Environmental, Planning, and Engineering Consultants
34 South Broadway
Suite 401
White Plains, NY 10601
tel: 914 949-7336
fax: 914 949-7559
www.akrf.com

April 20, 2018

Mr. Matthew Hubicki
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

Subject: **Pile Design – Submittal #4**
Polychrome West (C360099)
City of Yonkers, Westchester County
BCP Site Number C360099

Dear Mr. Hubicki:

The following Submittal #4 provides additional detail regarding the Pile Design (or pile modifications) outlined in the Polychrome West Remedial Action Workplan (RAWP). The Polychrome West Site is located at 137-145 Alexander Street in Yonkers, New York (the "site") and this submittal has been prepared by AKRF, Inc. on behalf of Avalon Yonkers Sun Sites, LLC (AVB).

Pile Modifications

As identified in the RAWP, specific areas in the western portion of the Site with elevated TarGOST readings were designated as "DNAPL Special Pile Installation Detail Areas". Proposed piles in the DNAPL Special Pile Installation Detail Areas were evaluated to determine if an updated pile design or pile modification is warranted to prevent a preferential pathway for vertical contaminant migration. As shown on the enclosed Figure 1, 18 pile locations are proposed for pile modification.

The proposed pile modification consists of augering a 36-inch diameter in-situ soil solidification (ISS) column utilizing a Delmag RH-18 drill rig, or similar, for each of the 18 selected piles. Column center points will be located/surveyed in accordance with the structural pile plan.

The ISS auger rig will be equipped with a mast inclination system with automatic mast adjustment to maintain vertical alignment. This will ensure that the ISS columns are installed within strict vertical tolerances. The rig will also be fitted with a computerized drill parameter monitoring system capable of monitoring verticality, penetration depth, penetration rate, auger rotation speed, and crowd pressure during drilling. Readings will be hand recorded onto the operators drill log once the column is completed. Proposed ISS auger column depths and elevations are summarized in Table 1 and are proposed to extend 3 feet below the deepest adjacent elevated TarGOST reading. As outlined in the PS&S Pre-Design Investigation and RAWP, the elevated TarGOST readings are representative of the transition from fill to less permeable native river sediments. Adjacent TarGOST boring logs are enclosed as Attachment A.

After allowing sufficient time for the ISS column to cure, the column will then be pre-cored prior to pile driving activities. The ISS mix for the ISS columns will be a 15% grout addition. After pile driving activities are completed, the annulus of the drilled pile will be filled with grout and/or a bentonite mix. Final pile modification composition and extents will be documented in the Final Engineering Report.

Please confirm if the proposed modifications will meet the Pile Design requirements outlined in Sections 3.4 and 6.2 of the RAWP. In the meantime, please contact Patrick McHugh at (914) 922-2387, if you have any questions or require additional information.

Sincerely,
AKRF, Inc.

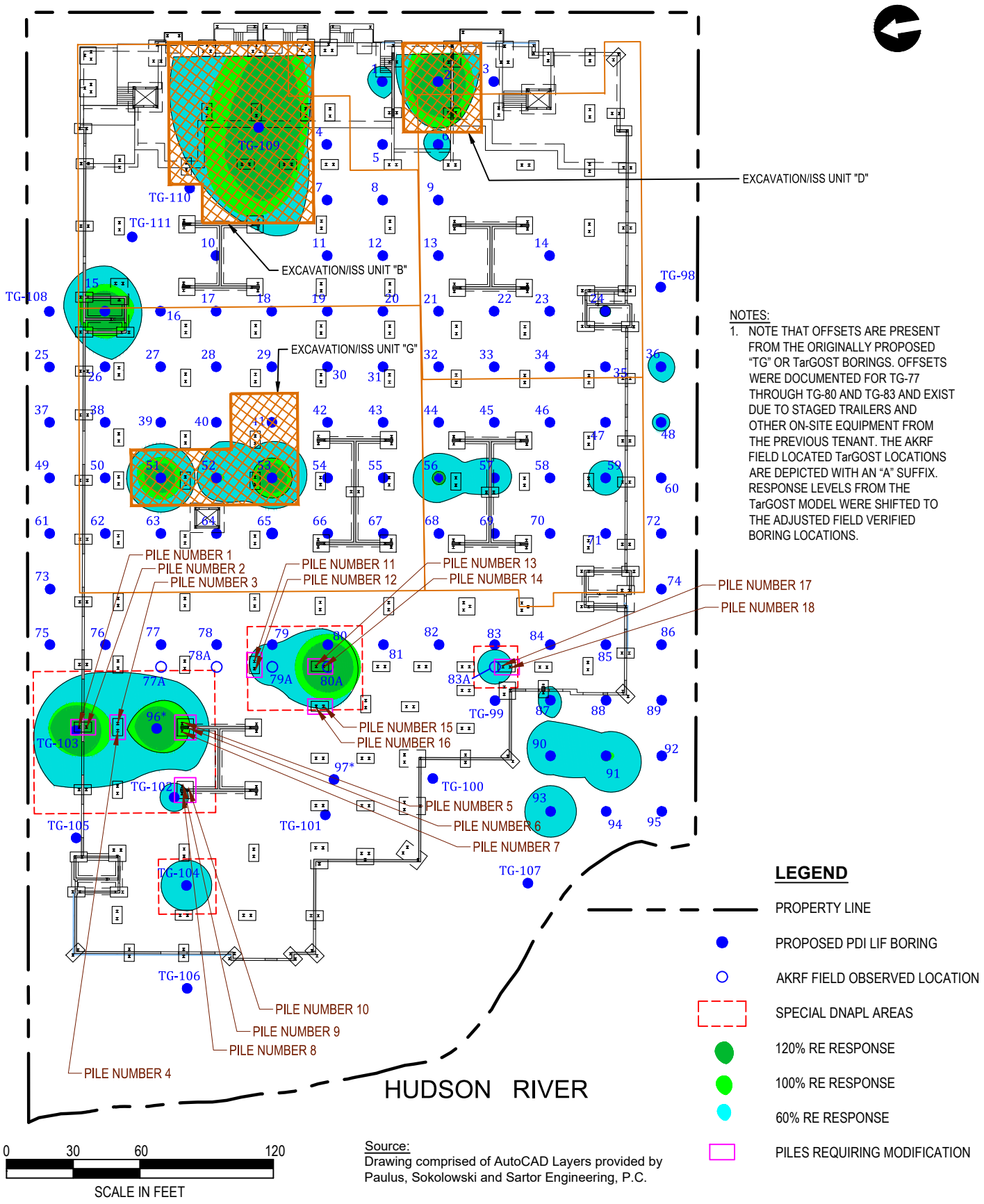
Marc S. Godick, LEP
Sr. Vice President

cc: David Crosby – NYSDEC
Scott Deyette – NYSDEC
Aaron Levy – AVB
Barry White – AVB
Christopher Capece - AVB
Patrick McHugh - AKRF
Steven Grens – AKRF

Enclosures:

Figure 1 – Pile Design Areas
Table 1 – Proposed ISS Column Depths
Attachment A – Adjacent TarGOST logs

Figure 1 - Pile Design Areas



NOTES:

1. NOTE THAT OFFSETS ARE PRESENT FROM THE ORIGINALLY PROPOSED "TG" OR TarGOST BORINGS. OFFSETS WERE DOCUMENTED FOR TG-77 THROUGH TG-80 AND TG-83 AND EXIST DUE TO STAGED TRAILERS AND OTHER ON-SITE EQUIPMENT FROM THE PREVIOUS TENANT. THE AKRF FIELD LOCATED TarGOST LOCATIONS ARE DEPICTED WITH AN "A" SUFFIX. RESPONSE LEVELS FROM THE TarGOST MODEL WERE SHIFTED TO THE ADJUSTED FIELD VERIFIED BORING LOCATIONS.

LEGEND

- PROPERTY LINE
- PROPOSED PDI LIF BORING
- AKRF FIELD OBSERVED LOCATION
- SPECIAL DNAPL AREAS
- 120% RE RESPONSE
- 100% RE RESPONSE
- 60% RE RESPONSE
- PILES REQUIRING MODIFICATION

Source:
Drawing comprised of AutoCAD Layers provided by Paulus, Sokolowski and Sartor Engineering, P.C.

AKRF
440 Park Avenue South, New York, NY 10016

Polychrome West
NYSDEC Site
Yonkers, New York

PILE DESIGN AREAS

DATE
4/18/2018

PROJECT NO.
180017

FIGURE
1

Table 1 - Proposed ISS Column Depths

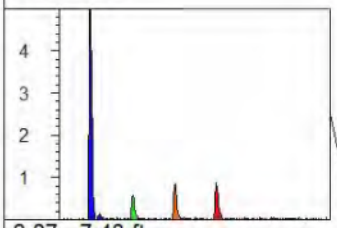
Table 1 - Proposed ISS Column Depths					
Pile Number	Nearest TarGOST boring	Approximate Ground Elevation (NAVD88)	Depth of elevated TarGOSTG readings (bgs)	Bottom Elevation of Elevated TarGOST reading (NAVD88)	Proposed Bottom ISS Column Elevation (NAVD88)
1	TG-103	3.5	29	-25.5	-28.5
2	TG-103	3.5	29	-25.5	-28.5
3	TG-103/TG-96	3.5	29/28	-25	-28
4	TG-103/TG-96	3.5	29/28	-25	-28
5	TG-96	3.5	28	-24.5	-27.5
6	TG-96	3.5	28	-24.5	-27.5
7	TG-96	3.5	28	-24.5	-27.5
8	TG-102	3.0	33	-30	-33
9	TG-102	3.0	33	-30	-33
10	TG-102	3.0	33	-30	-33
11	TG-79	4.8	25	-20.2	-23.2
12	TG-79	4.8	25	-20.2	-23.2
13	TG-80	5.0	24.5	-19.5	-22.5
14	TG-80	5.0	24.5	-19.5	-22.5
15	TG-80	5.0	24.5	-19.5	-22.5
16	TG-80	5.0	24.5	-19.5	-22.5
17	TG-83/TG-99	4.8	25/24.5	-20.3	-23.3
18	TG-83/TG-99	4.8	25/24.5	-20.3	-23.3

Notes:

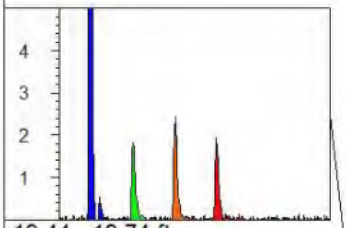
1. Elevation data utilized was provided by Paulus, Sokolowski and Sartor Engineering, PC and collected by survey.
2. TG-103 and TG-102 were not surveyed. AKRF utilized nearby elevation data to estimate approximate ground elevations.

Attachment A – Adjacent TarGOST logs

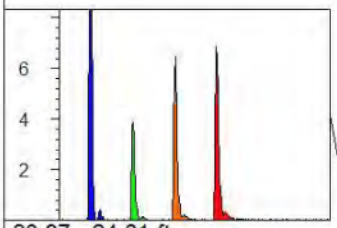
Callouts



6.87 - 7.43 ft
6.6 %RE (s 3.2)

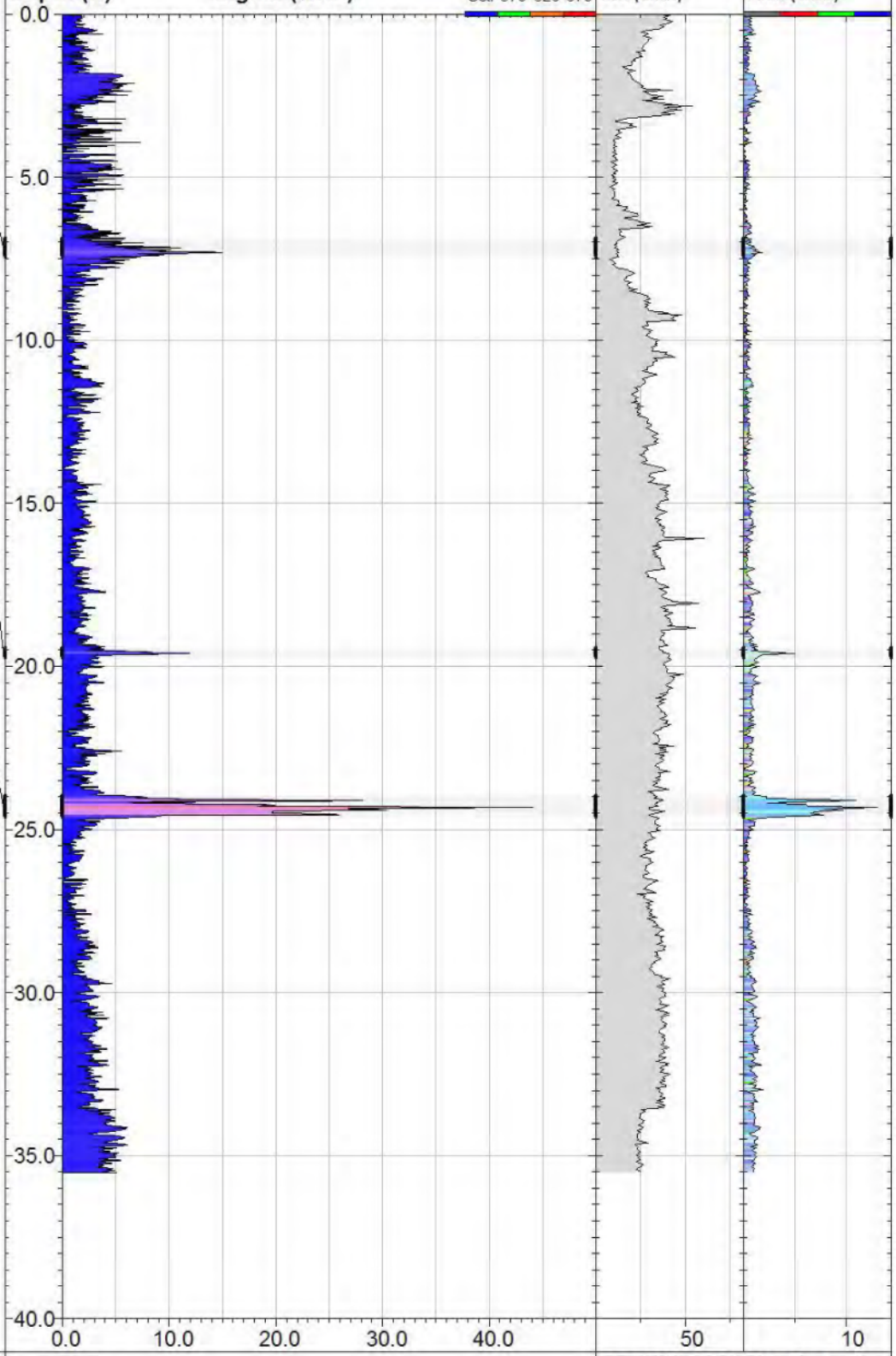


19.44 - 19.74 ft
5.3 %RE (s 3.2)



23.97 - 24.61 ft
16.1 %RE (s 10.2)

Pre- probed to ~2.5'.



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TG-75

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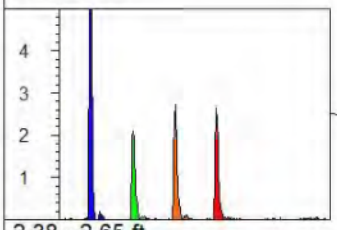
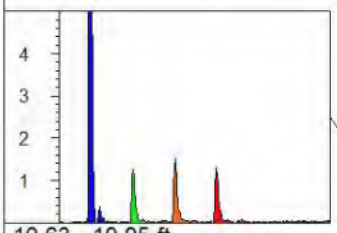
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **35.51 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **44.1 %RE @ 24.32 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-24 11:47 CDT**

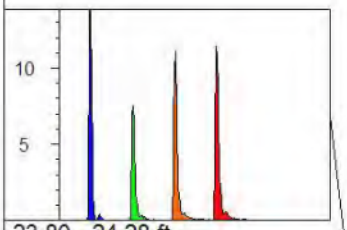
Callouts



2.38 - 2.65 ft
15.6 %RE (s 29.9)

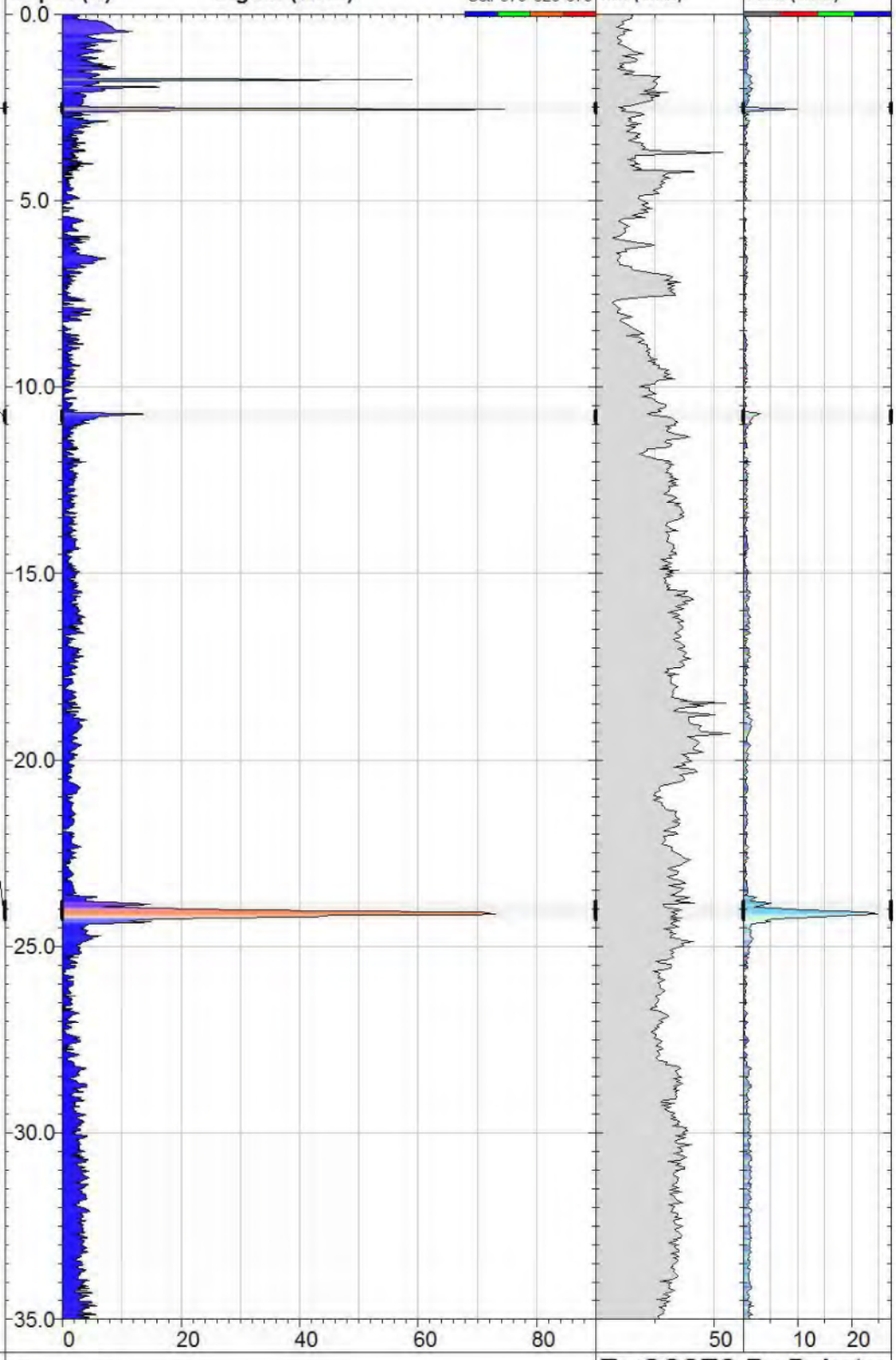


10.63 - 10.95 ft
4.9 %RE (s 3.6)



23.80 - 24.28 ft
29.0 %RE (s 22.7)

Pre- probed to ~2.5'.



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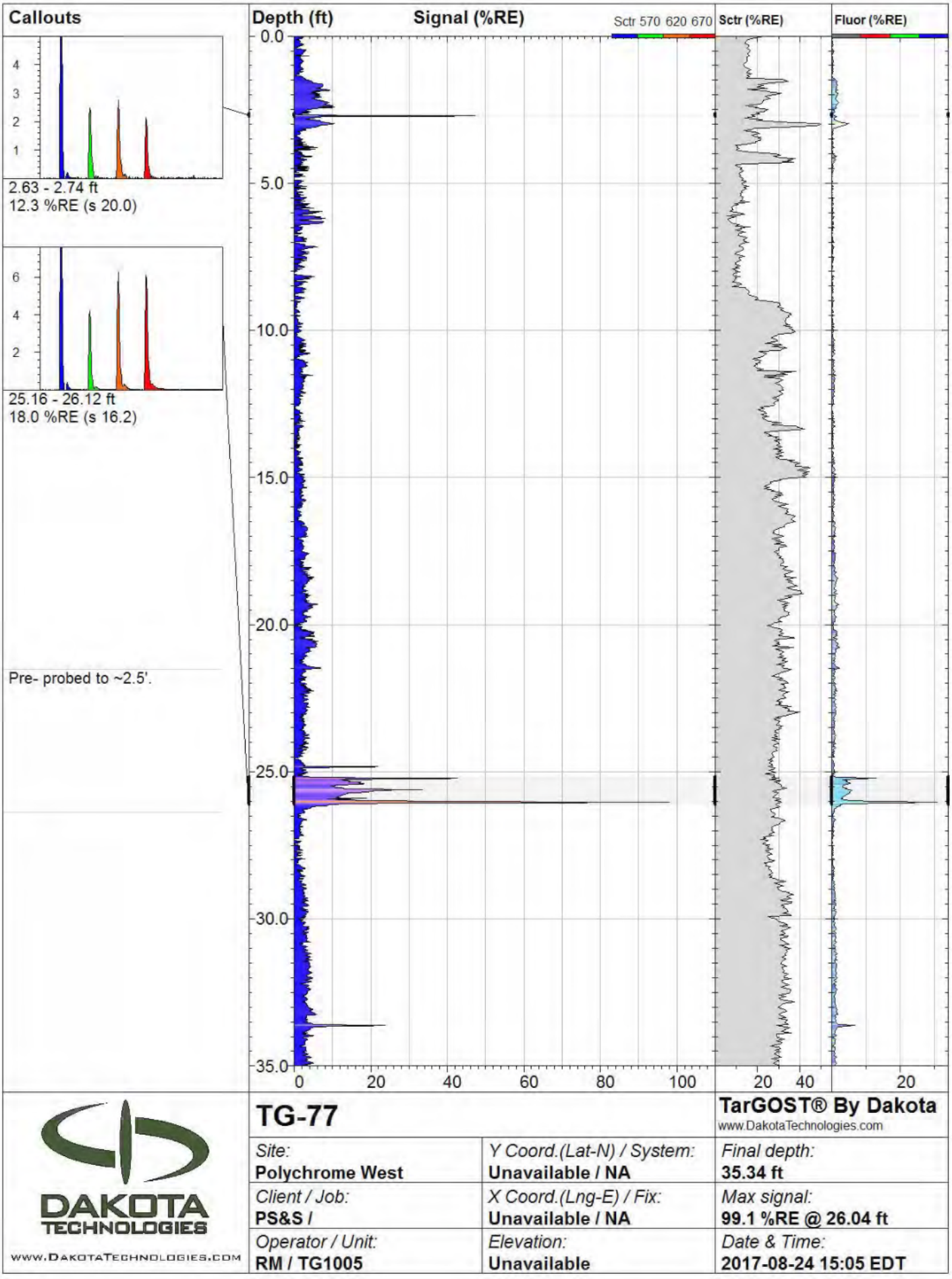
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **35.04 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **77.7 %RE @ 2.56 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-24 13:49 EDT**



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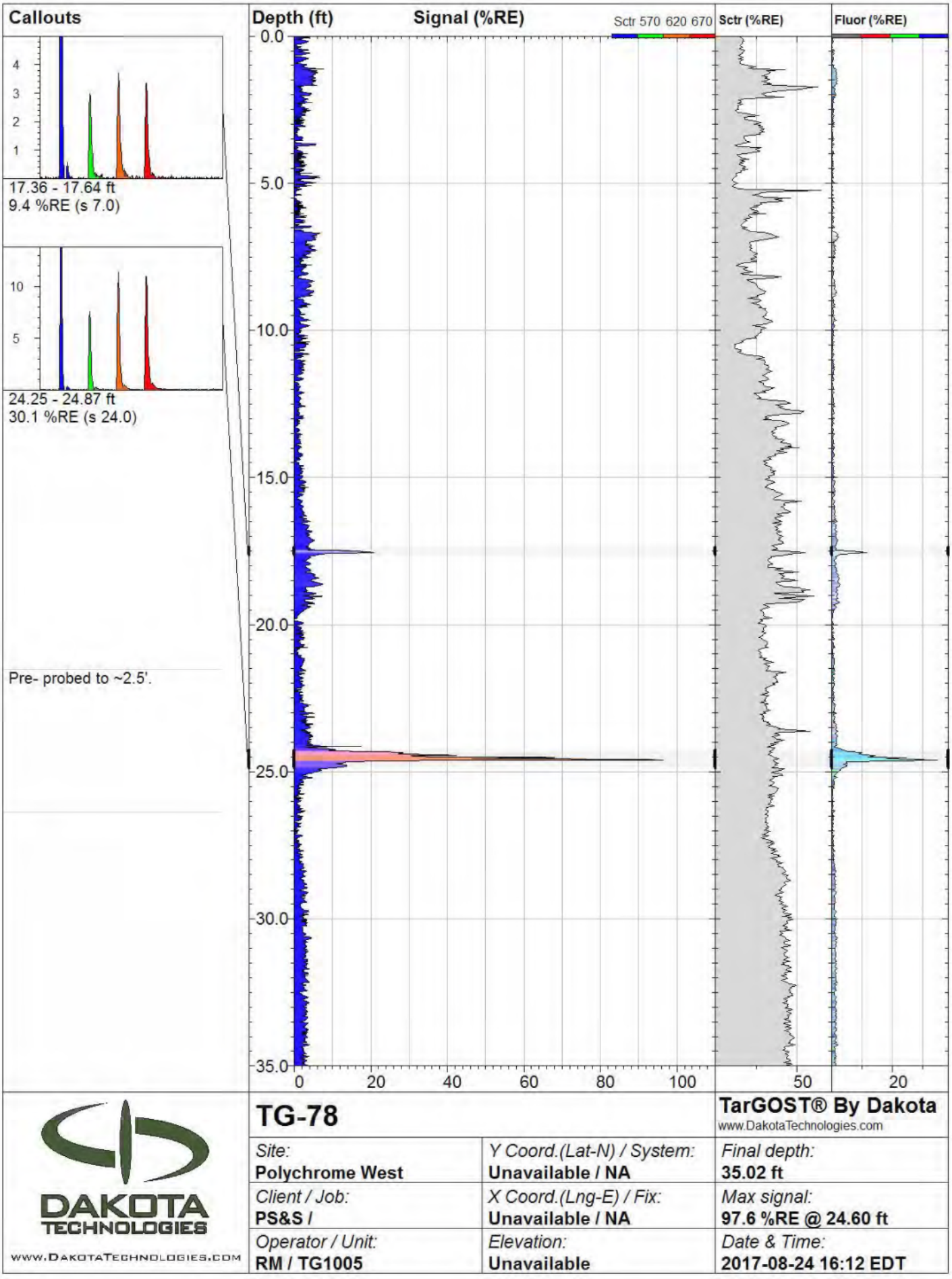
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **35.34 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **99.1 %RE @ 26.04 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-24 15:05 EDT**



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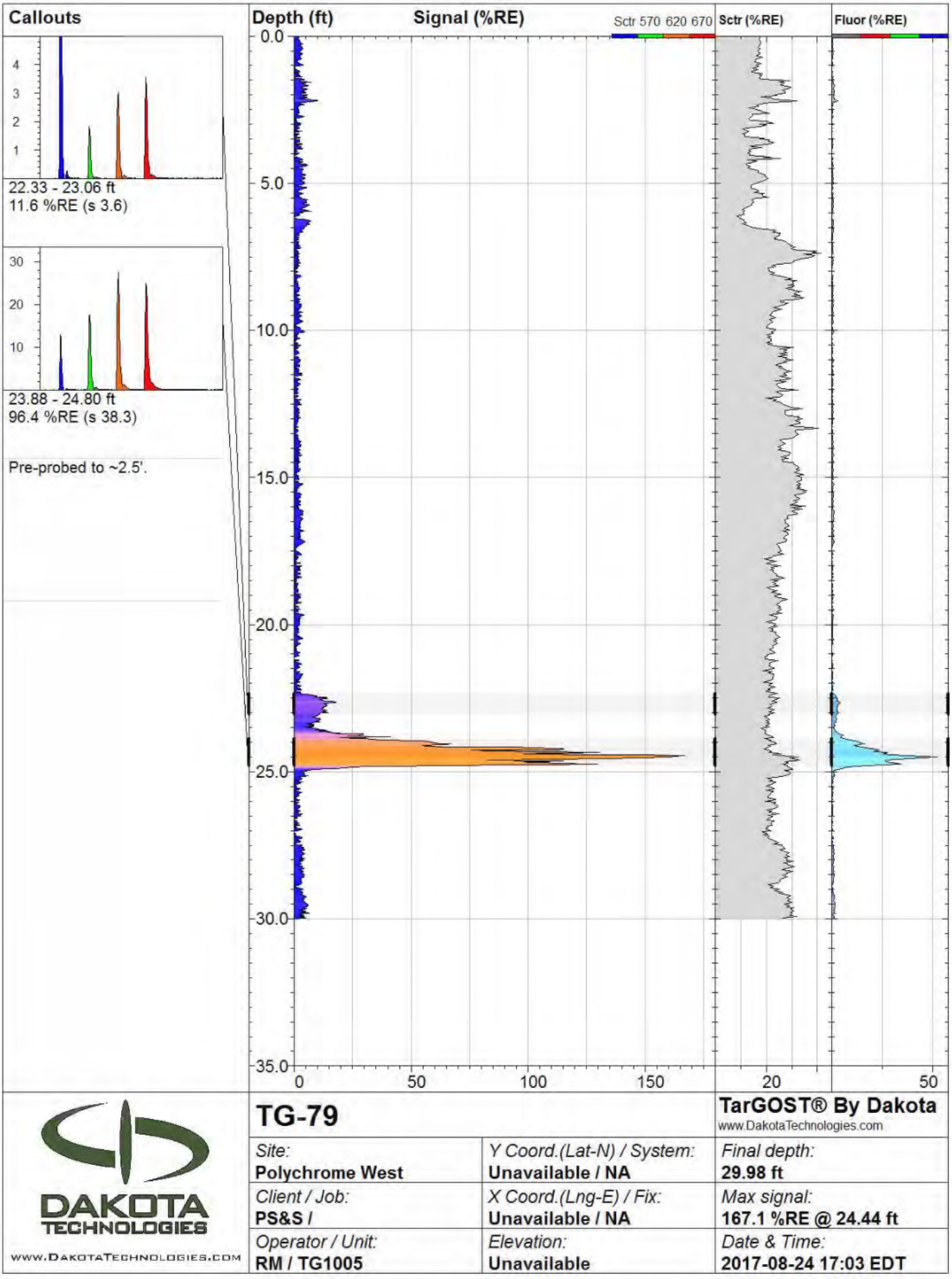
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **35.02 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **97.6 %RE @ 24.60 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-24 16:12 EDT**



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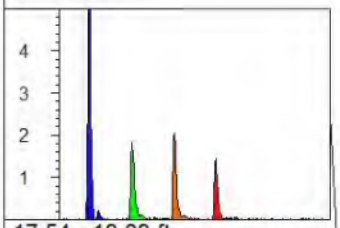
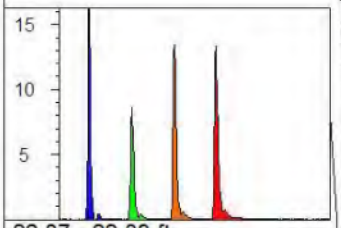
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **29.98 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **167.1 %RE @ 24.44 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-24 17:03 EDT**

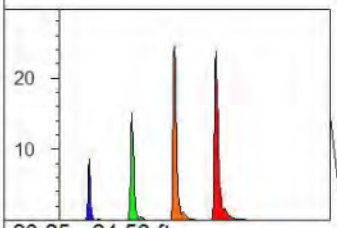
Callouts



17.54 - 18.08 ft
12.1 %RE (s 3.8)

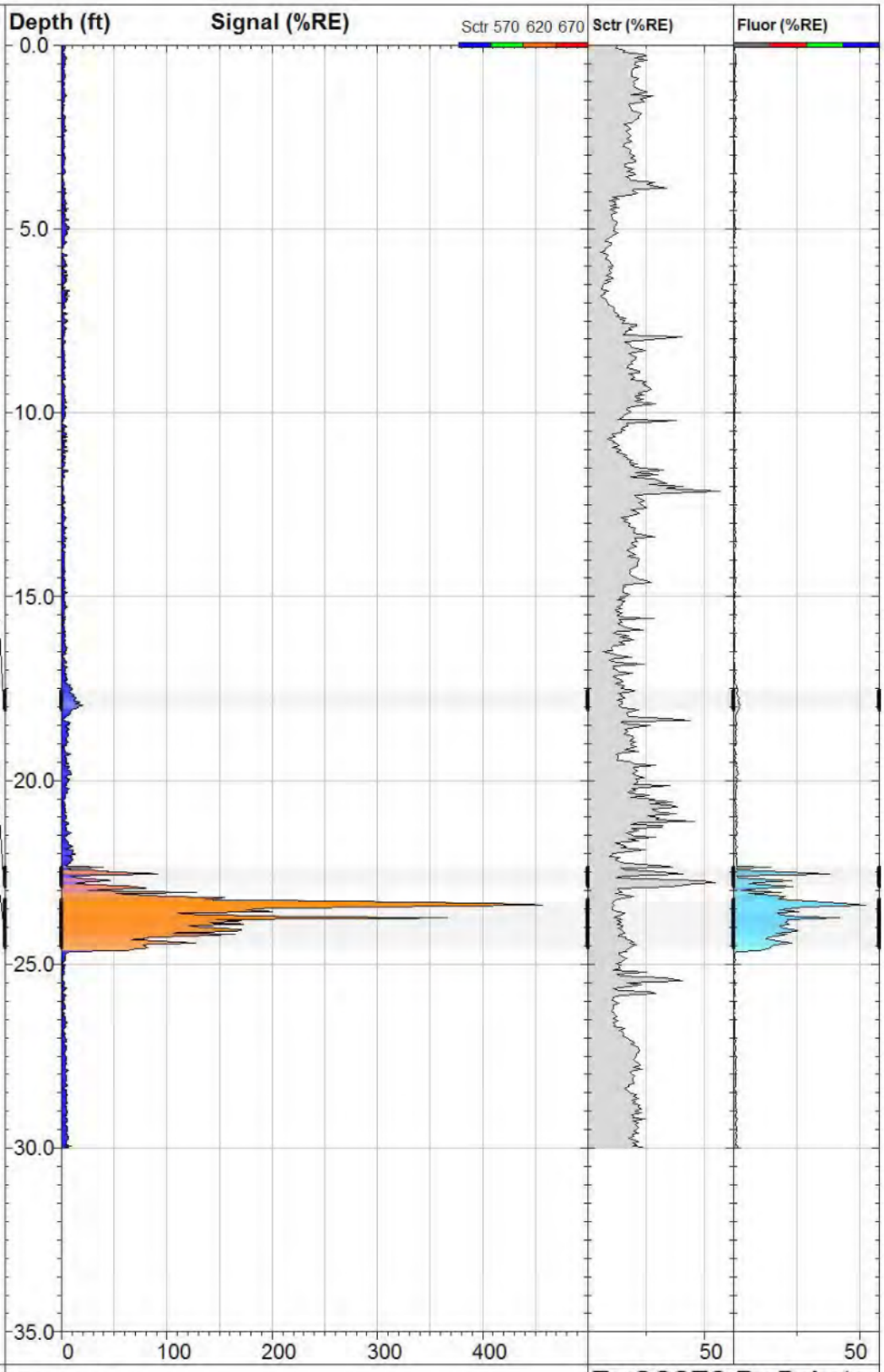


22.37 - 22.88 ft
37.1 %RE (s 27.0)



23.25 - 24.56 ft
154.9 %RE (s 93.2)

Pre- probed to ~2.5'.



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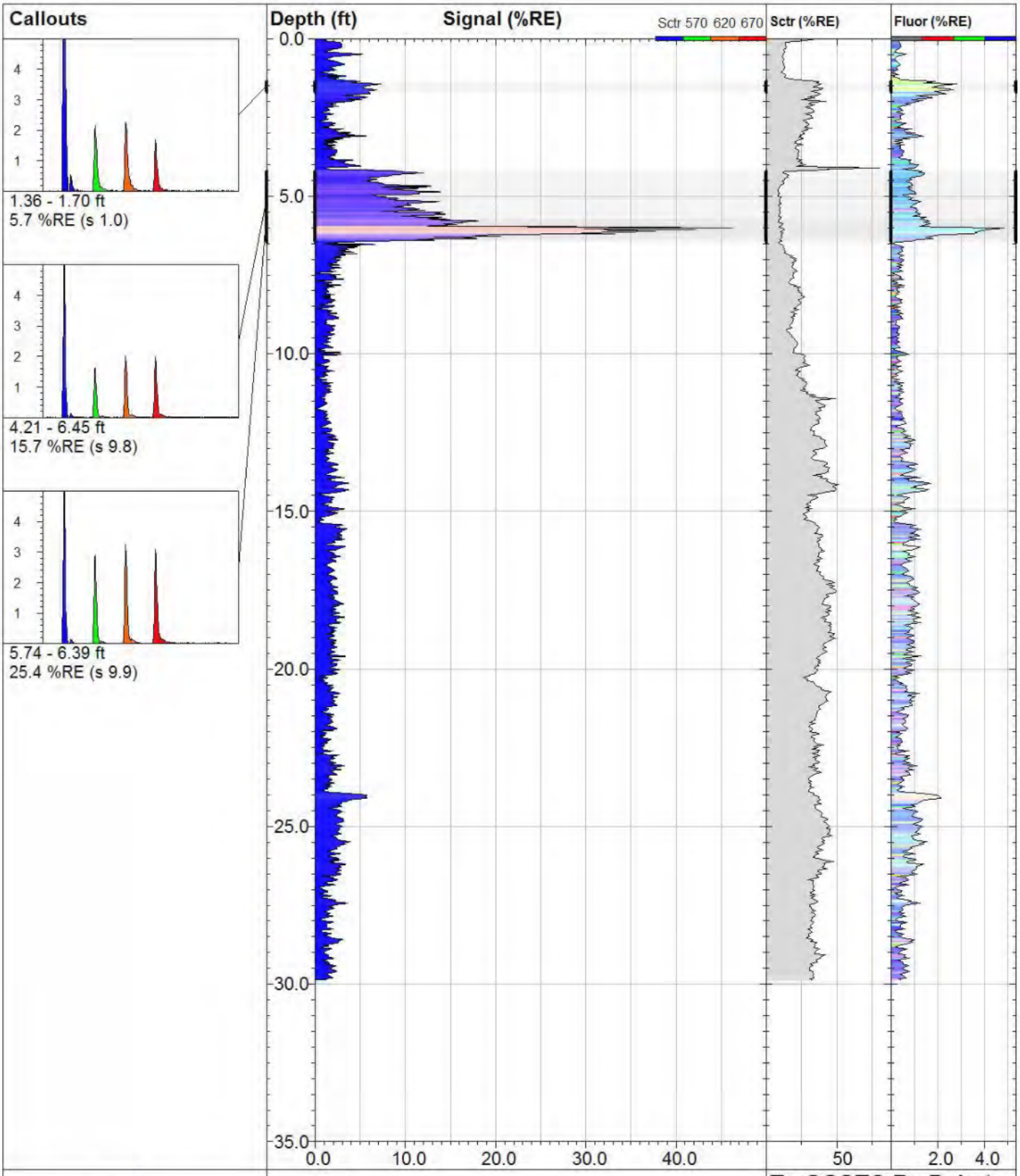
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.01 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **460.0 %RE @ 23.39 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-25 11:06 EDT**



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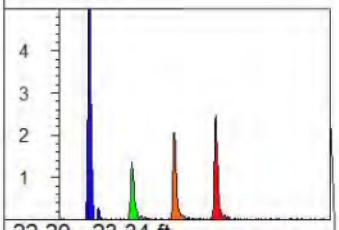
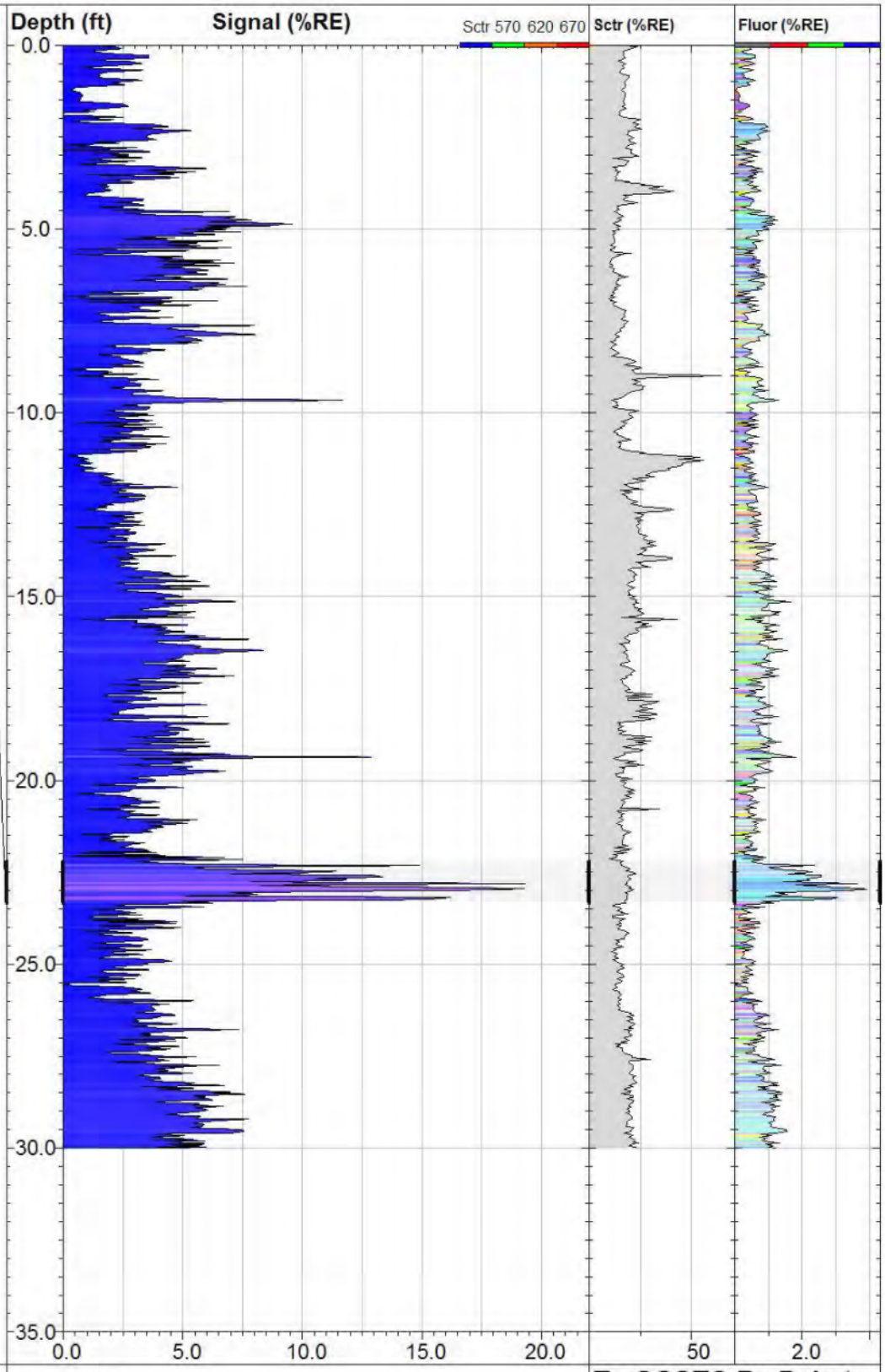
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **29.87 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **46.7 %RE @ 6.01 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-25 07:13 EDT**

Callouts



22.20 - 23.34 ft
10.6 %RE (s 4.7)

Pre-probed to ~2.5'.



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TG-82

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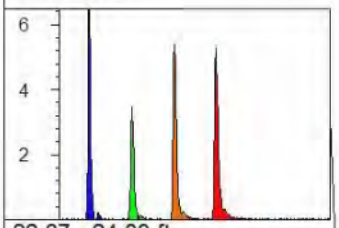
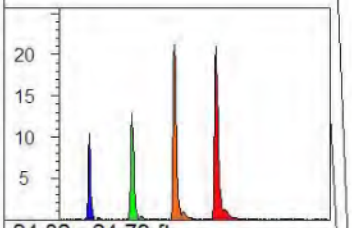
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.00 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **19.6 %RE @ 22.81 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-25 10:13 EDT**

Callouts

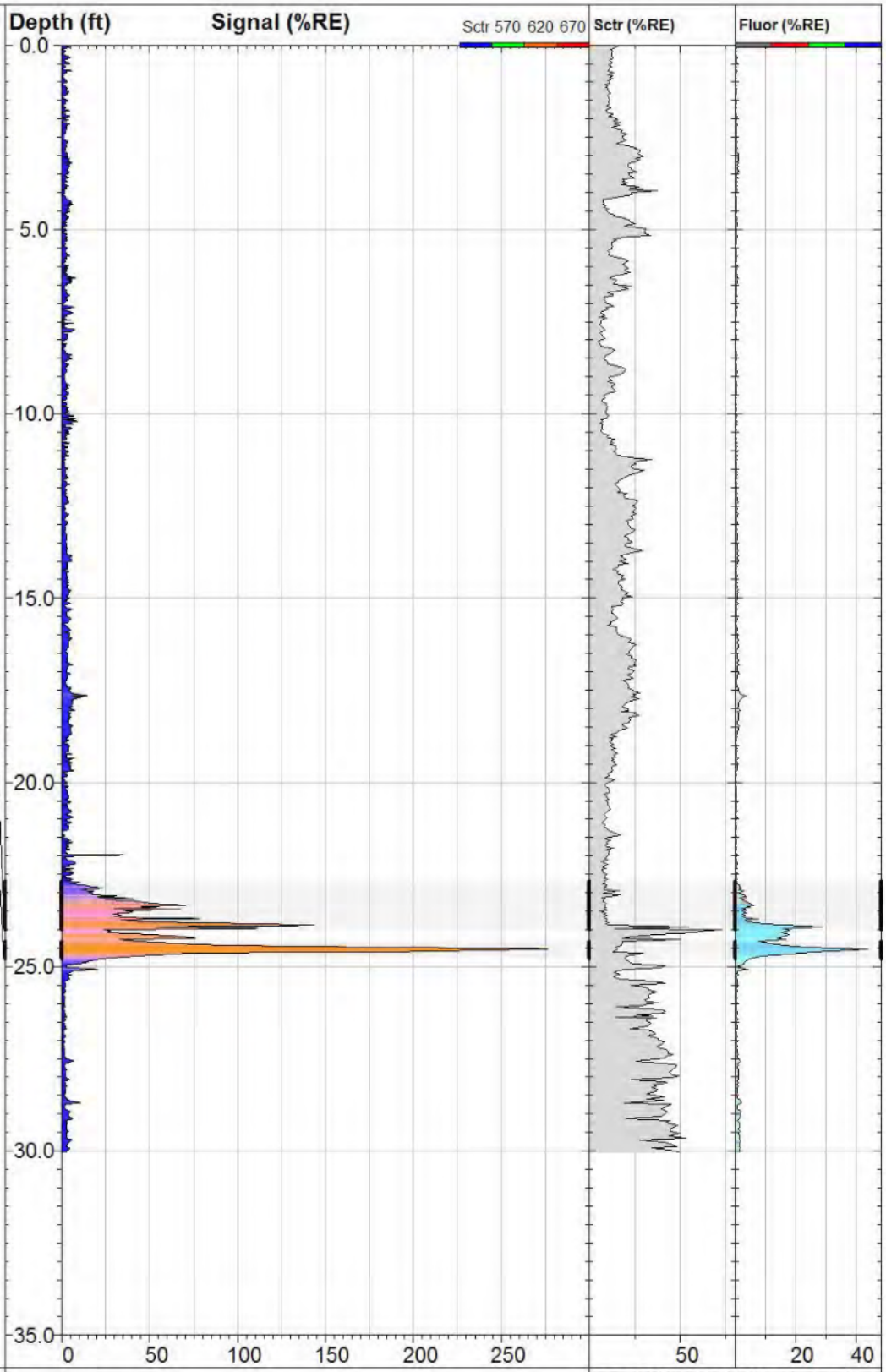


22.67 - 24.00 ft
39.8 %RE (s 30.2)



24.32 - 24.79 ft
98.1 %RE (s 85.9)

Pre-probed to ~2.5'.
Stepped off from TG-83



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TG-83a

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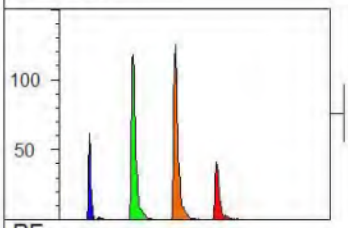
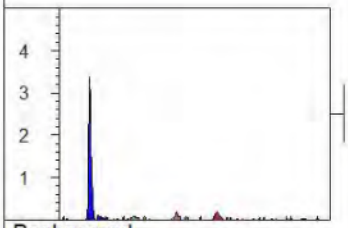
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.03 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **279.1 %RE @ 24.52 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-08-25 09:23 EDT**

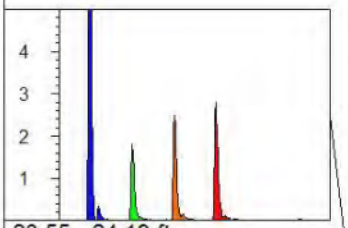
Callouts



RE
100.0 %RE

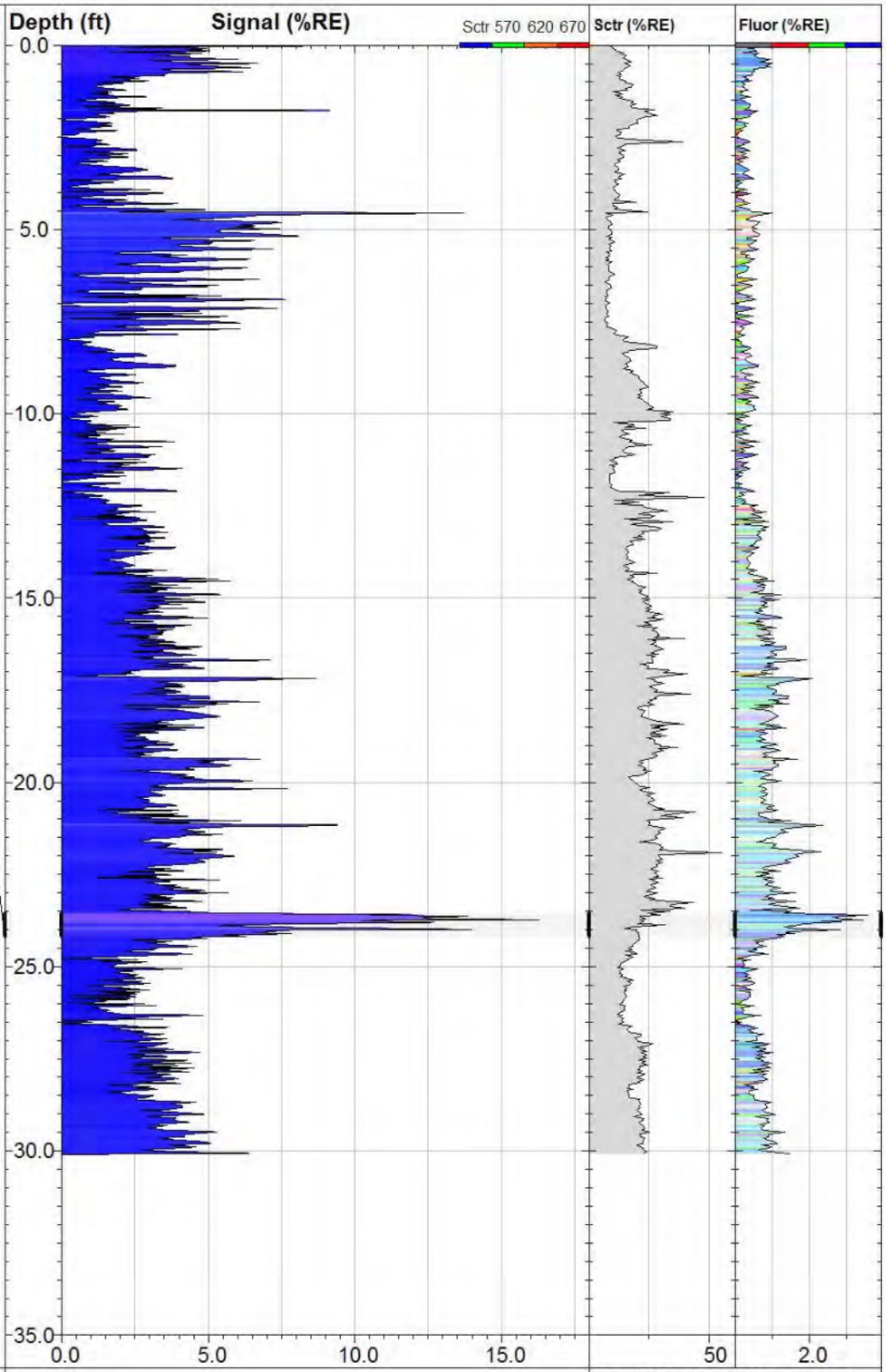


Background
2.4 %RE



23.55 - 24.19 ft
9.5 %RE (s 3.3)

Pre probed to 5'.



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TG-84

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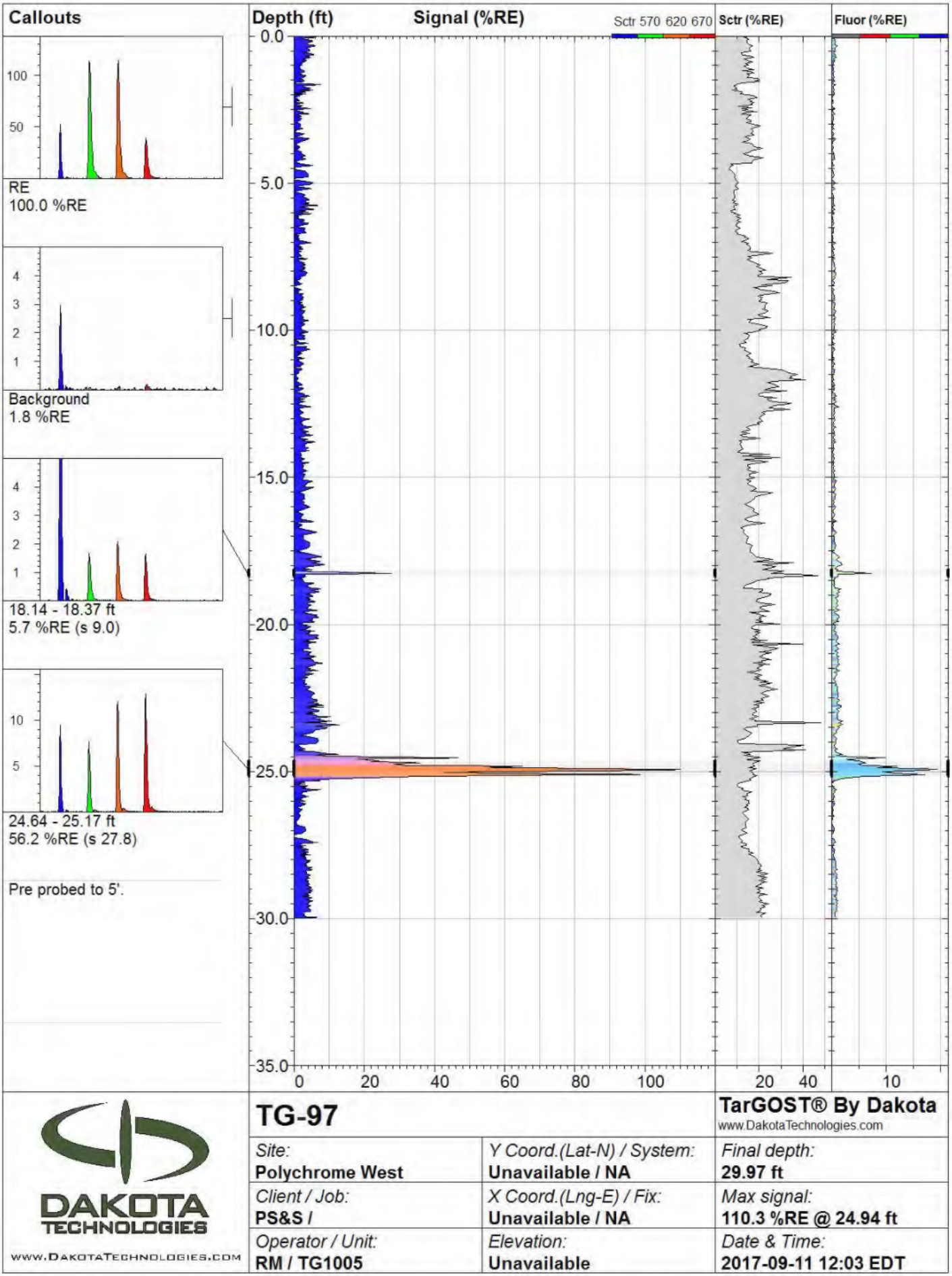
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.09 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **16.4 %RE @ 23.74 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-11 08:25 EDT**



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TG-97

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Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **29.97 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **110.3 %RE @ 24.94 ft**
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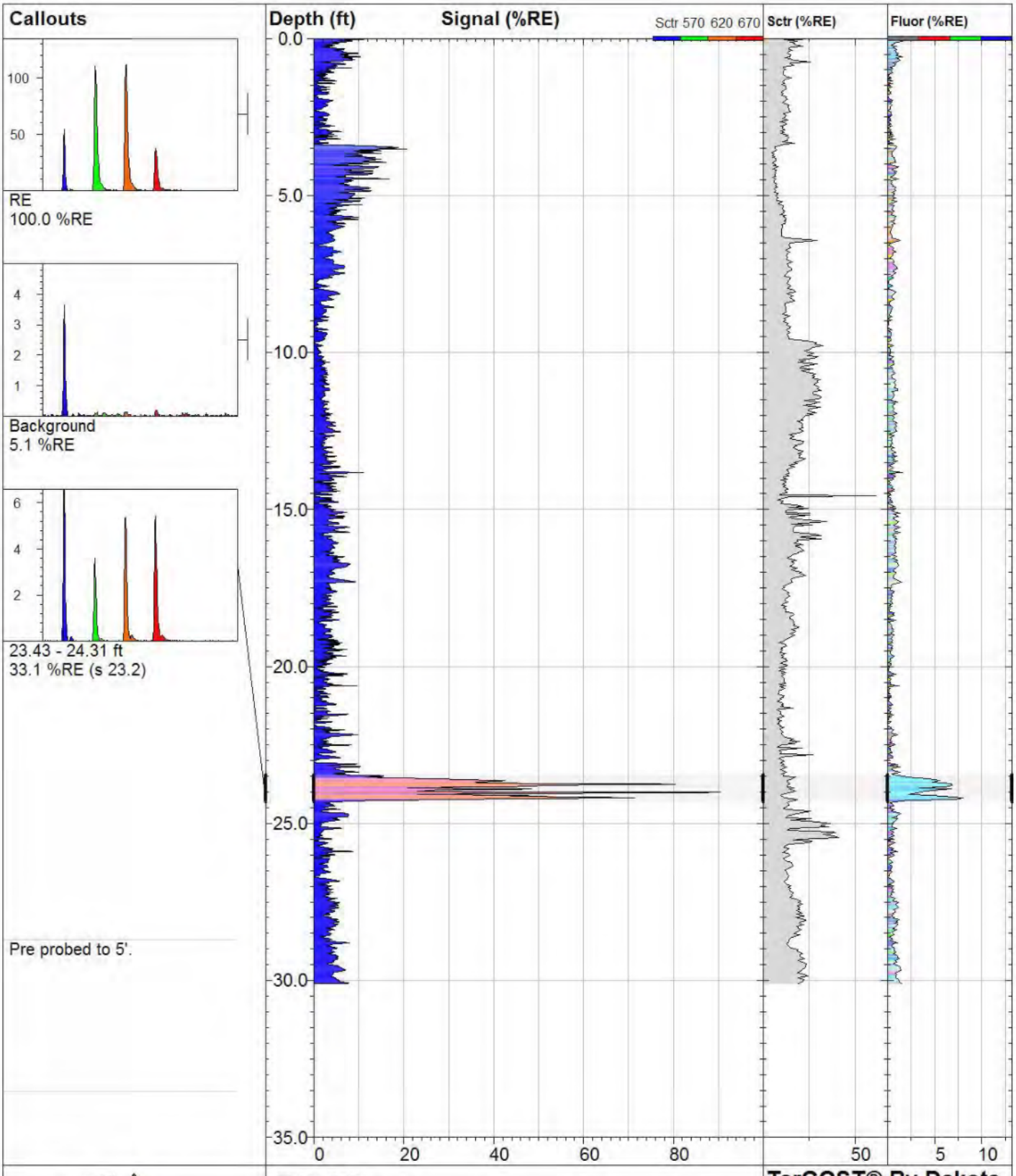

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TG-99

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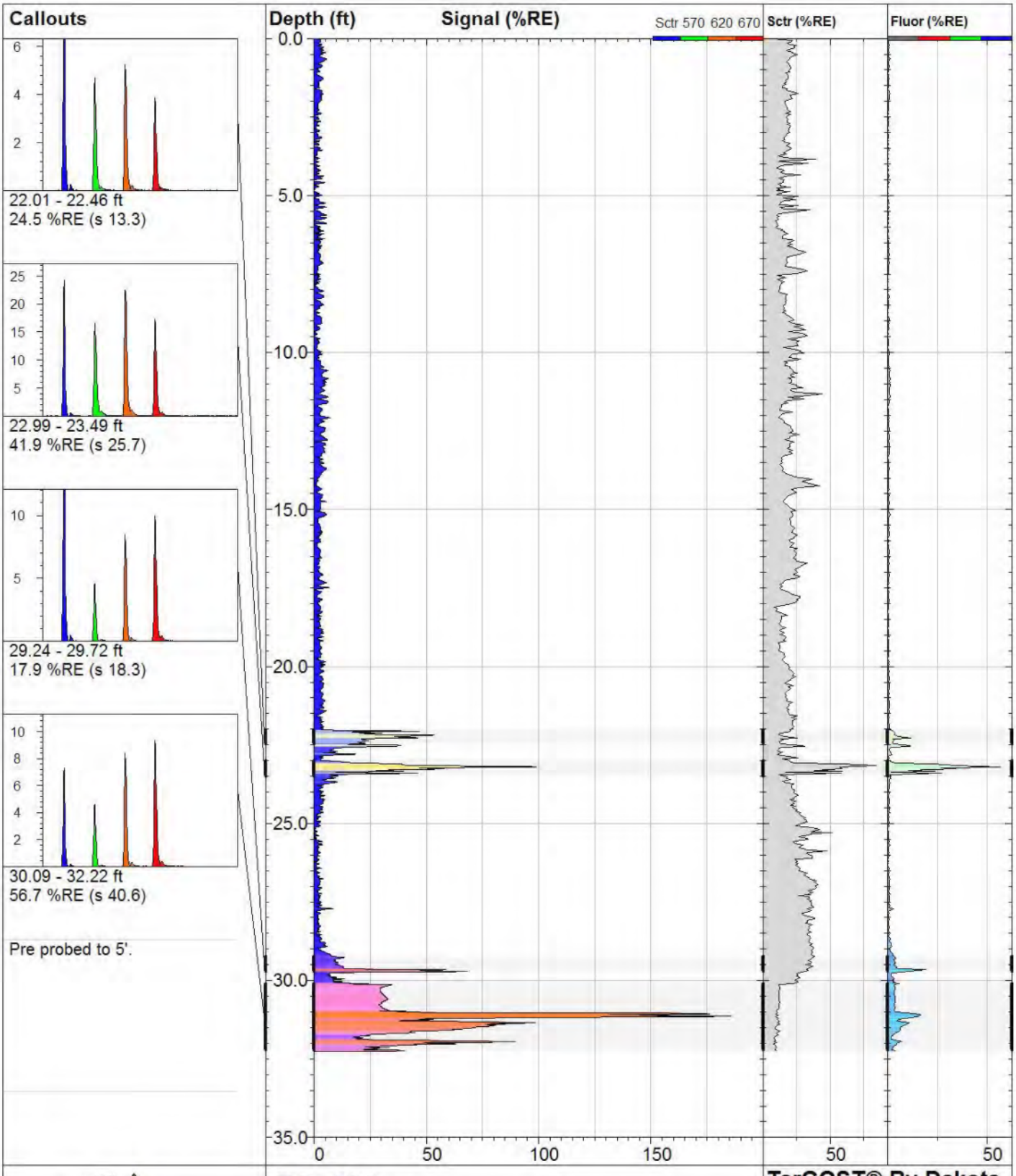
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.10 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **93.7 %RE @ 24.01 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-12 13:32 EDT**



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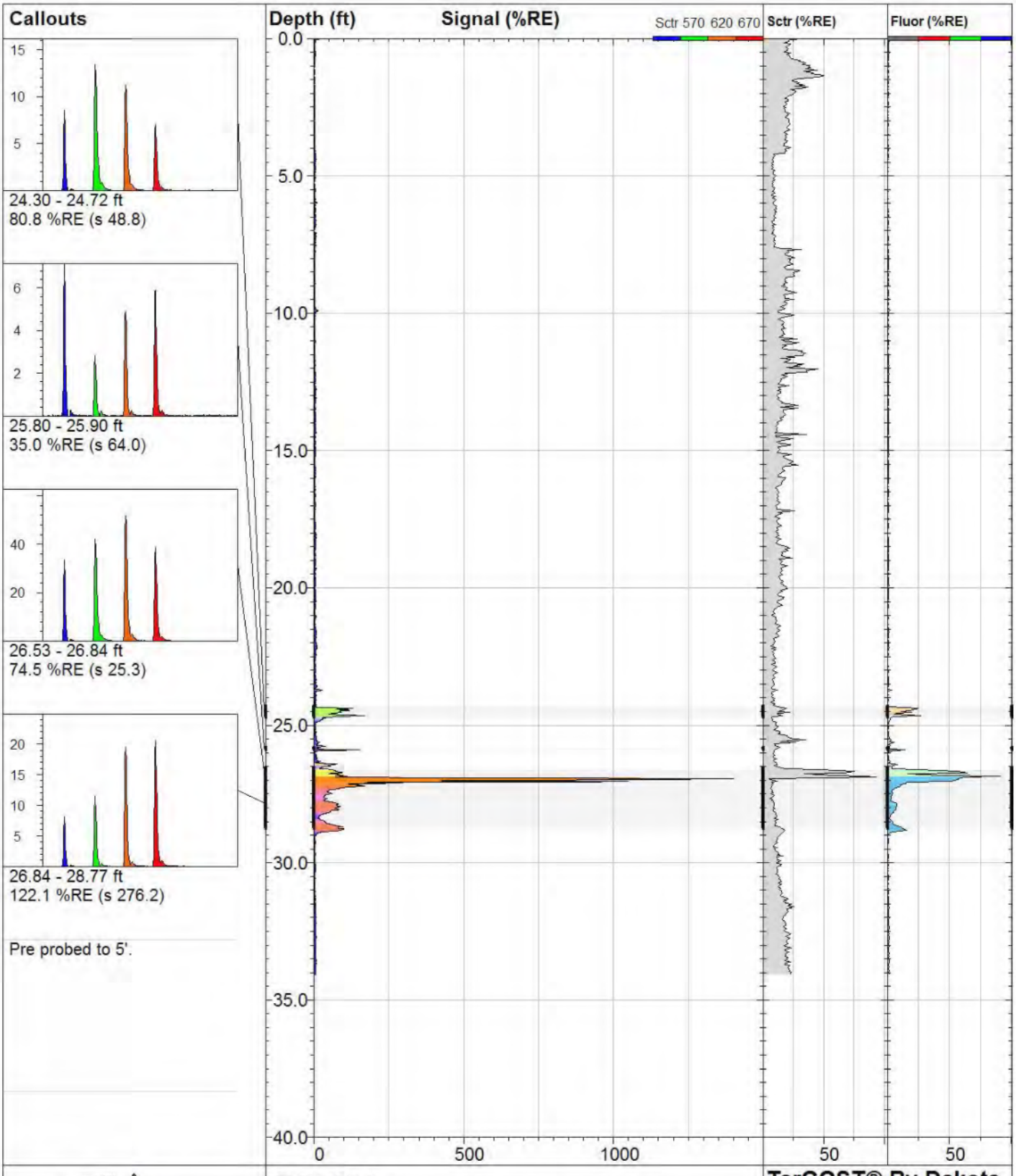
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **32.26 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **186.7 %RE @ 31.14 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-12 16:03 EDT**



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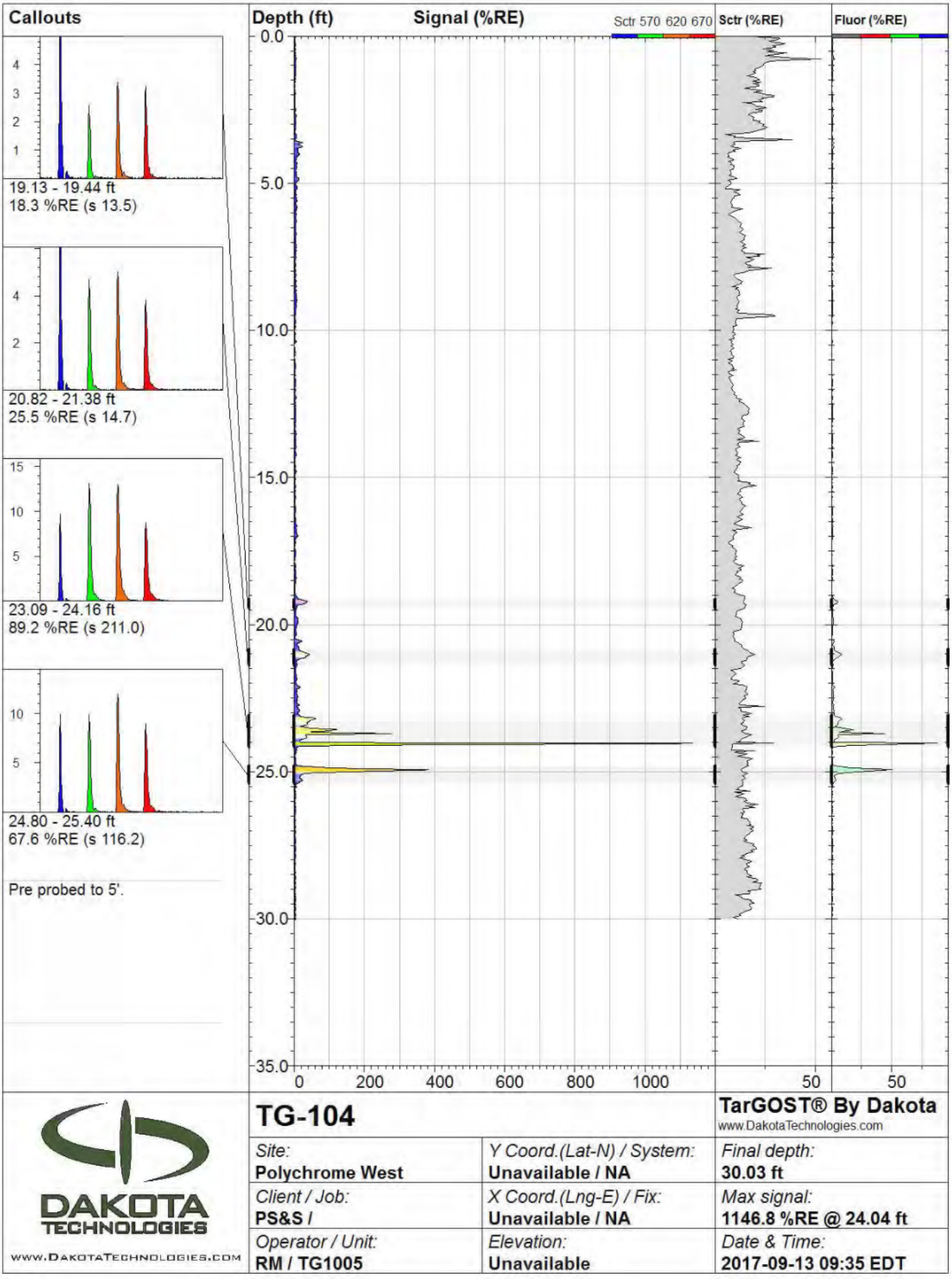
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **34.06 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **1427.0 %RE @ 26.95 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-13 08:34 EDT**



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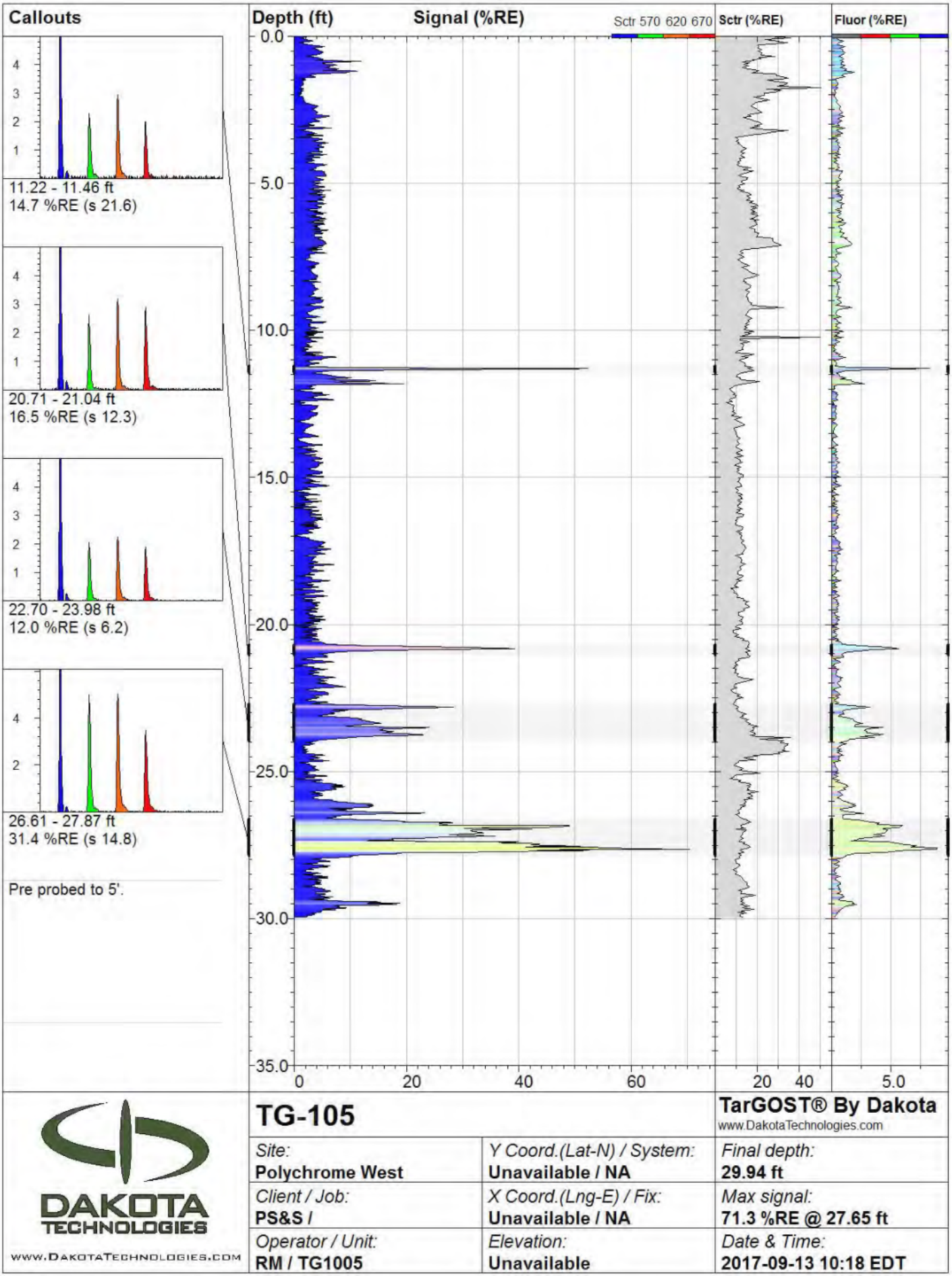
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.03 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **1146.8 %RE @ 24.04 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-13 09:35 EDT**



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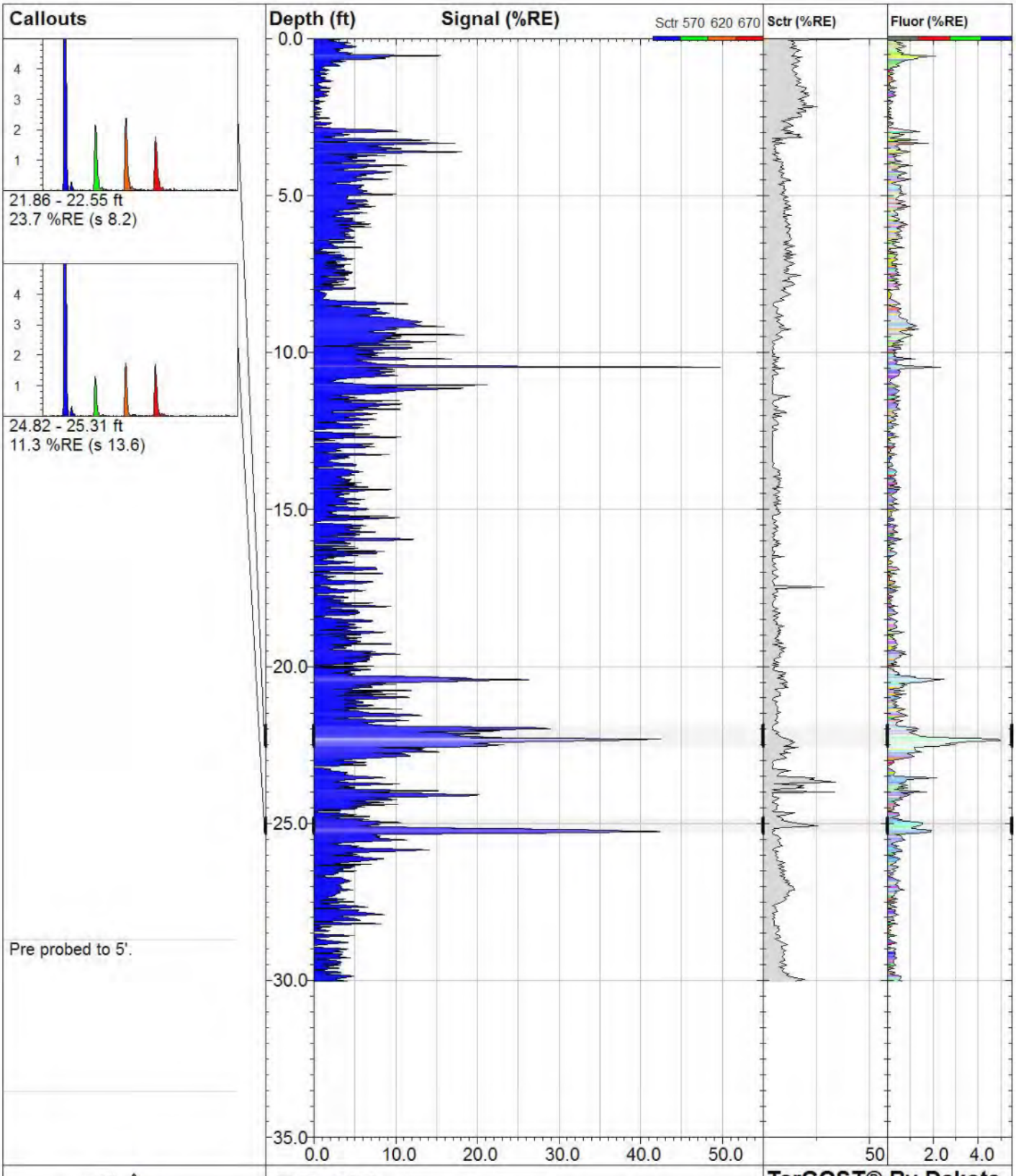
Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **29.94 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **71.3 %RE @ 27.65 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-13 10:18 EDT**



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Site: **Polychrome West**	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:* **30.03 ft**
Client / Job: **PS&S /**	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **52.3 %RE @ 10.47 ft**
Operator / Unit: **RM / TG1005**	*Elevation:* **Unavailable**	*Date & Time:* **2017-09-13 12:20 EDT**