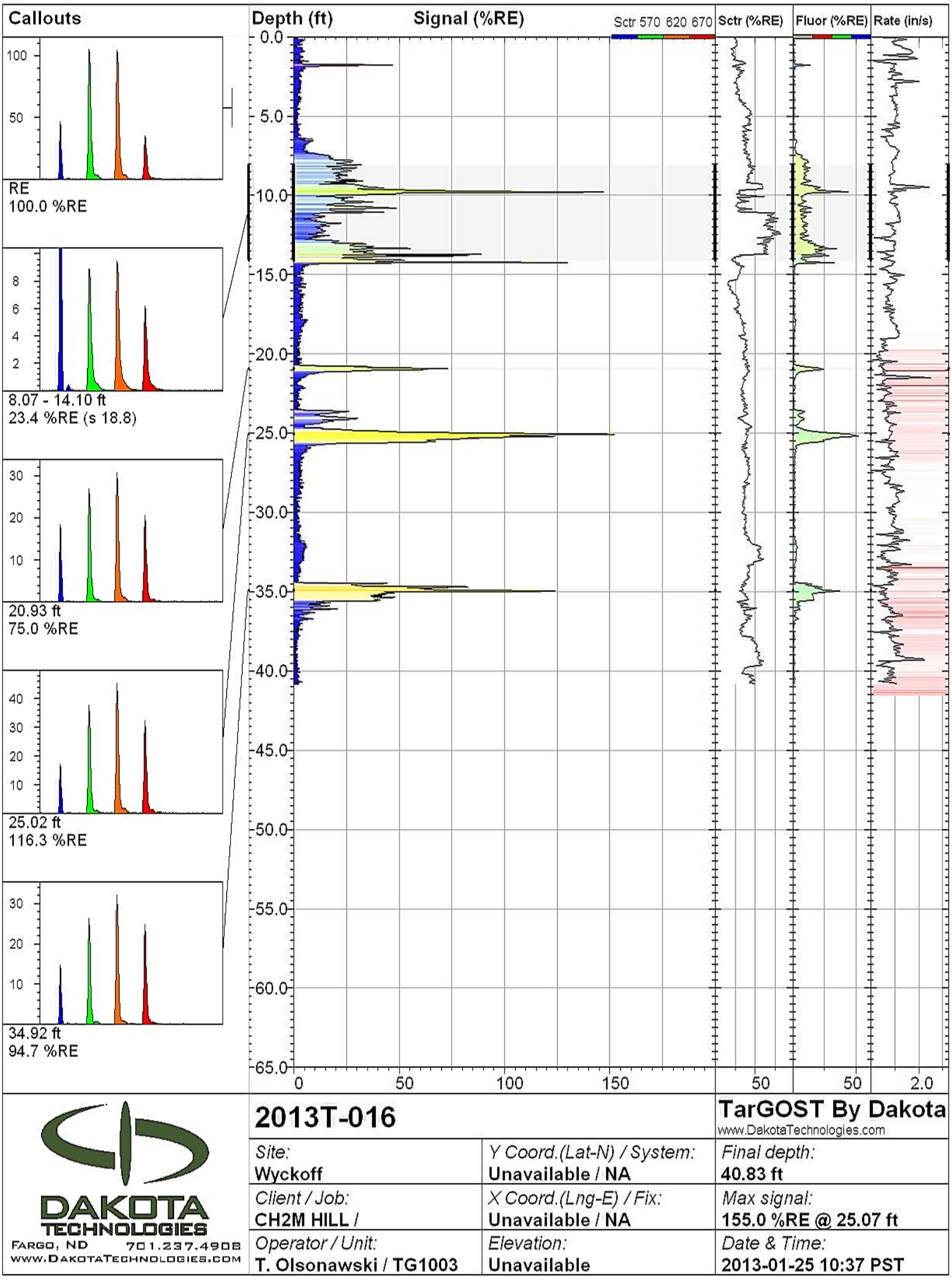
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **35.79 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **167.9 %RE @ 27.78 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 08:45 PST**



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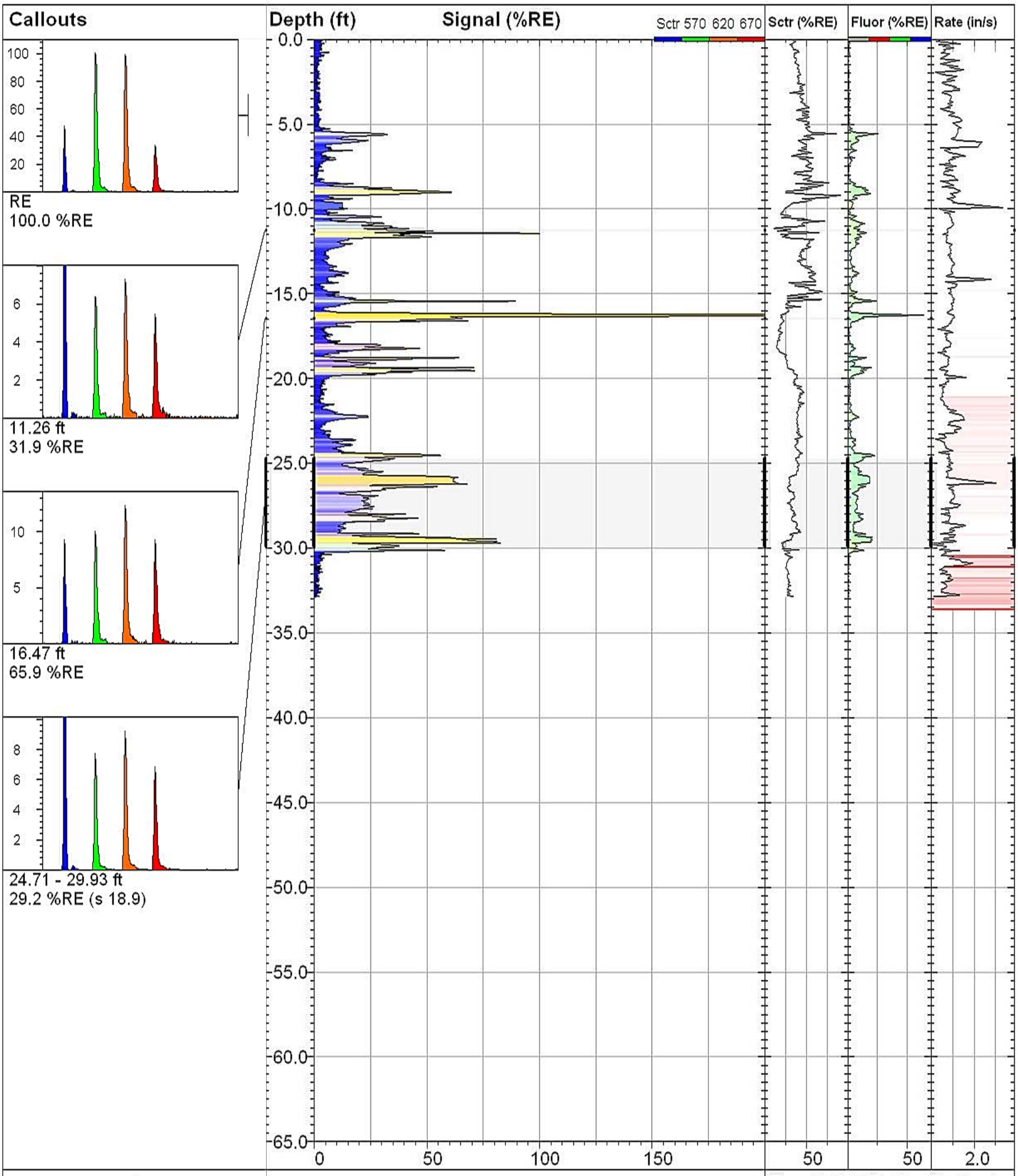
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **40.83 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **155.0 %RE @ 25.07 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 10:37 PST**



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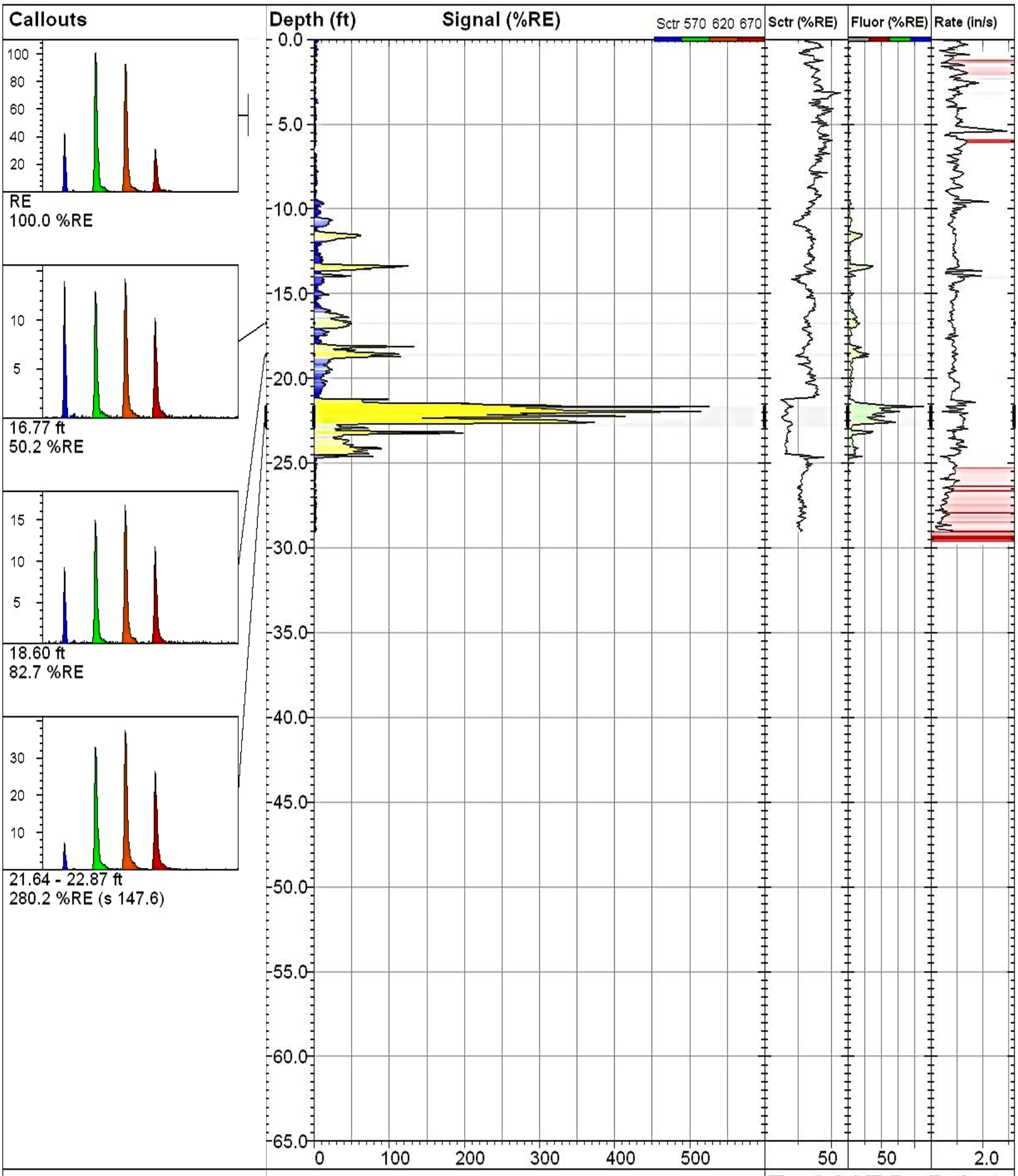
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.86 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **345.4 %RE @ 16.28 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 09:45 PST**



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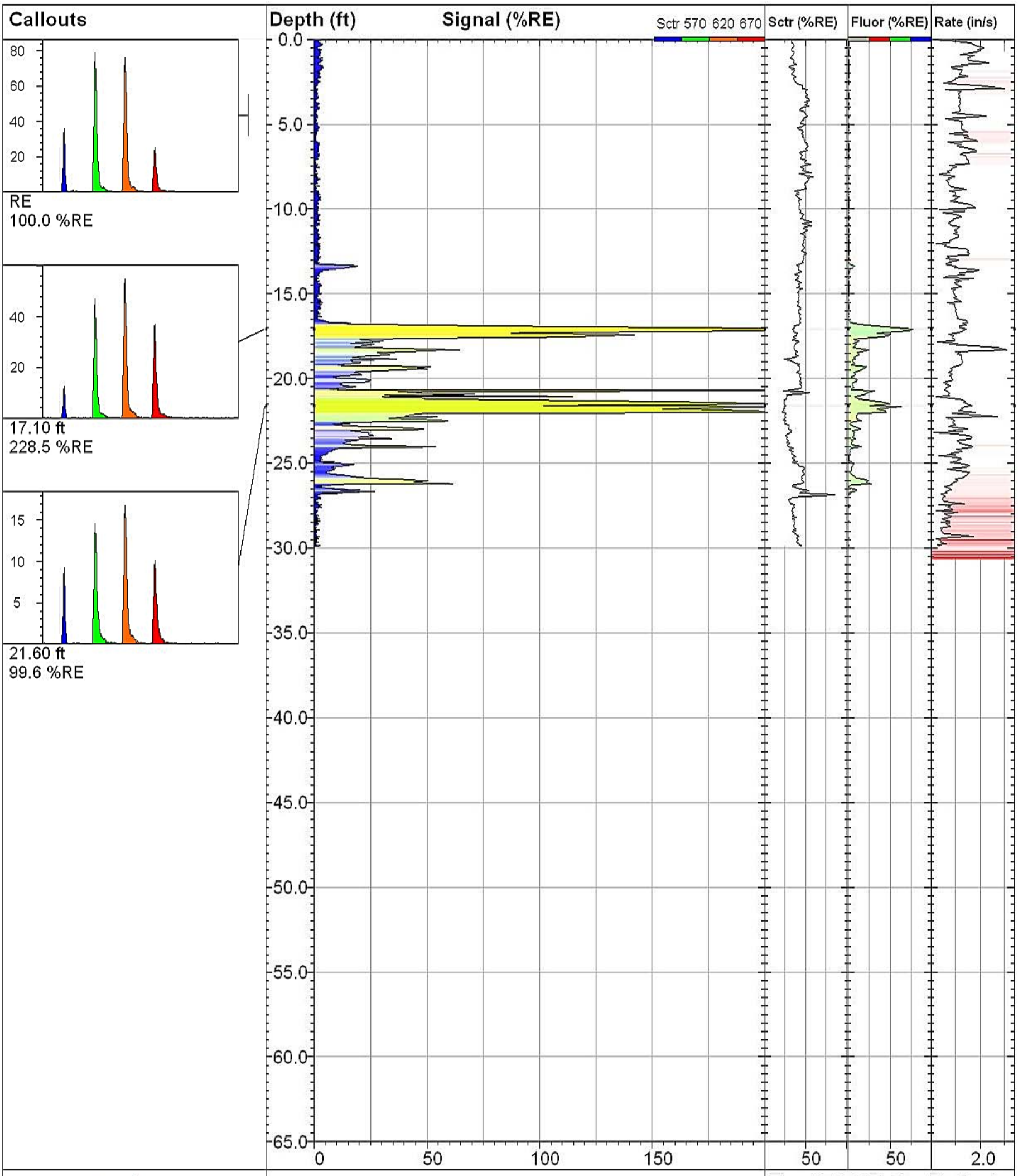
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **29.07 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **541.3 %RE @ 21.67 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 08:57 PST**



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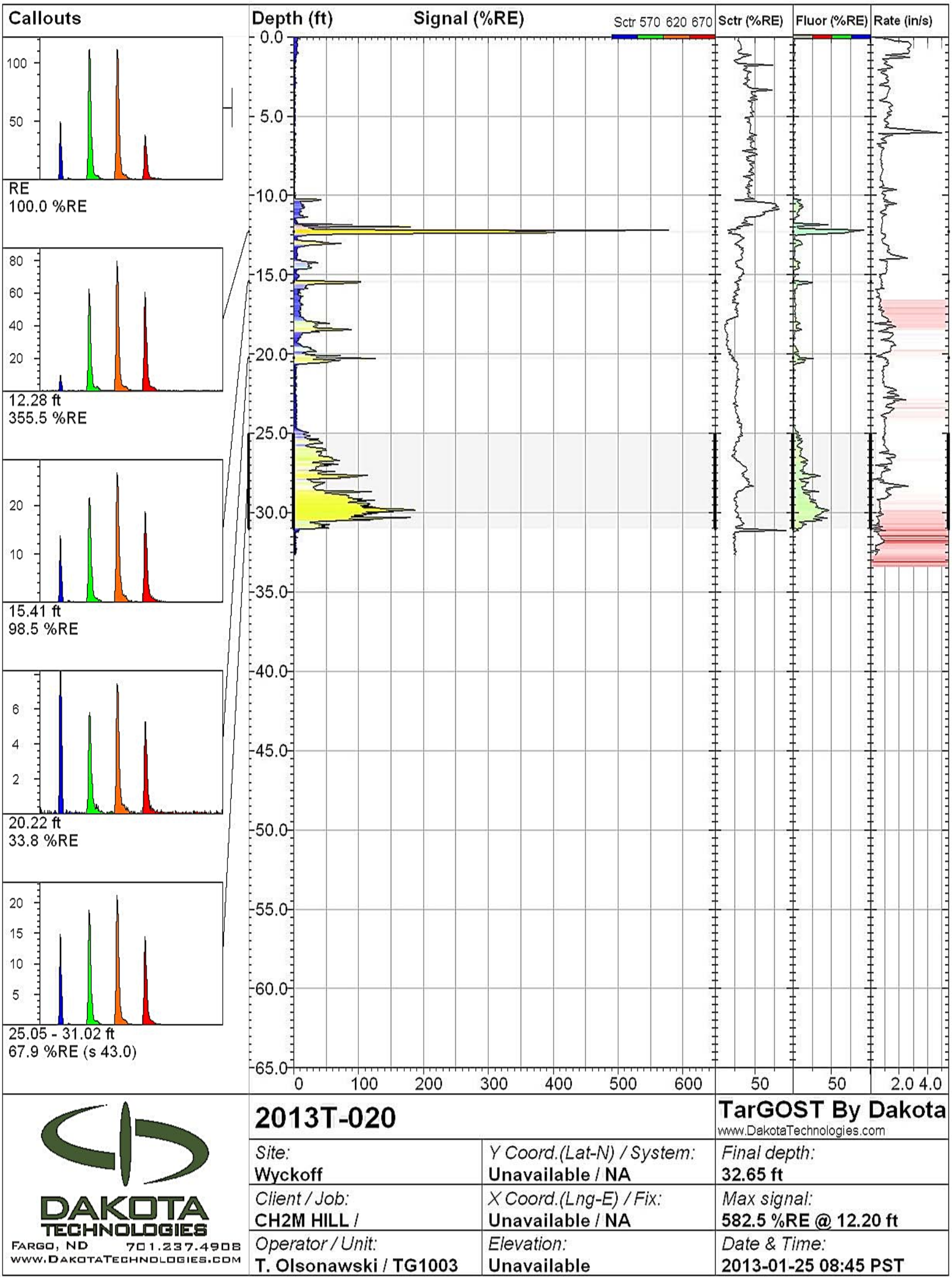
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **29.91 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **321.6 %RE @ 20.69 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-23 14:45 PST**



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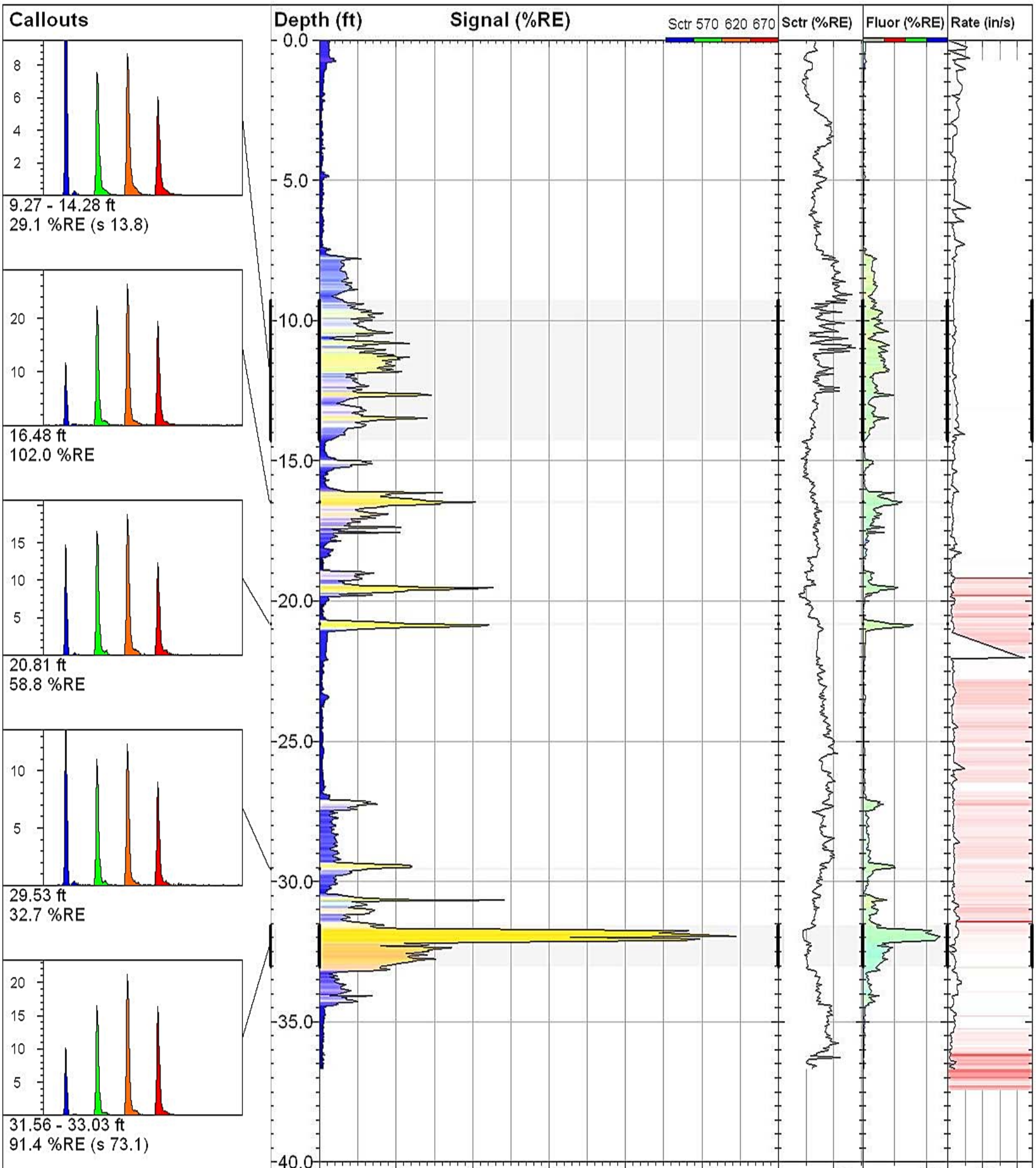
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.65 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **582.5 %RE @ 12.20 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 08:45 PST**



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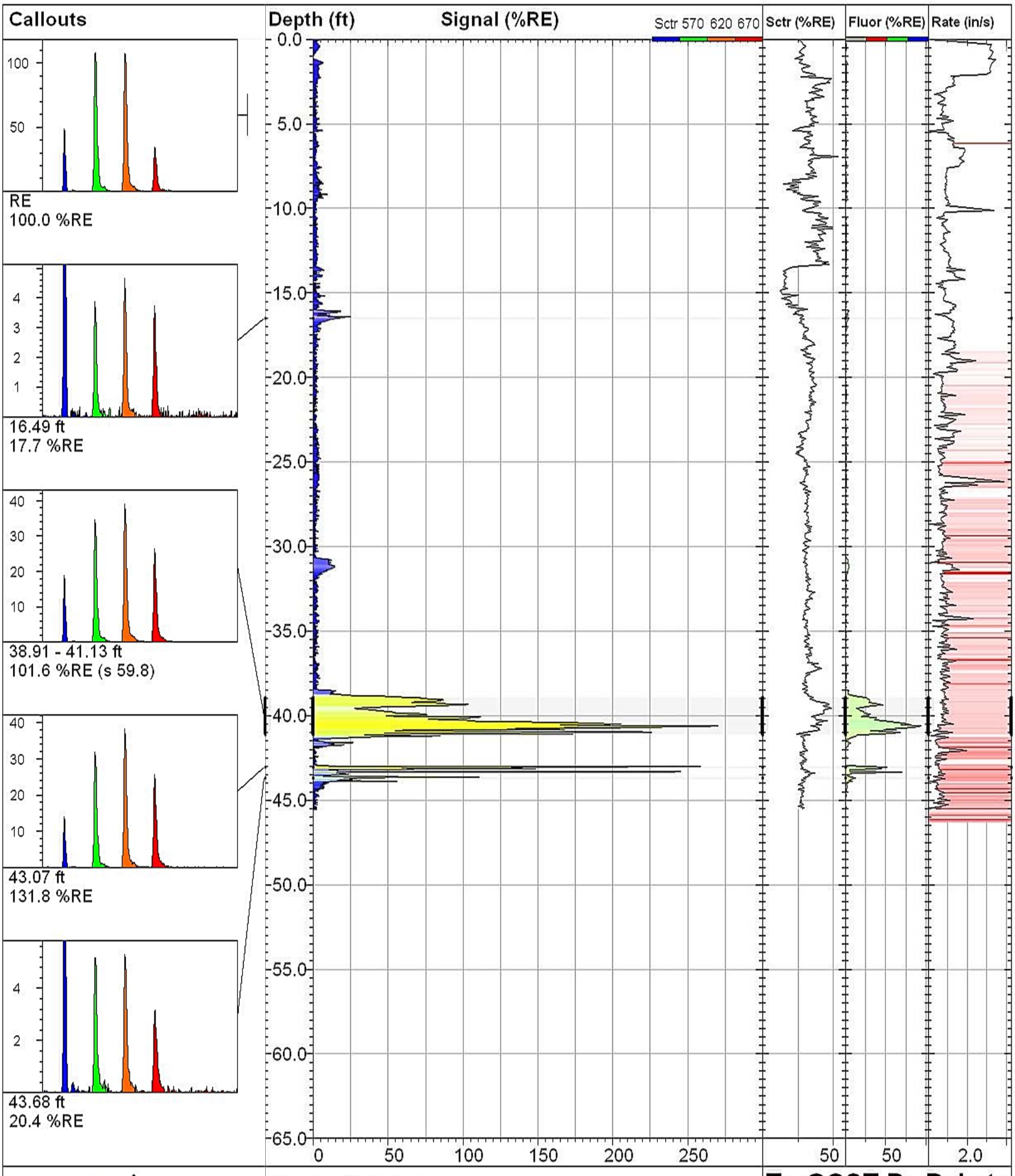
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **36.68 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **274.2 %RE @ 31.96 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 08:15 PST**



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2013T-024

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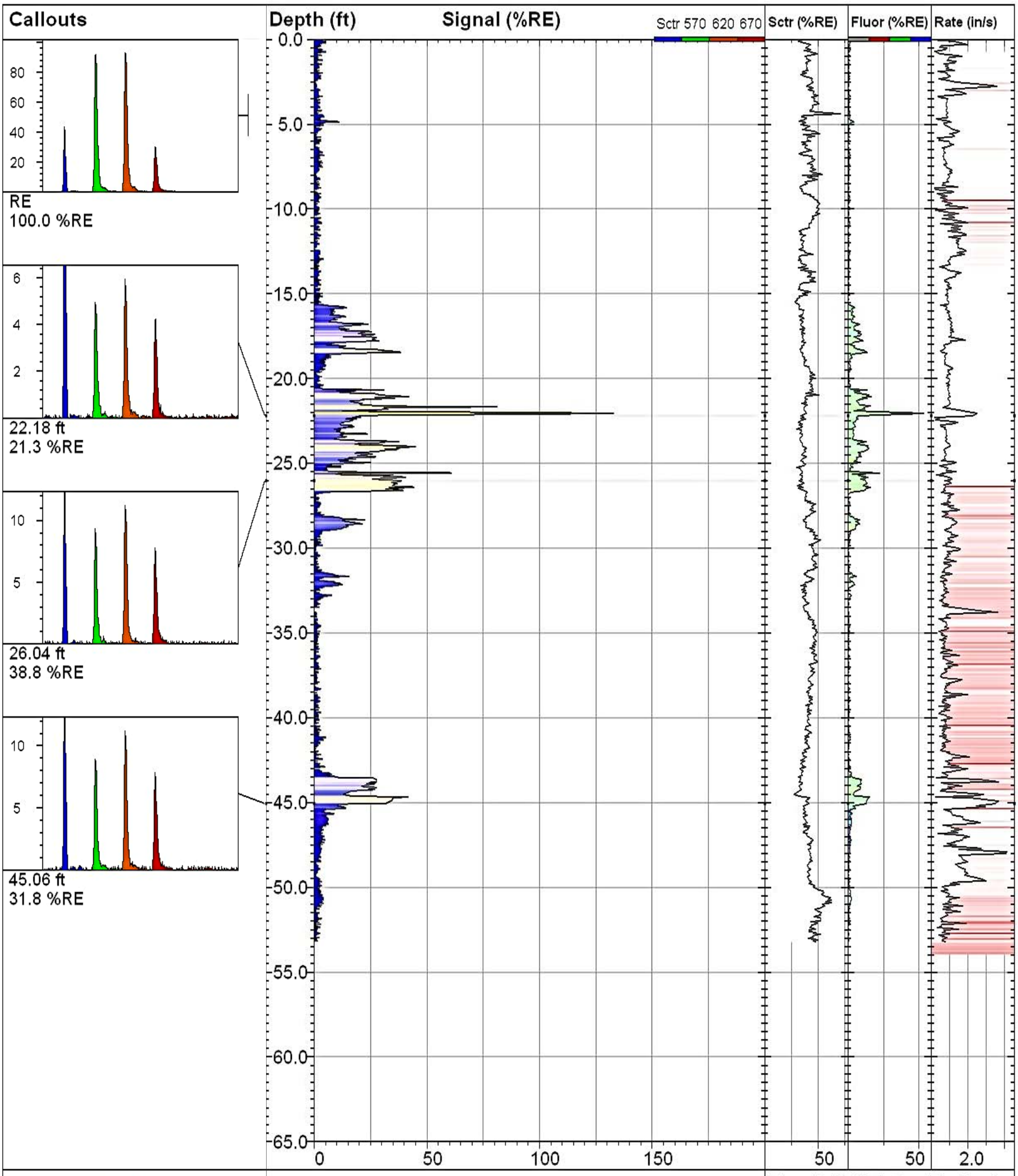
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **45.54 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **276.0 %RE @ 40.61 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-22 12:50 PST**



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2013T-025

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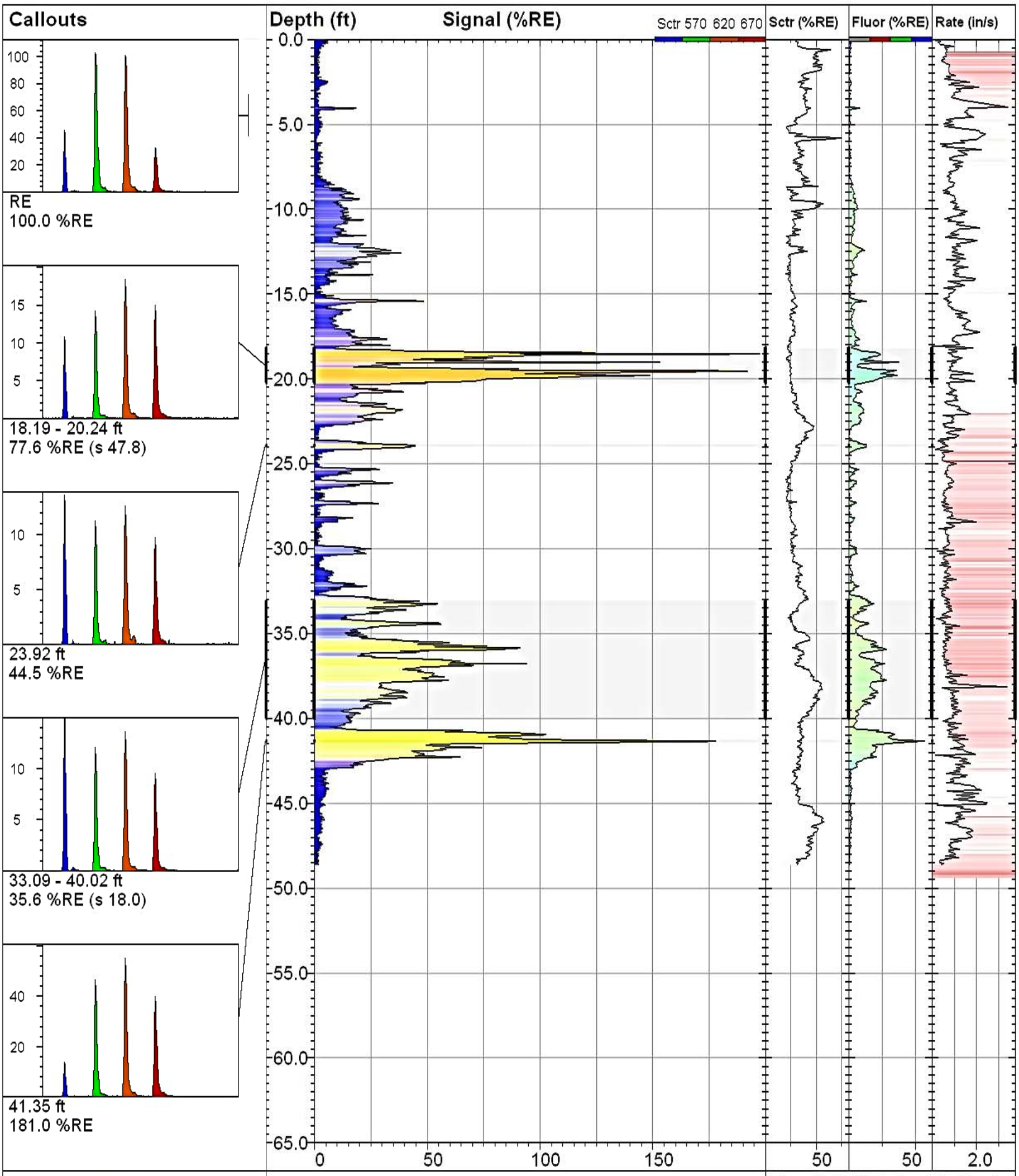
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **53.22 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **136.0 %RE @ 22.05 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-22 09:43 PST**



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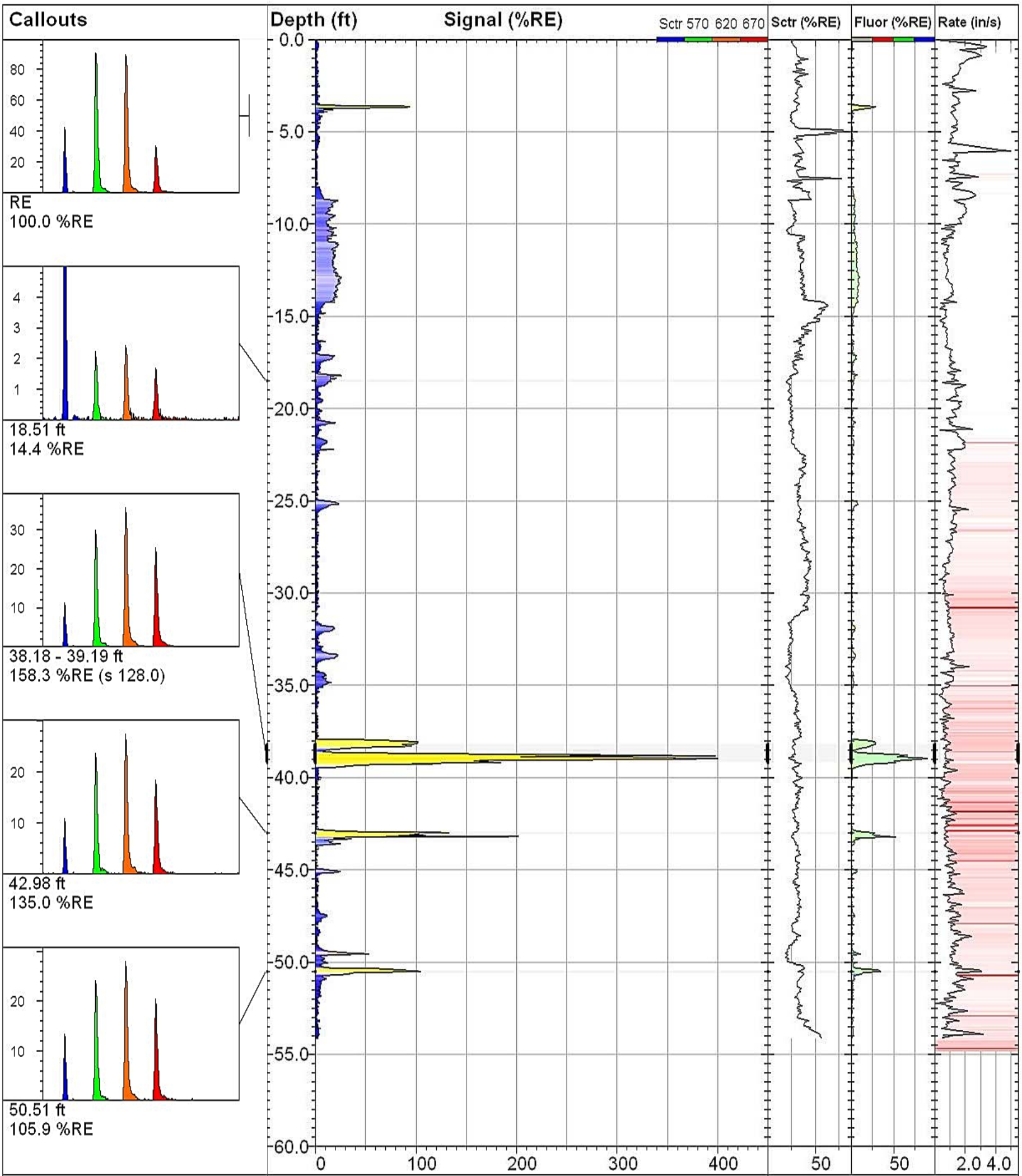
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **48.61 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **200.9 %RE @ 18.54 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-22 15:46 PST**



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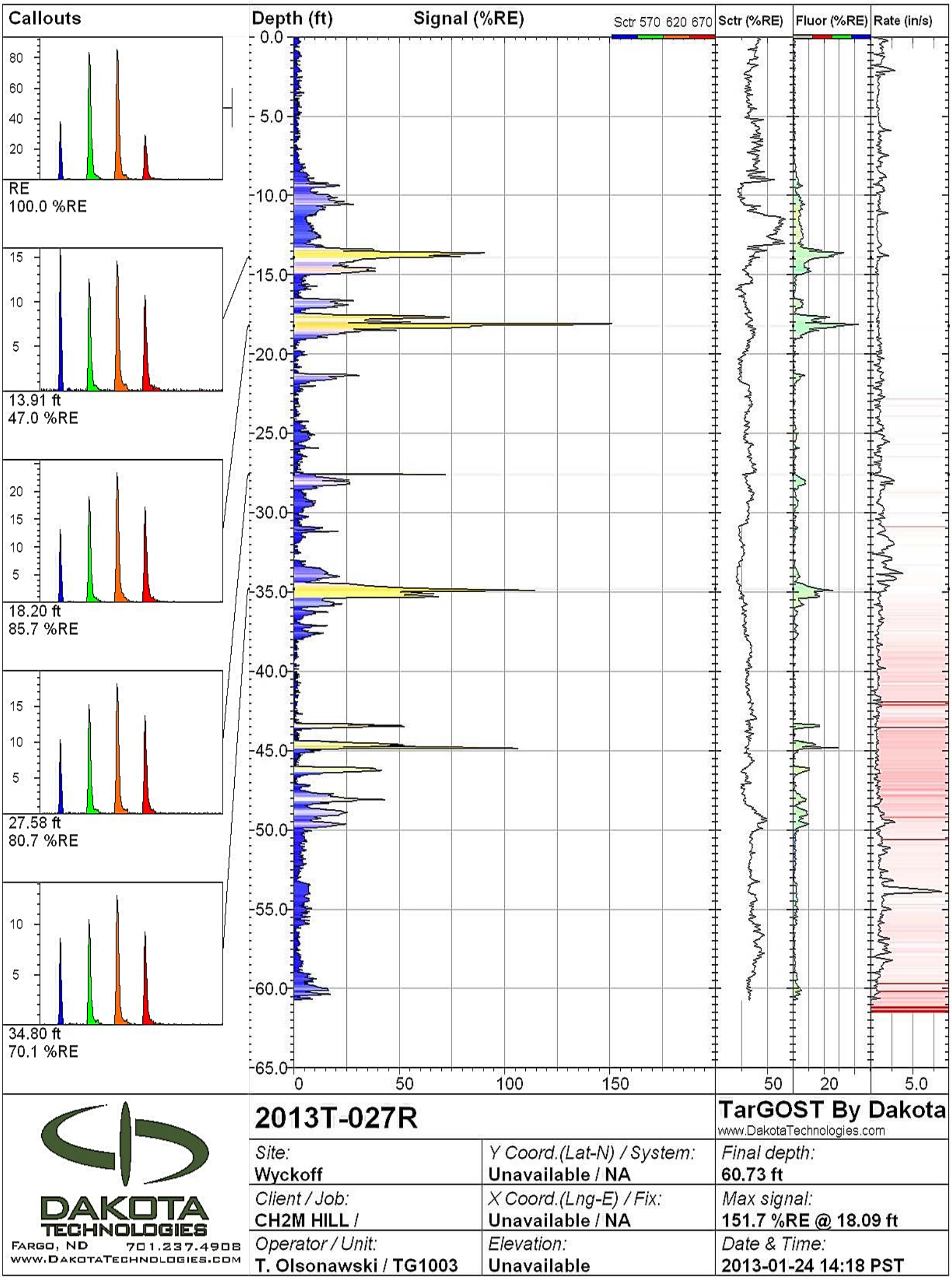
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **54.13 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **402.9 %RE @ 38.98 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 13:37 PST**



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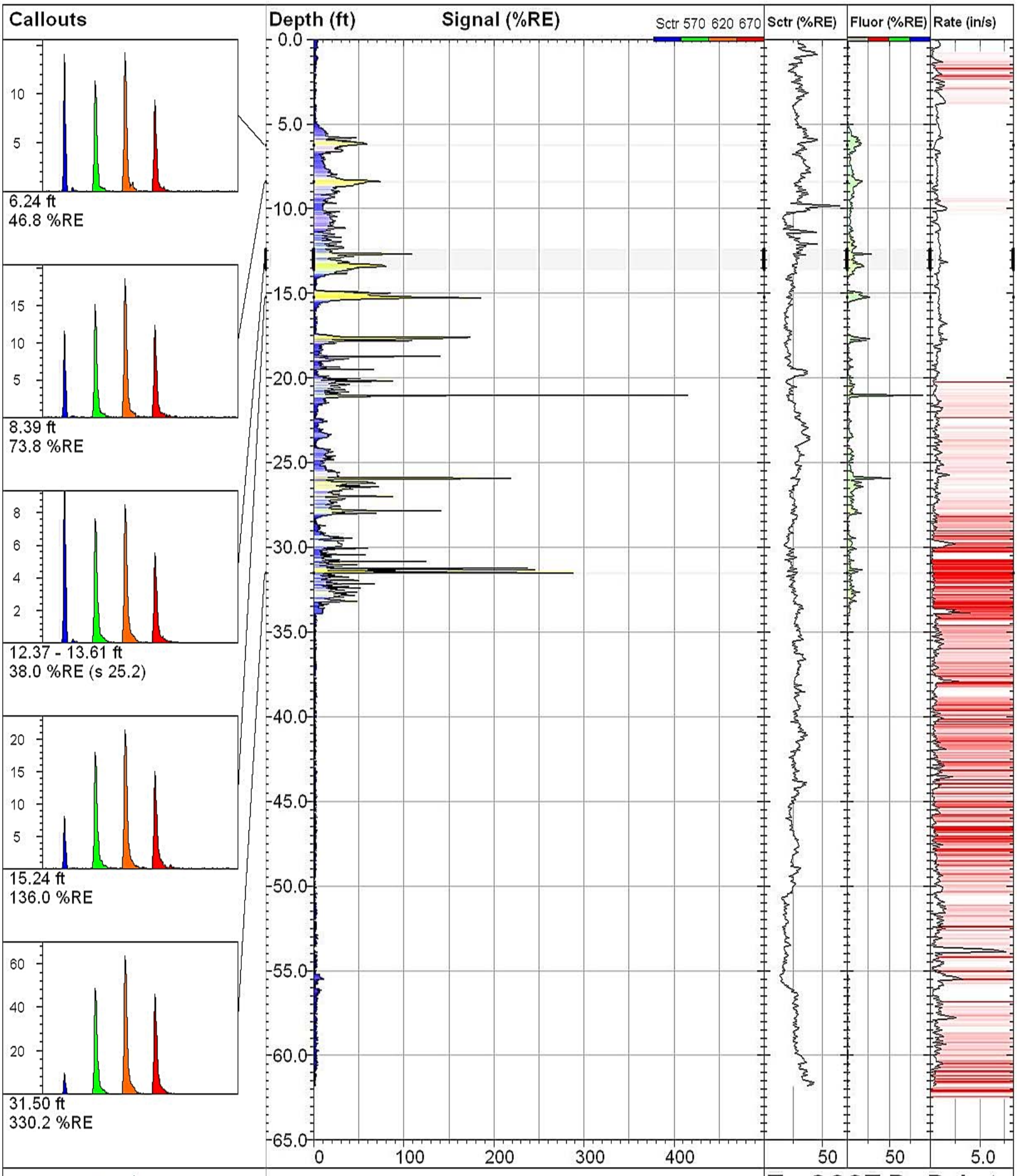
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **60.73 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **151.7 %RE @ 18.09 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 14:18 PST**



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2013T-029

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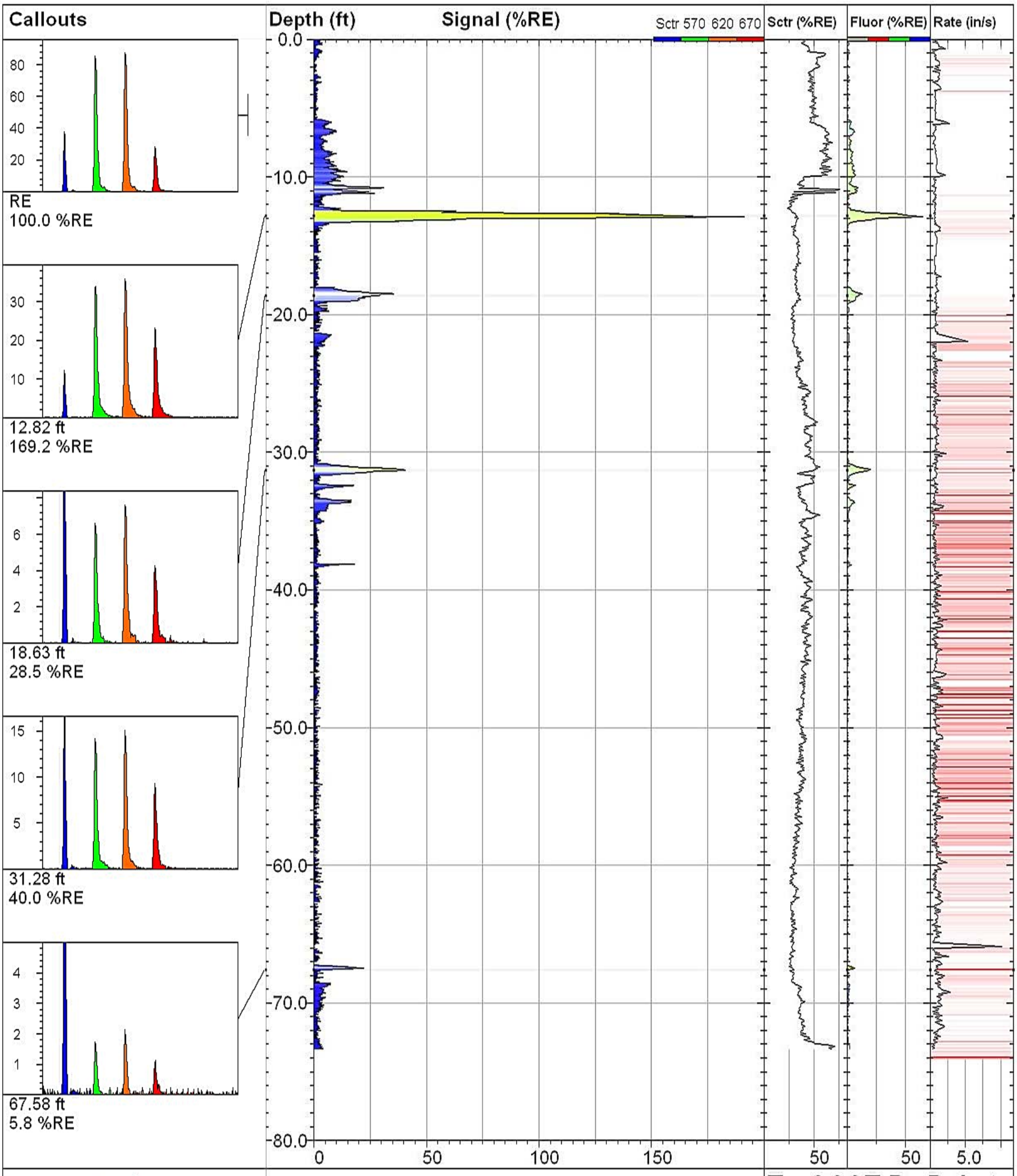
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **61.78 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **467.3 %RE @ 21.02 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 13:46 PST**



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2013T-030

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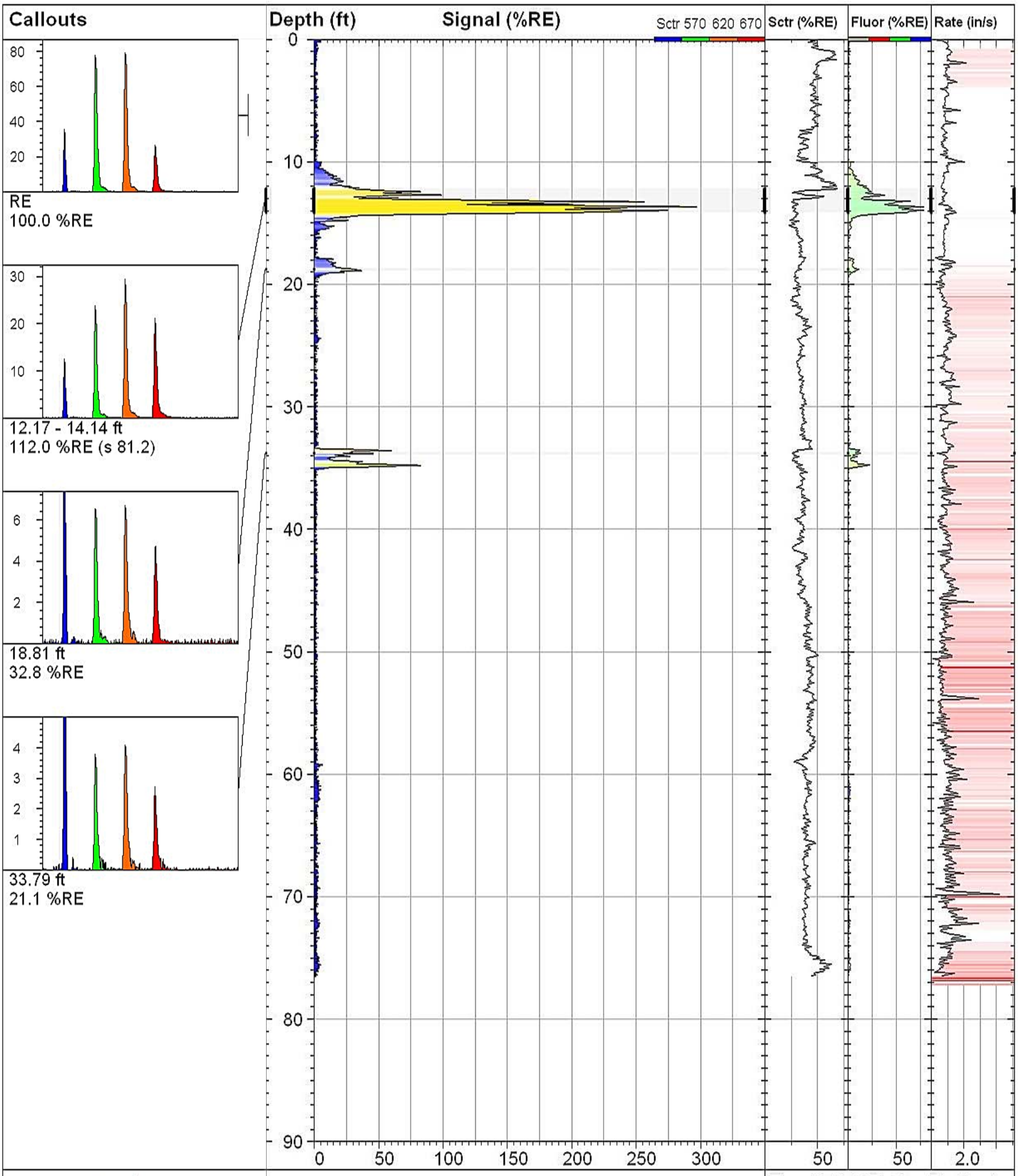
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **73.33 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **193.7 %RE @ 12.88 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 11:39 PST**



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2013T-031

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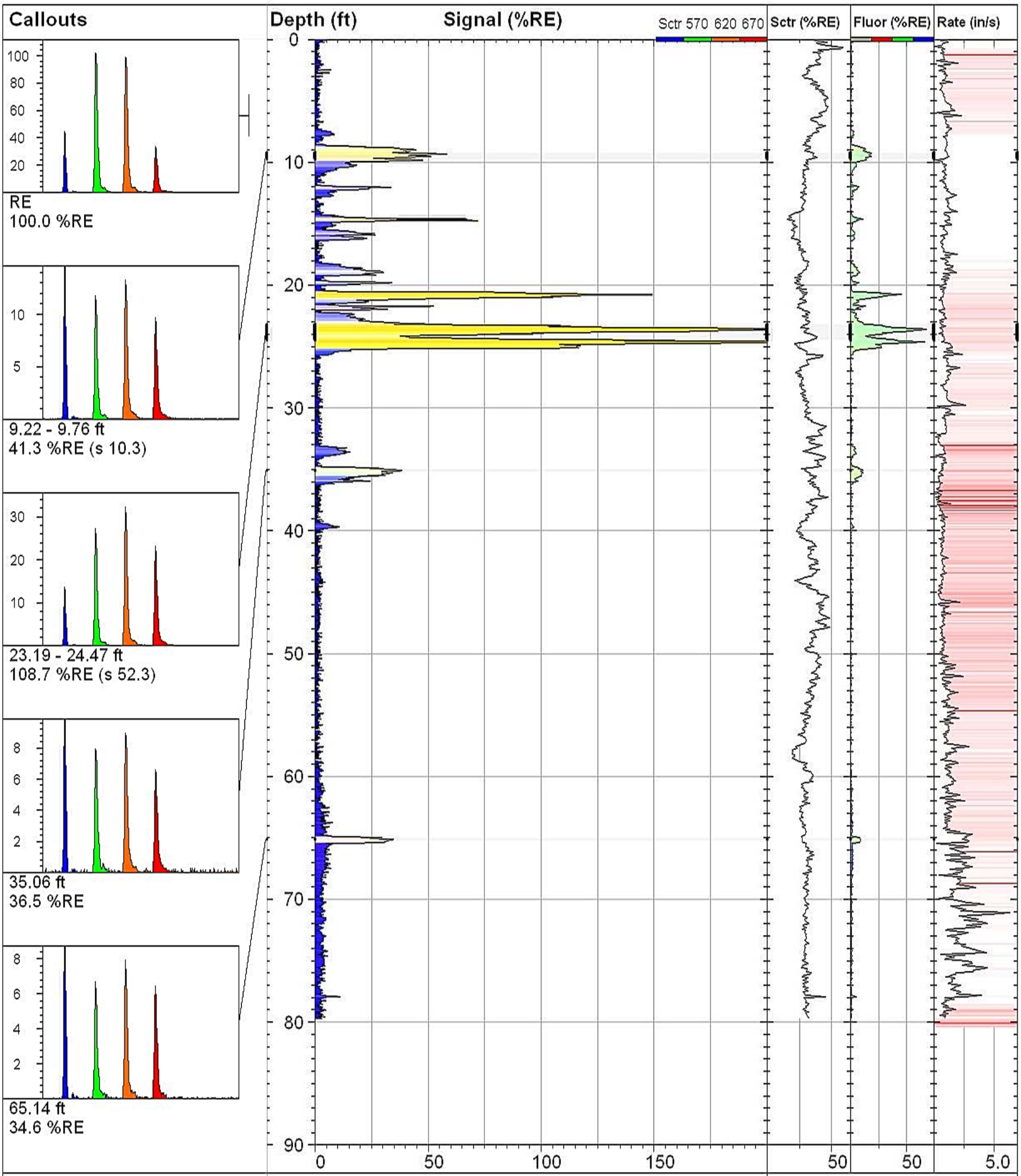
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **76.51 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **297.9 %RE @ 13.67 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 15:13 PST**



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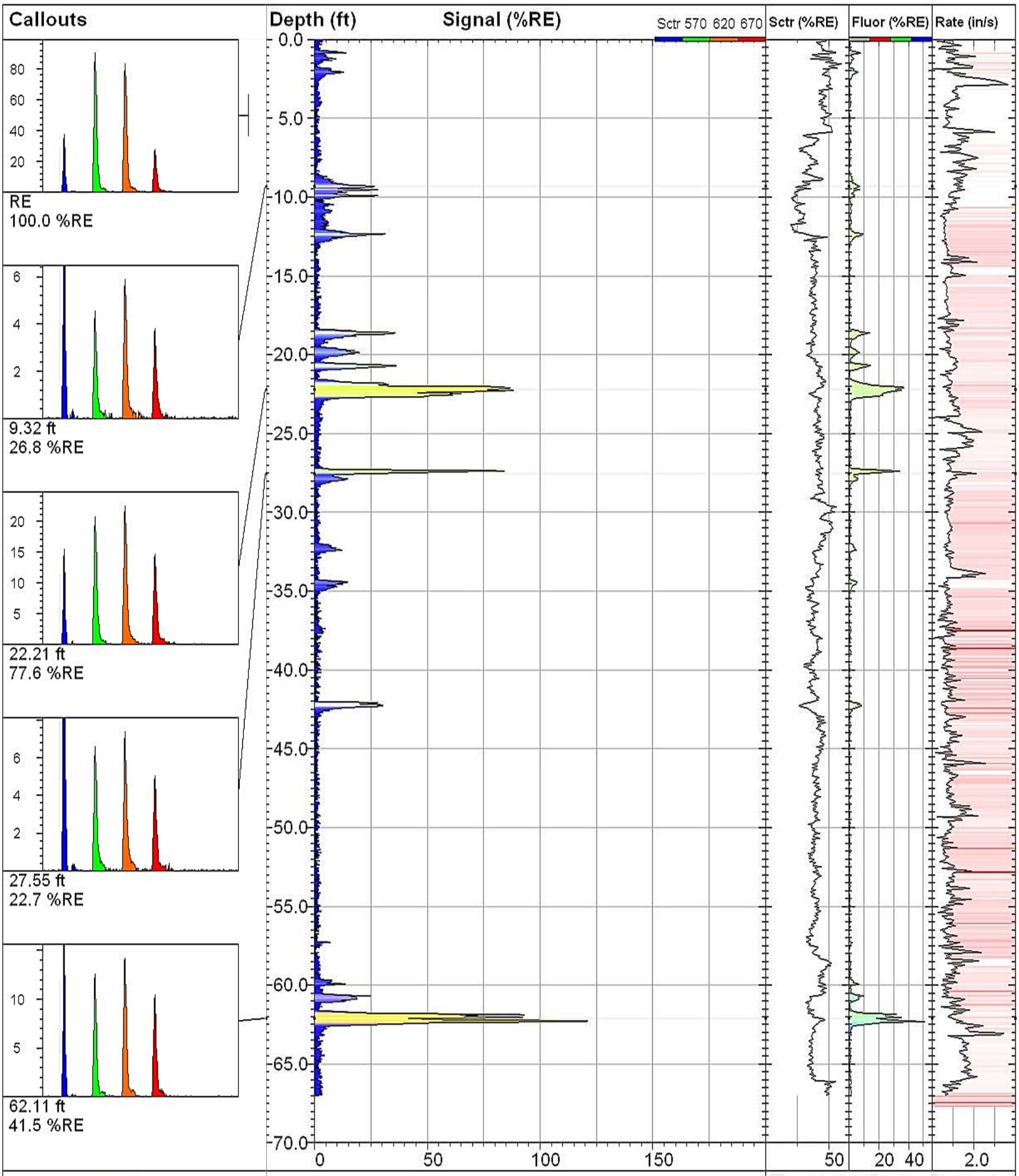
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **79.70 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **224.0 %RE @ 24.63 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-23 08:27 PST**



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2013T-033

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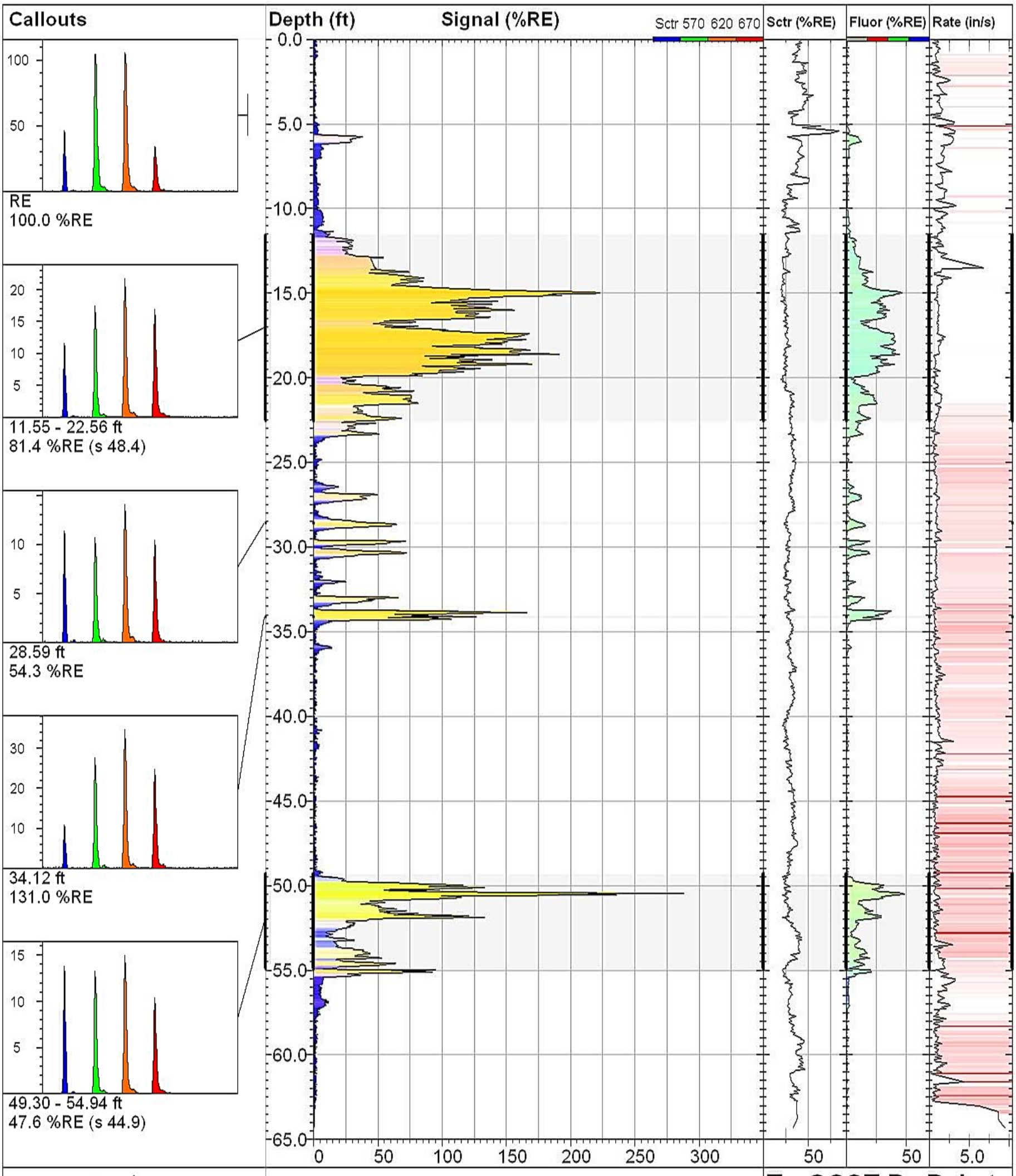
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **67.02 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **121.2 %RE @ 62.25 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-23 13:45 PST**



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2013T-034

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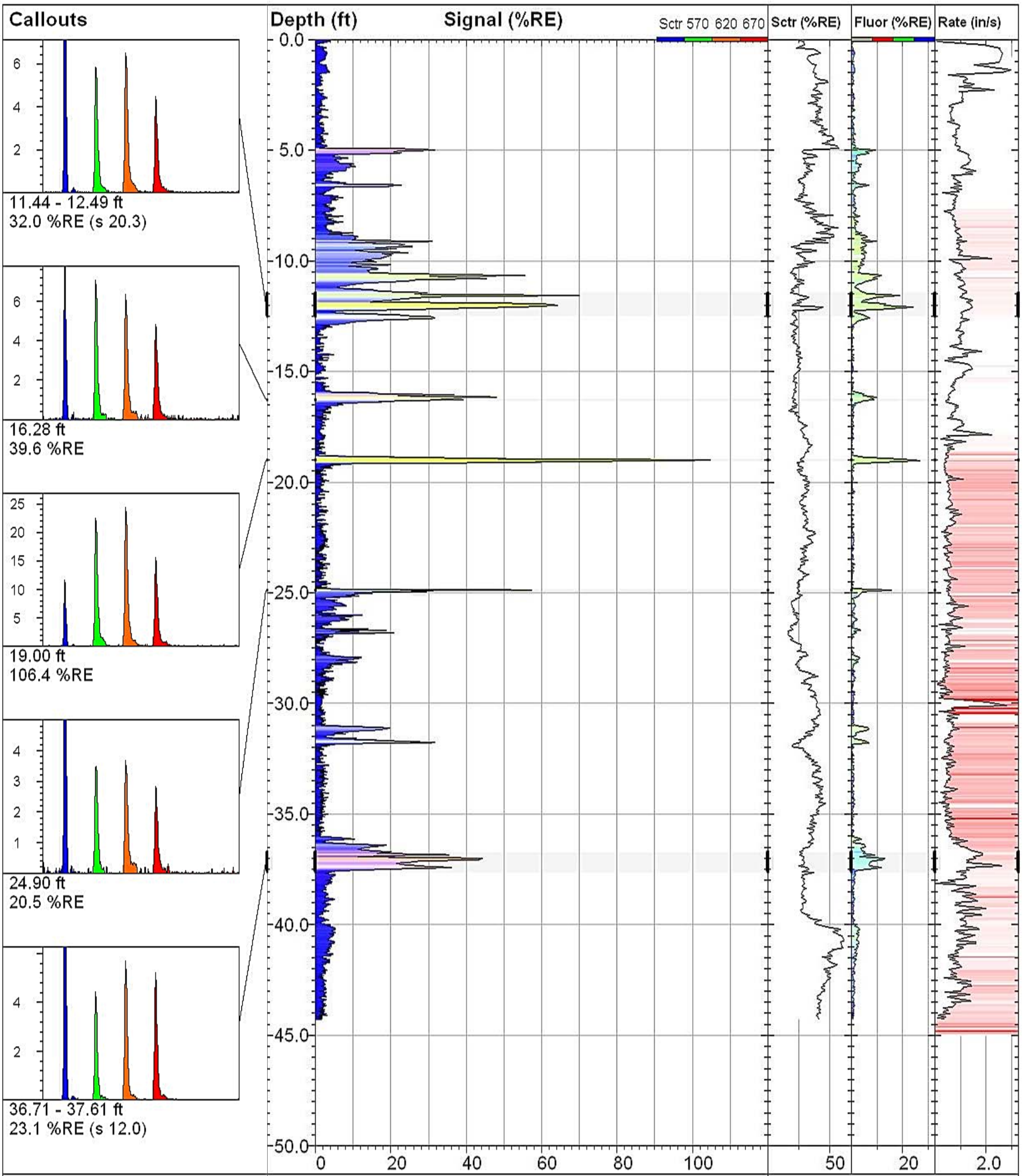
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **64.28 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **288.8 %RE @ 50.45 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-22 14:55 PST**



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2013T-035

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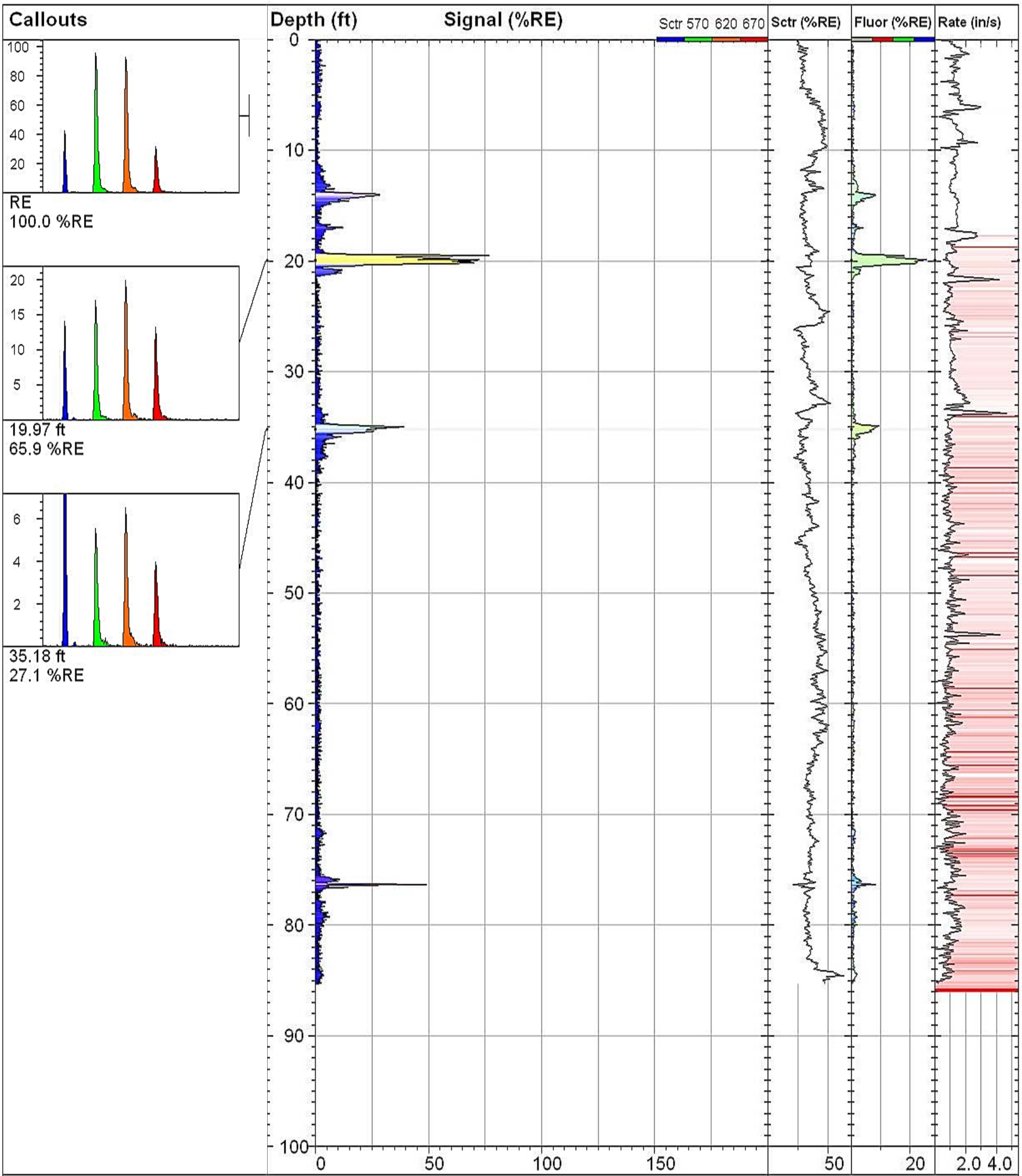
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **44.29 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **106.4 %RE @ 19.00 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 09:21 PST**



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2013T-036

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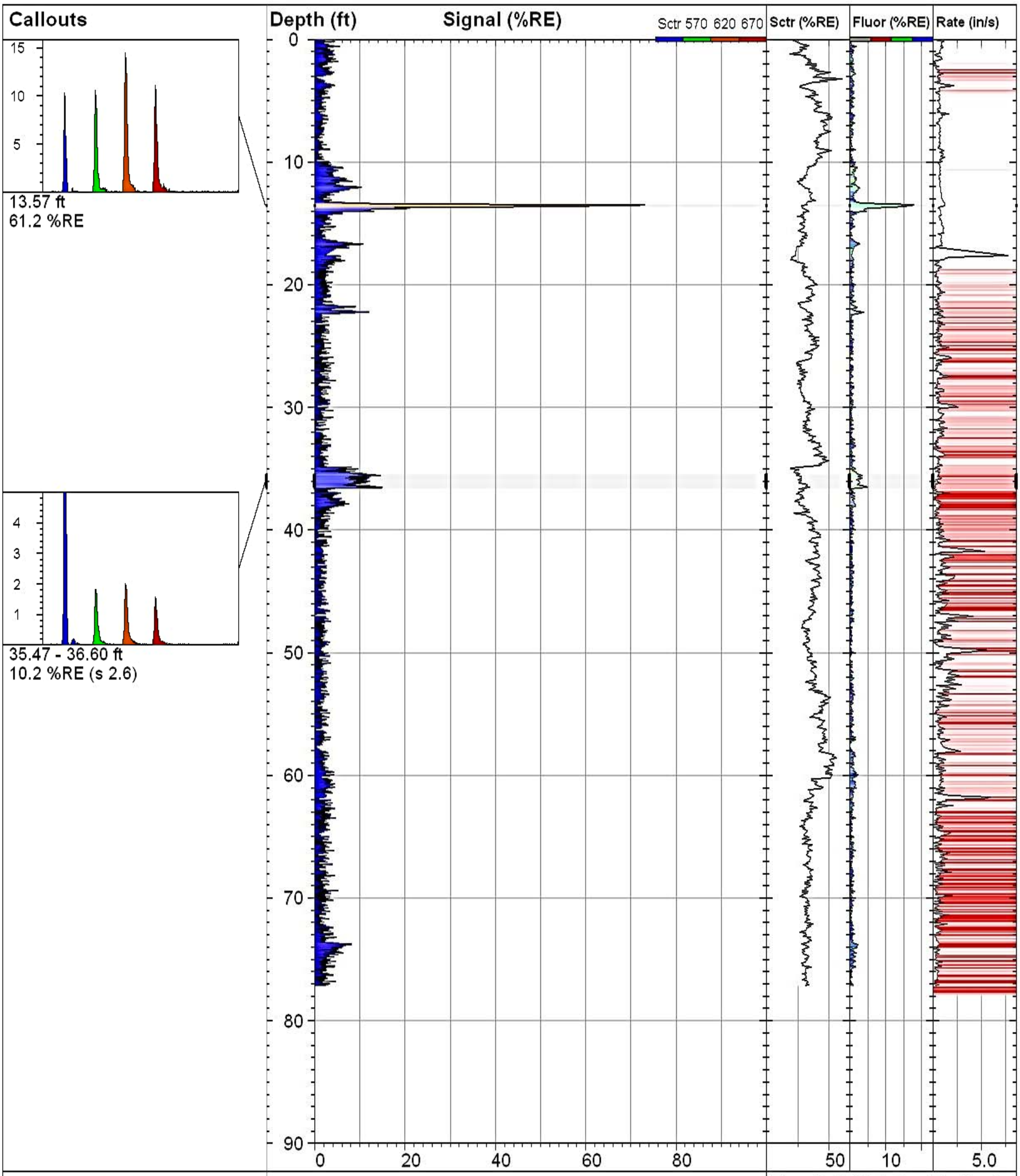
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **85.31 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **77.7 %RE @ 19.51 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-23 10:53 PST**



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2013T-036R

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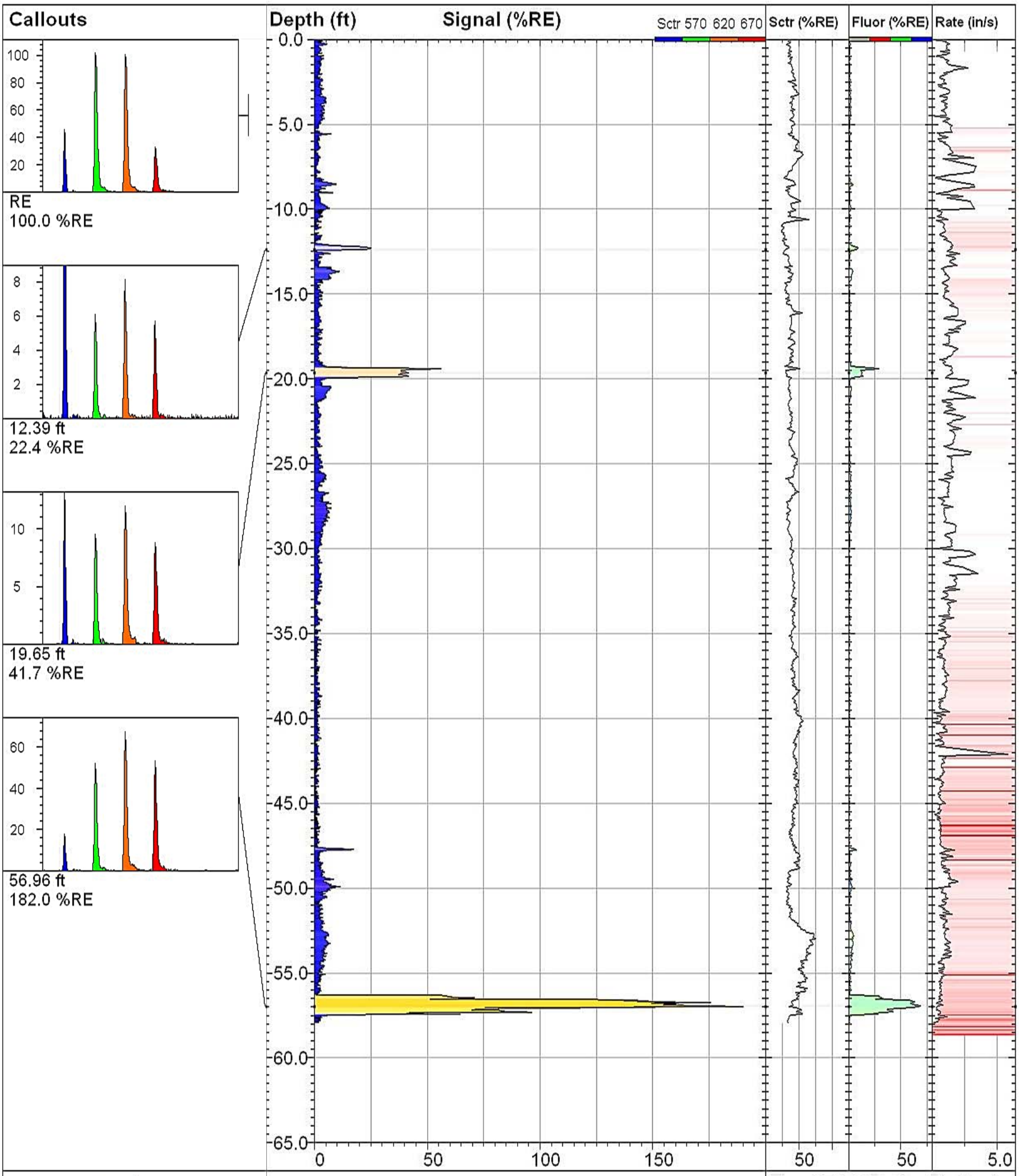
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **77.14 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **73.3 %RE @ 13.50 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 13:55 PST**



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2013T-037

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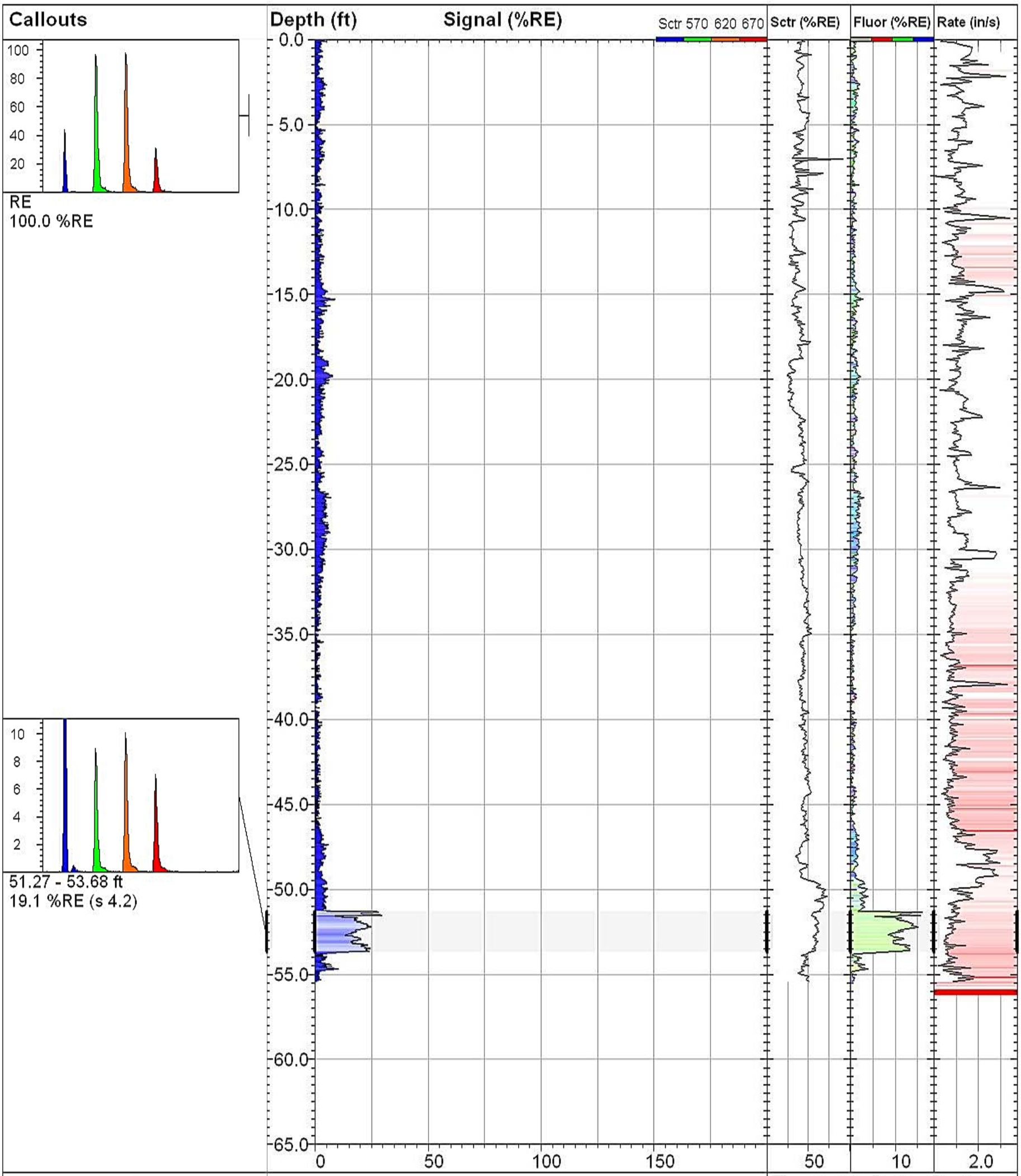
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **57.90 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **191.3 %RE @ 56.99 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-21 15:30 PST**



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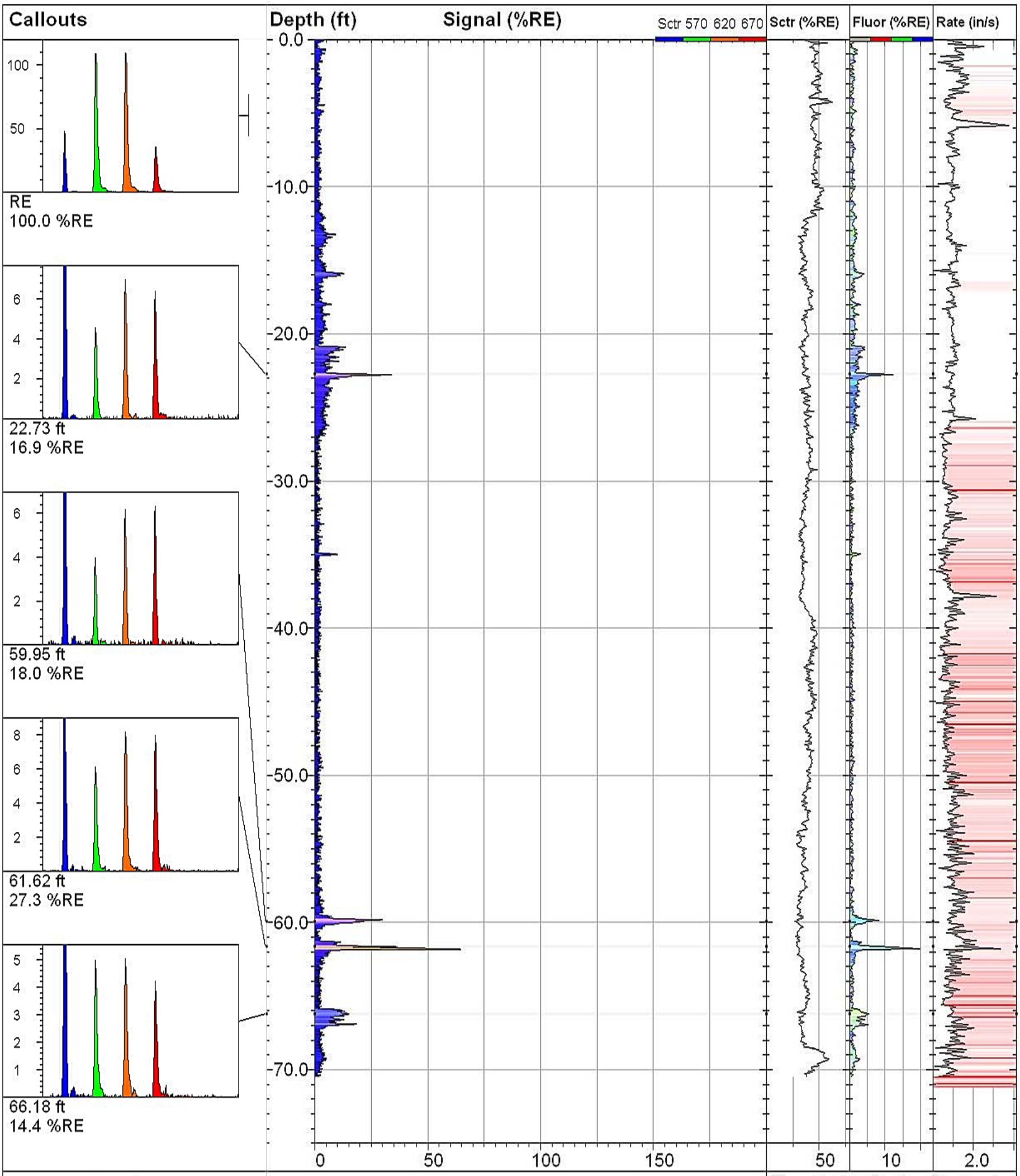
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **55.43 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **29.3 %RE @ 51.52 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-22 08:15 PST**



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2013T-039

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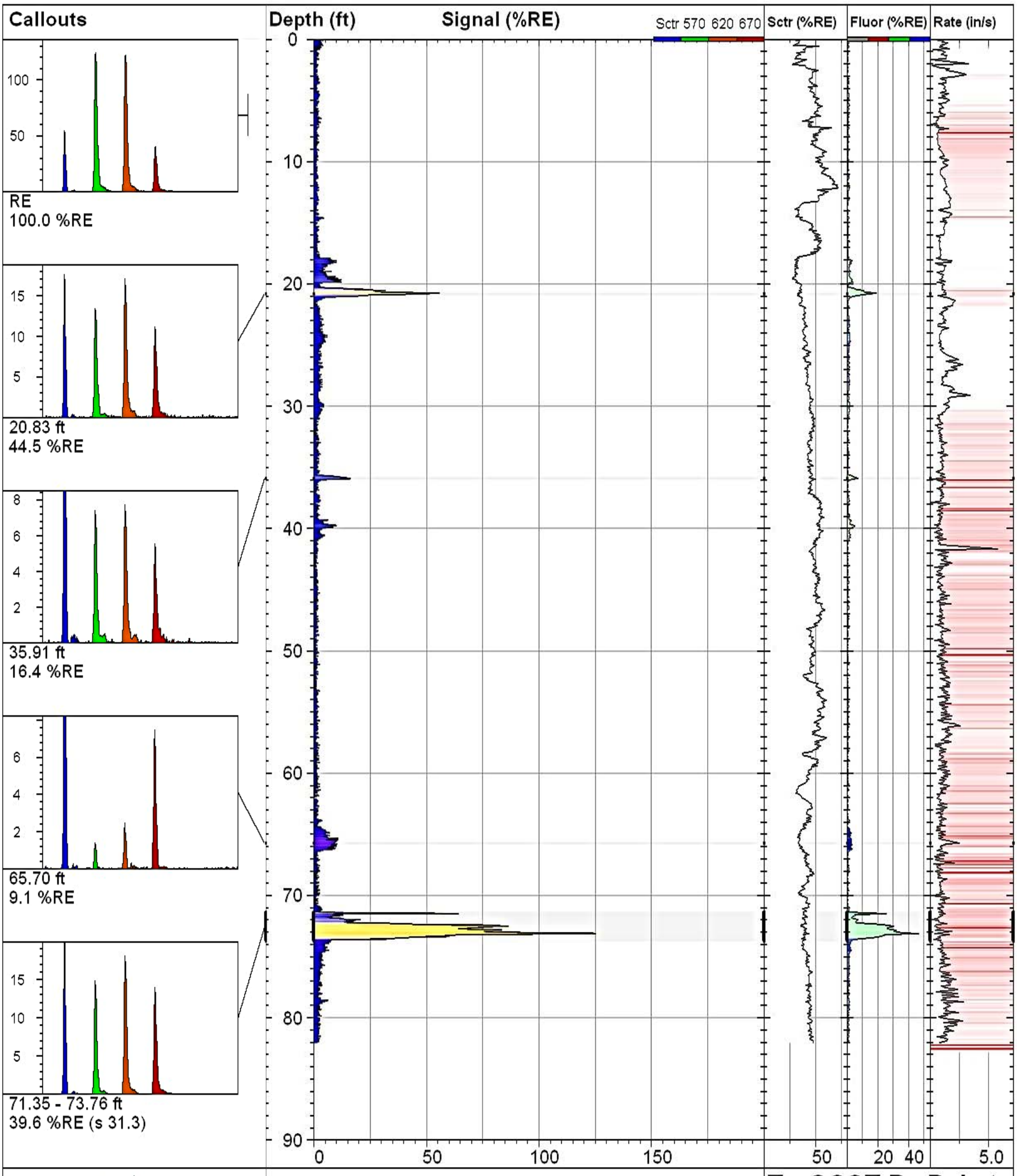
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **70.46 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **65.1 %RE @ 61.83 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-21 08:21 PST**



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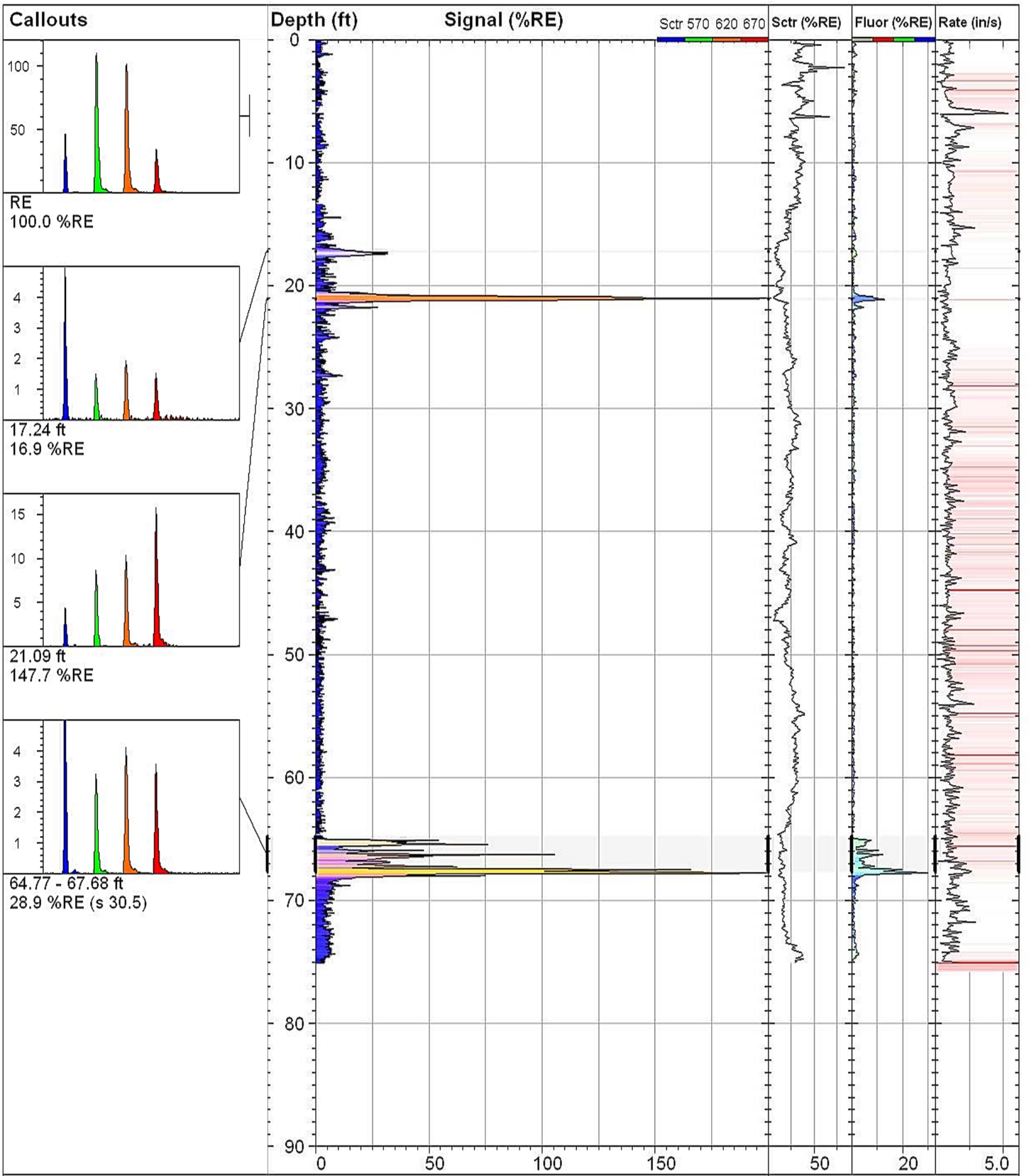
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **82.03 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **129.8 %RE @ 73.09 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-17 15:12 PST**



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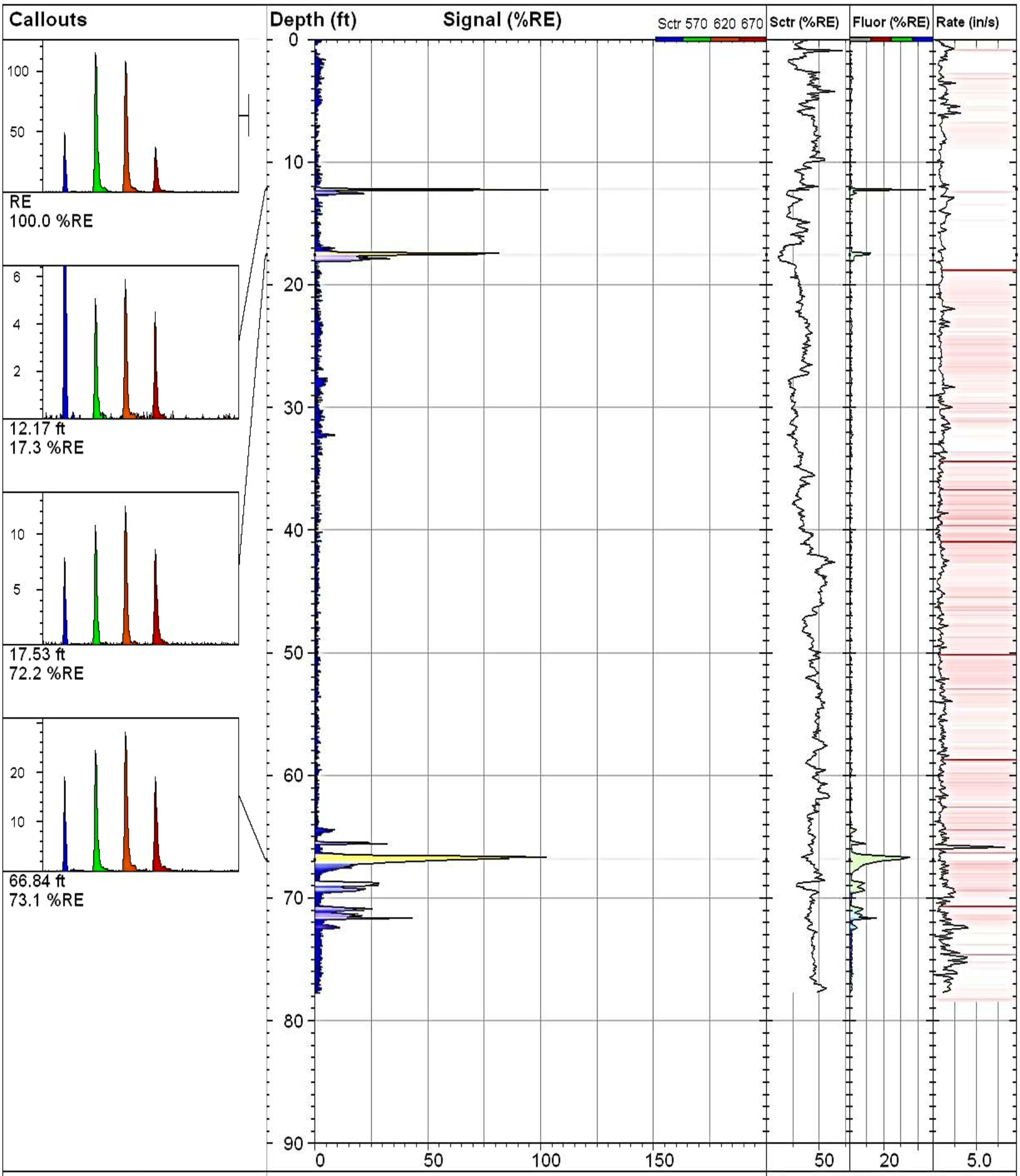
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **75.08 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **208.5 %RE @ 21.04 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-16 11:22 PST**



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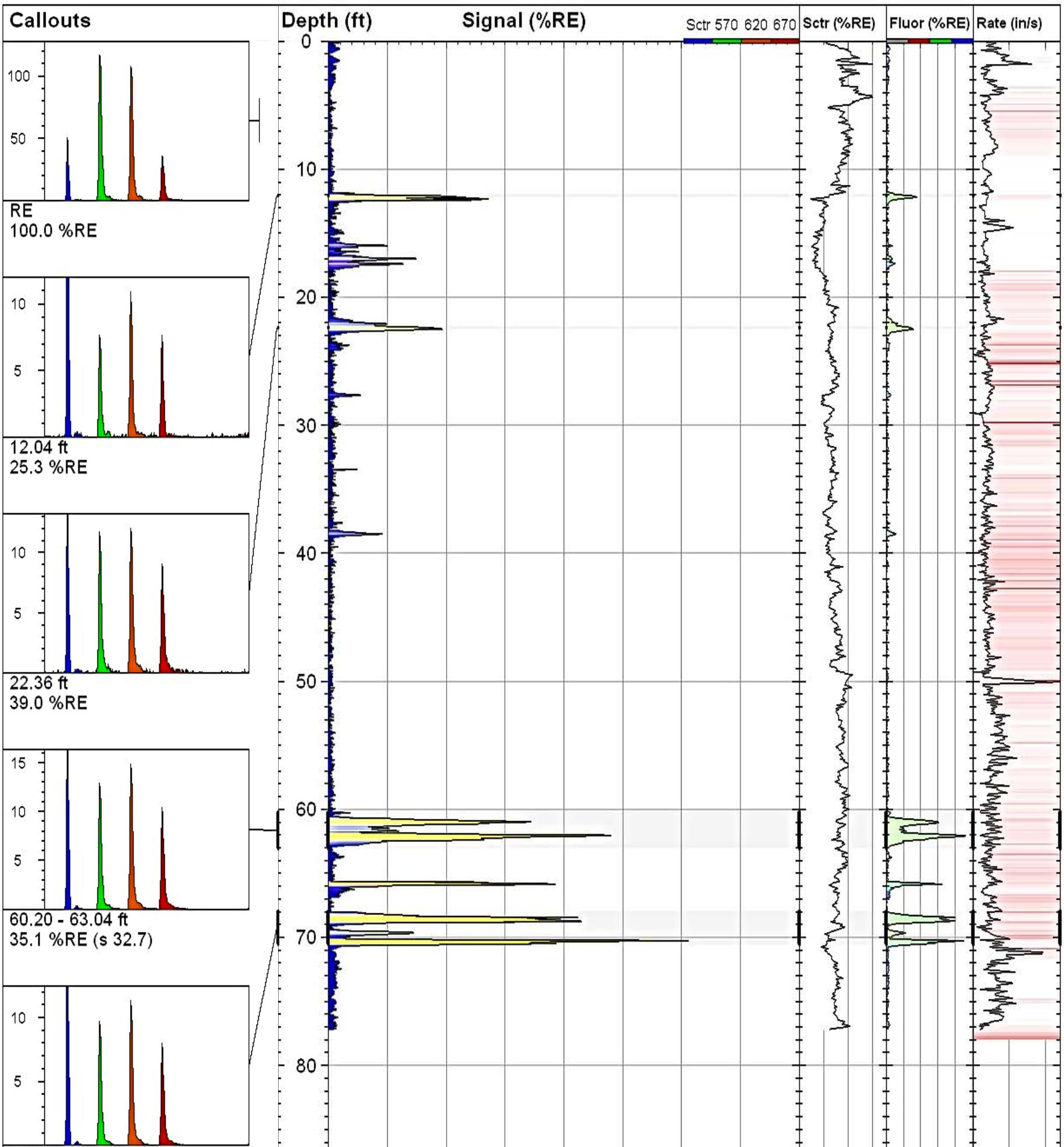
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **77.74 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **109.1 %RE @ 12.25 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-16 13:09 PST**



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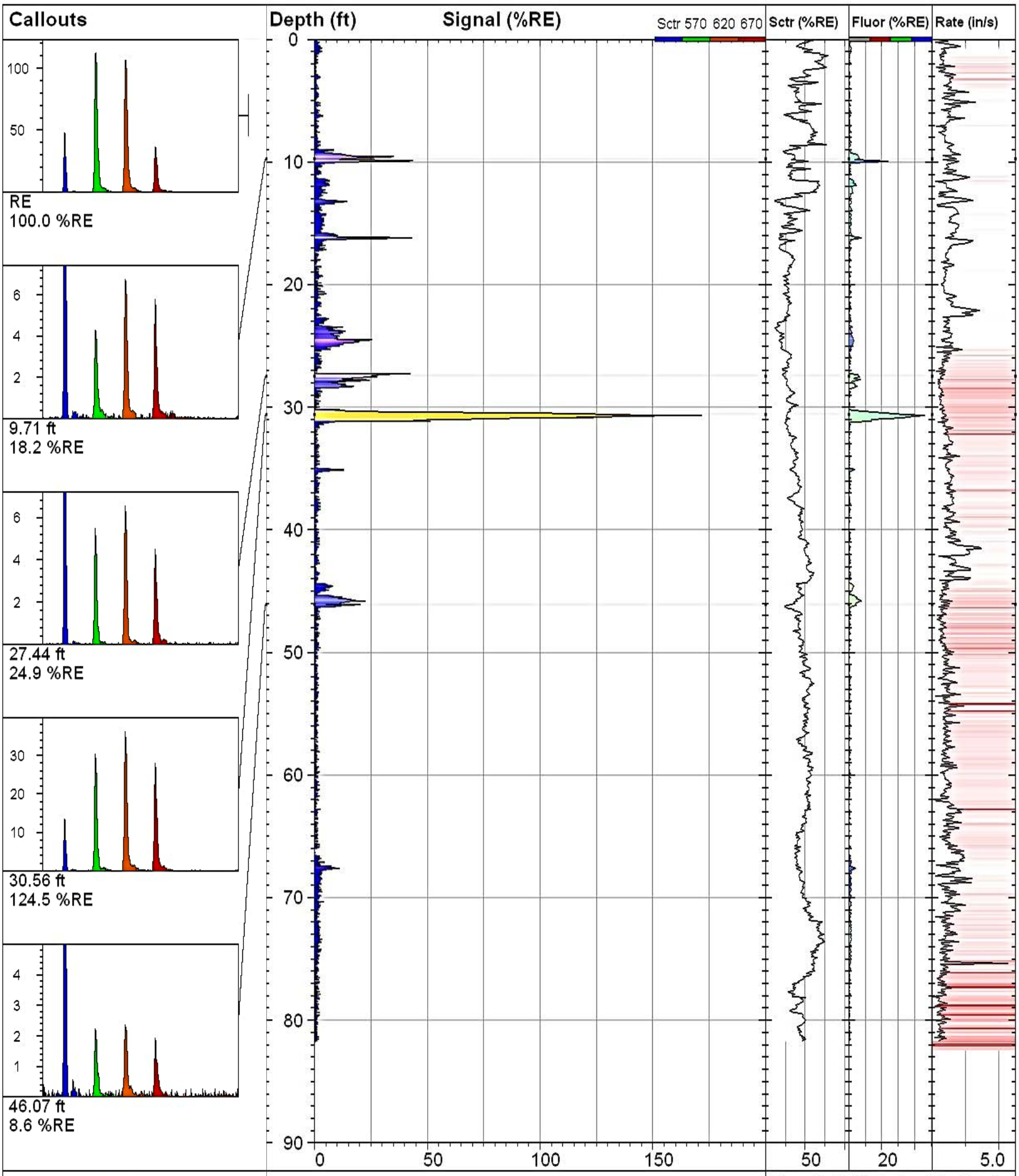
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **77.23 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **156.1 %RE @ 70.26 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-17 09:28 PST**



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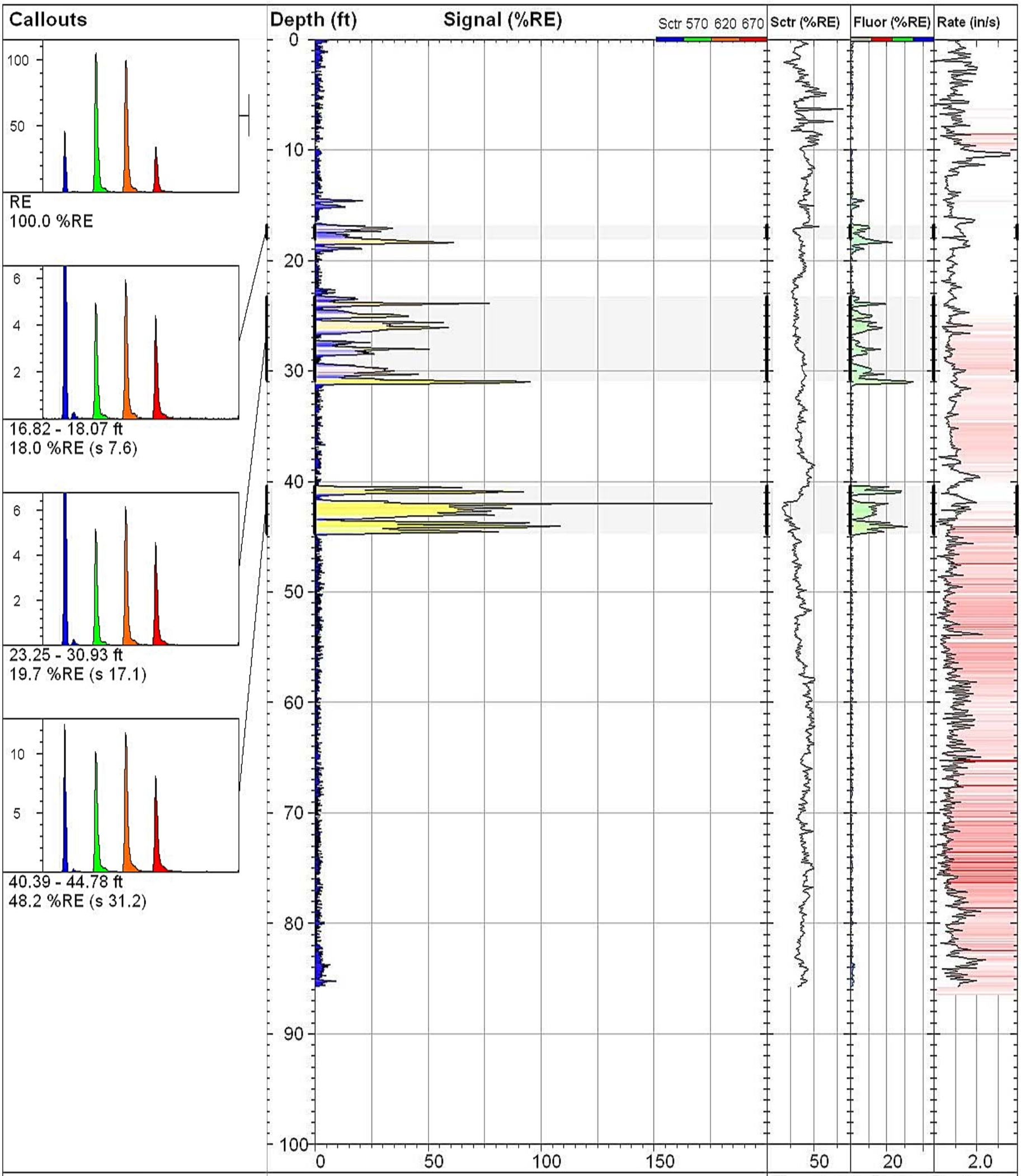
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **81.72 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **176.1 %RE @ 30.68 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-16 14:27 PST**



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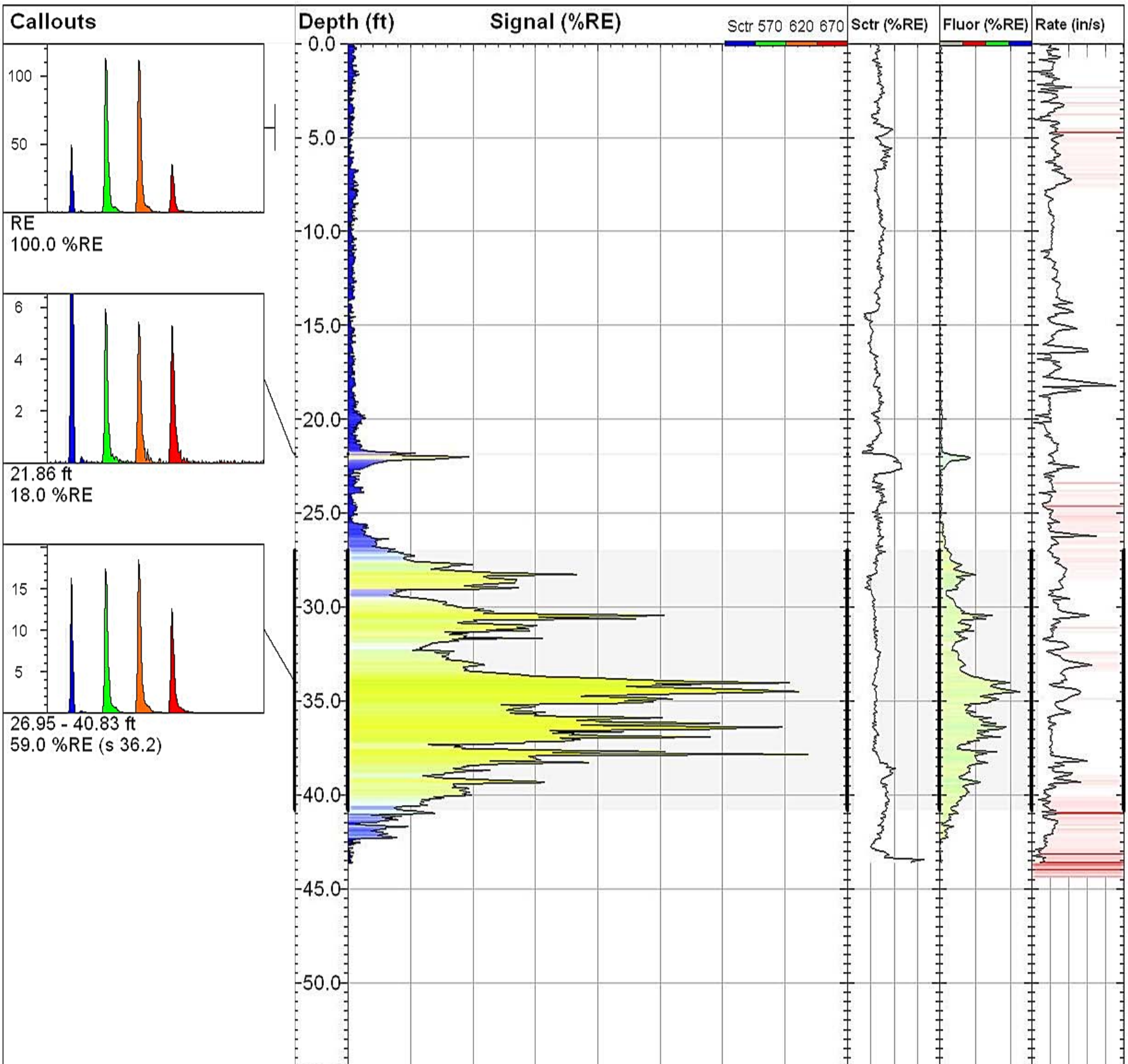
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **85.69 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **181.1 %RE @ 41.98 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-17 08:18 PST**



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2013T-046

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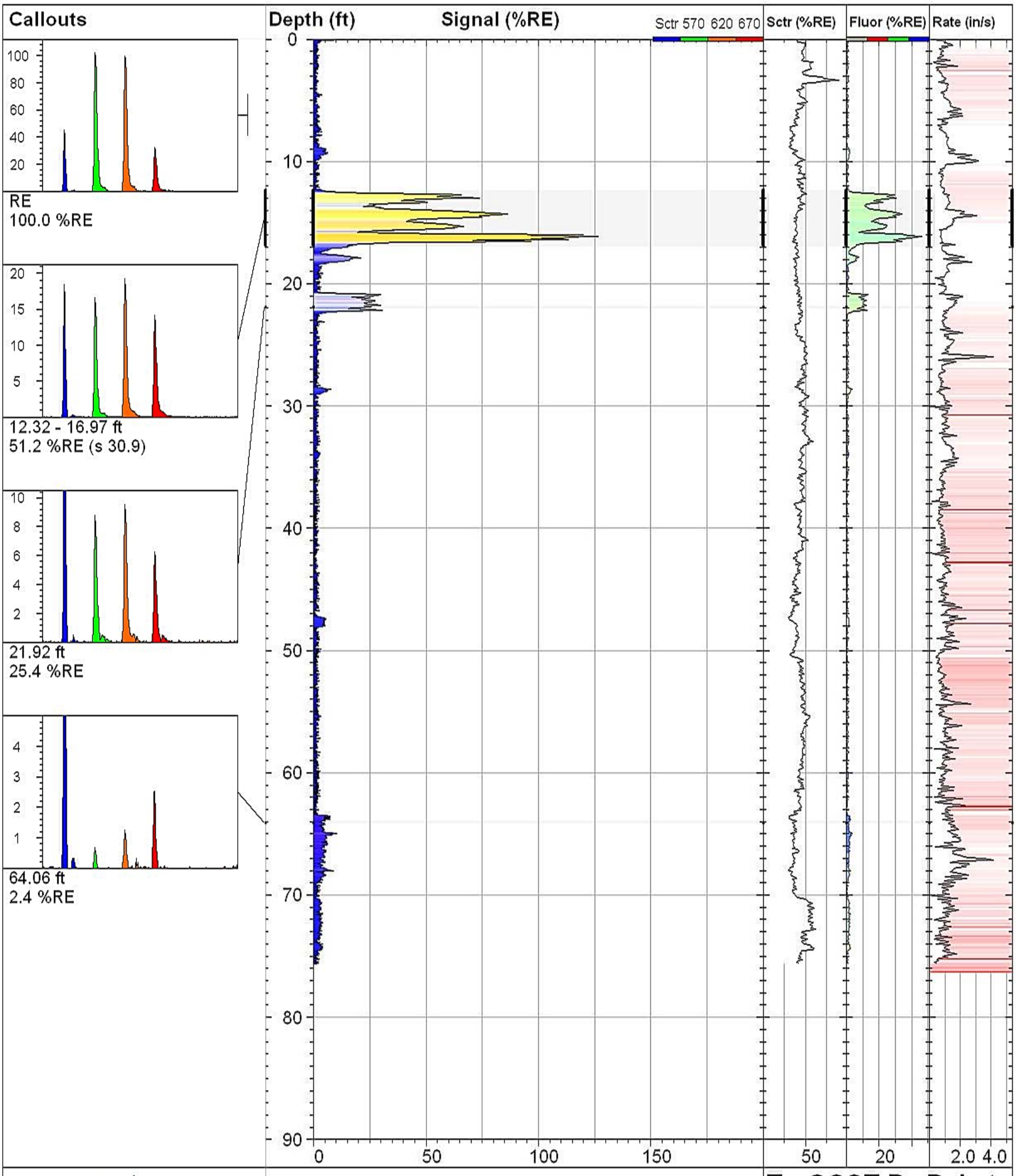
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **43.65 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **189.3 %RE @ 37.83 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-22 13:53 PST**



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2013T-047

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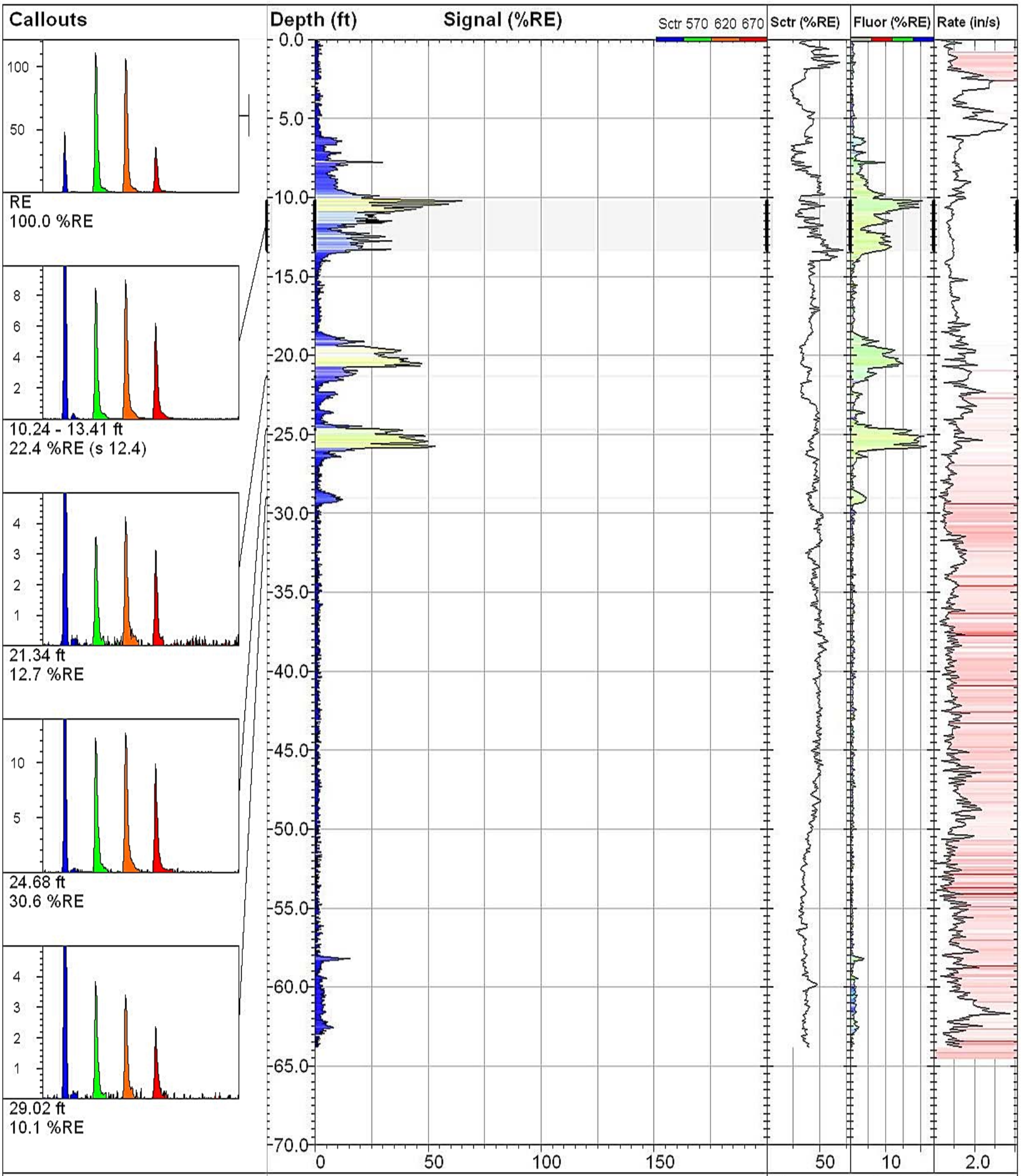
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **75.61 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **126.8 %RE @ 16.12 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-21 14:10 PST**



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2013T-048

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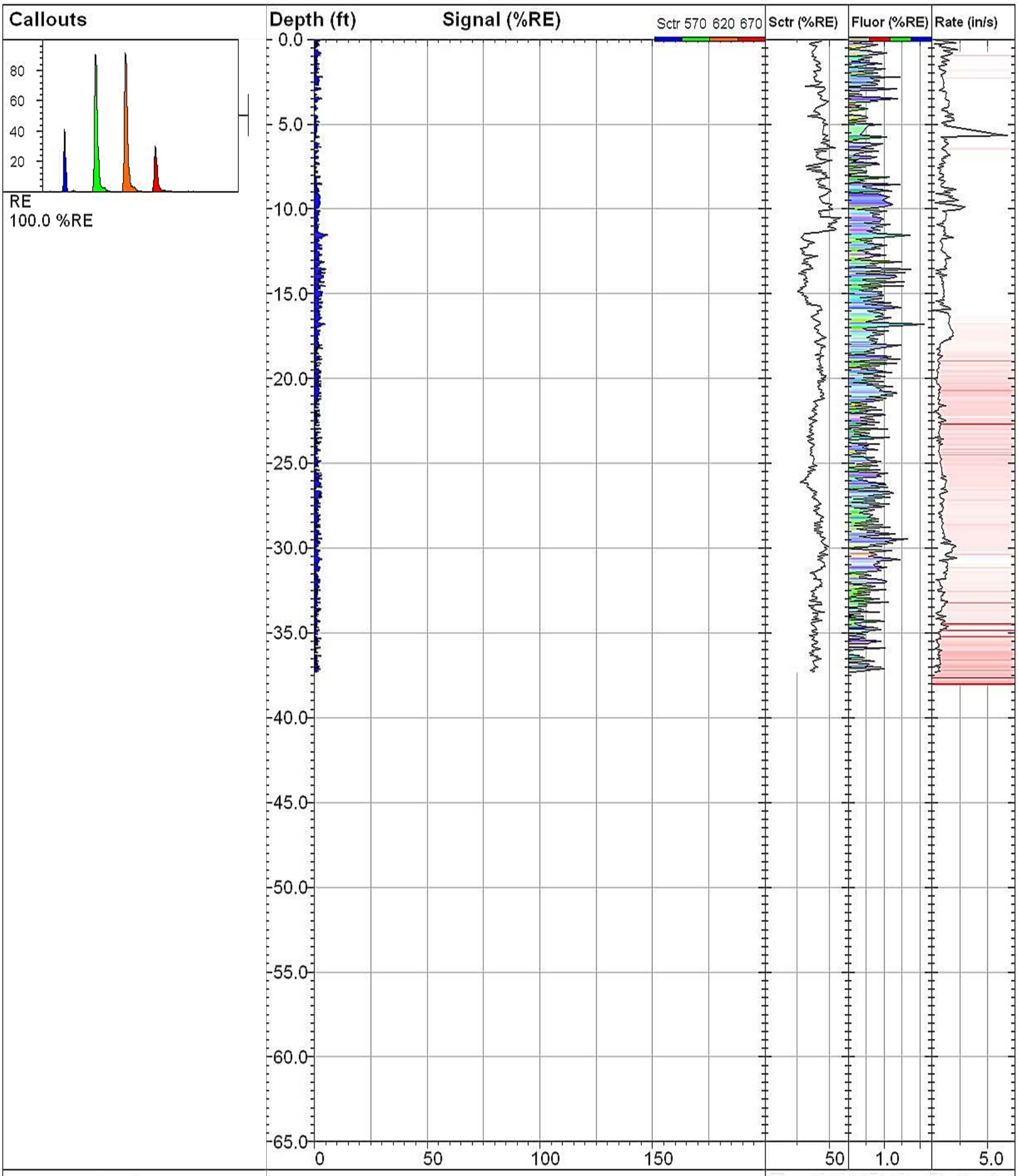
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **63.82 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **65.8 %RE @ 10.23 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-21 11:13 PST**



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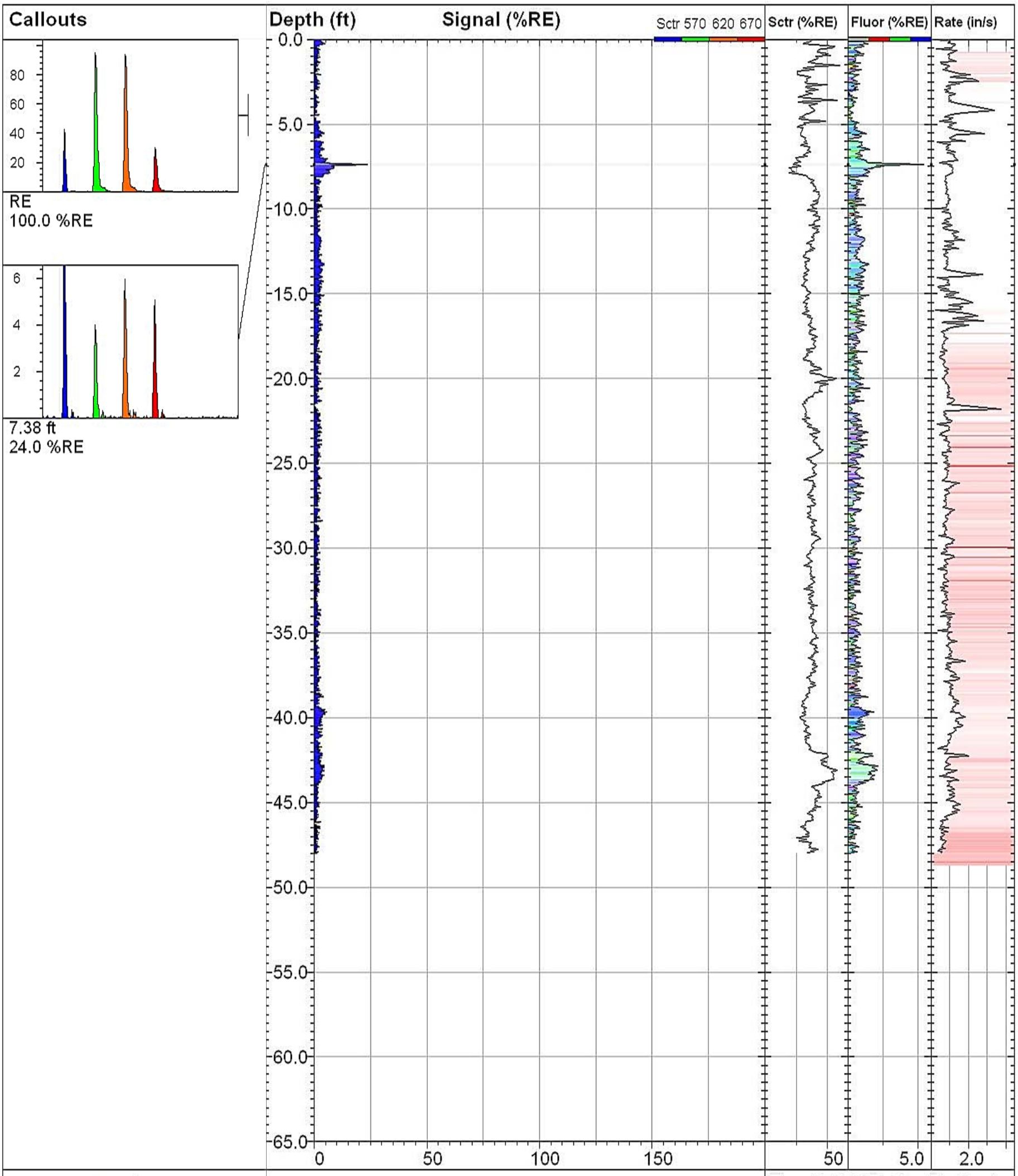
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **37.31 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **5.7 %RE @ 11.53 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 10:08 PST**



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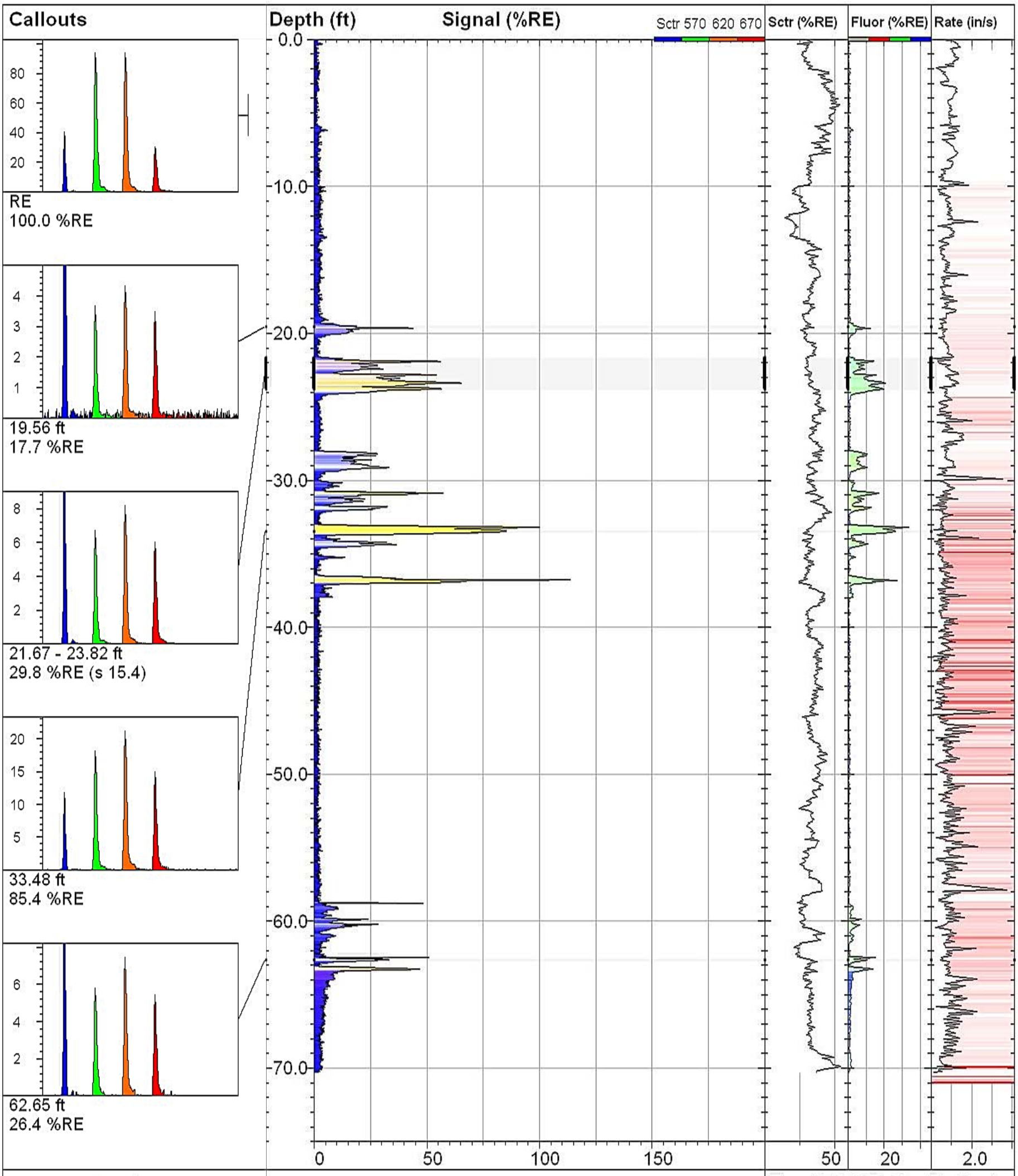
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **47.99 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **24.0 %RE @ 7.38 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-24 10:51 PST**



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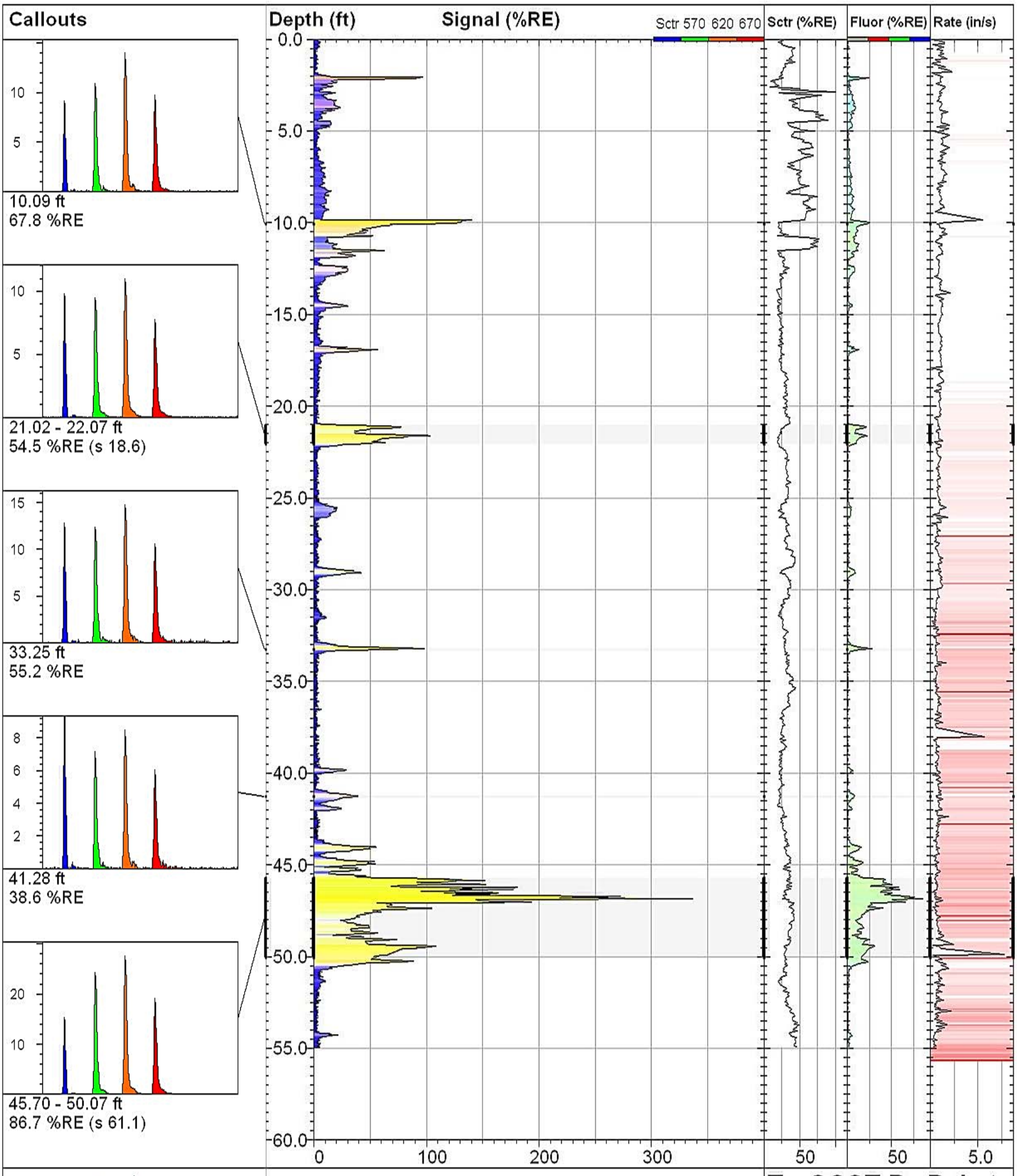
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **70.27 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **120.8 %RE @ 36.76 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 14:42 PST**



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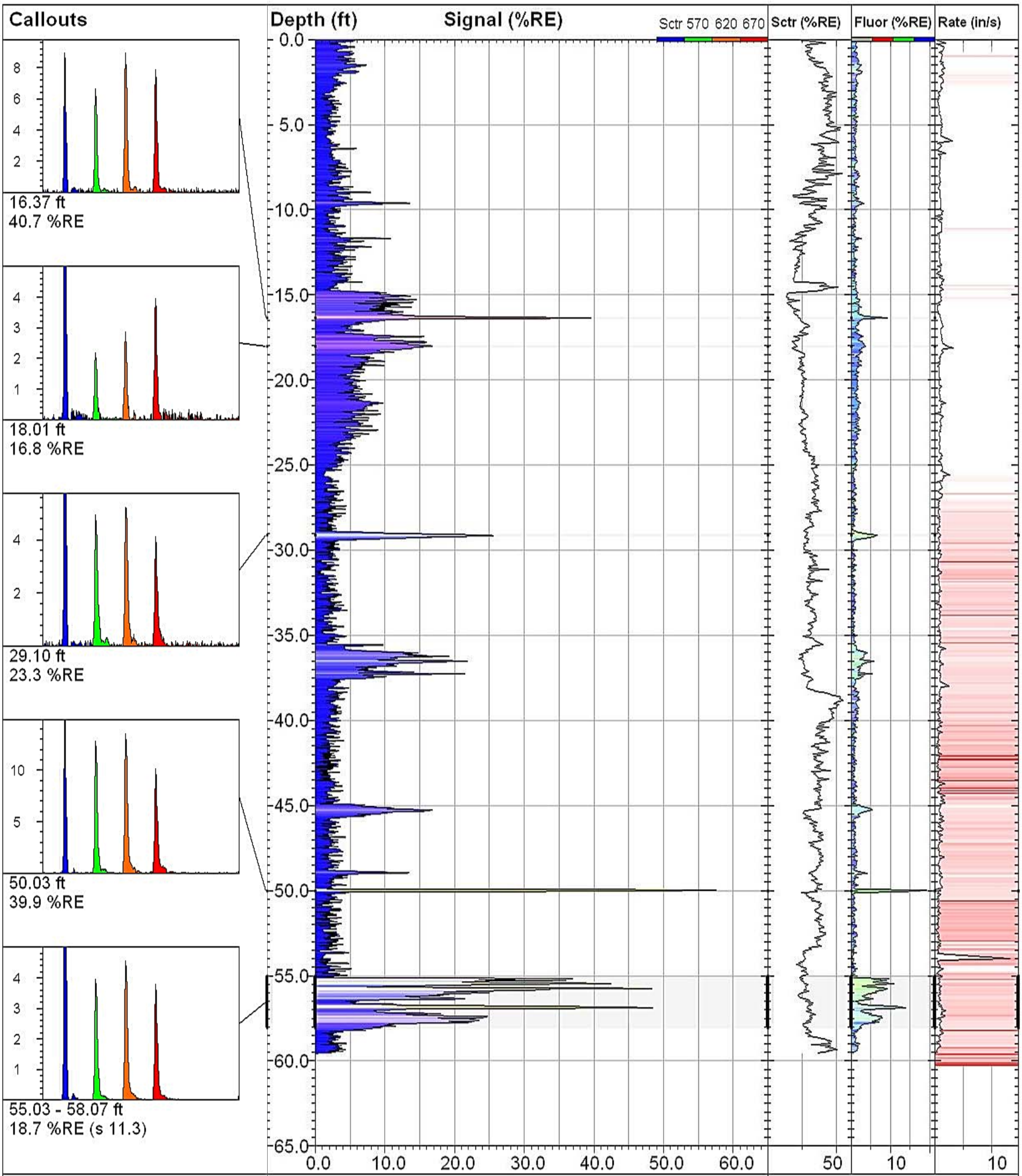
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **54.95 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **337.4 %RE @ 46.85 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-28 08:32 PST**



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2013T-054

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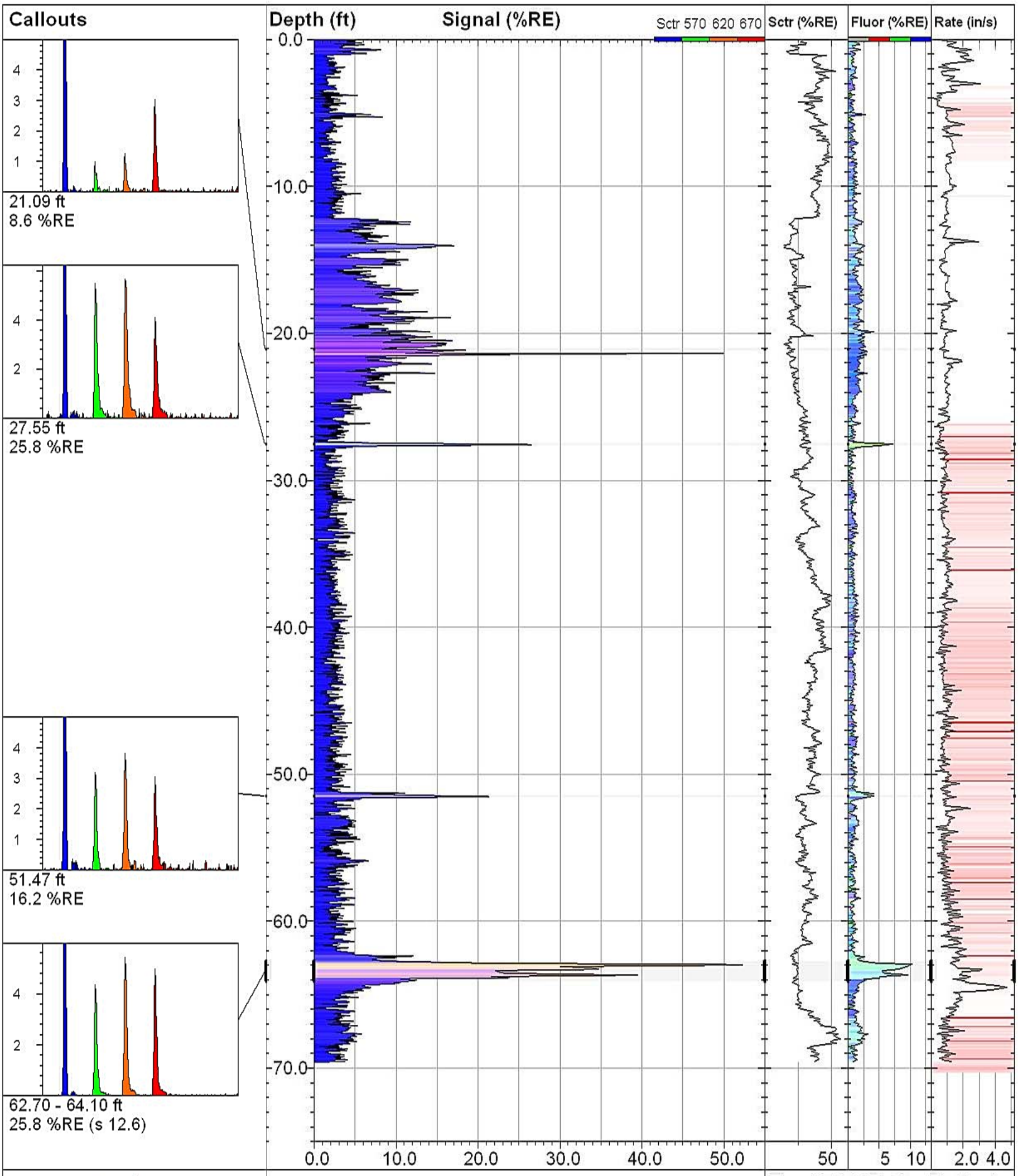
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **59.56 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **57.7 %RE @ 49.95 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-28 11:03 PST**



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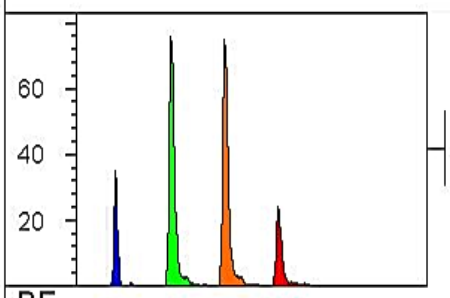
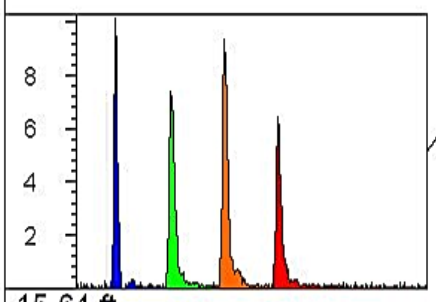
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **69.57 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **52.4 %RE @ 62.98 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-28 09:31 PST**

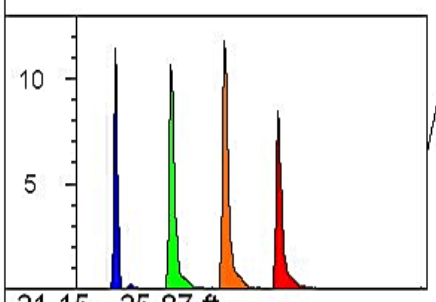
Callouts



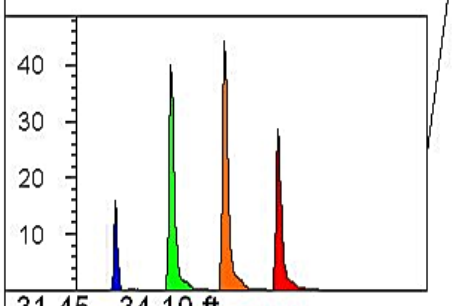
RE
100.0 %RE



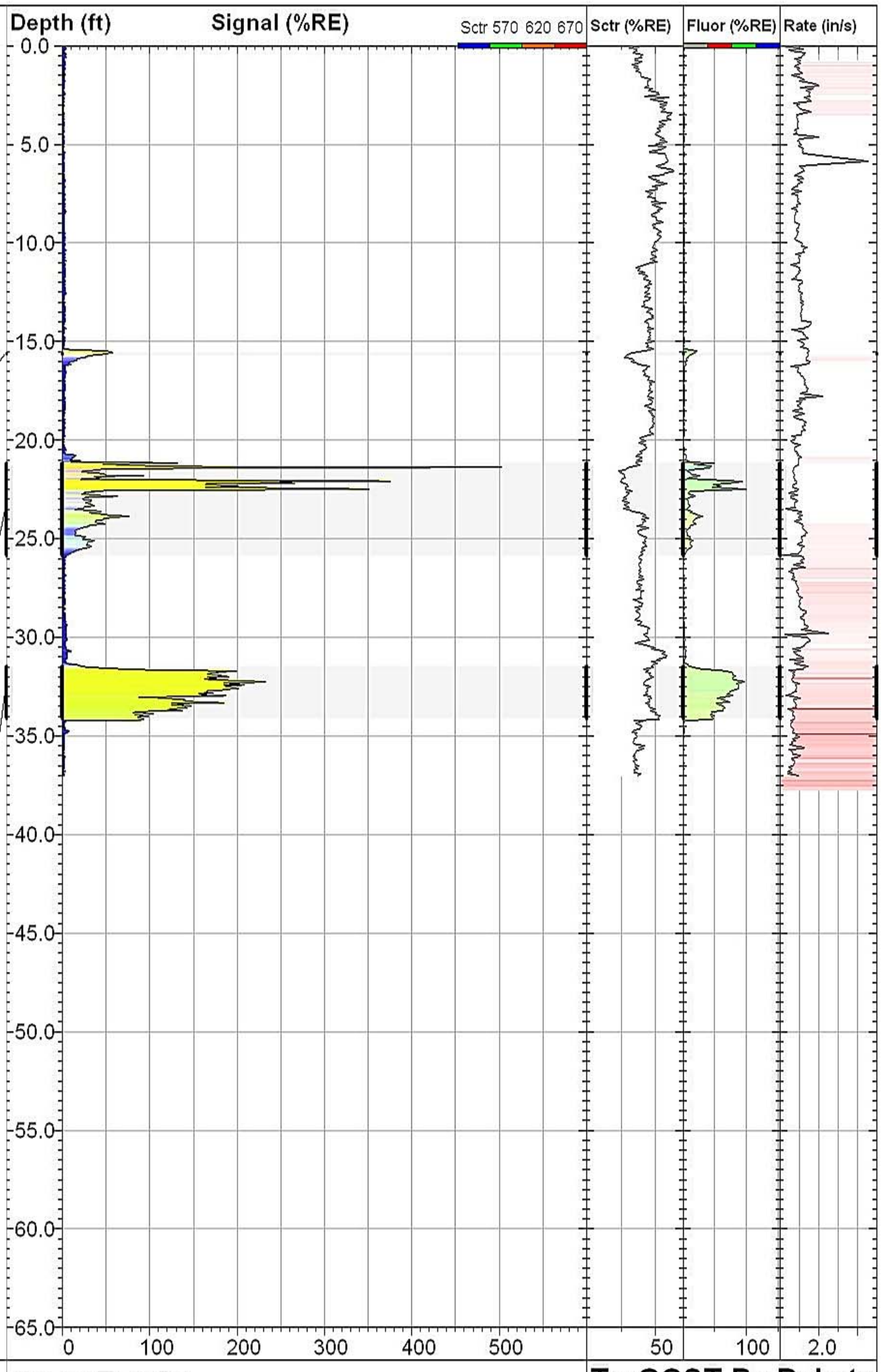
15.64 ft
47.6 %RE



21.15 - 25.87 ft
57.7 %RE (s 85.3)



31.45 - 34.10 ft
145.3 %RE (s 44.9)



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2013T-056

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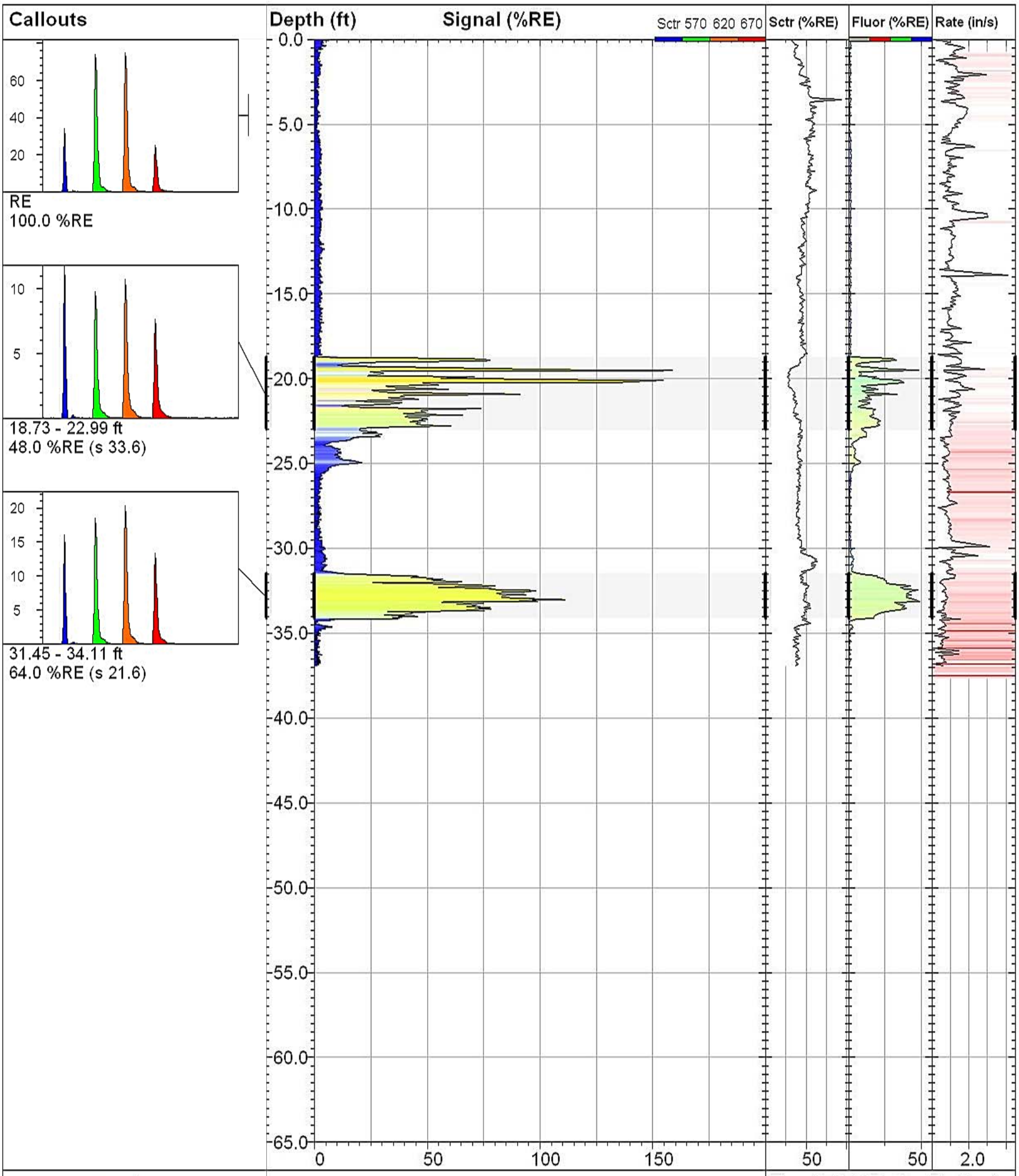
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **37.02 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **537.7 %RE @ 21.37 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 13:32 PST**



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2013T-056R

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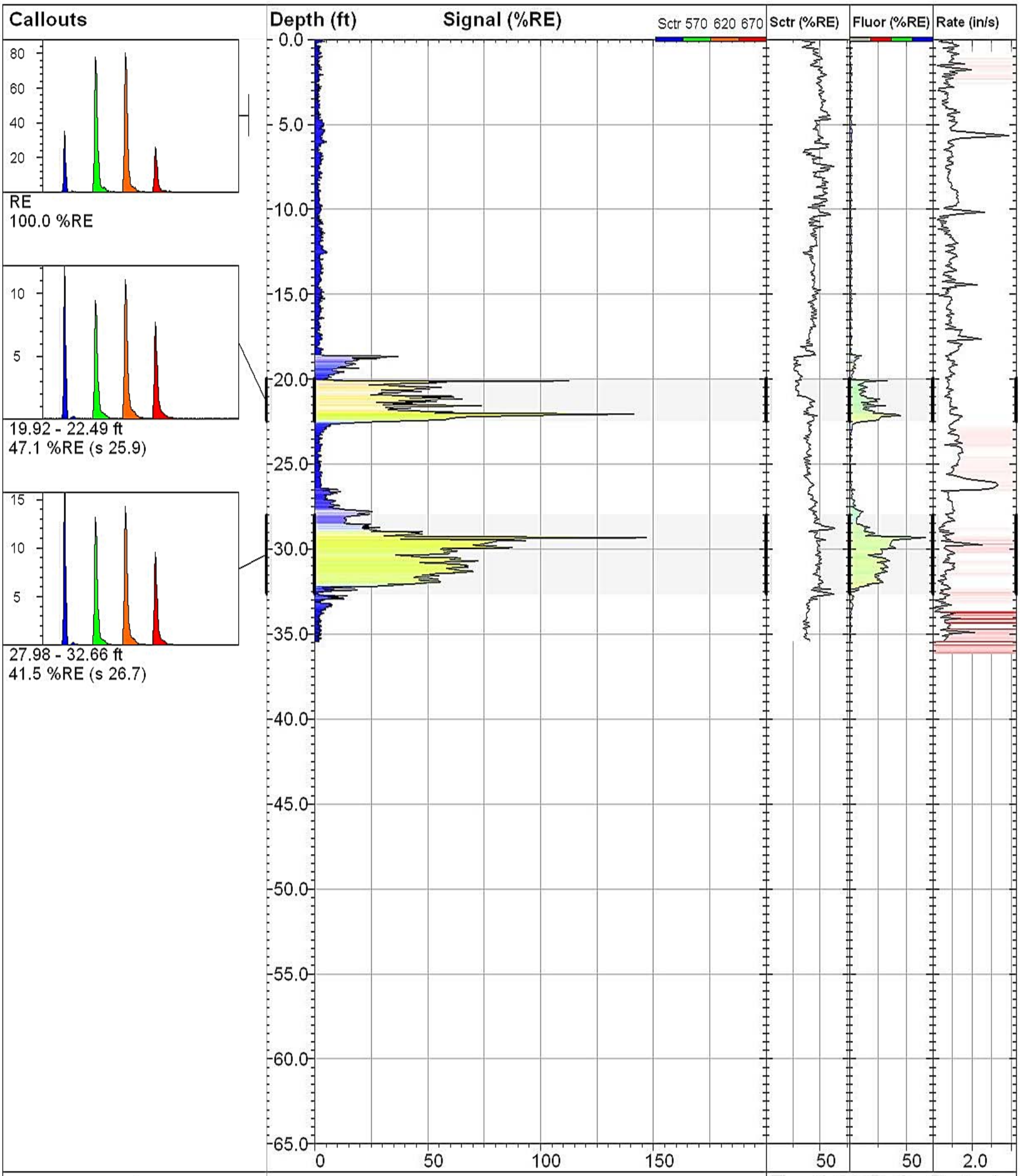
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **36.92 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **159.0 %RE @ 19.51 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 14:01 PST**



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2013T-058

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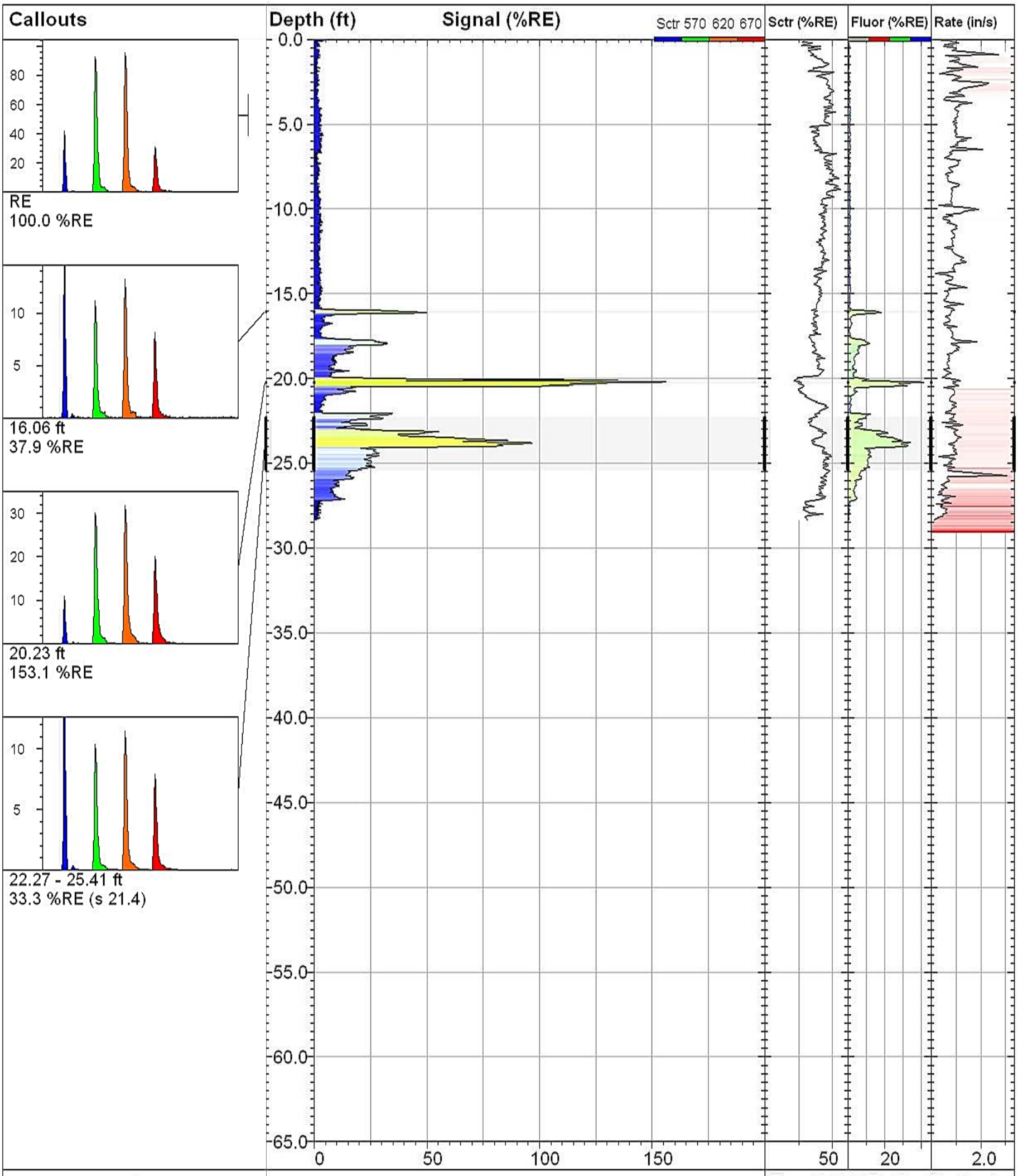
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **35.42 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **149.0 %RE @ 29.31 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 12:57 PST**



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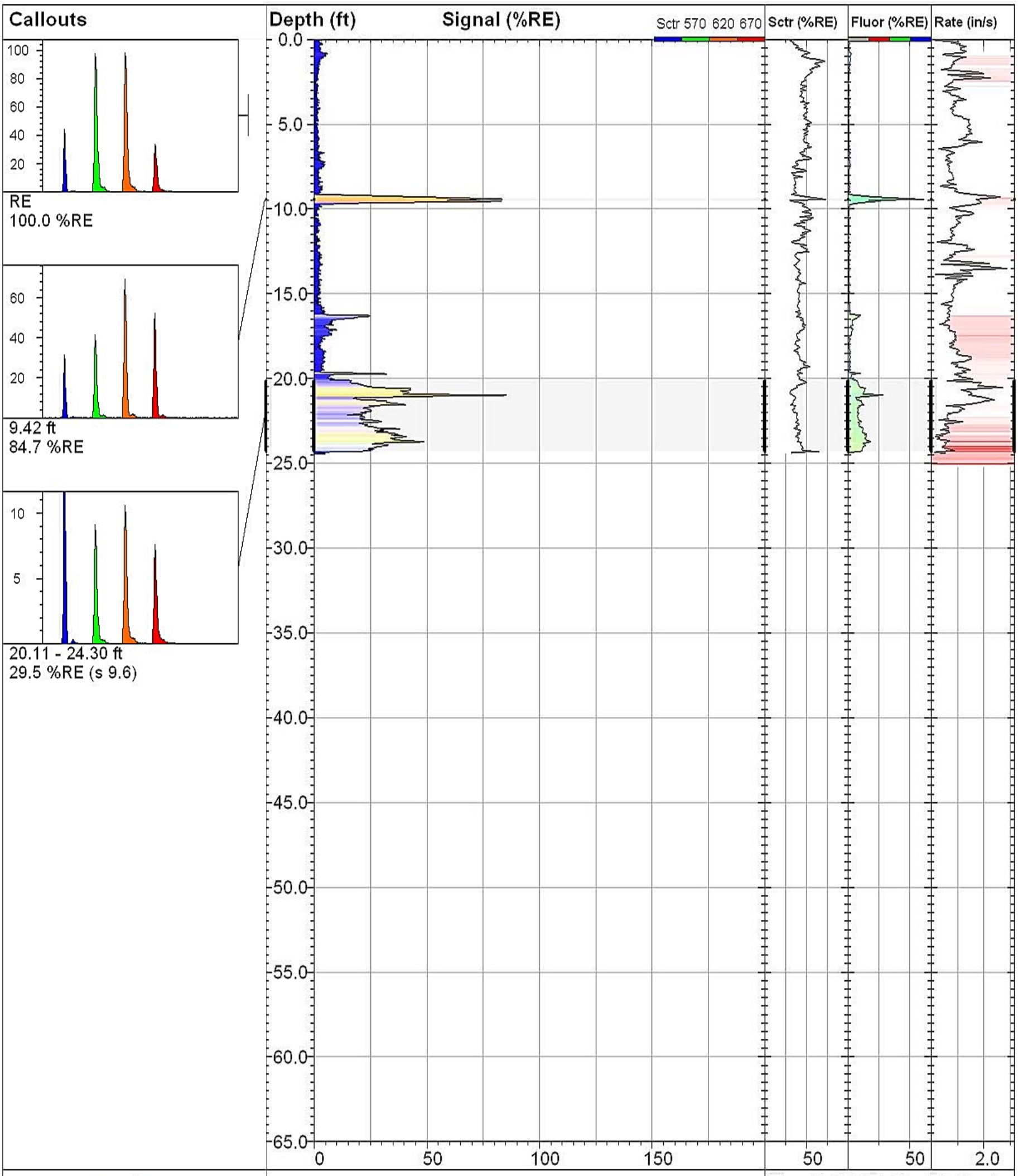
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **28.31 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **156.5 %RE @ 20.17 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 11:41 PST**



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2013T-060

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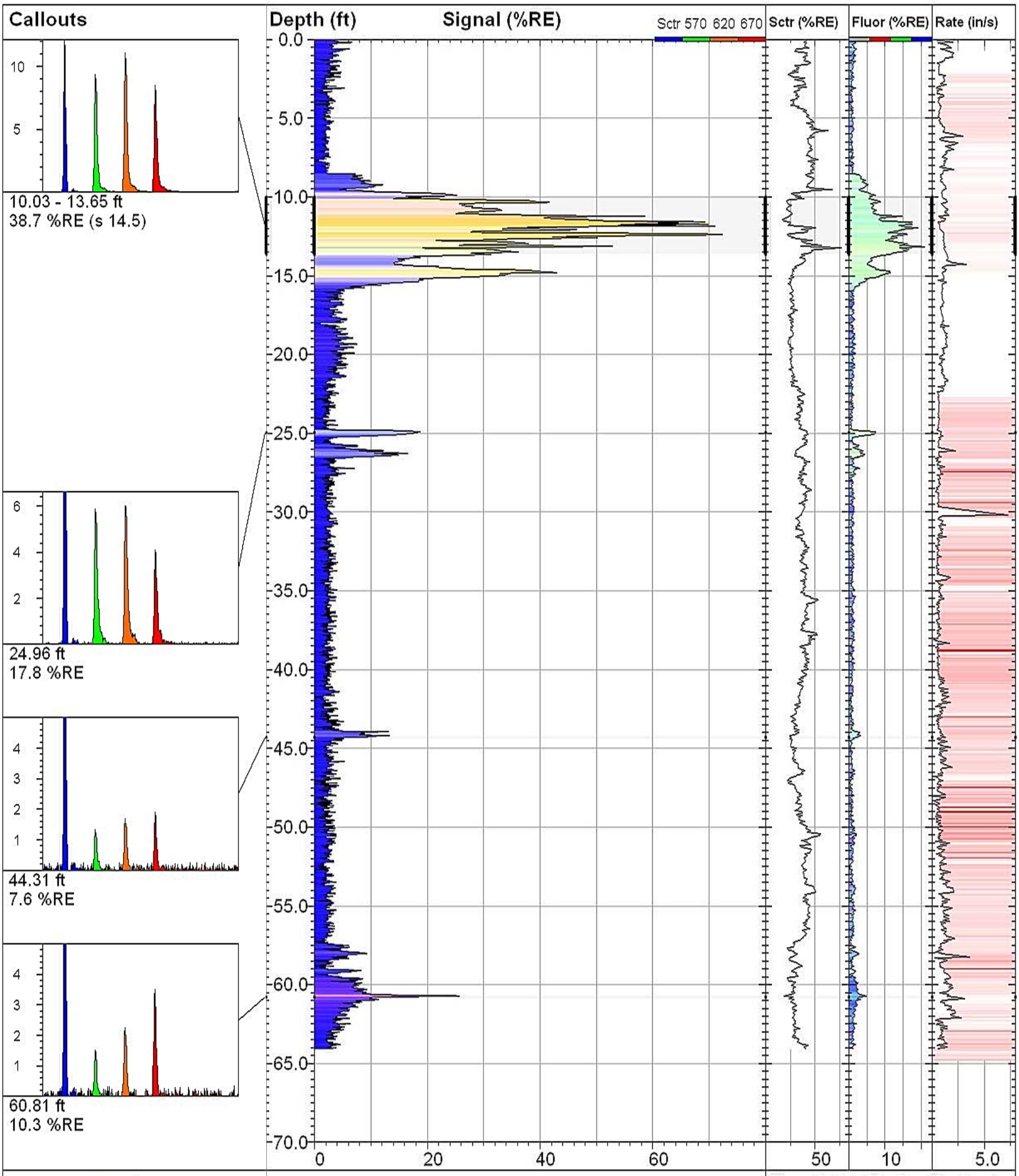
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.43 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **87.0 %RE @ 20.99 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-25 11:18 PST**



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2013T-061

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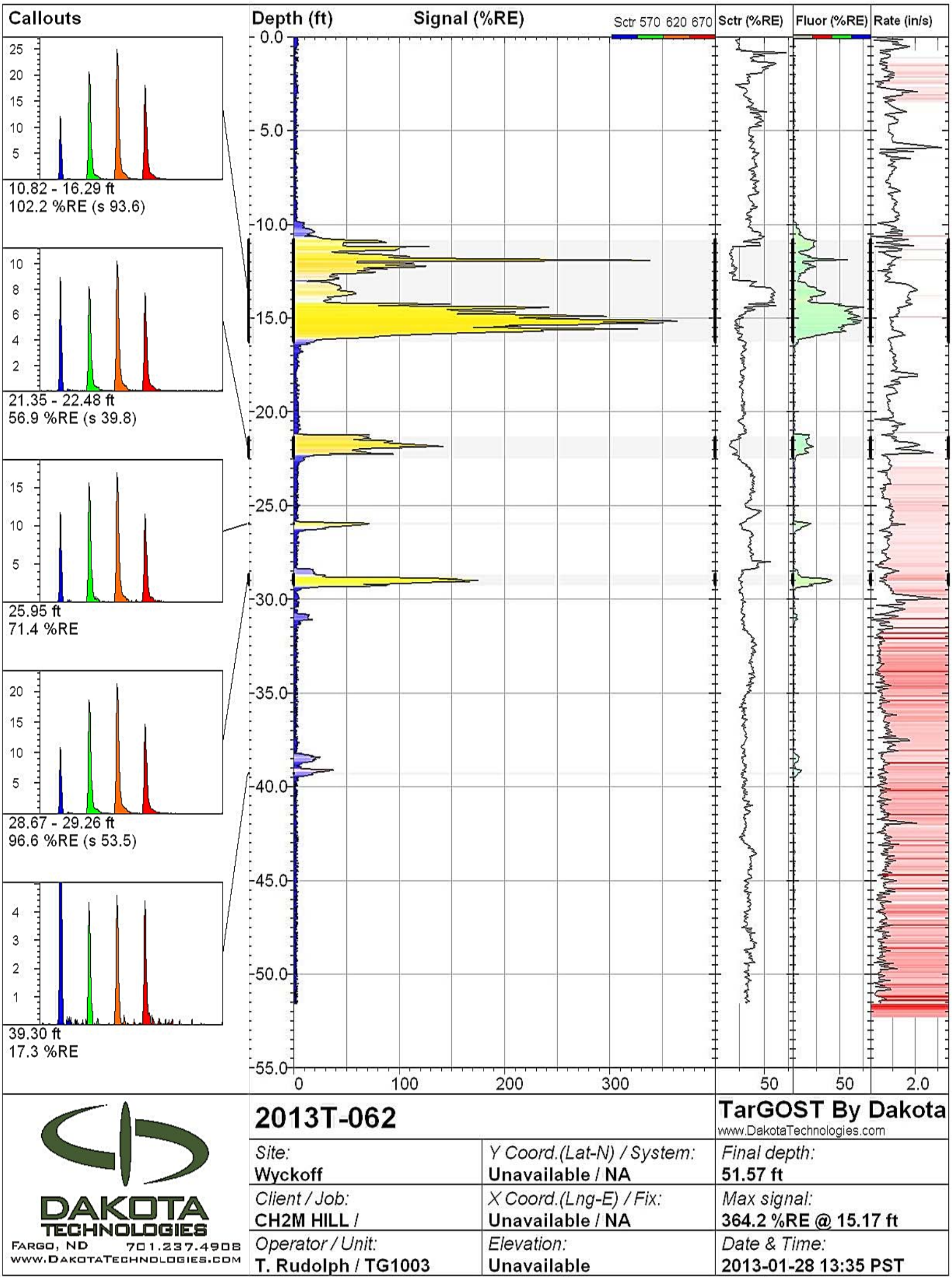
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **64.06 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **72.5 %RE @ 12.38 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-28 15:37 PST**



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2013T-062

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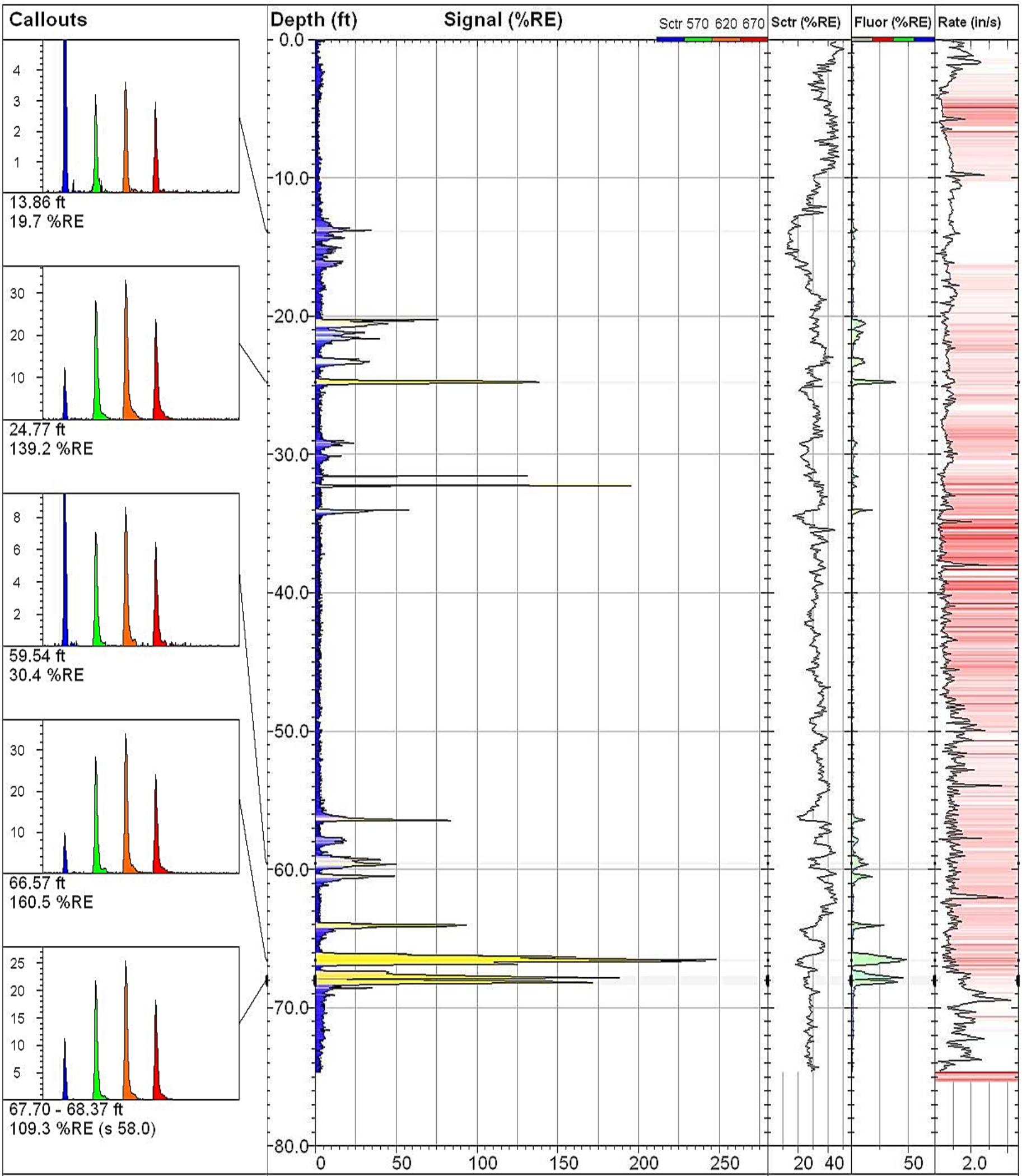
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **51.57 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **364.2 %RE @ 15.17 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-28 13:35 PST**



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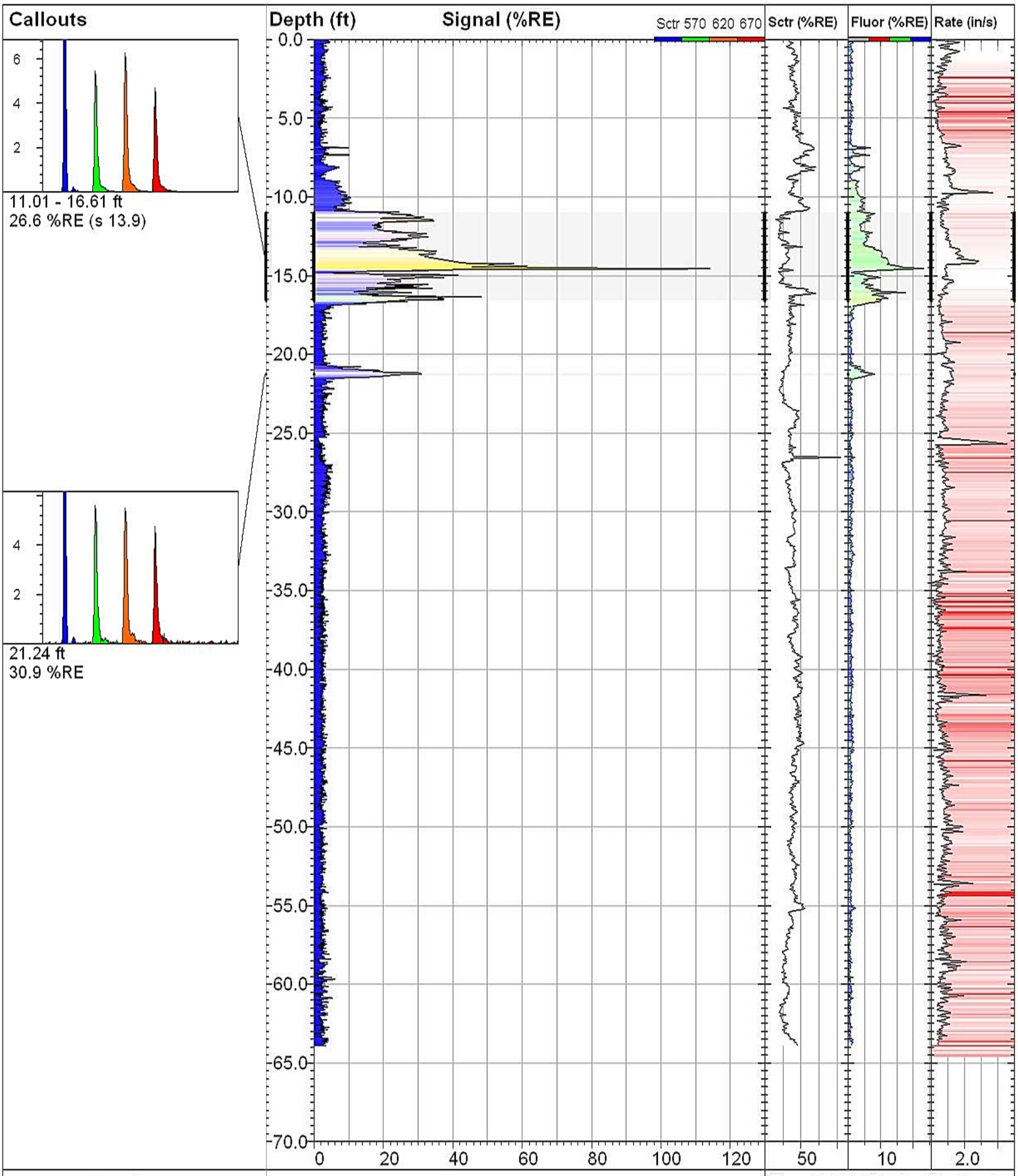
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **74.65 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **260.4 %RE @ 32.24 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-29 09:39 PST**



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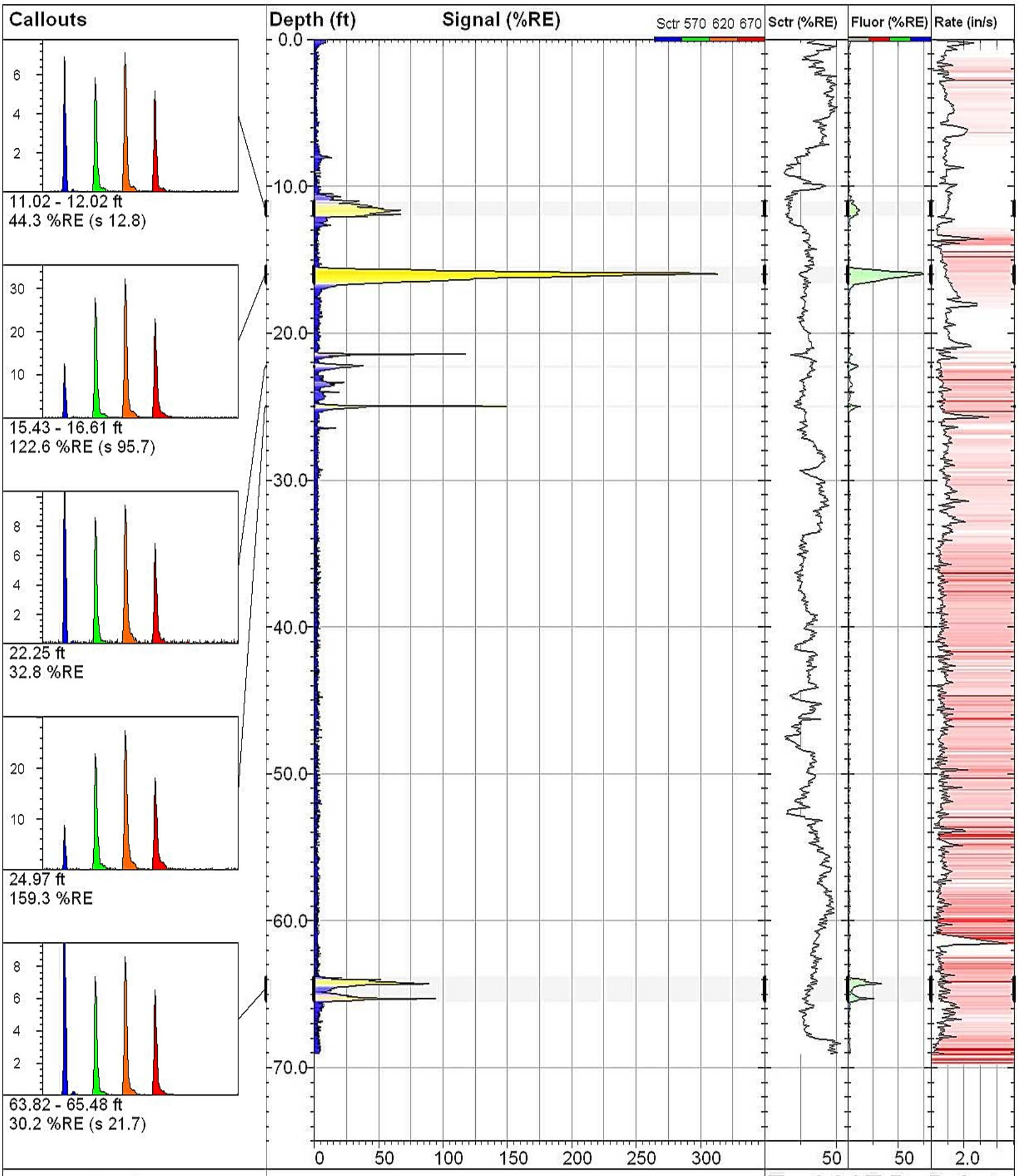
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **63.90 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **115.4 %RE @ 14.57 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-29 11:45 PST**



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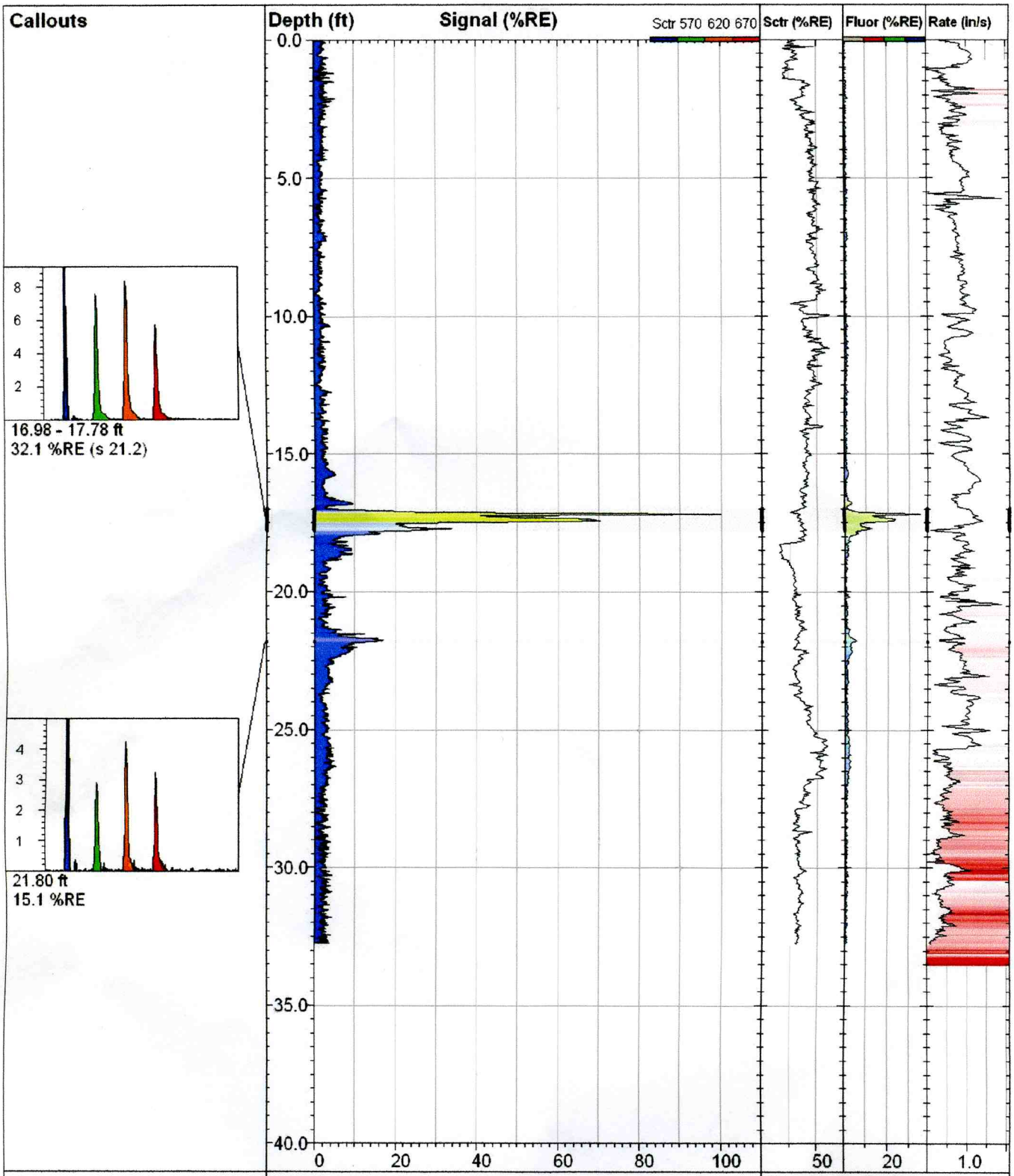
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **69.02 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **314.9 %RE @ 15.97 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-29 14:03 PST**



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2013T-066

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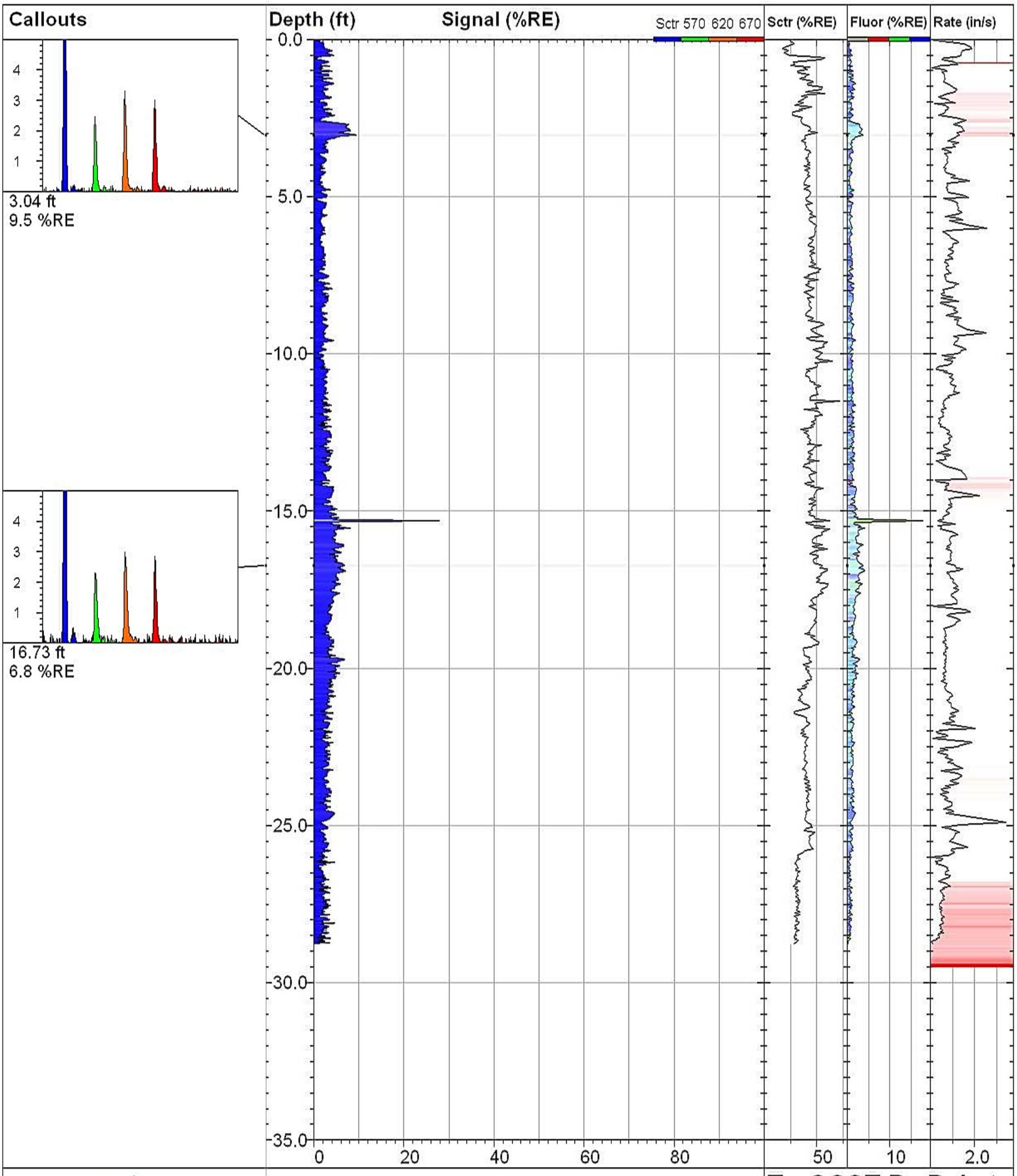
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.75 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **101.6 %RE @ 17.19 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 09:54 PST**



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2013T-067

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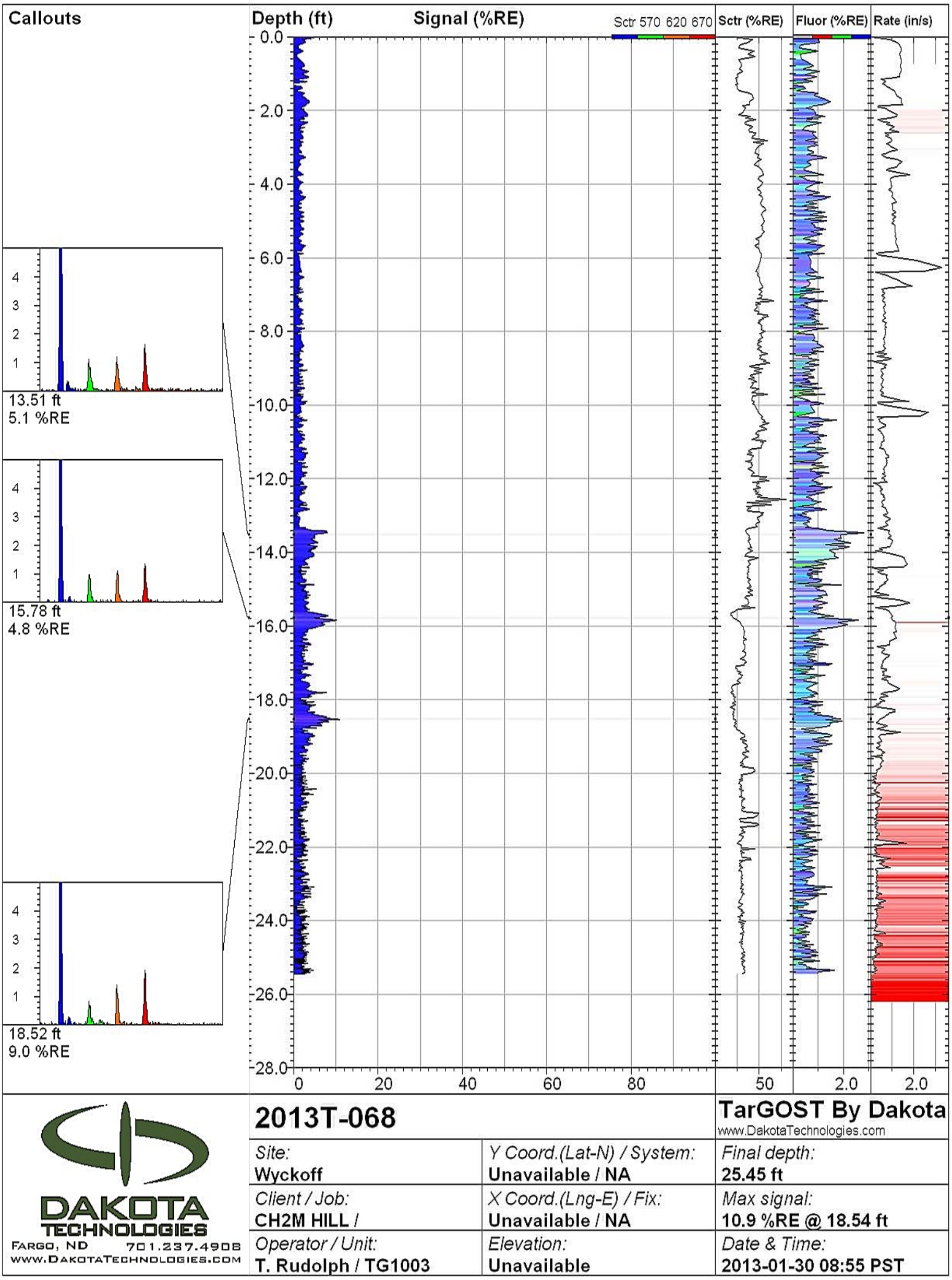
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **28.75 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **28.3 %RE @ 15.30 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 09:29 PST**



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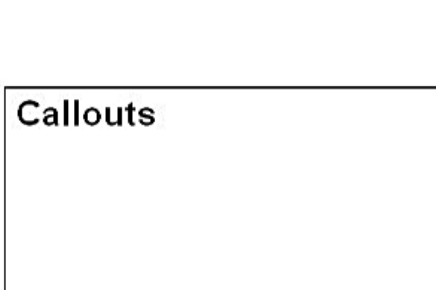
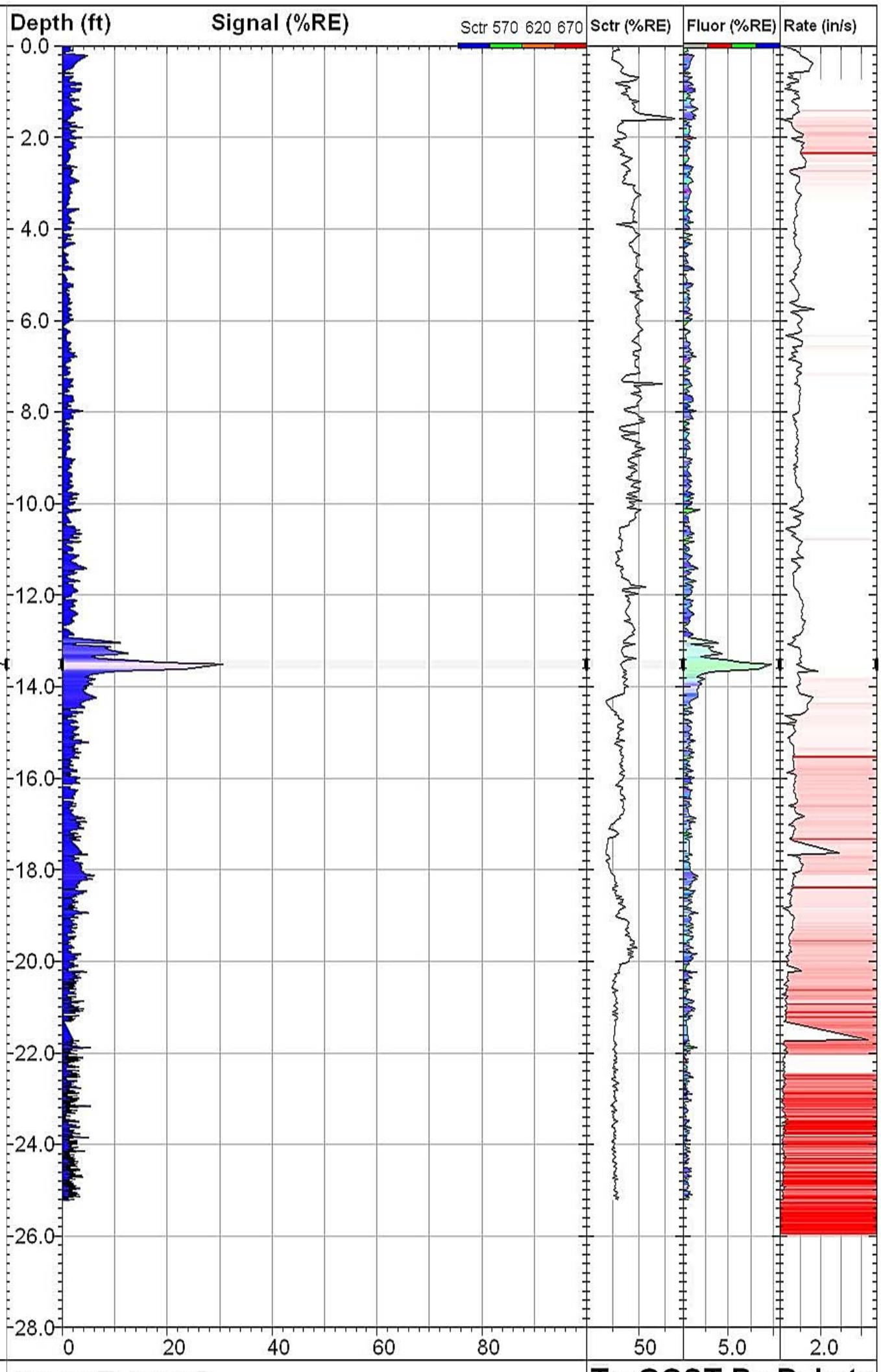
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.45 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **10.9 %RE @ 18.54 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 08:55 PST**

Callouts



13.41 - 13.62 ft
20.6 %RE (s 8.0)



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2013T-068R

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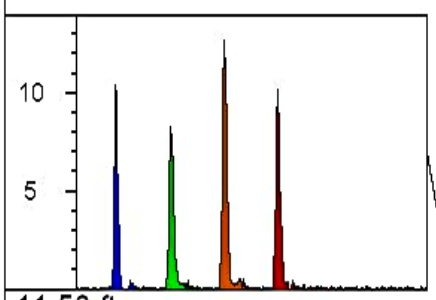
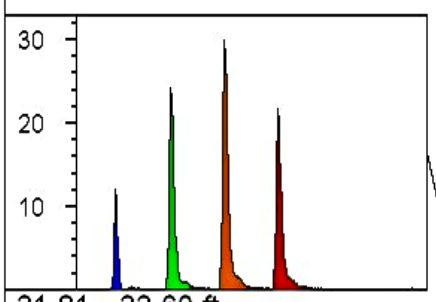
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.22 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **30.6 %RE @ 13.51 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-01 08:16 PST**

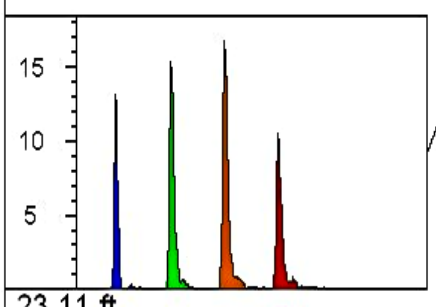
Callouts



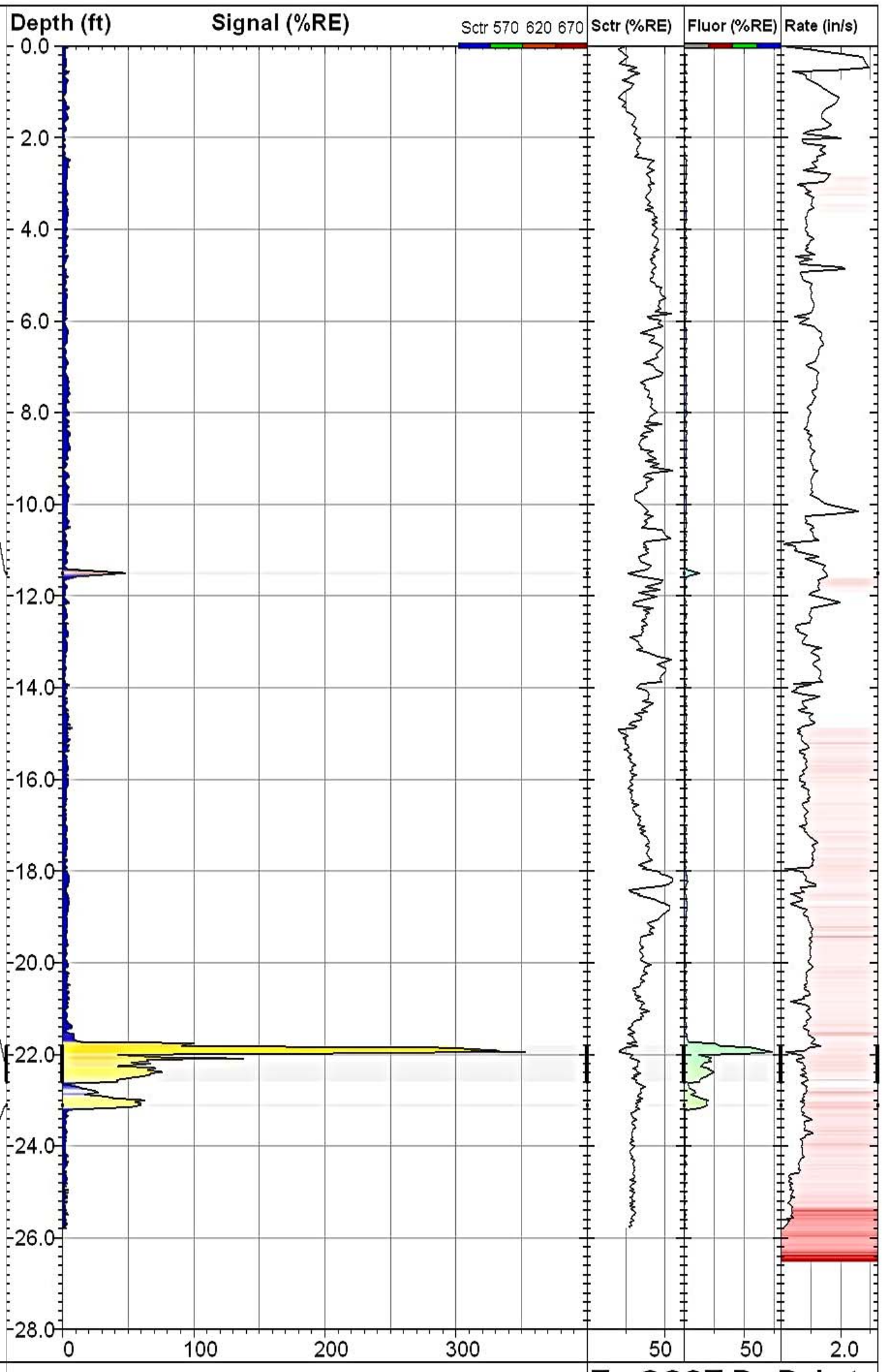
11.50 ft
48.3 %RE



21.81 - 22.60 ft
123.4 %RE (s 114.1)



23.11 ft
59.3 %RE



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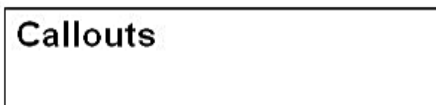
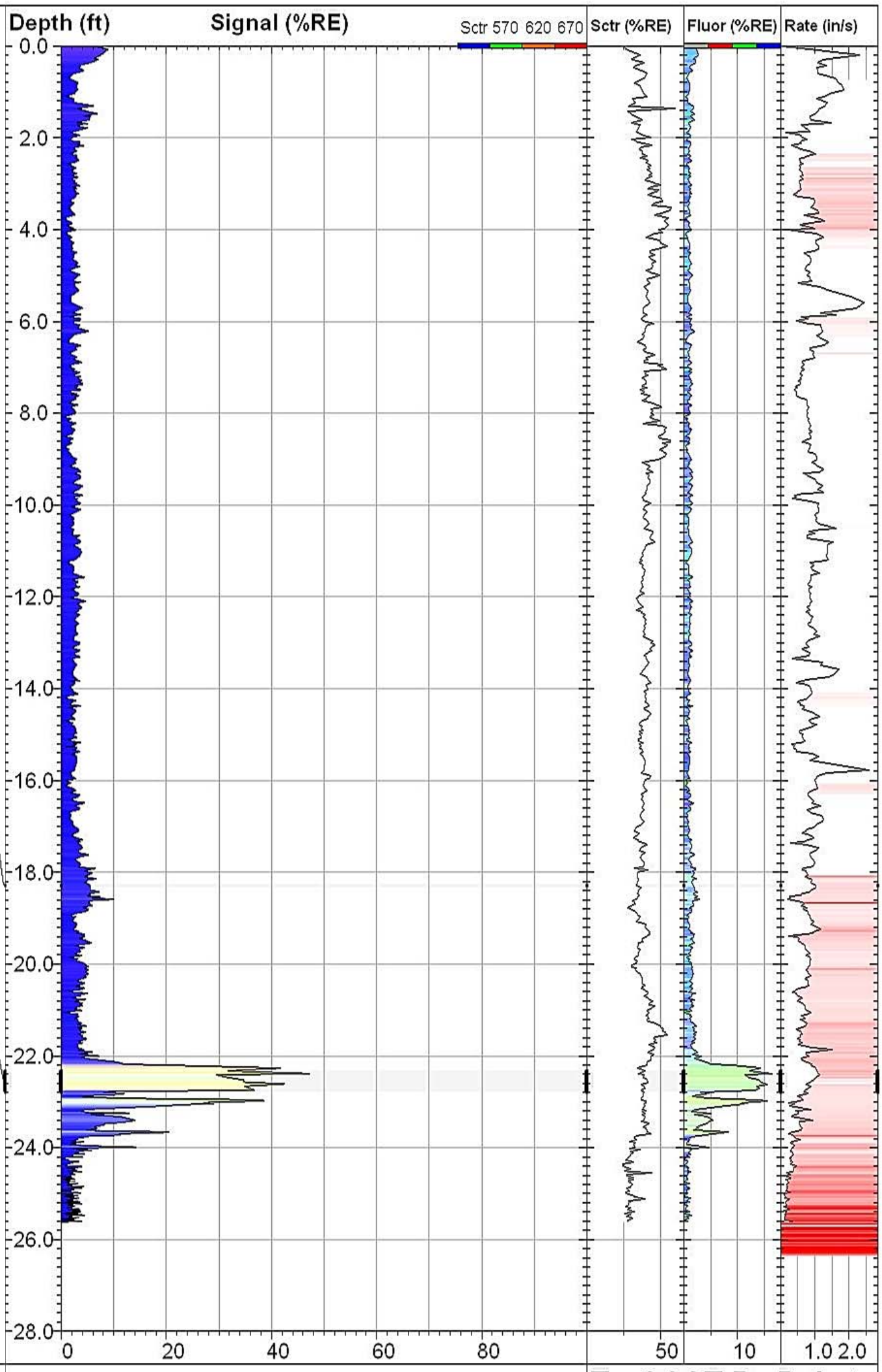
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.79 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **354.0 %RE @ 21.95 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 08:22 PST**

Callouts



18.28 ft
5.4 %RE

22.33 - 22.78 ft
33.2 %RE (s 9.9)



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2013T-070

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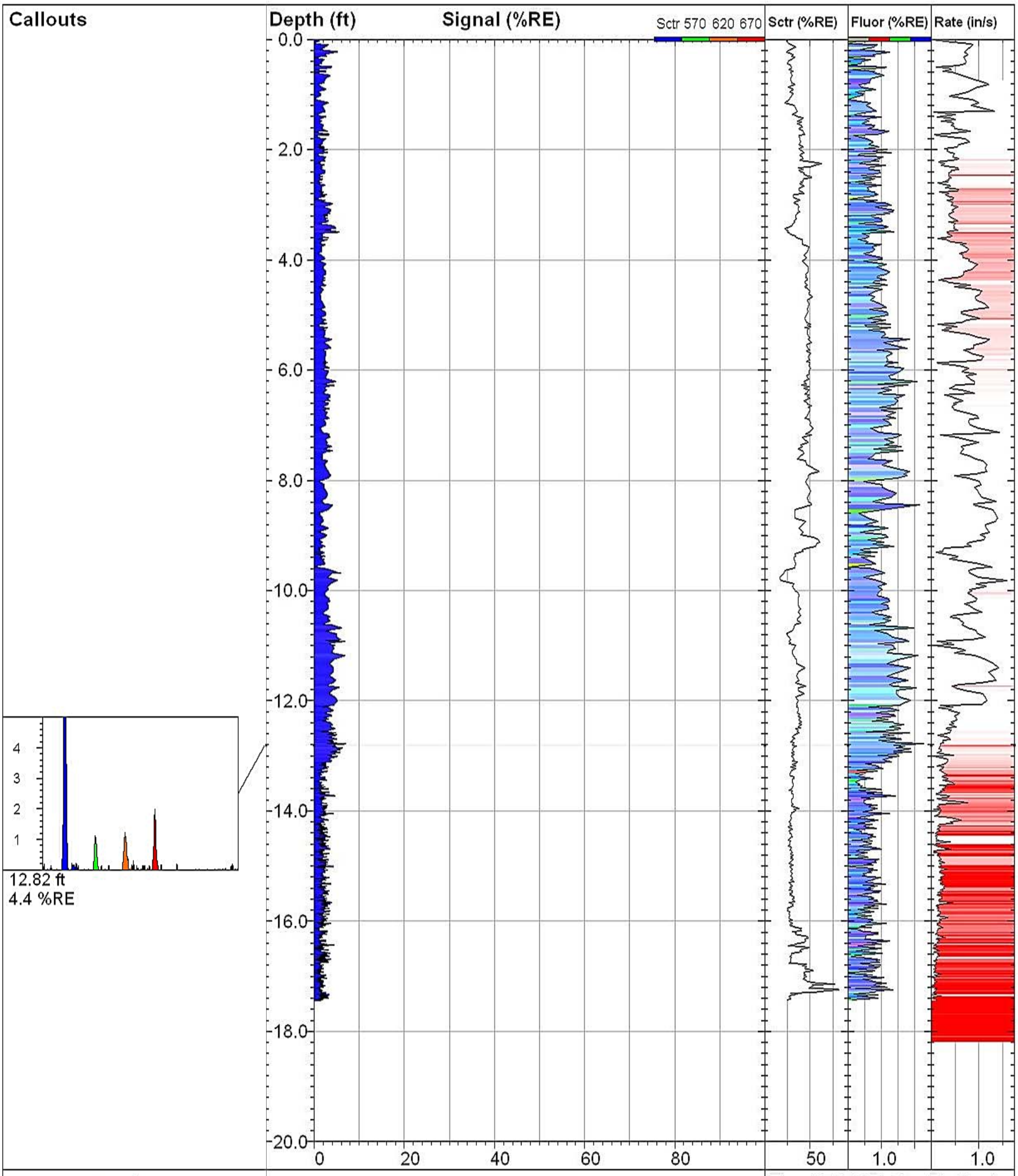
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.62 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **47.5 %RE @ 22.39 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 10:35 PST**



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2013T-071

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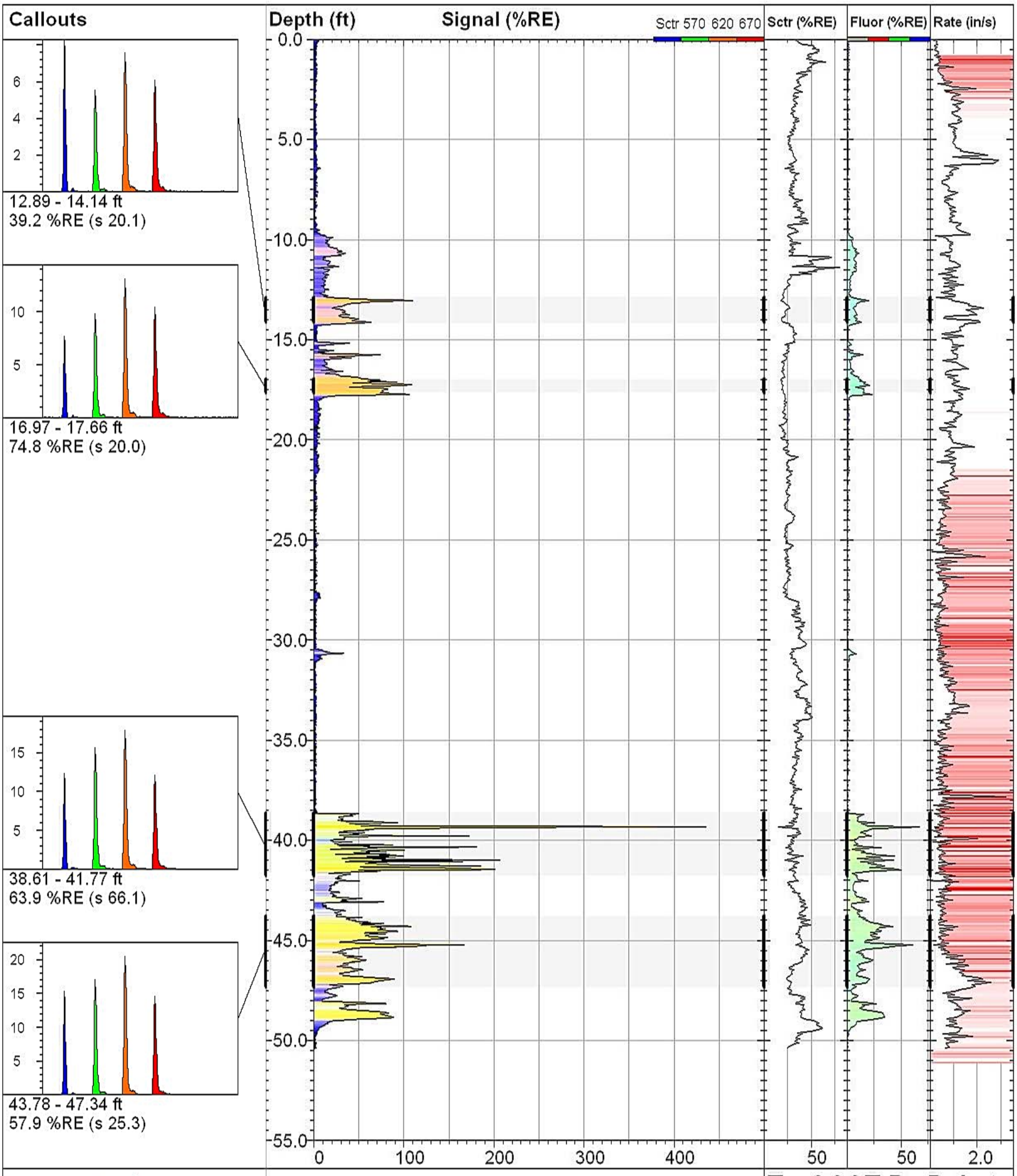
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **17.44 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **7.2 %RE @ 12.78 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 11:07 PST**



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2013T-072

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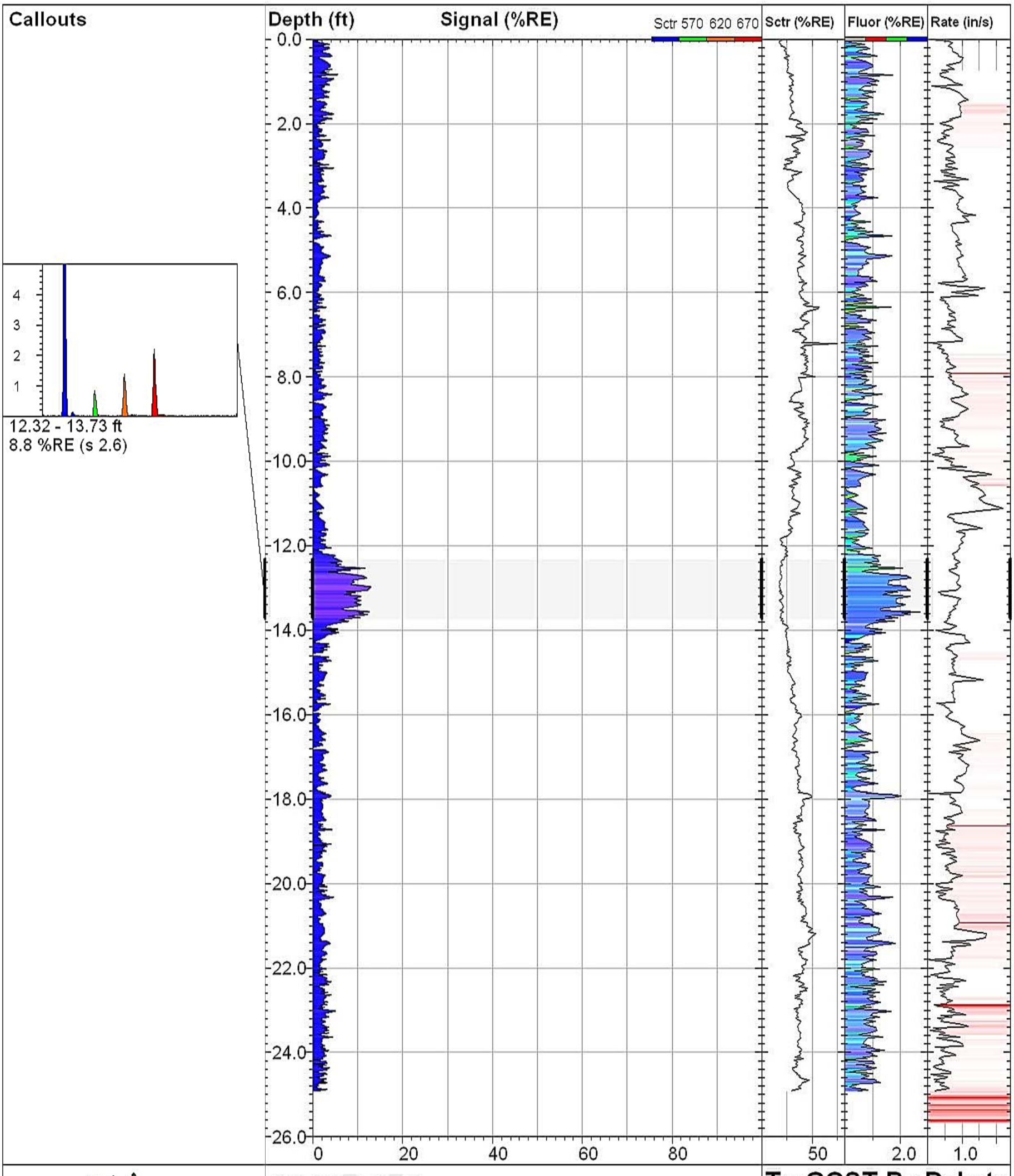
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **50.39 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **449.6 %RE @ 39.32 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-30 15:06 PST**



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2013T-073

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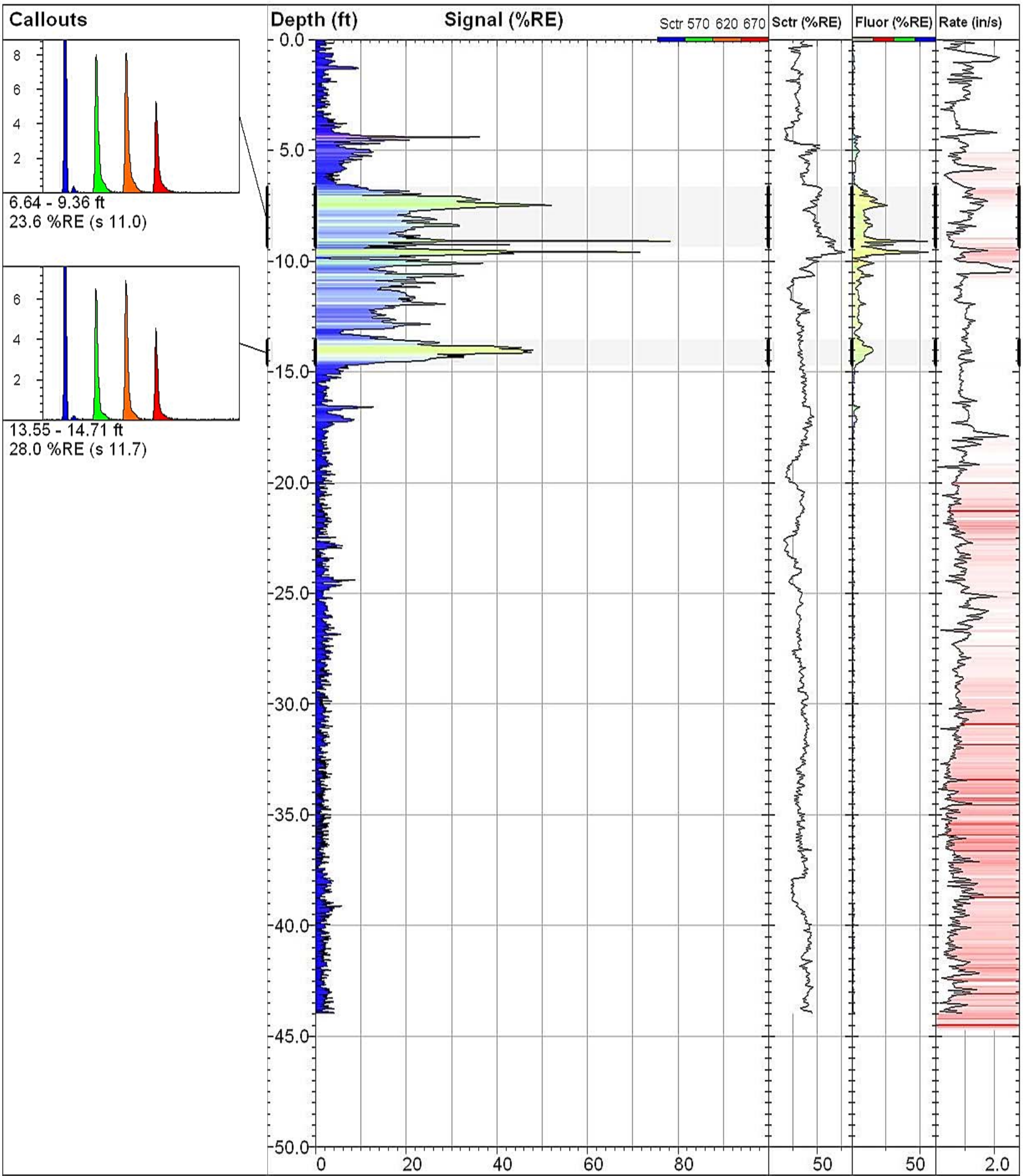
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **24.92 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **12.9 %RE @ 12.97 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 13:17 PST**



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2013T-074

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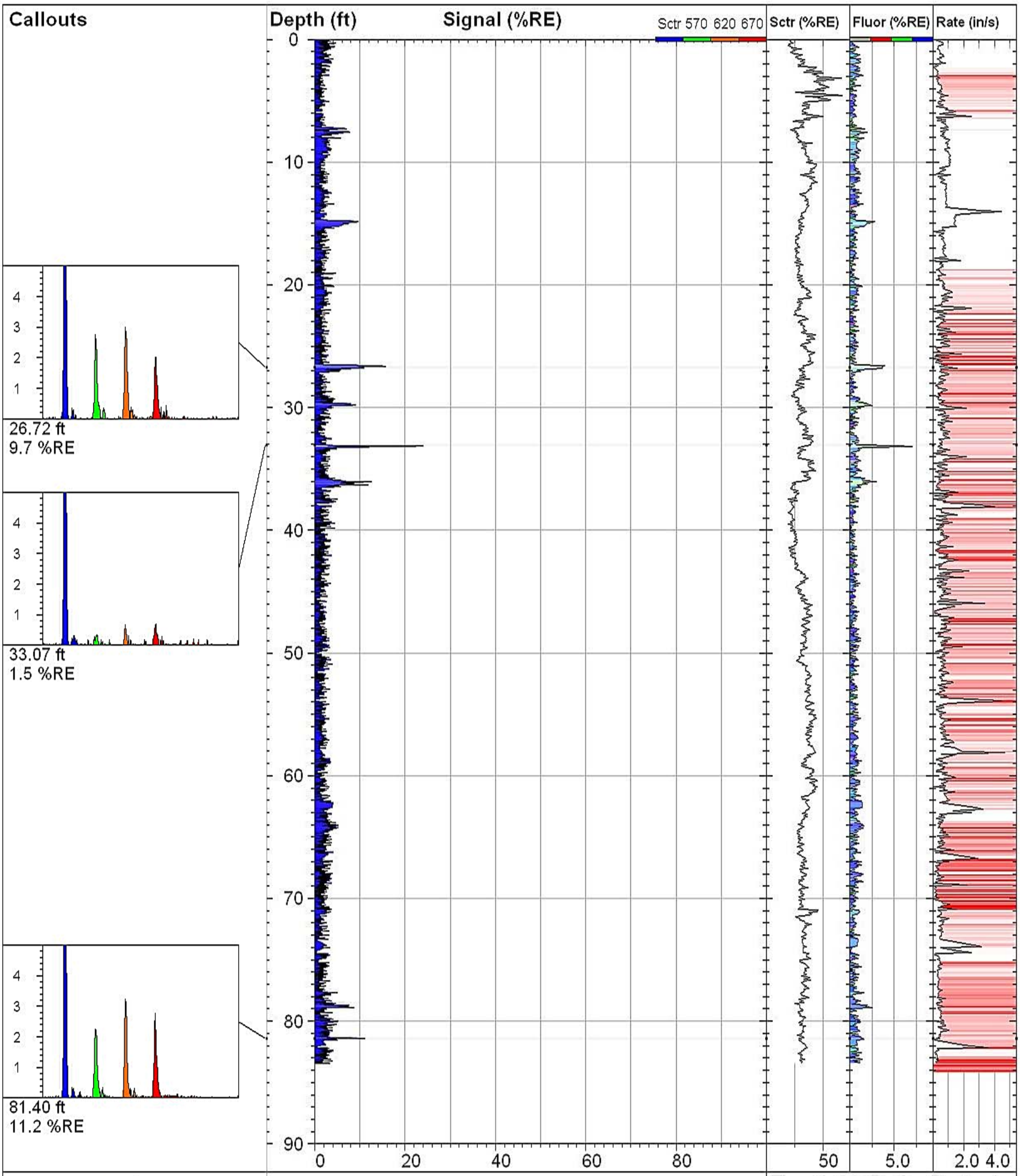
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **43.96 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **80.9 %RE @ 9.10 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-01-31 12:21 PST**



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2013T-076

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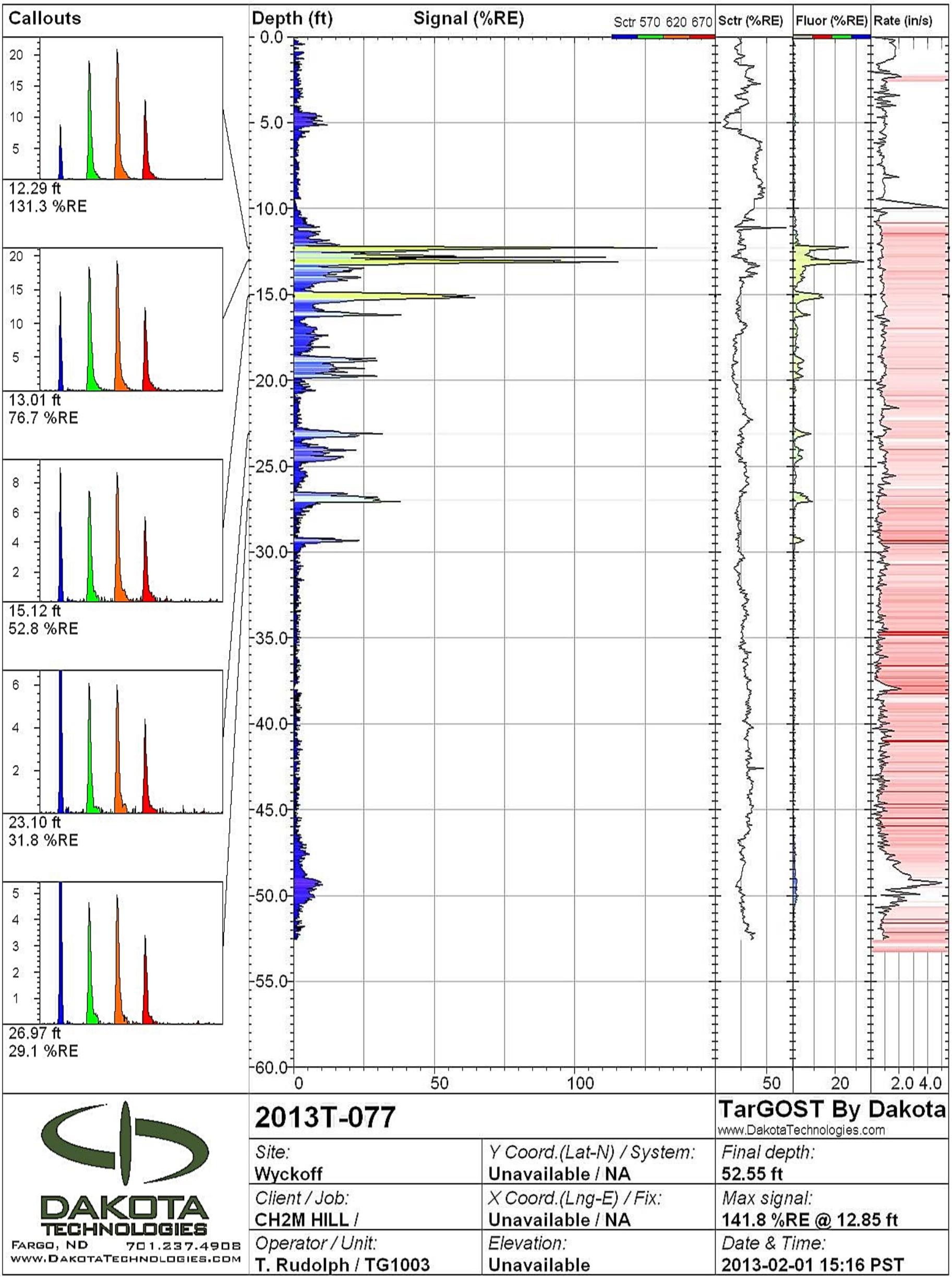
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **83.46 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **25.0 %RE @ 33.14 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-01 08:54 PST**



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2013T-077

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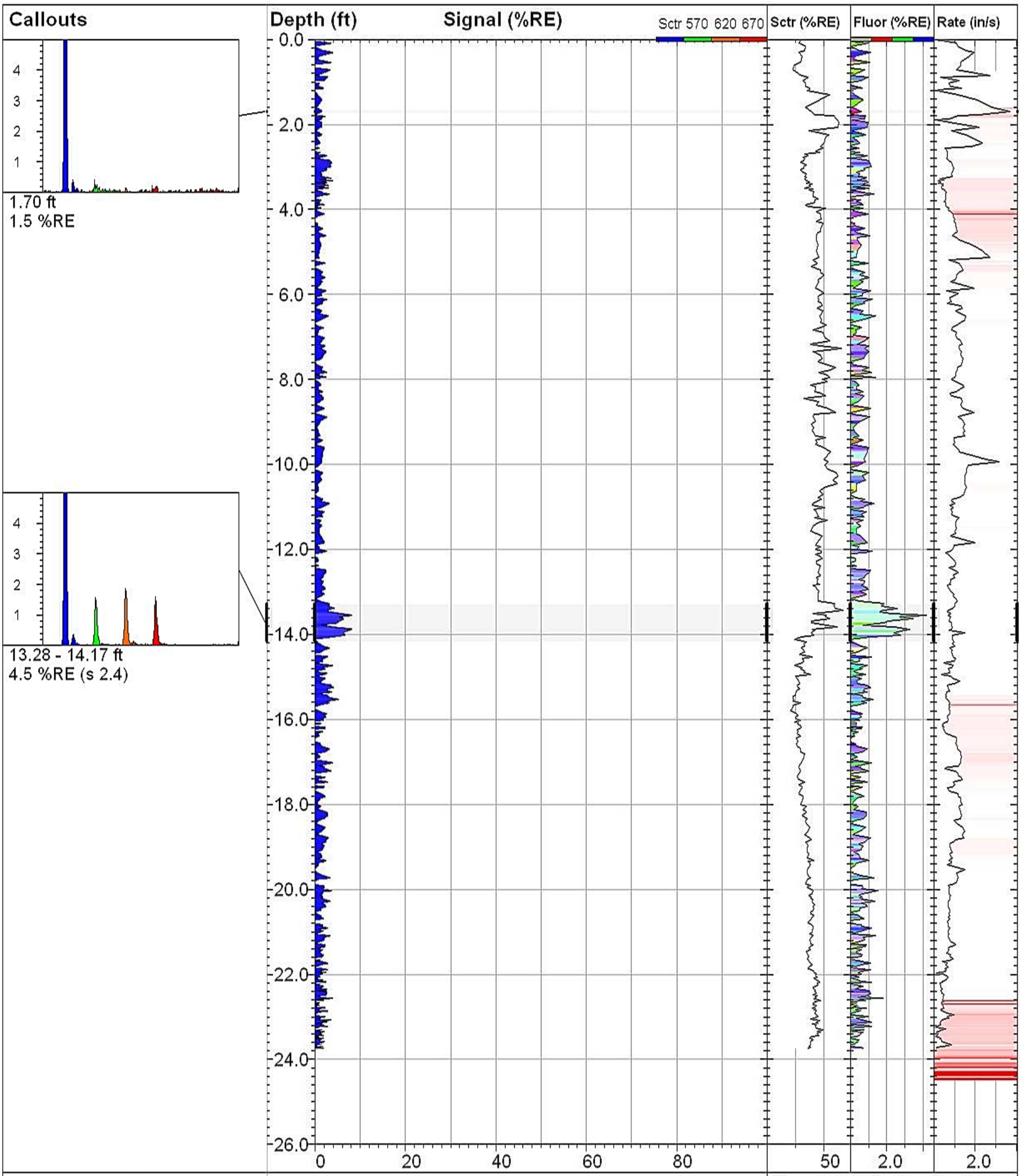
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **52.55 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **141.8 %RE @ 12.85 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-01 15:16 PST**



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2013T-078

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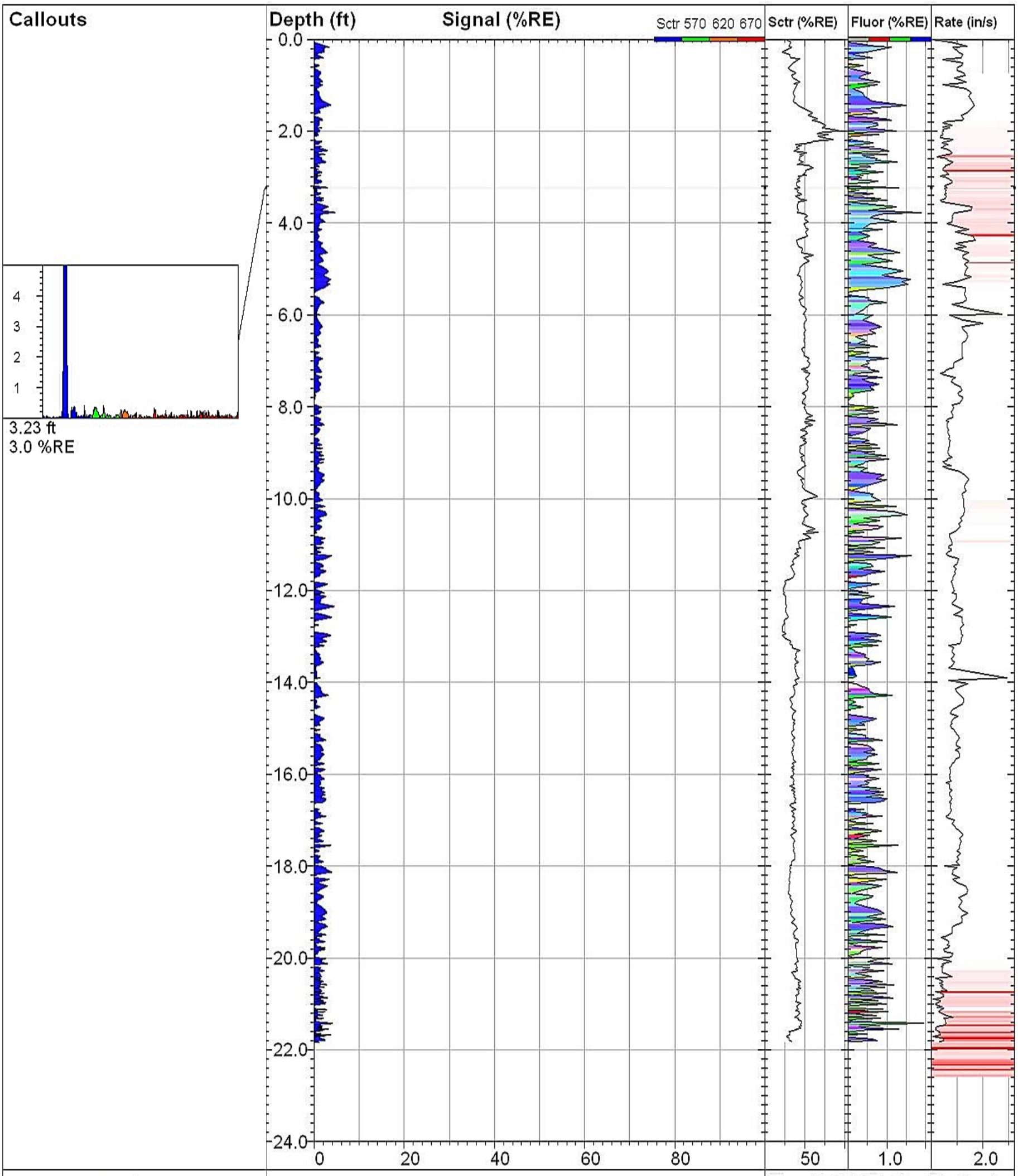
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.74 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **8.3 %RE @ 13.87 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 09:07 PST**



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2013T-079

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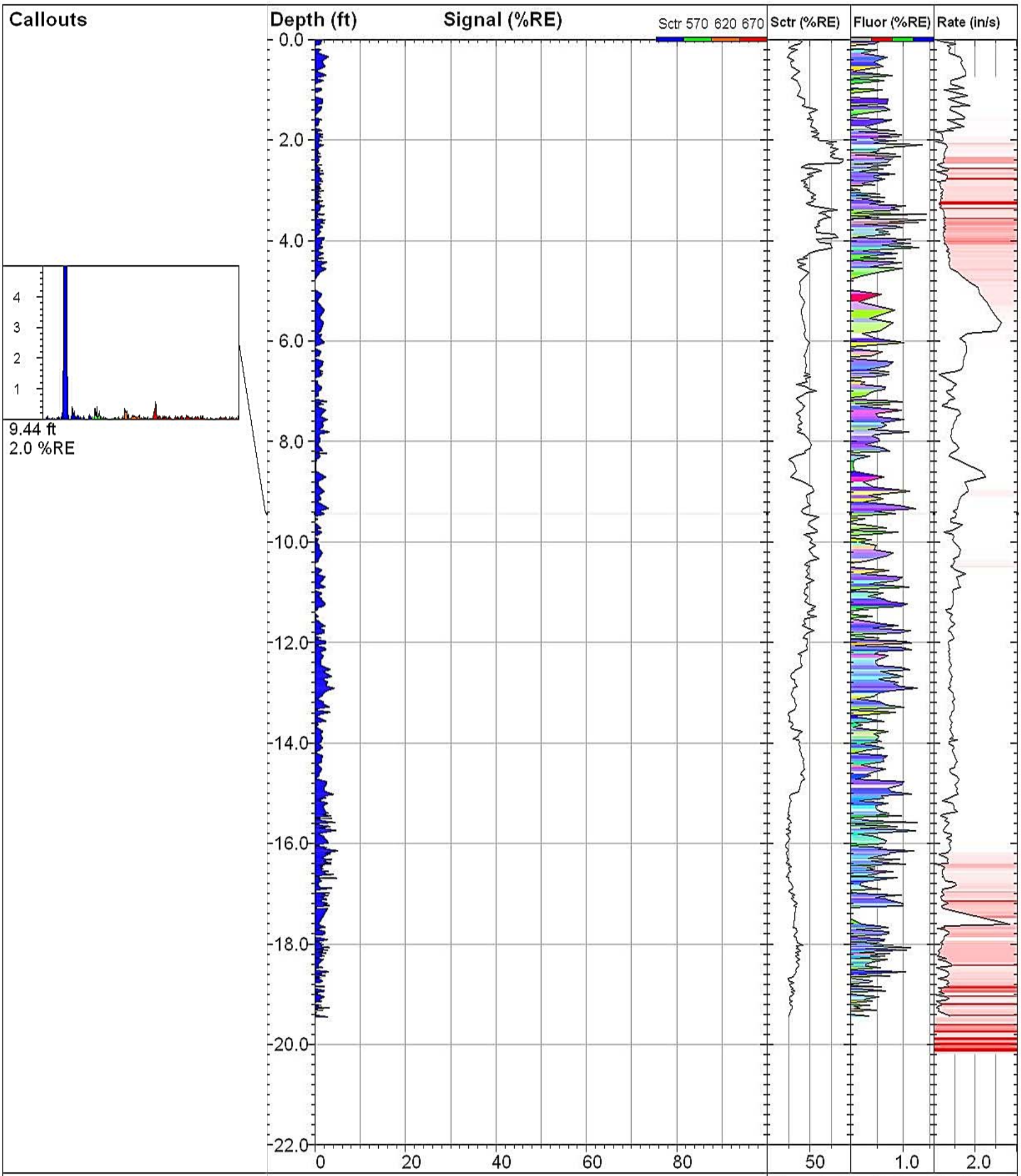
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **21.84 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **4.7 %RE @ 3.77 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 09:39 PST**



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2013T-080

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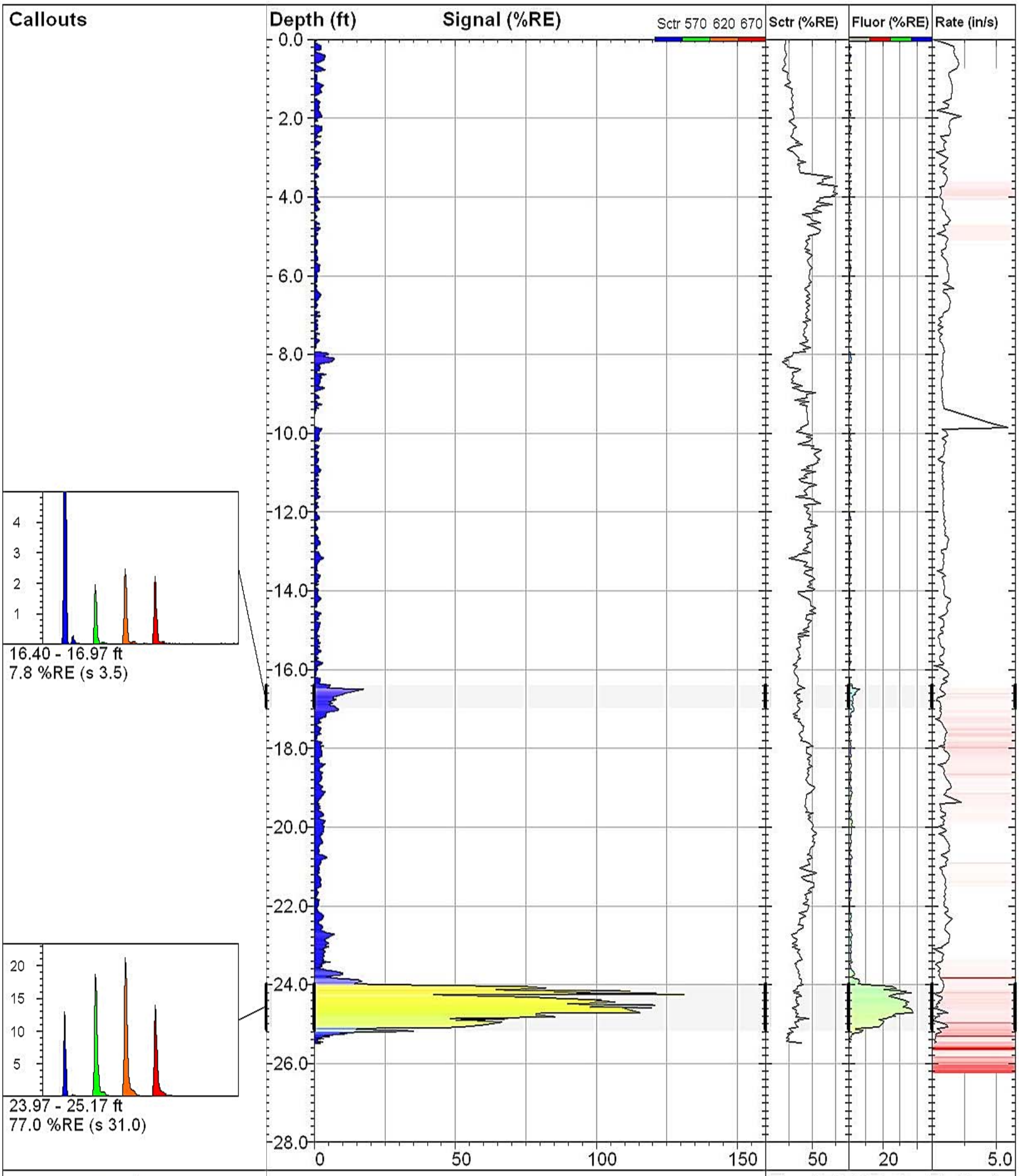
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **19.45 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **5.1 %RE @ 16.69 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 10:05 PST**



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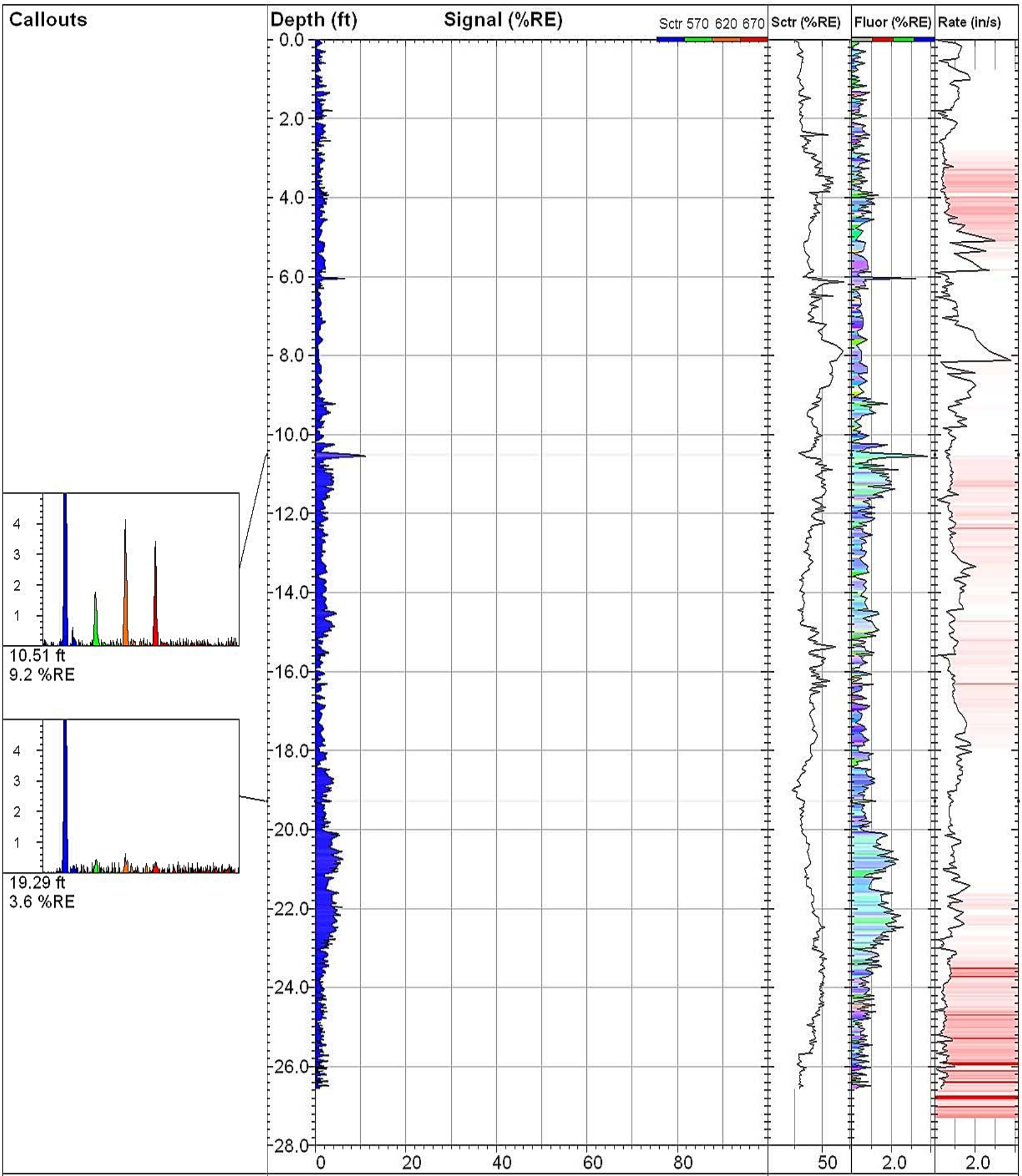
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.50 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **143.0 %RE @ 24.24 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 10:29 PST**



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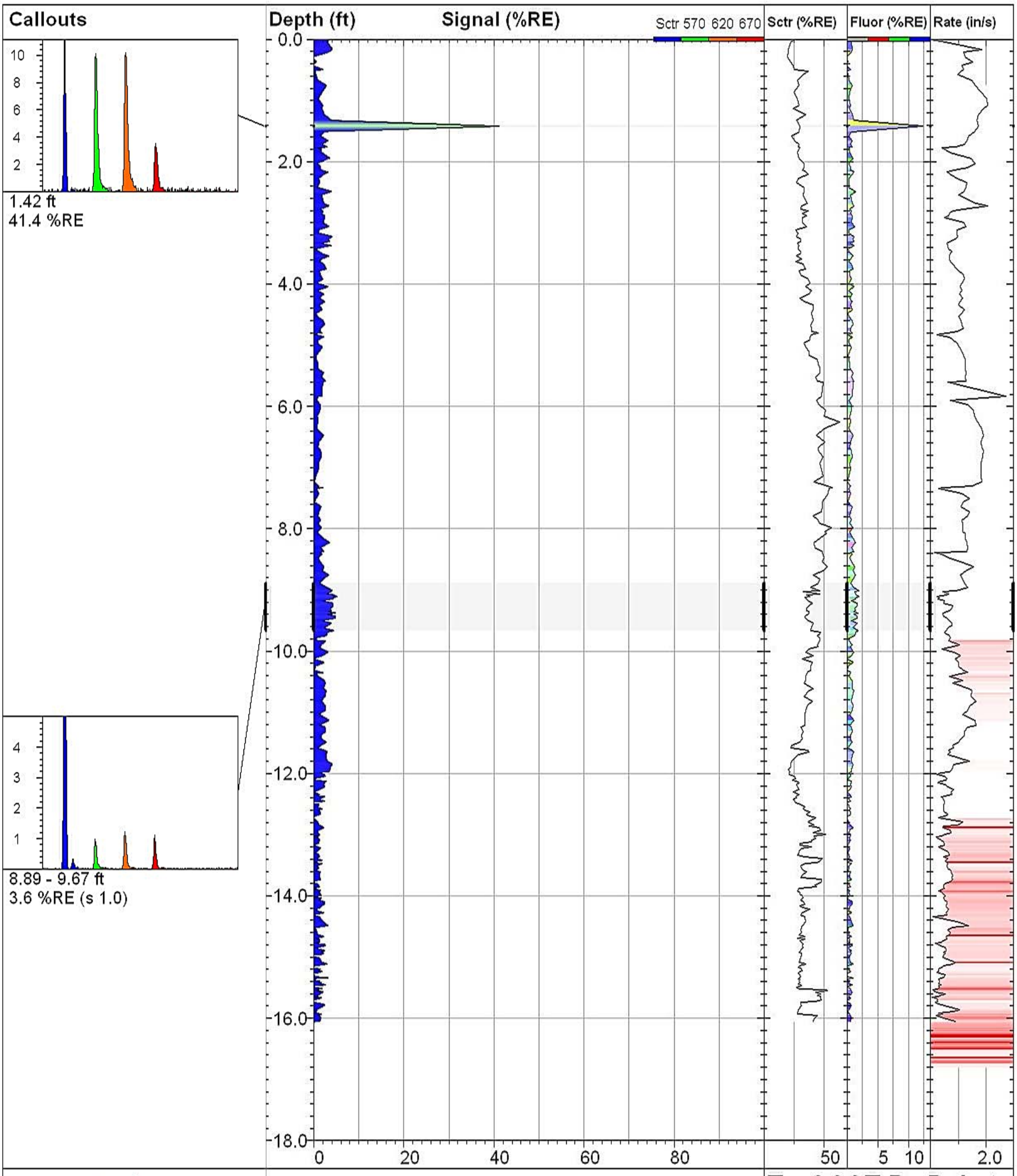
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **26.55 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.1 %RE @ 10.55 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 11:01 PST**



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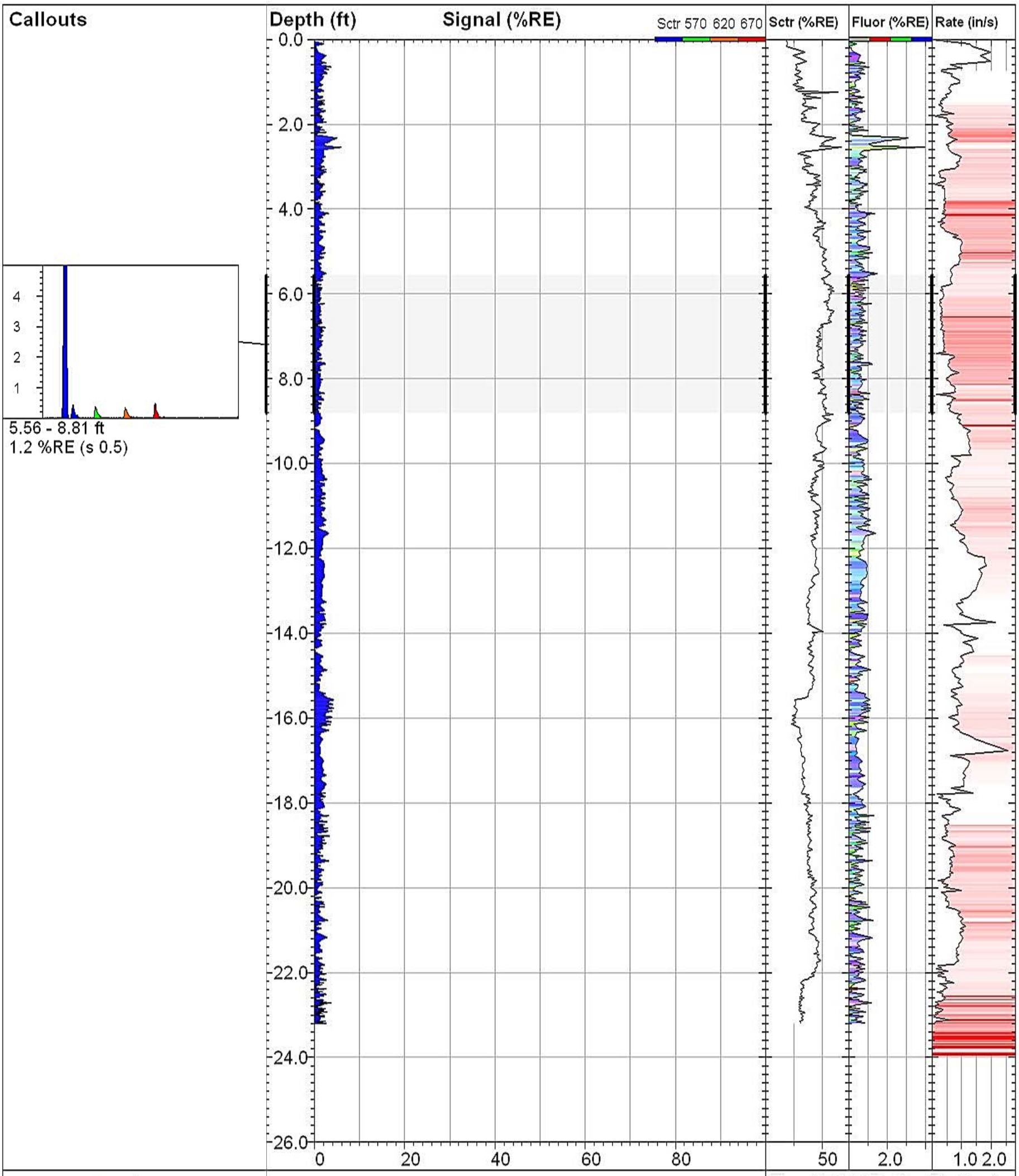
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **16.06 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **41.4 %RE @ 1.42 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 13:49 PST**



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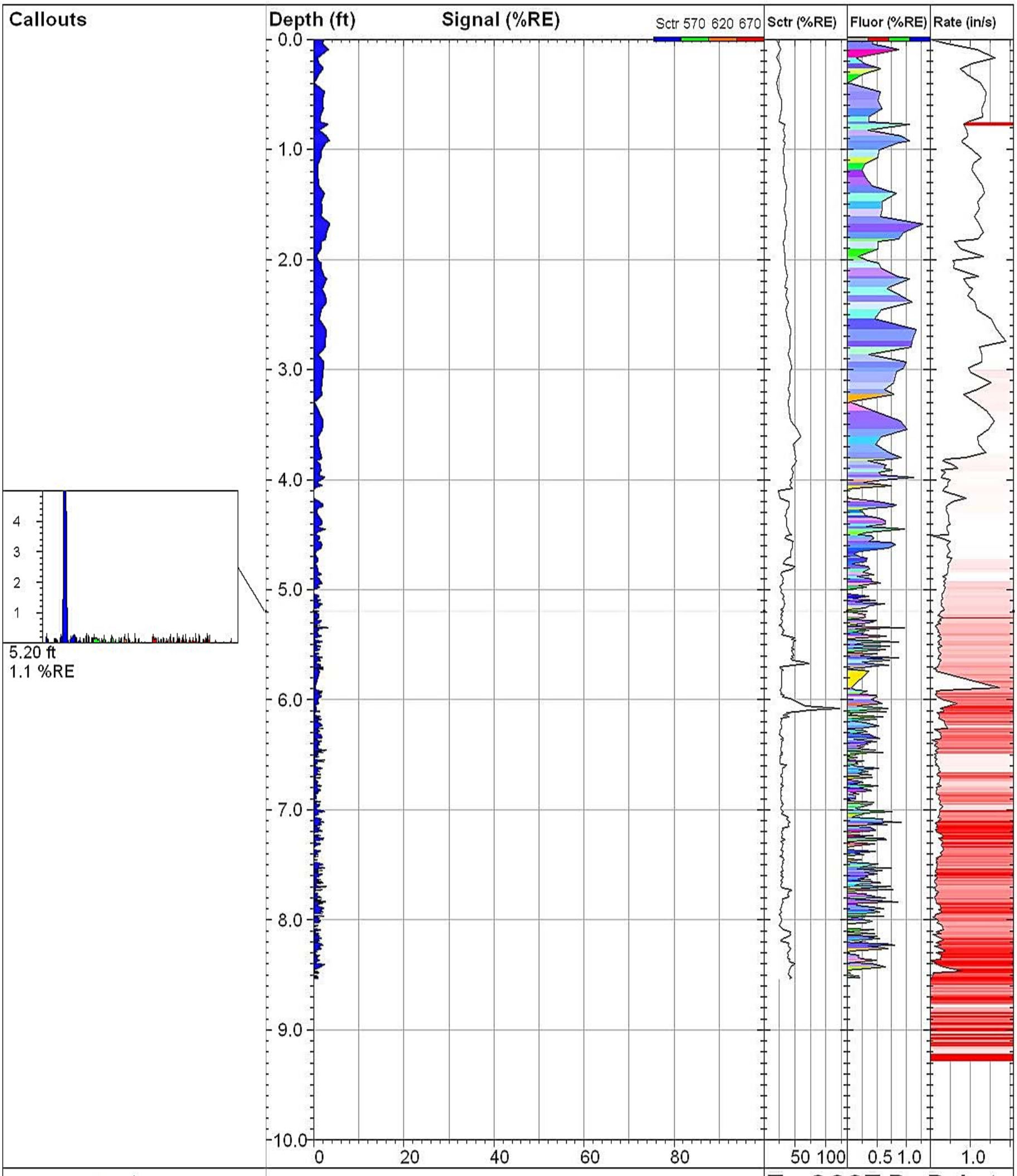
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.21 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **5.9 %RE @ 2.55 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 14:10 PST**



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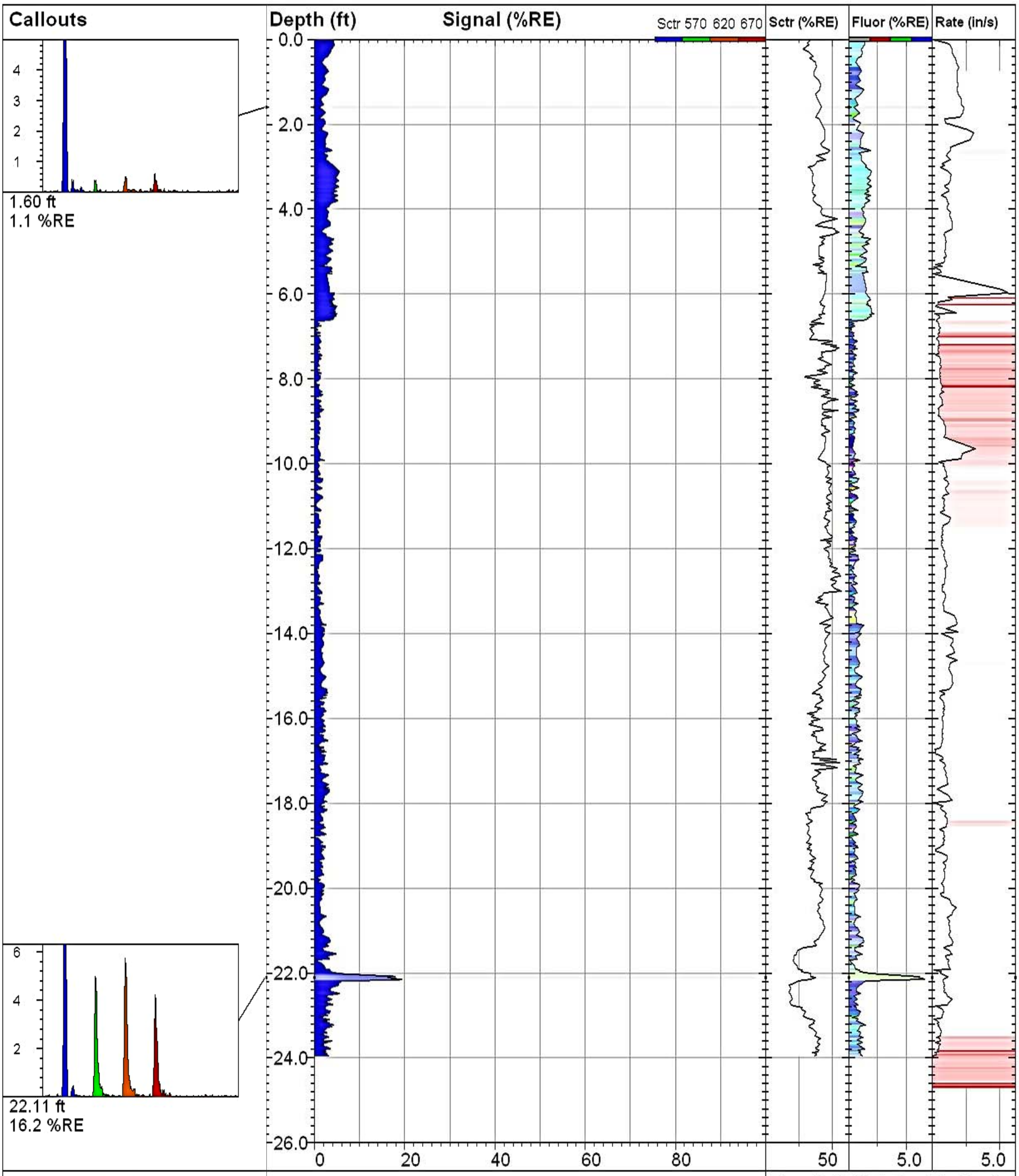
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **8.54 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **3.5 %RE @ 1.68 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-08 14:50 PST**



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2013T-100

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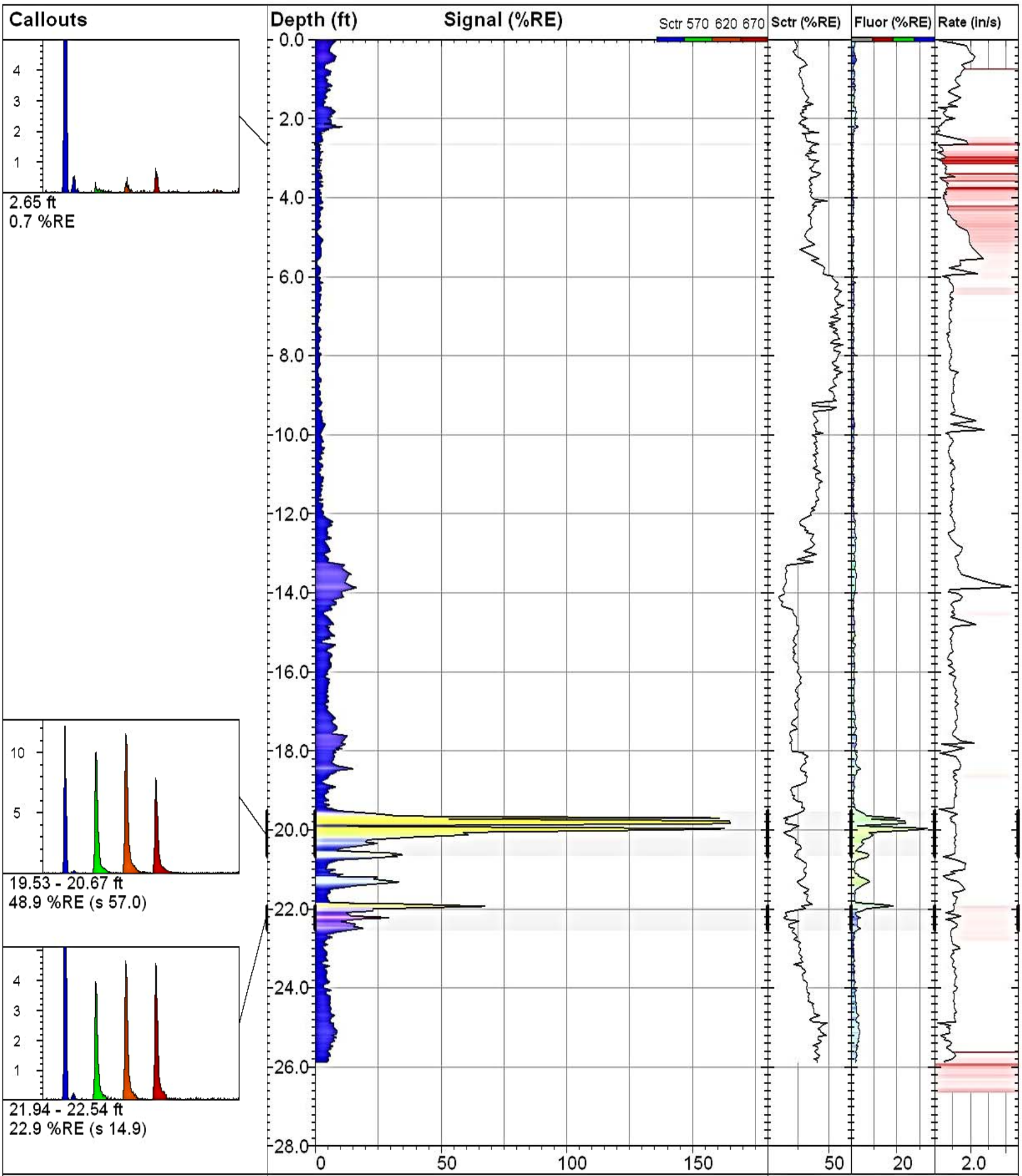
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.95 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **19.4 %RE @ 22.15 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-27 15:38 PST**



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2013T-101

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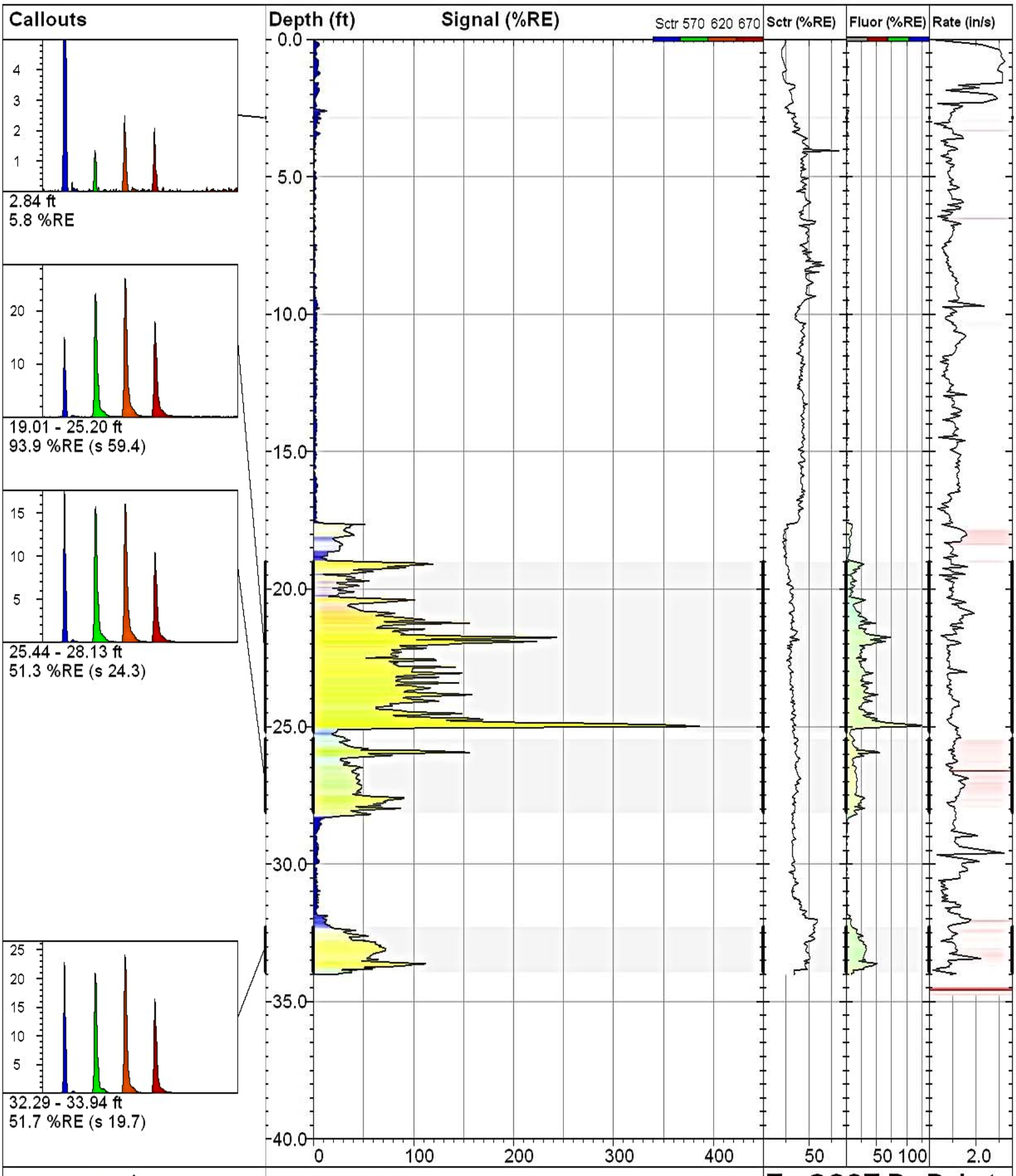
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **25.89 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **165.0 %RE @ 19.84 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-05 11:32 PST**



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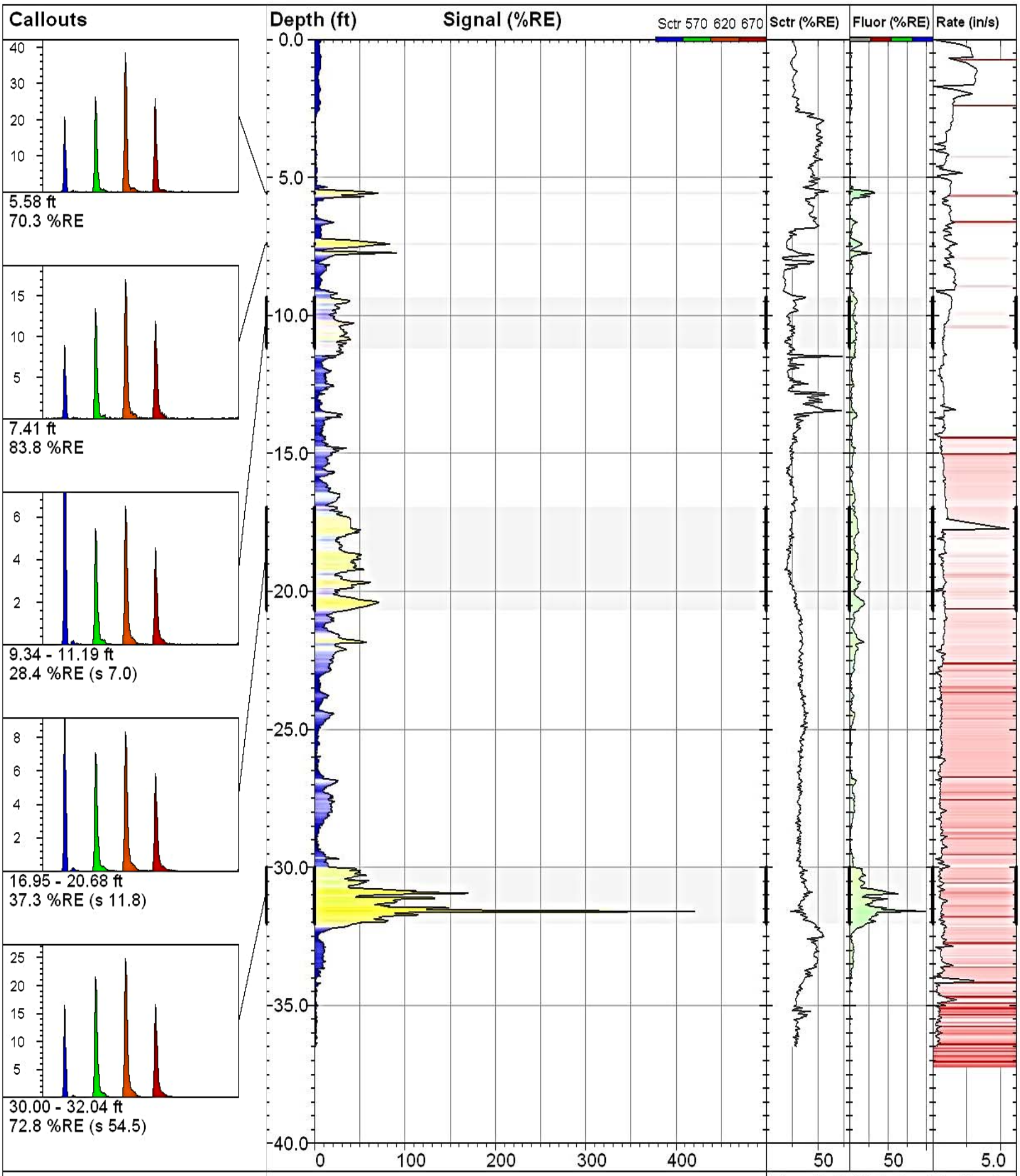
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **34.02 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **388.8 %RE @ 25.00 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-28 11:19 PST**



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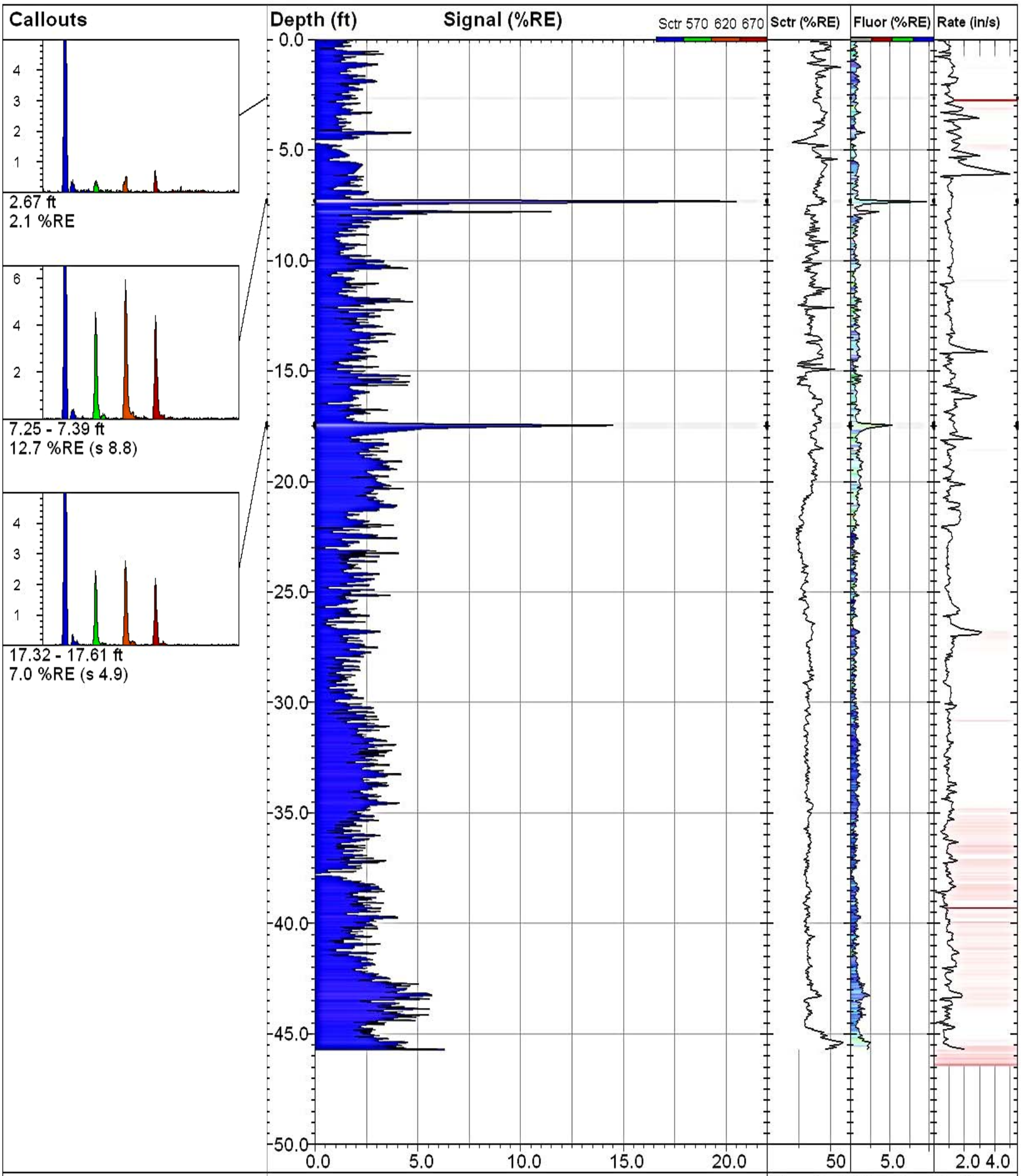
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **36.49 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **427.5 %RE @ 31.60 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-28 12:49 PST**



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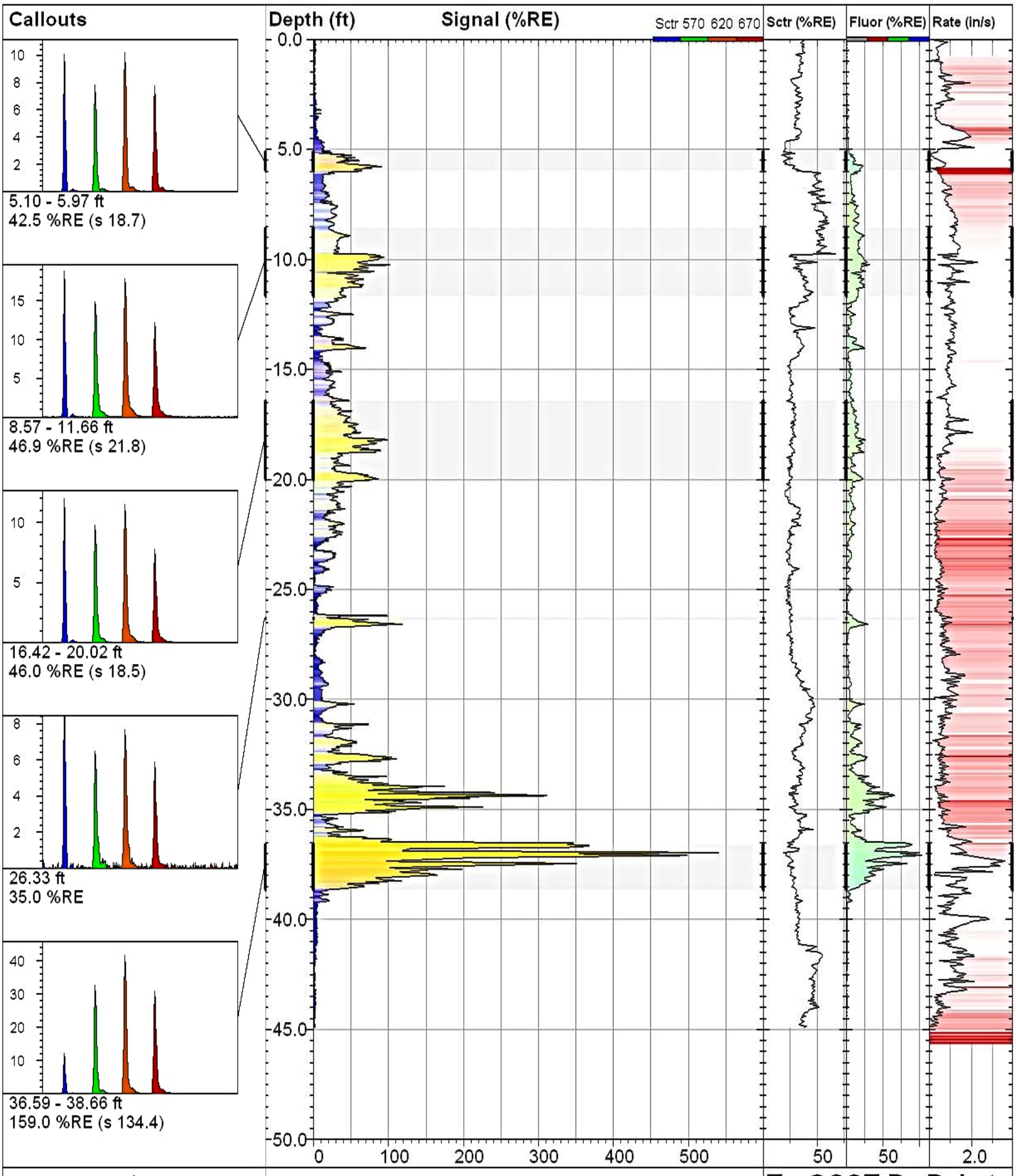
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **45.71 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **20.5 %RE @ 7.32 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-28 14:18 PST**



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2013T-105

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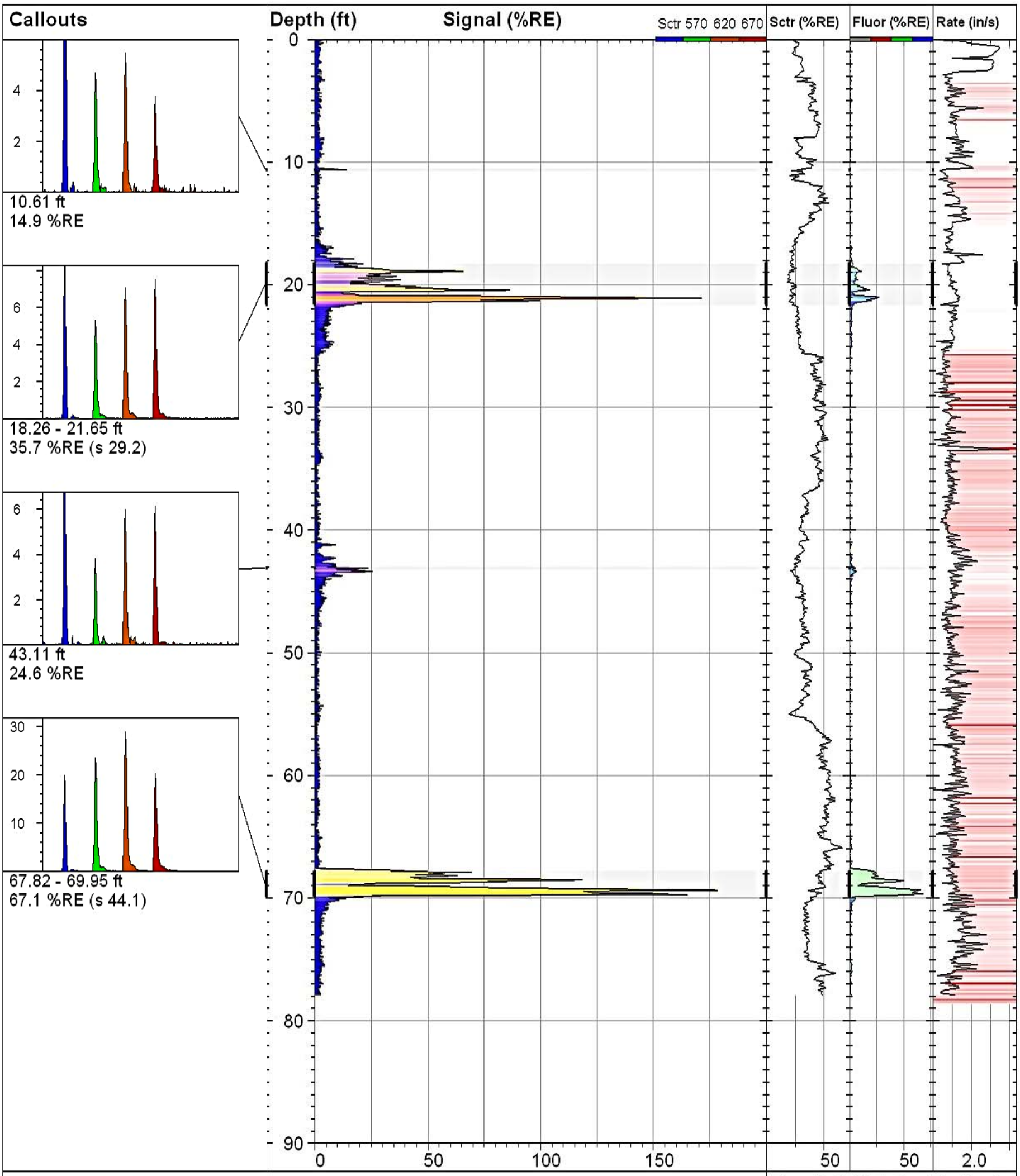
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **44.90 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **546.5 %RE @ 36.96 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-28 14:53 PST**



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2013T-106

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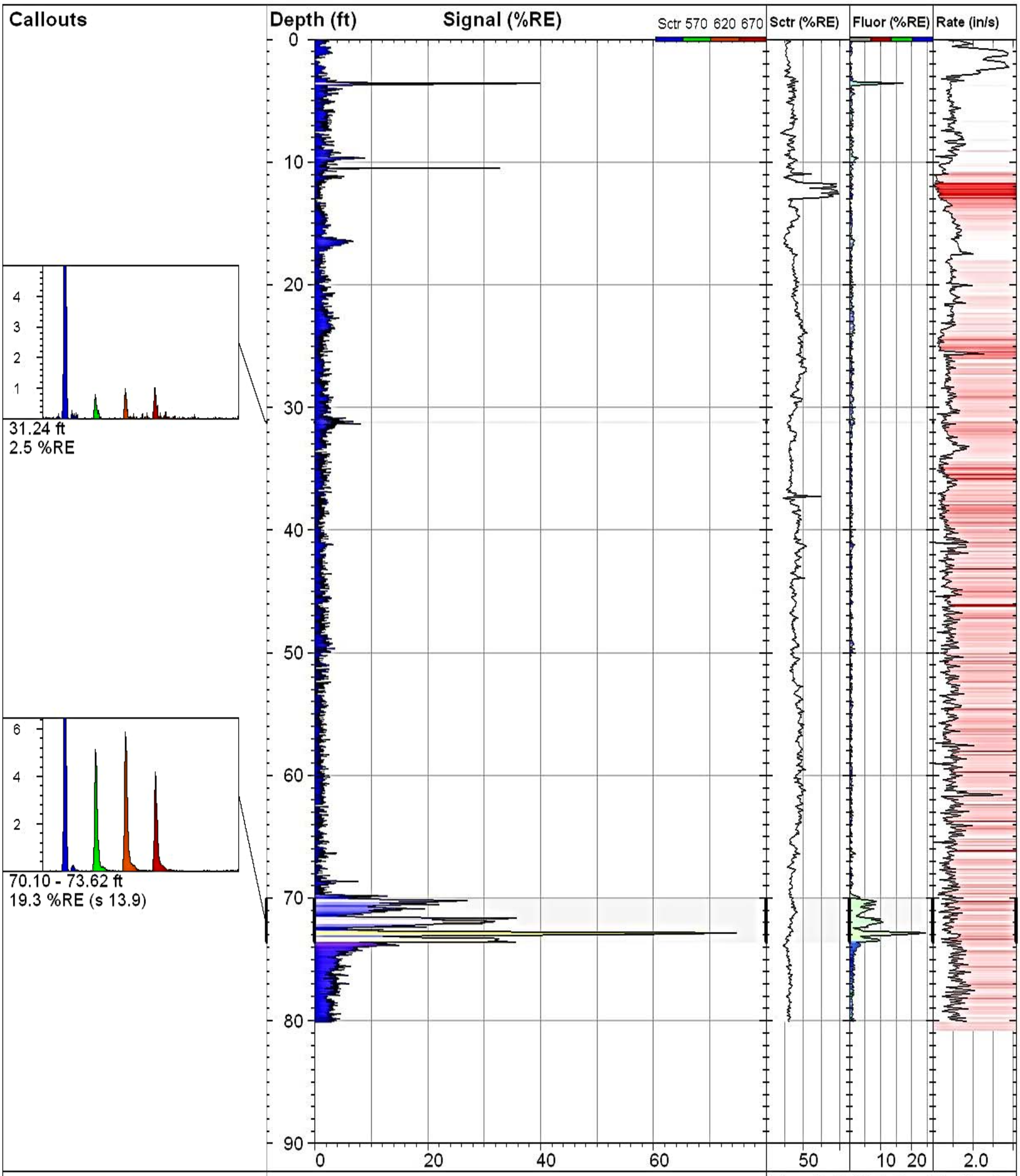
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **77.90 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **179.1 %RE @ 69.36 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-02-28 15:45 PST**



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2013T-107

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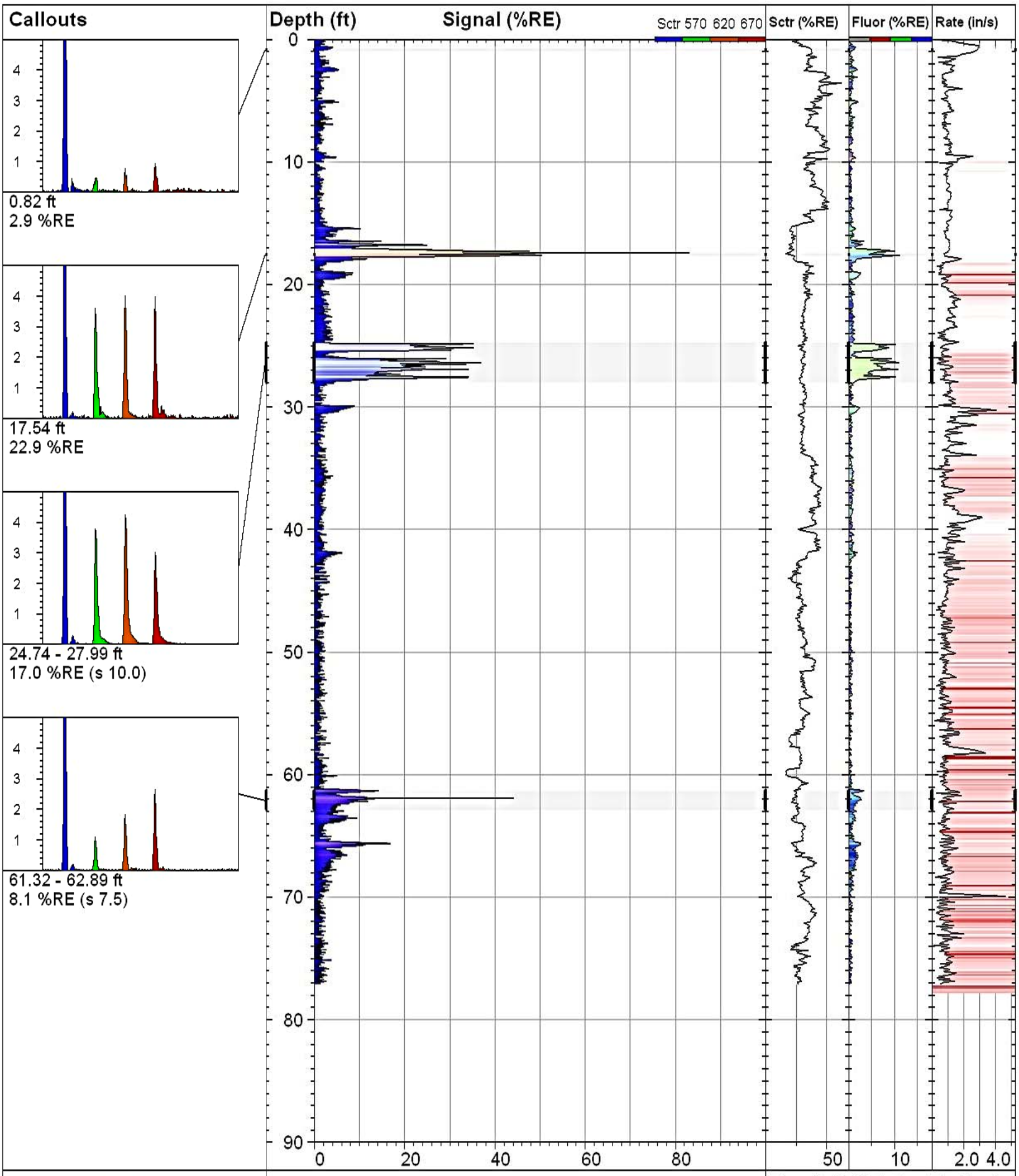
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **80.10 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **74.8 %RE @ 72.85 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-01 08:34 PST**



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2013T-108

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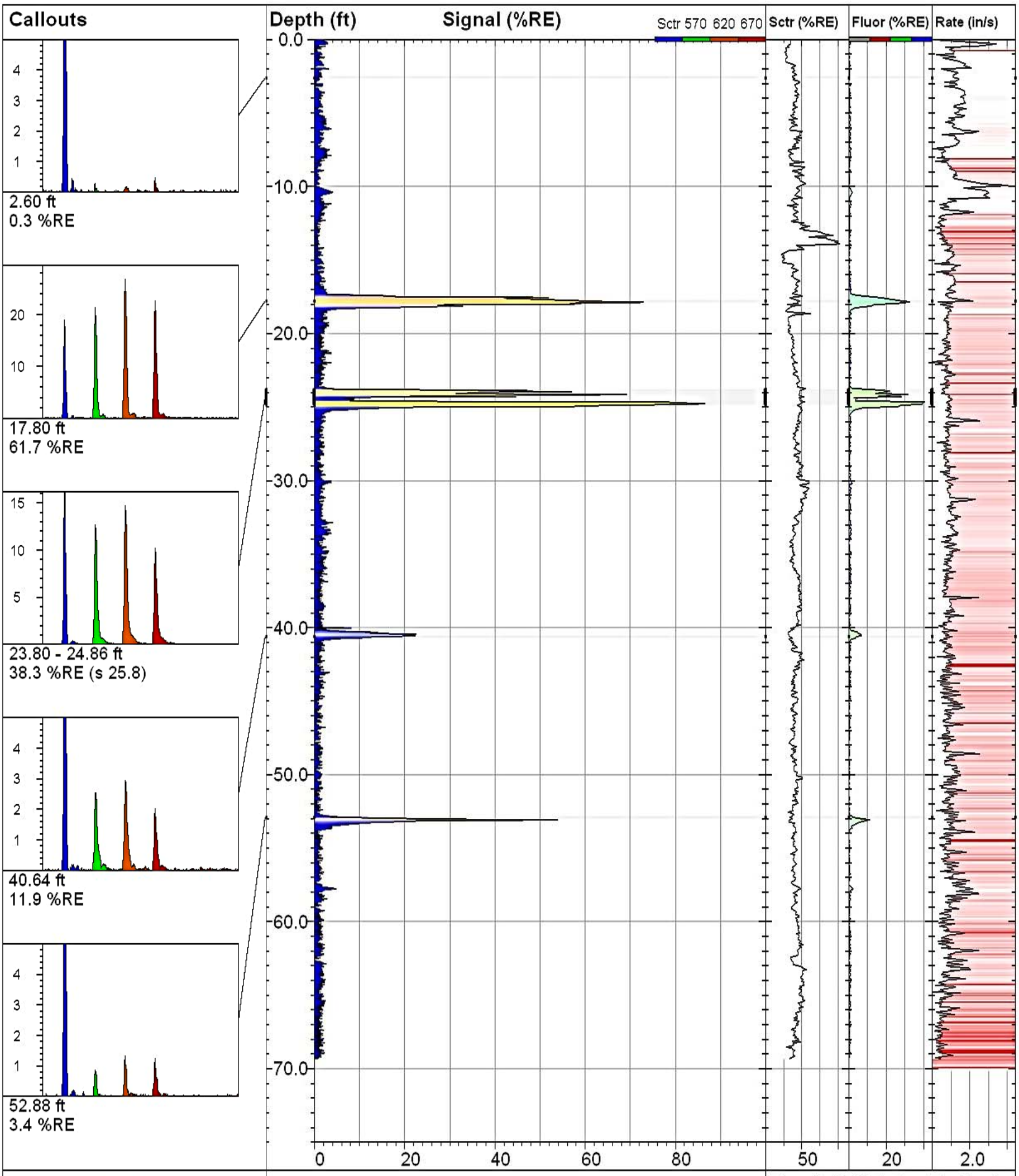
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **77.05 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **89.9 %RE @ 17.43 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-01 09:53 PST**



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2013T-109

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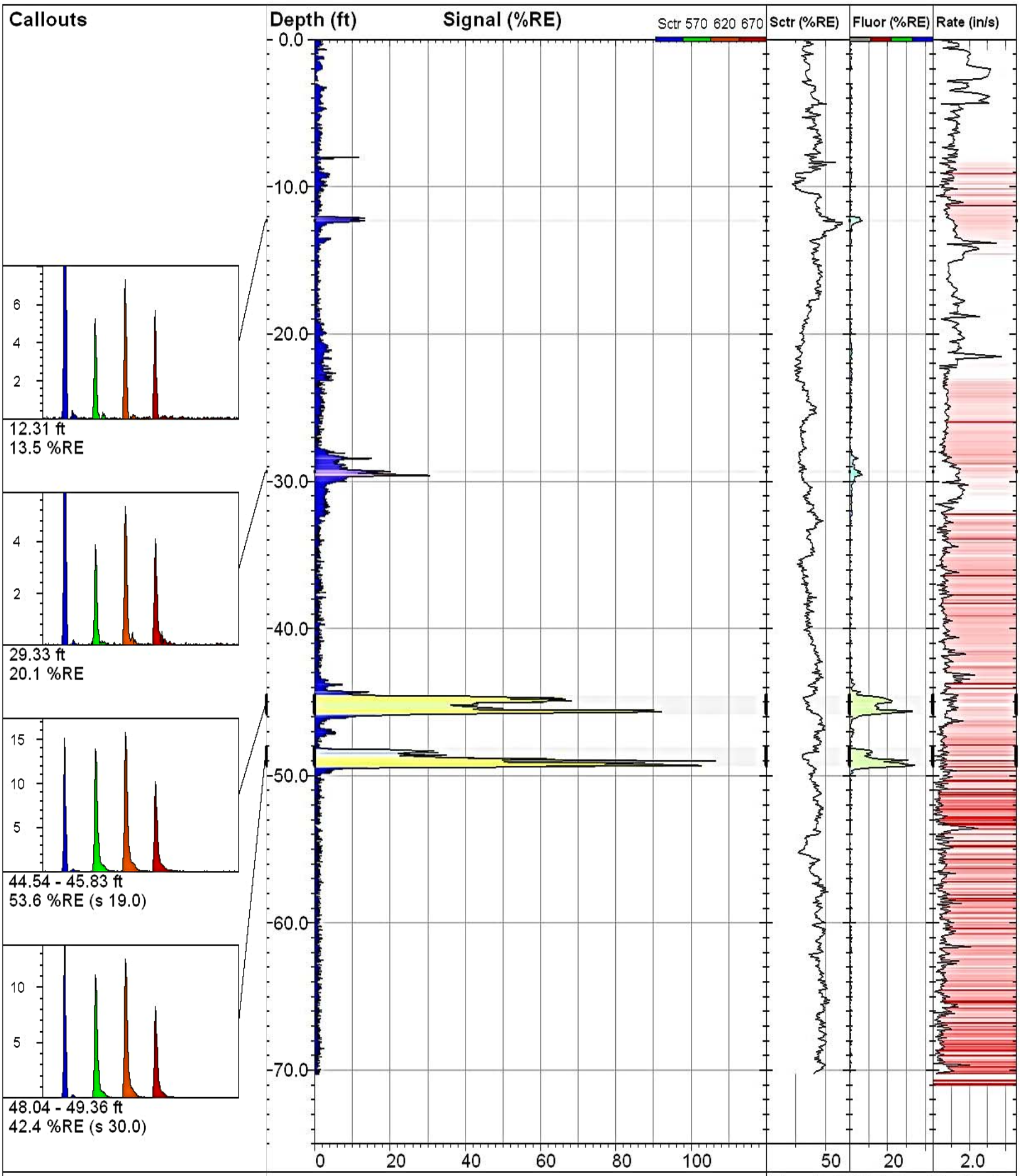
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **69.34 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **86.7 %RE @ 24.76 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-01 11:08 PST**



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2013T-110

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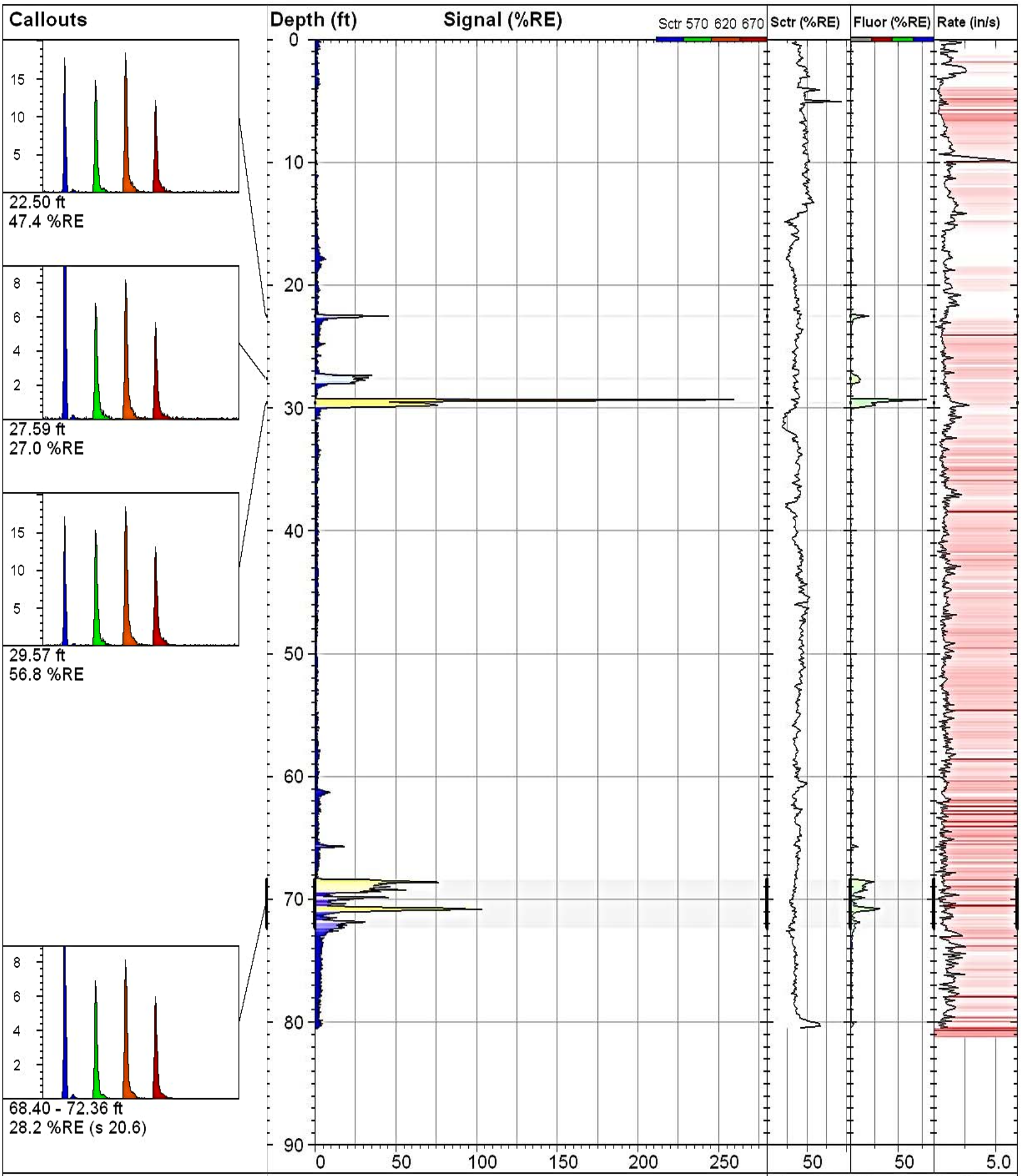
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **70.29 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **114.9 %RE @ 48.99 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-01 13:03 PST**



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2013T-111

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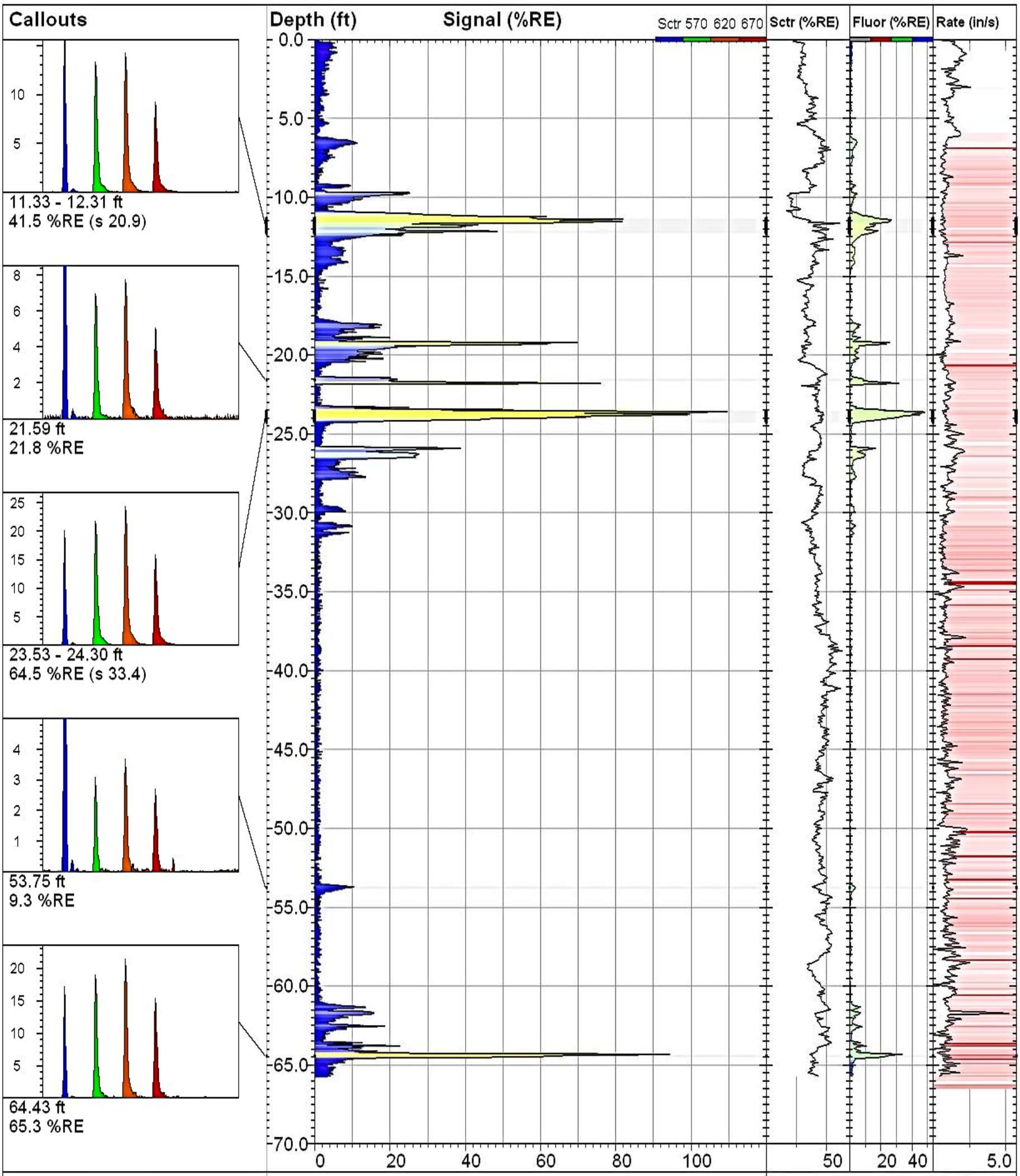
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **80.54 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **260.6 %RE @ 29.32 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-01 14:19 PST**



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2013T-112

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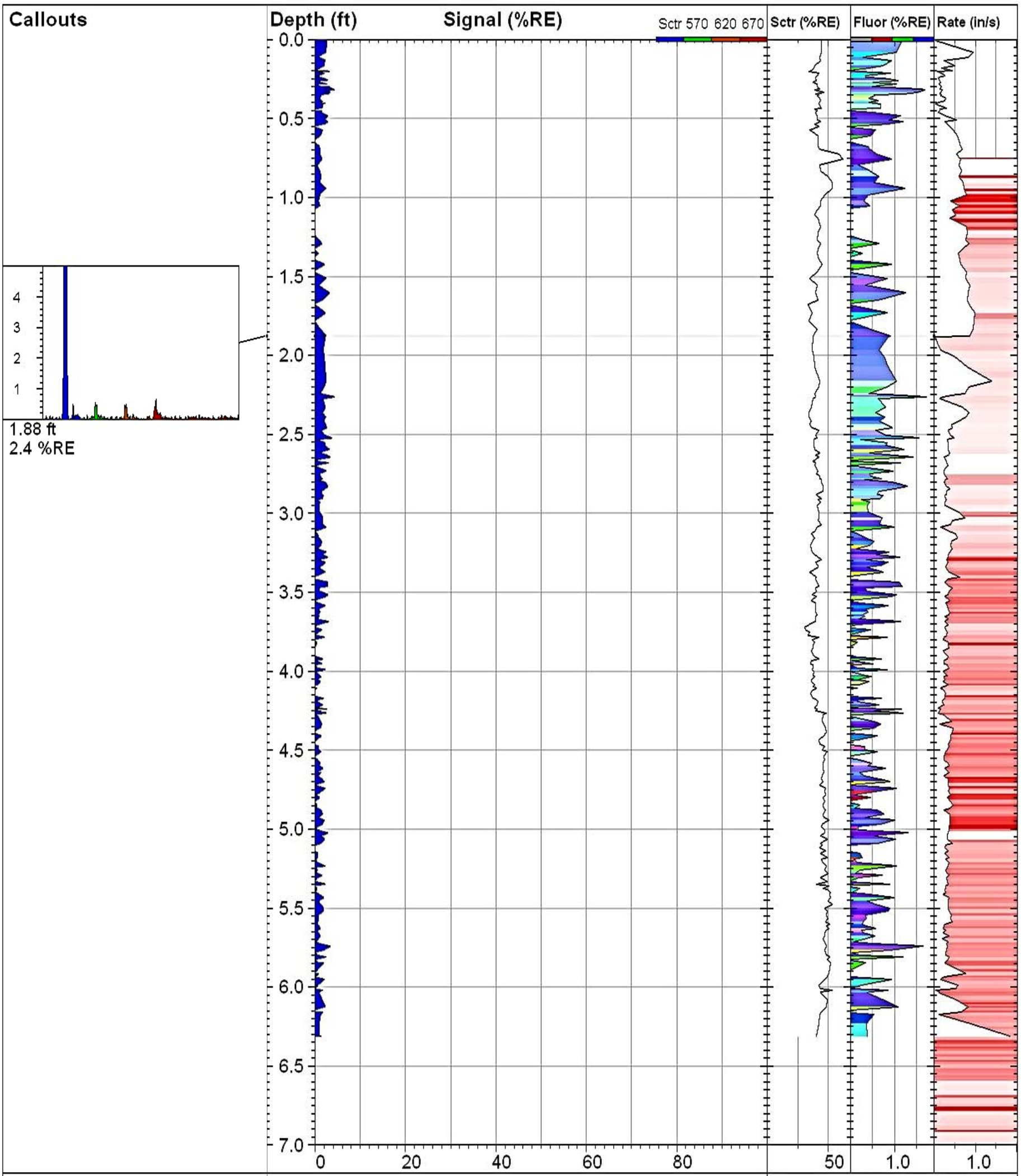
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **65.75 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **109.9 %RE @ 23.59 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-01 15:19 PST**



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2013T-113

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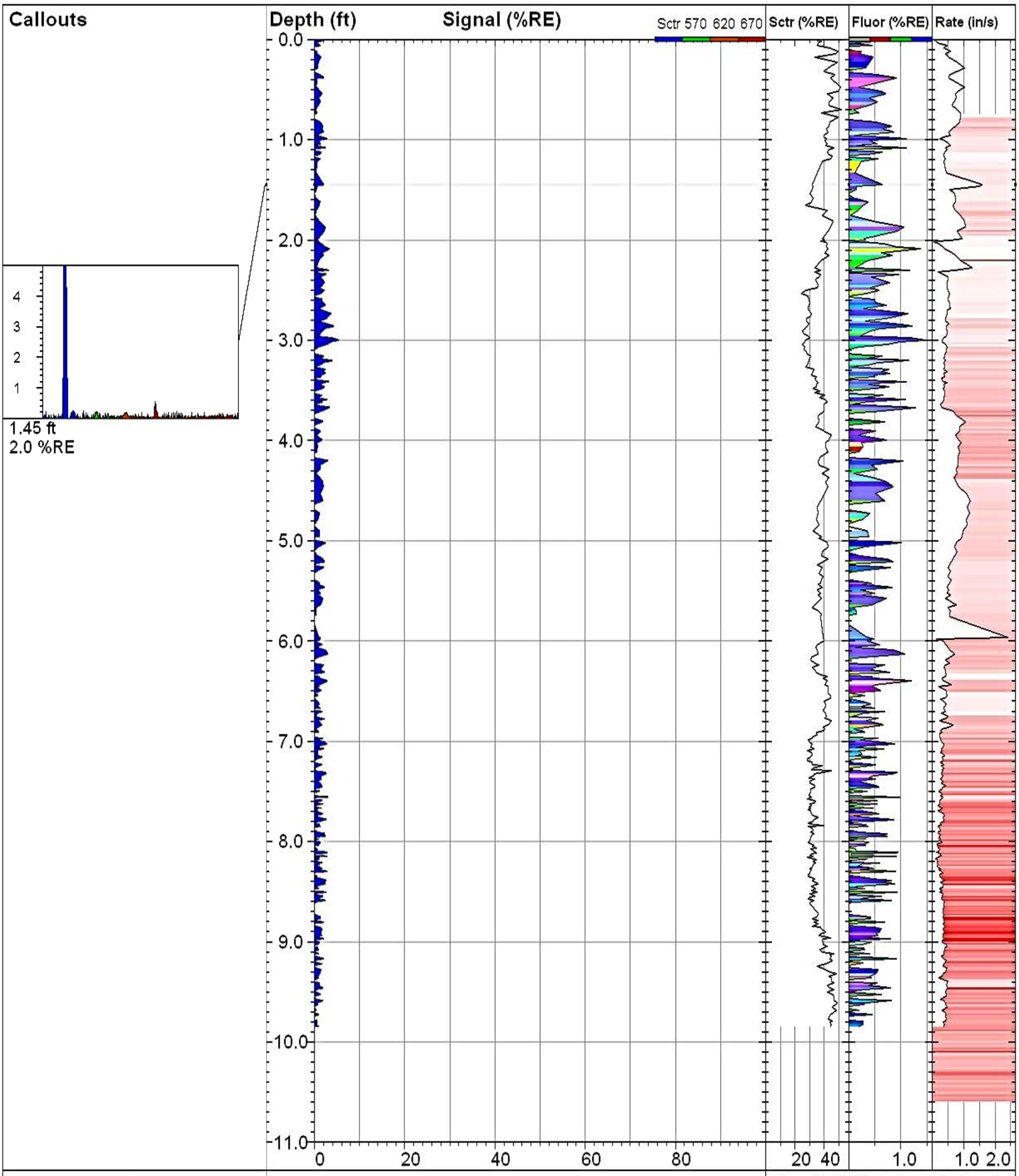
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **6.31 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **4.4 %RE @ 2.26 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 09:40 PST**



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2013T-114

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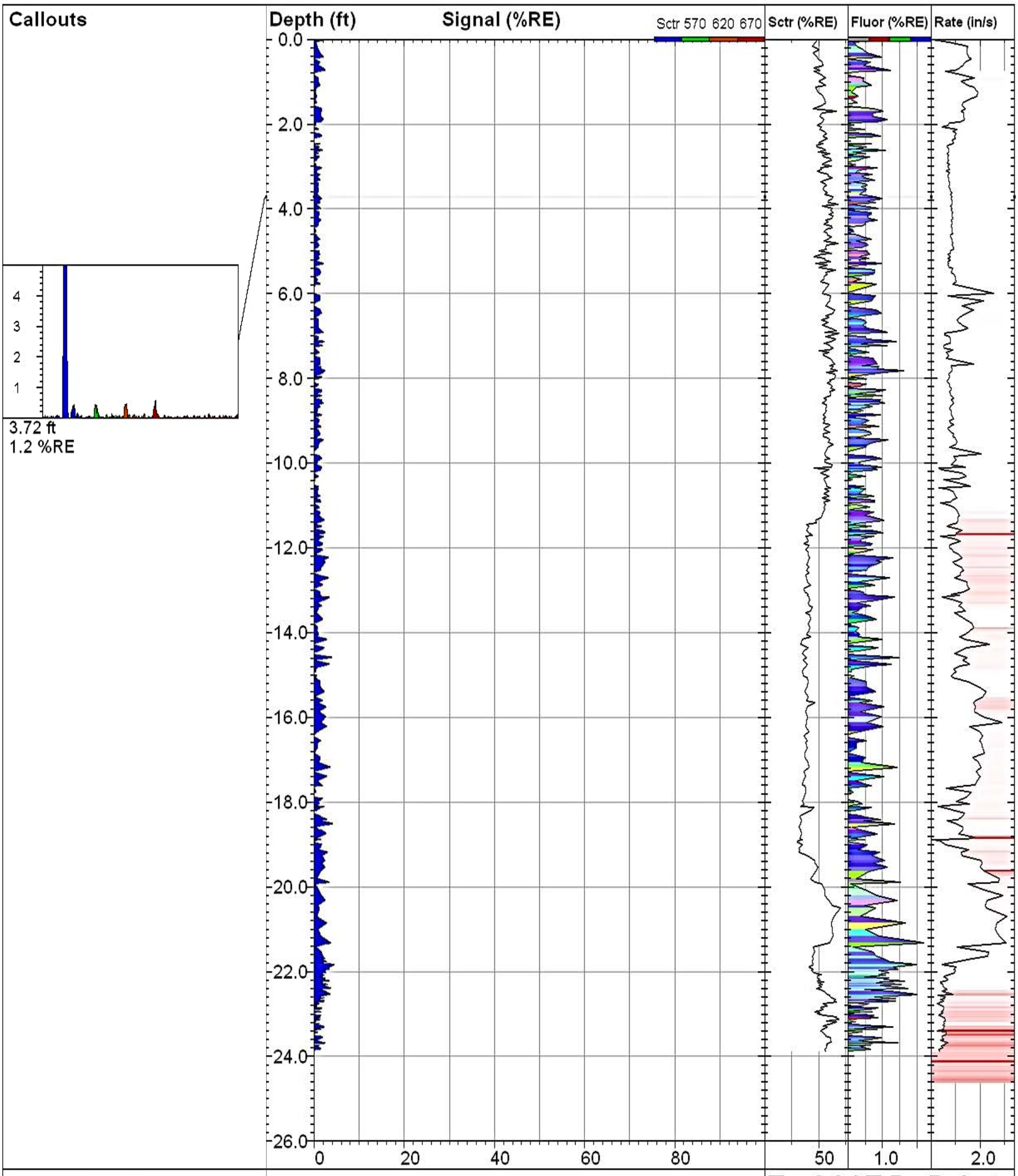
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.85 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **5.3 %RE @ 3.00 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 10:09 PST**



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2013T-115

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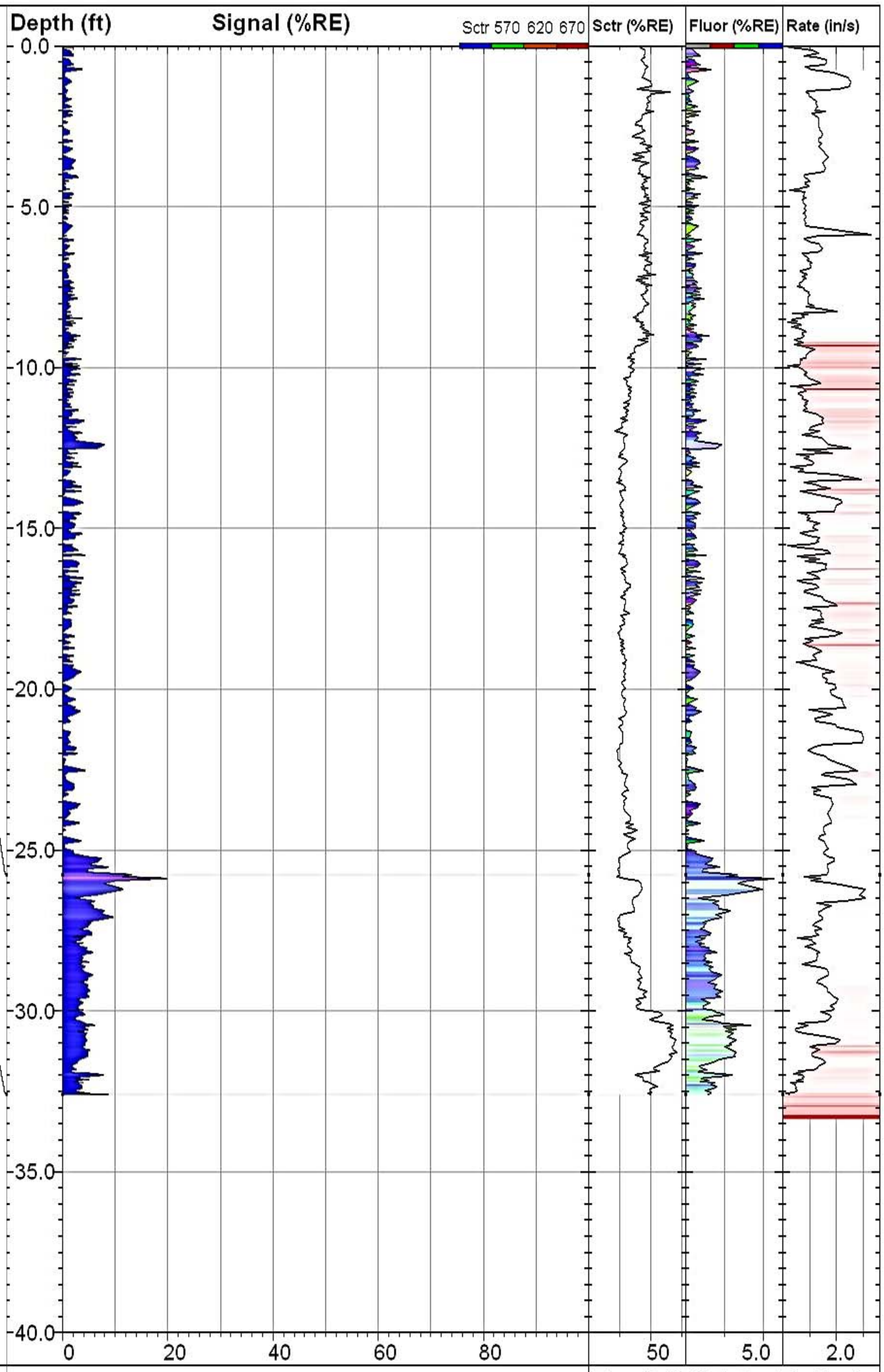
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.87 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **4.5 %RE @ 21.83 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 11:50 PST**

Callouts

25.76 ft
13.1 %RE

32.59 ft
9.4 %RE



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2013T-116

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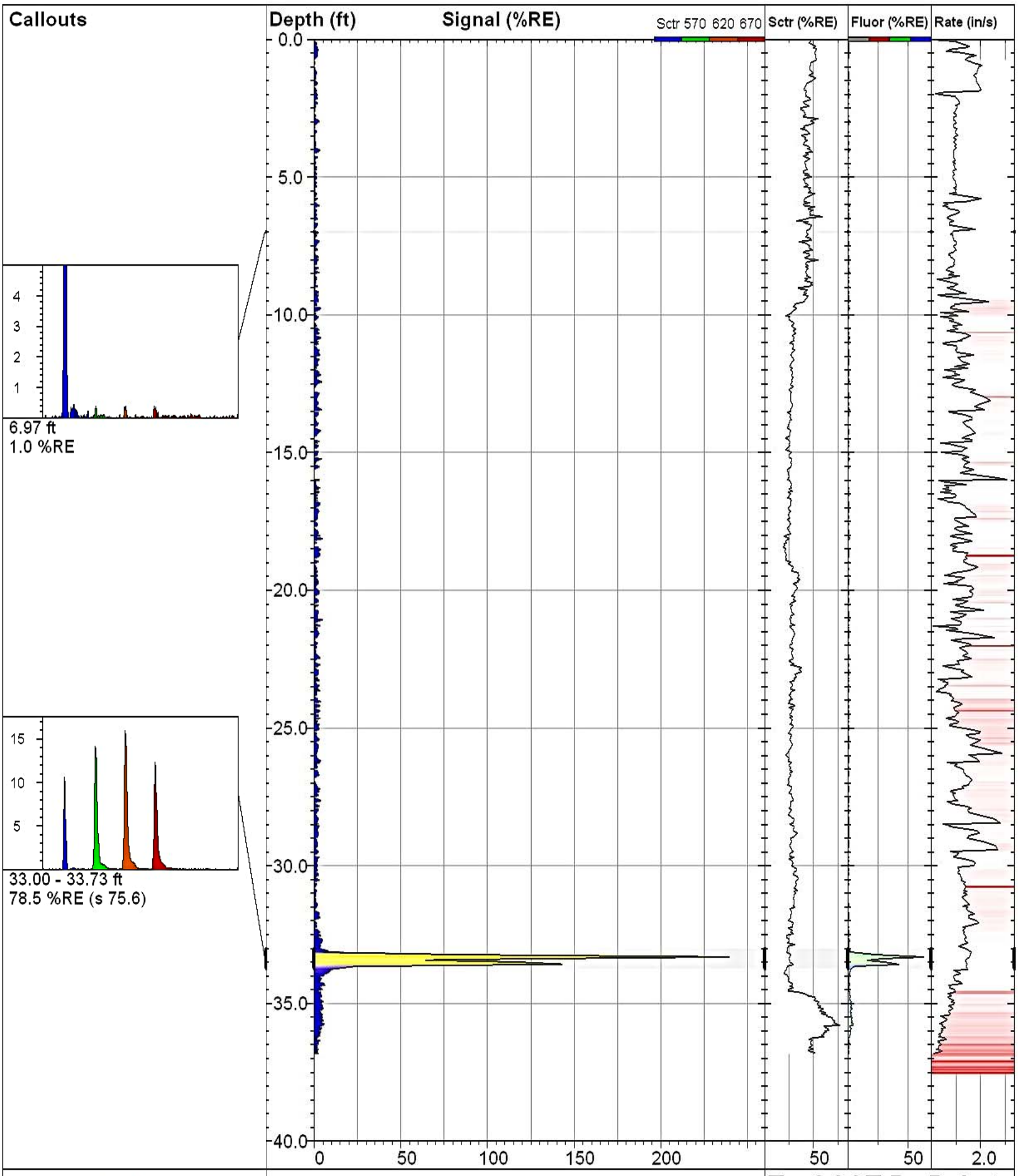
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.59 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **19.8 %RE @ 25.88 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 12:30 PST**



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2013T-117

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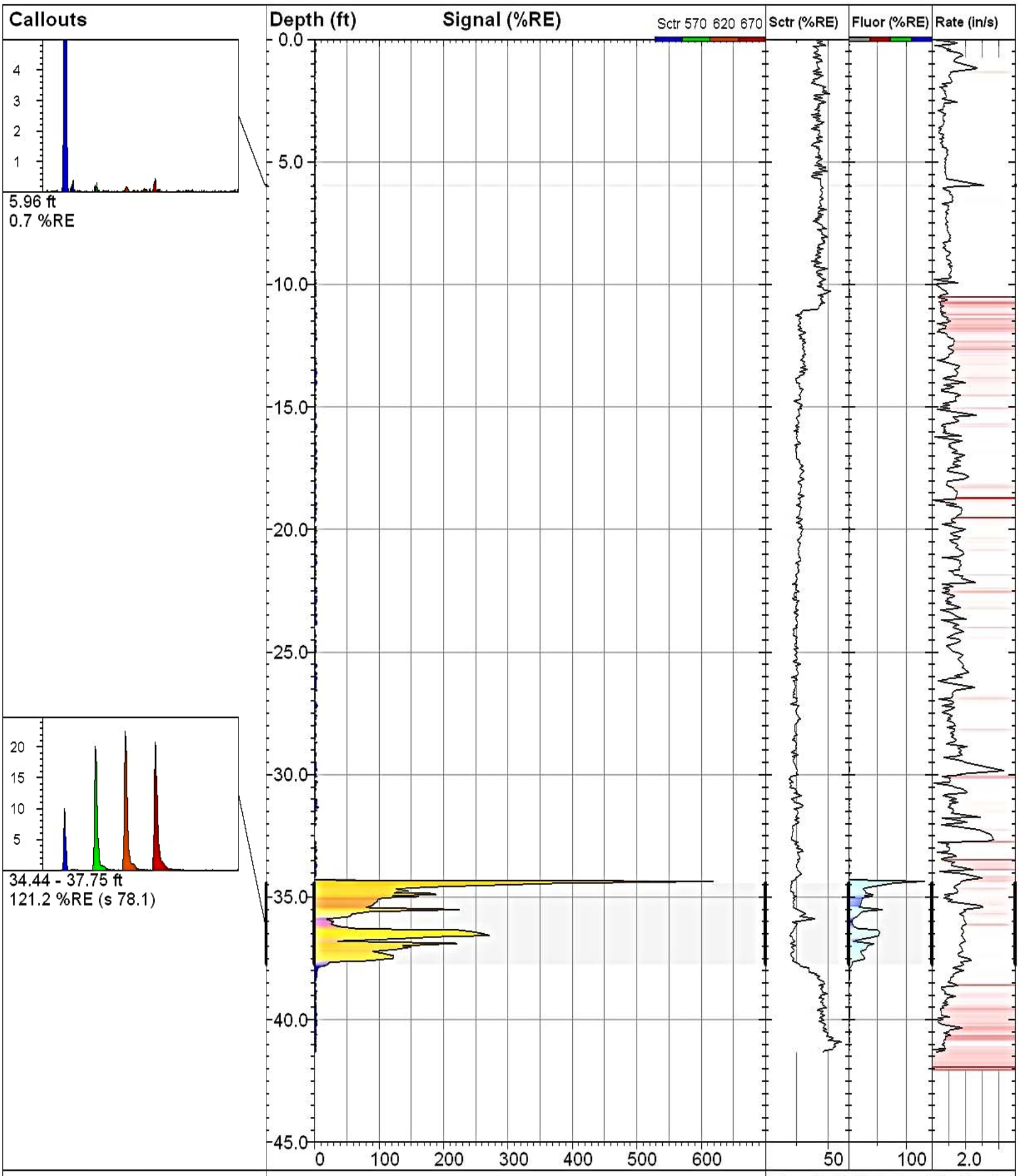
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **36.82 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **242.0 %RE @ 33.31 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 13:14 PST**



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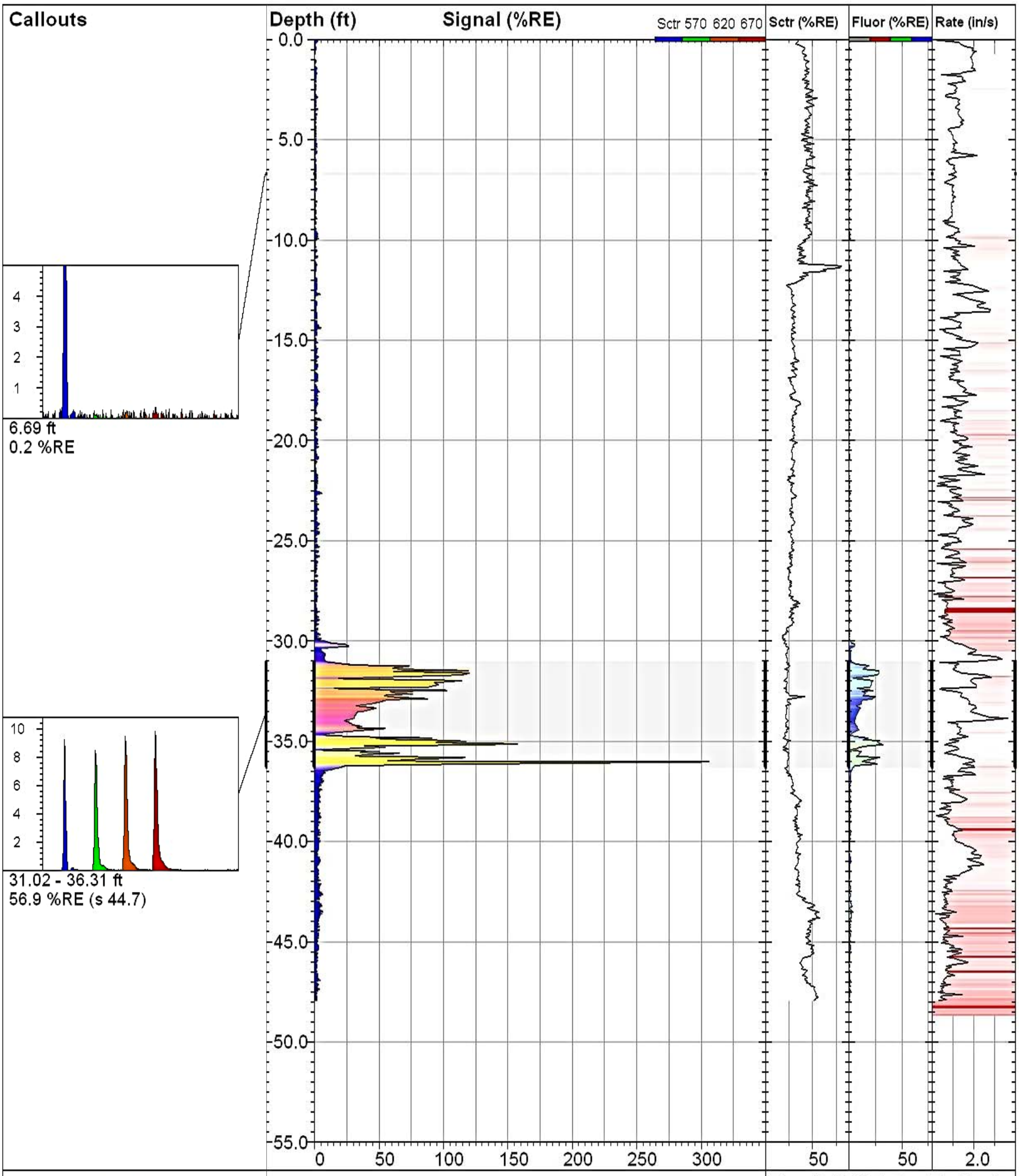
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **41.33 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **627.9 %RE @ 34.35 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 14:04 PST**



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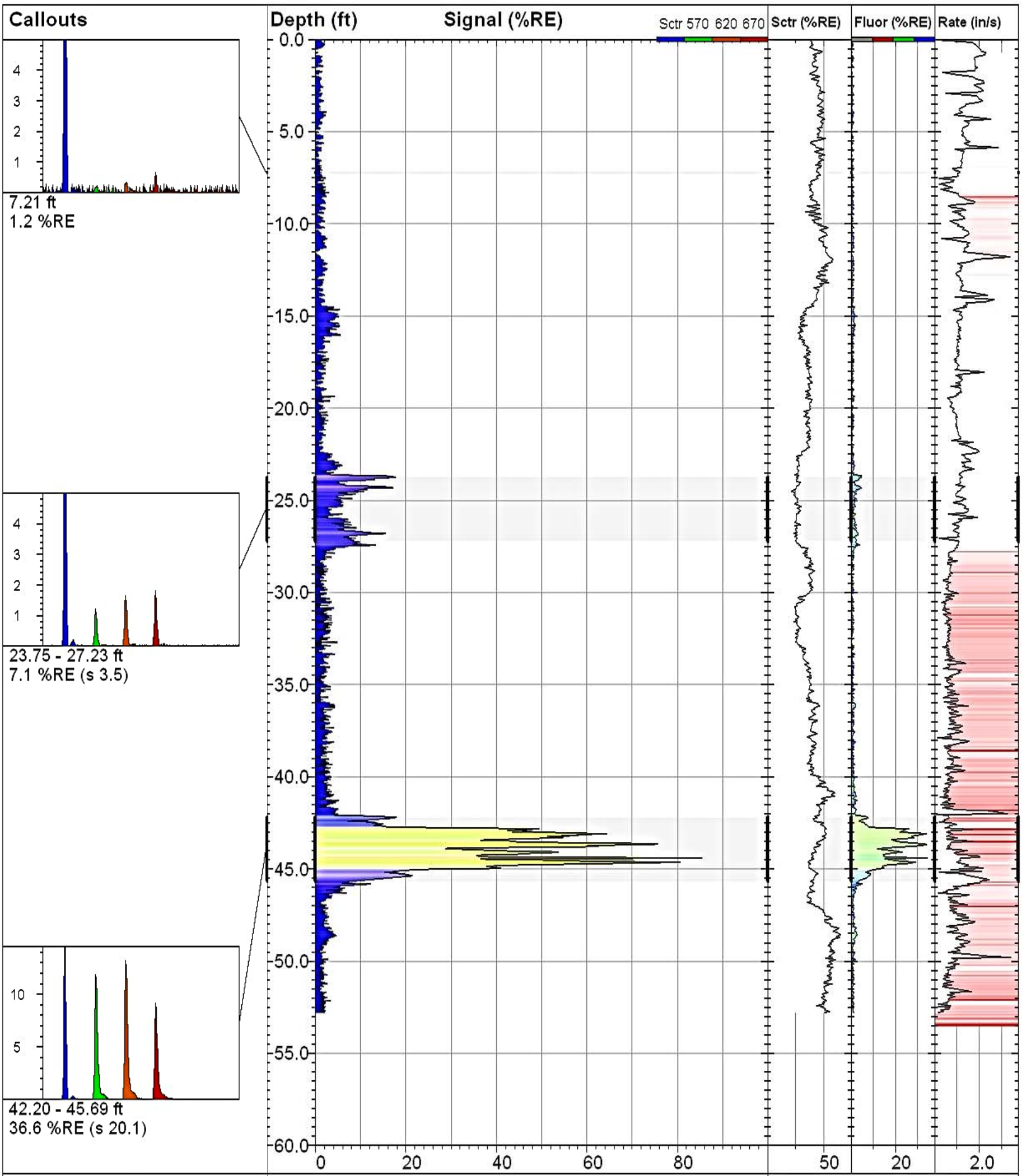
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **47.95 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **315.8 %RE @ 36.02 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 14:50 PST**



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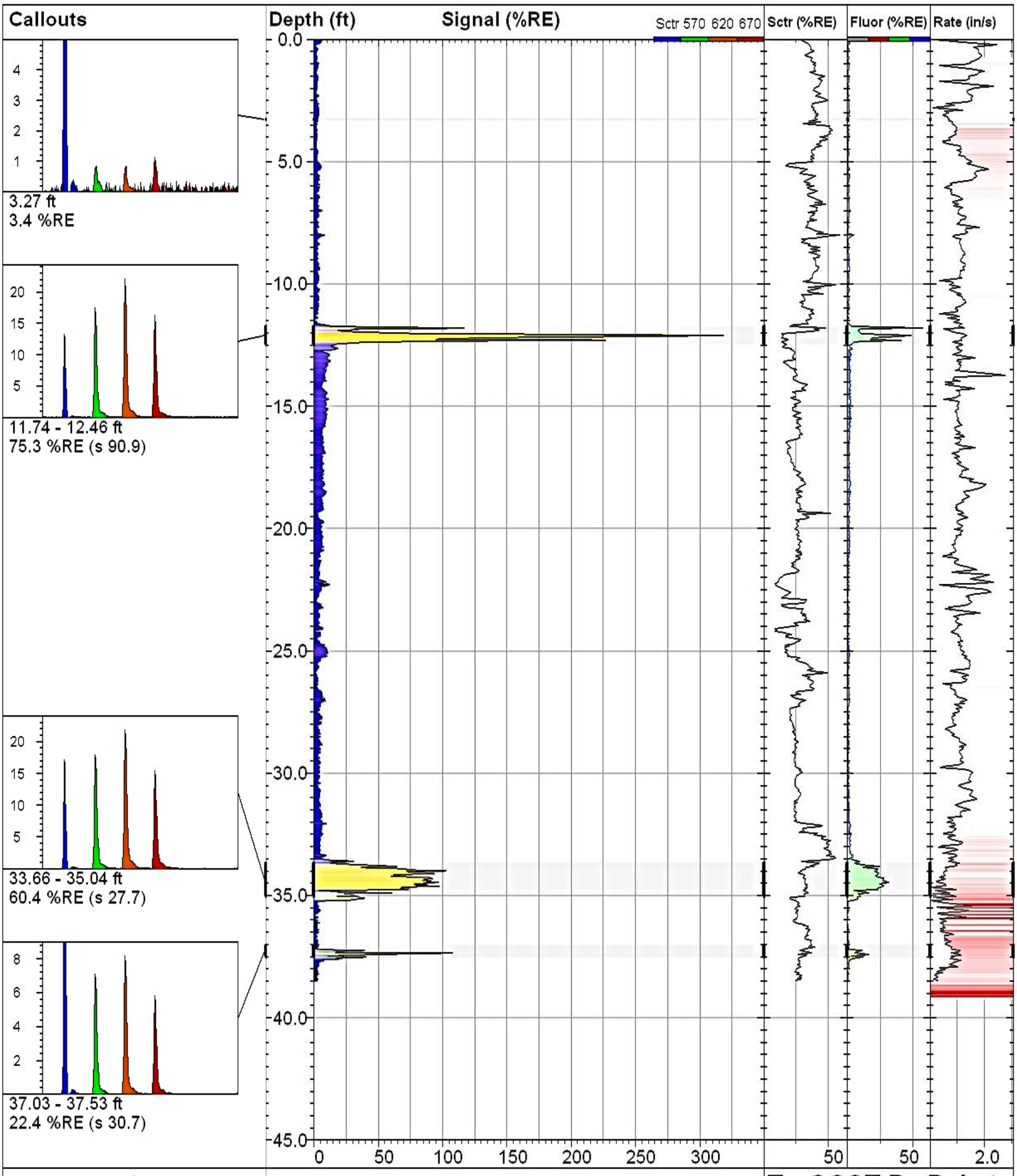
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **52.77 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **88.0 %RE @ 44.40 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-04 15:41 PST**



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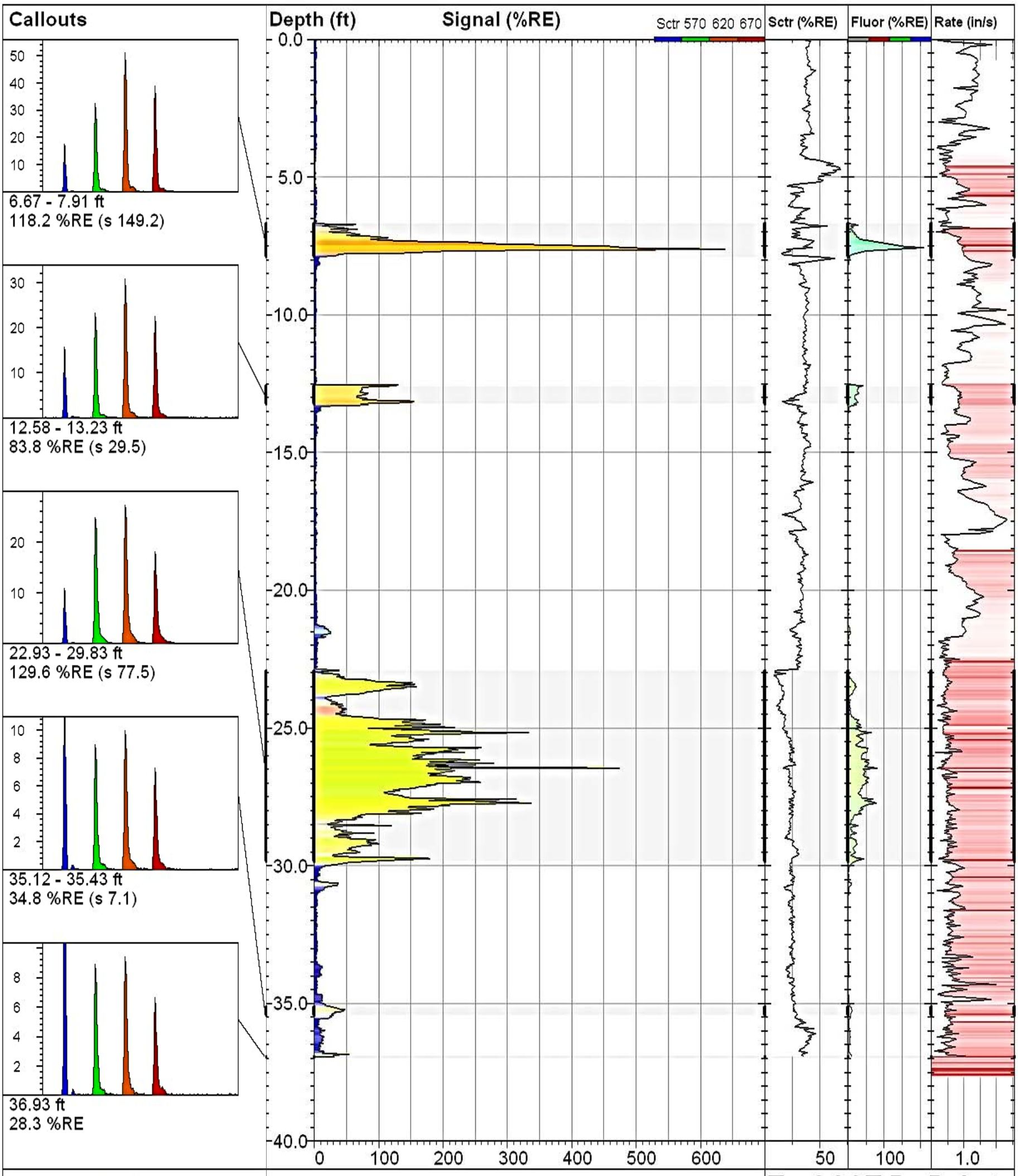
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **38.51 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **324.3 %RE @ 12.10 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-05 13:11 PST**



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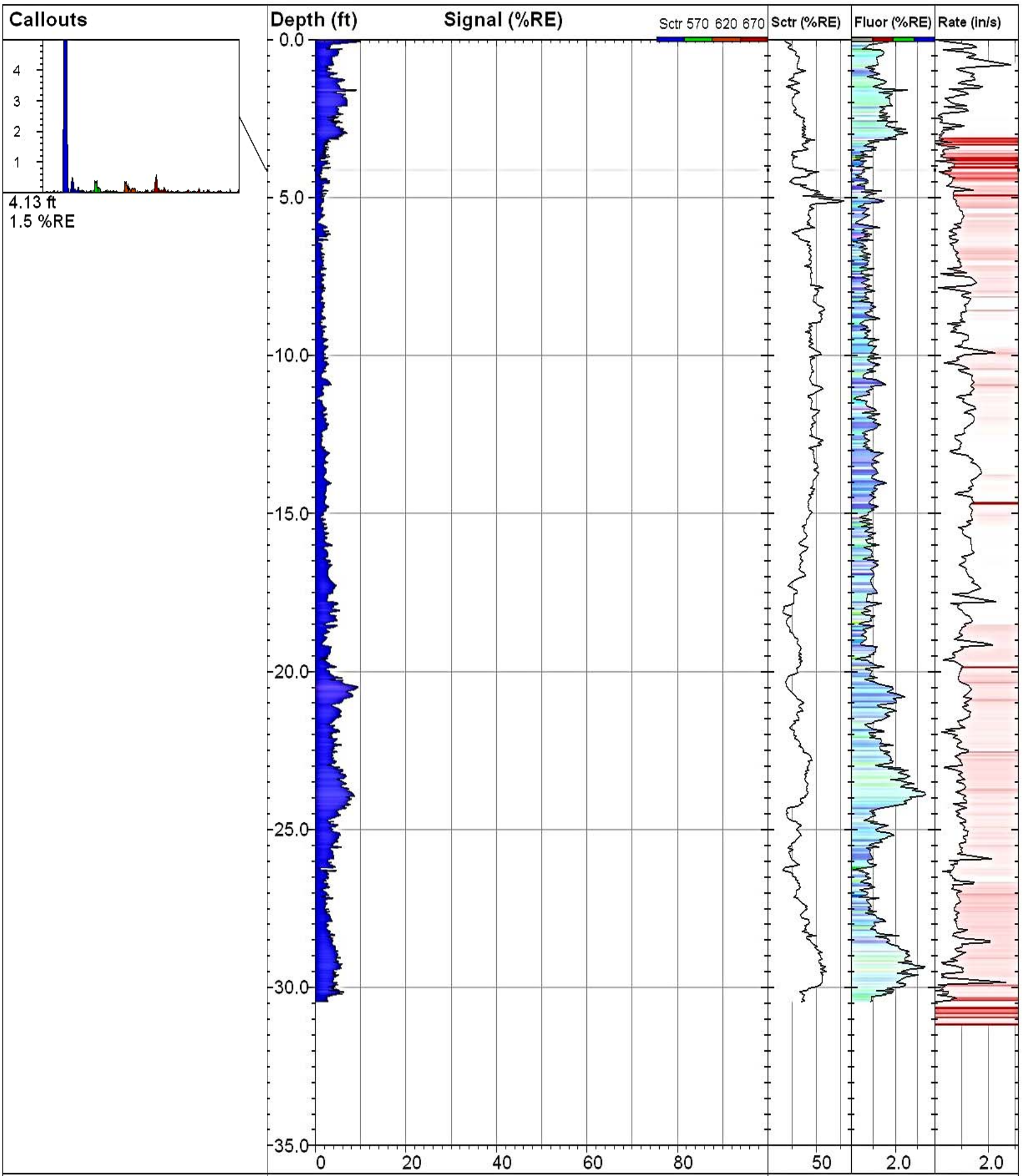
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **36.94 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **646.4 %RE @ 7.62 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-05 13:47 PST**



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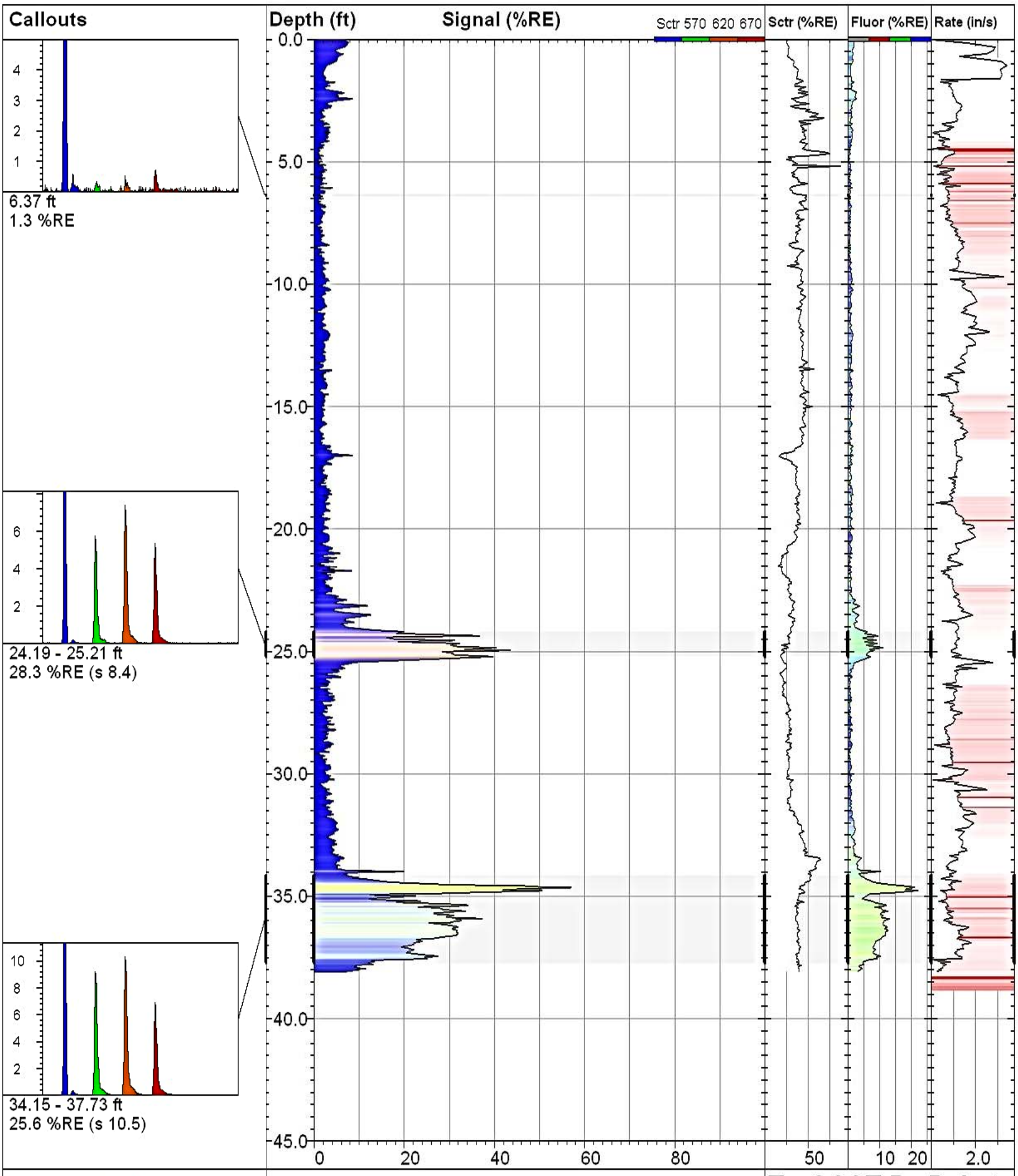
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.44 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **10.0 %RE @ 0.05 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-05 14:25 PST**



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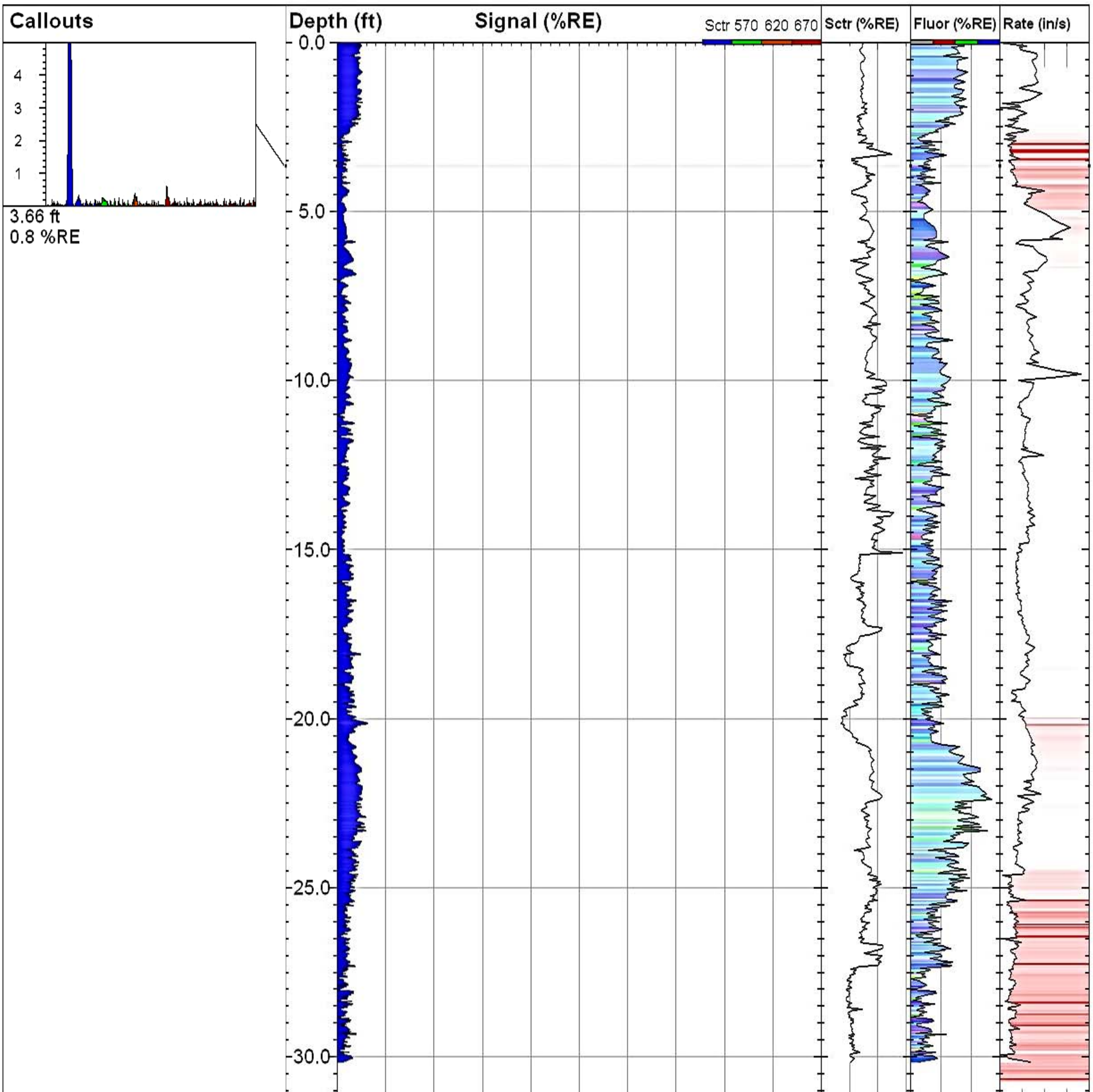
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **38.09 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **57.6 %RE @ 34.64 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-05 14:55 PST**



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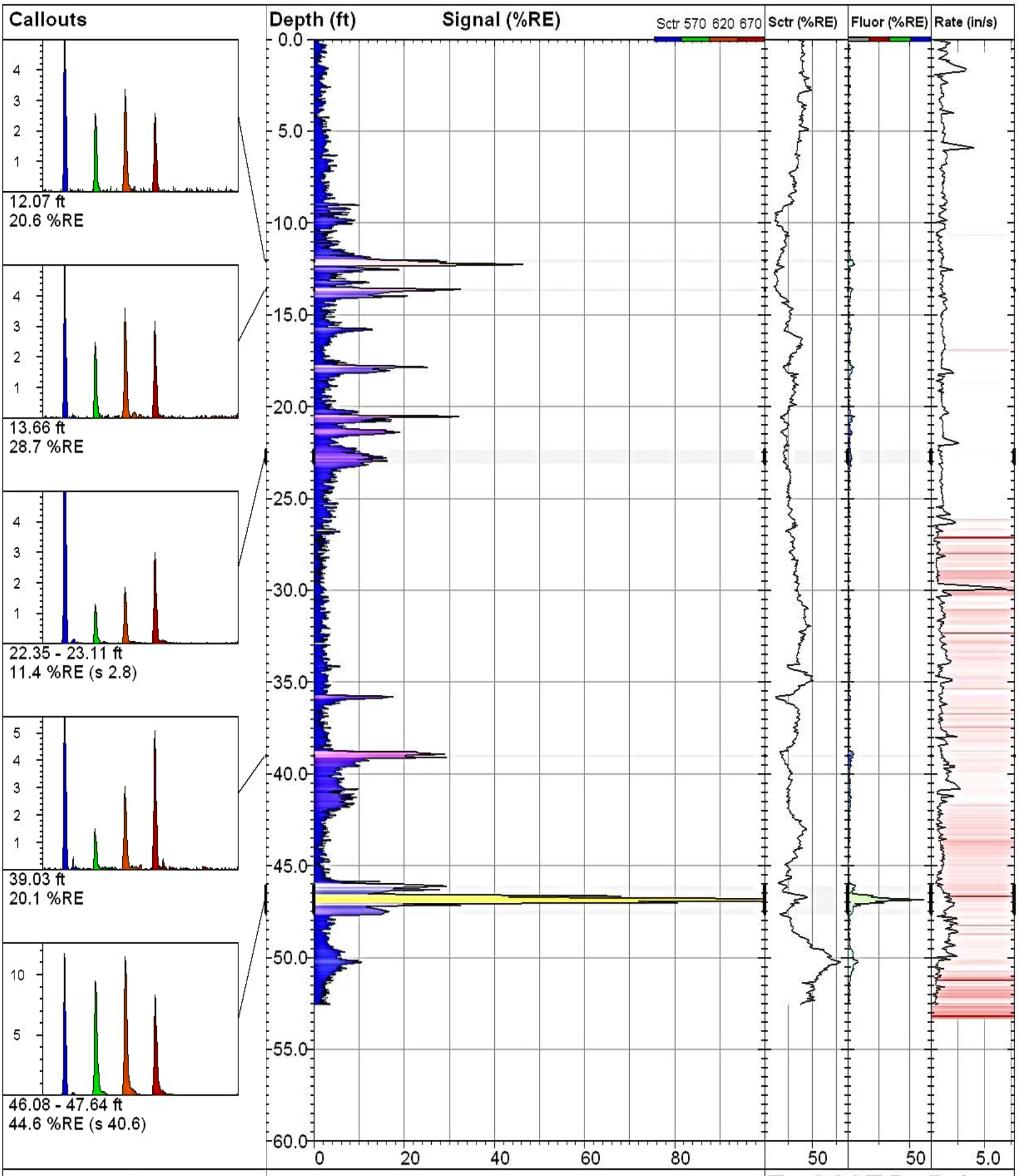
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.16 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **6.3 %RE @ 20.14 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-05 15:35 PST**



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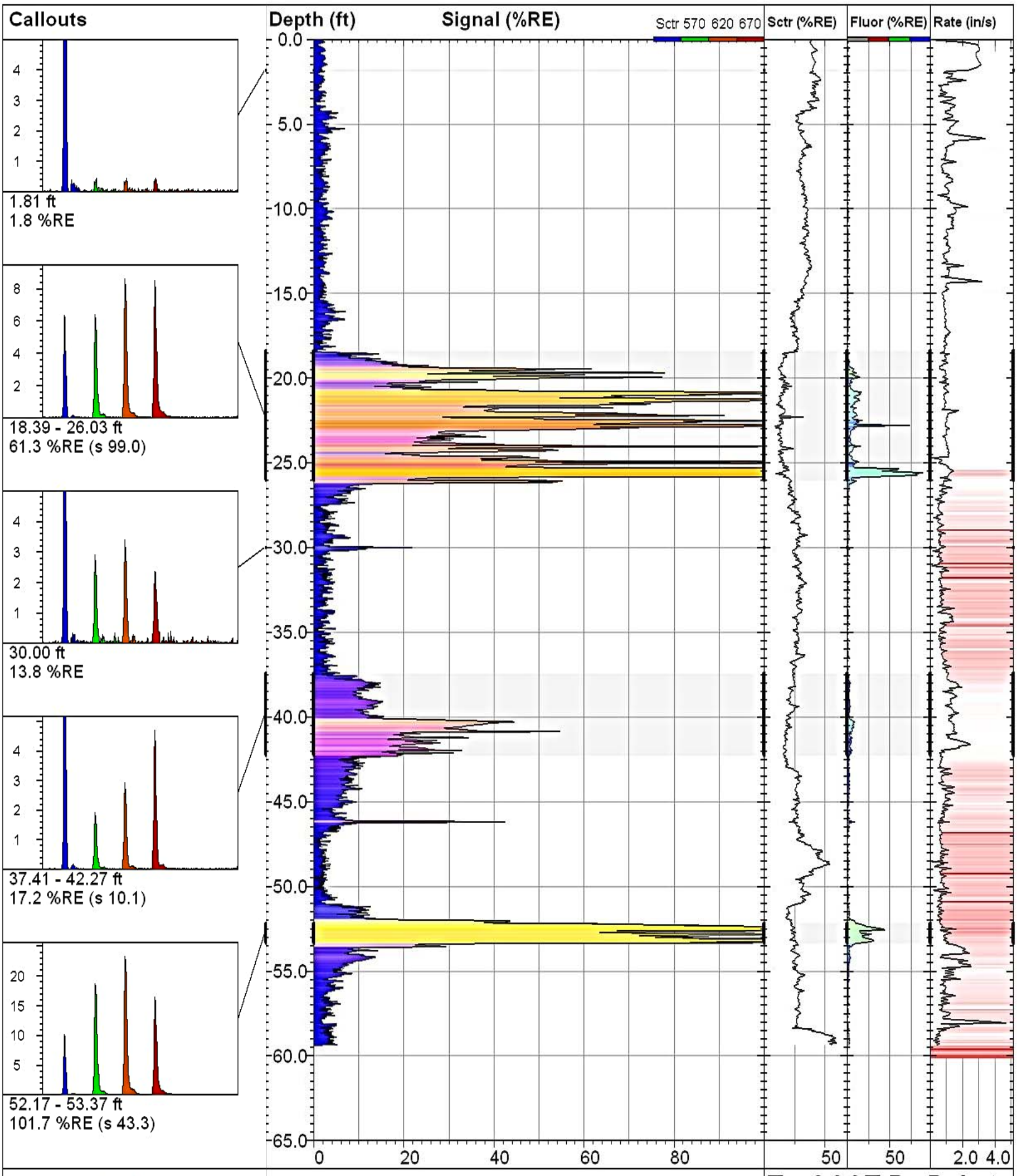
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **52.57 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **191.7 %RE @ 46.86 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-06 08:51 PST**



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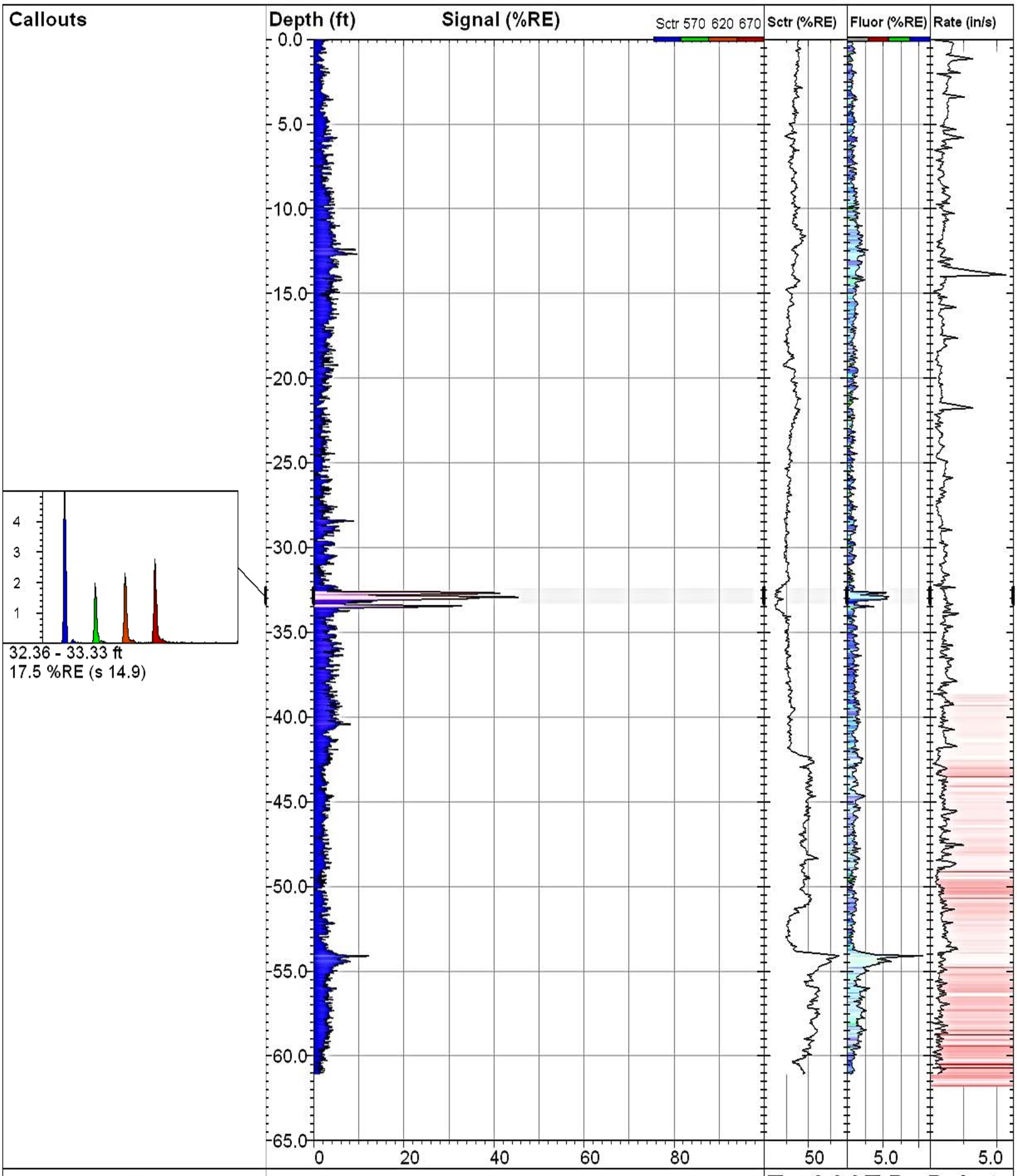
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **59.37 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **818.9 %RE @ 25.65 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-06 10:30 PST**



2013T-128

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Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **61.04 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **45.8 %RE @ 32.92 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-06 12:44 PST**

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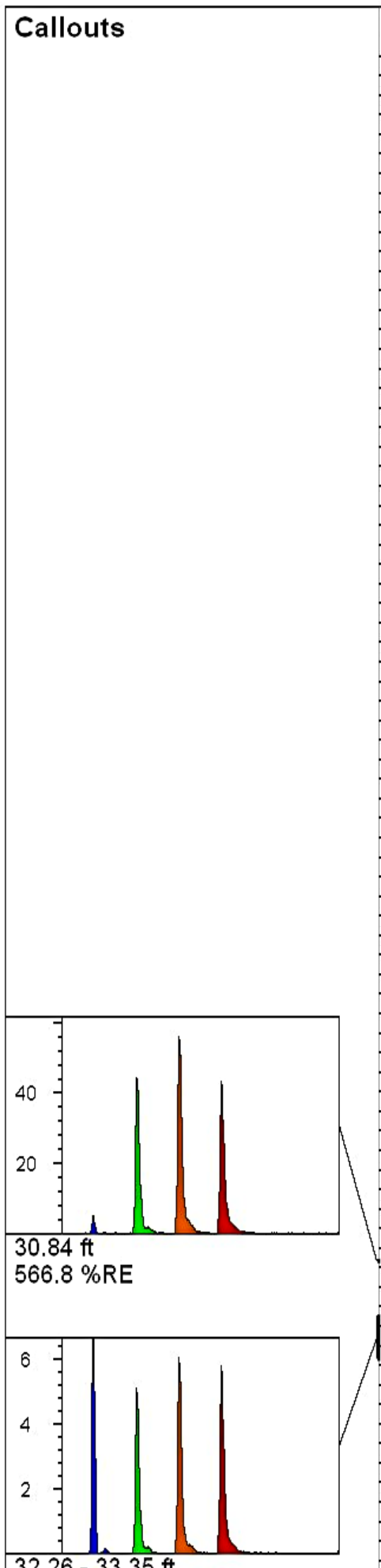
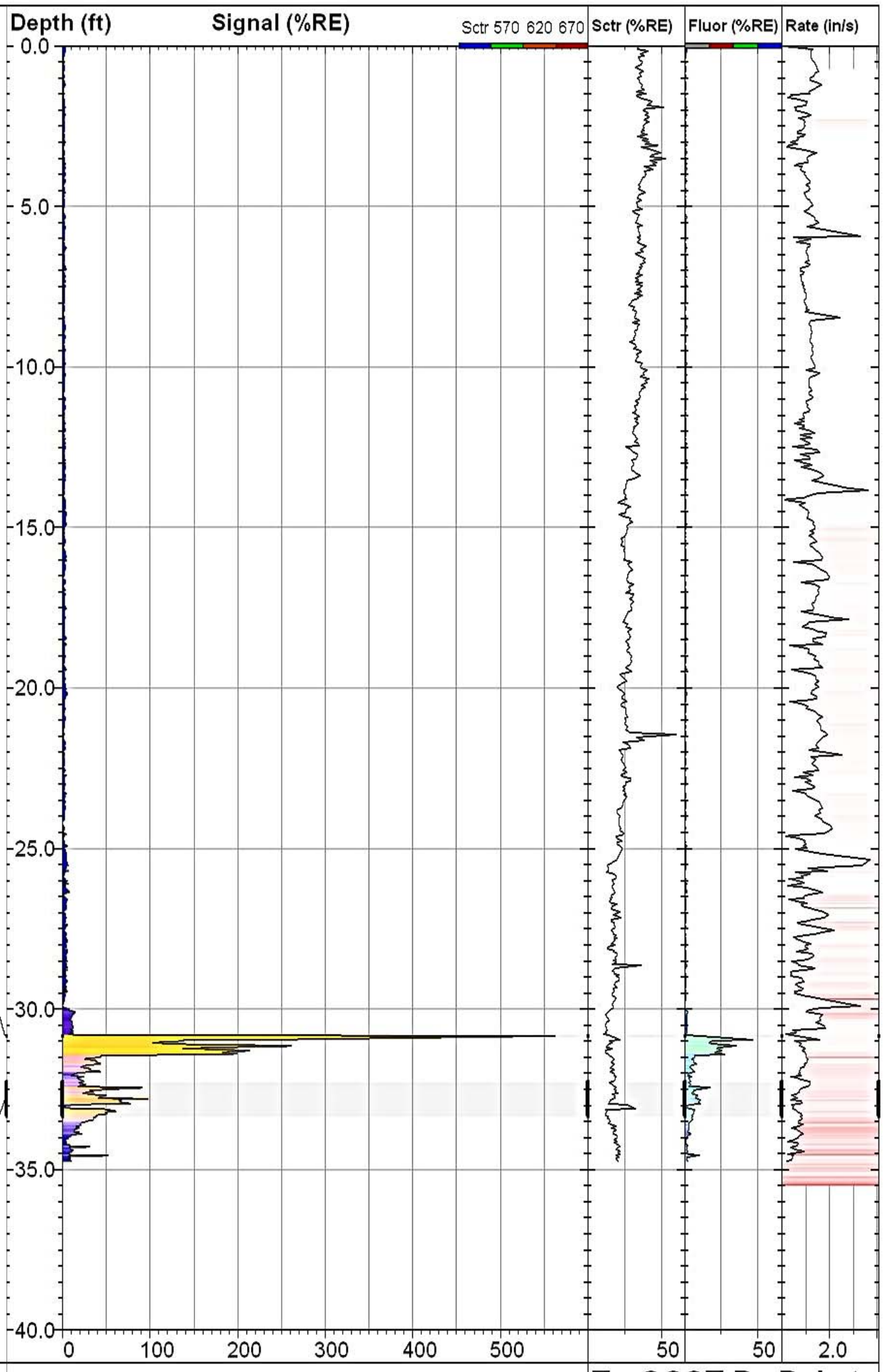
Callouts





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2013T-129

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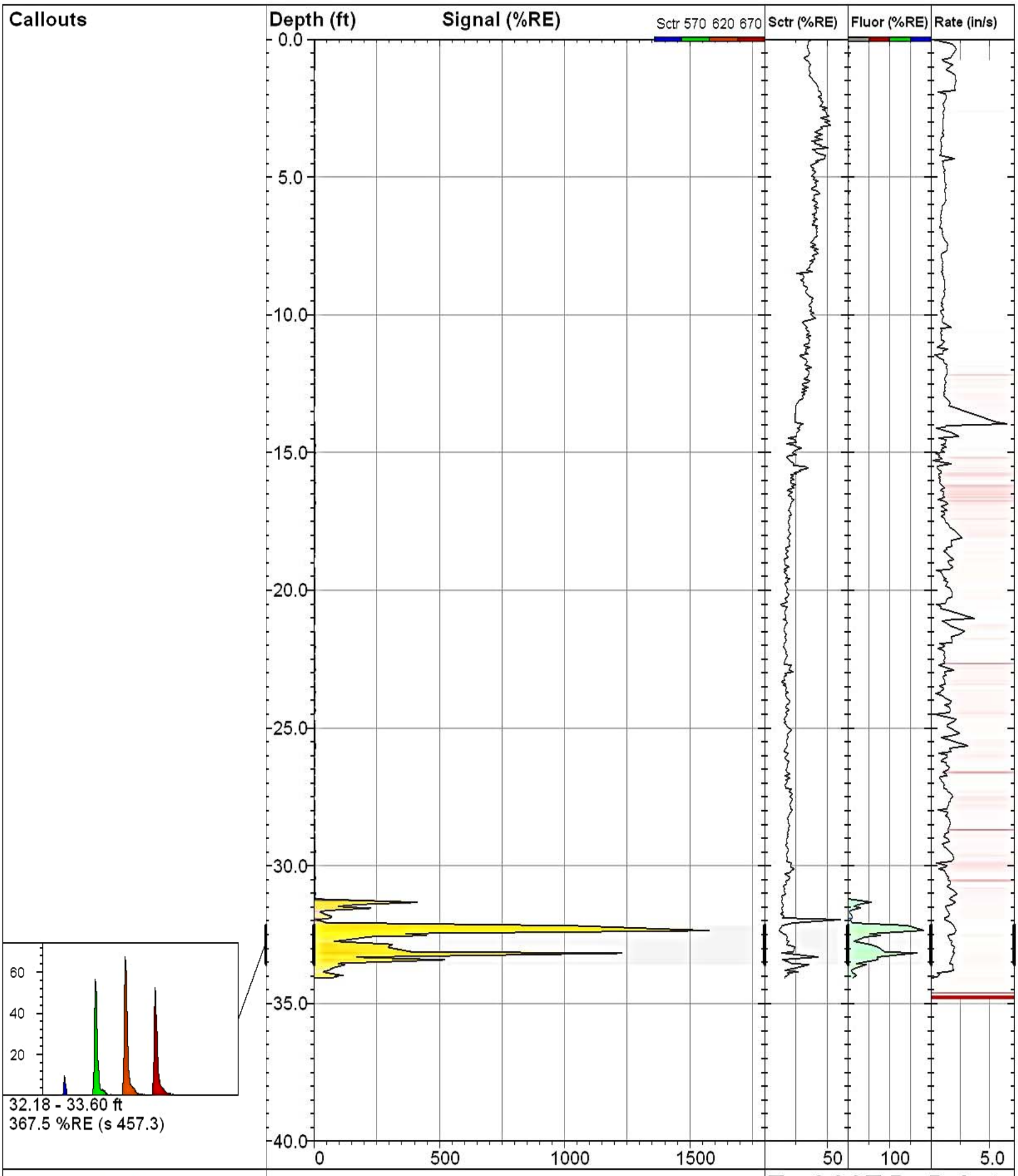
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **34.75 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **566.8 %RE @ 30.84 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-06 13:54 PST**



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2013T-130

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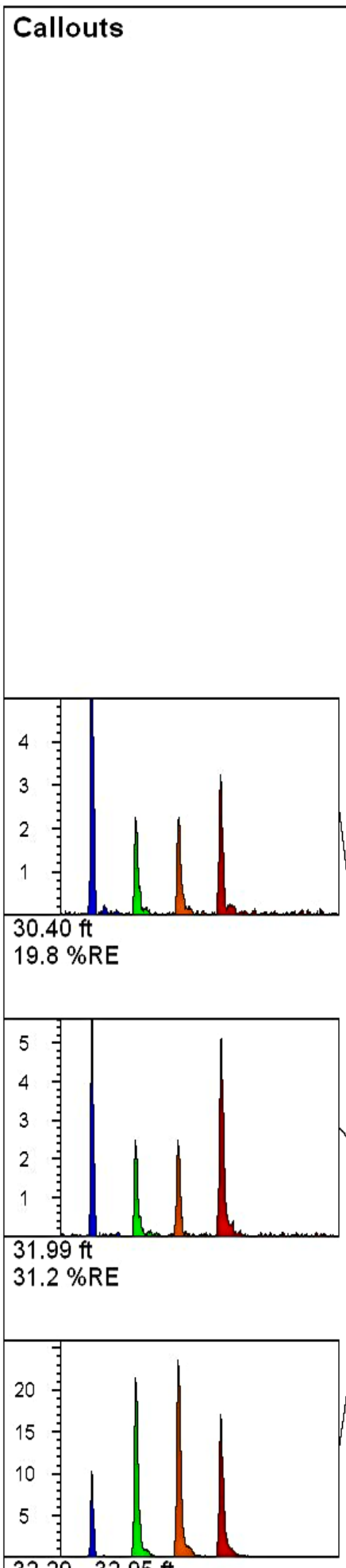
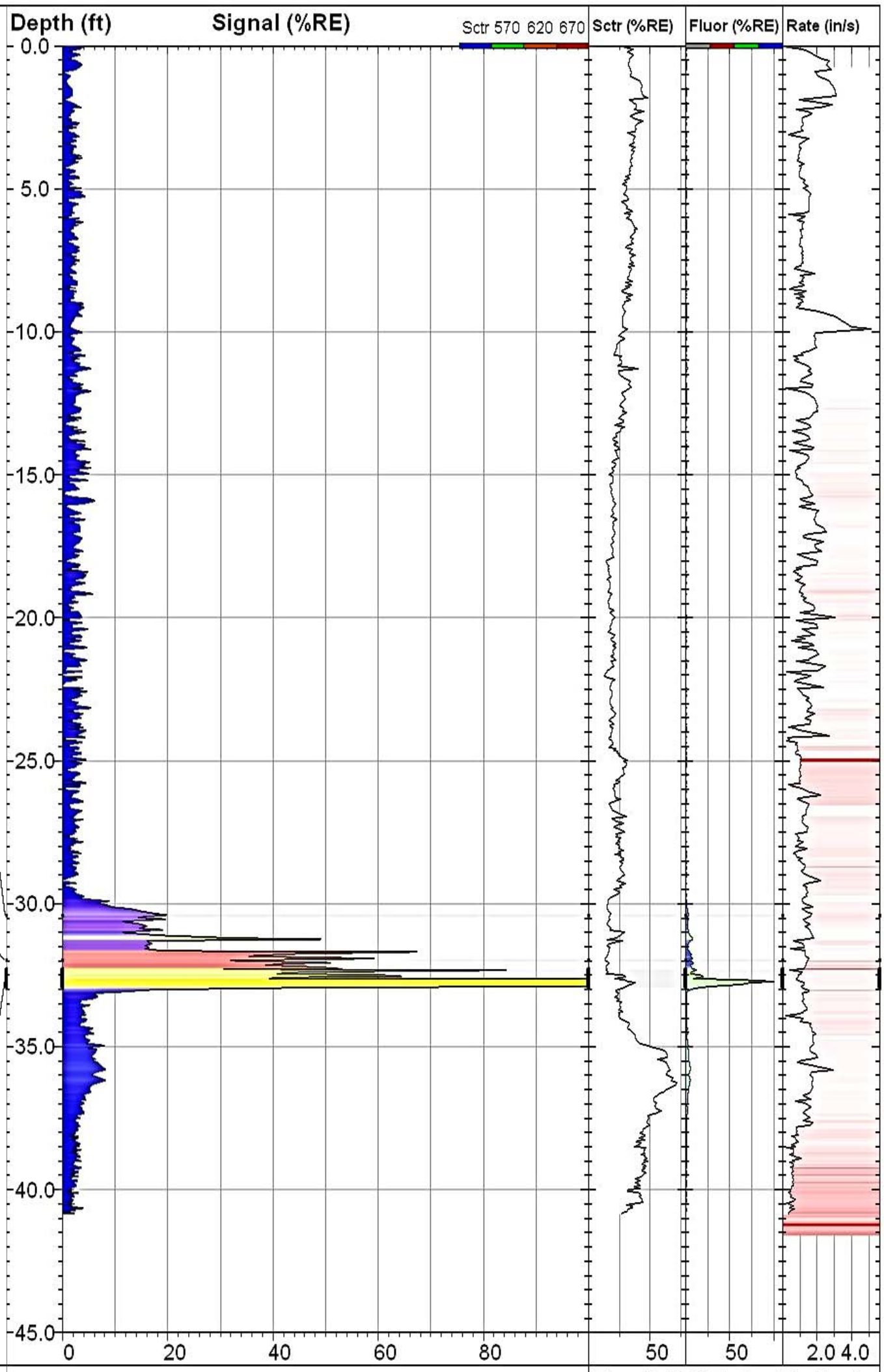
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **34.07 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **1579.9 %RE @ 32.36 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-06 14:39 PST**

Callouts





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2013T-131

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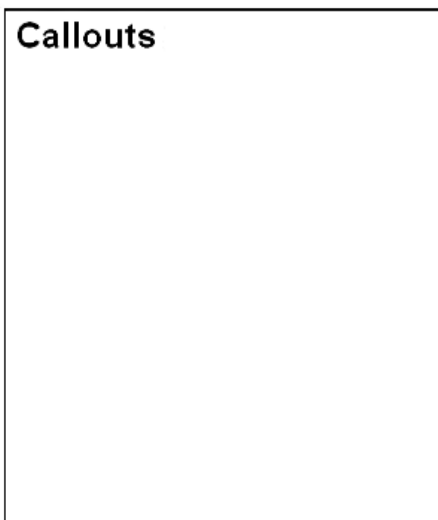
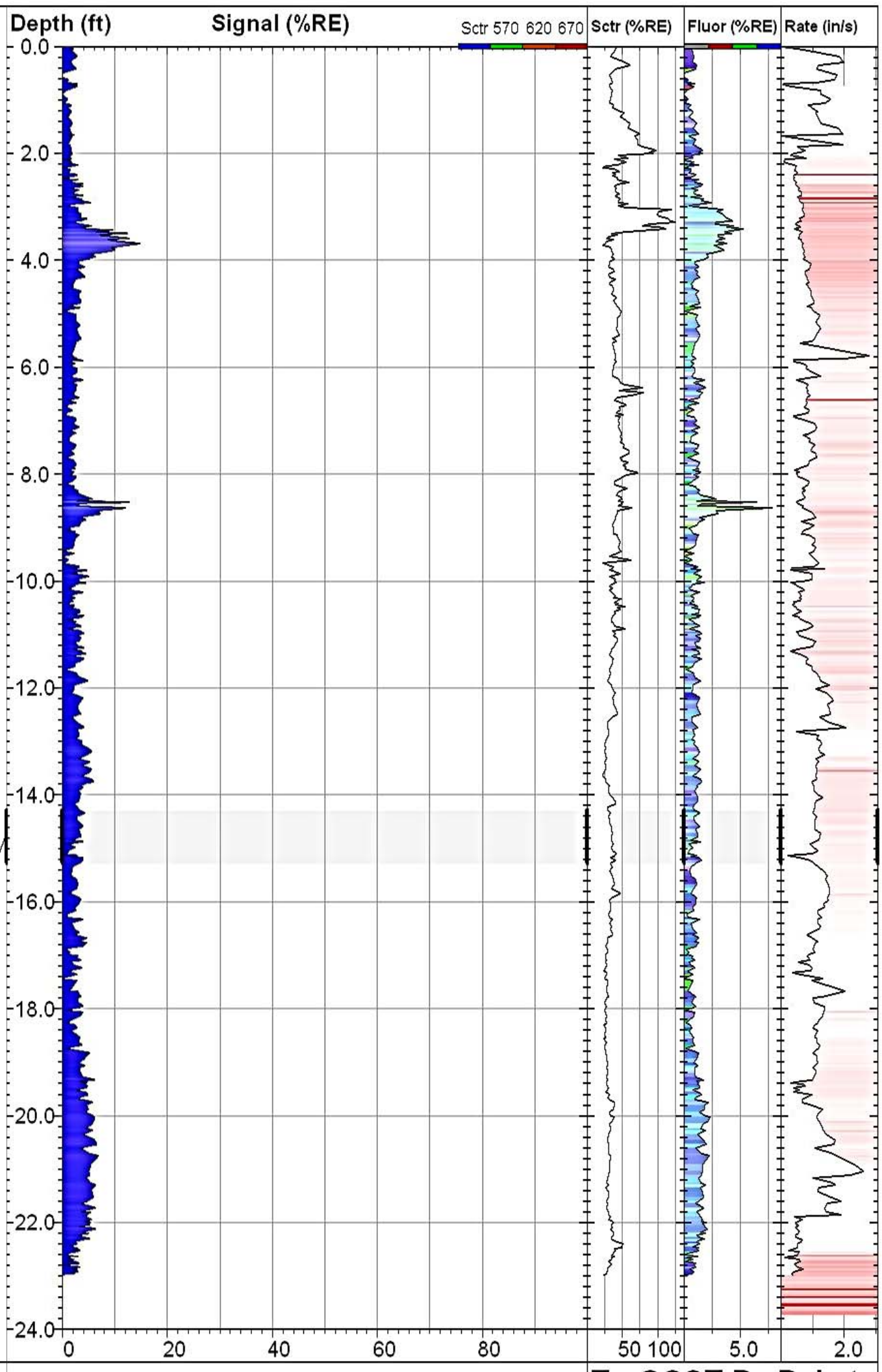
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **40.85 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **318.6 %RE @ 32.71 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-06 15:18 PST**

Callouts





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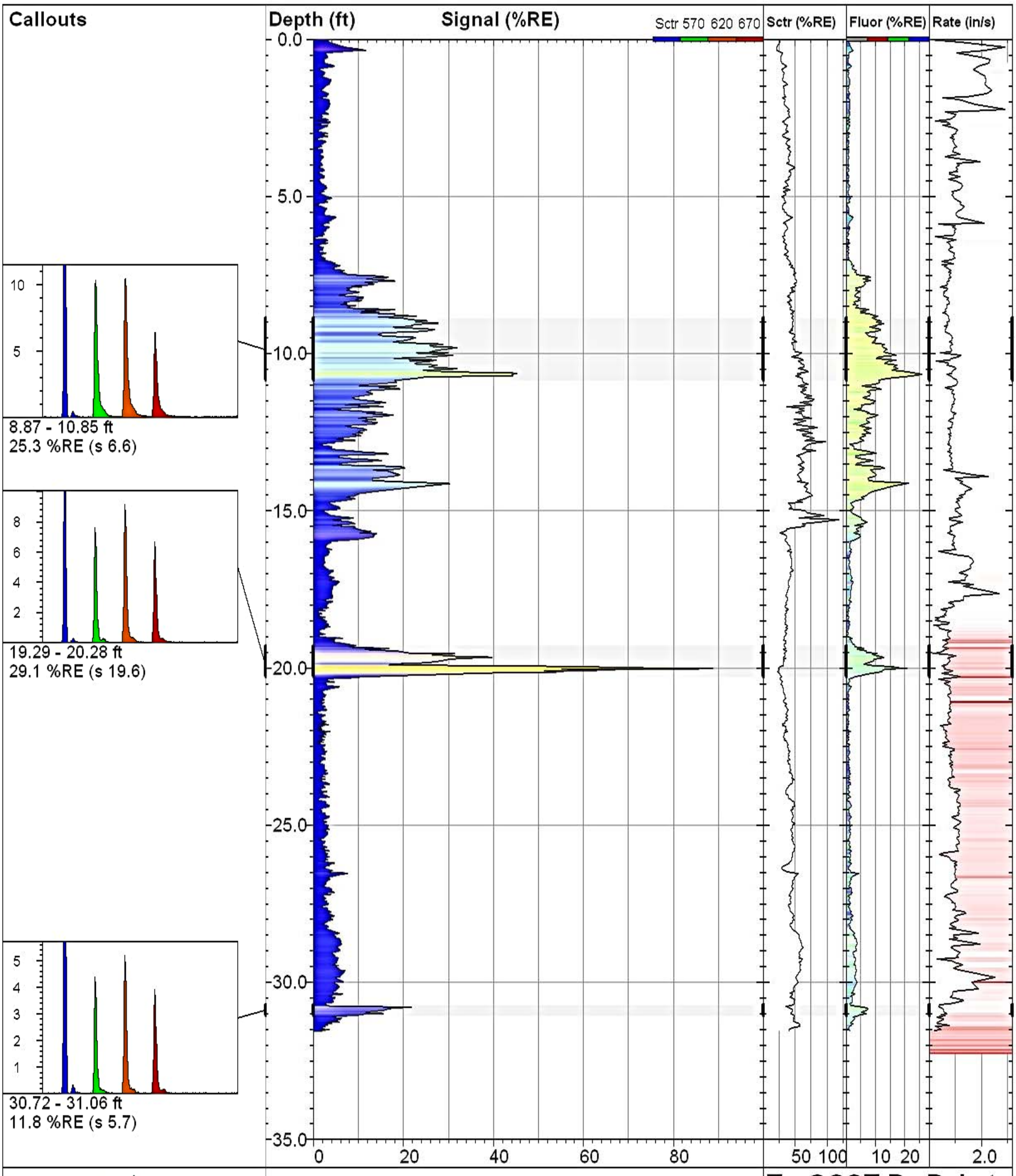
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **22.98 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **14.8 %RE @ 3.69 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-07 08:44 PST**



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2013T-133

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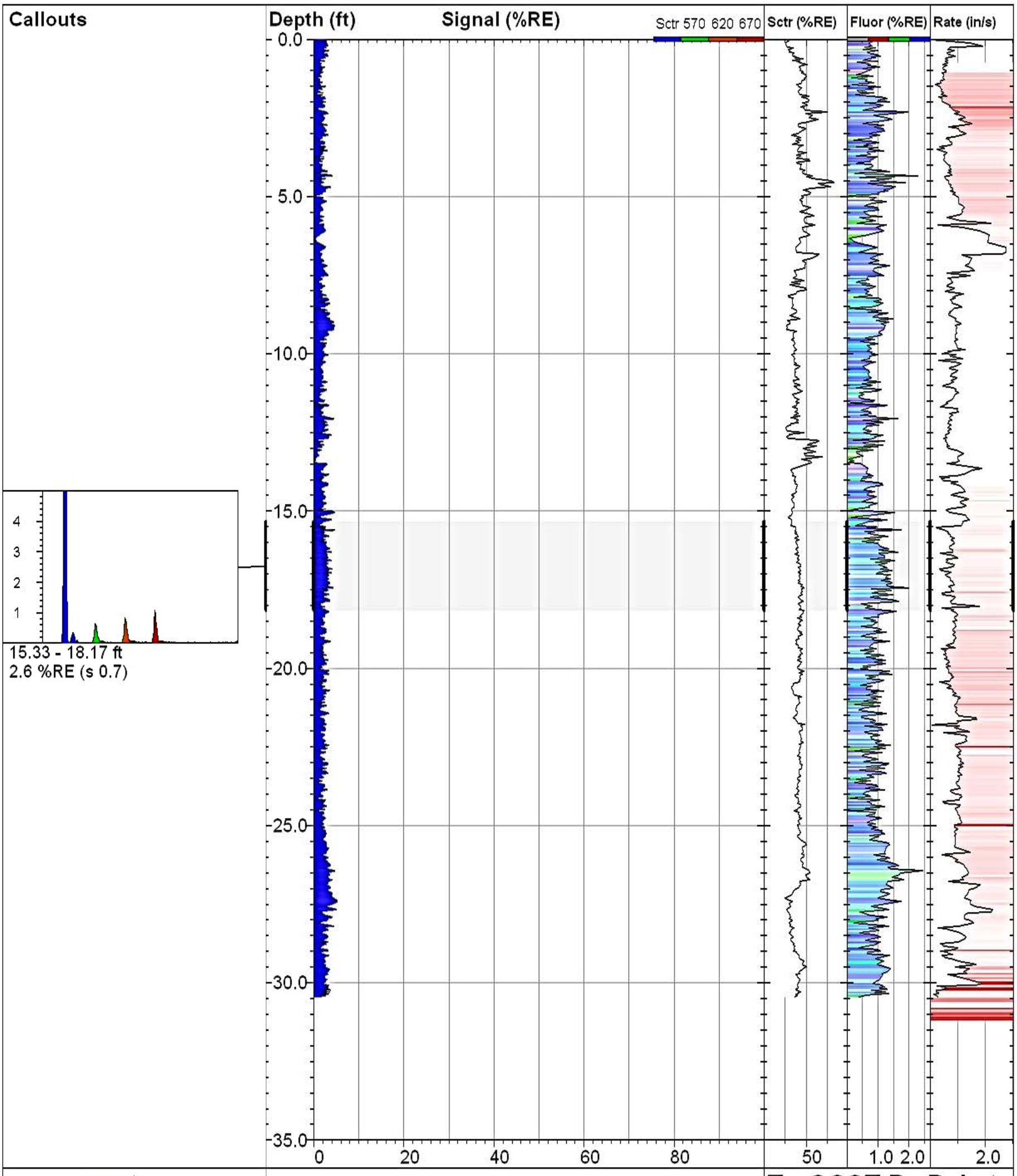
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **31.55 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **90.8 %RE @ 20.02 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-07 09:07 PST**



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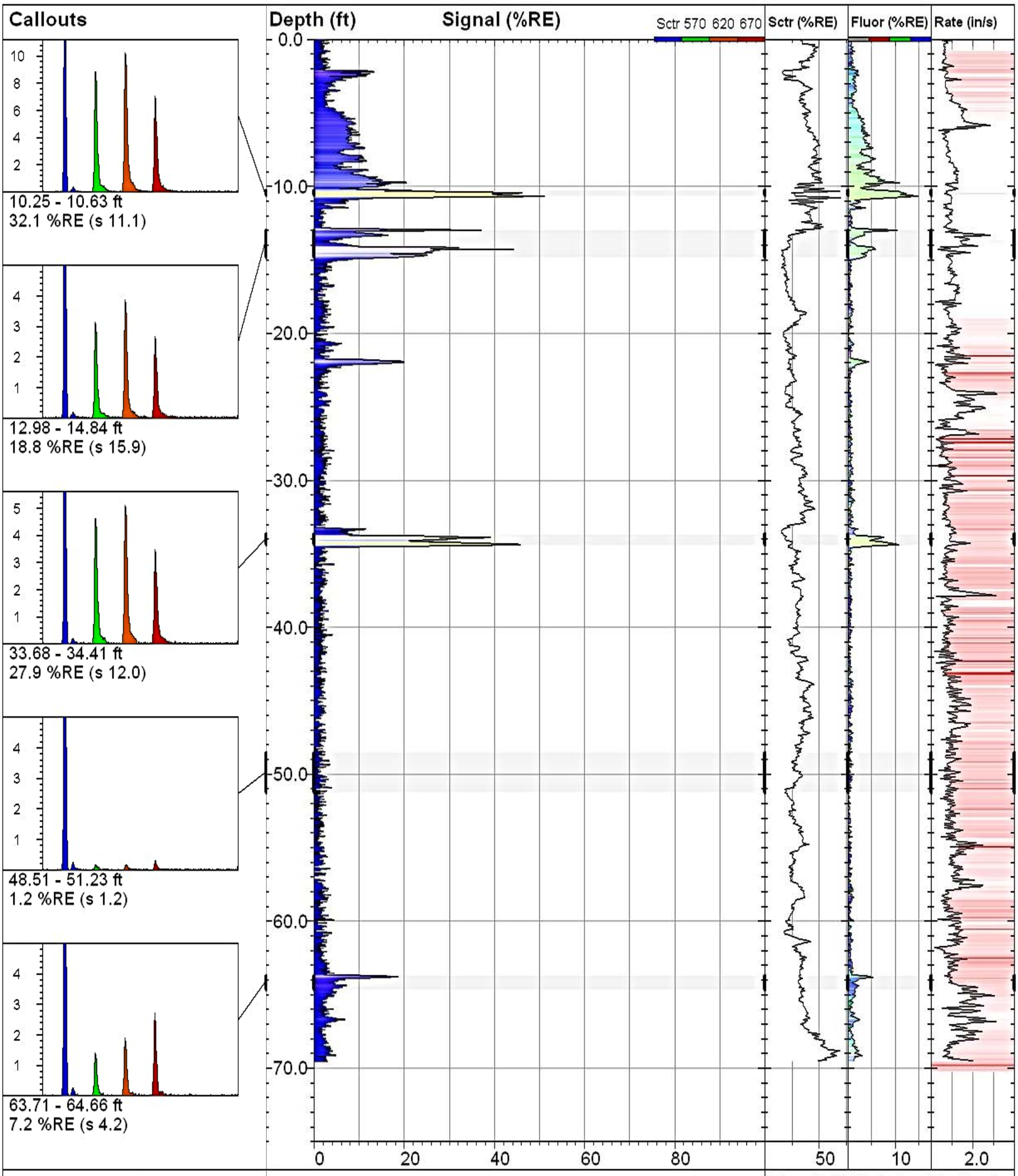
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.45 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **5.2 %RE @ 27.42 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-07 09:35 PST**



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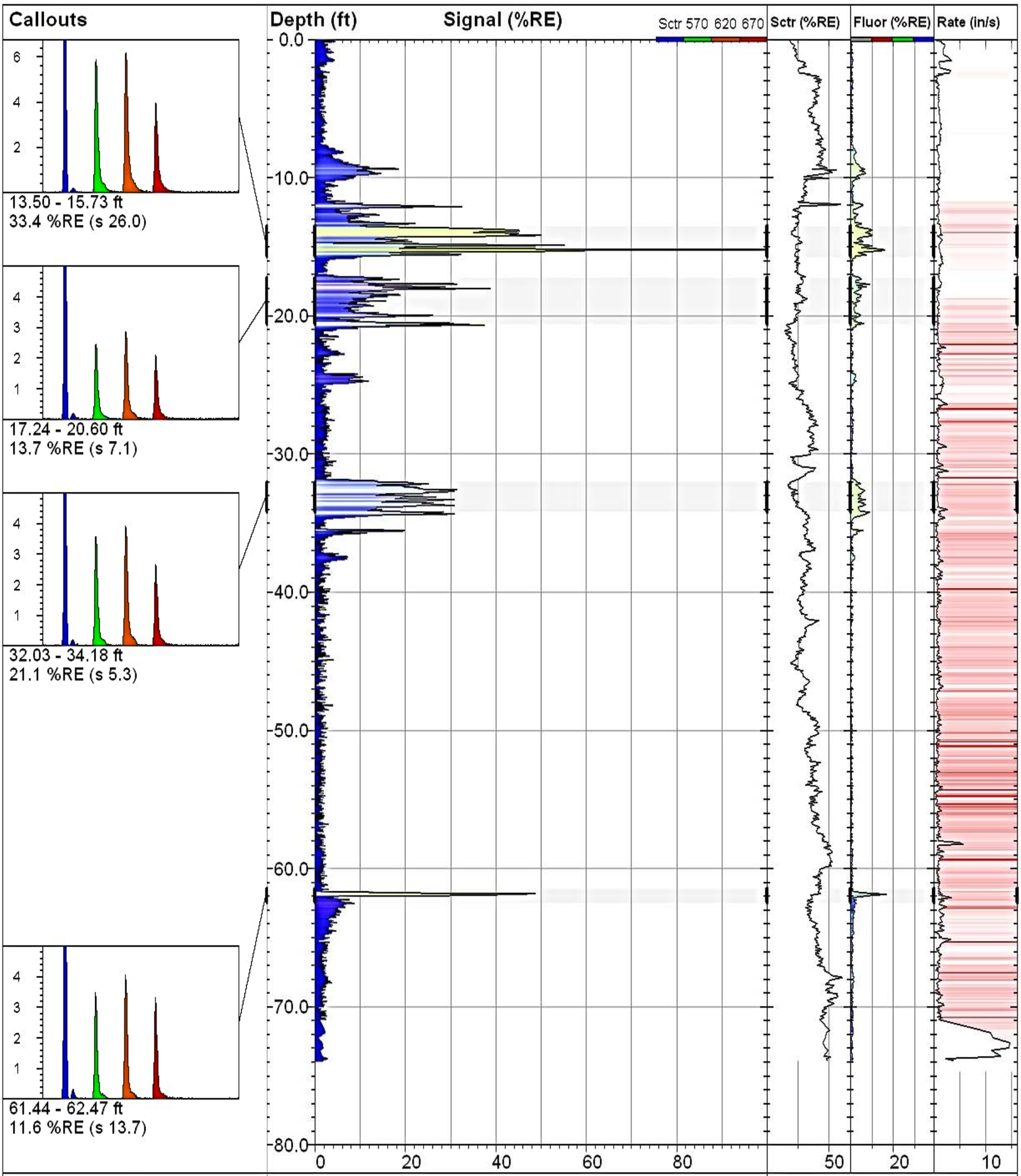
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **69.53 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **92.5 %RE @ 14.29 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-07 10:12 PST**



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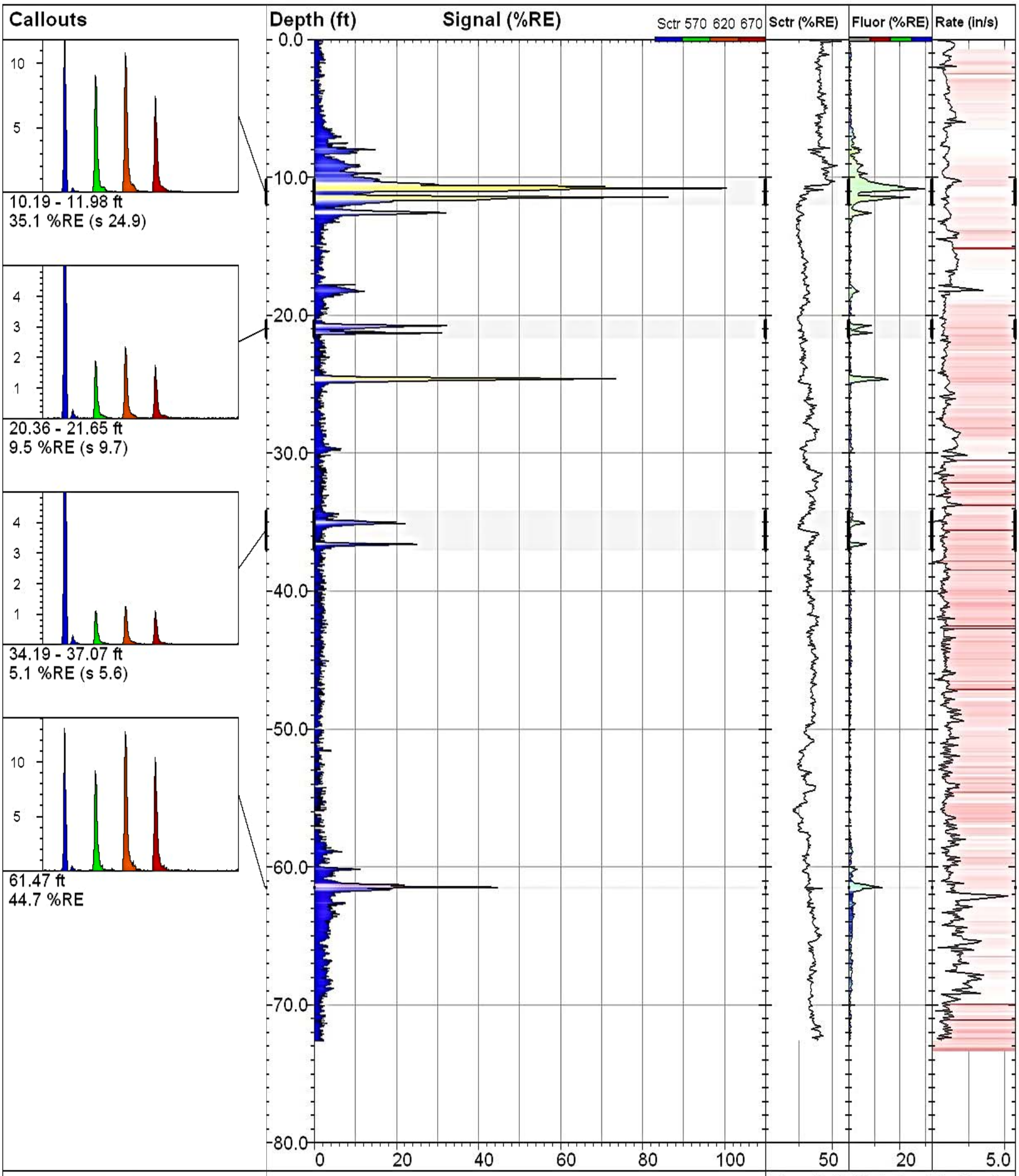
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **73.93 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **157.4 %RE @ 15.20 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-07 12:07 PST**



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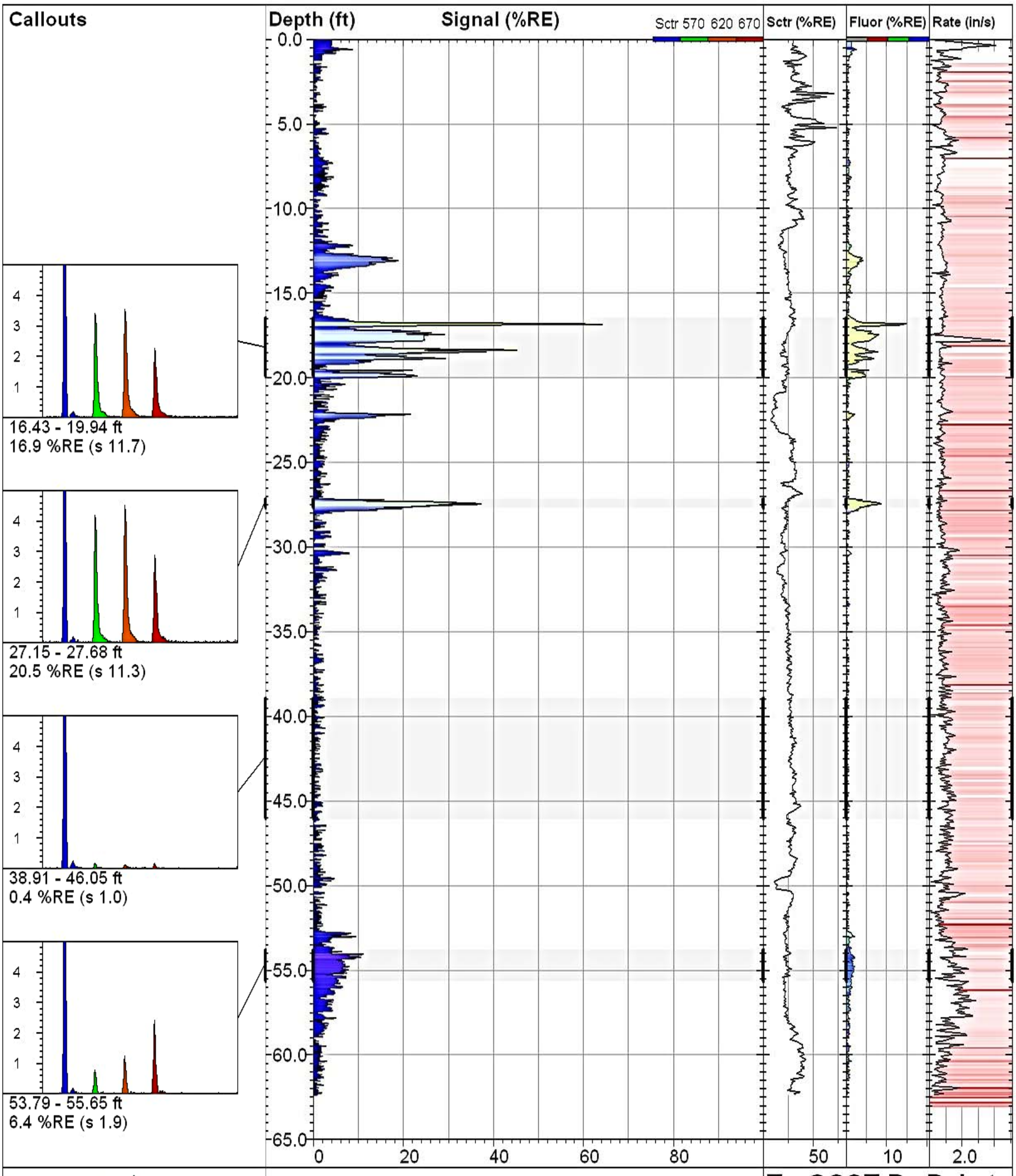
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **72.60 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **102.7 %RE @ 10.80 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-07 13:11 PST**



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2013T-138

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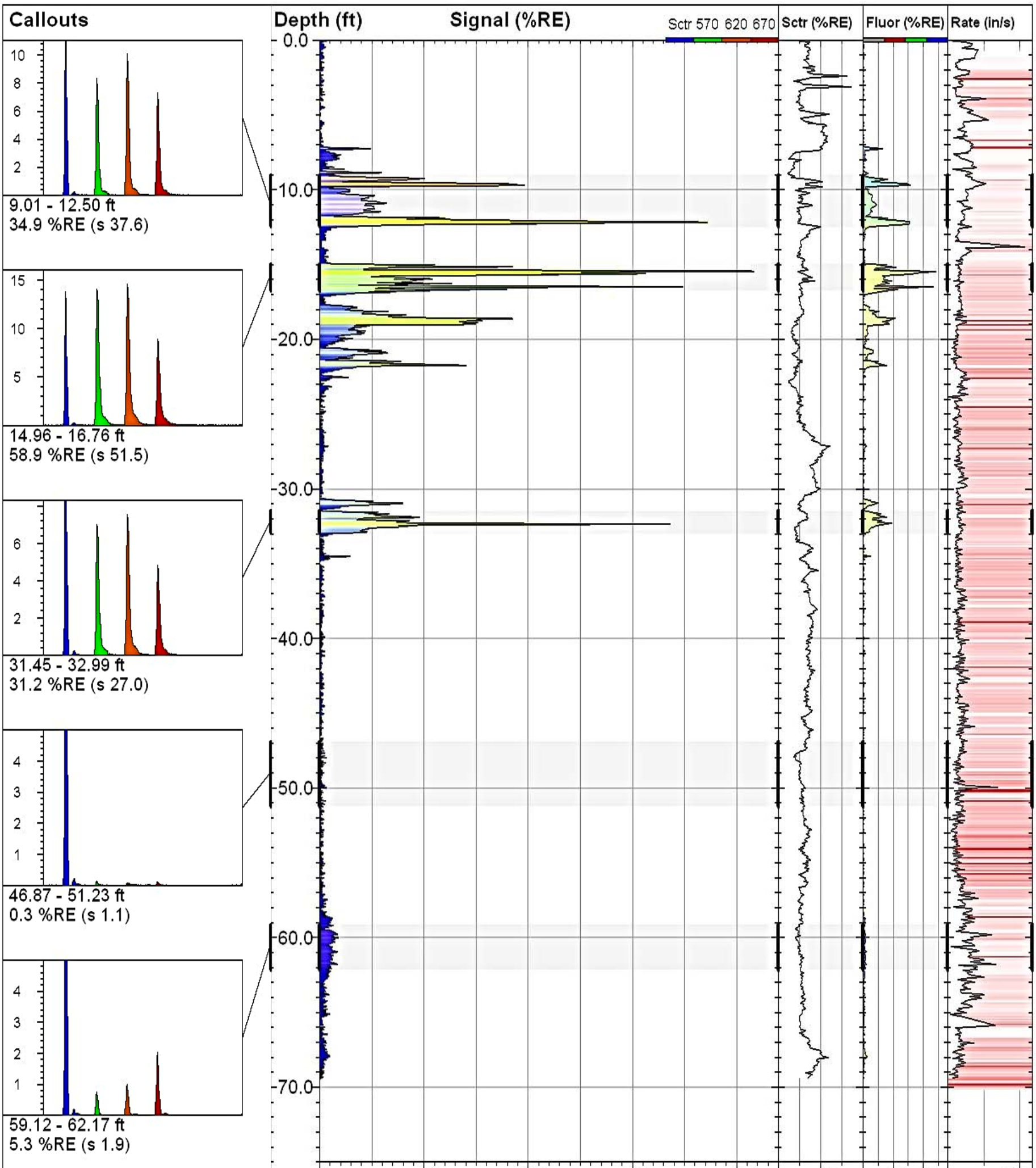
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **62.38 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **65.7 %RE @ 16.84 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 08:23 PST**



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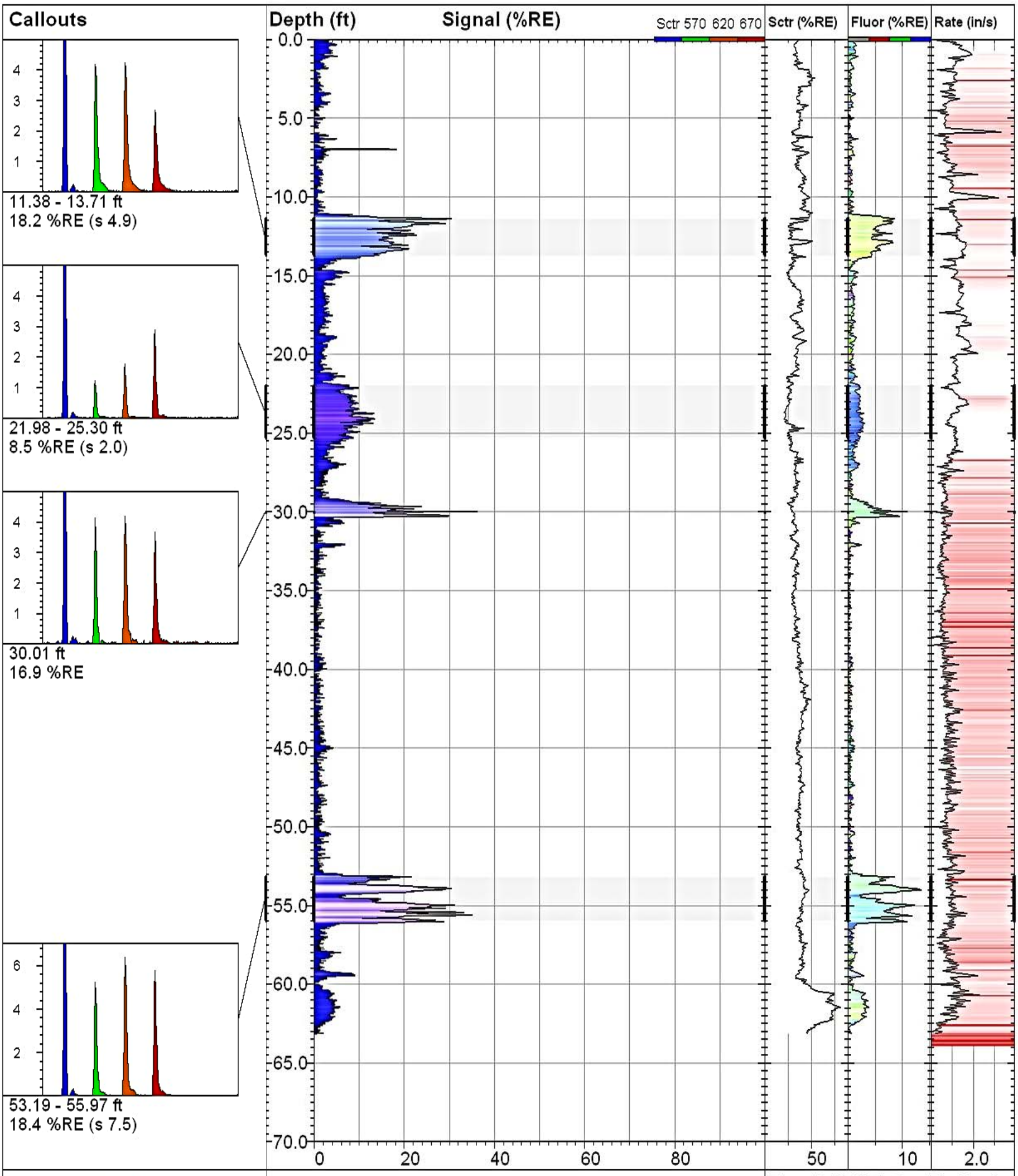
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **69.40 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **208.8 %RE @ 15.47 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 09:22 PST**



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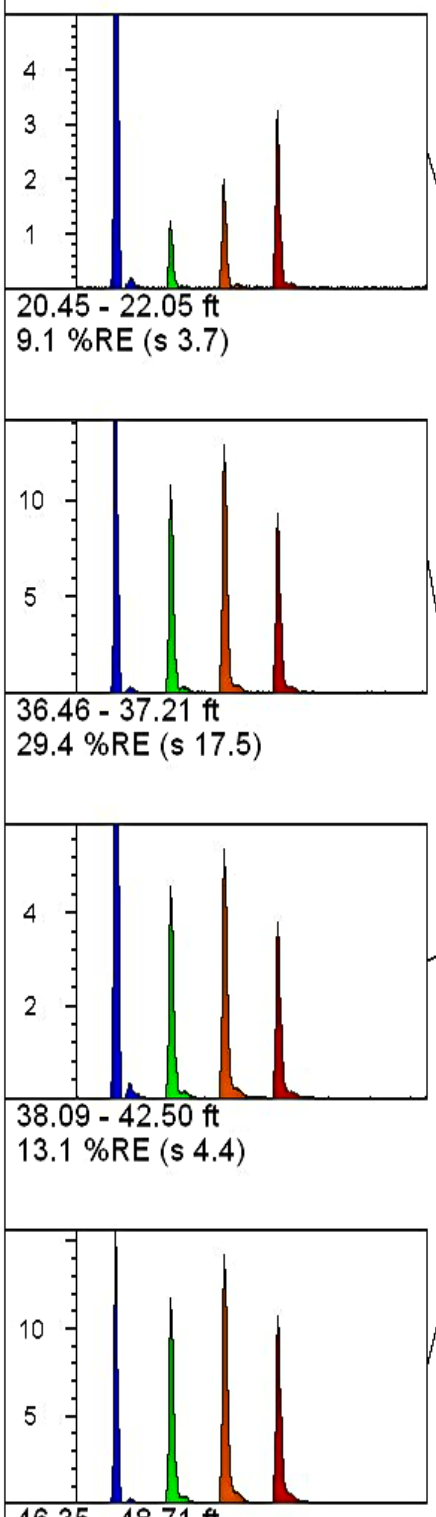
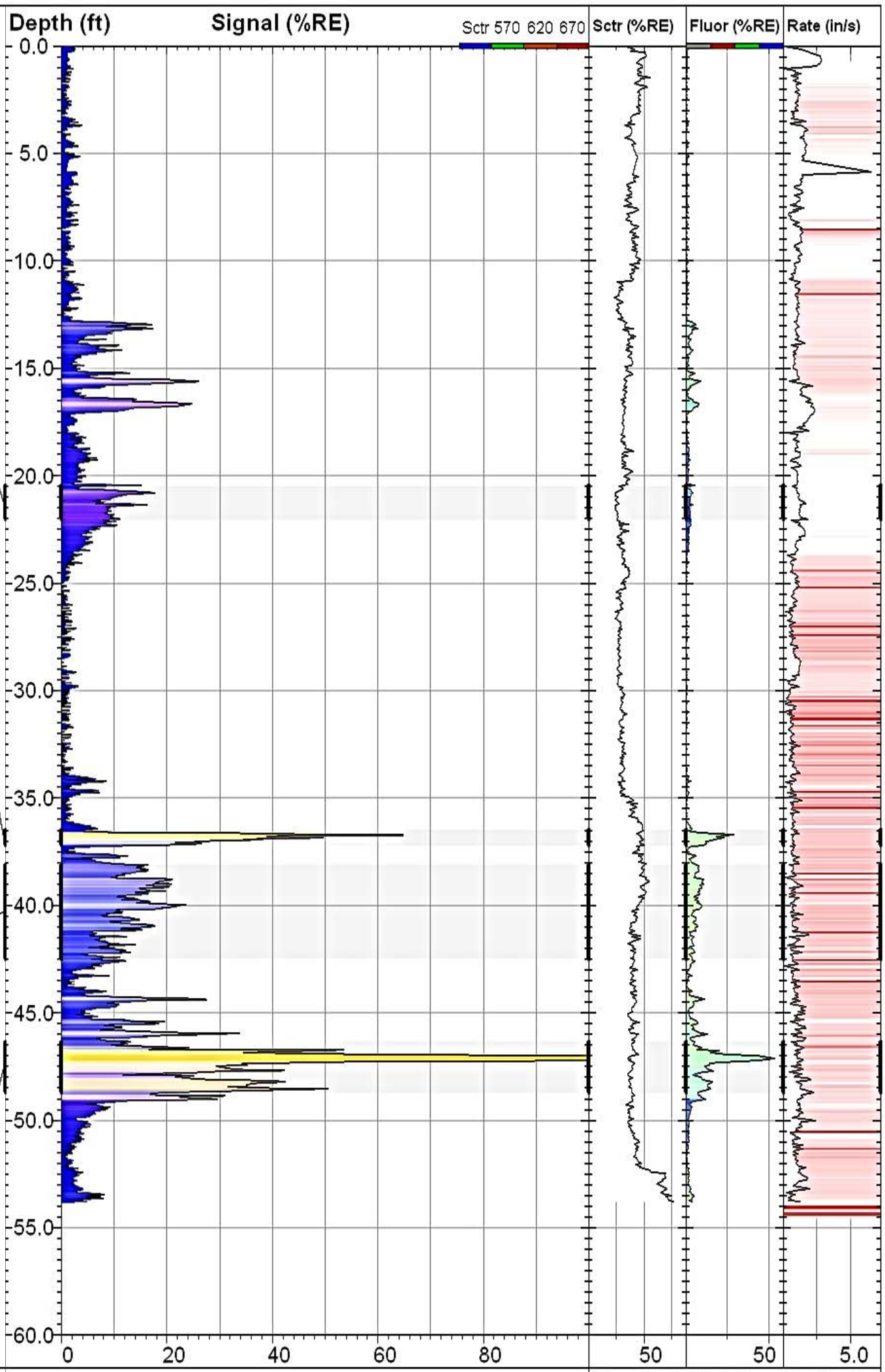
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **63.14 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **37.3 %RE @ 29.99 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 10:28 PST**

Callouts





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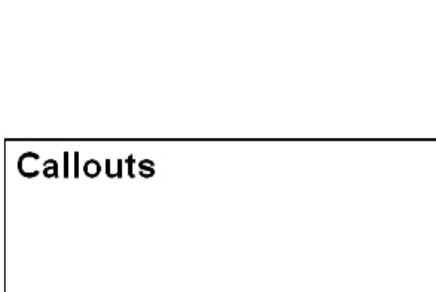
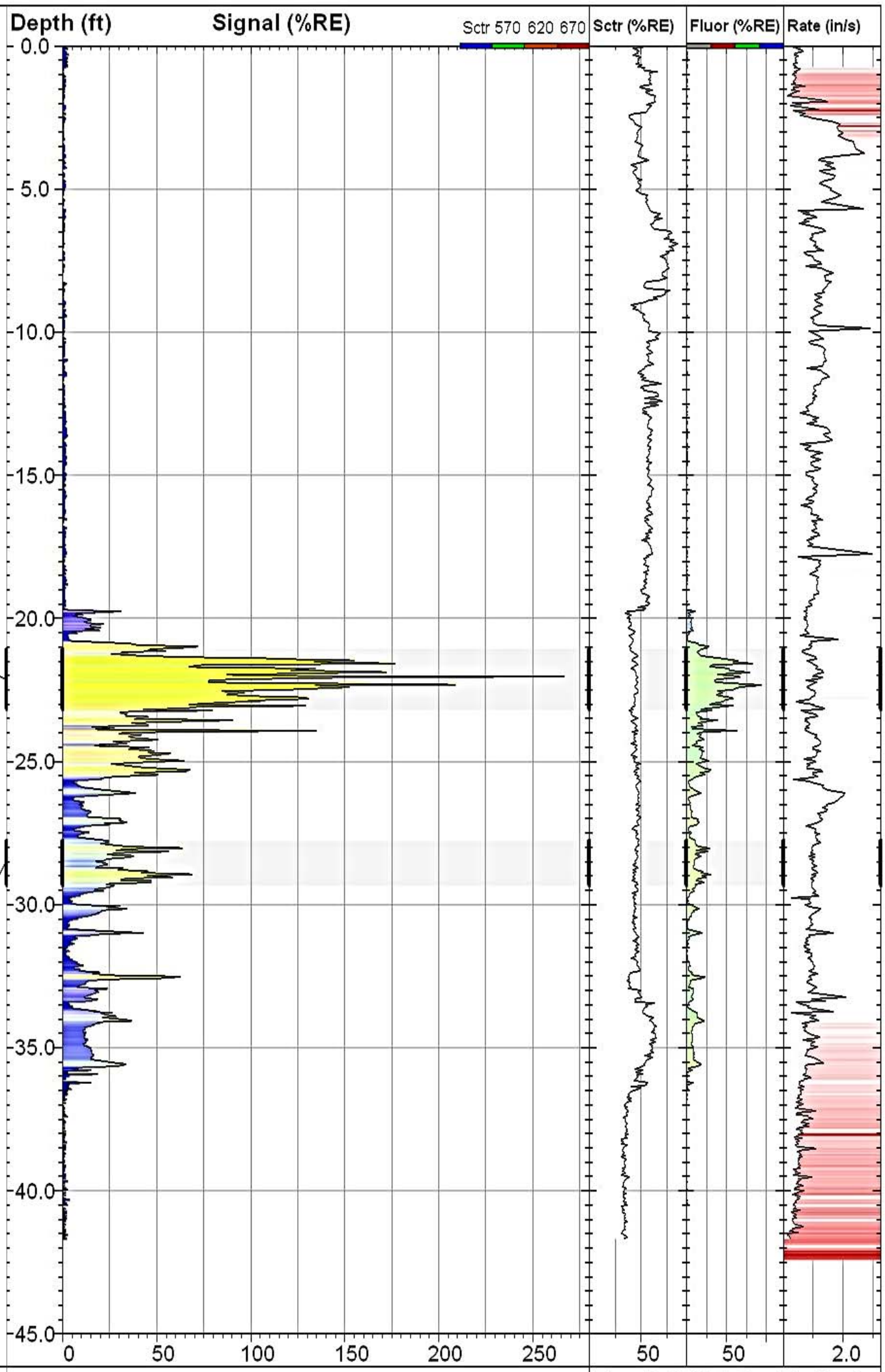
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **53.81 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **153.4 %RE @ 47.10 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 12:29 PST**

Callouts



21.07 - 23.19 ft
102.2 %RE (s 49.3)

27.78 - 29.33 ft
33.8 %RE (s 13.7)



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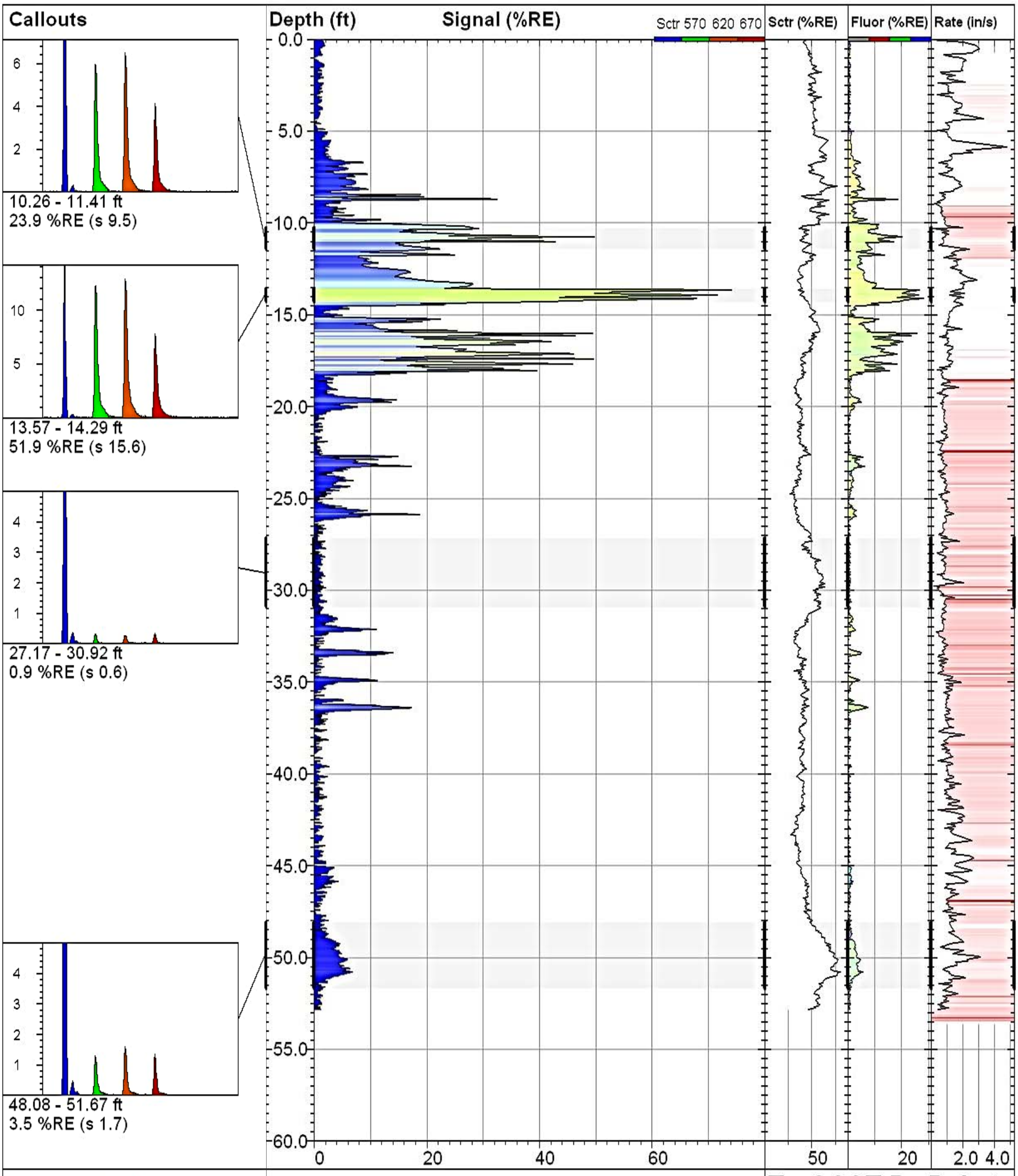
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **41.69 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **268.3 %RE @ 22.02 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 13:28 PST**



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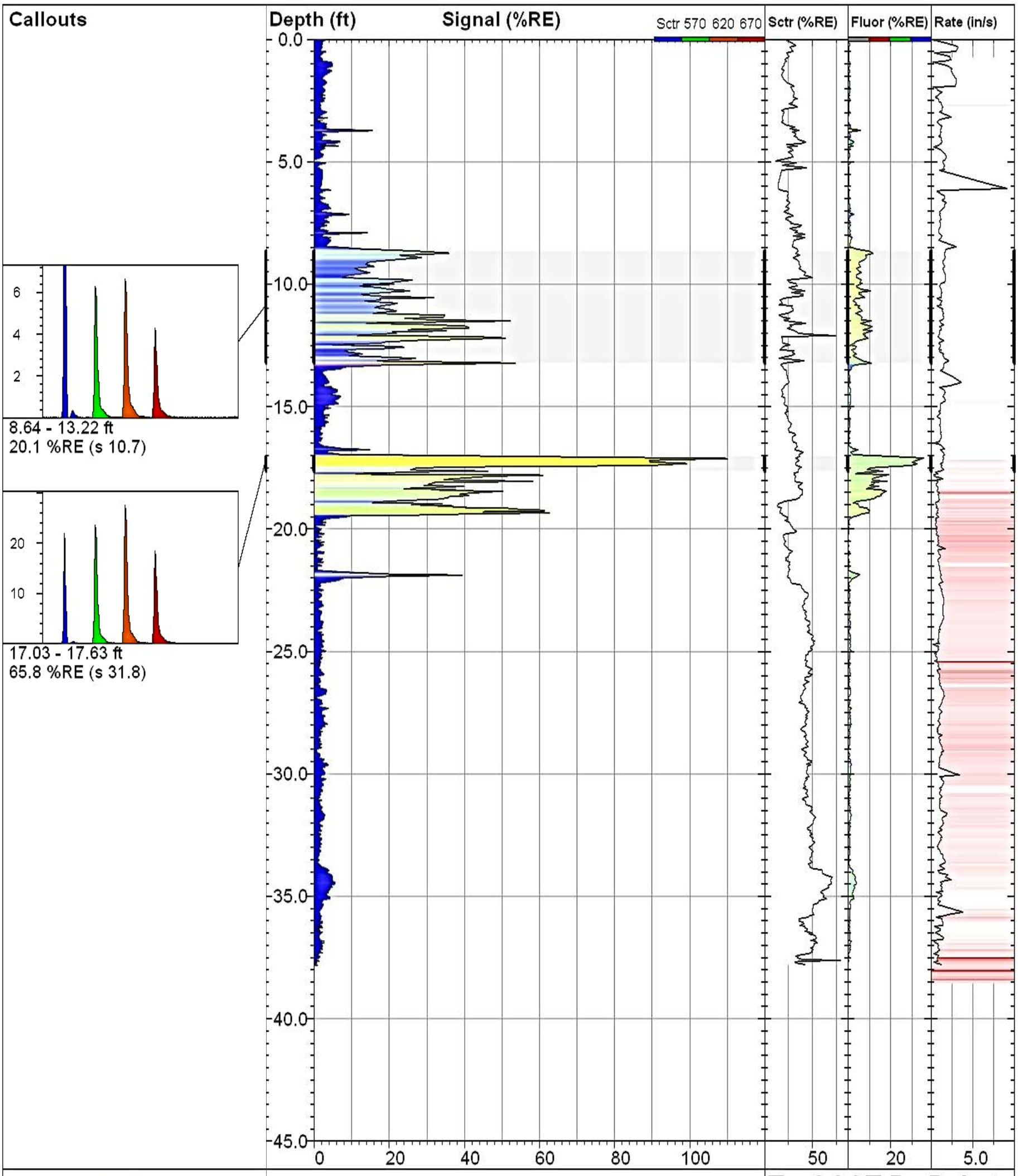
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **52.83 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **74.3 %RE @ 13.64 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 14:12 PST**



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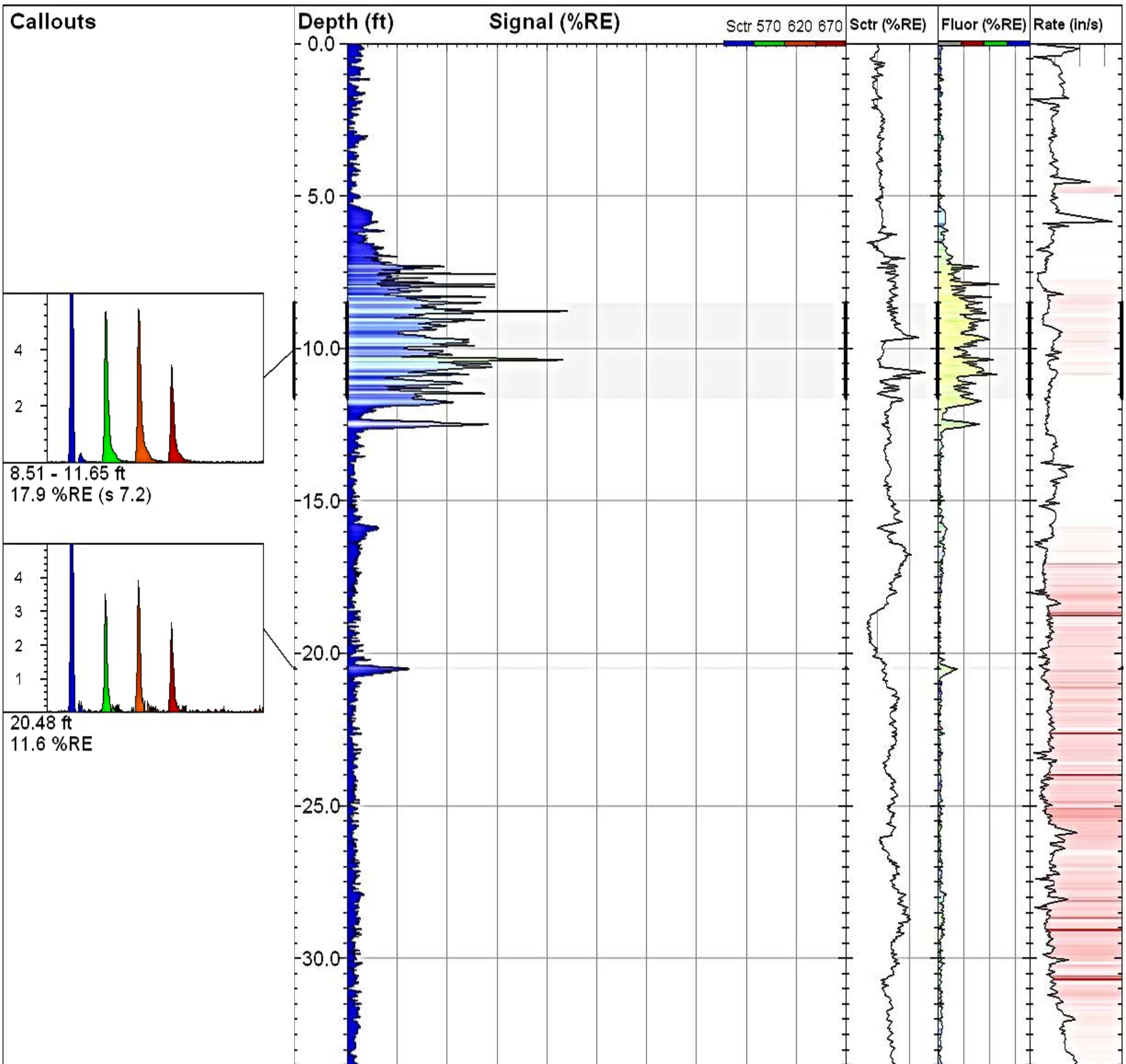
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **37.83 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **110.8 %RE @ 17.11 ft**
Operator / Unit: **T. Olsonawski / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-08 15:34 PST**



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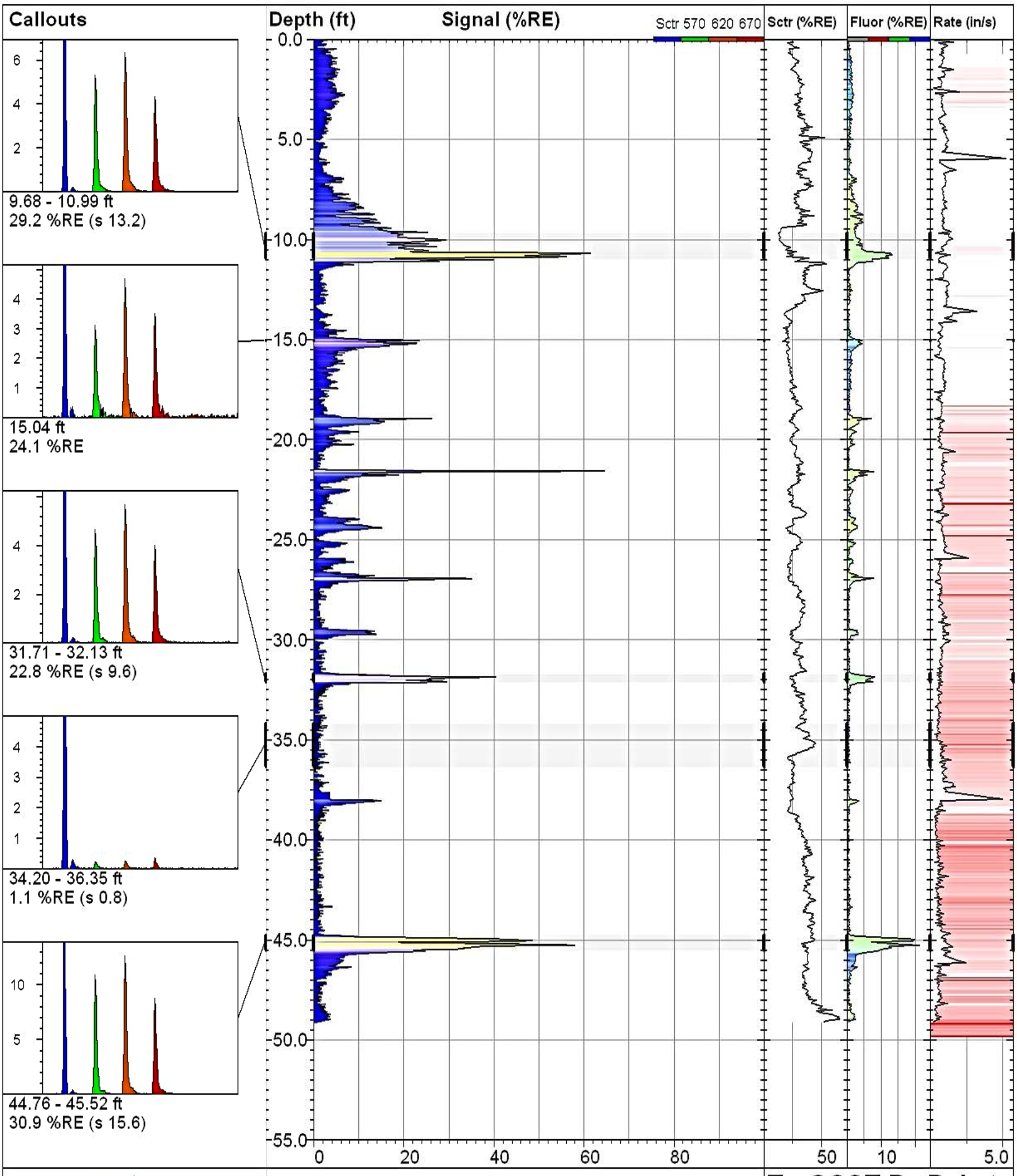
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **37.28 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **44.2 %RE @ 8.78 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 08:25 PDT**



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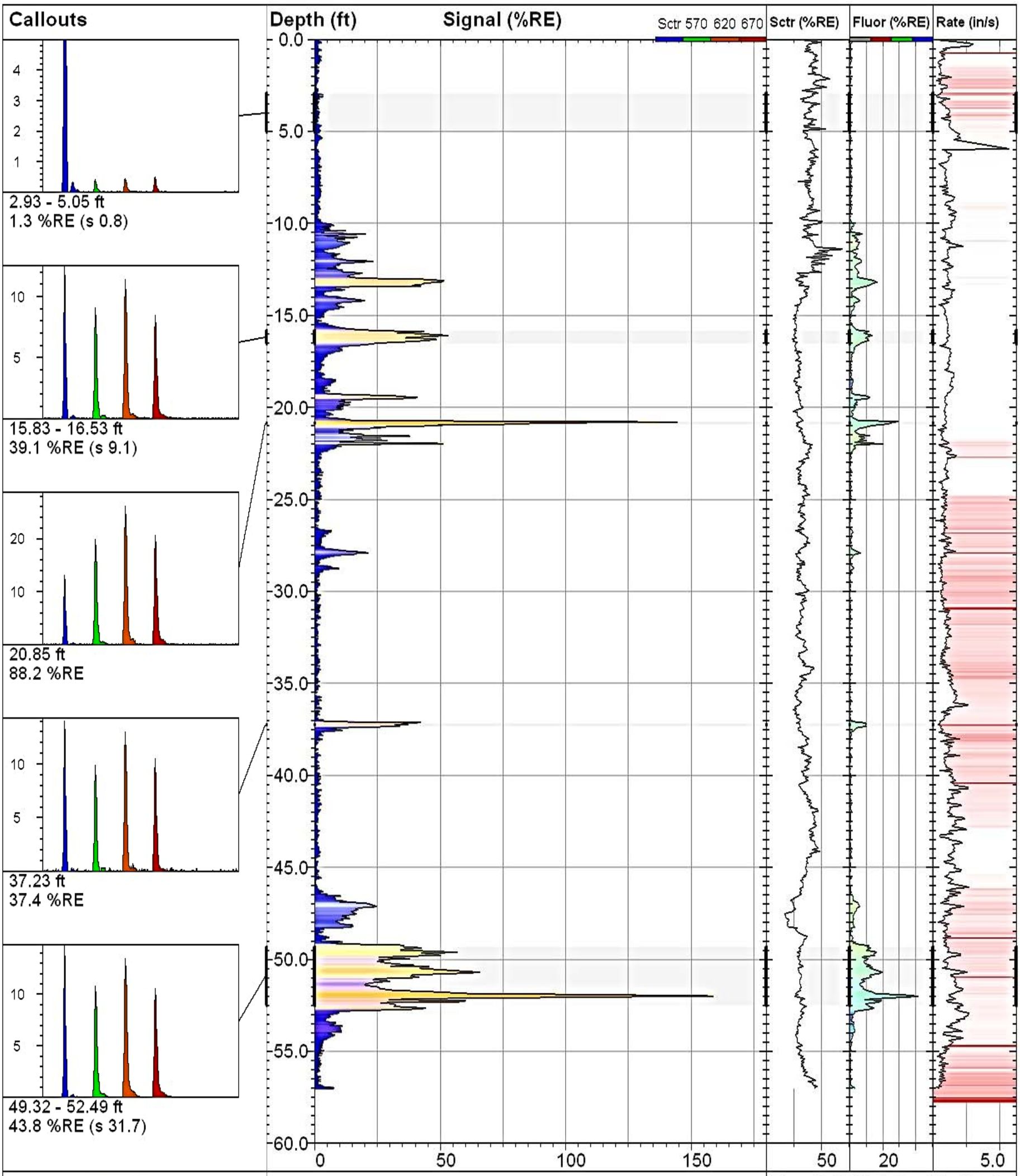
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **49.11 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **67.3 %RE @ 21.57 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 08:57 PDT**



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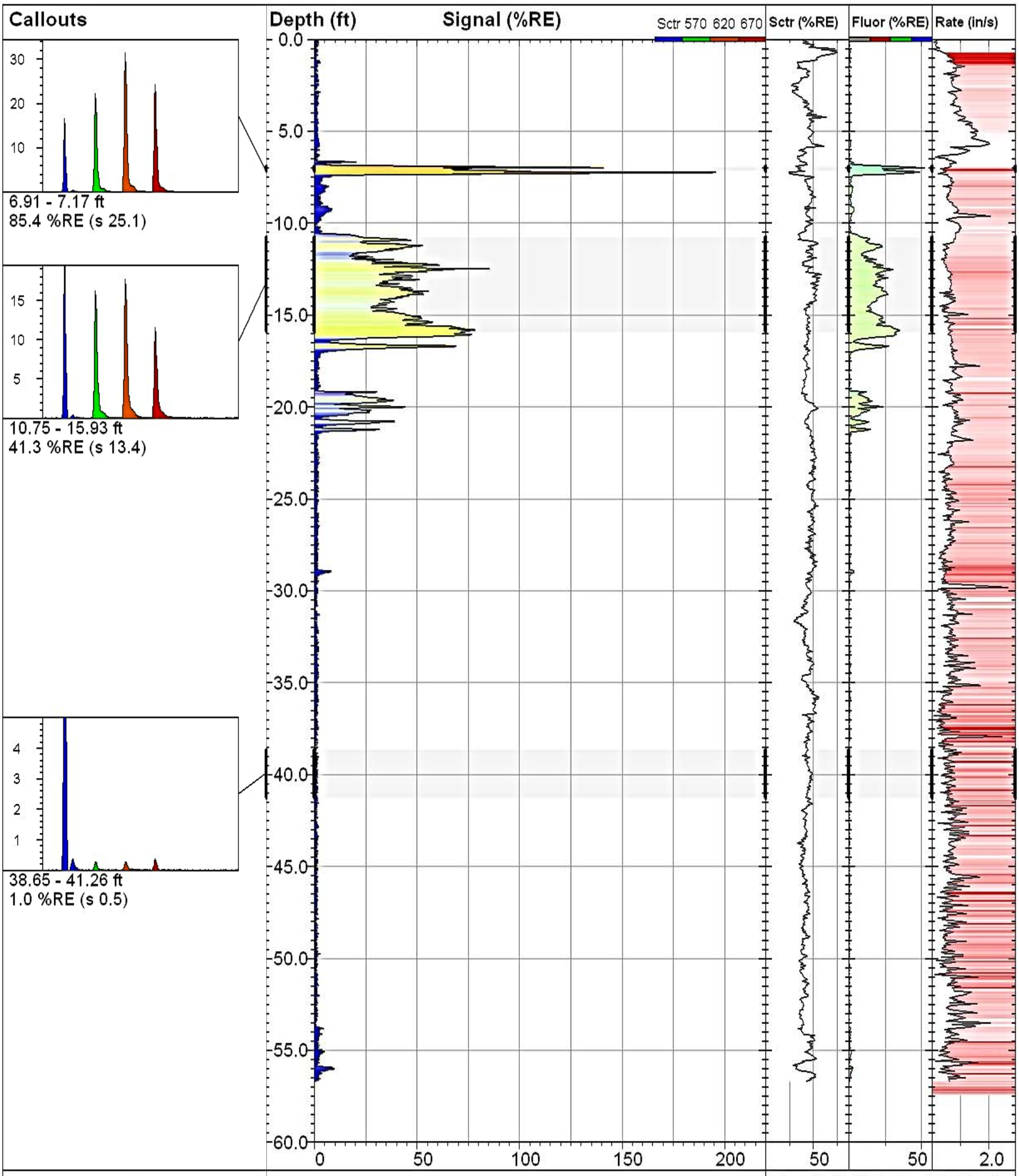
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **57.02 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **158.8 %RE @ 51.99 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 09:39 PDT**



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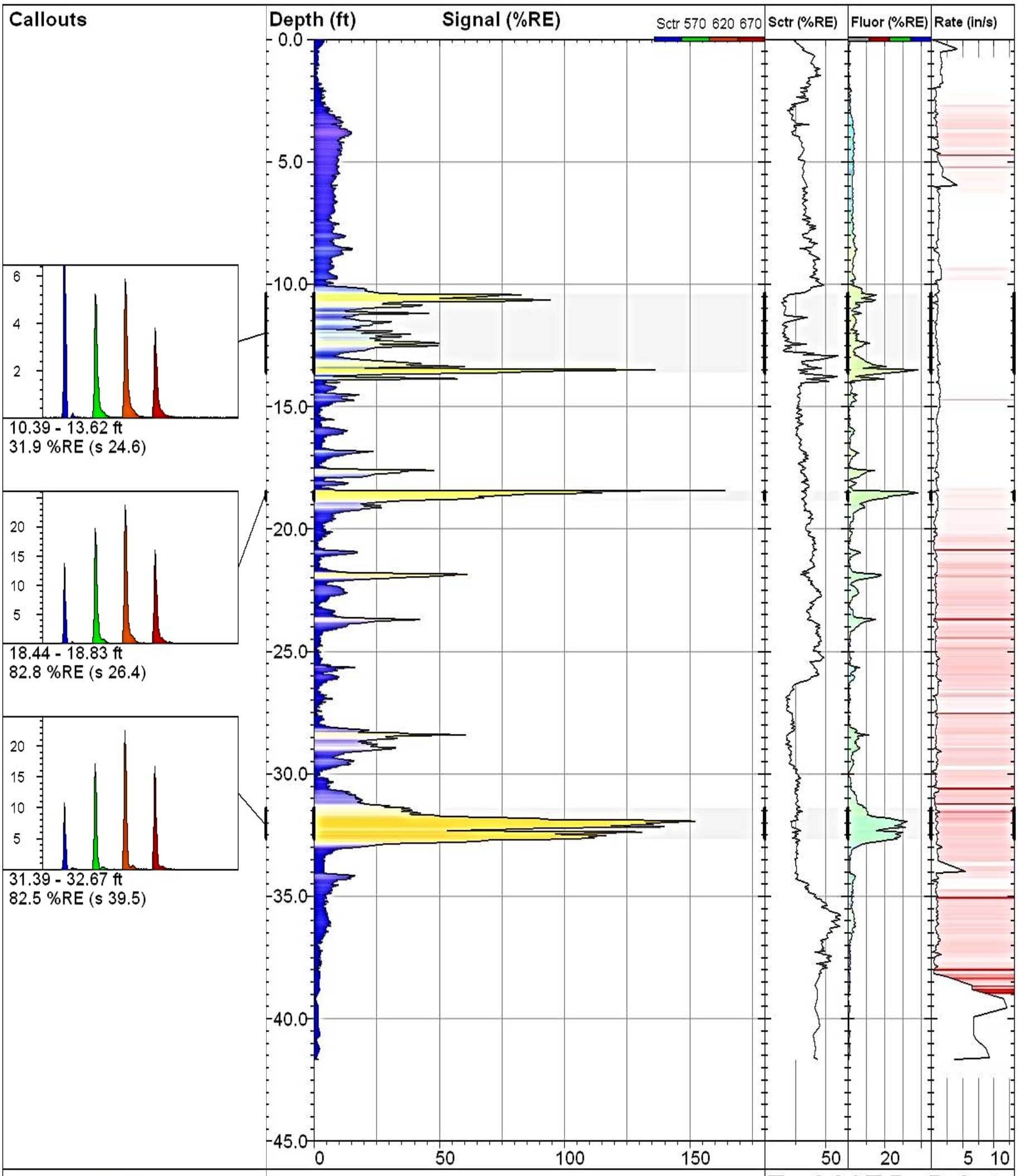
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **56.67 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **197.1 %RE @ 7.23 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 10:26 PDT**



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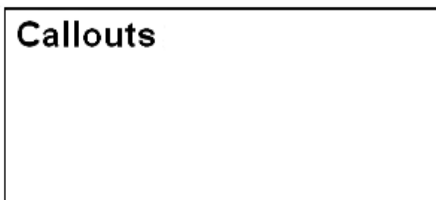
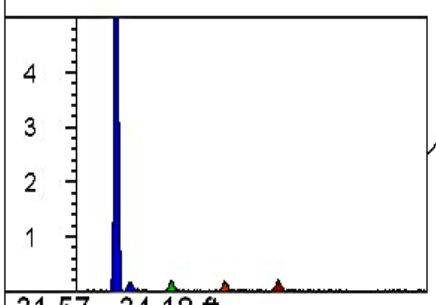
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **41.66 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **165.8 %RE @ 18.43 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 12:28 PDT**

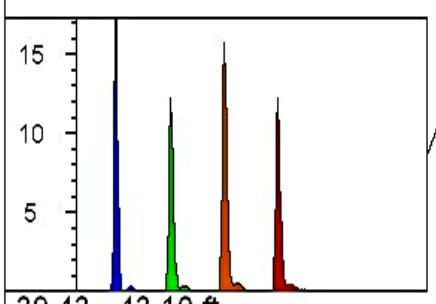
Callouts



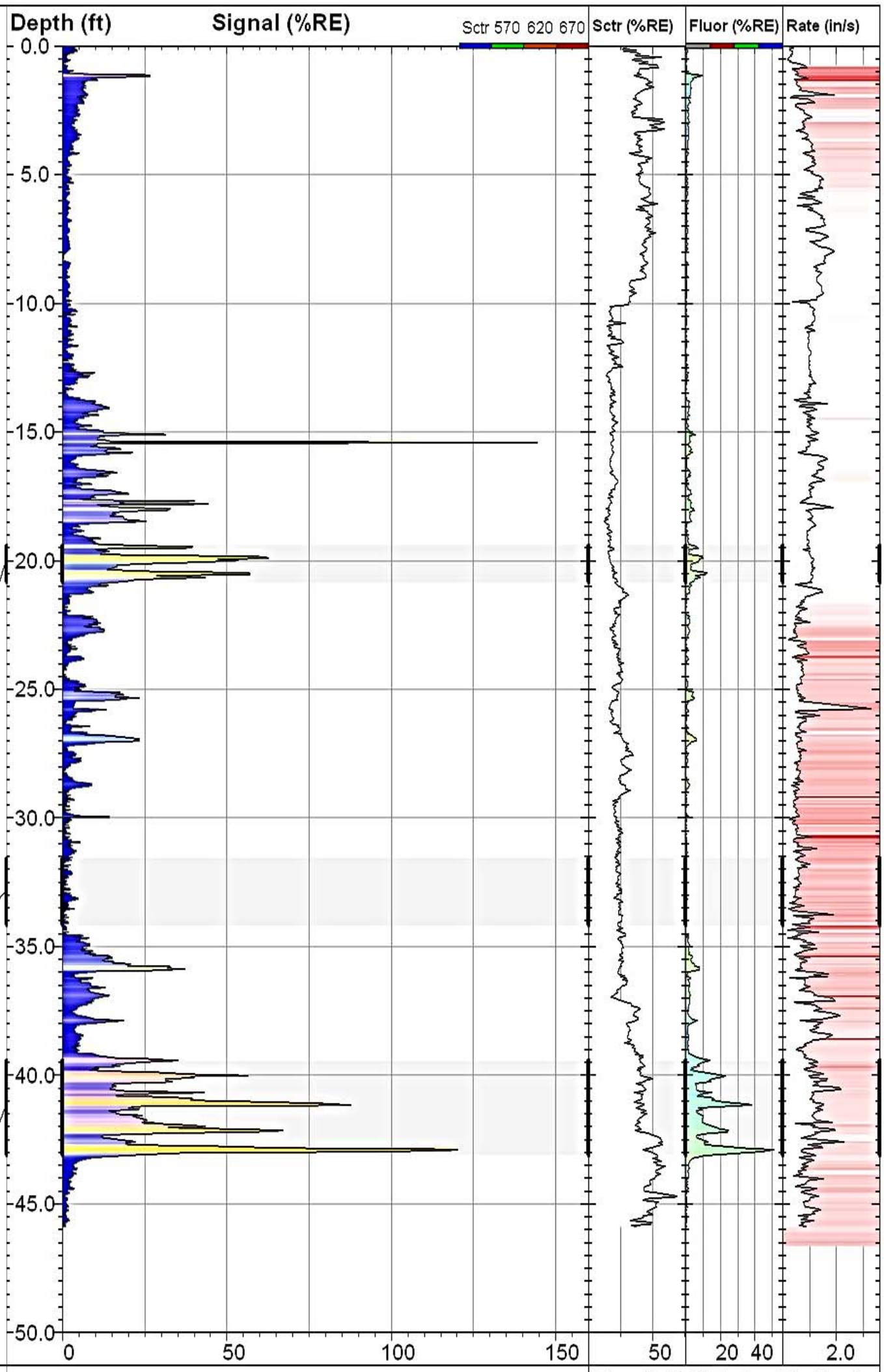
19.41 - 20.86 ft
29.6 %RE (s 16.9)



31.57 - 34.18 ft
1.1 %RE (s 1.2)



39.43 - 43.10 ft
35.0 %RE (s 26.0)



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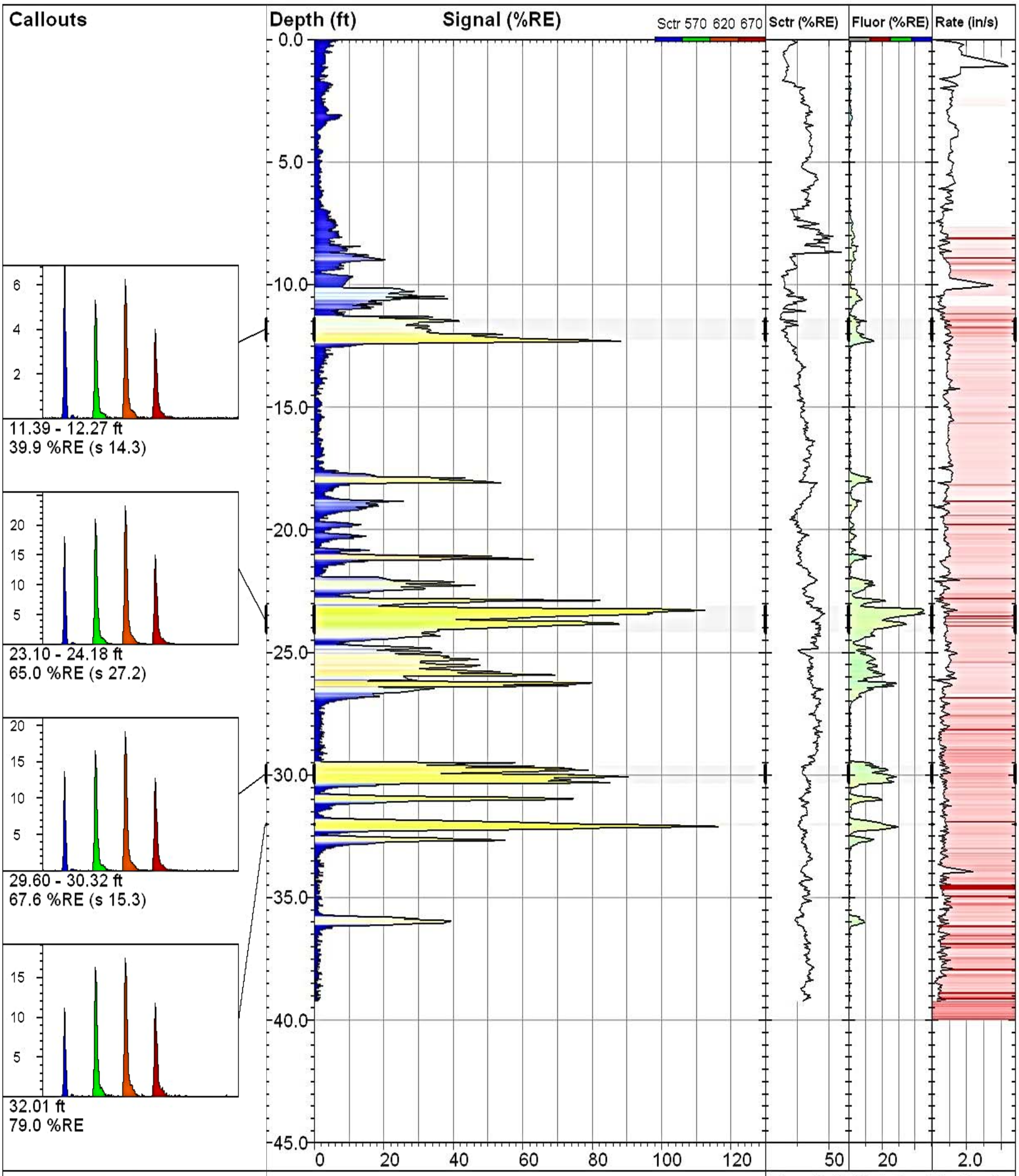
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **45.89 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **149.5 %RE @ 15.41 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 13:01 PDT**



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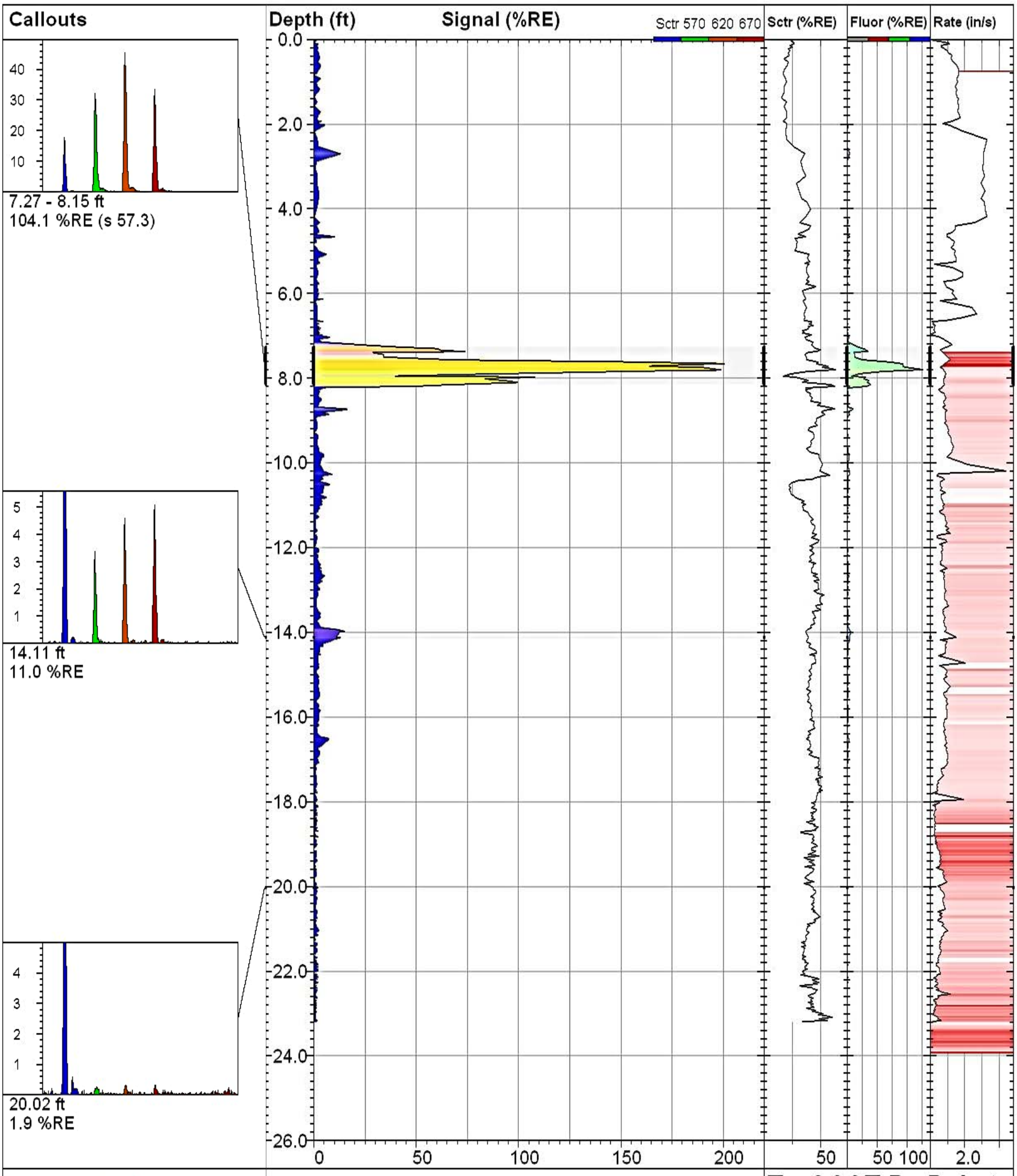
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **39.22 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **116.4 %RE @ 32.10 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 13:43 PDT**



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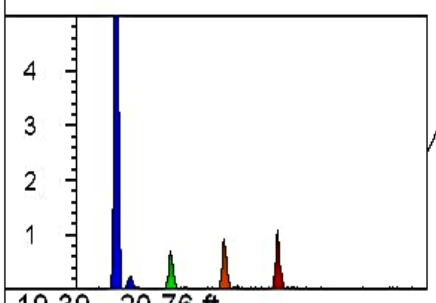
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **23.18 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **201.0 %RE @ 7.66 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-11 15:04 PDT**

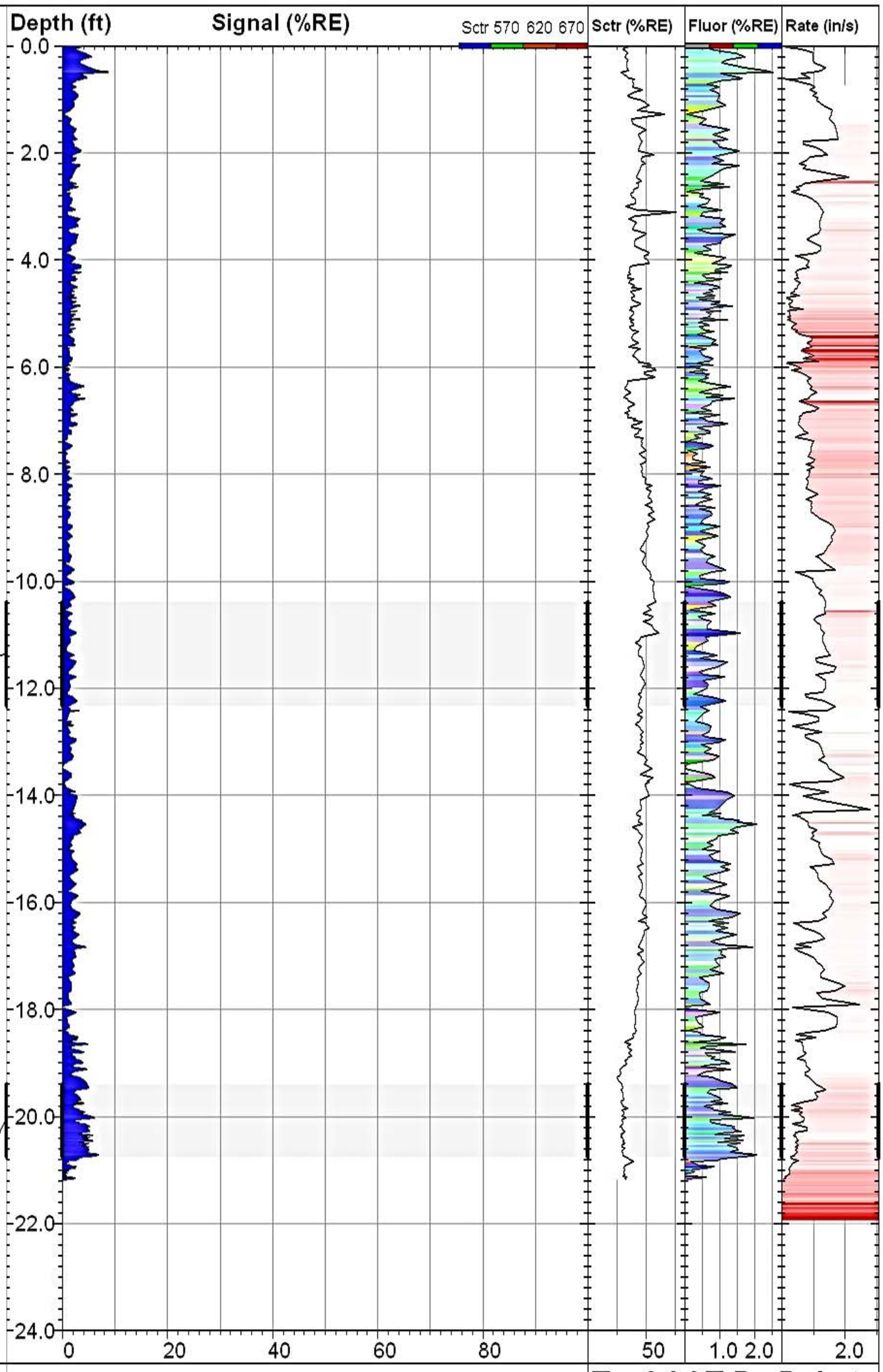
Callouts



10.38 - 12.34 ft
1.4 %RE (s 0.6)



19.39 - 20.76 ft
4.1 %RE (s 1.2)



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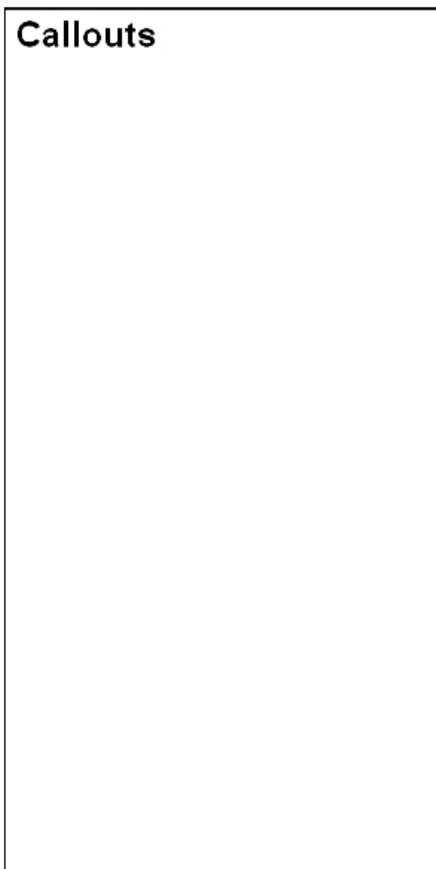
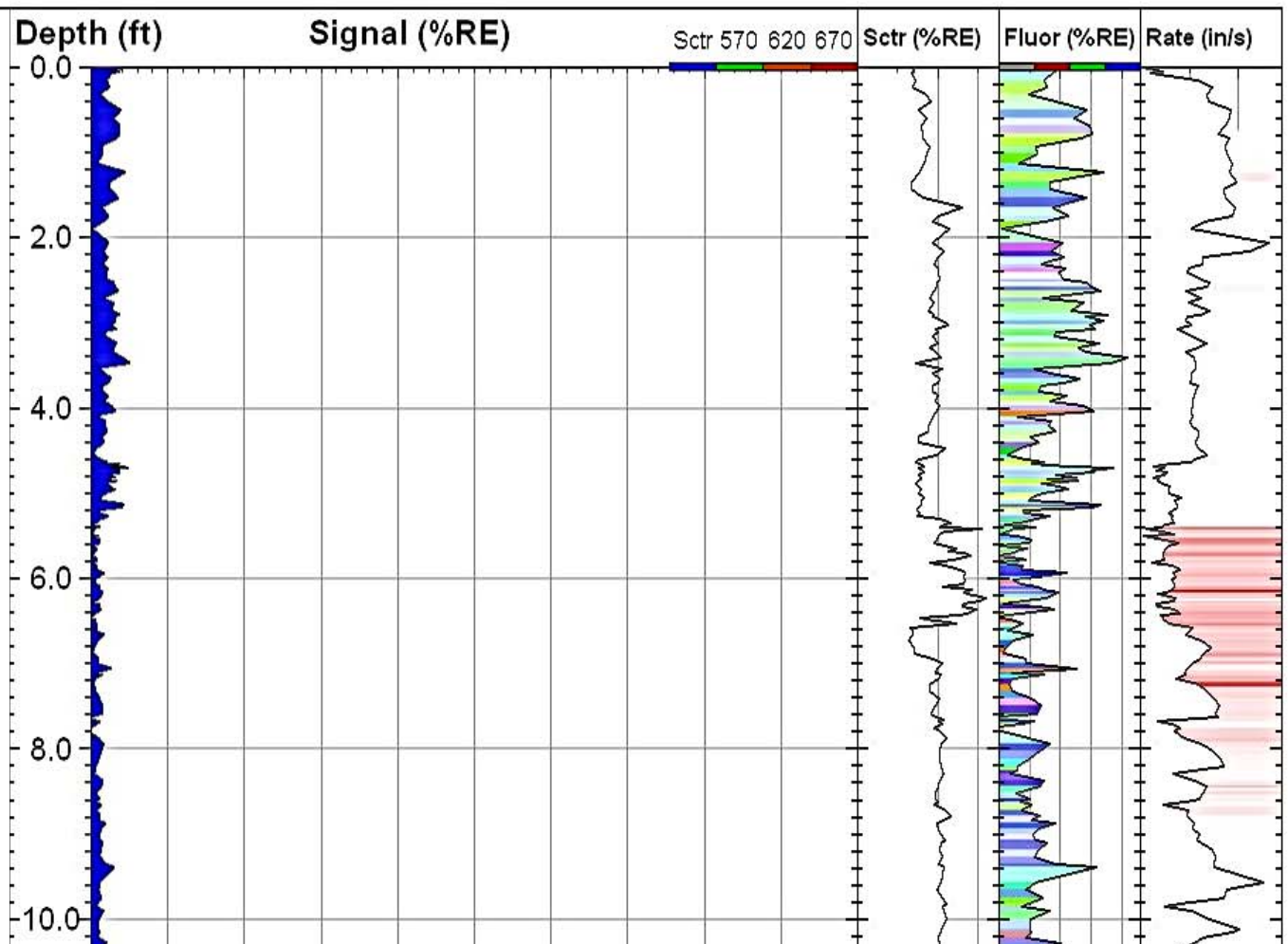
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **21.18 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **8.8 %RE @ 0.49 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 08:46 PDT**

Callouts



17.86 - 19.69 ft
2.6 %RE (s 0.8)



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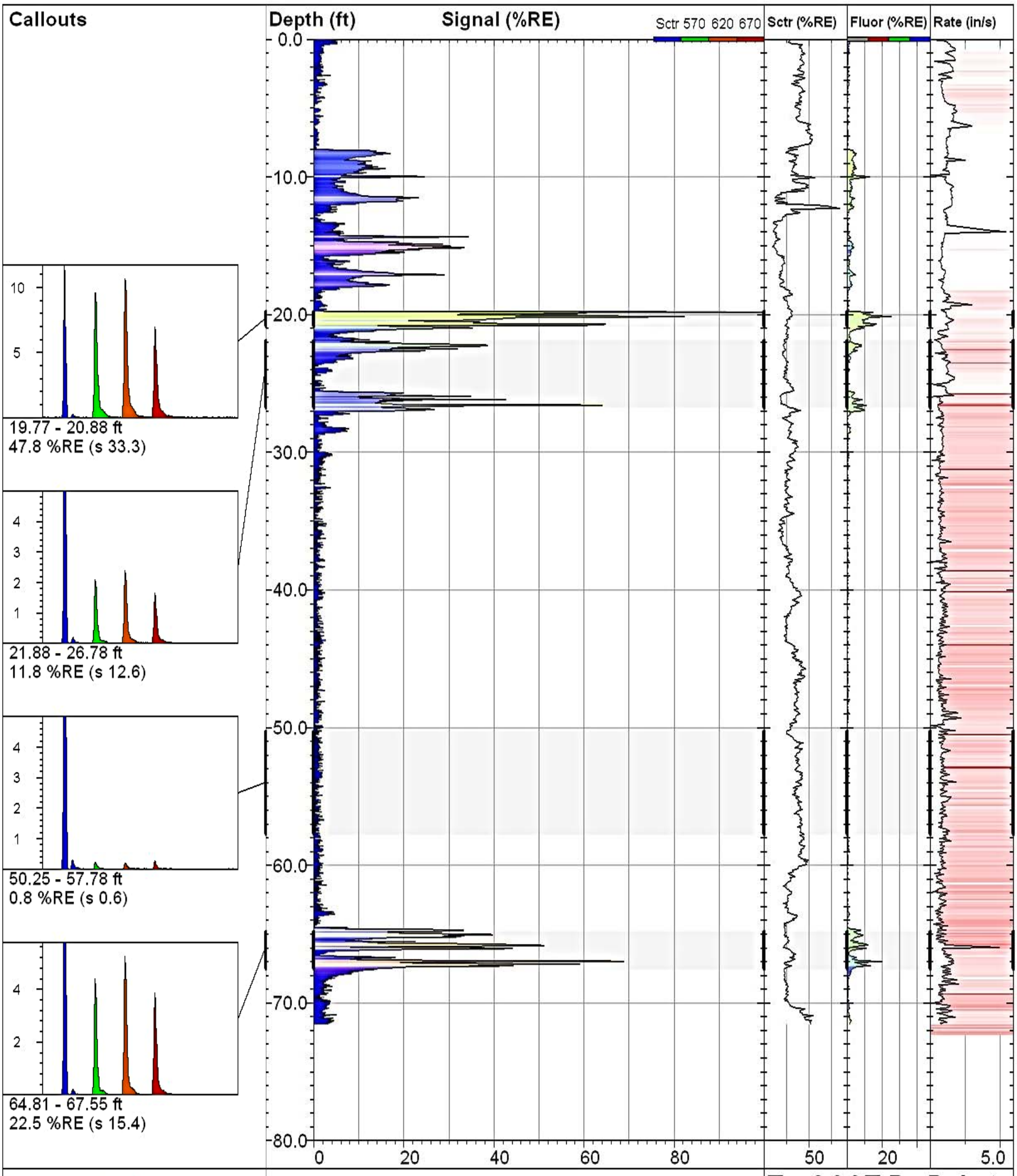
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **19.91 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **5.0 %RE @ 3.48 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 09:15 PDT**



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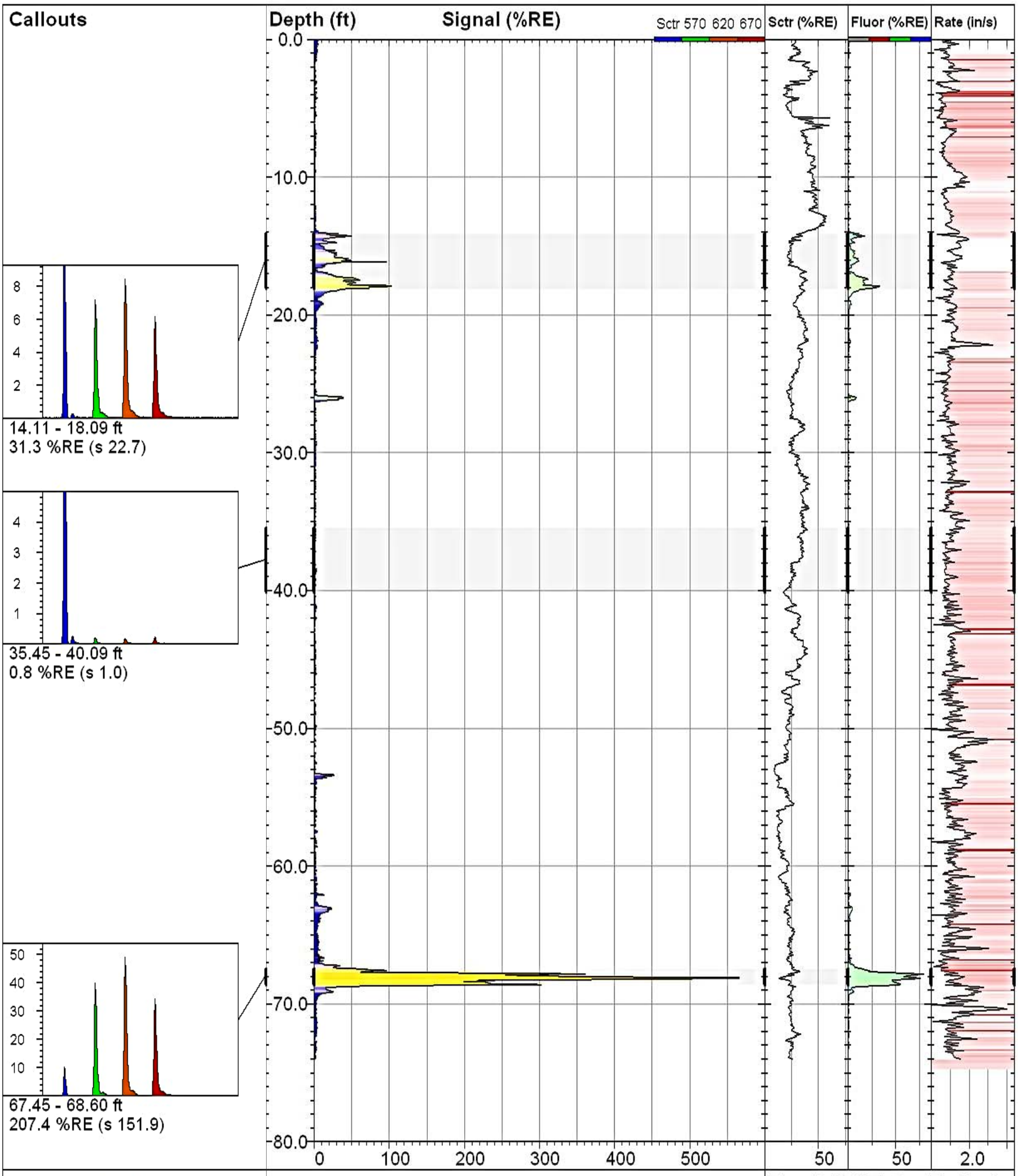
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **71.53 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **159.9 %RE @ 19.83 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 09:48 PDT**



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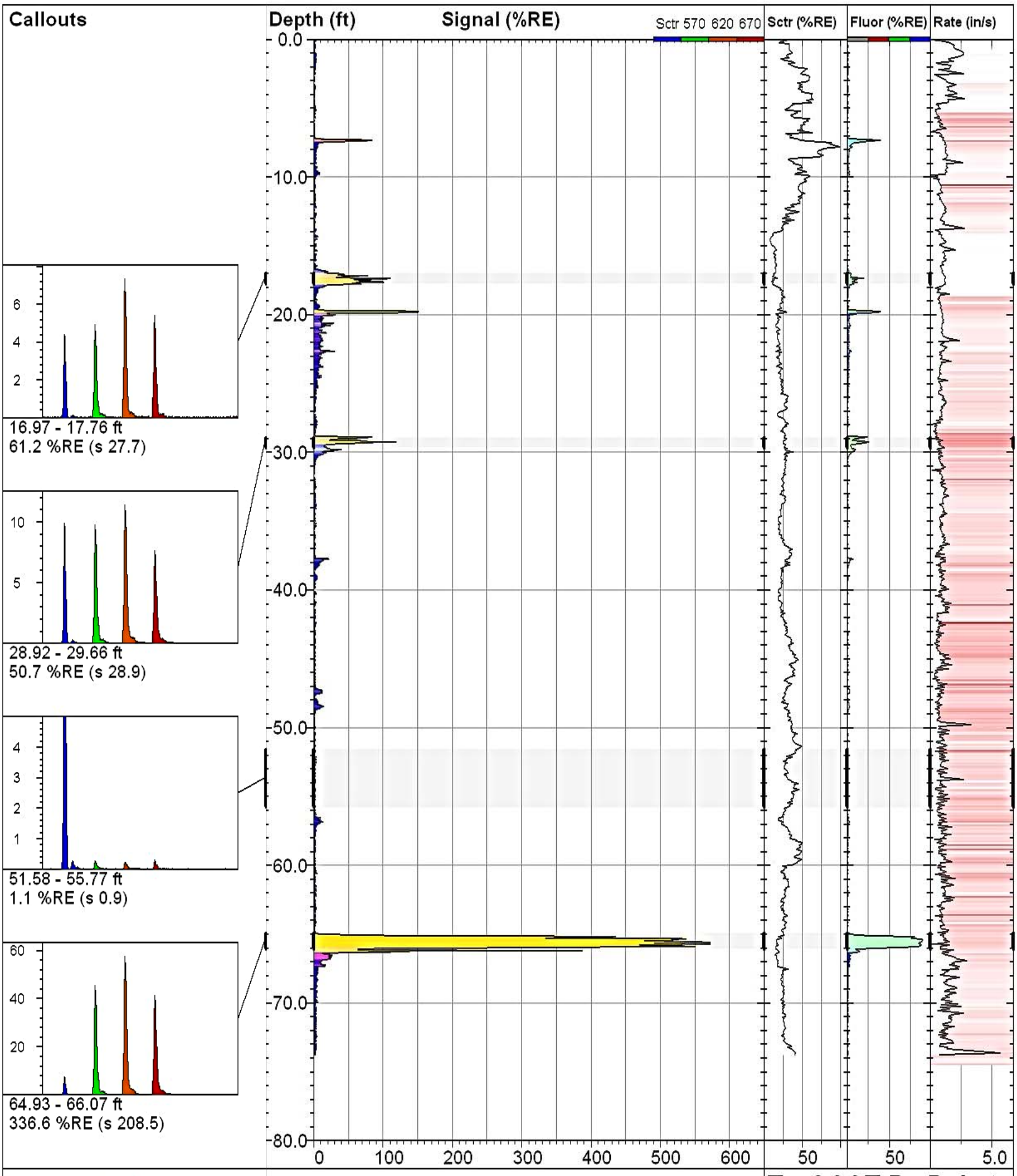
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **74.02 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **568.6 %RE @ 68.11 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 10:49 PDT**



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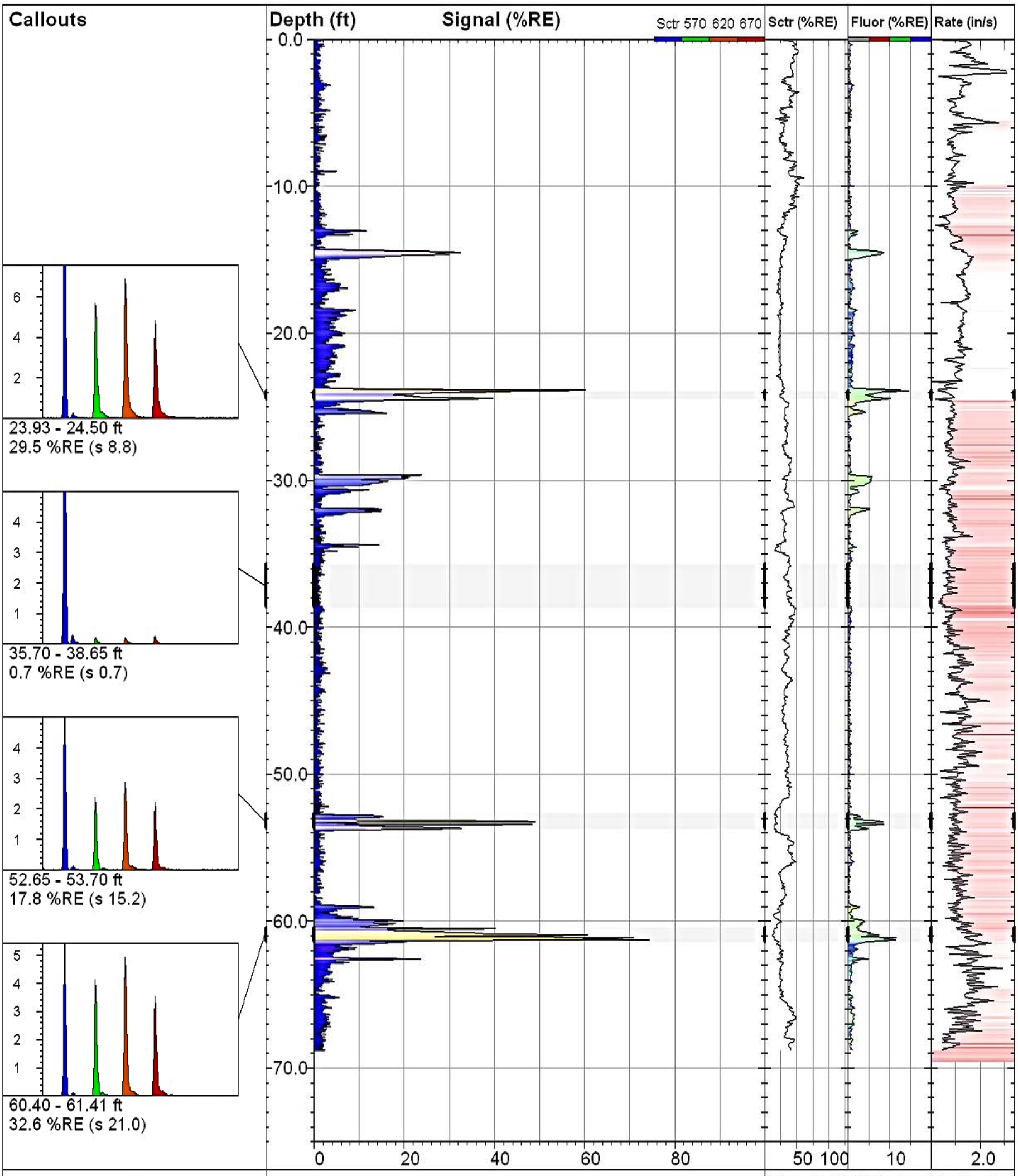
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **73.79 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **583.7 %RE @ 65.74 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 12:51 PDT**



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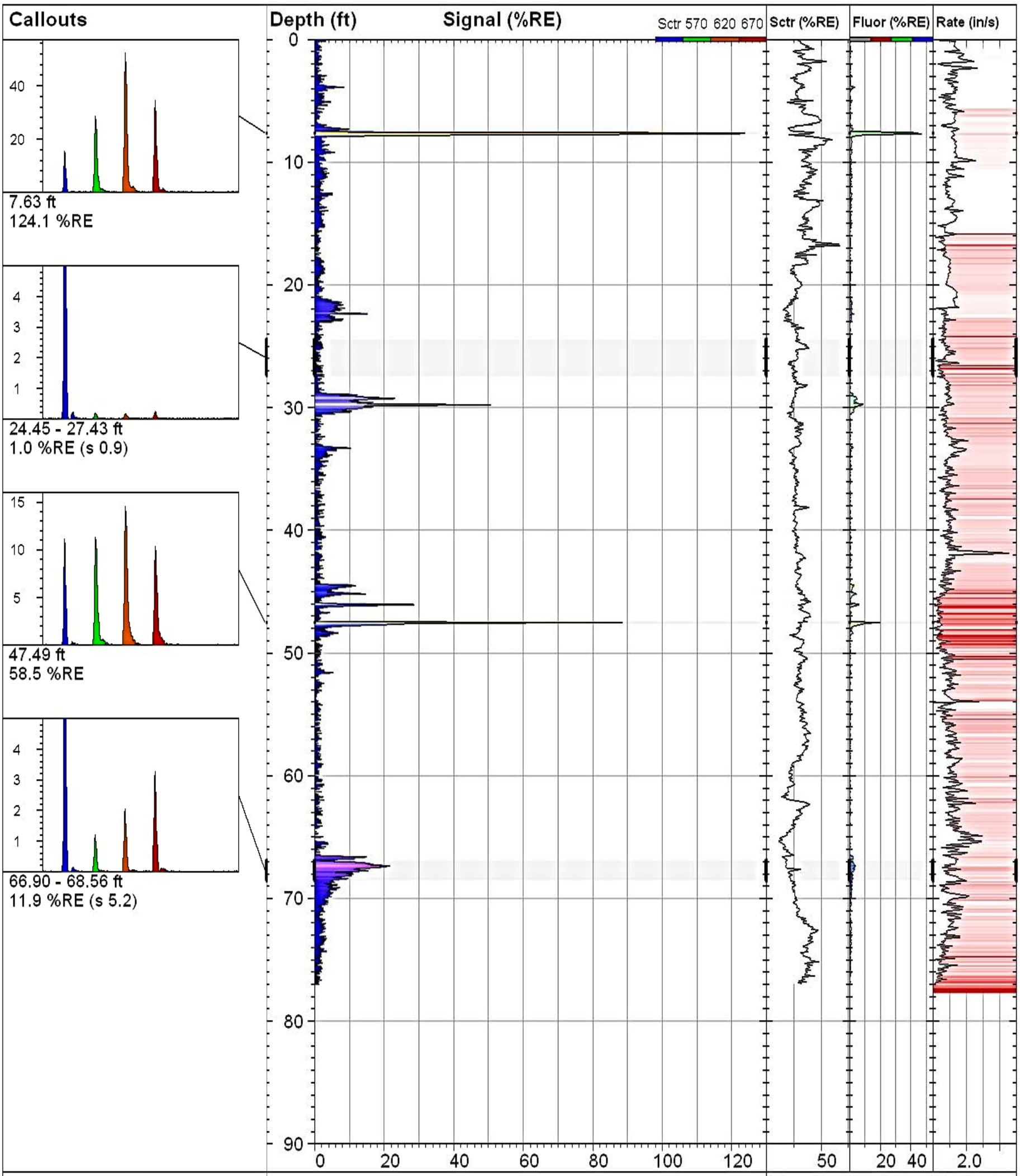
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **68.79 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **74.6 %RE @ 61.28 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 13:49 PDT**



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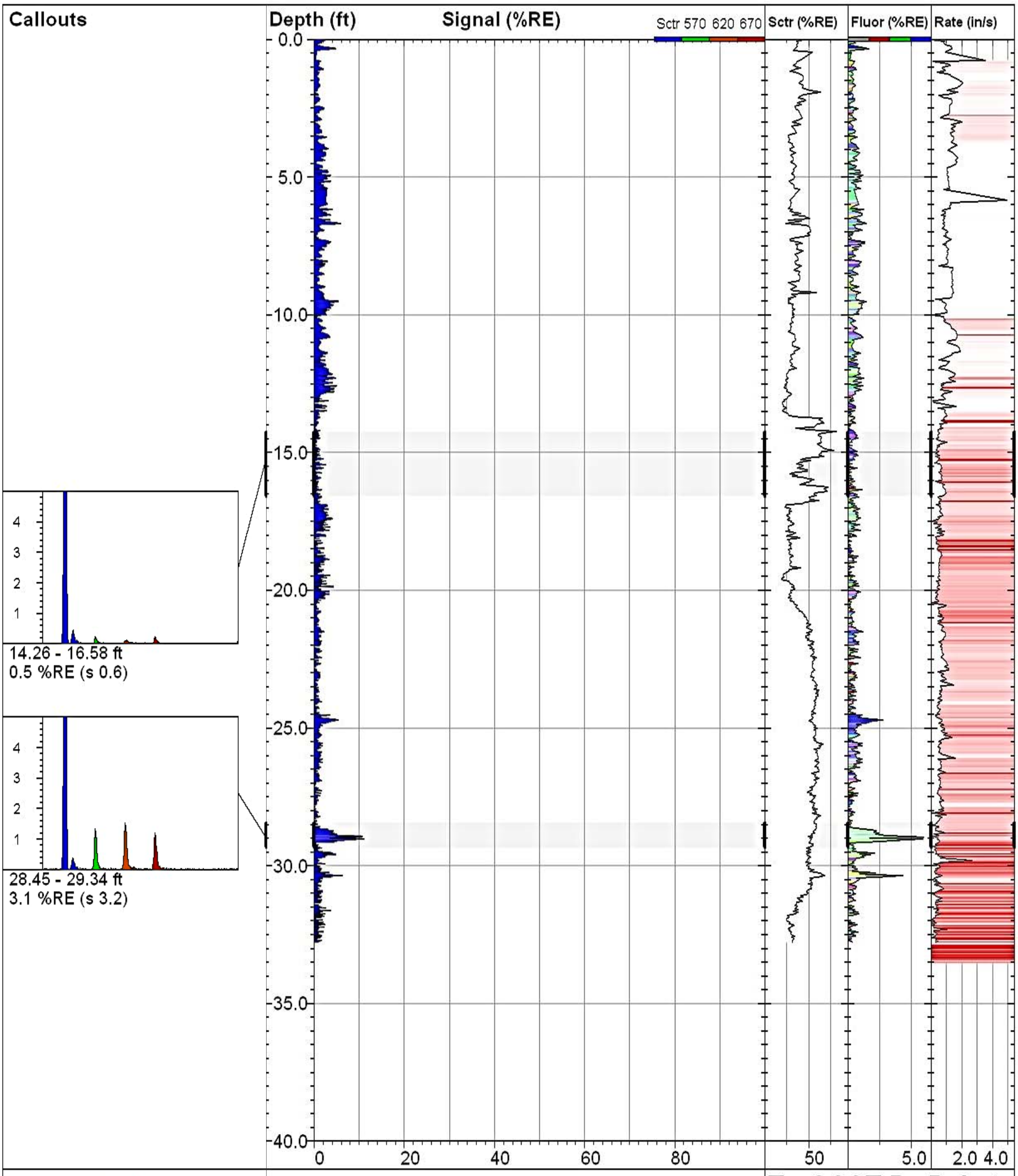
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **77.01 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **124.1 %RE @ 7.63 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-12 15:18 PDT**



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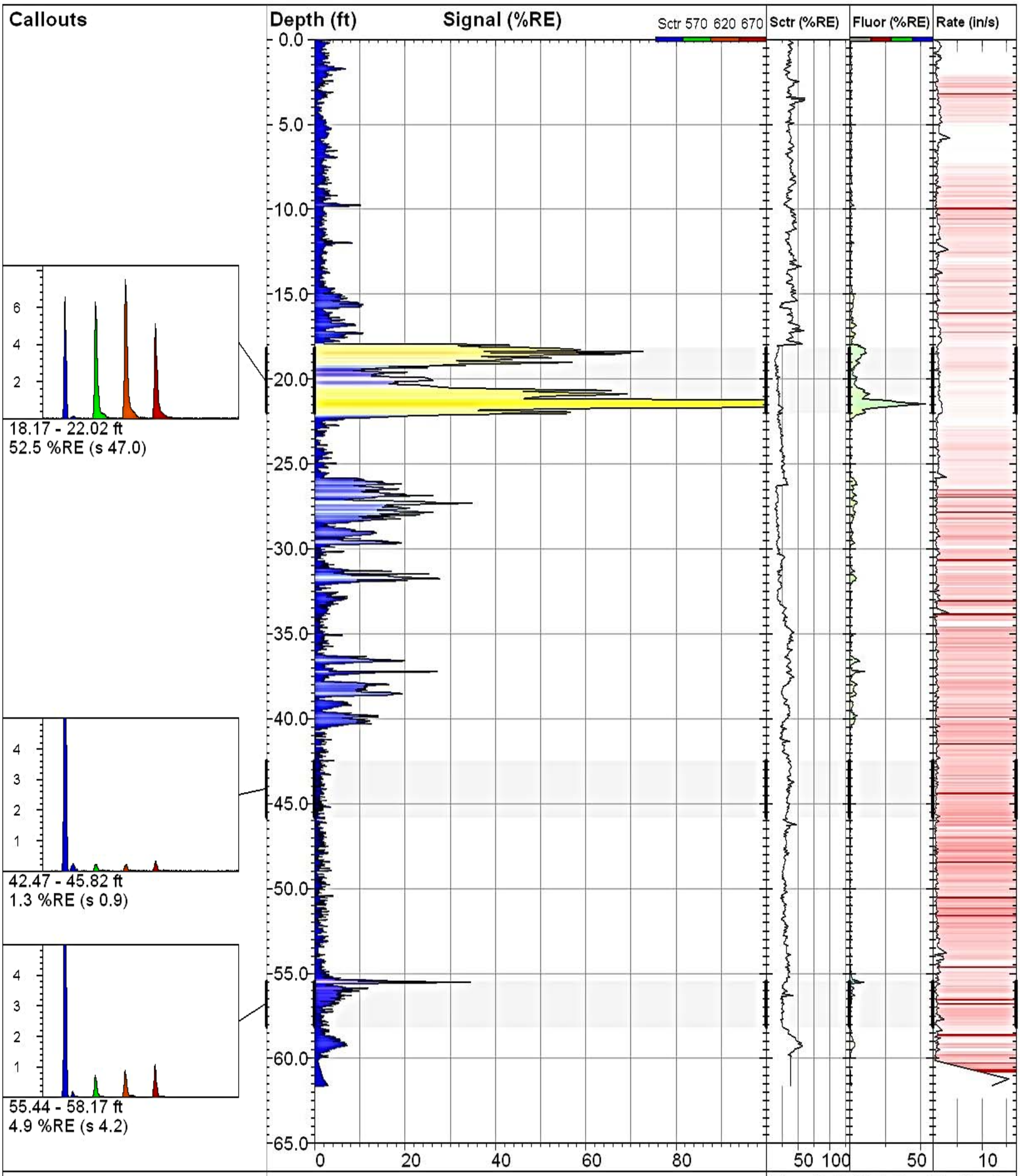
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.79 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.7 %RE @ 28.93 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-13 08:46 PDT**



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2013T-161

TarGOST By Dakota
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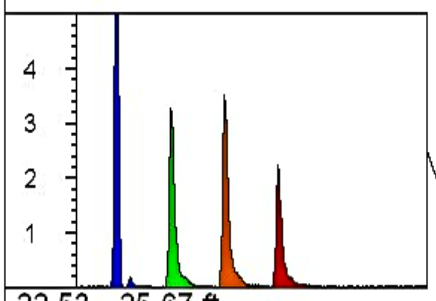
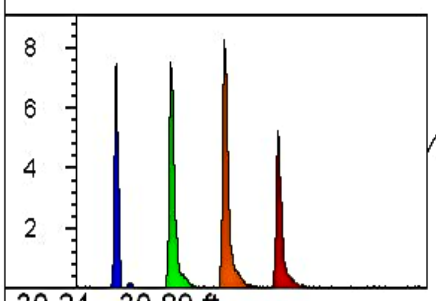
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **61.63 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **272.7 %RE @ 21.47 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-13 10:25 PDT**

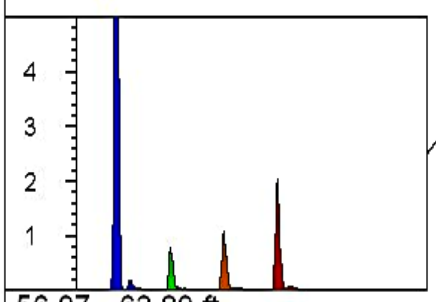
Callouts



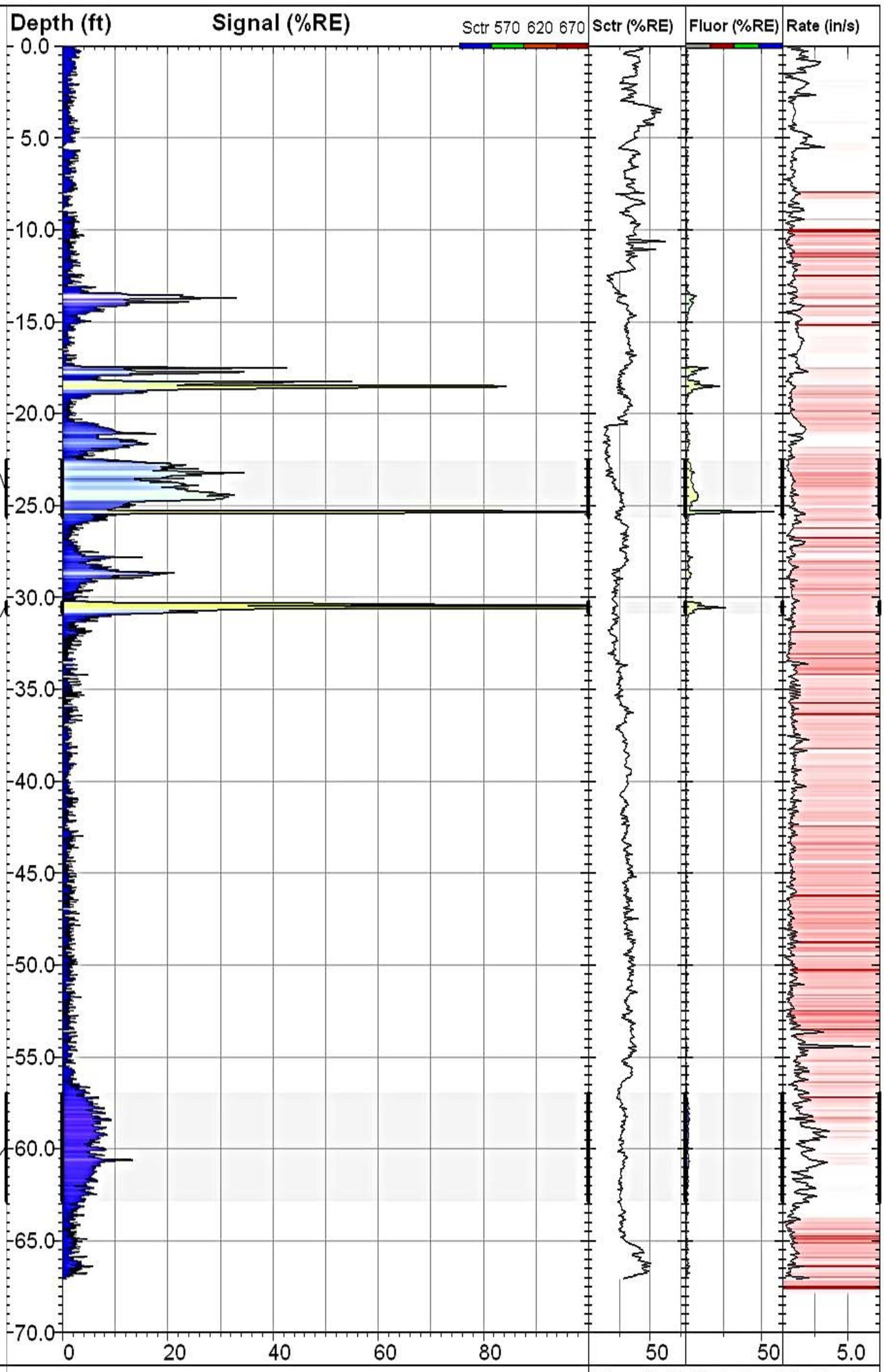
22.53 - 25.67 ft
22.3 %RE (s 25.1)



30.24 - 30.89 ft
50.8 %RE (s 48.8)



56.97 - 62.89 ft
6.0 %RE (s 1.7)



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2013T-162

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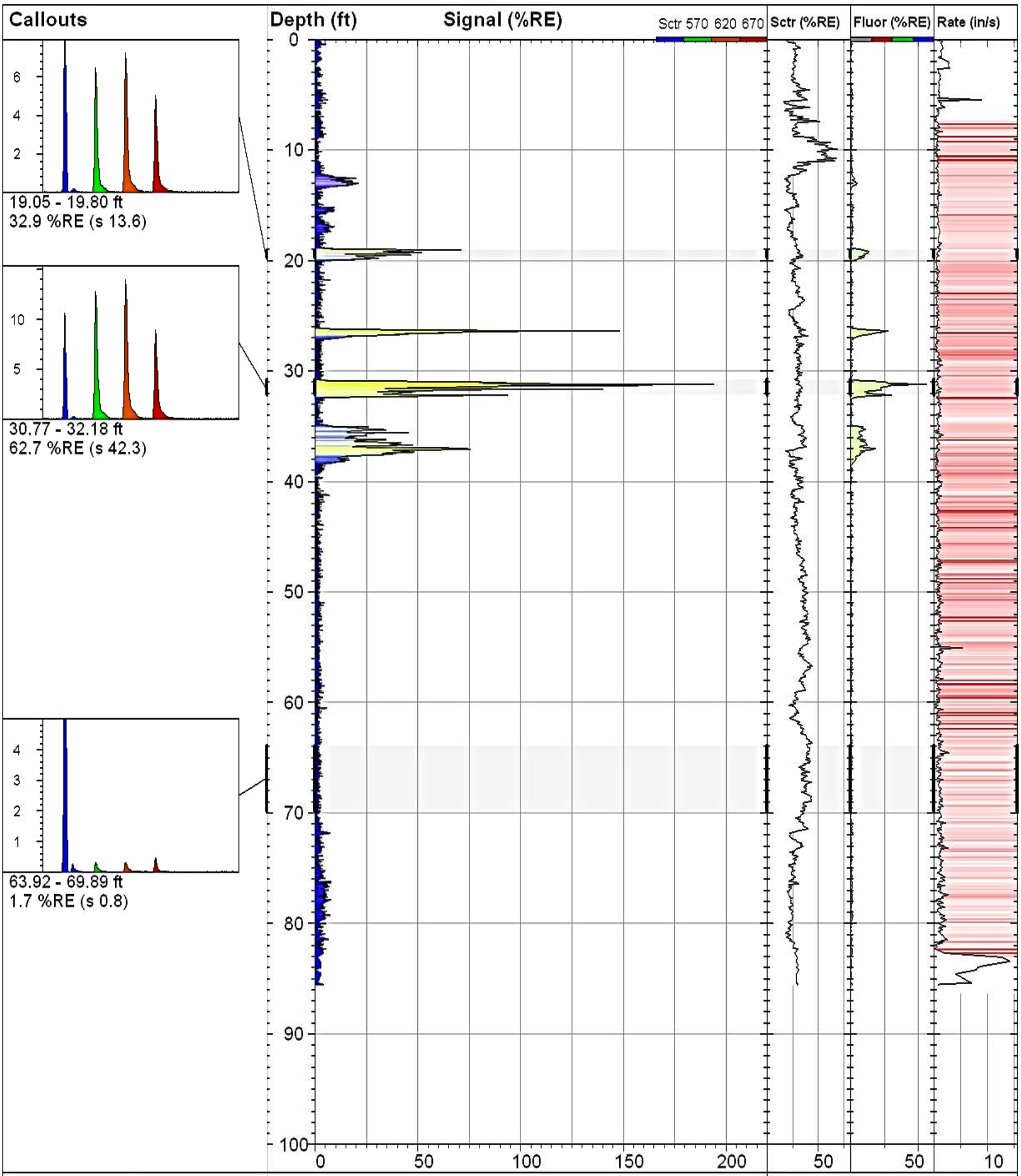
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **67.07 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **259.9 %RE @ 25.35 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-13 11:17 PDT**



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2013T-163

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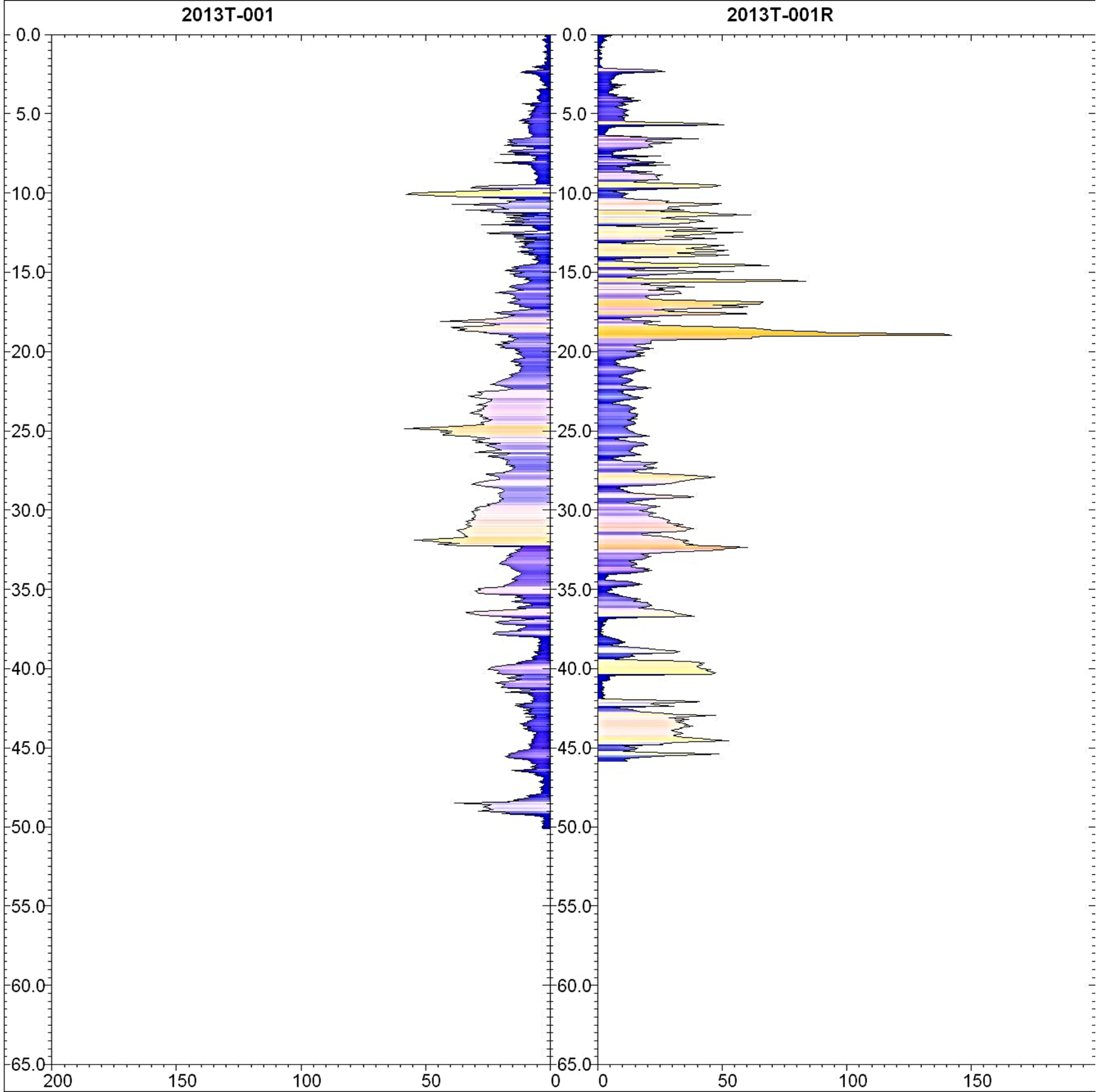
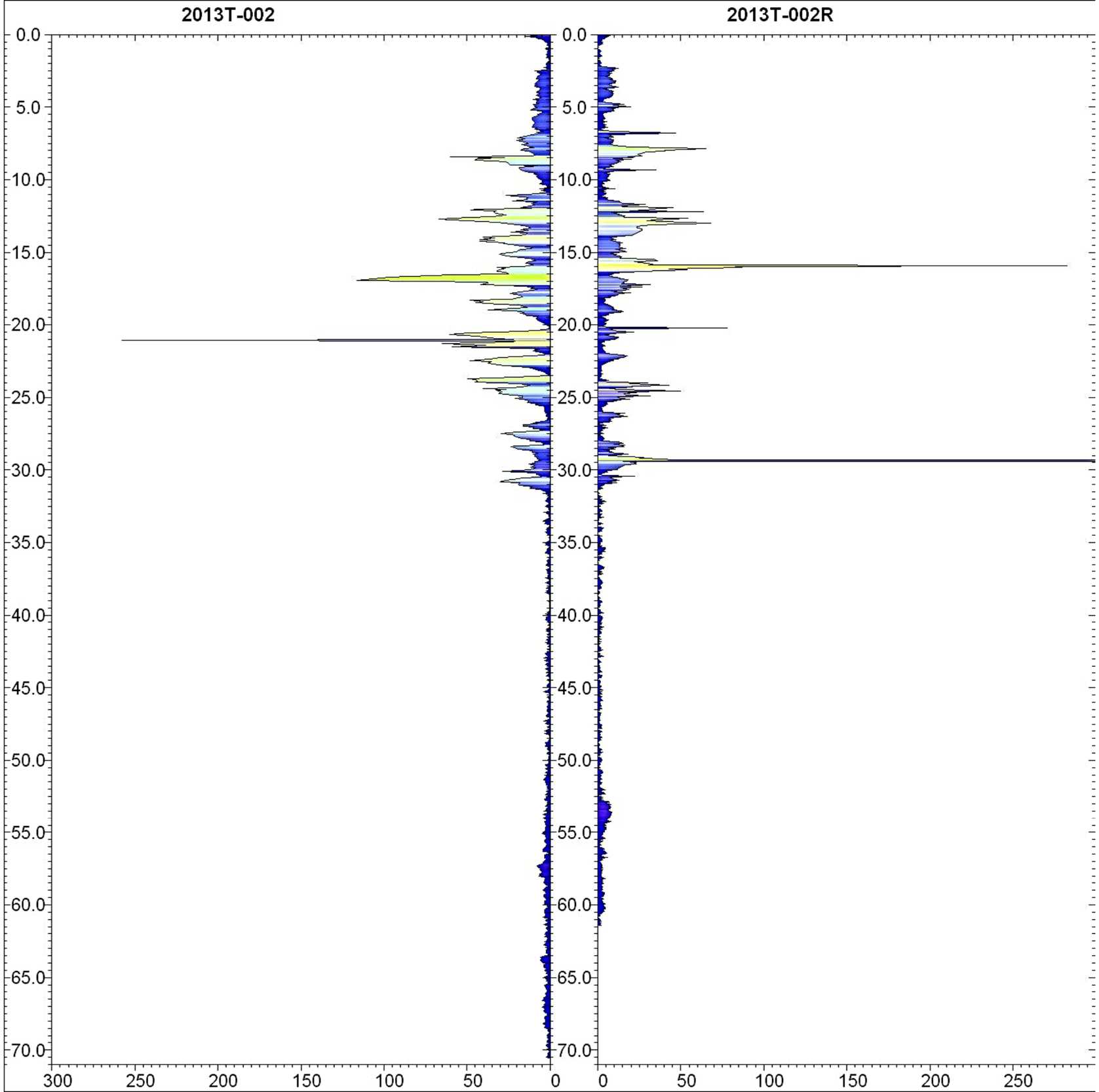
Site: **Wyckoff**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **85.58 ft**
Client / Job: **CH2M HILL /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **197.4 %RE @ 31.22 ft**
Operator / Unit: **T. Rudolph / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2013-03-13 13:34 PDT**

Appendix A-2
TarGOST Butterfly Log Comparison


2013T-001
2013T-001R
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
200
150
100
50
0
0
50
100
150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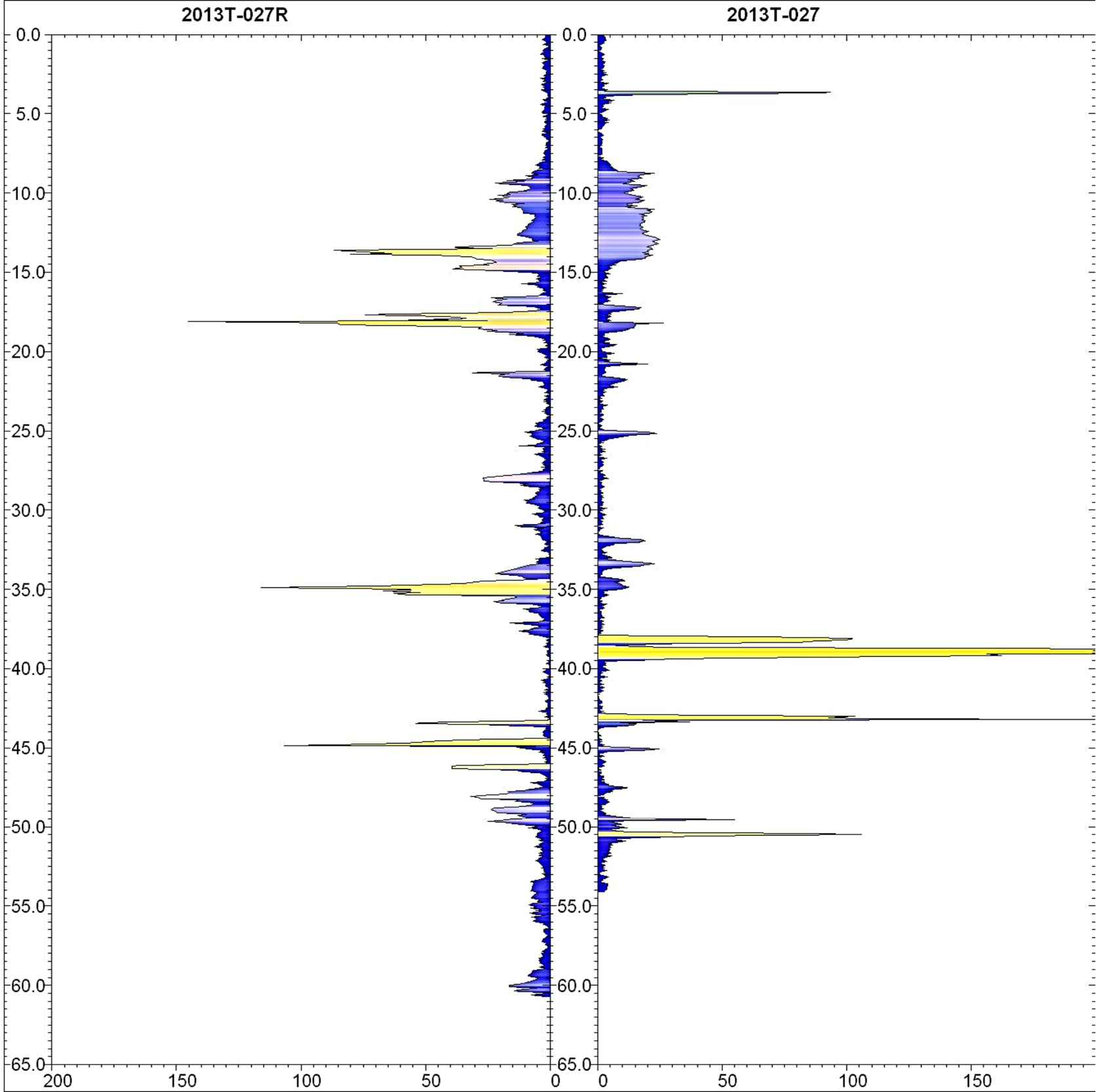
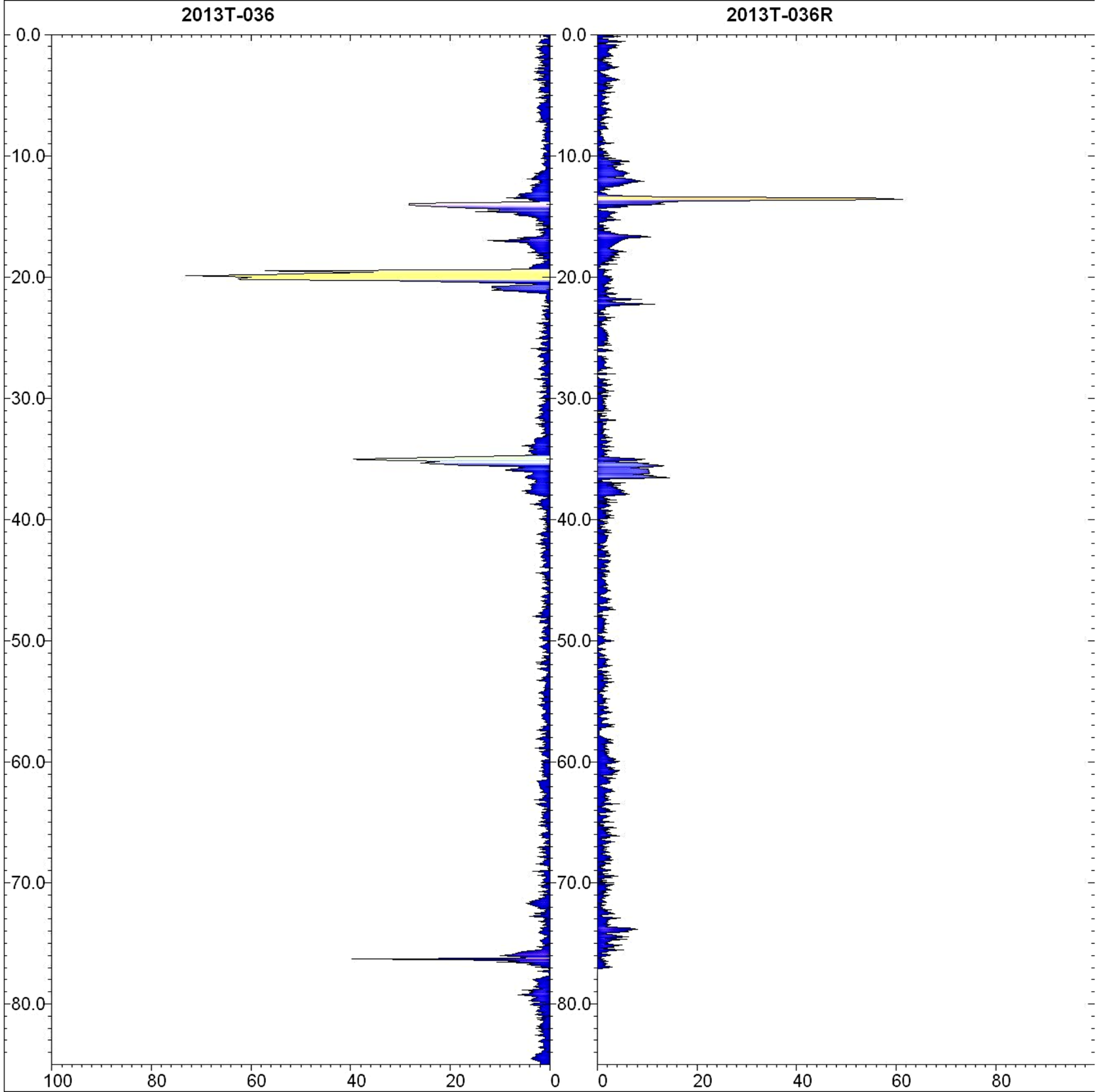
2013T-002R
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
300
250
200
150
100
50
0
0
50
100
150
200
250


2013T-027R
2013T-027
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
200
150
100
50
0
0
50
100
150


2013T-036
2013T-036R
0.0
10.0
20.0
30.0
40.0
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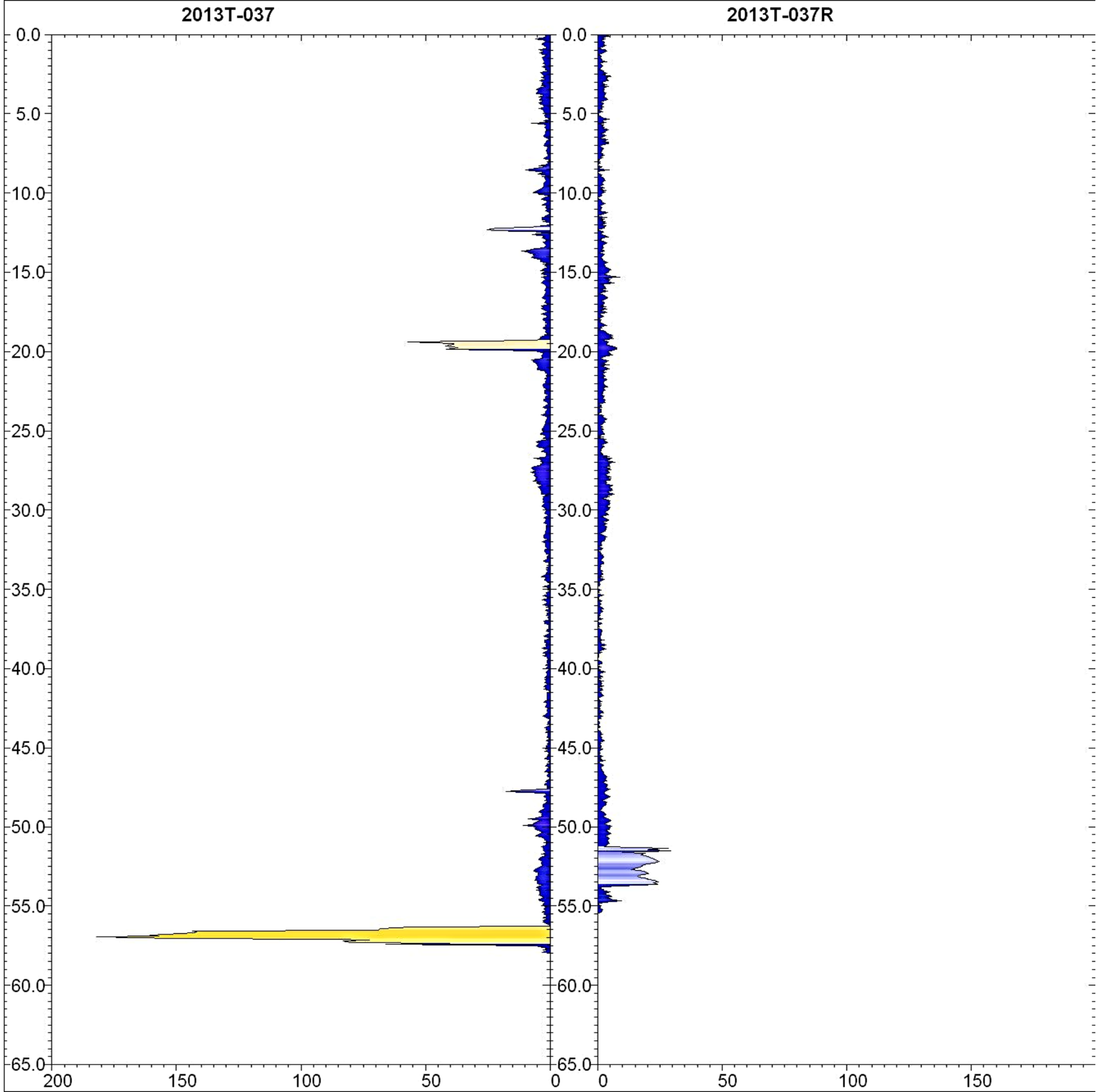
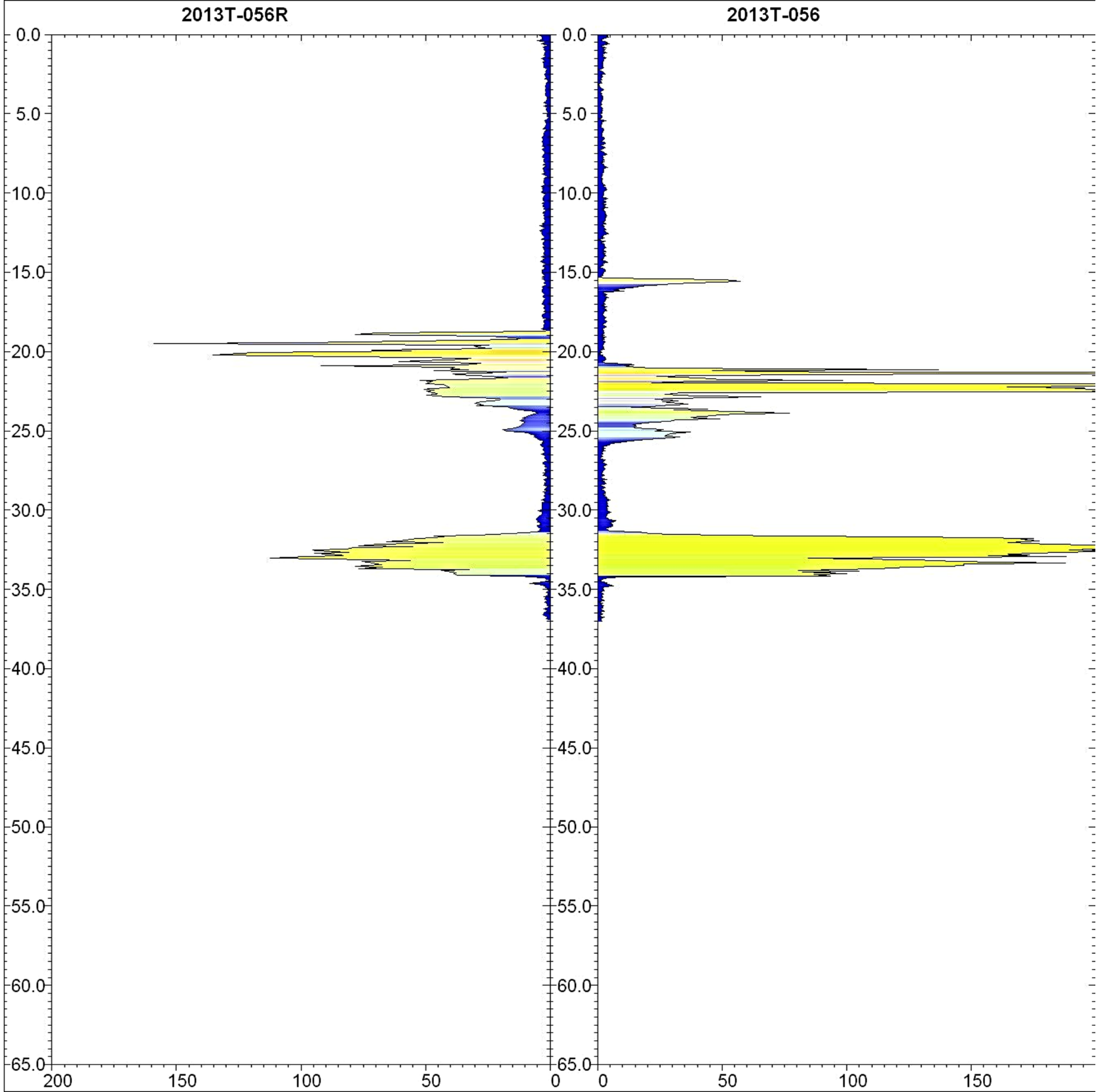
60.0
70.0
80.0
100
80
60
40
20
0
0
20
40
60
80


2013T-037
2013T-037R
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
200
150
100
50
0
0
50
100
150


2013T-056R
2013T-056
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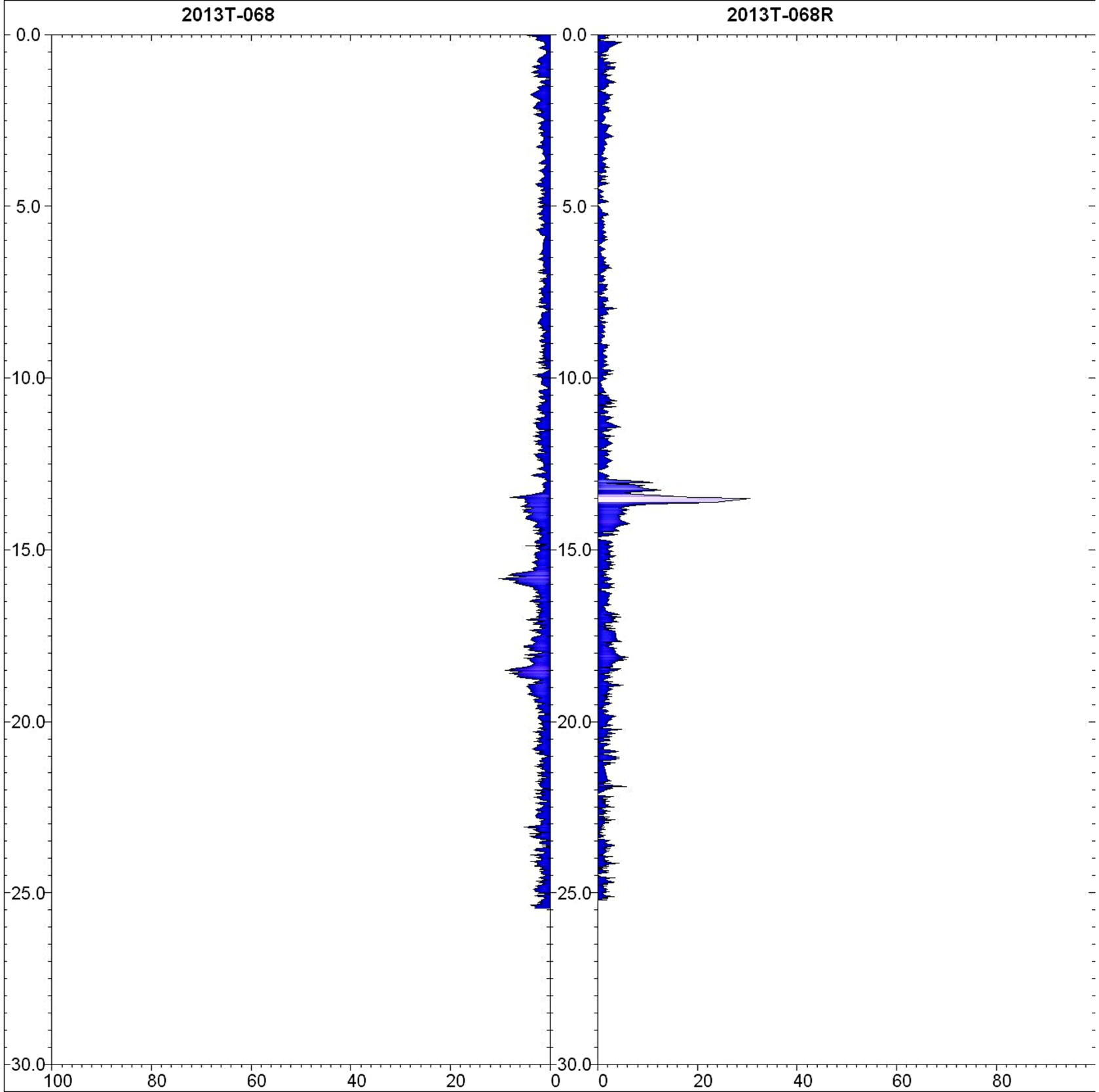
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
200
150
100
50
0
0
50
100
150


2013T-068
2013T-068R
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5.0
10.0
15.0
20.0
25.0
30.0
100
80
60
40
20
0
0
20
40
60
80

Appendix A-3
TarGOST Reference Emitter (RE)
Daily Calibration Logs

Upland Phase I Summary lif_Cal Log

File	Date/Time	RE Area	Background Area
2013T-003	1/14/2013 13:37	1905.81	10.24
2013T-002	1/14/2013 13:54	1947.16	10.24
2013T-004	1/15/2013 8:35	1807.57	31.46
2013T-006	1/15/2013 10:07	1957.31	11.95
2013T-007	1/15/2013 12:41	1676.32	23.79
2013T-001	1/15/2013 13:56	167.77	29.08
2013T-001R	1/15/2013 14:48	1829.01	13.46
2013T-005	1/15/2013 15:35	1814.32	18.16
2013T-041	1/16/2013 11:22	1632.84	17.61
2013T-042	1/16/2013 13:09	1719.42	13.44
2013T-044	1/16/2013 14:27	1699.26	23.87
2013T-045	1/17/2013 8:18	1594.6	24.65
2013T-043	1/17/2013 9:28	1725.82	33.26
2013T-040	1/17/2013 15:12	1948.43	17.11
2013T-039	1/21/2013 8:21	1744.22	58.86
2013T-048	1/21/2013 11:13	1690.68	44.87
2013T-047	1/21/2013 14:10	1597.36	52.85
2013T-037	1/21/2013 15:30	1599.58	51.49
2013T-037R	1/22/2013 8:15	1528.83	38.08
2013T-025	1/22/2013 9:43	1478.8	50.01
2013T-024	1/22/2013 12:50	1721.75	30.11
2013T-046	1/22/2013 13:53	1785.8	30.63
2013T-034	1/22/2013 14:55	1672.83	33.42
2013T-026	1/22/2013 15:46	1620.42	28.85
2013T-032	1/23/2013 8:27	1585.41	31.54
2013T-010	1/23/2013 9:40	1532.79	28.94
2013T-036	1/23/2013 10:53	1475.81	32.7
2013T-033	1/23/2013 13:45	1332.71	26.12
2013T-019	1/23/2013 14:45	1226.24	32.37
2013T-013	1/23/2013 15:22	1504.1	30.56
2013T-018	1/24/2013 8:57	1517.06	31.35
2013T-050	1/24/2013 10:08	1437.77	32.7
2013T-051	1/24/2013 10:51	1459.82	29.73
2013T-030	1/24/2013 11:39	1349.31	36.83
2013T-027	1/24/2013 13:37	1432.45	19.33
2013T-027R	1/24/2013 14:18	1343.93	28.87
2013T-031	1/24/2013 15:13	1252.62	30.56
2013T-020	1/25/2013 8:45	1766.51	30.65
2013T-017	1/25/2013 9:45	1592.31	29.28
2013T-016	1/25/2013 10:37	1638.06	21.39
2013T-060	1/25/2013 11:18	1536.99	26.69
2013T-059	1/25/2013 11:41	1477.16	36.51
2013T-058	1/25/2013 12:57	1245.13	44.85
2013T-056	1/25/2013 13:32	1190.26	44.1
2013T-056R	1/25/2013 14:01	1181.81	41.53
2013T-052	1/25/2013 14:42	1453.46	36.92
2013T-053	1/28/2013 8:32	1568.72	51.54
2013T-055	1/28/2013 9:31	1572.29	25.7
2013T-054	1/28/2013 11:03	1537.99	27.67
2013T-062	1/28/2013 13:35	1542.67	26.27
2013T-061	1/28/2013 15:37	1562.57	24.5
2013T-063	1/29/2013 9:39	1599.24	28.28
2013T-064	1/29/2013 11:45	1475.17	28.36
2013T-065	1/29/2013 14:03	1544.91	27.87
2013T-008	1/29/2013 15:28	1471.79	27.43
2013T-069	1/30/2013 8:22	1463.97	29
2013T-068	1/30/2013 8:55	1460.29	30.3
2013T-067	1/30/2013 9:29	1431.86	30.68
2013T-066	1/30/2013 9:54	1411.52	29.99
2013T-070	1/30/2013 10:35	1370.35	29.99
2013T-009	1/30/2013 12:37	1335.55	31.54
2013T-029	1/30/2013 13:46	1485.14	19.58

Upland Phase I Summary lif_Cal Log

2013T-072	1/30/2013 15:06	1434.18	22.94
2013T-022	1/31/2013 8:15	1409.77	22.9
2013T-015	1/31/2013 8:45	1465.37	26.25
2013T-035	1/31/2013 9:21	1462.32	24.93
2013T-002R	1/31/2013 10:05	1458.04	25.66
2013T-074	1/31/2013 12:21	1406.49	22.9
2013T-036R	1/31/2013 13:55	1349.73	24.96
2013T-068R	2/1/2013 8:16	1369.68	25.09
2013T-076	2/1/2013 8:54	1390.24	27.37
2013T-012	2/1/2013 10:47	1431.49	31.07
2013T-077	2/1/2013 15:16	1413.77	27.52
2013SC-046	2/4/2013 12:05	1568.08	19.7
2013SC-046B	2/4/2013 16:07	1656.9	19.92
2013SC-041	2/5/2013 11:29	1503.24	17.83
2013SC-041B	2/5/2013 15:00	1531.07	17.83
2013SC-041C	2/6/2013 9:49	1520.16	16.43
2013SC-045	2/6/2013 14:57	1592.09	17.94
2013SC-045B	2/7/2013 8:46	1561.66	18.94
2013SC-045C	2/7/2013 11:46	1522.82	17.16
2013T-078	2/8/2013 9:07	1502.18	23.88
2013T-079	2/8/2013 9:39	1526.32	26.28
2013T-080	2/8/2013 10:05	1469.2	28.6
2013T-081	2/8/2013 10:29	1406.23	28.61
2013T-082	2/8/2013 11:01	1500.1	30.18
2013T-014	2/8/2013 11:34	1570.66	31.93
2013SC-045D	2/8/2013 13:27	1528.88	29.16
2013T-083	2/8/2013 13:49	1496.52	27.59
2013T-084	2/8/2013 14:10	1586.18	30.52
2013T-085	2/8/2013 14:50	1617.12	28.91

[STATS]
File Count=91
Total Depth=4331.3
Max Depth=85.7
Max Signal=1610.7

Upland Phase II Summary lif_Cal Log

File	Date/Time	RE Area	Background Area
2013SC-006	2/25/2013 10:01	1542.62	37.01
2013SC-072	2/25/2013 14:28	1480.3	37.01
2013SC-001	2/26/2013 7:24	1694.41	39.94
2013SC-002	2/26/2013 7:40	1776.79	39.38
2013SC-036	2/26/2013 7:52	1703.06	42.3
2013SC-072B	2/26/2013 9:09	1661.14	37.05
2013SC-055	2/26/2013 10:32	1751.83	40.59
2013SC-055B	2/27/2013 10:23	1697.42	39.72
2013SC-068	2/27/2013 12:46	1819.02	41.46
2013T-100	2/27/2013 15:38	1653.81	29.02
2013T-102	2/28/2013 11:19	1715.33	40.65
2013T-103	2/28/2013 12:49	1618.53	35.25
2013T-104	2/28/2013 14:18	1618.98	37.24
2013T-105	2/28/2013 14:53	1601.38	42.42
2013T-106	2/28/2013 15:45	1533.91	36.75
2013T-107	3/1/2013 8:34	1525.04	28.61
2013T-108	3/1/2013 9:53	1565.89	34.31
2013T-109	3/1/2013 11:08	1435.13	37.75
2013T-110	3/1/2013 13:03	1521.4	45.88
2013T-111	3/1/2013 14:19	1528.07	37.44
2013T-112	3/1/2013 15:19	1572.67	49.58
2013T-113	3/4/2013 9:40	1666.14	38.55
2013T-114	3/4/2013 10:09	1644.34	48.43
2013T-115	3/4/2013 11:50	1342.15	34.44
2013T-116	3/4/2013 12:30	1489.28	47.13
2013T-117	3/4/2013 13:14	1519.78	38.34
2013T-118	3/4/2013 14:04	1535.04	48.5
2013T-119	3/4/2013 14:50	1474.57	33.24
2013T-120	3/4/2013 15:41	1419.44	33.24
2013T-101	3/5/2013 11:32	2096.54	20.3
2013T-121	3/5/2013 13:11	1941.22	26.17
2013T-122	3/5/2013 13:47	1909.57	33.89
2013T-123	3/5/2013 14:25	1929.96	23.13
2013T-124	3/5/2013 14:55	1811.28	20.8
2013T-125	3/5/2013 15:35	1717.11	20.8
2013T-126	3/6/2013 8:51	1580.73	18.36
2013T-127	3/6/2013 10:30	1598.68	23.35
2013T-128	3/6/2013 12:44	1617.98	20.86
2013T-129	3/6/2013 13:54	1681.19	23.5
2013T-130	3/6/2013 14:39	1723.7	24.08
2013T-131	3/6/2013 15:18	1587.13	24.23
2013T-132	3/7/2013 8:44	1777.49	27.75
2013T-133	3/7/2013 9:07	1635.24	25.05
2013T-134	3/7/2013 9:35	1731.36	28.19
2013T-135	3/7/2013 10:12	1713.26	27.8
2013T-136	3/7/2013 12:07	1654.49	28
2013T-137	3/7/2013 13:11	1643.97	26.61
2013T-138	3/8/2013 8:23	1676.8	12.66
2013T-139	3/8/2013 9:22	1633.12	13.74
2013T-140	3/8/2013 10:28	1476.61	21.79
2013T-141	3/8/2013 12:29	1439.67	38.97
2013T-142	3/8/2013 13:28	1341.64	37.18
2013T-143	3/8/2013 14:12	1277.82	55.57
2013T-144	3/8/2013 15:34	2214.46	17.29
2013T-145	3/11/2013 8:25	1771.75	20.83
2013T-146	3/11/2013 8:57	1715.93	22.26
2013T-147	3/11/2013 9:39	1701.85	27.83
2013T-148	3/11/2013 10:26	1637.44	28.71
2013T-149	3/11/2013 12:28	1531.16	31.55
2013T-150	3/11/2013 13:01	1567.75	16.88
2013T-151	3/11/2013 13:43	1574.99	21.14
2013T-152	3/11/2013 15:04	1472.22	24.8

Upland Phase II Summary lif_Cal Log

2013T-153	3/12/2013 8:46	1347.1	28.33
2013T-154	3/12/2013 9:15	1338.76	28.95
2013T-155	3/12/2013 9:48	1518.41	14.89
2013T-156	3/12/2013 10:49	1611.13	15.97
2013T-157	3/12/2013 12:51	1420.84	16.24
2013T-158	3/12/2013 13:49	1509.37	23.07
2013T-159	3/12/2013 15:18	1417.07	22.47
2013T-160	3/13/2013 8:46	1495.31	19.65
2013T-161	3/13/2013 10:25	1394.47	35.13
2013T-162	3/13/2013 11:17	1402.91	32.56
2013T-163	3/13/2013 13:34	1292.94	25.6
2013SC-127	3/14/2013 10:01	1493.15	8.01
2013SC-127B	3/14/2013 13:13	1525.43	31.55
2013SC-119	3/15/2013 9:11	1599.07	33.63
2013SC-152	3/15/2013 13:06	1490.51	30.55
2013SC-152A	3/15/2013 14:12	1566.65	36.05
2013SC-101	3/18/2013 8:52	1676.75	31.51
2013SC-054	3/18/2013 11:18	1692.36	32.85
2013SC-054B	3/18/2013 13:00	1659.42	28.38
2013SC-054C	3/18/2013 16:05	1606.03	30.83
2013SC-054D	3/19/2013 8:17	1654.41	30.05
2013SC-155	3/19/2013 10:03	1565.32	27.99
2013SC-155B	3/19/2013 13:29	1651.36	32.7
2013SC-013	3/20/2013 8:37	1601.25	30.67
2013SC-070	3/20/2013 11:38	1574.79	31.9
2013SC-106	3/21/2013 8:34	1668.64	29.51
2013SC-106B	3/21/2013 14:53	1568.07	25.29
2013SC-014	3/22/2013 8:29	1631.86	22.25
2013SC-152V2	3/22/2013 11:21	1567.47	22.41

[STATS]
File Count=91
Total Depth=3550.8
Max Depth=85.6
Max Signal=1579.9

Appendix B
Field Notes

CONTENTS

PAGE	REFERENCE	DATE

Location Wyckoff Date 1/14/13

Project / Client USEPA

Personnel: M Bruno / PDT
K Scheffler / SEA
Tad Olsonawski / Dalcotech Technologies
Alan Jensen / E&E
Jonathan Reeve / E&E

Weather: ~30° F, overcast, breezy

Objective: Project H&S kickoff, Target Cost probing of initial locations

0800 Arrive onsite

0810 H&S kickoff w/ Stan
Site hazards, utilities, PPE, decon procedures

0830 Site H&S walk w/ Stan - utilities, holes, slopes rear sheet pile wall

0900 E&E begins prepping equipment
Calibrate MultiRAE # C102629
Zero Cal - Pass
O_2 - 20.9
CO - 0
LEL - 0
H_2S - 0
Span cal Lot # IAM-413-18-18 Exp 11/13
O_2 - 18.0 LEL: 50%
CO - 50 H_2S: 10

-mrb-

Location Wyckoff Date 1/14/13

Project / Client USEPA

Isobutylene Lot # LTH072-RB-CM Exp: 8/2015

100 ppm reading = 99.8 ppm

1030 Mark locations with stakes 2013T-001, 2013T-002, 2013T-003

Called R Healy ISGA to get aquitard depths in logs

1140 Begin drilling @ 2013T-003

TD = 57.84'

Results: 8.08-8.68 Medium response

12.35-12.71 High response

18.78-20.23 High Response

1250 Tooling removed from hole

Actual GPS coordinates of boring recorded

Northing: 229265.95

Easting: 1229388.26

1310 Lunch

1340 Move rig to 2013T-002

1350 Begin probing @ 2013T-002

1445 Finish probing. TD = 70.58. Refusal.

Results:

8.6 moderate response

12-13 moderate response

16.78 strong response

20-21.5 moderate to very strong

22-23 moderate

24 moderate

36.25 weak

-MP-

Location Wyckoff Date 1/14/13

Project / Client USEPA

1450 Drillers remove tooling from borehole.

1505 Record actual GPS coordinates:

Northing = 229368.59

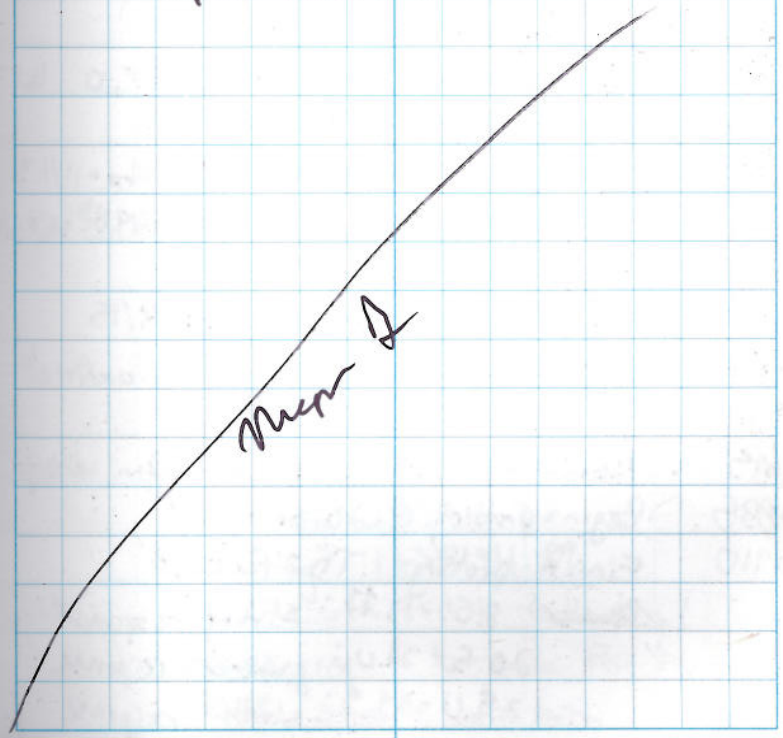
Easting = 1229401.74

1510 GtE/Dakota decon equipment

1515 Mark 2013T-004, -005, -006, -007

1545 Mobe to office trailer to copy daily LIF logs, email daily report

Depart from site



Location Wyckoff Date 1/15/13

Project / Client USEPA

Personnel: M Bruno / CWO
N Badon / SGA
T Olsonawski / Dakota
A Jensen / E&E
S Reeve / E&E

Objective: TARGOST probing initial locations

Conditions:

0745 Arrive on site
Calibrate PID MultiRAE # CK02629
Fresh air cal
O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0
VOC = 0.0
Span cal Lot = 1AM-413-10-18 Exp = 11/13
O_2 = 18.0 CO = 50 LEL = 49.8% H_2S = 10.3
100 ppm Isobutylene = 100.1
Lot: LTH0732-BR-CM Exp: 8/15

0810 H&S Tailgate - slips, trips, falls around extraction wells

0815 Mobe to 2013T-004 & begin setup

0835 Begin probing @ 2013T-004

0910 Finish probing. TD = 57.68'
Results: 8.51-12.77: strong response
20.5-21.0: weak response
28.0-29.5: weak response

-MB-

Location Wyckoff Date 1/15/13

Project / Client USEPA

0945 Drillers pull tooling from borehole.

0945 Actual GPS coordinates:
Northing = 229593.70
Easting = 1229259.49

0950 Move to 2013T-006

1005 Begin probing @ 2013T-006

1040 End probing @ 2013T-006. TD = 55.16
Results: 8.06-15.23 = medium to strong response
19.70-21.05: medium to strong response
21.5-27.0: weak to medium response
36.0-36.5: medium response
41.0-42.0: medium to high response
47.5-48.0: weak response

1045 Drillers begin removing tooling - head broken off tooling. Unstring cable from tooling. 40' rod left in hole

1050 Dakota gets new cable, restrings tooling on larger rod

1055 Record actual GPS coordinates:
Northing: 229516.22
Easting: 1229194.89

1155 E&E/Dakota finish retooling / restringing & break for lunch
EH2M starts marking sheet pile

-MB-

Location Wyckoff Date 1/15/13

Project / Client USEPA

borehole locations

1225 Move to 2013T-007 & begin setup

1240 Begin probing @ 2013T-007

1310 End probing @ 2013T-007 TD = 64.32

Results: 6.77-13.64: medium to strong signal

18.5-20.5: strong signal

25.5-27.5: weak signal

29.75-33.59: medium signal

~~30.5-33.40~~ KB

1315 E&E pulls tooling from borehole

1325 Record actual GPS coordinates

Northing = 229594.80

Easting = 1229260.37

1340 Move to 2013T-001 & begin setup

1345 Begin probing @ 2013T-001

1420 Finish probing @ 2013T-001 TD = 50.12'

Results: weak response 0.0-50.12'

10.0-10.5 = medium response

24.5-25.5 = medium response

31.5-32.0 = medium response

1425 E&E pulls tooling

Actual GPS coordinates measured

Northing: 229427.58

Easting: 1229065.15

-mrb-

Location Wyckoff Date 1/15/13

Project / Client USEPA

1440 Move rig forward ~2' & setup for replicate

1445 Begin probing replicate 2013T-001R

1510 Hit refusal @ 45.89 ft

Results: Weak response 0.0-45.89

9.5 medium response

11.5-17.5 medium response

18.5-19.5 strong response

32.0-32.5 medium response

40.0-44.0 medium response

1515 Drillers pull tooling

1525 Record actual GPS coordinates of rep.

Northing = 229428.96

Easting = KB 1229066.42

1530 Move to ~~2012~~ 2013T-005 & setup

1535 Begin probing @ 2013T-005

1550 Finish probing @ 2013T-005 TD = 39.99

Results: 9.10-15.04: medium signal

18.58-21.17: strong response

24.5-25.0: strong response

33.8-34.84: medium response

1555 Drillers pull tooling

Actual GPS coords recorded

Northing = 229486.76

-mrb-

Location Wyckoff Date 1/15/13

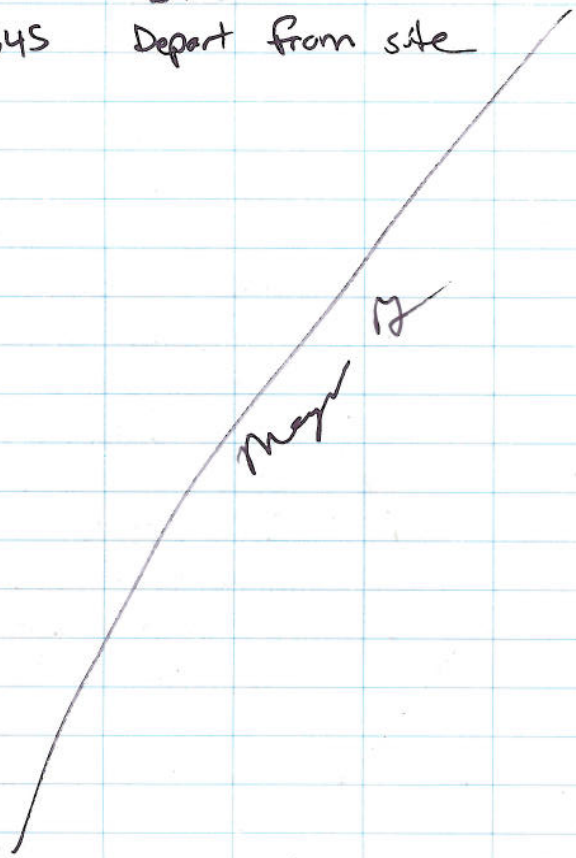
Project / Client USEPA

Gasting = 122 9049. 72

1605 Mobe to decon pad to decon Gatorlods

1615 Mobe to office trailer to transfer electronic LIF files, send daily report, etc.

1645 Depart from site



Location Wyckoff Date 1/15/13

Project / Client USEPA

Conditions: ~33°F, foggy, breezy

Personnel: M Bruno / PDT
T Olsonawski / Dakota
A Jensen / E&E
J Reeve / E&E

Objective: LIF probing @ sheet pile wall locations

0700 Arrive onsite & sign in

0710 Calibrate MultiRAE PID

Fresh air cal = Pass

O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0
VOC = 0.0

Span cal Lot = IAM-413-18-18 Exp = 11/13
O_2 = 18.0 CO = 51 LEL = 49 H_2S = 10.2
100 ppm Isobutylene = 100.2
Lot = LT1H072-RR-CM Exp = 8/15

0800 Safety tailgate - icy conditions on site this morning. Craters on berm near sheet pile wall. Need to be extra vigilant about where we walk today.

0820 Mobe to 2013T-039 ~~& begin setup~~ (MB)

0830 E&E truck gets stuck - 4 wheel drive will not engage.

- MM -

Location Wyckoff Date 1/16/13

Project / Client USEPA

J Reeve mobes to get his personal 4 wheel drive vehicle to try to pull E&E truck out

0850 J Reeve pulls E&E truck out, mobes personal vehicle to decon area

0855 E&E moves rig down main road to the West & tries to drive onto berm again. Truck gets stuck

0900 J Reeve mobes to get personal vehicle to pull out truck

0910 Truck pulled free. Move to 2013T-043 & try to make it up hill onto berm. Truck gets stuck 1/4 way up hill on 3 seperate tries.

0930 Mobe to decon pad - Dakota going to switch rods over to trailer & add more rods so he has enough to do all remaining holes. J Reeves mobes to hardware store to get plywood to lay down under truck tires. + Jensen unloads extra

-mg-

Location Wyckoff Date 1/16/13

Project / Client USEPA

equipment/supplies from E&E truck to try to reduce weight

M. Bruno finishes entering secondary borehole target locations into GPS & begins staking secondary locations

1055 E&E truck unloaded, J Reeve back with plywood. Mobe to 2013T-043 to try again. Find rock road going to 2013T-041 & drive truck up it. Get positioned on 2013T-041

1120 Begin probing @ 2013T-041

1200 Finish probing @ 2013T-041

Results: TD = 75.08 ft Refusal

17.0-18.0: weak response

20.5-21.5: strong response

64.77-67.68: strong response

1205 Drillers pull rod

1215 Record actual GPS coordinates

Northing: 229798.30

Easting: 122917.20

1220 Mobe to 2013T-042 & begin setup

1230 Lunch

-mg-

Location Wyckoff Date 1/16/13

Project / Client USEPA

1305 Begin probing @ 2013T-042

1350 Finish probing @ 2013T-042

Results: TD = 77.74 ft

12.0-13.0 : strong response

17.5-18.0 : medium response

66.0-68.0 : strong response

69.0-70.0 : weak response

70.5-72.0 : weak response

1355 Drillers pull tooling from borehole

1410 Record actual GPS coordinates

Northing = 229803.77

Easting = 122983.44

1415 Mobe to 2013T-044 & begin setup

1425 Begin probing @ 2013T-044

1510 Finish probing @ 2013T-044

Results: TD = 81.72

9.0-10.0 : weak response

16-16.5 : weak response

23.0-28.0 : weak response

30.0-31.5 : strong response

1520 Drillers pull tooling

1525 Record actual GPS coordinates

Northing = 229743.10

Easting = 122930.23

Location Wyckoff Date 1/16/13

Project / Client USEPA

1530 Mobe to 2013T-045 & begin setup

Discussion about whether to start next hole. E&E says they were told they needed to be finished by 4 & off site by 430 daily. E&E will talk to Renee tonight about extending work day starting tomorrow

1545 Mobe J Reeve personal vehicle, EPA pickup, & gator to decon pad to decon

1555 E&E transfers plywood from open-bed EPA pickup to J Reeve's enclosed personal vehicle to keep dry.

M Bruno marks more stakes to continue staking secondary borehole locations.

1610 Mobe to office trailer to transfer LIF logs, send daily report, etc.

1640 Depart from site

Location Wyckoff Date 1/17/13

Project / Client USEPA

Conditions: ~34° F, breezy, foggy

Personnel: M Bruno / CH2M Hill
T Olsonawski / Dakota
A Jensen / G+G
J Reeve / E+E

Objective: Continue TARGOST probing at sheet pile wall locations; begin probing @ secondary locations

0700 Arrive onsite. Dakota arrives onsite. Both sign in

0705 Calibrate PID - Mult: RAE # c102629
Fresh air cal - pass
O_2: 20.9 CO: 0 LEL: 0 H_2S: 0.0 VOC: 0.0
span cal: Lot: 1AM-413-18-10 Exp: 11/13
O_2: 18.0 CO: 51 LEL: 49 H_2S: 10.2
100 ppm Isob Lot: LT1407A-PE-CA Exp: 8/15
100.2 ppm

0730 A Jensen arrives on site & signs in

0745 Move to 2013T-045 & resume setup

0800 H&S ~~MB~~ J Reeve arrives onsite

0810 H&S tailgate - soft ground, use plywood if needed, steep slopes & holes in hillside

0815 Begin probing @ 2013T-045

-MB-

Location Wyckoff Date 1/17/13

Project / Client USEPA

0900 Finish probing 2013T-045 TD = 85.69
Results:
16.82-18.07: weak response
23.25-30.93: medium response
40.39-44.78: strong response

MB

Drillers pull tooling from borehole

0915 Record actual GPS coordinates
Northing = ~~229743.10~~ MB 229671.46
Easting = ~~122 9305.23~~ MB 1229339.68

0920 Move to 2013T-043 & begin setup

0925 Begin probing @ 2013T-043

0940 Receive call from R Healy - switching methodology back to going to refusal (with exceptions where aquitard is very thin)

1000 Refusal @ 77.23 ft, finish probing. E+E pulls tooling
Results:
12.0-12.5: medium response
16.0-18.0: weak response
21.0-23.0: weak response
60.20-63.04: medium to strong
67.54-70.56: strong response

—MB—

Location Wyckoff Date 1/17/13

Project / Client USEPA

1015 Record actual GPS location
Northing: 229758.85
Easting: 1229230.04

1020 Move to 2013T-040 & begin setup

1030 Begin probing @ 2013T-040

1040 @ 18.21 ft, signal looks off from ~10 ft onwards, Dakota decides to pull probe & check laser. Very high signal in red channel & very consistent response, no peaks.

1045 All tooling pulled up - LIF head broken in half. Cable also broken off. Dakota to unstring & restring, M Bruno to help N Budon w/ salinity measurements during restringing.

1215 Restringing completed. Lunch.

1245 Stan shows M Bruno/N Budon how to operate security system. Drillers mobe to 2013T-040, move truck ~1 ft forward, to 2nd attempt location

1310 Start probing at 2013T-040

— mb —

Location Wyckoff Date 1/17/13

Project / Client USEPA

1315 Hit large rock @ ~10' - approx same depth we think probe broke @ on previous attempt. Decide to pull up, move rig ~2' & try again.

~~Begin probing attempt #3 @ 2013T-040~~ (HS) (HS)

TARGOST head pulled off threads of first (bottom) rod.

1325 Unstring rods. Put new adapter down cable, put 3x4' rods back on cable & paused down. Cable shears off @ adaptor. Tooling pulled from hole.

1355 Dakota restrings with new cable

1455 Drill rig moves downslope ~10' for third attempt

1510 Begin probing 3rd attempt @ 2013T-040

1600 Refusal @ 82.03 feet
Drillers pull tooling
Results: 20.0-21.0: medium response
35.9: weak response
64.0-67.0: weak response

— mb —

Location Wyckoff Date 1/17/13

Project / Client USEPA

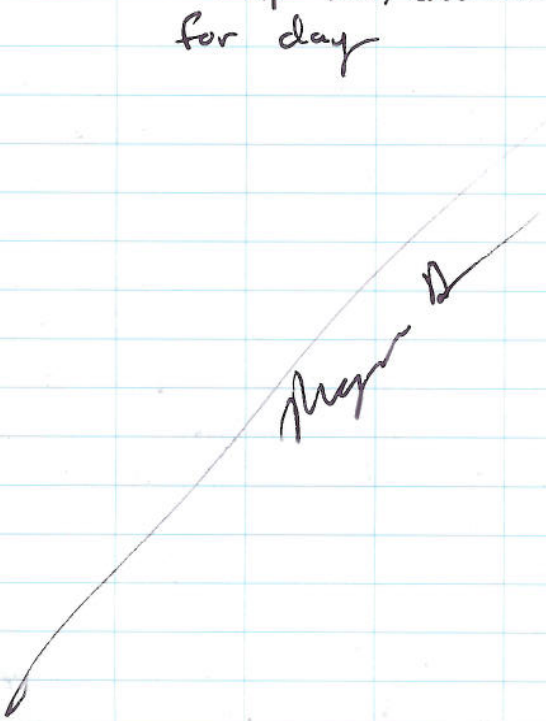
71.35 - 73.76: medium to strong response

1615 Record actual GPS coordinates
Northing = 229777.44
Easting = 1229039.10

1620 Mobe to decon pad to decon gator

1625 Mobe to office trailer to transfer LIF logs, email daily report, etc.

1700 Lock up site, activate alarm, depart for day



Location Wyckoff Date 1/18/13

Project / Client USEPA

Conditions: ~36°F, foggy
Personnel: M Bruno / PDT
N Badan / SEA
A Jensen / E&E
J Reeve / E&E
Objective: E&E to grout boreholes; CH2M to continue salinity measurements

0715 Mark stakes for additional secondary borehole locations

0740 Stake locations 2013T-019 through 2013T-026 & 2013T-046

0810 N Badan arrives on site

0820 Mobe to plant to assist Nicole — see salinity profiling log book.

1220 Lunch

1250 Work on accruals tracking sheet, daily report, etc.

1330 Check in w/ E&E - having trouble grouting holes, particularly 2013T-045. Seems to be a 'void' there that is sucking up a lot of grout.

1445 Check in with Keith - says he will stay on site until E&E finishes & locks up

1500 Depart from site

Location Wyckoff Date 1/21/13

Project / Client USEPA

Conditions: ~36° F, foggy

Personnel: M Bruno / PDX

T Olsonawski / Dakota

A Jensen / E&E

J Reeve / E&E

Objective: Continue TarGOST probing - finish sheet pile locations & move on to secondary locations

0700 Arrive onsite. T Olsonawski arrives onsite

Calibrate MultiRAE PID #C102629

Fresh air cal: Pass

O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOC = 0.0

100 ppm Isobutylene = 100.2 ppm

Lot: LTH072-RR-CM Exp: 8/15

Span cal Lot = IAM-413-18-18 Exp: 11/13

O_2 = 18.0 CO = 51 LEL = 49 H_2S = 10.2

0725 A Jensen arrives onsite

0755 J Reeve arrives onsite

0800 H&S tailgate - complacency, body position, PPE.

0805 Mobe to 2013T-039 & begin setup

0820 Begin probing @ 2013T-039

0900 Refusal @ 70.46' bgs. Drillers pull tooling

Results:

— MB —

Location Wyckoff Date 1/21/13

Project / Client USEPA

22.75: weak response

59.5 - 60.5: weak response

61.0 - 63.0: medium response

66.0 - 67.0: weak response

0925 Record actual GPS coordinates

Northing = 229712.18

Easting = 1228961.56

0930 Move to 2013T-047 ~~& begin setup~~ MB

0935 Truck gets stuck. E&E mobes to decon area to get plywood.

1100 Truck unstuck. Move to 2013T-048 & begin setup.

1115 Begin probing @ 2013T-048

1120 Call R Healy & K Scheffler to discuss issues moving around site.

1155 Refusal @ 63.82. Drillers pull tooling

Results:

10.24 - 13.41: medium response

19.0 - 21.0: ~~medium~~ MB weak response

24.0 - 27.0: weak response

Record actual GPS coordinates

Northing = 229709.83

Easting = 1229147.56

1210 Lunch

— MB —

Location Wyckoff Date 1/21/13

Project / Client USEPA

1245 E&E loads more plywood in EPA truck CH2M stakes locations 34 & 37.

1300 Recalibrate MultiRAE & check tanks w/ Stan

1305 E&E moves rig to 2013T-047 & begins probing.

1320 Cap stuck on rod. TD = 17.89' Can't get cap free. Pull rod from borehole.

1410 Move rig slightly - begin probing attempt #2 on 2013T-047

1445 Refusal @ 75.61 ft bgs. Drillers pull tooling.

1450 Per email from J. Culley, borrow PID from Stan. Calibrate 100 isobutylene = 101 Lot: LTH072-RE-CM Exp: 8/15

1500 Record actual GPS coordinates of 2013T-047
Northing = 229728.10
Easting 1289095.17

1505 Rig moves to 2013T-037 on plywood "road" & begin setup

1530 Begin TarGost probing @ 2013T-037
Results from 2013T-047:
12.32 - 16.97: medium to strong response

—MB—

Location Wyckoff Date 1/21/13

Project / Client USEPA

20.90 - 22.5: weak response
64.0 - 69.0: weak response

1600 Refusal @ 57.90 ft bgs. Drillers pull tooling.
Results:
12.0 - 12.5: weak response
19.0 - 20.0: weak to medium response
56.25 - 57.5: strong response

1610 Record actual GPS coordinates
Northing: 229578.18
Easting: 1288958.33

1620 Mobe to decon pad to decon Gator, EPA pickup, J. Reeve personal vehicle.

1630 Mobe to field trailer to transfer LIF files, send daily report, etc.

1700 Depart from/ lock up site

Location Wyckoff Date 1/22/13

Project / Client USEPA

Conditions: ~33°F, foggy,

Personnel: M Bruno/PDX

T Olsonawski/Dakota

A Jensen/E&E

J Reeve/E&E

Objective: Continue TarGOST probing @ secondary locations

0715 Arrive onsite T Olsonawski arrives onsite

Calibrate MultiRAE PID

Fresh air cal = Pass

O_2 = 20.9 CO = 0 H_2S = 0.0 LEL = 0 VOC = 0.0

Span cal Lot # IAM-413-18-18 Exp = 11/13

O_2 = 18.0 CO = 50 H_2S = 10.4 LEL = 53

100 ppm Isobutylene =

Lot # LTH072 - ~~CM RR~~ MB RR-CM Exp = 8/15

0725 Calibrate Stan's PID ~~to~~ MB Fresh air = 0 ppm

100 ppm Isobutylene = 108 ppm

Same isobutylene cal gas as above

0730 A Jensen arrives onsite

0740 Print Revised proposed borehole Location chart w/ silt & glacial till depths

0755 Load equipment into Gator

0800 J Reeve arrives onsite

0805 H&S tailgate - ergonomics & proper lifting while moving plywood sheets

-MB-

Location Wyckoff Date 1/22/13

Project / Client USEPA

0820 Begin probing replicate boring @ 2013T-037R ~3ft from original boring

0845 Refusal @ 55.43 ft bgs. E&E pulls tooling.

Results: 51.27-53.68 - weak response

0900 Record actual GPS coordinates

Northing = ~~122~~ MB 229575.82

Easting = 1228953.17

0905 Move rig to 2013T-025 & begin setup

~~Begin probing @ 2013T-025~~ MB

0915 Rock between dualies on left rear of drill rig truck moves & breaks valve stem off outer tire. Tire goes flat. A. Jensen calls repair truck to come out & replace.

0925 Begin probing @ 2013T-025

0930 Refusal @ 11.86 ft bgs. E&E pulls tooling

0940 Rig pulled forward ~3 ft for atempt #2

0945 Probing begins @ 2013T-~~20~~ MB 025

-MB-

Location Wyckoff Date 1/22/13

Project / Client USEPA

attempt #2

1000 Kira Lynch arrives on site

1010 Refusal @ 53.22 ft bgs. E&E pulls tooling. Results:
15.5 - 18.0 : weak response
20.5 - 21.5 : weak response
21.5 - 22.5 : strong response
23.5 - 25.0 : weak response
25.5 - 27.0 : weak response
43.5 - 45.0 : weak response

1025 Record actual GPS coordinates
Northing = 229560.97
Easting = 1229000.89

1025 Kira departs to talk to Stan RE: H_2S readings

1030 E&E removes tire from rig truck

1045 Mobe to decon pad. E&E decons tire.

1050 J Reeve mobes to take tire to repair shop.

1100 Lunch

1130 New MultiRAE has arrived onsite. Calibrate with cal gas (pg 26)
Fresh air O_2=20.9 VOC=0 H_2S=0 CO=0 LEL=0
Span cal O_2=18.0 H_2S=10 CO=50 LEL=49
VOC= 99.7 ppm

Location Wyckoff Date 1/22/13

Project / Client USEPA

1150 Pack old MultiRAE & MiniRAE up for return to DWH.

1200 E&E arrives back onsite w/ replacement tire & eat lunch.

1230 Mobe back to rig. E&E puts tire back on - Les Schwab in Poulsbo replaced valve stem.

1240 Mobe to 2013T-024 & begin setup.

1250 Begin probing @ 2013T-024

1315 Refusal @ 45.54 ft bgs. E&E pulls tooling.
Results:
38.91 - 41.13 : strong response
42.8 - 44.0 : strong response

1330 Record actual GPS coordinates
Northing = 229467.35
Easting = 1228919.87

1335 Move to 2013T-046 using plywood "road" & begin setup

1350 Begin probing @ 2013T-046

1405 Refusal @ 43.65 ft bgs E&E pulls tooling.
Results - 21.5-23.0: weak response

— MB —

26.95-40.83: medium to strong response.

1425 Record actual GPS coordinates
Northing = 229477.18
Easting = 1228827.66

1430 Move rig on plywood 'road' to 2013T-034

1435 Gator trailer tips over on side slope.
Dakota & E&G reload rod onto trailer

1450 Set up on 2013T-034

1455 Begin probing @ 2013T-034

1525 Refusal @ ~~62.~~ 64.28 ft bgs. E&G pulls tooling
Results: 11.55-22.56: strong response
26.5-27.5 weak response
28.5-29.0: medium response
29.5-30.0: medium response
30.2-31.0: medium response
33.5-34.5: strong response
49.30-54.94: medium to strong response

1535 Record actual GPS coordinates
Northing = 229630.64
Easting = 1229108.96

1540 Move to 2013T-026 & begin setup

1545 Begin probing @ 2013T-026

1610 Refusal @ 48.61 ft bgs. E&E pulls tooling

—mj—

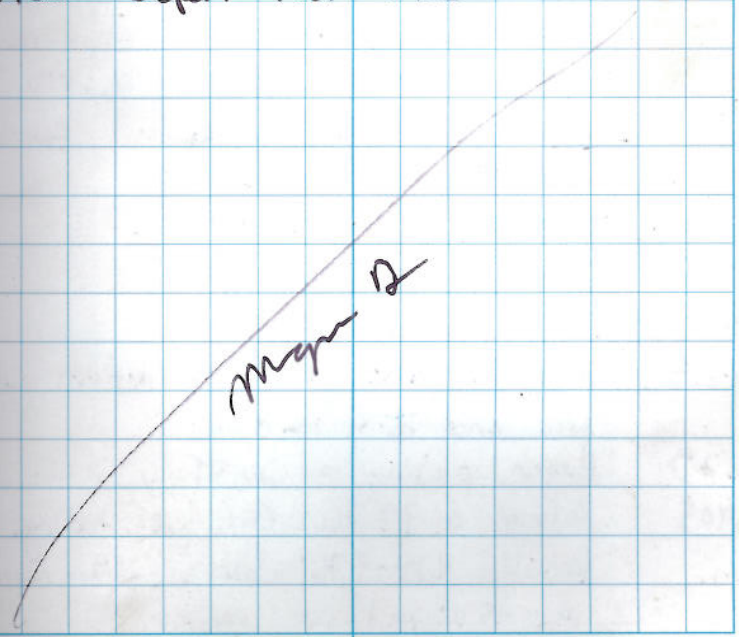
Results: 18.19-20.24 = strong response
20.5-24.5: weak response
33.09-40.02: medium response
40.5-43.0: strong response

1625 Record actual GPS coordinates
Northing = 229573.73
Easting = 1229072.14

1630 Mobe to decon pad to decon Gator

1635 Mobe to field office to transfer
HSE files, send daily, etc.

1700 Depart from site



Location Wyckoff Date 1/23/13

Project / Client US EPA

Conditions: ~43°F, overcast

Personnel: M Bruno / PDT
T Olsonawski / Dakota
A Jensen / E&E
J Reeve / E&E

Objective: Continue TarGOST probing @ secondary borehole locations

0700 Arrive onsite. T Olsonawski arrives onsite

0705 Calibrate PID - MultiRAE

Fresh air cal:

O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOC = 0.0

Span Cal. Lot = IAM-413-18-18 Exp = 11/13

O_2 = 18.0 CO = 50 LEL = 49 H_2S = 10

VOC span cal. Lot = LTH078-RR-CM Exp = 8/15

VOC = 99.8

0730 A Jensen arrives onsite

0800 J Reeve arrives onsite

0805 Mobe to 2013T-032

0815 H&S tailgate - slick conditions, work pace once rain starts

0825 Begin probing @ 2013T-032

0905 Refusal @ 79.70. E&E pulls tooling.

Results: 9.22-9.76: weak to medium response

14.0-15.0: medium response

-MB-

Location Wyckoff Date 1/23/13

Project / Client USEPA

20.5-22.0: strong response

23.19-24.47: strong response

34.5-36.0: weak response

65.0-66.0: weak response

0920 Record actual GPS coordinates

Northing = 229657.29

Easting = 1229305.03

0925 Move to ~~2013T-031~~ 2013T-010.

Move 2013T-010 to midway between 2013T-011 & 2013T-036 per R Healy

0925 R Healy arrives onsite

0930 Begin probing @ 2013T-010

1030 Finish probing @ 2013T-010 @ 81.43 ft bgs. Not refusal, but getting close to estimated bottom of aquitard & don't want to drill through. E&E pulls tooling.

Results: 22.0-24.0: weak response

26.0-27.0: weak response

27.0-28.0: medium response

36.0-40.0: weak response

1045 Record actual GPS coordinates

-MB-

Location Wyckoff Date 1/23/13

Project / Client USEPA

Northing = 229476.00
Easting = 1229400.49

1050 Move to 2013T-036 & begin setup
1100 Begin probing @ 2013T-036
1145 Refusal @ 85.31 ft bgs. GtG pulls tooling & transfers to new red rack on front of Gator.
Results: 14.0-21.0: medium response
35.0-36.0: weak response
75.5-77.0: weak response
1200 Record actual GPS coordinates
Northing = 229573.88
Easting = 1229371.19
1250 Finish loading rod on new rack.
Lunch
1320 Move to 2013T-033 & begin setup
1345 Begin probing @ 2013T-033
1420 Refusal @ 67.02 ft bgs. GtG pulls tooling.
Results: 8.0-12.5: weak response
18.0-21.0: weak response
21.0-23.0: medium response
27.0-28.0: medium response
42.0-42.5: weak response

-MB-

Location Wyckoff Date 1/23/13

Project / Client USEPA

62.0-63.0: strong response
1425 Rob Healy departs & remote
1435 Record actual GPS coordinates
Northing = 229676.00
Easting = 1229227.35
1440 Move to 2013T-019 & begin setup
1445 Begin probing @ 2013T-019
1500 Refusal @ 29.91 ft bgs. GtG pulls tooling.
Results = 16.5-18.0: strong response
18.0-20.0: medium response
20.0-22.0: strong response
22.0-24: medium response
25.5-26.5 medium response
1510 Record actual GPS coordinates
Northing = 229338.57
Easting = 1228930.37
1515 Move to 2013T-013 & begin setup
1520 Begin probing @ 2013T-013
1550 Finish probing @ 49.77 ft bgs. Not @ refusal, but nearing estimated bottom of aquitard. GtG pulls tooling
Results: 8.0-10.0: weak response

-MB-

Location Wyckoff Date 1/23/13

Project / Client USEPA

11.0-13.0: weak response
47.0-48.0: weak response

1600 Record actual GPS coordinates
Northing = 229238.14
Easting = 1229415.47

1605 Mobe to decon pad to decon Gator & drill rig.

1610 Take MultiRAE to Stan for H_2S monitoring. Move to field trailer to transfer LIF logs, send daily report, etc.

1625 Stan returns MultiRAE
Depart from site

Location Wyckoff Date 1/24/13

Project / Client USEPA

Conditions: ~40°F, overcast
Personnel: M Bruno/PDT
T Olsonawski/Dakota
A Jensen/E&E
J Reeve/E&E
Objective: Continue TarGOST probing @ secondary borehole locations

0700 Arrive onsite. T Olsonawski arrives onsite

0710 Calibrate MultiRAE PID. Fresh air:
O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOC = 0.0
Span cal Lot: IAN-413-18-18 Exp 11/13
O_2 = 18.0 CO = 50 LEL = 49 H_2S = 10
Span cal VOCs Lot: LTH072-RR-CM Exp 8/15
VOCs = 100

0735 A Jensen arrives onsite

0740 A Jensen departs w/ drilling to fill w/ diesel

0745 Mobe to PS area to stake accessible locations for 2013T-014 & 2013T-018. Send email to K Scheffler about access issues

0800 J Reeve arrives onsite

-MB-

Location Wyckoff Date 1/24/13

Project / Client USEPA

0815 A Jensen arrives back onsite w/ drill rig

0825 T Olsonawski finishes water-proofing modifications to Gator

0830 Discuss starting @ 2013T-014 inside Pilot study (PS) area. E&E informs me their locator did not clear PS area & they aren't comfortable drilling in that area. Move to revised 2013T-018 location just West of sheet pile wall (outside PS area).

0835 Truck gets stuck

0850 Truck unstuck. Begin setup at 2013T-018 ~~Begin probing @ 2013T-018~~ (MB)

0855 H&S Tailgate - walking, driving around interior of site w/ obstructions, foundations etc.

~~0855~~ (MB) 0900 Begin probing @ 2013T-018.

0910 Refusal @ 29.07 ft bgs. E&E pulls tooling.

Results: 11.5-12.5: ~~weak~~ medium response

13.0-14.0: strong response

16.0-17.0: weak response

18.0-19.0: strong response

- MB -

Location Wyckoff Date 1/24/13

Project / Client USEPA

21.64-24.0: strong response

24.0-25.0: medium response

0915 Record actual GPS coordinates

Northing: 229326.95

Easting: 1228998.40

0920 Move to 2013T-049 (west side of gravel foundation on SE corner of site) & begin setup. Concern about stand ~~pipe~~ pipe (MB) Consult w/ Stan about ~~pipe~~ (MB) piping / utility layouts near gravel pad. Stan informs us there is electrical & piping running along west side of gravel pad. Move to south side of gravel pad & set up. Calling it 2013T-050

1005 Begin probing (MB) 2013T-050

1030 Finish drilling @ ~~39.70~~ 37.31 ft bgs

Not @ refusal, but stopped based on estimated (interpolated) bottom of aquitard. E&E pulls tooling.

Results: No responses above background.

1040 Record actual GPS coordinates

- MB -

Location Wyckoff Date 1/24/13

Project / Client USEPA

Northing = 229065.17
Easting = 1229420.59

1045 Move to 2013T-051 (East side gravel pad) & begin setup.

1050 Begin probing @ 2013T-051

1055 A Jensen hears back from Renee - drill rig truck will be going in to shop on Friday after workday is complete to get looked at. Transmission is making noises.

1115 Stop drilling @ 47.99 ft bgs. Not refusal, but close to estimated bottom of aquitard. E&E pulls tooling.

Results: 7.0-7.5: Weak response

(MB)

1125 Record actual GPS coordinates
Northing = 229150.35
Easting = 1229467.62

1130 Move to 2013T-030 & begin setup

1135 Begin probing @ 2013T-030

1225 Refusal @ 73.33 ft bgs. E&E pulls tooling.

Results: 6.0-12.0: weak response
12.0-14.0: strong response

— MRB —

Location Wyckoff Date 1/24/13

Project / Client USEPA

18.0-19.5: Weak response
30.5-33.0: weak response
67.0-68.0: weak response

1240 Record actual GPS coordinates
Northing = 229550.35
Easting = 1229294.05

1245 Lunch

1315 Move to 2013T-027 & begin setup

1335 Begin probing @ 2013T-027

1405 Refusal @ ~~53~~ (MB) 54.13 ft bgs. E&E pulls rods.

Results: 3.5-4.0: medium response
8.5-14.0: weak response
17.0-19.0: weak response
25.0-26.0: weak response
38.0-39.5: strong response
43.0-44.5: strong response
49.0-49.5: medium response
50.3-51.0: strong response

Record actual GPS coordinates
Northing = 229581.87
Easting = 1229186.02

1415 Drill rig moves ~2 ft to do duplicate boring @ 2013T-027R

— MRB —

Location Wyckoff Date 1/24/13

Project / Client USEPA

1420 Begin boring @ 2013T-027R

1450 Refusal @ 60.73 ft bgs. Ext & pull tooling.

Results:

3.0 - 15.0: medium response

17.5 - 19.0: strong response

21.5 - 22.0: weak response

28.0: medium response

34.5 - 35.5: strong response

43.0 - 44.0: medium response

44.5 - 45.0: strong response

46.0 - 46.5: medium response

47.5 - 49.5: weak response

1500 Record actual GPS coordinates

Northing = 229578.02

Easting = 1279184.79

1505 Move to 2013T-031 & begin setup

1510 Begin probing @ 2013T-031

1550 Refusal @ 76.51 ft bgs. Ext/pull tooling

Results: 12.0-13.0: medium response

13.0 - 15.0: strong response

18 - 19.5: weak response

33.0-35.0: medium response

-MB-

Location Wyckoff Date 1/24/13

Project / Client USEPA

1600 Record actual GPS coordinates

Northing = 229610.57

Easting = 1279329.06

1605 Move to decon pad to decon Gator/rods

1610 Move to field trailer to transfer LIF logs, send daily report, etc.

1645 Depart from site



Location Wyckoff Date 1/25/13

Project / Client USEPA

Conditions: ~44°F, overcast

Personnel: M Bruno / PDX

T Olsonawski / Dakota

A Jensen / E&E

J Reeve / E&E

Objective: Continued TarGOST probing @ secondary locations

0715 Arrive onsite, T Olsonawski arrives onsite

0720 Calibrate MultiRAE PID

Fresh air O_2=20.9 CO=0 H_2S=0 LEL=0 VOC=0.0

Span Cal Lot=1AM-4/3-18-18 Exp=11/13

O_2=18 CO=49 LEL=50 H_2S=10

VOC span cal Lot=LTH072-RR-CM Exp=8/15

VOC=100.1

0730 A Jensen arrives onsite

0740 Print map of new boring locations

0800 Mobe to 2013T-020 on plywood "road" & begin setup.

0815 J Reeve arrives onsite

0830 H&S tailgate - Friday! Complacency, appropriate work pace - no rushing

0840 Begin probing @ 2013T-020

0900 Refusal @ 32.65 ft bgs. E&E pulls tooling.

— MB —

Location Wyckoff Date 1/25/13

Project / Client USEPA

Results: 12.5-13.75: strong response

15.4-16: medium response

17.5-18.5: medium response

20.0-21.0: medium response

26.0-27.5: medium response

27.5-28.0: strong response

28.5-30.5: strong response

0905 Record actual GPS coordinates

Northing=229379.40

Easting=1228990.66

0910 Move to 2013T-017 on plywood "road"

0940 Begin setup on 2013T-017. Talk to Keith RE: hose running from PW-1 to plant & accessing 2013T-016. Keith comes out to disconnect hose & roll up out of way.

0945 Begin probing @ 2013T-017

1005 Refusal @ 32.86 ft bgs. E&E pulls tooling.

Results: 5.5-7.0: weak response

8.5-9.5: medium response

11.0-12.0: medium response

15.0-15.5: medium response

16.0-16.8: strong response

— MB —

Location Wyckoff Date 1/25/13

Project / Client USEPA

18.0 - 20.0': medium response
22.0 - 23.0: weak response
24.5 - 25.5: medium response
25.5 - 27.0: medium response
29.0 - 30.5: medium response

1010 Record actual GPS coordinates
Northing = 229394.86
Easting = 1229056.18

1015 Move to 2013T-016 on plywood "road" & begin setup

1020 Begin probing 2013T-016
Refusal @ 1.5 ft bgs. Tooling pulled by E&E. Rig moved ~2 ft & attempt #2 lined up.

1025 Begin probing attempt #2 @ 2013T-016

1030 Refusal @ 1.23 ft. E&E pulls tooling.

1035 Move rig ~ 2' for attempt #3
Begin probing attempt #3 @ 2013T-016

1100 Refusal @ 3rd 40.83 ft bgs. E&E pulls tooling.
Results: 1.5 - 2.0: weak response
7.0 - 9.5: weak response
9.5 - 10.0: strong response
10.0 - 11.5: weak response

— MJ —

Location Wyckoff Date 1/25/13

Project / Client USEPA

13.0 - 14.5: medium to strong response
20.5 - 21.0: medium response
24.5 - 26.0: strong response
34.0 - 35.5: medium to strong response

1105 Record actual GPS coordinates
Northing = 229412.29
Easting = 1229136.20

1110 Move to 2013T-060 & begin setup

1115 Begin probing @ 2013T-060

1130 Refusal @ 24.43 ft bgs. E&E pulls tooling.
Results: 9.0 - 9.5: medium response
16.0 - 16.5: weak response
19.5 - 20.0: weak response
20.5 - 21.0: weak response
21.0 - 21.5: medium response
21.5 - 24.5: weak response

1135 Record actual GPS coordinates:
Northing = 229280.13
Easting = 1228959.25

1135 Move to 2013T-059 & begin setup

1140 Begin probing @ 2013T-059

1150 Refusal @ 28.31 ft bgs. E&E pulls tooling

— MJ —

Location Wyckoff Date 1/25/13

Project / Client USEPA

Results: 16.0-16.5: weak response
18.0-19.0: weak response
20.0-21.0: strong response
22.0-23.0: weak response
24.0-25.0: medium response
24.0-26.0: weak response

1200 Record actual GPS coordinats
Northing: 229316.92
Easting: 1228911.50

1205 Lunch

1240 Move to 2013T-058 & begin setup.

1255 Begin boring @ 2013T-058

1320 Refusal @ 35.42 ft bgs. E+E pulls tooling.

Results: 18.5-20.0: weak response
20.0-22.5: medium to strong response
26.5-29.0: weak response
29.0-29.5: strong response
29.5-32.5: medium response

1325 Record actual GPS coordinates
Northing: 229373.24
Easting: 1228848.90

1330 Move to 2013T-056 & begin setup

1335 Begin probing @ 2013T-056

—MB

Location Wyckoff Date 1/25/13

Project / Client USEPA

1350 Refusal @ 37.02 ft bgs. E+E pulls rods.

Results: 15.3-16.5: medium response
21.15-22.5: strong response
22.5-24.0: medium response
24.0-26.0: weak response
31.0-34.10: strong response

1355 Record actual GPS coordinates
Northing = 229417.22
Easting = 1228879.73

1355 Move drill rig ~ 2', drill duplicate @ 2013T-056R

1400 Begin probing @ 2013T-056R

1420 Refusal @ 2' 36.92 ft bgs. E+E pulls tooling.

Results: 18.75-19.5: medium (MB sig) response
19.5-20.5: strong response
20.5-23.0: medium response
23.0-25.0: weak response
31.45-34.11: medium to strong response

1425 Record actual GPS coordinates:
Northing: 229418.92
Easting = 1228878.11

1430 Move to 2013T-052 & begin setup

—mb—

Location Wyckoff Date 1/25/13

Project / Client USEPA

1445 ~~1435~~ Begin probing @ 2013T-052

1525 Refusal @ 70.27 ft bgs. E+E pulls tooling. 18.0 - 21.0

Results: ~~19.0 - 20.5~~: weak response

21.5 - 24.5: medium response

28.0 - 30.0: weak response

31.0 - 32.5: weak response

33.0 - 34.0: medium response

36.0 - 37.0: medium response

58.5 - 61.0: weak response

62.0 - 64.0: weak response

1540 Record actual GPS coordinates

Northing = 229675.86

Easting = 1229250.87

1545 Mobe to decon pad to decon Gator, rods, & drill rig truck.

1550 Mobe to field office to transfer 4F files, send daily report, etc.

1615 E+E departs from site with drill rig to take to shop

1645 Try to depart from site - Notice GPA pickup is still here. Try to contact A Jensen & Renee to see if A Jensen is returning to site tonight

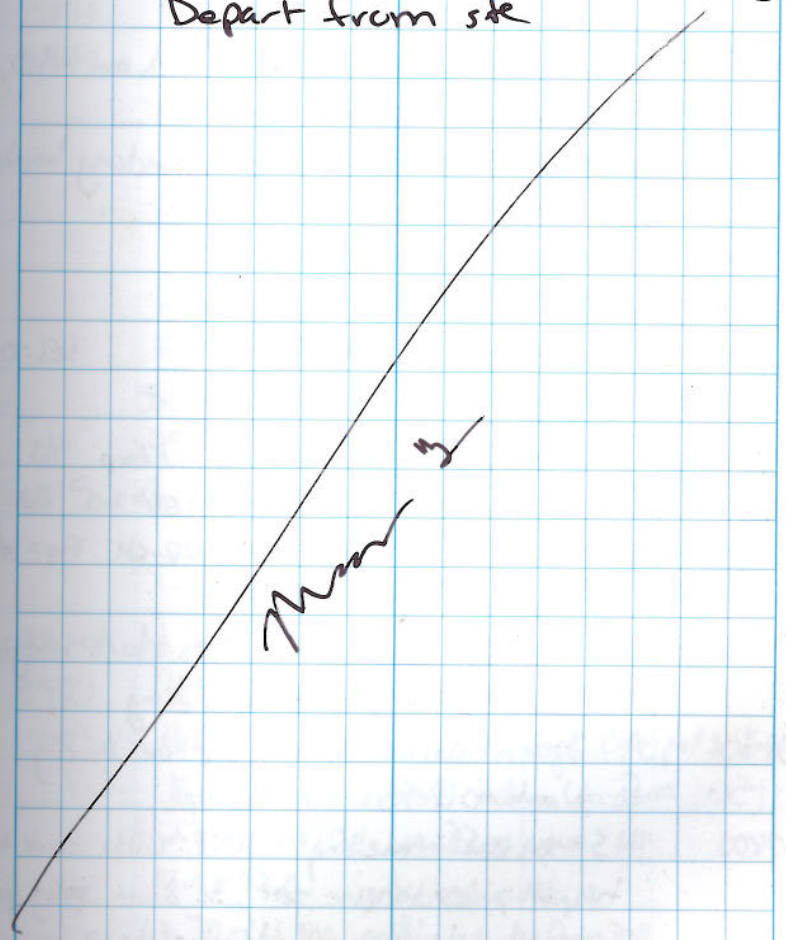
— mg

Location Wyckoff Date 1/25/13

Project / Client USEPA

Can't get in touch with anyone from E+E. Decide to wait & see if A Jensen returns

1720 Decide A Jensen is not returning Depart from site



Location Wyckoff Date 1/28/13

Project / Client USEPA

Conditions: ~38°F, overcast

Personnel: M Bruno / PDT
T Rudolph / Dakotte
A Jensen / E&E
E Nuchims / E&E

Objective: - Get new personnel oriented on H&S requirements / procedures
- Continue probing @ secondary borehole locations

0645 Arrive onsite
Calibrate MultiRAE PID
Fresh air: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0 VOC = 0.0
Span cal Lot: IAM-413-18-18 Exp 11/13
O_2 = 17.9 CO = 50 LEL = 50 H_2S = 9
VOC span cal Lot = LTH-072-RE-CM Exp = 8/15
VOC = 99.9

0730 T Rudolph arrives onsite & starts readying TarGost unit/ATV for day

0730 A Jensen arrives onsite w/ drill rig

0750 E Nuchims arrives onsite

0800 H&S kickoff meeting - HASP, COCs, route to hospital, exclusion zone & decon policy / procedures
T Rudolph lets us know he is on Coumadin (blood thinner) & emergency responders should be notified if anything happens to him.

0820 Move to 2013T-053 & begin setup

0830 Begin probing @ 2013T-053

0900 Refusal @ 54.95 ft bgs. E&E pulls tooling.
Results: 1.5-2.5: medium response
9.5-11.0: strong response
17.0-18.0: weak response
21.0-22.5: strong response
28.5-29.5: ~~medium~~ weak response
33.5-34.5: medium response
45.70-50.0?: strong response

0915 Record actual GPS coordinates
Northing: 229592.33
Easting: 1229155.49

0920 Move to 2013T-055 & begin setup

0930 Begin probing @ 2013T-055

1005 Refusal @ 69.57 ft bgs. E&E pulls tooling
Results: 21.0-22.0: medium response
27.0-28.0: weak response
51.0-52.0: weak response
62.70-64.10: medium response

— MB —

Location Wyckoff Date 1/28/13

Project / Client USEPA

— MB —

Location Wyckoff Date 1/28/13

Project / Client USEPA

1020 Record actual GPS coordinates
Northing = 229729.88
Easting = 1228992.02

1045 E&E builds plywood 'road' to drive truck to 2013T-054

1100 Begin setup @ 2013T-054

1105 Begin probing @ 2013T-054

~~1105~~ (MB) 1130 Refusal @ 59.56 ft bgs. E&E pulls tooling

1130 Results: 14.5 - 16.5: weak response
28.5-29.5: weak response
35.5-38.0: weak response
45.0-46.0: weak response
49.5-50.5: medium response
55.03-58.07: weak response

1150 Record actual GPS coordinates
Northing = 229671.93
Easting = 1229058.97

1155 Move drill rig on plywood 'road' to main road

1200 Lunch

1220 Mobe to 'clean' part of exclusion zone to users drilling access to 2013T-057

1230 A Jensen comes out to assess accesibility

1240 Decon drill rig & gator

1240 Print map of new boreholes 2013T-061,

Location Wyckoff Date 1/28/13

Project / Client USEPA

2013T-062, 2013T-063

1300 Move to 2013T-057. Truck can not make it up slope to approach 2013T-057 from west.

1320 Move to 2013T-062 & begin setup

1325 Begin probing @ 2013T-062

1330 BZ air monitoring:

(MB) ~~1330~~ O_2=20.9 CO=0 VOC=0.0 H_2S=0 LEL=0

1410 Refusal @ 51.57 ft bgs. E&E pulls tooling. BZ: O_2=20.9 CO=0 VOC=0.0 LEL=0 H_2S=0

Results: 10.82 - 16.29: strong response
21.35 - 22.48: strong response
25.5 - 26.5: medium response
28.67 - 29.26: strong response
38.0 - 39.5: weak response

1420 Record actual GPS coordinates
Northing = 229648.53
Easting = 1229157.93

1425 Move to 2013T-061. Truck gets stuck. Make plywood 'road'

1530 Arrive @ 2013T-061 & begin setup

1535 Begin probing @ 2013T-061

1540 ~~BZ~~ (MB) Multi RAE battery dies

- MB -

Location Wyckoff Date 1/28/13

Project / Client USEPA

Discuss issue with MultiRAE holding charge with J Culley. Email T Foxworthy RE: the MultiRAE issue and/or getting a replacement.

1550 J Culley asks about boring GDP-003. Located within 5 ft of transducer cable trench. Culley states we can't drill within 5 ft of underground utility without uncovering it, & then have to stay at least 2 feet from utility. Acknowledge information, inform Culley the boring is from a previous event @ the site.

1610 Refusal of SB3T-061 @ 64.06 ft bgs E&E pulls tooling.

1625 Record actual GPS coordinates

Northing = 229689.82

Easting = 122 9094.79

Results: 10.03 - 13.65: medium raponse

24.5 - 25.5 : weak response

26.0 - 26.5 : weak response

43.5 - 44.5 : weak response

59.0 - 62.0 : weak response

- mg -

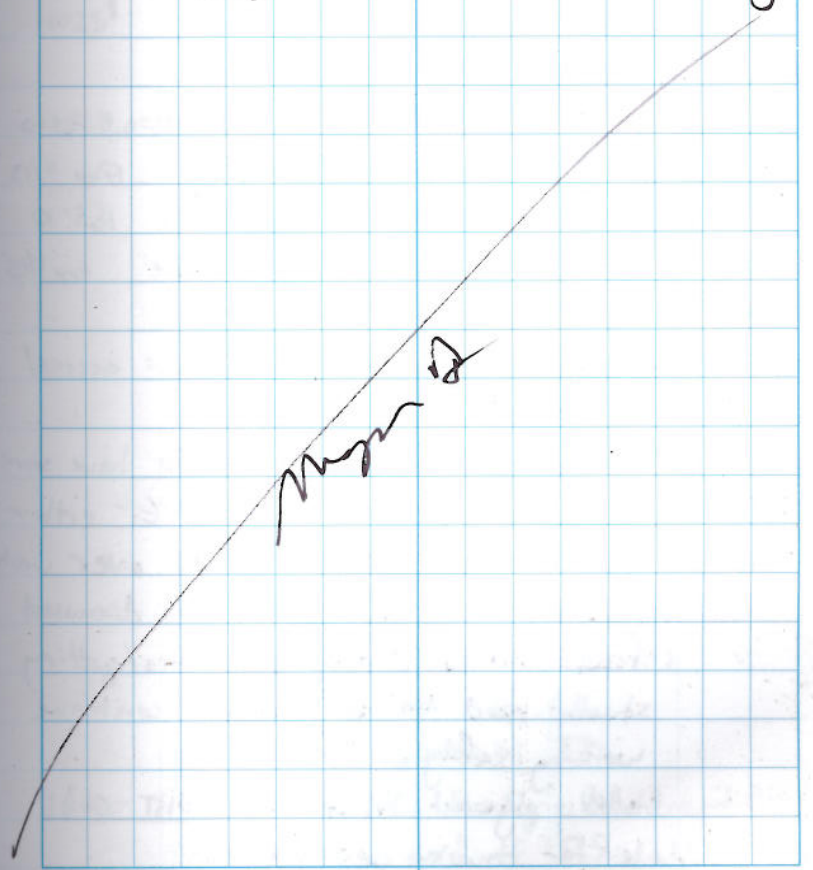
Location Wyckoff Date 1/28/13

Project / Client USEPA

1630 Mobe to decon pad to decon Gator & rods

1640 Mobe to field office to transfer LIF logs, send daily report, etc.

1725 Depart from site & set alarm system



Location Wyckoff Date 1/29/13

Project / Client USEPA

Conditions: ~40 °F, overcast

Personnel: M Bruno/PDT
T Rudolph/Dakotas
A Jensen/E&E
E Nuchims/E&E

Objective: Continue TarGOST probing

0700 Arrive onsite

0705 Calibrate PID MultiRAE

Fresh air O_2=20.9 CO=0 LEL=0 VOC=0.0 H_2S=0

Span cal Lot: IAM-413-18-18 Exp 11/13

O_2: 18.0 CO: 50 LEL: 49 H_2S: 10

VOC span cal Lot: LTH079-CH-RR Exp 8/15

VOCs: 99.7

0800 Mobe to 2013T-063 & discuss access/approach

0810 H_2S tailgate - making sure to have some kind of clothing cover PPE - either rain suit, Tyvek, or overalls over work clothes in exclusion zone. Also discussed frustration w/ sloppy conditions/getting stuck - need to stay calm & continue working safely.

0815 Build plywood 'road' to 2013T-063 after truck gets stuck

- MB -

Location Wyckoff Date 1/29/13

Project / Client USEPA

0935 Arrive @ 2013T-063 & begin setup

0940 Begin probing @ 2013T-063

0945 B2 O_2: 20.9 LEL: 0 CO: 0
H_2S: 0 VOC: 0.0

1005 B2 O_2: 20.9 LEL: 0 CO: 0
H_2S: 0 VOC: 0.0

1025 B2 O_2: 20.9 LEL: 0 CO: 0
H_2S: 0 VOC: 0.0

1030 Refusal @ 74.65 ft bgs. E&E pulls tooling.

Results: 13.0-14.0: weak response
20.0-21.0: medium response
24.5-25.0: strong response
31.0-32.5: strong response
34.0-35.0: medium response
56.0-57.0: medium response
59.0-61.0: weak response
63.5-64.5: medium response
~~67.70-68.37~~ 66.0-68.37: strong response

Record actual GPS coordinates
Northing: 229736.66
Easting: 129221.32

1040 Speak with RC Healy about next location - N end of Foundation.

- MB -

Location Wyckoff Date 1/29/13

Project / Client USEPA

1100 Move rig on plywood 'road' to 2013T-064

1140 Begin setup @ 2013T-064

1145 Begin probing @ 2013T-064

1150 BZ: O_2 = 20.9 CO = 0 LGL = 0
H_2S = 0 VOC = 0.1

1200 BZ: O_2 = 20.9 ~~CO = 0~~ LEL = 0
H_2S = 0 VOC = 0.0

1220 BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOC = 0.0

1230 Refusal @ 63.90 ft bgs. E&E pulls tooling.
Results: 11.01 - 16.61: weak response
14.5 - 15.0: strong response
20.5 - 21.5: weak response

1240 Record actual GPS coordinates
Northing = 229760.41
Easting = 1229164.39

1245 Lunch

1315 Mobe to stake location of 2013T-065 colocated w/ SE. T Rudolph mobes to decon pad to refuel generator.

1330 Discuss next few borehole locations w/ R Healy

1345 Move drill rig to 2013T-065

-mg-

Location Wyckoff Date 1/29/13

Project / Client USEPA

1355 Begin setup @ 2013T-065

1400 Begin probing @ 2013T-065
BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0 VOC = 0.0

1430 BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOC = 0.0

1450 Refusal @ 69.02 ft bgs. E&E pulls tooling
Results: 11.02 - 12.02: medium response
15.43 - 16.61: strong response
21.0 - 22.0: strong response
24.5 - 25.5: strong response
63.82 - 65.48: medium response

1500 Record actual GPS coordinates
Northing = 229760.78
Easting = 1229089.94

1505 Mobe to field trailer to send map of proposed SW delineation locations to R Healy

1510 Move rig to 2013T-008

1520 Begin setup @ 2013T-008

1525 Begin probing @ 2013T-008

1530 BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOC = 0.0

1545 BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOC = 0.0

1550 Refusal @ 41.33 ft bgs. E&E pulls tooling
Results: 4.0 - 4.3: weak response

-mg-

Location Wyckoff Date 1/29/13

Project / Client USEPA

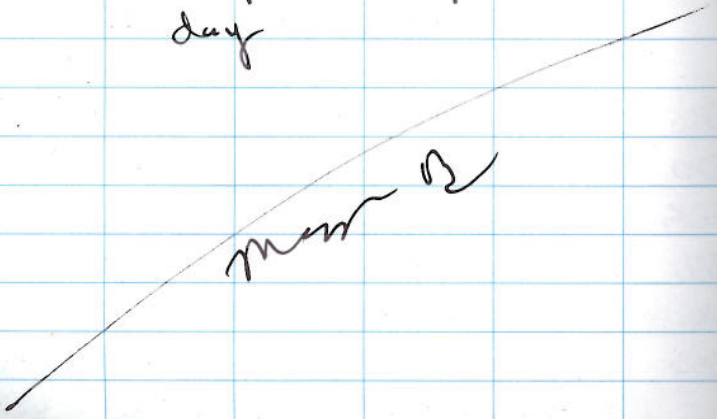
9.68 - 10.53: strong response
13.5 - 14.5: weak response
15.0 - 16.0: strong response
16.0 - 16.5: medium response
17.24 - 17.88: weak response
30.5 - 31.0: weak response
41.0 - 41.33: weak response

1600 Record actual GPS coordinates
Northing = 224345.88
Easting = 1229278.96

1605 Mobe to decon pad to decon gater & rods

1610 Mobe to field trailer to transfer HF files, send daily report/etc.

1700 Lock up site & depart from site for day



Location Wyckoff Date 1/30/13

Project / Client USEPA

Conditions: ~40°, foggy
Personnel: M Bruno / PDX
T Rudolph / Dakota
A Jensen / E&E
E Nachims / E&E

Objective: TarGOST probing, starting w/ new proposed locations in SW corner of site

0700 Arrive on site

0710 Calibrate MultiRAE PID/4 gas meter
Fresh air: O_2 = 20.9 LEL=0 CO=0 H_2S=0 VOC=0
Span cal: Lot = 1AM-413-18-18 Exp: 11/13
O_2 = 18.0 LEL = 49 CO = 50 H_2S = 10
Span cal - VOCs: Lot: LTH072-CM-RR Exp: 8/15
VOCs =

0715 T Rudolph arrives onsite. Ask him to double-check flash (thumb) drive since it wasn't working in my computer yesterday.

0730 A Jensen arrives onsite with more plywood to replace pieces that have gotten broken moving drill rig.

0740 T Rudolph can't get thumb drive to work either. He makes replacement

— MA

Location Wyckoff Date 1/30/13

Project / Client USEPA

thumb drive. Mobe to field trailer to send out LIF logs from yesterday.

0745 A Jensen decons drill rig

0755 E Nuchims arrives onsite

0800 H&S tailgate - slips, trips, & falls w/ all debris onsite

0810 Move to 2013T-069 & begin setup

0815 Pre-drill through asphalt with dummy probe to avoid breaking TarGOST head

0820 Begin probing @ 2013T-069

Bz: O_2 = 20.9 LEL=0 CO=0 H_2S=0 VOC= 0.0

0835 Refusal @ 25.74 ft bgs. E&E pulls tooling.

Results: 11.4-11.8: weak response

21.81-22.60: strong response

22.80-23.20: medium response

0840 Record actual GPS coordinates

Northing: 229268.58

Easting: 1228872.21

0845 Move to 2013T-068 & begin setup

0850 Pre-drill through asphalt with dummy probe to avoid breaking TarGOST head

0855 Begin probing @ 2013T-068

0900 Bz: O_2 = 20.9 CO:0 LEL:0 H_2S:0 VOC: 0.0

0915 Refusal @ 25.45 ft bgs. E&E pulls tooling.

-mb-

Location Wyckoff Date 1/30/13

Project / Client USEPA

Results: No responses above background

0925 Record actual GPS coordinates

Northing = 229239.16

Easting = 1228804.02

0925 Rig moves to 2013T-067 & begins setup

0930 Begin probing through asphalt with dummy probe to avoid breaking TarGOST head

0932 Begin probing @ 2013T-067

0935 Bz: O_2 = 20.9 CO = 0 LEL=0 H_2S = 0 VOC= 0.0

0940 Refusal @ 28.75 ft bgs. E&E pulls tooling

Results: 15.5-16.0: weak response

No other responses above background

0945 Record actual GPS coordinates

Northing = 229280.16

Easting = 1228763.09

0945 Drill rig moves to 2013T-066 & begins setup

0950 E&E begins drilling through asphalt with dummy probe

~~09~~ 1000 Begin probing @ 2013T-066

Bz: O_2 = 20.9 LEL= 0 CO = 0 H_2S = 0 VOC= 0.1

1010 Bz: O_2 = 20.9 LEL=0 CO=0 H_2S=0 VOC=0.0

1020 Refusal @ 32.75 ft bgs. E&E pulls tooling

Results: 16.98-17.78: medium response

-mb-

Location Wyckoff Date 1/30/13

Project / Client USEPA

21.5 - 22.5: weak response

1025 Record actual GPS coordinates
Northing = 229323.73
Easting = 1228809.98

1025 Move rig to 2013T-070 & begin setup

1030 E&E drills through asphalt with dummy probe

1035 Begin probing @ 2013T-070

1040 BZ: O_2=20.9 LEL=0 CO=0 H_2S=0 VOC=0.1

1050 Refusal @ 25.62 ft bgs. E&E pulls tooling
Results: 22.33 - 22.78: weak response
23.6 - 24.0: weak response

1055 Record actual GPS coordinates
Northing = 229281.61
Easting = 1228921.61

1100 Move to 2013T-071 & begin setup

1105 E&E drills through asphalt w/ dummy probe

1110 Begin probing @ 2013T-071

1115 BZ: O_2=20.9 LEL=0 CO=0 H_2S=0 VOC=0.0

1125 Refusal @ 17.44 ft bgs. E&E pulls tooling
Results: No response above background

1135 Record actual GPS coordinates
Northing = 229192.33
Easting = ~~1228492~~ 1228708.54

1140 Move drill rig to 2013T-028

— MR —

Location Wyckoff Date 1/30/13

Project / Client USEPA

1145 Lunch

1200 Weather change - foggy & misting rain

1215 Mobe to move 2013T-029 & 2013T-009 to be more centrally located between boreholes they are infilling

1225 Drill rig moves to 2013T-009 & begins setup

1235 Begin probing @ 2013T-009

1240 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC=0.0

1310 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC=0.0

1320 Refusal @ 60.19 ft bgs. E&E pulls tooling
Results: 9.10 - 10.86: medium to strong response
12.5 - 13.5: ~~strong response~~ medium response
14.0 - 16.0: medium response
16.67 - 17.82: strong response
24.0 - 28.0: weak response
31.0 - 31.5: weak response
Laser window was smashed upon retrieval. T Rudolph believes this occurred @ ~ ~~24~~ 28 ft bgs. T Rudolph tested std soln - response read as 69.3 % RE. Should have still picked up any thing present below this depth, the response would just have been

— MR —

dampened. Decide not to rerun this location based on consultation w/ T Rudolph.

1335 Record actual GPS coordinates
Northing = 229406.94
Easting = 1229347.02

1335 T Rudolph replaces laser window.

1335 Drill rig moves to 2013T-029 & begins setup

1350 Begin probing @ 2013T-029
BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1405 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1435 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1440 Refusal @ 61.78 ft bgs. E&E pulls tooling

Results: 5.50-6.70: mdium response
8.0-9.0: medium response
12.5-13.0: strong response
13.5-14.5: medium response
14.8-15.5: strong response
17.5-18.0: strong response
19.0-20.0: medium to strong response
21.0-21.5: strong response
26.0-28.0: medium to strong response
31.0-32.0: strong response

– MD –

1455 Record actual GPS coordinates
Northing = 229488.77
Easting = 1229305.75

1500 Move to 2013T-072 & begin setup

1505 Begin probing @ 2013T-072

1505 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

535 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1540 Refusal @ 50.39 ft bgs. E&E pulls tooling

Results: 12.89-14.14: medium response
15.5-16.0: medium response
16.97-17.66: strong response
38.61-41.77: strong response
43.78-47.34: medium to strong responses
48.0-49.0: medium response

1600 Record actual GPS coordinates
Northing = 229581.72
Easting = 1229079.96

1605 Mobe to decon pad to decon Geoprobe & rods

1610 Mobe to field trailer to transfer LIF logs, send daily report, etc.

1635 Lock up site & depart for day

MD

Location Wyckoff Date 1/31/13

Project / Client USEPA

Conditions: ~45° F, overcast

Personnel: M Bruno / IDX
T Rudolph / Dakota
A Jensen / ETE
E Nuchims / ETE

Objective: Continue TarGOST probing

0700 Arrive onsite

0705 Calibrate MultiRAE PID
Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S 0 VOC = 0.0
Span cal. Lot: 1AM-413-18-18 Exp 11/13
O_2 = 17.9 CO = 51 LEL = 50 H_2S = 10
VOC span cal Lot: LTH072-CM-RR
VOCs = 100

0715 T Rudolph arrives on site

0730 A Jensen arrives onsite

0750 E Nuchims arrives onsite

0755 While A Jensen to first 3 locations & discuss access options

0800 H_2S tailgate - Pinch points - on rig & while racking / unracking rods from rod rack

0805 Move to 2013T-022 & begin setup

0810 Begin probing @ 2013T-022

0815 0Z: O_2 = 20.9 LEL = 0 CO = 0 H_2S = 0 VOCs = 0.0

0830 Refusal @ 36.68 ft bgs. ETE pulls tooling

-MB-

Location Wyckoff Date 1/31/13

Project / Client USEPA

Results: 9.0 - 13.5: weak to medium response
15.8 - 17.5: medium response
19.4 - 20.0: strong response
20.6 - 21.2: strong response
27.0 - 27.5: weak response
29.2 - 29.8: medium response
30.5 - 30.8: strong response
31.56 - 33.03: strong response

0835 Record actual GPS coordinates
Northing = 229452.20
Easting = 1229142.80

0840 Move to 2013T-015 & begin setup

0845 Begin probing @ 2013T-015
0Z: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOCs = 0.0

0905 Refusal @ 35.79 ft bgs. ETE pulls tooling

Results: 7.0 - 12.0: weak response
13 - 13.5: medium response
18.5 - 19.0: weak response
22.0 - 23.0: weak response
24.5 - 25.0: weak response
27.39 - 28.52: strong response

0910 Record actual GPS coordinates
Northing = 229408.01
Easting = 1229191.48

-MB-

Location Wyckoff Date 1/31/13

Project / Client USEPA

0915 Move to 2013T-035 & begin setup

0920 Begin probing @ 2013T-035

BZ: O_2=20.9 LEL=0 CO=0 H_2S=0 VOCs=0.0

0935 BZ: O_2=20.9 LEL=0 CO=0 H_2S=0 VOCs=0.0

0945 Refusal @ 44.29 ft bgs. E&E pulls tooling

Results: 5.0-10.5: weak response

10.5-11.0: medium response

11.5-12.5: medium response

13.5-13.0: weak response

16.0-16.5: weak response

18.7-19.5: strong response

24.7-25.3: medium response

31.0-32.0: weak response

36.71-37.61: weak response

0950 Record actual GPS coordinates

Northing = 229439.30

Easting = 1229222.26

0955 Move to 2013T-002R & begin setup

1000 Begin probing @ 2013T-002R

BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1005 Weather change - raining & windy

1025 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1035 Rain stops

1050 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

-mb

Location Wyckoff Date 1/31/13

Project / Client US EPA

1105 Refusal @ 61.43 ft bgs. E&E pulls tooling

Results: 7.0-8.0: weak response

11.79-13.75: medium response

15.52-16.16: strong response

20.0-20.5: medium response

24.0-25.0: medium response

25.0-25.5: strong response

28.5-29.5: strong response

1120 Record actual GPS coordinates

Northing = 229364.04

Easting = 1229402.11

1125 Move drill rig to 2013T-074

1130 Lunch

1200 Begin setup @ 2013T-074

1220 Begin probing @ 2013T-074

BZ: O_2=20.9 LEL=0 CO=0 H_2S=0 VOCs=0.0

1225 E&E can't tilt rig enough due to sideslope. E&E pulls tooling, repositions rig.

1230 E&E gets call - drill rig is going in tomorrow evening (after work day) to get 6-wheel drive fixed.

1230 Begin probing @ 2013T-074

BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

-mb-

Location Wyckoff Date 1/31/13

Project / Client USEPA

0855	BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC_s=0.0
1300	Refusal @ 43.96 ft bgs. E+E pulls tooling
	Results: 6.64-9.36: weak to medium response
	13.55-14.71: weak response
1305	Record actual GPS coordinates
	Northing = 229260.03
	Easting = 1229352.90
1305	Move rig to 2013T-073 & begin setup
	E+E pre-bores through gravel with dummy rod to avoid breaking TarGOST head
1315	Begin probing @ 2013T-073
	BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC_s=0.0
1335	Refusal @ 24.92 ft bgs. E+E pulls tooling
	Results: 12.32-8.73: weak response
	No other responses above background
1340	Record actual GPS coordinates
	Northing = 229239.29
	Easting = 1229247.39
1345	Move to 2013T-036R & begin setup for replicate boring
1355	Begin boring @ 2013T-036R
1400	BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC_s=0.0
1425	BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC_s=0.0
155	BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC_s=0.0

-MB-

Location Wyckoff Date 1/31/13

Project / Client USEPA

1525	BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC_s=0.0
1535	Refusal @ 77.14 ft bgs. E+E pulls tooling.
	Results: 13.0-14.5: medium response
	35.47-36.60: weak response
	73.5-74.0: weak response
1555	Record actual GPS coordinates
	Northing = 229565.99
	Easting = 1229372.56
1600	Mobe to decon pad to decon Gator, rods, & drill rig in preparation for probing in SW corner of site.
1620	Finish decon'ing vehicles. Decide not enough time to finish both 2013T-075 + 2013T-068R. Want to complete both @ same time due to decon requirements. Decide to wait & complete tomorrow.
1625	Mobe to field office to transfer LIF logs, send daily report, etc.
16	Lock up & depart from site - set alarm upon leaving

Location Wyckoff Date 2/1/13

Project / Client USEPA

Conditions: ~46°F, cloudy

Personnel: M Bruno/PDT
T Rudolph/Dakoton
A Jensen / E&E
E Nuchims/E&E

Objective: Continue TarGOST probing

0710 Arrive onsite

0715 Calibrate MultiRAE PID
Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC=0.0
Span cal Lot = IAM-413-18-18 Exp 11/13
O_2=18.6 CO=50 LEL=50 H_2S=9
VOC Span cal Lot = LTH072-CM-RR Exp 8/15
VOCs = 100

0715 T Rudolph arrives onsite

0735 A Jensen arrives onsite.

0750 E Nuchims arrives onsite

0800 H&S tailgate - Friday! No rushing or complacency - need to keep working safely & diligently. Also reiterated slip/trip/fall hazards due to debris & dead brush on site.

0805 Move to 2013T-068R & begin setup for replicate boring.

0810 E&E pre-drills through asphalt w/ dummy probe

-MB-

Location Wyckoff Date 2/1/13

Project / Client USEPA

0820 Begin probing @ 2013T-068R

0825 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0
Refusal @ 25.22 ft bgs. E&E pulls tooling.
Results: 13.41-13.62: weak response
No other responses above background
Record actual GPS coordinates
Northing = 229239.22
Easting = 1228803.70

0845 Move to 2013T-076 & begin setup

0850 E&E pre-bores through rock w. dummy probe

0855 Begin probing @ 2013T-076

0900 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

0920 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

0940 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1000 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1015 Finish boring @ 83.46 ft bgs. Not refusal, but nearing estimated bottom of aquitard. E&E pulls tooling.
Results: 26.0-27.0: weak response
33.0-34.0: weak response
55.5-56.5: weak response
81.0-82.0: weak response

1035 Record actual GPS coordinates

-MB-

Location Wyckoff Date 2/1/13

Project / Client USEPA

Northing = 229521.83
Easting = 122 9384.43

1040 Move to 2013T-012 & begin setup

1045 E+E pre-probes through gravel w/ dummy probe

1050 Begin probing @ 2013T-012

1055 BZ: O_2 = 20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1115 BZ: O_2 = 20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1130 Refusal @ 57.17 ft bgs. E+E pulls tooling

Results: 8.3-9.5: ~~medium~~ weak response
9.73-10.36: medium response
10.36-17.0: weak response
17.0-17.5: medium response
19.5-20.5: weak response
29.0-30.0: weak response
49.5-51.0: weak response
54.5-55.5: weak response

1155 Record actual GPS coordinates
Northing: 229 314.20
Easting: 122 9402.27

1200 Lunch

1230 Conference call w/ Ko Scheffler / R. Healy / N. Badon RE: plan for next weeks visual confirmation

Location Wyckoff Date 2/1/13

Project / Client USEPA

borings. E+E drills & ropes new plywood sheets

1300 Move to 2013T-077 & begin setup

1310 Begin probing @ 2013T-077
Refusal @ 6.55 ft bgs. E+E pulls tooling, moves ~2 ft forward to try to get off rock.

1330 Begin probing attempt #2 @ 2013T-077

1335 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1340 Refusal @ 8.05 ft bgs. E+E pulls tooling, moves rig ~4' N.

1350 Begin probing attempt #3 @ 2013T-077

1355 BZ: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

1405 18.03 ft bgs - rod becomes so crooked it can't be pushed any farther. E+E pulls tooling.

1420 Tooling retrieved. 3 + 4' long rods + 1st 2' long rod bent.

1430 Mobe Gator to decon area + decon rods

1440 TarGOST head also bent. T Rudolph removes bent head + rod, replaces TarGOST head.

-mb-

Location Wyckoff Date 2/1/13

Project / Client USEPA

1455 Move rig ~15' to SE for probe attempt #4 @ 2013T-077

1500 E&E pre probes through gravel with dummy probe. Dummy probe bends @ ~2 ft bgs. E&E pulls tooling, moves rig ~ 5' to NW. Tries probing again with dummy probe - success to ~4' bgs. E&E pulls tooling.

1515 Begin probing attmpt #4@ 2013T-077

1520 BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOCs = 0.0

1540 BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0 VOCs = 0.0

1545 Finish probing @ 52.55 ft bgs - Not refusal, but getting close to estimated bottom of aquitard. ~~E&E pulls tooling~~.

Results: 12.0-12.5: strong response
13.0-13.5: strong response
14.8-15.5: medium response
16.0-16.5: weak response
18.5-20.0: weak response
22.5-23.5: weak response
26.5-28.0: weak response
29.0-29.5: weak response
49.0-49.5: weak response

While most rods were off rod rack,

— MJ —

Location Wyckoff Date 2/1/13

Project / Client USEPA

T. Rudolph decides to pull remaining strung rods off & string additional 4 rods on rack that were not previously strung.

1550 T Rudolph strings rods & reracks rods. E&E pulls tooling

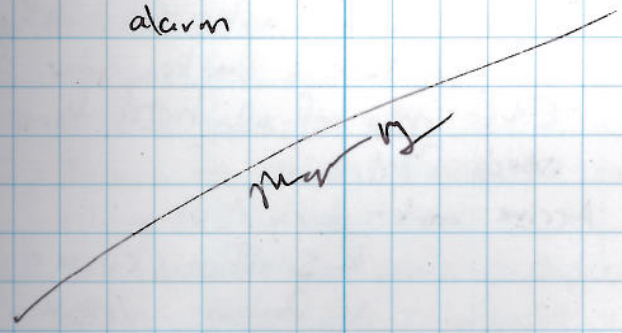
1605 Record actual GPS coordinates.
Northing = 229277.05
Easting = 1229451.89

1610 Mobe to decon pad to decon Gator/rods & drill rig.

1615 Mobe to field office to transfer LIF logs, send daily report, etc.

1640 A Jensen departs site with drill rig to get 6-wheel drive fixed.

1709 Depart from site - lock up & set alarm



Location Wyckoff Date 2/4/13

Project / Client USEPA

Conditions: ~45° F, cloudy

Objective: Visual confirmation logs / TarGost confirmation readings, + borehole grouting, & borehole surveying

0650 Arrive onsite.

0655 Calibrate MultiRAE PID

Fresh air: O_2=20.9 CO:0 LEL=0 H_2S:0 VOC:0.0

Span Cal Lot: IAM-413-18-18 Exp: 11/13

O_2: 17.9 CO = 50 LEL=49 H_2S:9

VOC span cal Lot: LTH073-RR-CM Exp 8/15

VOCs = 100

0710 Make map of boreholes that need grouted for E+E

0720 T Rudolph arrives onsite

0740 talk to T Rudolph about printing hard copies of missing LIF logs

0800 A Jensen arrives onsite w/ drill rig. 6-wheel drive is working now. Give E&E map of all holes that need filled.

0800 Arrive onsite - Kira / EPA

K Scheffler / CH2M

N Badon / CH2M

D. Williams / CH2M (Survey)

-mb-

Location Wyckoff Date 2/4/13

Project / Client USEPA

J. Taylor / CH2M (Survey)

E Nuchims / E+E

0805 H&S briefing w/ surveyors.

0810 Surveyors mobe to find control points.

0815 H&S briefing with Russel Neill + Sustar Graves / EPA - sonic rig

0830 Nicole Badon / CH2M takes over notes for rotosonic drilling. Morgan Bruno / CH2M escorts surveyors

*Note: Alan Jensen (E+E also on site 2/4/13) with Geoprobe direct push rig

1025 Mob rotosonic drilling supplies to 2013-SC-046 (Geoprobe 8140 DT sonic)

1050 Surveyors finished surveying, off site

1111 Mob to 2013-SC-046 to drill

1128 Start drilling. N. Badon / SEM and M. Bruno / PDX, oversight

1310 Drillers take lunch break

1412 Drillers back on site

1425 Return to 2013-SC-046 to resume drilling at 25' bgs

1440 Sand heaved into sonic casing over lunch, drillers trip casing out of borehole to clean out sand.

Nicole Badon 2/4/13

Location Wyckoff Date 2/4/13

Project / Client USEPA

1510 Run back in borehole with casing to 25' bgs

1600 Obtain sample 25' to 30'

1700 finished drilling to 42' bgs; encountered aquitard at 37' bgs

1710 Cleaning up site; loosing daylight so will log 40' to 42' sample core on 2/5/13

1725 Decon and doff PPE

1730 Drillers offsite

1745 Everyone off site. End of day

Nicole Badon 2/4/13

Location Wyckoff Date 2/5/13

Project / Client USEPA

Condition: ~44° F, overcast

Personnel: M Bruno/PID
N Badon/SEA
T Rudolph/Dakota
R Neill/EPA
J Graves/EPA

Objective: Continue sonic drilling @ selected confirmation borehole locations

0700 M Bruno arrives onsite.

0705 Calibrate MultiRAE PID

Fresh air: O_2 = 20.9 CO=0 LEL=0 H_2S=0 VOC=0.0

Span cal: Lot= 1AM-413-18-15 Exp 11/13

CO=49 H_2S=10 LEL=49 O_2=18.0

VOCs span cal: Lot= 07H072-PR-CM Exp 8/15

VOCs = 99.8

0720 T Rudolph arrives onsite

0745 EPA drillers arrive onsite

0800 N Badon & E&E drillers arrive onsite

H_2S tailgate - discussed wet muddy conditions, trip hazards on rocks in work area

0820 At 2013-SC-046 to trip out drill rods and log trial core 40' to 42' from 2/4/13

Nicole Badon 2/5/13

Location Wyckoff Date 2/5/13

Project / Client US EPA

0855 Drillers mob to decon drilling tools

0930 Helen Bottcher /EPA and Howard Orlean/EPA on site

* Note: drillers are using Geoprobe 8140 DT rotosonic drill rig with 4.5" dia casing and 2.25" inner rods with plastic sample core tubes

1015 Drillers mob equipment to 2013SC-041

1110 Prepare to start drilling

1114 Begin drilling 2013-SC-041

1255 Drillers leave for lunch

1317 CH2M HILL and TerraGlOST staff take lunch

1405 Drillers arrive back at site

1415 Head back to 2013-SC-041

1425 Resume drilling

1550 Howard O. and Helen B. /EPA offsite

1615 Drillers are having problems with heaving sands filling casing before they can lower their sampling rods downhole for sample collection; currently at 50' bgs

1645 Nicole Badon/CH2M hill heads back to office to doff PPE and leave for the day

Nicole Badon 2/5/13

Location Wyckoff Date 2/5/13

Project / Client US EPA

1647 core barrel twisted off at bottom of borehole so drillers have to trip all tools out of the hole and start drilling from next hole 0' bgs

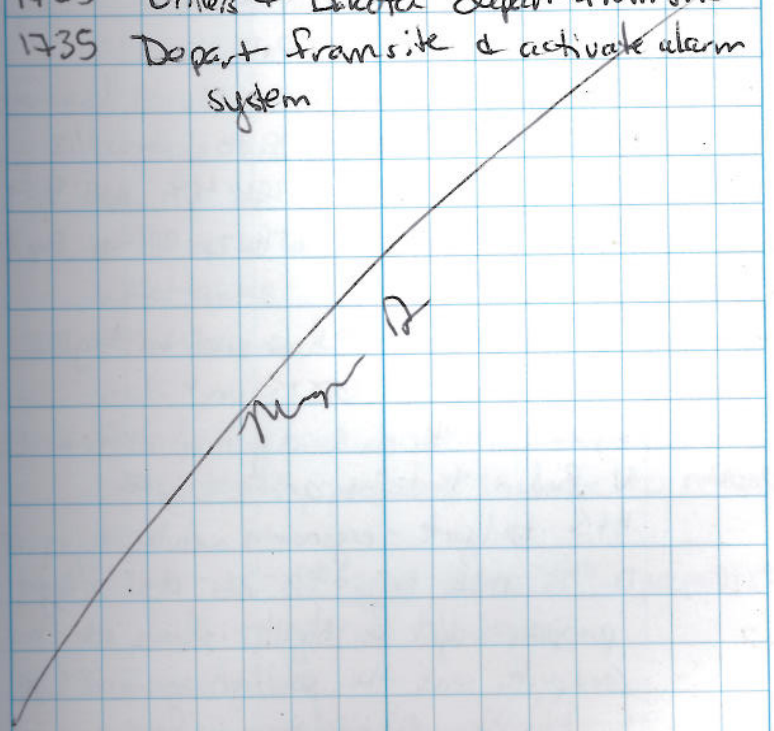
1700 Drillers finish tripping tools out of hole

1705 Mobe to decon pad to doff PPE

1720 Mobe to field office to send daily report

1725 Drillers & Dakota depart from site

1735 Depart from site & activate alarm system



Location Wyckoff Date 2/6/13

Project / Client USEPA

Conditions: 42°F, cloudy, sprinkling

Personnel: M Bruno/PDT
N Badon/SEA
T Rudolph/Dakota
R Neill/EPA
J Graves/EPA

Objective: Continue sonic drilling for visual core logging/TarGOST confirmation sampling

0710 M Bruno arrives onsite

0720 Calibrate MultiRAE PID

Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0 VOCs=0.0

Span cal: Lot: IAN-413-18-18 Exp 11/13

O_2=18.0 CO=49 LEL=49 H_2S=9

VOC span cal: Lot=LTH0723-RR-CH Exp 8/15

VOCs=100

0730 T Rudolph arrives onsite & begins prepping TarGOST unit

0735 Replace batteries in digital camera

0800 N Badon & drillers arrive onsite

H&S tailgate - ergonomics while logging cores

0810 Drillers move to 2013-SC-041 & begin prepping rig. R Neill informs us that Geoprobe sent the wrong size end caps, so they can't cap cores from now on

-MB-

Location Wyckoff Date 2/6/13

Project / Client USEPA

0815 K. Scheffler calls to discuss heaving sand issue & testing submersible pump to see if it will work to dewater sheet pile will seam pockets.

0820 Drillers go back into hole to drill down to 50' and resume sampling. see p.87 for details

1120 ~~receive~~ ~~drill~~ Recieve final soil core from 2013-SC-041 from 75' to 78' bgs glacial till encountered at ~ 75.7' bgs drillers are tripping equipment out of borehole and decomming. TD = 78' bgs

1211 Mob rig off of borehole. Drillers need to leave site to get diesel and fill their water tanks

1225 CH2M HILL and Dakota staff take lunch break

1310 EPA drillers return to site and fill water tanks, prepare to move to next hole

1434 Set up at 2013-SC-045, prepare to drill to glacial till layer

1446 Begin drilling

MB 2/6/13

Location Wyckoff Date 2/6/13

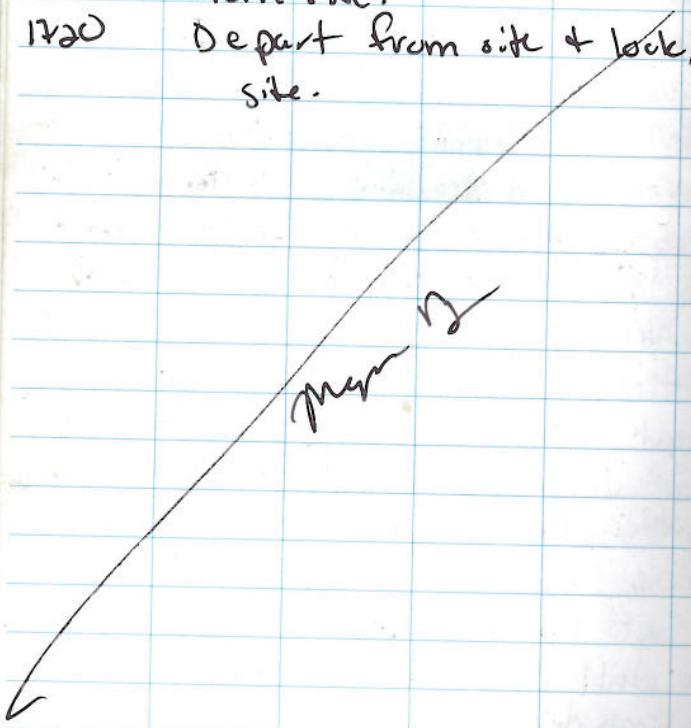
Project / Client USEPA

1645 Drilled to 30 feet bgs. Cleaning up for the day, will resume drilling on 2/7/13

1655 Mobe to decon pad to decon gator. doff PPE

1705 Mobe to field office to send daily report. N. Badon departs from site.

1720 Depart from site & lock/alarm site.



Location Wyckoff Date 2/7/13

Project / Client USEPA

Conditions: ~40° F. overcast, breezy

Personnel: M Bruno / ADT
N Badon / SEA
T Rudolph / Dakota
R. Neill / EPA
J. Graves / EPA

Objective: Sonic drilling / visual core logging / TarGOST confirmation ~~and~~ readings @ 2013SC-045 & 2013SC-001

0710 Arrive onsite (M. Bruno)

0715 Calibrate PID - MultiRAE

Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC=0.0

Span cal: Lot= 1AM-413-18-18 Exp 11/13

O_2= 17.9 CO= 50 LEL= 49 H_2S= 9

VOC span cal: Lot= LTH078-RR-CM Exp: 8/15

VOCs = 99.9

0725 Try to transfer data files from GPS to computer. Transfer fails. Data conversion error.

0730 T Rudolph arrives onsite, begins prepping TarGOST unit

0800 R Healy, N Badon, EPA drillers arrive onsite

0805 Scan 2013SC-041 boring log & 2/6/13 — mb

Location Wyckoff Date 2/7/13

Project / Client USEPA

TarGost logs + send to project team

0810 (MB) Mobe to 2013SC-04S + resume drilling @ 30 ft bgs

0805 H&S tailgate - Slips, trips, & falls with mud-slicked ground

0830 Resume drilling at 30' bgs

1210 BZ check @ drill rig
CO=4 VOCs=0.0 O_2=20.9 LEL=0 H_2S=0

1220 Lunch. Drillers depart from site to get diesel.

1340 Drillers arrive back on site & don PPE

1345 Mobe to 2013SC-04S

1404 Resume drilling, at 55' bgs

1409 Driller's breathing zone
VOCs=0.0 ppm O_2=20.9

1410 M Bruno mobes to field office to get MiniRAE PID from Stan
Calibrate PID. See pg 91 for cal gas info.
Fresh air=0.1 ppm Span=99.7 ppm

1415 M Bruno Mobes to 2013SC-04S. will check BZ & HS readings with both MultiRAE & MiniRAE.

1510 Drillers BZ: VOCs=0.0 O_2=20.9

-MB-

Location Wyckoff Date 2/7/13

Project / Client USEPA

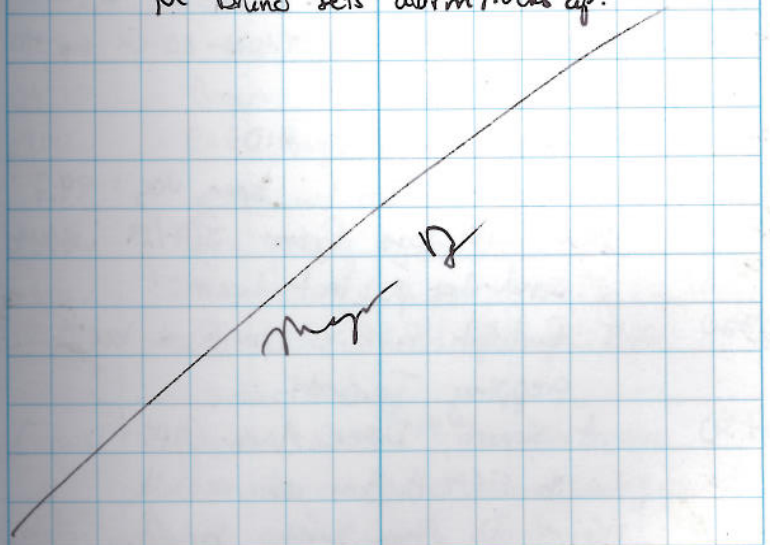
1600 Sampler barrel is sand locked inside casing at ~70' bgs. Drillers are trying to free the rods

1615 Drillers BZ: O_2=20.9 VOCs=0.0

1650 Drillers removed all rods but sampler barrel twisted off downhole. Drillers will have to remove it tomorrow

1655 MCB ~~removed~~ from drill location. Remove PPE and pack up for the day

1705 Everyone departs from site for day. M Bruno sets alarm/locks up.



Location Wyckoff Date 2/8/13

Project / Client USEPA

Conditions: ~36° F, overcast, windy

Personnel: M Bruno / PDX; N. Barton / SEA;
T Rudolph / Dakota; R. Neill / EPA;
J. Graves / EPA; A. Jensen / E&E;
J. Reeves / E&E

Objective: Finish confirmation sampling @ 2013SC-045
Tar GOST probing @ locations inside pilot study area

0710 M Bruno arrives onsite

0715 Calibrate MultiRAE PID

Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0 VOC=0.0

Span cal: Lot: IAM-413-18-18 Exp 11/13
O_2= 18.0 LEL=49 CO=50 H_2S=9
VOC span cal: Lot: LTH072-RR-CM Exp 9/15
VOC = 99.9

Calibrate MiniRAE PID

Fresh air = 0.0 span VOC = 99.7

0720 Scan HF bgs from 2/7/13 work & send to project team.

0720 T Rudolph arrives onsite & begins prepping TarGOST

0730 A Jensen, Dane Ahara (APS - locator) & EPA drillers arrive onsite

0740 Give D. Ahara safety briefing -MB-

Location Wyckoff Date 2/8/13

Project / Client USEPA

0750 J Reeves, N Barton, R Nordeen arrive onsite

0800 Discuss areas to be cleared with locator & Renee

0805 K Scheffler arrives on site

0805 EPA drillers mobe to 2013SC-045 & continue trying to remove sampler barrel.

0810 Tailgate H&S meeting - complacency & rushing - take time & work diligently

0820 E&E decons drill rig. T Rudolph decons greter. Mobe to 2013T-078

0845 Locator clears area around 2013T-078

0850 Begin setup @ 2013T-078

0900 E&E begins pre-probing through gravel w/ dummy probe

0905 Begin probing @ 2013T-078

0910 BZ: VOCs = 0.2 ppm

0920 Refusal @ 23.74 ft bgs. E&E pulls tooling.
Results: 13.28 - 14.17: weak response.
No other responses above background

0925 Record actual GPS coordinates

Location Wyckoff Date 2/8/13

Project / Client USEPA

Northing = 229225.84
Easting = 1228964.56

0930 Move to 2013T-079 & begin setup
0935 E&E probes through gravel with dummy probe
0940 Begin probing @ (MB) ~~229~~ 2013T-079
BZ: VOCs = 0.1 ppm
0950 Refusal @ 21.84 ft bgs. E&E pulls tooling
Results: No responses above background
0955 Record actual GPS coordinates
Northing = 229224.13
Easting = 1228981.82
1000 Move to 2013T-080 & begin setup
E&E probes through gravel w/ dummy probe
1005 Begin probing @ 2013T-080
1010 BZ: VOCs = 0.5 ppm
1015 Refusal @ ~~19.36~~ 19.45 (MB) ft bgs. E&E pulls tooling
Results: No responses above background
Record actual GPS coordinates
Northing = 229214.01
Easting = 1228909.10
1025 Move to 2013T-081 & begin setup
E&E probes through gravel w/ dummy probe
1030 Begin probing @ 2013T-081
1040 Refusal @ 25.50 ft bgs. E&E pulls tooling

—MB—

Location Wyckoff Date 2/8/13

Project / Client USEPA

Results: 16.40 - 16.97: weak response
23.87 - 25.17: strong response
Record actual GPS coordinates
Northing = 229289.85
Easting = 1228947.38
1055 Move to 2013T-082 & begin setup
E&E drills through gravel w/ dummy probe
1100 Begin probing @ 2013T-082
1115 Refusal @ 26.55 ft bgs. E&E pulls tooling.
Results: 10.4 - 10.8 = weak response
No other responses above background
1120 Record actual GPS coordinates
Northing = 229251.16
Easting = 1228939.49
1125 Move to 2013T-014 & begin setup
1130 E&E probes through gravel w/ dummy probe
1135 Begin probing @ 2013T-014
1150 Refusal @ 32.03 ft bgs. E&E pulls tooling
Results: 9.86 - 10.47: strong response
13.24 - 17.41: weak response
21.0 - 22.0: weak response
Record actual GPS coordinates
Northing = 229321.78

—MB

Location Wyckoff Date 2/8/13

Project / Client USEPA

Easting = 122 9147. 24

1200 Mobe drill rig (DPT) & gator to decon pad
1210 Lunch
1225 N. Badon / EPA drillers take lunch
1240 M. Bruno heads back out to field
1255 N. Badon heads back out, wait for EPA drillers to return; decon equipment

Notes from Retosonic drilling

0800 Drillers trip out all casing to free sampler barrel that twisted off downhole on 2/7/13
0830 Resume drilling to 75' bgs
1058 Drillers have issue with rods. Cannot get sampler barrel down to bottom of cased borehole. Driller says he hit a hard, metal-feeling object in the casing @ ~ 77' bgs TD is 80'
1100 Trip rods and casing out of borehole. TD is 80'; will not be able to finish to target 85' b/c drillers have to de-mob from site today. Glacial till layer was likely encountered at 79.5' @ bottom of last run
1158 Drillers finish tripping rods out of hole

Heidi Badon 2/8/13

Location Wyckoff Date 2/8/13

Project / Client US EPA

1200 Mob to drill rig and tooling to decon pad

End sonic drilling notes

1317 EPA drillers return to finish decon and prep rig to load up onto semi and de-mob from site
1320 Mobe w/ K Scheffler to mark SW corner locations. D. Aura clearing staked locations.
1330 M Bruno mobes to field office to transfer visual confirmation logging photos to network.
1340 Mobe to 2013T-083 & begin setup
1345 E&E probes through top 4 ft w/ dummy probe
1350 Begin probing @ 2013T-083
1355 BZ: O_2 = 20.9 VOC=0.0
1355 Refusal @ 16.06 ft bgs. E&E pulls tooling
Results: 1.2-16: weak response
No other responses above background
1400 Record actual GPS coordinates
Northing = 229 189.07
Easting = 122 876 5.72
1405 Move to 2013T-084 & begin setup

MB

Location Wyckoff Date 2/8/13

Project / Client USEPA

E&E drills through gravel w/ dummy probe

1410 Begin probing @ 2013T-084

1415 BZ: O_2=20.9 VOCs=0.0

1425 Refusal @ 23.21 ft bgs. E&E pulls tooling

Results: No responses above background

1430 Record actual GPS coordinates

Northing = 229212.59

Easting = 1228905.09

1440 Move to 2013T-085 & begin setup

1450 E&E preprobes through gravel w/ dummy probe

1455 Begin probing @ 2013T-085

BZ: O_2 = 20.9 VOCs = 0.0

1500 Refusal @ 8.54 ft bgs. E&E pulls tooling

Results: No responses above background

1505 Record actual GPS coordinates

Northing = 229141.44

Easting = 1228782.83

1510 Move DPT rig to fill on NW side of site to see if rig can make it up hill with repaired 6 wheel drive.

1515 DPT rig successfully makes it up hill & across top of fill for several hundred yards.

1525 Mobe to decon pad to decon

-MB-

Location Wyckoff Date 2/8/13

Project / Client USEPA

EPA pickup & Gator.

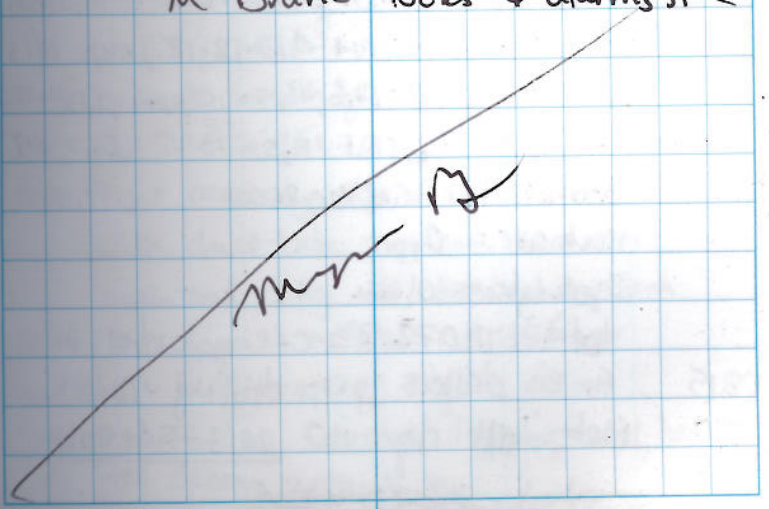
1540 M Bruno mobes to field office to scan LIF logs, 2013SC-045 boring logs, transfer LIF logs, send daily report, etc.

Note: EPA drillers advised N. Badon that they did not find the obstruction in the drill casing that prevented them from lowering their rods all the way to the bottom of the cased borehole (after tripping all tooling out of the hole) see p.98

1655 EPA drillers finish loading equipment

1700 Everyone departs from site.

M Bruno locks & alarms site



Location Wyckoff Date 2/18/13

Project / Client USEPA

0705 Nicole Badon/CH2M HILL ferry to. ~~on site~~ Bainbridge Island

0750 Arrive on site at Wyckoff

Conditions: 41°F, 50% chance of rain overcast

Personnel: Nicole Badon/CH2M HILL
Alan Jensen/E+E
Jeff Fetters/E+E

Task: Visual soil coring with DPT rig at TarGOST boreholes, collection of samples for confirmation TarGOST screening

0810 calibrate QRAE 4gas meter
fresh air: O_2=20.9 CO=0.0 LEL=0.0 H_2S=0.0
span cal lot # 1AM-413-18-18, exp. 11/13
CO=50ppm, O_2=18%, H_2S=10ppm, LEL=50%
calibrated: CO_2=49 O_2=18.1 H_2S=10 LEL=49
Calibrate PID Mini Rae 2000
fresh air = 0ppm
Isobutylene=101ppm
lot# LTH072-RR-CM exp. 8/15

0815 E+E drillers prep drilling rods

0950 Mob drill rig to 2013-SC-001

2/18/13

Location Wyckoff Date 2/18/13

Project / Client EPA

1020 Start drilling with direct push Geoprobe 6400 dual tube sampling system 2 1/8" outter casing, ~1" diameter inner rods with acetate liners (4' cores)

1115 Having issues with dual tube system; core liner jammed into core barrel @ 24' bgs

1130 Drillers switch out to standard direct push drilling system due to core liners getting stuck in core barrel

1200 Lunch break

1235 Back at site to resume drilling at 20' to 24' with conventional method

1330 Switch back to dual tube system

1430 Poor recovery on 32' to 36' sample ~0.5', move over ~2' and redrill

Note Driller's breathing zone @ 1400
O_2=20.9%, LEL=0, CO=0, H_2S=0

1517 Poor recovery again on 32' to 36' with dual tube system. Move over again and retry with standard system

1555 Direct push refusal at 35' bgs

1600 E+E drillers mob rig to decon

1630 N. Badon finished logging soil, head to decon area

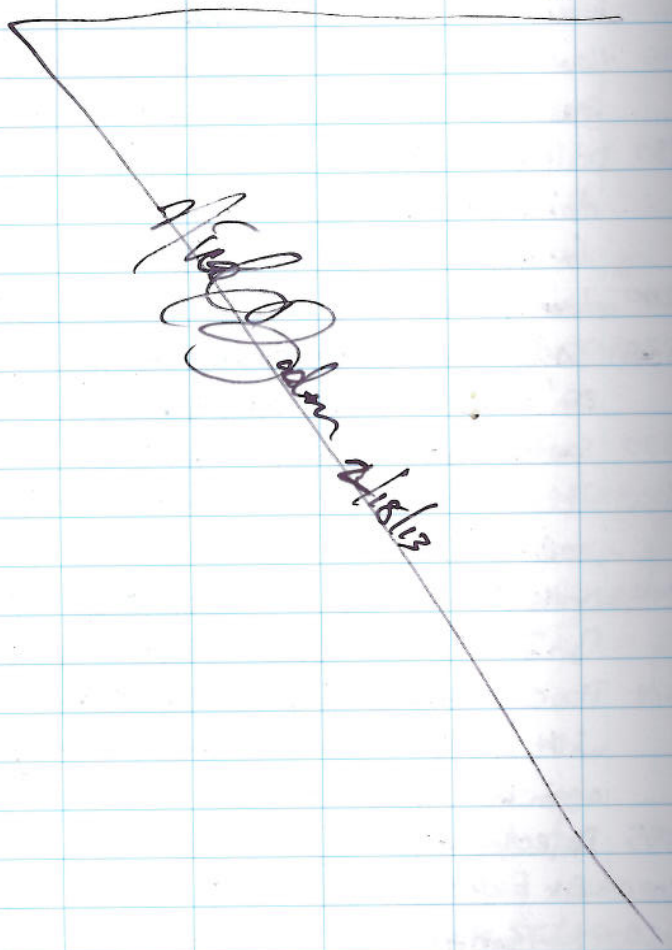
2/18/13

Location Wyckoff Date 2/18/13

Project / Client USEPA

1645 Doff PPE and secure site for the evening

1700 All off site. End of day.



Location Wyckoff Date 2/19/13

Project / Client USEPA

Conditions: 39°F, high 49°F, partly sunny

Personnel: Nicole Badon/CH2M HILL
Alan Jensen/E+E
Jonathan Reese/E+E

Task: DPT drilling for visual confirmation of TarGOST readings at previously drilled locations

0705 N. Badon on ferry to Bainbridge Is.

0753 Arrive at Wyckoff, don PPE and complete FTSP. load field vehicle

0835 Calibrate PID
fresh air = 0.0 ppm
Isobutylene = 101 ppm
lot # LTH072-RR-CM, exp. 8/2015

Calibrate ~~Multirae~~ Qrae 4-gas meter
fresh air = O_2=20.9, LEL=0, CO=0
H_2S=0
Calgas: O_2=18.0% LEL=49% CO=49 ppm
H_2S=10 ppm lot # IAM-413-18-18, exp. 11/13

0905 Mob to 2013 SC002

0915 Begin drilling

1130 Down to 44' bgs; drilled to 48' bgs and sample liner snapped off down hole. Drillers try to retrieve liner.

2/19/13

Location Wyckoff Date 2/19/13

Project / Client US EPA

1148 Could not retrieve liner, will have to trip casing out of hole

1150 Take lunch break

1235 Return to SC-002

1315 Drillers retrieved sampler barrel but could not extrude jammed liner from sampler barrel - no sample from 44' to 48' bgs

1320 Resume drilling @ 48' bgs

1420 Sampler barrel became disconnected from rods while retrieving 52' to 56' sample; drillers trip casing out of hole to retrieve sampler barrel

* Air Monitoring

1100 Driller's breathing zone = 1.5 ppm

1430 Driller's breathing zone = 0.1 ppm

1437 Retrieved sample 52' to 56', liner is shreaded

1555 finished drilling to top of glacial till Bottom of hole = 60'; drillers mob rig to decon pad and decon tooling

1620 N. Badon finished logging soil cores, tidy work area and head to decon to doff PPE.

1645 Drillers off site, Secure site for evening

1655 N. Badon off site 2/19/13

Location Wyckoff Date 2/20/13

Project / Client USEPA

Conditions: 37°F overcast, high 46°F with 50% chance rain

Personnel: Nicole Badon/SEA
Alan Jensen/E&E
Jake Hoosen/E&E

Task: DPT drilling for visual confirmation of TarGOST readings at previously drilled locations

0705 N. Badon on ferry to Bainbridge IS.

0745 Stop at store to purchase supplies

0850 Arrive on site at Wyckoff

0805 Don PPE, prepare PTSP

0829 Calibrate PID MiniRae 2000
fresh air = 0.0 ppm
Isobutylene = 103 ppm lot# LTH072-RR-CM EXP. 8/2015
Calibrate QRAE 4 gas meter
fresh air: CO = 0 H_2S = 0 LEL = 0
O_2 = 20.9
cal gas: O_2 17.9% LEL = 49% CO 50 ppm
H_2S = 10 ppm, lot# IAM-413-18-18

0855 Mob to 2013 SC-036

0916 Begin drilling with DPT and dual tube system

1020 on 24' to 28' interval gravels caused sample liner to crumple in sampler barrel →

2/20/13

drillers trip tooling out of borehole and go back downhole with closed tip rod then retry 24' to 28' sample interval with new liner

1135 lunch break

1220 Resume drilling

1258 for sample 44' to 48', heaving sands filled sample liner before reaching sample interval. Drillers trip all tooling out of hole and go back in with closed tip sampler

1413 A couple rods slipped back down the borehole as drillers were retrieving the 44' to 48' sample. They are stuck a few feet down from top of borehole. Drillers try to fish out

1420 Ken Scheffler/CH2M HILL, Rob Healy/CH2M HILL and Jeff Gentry/CH2M HILL on site

1620 Drillers still trying to fish rods out of borehole. N. Badon heads to decon

1650 Drillers head back to decon area, leave drill rig at borehole location

1700 All off site

Nicole Badon 2/20/13

Conditions 44°F, overcast, high 46°F, 80% chance of rain

Personnel: Nicole Badon/CH2M HILL
Alan Jensen/E&E
Jake Moesen/E&E

Task: DPT drilling for visual confirmation of TarGOST readings at previously drilled locations

0705 Nicole Badon on ferry to Bainbridge Is.

0750 Arrive at Wyckoff. Don PPE and complete PTSP.

0825 Calibrate PID MiniRae 2000
fresh air = 0.0 ppm
Isobutylene = 103 ppm lot# LTH042-RZ-CM
Calibrate QTRAE 4 gas meter
fresh air: O_2=20.9 LEL=0 CO=0
H_2S=0
Cal gas: O_2= 18.0 % LEL=49% CO=49 ppm
H_2S= 10 ppm lot# 1AM-413-18-18 exp. 10/13

0840 Head to 2013-SC-036 to resume drilling from 2/20/13. Drillers are at the rig trying to fish out the rods that slipped back down hole on 2/20/13 (see p. 108). Digging a hole next to the rods ~5' down. Air monitoring: O_2=20.9 →

Nicole Badon 2/21/13

Location Wyckoff Date 2/21/13

Project / Client USEPA

LEL = 0, CO = 0 H_2S = 0

0945 Bz @ drill rig = 0.0ppm on PID

1040 Drillers retrieved rods from borehole with 44' to 48' sample interval. Going to move rig forward a couple feet and drill down to current depth in a new hole. Sample liner is stuck in core barrel.

1115 Begin drilling in new hole down to 44' to 48' bgp ~2' N of first hole

1200 Drillers are down to ~~44~~ 36 feet take lunch break - have to recharge nitrogen in hydraulic hammer to resume drilling

1240 Drillers back on site, N. Badon scanning and emailing drilling logs from finished boreholes

1335 finish drilling 44' to 48' interval at off set borehole

1426 Drillers' breathing zone PID = 0.0ppm

1455 finish drilling for the day @ 52' bgp Drillers mob to decon.

1503 N. Badon mobs to decon

1520 Drillers off-site

1525 N. Badon off site; End of day

Nicole Badon 2/21/13

Location Wyckoff Date 2/22/13

Project / Client USEPA

Conditions: 44°F, rain, wind, high 48°F winds becoming gusty, and heavy rain

Personnel: Nicole Badon/CH2M HILL
Alan Jensen/E&E
Jake Moesen/E&E

Task: DPT drilling for visual confirmation of TarGOST readings at previously drilled locations

0705 NicoleBadon on ferry to Bainbridge Is.

0754 Arrive at wyckoff, don PPE and complete PTSP

0825 Calibrate PID MiniRae 2000
fresh air = 0.0 ppm
Isobutylene = 99.3 ppm, lot#LTH072-RR-CM
Calibrate QRAE 4 gas meter
fresh air: O_2 = 20.9 LEL = 0 CO = 0
H_2S = 0
Cal gas: O_2 = 18.0% LEL 49% CO = 50 ppm
H_2S = 9 ppm

0835 Drillers are on site at 2013SC-036
Continue drilling today from 2/21/13 to top of glacial till. Currently at 52' bgp

0855 Nicole Badon mobs to drill location
drillers are back at equipment area getting hydraulic extruder for extruding samples from core barrel

2/22/13

Location Wyckoff Date 2/22/13

Project / Client USEPA

0900 Drillers return to drilling location and attach hydraulic extruder

0920 Resume drilling

1220 lunch break

1305 N. Badon back on site, waiting for drillers

1320 Drillers return

having issues with heaving sands while drilling and attempting to collect sample

1438 Drillers pause drilling to refill nitrogen charge in drill head

1440 Resume drilling

1453 Very hard drilling at approximately 62.5' bgs. Drillers pull up sample. Attempted interval was 60' to 64' bgs

1511 Retry drilling

1525 Drilled to 64' but very hard drilling sample indicates likely glacial till layer - slightly different from usual appearance / description

1545 Drillers trip tooling out of borehole

1600 Drillers MOB to decon

1620 N. Badon finishes up at site, MOB to decon

1640 N. Badon prepares daily summary, drillers secure equipment for weekend

1700 All off site, site locked / alarmed

N. Badon 2/22/13

Location Wyckoff Date 2/25/13

Project / Client USEPA

Conditions: 40° F, overcast, breezy

Personnel: M Bruno / CH2M - PDX
T Olsonawski / Dakota
A Jensen / E&E
J. Reeve / E&E
N. Badon / CH2M - SEA

Objective: TarGOST confirmation readings of visual core samples collected week of 2/18 - 2/22; TarGOST probing @ Phase II borehole locations

0655 M. Bruno + T Olsonawski arrive onsite. T Olsonawski begins prepping TarGOST equipment for use

0710 Unpack GPS, multi RAE, new field supplies

0725 Calibrate multi RAE # C102630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOC = 0.0
Span cal Lot: IAM-413-18-18 Exp: 11/13
O_2 = 18.0 CO = 49 LEL = 52 H_2S = 10.3
VOC span cal Lot: LTH072-RQ-CM Exp 8/15
VOCs = 100.1 ppm

0750 N. Badon, S. Reeve, A. Jensen arrive onsite

— MB —

Location Wyckoff Date 2/25/13

Project / Client USEPA

0800 E+E decons drill rig & depart from site to refuel truck

0805 N Badon + M Bruno call R Healy to check in on approach for today - confirmation borings + TarGOST readings of confirmation samples from last week.

0820 H+S Tailgate meeting - wind advisory in effect until 4pm - watch for objects blowing around site, take breaks as needed to warm up.

0915 E+E drillers return

0925 Mob to 2013 SC-006 to drill with DPT and collect visual confirmation soil cores with TarGOST ex-situ analysis

0940 Begin drilling

1150 Direct push refusal at 50' bgs, bottom of borehole at 50 feet
Glacial aquitard encountered at 49' bgs

1230 lunch break

1315 Return to drill rig; E+E drillers to move over a couple feet and redrill 12' to 20'. No recovery on first try.

Nicole Badon 2/25/13

Location Wyckoff Date 2/25/13

Project / Client EPA

1350 finish drilling at 2013 SC-006, locate next drilling spot

1420 Set up and start drilling at 2013-SC-072

1550 Driller BZ: O_2=20.9 LEL=0 CO=0 H_2S=0.0 VOCs=0.0

1630 Driller BZ: O_2=20.9 LEL=0 CO=0 H_2S=0.0 VOCs=0.1

1644 Down to 52' bgs. Nicole Badon off site to decon

1650 Finish drilling for day. E+E leaves rig setup on 2013-SC-072. Mobe to decon.

1700 Mobe to office trailer to transfer LIF logs. N Badon + J Reeve depart from site.

1720 T Olsenewski + A Jensen depart from site

1725 M Bruno locks up site + departs

2/25/13

Location Wyckoff Date 2/26/13

Project / Client USEPA

Conditions: 37°F, overcast, calm

Personnel: M Bruno / PDX
N Badon / SEA
T Olsonawski / Dakota
A Jonson / E+E
S ~~Mpesen~~ Reeve / E+E

Objective: Continued DPT drilling, logging of visual confirmation cores, & confirmation TarGOST readings

0700 M Bruno & T Olsonawsker arrive onsite.

0710 T Olsonawski sets up TarGOST equipment & mobes to exclusion zone to take confirmation readings of samples from visual cores collected previous week.

0715 Calibrate ~~PID~~ MultiRAE # C102630

Fresh air cal: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

Span cal Lot = IAH-413-18-18 Exp: 11/13
CO = 49 O_2 = 18.0 H_2S = ~~53~~ 10.0 LEL = 53

VOCs span cal Lot = LTH073-AR-CM Exp: 8/15
VOCs = 100.0

0755 Nicole Badon / CHEM HILL arrives on site don PPE and gather equipment.

Nicole Badon 2/26/13

Location Wyckoff Date 2/26/13

Project / Client US EPA

0820 Health and safety topic: slips/trips/falls short brush in work area creates trip hazard

0825 Mob to 2013SC-072 to continue drilling to top of glacial aquitard stopped at 52' bgs on 2/26/13

0910 E+E drillers offset and redrill 8' to 12' interval; poor recovery on 2/25/13

0920 Equal poor recovery <0.5' at 8' to 12' on offset; offset again and retry

0950 finish drilling at 2013SC-072, clean up area

1015 Mob to 2013SC-055

1025 Morgan Bruno ~~CHEM HILL~~ joins drilling soil logging crew Begin drilling

1100 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1130 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1200 Break for lunch

1240 Back on site

1255 E+E drillers back on site

1337 Drillers cannot drill and retrieve 36' to 40' sample, problems with heaving sands and →

MB 2/26/13

Location Wyckoff Date 2/26/13

Project / Client US EPA

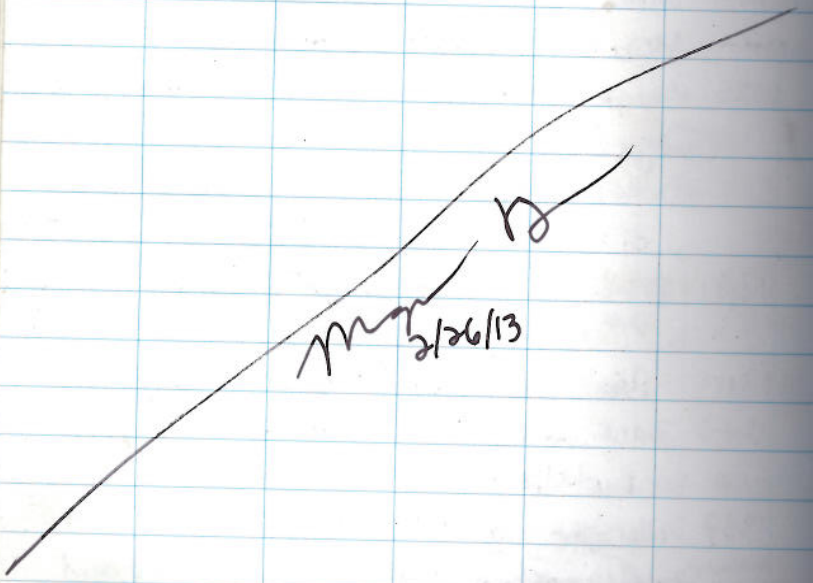
gravel clogging drive shoe on sampler

1338 E&E drillers off set and redrill ~~for~~ 2/26/13 to 36' to continue collecting soil cores in a new hole

1525 Driller's breathing zone
O_2 = 20.9%, LEL = 0, H_2S = 0 VOC: 0
CO = 0

1630 finish drilling for the day; down to 60' bgs
MOB to decon and unload Field vehicle

17 Everyone offsite, lock gate & set alarm



Location wyckoff Date 2/27/13

Project / Client USEPA

Conditions: ~40° F, overcast, calm

Personnel: M Bruno / PDI
N Baden / SEA
T Olsonawski / Dalecta
A Jensen / E&E
R Nordeen / E&E

Objective: Continue visual core logging @ 2013-SC-055 to 2013-SC-068. Dewater sheet pile wall seam pockets & monitor water levels (see field book #2).

0700 M Bruno & T Olsonawski arrive onsite

0710 T Olsonawski begins prepping TerraCAST unit

0715 Calibrate MultiRAE # 0102-630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0
Span cal Lot: IAM-413-18-18 Exp 11/13
O_2 = 18.1 CO = 50 LEL = 52 H_2S = 10.1
VOC span cal lot: LTH072-RF-CM Exp 8/13
VOCs = 100.0

0750 E&E + N. Baden arrive onsite
H&S tailgate - stay hydrated during the work day

0810 N. Baden and T. Olsonawski head to site

0820 M. Bruno on site

N Baden 2/27/13

Location Wyckoff Date 2/27/13

Project / Client USEPA

0825 E+E drillers arrive on site

0849 Start drilling from 60' bgs on 2/26/13
© 2013-SC-055

1015 M. Bruno off drill site to dewater sheet pile wall seam pockets

1035 E+E drillers encounter direct push refusal at 67.5' bgs

1117 Clean up work area and mob to decon

1145 Finish decon, take lunch break

1220 Mob to 2013-SC-068

1235 Begin drilling

1315 finish drilling to 23.5' to top of glacial till aquitard; offset and redrill ~~8' to 12'~~ 12 to 16' and 16' to 20', no recovery on first hole

1415 finish drilling offset borehole, clean up work area. Drillers prepare for TarGOST borings

1450 At decon area to decon tools and store in conex (N. Badon)

1535 Join TarGOST drilling crew at 2013-T-100 target depth is top of glacial till ~ 20' bgs

1545 Start drilling with TarGOST probe
Drillers breathing zone: O_2 = 20.9, LEL = 0, CO = 0 H_2S = 0 VOC = 0

1547 M. Bruno joins drilling crew
-mrg-

Location Wyckoff Date 2/27/13

Project / Client USEPA

1550 N. Badon departs from site to decon & doff PPE.

1555 Refusal @ 23.95 ft bgs. E+E pulls tooling.
Results: 22.0 - 22.4: weak response.
No other responses above background.

1605 Record actual GPS coordinates
Northing = 229234.52
Easting = 1228649.48

1605 E+E mobs rig to 2013T-101 & ~~begins setup~~ rig gets stuck enroute.

1620 E+E / Dakota mobe to decon pad to decon/doff PPE. M Bruno mobes to sheet pile wall seam pocket #5 to resume pumping (see book #2).

MB 2/27

Location Wyckoff Date 2/28/13

Project / Client USEPA

Conditions: ~43°F, overcast, calm

Personnel: M. Bruno / PDX
T. Olsonawski / Dakota
A. Jensen / E&E
J. Reeve / E&E

Objective: TarGOST probing @ Phase II boreholes

0700 M Bruno & T Olsonawski onsite. T Olsonawski starts prepping TarGOST equipment

0715 Calibrate MultiRAE #clo2630
Fresh air: O_2=20.9 CO=0 LEL=0
H_2S=0.0 VOCs=0.0
Span cal: Lot= IAM-413-18-18 Exp: 11/13
O_2=18.0 LEL=50 CO=52 H_2S=10.0
VOC span cal: Lot= LTH073-RD-CM Exp: 8/15
VOCs=100.0

0740 A. Jensen arrives onsite

0800 J. Reeve arrives onsite
E&E mobes to try to get drilling unstuck from soft fill

0800 M Bruno mobes to check seam pocket water levels - see book #2

0820

0840 (B) H&S Tailgate - sharp edges & proper lifting technique when moving ply wood

1100 Rig unstuck. Mobe to 2013T-102
-MB-

Location Wyckoff Date 2/28/13

Project / Client USEPA

& begin setup

1110 E&E probes through first 5 ft with dummy probe due to rocks

1120 Begin TarGOST probing @ 2013T-102

1125 Drillers BZ: O_2=20.9 CO=0 LEL=0
H_2S=0.0 VOCs=0.0

1135 Refusal @ 34.02 ft bgs. E&E pulls tooling.
Results: 19.0-19.5: strong response (MB)
20.5-25.20 strong response
25.44-28.13: medium to strong response

1140 Record actual GPS coordinates
Northing: 229430.23
Easting: 1228833.33

1145 Mobe to 2013T-103 & begin setup

200 lunch

1230 Mobe to 2013T-103

1235 E&E dummy probes through first 5 ft due to rocks

1245 Begin TarGOST probing @ 2013T-103

1250 Drillers BZ: O_2=20.9 CO=0 LEL=0
H_2S=0.0 VOCs=0.0

1305 Refusal @ 36.49 ft bgs E&E pulls tooling.
-MB-

Location Wyckoff Date 2/28/13

Project / Client USEPA

Results: 5.3 - 6.0: strong response
7.3 - 8.0: strong response
9.34 - 11.14: medium response
16.95 - 20.68: medium response
30.00 - 32.04: strong response

1315 Record actual GPS coordinates
Northing = 229443.74
Easting = 1228985.71

1320 Mobe rig to 2013T-104. Rig starts sinking in soft fill. E+E mobs to get plywood to build plywood road to borehole location

1340 Rig can't get up on plywood. E+E mobs to decon pad to drop rods & concrete to lighten load.

1415 Arrive @ 2013T-104 & begin setup

1420 Begin TarGOST probing @ 2013T-104

1425 Drillers BZ: O_2=20.9 LEL=0 CO=0
H_2S=0.0 VOCs=0.0

1435 Refusal @ 45.69 ft bgs. E+E pulls tooling
Results: 7.5 - 8.0: weak response
17.0 - 17.5: weak response

1445 Record actual GPS coordinates
Northing = 229516.31
Easting = 1228893.57

— MB —

Location Wyckoff Date 2/28/13

Project / Client USEPA

1450 Mobe rig to 2013T-105 & begin setup

1455 Begin TarGOST probing @ 2013T-105

1510 Drillers BZ: O_2=20.9 CO=3 LEL=0
H_2S=0.0 VOCs=0.0

1520 Refusal @ 44.90 ft bgs. E+E pulls tooling.
Results: 5.10 - 5.97: two medium response
8.57 - 11.66: medium response
16.42 - 20.02: medium response
26.0 - 27.5: strong response
33.5 - 35.3: strong response
36.59 - 38.66: strong response

1530 Record actual GPS coordinates
Northing = 229506.34
Easting = 1229114.51

1535 Mobe to 2013T-106 & begin setup

1540 E+E pre-probes first 4' with dummy probe due to rocks

1545 Begin TarGOST probing @ 2013T-106

1555 Drillers BZ: O_2=20.9 CO=0 LEL=0
H_2S=0.0 VOCs=0.0

1620 Refusal @ 77.90 ft bgs. E+E pulls tooling.

— MB —

Location Wyckoff Date 2/28/13

Project / Client USEPA

Results: 18.26 - 21.65 = strong response
41.5 - 42.5: weak response
67.82 - 69.95: strong response

1635 Record actual GPS coordinates
Northing = 229815.72
Easting = 1229101.46

1640 Mobe to decon pad to decon/doff PPE

1645 Mobe to field trailer to transfer LIF logs, send daily report, etc.

1715 Lock up, set alarm set, & depart site for day

MMB 2/28/13

Location Wyckoff Date 3/1/13

Project / Client USEPA

Conditions: 50°F, drizzling, no wind

Personnel: M Bruno / PDX
T Olsonawski / Dakota
A Jensen / E&E
J Reeve / E&E

Objective: Continue TarGOST probing of Phase II boreholes

0700 M Bruno & T Olsonawski: arrive onsite
T Olsonawski: begins prepping TarGOST equipment

0710 Calibrate RKI MultiRAE #C102630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0
Span cal: Lot = 1AM-413-18-18 Exp: 11/13
O_2 = 18.2 CO = 48 LEL = 53 H_2S = 10.1
VOC span cal: Lot = LTH07A-PR-CH Exp 8/15
VOCs = 100.0

0730 A Jensen arrives onsite

0805 J Reeve arrives onsite

0815 H&S tailgate meeting - slick, muddy conditions - think before acting to move vehicles / drill rig safely, & don't get frustrated if drill rig gets stuck. Stay

-MB-

Location Wyckoff Date 3/1/13

Project / Client USEPA

calm + work safely

0820 Mobe to drill rig + move rig to 2013T-107 + begin setup

0825 E+E preprobes first 4 ft with dummy probe due to rocks

0830 Begin TarGOST probing @ 2013T-107

0840 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

0920 Refusal @ 80.10 ft bgs. EPA Dakota adds 3 rods to rod rack for upcoming deeper holes. E+E pulls tooling.

Results: 30.5-31.0: weak response
69.8-72.5: medium response

0940 Record actual GPS coordinates
Northing: 229827.23
Easting: 1229146.49

0945 Move drill rig to 2013T-108 + begin setup

0950 E+E preprobes with dummy probe through first 4' due to rocks

0955 Begin TarGOST probing @ 2013T-108

1000 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

1035 Drillers BZ: O_2=20.9 LEL=0 CO=0

— MB —

Location Wyckoff Date 3/1/13

Project / Client USEPA

H_2S=0.0 VOCs=0.0

1040 Refusal @ 77.05 ft bgs. E+E pulls tooling.

Results: 16.5-18.0: medium response
24.74-27.99: weak response
61.32-62.89: weak response

1055 Record actual GPS coordinates
Northing: 229803.46
Easting: 1229068.52

1100 Move rig to 2013T-109 + begin setup. E+E preprobes through first 4' with dummy probe due to rocks.

1110 Begin TarGOST probing @ 2013T-109

1125 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

1150 Refusal @ 69.34 ft bgs. E+E pulls tooling.

Results: 17.0-18.5: medium response
23.80-24.86: medium response
40.0-41.0: weak response
52.5-54.0: medium response

1210 Record actual GPS coordinates
Northing: 229799.67

— MB —

Location Wyckoff Date 3/1/13

Project / Client USEPA

Easting: 1229215.36

1215 Lunch

1245 Mobe to 2013T-109 & move drill rig to 2013T-110 & begin setup

1255 EtE probes through 1st 4 ft with dummy probe due to rocks.

1300 Begin Tar60ST probing @ 2013T-110

1310 Drillers BZ: O_2=20.9 CO: 0 LEL= 0
H_2S = 0.0 VOCs= 0.0

1330 EtE recharges hammer - probe @ 53.30 ft.

1340 EtE resumes probing

1345 Drillers BZ: O_2=20.9 CO=0 LEL=0
H_2S = 0.0 VOCs=0.0

1400 Refusal @ 70.29 ft bgs. EtE pulls tooling.
Results: 28.0-30.0: weak response
44.54-45.83: medium response
48.04-49.36: strong response

1410 Record actual GPS coordinates
Northing = 229714.92
Easting = 1229294.05

1415 Move drill rig to 2013T-111 & begin setup

1420 Begin Tar60ST probing @ 2013T-111

1425 Drillers BZ: O_2= 20.9 LEL= 0 CO=0

—MB—

Location Wyckoff Date 3/1/13

Project / Client USEPA

H_2S = 0.0 VOCs= 0.0

1500 Refusal @ 80.54 ft. EtE pulls tooling.
Results: 22.0-23.0: weak response
27.0-28.0: weak response
29.2-30.0: strong response
68.40-72.36: medium response

1510 Record actual GPS coordinates
Northing = 229775.98
Easting = 1229206.89

1515 Move drill rig to 2013T-112 & begin setup

1520 Begin Tar60ST probing @ 2013T-112

1525 Drillers BZ: O_2 = 20.9 CO = 0
H_2S = 0.0 LEL= 0 VOCs=0.0

1550 Refusal @ 65.75 ft bgs. EtE pulls tooling
Results: 11.33-12.31: medium response
19.0-20.0: medium response
21.3-22.0 = medium response
23.53-24.30: medium response strong response
25.5-26.5: weak response
63.5-64.5: medium response

1605 Record actual GPS coordinates
Northing = 229702.62

—MB—

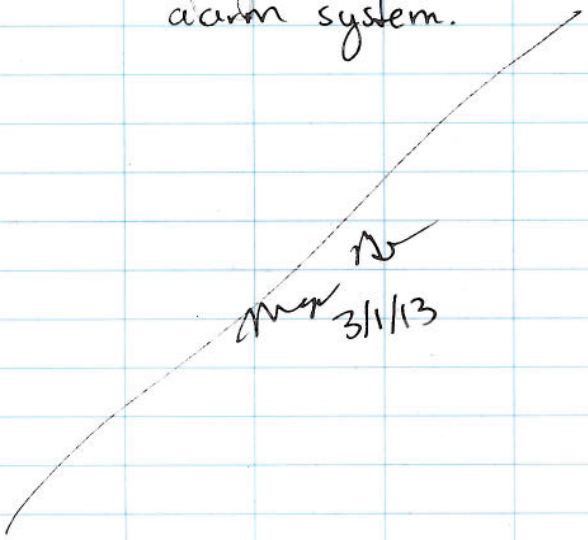
Easting = 1229192.11

1610 E+E finds that cooling fan on hydraulic system on drill rig has seized. Decide to stop for day so A. Jensen can remove fan to work on over the weekend.

1615 Mobe to decon pad to decon

1620 A. Jensen & T. Olsonowski remove cooling fan. M Bruno mobes to field office to transfer LIF logs, send daily report, etc.

1650 Everyone offsite. Lock ~~&~~ (MB) & arm alarm system.



Conditions: ~37°F, clear, windy

Personnel: M Bruno / PDT
T Olsonowski / Dakota
A Jensen / E+E
J Moerse / E+E

Objective: Continue TarGOST probing @ Phase II boreholes

0645 M Bruno arrives onsite
Calibrate MultiRAE # C102630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0
Span cal Lot = IAM-413-18-18 Exp 11/13
O_2 = 18.0 CO = 49 LEL = 53 H_2S = 10.2
VOC span cal: Lot = LTH073-RR-CM Exp 8/15
VOCs = 100.1

0715 T Olsonowski arrives onsite & begins prepping TarGOST equipment

0720 Upload beach borehole coordinates into GPS unit

0735 Mobe to locate boreholes south of boundary fence (Pritchard Park).

0740 A Jensen arrives onsite & works on reinstalling hydraulic system cooling fan.

0750 J. Moerse arrives onsite
—MB—

Location Wyckoff Date 3/4/13

Project / Client USEPA

0830 E&E decons drill rig

0840 H&S tailgate - working outside site fence today - need to set up exclusion zone with cones, caution tape. Need to be especially conscientious of people near work zone.

0845 E&E mobs to fuel up drill rig

0920 E&E arrives back onsite

0925 Mobe to 2013T-113 & begin setup

0930 J. Moore setups up exclusion zone around drilling area with cons & tape

0945 Begin probing @ 2013T-113

0955 Refusal @ 6.31 ft bgs. E&E pulls tooling.
Results: No responses above background

1000 Record actual GPS coordinates
Northing = 229026.78
Easting = 1228699.80

1005 TOOC (MB) Move drill rig to 2013T-114 & begin setup

1010 Begin probing @ 2013T-114

1012 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1015 Refusal @ 9.85 ft bgs. E&E pulls tooling.
Results: No responses above background

1020 Record actual GPS coordinates
Northing = 229042.52
Easting = 1228629.42

Location Wyckoff Date 3/4/13

Project / Client USEPA

1025 Break down exclusion zone. Mobe drill rig back onsite to load up grout/grout machine for beach borehole abandonment

1100 Lunch

1130 Mobe to beach N of bulkhead (sheet pile wall) & walk to assess accessibility with drill rig.

1140 Move drill rig to 2013T-115 & begin setup including taping off exclusion zone with caution tape.

1155 Begin TarGost probing @ 2013T-115

1158 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1210 Refusal @ 23.87 ft bgs. E&E pulls tooling.
Results: No responses above background

1215 Record actual GPS coordinates
Northing = 229285.38
Easting = 1228558.14

1220 E&E grouts hole closed w/ bentonite

1225 Move drill rig to 2013T-116 & begin setup, including creating caution tape exclusion zone. - MB -

Location Wyckoff Date 3/4/13

Project / Client USEPA

1230 Begin TarGOST probing @ 2013T-116

1235 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1245 Refusal @ 32.59 ft bgs. E+E pulls tooling.
Results: 25.5 - 27.5: weak response
32.5 - 32.59: weak response

1250 E+E grouts hole w/ bentonite

1255 Record actual GPS coordinates
Northing = 229358.90
Easting = 1228606.91

1300 Move rig to 2013T-117 & begin setup including creating exclusion zone w/ caution tape

1310 Begin TarGOST probing @ 2013T-117

1315 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1330 Refusal @ 36.82 ft bgs. E+E pulls tooling
Results: 33.00 - 33.73: strong response

1340 E+E grouts hole w/ bentonite

1350 Record actual GPS coordinates
Northing = 229426.73
Easting = 1228668.49

1355 Move rig to 2013T-118 & begin setup, including exclusion zone w/ caution tape
-MB-

Location Wyckoff Date 3/4/13

Project / Client USEPA

1400 Begin TarGOST probing @ 2013T-118

1405 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
VOCs = 0.0 H_2S = 0.0

1425 Refusal @ 41.33 ft bgs. E+E pulls tooling
Results: 34.44 - 37.75 ft bgs = strong response

1435 E+E grouts hole w/ bentonite

1445 Record actual GPS coordinates
Northing = 229494.17
Easting = 1228732.51

1445 Move drill rig to 2013T-119 & begin setup, including making exclusion zone w/ caution tape

1450 Begin TarGOST probing @ 2013T-119

1505 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOCs = 0.0

1515 Refusal @ 47.95 ft bgs. E+E pulls tooling
Results: 30.0 - 30.5: weak response
31.02 - 36.31: strong response

1530 E+E grouts hole w/ bentonite

1535 Record actual GPS coordinates
Northing = 229528.71
Easting = 1228779.46

1540 Move drill rig to 2013T-120 & begin setup including caution-taping exclusion zone

1545 Begin TarGOST probing @ 2013T-120
-MB-

Location Wyckoff Date 3/4/13

Project / Client USEPA

1555 Drillers B2: O_2 = 20.9 CO=0 LEL= 0
H_2S = 0.0 VOC_s = 0.0

1610 Refusal @ 52.77 ft bgs. E&E pulls tooling
Results: 23.75 - 27.23 = weak response
42.20 - 45.69 = medium response

1620 E&E grouts hole w/ bentonite

1625 Record actual GPS coordinates
Northing = 229580.26
Easting = 1228834.47
Top 6 4' rods & 2' rod are bent.
T. Olsonawski plans to unstring in the am & replace bent rods before resuming work.

1630 E&E loads up grout machine.

1640 Mobe back onsite & unload grout machine.

1655 Mobe to field office to transfer LIF logs, send daily report, etc.

1 Everyone offsite. Set alarm & lock site, depart for day.

3/4/13

Location Wyckoff Date 3/5/13

Project / Client USEPA

Conditions:

Personnel: M Bruno / PDT
T Olsonawski / Dakota
A Jensen / E&E
J Moerse / E&E

Objective: TarGOST probing @ Phase II boreholes

0710 MBruno & TOlsonawski: arrive onsite.
T Olsonawski: begins prepping TarGOST equipment

0720 Calibrate MultiRAE #C102630
Fresh air: O_2 = 20.9 CO=0 LEL=0 H_2S=0.0 VOC_s=0.0
Span cal Lot: IAM-413-18-18 Exp 11/13
O_2 = 18.0 CO=49 LEL=54 H_2S = 10.1
VOC span cal Lot = LTH072-RR-CM Exp 8/15
VOC_s = 100.0

0740 A. Jensen arrives onsite

0750 J Moerse arrives onsite

0755 Walk SW corner fill material to assess accessibility. Still soft & wet in places, but firmer than it has been. Decide to try SW corner today before it starts raining again.

0820 E&E mobes to get more plywood.
T Olsonawski & M Bruno collect plywood

-MJ-

Location Wyckoff Date 3/5/13

Project / Client USEPA

in exclusion zone & drag behind gator to decon pad. Decon gator

1000 E&E arrives back onsite. J. Moore decons old plywood while T. Olsonowski & A. Jensen work on putting rope 'handles' on new plywood.

1030 H&S tailgate meeting - Having to plywood to holes today - using good ergonomics & proper lifting techniques when moving plywood, wear work gloves when handling plywood.

1040 A Jensen moves drill rig over to SW corner

1115 Get drill rig moved to 2013T-101 & begin setup

1130 Begin TarGOST probing @ 2013T-101

1135 Drillers BZ: O_2 = 20.9 CO = 2. LEL = 0
H_2S = 0.0 VOCs = 0.0

1150 Refusal @ 25.89 ft bgs. E&E pulls tooling
Results: 19.53 - 20.67': strong response
21.94 - 22.54: medium response
Record actual GPS coordinates
Northing = 229304.36
Easting = 1228644.69
-MB-

Location Wyckoff Date 3/5/13

Project / Client USEPA

1200 Move drill rig to 2013T-121

1215 Lunch

1245 Mobe to beach to evaluate feasibility of accessing proposed beach offsets

1300 Mobe to drill rig, begin setup

1310 Begin TarGOST probing @ 2013T-121

1315 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1330 Refusal @ 38.51 ft bgs. E&E pulls tooling.
Results: 11.74 - 12.46: strong response
33.66 - 35.04: medium response
37.07 - 37.53: strong response

1340 Record actual GPS coordinates:
Northing = 229379.35
Easting = 1228692.06

1345 Move drill rig to 2013T-122 & begin setup

1350 Begin TarGOST probing @ 2013T-122

1355 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1410 Refusal @ 36.94 ft bgs. E&E pulls tooling
Results: 6.67 - 7.91: strong response
12.58 - 13.23: strong response
22.93 - 29.83: strong response
35.12 - 35.43: weak response
36.8 - 36.94: weak response
-MB-

Location Wyckoff Date 3/5/13

Project / Client USEPA

1420 Record actual GPS coordinates
Northing = 229422.23
Easting = 1228757.80

1420 Move drill rig to 2013T-123 & begin setup

1425 Begin TarGOST probing @ 2013T-123
Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1440 Refusal @ 30.44 ft bgs. E&E pulls tooling
Results: No responses above background

1450 Record actual GPS coordinates:
Northing = 229344.19
Easting = 1228754.32

1450 Move drill rig to 2013T-124 & begin setup

1455 Begin TarGOST probing @ 2013T-124

1505 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1515 Refusal @ 38.09 ft bgs. E&E pulls tooling
Results: 24.19 - 25.21: weak response
34.15 - 37.73: weak to medium response

1525 Record actual GPS coordinates
Northing = 229381.21
Easting = 1228790.89

1525 Move drill rig to 2013T-125 & begin setup

1535 Begin TarGOST probing @ 2013T-125
— MB -

Location Wyckoff Date 3/5/13

Project / Client USEPA

1540 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1550 Refusal @ 30.16 ft bgs. E&E pulls tooling
Results: No responses above background

1555 Record actual GPS coordinates:
Northing = 229293.11
Easting = 1228709.04

1600 E&E & Dakota mobe to decon pad to decon/doff PPE. M. Bruno mobes to beach to record GPS coordinates of proposed beach stepout locations.

1630 Mobe to decon pad to decon/doff PPE

1635 Mobe to field trailer to send daily report, transfer LIF logs, etc.

1650 Lock site, set alarm, & depart from site

3/5/13

Location Wyckoff Date 3/6/13

Project / Client USEPA

Conditions: 42° F, overcast, calm

Personnel: M Bruno/PDT
T Olsonawski/Dakota
A Jensen/Ett
J Moerse /Ett
Jordan Lutz /Dakota - in training

Objective: TarGOST probing @ beach step-out locations

0650 Arrive onsite

0700 Ett arrive onsite - safety orientation w/ J. Lutz.

0730 Calibrate MultiRAE #C102630
Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOC_s=0.0
Span cal: Lot: (MB) ~~TA~~ IAM-413-18-18 Exp 11/13
O_2=17.9 CO=49 LEL=53 H_2S=10.0
VOC span cal: Lot- ITH673-RR-CM Exp 8/15
VOC_s=100.0

0740 (MB) ~~J Moerse~~ A Jensen arrives onsite

0755 J Moerse arrives onsite

0805 HES meeting - slips, trips, falls - driftwood on beach. Also, dog safety due to large # dog walkers on beach.

0815 Move drill rig to 2013T-126 & begin setup including exclusion zone
- MB

Location Wyckoff Date 3/6/13

Project / Client USEPA

0820 MultiRAE will not power on. Mobe to borrow PID from Stan & Keith

0851 Begin probing @ 2013T-126

0900 Drillers BZ: VOCs = 0.0

0920 Refusal @ 57.57 ft bgs. Ett pulls tooling
~~Results: 24.19-25.21: weak response~~
(MB) ~~34.15-37.73: weak to medium response~~
~~Record actual GPS coordinates~~
~~Northing: 229~~
~~Easting: 122~~
Results: 11.7-12.5: weak response
13.5-14.5: weak response
17.5-18.5: weak response
20.5-23.5: weak response
38.5-39.5: weak response
46.08-47.64: strong response

0930 Record actual GPS coordinates
Northing = 229613.49
Easting = 128880.25

0940 (MB) ~~Mobe drill rig to 2013T-127 begin setup, including exclusion zone~~

0935 Ett left buckets for grouting onsite. J. Moerse mobe to get buckets
- MB -

Location Wyckoff Date 3/6/13

Project / Client USEPA

0950	E&E grouts hole w/ bentonite
0950	H. Orlean, B. Ryan, & M. Keeley arrive onsite
1005	Move drill rig to 2013T-127 & begin setup including exclusion zone
1030	Begin Tar6ost probing @ 2013T-127
1032	Drillers BZ: VOCs = 0.2 ppm
1100	Refusal @ 59.37 ft bgs. E&E pulls tooling
	Results: 18.39-26.03: strong response
	37.41-42.27: weak to medium response
	52.17-53.37: strong response
1115	Record actual GPS coordinates
	Northing = 229669.70
	Easting = 122-8831.15
1120	E&E grouts hole w/ bentonite
1120	EPA folks depart from site
1125	Lunch
	Switching to Book #2

MP 3/6/13

The manufacturers of *Rite in the Rain* all-weather writing products are grateful to the numerous environmental experts who have contributed to the development of this book. Should you have any additions, improvements or corrections for future publications of this field book or have suggestions for other environmental field book formats, we welcome your input.

Although much effort has been taken to ensure the accuracy of the following reference pages, the J. L. Darling Corp. cannot guarantee the accuracy of the data.

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Common Field Data Error Codes

Error codes are used to explain common mistakes and are written above or close to the mistake. Commonly used error codes include:

RE	Recording Error
CE	Calculation Error
TE	Transcription Error
SE	Spelling Error
CL	Changed for Clarity
DC	Original Sample Description Changed After Further Evaluation
WO	Write Over
NI	Not Initialed and Dated at Time of Entry
OB	Not Recorded at the Time of Initial Observation

Note: Error code should be circled, dated, and initialed when recorded.

Hazard Classifications

Class 1 Explosives
Class 2 Gas
Class 3 Flammable Liquid
Class 4 Flammable Solids (Potential spontaneous combustion, or emission of flammable gases when in contact with water)
Class 5 Oxidizing Substances and Organic Peroxides
Class 6 Toxic (poisonous) and infectious substances
Class 7 Radioactive material
Class 8 Corrosives
Class 9 Miscellaneous dangerous goods

Container type abbreviations (for sampling guidelines)

BR - Boston Round • ABR - Amber Boston Round • AJ - Amber Jug • AWM - Amber Wide Mouth • Poly - Polyethylene Bottles • BOD - Bottle • CWM - Clear Wide Mouth

CONTENTS

REFERENCE	DATE

Location Wyckoff Date 2/27/13

Project / Client USEPA

Conditions: ~40°F, overcast, calm

Personnel: M. Bruno / PDX
N. Badon / SEA - onsite doing visual core logging. See book #1.

Objective: Pumping of H_2O from sheet pile wall seams & monitoring recovery (if any).

1030 Water level meter (coil / water probe) arrives onsite via ~~UPS~~ FedEx ~~Solinst~~ Solinst #C102662

1035 Mobe to seam pocket #1 & begin setup. Not going to measure TD today to avoid stirring up sediment / metal in bottom of seam pocket that could damage pump. Will use TD's measured during 1/15/13 - 1/18/13 salinity profiling event.
DTW = 15.01' below toc
Pump set @ 44' toc - 5 ft above TD.
Only able to set pump at ~15' toc - pump hanging up on seam pocket interior wall rust.

- MB -

Location Wyckoff Date 2/27/13

Project / Client USGPA

1045 Begin pumping seam pocket #1

1050 No more water pumping - pull pump Tide = 3.2' ↓falling

Time	DTW
1053	17.00
1058	16.95
1103	16.95

1105 Pull H_2O level meter per K. Scheffler

1110 Mobe to Seam pocket #2

DTW = 14.00' TOC

Set pump @ 30' toc - would not go any lower. Target pump depth - 55' TOC.

1115 Begin pumping seam pocket #2

1200 Pump runs dry. Pull pump & begin monitoring H_2O level.

Time	DTW (ft TOC)
1200	26.90
1205	26.65
1210	26.22
1215	25.95

1220 Mobe to seam pocket #3 & begin setup

DTW = 14.60' TOC

Pump target depth: 77' TOC

Set pump @ ~35' TOC

- mp -

Location Wyckoff Date 2/27/13

Project / Client USGPA

1240 Begin pumping seam pocket #3

1305 Done pumping. Pull pump, dro down water meter, & monitor rec

Time	DTW (ft TOC)
1307	27.54
1312	27.51
1317	27.50

1320 Lunch

1345 Mobe to seam pocket #4

DTW = 14.70 'TOC

Break down through rust wit down rigger ball. Could still only lower pump ~25' before it hung up.

1410 Begin pumping seam pocket #4

Done pumping. Pull pump & d H_2O level meter down seam pocket to monitor recharge.

Time	DTW (ft TOC)
1435	26.70
1440	26.53
1445	25.51

Mobe to seam pocket #5

DTW = 15.67 'TOC

- mp -

Location Wyckoff Date 2/27/13

Project / Client USEPA

Break through rust inside seam pocket w/ 8# ~~dart~~ downrigger ball.
Pump target depth = 67' TOC
Set pump @ ~45' TOC.

1455 Begin pumping seam pocket #5

1510 Get call from N. Badon. Stop pumping to get E&E started on TarGOST probing.

1530 Return to seam pocket #5, offload needed equipment to finish pumping, mobe truck to decon pad to decon

1620 Return to seam pocket #5 & resume pumping.

~~Finished pumping pull pump & drop H2O level meter down seam pocket to measure recharge.~~

1630 Battery dies. Mobe to other seam pockets to measure H2O level on way to decon pad.

Seam #4 - 22.58' TOC @ 1634
Seam #3 - 27.37' TOC @ 1638
Seam #2 - 15.33' TOC @ 1641
Seam #1 - 17.71' TOC @ 1645

—MB—

Location wyckoff Date 2/27/13

Project / Client USEPA

1650 Try to remove tubing from pump for storage - Fitting on top of pump breaks in half. Decon pump.

1700 Mobe to field office to transf LIF logs, send daily report, etc

1740 Depart from site & arm alarm

MB 2/27/13

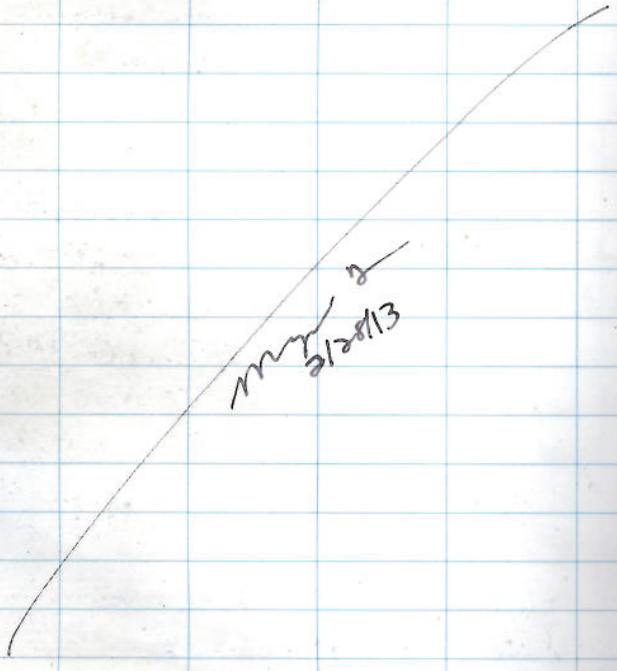
Location Wyckoff Date 2/20/13

Project / Client USEPA

See book #1 for header info.

Mobe to check H_2O levels in sheet pile wall seam pockets.

Location	DTW (ft. TOC)	Time
Seam pocket #1	16.15	0805
Pocket #2	14.66	0810
Pocket #3	16.78	0814
Pocket #4	15.31	0817



Location wyckoff Date 3/6/13

Project / Client USEPA

Continued from Book #1

1150 Mobe to beach, start building plyw road to next hole

1235 Arrive @ 2013T-128 & begin setup

1240 Begin TarGOST probing @ 2013T-128

1245 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

1315 Refusal @ 61.04 ft bgs. G+E pulls to

Results: 32.36-33.33: weak respons

No other responses above background

1320 Record actual GPS coordinates

Northing = 229619.93

Easting = 1228773.38

1325 G+E grouts hole. w/ bentonite

1330 Move drill rig to 2013T-129

1350 Begin setup @ 2013T-129

1355 Begin TarGOST probing @ 2013T-

1405 Drillers BZ = O_2=20.9 CO=0 LEL H_2S=0.0 VOCs=0

1420 Refusal @ 34.75 ft bgs. G+E pu tooling

Results: 30.7-31.5: strong response

32.5-33.0: strong response

1425 Record actual GPS coordinates

-MB-

Location Wyckoff Date 3/6/13

Project / Client USEPA

Northing = 229564.29
Easting = 1228729.13

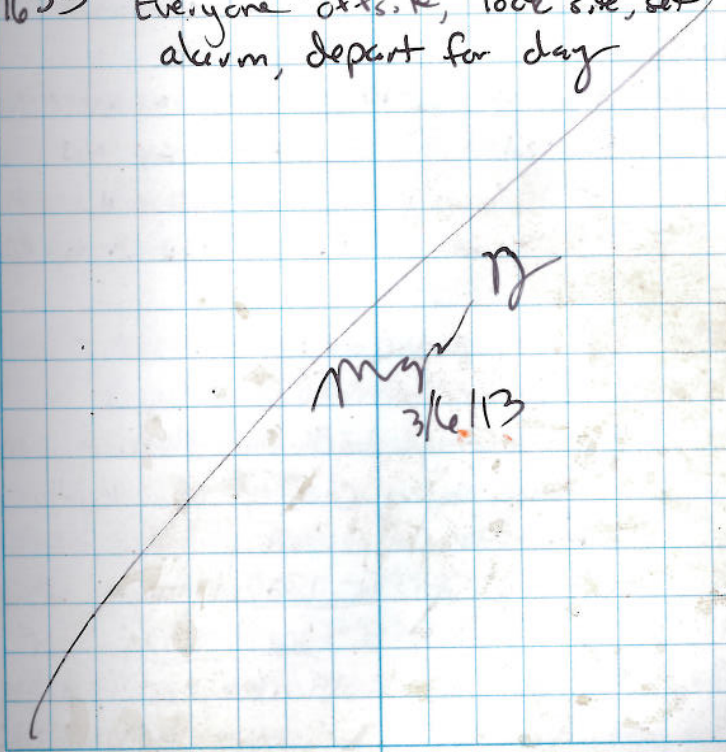
1430 E&E grouts hole w/ bentonite
1435 Move drilling to 2013T-130 & begin setup
1440 Begin TarGost probing @ 2013T-130
1450 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0
1500 Refusal @ 34.07 ft bgs. E&E pulls tooling
Results: 32.18 - 33.60: strong response
No other responses above background
1510 E&E grouts hole with bentonite
1515 Record actual GPS coordinates
Northing = 229517.63
Easting = 1228702.17
1520 Move rig to 2013T-131 & begin setup
1520 Begin probing @ 2013T-131
1525 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0
1535 Refusal @ 40.85 ft bgs. E&E pulls tooling
Results: 29.5 - 31.5: weak response
31.5 - 32.2: medium response
32.29 - 32.95: strong response
1550 E&E grouts hole w/ bentonite
1555 Record actual GPS coordinates
-mb-

Location Wyckoff Date 3/6/13

Project / Client USEPA

Northing = 229450.31
Easting = 1228633.77

1600 Mobe gator to collect plywood sheets, drag inside gate for night
1620 Mobe to decon pad to decon/doff PPE
1625 Mobe to field trailer to transfer LIF logs, send daily report, etc.
1655 Everyone offsite, lock site, set alarm, depart for day



Location Wyckoff Date 3/7/13

Project / Client USEPA

Conditions: 42°F, light rain, calm

Personnel: M Bruno / CH2M
T Olsonowski / Dakota
J Lutz / Dakota
A Jensen / E+E
J. Moerse / E+E

Objective: TarGOST probing of Phase II locations

0650 M Bruno arrives onsite

0700 T Olsonowski & J Lutz arrive onsite

0700 Calibrate MultiRAE # C102630
Fresh air O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0
Span cal lot= IAM-413-18-18 Exp 11/13
O_2= 20.9 CO= 49 LEL= 52 H_2S= 10.1
VOC span cal Lot= LTH072-RR-CM Exp 8/15
VOCs = 100.0

0740 A Jensen arrives onsite

0755 J Moerse arrives onsite

0800 H&S meeting - back in exclusion zone - goose safety. Getting more territorial, need to be aware of their locations.

0810 Move to 2013T-132 & begin setup

0835 Begin probing @ 2013T-132

0837 Refusal @ 2.19 ft bgs, E+E pulls tooling & moves rig ~ 3' to NW
- MB -

Location Wyckoff Date 3/7/13

Project / Client USEPA

for attempt #2

0840 Begin probing attempt #2 @ 2013T-132

0845 Drillers BZ: O_2=20.9 CO=0 LEL=0
H_2S=0.0 VOCs=0.0

0855 Refusal @ 22.98 ft bgs. E+E pulls

Results: 3.4-4.0 weak response
8.4-8.8 weak response

0900 Record actual GPS coordinates
Northing = 229215.04
Easting = 1229188.65

0900 Move rig to 2013T-133 & begin setup

0903 Dummy probe to 4 ft bgs due to r

0905 Begin TarGOST probing @ 2013T-133

0910 Drillers BZ: O_2 = 20.9 CO= 0 LEL= 0
H_2S= 0.0 VOCs = 0.0

0920 Refusal @ 31.55 ft bgs. E+E pulls tool

Results: 8.87-10.85: weak response
19.29-20.28: medium response
30.72-31.06: weak response

0925 Record actual GPS coordinates
Northing = 229332.50
Easting = 1229220.19

0925 Move drill rig to 2013T-134 & begin

0930 E+E probes to 4 ft bgs w/ dummy pr

due to rocks - MB -

Location Wyckoff Date 3/7/13

Project / Client USEPA

0937 Begin TarGOST probing @ 2013T-134

0940 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOC_s = 0.0

0950 Refusal @ 30.45 ft bgs. GtG pulls tooling
Results: No responses above background

1000 Record actual GPS coordinates
Northing = 229165.13
Easting = 1229311.85

1005 Move drill rig to 2013T-135 & begin setup

1010 GtG probes to 4 ft bgs w/ dummy probe due to rocks

1012 Begin TarGOST probing @ 2013T-135

1015 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOC_s = 0.0

1045 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOC_s = 0.0

1050 Refusal @ 69.53 ft bgs. GtG pulls tooling
Results: 10.25 - 10.63: medium response
12.98 - 14.84: weak response
33.68 - 34.41: weak response
63.71 - 64.66: weak response

1115 Record actual GPS coordinates:
Northing = 229523.54
Easting = 1229341.27

— mb —

Location Wyckoff Date 3/7/13

Project / Client USEPA

1120 Lunch

1150 Move drill rig to 2013T-136 & begin

1153 GtG pre-probes to 4 ft bgs w/ dumm
probe due to rocks

1205 Begin TarGOST probing @ 2013T-136

1215 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOC_s = 0.0

1250 Refusal @ 73.93 ft bgs. GtG pulls
Results: 9.0 - 10.3: weak response
13.50 - 15.78: strong response
17.24 - 20.60: weak response
32.03 - 34.18: weak response
61.44 - 62.47: weak response

1305 Record actual GPS coordinates
Northing = 229476.57
Easting = 1229301.06

1305 Move rig to 2013T-137 & begin set

1310 GtG pre-probes to 4 ft bgs with dumm
probe due to rocks

1313 Begin TarGOST probing @ 2013T-137

1320 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOC_s = 0.0

1350 Refusal @ 72.60 ft bgs. GtG pulls to
Results: 10.19 - 11.98: medium response

— mb —

Location Wyckoff Date 3/7/13

Project / Client USEPA

20.36-21.65: weak response
24.0-25.0: medium response
34.19-37.07: weak response
61.0-62.0: weak response

1405 Record actual GPS coordinates
Northing = 229587.09
Easting = 1329297.31

1405 Move rig to 2013T-138 & begin setup

1410 E&E preprobes to 4 ft bgs with dummy probe due to rocks

1415 Refusal @ 8.99 ft bgs. E&E pulls tooling, & moves probe ~2 ft to E

1420 E&E preprobes to 4 ft bgs w/ dummy probe

1430 E&E begins TarGost probing attempt #2 @ 2013T-138

1440 Refusal @ 8.11 ft bgs. E&E pulls tooling.

1445 E&E begins probing w/ dummy probe.

1455 Refusal @ 9.01 ft bgs.
Abandon efforts @ 2013T-138 until M Bruno can talk to R Healy about it.

1500 Dakota mobes to decon area to decon gator.

1510 Dakota mobes to SW area to get

-MB-

Location Wyckoff Date 3/7/13

Project / Client USEPA

plywood & bring into exclusion zon

1515 Dakota brings plywood over, build r to next borehole.

1520 Move rig to next borehole. & begi setup.

1525 Probe not giving good responses duri calibration. Dakota needs to tak apart & do some maintenance.

1530 Leave truck (rig) parked on boreha

1530 Dakota mobes to decon pad & decons gator to do work o probe.

1540 Mobe to decon pad to decon/ doff PPE. M Bruno change out boot wash water.

1545 Mobe to field trailer to transf LIF logs, send daily report, etc.

1600 Dakota finishes maintenance on rig.
Everyone offsite - lock site, arm alarm, depart for day.

MB 3/7/13

Location Wyckoff Date 3/8/13

Project / Client USEPA

Conditions: ~45° F, sunny, breezy

Personnel: M Bruno / PDX
T Olszewski / Dakota
J Lutz / Dakota
A Jensen / E&E
J. Fetters / E&E

Objectives TarGOST probing at Phase II locations

0700 M Bruno, T Olszewski, J Lutz arrive onsite
Dakota begins prepping TarGOST equipment

0710 Calibrate MultiRAE # cio2630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOC = 0.0
Span cal Lot: IAM-413-18-18 Exp: 11/13
O_2 = 18.0 CO = 48 LEL = 81 H_2S = 11.3
VOC span cal Lot: LTH072-RR-CM Exp 8/13
VOCs = 100.0

0725 Dakota departs to refuel gas cans

0740 A Jensen arrives onsite

0755 Dakota arrives back onsite & refuels gator & generator

0810 H&S tailgate - complacency & rushing. Work @ safe pace, be methodical

0815 Begin setup at next borehole - renaming as 2013T-138 to avoid confusion

0820 Begin TarGOST probing @ 2013T-138

—MB—

Location Wyckoff Date 3/8/13

Project / Client USEPA

0825 (MB) J. Fetters arrives onsite

0830 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

0900 Refusal @ 62.38 ft bgs. E&E pulls to

Results: 12.0-14.5: weak response
16.43-19.94: weak to medium respon
27.15-27.68: weak response

0910 Record actual GPS coordinates
Northing = 229333.41
Easting = 1229446.82

0910 Move drill rig to 2013T-139 & begin s

0926 Begin TarGOST probing @ 2013T-139

0930 Drillers BZ: O_2 = 20.9 CO = 2 LEL = 0
H_2S = 0.0 VOCs = 0.0

1000 Refusal @ 69.40 ft bgs. E&E pulls to

Results: 9.01-12.50: medium to strong response
14.96-16.76: strong response
18.0-19.0: medium response
(MB) ~~20.5~~ 21.5-22.5: medium response
31.45-32.99: strong response

1015 Record actual GPS coordinates
Northing = 229422.07
Easting = 1229414.87

1020 Move rig to 2013T-140 & begin setup

—MB—

Location Wyckoff Date 3/8/13

Project / Client USEPA

1025 Begin TarGOST probing @ 2013T-140

1035 Drillers BZ: O_2 = 20.9 CO=0 LEL=0
H_2S = 0.0 VOCs = 0.0

1100 Refusal @ 63.14 ft bgs. E+E pulls tooling.
Results: 21.98 - 25.30: weak response
2nd (MB) 11.38 - 13.71: weak response
29.0 - 30.5: weak response
53.19 - 55.97: weak response

1110 Record actual GPS coordinates
Northing: 229671.82
Easting: 1228979.26

1110 Move rig to 2013T-141

1125 Lunch

1155 Mobe to drill rig begin setup

1220 Begin TarGOST probing @ 2013T-141

1225 Rods hit large rock + deflect sideways @ 1.85 ft bgs. E+E pulls rods, moves probe ~ 2 ft + reprobes.

1227 Begin probing attempt #2 @ 2013T-141

1300 Refusal @ 53.81 ft bgs. E+E pulls tooling
Results: 12.5 - 17.0: weak response
20.45 - ~~37.21~~ 22.05 (MB): weak response
36.46 - 37.21: medium response
38.04 - 42.50: weak response

—MB—

Location Wyckoff Date 3/8/13

Project / Client USEPA

46.35 - 48.71: strong response

1310 Record actual GPS coordinates
Northing = 229599.62
Easting = 1229042.86

1310 Move rig to 2013T-142

1325 Begin setup @ 2013T-142

1337 Begin TarGOST probing @ 2013T-142

1340 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1345 Refusal @ 41.69 ft bgs. E+E pulls tooling
Results: 21.07 - 23.19: strong response
27.78 - 29.33: medium response
32.2 - 32.7: medium response
33.5 - 35.7: weak response

1355 Record actual GPS coordinates
Northing = 229439.56
Easting = 1228800.86

1400 Move rig to 2013T-143 + begin setup

1410 Begin probing @ 2013T-143

1419 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1435 Refusal @ 52.83 ft bgs. E+E pulls tooling
Results: 10.26 - 11.41: weak response
13.57 - 14.29: medium response

—MB—

Location Wyckoff Date 3/8/13

Project / Client USEPA

15.0 - 18.2: weak response

27.17 - 30.92: weak response

1440 Record actual GPS coordinates

Northing = 229327.11

Easting = 1229376.20

1445 Dakota pulls spock (TarGOST head) apart to clean out condensation.

1455 Laser still not giving good calibration. Dakota disassembles spock to clean out. Mirror surface scratched up. Dakota replaces mirror.

1520 Laser repaired. Move rig to 2013T-144 & begin setup.

1530 Begin TarGOST probing @ 2013T-144

1540 Drillers BZ: O_2 = 20.9 CO_2 = 0 LEL = 0

H_2S = 0.0 VOCs = 0.0

1550 Refusal @ 37.83 ft bgs. E&G pulls tooling.

1600 Results: 8.64 - 13.22: weak response

17.03 - 17.63: strong response

17.63 - 19.5: medium response

1600 Record actual GPS coordinates

Northing = 229393.51

Easting = 1229211.22

1605 Leave rig @ 2013T-144. Mobe to decon

-MB-

Location Wyckoff Date 3/8/13

Project / Client US EPA

pad to decon & doff PPE & decon gator

1610 Mobe to field trailer to transfer HF logs, send daily report, etc.

1645 Everyone offsite. Lock site, arm alarm system, depart for day.

MB 3/8/13

Location Wyckoff Date 3/11/13

Project / Client US EPA

Conditions: 42° F, cloudy, windy

Personnel: M Bruno / PDX
T Ruddph / Dakota
J Lutz / Dakota
A Jensen / E&E
J. Reeve / E&E

Objective: TarGost probing near product recovery wells

0700 M Bruno, J Lutz, T Ruddph arrive onsite
Dakota begins prepping TarGost equipment

0720 Calibrate PID - MultiRAE #102630
~~Fresh air: O_2= CO= LEL= H_2S=~~
~~Span cal: Lot= 1AM-413-18-18 Exp 11/13~~
~~O_2= CO= LEL= H_2S=~~
~~VOC span cal: Lot= LTH072-RR-CM Exp 8/15~~
~~VOC=~~

MB

MultiRAE battery dead. Heat off in trailer over weekend - cold trailer likely drained battery even though it was plugged in. Heat turned on.

0730 Borrow PID from Stan.

0735 Calibrate PID. Fresh air = 0.0 Span VOC = 100ppm

0740 A Jensen arrives onsite

0800 J Reeve arrives onsite

0805 H&S tail gate - slips, trips, & falls - debris & brush

— MB —

Location Wyckoff Date 3/11/13

Project / Client

0810 Mobe to rig, move rig to 2013T-145 & begin setup

0825 Begin TarGost probing @ 2013T-145
Drillers BZ: VOC = 0.2 ppm

0845 Refusal @ 37.28 ft bgs. E&E pulls tool
Results: 8.51-11.65: weak response
20.4-21.0: weak response

0850 Record actual GPS coordinates
Northing = 229357.47
Easting = 1229251.84

0850 Move rig to 2013T-146 & begin setup

0900 Begin TarGost probing @ 2013T-146

0905 Drillers BZ: VOC = 0.0

0920 Refusal @ 49.11 ft bgs. E&E trips tools
Results: 9.68-10.99: medium response
15.0-15.5: weak response
18.8-19.5: weak response
31.71-32.13: weak response
44.76-45.52: medium response

0930 Record actual GPS coordinates
Northing = 229543.90
Easting = 1229171.66

0930 Move drill rig to 2013T-147 & begin set

0940 Begin TarGost probing @ 2013T-147

— MB —

Location Wyckoff Date 3/11/13

Project / Client USEPA

0950 Drillers BZ: VOCs = 0.2

1000 Refusal @ 57.02 ft bgs. E+E pulls tooling

Results: 13.0 - 13.5 medium response

15.83 - 16.53: medium response

20.6 - 21.2: strong response

21.2 - 22.0: weak response

37.0 - 37.5: weak response

46.2 - 49.0: weak response

49.32 - 52.49: medium to strong response

1010 Record actual GPS coordinates

Northing = 229632.82

Easting = 1229130.79

1010 Move rig to 2013T-148 & begin setup

1020 Begin TarGost probing @ 2013T-148

1025 Drillers BZ: VOCs = 0.0

1100 Refusal @ 56.67 ft bgs. E+E pulls tooling

Results: 6.91 - 7.17: strong response

10.75 - 15.93: medium response

19.0 - 21.5: weak response

1120 Record actual GPS coordinates

Northing = 229762.34

Easting = 1229122.12

1120 Move rig to 2013T-149 & begin setup

1125 Lunch

—MB—

Location Wyckoff Date 3/11/13

Project / Client USEPA

1155 Receive map of new locations from R. Healy via email. Try to print on Stan's printer - repeatedly get paper error message. Cannot fix. Draw new locations on previous map by hand.

1210 Mobe to rig - poor laser response during calibration. Dakota change out laser window & recalibrates

1230 Begin TarGost probing @ 2013T-149

1235 Drillers BZ: VOCs: 0.0

1245 Refusal @ 41.66 ft bgs. E+E pull tool

Results: 10.39 - 13.62: medium to strong response

18.44 - 18.83: strong response

21.5 - 22.2: medium response

28.0 - 30.0: medium response

31.39 - 32.67: strong response

1255 Record actual GPS coordinates

Northing: 229450.64

Easting: 1229083.30

1255 Move rig to 2013T-150 & begin setup

1300 Begin probing @ 2013T-150

1305 Drillers BZ: VOCs = 0.0

1325 Refusal @ 45.84 ft bgs. E+E pulls tools

—MB—

Location Wyckoff Date 3/11/13

Project / Client USEPA

Results: 15.0-15.5: strong response
19.41-20.86: medium response
35.5-36.0: weak response
39.43-43.10: medium to strong response

1325 Record actual GPS coordinates
Northing = 229531.45
Easting = 122 9041.89

1335 Move rig to 2013T-151. Set up preprobes with dummy probe due to possible foundations. Concrete encountered.

1345 Move rig ~10 ft to E. Set up preprobes to 4 ft bgs. Only bricks encountered.

1350 Begin TarGOST probing @ 2013T-151

1355 Drillers B2: VOCs: 0.0

1415 Refusal @ 39.22 ft bgs. Set up pulls tooling.

Results: 11.39-12.27: medium response
17.5-18.3: medium response
23.10-24.18: strong response
25.0-26.5: medium response
29.60-30.32: strong response
32.0-33.0: strong response
35.7-36.3: weak response

1430 Record actual GPS coordinates
Northing = 229617.72
Easting = 122 9239.25 -MB-

Location Wyckoff Date 3/11/13

Project / Client USEPA

1430 Mobe rig to decon pad to decon

1440 Move rig up to exclusion zone fence, take part of fence down to set up on 2013T-152.

1450 Begin TarGOST probing @ 2013T-152

1452 Drillers B2: VOCs: 0.0

1455 Refusal @ 7.06 ft bgs. Set up pulls tooling + shifts rig ~3 ft.

1505 Begin targost probing attempt #2 @ 2013T-152

1515 Refusal @ 23.18 ft bgs. Set up pulls tooling

Results: 7.27-8.15: strong response
13.8-14.2: weak response

1530 Record actual GPS coordinates
Northing = 229184.16
Easting = 1229185.69

1535 Mobe to decon pad to decon gator, doff PPE. Stopping early today so A. Jensen can attend a funeral this afternoon.

1540 Mobe to field trailer to transfer LIF logs, send daily report, etc.

1610 Everyone off site. Set alarm, lock site, depart for the day

— MM —

Location Wyckoff Date 3/12/13

Project / Client USEPA

Conditions: ~40°F, overcast, calm

Personnel: M Bruno / PDX
T Rudolph / Dakota
J Lutz / Dakota
A Jensen / E&E
J Reeve / E&E

Objectives: Continue Phase II TarGOST probing

0700 M Bruno arrives onsite

0705 J Lutz / T Rudolph arrive onsite & begin prepping targost equipment

0710 Calibrate MiniRAE PID
Fresh air = 0.0
span Lot = LTH072-RP-CM Exp 8/15
VOCs = 101.5

0730 A. Jensen arrives on site. Departs from site to refuel drill rig

0750 Mobe to SW corner to mark new locations

0805 J Reeve arrives onsite

0810 change out bootwash water in decon pod while waiting for A Jensen to return

0820 A Jensen arrives back onsite

0825 H&S tailgate - use spotter when moving vehicles (gator, drill rig) around site to avoid debris and/or holes

- MB -

Location Wyckoff Date 3/12/13

Project / Client USEPA

0830 Move drill rig to 2013T-153 & begin setup

0850 Begin targosting probing @ 2013T-153

0855 Drillers BZ: VOCs = 0.0

0900 Refusal @ 21.18 ft bgs. E&E pulls tooling.
Results: 19.39-20.76: weak response
No other responses above background

0905 Record actual GPS coordinates
Northing = 229192.19
Easting = 1228589.92

0905 Move drill rig to 2013T-154 & begin setup

0910 Begin TarGOST probing @ 2013T-154

0920 Refusal @ 19.91 ft bgs. E&E pulls tooling
Results: No results above background

0925 Record actual GPS coordinates
Northing = 229196.89
Easting = 1228657.30

0925 Move rig to 2013T-155 & begin setup

0950 Begin TarGOST probing @ 2013T-155

0955 Drillers BZ: VOCs = 0.3 ppm

1005 Drillers BZ: VOCs = 0.2 ppm

1020 Refusal @ 71.53 ft bgs. E&E pulls tooling
Results: 9.0-11.0: weak response

- MB -

Location Wyckoff Date 3/12/13

Project / Client USEPA

12.5-19.2: weak response
19.77-20.88: strong response
21.88-26.78: weak ~~to medium~~ (MB) response
28.0-29.0: weak to medium response
64.81-67.55: weak to medium response

1035 Record actual GPS coordinates
Northing = 229753.03
Easting = 1229135.96

1035 Dakota mobes to refuel Gator @ decon pad. E&E moves drill rig to 2013T-156.

1040 Dakota mobes back to 2013T-156 & begins setup

1045 Begin TarGOST probing @ 2013T-156

1055 Drillers BZ: VOCs = 0.1 ppm

1120 Refusal @ 74.02 ft bgs. E&E pulls tooling
Results: 14.11-18.09: medium response
67.45-68.60: strong response

1135 Record actual GPS coordinates
Northing = 229786.92
Easting = 1229070.74

1140 Lunch

1200 Replace MultiRAE #CR2 630 battery pack w/ alkaline battery pack. Unit now turns on. Calibrate multiRAE

-MB-

Location wyckoff Date 3/12/13

Project / Client USEPA

Span Lot: 1AM-4B-18-18 Exp 11/13
O_2 = ~~20~~ (MB) 18.1 CO = 49 LEL = 52 H_2S = 10.1
VOC span Lot: LTH072-RR-CM Exp 8/15
VOCs = 100.1

1230 Mob to drill rig. Move rig to 2013T-157 & begin setup

1250 Begin probing @ 2013T-157

1255 Drillers BZ: O_2 = 20.9 CO = 0
LEL = 0 H_2S = 0.0 VOCs = 0.0

1320 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1325 Refusal @ 73.79 ft bgs. E&E pulls tooling
Results: 16.97-17.76: strong response
19.7-20.2: strong response
28.92-29.66: strong response
64.93-66.07: strong response

1340 Record actual GPS coordinates
Northing = 229775.47
Easting = 1229008.58

1340 Move rig to 2013T-158 & begin setup

1345 Begin TarGOST Probing @ 2013T-158

1350 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1420 Refusal @ 68.79 ft bgs. E&E pulls tool

-MB-

Location Wyckoff Date 3/12/13

Project / Client USEPA

Results: 14.0-15.0: weak response
23.93-24.50: medium response
29.4-31.0: weak response
52.65-53.70: weak response
60.40-61.41: medium response

1430 Record actual GPS coordinates
Northing = 229713.47
Easting = 122 9070.92

1430 Move rig to 2013T-159 & begin setup

1440 Begin probing @ 2013T-159

1445 Drillers BZ: O_2 = 20.9 CO = 0
LEL = 0 H_2S = 0.0 VOCs = 0.0

1447 Refusal @ 8.34 ft bgs. E&E pulls tooling, moves rig ~3 ft.

1500 Begin TarGOST probing attempt #2 @ 2013T-159

1510 Refusal @ 9.80 ft bgs. E&E pulls tooling
Move rig ~3' to E.

1520 Begin TarGOST probing attempt #3 @ 2013T-159

1525 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1525 J Reeve departs from st. T. Rudolph starts acting as drillers assistant. —MB—

Location Wyckoff Date 3/12/13

Project / Client US EPA

1545 Probe @ 49.85 ft bgs. At Jens stops probing to recharge batt

1550 Probing resumed. Drillers BZ: O_2 = 20. CO = 0 LEL = 0 H_2S = 0.0 VOCs = 0.0

1605 Refusal @ 77.01 ft bgs. E&E pulls tooling

Results: 7.0-8.0: strong response
24.45-27.43: weak to medium response
47.0-48.0: medium response
66.90-68.56: weak response

1615 Record actual GPS coordinates
Northing = 229768.56
Easting = 122 9275.83

1620 Mobe to decon pad to decon gator doff PPE

1715 Everyone off site. Set alarm, lock site, & depart for day.

MB
3/12/13

Location Wyckoff Date 3/13/13

Project / Client USEPA

Conditions: ~50°F, overcast, calm

Personnel: M Bruno /PDX
T Rudolph /Dakota
J Lutz /Dakota
A Jensen /E&E
J Reeve /E&E

Objective: Continue Phase II TarGOST borings

0700 M Bruno, T Rudolph, J Lutz arrive onsite
Dakota begins prepping TarGOST equipment

0730 Calibrate MultiRAE #c102630
Alkaline batteries apparently dead-will not turn on.

0735 Borrow 4 AA batteries from Stan, & replace in unit. Unit now working.

0740 Calibrate Stonis MiniRAE PID
Fresh air = 0.0
Span cal: VOCs = 101 Lot= LTH072 - RR-CM Exp 8/15

0745 Calibrate MultiRAE
Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOCs = 0.0
Span cal Lot= IAM413 48-18 Exp 11/13
O_2 = 17.9 CO = 48 LEL = 53 H_2S = 10.9
VOC span cal Lot= LTH 072-RR-CM Exp 8/15
VOCs = 100.0

0745 A Jensen arrives onsite

— MB —

Location Wyckoff Date 3/13/13

Project / Client USEPA

0800 J Reeve arrives onsite

0805 H&S tailgate- proper PPE- keep PPE in clean, working condition. If using semi-reusable ear plugs, replace when they start getting dirty.

0815 Mobe to drill rig, move rig to 2013T-160 & begin setup

0830 Begin TarGOST probing @ 2013T-160

0835 Refusal @ 11.44 ft bgs. E&E pulls tooling, moves rig ~3 ft

0845 Begin probing @ 2013T-160, attempt #2

0850 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

0905 Refusal @ 32.79 ft bgs. E&E pulls tooling
Rods broken off. E&E tries driving rod back down to cut cable @ spool&TarGOST head).

Results: 28.45 - 29.34: weak response
No other responses above background
Not going to try another attempt @ this location due to large amount of rocks & the fact that refusal was below where we saw product response previously @ 2013T-044

— MB —

Location Wyckoff Date 3/13/13

Project / Client USEPA

Left 20 ft rod in hole along with ~20 ft cable & TarGOST head. Broken rod sheared off @ threads.

0925 Dakota mobes to decon pad to decon gator / remaining rods, then to storage bay to work on cable repairs.

0945 Dakota mobes back to rig & begins restringing cable through rod.

0950 Drill rig mobes to 2013T-161

1005 Record actual GPS coordinates of 2013T-160

Northing = 229752.70

Easting = 122 9311.56

1015 Dakota finishes restringing rods & mobes to 2013T-161.

1025 Begin TarGOST probing @ 2013T-161

1035 Drillers BZ: O_2 = 20.9 CO_2 3 LEL = 0

H_2S = 0.0 VOC_s = 0.0

1100 Refusal @ 61.63 ft bgs. E&E pulls tooling

Results: 18.17 - 19.50: medium response

20.2 - 22.07: strong response

55.44 - 58.17: weak response

1105 Record actual GPS coordinates

Northing = 229470.88

Easting = 122 9264.34

- MB -

Location Wyckoff Date 3/13/13

Project / Client USEPA

1110 Move rig to 2013T-162 & begin setup

1120 Begin TarGOST probing @ 2013T-162

1125 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0

H_2S = 0.0 VOC_s = 0.0

1150 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0

H_2S = 0.0 VOC_s = 0.0

1155 Refusal @ 67.07 ft bgs. E&E pulls tooling

Results: 13.0 - 14.5: weak response

17.0 - 19.0: weak to medium response

22.53 - 25.0: weak response

25.0 - 25.67: strong response

30.24 - 30.89: strong response

56.97 - 62.89: weak response

1205 Record actual GPS coordinates

Northing = 229379.35

Easting = 122 9449.29

1210 Lunch

1245 Mobe to drill rig. Move rig to 2013T-163 & begin setup. Dummy probe to 8 ft bgs

1325 Begin probing @ 2013T-163

1335 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0

H_2S = 0.0 VOC_s = 0.0

1410 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0

H_2S = 0.0 VOC_s = 0.0

- MB -

Location Wyckoff Date 3/13/13

Project / Client USEPA

1430 Refusal @ 85.58 ft bgs. E+E pulls tooling
Results: 12.0-13.5: weak response
14.05-19.80: medium response
26-27.5: strong response
30.77-32.18: strong response
34.8-38.5: weak to medium response

1435 Record actual GPS coordinates
Northing = 229610.25
Easting = 123374.64

1435 Move drill rig to 2013T-164 & begin setup E+E preprobes to 12 ft bgs w/ dummy probe due to rocks.

1445 Refusal @ ~11 ft bgs. E+E pulls tooling.

1500 Move rig ~3 ft to N & try preprobing again w/ dummy probe.

1515 1530 Probe gets to 12 ft bgs. E+E pulls tooling, rods all bent. T Rudolph doesn't feel comfortable putting Tarzost tooling down hole for fear of breaking it.

1520 Move rig to old dock to try drilling proposed borehole there. Reassigning # 2013T-164 to this location

1525 E+E preprobes w/ dummy probe Refusal @ 8 ft bgs. E+E pulls tooling, moves rig

Location Wyckoff Date 3/13/13

Project / Client USEPA

~3 ft to S & preprobes again w/ dummy probe. Refusal @ 4 ft bgs. E+E pulls tooling.

1545 Getting short on time to drill another hole. Decide to prep for tomorrow now. Mobe Dakota to load up plywood in exclusion zone & move to decon pad. E+E mobes to decon pad to decon rig & load up dual-tube tooling for tomorrow's visual confirmation sampling.

1600 Dakota gets all plywood to decon pad & decons grator.

1610 Decon plywood

1650 Mobe to field trailer to transfer LIF logs, send daily report, etc.

1710 Depart from site

3/13/13

Location Wyckoff Date 3/14/13

Project / Client USEPA

Conditions: ~49°F, overcast, calm

Personnel: M Bruno / PDX
Michel Bouchedid / SEA
T Rudolph / Dakota
A Jensen / E&E
J Reeve / E&E

Objective: Visual confirmation boring on beach

0710 M Bruno & T Rudolph arrive onsite
T Rudolph begins prepping TarGOST equipment

0730 Calibrate MultiRAE # C102630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0
VOCs = 0.0
Span cal: Lot = 1AM-413-18-18 Exp 11/13
O_2 = 18.0 CO = 48 LEL = 51 H_2S = 10.9
VOCs span cal: LTH072-RR-CM Exp 8/15
VOCs = 100.1

0740 A Jensen arrives onsite

0800 J Reeve & M Bouchedid arrive onsite

0805 H&S orientation w/ M. Bouchedid

0815 Mobe to ~~2013T~~ 2013-SC-127 & begin setup, including exclusion zone around work area

0830 H&S tailgate - ergonomics while moving

-MB-

Location Wyckoff Date 3/14/13

Project / Client USEPA

plywood on beach; dogs on beach

0950 Begin drilling @ 2013-SC-127

1000 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1125 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1215 Lunch - drillers leave 40-44' run @ depth

1245 Mobe back to 2013-SC-127

1255 Resume drilling @ 2013-SC-127

1300 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1340 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1430 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1435 Refusal @ 63 ft bgs. Till @ 57.3 ft bgs

1440 E&E grouts hole w/ bentonite as they pull casing.

1500 Record actual GPS coordinates
Northing = 229671.91
Easting = 1228835.53

1505 Mobe back onsite - Dakota pulls plywood just inside site fence w/ Gator

-MB-

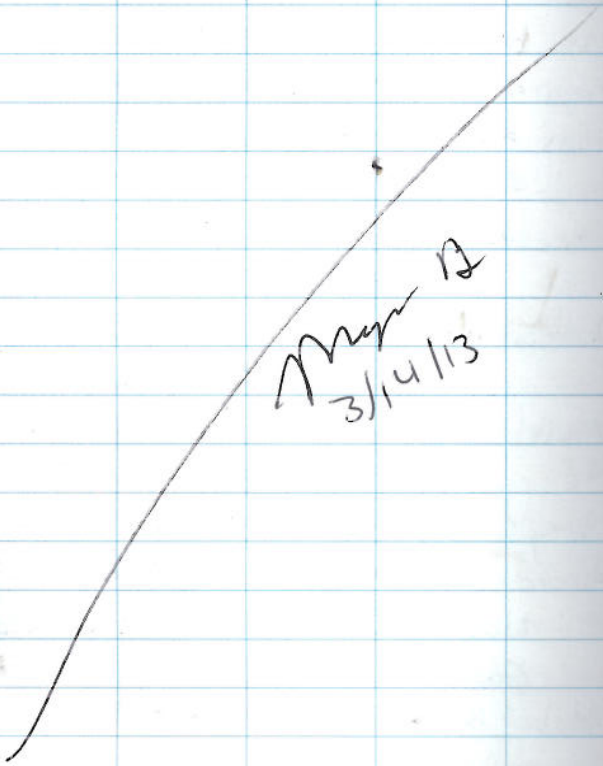
Location Wyckoff Date 3/14/13

Project / Client UPRR

1530 Mobe to decon pad, decon gator & drill rig. Work on cutting & drumming core liners.

1610 Mobe to field office to transfer LIF logs, send daily report, etc.

1645 Set alarm, lock site, depart for day



Location Wyckoff Date 3/15/13

Project / Client USEPA

Conditions: ~48°F, overcast, calm

Personnel: M Bruno / PDX
M Bouchedid / CH2M Hill - SEA
T Rudolph / Dakota
A Jensen / E+E
S Reeve / E+E

Objective: Visual confirmation borings

0710 M Bruno arrives onsite

0730 T Rudolph arrives onsite & begins prepping Tar-GOST equipment

0735 Calibrate MultiRAE #CI02630

Fresh air: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

Span cal Lot: IAM-413-18-18 Exp 11/13
O_2 = 18.0 CO = 48 LEL = 51 H_2S = 10.5
VOCs span cal Lot=LTH 073-PR-CM Exp 8/15
VOCs = 100.1

0800 S Reeve & M Bouchedid arrive onsite

0805 H&S tailgate - Friday! Work pace & alertness - no rushing or complacency

0810 Mobe back to beach.

0815 Drill rig gets stuck ~20 ft W of 2013T-119. T Rudolph mobes with gator to get plywood

Location Wyckoff Date 3/15/13

Project / Client USEPA

from inside site gate

0830 Dig rig out & build plywood "road" to 2013-SC-119

0845 Arrive @ 2013-SC-119 & begin setup, inclds caution tape exclusion zone

0900 Begin drilling @ 2013-SC-119

0902 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

0910 Heave encountered @ 5 ft bgs
E&E pulls tooling & cleans out, retrieves

1020 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1025 Refusal @ 28 ft bgs. E&E pulls tooling shifts to new borehole to continue w/ closed point sampler to 28' bgs.

1040 Begin ~~probing~~ (MB) drilling in 2nd borehole @ 2013-SC-119

1120 Refusal @ ~30 ft bgs. E&E pulls tooling

1135 E&E grouts both attempts @ 2013-SC-119 w/ bentonite

1140 Record actual GPS coordinates -
Attempt 1 { Northing = 229520.57
Easting = 122780.17
Attempt 2 { Northing = 229524.92
Easting = 122779.04

-mg-

Location Wyckoff Date 3/15/13

Project / Client USEPA

1145 - Build plywood 'road' & drive rig off beach & back onsite

1200 - Move rig to 2013-SC-152

1215 - Lunch

1245 - Begin setup @ 2013-SC-152

1300 - Begin drilling @ 2013-SC-152

1305 - Refusal @ ~2.5 ft bgs - large piece of wood. E&E pulls tooling, moves rig over. ~2 ft for attempt #2

1309 - Begin (MB) ~~probing~~ drilling attempt #2

1311 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1335 Refusal @ 28 ft bgs. E&E pulls tooling E&E moves rig over to try to get discrete sample from 5-9 ft bgs to capture fluorescent material from TarGost log (no recovery from 6-8 ft bgs in first 2013-SC-152 attempt)

1345 E&E begins drilling attempt #2

1405 Drilling completed @ 2013-SC-152

1415 Record GPS coordinates
1st attempt { Northing = 229169.36
Easting = 122778.43

-MB-

Location Wyckoff Date 3/15/13

Project / Client USEPA

2nd attempt { Northing = 229180.23
Easting = ~~229~~ 1229185.94

1420 Mobe to decon pad to decon Gator, drum core liners, doff PPE, clean up decon pad

1450 Mobe to field trailer to transfer 4F logs, send daily report, etc.

16 1550 (MB) Everyone offsite. set alarm, lock gate, depart for day.

[signature] 3/15/13

Location Wyckoff Date 3/18/13

Project / Client USEPA

Conditions: ~41° F. overcast, breezy

Personnel: M Bruno / PDX
M Bouchedid / SEA
T Rudolph / Dakota
A Jensen / E&E
C. Whitehead / E&E

Objective: Continue Phase II usual coring

0700 M Bruno arrives onsite

0705 Calibrate MultiRAE #C102630

Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOCs = 0.0

Span cal: Lot = 1AM-413-18-18 Exp 11/13

O_2 = 18.0 CO = 49 LEL = 51 H_2S = 10.1

VOCs span cal: Lot = LTH072-RR-CM Exp 8/15

VOCs = 100.0

0715 T Rudolph arrives onsite & begins prepping TarGost equipment

0740 A Jensen arrives onsite

0800 M Bouchedid & C. Whitehead arrive onsite

0805 H&S tailgate - geese onsite are territorial be aware & try to avoid them

0820 Mobe to 2013-SC-101 on plywood 'road

0840 Begin setup @ 2013-SC-101

0845 Begin drilling @ 2013-SC-101

0900 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0

VOCs = 0.0

— MB —

Location Wyckoff Date 3/18/13

Project / Client USEPA

0840 Drillers hit refusal @ ~27 ft bgs

1010 Glacial till @ 25.2 ft bgs.

1020 Record actual GPS coordinates
Northing = 229307.74
Easting = 1228641.43

1025 E&E mobes to field trailer to pick up new shipment of liners from Fedex. Dakota gathers plywood & piles in one spot just outside exclusion zone

1030 Mobe to 2013-SC-054 & begin setup

1110 Begin drilling @ 2013-SC-054

1112 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1135 Grout from 2013T-054 seen in 12-16 ft bgs run in 2013-SC-054. E&E pulls casing and moves over slightly, drills back to 20 ft bgs closed, then resumes normal drilling with 20-24 ft bgs interval.

1200 E&E set to start down new attempt hole. Decide to break for lunch first.

1210 Lunch

1240 Mobe back to 2013-SC-054

1255 Resume drilling @ 2013-SC-054

-MB-

Location Wyckoff Date 3/18/13

Project / Client USEPA

1302 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1405 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1445 No recovery from 36-48 ft bgs. Probably due to rock. Decide to pull tooling, move over & go down to 36 ft bgs w/ closed sampler, then resume drilling as previously.

1455 Rock stuck in end of cutting shoe

1500 E&E low on H_2O (used to keep heave down). E&E mobes to decon pad to refill water tank.

1510 E&E mobes back to 2013-SC-054 & begins setup on slightly offset attempt #3 location

1520 Drilling resumes @ 2013-SC-054

1525 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1630 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1645 48-52' interval pulled up - center w/ E&E, decide to push tooling

-MB-

Location Wyckoff Date 3/18/13

Project / Client USEPA

to 52 ft bgs & leave in hole overnight. Will finish drilling 2013-SC-054 tomorrow am.

1655 E&E mobes to decon pad, Dakota & CH2M stay to finish logging TarGOST reading 48-52 ft interval.

1705 Mobe to decon pad to decon Gator, doff PPE

1715 M Bruno mobes to beach outside sheet pile wall to GPS location where a) sheen is seeping out of sand and b) ebullition is causing sheen spreading of surface of H_2O.

1800 Mobe to field trailer to transfer LIF logs, etc.

1810 Everyone off site, set alarm, lock site, & depart for day.

MB 3/18/13

Location Wyckoff Date 3/19/13

Project / Client USEPA

Conditions: ~38°F, cloudy, breezy

Personnel: M Bruno / CH2M (PDT)
M Bouchedid / CH2M (SEA)
T Rudolph / Dakota
A Jensen / E&E
C Whitehead / E&E

Objective: Dual core logging & TarGOST reading @ 2013-SC-054 & 2013-SC-155

0710 M Bruno arrives onsite

0715 Calibrate MultiRAE #C102630
Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0
Span cal: Lot= LAM413-18-18 Exp 11/13
O_2=17.9 CO=48 LEL=51 H_2S=10.5
VOCs span cal: Lot= LTH073-RP-CM Exp 8/15
VOCs = 100.1

0720 T Rudolph arrives onsite & begins prepping TarGOST equipment

0740 A Jensen arrives onsite

0800 C Whitehead & M Bouchedid arrive onsite

0805 HASS tailgate - slips, trips, falls w/brush & site debris

0810 Mobe to 2013-SC-054 & begin setup

0815 Resume drilling @ 2013-SC-054

— MB —

Location Wyckoff Date 3/19/13

Project / Client USEPA

0825 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
VOCs = 0.0 H_2S = 0.0

0910 Refusal @ 60 ft bgs

0915 Till @ 59.3 ft bgs. E+E pulls casing

0925 Record actual GPS coordinates
Northing = 229675.23
Easting = 1229055.98

0930 E+E mobs to decon pad to refill H_2O tank

0940 E+E returns, mobe to 2013-SC-155 & begin setup

0950 Begin drilling @ 2013-SC-155

0955 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
VOCs = 0.0 H_2S = 0.0

1000 NR from 4-8 ft bgs - rock stuck in cutting shoe. ~~E+E pulls casing~~ (MB) ~~move~~ Continue drilling from 8 ft bgs in same hole.

1045 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
VOCs = 0.0 H_2S = 0.0

1045 H Orlean & Beth Sheldrake /EPA arrive onsite

1105 H Orlean & B. Sheldrake depart from exclusion zone

— MB —

Location Wyckoff Date 3/19/13

Project / Client USEPA

1145 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1150 E+E drives sampler to 48-52 ft interval, leaves @ depth to go to lunch

1210 Lunch

1245 Mobe to 2013-SC-155

1315 Resume drilling @ 2013-SC-155

1330 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0
H_2S = 0.0 VOCs = 0.0

1445 Refusal @ 69.3 ft bgs. E+E pulls casing
No till observed in 68-69.7 ft interval

1525 Record actual GPS coordinates
Northing = 229759.62
Easting = 1229126.81

1525 E+E mobs rig to decon pad to decon rig.

1535 Dakota + CH2M mobe to decon pad to decon & don/doff PPE

1540 A Jensen mobes offsite w/ rig to refuel

1540 Mobe to field trailer to transfer LIF logs, send daily report, etc.

1610 A Jensen arrives back onsite &

— MB —

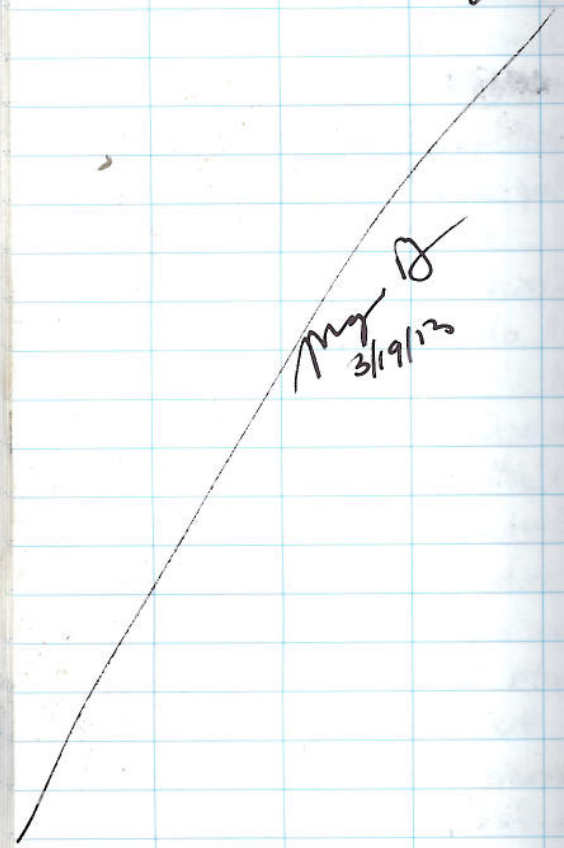
56

Location Wyckoff Date 3/19/13

Project / Client USEPA

drops off refueled drill rig.

1635 Everyone offsite. Set alarm, lock site, depart for day



Location Wyckoff Date 3/20/13

Project / Client USEPA

Conditions: ~48°F, breezy, raining

Personnel: M Bruno
M Bachedid
T Rudolph
A Jensen
C Whitehead/GSC

Objective: Visual core logging - Phase II locati

0715 M Bruno arrives onsite, cleans yesterdays boring logs

0725 Calibrate PID # C102630 (MultiRAE)
Fresh air: O_2=20.9 CO=0 LEL=0 H_2S=0.0
span cal: Lot= IAM-413-18-18 Exp 11/13
O_2= 18.0 CO= 49 LEL= 51 H_2S= 1
VOCs span cal: Lot= LTH-072-RR-CM Exp
VOCs= 100.0

0730 T Rudolph arrives onsite & begins prepping TarGOST equipment

0745 A Jensen arrives onsite

0755 C Whitehead & M Bachedid arrive onsite

0805 GSC refills H_2O tank on rig

0810 H&S tailgate - severe weather alert today - inches of rain & high wind. Take breaks as needed today

- MB -

Location Wyckoff Date 3/20/13

Project / Client USEPA

off / warm up

0815 Mobe to 2013-SC-013 & begin setup

0830 Begin drilling @ 2013-SC-013

0840 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOC_s=0.0

0920 Drillers BZ: O_2=20.9 CO=2 LEL=0 H_2S=0.0 VOC_s=0.0

0945 Dakotas new shipping crate arrives. T Rudolph mobes to direct delivery person where to leave it

1000 T Rudolph arrives back @ 2013-SC-013

1020 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOC_s=0.0

1025 Refusal @ 52 ft bgs. Sampler came off rods. C&E pulls casing, able to retrieve sampler.

1035 Till observed @ 48 ft bgs

1050 Record actual GPS coordinates
Northing = 229252.18
Easting = 1229404.92

1055 Mobe to decon pad to decon drill rig & gator & put lines in drum

1110 Mobe to 2013-SC-070 & begin setup

—MB

Location Wyckoff Date 3/20/13

Project / Client USEPA

1130 Begin drilling @ 2013-SC-070

1135 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOC_s=0.0

1210 Refusal @ 27 ft bgs, Till observed @ 24 ft bgs.

1230 Record actual GPS coordinates
Northing = 229281.85
Easting = 1228913.01

1230 Mobe to decon pad to refill H_2O tank on rig

1245 Mobe to 2013-SC-106 & set rig up on borehole.

1300 Mobe to decon pad to doff PPE

1315 C&E departs from site; M Bouchedid departs from site

1315 T Rudolph begins packing up equipment in preparation for demobing on 3/22 M

Bruno mobes to field trailer to transfer LIF logs, work on GPS file for surveyors, send daily report, etc.

1640 Locks site, sets alarm, departs for day

—MB - 3/[illegible]/13

Location Wyckoff Date 3/21/13

Project / Client USEPA

Conditions: ~36°F, overcast, calm

Personnel: M Bruno
M Bouchedid
T Rudolph
A Jensen
J Reeve /E&E
Drake Williams /CH2M - surveyor
Kirsten Smids /CH2M - surveyor

Objective: Visual core logging / TarGOST readings @ 2013-SC-106, survey of borehole locations

0710 M Bruno arrives onsite

0715 Calibrate MultiRAE #c102630
Fresh air: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOCs 0.0
Span cal: lot = IAM-413-18-18 Exp 11/13
O_2 = 18.0 CO = 49 LEL = 50 H_2S = 10.1
VOCs span cal: lot = LTH-073-RR-CM Exp 8/14
VOCs = 100.1

0725 T Rudolph arrives onsite & begins prepping TarGOST equipment

0740 A Jensen arrives onsite

0755 M Bouchedid, D Williams, K Smids arrive onsite.

0800 (MB) ~~M~~ B Hds tailgate - driving safety - use spotter when backing

0805 ~~M Bruno splits off to accompany surveyors.~~ (AJ)

0805 J Reeve arrives onsite

0810 Additional safety topic - potential thunder & lightning today. If this occurs, stop work, get away from rig

0820 Mobe to 2013-SC-106 & begin setup

0830 M Bruno splits off to accompany surveyors

0837 Started pushing probe at 2013-SC-106

1035 M Bruno rejoins drilling / logging crew. Surveyors packing up equipment to depart from site.

1040 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOCs = 0.0

1115 Drillers BZ: O_2 = 20.9 CO = 0 LEL = 0 H_2S = 0.0 VOCs = 0.0

1150 E&E runs out of H_2O. Push rods to depth (60 ft bgs) & leave in ground. Mobe rig to decon pad to refill H_2O tank

-MB-

Location Wyckoff Date 3/21/13

Project / Client USEPA

-MB-

Location Wyckoff Date 3/21/13

Project / Client USEPA

1205 Lunch

1235 T Rudolph unloads rods from Gator & packs in crate

1250 Mobe back to 2013-SC-106 & set rig back up on hole

1305 Resume drilling @ 2013-SC-106

1310 Driller BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

1320 No recovery from 56-64 ft bgs. EtE decides to pull casing - likely rock stuck in cutting shoe.

1340 Casing out - no obstruction found. EtE going back down same hole. Poor / no recovery believed to be due to gravels

1345 M Bruno departs to check Phase I boreholes & determine whether they were all grouted.

1405 M Bruno returns.

1405 Driller BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

1450 Driller BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

1550 Refusal @ 81.5 ft bgs. EtE trips tooling out of borehole.

Location Wyckoff Date 3/21/13

Project / Client USEPA

1605 No till observed in last sampled interval (80-81.5 ft bgs)

1615 Mobe to decon pad to refill H_2O tank on drill rig

1625 Mobe rig to 2013-SC-014

1630 Mobe to decon pad to doff PPE

1635 Mobe to field trailer to transfer LIF logs, etc. Everyone offsite. Set alarm, lock site, depart for day.

mg 3/21/13

Location Wyckoff Date 3/22/13

Project / Client USEPA

Conditions: ~34° F, overcast, sprinkling

Personnel: M Bruno / PDX

M Bouchedid / SEA

T Rudolph / Dakota

A Jensen / E&E

J Moersen / E&E

Objective: Visual boring @ 2013-SC-014; select intervals of 2013-SC-152

0715 T Rudolph arrives onsite & begins prepping TarGOST equipment

0730 M Bruno arrives onsite

0735 Calibrate MultiRAE #C102630

Fresh air O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=

Span cal: Lot: IAM-413-18-18 Exp 11/13

O_2=18.0 CO=48 LEL=51 H_2S=10.4

VOC Span cal Lot: LTH-072-RR-CM Exp 8/13

VOCs:

0740 A Jensen arrives on site

0755 M Bouchedid & J Moersen arrive onsite

0805 H&S tailgate - complacency & rushing. Pay attention, be aware of surroundings, work at steady, safe pace

0815 Mobe to 2013-SC-014 & begin setup

0835 Begin drilling @ 2013-SC-014

-MB-

Location Wyckoff Date 3/22/13

Project / Client USEPA

0840 Drillers BZ: O_2=20.9 CO=0 LEL=0 H_2S=0.0 VOCs=0.0

0950 Refusal @ 39.5 ft bgs

1010 Mobe to decon pad to decon drilling

1025 Mobe to 2013-SC-152 & set up next to it to sample 7-11 ft bgs to try to confirm TarGOST spike. Calling this boring 2013-SC-152-v2 for version 2 of 2013-SC-152

1040 E&E preprobes with dummy probe to 6 ft due to wood/brick debris previously encountered.

1100 E&E drills to 7' w/ closed tip, opens & resumes normal drilling to collect sample.

1100 M Bouchedid (MB) mobes to decon pad to doff PPE - has to leave to make client meeting for another project

1105 M Bouchedid observes core from other side of fence, confirms M. Bruno's logging of 7-11 ft bgs core

-MB-

Location Wyckoff Date 3/22/13

Project / Client USEPA

1125 Record 2013-SC-152-v2 actual GPS
Northing = 229176.66
Easting = 1229189.31

1130 Record actual GPS 2013-SC-014
Northing = 229323.93
Easting = 1229147.13

1145 Lunch

1205 Mobe to help T Rudolph unpack Gator, get all CH2M articles out & put away.

1215 E&E mobes to decon pad to decon rods/casing

1300 Mobe to field trailer to transfer LIF logs, send daily report, clean out trailer, etc.

1515 Everyone offsite, set alarm, lock set, & depart for day.

3/22/13

Location Date

Project / Client

Appendix C
Direct Push and RotoSonic Soil Coring Data

Appendix C-1
Soil Coring Logs

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-001**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/18/2013
END DATE: 2/18/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 35'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	0.3-0.4	1.7	SP	0.0' -1.7': Fine to medium SAND (SP), some Silt, trace fine sub rounded Gravel, trace wood at 0.3' w/ sheen, yellowish brown, dry.	0.3': Heavy sheen	PID = 0.2 ppm
1							
2				NR	1.7' - 4.0': No Recovery	1.6': Heavy sheen	
3							
4	4 to 8	4.7	1.4	SP	4.0' -5.4': Fine to medium SAND (SP), some fine to coarse sub rounded Gravel, trace wood, trace Silt, moist, black, trace shells.	4.0' - 5.4': Moderate sheen and oil coated throughout	4.2': PID = 1.1 ppm 4.6': PID = 2.2 ppm
5		5.2		NR	5.4' -8.0': No Recovery		5.0': PID = 7.6 ppm Breathing Zone: PID = 0.8 ppm
6							
7							
8	8 to 12	9.0 - 9.1	2.0	SP	8.0' -10.0' : Fine to medium SAND (SP), little fine sub rounded to well rounded Gravel, trace Silt, trace shell fragments throughout, moist, black.	8.0' - 10.0': Moderate sheen and oil coated throughout	8.3': PID = 17.8 ppm 8.7': PID = 32.5 ppm 9.0': PID = 18.4 ppm 9.6': PID = 25.5 ppm
9							
10				NR	10.0' - 12.0': No Recovery		Breathing Zone: PID = 1.1 ppm
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-001**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/18/2013
END DATE: 2/18/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 35'
DTW:

12	12 to 16		0.4	SW NR	12.0' - 12.4': Fine to coarse SAND (SW), some fine to coarse well rounded Gravel, trace Silt, shell fragments throughout, wet, dark gray. 12.4' - 16.0': No Recovery	12.0' - 12.4': Heavy sheen and oil coated throughout	PID = 6.0 ppm Breathing Zone: PID = 1.0 ppm
16	16 to 20	17.5 - 17.8	2.8	SW NR	16.0' - 18.8': Fine to coarse SAND (SW), trace fine to coarse sub rounded Gravel, trace Silt, wet, dark gray. 18.8' - 20.0': No Recovery	16.0' - 18.8': Heavy sheen throughout 16.0' - 16.6': Oil coated 16.6' - 16.8': Oil wetted 16.8' - 17.1': Oil coated 17.1' - 18.2': Oil wetted 18.2' - 18.8': Oil coated	16.4': PID = 19.6 ppm 17.0': PID = 23.5 ppm 17.6': PID = 22.3 ppm 18.0': PID = 17.7 ppm 18.7': PID = 27.0 ppm Breathing Zone: PID = 2.2 ppm
20	20 to 24	21.4-21.6	1.9	SW NR	20.0' - 21.9': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, trace Silt, wet, dark gray. 21.9' - 24.0': No Recovery	20.0' - 21.9': Slight sheen throughout, oil wetted throughout	20.5': PID = 18.4 ppm 21.0': PID = 45.1 ppm 21.5': PID = 43.2 ppm Breathing Zone: PID = 2.7 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-001**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/18/2013
END DATE: 2/18/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 35'
DTW:

24							
	24 to 28		2.4	SW	24.0' - 26.4': Fine to coarse SAND (SW), trace Silt, wet, dark gray.	24.0' - 26.4': Heavy sheen and oil wetted throughout sample; NAPL density field test indicates LNAPL	
25							25.0': PID = 14.2 ppm
							25.5': PID = 13.7 ppm
26		26.0-26.1					26.0': PID = 18.2 ppm
				NR	26.4' - 28.0': No Recovery		
27							
28							
		28.2-28.4	1.9	SW	28.0' - 29.9': Fine to coarse SAND (SW), trace fine to coarse sub rounded to well rounded Gravel, trace Silt, wet, dark gray.	28.0' - 28.7': Heavy sheen	28.5': PID = 20.0 ppm
29						28.7' - 29.9': Moderate sheen and oil coated	29.0': PID = 27.0 ppm
							29.5': PID = 19.6 ppm
30	28 to 32			NR	29.9' - 32.0': No Recovery		Breathing Zone: PID = 1.2 ppm
31							
32							
		32.3-32.4	2.5	SW	32.0' - 33.8': Fine to coarse SAND (SW), trace fine to coarse sub rounded to well rounded Gravel, trace Silt, wet, dark gray.	32.0' - 34.5': Slight to moderate sheen and oil wetted throughout; NAPL density field test indicates LNAPL and DNAPL	Poor recovery in initial borehole. Moved over and redrilled this run.
33							32.5': PID = 41.9 ppm
							33.0': PID = 51.9 ppm
	32 to 35	33.5-33.7					33.5': PID = 43.3 ppm
34				GW	33.8' - 34.5': Fine to coarse rounded to sub rounded Gravel (GW), some fine to coarse Sand, little Silt, dark gray, wet.		34.0:' PID = 30.6 ppm
				NR	34.5' - 35.0': No Recovery		Breathing Zone: PID = 1.7 ppm
35					35.0': End of Boring - Refusal		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-002**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/19/2013
END DATE: 2/19/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0			1.9	SP	0.0' - 1.9': Predominantly fine SAND (SP), some Silt, trace fine Gravel, moist, yellowish brown to dark brown.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2	0 to 4			NR	1.9' - 4.0': No Recovery		
3							
4			1.8	SP	4.0' - 5.8': Predominantly fine SAND (SP), some Silt, trace fine Gravel, trace wood, moist, dark gray to grayish black.		4.5': PID = 21.9 ppm
5		5.4-5.6				5.0' - 5.8': Slight sheen and NAPL staining	5.0': PID = 20.3 ppm 5.5': PID = 35.5 ppm
6	4 to 8			NR	5.8' - 8.0': No Recovery		Breathing Zone: PID = 0.2 ppm
7							
8			1.4	GP	8.0' - 9.4': Fine to coarse sub rounded GRAVEL (GP), some Silt, trace fine Sand, moist, dark gray.		
9		9.0-9.2				Slight to moderate sheen throughout 8.5': Oil coated	8.5': PID = 28.4 ppm 9.0': PID = 107 ppm
10	8 to 12			NR	9.4' - 12.0': No Recovery	9.0': Oil coated	Breathing Zone: PID = 0.5 ppm
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-002**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/19/2013
END DATE: 2/19/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

12							
	12 to 16	12.7-12.9	3.8	SP	12.0'-15.8': Predominantly fine SAND (SP), some Silt, trace fine sub rounded to well rounded Gravel, trace shells, dark gray, moist to wet at 14.1'.	Slight sheen throughout 12.0'-14.1': Oil staining	Breathing Zone: PID = 0.4 ppm
13							13.0': PID = 101 ppm
14						14.1'-14.9': Oil coated	14.0': PID = 97.4 ppm
15		15.3-15.5				14.9'-15.8': Oil wetted	15.0': PID = 92.5 ppm
16				NR	15.8'-16.0': No Recovery		15.8': PID = 67.3 ppm
	16 to 20	16.5-16.7	4.0	GW	16.0'-20.0': Fine to coarse rounded and sub rounded GRAVEL and fine to coarse SAND (GW), some Silt, layered Gravel and Sand, trace shells, wet, grayish black.	16.0'-20.0': Oil wetted, slight to moderate sheen	Breathing Zone: PID = 0.4 ppm
17							17.0': PID = 132 ppm
18							18.0': PID = 154 ppm
		18.7-19.0					
19							19.0': PID = 163 ppm
20							19.9': PID = 120 ppm
	20 to 24		1.8	GM	20.0'-21.8': Silty fine to coarse sub rounded to rounded GRAVEL (GM), some fine Sand, wet, olive gray.	20.0'-21.8': Heavy sheen throughout, slight oil wetting	
21							21.0': PID = 25 ppm
							21.5': PID = 23.2 ppm
22				NR	21.8'-24.0': No Recovery		Breathing Zone: PID = 1.4 ppm
23							
24			3.0	GM	24.0'-27.0': Silty fine to coarse sub rounded GRAVEL and fine SAND (GM), wet, olive gray.	24.0'-27.0': Heavy sheen throughout, slight soil staining in bands	Breathing Zone: PID = 1.4 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-002**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/19/2013
END DATE: 2/19/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

25	24 to 28						25.0': PID = 53.6 ppm
26		26.6-26.8				26.6'-27.0': Oil coated	26.0': PID = 22.2 ppm
27				NR	27.0'-28.0': No Recovery		27.0': PID = 38 ppm
28	28 to 32	28.7-28.9	2.9	SW	28.0'-30.9': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, trace Silt, wet, dark gray.	28.0'-29.0': No sheen, oil coated	Breathing Zone: PID = 1.1 ppm 28.6': PID = 70.6 ppm
29							29.0': PID = 171 ppm
30							29.7': PID = 46.8 ppm 30.2': PID = 39.1 ppm
31				NR	30.9'-32.0': No Recovery		
32	32 to 36	32.8-33.0	2.2	SW	32.0'-34.2': Fine to coarse SAND and fine to coarse sub rounded GRAVEL (SW), little Silt, wet, dark gray.	32.0'-34.2': NAPL odor present, no sheen	Breathing Zone: PID = 0.9 ppm
33							32.8': PID = 8.9 ppm 33.4': PID = 8.0 ppm
34				NR	34.2'-36.0': No Recovery		33.9': PID = 6.4 ppm
35							
36	36 to 40		2.5	SW	36.0'-38.5': Fine to coarse SAND and fine to coarse sub rounded GRAVEL (SW), little Silt, wet, dark gray.	36.0'-38.5': NAPL odor, no sheen or visible oil	Breathing Zone: PID = 0.3 ppm 1.0': PID = 3.2 ppm 1.5': PID = 2.6 ppm 2.0': PID = 1.5 ppm 2.5': PID = 3.1 ppm
37							
38				NR	38.5'-40.0': No Recovery		

CH2MHILL

SOIL BORING LOG

PAGE: 4

BORING NO: **2013SC-002**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/19/2013
END DATE: 2/19/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

39							
40	40 to 44	41.1-41.3	2.5	SW	40.0'-42.5': Fine to coarse SAND (SW), some fine to coarse sub rounded to well rounded Gravel, little Silt, wet, dark gray.	Slight NAPL odor 41.1'-41.3': No sheen or visible oil	Breathing Zone: PID = 0.4 ppm 40.5': PID = 6.2 ppm 41.0': PID = 2.4 ppm 42.0': PID = 3.1 ppm
41							
42							
43				NR	42.5'-44.0': No Recovery		
44	44 to 48		0.0	NR	44.0'-48.0': No Recovery - see comment; Silty fine to coarse SAND from bottom (48.0') of sampler barrel.	N/A	Sample liner stuck in casing down borehole. Tripped out casing to retrieve it; could not recover the sample intact.
45							
46							
47							
48	48 to 52	50.0-50.3	2.5	SW	48.0'-50.5': Fine to coarse SAND (SW), some fine to coarse Gravel, Silt increasing from trace to some silt at 48.8', trace shell fragments, wet, olive gray.	48.0'-50.5': No visible evidence of NAPL, no sheen	48.3': PID = 3.0 ppm 48.3'-50.5': PID = 0.1 ppm Breathing Zone: PID = 0.0 ppm
49							
50							
51				NR	50.5'-52.0': No Recovery		
52			1.6	SM	52.0'-53.6': Silty fine to medium SAND (SM), trace fine to coarse rounded Gravel, trace shell fragments, trace wood/plant fibers, wet, olive gray.	No visible evidence of NAPL	Sampler barrel disconnected down-hole, trip out all casing to retrieve 52.0' - 56.0', liner retrieved shredded
53							

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SOIL BORING LOG

BORING NO: **2013SC-002**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/19/2013
END DATE: 2/19/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

54	52 to 56			NR	53.6'-56.0': No Recovery		PID = 0.2 ppm
55							
56							
57	56 to 60	57.0-57.2	3.4	SM	56.0'-58.5': Silty to fine medium SAND (SM), trace fine rounded Gravel, abundant shell fragments throughout, wet, olive gray.		56.5': PID = 0.9 ppm 57.0': PID = 1.3 ppm
58				ML	58.5'-59.4': Very dense, Sandy SILT (ML), some fine to coarse rounded to well rounded Gravel, yellowish brown, moist.		
59		59.2-59.4		NR	59.4'-60.0': No Recovery	No sheen throughout sample 59.3': Oil-stained nodule	59.0': PID = 1.5 ppm
60					60.0': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-006**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/25/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 50'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		1.6	SP	0.0'-1.6': Fine to medium SAND (SP), trace fine to coarse rounded Gravel, trace plant material, trace shells, trace Silt, dark brown, slightly moist.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2				NR	1.6'-4.0': No Recovery		
3							
4	4 to 8		1.2	SW	4.0'-5.2': Fine to coarse SAND (SW), some fine to coarse Gravel, little Silt, trace shells, dark brown to dark gray at 5.0', moist.		PID = 0.0 ppm
5		5.0-5.1		NR	5.2'-8.0': No Recovery	4.9'-5.2': Moderate sheen	
6							
7							
8	8 to 12	8.6-8.7	0.9	GW	8.0'-8.9': Fine to coarse sub rounded to rounded GRAVEL (GW), some fine to coarse Sand, some Silt, dark gray, moist.	8.0'-8.9': Moderate sheen throughout	8.2': PID = 6.8 ppm 8.6': PID = 26.4 ppm
9				NR	8.9'-12.0': No Recovery		8.8': PID = 24 ppm
10							
11							

CH2MHILL

SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-006**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/25/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 50'
DTW:

12	12 to 16	12.3-12.5	2.9	SP	12.0'-14.9': Predominantly fine SAND (SP), trace fine Gravel, little Silt, trace shell fragments, trace organics, wet, dark gray.	12.0'-12.4': Heavy sheen	Driller notes void at 12'-16': No Recovery. Offset ~1 ft and redrill. 12.6': PID = 8.4 ppm
13		13.1-13.3				13.0'-13.3': Oil coated	13.0': PID = 9.8 ppm 13.5': PID = 2.7 ppm
14						13.8'-14.0': Oil coated	14.0': PID = 1.5 ppm
15		14.6-14.8		NR	14.9'-16.0': No Recovery	14.6'-14.8': Oil coated	
16	16 to 20		2.6	SW	16.0'-18.6': Fine to coarse SAND (SW), little fine to coarse Gravel, little Silt, wet, dark gray.	16.0'-18.6': Heavy sheen throughout	Driller notes void at 16'-20': No Recovery. Offset ~1 ft and redrill (same borehole as 12' to 16').
17		16.9-17.1				16.9'-17.1': Oil coated	16.5': PID = 2.0 ppm 17.0': PID = 26.8 ppm
18		17.9-18.0				17.9'-18.0': Oil coated	18.0': PID = 21.0 ppm
19				NR	18.6'-20.0': No Recovery		
20	20 to 24		2.3	SW	20.0'-22.3': Fine to coarse SAND and sub rounded to well rounded GRAVEL (SW), little Silt, wet, grayish black.	Layer of product at top of sample tube prior to opening ~1" thick.	Breathing Zone: PID = 0.3 ppm
21		20.6-20.7				20.0'-22.3': Oil wetted throughout with moderate sheen.	20.6': PID = 11.8 ppm 21.0': PID = 44.4 ppm 21.6': PID = 35.9 ppm
22							22.0': PID = 39.4 ppm
23				NR	22.3'-24.0': No Recovery		
24			4.0	SW	24.0'-28.0': Fine to coarse SAND and fine to coarse sub rounded to rounded GRAVEL (SW), some Silt, wet, dark gray.	24.0'-28.0': Moderate to heavy sheen and oil wetted throughout.	Breathing Zone: PID = 0.7 ppm 24.2': PID = 9.6 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-006**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/25/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 50'
DTW:

25	24 to 28	24.9-25.0					25.0': PID = 3.7 ppm
26							26.0': PID = 7.1 ppm
27							27.0': PID = 27.8 27.6': PID = 21.6 ppm
28	28 to 32	28.6-28.7	3.0	SW	28.0'-31.0': Same as above (SW), increasing Silt at 29.7' and olive gray to dark gray at 29.6'.		Breathing Zone: PID = 0.4 ppm 28.4': PID = 3.0 ppm
29							29.0': PID = 1.3 ppm
30		30.3-30.4				30.0'-31.0': Heavy sheen 30.3'-30.4': Oil wetted	30.0': PID = 1.2 ppm
31				NR	31.0'-32.0': No Recovery		30.6': PID = 0.9 ppm
32	32 to 36		3.0	SW	32.0'-35.0': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, some Silt, trace shell fragments, wet, dark gray.	Heavy sheen throughout appears to have come from core liner and coated outside of sample core.	32.5': PID = 0.5 ppm
33							33.0': PID = 0.7 ppm
34		34.4-34.5					33.6': PID = 2.0 ppm 34.0': PID = 2.4 ppm
35				NR	35.0'-36.0': No Recovery		35.5': PID = 3.2 ppm
36	36 to 40	36.4-36.5	3.7	SP	36.0'-39.7': Fine to medium SAND (SP), little fine to coarse sub rounded to rounded Gravel, little Silt, little fine shell fragments throughout, wet, dark gray.	36.0'-37.0': Slight sheen	36.5': PID = 3.3 ppm
37							37.0': PID = 4.4 ppm
38							38.0': PID = 0.7 ppm

CH2MHILL

SOIL BORING LOG

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BORING NO: **2013SC-006**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/25/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 50'
DTW:

39				NR	39.7'-40.0': No Recovery		39.0': PID = 0.5 ppm
40	40 to 44		2.5	SP	40.0'-42.5': Fine to medium SAND (SP), little fine to coarse sub rounded to rounded Gravel, little Silt, abundant shell fragments throughout, wet, olive gray. Increasing Silt from 42.0'-42.5'.	No visible evidence of NAPL	40.5': PID = 0.7 ppm
41							41.0': PID = 0.4 ppm
42							41.8': PID = 0.1 ppm
43				NR	42.5'-44.0': No Recovery		
44	44 to 48	44.4-44.5	3.9	ML	44.0'-44.9': Clayey SILT (ML), slight plasticity, little fine Sand, trace rounded Gravel, trace organics/wood, abundant shells, wet, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm
45				SM	44.9'-47.9': Silty SAND (predominantly medium) (SM), trace fine sub rounded Gravel, trace shells, wet, light gray.		
46		46.2-46.3					
47							
48				NR	47.9'-48.0': No Recovery		
48	48 to 50		2.0	SM	48.0'-49.0': Same as 44.9'-47.9' (SM), shells only from 48.0'-48.4'.	No visible evidence of NAPL	PID = 0.0 ppm
49		49.4-49.5		SM	49.0'-50.0': Very dense Sandy SILT (SM), some fine to coarse sub rounded to rounded Gravel, some fine to coarse Sand, moist, grayish brown, with few oxidized nodules.		
50					50.0' - End of Boring - Refusal		Refusal at 50.0'

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-013**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 52'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	1.0-1.2	1.7	SM	0.0'-1.7': Silty SAND with Gravel (SM), brown, with white sea shells, moist, fine to coarse sand, fine to coarse sub-angular gravel, grass and roots in top 4", ~25% fines, ~20% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
1							
2				NR	1.7'-4.0': No Recovery		
3							
4	4 to 8	4.4-4.5	2.1	SM	4.0'-5.0': Silty SAND (SM), brown with orange iron oxide lenses, fine to medium sand, ~35% fines.	No visual evidence of NAPL	PID = 0.0 ppm
5				SW	5.0'-6.1': Well-graded SAND (SW), gray, with white sea shells, fine to coarse sand, trace Gravel, ~5% fines.		
6				NR	6.1'-8.0': No Recovery		
7							
8	8 to 12	9.9-10.0	2.1	SW	8.0'-9.9': Well-graded SAND (SW), same as above.	Slight odor	PID = 0.0 ppm
9							
10				GW	9.9'-10.1': Well-graded GRAVEL with Sand (GW), black, wet, fine to coarse sub-rounded gravel, fine to medium sand, ~35% sand, ~5% fines.	9.9'-10.1': Slight sheen	
				NR	10.1'-12.0': No Recovery		
11							
12			2.5	GW	12.0'-12.8': Well-graded GRAVEL with Sand (GW), same	Mild Odor	12.0': PID = 1.6 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-013**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 52'
DTW:

13	12 to 16				as above.	12.0'-14.5': Slight sheen	
		13.4-13.6		SW	12.8'-14.5': Well-graded SAND (SW), gray, wet, fine to coarse sand, predominantly fine to medium sand, white sea shells, ~5% fines.	13.4'-13.6': Oil coating	13.0': PID = 6.7 ppm
14							14.0': PID = 2.2 ppm
15				NR	14.5'-16.0': No Recovery		
16	16 to 20	16.1-16.2	2.3	SW	16.0'-18.3': Well-graded SAND with Gravel (SW), dark gray from 16.0'-16.9', gray from 16.9'-17.5', dark gray from 17.5'-18.3', with white sea shells, wet, fine to coarse sand, fine sub-rounded gravel, ~5% fines, ~15% gravel.	Mild to strong odor 16.0'-16.4': Slight sheen	16.0': PID = 0.2 ppm
17							17.0': PID = 0.1 ppm
18		17.5-17.6				17.5'-18.3': Slight sheen	18.0': PID = 0.2 ppm
19				NR	18.3'-20.0': No Recovery		
20	20 to 24		0.8	GW	20.0'-20.8': Well-graded GRAVEL with Sand (GW), black, wet, fine to coarse sub-rounded gravel, fine to coarse sand, ~15% sand, ~less than 5% fines.	Slight odor 20.0'-20.8': No visual evidence of NAPL	PID = 0.0 ppm
21				NR	20.8'-24.0': No Recovery		
22							
23							

CH2MHILL

SOIL BORING LOG

PAGE: 3

BORING NO: **2013SC-013**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 52'
DTW:

24	24 to 28		0.7	GW	24.0'-24.7': Well-graded GRAVEL with Sand (GW), same as above.	Slight odor 24.0'-24.7': No visual evidence of NAPL	PID = 0.0 ppm
25				NR	24.7'-28.0': No Recovery		
26							
27							
28	28 to 32	28.6-28.8	1.3	SW	28.0'-29.3': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, fine to coarse sub-rounded gravel, ~5% fines, ~15% gravel.	Slight odor 28.0'-29.3': No visual evidence of NAPL	PID = 0.0 ppm
29				NR	29.3'-32.0': No Recovery		
30							
31							
32	32 to 36	34.2-34.4	2.6	SW	32.0'-34.6': Well-graded SAND with Gravel (SW), same as above.	Slight odor 32.0'-34.6': No visual evidence of NAPL	PID = 0.0 ppm
33							
34				NR	34.6'-36.0': No Recovery		
35							
36		36.3-36.4	0.8	SW	36.0'-36.8': Well-graded SAND with Gravel (SW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
37				NR	36.8'-40.0': No Recovery		

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-013**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 52'
DTW:

38	36 to 40						
39							
40	40 to 44		3.7	SM	40.0'-43.7': Silty SAND with Gravel (SM), gray, wet, fine to coarse sand, fine sub-rounded gravel, some wood chips between 40.0'-41.0', ~15% fines, ~15% gravel.	No visual evidence of NAPL	
41							
42							42.0': PID = 0.1 ppm
43		43.2-43.3					43.0': PID = 0.2 ppm
				NR	43.7'-44.0': No Recovery		
44	44 to 48		2.4	SM	44.0'-46.4': Silty SAND with Gravel (SM), gray from 44.0'-44.8', tan with orange iron oxide staining from 44.8'-46.4', wet, fine to coarse sand, fine to coarse sub-rounded gravel, ~20% fines, ~20% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
45							
46		46.0-46.2					
				NR	46.4'-48.0': No Recovery		
47							
48	48 to 52		4.0	SM	48.0'-52.0': Silty SAND with Gravel (SM), tan with orange iron oxide lenses at 50.0', moist, fine to coarse sand, fine to coarse sub-rounded gravel, ~25% fines, ~25% gravel. Till at 48.0'.	No visual evidence of NAPL	PID = 0.0 ppm
49		49.0-49.2					
50							
51							
52					52.0': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-014**

PROJECT NO: **438527.FI.02.01** START DATE: 3/20/2013

PROJECT NAME: Wyckoff END DATE: 3/20/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 39.5 DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	1.7-1.8	1.9	SM	0.0'-1.9': Silty SAND with Gravel (SM), dark brown from 0.0'-1.0', dark gray from 1.0'-1.9', moist, fine to coarse sand, fine to coarse sub-angular gravel, organics and decomposed wood from 0.0'-0.5', ~30% fines, ~15% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
1							
2				NR	1.9'-4.0': No Recovery		
3							
4	4 to 8	4.9-5.0	2.8	SM SW	4.0'-4.4': Silty SAND with Gravel (SM), tan to gray, moist, fine to coarse sand, fine to coarse gravel, ~30% fines, ~20% gravel.	Slight odor	PID = 0.106 ppm
5				ML	4.4'-4.8': Well-graded SAND (SW), gray, moist, fine to coarse sand.		
6		5.8-6.0		SW	4.8'-6.0': Sandy SILT (ML), gray, moist, non-plastic, ~35% sand, trace Gravel. 6.0'-6.8': Well-graded SAND (SW), black, moist, fine to coarse sand, trace Gravel.	5.8'-6.0': Slight sheen	
7				NR	6.8'-8.0': No Recovery		
8	8 to 12	8.6-8.7	1.7	SW	8.0'-9.7': Well-graded SAND (SW), gray, moist, fine to coarse sand, predominantly fine to medium sand, decomposed white sea shells, trace fine sub-rounded Gravel, ~5% fines, ~5% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
9							
10				NR	9.7'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-014**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 39.5
DTW:

12							
13	12 to 16	12.5-12.6	1.8	SW	12.0'-13.8': Well-graded SAND (SW), similar to above except ~10% Gravel, wet.	Slight odor 12.4'-12.8': Moderate sheen	12.5': PID = 0.4 ppm
14				NR	13.8'-16.0': No Recovery		13.5': PID = 0.2 ppm
15							
16	16 to 20	17.5-17.6	1.7	SW	16.0'-17.7': Well-graded SAND (SW), similar to above except lots of decomposed sea shells from 17.0'-17.7'.	No visual evidence of NAPL	PID = 0.0 ppm
17				NR	17.7'-20.0': No Recovery		
18							
19							
20	20 to 24	21.2-21.3	2.3	SW	20.0'-22.3': Well-graded SAND (SW), similar to above, except lots of sea shells from 20.0'-20.7'.	Slight odor 21.2'-21.4': Heavy sheen 21.25'-21.3': Oil coating	21.3': PID = 0.1 ppm
21							
22				NR	22.3'-24.0': No Recovery		
23							

CH2MHILL

SOIL BORING LOG

PAGE: 3

BORING NO: **2013SC-014**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 39.5
DTW:

24	24 to 28	25.0-25.2	2.1	SW	24.0'-26.1': Well-graded SAND (SW), same as above.	Slight odor 24.0'-26.1': No visual evidence of NAPL	PID = 0.0 ppm
25							
26				NR	26.1'-28.0': No Recovery		
27							
28	28 to 32	29.0-29.1	2.2	SW	28.0'-28.8': Well-graded SAND (SW), same as above, except lots of sea shells.	No visual evidence of NAPL	PID = 0.0 ppm
29				SM	28.8'-30.2': Silty SAND with Gravel (SM), brown, wet, fine to coarse sand, fine to coarse sub-rounded gravel, ~25% fines, ~15% gravel.		
30				NR	30.2'-32.0': No Recovery		
31							
32	32 to 36		4.4	SM	32.0'-33.2': Silty SAND (SM), brown, wet, fine to coarse sand, ~15% fines.	No visual evidence of NAPL	PID = 0.0 ppm
33				ML	33.2'-35.2': Sandy SILT (ML), brown, with orange iron oxide stain, non-plastic, moist, interbedded layer of decomposed organics, ~30% fine sand.		
34							
35		35.2-35.3		ML	35.2'-36.0': SILT (ML), gray, moist to dry, low to non-plastic, ~5% Sand.		
36			4.0	ML	36.0'-38.5': SILT (ML), gray, similar to above.	No visual evidence of NAPL	PID = 0.0 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-014**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 39.5
DTW:

37	36 to 39.5	38.6-38.8		ML	38.5'-39.5': SILT (ML), brown, dry to slightly moist, non-plastic, ~10% Sand. 39.5': End of Boring - Refusal		
38							
39							
				SM	39.5'-40.0': Silty SAND with Gravel (SM), brown, slightly moist, fine to coarse sand, fine sub-rounded gravel, ~20% fines, ~15% gravel.		
40							

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-036**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/20/2003
END DATE: 2/22/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 64'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		2.0	SM	0.0'-2.0': SILT and fine to medium SAND (SM), trace fine angular Gravel, trace decomposed wood/organics, slightly moist, yellowish brown.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2				NR	2.0'-4.0': No Recovery		
3							
4	4 to 8		1.5	SP	4.0'-5.5': Very fine to fine SAND (SP), moist, light gray with some oxidation, trace shell fragments.	No visible evidence of NAPL	PID = 0.0 ppm
5							
6				NR	5.5'-8.0': No Recovery		
7							
8	8 to 12		2.6	SP	8.0'-10.6': Same as above (SP), no shells, light gray with oxidized laminations, moist to wet at ~9.9', color changes to dark gray at 9.9'.		Breathing Zone: PID = 0.2 ppm 8.5': PID = 0.0 ppm
9							9.0': PID = 0.0 ppm
10		10.0-10.2				9.9'-10.6': Oil stained and heavy sheen	10.0': PID = 1.3 ppm
				NR	10.6'-12.0': No Recovery		10.5': PID = 12.5 ppm
11							

CH2MHILL

SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-036**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/20/2003
END DATE: 2/22/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 64'
DTW:

12	12 to 16	12.1-12.3	2.7	SP	12.0'-14.7': Fine SAND (SP), little Silt, trace fine rounded Gravel, trace wood fragments, dark gray, wet.	12.0'-14.0': Heavy Sheen 12.0'-12.4': Oil coating 12.4' - 14.0' : Oil staining in bands 14.0'-14.05': Oil coating	Breathing Zone: PID = 0.2 ppm 12.4': PID = 10.8 ppm 13.0': PID = 7.6 ppm 14.0': PID = 5.7 ppm
13							
14							
15				NR	14.7'-16.0': No Recovery		
16	16 to 20		4.0	SP	16.0'-20.0': Fine SAND (SP), some Silt, trace wood fragments, trace fine sub angular Gravel, few shell fragments throughout, olive gray, wet.		Heaving sand, drillers add water to borehole casing to try to control. Battery on PID died; plugged in to charge
17							
18		18.4-18.6				18.1'-18.2': Heavy sheen and oil coated. 18.4'-18.6': Heavy sheen and oil coated.	
19							
20		19.8-19.9	0.7	GM	20.0'-20.7': Silty fine to coarse sub rounded GRAVEL (GM), some fine to coarse Sand, trace shell fragments, wet, olive gray.	20.3'-20.4': Heavy sheen and oil staining	No PID reading - PID on charger
21	20 to 24			NR	20.7'-24.0': No Recovery		
22							
23							
24			3.8	SM	24.0'-26.0': Silty fine to coarse SAND (SM), some fine to coarse sub rounded to well rounded Gravel, trace shells, wet, olive gray.	No visible evidence of NAPL Slight Odor	Original sample liner crumpled in sampler barrel due to gravel.

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-036**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/20/2003
END DATE: 2/22/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 64'
DTW:

25							Drillers trip out and go back in same borehole.
26	24 to 28	26.0-26.2		SP	26.0'-27.8': Predominantly fine SAND (SP), little Silt, trace fine rounded Gravel, wet, dark gray, no shells, trace wood/organics.		No PID reading - PID on charger
27							
28				NR	27.8'-28.0': No Recovery		
28			4.0	SP	28.0'-32.0': Predominantly fine SAND (SP), some Silt, trace fine rounded Gravel, trace shell fragments and plant fibers/organics, wet, dark gray grading to olive gray at 30.0'.	No visible evidence of NAPL	No PID reading - PID on charger
29							
30	28 to 32						
31							
32			3.1	SM	32.0'-34.2': Silty fine SAND (SM), abundant shell fragments, trace fine rounded Gravel, wet, olive gray.		32.2': PID = 0.9 ppm
33							33.0': PID = 0.1 ppm
34	32 to 36	34.7-34.9		GP	34.2'-35.1': Fine to coarse GRAVEL (GP), little fine to coarse Sand, trace shell fragments, grayish black, wet, trace wood fiber.	34.6'-35.1': Slight sheen and oil stained	34.0': PID = 0.1 ppm
35				NR	35.1'-36.0': No Recovery		35.0': PID = 39 ppm
36			2.0	SW	36.0'-38.0': Fine to coarse SAND and fine to coarse rounded to well rounded GRAVEL (SW), trace Silt, trace shell fragments, grayish black, wet.	36.0'-37.1': Heavy sheen and oil coated	36.2': PID = 30.4 ppm
37		36.3-36.5					37.0': PID = 32.1 ppm
38	36 to 40			NR	38.0'-40.0': No Recovery		37.5': PID = 4.5 ppm

CH2MHILL

SOIL BORING LOG

PAGE: 4

BORING NO: **2013SC-036**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/20/2003
END DATE: 2/22/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 64'
DTW:

39							
40	40 to 44	41.2-41.4	2.1	SW	40.0'-42.1': Fine to coarse SAND and fine to coarse rounded to well rounded GRAVEL (SW), little Silt, trace fine shell fragments, wet, olive gray.	No visible evidence of NAPL	PID = 0.4 ppm Breathing Zone: PID = 0.3 ppm
41							
42				NR	42.1'-44.0': No Recovery		
43							
44	44 to 48		3.6	SW	44.0'-47.6': Fine to coarse SAND and fine to coarse rounded to well rounded GRAVEL (SW), little Silt, abundant shell fragments, wet, dark gray.	No visible evidence of NAPL	44.0'-48.0': Heaving sand filled sample liner prior to reaching sample depth (2/20/13). Trip tooling out and go back in with closed tip sampler. Sample stuck in core barrel - offset ~2 ft North and redrill sample interval (2/21/13).
45							
46							
47							44.5': PID = 0.3 ppm 45.5': PID = 0.4 ppm 46.0': PID = 0.5 ppm
48				NR	47.6'-48.0': No Recovery		47.0': PID = 1.0 ppm
49	48 to 52	48.6-48.8	2.4	SW	48.0'-50.4': Fine to coarse SAND and fine to coarse rounded to well rounded GRAVEL (SW), trace Silt, abundant shell fragments throughout, wet, dark gray.	No visible evidence of NAPL	48.5': PID = 0.2 ppm 49.4': PID = 0.2 ppm
50							50.0': PID = 0.1 ppm
51				NR	50.4'-52.0': No Recovery		
52			3.2	SW	52.0'-55.2': Same as above (SW), little to some Silt.	No visible evidence of NAPL	
53							53.0': PID = 0.1 ppm

CH2MHILL

SOIL BORING LOG

PAGE: 5

BORING NO: **2013SC-036**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/20/2003
END DATE: 2/22/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 64'
DTW:

54	52 to 56						54.0': PID = 0.1 pm
55				NR	55.2'-56.0': No Recovery		55.0': PID = 0.0 ppm
56							
	56 to 60	56.5-56.7	2.2	SP	56.0'-58.2': Fine to medium SAND (SP), little Silt, trace fine sub rounded Gravel from 57.8'-58.2', abundant fine shell fragments, wet, dark gray.	No visible evidence of NAPL	Breathing Zone: PID = 0.4 ppm 56.5': PID = 1.8 ppm
57							57.0': PID = 1.1 ppm
58				NR	58.2'-60.0': No Recovery		58.0': PID = 1.7 ppm
59							
60			0.5	SM	60.0' - 60.5': Silty fine to medium SAND (SM), little fine rounded Gravel, moist, olive gray, dense.	No visible evidence of NAPL	Very hard drilling. Rods would not advance past 62.5'.
	60-62.5			NR	60.5'-62.5': No Recovery		PID = 0.1 ppm
61							
62							
63	62.5-64	63.0-63.1	0.7	SM	62.5'-63.2': Very dense Silty fine SAND (SM), some fine to coarse sub rounded to rounded Gravel, moist, olive gray, likely glacial till aquitard.	No visible evidence of NAPL	Very hard drilling PID = 0.2 ppm
				NR	63.2'-64.0': No Recovery		
64					64.0: End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-041**

PROJECT NO: **438527.FI.02.01** START DATE: 2/5/2013

PROJECT NAME: Wyckoff END DATE: 2/6/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 78' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		4.0	ML	0.0'-3.0': Silty SAND (ML), predominantly fine sand, some fine to coarse well rounded Gravel, trace sub rounded Cobbles, moist, light brown, trace wood fragments.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2							
3				SW	3.0'-4.0': Fine to coarse SAND (SW), some Silt, little fine to coarse rounded to well rounded Gravel, grading to Silty SAND (SM) at 4.0'. Sand is light brown, silty sand is dark gray.		
4		3.8-4.0					4.0': Sulfur odor
	4 to 5		1.0	SM	4.0'-5.0': Silty SAND (SM), predominantly fine, some fine to coarse sub rounded to well rounded Gravel, trace Cobbles, medium brown, slightly moist.	No visible evidence of NAPL	PID = 0.0 ppm
5	5 to 10		4.3	SM	5.0'-8.1': Silty SAND (SM), fine to coarse, some fine to coarse rounded and sub rounded Gravel, trace sub rounded Cobbles, moist, medium brown.	No visible evidence of NAPL	PID = 0.0 ppm
6							
7							
8				SP	8.1'-9.3': Very fine SAND (SP), trace Silt, moist, light brown with some light gray laminations and oxidized nodules.		
9				NR	9.3'-10.0': No Recovery		
10			5.0	SP	10.0'-15.0': Predominantly fine SAND (SP), <5% fines, trace wood fragments, moist to wet at 12.0', light brown, some oxidized laminations, grading to fine to medium sand at 13.3' with trace fine sub rounded Gravel and oxidation from 14.8'-15.0', olive gray and moist.	No visible evidence of NAPL	PID = 0.0 ppm
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-041**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: EPA
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/5/2013
END DATE: 2/6/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic
BORING DIAMETER: 4.5", 2.25" inner sampling rod
TOTAL DEPTH: 78'
DTW:

12	10 to 15						
13							
14							
15		15.0					
	15 to 20		3.7	SW	15.0'-15.9': Fine to coarse SAND (SW), trace Silt, little fine sub rounded Gravel, olive gray, wet.	No visible evidence of NAPL	PID = 0.0 ppm Sulfur odor
16		16.0-16.2		SW	15.9'-16.4': Fine to coarse SAND (SW), little Silt, little fine to coarse sub rounded Gravel, some wood pulp, dark gray to black, moist.		
17		17.1-17.3		SP	16.4'-18.7': Fine to medium SAND (SP), trace fine to coarse well rounded and rounded Gravel, trace shells, little wood fragments, trace Silt, wet.		
18							
19				NR	18.7'-20.0': No Recovery		
20			4.5	SP-Wood	20.0'-21.3': Fine to medium SAND and wood pulp (SP-Wood), trace Silt, trace fine sub rounded Gravel, dark gray, moist to wet	20.0'-23.0': Heavy sheen	
21		20.8-21.0				20.8': Oil Staining	21.0': PID = 2.9 ppm
		21.4-21.5		SP	21.3'-24.5': Fine to medium SAND (SP), trace fine Gravel, trace shells, trace wood fragments, olive gray, wet, <5% fines	21.4'-21.5': Oil Staining	
22		21.8-22.0					22.0': PID = 0.1 ppm
	20 to 25						
23							23.0': PID = 0.0 ppm
24		24.0-24.2					

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-041**

PROJECT NO: **438527.FI.02.01** START DATE: 2/5/2013

PROJECT NAME: Wyckoff END DATE: 2/6/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 78' DTW:

				NR	24.5'-25.0': No Recovery		24.5': PID = 0.0 ppm
25	25 to 30		5.0	SW	25.0'-26.8': Fine to coarse SAND (SW), some fine to coarse rounded Gravel, trace Silt, wet, <5% fines, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm
26							
27				GM	26.8'-28.0': Silty fine to coarse GRAVEL (GM), little fine Sand, sub rounded to rounded Gravel, olive gray, wet.		
28		27.9-28.1		SP	28.0'-30.0': Very fine SAND (SP), trace Silt, trace fine to coarse rounded Gravel, trace shell fragments, wood fragments from 28.0'-28.1', olive gray, wet, little Cobbles, rounded.		
29		29.0-29.2					
30	30 to 35		5.0	GW	30.0'-33.1': Silty fine to coarse GRAVEL (GW), sub rounded to well rounded, some fine to coarse Sand, wet, olive gray	No visible evidence of NAPL	PID = 0.0 ppm
31							
32							
33				SP	33.1'-35.0': Fine to medium SAND (SP), little fine to coarse rounded to well rounded Gravel, trace Silt, wet, olive gray.		
34		33.5-33.7					
35	35 to 40		4.8	GM	35.0'-39.8': Silty fine to coarse rounded to well rounded GRAVEL (GM), some fine to coarse Sand, wood from 39.4'-39.8', wet, olive gray changing to dark gray at 35.4'.	No visible evidence of NAPL	PID = 0.0 ppm
36							
37							
38		37.5-37.7					

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SOIL BORING LOG

PAGE: 4

BORING NO: **2013SC-041**

PROJECT NO: **438527.FI.02.01** START DATE: 2/5/2013

PROJECT NAME: Wyckoff END DATE: 2/6/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 78' DTW:

39		39.6-39.8		NR	39.8'-40.0': No Recovery		
40			4.7	SM	40.0'-42.6': Silty fine SAND (SM), wet, olive gray, trace shell fragments from 40.0'-42.0'.	No visible evidence of NAPL	PID = 0.0 ppm
41							
42	40 to 45						
43				GM	42.6'-43.3': Silty GRAVEL (GM), fine to coarse, rounded, some fine to coarse Sand, wet, olive gray.		
				GW	43.3'-44.7': Sandy GRAVEL (GW), fine to coarse, rounded to well rounded, sand is fine to coarse, little Silt, wet, black.		
44		43.6-43.8					
		44.2-44.4		NR	44.7'-45.0': No Recovery		
45			4.7	GW	45.0'-49.7': Fine to coarse GRAVEL (GW), sub rounded to well rounded, trace fine to coarse Sand, trace silt starting at 49.2' to 49.7', wet, dark gray with oxidations from 49.2'-49.7'.	No visible evidence of NAPL	PID = 0.0 ppm
46		45.5-45.7					
47							
48	45 to 50						
49							
				NR	49.7'-50.0': No Recovery		2/5/13 stop drilling, 50'
50			1.5	SW	50.0'-51.5': Fine to coarse SAND (SW) grading to fine to coarse sub rounded to rounded GRAVEL, dark gray (description from cuttings emptied from core liner).	No sample core, emptied to ground	2/5/13: Heaving sands preventing collection of 50' - 55' core. Resume drilling on 2/6/13.
51							
				NR	51.5'-55.0': No Recovery		
52							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-041**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/5/2013

PROJECT NAME: Wyckoff

END DATE: 2/6/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 78'

DTW:

53	50 to 55						
54							
55			4.8	SW	55.0'-59.8': Fine to coarse SAND (SW), some fine to coarse sub rounded to well rounded Gravel, abundant shell fragments throughout, trace Silt <5%, wet, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm
56							
57	55 to 60						
58		58.4-58.5					
59							
60				NR	59.8'-60.0': No Recovery		
			1.9	SW	60.0'-61.9': Fine to coarse SAND (SW), same as above, slightly more Silt ~5-10%.	No visible evidence of NAPL	PID = 0.0 ppm
61		60.8-61.0					
62				NR	61.9'-65.0': No Recovery		
63	60 to 65						
64							
65			5.1	SW	65.0'-67.2': Fine to coarse SAND (SW), same as above, ~10% Silt.	No visible evidence of NAPL	
66		66.2-66.4				66.2'-66.5': Heavy Sheen/ slight oil coating	66.0': PID = 0.0 ppm

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SOIL BORING LOG

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BORING NO: **2013SC-041**

PROJECT NO: **438527.FI.02.01** START DATE: 2/5/2013

PROJECT NAME: Wyckoff END DATE: 2/6/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 78' DTW:

67	65 to 70	67.2-67.3 67.4-67.5 68.5-68.7		ML	67.2'-70.0': Clayey SILT (ML), stiff, little fine to coarse Sand, trace fine to coarse rounded to well rounded Gravel, abundant shells, wood from 67.2'-67.6', medium plasticity, wet, olive gray. Sand occurs in lenses in places.	67.2'-67.7': Heavy Sheen with oil coated wood	67.0': PID = 1.1 ppm 68.0': PID = 0.4 ppm 69.0': PID = 0.1 ppm 70.0': PID = 0.1 ppm
68							
69							
70	70 to 75	72.5-72.7	5.0	ML-SM	70.0'-75.0': Sandy SILT to Silty fine SAND (ML-SM), stiff, moist, olive gray, shell fragments throughout, trace wood and plant debris, trace fine to coarse well rounded Gravel.	No visible evidence of NAPL	PID = 0.0 ppm
71							
72							
73							
74							
75	75 to 78	76.5-76.7	4.8	SM SM-ML	75.0'-75.7': Silty fine to coarse SAND (SM), some fine to coarse rounded to well rounded Gravel, trace shell fragments, olive gray, wet. 75.7'-78.0': Very dense Sandy SILT (SM-ML), some fine to coarse Sand, little fine to coarse rounded to well rounded Gravel, olive gray to grayish brown, moist. 78.0': End of Boring	No visible evidence of NAPL	PID = 0.0 ppm
76							
77							
78							

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SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/6/2013

PROJECT NAME: Wyckoff

END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 80'

DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	**Soil Description** Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	**NAPL Observations** Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	**Comments**
0	0 to 5	0.5-0.7	1.1	SM	0.0'-1.1': Silty SAND (SM), predominantly fine sand, little medium to coarse sand, some fine to coarse rounded to well rounded Gravel, medium brown, moist, trace grass roots at 0.0'.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2							
3							
4							
5	5 to 10	6.3-6.5	5.0	CL	5.0'-6.5': Sandy CLAY (CL), very stiff, moist, some fine Sand, brick particles, trace fine sub rounded Gravel, light gray with light brown mottling.	No visible evidence of NAPL	Sample stuck in core barrel, vibrated out into sample bag. Sample disturbed. PID = 0.0 ppm
6							
7				SM	6.5'-10.0': Silty SAND (SM) fine to coarse, some Gravel (fine to coarse rounded to well rounded), wet, yellowish brown to gray.		
8							
9							

CH2MHILL

SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/6/2013

PROJECT NAME: Wyckoff

END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 80'

DTW:

10	10 to 15		5.0	SM	10.0'-11.0': Silty SAND (SM) same as above but color is dark brown, dry, dense (rip rap rock fragments at 10.0').	No visible evidence of NAPL	PID = 0.0 ppm
11				SP	11.0'-15.0': Very fine SAND (SP), trace medium sand, <5% fines occur in thin laminations, yellowish brown grading to dark gray at 13.4', moist to wet at 13.4', some oxidation in laminations.		
12		11.5-11.7					
13							
14		14.3-14.5					
15	15 to 20		5.0	SP	15.0'-20.0': Predominantly fine SAND (SP), little medium Sand, Gravel zone 15.4'-15.9' (rounded to well rounded fine gravel), <5% fines, wet, dark gray to black.	15.0'-18.9' - Heavy sheen and oil coated	Breathing Zone: PID = 0.5 ppm
16		15.8-16.0					16.0': PID = 0.0 ppm
17		16.9-17.1					17.0': PID = 5.0 ppm
		17.3-17.5					
18							18.0': PID = 4.9 ppm
19		18.9-19.0					19.0': PID = 1.5 ppm
							20.0': PID = 1.5 ppm
20			5.0	SP	20.0'-24.0': Predominantly fine SAND (SP), little medium to coarse SAND, trace wood fragments, trace shells, trace Silt, dark gray to black, wet.		Breathing Zone: PID = 0.0 ppm
21		21.0-21.1				20.9'-24.5': Heavy sheen and oil wetted	21.0': PID = 0.0 ppm
		21.3-21.5					

CH2MHILL

SOIL BORING LOG

PAGE: 3

BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/6/2013

PROJECT NAME: Wyckoff

END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 80'

DTW:

22	20 to 25	22.4-22.5					22.0': PID = 0.8 ppm
23							23.0': PID = 1.6 ppm
24		23.8-24.0		GM	24.0'-25.0': Silty fine rounded and sub rounded GRAVEL (GM), some fine to coarse Sand, abundant shells, dark gray, wet.	24.5'-25.0': Slight sheen	24.0': PID = 0.6 ppm
25	25 to 29		4.0	GW	25.0'-29.0': Fine to coarse GRAVEL and fine to coarse SAND (GW), gravel is rounded to well rounded, some Silt, trace Cobbles, wet, dark gray.	25.0' - Moderate Sheen	Disturbed sample compacted in sample bag
26		25.8-26.0					26.0': PID = 3.1 ppm
27		27.2-27.4				27.0'-27.4': Heavy sheen and oil coated	
28							28.0': PID = 5.6 ppm
29	29 to 30	29.3-29.5	2.0	GM	29.0'-30.0': Silty GRAVEL (GM) fine to coarse sub rounded to well rounded, little fine to coarse Sand, few/little Cobbles (rounded), olive gray, wet.	29.5': Moderate sheen	PID = 0.0 ppm
30	30 to 33.5		5.0	GM SP	30.0'-30.7': Silty GRAVEL (GM) as above, no cobbles. 30.7'-33.5': Predominantly fine SAND (SP), little medium to coarse Sand, little Silt, trace shell fragments throughout, wood fragments (trace) throughout, dark gray, wet.	No visible evidence of NAPL	PID = 0.0 ppm
31		31.0-31.2					
32							
33		33.2-33.4					

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SOIL BORING LOG

PAGE: 4

BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/6/2013

PROJECT NAME: Wyckoff

END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 80'

DTW:

34	33.5 to 35	34.5-34.7	2.6	SP	33.5'-35.0': Predominantly fine SAND (SP), trace Silt, trace shell fragments, wet, dark gray, trace plant fibers.	No visible evidence of NAPL	PID = 0.0 ppm
35	35 to 40	37.0-37.2 39.0-39.2	5.0	SP	35.0'-40.0': Predominantly fine SAND (SP), same as above, shell fragments throughout, ~10% Silt.	No visible evidence of NAPL	PID = 0.0 ppm
40	40 to 45	42.0-42.2 44.8-45.0	5.0	SP GM-SM	40.0'-41.0': Predominantly fine SAND (SP), same as above, trace fine rounded Gravel. 41.0'-45.0': Silty GRAVEL (GM-SM) fine to coarse, rounded to well rounded, some fine to medium Sand, trace shell fragments at 44.8', wet, olive gray, very dense.	No visible evidence of NAPL	PID = 0.0 ppm
45			5.0	SM-GM	45.0'-46.8': Silty GRAVEL and fine to coarse SAND (SM-GM), gravel is fine to coarse rounded to well rounded, wet, olive gray.	No visible evidence of NAPL	Heaving sands PID = 0.0 ppm

CH2MHILL

SOIL BORING LOG

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BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/6/2013

PROJECT NAME: Wyckoff

END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 80'

DTW:

46	45 to 47.5	46.0-46.2		SW	46.8'-47.5': Fine to coarse SAND and fine to coarse rounded gravel (SW), trace Silt, wet, olive gray to dark gray.		
47							
48	47.5 to 50	48.7-48.9	5.0	SM SW-GW	47.5'-48.0': Silty fine to medium SAND (SM), shell fragments throughout, wet, olive gray. 48.0'-50.0': Fine to coarse SAND and fine to coarse rounded GRAVEL (SW-GW), abundant shell fragments, trace Silt, olive gray, wet.	No visible evidence of NAPL	Heaving sands PID = 0.0 ppm
49							
50	50 to 53	51.0-51.2	3.0	SW-GW	50.0'-53.0': Fine to coarse SAND and GRAVEL (SW-GW), same as above, less shell fragments, finely broken throughout.	No visible evidence of NAPL	PID = 0.0 ppm
51							
52							
53	53 to 55	54.0-54.2	3.0	SM	53.0'-55.0': Silty fine to coarse SAND (SM), some fine to coarse rounded to well rounded Gravel, trace fine shell fragments throughout, wet, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm
54							
55	55 to 60	58.0-58.2	5.0	SW	55.0'-60.0': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, some Silt, trace fine shell fragments throughout, Gravelly zone from 58.6'-59.0', wet, olive gray to dark gray.	No visible evidence of NAPL	56.0': PID = 0.4 ppm 57.0': PID = 0.0 ppm 58.0': PID = 0.0 ppm
56							
57							
58							

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SOIL BORING LOG

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BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/6/2013

PROJECT NAME: Wyckoff

END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 80'

DTW:

59							59.0': PID = 0.0 ppm
60	60 to 65	62.5-62.7	4.9	SW	60.0'-64.9': Same as above, no gravel zone, fine to coarse SAND and fine to coarse GRAVEL (SW).	No visible evidence of NAPL	PID = 0.1 ppm
61							
62							
63							
64							
65				NR	64.9'-65.0': No Recovery		
66	65 to 69	66.0-66.2	4.9	SW	65.0'-69.0': Fine to coarse SAND (SW), some fine to coarse rounded to well rounded Gravel, some Silt, trace fine shell fragments throughout, wet, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm
67							
68							
69	69 to 70		1.4	SW	69.0'-70.0': Fine to coarse SAND (SW), little fine to coarse rounded Gravel, trace Silt, trace shell fragments, brownish gray, wet.	No visible evidence of NAPL	PID = 0.0 ppm

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SOIL BORING LOG

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BORING NO: **2013SC-045**

PROJECT NO: **438527.FI.02.01** START DATE: 2/6/2013

PROJECT NAME: Wyckoff END DATE: 2/8/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 80' DTW:

70	70 to 73.5		3.5	SW	70.0'-73.5': Fine to coarse SAND (SW), little fine to coarse sub rounded to well rounded Gravel, some Silt, trace shell fragments throughout, wet, olive gray.	No visible evidence of NAPL	Sample stuck in core barrel, vibrated out into sample bag. Sample disturbed. PID = 0.0 ppm Drillers' breathing zone, 2/8/13 08:45: 0_2 = 20.9 ppm LEL = 0.0 ppm CO = 0.0 ppm VOC = 0.0 ppm
73.5	73.5 to 75	74.0-74.1	2.4	SW	73.5'-75.0': Fine to coarse SAND (SW), some fine to coarse rounded and sub rounded Gravel, trace Silt, fine shell fragments throughout, wet, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm Breathing Zone: PID = 0.0 ppm
75	75 to 80	78.0-78.1 79.0-79.1	5.0	SW-GW SM	75.0'-79.5': Fine to coarse SAND and fine to coarse rounded to well rounded GRAVEL (SW-GW), some Silt, trace shell fragments throughout, light brown to dark gray at ~78', wet. 79.5' - 80.0': Very dense Silty SAND (SM) with trace Gravel, moist, dark gray, possible glacial till layer. 80.0': End of Boring	No visible evidence of NAPL	Sample stuck in core barrel, vibrated out into sample bag. Sample disturbed. PID = 0.0 ppm 80.0': Could not get rods back down casing; rods hitting hard object. No obstruction found upon tripping tooling out.
80							

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-046**

PROJECT NO: **438527.FI.02.01**

START DATE: 2/4/2013

PROJECT NAME: Wyckoff

END DATE: 2/4/2013

LOCATION: Bainbridge Island, WA

LOGGER: N. Badon

DRILLING CONTRACTOR: EPA

DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION:

BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION:

TOTAL DEPTH: 42'

DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 5	2.0 - 2.1	4.5	SM	0.0'-4.5': Silty SAND (SM), predominantly fine sand, some coarse sand, some fine to coarse sub rounded Gravel, trace sub rounded Cobbles, ~40 to 50% silt, brown, moist. Grass and roots from 0.0' to 0.8'.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2							
3							
4				NR	4.5'-5.0': No Recovery		
5	5 to 10	8.0 - 8.1	4.8	SM	5.0'-5.3': Silty SAND (SM) as above with one sub rounded Cobble, moist.	No visible evidence of NAPL	PID = 0.0 ppm
6				SW	5.3'-9.8': Fine to coarse SAND and fine to coarse sub rounded to well rounded GRAVEL (SW), coarsening at 8.2', little Silt, moist to wet at 8.2', light brown.		
7							
8							
9							
10				NR	9.8'-10.0': No Recovery		
			2.9	SW	10.0'-12.9': Medium to coarse SAND and fine to coarse sub rounded to well grounded GRAVEL (SW), wet, little Silt, olive gray.	No visible evidence of NAPL	PID = 0.0 ppm
11							

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SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-046**

PROJECT NO: **438527.FI.02.01** START DATE: 2/4/2013

PROJECT NAME: Wyckoff END DATE: 2/4/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 42' DTW:

12	10 to 15						
13				NR	12.9'-15.0': No Recovery		
14							
15			2.7	SW	15.0'-16.2': Fine to coarse SAND (SW), some fine to coarse rounded Gravel, trace Silt, wet.		PID = 0.0 ppm NAPL odor
16						16.0' - 17.3': Moderate Sheen	
		16.3-16.4		SM	16.2'-17.7': Silty SAND (SM), fine to coarse, some fine to coarse rounded to well rounded Gravel, wet, slight plasticity, olive gray.		
17	15 to 20						
		17.3-17.4				17.3' - 17.7': Heavy Sheen	
18				NR	17.7'-20.0': No Recovery		
19							
20			3.8	Wood-ML	20.0'-21.1': Decomposed wood and SILT (Wood-ML), wet, black, trace fine Sand.	20.0' - 21.0': Heavy Sheen	
		20.8-20.9					
21		21.2-21.3		SP	21.1'-23.8': Predominantly fine SAND (SP), trace fine sub rounded Gravel, trace Silt, trace wood from 3.3'-3.7', trace shells, moist, olive gray. Wood is small branch fragment and tree trunk fragment.		21.2': PID = 3.2 ppm
22						21.6'-22.0': Moderate Sheen	22.0': PID = 3.7 ppm
	20 to 25	22.4-22.6				22.4'-22.5': Heavy Sheen	
23		23.0-23.1				23.1'-23.3': Heavy Sheen	22.8': PID = 1.3 ppm 23.5': PID = 4.4 ppm
24				NR	23.8'-25.0': No Recovery		

CH2MHILL

SOIL BORING LOG

PAGE: 3

BORING NO: **2013SC-046**

PROJECT NO: **438527.FI.02.01** START DATE: 2/4/2013

PROJECT NAME: Wyckoff END DATE: 2/4/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 42' DTW:

25	25 to 30		5.0	SP	25.0'-30.0': Predominantly fine SAND (SP), little Silt, trace wood and plant debris, trace shells throughout, dark gray, wet.		Breathing Zone: PID = 0.5 ppm 25.0': PID = 5.0 ppm
26						25.8' - 26.4': Heavy Sheen	26.0': PID = 9.3 ppm
27		26.9-27.0 27.2-27.4					27.0': PID = 32.4 ppm
28		27.7-27.9				27.2' - 27.4': Heavy Sheen	28.0': PID = 3.3 ppm
29		29.6-29.8				28.5' - 29.2': Heavy Sheen 29.2' - 30.0': Heavy sheen and slight oil coating	29.0': PID = 8.3 ppm 30.0': PID = 76.9 ppm
30	30 to 35		5.0	SP	30.0'-35.0': Predominantly fine SAND (SP), same as above, trace fine sub rounded Gravel.	30.4' - 31.2': Moderate to heavy sheen	Breathing Zone: PID = 1.8 ppm 30.2': PID = 28.8 ppm
31		31.0-31.2				31.1': Product Globules 31.1' - 35.0': Heavy Sheen	31.0': PID = 40.5 ppm
32							32.0': PID = 61.9 ppm
33		33.1-33.3				33.0': Product Globules	33.0': PID = 42.6 ppm
34							34.0': PID = 67.1 ppm
35							35.0': PID = 61.9 ppm
			4.4	SM	35.0'-37.0': Silty fine SAND (SM), abundant shells throughout, trace wood and plant debris, dark gray, wet.	35.0' - 37.0': Product globules and Heavy Sheen	Breathing Zone: PID = 1.1 ppm
36		35.5-35.7					36.0': PID = 3.9 ppm
37	35 to 40			ML	37.0'-39.4': Clayey SILT (ML), some fine to coarse well rounded Gravel, very stiff, olive gray to gray brown, moist.		37.0': PID = 2.5 ppm

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SOIL BORING LOG

PAGE: 4

BORING NO: **2013SC-046**

PROJECT NO: **438527.FI.02.01** START DATE: 2/4/2013

PROJECT NAME: Wyckoff END DATE: 2/4/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: EPA DRILLING EQUIPMENT: Geoprobe 8140 DT, rotosonic

TOC (PVC) ELEVATION: BORING DIAMETER: 4.5", 2.25" inner sampling rod

GROUND ELEVATION: TOTAL DEPTH: 42' DTW:

38		38.0-38.2					38.0': PID = 3.5 ppm
39		39.1-39.3		NR	39.4'-40.0': No Recovery		39.0': PID = 2.6 ppm
40	40 to 42		5.0	ML	40.0' - 41.3': Very dense sandy SILT (ML), some Clay, fine to coarse Sand, little fine to coarse Gravel, moist, olive gray to gray brown.		Sample heaved into core liner; Swelling/ expansive clay.
41		41.3-41.5		CH	41.3' - 42.0': CLAY (CH), expansive clay, moist, gray brown with some oxidized mottling, trace fine Gravel (sub rounded).	41.5': Heavy Sheen	41.0': PID = 0.3 ppm
42					42.0' - End of Boring		42.0': PID = 0.4 ppm

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-54**

PROJECT NO: **438527.FI.02.01** START DATE: 3/18/2013

PROJECT NAME: Wyckoff END DATE: 3/19/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 60' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	1.2-1.4	2.0	SM	0.0'-2.0': Silty SAND (SM), 0.0'-0.5' brown and moist, 0.5'-2.0' gray and wet, fine to coarse sand, grass and decomposed wood at 0.4' and 1.2', trace fine sub-rounded Gravel, ~35% fines, ~10% fine gravel.	No visual evidence of NAPL	PID = 0.0 ppm
1							
2				NR	2.0'-4.0': No Recovery		
3							
4	4 to 8	4.9-5.0	1.9	SM	4.0'-5.4': Silty SAND (SM), gray, wet, fine to coarse sand, trace Gravel, ~30% fines, ~10% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
5				GM	5.4'-5.9': Silty GRAVEL (GM), gray, wet, fine to coarse sub-angular gravel, fine to coarse Sand, ~15% fines, ~30% sand.		
6				NR	5.9'-8.0': No Recovery		
7							
8	8 to 12	10.0-10.2	2.3	GM	8.0'-8.3': Silty GRAVEL (GM), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
9				SM	8.3'-10.3': Silty SAND with Gravel (SM), 8.3'-10' gray, 10'-10.3' black, decomposed wood at 8.8', wet, fine to coarse sand, scattered fine to coarse sub-rounded gravel, ~30% fines, ~20% gravel.		
10				NR	10.3'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-54**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/18/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

12							
13	12 to 16	14.0-14.2	2.3	SM Grout SM NR	12.0'-12.8': Silty SAND (SM), gray, wet, fine to coarse sand, ~15% fines. 12.8'-13.8': Grout 13.8'-14.3': Silty SAND with Gravel (SM), black, wet, fine to coarse sand, fine sub-rounded gravel, ~15% fines, ~15% gravel. 14.3'-16.0': No Recovery	13.9': Heavy sheen and staining 14.3': Heavy sheen and staining	PID = 0.0 ppm Borehole out of plumb. Crossed into borehole 2013-T-054
14							
15							
16	16 to 20	16.0-16.2 17.1-17.2	3.4	SM NR	16.0'-17.1': Silty SAND (SM), gray, with white sea shells. 17.1'-17.4': Silty SAND (SM), with decomposed brown wood. 17.4'-19.4': Silty SAND (SM), tan to gray, wet, fine to coarse sand, trace fine Gravel from 16.0'-17.1', ~20% fines, ~10% gravel. 19.4'-20.0': No Recovery	16.0'-16.2': Slight sheen 16.2'-19.4': No visual evidence of NAPL	17.3': PID = 0.3 ppm
17							
18							
19							
20	20 to 24	22.0-22.2	3.0	SW-SM NR	20.0'-23.0': Well-graded SAND with Silt (SW-SM), gray, wet, fine to coarse sand, trace wood chips, trace decomposed sea shells from 22.0'-23.0', ~10% fines. 23.0'-24.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
21							
22							
23							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-54**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/18/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

24	24 to 28	25.0-25.2	2.2	SW	24.0'-26.2': Well-graded SAND (SW), gray, wet, fine to coarse sand, predominantly fine to medium sand, 0.1" Silt lens at 25.0', ~5% fines, trace fine sub-rounded Gravel.	No visual evidence of NAPL	24.0': Driller reports 2" heave PID = 0.0 ppm
25							
26				NR	26.2'-28.0': No Recovery		
27							
28	28 to 32	29.4-29.6	2.9	SW	28.0'-30.9': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, fine to coarse sub-rounded gravel, 2" lens of fine to coarse gravel at 30.5', ~5% fines, ~15% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
29							
30							
31				NR	30.9'-32.0': No Recovery		
32	32 to 36	32.5-32.6	1.9	SW	32.0'-33.9': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, scattered fine to coarse gravel, 0.75" fractured gravel at 33.8', ~5% fines, ~20% gravel.	Light H2S odor 32.0'-33.0': Moderate sheen	PID = 0.0 ppm
33							
34				NR	33.9'-36.0': No Recovery		
35							
36			2.6	SW	36.0'-38.6': Well-graded SAND with Gravel (SW), gray with decomposed white sea shells, wet, fine to coarse sand, fine to coarse sub-rounded gravel, ~5% fines,	No visual evidence of NAPL	PID = 0.0 ppm

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SOIL BORING LOG

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BORING NO: **2013SC-54**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/18/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

37	36 to 40	37.1-37.3			~20% gravel.		Had three runs with no recovery from 36.0'-48.0'. Pulled rods out and found 1.5" large gravel stuck at bottom of casing. Moved about 2' and started drilling new hole.
38							
39				NR	38.6'-40.0': No Recovery		
40	40 to 44		2.9	SW	40.0'-42.6': Well-graded SAND with Gravel (SW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
41							
42		42.6-42.8		SM	42.6'-42.9': Silty SAND with Gravel (SM), dark gray to black, wet, fine to coarse sand, fine sub-rounded gravel, white sea shells, ~20% fines, ~15% gravel.		
43				NR	42.9'-44.0': No Recovery		
44	44 to 48		2.4	SW	44.0'-46.4': Well-graded SAND with Gravel (SW), gray, with decomposed white sea shells, fine to coarse sand, fine to coarse sub-rounded gravel, ~5% fines, ~15% gravel.		
45						45.6'-46.4': Heavy sheen	
46		45.8-45.9				45.8'-46.0': Oil coating	46.0': PID = 1.2 ppm
47		46.3-46.4		NR	46.4'-48.0': No Recovery		
48	48 to 52		2.8	SW	48.0'-50.8': Well-graded SAND with Gravel (SW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
49							
50		50.4-50.5					

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SOIL BORING LOG

BORING NO: **2013SC-54**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/18/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 60'
DTW:

51				NR	50.8'-52.0': No Recovery		
52	52 to 56	52.6-52.7 53.7-53.8	2.0	SW NR	52.0'-54.0': Well-graded SAND with Gravel (SW), similar to above, except 2" decomposed wood and organics at 53.8'. 54.0'-56.0': No Recovery	52.5'-52.8': Heavy sheen 52.8'-54.0': Moderate sheen	PID = 0.1 ppm 56.0': Driller reports 2" of heave
56	56 to 60	56.4-56.5 59.3-59.5	3.7	SW SM NR	56.0'-59.3': Well-graded SAND with Gravel (SW), same as above. 59.3'-59.7': Silty SAND with Gravel (SM), brown, moist to wet, fine to coarse sand, fine sub-rounded gravel, ~20% fines, ~15% gravel, till. 59.7'-60.0': No Recovery 60.0': End of Boring	56.0'-56.8': Heavy sheen 56.3'-56.6': Oil coating 56.8'-59.7': No visible sheen	56.2': PID = 1.5 ppm

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SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-055**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/26/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 67.5'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		2.2	SM	0.0'-2.2': Silty SAND (SM), fine to medium, trace fine to coarse sub rounded to rounded Gravel, trace roots, moist, yellowish brown.	No visual evidence of NAPL	PID = 0.0 ppm
1							
2				NR	2.2'-4.0': No Recovery		
3							
4	4 to 8		2.0	SM	4.0'-5.0': Silty SAND (SM), fine to medium, trace fine to coarse sub rounded Gravel, trace brick fragments, moist, dark brown to black.	No visual evidence of NAPL	PID = 0.0 ppm
5				SP	5.0'-6.0': Predominantly fine SAND (SP), trace shell fragments, moist, light gray with oxidized laminations.		
6				NR	6.0'-8.0': No Recovery		
7							
8	8 to 12	8.8-9.0	1.5	SP	8.0'-9.5': Predominantly fine SAND (SP), trace fine sub rounded Gravel, trace shells, yellowish gray with some oxidation, moist.	No visual evidence of NAPL	PID = 0.0 ppm
9							
10				NR	9.5'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-055**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/26/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 67.5'
DTW:

12							
	12 to 16		1.6	SP	12.0'-13.6': Fine to medium SAND (SP), trace Silt, some wood from 12.0' to 12.7', trace fine rounded Gravel, trace shells at 13.3' - 13.6', wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm
13		12.7-12.9					
				NR	13.6'-16.0': No Recovery		
14							
15							
16							
	16 to 20		1.5	GM-SM	16.0'-17.5': Silty fine to coarse SAND and fine to coarse sub rounded GRAVEL (GM-SM), interlayered with wood throughout, little shell fragments throughout, wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm
17							
				NR	17.5'-20.0': No Recovery		
18							
19							
20							
	20 to 24		2.4	Wood-ML	20.0' to 21.2': Wood and SILT (Wood-ML) with trace shells, trace fine Sand, wet, dark and olive gray.	No visual evidence of NAPL	Sulfur odor from sample
21				SM	21.2' to 22.4': Silty fine SAND (SM), with some wood fragments throughout, wet, dark olive gray.		21.0': H_2S = 7.4 ppm 21.0': VOC = 0.6 ppm
		21.5-21.7					
22							22.0': H_2S = 5.2 ppm
				NR	22.4'-24.0': No Recovery		22.0': VOC = 0.5 ppm
23							Breathing Zone: H_2S = 0.0 ppm VOC = 0.0 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-055**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/26/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 67.5'
DTW:

24							
	24 to 28		1.8	SW	24.0'-25.8': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, little Silt, trace plant fibers/wood from 24.0' to 24.2', wet, dark gray.	No visual evidence of NAPL	24.6': H_2S = 0.8 ppm 24.6': VOC = 0.0 ppm
25							
26				NR	25.8'-28.0': No Recovery		25.6': H_2S = 0.0 ppm 25.6': VOC = 0.0 ppm
27							Breathing Zone: H_2S = 0.0 ppm VOC = 0.0 ppm
28							
	28 to 32	29.4-29.5	2.8	SW	28.0'-30.8': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, little Silt with increased Silt from 30.6' - 30.8', wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm
29							
30							
31				NR	30.8'-32.0': No Recovery		
32							
	32 to 36	33.0-33.2	1.4	SP	32.0'-32.8': Coarse SAND and fine sub rounded GRAVEL (SP), little Silt, wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm
33				SP	32.8'-33.4': Fine to medium SAND (SP), some fine sub rounded to rounded Gravel, little Silt, wet, dark gray.		
34				NR	33.4'-36': No Recovery		
35							
36			3.8	SP	36.0'-37.9': Fine to medium SAND (SP), trace fine to coarse sub rounded Gravel, trace Silt, wet, dark gray.	No visual evidence of NAPL	
37		37.0-37.1					37.0': PID = 0.8 ppm

CH2MHILL

SOIL BORING LOG

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BORING NO: **2013SC-055**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/26/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 67.5'
DTW:

38	36 to 40			SW	37.9'-39.8': Fine to coarse SAND and fine to coarse sub rounded to rounded GRAVEL (SW), some Silt, abundant shell fragments, wet, olive gray.		38.0': PID = 0.8 ppm
39		39.0-39.1					39.0': PID = 0.9 ppm
40				NR	39.8'-40.0': No Recovery		
41	40 to 44		2.3	SW	40.0'-42.3': Fine to coarse SAND (SW), some fine to coarse sub rounded to well rounded Gravel, little Silt, abundant shell fragments throughout, wet, dark olive gray.	No visual evidence of NAPL	PID = 0.0 ppm
42				NR	42.3'-44.0': No Recovery		
43							
44	44 to 48		2.2	SW	44.0'-42.6': Fine to coarse SAND (SW), some fine to coarse sub rounded to well rounded Gravel, little Silt, abundant shell fragments throughout, wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm
45							
46				NR	46.2'-48.0': No Recovery		
47							
48	48-52		2.1	SW	48.0'-50.1': Fine to coarse SAND and fine to coarse sub rounded to well rounded GRAVEL (SW), some Silt, abundant shell fragments, wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm
49		49.0-49.1					
50				NR	50.1'-52.0': No Recovery		
51							

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SOIL BORING LOG

BORING NO: **2013SC-055**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/26/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 67.5'
DTW:

52							
	52 to 56		2.0	SW	52.0' - 54.0': Fine to coarse SAND and fine to coarse sub rounded to well rounded GRAVEL (SW), some Silt, abundant shell fragments, wet, dark gray. Increased silt and shells from 53.4' - 54.0', trace plant fibers at 53.8'.	No visual evidence of NAPL	Sulfur odor
53							53.0': H_2S = 15.1 ppm 53.0': VOC = 1.6 ppm
54				NR	54.0'-56.0': No Recovery		54.0': H_2S = 7.4 ppm 54.0': VOC = 0.7 ppm
55							Breathing Zone: H_2S = 0.0 ppm VOC = 0.0 ppm
56							
	56 to 60		0.5	SP NR	56.0'-56.5': Fine to medium SAND (SP), some fine to coarse sub rounded Gravel, some Silt, abundant shell fragments throughout, wet, dark gray with some brown mottling. 56.5'-60.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
57							
58							
59							Stop drilling 2/26/13 at 60'
60							
	60 to 64		3.0	SW	60.0'-61.6': Fine to coarse SAND and fine to coarse sub rounded to rounded GRAVEL (SW), some Silt, abundant shells, wet, dark gray to black.		Resume 2/27/13 60.5': H_2S = 1.6 ppm 60.5': VOC = 0.9 ppm
61		61.0-61.1					61.0': H_2S = 0.0 ppm 61.0': VOC = 16.6 ppm
				ML-SM	61.6'-63.0': Slightly plastic SILT to Silty fine SAND (ML-SM) at ~62', trace medium to coarse Sand, trace shells,	60.6'-61.5': heavy sheen and oil wetted	61.5': VOC = 18.7 ppm
62		62.0-62.1			moist to wet, olive gray.		62.0': VOC = 4.5 ppm
63				NR	63.0'-64.0': No Recovery		62.7': VOC = 1.4 ppm
64							
			3.5	SM-GM	64.0' - 65.8': Silty fine to coarse SAND and fine to coarse sub rounded to rounded GRAVEL (SM-GM), abundant shells, olive gray to light gray at 64.8'.	No visual evidence of NAPL	PID = 0.0 ppm
65		65.0-65.1					

CH2MHILL

SOIL BORING LOG

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BORING NO: **2013SC-055**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/26/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 67.5'
DTW:

66	64 to 67.5			ML	65.8' - 66.6': SILT and fine SAND (ML), trace fine to coarse Gravel, saturated, yellowish brown.		
67		67.0-67.1		ML-SM	66.6' - 67.5': Very dense Sandy SILT (ML-SM), fine to coarse sand, some fine to coarse Gravel, sub rounded to well rounded, moist to wet, grayish brown. 67.5': End of Boring		67.5': Direct push refusal

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-068**

PROJECT NO: **438527.FI.02.01** START DATE: 2/27/2013

PROJECT NAME: Wyckoff END DATE: 2/27/2013

LOCATION: Bainbridge Island, WA LOGGER: N. Badon

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 23.5' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		2.0	SM	0.0'-2.0': Silty fine SAND (SM), some fine to coarse sub angular Gravel, trace Clay, trace wood, moist dark brown to light gray with yellowish orange oxidation (mottled).	No visual evidence of NAPL	PID = 0.0 ppm
1							
2				NR	2.0'-4.0': No Recovery		
3							
4	4 to 8	5.0-5.1	2.55	CL	4.0' - 6.55': CLAY (CL), some fine to medium Sand in layers throughout, trace fine rounded Gravel, moist, gray with yellowish orange oxidized mottling.	No visual evidence of NAPL	PID = 0.0 ppm
5							
6				NR	6.55' - 8.0': No Recovery		
7							
8	8 to 12		1.7	CL	8.0'-9.7': Sandy CLAY (CL), fine sand throughout, trace fine to coarse rounded Gravel, trace Silt, gray with yellowish orange oxidized mottling, moist.	No visual evidence of NAPL	PID = 0.0 ppm
9							
10				NR	9.7'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-068**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/27/2013
END DATE: 2/27/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 23.5'
DTW:

12	12 to 16	13.5-13.6	2.3	CL	12.0'-13.4': Sandy CLAY (CL), fine to coarse sand in lenses, trace fine sub rounded Gravel, trace Silt, trace wood/organic matter, moist, gray with yellowish orange oxidized sand lenses.	No visual evidence of NAPL	PID = 0.0 ppm No recovery on 1st borehole Recovery on 2nd borehol
13				SM	13.4'-14.3': Silty fine to coarse SAND (SM), some fine sub rounded to rounded Gravel, wet, gray with yellowish orange oxidation.		
14				NR	14.3'-16.0': No Recovery		
15							
16	16 to 20		2.1	SW	16.0'-17.0': Fine to coarse SAND (SW), some fine to coarse rounded to well rounded Gravel, trace Silt, wet, dark gray.	No visual evidence of NAPL	PID = 0.0 ppm No recovery on 1st borehole Recovery on 2nd borehol
17				CL	17.0'-18.1': Very dense Silty CLAY (CL), little fine to coarse Sand, little fine to coarse sub rounded to rounded Gravel, medium gray with few oxidized nodules, moist.		
18				NR	18.1'-20.0': No Recovery		
19							
20	20 to 23.5	20.5-20.6	0.9	CL	20.0'-20.9': Very dense Silty CLAY (CL), some fine to coarse Sand, little fine to coarse sub rounded to rounded Gravel, moist, medium gray.	No visual evidence of NAPL	PID = 0.0 ppm
21							
22							
23					23.5': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-70**

PROJECT NO: **438527.FI.02.01** START DATE: 3/20/2013

PROJECT NAME: Wyckoff END DATE: 3/20/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 27' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		2.3	SM	0.0'-1.0': Silty SAND with Gravel (SM), brown, moist, fine to coarse sand, fine to coarse gravel, grass and roots from 0.0'-0.5', ~25% fines, ~15% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
1		1.0-1.2		SW	1.0'-2.3': Well-graded SAND (SW), brown, moist, fine to coarse sand, predominantly fine to medium sand, ~5% fines, trace Gravel.		
2				NR	2.3'-4.0': No Recovery		
3							
4	4 to 8		1.9	SW	4.0'-5.9': Well-graded SAND (SW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
5		4.4-4.5					
6				NR	5.9'-8.0': No Recovery		
7							
8	8 to 12		1.9	SW	8.0'-9.9': Well-graded SAND (SW), similar to above except wet, 2" Silt lens at 8.8'.	No visual evidence of NAPL	PID = 0.0 ppm
9		9.1-9.3					
10				NR	9.9'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-70**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 27'
DTW:

12							
	12 to 16	12.4-12.5	0.8	SW	12.0'-12.8': Well-graded SAND (SW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
13				NR	12.8'-16.0': No Recovery		
14							
15							
16							
		16.5-16.6	1.8	CL	16.0'-17.5': Lean CLAY (CL), gray, moist, medium plasticity, ~ less 5% Sand.	16.0'-17.5': Moderate sheen	16.0': PID = 0.0 ppm
17							17.0': PID = 3.5 ppm
	16 to 20	17.5-17.6		GW	17.5'-17.8': Well-graded GRAVEL with Sand (GW), black, wet, fine to coarse sub-rounded to sub-angular gravel, fine to coarse sand, ~20% sand, ~5% fines.	17.5'-17.8': Heavy sheen and oil coating	17.4': PID = 7.8 ppm
18				NR	17.8'-20.0': No Recovery		
19							
20							
			1.4	GW	20.0'-20.4': Well-graded GRAVEL with Sand (GW), similar to above.	20.0'-21.4': Slight sheen	PID = 0.3 ppm
		20.6-20.7		CL	20.4'-21.4': Lean CLAY (CL), gray, moist, medium plasticity, ~less than 5% Sand.		
21				NR	21.4'-24.0': No Recovery		
22	20 to 24						
23							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-70**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/20/2013
END DATE: 3/20/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 27'
DTW:

24							
25	24 to 27	25.5-25.7	4.0	ML	24.0'-27.0': SILT with Sand and Gravel (ML), gray, dry to moist, low to non-plastic, fine sub-rounded gravel, ~20% sand, ~15% gravel, till.	No visual evidence of NAPL	PID = 0.0 ppm
26							
27					27.0': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-072**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/26/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 51'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	1.5-1.7	2.5	SM	0.0'-2.5': Silty SAND (SM), predominantly fine to medium, some fine to coarse rounded Gravel, trace wood, moist, brown.	No visible evidence of NAPL	PID = 0.0 ppm
1							
2							
3				NR	2.5'-4.0': No Recovery		
4	4 to 8		1.5	SM	4.0'-5.5': Same as above (SM), less gravel and no wood.	No visible evidence of NAPL	4.4': PID = 0.1 ppm
5							4.9': PID = 0.2 ppm 5.2': PID = 0.1 ppm
6				NR	5.5'-8.0': No Recovery		
7							
8	8 to 12	9.0-9.1 9.6-9.7	1.9	SM	8.0'-8.2': Wood, no soil. 8.2'-9.9': Silty SAND (SM), fine to medium, little fine to coarse sub rounded Gravel, trace shell fragments starting at ~9.5', trace wood/plant fibers, wet, dark gray.	8.4'-8.5': Moderate Sheen and oil staining 9.0'-9.9': Moderate Sheen with oil coating in bands	8.3': PID = 0.6 ppm 9.0': PID = 0.7 ppm 9.5': PID = 0.7 ppm
9							
10				NR	9.9'-12.0': No Recovery		9.7': PID = 6.5 ppm

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-072**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/26/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 51'
DTW:

11							Poor recovery on 2/25/13. Redrill on 2/26/13 with poor recovery, try second offset on 2/26/13, successful.
12	12 to 16	12.4-12.5	1.6	GM	12.0'-13.6': Silty GRAVEL (GM), fine to coarse sub rounded to rounded, some fine Sand, wet, black.	12.0'-13.6': Oil wetted throughout	Breathing Zone: PID = 0.6 ppm 12.4': PID = 18.4 ppm
13		13.1-13.3					13.0': PID = 11 ppm
14				NR	13.6'-16.0': No Recovery		13.5': PID = 21.6 ppm
15							
16	16 to 20	16.2-16.3	0.9	GM SM	16.0'-16.4': Same as above; Silty GRAVEL (GM) 16.4'-16.9': Silty SAND (SM), predominantly fine to medium, trace wood, dark gray, wet.	16.0'-16.9': Heavy Sheen throughout 16.2'-16.3': Oil wetted	16.4': PID = 2.2 ppm
17				NR	16.9'-20.0': No Recovery		
18							
19							
20	20 to 24	20.1-20.2	1.5	SM SW	20.0'-20.4': Silty SAND (SM), few fine to coarse Gravel, trace wood/pine needles, wet, brownish gray.	20.0'-20.7': Heavy sheen 20.0'-20.3': Oil coated	
21					20.4'-21.5': Fine to coarse SAND and fine to coarse GRAVEL (SW), rounded and sub rounded, little Silt, trace shell fragments, dark gray, wet.		20.6': PID = 0.3 ppm 21.3': PID = 0.4 ppm
22				NR	21.5'-24.0': No Recovery		
23							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-072**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/26/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 51'
DTW:

24	24 to 28		2.0	SW	24.0' - 26.0': Same as 20.4' - 21.5' (SW), no shells.	No visible evidence of NAPL	24.5': PID = 0.1 ppm 25.0': PID = 0.0 ppm 25.5': PID = 0.0 ppm
25							
26				NR	26.0'-28.0': No Recovery		
27							
28	28 to 32	29.0-29.1	2.5	SW	28.0'-29.0': Same as above (SW), no shells.	No visible evidence of NAPL	PID = 0.0 ppm
29				SW	29.0'-30.5': Fine to coarse SAND and fine to coarse sub rounded to rounded GRAVEL (SW), some Silt, abundant shell fragments, olive gray, wet.		
30							
31				NR	30.5'-32.0': No Recovery		
32	32 to 36		2.5	SW	32.0'-34.5': Same as 29.0' - 30.5' (SW).	No visible evidence of NAPL	PID = 0.0 ppm
33							
34				NR	34.5'-36.0': No Recovery		
35							

CH2MHILL

SOIL BORING LOG

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BORING NO: **2013SC-072**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/26/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 51'
DTW:

36							
	36 to 40		3.2	SW	36.0'-39.2': Fine to coarse SAND (SW), some fine to coarse sub rounded to rounded Gravel, some Silt, little shell fragments throughout, wet, olive gray.	36.0'-36.4': Heavy sheen 36.6': Oil wetted	Breathing Zone: PID = 0.1 ppm
37						37.0'-37.8': Oil wetted	37.0': PID = 3.0 ppm
38							38.0': PID = 15.7 ppm
						38.7'-38.9': Oil wetted	
39		38.8-39.0		NR	39.2'-40.0': No Recovery		39.0': PID = 17.4 ppm
40							
	40 to 44		3.6	SW	40.0'-42.2': Same as above (SW), trace shells.		Breathing Zone: PID = 0.0 ppm
						40.6'-40.9': Slight sheen 40.7'-40.9': Oil coated	
41						41.0'-43.6': Oil wetted	41.0': PID = 2.1 ppm
42		41.9-42.0		SM	42.2'-43.6': Silty SAND, fine to coarse, and some fine to coarse GRAVEL (SM), trace shell fragments, wet, olive gray.		42.0': PID = 40.2 ppm
43		43.2-43.3					43.0': PID = 42.2 ppm
				NR	43.6'-44.0': No Recovery		
44			2.0	ML	44.0'-45.1': Clayey SILT (ML), little fine Sand, trace Gravel, abundant shells, olive gray, wet.	44.0'-44.6': Slight sheen	
						44.9'-45.0': Slight oil coating	44.6': PID = 0.6 ppm
45				SM	45.1'-46.0': Silty SAND (SM), fine to medium, trace shell fragments, wet, olive gray.	45.1'-45.4': Slight sheen	
	44 to 48						45.6': PID = 1.4 ppm
46				NR	46.0'-48.0': No Recovery		
47							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-072**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 2/25/2013
END DATE: 2/26/2013
LOGGER: N. Badon
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 51'
DTW:

48							
	48 to 51	48.4-48.5	1.3	SW	48.0'-48.9': Fine to coarse SAND (SW), trace Silt, abundant shell fragments, wet, dark gray.	48.0'-48.75': Heavy sheen and oil coated	48.4': PID = 9.6 ppm
				SM-ML	48.9'-49.3': Very dense Sandy SILT (SM-ML), fine to medium sand, some fine to coarse sub rounded Gravel, moist, grayish brown, few oxidized nodules and laminations.		48.8': PID = 5.0 ppm
49				NR			
					49.3'-51.0': No Recovery		
50							
					51.0': End of Boring		
51							

SOIL BORING LOG

CH2MHILL

PAGE: 1

BORING NO: **2013SC-101**

PROJECT NO: **438527.FI.02.01** START DATE: 3/18/2013

PROJECT NAME: Wyckoff END DATE: 3/18/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 27' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	0.6-0.7	1.0	SM	0.0'-1.0': Silty SAND with Gravel (SM), brown with orange iron-oxide stains, moist, fine to coarse sand, fine to coarse sub-rounded gravel, ~30% fines, ~20% gravel, grass and organics in top 2".	No visual evidence of NAPL	PID = 0.0 ppm
1				NR	1.0'-4.0': No Recovery		
2							
3							
4	4 to 8	6.2-6.3	3.6	SM	4.0'-6.4': Silty SAND (SM), brown to gray, moist, fine to coarse sand, trace fine Gravel, ~25% fines, ~5% gravel, 2" white sand lens from 6.2-6.4'.	No visual evidence of NAPL	PID = 0.0 ppm
5							
6				ML	6.4'-7.6': Sandy SILT (ML), gray, moist, non-plastic, ~35% sand, trace fine sub-rounded Gravel.		
7		7.4-7.6		NR	7.6'-8.0': No Recovery		
8	8 to 12	9.2-9.3	2.2	ML	8.0'-10.2': Sandy SILT (ML), similar to above, except ~10% sand from 8.2'-9.2', moist to wet, medium plastic.	No visual evidence of NAPL Slight H_2S odor	PID = 0.0 ppm
9							
10				NR	10.2'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-101**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/18/2013
END DATE: 3/18/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 27'
DTW:

12	12 to 16	12.9-13.0	1.8	ML	12.0'-12.8': SILT (ML), gray, moist to wet, medium plasticity, ~10% fine Sand, trace fine sub-rounded Gravel.	No visual evidence of NAPL	PID = 0.0 ppm
13				SM	12.8'-13.8': Silty SAND (SM), brown with orange iron oxide stains at 12.2', wet, fine to coarse sand, trace black organics at 12.8', ~30% fines.		
14				NR	13.8'-16.0': No Recovery		
15							
16	16 to 20		2.8	SM	16.0'-16.8': Silty SAND (SM), brown, wet, fine to coarse sand, trace fine Gravel, ~30% fines.		16.4': PID = 1.4 ppm
17		16.9-17.0		ML	16.8'-18.0': SILT (ML), gray, wet, low plasticity, ~5-10% Sand.	16.8'-17.3': Slight sheen 17.3'-18.0': Moderate sheen	
18		18.2-18.4		SM	18.0'-18.8': Silty SAND (SM), gray, wet, fine to medium sand, ~15% fines	18.0'-18.5': Heavy sheen	18.2': PID = 1.9 ppm
19		18.6-18.8		NR	18.8'-20.0': No Recovery	18.5'-18.8': Oil coating	
20	20 to 24		3.3	SM	20.0'-20.4': Silty SAND (SM), gray, fine to medium sand, ~15% fines.	20.0'-21.0': Slight sheen	
21		20.9-21.0		CL	20.4'-21.9': Lean CLAY (CL), gray, wet, plastic, ~ less than 5% fine Sand.	21.0'-21.2': Oil coating and moderate sheen 21.2'-21.9': Slight sheen	21.0': PID = 0.4 ppm
22		21.9-22.0		SM	21.9'-22.3': Silty SAND (SM), black, wet, fine to medium sand, decomposed organics, ~30% fines.	21.9'-22.0': Oil wetted 22.0'-22.6': Moderate sheen	22.0': PID = 0.9 ppm
		22.3-22.4		SM	22.3'-23.3': Silty SAND (SM), gray, with decomposed white shells, fine to coarse sand, ~15% fines.	22.6'-23.0': Slight sheen	
23				NR	23.3'-24.0': No Recovery		23.0': PID = 0.8 ppm

CH2MHILL

SOIL BORING LOG

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BORING NO: **2013SC-101**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/18/2013
END DATE: 3/18/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 27'
DTW:

24			1.4	SM	24.0'-25.0': Silty SAND with Gravel (SM), gray, wet, fine to coarse sand, fine sub-rounded gravel, with white decomposed shell, ~15% fines, ~15% gravel, beach deposits.	No visual evidence of NAPL	PID = 0.0 ppm
25	24 to 27	25.1-25.3		SM NR	25.0'-25.4': Silty SAND with Gravel (SM), gray and tan, moist, fine to coarse sand, fine sub-rounded gravel, ~30% fines, ~15% gravel, weathered till. 25.4'-27.0': No Recovery		
26							
27					27.0': End of Boring		

SOIL BORING LOG

CH2MHILL

PAGE: 1

BORING NO: **2013SC-106**

PROJECT NO: **438527.FI.02.01** START DATE: 3/21/2013

PROJECT NAME: Wyckoff END DATE: 3/21/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 81.5' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	0.4-0.5	0.9	SM	0.0'-0.9': Silty SAND with Gravel (SM), brown, moist, fine to coarse sand, fine to coarse angular gravel, 0.75" diameter gravel lodged at bottom of sampler, scattered wood chips, ~20% fines, ~20% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
1				NR	0.9'-4.0': No Recovery		
2							
3							
4	4 to 8	4.3-4.4	0.7	SM	4.0'-4.7': Silty SAND with Gravel (SM), brown and black, moist, fine to coarse sand, fine to coarse sub-angular to sub-rounded gravel, ~20% fines, ~30% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
5				NR	4.7'-8.0': No Recovery		
6							
7							
8	8 to 12	8.4-8.5	0.7	SM	8.0'-8.7': Silty SAND with Gravel (SM), same as above, except wet.	8.4'-8.7': Slight sheen	PID = 0.0 ppm
9				NR	8.7'-12.0': No Recovery		
10							
11							

CH2MHILL

SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-106**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/21/2013
END DATE: 3/21/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 81.5'
DTW:

12							
13	12 to 16	12.4-12.5	0.8	SM	12.0'-12.8': Silty SAND (SM), gray with orange iron oxide stains, wet, fine to coarse sand, predominantly fine to medium sand, decomposed wood at 12.2', ~15% fines, trace fine sub-rounded Gravel.	No visual evidence of NAPL	PID = 0.0 ppm
14				NR	12.8'-16.0': No Recovery		
15							
16	16 to 20	16.5-16.6	1.1	SW	16.0'-17.1': Well-graded SAND (SW), gray, wet, fine to coarse sand, predominantly fine to medium sand, decomposed white sea shells, ~5% fines	No visual evidence of NAPL	PID = 0.0 ppm
17				NR	17.1'-20.0': No Recovery		
18							
19							
20	20 to 24		0.0	NR	20.0'-24.0': No Recovery	N/A	N/A
21							
22							
23							

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SOIL BORING LOG

PAGE: 3

BORING NO: **2013SC-106**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/21/2013
END DATE: 3/21/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 81.5'
DTW:

24	24 to 28	24.2-24.3	0.5	SM	24.0'-24.5': Silty SAND (SM), gray, wet, fine to medium sand, decomposed wood chips at 24.4', ~15% fines.	24.0'-24.5': Slight sheen	PID = 0.0 ppm
				NR	24.5'-28.0': No Recovery		
25							
26							
27							
28	28 to 32	28.4-28.5	0.7	SW	28.0'-28.7': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, fine to coarse sub-angular gravel, ~40% gravel, ~5% fines.	No visual evidence of NAPL	PID = 0.0 ppm
				NR	28.7'-32.0': No Recovery		
29							
30							
31							
32	32 to 36		0.3	GW	32.0'-32.3': Well-graded GRAVEL (GW), gray, wet, fine to coarse gravel, ~10% Sand, ~ less than 5% fines.	No visual evidence of NAPL	PID = 0.0 ppm
				NR	32.3'-36.0': No Recovery		
33							
34							
35							
36		36.5-36.6	0.8	GW	36.0'-36.8': Well-graded GRAVEL with Sand (GW), gray, wet, fine to coarse sub-rounded gravel, fine to coarse sand, ~35% sand, ~5% fines.	No visual evidence of NAPL	PID = 0.0 ppm
37				NR	36.8'-40.0': No Recovery		

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-106**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/21/2013
END DATE: 3/21/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 81.5'
DTW:

38	36 to 40						
39							
40	40 to 44		0.4	GW NR	40.0'-40.4': Well-graded GRAVEL with Sand (GW), same as above except ~40% sand, very thin interbedded layers of decomposed organics. 40.4'-44.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
41							
42							
43							
44	44 to 48	44.6-44.7	0.9	SW NR	44.0'-44.9': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, fine to coarse sub-rounded gravel, 5mm lens of decomposed organics at 44.5', ~40% gravel, ~5% fines. 44.9'-48.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
45							
46							
47							
48	48 to 52		0.4	GW NR	48.0'-48.4': Well-graded GRAVEL with Sand (GW), gray, wet, fine to coarse sub-rounded gravel, fine to coarse sand, ~35% sand, ~5% fines. 48.4'-52.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
49							
50							
51							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-106**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/21/2013
END DATE: 3/21/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 81.5'
DTW:

52							
53	52 to 56		0.3	GW NR	52.0'-52.3': Well-graded GRAVEL with Sand (GW), similar to above except ~15% sand. 52.3'-56.0': No Recovery	Very mild odor 52.0'-52.3': No visual evidence of NAPL	PID = 0.0 ppm
54							
55							
56	56 to 60		0.0	NR	56.0'-60.0': No Recovery	N/A	N/A
57							
58							
59							
60	60 to 64		0.0	NR	60.0'-64.0': No Recovery	N/A	N/A
61							
62							
63							
64			2.3	SW	64.0'-66.3': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, fine to coarse sub-rounded gravel, ~20% gravel, ~5% fines, decomposed white sea shells.	No visual evidence of NAPL	PID = 0.0 ppm
65		65.2-65.4					

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-106**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/21/2013
END DATE: 3/21/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 81.5'
DTW:

66	64 to 68			NR	66.3'-68.0': No Recovery		
67							
68			1.8	SW	68.0'-69.8': Well-graded SAND with Gravel (SW), similar to above except ~35% gravel.	No visual evidence of NAPL Mild odor	PID = 0.0 ppm
69		69.4-69.5					
70	68 to 72			NR	69.8'-72.0': No Recovery		
71							
72			1.2	SW	72.0'-73.2': Well-graded SAND with Gravel (SW), same as above.	Strong odor 72.0'-73.2': Oil coating	72.2': PID = 22.5 ppm
73		72.6-72.7		NR	73.2'-76.0': No Recovery		73.0': PID = 16.1 ppm
74	72 to 76						Breathing Zone: PID = 2.2 ppm
75							
76		76.0-76.2	1.4	SW	76.0'-77.4': Well-graded SAND with Gravel (SW), gray, wet, fine to coarse sand, fine to coarse sub-rounded gravel, lots of decomposed sea shells, ~20% gravel, ~5% fines.	Mild odor 76.0'-77.3': Moderate sheen	76.4': PID = 0.1 ppm
77		77.1-77.2					76.9': PID = 0.6 ppm
78	76 to 80			NR	77.4'-80.0': No Recovery		
79							

SOIL BORING LOG

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BORING NO: **2013SC-106**

PROJECT NO: **438527.FI.02.01** START DATE: 3/21/2013

PROJECT NAME: Wyckoff END DATE: 3/21/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 81.5' DTW:

80							
	80 to 81.5	80.7-80.9	1.2	SW	80.0'-81.2': Well-graded SAND with Gravel (SW), similar to above except ~30% gravel.	Mild odor 80.0'-81.2': No visual evidence of NAPL	PID = 0.0 ppm
81				NR	81.2'-81.5': No Recovery 81.5': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-119**

PROJECT NO: **438527.FI.02.01**

PROJECT NAME: Wyckoff

LOCATION: Bainbridge Island, WA

START DATE: 3/15/2013

END DATE: 3/15/2013

LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E

DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION:

BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION:

TOTAL DEPTH: 30'

DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	0.5-0.6	1.0	SW	0.0'-1.0': Well-graded SAND (SW), brown, moist, fine to coarse sand, scattered fine sub-rounded Gravel, ~less than 5% fines, ~less than 10% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
1				NR	1.0'-4.0': No Recovery		
2							
3							
4	4 to 8	4.4-4.6	0.8	SW	4.0'-4.8': Well-graded SAND (SW), same as above except wet.	No visual evidence of NAPL	PID = 0.0 ppm
5				NR	4.8'-8.0': No Recovery		5.0': Driller reports 1.0' of heave
6							
7							
8	8 to 12	9.0-9.2	1.5	SW	8.0'-9.0': Well-graded SAND (SW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
9				GW	9.0'-9.5': Well-graded GRAVEL with Sand (GW), brown and black, wet, angular to sub-angular, fine to coarse fractured rock fill - up to 1" diameter, ~20% sand, ~less than 5% fines.		
10				NR	9.5'-12.0': No Recovery		
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-119**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/15/2013
END DATE: 3/15/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 30'
DTW:

12							
13	12 to 16	12.4-12.6	0.8	GW NR	12.0'-12.8': Well-graded GRAVEL with Sand (GW), similar to above, except ~15% sand. 12.8'-16.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
14							
15							
16	16 to 20	16.2-16.4	0.7	GW NR	16.0'-16.7': Well-graded GRAVEL with Sand (GW), similar to above, except black with some white gravel. 16.7'-20.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
17							
18							
19							
20	20 to 24		0.5	GW NR	20.0'-20.5': Well-graded GRAVEL with Sand (GW), same as above. 20.5'-24.0': No Recovery	No visual evidence of NAPL	PID = 0.0 ppm
21							
22							
23							

SOIL BORING LOG

BORING NO: **2013SC-119**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/15/2013
END DATE: 3/15/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 30'
DTW:

24	24 to 28		0.7	GW	24.0'-24.7': Well-graded GRAVEL with Sand (GW), similar to above except 30% fine to coarse sand, bottom 3" are gray.	No visual evidence of NAPL	PID = 0.0 ppm
		24.6-24.7		NR			
25					24.7'-28.0': No Recovery		
26							
27							
28	28 to 30	28.1-28.2	0.3	SM	28.0'-28.3': Silty SAND with Gravel (SM), gray with heavy black creosote staining, fine to coarse sand, fine to coarse sub-angular gravel, ~20% fines, ~30% gravel, till.	28.0'-28.2': Moderate sheen 28.2'-28.3': Oil coating	PID = 0.6 ppm Very hard formation, slow progress at 28.0'. Pulled rods out, moved 2' north and drilled new hole and hit same hard formation at 28'.
				NR			
29					28.3'-30.0': No Recovery		
30					30.0': End of Boring - Refusal		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-127**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/14/2013
END DATE: 3/14/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 63'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	0.5-0.6	1.0	SW	0.0'-1.0': Well-graded SAND (SW), brown and tan, dry, fine to medium sand, ~5% fines.	No visual evidence of NAPL	0.5': PID = 0.0 ppm
1				NR	1.0'-4.0': No Recovery		
2							
3							
4	4 to 8	5.0-5.2	1.5	SW	4.0'-5.5': Well-graded SAND (SW), brown, wet, fine to medium sand, trace fine rounded Gravel, trace seashells, ~5% fines.	No visual evidence of NAPL	4.5': PID = 0.0 ppm 5.0': PID = 0.0 ppm
5							
6				NR	5.5'-8.0': No Recovery		
7							
8	8 to 12	9.5-9.7	3.0	SW	8.0'-11.0': Well-graded SAND (SW), brown, wet, fine to medium sand, ~5% fines.	No visual evidence of NAPL	9.0': PID = 0.0 10.0': PID = 0.0
9							
10							
11				NR	11.0'-12.0': No Recovery		11.0': PID = 0.0

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-127**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/14/2013
END DATE: 3/14/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 63'
DTW:

12							
13	12 to 16	13.2-13.4	1.5	SW	12.0'-12.8': Well-graded SAND (SW), same as above.	No visual evidence of NAPL	12.5': PID = 0.0 ppm
14				SW	12.8'-13.5': Well-graded SAND (SW), gray, wet, fine to medium sand, interbedded wood, decomposed organics at 13.3', ~5% fines.		13.0': PID = 0.0 ppm
15				NR	13.5'-16.0': No Recovery		
16							
17	16 to 20	16.8-17.0	1.3	SW	16.0'-17.0': Well-graded SAND (SW), gray, wet, fine to medium sand, ~5% fines.	Strong odor 16.0'-17.0': No visual evidence of NAPL	
18				Wood	17.0'-17.3': Decaying Wood with moderate oil sheen.	17.0'-17.3': Moderate sheen	17.0': PID = 0.4 ppm 17.0': H_2S = 14.8 ppm
19				NR	17.3'-20.0': No Recovery		Breathing Zone: H_2S = 0.5 ppm
20							
21	20 to 24	20.6-20.8	0.8	Wood	20.0'-20.8': Decaying Wood, brown with white sea shells, wet, trace fine sand and silt, visible oil from 20.5'-20.8'.	20.0'-20.2': Light sheen 20.2'-20.5': Moderate sheen 20.5'-20.8': Oil coating	20.5': PID = 0.0 20.5': H_2S = 1.9 ppm 20.5': Breathing Zone H_2S = 0.0 ppm
22				NR	20.8'-24.0': No Recovery		
23							

SOIL BORING LOG

BORING NO: **2013SC-127**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/14/2013
END DATE: 3/14/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 63'
DTW:

24	24 to 28	24.3-24.5	1.7	Wood SM	24.0'-24.4': Decaying Wood coated in oil. 24.4'-25.7': Silty SAND (SM), dark brown, wet, fine to medium sand, trace sub-rounded Gravel, trace sea shells, ~20% fines.	24.0'-24.4': Oil wetted 24.4'-24.9': No visual evidence of NAPL 24.9'-25.3': Slight sheen	PID = 0.0 ppm Breathing Zone H_2S = 0.0 ppm
25		25.1-25.3					25.0': H_2S = 1.1 ppm
26				NR	25.7'-28.0': No Recovery		
27							
28	28 to 32	28.0-28.2	3.0	SM	28.0'-31.0': Silty SAND (SM), gray with white decomposed sea shells, fine to medium sand, scattered sub-rounded Gravel, decomposed shells throughout, ~20% fines.	Strong odor	PID = 0.0 ppm Breathing Zone: H_2S = 0.0 ppm
29							29.0': H_2S = 1.1 ppm
30		30.0-30.2				30.0'-31.0': Light sheen	30.0': H_2S = 0.8 ppm
31				NR	31.0'-32.0': No Recovery		
32	32 to 36	33.5-33.7	3.0	SM	32.0'-35.0': Silty SAND (SM), same as above.	No visual evidence of NAPL	PID = 0.0 ppm H_2S = 0.0 ppm
33							
34							
35				NR	35.0'-36.0': No Recovery		
36		36.5-36.7	1.2	SM	36.0'-37.0': Silty SAND (SM), same as above except fragmented sea shells from 36.8'-37.0'.	36.5'-37.2': Heavy sheen	PID = 0.0 ppm

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SOIL BORING LOG

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BORING NO: **2013SC-127**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/14/2013
END DATE: 3/14/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 63'
DTW:

37	36 to 40			ML	37.0'-37.2': SILT (ML), brown, wet, decomposed wood fragments, decomposed organics, non-plastic.		
				NR	37.2'-40.0': No Recovery		
38							
39							
40	40 to 44		3.5	OL	40.0'-43.5': Sandy organic SILT (OL), dark brown with white sea shells, wet, scattered decaying wood, scattered decaying sea shells, trace fine sub-rounded Gravel, ~30% fine to medium sand, low to no plasticity.	No visual evidence of NAPL Mild odor	PID = 0.0 ppm
41		41.5-41.7					
42							
43							
				NR	43.5'-44.0': No Recovery		
44	44 to 48		2.5	OL	44.0'-45.0': Sandy organic SILT (OL), similar to above, except ~40% Sand.	No visual evidence of NAPL	PID = 0.0 ppm
45				SW	45.0'-46.5': Well-graded SAND with Gravel (SW), dark gray to black, wet, fine to coarse sand, fine sub-rounded gravel, ~15% gravel, ~15% fines.		
46		46.2-46.4					
				NR	46.5'-48.0': No Recovery		
47							
48	48 to 52	48.2-48.3	2.5	SW	48.0'-50.5': Well-graded SAND with Gravel (SW), similar to above, except 49.5'-50.5' have less than 10% fine gravel.	Strong odor 48.0'-49.5': Heavy sheen	PID = 0.0 ppm
49		49.7-49.9				49.5'-50.5': Oil coating	
50		50.4-50.5					
				NR	50.5'-52.0': No Recovery		

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SOIL BORING LOG

BORING NO: **2013SC-127**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/14/2013
END DATE: 3/14/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 63'
DTW:

51							
52	52 to 56	52.2-52.4	4.0	ML	52.0'-53.5': Sandy SILT (ML), olive gray, wet, low plasticity, scattered white decaying sea shells, 0.2" decaying wood at 40.2', ~20% fine Sand.	52.0'-52.8': Moderate sheen	
53		53.0-53.2					53.0': PID = 0.8 ppm
54				SM	53.5'-56.0': Silty SAND (SM), olive gray, wet, fine to medium sand, white sea shells, ~35% fines.	54.2': Light sheen	54.0': PID = 0.6 ppm
55						54.5'-56.0': No visual evidence of NAPL	55.0': PID = 0.1 ppm
56							56.0': PID = 0.0 ppm
56	56 to 60		4.0	SM	56.0'-57.3': Silty SAND (SM), dark gray with white decaying sea shells, wet, fine to medium sand, ~30% fines.	No visual evidence of NAPL	PID = 0.0 ppm
57				SM	57.3'-60.0': Silty SAND with Gravel (SM), tan, wet, fine to coarse sand, fine sub-rounded gravel, ~20% fines, till.		
58							
59		59.0-59.2					
60	60 to 63		3.0	SM	60.0'-63.0': Silty SAND with Gravel (SM), tan, moist, fine to coarse sand, fine sub-rounded gravel, ~25% gravel, ~20% fines.	No visual evidence of NAPL	PID = 0.0 ppm
61		61.0-61.2					
62							
63					63.0': End of Boring		

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SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-152**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/15/2013
END DATE: 3/15/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 28'
DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4	0.4-0.6	1.2	SM	0.0'-1.2': Silty SAND with Gravel (SM), brown, moist, fine to coarse sand, fine sub-rounded gravel, ~15% fines, ~15% gravel, 2" piece of wood at 1.2'.	No visual evidence of NAPL	PID = 0.0 ppm
1				NR	1.2-4.0: No Recovery		
2							
3							
4	4 to 8	4.5-4.6	2.2	SM	4.0'-6.2': Silty SAND with Gravel (SM), similar to above, except 2" of decomposed wood at 4.0', reddish pink gravel at 5.8', decomposed white sea shells, ~25% fine to coarse gravel.	No visual evidence of NAPL	PID = 0.0 ppm
5		5.4-5.6					
6		6.0-6.2		NR	6.2'-8.0': No Recovery		
7							
8	8 to 12	9.0-9.2	1.4	SM	8.0'-9.4': Silty SAND with Gravel (SM), brown with interbedded black lenses, moist with bottom 2" at 9.2' wet, fine to coarse sand, fine to coarse sub-rounded gravel, large gravel at 9.3', ~20% gravel, ~15% fines.	No visual evidence of NAPL	PID = 0.0 ppm
9				NR	9.4'-12.0': No Recovery		
10							
11							

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SOIL BORING LOG

PAGE: 2

BORING NO: **2013SC-152**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/15/2013
END DATE: 3/15/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 28'
DTW:

12							
	12 to 16	12.3-12.4	1.4	SW-SM	12.0'-13.4': Well-graded SAND with SILT (SW-SM), dark gray with interbedded brown lenses of decomposed wood and organics, wet, fine to coarse sand, trace fine Gravel, ~5% gravel, ~10% fines.	No visual evidence of NAPL	PID = 0.0 ppm
13				NR	13.4'-16.0': No Recovery		
14							
15							
16							
	16 to 20	16.4-16.6	3.2	SM	16.0'-17.3': Silty SAND with Gravel (SM), gray, moist to wet, fine to coarse sand, fine to coarse sub-rounded gravel, 1" piece of wood at 16.4', ~20% fines, ~15% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
17				SM	17.3'-19.2': Silty SAND with Gravel (SM), brown with orange iron oxide stains, moist, fine to coarse sand, fine to coarse sub-rounded gravel, ~25% fines, ~20% gravel, weathered till.		
18		18.2-18.4					
19				NR	19.2'-20.0': No Recovery		
20							
	20 to 24		4.0	SM	20.0'-23.0': Silty SAND with Gravel (SM), weathered till - same as above.	No visual evidence of NAPL	PID = 0.0 ppm
21							
22							
23				ML	23.0'-24.0': SILT (ML), dark gray, dry, trace fine sub-angular Gravel, ~10% Sand, ~5% gravel, low to non-plastic. Glacio-lacustrine deposits.		
24			4.0	ML	24.0'-28.0': SILT (ML), same as above.	No visual evidence of NAPL	PID = 0.0 ppm

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SOIL BORING LOG

PAGE: 3

BORING NO: **2013SC-152**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/15/2013
END DATE: 3/15/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 28'
DTW:

25 26 27 28	24 to 28				28.0': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-152V2**

PROJECT NO: **438527.FI.02.01** START DATE: 3/22/2013

PROJECT NAME: Wyckoff END DATE: 3/22/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 11' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 7		0.0	NS	0.0'-7.0': Not Sampled	N/A	N/A
7	8 to 12	7.5-7.7	1.9	SW	7.0'-8.8': Well-graded SAND with Gravel (SW), brown with interbedded black lenses, decomposed white sea shells, moist, fine to coarse sand, scattered fine to coarse sub-rounded gravel, ~5% gravel, ~5% fines.	No visual evidence of NAPL	PID = 0.0 ppm
		8.5-8.6		SM	8.8'-8.9': Silty SAND with Gravel (SM), black, moist, fine to coarse sand, fine to coarse sub-rounded gravel, ~20% gravel, ~15% fines.		
				NR	8.9'-11.0': No Recovery		
11					11.0': End of Boring		

CH2MHILL

SOIL BORING LOG

PAGE: 1

BORING NO: **2013SC-155**

PROJECT NO: **438527.FI.02.01** START DATE: 3/19/2013

PROJECT NAME: Wyckoff END DATE: 3/19/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 69.3' DTW:

Depth (ft)	Soil Core ID	TarGOST Sample Interval (ft bgs)	Recovery (ft)	Soil Log	Soil Description Soil name, USCS group symbol, color, moisture content, particle size percentages, sediment structure, organic material	NAPL Observations Presence of: Sheen, Staining, Oil-Coated NAPL, Oil-Wetted NAPL	Comments
0	0 to 4		2.1	SM	0.0'-2.1': Silty SAND with Gravel (SM), tan with orange iron oxide stains, moist, fine to coarse sand, predominantly fine to medium sand, fine sub-rounded gravel, ~20% fines, ~15% gravel, grass and roots from 0.0'-0.25'.	No visual evidence of NAPL	PID = 0.0
1		1.0-1.2					
2				NR	2.1'-4.0': No Recovery		
3							
4	4 to 8		0.0	NR	4.0'-8.0': No Recovery		Driller reports hit large gravel at 4.0', had to pull rods out to remove it from tip of rods.
5							
6							
7							
8	8 to 12		1.7	SM	8.0'-8.4': Silty SAND (SM), tan, moist, fine to medium sand, ~25% fines.		Breathing Zone: PID = 0.0 ppm
		8.4-8.5		SW	8.4'-9.7': Well-graded SAND (SW), gray with white sea shells, moist to wet, fine to coarse sand, predominantly fine to medium sand, trace fine sub-rounded Gravel, ~5% fines.	8.4'-8.5': Heavy sheen 8.5'-9.0': Slight sheen 9.0'-9.7': Oil coating	8.5': PID = 2.2 ppm
9							
		9.6-9.7		NR	9.7'-12.0': No Recovery		9.5': PID = 17.4 ppm
10							
11							

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-155**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/19/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 69.3'
DTW:

12	12 to 16	12.3-12.4	0.6	SW NR	12.0'-12.6': Well-graded SAND (SW), gray to dark gray, wet, fine to medium sand, trace fine sub-rounded Gravel, ~5% fines. 12.6'-16.0': No Recovery	12.0'-12.6': Moderate sheen	12.0'-16.0': Driller reports very soft PID = 1.3 ppm
16	16 to 20	16.1-16.3	1.0	SW NR	16.0'-17.0': Well-graded SAND (SW), similar to above, except gray with white decomposed sea shells. 17.0'-20.0': No Recovery	16.0'-16.3': Mild odor, heavy sheen 16.3'-17.0': Mild odor, no visible sheen	PID = 0.0 ppm 16.0'-20.0': Driller reports very soft
20	20 to 24	20.6-20.8	0.8	SW NR	20.0'-20.8': Well-graded SAND with Gravel (SW), gray with white decomposed sea shells, wet, fine to coarse sand, fine to coarse sub-rounded gravel, ~5% fines, ~20% gravel. 20.8'-24.0': No Recovery	20.0'-20.8': Heavy sheen 20.5'-20.8': Oil coating	PID = 2.8 ppm 20.0'-24.0': Driller reports soft
24		24.1-24.3	0.9	SW	24.0'-24.9': Well-graded SAND with Gravel (SW), similar to above except ~30% gravel.	24.0'-24.3': Oil coating 24.0'-24.9': Moderate sheen	24.0'-28.0': Driller reports soft

CH2MHILL

SOIL BORING LOG

BORING NO: **2013SC-155**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/19/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 69.3'
DTW:

25	24 to 28			NR	24.9'-28.0': No Recovery		24.5': PID = 2.2 ppm 24.9': PID = 1.5 ppm
28	28 to 32	28.6-28.8	1.0	GW	28.0'-29.0': Well-graded GRAVEL with Sand (GW), gray, wet, fine to coarse sub-rounded gravel, fine to coarse sand, ~35% sand, ~5% fines.	28.6'-28.8': Moderate sheen	PID = 0.1 ppm 28.0'-32.0': Driller reports soft
29				NR	29.0'-32.0': No Recovery		
32	32 to 36	32.4-32.6	0.8	GW	32.0'-32.8': Well-graded GRAVEL with Sand (GW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm 32.0'-36.0': Driller reports soft
33				NR	32.8'-36.0': No Recovery		
36	36 to 40	37.3-37.4	1.9	GW	36.0'-37.9': Well-graded GRAVEL with Sand (GW), similar to above except ~40% sand.	No visual evidence of NAPL	PID = 0.0 ppm Driller reports harder starting at 36.0'
38				NR	37.9'-40.0': No Recovery		

CH2MHILL

SOIL BORING LOG

PAGE: 4

BORING NO: **2013SC-155**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/19/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 69.3'
DTW:

39							
40	40 to 44	41.1-41.2	1.3	GW	40.0'-41.3': Well-graded GRAVEL with Sand (GW), same as above.	No visual evidence of NAPL	PID = 0.0 ppm
41				NR	41.3'-44.0': No Recovery		
42							
43							
44	44 to 48	45.0-45.1	2.2	SW	44.0'-46.2': Well-graded SAND with Gravel (SW), gray with decomposed white sea shells, wet, fine to coarse sand, predominantly medium to coarse sand, fine to coarse sub-rounded gravel, ~25% gravel, ~5% fines.	No visual evidence of NAPL	PID = 0.0 ppm
45							
46				NR	46.2'-48.0': No Recovery		
47							
48	48 to 52	49.8-50.0	2.1	SW	48.0'-50.1': Well-graded SAND with Gravel (SW), similar to above except ~30% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
49							
50				NR	50.1'-52.0': No Recovery		
51							
52		53.0-53.2	2.4	SW	52.0'-54.4': Well-graded SAND with Gravel (SW), similar to above except ~15% gravel.	No visual evidence of NAPL	PID = 0.0 ppm
53							

CH2MHILL

SOIL BORING LOG

PAGE: 5

BORING NO: **2013SC-155**
PROJECT NO: **438527.FI.02.01**
PROJECT NAME: Wyckoff
LOCATION: Bainbridge Island, WA
DRILLING CONTRACTOR: E&E
TOC (PVC) ELEVATION:
GROUND ELEVATION:

START DATE: 3/19/2013
END DATE: 3/19/2013
LOGGER: M. Bouchedid
DRILLING EQUIPMENT: Geoprobe 6600, direct push
BORING DIAMETER: 2.25"; 1.25" dia. sample liner
TOTAL DEPTH: 69.3'
DTW:

54	52 to 56			NR	54.4'-56.0': No Recovery		
55							
56							
57		56.5-56.6	1.0	SW NR	56.0'-57.0': Well-graded SAND with Gravel (SW), similar to above except ~25% gravel. 57.0'-60.0': No Recovery	Strong odor 56.5'-56.6': Oil wetted 56.5'-57.0': Heavy sheen	PID = 7.4 ppm
58	56 to 60						
59							
60							
61		61.5-61.6	1.8	GW NR	60.0'-61.8': Well-graded GRAVEL with Sand (GW), gray with white decomposed sea shells, fine to coarse sub-rounded gravel, fine to coarse sand, ~35% sand, ~5% fines. 61.8'-64.0': No Recovery	60.0'-61.4': No visual evidence of NAPL 61.4'-61.8': Heavy sheen	61.6': PID = 2.7 ppm
62	60 to 64						
63							
64							
65	64 to 68		0.3	GW NR	64.0'-64.3': Well-graded GRAVEL with Sand (GW), same as above. 64.3'-68.0': No Recovery	64.0'-64.3': Slight sheen	PID = 0.0 ppm Poor recovery. 0.75" diameter gravel at bottom of sample - gravel is fractured by driving casing on top of it.
66							
67							
68							

CH2MHILL

SOIL BORING LOG

PAGE: 6

BORING NO: **2013SC-155**

PROJECT NO: **438527.FI.02.01** START DATE: 3/19/2013

PROJECT NAME: Wyckoff END DATE: 3/19/2013

LOCATION: Bainbridge Island, WA LOGGER: M. Bouchedid

DRILLING CONTRACTOR: E&E DRILLING EQUIPMENT: Geoprobe 6600, direct push

TOC (PVC) ELEVATION: BORING DIAMETER: 2.25"; 1.25" dia. sample liner

GROUND ELEVATION: TOTAL DEPTH: 69.3' DTW:

69	68 to 69.3	69.0-69.2	3.4	SM	68.0'-69.3': Silty SAND with Gravel (SM), gray, wet, fine to coarse sand, fine sub-rounded gravel, ~20% fines, ~15% gravel. 69.3': End of Boring - Refusal	No visual evidence of NAPL	PID = 0.0 ppm Obtained 3.4' recovery on a 1.3' drive.

Appendix C-2
Soil Core Photographs


2013-SC-068
20' to 24'
2/27/13


2013-SC-068
12' to 16'
2/27/13


2013-SC-068
8' to 12'
2/27/13




2013-SC-068
12' to 16'
2/27/13


2013-SC-068
16' to 20'
2/27/13


2013-SC-068
12' to 16'
2/27/13


2013
SC
068
13.5'
to
15.6'




2013-SC-001
0' to 4'
2/18/13


2013-SC-068
16' to 20'
2/27/13


2013-SC-001
0' to 4'
2/18/13


2013-SC-001
4' to 8'
2/18/13


2013-SC-001
4' to 8'
2/18/13
2013
SC
001
4.7'
TARGET


2013
SC
001
0.3'
to
0.4'
2013-SC-001
0' to 4'
2/18/13


2013-SC-001
4' to 8'
2/18/13


2013-SC-001
8" to 12'
2/18/13


2013-SC-00
8" to 12'
2/18/13
2013
SC
001
9,0'
to
9,1'
Target


2013
SC
001
5,2'
Target


2013-SC-001
8" to 12'
2/18/13


2013-SC-001
16' to 20'
2/18/13


2013-SC-001
16' to 20'
2/18/13


2013-SC-001
12' to 16"
2/18/13


2013-SC-001
16' to 20'
2/18/13


2013
SC
001
17.5'
to
17.8'
Target


2013
SC
001
17.5'
to
17.8'
Target


2013-SC-001
20' to 24'
2/18/13


2013-SC-001
20' to 24'
2/18/13


2013-SC-001
24'+028'
2/18/13


2013-SC-001
24'+028'
2/18/13


2013
SC
001
214'
TO
216'
TERMINUS
2/18

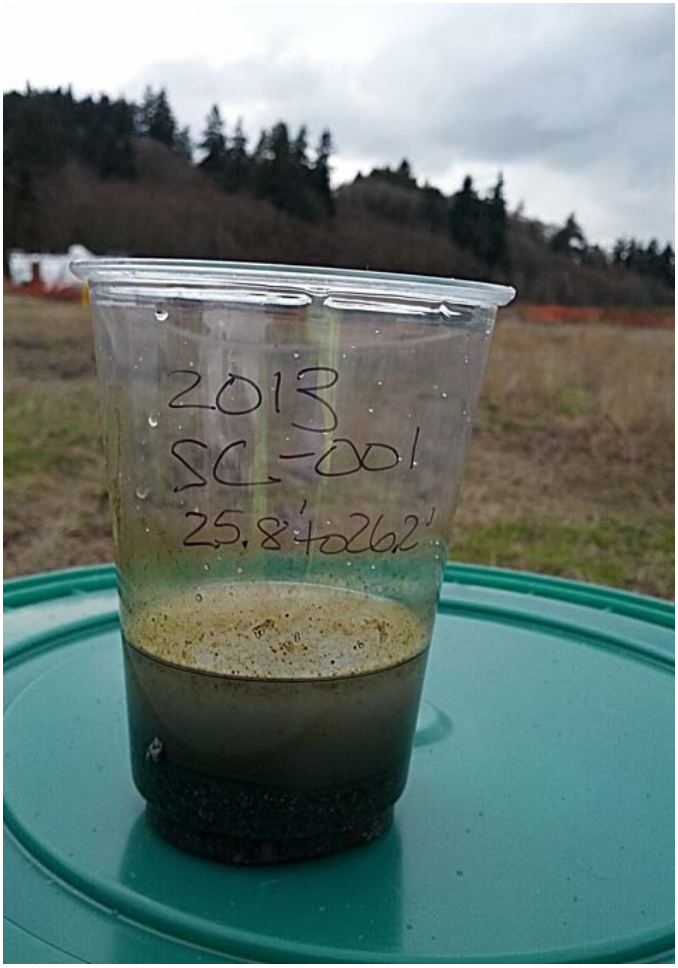

2013-SC-001
24'+028'
2/18/13


2013-SC-001
28'+032'
2/18/13


NitriSoft II
2013
SC
001
28.2'
to
28.4'
Tardost


2013
SC
001
24.0'
26.1'
Tardost


2013-SC-001
28'+032'
2/18/13


2013
SC-001
25.8'to26.2'


2013
SC-001
25.8'to26.2'


2013
SC-001
25.8'to26.2'


2013-SC-001
32'to35'
2/18/13

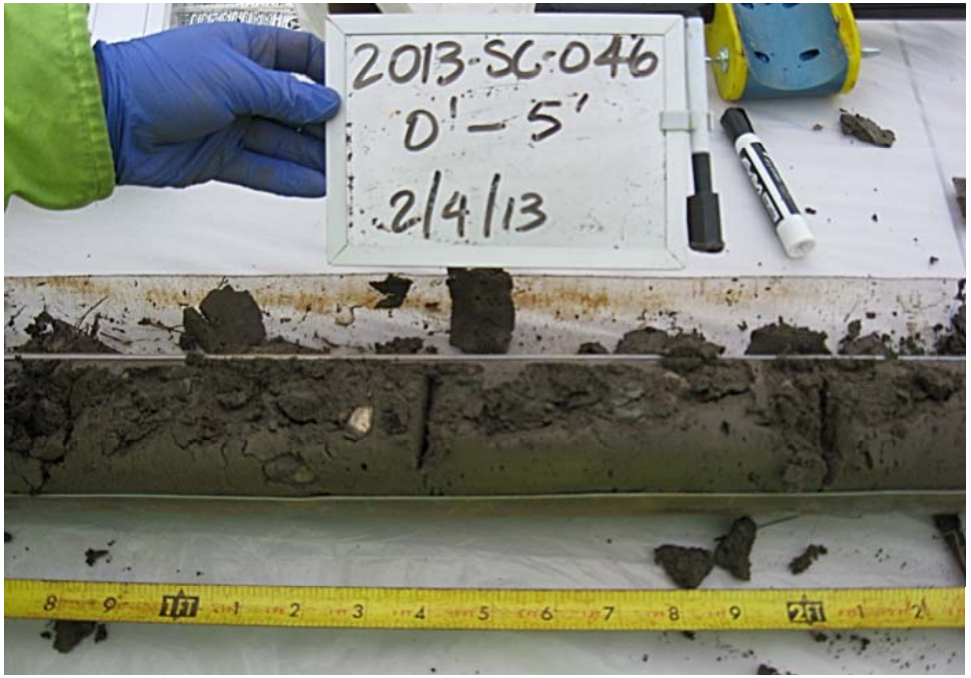

2013-SC-001
32'to35'
2/18/13


2013
SC
001
33.5'
to
33.7'


2013-SC-001
32'to35'
2/18/13


2013
SC
001
32.3'
to
32.4'


2013
SC
001


2013-SC-046
0'-5'
2/4/13


2013
SC
001


2013-SC-046
0'-5'
2/4/13


2013-SC-046
0'-5'
2/4/13


2013-SC-046
0'-5'
2/4/13


2013-SC-046
0'-5'
2/4/13


2013-SC-046
0'-5'
2/4/13

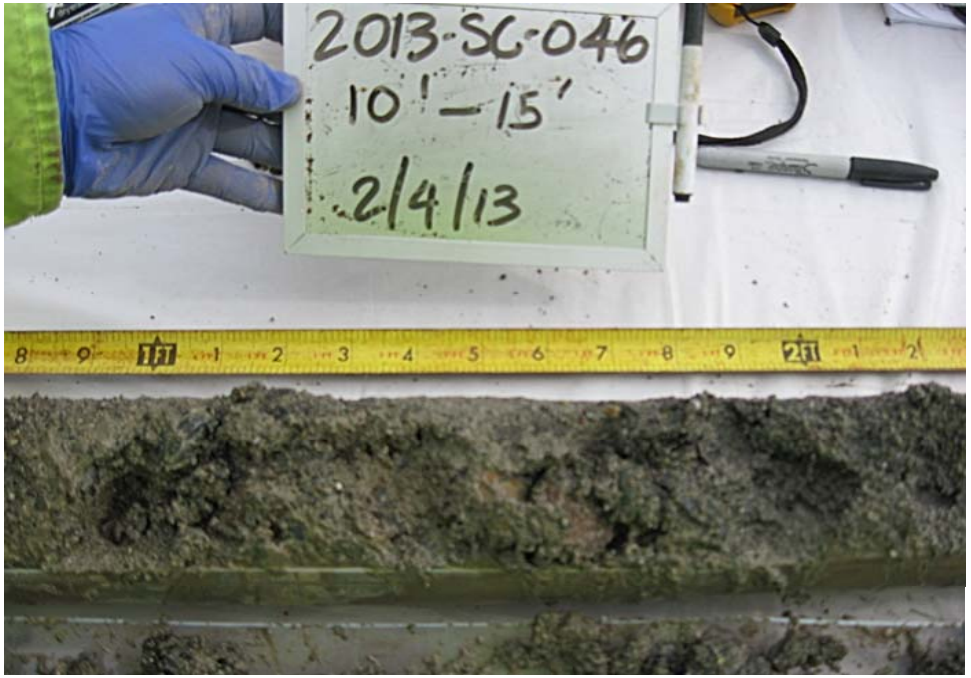

2013-SC-046
5'-10'
2/4/13


2013-SC-046
5'-10'
2/4/13


2013-SC-046
5'-10'
2/4/13


2013-SC-046
5'-10'
2/4/13


2013
SC
046
8.0'
8.1'


2013-SC-046
10'-15'
2/4/13


2013-SC-046
5'-10'
2/4/13


2013-SC-046
10'-15'
2/4/13


2013-SC-046
15'-20'
2/4/13


2013-SC-046
15'-20'
2/4/13


2013-SC-046
10'-15'
2/4/13


2013-SC-046
15'-20'
2/4/13


2013
SC
046
17.3-
17.4
Party
cups


2013
SC
046
16.3-
16.4
Jumbo Craft Sticks


2013-SC-046
20'-25'
2/4/13


2013-SC-046
20'-25'
2/4/13


2013-SC-046
20'-25'
2/4/13




2013-SC-046
20'-25'
2/4/13

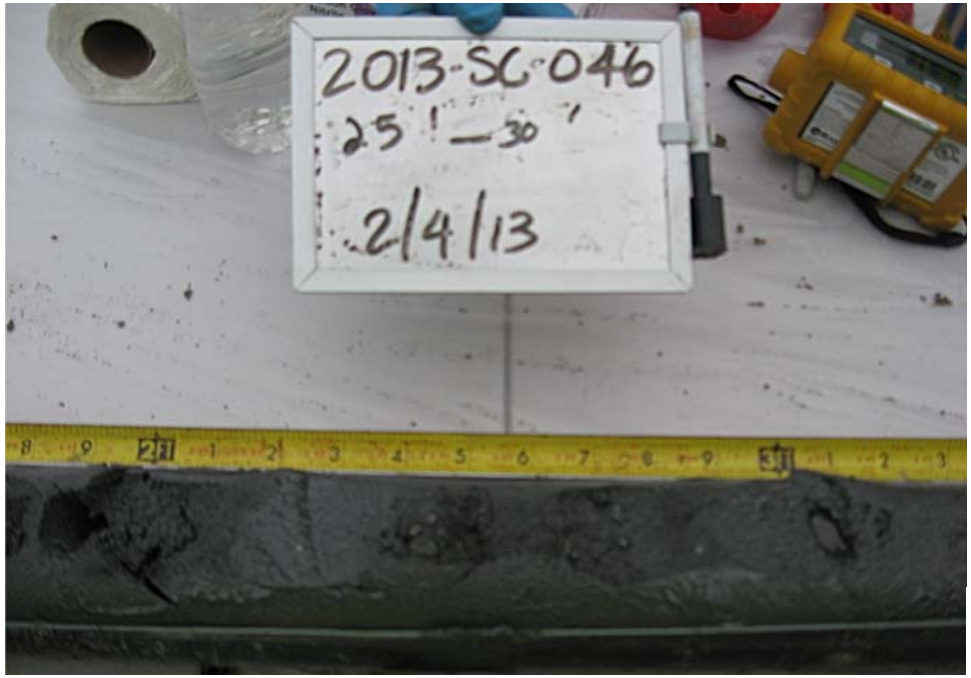

2013-SC-046
20'-25'
2/4/13


2013
SC
046
21.2-
21.3


2013
SC
046
22.4-
22.6


2013
SC
046
23.0
23.1


2013-SC-046
25'-30'
2/4/13


2013-SC-046
25'-30'
2/4/13


2013-SC-046
25'-30'
2/4/13


2013-SC-046
25'-30'
2/4/13


2013-SC-046
25'-30'
2/4/13


2013
SC
046
26.9
27.0


2013
SC
046
27.2
27.4


2013
SC
046
27.7
27.9


2013
SC
046
29.6
29.8


2013-SC-046
30'-35'
2/4/13

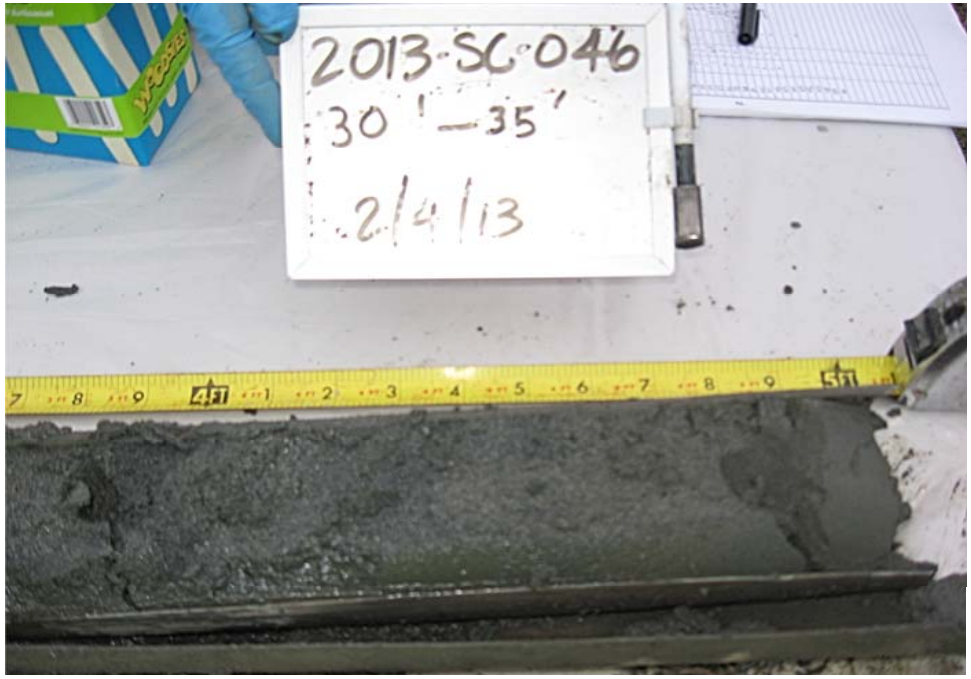

2013-SC-046
30'-35'
2/4/13


2013-SC-046
30'-35'
2/4/13


2013-SC-046
30'-35'
2/4/13


2013
SC
046
33.1
33.3


2013-SC-046
35'—40'
2/4/13


2013-SC-046
30'—35'
2/4/13


2013
SC
046
31.0
31.3


2013-SC-046
35'-40'
2/4/13


2013-SC-046
35'-40'
2/4/13


2013-SC-046
35'-40'
2/4/13


2013-SC-046
35'-40'
2/4/13


2013
SC
046
35.5
35.7


2013
SC
046
38.0
38.2


2013
SC
046
39.1
39.3


2013-SC-046
40'-42'
2/5/13

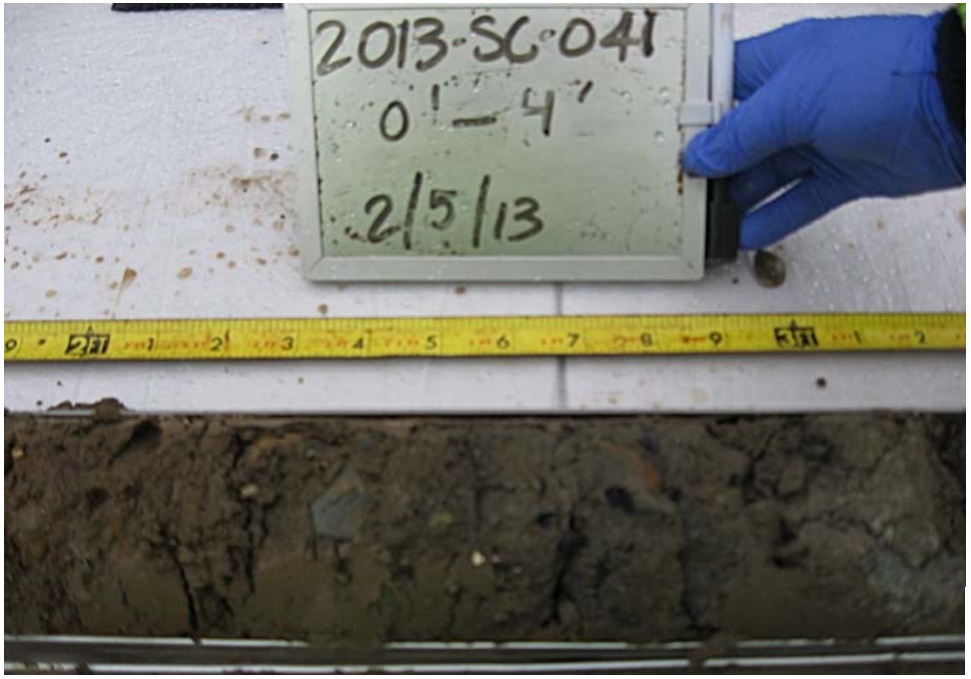

2013-SC-046
40'-42'
2/5/13


2013-SC-046
40'-42'
2/5/13


2013-SC-046
40'-42'
2/5/13


2013-SC-046
40'-42'
2/5/13


2013-SC-041
0'-4'
2/5/13


2013-SC-041
0'-4'
2/5/13


2013
SC
046
413
415


2013-SC-041
0'-4'
2/5/13


2013-SC-041
0'-4'
2/5/13

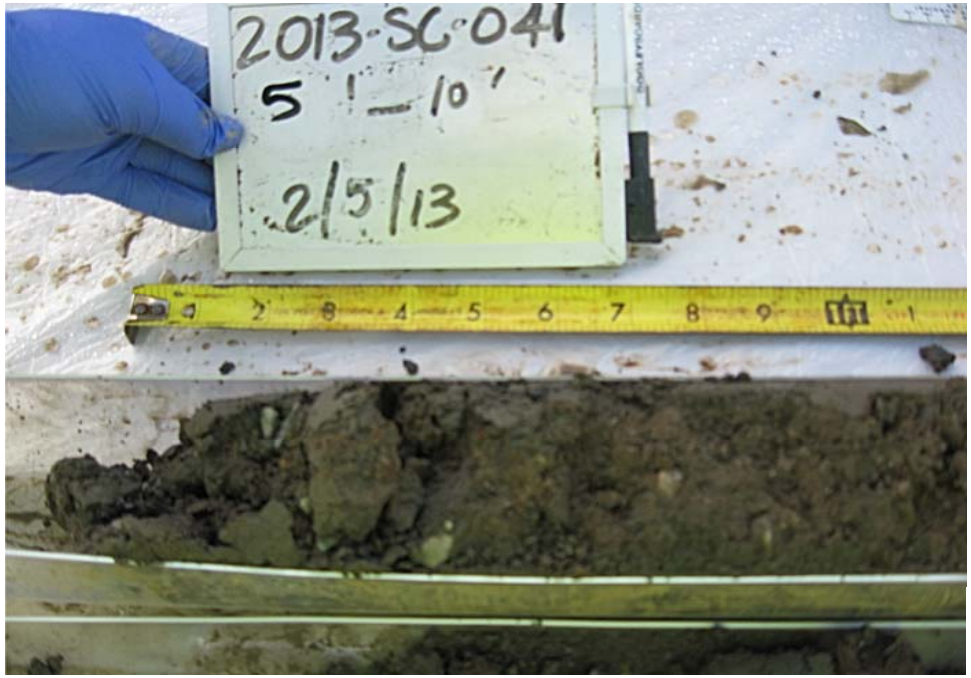

2013-SC-041
4'-5'
2/5/13


2013-SC-041
0'-4'
2/5/13

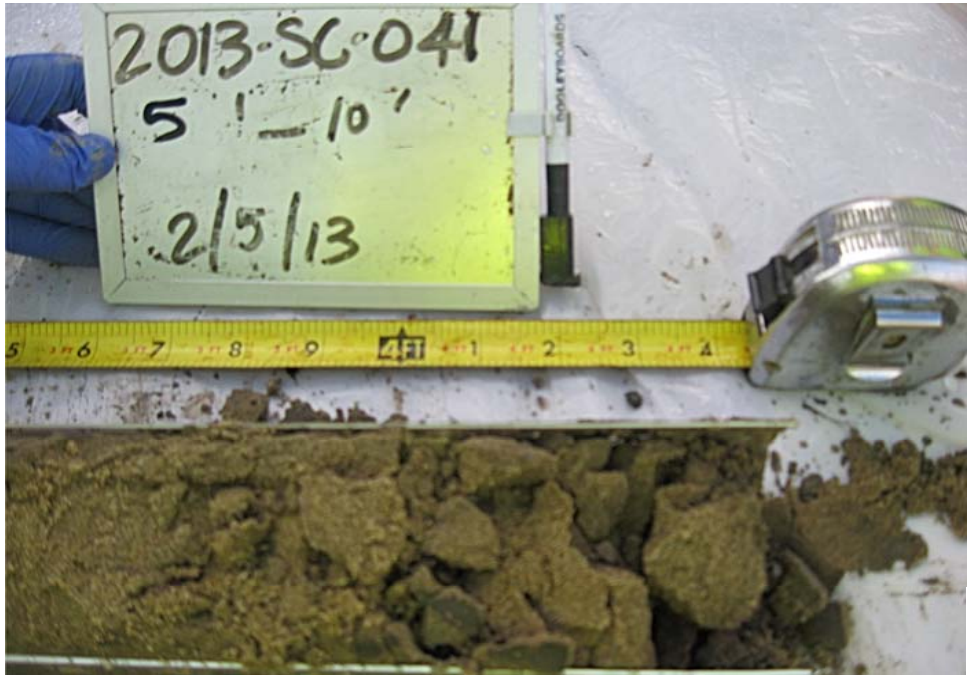


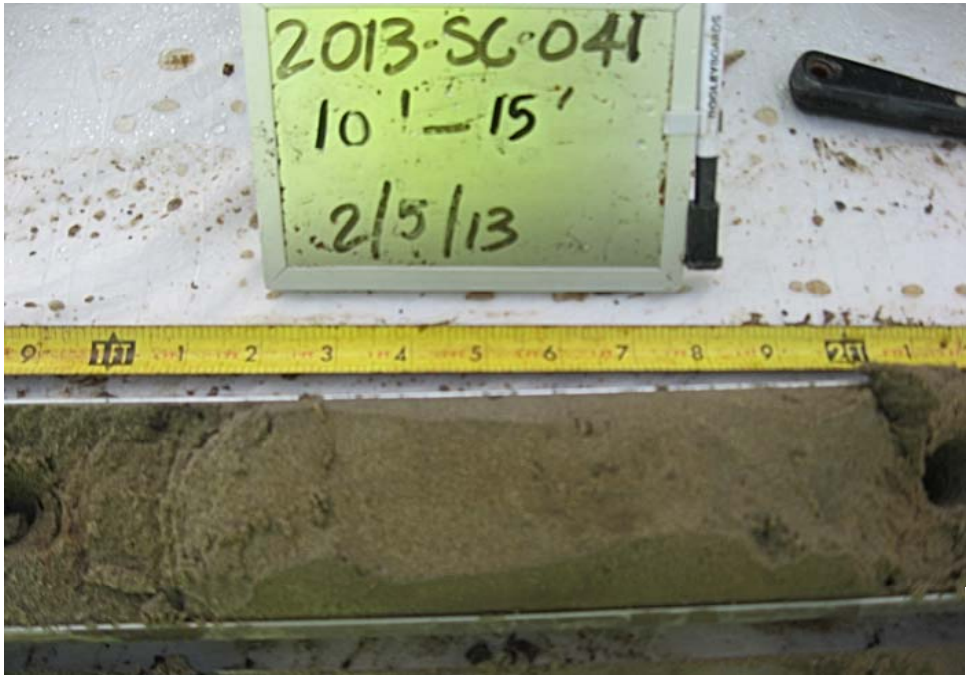

5 ' – 10 '
2/5/13


2013-SC-041
5 ' – 10 '
2/5/13

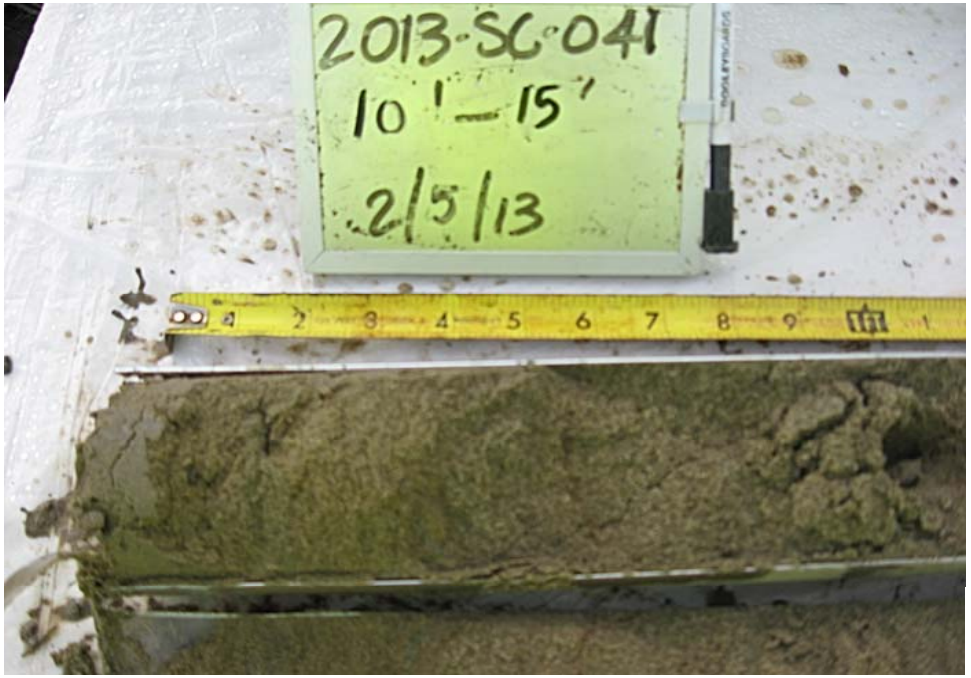

2013-SC-041
5 ' – 10 '
2/5/13


2013-SC-041
5 ' – 10 '
2/5/13


2013-SC-041
5'-10'
2/5/13


2013-SC-041
10'-15'
2/5/13


2013-SC-041
5'-10'
2/5/13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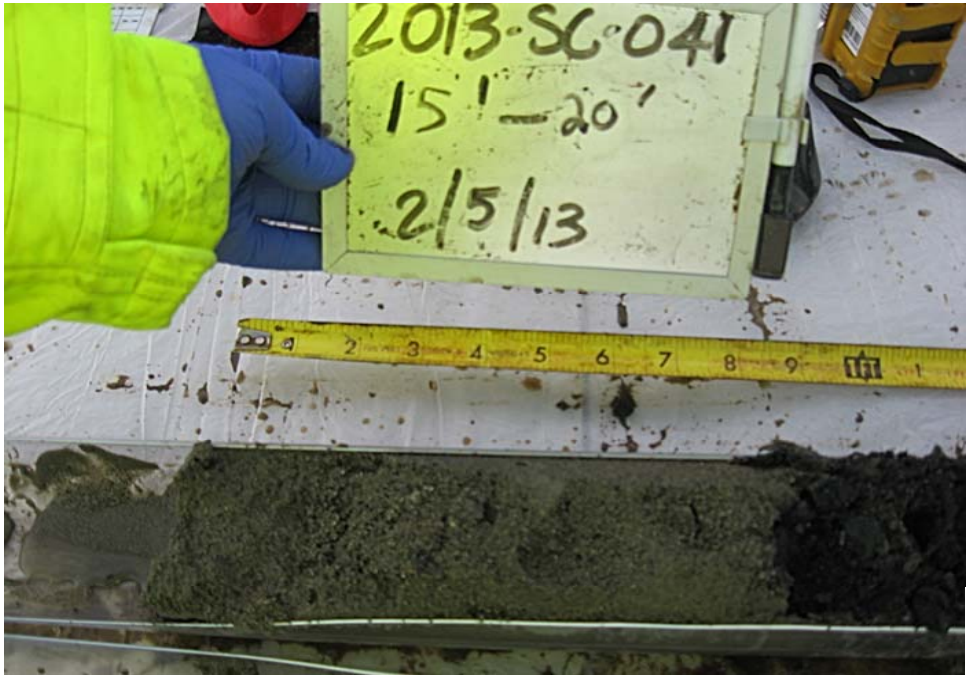
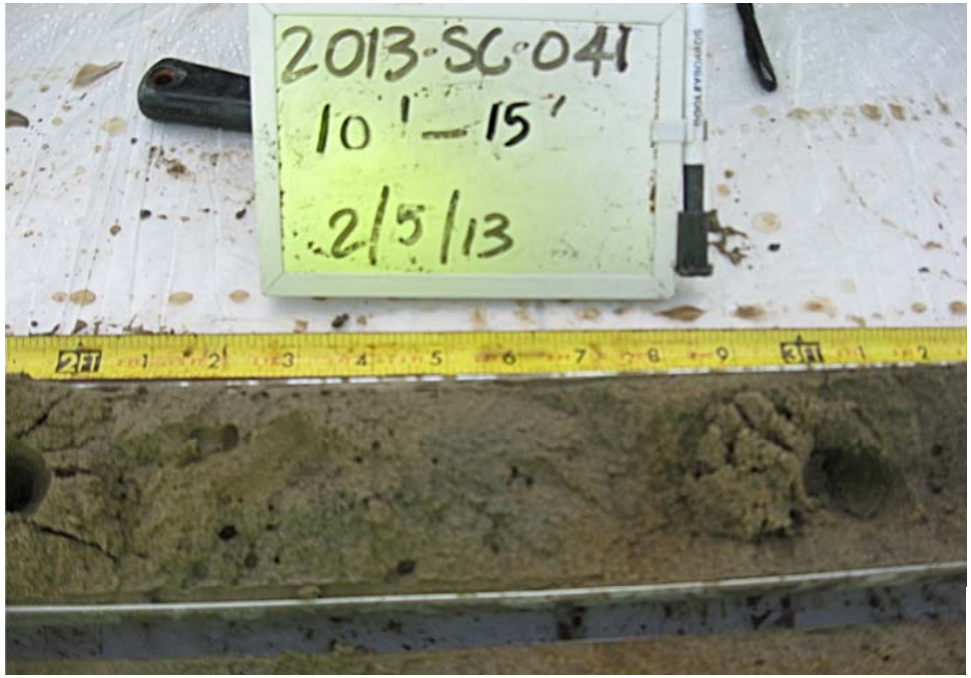
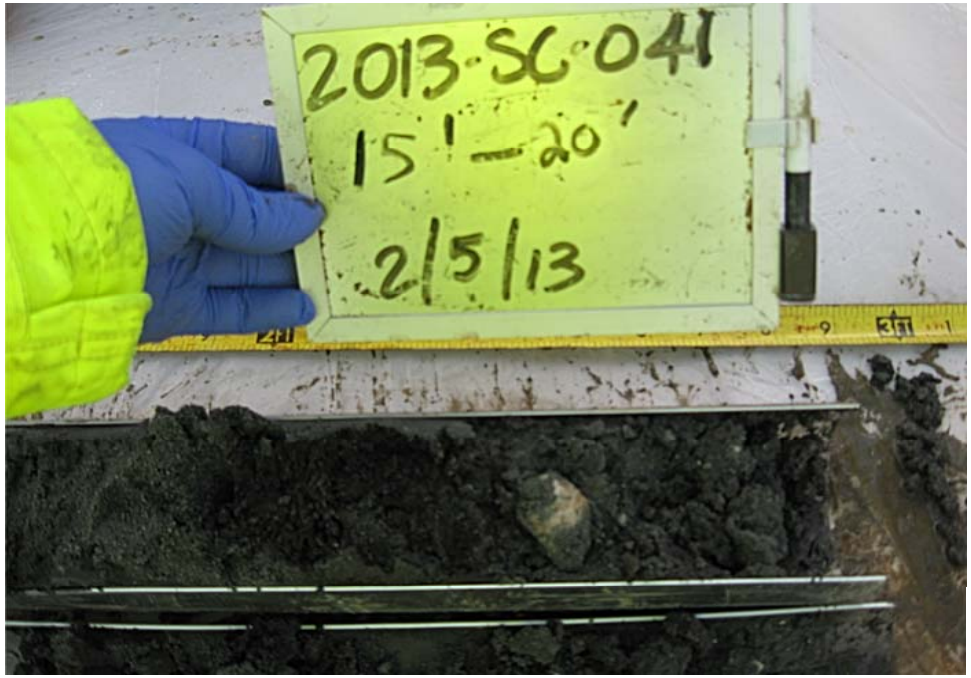
10'-15'
2/5/13


2013-SC-041
10'—15'
2/5/13


2013-SC-041
15'—20'
2/5/13


2013-SC-041
10'—15'
2/5/13


2013-SC-041
10'—15'
2/5/13


2013-SC-041
15'-20'
2/5/13


2013
SC
041
17.1
19.3


2013-SC-041
15'-20'
2/5/13


2013
SC
041
16.0
16.2


2013-SC-041
20'-25'
2/5/13


2013-SC-041
20'-25'
2/5/13


2013-SC-041
20'-25'
2/5/13


2013-SC-041
20'-25'
2/5/13


2013-SC-041
20'-25'
2/5/13


2013
SC
041
21.4
21.5


2013
SC
041
21.8
22.0


2013
SC
041
24.0
24.2


2013-SC-041
25'-30'
2/5/13


2013-SC-041
25'-30'
2/5/13


2013
SC
041
25'
30'


2013-SC-041
25'-30'
2/5/13


2013-SC-041
25'-30'
2/5/13


2013
SC
041
25'-30'


2013-SC-041
25'-30'
2/5/13


2013
SC
041
25'-30'


2013-SC-041
30'-35'
2/5/13


2013-SC-041
30'-35'
2/5/13


2013-SC-041
30'-35'
2/5/13


2013-SC-041
30'-35'
2/5/13


2013
SC 041
33.5
33.7


2013-SC-041
35'-40'
2/5/13


2013-SC-041
30'-35'
2/5/13


2013-SC-041
35'-40'
2/5/13


2013-SC-041
35'-40'
2/5/13


2013
SC 041
37.5
37.7


2013-SC-041
35'-40'
2/5/13


2013-SC-041
35'-40'
2/5/13


2013-SC-041
40'_45'
2/5/13


2013-SC-041
40'_45'
2/5/13


2013
SC
041
39.6
39.8


2013-SC-041
40'_45'
2/5/13


2013-SC-041
401_45'
2/5/13


2013
SC
041


2013-SC-041
401_45'
2/5/13

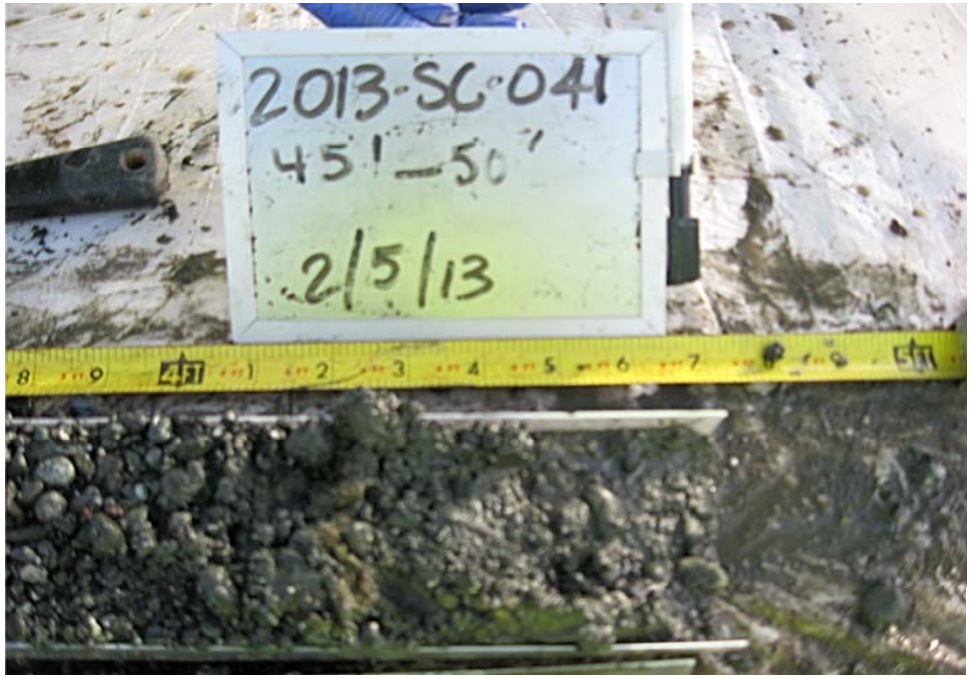

2013
SC
041
436
438


2013-SC-041
45'-50'
2/5/13


2013-SC-041
45'-50'
2/5/13

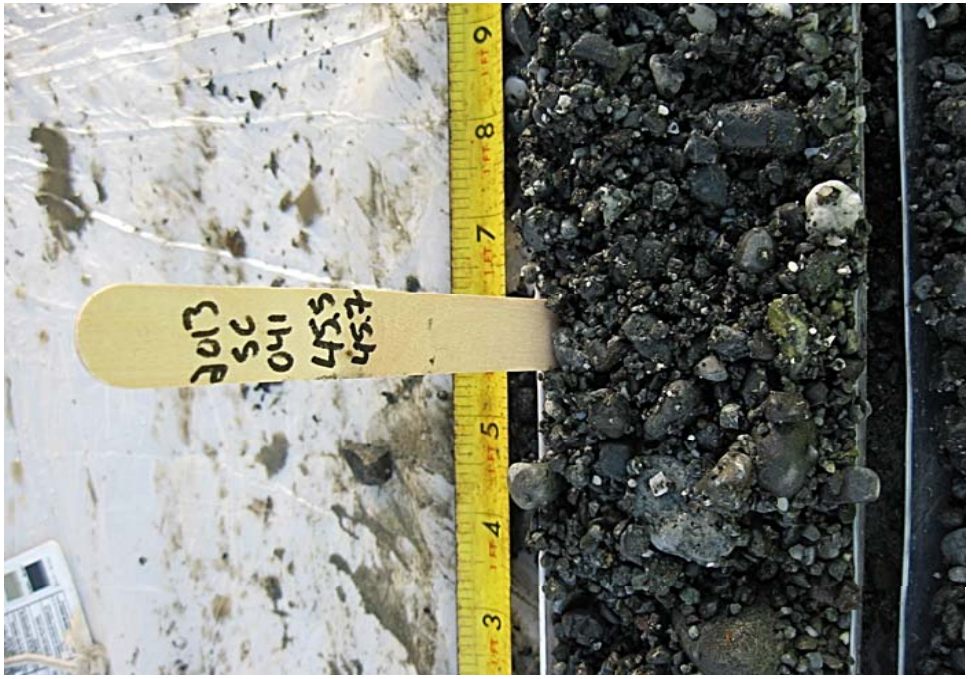

2/5/13


2013-SC-041
45'-50'
2/5/13


2013-SC-041
45'-50'
2/5/13


2013-SC-041
55'to60'
2/6/13


2013-SC-041
45'-50'
2/5/13


2013
SC
041
45'-50'


2013-SC-041
55' to 60'
2/6/13


2013-SC-041
55' to 60'
2/6/13


2013-SC-041
55' to 60'
2/6/13


2013-SC-041
55' to 60'
2/6/13


2013-SC-041
60 'to 65'
2/6/13


2013
SC
041
60.8
61.0


2013-
SC-
041
58.4'
to
58.5'


2013-SC-041
60 'to 65'
2/6/13


2013-SC-041
65' to 70'
2/6/13


2013-SC-041
65' to 70'
2/6/13


2013-SC-041
65' to 70'
2/6/13


2013-SC-041
65' to 70'
2/6/13


2013-SC-041
65 to 70
2/6/13


2013
SC
041
66.2
66.4


2013
SC
041
67.2
67.3


2013
SC
041
67.4
67.5


2013-SC-041
70 to 75'
2/6/13


2013-SC-041
70 to 75'
2/6/13


2013
SC
041
68.5
68.7


2013-SC-041
70 to 75'
2/6/13


2013-SC-041
70 'to 75'
2/6/13


2013-SC-041
75 'to 78'
2/6/13


2013-SC-041
70 'to 75'
2/6/13


2013
SC
041
75'
78'


2013-SC-041
75 ' to 78 '
2/6/13


2013-SC-041
75 ' to 78 '
2/6/13


2013-SC-041
75 ' to 78 '
2/6/13


2013-SC-041
75 ' to 78 '
2/6/13


2013-SC-045
0' to 5'
2/6/13


2013-SC-045
5' to 10'
2/6/13


2013
SC
041
76.5
76.7


2013
SC
045
0.5
0.7


2013-SC-045
5' to 10'
2/6/13


2013-SC-045
10' to 15'
2/6/13


5' to 10'
2/6/13


2013
SC
045
6.3
6.5


2013-SC-045
10' to 15'
2/6/13


2013-SC-045
10' to 15'
2/6/13


2013-SC-045
10' to 15'
2/6/13


2013-SC-045
10' to 15'
2/6/13


2013
SC
045
11.5
11.7


2013
SC
045
14.3
14.5

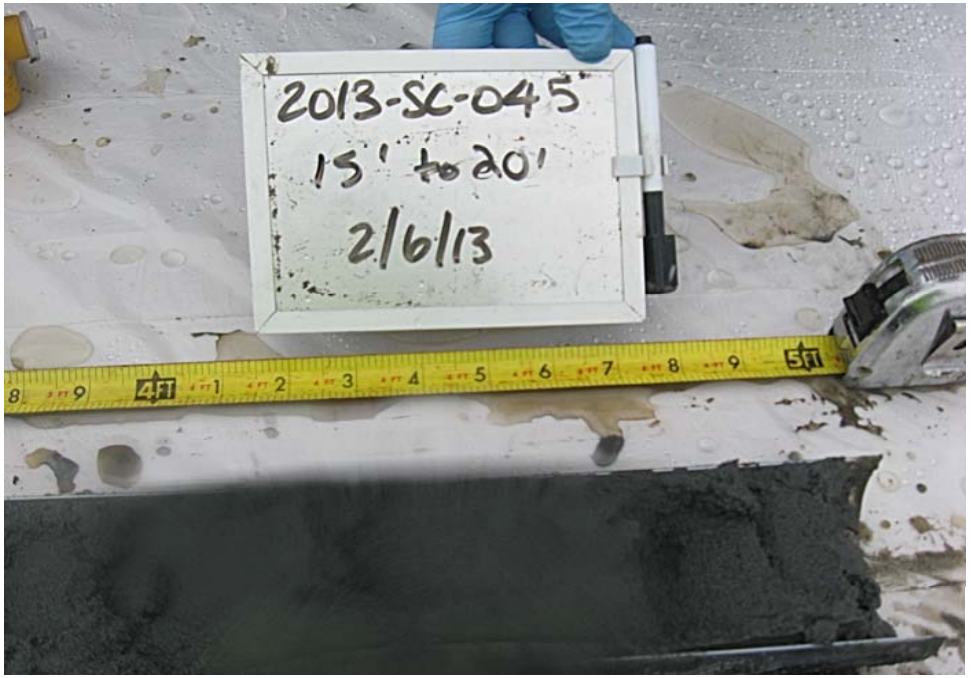

2013-SC-045
15' to 20'
2/6/13


2013-SC-045
15' to 20'
2/6/13

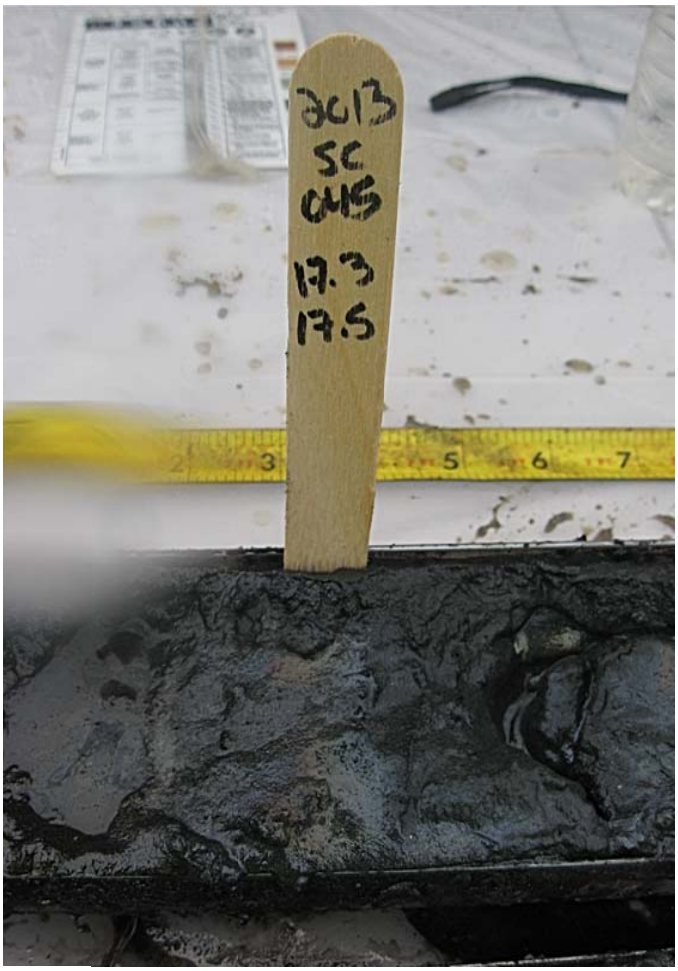

2013-SC-045
15' to 20'
2/6/13



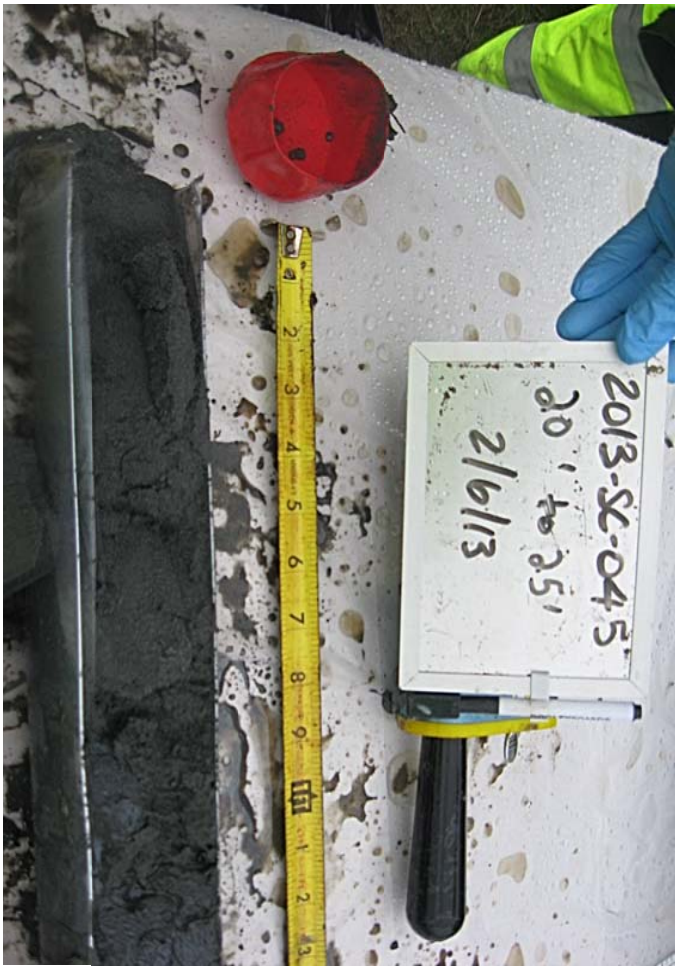

2013-SC-045
15' to 20'
2/6/13


2013-SC-045
15' to 20'
2/6/13


2013
SC
045
16.9
17.1


2013
SC
045
17.3
17.5


2013
SC
045
18.9


2013-SC-045
20' to 25'
2/6/13


2013-SC-045
20' to 25'
2/6/13


2013-SC-045
20' to 25'
2/6/13


2013-SC-045
20' to 25'
2/6/13


2013-SC-045
20' to 25'
2/6/13


2013
SC
045
21.0
21.1


2013
SC
045
21.3
21.5


2013
SC
045
22.4
22.5

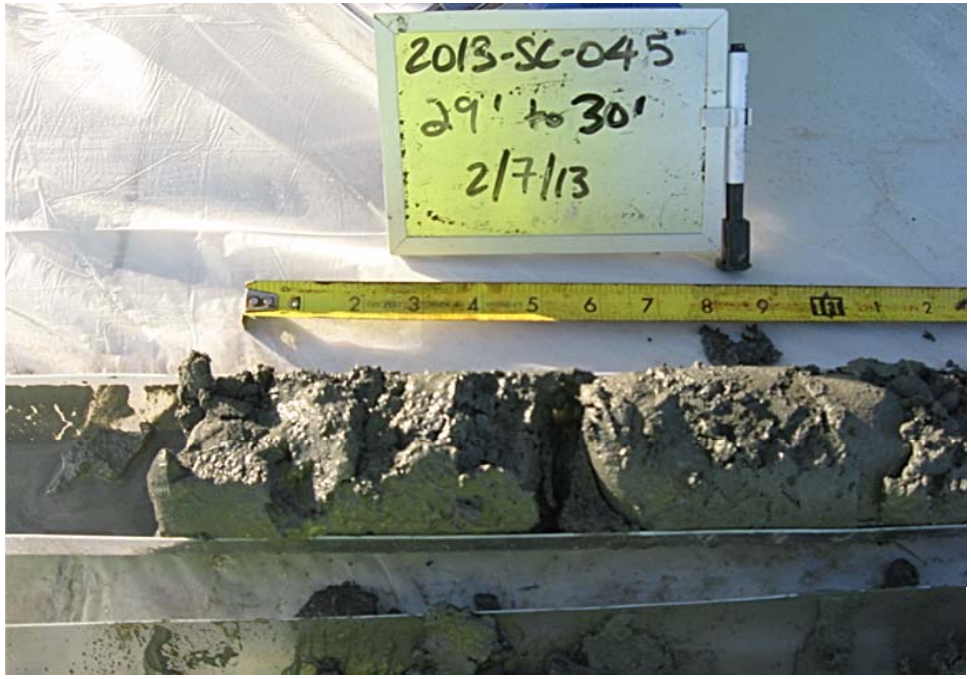

2013
SC
045
23.8
24.0


2013-SC-045
25' to 27'
2/6/13



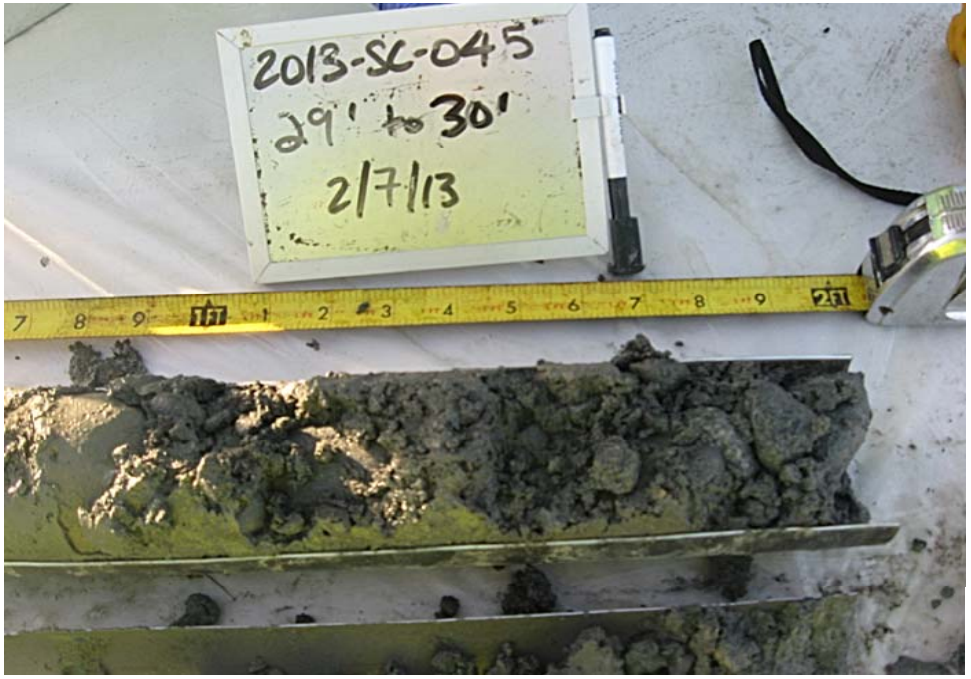

2013-SC-045
25' to 27'
2/6/13


2013-SC-045
25' to 27'
2/6/13


2013-SC-045
29' to 30'
2/7/13






2013-SC-045
29' to 30'
2/7/13


2013-SC-045
30' to 33.5'
2/7/13


2013-SC-045
30' to 33.5'
2/7/13


2013-SC-045
30' to 33.5'
2/7/13


2013-SC-045
30' to 33.5'
2/7/13


2013
SC
045
31.0
31.2


2013-SC-045
33.5' to 35'
2/7/13

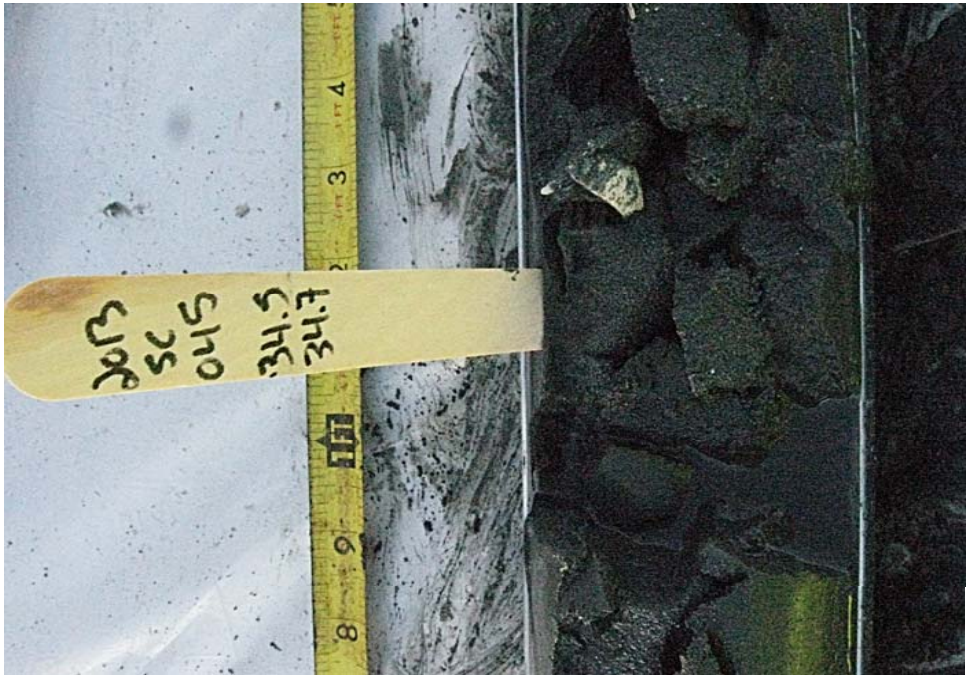

2013-SC-045
30' to 33.5'
2/7/13


2013
SC
045
33.2
33.4


2013-SC-045
33.5' to 35'
2/7/13


2013-SC-045
35' to 40'
2/7/13


2013-SC-045
33.5' to 35'
2/7/13


34.5
34.7


2013-SC-045
35' to 40'
2/7/13


2013-SC-045
35' to 40'
2/7/13


2013-SC-045
35' to 40'
2/7/13


2013-SC-045
35' to 40'
2/7/13


2013
SC
045
37.0
37.2


2013
SC
045
39.0
39.2


2013-SC-045
40' to 45'
2/7/13


2013-SC-045
40' to 45'
2/7/13


2013-SC-045
40' to 45'
2/7/13


2013
SC-045
40.0
45.0


2013-SC-045
40' to 45'
2/7/13


2013-SC-045
40' to 45'
2/7/13




2013-SC-045
45' to 47.5'
2/7/13


2013
SC
045
47.5
45'


2013-SC-045
45' to 47.5'
2/7/13


2013-SC-045
45' to 47.5'
2/7/13


2013
SC
045
46.0
46.2


2013-SC-045
45' to 47.5'
2/7/13


2013-SC-045
45' to 47.5'
2/7/13


2013-SC-045
47.5' to 50'
2/7/13


2013-SC-045
47.5' to 50'
2/7/13


2013-SC-045
47.5' to 50'
2/7/13


2013-SC-045
47.5' to 50'
2/7/13


2013
SC
045
47
48.9


2013-SC-045
50' to 53'
2/7/13


2013-SC-045
47.5' to 50'
2/7/13

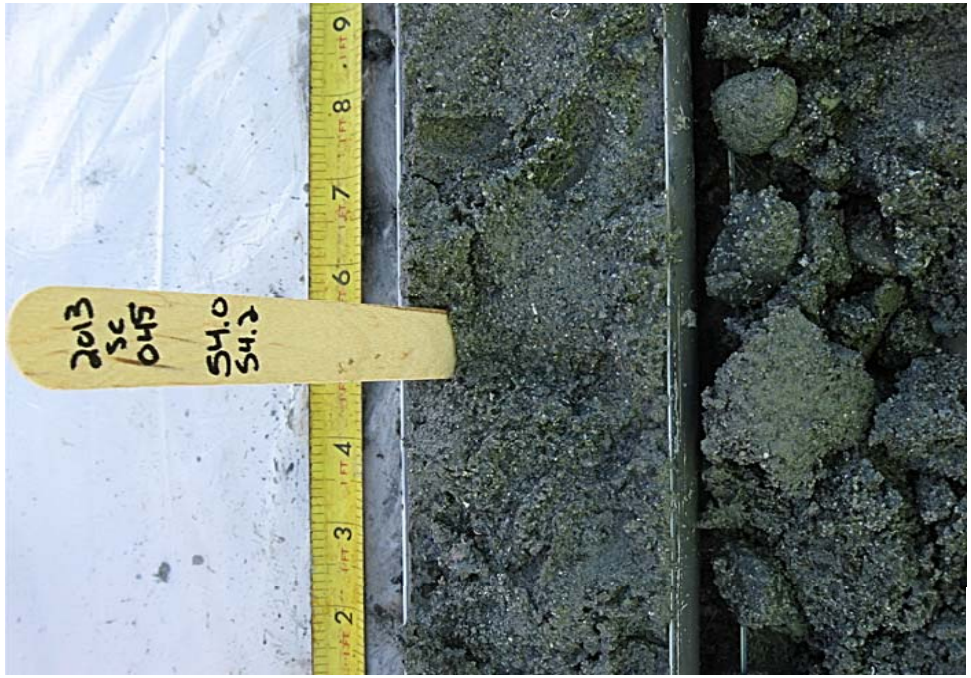

2013-SC-045
50' to 53'
2/7/13


2013
SC
045
51.0
51.5


2013-SC-045
53' to 55'
2/7/13


2013-SC-045
50' to 53'
2/7/13


2013-SC-045
53' to 55'
2/7/13


2013
SC
045
54.0
54.2


2013-SC-045
55' to 60'
2/7/13


2013-SC-045
53' to 55'
2/7/13


2013-SC-045
55' to 60'
2/7/13


2013-SC-045
55' to 60'
2/7/13


2013
SC
045
58.0
58.2


2013-SC-045
55' to 60'
2/7/13


2013-SC-045
55' to 60'
2/7/13


2013-SC-045
60' to 65'
2/7/13


2013-SC-045
60' to 65'
2/7/13


2013-SC-045
60' to 65'
2/7/13


2013-SC-045
60' to 65'
2/7/13


2013
SC
045
63.5
63.7


2013-SC-045
65' to 69'
2/7/13


2013-SC-045
60' to 65'
2/7/13


2013-SC-045
65' to 69'
2/7/13


2013-SC-045
65' to 69'
2/7/13

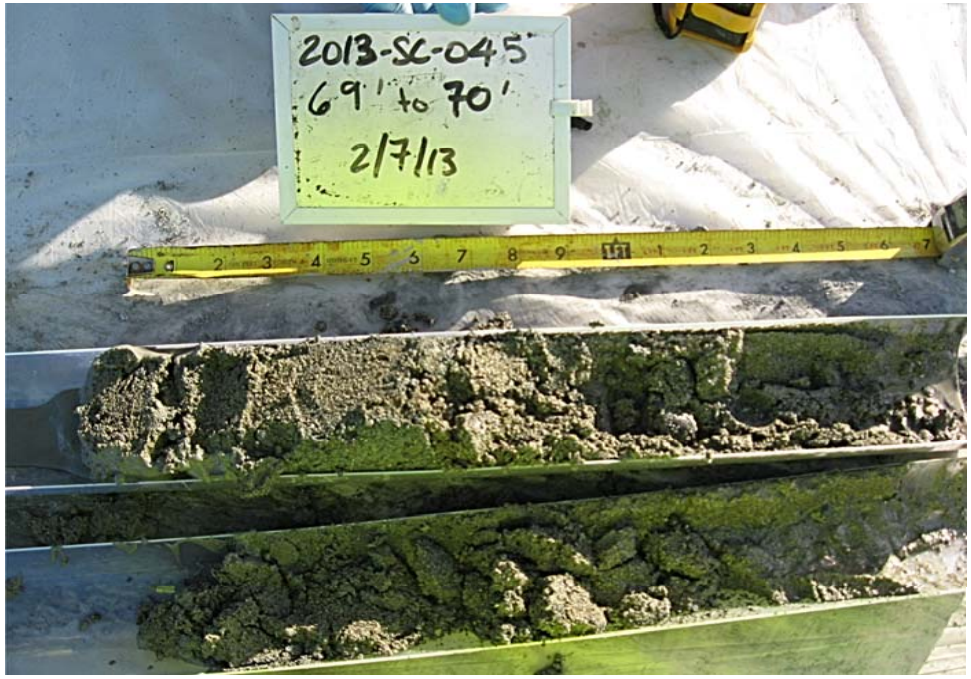

2013
SC
045
66.0
66.2


2013-SC-045
65' to 69'
2/7/13


2013-SC-045
65' to 69'
2/7/13


2013-SC-045
73.5' to 75'
2/8/13


2013
SC
045
74.1
to
74.1


2013-SC-045
69' to 70'
2/7/13


2013-SC-045
73.5' to 75'
2/8/13


2013-SC-045
70' to 73.5'
2/8/13


2013-SC-045
75' to 80'
2/8/13


2013-SC-045
70' to 73.5'
2/8/13


2013-SC-045
75' to 80'
2/8/13
Hefty


2013
SC
045
78.0
to
78.1




2013-SC-045
75' to 80'
2/8/13


2013
SC
045
79.0
to
79.1


2013-SC-002
0'-4'
2/19/13


2013-SC-002
4'+08'
2/19/13


2013-SC-002
0'-4'
2/19/13


2013-SC-002
4'+08'
2/19/13


2013-SC-002
8'to12'
2/19/13


2013
SC
002
9.0'
to
9.2'


2013-SC-002
4'to8'
2/19/13
2013
SC
002


2013-SC-002
8'to12'
2/19/13


2013-SC-002
12' to 16'
2/19/13

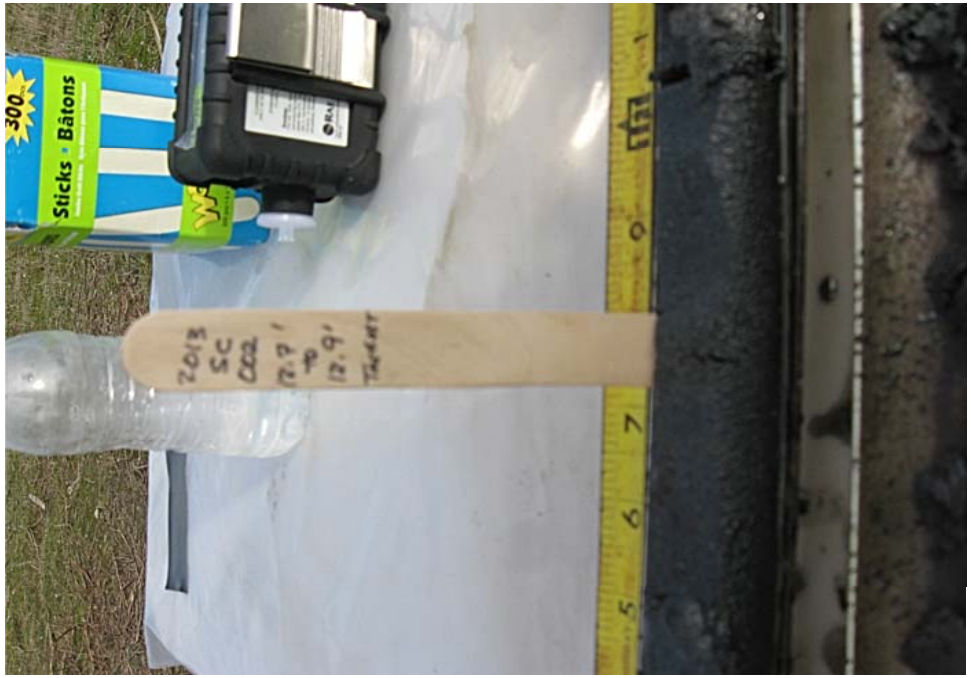

2013-SC-002
12' to 16'
2/19/13


2013-SC-002
12' to 16'
2/19/13


2013-SC-002
12' to 16'
2/19/13


2013
SC
002
15.5'
TO
15.5'


2013-SC-002
16' to 20'
2/19/13


Sticks • Bâtons
2013
SC
002
12.7'
TO
12.9'


2013-SC-002
16' to 20'
2/19/13


2013-SC-002
16' to 20'
2/19/13

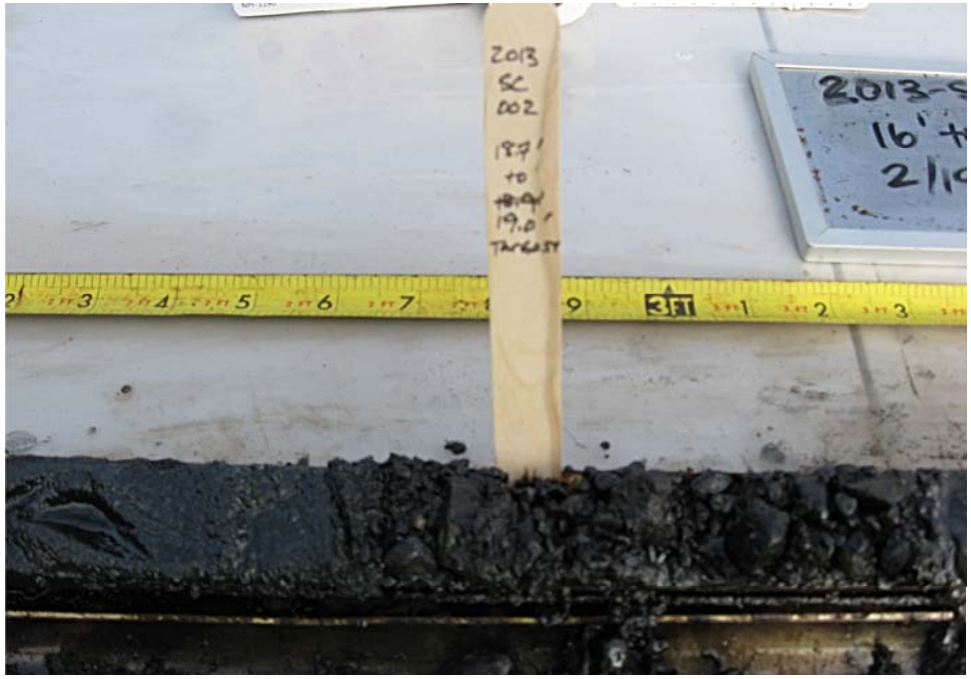

2013
SC
002
16.8'
TO
16.9'


2013-SC-002
16' to 20'
2/19/13


2013
SC
002
16.8'
TO
16.9'


2013-SC-002
20' to 24'
2/19/13


2013-SC-002
24' to 28'
2/19/13


2013
SC
002
19.0'


2013-SC-002
20' to 24'
2/19/13


2013-SC-002
24'+028'
2/19/13


2013
SC
002


2013-SC-002
24'+028'
2/19/13


2013-SC-002
24'+028'
2/19/13

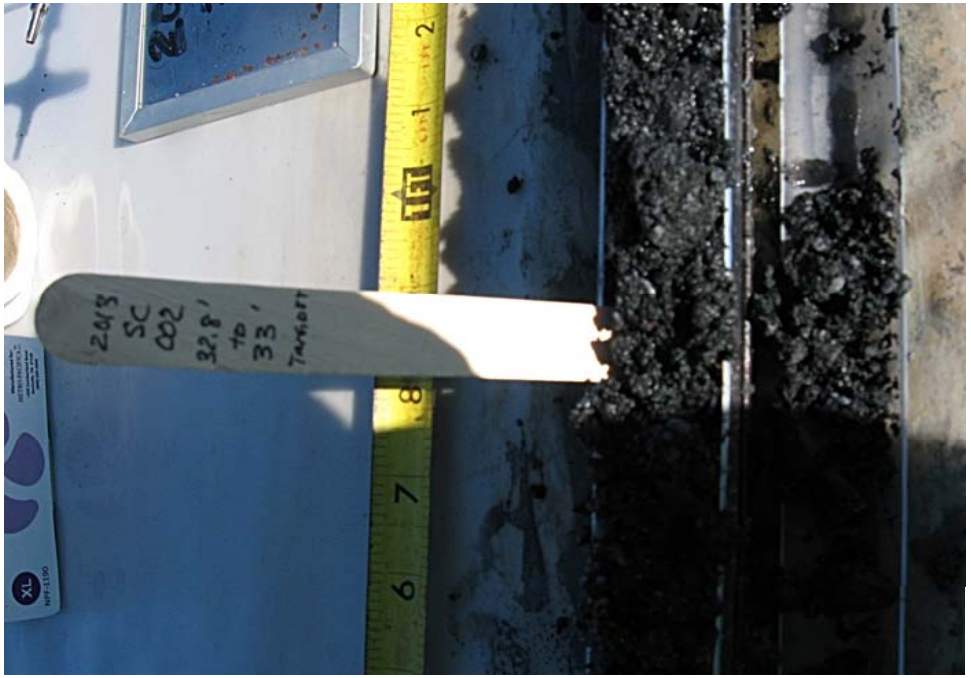

2013-SC-002
28' to 32'
2/19/13

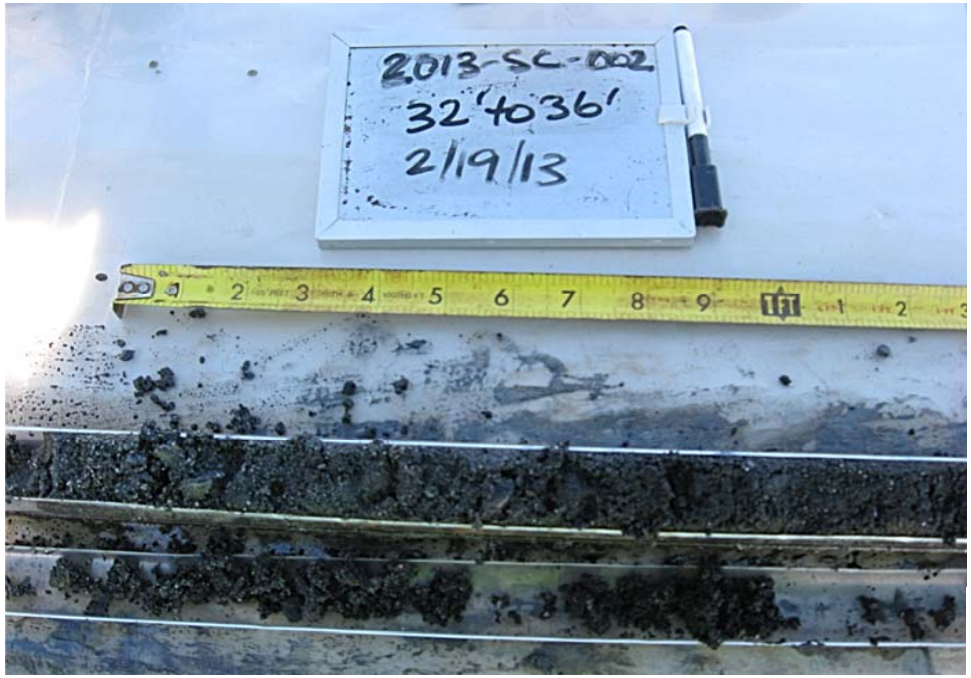

NitriSoft II
2013
SC
002
28.9'
to
28.9'


2013-SC-002
28' to 32'
2/19/13


2013-SC-002
28' to 32'
2/19/13


2013-SC-002
32'to36'
2/19/13


2013
SC
002
32.8'
to
33'
Target


2013-SC-002
32'to36'
2/19/13


NitriSoft


2013-SC-002
36' to 40'
2/19/13


2013-SC-002
40' to 44'
2/19/13


2013-SC-002
36' to 40'
2/19/13


2013-SC-002
36' to 40'
2/19/13


2013-SC-002
40' to 44'
2/19/13


2013-SC-002
44' to 48' no recov.
2/19/13


2013-SC-002
40' to 44'
2/19/13


2013
SC
002
41.1'
to
41.3'

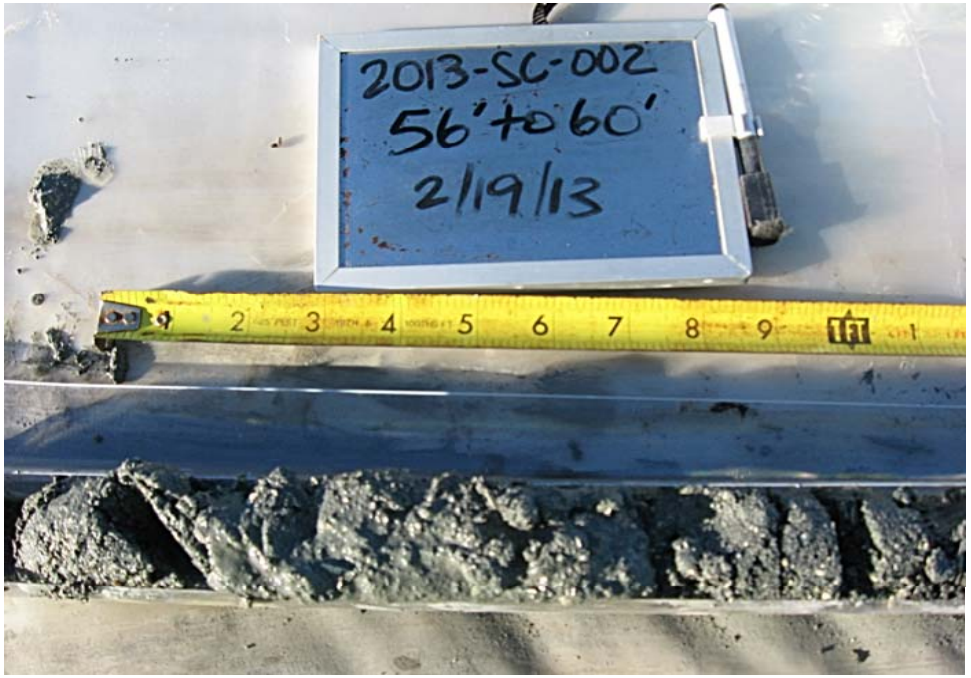

2013-SC-002
48' to 52'
2/19/13


2013
SC
002
50'
to
50.3'
TARGET


2013-SC-002
48' to 52'
2/19/13


2013-SC-002
48' to 52'
2/19/13


2013-SC-002
52' to 56'
2/19/13


2013-SC-002
56' to 60'
2/19/13


2013
SC
002
50'
to
50.3'

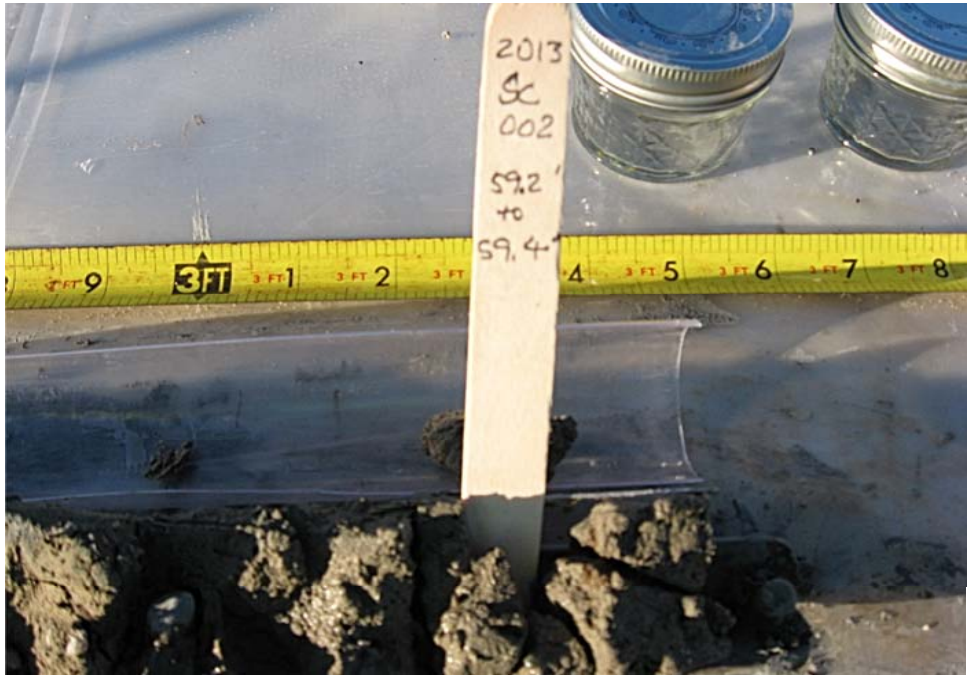

2013-SC-002
52' to 56'
2/19/13


56'to 60'
2/19/13

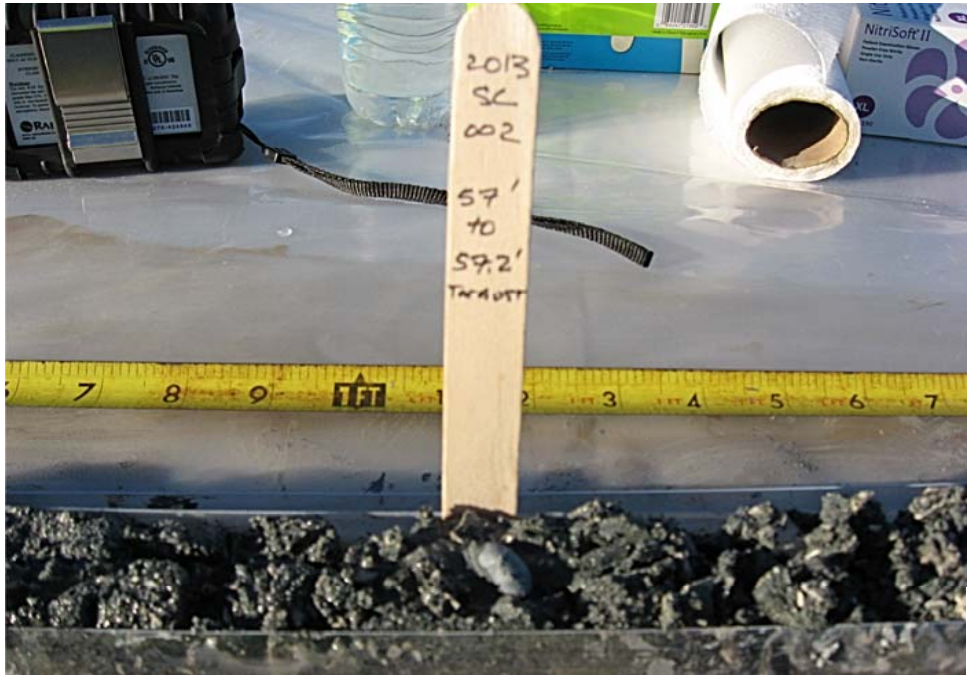

2013-SC-002
56'to 60'
2/19/13


2013-SC-002
56'to 60'
2/19/13


2/19/13


2013
SC
002
59.2'
to
59.4'


2013-SC-036
0' to 4'
2/20/13


2013
SC
002
57'
to
59.2'
TAKEOFF


2013-SC-036
0' to 4'
2/20/13


2013-SC-036
4'+0 8'
2/20/13


2013-SC-036
8'+0 12'
2/20/13


2013-SC-036
4'+0 8'
2/20/13


2013-SC-036
8'+0 12'
2/20/13


2013
SC
036
10'
to
10.2'
TANKOTT


2013-SC-036
12' to 16'
2/20/13


2013-SC-036
8' to 12'
2/20/13


2013-SC-036
12' to 16'
2/20/13


2013
SC
036
12.1'
TO
12.3'


2013-SC-036
16' to 20'
2/20/13


2013-SC-036
12' to 16'
2/20/13


2013-SC-036
16' to 20'
2/20/13


2013-SC-036
16' to 20'
2/20/13


2013
SC
036
19.8'
to
19.9'
Tangent


2013-SC-036
16' to 20'
2/20/13


2013
SC
036
18.4'
to
18.6'
Tangent


2013-SC-036
24' to 28'
2/20/13


2013-SC-036
24' to 28'
2/20/13


2013-SC-036
20' to 24'
2/20/13


2013-SC-036
24' to 28'
2/20/13


2013
SC
036
24'
to
26.2'
2FT


2013-SC-036
28' to 32'
2/20/13
1FT
2FT


2013-SC-036
24' to 28'
2/20/13
3FT

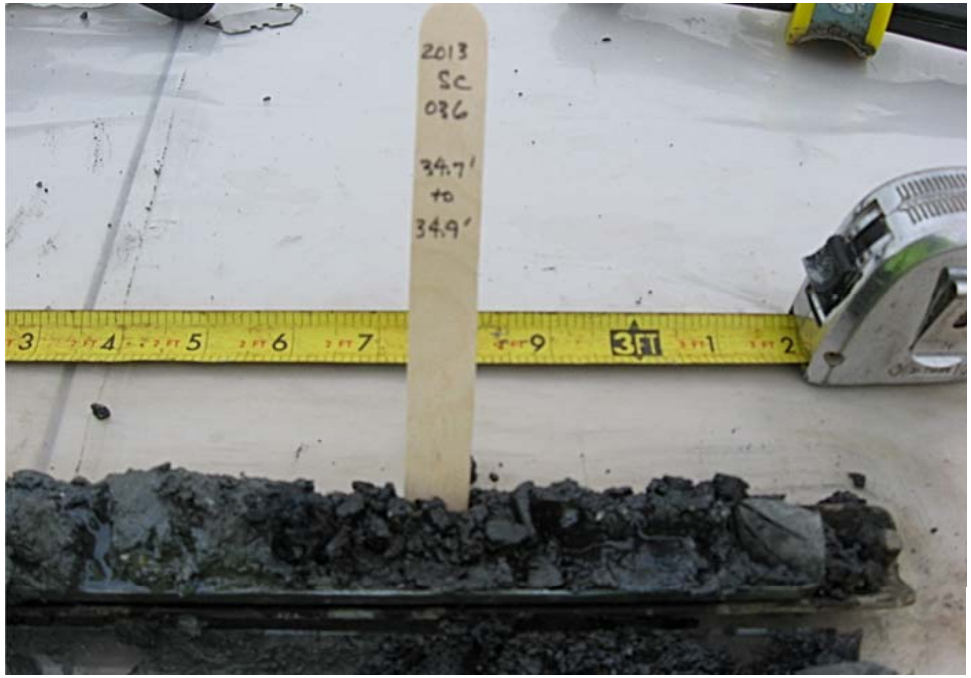

2013-SC-036
28' to 32'
2/20/13
1FT


2013-SC-036
28' to 32'
2/20/13


2013-SC-036
32' to 36'
2/20/13


2013-SC-036
28' to 32'
2/20/13


2013-SC-036
32' to 36'
2/20/13


2013
SC
036
34.7'
to
34.9'


2013-SC-036
36' to 40'
2/20/13


2013-SC-036
32' to 36'
2/20/13


2013-SC-036
36' to 40'
2/20/13


2013-SC-036
40' to 44'
2/20/13


2013
SC
036
41.2'
to
41.4'
TARGET


2013
SC
036
36.3'
to
36.5'
TARGET


2013-SC-036
40' to 44'
2/20/13


2013-SC-036
48' to 52'
2/21/13


2013
SC
036
48.6'
to
48.8'


2013-SC-036
48' to 52'
2/21/13


2013-SC-036
48' to 52'
2/21/13


2013-SC-036
44'to48'
2/22/13


2013-SC-036
44'to48'
2/22/13


2013-SC-036
44'to48'
2/22/13


2013-SC-036
44'to48'
2/22/13


2013-SC-036
52' to 56'
2/22/13


2013-SC-036
56' to 60'
2/22/13


2013-SC-036
52' to 56'
2/22/13


2013-SC-036
52' to 56'
2/22/13


2013
SC
036
56.5'
to
56.7'


2013-SC-036
62.5' to 64'
2/22/13


2013-SC-036
56' to 60'
2/22/13


2013-SC-036
60' to 62.5'
2/22/13

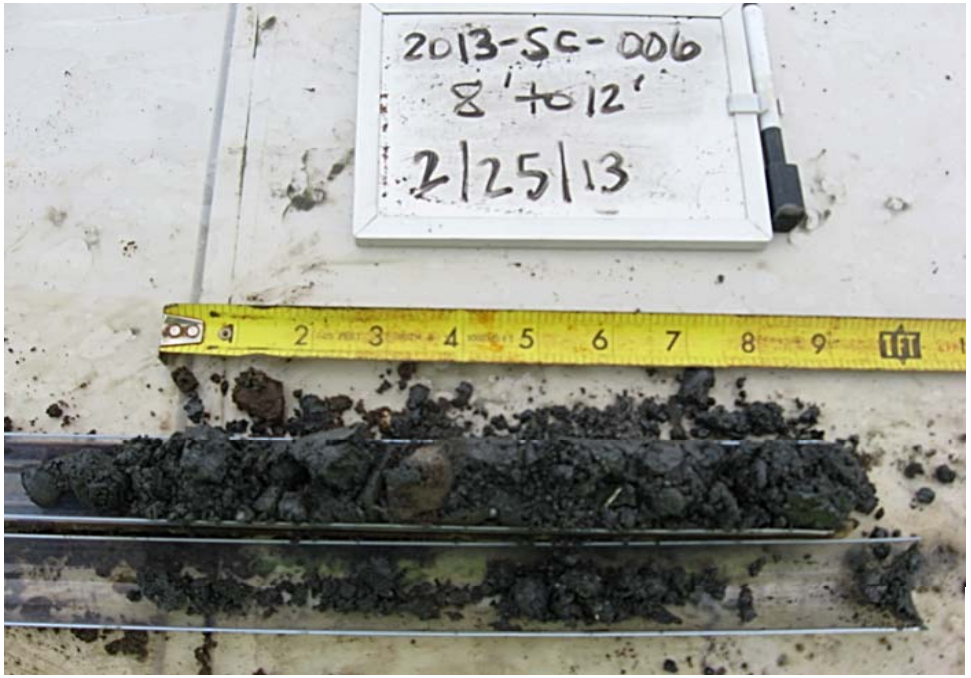

2013
SC
036
63'
to
63.1'
2013-SC-0
62.5' to 64
2/22/13


2013-SC-006
0' to 4'
2/25/13


2013
SC
036
63'
to
63.1'
2013-SC-0
62.5' to 64
2/22/13


2013-SC-006
0' to 4'
2/25/13


2013-SC-006
4'to8'
2/25/13


2013-SC-006
8'to12'
2/25/13


2013-SC-006
4'to8'
2/25/13


2013
SC
006
5.0'
to
5.1'


2013-SC-006
20' to 24'
2/25/13


2013-SC-006
20' to 24'
2/25/13


2013
SC
006
8.6'
to
8.7'


2013-SC-006
20' to 24'
2/25/13


2013-SC-006
24'+028'
2/25/13


2013-SC-006
24'+028'
2/25/13


2013
SC
006
20.6'
to
20.7


2013-SC-006
24'+028'
2/25/13


2013
SC
006
24.9'
TO
25.0


2013-SC-006
28' to 32'
2/25/13


2013-SC-006
24' to 28'
2/25/13


2013-SC-006
28' to 32'
2/25/13

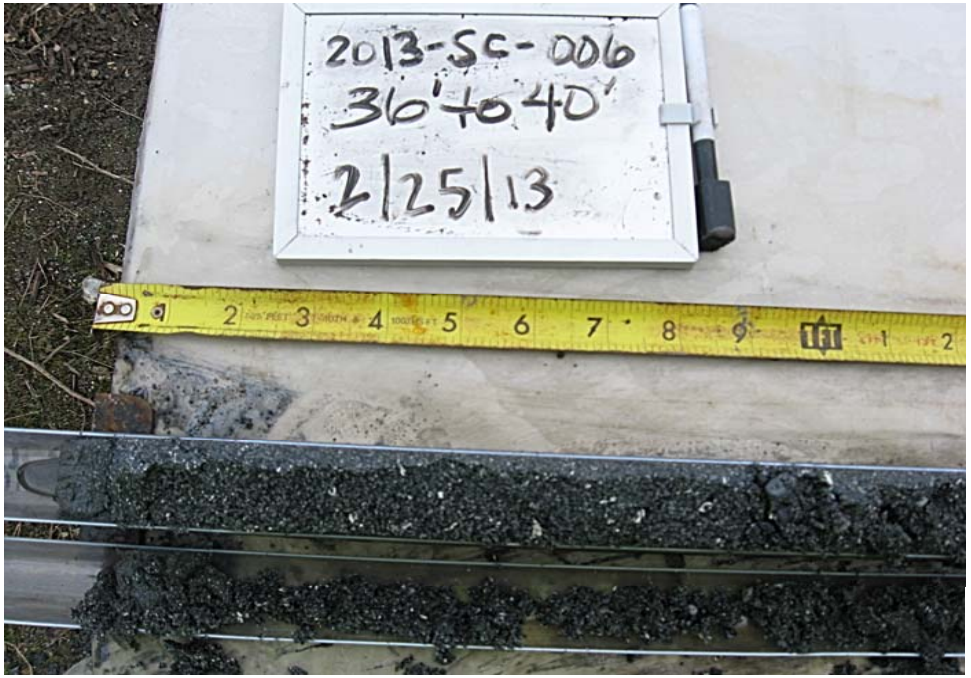

2013
SC
006
28.6'
to
28.7'
Turbo ST


2013-SC-006
32' to 36'
2/25/13


2013-SC-006
28' to 32'
2/25/13


2013
SC
006
30.3'
to
30.4'
Turbo ST


2013-SC-006
32' to 36'
2/25/13


2013-SC-006
36' to 40'
2/25/13


2013-SC-006
32' to 36'
2/25/13


2013
SC
006
34.4'
to
34.5'


2013-SC-006
36' to 40'
2/25/13


2013
SC
006
36.4'
to
36.5'


2013-SC-006
36' to 40'
2/25/13


2013-SC-006
36' to 40'
2/25/13


2013-SC-006
40' to 44'
2/25/13


2013-SC-006
44' to 48'
2/25/13


2013-SC-006
40' to 44'
2/25/13

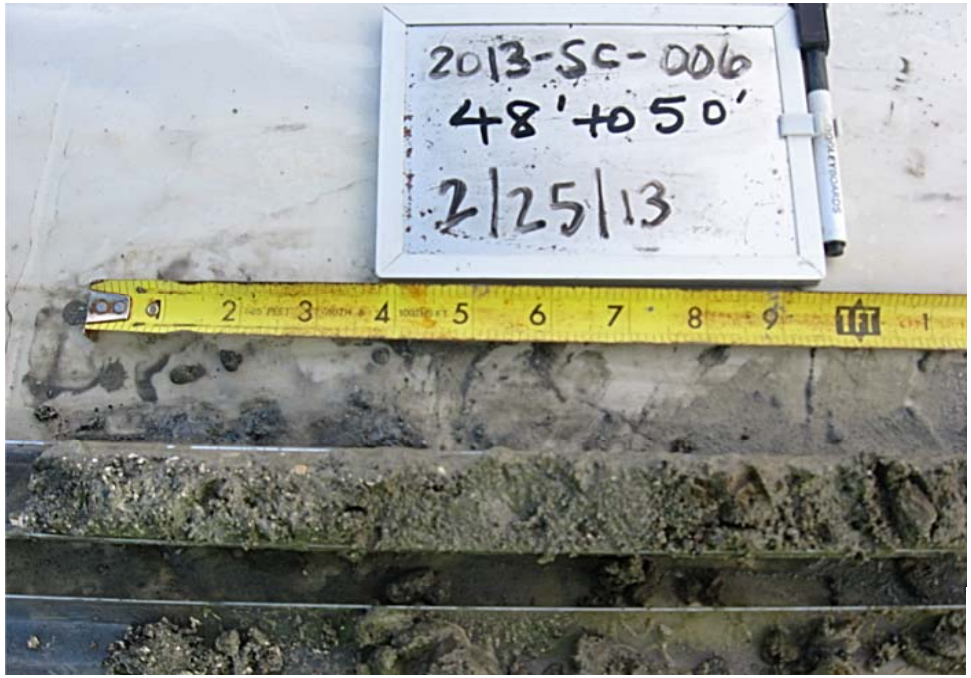

2013-SC-006
40' to 44'
2/25/13


2013-SC-006
44' to 48'
2/25/13


2013
SC
006
44.4'
to
44.5'
Target


2013-SC-006
44' to 48'
2/25/13

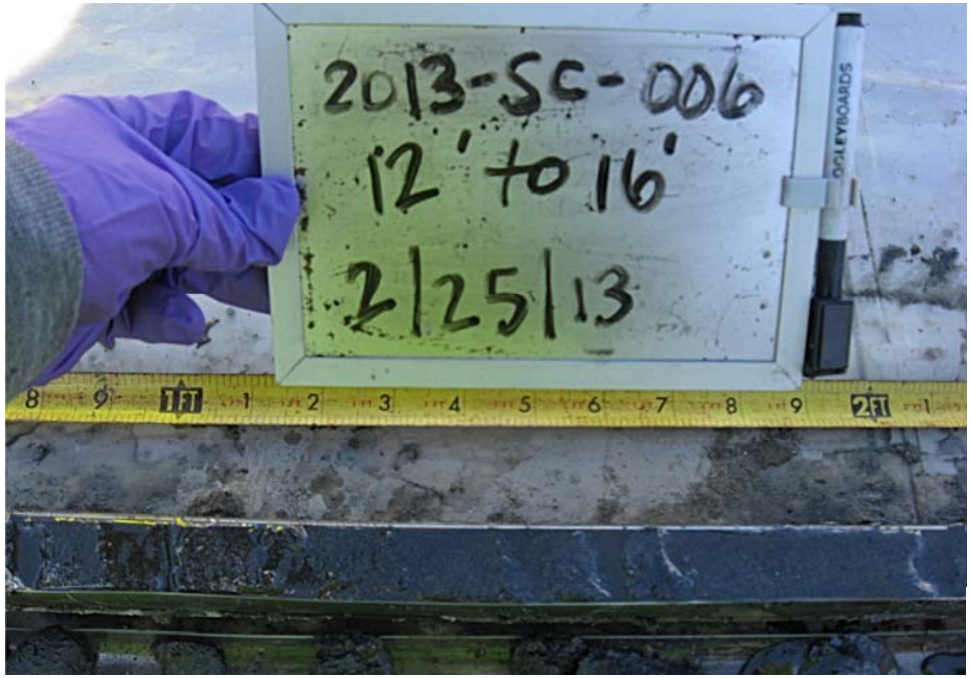

2013-SC-006
44' to 48'
2/25/13


2013-SC-006
48'+050'
2/25/13

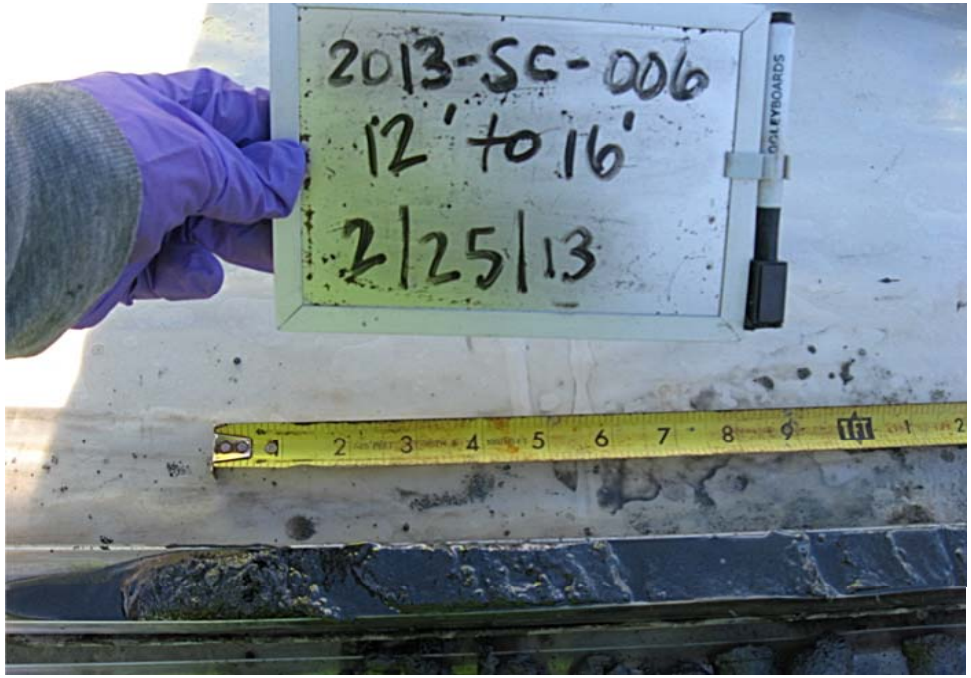

2013
SC
006
49.4'
to
49.5'


2013
SC
006
46.2'
to
46.3'


2013-SC-006
48'+050'
2/25/13

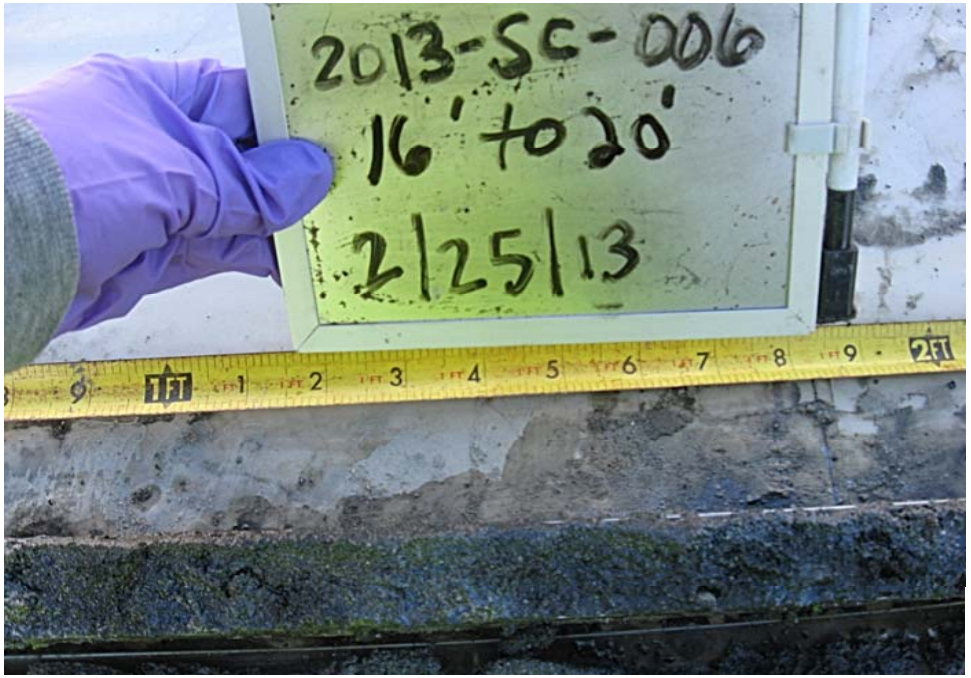

2013-SC-006
12' to 16'
2|25|13


2013
SC
006
12'3"
12.5

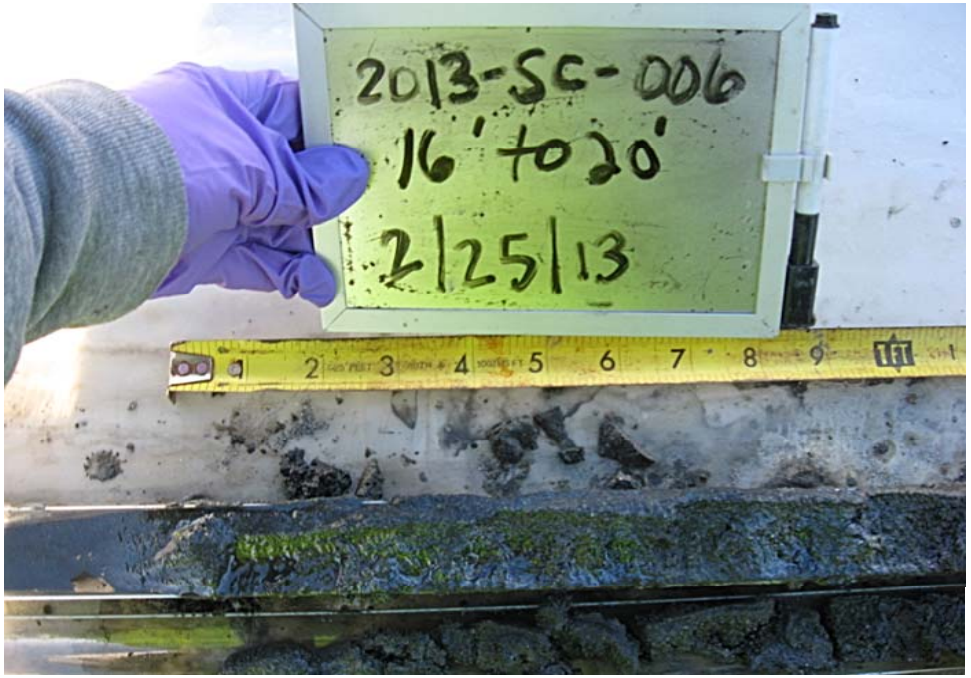

2013-SC-006
12' to 16'
2|25|13


2013-SC-006
12' to 16'
2|25|13


2013
SC
006
14.6-
14.8


2013-SC-006
16' to 20'
2|25|13


2013
SC
006
13.1-
13.3

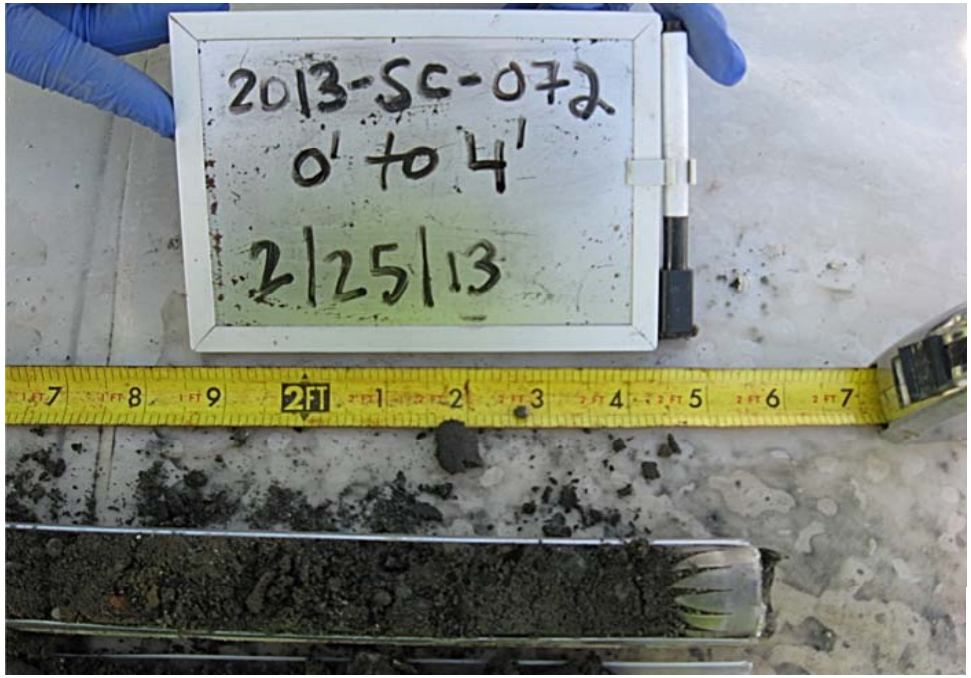

2013-SC-006
16' to 20'
2|25|13

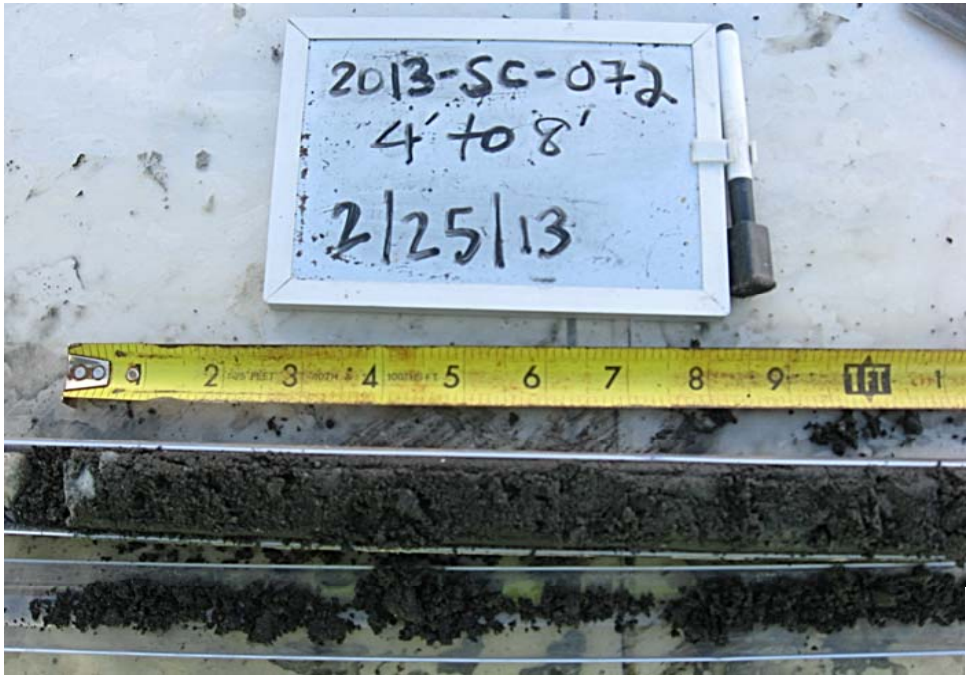

2013
SC
006
16.9-
Ft.1


2013-SC-072
0' to 4'
2|25|13


2013-SC-006
16' to 20'
2|25|13

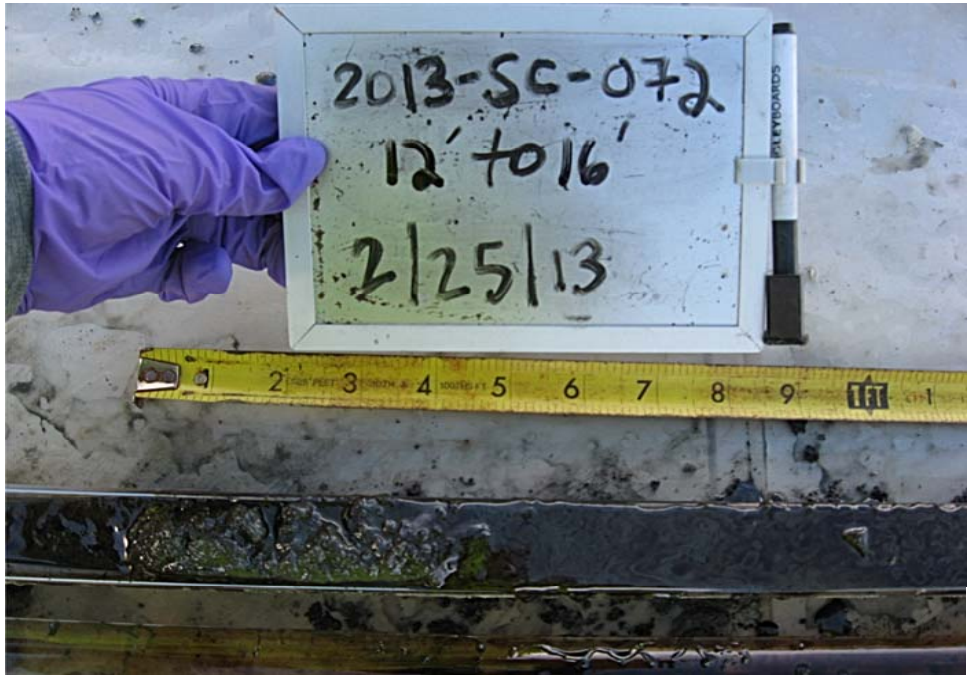

2013
SC
006
17.9-
18.0

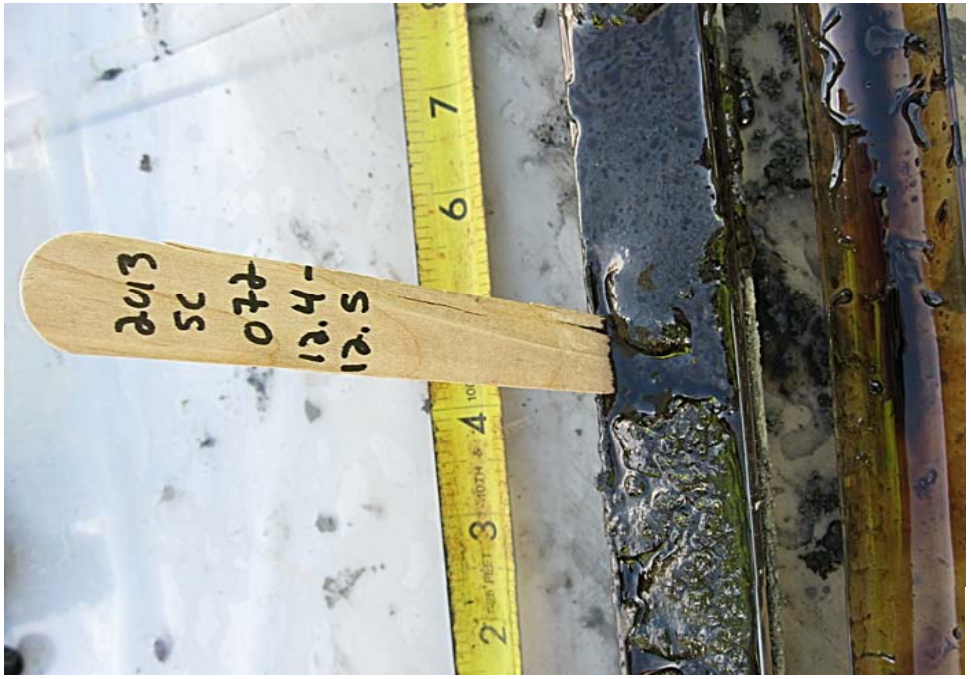

2013-SC-072
0' to 4'
2|25|13


2013-SC-072
4' to 8'
2|25|13


2013-SC-072
0' to 4'
2|25|13


2013
SC
072
0' to 4'


2013-SC-072
12' to 16'
2|25|13


2013
SC
072
12'-4'
12'S


2013-SC-072
4' to 8'
2|25|13


2013-SC-072
12' to 16'
2|25|13


2013-SC-072
16' to 20'
2/25/13


2013-SC-072
20' to 24'
2/25/13

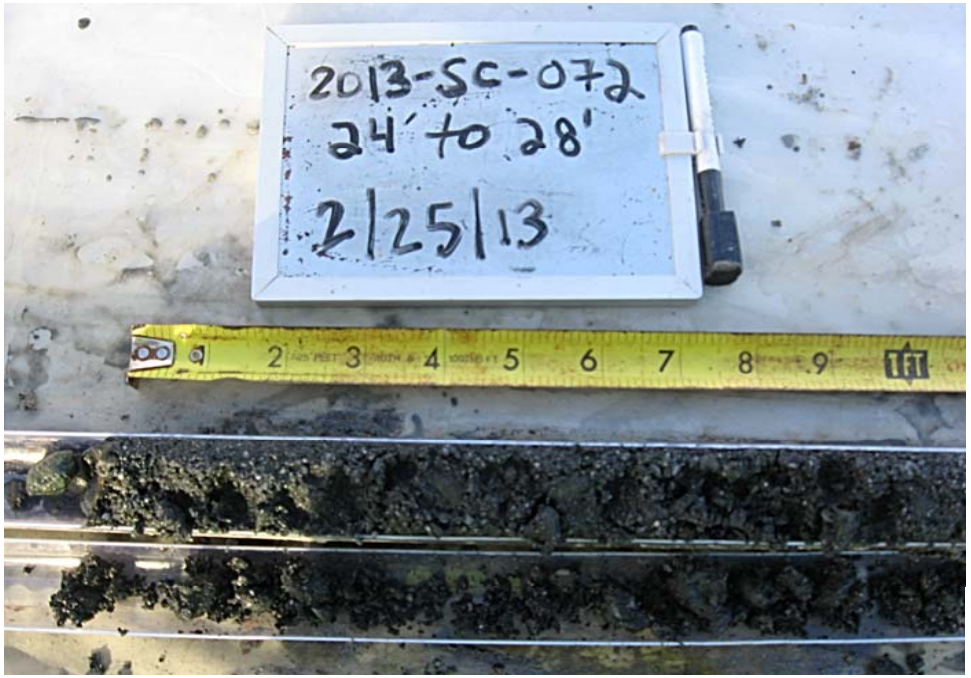

2013
SC
072
13.1-
13.3

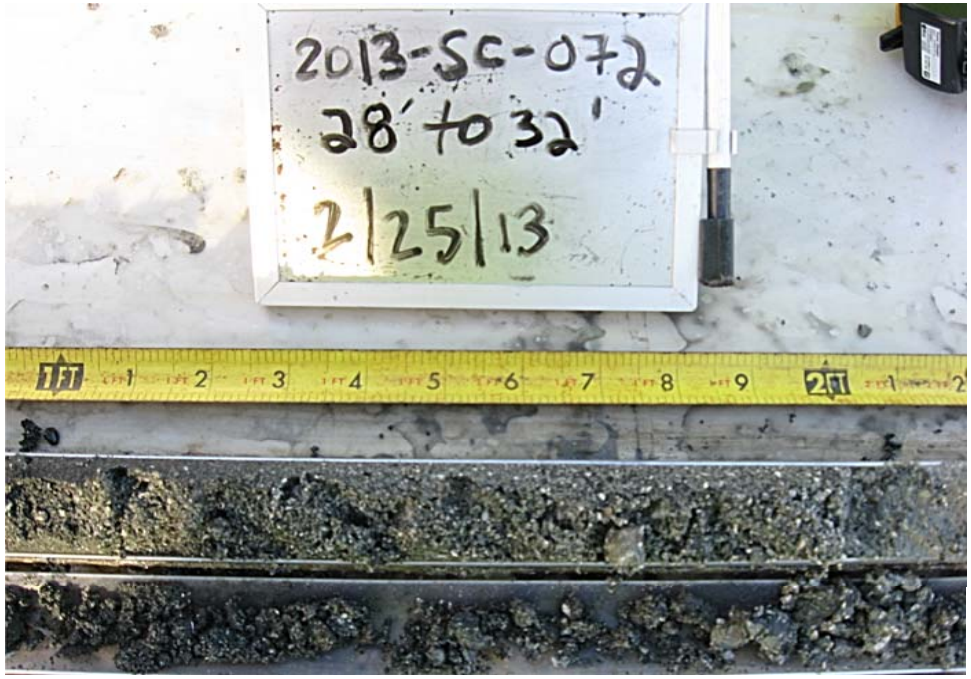

2013
SC
072
16.2-
16.3


2013
SC
072
20'
24'


2013-SC-072
24' to 28'
2/25/13


2013-SC-072
20' to 24'
2/25/13

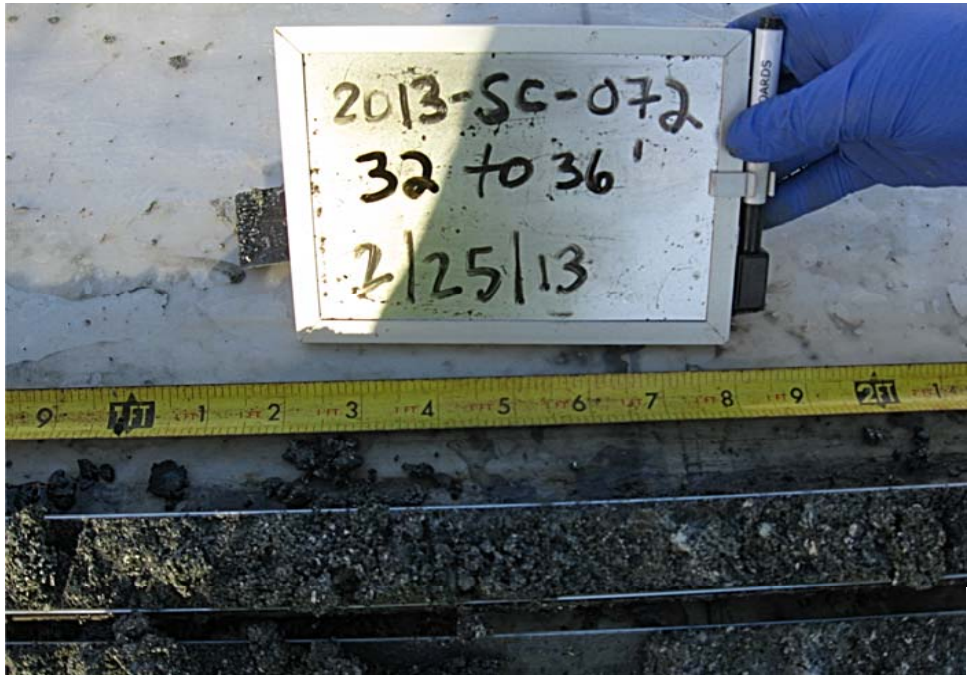

2013-SC-072
24' to 28'
2/25/13

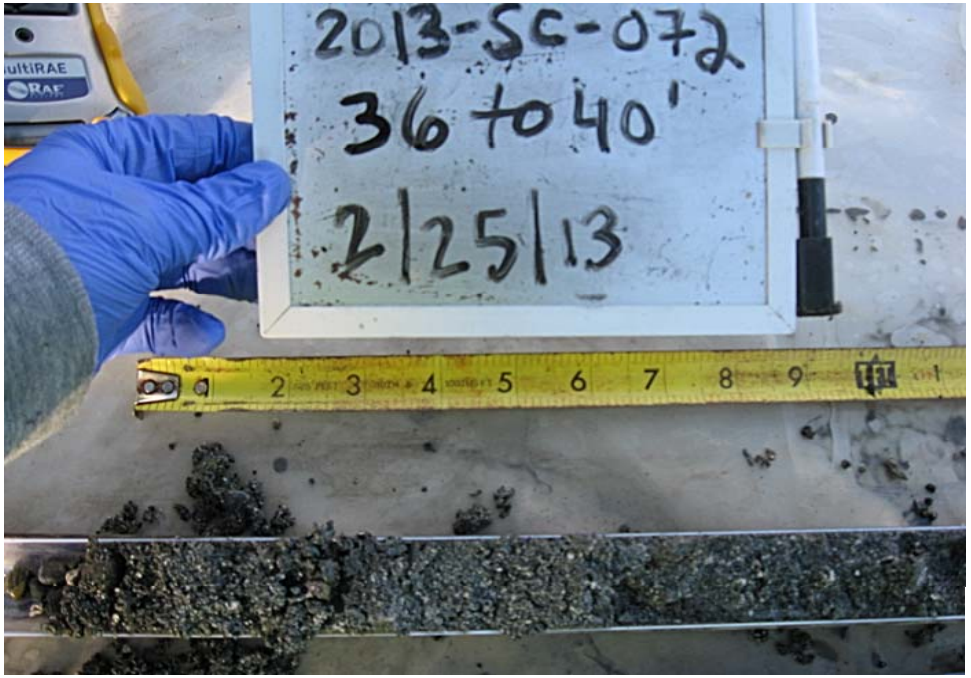

2013-SC-072
28' to 32'
2/25/13

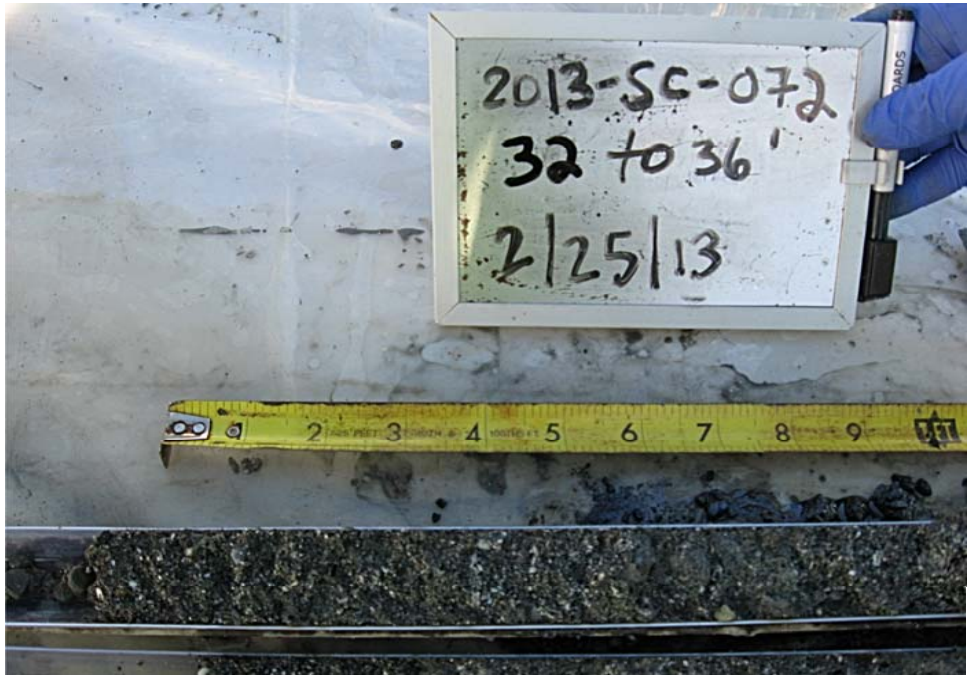

2013
SC
072
29.0-
29.1


2013-SC-072
28' to 32'
2/25/13


2013-SC-072
28' to 32'
2/25/13

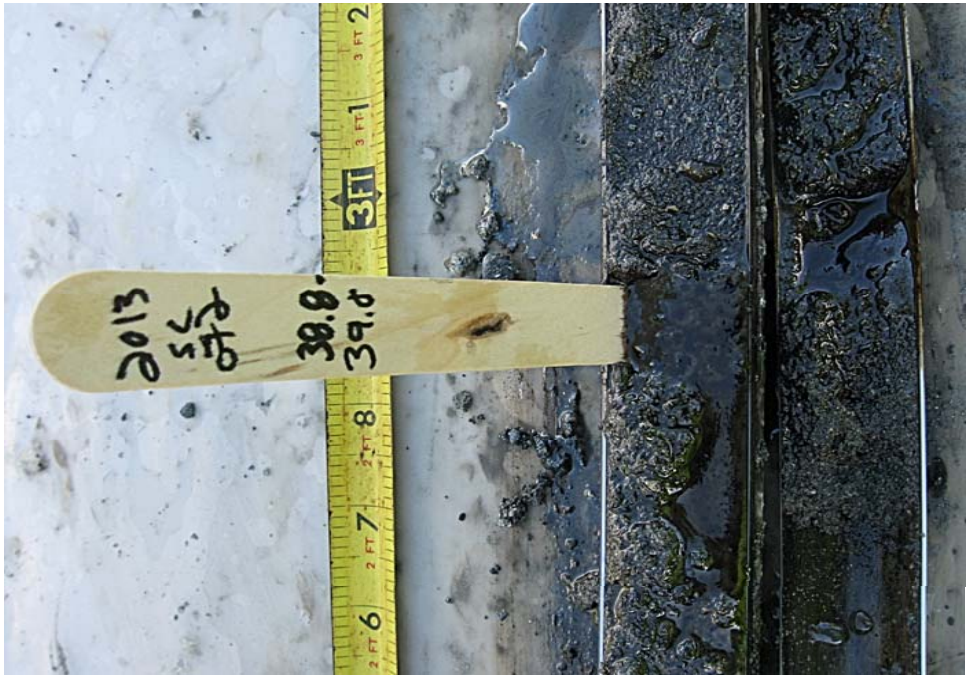

2013-SC-072
32 to 36'
2|25|13


2013-SC-072
36 to 40'
2|25|13


2013-SC-072
32 to 36'
2|25|13


2013-SC-072
32 to 36'
2|25|13


2013-SC-072
36 to 40'
2/25/13


2013
38.0'
39.0'


2013-SC-072
36 to 40'
2/25/13


2013-SC-072
36 to 40'
2/25/13


2013-SC-072
40 to 44'
2|25|13


2013-SC-072
40 to 44'
2|25|13

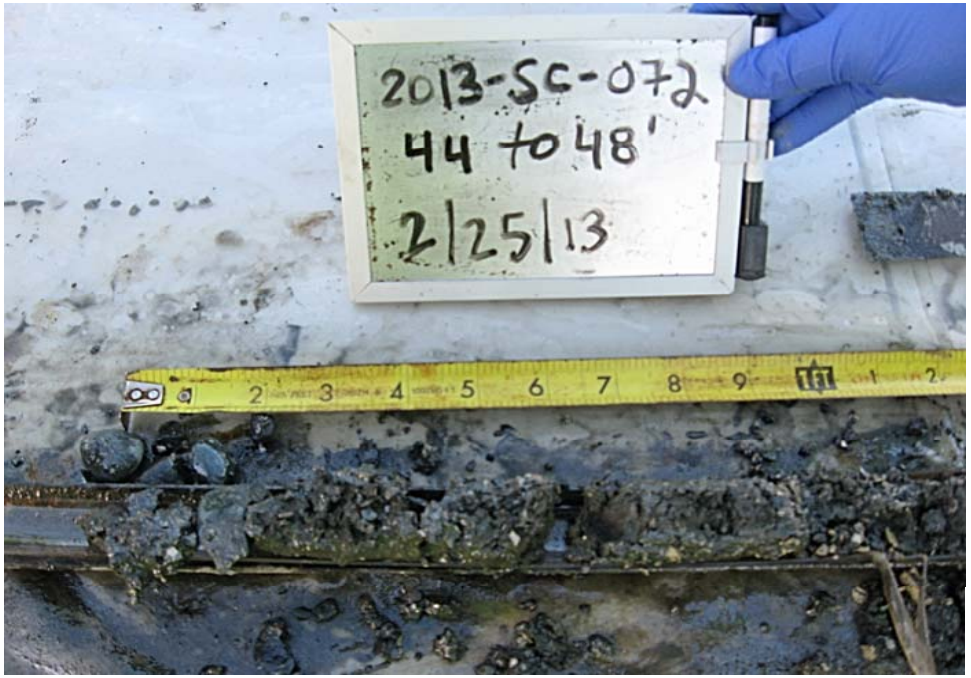

2013-SC-072
40 to 44'
2|25|13


2013-SC-072
40 to 44'
2|25|13


2013
SC
072
43.2
43.7


2013-SC-072
44 to 48'
2|25|13


2013
SC
072
41.9
42.0


2013-SC-072
44 to 48'
2|25|13


2013-SC-072
48'to51'
2/26/13


2013-SC-072
8 to 12'
2/26/13


2013-SC-072
48'to51'
2/26/13


2013
SC
072


2013
SC
072
9.0'
to
9.1'
TARGET


2013-SC-055
0' to 4'
2/26/13


2013-SC-072
8 to 12'
2/26/13


2013
SC
072
9.6'
to
9.7'
TARGET


2013-SC-055
4' to 8'
2|26|13


2013-SC-055
8' to 12'
2|26|13


2013-SC-055
0' to 4'
2|26|13


2013-SC-055
4' to 8'
2|26|13


2013
SC
055
8.8
9.0


2013-SC-055
12' to 16'
2|26|13


2013-SC-055
8' to 12'
2|26|13

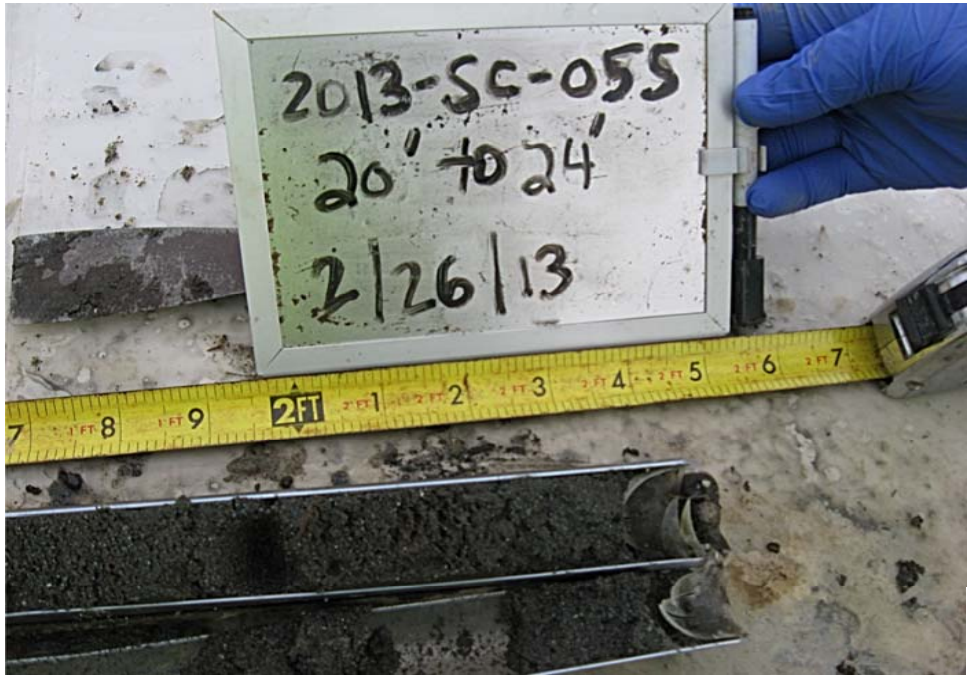

2013-SC-055
12' to 16'
2|26|13


2013-SC-055
16' to 20'
2|26|13


2013-SC-055
20' to 24'
2|26|13


2013
SC
055
12.7
13.5


2013-SC-055
16' to 20'
2|26|13

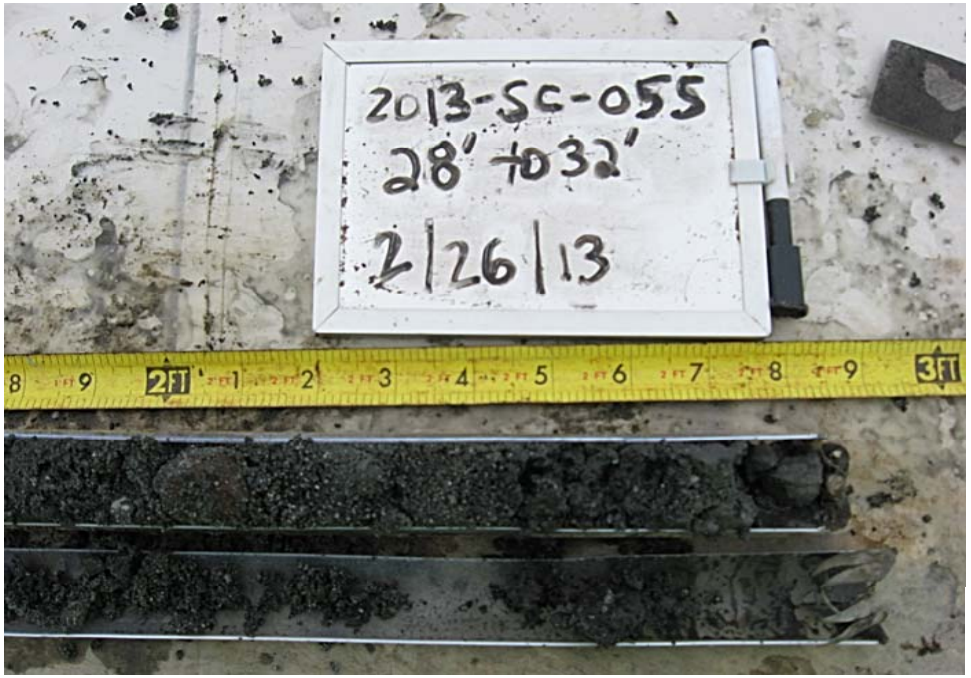

2013-SC-055
20' to 24'
2/26/13

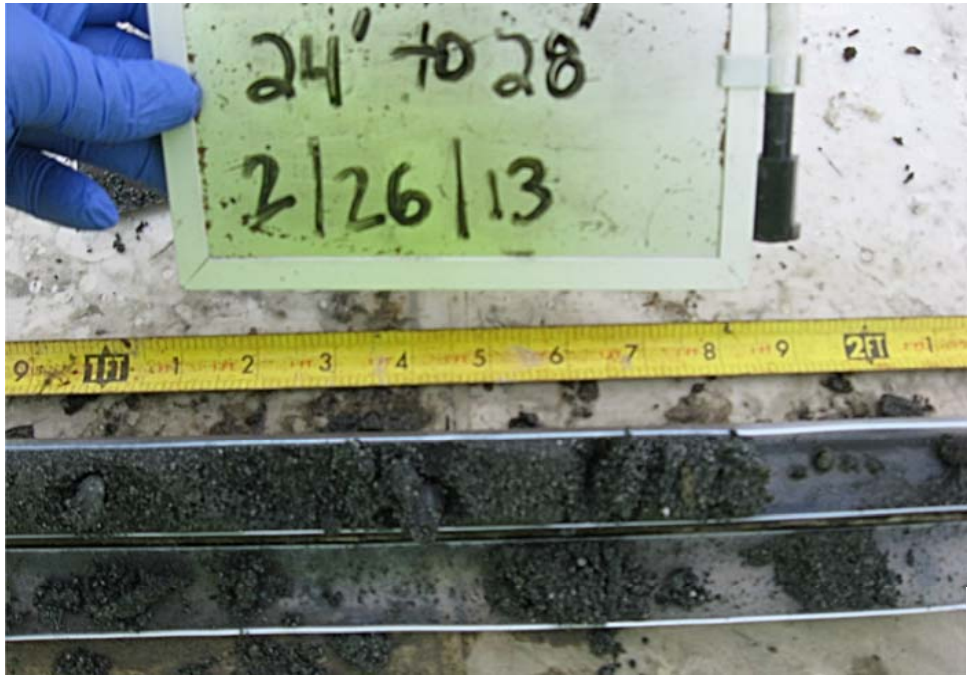

2013-SC-055
24' to 28'
2/26/13


2013-SC-055
20' to 24'
2/26/13

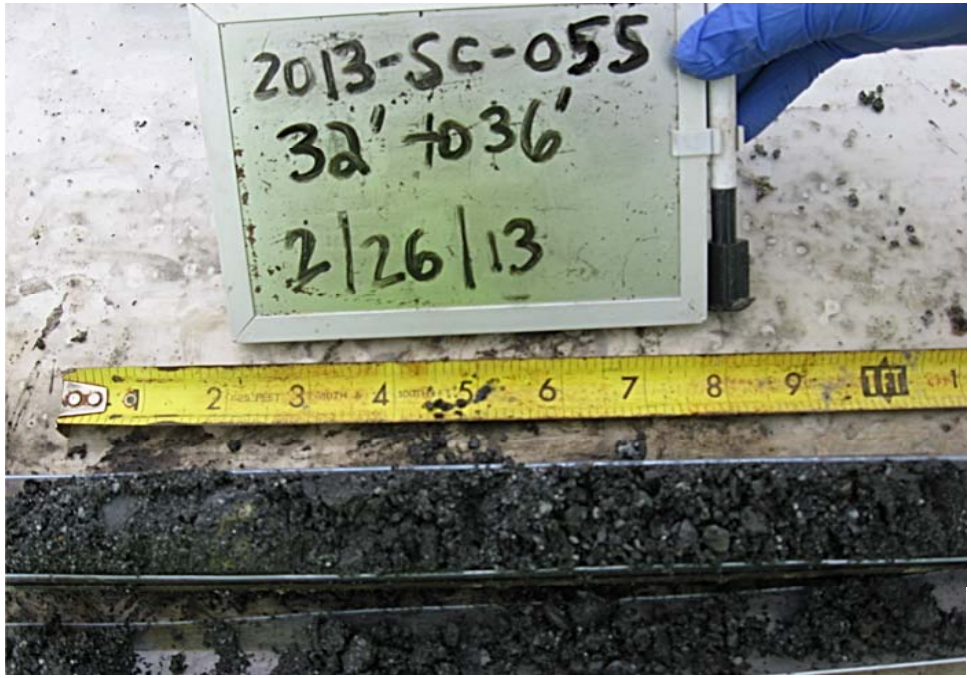

2013
SC
055
20' to 24'


2013-SC-055
28' to 32'
2/26/13


2013-SC-055
28' to 32'
2/26/13


24' to 28'
2/26/13


2013-SC-055
28' to 32'
2/26/13


2013-SC-055
32' to 36'
2/26/13


2013
SC
055
33.0
33.5


2013
SC
055
29.5


2013-SC-055
32' to 36'
2/26/13


2013-SC-055
36' to 40'
2|26|13


2013-SC-055
36' to 40'
2|26|13


2013-SC-055
36' to 40'
2|26|13

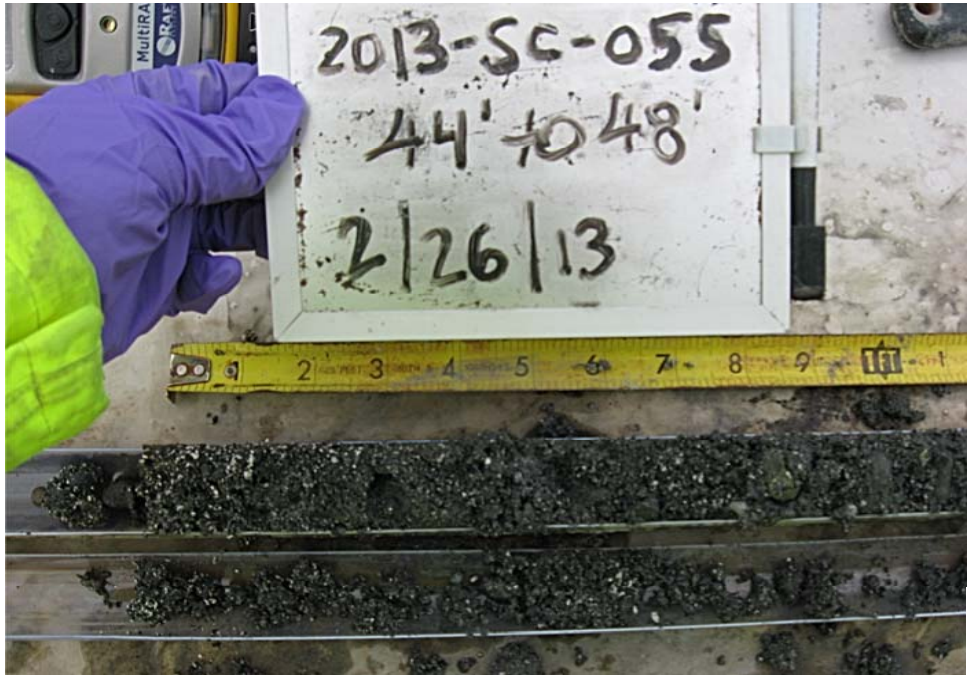

2013-SC-055
36' to 40'
2|26|13


2013
SC
055
37.0'
to
37.1'


2013
SC
055
39'
to
39.1'

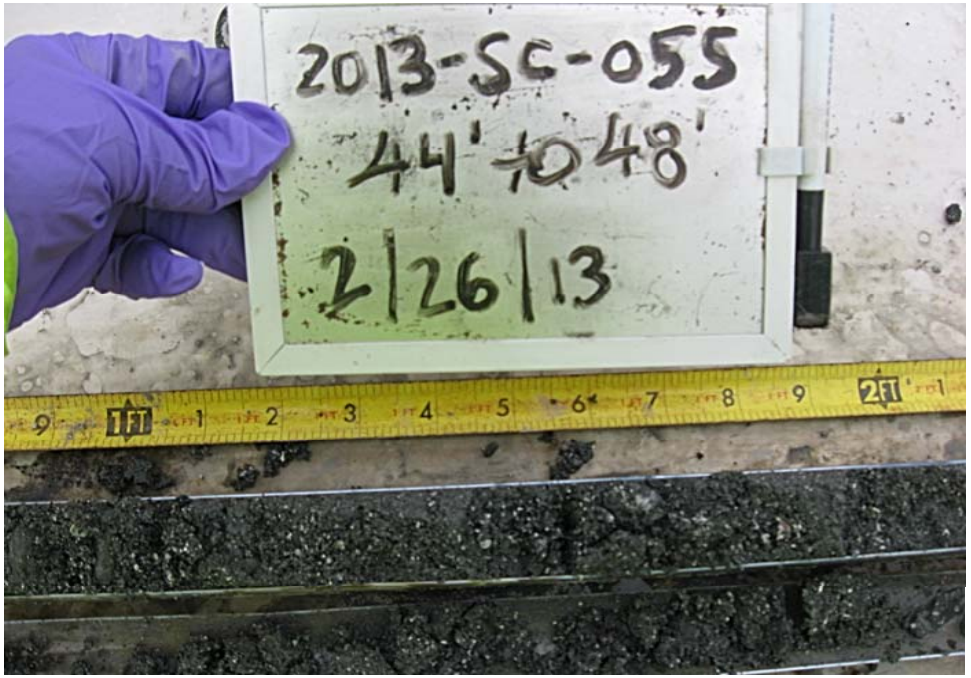

2013-SC-055
40'+0.44'
2/26/13


2013-SC-055
40'+0.44'
2/26/13


2013-SC-055
44' to 48'
2|26|13

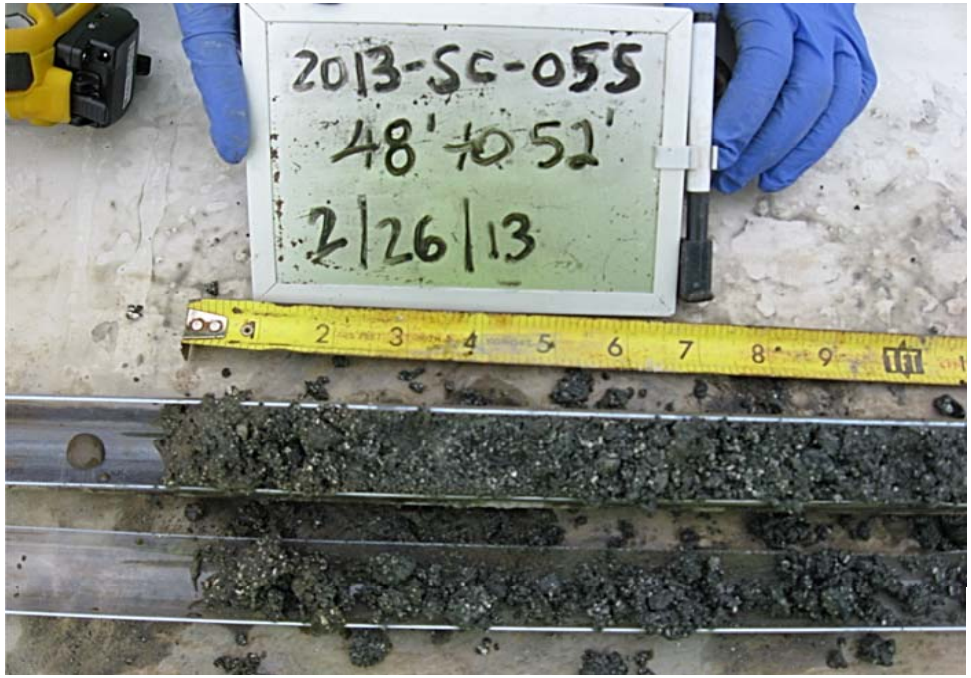

2013-SC-055
44' to 48'
2|26|13


2013-SC-055
40' to 44'
2|26|13

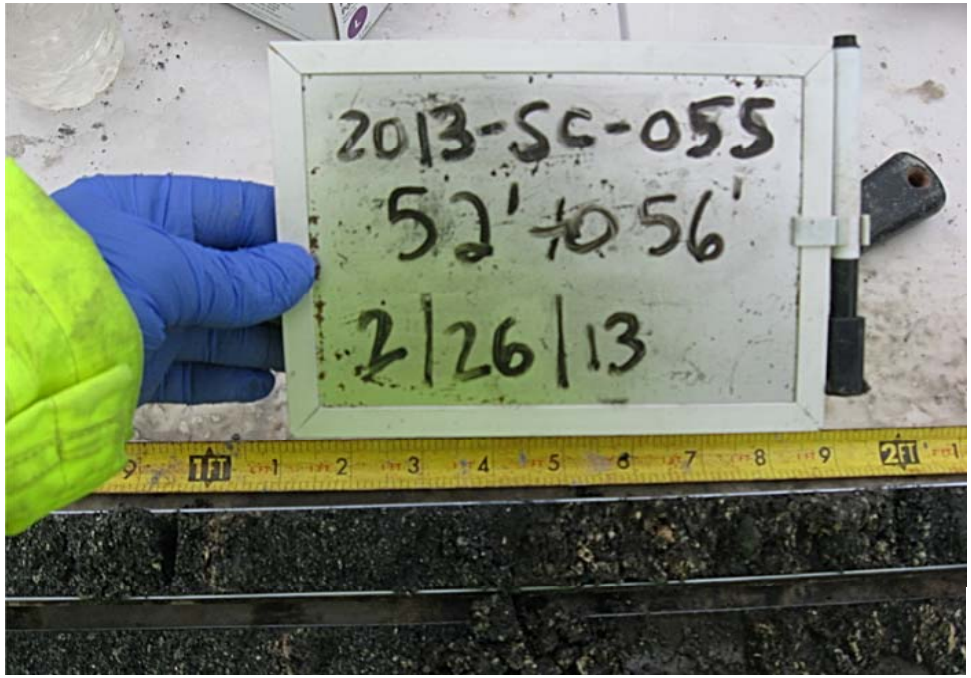

2013-SC-055
44' to 48'
2|26|13

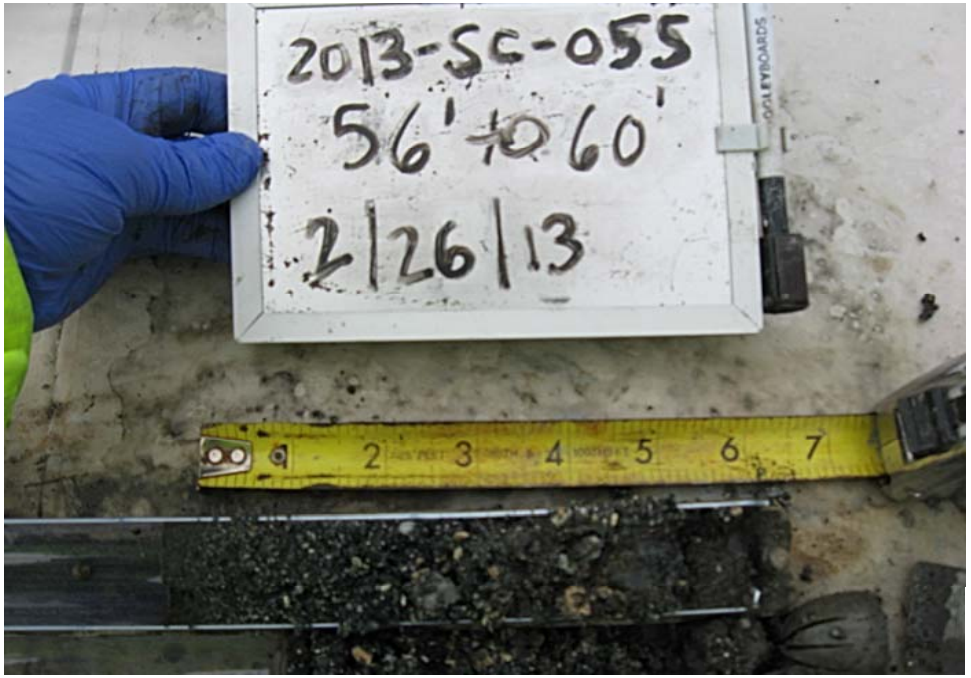

2013-SC-055
48' to 52'
2|26|13

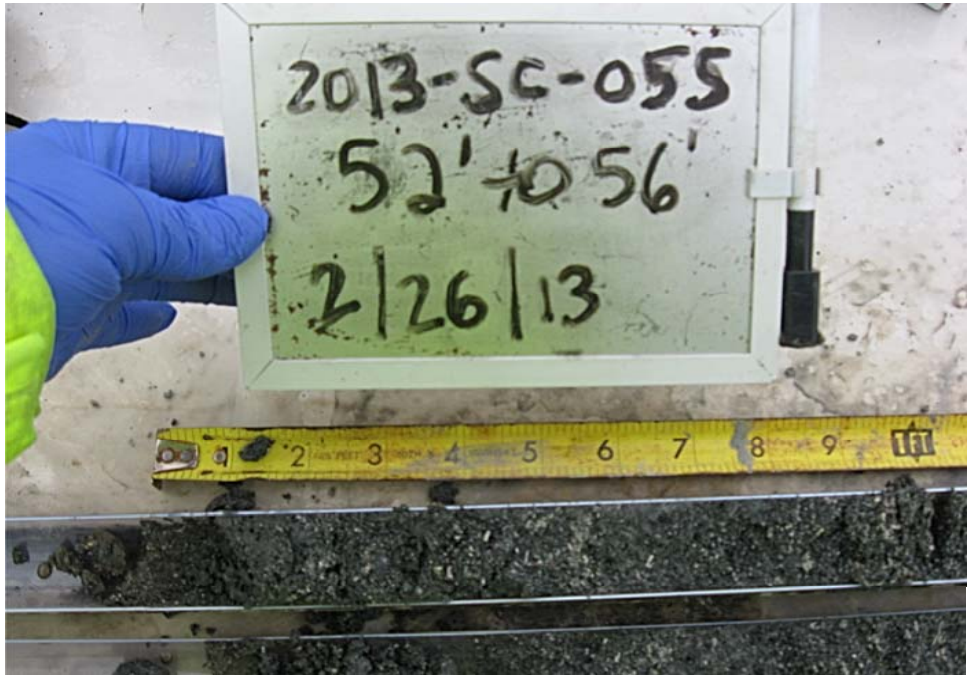

2013
SC
055
49.0
49.1

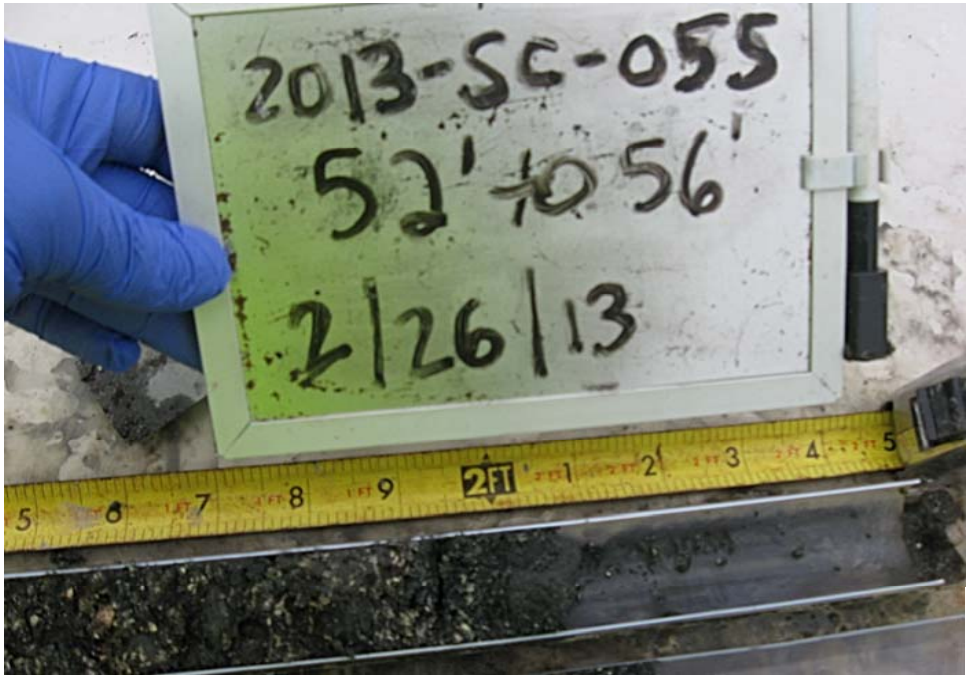

2013-SC-055
48' to 52'
2|26|13


2013-SC-055
48' to 52'
2|26|13


2013-SC-055
52' to 56'
2|26|13


2013-SC-055
56' to 60'
2|26|13


2013-SC-055
52' to 56'
2|26|13


2013-SC-055
52' to 56'
2|26|13


2013-SC-055
60' to 64'
2/27/13


WOODSIES


2013-SC-055
60' to 64'
2/27/13


2013-SC-055
60' to 64'
2/27/13

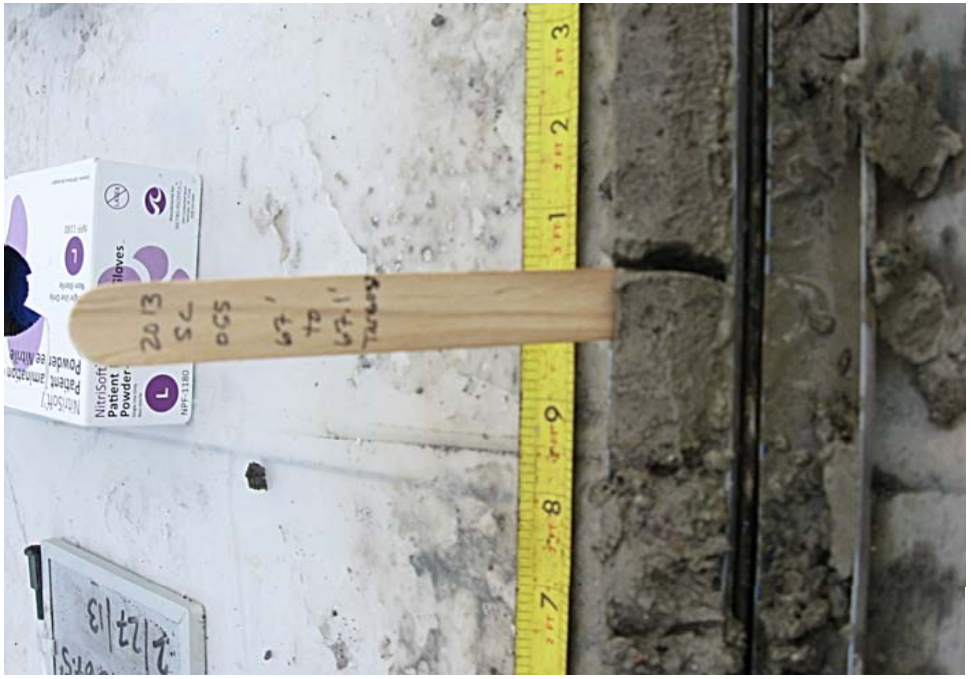

2013
SC
055
62'
to
62.1'
TARGET


2013-SC-055
64' to 67.5'
2/27/13


2013
SC
055
61'
to
61.1'
TARGET


2013-SC-055
64' to 67.5'
2/27/13


2013-SC-055
64' to 67.5'
2/27/13


2013
SC
055
67'
to
67.1'

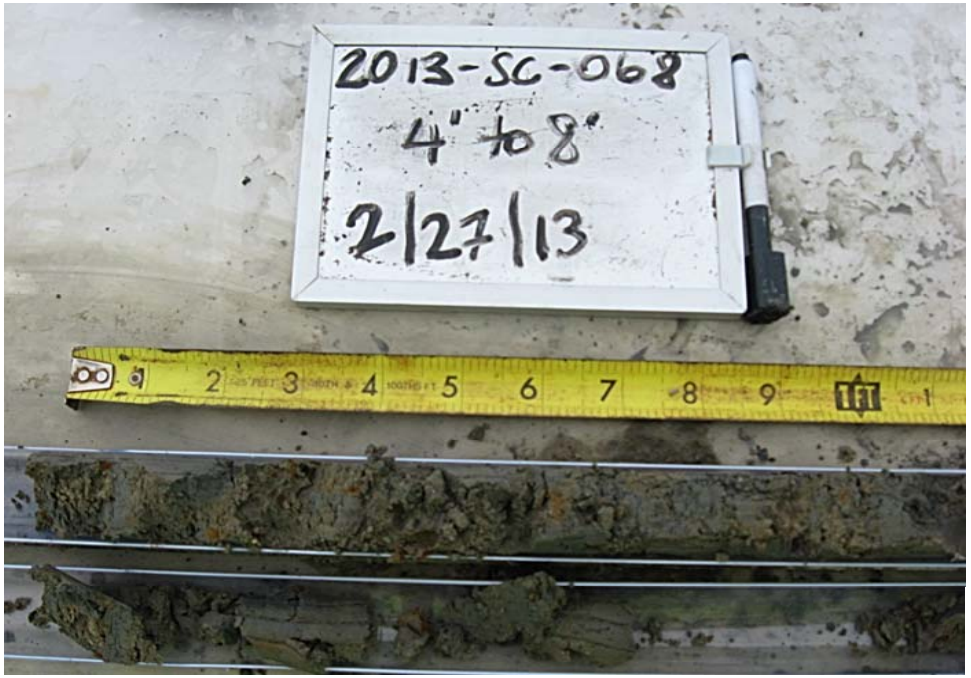

2013-SC-055
64' to 67.5'
2/27/13


2013
SC
055
65'
to
65.1


2013-SC-068
0' to 4'
2/27/13


2013-SC-068
4' to 8'
2/27/13

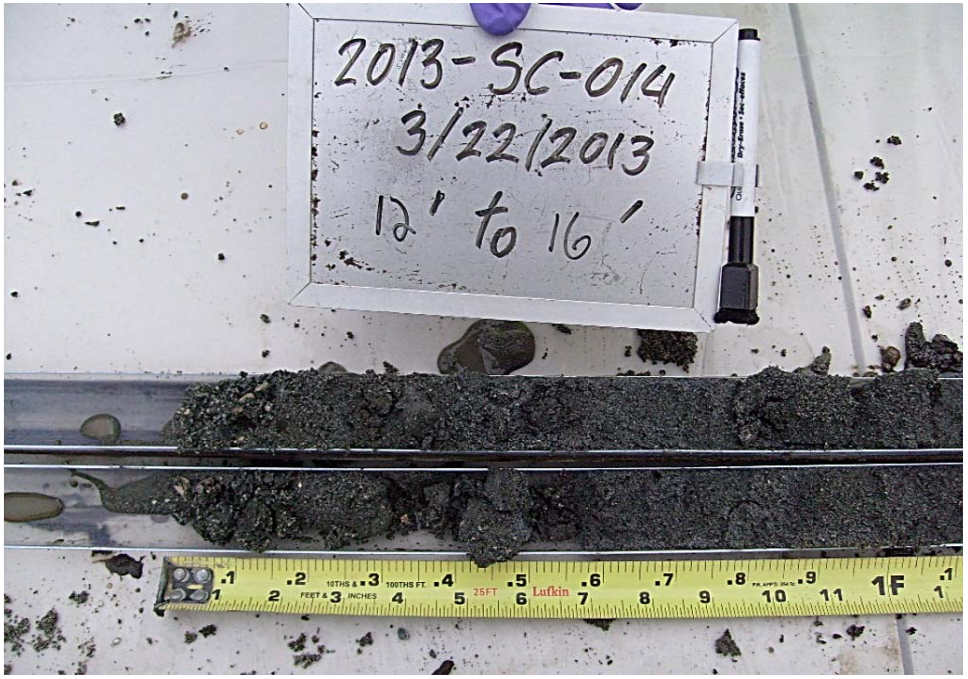

2013-SC-068
0' to 4'
2/27/13


2013-SC-068
4' to 8'
2/27/13

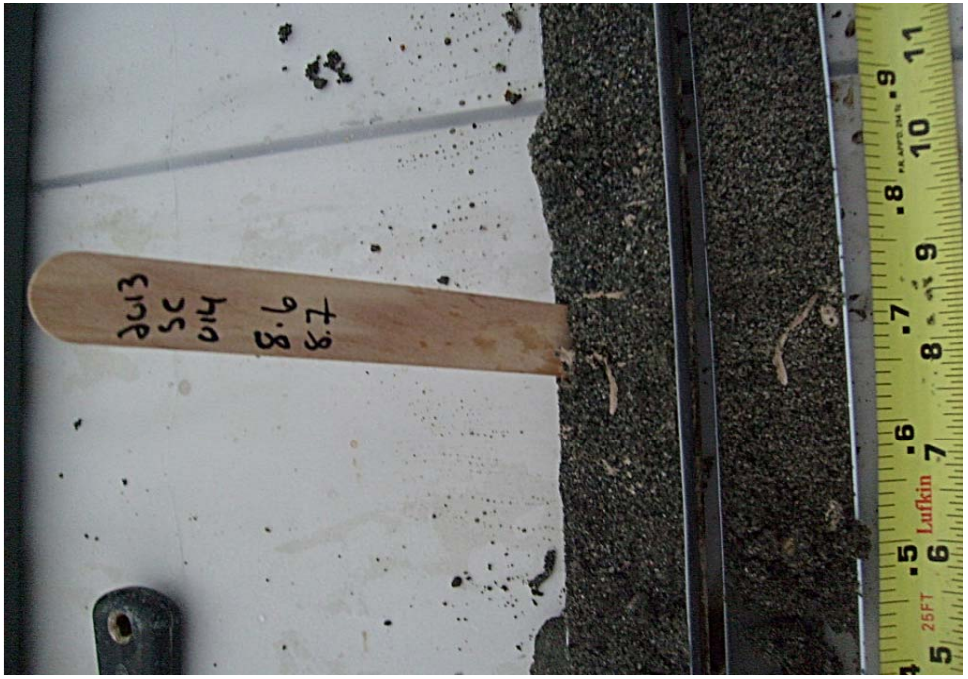
2013
SC
068
5.0'
to
5.1'

2013-SC-068
4' to 8'
2/27/13

2013-SC-068
8' to 12'
2/27/13


2013-SC-014
3/22/2013
12' to 16'


2013
SC
014
12.5
12.6


2013
SC
014
8.6
8.7

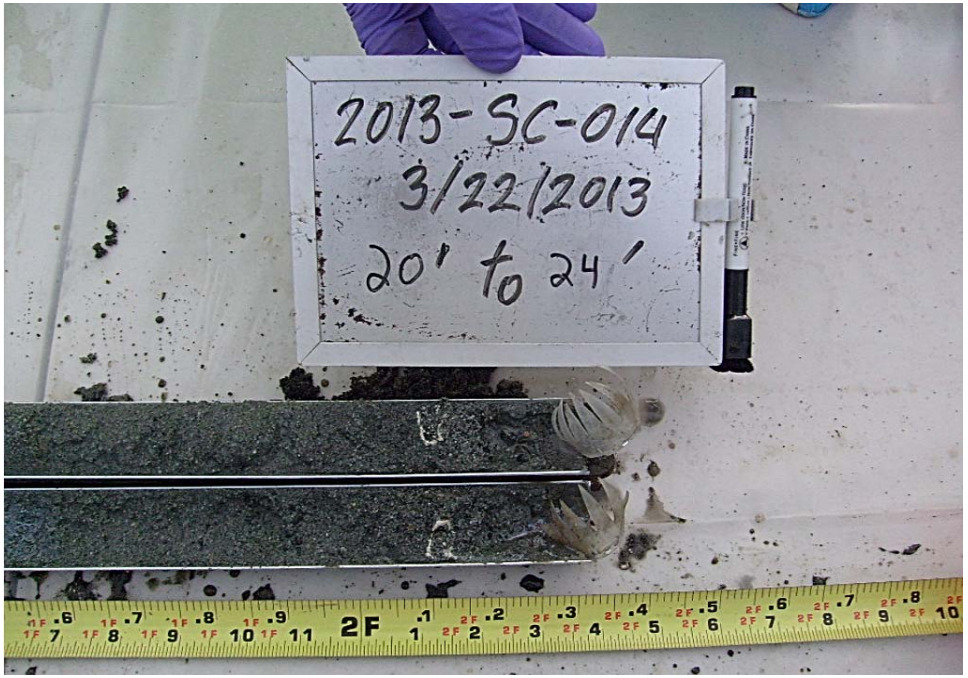

2013-SC-014
3/22/2013
12' to 16'


2013-SC-014
3/22/2013
16' to 20'


2013-SC-014
3/22/2013
20' to 24'

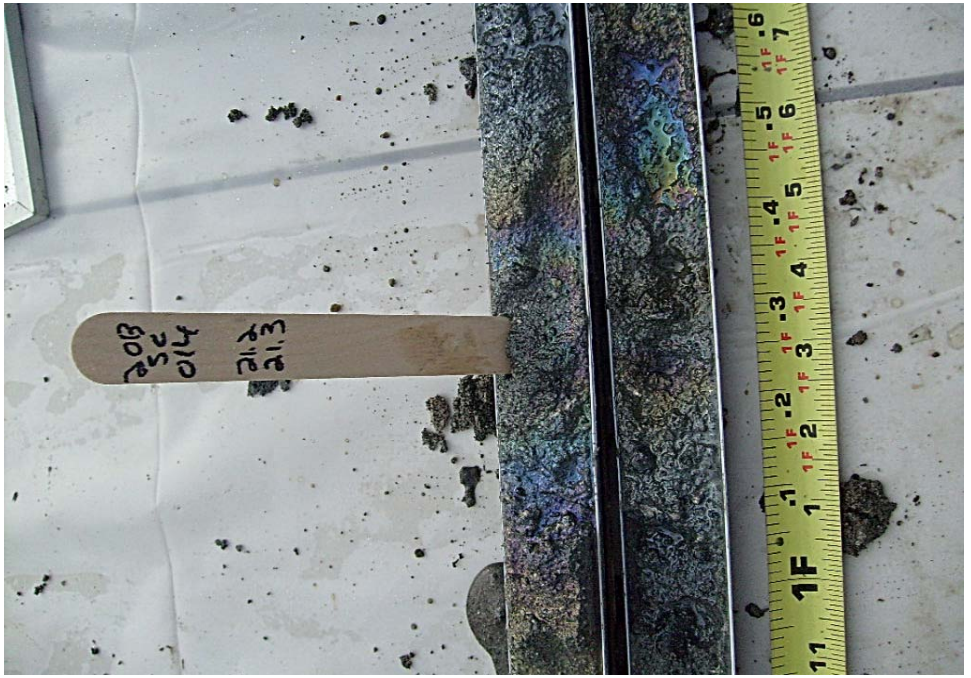

2013-SC-014
3/22/2013
16' to 20'

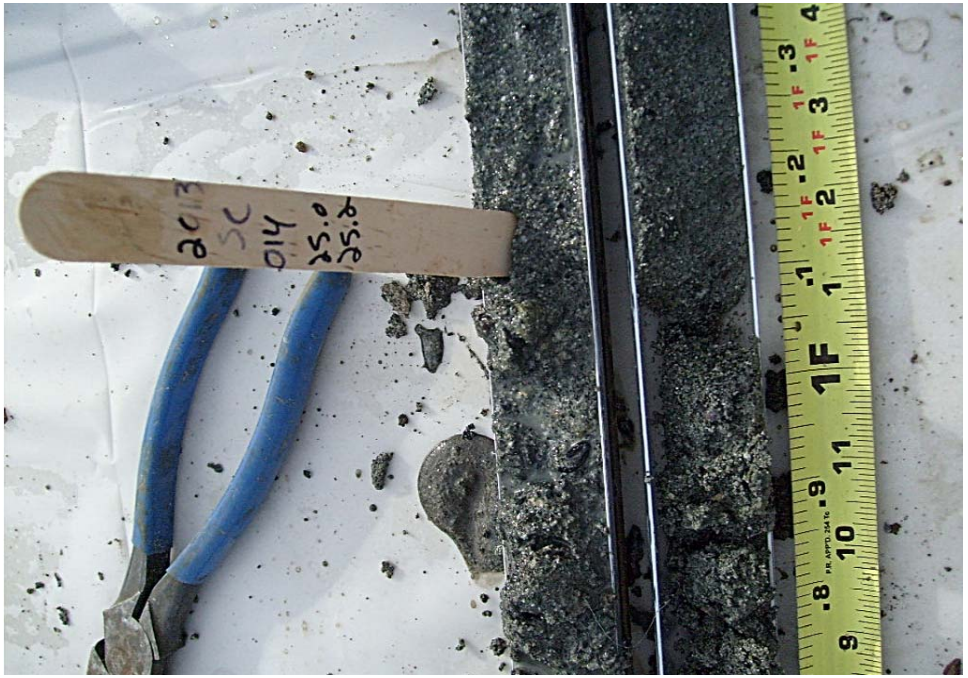

2013
SC
014
17.5
17.6


2013-SC-014
3/22/2013
20' to 24'


2013-SC-014
3/22/2013
24' to 28'


2013-SC-014
3/22/2013
20' to 24'


2013
SC
014
21'-23'


2013
SC
014
3/22/2013

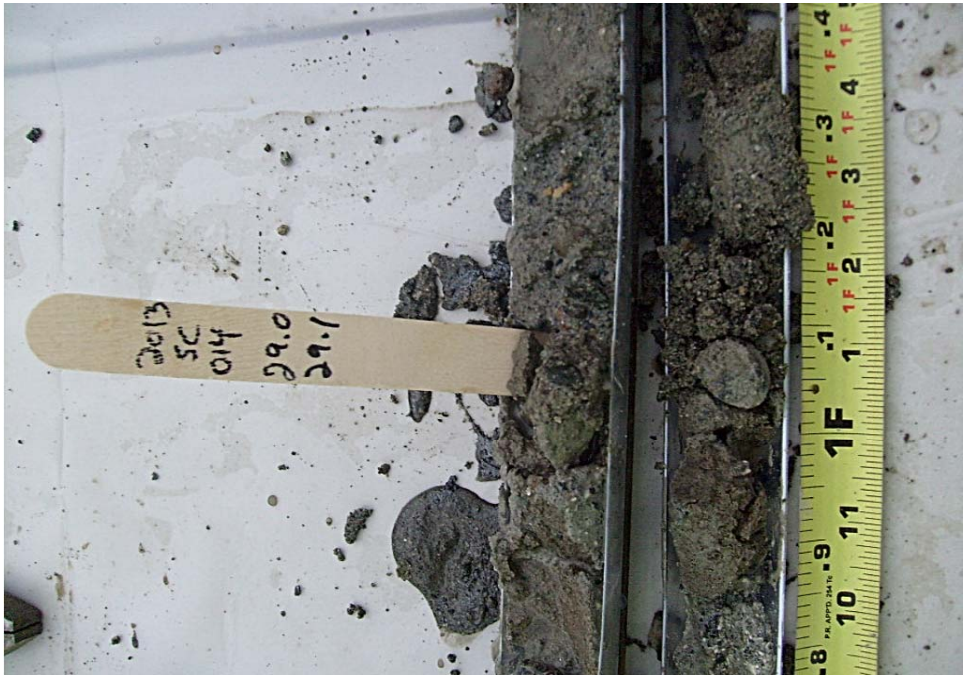

2013-SC-014
3/22/2013
28' to 32'


2013-SC-014
3/22/2013
24' to 28'


2013-SC-014
3/22/2013
28' to 32'

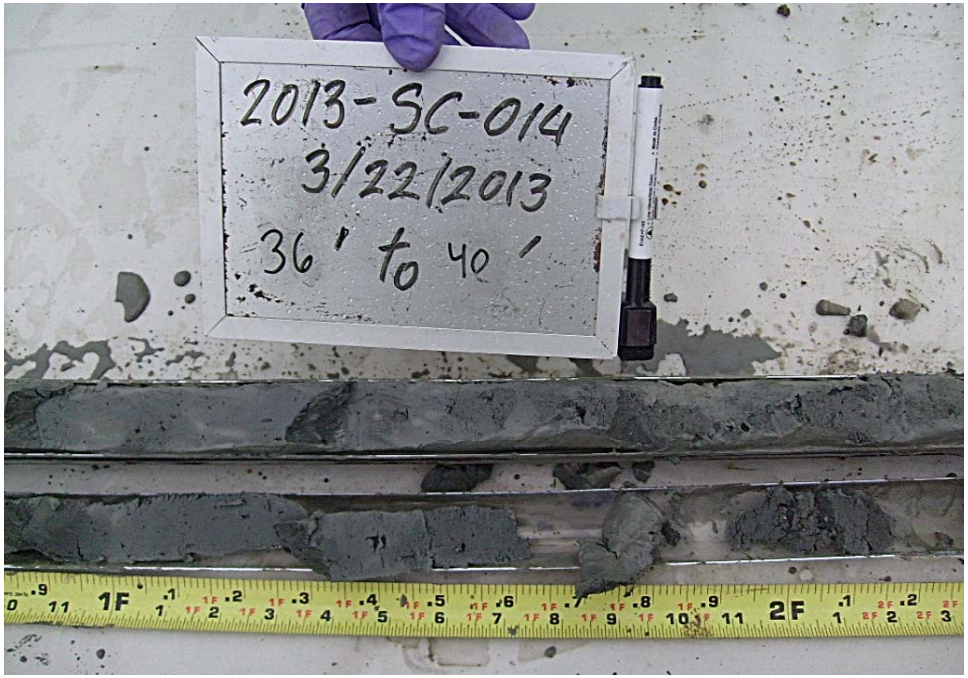

2013-SC-014
3/22/2013
32' to 36'


2013-SC-014
3/22/2013
32' to 36'


2013
SC
014
29.0
29.1


2013-SC-014
3/22/2013
32' to 36'


2013
SC
014
35.2
35.3


2013-SC-014
3/22/2013
36' to 40'


2013-SC-014
3/22/2013
32' to 36'


2013-SC-014
3/22/2013
36' to 40'


2013-SC-014
3/22/2013
36' to 40'


2013-SC-152 S2
3/22/2013
1' to 11'


2013-SC-014
3/22/2013
36' to 40'


2013
SC
014
38.6
38.8

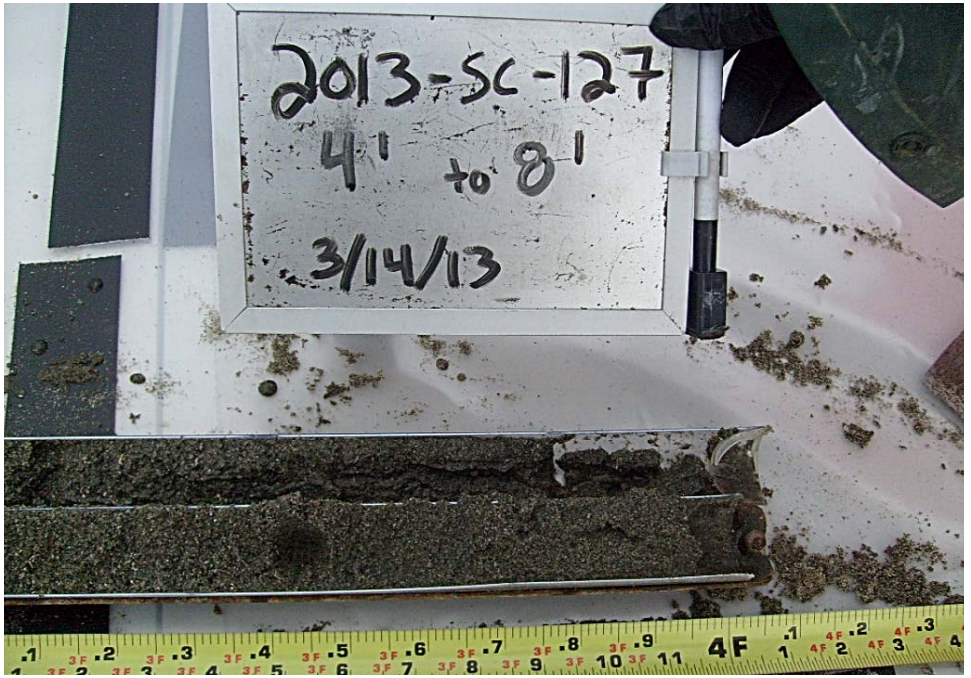

2013
SC-152
4'-5'


2013-SC-127
0' to 4'
3/14/13
TOP/FLEYBOARDS


2013-SC-152 S2
3/22/2013
7' to 11'
SWANSON
AE141


2013
SC-152
9'-8'


2013
SC
127
0.5-
0.6


2013-SC-127
4' to 8'
3/14/13


2013-SC-127
0' to 4'
3/14/13


2013-SC-127
4' to 8'
3/14/13


2013-SC-127
8' to 12'
3/14/13

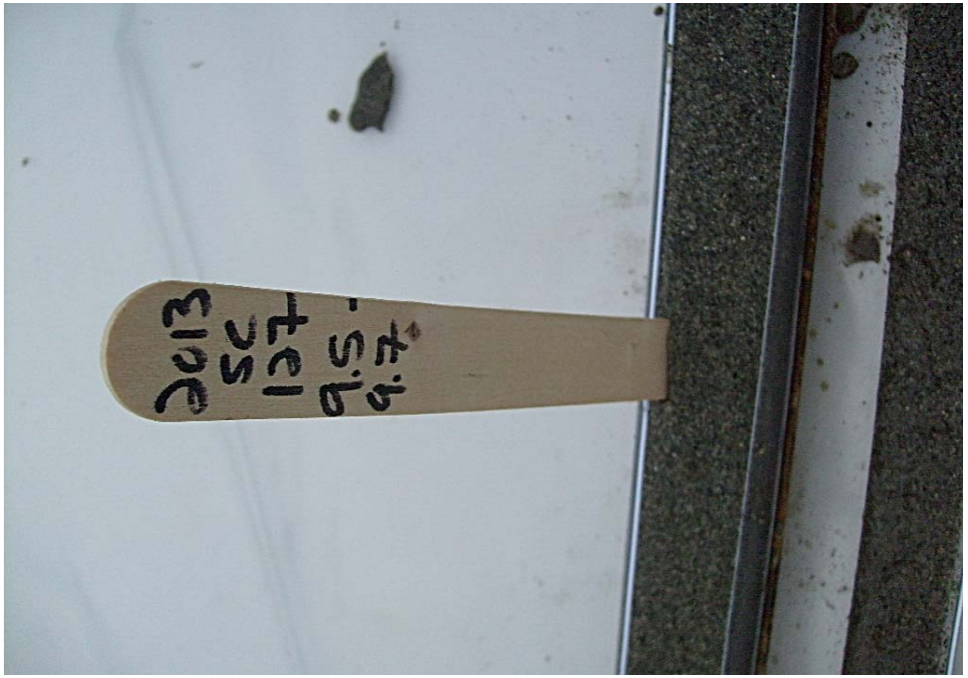

2013-SC-127
8' to 12'
3/14/13




2013-SC-127
8' to 12'
3/14/13


2013
SC
127
9.5'-
9.7'


2013-SC-127
12' to 16'
3/14/13


2013
SC
127
9.5'-
9.7'

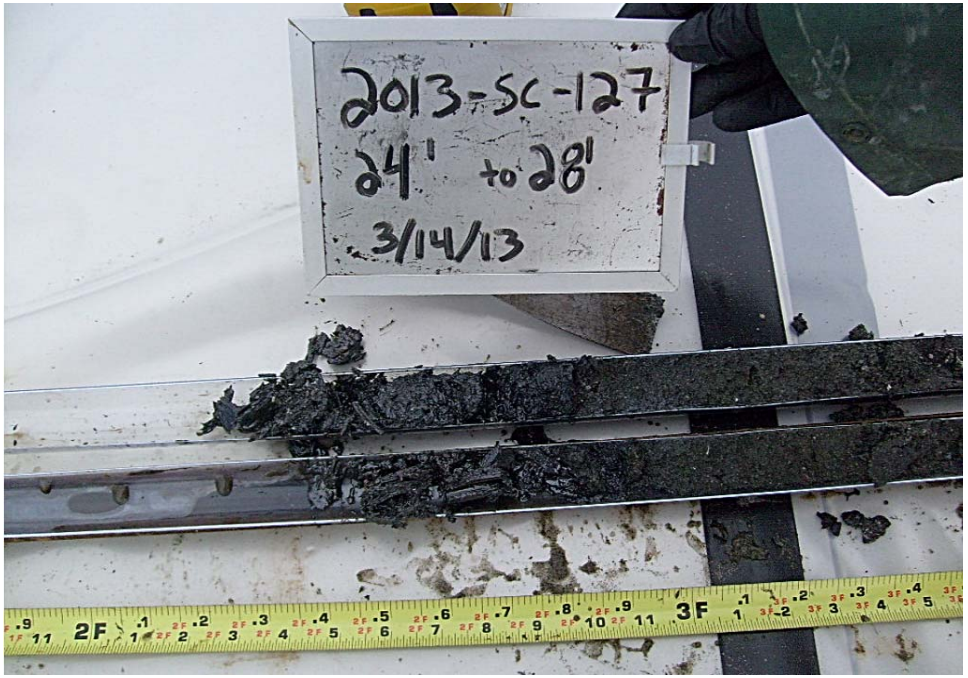

2013-SC-127
12' to 16'
3/14/13


2013-SC-127
16' to 20'
3/14/13

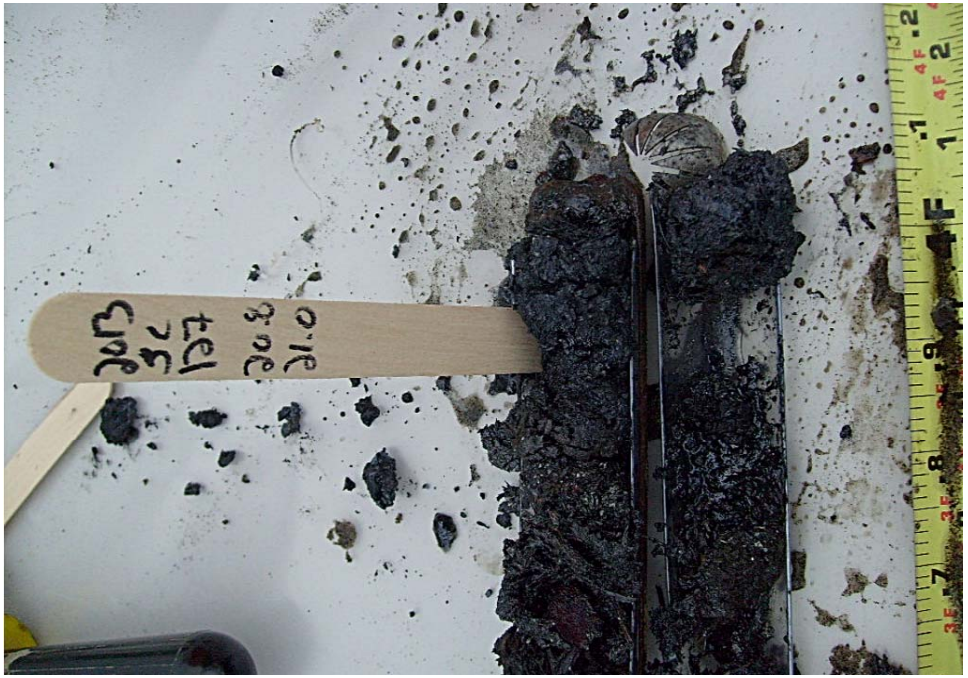

2013-SC-127
20' to 24'
3/14/13


2013
SC
127
13.2
13.4

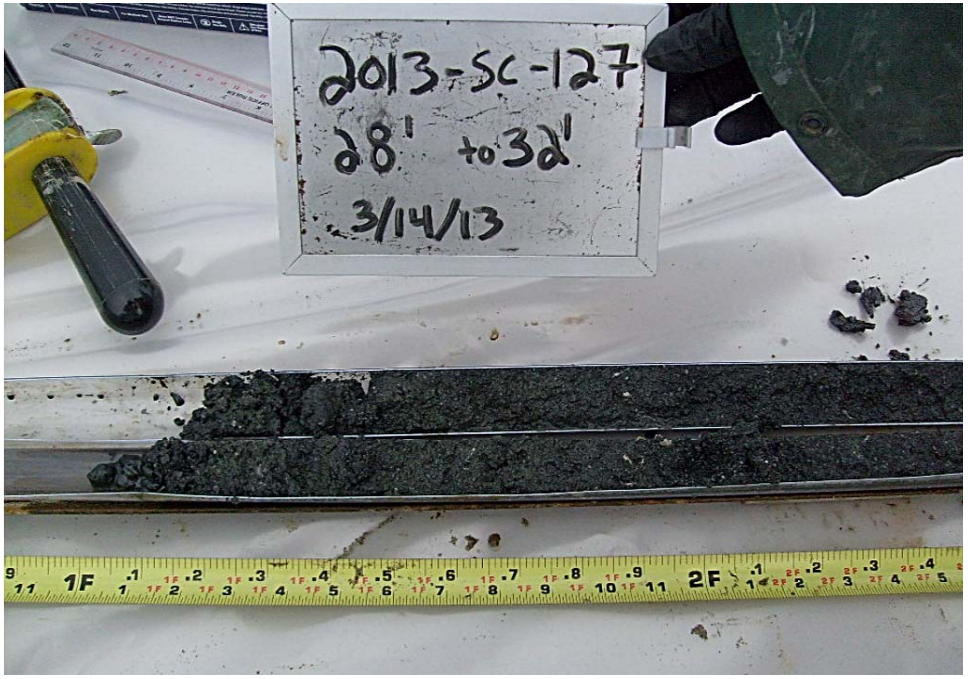

2013
SC
127
16.8-
17.0


2013-SC-127
24' to 28'
3/14/13

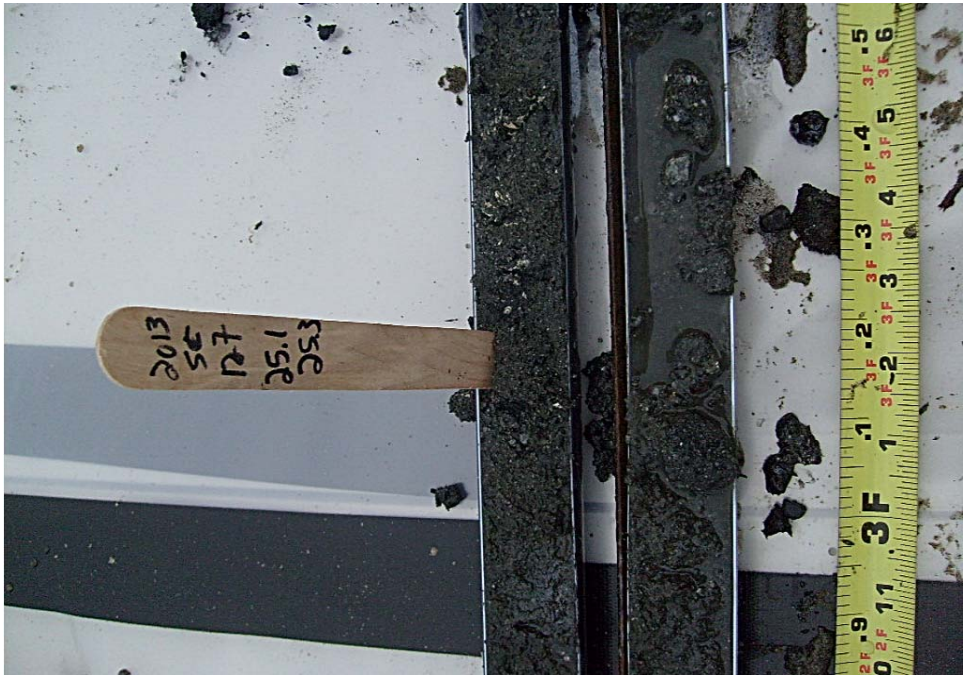





2013-SC-127
24' to 28'
3/14/13


2013-SC-127
28' to 32'
3/14/13


2013-SC-127
28' to 32'
3/14/13


2013
SC
127
25'
25'


2013-SC-127
28' to 32'
3/14/13

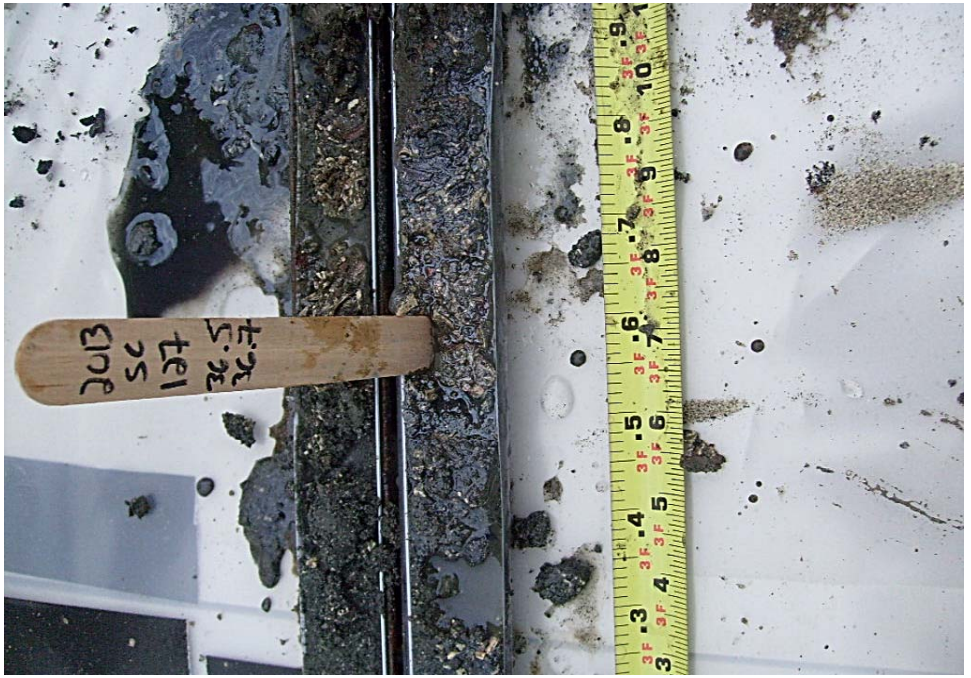

2013
SC
127
30.0
30.1

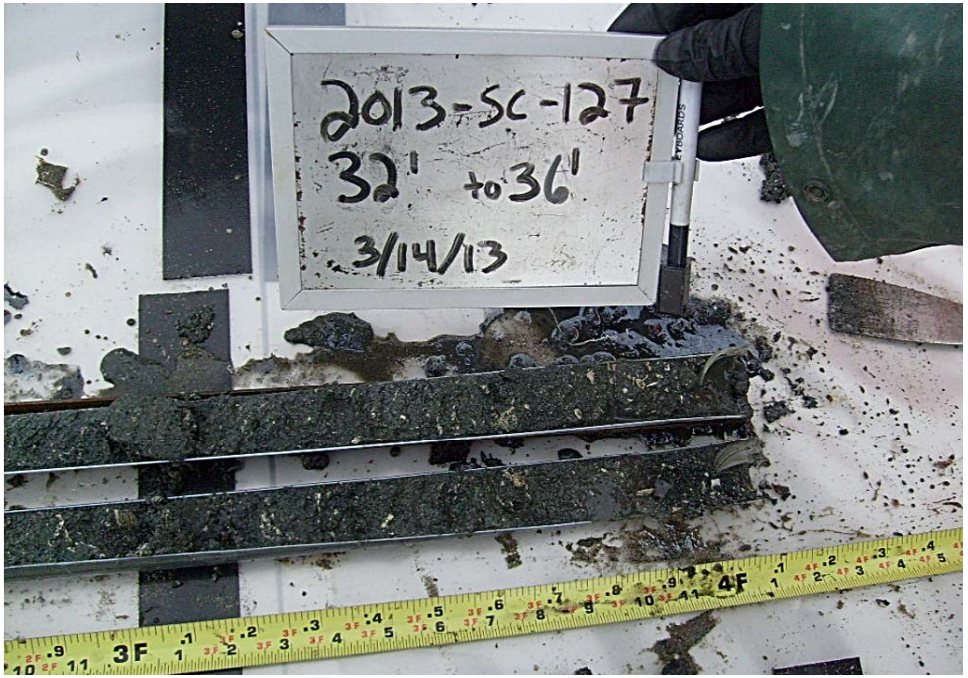

2013-SC-127
32' to 36'
3/14/13

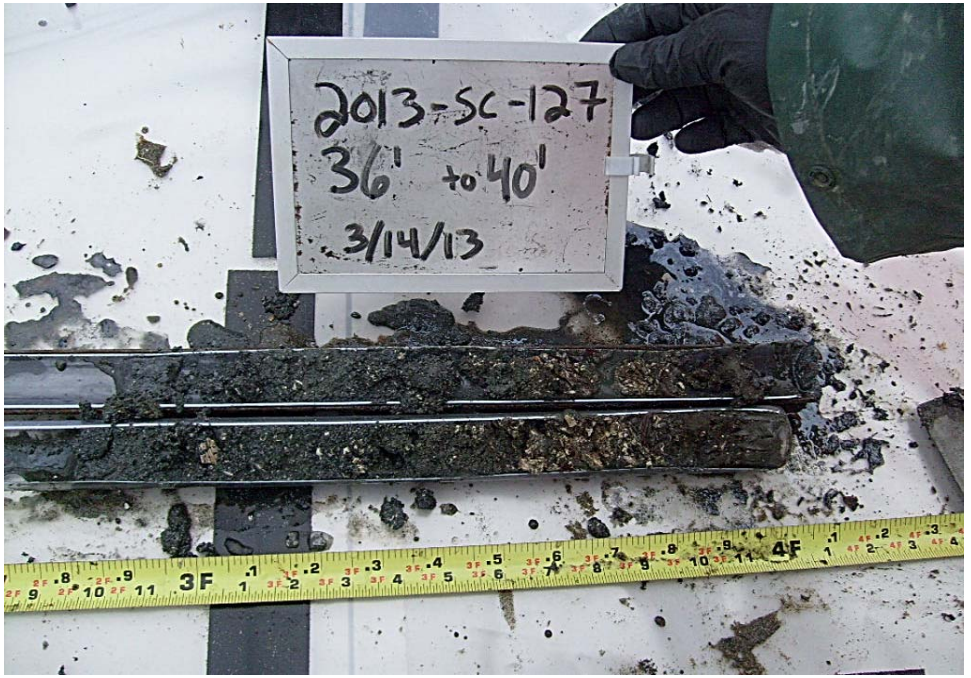

2013
SC
127
38.0
38.2


2013-SC-127
32' to 36'
3/14/13


2013
SC
127
33.5
33.7


2013
SC
127
36.5
36.7

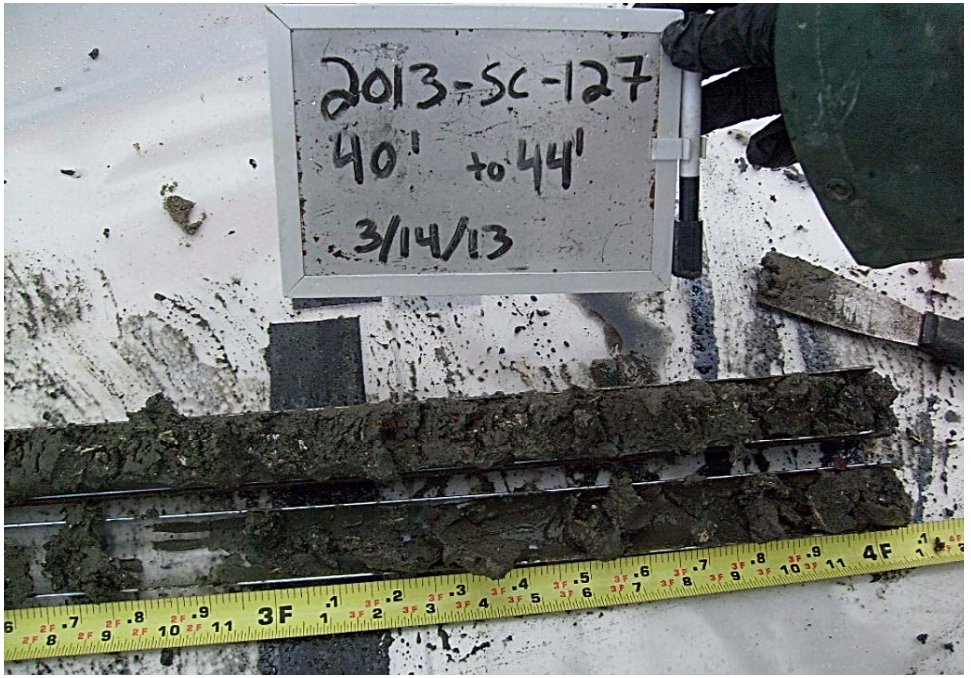

2013-SC-127
32' to 36'
3/14/13


2013-SC-127
36' to 40'
3/14/13

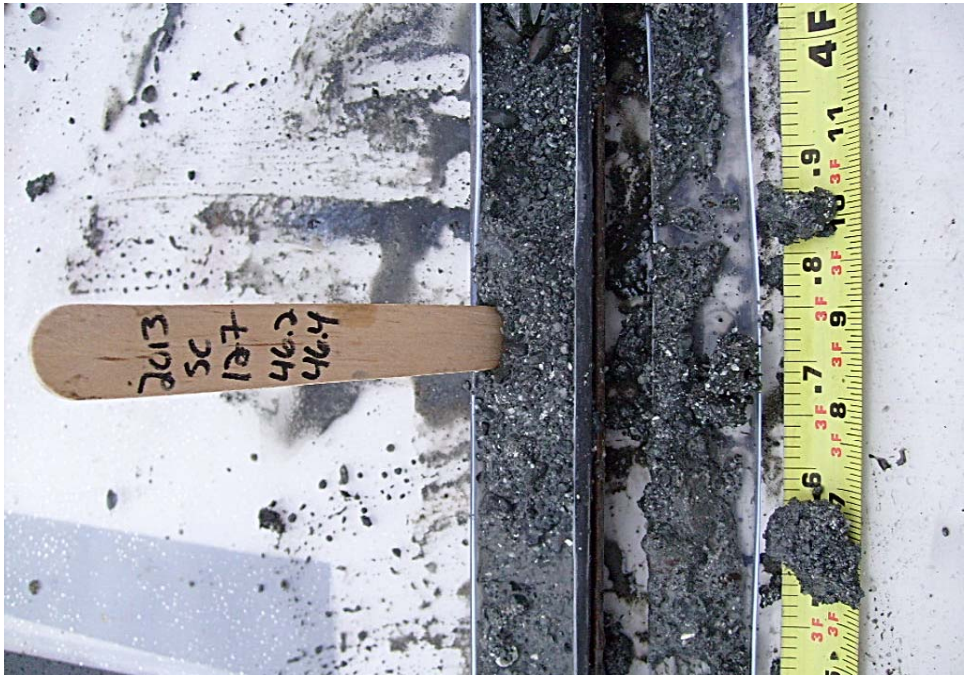

2013-SC-127
40' to 44'
3/14/13


2013
SC
tel
4th

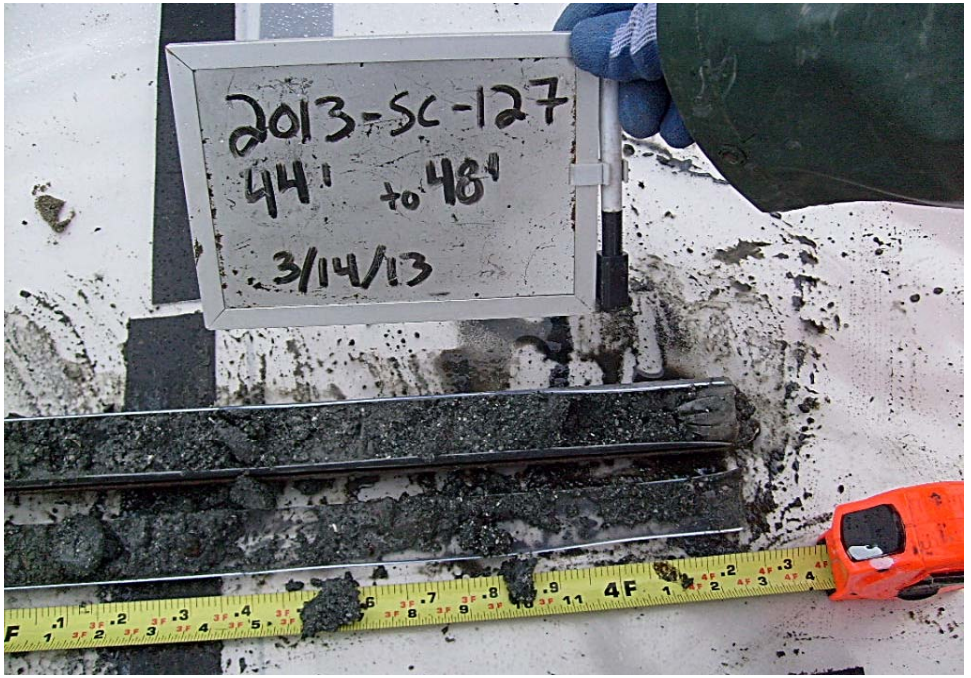

2013-SC-127
40' to 44'
3/14/13


2013-SC-127
40' to 44'
3/14/13


2013-SC-127
44' to 48'
3/14/13


2013
SC
127
46.2
46.4


2013-SC-127
44' to 48'
3/14/13


2013-SC-127
44' to 48'
3/14/13


2013-SC-127
48' to 52'
3/14/13

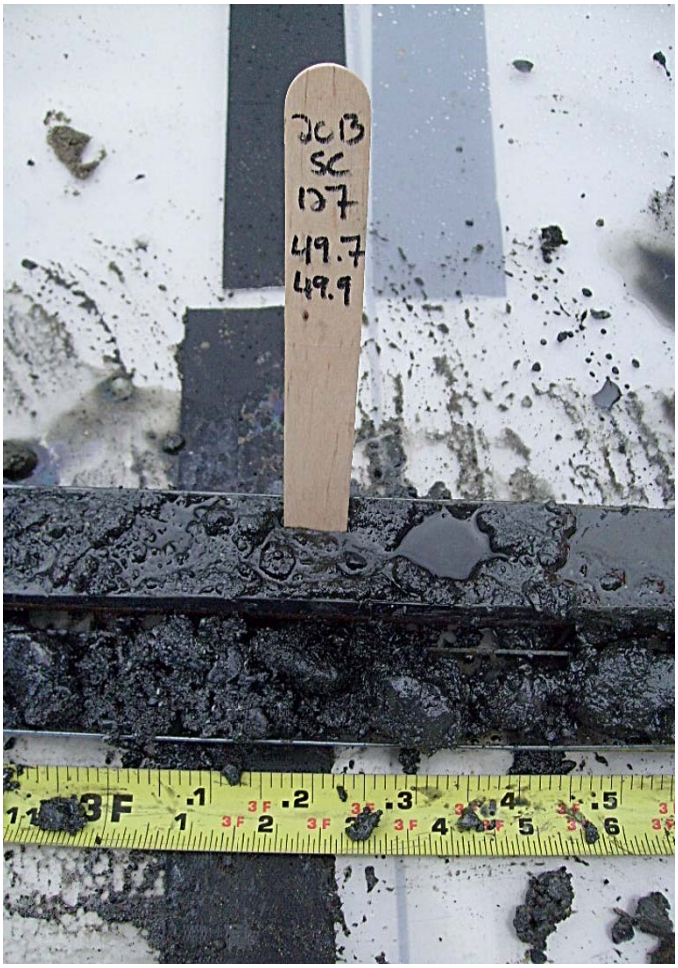

2013-SC-127
48' to 52'


2013-SC-127
48' to 52'
3/14/13

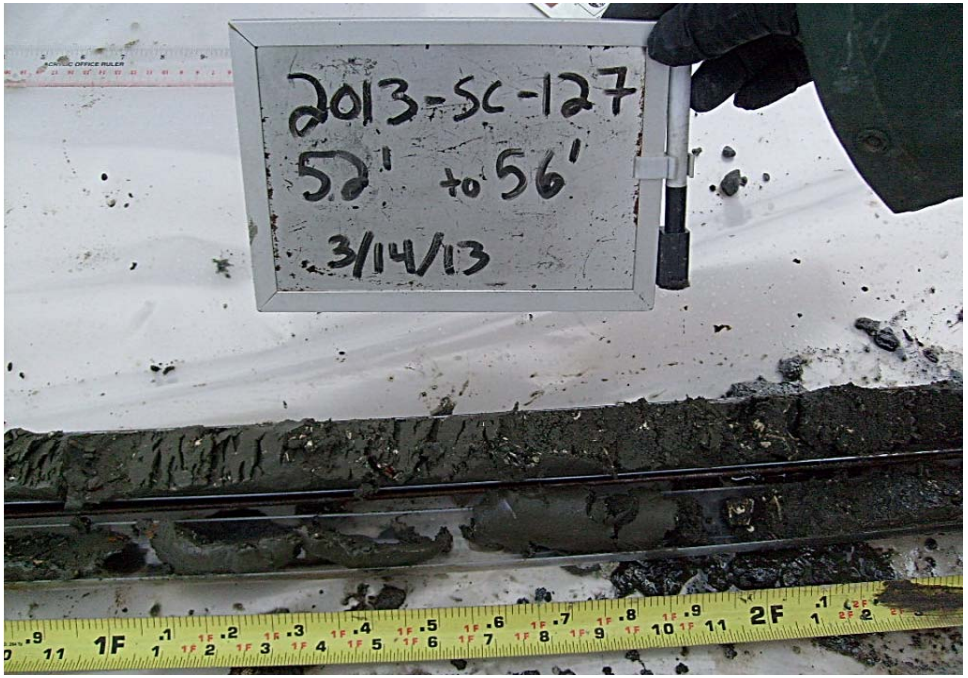

2013-SC-127
48' to 52'
3/14/13

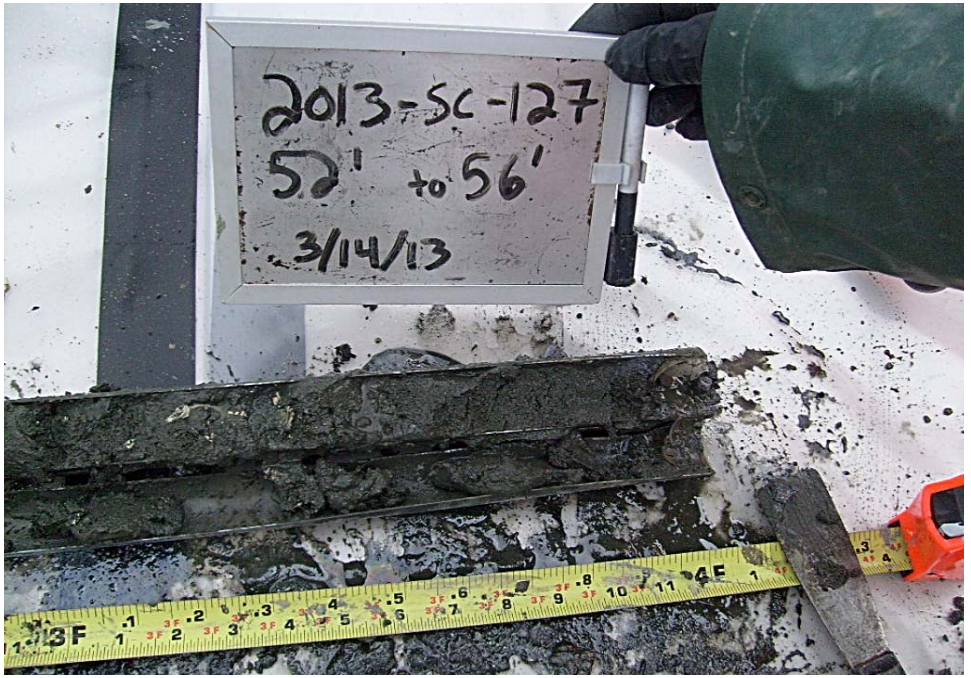

2013
SC
127
45.7
45.9


2013
SC
127
46.4
46.5


2013
SC
127
49.7
49.9


2013
SC
127
50.4
50.5


2013-SC-127
52' to 56'
3/14/13


2013-SC-127
52' to 56'
3/14/13


2013-SC-127
52' to 56'
3/14/13

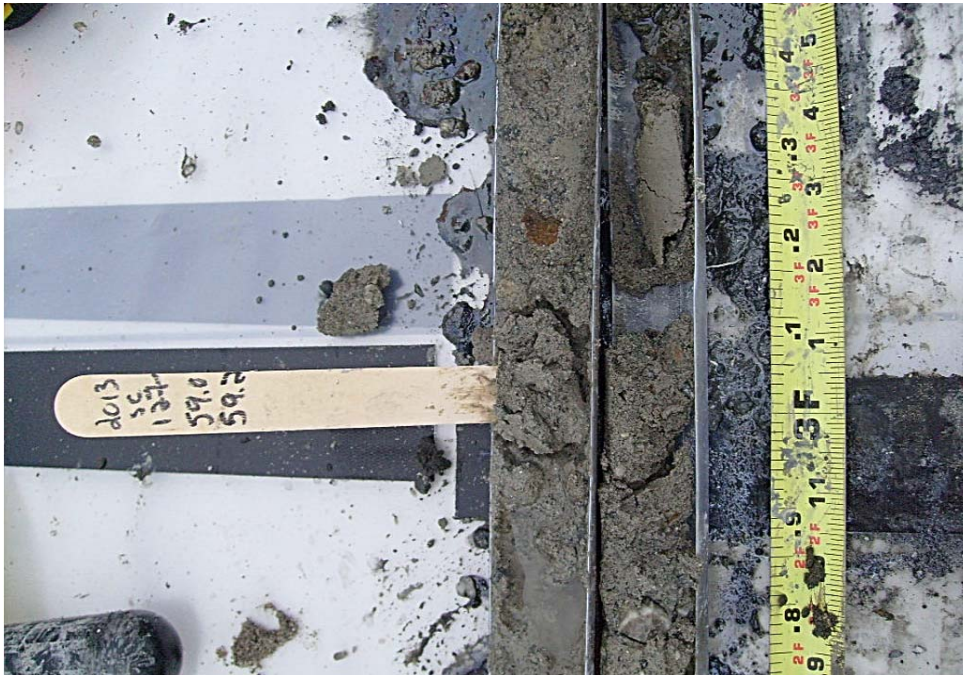

2013-SC-127
52' to 56'
3/14/13


2013-SC-127
56' to 60'
3/14/13


2013-SC-127
56' to 60'
3/14/13


2013-SC-127
56' to 60'
3/14/13

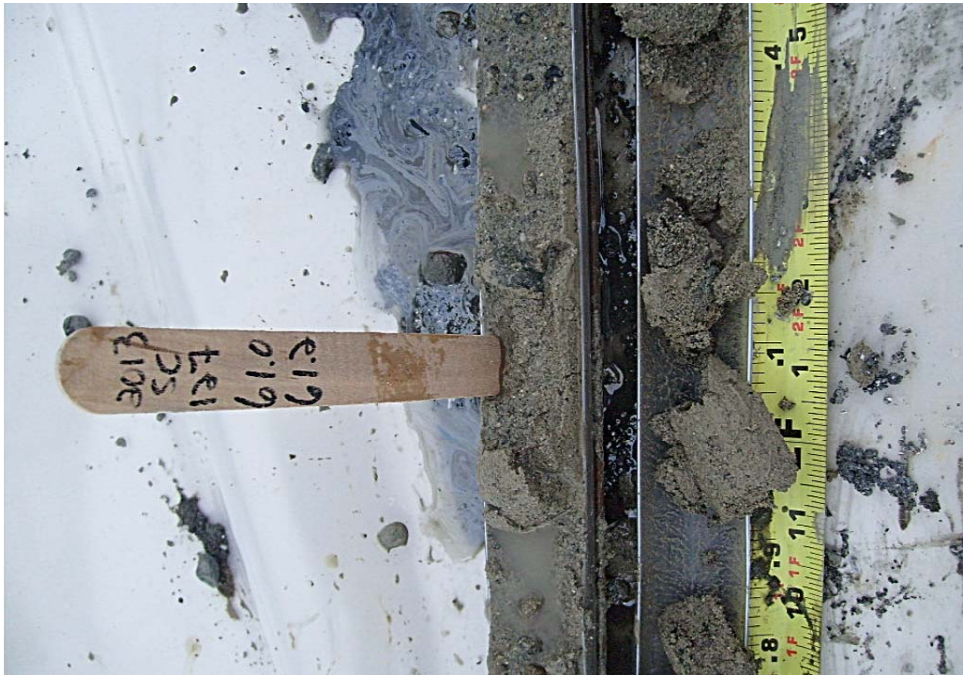

2013-SC-127
56' to 60'
3/14/13


2013
SC
127
59.0
59.2


2013-SC-127
60' to 63'
3/14/13


2013
SC
127
59.0
59.2


2013-SC-127
60' to 63'
3/14/13


2013
SC
127
6.0
6.2


2013
SC
119
0.5
0.6


2013-SC-127
60' to 63'
3/14/13

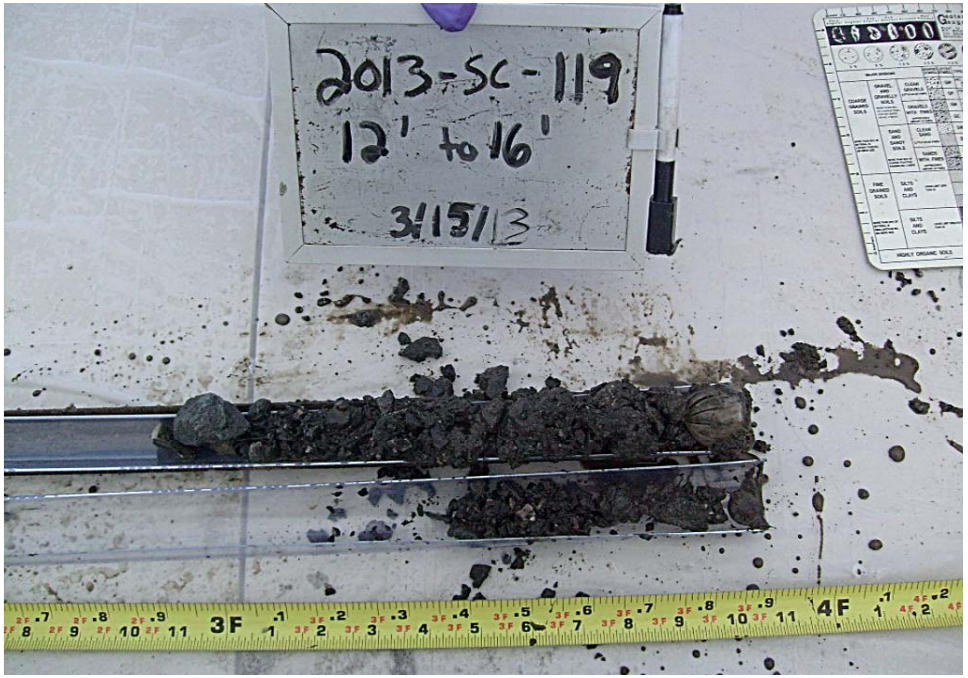

2013-SC-119
0' to 4'
3/15/13


2013
SC
119
4.4
4.6


2013-SC-119
8' to 12'
3/15/13


2013-SC-119
4' to 8'
3/15/13


2013-SC-119
8' to 12'
3/15/13


2013-SC-119
12' to 16'
3/15/13


2013-SC-119
16' to 20'
3/15/13


2013
SC
119
9.0'
9.6'

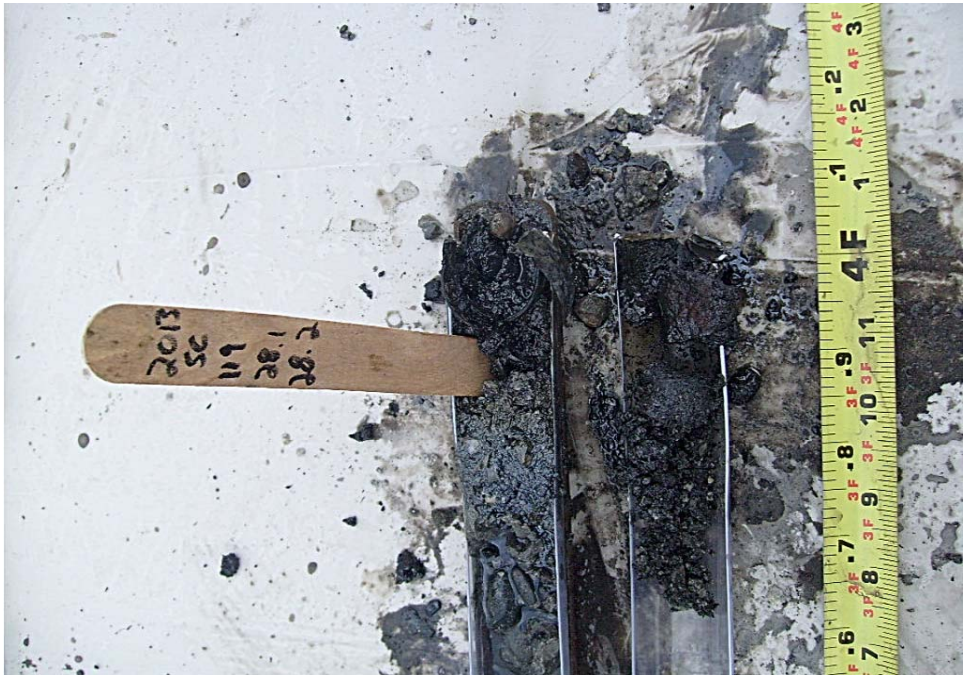

2013
SC
119
12.4'
12.9'


2013-SC-119
20' to 24'
3/15/13


2013
SC
119
24.6
24.8


2013
SC
119
16.2
16.4


2013-SC-119
24' to 28'
3/15/13




2013-SC-152
0' to 4'
3/15/13


2013-SC-119
28' to 30'
3/15/13


2013-SC-
28' to 30'
3/15/13


2013-SC-152
4' to 8'
3/15/13


2013-SC-152
4' to 8'
3/15/13


2013
SC
152
4'-8'

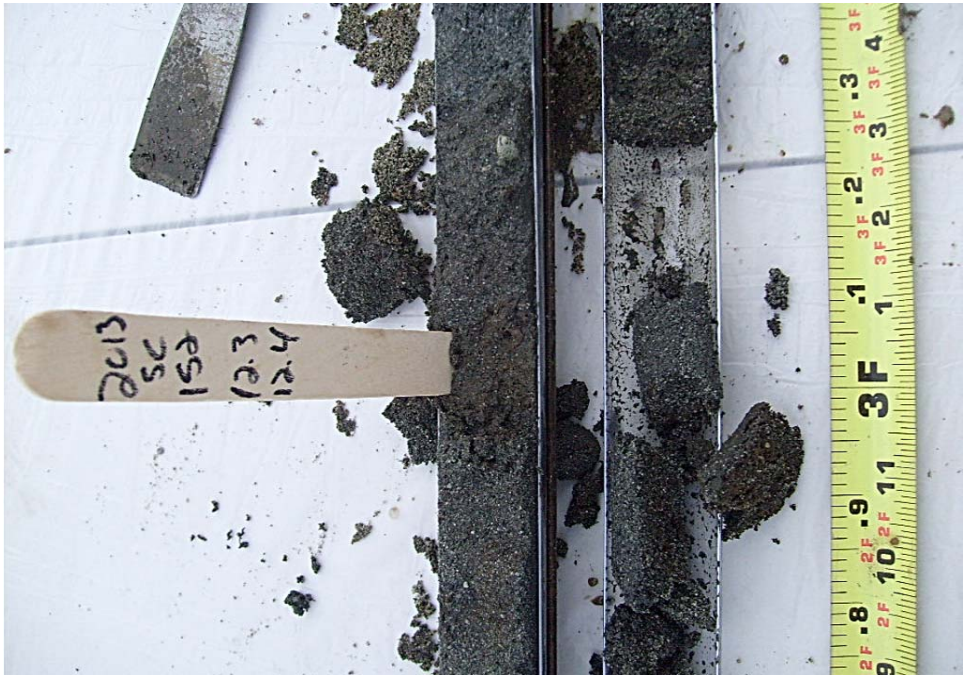

2013-SC-152
4' to 8'
3/15/13


2013
SC
152
5.4
5.6


2013
SC
152
9.0
9.2


2013
SC
152
4.5
4.6

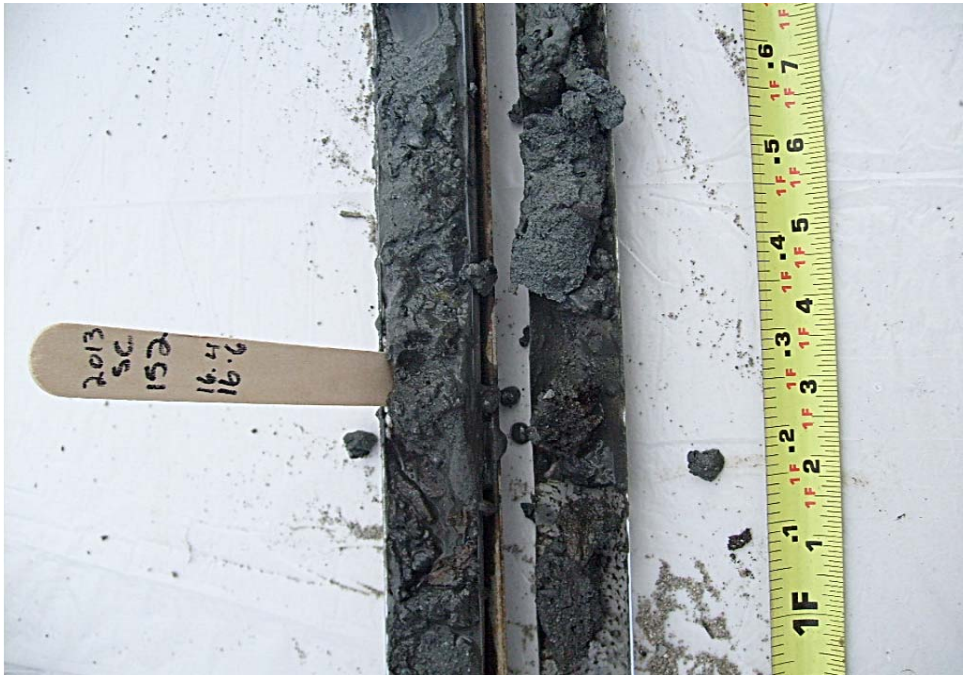

2013-SC-152
8' to 12'
3/15/13


2013
SC
152
12'-3
12'-4


2013-SC-152
16' to 20'
3/15/13


2013-SC-152
12' to 16'
3/15/13


2013-SC-152
16' to 20'
3/15/13


2013
SC
152
16'-20'


2013-SC-152
20' to 24'
3/15/13


2013-SC-152
16' to 20'
3/15/13

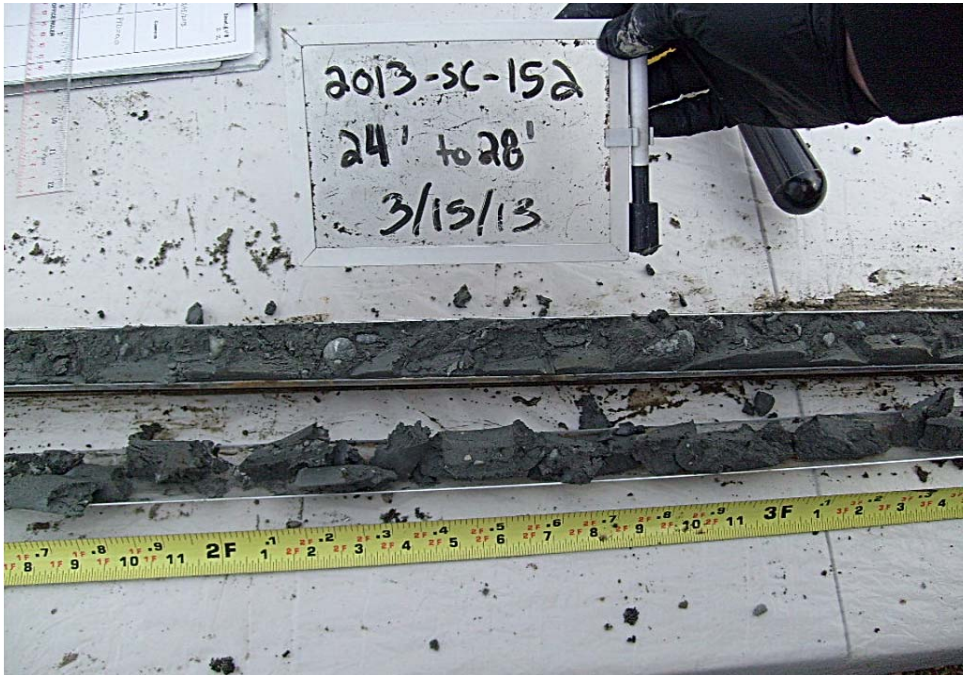

2013
SC
152
16'-20'


2013-SC-152
20' to 24'
3/15/13


2013-SC-152
24' to 28'
3/15/13


2013-SC-152
20' to 24'
3/15/13


2013-SC-152
20' to 24'
3/15/13


2013-SC-152
24' to 28'
3/15/13


2013-SC-152B
5' to 9'
3/15/13


2013-SC-152
24' to 28'
3/15/13


2013-SC-152
24' to 28'
3/15/13


2013
SC 101
9.7


2013-SC-101
12' to 16'
3/18/13


2013-SC-152B
5' to 9'
3/15/13


2013
SC
101
9.7
9.3


2013
SC
101
12.9
13.0


2013-SC-101
16' to 20'
3/18/13


2013-SC-101
12' to 16'
3/18/13


2013-SC-101
16' to 20'
3/18/13


2013
SC
101
16.9
19.0

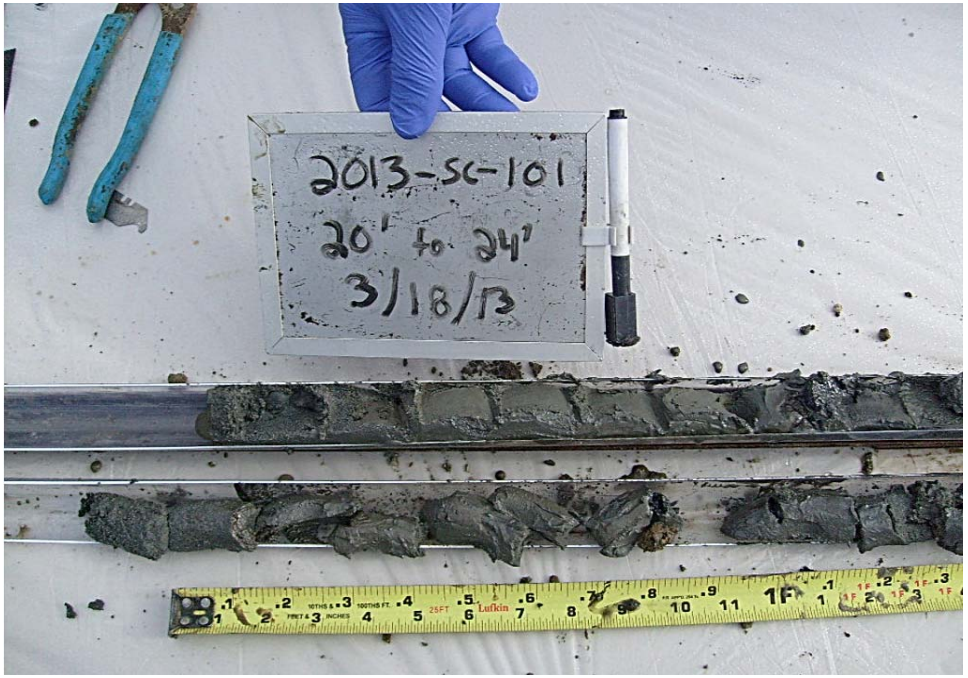

2013
SC
101
12.6
18.8


2013-SC-101
16' to 20'
3/18/13


2013
SC
101
18.3
18.4

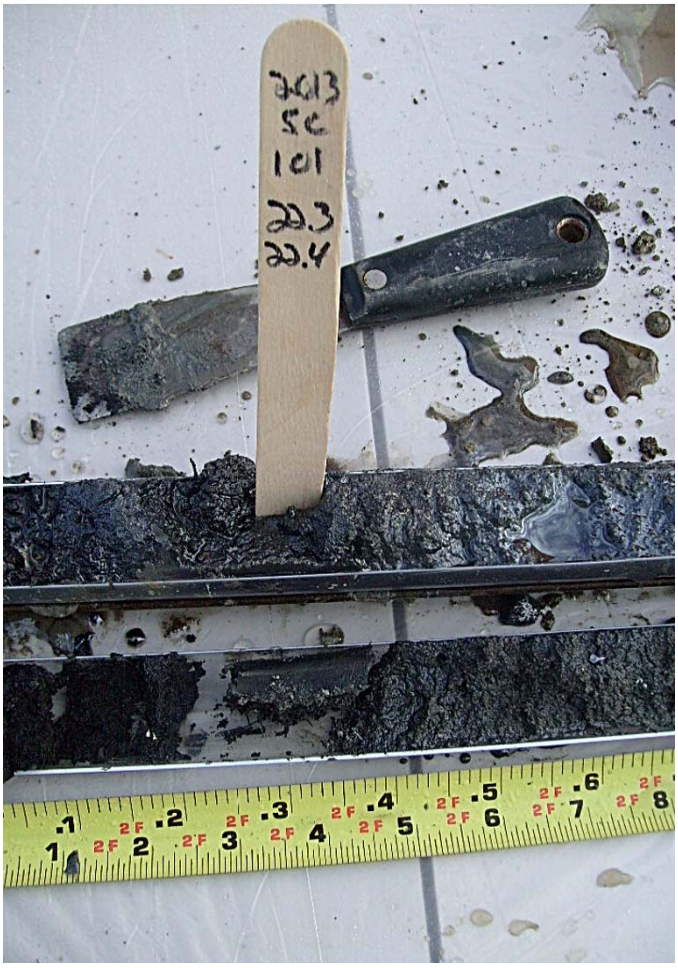

2013-SC-101
20' to 24'
3/18/13


2013
SC
101
20.9
21.0


2013-SC-101
20' to 24'
3/18/13


2013-SC-101
20' to 24'
3/18/13


2013
SC
101
21.9
22.0


2013
SC
101
22.3
22.4

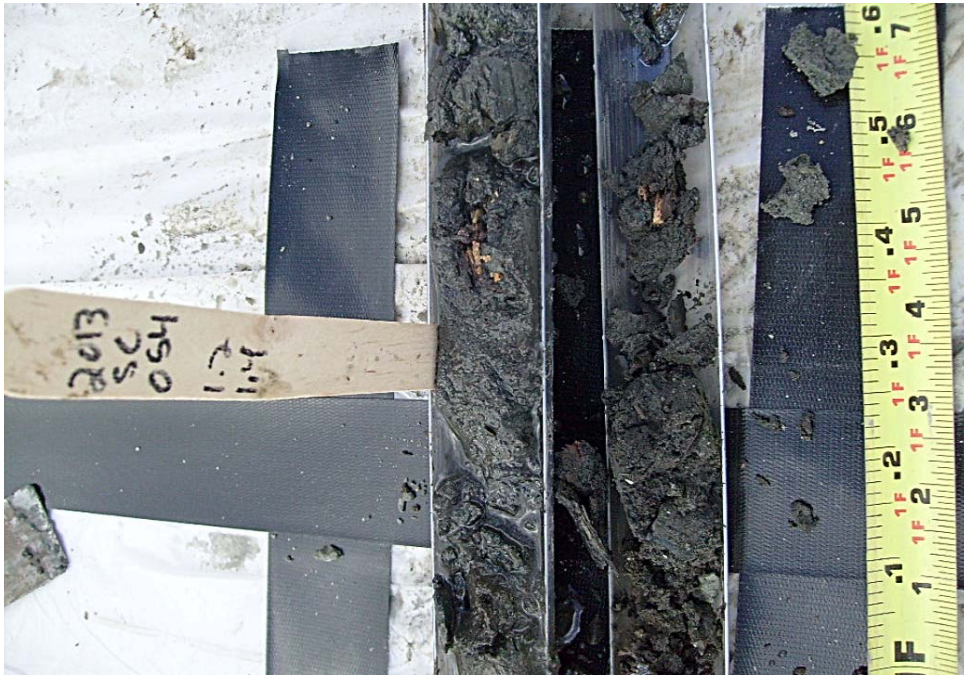

2013-SC-101
3/18/13

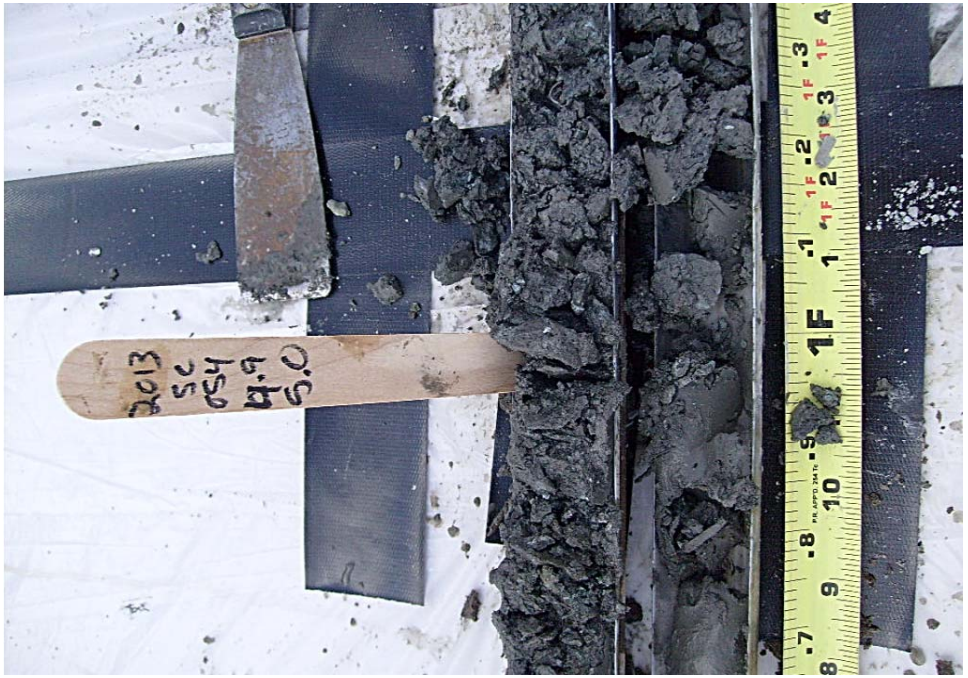

2013
SC
101
25.1
25.3


2013-SC-054
0' to 4'
3/18/13


2013-SC-054
4' to 8'
3/18/13


2013-SC-054
0' to 4'
3/18/13




2013
SC
054
4.9
5.0

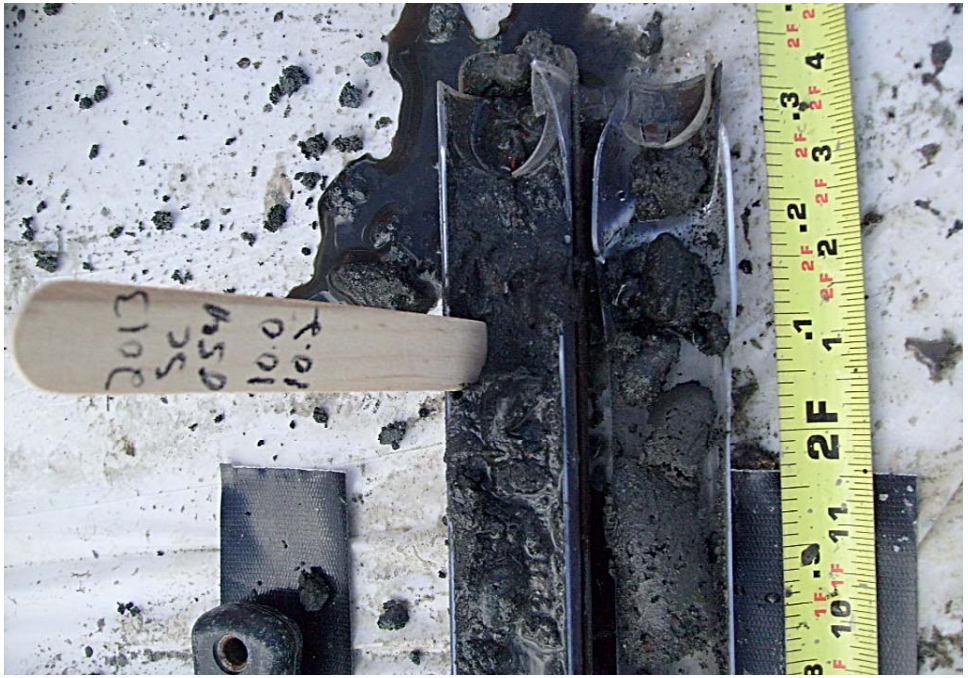

2013-SC-054
8' to 12'
3/18/13


2013-SC-054
4' to 8'
3/18/13


2013-SC-054
8' to 12'
3/18/13

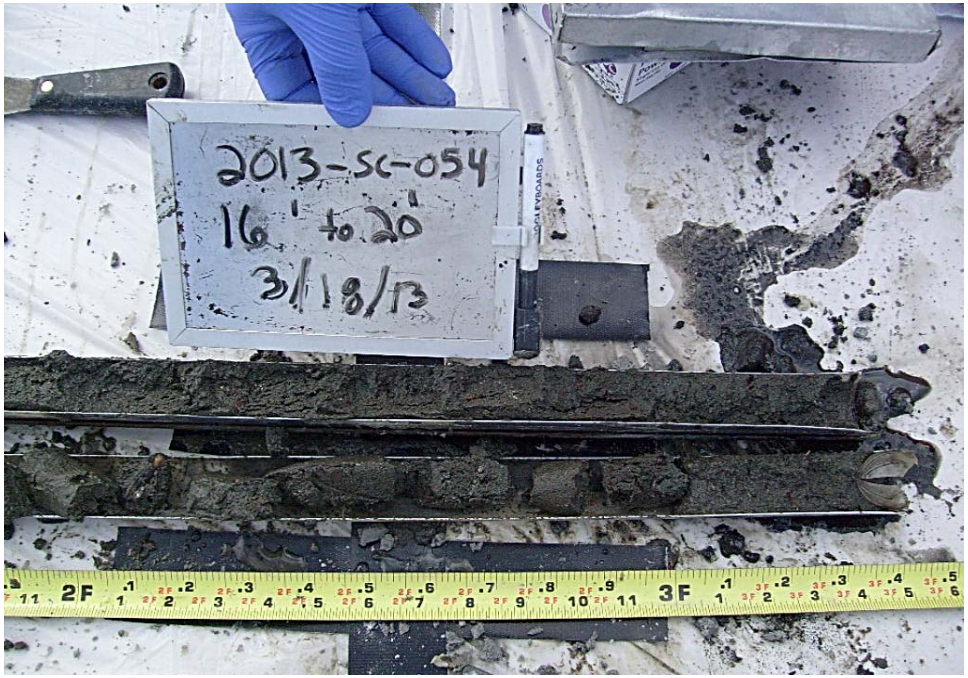

2013-SC-054
12' to 16'
3/18/13


2013-SC-054
12' to 16'
3/18/13


2013
SC
054
10.0
10.1


2013-SC-054
12' to 16'
3/18/13


2013-SC-054
16' to 20'
3/18/13

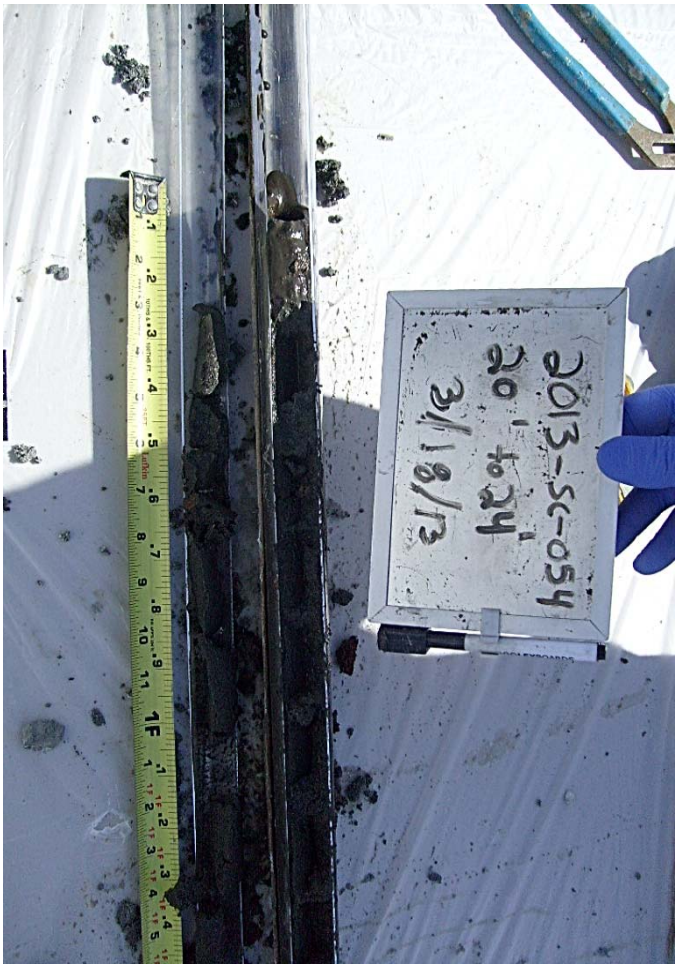

2013-SC-054
16' to 20'
3/18/13


2013
SC
054
14.0
14.2


2013-SC-054
16' to 20'
3/18/13

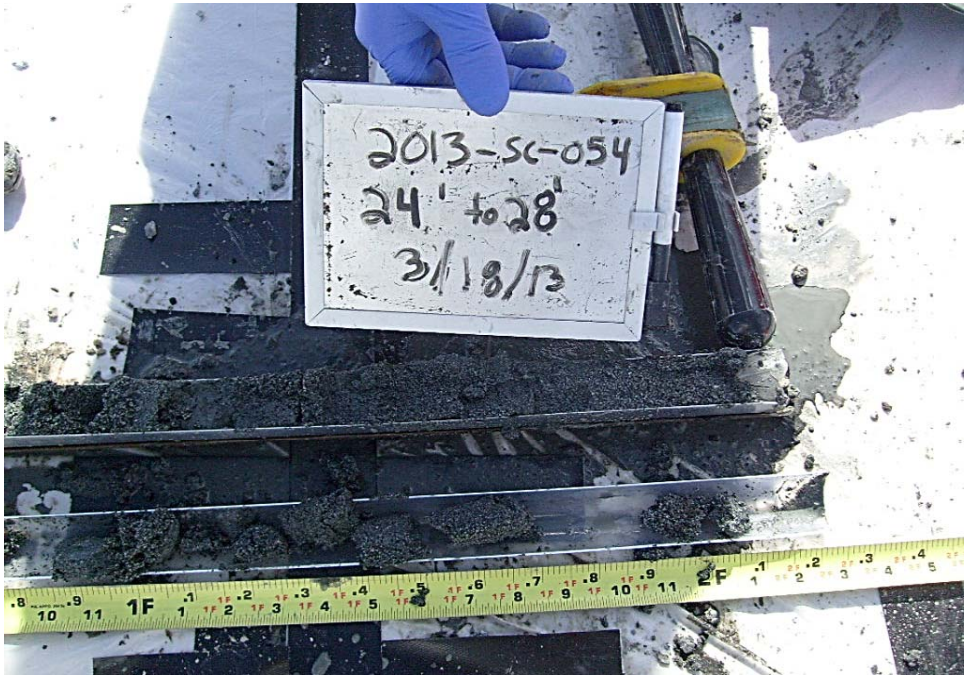

2013
SC
054
16.0
16.2


2013
SC
054

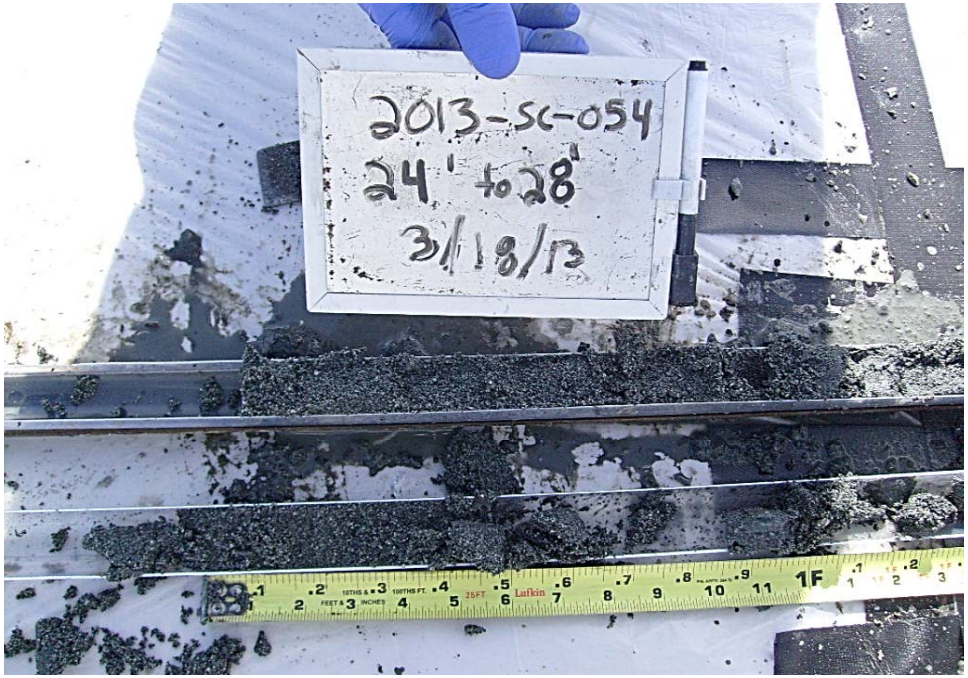

2013-SC-054
20'+24'
3/18/13

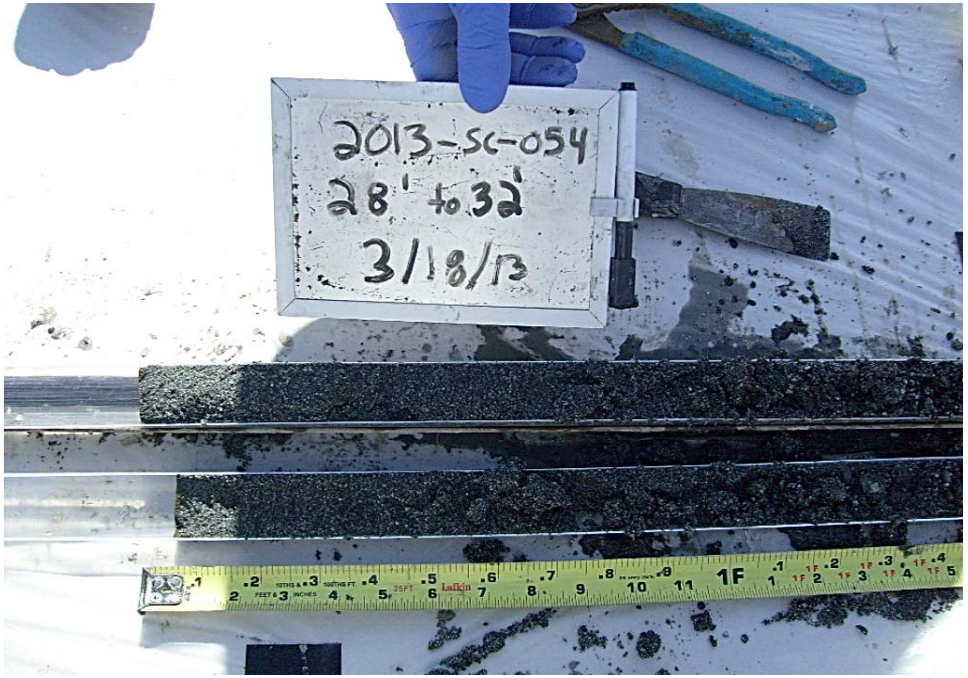

2013-SC-054
20'+24'
3/18/13

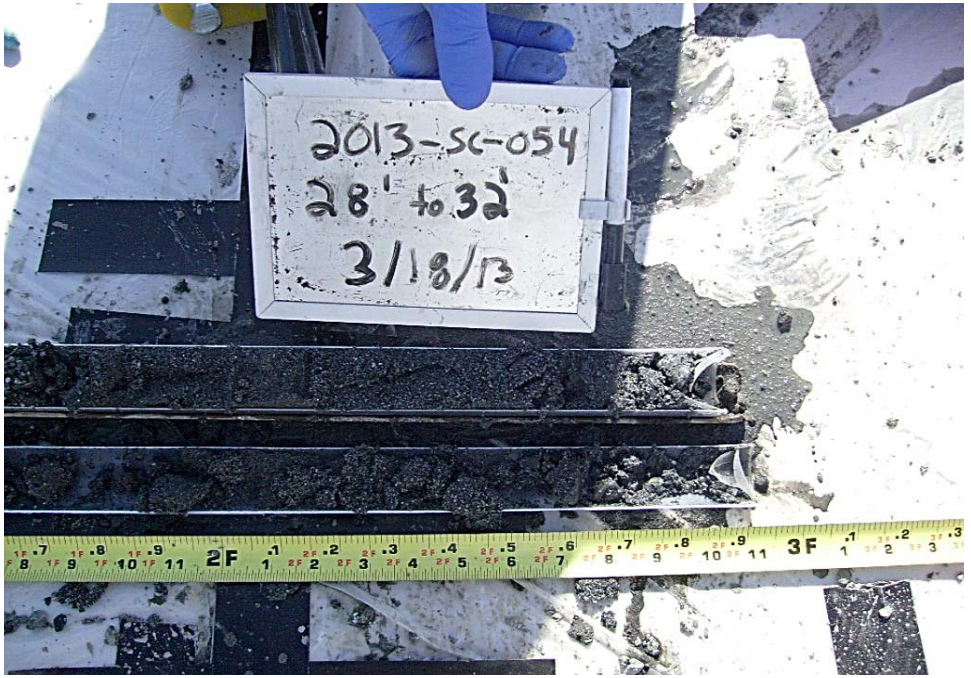

2013
SC
054

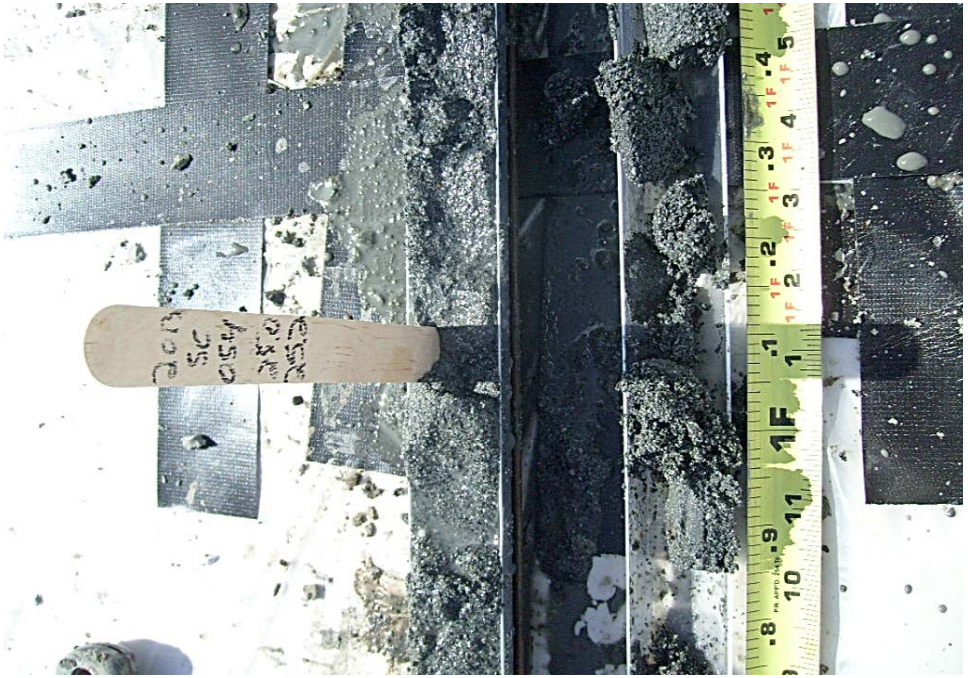

2013-SC-054
24' to 28'
3/18/13


2013-SC-054
20' to 24'
3/18/13

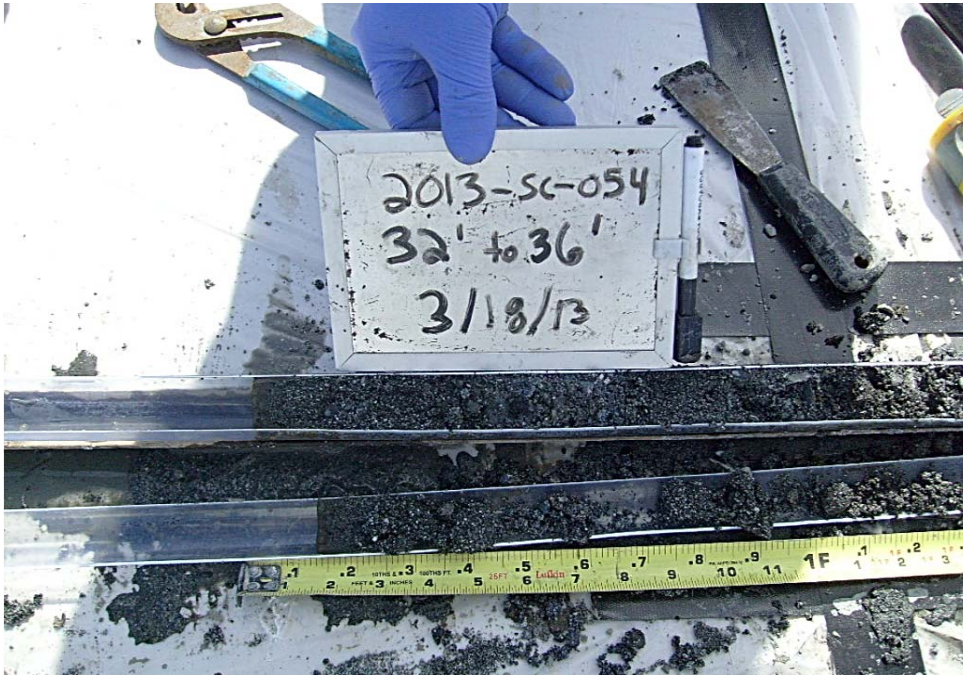

2013-SC-054
24' to 28'
3/18/13

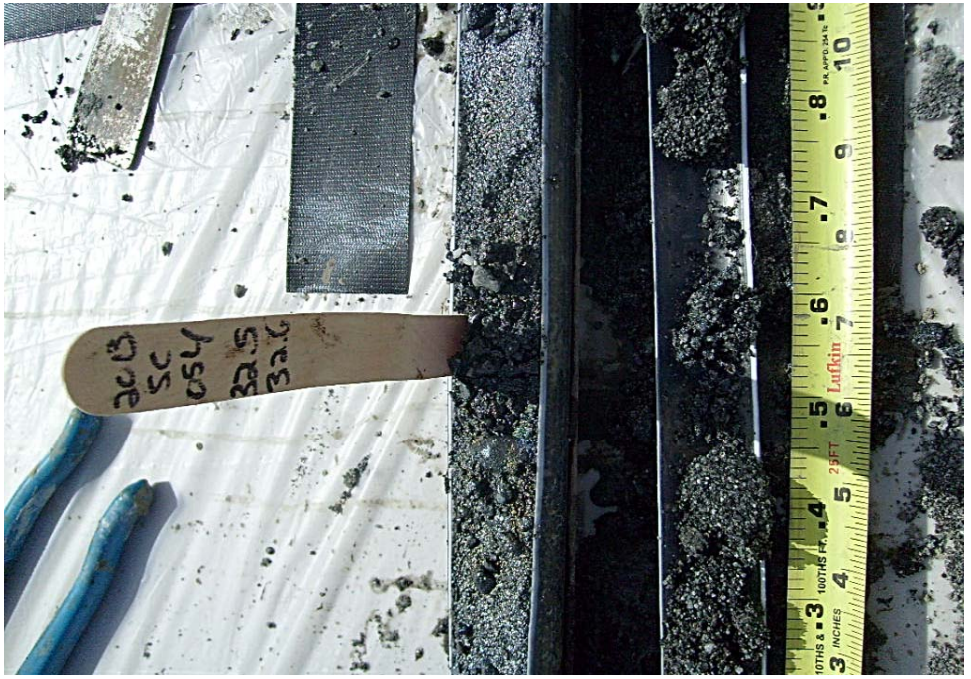

2013-SC-054
28' to 32'
3/18/13


2013-SC-054
28' to 32'
3/18/13




2013-SC-054
28' to 32'
3/18/13


2013-SC-054
32' to 36'
3/18/13


2013
SC
054
32.5
33.5


2013
SC
054
32.5
33.5


2013-SC-054
32' to 36'
3/18/13


2013-SC-054
36' to 40'
3/18/13


2013-SC-054
36' to 40'
3/18/13




2013-SC-054
36' to 40'
3/18/13


2013-SC-054
40' to 44'
3/18/13


2013-SC-054
40' to 44'
3/18/13


2013
SC
054
37.1
37.3

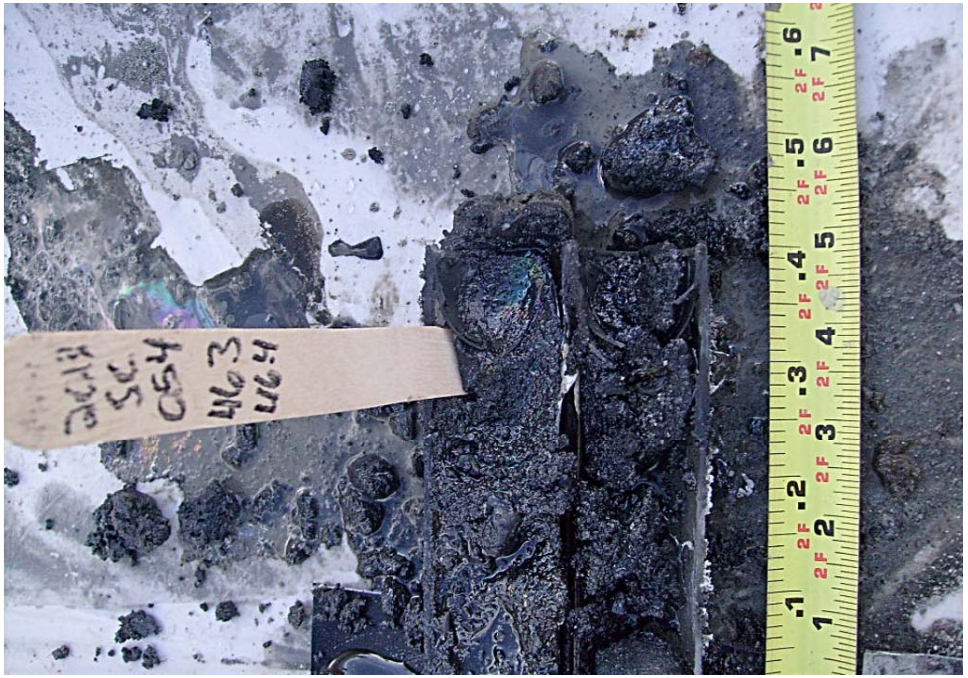

2013-SC-054
40' to 44'
3/18/13


2013-SC-054
44' to 48'
3/18/13

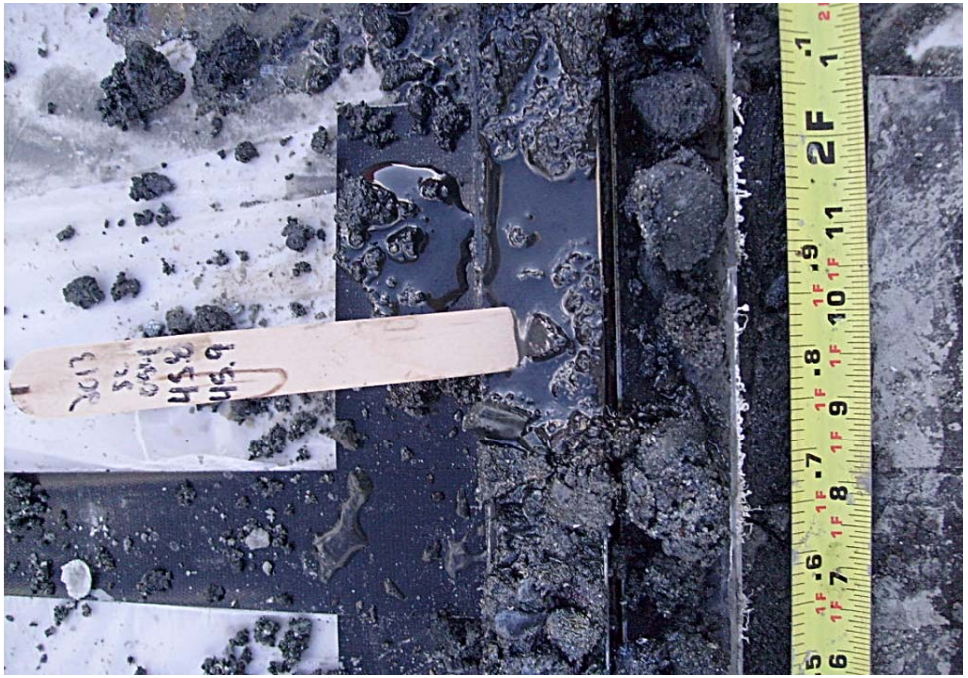

2013-SC-054
44' to 48'
3/18/13


2013
SC
054
42.6
42.8


2013-SC-054
44' to 48'
3/18/13




2013-SC-054
48' to 52'
3/18/13



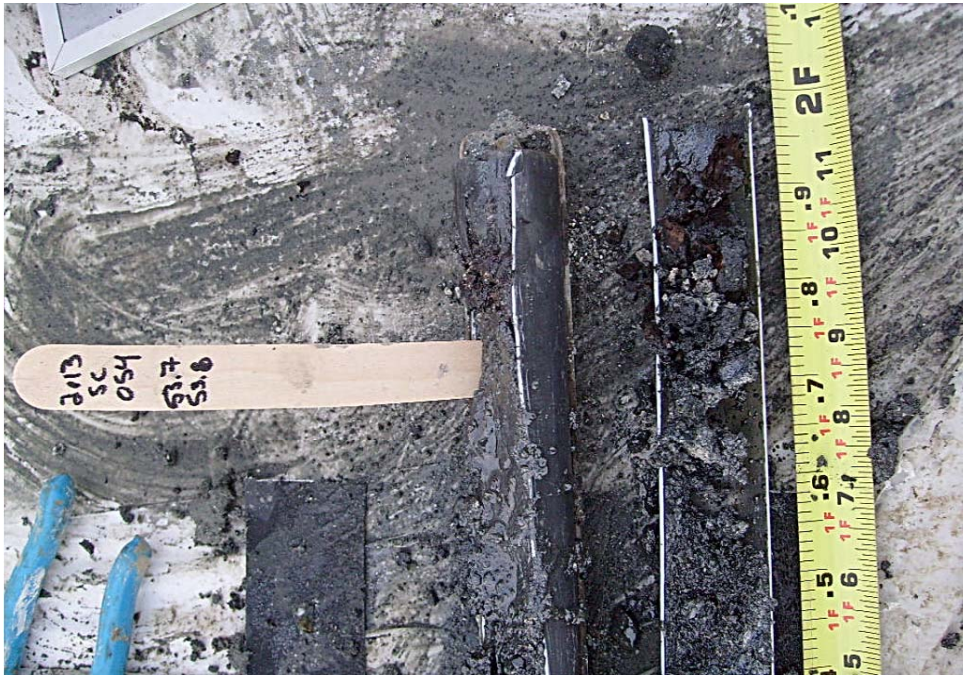

2013-SC-054
48' to 52'
3/18/13


2013
SC
054
60.4
56.5

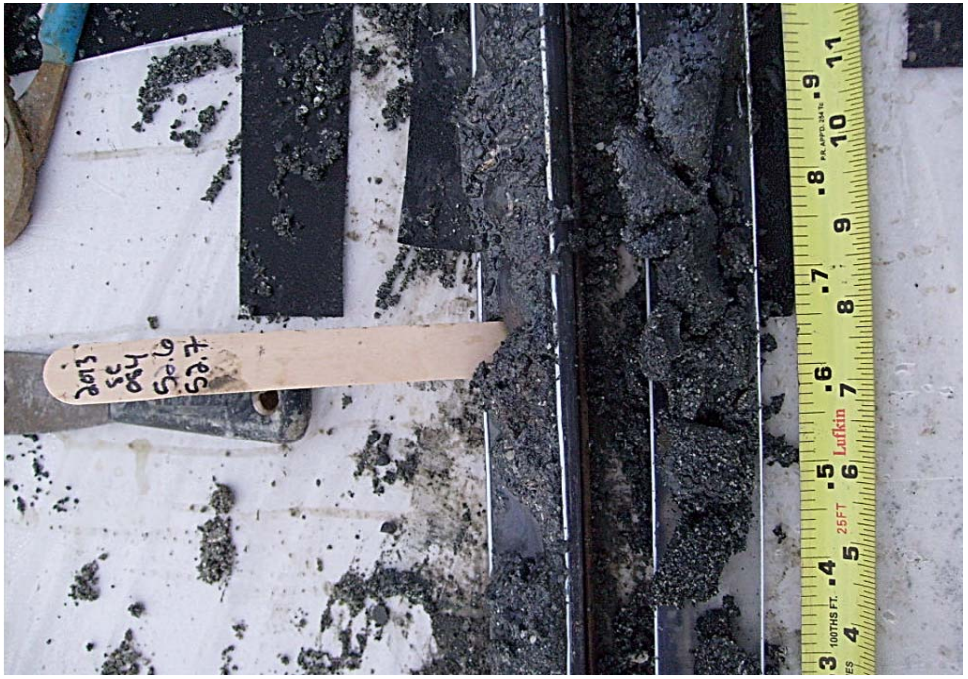

2013-SC-054
52' to 56'
3/19/13


2013-SC-054
48' to 52'
3/18/13


2013-SC-054
52' to 56'
3/19/13


2013
SC
054
56'
60'

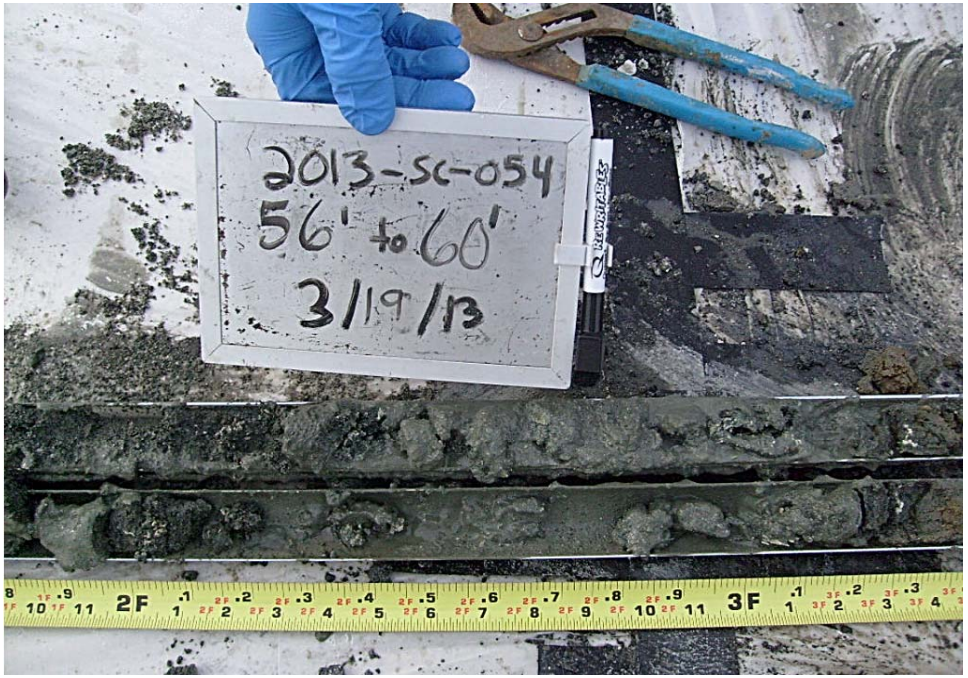

2013-SC-054
56' to 60'
3/19/13


2013
SC
054
56'
60'
Lufkin


2013-SC-054
56' to 60'
3/19/13
Lufkin


2013-SC-054
56' to 60'
3/19/13


2013
SC
054
59.3
59.5


2013-SC-054
56' to 60'
3/19/13

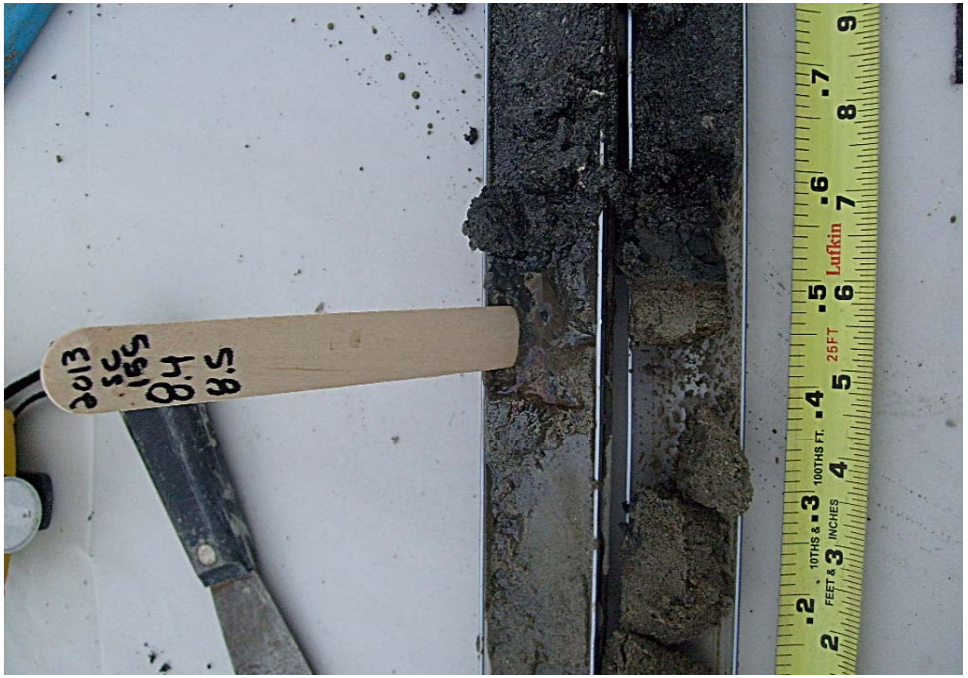

2013
SC
054
56.4
56.5
Lufkin


2013-SC-155
0' to 4'
3/19/13


2013-SC-155
8' to 12'
3/19/13


2013-SC-155
0' to 4'
3/19/13


2013
SC
155
10-
12

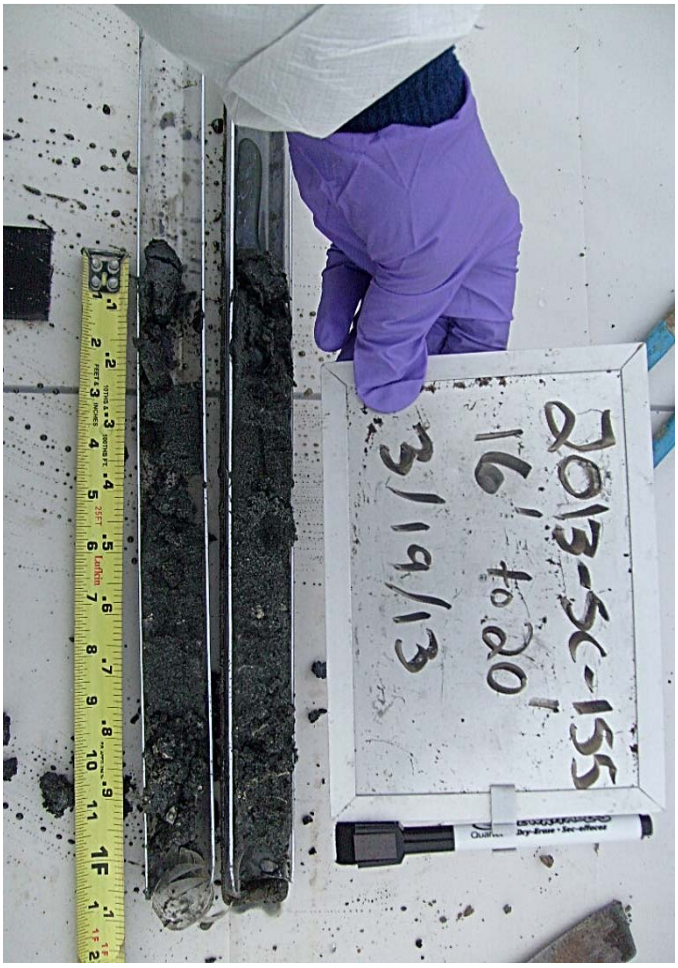

2013
SC
155
8.4
8.5

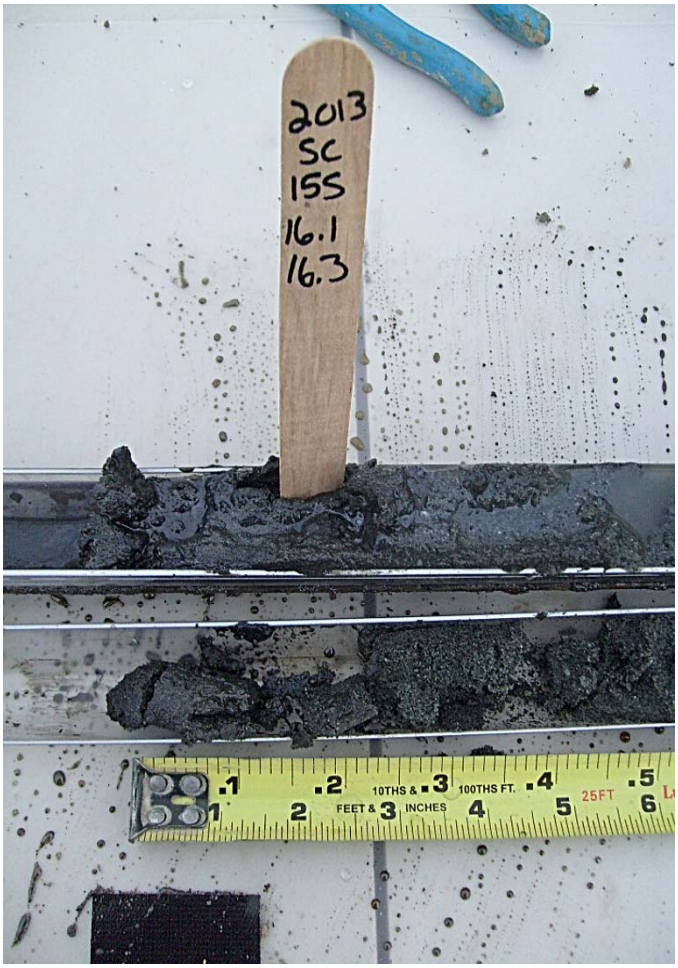

2013-SC-155
12' to 16'
3/19/13


2013-SC-155
8' to 12'
3/19/13


2013
SC
155
9.6
9.7

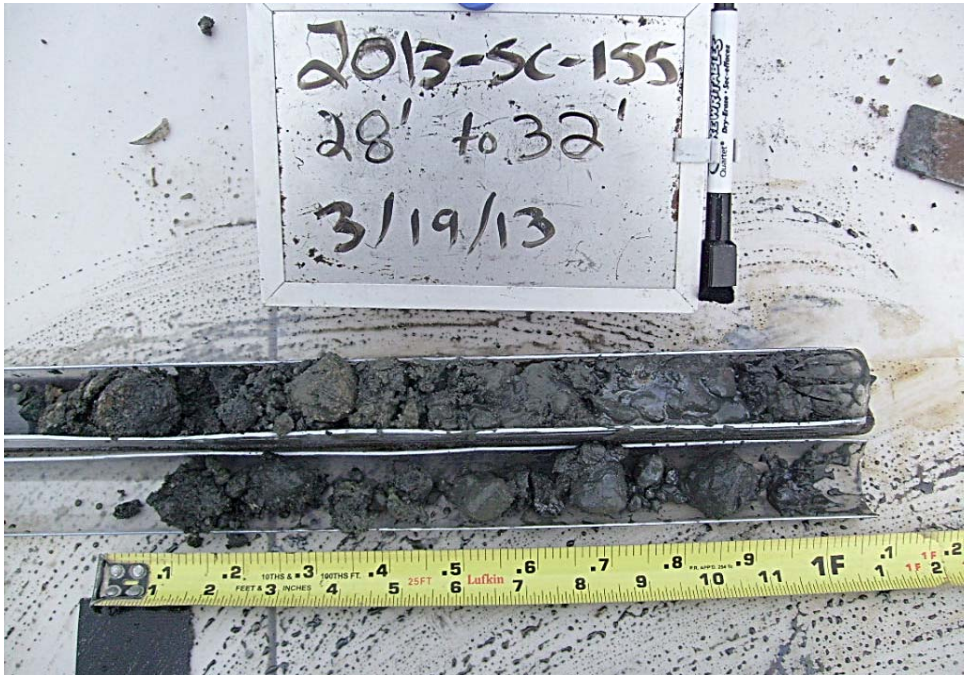

2013
SC
155
12.3
12.4
Lufkin


2013-SC-155
16' to 20'
3/19/13
Lufkin

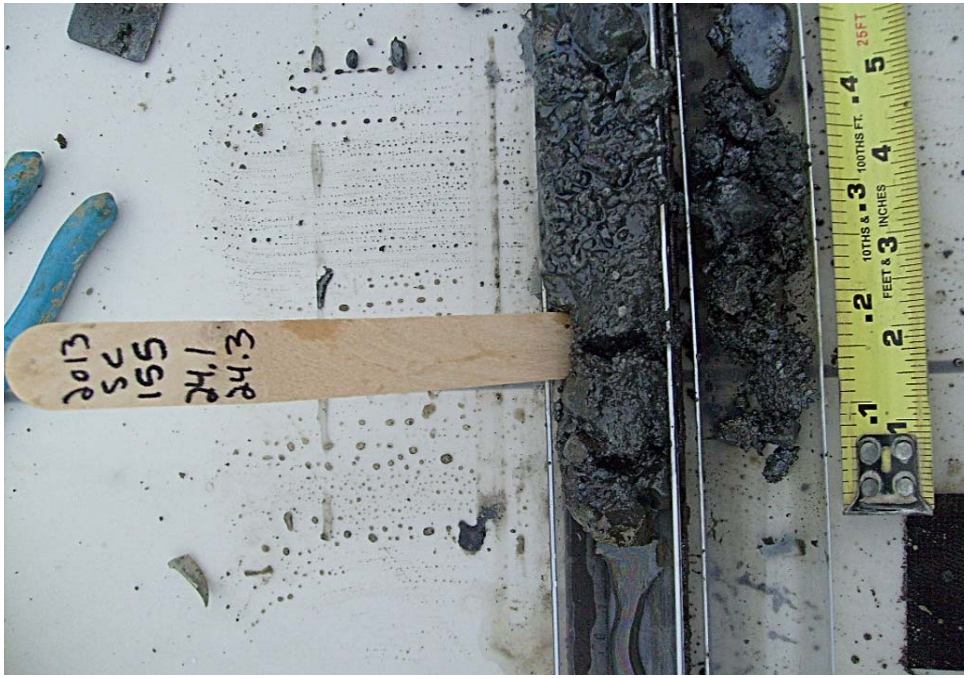

2013
SC
155
16.1
16.3

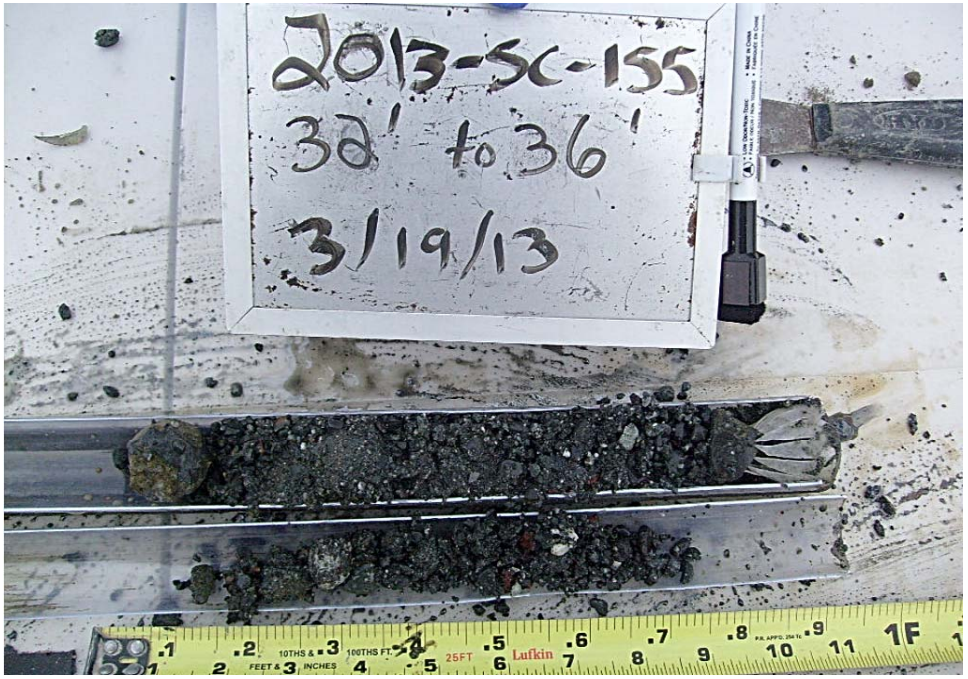

2013-SC-155
20' to 24'
3/19/13
Lufkin


2013-SC-155
24' to 28'
3/19/13


2013-SC-155
28' to 32'
3/19/13


2013 SC 155 20.6 20.8

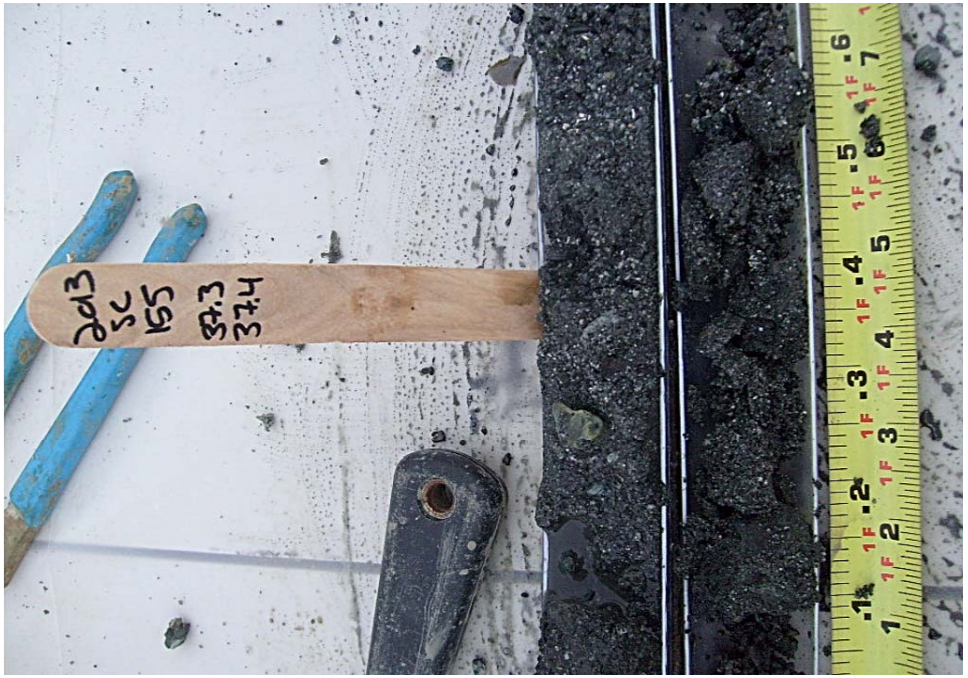

2013 SC 155 24.1 24.3

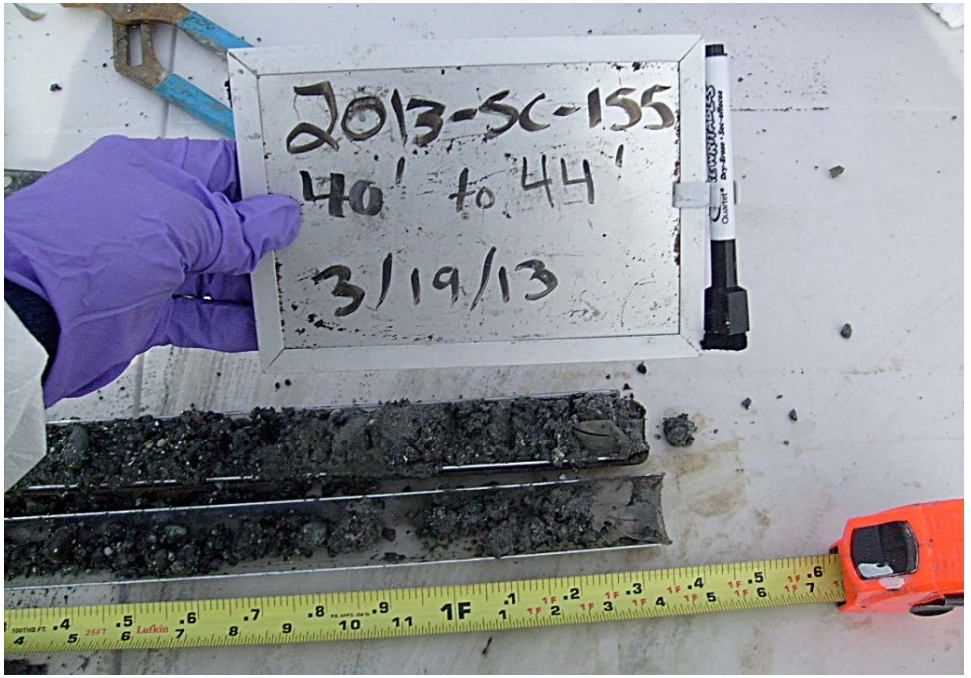

2013-SC-155
32' to 36'
3/19/13


2013-SC-155
36' to 40'
3/19/13

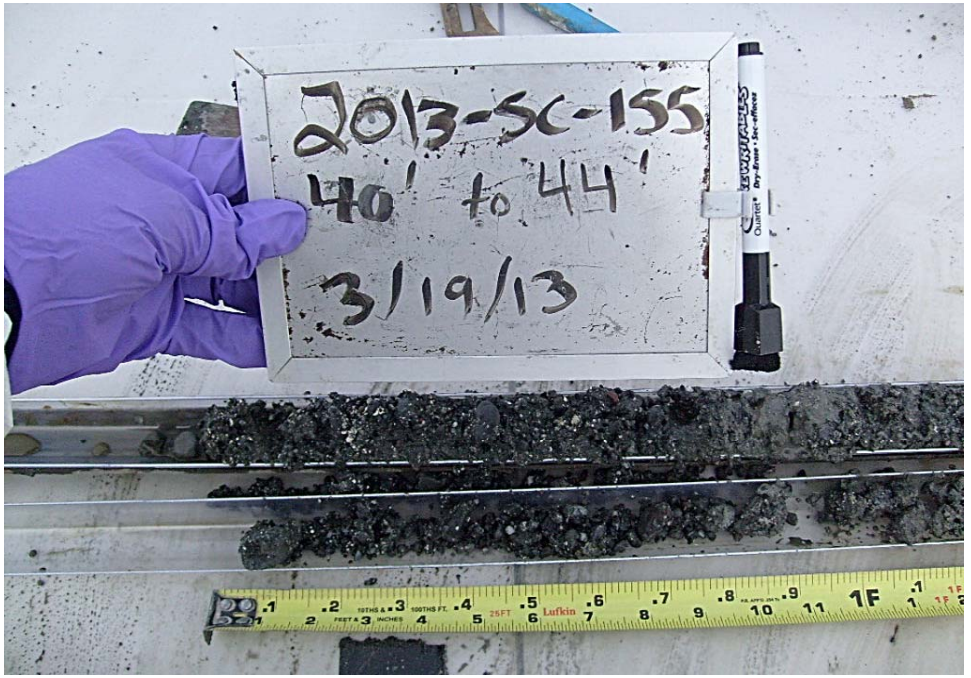

2013
SC
155
28.6
28.8


2013
SC
155
32.4
32.2

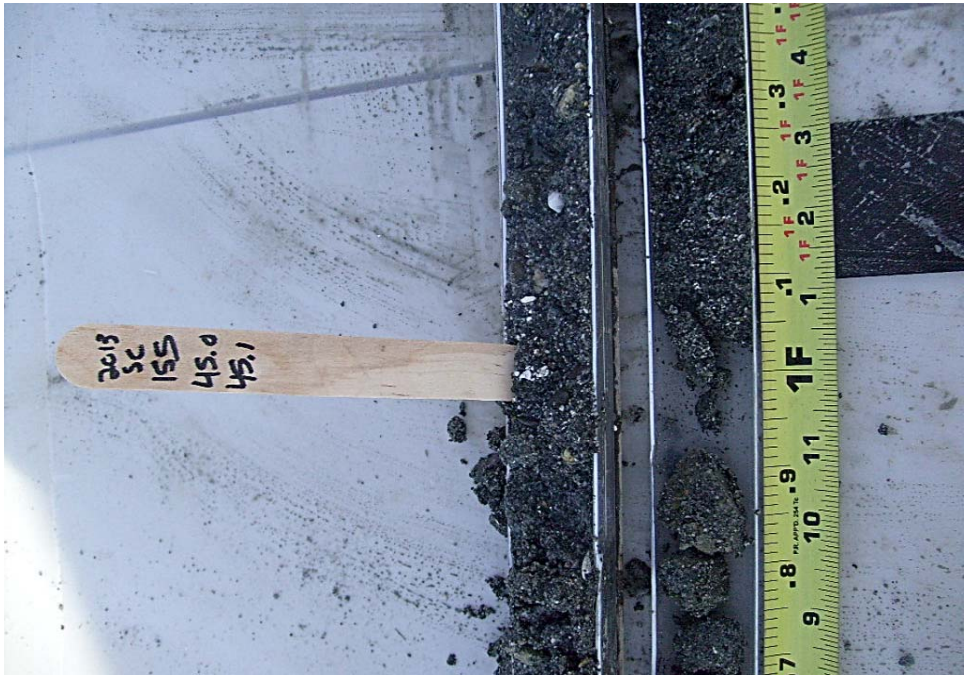

2013
SC
155
37.3
37.4

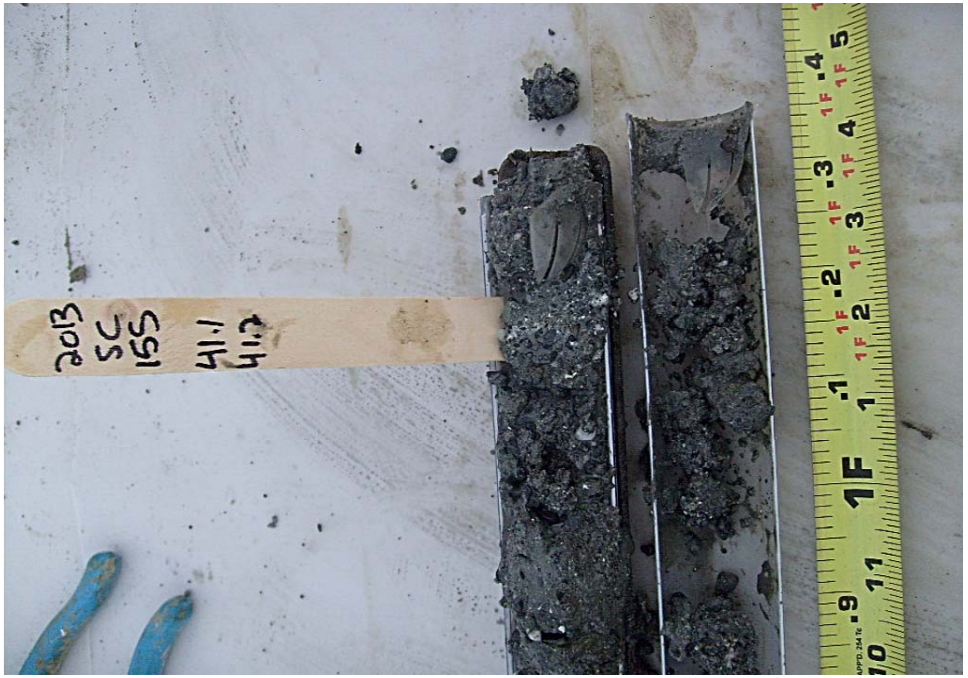

2013-SC-155
40' to 44'
3/19/13

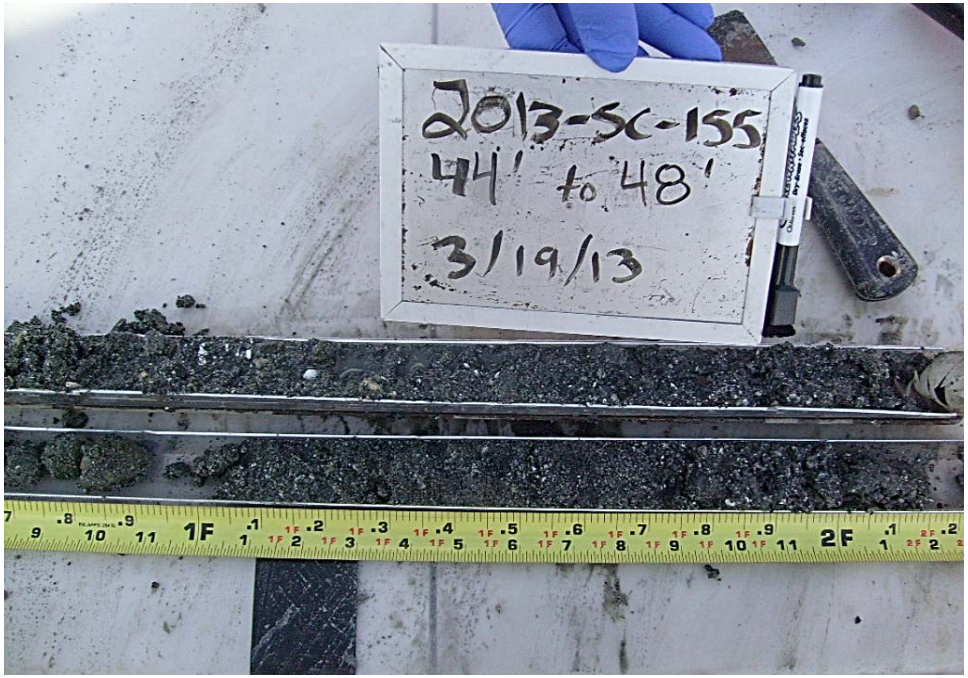

2013-SC-155
36' to 40'
3/19/13

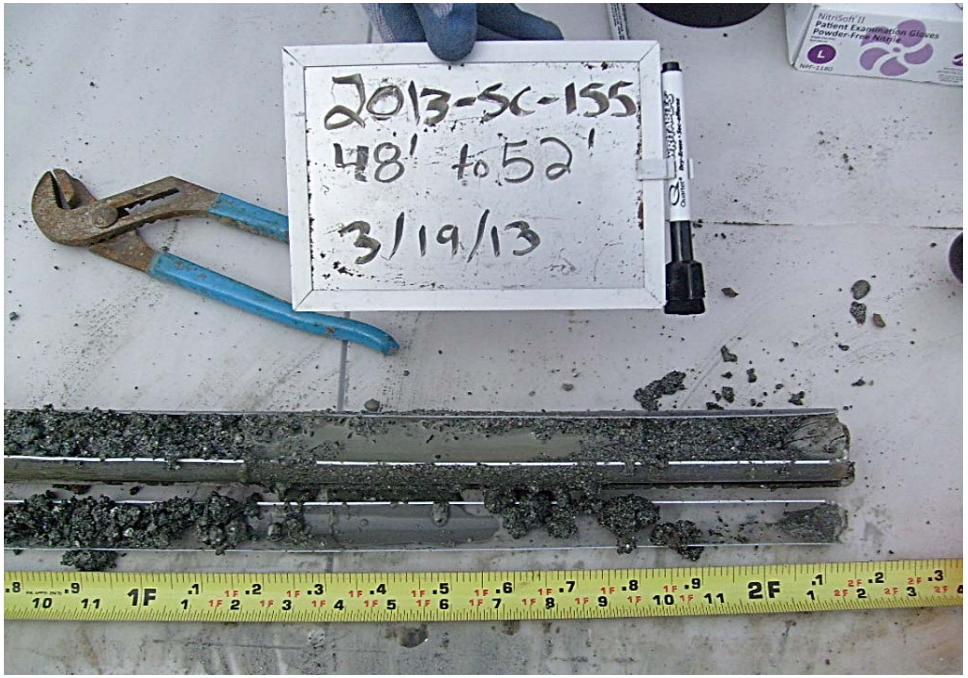

2013-SC-155
40' to 44'
3/19/13

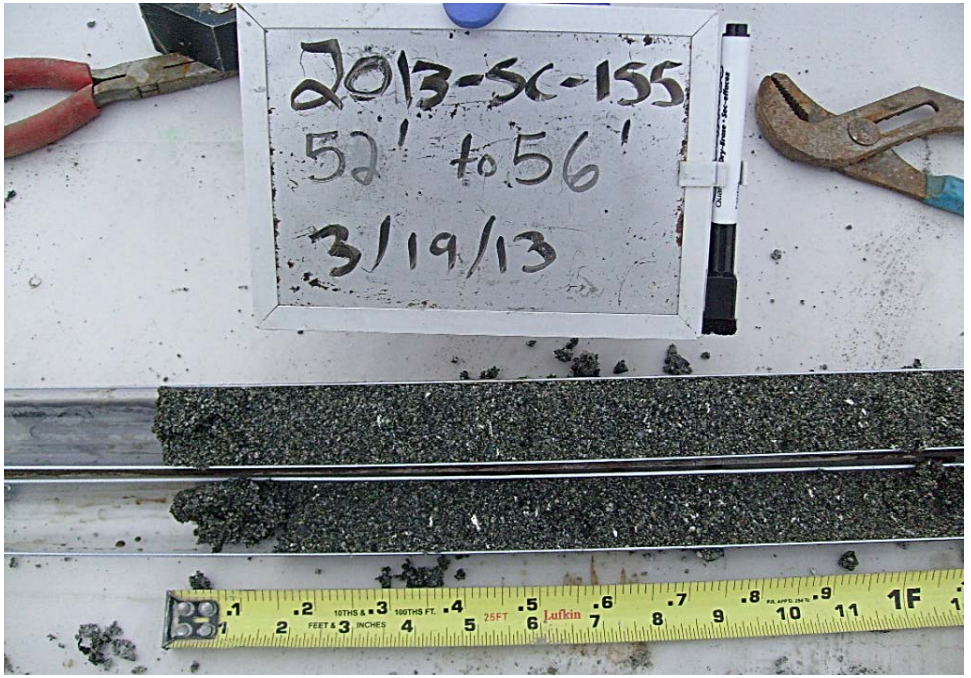

2013-SC-155
44' to 48'
3/19/13

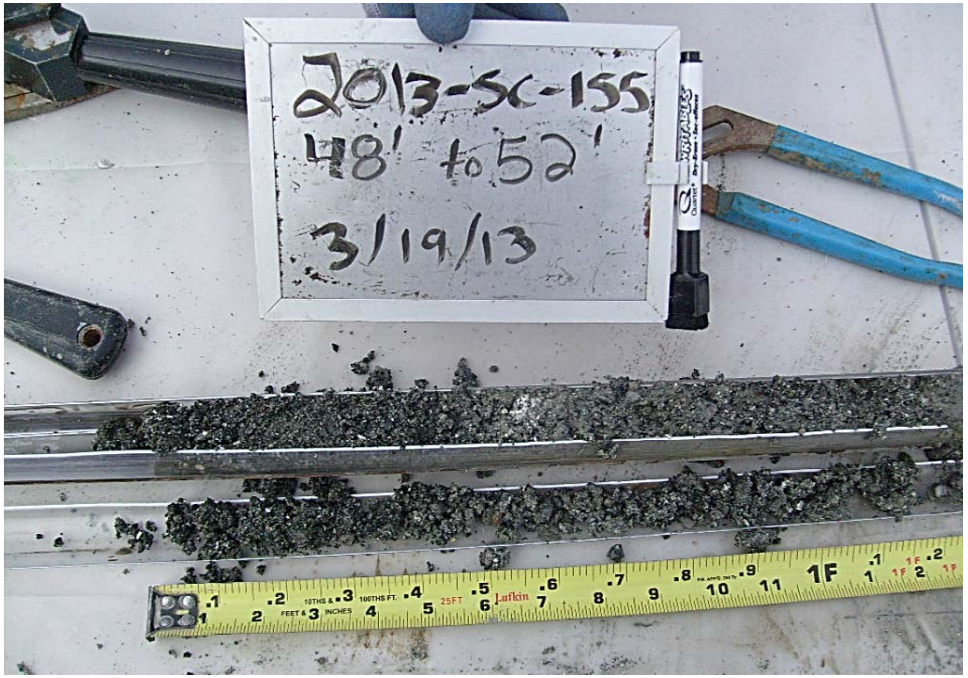

2013
SC
155
45.0
45.1


2013
SC
155
41.1
41.2

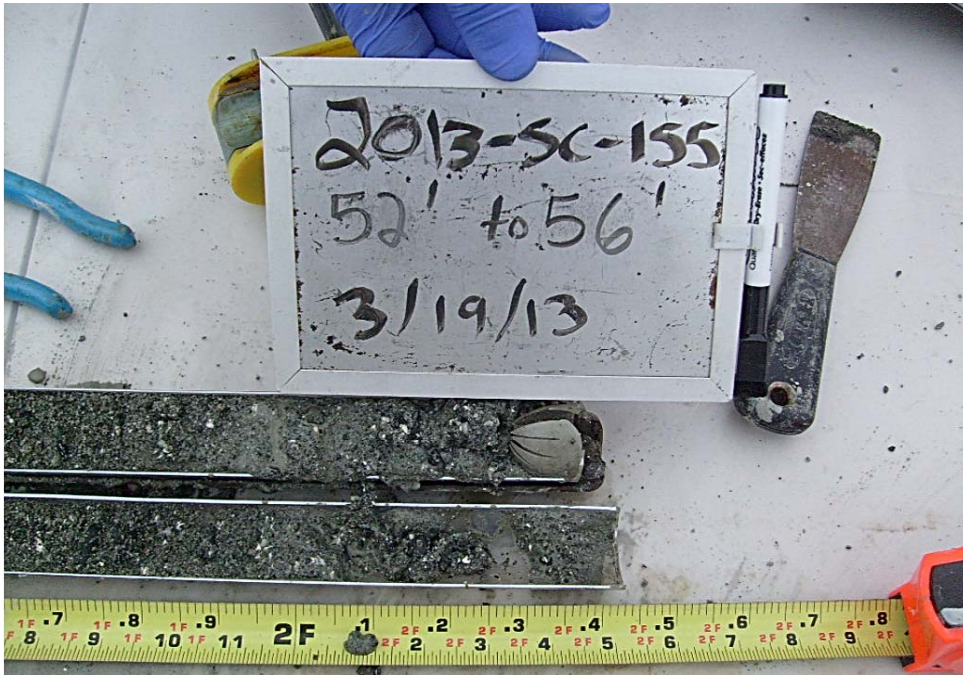

2013-SC-155
44' to 48'
3/19/13


2013-SC-155
48' to 52'
3/19/13


2013-SC-155
52' to 56'
3/19/13


2013-SC-155
48' to 52'
3/19/13

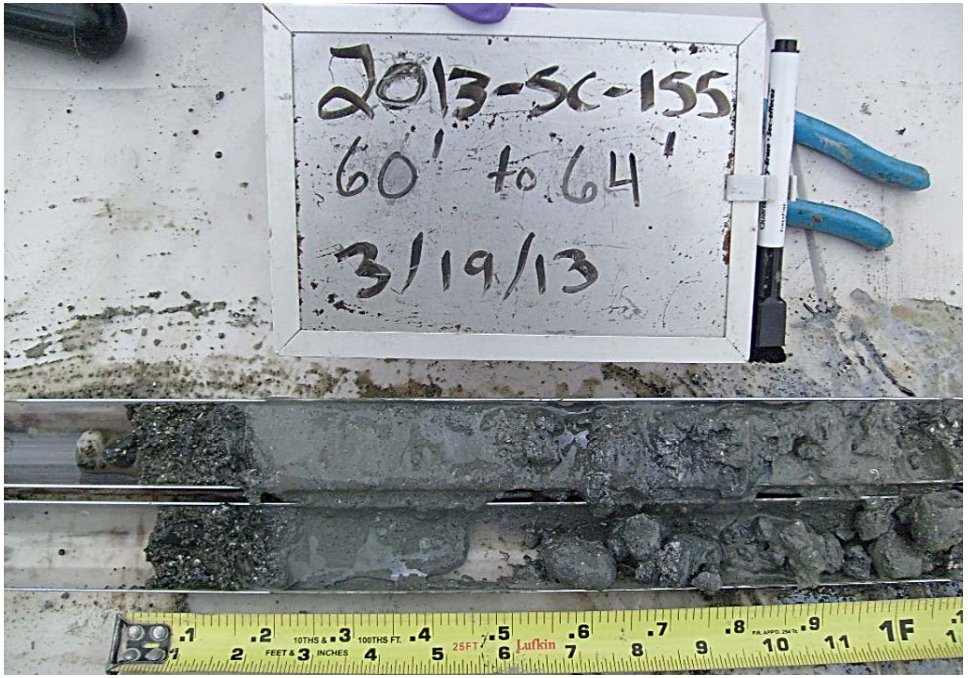

2013
SC
155
49.8
50.0


2013-SC-155
52' to 56'
3/19/13

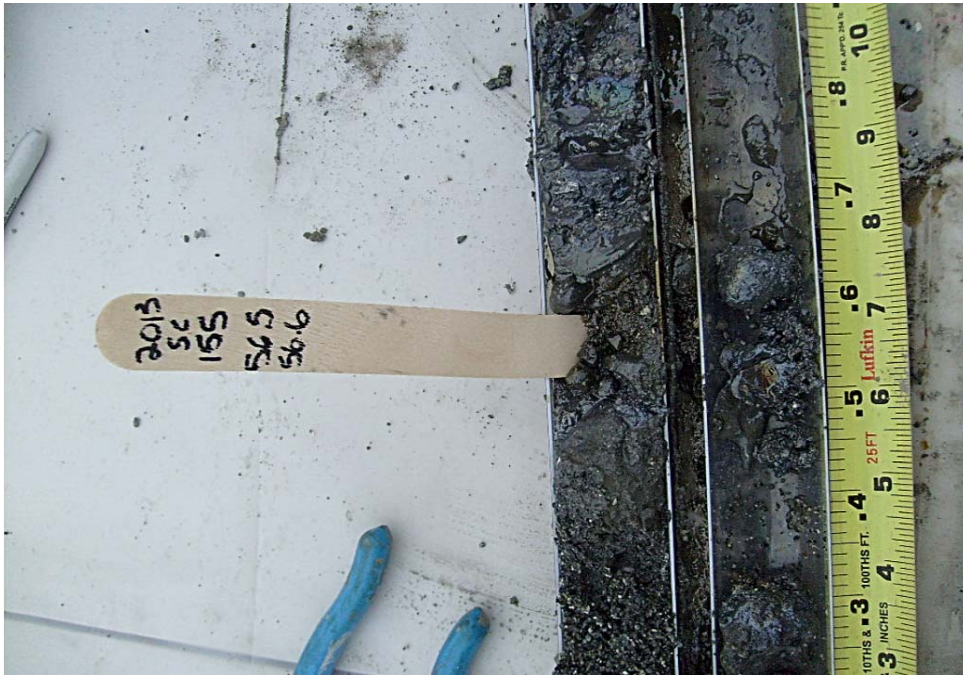

2013-SC-155
56' to 60'
3/19/13

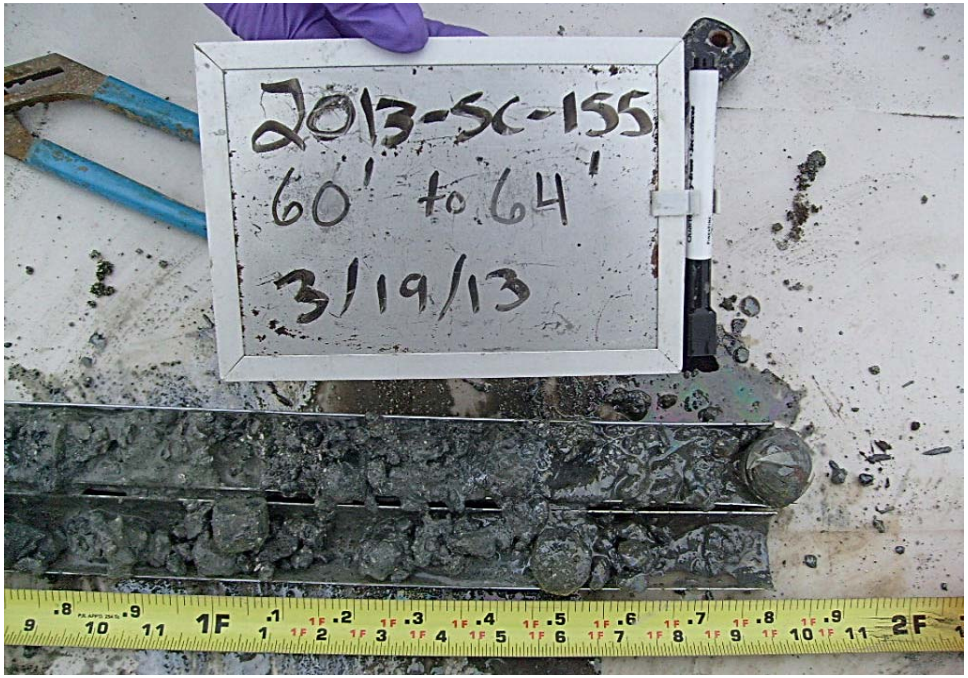

2013-SC-155
52' to 56'
3/19/13


2013
SC
155
53.0
53.2


2013-SC-155
60' to 64'
3/19/13
Lufkin


2013
SC
155
61.5
61.6


2013
SC
155
56.5
56.6
Lufkin


2013-SC-155
60' to 64'
3/19/13


2013-SC-155
68' to 72'
3/19/13


2013-SC-155
68' to 69.7'
3/19/13


2013-SC-155
64' to 68'
3/19/13


2013-SC-155
68' to 69.7'
3/19/13


2013
SC
155
69.0
69.7


2013-SC-013
0' to 4'
3/20/13


2013-SC-155
68' to 69.7'
3/19/13


2013-SC-013
0' to 4'
3/20/13

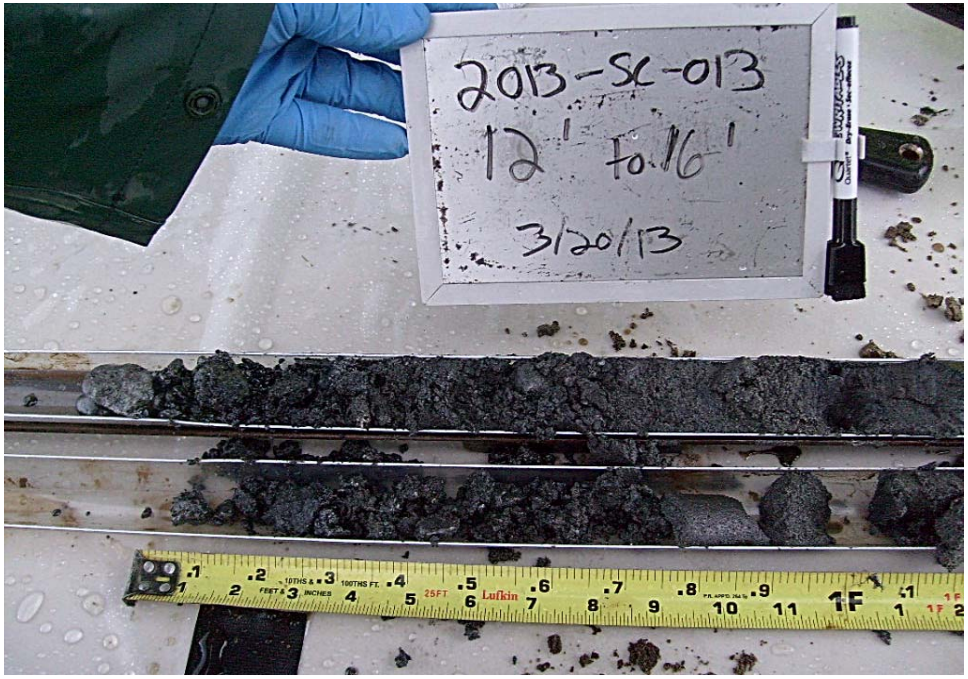

2013
SC
013
1.0
1.2


2013-SC-013
4' to 8'
3/20/13
REWRITABLE

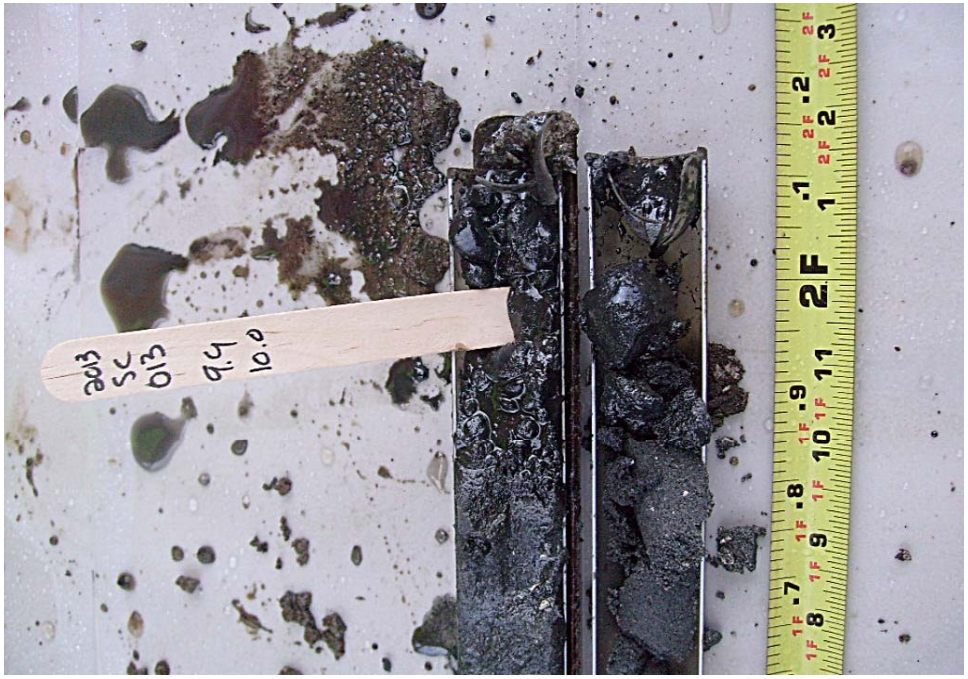

2013-SC-013
4' to 8'
3/20/13
REWRITABLE


2013
SC
013
4.4
4.5
Lufkin


2013-SC-013
8' to 12'
3/20/13


2013-SC-013
12' to 16'
3/20/13


2013-SC-013
8' to 12'
3/20/13

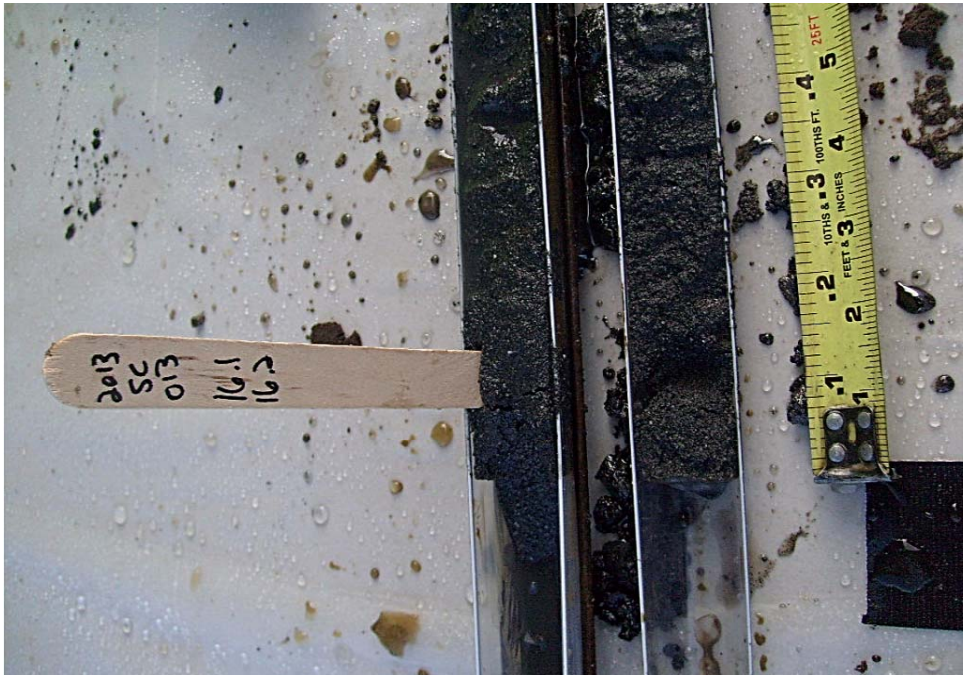

2013
SC
013
9.4
10.0


2013-SC-013
12' To 16'
3/20/13

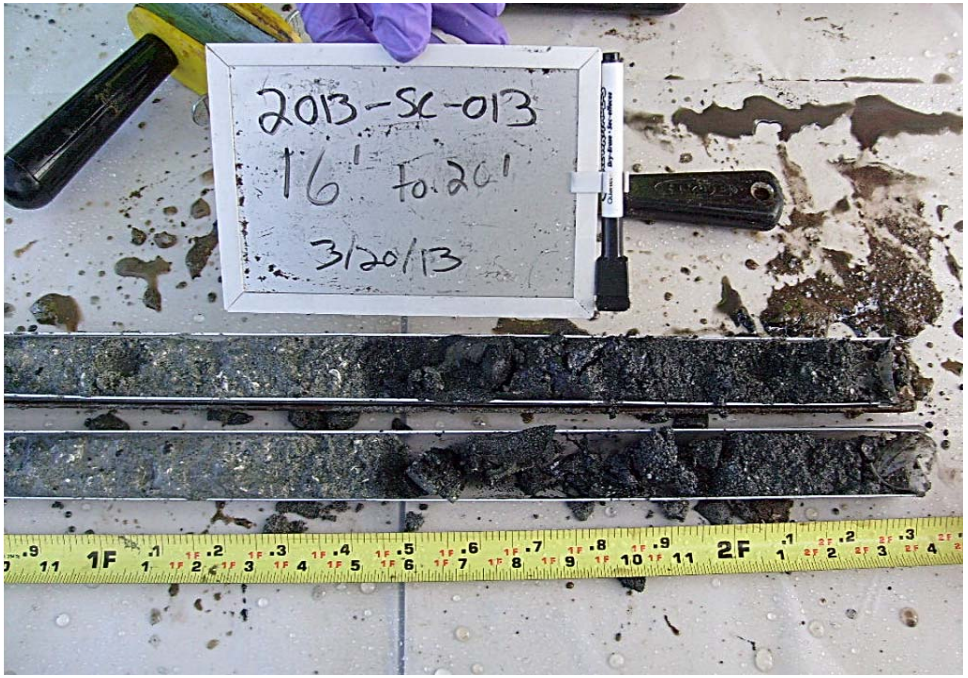

2013-SC-013
16' To 20'
3/20/13


2013-SC-013
12' To 16'
3/20/13




2013
SC
013
16.1
16.2


2013-SC-013
20' To 24'
3/20/13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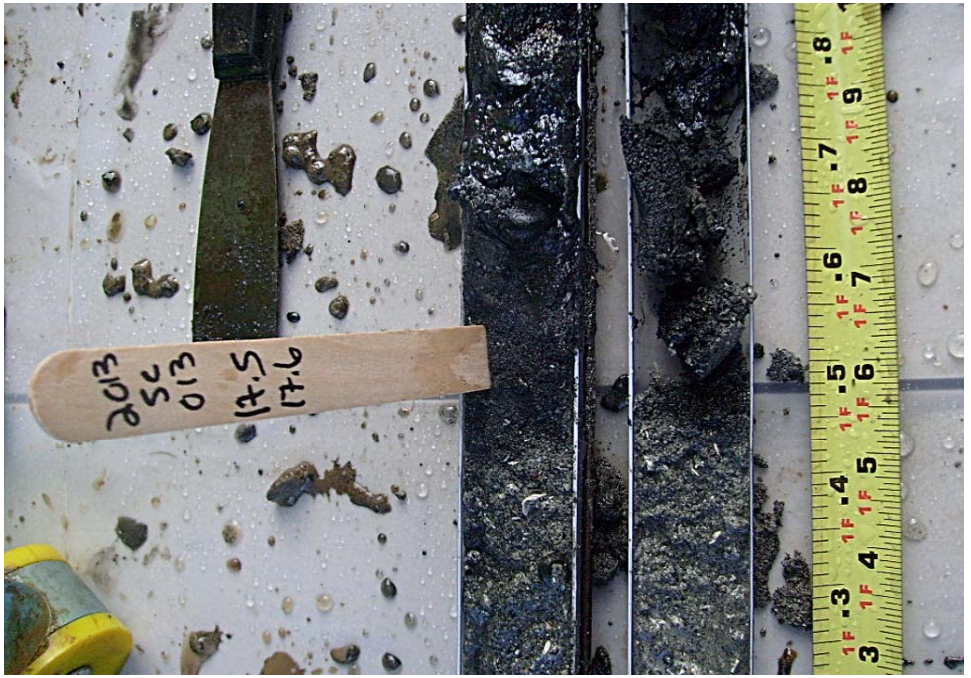
16' To 20'
3/20/13


2013
SC
013
17.5
17.6


2013-SC-013
28' To 32'
3/20/13


2013-SC-013
32' To 36'
3/20/13

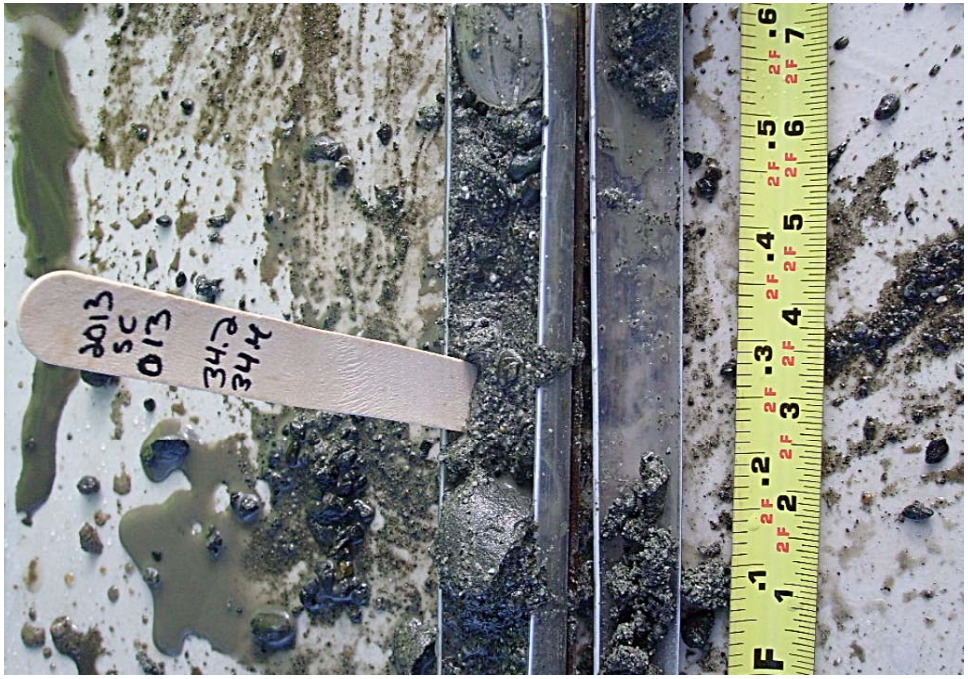

2013-SC-013
24' To 28'
3/20/13


2013
SC
013
28.6
28.8


2013-SC-013
32' To 36'
3/20/13

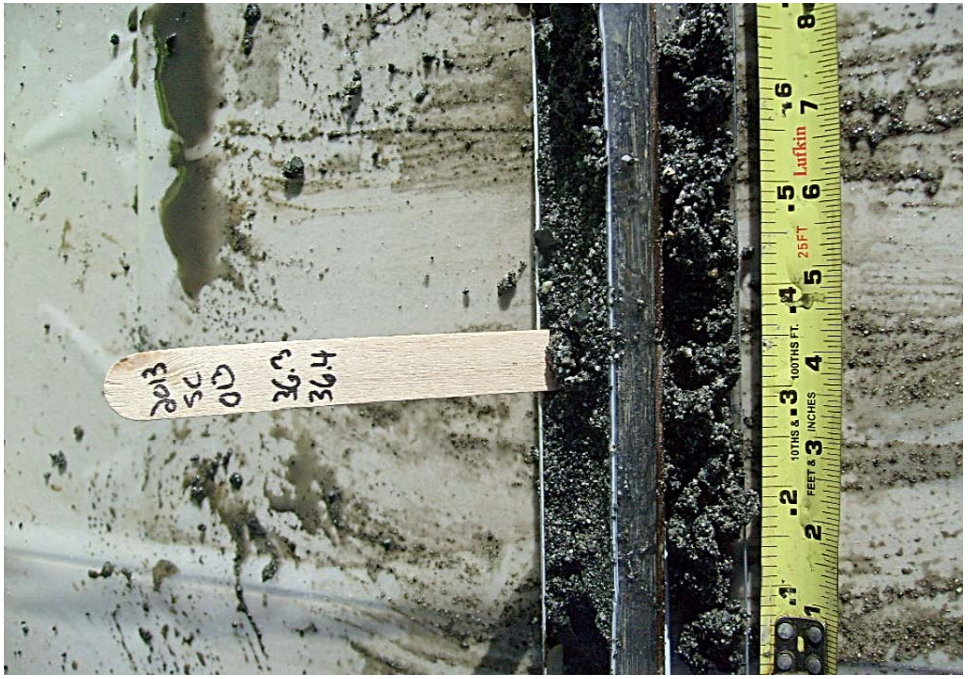

2013-SC-013
3/20/13
36' to 40'

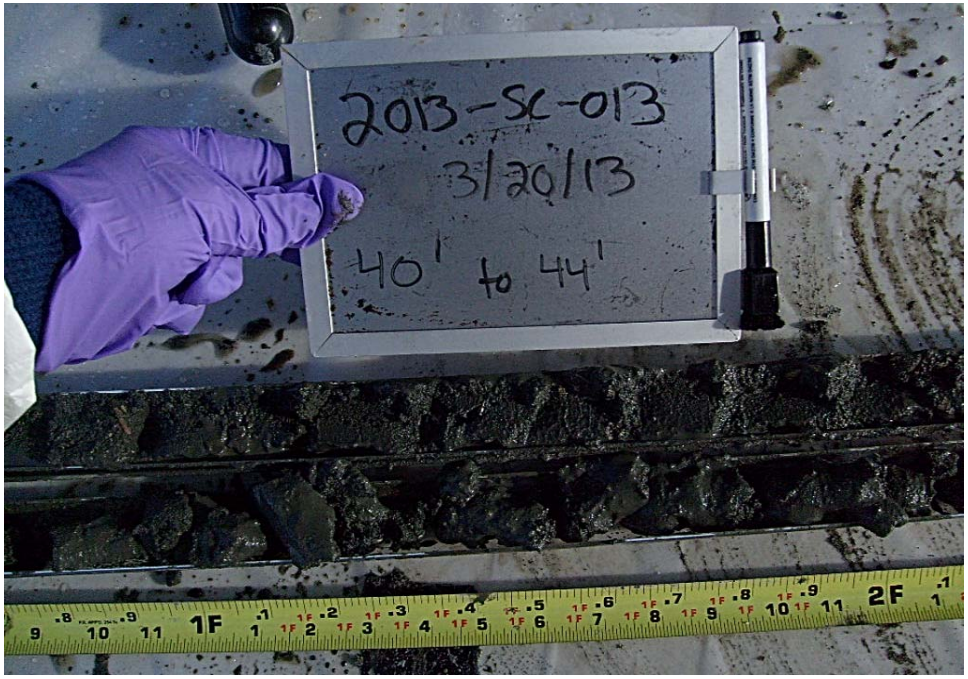

2013-SC-013
32' To 36'
3/20/13


2013
SC
013
34.2
34.4


2013-SC-013
3/20/13
40' to 44'

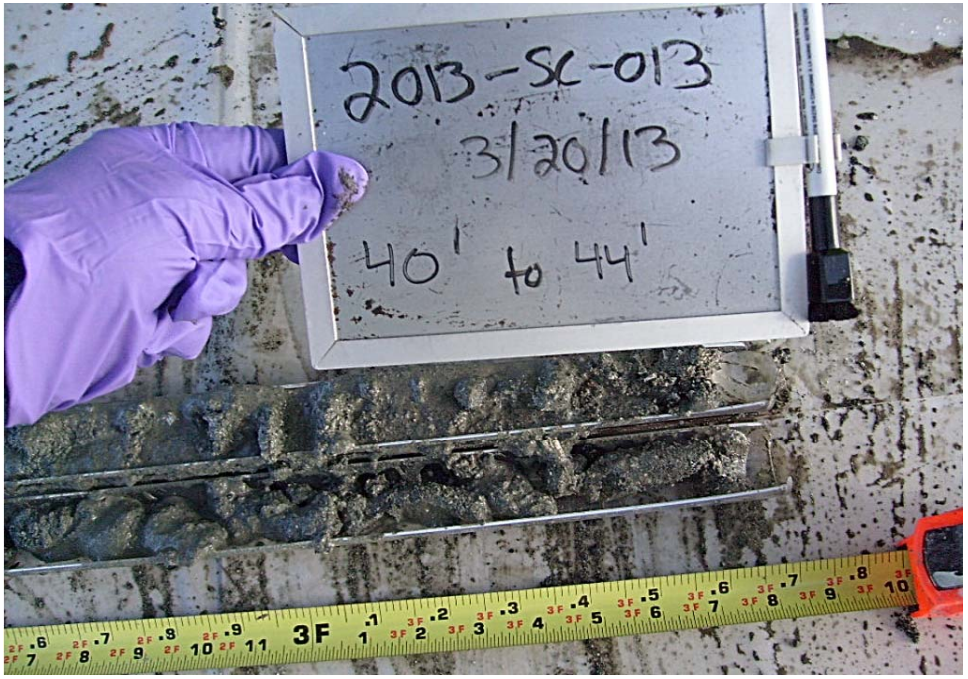

2013-SC-013
3/20/13
40' to 44'


2013
SC
013
36.3
36.4


2013-SC-013
3/20/13
40' to 44'

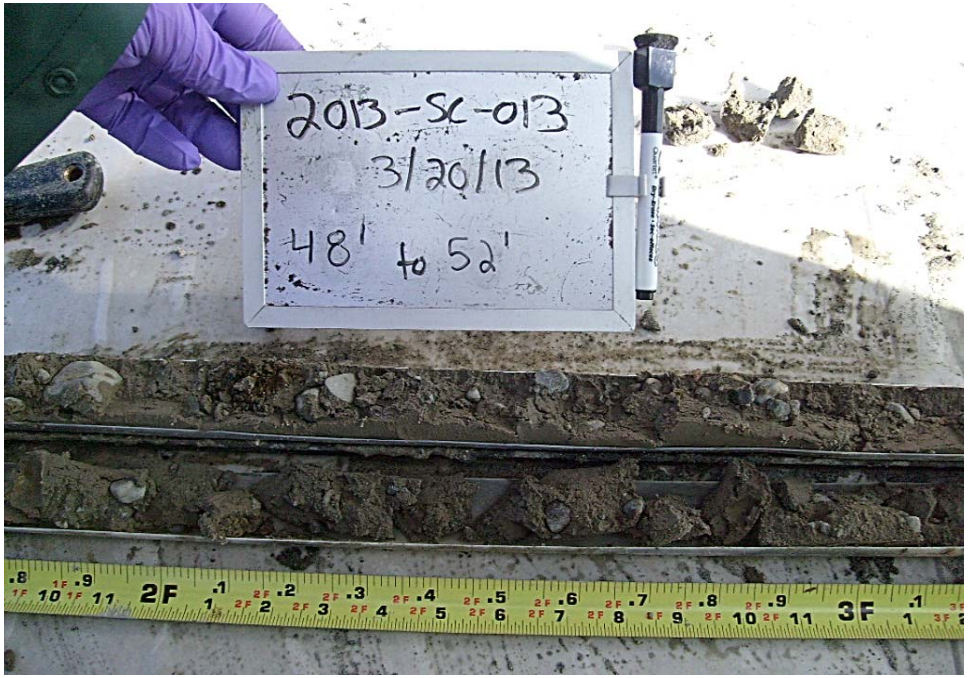

2013
SC
013
43.2
43.3

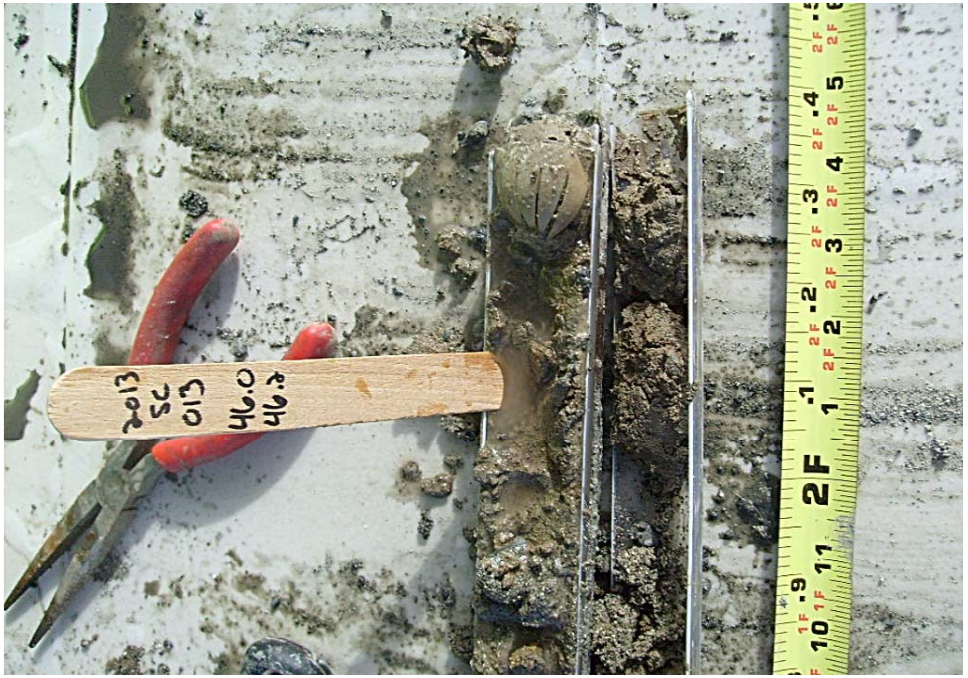

2013-SC-013
3/20/13
44' to 48'


2013-SC-013
3/20/13
40' to 44'


2013-SC-013
3/20/13
44' to 48'

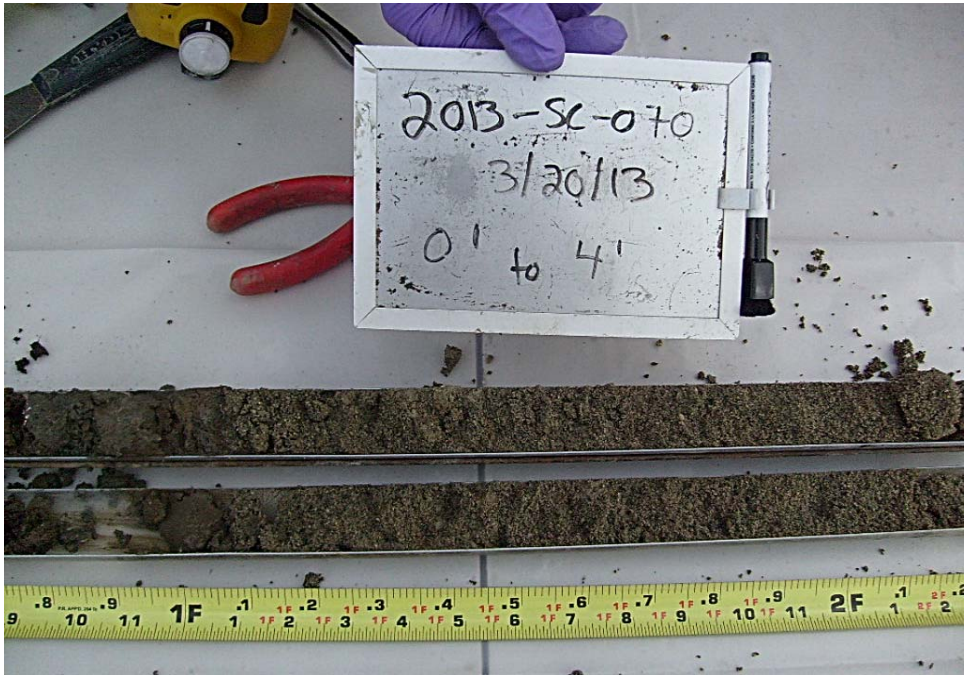

2013-SC-013
3/20/13
48' to 52'


2013-SC-013
3/20/13
48' to 52'

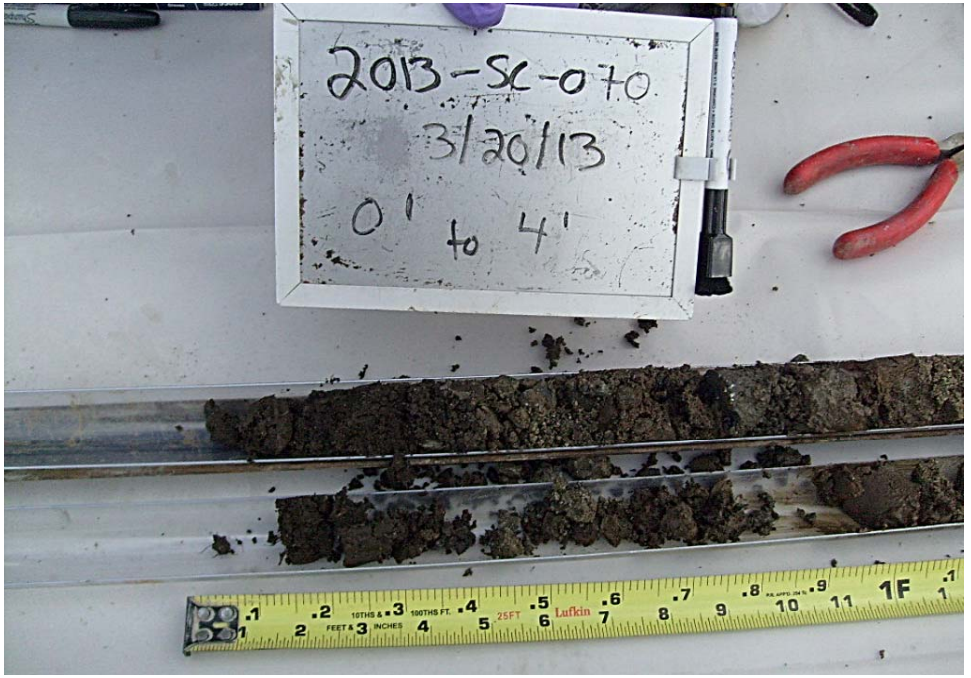

2013
SC
013
46.0
46.4

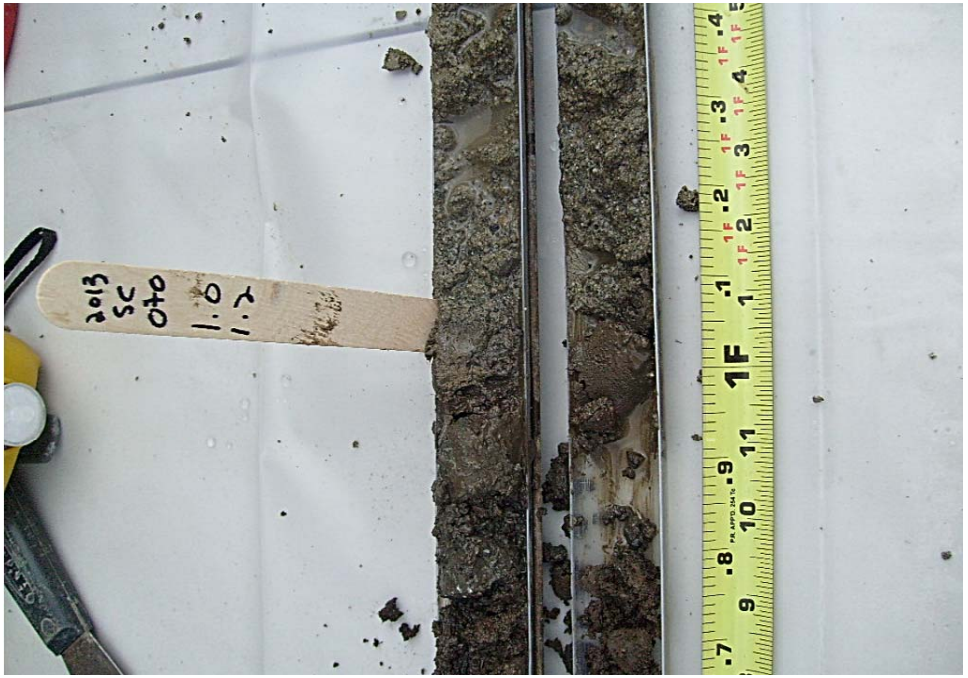

2013-SC-013
3/20/13
48' to 52'


2013
SC
013
49.0
49.7


2013-SC-070
3/20/13
0' to 4'


2013-SC-013
3/20/13
48' to 52'


2013-SC-070
3/20/13
0' to 4'


2013
SC
070
1.0
1.2


2013-SC-070
3/20/13
4' to 8'

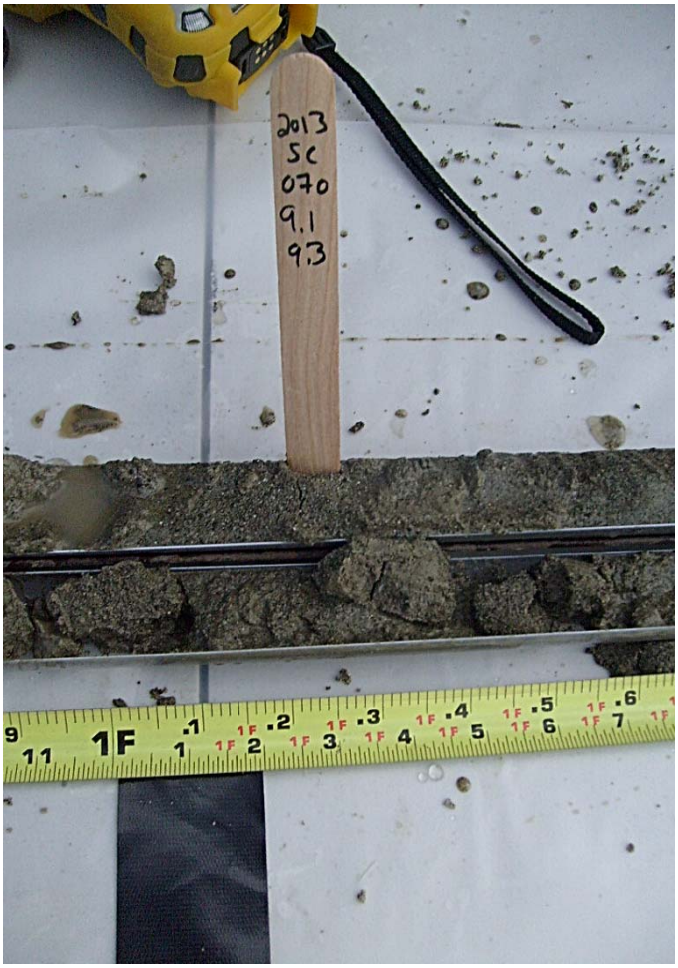

2013-SC-070
3/20/13
0' to 4'

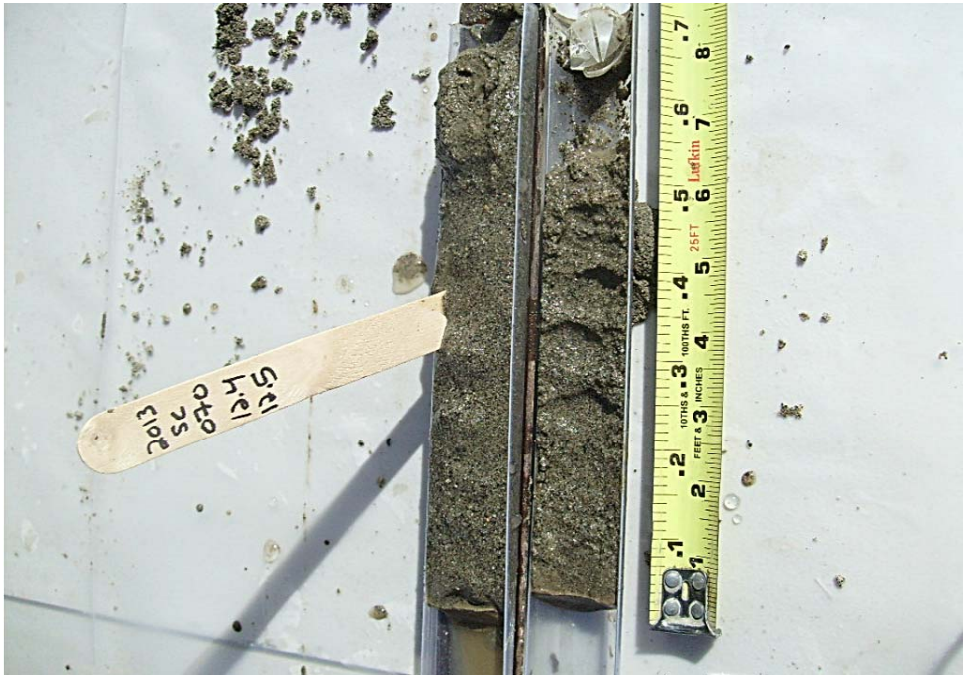

2013-SC-070
3/20/13
4' to 8'


2013
SC
013
4.4
4.5
Lufkin


2013-SC-070
3/20/13
8 to 12
Lufkin

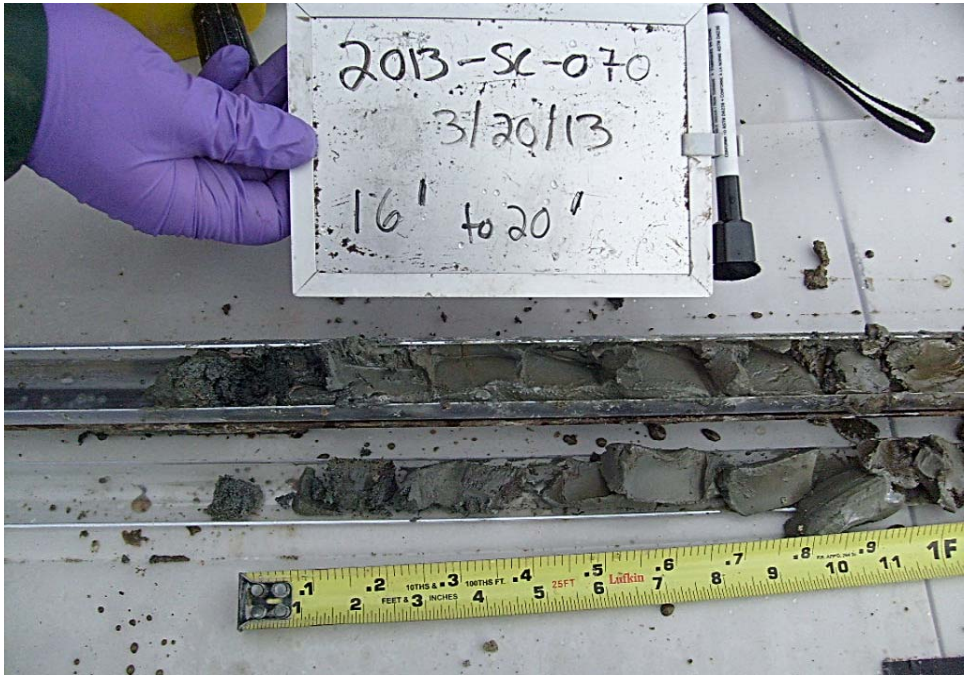

2013-SC-102
3/20/13
8 to 12


2013
SC
070
9.1
9.3
1F


2013
SC
070
12.4
12.5

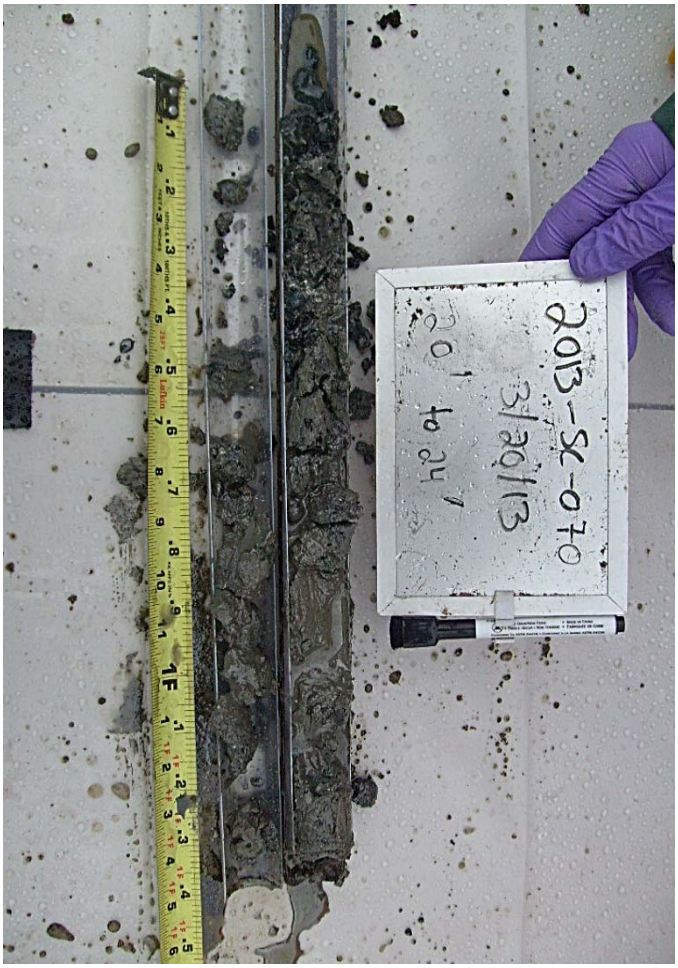

2013-SC-070
3/20/13
16' to 20'


2013-SC-070
3/20/13
12' to 16'

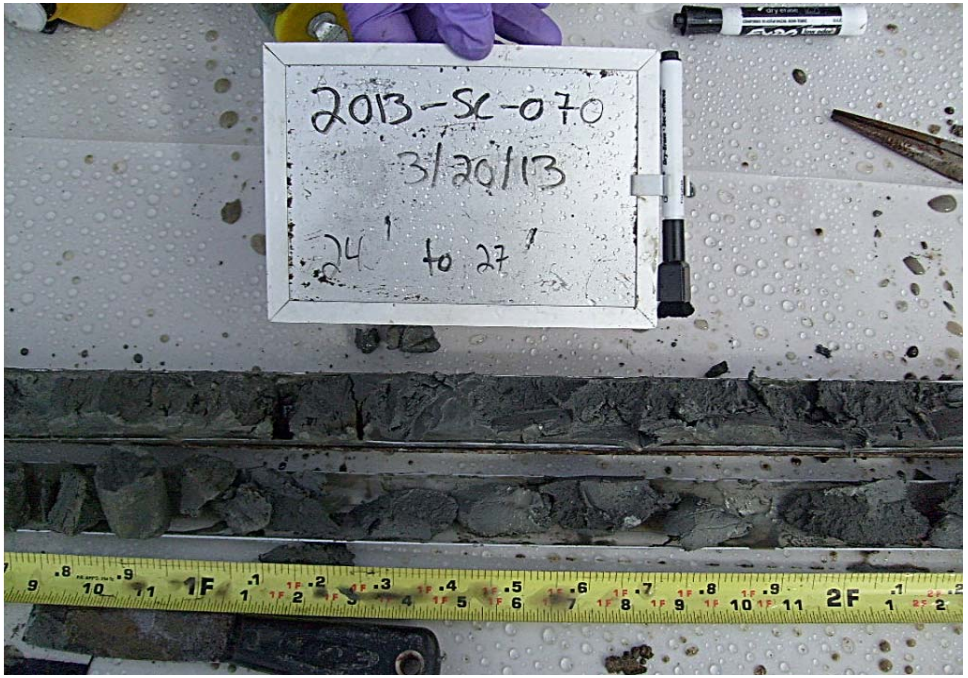

2013-SC-070
3/20/13
16' to 20'

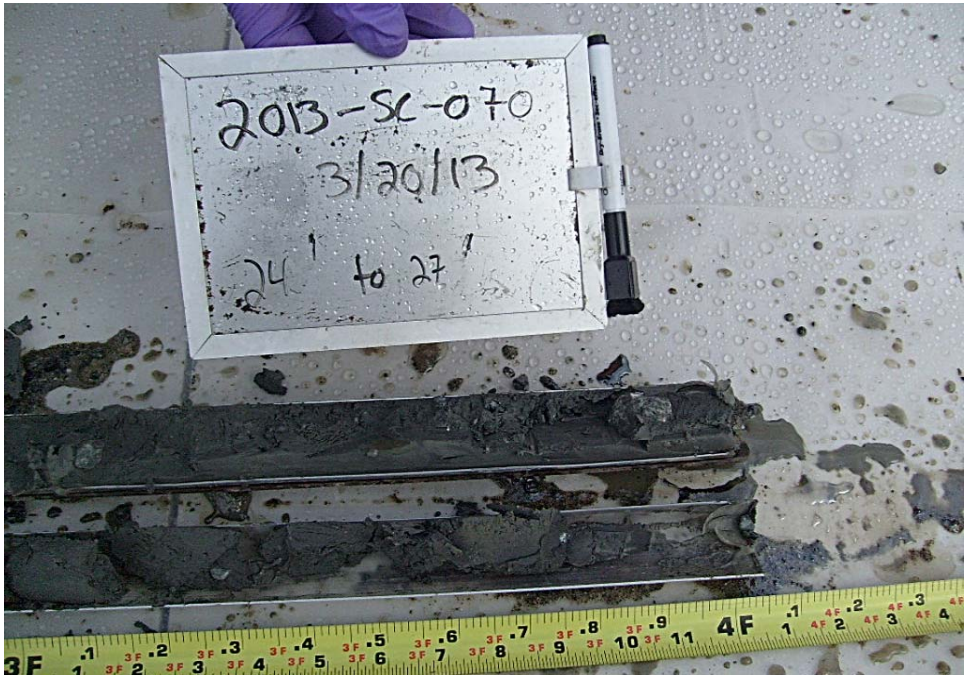

2013
SC
070
16.5
16.6
Lufkin

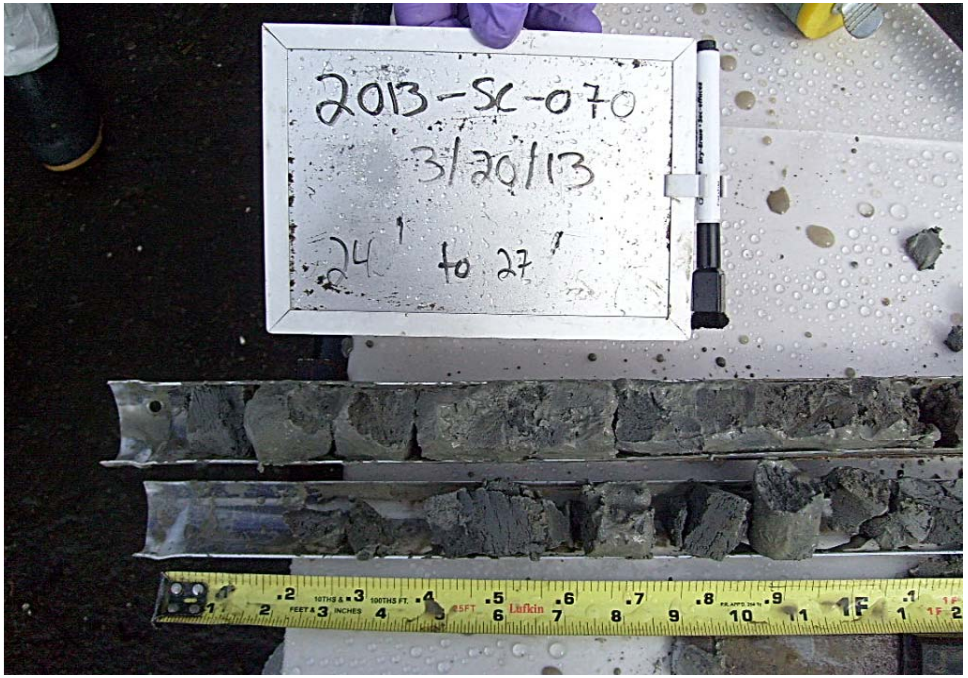

2013
SC
070
17.5
17.6

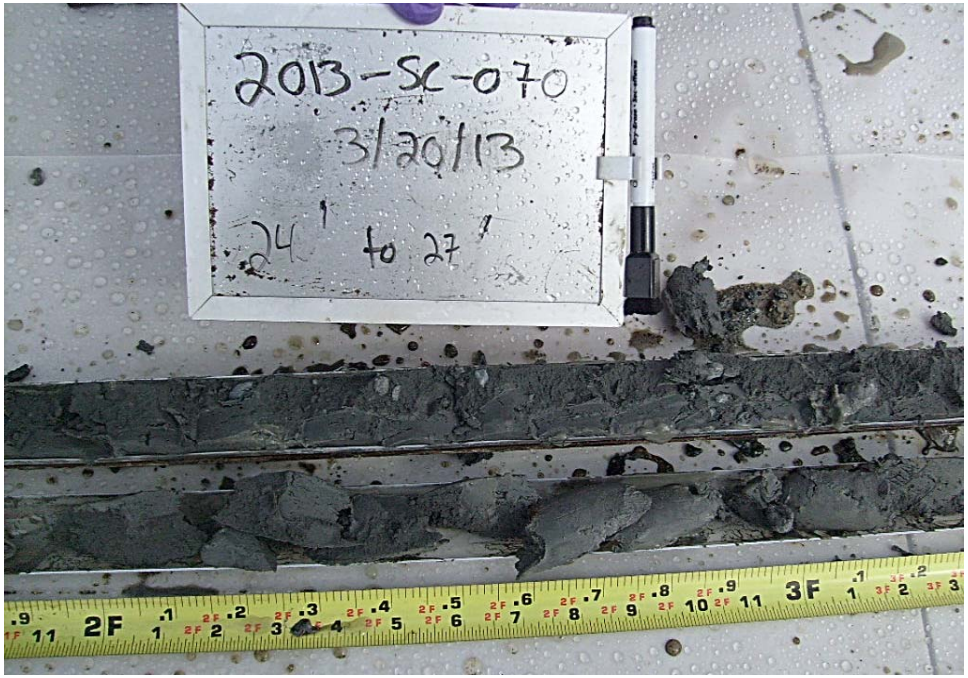

2013-SC-070
3/20/13


2013
SC
070
20.6
20.7
Lufkin

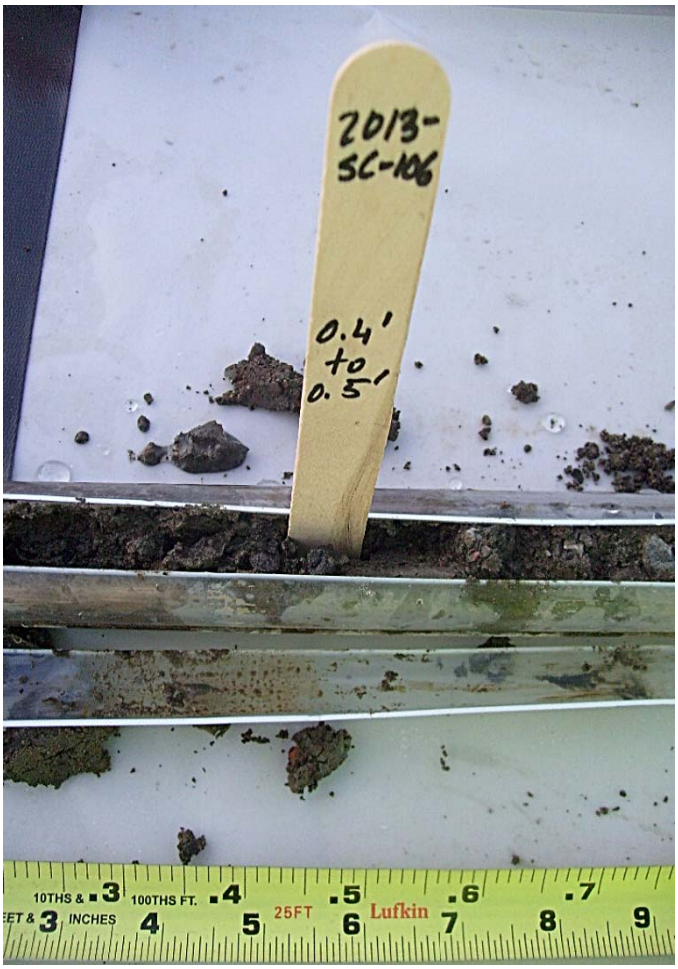

2013-SC-070
3/20/13
24' to 27'

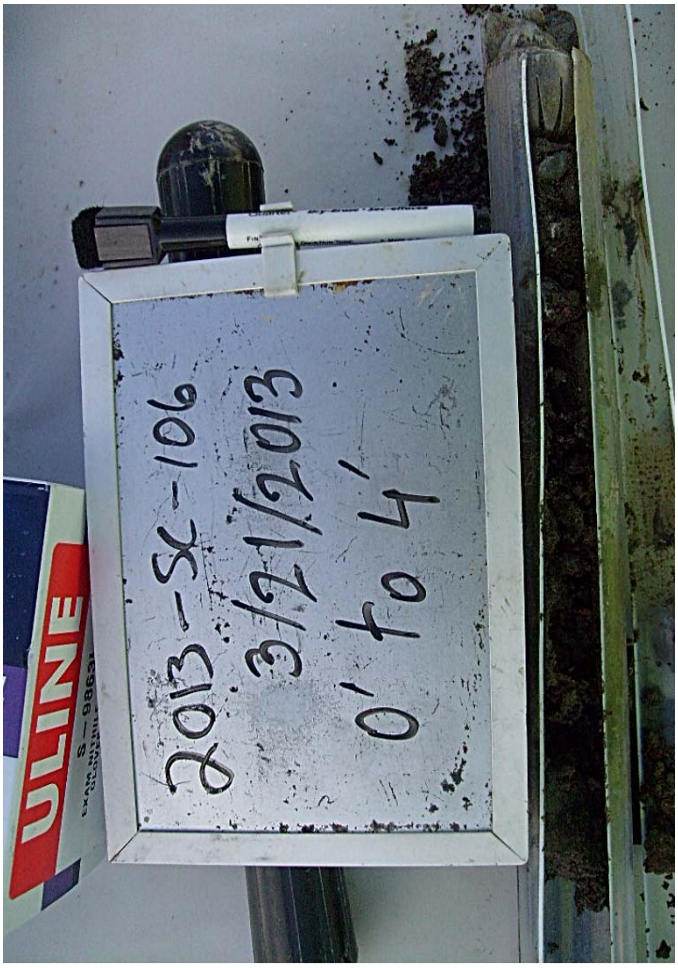

2013-SC-070
3/20/13
24' to 27'

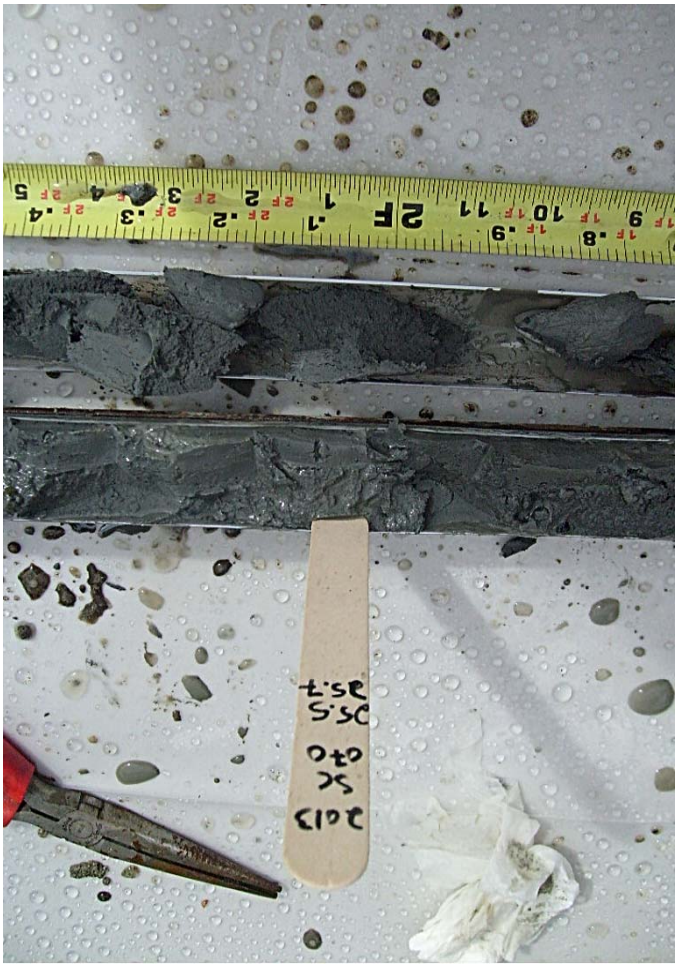

2013-SC-070
3/20/13
24' to 27'


2013-SC-070
3/20/13
24' to 27'

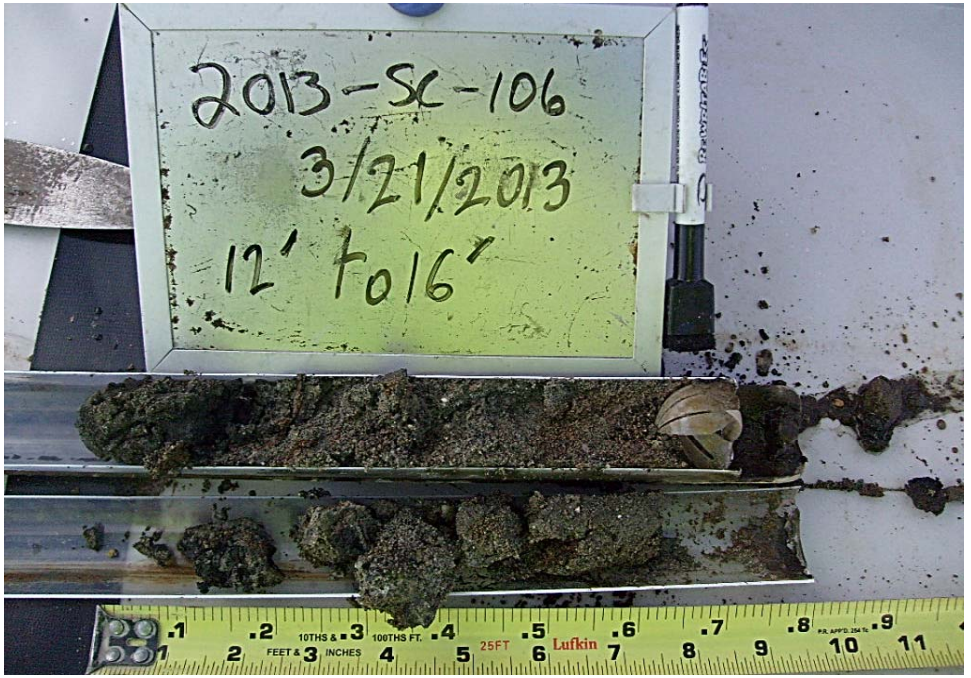

2013-SC-106
3/21/2013
4' to 8'


2013-
SC-106
0.4'
to
0.5'
Lufkin

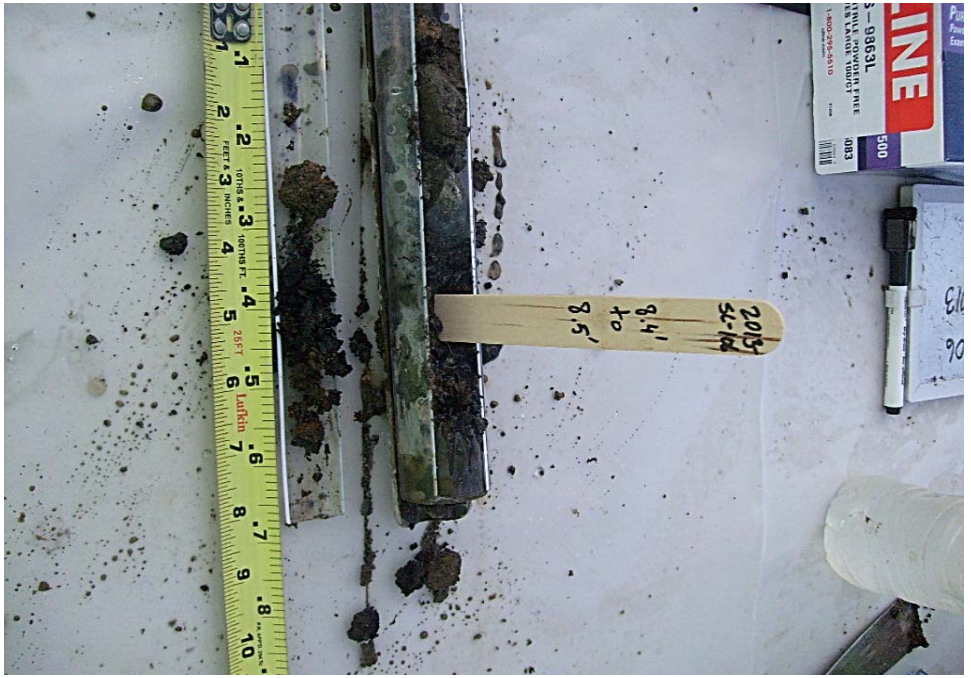

2013-SC-106
3/21/2013
0' to 4'
ULINE

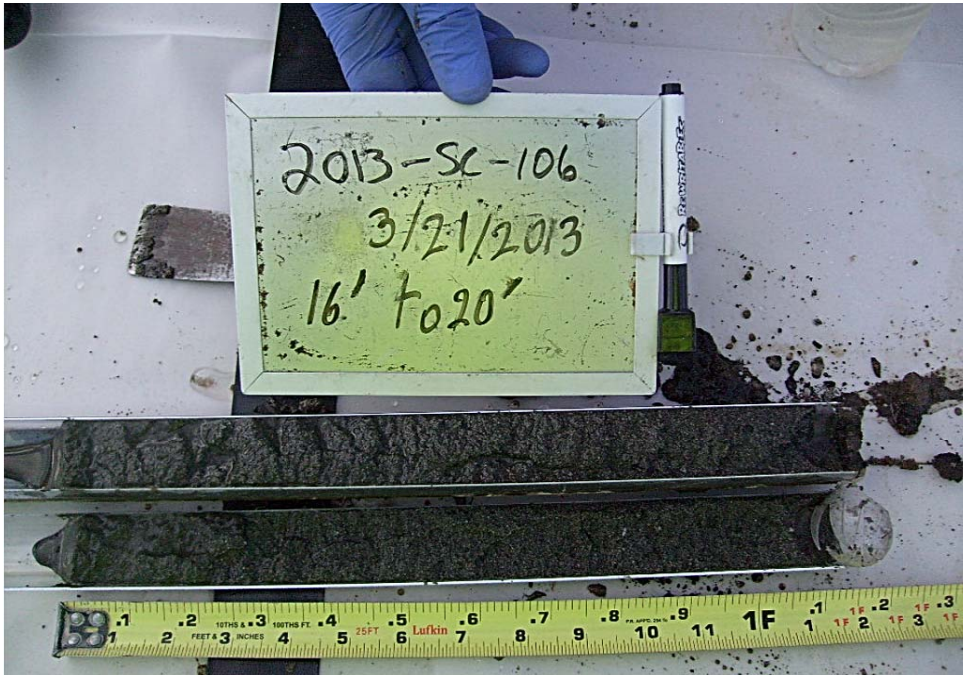

2013
SC
0.5
0.4

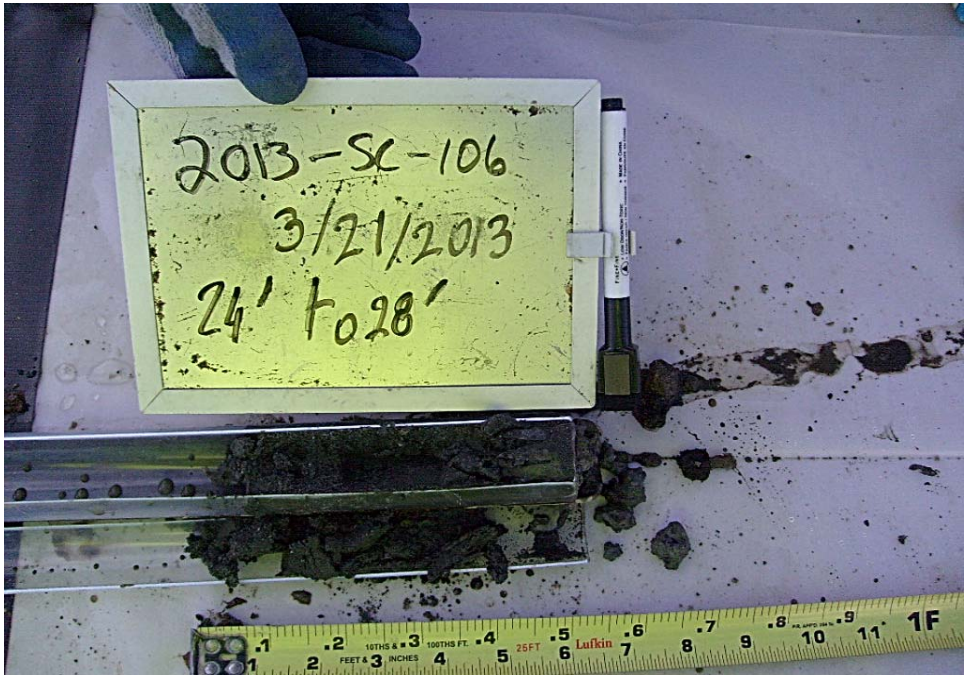

2013-SC-106
3/21/2013
8' to 12'


2013-SC-106
3/21/2013
12' to 16'

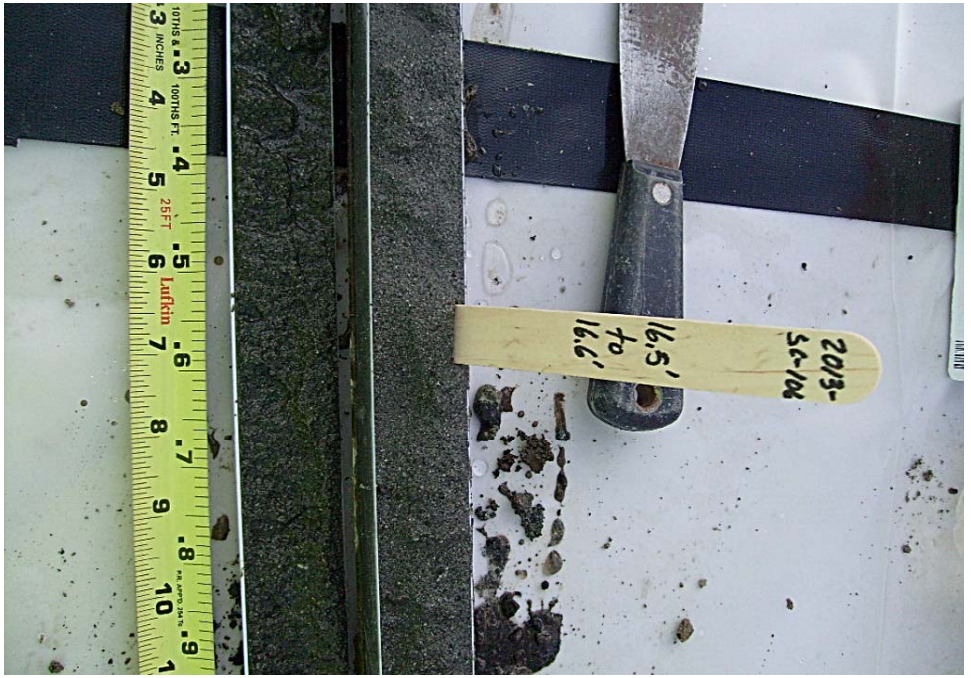

2013-SC-106
4.3' to 4.4'

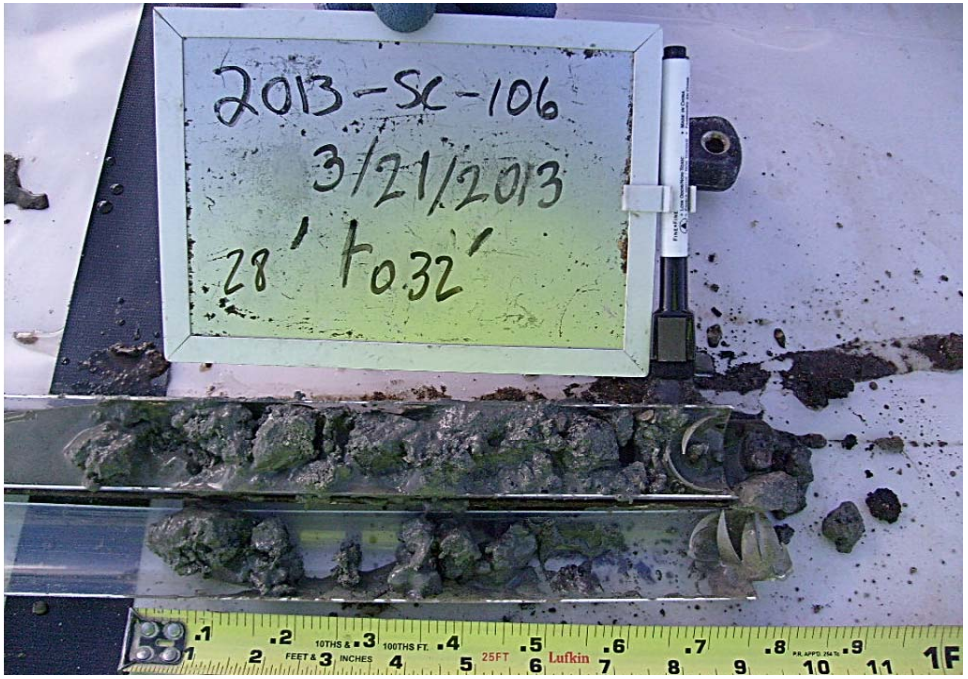

2013-SC-106
8.4' to 8.5'

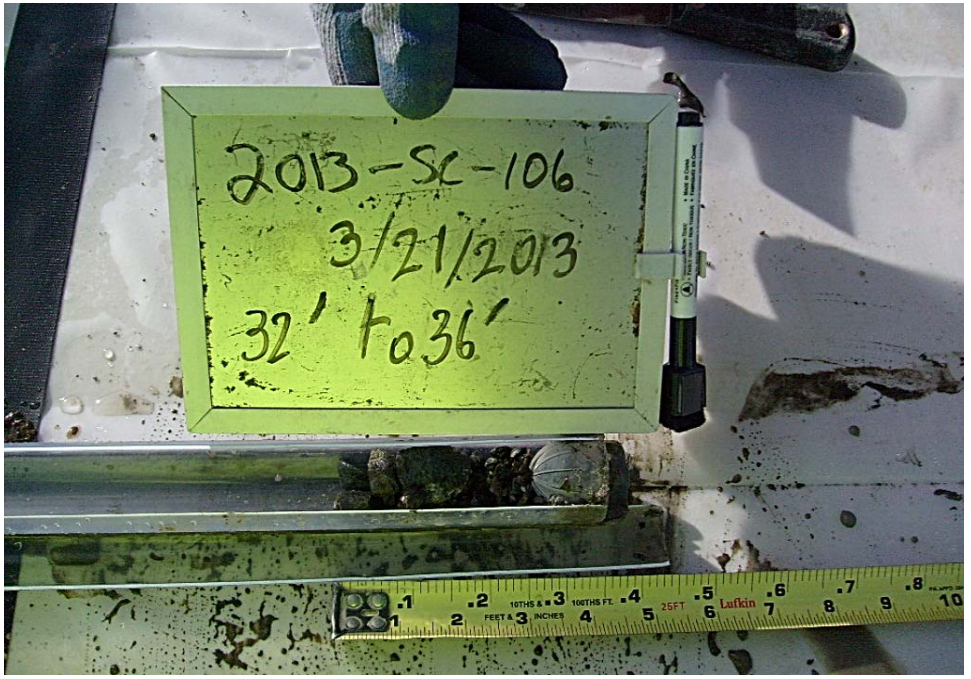

2013-SC-106
3/21/2013
16' to 20'

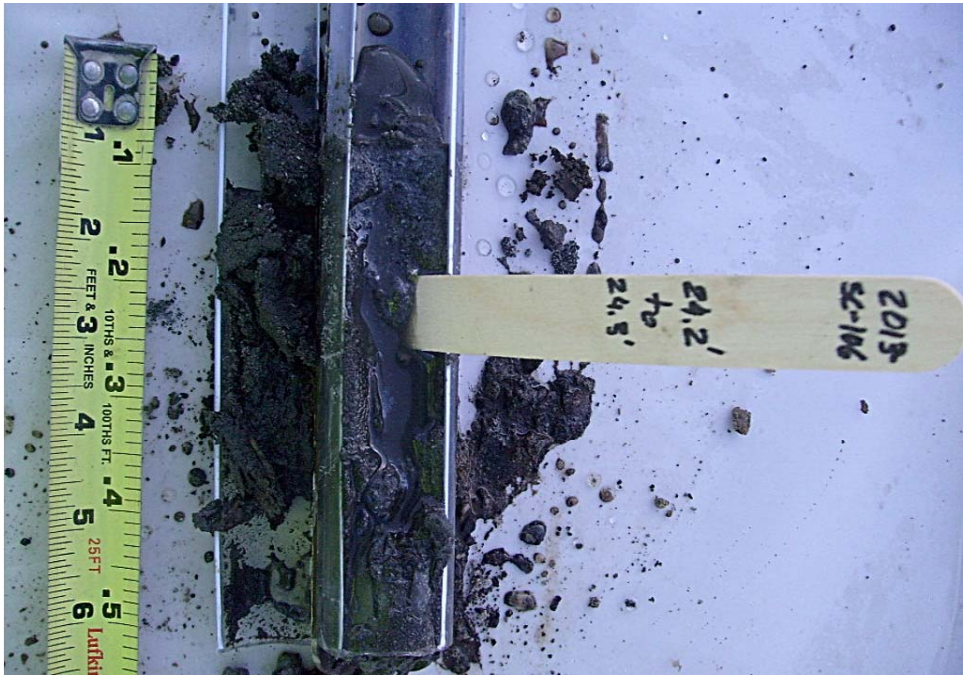

2013-SC-106
3/21/2013
24' to 28'


2013-SC-106
124' to 125'

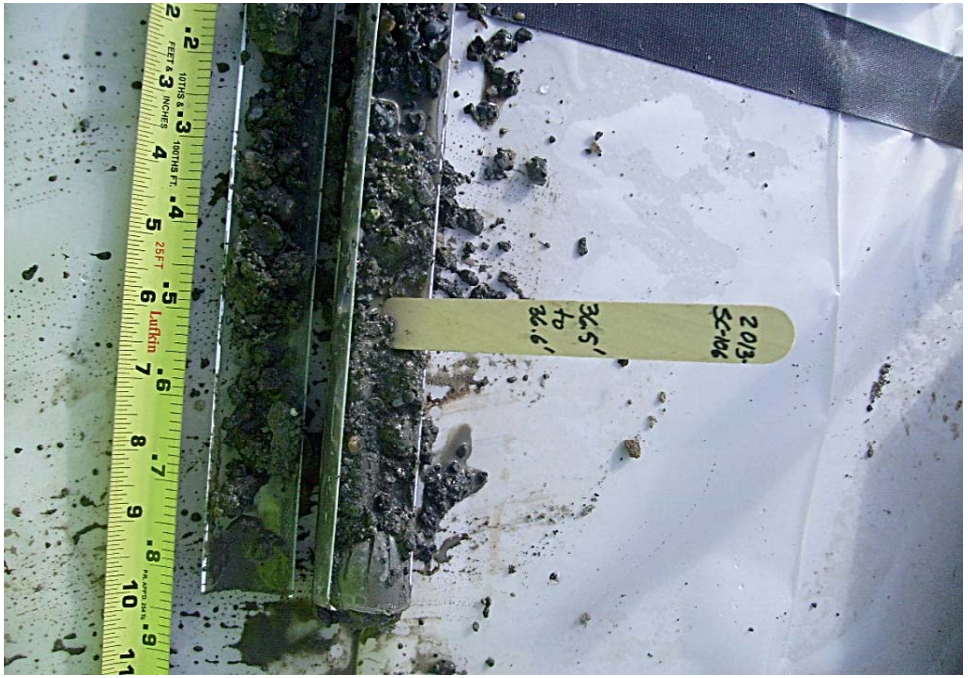

2013-SC-106
16.5' to 16.6'


2013-SC-106
3/21/2013
28' to 32'


2013-SC-106
3/21/2013
32' to 36'


2013
SC-106
24.2'
to
24.5'

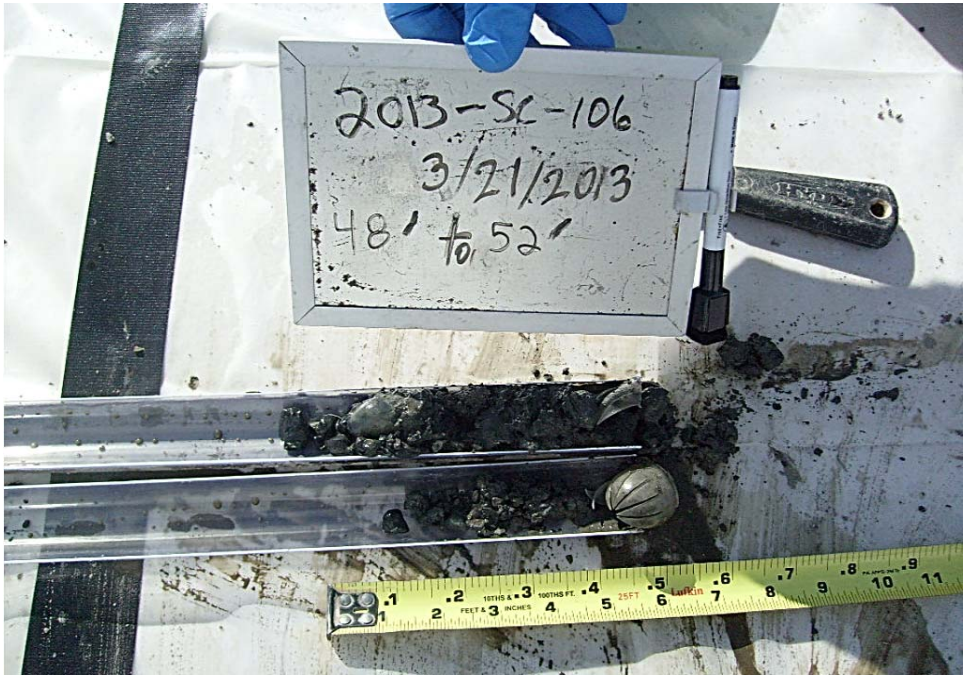

2013-
SC-106
28.4'
to
28.5'


2013-SC-106
36.5'
to
36.6'

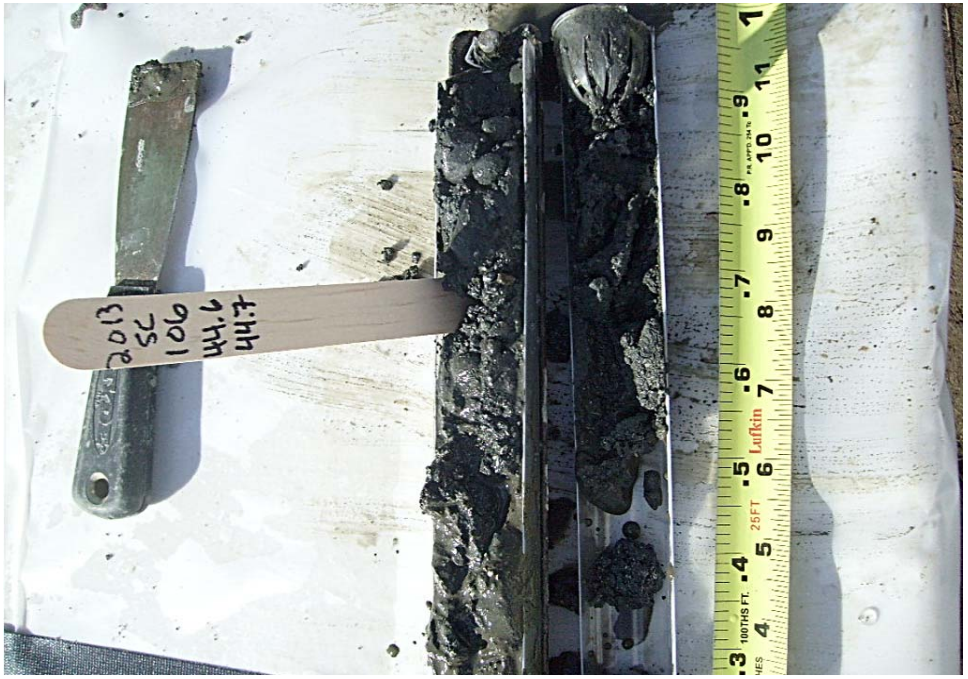

2013-SC-106
3/21/2013
44' to 48'


2013-SC-106
3/21/2013
36' to 40'

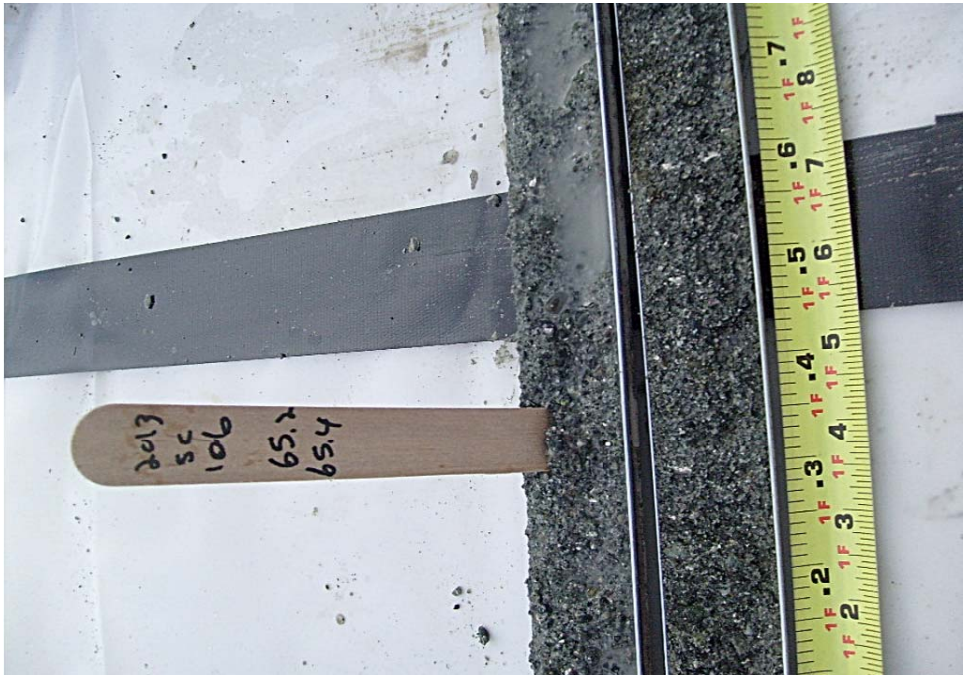

2013-SC-106
3/21/2013
40' to 44'


2013-SC-106
3/21/2013
48' to 52'

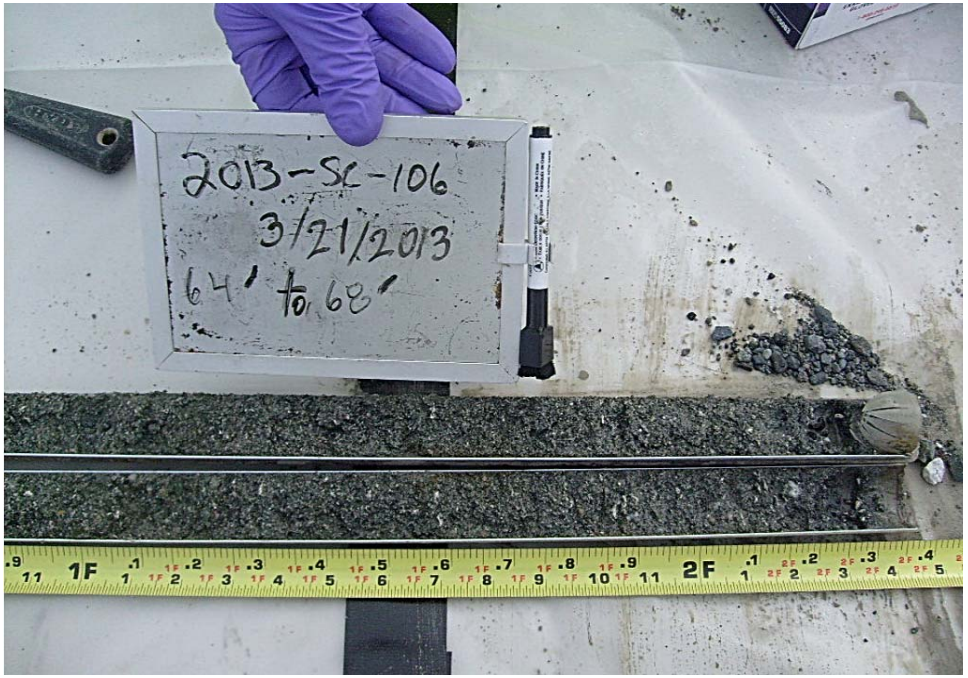

2013-SC-106
3/21/2013
64' to 68'


2013
SC
106
44.6
44.7

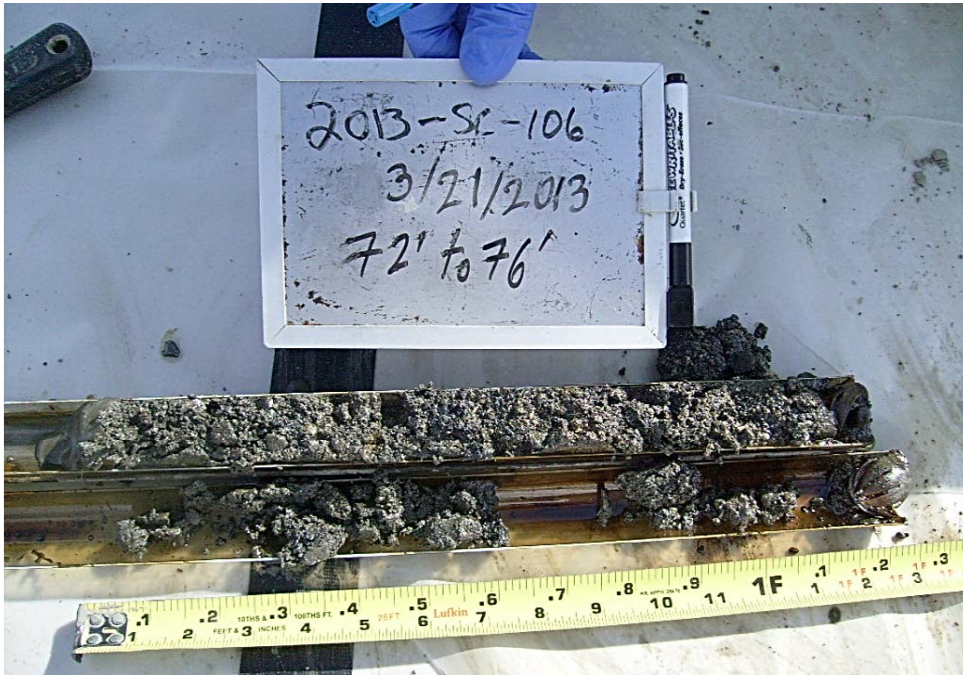

2013-SC-106
3/21/2013
52' to 56'


2013
SC
106
65.2
65.4

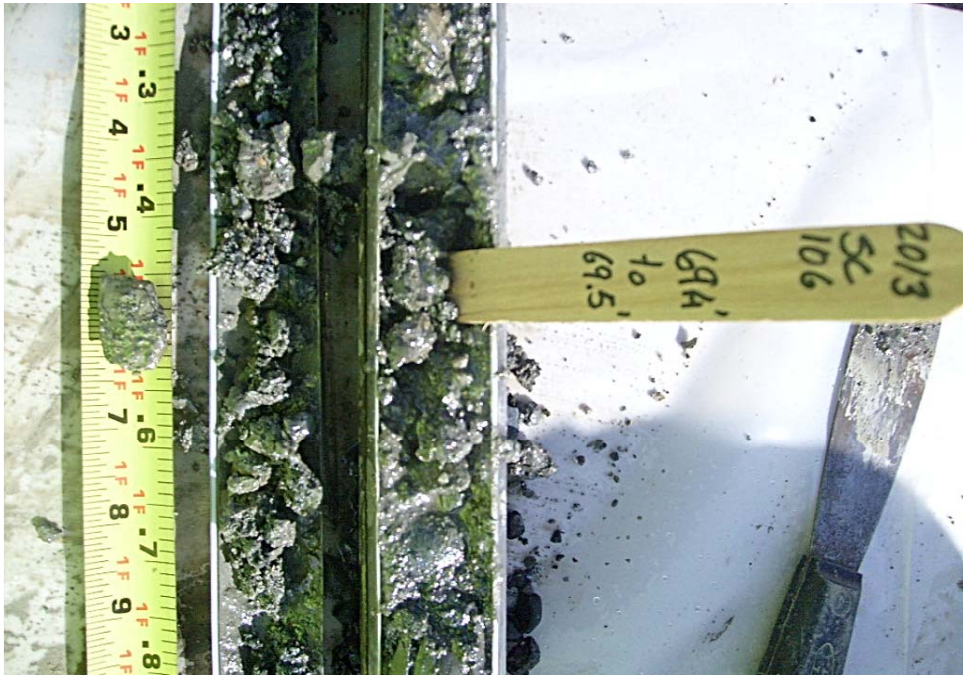

2013-SC-106
3/21/2013
68' to 72'


2013-SC-106
3/21/2013
64' to 68'


2013-SC-106
3/21/2013
68' to 72'


2013-SC-106
3/21/2013
72' to 76'


2013-SC-106
3/21/2013
76' to 80'


2013
SC
106
69.4'
to
69.5'


2013
SC
106
78.6
78.7


2013
SC
106
77.1
77.9


2013
SC
106
80.7
80.9


2013-SC-106
3/21/2013
76.' to 80'


2013-SC-106
3/21/2013
80.' to 81.5'


2013-SC-014
3/22/2013
0' to 4'


2013-SC-014
3/22/2013
4' to 8'


2013-SC-014
3/22/2013
0' to 4'


2013
SC
0141
1.7
1.8


2013-SC-014
3/22/2013
4' to 8'


2013
SC
014
5.8
6.0


2013-SC-014
3/22/2013
4' to 8'


2013
SC
014
4.9
5.0


2013-SC-014
3/22/2013
8' to 12'


2013-SC-014
3/22/2013
8' to 12'

Appendix C-3
Visual Comparison of TarGOST and Confirmation Boring NAPL Observations

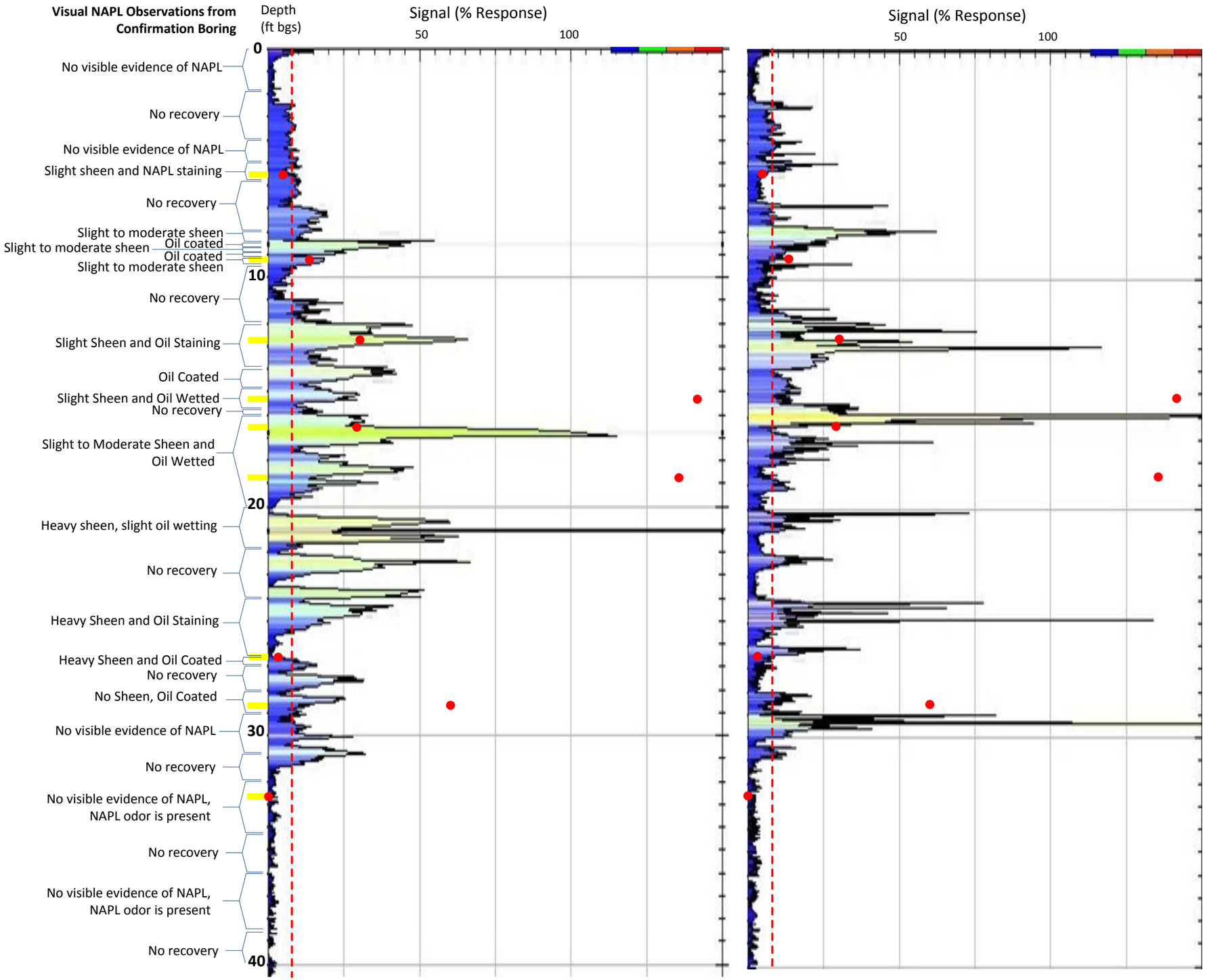
TABLE C-1

Summary of Visual NAPL Evaluation for Confirmation Borings

Wyckoff Upland Field Investigation

Confirmation Boring ID	%RE Response Indicting NAPL
001/001R	5
002/002R	8
006	10
013	9
014	13
036/036R	5
041	15
045	18
046	6
054	11
055	25
068/068R	11
070	7
072	6
101	9
106	5
119	6
127	7
152	9
155	4
Average	**9.5**

TarGOST Confirmation Boring 2013SC-002 and 002R



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

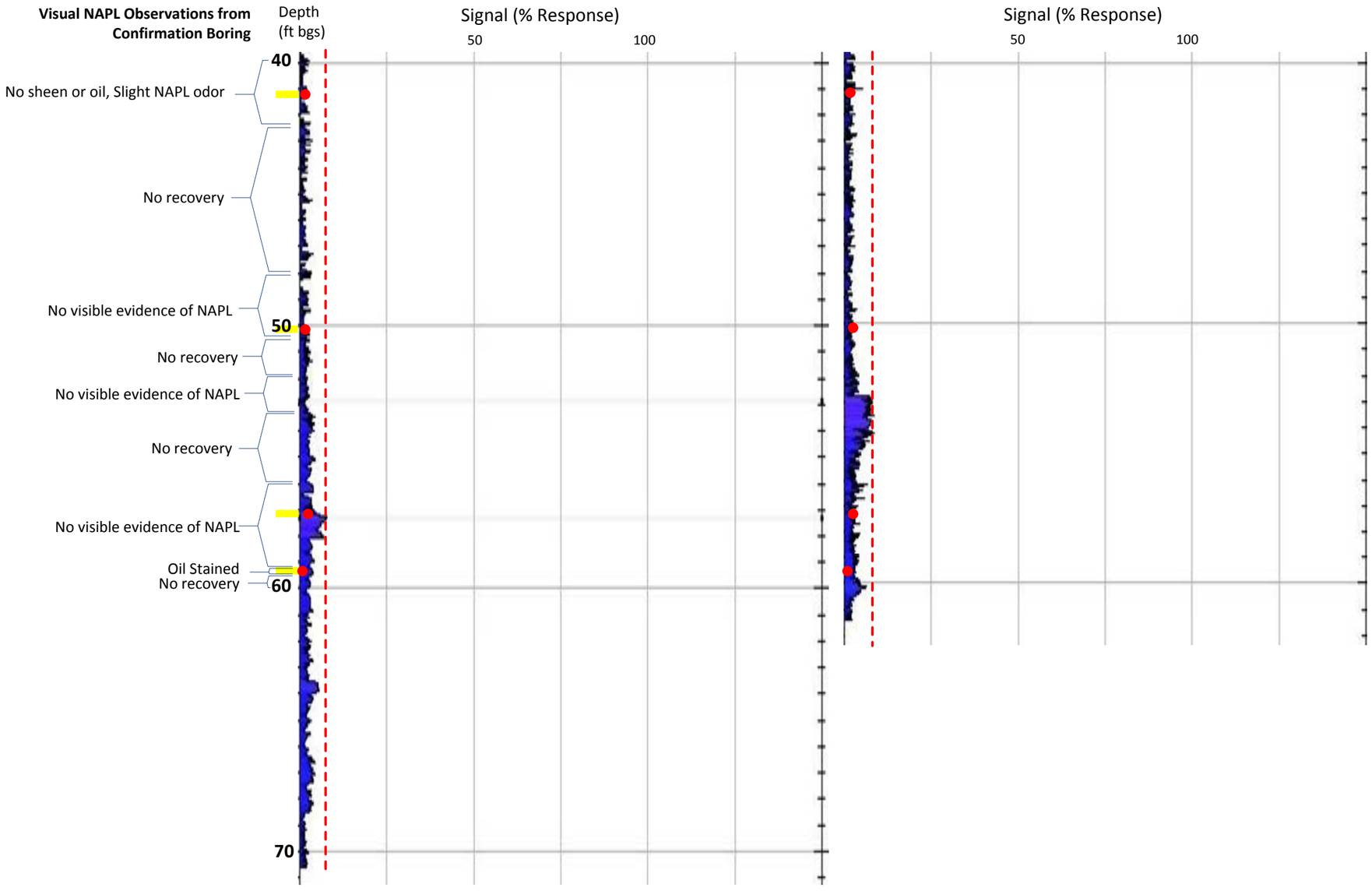
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 8

This value was chosen based on the differentiation between no visible NAPL and NAPL evidence in the top 10 feet and 30 – 40 ft bgs. A sheen is present at the top of the log at approximately 8%RE and this was used as a basis for the %RE chosen. The slight increase at ~57 ft bgs where no visible NAPL was observed was also used to choose the %RE. Though no visible NAPL was observed at ~30 ft bgs while a higher %RE response was observed, this is assumed to be possible off-set from nearby oil-coated intervals. Intervals of no visible NAPL below 30 ft bgs are well below the 8%RE cutoff.

TarGOST Confirmation Boring 2013SC-002 and 002R



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

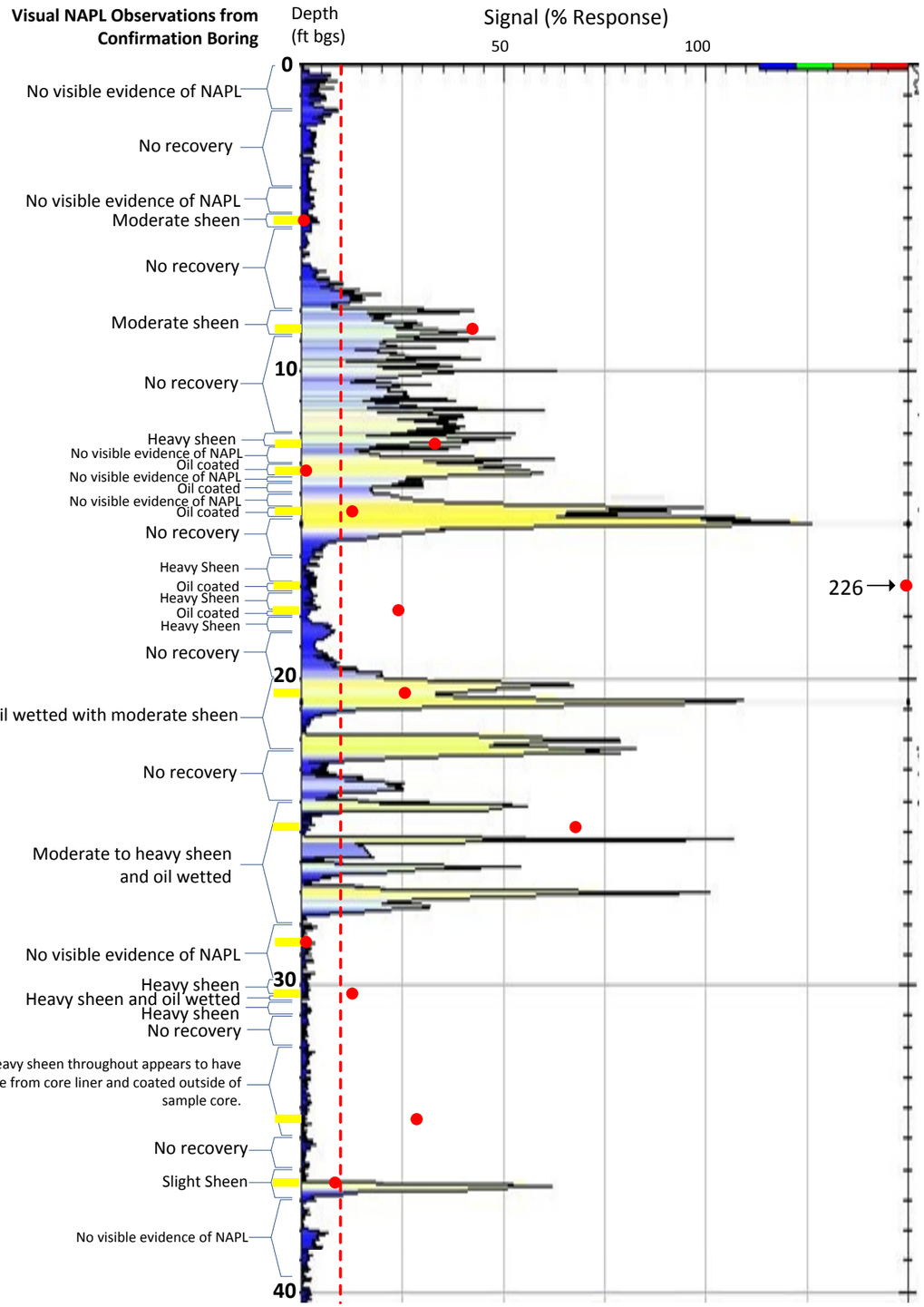
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-006



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

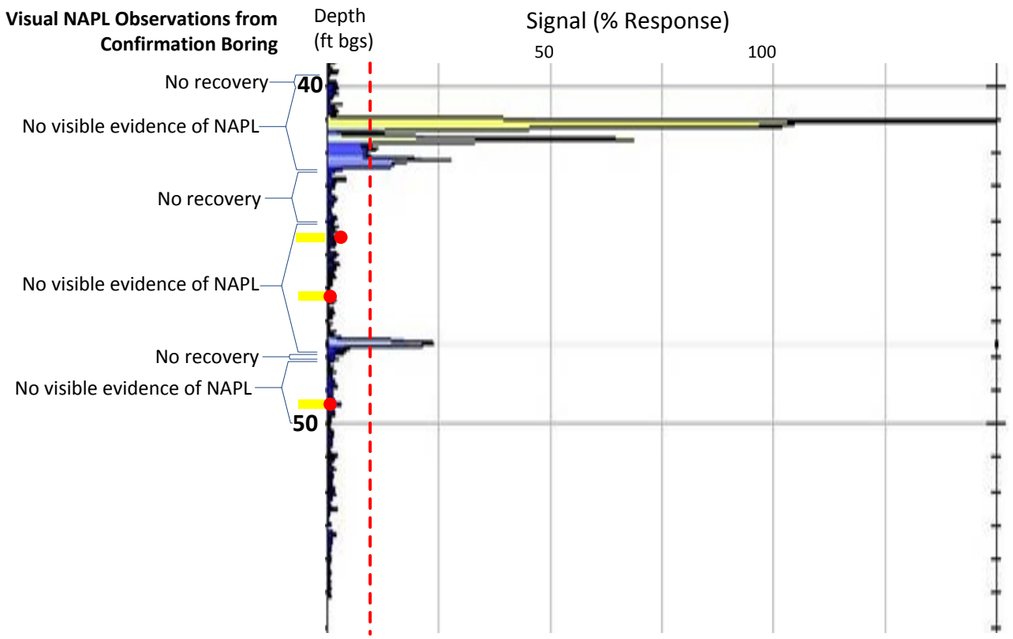
Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 10

The interpretation of this core was challenged by some strong visual observations of NAPL that paired with very low %RE responses. However, possible error was noted in the log at 32 ft bgs where this is the case that a sheen appears to have coated the inside and outside of the core liner. These results were generally disregarded, less they bias the %RE cutoff uncharacteristically low. Likewise, there were some spikes in %RE which corresponded with no visible NAPL and no explanation is available to explain these results.

The portions of the log which did factor into the selection of a %RE were the top 7 feet where a %RE up to 10% still corresponded to no visible NAPL observations.

TarGOST Confirmation Boring 2013SC-006



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

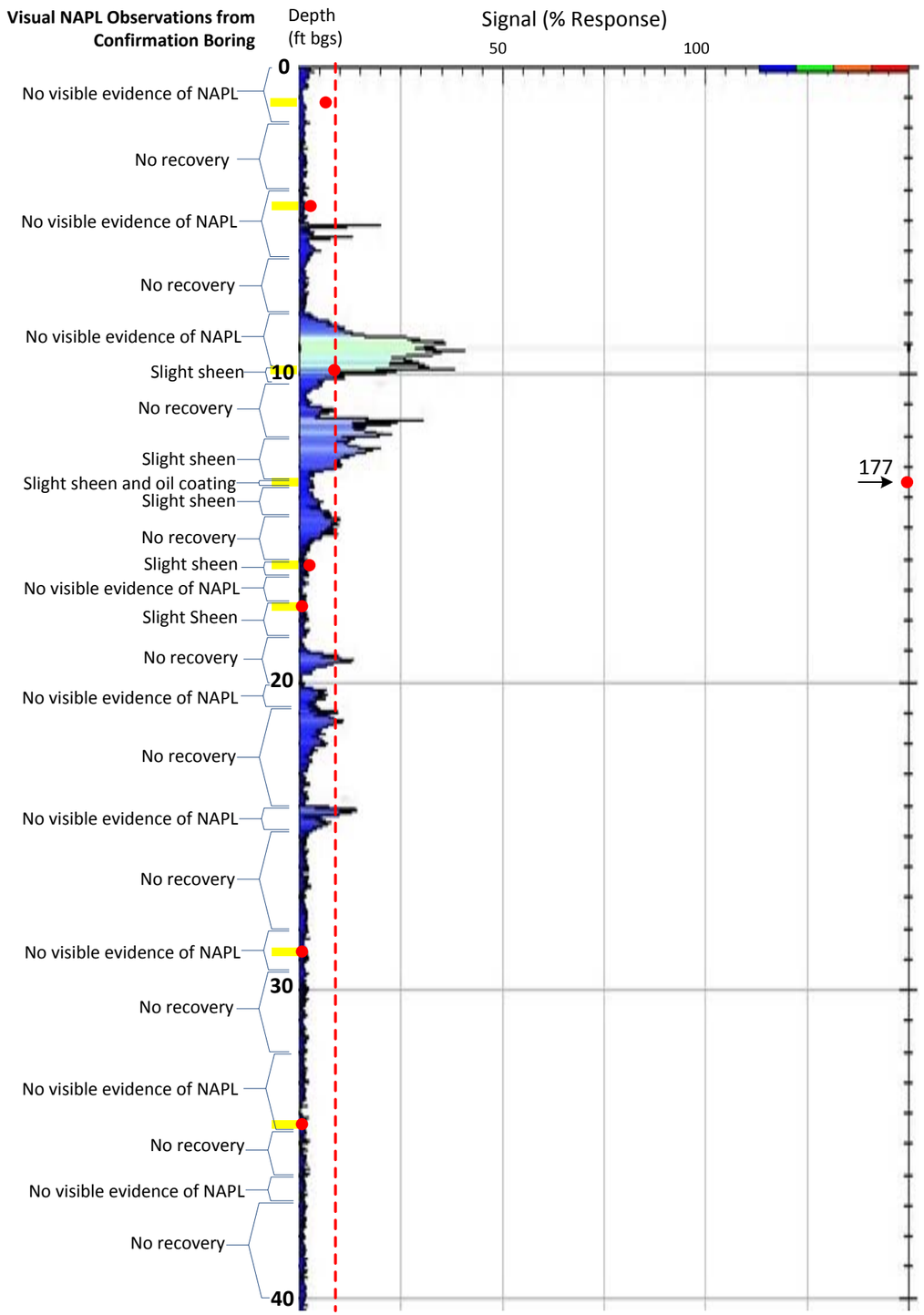
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-013



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

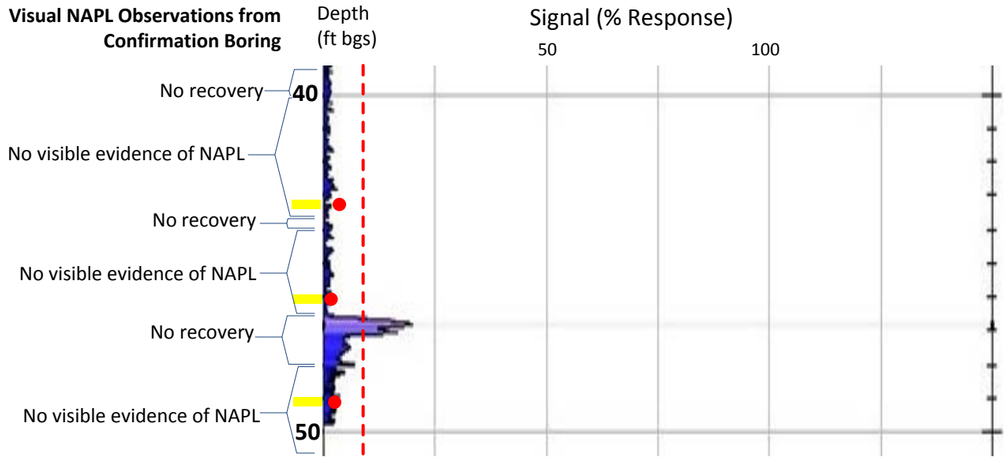
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 9

A %RE of 9 appears to balance between the in-situ and ex-situ TarGOST observations corresponding with the visual NAPL observations; specifically the lack of NAPL observed at approximately 1.3 ft and the slight sheen observed at 10 ft. Visual observations of NAPL presence do not appear to correlate with all of the elevated TarGOST readings. However, visual observations of NAPL presence are scattered throughout the top 20 feet of the boring where most elevated TarGOST readings were found.

TarGOST Confirmation Boring 2013SC-013



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

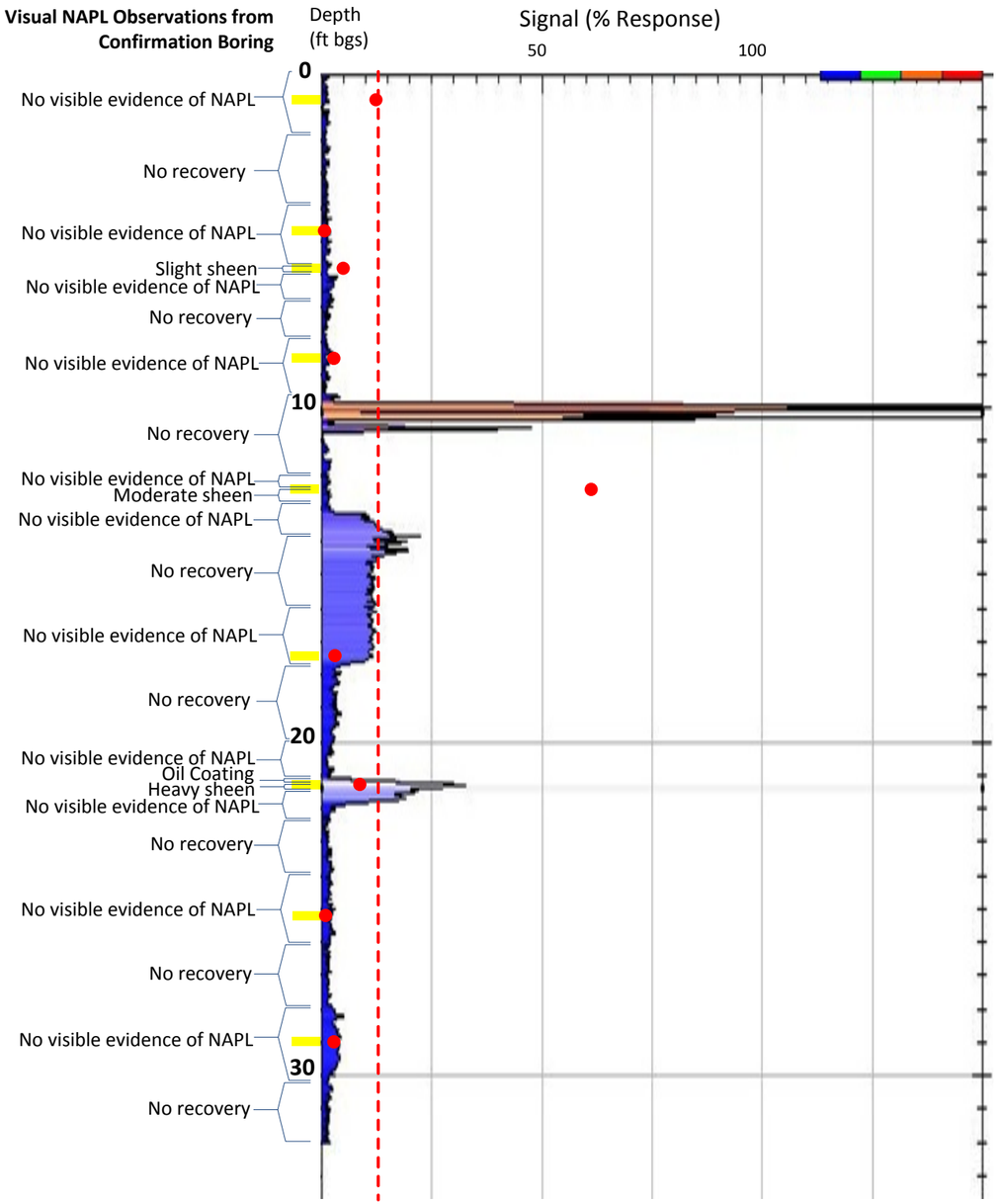
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-014



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

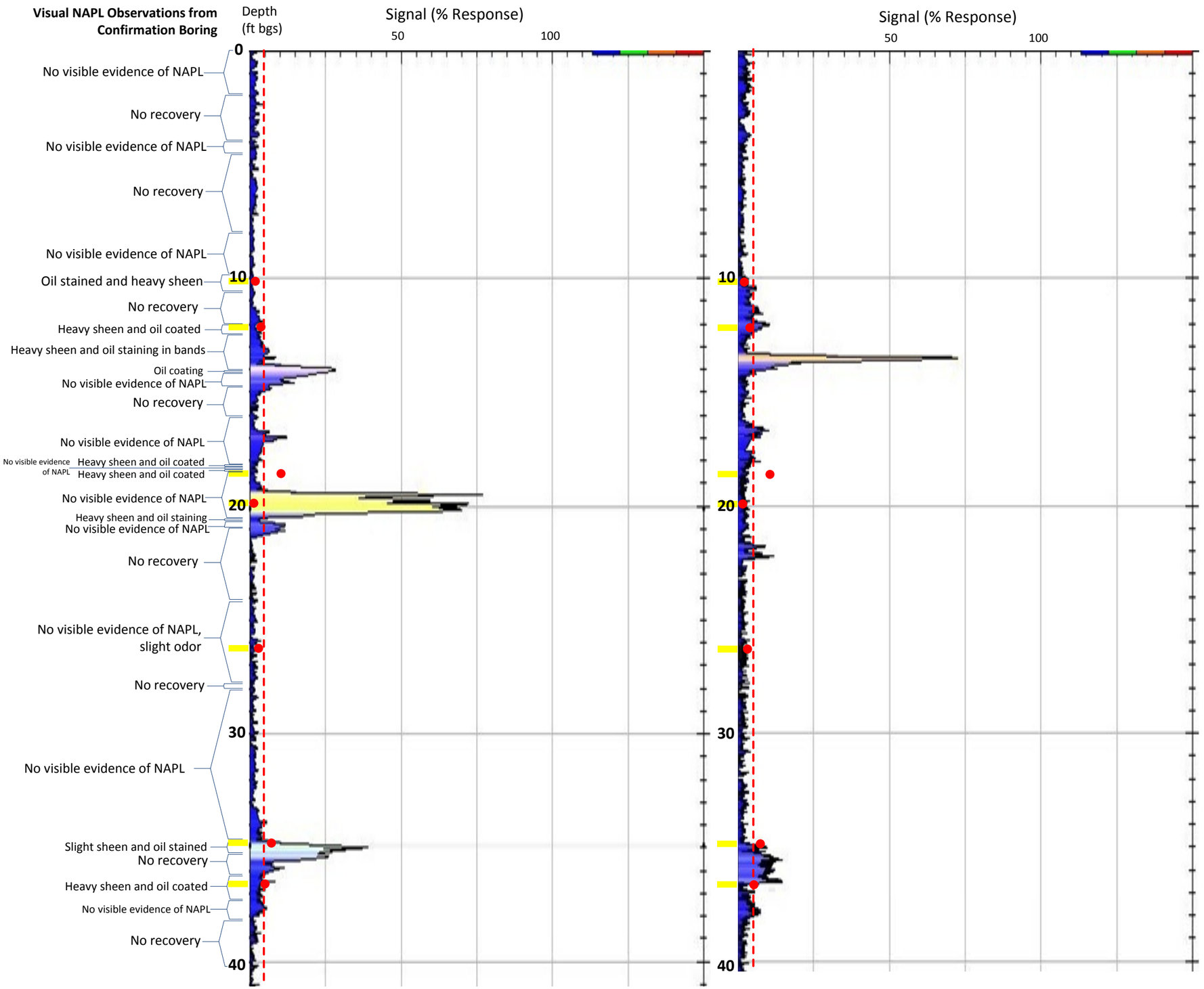
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 13

The portion of the log driving the selection of this %RE cutoff point is the elevated response between 13 and 18 ft as well as the ex-situ response at 0.9 ft. Visual observations associated with these portions indicated no visible NAPL. There were some sheen observations which corresponded with very low TarGOST responses in several areas, however 13%RE was evaluated to be a compromise between the observed NAPL and the TarGOST responses.

TarGOST Confirmation Boring 2013SC-036 and -036R



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

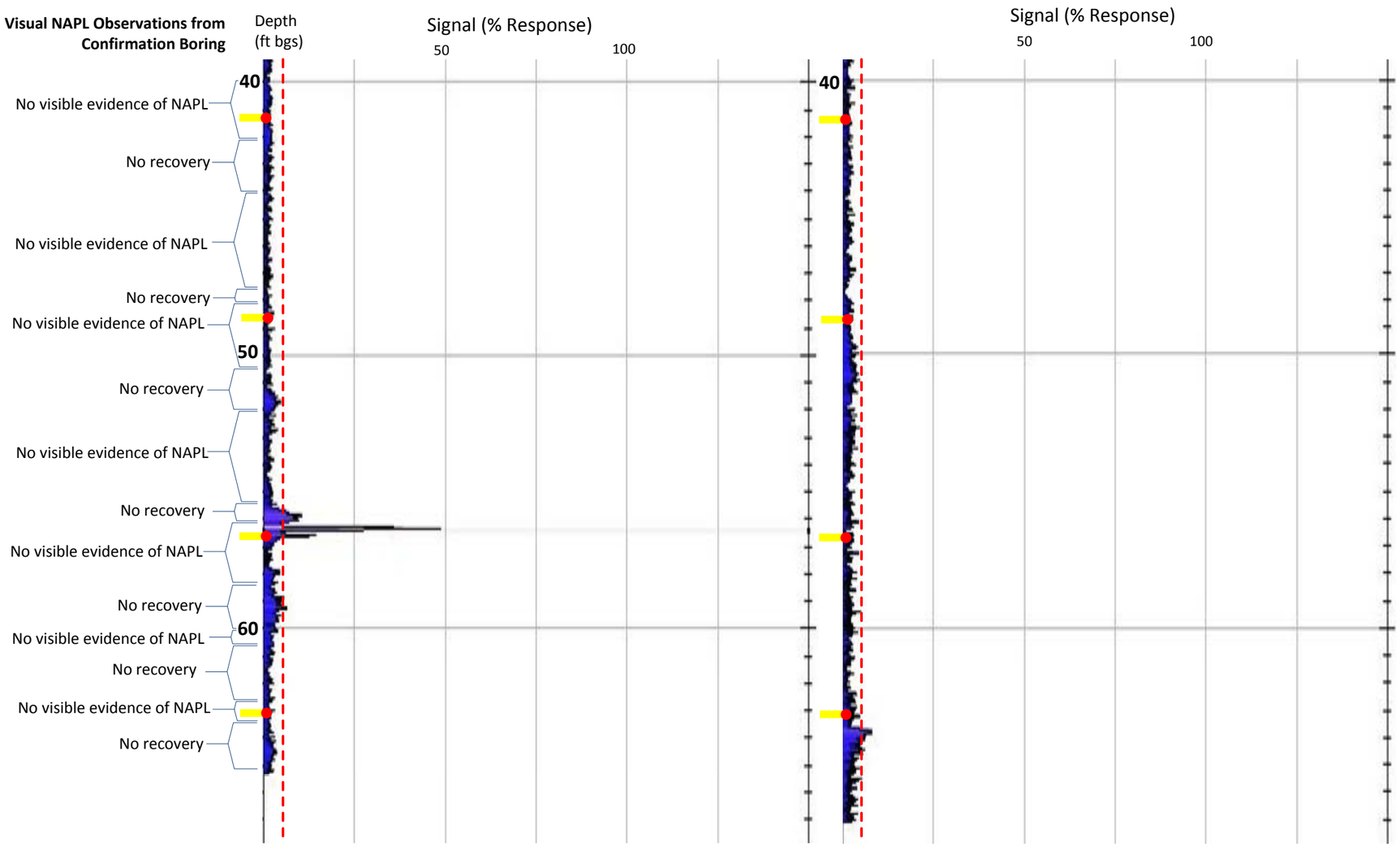
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 5

%RE responses in this boring and the replicate were relatively low and the areas of visible NAPL presence generally corresponded with elevated %RE response. The deeper part of the logs >40 feet was used to determine the cutoff %RE chosen as no visible NAPL evidence was seen.

TarGOST Confirmation Boring 2013SC-036 and -036R



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

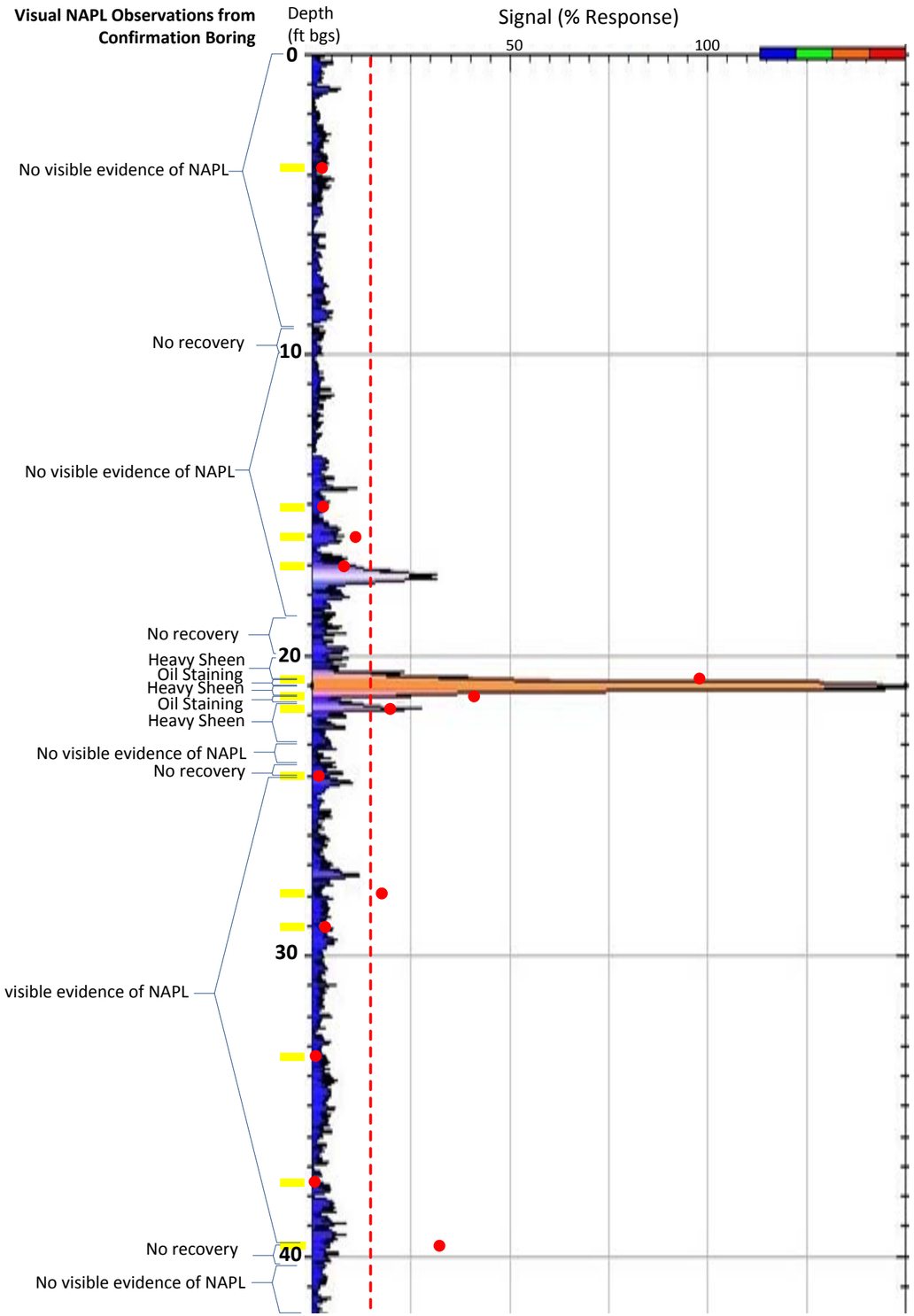
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-041



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

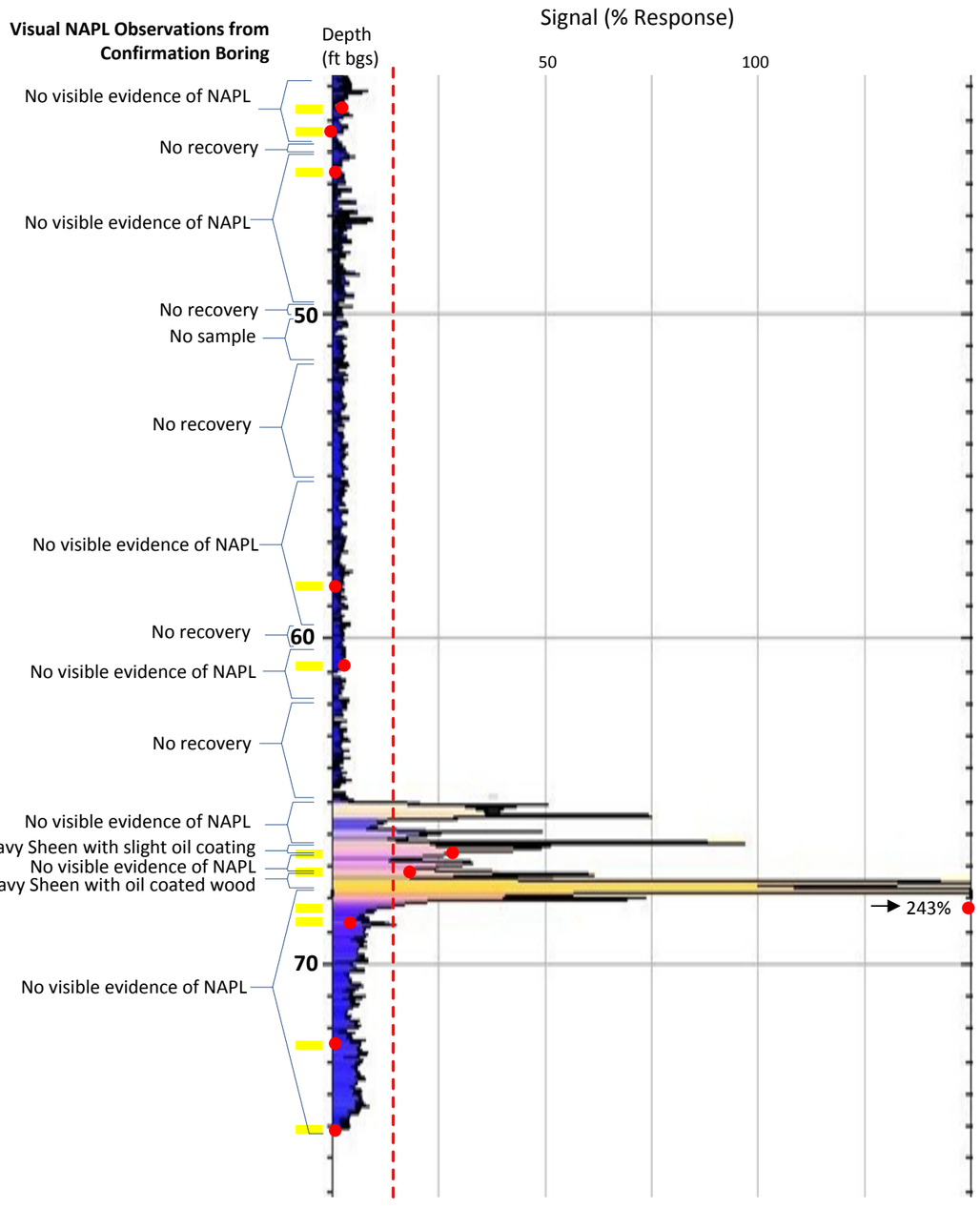
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 15

Though most of the boring had no visible NAPL and a low %RE response, there were some mismatched sections of visible NAPL with low %RE and no visible NAPL with high %RE. The choice of the %RE cutoff was intended to balance the impact of false readings or other noise in the data.

TarGOST Confirmation Boring 2013SC-041



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

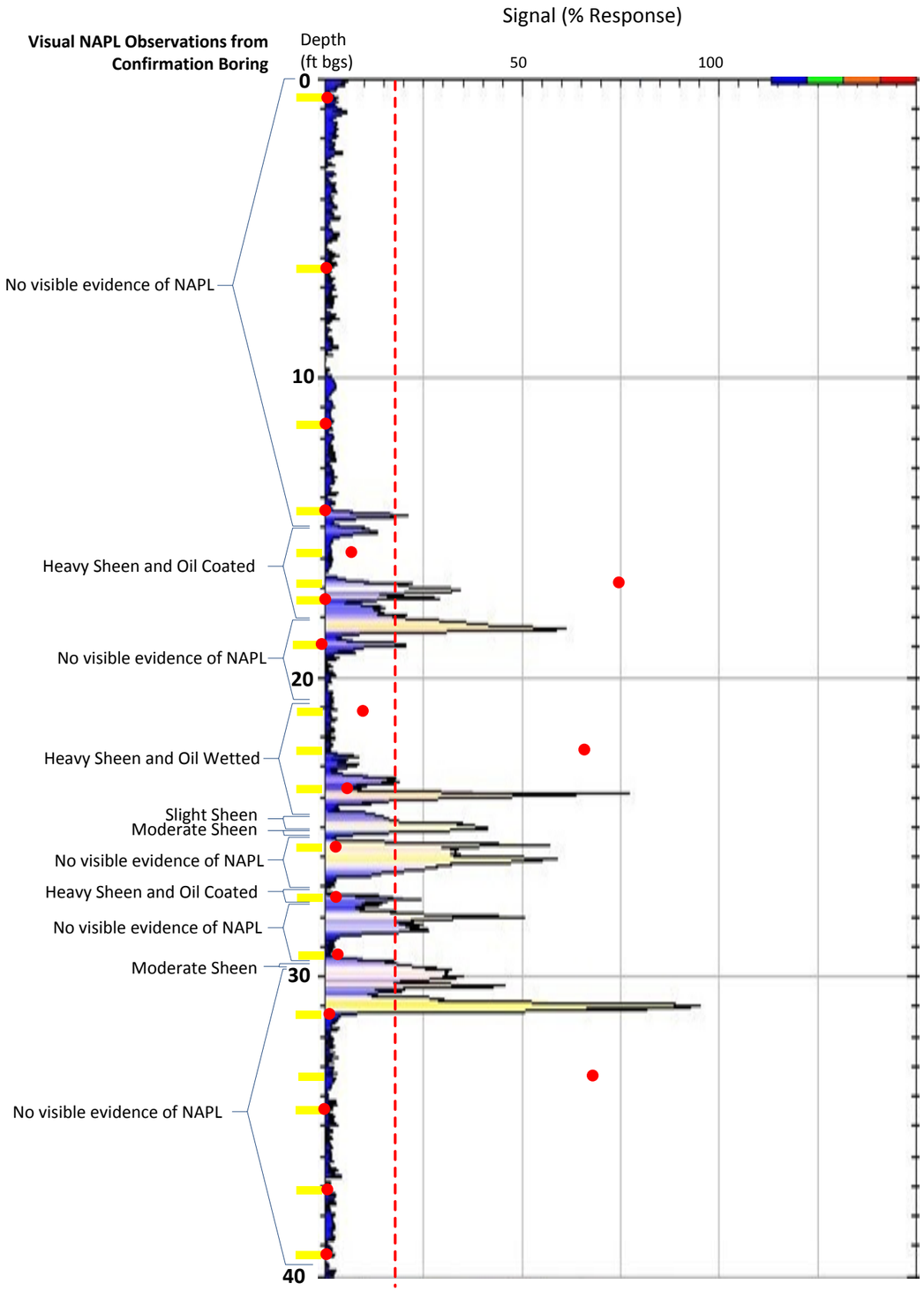
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-045



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

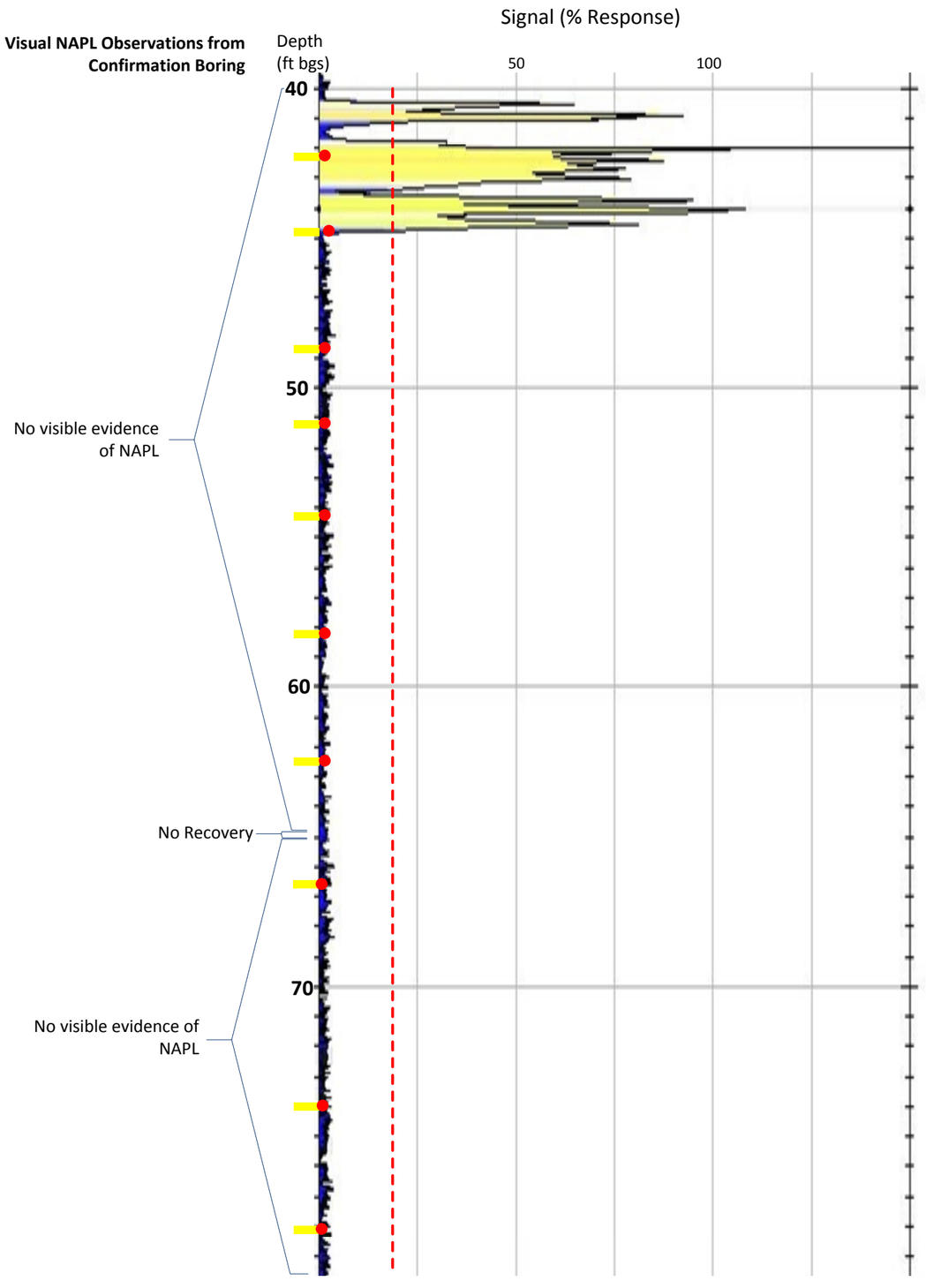
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 18

While elevated %RE responses from 15 to 32 ft bgs appear to coincide generally with visible NAPL observations, additional strong %RE responses are recorded at 40 – 45 ft bgs with no corresponding visual NAPL observations. The %RE chosen was based on including the peaks of the %RE in the 15 to 32 ft bgs range.

TarGOST Confirmation Boring 2013SC-045



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

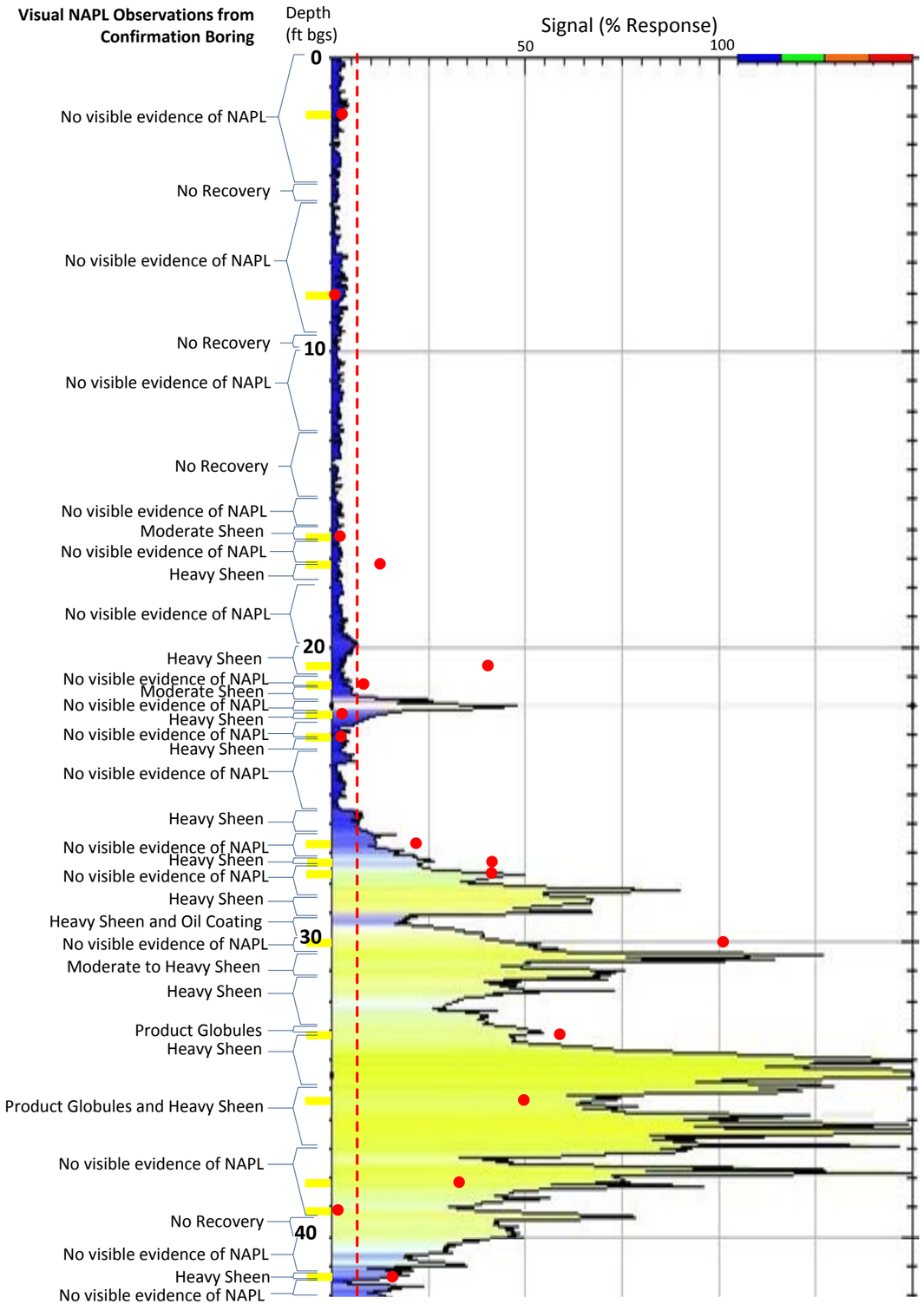
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-046



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

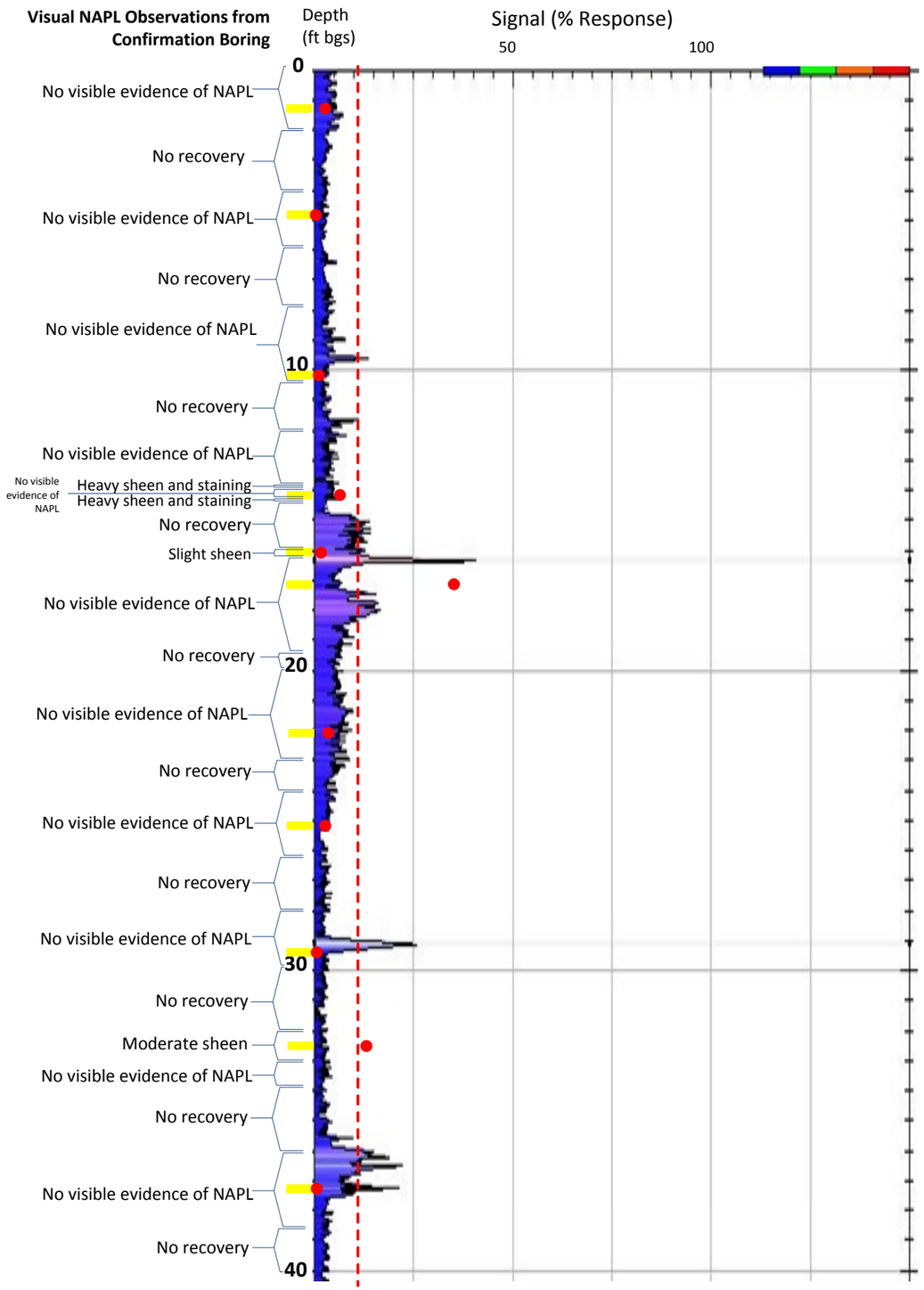
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 6

Though there is some mismatch between the visual NAPL observations and the %RE response, the observations and %RE generally match. The %RE cutoff was determined to include the peak at 20 ft bgs but not those between 0 and 20 ft bgs despite some occasional evidence of sheen in the visual observations.

TarGOST Confirmation Boring 2013SC-054



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

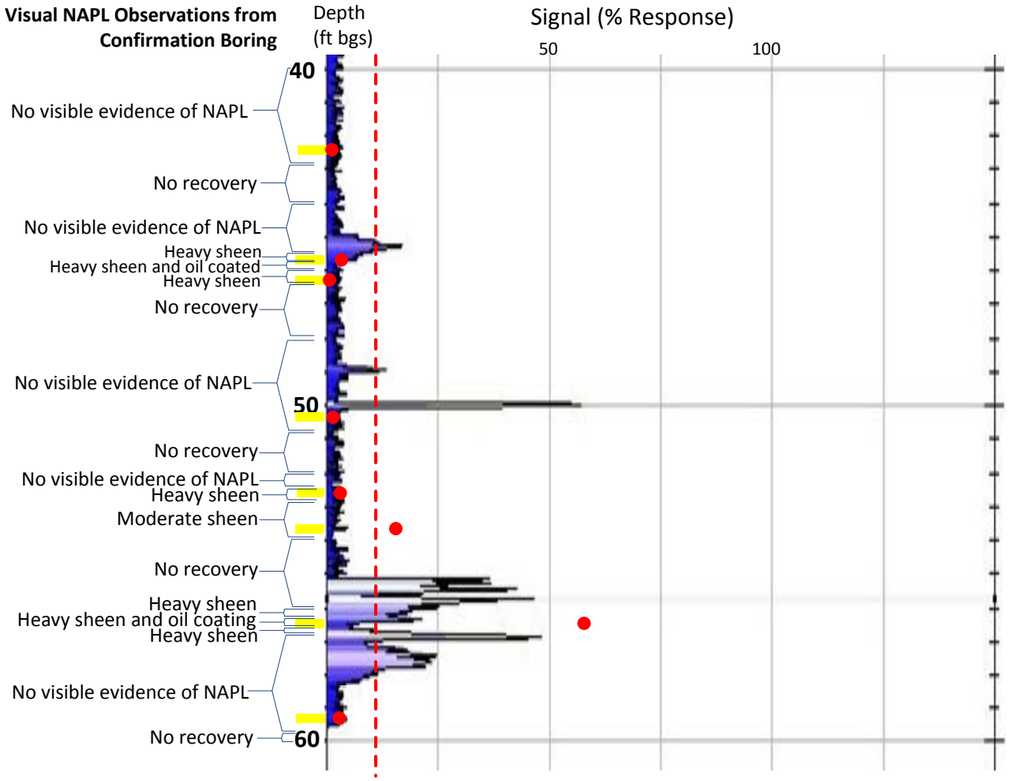
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 11

This log also fluctuates between positive identification of NAPL in visual observations coupled with low TarGOST responses and absence of NAPL in visual observations paired with elevated TarGOST responses. This complicates the evaluation of the cutoff %RE. A value which could appear to be more conservative was therefore chosen to indicate NAPL presence for this log. The value was chosen primarily to minimize TarGOST responses in areas of no visible NAPL from falling into the NAPL present category (17 – 23 ft and 36 – 38.5 ft).

TarGOST Confirmation Boring 2013SC-054



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

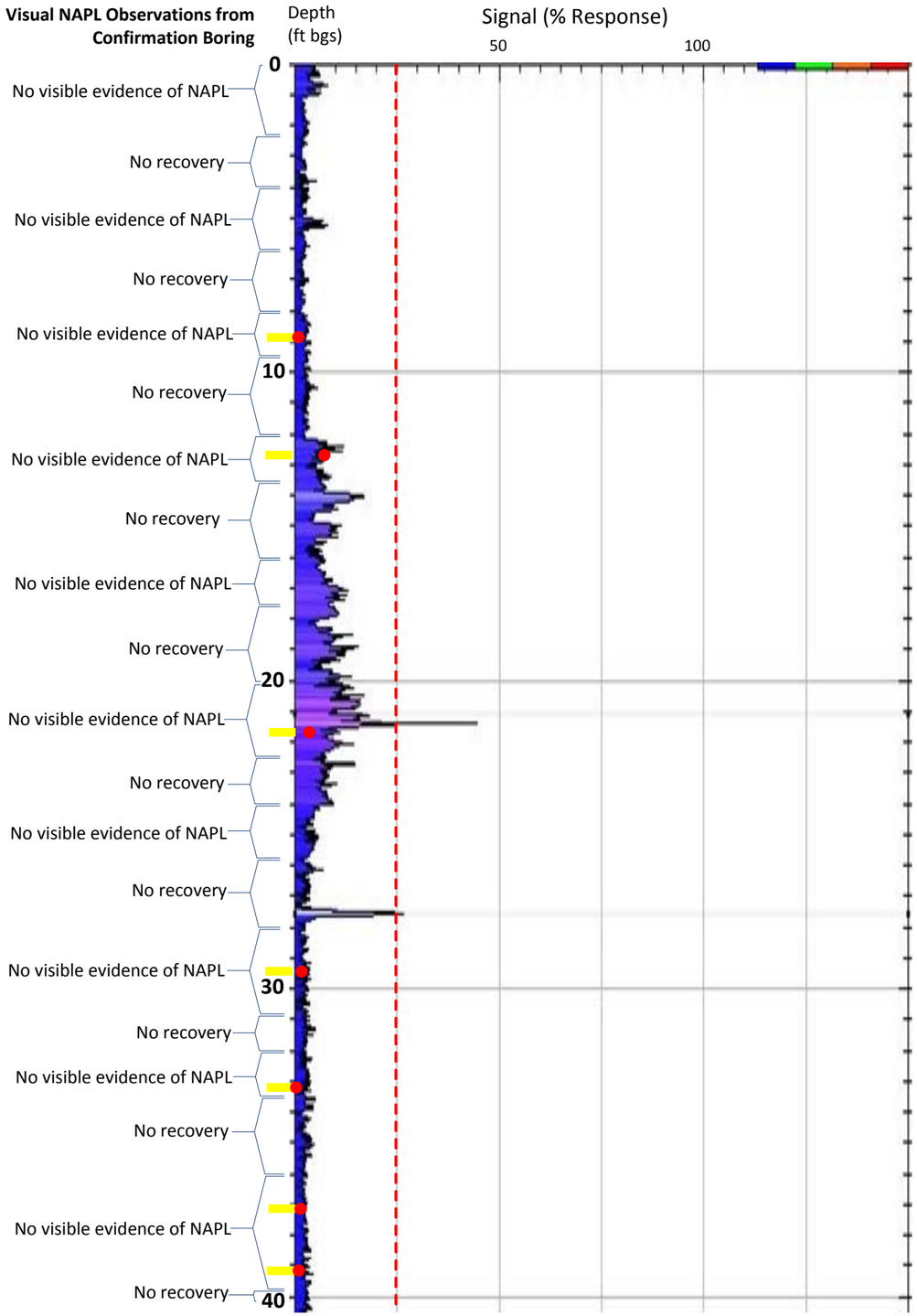
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-055



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

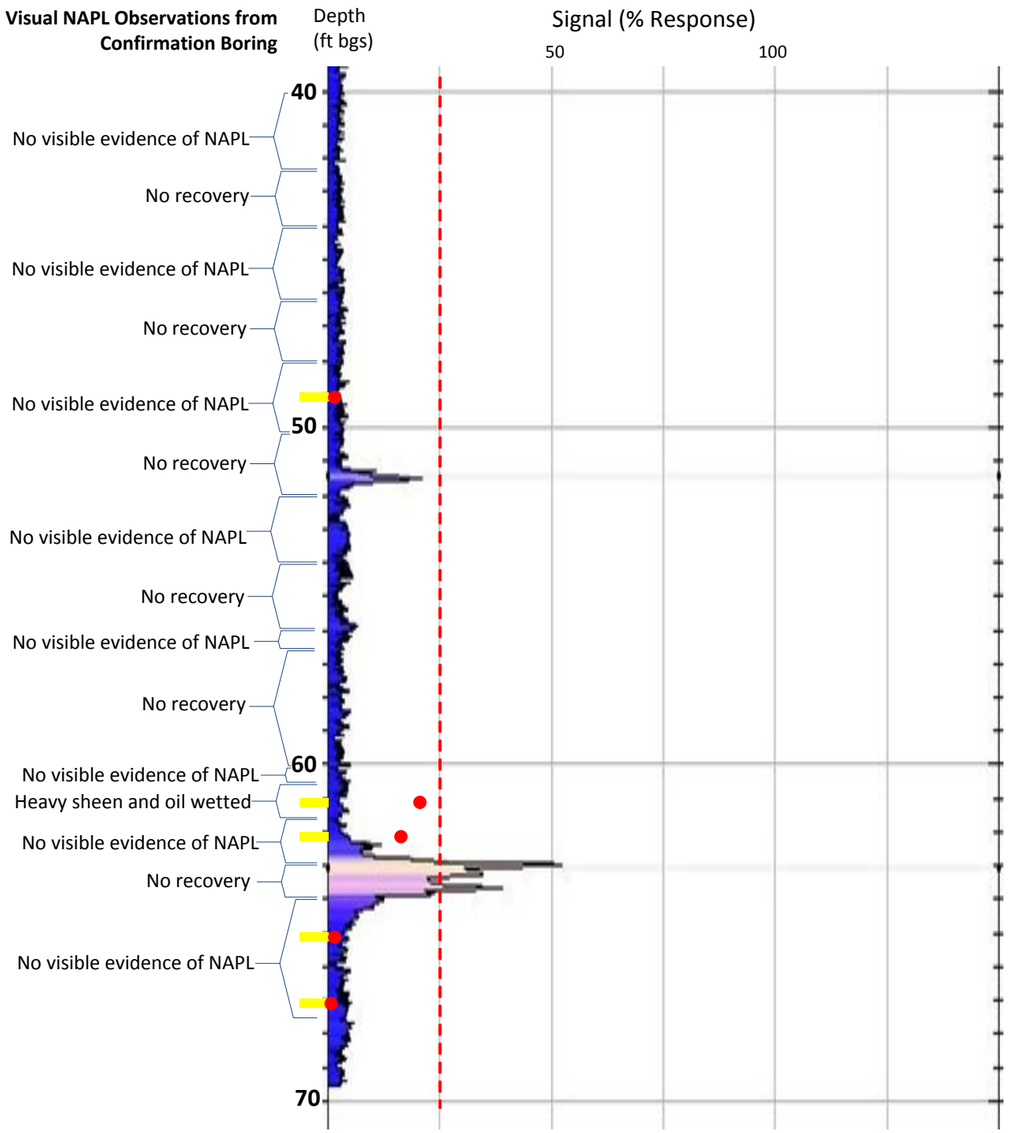
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 25

There are few visual observations of NAPL in this boring. The %RE was chosen based on avoiding the possible “noise” or false positives in the range of 12 to 28 ft bgs while still including the peak of the response at a~63 ft bgs which is near visual NAPL observations.

TarGOST Confirmation Boring 2013SC-055



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

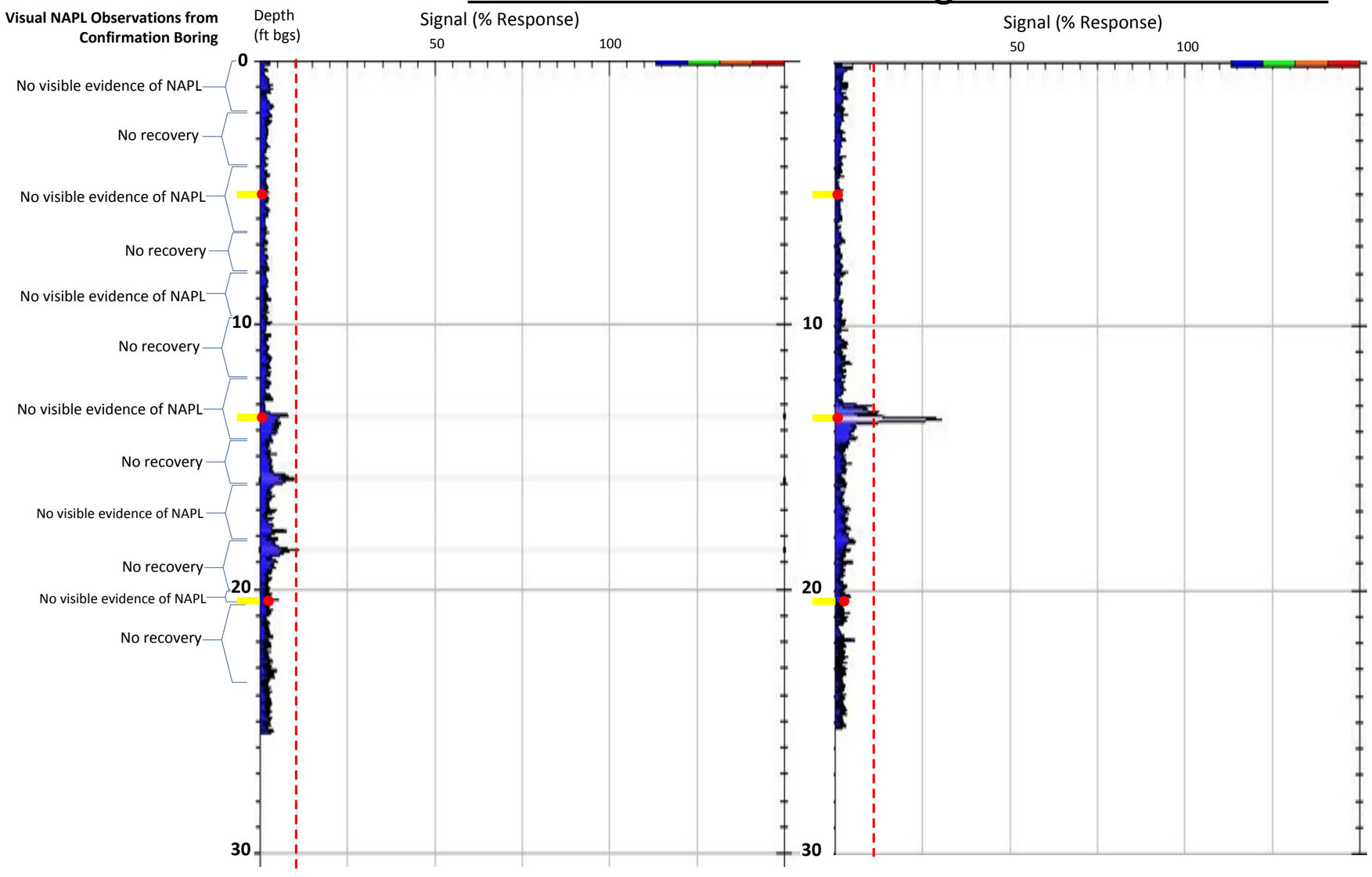
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-068 and -068R



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

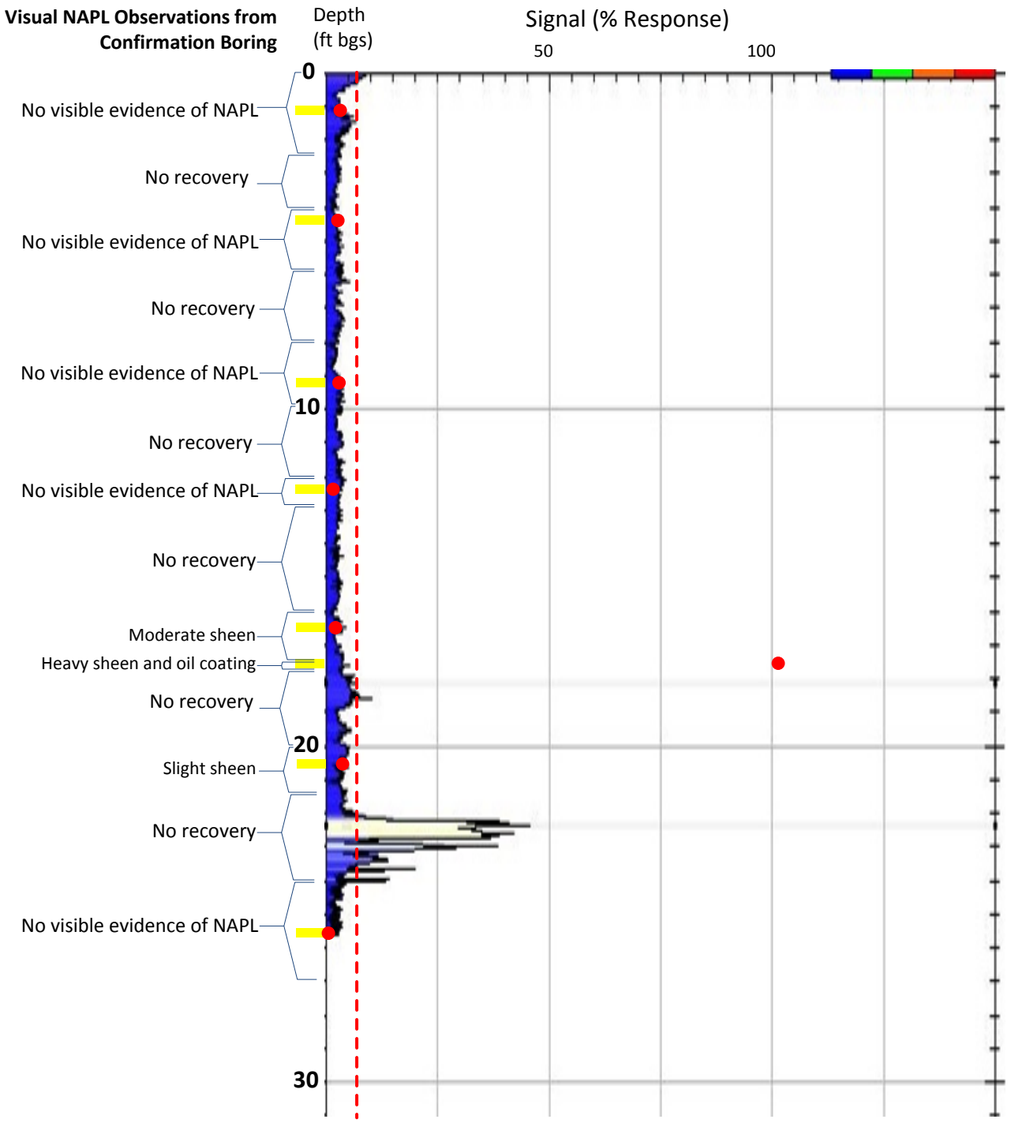
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 11

Visual NAPL observations indicated no visible NAPL throughout the entire confirmation boring. The %RE was chosen to be above the possible false positive readings seen between 13 and 19 ft bgs on the main boring.

TarGOST Confirmation Boring 2013SC-070



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

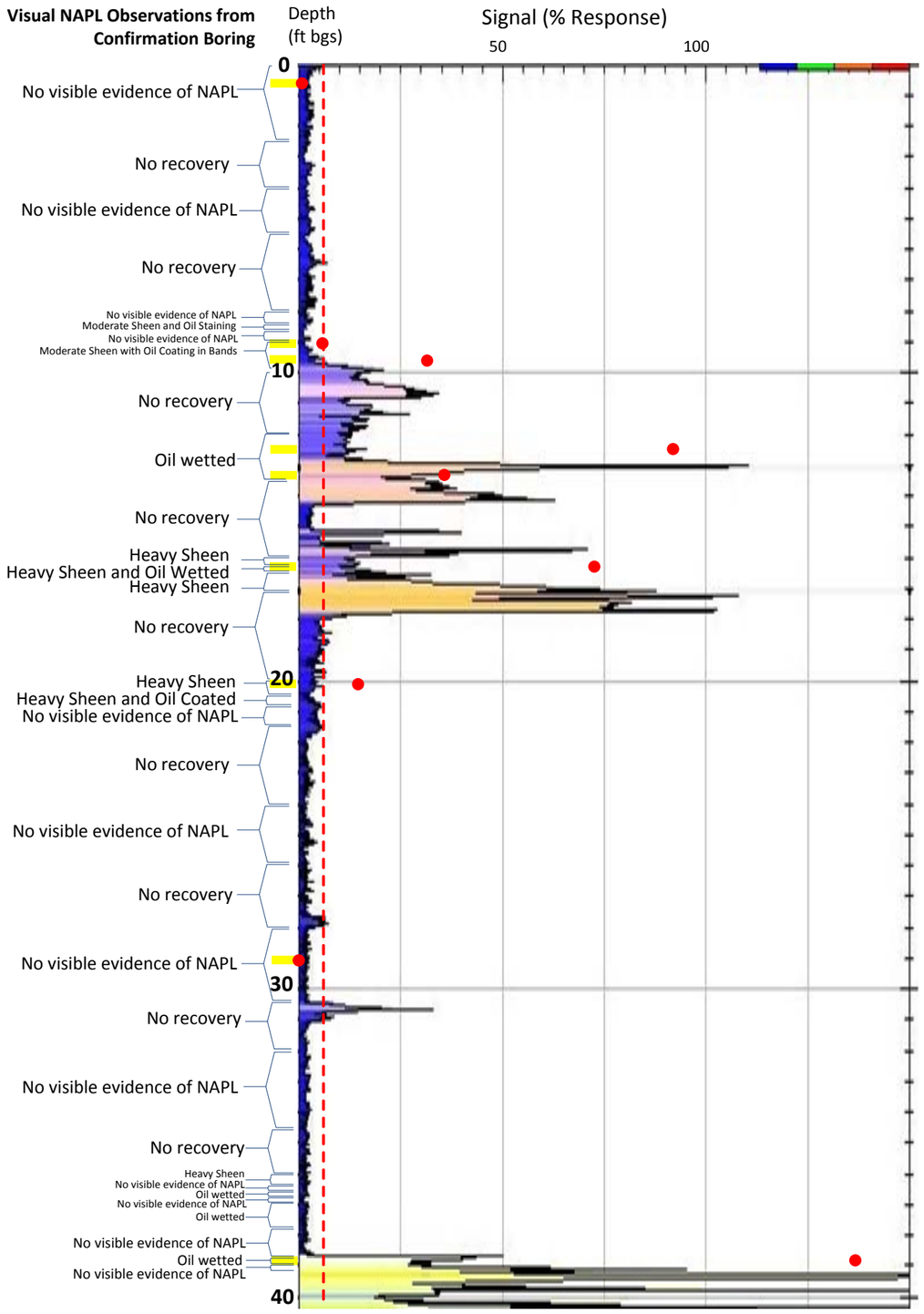
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 7

There are few areas in the log where visual NAPL observations indicate the presence of NAPL, and those that there are generally correspond with low TarGOST responses (16 – 18 ft and 20 – 21.5 ft). Instead of matching the low responses, a higher cutoff %RE was chosen to match the areas where no visible NAPL was observed. Therefore, 0 ft and 18.5 ft were the driving depths in the selection of the %RE.

TarGOST Confirmation Boring 2013SC-072



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

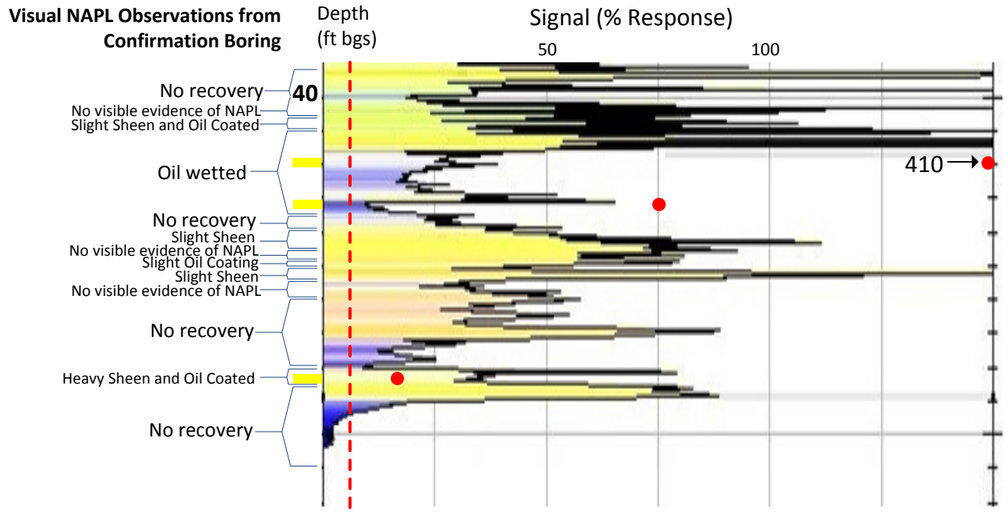
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 6

Areas of visual NAPL observations correlated generally well with elevated RE% response. The portion of the log used to determine the selected %RE cutoff was the 20 to 22 ft interval where heavy sheen and oil coating was observed at approximately 6 %RE.

TarGOST Confirmation Boring 2013SC-072



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

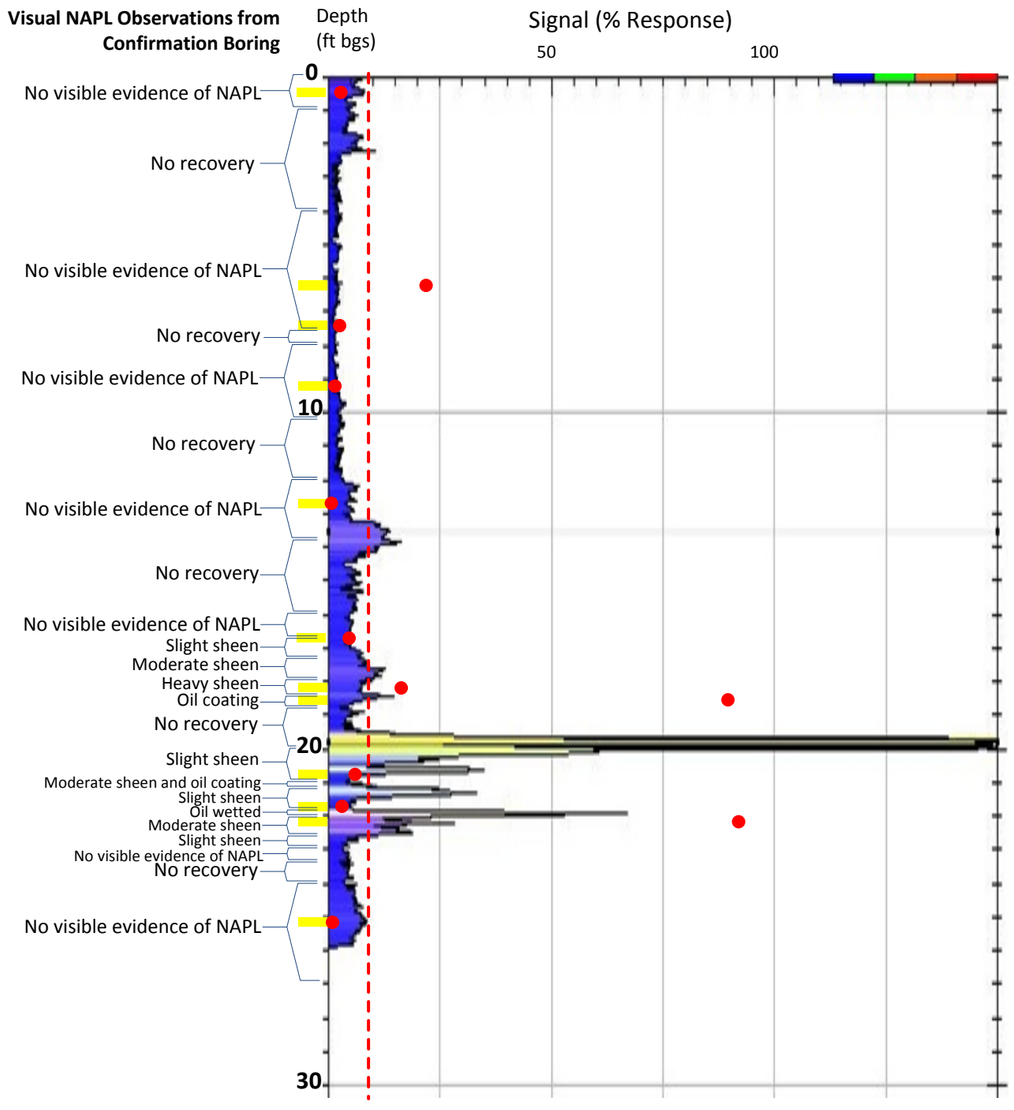
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-101



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

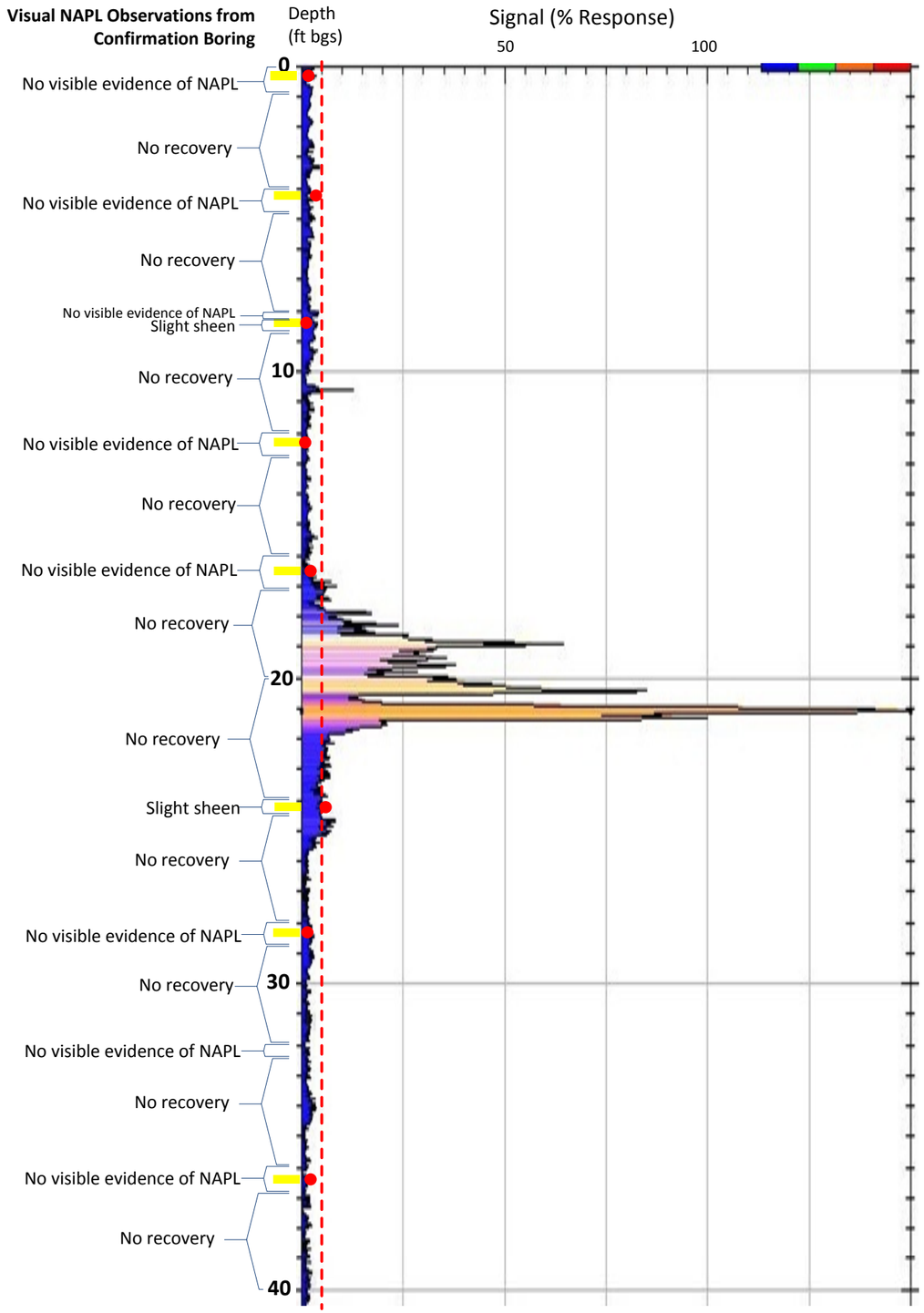
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 9

This log shows some elevated TarGOST responses where NAPL was not visually observed. These areas, specifically 0 – 1 ft and 24 – 26 ft, were used to evaluate a cutoff %RE which would result in most areas without visible NAPL corresponding with TarGOST readings which would indicate absence of NAPL.

TarGOST Confirmation Boring 2013SC-106



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

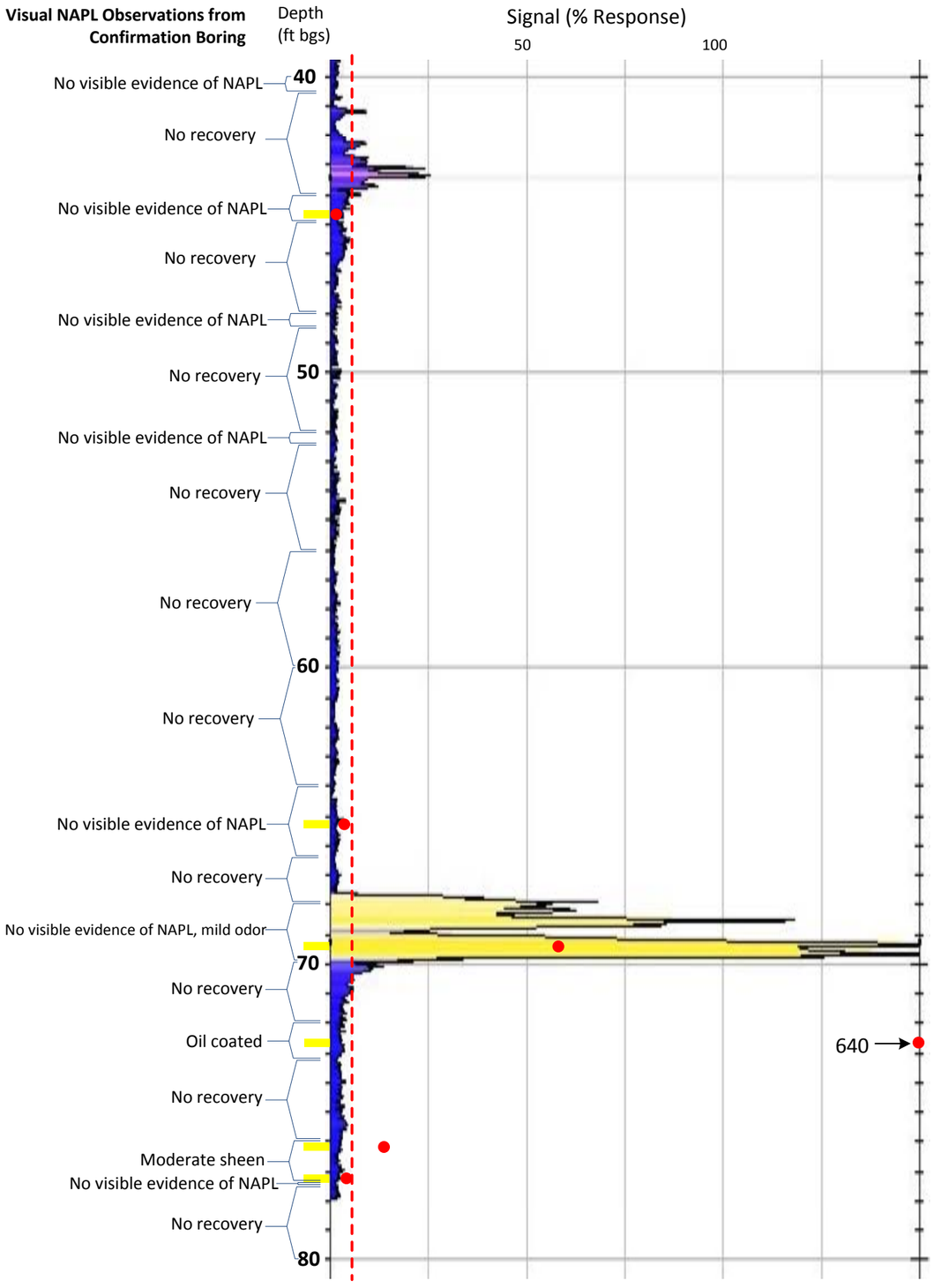
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 5

Unfortunately, the areas of elevated TarGOST response in this log often corresponded with areas of no recovery in the confirmation boring. The slight sheen observed from 24 – 24.5 ft was used to establish the %RE indicating presence of NAPL in this log. This value results in most areas where NAPL was not visually observed being below the %RE cutoff for presence of NAPL as indicated by TarGOST response.

TarGOST Confirmation Boring 2013SC-106



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

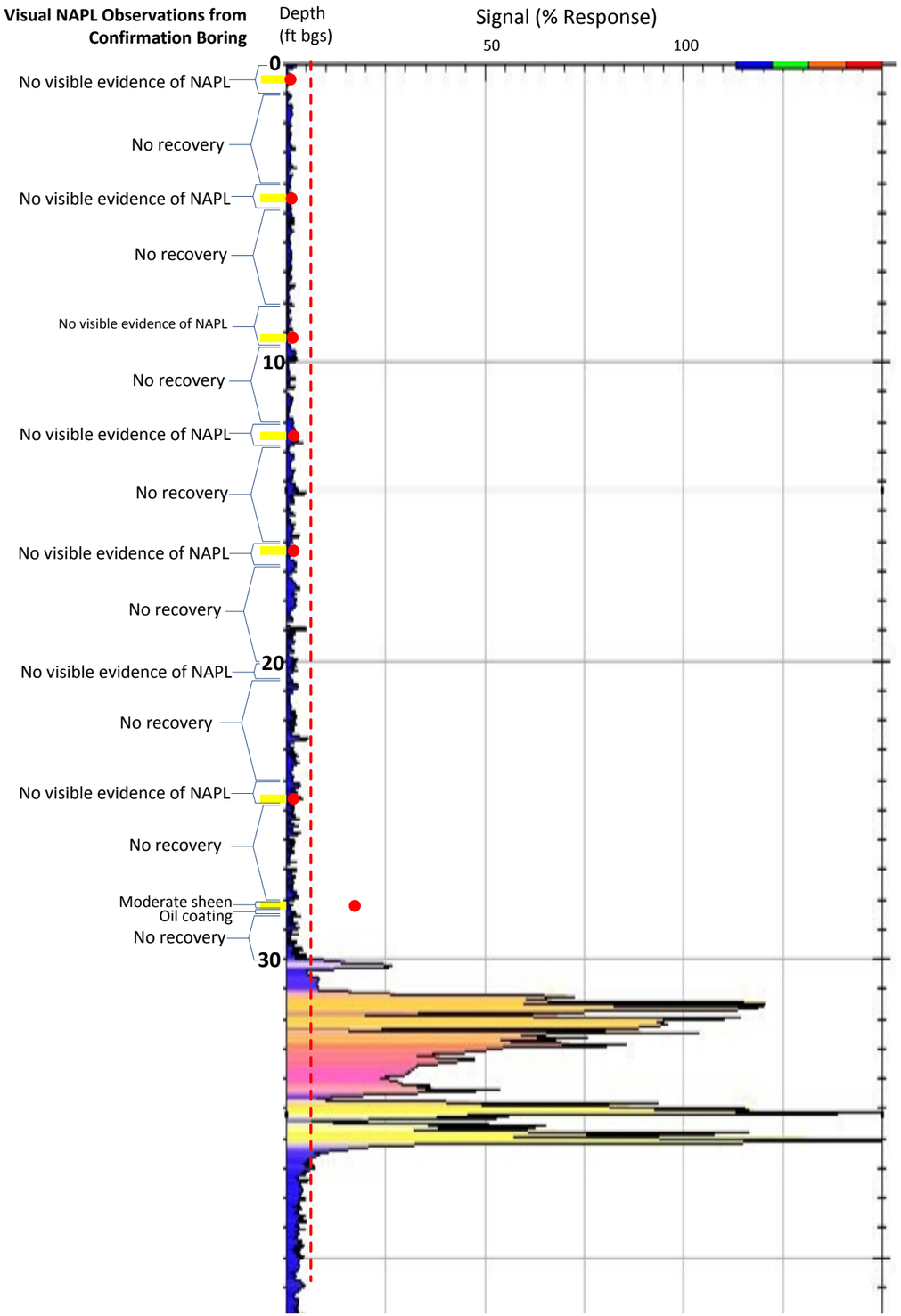
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-119



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

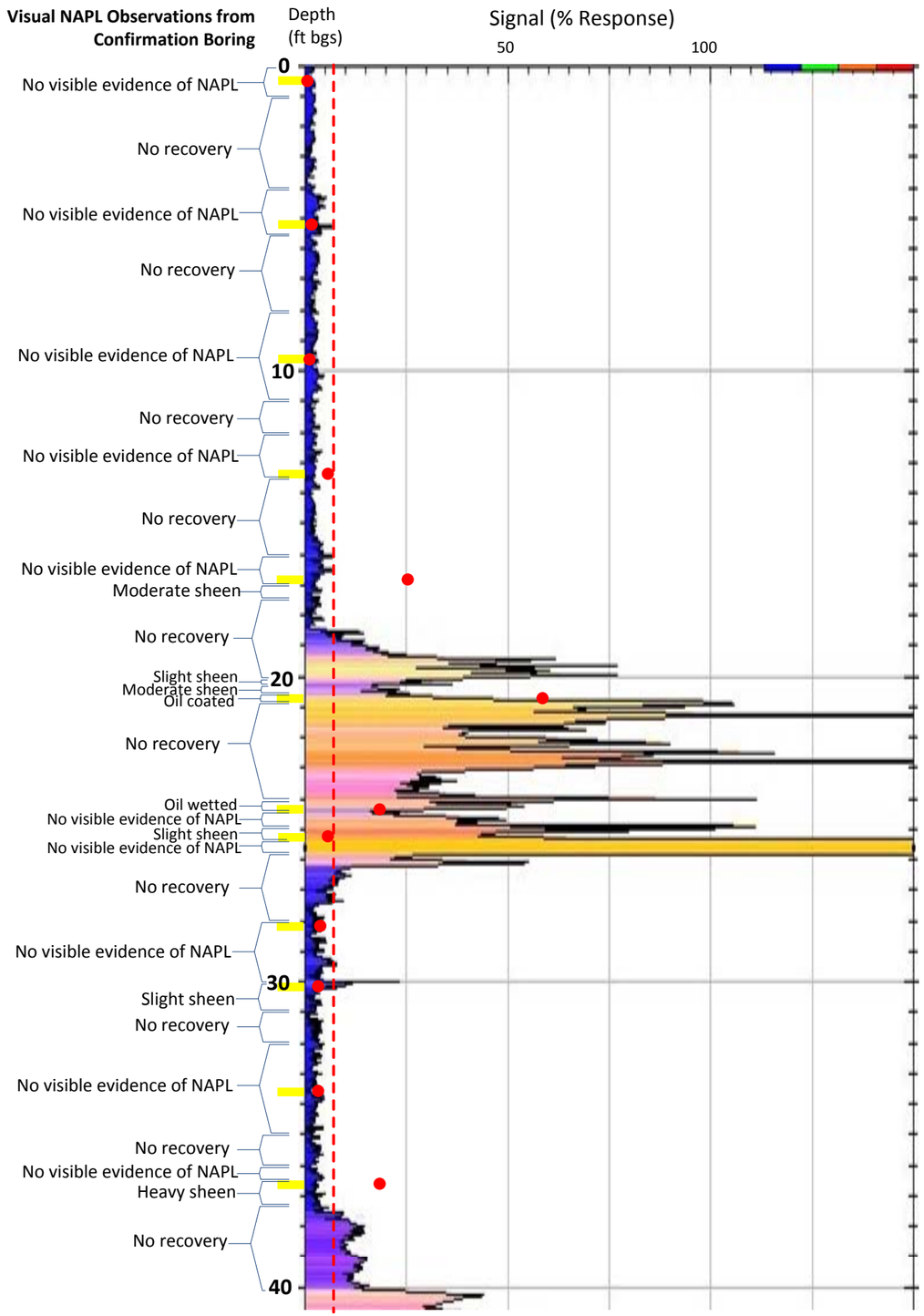
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 6

Due to refusal in the confirmation boring at 30 ft, visual NAPL observations do not extend to the depth where the TarGOST response indicated significant NAPL presence. Therefore, very little information is available to assess the NAPL presence cutoff in correlation to visual NAPL observations. The cutoff chosen was intended to be above all the TarGOST responses in areas of no visible NAPL.

TarGOST Confirmation Boring 2013SC-127



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

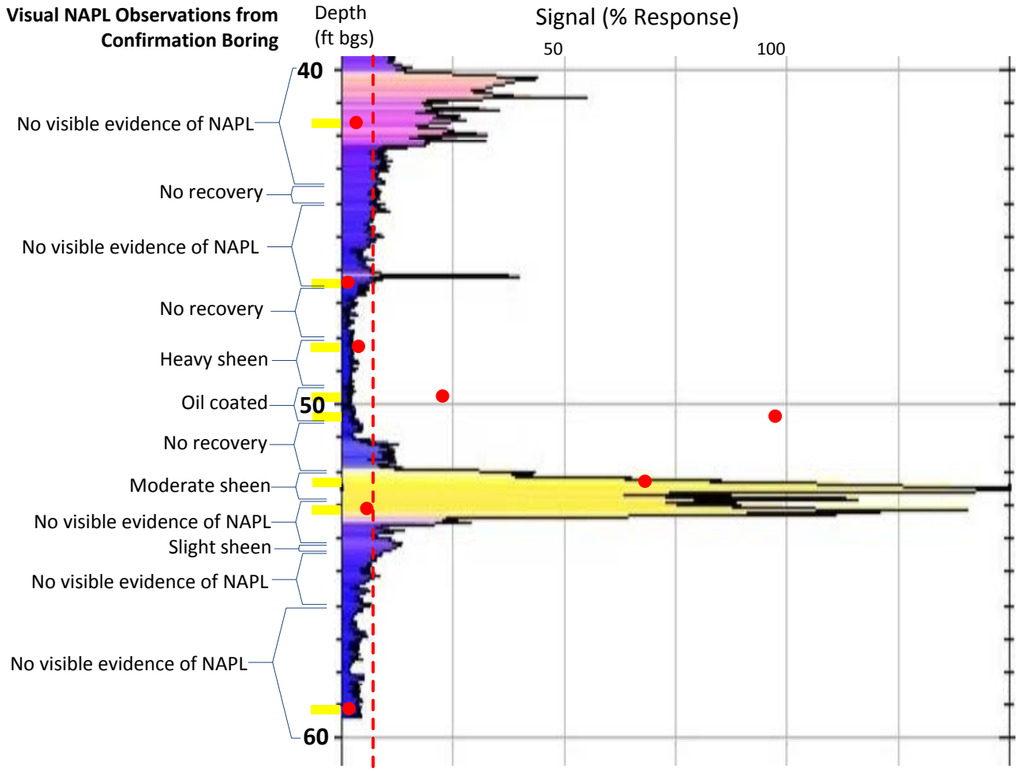
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 7

Though not always perfectly aligned, areas of visual NAPL observations appear near elevated TarGOST responses in this log. A value of 7 %RE was chosen to avoid the noise in the TarGOST response in areas where no NAPL was observed visually.

TarGOST Confirmation Boring 2013SC-127



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

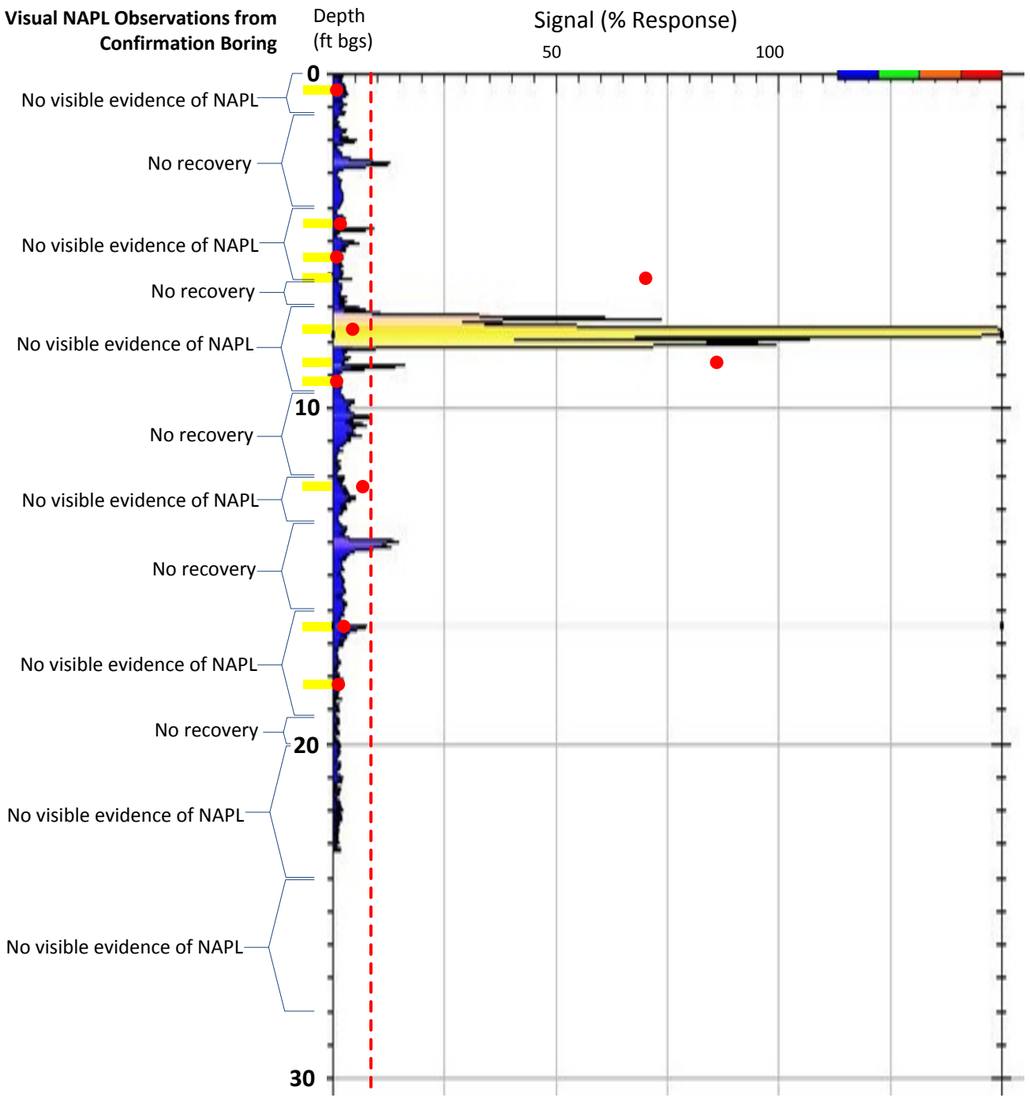
Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

TarGOST Confirmation Boring 2013SC-152 and 2013SC-152v2



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

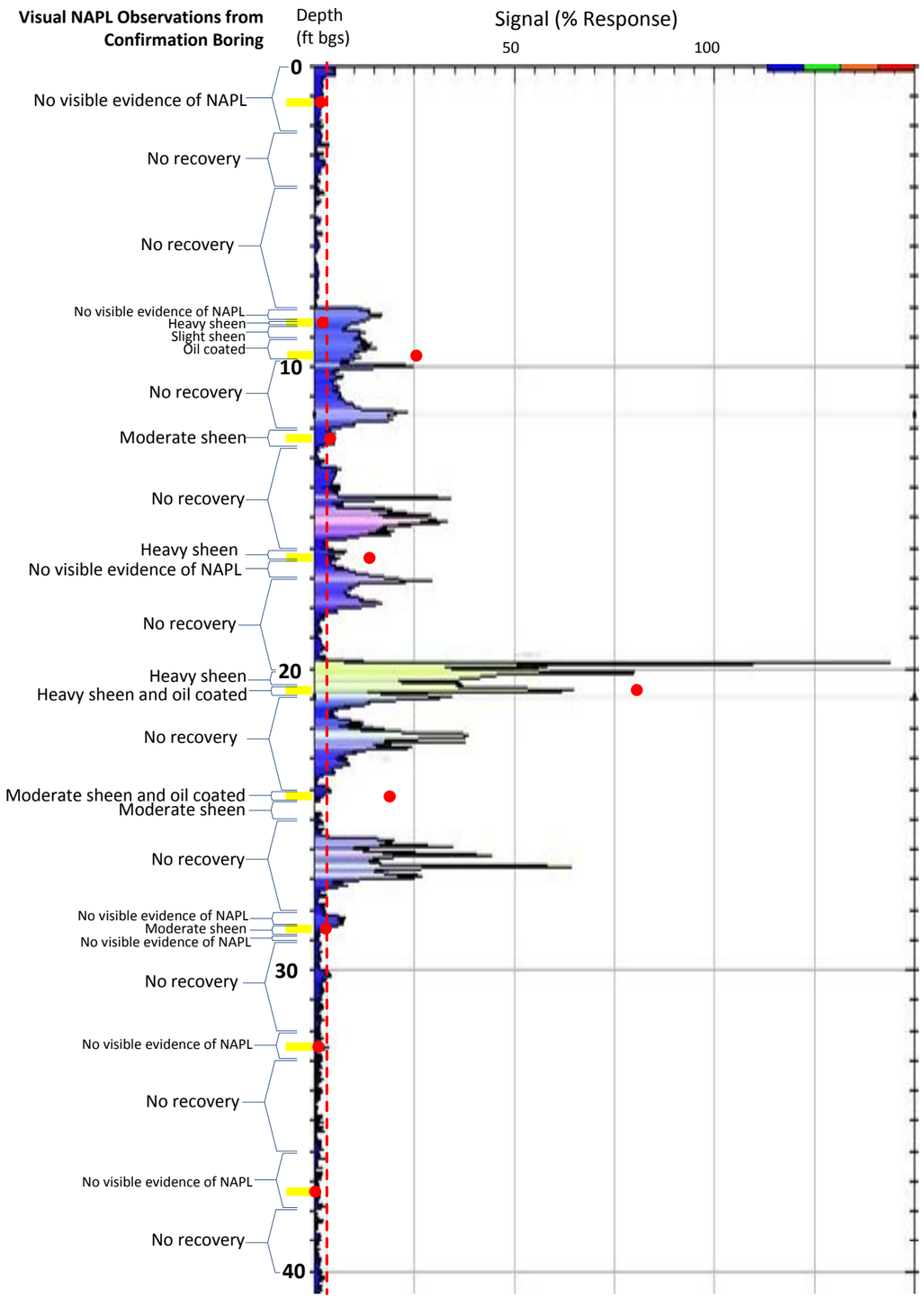
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 9

No visual evidence of NAPL was observed in the confirmation boring for this location despite elevated TarGOST responses in both in-situ and ex-situ readings. The cutoff %RE was chosen to be above the peaks in the in-situ TarGOST which were within areas of no visible NAPL and were corroborated with low ex-situ TarGOST responses. These were in the intervals of 4 – 6 ft and 16 to 19 ft. The interval between 7 - 8 ft which showed elevated in-situ and ex-situ responses was considered to accurately reflect NAPL presence.

TarGOST Confirmation Boring 2013SC-155



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

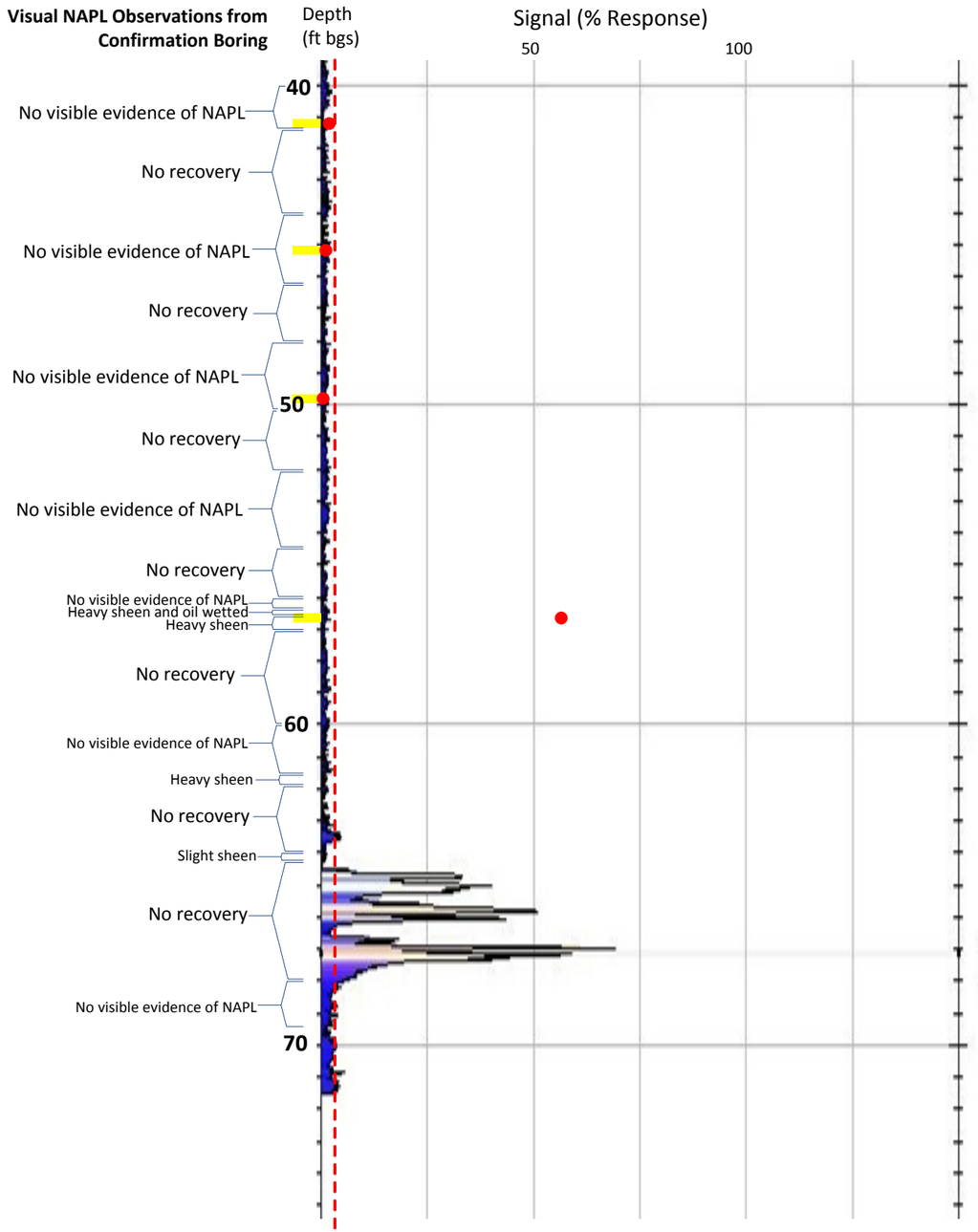
Interpretation

Selected ≥%RE indicating NAPL presence

≥%RE Chosen to Indicate NAPL Presence = 4

This value was chosen based primarily on the interval between 18 and 30 feet. This interval had the most observations of NAPL interspersed with areas of no NAPL observations. The value of 4 appears to delineate between both the in-situ and ex-situ TarGOST NAPL presence and absence numbers in comparison to the visual NAPL observations. The ex-situ readings for moderate sheen observations at 12.5 and 28.6 ft are at or below approximately 4 %RE while readings above and below this zone indicating no visible NAPL observations are all below 4%RE.

TarGOST Confirmation Boring 2013SC-155



LEGEND

In-Situ TarGOST Measurements

In-situ TarGOST response graphs are shown as the base of these figures. The TarGOST graphs shown correspond to the colocated confirmation soil cores.

Ex-situ TarGOST Measurements

Depth interval of ex-situ TarGOST measurement performed on soil core

Approximate average value for of %RE response for ex-situ TarGOST interval

Visual NAPL Observations

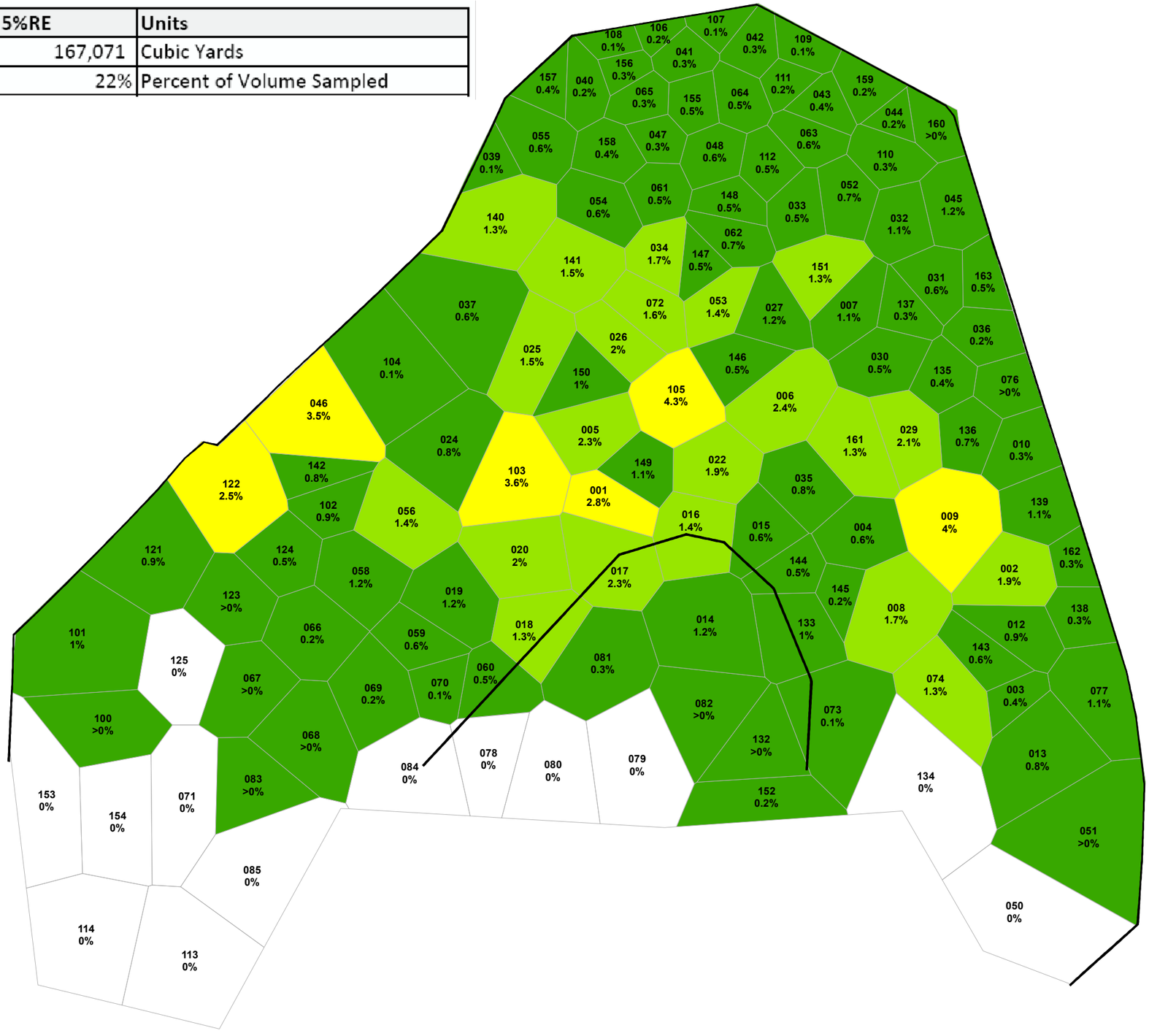
Visual observation of NAPL in the confirmation soil cores is shown with depth along the left border of the co-located in-situ TarGOST graphs.

Interpretation

Selected ≥%RE indicating NAPL presence

Appendix D
Supplemental Figures from Thiessen Polygon Evaluation

5%RE	Units
167,071	Cubic Yards
22%	Percent of Volume Sampled



10%RE

LEGEND

Percent of Total Affected Volume

(Area of polygons within each class)

0%	(2.1 acres)
>0% - 1.25%	(6.3 acres)
1.25% - 2.5%	(1.9 acres)
2.5% - 5%	(0.7 acres)
5% - 10%	(0 acres)
10% - 20%	(0 acres)

Sheet Pile Wall

Volume Sampled	Units
755,018	Cubic Yards
100%	Percent of Volume Sampled

Volume sampled is represented by TarGOST perfomed within the sheet pile wall.

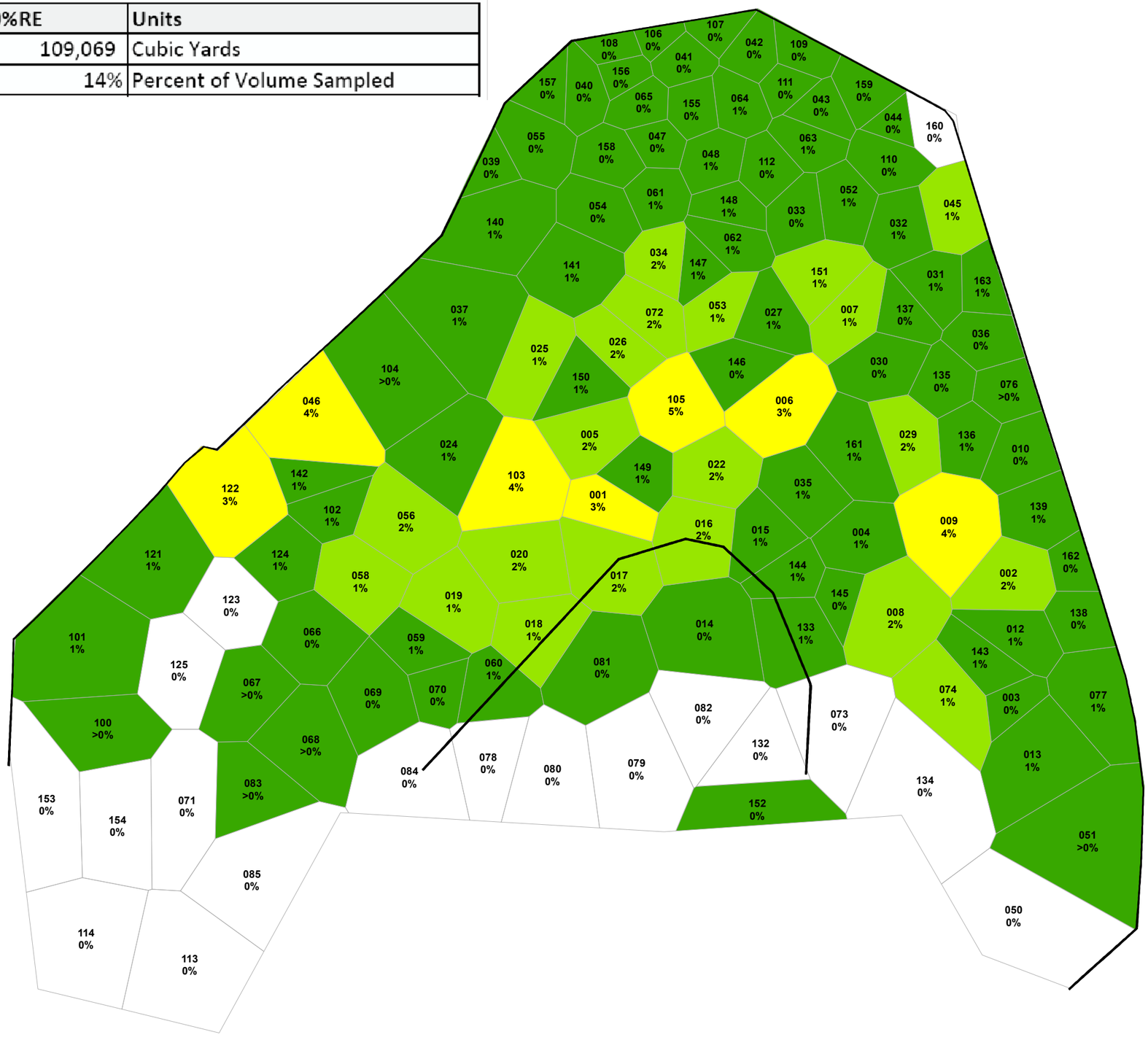
N

0 50 100 200 Feet

Figure D-1
Thiessen Polygon Volume Estimate
10%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURED-1_THEISSENPOLYS10RE.MXD GGEE 9/6/2013 9:14:52 AM

10%RE	Units
109,069	Cubic Yards
14%	Percent of Volume Sampled



15%RE

LEGEND

Percent of Total Affected Volume

(Area of polygons within each class)

	0%	(2.6 acres)
	>0% - 1.25%	(5.8 acres)
	1.25% - 2.5%	(1.8 acres)
	2.5% - 5%	(0.8 acres)
	5% - 10%	(0 acres)
	10% - 20%	(0 acres)
	Sheet Pile Wall	

Volume Sampled	Units
755,018	Cubic Yards
100%	Percent of Volume Sampled

Volume sampled is represented by TarGOST perfomed within the sheet pile wall.

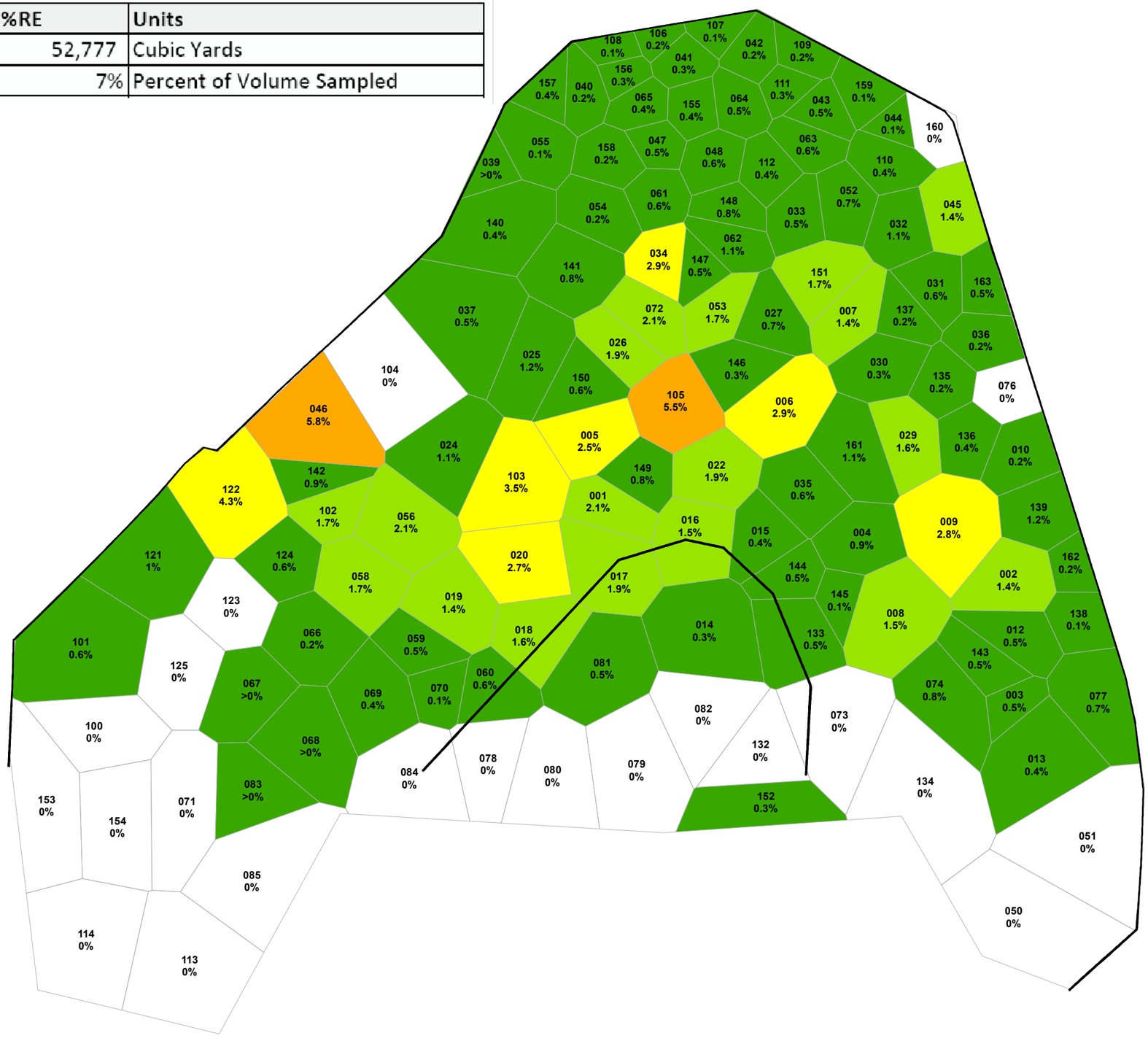
N

0 50 100 200 Feet

Figure D-2
Thiessen Polygon Volume Estimate
15%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURED-2_THEISSENPOLYS15RE.MXD GGEE 9/6/2013 9:24:56 AM

25%RE	Units
52,777	Cubic Yards
7%	Percent of Volume Sampled



25%RE

LEGEND

Percent of Total Affected Volume

(Area of polygons within each class)

0%	(3.2 acres)
>0% - 1.25%	(5.4 acres)
1.25% - 2.5%	(1.5 acres)
2.5% - 5%	(0.8 acres)
5% - 10%	(0.2 acres)
10% - 20%	(0 acres)
Sheet Pile Wall	

Volume Sampled	Units
755,018	Cubic Yards
100%	Percent of Volume Sampled

Volume sampled is represented by TarGOST perfomed within the sheet pile wall.

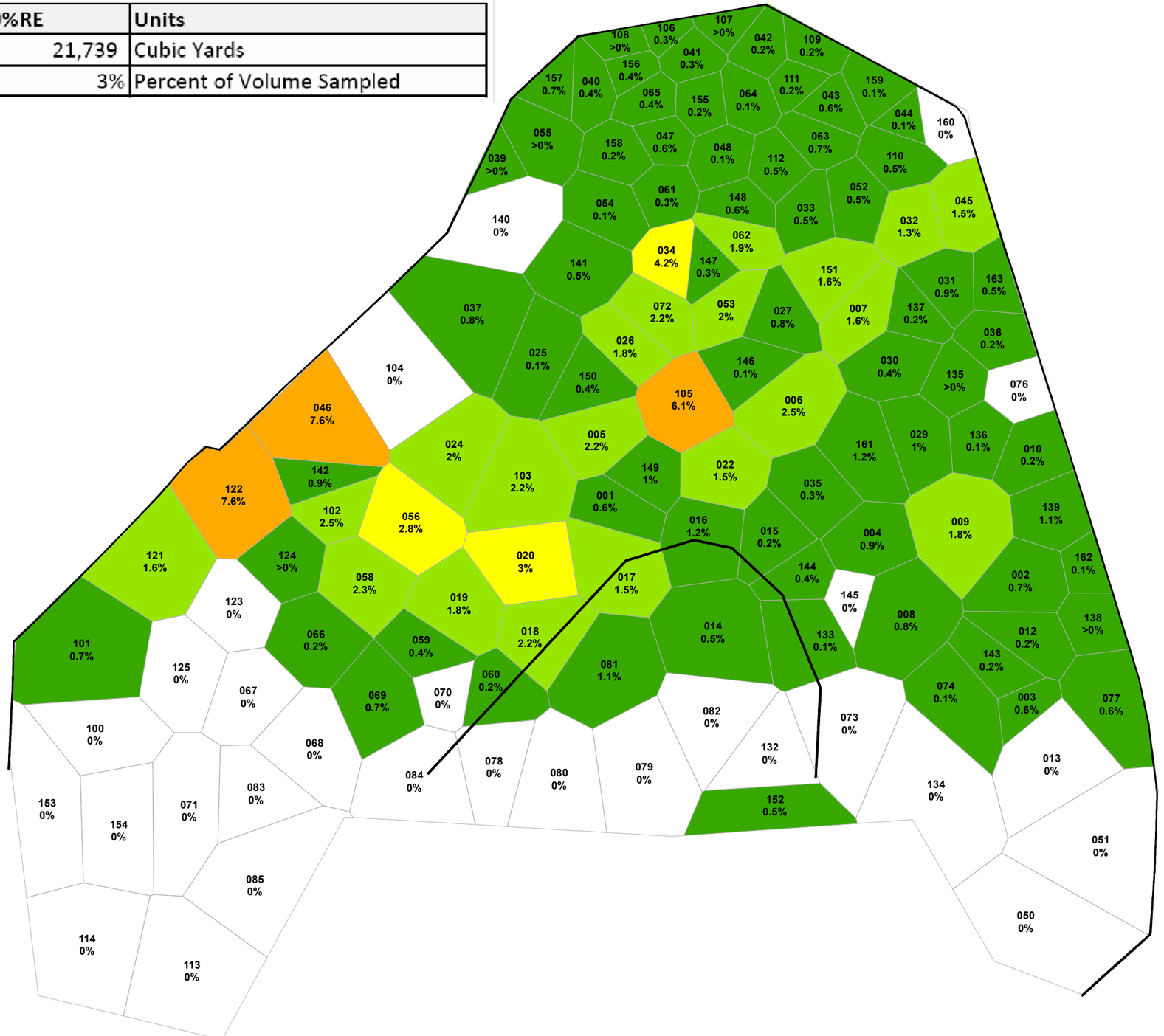
N

0 50 100 200 Feet

Figure D-3
Thiessen Polygon Volume Estimate
25%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

C:\USERS\GGEE\DOCUMENTS\GIS\WYCKOFF\MAPFILES\2013\FIELD INVESTIGATION SUMMARY MEMO\FIGURED-3_THEISSENPOLYS25RE.MXD GGEE 9/6/2013 9:36:04 AM

50%RE	Units
21,739	Cubic Yards
3%	Percent of Volume Sampled



50%RE

LEGEND

Percent of Total Affected Volume

(Area of polygons within each class)

	0%	(3.8 acres)
	>0% - 1.25%	(4.8 acres)
	1.25% - 2.5%	(1.8 acres)
	2.5% - 5%	(0.3 acres)
	5% - 10%	(0.4 acres)
	10% - 20%	(0 acres)
	Sheet Pile Wall	

Volume Sampled	Units
755,018	Cubic Yards
100%	Percent of Volume Sampled

Volume sampled is represented by TarGOST perfomed within the sheet pile wall.

N

0 50 100 200 Feet

Figure D-4
Thiessen Polygon Volume Estimate
50%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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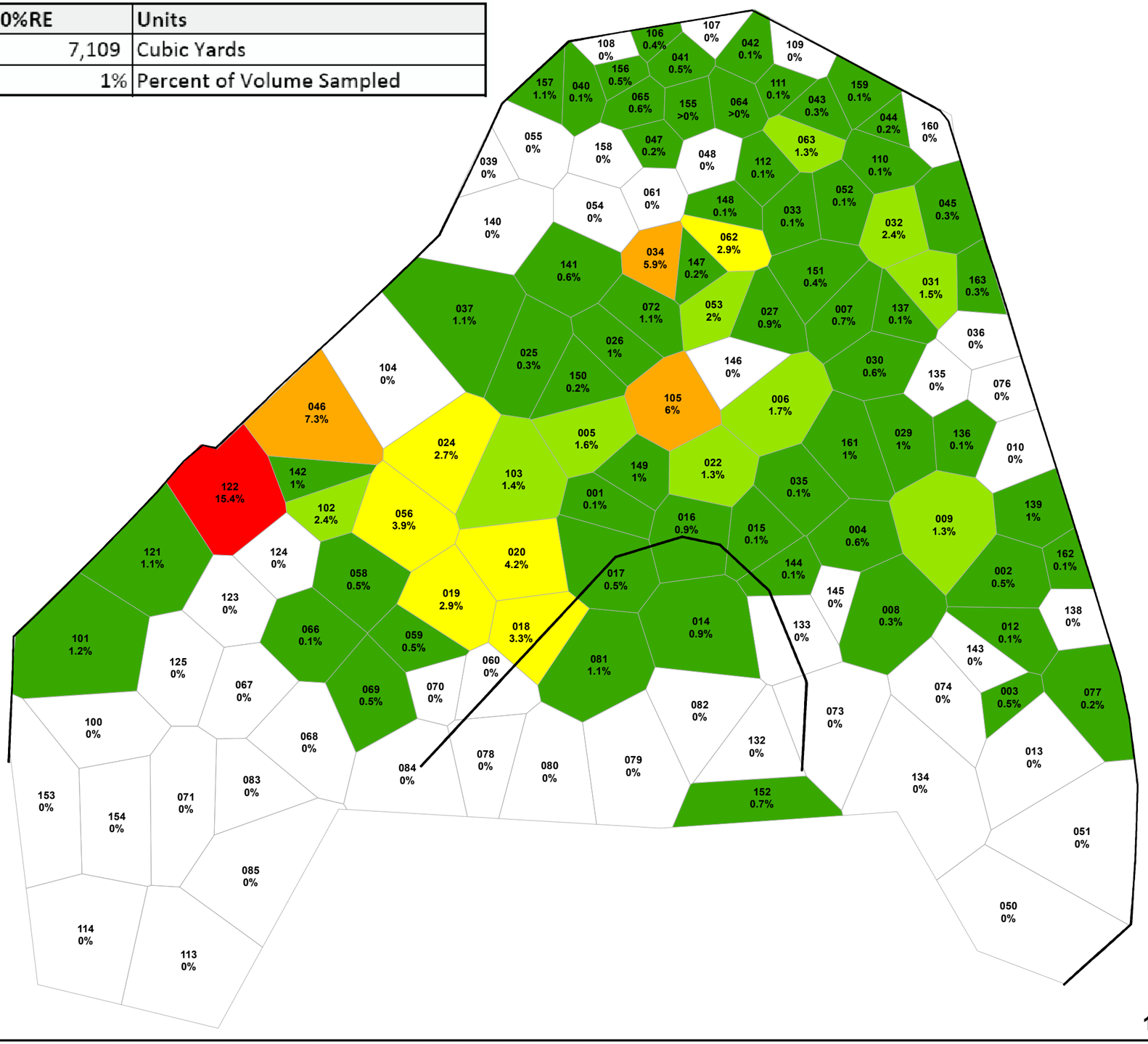
100%RE	Units
7,109	Cubic Yards
1%	Percent of Volume Sampled



100%RE

LEGEND

Percent of Total Affected Volume

(Area of polygons within each class)

	0%	(4.9 acres)
	>0% - 1.25%	(4.3 acres)
	1.25% - 2.5%	(0.8 acres)
	2.5% - 5%	(0.6 acres)
	5% - 10%	(0.3 acres)
	10% - 20%	(0.1 acres)
	Sheet Pile Wall	

Volume Sampled	Units
755,018	Cubic Yards
100%	Percent of Volume Sampled

Volume sampled is represented by TarGOST perfomed within the sheet pile wall.

N

0 50 100 200 Feet

Figure D-5
Thiessen Polygon Volume Estimate
100%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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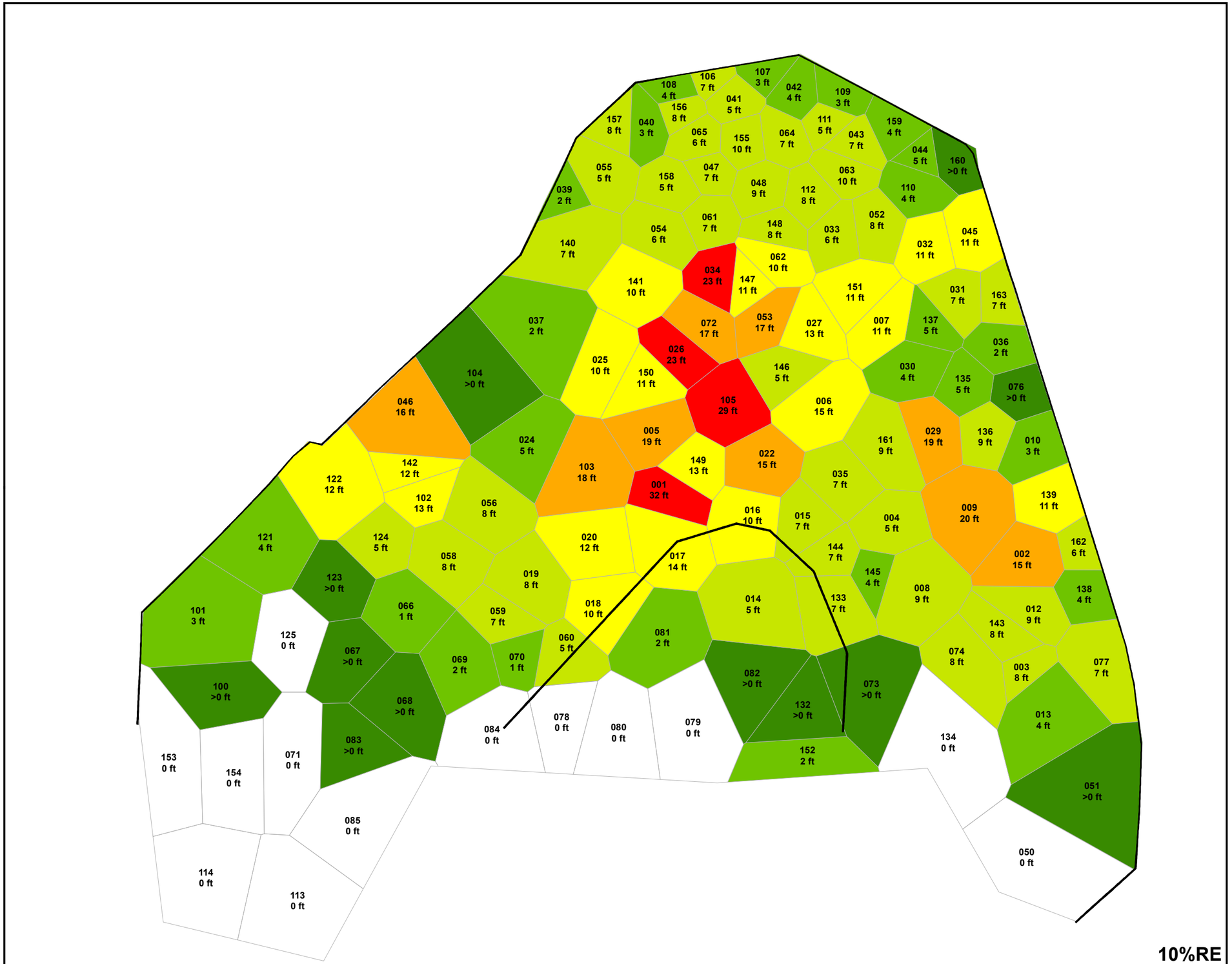

LEGEND

Thickness of Affected TarGOST Sample
(Area of polygons within each class)

0	(2.1 acres)
>0 - 1	(1.4 acres)
1 - 5	(2.0 acres)
5 - 10	(2.9 acres)
10 - 15	(1.6 acres)
15 - 20	(0.9 acres)
>20	(0.3 acres)
Sheet Pile Wall	

N

0 50 100 200 Feet

Figure D-6
Thickness of Affected TarGOST Samples
10%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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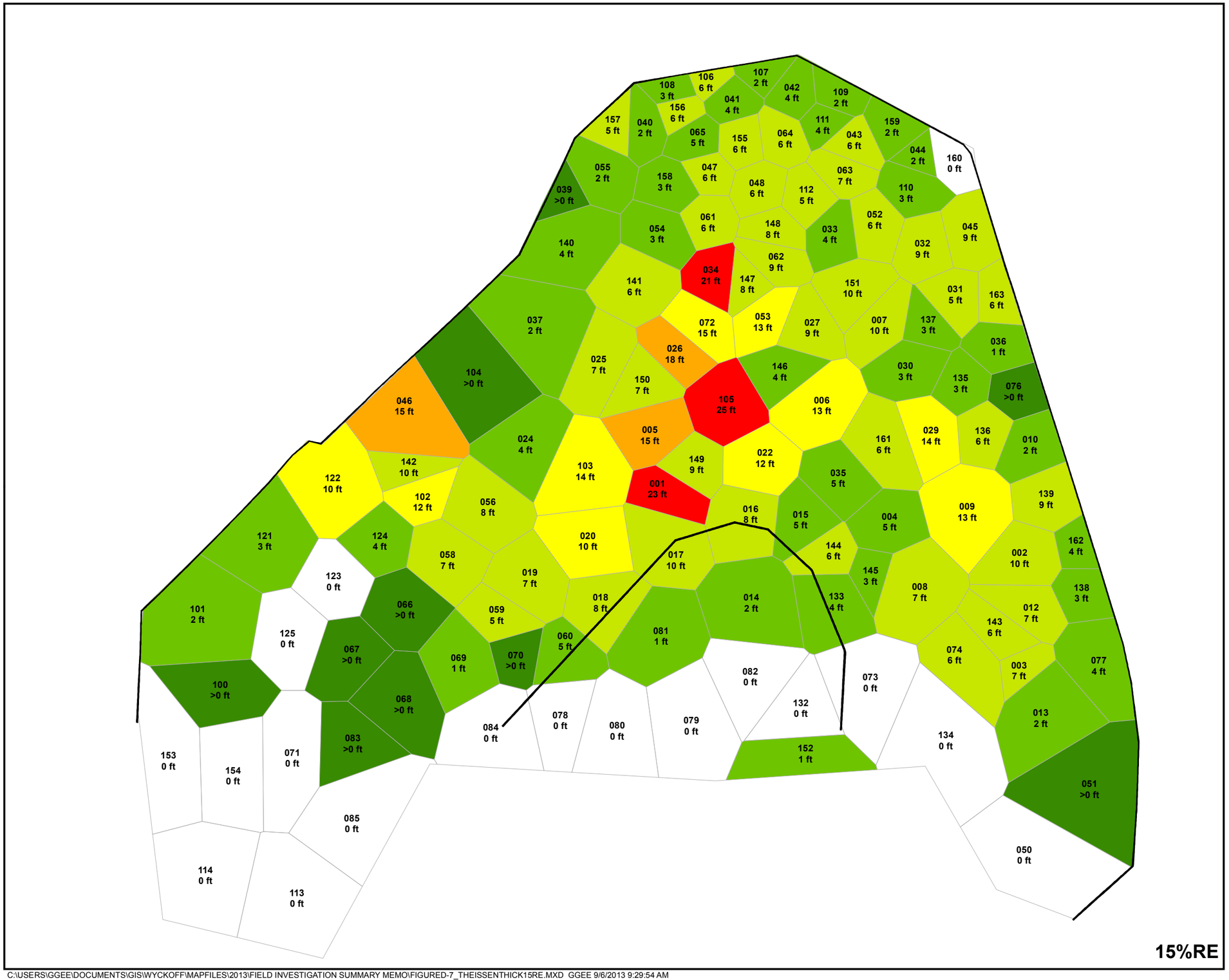

LEGEND

Thickness of Affected TarGOST Sample
(Area of polygons within each class)

	0	(2.6 acres)
	>0 - 1	(1.1 acres)
	1 - 5	(3.1 acres)
	5 - 10	(2.8 acres)
	10 - 15	(1.0 acres)
	15 - 20	(0.3 acres)
	>20	(0.2 acres)
	Sheet Pile Wall	

N

0 50 100 200 Feet

Figure D-7
Thickness of Affected TarGOST Samples
15%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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LEGEND

Thickness of Affected TarGOST Sample
(Area of polygons within each class)

	0	(3.2 acres)
	>0 - 1	(1.8 acres)
	1 - 5	(3.5 acres)
	5 - 10	(2.0 acres)
	10 - 15	(0.5 acres)
	15 - 20	(0.1 acres)
	>20	(0 acres)
	Sheet Pile Wall	

N

0 50 100 200 Feet

25%RE

Figure D-8
Thickness of Affected TarGOST Samples
25%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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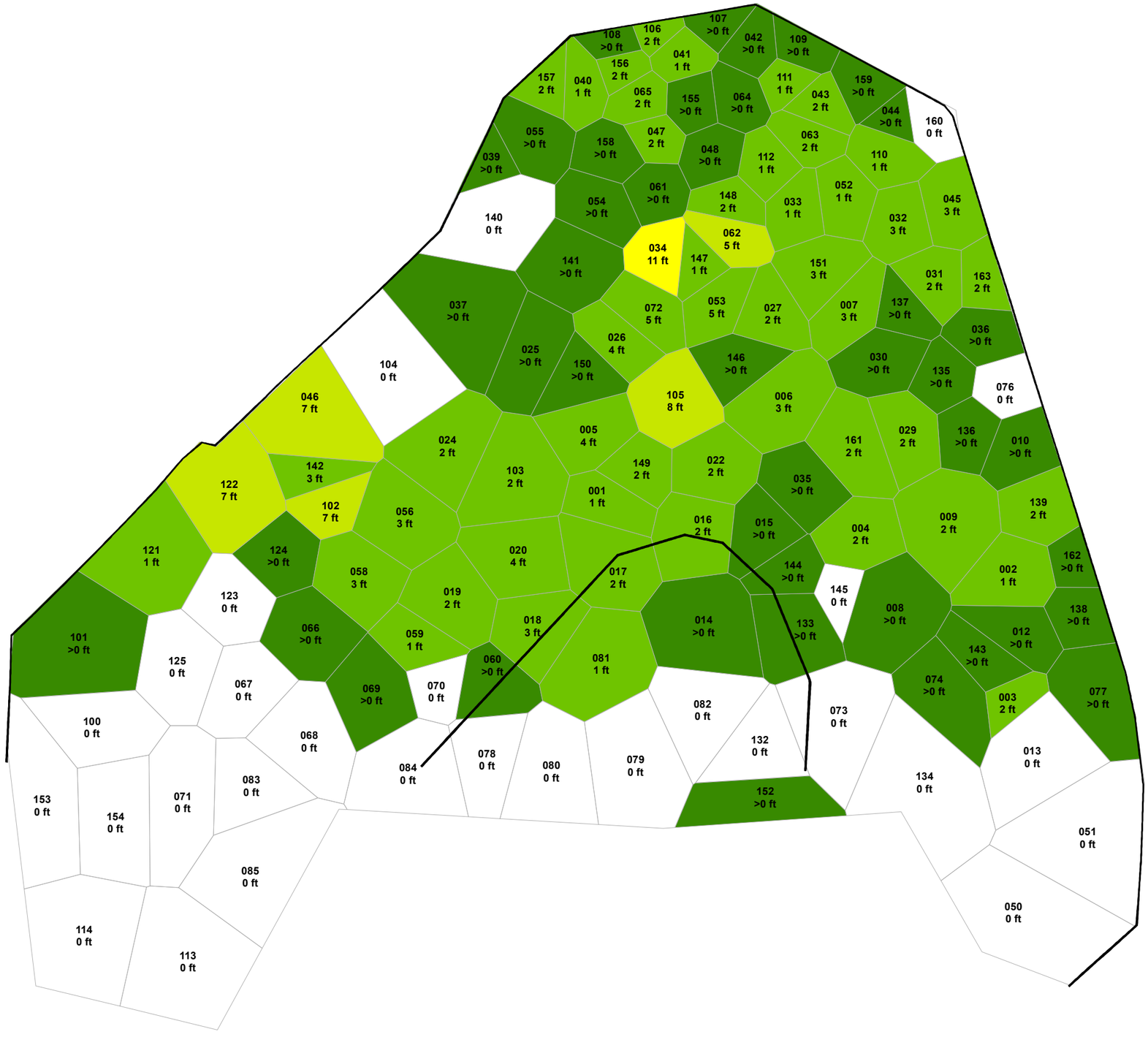

50%RE

LEGEND

Thickness of Affected TarGOST Sample
(Area of polygons within each class)

	0	(3.8 acres)
	>0 - 1	(3.1 acres)
	1 - 5	(3.6 acres)
	5 - 10	(0.5 acres)
	10 - 15	(0.1 acres)
	15 - 20	(0 acres)
	>20	(0 acres)
	Sheet Pile Wall	

N

0 50 100 200 Feet

Figure D-9
Thickness of Affected TarGOST Samples
50%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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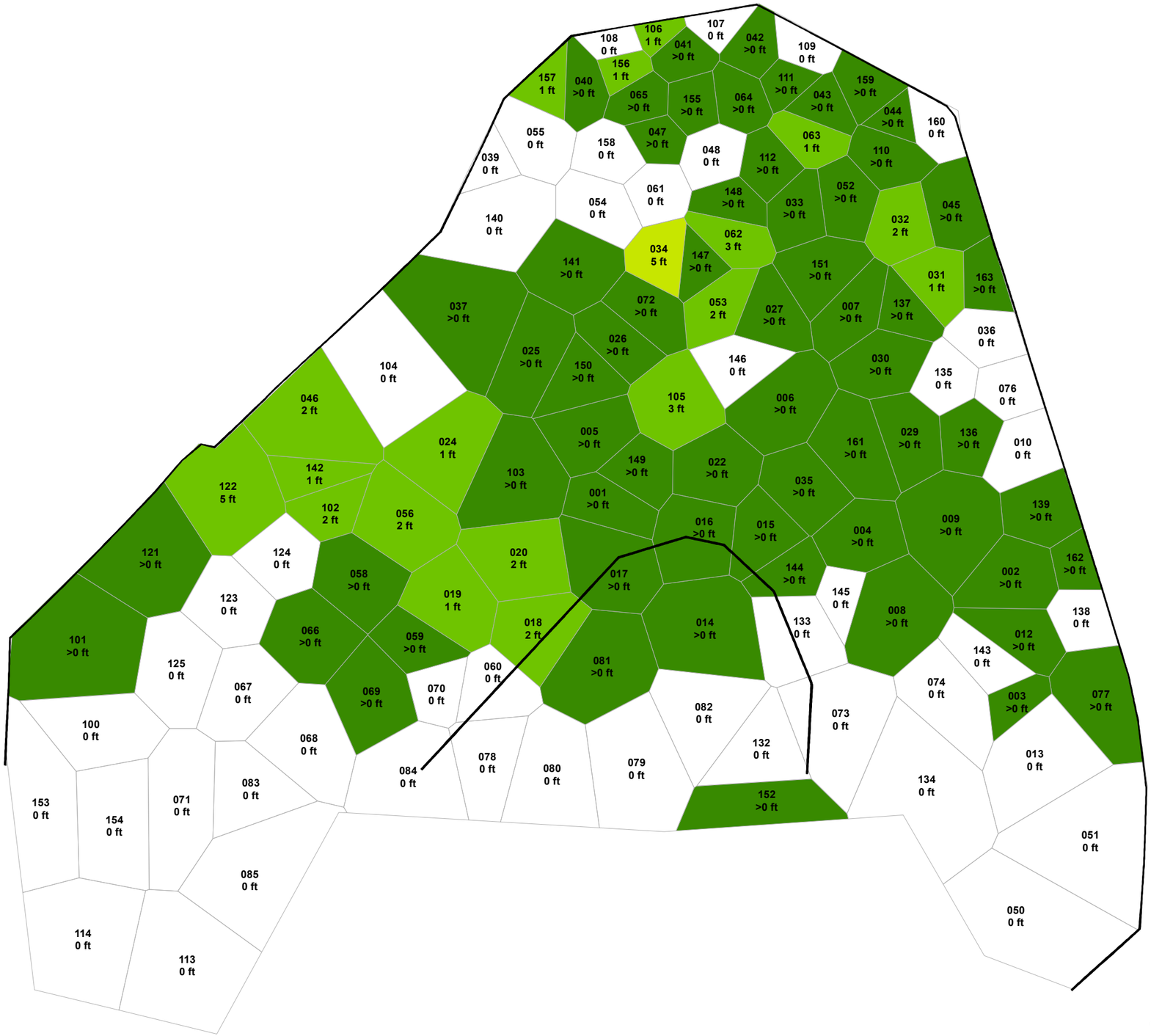

LEGEND

Thickness of Affected TarGOST Sample

(Area of polygons within each class)

	0	(4.9 acres)
	>0 - 1	(4.7 acres)
	1 - 5	(1.4 acres)
	5 - 10	(0.1 acres)
	10 - 15	(0 acres)
	15 - 20	(0 acres)
	>20	(0 acres)
	Sheet Pile Wall	

N

0 50 100 200 Feet

Figure D-10
Thickness of Affected TarGOST Samples
100%RE
Upland Dataset
Wyckoff Upland Field Investigation
Wyckoff/Eagle Harbor Superfund Site

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