AECOM Environment
40 British American Blvd.
Latham, NY 12110

518.951.2200 tel
518.951.2300 fax

Memorandum

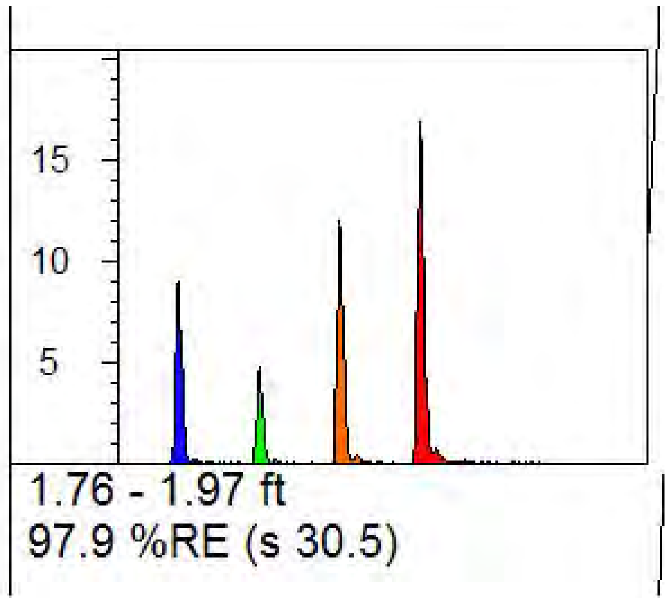
To	Elizabeth Lukowski, NYSDEC DER	Page	1
CC	John Ruspantini, NYSEG		
Subject	NYSEG Penn Yan Water Street former MGP Site Cell 6 Supplemental Investigation Data Summary		
From	Matthew Thorpe, P.E.		
Date	November 16, 2016		

This memo provides a summary of the results of the Cell 6 Investigation performed between October 4 and 12, 2016 at the Penn Yan Former Manufactured Gas Plant (MGP) Site (Site). Except as noted, the investigation was conducted as described in the Cell 6 Investigation Work Plan (Work Plan) dated September 29, 2016 as modified by an email from Matthew Thorpe to Elizabeth Lukowski dated October 4, 2016.

The scope of the investigation included the following activities:

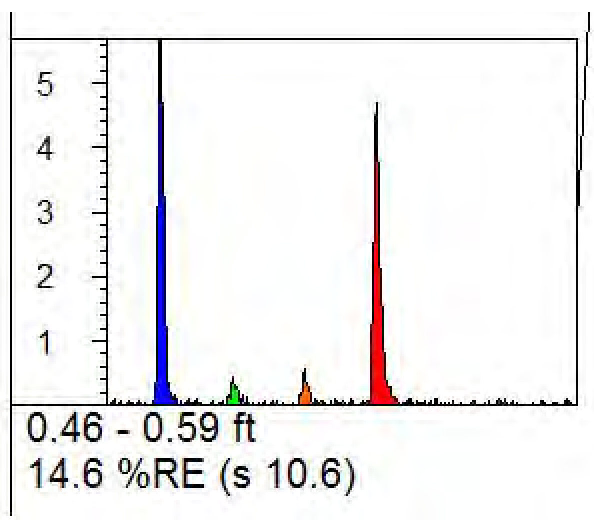
- Installation of 32 Cone Penetrometer Test (CPT) borings
- Performance of tar specific green optical screening tool (TarGOST) testing concurrent with CPT borings
- Installation of 14 vibracore borings near or in place of CPT boring locations

Drawing SI-6-1 shows investigation locations. Under the Work Plan (as revised on October 4, 2016) 44 CPT/TarGOST borings and 5 vibracore borings were planned. The 5 vibracore borings were intended to be placed immediately adjacent to CPT borings in order to provide visual confirmation of CPT/TarGOST data. Due to the unusually low water level in Keuka Lake this year 12 of the planned boring locations could not be accessed with the CPT/TarGOST drilling barge. Therefore it was mutually agreed upon with NYSDEC that these boring locations would be investigated with vibracore borings only. Additionally the number of locations was reduced by three (borings SSC-13, 16 and 43 were not completed). CPT/TarGOST logs are included in Attachment A. Vibracore logs are included in Attachment B. Attachment A also includes a guide for interpreting the CPT results, TarGOST technology brochure and example TarGOST boring log. Tables 1, 2 and 3 provide summaries of results for all borings, CPT/TarGOST and vibracore borings, respectively. For the CPT/TarGOST borings, the table shows the depths and elevation of the top of clay layer and bottom of impacts. A judgement of impacted vs. not impacted for TarGOST was made based on a response which matches the TarGOST coal tar “fingerprint” established for the site. The fingerprint was established by placing samples of site coal tar, sheen collected from the outlet water surface and visually impacted sediments collected from the outlet bottom on the TarGOST instrumentation. These evaluations produced borings logs labeled: “Sample”; “Sheen Sample”; and “Sediment Sample” respectively. All three of these exhibited the three wavelength (530, 620, and 670nm) callout plot “fingerprint” for the site coal tar. This is an up-sloped (left to right) “callout” plot of the intervals that showed increased fluorescence in the Signal (%RE) plot on the TarGOST boring logs.



Site coal tar “Fingerprint” Callout Plot (up-sloped green, orange and red channel responses). Note the “blue” channel is scatter received by the sensor.

Due to the highly organic nature of the shallow sediments fluorescence from algae was also observed in the TarGOST boring logs. As described by historic results on previous sediment projects by Dakota Technologies these responses are characterized by a “red shifted” callout plot as shown below and easily distinguished. Algae responses were observed in the following boring locations: SCC-03, 12, 23, 34



Algae Callout Plot showing predominantly red channel only response.

For vibracore borings, the judgement was made based on visual observation. Drawings SI-6-2, SI-6-3 and SI-6-4 show the estimated horizontal, vertical limits and impacted thickness of sediment impacts, respectively, based on the results shown in the tables.

Note that the CPT logs provide very detailed subsurface data, revealing that the silt, clay, and sand soils in Cell 6 have complex interlayering. Therefore, some judgement is necessary to define the top of a “clay” confining layer.

Although no soil samples are obtained, the CPT data is used to interpret “Soil Behavior Type” (SBT) as described in Attachment A. In addition to SBT, AECOM considered both the CPT tip resistance (qt) and pore pressure response (u) to define top of “clay.” In general, the very soft sediments immediately below mudline were discounted, and top of “clay” conforms to the depth where the CPT tip resistance begins to increase to values greater than about 5 tsf and where there is a distinct pore pressure response. The logic is that the stiffer soil defined by these criteria will provide a hydraulic barrier, whereas the upper very soft sediments may not. Vibracore data were interpreted in similar fashion, where very soft sediments were not considered when defining the top of the “clay” confining layer.

It is also noted that at a few locations the CPT borings indicated that the sediments were primarily sandy. An example is CPT SSC-08, where approximately 2 feet of very soft sediments is followed by silty sand soils with no substantial clay layer. These situations will be handled similar to where clayey soils were found; that is, soft sediments will be removed to a firm bottom or to bottom of MGP impacts, whichever is deeper.

It is also noted that, on occasion, the driller was unsuccessful in controlling the rate of CPT penetration through the upper very soft sediments, causing the CPT drill rods to drop. This rapid descent may have impacted the reliability of the TarGOST tests, which require a prescribed rate of penetration. (That is, it is possible that some relatively thin MGP impacts may have been missed in this very soft zone at locations where the rate of CPT penetration was too fast.) However, dredging to top of “clay,” as previously defined herein, will remove these very soft sediments, eliminating any uncertainty in the TarGOST data.

Drawings

Boring Data Summary Tables

Attachment A
Cone Penetration Test and TarGOST Logs

Attachment B
Vibracore Logs

Boring Data Summary Tables

Table 1
CPT, TarGOST, and Vibracore Boring Summary
Cell 6 Investigation
Penn Yan Former MGP Site

		Boring Location				Mudline		Top of Clay Layer		Bottom of TarGOST Impacts		Bottom of Visual Impacts		Summarized Bottom of Impacts	
Point No.	Date Drilled	Northing	Easting	Deck Elev	Water Elev.	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)
SSC-1	10/5/2016	968881.2	693433.3	824.0	712.71	3.80	708.91	6.8	705.9	3.8	708.9	NA	NA	3.8	708.91
SSC-2	10/4/2016	968866.2	693447.0	825.0	712.71	5.00	707.71	6.0	706.7	5.0	707.7	NA	NA	5.0	707.71
SSC-2-VC	10/12/2016	968865.1	693446.3	NA	NA	NA	708.01	3.0	705.0	NA	NA	3.0	705.01	NU	NU
SSC-3	10/5/2016	968850.4	693456.8	826.7	712.71	6.00	706.71	8.2	704.5	6.0	706.7	NA	NA	6.0	706.71
SSC-4	10/5/2016	968892.8	693451.4	824.4	712.71	4.00	708.71	7.8	704.9	4.0	708.7	NA	NA	4.0	708.71
SSC-5	10/4/2016	968878.2	693462.7	824.9	712.71	5.30	707.41	8.0	704.7	5.3	707.4	NA	NA	5.3	707.41
SSC-6	10/5/2016	968860.8	693474.8	825.0	712.71	5.90	706.81	9.3	703.4	5.9	706.8	NA	NA	5.9	706.81
SSC-7	10/5/2016	968895.0	693470.4	825.0	712.71	3.20	709.51	6.5	706.2	8.6	704.1	NA	NA	8.6	704.11
SSC-8	10/5/2016	968886.2	693480.7	825.0	712.71	5.30	707.41	8.0	704.7	5.3	707.4	NA	NA	5.3	707.41
SSC-9	10/5/2016	968869.1	693490.2	824.9	712.71	5.70	707.01	7.0	705.7	5.7	707.0	NA	NA	5.7	707.01
SSC-10	10/5/2016	968906.1	693488.0	826.0	712.71	3.90	708.81	7.7	705.0	7.8	705.0	NA	NA	7.8	704.96
SSC-11	10/5/2016	968900.0	693499.0	825.0	712.71	4.80	707.91	9.5	703.2	11.7	701.0	NA	NA	11.7	701.01
SSC-11-VC	10/11/2016	968900.9	693501.5	NA	NA	NA	708.1	4.0	704.1	NA	NA	4.0	704.10	NU	NU
SSC-12	10/5/2016	968885.6	693512.2	825.0	712.71	5.80	706.91	7.5	705.2	5.8	706.9	NA	NA	5.8	706.9
SSC-14	10/7/2016	968918.6	693514.1	824.9	712.72	4.00	708.72	8.0	704.7	8.0	704.7	NA	NA	8.0	704.7
SSC-15	10/6/2016	968908.2	693532.0	830.1	712.70	5.60	707.10	7.0	705.7	5.7	707.0	NA	NA	5.7	707.0
SSC-17	10/7/2016	968934.3	693526.4	824.9	712.72	3.70	709.02	8.0	704.7	9.8	703.0	NA	NA	9.8	703.0
SSC-18	10/6/2016	968922.1	693543.9	825.2	712.70	5.60	707.10	10.0	702.7	5.6	707.1	NA	NA	5.6	707.1
SSC-19-VC	10/11/2016	968963.3	693523.7	NA	NA	NA	711.60	5.5	706.1	NA	NA	2.5	709.10	2.5	709.1
SSC-20	10/7/2016	968949.6	693541.2	824.7	712.72	3.20	709.52	10.0	702.7	8.2	704.5	NA	NA	NU	NU
SSC-20-VC	10/11/2016	968948.9	693538.4	NA	NA	NA	709.28	6.0	703.3	NA	NA	6.0	703.28	6.0	703.3
SSC-21	10/6/2016	968937.7	693555.3	824.8	712.70	4.80	707.90	10.3	702.4	4.8	707.9	NA	NA	4.8	707.9
SSC-22	10/7/2016	968968.5	693553.7	824.9	712.72	2.60	710.12	9.0	703.7	7.6	705.1	NA	NA	7.6	705.1
SSC-22-VC	10/13/2016	968965.5	693550.4	NA	NA	NA	709.88	4.0	705.9	NA	NA	2.5	707.38	NU	NU
SSC-23	10/6/2016	968953.8	693569.9	824.5	712.70	4.90	707.80	9.2	703.5	4.9	707.8	NA	NA	4.9	707.8

Table 1
CPT, TarGOST, and Vibracore Boring Summary
Cell 6 Investigation
Penn Yan Former MGP Site

		Boring Location				Mudline		Top of Clay Layer		Bottom of TarGOST Impacts		Bottom of Visual Impacts		Summarized Bottom of Impacts	
Point No.	Date Drilled	Northing	Easting	Deck Elev	Water Elev.	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)
SSC-24	10/7/2016	968978.8	693569.7	824.9	712.72	3.20	709.52	8.5	704.2	3.2	709.5	NA	NA	3.2	709.5
SSC-25	10/6/2016	968968.5	693581.6	823.1	712.70	4.60	708.10	8.3	704.4	4.6	708.1	NA	NA	4.6	708.1
SSC-26-VC	10/11/2016	969003.6	693566.9	NA	NA	NA	710.69	6.0	704.7	NA	NA	NO	NA	NU	NU
SSC-27	10/7/2016	968991.8	693580.7	824.9	712.72	3.10	709.62	8.5	704.2	5.0	707.7	NA	NA	5.0	707.7
SSC-28	10/6/2016	968986.8	693591.4	823.7	712.70	4.20	708.50	9.0	703.7	4.2	708.5	NA	NA	4.2	708.5
SSC-29-VC	10/11/2016	969023.7	693576.0	NA	NA	NA	710.99	6.0	705.0	NA	NA	NO	NA	NU	NU
SSC-30	10/7/2016	969011.7	693593.3	824.9	712.72	3.30	709.42	7.0	705.7	3.3	709.4	NA	NA	3.3	709.4
SSC-31	10/6/2016	969001.1	693603.9	824.8	712.70	4.20	708.50	8.5	704.2	4.2	708.5	NA	NA	4.2	708.5
SSC-32-VC	10/11/2016	969041.9	693585.7	NA	NA	NA	711.30	3.0	708.3	NA	NA	NO	NA	NU	NU
SSC-33	10/6/2016	969030.0	693599.9	824.8	712.70	3.70	709.00	9.0	703.7	3.7	709.0	NA	NA	3.7	709.0
SSC-34	10/6/2016	969019.2	693619.3	824.8	712.70	4.70	708.00	8.5	704.2	4.7	708.0	NA	NA	4.7	708.0
SSC-34-VC	10/12/2016	969021.7	693621.0	NA	NA	NA	708.28			NA	NA	NO	NA	NU	NU
SSC-35-VC	10/11/2016	969060.0	693595.3	NA	NA	NA	711.35	6.0	705.4	NA	NA	NO	NA	NU	NU
SSC-36	10/6/2016	969050.3	693616.9	824.8	712.70	3.70	709.00	8.5	704.2	3.7	709.0	NA	NA	3.7	709.0
SSC-37	10/6/2016	969039.7	693632.9	824.7	712.70	4.40	708.30	9.0	703.7	4.4	708.3	NA	NA	4.4	708.3
SSC-38-VC	10/11/2016	969078.5	693602.8	NA	NA	NA	711.59	7.5	704.1	NA	NA	NO	NA	NU	NU
SSC-39	10/6/2016	969067.5	693625.8	824.5	712.70	3.20	709.50	8.0	704.7	3.2	709.5	NA	NA	3.2	709.5
SSC-40	10/6/2016	969058.3	693641.4	824.8	712.70	4.10	708.60	8.0	704.7	4.1	708.6	NA	NA	4.1	708.6
SSC-41-VC	10/12/2016	968927.9	693490.7	NA	NA	NA	711.34	5.5	705.8	NA	NA	0.8	710.59	0.8	710.6
SSC-42-VC	10/12/2016	968944.3	693503.0	NA	NA	NA	711.88	5.0	706.9	NA	NA	2.0	709.88	2.0	709.9
SSC-44-VC	10/11/2016	968978.2	693536.1	NA	NA	NA	711.98	5.0	707.0	NA	NA	NO	NA	NU	NU

Notes:

NO - Not observed

NA - Not applicable

NU - Not Used

VC - Vibracore

CPT - Cone Penetrometer Test

Table 2
CPT and TarGOST Boring Summary
Cell 6 Investigation
Penn Yan Former MGP Site

		Boring Location				Mudline		Targost Impacts		Top of Clay Layer		Top of Silt/Sand Layer		Bottom of TarGOST Impacts	
Point No.	Date Drilled	Northing	Easting	Deck Elev	Water Elev.	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)
SSC-1	10/5/2016	968881.2	693433.3	824.0	712.71	3.80	708.91	3.8	708.9	6.8	705.9	14.0	698.7	3.8	708.9
SSC-2	10/4/2016	968866.2	693447.0	825.0	712.71	5.00	707.71	5.0	707.7	6.0	706.7	8.5	699.2	5.0	707.7
SSC-3	10/5/2016	968850.4	693456.8	826.7	712.71	6.00	706.71	6.0	706.7	8.2	704.5	12.7	694.0	6.0	706.7
SSC-4	10/5/2016	968892.8	693451.4	824.4	712.71	4.00	708.71	4.0	708.7	7.8	704.9	9.8	698.9	4.0	708.7
SSC-5	10/4/2016	968878.2	693462.7	824.9	712.71	5.30	707.41	5.3	707.4	8.0	704.7	8.3	699.1	5.3	707.4
SSC-6	10/5/2016	968860.8	693474.8	825.0	712.71	5.90	706.81	5.9	706.8	9.3	703.4	11.0	695.8	5.9	706.8
SSC-7	10/5/2016	968895.0	693470.4	825.0	712.71	3.20	709.51	8.6	704.1	6.5	706.2	10.0	699.5	8.6	704.1
SSC-8	10/5/2016	968886.2	693480.7	825.0	712.71	5.30	707.41	5.3	707.4	8.0	704.7	8.0	699.4	5.3	707.4
SSC-9	10/5/2016	968869.1	693490.2	824.9	712.71	5.70	707.01	5.7	707.0	7.0	705.7	7.0	700.0	5.7	707.0
SSC-10	10/5/2016	968906.1	693488.0	826.0	712.71	3.90	708.81	4.4	708.3	7.7	705.0	11.7	697.1	7.8	705.0
SSC-11	10/5/2016	968900.0	693499.0	825.0	712.71	4.80	707.91	5.3	707.4	9.5	703.2	NO	NA	11.7	701.0
SSC-12	10/5/2016	968885.6	693512.2	825.0	712.71	5.80	706.91	5.8	706.9	7.5	705.2	12.5	694.4	5.8	706.9
SSC-14	10/7/2016	968918.6	693514.1	824.9	712.72	4.00	708.72	5.3	707.4	8.0	704.7	NO	NA	8.0	704.7
SSC-15	10/6/2016	968908.2	693532.0	830.1	712.70	5.60	707.10	5.7	707.0	7.0	705.7	15.8	691.3	5.7	707.0
SSC-17	10/7/2016	968934.3	693526.4	824.9	712.72	3.70	709.02	4.7	708.0	8.0	704.7	16.0	693.0	9.8	702.9
SSC-18	10/6/2016	968922.1	693543.9	825.2	712.70	5.60	707.10	5.6	707.1	10.0	702.7	NO	NA	5.6	707.1
SSC-20	10/7/2016	968949.6	693541.2	824.7	712.72	3.20	709.52	4.8	707.9	10.0	702.7	NO	NA	8.2	704.5
SSC-21	10/6/2016	968937.7	693555.3	824.8	712.70	4.80	707.90	4.8	707.9	10.3	702.4	NO	NA	4.8	707.9
SSC-22	10/7/2016	968968.5	693553.7	824.9	712.72	2.60	710.12	3.9	708.8	9.0	703.7	NO	NA	7.6	705.1
SSC-23	10/6/2016	968953.8	693569.9	824.5	712.70	4.90	707.80	4.9	707.8	9.2	703.5	13.8	694.0	4.9	707.8
SSC-24	10/7/2016	968978.8	693569.7	824.9	712.72	3.20	709.52	3.2	709.5	8.5	704.2	NO	NA	3.2	709.5
SSC-25	10/6/2016	968968.5	693581.6	823.1	712.70	4.60	708.10	4.6	708.1	8.3	704.4	13.3	694.8	4.6	708.1
SSC-27	10/7/2016	968991.8	693580.7	824.9	712.72	3.10	709.62	4.0	708.7	8.5	704.2	10.7	698.9	5.0	707.7
SSC-28	10/6/2016	968986.8	693591.4	823.7	712.70	4.20	708.50	4.2	708.5	9.0	703.7	11.0	697.5	4.2	708.5
SSC-30	10/7/2016	969011.7	693593.3	824.9	712.72	3.30	709.42	3.3	709.4	7.0	705.7	8.0	701.4	3.3	709.4
SSC-31	10/6/2016	969001.1	693603.9	824.8	712.70	4.20	708.50	4.2	708.5	8.5	704.2	NO	NA	4.2	708.5
SSC-33	10/6/2016	969030.0	693599.9	824.8	712.70	3.70	709.00	3.7	709.0	9.0	703.7	20.0	689.0	3.7	709.0
SSC-34	10/6/2016	969019.2	693619.3	824.8	712.70	4.70	708.00	4.7	708.0	8.5	704.2	NO	NA	4.7	708.0
SSC-36	10/6/2016	969050.3	693616.9	824.8	712.70	3.70	709.00	3.7	709.0	8.5	704.2	20.0	689.0	3.7	709.0
SSC-37	10/6/2016	969039.7	693632.9	824.7	712.70	4.40	708.30	4.4	708.3	9.0	703.7	NO	NA	4.4	708.3
SSC-39	10/6/2016	969067.5	693625.8	824.5	712.70	3.20	709.50	3.2	709.5	8.0	704.7	NO	NA	3.2	709.5
SSC-40	10/6/2016	969058.3	693641.4	824.8	712.70	4.10	708.60	4.1	708.6	8.0	704.7	NO	NA	4.1	708.6

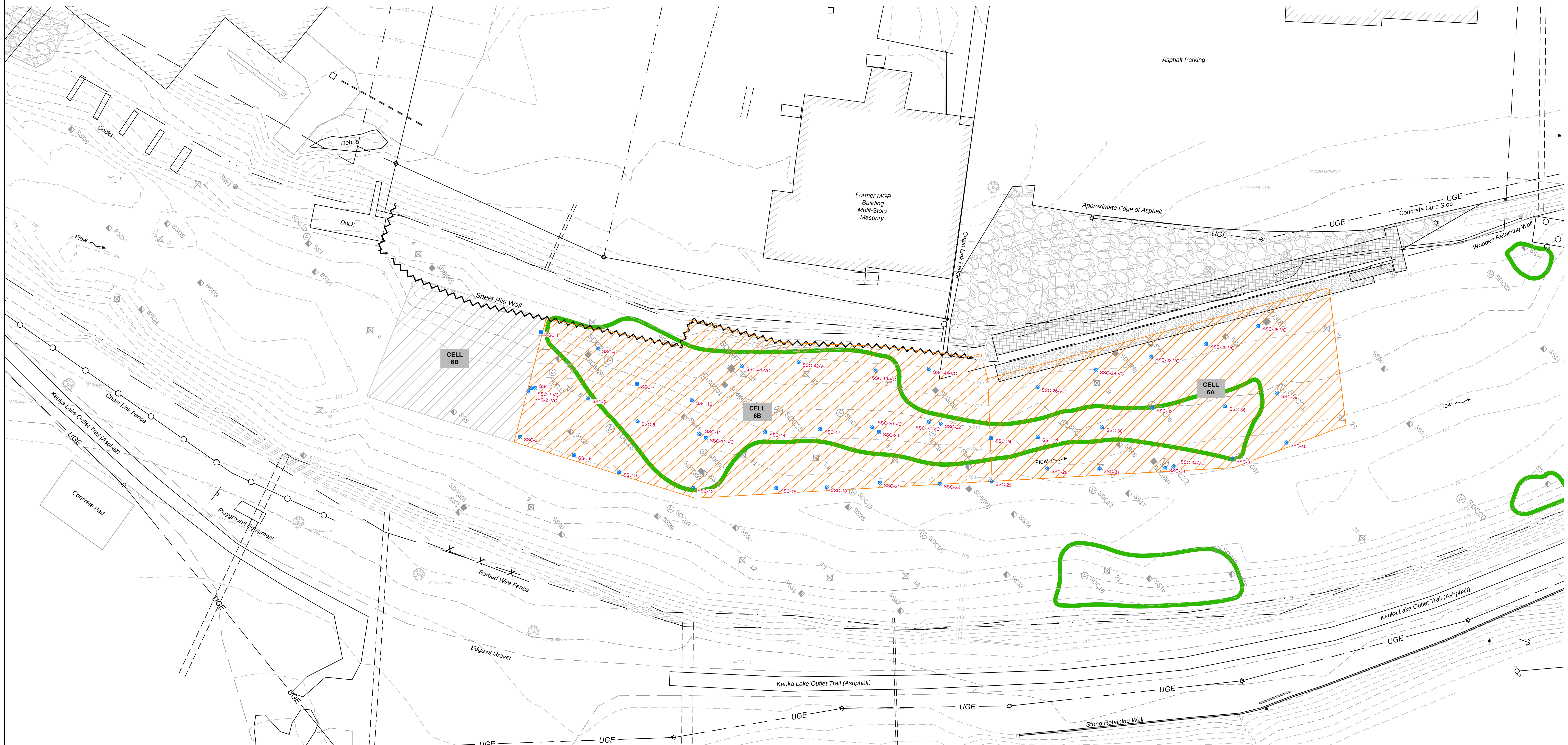
Notes:
- NO - Not observed
- VC - Vibracore
- CPT - Cone Penetrometer Test

Table 3
Vibracore Boring Summary
Cell 6 Investigation
Penn Yan Former MGP Site

Point No.	Date Drilled	Boring Location			Top of Clay Layer		Top of Silt/Sand Layer		Bottom of Visual Impacts	
		Northing	Easting	Mudline Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)	Depth (feet)	Elev. (feet)
SSC-2-VC	10/12/2016	968865.1	693446.3	708.01	3.0	705.0	0	708.01	3.0	705.01
SSC-11-VC	10/11/2016	968900.9	693501.5	708.1	4.0	704.1	NO	NA	4.0	704.10
SSC-19-VC	10/11/2016	968963.3	693523.7	711.60	5.5	706.1	NA	NA	2.5	709.10
SSC-20-VC	10/11/2016	968948.9	693538.4	709.28	6.0	703.3	NA	NA	6.0	703.28
SSC-22-VC	10/13/2016	968965.5	693550.4	709.88	4.0	705.9	0.0	709.9	2.5	707.38
SSC-26-VC	10/11/2016	969003.6	693566.9	710.69	6.0	704.7			NO	NA
SSC-29-VC	10/11/2016	969023.7	693576.0	710.99	6.0	705.0			NO	NA
SSC-32-VC	10/11/2016	969041.9	693585.7	711.30	3.0	708.3			NO	NA
SSC-34-VC	10/12/2016	969021.7	693621.0	708.28					NO	NA
SSC-35-VC	10/11/2016	969060.0	693595.3	711.35	6.0	705.4			NO	NA
SSC-38-VC	10/11/2016	969078.5	693602.8	711.59	7.5	704.1			NO	NA
SSC-41-VC	10/12/2016	968927.9	693490.7	711.34	5.5	705.8			0.8	710.59
SSC-42-VC	10/12/2016	968944.3	693503.0	711.88	5.0	706.9			2.0	709.88
SSC-44-VC	10/11/2016	968978.2	693536.1	711.98	5.0	707.0			NO	NA

Notes:
- NO - Not observed
- NA - Not applicable
- VC - Vibracore

Drawings



LEGEND

- Approximate Limits of Observed MGP-Related Hydrocarbon Impacts in the Sediment Investigation Area (Remedial Investigation 2008)
- Proposed Deep Sediment Removal Area
- Proposed Shallow Sediment Removal Area
- SAMPLE ID. — Supplemental Investigation Boring Location

20 0 40

1"=20'

* COLOR DOCUMENT *

AECOM

PROJECT

100% REMEDIAL DESIGN
WATER STREET
MANUFACTURED GAS PLANT

VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CELL 6 SUPPLEMENTAL INVESTIGATION

CLIENT

NYSEG

New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
-	-	-

KEY PLAN

SHEET TITLE

CELL 6
SUPPLEMENTAL INVESTIGATION
BORING LOCATION PLAN

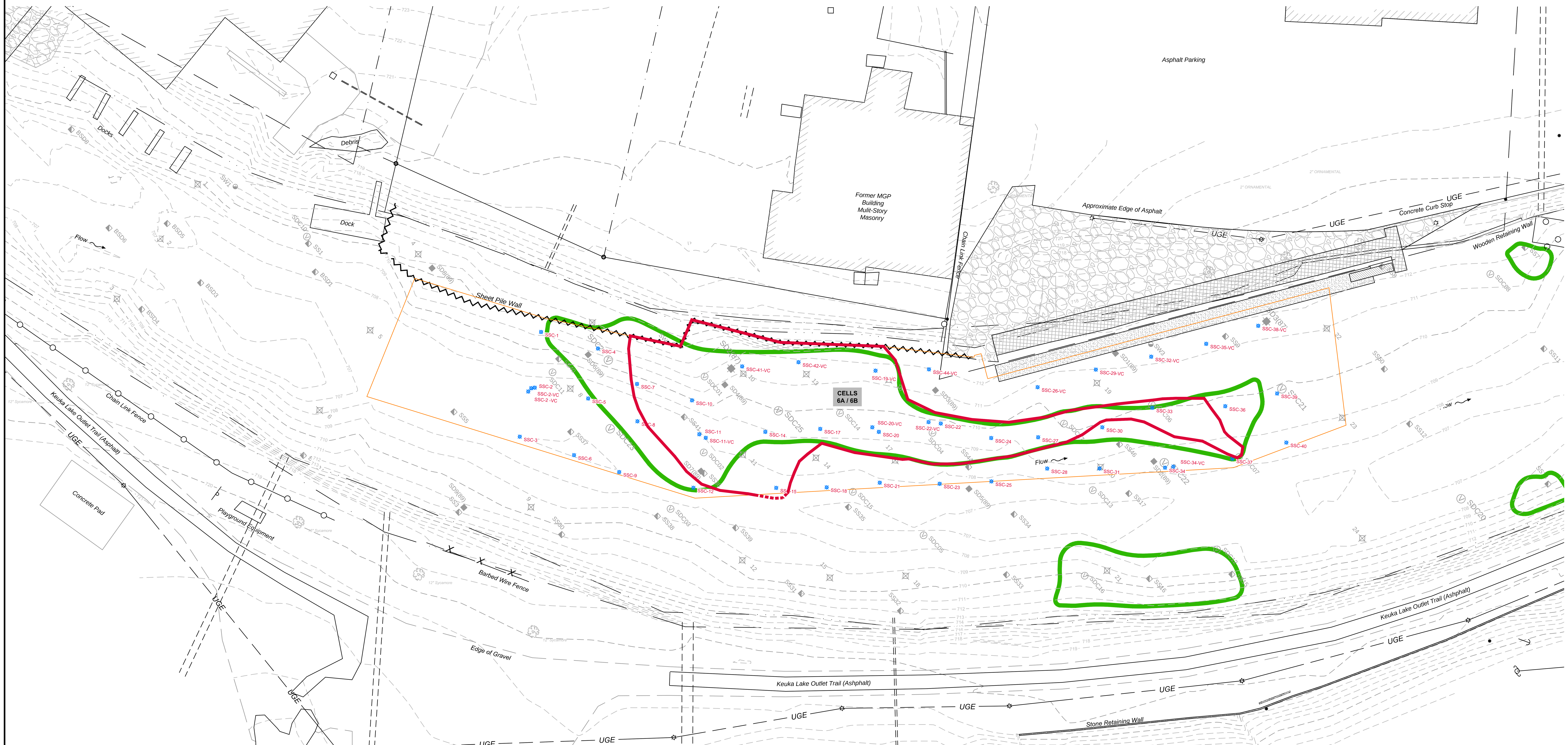
SHEET NUMBER

SI-6-1

Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI D 22" x 34"

Last saved by: MEISTERK(2016-11-15) Last Plotted: 2016-11-15
Filename: P:\60284725_NYSEG PENN YAN RD\7.2 CADD\500\CIVIL\DESIGN\PENN YAN-R2\ADDITIONAL SUBSURFACE INFO CELL 6\CELL 6 SUBSURFACE.DWG

Printed on ___% Post-Consumer Recycled Content Paper



LEGEND

Approximate Limits of Observed MGP-Related Hydrocarbon Impacts in the Sediment Investigation Area (Remedial Investigation 2008)

Approximate Limits of Observed MGP-Related Hydrocarbon Impacts in the Sediment Investigation Area (Cell 6 Supplemental Investigation 2016) Dashed where Inferred

Proposed Sediment Removal Area

SAMPLE ID. Supplemental Investigation Sample Location

20 0 40

1"=20'

* COLOR DOCUMENT *

AECOM

PROJECT

100% REMEDIAL DESIGN
WATER STREET
MANUFACTURED GAS PLANT

VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CELL 6 SUPPLEMENTAL INVESTIGATION

CLIENT

NYSEG

New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
-	-	-

KEY PLAN

SHEET TITLE

CELL 6
HORIZONTAL EXTENTS
OF MGP IMPACTS

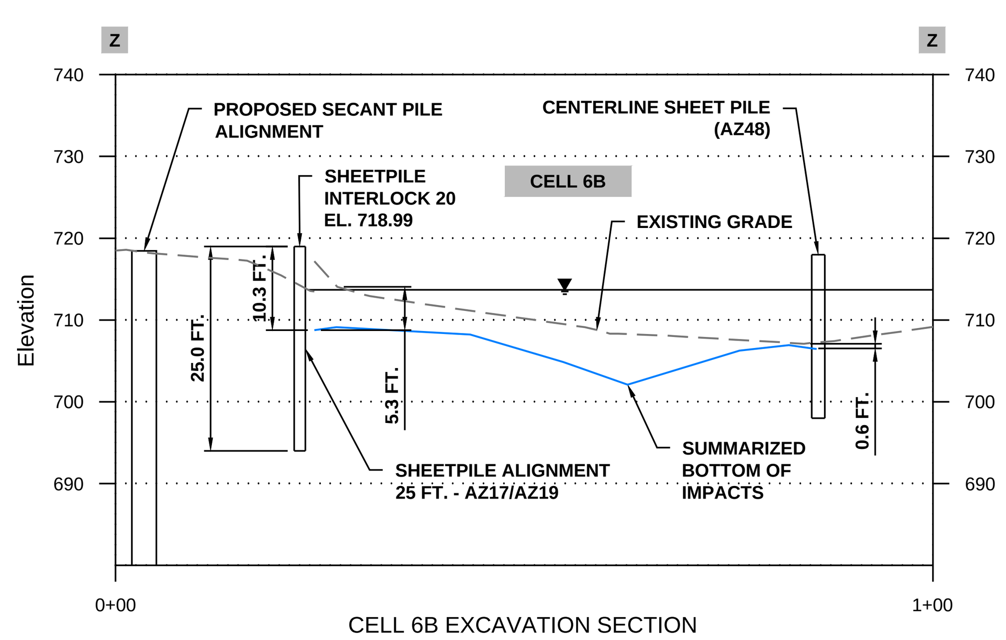
SHEET NUMBER

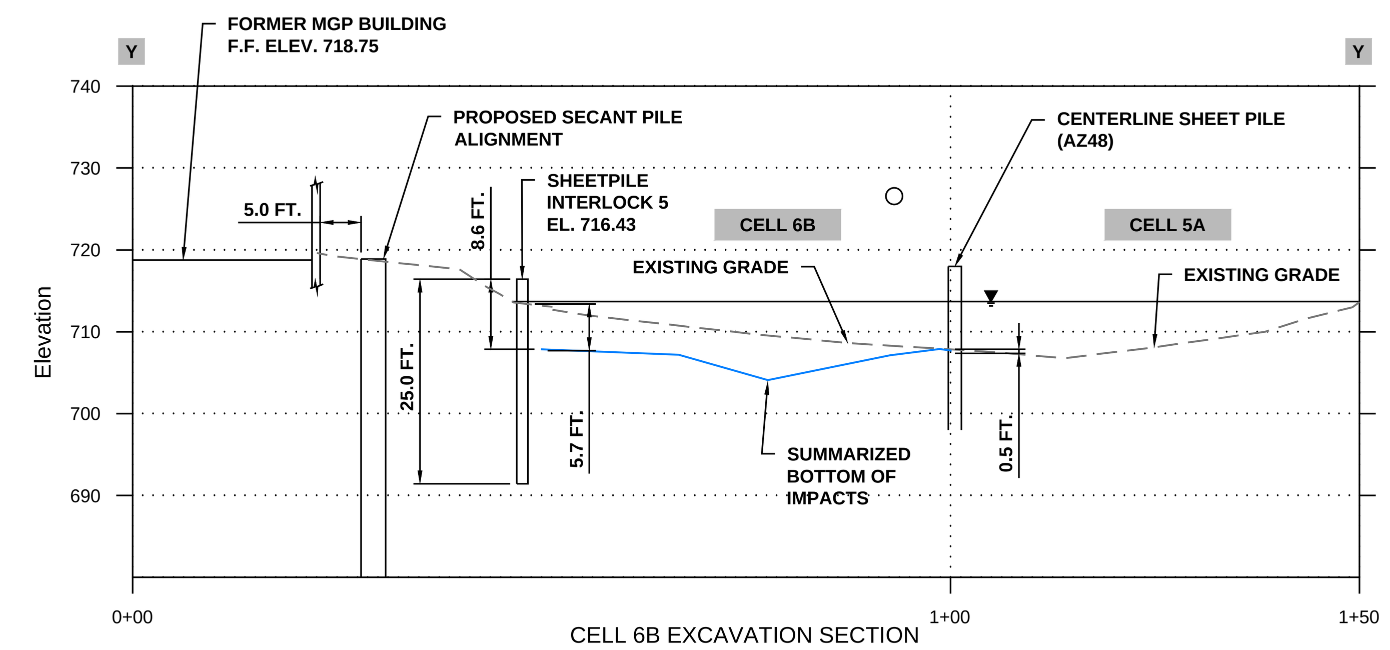
SI-6-2

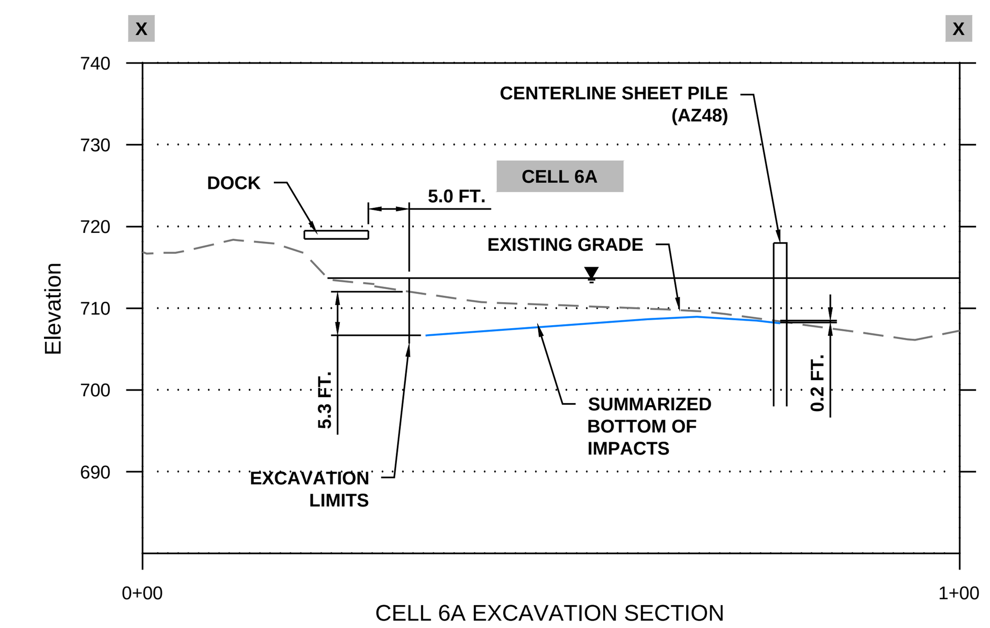
Project Management Initials: Designer: Checked: Approved: ANSI D 22" x 34"

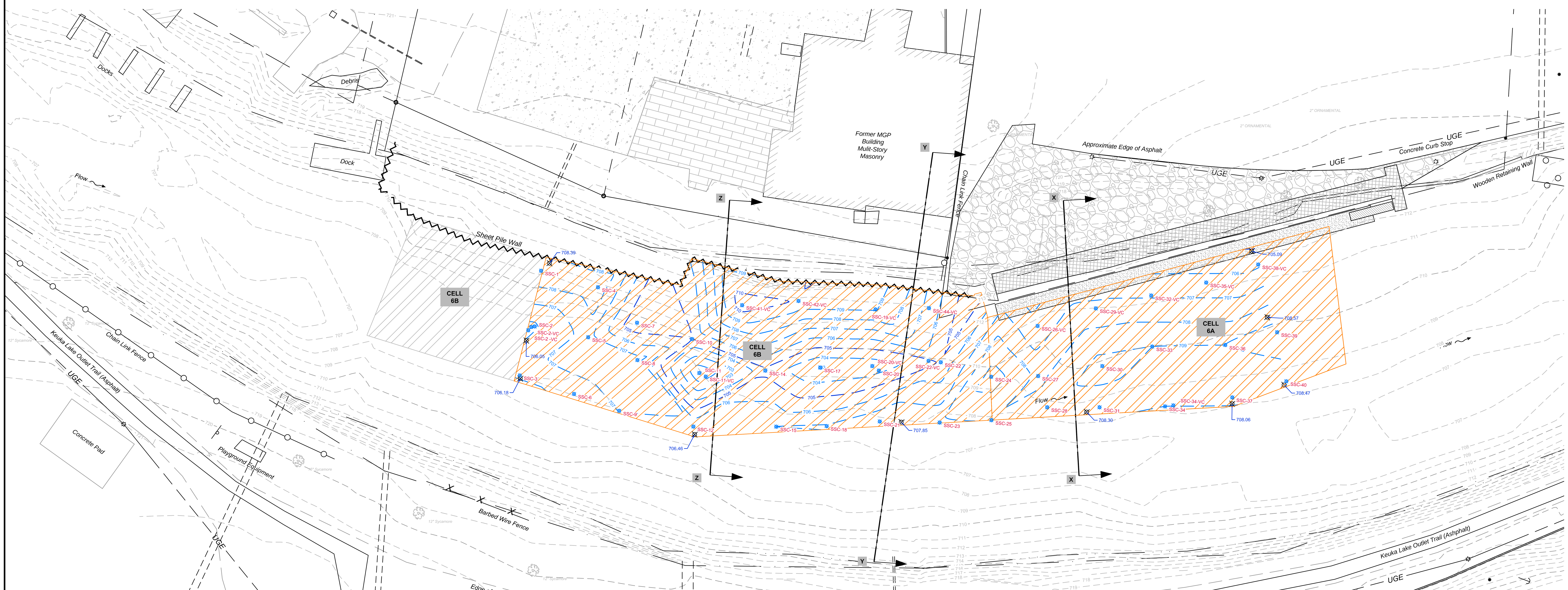
Last saved by: MEISTERK(2016-11-15) Last Plotted: 2016-11-15
Filename: P:\60284725_NYSEG PENN YAN RD\7.2 CADD\500\CIVIL\DESIGN\PENN YAN-R2\ADDITIONAL SUBSURFACE INFO CELL 6\CELL 6 SUBSURFACE.DWG

Printed on ___% Post-Consumer Recycled Content Paper









LEGEND

- SAMPLE ID. — Supplemental Investigation Sample Location
- Proposed Deep Sediment Removal Area
- Proposed Shallow Sediment Removal Area
- Summarized Bottom of Impacts contour (1 ft. interval)
- 706.3 — Summarized Bottom of Impacts Spot Elevation

20 0 40

1"=20'

* COLOR DOCUMENT *

AECOM

PROJECT

100% REMEDIAL DESIGN
WATER STREET
MANUFACTURED GAS PLANT

VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CELL 6 SUPPLEMENTAL INVESTIGATION

CLIENT

NYSEG

New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
0	02-06-15	ISSUED FOR CONSTRUCTION

KEY PLAN

SHEET NOTE:

NEW SHEETS C-04A - C-04H REPLACE ORIGINAL SHEETS C-04 AND C-05.

SHEET TITLE

CELL 6 - SUMMARIZED BOTTOM OF IMPACTS PLAN

SHEET NUMBER

SI-6-3

ANSI D 22" x 34"

Approved:

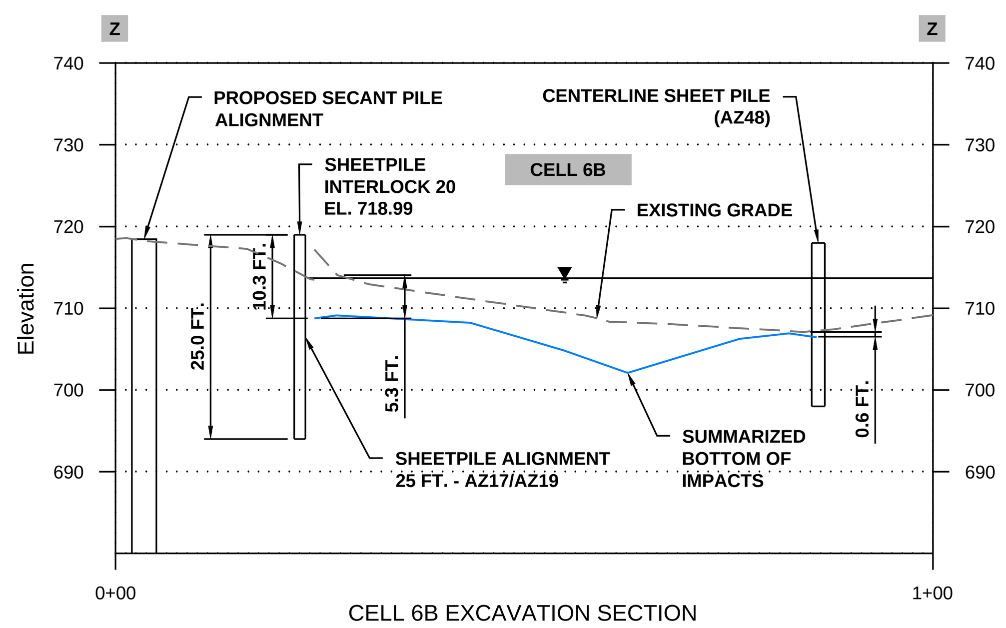
Checked:

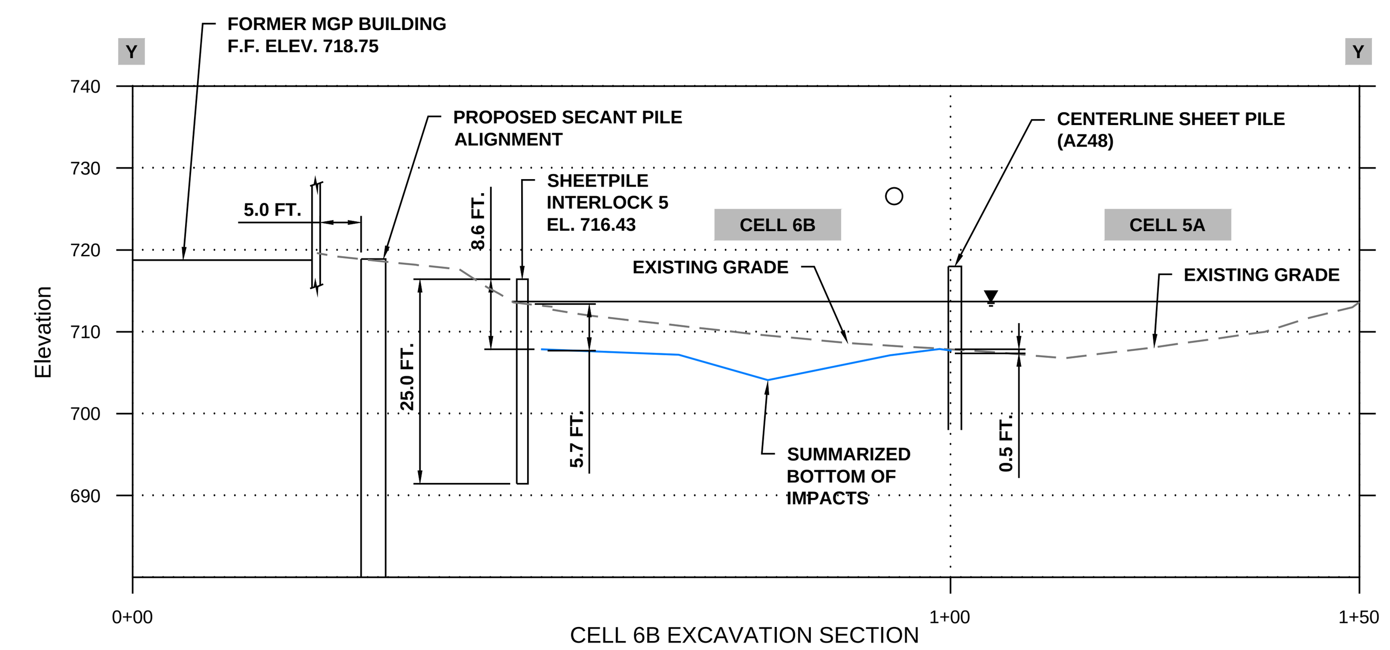
Designer:

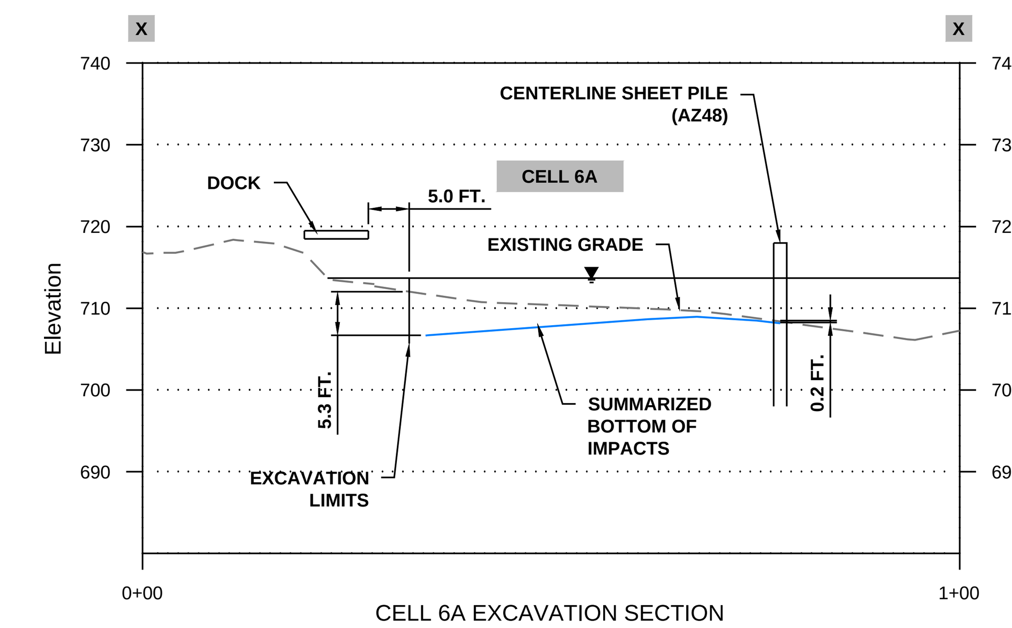
Project Management Initials:

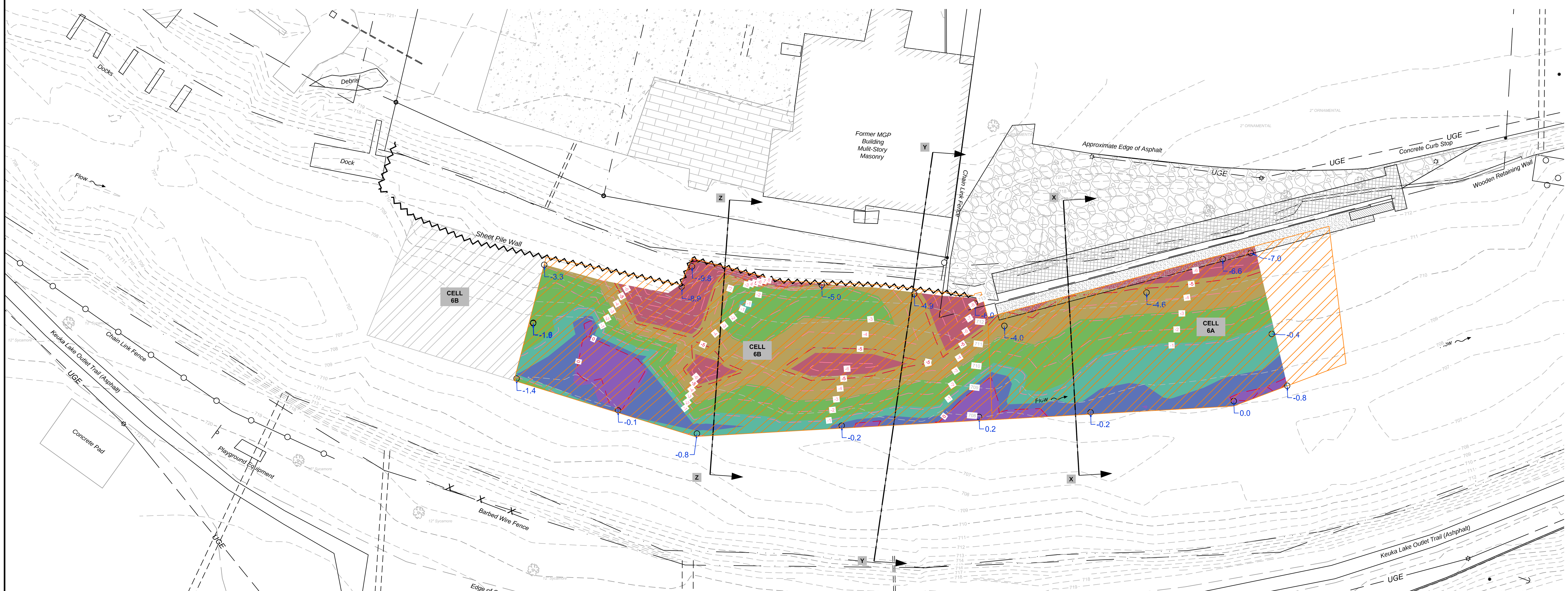
Last saved by: MEISTERK(2016-11-16) Last Plotted: 2016-11-16
Filename: P:\60284725_NYSEG PENN YAN RD\7.2 CAD\500\CIVIL\DESIGN\PENN YAN-R2\ADDITIONAL SUBSURFACE INFO CELL 6\CELL 6 SUBSURFACE.DWG

Printed on ___% Post-Consumer Recycled Content Paper









LEGEND

- Proposed Deep Sediment Removal Area
- Proposed Shallow Sediment Removal Area
- Sediment Thickness Contour (1 ft. interval)
- 5.2 Sediment Spot Thickness

20 0 40

1"=20'

* COLOR DOCUMENT *

AECOM

PROJECT

100% REMEDIAL DESIGN
WATER STREET
MANUFACTURED GAS PLANT

VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CELL 6 SUPPLEMENTAL INVESTIGATION

CLIENT

NYSEG

New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
0	02-06-15	ISSUED FOR CONSTRUCTION

KEY PLAN

SHEET NOTE:

NEW SHEETS C-04A - C-04H REPLACE ORIGINAL SHEETS C-04 AND C-05.

SHEET TITLE

CELL 6 - ISOPACH PLAN
SEDIMENT THICKNESS TO
BOTTOM OF IMPACTS

SHEET NUMBER

SI-6-4

ANSI D 22" x 34"
Project Management Initials: ___ Designer: ___ Checked: ___ Approved: ___

Last saved by: MEISTERK(2016-11-16) Last Plotted: 2016-11-16
Filename: P:\60284725_NYSEG PENN YAN RD\7.2 CAD\500\CIVIL\DESIGN\PENN YAN-R2\ADDITIONAL SUBSURFACE INFO CELL 6\CELL 6 SUBSURFACE.DWG

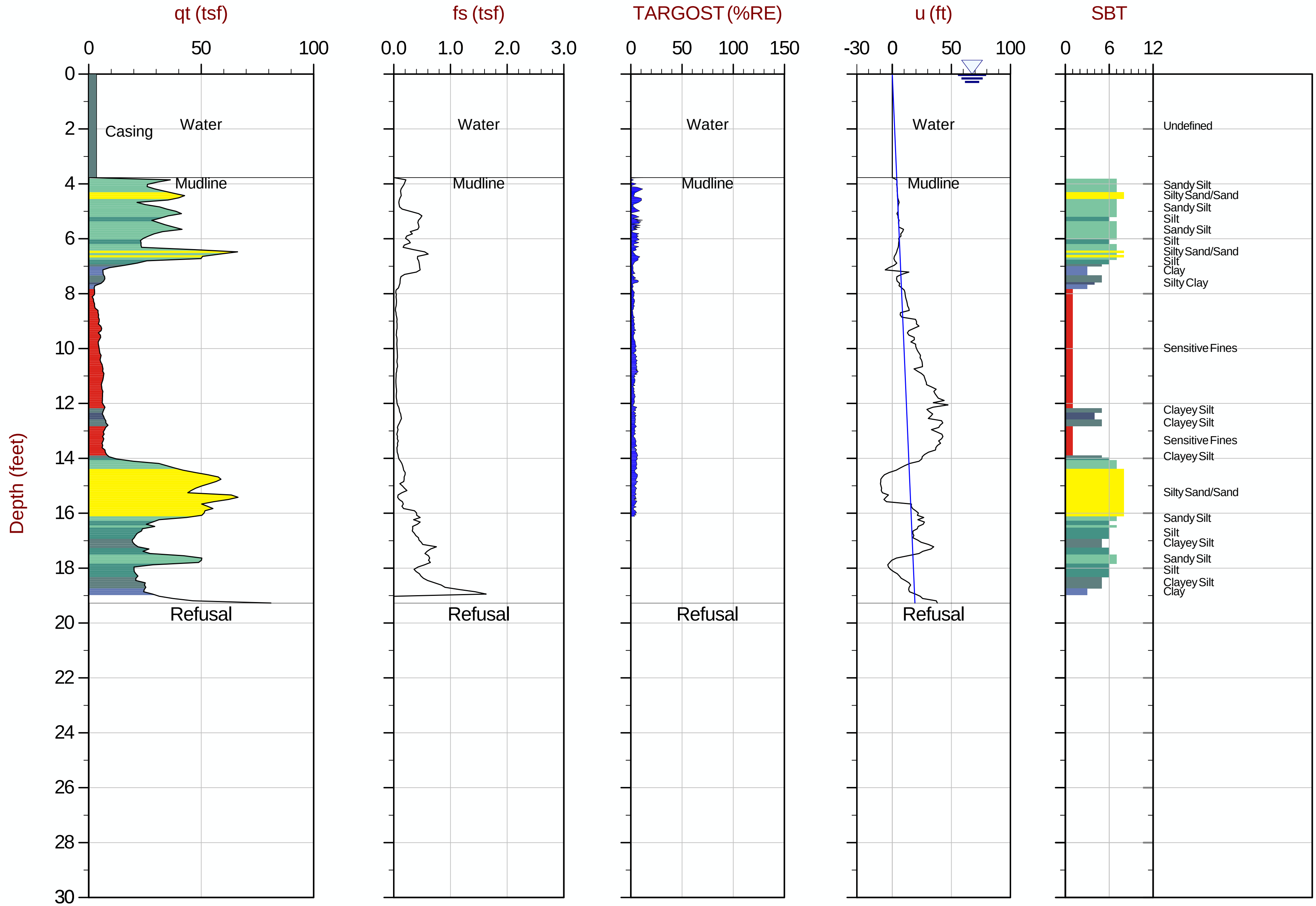
Printed on ___% Post-Consumer Recycled Content Paper

Attachment A
Cone Penetration Test and TarGOST Logs

Leidos

Job No: 16-53087
Date: 2016/10/05 09:14
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-01
Cone: 301:T1500F15U500



Max Depth: 5.875 m / 19.27 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724912m E: 331605m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

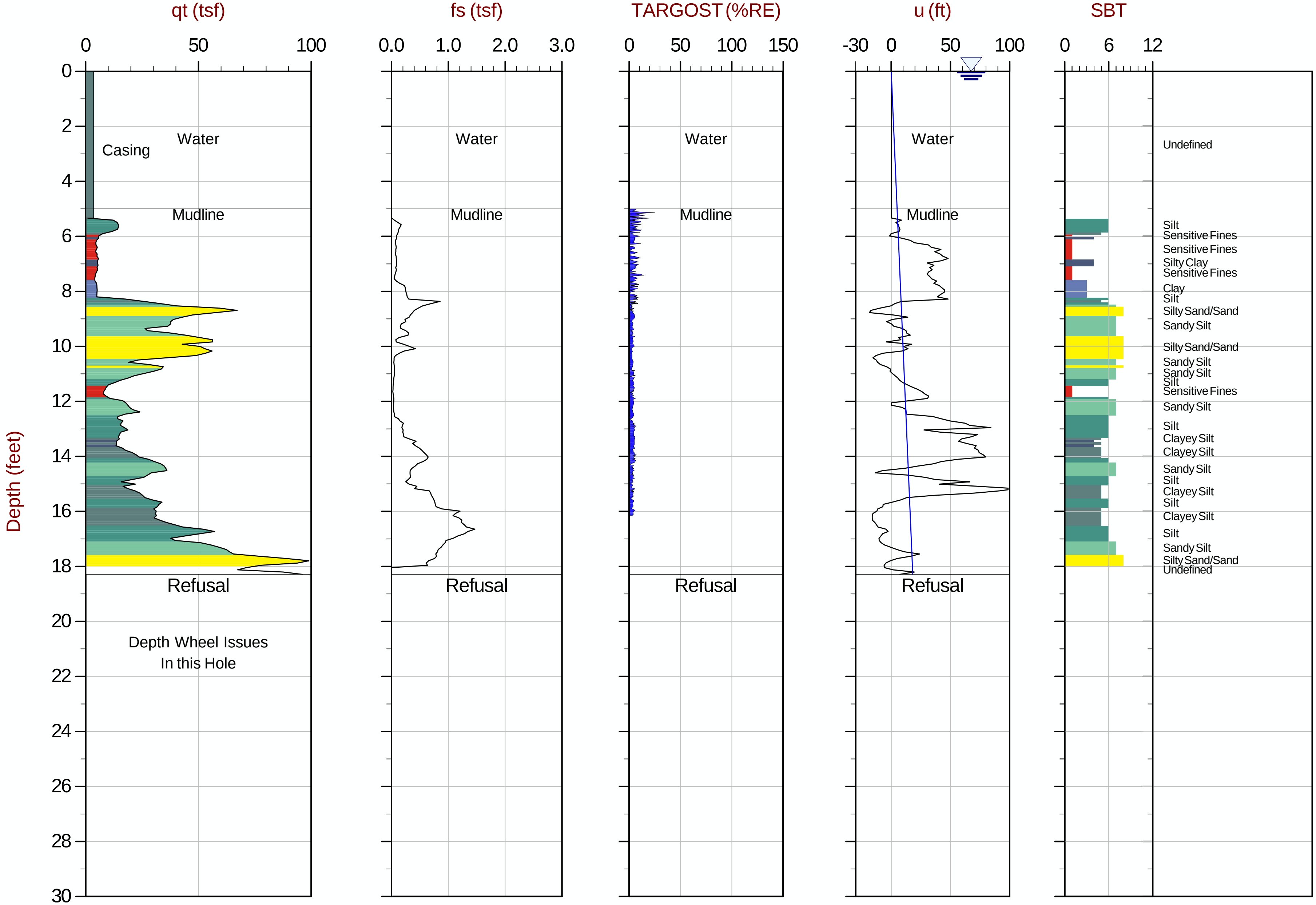
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/04 16:05
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-02
Cone: 301:T1500F15U500



Max Depth: 5.575 m / 18.29 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP02.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724914m E: 331605m

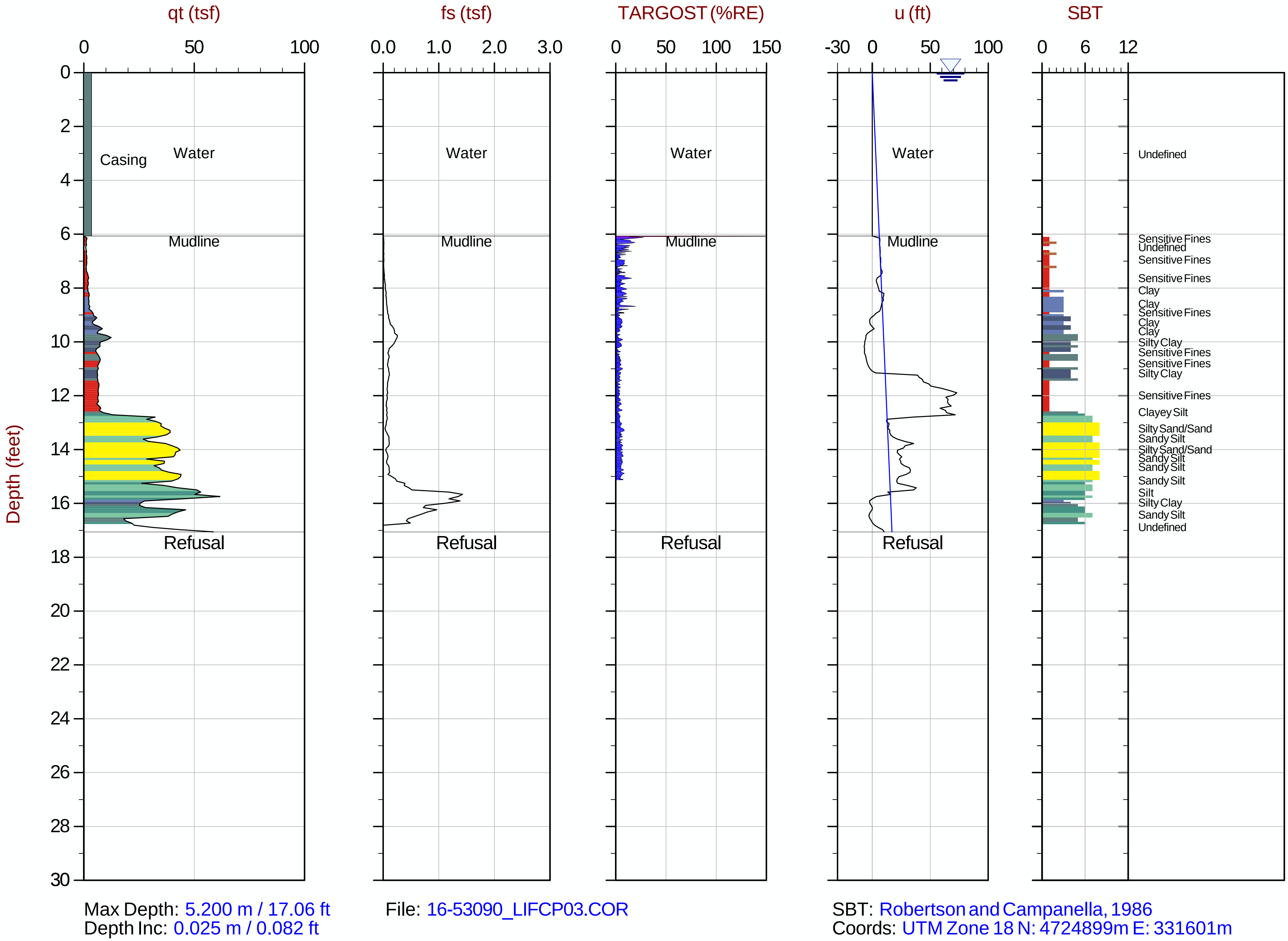
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Leidos

Job No: 16-53087
Date: 2016/10/05 15:31
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-03
Cone: 301:T1500F15U500



Max Depth: 5.200 m / 17.06 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP03.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724899m E: 331601m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

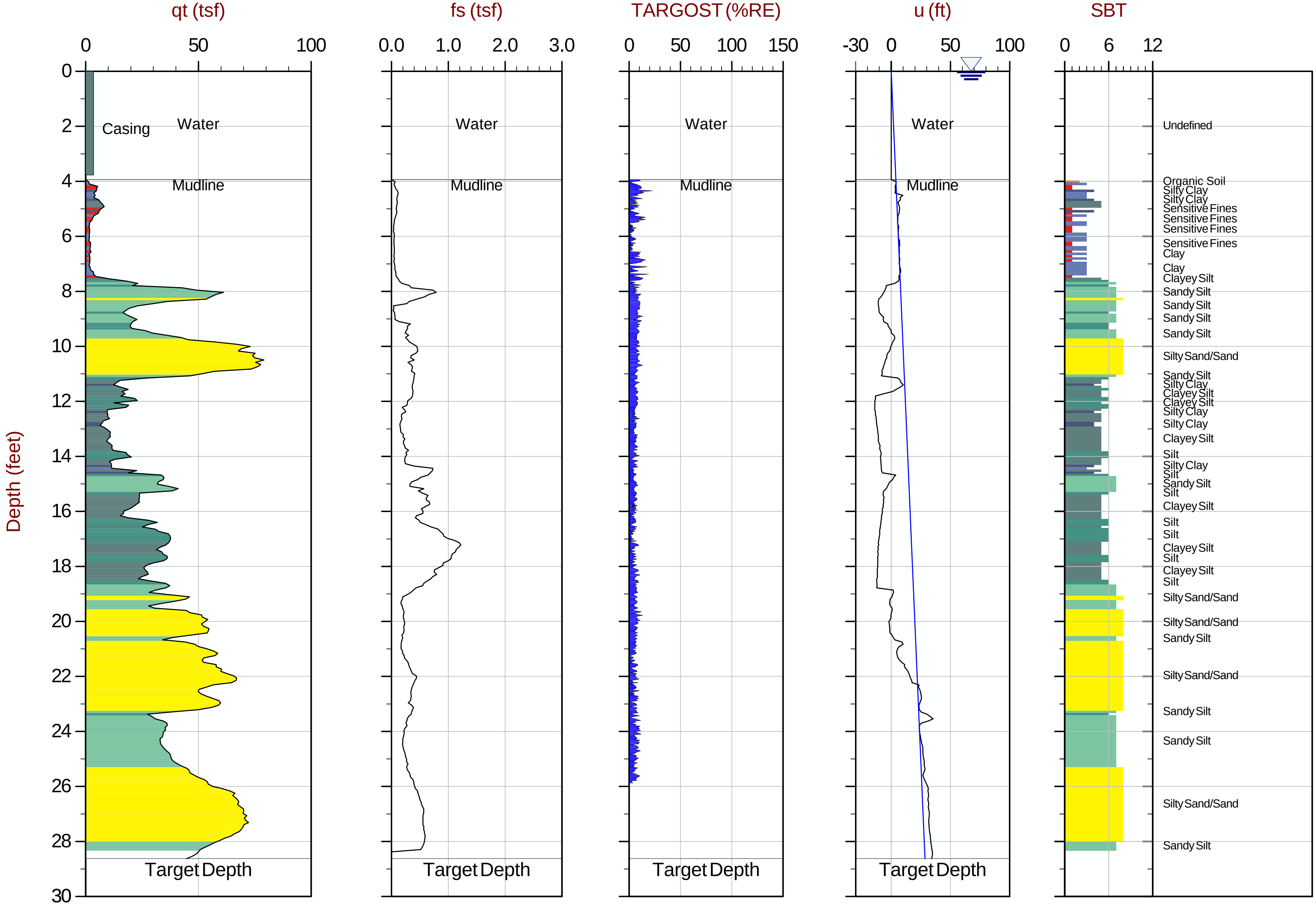
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/05 10:09
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-04
Cone: 301:T1500F15U500



Max Depth: 8.725 m / 28.62 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP04.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724912m E: 331612m

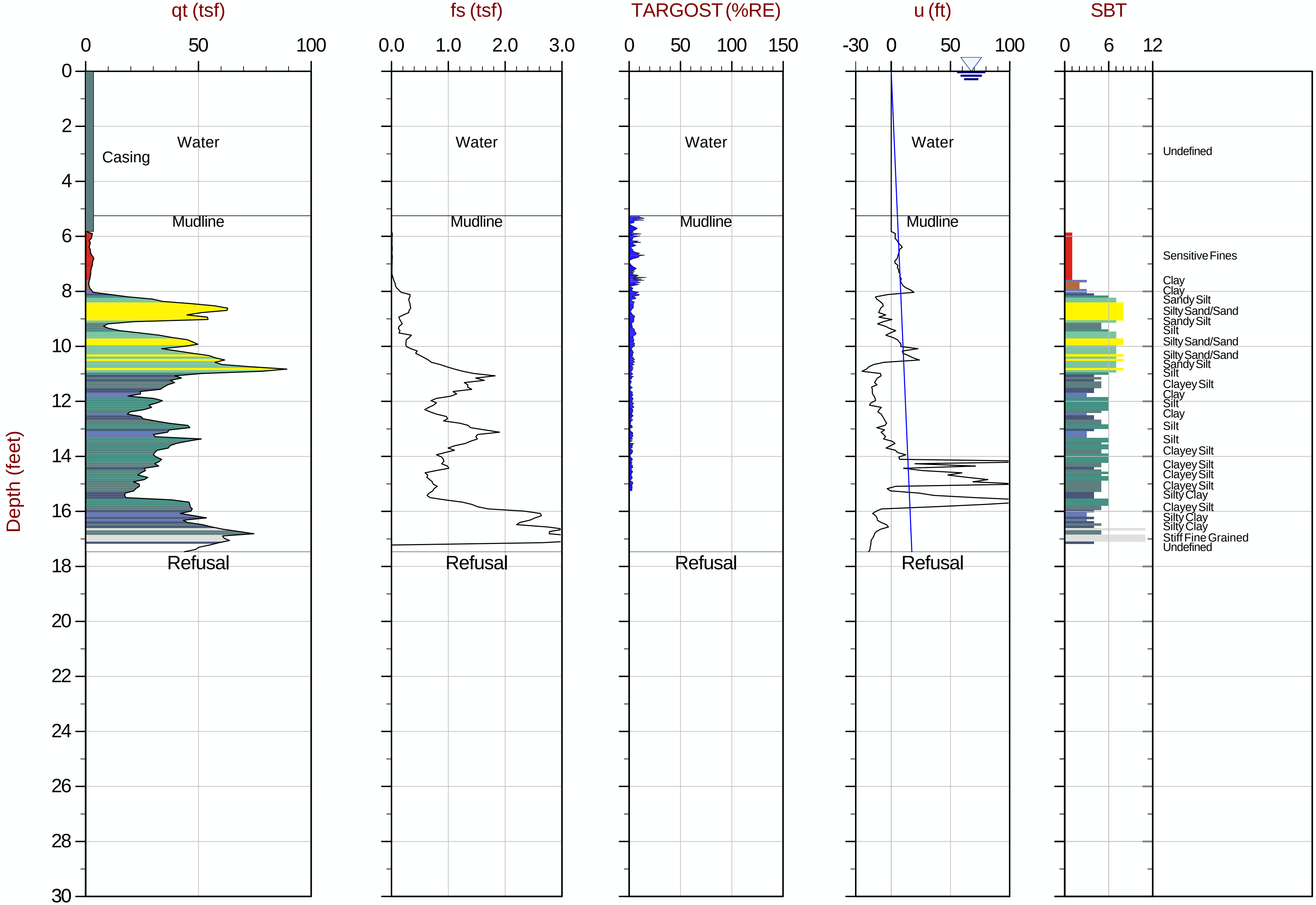
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/04 17:57
Site: Penn Yan MGP
Sounding: LIF-CPT16-SSC-05
Cone: 301:T1500F15U500



Max Depth: 5.325 m / 17.47 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP05.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724906m E: 331613m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

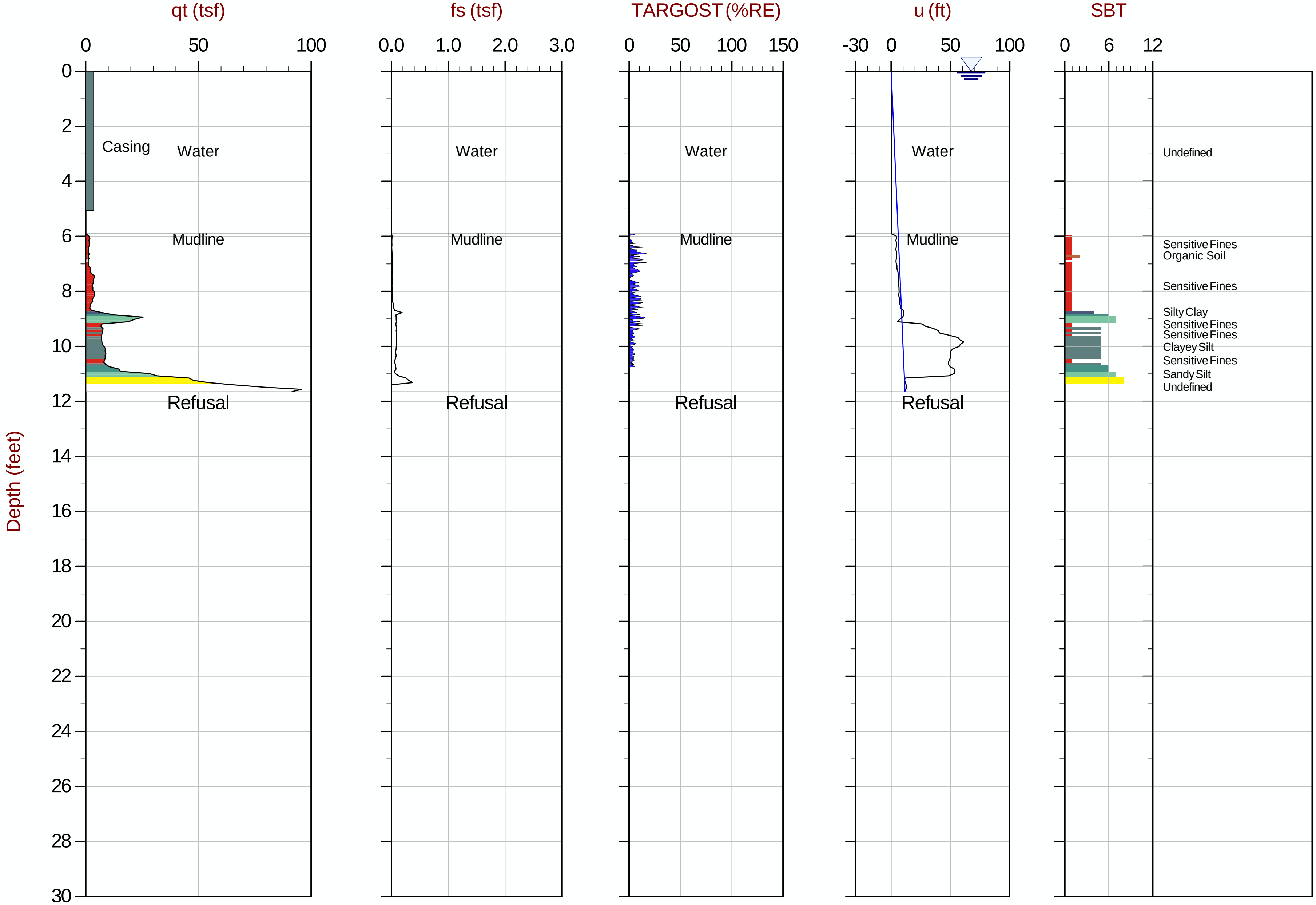
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/05 16:13
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-06
Cone: 301:T1500F15U500



Max Depth: 3.550 m / 11.65 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP06.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724904m E: 331615m

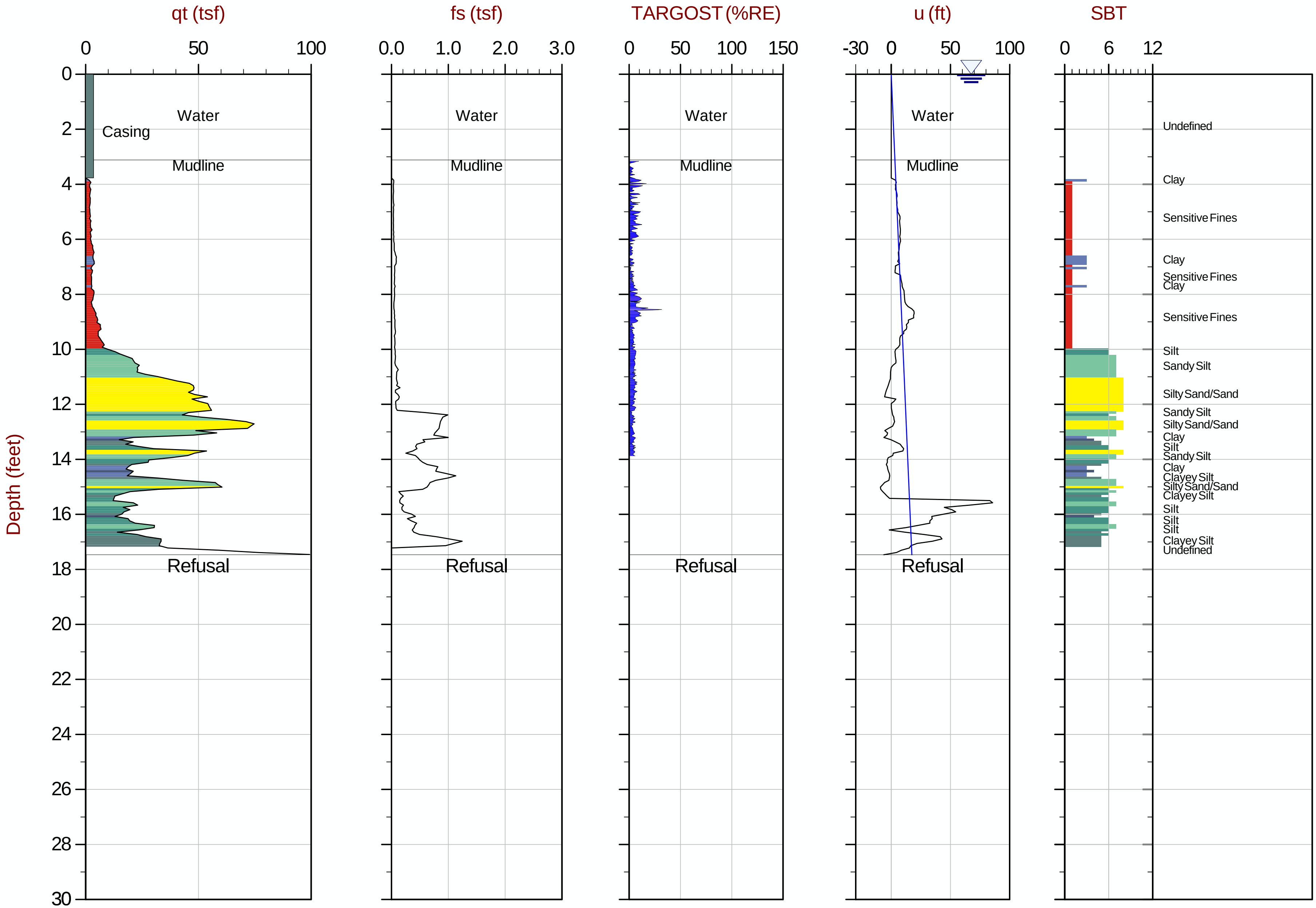
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Leidos

Job No: 16-53087
Date: 2016/10/05 12:34
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-07
Cone: 301:T1500F15U500



Max Depth: 5.325 m / 17.47 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP07.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724904m E: 331613m

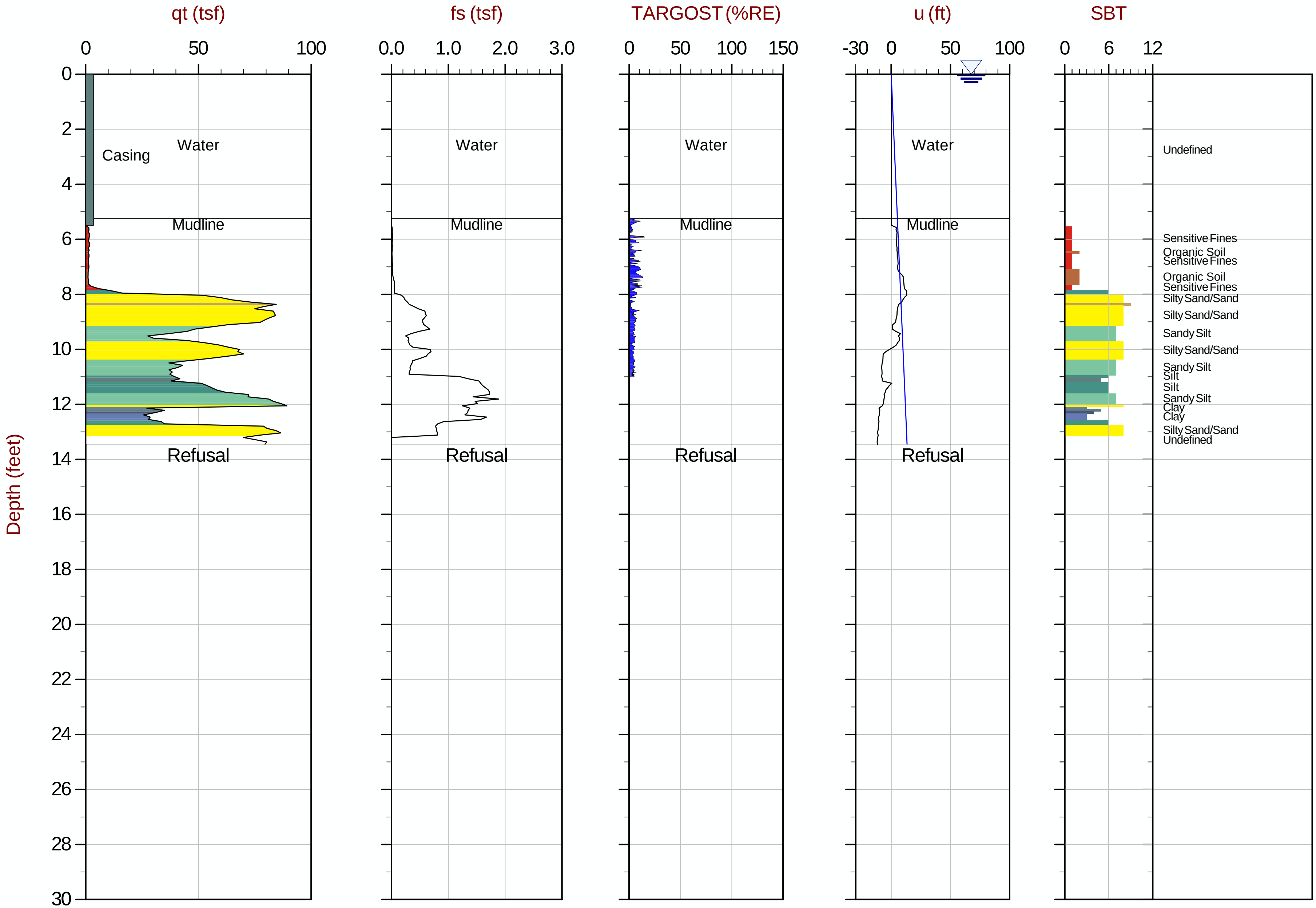
Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/05 11:27
Site: Penn Yan MGP
Sounding: LIF-CPT16-SSC-08
Cone: 301:T1500F15U500



Max Depth: 4.100 m / 13.45 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP08.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724912m E: 331608m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

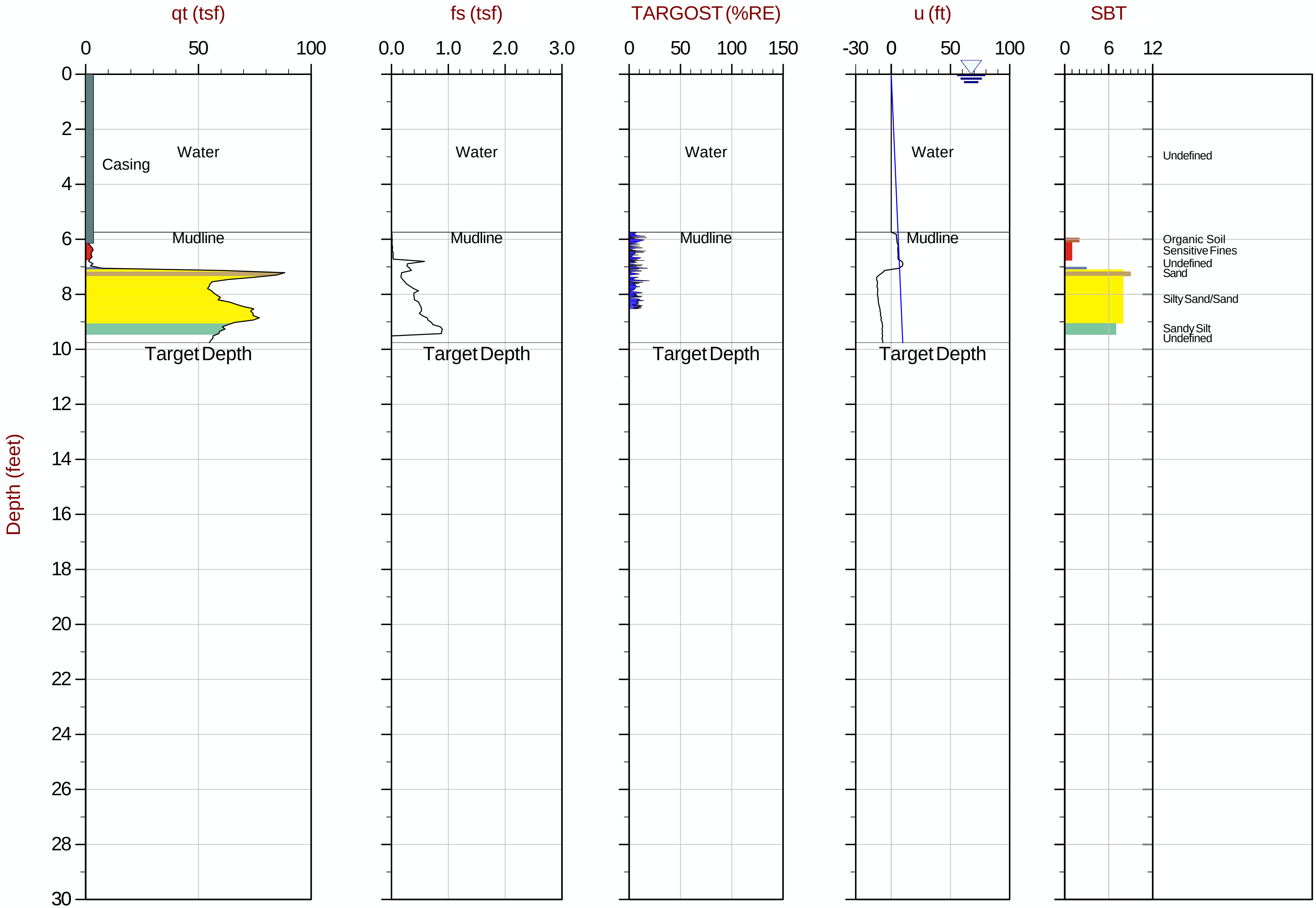
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/05 16:52
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-09
Cone: 301:T1500F15U500



Max Depth: 2.975 m / 9.76 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP09.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724910m E: 331618m

Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

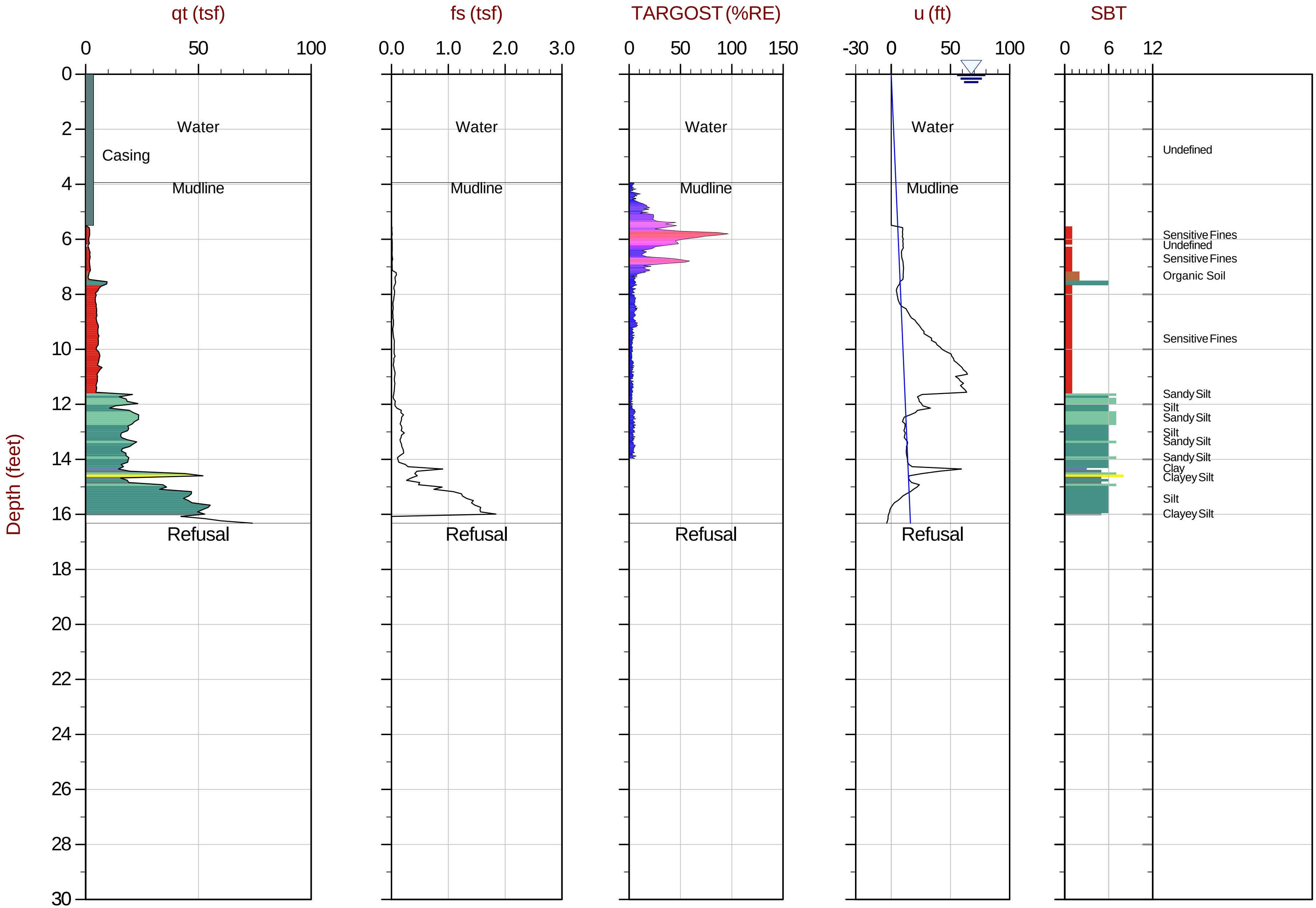
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/05 13:42
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-10
Cone: 301:T1500F15U500



Max Depth: 4.975 m / 16.32 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP10.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724912m E: 331616m

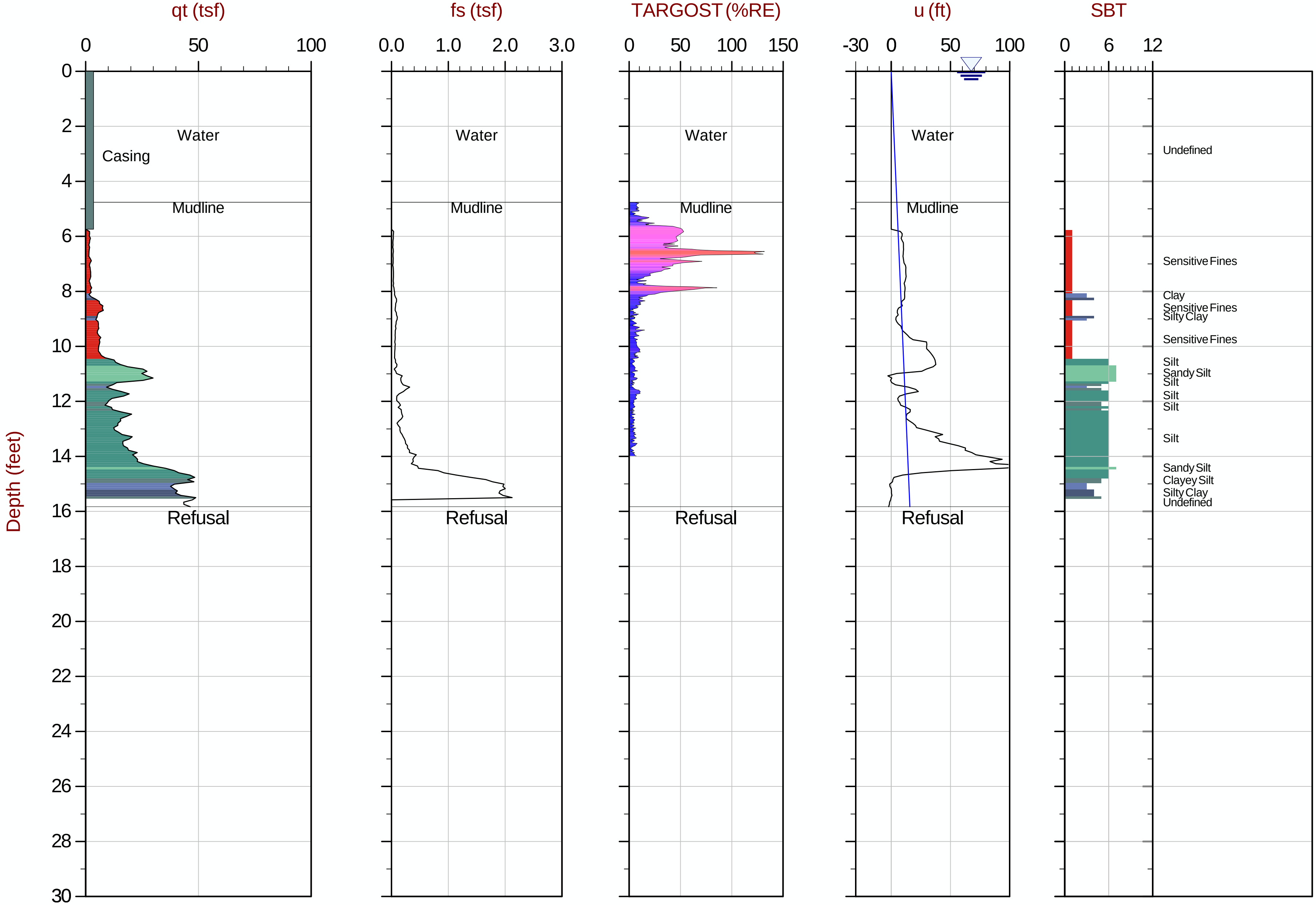
Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Job No: 16-53087
Date: 2016/10/05 14:30
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-11
Cone: 301:T1500F15U500

Leidos



Max Depth: 4.825 m / 15.83 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP11.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724915m E: 331622m

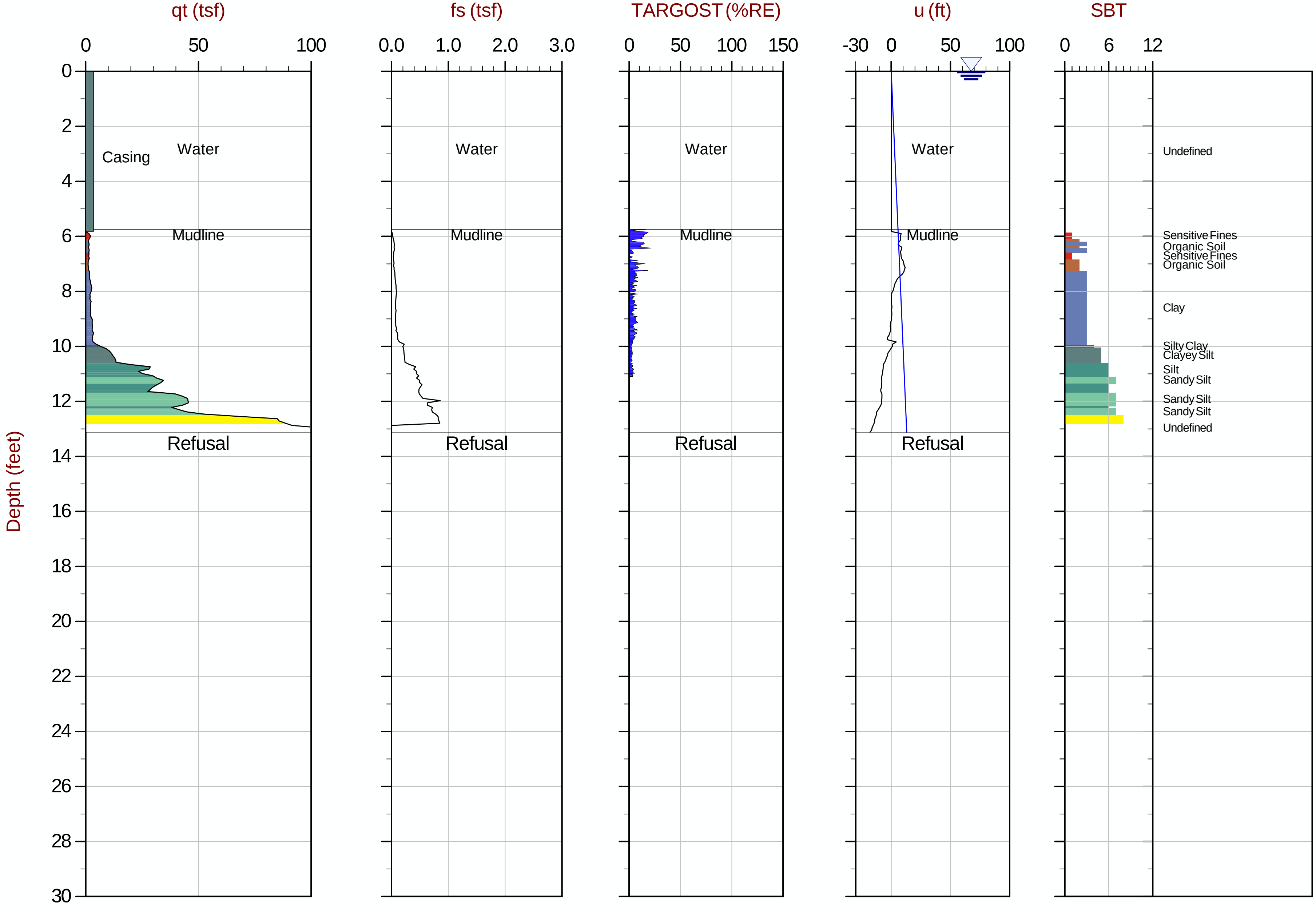
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/05 17:29
Site: Penn Yan MGP
Sounding: LIF-CPT16-SSC-12
Cone: 301:T1500F15U500



Max Depth: 4.000 m / 13.12 ft
Depth Inc: 0.025 m / 0.082 ft

File: 16-53090_LIFCP12.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724917m E: 331631m

Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

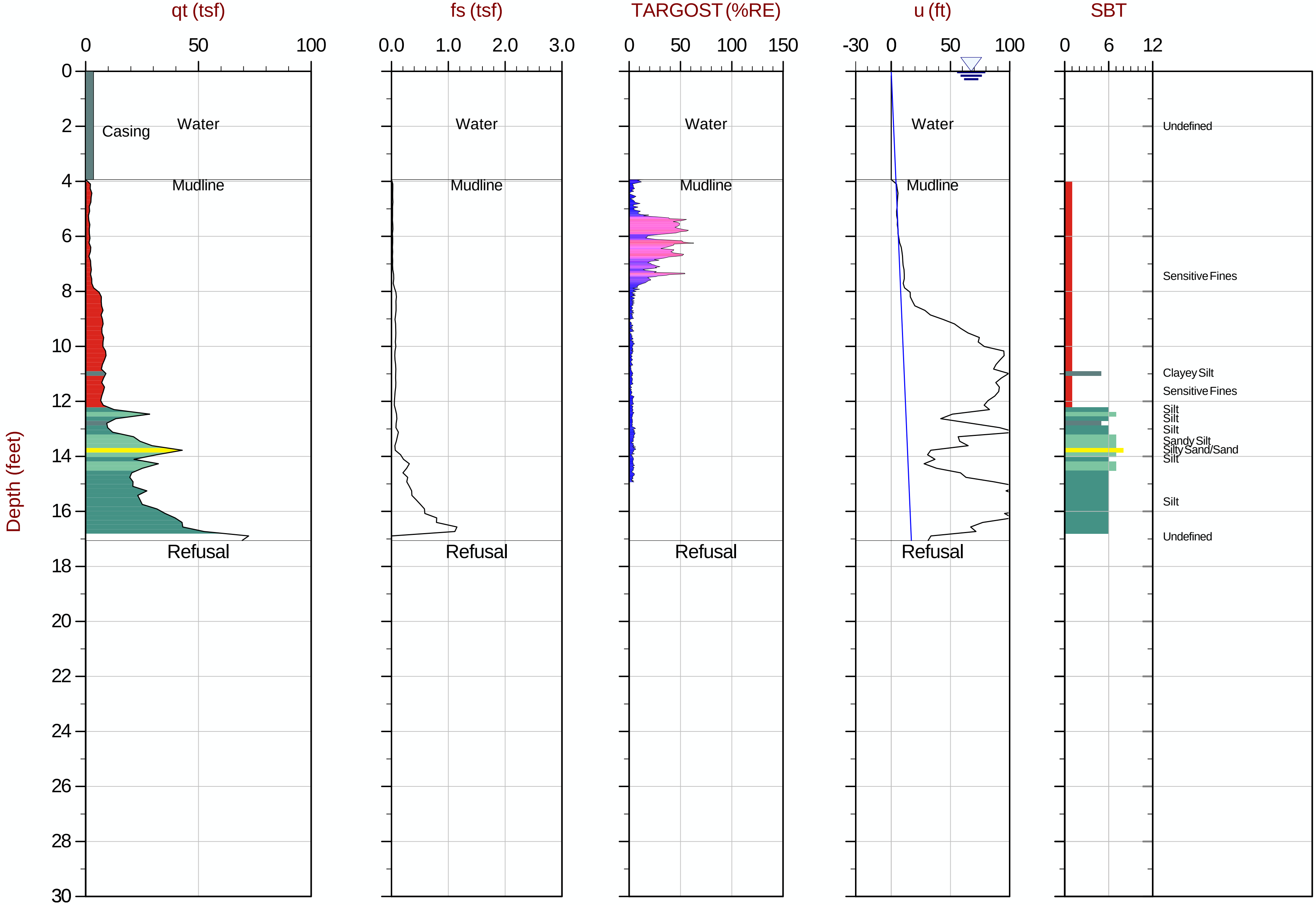
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/07 12:59
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-14
Cone: 301:T1500F15U500



Max Depth: 5.200 m / 17.06 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP14.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724923m E: 331623m

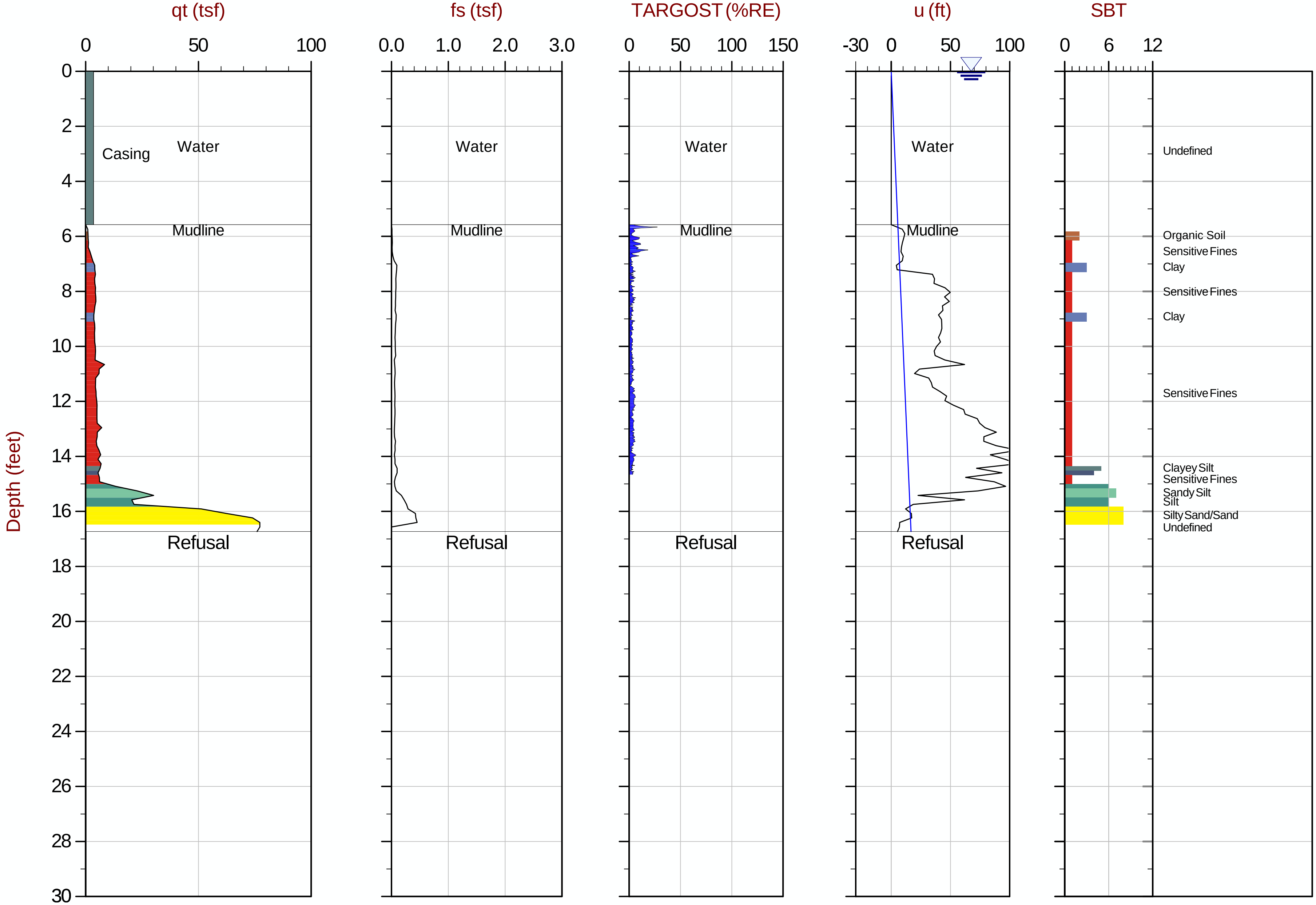
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/06 08:23
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-15
Cone: 301:T1000F10U500



Max Depth: 5.100 m / 16.73 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP15.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724921m E: 331630m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

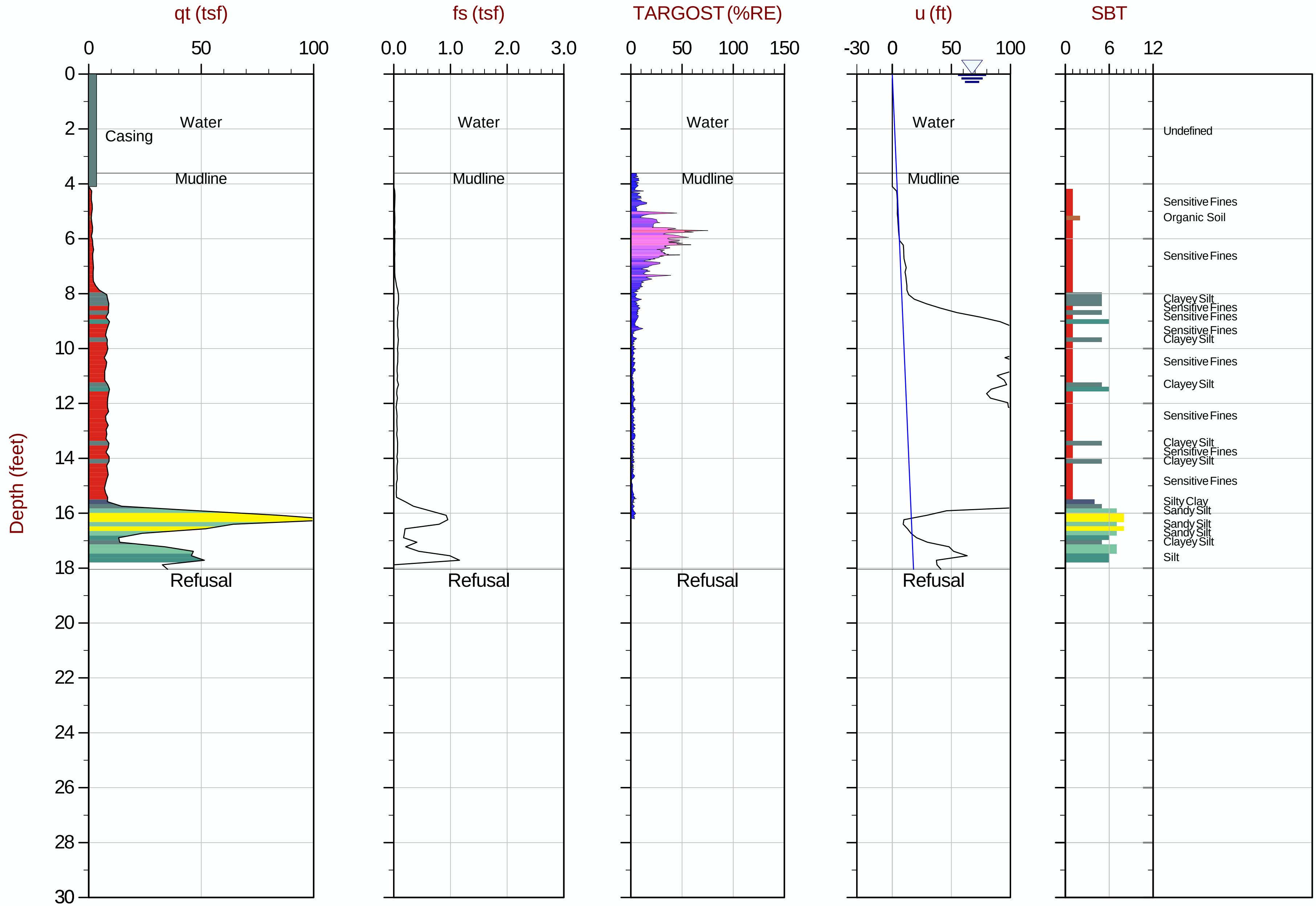
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/07 12:16
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-17
Cone: 301:T1500F15U500



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP17.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724922m E: 331637m

Hydrostatic Line | Ueq | Assumed Ueq | PPD, Ueq achieved | PPD, Ueq not achieved

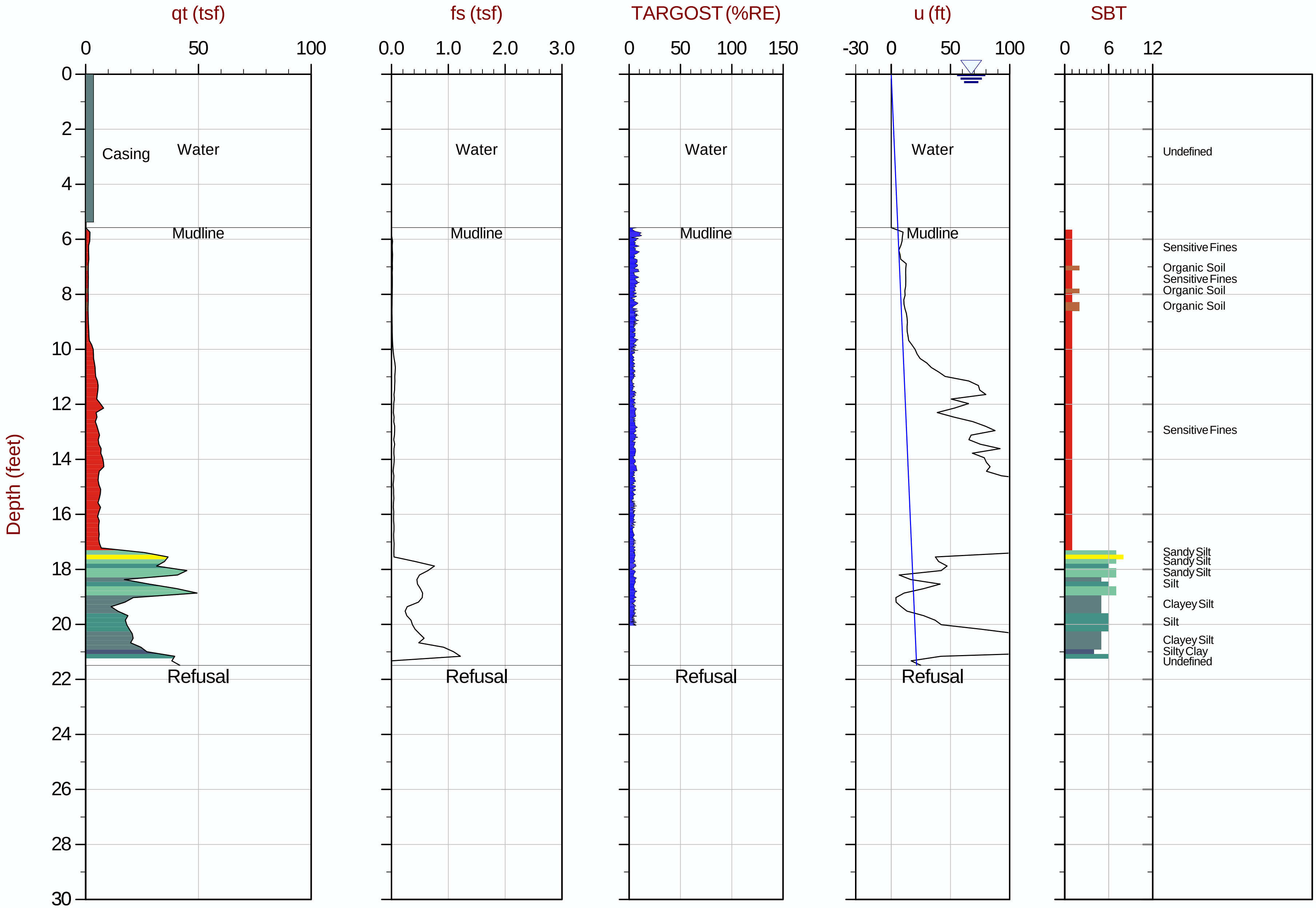
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/06 09:16
Site: Penn Yan MGP, Penn Yan, NY

Sounding: LIF-CPT16-SSC-18
Cone: 301:T1000F10U500



Max Depth: 6.550 m / 21.49 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP18.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724924m E: 331632m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

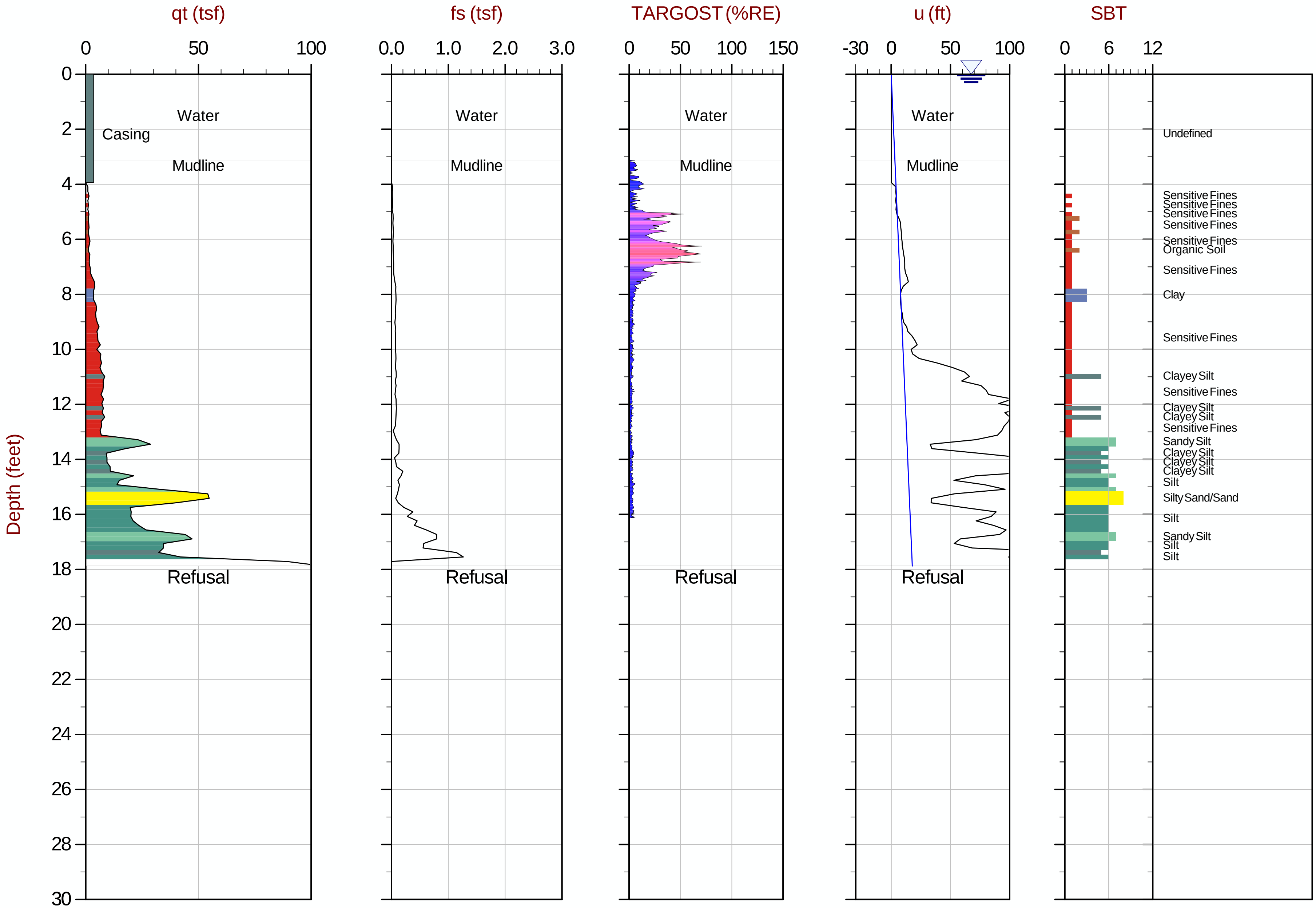
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/07 11:37
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-20
Cone: 301:T1500F15U500



Max Depth: 5.450 m / 17.88 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP20.COR

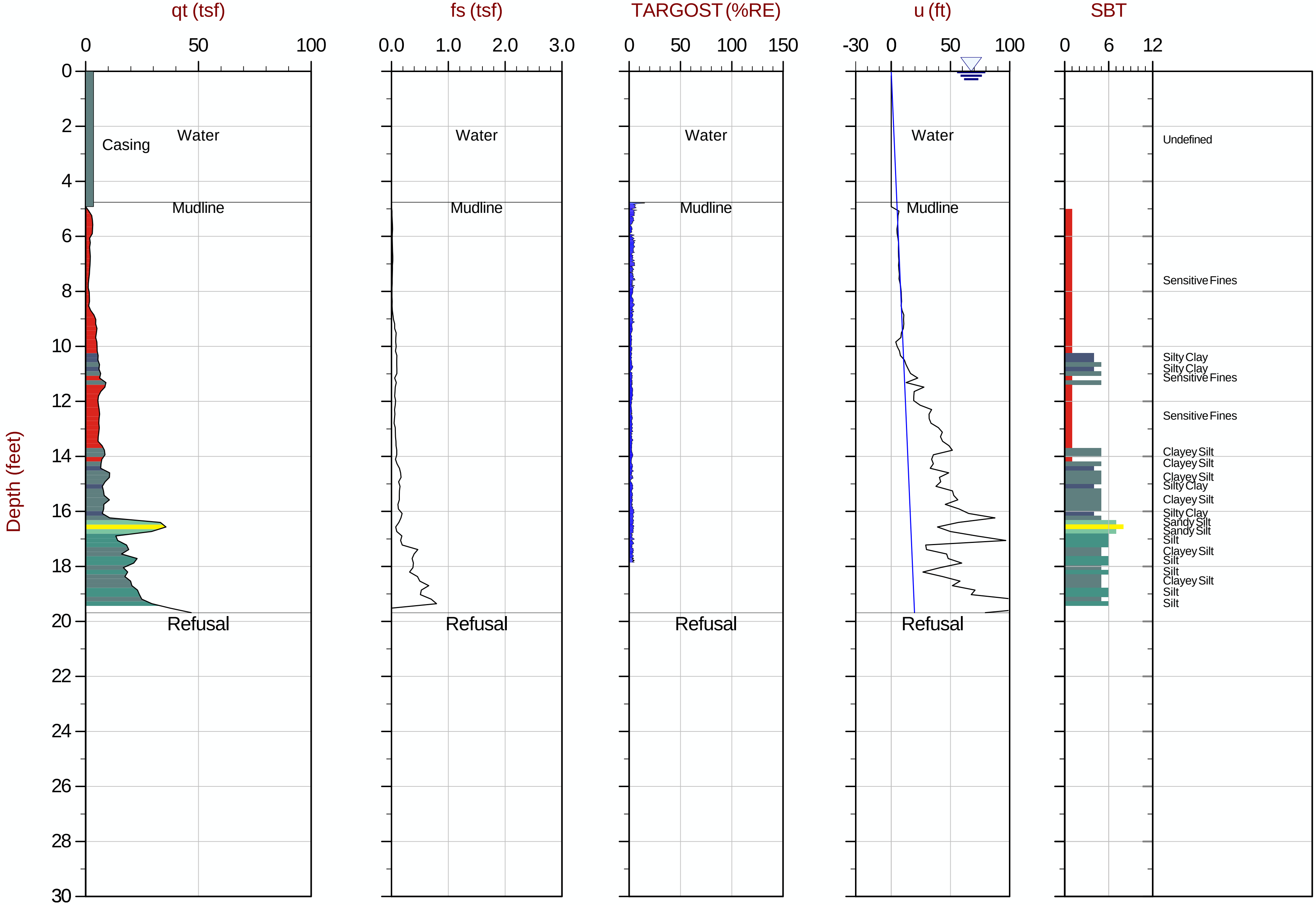
SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724930m E: 331639m

Hydrostatic Line ○ Ueq ○ Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Leidos

Job No: 16-53087
Date: 2016/10/06 10:34
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-21
Cone: 301:T1000F10U500



Max Depth: 6.000 m / 19.68 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP21.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724926m E: 331640m

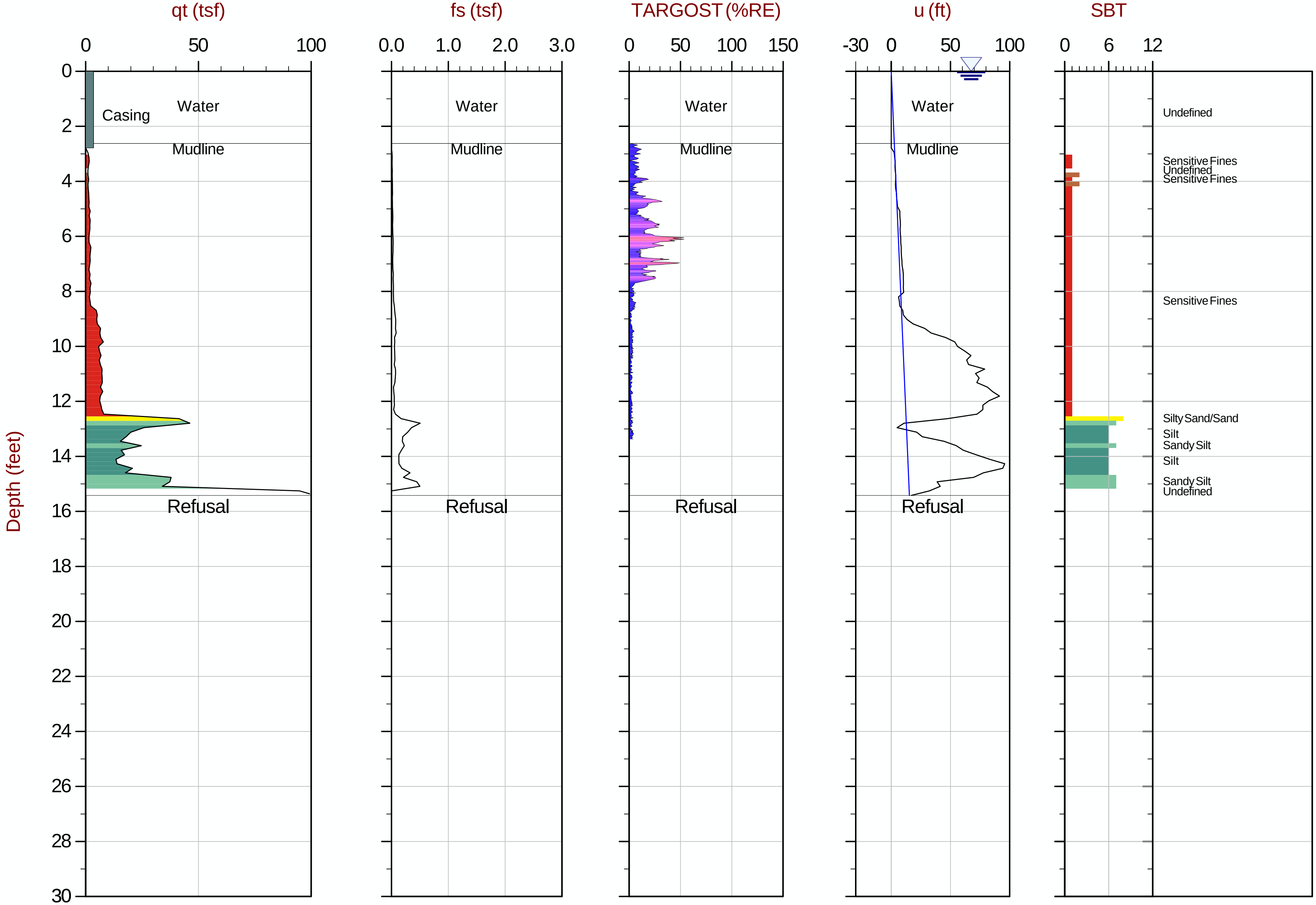
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Leidos

Job No: 16-53087
Date: 2016/10/07 11:05
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-22
Cone: 301:T1500F15U500



Max Depth: 4.700 m / 15.42 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP22.COR

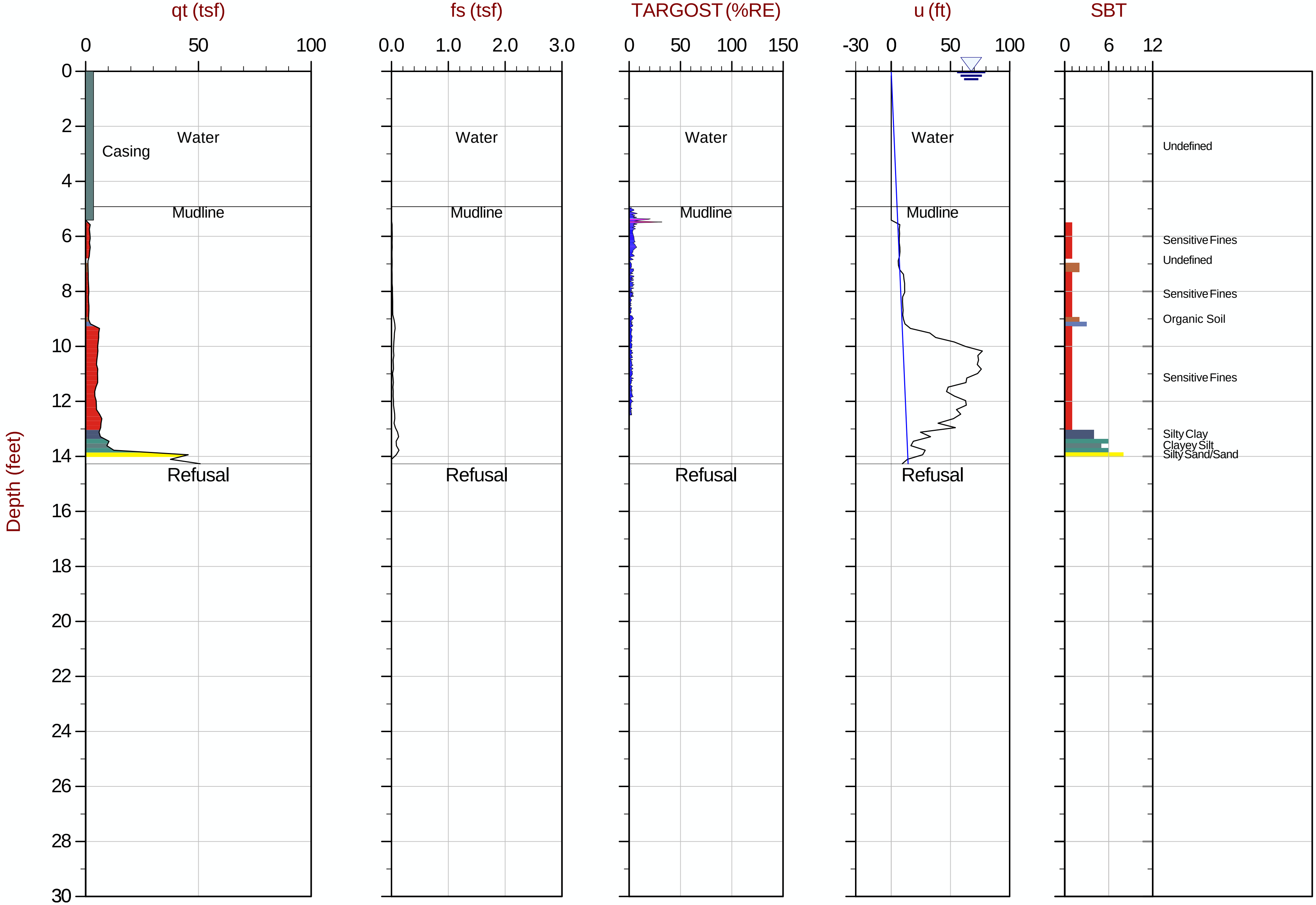
SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724935m E: 331643m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Leidos

Job No: 16-53087
Date: 2016/10/06 11:45
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-23
Cone: 301:T1000F10U500



Max Depth: 4.350 m / 14.27 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP23.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724944m E: 331646m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

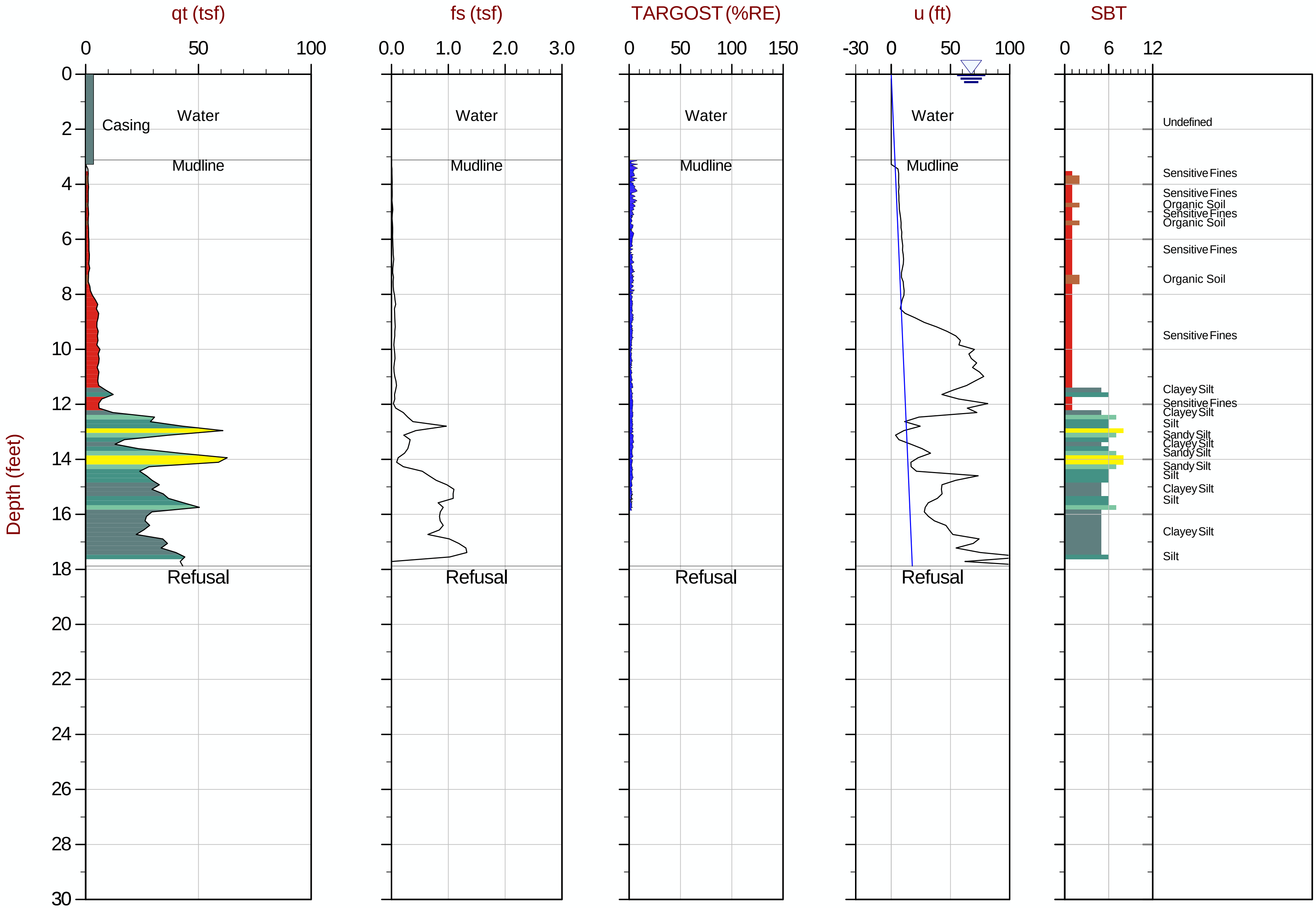
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/07 09:05
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-24
Cone: 301:T1500F15U500



Max Depth: 5.450 m / 17.88 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP24.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724946m E: 331642m

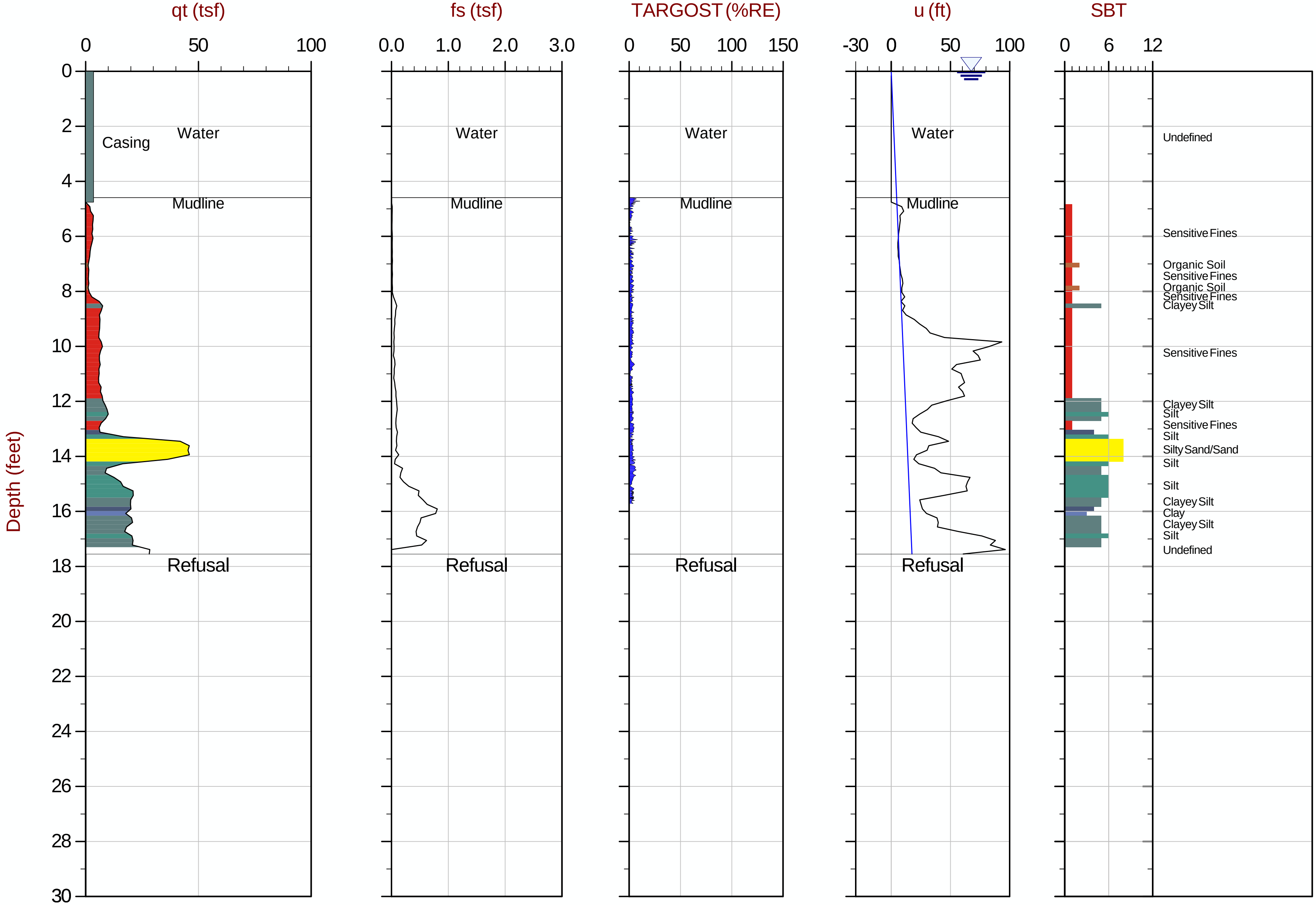
Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/06 12:28
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-25
Cone: 301:T1000F10U500



Max Depth: 5.350 m / 17.55 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP25.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724939m E: 331647m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

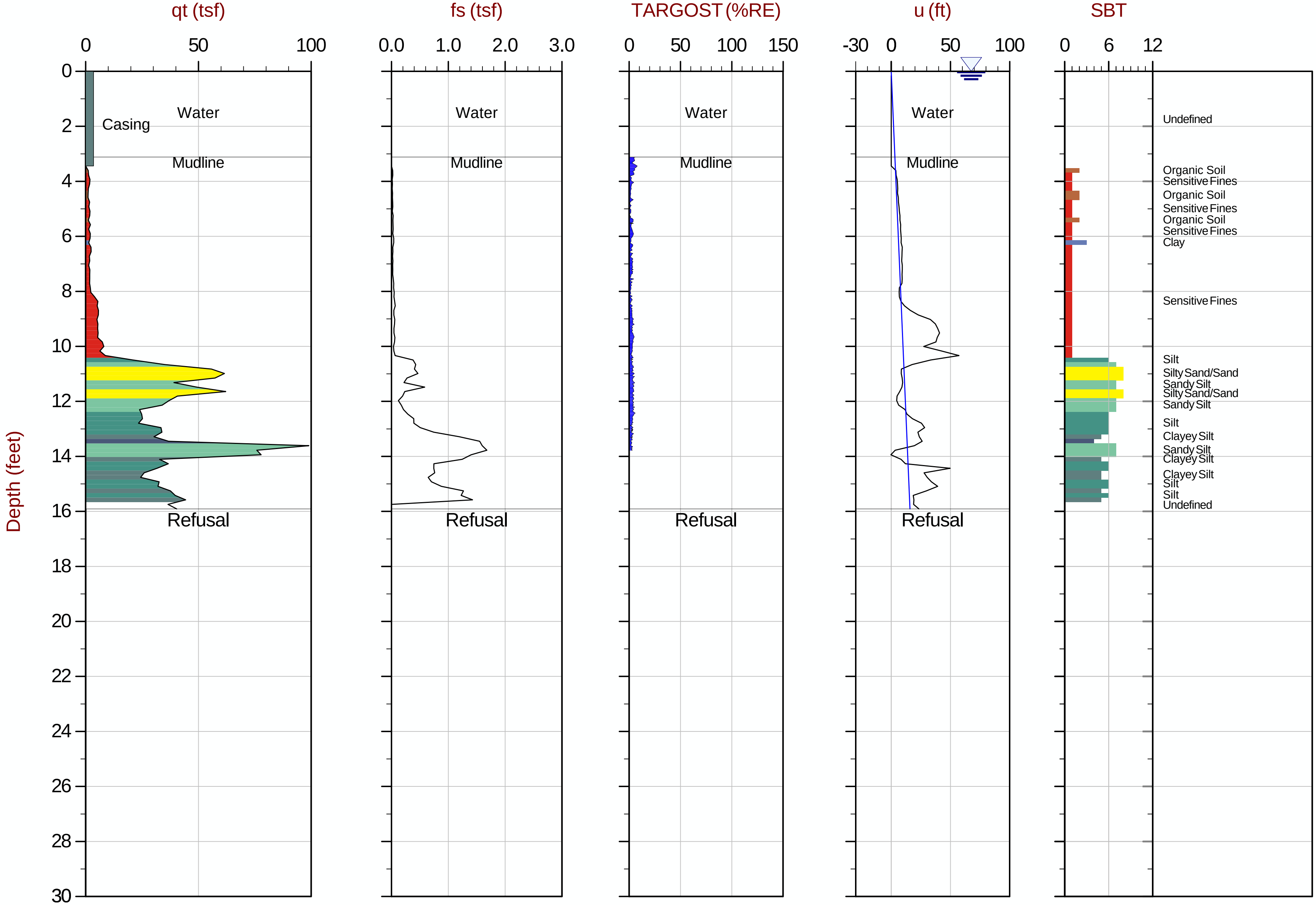
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/07 08:18
Site: Penn Yan MGP

Sounding: LIF-CPT16-SSC-27
Cone: 301:T1500F15U500



Max Depth: 4.850 m / 15.91 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP27.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724942m E: 331651m

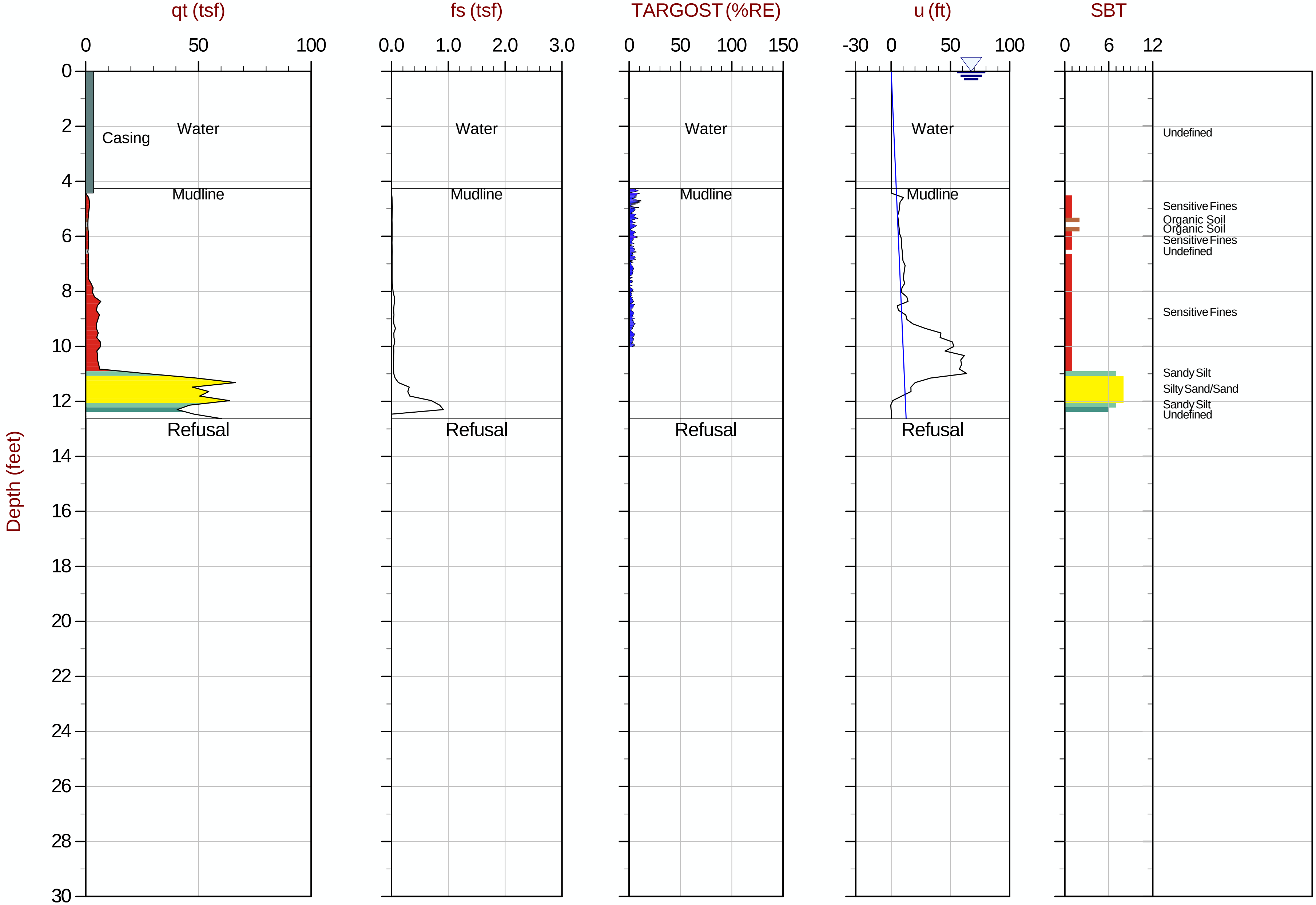
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/06 13:07
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-28
Cone: 301:T1000F10U500



Max Depth: 3.850 m / 12.63 ft
Depth Inc: 0.050 m / 0.164 ft

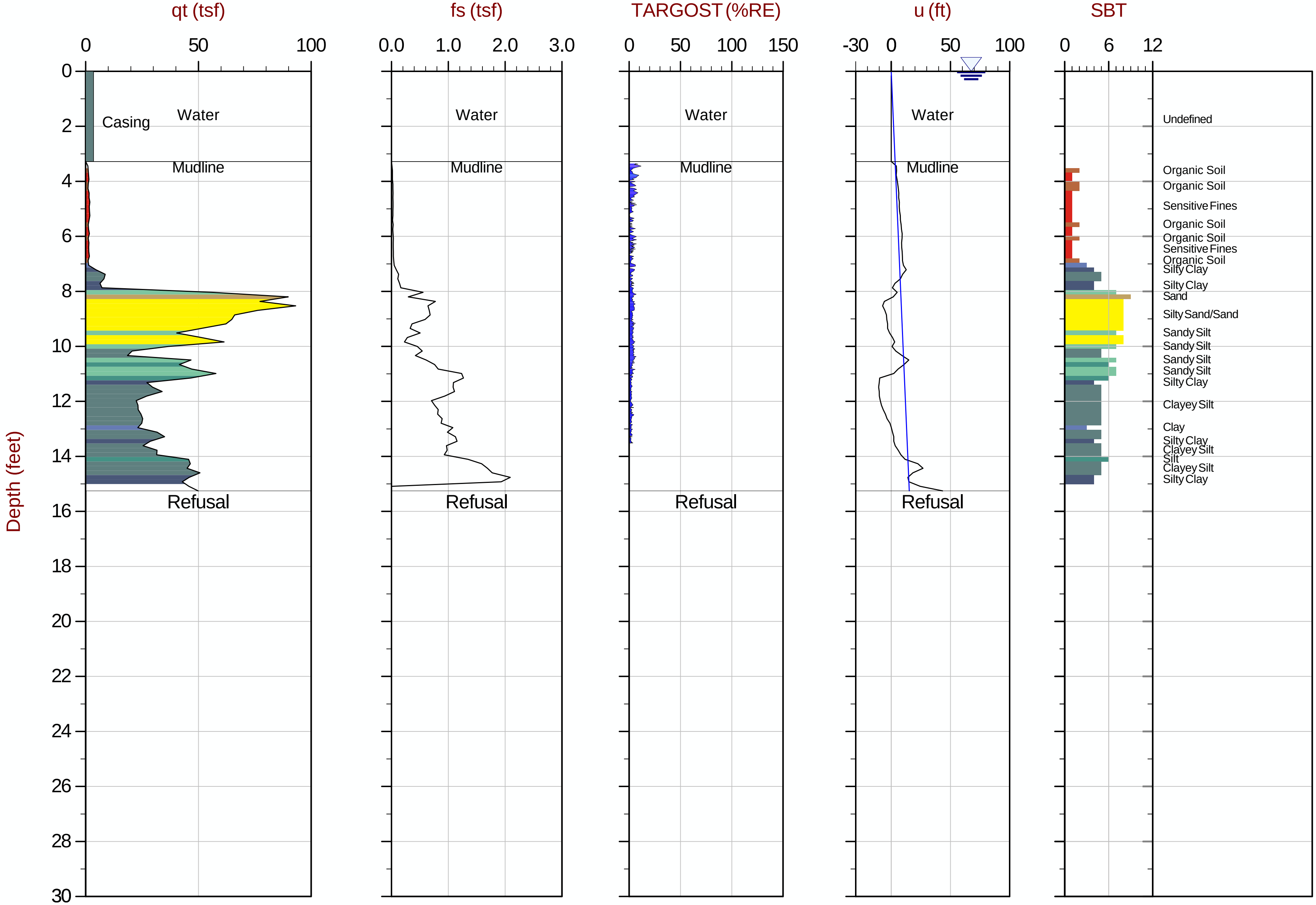
File: 16-53090_LIFCP28.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724943m E: 331647m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec	Job No: 16-53087	Sounding: LIF-CPT16-SSC-30
Leidos	Date: 2016/10/07 14:07	Cone: 301:T1500F15U500
	Site: Penn Yan MGP	



Max Depth: 4.650 m / 15.26 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP30.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724952m E: 331654m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

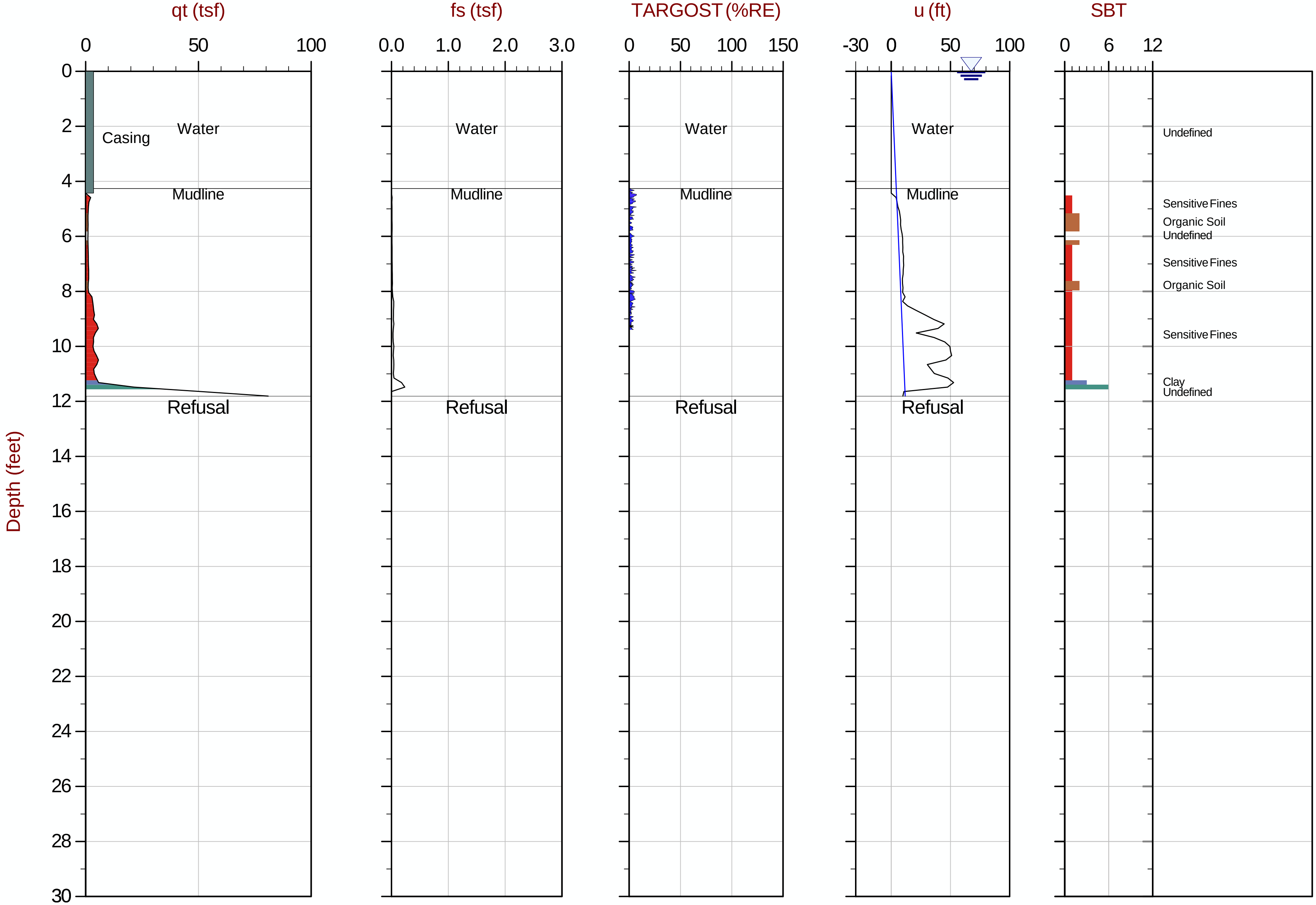
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/06 13:46
Site: Penn Yan MGP, Penn Yan, NY

Sounding: LIF-CPT16-SSC-31
Cone: 301:T1000F10U500



Max Depth: 3.600 m / 11.81 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP31.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724946m E: 331653m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

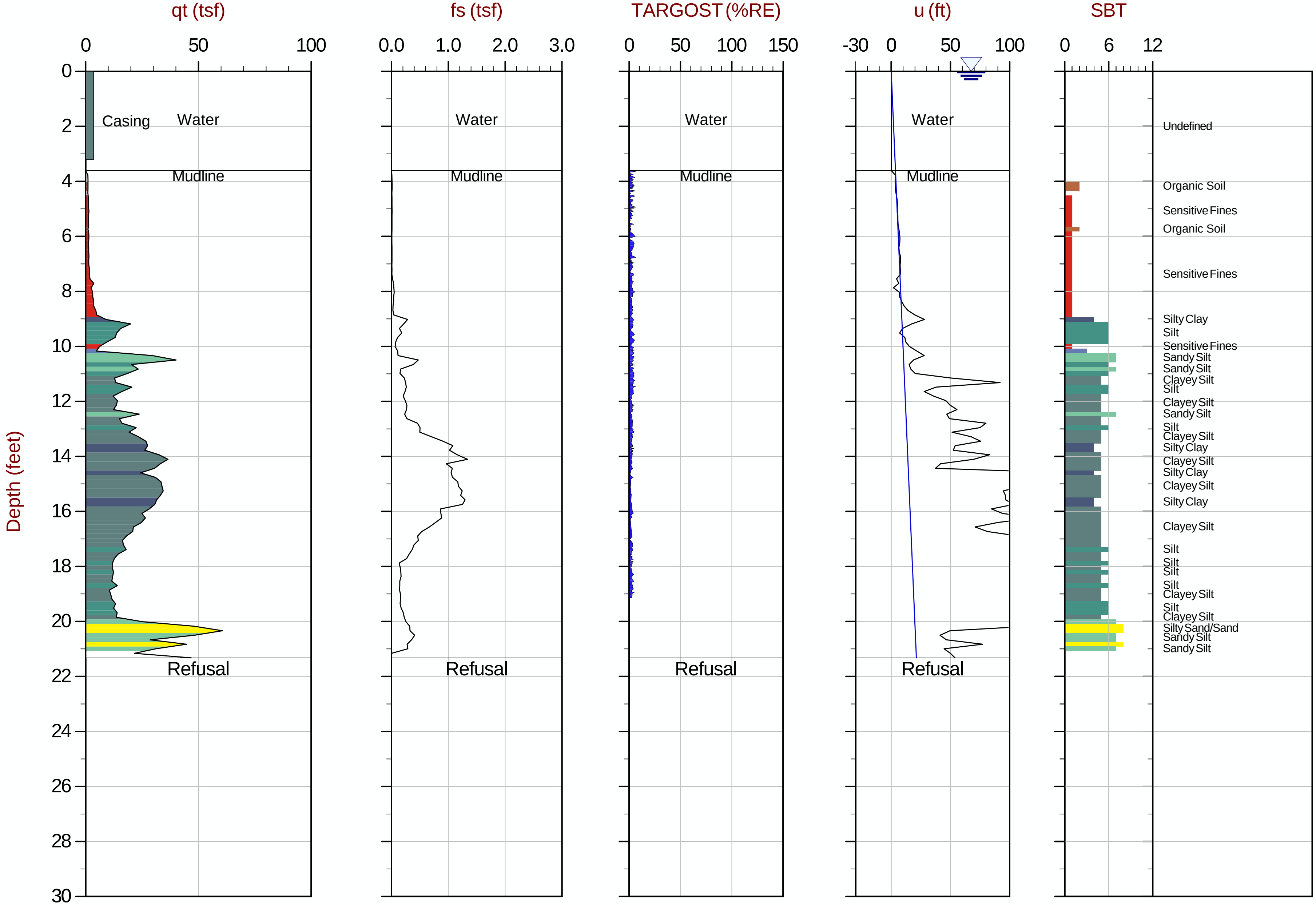
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/06 18:34
Site: Penn Yan MGP, Penn Yan, NY

Sounding: LIF-CPT16-SSC-33
Cone: 301:T1000F10U500



Max Depth: 6.500 m / 21.33 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP33.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724955m E: 331656m

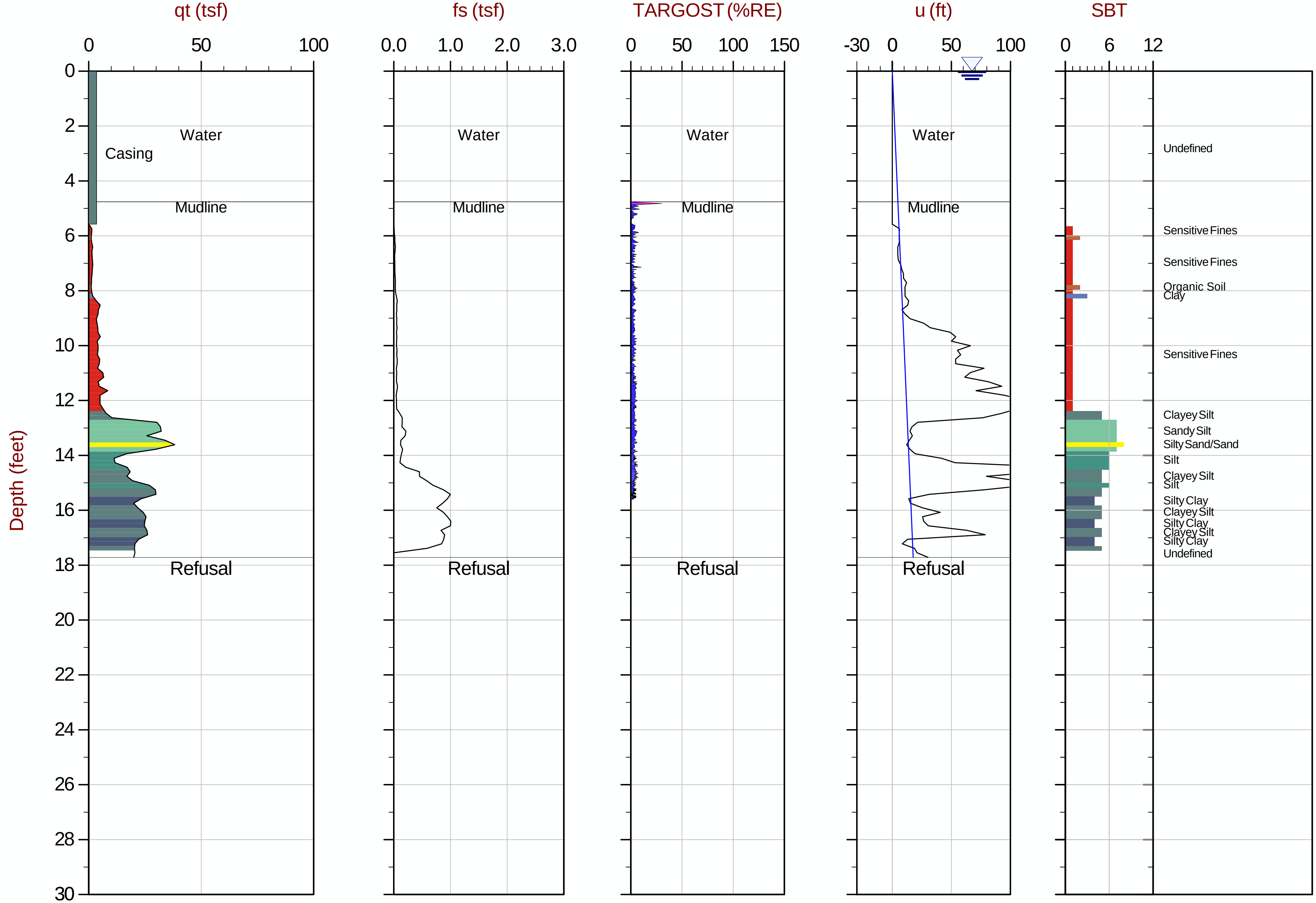
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/06 14:25
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-34
Cone: 301:T1000F10U500



Max Depth: 5.400 m / 17.72 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP34.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724946m E: 331664m

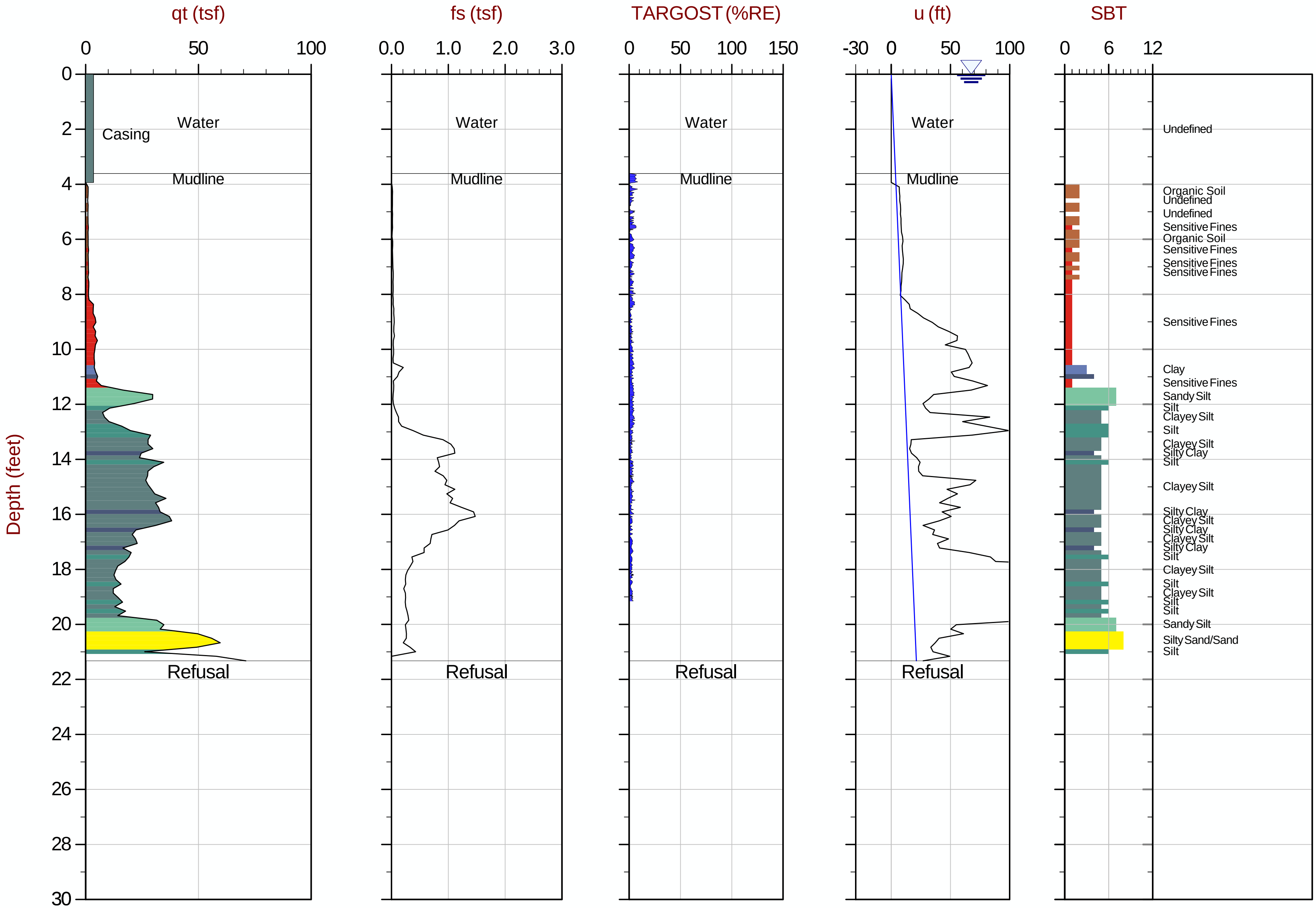
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/06 17:31
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-36
Cone: 301:T1000F10U500



Max Depth: 6.500 m / 21.33 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP36.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724983m E: 331662m

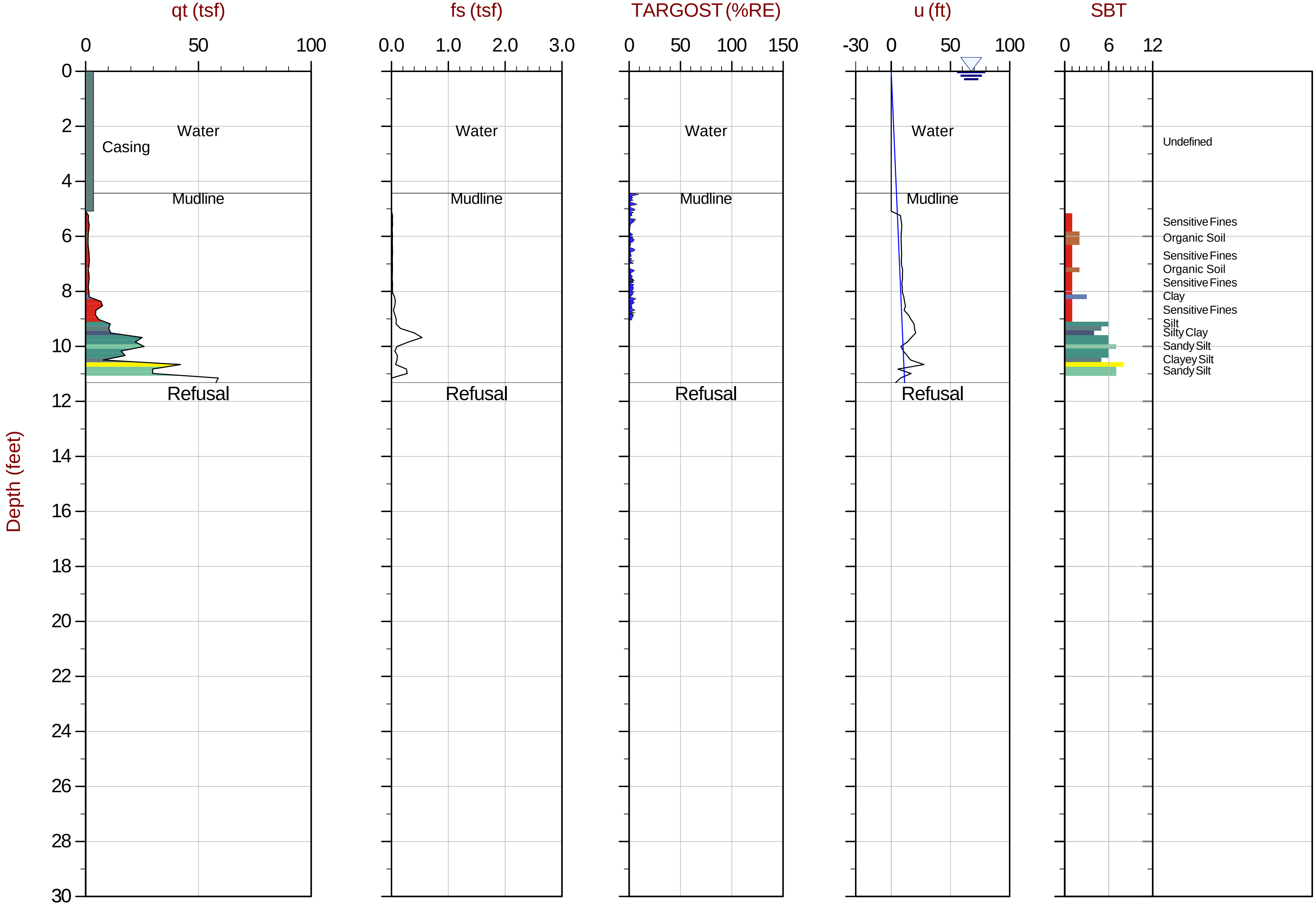
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Leidos

Job No: 16-53087
Date: 2016/10/06 15:39
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-37
Cone: 301:T1000F10U500



Max Depth: 3.450 m / 11.32 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP37.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724955m E: 331662m

Hydrostatic Line | Ueq | Assumed Ueq | PPD, Ueq achieved | PPD, Ueq not achieved

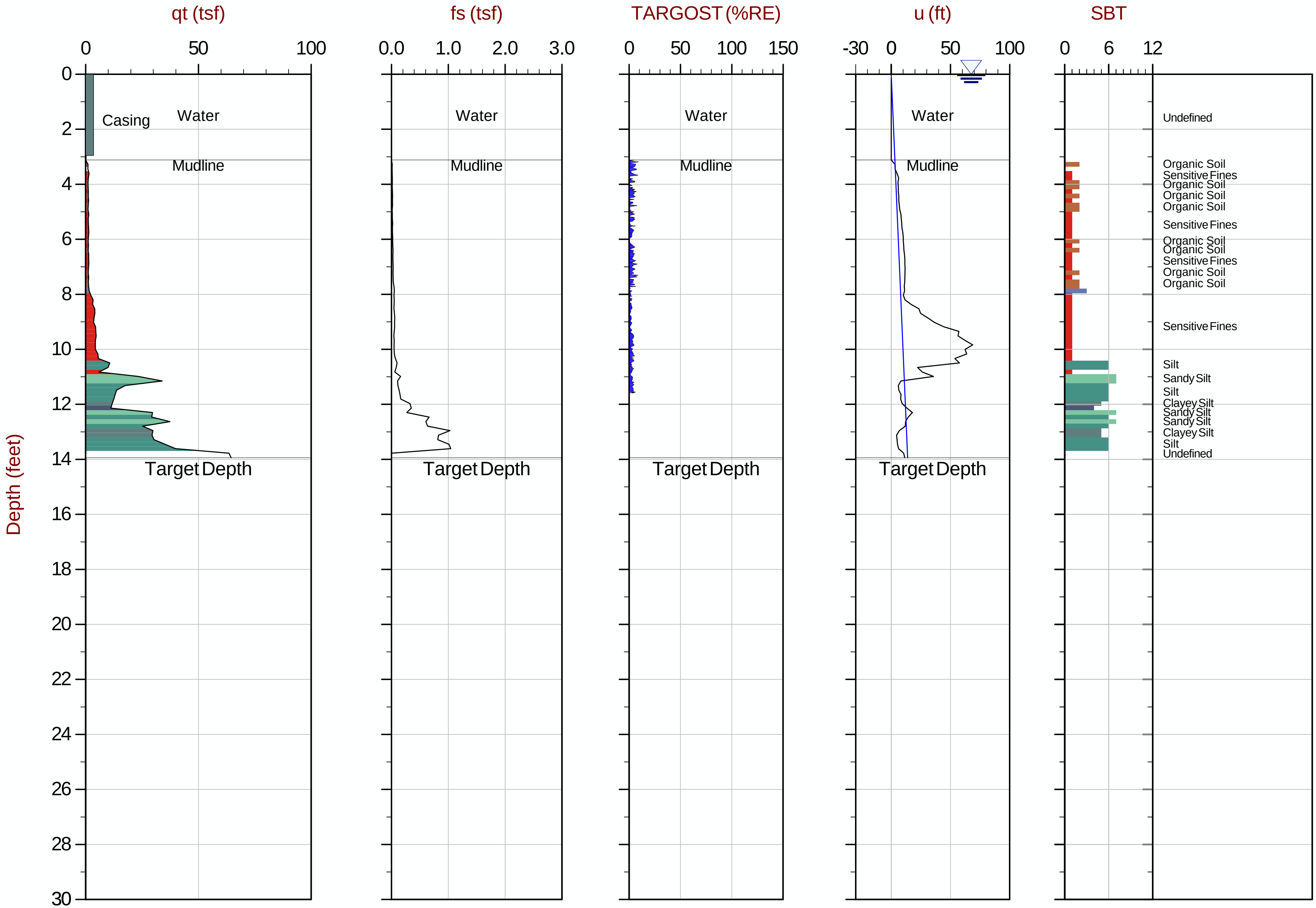
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/06 16:58
Site: Penn Yan MGP, Penn Yan, NY

Sounding: LIF-CPT16-SSC-39
Cone: 301:T1000F10U500



Max Depth: 4.250 m / 13.94 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP39.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724983m E: 331662m

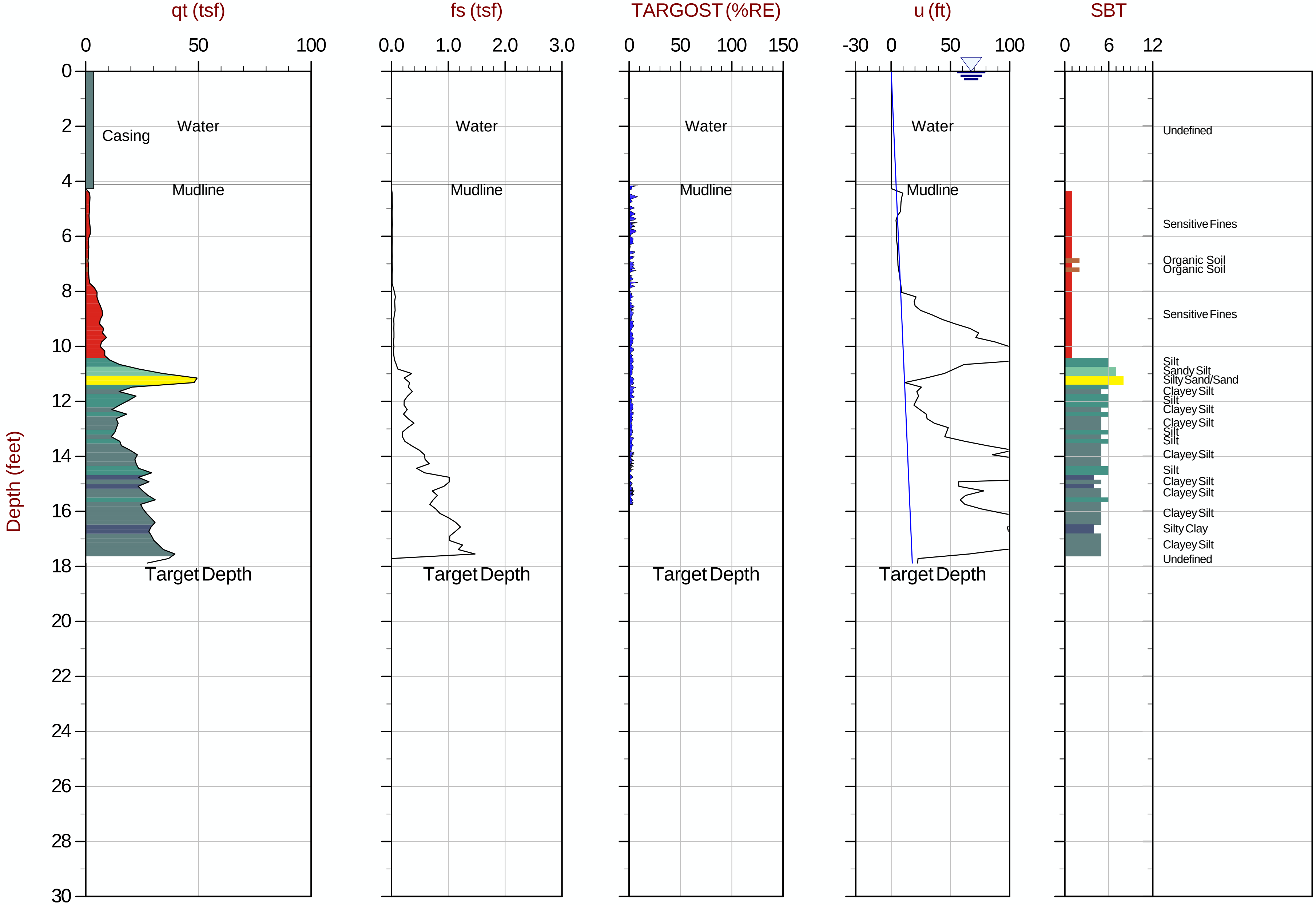
Hydrostatic Line | Ueq | Assumed Ueq | PPD, Ueq achieved | PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Leidos

Job No: 16-53087
Date: 2016/10/06 16:12
Site: Penn Yan MGP, Penn Yan, NY
Sounding: LIF-CPT16-SSC-40
Cone: 301:T1000F10U500



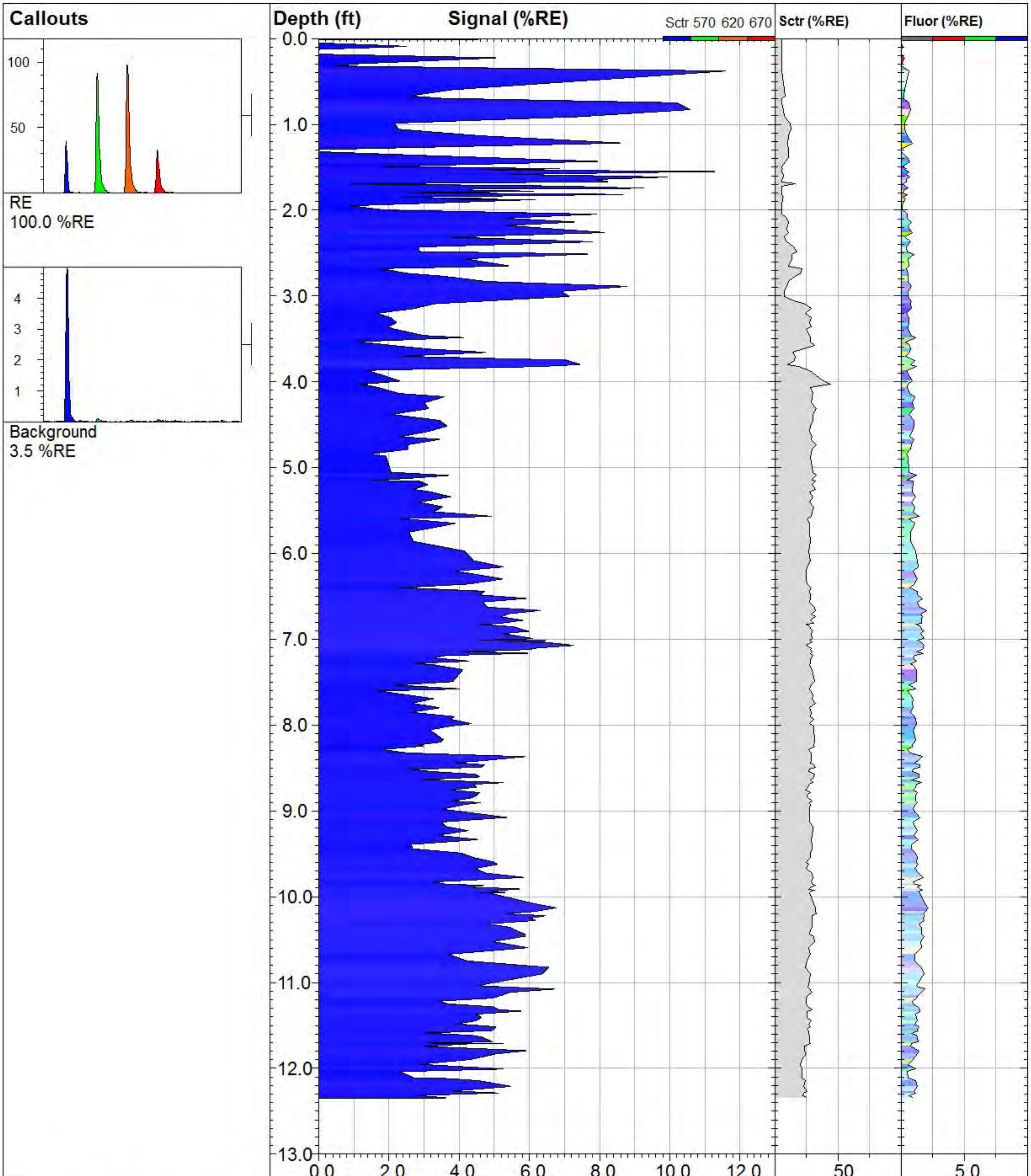
Max Depth: 5.450 m / 17.88 ft
Depth Inc: 0.050 m / 0.164 ft

File: 16-53090_LIFCP40.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4724964m E: 331668m

Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

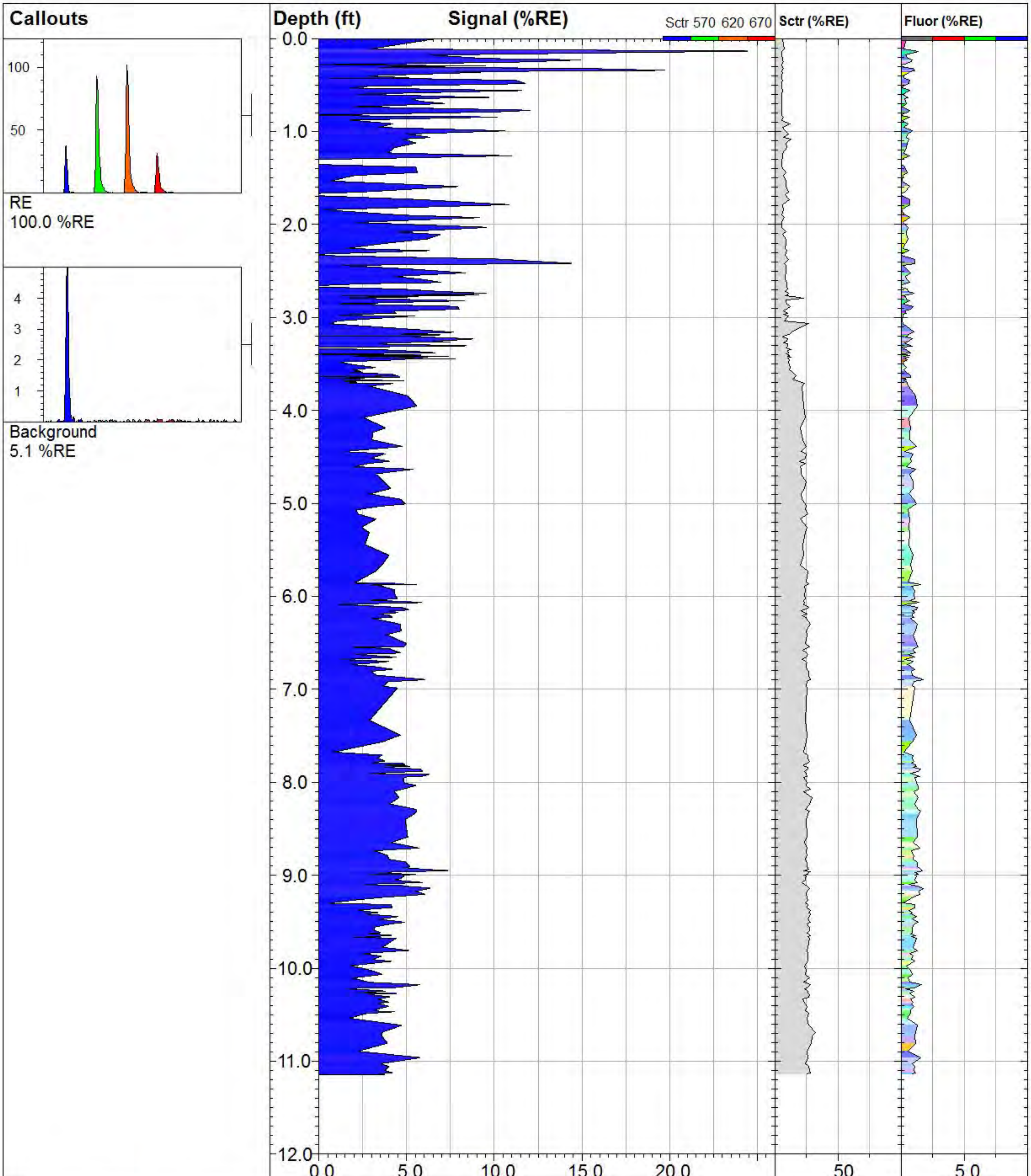


SSC-01

TarGOST® By Dakota
www.DakotaTechnologies.com

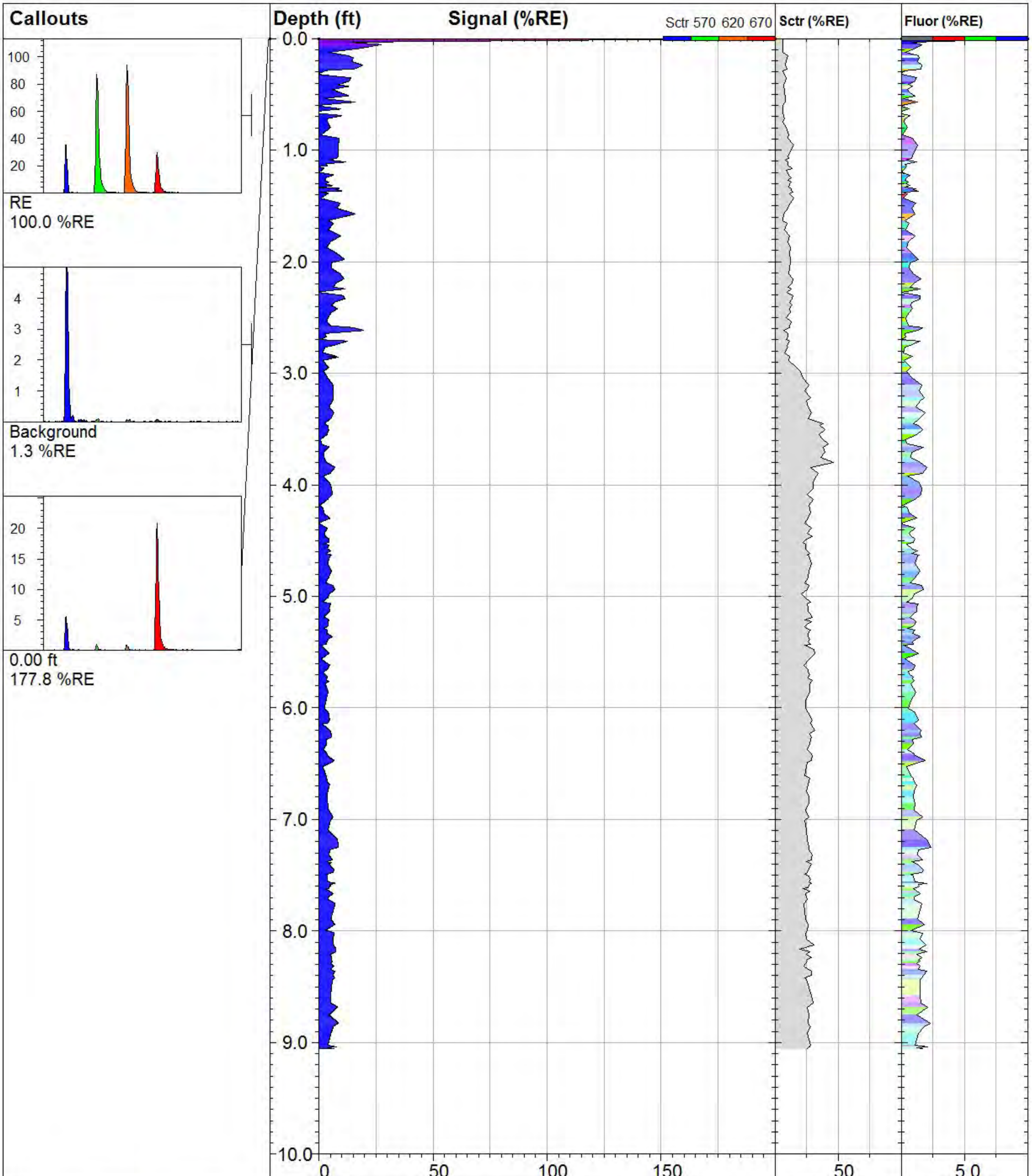
DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **12.35 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.6 %RE @ 0.38 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 09:04 EDT**



DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-02		**TarGOST® By Dakota** www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **11.14 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **24.8 %RE @ 0.14 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-04 15:55 EDT**

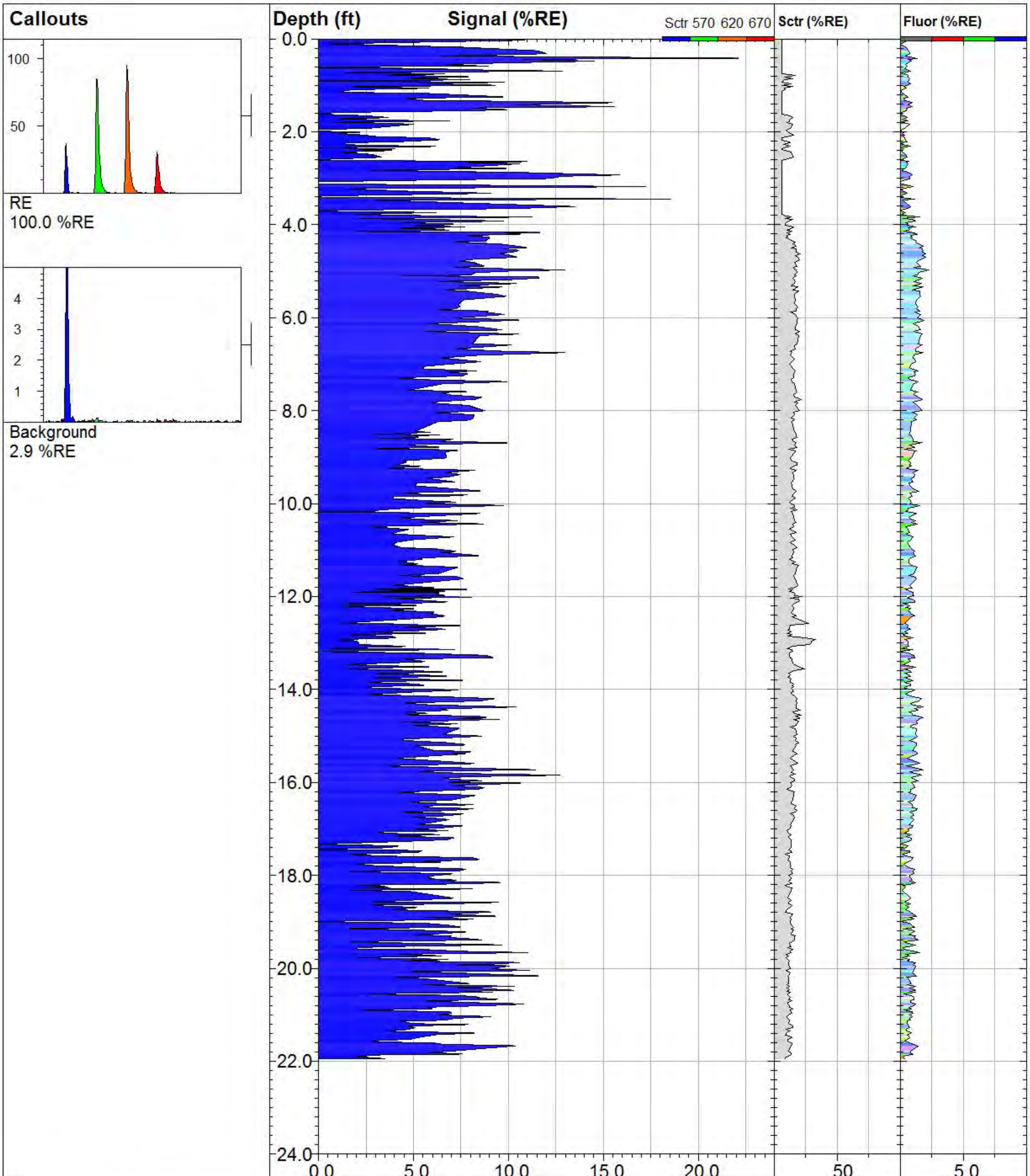


SSC-03

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.06 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **177.8 %RE @ 0.00 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 15:22 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

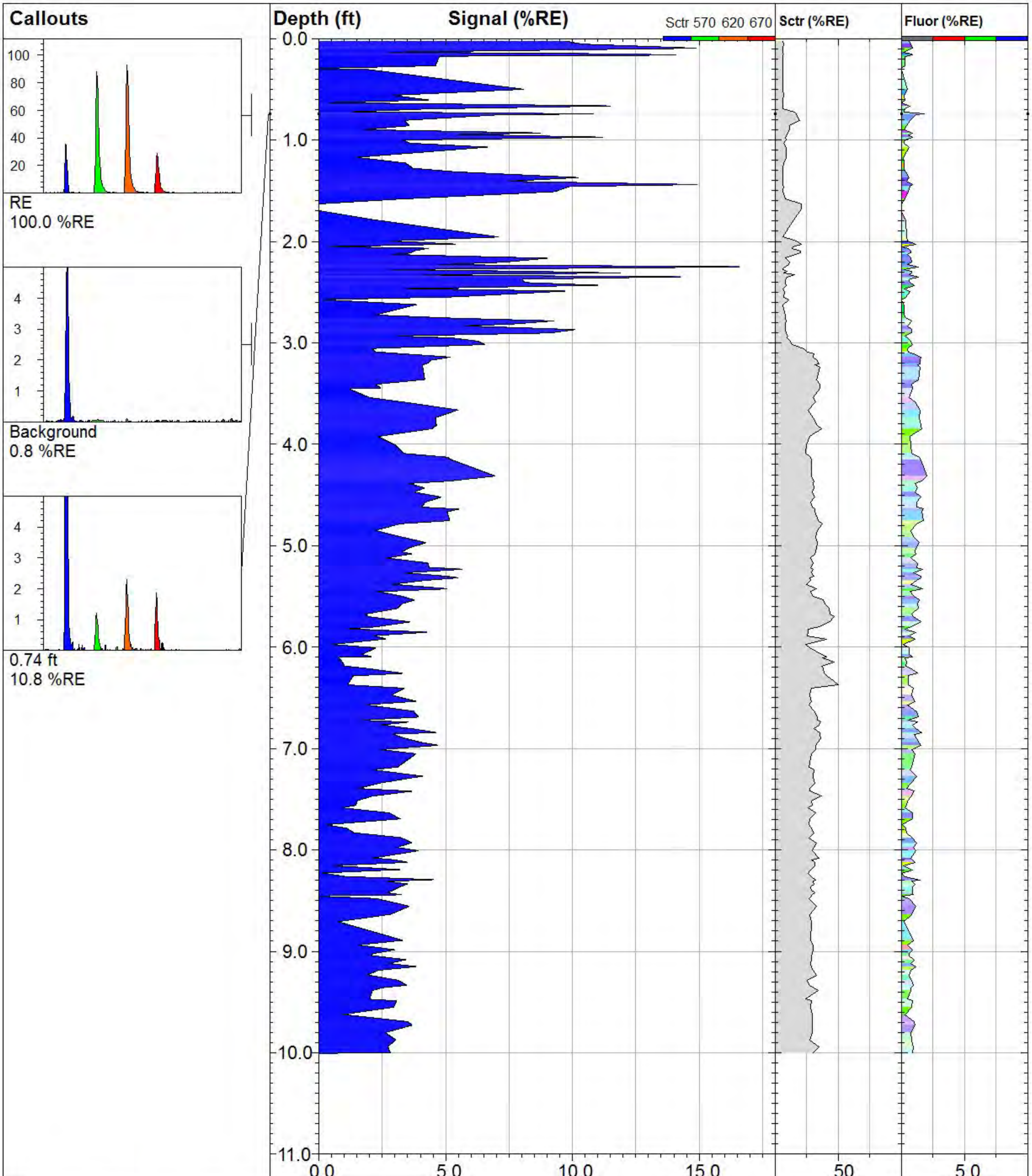


SSC-04

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **21.95 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **22.4 %RE @ 0.42 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 10:01 EDT**

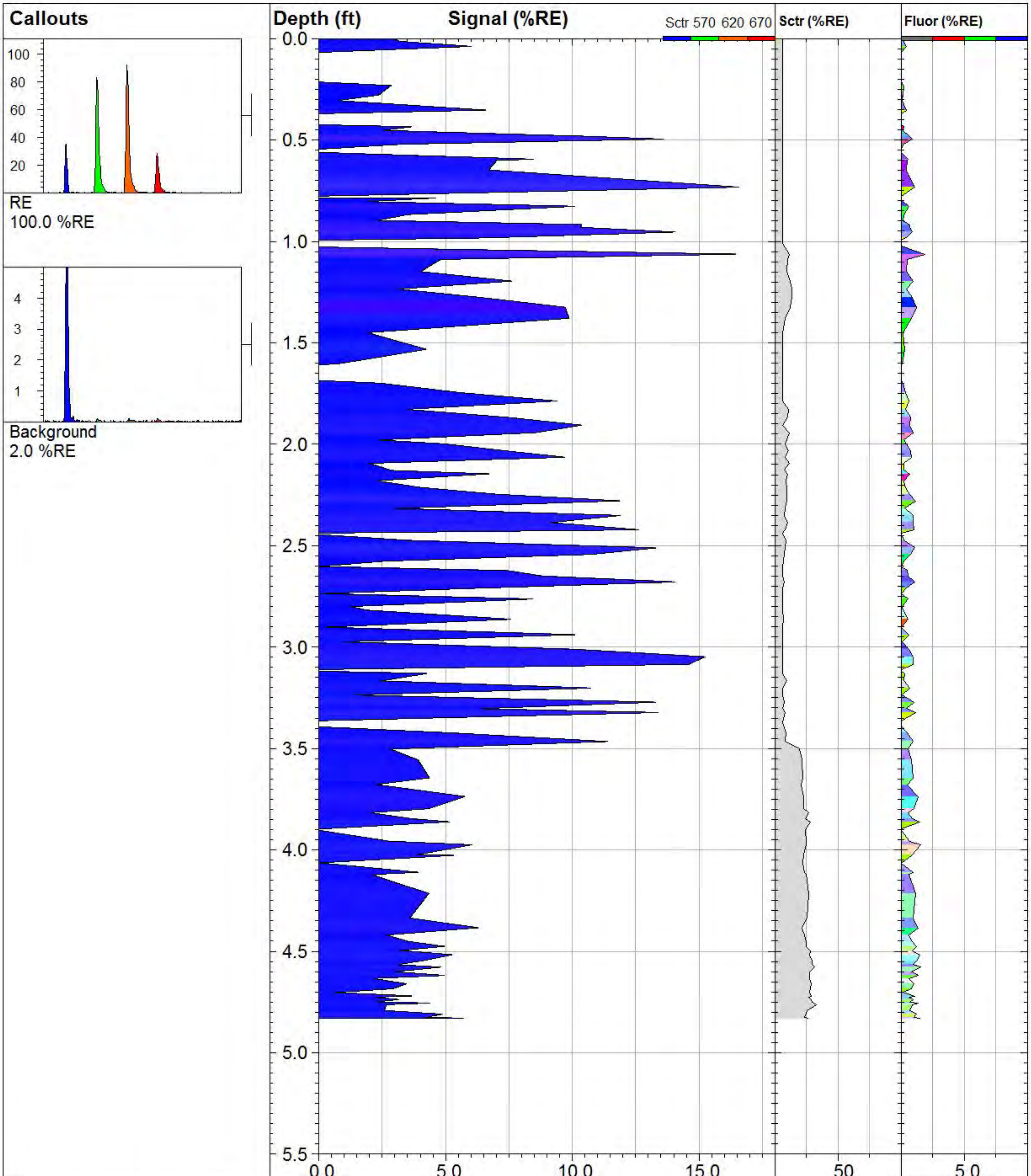


DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-05

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.00 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **16.7 %RE @ 2.25 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-04 17:45 EDT**

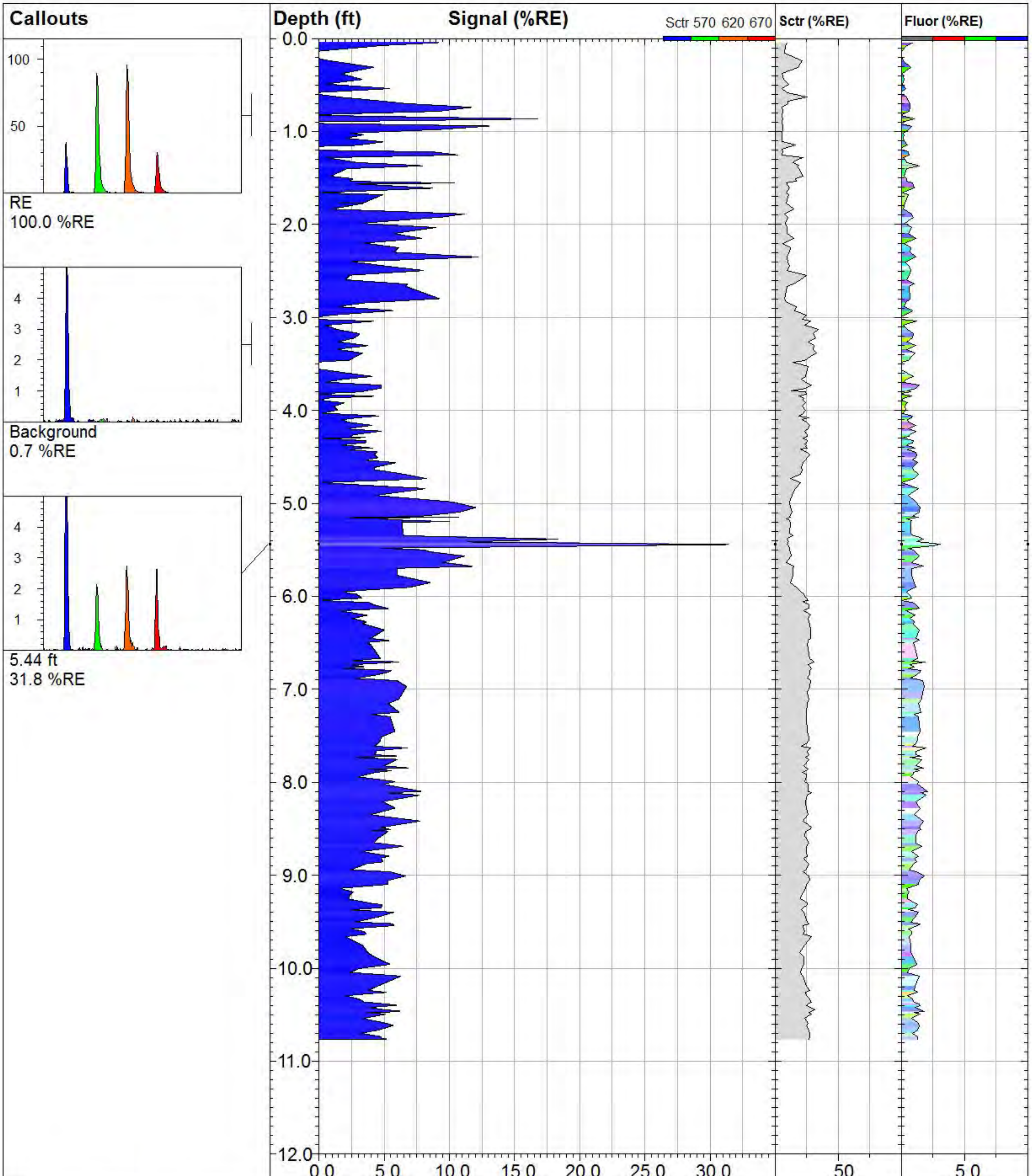


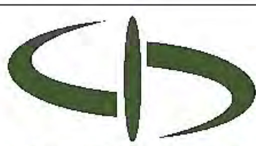
SSC-06

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **4.83 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **16.6 %RE @ 0.73 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 16:08 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM



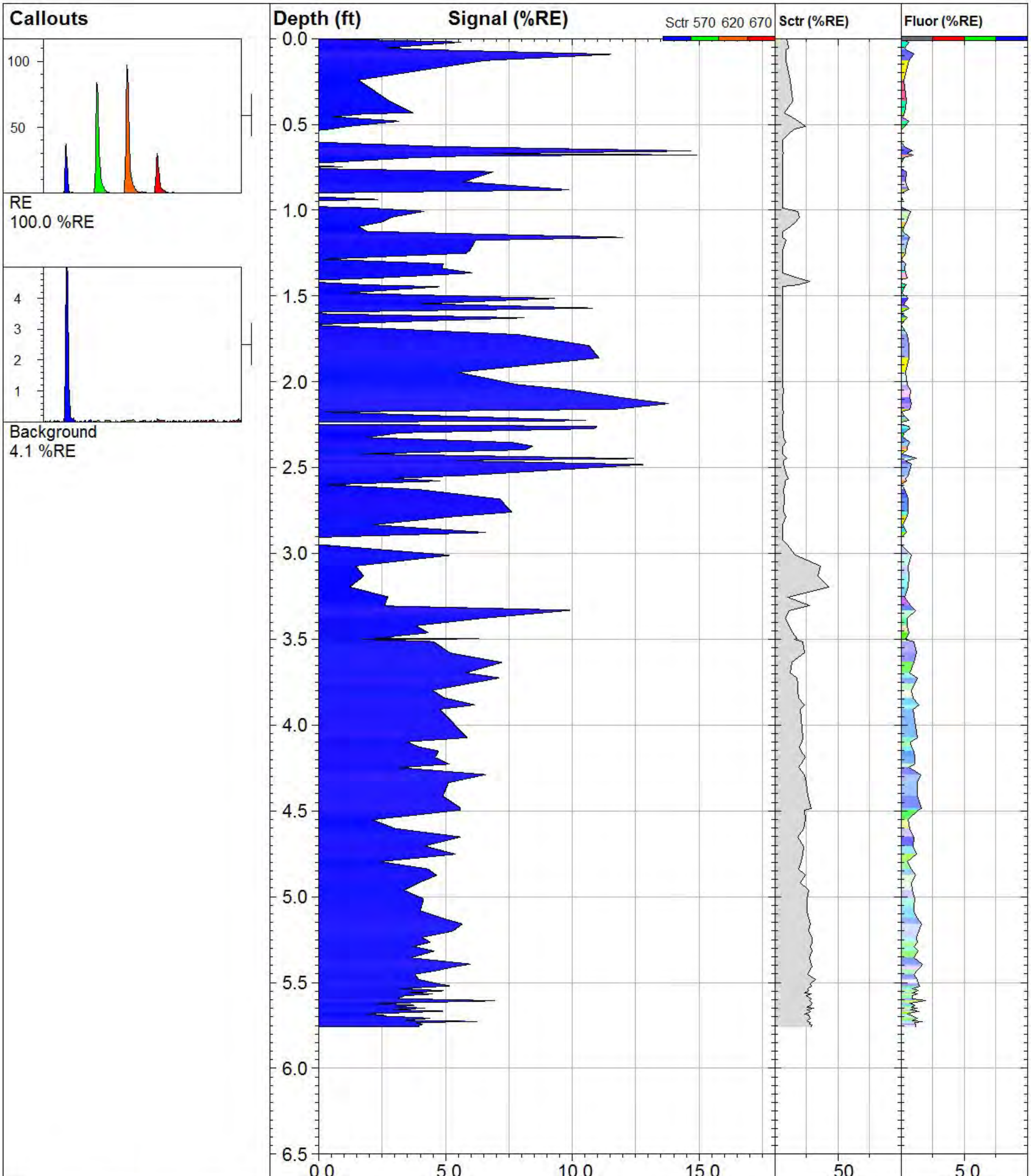


SSC-07

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.76 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **31.8 %RE @ 5.44 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 12:29 EDT**

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

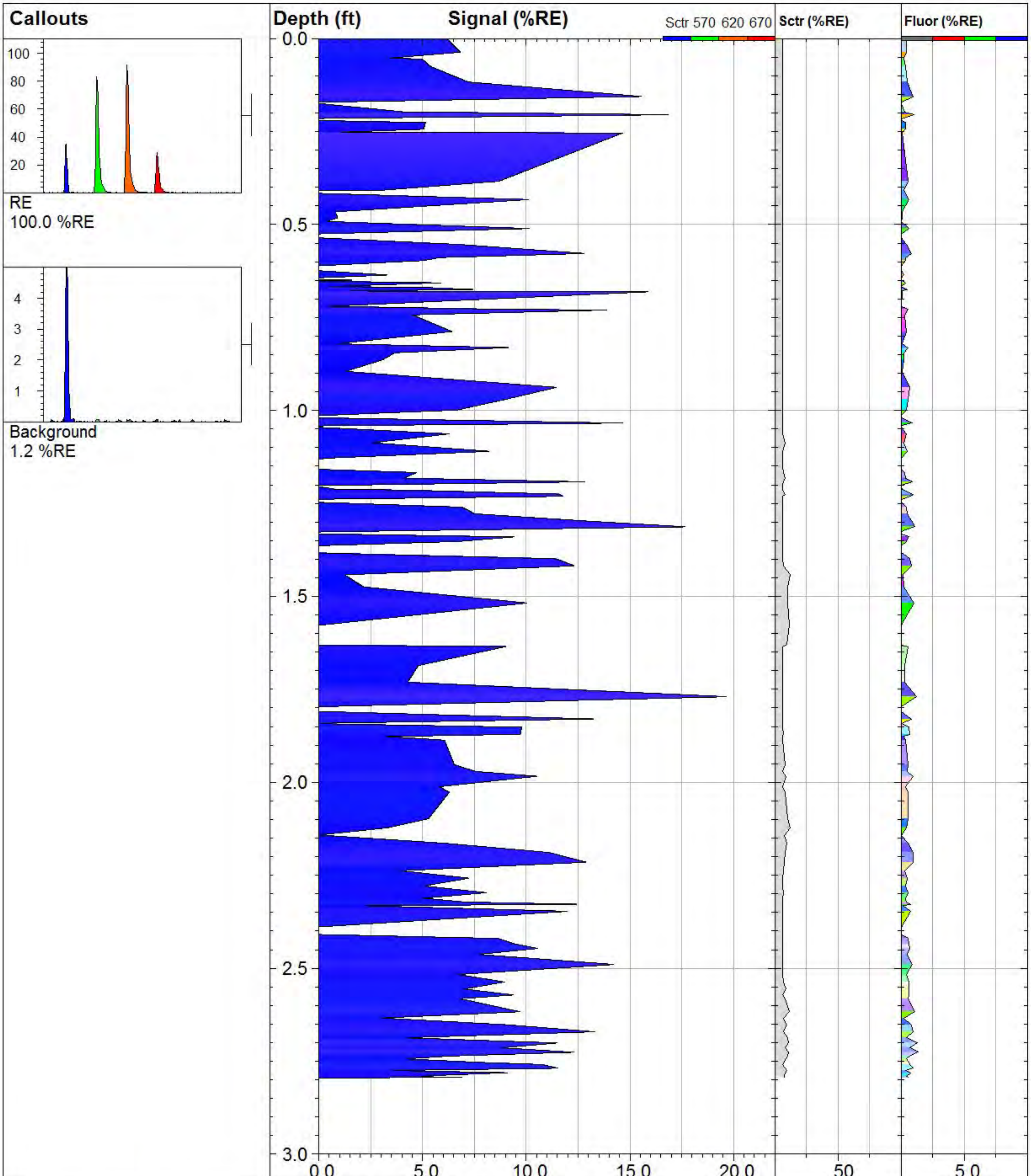


DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-08

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **5.76 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **15.3 %RE @ 0.68 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 11:22 EDT**

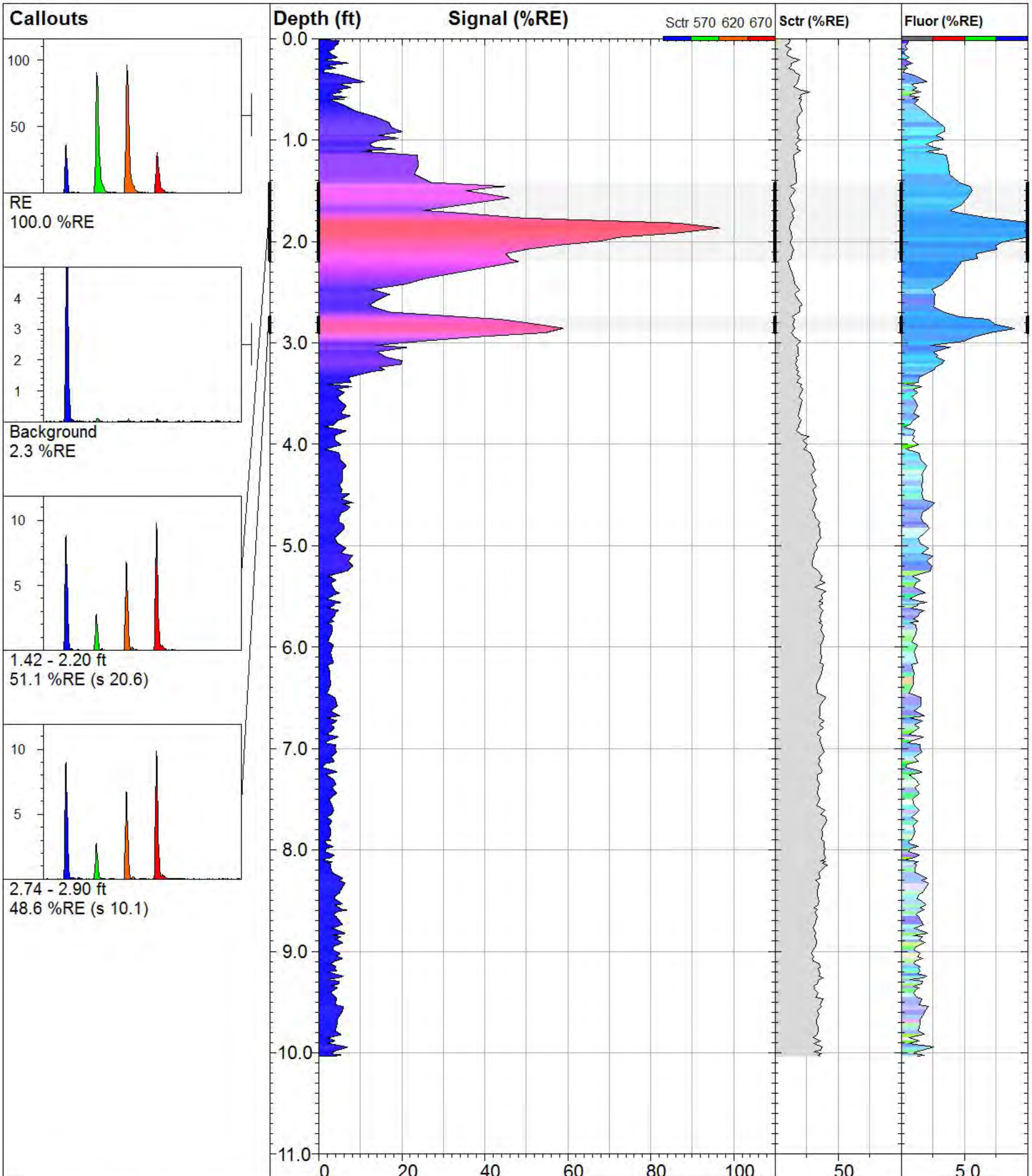


SSC-09

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **2.79 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **19.7 %RE @ 1.77 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 16:47 EDT**

WWW.DAKOTATECHNOLOGIES.COM

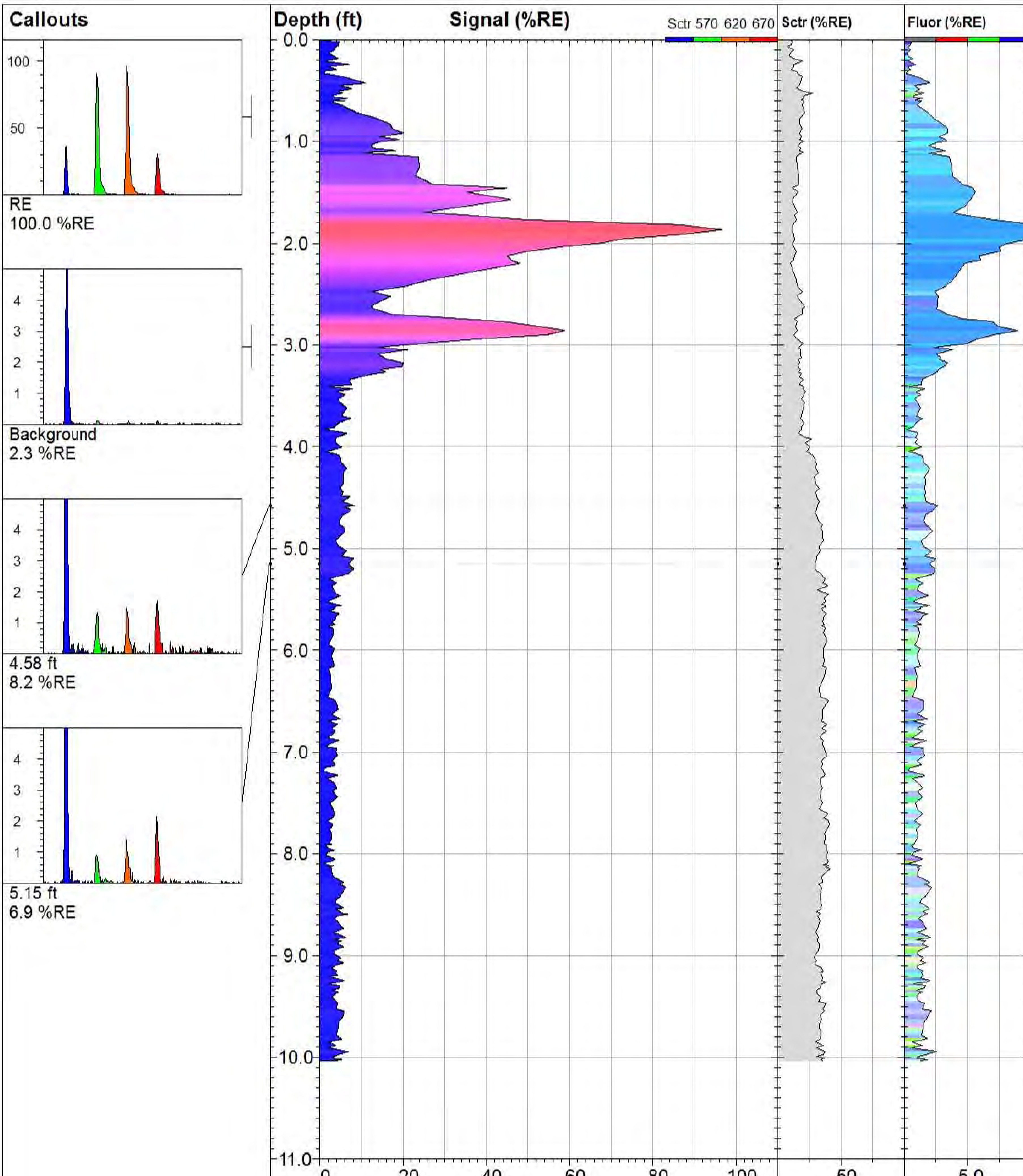


SSC-10

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.03 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **96.6 %RE @ 1.87 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 13:32 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

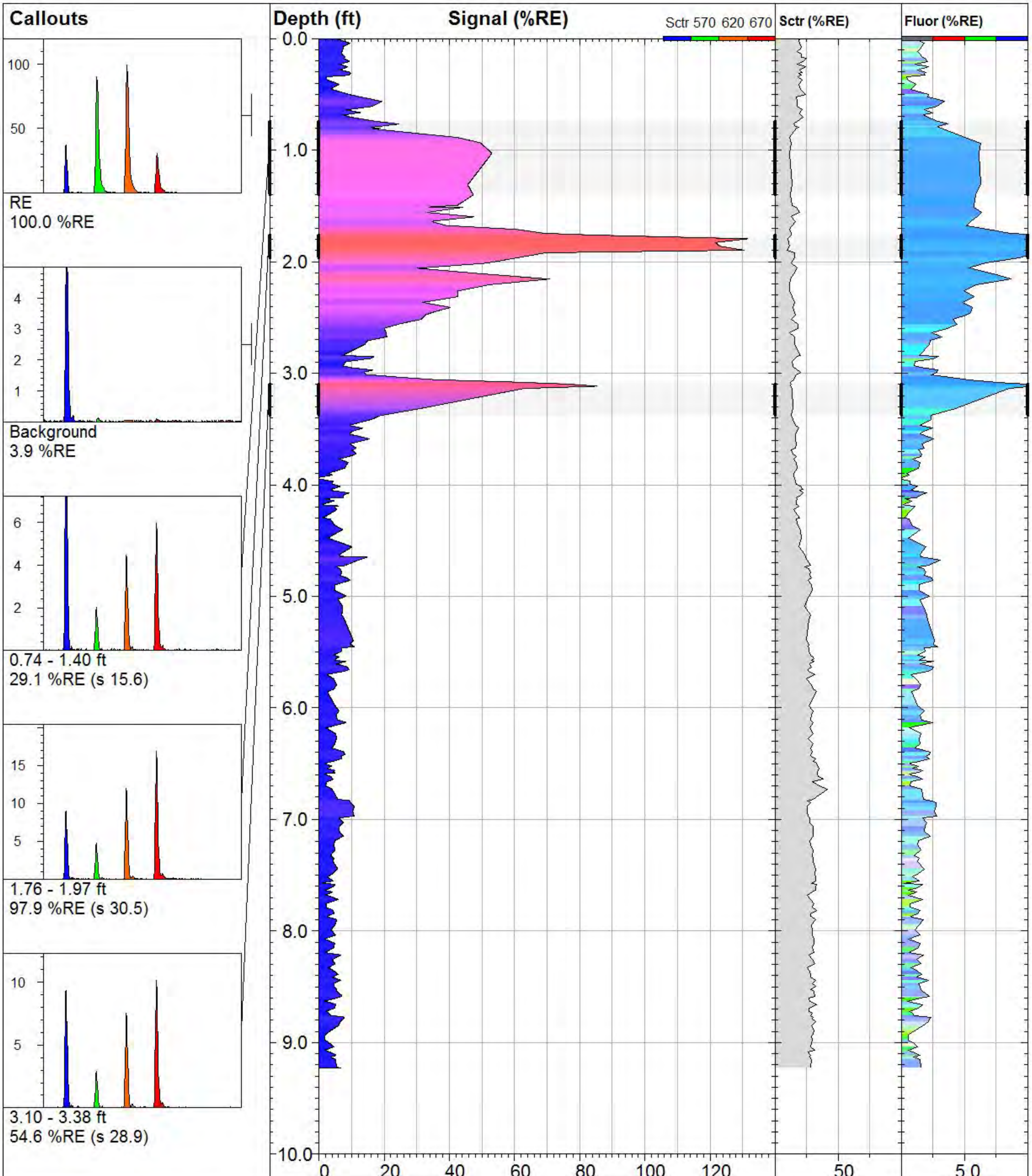


DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-10

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.03 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **96.6 %RE @ 1.87 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 13:32 EDT**



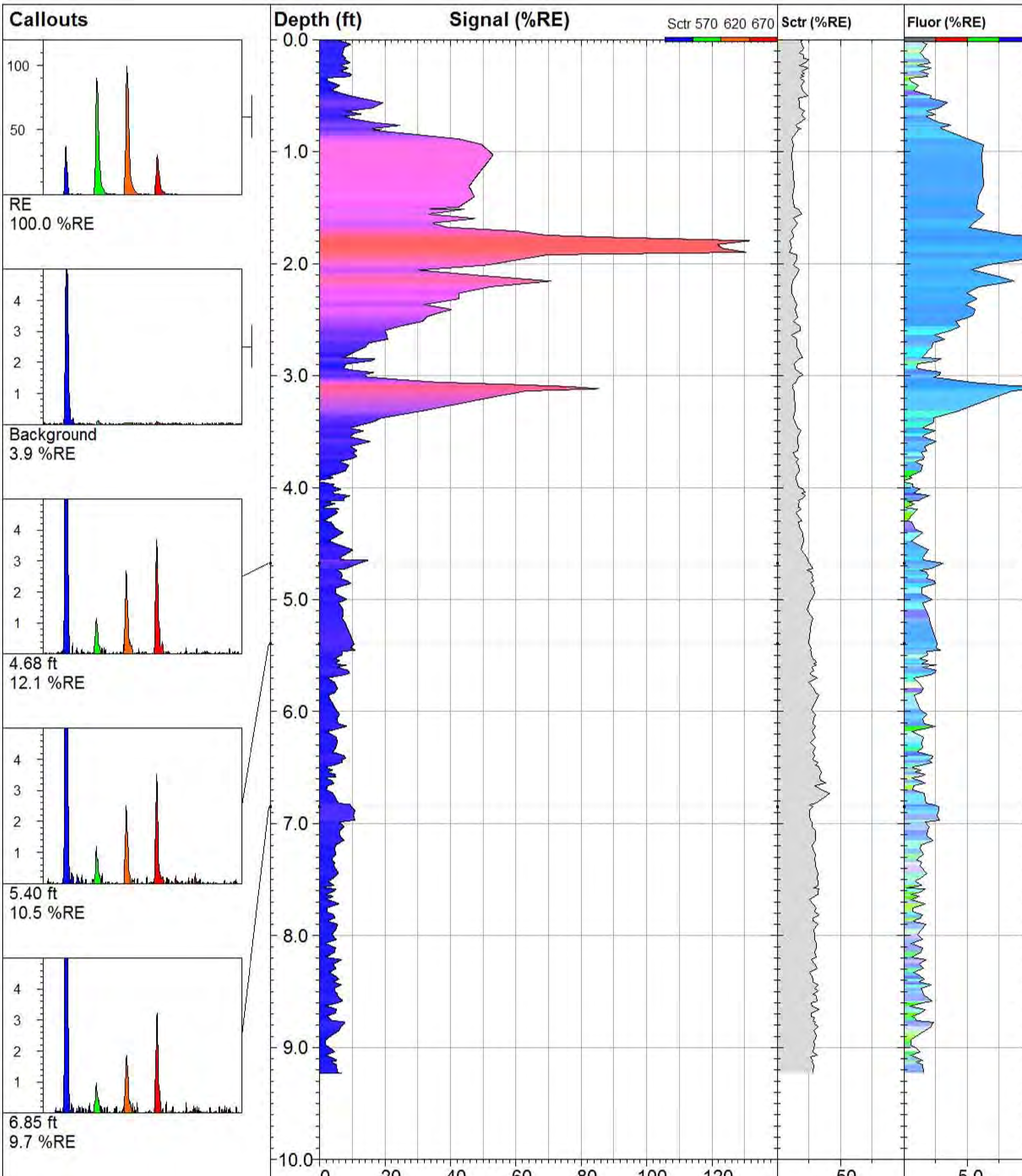
DAKOTA TECHNOLOGIES

www.DakotaTechnologies.com

SSC-11

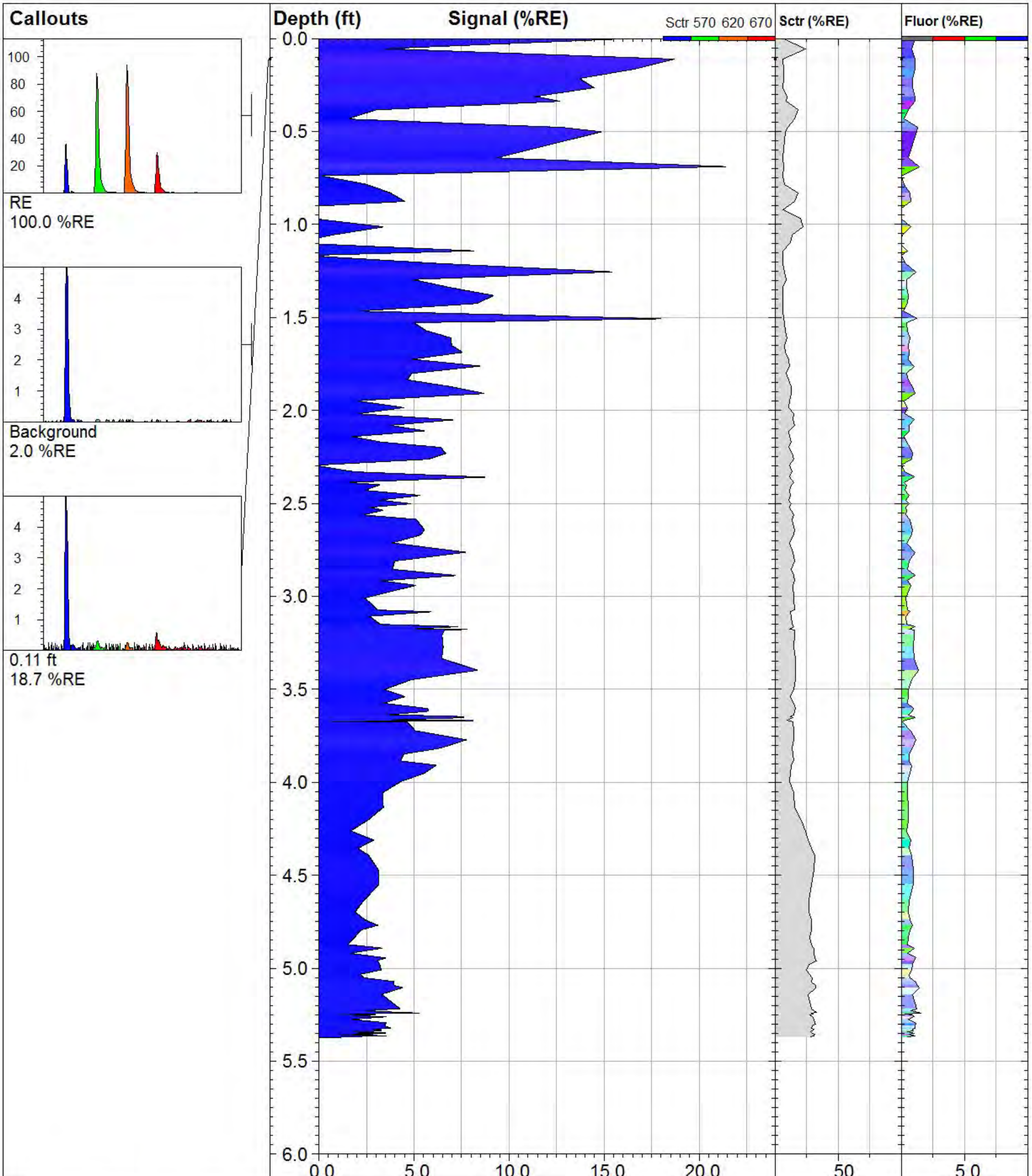
TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.23 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **131.7 %RE @ 1.80 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 14:17 EDT**



SSC-11		TarGOST® By Dakota www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.23 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **131.7 %RE @ 1.80 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 14:17 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

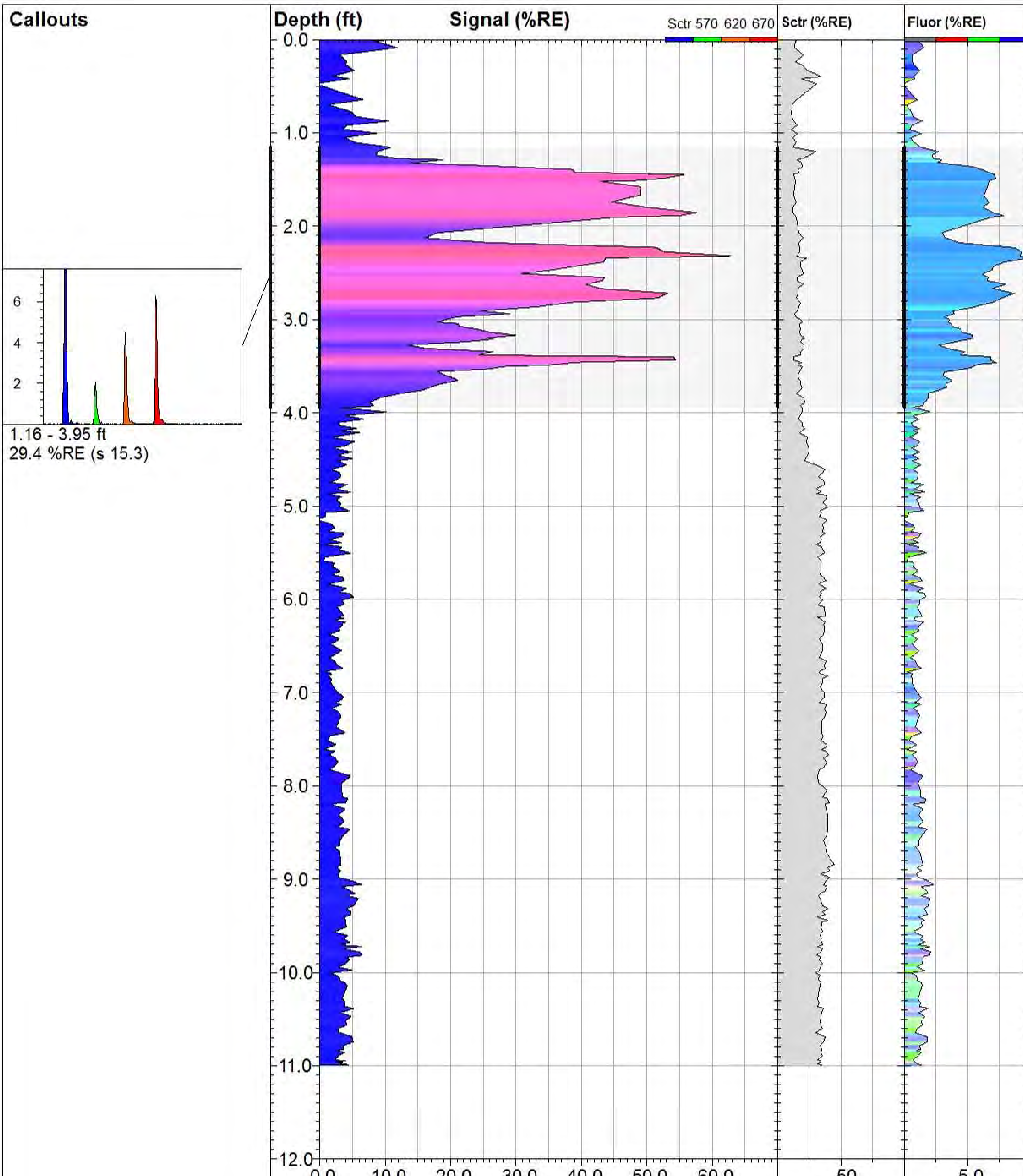


SSC-12

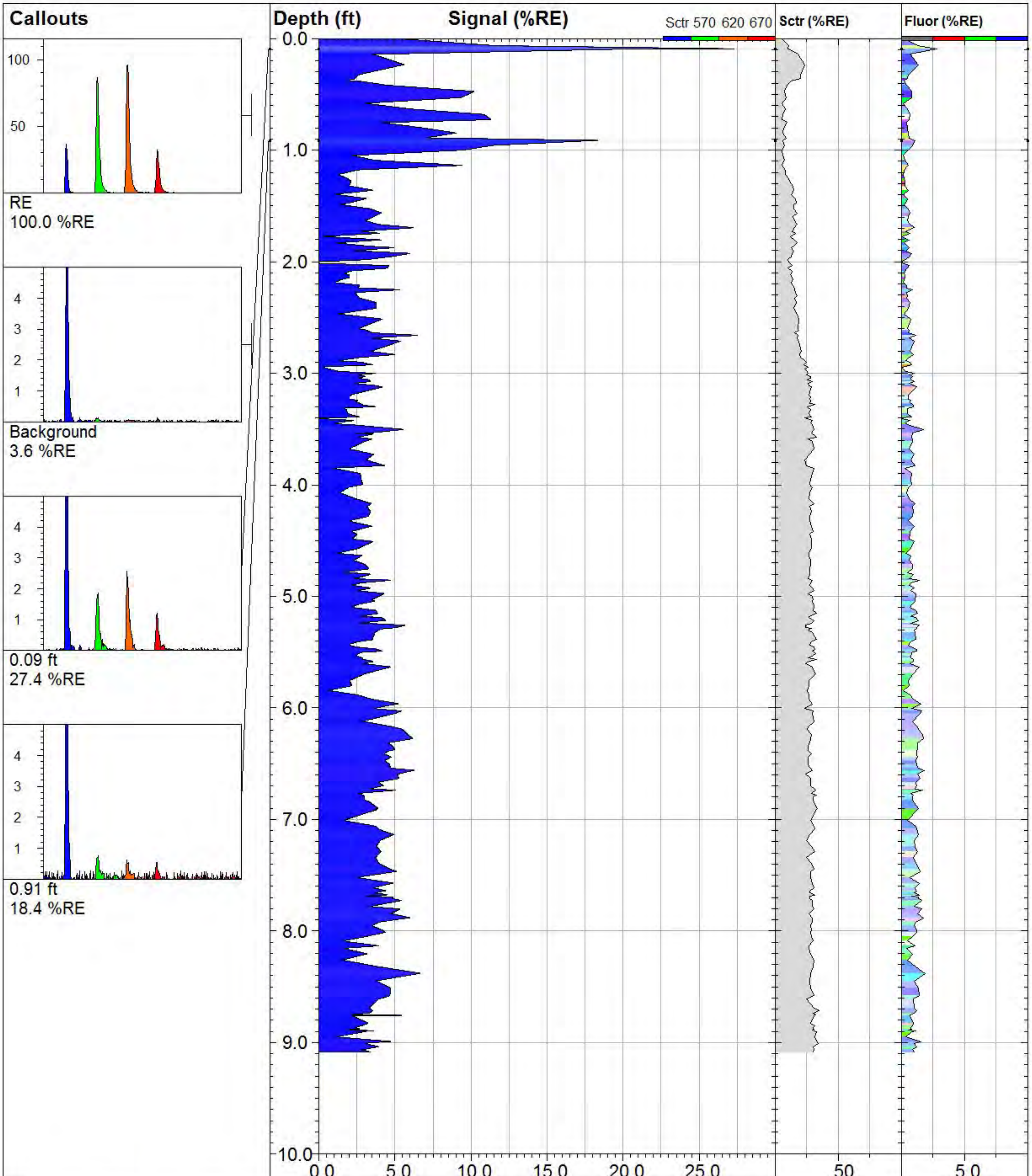
TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **5.37 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **21.4 %RE @ 0.69 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 17:23 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM



DAKOTA TECHNOLOGIES www.DakotaTechnologies.com	**SSC-14**		**TarGOST® By Dakota** www.DakotaTechnologies.com
	Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.99 ft**
	Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **63.0 %RE @ 2.32 ft**
	Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 12:55 EDT**

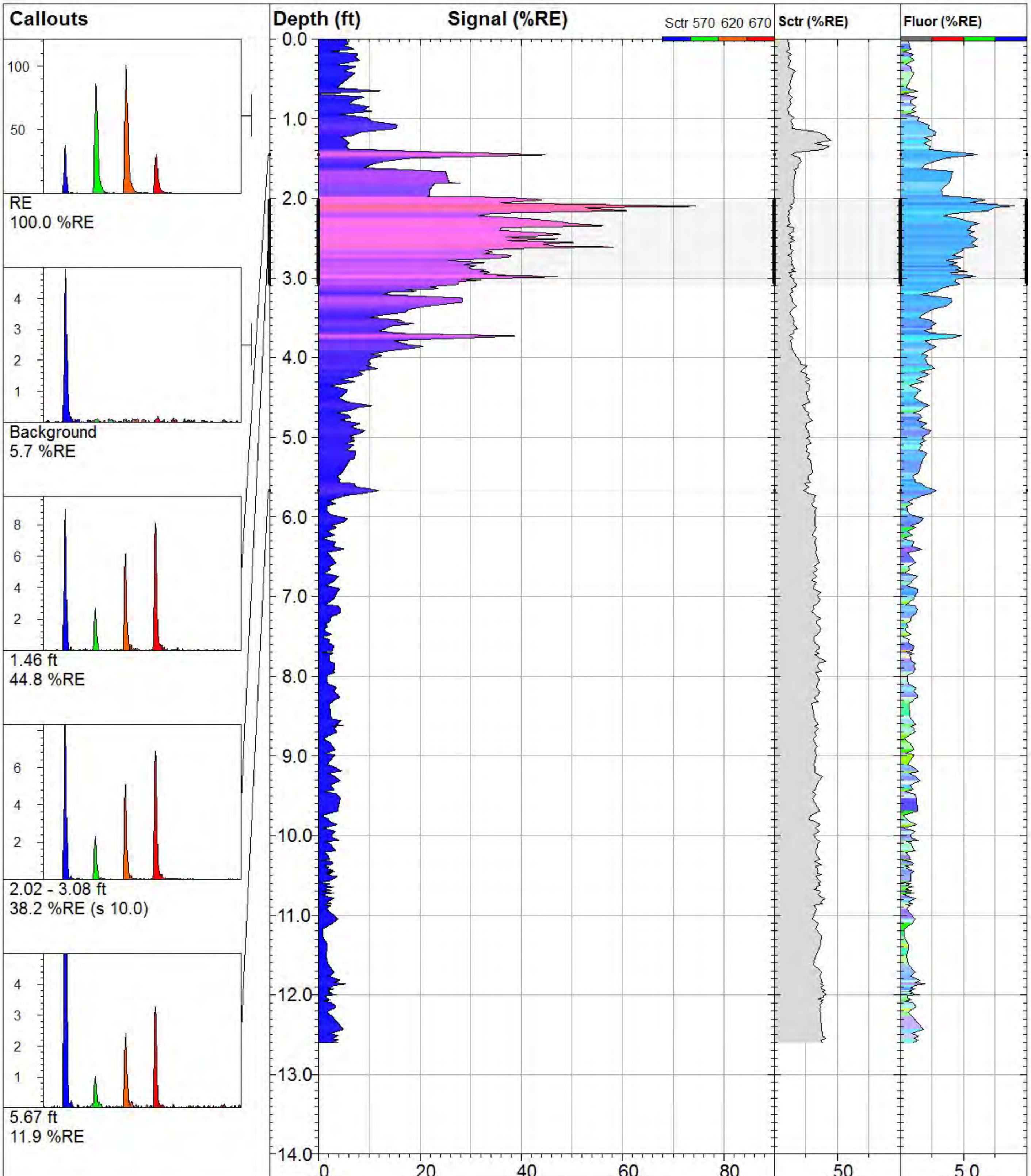


SSC-15

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.09 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **27.4 %RE @ 0.09 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 08:21 EDT**

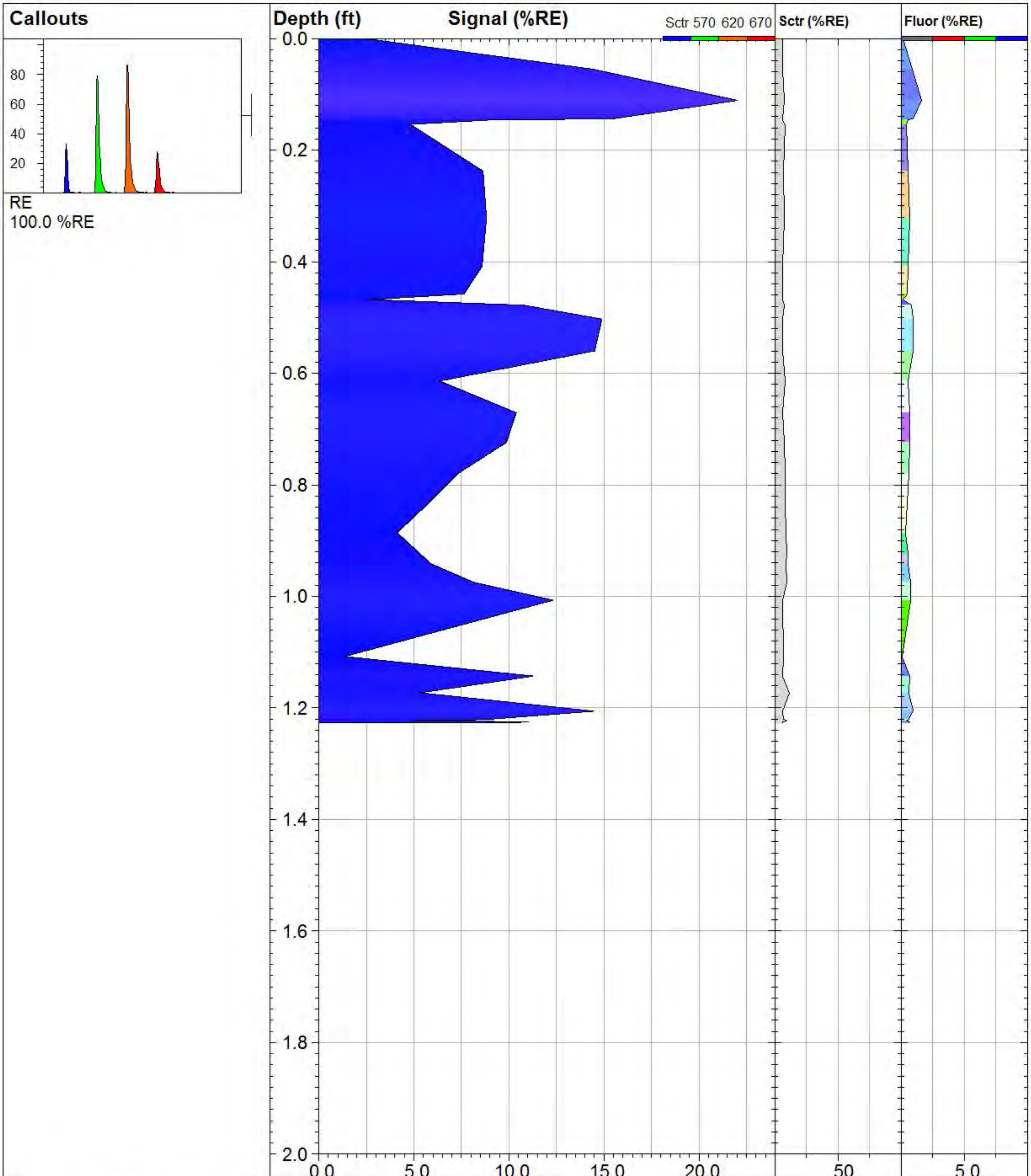


SSC-17

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **12.60 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **75.2 %RE @ 2.10 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 12:12 EDT**

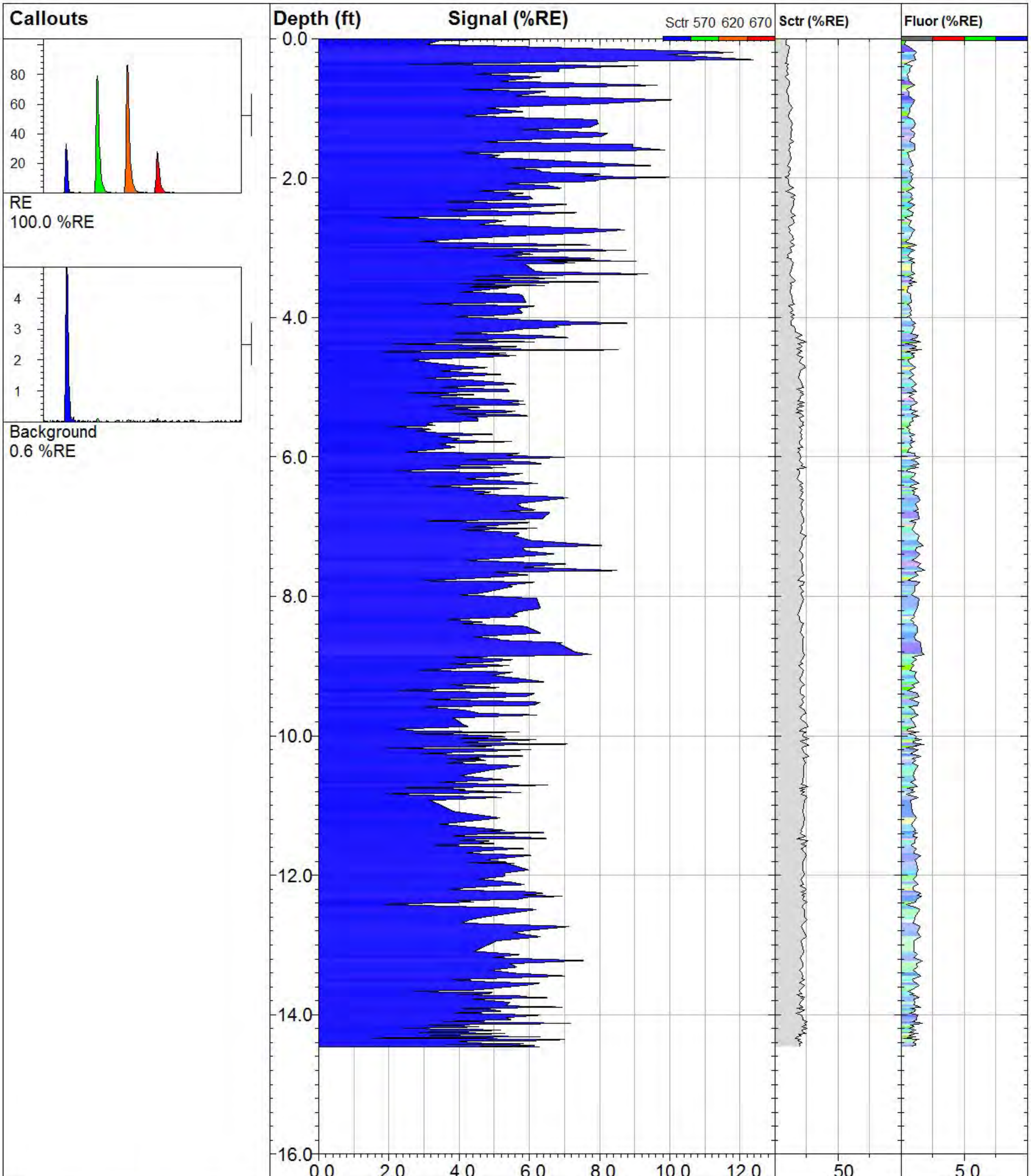


SSC-18

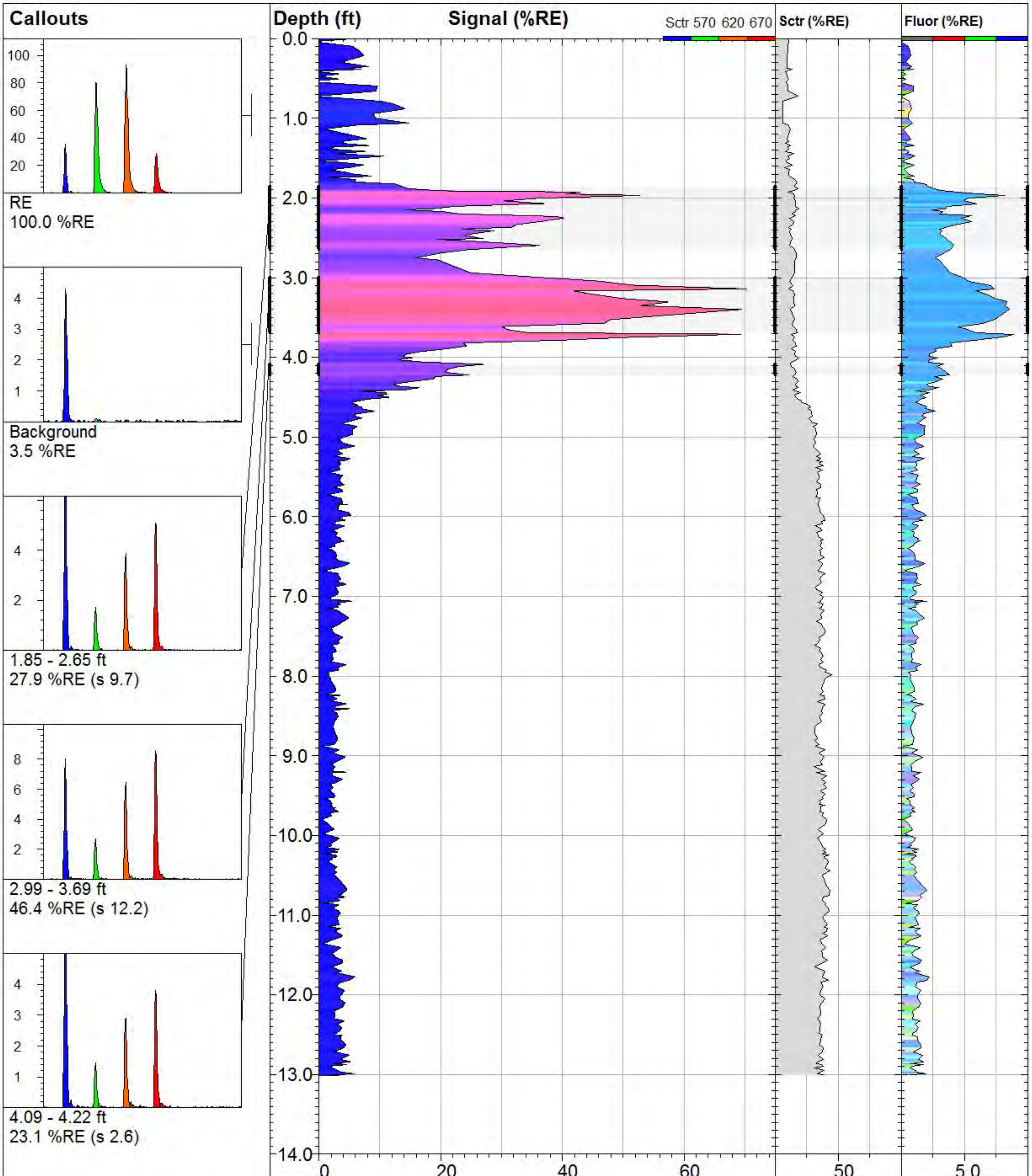
TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **1.23 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **22.0 %RE @ 0.11 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 09:06 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM



DAKOTA TECHNOLOGIES www.DakotaTechnologies.com	**SSC-18A**		**TarGOST® By Dakota** www.DakotaTechnologies.com
	Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **14.46 ft**
	Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **12.4 %RE @ 0.30 ft**
	Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 09:22 EDT**

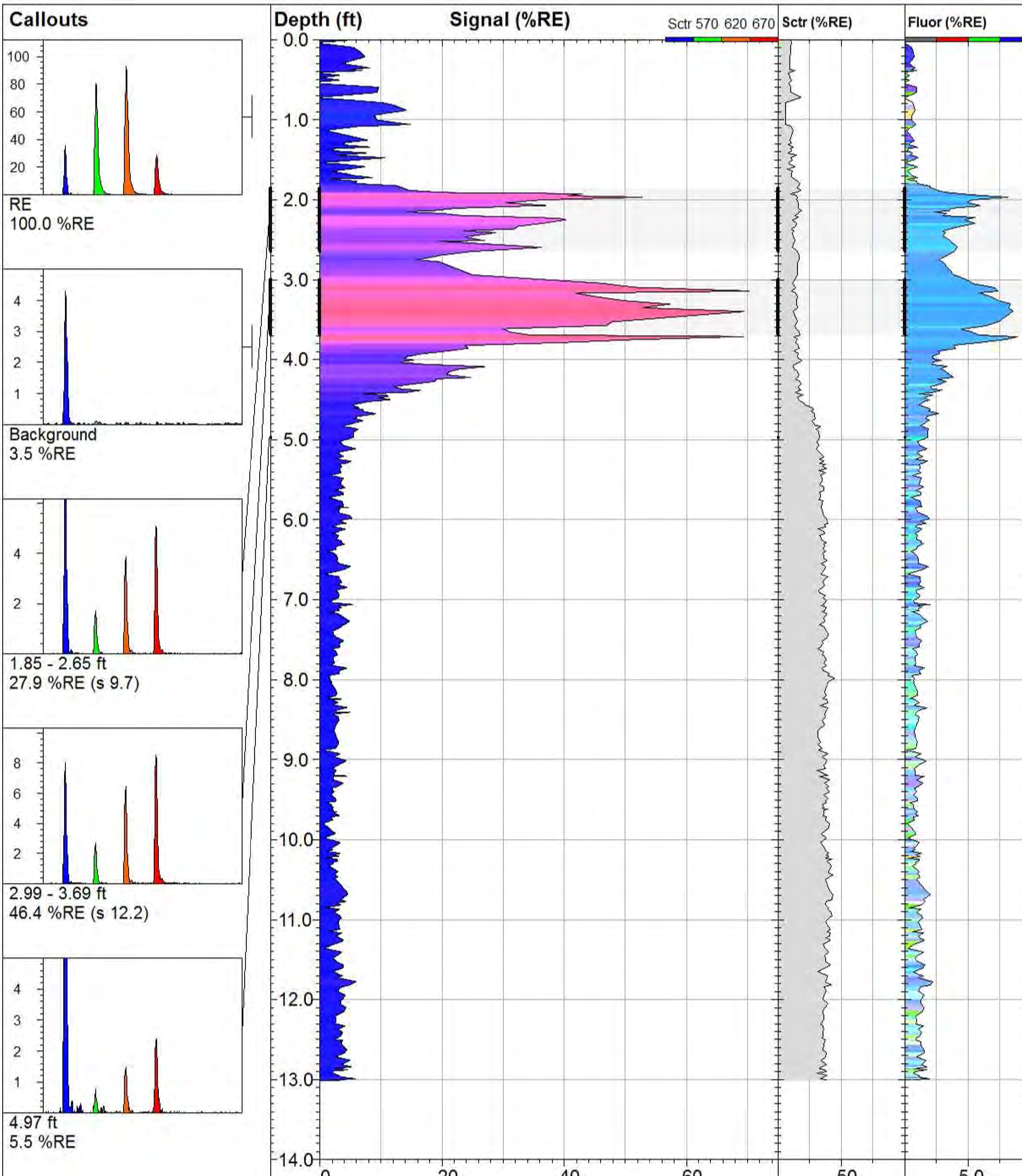


SSC-20

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **13.01 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **70.5 %RE @ 3.14 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 11:33 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

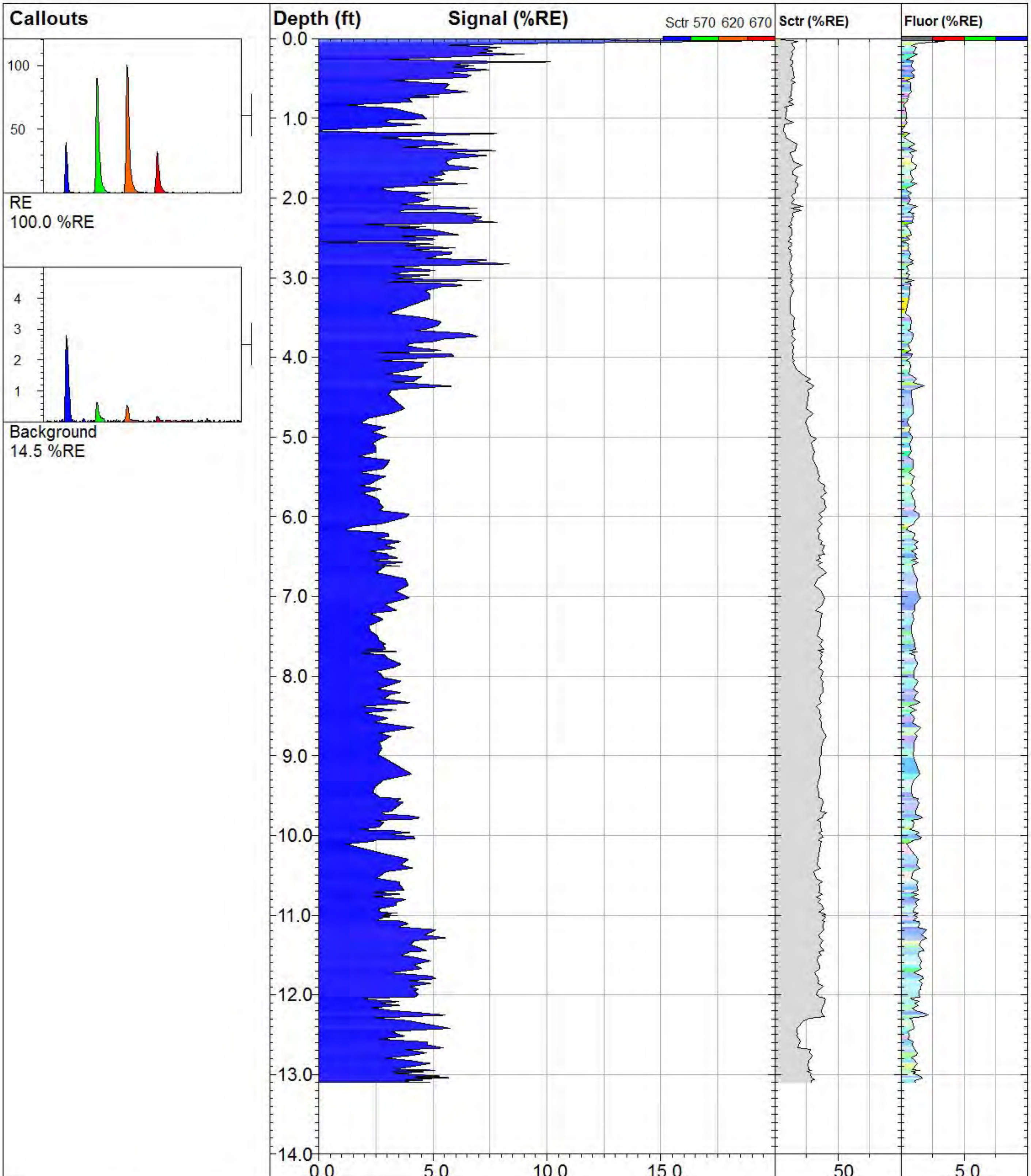


SSC-20

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **13.01 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **70.5 %RE @ 3.14 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 11:33 EDT**

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

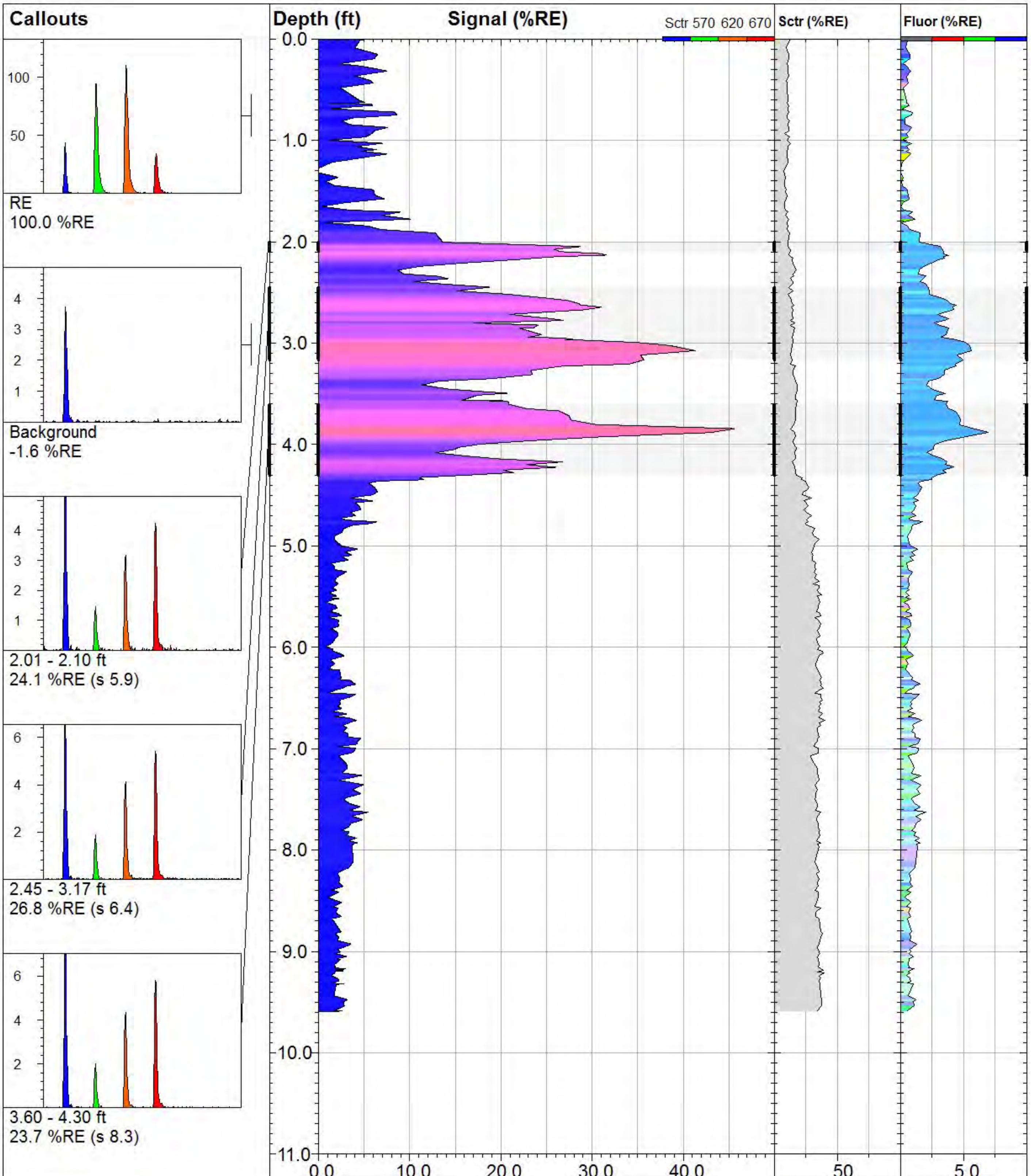


DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-21

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **13.10 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **18.7 %RE @ 0.03 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 10:38 EDT**



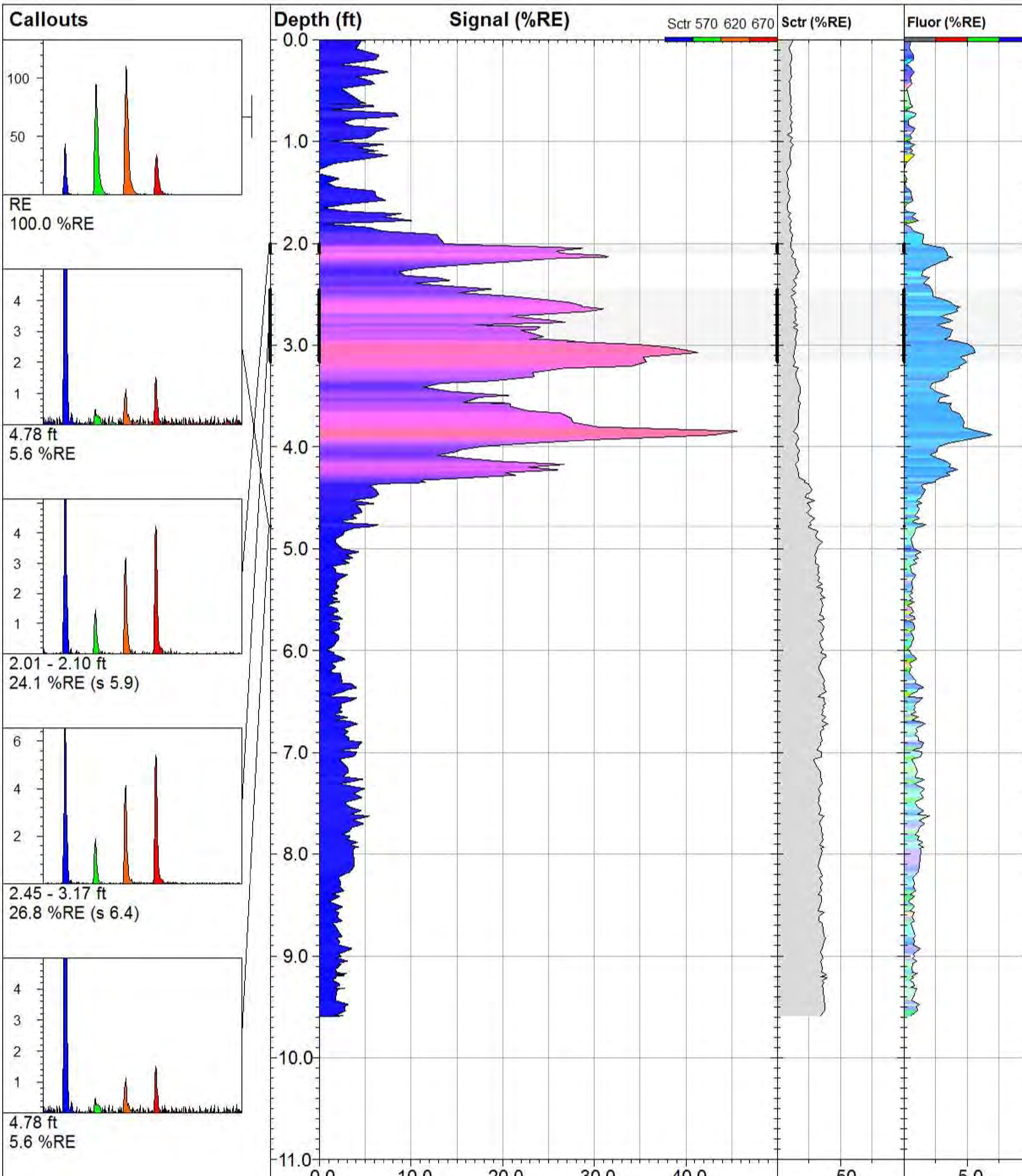
DAKOTA TECHNOLOGIES

www.DakotaTechnologies.com

SSC-22

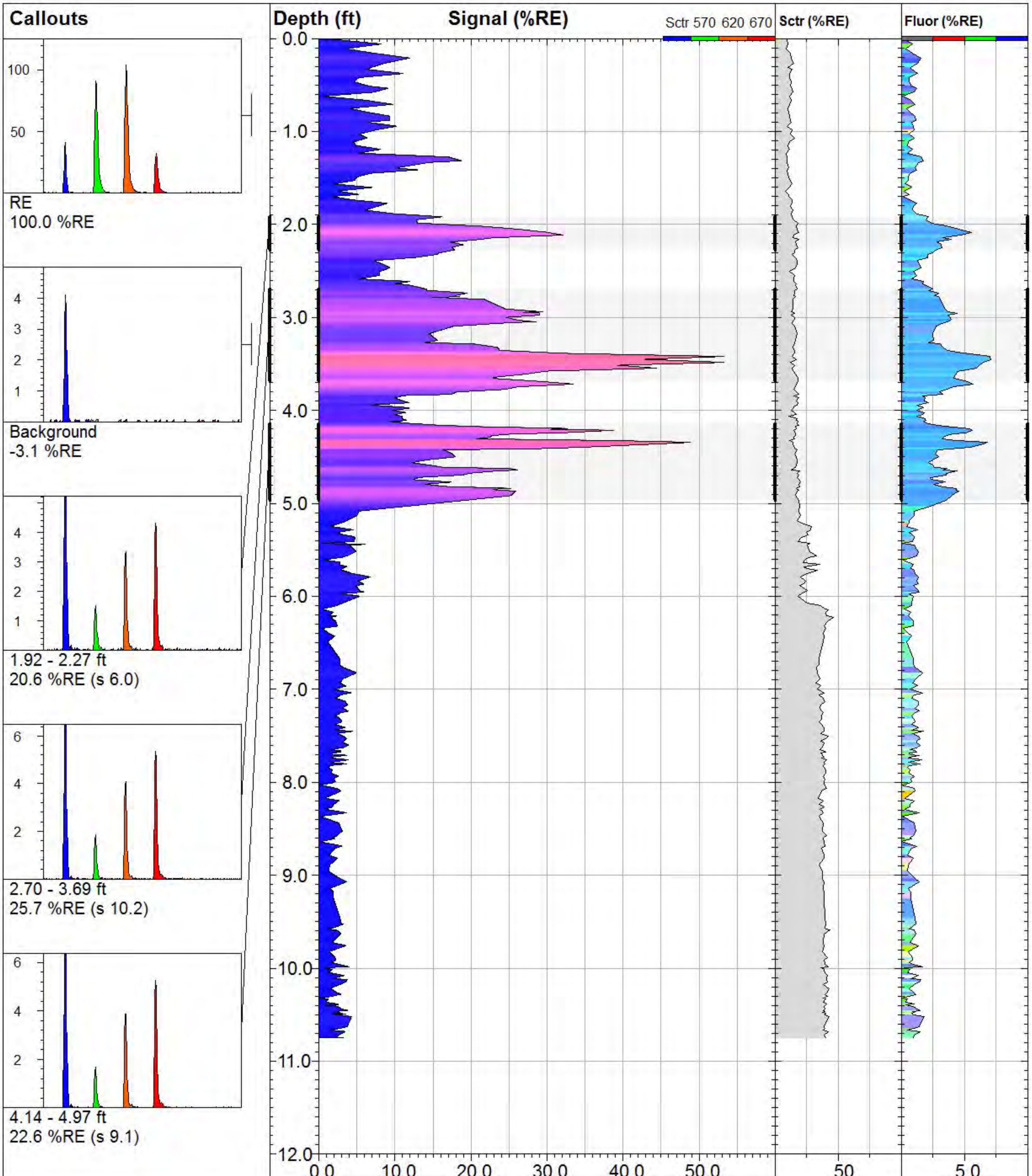
TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.59 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **45.7 %RE @ 3.84 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 09:59 EDT**



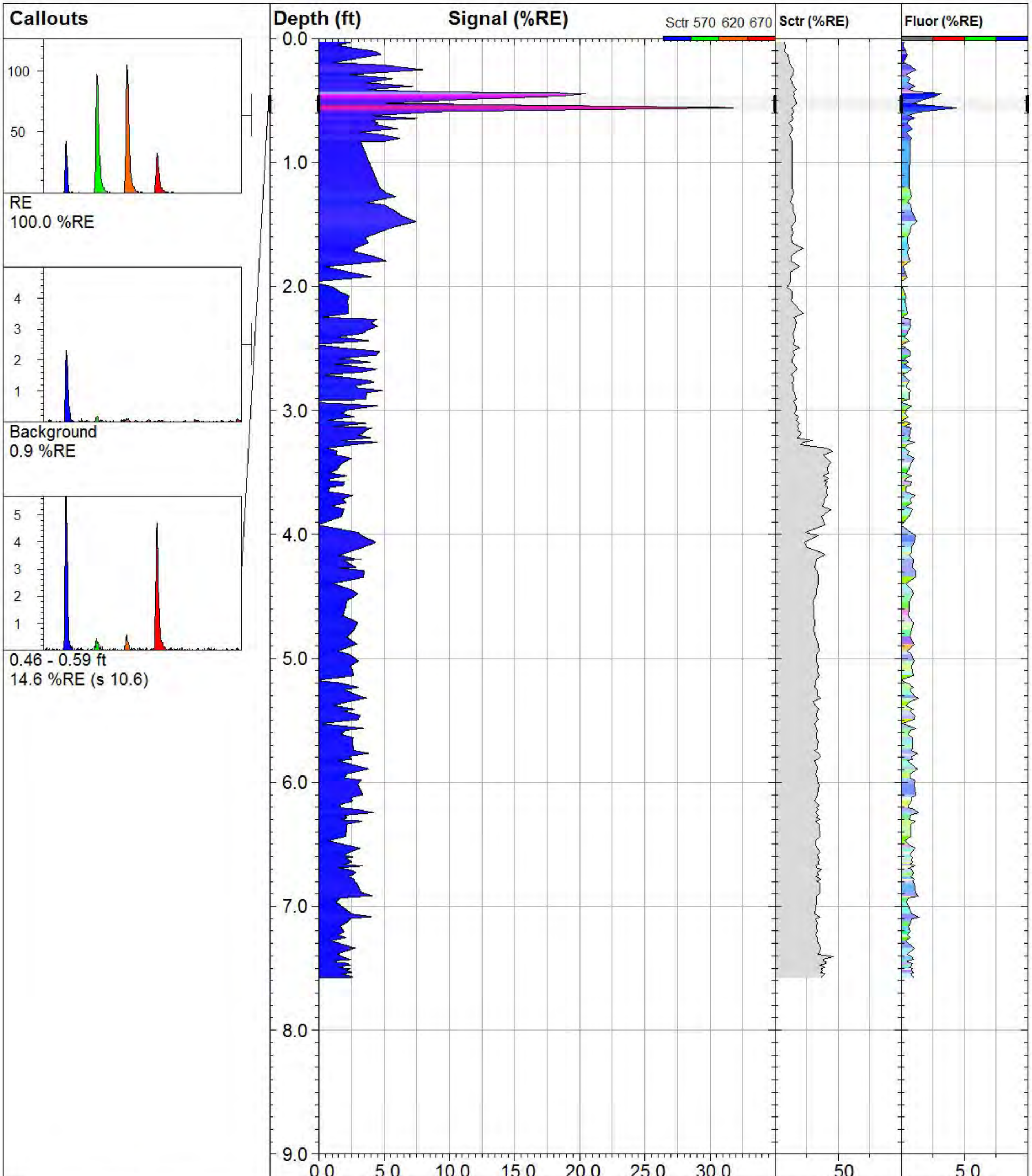
DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-22		TarGOST® By Dakota www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.59 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **45.7 %RE @ 3.84 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 09:59 EDT**



SSC-22A		TarGOST® By Dakota www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.75 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **53.5 %RE @ 3.48 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 11:04 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

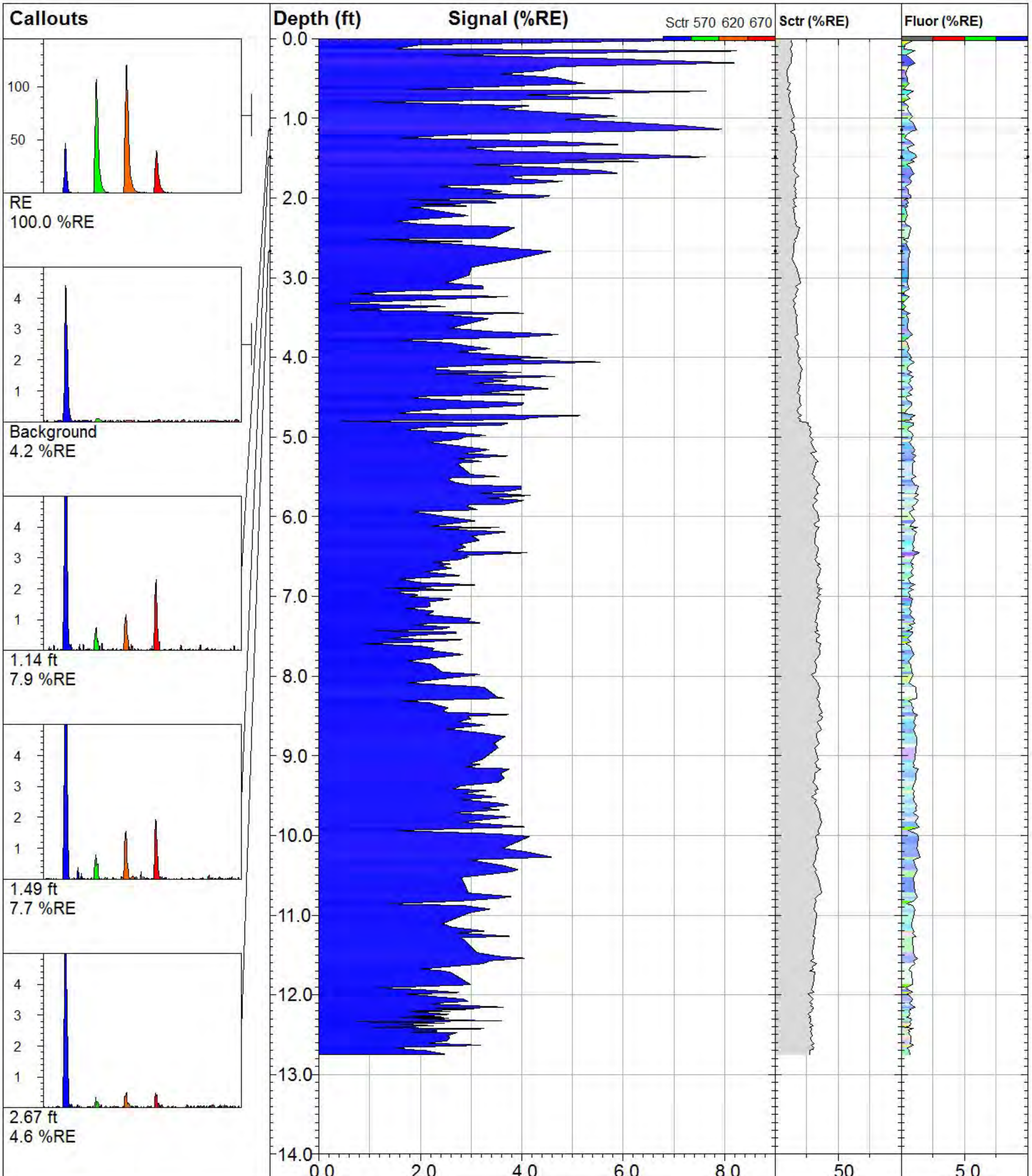


SSC-23

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **7.58 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **31.9 %RE @ 0.56 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 11:39 EDT**

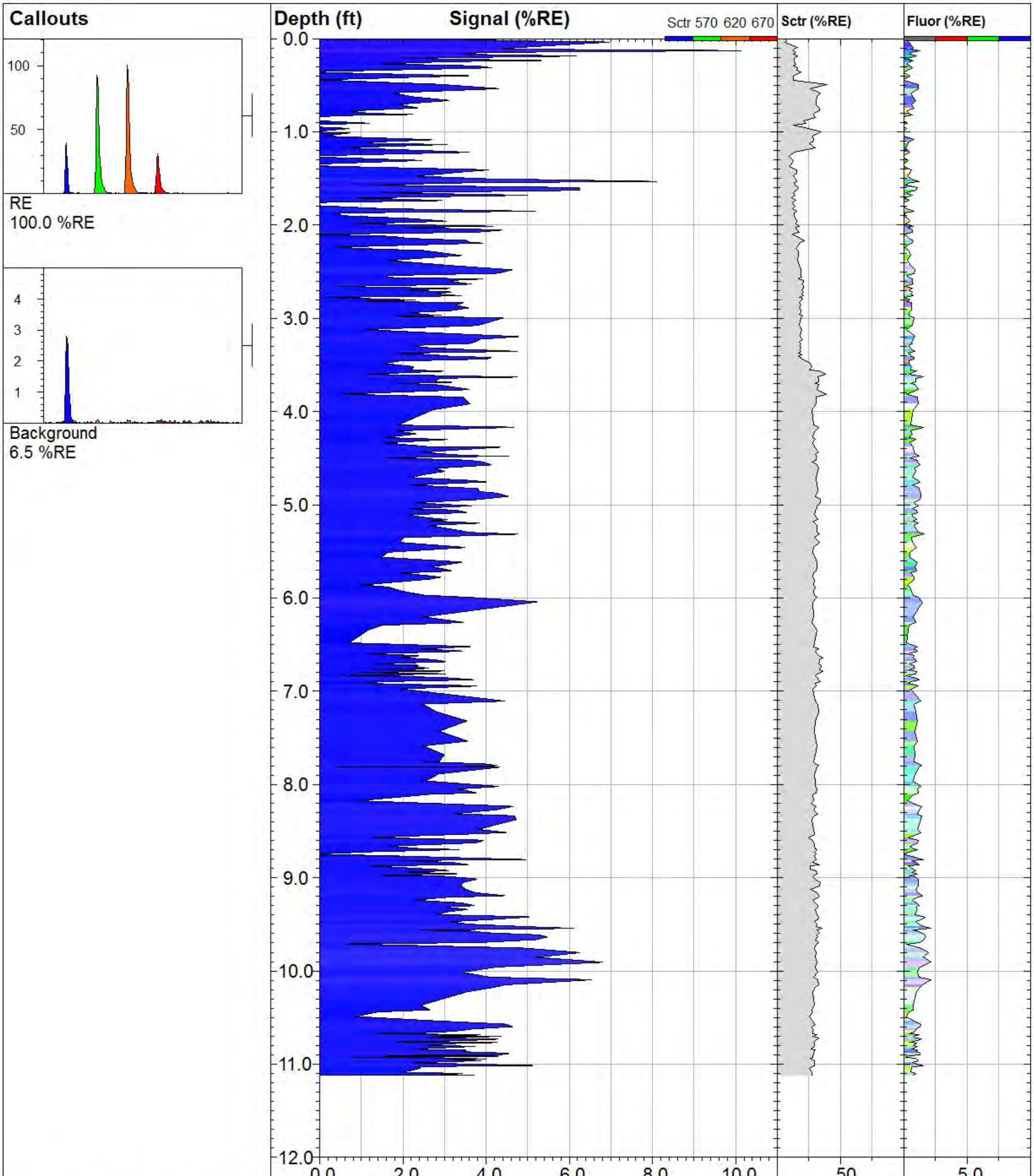


DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

SSC-24

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **12.75 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **8.3 %RE @ 0.16 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 08:57 EDT**



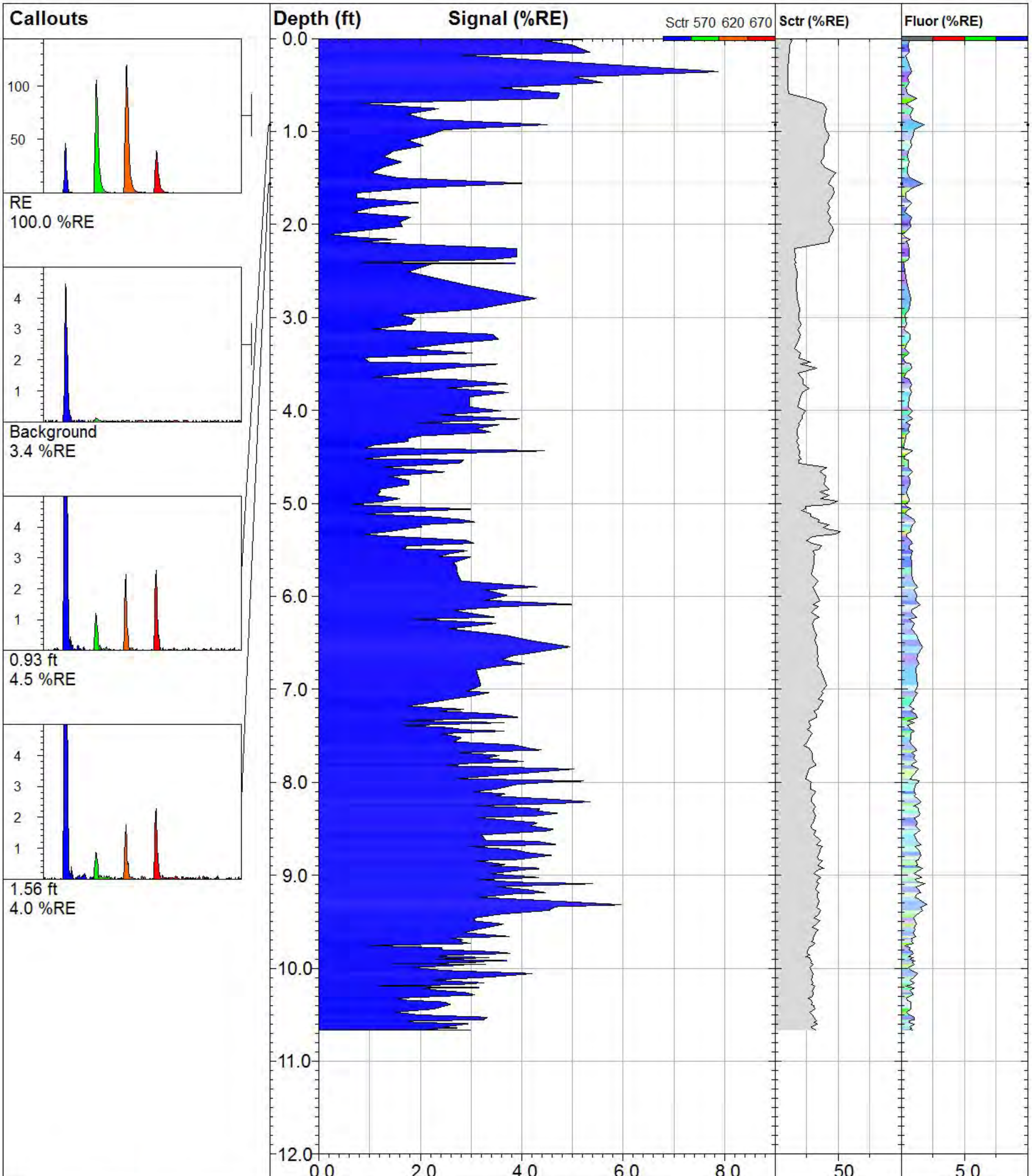
DAKOTA TECHNOLOGIES

www.DakotaTechnologies.com

SSC-25

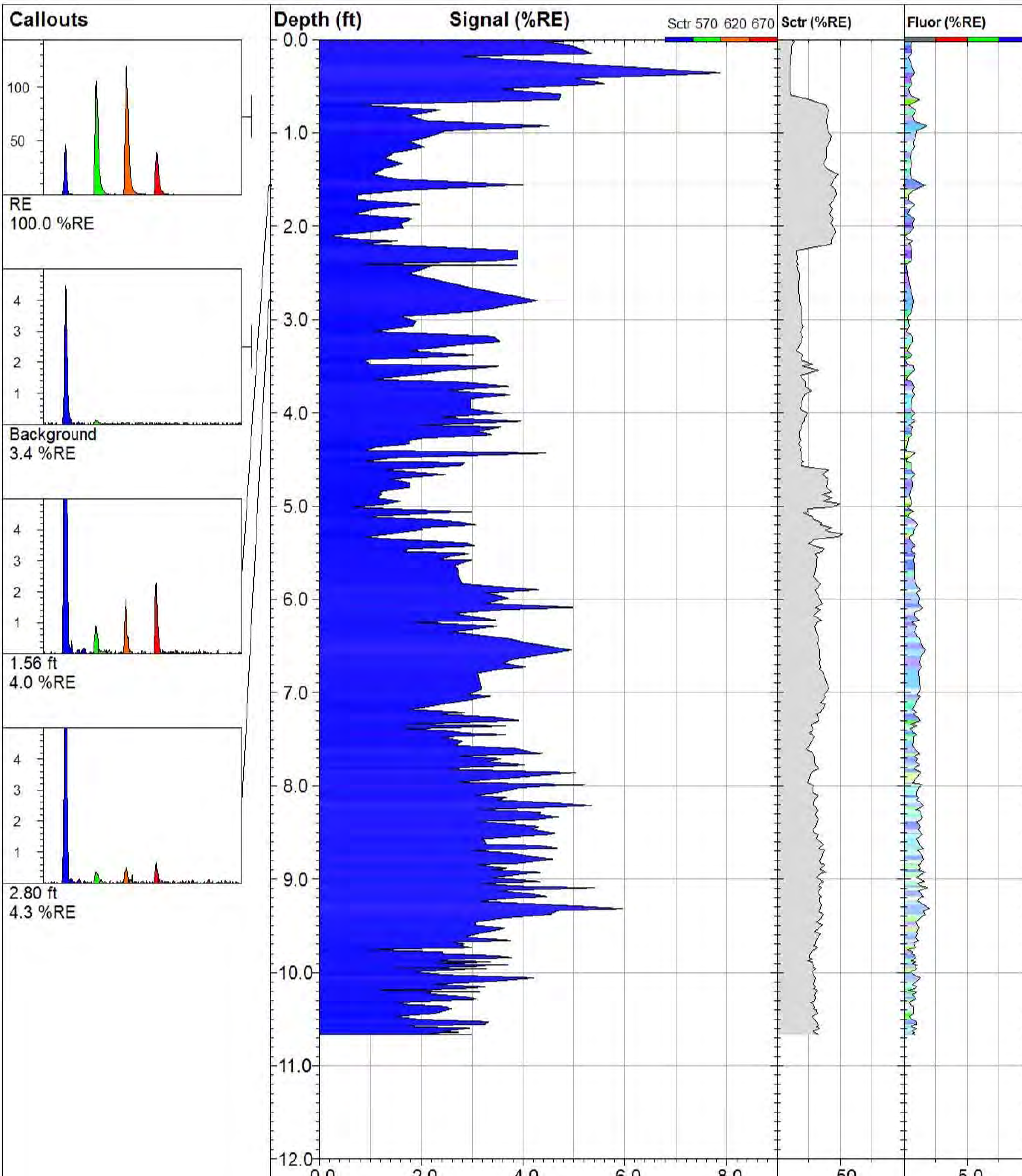
TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **11.12 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **10.4 %RE @ 0.13 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 12:14 EDT**



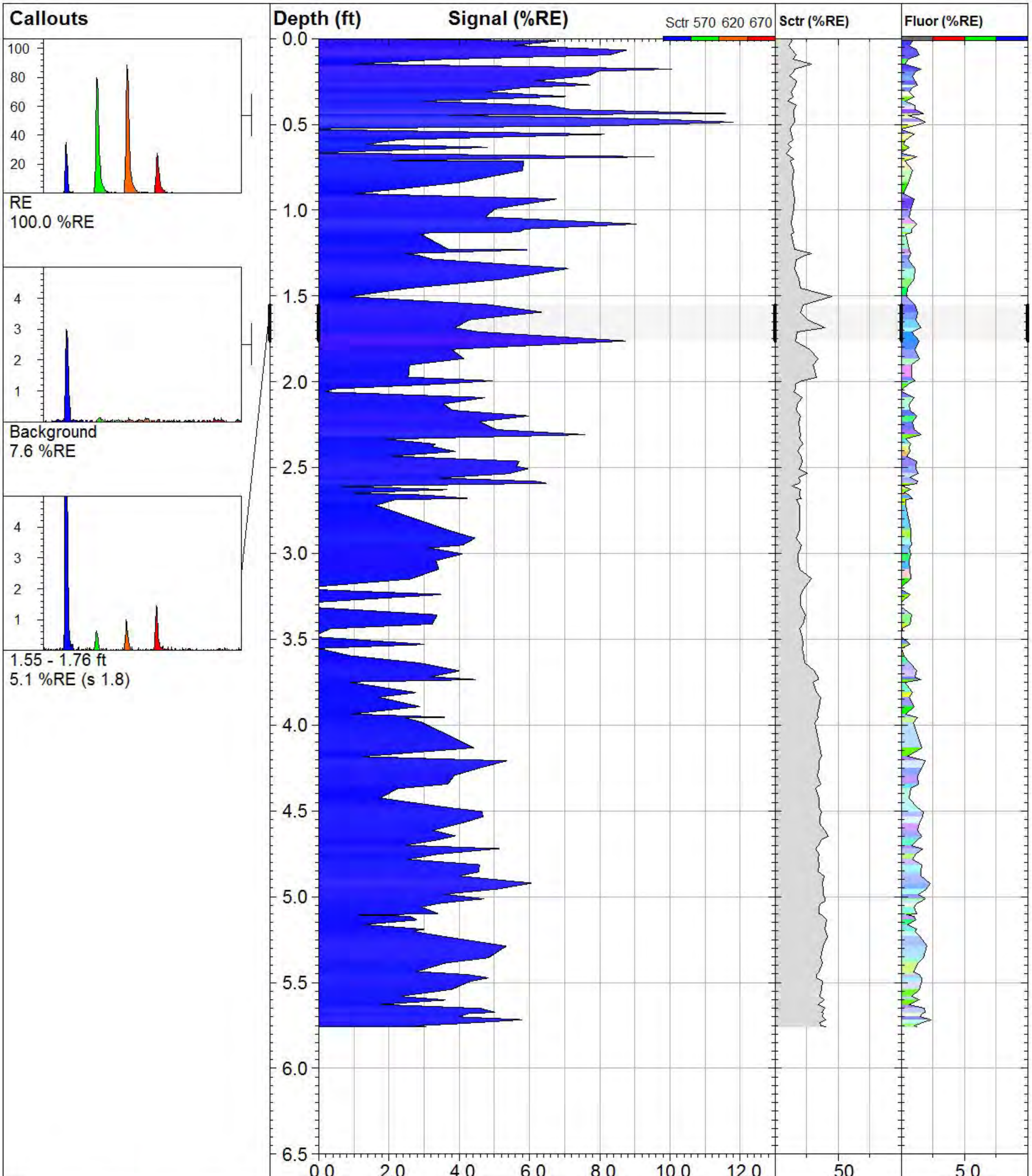
SSC-27		**TarGOST® By Dakota** www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.67 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **7.9 %RE @ 0.36 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 08:17 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM



SSC-27		**TarGOST® By Dakota** www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.67 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **7.9 %RE @ 0.36 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 08:17 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

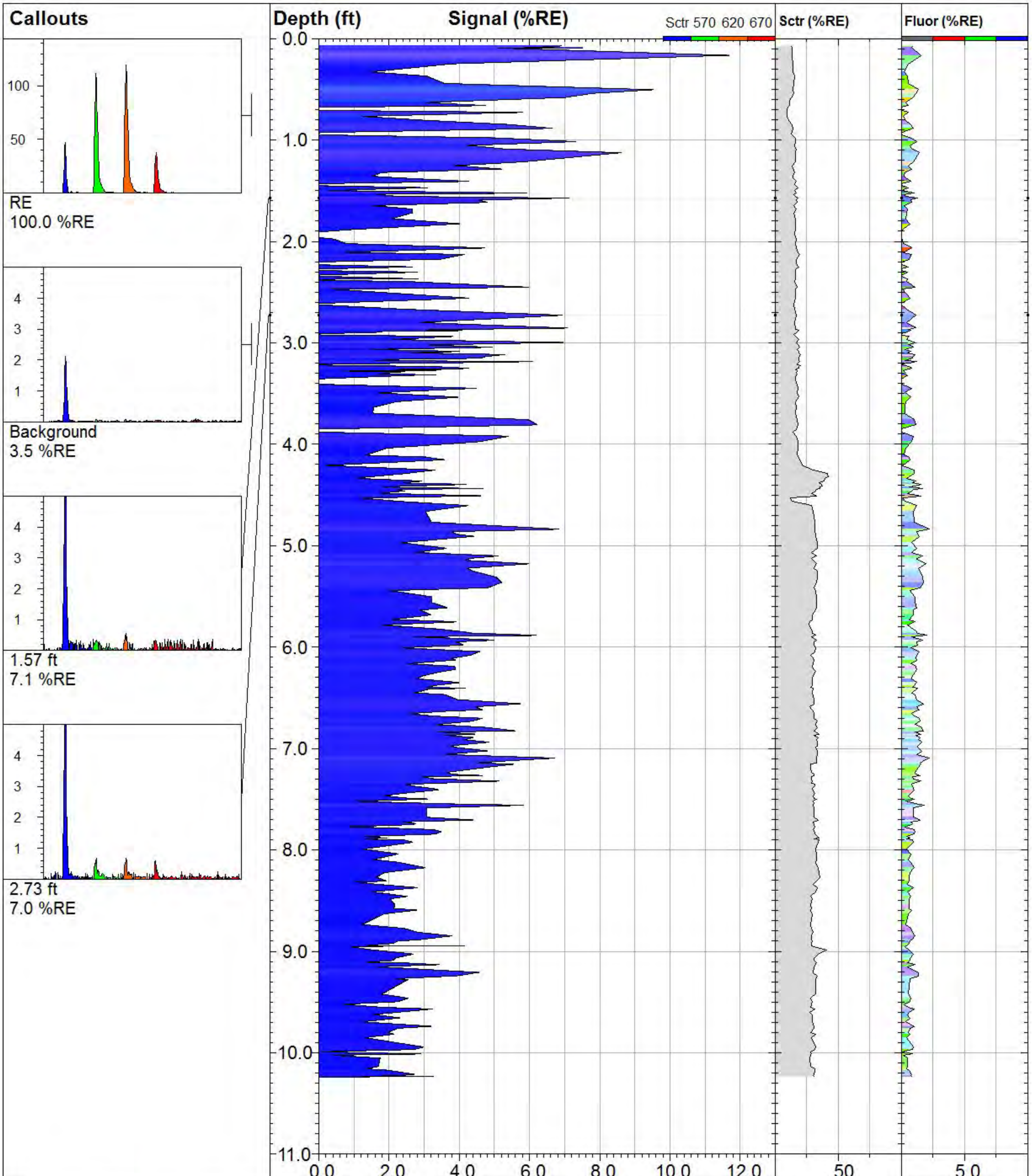


DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

SSC-28

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **5.76 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.8 %RE @ 0.49 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 13:00 EDT**



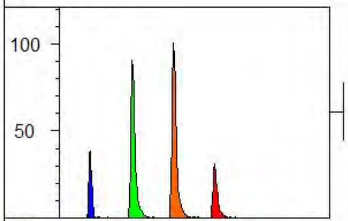
DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

SSC-30

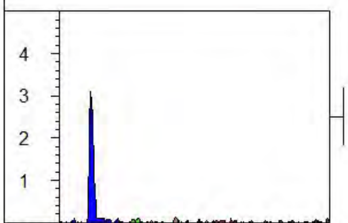
TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.24 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **11.7 %RE @ 0.17 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 14:02 EDT**

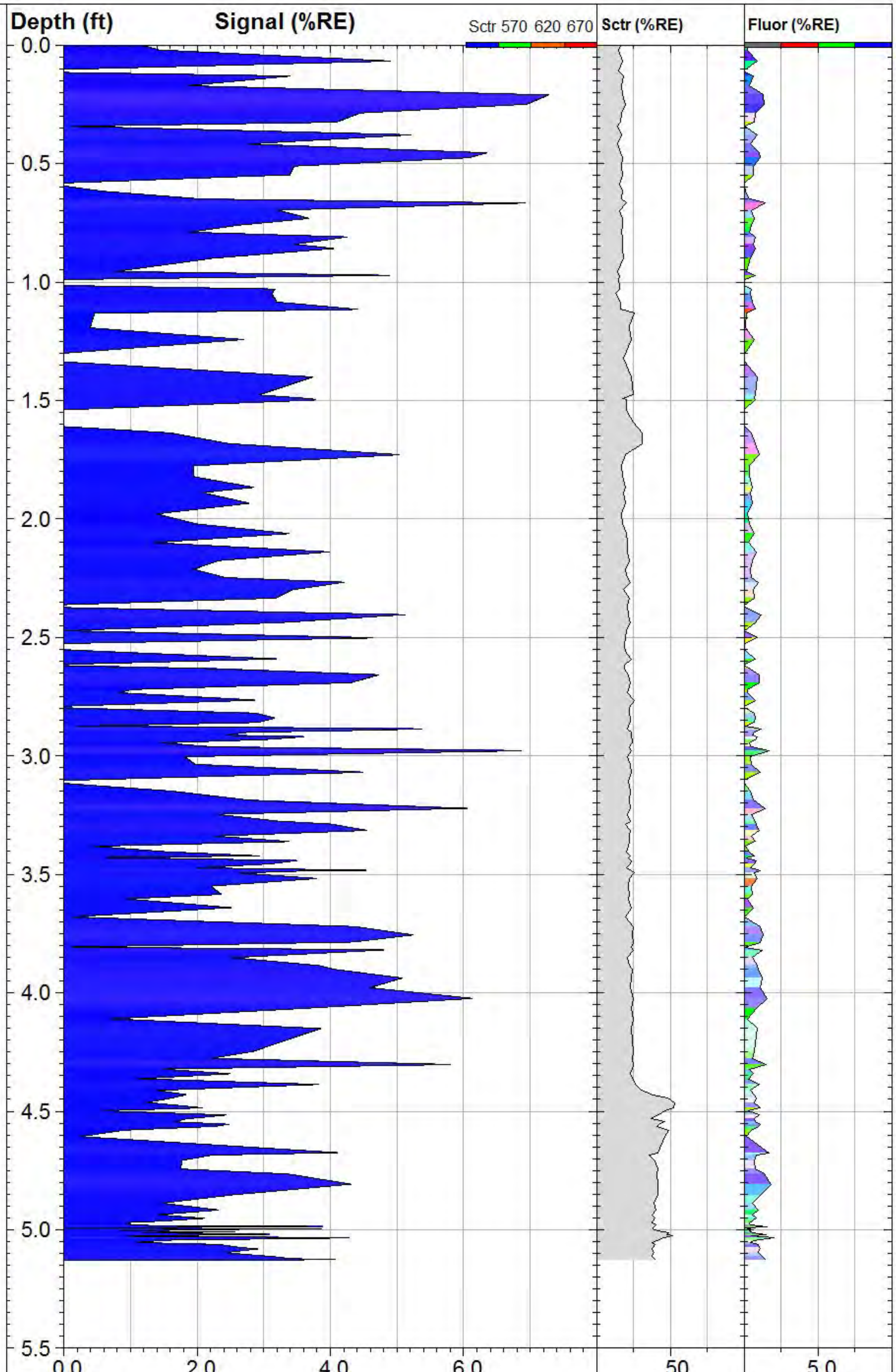
Callouts



RE
100.0 %RE



Background
3.0 %RE

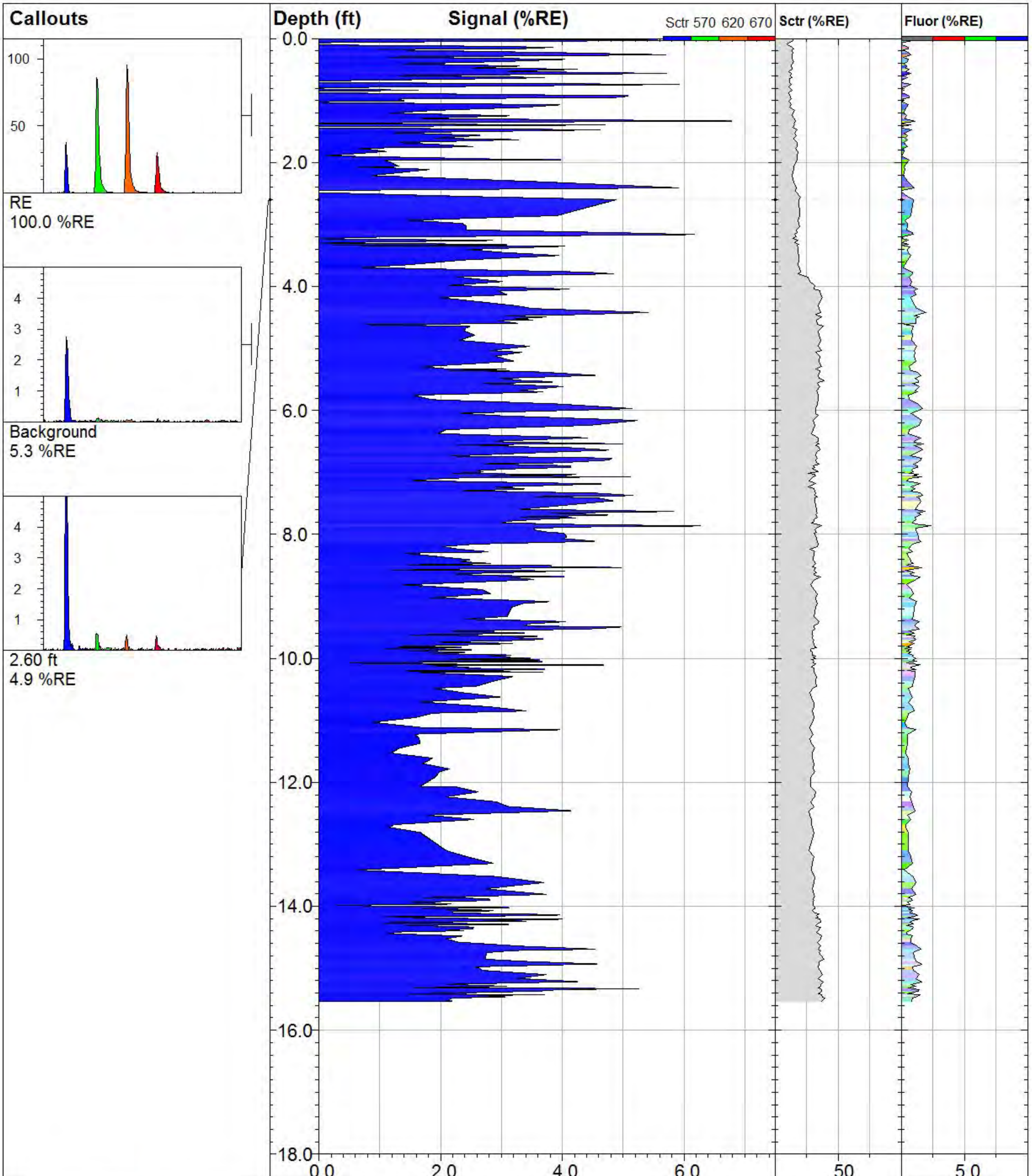


DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

SSC-31

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **5.13 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **7.3 %RE @ 0.21 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 13:38 EDT**



DAKOTA TECHNOLOGIES

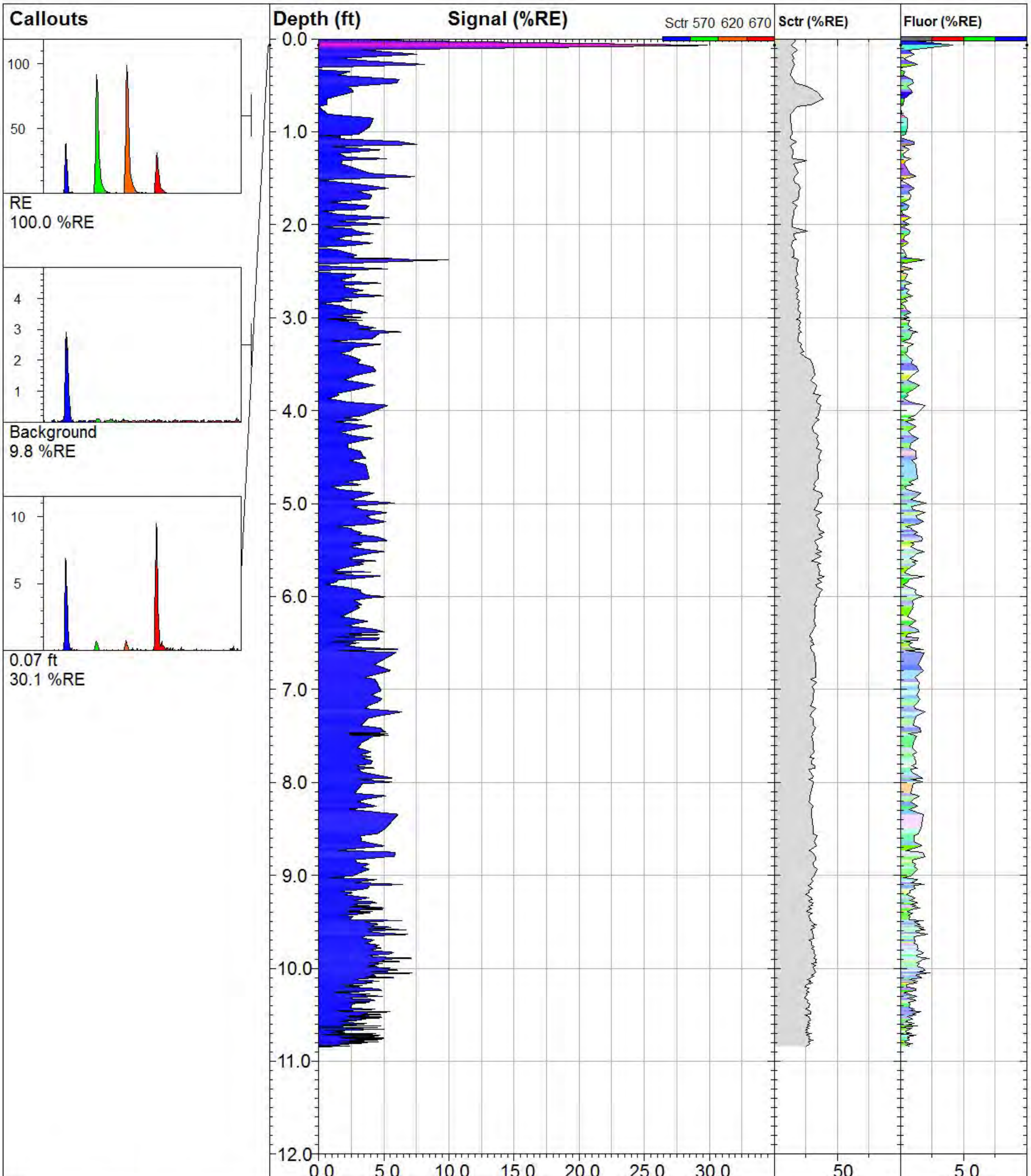
WWW.DAKOTATECHNOLOGIES.COM

SSC-33

TarGOST® By Dakota

www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **15.53 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **6.9 %RE @ 1.33 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 18:31 EDT**

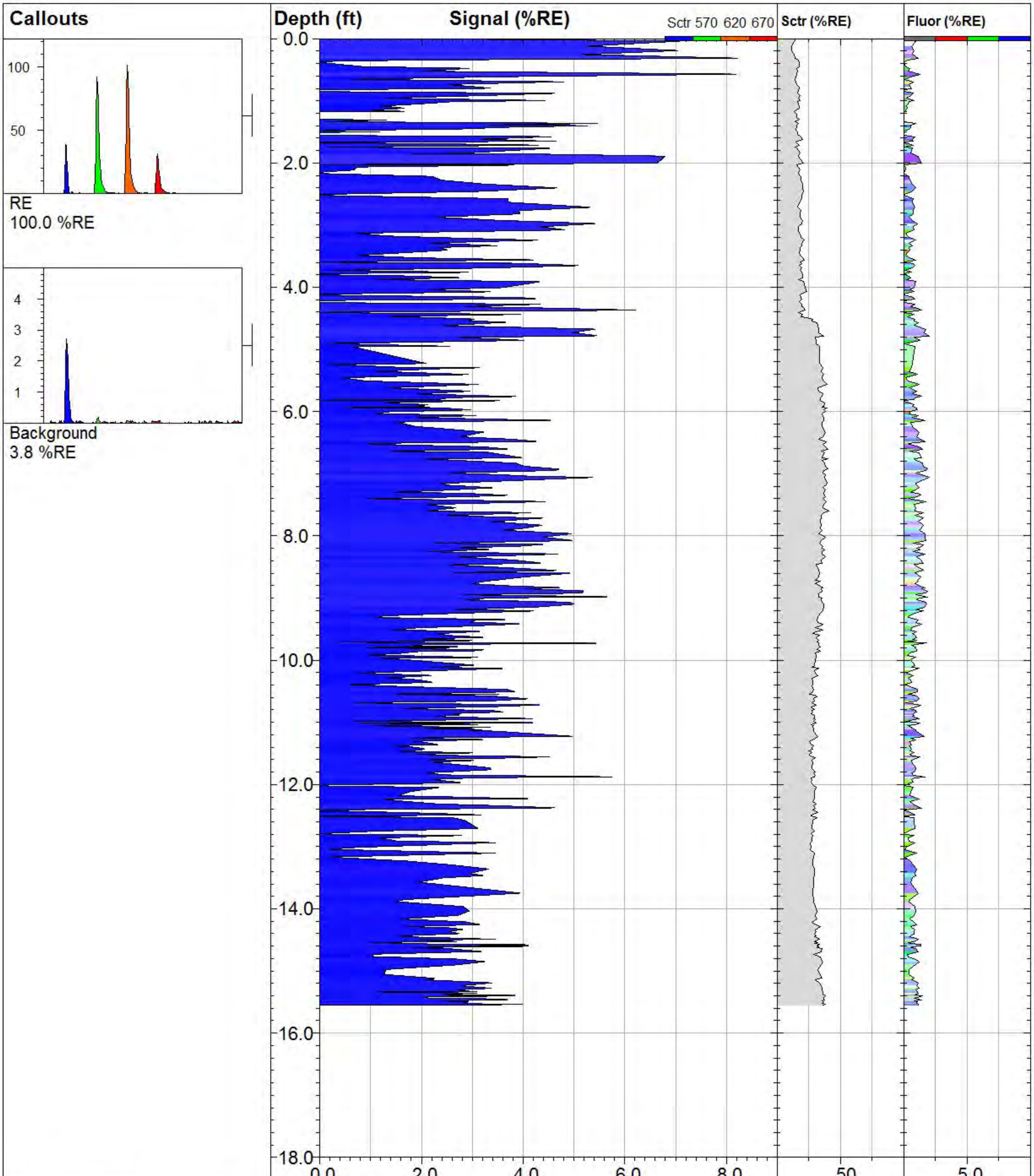


SSC-34

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **10.84 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **30.1 %RE @ 0.07 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 14:21 EDT**

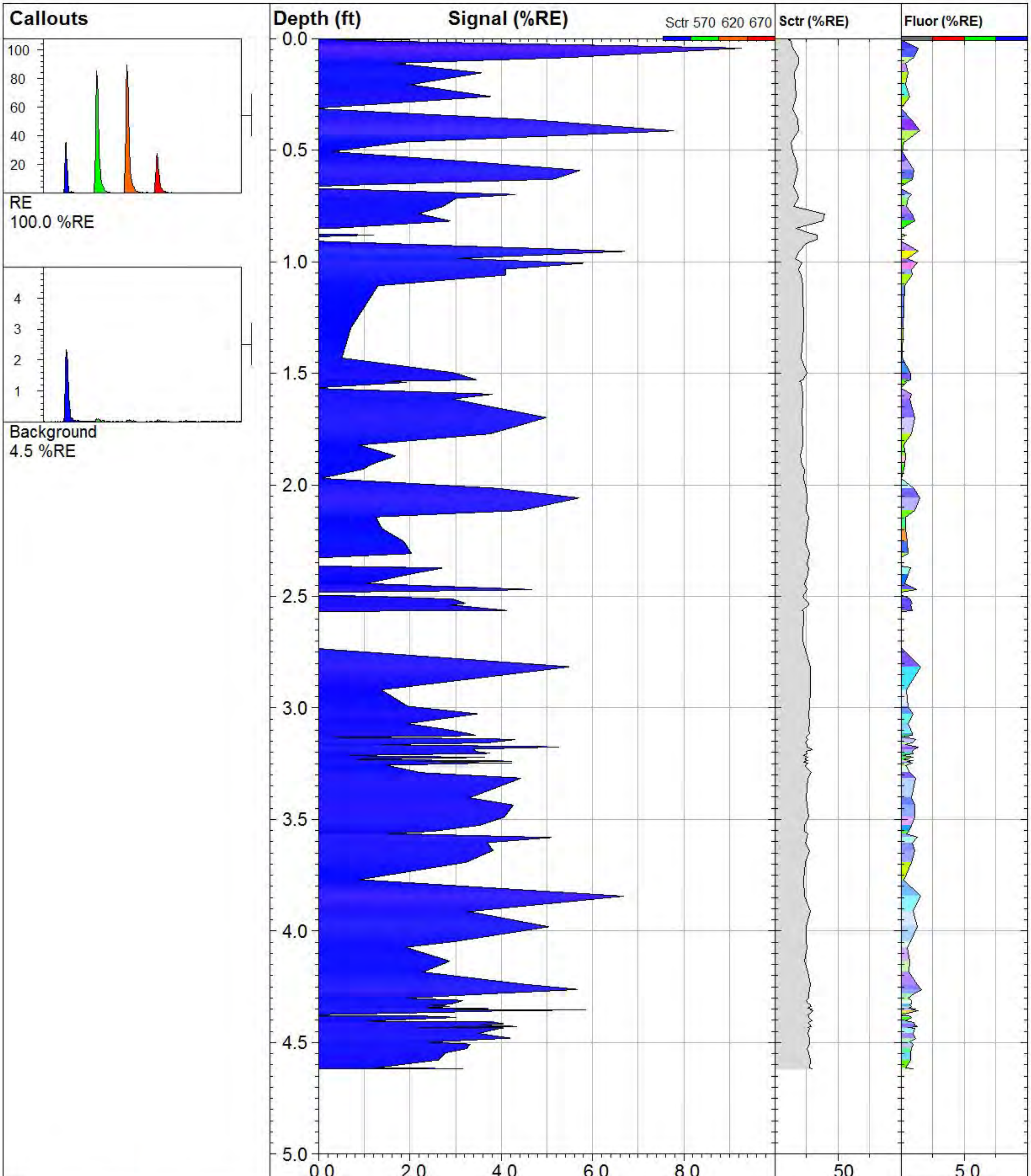


SSC-36

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **15.54 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **8.3 %RE @ 0.32 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 17:23 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM



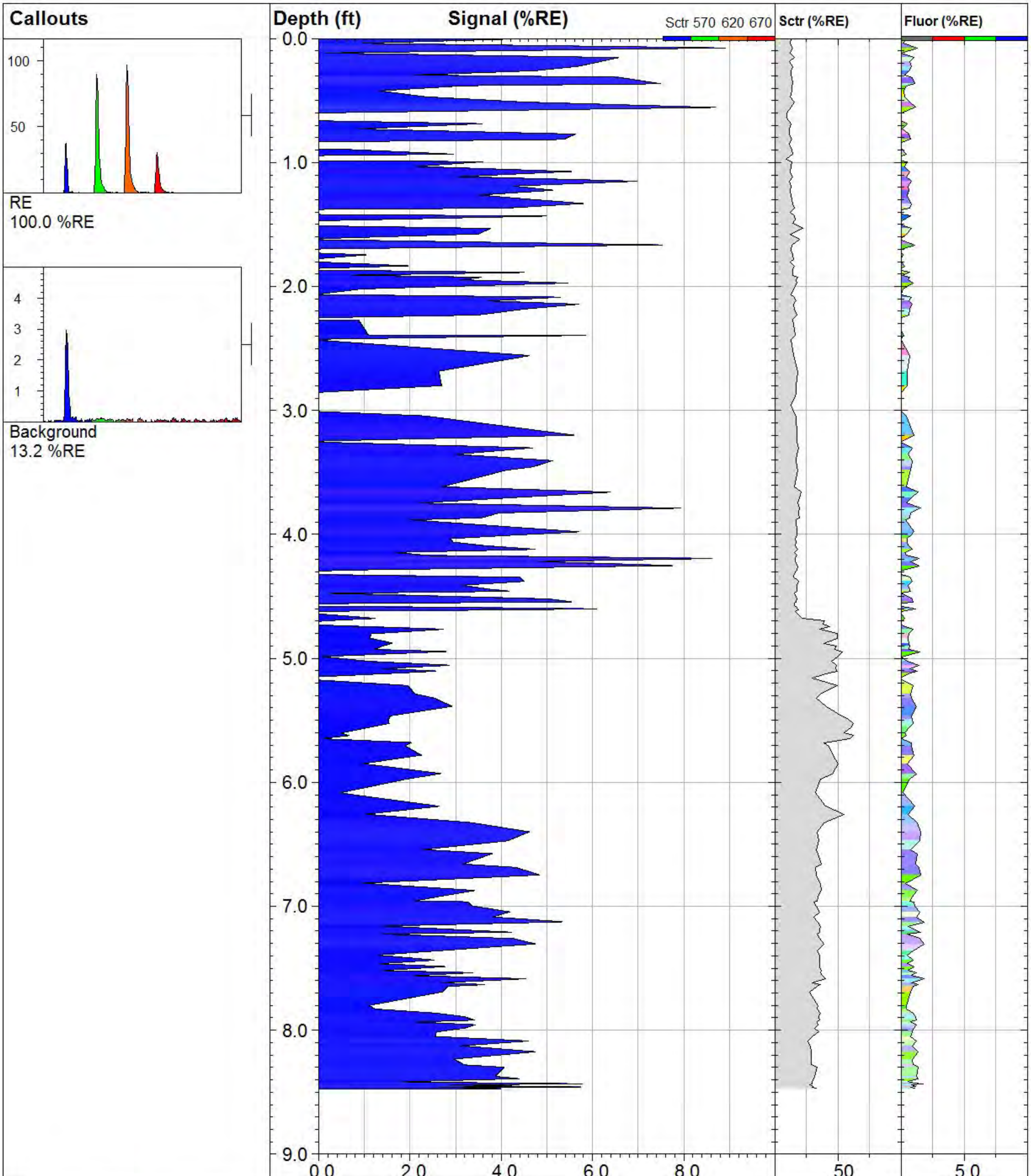
DAKOTA TECHNOLOGIES

WWW.DAKOTATECHNOLOGIES.COM

SSC-37

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **4.62 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **9.3 %RE @ 0.04 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 15:35 EDT**

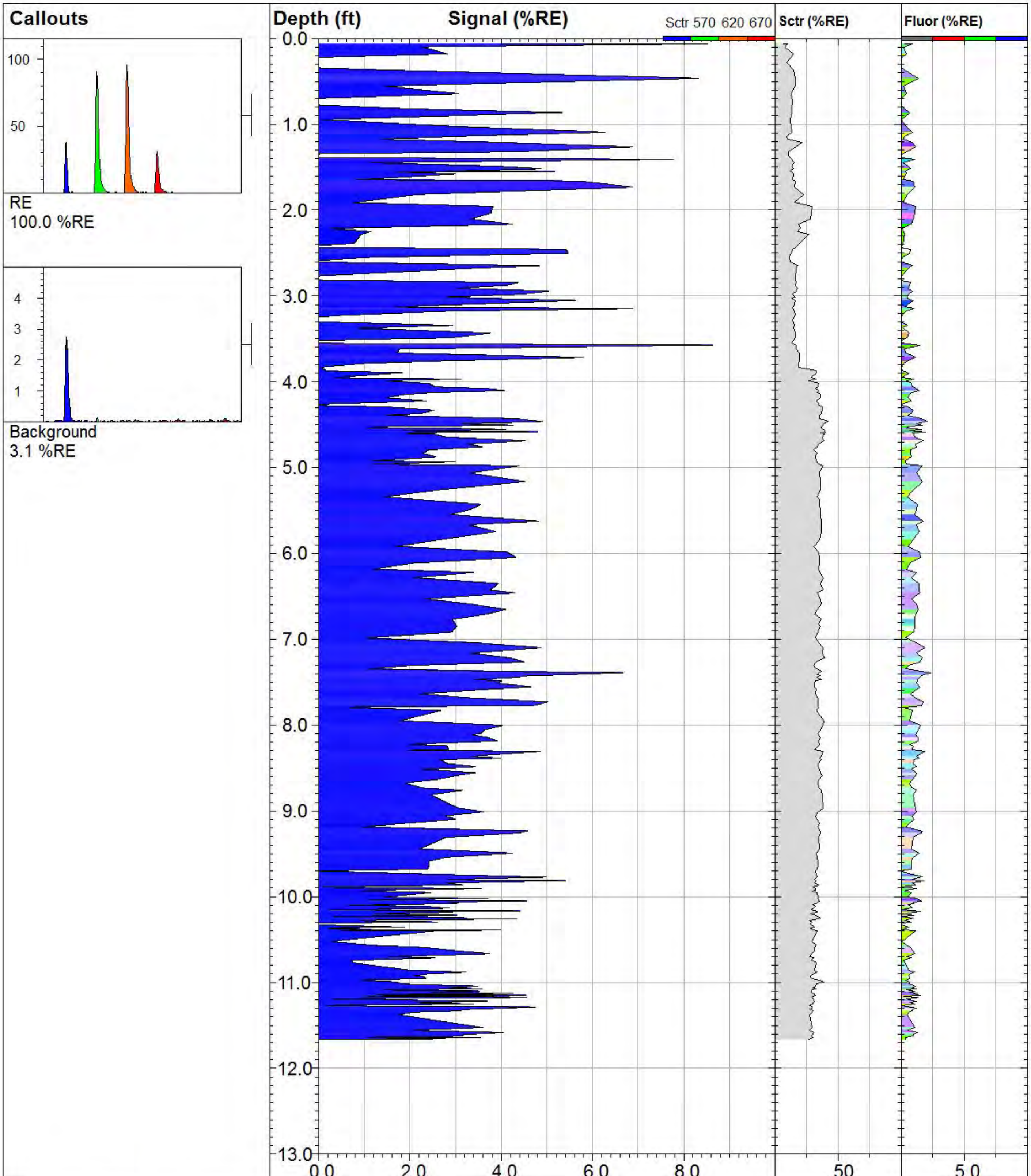


SSC-39

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Site:	*Y Coord.(Lat-N) / System:*	*Final depth:*
Penn Yan MPG Site	**Unavailable / NA**	**8.47 ft**
Client / Job:	*X Coord.(Lng-E) / Fix:*	*Max signal:*
AECOM /	**Unavailable / NA**	**8.9 %RE @ 0.08 ft**
Operator / Unit:	*Elevation:*	*Date & Time:*
KVDV / TG1003	**Unavailable**	**2016-10-06 16:49 EDT**

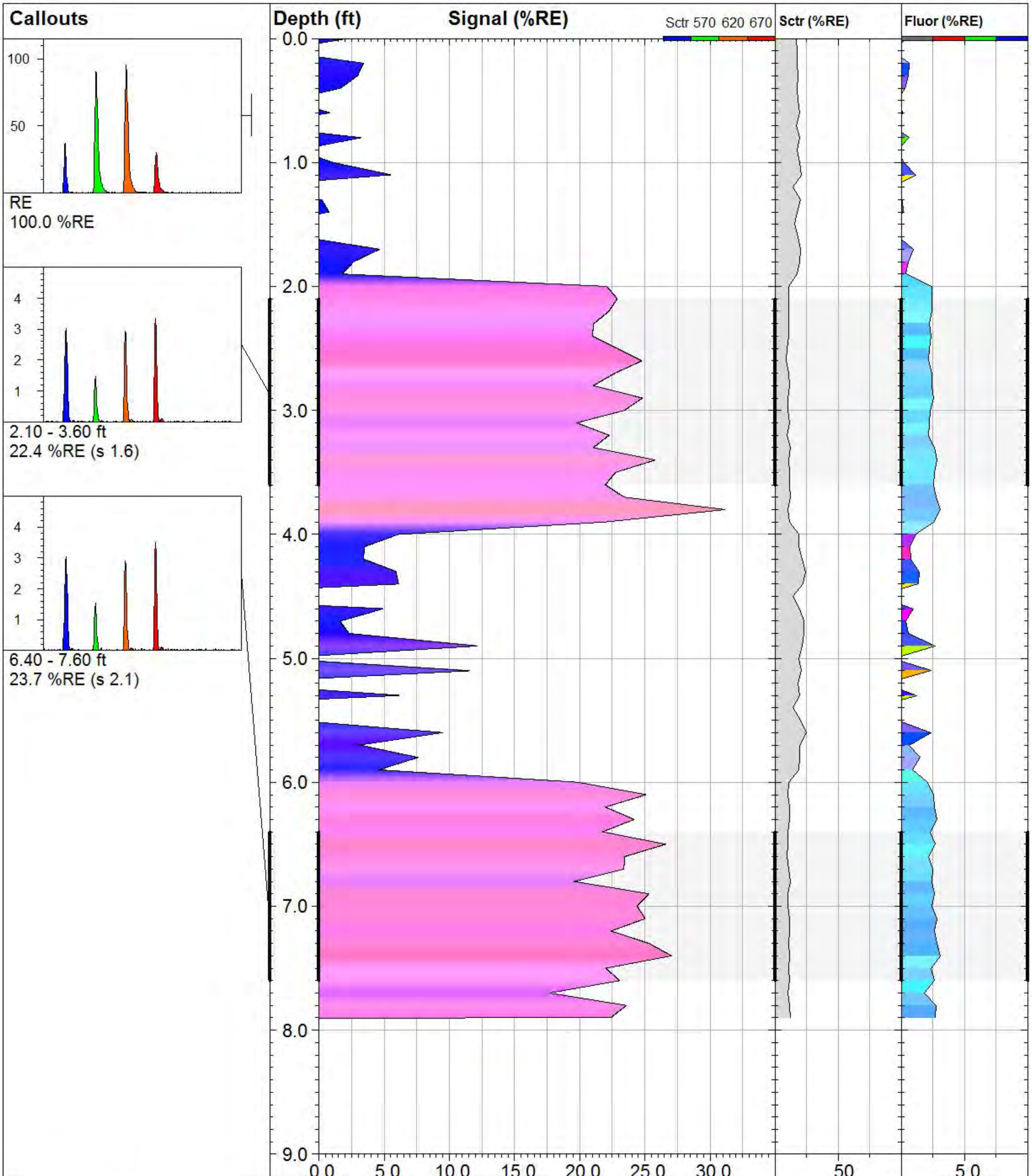


SSC-40

TarGOST® By Dakota
www.DakotaTechnologies.com

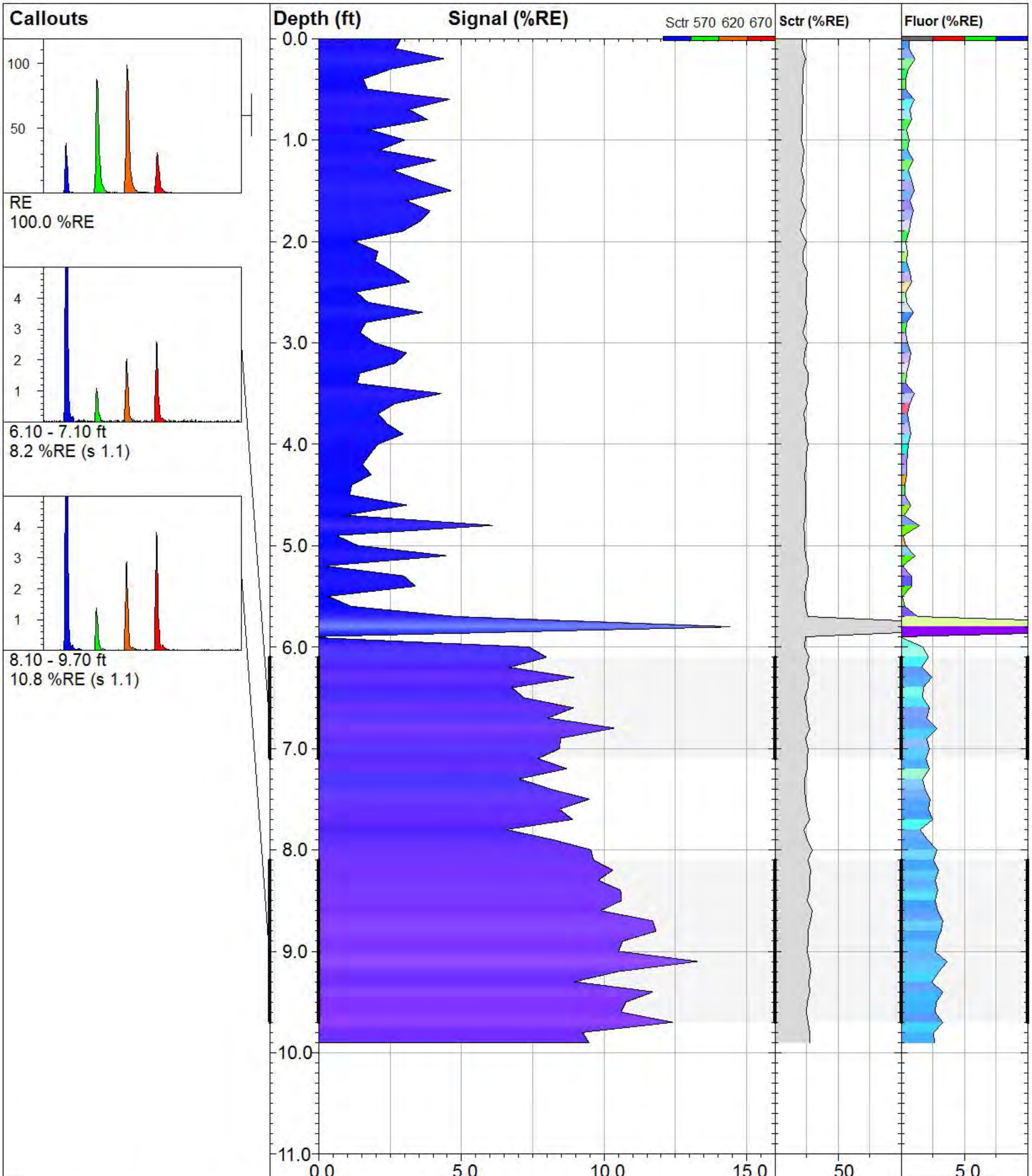
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **11.66 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **8.7 %RE @ 3.57 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-06 16:04 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM



SAMPLE		TarGOST® By Dakota www.DakotaTechnologies.com
Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **7.90 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **31.2 %RE @ 3.80 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-04 12:58 EDT**

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

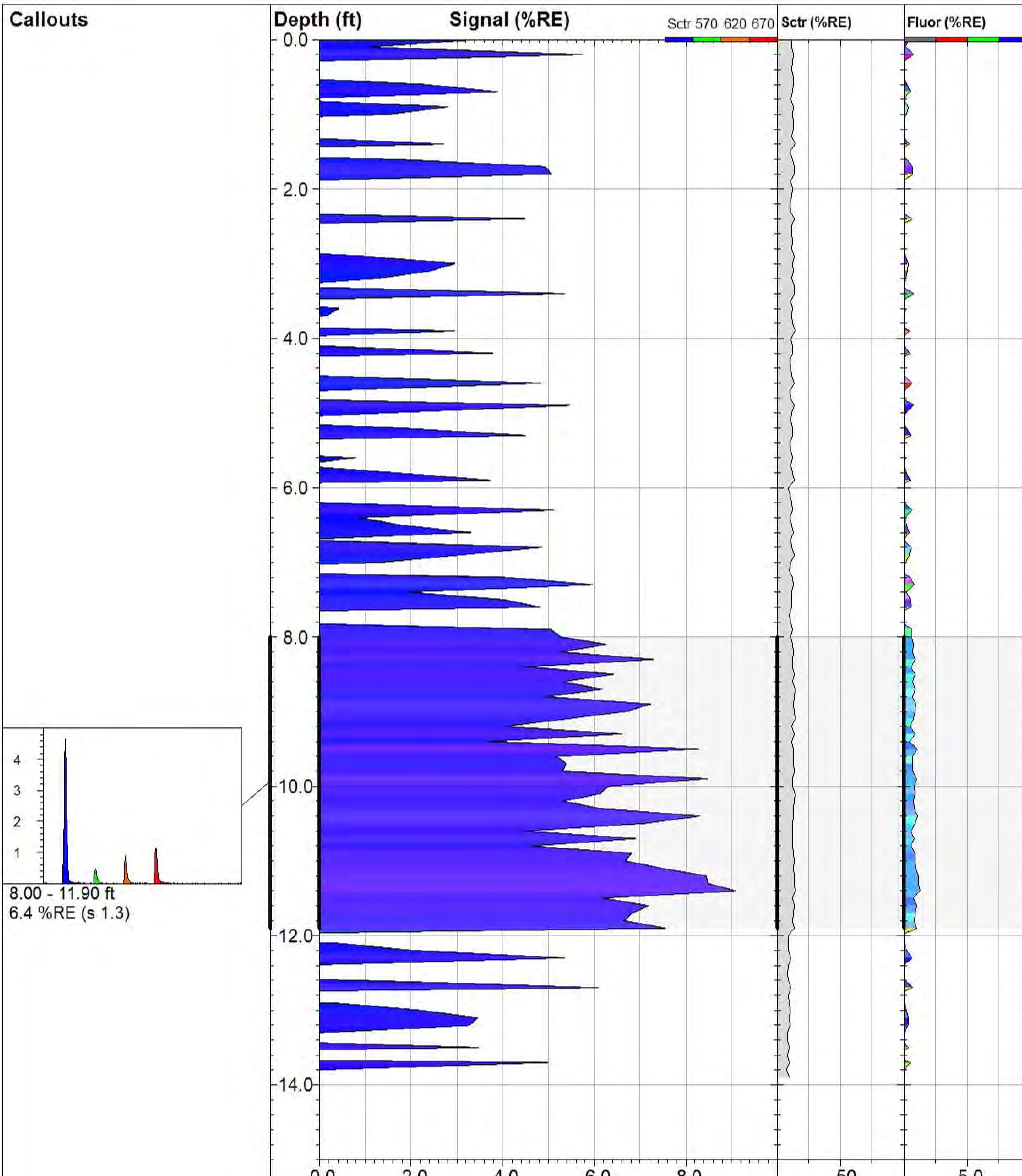


DAKOTA TECHNOLOGIES
www.DakotaTechnologies.com

Sediment Sample

TarGOST® By Dakota
www.DakotaTechnologies.com

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **9.90 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **14.5 %RE @ 5.80 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-05 12:11 EDT**



Sheen Sample

TarGOST® By Dakota
www.DakotaTechnologies.com

DAKOTA TECHNOLOGIES
WWW.DAKOTATECHNOLOGIES.COM

Site: **Penn Yan MPG Site**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **13.90 ft**
Client / Job: **AECOM /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **9.1 %RE @ 11.40 ft**
Operator / Unit: **KVDV / TG1003**	*Elevation:* **Unavailable**	*Date & Time:* **2016-10-07 09:38 EDT**

The cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd. of Richmond, British Columbia, Canada.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. The 15 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u_2" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meet or exceed those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

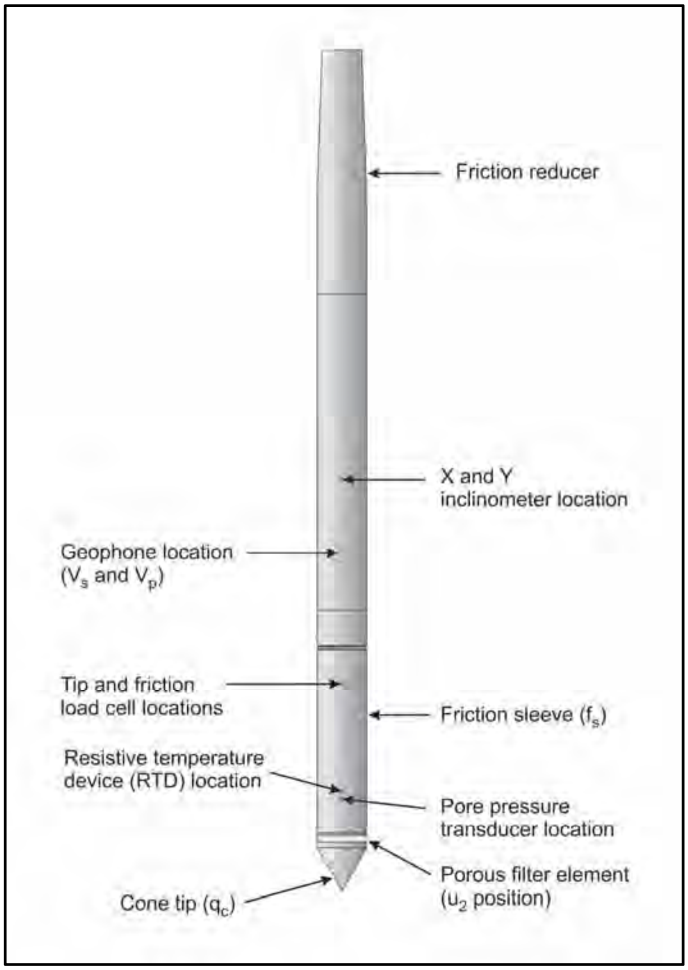


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording intervals are either 2.5 cm or 5.0 cm depending on project requirements; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerin or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil or glycerin under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson (1990) and Robertson (2009). It should be noted that it is not always possible to accurately identify a soil type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al, 1986:

$$q_t = q_c + (1-a) \bullet u_2$$

where: q_t is the corrected tip resistance
q_c is the recorded tip resistance
u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)
a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (Rf) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of interpretation files were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the interpretation methods used is included in an appendix.

For additional information on CPTu interpretations, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, “Cone Penetration Testing in Geotechnical Practice”, Blackie Academic and Professional.

Mayne, P.W., 2013, “Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests”, Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420.

Mayne, P.W. and Peuchen, J., 2012, “Unit weight trends with cone resistance in soft to firm clays”, Geotechnical and Geophysical Site Characterization *4,* Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, “Interpretation of geotechnical parameters from seismic piezocone tests”, CPT’14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, “Use of Piezometer Cone Data”, Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, “Soil Classification Using the Cone Penetration Test”, Canadian Geotechnical Journal, Volume 27: 151-158.

Robertson, P.K., 2009, “Interpretation of cone penetration tests – a unified approach”, Canadian Geotechnical Journal, Volume 46: 1337-1355.

Shear wave velocity testing is performed in conjunction with the piezocone penetration test (SCPTu) in order to collect interval velocities. For some projects seismic compression wave (Vp) velocity is also determined.

ConeTec's piezocone penetrometers are manufactured with a horizontally active geophone (28 hertz) that is rigidly mounted in the body of the cone penetrometer, 0.2 meters behind the cone tip.

Shear waves are typically generated by using an impact hammer horizontally striking a beam that is held in place by a normal load. In some instances an auger source or an imbedded impulsive source maybe used for both shear waves and compression waves. The hammer and beam act as a contact trigger that triggers the recording of the seismic wave traces. For impulsive devices an accelerometer trigger may be used. The traces are recorded using an up-hole integrated digital oscilloscope which is part of the SCPTu data acquisition system. An illustration of the shear wave testing configuration is presented in Figure SCPTu-1.

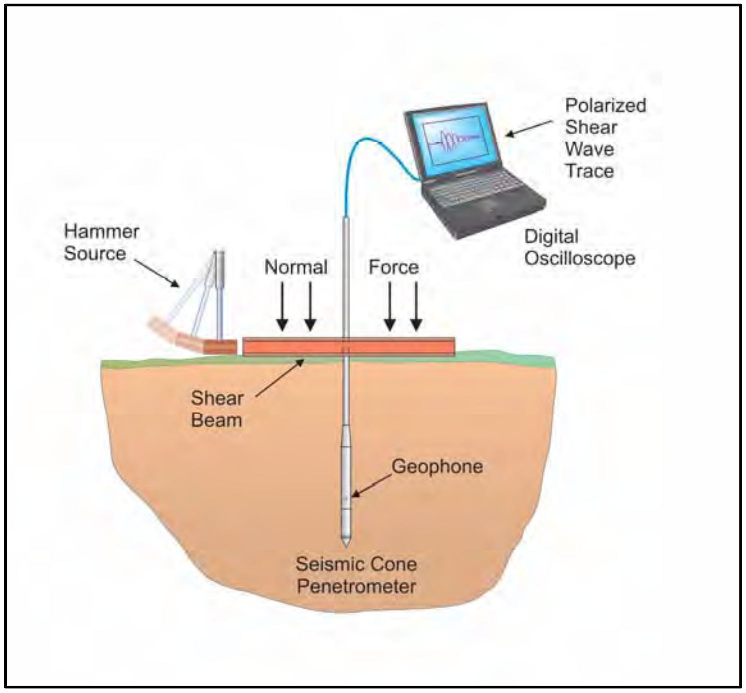


Figure SCPTu-1. Illustration of the SCPTu system

All testing is performed in accordance to ConeTec's SCPTu operating procedures.

Prior to the start of a SCPTu sounding, the procedures described in the Cone Penetration Test section are followed. In addition, the active axis of the geophone is aligned parallel to the beam (or source) and the horizontal offset between the cone and the source is measured and recorded.

Prior to recording seismic waves at each test depth, cone penetration is stopped and the rods are decoupled from the rig to avoid transmission of rig energy down the rods. Multiple wave traces are recorded for quality control purposes. After reviewing wave traces for consistency the cone is pushed to the next test depth (typically one meter intervals or as requested by the client). Figure SCPTu-2 presents an illustration of a SCPTu test.

For additional information on seismic cone penetration testing refer to Robertson et.al. (1986).

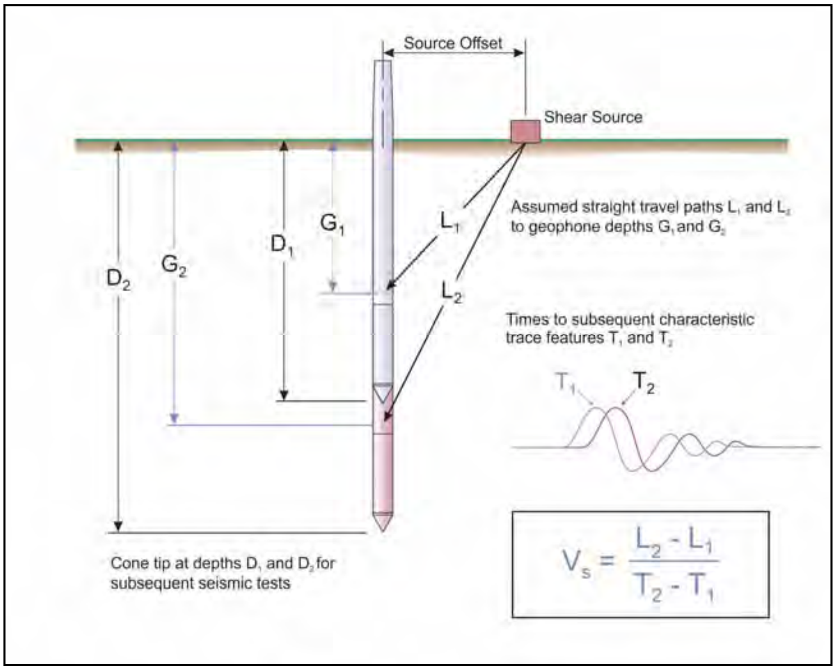


Figure SCPTu-2. Illustration of a seismic cone penetration test

Calculation of the interval velocities are performed by visually picking a common feature (e.g. the first characteristic peak, trough, or crossover) on all of the recorded wave sets and taking the difference in ray path divided by the time difference between subsequent features. Ray path is defined as the straight line distance from the seismic source to the geophone, accounting for beam offset, source depth and geophone offset from the cone tip.

The average shear wave velocity to a depth of 100 feet (30 meters) ($\bar{v}_s$) has been calculated and provided for all applicable soundings using the following equation presented in ASCE, 2010.

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{v_{si}}}$$

where: $\bar{v}_s$ = average shear wave velocity ft/s (m/s)
d_i = the thickness of any layer between 0 and 100 ft (30 m)
v_{si} = the shear wave velocity in ft/s (m/s)
$\sum_{i=1}^{n} d_i$ = 100 ft (30 m)

Average shear wave velocity, $\bar{v}_s$ is also referenced to V_{s100} or V_{s30}.

The layer travel times refers to the travel times propagating in the vertical direction, not the measured travel times from an offset source.

Tabular results and SCPTu plots are presented in the relevant appendix.

References

American Society of Civil Engineers (ASCE), 2010, "Minimum Design Loads for Buildings and Other Structures", Standard ASCE/SEI 7-10, American Society of Civil Engineers, ISBN 978-0-7844-1085-1, Reston, Virginia.

Robertson, P.K., Campanella, R.G., Gillespie D and Rice, A., 1986, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8: 791-803.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

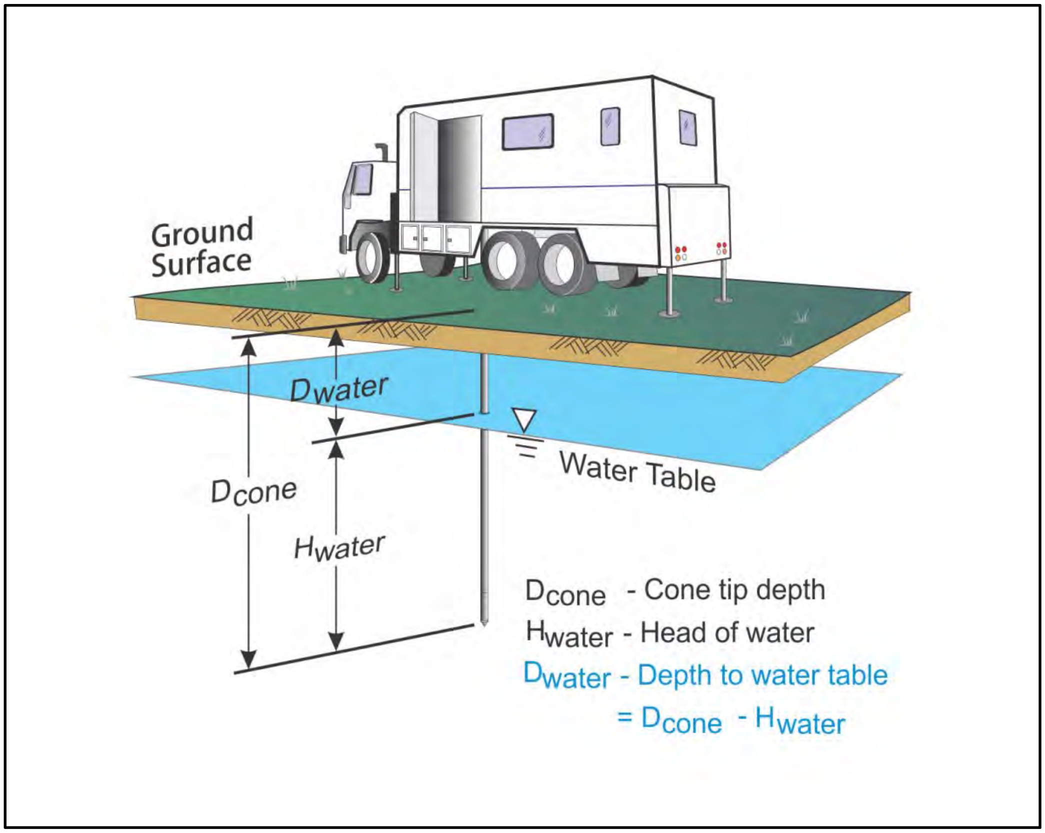


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behavior.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

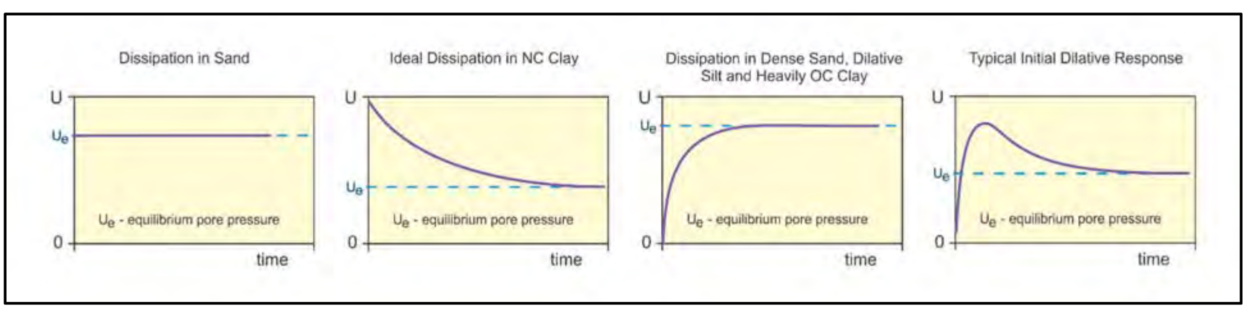


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve of Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100}. In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100}. A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

T^* is the dimensionless time factor (Table Time Factor)
a is the radius of the cone
I_r is the rigidity index
t is the time at the degree of consolidation

Table Time Factor. T* versus degree of dissipation (Teh and Houlsby, 1991)

Degree of Dissipation (%)	20	30	40	50	60	70	80
T* (u_2)	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50}, dissipation tests must be taken to a pressure less than u_{50}. The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100}. To estimate u_{50}, both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby, 1991), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50}. In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r, the equilibrium pore pressure and the effect of an initial dilatory response on calculating t_{50}, other methods should be applied to confirm the results for c_h.

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, "Monotonic and dilatory pore pressure decay during piezocone tests", Canadian Geotechnical Journal 26 (4): 1063-1073.

Burns, S.E. and Mayne, P.W., 2002, "Analytical cavity expansion-critical state model cone dissipation in fine-grained soils", Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, "The piezometer probe: a useful investigation tool", Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, "Estimating coefficient of consolidation from piezocone tests", Canadian Geotechnical Journal, 29(4): 551-557.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, "An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils", Canadian Geotechnical Journal, 36(2): 369-381.

Teh, C.I., and Houlsby, G.T., 1991, "An analytical study of the cone penetration test in clay", Geotechnique, 41(1): 17-34.

Dakota Technologies
TarGOST® Reference Log

Main Plot:

Signal (total fluorescence) versus depth where signal is relative to the Reference Emitter (RE). The total area of the waveform is divided by the total area of the Reference Emitter yielding the %RE. This %RE scales with the NAPL fluorescence. The fill color is based on relative contribution of each channel's area to the total waveform area (see callout waveform). The channel-to-color relationship and corresponding wavelengths are given in the upper right corner of the main plot.

Callouts:

Waveforms from selected depths or depth ranges showing the multi-wavelength waveform for that depth. The four peaks are due to fluorescence at four wavelengths and referred to as "channels." Each channel is assigned a color.

Various NAPLs will have a unique waveform "fingerprint" due to the relative amplitude of the four channels and/or broadening of one or more channels. Basic waveform statistics and any operator notes are given below the callout.

Conductivity Plot:

The Electrical Conductivity (EC) of the soil can be logged simultaneously with the TarGOST data. EC often provides insight into the stratigraphy.

Scatter Plot:

Scatter versus depth where intensity is relative to the scatter level of the Reference Emitter.

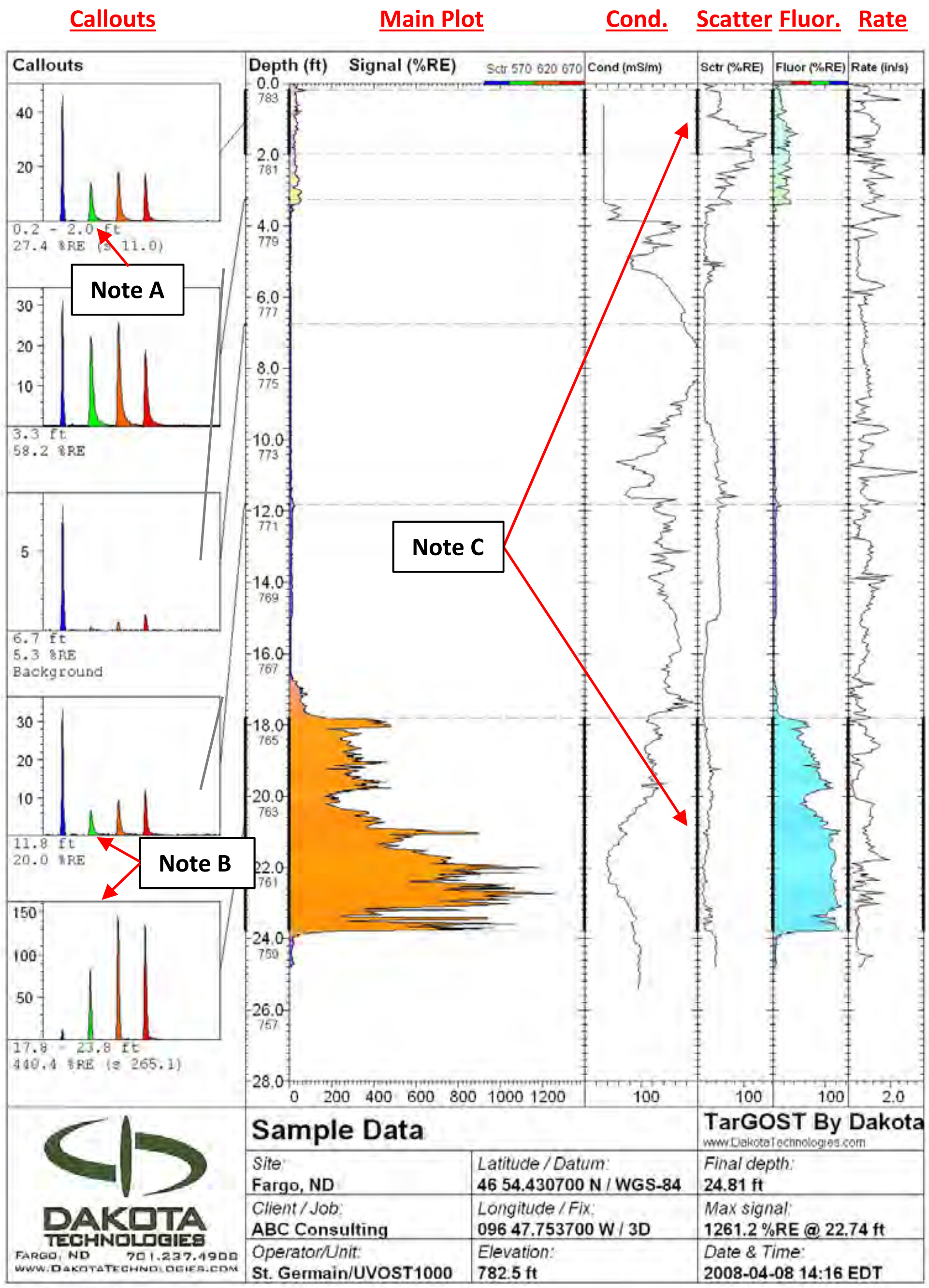
Fluorescence Plot:

A plot of the fluorescence signal alone versus depth. The scatter channel is not used in the calculation of signal intensity or coloring. Note the coloring key at the top of the plot. Intensity unit is percent of Reference Emitter fluorescence.

Varying soil or product can often be visually pulled-out from the background based on the fill color of this plot if scatter dominates the color of the main plot.

Rate Plot:

The rate of probe advancement. Approx. 0.8 inches (2cm) per second is preferred. A noticeable decrease in the rate of advancement may be indicative of difficult probing conditions (gravel, angular sands, etc.) such as that seen here at approx. 5 ft.



Note A:

Time is along the x axis. No scale is given on callouts, but it is constant and is 250ns wide. The y axis is in mV and directly corresponds to the amount of light striking the photodetector.

Note B:

These two waveforms show two different products, each with a unique waveform.

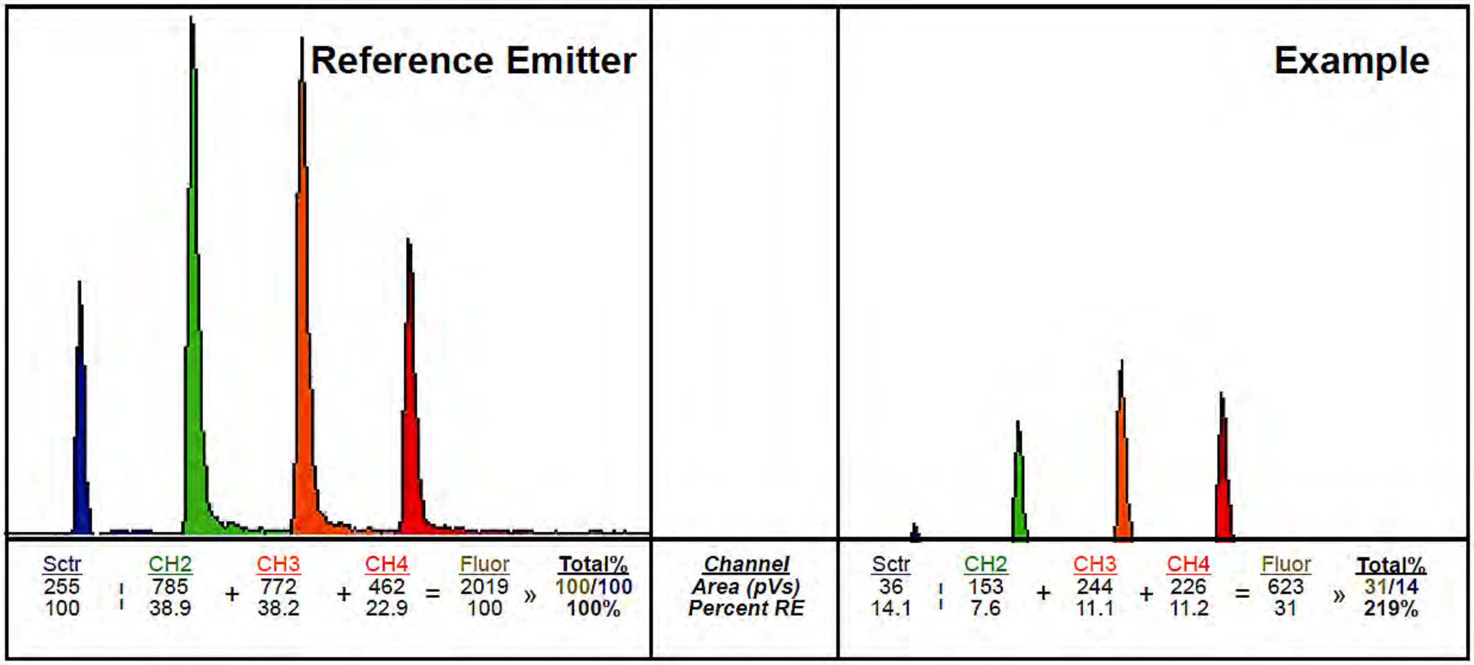
Note C:

The top zone has moderate fluorescence, but high scatter while the bottom zone has high fluorescence and low scatter. Note how this impacts the main signal plot.

Dakota Technologies

TarGOST® Reference Log

Waveform Signal Calculation

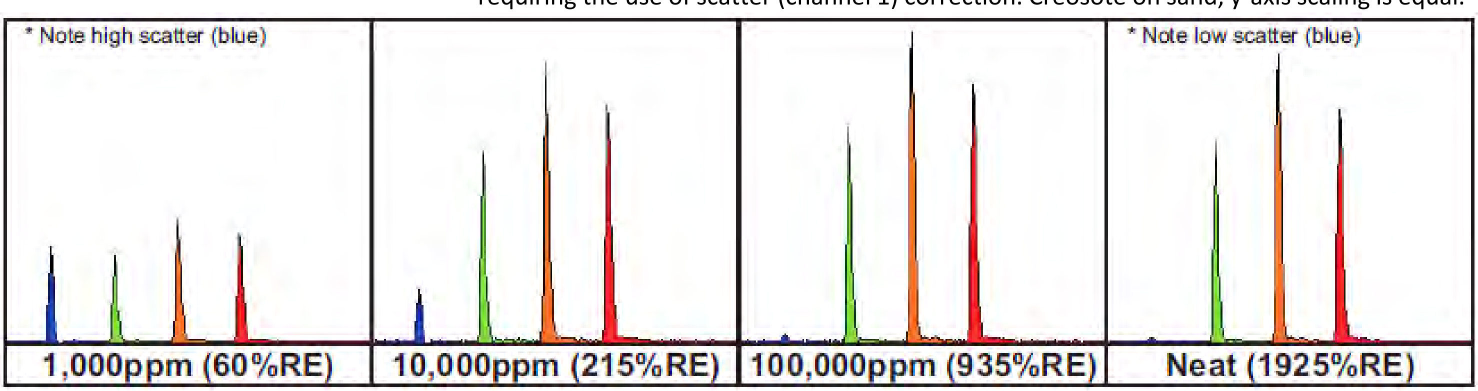


Data Files

***.lif.raw.bin**	Raw data file. Header is ASCII format and contains information stored when the file was initially written (e.g. date, total depth, max signal, GPS, etc., and any information entered by the operator). All Raw waveforms are appended to the bottom of the file in a binary format.
***.lif.plt**	Stores the plot scheme history (e.g. callout depths) for associated Raw file. Transfer along with the Raw file in order to recall previous plots.
***.lif.jpg**	A .jpg image of the OST log including the main signal vs. depth plot, callouts, information, etc.
***.lif.dat.txt**	Data export of a single Raw file. Tab delimited format. No string header is provided for the columns to make importing into some programs easier. Each row is a unique depth reading. The columns are: 1-Depth; 2-Total Signal (%RE); 3-CH1%; 4-Ch2%; 5-CH3%; 6-Ch4%; 7-Rate; 8-EC Depth; 9-EC Signal; 10-Hammer Rate Depth; 11-Hammer Rate; 12-Color (RRGGBB). Summing channels 1 to 4 yields the Total Signal.
***.lif.sum.txt**	A summary file for a number of Raw files. ASCII tab delimited format. The file contains a string header. The summary includes one row for each Raw file and contains information for each filed including: the file name, GPS coordinates, max depth, max signal, and depth at which the max signal occurred.
***.lif.log.txt**	An activity log generated automatically is located in the OST application directory in the 'log' subfolder. Each OST unit the computer operates will generate a separate log file per month. A log file contains much of the header information contained within each separate Raw file, including: data rate, total depth, max signal, etc.

Non Linear Fluorescence

Due to self-absorption, fluorescence levels (channels 2-4) are not linear with concentration, requiring the use of scatter (channel 1) correction. Creosote on sand, y-axis scaling is equal.



TarGOST®

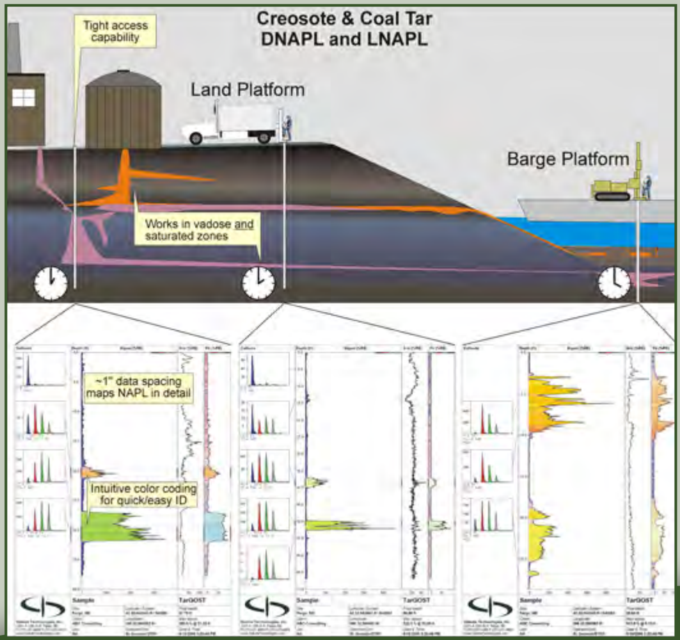
Tar-specific Green Optical Screening Tool

Dakota Technologies specializes in delineating coal tar and creosotes at former manufactured gas plants (MGP) and wood treatment facilities.

Our Tar-specific Green Optical Screening Tool (TarGOST®) is designed specifically for delineating coal tars and creosotes - the non-aqueous phase liquid contamination typically found at former MGP and wood treater sites. TarGOST can be deployed by all forms of direct push platforms across a wide range of site conditions... even hand delivery is an option.

TarGOST benefits include:

- **Real-time data** — allows for "on-the-fly" guidance of the next bore-hole location, leading to better bounding of source term NAPL
- **No IDW** — true in-situ information without producing waste, carryover, or handling and storage of samples
- **Fast** — production rates of 300 to 500 feet per day (typical direct push conditions)
- **Flexible delivery** — percussion (i.e. Geoprobe®) or cone penetration test (CPT)
- **Color-coded logs** — the ultimate in qualitative and semi-quantitative information "at-a-glance"
- **High data density** — one inch/data point
- **Sensitive** — low detection limits and quiet baselines that only laser-based systems provide
- **Selective** — TarGOST is "blind" to dissolved phase and the waveforms offer positive identification of NAPL vs natural fluorescence commonly encountered at MGP and wood treater sites



TarGOST is delivered with direct-push platforms such as Geoprobe (hammerable) and CPT. The probe features a sapphire window in the side allowing direct fluorescence measurements as the probe is steadily advanced into the soil.

Coal tar and creosote fluorescence is directed back up-hole to be analyzed. Responses are indicated in real-time on a graph of Signal versus depth. The logged results are color-coded and contain hundreds of waveforms to aid in proper interpretation of the fluorescence response.

MGP waste and creosote NAPLs contain large amounts of naturally fluorescent PAHs, but UV-based fluorescence systems fail to consistently detect them due to quenching. The TarGOST system was specifically designed to overcome this quenching and precisely log NAPL presence versus depth while ignoring dissolved phase PAHs.

DAKOTA TECHNOLOGIES

www.dakotatechnologies.com
info@dakotatechnologies.com
701.237.4908

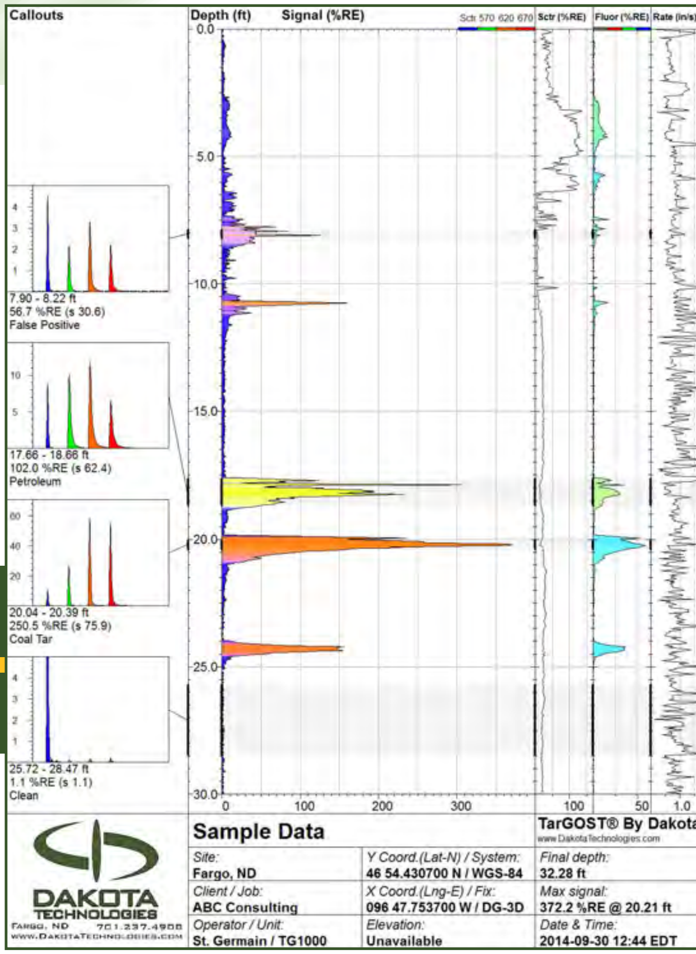
Maple Grove, MN
Morris, MN
Kansas City, MO
Fargo, ND
Columbus, OH
Charleston, SC

TarGOST®

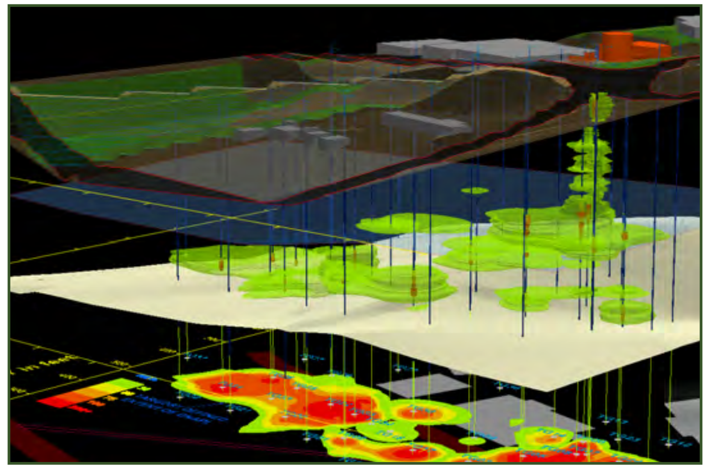
Tar-specific Green Optical Screening Tool

Successful risk assessments and remediation system designs require detailed knowledge of NAPL distribution. TarGOST provides this knowledge at unprecedented speed, detail, and efficiency. Sampling simply can't compete with TarGOST's production rates.

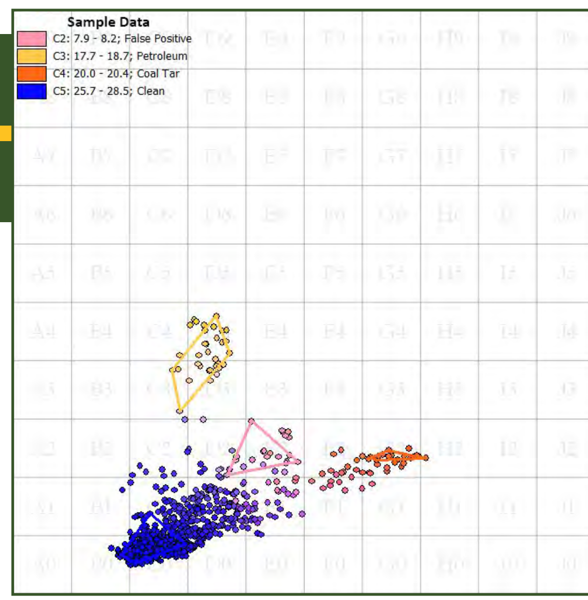
Since the first full-scale site characterization project in June 2003, the TarGOST system has been successfully applied at over 300 investigations. Barge is a common deployment platform for TarGOST studies of NAPL impacted sediments adjacent to former MGP and wood treater sites.



High Resolution TarGOST Logs



TarGOST Data—Conceptual Site Model (CSM)



The end result of a TarGOST boring is a high-density, non-subjective electronic data log (above) readily incorporated into 2D and 3D conceptual site models. [The yellow contaminant at 18 ft. is diesel, while the lower orange lenses are coal tar.]

Advanced data analysis extracts maximum benefit from temporal and spectral information

Bottom line: You have more important things to do for your client than struggle to define a heterogeneously distributed source term NAPL body. A TarGOST survey allows you to properly define the NAPL distribution once and for all so you can move on to the next steps.

DAKOTA TECHNOLOGIES
www.dakotatechnologies.com
info@dakotatechnologies.com
701.237.4908

Maple Grove, MN
Morris, MN
Kansas City, MO
Fargo, ND
Columbus, OH
Charleston, SC

Attachment B
Vibracore Logs

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-2-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/12/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0						SP		Dark brown; fine to coarse SAND, some fine to coarse gravel, little silt; loose, wet.		
-2										
						CL		Brown; CLAY, some silt, little fine sand; compact, moist.		
-4	5.5	0.0								
-6								Grades to gray at 6 ft bgs.		
-8										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

AECOM

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-11-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/12/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -4	7.0	19.2				SM	Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs	Gray to brown; SILT, some fine to medium sand, little organics; very soft, wet. Some semi-viscous NAPL blebs at 0 to 4 ft bgs.		
-4 to -8		0.3				CL		Gray; CLAY, some silt, some fine sand, trace medium to coarse gravel at 7 to 7.5 ft bgs; compact, moist.		

Legend: Coal Tar or Coal Tar NAPL Saturated Soil (red); Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs (green)

Comments: Default Listing
Default Listing
Default Listing

AECOM

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-19-VC

Project Name: NYSEG Penn Yan

NYSEG/Project Number: NYSEG

Date Started/Date Completed: 10/11/16

Boring Location: Canal

Drilling Company: ATL

Sampling Method: Vibracore

PVC Elevation (ft/msl, NAVD 88): NA

Ground Elevation (ft/msl, NAVD 88): NA

Total Depth: 8.0 ft

Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0	6.0	13.6				SM	🟩	Black; SILT, some fine sand, some organics; loose, wet. Little semi-viscous coal tar at 0 to 1.5 ft bgs.		
-2		10.6					🟩	Dark brown SILT and fine SAND, little organics; soft, wet. Little semi-viscous coal tar at 1.5-2.5 ft bgs.		
-4										
-6		0.0				ML		Brown; SILTY fine SAND, little clay, little fine to medium gravel, some orange mottling; compact, moist.		
-8										

🟥 Coal Tar or Coal Tar NAPL Saturated Soil

🟩 Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: SSC-20-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/11/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0	7.0	9.7				SM	Coal Tar or Coal Tar NAPL Saturated Soil (at ~1.4–1.5 ft)	Black; SILT, some fine sand, some organics; very soft, wet. Semi-viscous coal tar coated wood chips at 1.5 ft bgs.		
-2		18.6					Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs (1.5–6 ft)	Brown; SILT, some organics, little fine sand, trace clay. Some NAPL blebs at 1.5 to 6 ft bgs.		
-4										
-6		0.1				ML		Brown; SILT, little clay, some orange mottling; compact. moist.		
-8										

Legend: Coal Tar or Coal Tar NAPL Saturated Soil (red); Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs (green)

Comments: Default Listing
Default Listing
Default Listing

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: SSC-22-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/13/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -1	7.5	12.2				ML		Dark brown to black; SILT, little organics and fine sand; soft, wet. Moderate hydrocarbon-like odors at 0 to 1 ft bgs.		
-1 to -4		18.3					Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs (1 to 3 ft)	Brown to gray; SILT, some clay, some organics; soft, moist. Some semi-viscous NAPL blebs at 1 to 3 ft bgs.		
-4 to -8		0.0				CL		Brown; CLAY; compact, moist.		

Depth scale: 0, -2, -4, -6, -8

Legend: Coal Tar or Coal Tar NAPL Saturated Soil; Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

AECOM

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-26-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/11/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -6	6.3	0.0				SM		Dark brown; SILT, some fine sand, some organics, little medium sand; very soft, wet.		
-6 to -8						ML		Brown; SILT, some fine sand, some orange mottling; compact, moist.		

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-29-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/11/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -2						SM		Dark brown; SILT, little clay, little fine sand, little organics; very soft, wet.		
-2 to -6	5.1	0.0				CL		Gray; SILTY CLAY; soft, moist.		
-6 to -8						SM		Brown; SILTY fine SAND, some fine to coarse gravel; very compact, dry.		

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-32-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/11/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0						SM		Dark brown; SILT, little clay, some fine sand, little fine to medium gravel; very loose, wet.		
								Dark brown; SILT, some fine to medium sand, little organics, trace coal fragments, trace medium to coarse gravel; soft, wet.		
-2										
						CL		Light brown; CLAY, some silt, some orange mottling; compact, moist.		
-4	5.1	0.0								
-6										
-8										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: SSC-34-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/12/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0	6.0					ML		Dark brown; SILT, some fine to medium sand, little shell fragments, little organics; loose, wet.		
		0.0				CL		Brown; CLAY; compact, wet.		
-2										
-4		0.0								
-6						SP		Brown; fine SAND, some silt, some fine to coarse gravel; compact, wet.		
-8										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-35-VC

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/11/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -5	5.1	0.0				SM		Dark brown; SILT, little clay, some fine sand, little organics; soft, wet.		
-5 to -6						SP		Gray; fine to medium SAND; some silt, trace fine gravel; loose, wet.		
-6 to -8						CL		Brown; CLAY, some silt, some orange mottling; compact, moist.		

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

Well ID: SSC-38-VC

AECOM
40 British American Blvd
Latham, New York, 12110

Project Name: NYSEG Penn Yan

NYSEG/Project Number: NYSEG

Date Started/Date Completed: 10/11/16

Boring Location: Canal

Drilling Company: ATL

Sampling Method: Vibracore

PVC Elevation (ft/msl, NAVD 88): NA

Ground Elevation (ft/msl, NAVD 88): NA

Total Depth: 8.0 ft

Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0						GP		Dark brown; fine to coarse GRAVEL, some silt, some fine to medium sand; loose, wet.		
						ML		Dark brown; SILT, some clay, little organics; very soft, wet.		
-2										
-4	6.0	0.0								
-6										
						CL		Gray; CLAY, some silt; soft, wet.		
-8										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

40 British American Blvd
Latham, New York, 12110

Well ID: SSC-41-VC

Project Name: NYSEG Penn Yan

NYSEG/Project Number: NYSEG

Date Started/Date Completed: 10/12/16

Boring Location: Canal

Drilling Company: ATL

Sampling Method: Vibracore

PVC Elevation (ft/msl, NAVD 88): NA

Ground Elevation (ft/msl, NAVD 88): NA

Total Depth: 8.0 ft

Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -1.5	6.5	56.6				SM	Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs	Dark gray; SILT and fine to medium SAND, little fine to coarse gravel; loose, wet. Some semi-viscous NAPL blebs at 0 to 1.5 ft bgs.		
-1.5 to -5.5		3.2				ML		Gray; SILT, little fine sand, little organics; soft, moist.		
-5.5 to -8		0.0						Brown; CLAYEY SILT, little fine sand, some orange mottling; compact, moist.		

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: SSC-42-VC

Project Name: NYSEG Penn Yan	**Sampling Method:** Vibracore
NYSEG/Project Number: NYSEG	**PVC Elevation (ft/msl, NAVD 88):** NA
Date Started/Date Completed: 10/12/16	**Ground Elevation (ft/msl, NAVD 88):** NA
Boring Location: Canal	**Total Depth:** 8.0 ft
Drilling Company: ATL	**Logged By:** KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -2	6.0	26.3				SM	Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs	Black; SILT, some fine to medium sand, little fine to coarse gravel, some wood fragments at 1.5 ft bgs; soft, wet. Hydrocarbon-like stain and sheen at 0 to 2 ft bgs.		
-2 to -5		1.4				ML		Gray; SILT, little fine sand, little organics; soft, moist.		
-5 to -8		0.1						Brown; CLAYEY SILT, little fine sand, little fine gravel, some orange mottling; compact, moist.		

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing

Well ID: SSC-44-VC

40 British American Blvd
Latham, New York, 12110

Project Name: NYSEG Penn Yan
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 10/11/16
Boring Location: Canal
Drilling Company: ATL

Sampling Method: Vibracore
PVC Elevation (ft/msl, NAVD 88): NA
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8.0 ft
Logged By: KS

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0						FILL		Black; fine to coarse SAND and coal slag, little silt; loose, wet. Moderate hydrocarbon-like odors at 0 to 1.5 ft bgs.		
						SM		Dark brown; SILT, some fine sand, trace clay and organics; very soft, wet.		
-2										
-4	5.0	0.0								
								Brown; SILTY fine SAND, little fine to medium gravel; compact.		
-6						CL		Brown; CLAY, little silt; very compact, moist.		
-8										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Default Listing
Default Listing
Default Listing