PBW

Consulting Engineers
and Scientists

PASTOR, BEHLING & WHEELER, LLC
2201 Double Creek Drive, Suite 4004
Round Rock, TX 78664

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November 12, 2008
(PBW Project No. 1352)

VIA OVERNIGHT DELIVERY

Mr. Gary Miller, Remedial Project Manager
U.S. Environmental Protection Agency, Region 6
Superfund Division (6SF-AP)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Re: Proposed Phase 5 Groundwater Investigation Activities, Gulfco Marine Maintenance Site, Freeport, Texas

Dear Mr. Miller:

Per our previous discussions, this letter provides validated data for groundwater samples from Zone B monitoring well NE4MW31B, Zone C monitoring well NE4MW32C, and Zone C piezometers NG3CPT1, NE4CPT2, NC2CPT3, and OCPT4, which were sampled as part of the Remedial Investigation/Feasibility Study (RI/FS) at the subject site (the Site). Phase 5 groundwater investigation activities proposed on the basis of those data are also described herein. This information is provided by Pastor, Behling & Wheeler, LLC (PBW) on behalf of LDL Coastal Limited LP (LDL), Chromalloy American Corporation (Chromalloy) and The Dow Chemical Company (Dow). In accordance with Paragraph 52 of the amended Unilateral Administrative Order for the Site, effective January 31, 2008, I certify that I have been fully authorized by these Respondents to submit these documents and to legally bind these Respondents thereto.

PHASE 4 GROUNDWATER DATA SUMMARY

Phase 4 groundwater investigation activities were proposed in a February 11, 2008 letter to you and were approved by your letter dated March 18, 2008. These Phase 4 field activities, which were performed during the period from June to September 2008, included the following:

- Installation, development and sampling of monitoring well NE4MW31B within the Zone B water-bearing unit in the area north of Marlin Avenue (the North Area), as shown on Figure 1;
- Hydraulic testing of three monitoring wells (ND4MW24B, NG3MW25B and OMW27B) within the Zone B water-bearing unit;
- Advancement of four borings using a Cone Penetrometer equipped with a Membrane Interface Probe (MIP) to Zone C at locations NG3CPT1, NE4CPT2, NC2CPT3, and OCPT4 (Figure 1), followed by back grouting of the Cone Penetrometer Testing (CPT) borings and subsequent installation of adjacent small-diameter piezometers;

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- Installation, development and sampling of monitoring well NE4MW32C within the Zone C water-bearing unit (location shown on Figure 1);
- Evaluation of the possible presence of NAPL within monitoring wells; and
- Measurement of water levels in Site monitoring wells, piezometers and staff gauges.

Although not proposed in the February 11, 2008 letter, soil samples were collected from the boring for NE4MW32C for vertical hydraulic conductivity testing in conjunction with Phase 4 groundwater activities. Installation, geophysical logging and plugging/abandonment of a deep soil boring (SE1DB01 as shown on Figure 1) as described in the approved RI/FS Work Plan was also performed concurrent with the Phase 4 activities. A soil sample from this boring was also collected for vertical hydraulic conductivity testing.

Based on the data for the groundwater sample collected from monitoring well NE4MW32C (discussed below), re-sampling of this well and collection of groundwater samples from the four Zone C CPT piezometers described above were proposed in e-mail messages to you on July 17, 2008 and July 23, 2008 and was approved by your e-mail message on July 23, 2008. A second re-sampling of NE4MW32C was discussed with and approved by you on September 3, 2008.

At NE4MW31B, Zone B was encountered at a depth of 20 feet below ground surface (bgs) and consisted of more than ten feet of a fine to medium-grained sand (boring log provided in Attachment A). The groundwater sample collected from this well contained no analytes at concentrations exceeding their respective Preliminary Screening Values (PSVs) (Table 1). Water levels measured in Zone B monitoring wells on July 30, 2008 (Figure 2) indicate a predominantly north to northwest hydraulic gradient within this zone.

At NE4MW32C, Zone C consisted of a thin (less than 0.5 ft thick) shell layer at a depth of approximately 73 feet bgs within a surrounding high plasticity clay unit. As shown on the NE4MW32C boring log (Attachment A) and profiles for the four CPT probe holes (Attachment B), approximately 25 or more feet of clay/silty clay separate Zone C from Zone B. The vertical hydraulic conductivity of this clayey material was measured at approximately 6×10^{-9} cm/sec (Table 2).

Water level elevations measured in the Zone C monitoring well/piezometers were used to construct potentiometric surface maps for June 17 (Figure 3), July 30 (Figure 4), and September 29, 2008 (Figure 5). All three of these maps suggest a generally northwesterly gradient within this unit. The total dissolved solids (TDS) concentration of groundwater in Zone C was 24,600 mg/L.

As indicated in Table 1, three volatile organic compounds (VOCs), 1,2,3-trichloropropane (1,2,3-TCP), tetrachloroethene (PCE), and trichloroethene (TCE) were detected in the June 18, 2008 groundwater sample from NE4MW32C at concentrations exceeding their respective PSVs. Re-sampling of this well and the four Zone C CPT piezometers was performed on July 31, 2008. Analyses of these samples confirmed only the 1,2,3-TCP exceedence in the initial NE4MW32C sample (at a lower concentration), and indicated no PSV exceedences in any of the CPT piezometer samples (Table 1). A third sample from NE4MW32C, collected on September 30, 2008 following re-development of the well after submergence of the Site during the Hurricane Ike storm surge, did not indicate any PSV exceedences.

PROPOSED PHASE 5 GROUNDWATER INVESTIGATION ACTIVITIES

Per our discussions, installation of an additional Zone C CPT piezometer (OCPT5) is proposed at the location shown on Figure 6. This piezometer is proposed to provide a Zone C monitoring location directly downgradient from the former surface impoundments at the Site. This piezometer will be installed using the same approach used for the other Zone C piezometers, as detailed below.

It is anticipated that OCPT5 will be advanced using a track-mounted CPT unit. The CPT probe will be combined with an MIP probe to provide a real-time indication of the possible presence of VOCs in the subsurface. The CPT boring will be advanced to the inferred base of Zone C (as indicated by cone resistance and friction resistance data measured by the cone penetrometer) or refusal. Upon reaching the target depth (or upon refusal), the CPT probe will be withdrawn and the probe hole will be backfilled with a cement-bentonite grout emplaced by tremie pipe from the bottom of the hole to the surface. Using the estimated lithology from the CPT boring, hollow push rods with a disposable tip will be advanced to the Zone C target depth in a separate borehole adjacent to each CPT boring. A small diameter (¾-inch or smaller) piezometer will then be installed through the push rods. The push rods will be withdrawn from the boring leaving the disposable tip and piezometer materials in place. The piezometer will be constructed with a maximum 10-foot screen length with a pre-packed filter pack and bentonite seal. The annular space above the piezometer seal will be filled with a cement-bentonite grout. Each piezometer will be completed above grade with locking protective steel casing within a 2 foot by 2 foot well pad.

After construction, OCPT5 will be sampled using low flow methods as described in the Work Plan and the approved Field Sampling Plan (FSP). NE4MW32C will also be sampled in the same way concurrent with the OCPT5 sampling. These groundwater samples will be analyzed for the parameters listed in Table 3.

Although PSV exceedences were noted in the two initial samples collected from NE4MW32C, it is proposed that no additional groundwater investigation be performed should the OCPT5 and NE4MW32C samples proposed herein show no PSV exceedences. In such case, the proposed NE4MW32C sample would be the second sample (along with the September 30, 2008 sample) from this well that did not confirm the initial PSV exceedences. In addition, the VOCs detected in the three NE4MW32C samples collected to date have shown significant decreasing concentration trends (Table 1).

Thank you for the opportunity to submit this information. We look forward to your approval of these proposed activities, so we can continue to move forward with the expeditious completion of this project.

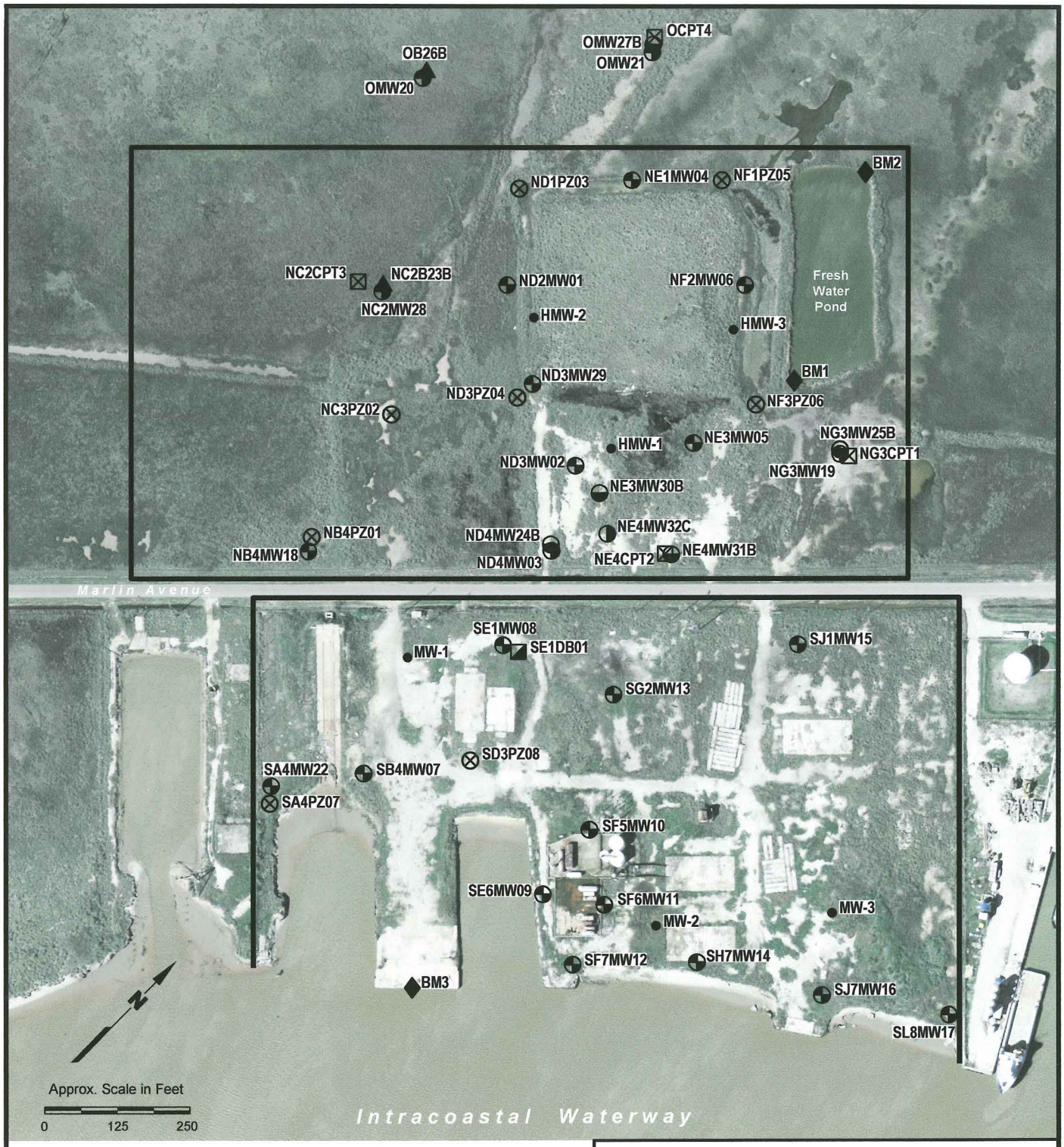
Sincerely,

PASTOR, BEHLING & WHEELER, LLC

Eric F. Pastor, P.E.
Principal Engineer

cc: Ms. Luda Voskov - Texas Commission on Environmental Quality
Mr. Brent Murray – Environmental Quality, Inc.
Mr. Rob Rouse - The Dow Chemical Company
Mr. Allen Daniels - LDL Coastal Limited, LP
Mr. F. William Mahley - Strasburger & Price, LLP
Mr. James C. Morriss III - Thompson & Knight, LLP

FIGURES



EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Monitoring Well Location - Zone A
- Temporary Piezometer - Zone A
- Staff Gauge
- Previous Monitoring Well Location
- Monitoring Well Location - Zone B
- Soil Boring Location - Zone B
- Monitoring Well Location - Zone C
- CPT Piezometer Location - Zone C
- Deep Soil Boring Location

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 1

MONITORING WELL LOCATIONS

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: NOV., 2008	CHECKED: EFP	

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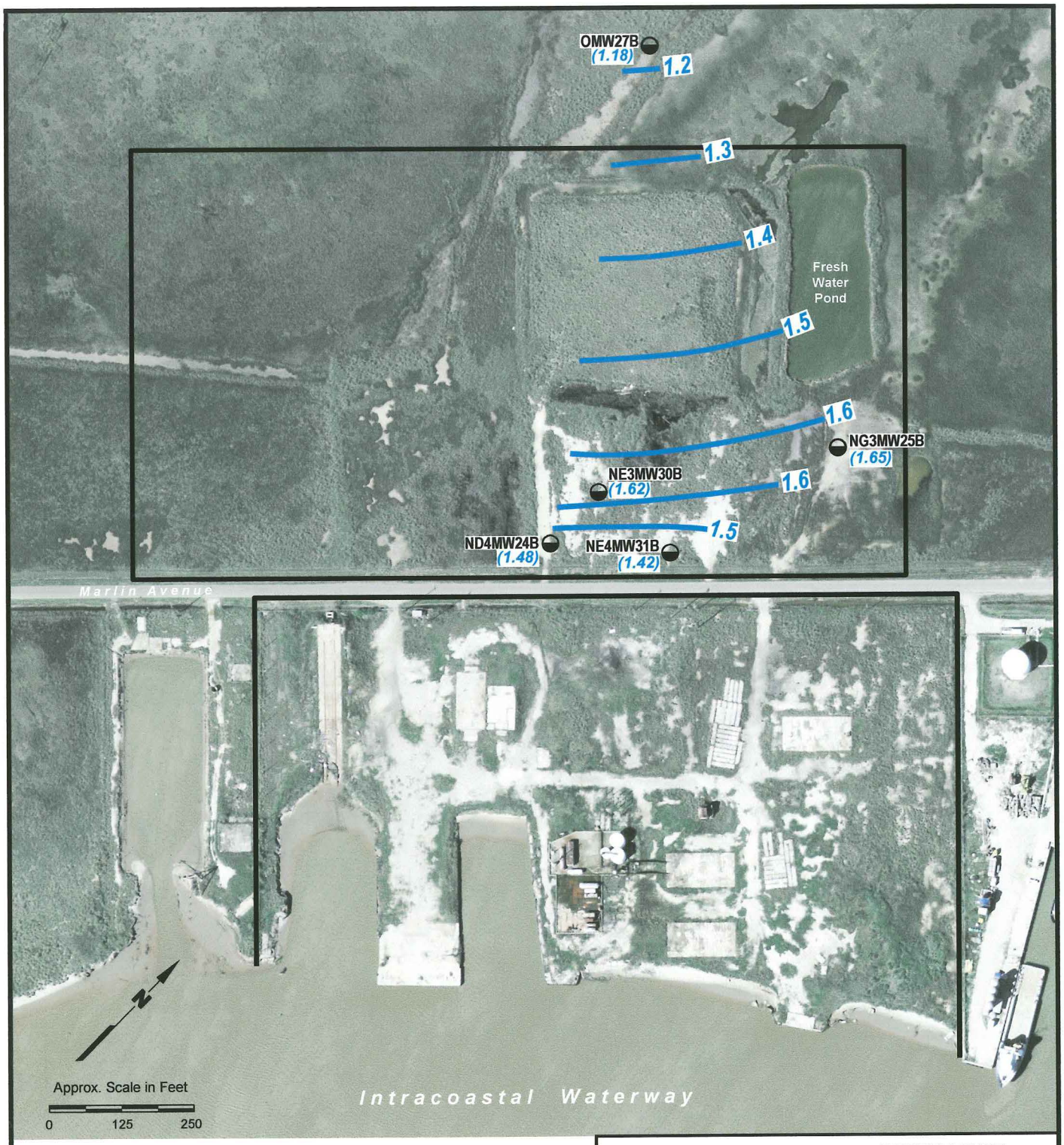

EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Monitoring Well Location - Zone B
- (1.48) Water-Level Elevation (Ft AMSL) Measured 7/30/08
- 1.5 Potentiometric Surface Contour (Ft AMSL) Contour Interval = 0.1 Ft

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 2

ZONE B POTENTIOMETRIC SURFACE JULY 30, 2008

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: NOV., 2008	CHECKED: EFP	

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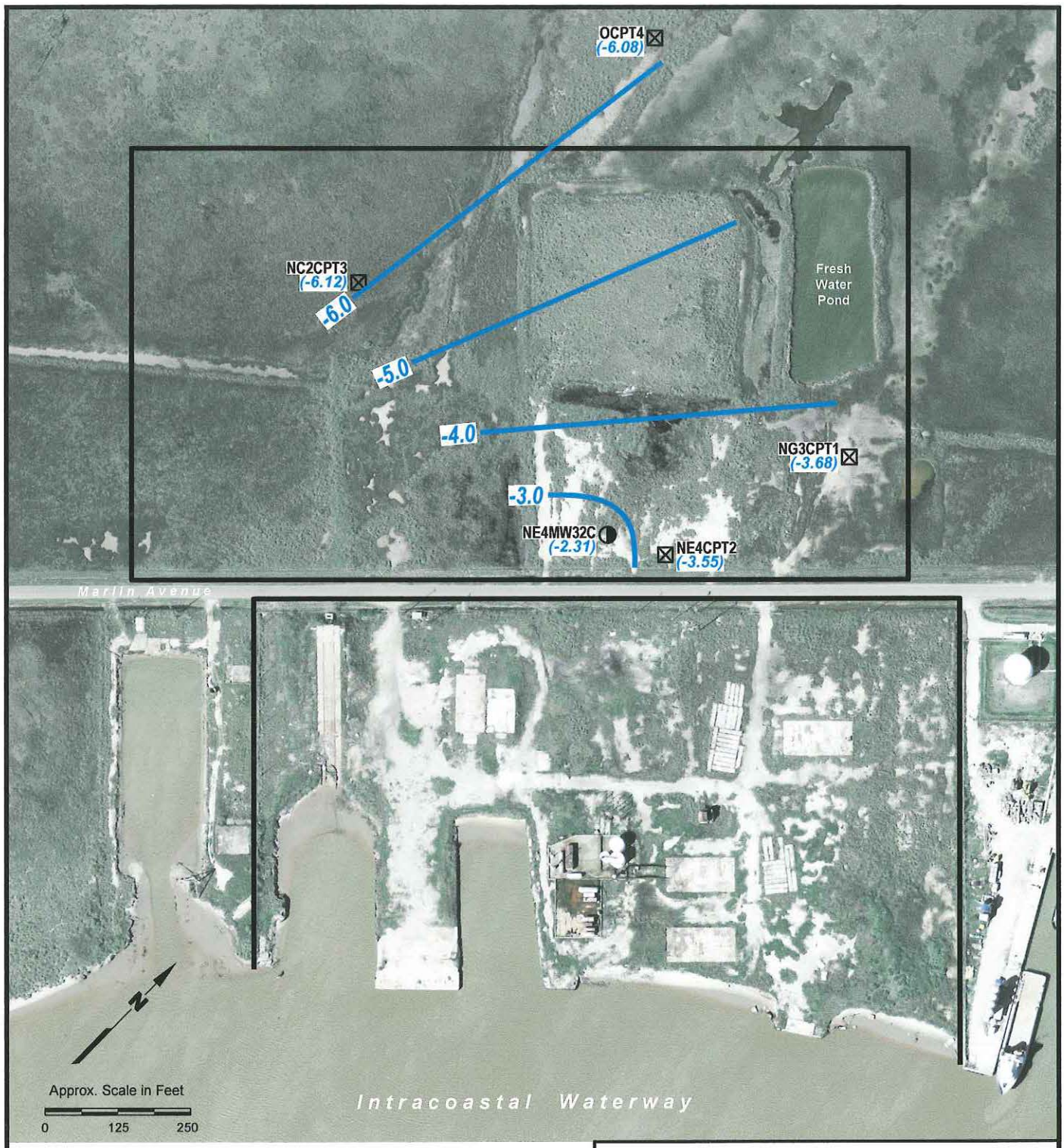

EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Monitoring Well Location - Zone C
- CPT Piezometer Location - Zone C
- (-6.12) Water-Level Elevation (Ft AMSL) Measured 6/17/08
- -3.0 Potentiometric Surface Contour (Ft AMSL) Contour Interval = 1 Ft

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 3

ZONE C POTENTIOMETRIC SURFACE JUNE 17, 2008

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: NOV., 2008	CHECKED: EFP	

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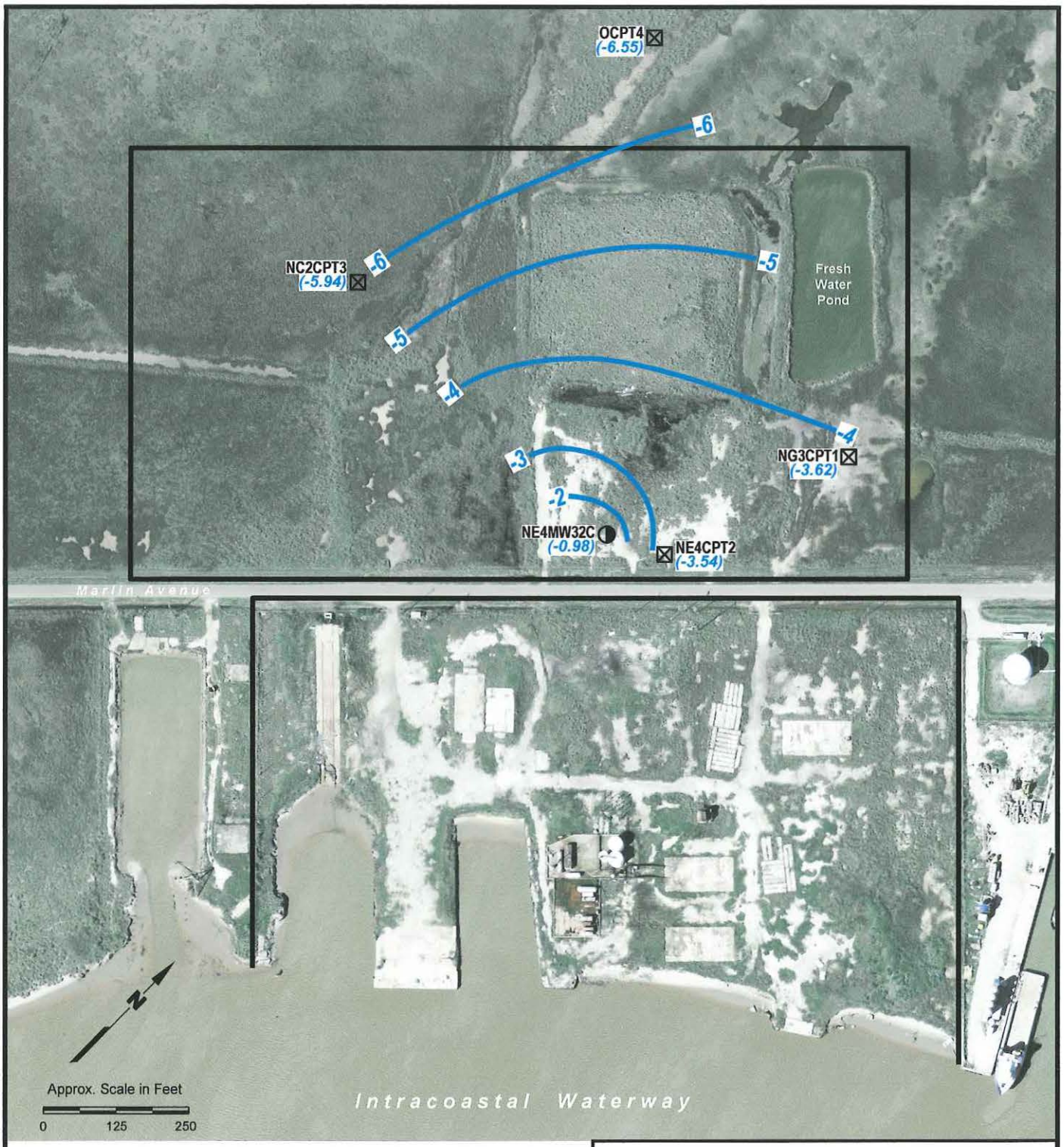

EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Monitoring Well Location - Zone C
- CPT Piezometer Location - Zone C
- (-6.55) Water-Level Elevation (Ft AMSL) Measured 7/30/08
- -3.0 Potentiometric Surface Contour (Ft AMSL) Contour Interval = 1 Ft

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 4

ZONE C POTENTIOMETRIC SURFACE JULY 30, 2008

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: NOV., 2008	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
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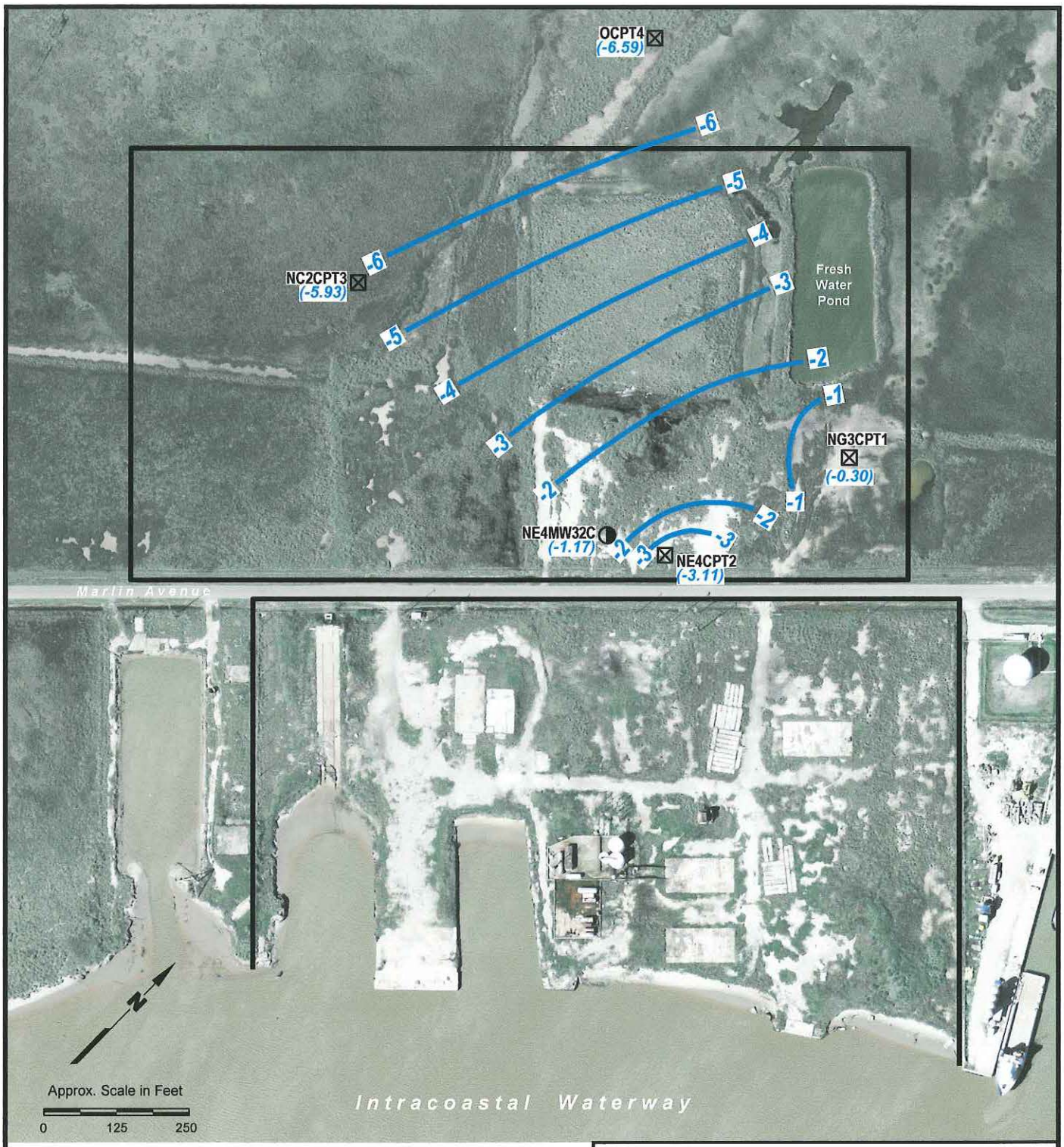

EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Monitoring Well Location - Zone C
- CPT Piezometer Location - Zone C
- (-3.11) Water-Level Elevation (Ft AMSL) Measured 9/29/08
- -3.0 Potentiometric Surface Contour (Ft AMSL) Contour Interval = 1 Ft

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 5

ZONE C POTENTIOMETRIC SURFACE SEPTEMBER 29, 2008

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: NOV., 2008	CHECKED: EFP	

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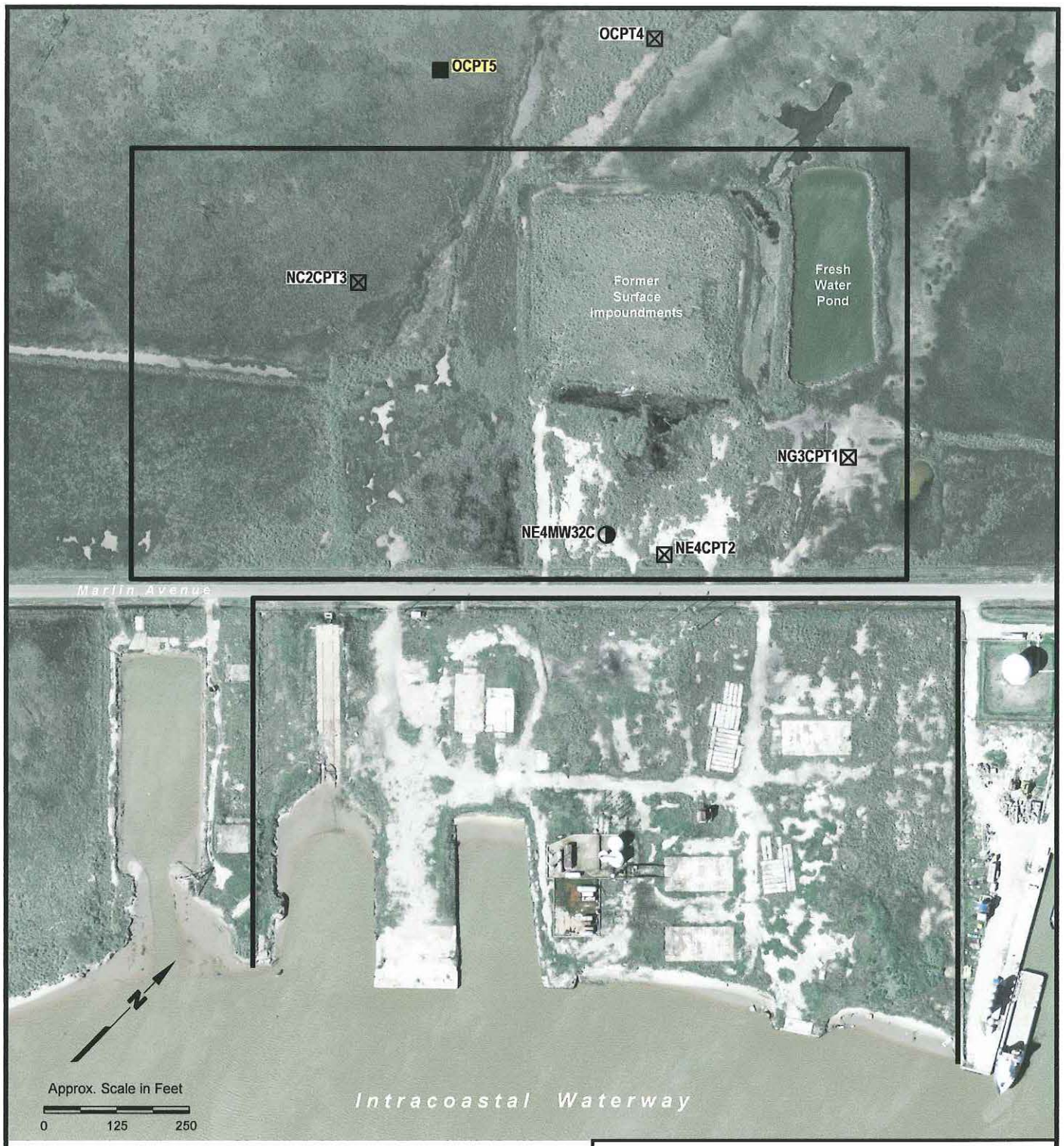


EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Monitoring Well Location - Zone C
- CPT Piezometer Location - Zone C
- Proposed Zone C Piezometer Location

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 6

PROPOSED CPT PIEZOMETER LOCATION

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: NOV., 2008	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

TABLES

TABLE 1 - PHASE 4 GROUNDWATER DATA

Sample Location	Sample Date	Analytical Parameter	Concentration (mg/L)	Preliminary Screening Value (mg/L)[1]
NE4MW31B	6/18/2008	1,1,1-Trichloroethane	<0.000155	20
		1,1-Dichloroethene	<0.000226	0.7
		1,2,3-Trichloropropane	<0.000151	0.029
		1,2-Dichloroethane	<0.000184	0.5
		Benzene	<0.000184	0.5
		Carbon tetrachloride	<0.000124	0.5
		cis-1,2-Dichloroethene	0.000423J	7
		Methylene chloride	0.00218J	0.5
		Tetrachloroethene	<0.000081	0.5
		Trichloroethene	<0.000123	0.5
		Vinyl chloride	<0.000163	0.2
NE4MW32C	6/18/2008	1,1,1-Trichloroethane	0.709	20
		1,1-Dichloroethene	<0.000226	0.7
		1,2,3-Trichloropropane	**0.321**	0.029
		1,2-Dichloroethane	<0.000184	0.5
		Benzene	0.0459J	0.5
		Carbon tetrachloride	<0.000124	0.5
		cis-1,2-Dichloroethene	4.62	7
		Methylene chloride	<0.000104	0.5
		Tetrachloroethene	**1.35**	0.5
		Trichloroethene	**1.89**	0.5
		Vinyl chloride	<0.000163	0.2
	7/31/2008	1,1,1-Trichloroethane	0.18	20
		1,1-Dichloroethene	0.0379	0.7
		1,2,3-Trichloropropane	**0.219**	0.029
		1,2-Dichloroethane	<0.0018	0.5
		Benzene	0.0548	0.5
		Carbon tetrachloride	<0.00312	0.5
		cis-1,2-Dichloroethene	3.27	7
		Methylene chloride	<0.00192	0.5
		Tetrachloroethene	<0.00306	0.5
		Trichloroethene	<0.00236	0.5
		Vinyl chloride	<0.00310	0.2
	9/30/2008	1,1,1-Trichloroethane	<0.000096	20
		1,1-Dichloroethene	0.00177J	0.7
		1,2,3-Trichloropropane	0.0119	0.029
		1,2-Dichloroethane	<0.00009	0.5
		Benzene	0.0012J	0.5
		Carbon tetrachloride	<0.000156	0.5
		cis-1,2-Dichloroethene	0.168	7
		Methylene chloride	<0.000096	0.5
		Tetrachloroethene	0.00648	0.5
		Trichloroethene	0.00639	0.5
		Vinyl chloride	<0.000155	0.2

TABLE 1 - PHASE 4 GROUNDWATER DATA

Sample Location	Sample Date	Analytical Parameter	Concentration (mg/L)	Preliminary Screening Value (mg/L)[1]
NG3CPT1	7/31/2008	1,1,1-Trichloroethane	<0.000096	20
		1,1-Dichloroethene	<0.000201	0.7
		1,2,3-Trichloropropane	<0.000091	0.029
		1,2-Dichloroethane	<0.000090	0.5
		Benzene	<0.000065	0.5
		Carbon tetrachloride	<0.000156	0.5
		cis-1,2-Dichloroethene	<0.000162	7
		Methylene chloride	<0.000096	0.5
		Tetrachloroethene	<0.000153	0.5
		Trichloroethene	<0.000118	0.5
		Vinyl chloride	<0.000155	0.2
NE4CPT2	7/31/2008	1,1,1-Trichloroethane	<0.000096	20
		1,1-Dichloroethene	<0.000201	0.7
		1,2,3-Trichloropropane	<0.000091	0.029
		1,2-Dichloroethane	<0.000090	0.5
		Benzene	<0.000065	0.5
		Carbon tetrachloride	<0.000156	0.5
		cis-1,2-Dichloroethene	<0.000162	7
		Methylene chloride	<0.000096	0.5
		Tetrachloroethene	<0.000153	0.5
		Trichloroethene	<0.000118	0.5
		Vinyl chloride	<0.000155	0.2
NC2CPT3	7/31/2008	1,1,1-Trichloroethane	<0.000096	20
		1,1-Dichloroethene	<0.000201	0.7
		1,2,3-Trichloropropane	<0.000091	0.029
		1,2-Dichloroethane	<0.000090	0.5
		Benzene	<0.000065	0.5
		Carbon tetrachloride	<0.000156	0.5
		cis-1,2-Dichloroethene	<0.000162	7
		Methylene chloride	<0.000096	0.5
		Tetrachloroethene	<0.000153	0.5
		Trichloroethene	<0.000118	0.5
		Vinyl chloride	<0.000155	0.2

TABLE 1 - PHASE 4 GROUNDWATER DATA

Sample Location	Sample Date	Analytical Parameter	Concentration (mg/L)	Preliminary Screening Value (mg/L)[1]
OCPT4	7/31/2008	1,1,1-Trichloroethane	<0.000096	20
		1,1-Dichloroethene	<0.000201	0.7
		1,2,3-Trichloropropane	<0.000091	0.029
		1,2-Dichloroethane	<0.000090	0.5
		Benzene	<0.000065	0.5
		Carbon tetrachloride	<0.000156	0.5
		cis-1,2-Dichloroethene	<0.000162	7
		Methylene chloride	<0.000096	0.5
		Tetrachloroethene	<0.000153	0.5
		Trichloroethene	<0.000118	0.5
		Vinyl chloride	<0.000155	0.2

Notes:
(1) From Table 18 of RI/FS Workplan (human health PSVs only).
(2) Data qualifiers: J = estimated value.
(3) Bolded values exceed preliminary screening value.

TABLE 2 - LABORATORY VERTICAL HYDRAULIC CONDUCTIVITY TESTING RESULTS

Sample Location	Sample Depth (ft below ground surface)	Vertical Hydraulic Conductivity (cm/sec)
NE4MW32C	53-55	6.55×10^{-9}
NE4MW32C	55-57	5.66×10^{-9}
SE1DB01	80-82	1.64×10^{-8}

TABLE 3 - PROPOSED GROUNDWATER SAMPLE ANALYSES

Sample Location	Analytical Parameter
OCPT5	1,1,1-Trichloroethane
NE4MW32C	1,1-Dichloroethene
	1,2,3-Trichloropropane
	1,2-Dichloroethane
	Benzene
	Carbon tetrachloride
	cis-1,2-Dichloroethene
	Methylene chloride
	Tetrachloroethene
	Trichloroethene
	Vinyl chloride

ATTACHMENT A

NE4MW31B AND NE4MW32C
BORING LOGS

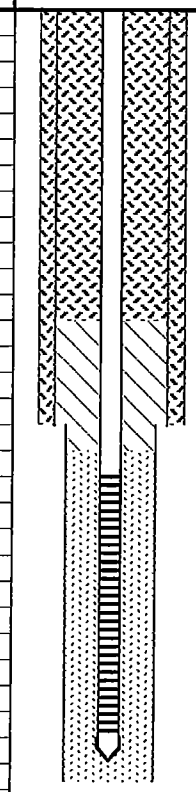
PASTOR, BEHLING & WHEELER, LLC
Consulting Engineers and Scientists

Log of Boring: NE4MW31B

Gulfco Marine Maintenance
Superfund Site
Freeport, TX

PBW Project No. 1352

Completion Date:	06/13/08	Borehole Diameter (in.):	8.0/13.0
Drilling Company:	Universal Drilling	Total Depth (ft):	45
Field Supervisor:	Tim Jennings, P.G.	Northing:	3154903.18
Drilling Method:	Hollow Stem Auger	Easting:	13554709.81
Sampling Method:	5 ft. split spoon	Ground Elev. (ft. MSL):	3.0
		TOC Elev. (ft MSL)	6.01



Depth (ft)	PID (ppm-v)	Recovery (ft/ft)	USCS	Lithologic Description
0			RD BASE	(0.0-0.8) Caliche road base.
	0.2, 0.3	5/5	CL/CH	(0.8-6.2) Sandy CLAY, gray with brown mottling, moist, ~5 to 10% fine-grained sand, ~ 90 to 95% medium to high plasticity clays.
5	0.4, 0.2	5/5	CH	(6.2-8.5) Silty sandy CLAY, brown with gray mottling, moist to locally wet, ~5 to 10% fine-grained sand, ~15 to 20% silt, ~70 to 80% high plasticity clay, soft.
			ML	(8.5-9.4) Clayey SILT, grayish-brown, wet, ~30 to 40% high plasticity clay, ~60 to 70% silt, soft.
10	0.2, 0.2	5/5	SM	(9.4-11.3) Silty SAND, grayish-brown to brown, wet, ~10 to 30% silt, ~70 to 90% fine-grained sand, soft.
			ML	(11.3-13.4) Sandy clayey SILT, brown, wet, ~10 to 20% high plasticity clay, ~20 to 30% fine-grained sand, ~50 to 70% silt, very soft.
15	0.2		CH	(13.4-16.0) Sandy CLAY, grayish-brown, wet, ~10 to 20% very fine-grained sand, ~80 to 90% high plasticity clay, very soft.
		1/5	NR	(16.0-20.0) NO RECOVERY.
20	0.2	2.5/5	SP	(20.0-30.0) SAND, poorly graded, brown, wet, very fine-grained to medium-grained sand with ~5% shell fragments at 20.0 to 21.5, very fine-grained to fine-grained sand with trace shell fragments at 21.5 to 30.0, firm, trace gray clay.
25		2.5/5		
30		0/5	NR	(30.0-40.0) NO RECOVERY in flowing sands.
35		0/5		
40		0.25/5	CL	(40.0-45.0) Sandy CLAY in shoe of core barrell, only recovered 0.2', drilled like clay.
45				

PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Well Materials
(0.0-16.0) Surface Casing, 10" sch. 40 PVC
(0.0-18.0) Casing, 2" sch. 40 PVC
(18.0-28.0) Screen, 2" sch. 40 PVC, 0.01" slot
(28.0-28.3) End Cap

Annular Materials
(0.0-12.0) Cement/Bentonite slurry, inside surf. casing
(0.0-16.0) Cement/Bentonite slurry, outside surf. casing
(12.0-17.0) 3/8" bentonite chips, inside surf. casing
(17.0-29.7) 16/30 silica sand

This boring log should not be used separately from the original report.

PASTOR, BEHLING & WHEELER, LLC
Consulting Engineers and Scientists

Log of Boring: NE4MW32C

Gulfco Marine Maintenance
Superfund Site
Freeport, TX

PBW Project No. 1352

Completion Date:	06/13/08	Borehole Diameter (in.):	8.0/13.0/17.5
Drilling Company:	Universal Drilling	Total Depth (ft):	80
Field Supervisor:	Tim Jennings, P.G.	Northing:	3154802.32
Drilling Method:	Hollow Stem Auger	Easting:	13554653.07
Sampling Method:	5 ft. split spoon	Ground Elev. (ft. MSL):	3.2
		TOC Elev. (ft MSL)	6.31

Depth (ft)	Well Construction Diagram	PID (ppm-v)	Recovery (ft/ft)	USCS	Lithologic Description
0				RD BASE	(0.0-0.5) Caliche road base, plugged sampler, no recovery.
			0.25/5	CL	(0.5-5.0) Sandy CLAY.
5		0.5	0.5/5	ML	(5.0-10.0) Sandy SILT, brown, wet, ~20 to 30% fine-grained sand, ~70 to 80% low plasticity silt.
10		0.1 0.1	5/5	SM	(10.0-14.4) Silty clayey SAND, brown, wet, ~10 to 20% medium plasticity clay in thin (<0.5") interbeds, 20 to 30% low plasticity silt, ~50 to 80% fine-grained sand, soft.
15		0.1 0.2	5/5	SP	(14.4-19.2) SAND, poorly graded, brown, wet, very fine-grained to fine-grained sand, soft; black, natural organic material locally.
20		0.6		CL	(19.2-20.5) CLAY, grayish-brown, wet, medium plasticity clay, locally bedded, soft.
			5/5	CL	(20.5-26.2) Sandy CLAY, grayish-brown, wet, ~20 to 30% fine-grained sand, ~70 to 80% medium plasticity clay, very soft, barrel filled with cuttings and slough from inside casing--resulted in poor recovery.
25		44.1	2.5/5	SP	(26.2-29.0) SAND, grades to poorly graded sand, brown, wet, very fine-grained to fine-grained sand, very soft.
30		14.2	3/5	SP	(29.0-35.0) Poorly graded SAND and clayey SAND, wet, ~10% high plasticity clay in sand locally, ~90% fine-grained to medium-grained sand, shell fragments throughout.
35		0	2/5	SP	(35.0-40.2) SAND, poorly graded, brown, wet, very fine-grained to fine-grained sand, compact, gray below 39.0.
40		1		CH	(40.2-41.7) CLAY, gray, wet, high plasticity clay, soft.

PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Well Materials
(0.0-20.0) Surface Casing, 14" sch. 40 PVC
(0.0-48.8) Surface Casing, 10" sch. 40 PVC
(0.0-64.0) Casing, 2" sch. 40 PVC
(64.0-74.0) Screen, 2" sch. 40 PVC, 0.01" slot
(74.0-74.3) End Cap

Annular Materials
(0.0-10.0) Bentonite chips, inside 10" casing
(0.0-20.0) Cement/Bentonite slurry, outside 14" casing
(0.0-48.8) Cement/Bentonite slurry, outside 10" casing
(10.0-58.3) Cement/Bentonite slurry, inside 10" casing
(58.3-62.0) 3/8" bentonite chips
(62.0-76.0) 16/30 silica sand
(76.0-80.0) Coated bentonite pellets

This boring log should not be used separately from the original report.

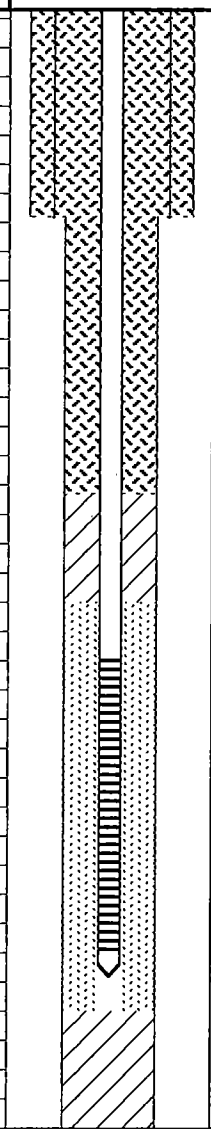
PASTOR, BEHLING & WHEELER, LLC
Consulting Engineers and Scientists

Log of Boring: NE4MW32C

Gulfco Marine Maintenance
Superfund Site
Freeport, TX

PBW Project No. 1352

Completion Date:	06/13/08	Borehole Diameter (in.):	8.0/13.0/17.5
Drilling Company:	Universal Drilling	Total Depth (ft):	80
Field Supervisor:	Tim Jennings, P.G.	Northing:	3154802.32
Drilling Method:	Hollow Stem Auger	Easting:	13554653.07
Sampling Method:	5 ft. split spoon	Ground Elev. (ft. MSL):	3.2
		TOC Elev. (ft MSL)	6.31



Depth (ft)	PID (ppm-v)	Recovery (ft/ft)	USCS	Lithologic Description
45	9.2	3/5	SP	(41.7-45.8) Poorly graded SAND and clayey SAND, gray, wet, ~20% high plasticty clay, ~80% fine-grained sand.
		5/5	CH	(45.8-47.1) CLAY, gray, wet, high plasticity clay.
			SP	(47.1-47.4) SAND, poorly graded, gray, wet, fine-grained to medium-grained sand interbedded in clay.
50	0.9			(47.4-47.7) CLAY, gray, wet.
		3/3	CL	(47.7-55.0) Sandy CLAY, reddish-brown with gray mottling, ~5 to 10% very fine-grained sand, ~90 to 95% medium plasticity clay, a few small shell fragments near top, very stiff and dense.
		2/2		
55		2/2	CH	(55.0-60.0) Silty CLAY, gray with local red mottling, moist, ~5 to 10% silt as very thin interbeds and lenses, a few silt lenses and thin (<0.1') interbeds at 57.0 to 58.5.
	0.1	3/3		
60			CH	(60.0-60.5) CLAY, gray, ~20 to 30% shell fragments.
	0	5/5		
65	0.2	5/5	CH	(60.5-72.7) CLAY, very dark gray, moist, high plasticity, clay with abundant natural organic material at 62.5 to 68.0, a few shell fragments.
	0.5			
70	0.3	5/5	SHELL	(72.7-73.0) SHELL layer, appears to contain some water.
			CH	(73-73.8) CLAY, similar to the material at 60.5 to 72.7.
75	0.3	5/5	CH	(73.8-80) CLAY, bluish-gray, moist, high plasticity clay with few shell fragments, very firm to stiff, thin silt bed at 77.7.
80				

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(0.0-48.8) Cement/Bentonite slurry, outside 10" casing
(10.0-58.3) Cement/Bentonite slurry, inside 10" casing
(58.3-62.0) 3/8" bentonite chips
(62.0-76.0) 16/30 silica sand
(76.0-80.0) Coated bentonite pellets

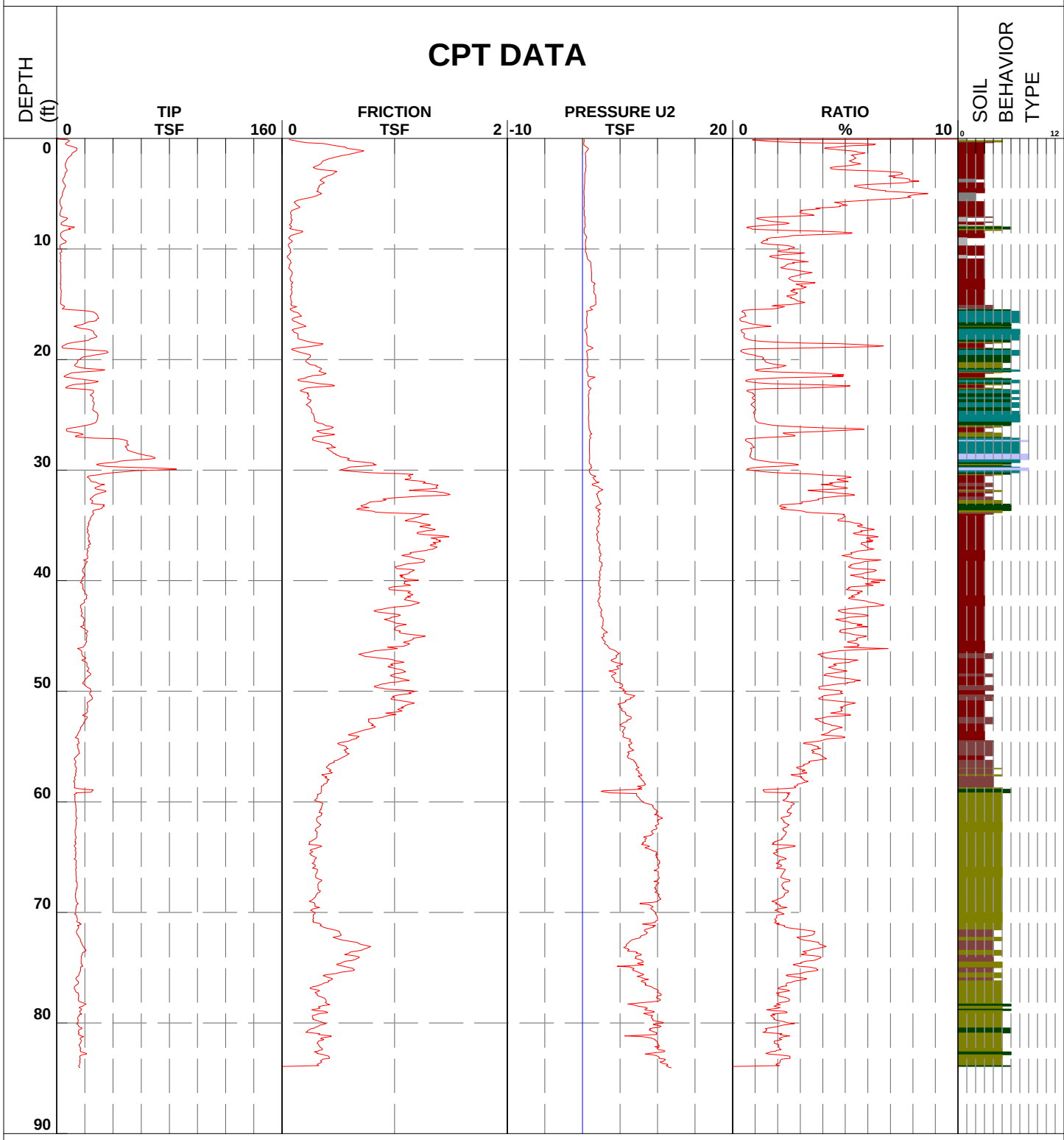
This boring log should not be used separately from the original report.

ATTACHMENT B

FUGRO CONSULTANTS, INC.
CONE PENTRATION TESTING REPORT

CPT Data

Job Number	04.1908-0042	CPT Number	NG3-CPT1	Location	Gulfco Site-Freeport-TX
Operator	ALBERT FONSECA	Date and T	03-Jun-2008 08:55:23	Cone Number	A15F2.5CKEHW1636
Client		Elevation		Water Table	0.00 ft

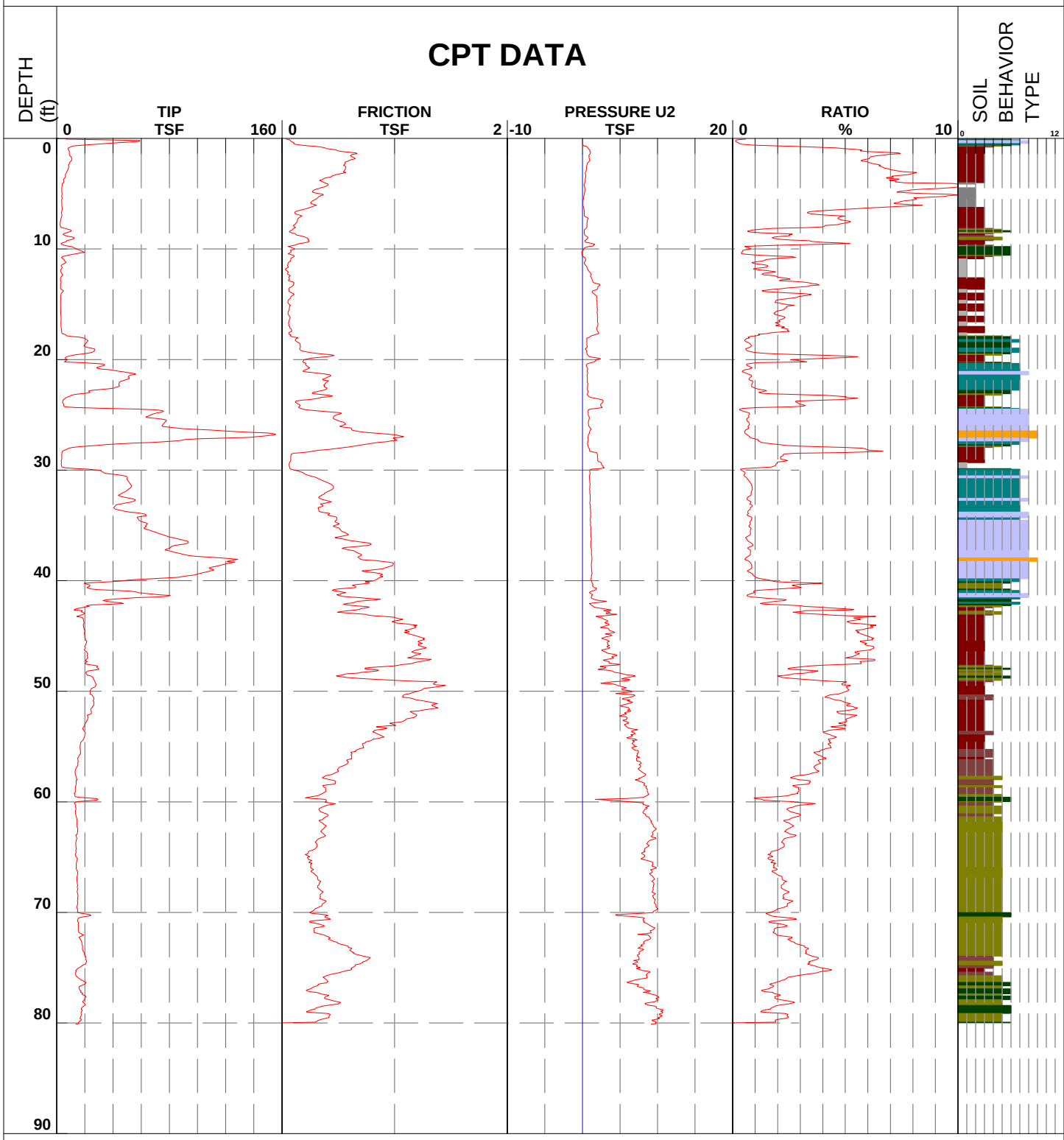


1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented

CPT Data

Job Number	04.1908-0042	CPT Number	NE4-CPT2	Location	Gulfco Site-Freeport-TX
Operator	ALBERT FONSECA	Date and T	04-Jun-2008 13:11:05	Cone Number	A15F2.5CKEHW1636
Client		Elevation		Water Table	0.00 ft

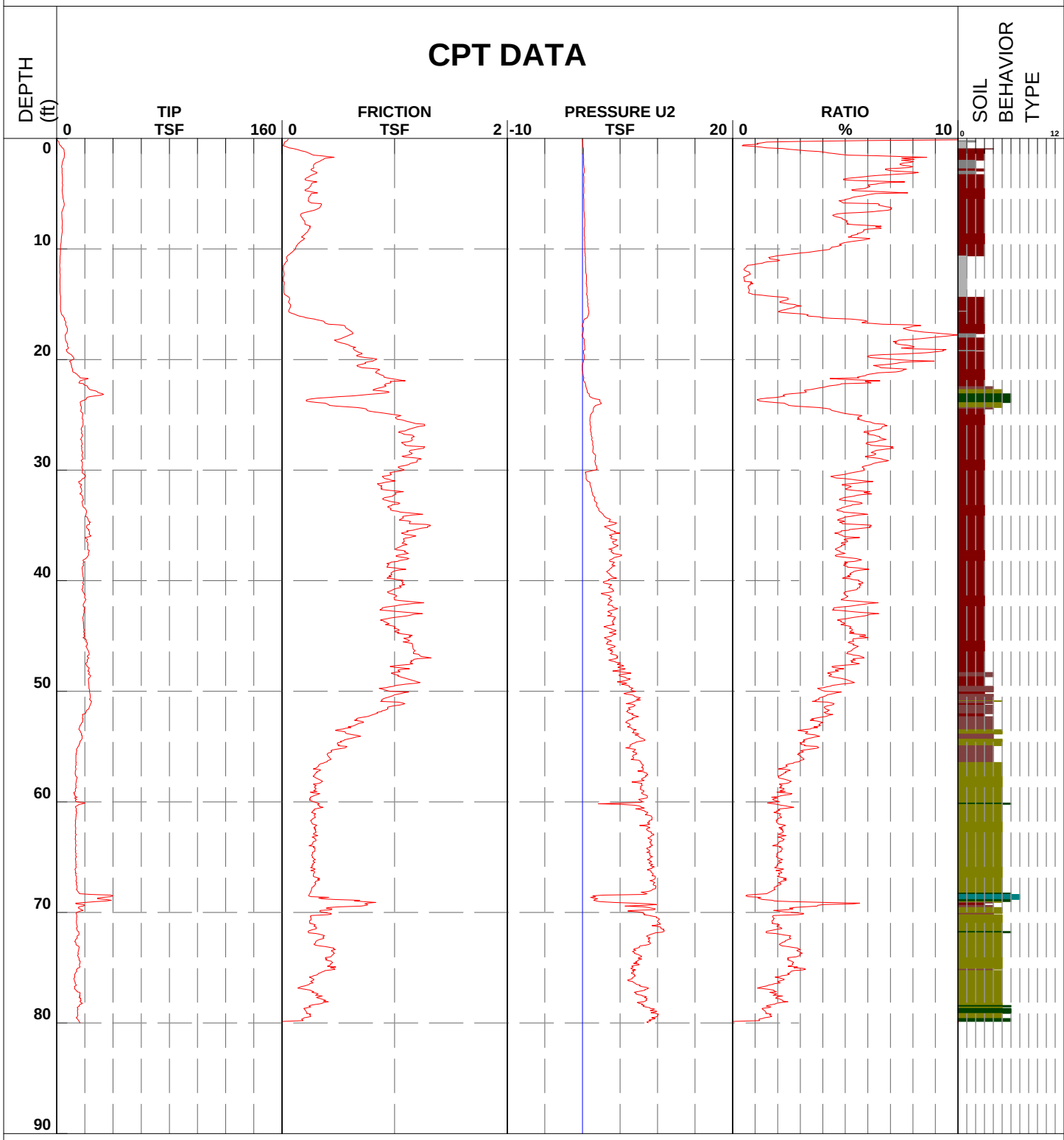


1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented

CPT Data

Job Number	04.1908-0042	CPT Number	NC2-CPT3	Location	Gulfco Site-Freeport-TX
Operator	ALBERT FONSECA	Date and T	02-Jun-2008 14:04:29	Cone Number	A15F2.5CKEHW1636
Client		Elevation		Water Table	0.00 ft

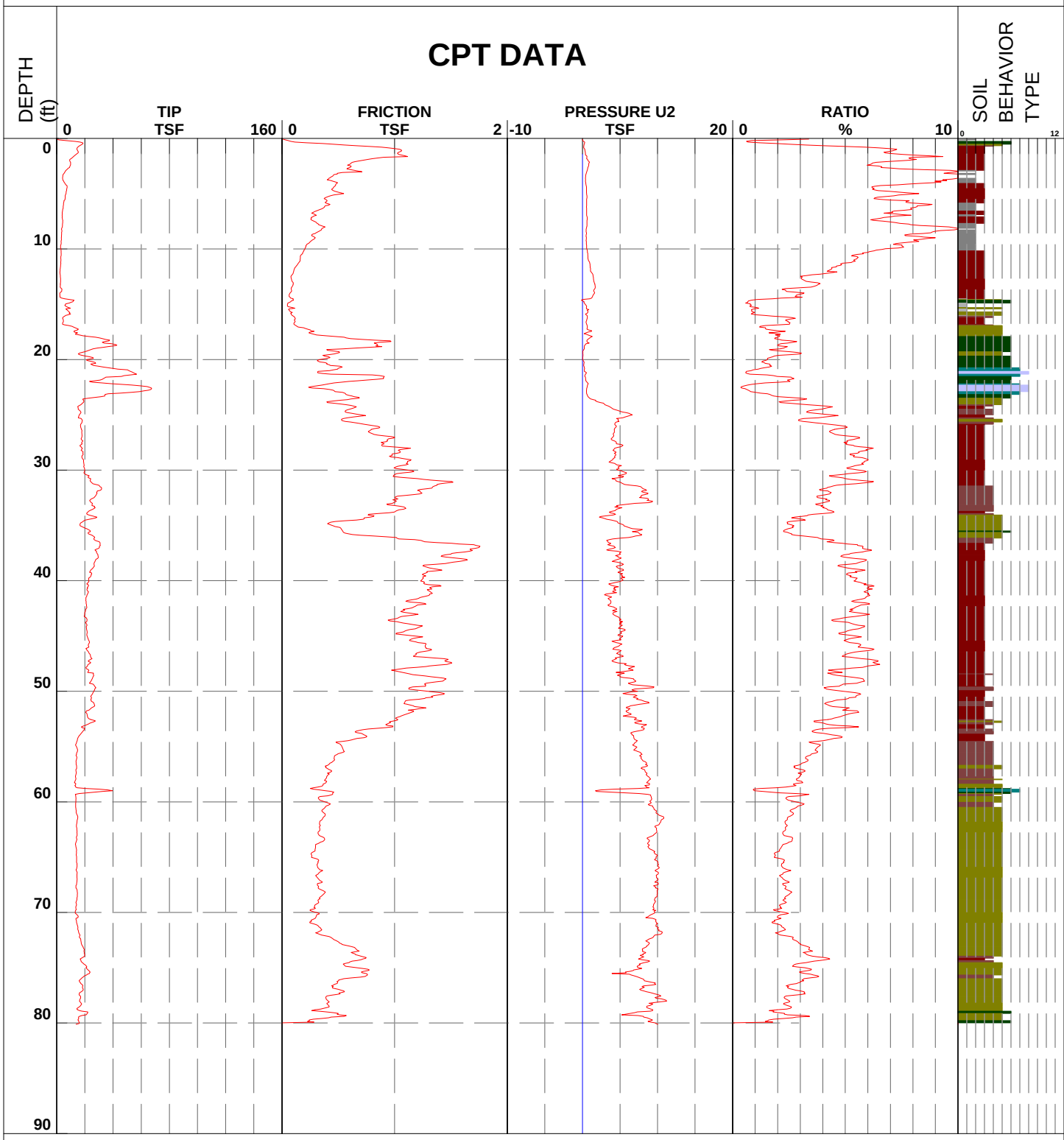


1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented

CPT Data

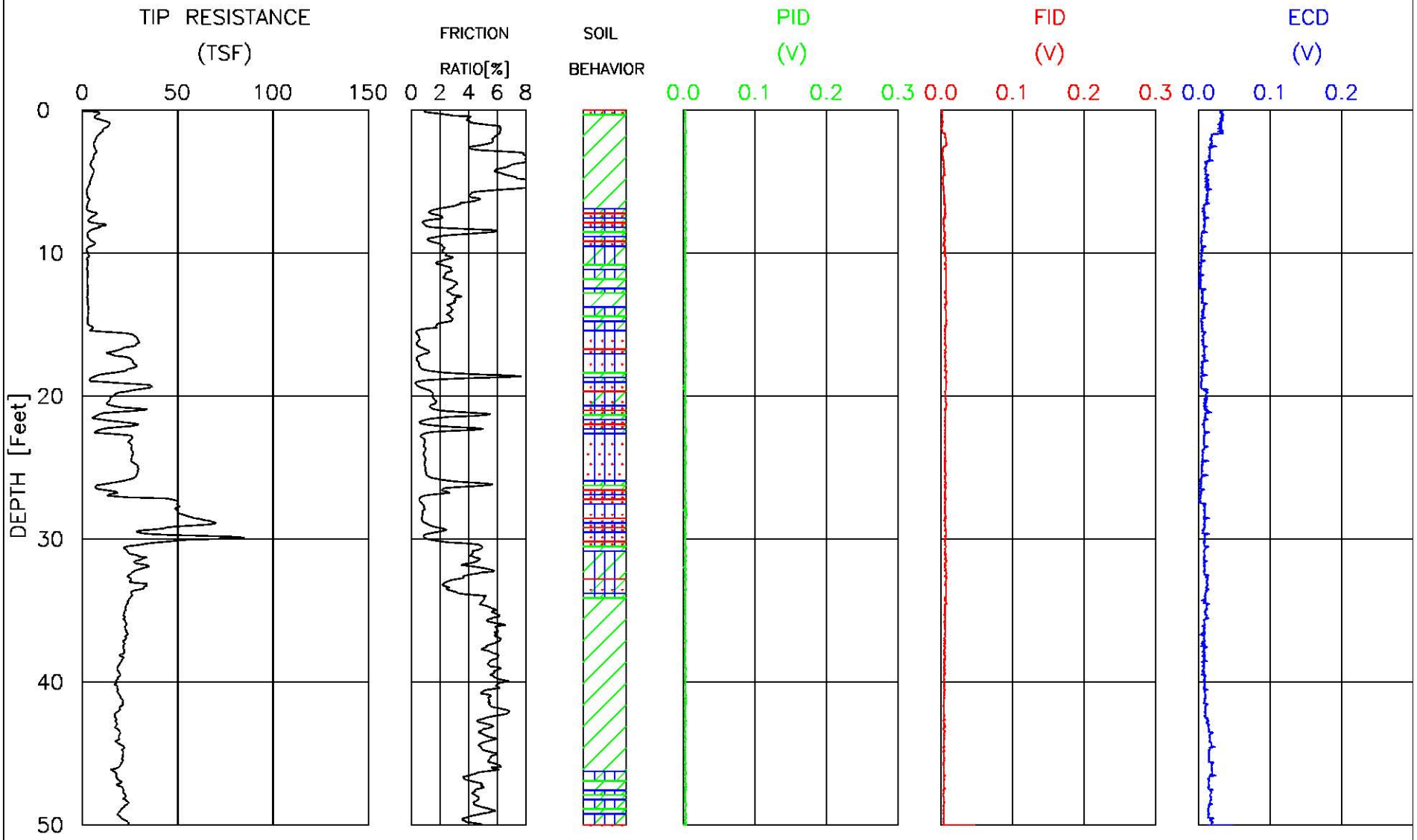
Job Number	04.1908-0042	CPT Number	OCPT-4	Location	Gulfco Site-Freeport-TX
Operator	ALBERT FONSECA	Date and T	03-Jun-2008 16:42:24	Cone Number	A15F2.5CKEHW1636
Client		Elevation		Water Table	0.00 ft



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Robertson et al. 1986 * Overconsolidated or Cemented

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: NG3-CPT1

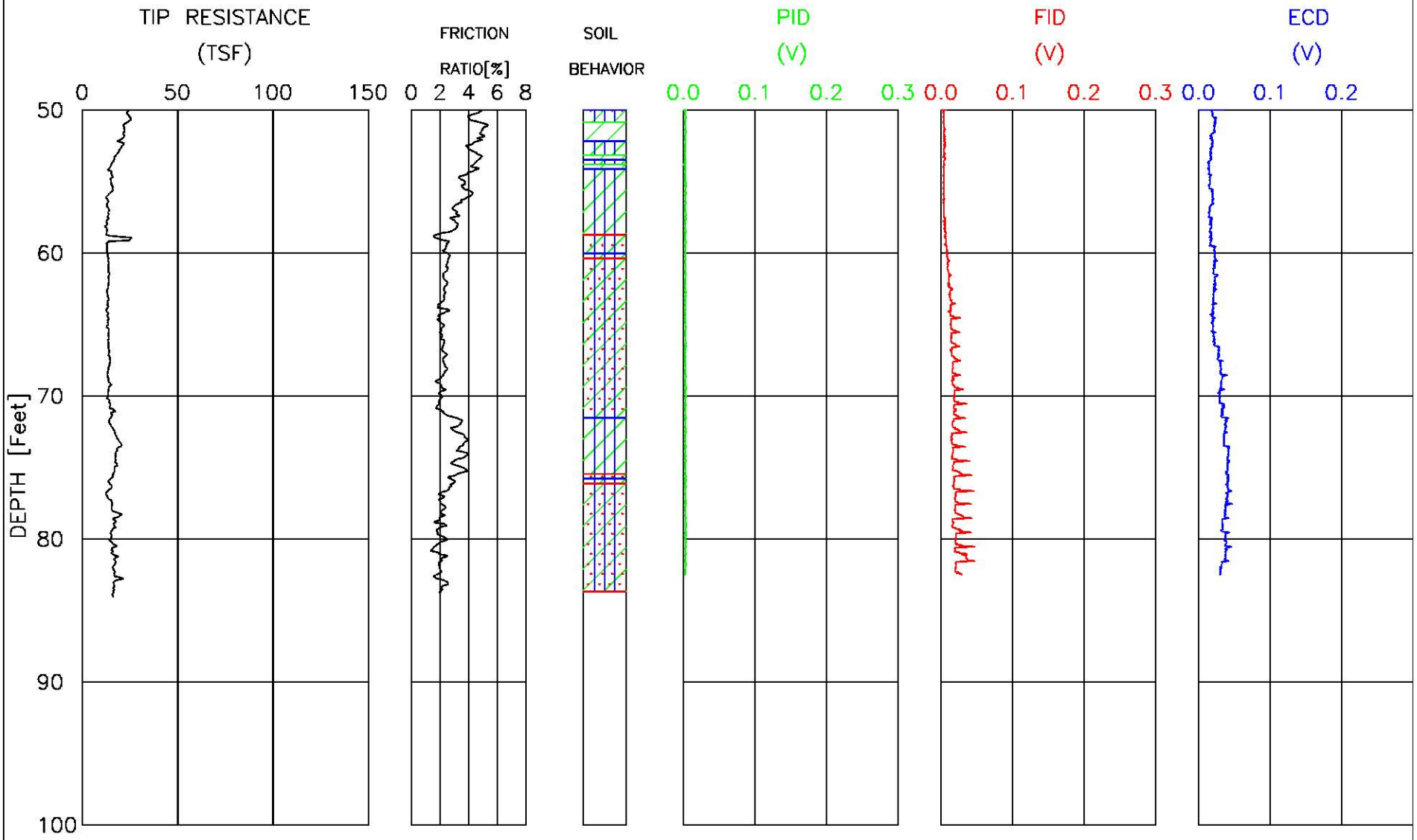
CONE NUMBER: A15F2.5CKEHW1636

DATE: 03-Jun-2008

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: NG3-CPT1

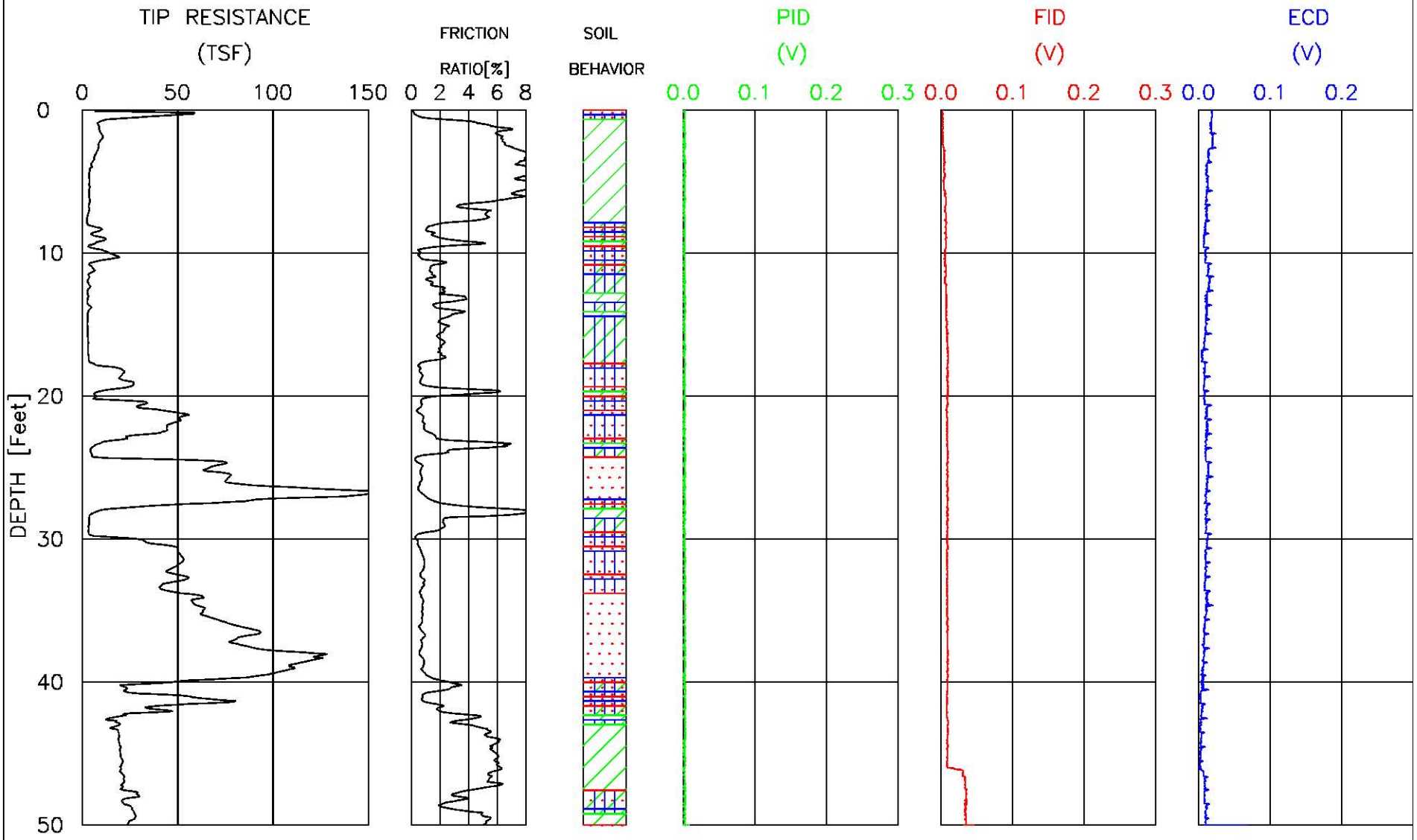
CONE NUMBER: A15F2.5CKEHW1636

DATE: 03-Jun-2008

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

CPT NUMBER: NE4-CPT2

DATE: 04-Jun-2008

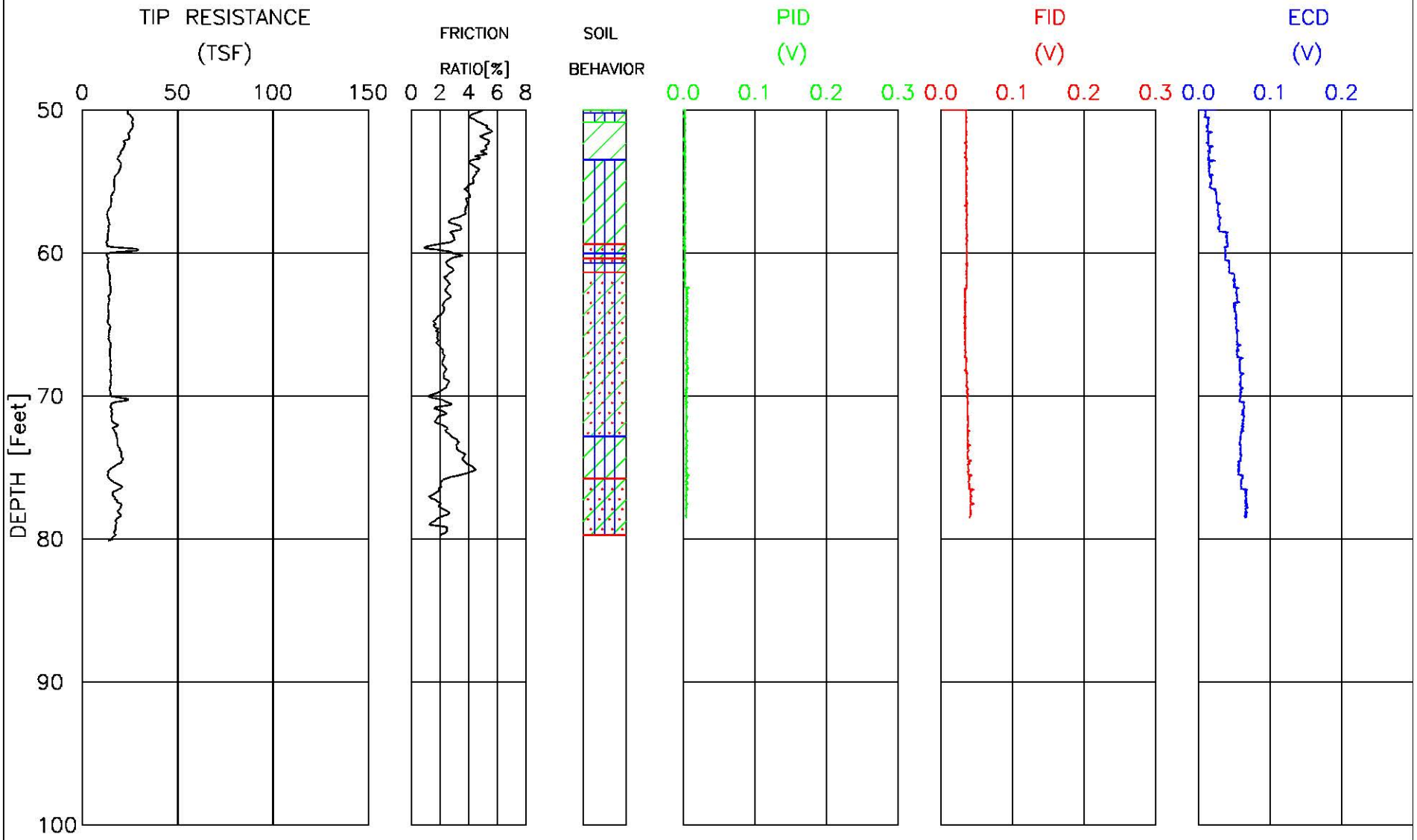
ELEVATION: 0.00

CONE NUMBER: A15F2.5CKEHW1636

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: NE4-CPT2

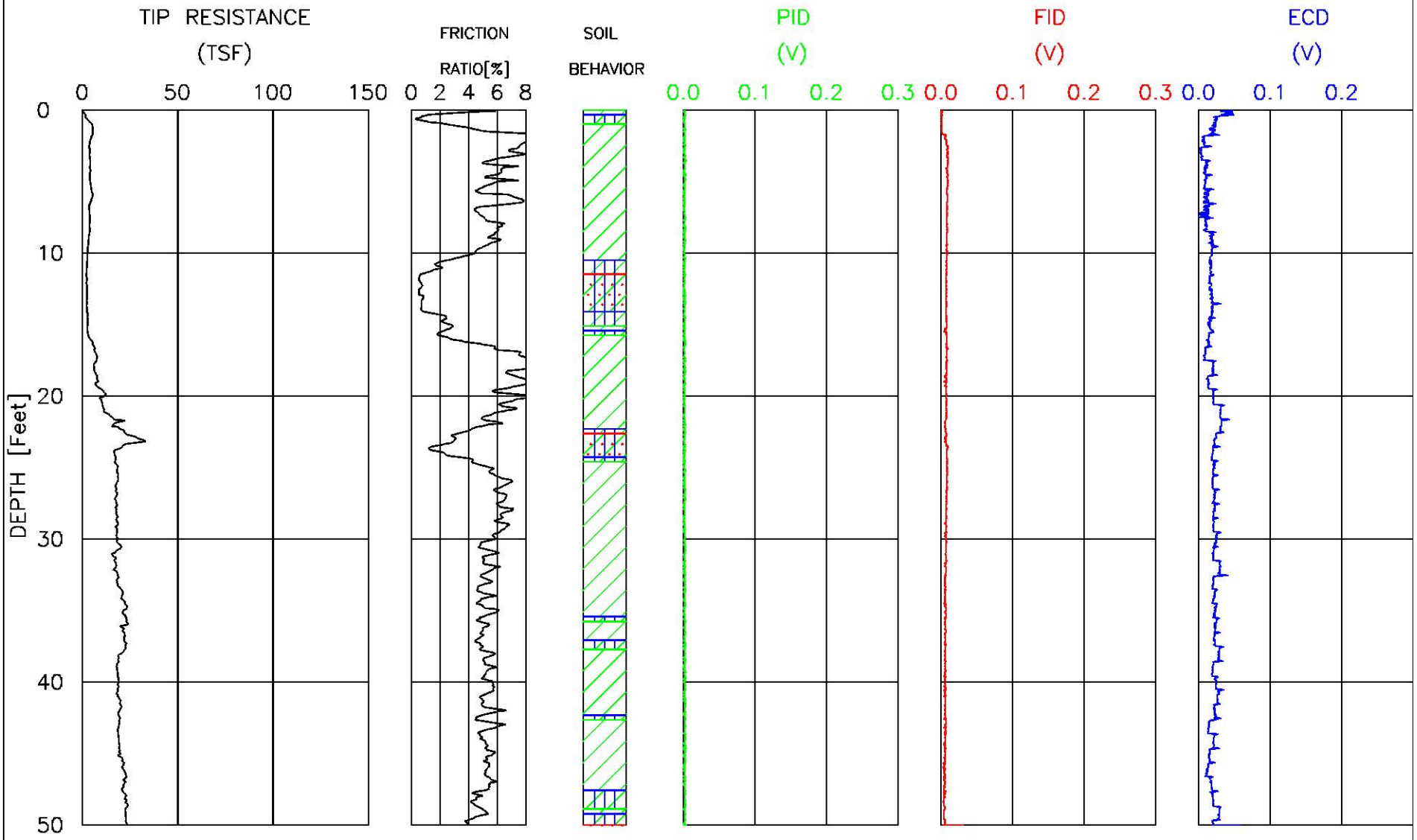
CONE NUMBER: A15F2.5CKEHW1636

DATE: 04-Jun-2008

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: NC2-CPT3

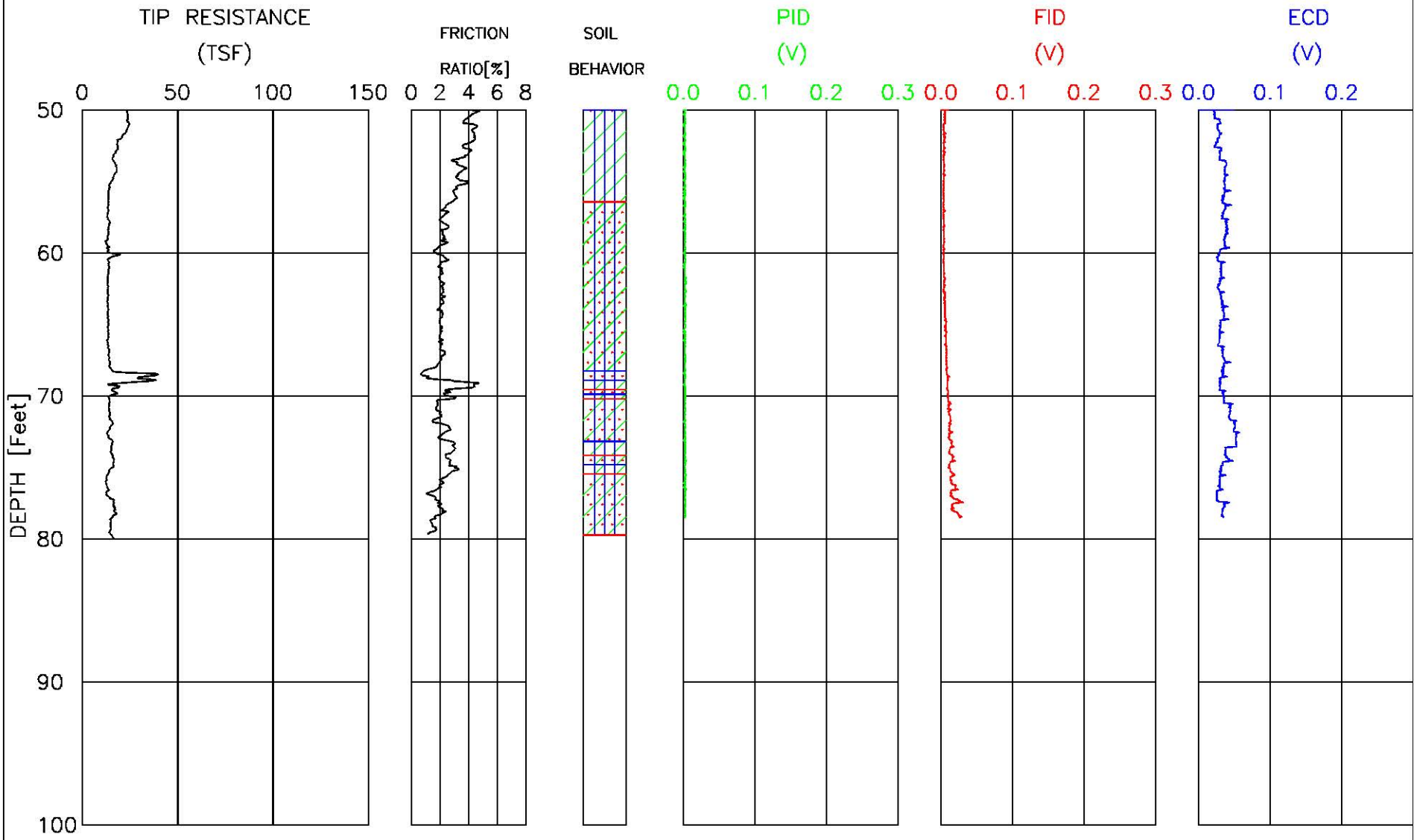
CONE NUMBER: A15F2.5CKEHW1636

DATE: 02-Jun-2008

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: NC2-CPT3

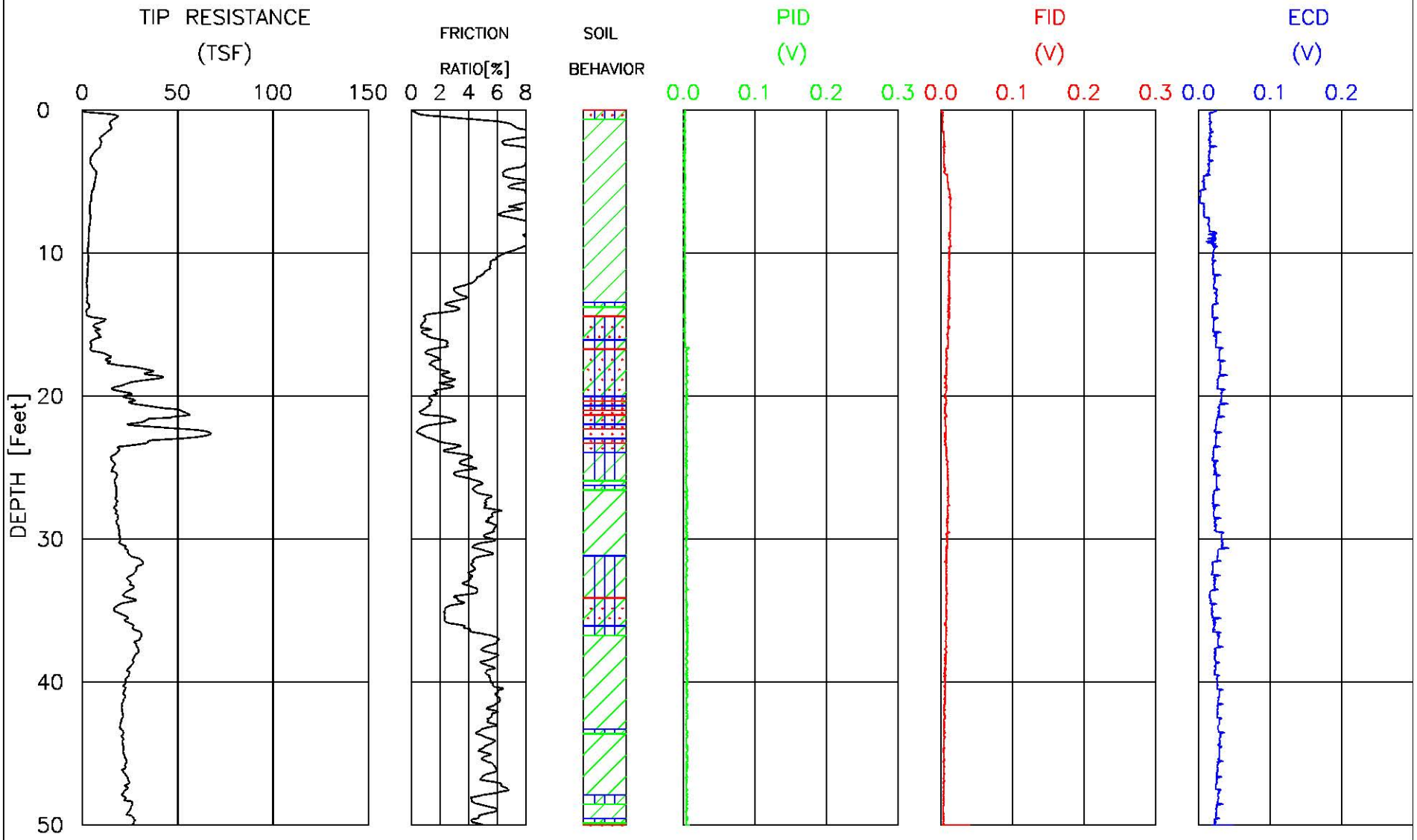
CONE NUMBER: A15F2.5CKEHW1636

DATE: 02-Jun-2008

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: OCPT-4

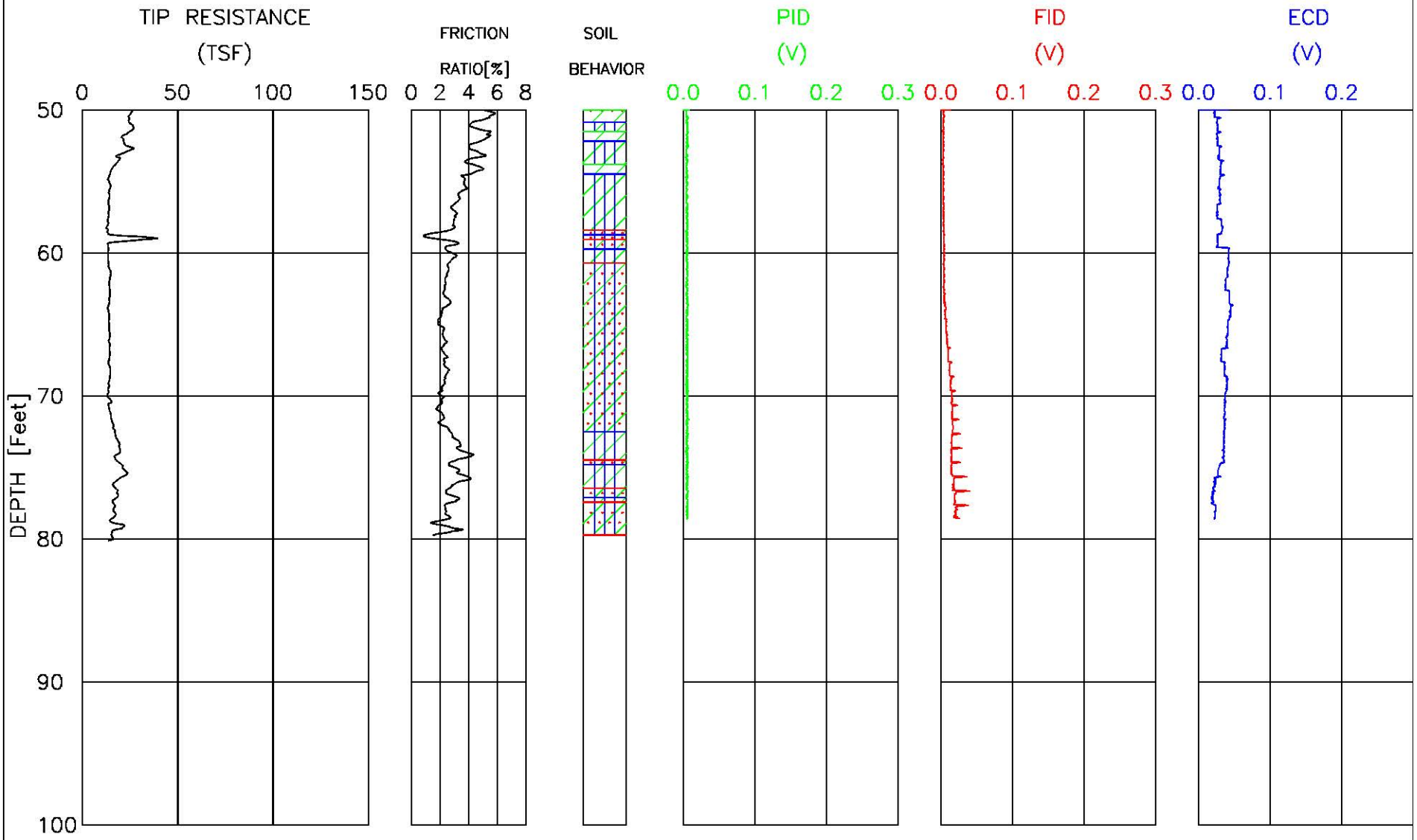
CONE NUMBER: A15F2.5CKEHW1636

DATE: 03-Jun-2008

PLATE: 1 OF 2

FUGRO GEOSCIENCES,INC

CPT/MIP TEST RESULTS



JOB NUMBER: 04.1908-0042

ELEVATION: 0.00

CPT NUMBER: OCPT-4

CONE NUMBER: A15F2.5CKEHW1636

DATE: 03-Jun-2008

PLATE: 2 OF 2

FUGRO GEOSCIENCES,INC