Shaw Environmental & Infrastructure, Inc.
1430 Enclave Parkway
Houston, Texas 77077-2023
281.368.4400
Fax: 281.368.4401

Shaw™ Shaw Environmental & Infrastructure, Inc.

April 29, 2004

Mr. Subhash Pal
Project Manager
Superfund Cleanup Section
Texas Commission on Environmental Quality
12100 Park 35 Circle, Bldg. D
Austin, Texas 78753

Re: Remedial Investigation - CPT
August/September 2003
Jones Road Superfund Site
Houston, Texas

Dear Mr. Pal:

Shaw Environmental, Inc. (Shaw) is pleased to present to the Texas Commission on Environmental Quality (TCEQ) this letter report which summarizes the results of the Remedial Investigation (RI) - Cone Penetration Technology (CPT) related field work conducted at the above-referenced site in late August, early September 2003. This letter report is not intended to be a final report nor does it preclude or serve in the place of the Remedial Investigation Technical Memorandum; rather, this letter report provides a summary of results and preliminary conclusions based on Shaw's interpretations of the currently available data.

The objectives of this specific phase of the investigation included:

- identification of the shallow subsurface lithological structure in the immediate and nearby surrounding neighborhood of the former Bell Dry Cleaner using the CPT;
- determination of the extent of groundwater contamination in the immediate vicinity of the former Bell Dry Cleaner utilizing a "Hydro Trap" groundwater sampler with the CPT unit;
- selection of locations for 10 offsite monitoring wells using the CPT data and groundwater analytical results; and
- assessment of the efficacy of the Color Tec field screening on the groundwater matrix by comparing screening test results with groundwater analyses performed by an off-site laboratory.

All groundwater samples were collected using Fugro Geosciences, Inc. (Fugro) CPT rig that utilizes direct push technology (DPT). Soil samples were not collected as part of this assessment. All collected groundwater samples were submitted to Severn Trent Laboratories in Houston, Texas (contracted directly by Shaw) to perform analyses using EPA Method 8260. In addition, field screening of groundwater samples for PCE was also performed in the field using the Color Tec Method.

Summary of CPT Field Activities

Prior to mobilization into the field to conduct this CPT investigation, Shaw personnel met with TCEQ representatives to mark potential CPT locations. Prospective CPT locations were selected to target the area surrounding the former Bell Dry Cleaners site. Additional "step out" locations were selected at 100, 200, 300, 400, 600, and 800 feet radial distances from the site. Adjustments to the prospective locations were made in the field as needed if the locations fell in areas occupied by buildings, roadways, residences or utility corridors. The objectives of this field activity were to identify the subsurface lithology in the immediate vicinity of the site and to collect groundwater samples to delineate the impacted shallow groundwater boundary.

A total of 37 CPT locations were installed during this field effort which began on August 25, 2003 (Figure 1). The CPT rig has a 20-ton pushing capacity hydraulic ram assembly mounted inside a 20-ton all-wheel drive vehicle. A continuous record of "real time" tip resistance and sleeve friction from the cone were simultaneously plotted on chart in the CPT unit. Based upon the tip and sleeve response, the lithology could be determined. An objective of this investigation was to assess the extent of groundwater contamination in the shallow aquifer; therefore, the underlying sand units were targeted.

Once these sand units were identified from the lithology log, a second CPT push was made to the targeted sand unit to collect a water sample. The CPT unit would move approximately three feet away from the location of the first "lithology" push to conduct the second water sample push. Fugro used their "Hydro Trap" sampler (constructed of stainless steel with a screened interval approximately 18 inches long with 0.004" screen openings) to collect a water sample at a discrete depth from the second push. The "Hydro Trap" groundwater sampler was a discrete depth sampler. While hydraulically pushing, the screen is protected by a stainless steel sleeve to prevent clogging and cross contamination. The "Hydro Trap" was advanced approximately 18 inches beyond the targeted sand depth and the sleeve was pulled back to expose the screen to the water bearing zone. A stainless steel bailer was then lowered through the pipe string to collect a groundwater sample. A Shaw geologist was onsite to oversee each CPT push, perform field screening using Color Tec, and also to collect all groundwater samples.

Groundwater samples were collected in three 40 ml pre-cleaned VOA vials preserved with HCL as required by the Field Sampling Plan (FSP), submitted August 25, 2003. The samples were shipped daily to Severn Trent Laboratories for analysis using EPA Method 8260. A second objective of this investigation was to determine the accuracy of the Color Tec field screening method. Therefore, each groundwater sampled collected and submitted to the laboratory for analysis was also screened in the

field using Color Tec. The procedure followed for performing the Color Tec screening can be found in the aforementioned FSP.

During this field activity, a total of 2,194 feet of rods were pushed to gather stratigraphy data and another 2,311 feet of rods were pushed to collect groundwater samples (Table 1). Groundwater samples were not collected at CPT-1, CPT-2, CPT-4, CPT-14, CPT-23, CPT-25, CPT-34, and CPT-35 because the formation did not yield a sufficient volume of water to meet laboratory analyses requirements. However, at locations CPT-18, CPT-27, and CPT-36, because two to three sand units at approximate depths of 40, 50, and 60 feet were identified, more than one groundwater sample was collected for analysis. In total, 32 groundwater samples were collected from 29 different CPT locations and submitted to Severn Trent Laboratories for analysis. In accordance with the requirements defined in the TCEQ Superfund Cleanup Section Quality Assurance Project Plan (QAPP), an additional five duplicates, nine equipment blanks, six field blanks, and eight trip blank samples were collected during this field effort and submitted to Severn Trent Laboratories for analysis.

Upon completion of each CPT push at a location, all downhole equipment was decontaminated using a steam cleaner. Decontamination water was collected in a self-contained unit and transferred into 55-gallon drums, then sealed, labeled, and staged behind the former Bell Dry Cleaner. Each CPT borehole was pressure grouted from the bottom up using tremie pipe with a trailer-mounted ChemGrout system.

Regional Geologic/Hydrogeologic Discussion

The Jones Road Superfund site is located within the Texas Gulf Coastal Plain. The uppermost geologic formations are of Pliocene, Pleistocene, and Holocene age. These formations consist of fluvial, deltaic, coastal marsh, and lagoonal soil material and shallow sea deposits. The sedimentary deposits slope gently toward the Gulf of Mexico. The Beaumont Formation of Pleistocene Age underlies the area. This formation consists of river delta and over-bank flood deposits composed of clays and interbedded silts and fine sands that were deposited by rivers at various stages of flow and flood. The soils were exposed to air-drying after deposition and the resulting shrinkage caused the clay to become generally stiff and over consolidated.

Records from State of Texas Water Well Report's available for domestic wells near the site suggest that the shallow (<300 ft below ground surface [bgs]) lithology consists of interbedded clay, sand and silt. Discrete clay horizons are identified on driller's logs of private and public water supply wells in the area.

Water for Harris County is drawn from the Chicot and Evangeline Aquifers, and from Lake Houston. Groundwater comes from mixed sources including shallow (200 to 400 ft bgs) private water supply wells, and public water sources derived from deep wells (typically greater than 600 ft bgs). Two municipal water supply wells have been identified at a distance of approximately 2.75 miles from the former Bell Dry Cleaners location.

The Chicot Aquifer (in Holocene- and Pleistocene-age sediments) and the Evangeline Aquifer (in Pliocene- and Miocene-age sediments) are the two primary aquifers in the Houston-Galveston region and are part of the Gulf Coast aquifer system. Both hydrogeologic units are laterally discontinuous, fluvial-deltaic deposits of gravel, sand, silt, and clay that dip and thicken from northwest to southeast. Both aquifers out crop in bands inland, parallel to the coast, but progressively become more deeply buried (increase in depth from bgs) and confined toward the coast. The Chicot outcrop, which comprises the youngest sediments, is the closest of the aquifer outcrops to the coast, followed farther inland by the Evangeline outcrop. The Evangeline is one of the more productive Texas aquifers, and is expected to be located at a depth of 300 to 400 feet bgs in the Jones Road area (Texas Department of Water Resources, Report 236).

The Chicot Aquifer can be differentiated from the geologically similar Evangeline Aquifer on the basis of its contrasting relatively lower transmissivity. A weak hydraulic connection between land surface and the Chicot Aquifer and between the Chicot and Evangeline Aquifers allows vertical movement of water into and between the aquifers; the aquifer system thus is characterized as "leaky" (Carr and others, 1985, p. 10).

The water in both the Chicot and Evangeline Aquifers is fresh (less than 1,000 milligrams per liter dissolved solids concentration) in the region, but becomes more saline in the downdip and deeply buried parts of the aquifers in the direction towards the coast. In the natural ground-water-flow system, water recharges the aquifers in the unconfined outcrop areas, moves downward and coastward, and discharges vertically as diffuse upward leakage in the confined downdip areas (United States Geological Survey, Open File Report 03-377).

Shallow geotechnical soil borings conducted in 1982 from an undisclosed location on Tower Oaks Boulevard (near the site) identified light gray sandy silt with clay from ground surface to 5 ft bgs, light gray and tan silty clay to an average depth of 7 ft bgs, and light gray and tan clay with some calcareous nodules from 7 ft to the total depth explored of 20 ft bgs. Groundwater was encountered at 20 ft bgs in one of the three borings.

The results of the CPT field activities conducted in August and September 2003 indicated similar findings to the 1982 geotechnical soil borings. Below approximately 20 feet bgs, interbedded layers of clay, silt, and sand with nodules were observed. Groundwater bearing units (silts and sands) were not typically encountered until approximately 28 feet bgs and below (Table 2).

Subsequent to the CPT field activity a geoprobe investigation was conducted by Shaw in October 2003 targeting the soils in the subsurface within the immediate vicinity of the former Bell Dry Cleaner (Remedial Investigation Report – Geoprobe, January 2004). A comparison of the results of these soil borings with CPT boring logs indicate that interbedded layers of calcareous nodules and some iron nodules were deposited and encountered between 20 to 25 feet below ground surface. Silty sand and sand comprised the first water bearing unit at approximately 28 feet bgs. Attachment 1 provides copies of all the CPT boring logs. Figure 2 shows a comparison of a typical CPT log and an adjacent Geoprobe boring log and the corresponding lithology.

Summary of Analytical Results

Groundwater

All groundwater samples collected were shipped to an offsite laboratory for analysis using EPA Method 8260. In addition, each sample was field screened using the Color Tec method. The laboratory results indicated that CPT locations 3, 5, 6, and 32 had concentrations for PCE and TCE above the laboratory detection limits. Also, CPT locations 5, 33, and 39 had VC detections above the laboratory detection limits. The detections of the COC's were primarily seen in the sand encountered at approximately 30 feet bgs. Only CPT-32 showed detectable concentrations of PCE and TCE in a sand unit encountered at 51 feet bgs. The results of the laboratory analysis can be found on Table 3 and presented on Figure 3. In all cases where laboratory results for the COC's were above the detection limits, the Color Tec field screening result was positive indicating the presence of PCE.

Preliminary Conclusions

As stated previously, the objectives of this phase of the RI investigation included:

- identification of the shallow subsurface lithological structure in the immediate and nearby surrounding neighborhood of the former Bell Dry Cleaner using the CPT Piezocone;
- determination of the extent of groundwater contamination in the immediate vicinity of the former Bell Dry Cleaner utilizing a "Hydro Trap" groundwater sampler with the CPT unit;
- selection of locations for 10 offsite monitoring wells using the CPT data and groundwater analytical results; and
- assessment of the efficacy of the Color Tec field screening on the groundwater matrix by comparing screening test results with groundwater analyses performed by an off-site laboratory.

In the following text, preliminary assessment of the data (i.e., data collected during the CPT Field activities and subsequent laboratory results) with respect to each individual investigative objective will be discussed.

Identification of Shallow Subsurface Lithology

- Lithologies in and around the former Bell Dry Cleaner appeared to be predominately silty clays and clays down to approximately 25 feet bgs.
- The presence of calcareous nodules was observed to be interbedded within these silty clays anywhere from 15 to 23 feet bgs. [Note: This conclusion was not drawn until after the completion and a review of the results obtained from the Geoprobe investigation was performed.]

- Potential water-bearing sands were encountered approximately 30 feet bgs; some of these sands yielded water during sampling while using the CPT technology, but not all.

- Additional sands were encountered at greater depths. Some of these sand units yielded water during sampling while using the CPT technology, while others did not. This may be the result of the CPT groundwater sampling method. Similar sand units were tested during the Geoprobe investigation and groundwater samples were collected from all geoprobe borings. Please refer to the Remedial Investigation Report – Geoprobe, January 2004 for water sampling procedures.

- General lithologies from location to location within the realm of this investigation were consistent.

Determination of the Extent of Groundwater Contamination

The following preliminary conclusions can be drawn from an interpretation of the results from the CPT field investigation:

Groundwater

- Contaminant mass in groundwater matrix is primarily PCE; however, the presence of degradation daughter products (TCE, cis-DCE, VC) was observed.

- The lateral extent of the contaminants of interests in the shallow groundwater unit (approximately 30 feet bgs) appears to be contained within a radius of 300 feet of the former Bell Dry Cleaner.

- The presence of the COCs in groundwater at CPT-32 suggests that the gradient of the shallow groundwater is towards the south.

- The presence of only daughter products at locations south of the septic leach field suggested a secondary discharge route of PCE. [Results from later Geoprobe sampling activities discount the leachate field as a discharge route of PCE.]

Determination of Monitoring Well Locations

Based upon the results of the CPT investigation and subsequent Geoprobe investigation in October 2003 the following activities occurred:

- Only three (MW-7, MW-8, and MW-9) of the initially proposed ten monitoring wells were installed as part of the CPT field activity.

- Monitor well MW-7 was installed at CPT location CPT-32; monitor well MW-8 was installed at CPT location CPT-12; and monitor well MW-9 was installed at CPT location CPT-20.

- The installation of the additional remaining monitor wells was postponed based on the hydrogeologic data acquired during this initial investigative phase.

Assessment of the Efficacy using Color Tec Field Screening on Groundwater

The following preliminary conclusions can be made from a review of the results obtained during this CPT field investigation:

- Correlations between positive Color Tec field test results and the detections of contaminants of interest by the fixed-based laboratory were excellent. In all cases where the laboratory analyses detected concentrations of PCE above their detection limits, the Color Tec method indicated positive results for PCE.

- "False positive results" were obtained using the Color Tec method when four (4) pulls were performed suggesting that the maximum number of pulls be limited to three for accuracy.

Preliminary Suggested Recommendations

- Continue to investigate the extent of the contaminant mass detected in groundwater until aerial delineation is complete.

- Utilize the Color Tec field screening method on all future assessments involving groundwater.

- [Note: Additional recommendations from Shaw maybe added to this section upon discussion with the TCEQ].

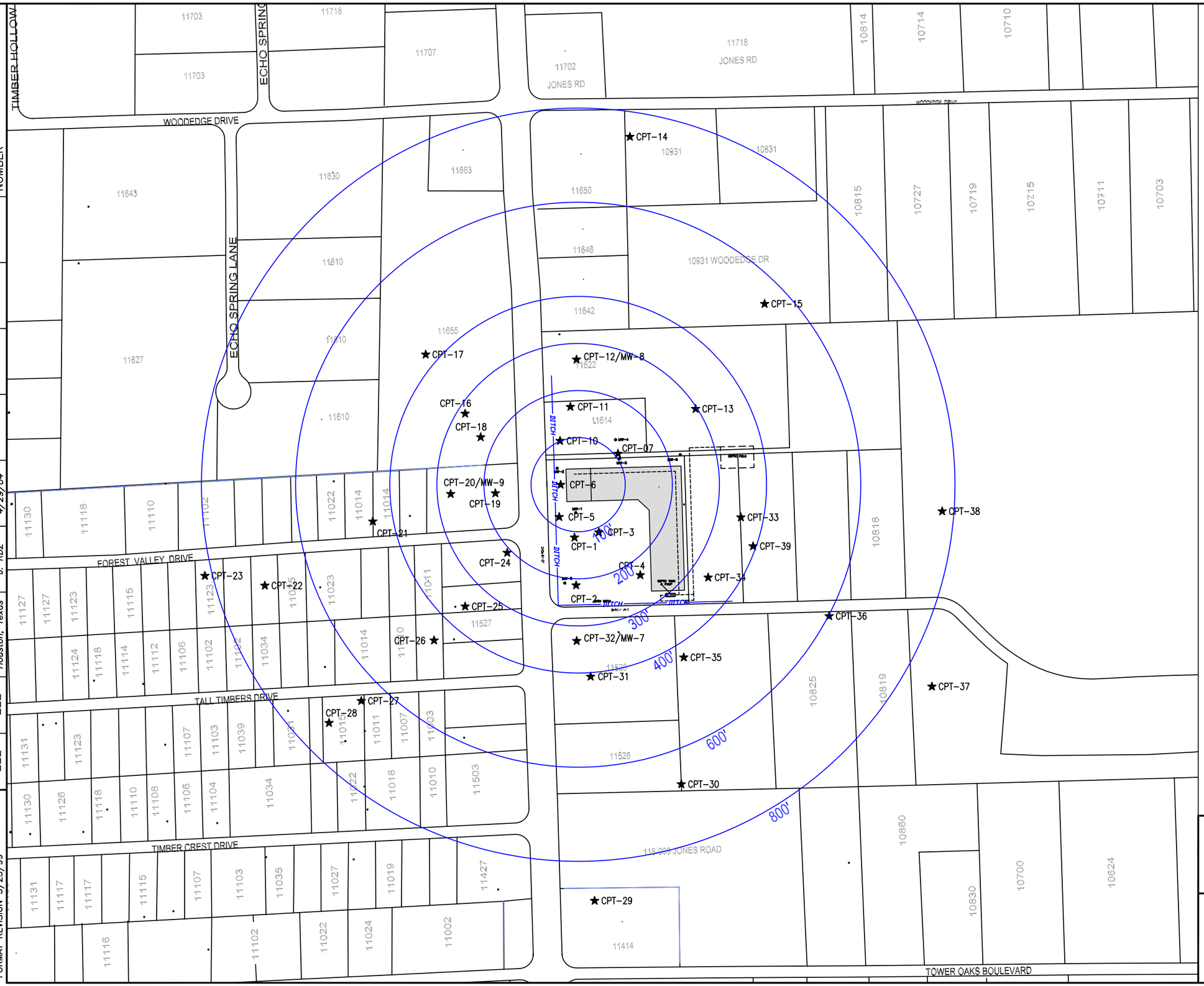
This concludes the summary letter report of the Remedial Investigation- CPT Work. If you have any questions, please either contact me at 281-396-4590 or Bill Hardmant at 281-396-4599.

Sincerely,
Shaw Environmental, Inc.

Perry Mann
Program Manager

PM/mfa
Attachments

FIGURES



LEGEND:

MONITORING WELL LOCATION

CPT LOCATION

SCALE

0 200 400 FEET

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

FIGURE 1

CPT LOCATIONS

11600 JONES ROAD

#TXN000605460

HARRIS COUNTY, TEXAS

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	OFFICE	X-REF	IMAGE
100249-B14			J. RDZ 4/29/04	Houston, Texas	---	---

PLOT DATE: 4/29/04
FORMAT REVISION 3/25/99

Shaw Environmental & Infrastructure, Inc.

Project	100249	Owner	TCEQ		
Location	Jones Rd, Houston, Texas	Permit No.			
Boring Number	GP-6	Total Depth	32	Diameter	2.5
Casing Elevation	Not measured	Water Level: Initial	23	Static	
Screen Dia.	1 inch	Length	10 foot	Slot Size	0.010
Casing Dia.	1 inch	Length	20	Type	PVC
Drilling Method	Geoprobe (Direct Push)	Sample Method	Split Spoon		
Completion Details	Temporary Well				
Driller	Best Drilling Services	Log By	H. Woelfel	Date	October 22, 2003

Depth (feet)	Lithology (USCS)	Well Const.	OVM (ppm)	LEL %	Sample Collected	Lithology	Notes
			0			wet, silty clay, olive gray, firm	
			0		1-2'		
			0				
			0				
5			0			moist, very firm, silty clay, light gray,	
			0			moderate iron staining, and iron	
			0			nodules throughout.	
			0				
			0				
10	CH		0				
			0				
			0			moist, stiff, sitly clay, light gray,	
			0			heavy iron staining, fragmented	
			0			calcareous layer at 13-16',	
15			0			at 18-20' and at 20-23'	
			0				
			0				
			0		18-19'		
	CH		0				
20			0				
			0				
			0				
	CL		0			wet, sandy silty clay, heavy iron staining	Initial water @ 23'
			5				
25			6				
			2				
			0		26-27'		
			0				
			0				
30	CH		0			moist, silty clay, firm, heavy iron staining	
			0		31-32'		
35						Pushed to 32', set temporary well to 30'	

SILTY CLAY

SILTY CLAY
CALCAREOUS NODULES
13'–16', 18'–20'

SILTY CLAY TO
SANDY SILTY CLAY
CALCAREOUS NODULES
20'–23'

▼ Initial Water Level - Feet TOC

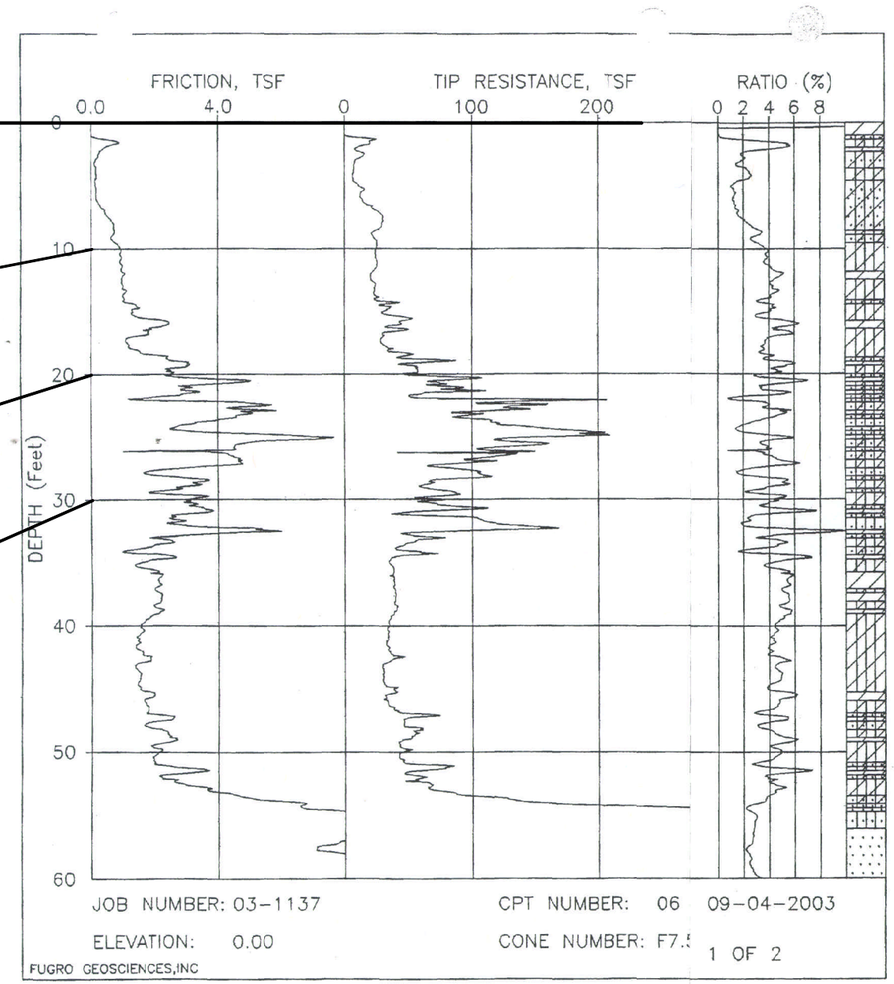
▲ Static Water Level - Feet TOC

Sand

Cement

Bentonite Seal

Pelleted Bentonite



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

FIGURE 2
GEOPROBE BORING COMPARED TO CPT LOG
#TXN000605460
HARRIS COUNTY, TEXAS

DRAWING NUMBER 100249–B15
APPROVED BY
CHECKED BY
DRAWN BY J. RDZ 4/29/04
OFFICE Houston, Texas
X–REF ---
IMAGE CPT & GEO
PLOT DATE: 4/29/04
FORMAT REVISION 3/25/99

LEGEND:

- MONITORING WELL LOCATION
- CPT LOCATION
- PCE — TETRACHLOROETHENE CONCENTRATION IN µg/L
- TCE — TRICHLOROETHENE CONCENTRATION IN µg/L
- VC — VINYL CHLORIDE CONCENTRATION IN µg/L

SAMPLING PERIOD
8/25/03 THROUGH 9/08/03

SCALE
0 150 300 FEET

Shaw

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

FIGURE 3

PCE, TCE, VC CONCENTRATIONS IN GROUNDWATER
11600 JONES ROAD
#TXN000605460
HARRIS COUNTY, TEXAS

DRAWING NUMBER	100249-B13
APPROVED BY	
CHECKED BY	
DRAWN BY	J. RDZ 4/20/04
OFFICE	Houston, Texas
X-REF	----
IMAGE	----

PLOT DATE: 4/29/04
FORMAT REVISION 3/25/99

TABLES

Table 1

Jones Road Superfund Site
August/September 2003 CPT Remedial Investigation

Location	Photo #	MW Location	CPT Lithology Depth (ft)	CPT H_20 Depth 1st Push (ft)	CPT H_20 Depth 2nd Push (ft)	CPT H_20 Depth 3rd Push (ft)	CPT H_20 Total Footage	CPT H_20 Sample Depth	Total Footage Pushed at Location	Date Field Work Conducted/ Sample Collectec	Color-Tec Results in (ppm)	Other Samples Collected
1	33		61	59	0	0	59	Dry	120	9/3/2003	NS	
2	16		46	36	22	0	36	Dry / Dry	82	8/28/2003	NS	
3	28		58	29.5	52	46	81.5	29.5 / Dry / Dry	139.5	9/2/2003	>3.0	Field Blank #3
4	32		45.5	34.5	28.5	0	34.5	Dry / Dry	80	9/3/2003	NS	Field Blank #4
5	35		66.5	36	30	0	36	Dry / 30	102.5	9/3/2003	>3.0	
6	42		61.5	32	60	0	92	32 / Dry	153.5	9/4/2003	>3.0	
7	36		56.5	29	0	0	29	29	85.5	9/4/2003	ND	Decon #5 / Field Blank #5
8			Locations have been scratched									
9			Locations have been scratched									
10	29		63	38.5	29	60.5	99	Dry / 29 / Dry	162	9/2/2003	0.7	Decon #4
11	7		58	37	29	0	37	Dry / 29	95	8/26/2003	ND	
12	8	MW-8	59	29	54	0	83	29 / Dry	142	8/26/2003	ND	Equip. Blk #2 / MS MSD
13	9		55	32	0	0	32	32	87	8/26/2003	ND	
14	12, 13		58	21	0	0	21	Dry	79	8/27/2003	NS	
15	5		58	36	0	0	36	36	94	8/26/2003	ND	
16	44		73.5	30	73	0	103	30 / Dry	176.5	9/8/2003	ND	Dup #5
17	4		48.5	29	0	0	29	29	77.5	8/25/2003	ND	Equip. Blk #1
18	43		49	32	29	0	32	32 / 29	81	9/8/2003	ND / ND	Field Blank #6, Equip. Blk #9, Decon #6
19	3		55	40	30	0	40	30	95	8/25/2003	ND	Dup 1
20	2	MW-9	45.5	39	31.5	0	39	Dry / 31.5	84.5	8/25/2003	ND	
21	37,39,40		68	30.5	0	0	30.5	30.5	98.5	9/4/2003	0.2	Equip. Blank #8
22	14		55	29	0	0	29	29	84	8/27/2003	ND	
23	23,24,25,26		58.5	29	55	46	84	Dry / Dry / Dry	142.5	8/29/2003	NS	
24	38		81	32.5	75	0	107.5	32.5 / Dry	188.5	9/4/2003	0.4	
25	27		61	36	50.5	46	86.5	Dry / Dry / Dry	147.5	8/29/2003	NS	Decon #3
26	30		59.5	58.5	0	0	58.5	58.5	118	9/2/2003	ND	
27	31		63.5	40	63	0	103	40 / 63	166.5	9/2/2003	ND / ND	Equip. Blk #6
28	6		49	33	46	0	79	Dry / 46	128	8/26/2003	ND	
29	19, 21		74.5	29	55	0	84	29 / Dry	158.5	8/28/2003	0.5	Decon #2
30	15		61	32	0	0	32	32	93	8/27/2003	ND	Dup #2 / Equip. Blk #3
31	22		56	31	49	0	80	Dry / 49	136	8/29/2003	0.7	Dup #3, Equip.Blk #5, MS/MSD, Field Blk #2
32	17, 20	MW-7	51.5	51	0	0	51	51	102.5	8/28/2003	>3.0	Field Blk #1
33	1		58	25	36	0	61	Dry / 36	119	8/25/2003	1.5	
34	41		65	34.5	30	0	34.5	Dry / Dry	99.5	9/4/2003	NS	
35	10		58	36.5	23	0	36.5	Dry / Dry	94.5	8/27/2003	NS	
36	34		70.5	46	57	70	173	46 / 57 / Dry	243.5	9/3/2003	ND / ND	Dup #4, MS/MSD
37	11		65	35	64	0	99	Dry / 64	164	8/27/2003	0.5	
38	18		70	30	68	0	98	30 / Dry	168	8/28/2003	ND	Equip. Blk #4
39	45		52	30	35	0	65	30 / Dry	117	9/8/2003	1.3	
			2194.5				2311					

Notes:

ND Not Detected

NS Not Sampled

Dry CPT boring did not produce enough water to collect a sample

Table 2

Jones Road Groundwaer Plume Remedial Investigation
CPT Results and Assessment Depths
August / September 2003

CPT Location	Interval Depth	Interval Depth	Interval Depth	Interval Depth	Interval Depth	Total Depth	Sample Depth	Sample Depth	Sample Depth	Sample Depth	Sample Depth
CPT # 1	20 - 32	34 - 35	47 - 48	52.5 - 60		61	59 (Dry)	58.5 (Dry)			
CPT # 2	20 - 32	34 - 36	44 - 46			46	36 (Dry)	35 (Dry)	29 (Dry)	22 (Dry)	
CPT # 3	21 - 33.5	35 - 36	43 - 44	51 - 52		58	29.5	52 (Dry)	44 (Dry)		
CPT # 4	19 - 32	34 - 35.5				45.5	34.5 (Dry)	28.5 (Dry)			
CPT # 5	14 - 33	35 - 36	44 - 47.5	54 - 66		66.5	36 (Dry)	30			
CPT # 6	21 - 33			55 - 60		61.5	32	60 (Dry)			
CPT # 7	21 - 36		43 - 44	52.5 - 54		56.5	29				
CPT # 10	16 - 30.5	32 - 34	45 - 47	56 - 60.5		63	38.5 (Dry)	29	60.5 (Dry)	59.5 (Dry)	
CPT # 11	19 - 35		47 - 50	52.5 - 56		58	37 (Dry)	30.5 (Dry)	29		
CPT # 12	18.5 - 36		45 - 49	52 - 55		59	29	54 (Dry)			
CPT # 13	20 - 35		43 - 48	53 - 54.5		55	32				
CPT # 14	18 - 37			54 - 56		58	21 (Dry)	20 (Dry)			
CPT # 15	23 - 37			53.5 - 56		58	36				
CPT # 16	20.5 - 34.5			52.5 - 56	69 - 75.5	73.5	30	73 (Dry)	55 (Dry)		
CPT # 17	22 - 36					48.5	29				
CPT # 18	21 - 33					49	32	29			
CPT # 19	18 - 32		47 - 48	52 - 55		55	40 (Dry)	37.5 (Dry)	30		
CPT # 20	19.5 - 33					45.5	39 (Dry)	36 (Dry)	31.5		
CPT # 21	19 - 37		47 - 51	56 - 58		68	30.5				
CPT # 22	19.5 - 32		42.5 - 46	52.5 - 54.5		55	29				
CPT # 23	17.5 - 32	34 - 35	41.5 - 47	52.5 - 55		58.5	29 (Dry)	28 (Dry)	55 (Dry)	47 (Dry)	46 (Dry)
CPT # 24	20.5 - 33.5		44 - 49	52.5 - 56.5	66 - 77	81	32.5 (Dry)	32	75 (Dry)	74 (Dry)	
CPT # 25	20 - 32.5	34 - 36	44.5 - 46.5	50 - 57		61	36 (Dry)	30 (Dry)	28 (Dry)	50.5 (Dry)	46 (Dry)
CPT # 26	19 - 31	33.5 - 38	42 - 46	48.5 - 55.5		59.5	58.5				
CPT # 27	24 - 33.5	36 - 41.5	45 - 50	51 - 62.5		63.5	40	63			
CPT # 28	22 - 35	36 - 39	43.5 - 46.5			49	33 (Dry)	30 (Dry)	25 (Dry)	46	
CPT # 29	21 - 37		49 - 50	53.5 - 56		74.5	29	55 (Dry)	54 (Dry)		
CPT # 30	21 - 36		45 - 47	50.5 - 58		61	32				
CPT # 31	21 - 36	38 - 44	46.5 - 50.5	55 - 56		56	31 (Dry)	29 (Dry)	49		
CPT # 32	20 - 35.5	37 - 40	45 - 51			51.5	51				
CPT # 33	21 - 33.5	35 - 36	40 - 41			58	25 (Dry)	36			
CPT # 34	19 - 32.5	34 - 36	46.5 - 47.5	52.5 - 53.5	62.5 -	65	34.5 (Dry)	30 (Dry)			
CPT # 35	23 - 34.5	36.5 - 38	47.5 - 50	53 - 54		58	36.5 (Dry)	32 (Dry)	24 (Dry)	22.5 (Dry)	
CPT # 36	20.5 - 33	34.5 - 36	45 - 47.5	51 - 58	66.5 -	70.5	46	57	70 (Dry)		
CPT # 37	18.5 - 33	34.5 - 36	44 - 48.5	54.5 - 59.5	61.5 - 65	65	35 (Dry)	34 (Dry)	64		
CPT # 38	19 - 33.5	36 - 38.5	46.5 - 48	52 - 55	66 - 69	70	30	69 (Dry)	67.5 (Dry)	66 (Dry)	
CPT # 39	21 - 34	35.5 - 40	43.5 - 47			52	30	35 (Dry)			

Blue type indicates water sample collected.

N:\Jones Road\RI Data\CPT Groundwater\Jones Road RI-CPT Tables.xls

Table 3

Jones Road Groundwater Plume Remedial Investigation
Laboratory Results for Water Samples Collected During the CPT Investigation
August / September 2003

CPT Sample ID	Depth	Tetrachloroethene	Trichloroethene	trans 1,2-Dichloroethene	cis 1,2-Dichloroethene	1,2-Dichloroethene (total)	Vinyl Chloride	Methylene Chloride	Acetone	Carbon Disulfide	MTBE	1,2,4-Trichlorobenzene	Toluene	Chloroethane	Color-Tec (# of pulls) ppm
CPT # 1-DRY															
CPT # 2-DRY															
CPT # 3-29.5'	29.5	3810	184		381										>3.0 (1)
CPT # 4-DRY															
CPT # 5-30'	30	62	47.3	1.37	48.5		9.56		19.5				18.6		>3.0 (1)
CPT # 6-32'	32	238	1.2		2.28										>3.0 (1)
CPT # 7-29'	29								4.93		2.97				ND (4)
CPT #8	Locations have been scratched														
CPT #9	Locations have been scratched														
CPT # 10-29'	29								2.98						0.7 (1)
CPT # 11-29'	29								8.82						ND (3)
CPT # 12-29'	29								20.4						ND (3)
CPT # 13-32'	32								21.8						ND (3)
CPT # 14-DRY	21														
CPT # 15-36'	36														ND (3)
CPT # 16-30	30			1.32					6.91						ND (4)
CPT # 17-29'	29								7.29						ND (3)
CPT # 18-32'	32								3.32						ND (4)
CPT # 18-29'	39								2.74						ND (4)
CPT # 19-30'	30								19.7						ND (3)
CPT # 20-31.5'	31.5								18.9						ND (3)
CPT # 21-30.5'	30.5								8.99	1.42			1.73		0.2 (4)
CPT # 22-29'	29								76.9			1.62			ND (3)
CPT # 23-DRY															

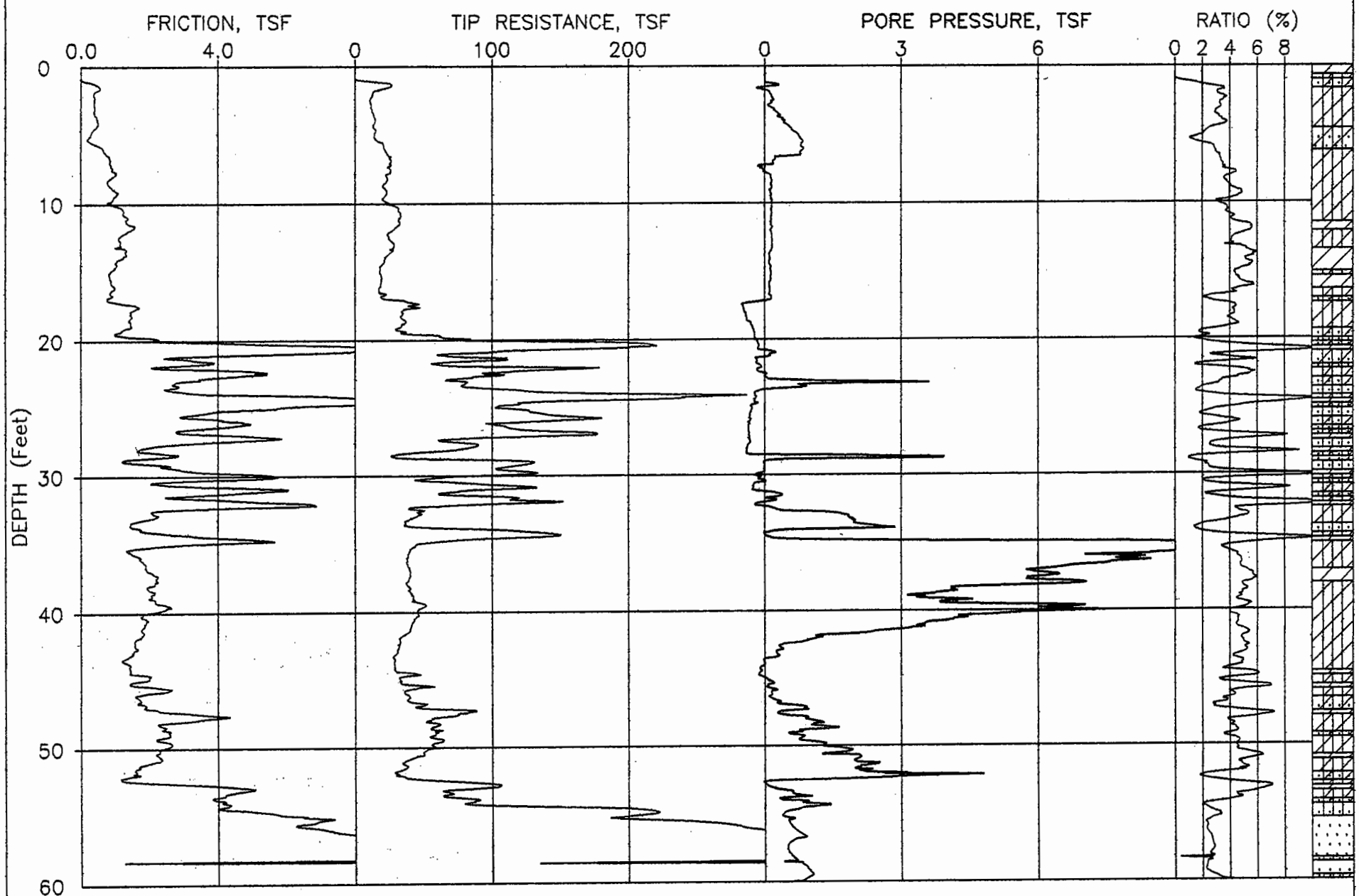
Table 3

Jones Road Groundwater Plume Remedial Investigation
Laboratory Results for Water Samples Collected During the CPT Investigation
August / September 2003

CPT Sample ID	Depth	Tetrachloroethene	Trichloroethene	trans 1,2-Dichloroethene	cis 1,2-Dichloroethene	1,2-Dichloroethene (total)	Vinyl Chloride	Methylene Chloride	Acetone	Carbon Disulfide	MTBE	1,2,4-Trichlorobenzene	Toluene	Chloroethane	Color-Tec (# of pulls) ppm
CPT # 24-32'	32.5								7.64						0.4 (4)
CPT # 25-DRY															
CPT # 26-58.5'	58.5								9.82						ND (4)
CPT # 27-40'	40									11.4	154				ND (4)
CPT # 27-63'	63								4.07		2.72				ND (4)
CPT # 28-46'	46								3.9						ND (3)
CPT # 29-29'	29								7.32				4.17		0.2 (4)
CPT # 30-32'	32								8.79						ND (3)
CPT # 31-49'	49												1.79		0.7 (4)
CPT # 32-51'	51	2480	97.7		110				5.23		68.6		1.62		>3.0 (1)
CPT # 33-36'	36			1.73	193	192	13.9		46.5						1.5 (1)
CPT # 34-DRY															
CPT # 35-DRY															
CPT # 36-46'	46				2				14		1.11				ND (3)
CPT # 36-57'	57				1.49				2.9			1.62			ND (3)
CPT # 37-64'	64							1.2	28.8						0.5 (3)
CPT # 38-30'	30								23.9		1.94				ND (3)
CPT # 39-30'	30			1.32			9.81		9.66		2.02			1.22	1.3 (1)

Note: All values in ug/L except Color-Tec (ppm)

ATTACHMENTS



JOB NUMBER: 03-1137

CPT NUMBER: 01

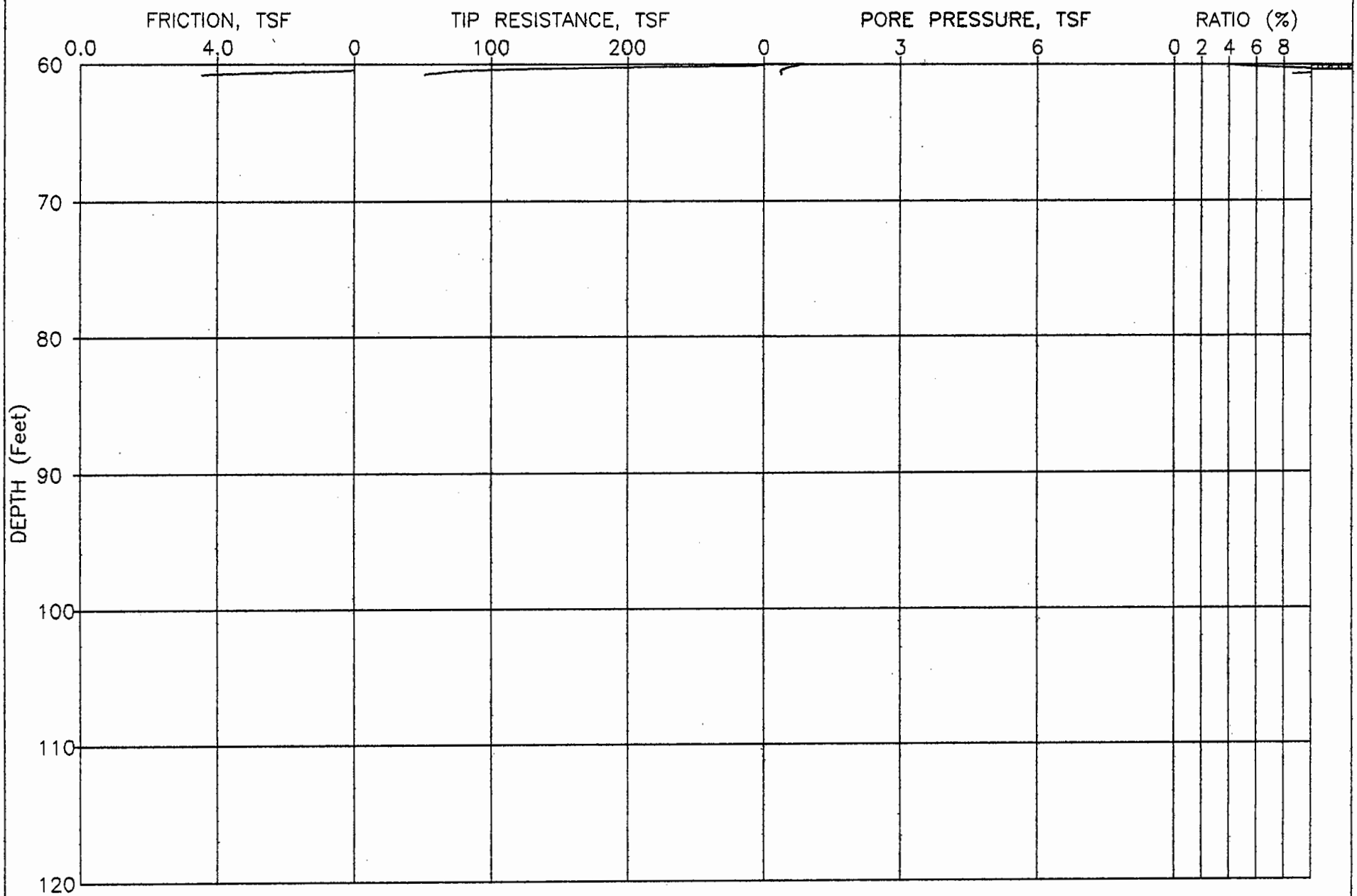
DATE: 09-03-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 01

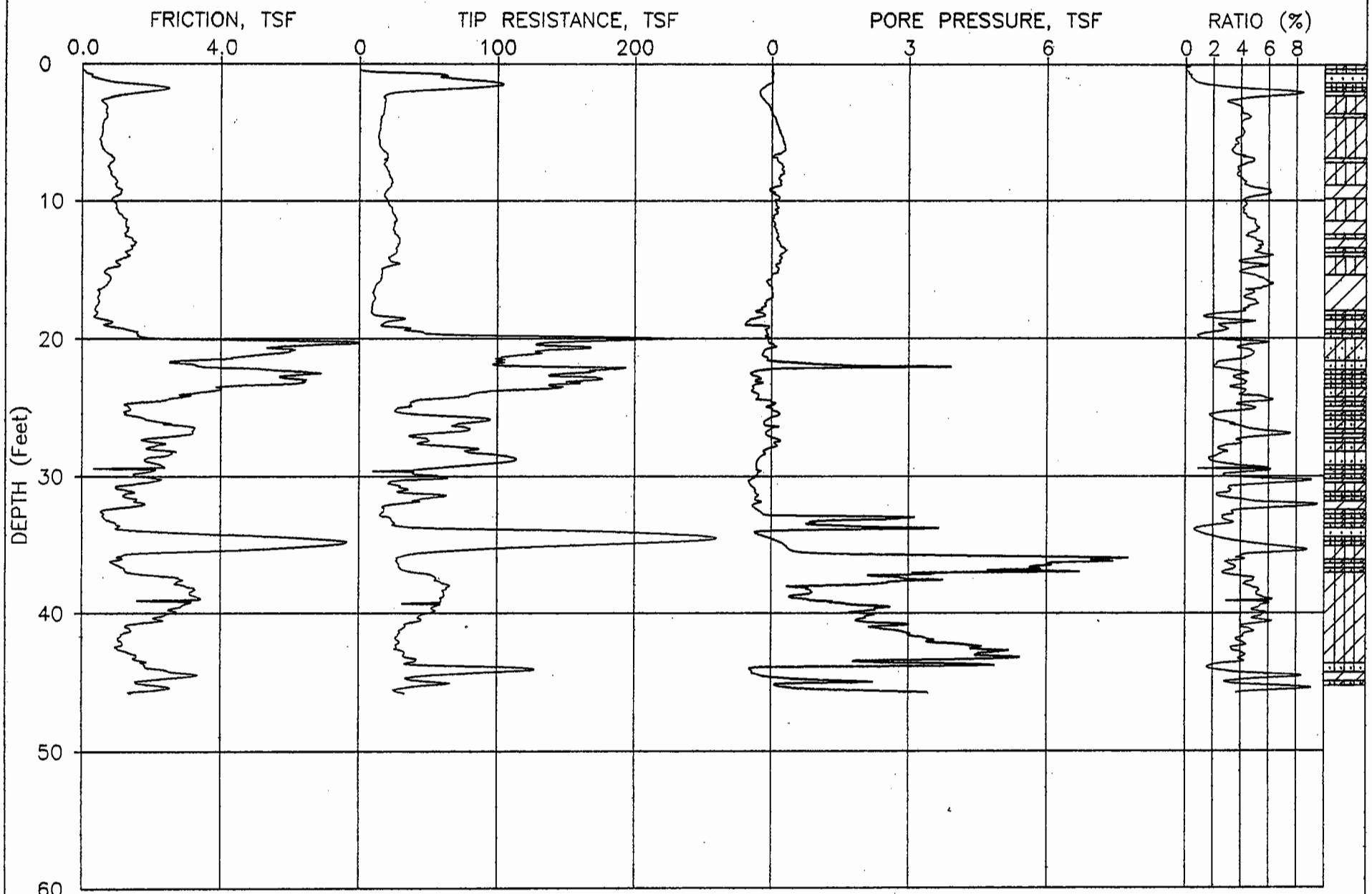
DATE: 09-03-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 02

DATE: 08-28-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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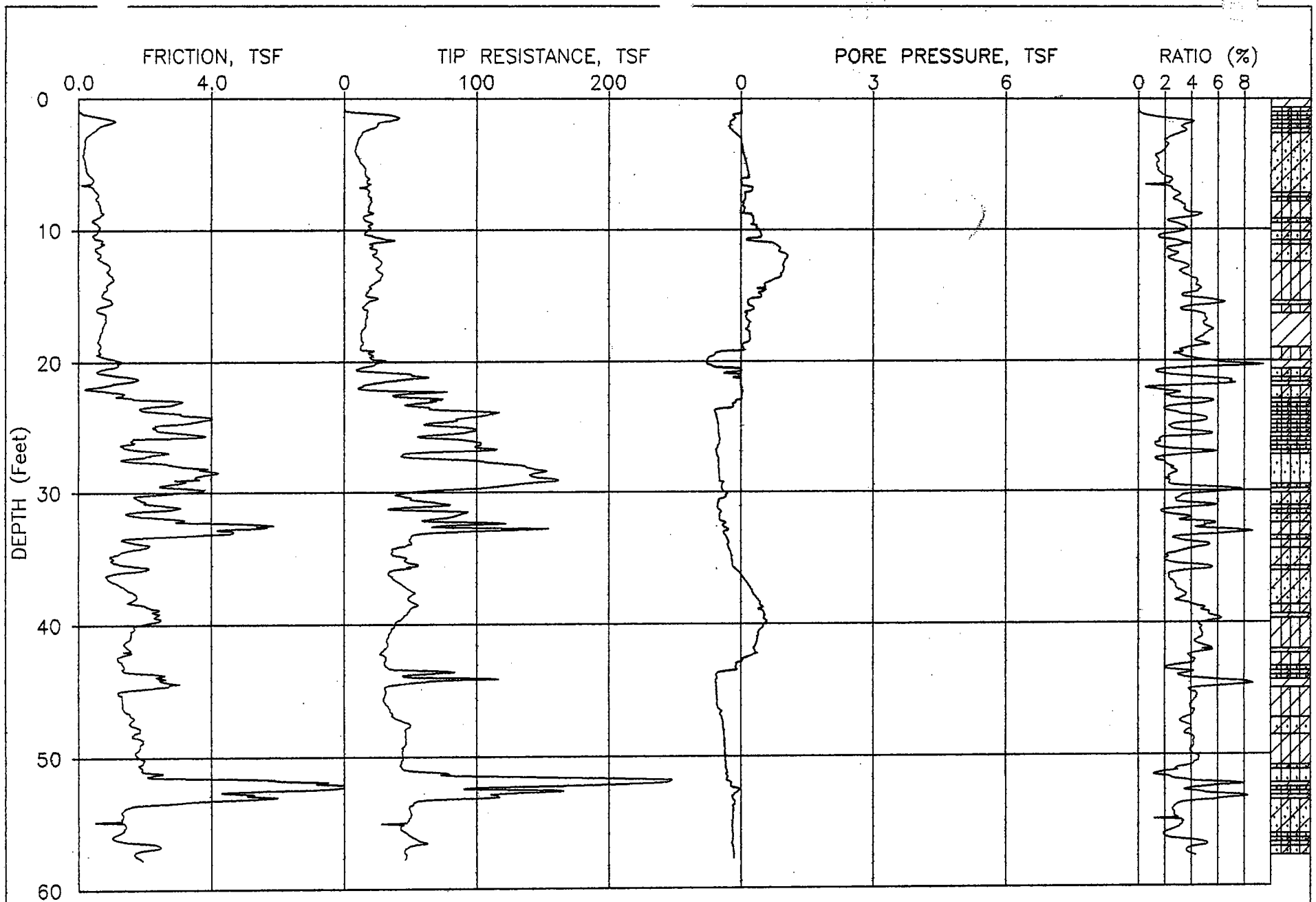


JOB NUMBER: 03-1137

CPT NUMBER: 03

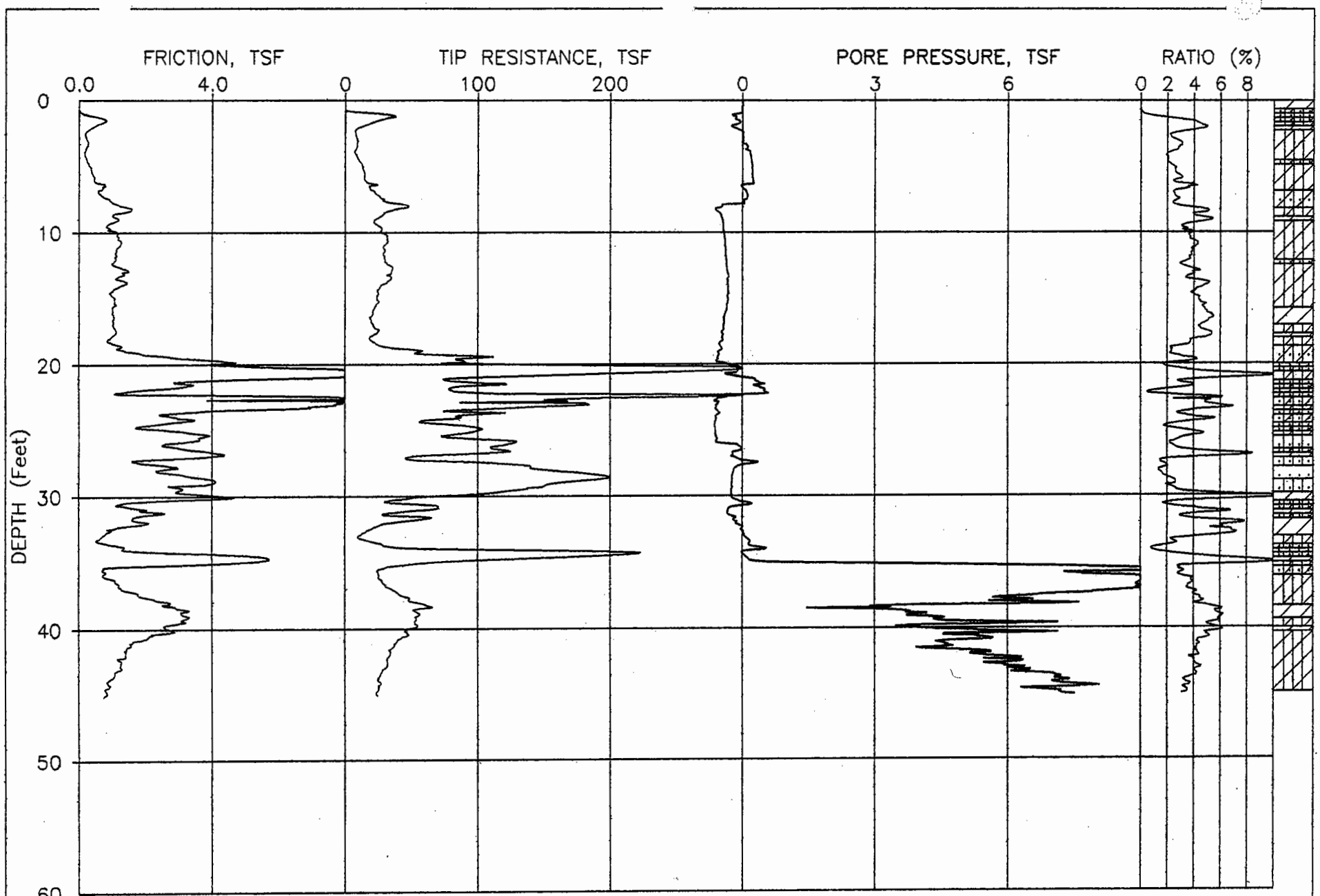
DATE: 09-02-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 04

DATE: 09-03-2003

ELEVATION: 0.00

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PLATE: 1 OF 1

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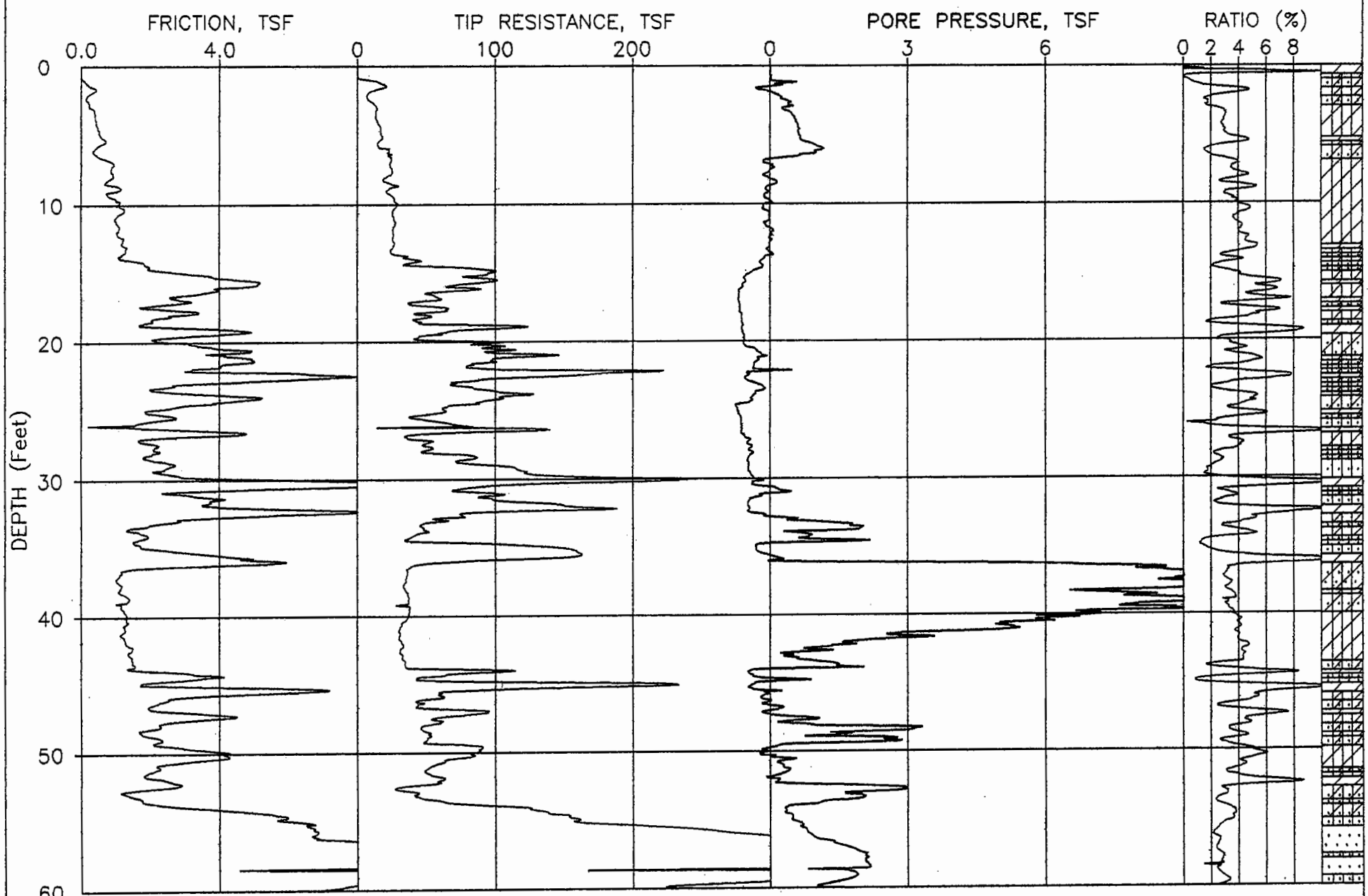

JOB NUMBER: 03-1137

CPT NUMBER: 05

DATE: 09-03-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

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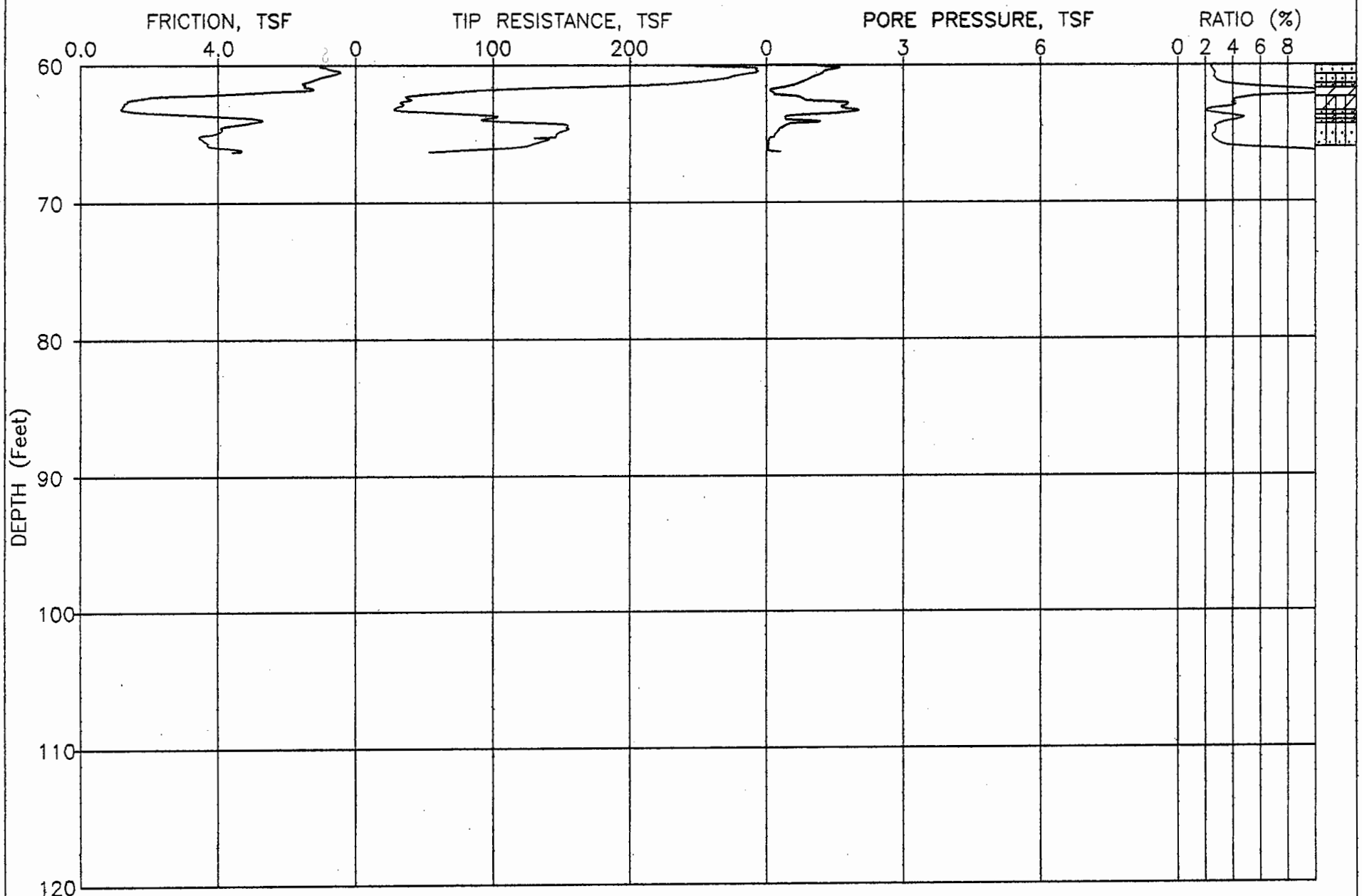

JOB NUMBER: 03-1137

CPT NUMBER: 05

DATE: 09-03-2003

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PLATE: 2 OF 2

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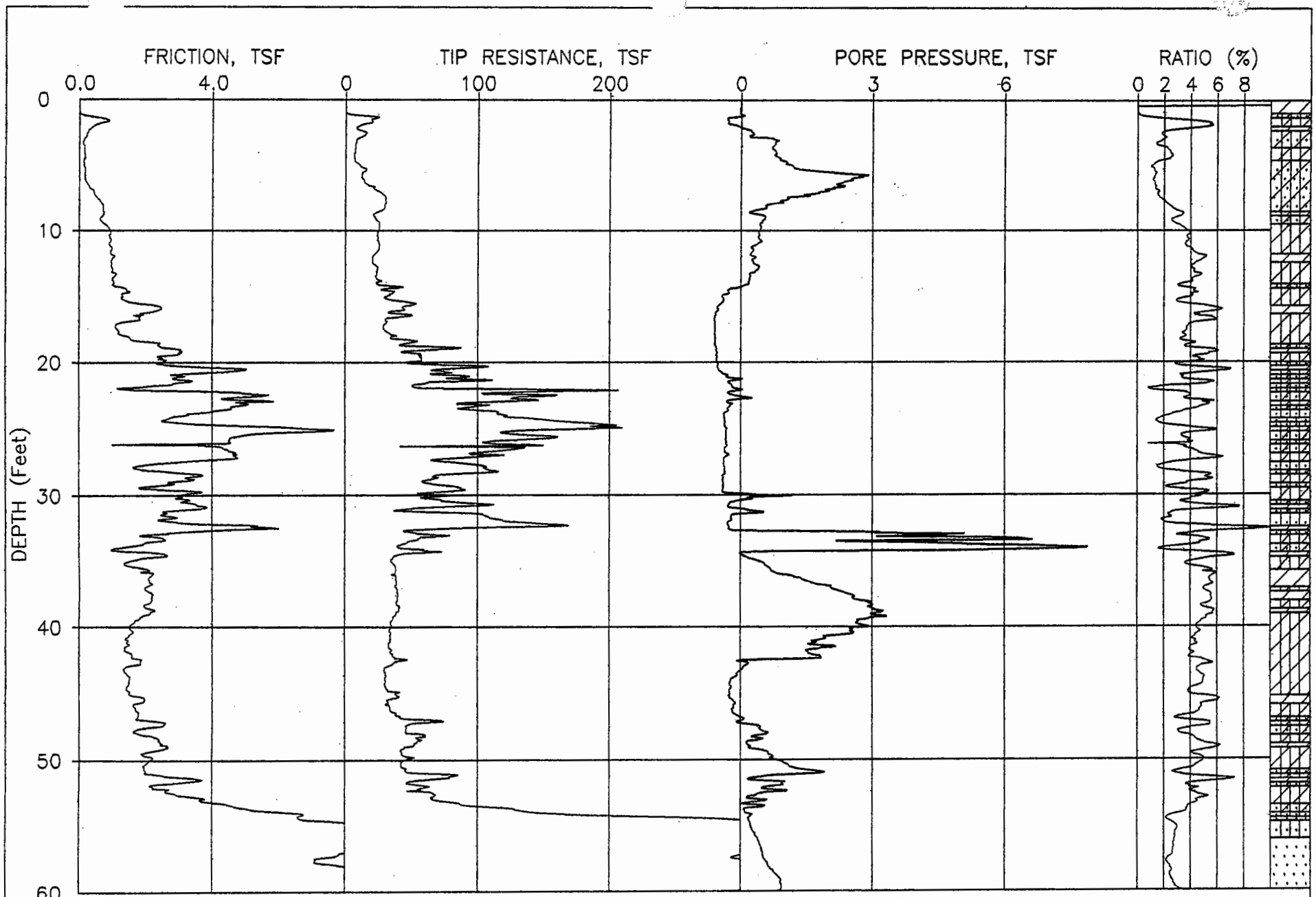


JOB NUMBER: 03-1137

CPT NUMBER: 06

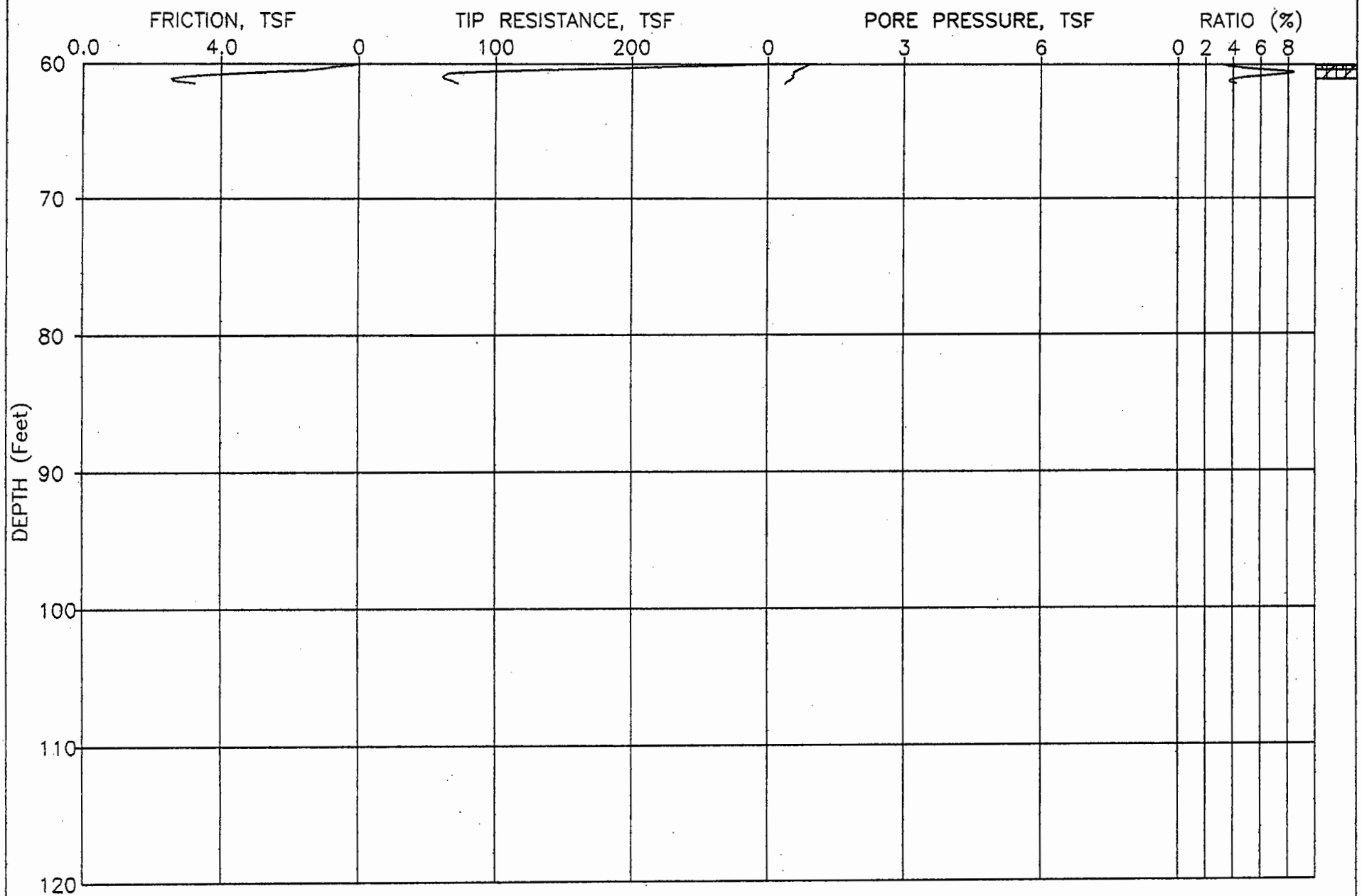
DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 06

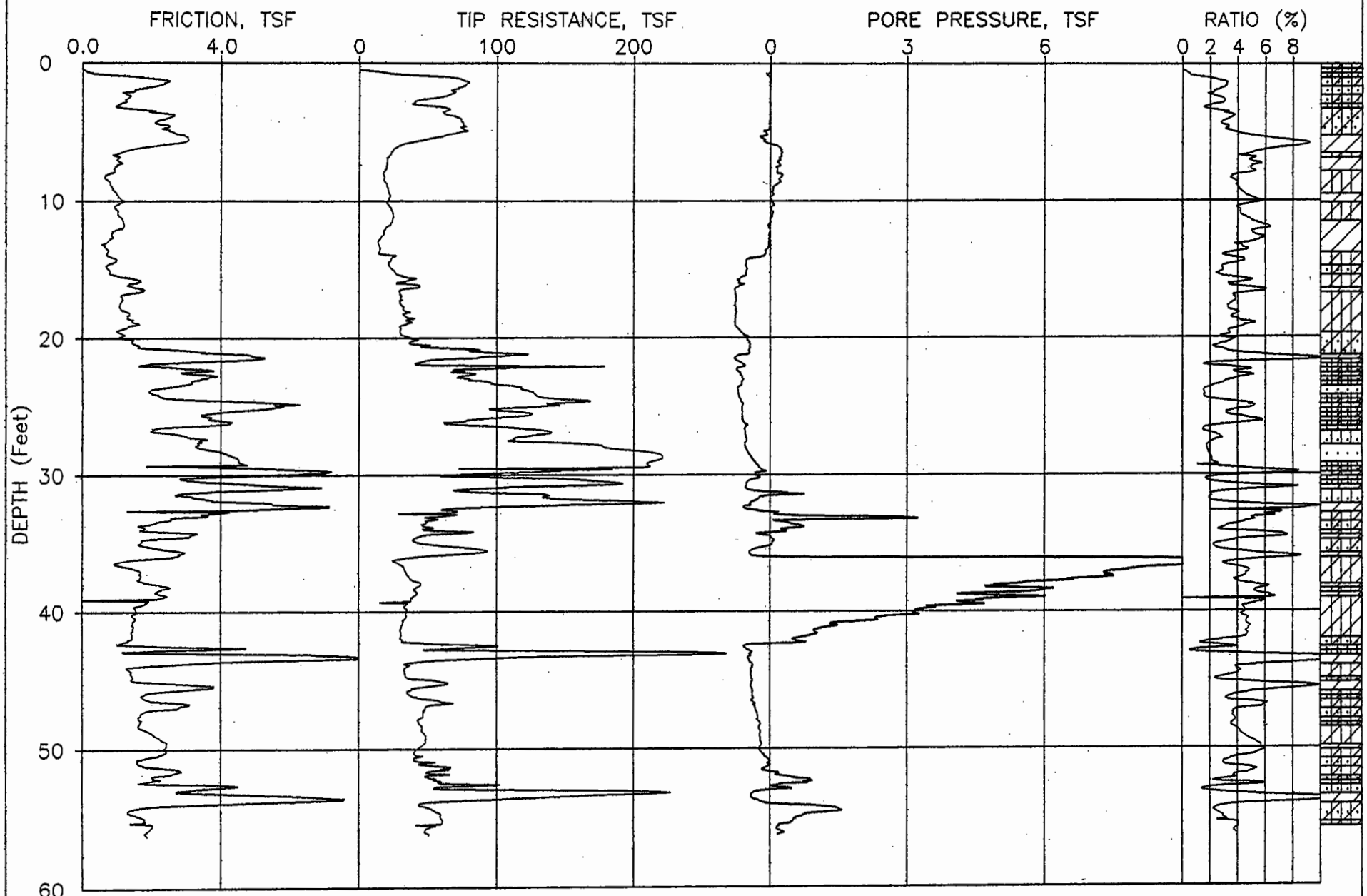
DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 07

DATE: 09-04-2003

ELEVATION: 0.00

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PLATE: 1 OF 1

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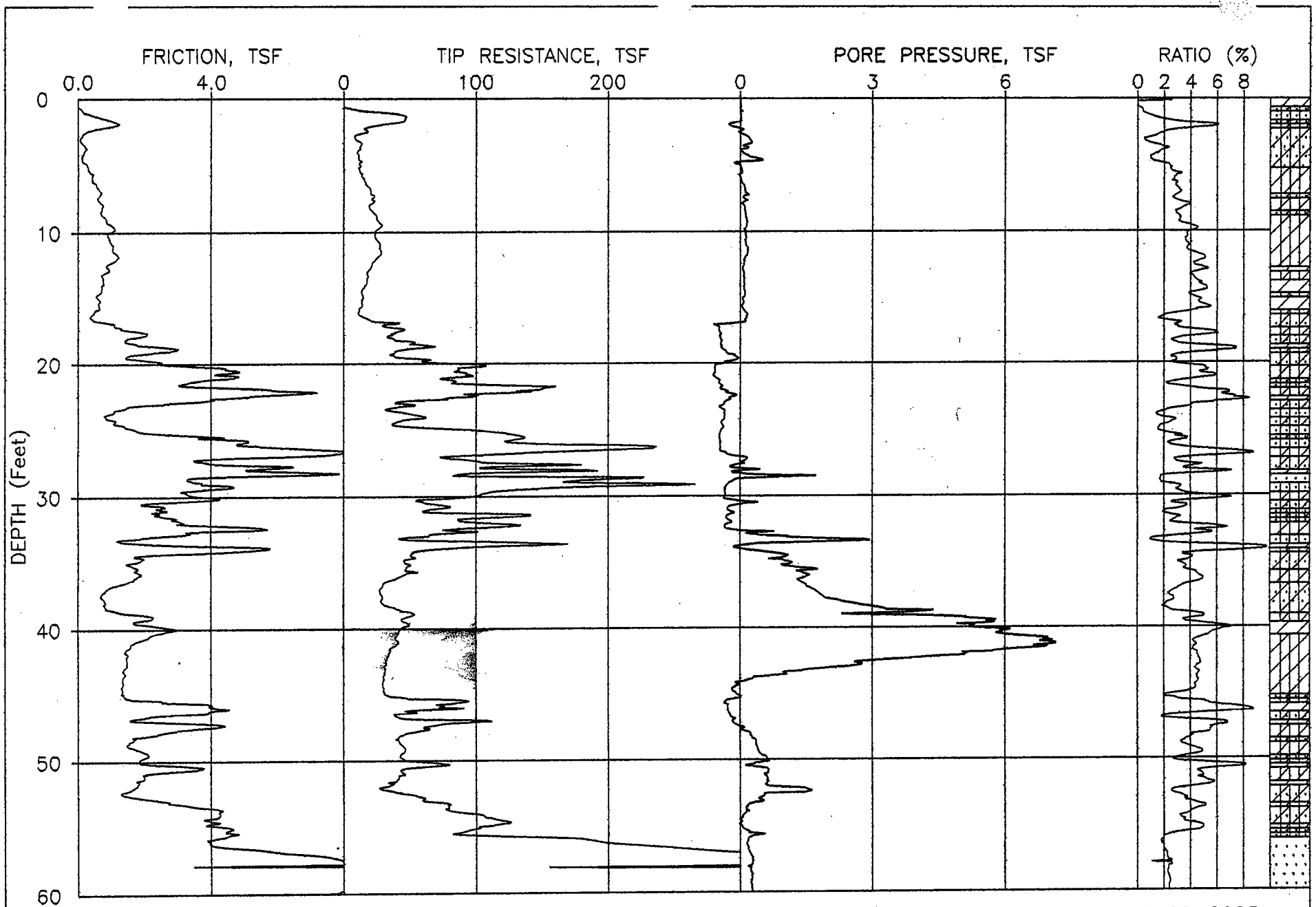

JOB NUMBER: 03-1137

ELEVATION: 0.00

CPT NUMBER: 10

CONE NUMBER: F7.5CKEGW613

DATE: 09-02-2003

PLATE: 1 OF 2

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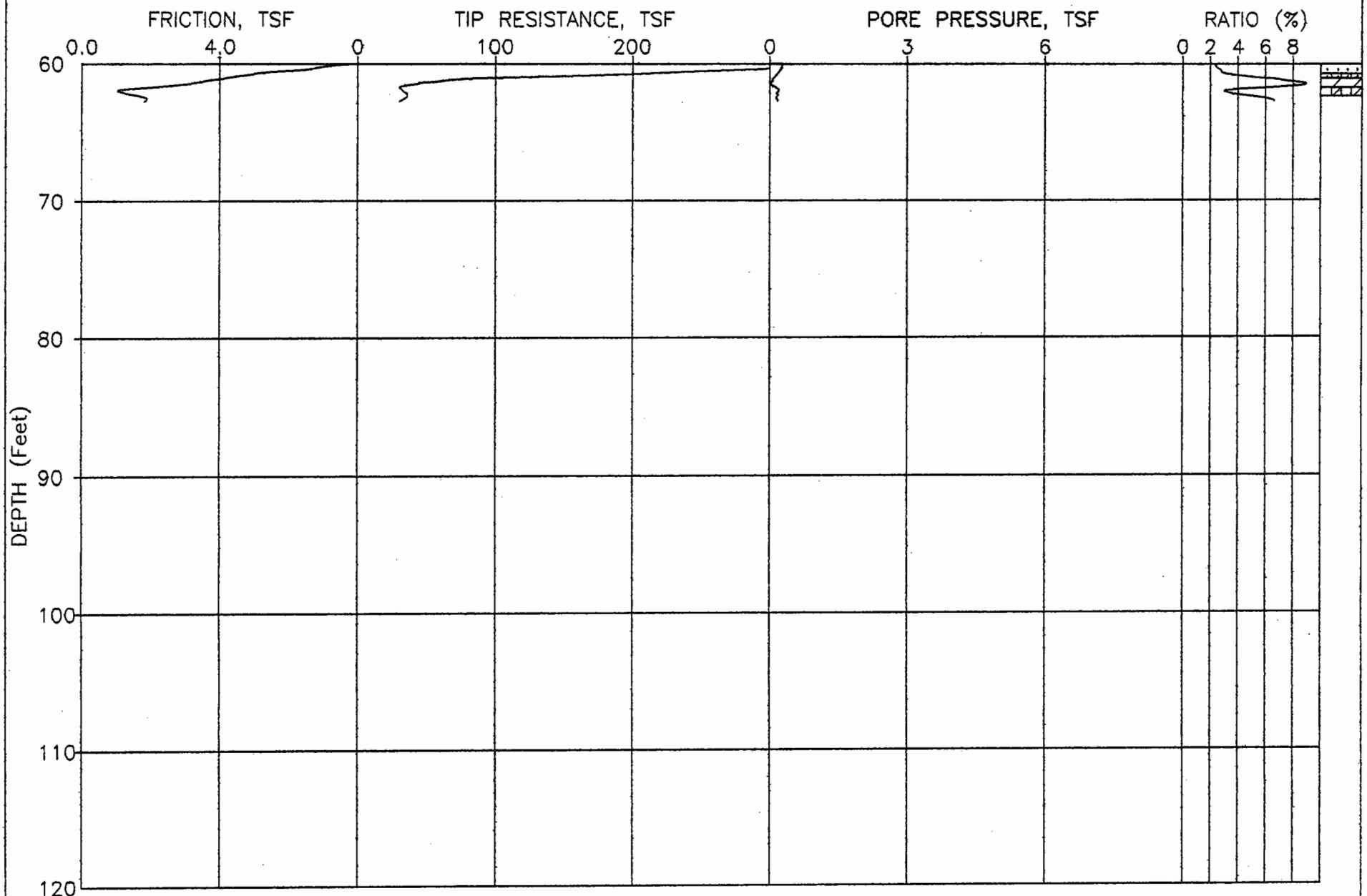


JOB NUMBER: 03-1137

CPT NUMBER: 10

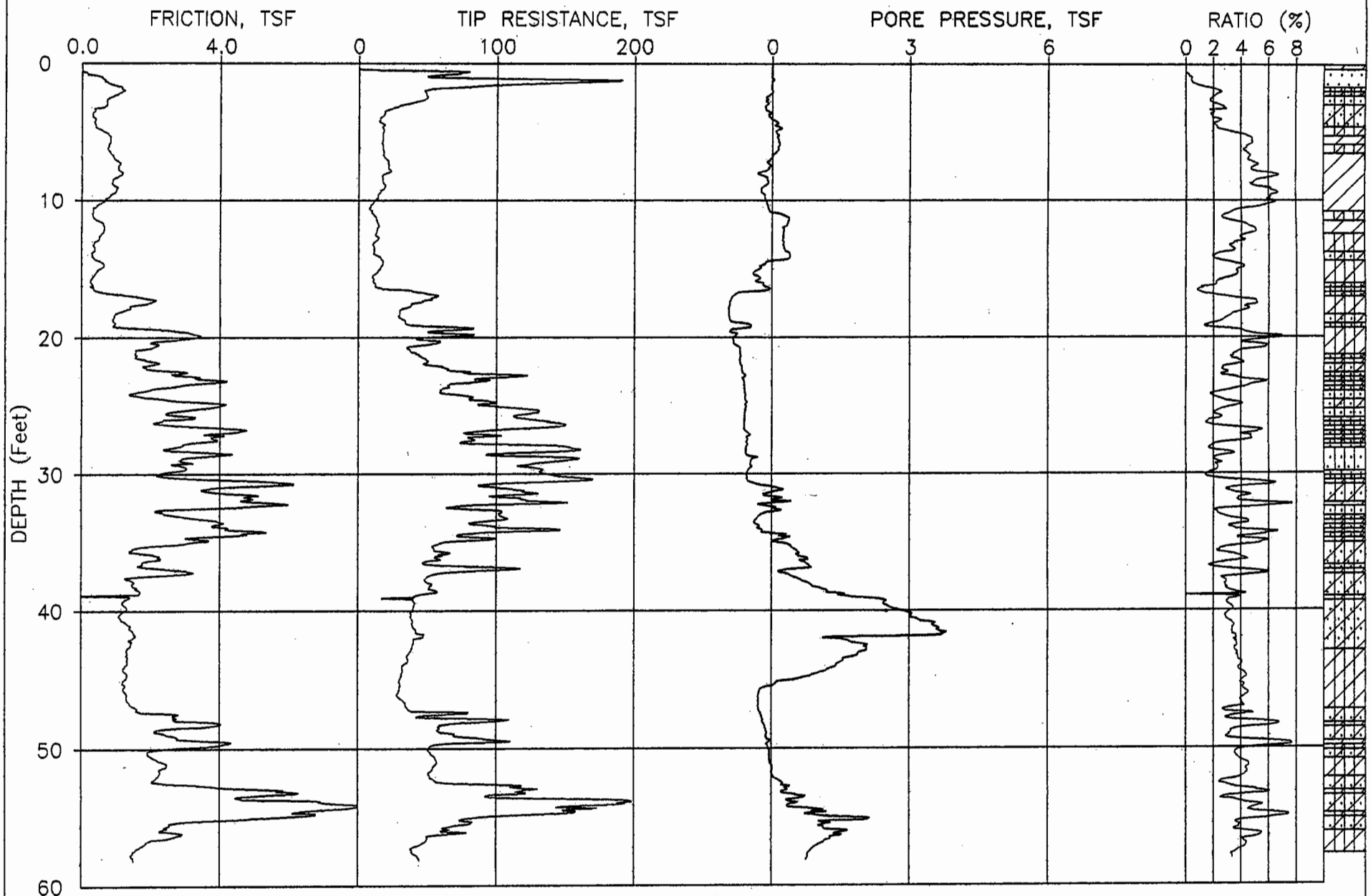
DATE: 09-02-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 11

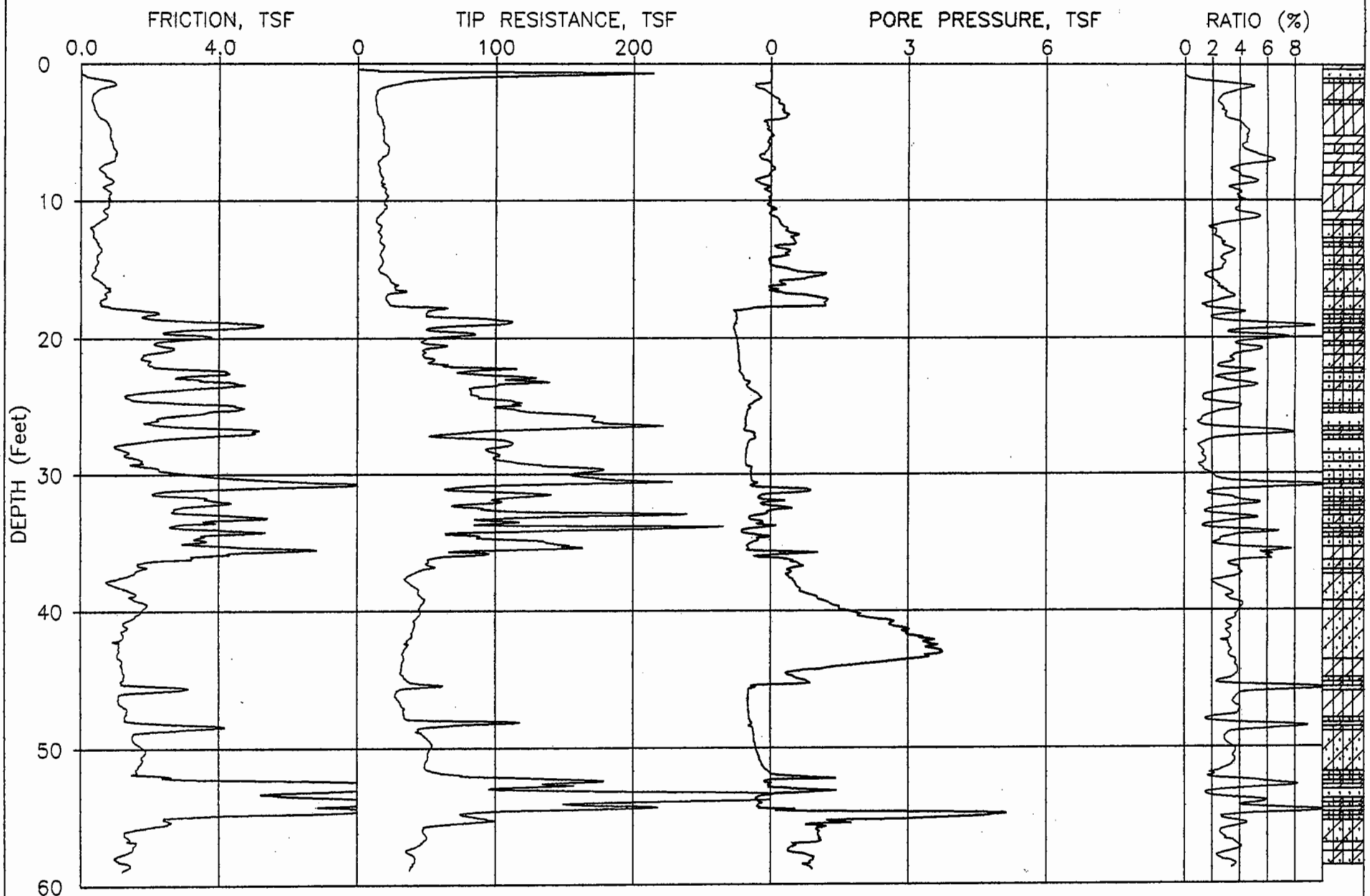
DATE: 08-26-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 12

DATE: 08-26-2003

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CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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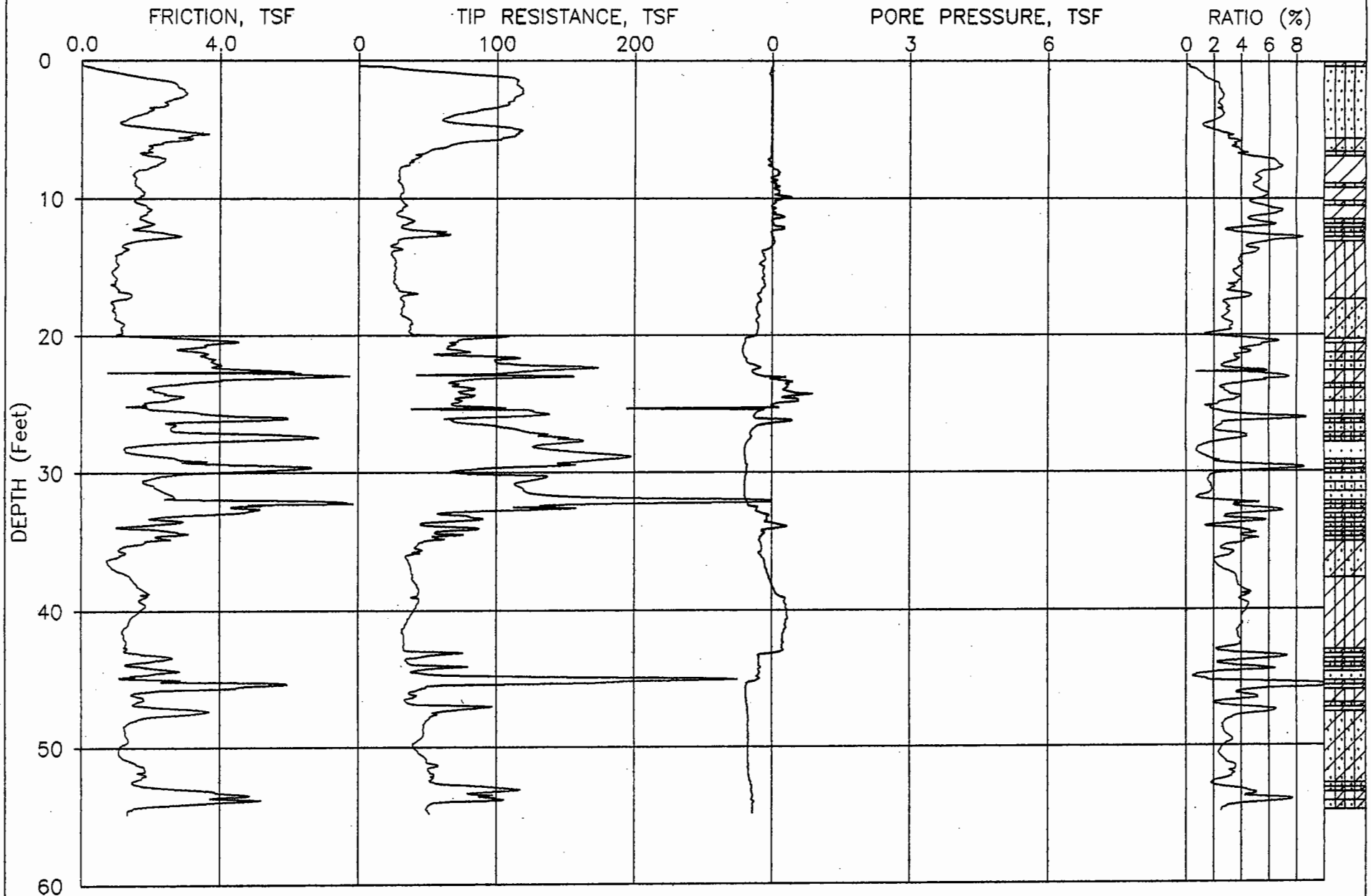

JOB NUMBER: 03-1137

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DATE: 08-26-2003

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CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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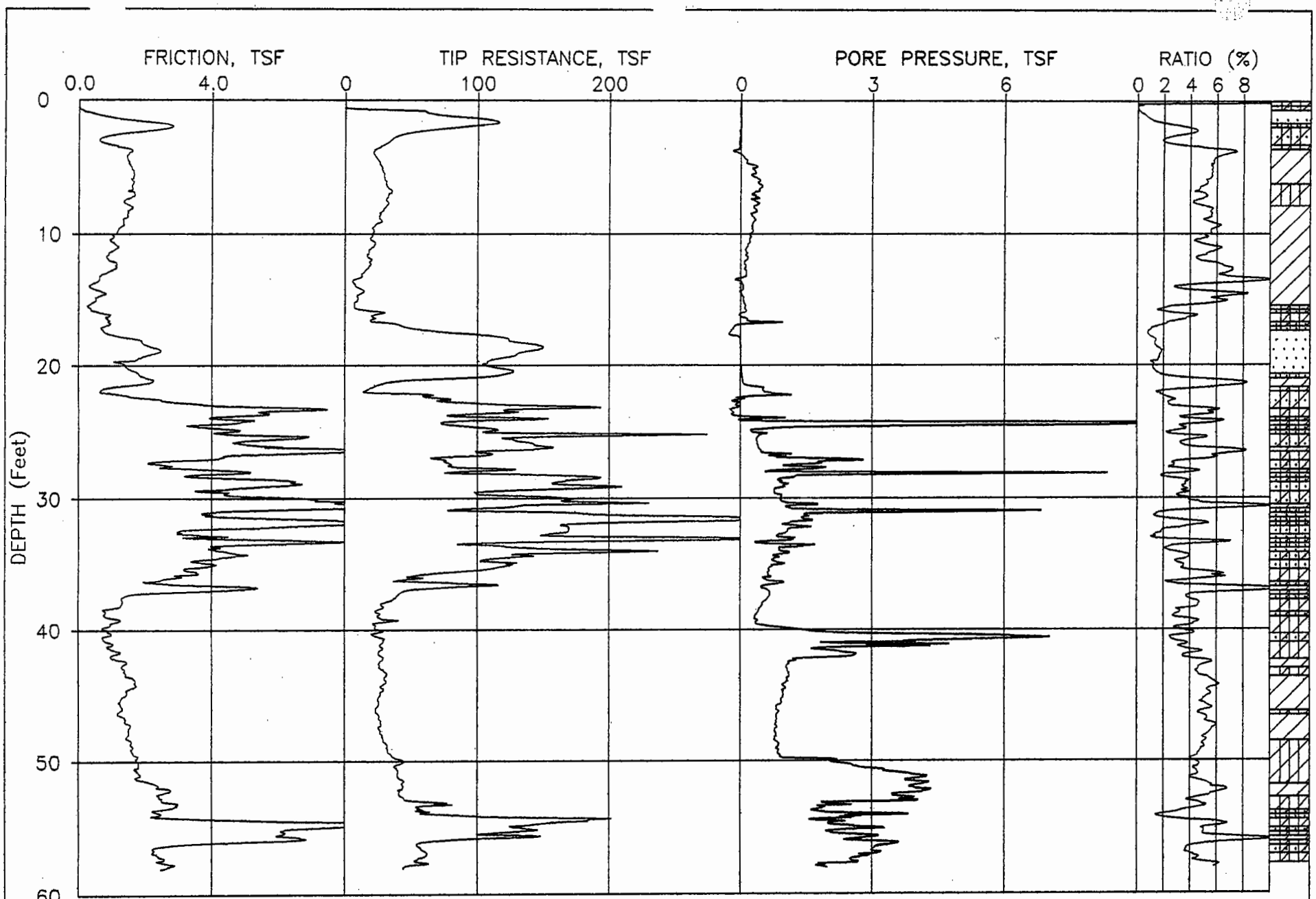

JOB NUMBER: 03-1137

CPT NUMBER: 14

DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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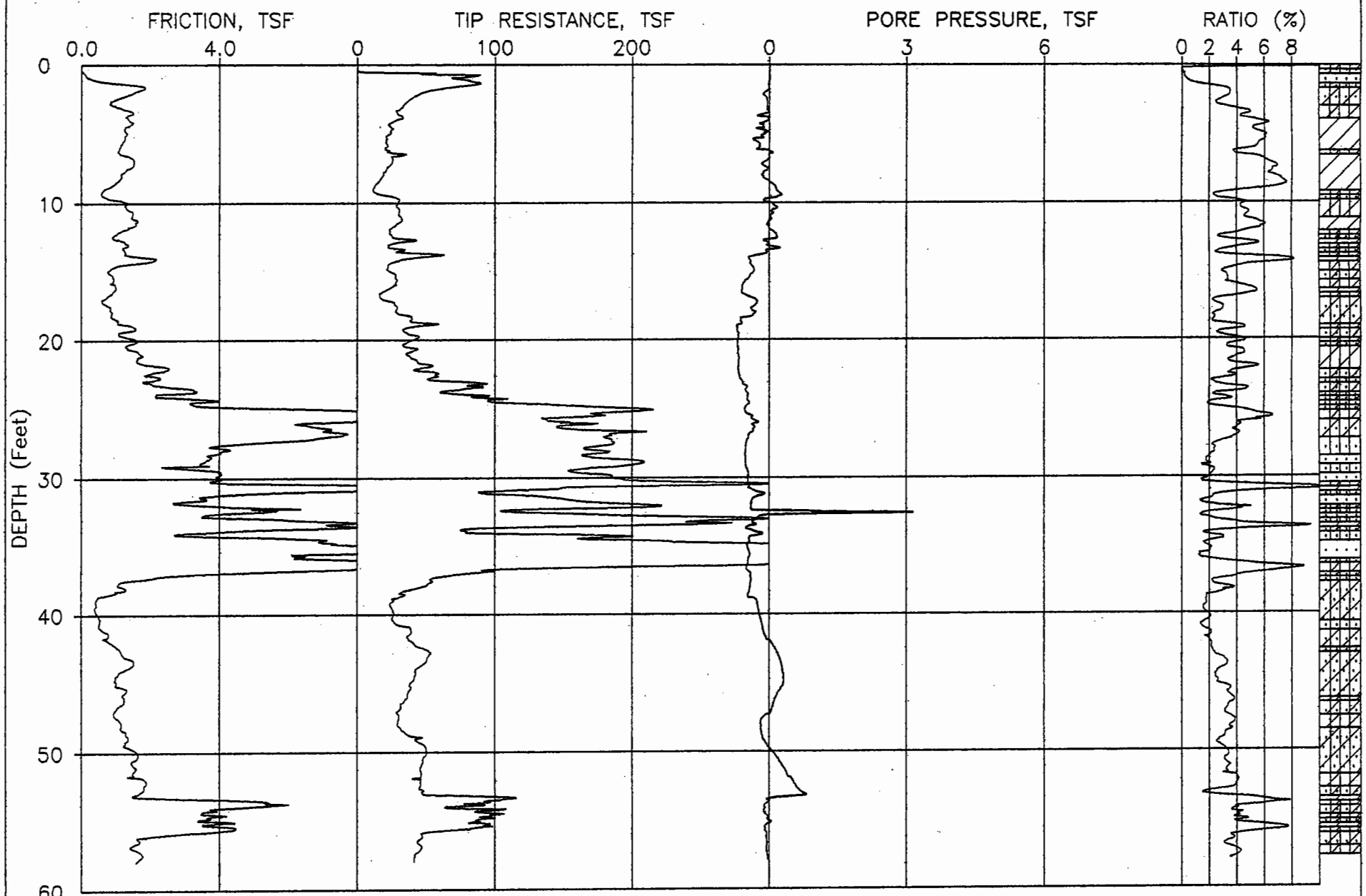


JOB NUMBER: 03-1137

CPT NUMBER: 15

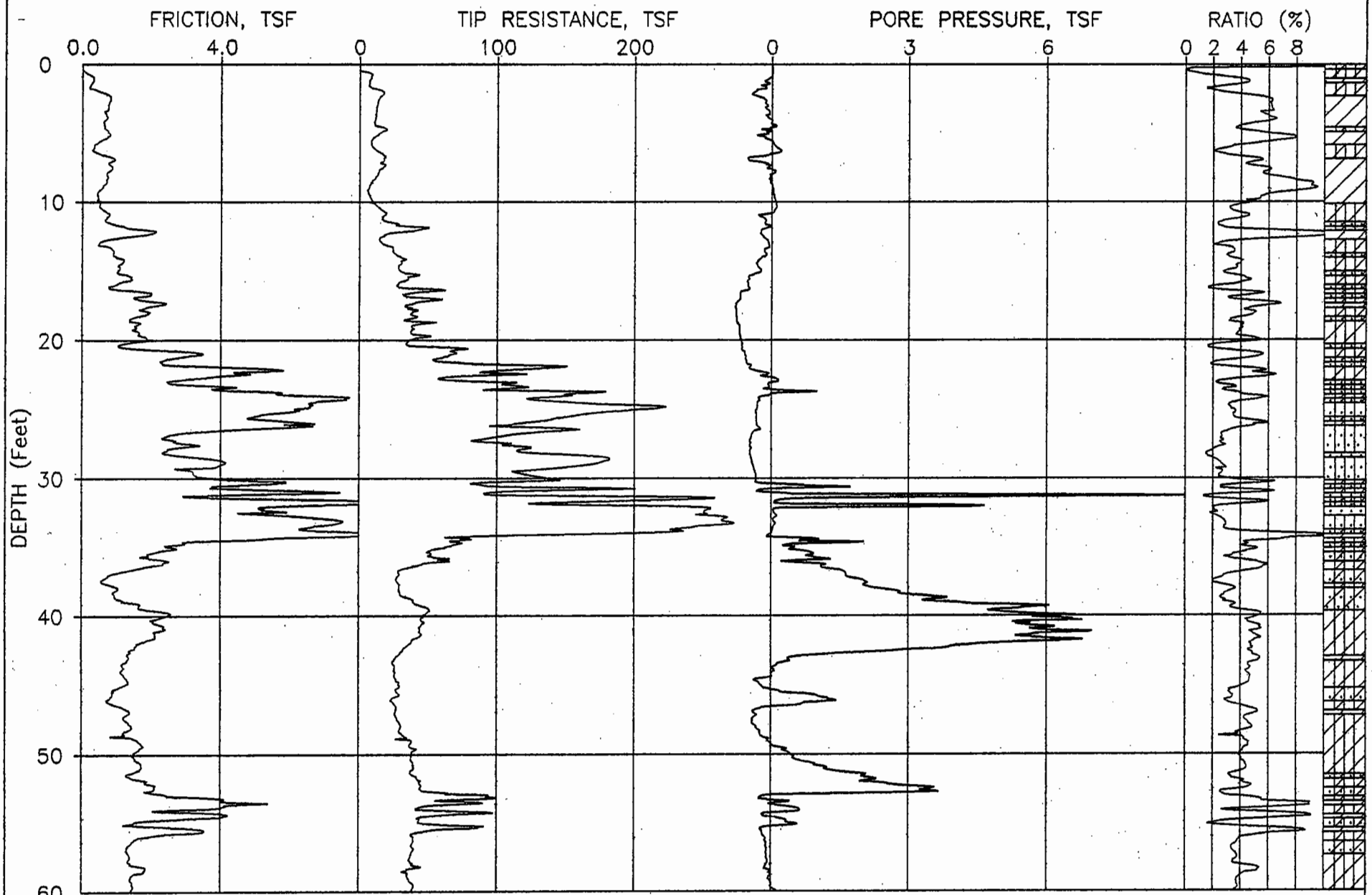
DATE: 08-26-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 16

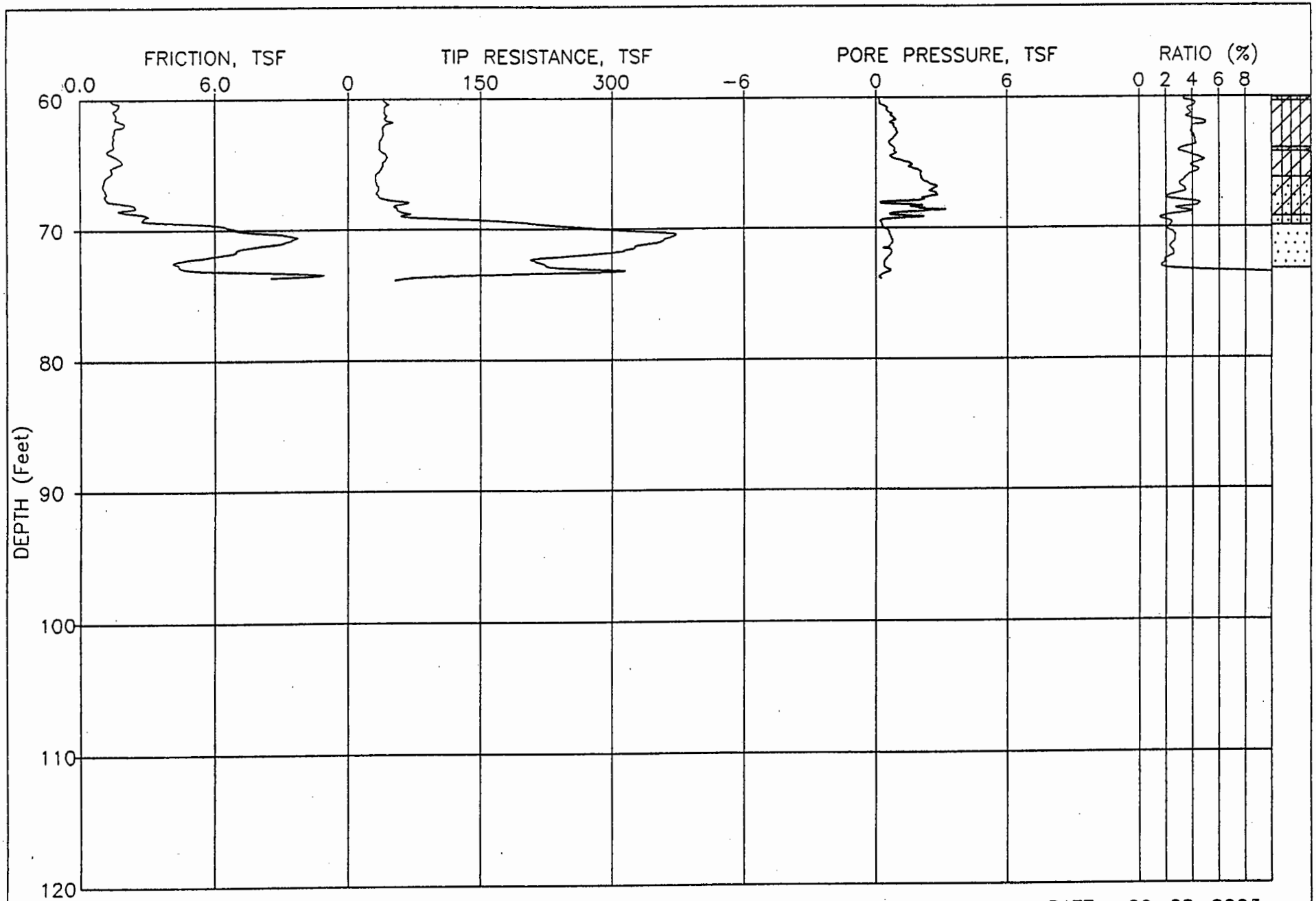
DATE: 09-08-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 16

DATE: 09-08-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

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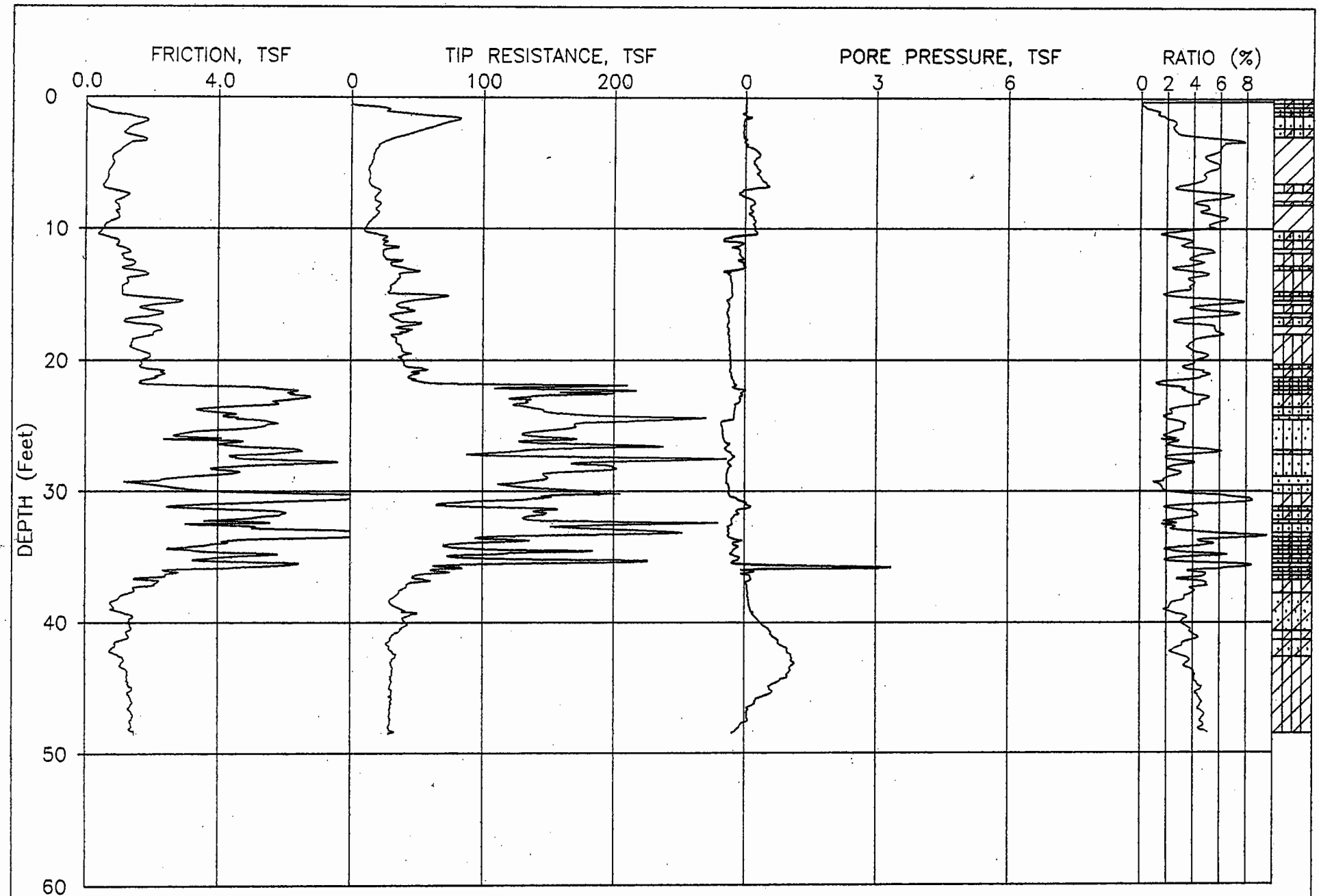

JOB NUMBER: 03-1137

CPT NUMBER: 17

DATE: 08-25-2003

ELEVATION: 0.00

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PLATE: 1 OF 1

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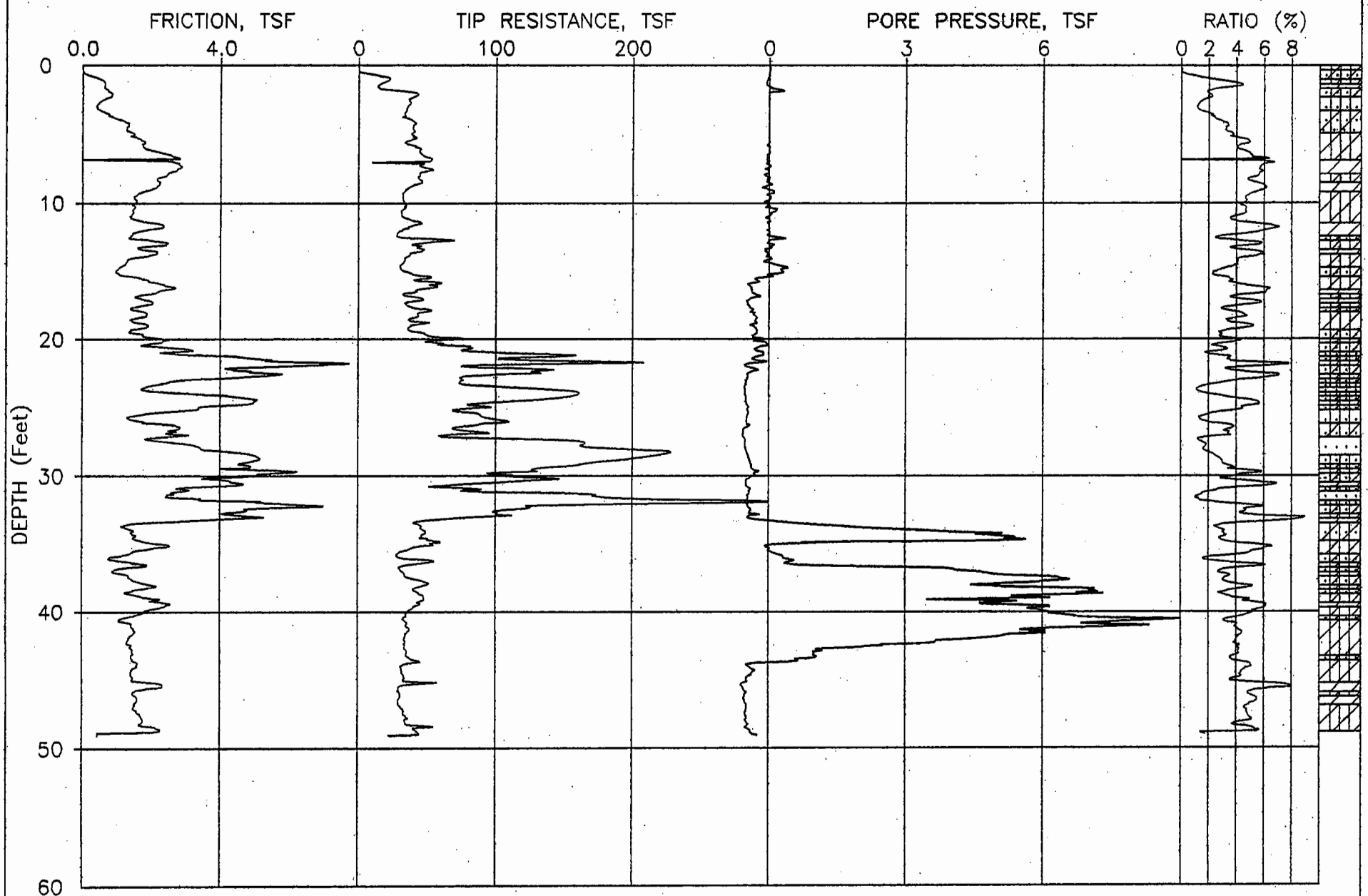

JOB NUMBER: 03-1137

CPT NUMBER: 18

DATE: 09-08-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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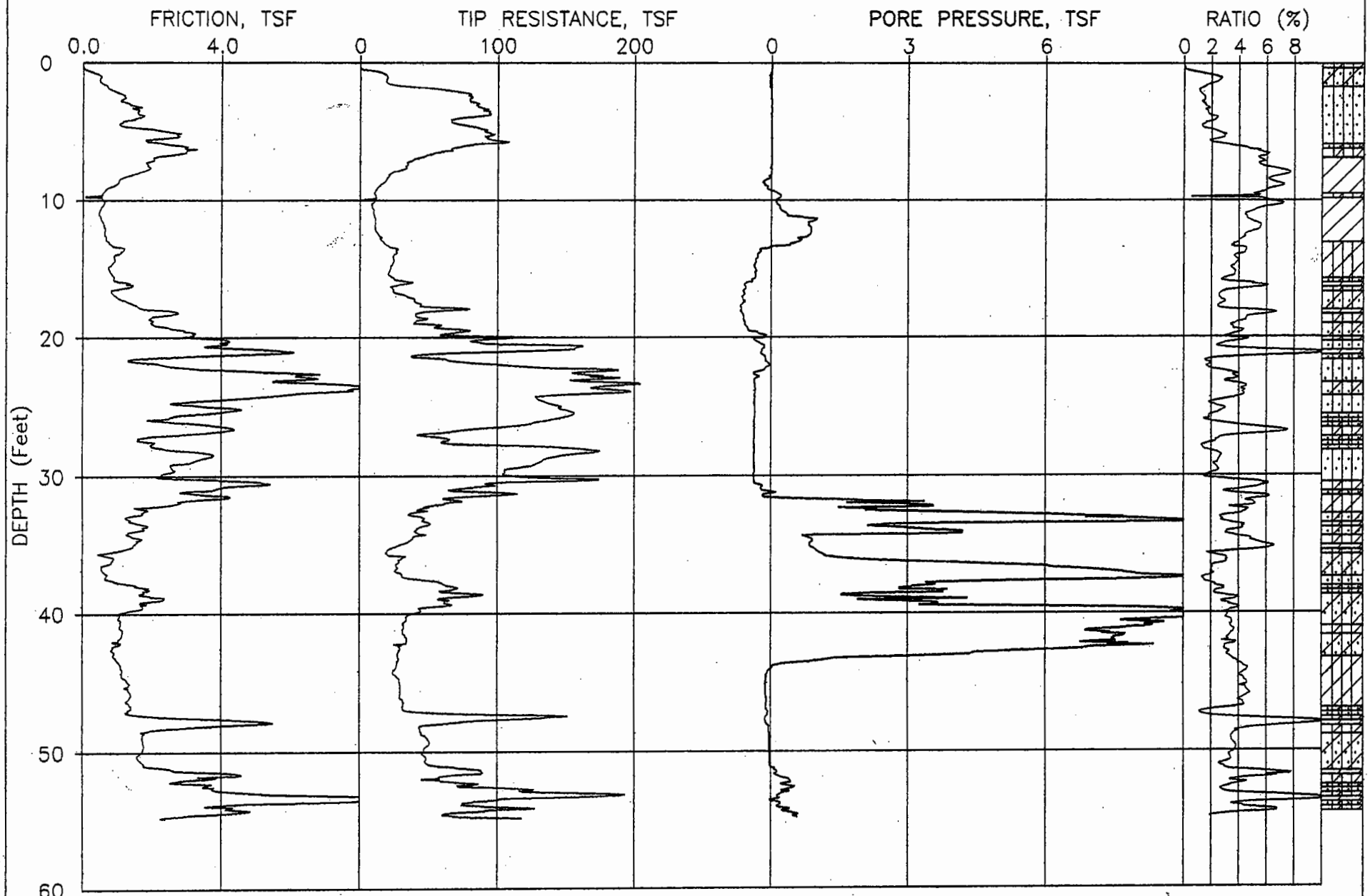

JOB NUMBER: 03-1137

CPT NUMBER: 19

DATE: 08-25-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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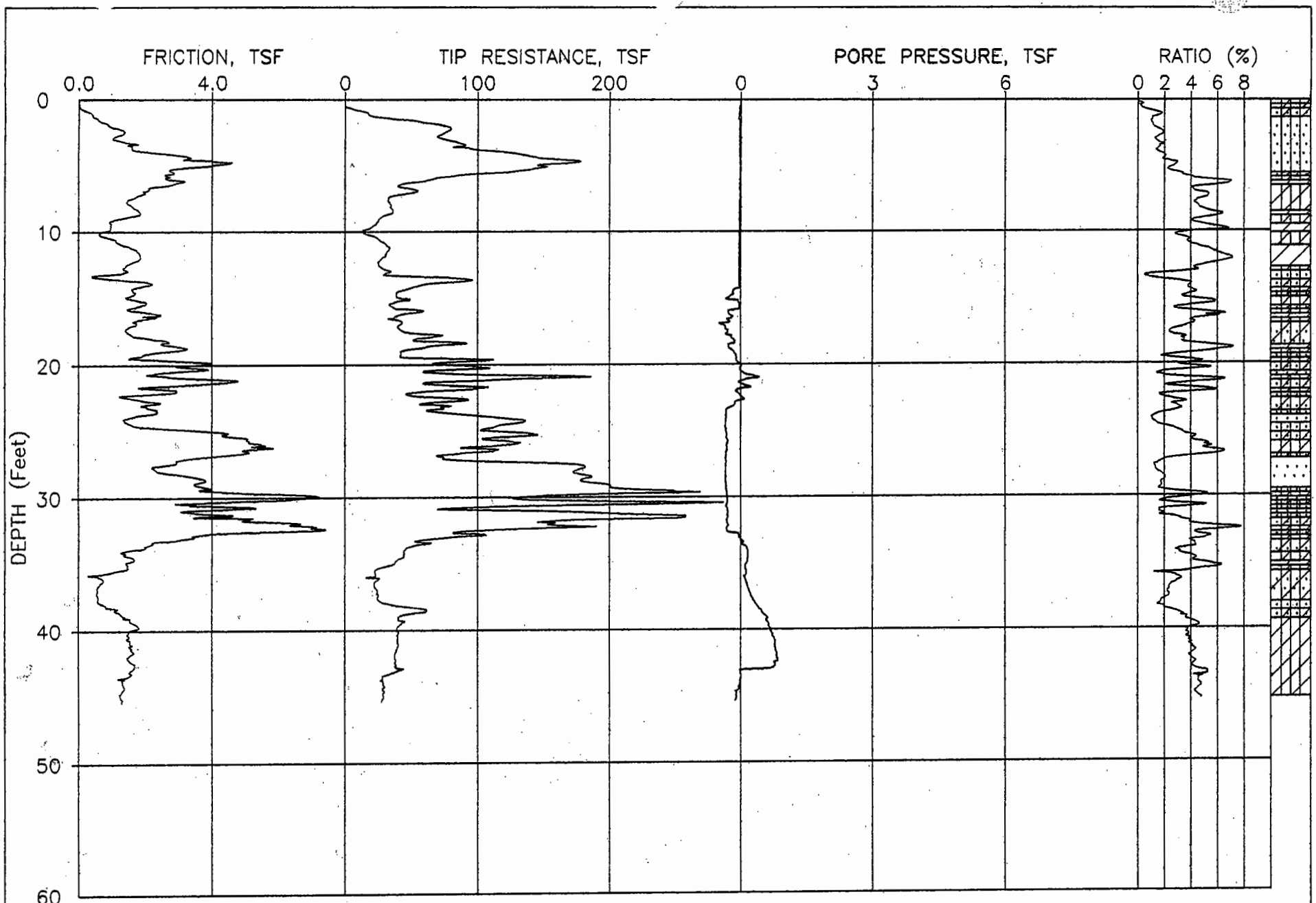

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CPT NUMBER: 20

DATE: 08-25-2003

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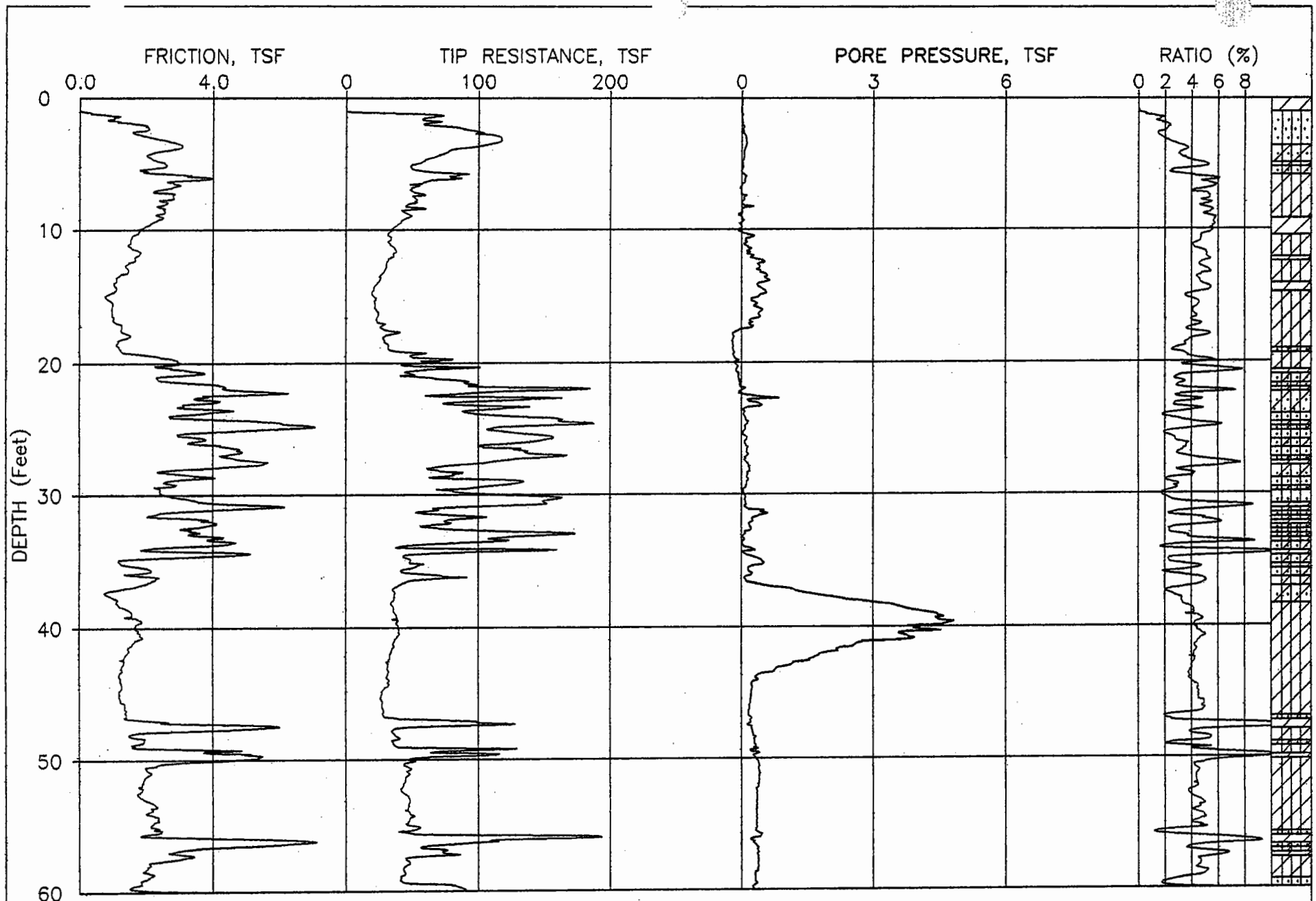
PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 21

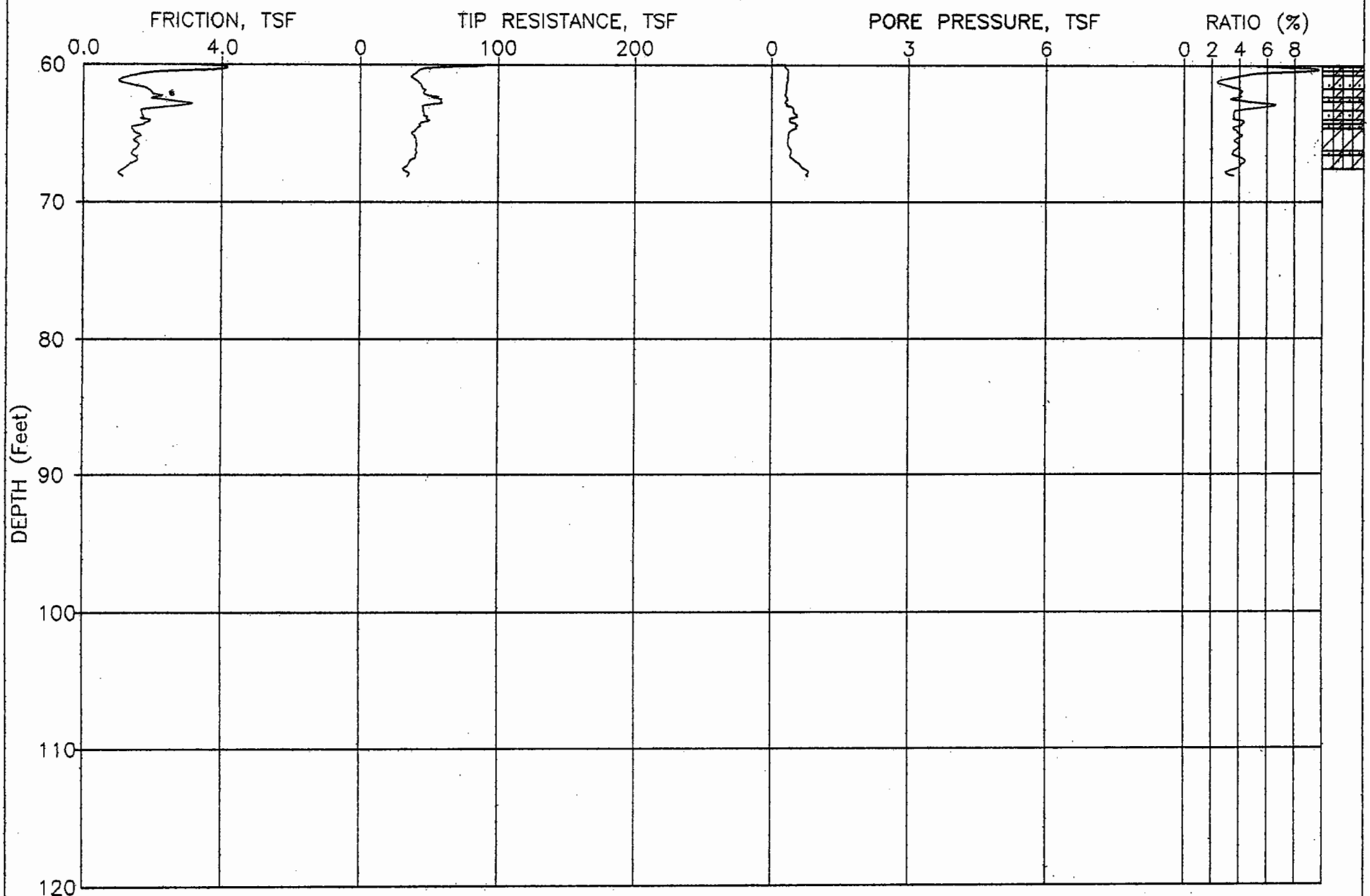
DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 21

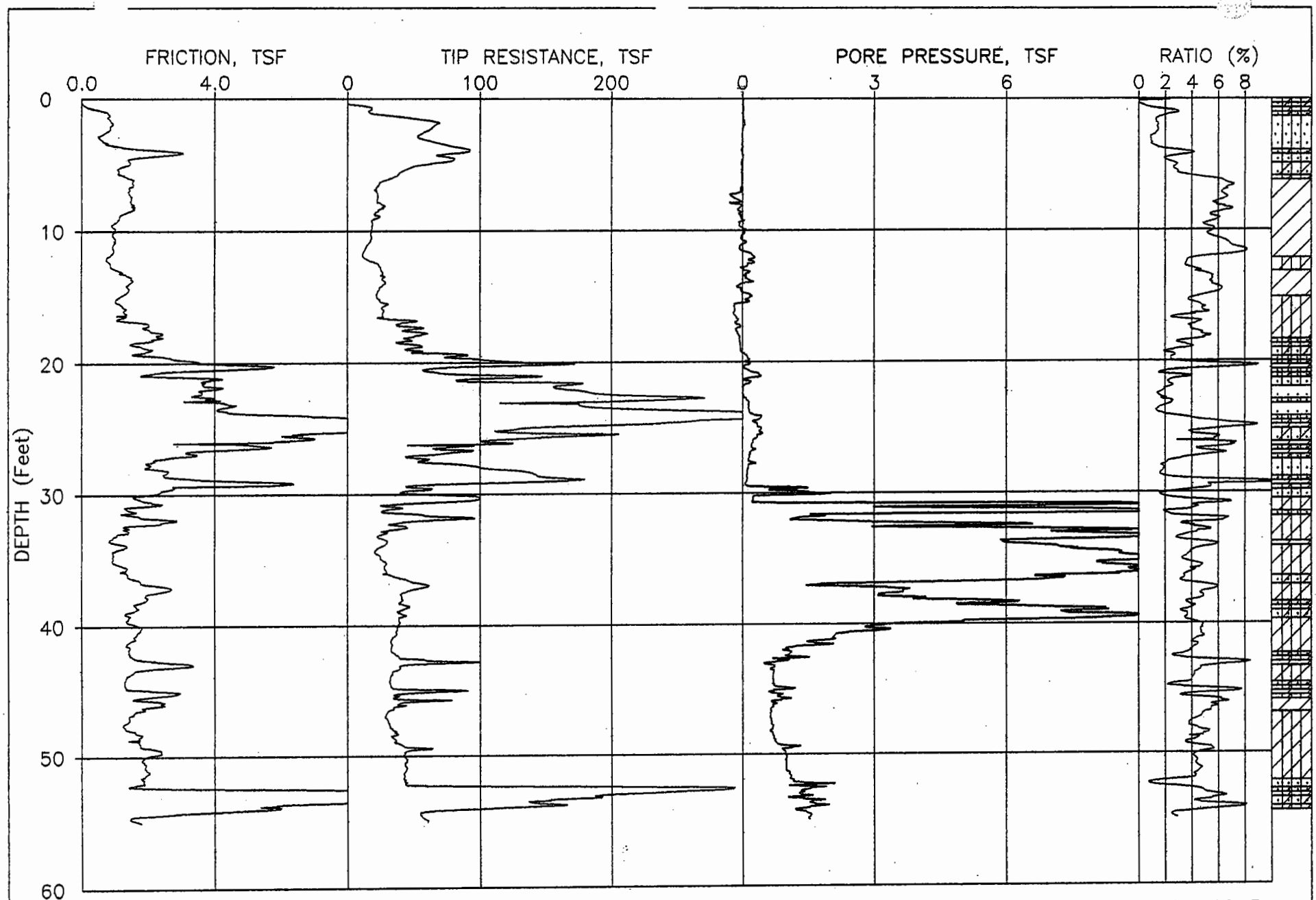
DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 22

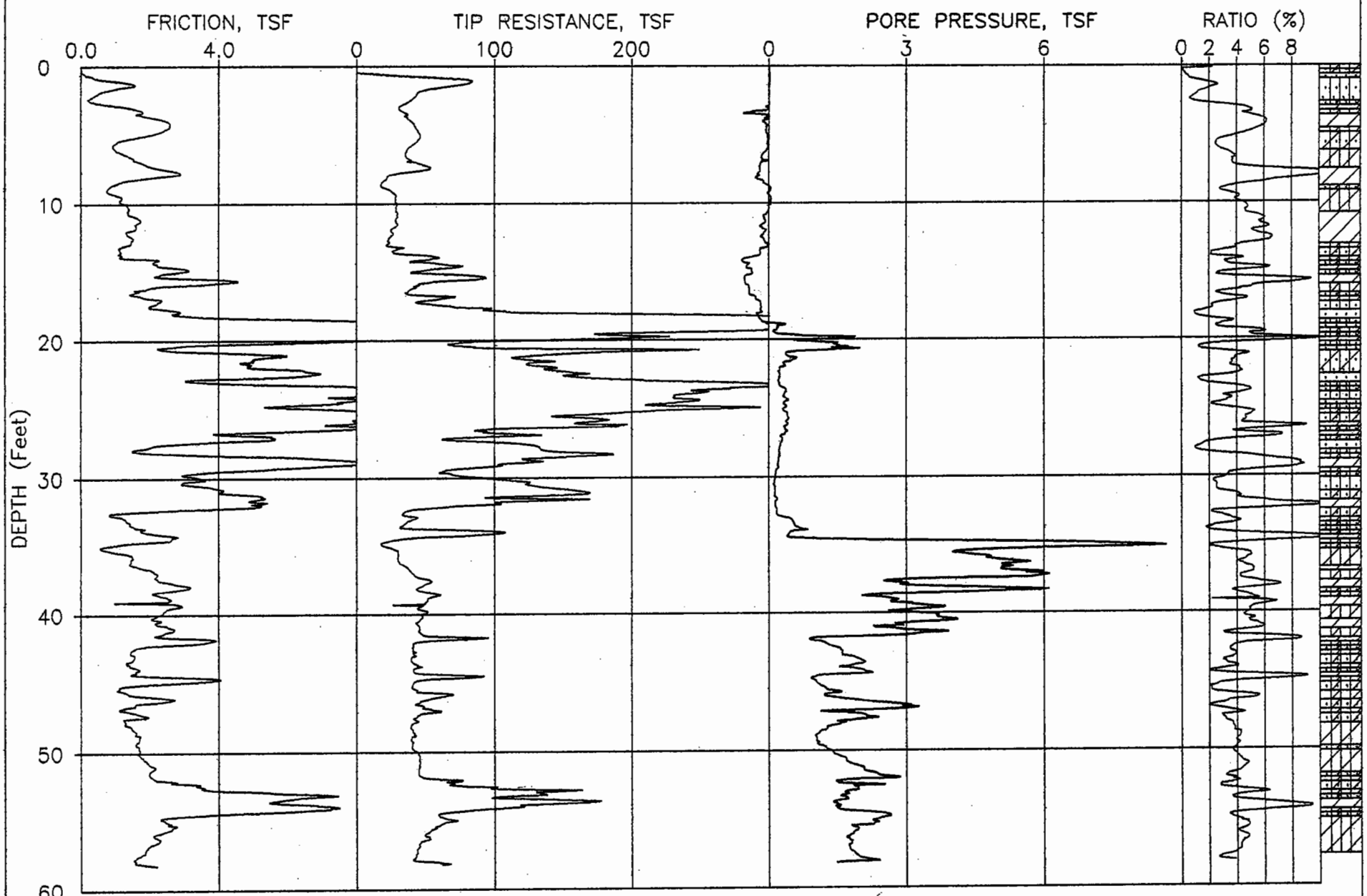
DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 23

DATE: 08-29-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

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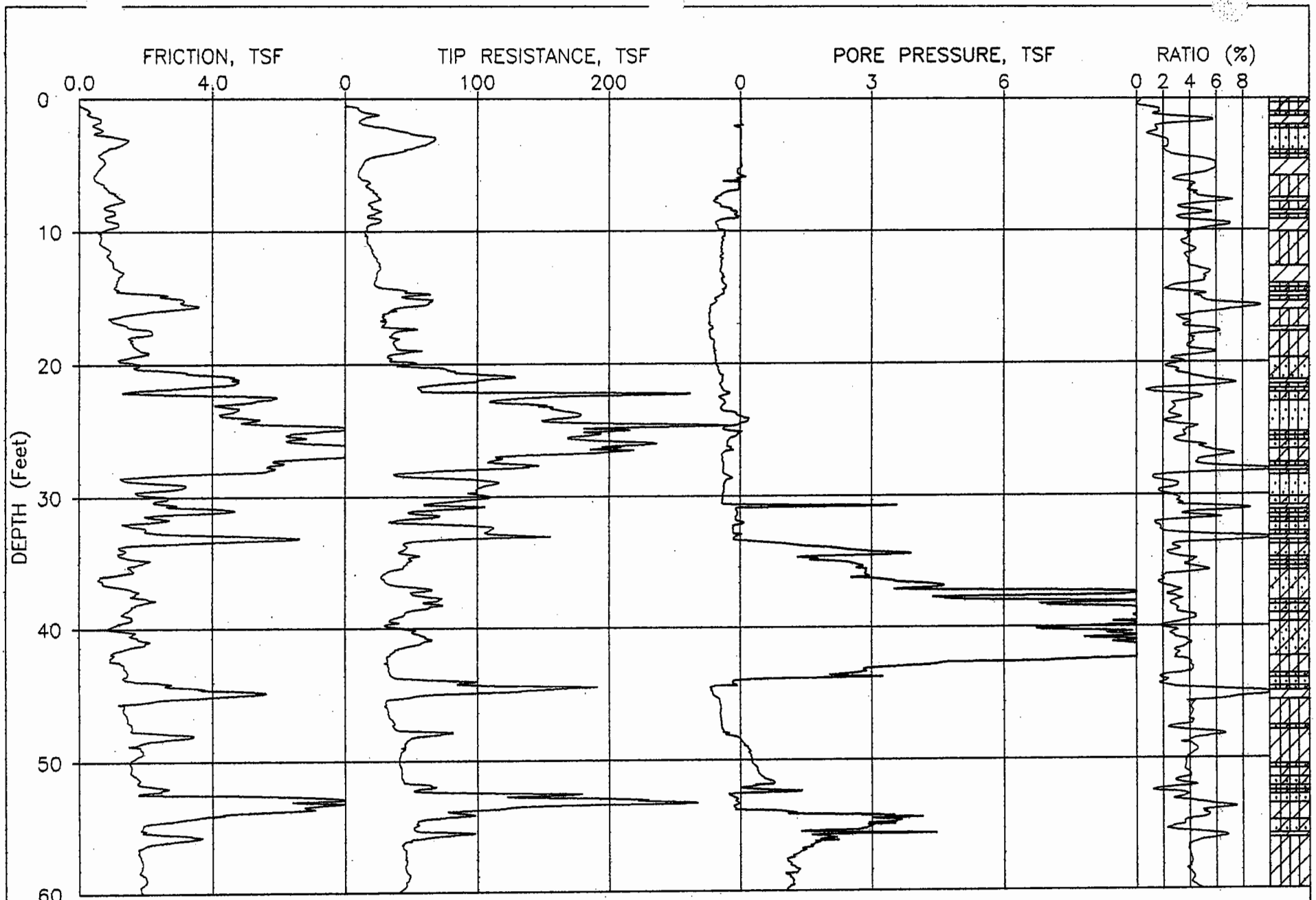

JOB NUMBER: 03-1137

ELEVATION: 0.00

CPT NUMBER: 24

CONE NUMBER: F7.5CKEGW613

DATE: 09-04-2003

PLATE: 1 OF 2

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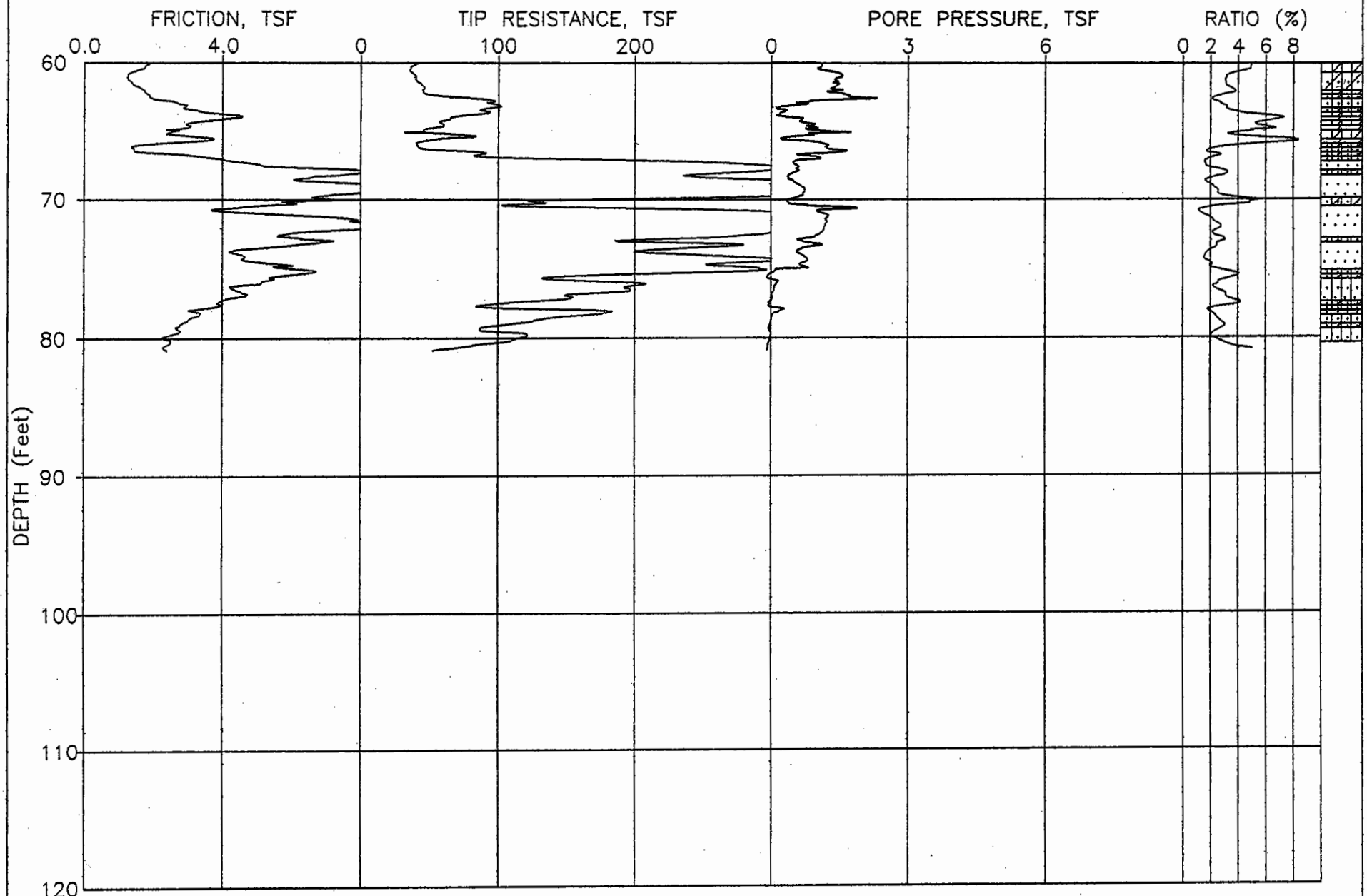

JOB NUMBER: 03-1137

CPT NUMBER: 24

DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

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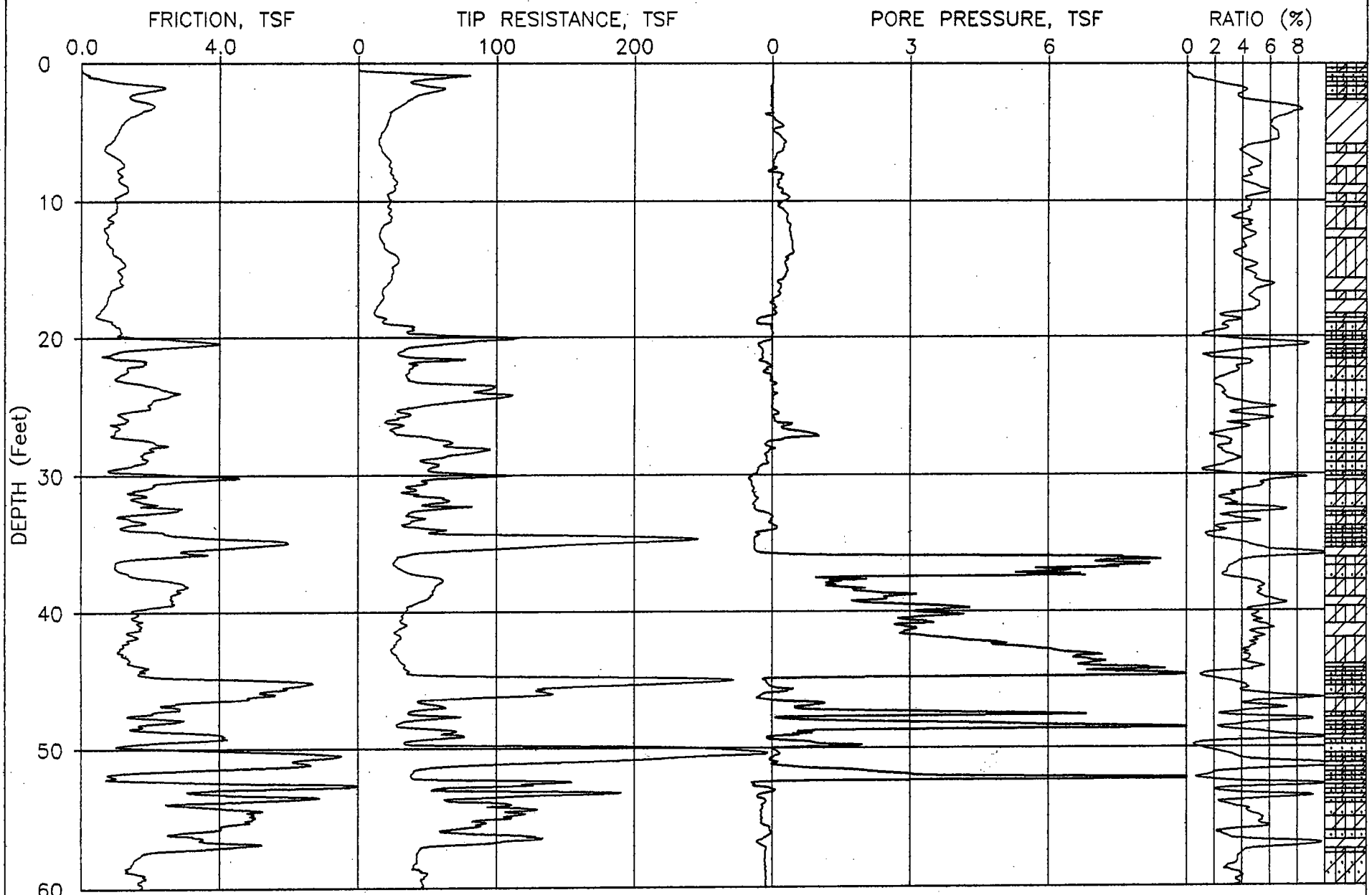


JOB NUMBER: 03-1137

CPT NUMBER: 25

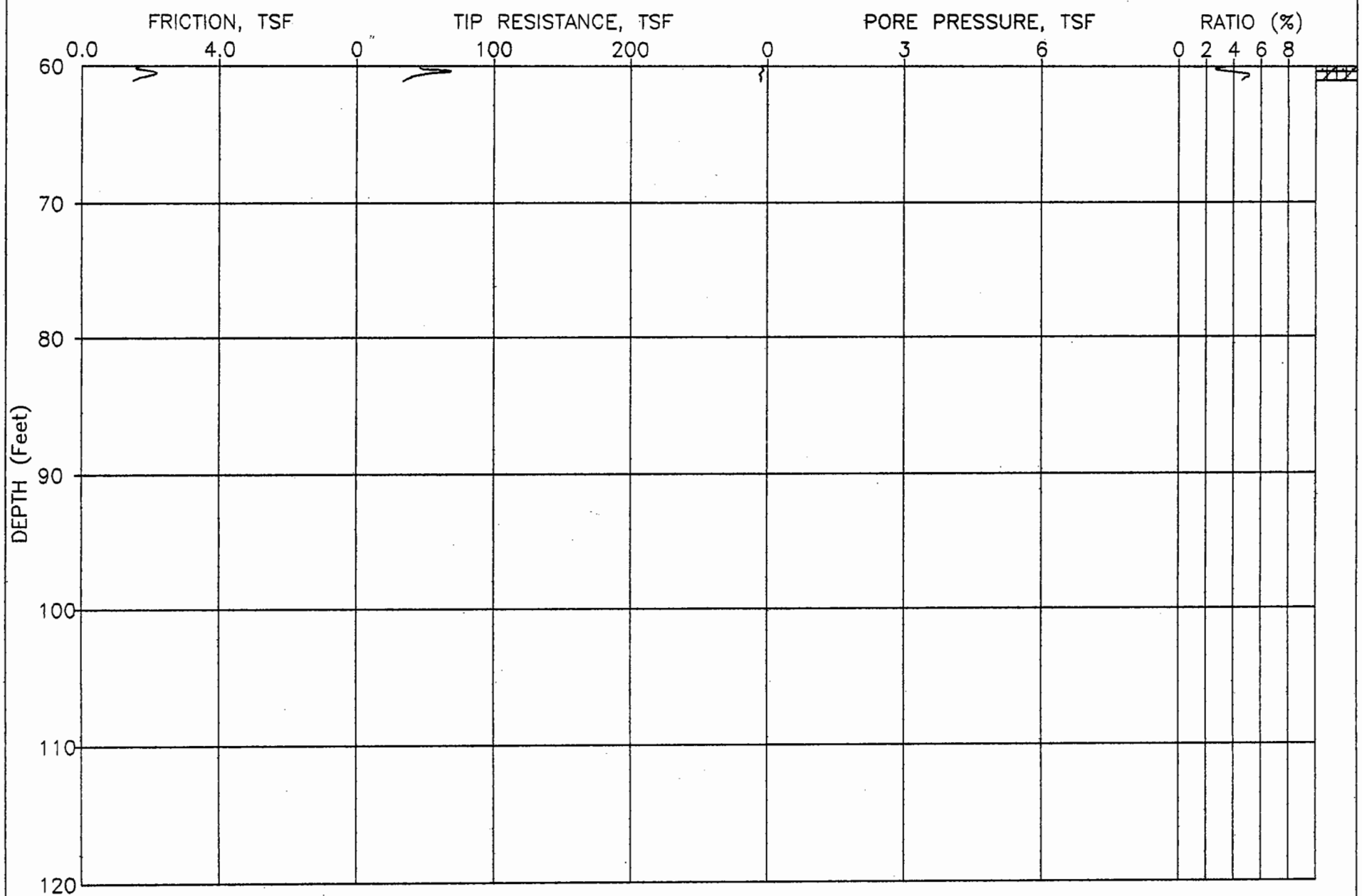
DATE: 08-29-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 25

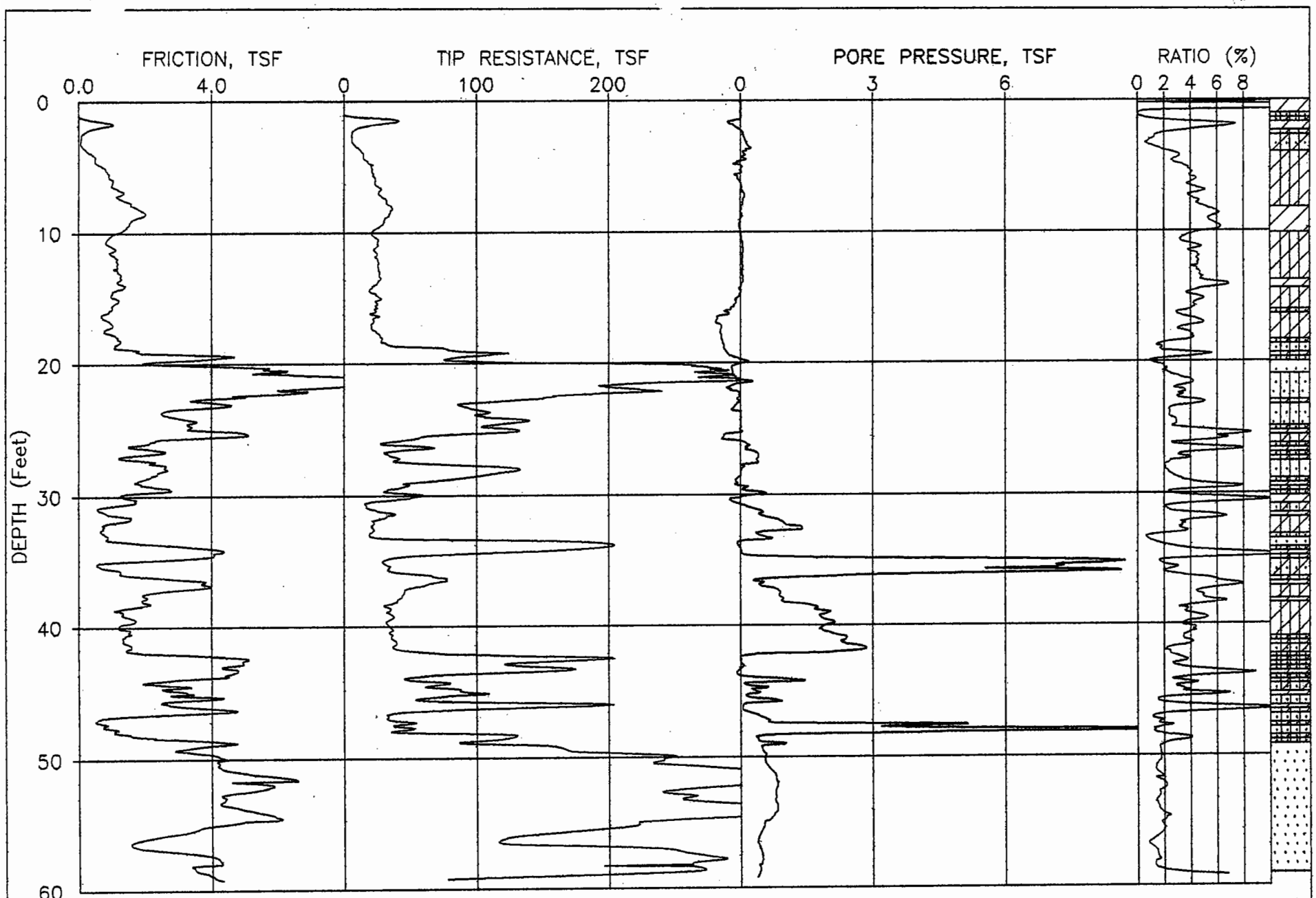
DATE: 08-29-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 26

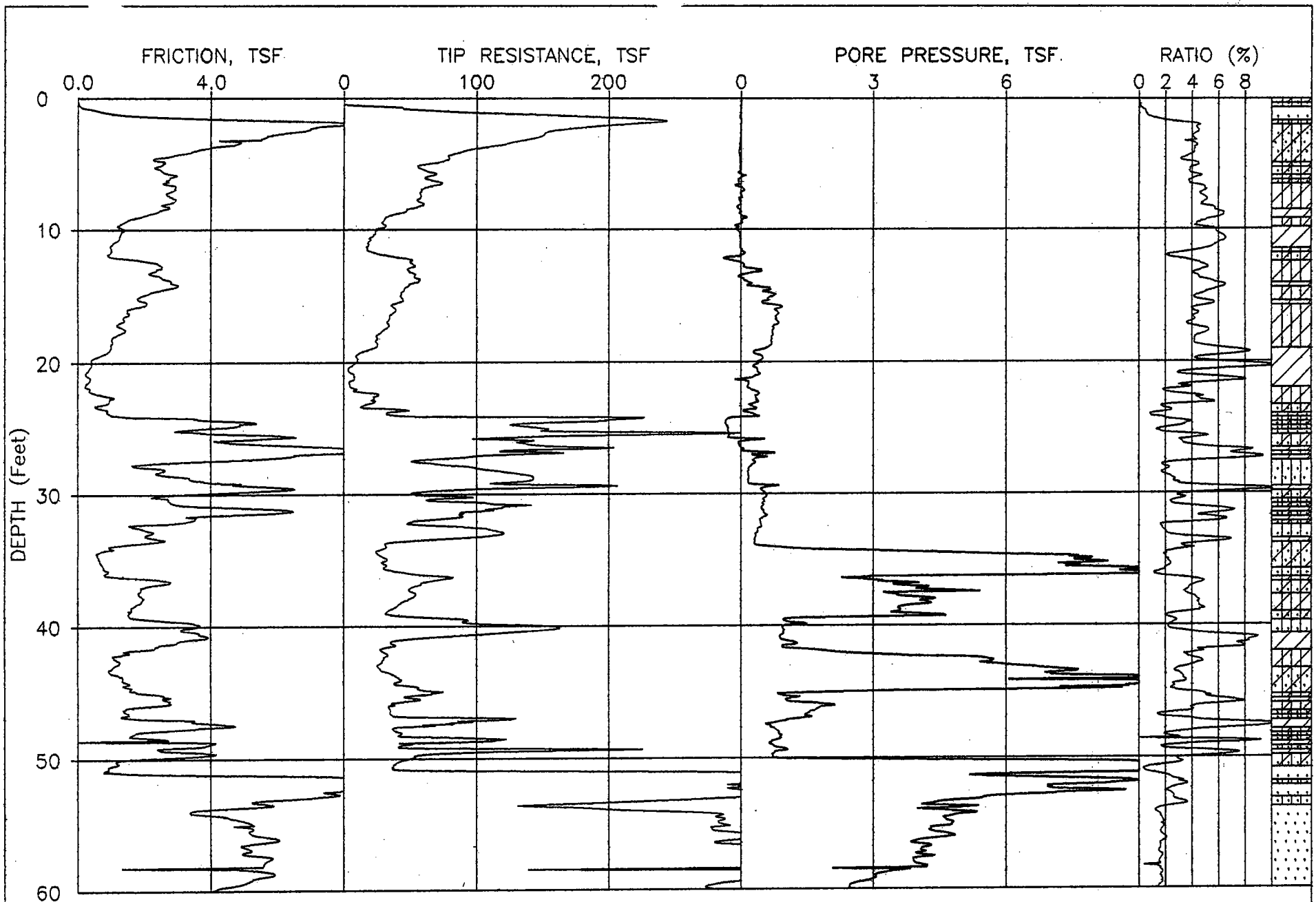
DATE: 09-02-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 27

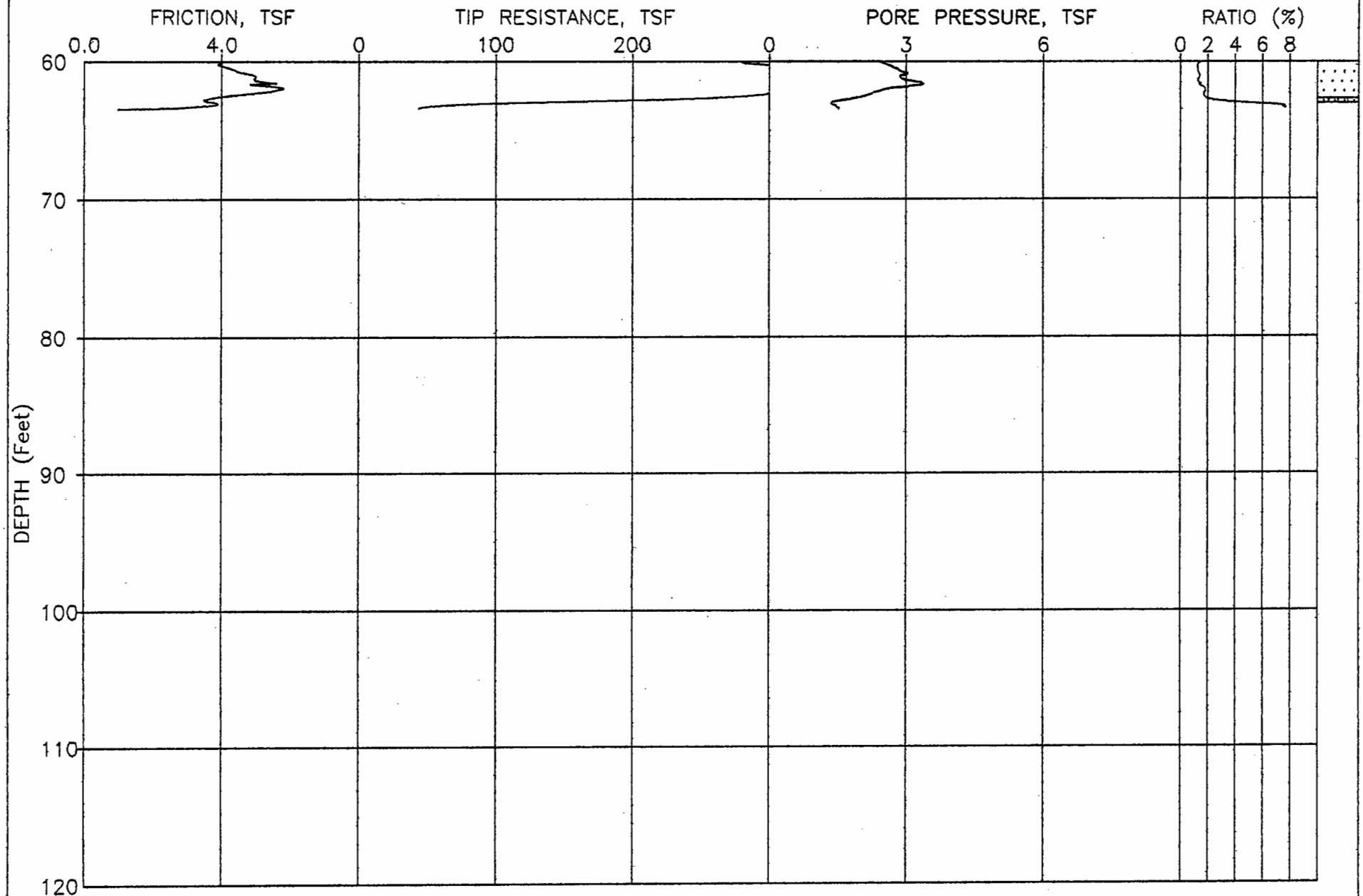
DATE: 09-02-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 27

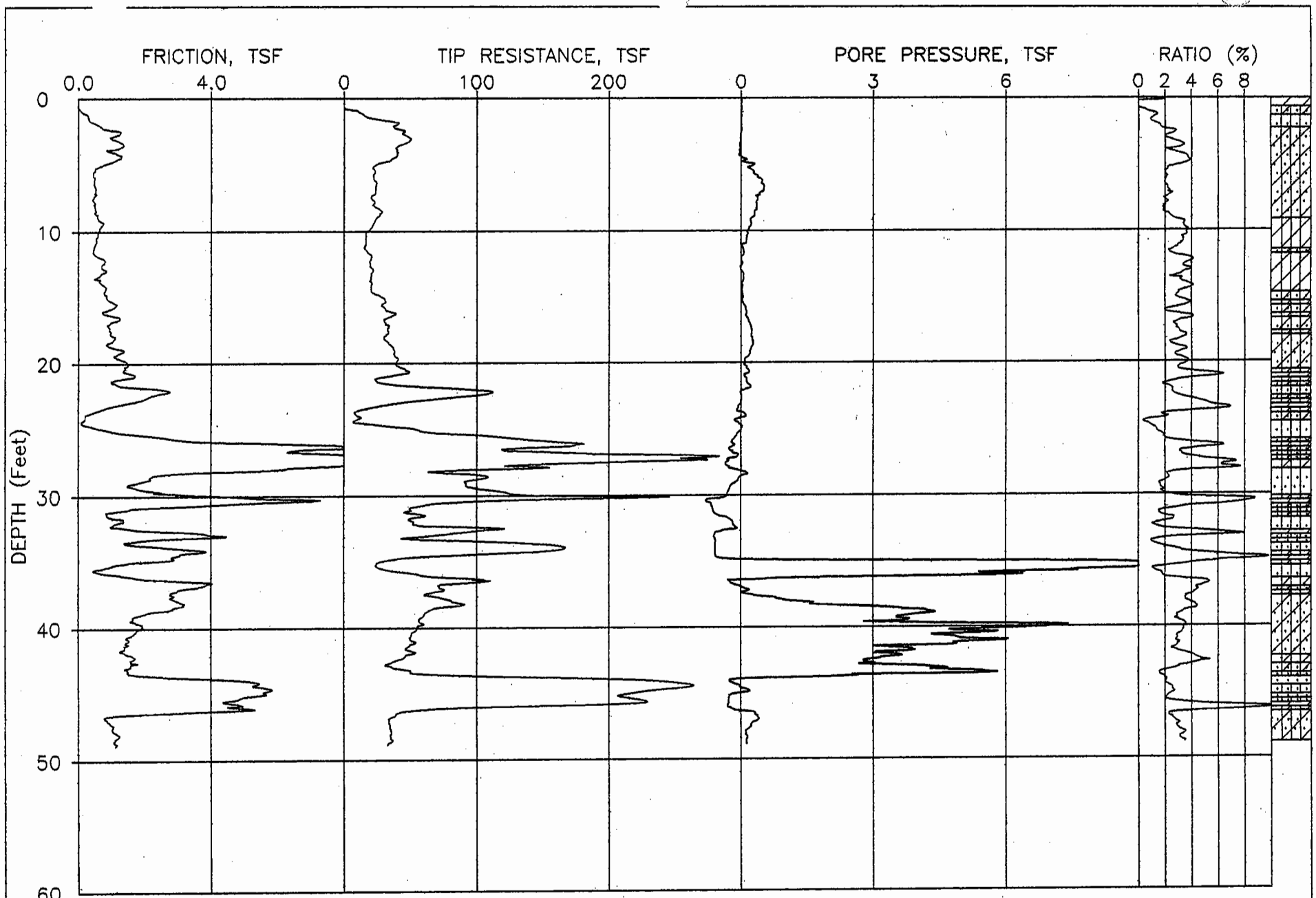
DATE: 09-02-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 28

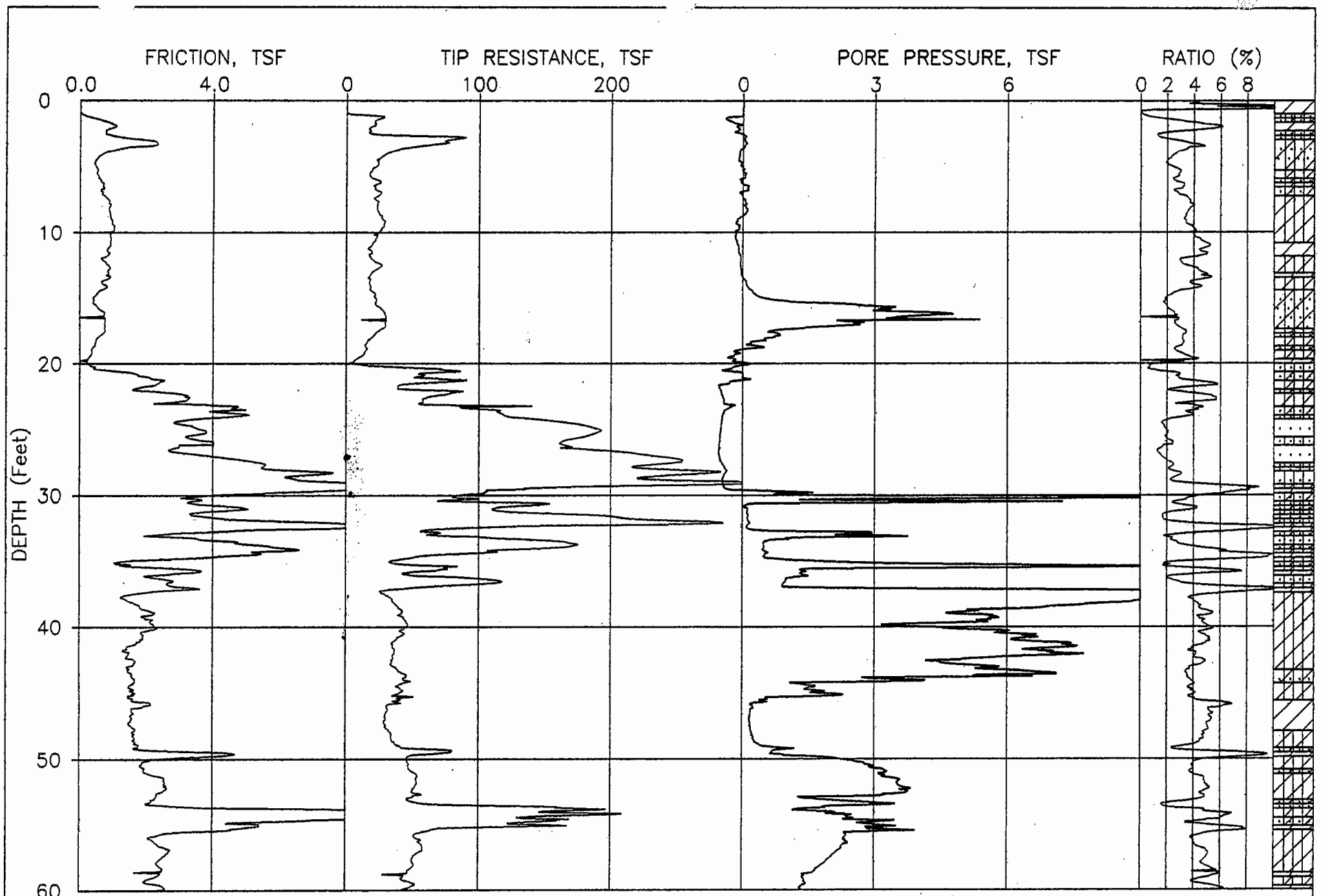
DATE: 08-26-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 29

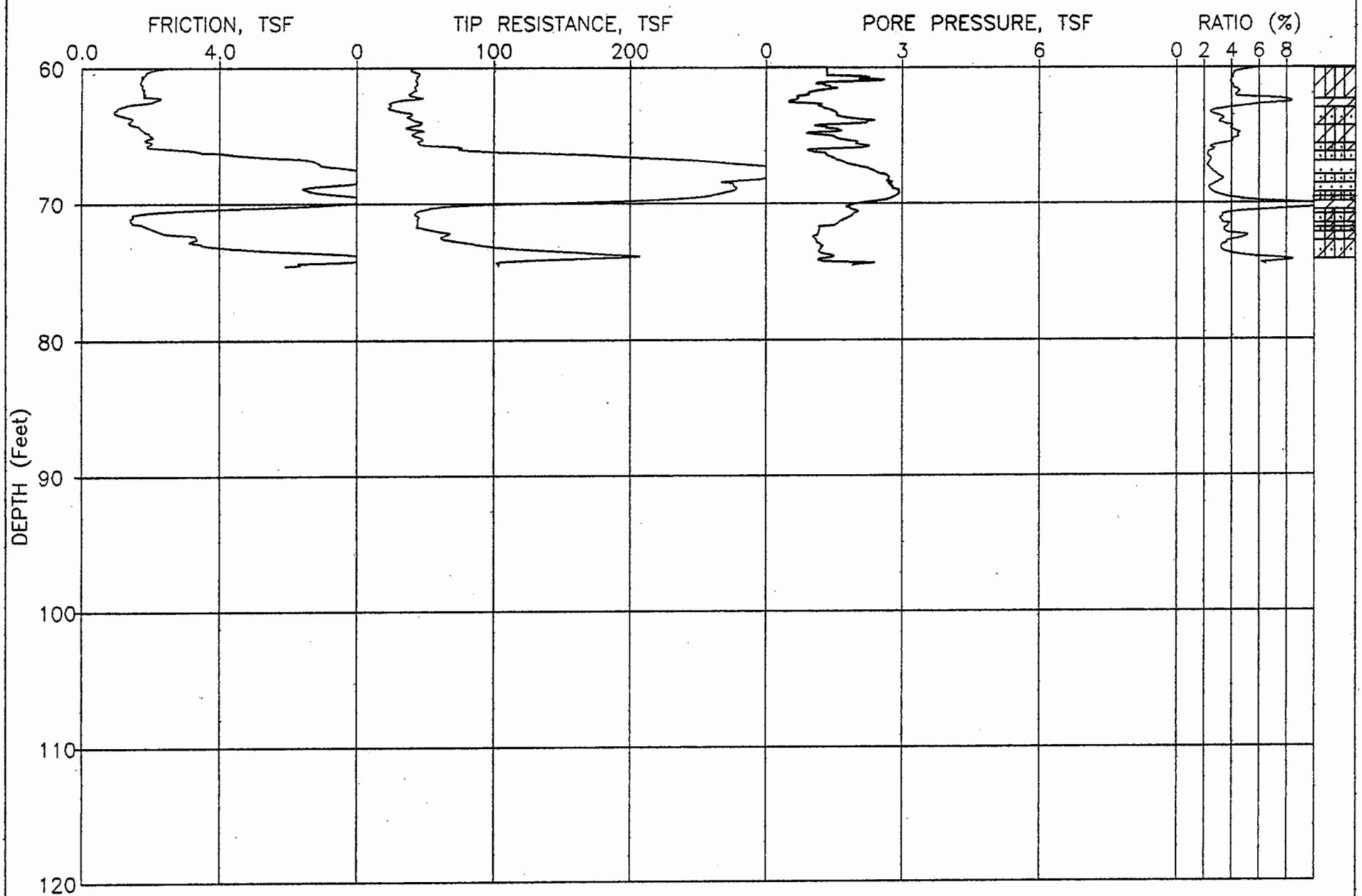
DATE: 08-28-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 29

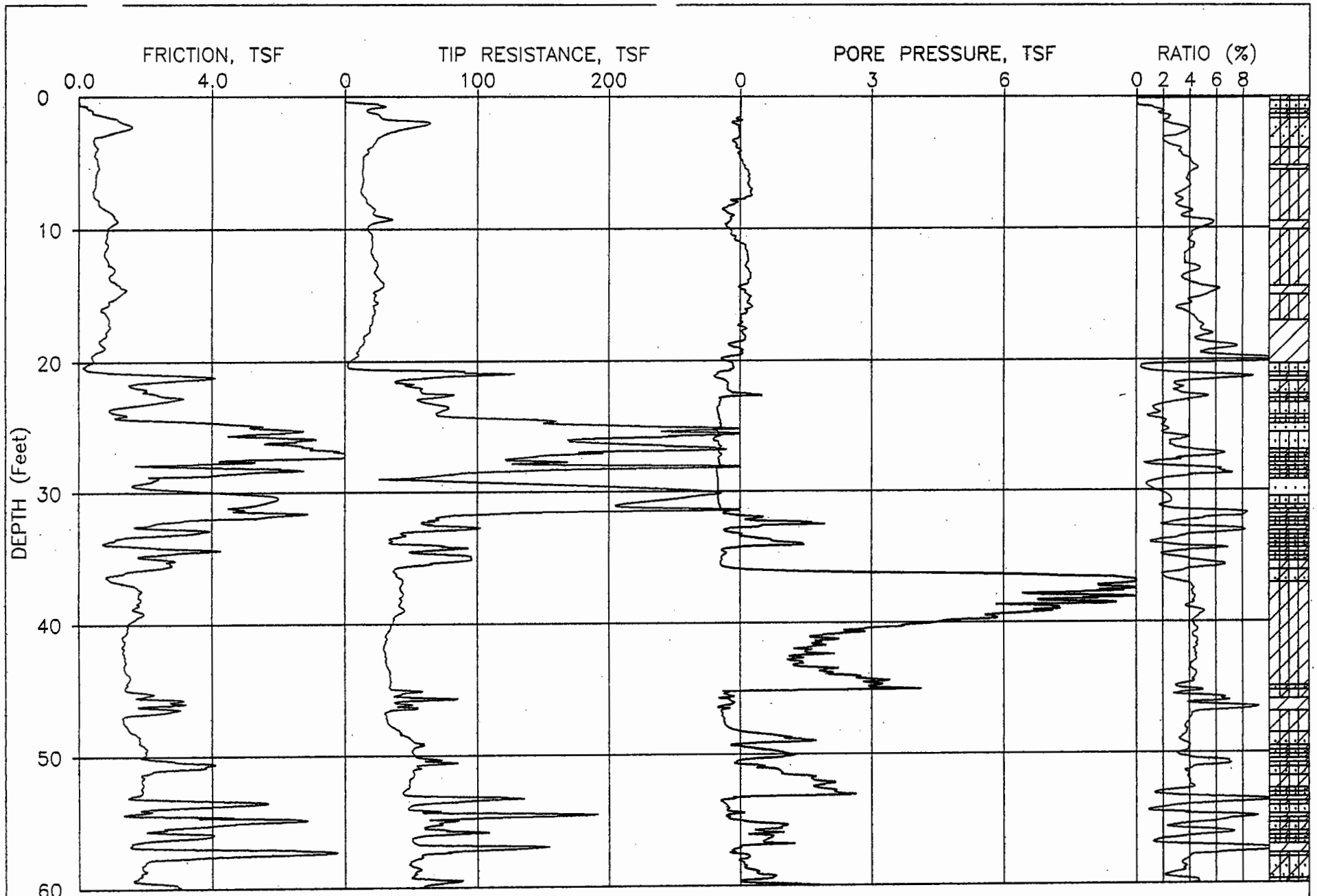
DATE: 08-28-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 30

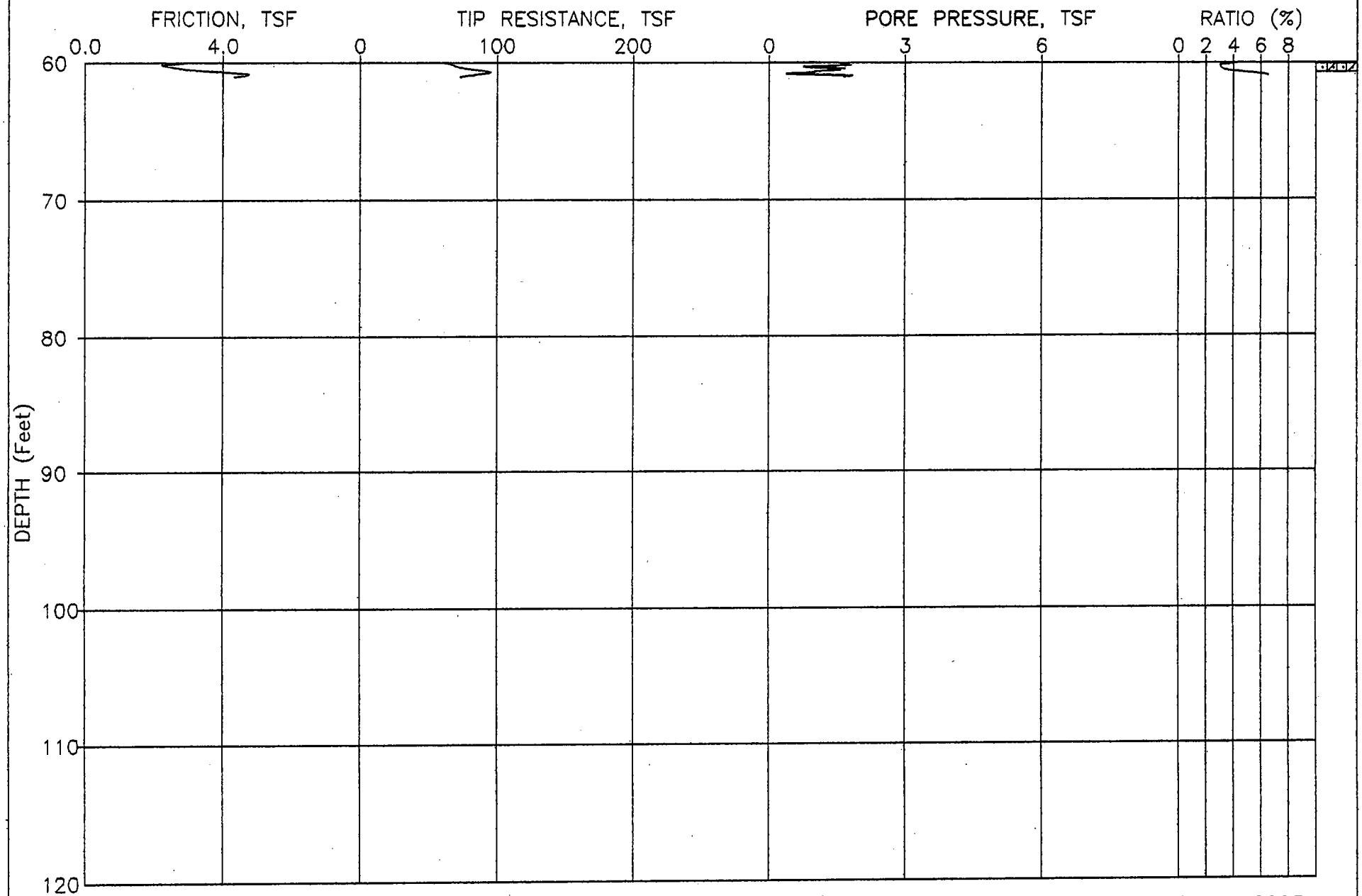
DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 30

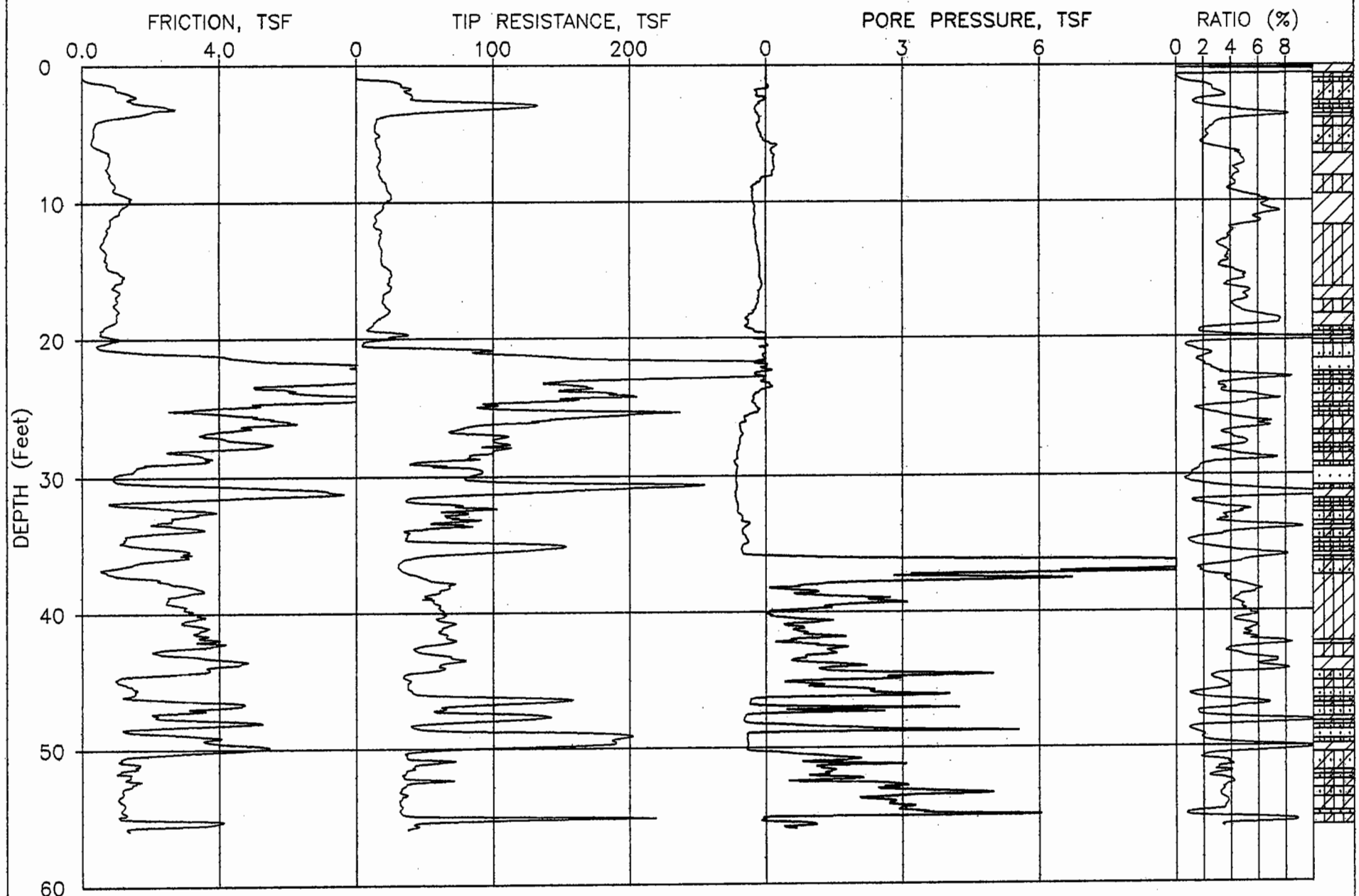
DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 31

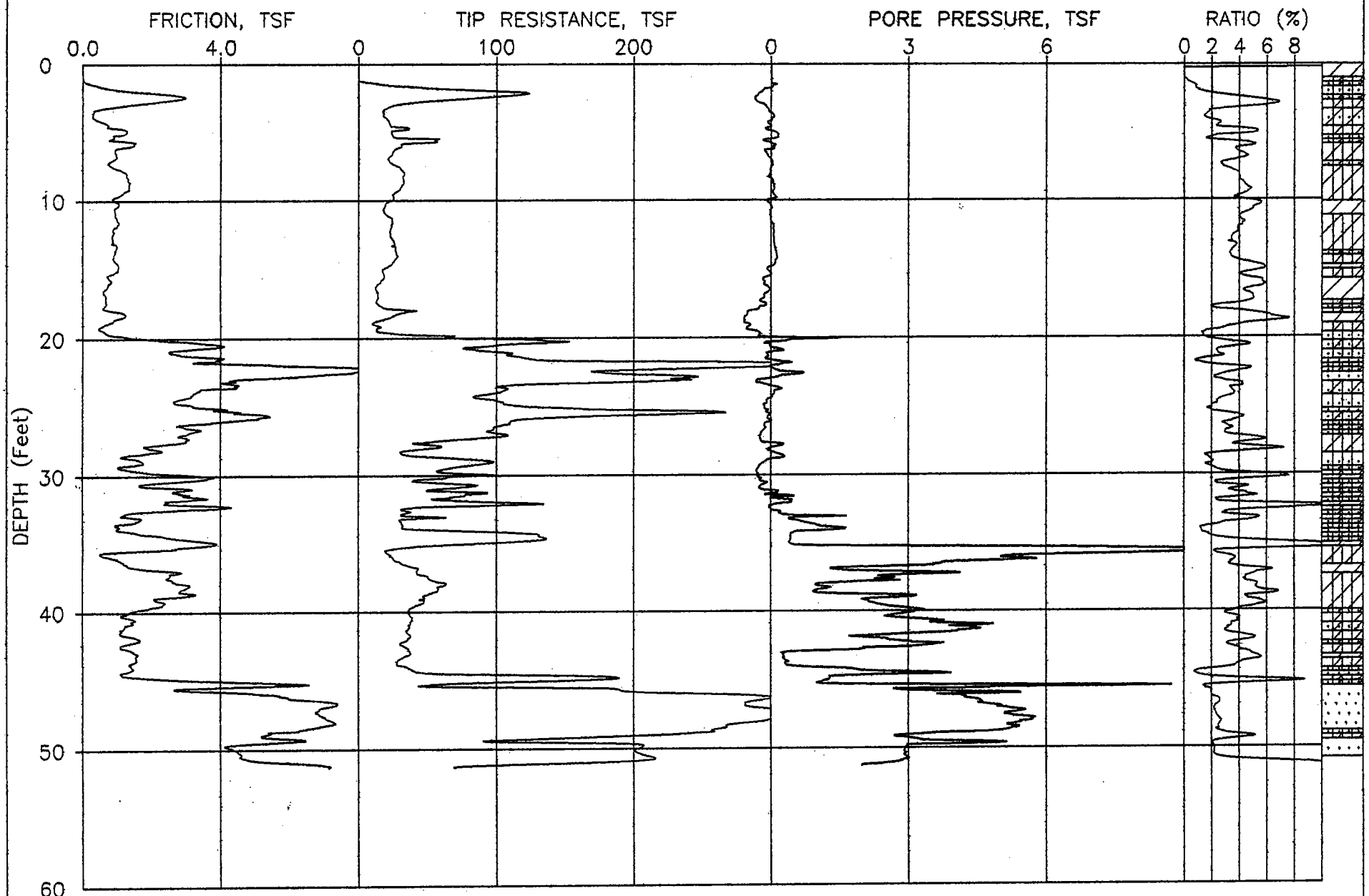
DATE: 08-29-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

ELEVATION: 0.00

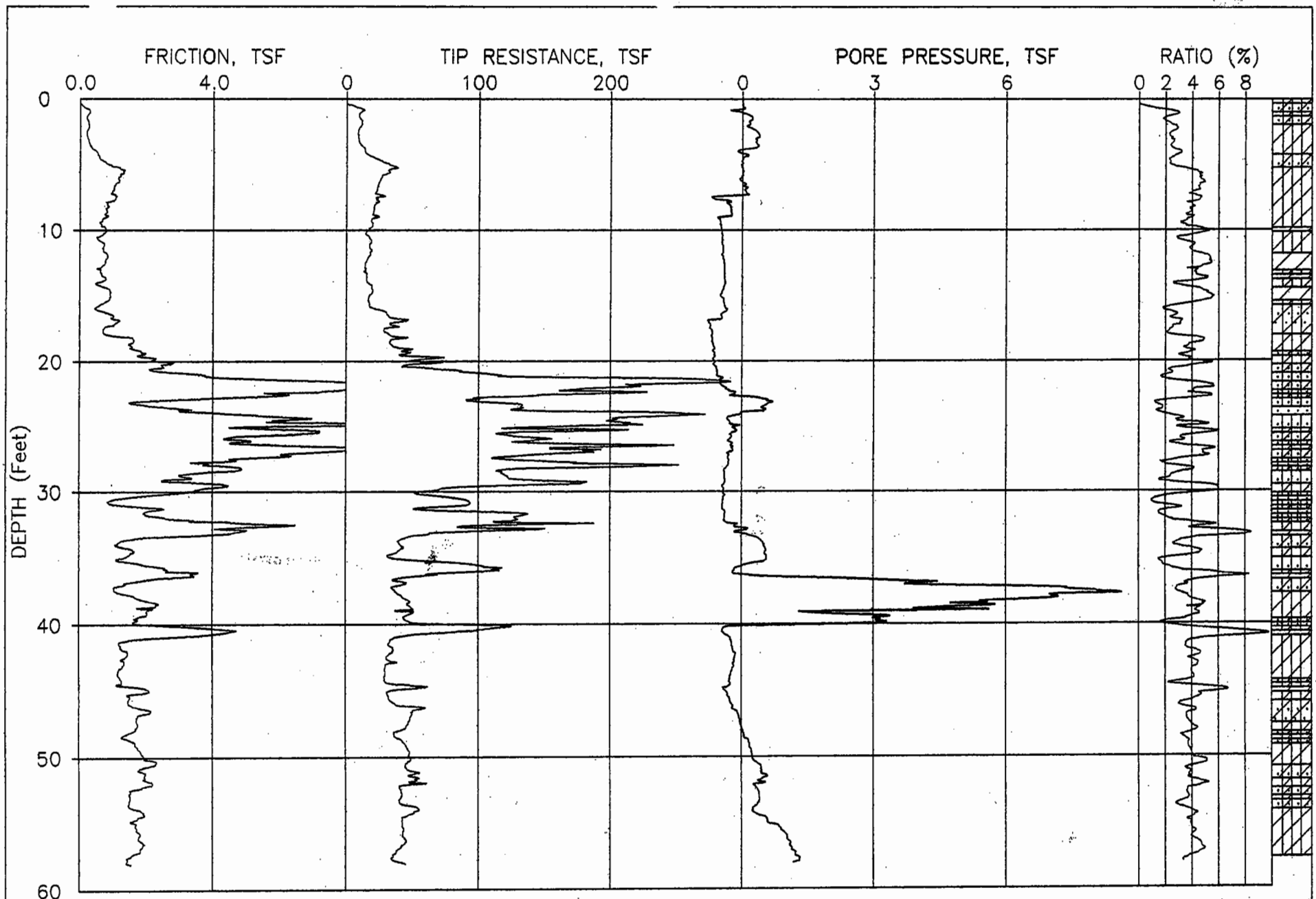
CPT NUMBER: 32

CONE NUMBER: F7.5CKEGW613

DATE: 08-28-2003

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 33

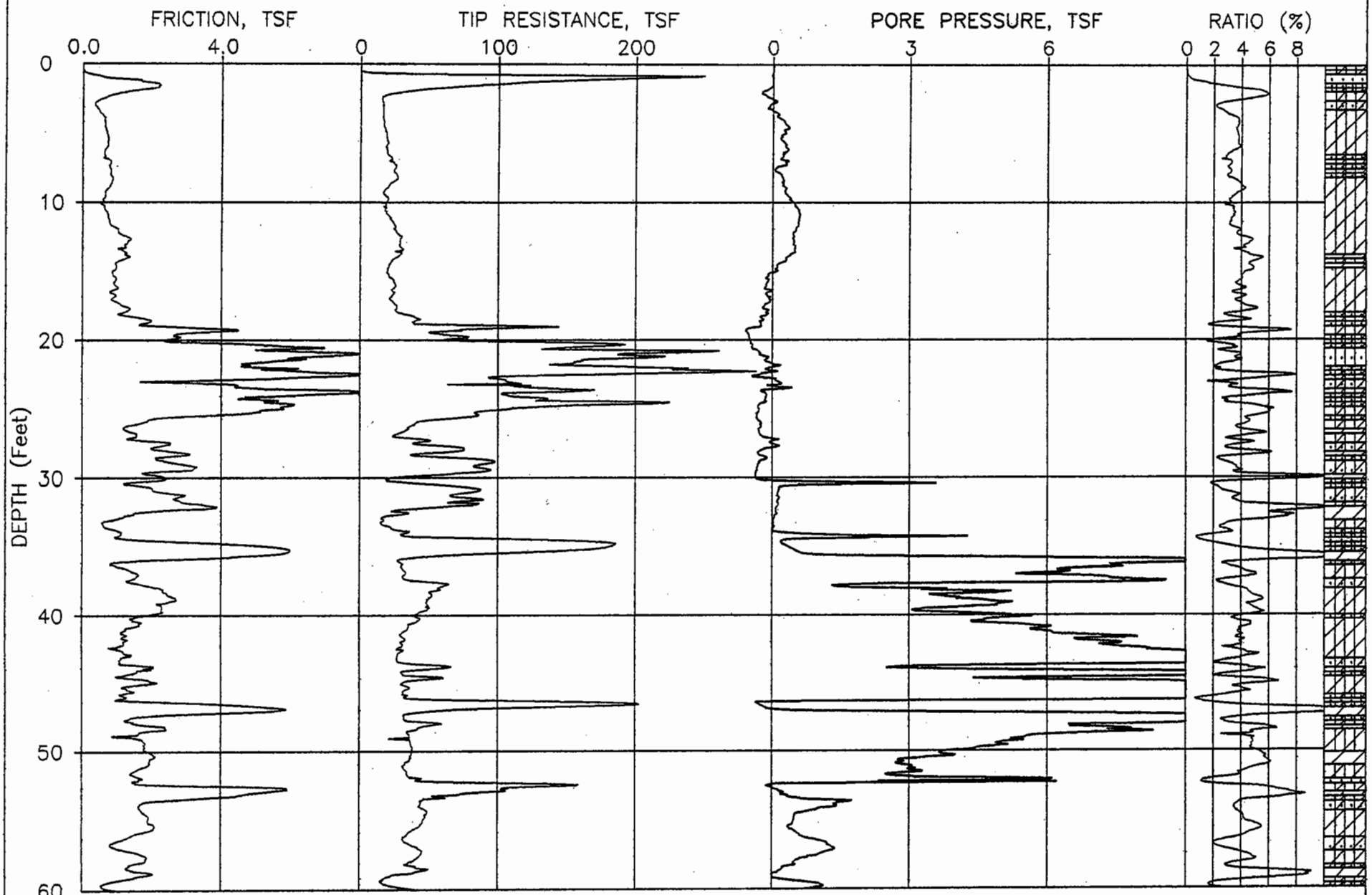
DATE: 08-25-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 34

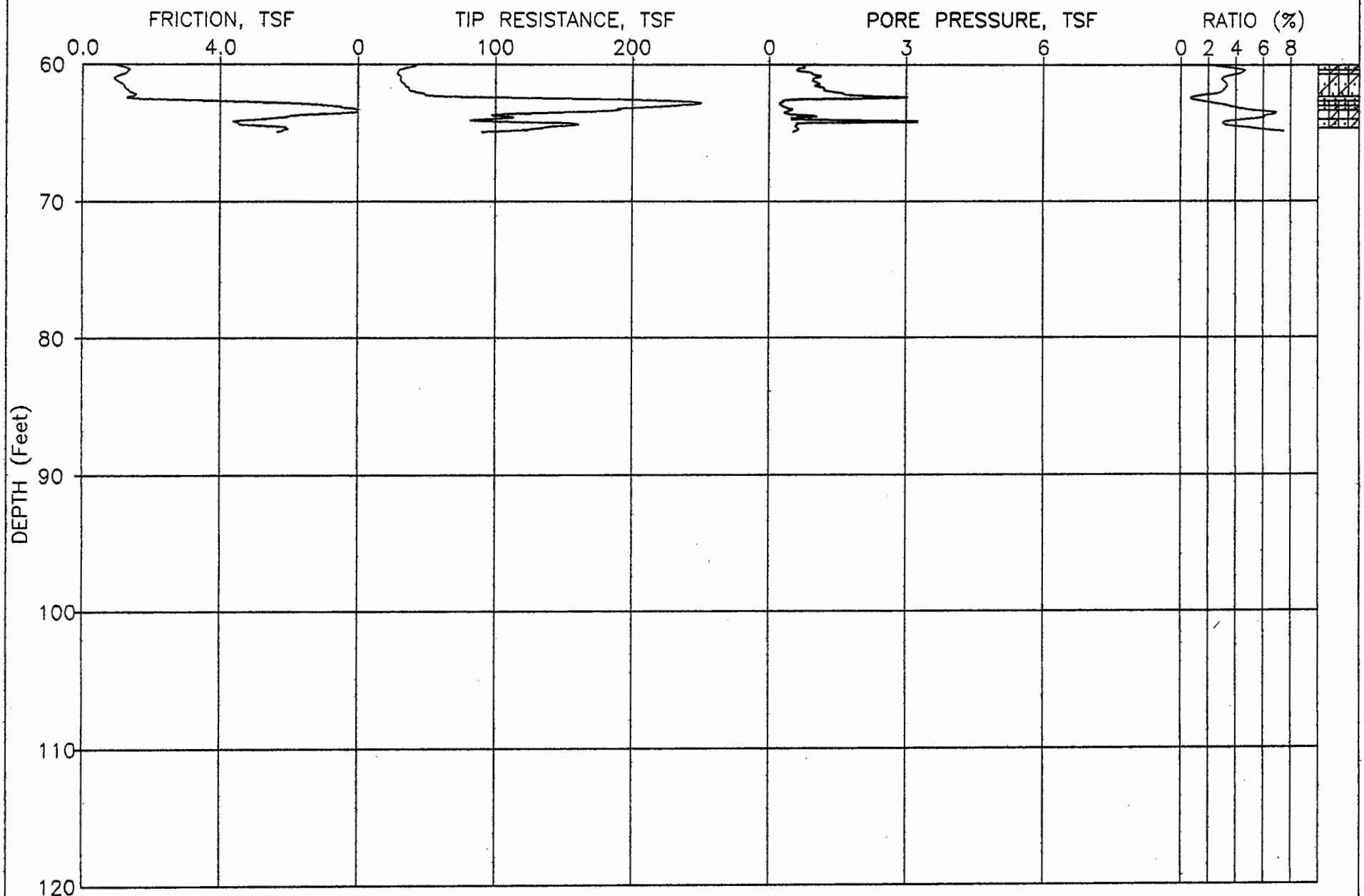
DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 34

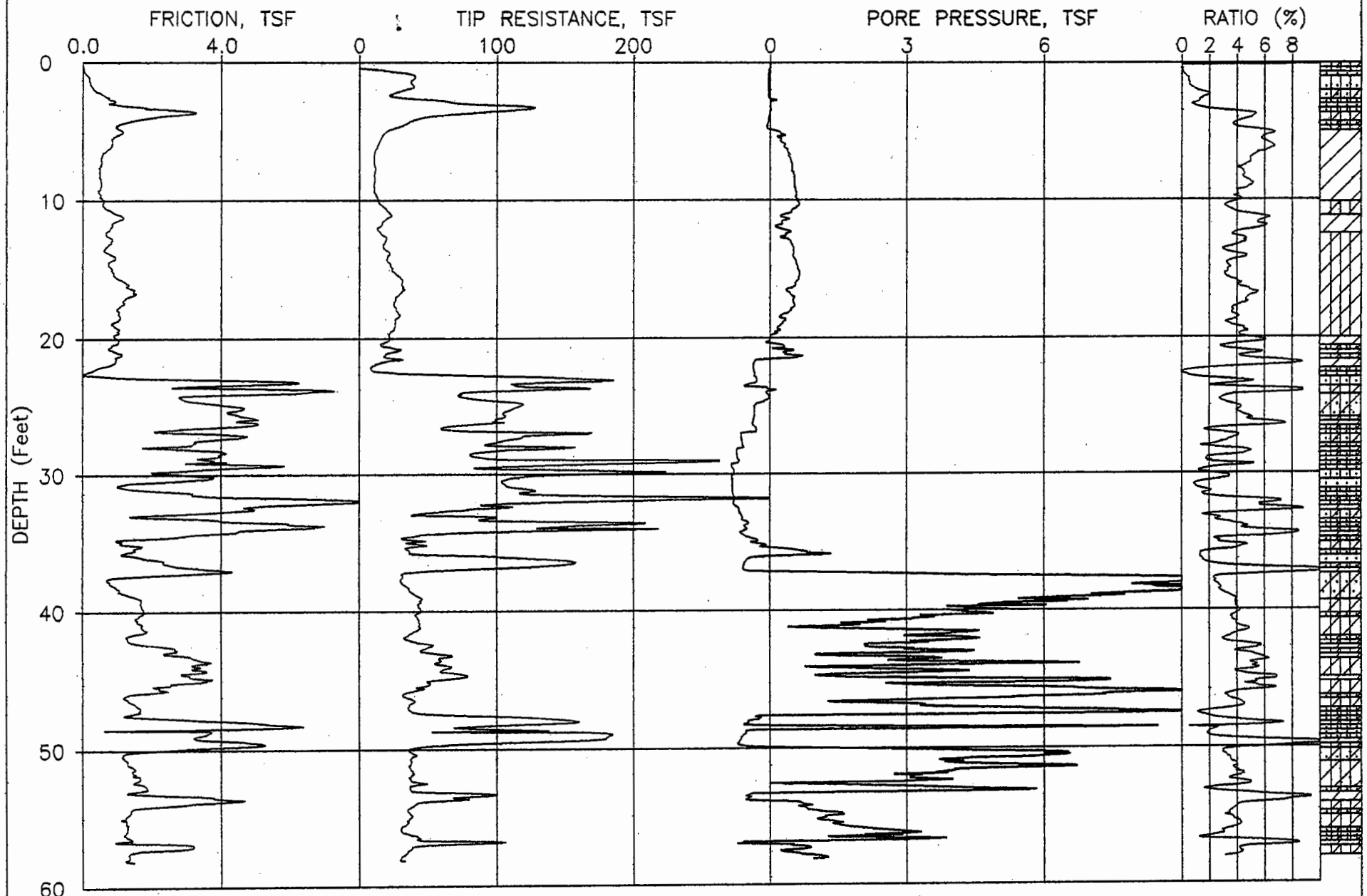
DATE: 09-04-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 35

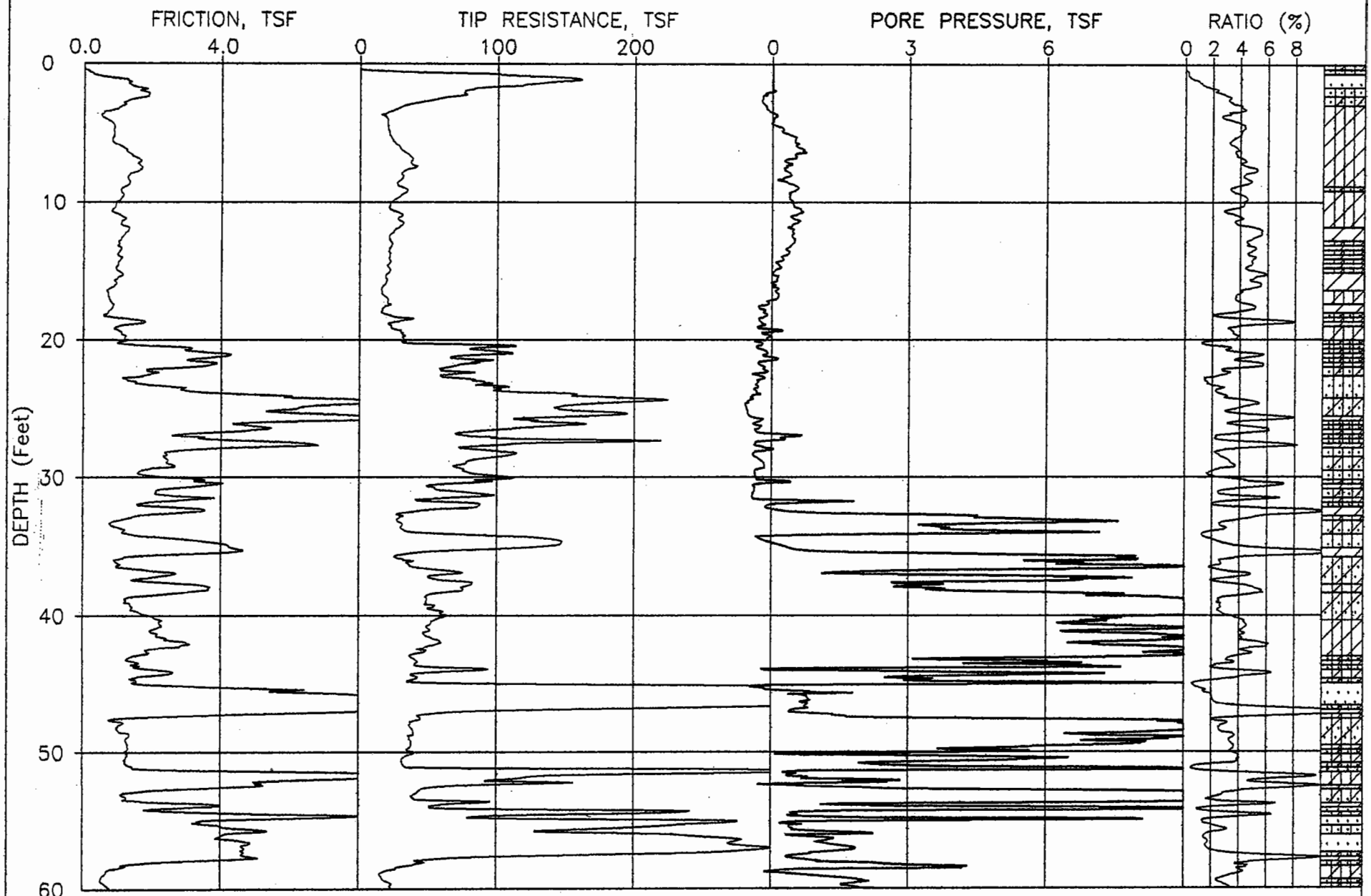
DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 36

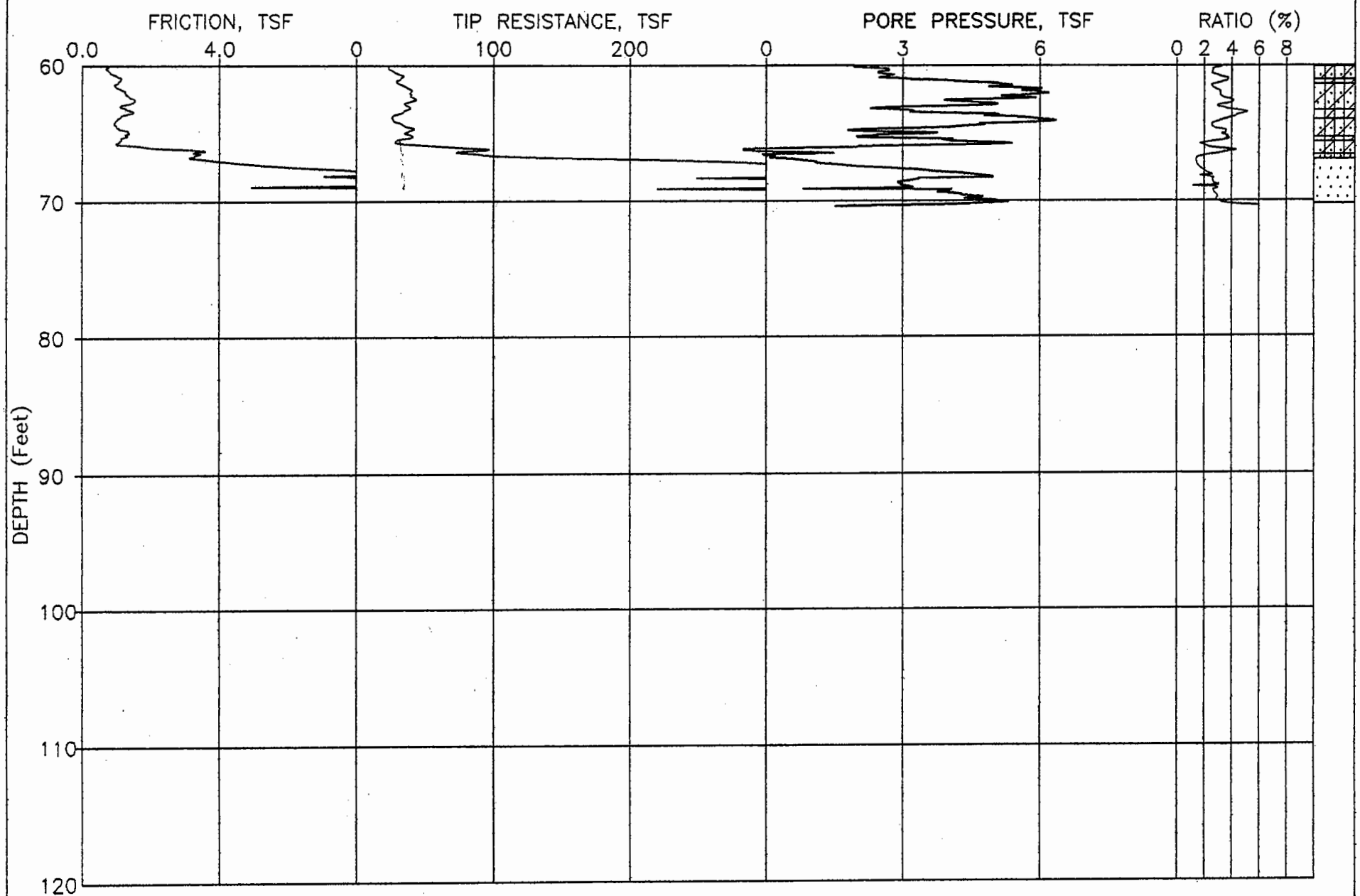
DATE: 09-03-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 36

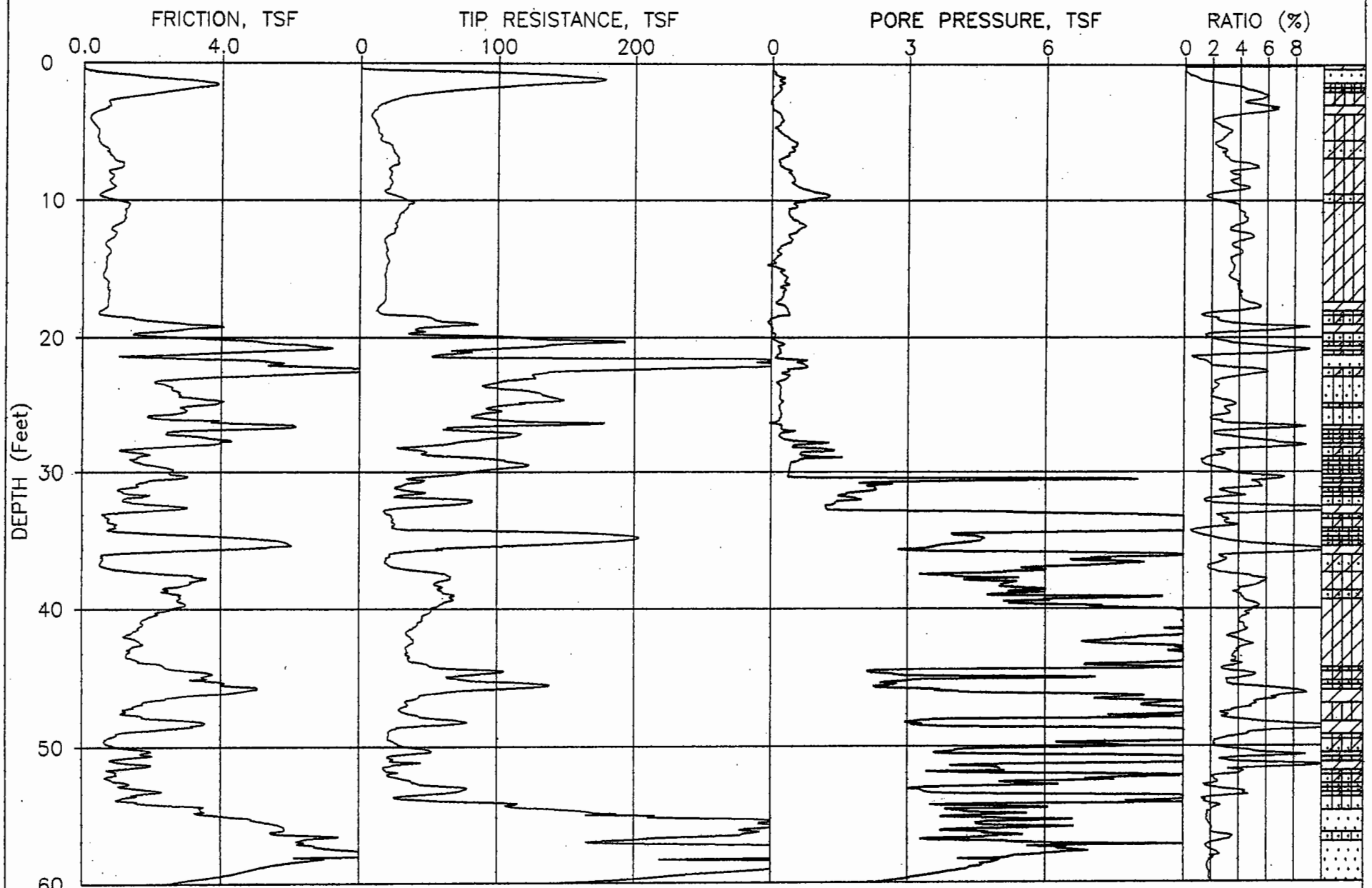
DATE: 09-03-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 37

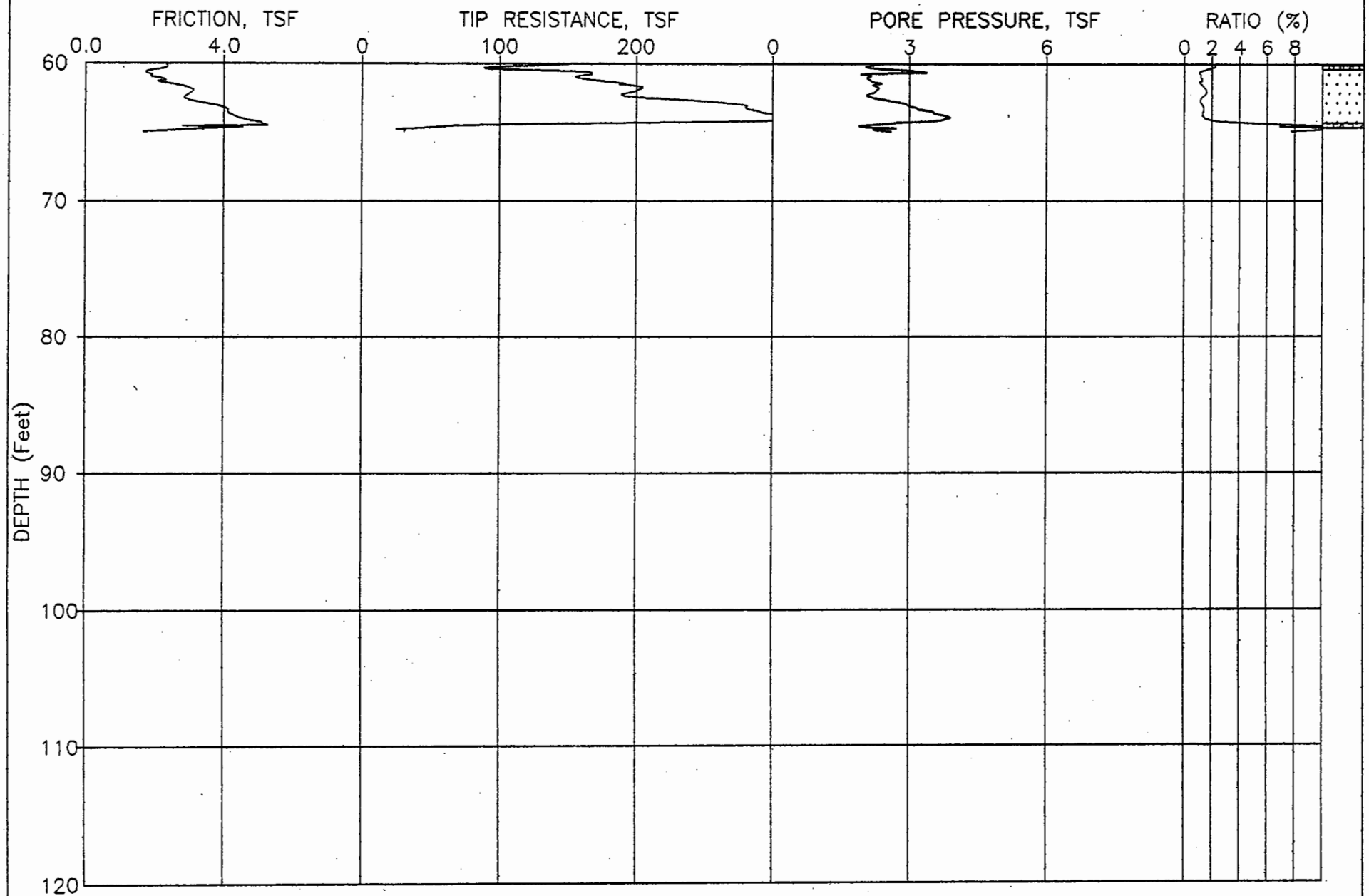
DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 37

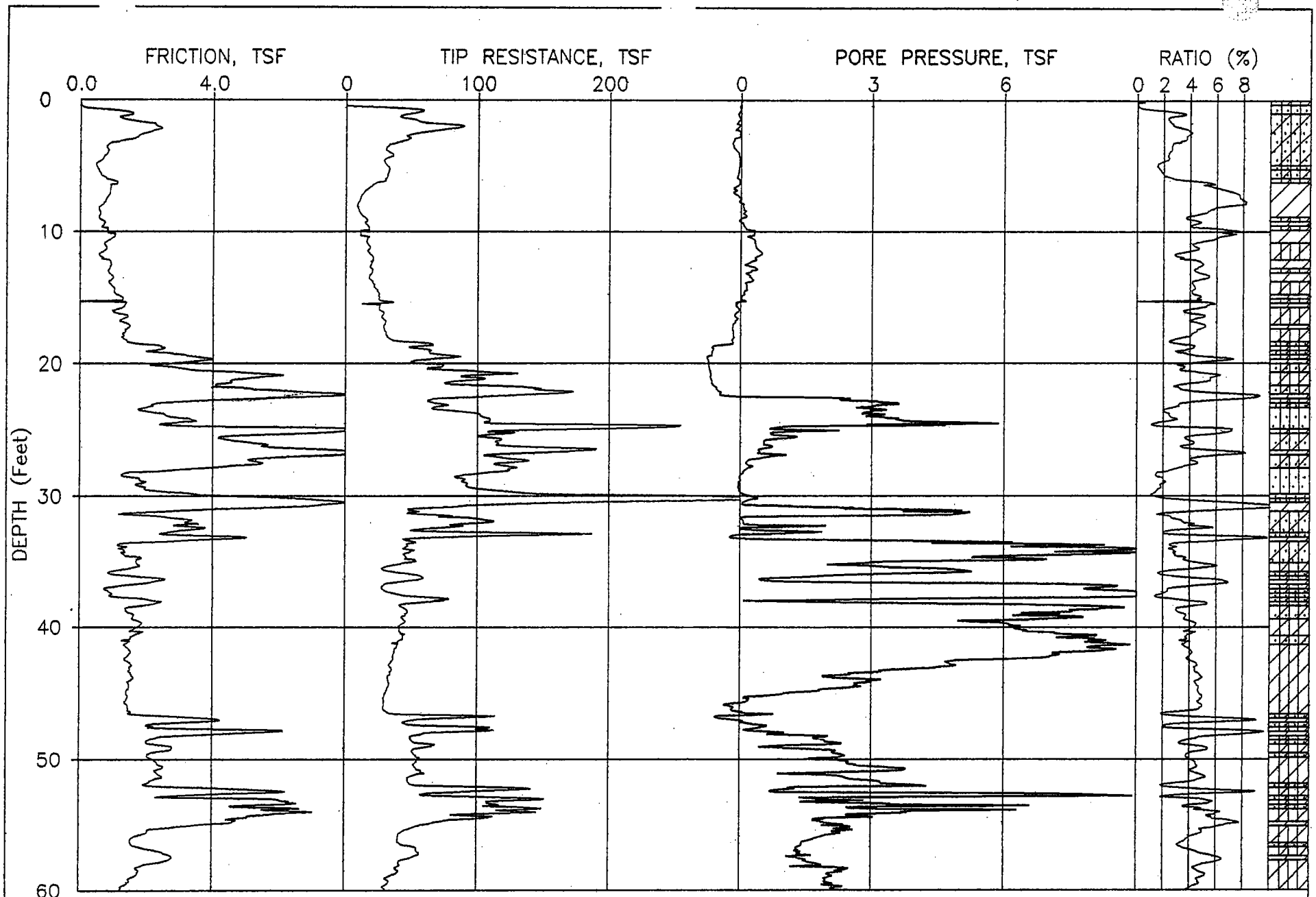
DATE: 08-27-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

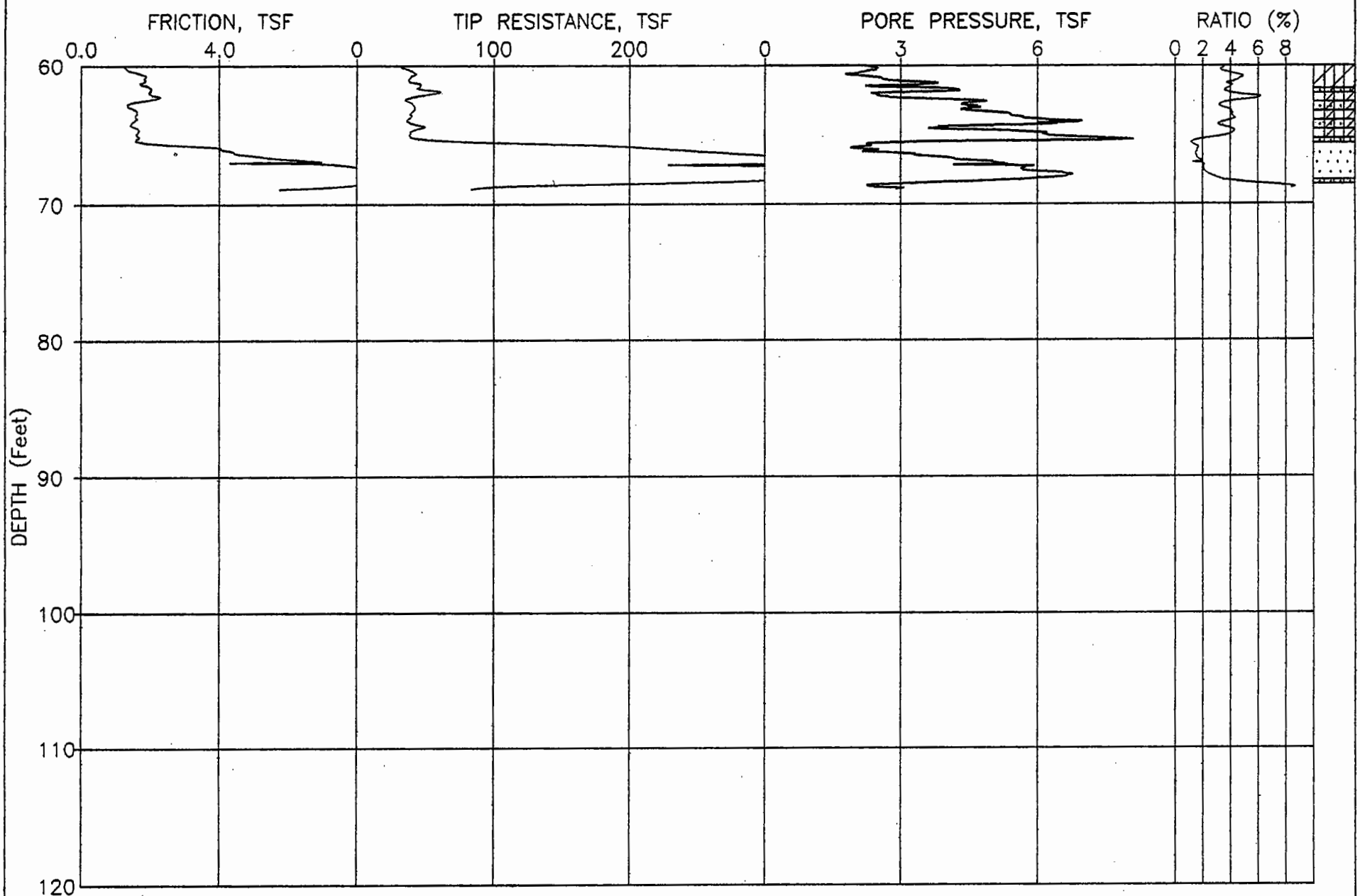
FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137 CPT NUMBER: 38 DATE: 08-28-2003

ELEVATION: 0.00 CONE NUMBER: F7.5CKEGW613 PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 38

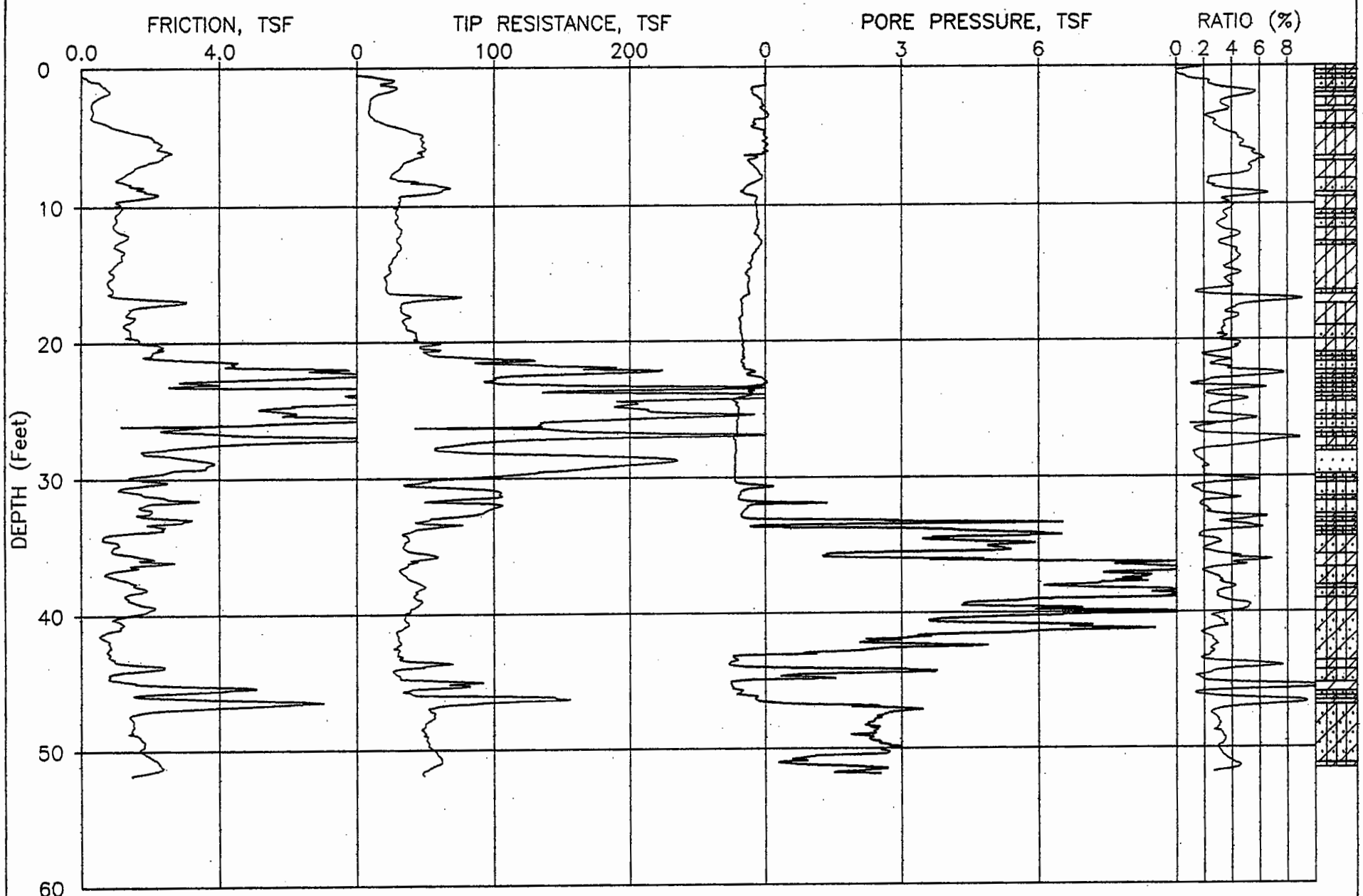
DATE: 08-28-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC



JOB NUMBER: 03-1137

CPT NUMBER: 39

DATE: 09-08-2003

ELEVATION: 0.00

CONE NUMBER: F7.5CKEGW613

PLATE: 1 OF 1

FUGRO GEOSCIENCES,INC