Attachment 3

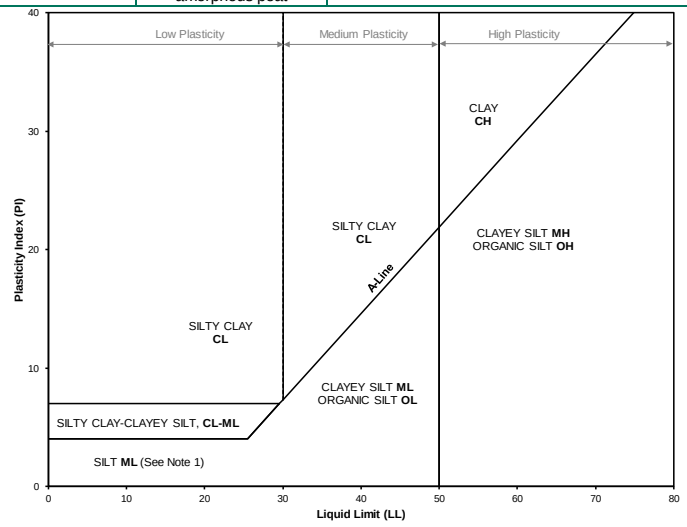
Boring, CPT, Hand Auger, and Probe Logs

METHOD OF SOIL CLASSIFICATION

The Golder Associates Inc. Soil Classification System is based on the Unified Soil Classification System (USCS)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$	$Cc = \frac{(D_{30})^2}{D_{10} x D_{60}}$	Organic Content	USCS Group Symbol	Group Name
INORGANIC (Organic Content <30% by mass)	COARSE-GRAINED SOILS (>50% by mass is larger than 0.075 mm)	GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm)	Gravels with <12% * fines (by mass)	Poorly Graded	<4	≤1 or ≥3	<30%	GP	GRAVEL
				Well Graded	≥4	1 to 3		GW	GRAVEL
			Gravels with >12% fines (by mass)	Below A Line	n/a			GM	SILTY GRAVEL
				Above A Line	n/a			GC	CLAYEY GRAVEL
		SANDS (>50% by mass of coarse fraction is smaller than 4.75 mm)	Sands with <12% * fines (by mass)	Poorly Graded	<6	≤1 or ≥3		SP	SAND
				Well Graded	≥6	1 to 3		SW	SAND
			Sands with >12% fines (by mass)	Below A Line	n/a			SM	SILTY SAND
				Above A Line	n/a			SC	CLAYEY SAND

Organic or Inorganic	Soil Group	Type of Soil	Laboratory Tests	Field Indicators: Dilatancy	Dry Strength	Shine Test	Thread Diameter	Toughness (of 3 mm thread)	Organic Content	USCS Group Symbol	Primary Name
INORGANIC (Organic Content <30% by mass)	FINE-GRAINED SOILS (≥50% by mass is smaller than 0.075 mm)	SILTS (Non-Plastic or PI and LL plot below A-Line on Plasticity Chart below)	Liquid Limit <50	Rapid	None	None	>6 mm	N/A (can't roll 3 mm thread)	<5%	ML	SILT
				Slow	None to Low	Dull	3 mm to 6 mm	None to low	<5%	ML	CLAYEY SILT
				Slow to very slow	Low to medium	Dull to slight	3 mm to 6 mm	Low	5% to 30%	OL	ORGANIC SILT
			Liquid Limit ≥50	Slow to very slow	Low to medium	Slight	3 mm to 6 mm	Low to medium	<5%	MH	CLAYEY SILT
				None	Medium to high	Dull to slight	1 mm to 3 mm	Medium to high	5% to 30%	OH	ORGANIC SILT
		CLAYS (PI and LL plot above A-Line on Plasticity Chart below)	Liquid Limit <30	None	Low to medium	Slight to shiny	~ 3 mm	Low to medium	0% to 30% **(see Note 2, below)**	CL	SILTY CLAY
			Liquid Limit 30 to <50	None	Medium to high	Slight to shiny	1 mm to 3 mm	Medium		CL	SILTY CLAY
			Liquid Limit ≥50	None	High	Shiny	<1 mm	High		CH	CLAY
HIGHLY ORGANIC SOILS (Organic Content >30% by mass)		Peat and mineral soil mixtures							30% to 75%	PT	SILTY PEAT, SANDY PEAT
		Predominantly peat, may contain some mineral soil, fibrous, or amorphous peat							75% to 100%		PEAT



Note 1 – Fine-grained materials with PI and LL that plot in this area are named (ML) SILT with slight plasticity. Fine-grained materials which are Non-plastic (i.e. a PL cannot be measured) are named SILT.
Note 2 – For soils with <5% organic content, include the descriptor "trace organics." For soils with between 5% and 30% organic content include the prefix "organic" before the Primary name.

* Dual Symbol — A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC, and CL-ML. For non-cohesive soils, the dual symbols must be used when the soil has between 5% and 12% fines (i.e. to identify transitional material between "clean" and "dirty" sand or gravel). For cohesive soils, the dual symbol must be used when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart (see plasticity chart at left).

Borderline Symbol — A borderline symbol is two symbols separated by a slash, for example, GM/SM, CL/ML. A borderline symbol should be used to indicate that the soil has been identified as having properties that are on the transition between similar materials. In addition, a borderline symbol may be used to indicate a range of similar soil types within a stratum.

METHOD OF SOIL CLASSIFICATION

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimeters	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	> 300	> 12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	< 0.075	< (200)

MODIFIERS FOR SECONDARY AND MINOR CONSTITUENTS

Percentage by Mass	Modifier
≤ 5	trace
> 5 to 12	some
> 12 to 35	Primary soil name prefixed with "gravelly, sandy, SILTY, CLAYEY" as applicable
> 35	Use 'and' to combine major constituents (*i.e.,* SAND and GRAVEL, SAND and CLAY)

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

N = the number of blows required to drive a 2 inch (50 mm) split-spoon sampler one foot (300 mm) using a 140 lb (63.5 kg) hammer falling 30 inches (760 mm) after an initial 6 inch (150 mm) seating (ASTM D1586).

Cone Penetration Test (CPT):

An electronic cone penetrometer with a 60° conical tip and a typical projected end area of 10 or 15 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve friction (f_s) are recorded electronically in real time during penetration. The seismic CPT (SCPT) adds measurement of shear wave velocity (V_S) to the standard CPT.

Dynamic Cone Penetration Test (DCP), N_d:

The penetration rate by an 8 kg (17.6 lb) hammer dropped 575 mm (22.6 in.) to drive uncased a 20 mm (0.79 in.) diameter, 60° cone attached to 16 mm (5/8 in.) drive rods (ASTM D6951). Other test methods exist for DCPs with different configurations and different correlations.

PH: Sampler advanced by hydraulic pressure
PM: Sampler advanced by manual pressure
WH: Sampler advanced by static weight of hammer
WR: Sampler advanced by weight of sampler and rod

SAMPLE TYPES

AS	Auger sample
CS	Chunk sample
DO or DP	Drive open (SPT) or direct pushed tube sampler
DS	Denison type sample
FS	Foil sample
PS	Pitcher type sample
RC	Rock core
SC	Soil core
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

SOIL TESTS

M	water content
A	Atterberg limits (plastic and liquid limits)
G, H	grain size, hydrometer
UW	unit weight
Com	compaction
C	consolidation (oedometer) test
U	unconfined compression test
UU	unconsolidated undrained triaxial test
CD	consolidated isotropically drained triaxial test[1]
CU	consolidated isotropically undrained triaxial test with porewater pressure measurement[1]
D	direct shear test
V (FV)	field vane (LV-laboratory vane test)
SG	specific gravity
P	permeability
PD	pinhole dispersion
O	organic content test
PH	pH
CHEM	chemical analysis (refer to text)

1. Tests which are anisotropically consolidated prior to shear are shown as CAD, CAU.

NON-COHESIVE (COHESIONLESS) SOILS

Compactness[1]

Term	SPT 'N' (blows/foot)[2]
Very Loose	0 - 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

1. Definition of compactness descriptions based on SPT 'N' ranges from Terzaghi and Peck (1967) and correspond to typical average N_{60} values.
2. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects. 'N'-values should be considered ONLY an approximate guide to consistency; for sensitive clays the 'N'-value approximation for consistency terms does not apply.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

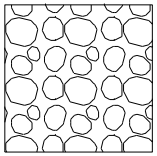
Consistency

Term	Undrained Shear Strength (kPa)	Undrained Shear Strength (tsf)	SPT 'N'[1] (blows/foot)
Very Soft	<12	<0.12	0 to 2
Soft	12 to 25	0.12 to 0.25	2 to 4
Firm	25 to 50	0.25 to 0.5	4 to 8
Stiff	50 to 100	0.5 to 1	8 to 15
Very Stiff	100 to 200	1 to 2	15 to 30
Hard	>200	>2	>30

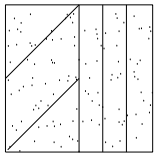
1. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.

Water Content

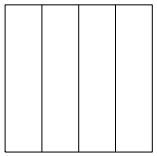
Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.



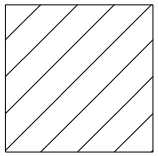
SM - SAND AND GRAVEL



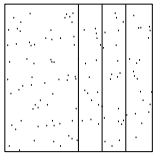
SC - CLAYEY SAND



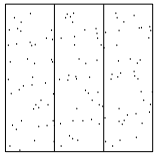
ML - SILT AND CLAYEY SILT



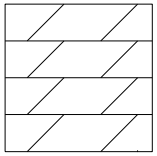
CL - SILTY CLAY



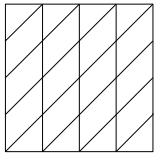
SP-SM - POORLY-GRADED SAND WITH SILT



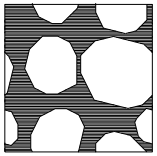
SM - SILTY SAND



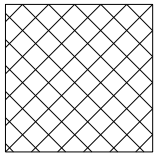
DISINTEGRATED ROCK



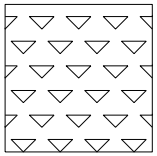
CL-ML - SILTY CLAY - CLAYEY SILT



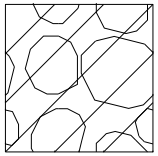
BOULDERS AND COBBLES



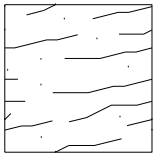
FILL



COAL COMBUSTION RESIDUALS (CCR)



GC - CLAYEY GRAVEL



BEDROCK

RECORD OF BOREHOLE EB-01

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion, West

DRILLING START: March 17, 2015 15:00
DRILLING END: March 17, 2015 17:30
COORDINATES: 37.707599° -78.283472°

SHEET: 1 of 1
GS ELEV.: 247.5
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft	WATER CONTENT (%)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0		0.0		247.5									
	3.25" HSA	0.5	(CL), sandy SILTY CLAY, medium plasticity, trace gravel, red-brown, some organics; cohesive, very soft, w < PL	247.0	CL		DO 1	2-2-2-3 **(4)**	24/24	4			
			CCR, SAMPLED AS, (ML), SILT, non plastic, trace fine sand, black; non-cohesive, very loose, dry to wet				TO UD-1		20/24				M, UW
5													
10							DO 2	2-1-1-1 **(2)**	24/24	2			M
15					ML		DO 3	0-0-0-0 **(0)**	6/24	0			M
20							DO 4	1-1-1-4 **(2)**	24/24	2			M
25							DO 5	0-0-0-0 **(0)**	0/24	0			
30							DO 6	0-0-1-1 **(1)**	12/24	1			M
		32.0		215.5								33.5 - 35.5 ft: Sample 7 SPT values may not be fully representative of in-situ conditions due to noted base heave in this zone.	
			CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine to medium sand, some fine to coarse gravel, black; non-cohesive, very loose, wet		ML								
35		35.5		212.0			DO 7	0-0-0-0 **(0)**	10/24	0			M
			Bottom of borehole at 35.5 ft. Boring offset 5 ft east and continued (EB-01A) with mud rotatary due to excessive heave. Backfilled with auger cuttings.										
40													
45													
50													

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-01A

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion, West

DRILLING START: March 17, 2015 08:00
DRILLING END: March 18, 2015 12:30
COORDINATES: 37.707599° -78.283472°

SHEET: 1 of 2
GS ELEV.: 247.5
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	Depth	DESCRIPTION	Elev	USCS	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%) (W_p W W_l)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	3.875" Mud Rotary	0.0		247.5							
		0.5	(CL), sandy SILTY CLAY, medium plasticity, trace gravel, red-brown, some organics; cohesive, very soft, w < PL	247.0	CL						
			CCR, SAMPLED AS, (ML), SILT, non plastic, trace fine sand, black; non-cohesive, very loose, dry to wet								
5										0 - 35 ft: Soil profile based on sampling in EB-01.	
10											
15					ML					13.4 ft, 03/18/2015 08:00, Augers in hole.	
20											
25						TO UD-2		19/24	○	UD-02: water leaking out of bottom before cap applied.	M, SG, UW
										27 ft: Vane Shear Test - Peak: 1.44 tsf, Residual: 0.26 tsf	
30											
		32.0		215.5							
			CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine to medium sand, some fine to coarse gravel, black; non-cohesive, very loose, wet								
35											
40					ML	DO 8	0-0-1-4 (1)	0/24	1 ■ ○		M
45						DO 9	0-1-1-1 (2)	6/24	2 ■ >>○	43.5 - 45.5 ft: Water Content = 107.7%	H, M, G, SG
										47 ft: Vane Shear Test - Peak: 1.18 tsf, Residual: 0.31 tsf	
		49.1		198.4							
50					ML	DO 10	0-2-2-4 (4)	20/24	4 ■ ○		M

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL. RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-01A

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion, West

DRILLING START: March 17, 2015 08:00
DRILLING END: March 18, 2015 12:30
COORDINATES: 37.707599° -78.283472°

SHEET: 2 of 2
GS ELEV.: 247.5
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50		50.0	(ML), CLAYEY SILT, low plasticity, gray with red; cohesive, soft, w ~ PL *(continued)*	197.5	ML							
		52.5		195.0								
		54.0	(GC), CLAYEY GRAVEL, fine to coarse, subrounded to round, low plasticity fines, trace fine to coarse sand; non-cohesive, very dense, wet	193.5	GC		DO 11	20-50/1" **(50/1")**	4/7	100 ■		
55			Refusal at 54.4 ft. Bottom of borehole at 54.4 ft. Backfilled with cuttings.									
60												
65												
70												
75												
80												
85												
90												
95												
100												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion, East

DRILLING START: March 18, 2015 13:00
DRILLING END: March 18, 2015 17:30
COORDINATES: 37.706540° -78.281906°

SHEET: 1 of 2
GS ELEV.: 247.6
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 3.875" Mud Rotary

Depth (ft)	Depth	DESCRIPTION	Elev	USCS	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	0.0		247.6						
	0.5	(CL), SILTY CLAY, medium plasticity, trace fine sand, trace gravel, red, trace organics (roots); cohesive, very soft, w < PL	247.1	CL	DO 1	3-0-1-1 (1)	2/24		
		CCR, SAMPLED AS, (ML), SILT, non plastic, trace gravel, trace sand, gray to black; non-cohesive, very loose, dry to wet							
5					DO 2	1-2-2-1 (4)	6/24	0 - 10 ft: Bulk sample taken from auger cuttings of sampling borehole offset 5 ft west	M, Com
				ML					
10					DO 3	1-1-1-1 (2)	24/24		H, M, G, SG
	14.0		233.6						
15	15.0	(ML), sandy CLAYEY SILT, low plasticity, fine sand, red; cohesive, soft, w > PL	232.6	ML	DO 4	0-1-1-0 (2)	24/24		
		CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine to medium sand, gray to black; non-cohesive, very loose, wet							
20					DO 5	1-1-1-1 (2)	24/24		M
								21.5 ft: Vane Shear Test - Peak: 1.70 tsf, Residual: 0.39 tsf	
25					DO 6	0-0-0-0 (0)	24/24		M
30					DO 7	0-0-0-0 (0)	24/24		M
				ML					
35					TO UD-1		24	33 - 35 ft: Water Content = 124.9%	C, D, H, M, G, SG, UW
					DO 8	0-0-1-2 (1)	24/24		M
40					DO 9	0-0-1-1 (1)	24/24	38.5 - 40.5 ft: Water Content = 152.4%	H, M, G
								42 ft: Vane Shear Test - Peak: 1.96 tsf, Residual: 0.26 tsf	
45					TO UD-2		24	43 - 45 ft: Water Content = 127.3%	C, H, M, G, SG, UW
	47.0		200.6		DO 10	0-0-1-1 (1)	24/24		
		(CL), SILTY CLAY, medium plasticity, some sand, red-brown; cohesive, very soft, w > PL		CL					
50					DO 11	0-0-1 (1)	18/18		

PENETRATION RESISTANCE BLOWS / ft (20, 40, 60, 80)
WATER CONTENT (%) W_p — W — W_l (20, 40, 60, 80)

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion, East

DRILLING START: March 18, 2015 13:00
DRILLING END: March 18, 2015 17:30
COORDINATES: 37.706540° -78.281906°

SHEET: 2 of 2
GS ELEV.: 247.6
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	■ PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) WATER CONTENT (%) (W_p — W — W_l) (20 40 60 80)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50		50.0		197.6								
			(CL), SILTY CLAY, medium plasticity, some sand, red-brown; cohesive, very soft, w > PL *(continued)*		CL							
		53.0		194.6								
55			Refusal at 53.0 ft. Bottom of borehole at 53.0 ft. Backfilled with cuttings.									
60												
65												
70												
75												
80												
85												
90												
95												
100												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-03

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond, Center

DRILLING START: March 19, 2015 09:20
DRILLING END: March 19, 2015 13:00
COORDINATES: 37.705838° -78.280795°

SHEET: 1 of 2
GS ELEV.: 248.9
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 3.875" Mud Rotary

Depth (ft)	Depth	DESCRIPTION	Elev	USCS	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	Penetration Resistance Blows / ft	Water Content (%)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	0.0	FILL, (SM), gravelly SILTY SAND, fine, and low plasticity fines, fine angular gravel, red-brown, some ccr; cohesive, firm, w < PL, (moist to wet)	248.9	SM	DO 1	4-11-18-13 **(29)**	13/24	29			
5					DO 2	4-4-5-7 **(9)**	12/24	9			
	7.2	CCR, SAMPLED AS, (ML), SILT, non plastic, some fine sand, gray to black; non-cohesive, loose to compact, moist to wet	241.7								
10					DO 3	4-2-5-6 **(7)**	12/24	7			M
15				ML	DO 4	3-5-6-8 **(11)**	6/24	11			M
20					TO UD-1		24				M, UW
					DO 5	5-4-3-3 **(7)**	20/24	7			M
	23.1	CCR, SAMPLED AS, (ML), SILT, non plastic, some fine sand, gray to black; non-cohesive, very loose, moist to wet	225.8								
25					DO 6	0-0-0-0 **(0)**	18/24	0	>>	23.5 - 25.5 ft: Water Content = 109.7% 26.5 ft: Vane Shear Test - Peak: 1.18 tsf, Residual: 0.31 tsf	M
30					DO 7	0-0-0-0 **(0)**	18/24	0			M
				ML							
35					DO 8	0-0-0-0 **(0)**	18/24	0			H, M, G
40					DO 9	0-0-0-0 **(0)**	24/24	0	>>	38.5 - 40.5 ft: Water Content = 125.4%	M
	42.2	CCR, SAMPLED AS, (ML), SILT, non plastic, some fine sand, gray to black; non-cohesive, very loose, wet	206.7								
45					DO 10	0-0-0-0 **(0)**	20/24	0	>>	43.5 - 45.5 ft: Water Content = 110.2%	M
				ML							
50					DO 11	1-1-3-4 **(4)**	9/24	4	>>	48.5 - 50.5 ft: Water Content = 162.7%	

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-03

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond, Center

DRILLING START: March 19, 2015 09:20
DRILLING END: March 19, 2015 13:00
COORDINATES: 37.705838° -78.280795°

SHEET: 2 of 2
GS ELEV.: 248.9
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%) (W_p W W_l)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50		50.0	CCR, SAMPLED AS, (ML), SILT, non plastic, some fine sand, gray to black; non-cohesive, very loose, wet *(continued)*	198.9	ML							M
		52.2	(SM), gravelly SILTY SAND, fine to medium, subrounded to subangular, fine subrounded to subangular gravel, low plasticity fines, brown-gray; non-cohesive, compact, wet	196.7	SM		DO 12	5-7-8-30 **(15)**	12/24	15		
55		57.0		191.9								
60			Refusal at 57.0 ft. Bottom of borehole at 57.0 ft. Backfilled with cuttings.									
65												
70												
75												
80												
85												
90												
95												
100												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-04

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Dike

DRILLING START: March 22, 2015 14:00
DRILLING END: March 22, 2015 15:30
COORDINATES: 37.706141° -78.283171°

SHEET: 1 of 1
GS ELEV.: 238.1
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 3.25" HSA

Depth (ft)	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic)	REC/ATT (in)	Penetration Resistance (Blows / ft)	Water Content (%)	Notes / Water Levels	Additional Lab Testing
0.0	(GP-GM), GRAVEL, fine to coarse, poorly graded, angular, trace fine to coarse sand, trace low plasticity fines, gray; non-cohesive, loose, dry	237.1	GP-GM	DO 1	4-4-5-12 **(9)**	24/24	9			
1.0–1.5	FILL, (CL), SILTY CLAY, medium plasticity, some fine sand, red; cohesive, firm, w < PL	236.6	CL							
3.8	CCR, SAMPLED AS, (ML), sandy SILT, non plastic, black; non-cohesive, compact, dry	234.3	ML	DO 2	3-5-8-9 **(13)**	18/24	13			
5	FILL, (CL), sandy SILTY CLAY, low plasticity, brown with red, trace ccr; cohesive, firm to stiff, w < PL to w ~ PL		CL	DO 3	2-4-7-7 **(11)**	24/24	11			
10				DO 4	1-2-3-3 **(5)**	12/24	5			A, M, G
15				DO 5	2-3-4-4 **(7)**	20/24	7			
20										
23.5	FILL, (CL), sandy SILTY CLAY, low plasticity, fine sand, dark gray; cohesive, soft, w ~ PL, mixed with ccr	214.6	CL	DO 6	0-0-2-3 **(2)**	24/24	2			A, M
25										
28.3	FILL, (CL-ML), CLAY, low plasticity, some sand, red-brown, trace ccr; cohesive, firm to stiff, w ~ PL	209.8	CL-ML	DO 7	3-3-6-8 **(9)**	24/24	9		28.5 ft, 03/22/2015 15:00	
30										
35				DO 8	2-2-2-3 **(4)**	24/24	4			A, M
36.5	(CL), sandy SILTY CLAY, low plasticity, fine sand, red-brown; cohesive, very soft, w > PL	201.6	CL	DO 9	0-0-0-1 **(0)**	24/24	0			
40										
42.5		195.6								
43.7	(GP-GC), sandy GRAVEL, fine to coarse, poorly graded, subrounded to subangular, fine to medium sand, some low plasticity fines, red-brown; non-cohesive, very dense, wet, quartz and slate gravel	194.4	GP-GC	DO 10	21-50/2" **(50/2")**	8/8		100		
45	Refusal at 43.7 ft. Bottom of borehole at 43.7 ft. Backfilled with cuttings.									
50										

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDERATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-05

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion Dike

DRILLING START: March 22, 2015 12:30
DRILLING END: March 22, 2015 14:00
COORDINATES: 37.706877° -78.283808°

SHEET: 1 of 2
GS ELEV.: 252.3
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 3.25" HSA

Depth (ft)	Depth	DESCRIPTION	Elev	USCS	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	0.0		252.3							
	1.0	(GP-GC), GRAVEL, fine to coarse, poorly graded, angular, trace fine to coarse sand, trace non plastic fines, gray, some ccr; non-cohesive, loose, dry	251.3	GP-GC	DO 1	3-4-5-9 **(9)**	18/24	9		
	1.8	FILL, (CL), sandy SILTY CLAY, low plasticity, fine sand, red; cohesive, stiff, w < PL	250.5	CL						
5		CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine sand, trace gravel, gray to black; non-cohesive, compact to dense, dry			DO 2	9-14-20-20 **(34)**	14/24	34		
10				ML	DO 3	9-12-12-16 **(24)**	24/24	24		H, M, G
15					DO 4	8-10-12-16 **(22)**	18/24	22		
	17.0	CCR, SAMPLED AS, (ML), SILT, non plastic, and fine to coarse SAND, gray to black; non-cohesive, very loose, wet	235.3							
20					DO 5	0-1-2-1 **(3)**	24/24	3		
25				ML	DO 6	0-0-0-0 **(0)**	24/24	0	23 - 51 ft: SPT values may not be fully representative of in-situ conditions due to noted base heave in this zone. 23.5 - 25.5 ft: Water Content = 148.7%	H, M, G
30					DO 7	0-0-0-0 **(0)**	24/24	0		
	32.0	CCR, SAMPLED AS, (ML), SILT, non plastic, and fine SAND, gray to black; non-cohesive, very loose, wet	220.3							
35					DO 8	0-0-0-0 **(0)**	24/24	0		
40				ML	DO 9	0-0-0-0 **(0)**	24/24	0	38.5 - 40.5 ft: Water Content = 109.1%	H, M, G
	42.0	CCR, SAMPLED AS, (ML), SILT, non plastic, and fine to coarse SAND, trace gravel, gray to black; non-cohesive, very loose, wet	210.3							
45					DO 10	0-0-1-2 **(1)**	24/24	1		M
50				ML	DO 11	0-0-0-0 **(0)**	24/24	0	48.5 - 50.5 ft: Water Content = 103.8%	H, M,

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EB-05

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond Expansion Dike

DRILLING START: March 22, 2015 12:30
DRILLING END: March 22, 2015 14:00
COORDINATES: 37.706877° -78.283808°

SHEET: 2 of 2
GS ELEV.: 252.3
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%) (W_p W W_l) (20 40 60 80)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50		50.0		202.3								
	3.25" HSA		CCR, SAMPLED AS, (ML), SILT, non plastic, and fine to coarse SAND, trace gravel, gray to black; non-cohesive, very loose, wet *(continued)*		ML							CHEM, G
55		55.2		197.1			DO 12	4-6-7-7 **(13)**	24/24	13		A, M, CHEM
			(CL), sandy SILTY CLAY, low plasticity, fine sand, gray with red; cohesive, soft, w ~ PL		CL							
		58.4		193.9								
60			Refusal at 58.4 ft. Bottom of borehole at 58.4 ft. Backfilled with cement bentonite grout.									
65												
70												
75												
80												
85												
90												
95												
100												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

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01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:06
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE EZ-01

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: East Pond

DRILLING START: March 23, 2015 08:20
DRILLING END: March 23, 2015 10:00
COORDINATES: 37.706946° -78.282764°

SHEET: 1 of 1
GS ELEV.: 248.1
TOC ELEV.: 250.4
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	WELL DIAGRAM (Casing Top Elev: 250.4 ft; Casing Type: PVC; Diameter: 2 in)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	3.25" HSA	0.0		248.1								
		0.5	(CL), SILTY CLAY, medium plasticity, trace fine sand, trace gravel, red , trace organics (roots); cohesive, very soft, w < PL	247.6	CL					3/8" Bentonite chips. 2.3' stickup.	EZ-01 drilled without SPT for installation of piezometer	
			CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine sand, trace gravel, black									
5												
10										Auger cuttings, CCR backfill and collapse, washed into place from surface		
15											15.1 ft, 03/31/2015 11:40	
20					ML							
25												
30										Auger cuttings, CCR backfill and collapse, washed into place from surface. 0.010" slot size.		
35												
40												
45		45.0		203.1						Wooden plug		
			Bottom of borehole at 45.0 ft. Completed as well. Refer to diagram.									
50												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:07
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE GB-1

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: Eash Ash Pond Embankment Crest

DRILLING START: August 27, 2014 16:15
DRILLING END: August 27, 2014 17:10
COORDINATES: 37.704494° -78.278855°

SHEET: 1 of 1
GS ELEV.: 235.0
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 4-1/4" HSA

Depth (ft)	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic hammer)	REC/ATT (in)	Penetration Resistance (Blows / ft)	Water Content (%)	Notes / Water Levels
0.0		235.0							
0.7	FILL, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, light gray and dark gray-brown; shale gravel; non-cohesive, dry	234.3	SP-SM	DO S-01	7-8-6 **(14)**	10/18	14		
	FILL, (SC), CLAYEY SAND, fine to medium, and low plasticity fines, dark red-brown, trace coarse sand; cohesive, soft to firm, w ~ PL		SC	DO S-02	2-1-1 **(2)**	18/18	2		3.1 ft, 08/28/2014 08:00
7.0		228.0							
	FILL, (ML), sandy CLAYEY SILT, low plasticity, fine to medium sand, trace fine angular gravel, gray-brown; cohesive, firm to stiff, w < PL		ML	DO S-03	3-3-5 **(8)**	18/18	8		
				DO S-04	1-2-2 **(4)**	18/18	4		
				DO S-05	3-3-4 **(7)**	18/18	7		
22.0		213.0							
	FILL, (SC), CLAYEY SAND, fine to medium, and low plasticity fines, dark gray, some mica; non-cohesive, compact, moist		SC	DO S-06	3-4-7 **(11)**	18/18	11		
27.0		208.0							
	FILL, (CL), SILTY CLAY, low plasticity, trace fine to medium sand, dark brown; cohesive, stiff, w < PL to w ~ PL		CL	DO S-07	4-5-7 **(12)**	18/18	12		
				DO S-08	3-4-5 **(9)**	17/18	9		36.2 ft, 08/27/2014 17:30
37.0		198.0							27 ft: Increase in drilling resistance
	(CL), SILTY CLAY, medium plasticity, and fine SAND, dark gray-brown mottled gray, POSSIBLE RESIDUUM; cohesive, firm, w ~ PL		CL	DO S-09	2-3-3 **(6)**	18/18	6		
42.0		193.0							42 ft: Augers chattering
	DISINTEGRATED ROCK, SAMPLED AS, (SP-SC), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, dark gray; non-cohesive, moist to wet, Wet Spoon		SP-SC	DO S-10	50/0" **(50/0")**	0/0		100	
45.0	Refusal at 45.0 ft. Bottom of borehole at 45.0 ft. Backfilled with cement grout.	190.0							

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750 X

LOGGED: Patrick Callahan
CHECKED: Grant Martin
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:08
\\ATL1-S-FS1-VM\GOLDERATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE GB-2

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: Eash Ash Pond Embankment Crest

DRILLING START: August 27, 2014 14:40
DRILLING END: August 27, 2014 15:45
COORDINATES: 37.704687° -78.279285°

SHEET: 1 of 1
GS ELEV.: 235.0
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 4-1/4" HSA

Depth (ft)	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic hammer)	REC/ATT (in)	Penetration Resistance Blows / ft	Notes Water Levels
0.0		235.0						
0.6	FILL, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, light gray and dark gray-brown; shale gravel; non-cohesive, dry	234.4	SP-SM	DO S-01	6-6-4 **(10)**	14/18	10	
2.0	FILL, (SM/SM), SILTY SAND, fine to coarse, non plastic fines, dark red-brown, mica; cohesive, stiff, w < PL	233.0	SM/SM	DO S-02	5-5-6 **(11)**	16/18	11	
5	FILL, (ML), sandy CLAYEY SILT, medium plasticity, fine to coarse sand, trace fine angular gravel, dark red-brown with dark gray; cohesive, stiff, w < PL		ML					
10				TO UD-01		24/24		
12.0	FILL, (ML), sandy CLAYEY SILT, low plasticity, fine to medium sand, trace gravel, dark gray-brown; cohesive, stiff, w ~ PL	223.0	ML	DO S-03	2-2-4 **(6)**	18/18	6	
15								
20			ML	DO S-04	6-6-6 **(12)**	18/18	12	
25				DO S-05	3-4-6 **(10)**	18/18	10	▼ 23.0 ft, 08/28/2014 08:00
27.0	(ML), sandy CLAYEY SILT, low plasticity, fine to medium sand, trace gravel, dark gray-brown mottled dark yellow-brown, POSSIBLE RESIDUUM, mica; cohesive, stiff, w ~ PL	208.0	ML	DO S-06	3-4-7 **(11)**	18/18	11	
30								▽ 31.2 ft, 08/27/2014 17:20
35				DO S-07	3-5-6 **(11)**	18/18	11	
37.0	(ML), CLAYEY SILT, low plasticity, trace fine sand, trace gravel, dark brown with gray, POSSIBLE RESIDUUM, pockets of gray clay, mica; cohesive, firm, w ~ PL	198.0	ML	DO S-08	3-3-4 **(7)**	18/18	7	
40								
43.0	DISINTEGRATED ROCK, SAMPLED AS, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, dark gray, some clay; non-cohesive, moist to wet, Wet Spoon	192.0	SP-SM	DO S-09	50/2" **(50/2")**	2/2	100	43 ft: Augers chattering
45								
45.0	Refusal at 44.0 ft. Bottom of borehole at 44.0 ft. Backfilled with cement grout.	190.0						
50								

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750 X

LOGGED: Patrick Callahan
CHECKED: Grant Martin
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:08
\\ATL1-S-FS1-V\MGOLDERATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE GB-3

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: Eash Ash Pond Embankment Crest

DRILLING START: August 27, 2014 12:40
DRILLING END: August 27, 2014 14:05
COORDINATES: 37.704854° -78.279681°

SHEET: 1 of 1
GS ELEV.: 235.0
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 4-1/4" HSA

Depth (ft)	Elev	USCS	Description	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic hammer)	REC/ATT (in)	Penetration Resistance Blows / ft	Notes / Water Levels
0.0	235.0							
0.8	234.2	SP-SM	FILL, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, light gray and dark gray-brown, some Ash; shale gravel; non-cohesive, loose, dry	DO S-01	2-2-3 (5)	18/18	5	
2.5	232.5	SM	FILL, (SM), SILTY SAND, fine to coarse, low plasticity fines, trace gravel, dark red-brown, trace organics, some mica; cohesive, loose, dry to moist	DO S-02	5-5-8 (13)	18/18	13	
7.0	228.0	ML	FILL, (ML), CLAYEY SILT, low plasticity, and fine to medium SAND, some fine angular gravel, dark red-brown with dark gray; cohesive, very stiff, w ~ PL to w < PL	DO S-03	3-3-5 (8)	18/18	8	
		ML	FILL, (ML), sandy CLAYEY SILT, low plasticity, fine to medium sand, some gravel, orange-brown mottled gray; cohesive, stiff, w ~ PL	DO S-04	3-4-4 (8)	18/18	8	
17.0	218.0			TO UD-01		22/24		17.3 ft, 08/28/2014 07:45
		SM/SM	FILL, (SM/SM), SILTY SAND, fine to medium, low plasticity fines, some gravel, dark gray, trace organics; cohesive, soft to firm, w ~ PL	DO S-05	2-3-3 (6)	18/18	6	
				DO S-06	2-2-3 (5)	18/18	5	
28.0	207.0							28 ft: Increase in drilling resistance
		ML	(ML), sandy CLAYEY SILT, low plasticity, fine to medium sand, some gravel, dark gray mottled dark brown, POSSIBLE RESIDUUM, some mica, trace organics; cohesive, firm to stiff, w ~ PL	DO S-07	2-3-7 (10)	18/18	10	
				DO S-08	2-3-5 (8)	18/18	8	
				DO S-09	2-3-2 (5)	18/18	5	37.7 ft, 08/27/2014 14:20
41.0	194.0							41 ft: Augers chattering
44.3	190.7	SP-SM	DISINTEGRATED ROCK, SAMPLED AS, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, dark gray, some clay; non-cohesive, moist to wet, Wet Spoon	DO S-10	50/0" (50/0")	0/0	100	

Refusal at 44.3 ft.
Bottom of borehole at 44.3 ft.
Backfilled with cement grout.

Water content (%): W_p — W — W_l; scale 20, 40, 60, 80

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750 X

LOGGED: Patrick Callahan
CHECKED: Grant Martin
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:08
\\ATL1-S-FS1-VM\GOLDERATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE GB-4

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: Eash Ash Pond Embankment Crest

DRILLING START: August 27, 2014 11:25
DRILLING END: August 27, 2014 12:10
COORDINATES: 37.705048° -78.280224°

SHEET: 1 of 1
GS ELEV.: 235.0
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 4-1/4" HSA

Depth (ft)	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic hammer)	REC/ATT (in)	Penetration Resistance Blows / ft	Water Content (%)	Notes / Water Levels
0.0		235.0							
0.7	FILL, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, light gray and dark gray-brown, some Ash; shale gravel; non-cohesive, loose, dry	234.3	SP-SM	DO S-01	3-5-4 **(9)**	12/18	9		
	FILL, (SM), SILTY SAND, fine to coarse, non plastic fines, some fine angular gravel, dark orange-brown, some mica; non-cohesive, compact, dry to moist		SM	DO S-02	13-6-6 **(12)**	11/18	12		▼ 6.7 ft, 08/28/2014 07:50
7.5		227.5							
	FILL, (CL), sandy SILTY CLAY, low plasticity, fine to medium sand, dark orange-brown with dark gray, trace coarse sand, trace mica, some ash; cohesive, stiff to very stiff, w < PL to w ~ PL		CL	DO S-03	4-6-8 **(14)**	18/18	14		
14.1		220.9							
	FILL, (CL), sandy SILTY CLAY, low plasticity, fine to medium sand, dark gray, mostly fine sand, trace organics; cohesive, firm, w ~ PL		CL	DO S-04	4-8-4 **(12)**	18/18	12		
				DO S-05	2-2-3 **(5)**	18/18	5		
23.0		212.0							
	FILL, (SM), SILTY SAND, fine to medium, low plasticity fines, dark gray, mostly fine sand; non-cohesive, loose, moist		SM	DO S-06	2-2-2 **(4)**	18/18	4		
28.8		206.2							
	(SM), SILTY SAND, fine to medium, non plastic fines, dark gray mottled dark brown, POSSIBLE ALLUVIUM, trace organics; non-cohesive, loose, moist to wet		SM	DO S-07	2-2-2 **(4)**	18/18	4		
34.0		201.0							
	(SC), CLAYEY SAND, fine to medium, and medium plasticity fines, pale gray-brown, POSSIBLE ALLUVIUM, mostly fine sand; cohesive, firm, w > PL, wet spoon		SC	DO S-08	3-3-5 **(8)**	18/18	8		
39.6		195.4		DO S-09	0-2-2 **(4)**	18/18	4		▽ 38.7 ft, 08/27/2014 12:25
	(CL), sandy SILTY CLAY, low plasticity, fine sand, dark gray-brown, mottled, RESIDUUM, trace mica; cohesive, stiff, w > PL		CL						
43.0		192.0							
43.9	DISINTEGRATED ROCK, SAMPLED AS, (SP-SC), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, dark gray, some clay; non-cohesive, moist to wet, wet spoon	191.1	SP-SC	DO S-10	50/4" **(50/4")**	3/4		100	43 ft: Augers chattering

Refusal at 43.8 ft.
Bottom of borehole at 43.9 ft.
Backfilled with cement grout.

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750 X

LOGGED: Patrick Callahan
CHECKED: Grant Martin
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:08
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE GB-5

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: Eash Ash Pond Embankment Crest

DRILLING START: August 27, 2014 10:15
DRILLING END: August 27, 2014 10:50
COORDINATES: 37.705195° -78.280524°

SHEET: 1 of 1
GS ELEV.: 234.0
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 4-1/4" HSA

Depth (ft)	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic hammer)	REC/ATT (in)	Penetration Resistance Blows / ft	Notes / Water Levels
0.0	FILL, (SM/ML), SILTY SAND, fine to medium, and non plastic fines, some fine angular gravel, dark brown with black, trace organics; non-cohesive, loose to compact, dry to moist	234.0	SM/ML	DO S-01	4-5-6 (11)	16/18	11	
				DO S-02	3-2-3 (5)	14/18	5	
7.0	FILL, (SM/ML), SILTY SAND, fine, and low plasticity fines, some gravel, dark gray; non-cohesive, soft, moist, intermixed ccr	227.0	SM/ML					
9.0	FILL, (ML), sandy CLAYEY SILT, low plasticity, fine to coarse sand, trace fine angular gravel, dark brown and light gray, trace organics; non-cohesive, very loose to loose, moist, intermixed ccr	225.0	ML	DO S-03	2-1-2 (3)	17/18	3	
				DO S-04	1-2-2 (4)	6/18	4	
17.0	FILL, (SM), SILTY SAND, fine to coarse, non plastic fines, trace fine angular gravel, dark gray with dark brown, trace organics; non-cohesive, loose, moist to wet	217.0	SM	DO S-05	4-2-2 (4)	11/18	4	24 - 25 ft: Possible boulder
24.0	FILL	210.0		DO S-06	0-5-50/5" (55/11")	14/17	100	▼ 23.1 ft, 08/28/2014 08:15
25.0	FILL, (SM), SILTY SAND, fine to coarse, non plastic fines, trace fine angular gravel, dark gray with dark brown, some organics (bark); non-cohesive, loose, moist to wet	209.0	SM					▽ 25.4 ft, 08/27/2014 11:20
29.2	FILL, (ML), sandy CLAYEY SILT, low plasticity, fine to medium sand, trace gravel, dark brown and dark gray, mottled; cohesive, stiff, w ~ PL	204.8	ML	DO S-07	3-5-13 (18)	18/18	18	
33.0	(SM), SILTY SAND, fine to medium, low plasticity fines, trace fine angular gravel, brown with dark gray, stratified, POSSIBLE ALLUVIUM, pockets of high plasticity silt, trace organics; non-cohesive, stiff, moist to wet	201.0	SM	DO S-08	1-2-2 (4)	18/18	4	
38.5		195.5						
39.0	DISINTEGRATED ROCK, SAMPLED AS, (SP-SM), gravelly SAND, fine to coarse, poorly graded, fine angular gravel, some non plastic fines, dark gray, some clay; non-cohesive, moist to wet, wet spoon	195.0	SP-SM	DO S-09	50/2" (50/2")	0/2	100	

Refusal at 39.0 ft.
Bottom of borehole at 39.0 ft.
Backfilled with cement grout.

Water content (%): W_p — W — W_l; scale 20, 40, 60, 80

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750 X

LOGGED: Patrick Callahan
CHECKED: Grant Martin
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:08
\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NB-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond

DRILLING START: March 23, 2015 08:00
DRILLING END: March 23, 2015 16:30
COORDINATES: 37.709187° -78.277174°

SHEET: 1 of 2
GS ELEV.: 329.6
TOC ELEV.: 332.5
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	Depth	DESCRIPTION	Elev	USCS	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft	WATER CONTENT (%)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	3.875" Mud Rotary	0.0	CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine sand, black; non-cohesive, very loose, moist to wet	329.6	ML	DO 1	0-1-0-1 (1)	2/24	1			
5						DO 2	0-0-0-0 (0)	0/24	0		0 - 7.5 ft: Bulk sample taken from auger cuttings of sampling borehole offset 5 ft west 7.0 ft, 03/31/2015 10:40	M, Com
10						DO 3	0-1-0-1 (1)	15/24	1			M
15						DO 4	1-1-1-2 (2)	8/24	2			A, H, M, G
20						DO 5	0-0-0-0 (0)	14/24	0			M
25						TO UD-1A		0/24				
		27.0		302.6		TO UD-1		24/24				C, H, M, P, G, SG, UW
30			CCR, SAMPLED AS, (SM), gravelly SILTY SAND, fine to coarse, and non plastic fines, fine gravel, black; non-cohesive, very loose, wet		SM	DO 6	0-0-0-0 (0)	6/24	0		30 ft: Vane Shear Test - Peak: 0.52 tsf, Residual: 0.13 tsf	M, CHEM, SG
		31.0	CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine sand, black; non-cohesive, very loose, moist to wet	298.6								M, SG
35					ML	DO 7	0-0-0-0 (0)	18/24	0			M
		37.0	CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine sand, black; non-cohesive, very loose, wet	292.6								
40						DO 8	0-0-0-0 (0)	18/24	0			A, M
45					ML	DO 9	0-0-0-0 (0)	18/24	0			A, H, M, CHEM, G
		47.0	CCR, SAMPLED AS, (SM), SILTY SAND, fine, and non plastic fines, black; non-cohesive, very loose, wet	282.6								
50					SM	DO 10	0-0-0-0 (0)	9/24	0			M

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:09
\\ATL1-S-FS1-V-M\GOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NB-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond

DRILLING START: March 23, 2015 08:00
DRILLING END: March 23, 2015 16:30
COORDINATES: 37.709187° -78.277174°

SHEET: 2 of 2
GS ELEV.: 329.6
TOC ELEV.: 332.5
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	Depth	DESCRIPTION	Elev	USCS	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft	WATER CONTENT (%)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50	3.875" Mud Rotary	50.0	CCR, SAMPLED AS, (SM), SILTY SAND, fine, and non plastic fines, black; non-cohesive, very loose, wet *(continued)*	279.6	SM							
55						TO UD-2		24/24		>>	53.5 - 55.5 ft: Water Content = 158.2%	C, CU, H, M, G, SG, UW M
						DO 11	0-1-1-2 **(2)**	12/24	2		58.5 ft: Vane Shear Test - Peak: 3.92 tsf	
60												
65						DO 12	0-0-0-1 **(0)**	15/24	0			M, SG
70						TO UD-3		24/24		>> >>	68.5 - 70.5 ft: Water Content = 101.5%	A, C, M, P, SG, UW M
						DO 13	0-1-1-1 **(2)**	6/24	2		53.5 ft: Vane Shear Test - Peak: 3.66 tsf, Residual: 2.48 tsf	
75		75.5	CCR, SAMPLED AS, (ML), sandy SILT, non plastic, fine sand, some gravel, dark gray to black; cohesive, soft, w > PL	254.1							78.5 - 80.5 ft: Water Content = 141.7%	
80					ML	DO 14	2-3-3-4 **(6)**	12/24	6	>>	80.0 - 80.5 ft: Encountered rotten wood.	M
		83.8		245.8							Piezometer installed with 10 ft of screen from 75 - 85 ft, 2.9 ft stickup above ground, and backfilled with auger cuttings (CCR)	
85		85.2	(SM), SILTY SAND, fine to medium, low plasticity fines, some fine to coarse subangular to angular gravel, red-brown; micaceous, non-cohesive, very dense, wet, some rounded quartz gravel	244.4	SM	DO 15	8-14-50/3" **(64/9")**	6/15		100		M
			Refusal at 85.2 ft. Bottom of borehole at 85.2 ft. Completed as well.									
90												
95												
100												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:09
\\ATL1-S-FS1-V-M\GOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NZ-01

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond Dam

DRILLING START: March 21, 2015 13:30
DRILLING END: March 22, 2015 10:00
COORDINATES: 37.707441° -78.279963°

SHEET: 1 of 3
GS ELEV.: 334.2
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (WATER CONTENT (%))	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	3.875" Mud Rotary	0.0	FILL, (SM), SILTY SAND, fine to medium, low plasticity fines, trace fine subangular gravel, tan with red, trace organics; micaceous, cohesive, firm to stiff, w < PL to w ~ PL	334.2	SM		DO 1	4-5-7-10 **(12)**	16/24	12		
5							DO 2	4-8-8-12 **(16)**	16/24	16		
10							DO 3	6-10-11-15 **(21)**	15/24	21		M, G
15							DO 4	4-11-12-15 **(23)**	18/24	23		
20		17.0	FILL, (SM), SILTY SAND, fine to medium, low plasticity fines, trace fine subangular gravel, tan-brown with red; micaceous, cohesive, firm, w > PL, (wet)	317.2			DO 5	5-6-9-10 **(15)**	12/24	15		
25							DO 6	6-6-9-10 **(15)**	18/24	15		
30							DO 7	7-10-11-15 **(21)**	15/24	21		
35					SM		DO 8	4-10-12-13 **(22)**	18/24	22		A, M, G
40							DO 9	9-9-13-17 **(22)**	0/24	22		
45							DO 10	4-6-13-17 **(19)**	17/24	19		
50							DO 11	5-5-11-14 **(16)**	18/24	16		

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:09
\\ATL1-S-FS1-VM\GOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NZ-01

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond Dam

DRILLING START: March 21, 2015 13:30
DRILLING END: March 22, 2015 10:00
COORDINATES: 37.707441° -78.279963°

SHEET: 2 of 3
GS ELEV.: 334.2
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (WATER CONTENT (%))	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50		50.0		284.2								
	3.875" Mud Rotary		FILL, (SM), SILTY SAND, fine to medium, low plasticity fines, trace fine subangular gravel, tan-brown with red; micaceous, cohesive, firm, w > PL, (wet) *(continued)*		SM							
55							DO 12	6-9-9-21 **(18)**	18/24	18	54.7 ft, 03/22/2015 08:30	
		57.0		277.2								
			FILL, (SM), SILTY SAND, fine to medium, low plasticity fines, some fine subangular to angular gravel, brown-tan with red; micaceous, non-cohesive, compact to dense, wet		SM							
60							DO 13	9-13-13-21 **(26)**	20/24	26		M, G
65							DO 14	9-9-12-16 **(21)**	20/24	21		
70							DO 15	6-6-12-14 **(18)**	18/24	18		
75							DO 16	3-6-8-12 **(14)**	18/24	14		
80							DO 17	6-11-12-12 **(23)**	16/24	23		
85							DO 18	4-8-12-12 **(20)**	21/24	20		M, G
90							DO 19	6-8-11-11 **(19)**	18/24	19		
95							DO 20	6-12-19-16 **(31)**	18/24	31		
100							DO 21	6-8-13-16 **(21)**	12/24	21		

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:09
\\ATL1-S-FS1-VM\GOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NZ-01

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond Dam

DRILLING START: March 21, 2015 13:30
DRILLING END: March 22, 2015 10:00
COORDINATES: 37.707441° -78.279963°

SHEET: 3 of 3
GS ELEV.: 334.2
TOC ELEV.: na
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%) (W_p W W_l)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
100		100.0		234.2								
	3.875" Mud Rotary	102.0		232.2	SM							
			(ML), CLAYEY SILT, medium plasticity, and fine SAND, red-brown; micaceous, cohesive, stiff to very stiff, wet		ML		DO 22	3-5-5-10 **(10)**	20/24	10		
105												
110							DO 23	5-6-9-9 **(15)**	19/24	15		
		112.0		222.2								
			(CL), SILTY CLAY, medium plasticity, and fine to medium SAND, brown-red, POSSIBLE RESIDUUM; micaceous, cohesive, firm, wet		CL		DO 24	9-12-14-14 **(26)**	8/24	26		A, M, G
115												
		117.0		217.2								
			DISINTEGRATED ROCK, SAMPLED AS, (SM), SILTY SAND, fine, low plasticity fines, some fine to coarse angular gravel, gray-brown; non-cohesive, very dense, wet		SM		DO 25	12-41-45-20 **(86)**	6/24	86		
120												
							DO 26	18-50/5" **(50/5")**	2/11	100		
125		125.4		208.8								
			Refusal at 125.4 ft. Bottom of borehole at 125.4 ft. Backfilled with cement bentonite grout.									
130												
135												
140												
145												
150												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:09
\\ATL1-S-FS1-V-M\GOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NZ-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond Dam

DRILLING START: March 20, 2015 09:00
DRILLING END: March 20, 2015 17:00
COORDINATES: 37.707693° -78.280250°

SHEET: 1 of 3
GS ELEV.: 334.7
TOC ELEV.: 337.8
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	WELL DIAGRAM (Casing Top Elev: 337.8 ft; Casing Type: PVC; Diameter: 2 in)	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
0	3.875" Mud Rotary	0.0	FILL, (SM), SILTY SAND, fine, and medium plasticity fines, some fine to coarse gravel, brown; micaceous, cohesive, firm to stiff, w < PL to w ~ PL	334.7	SM		DO 1	5-4-3-6 **(7)**	9/24	3/8" Bentonite chips dropped from surface. 3' PVC stickup, 4" x 4" x 5' protective aluminum casing.		
							DO 2	4-6-9-11 **(15)**	15/24			
5												
							DO 3	5-8-9-7 **(17)**	12/24			
10												
		11.8	FILL, (SM), SILTY SAND, fine, and low plasticity fines, trace fine gravel, light brown with red; micaceous, cohesive, firm to very stiff, w ~ PL	322.9	SM		DO 4	6-7-7-14 **(14)**	15/24			
15												
							DO 5	2-6-10-12 **(16)**	12/24			
20												
							DO 6	4-6-7-8 **(13)**	18/24			M, G
25												
			... W > PL				DO 7	8-12-12-12 **(24)**	15/24			
30												
							DO 8	5-6-9-12 **(15)**	12/24			
35												
							DO 9	5-6-9-10 **(15)**	18/24			
40												
							DO 10	2-3-6-8 **(9)**	20/24			A, M, G
45												
							DO 11	9-12-14-16 **(26)**	12/24			
50												

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

Golder Associates

01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:09
\\ATL1-S-FS1-VM\GOLDERATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NZ-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond Dam

DRILLING START: March 20, 2015 09:00
DRILLING END: March 20, 2015 17:00
COORDINATES: 37.707693° -78.280250°

SHEET: 2 of 3
GS ELEV.: 334.7
TOC ELEV.: 337.8
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	WELL DIAGRAM	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
50		50.0		284.7								
	3.875" Mud Rotary		FILL, (SM), SILTY SAND, fine, and low plasticity fines, trace fine gravel, light brown with red; micaceous, cohesive, firm to very stiff, w ~ PL *(continued)*		SM		TO UD-1		8/24		UD-1 sample recovery estimated from lab measurements	
55							DO 12	5-7-7-10 **(14)**	18/24			
60							DO 13	9-11-14-17 **(25)**	18/24	SP#2 dropped and washed from surface.		
65							DO 14	8-19-11-13 **(30)**	12/24			M, G
			... Very stiff									
70							DO 15	18-10-14-20 **(24)**	15/24	0.010" slotted PVC with SP#2 filter pack.		
75							DO 16	8-11-14-17 **(25)**	20/24			
							TO UD-2		0/24	SP#2 dropped from surface.	UD-2 sample: End of tube bent during sampling attempt.	
80							DO 17	7-12-14-14 **(26)**	18/24			
		82.1		252.6								
			FILL, (ML), CLAYEY SILT, medium plasticity, and fine SAND, trace fine gravel, light brown-red; cohesive, stiff to very stiff, w > PL									
85							DO 18	9-10-11-15 **(21)**	15/24			
90					ML		DO 19	7-7-13-15 **(20)**	18/24			A, M, G
95							DO 20	4-5-9-11 **(14)**	18/24	3/8" Bentonite chips dropped from surface.		
100							DO 21	6-6-8-12 **(14)**	0/24			

Log continued on next page

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

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\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE NZ-02

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: North Pond Dam

DRILLING START: March 20, 2015 09:00
DRILLING END: March 20, 2015 17:00
COORDINATES: 37.707693° -78.280250°

SHEET: 3 of 3
GS ELEV.: 334.7
TOC ELEV.: 337.8
DATUM: NAVD88

DEPTH (ft)	BORING METHOD	SOIL PROFILE Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC/ATT (in)	WELL DIAGRAM	NOTES WATER LEVELS	ADDITIONAL LAB TESTING
100	3.875" Mud Rotary	100.0	FILL, (ML), CLAYEY SILT, medium plasticity, and fine SAND, trace fine gravel, light brown-red; cohesive, stiff to very stiff, w > PL *(continued)*	234.7	ML							
105							DO 22	4-6-9-12 **(15)**	18/24			
110							DO 23	4-6-6-8 **(12)**	20/24			A, M, G
		112.1		222.6								
		113.8	DISINTEGRATED ROCK, SAMPLED AS, (SM), SILTY SAND, some gravel; non-cohesive, very dense, wet	220.9	SM		DO 24	50/2" **(50/2")**	0/2			
115			Refusal at 113.8 ft. Bottom of borehole at 113.8 ft. Completed as well. Refer to diagram.									
120												
125												
130												
135												
140												
145												
150												

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

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\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE WB-1

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: West Pond Dike, North

DRILLING START: March 16, 2015 14:40
DRILLING END: March 16, 2015 17:00
COORDINATES: 37.712017° -78.293652°

SHEET: 1 of 1
GS ELEV.: 233.8
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 3.25" HSA

Depth (ft)	Depth	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic)	REC/ATT (in)	Penetration Resistance Blows / ft	Notes / Water Levels	Additional Lab Testing
0	0.0		233.8							
	1.6	FILL, (GM), SILTY GRAVEL, coarse, angular, low plasticity fines, trace fine to coarse sand; non-cohesive, compact, dry	232.2	GM	DO 1	11-15-10-12 **(25)**	24/24	25		
		FILL, (CL), sandy SILTY CLAY, medium plasticity, fine sand, brown, trace organics; cohesive, stiff to very stiff, w < PL		CL					3 - 5 ft: thin (~0.05 ft) clay lenses observed	
5					DO 2	5-7-9-9 **(16)**	24/24	16		
10					DO 3	3-4-5-5 **(9)**	24/24	9		A, M, G
15					DO 4	3-4-6-6 **(10)**	24/24	10		
	17.0		216.8							
		FILL, (CL), SILTY CLAY, low plasticity, some sand, brown-gray; cohesive, firm to stiff, w < PL to w ~ PL		CL					▼ 17.6 ft, 03/17/2015 12:00, Wet cave to 30 ft-bgs.	
20					DO 5	3-2-2-2 **(4)**	24/24	4		
					TO UD-1		16/24			A, CU, M, G, SG, UW
25					DO 6	2-3-5-8 **(8)**	24/24	8		A, M
	27.0		206.8							
		FILL, (CL), sandy SILTY CLAY, low plasticity, fine sand, trace fine gravel, brown-gray; cohesive, firm, w ~ PL to w > PL		CL						
30					DO 7	3-3-3-3 **(6)**	24/24	6		
35					DO 8	1-2-5-20 **(7)**	24/24	7		M, G
40	39.5		194.3		DO 9	11-27-50 **(77)**	18/18	77		
		DISINTEGRATED ROCK, SAMPLED AS, (SC), gravelly CLAYEY SAND, fine to medium, fine to coarse rounded to subrounded gravel, low plasticity fines, dark gray; non-cohesive, very dense, wet		SC						
45					DO 10	17-50 **(50/")**	6/12	100		
	49.0		184.8		DO 11	50 **(50/")**	6/6	100		
50		Refusal at 49.0 ft. Bottom of borehole at 49.0 ft. Backfilled with cement bentonite grout.								

Penetration Resistance: Blows / ft (20, 40, 60, 80)
Water Content (%): W_p — W — W_l (20, 40, 60, 80)

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL. RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

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\\ATL1-S-FS1-V\MGOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ

RECORD OF BOREHOLE WB-2

PROJECT: Bremo Power Plant
PROJECT NO.: 1520347
LOCATION: West Pond Dike, South

DRILLING START: March 17, 2015 07:30
DRILLING END: March 17, 2015 09:30
COORDINATES: 37.710100° -78.292245°

SHEET: 1 of 1
GS ELEV.: 233.7
TOC ELEV.: na
DATUM: NAVD88

BORING METHOD: 3.25" HSA

Depth (ft)	Depth	Description	Elev	USCS	Sample Type & Number	Blows per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic)	REC/ATT (in)	Penetration Resistance Blows / ft	Notes / Water Levels	Additional Lab Testing
0	0.0		233.7							
	1.0	(GM), SILTY GRAVEL, coarse, angular, low plasticity fines, trace fine to coarse sand; non-cohesive, compact, dry	232.7	GM	DO 1	2-7-14-22 **(21)**	12/24	21		
		(CL), sandy SILTY CLAY, low plasticity, fine sand, dark brown, trace organics; cohesive, stiff, w < PL		CL						
5					DO 2	3-5-8-8 **(13)**	24/24	13		
10					DO 3	2-4-7-7 **(11)**	24/24	11		
15					DO 4	2-6-6-7 **(12)**	18/24	12		A, M
20					DO 5	2-4-5-7 **(9)**	24/24	9		
	22.0		211.7						▼ 22.0 ft, 03/17/2015 09:00, Wet cave to 35 ft-bgs.	
		(CL), SILTY CLAY, low plasticity, and fine SAND, red-brown; cohesive, soft to firm, w < PL to w ~ PL		CL						
25					DO 6	2-4-4-6 **(8)**	24/24	8		
30					DO 7	2-4-5-4 **(9)**	24/24	9		A, M, G
35					DO 8 TO UD-1	0-2-2-2 **(4)**	24/24	4		
	36.0		197.7				0/4			
	37.4	(GC), sandy CLAYEY GRAVEL, fine to coarse, subrounded to subangular, low plasticity fines, fine sand; non-cohesive, very dense, wet	196.3	GC	DO 9	50/1" **(50/1")**	0/1	100		
40		Refusal at 37.4 ft. Bottom of borehole at 37.4 ft. Backfilled with cement bentonite grout.								
45										
50										

Penetration Resistance: Blows / ft (20, 40, 60, 80)
Water Content (%): W_p — W — W_l (20, 40, 60, 80)

DRILLING CO.: Premier Drilling
DRILLER: Larry Carter
DRILL RIG: CME 750X

LOGGED: Colin Daniel Langford
CHECKED: Grant Martin / Aaron Geiger
REVIEWED: Pieter DePree

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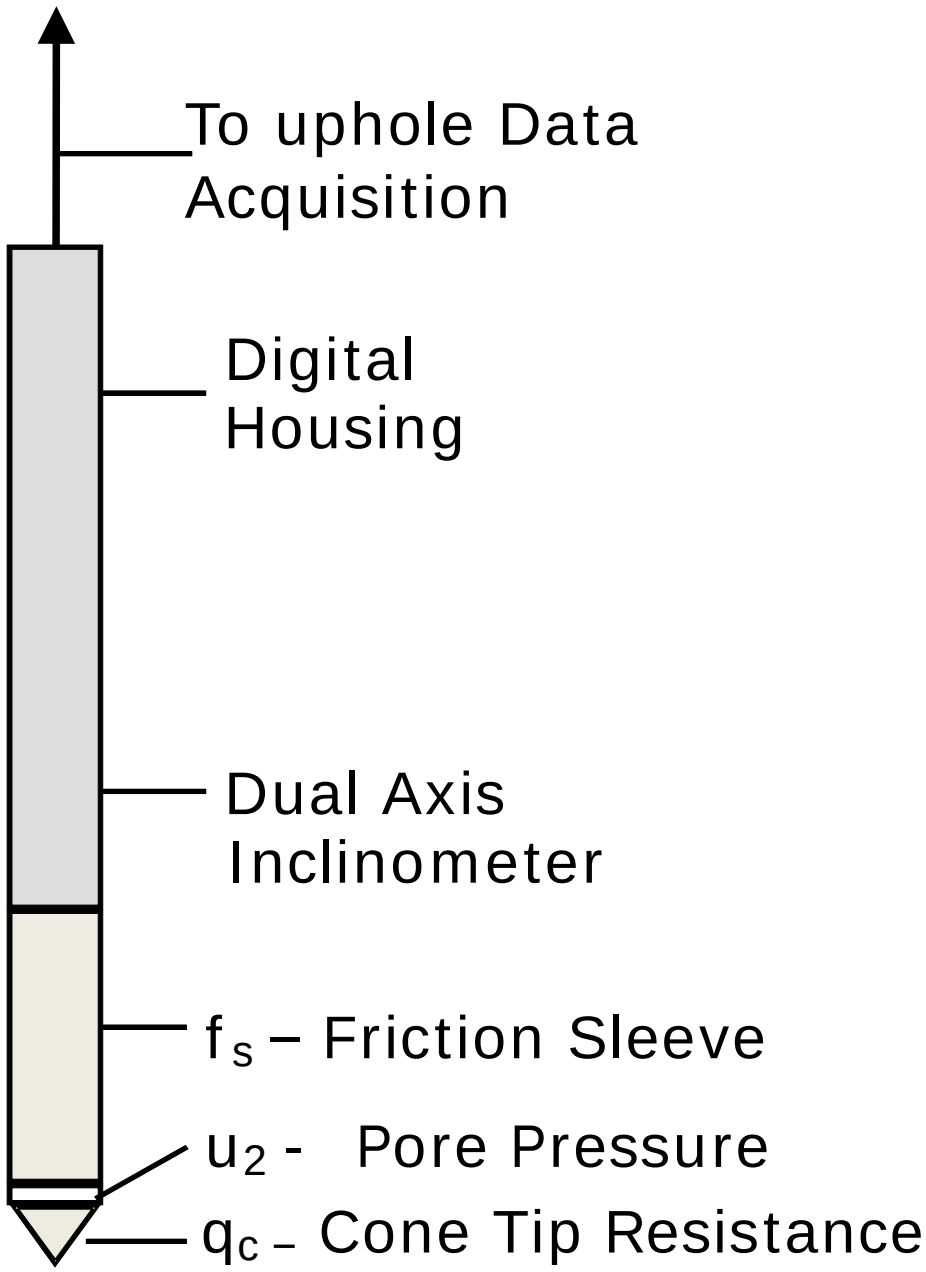
01 - GOLDER - BOREHOLE RECORD - DF STD US LAB E-M.GDT - 5/19/15 23:10
\\ATL1-S-FS1-V-M\GOLDER\ATLANTA\CLIENTS\RICHMOND OFFICE\1520347 BREMO CLOSURE\300_FIELD INFORMATION\2015 BORINGS\GINT\1520347_PREMIER_BORING_LOGS.GPJ



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SCHEMATIC OF A CONVENTIONAL PIEZOCONE (CPTu)

FIGURE	CPT LEGEND - 1

Presented below is a list of formulas used for the estimation of various soil properties. The formulas are presented in SI unit system and assume that all components are expressed in the same units.

:: Unit Weight, g (kN/m³) ::

$$g = g_w \cdot \left(0.27 \cdot \log(R_f) + 0.36 \cdot \log(\frac{q_t}{p_a}) + 1.236\right)$$

where g_w = water unit weight

:: Permeability, k (m/s) ::

$I_c < 3.27$ and $I_c > 1.00$ then $k = 10^{0.952-3.04 \cdot I_c}$

$I_c \leq 4.00$ and $I_c > 3.27$ then $k = 10^{-4.52-1.37 \cdot I_c}$

:: N_{SPT} (blows per 30 cm) ::

$$N_{60} = \left(\frac{q_c}{P_a}\right) \cdot \frac{1}{10^{1.1268-0.2817 \cdot I_c}}$$

$$N_{1(60)} = Q_{tn} \cdot \frac{1}{10^{1.1268-0.2817 \cdot I_c}}$$

:: Young's Modulus, Es (MPa) ::

$$(q_t - \sigma_v) \cdot 0.015 \cdot 10^{0.55 \cdot I_c + 1.68}$$

(applicable only to $I_c < I_{c_cutoff}$)

:: Relative Density, Dr (%) ::

$$100 \cdot \sqrt{\frac{Q_{tn}}{k_{DR}}}$$

(applicable only to SBT_n: 5, 6, 7 and 8 or $I_c < I_{c_cutoff}$)

:: State Parameter, ψ ::

$$\psi = 0.56 - 0.33 \cdot \log(Q_{tn,cs})$$

:: Peak drained friction angle, φ (°) ::

$$\varphi = 17.60 + 11 \cdot \log(Q_{tn})$$

(applicable only to SBT_n: 5, 6, 7 and 8)

:: 1-D constrained modulus, M (MPa) ::

If $I_c > 2.20$

$\alpha = 14$ for $Q_{tn} > 14$

$\alpha = Q_{tn}$ for $Q_{tn} \leq 14$

$M_{CPT} = \alpha \cdot (q_t - \sigma_v)$

If $I_c \leq 2.20$

$M_{CPT} = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$

:: Small strain shear Modulus, Go (MPa) ::

$$G_0 = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$$

:: Shear Wave Velocity, Vs (m/s) ::

$$V_s = \left(\frac{G_0}{\rho}\right)^{0.50}$$

:: Undrained peak shear strength, Su (kPa) ::

$N_{kt} = 10.50 + 7 \cdot \log(F_r)$ or user defined

$$S_u = \frac{(q_t - \sigma_v)}{N_{kt}}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c_cutoff}$)

:: Remolded undrained shear strength, Su(rem) (kPa) ::

$S_{u(rem)} = f_s$ (applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c_cutoff}$)

:: Overconsolidation Ratio, OCR ::

$$k_{OCR} = \left[\frac{Q_{tn}^{0.20}}{0.25 \cdot (10.50 \cdot +7 \cdot \log(F_r))}\right]^{1.25}$$ or user defined

$OCR = k_{OCR} \cdot Q_{tn}$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c_cutoff}$)

:: In situ Stress Ratio, Ko ::

$$K_O = (1 - \sin\varphi') \cdot OCR^{\sin\varphi'}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c_cutoff}$)

:: Soil Sensitivity, S_t ::

$$S_t = \frac{N_S}{F_r}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c_cutoff}$)

:: Effective Stress Friction Angle, φ' (°) ::

$$\varphi' = 29.5° \cdot B_q^{0.121} \cdot (0.256 + 0.336 \cdot B_q + \log Q_t)$$

(applicable for $0.10 < B_q < 1.00$)

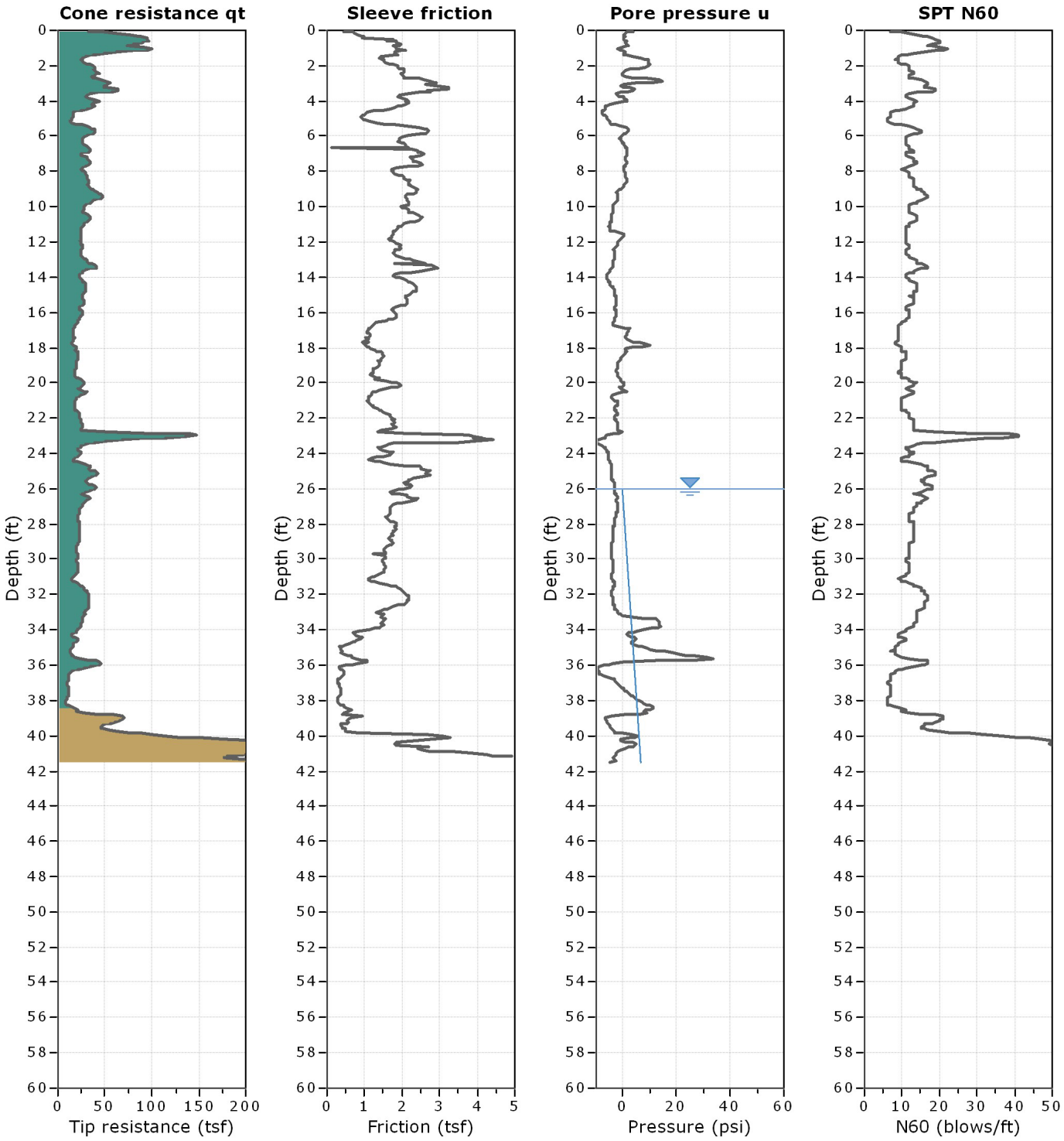
References

- Robertson, P.K., Cabal K.L., Guide to Cone Penetration Testing for Geotechnical Engineering, Gregg Drilling & Testing, Inc., 5th Edition, November 2012
- Robertson, P.K., Interpretation of Cone Penetration Tests - a unified approach., Can. Geotech. J. 46(11): 1337–1355 (2009)

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-01
Total depth: 41.50 ft, Date: 3/21/2015
Surface Elevation: 235.40 ft
Coords: N 37.70554, W 78.28134

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

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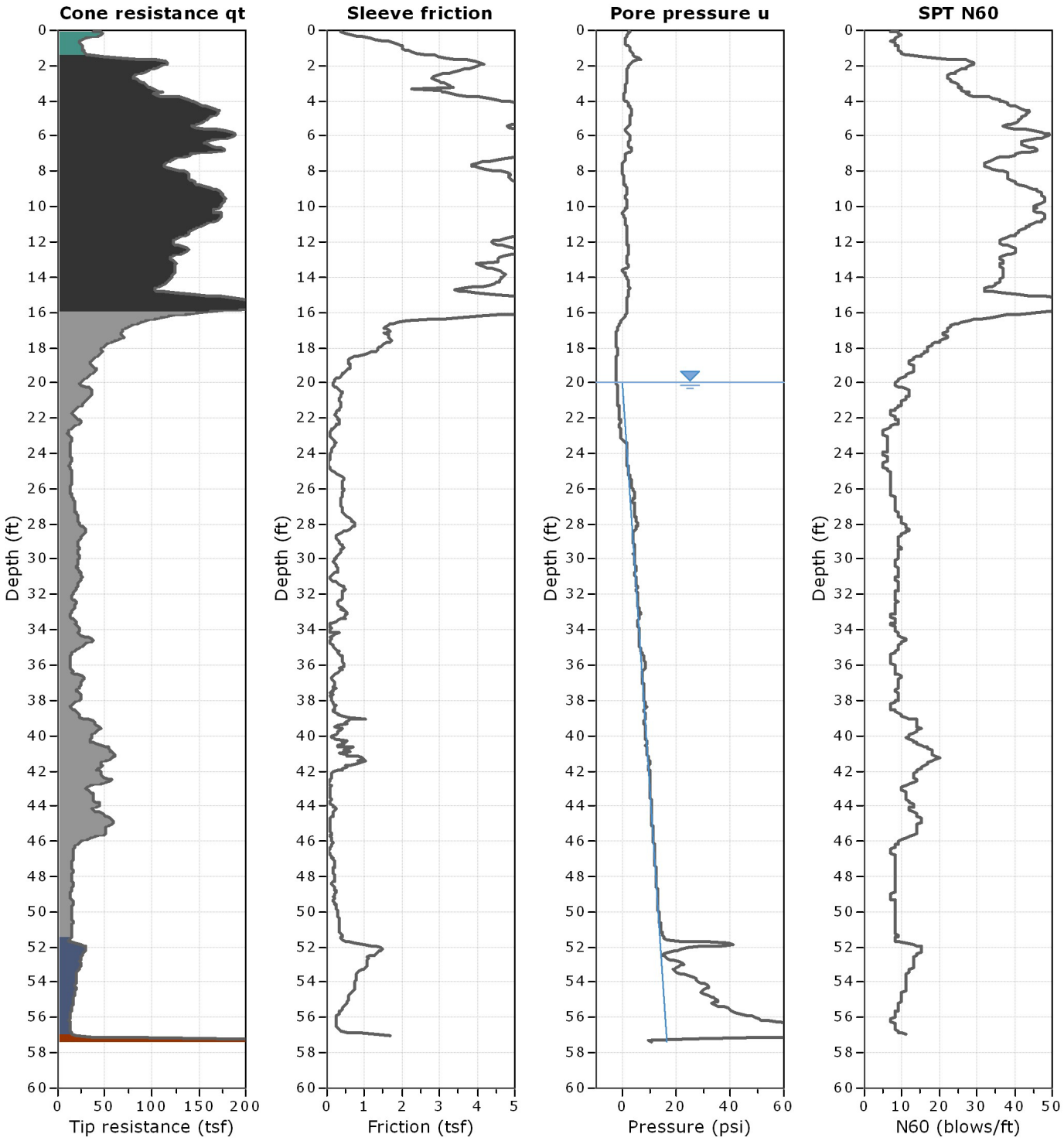
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-03
Total depth: 57.40 ft, Date: 3/20/2015
Surface Elevation: 252.70 ft
Coords: N 37.70788, W 78.28387

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

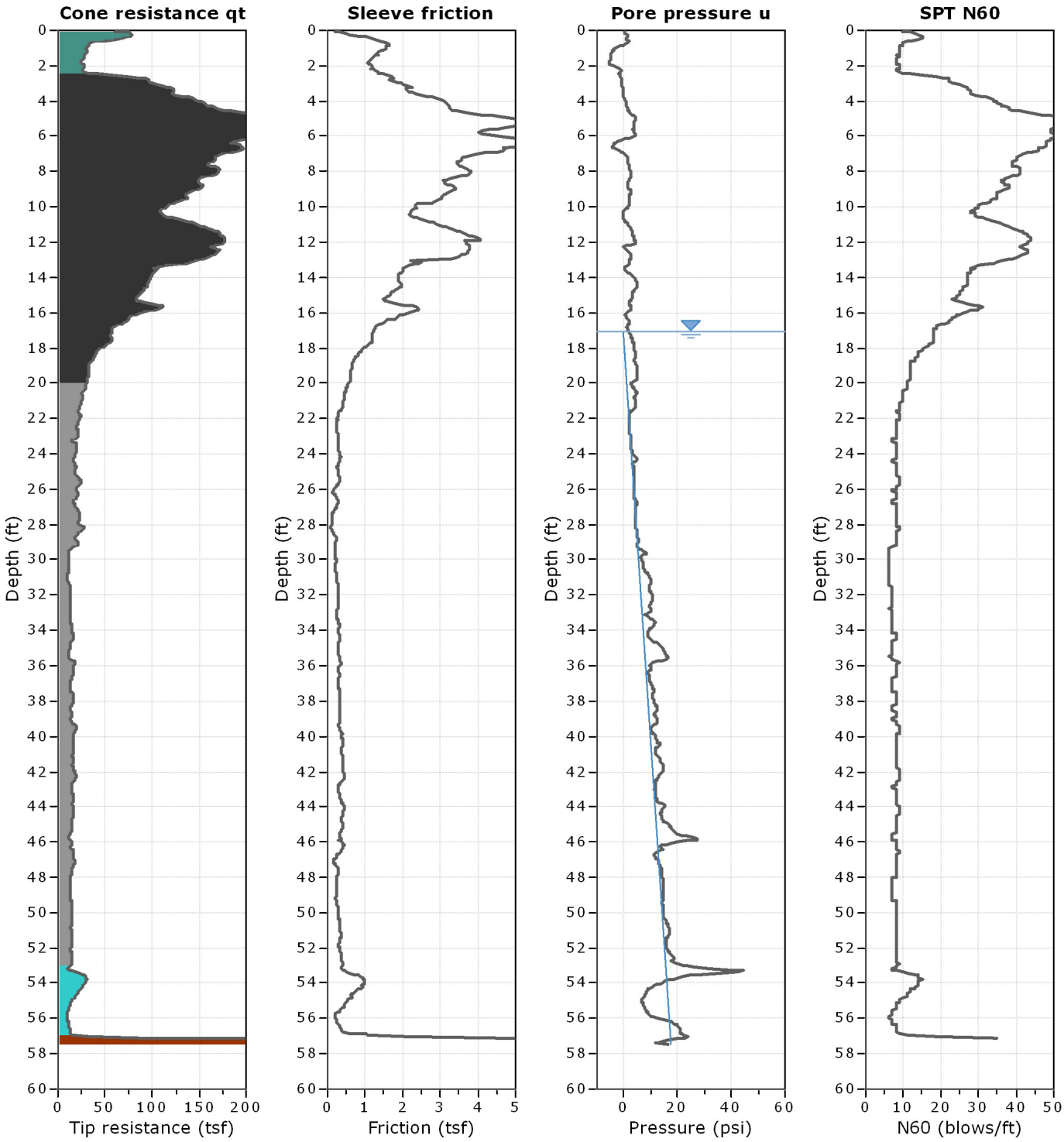


SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-04
Total depth: 57.50 ft, Date: 3/17/2015
Surface Elevation: 253.10 ft
Coords: N 37.70793, W 78.28250

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

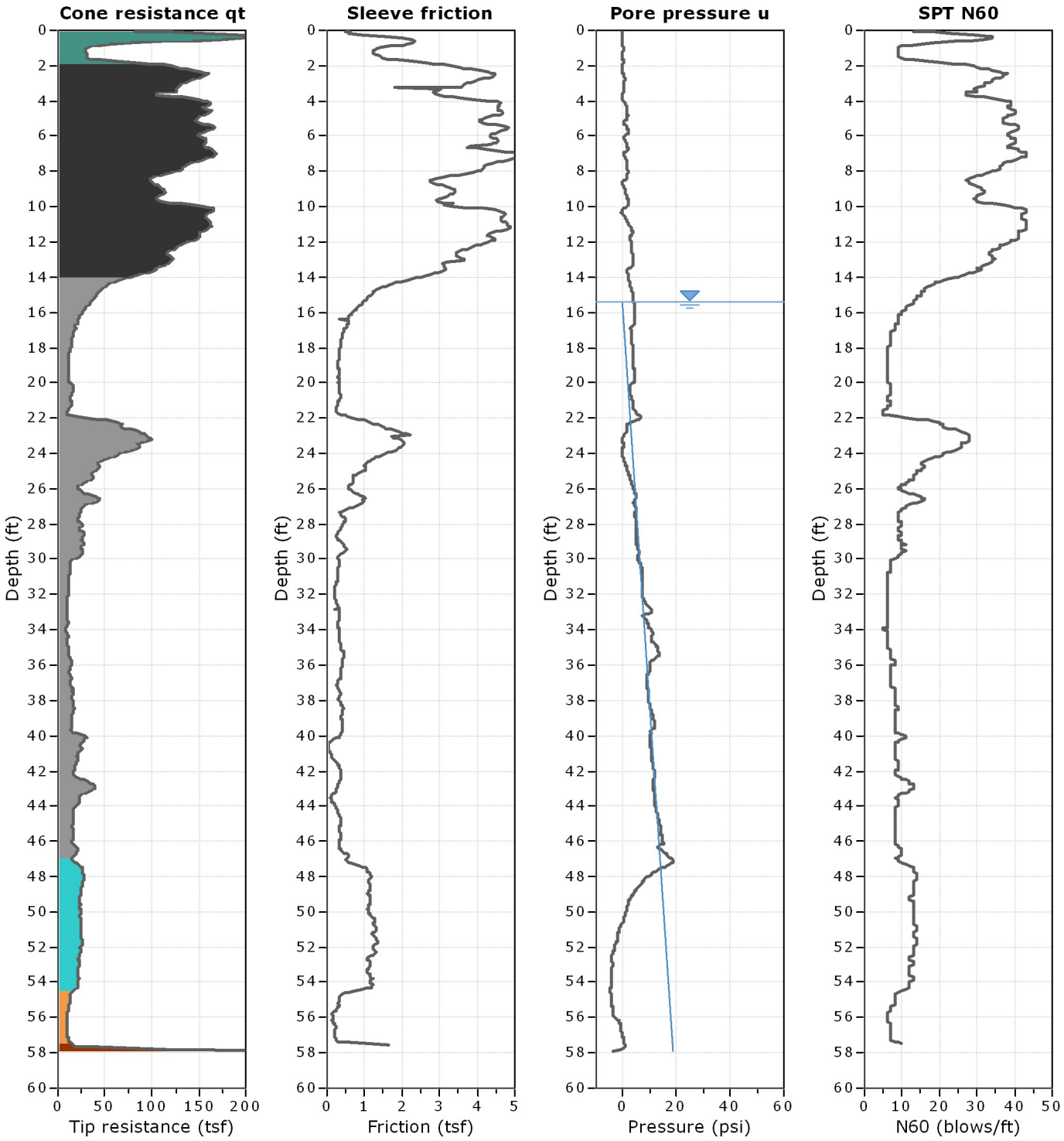


SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-05
Total depth: 57.90 ft, Date: 3/17/2015
Surface Elevation: 252.30 ft
Coords: N 37.70705, W 78.28143

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

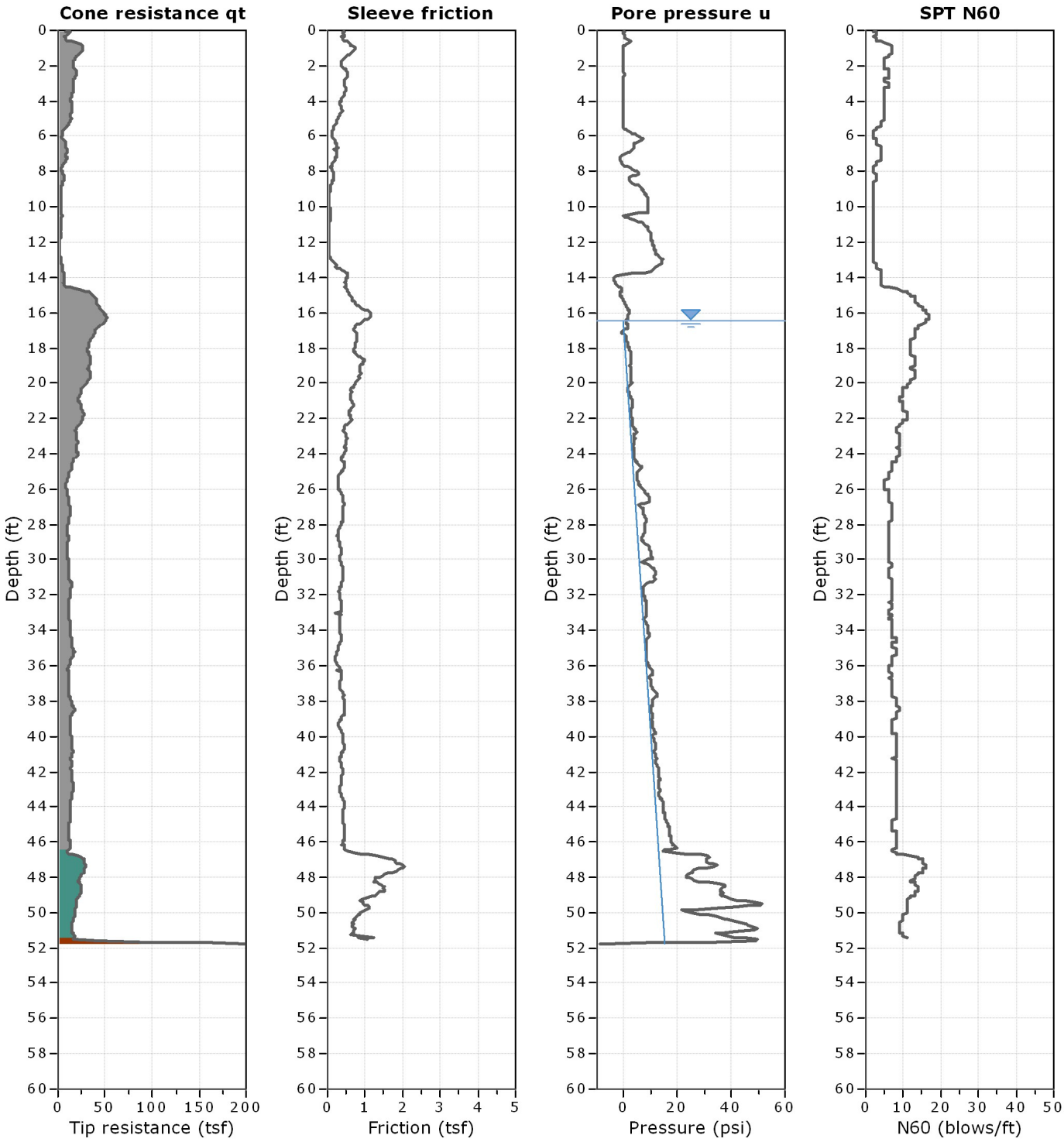


SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-06
Total depth: 51.80 ft, Date: 3/18/2015
Surface Elevation: 246.10 ft
Coords: N 37.70649, W 78.28187

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

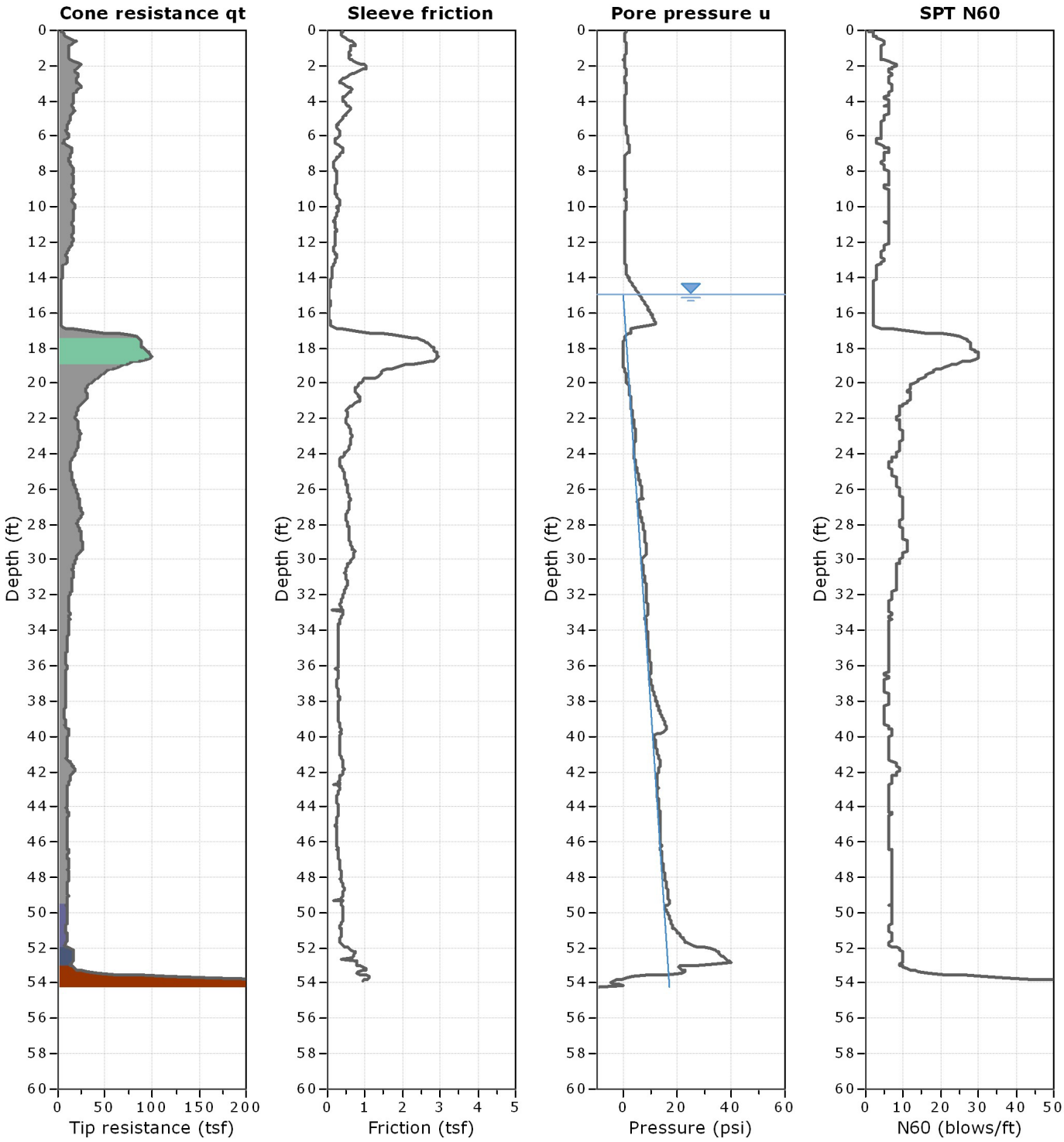


SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-07
Total depth: 54.20 ft, Date: 3/18/2015
Surface Elevation: 247.90 ft
Coords: N 37.70699, W 78.28271

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

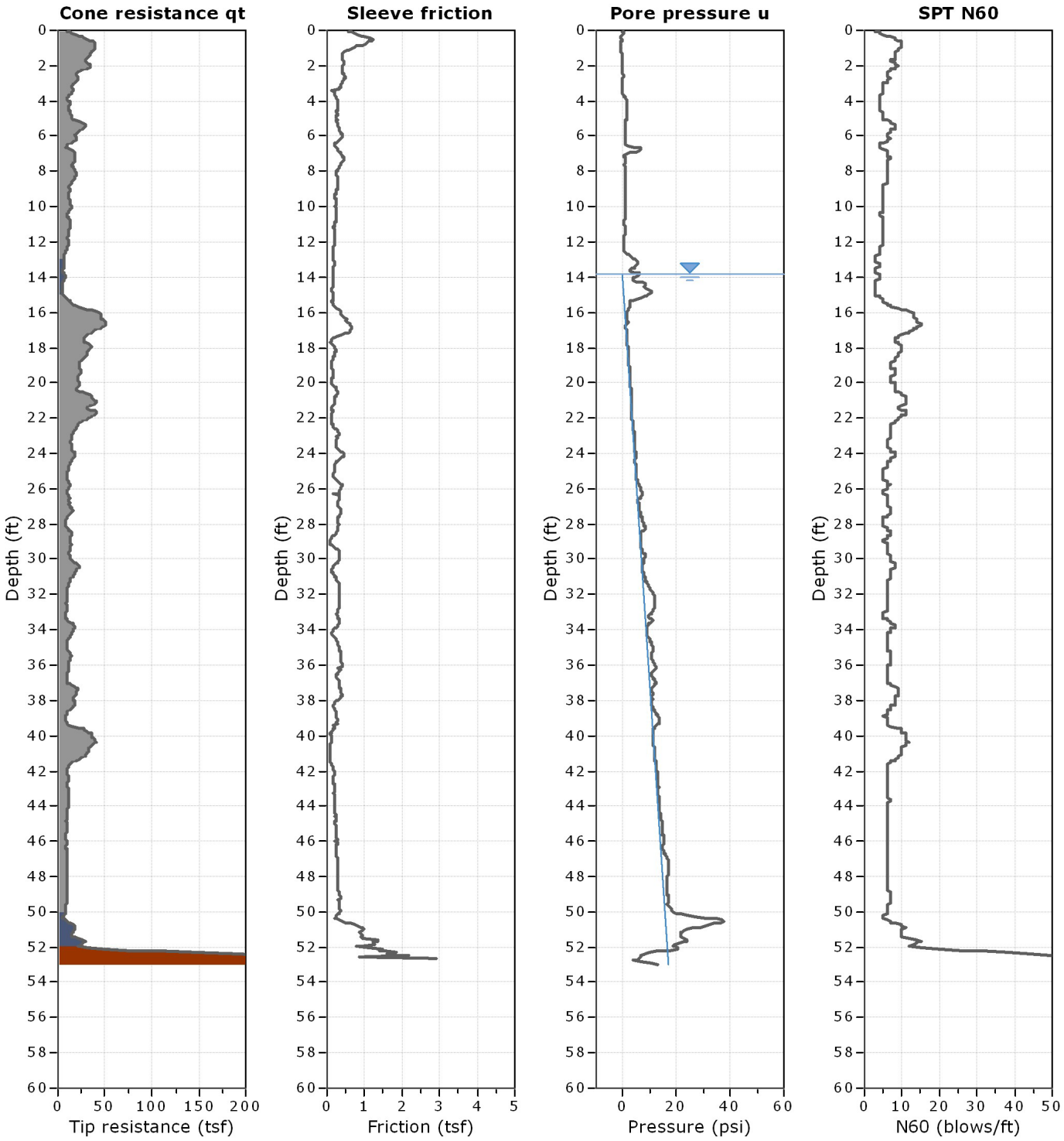


SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-08
Total depth: 53.00 ft, Date: 3/18/2015
Surface Elevation: 247.70 ft
Coords: N 37.70753, W 78.28343

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

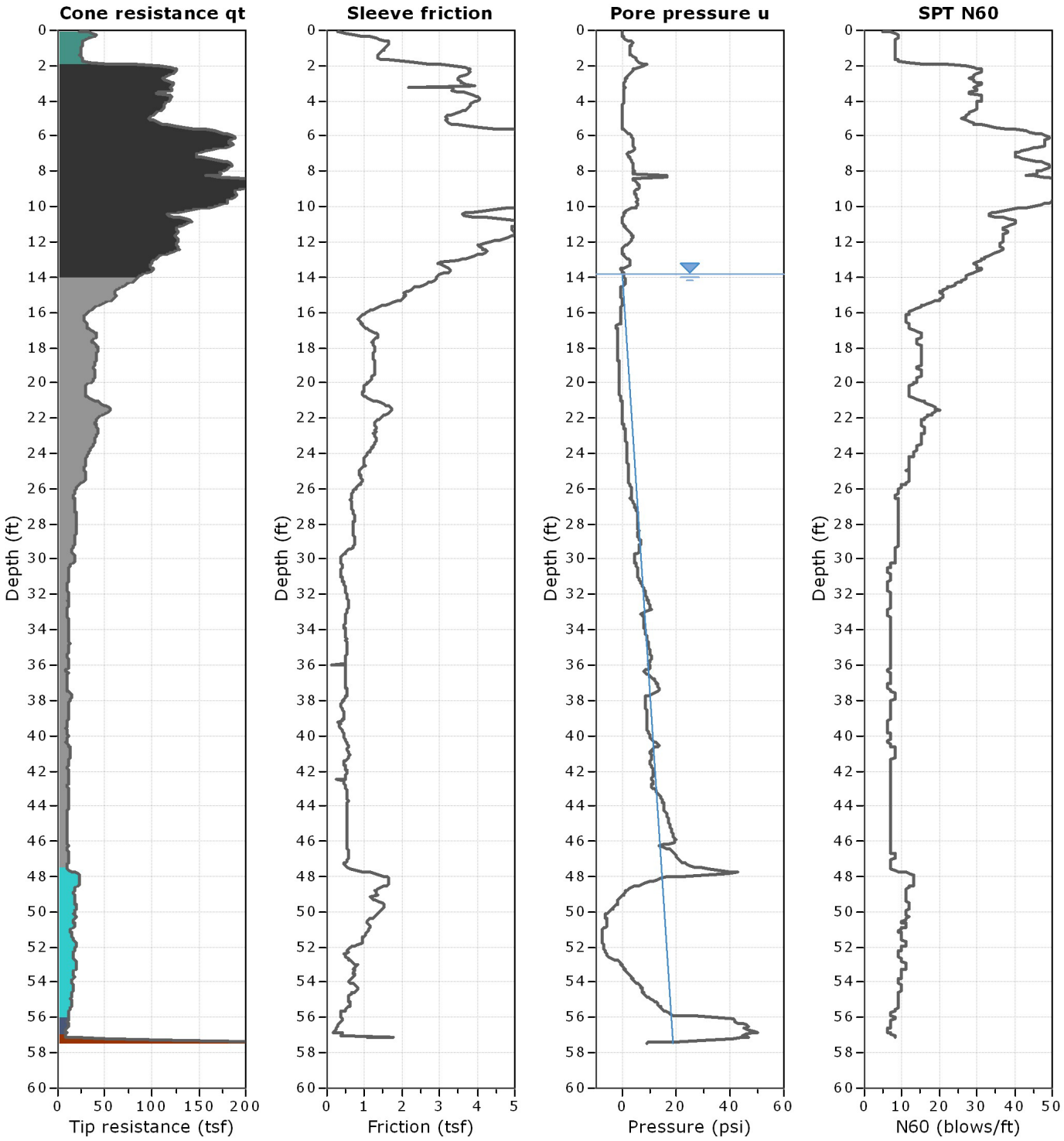


SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-09
Total depth: 57.50 ft, Date: 3/20/2015
Surface Elevation: 252.30 ft
Coords: N 37.70603, W 78.28229

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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SILTY SAND
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CCR/CLAY MIX
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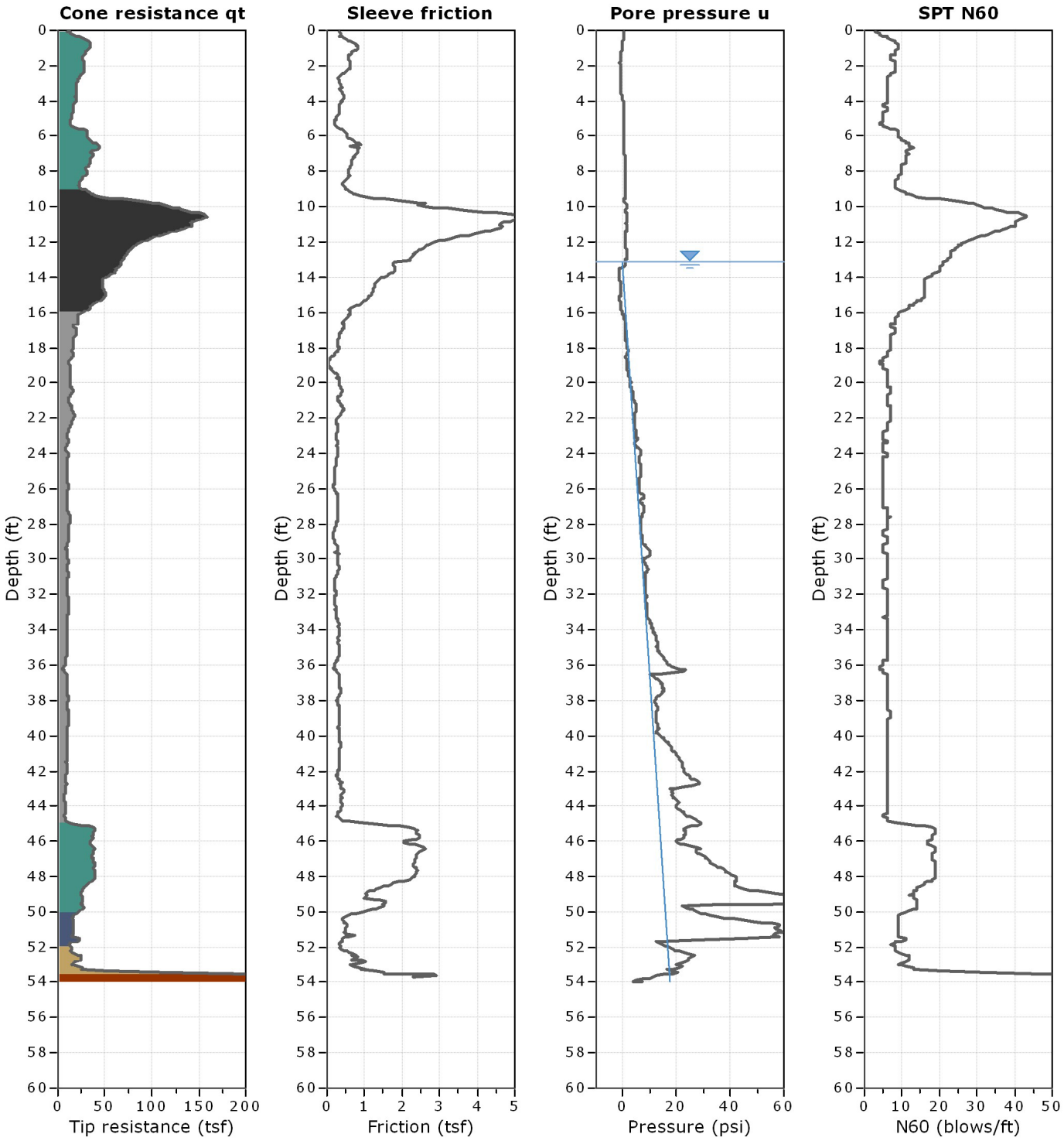
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-10
Total depth: 54.00 ft, Date: 3/18/2015
Surface Elevation: 248.50 ft
Coords: N 37.70560, W 78.28039

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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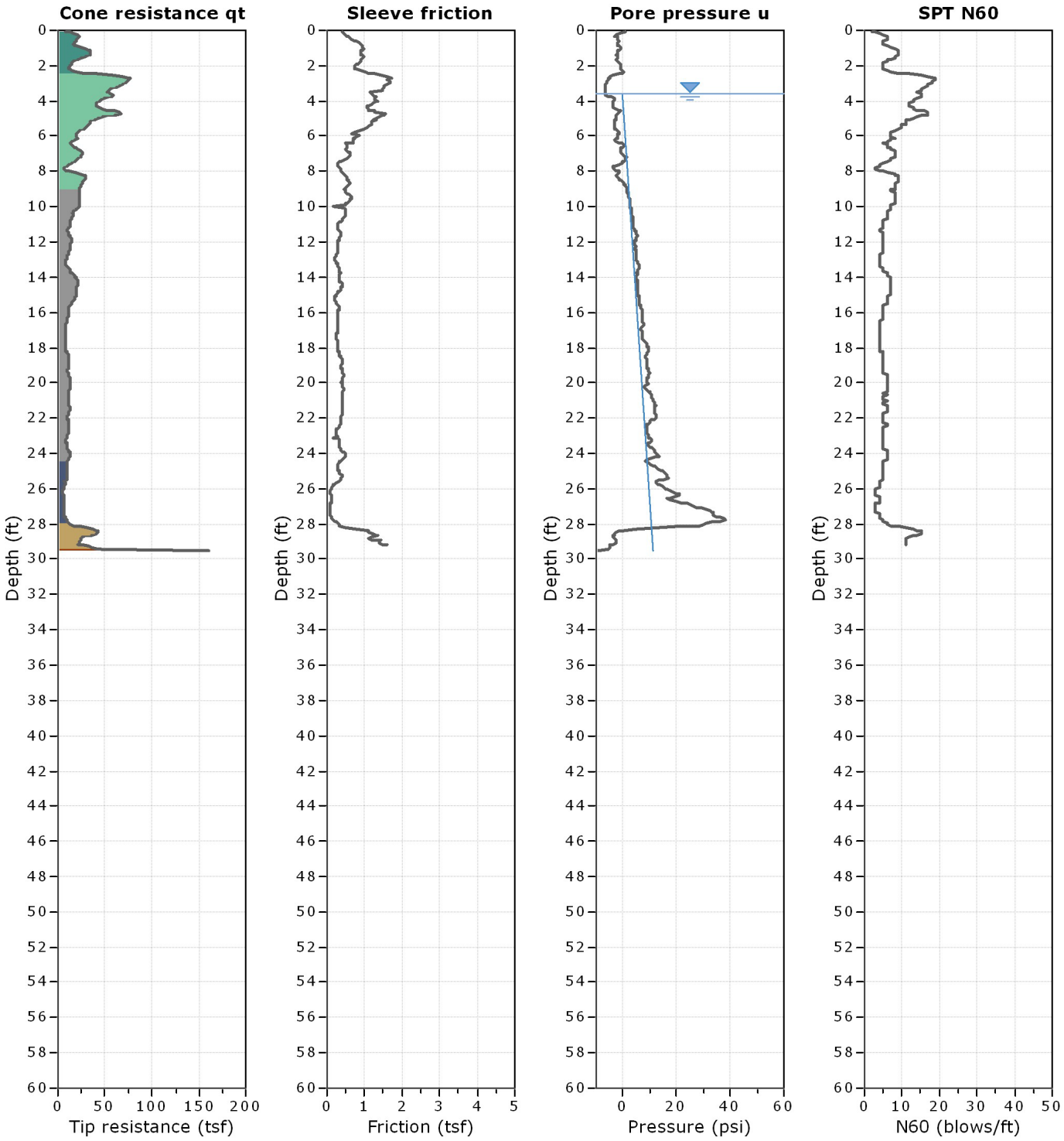
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-11
Total depth: 29.50 ft, Date: 3/21/2015
Surface Elevation: 235.70 ft
Coords: N 37.70685, W 78.28076

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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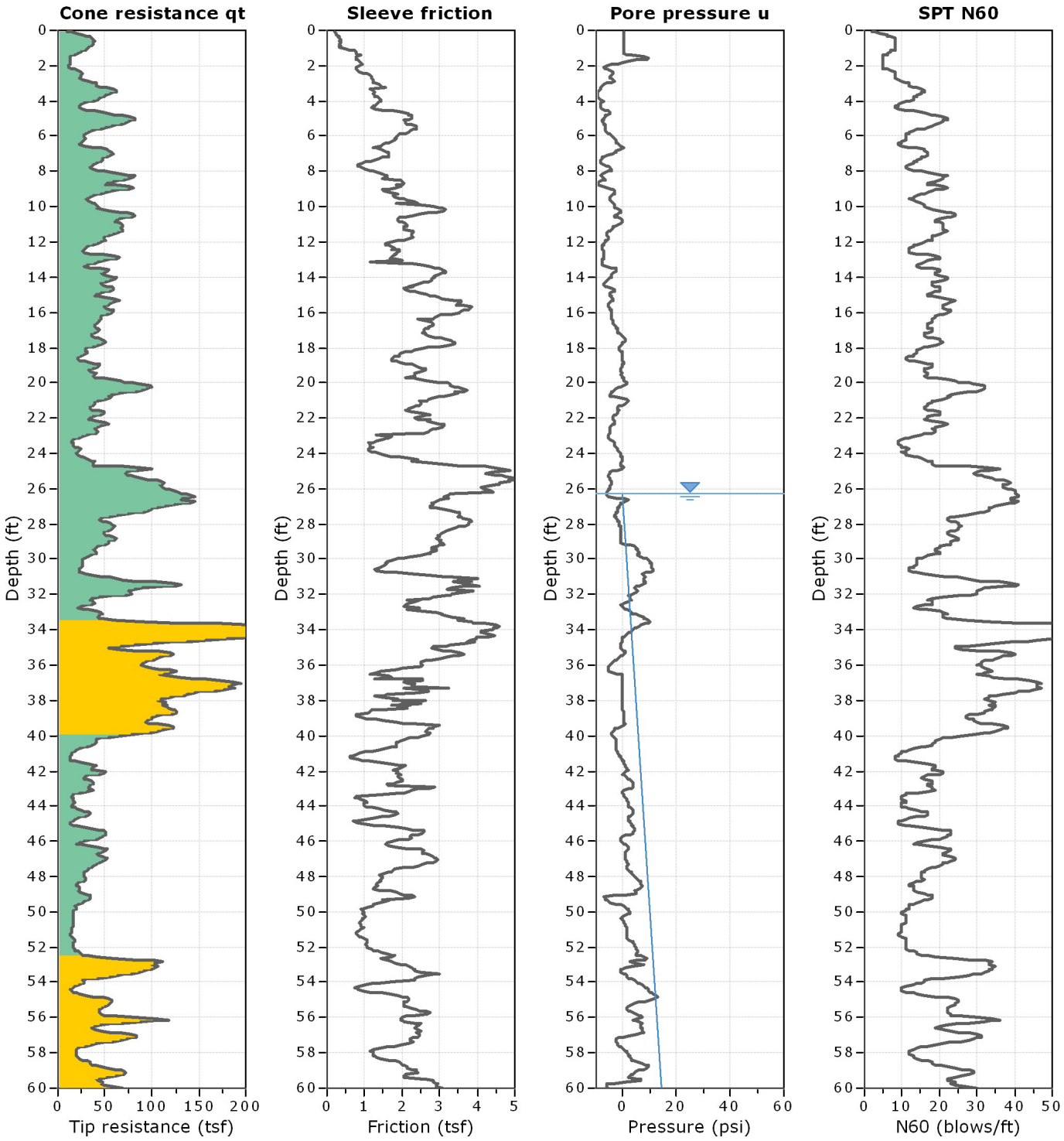
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-12
Total depth: 63.30 ft, Date: 3/24/2015
Surface Elevation: 272.60 ft
Coords: N 37.70707, W 78.28043

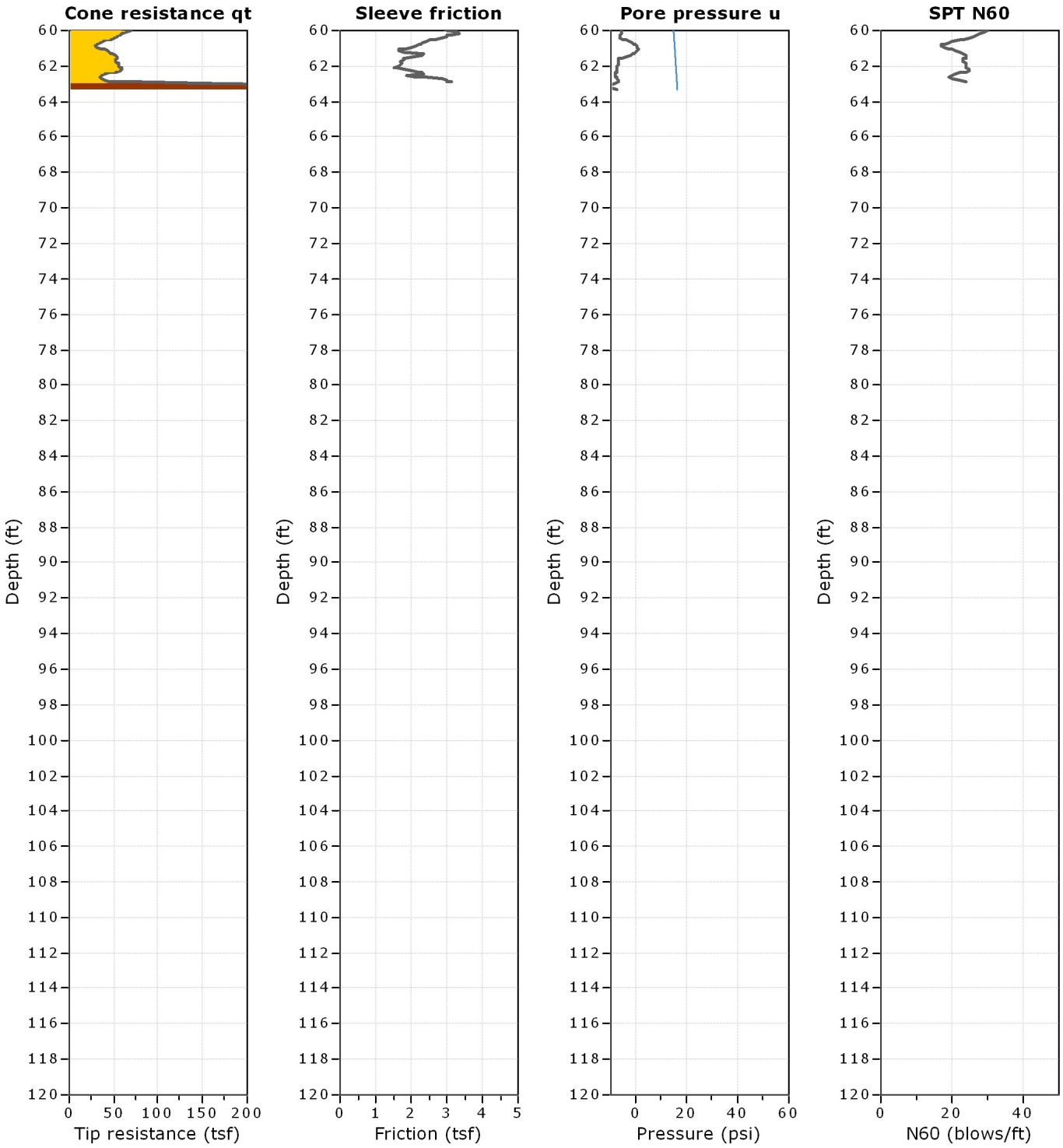
Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: EC-12
Total depth: 63.30 ft, Date: 3/24/2015
Surface Elevation: 272.60 ft
Coords: N 37.70707, W 78.28043

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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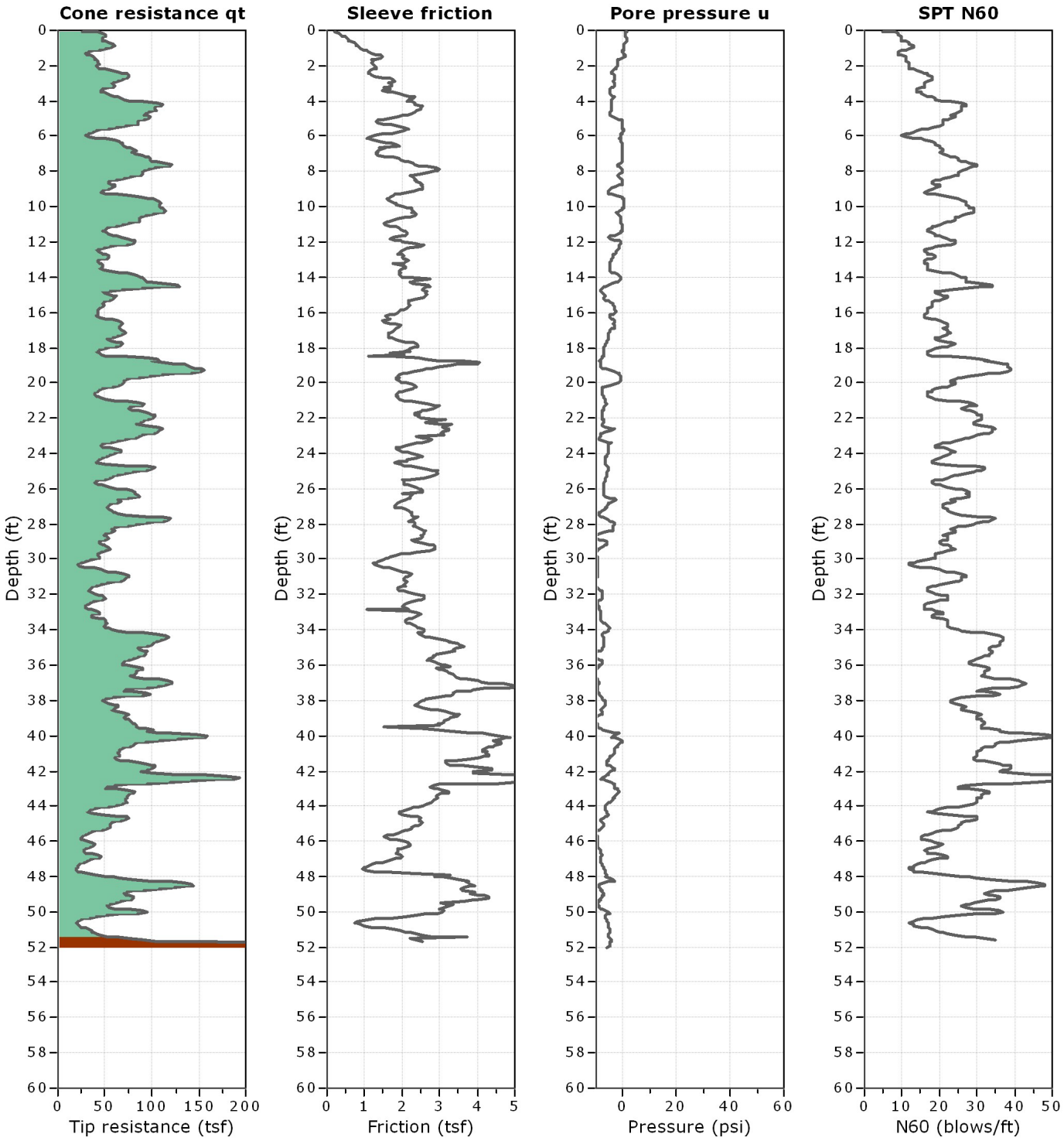
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-01
Total depth: 52.00 ft, Date: 3/19/2015
Surface Elevation: 333.90 ft
Coords: N 37.70699, W 78.27950

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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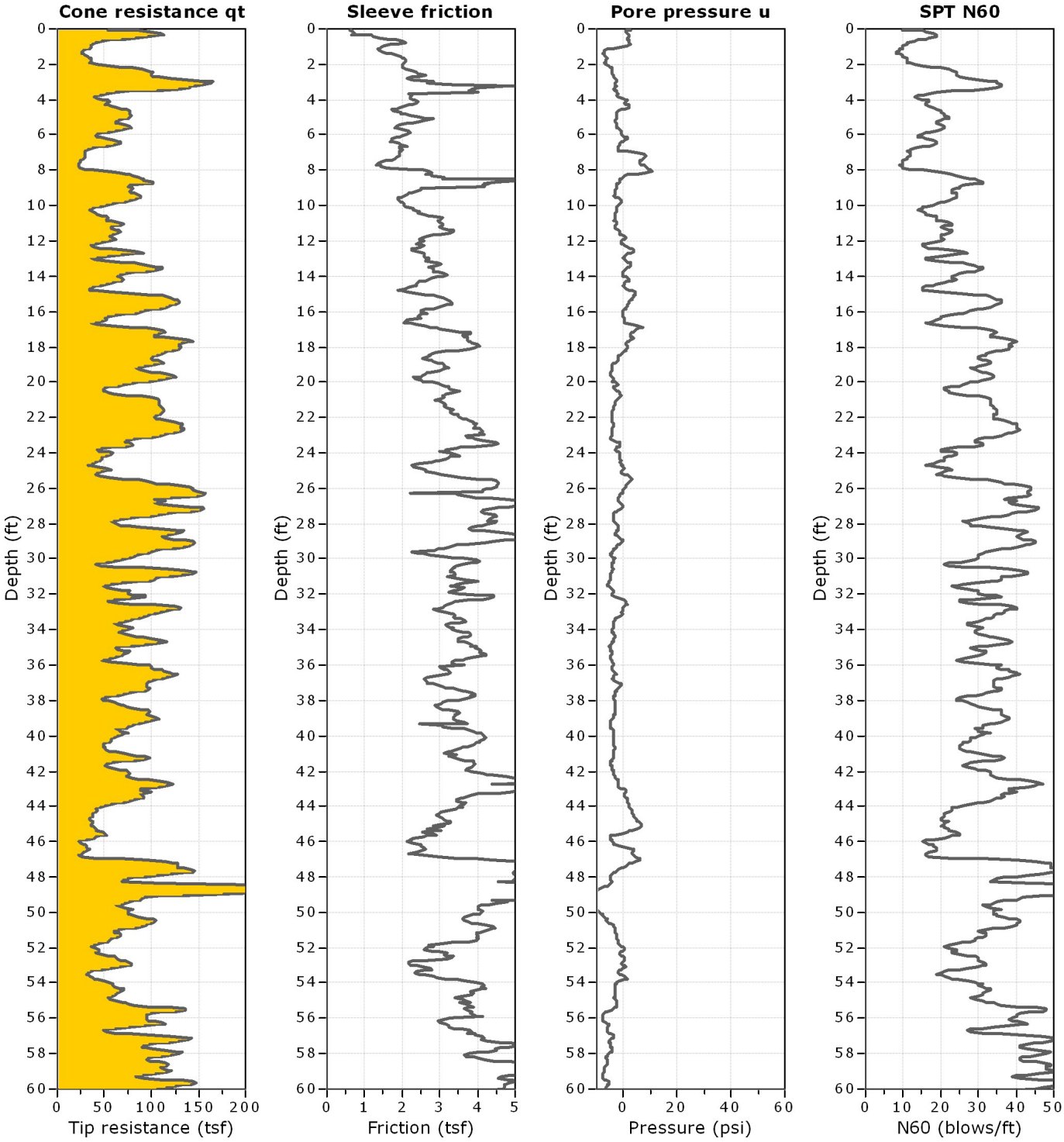
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-02
Total depth: 111.70 ft, Date: 3/25/2015
Surface Elevation: 334.50 ft
Coords: N 37.70779, W 78.28021

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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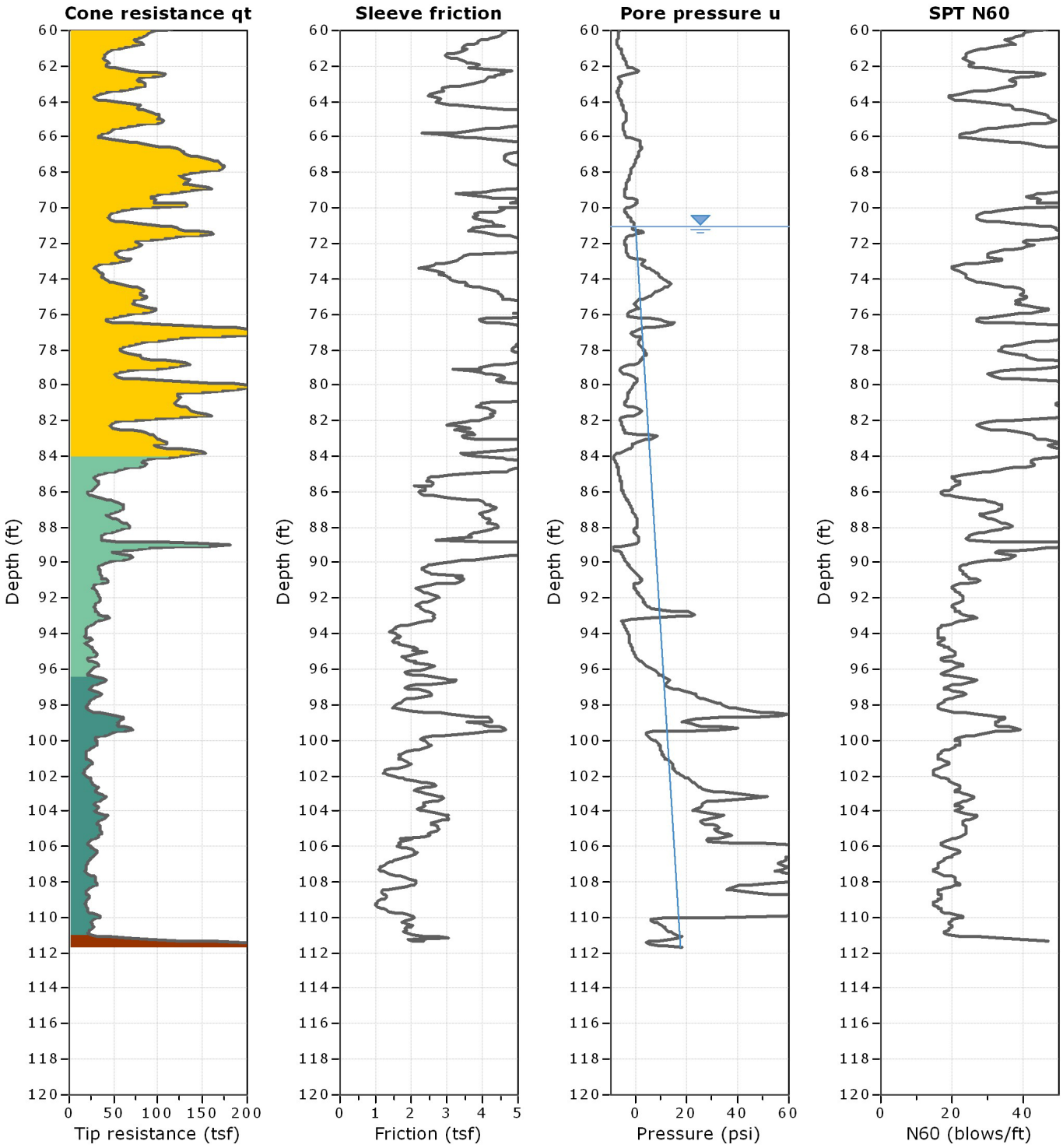
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-02
Total depth: 111.70 ft, Date: 3/25/2015
Surface Elevation: 334.50 ft
Coords: N 37.70779, W 78.28021

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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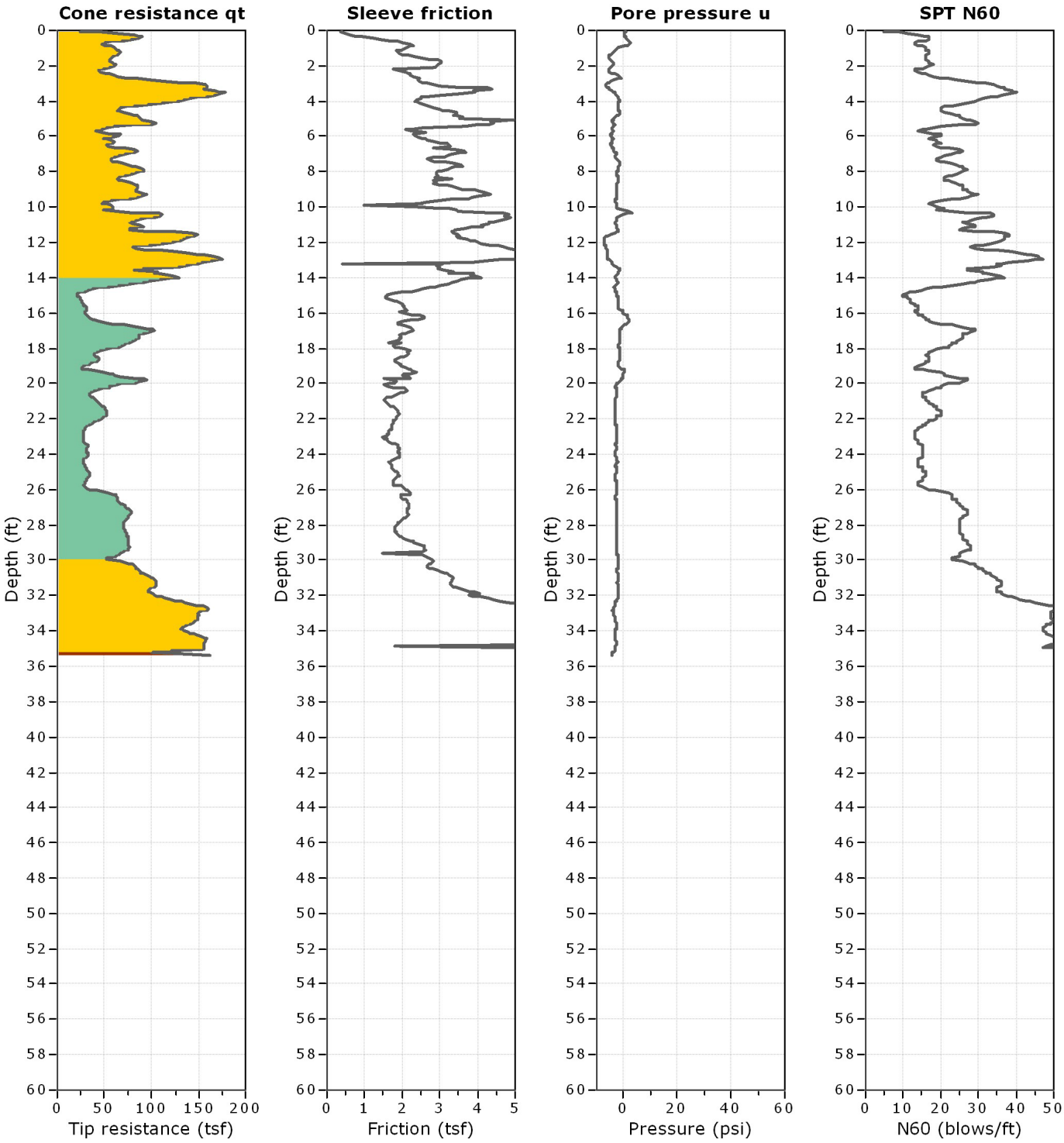
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-03
Total depth: 35.40 ft, Date: 3/20/2015
Surface Elevation: 333.90 ft
Coords: N 37.70887, W 78.28067

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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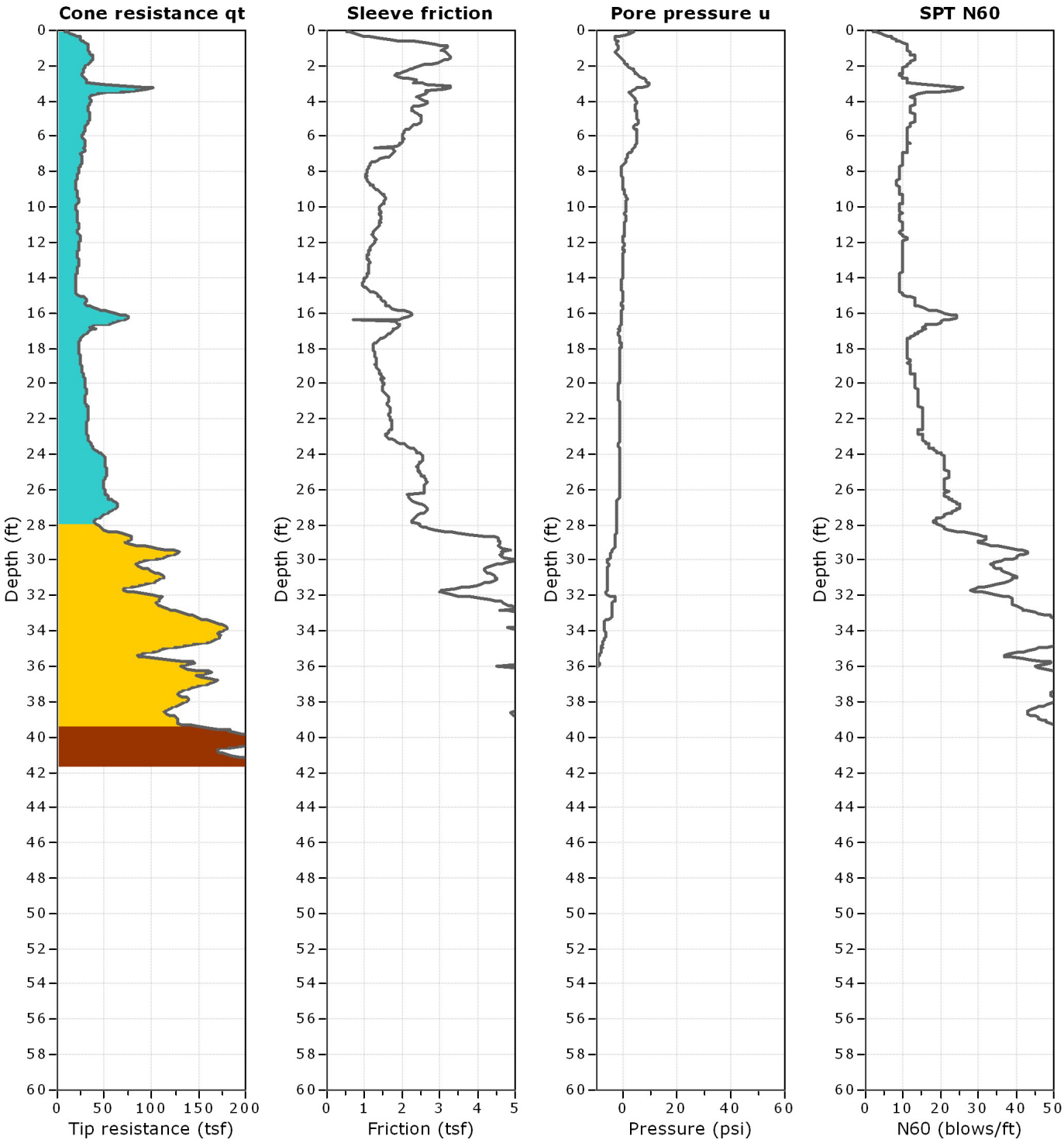
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-04
Total depth: 41.70 ft, Date: 3/20/2015
Surface Elevation: 333.80 ft
Coords: N 37.70958, W 78.27940

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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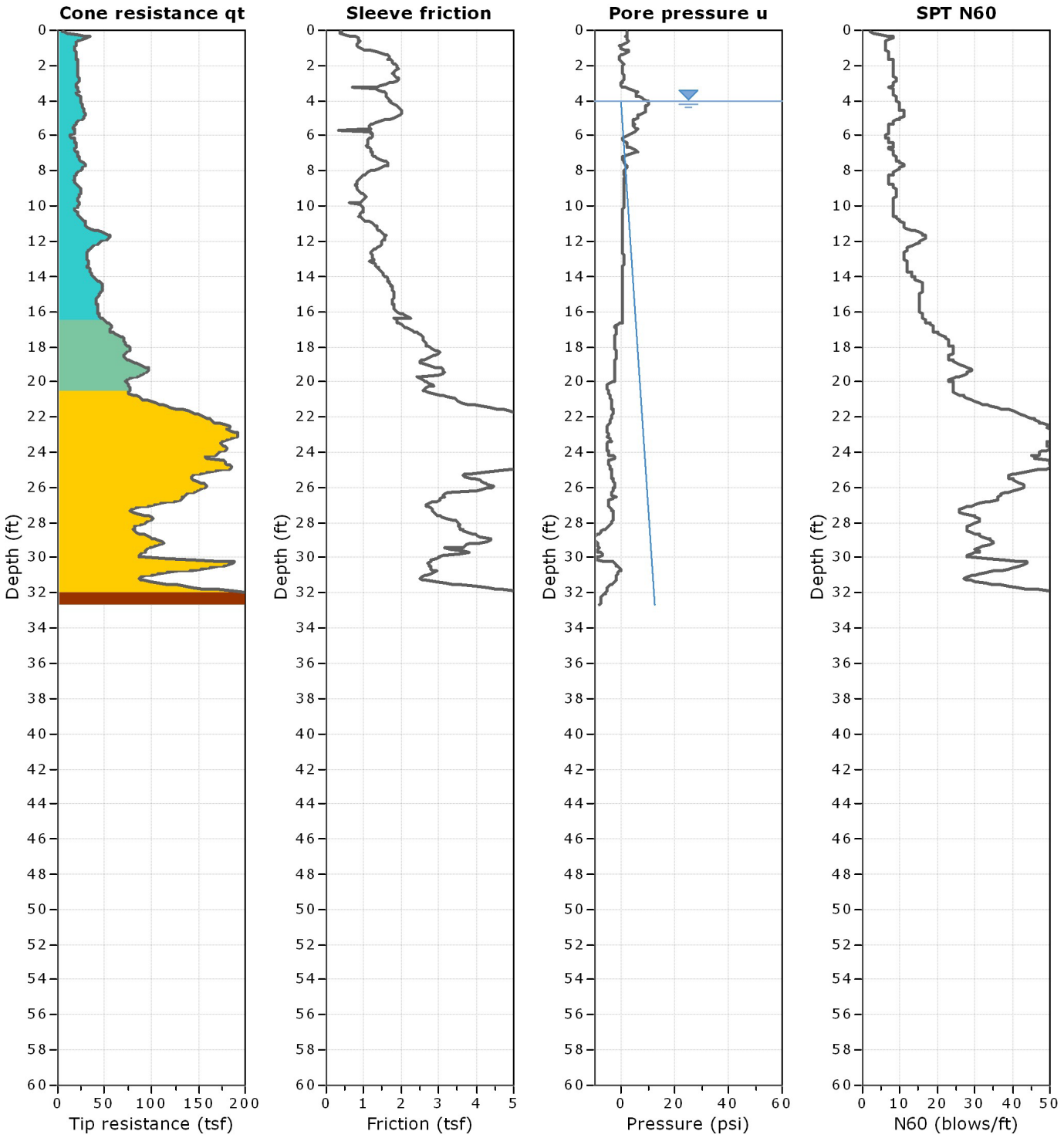
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-05
Total depth: 32.70 ft, Date: 3/20/2015
Surface Elevation: 330.90 ft
Coords: N 37.71065, W 78.27901

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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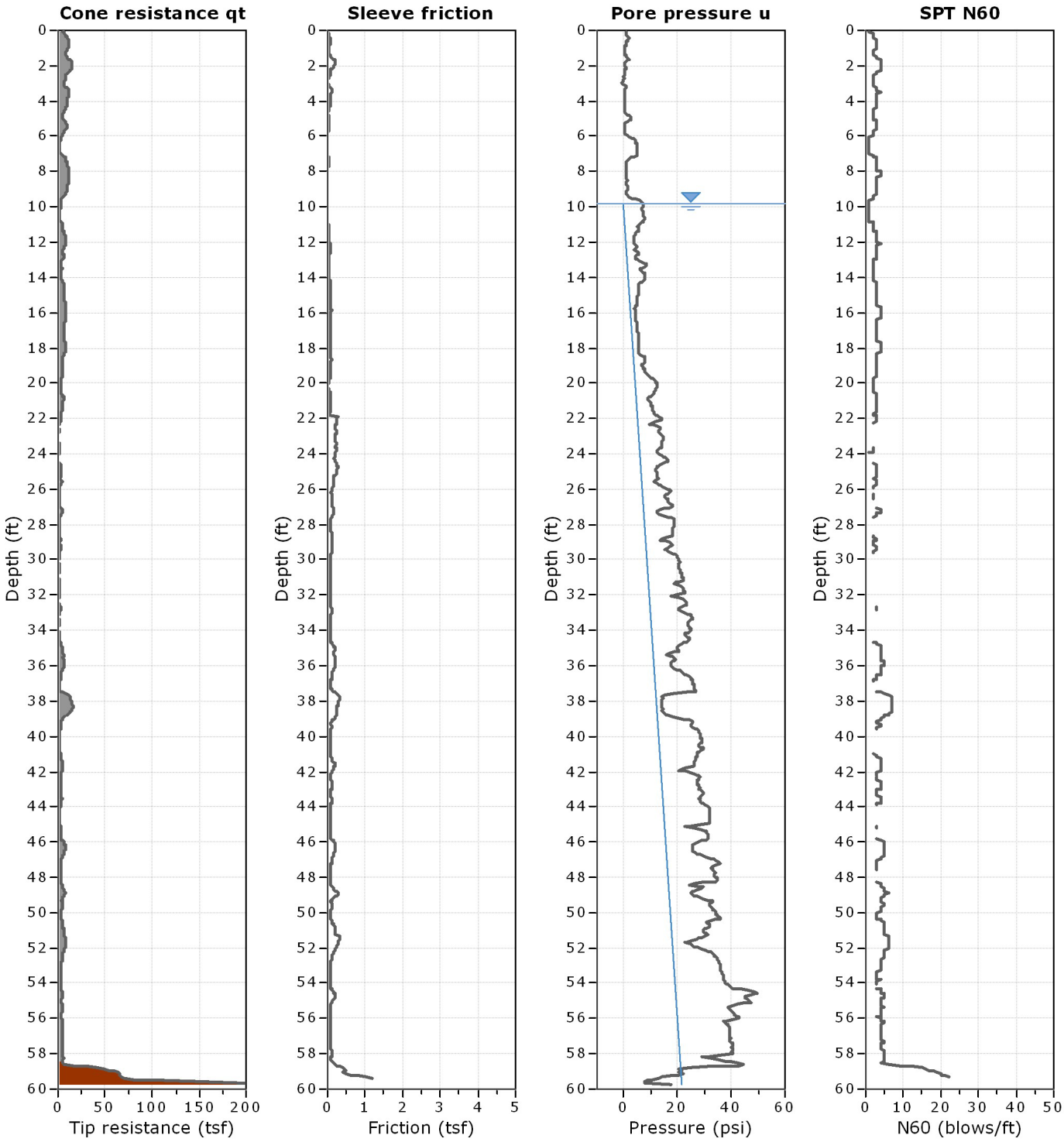
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-06
Total depth: 59.70 ft, Date: 3/21/2015
Surface Elevation: 323.40 ft
Coords: N 37.70861, W 78.27965

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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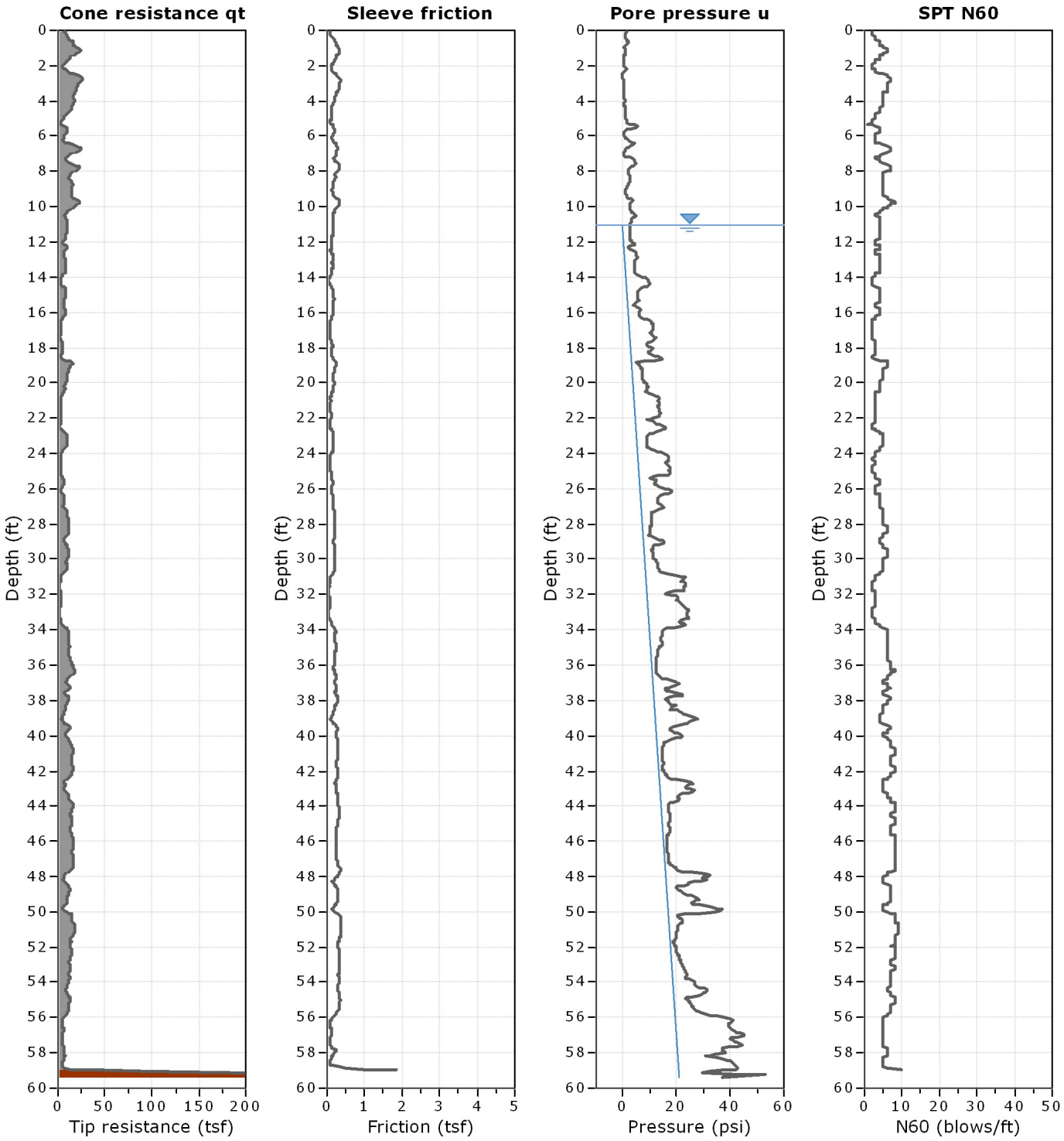
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-07
Total depth: 59.40 ft, Date: 3/23/2015
Surface Elevation: 328.90 ft
Coords: N 37.70911, W 78.27880

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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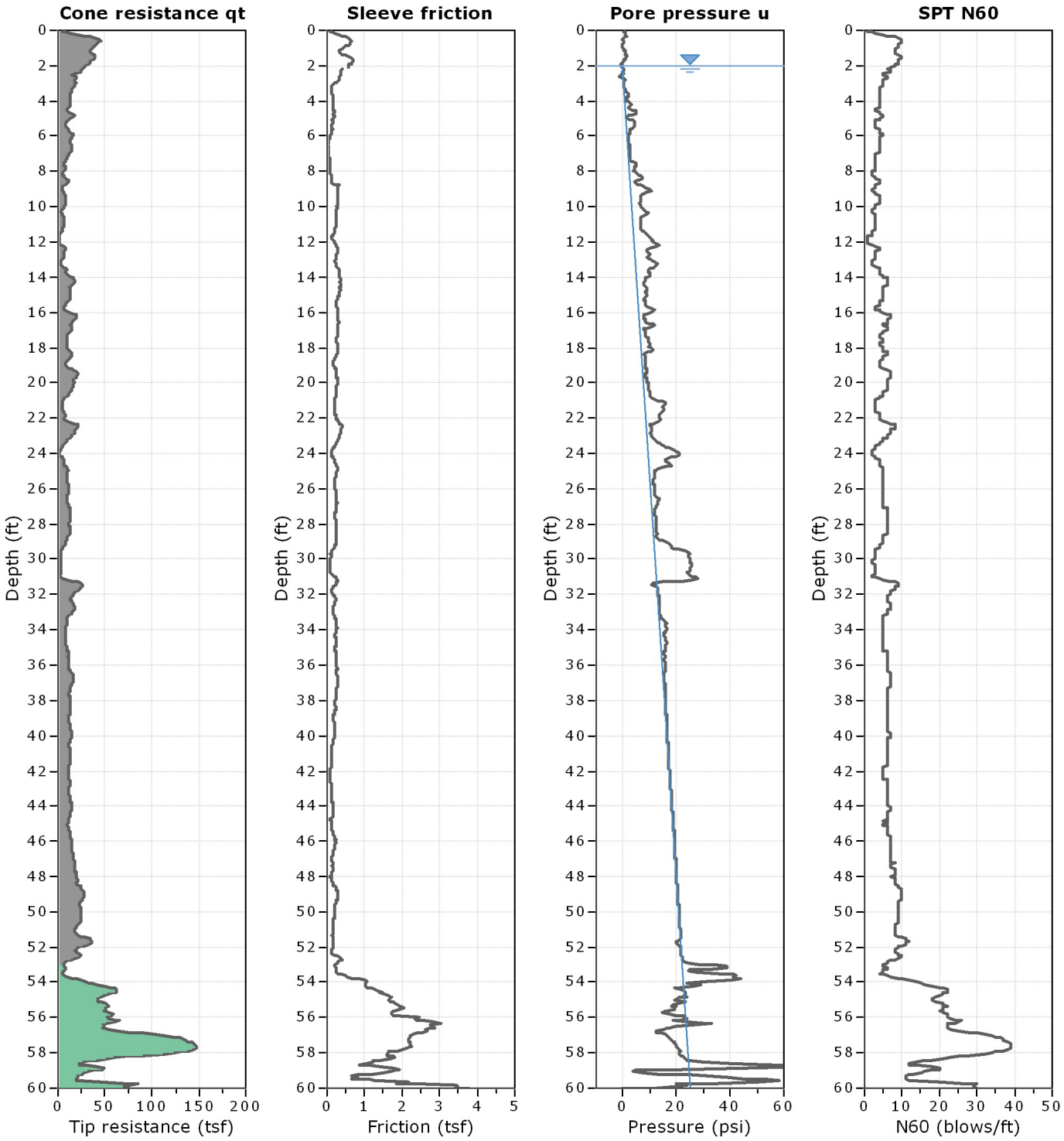
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

CPT: NC-08
Total depth: 61.08 ft, Date: 3/22/2015
Surface Elevation: 328.40 ft
Coords: N 37.71015, W 78.27819



SANDY SILTY CLAY
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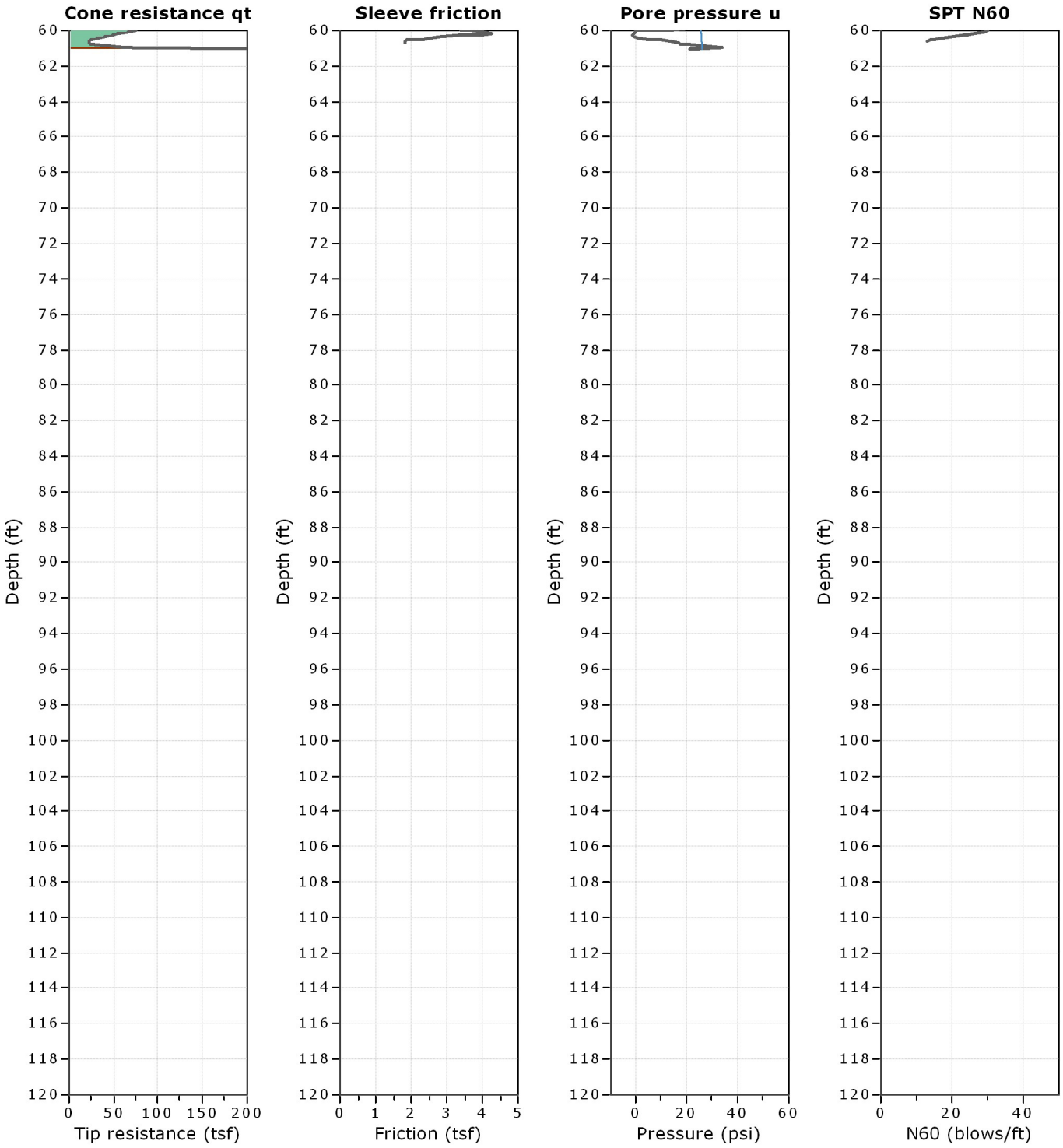
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

CPT: NC-08
Total depth: 61.08 ft, Date: 3/22/2015
Surface Elevation: 328.40 ft
Coords: N 37.71015, W 78.27819



SANDY SILTY CLAY
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PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
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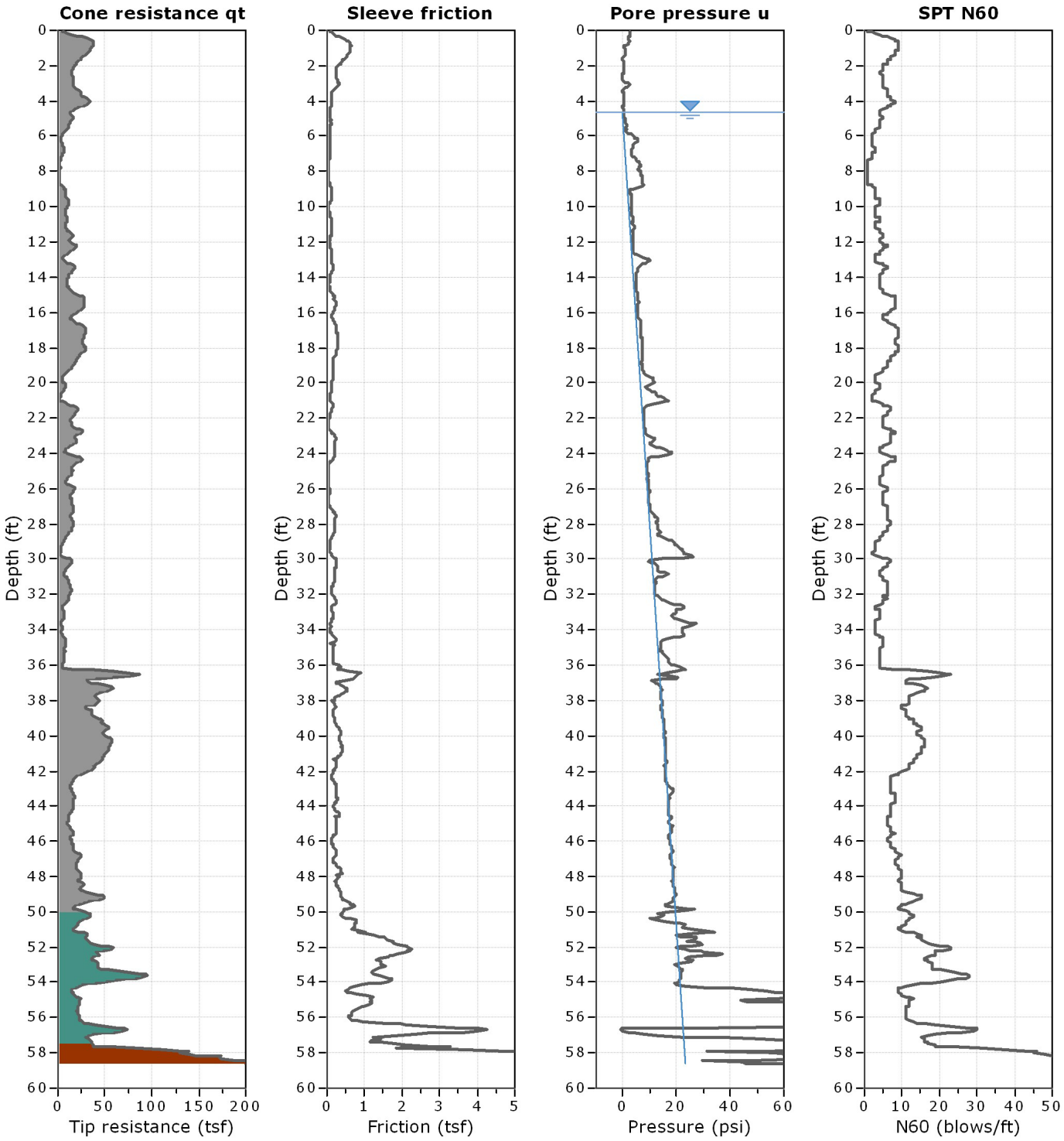
Atlanta, Georgia 30307
1 (770) 496-1893

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**

CPT: NC-09
Total depth: 58.61 ft, Date: 3/24/2015
Surface Elevation: 332.50 ft
Coords: N 37.71094, W 78.27600



SANDY SILTY CLAY
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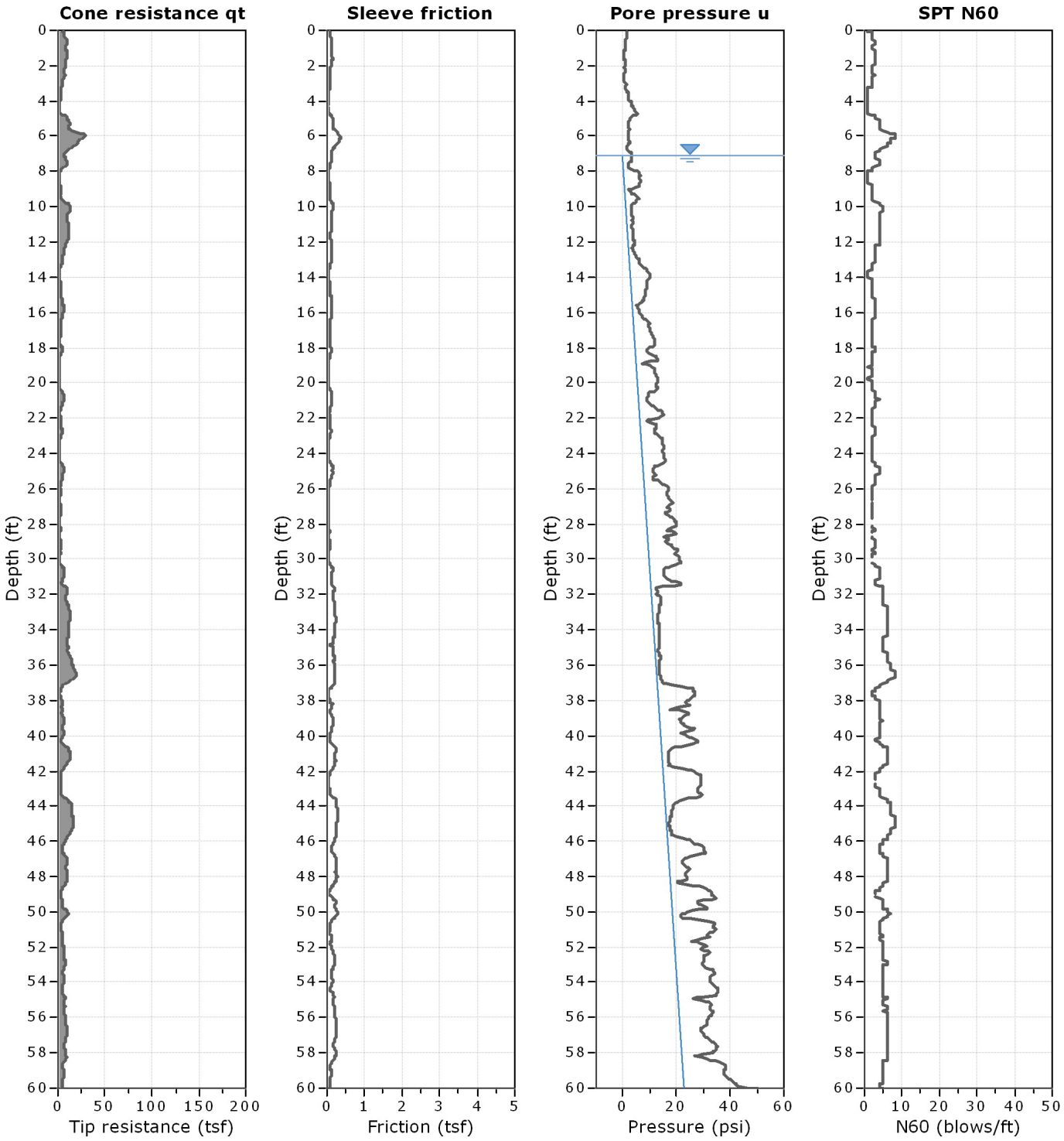
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-10
Total depth: 96.75 ft, Date: 3/23/2015
Surface Elevation: 325.60 ft
Coords: N 37.70826, W 78.27867

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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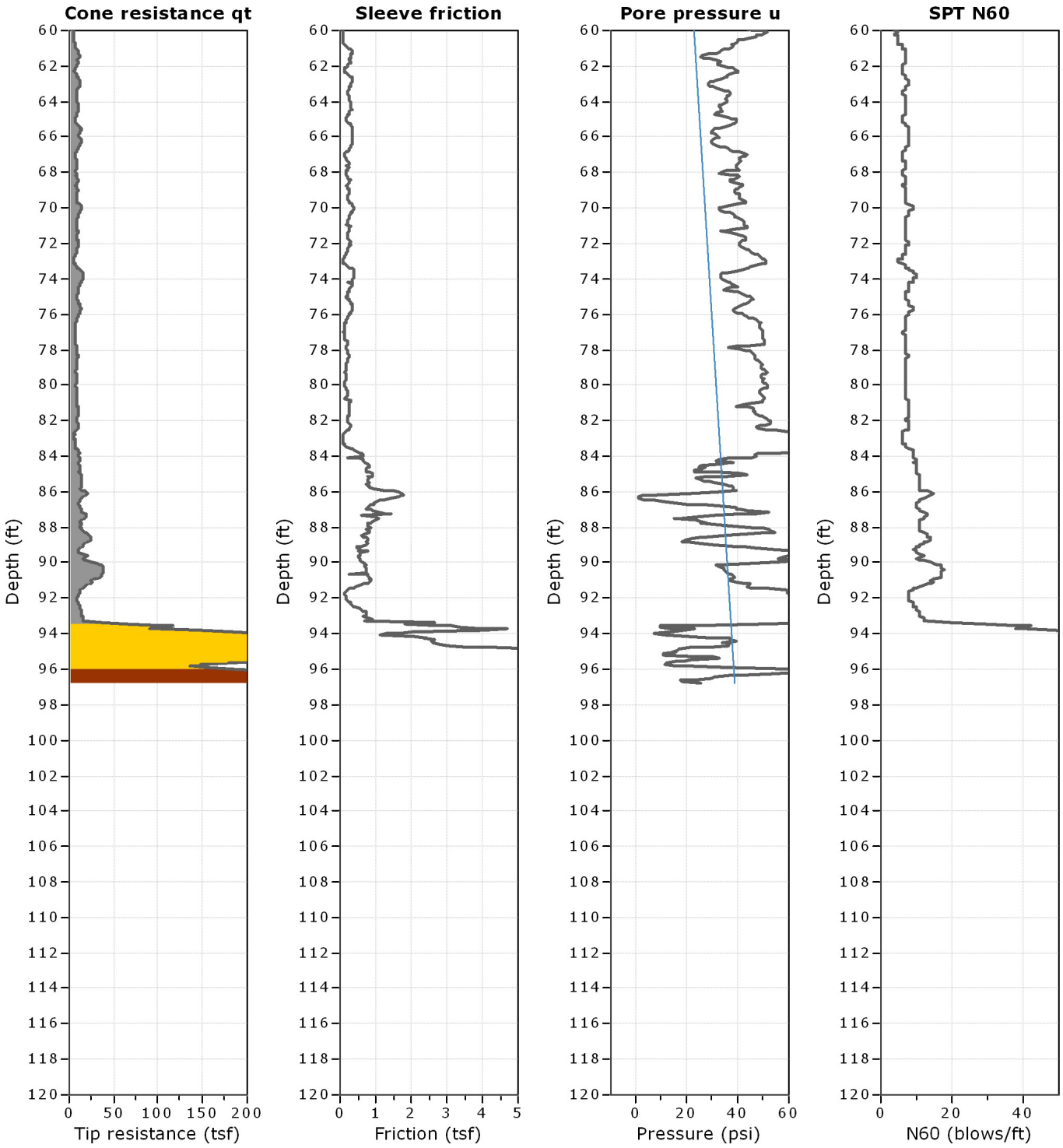
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-10
Total depth: 96.75 ft, Date: 3/23/2015
Surface Elevation: 325.60 ft
Coords: N 37.70826, W 78.27867

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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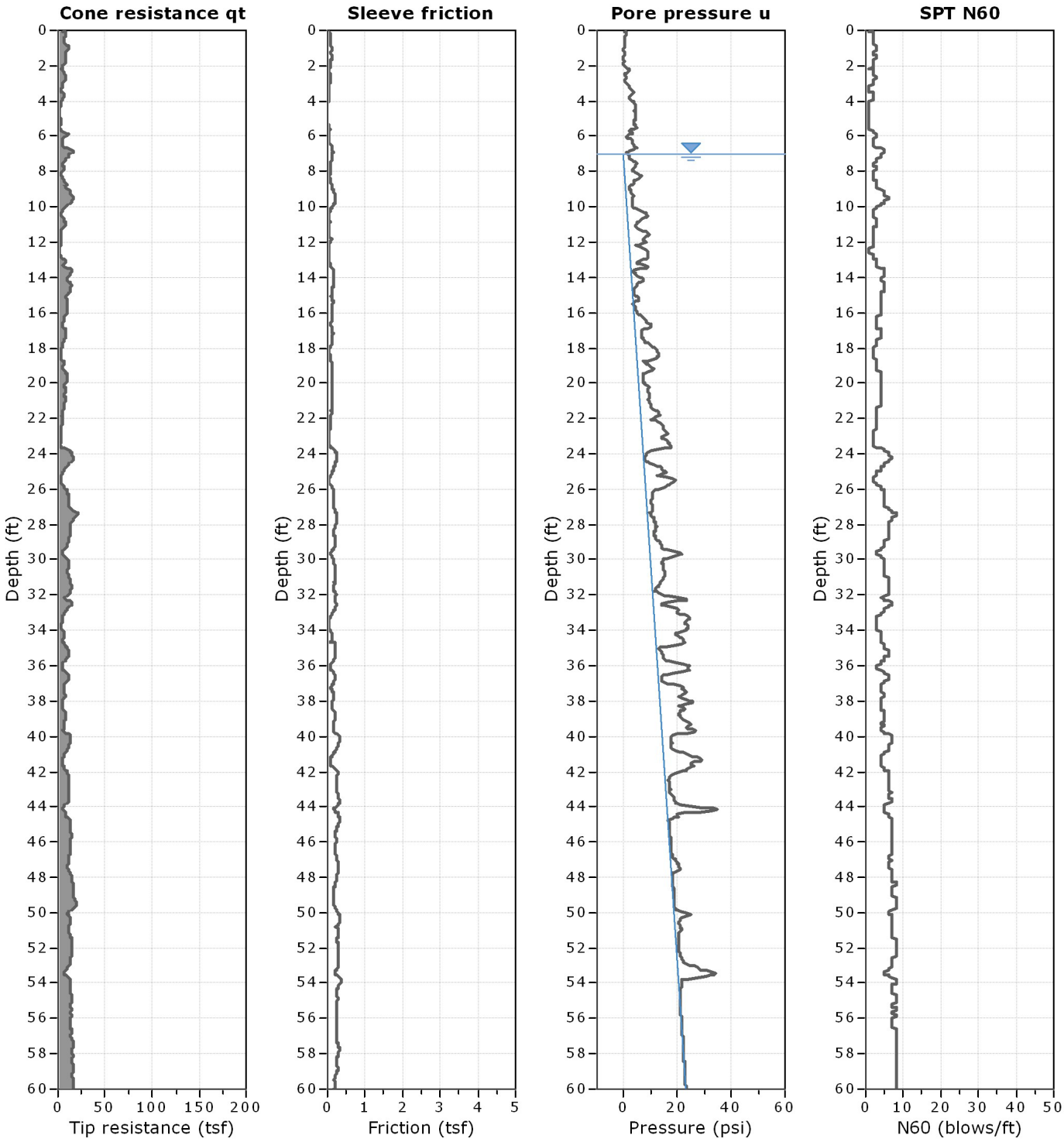
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-11
Total depth: 85.30 ft, Date: 3/22/2015
Surface Elevation: 329.70 ft
Coords: N 37.70929, W 78.27710

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
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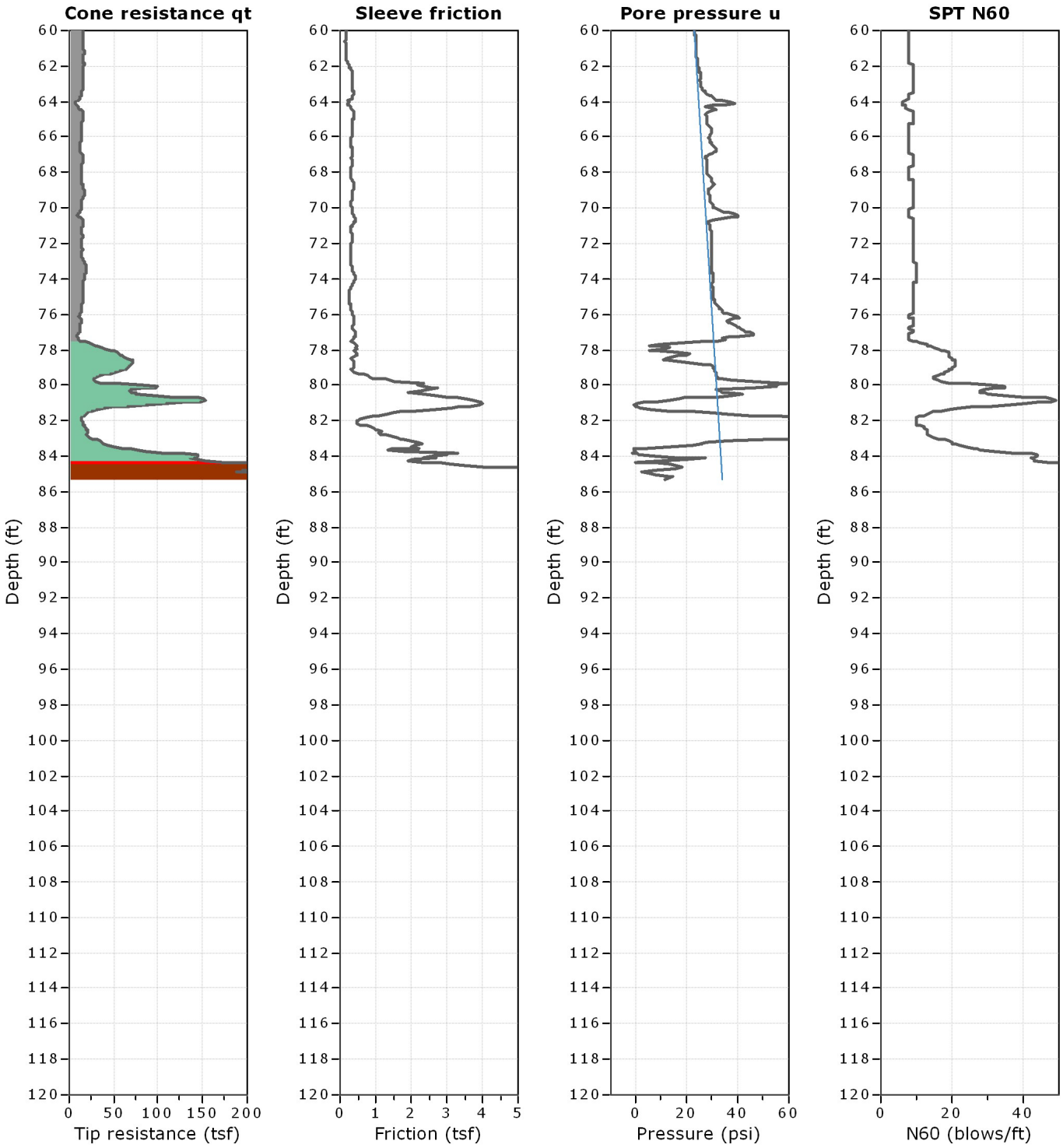
Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-11
Total depth: 85.30 ft, Date: 3/22/2015
Surface Elevation: 329.70 ft
Coords: N 37.70929, W 78.27710

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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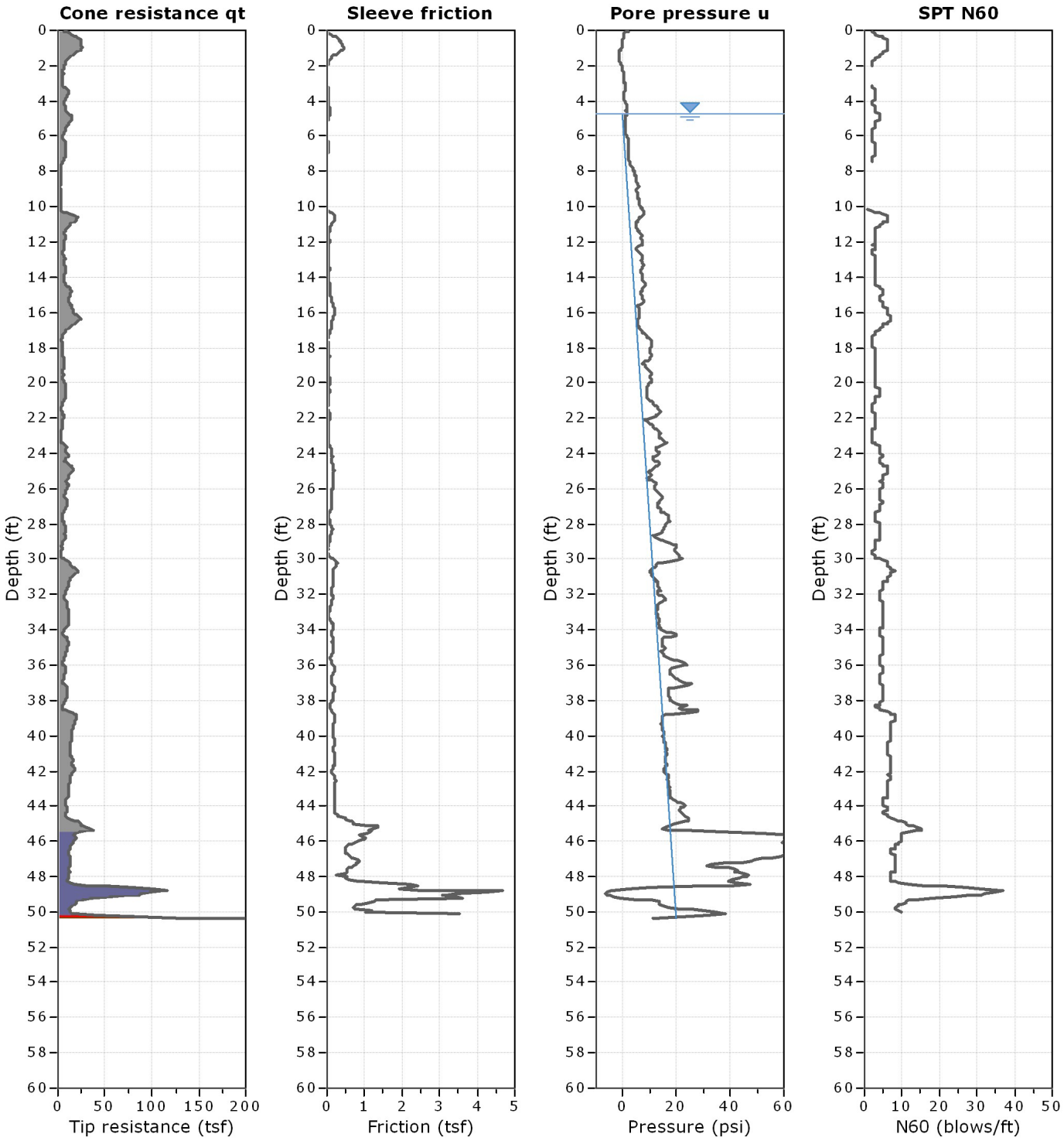
Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-12
Total depth: 50.40 ft, Date: 3/24/2015
Surface Elevation: 332.40 ft
Coords: N 37.71026, W 78.27565

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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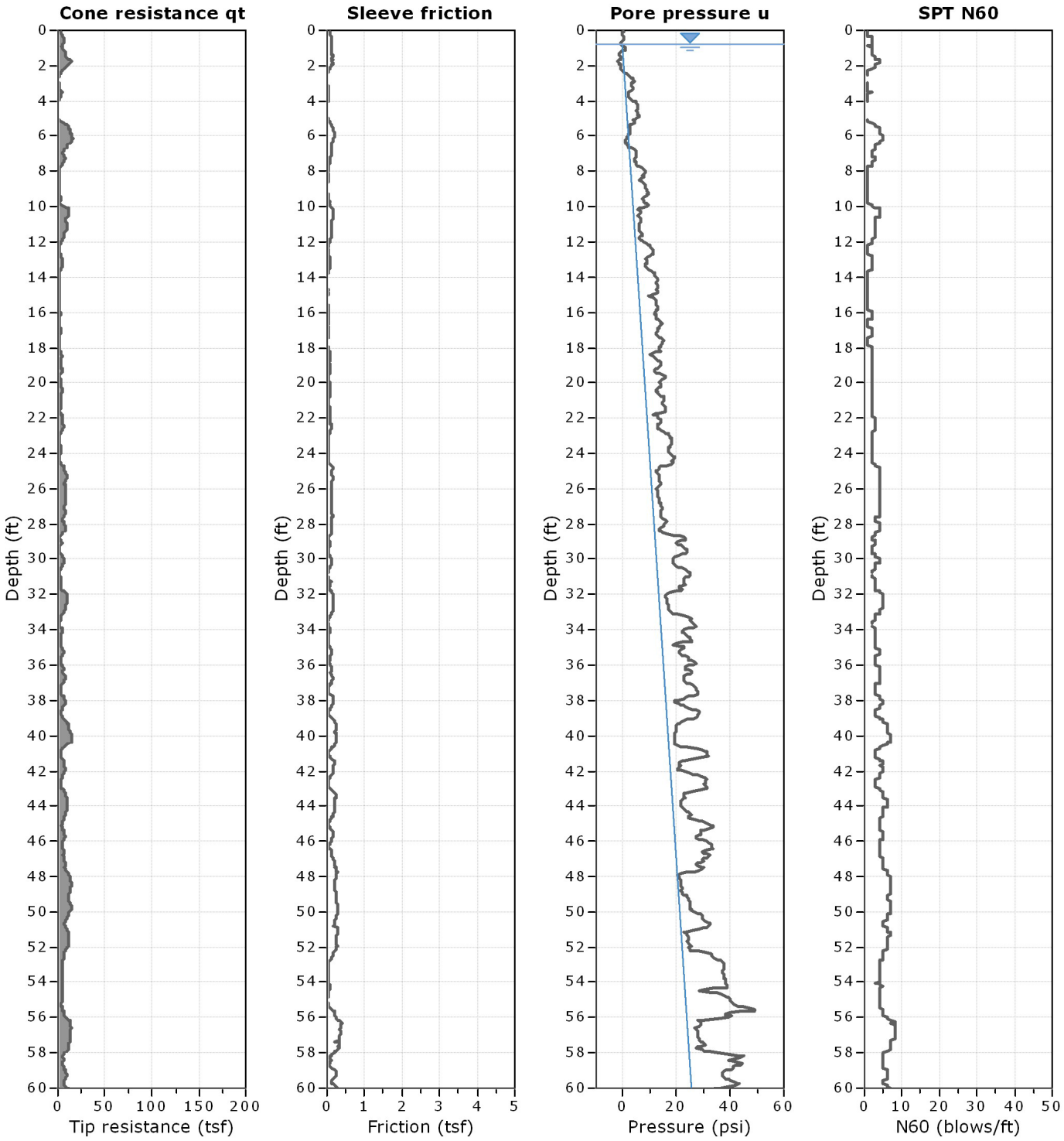
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-13
Total depth: 62.70 ft, Date: 3/22/2015
Surface Elevation: 327.80 ft
Coords: N 37.70824, W 78.27782

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
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PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT

Golder Associates Inc.
3730 Chamblee Tucker Rd.
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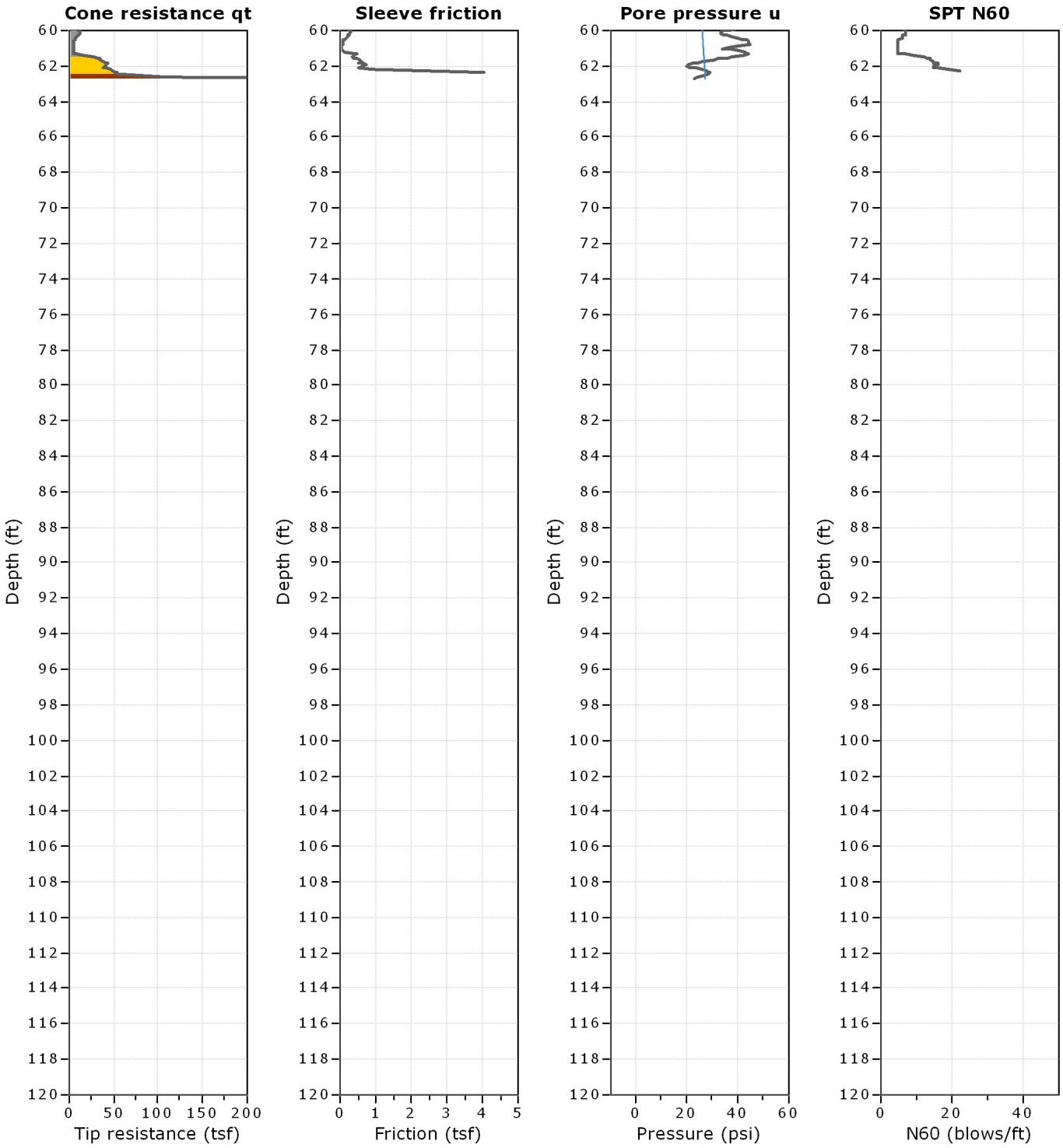
CPT: NC-13
Total depth: 62.70 ft, Date: 3/22/2015
Surface Elevation: 327.80 ft
Coords: N 37.70824, W 78.27782

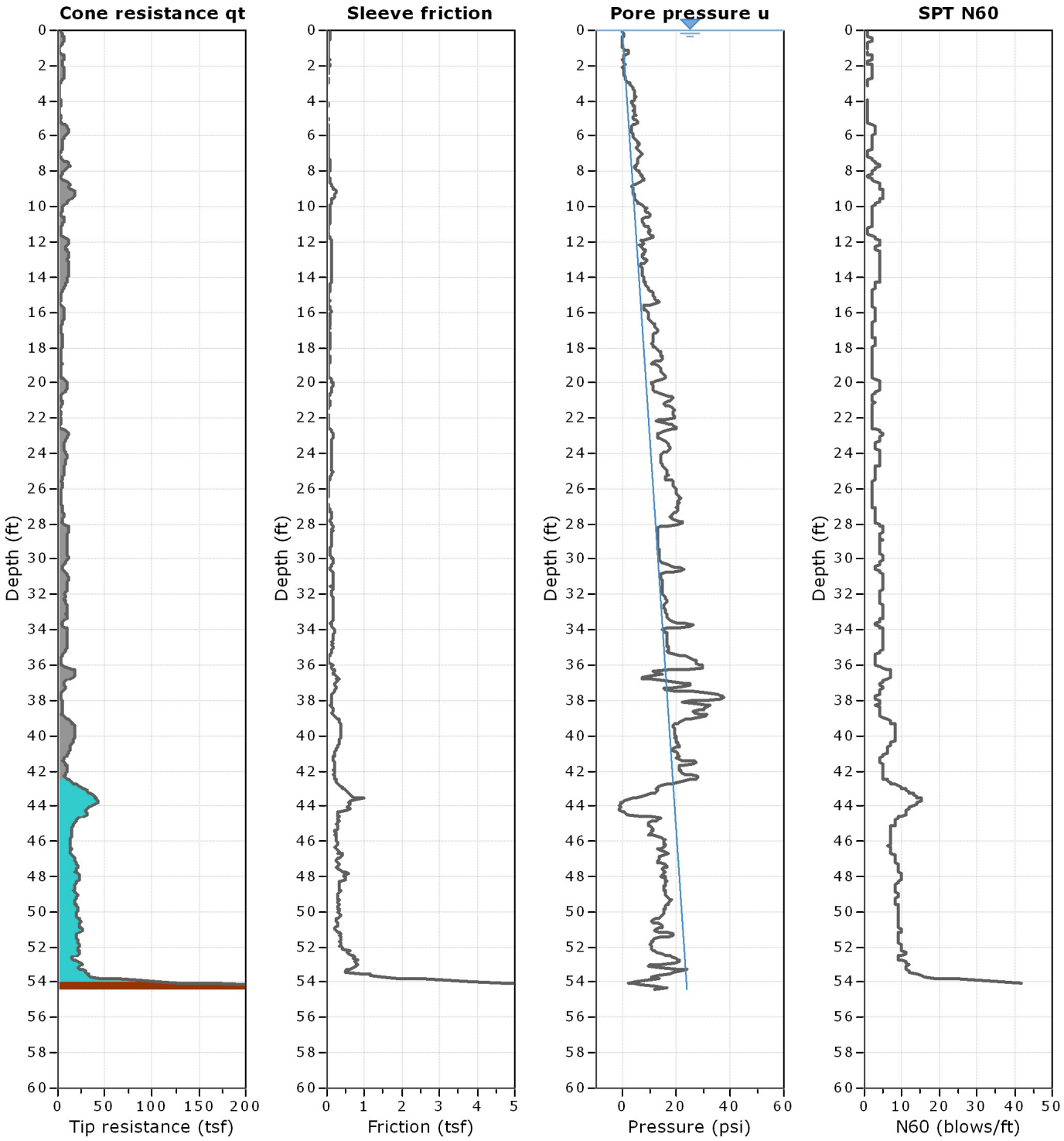
Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, Georgia 30307
1 (770) 496-1893

CPT: NC-14
Total depth: 54.40 ft, Date: 3/22/2015
Surface Elevation: 329.20 ft
Coords: N 37.70918, W 78.27574

Project: **Bremo Power Station Investigation**
Location: **Bremo Bluff, VA**



SANDY SILTY CLAY
SANDY SILT / SILTY SAND
SANDY SILT
SILTY SAND
CLAY
CCR/CLAY MIX
CCR
COMPACTED CCR
PWR / GRAVEL ALLUVIUM
ALLUVIUM, SILTY SAND
ALLUVIUM, SILT