Antea USA, Inc.
5910 Rice Creek Parkway, Suite 100
St. Paul, MN 55126 USA

MEMORANDUM

TO: Mr. John Hunt, Hydrogeologist
Wisconsin Department of Natural Resources

FROM: Antea®Group

DATE: September 1, 2022

SUBJECT: **Former Amoco Terminal (Superior, WI) – Supplemental Investigative and Sampling Work Plan**
BRRTS #02-16-000331, #02-16-117873, #02-16-297979

C: Ms. Erin Endsley, WDNR

Dear Mr. Hunt,

At our meeting held July 6, 2022 at the WDNR office in Eau Claire, Wisconsin a fair amount of discussion was focused on approaches to better define and update the LNAPL Conceptual Site Model (CSM). Specifically, the consensus of the group was that the following field investigations/data collection activities would be helpful to assess the current light non-aqueous phase liquid (LNAPL) conditions and demonstrate how conditions have changed since the previous investigations:

1. If LNAPL is present, collect LNAPL from wells previously sampled
2. Replicate and expand Laser-Induced Fluorescence (LIF) investigation
3. Replicate soil sampling at previous soil boring locations TPH-1 through TPH-10

<u>Collect LNAPL Samples</u>

The collection and chromatographic analysis of LNAPL has proven very beneficial in distinguishing product vintage and defining and refining the extent of each Area of Concern at the Terminal and at properties north of Winter Street. The analysis of the initial LNAPL samples in the 1990s was based on a limited quantification of hydrocarbons, but also on the experience of scientists in Amoco's Technical Group. Subsequently, LNAPL samples collected in 2001 and later had the advantage of a much more extensive hydrocarbon quantification (up to 89 peaks) that allowed for application of techniques for distinguishing refining processes, product vintage, age-dating, weathering, and degradation.

The monitor and recovery wells proposed for the collection of LNAPL samples are shown in the table below. Recovery wells RW-2 and RW-6 were sealed as a result of the development at FedEx on the former Terminal Property. Monitor well MWOW-5 does not typically contain sufficient LNAPL to sample.

Former Amoco Terminal 00406 (Superior, WI)						
Proposed Monitor Wells for LNAPL Sample Collection						
Well	Last Gauged	Product Thickness (feet)	LNAPL Sampled?	Lab?	Affected by C. Reiss Coal?	Accessible?
MW-27	07/16/19	1.62	07/26/19	Pace Energy		Yes
RW-2	10/03/13	0.81	04/30/04	Torkelson		Sealed
RW-4	07/16/19	2.39	04/30/04	Torkelson		Yes
RW-6	07/16/19	1.39	04/30/04	Torkelson		Sealed
MW-32	10/08/19	2.24	04/30/04	Torkelson		Yes
LRMW-4	10/26/17	5.16	05/07/15	Torkelson		Yes
LRMW-5	05/28/19	3.61	03/01/01	Torkelson		Yes
LRMW-11	10/08/19	0.27	04/23/15	Torkelson		Yes
MWAST-2	10/08/19	5.69				Yes
MWAST-4	10/29/19	1.37	10/21/02	Torkelson	Yes	Yes
MWAST-6	10/08/19	0.46	04/27/15	Torkelson		Yes
MWOW-1	10/08/19	0.15	06/23/14	Torkelson		Yes
MWOW-5	10/08/19	0.02	06/23/14	Torkelson		Possibly
MRW-3	10/29/19	8.48	02/12/14	Torkelson		Yes
MRW-5	10/29/19	0.29	02/12/14	Torkelson	Yes	Yes

LNAPL samples that lent themselves to a more quantitative analysis were collected in 2001, 2002, 2003, 2004, 2006, and 2014. The most recent LNAPL samples were collected in 2015 and for many of those monitor wells that has been the only LNAPL sampling to date. Accordingly, the focus and objective of the LNAPL sampling being conducted in 2022 is to collect a comprehensive, synchronous round of LNAPL samples from monitor or recovery wells where prior quantitative laboratory analysis was performed.

A sample of LNAPL that accumulated in a monitor well (MW-24) was collected for the first time in 1994. Characterization of the LNAPL was focused on identifying the product type, which was reported as a low-grade gasoline or naphtha, with relatively low proportions of iso-octane and aromatics, but a high proportion of methylcyclohexane (Lyle Bruce, Amoco; memorandum; January 23, 1995).

In 1995, LNAPL samples were collected from 16 monitor and recovery wells for chromatographic analysis (GC Scan) and Lead (Pb) analysis. Actual chromatogram data are not available, but an interpretation of the results assigned the LNAPL collected from each monitor or recovery well to one of three product types (Lyle Bruce and T. J. Nagengast, Amoco; memorandum; May 26, 1995):

A. Naphtha or low-grade gasoline, relatively undegraded

B. A bimodal mixture dominated by mid-grade to possibly premium-grade gasoline with a subordinate amount of diesel fuel or No. 2 fuel oil,
C. A nearly equal bimodal mixture, slightly dominated by kerosene-range product and a somewhat subordinate naphtha-range product

LNAPL samples will be collected from each of the monitor or recovery wells cited in the table above. Following standard protocol, one to two 40-milliliter vials will be filled with LNAPL from each sampling location. The LNAPL samples need no preservative but will be shipped, under chain-of-custody, in new metal "paint" overpack cans filled with vermiculite to comply with shipping regulations for hazardous materials. The LNAPL samples will be shipped to Accurate Environmental Laboratories (Tulsa, Oklahoma) for Hydrocarbon Characterization (Chromatogram), Density, and Viscosity analyses.

Accurate Environmental Laboratories is the successor to Torkelson Geochemistry and runs the same analyses as Torkelson Geochemistry provided for over 20 years, though instead of quantifying 89 peaks, Accurate Environmental Laboratories quantifies 88 peaks. The peak that is not quantified by Accurate Environmental Laboratories is tert-amyl methyl ether (TAME). TAME has never been detected in any of the previously submitted and analyzed LNAPL samples from the former Amoco Terminal.

LIF Investigation

Aromatic and polyaromatic hydrocarbons, such as benzene or benzo(a)pyrene, fluoresce under ultraviolet (UV) light. Particular wavelengths of UV light activate a varying fluorescence response in monoaromatic and polyaromatic hydrocarbons. For instance, a 254-nanometer (nM) wavelength as the UV light source induces the strongest response in monoaromatic hydrocarbons, such as benzene, toluene, ethylbenzene and xylene. The polyaromatic hydrocarbons, such as benzo(a)pyene, are more responsive to a somewhat longer wavelength of about 368 nM.

Cone-penetrometer testing (CPT) rigs and direct-push drilling machines (such as Geoprobe®) have been outfitted with downhole probes that emit a UV light at a particular wavelength into the surrounding soil. Then, other sensors in the same drill string detect the and log the magnitude and wavelength of response. The UV response is usually logged every 2 to 2.5 centimeters for the entire depth of the borehole. This provides a continuous record of UV response which is related to the presence of petroleum, and in particular aromatic and polyaromatic hydrocarbons.

The earliest application of downhole UV technology at the former Amoco terminal site was performed by Stratigraphics (Glen Ellyn, IL). Using a 30-ton CPT rig, Stratigraphics completed 28 downhole UV probes ranging in depth from 24.2 feet below ground surface (bgs) to 86.8 feet bgs, for a total footage of 1115.4 feet. Stratigraphics used a mercury bulb UV source that produced a UV beam with a wavelength of 254 nM. The Stratigraphics investigation provided the first evidence to define the lateral <u>and</u> vertical extent of petroleum impact, and provided the CPT provided the first indications that the unexpectedly complex hydrostratigraphy may be a prime factor in determining the distribution and migration of the LNAPL.

As noted earlier, the UV investigation with a wavelength of 254 nM was optimized to detect monoaromatic hydrocarbons. To ensure that both monoaromatic and polyaromatic hydrocarbons responded to the UV light, the next three LIF investigations were performed by Fugro Geosciences (Houston, Texas) uses the Rapid Optical

Screening Tool (ROST) with an adsorption wavelength of 290 nM. Fugro Geosciences conducted combined CPT/ROST investigations at the former Amoco Terminal in 2004, 2006 and 2009.

In 2004, Fugro completed 26 combined CPT/ROST (LIF-01 through LIF-26) with a total drilled footage of 620.28 feet. Because Fugro Geosciences uses a laser source with a UV wavelength of 290 nM, it induces responses from both monoaromatic and polyaromatic hydrocarbons. In addition, the ROST system incudes sensors to detect emission wavelengths (responses) at 340 nM, 390, nM, 440 nM and 490 nM. The emission responses from the aromatic hydrocarbons are detected and quantified for each of the wavelengths cited earlier, and they are displayed as a composite relative response (RE%) in the visual colorized graph of RE% vs. Depth. The most notable finding of the LIF investigation in 2004 was defining the extent of the "Finger Plume".

The CPT/LIF investigation conducted in 2006 consisted of 29 CPT/LIF borings and 25 CPT borings (M-1 through M-6 plus M-8; OW-01 through OW-04; RR-01 through RR-07; T-01 through T-06; T-08, and T-09). The CPT/LIF borings were designated M-13, M-14, M-16, M-18, M-20 to M-24, M-26, M-28, M-29, T-14 to T-17, T-21A, T-23, T-28, T-29, T-33 to T-35, T-37 to T-39, T-41 – T-43, and T-45. Total footage the CPT/LIF borings was 1,333.95 feet. The CPT/LIF investigation from 2006 provided further definition of the LNAPL occurrences at and around the former manifold on the Barge Dock property and further confirmation that thickening surficial clay, as well as undulations in the clay/sand contact, can influence the distribution of LNAPL in the subsurface.

The most recent CPT/LIF investigation, conducted in 2009 by Fugro Geosciences, consisted of 28 CPT/LIF borings (LIF-27 through LIF-53). The northernmost CPT/LIF point (LIF-27) was advanced north of monitor well MWOW-1 and east of LIF-17 to confirm that residual petroleum found at the oil-water separator and monitor well MWOW-1 had not migrated down the topographic slope and settled at the base of the hill. Additional CPT/LIF points were advanced in southerly direction along the narrow Barge Dock property to further define or constrain what would become AOC 12, AOC 11, AOC-10, and AOC 9. The remainder of the CPT/LIF borings were advanced in the northeast portion of the former Terminal to further define and refine the extents of what would become AOC 1, AOC 2, AOC 4, and AOC 5.

More than any other investigative technique utilized to date at the site, the combination of CPT and LIF has advanced the development of the Conceptual Site Model both in terms of detailed hydrostratigraphy and delineation of the lateral and vertical distribution of LNAPL.

The subsurface investigation proposed for 2022 is designed to assess how the LIF response has changed 13 years or more since Fugro Geosciences advanced the previous 83 CPT/LIF borings. Because the object of this investigation is to assess the LIF response as previously drilled locations, there is no need to couple LIF with CPT. Accordingly, it is planned that the LIF investigation will be conducted by Dakota Technologies (New Hope, MN).

The LIF system used by Fugro Geosciences is called ROST, while the LIF system used by Dakota Technologies is called UVOST. Dakota Technologies developed both systems, and UVOST can be thought of as the successor to ROST. ROST and UVOST differ slightly as far as the excitation wavelength and the emission wavelengths logged by the probing tool. For the ROST the excitation wavelength, as cited previously, is 290 nM while for the UVOST system the excitation wavelength is 308 nM. A higher emission wavelength has several advantages over a lower emission wavelength including (Kram, Keller, Massick and Laverman; 2004)[1]:

1. Shorter wavelengths (higher energy) radiation may lead to variability in the ratio of photons absorbed to photons emitted through fluorescence (fluorescence yield), and
2. Signal loss is more pronounced for shorter wavelength excitation sources, and
3. Solarization damage to the silica fiber occurs when exposed to the relatively high energy, low wavelength (generally less than 290 nM) sources

The ROST and UVOST systems also differ in the four emission wavelengths monitored. For ROST the emission wavelengths monitored and quantified are 340 nM, 390 nM, 440 nM and 490 nM. For UVOST the monitored emission wavelengths are 350 nM, 400 nM, 450 nM and 500 nM. This a relatively minor difference but may produce a slightly higher response from the polyaromatic hydrocarbons with multiple benzene rings.

The attached figure from Dakota Technologies compares the ROST and UVOST response for Gas, Diesel and Kerosene at the emission wavelengths of 350 nM, 400 nM, 450 nM and 500 nM. In actual practice, the response (%RE) is similar for each of petroleum products tested, though the UVOST system produces a higher %RE for Gas. For both ROST and UVOST, only the aromatic and polyaromatic hydrocarbons fluoresce when exposed to ultraviolet light. Polyaromatic hydrocarbons fluoresce more intensely than monoaromatic hydrocarbons, which for Gas means the response to UVOST or ROST is predominantly from naphthalene. In addition to excitation wavelength, Kram and Keller (2004)[2] found that soil type and water saturation affect the fluorescence emission, suggesting that fluctuations in the water table and lateral variation in soil grain size will also affect the magnitude and emission wavelength of the response.

A table of the proposed LIF locations is shown below. The table includes longitude and latitude coordinates so that new LIF boring may be located in the field at the specific locations necessary to assess the commingling of Areas of Concern (AOCs) at the Terminal or reoccupy previous LIF locations to evaluate the subsurface conditions and product characteristics more than a decade after the last LIF investigation was conducted. The planned completion depth of each LIF boring is based on the previous LIF boring completed at the same location and prior knowledge of the depth of LIF response. Finally, for field or map-reading location purposes, two features located near the proposed LIF boring location are cited. Locations of proposed LIF borings at the Terminal are depicted in Figure 1, proposed LIF borings on the Barge Dock Property are depicted in Figure 2.

The proposed LIF borings at the Finger Plume and the Barge Dock Property are located near LIF borings drilled during one of the earlier CPT/LIF investigations. As stated earlier, the purpose of drilling new LIF borings near previously drilled locations is assess the change in subsurface LNAPL based on the change in the LIF response.

---

[1] Kram, Keller, Massick and Laverman (2004) *Complex NAPL Site Characterization Using Fluorescence Part 1: Selection of Excitation Wavelength Based on NAPL Composition*; Soil & Sediment Contamination, Vol. 13, pp. 103 - 118

[2] Kram and Keller (2004) *Complex NAPL Site Characterization Using Fluorescence Part 2: Analysis of Soil Matrix Effects on the Excitation/Emission Matrix*; Soil & Sediment Contamination, Vol. 13, pp. 119 - 134

The proposed LIF borings associated with the Terminal are designed to refine the boundaries between AOC 4 and AOC 3 (LIF-54), and AOC 3 and AOC 2 (LIF-55). In addition, LIF-56 and LIF-57, located near the northern terminus of AOC 2, are positioned to provide better definition of the areal extent of AOC 2.

	Proposed LIF Locations					
	Location	Longitude	Latitude	Depth (feet)	Nearby No. 1	Nearby No. 2
Terminal	LIF-54	-92.121085	46.726988	30	RW-2	
	LIF-55	-92.120997	46.727450	30	EW-5	
	LIF-56	-92.121761	46.728577	30	T-4	RW-9
	LIF-57	-92.121647	46.728721	30	RW-8	MW-30DDD
Finger Plume	LIF-58	-92.122797	46.729943	30	LIF-13	MWM-6
	LIF-59	-92.122306	46.730191	30	LIF-11	MRW-8
	LIF-60	-92.121918	46.730325	30	LIF-7	MRW-8
	LIF-61	-92.121529	46.730489	30	LIF-5	MRW-6
	LIF-62	-92.121097	46.730658	30	LIF-3	MRW-6
Barge Dock Property	LIF-63	-92.120276	46.730384	30	M-24	MWAST-6
	LIF-64	-92.120289	46.731063	30	M-22	LRMW-8
	LIF-65	-92.120390	46.731770	40	M-28	LRMW-10
	LIF-66	-92.120243	46.731957	30	LIF-34	LRMW-10
	LIF-67	-92.120504	46.732036	30	LIF-32	LRMW-11
	LIF-68	-92.120447	46.732177	30	LIF-31	LRMW-11
	LIF-69	-92.120401	46.733016	30	LIF-20	MWRR-4
	LIF-70	-92.120421	46.733313	30	LIF-30	MWRR-2
	LIF-71	-92.120303	46.734107	30	LIF-52	MWOW-5

Images of the nearby LIF soundings are included in this memorandum for reference. Stratigraphics drilled T-4, which as noted earlier used a mercury bulb to produce an ultraviolet wavelength of 254 nM. Consequently, it has different appearance and response than the LIF soundings but still detects LNAPL in the surface and is comparable to LIF for identifying the LNAPL and its vertical extent.

The level of effort to complete the LIF investigation described above is 3 days. The presence of utilities or other obstructions will be checked prior to conducting any subsurface investigation and proposed drilling locations will be cleared by hand auger or other non-percussive means. Field results may be compared to previous LIF response soundings as the investigation is being conducted.

TPH Soil Sampling

As part of the estimation of the volume of LNAPL contained in each AOC, starting with the semi-annual report for 2014 (Antea Group, 2015)[3], a method presented by Parker and others (1996)[4] involves the collection of at least three soils that span the LNAPL smear zone in the subsurface. The soil samples are then analyzed for TPH-Gasoline, TPH-Diesel and TPH-Oil, or Total TPH. These data are then used to determine an oil-specific volume (feet) which represents the best estimate of the actual thickness of LNAPL in the subsurface. Because the units of oil-specific volume are feet, they may then be used in the estimate of LNAPL volume over a specified area, such as one of the AOCs.

As part of the reassessment of LNAPL conditions, the ten TPH soil boring locations drilled in 2014 will be reoccupied. Soil boring locations are shown in Figures 1 and 2, and the soil boring designations are the same as in 2014 with the addition of the letter "A". The number of soil samples collected and the sampling intervals will be same as was the case in 2014. A table of proposed TPH soil boring locations, with longitude, latitude, and sampling intervals specified appears below.

	Proposed TPH Soil Sampling Locations																		
					Soil Sampling Intervals (feet bgs)														
	Location	Longitude	Latitude	Depth (feet)	12.0 to 13.0	13.0 to 14.0	14.0 to 15.0	15.0 to 16.0	16.0 to 17.0	17.0 to 18.0	18.0 to 19.0	19.0 to 20.0	20.0 to 21.0	21.0 to 22.0	22.0 to 23.0	23.0 to 24.0	24.0 to 25.0	25.0 to 26.0	26.0 to 27.0
Terminal	TPH-4A	-92.122403	46.727884	19					X	X	X								
	TPH-5A	-92.122673	46.727853	22				X		X	X	X	X	X					
	TPH-6A	-92.121294	46.726712	22				X		X	X	X	X						
	TPH-7A	-92.121462	46.727717	25							X	X	X	X	X	X	X		
Finger Plume	TPH-1A	-92.121151	46.730643	21						X	X	X	X						
	TPH-2A	-92.121520	46.730519	23								X	X	X					
Barge Dock Property	TPH-3A	-92.120458	46.733337	19	X	X	X	X	X	X									
	TPH-8A	-92.120280	46.731100	23							X	X	X	X	X				
	TPH-9A	-92.120270	46.730420	21						X	X	X	X						
	TPH-10A	-92.120390	46.731770	27										X	X	X	X	X	X

It is anticipated that the borehole advancement and TPH soil sampling will require 3 – 4 days of field time. The presence of utilities or other obstructions will be cleared prior to conducting any subsurface investigation. Soil samples will be submitted to Pace Laboratories, on ice, under chain-of-custody, and in a durable and secure cooler.

Antea Group proposes to complete the work during the week of September 26 and requests a conference call with WDNR during the week of September 12 following your review of this document to discuss the proposed scope, answer any questions you may have regarding the technology used during the previous and proposed LIF investigations, and confirm the proposed technology will meet mutual assessment goals. Please do not hesitate to contact Antea Group if you have any questions regarding this work plan.

[3] Antea Group (14 January 2015) *2014 Progress Report: July – December 2014, former Amoco Terminal, 2904 Winter Street, Superior, Wisconsin*
[4] Parker, Waddill and Johnson (1996) *UST Corrective Action Technologies: Engineering Design of Free Product Recovery Systems*: USEPA Publication EPA/600/R-96/031

Sincerely,

Date: September 1, 2022

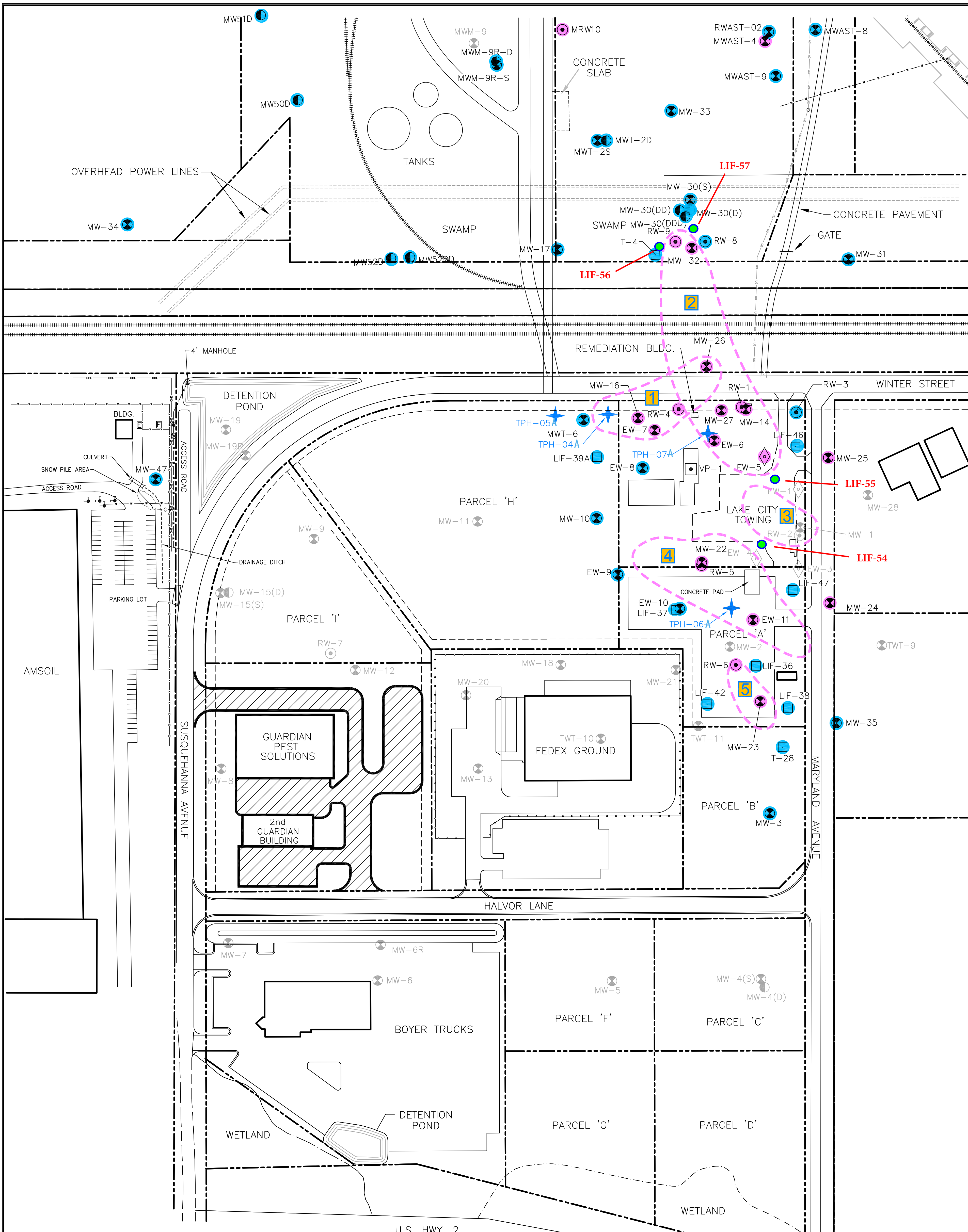
Layne Kortbein
Project Manager

Date: September 1, 2022

Wayne Hutchinson, PG, PH, CGWP
Senior Hydrogeologist

Date: September 1, 2022

Jonathan Zimdars
Consultant



LEGEND:

- MONITORING WELL LOCATION
- ABANDONED MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATIONS
- ABANDONED DEEP MONITORING WELL LOCATION
- RECOVERY WELL LOCATION
- ABANDONED RECOVERY WELL LOCATION
- SVE TOTAL FLUIDS RECOVERY WELL LOCATION
- ABANDONED SVE TOTAL FLUIDS RECOVERY WELL LOCATION
- LIF-TPH BORING LOCATION
- CPT-LIF BORING LOCATION
- VAPOR MONITORING POINT LOCATION
- MANHOLE
- FIRE HYDRANT
- ELECTRICAL BOX
- NEW ROADS/PARKING LOTS
- OHE — OVERHEAD ELECTRIC LINE
- RAILROAD TRACKS
- FENCE LINE
- APPROXIMATE PROPERTY LINE
- AG — ABOVE GROUND PIPELINE (REMOVED)
- UG — UNDERGROUND PIPELINE (APPROXIMATE LOCATION, STATUS UNKNOWN)
- W — WATER LINE (APPROXIMATE LOCATION)
- G — NATURAL GAS LINE (APPROXIMATE LOCATION)
- 1 — LNAPL EXTENT (PLUME I.D. REFERENCED IN TEXT)
- POINTS WITH LNAPL
- LOW/NO LNAPL
- Proposed LIF location - 2022

NOTE:
PLUME 3 IS INFERRED, BASED ON HISTORICAL DATA

North

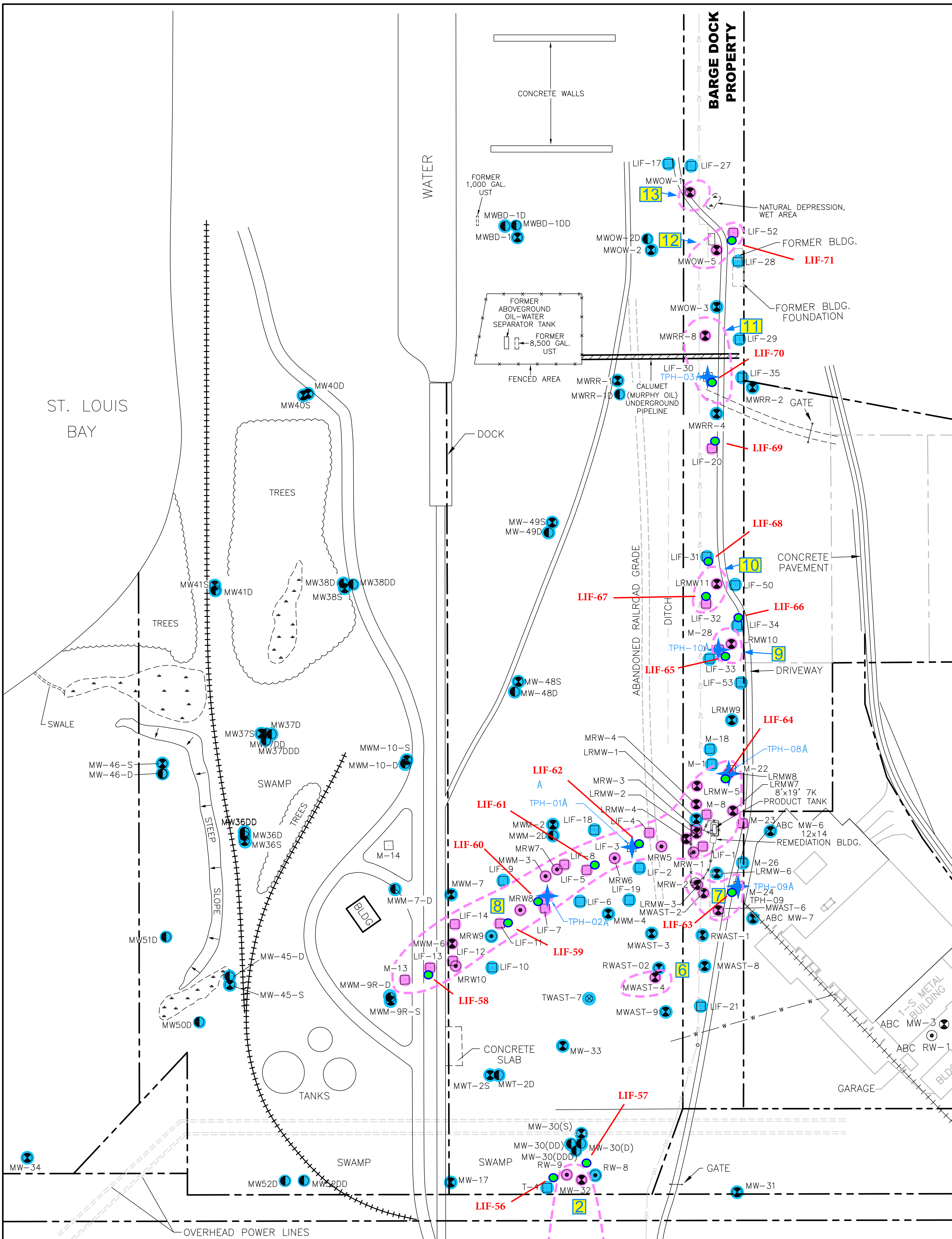
0 200
SCALE IN FEET

FIGURE 1
PROPOSED LIF AND TPH BORINGS
(TERMINAL)

FORMER AMOCO TERMINAL
SUPERIOR, WISCONSIN

PROJECT NO.	PREPARED BY	DRAWN BY
	WRH	
DATE	REVIEWED BY	FILE NAME
2022-08-17		

anteagroup



LEGEND:

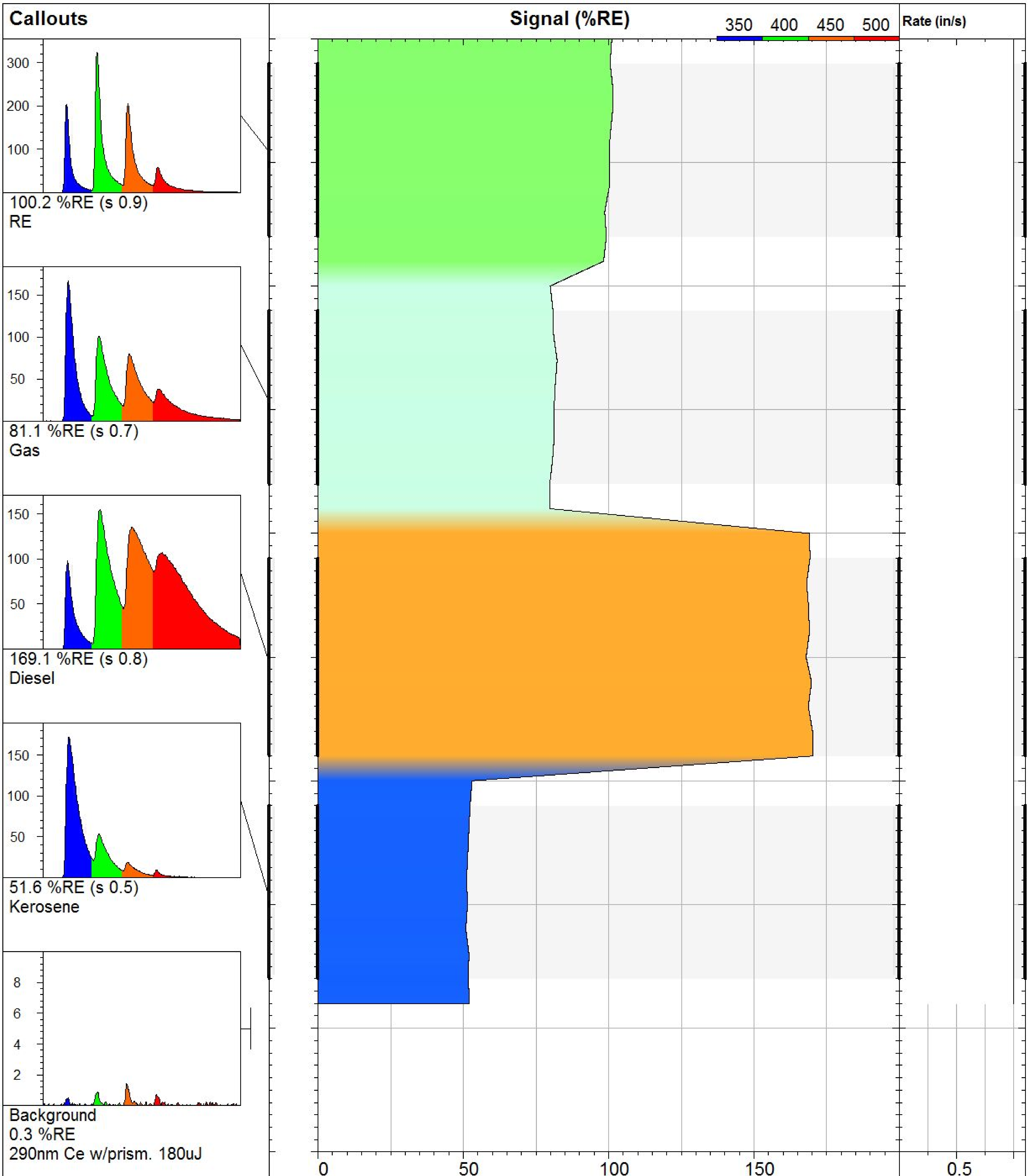
- MONITORING WELL LOCATION
- TEMPORARY MONITORING WELL LOCATION (REMOVED)
- DEEP MONITORING WELL LOCATIONS
- RECOVERY WELL LOCATION
- ABANDONED RECOVERY WELL LOCATION
- TPH BORING LOCATION
- SVE TOTAL FLUIDS RECOVERY WELL LOCATION
- CPT-LIF BORING LOCATION
- NATURAL DEPRESSION, WET AREA
- ABOVE GROUND PIPELINE (REMOVED)
- UNDERGROUND PIPELINE (APPROXIMATE LOCATION, STATUS UNKNOWN)
- CALUMET (MURPHY OIL) UNDERGROUND PIPELINE
- WATER LINE (APPROXIMATE LOCATION)
- GRAVEL ACCESS ROAD
- RAILROAD TRACKS
- FENCE LINE
- APPROXIMATE PROPERTY LINE
- 8 AREA OF CONCERN (AOC) NUMBER
- 8 LNAPL EXTENT (INFERRED FROM LIF & WELL GAUGING DATA) (PLUME I.D. REFERENCED IN TEXT)
- POINTS WITH LNAPL
- NO LNAPL
- Proposed LIF location - 2022

FIGURE 2
PROPOSED LIF AND TPH BORINGS
(BARGE DOCK)

FORMER AMOCO TERMINAL
SUPERIOR, WISCONSIN

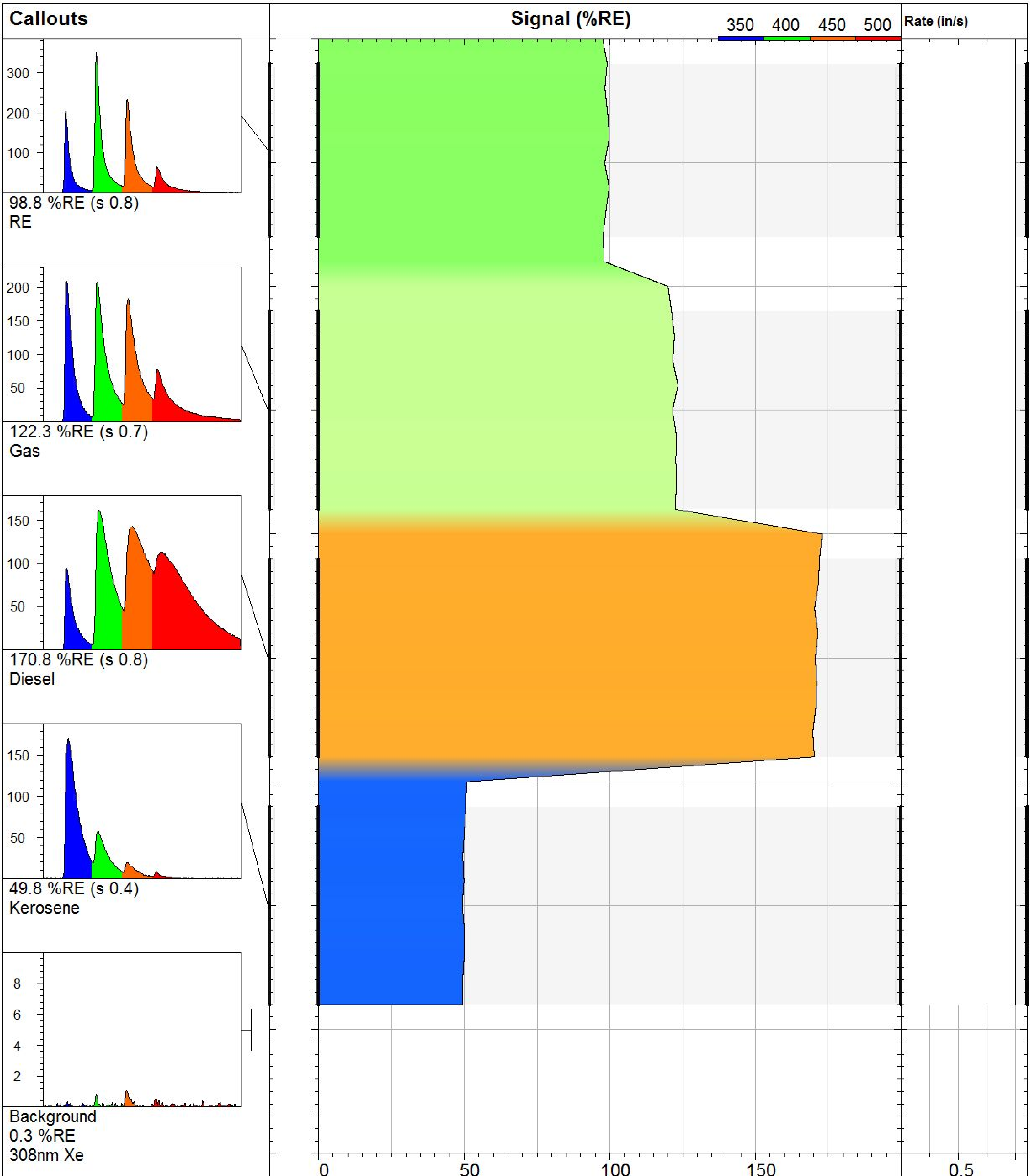
PROJECT NO.	PREPARED BY	DRAWN BY
	WRH	
DATE	REVIEWED BY	FILE NAME
2022-08-17		

anteagroup



290nm_01		UVOST By Dakota www.DakotaTechnologies.com
Site:	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:*
Client / Job: /	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **170.1 %RE**
Operator / Unit: **/ UVOST01**	*Elevation:* **Unavailable**	*Date & Time:* **2015-06-02 14:04 CDT**

DAKOTA TECHNOLOGIES
Fargo, ND 701.237.4908
www.DakotaTechnologies.com

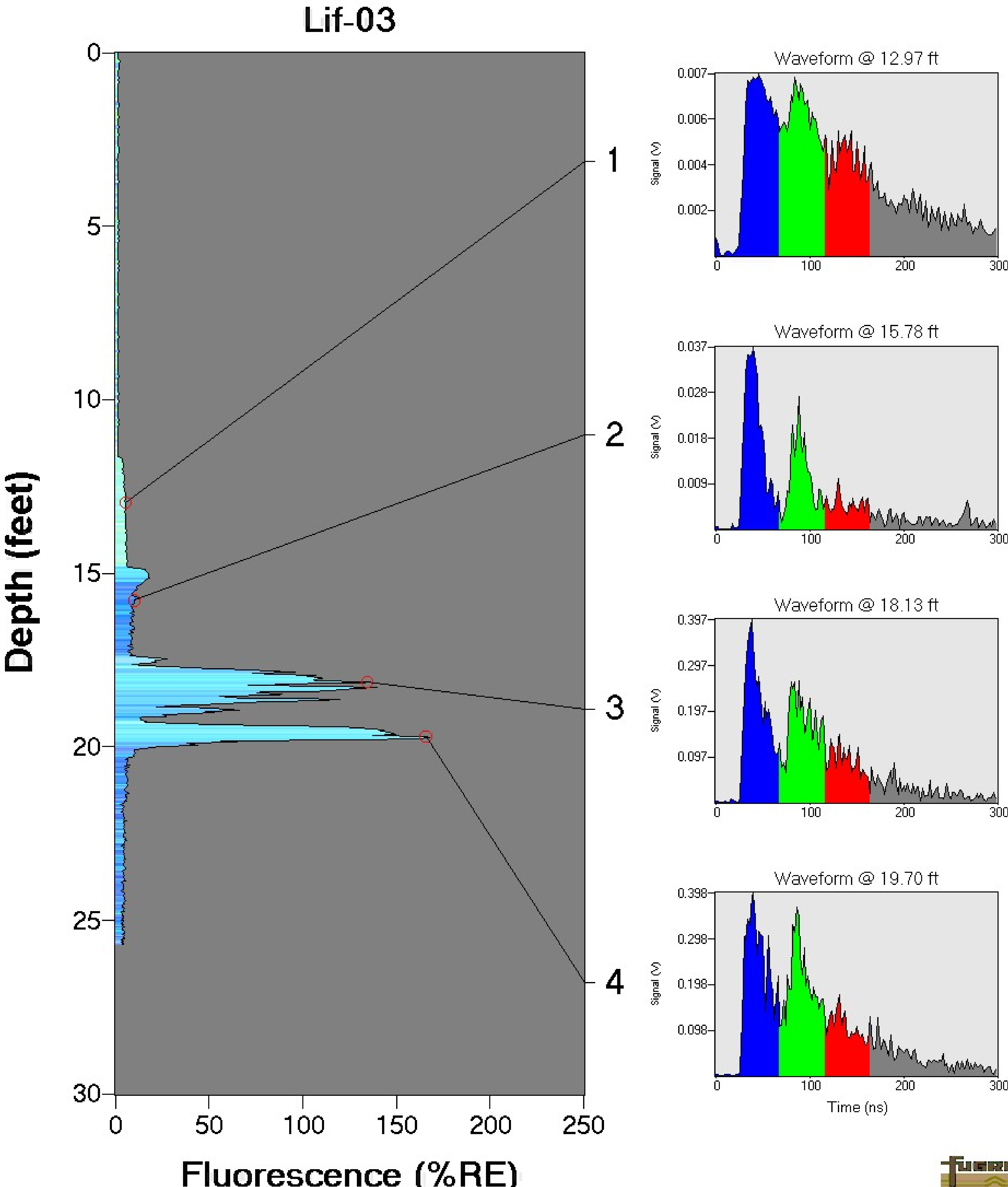


excimer 308nm_01		UVOST By Dakota www.DakotaTechnologies.com
Site:	*Y Coord.(Lat-N) / System:* **Unavailable / NA**	*Final depth:*
Client / Job: /	*X Coord.(Lng-E) / Fix:* **Unavailable / NA**	*Max signal:* **172.9 %RE**
Operator / Unit: **/ UVOST01**	*Elevation:* **Unavailable**	*Date & Time:* **2015-06-02 14:25 CDT**

DAKOTA TECHNOLOGIES
FARGO, ND 701.237.4908
WWW.DAKOTATECHNOLOGIES.COM

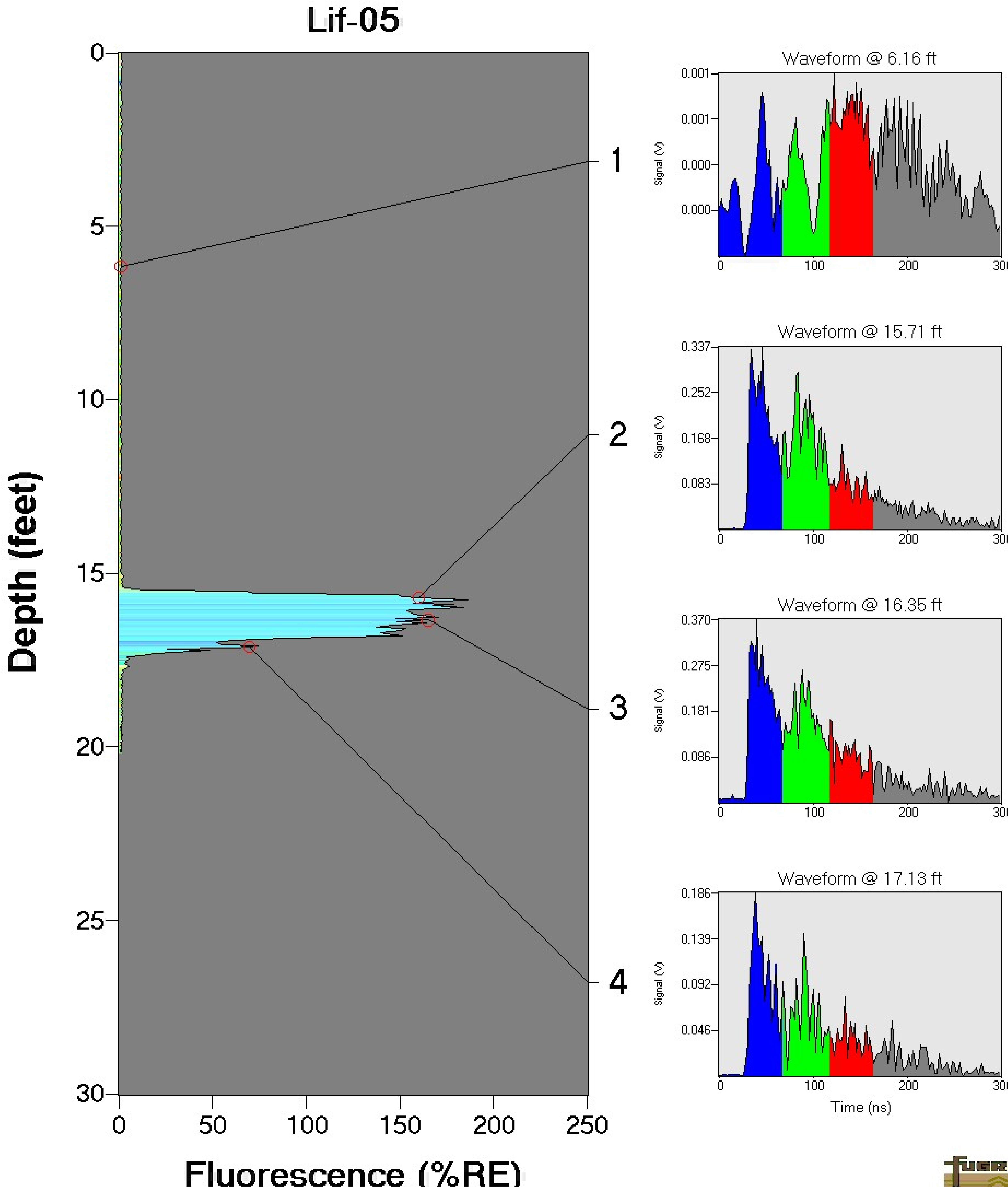
ROST Fluorescence Response Data

Site: SUPERIOR,WI.	Operator: GLENN
Client: DELTA	Fugro Job #: 0302-0605
Date/Time: 9/13/2004 @ 1:53:28 PM	Max fluorescence: 167.39% @ 19.73 ft
ROST Unit: 5	Final depth BGS: 25.70 ft



ROST Fluorescence Response Data

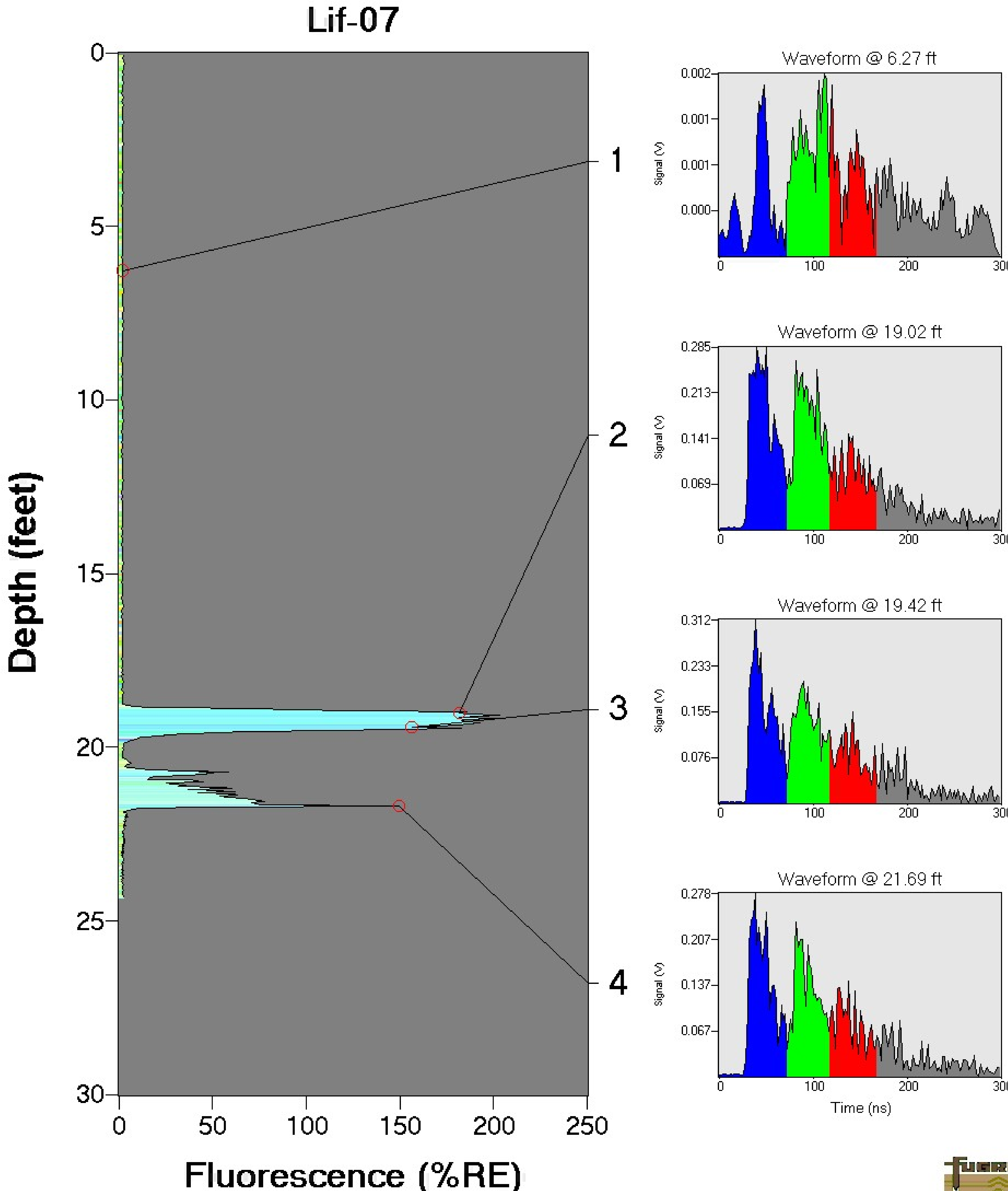
Site: SUPERIOR,WI.	Operator: GLENN
Client: DELTA	Fugro Job #: 0302-0605
Date/Time: 9/14/2004 @ 8:34:04 AM	Max fluorescence: 186.18% @ 15.76 ft
ROST Unit: 5	Final depth BGS: 20.19 ft



Fugro Geosciences, Inc., 6105 Rookin, Houston, TX 77074 (713) 346-4000 www.geo.fugro.com

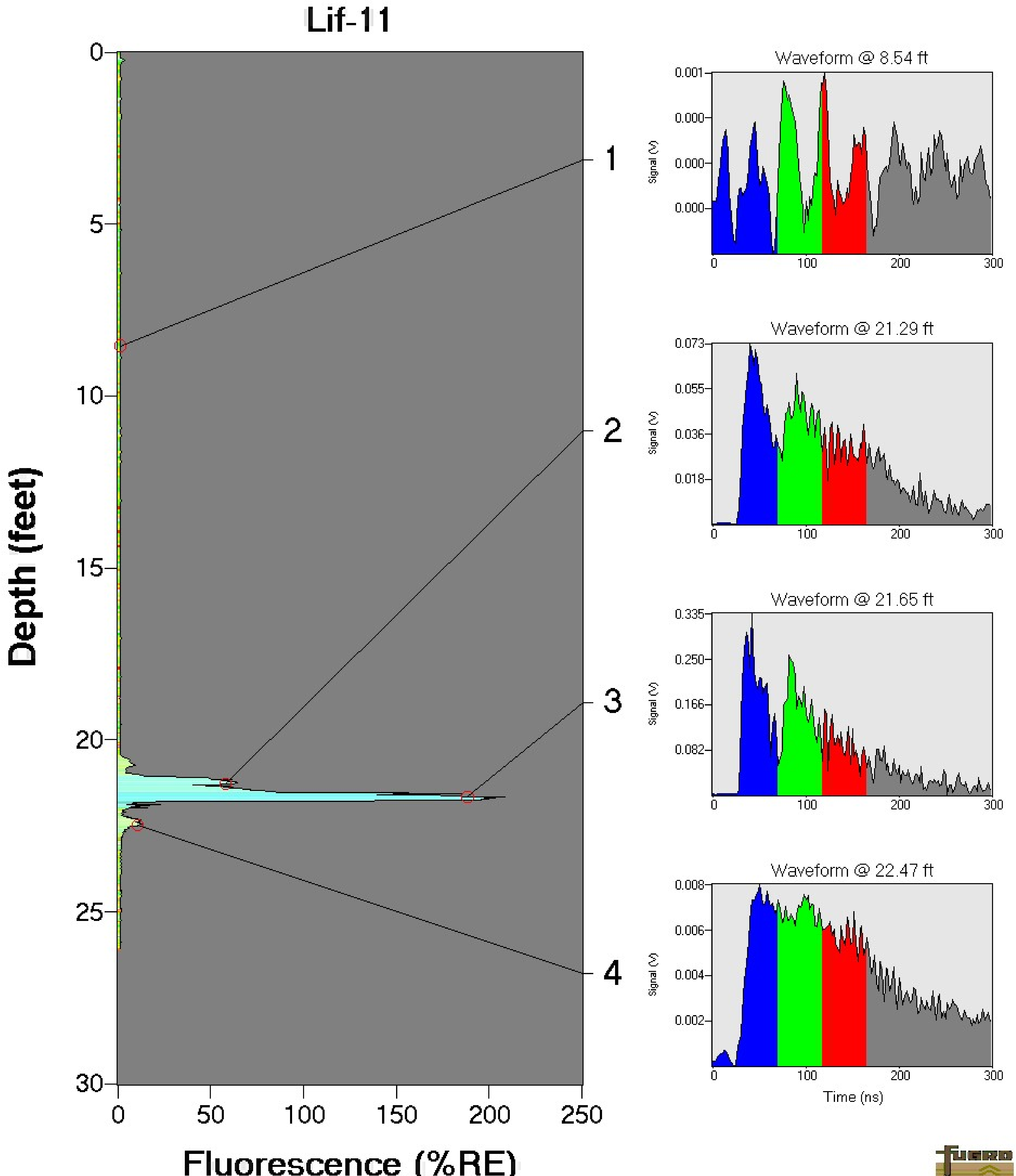
ROST Fluorescence Response Data

Site: SUPERIOR,WI.	Operator: GLENN
Client: DELTA	Fugro Job #: 0302-0605
Date/Time: 9/14/2004 @ 10:30:25 AM	Max fluorescence: 202.87% @ 19.09 ft
ROST Unit: 5	Final depth BGS: 24.35 ft



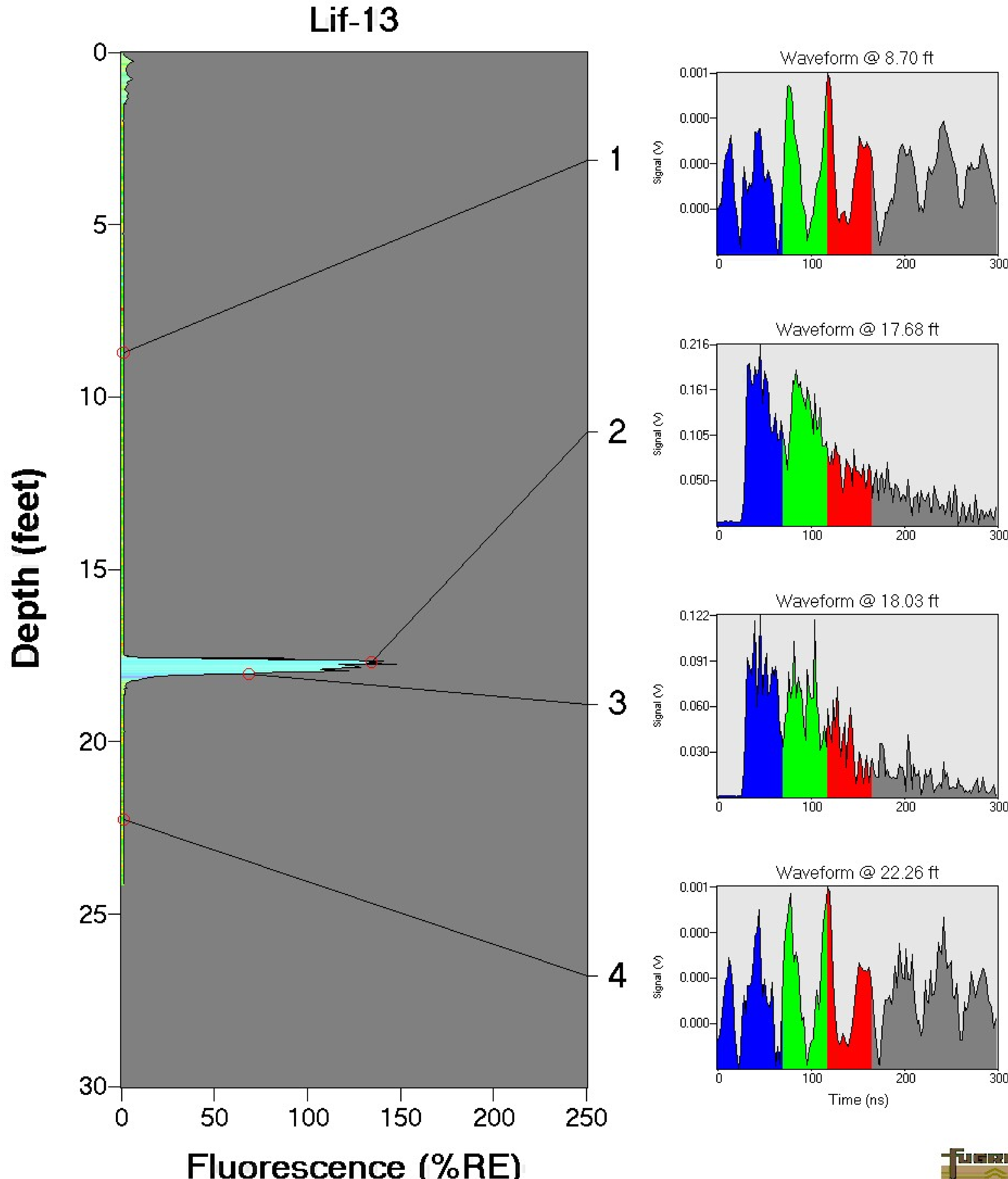
ROST Fluorescence Response Data

Site: SUPERIOR,WI.	Operator: GLENN
Client: DELTA	Fugro Job #: 0302-0605
Date/Time: 9/15/2004 @ 8:42:06 AM	Max fluorescence: 207.92% @ 21.67 ft
ROST Unit: 5	Final depth BGS: 26.10 ft



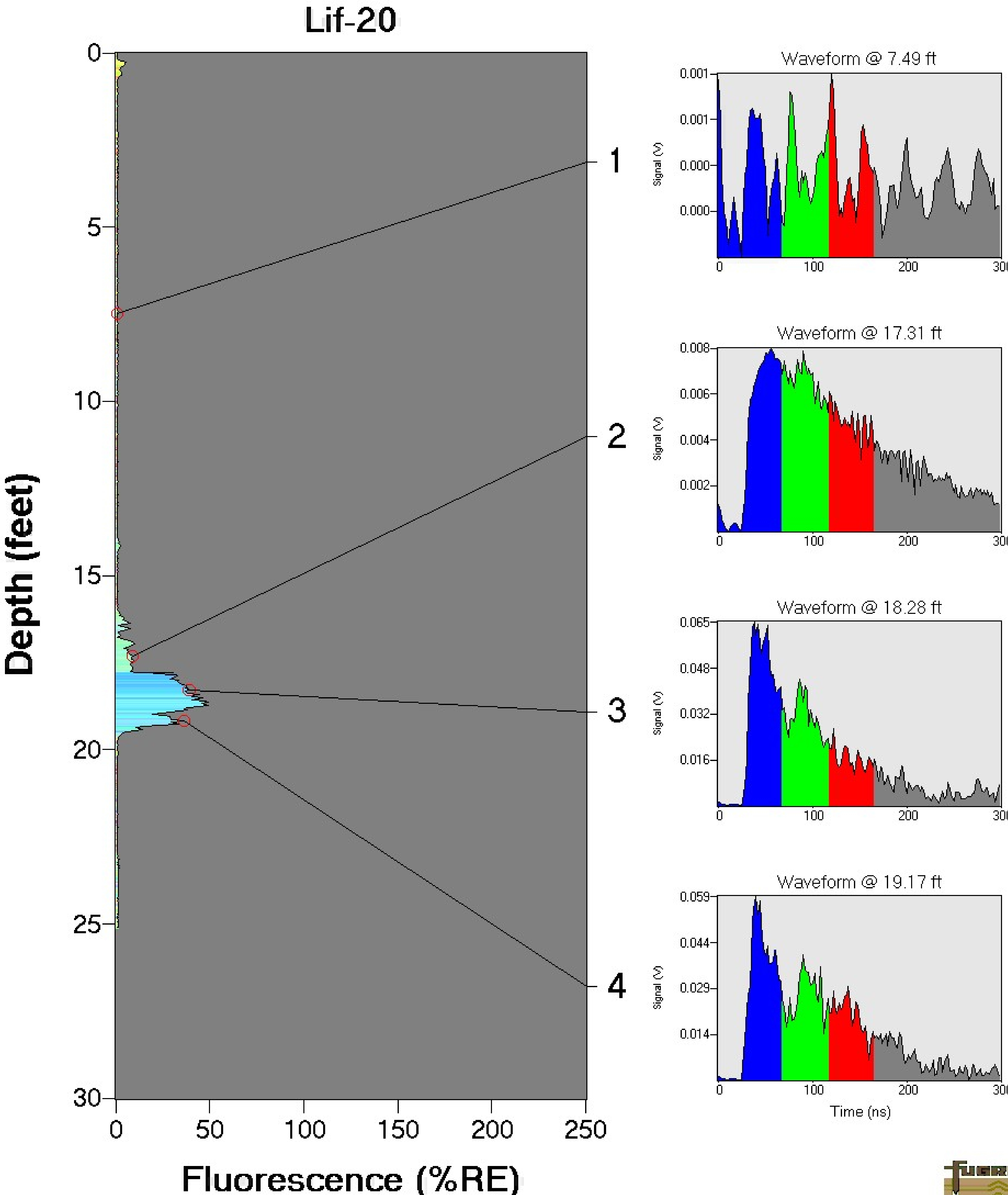
ROST Fluorescence Response Data

Site: SUPERIOR,WI.	Operator: GLENN
Client: DELTA	Fugro Job #: 0302-0605
Date/Time: 9/15/2004 @ 10:30:47 AM	Max fluorescence: 147.25% @ 17.74 ft
ROST Unit: 5	Final depth BGS: 24.16 ft



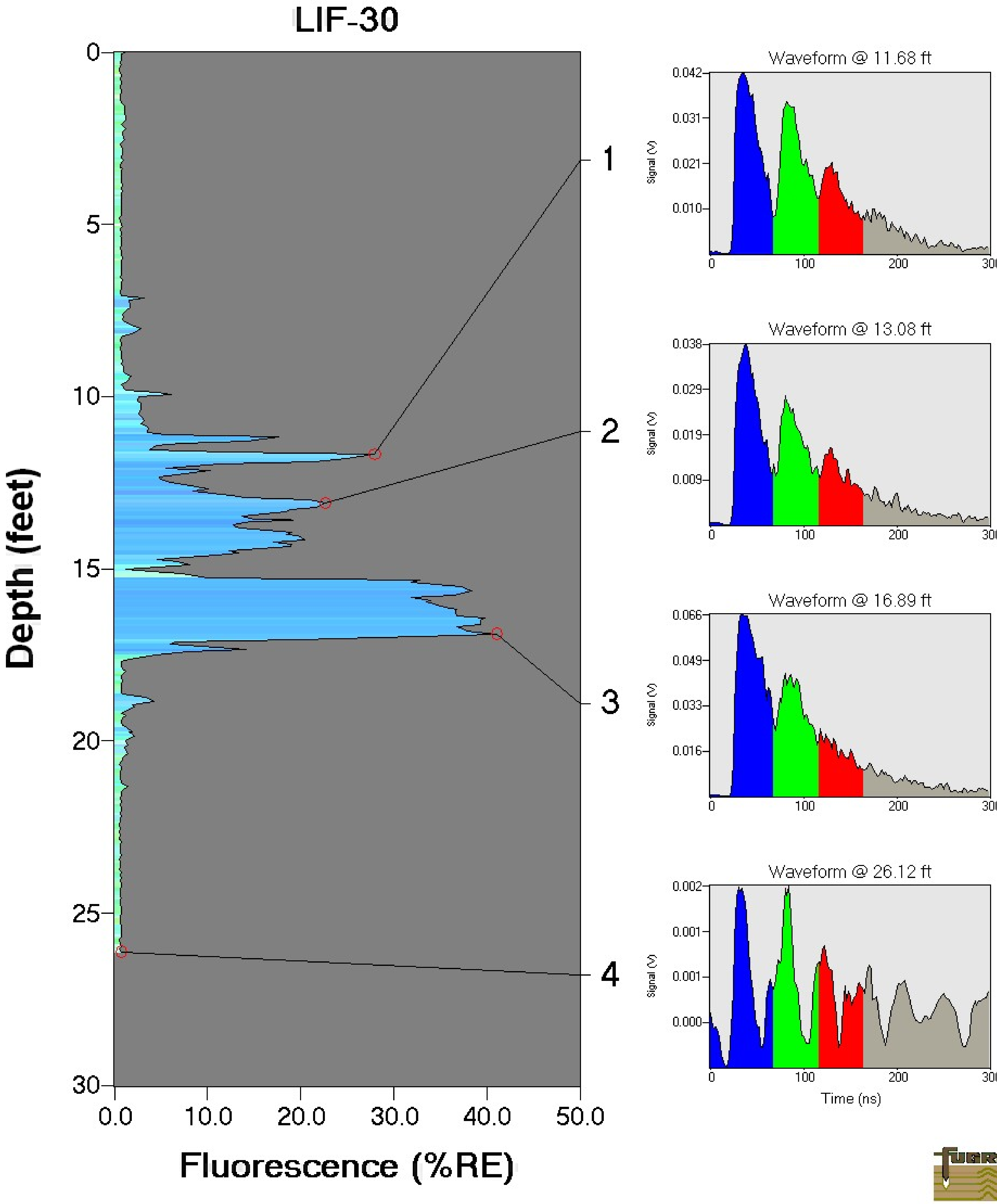
ROST Fluorescence Response Data

Site: SUPERIOR,WI.	Operator: GLENN
Client: DELTA	Fugro Job #: 0302-0605
Date/Time: 9/16/2004 @ 7:44:06 AM	Max fluorescence: 48.84% @ 18.74 ft
ROST Unit: 5	Final depth BGS: 25.13 ft



ROST Fluorescence Response Data

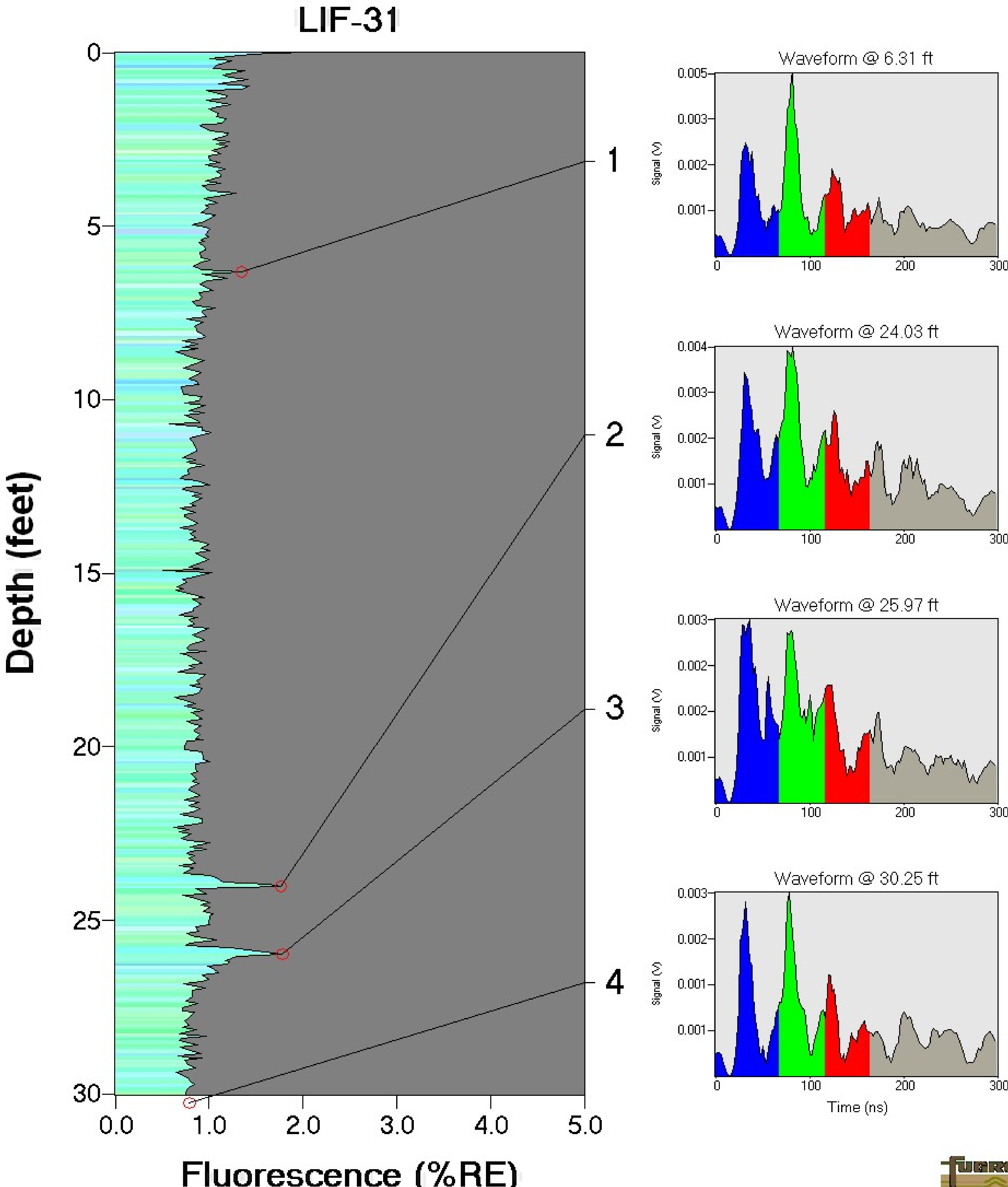
Site: Superior, Wisconsin	Operator: DdeLeon
Client: Delta Consultants	Fugro Job #: 04 1909-0045
Date/Time: 8/18/2009 @ 9:28:12 AM	Max fluorescence: 41.08% @ 16.89 ft
ROST Unit: ?	Final depth BGS: 26.12 ft



Fugro Geosciences, Inc., 6105 Rookin, Houston, TX 77074 (713) 346-4000 www.geo.fugro.com

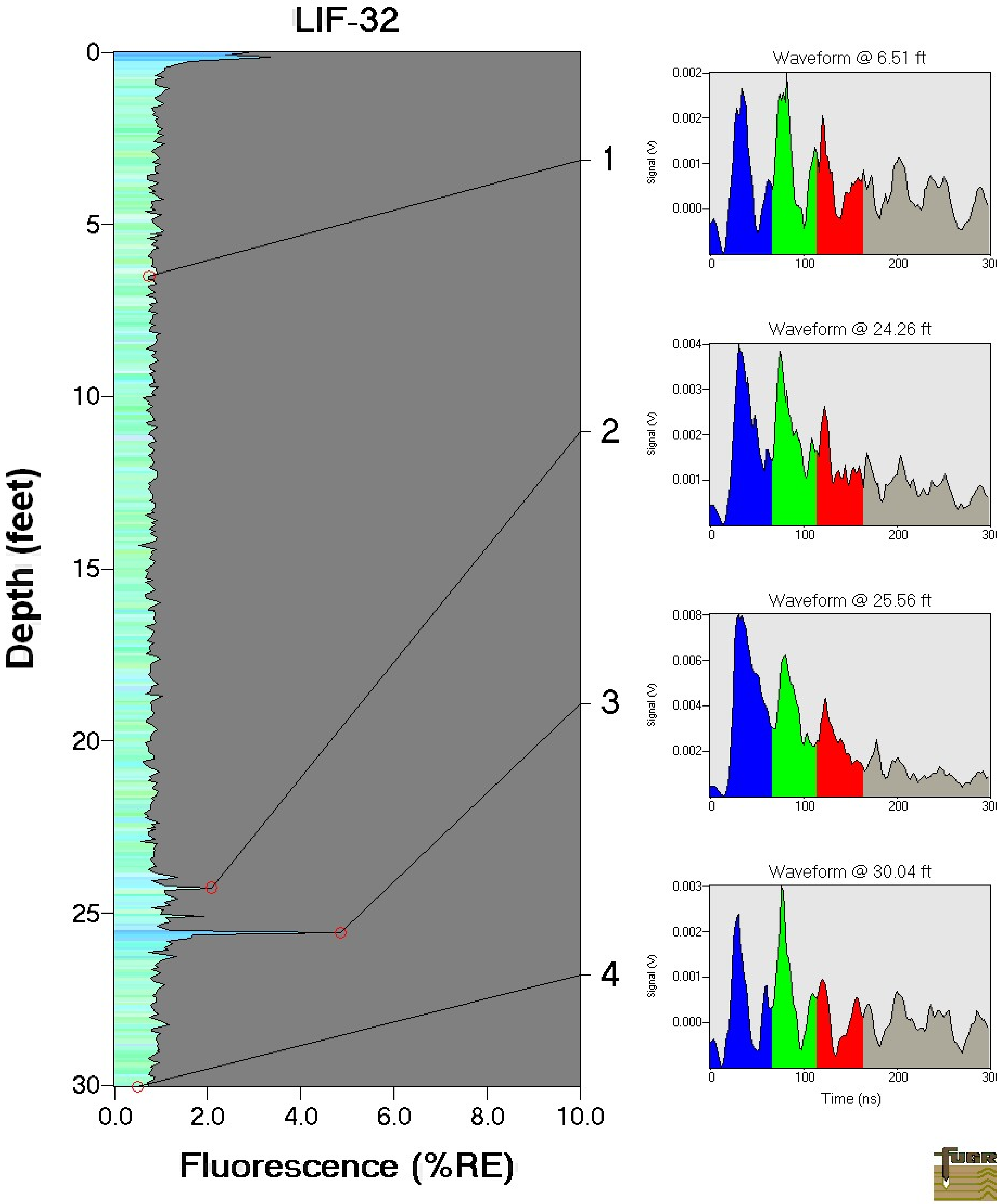
ROST Fluorescence Response Data

Site: Superior, Wisconsin	Operator: DdeLeon
Client: Delta Consultants	Fugro Job #: 04 1909-0045
Date/Time: 8/18/2009 @ 10:21:29 AM	Max fluorescence: 1.87% @ 0.00 ft
ROST Unit: ?	Final depth BGS: 30.25 ft



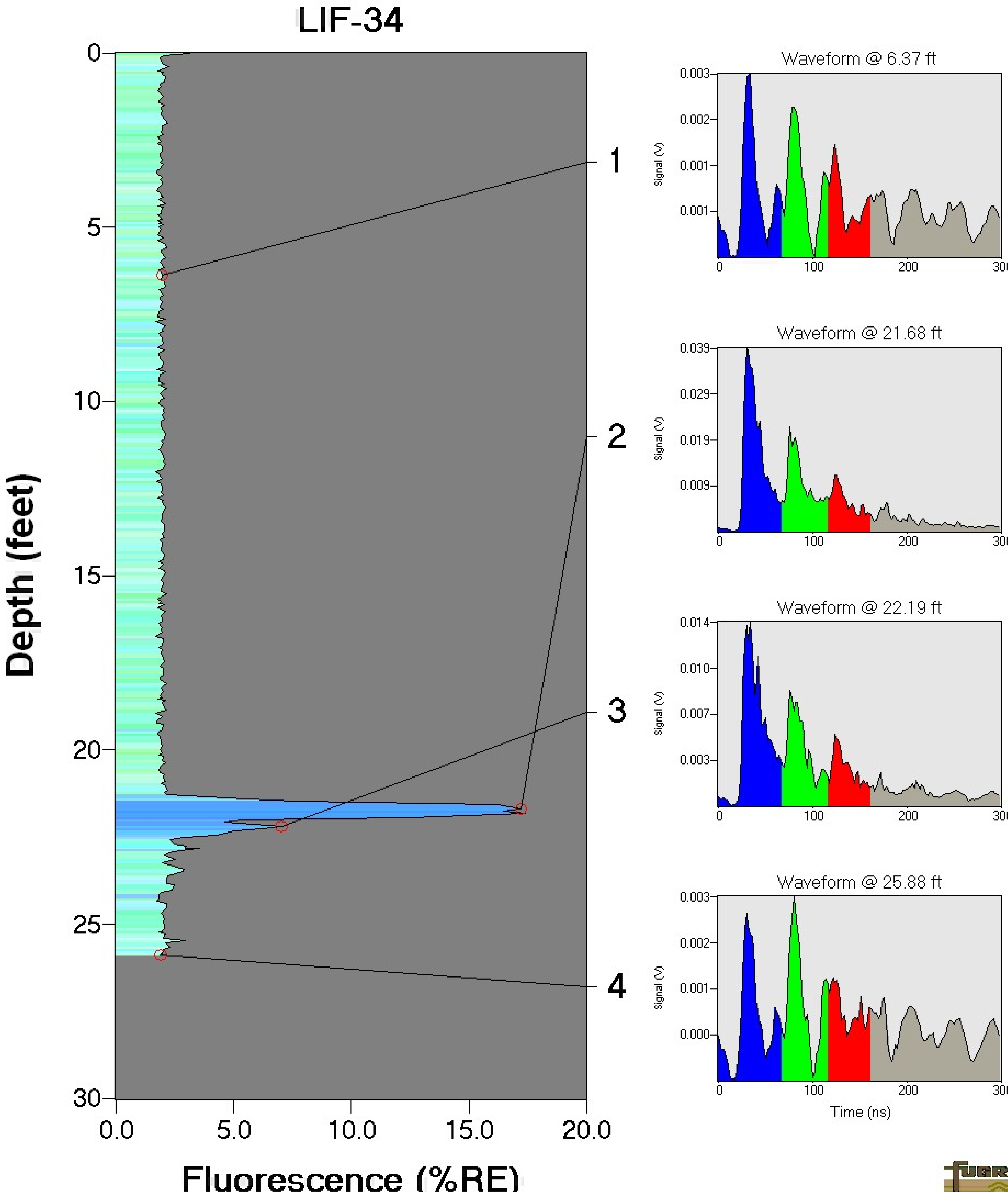
ROST Fluorescence Response Data

Site: Superior, Wisconsin	Operator: DdeLeon
Client: Delta Consultants	Fugro Job #: 04 1909-0045
Date/Time: 8/18/2009 @ 11:20:46 AM	Max fluorescence: 4.86% @ 25.56 ft
ROST Unit: ?	Final depth BGS: 30.04 ft



ROST Fluorescence Response Data

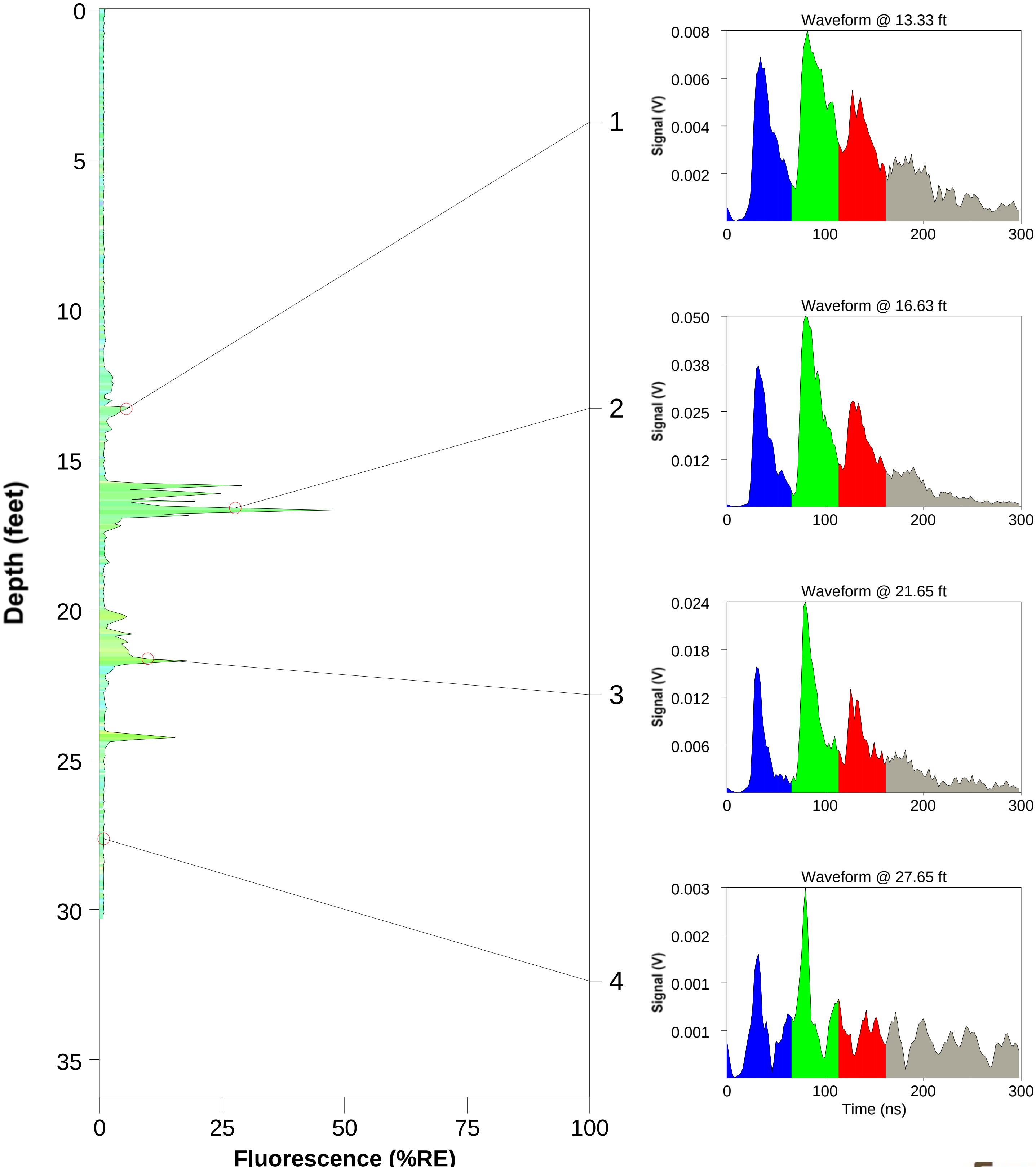
Site: Superior, Wisconsin	Operator: DdeLeon
Client: Delta Consultants	Fugro Job #: 04 1909-0045
Date/Time: 8/18/2009 @ 1:02:17 PM	Max fluorescence: 17.42% @ 21.81 ft
ROST Unit: ?	Final depth BGS: 25.88 ft



ROST Fluorescence Response Data

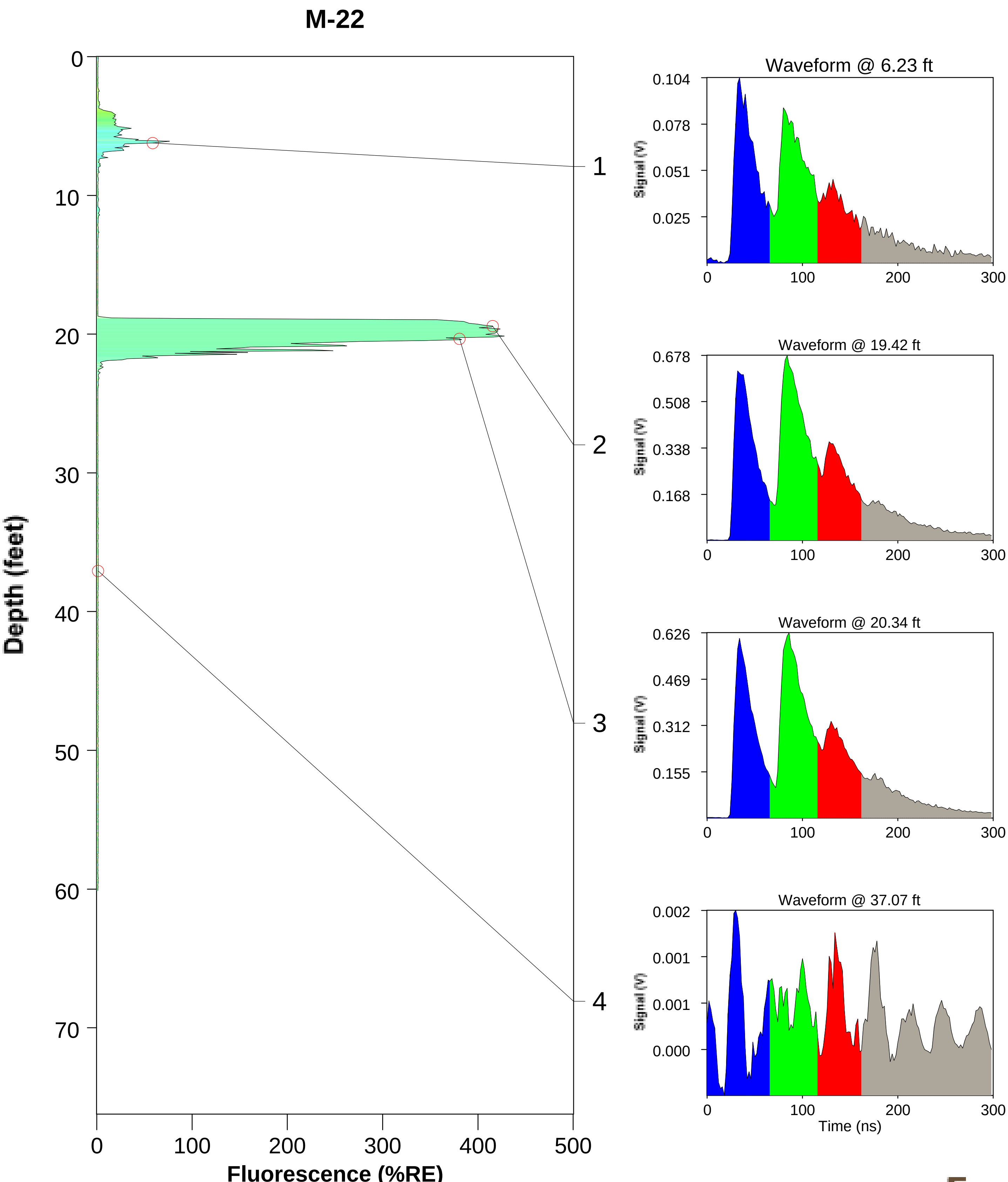
Site: Superior, Wisconsin	Operator: Dennis De Leon
Client: Delta Consultants	Fugro Job #: 04.1909-0045
Date/Time: 8/20/2009 @ 2:54:52 PM	Max fluorescence: 47.66% @ 16.70 ft
ROST Unit: Houston	Final depth BGS: 30.31 ft

LIF-52



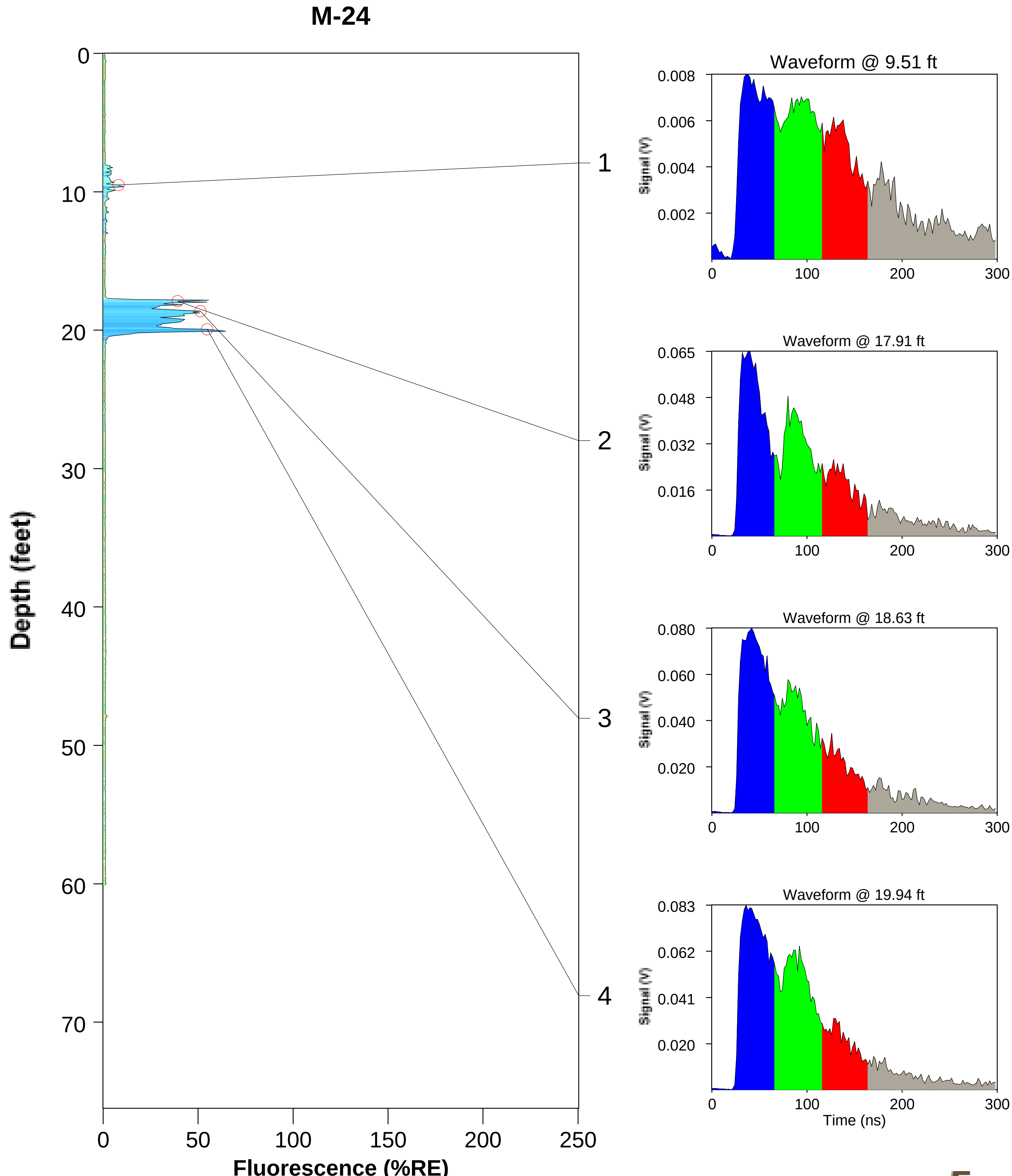
ROST Fluorescence Response Data

Site: BP SUPERIOR,WI.	Operator: JIM BANDLE
Client: DELTA	Fugro Job #: 0305-1968
Date/Time: 09/23/2006 @ 11:05:55 PM	Max fluorescence: 427.14% @ 20.14 ft
ROST Unit: 5	Final depth BGS: 60.10 ft



ROST Fluorescence Response Data

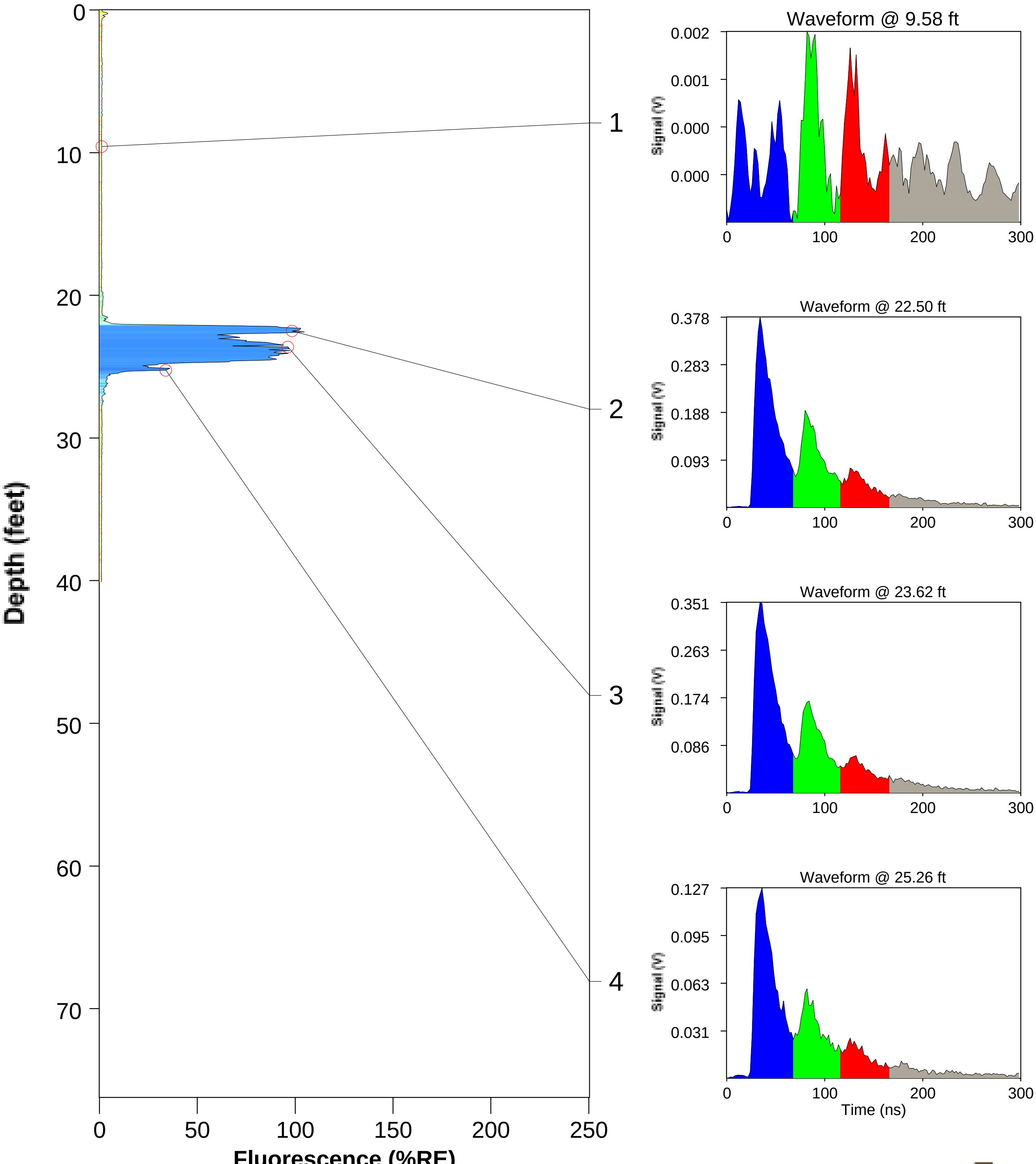
Site: BP SUPERIOR,WI.	Operator: JIM BANDLE
Client: DELTA	Fugro Job #: 0305-1968
Date/Time: 09/23/2006 @ 9:20:37 PM	Max fluorescence: 64.23% @ 20.08 ft
ROST Unit: 5	Final depth BGS: 60.10 ft



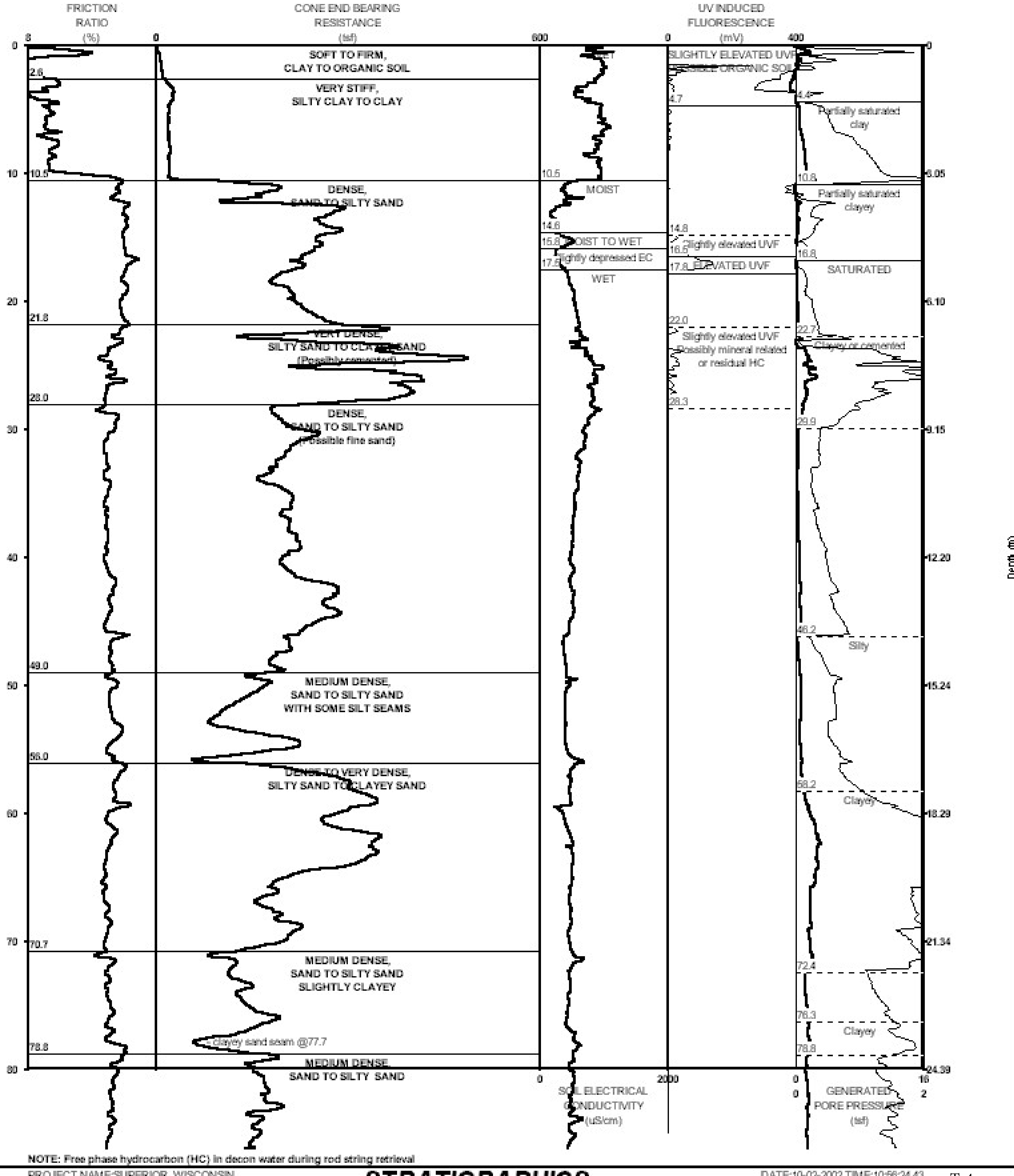
ROST Fluorescence Response Data

Site: BP SUPERIOR,WI.	Operator: JIM BANDLE
Client: DELTA	Fugro Job #: 0305-1968
Date/Time: 9/25/2006 @ 1:32:46 PM	Max fluorescence: 104.19% @ 22.57 ft
ROST Unit: 5	Final depth BGS: 40.09 ft

M-28



CPTU-EC-UVF LOG WITH LITHOLOGIC EVALUATION



NOTE: Free phase hydrocarbon (HC) in decon water during rod string retrieval

PROJECT NAME:SUPERIOR, WISCONSIN
PROJECT NUMBER:02-120-170

STRATIGRAPHICS

DATE:10-02-2002 TIME:10:56:24.43
SOUNDING NUMBER:CP-002