



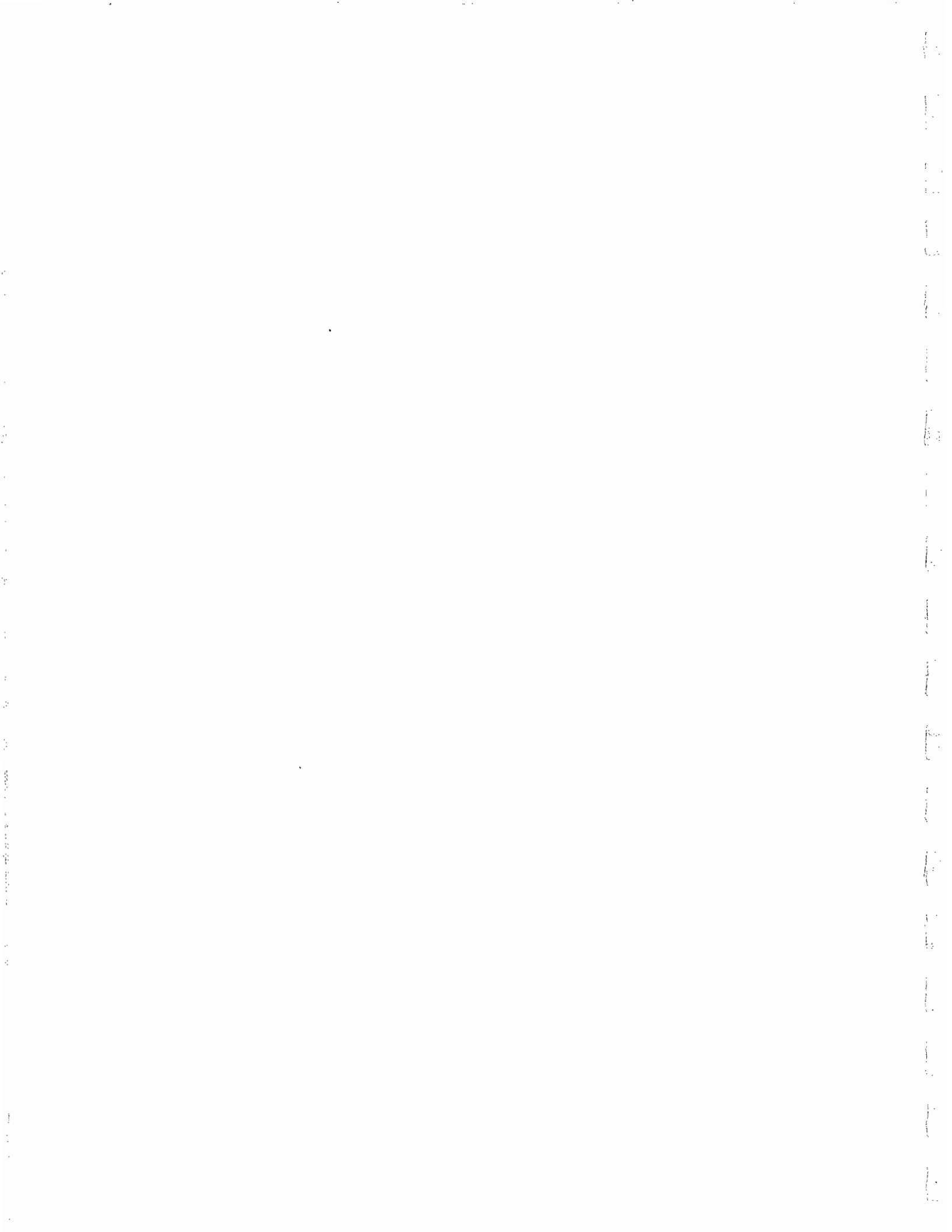
# 1985 OFFSHORE GEOTECHNICAL SITE INVESTIGATION

## **AMAILIGAK F-24 SITE BEAUFORT SEA**

Submitted to

**GULF CANADA RESOURCES  
CALGARY, ALBERTA**

**MARCH, 1986**



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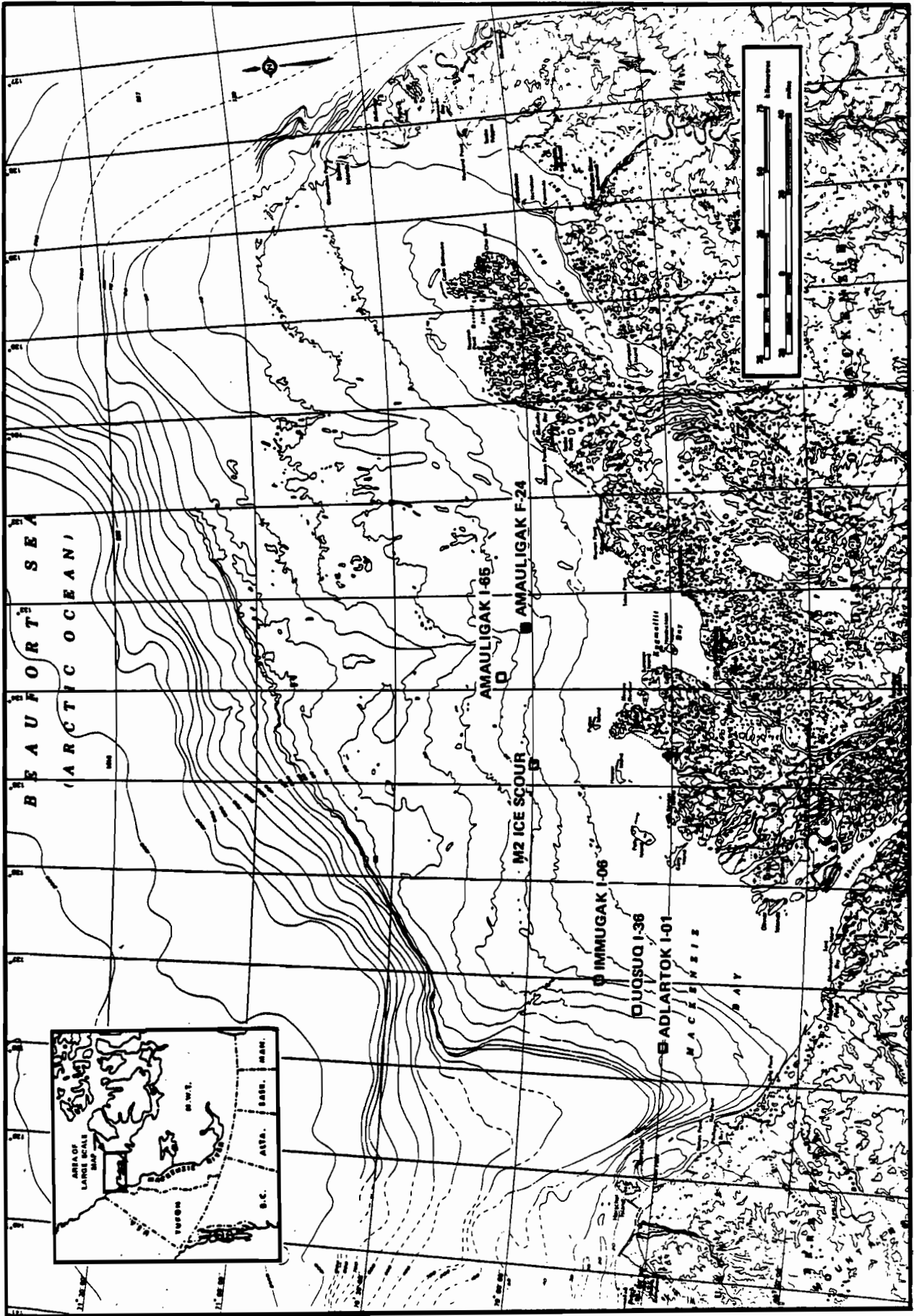


FIGURE 1 GENERAL LOCATION MAP

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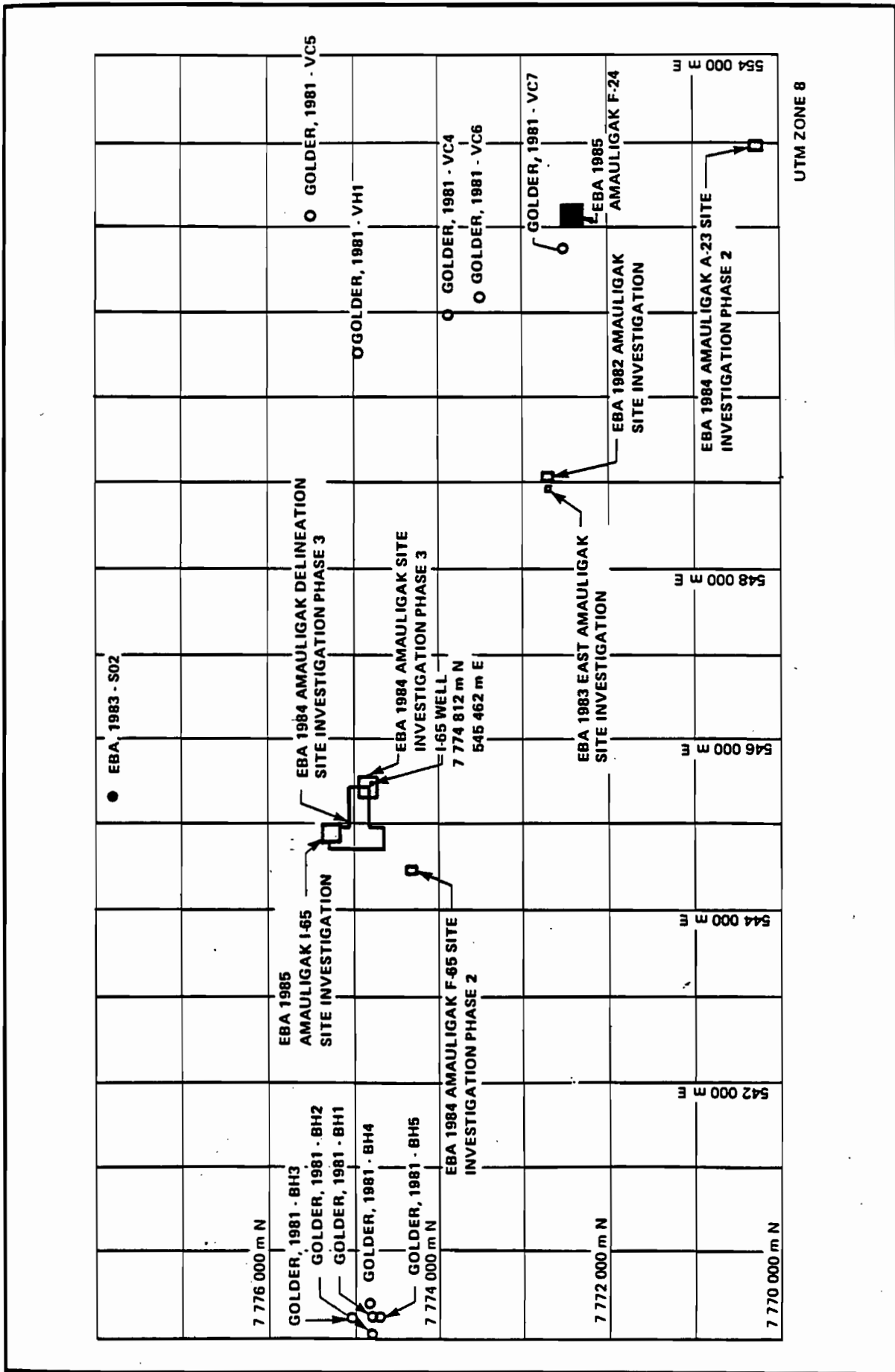
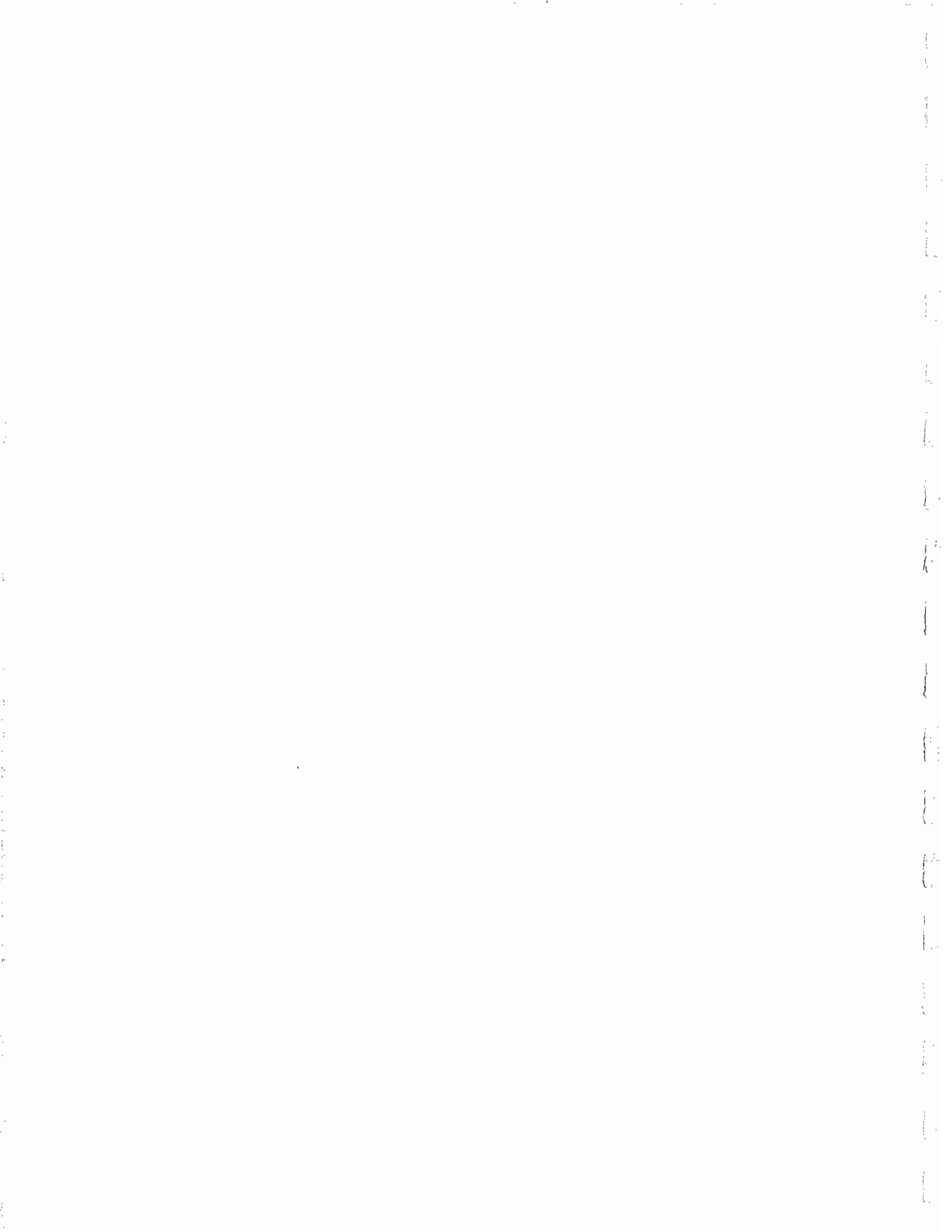


FIGURE 2 DETAILED BOREHOLE AND PROBEHOLE LOCATION MAP FOR ALL SITE INVESTIGATIONS ON THE AMAULIGAK BLOCK





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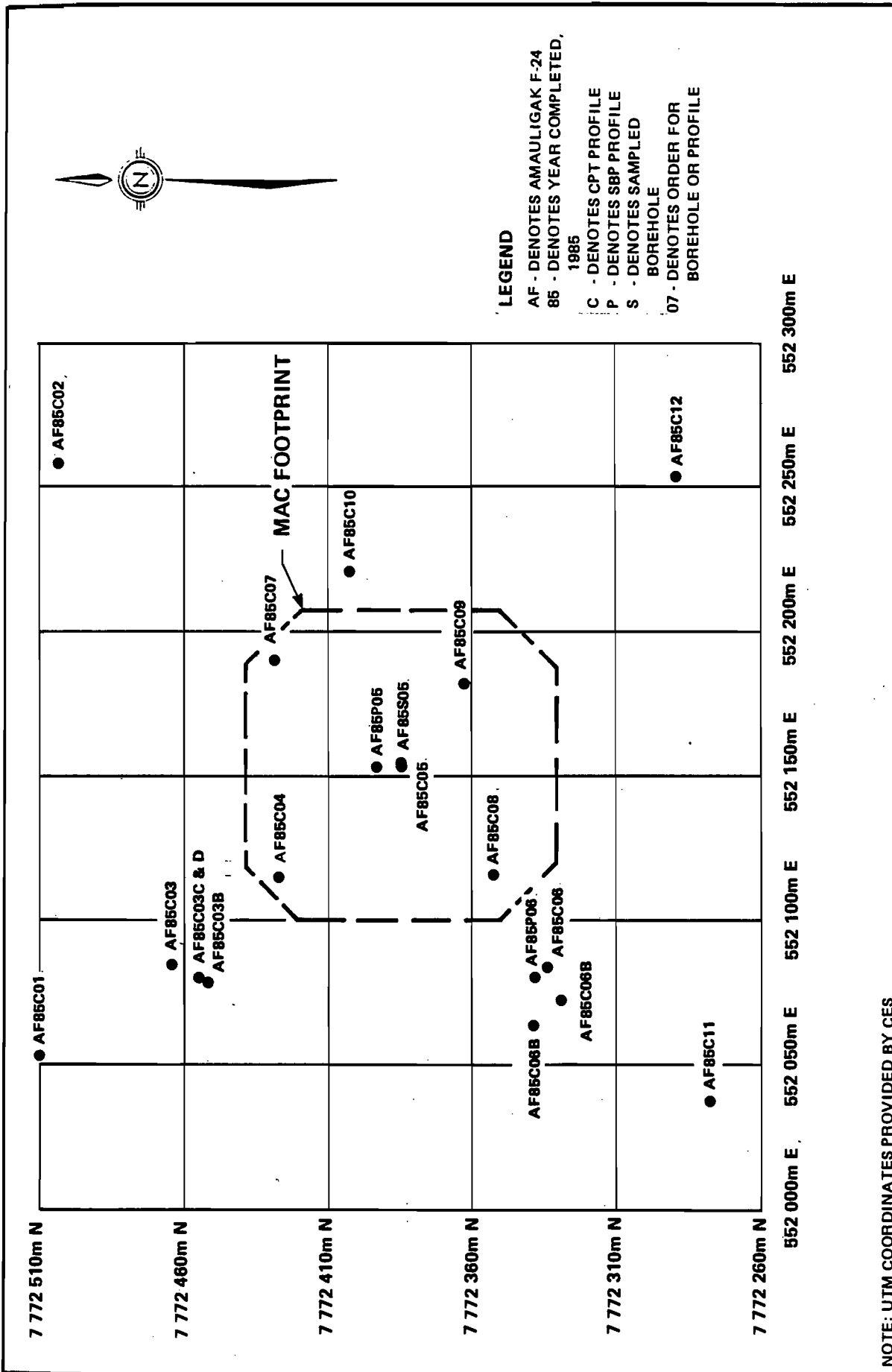


FIGURE 3 DETAILED BOREHOLE AND PROBEHOLE LOCATIONS AMAULIGAK F-24 SITE



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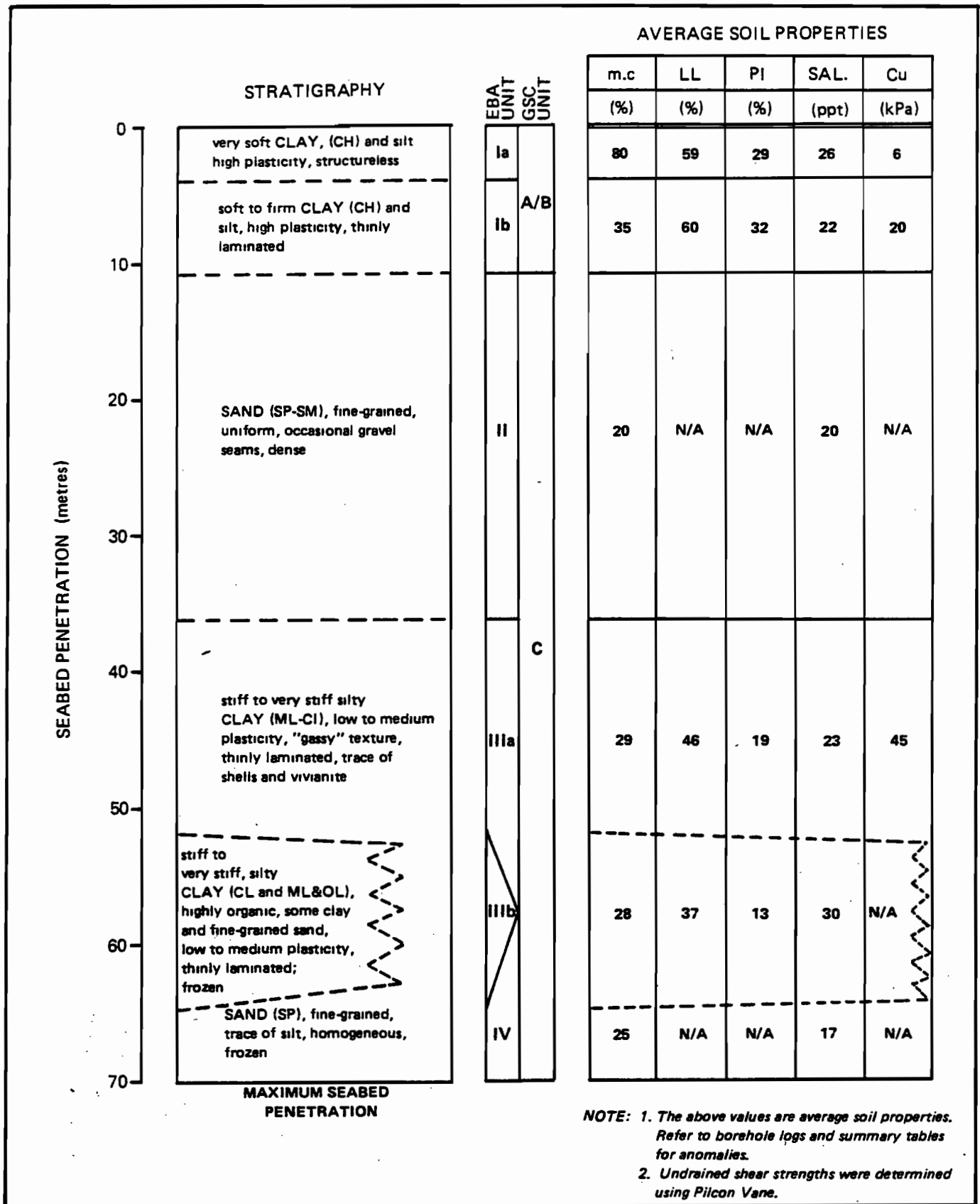
TABLE 1 BOREHOLE AND PROFILE LOCATIONS - AMAULIGAK F-24 SITE

BOREHOLE/ PROFILE NO.	UTM COORDINATES (ZONE 8)		GEOGRAPHIC COORDINATES		DATE COMPLETED (yr./mo./da.)	WATER DEPTH (metres)	SEABED PENETRATION (metres)
	NORTHING (metres)	EASTING (metres)	LATITUDE (deg./min./sec.)	LONGITUDE (deg./min./sec.)			
<b>BOREHOLES:</b>							
AF85S05	7 772 394	552 152	70°03'17.26"	133°37'48.40"	85-09-04	32.6	53.0 - 68.6
AF85S06	7 772 337	552 081	70°03'15.44"	133°37'55.16"	85-09-07	31.5	38.3 - 41.6
AF85S06B	7 772 329	552 072	70°03'15.44"	133°38'55.16"	85-09-09	32.6	0.0 - 53.4
<b>CPT PROFILES:</b>							
AF85C05	7 772 394	552 152	70°03'17.26"	133°37'48.40"	85-09-03	32.6	0.0 - 12.2
AF85C05b	7 772 394	552 152	70°03'17.26"	133°27'48.40"	85-09-03	32.6	10.9 - 32.0
AF85C05c*	7 772 394	552 152	70°03'17.26"	133°27'48.40"	85-09-03	32.6	32.0 - 52.8
AF85C03a	7 772 465	552 084	70°03'19.59"	133°37'54.62"	85-09-04	30.7	0.0 - 13.2
AF85C03b*	7 772 465	552 084	70°03'19.59"	133°37'54.62"	85-09-04	30.7	13.2 - 37.2
AF85C03c	7 772 451	552 077	70°03'19.15"	133°37'55.35"	85-09-06	30.7	34.1 - 52.7
AF85C03d	7 772 451	552 077	70°03'19.15"	133°37'55.35"	85-09-06	30.7	0.0 - 12.3
AF85C06a	7 772 334	552 084	70°03'15.34"	133°37'54.90"	85-09-06	32.2	0.0 - 12.2
AF85C06b*	7 772 338	552 063	70°03'15.51"	133°37'56.93"	85-09-08	31.5	10.0 - 28.4
AF85C06c*	7 772 338	552 063	70°03'15.51"	133°37'56.93"	85-09-09	31.5	29.4 - 39.5
AF85C06d	7 772 338	552 063	70°03'15.51"	133°37'56.93"	85-09-08	31.5	39.5 - 53.3
AF86C09	7 772 361	552 184	70°03'16.14"	133°37'45.37"	85-09-10	31.3	0.0 - 12.8
AF85C07	7 772 429	552 189	70°03'18.35"	133°37'44.77"	85-09-10	32.5	0.0 - 11.2
AF85C12 *	7 772 289	552 252	70°03'13.77"	133°37'39.16"	85-09-10	30.9	0.0 - 12.9
AF85C11	7 772 278	552 038	70°03'13.59"	133°37'59.35"	85-09-10	32.1	0.0 - 11.5
AF85C08	7 772 353	552 115	70°03'15.96"	133°37'51.96"	85-09-10	31.7	0.0 - 12.2
AF85C04	7 772 426	552 115	70°03'18.30"	133°37'51.74"	85-09-10	32.0	0.0 - 12.1
AF85C02	7 772 507	552 258	70°03'20.80"	133°37'39.11"	85-09-11	31.6	0.0 - 14.0
AF85C01	7 772 510	552 051	70°03'21.07"	133°37'57.68"	85-09-11	32.6	0.0 - 13.3
AF85C10	7 772 406	552 221	70°03'17.57"	133°37'41.84"	85-09-11	32.3	0.0 - 53.4
<b>PMT PROFILES:</b>							
AF85P06a	7 772 337	552 081	70°03'15.44"	133°37'55.16"	85-09-07	31.5	0.0 - 11.0
AF85P06b	7 772 337	552 081	70°03'15.44"	133°37'55.16"	85-09-07	31.5	42.0 - 51.8
AF85P05	7 772 397	552 157	70°03'17.32"	133°37'47.92"	85-09-11	32.6	15.6 - 30.8

NOTE: 1. \*indicates that the three channel cone was used. All other CPT profiles were completed using the four channel cone configuration.

2. "CPT" refers to cone penetration test, and "PMT" refers to pressuremeter test.





**FIGURE 4 SUMMARY OF STRATIGRAPHY AND AVERAGE SOIL PROPERTIES FOR THE AMAULIGAK F-24 SITE**



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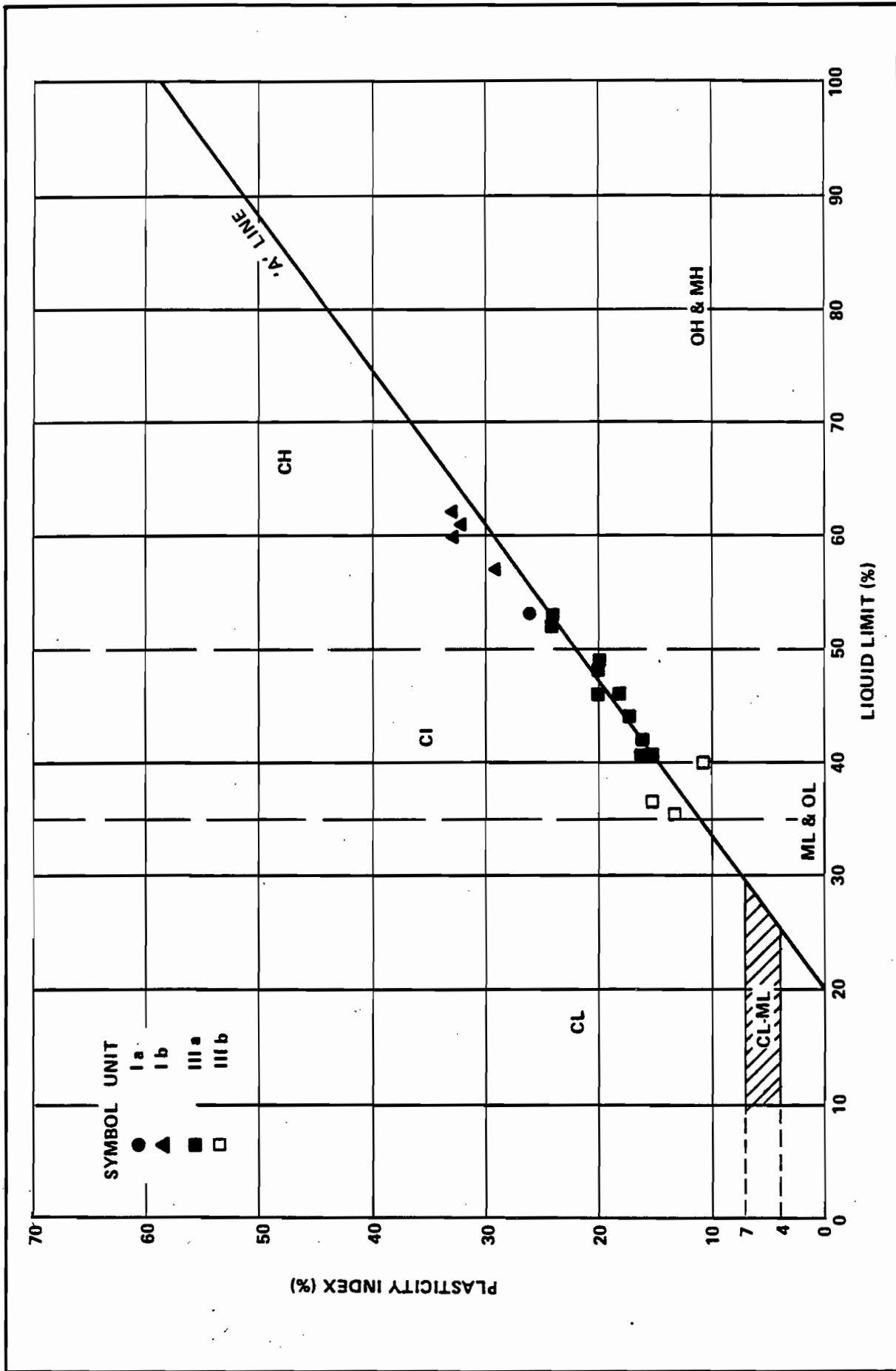


FIGURE 5 PLASTICITY CHART  
AMAULIGAK F-24 SITE

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**APPENDIX A**

**BOREHOLE LOGS**

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## SYSTEM INTERNATIONAL CONVERSIONS

<b>AREA</b>		
1 km <sup>2</sup>	= 3.861 x 10 <sup>-1</sup> mi <sup>2</sup>	1 km <sup>2</sup> = 100 hectares
1 km <sup>2</sup>	= 2.471 x 10 <sup>-2</sup> acre	
1 m <sup>2</sup>	= 1.196 yd <sup>2</sup>	
1 m <sup>2</sup>	= 1.076 x 10 <sup>-1</sup> ft <sup>2</sup>	
1 mm <sup>2</sup>	= 1.550 x 10 <sup>-3</sup> in <sup>2</sup>	see note 1
<b>DENSITY</b>		
1 Mg/m <sup>3</sup>	= 6.243 x 10 <sup>-1</sup> lb <sub>m</sub> /ft <sup>3</sup>	see note 2
1 kg/m <sup>3</sup>	= 6.243 x 10 <sup>-2</sup> lb <sub>m</sub> /ft <sup>3</sup>	
<b>FORCE</b>		
1 N	= 2.248 x 10 <sup>-1</sup> lb <sub>f</sub>	
<b>HEAT ENERGY (E)</b>		
1 kJ	= 9.478 x 10 <sup>-1</sup> BTU (IST)	1 BTU = 252 cal
1 J	= 2.388 x 10 <sup>-1</sup> cal (IST)	
<b>HEAT FLUX (Q)</b>		
1 W/m <sup>2</sup>	= 3.170 x 10 <sup>-1</sup> BTU/(ft <sup>2</sup> · hr)	
<b>SPECIFIC HEAT CAPACITY (c)</b>		
1 kJ/(kg · °C)	= 2.388 x 10 <sup>-1</sup> BTU/(lb <sub>m</sub> · °F)	
<b>THERMAL CONDUCTIVITY (k)</b>		
W/(m · °C)	= 5.778 x 10 <sup>-1</sup> BTU/(ft · hr · °F)	
<b>COEFFICIENT OF HEAT TRANSFER (c<sub>h</sub>)</b>		
1 W/(m <sup>2</sup> · °C)	= 1.761 x 10 <sup>-1</sup> BTU/(ft <sup>2</sup> · hr · °F)	see note 3
<b>LENGTH</b>		
1 km	= 6.214 x 10 <sup>-1</sup> mi (statute)	
1 m	= 1.094 yd	
1 m	= 3.281 ft	
1 mm	= 3.937 x 10 <sup>-2</sup> in	
<b>MASS</b>		
1 Mg	= 1.102 T	1 T = 2000 lb <sub>m</sub>
1 Mg	= 2.205 x 10 <sup>3</sup> lb <sub>m</sub>	Mg is equivalent to tonne
1 kg	= 2.205 lb <sub>m</sub>	
<b>POWER</b>		
1 W	= 1.341 x 10 <sup>-3</sup> HP	1 HP = 550 ft · lb <sub>f</sub> /s

<b>PRESSURE, STRESS or ELASTIC MODULI</b>		
1 MPa	= 1.044 x 10 <sup>-1</sup> T <sub>f</sub> /ft <sup>2</sup> [TSF]	see note 4
1 kPa	= 1.044 x 10 <sup>-2</sup> T <sub>f</sub> /ft <sup>2</sup> [TSF]	
1 kPa	= 1.450 x 10 <sup>-1</sup> lb <sub>f</sub> /in <sup>2</sup> [psi]	
1 kPa	= 3.346 x 10 <sup>-1</sup> ft of water	hydrostatic pressure of water at 1 ft. depth
1 Pa	= 2.089 x 10 <sup>-2</sup> lb <sub>f</sub> /ft <sup>2</sup> [psf]	
<b>TEMPERATURE</b>		
°C	= (°F - 32)/1.8	0°C = 273.15° K
°C	= 1.8 F°	1°C = 1 K°
<b>TIME</b>		
1 Ms	= 3.171 x 10 <sup>-2</sup> yr	for one year equal to 365 days
1 ks	= 1.157 x 10 <sup>-2</sup> day	
1 s	= 3.171 x 10 <sup>-8</sup> yr	
<b>VISCOSITY</b>		
<b>DYNAMIC (η)</b>		
1 Pa · s	= 1.000 x 10 <sup>-3</sup> centipoise	
<b>KINEMATIC (ν)</b>		
1 mm <sup>2</sup> /s	= 1.000 centistoke	
<b>VOLUME</b>		
1 m <sup>3</sup>	= 8.107 x 10 <sup>-4</sup> acre · ft	
1 m <sup>3</sup>	= 1.308 yd <sup>3</sup>	
1 m <sup>3</sup>	= 3.531 x 10 <sup>-1</sup> ft <sup>3</sup>	
1 m <sup>3</sup>	= 2.200 x 10 <sup>-2</sup> gal (Imperial)	1 m <sup>3</sup> = 1000 L
1 cm <sup>3</sup>	= 3.520 x 10 <sup>-2</sup> fl oz	see note 1
1 cm <sup>3</sup>	= 6.102 x 10 <sup>-2</sup> in <sup>3</sup>	
<b>VOLUME RATE OF FLOW</b>		
1 m <sup>3</sup> /s	= 1.901 x 10 <sup>-1</sup> mgpd (Imperial)	
1 m <sup>3</sup> /s	= 3.531 x 10 <sup>-1</sup> ft <sup>3</sup> /s	
<b>COEFFICIENTS</b>		
<b>VOLUME COMPRESSIBILITY OR SWELLING (m<sub>v</sub> or m<sub>s</sub>)</b>		
1 m <sup>2</sup> /MN	= 9.579 x 10 <sup>-2</sup> ft <sup>2</sup> /T <sub>f</sub>	
<b>CONSOLIDATION OR SWELLING (c<sub>v</sub> or c<sub>s</sub>)</b>		
1 m <sup>2</sup> /yr	= 1.076 x 10 <sup>-1</sup> ft <sup>2</sup> /yr	
1 m <sup>2</sup> /yr	= 2.949 x 10 <sup>-2</sup> ft <sup>2</sup> /day	
1 m <sup>2</sup> /yr	= 3.171 x 10 <sup>-4</sup> cm <sup>2</sup> /s	
<b>HYDRAULIC CONDUCTIVITY (k)</b>		
1 m/s	= 2.835 x 10 <sup>-8</sup> ft/day	see note 5

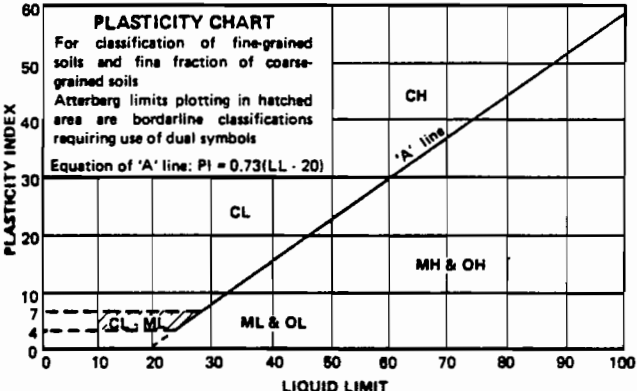
### NOTES.

- 1 The use of cm<sup>2</sup> and cm<sup>3</sup> for area and volume is permissible.
- 2 To convert mass density (ν) to weight per unit volume use:  










$$F = m a$$
 i.e.  $\nu \text{ Mg/m}^3 \times 9.807 \text{ m/s}^2 = 9.807 \nu \frac{\text{Mg} \cdot \text{m}}{\text{s}^2 \cdot \text{m}^3} = 9.807 \nu \frac{\text{kN}}{\text{m}^3}$ 
 kg<sub>m</sub>/m<sup>3</sup> is not a valid SI density unit.
- 3 The inverse of the 'coefficient of heat transfer' is 'thermal resistance' or the 'R' value.
- 4 kg<sub>f</sub>/m<sup>2</sup> is not a valid SI stress unit.
- 5 Hydraulic conductivity is a proportionality coefficient defined in Darcy's Law  $v = k \frac{h}{L}$  where  $v$  = velocity of flow  
 $\frac{\text{m}}{\text{s}} = k \frac{\text{m}}{\text{m}}$  hydraulic gradient
- 6 All conversion factors have been rounded to four significant figures.



# UNIFIED SOIL CLASSIFICATION

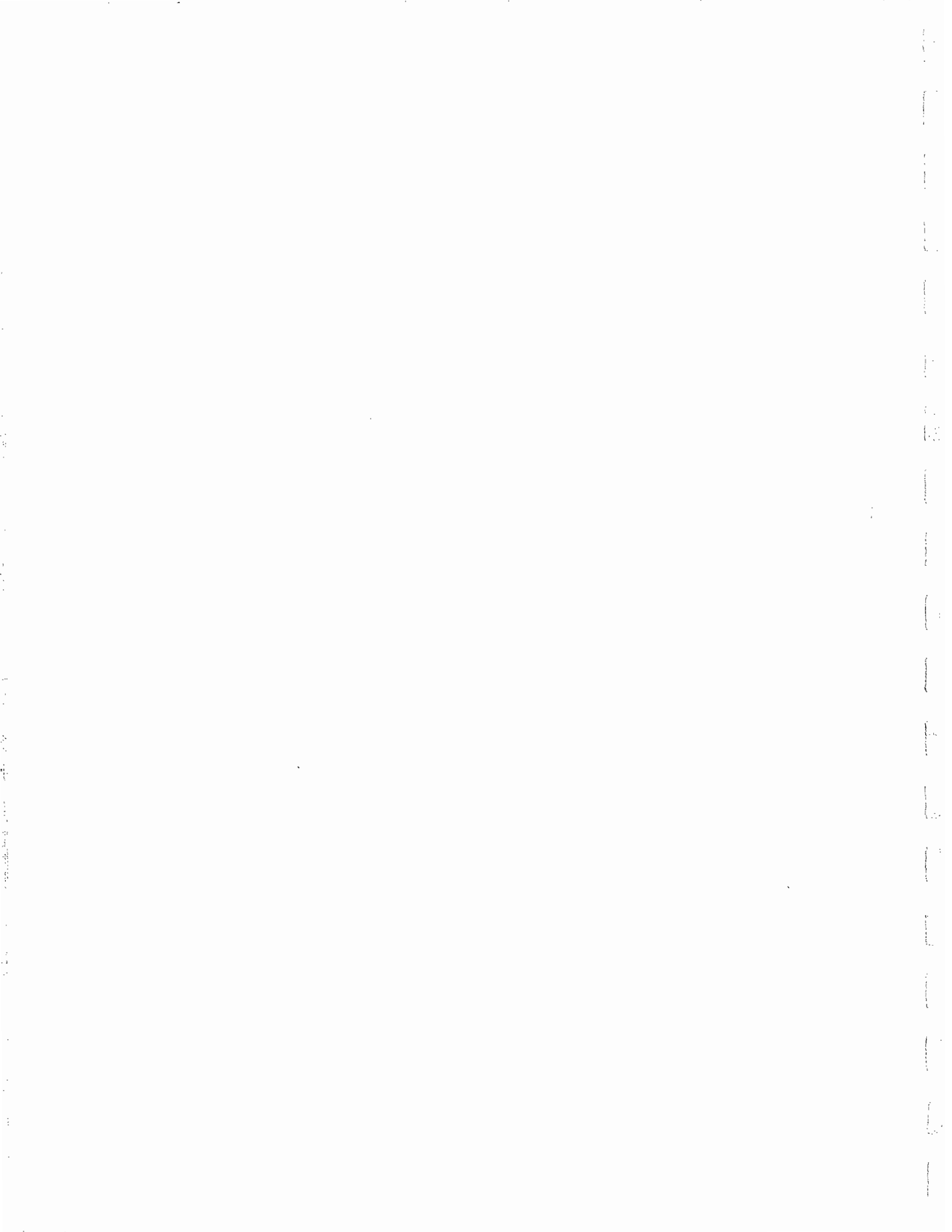
MAJOR DIVISIONS	GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA	
<b>COARSE-GRAINED SOILS</b> More than 50% retained on No. 200 sieve*	<b>GRAVELS</b> 50% or more of coarse fraction retained on No. 4 sieve	<b>CLEAN GRAVELS</b>	<b>GW</b> Well-graded gravels and gravel-sand mixtures, little or no fines	
		<b>GRAVELS WITH FINES</b>	<b>GP</b> Poorly-graded gravels and gravel-sand mixtures, little or no fines	
		<b>CLEAN SANDS</b>	<b>GM</b> Silty gravels, gravel-sand-silt mixtures	
		<b>SANDS WITH FINES</b>	<b>GC</b> Clayey gravels, gravel-sand clay mixtures	
	<b>SANDS</b> More than 50% of coarse fraction passes No. 4 sieve	<b>CLEAN SANDS</b>	<b>SW</b> Well-graded sands and gravelly sands, little or no fines	$C_u = D_{60}/D_{10}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting both criteria for GW
		<b>SANDS WITH FINES</b>	<b>SP</b> Poorly-graded sands and gravelly sands, little or no fines	Atterberg limits plot below 'A' line or plasticity index less than 4 Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
		<b>SANDS WITH FINES</b>	<b>SM</b> Silty sands, sand-silt mixtures	$C_u = D_{60}/D_{10}$ Greater than 6 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting both criteria for SW
		<b>SANDS WITH FINES</b>	<b>SC</b> Clayey sands, sand-clay mixtures	Atterberg limits plot above 'A' line and plasticity index greater than 7 Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
				Classification on basis of percentage of fines GW, GP, SW, SP GM, GC, SM, SC Borderline classification requiring use of dual symbols
				Less than 5% pass No. 200 sieve More than 12% pass No. 200 sieve 5% to 12% pass No. 200 sieve
		Atterberg limits plot below 'A' line or plasticity index less than 4 Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols		
		Atterberg limits plot above 'A' line and plasticity index greater than 7 Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols		
<b>FINE-GRAINED SOILS</b> 50% or more passes No. 200 sieve*	<b>SILTS AND CLAYS</b> Liquid limit 50% or less	<b>ML</b> Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	<b>PLASTICITY CHART</b> For classification of fine-grained soils and fine fraction of coarse-grained soils Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols Equation of 'A' line: $PI = 0.73(LL - 20)$ 	
		<b>CL</b> Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		<b>OL</b> Organic silts and organic silty clays of low plasticity		
	<b>SILTS AND CLAYS</b> Liquid limit greater than 50%	<b>MH</b> Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts		<b>CH</b> Inorganic clay of high plasticity, fat clays
		<b>CH</b> Inorganic clay of high plasticity, fat clays		<b>MH &amp; OH</b> Organic clays of medium to high plasticity
		<b>OH</b> Organic clays of medium to high plasticity		<b>ML &amp; OL</b> Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
		<b>ML</b> Inorganic silts, very fine sands, rock flour, silty or clayey fine sands		<b>CL</b> Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
<b>HIGHLY ORGANIC SOILS</b>	<b>PT</b>	Peat, muck and other highly organic soils	*Based on the material passing the 3 in. (75 mm) sieve †ASTM Designation D 2487, for identification procedure see D 2488	

## GROUND ICE DESCRIPTION

ICE NOT VISIBLE				VISIBLE ICE LESS THAN 50% BY VOLUME			
GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION		GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
N	Nf	Poorly-bonded or friable		V	Vx	Individual ice crystals or inclusions	
	Nbn	No excess ice, well-bonded			Vc	Ice coatings on particles	
	Nbe	Excess ice, well-bonded			Vr	Random or irregularly oriented ice formations	
			Vv		Stratified or distinctly oriented ice formations		
			Vh		Ice with soil inclusions		
				VISIBLE ICE GREATER THAN 50% BY VOLUME			
ICE		ICE + Soil Type	Ice with soil inclusions	ICE		Ice without soil inclusions (greater than 25 mm (1 in.) thick)	

- NOTE:**
- Dual symbols are used to indicate borderline or mixed ice classifications
  - Visual estimates of ice contents indicated on borehole logs  $\pm 5\%$
  - This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purpose

**LEGEND**  
 Soil  Ice 



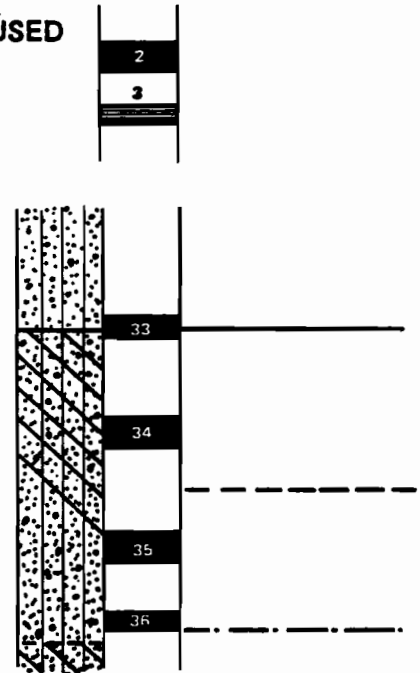
## SYMBOLS AND ABBREVIATIONS USED ON BOREHOLE LOGS

### SOIL SAMPLE

- represented by sample identification number which increases sequentially from the top of the hole, thickness of block is equivalent to sample recovery

### SOIL BOUNDARIES

- have been indicated using the following system
- stratum boundary observed within sample
- stratum boundary assumed to occur within  $\pm 0.5$  m of the marked level and is probably gradational between the two samples
- stratum boundary assumed to occur within  $\pm 1.0$  m of the marked level
- stratum boundary notation for both depth below seabed (41.5 m) and elevation below sealevel (uncorrected for tides) (-64.6m. Elevation)



41.5 (-64.6 El.)

### SOIL DESCRIPTION

#### UNIFIED SOIL CLASSIFICATION

USC

- determined in accordance with chart on following page

#### TEXTURAL DESCRIPTION

- determined in accordance with attached sheet and used to augment Unified Soil Classification

Special terms used include:

- e.g. - "becoming trace of/with some CLAY"  
indicating an overall change in a feature of the stratum not sufficient to change the total description
- "trace of/with some CLAY"  
indicating small feature displayed in that sample only

#### GROUND ICE DESCRIPTION

- determined in accordance with chart on following page; extra effort has been made to better describe the degree and extent of soil bonding and also a value of core temperature ( $^{\circ}$ C) at that level
- see also definition of terms in text

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#### GROUND ICE DESCRIPTION

- determined in accordance with chart on following page; extra effort has been made to better describe the degree and extent of soil bonding and also a value of core temperature ( $^{\circ}\text{F}$ ) at that level
- see also definition of terms in text

e.g. FROZEN - 1.2  $^{\circ}\text{C}$   
- Nf - Nbn  
- poorly to slightly bonded  
SAND: Nbn - 0.5  $^{\circ}\text{C}$   
CLAY: not frozen

#### TEST RESULTS

- see legend at bottom of borehole log

#### CONSISTENCY

##### Fine-Grained Soils

Major portion passing No. 200 Sieve. Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silt. Consistency is rated according to undrained shear strength, as indicated by cone penetrometer reading or miniature vane and triaxial test results.

Descriptive Term	Undrained Shear strength (kPa)
Very Soft	less than 12.5
Soft	12.5 to 25
Firm	25 to 50
Stiff	50 to 100
Very Stiff	100 to 200
Hard	200 and higher

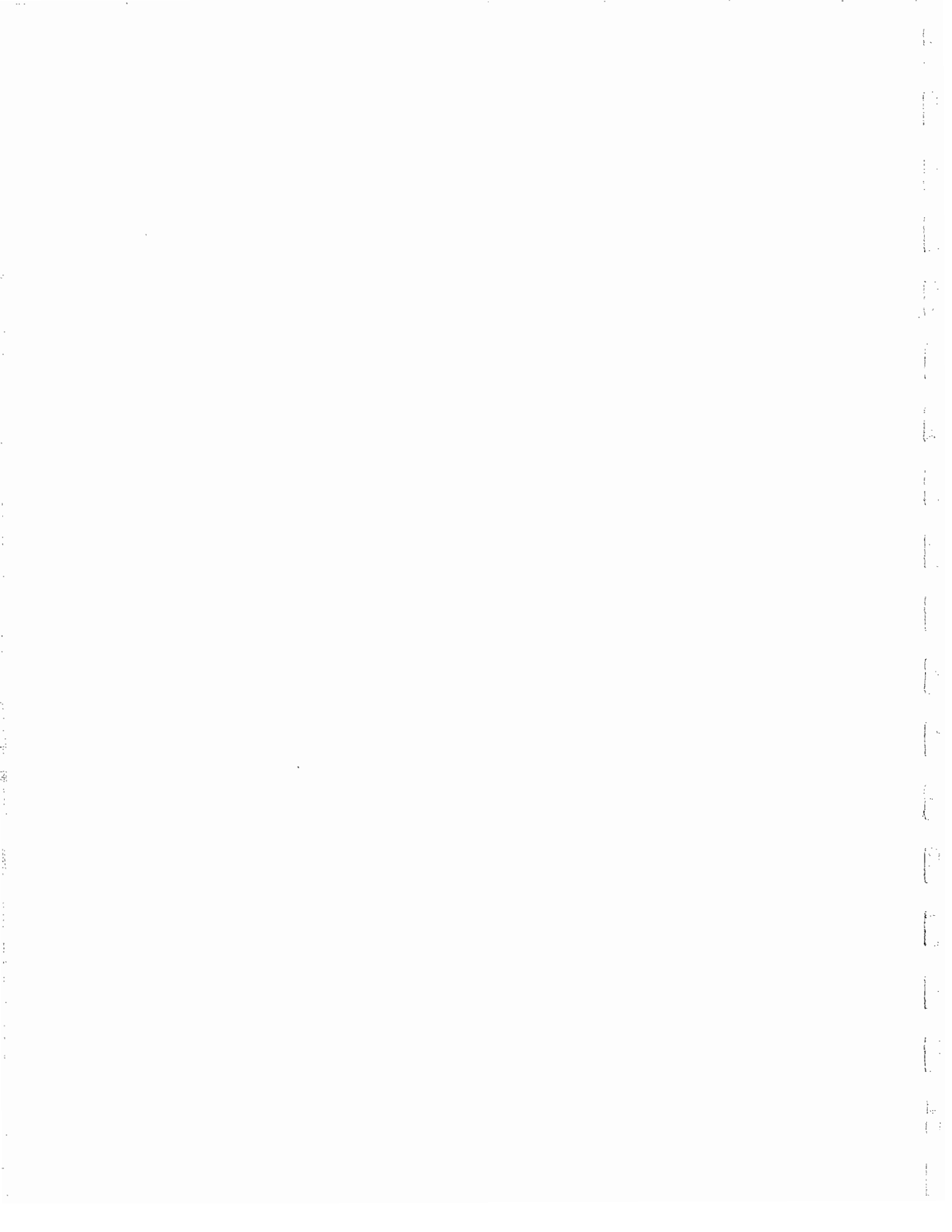
##### Coarse-Grained Soils

Major portion retained in No. 200 Sieve. Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as determined by laboratory tests.

Descriptive Term	Relative Density
Very Loose	0 - 20%
Loose	20 - 40%
Compact or Medium	40 - 75%
Dense	75 - 90%
Very Dense	90 - 100%

#### PLASTICITY

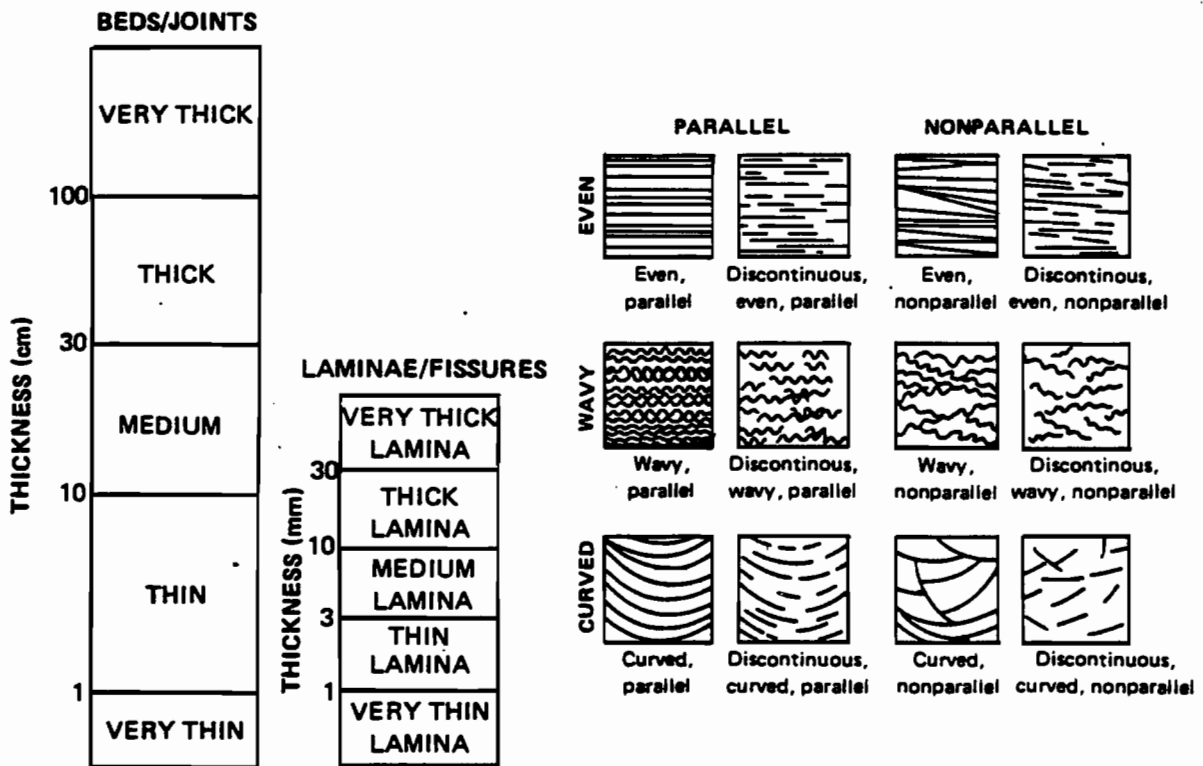
Low - Liquid limit less than 35  
Medium - Liquid limit between 35 and 50  
High - Liquid limit greater than 50



## DESCRIPTION OF SEDIMENTARY STRUCTURES

**BEDS** SEDIMENTATION UNITS DEPOSITED UNDER ESSENTIALLY CONSTANT PHYSICAL CONDITIONS, SEPARATED BY BEDDING PLANES WHICH ARE RECOGNIZABLE BY TEXTURAL OR COMPOSITIONAL CHANGES RESULTING FROM PERIODS OF NON-DEPOSITION OR EROSION, OR ABRUPT CHANGES IN DEPOSITIONAL CONDITIONS. BEDS MAY BE INTERNALLY HOMOGENEOUS, OR COMPOSED OF SMALLER UNITS-LAMINAE

**LAMINAE** THE SMALLEST MEGASCOPIC LAYERS IN A SEDIMENTARY SEQUENCE, REPRESENTING MINOR FLUCTUATIONS IN PHYSICAL CONDITIONS DURING THE DEPOSITION OF BEDS. LAMINAE ARE RELATIVELY UNIFORM IN TEXTURE AND COMPOSITION AND GENERALLY LACK MEGASCOPIC INTERNAL LAYERING.



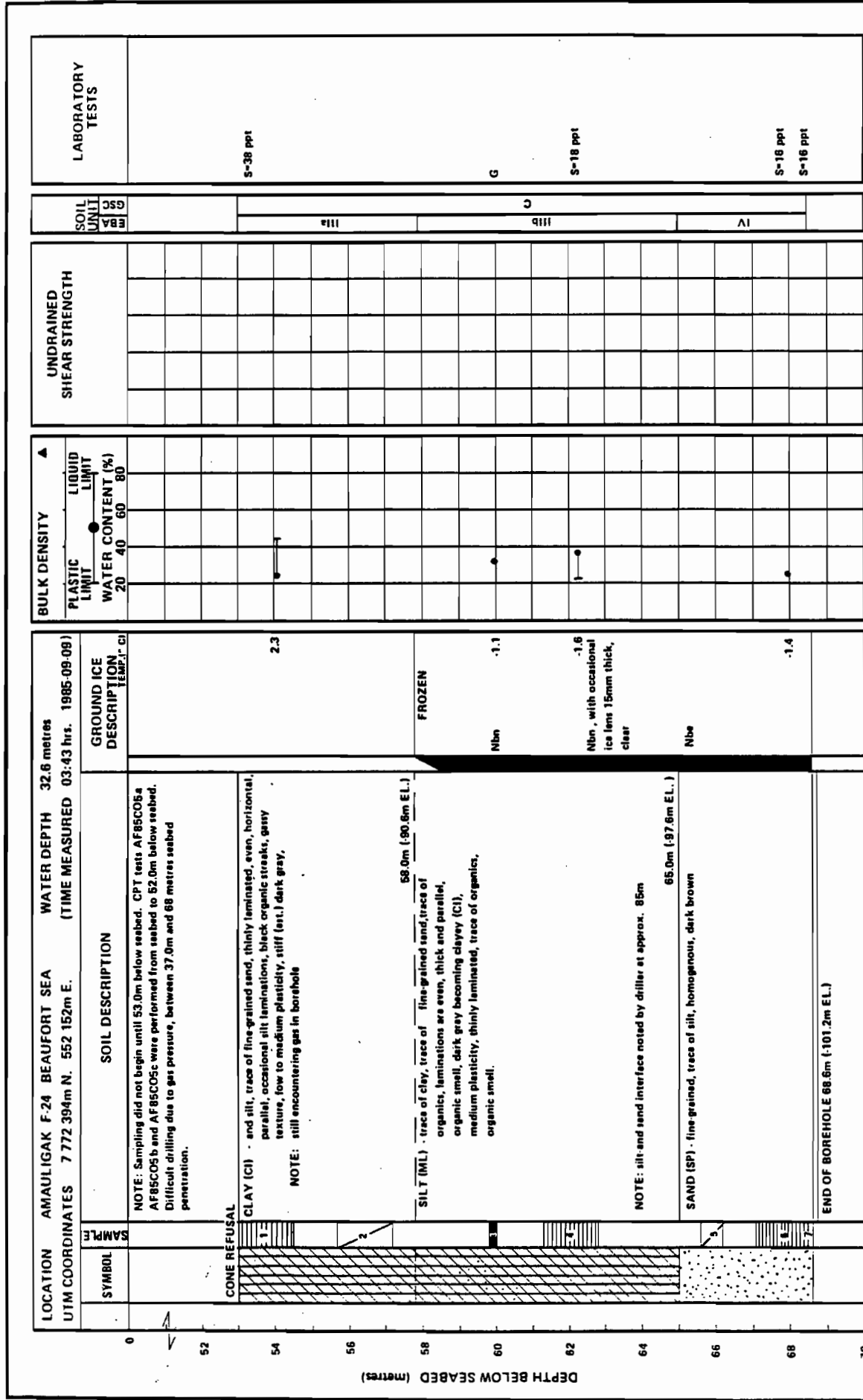
e.g. Thick bed  
Thickly spaced joint

e.g. Thin lamina  
Thinly spaced fissures

(After Campbell, 1967)

(Modified after Ingram, 1954  
and Campbell, 1967)

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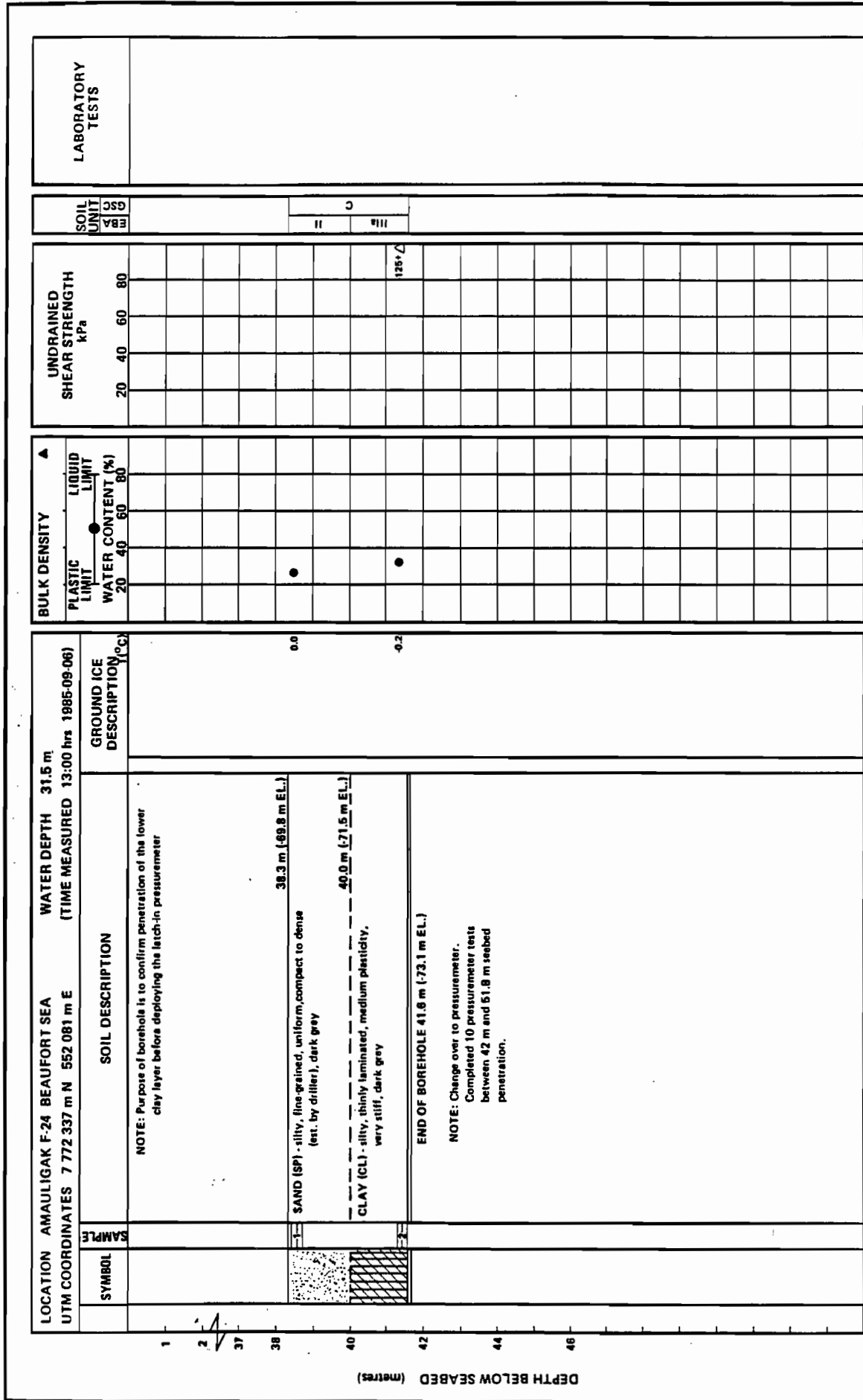
PROJECT NUMBER 101C-4418	SOIL SYMBOLS	SAMPLE TYPE	SHEAR STRENGTH	TEST IDENTIFICATION	BOREHOLE NUMBER AF85S05
DRILLING COMPLETED 1985-09-04	Gravel Silt Clay	Thin Wall Tube Split Spoon Core Disturbed No Recovery	UU Triaxial Mini Vane Fall Cone Picon Vane In Situ Vane	C Consolidation TS Thaw Strain DS Direct Shear DSS Direct Simple Shear	PAGE 1 OF 1
TERMINATION DEPTH 68.6m (-101.2m EL.)				T Triaxial Shear S P.W. Salinity G Gas Analysis	
DRILLING RIG SIMCO 5000/KIGGI/AK					
LOG COMPILED BY TRM/MDW					



AMAULIGAK F-24

BORFHOIF LOG AND LABORATORY TEST RESULTS

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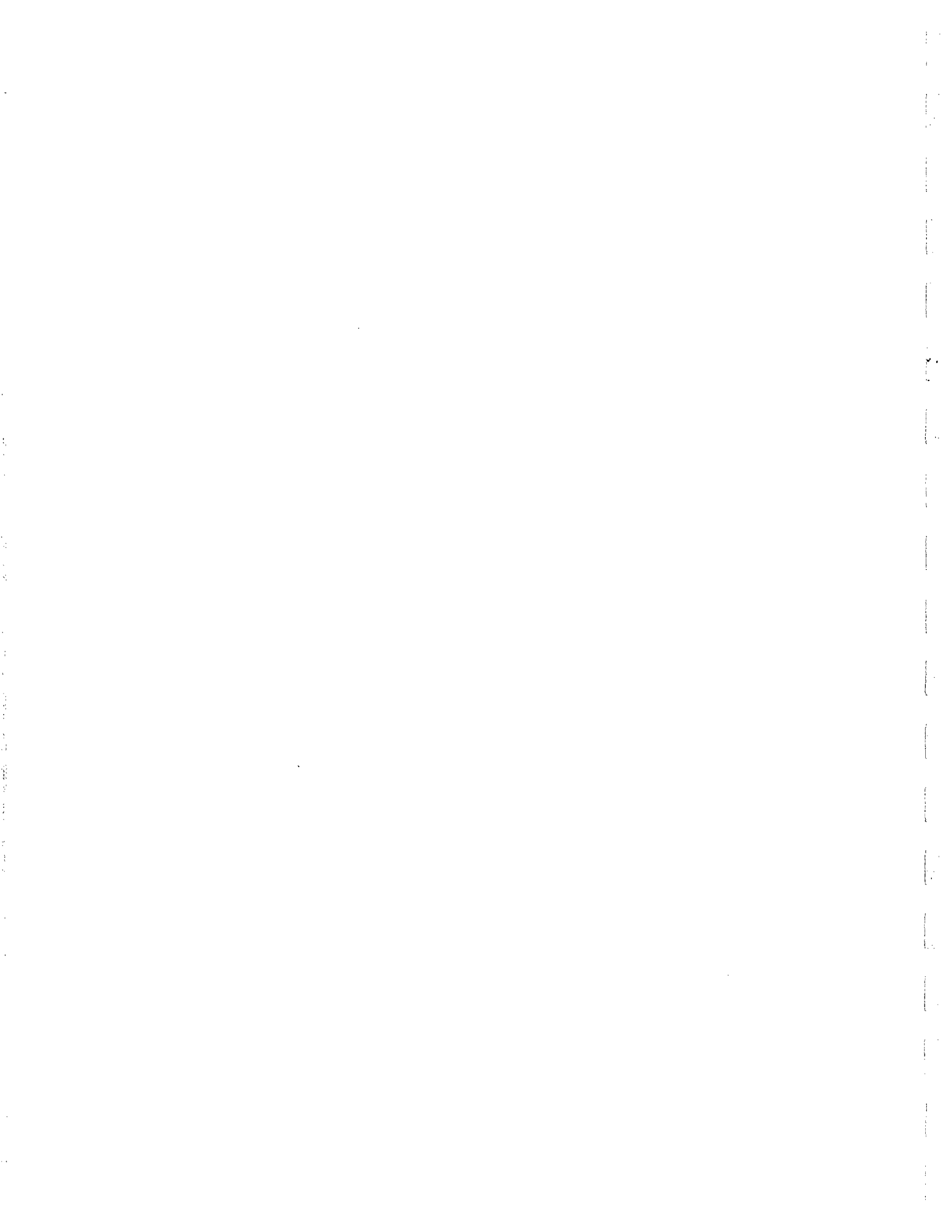


PROJECT NUMBER 101C-4416 DRILLING COMPLETED 1985-09-07 TERMINATION DEPTH 41.6 m (-73.1 m EL.) DRILLING RIG SIMCO/5000/KIGGIAK LOG COMPILED BY TRM	SOIL SYMBOLS Gravel Sand Silt Clay	SAMPLE TYPE Thin Wall Tube Split Spoon Liner Core Disturbed No Recovery	SHEAR STRENGTH + Torvane x Mini Vane △ Picon Vane ◇ In Situ Vane ▲ UU Triaxial ▽ Fall Cone	TEST IDENTIFICATION C Consolidation TS Thaw Strain DS Direct Shear DSS Direct Simple Shear T Triaxial Shear S P.W. Salinity G Gas Analysis	BOREHOLE NUMBER AF85S06 PAGE 1 OF 1
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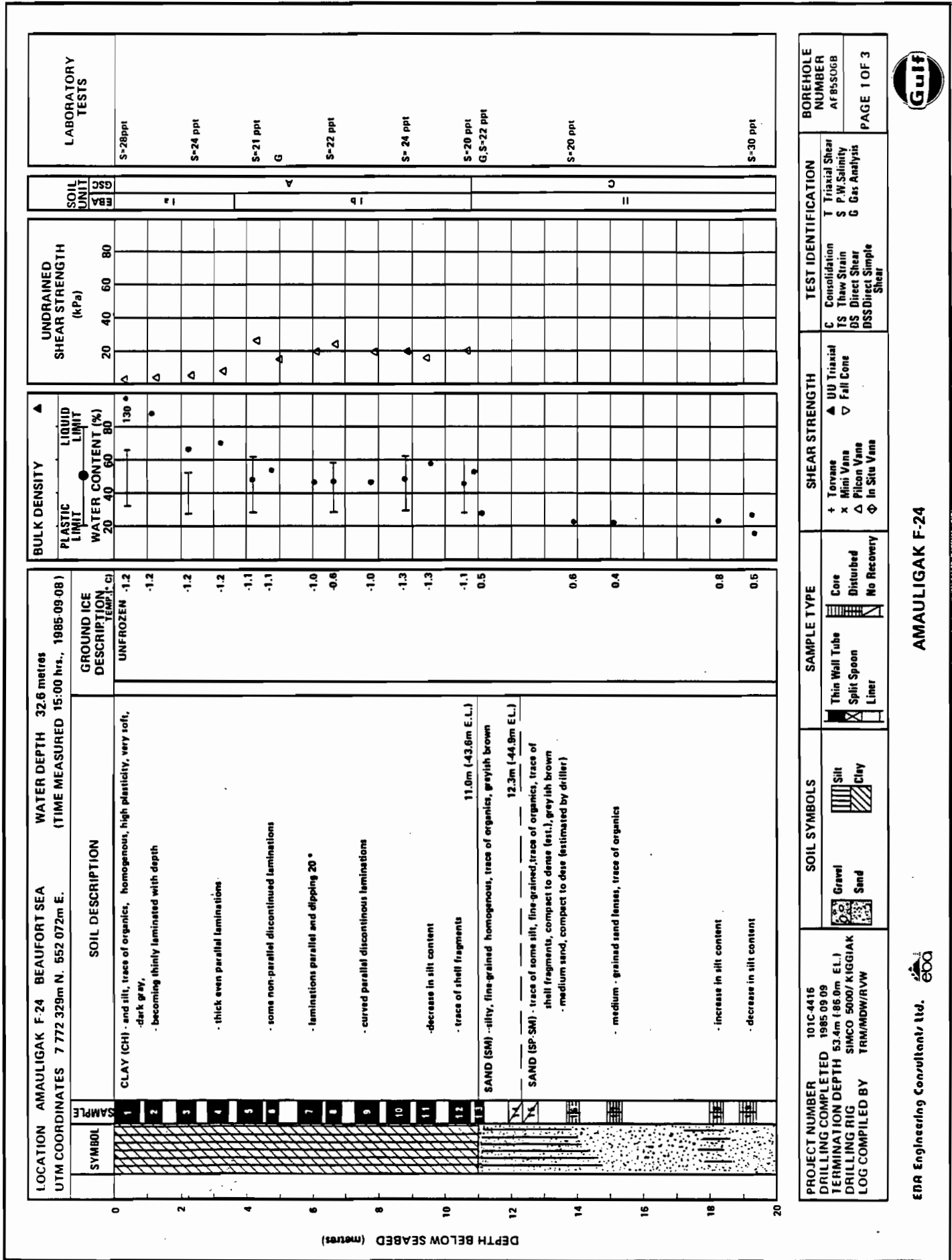


AMAULIGAK F-24

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AMAULIGAK F-24

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BOREHOLE LOG AND LABORATORY TEST RESULTS

PROJECT NUMBER 101C-4416	SOIL SYMBOLS Gravel, Sand, Silt, Clay	SAMPLE TYPE Thin Wall Tube, Split Spoon, Liner, Core, Disturbed, No Recovery	SHEAR STRENGTH + Torvane, x Mini Vane, Δ Picon Vane, ◊ In Situ Vane	TEST IDENTIFICATION C Consolidation, TS Thaw Strain, DS Direct Shear, DSS Direct Simple Shear, T Triaxial Shear, S P.W. Salinity, G Gas Analysis	BOREHOLE NUMBER AFB50GB
DRILLING COMPLETED 1985 09 09	TERMINATION DEPTH 53.4m (186.0m E.L.)	DRILLING RIG SIMCO 5000/ KIGGIK	LOG COMPILED BY TRM/MOW/RVW		PAGE 1 OF 3



LOCATION		AMALIGAK F-24 BEAUFORT SEA		WATER DEPTH 32.6 metres						
UTM COORDINATES		7 772 329m N. 552 072m E.		(TIME MEASURED 15:00 hrs. 1985 09 08)						
SYMBOL	SAMPLE	DEPTH BELOW SEABED (metres)	SOIL DESCRIPTION	GROUND ICE DESCRIPTION TEMP. (C.G.)	BULK DENSITY		UNDRAINED SHEAR STRENGTH (kPa)		SOIL UNIT	LABORATORY TESTS
					PLASTIC LIMIT	LIQUID LIMIT	20	40		
		20								
		21	SAND (SP-SM) - trace to some silt, (fine-grained), trace of gravel with occasional seams of medium-grained sand, homogenous, dense (est.), brownish gray	-1.7						S-20 ppt
		22	(SM) - becoming fine-grained with higher silt content @ 21.0m	3.0						S-20 ppt
		24	(SP) - predominantly medium-grained sand with a trace of silt.							S-20 ppt
		26	- gravelly, 30mm max. diameter, rounded to subangular, clayey silt matrix around gravel							S-20 ppt
		28	DRILLERS NOTE: Higher gravel content throughout this zone, larger diameter becoming finer-grained, gravel 40mm max. diameter, - rounded to subangular, dense (est.)							S-20 ppt
		30								S-20 ppt
		32								S-20 ppt
		34	- gravelly, trace of silt (SP-SM)							S-20 ppt
		36	NOTE: Top of clay determined from drillers observation 36.3m (-69.9m EL.)							S-20 ppt
		38	CLAY (CI-CH) - end silt, thinly laminated, horizontal, even, continuous parallel, black organic streaks, occasional fine-grained sand seams near top of layer, medium plasticity, stiff, gray							S-20 ppt
		39		1.8						S-19 ppt
		30		1.8						G
		31		1.6						S-27 ppt

PROJECT NUMBER 101-4416	SOIL SYMBOLS Gravel Sand Silt Clay	SAMPLE TYPE Thin Wall Tube Split Spoon Liner Core Disturbed No Recovery	SHEAR STRENGTH + Torvans x Mini Vane △ Picon Vane ◇ In Situ Vane	TEST IDENTIFICATION C Consolidation TS Thaw Strain DS Direct Shear DSS Direct Simple Shear	BOREHOLE NUMBER AF85S06B
DRILLING COMPLETED 1985-09-09					PAGE 2 OF 3
TERMINATION DEPTH 53.4m (166.0m EL.)					
DRILLING RIG SIMCO/5000/KIGGIAK					
LOG COMPILED BY MDW/TRM/RVW					



AMALIGAK F-24

EBA Engineering Consultants Ltd. eba

BOREHOLE LOG AND LABORATORY TEST RESULTS



LOCATION		AMAULIGAK F-24 BEAUFORT SEA		WATER DEPTH 32.6 metres	
UTM COORDINATES		7 772 329m N. 552 072m E.		(TIME MEASURED 15:00 hrs. 1985-09-08)	
DEPTH BELOW SEABED (metres)	SYMBOL	SAMPLE	SOIL DESCRIPTION	GROUND ICE DESCRIPTION (TEMP. °C)	
				UNFROZEN	FROZEN
40		31	CLAY (CI) - and silt, thinly laminated, laminations even, parallel, gassy texture, low to medium plasticity, stiff, dark grey	1.6	
42		32		2.3	
44		33	Increase in silt content	1.5	
46		34		0.8	
48		35		0.9	
50		36		0.8	
52		37		0.5	
54		38	very stiff becoming of high plasticity, decrease in silt content	0.0	
56		39		1.4	
58		40		0.8	
60		41		-0.5	
		42		0.4	
		43	Interbedded layers of clayey silt and silty fine-grained sand, thick laminations, even, parallel, trace of organics and shells 51.9m (-94.5m E.L.)	0.4	
		44	SILT (ML & OL) - clayey, sandy, fine-grained sand laminations, highly organic, trace of shell fragments, low plasticity, dark greyish / black	-1.5	
		45		-1.0	
		46	Increase in fine-grained sand content		
			END OF BOREHOLE 53.4m (-86.3m E.L.)		

UNDRAINED SHEAR STRENGTH (kPa)	BULK DENSITY		LABORATORY TESTS
	PLASTIC LIMIT	WATER CONTENT (%)	
20			S-27 ppt
40			G.S -26 ppt
60			S-18 ppt
80			S-20 ppt
			G.S -24 ppt
			S-27 ppt
			S-22 ppt
			S-26 ppt
			S-34 ppt

PROJECT NUMBER 101C-4266	SOIL SYMBOLS	SAMPLE TYPE	SHEAR STRENGTH	TEST IDENTIFICATION	BOREHOLE NUMBER
DRILLING COMPLETED 1985-09-09	Gravel Silt Sand Clay	Thin Wall Tube Split Spoon Liner	+ Torvex x Mini Vane Δ Picon Vane ◇ In Situ Vane	C Consolidation TS Thaw Strain DS Direct Shear DSS Direct Simple Shear	AF85S06B
TERMINATION DEPTH 53.4m (-86.0m E.L.)		Core Disturbed No Recovery	▲ UU Triaxial ▽ Fall Cone	T Triaxial Shear S P.W. Sat. Vane G Gas Analysis	PAGE 3 OF 3
DRILLING RIG SIMCO/5000/KIGGIKAK					
LOG COMPILED BY MDW/TRM/RVW					

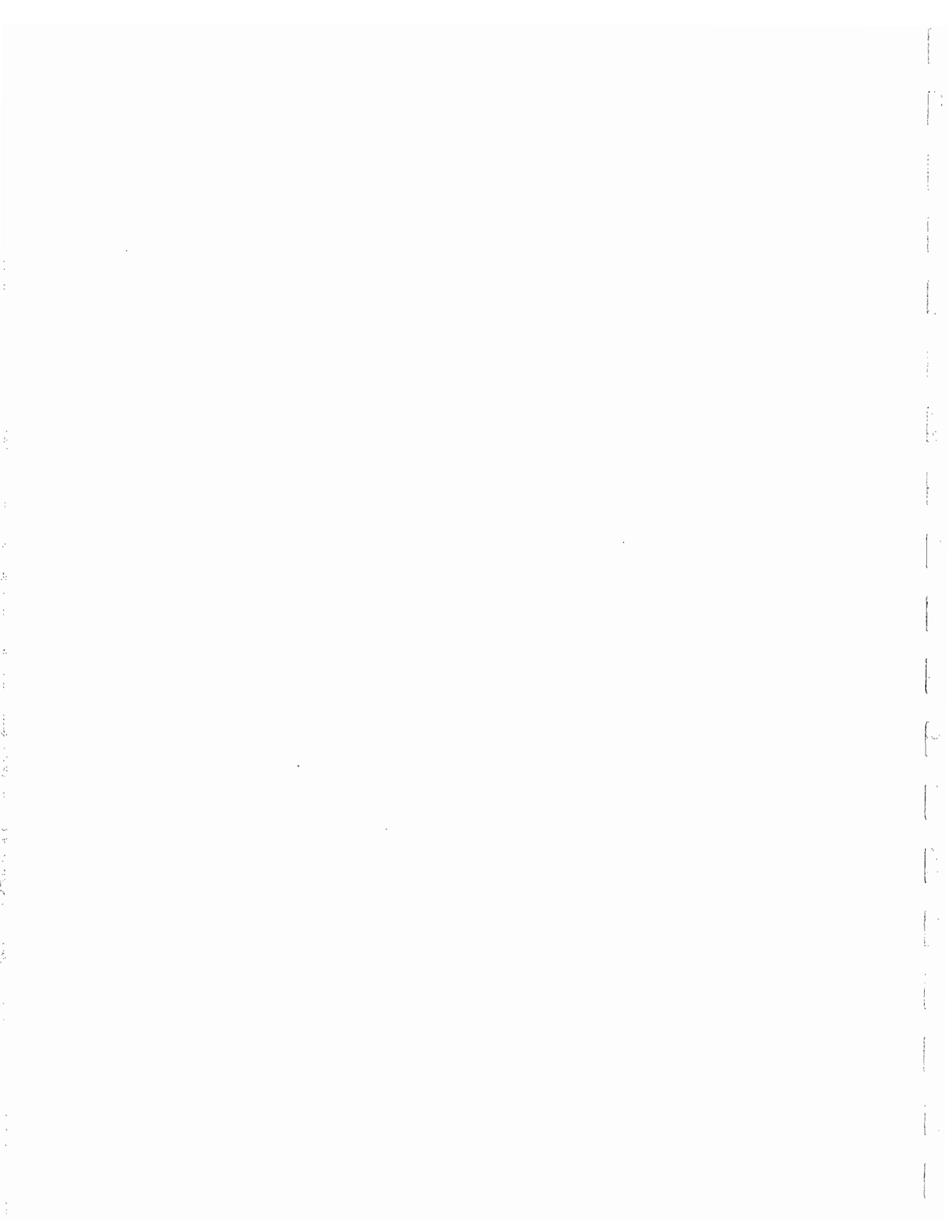


AMAULIGAK F-24

ENR Engineering Consultants Ltd.



BOREHOLE LOG AND LABORATORY TEST RESULTS

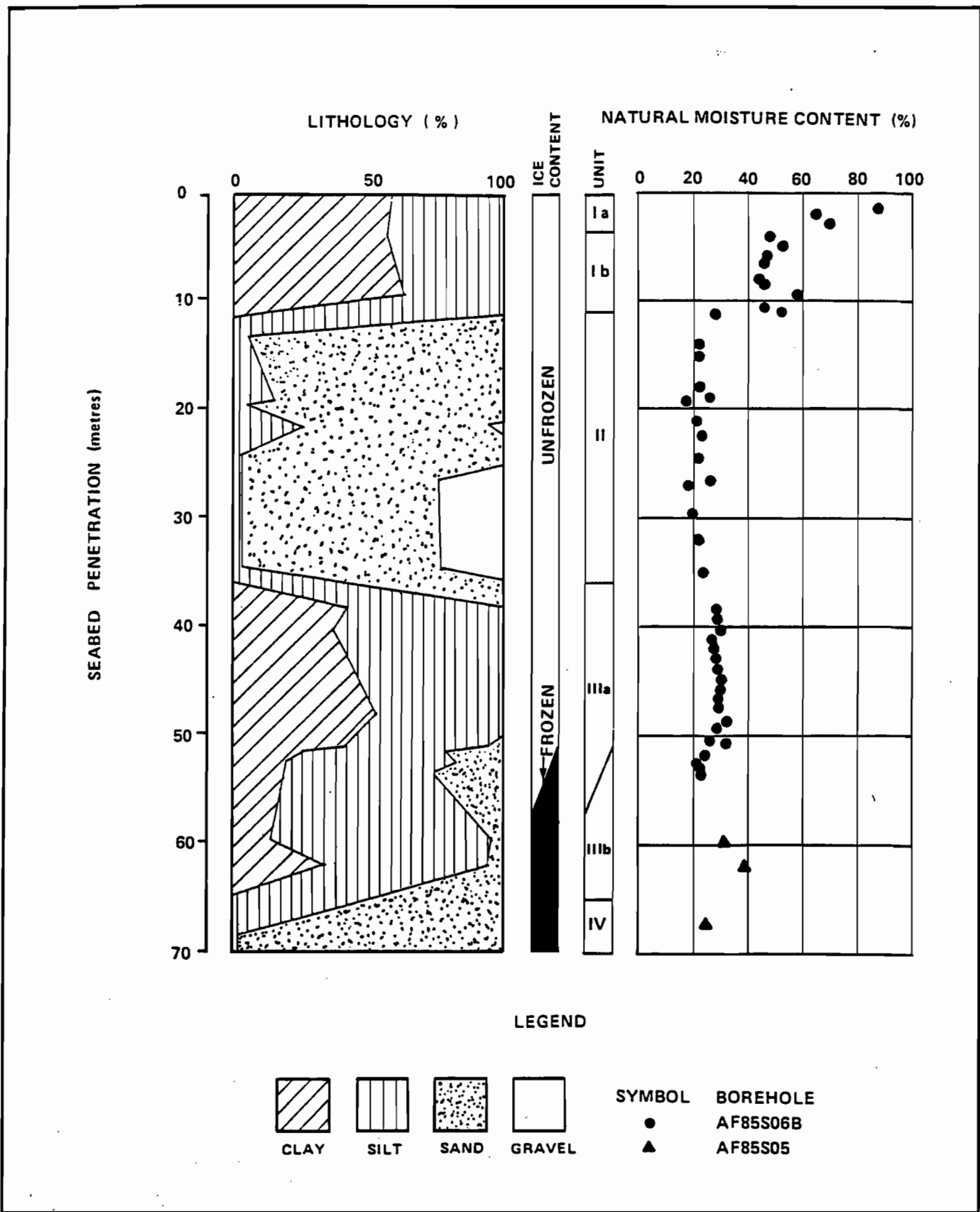


APPENDIX B

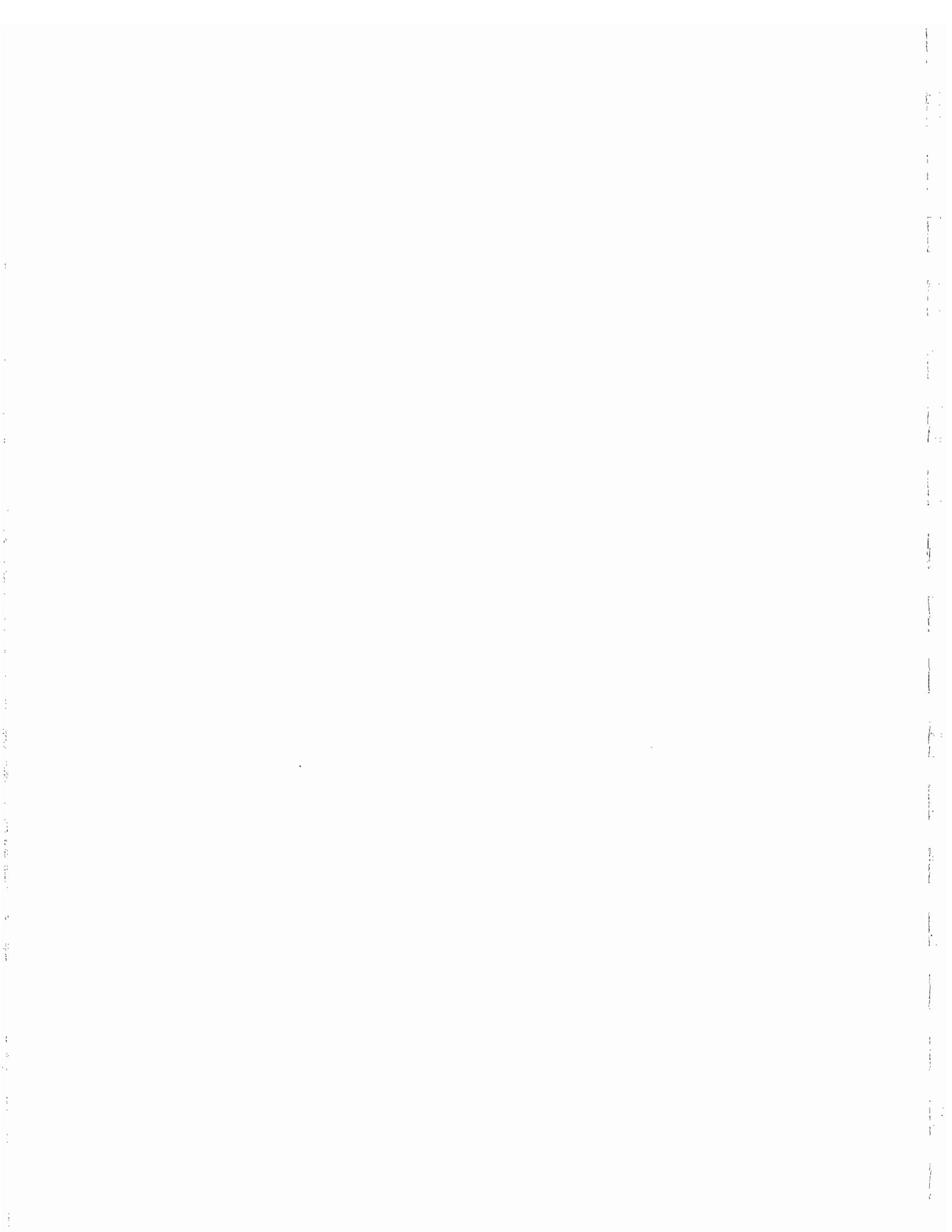
DIAGNOSTIC PROFILES

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**FIGURE C.1 NATURAL MOISTURE CONTENT PROFILE  
AMAULIGAK F-24 SITE**



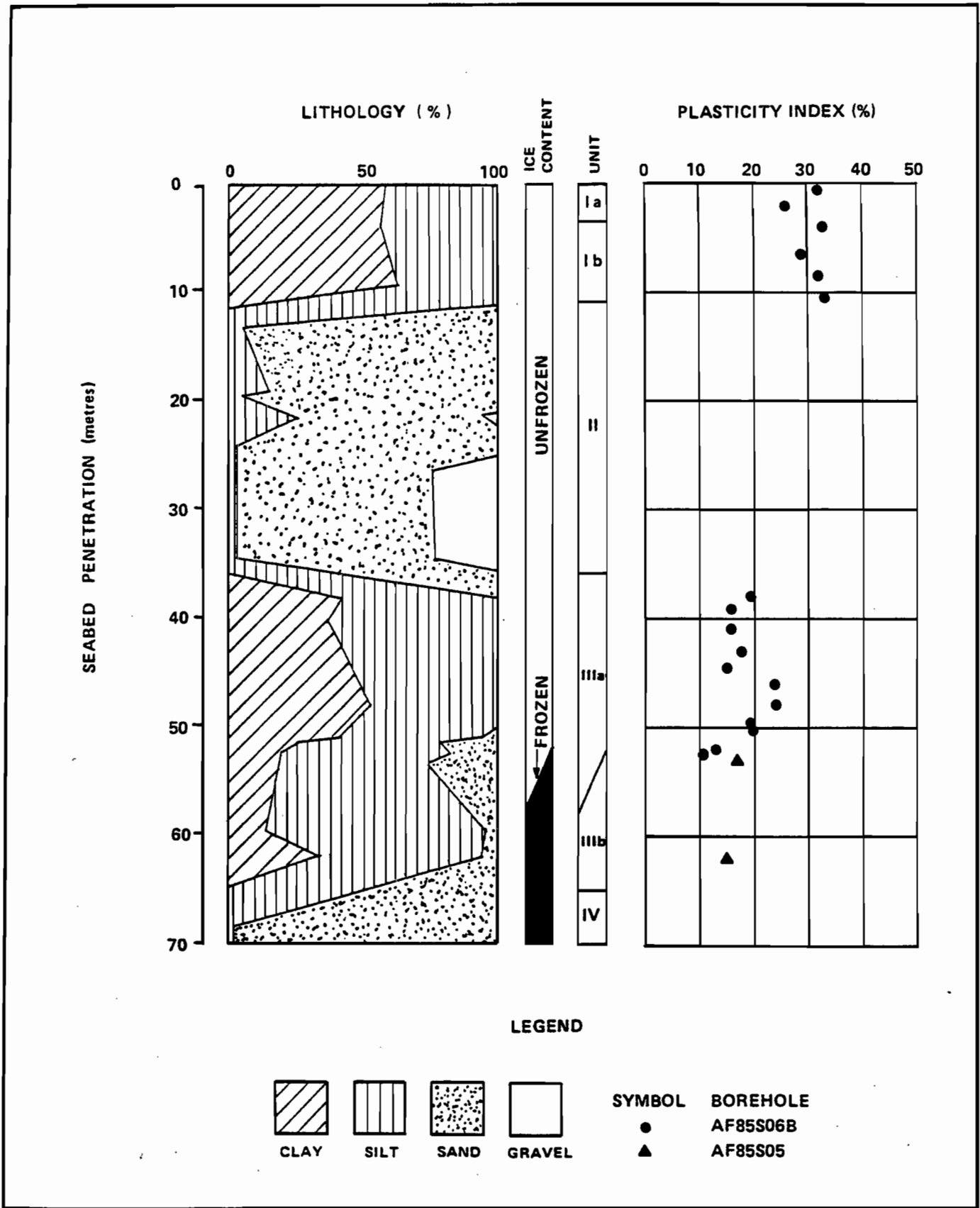


FIGURE C.2 PLASTICITY INDEX PROFILE  
AMAULIGAK F-24 SITE



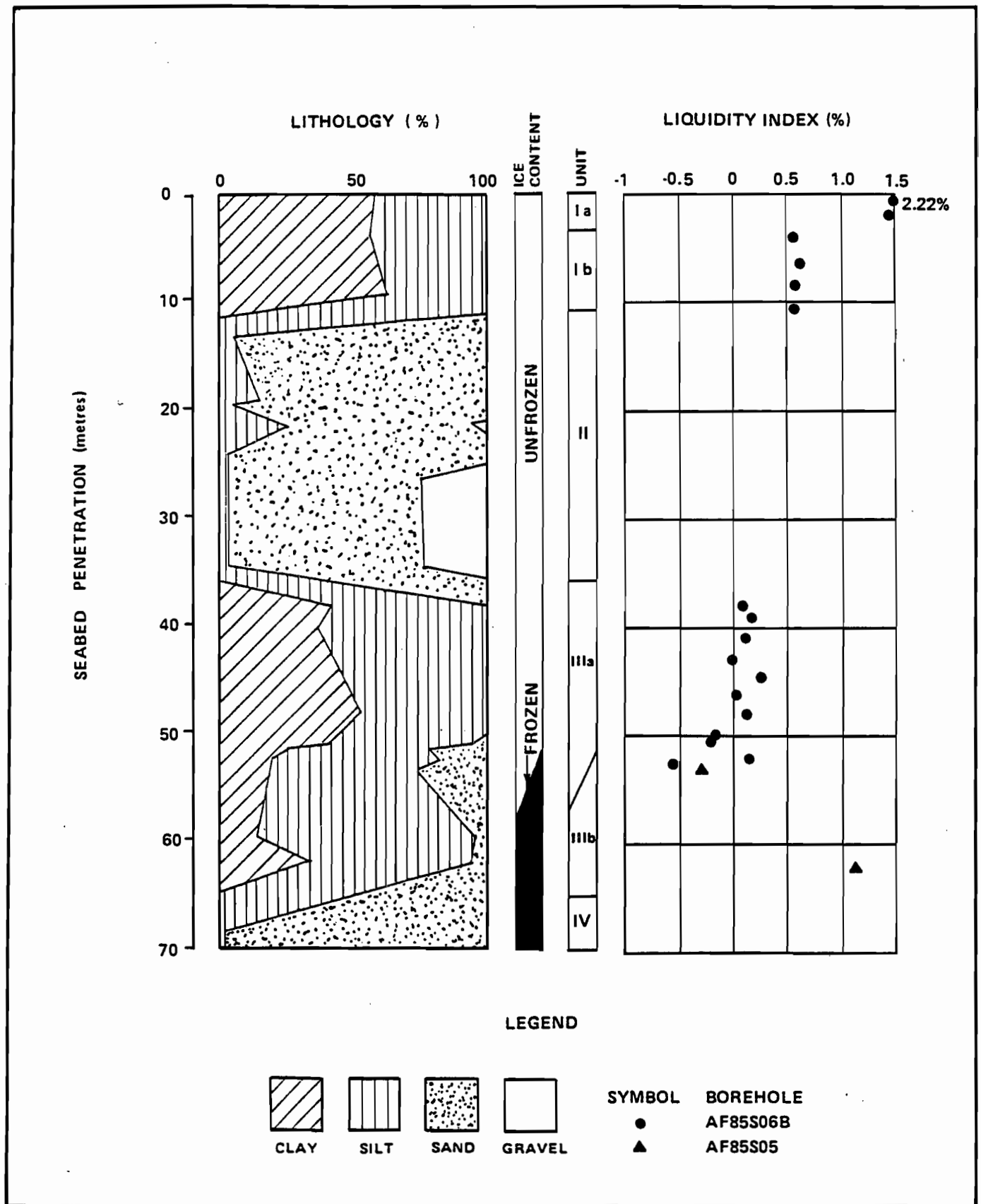
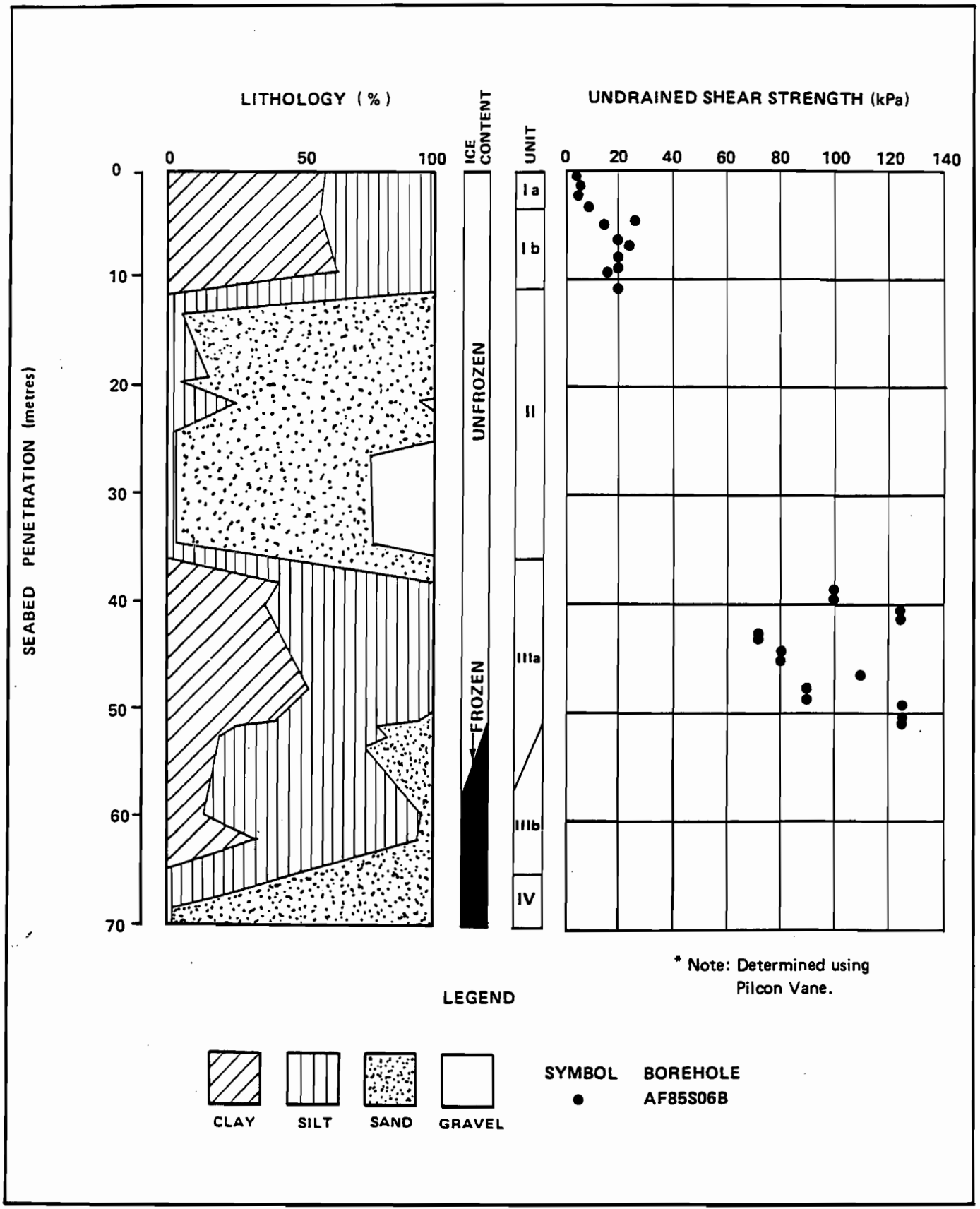


FIGURE C.3 LIQUIDITY INDEX PROFILE  
AMAULIGAK F-24 SITE

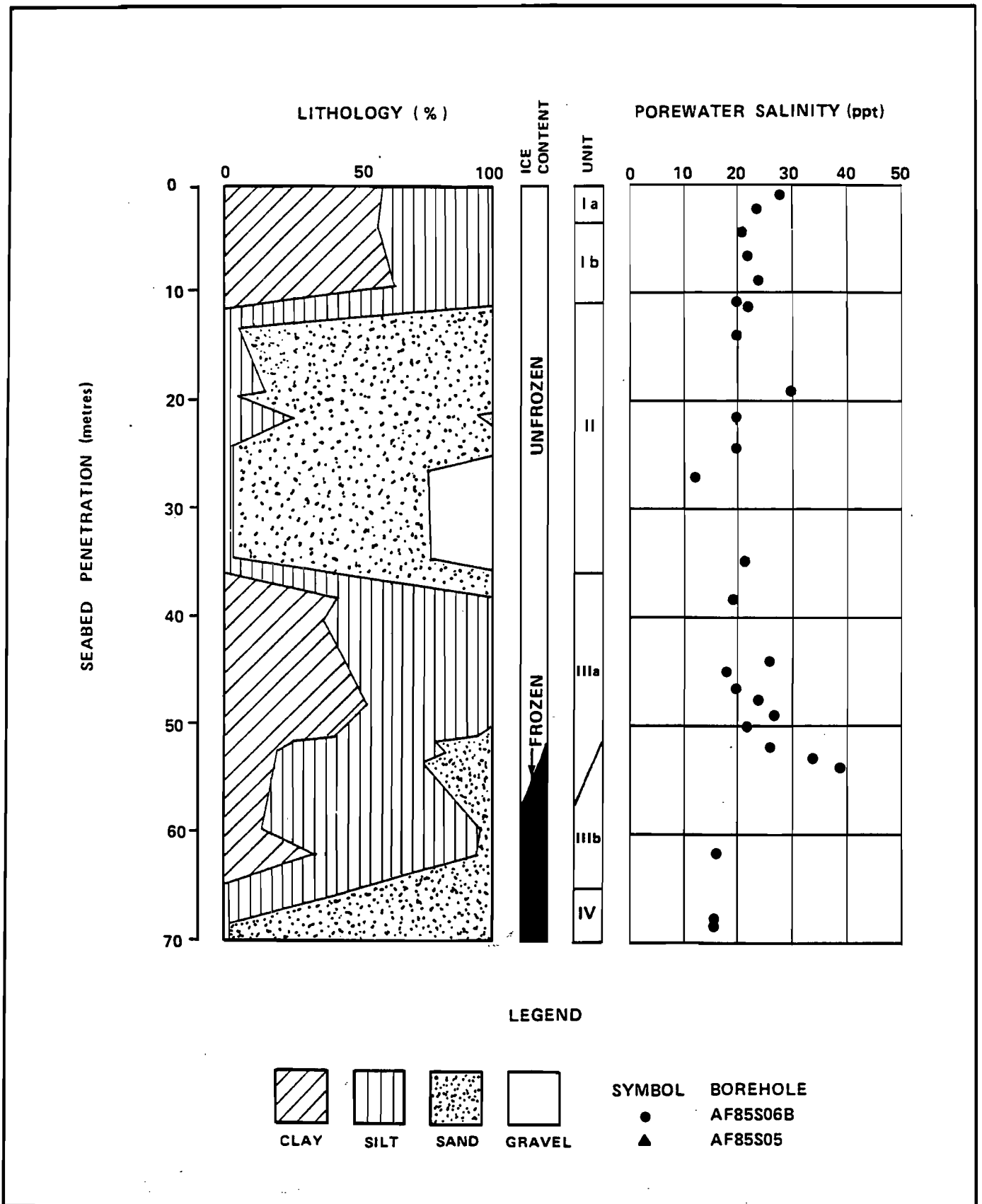




**FIGURE C.4 UNDRAINED SHEAR STRENGTH PROFILE AMAULIGAK F-24 SITE**







**FIGURE C.5 POREWATER SALINITY PROFILE  
AMAULIGAK F-24 SITE**



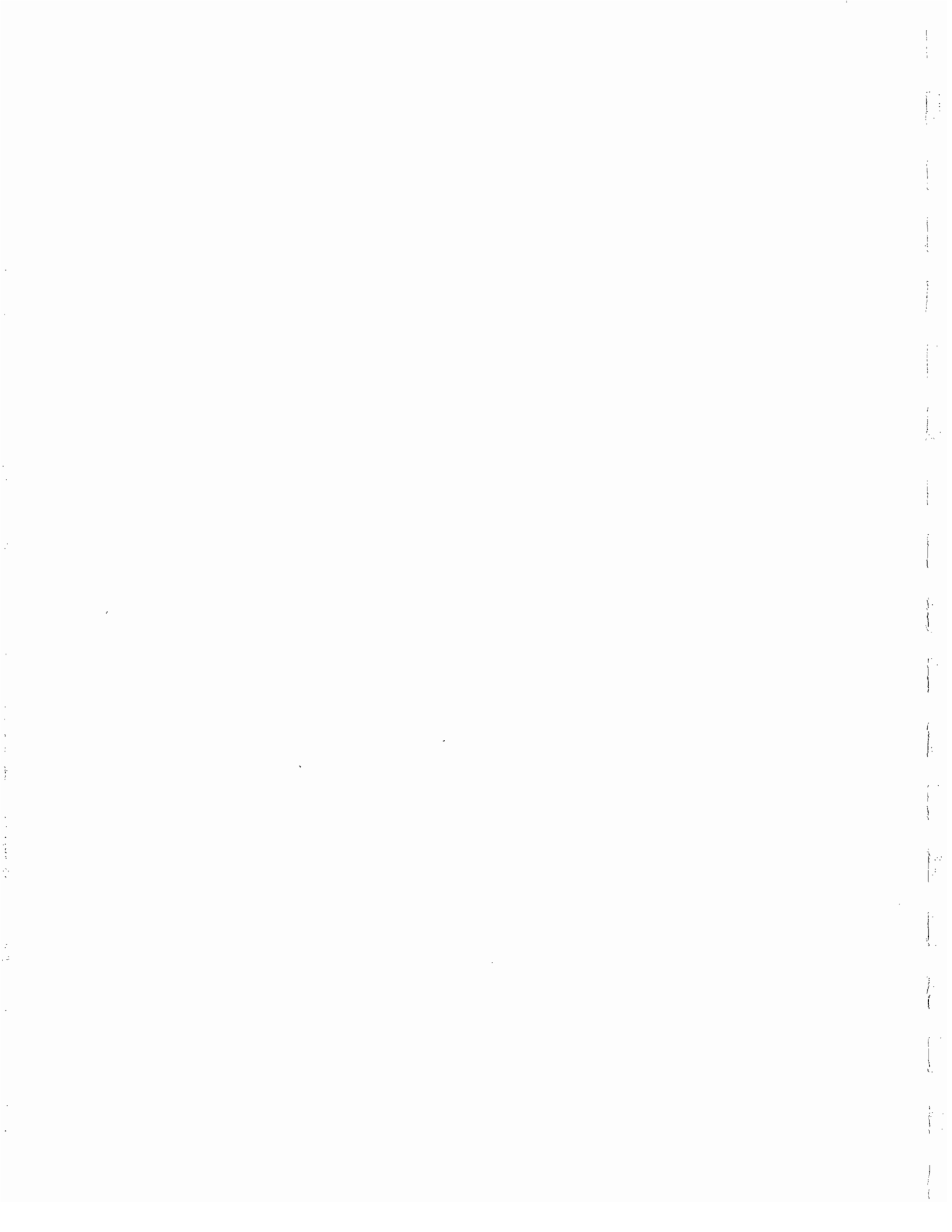
APPENDIX C

SUMMARY OF LABORATORY TESTING

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AMAULIGAK F-24

BOREHOLE AF85S05



**SUMMARY OF TEST RESULTS**

Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Content (%)	Bulk Density (g/cm³)	GRAIN SIZE DISTRIBUTION					SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST RESULTS SEPARATELY TABULATED		
									Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency		P <sub>0</sub>	P <sub>c</sub>
1A	B	53.0 - 54.5	ML&OL		2.3	22															S=38ppt	
2	NR	55.7																				
3A	B	59.8 - 60.0		Nbn	-1.1	31				8	89	3										
4A	C	61.3 - 62.8		llbn	-1.6																	S=18ppt
4B	B	61.3 - 62.8	CI			39																
4C	G	61.3 - 62.8								33	61	6										
5	NR	65.5																				
6A	C	67.1 - 68.6		Nbe	-1.4																	S=16ppt
6B	B	67.1 - 68.6	SP			25																
7A	B	68.6 - 68.7		Nbe																		S=16ppt
END OF BOREHOLE																						

**GULF CANADA RESOURCES  
1985 OFFSHORE SITE INVESTIGATION  
AMAULICAK F-24  
BOREHOLE AF85S05**

**LEGEND AND NOTES**

B - Bag Sample  
G - Gas Sample  
L - Liner Sample  
P - Piston Sample  
NR - No Recovery  
NS - No Sample Remaining

C - Frozen Core  
PW - Porewater Sample  
T - Sample Stored in Tube  
W - Washed Sample  
RC - Radioactive sample

MV - Miniature  
FC - Fall Cone  
TV - Torvane  
PV - Picon Vane  
RV - Remote Vane

UU - Unconsolidated Undrained Triaxial  
UU<sub>p</sub> - UU Triaxial with Pore Pressure Measurements  
CU - Consolidated Undrained Triaxial  
CU<sub>p</sub> - CU Triaxial with Pore Pressure Measurements  
CD - Consolidated Drained Triaxial

O - Organic Content  
S - Salinity  
TS - Thaw Strain  
SG - Specific Gravity

Project Number: 101C-4416  
Reviewed By: T.R. Murphy  
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AMAULIGAK F-24

BOREHOLE AF85S06

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### SUMMARY OF TEST RESULTS

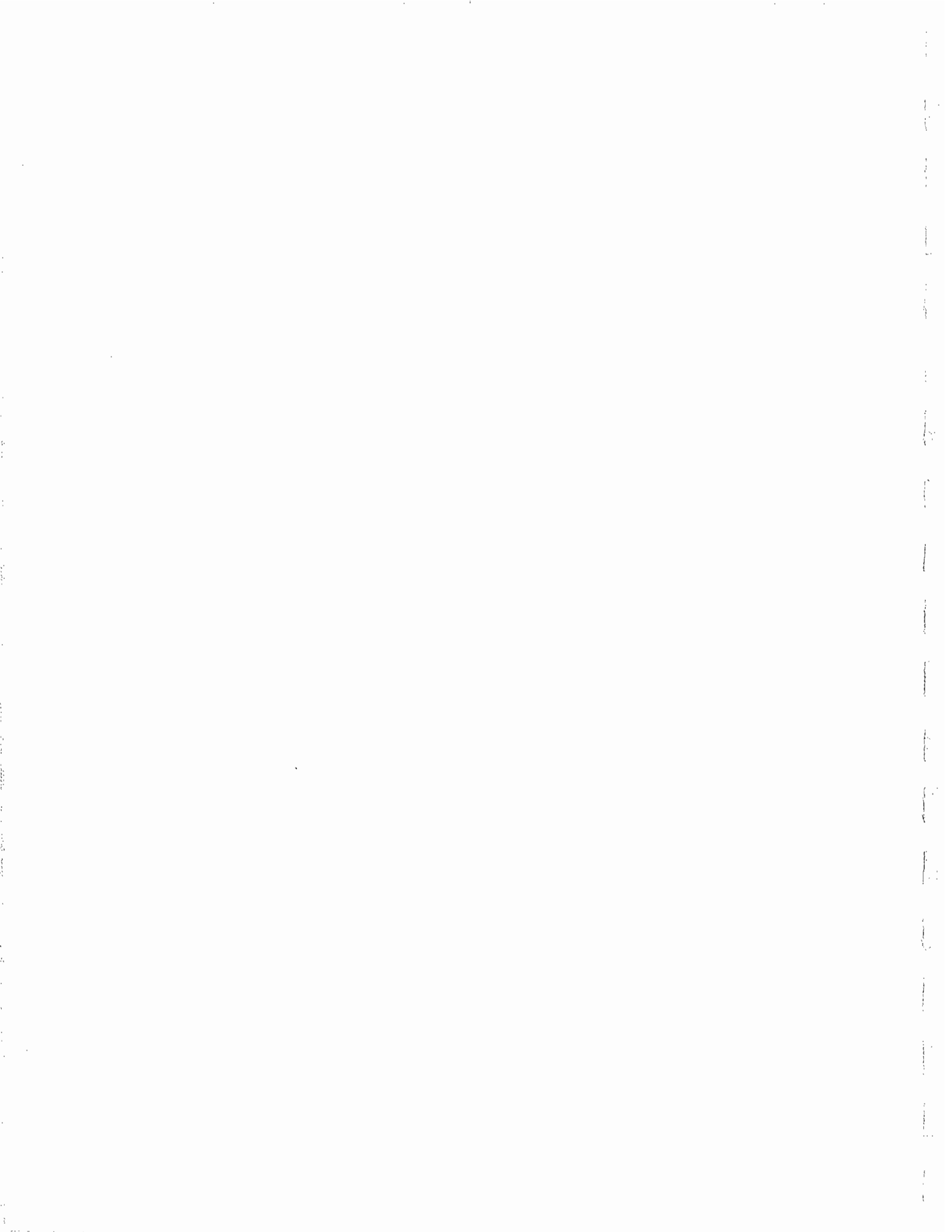
Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture (%)	Frozen Moisture (%)	Bulk Density	ATTENBERG LIMITS					GRAIN SIZE DISTRIBUTION				SHEAR STRENGTH				CONSOLIDATION CHARACTERISTICS			TEST TABLETS								
									Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	P <sub>0</sub>	P <sub>c</sub>	C <sub>c</sub>											
				DRILL-OUT TO THIS DEPTH																													
1A	B	38.3 - 38.7	SM		0.0	27																											
2A	B	41.3 - 41.6	CL		-0.2	31																											
2B	G	41.3 - 41.6	CL																														
PERFORM PRESSUREMETER TESTS IN CLAY LAYER																																	

**GULF CANADA RESOURCES**  
**1985 OFFSHORE SITE INVESTIGATION**  
**AMAULIGAK F-24**  
**BOREHOLE AF85S06**

**LEGEND AND NOTES**  
 B Bag Sample  
 G Gas Sample  
 L Liner Sample  
 P Piton Sample  
 NH No Recovery  
 NS No Sample Remaining  
 C Frozen Core  
 PW Porewater Sample  
 T Sample Stored in Tube  
 W Washed Sample  
 TIC Radioactive sample  
 MV Minivane  
 FC Fall Cone  
 TV Torvane  
 PV Piton Vane  
 HV Hamate Vane  
 UU Unconsolidated Undrained Triaxial  
 UU<sub>p</sub> UU Triaxial with Pore Pressure Measurements  
 CU Consolidated Undrained Triaxial  
 CU<sub>p</sub> CU Triaxial with Pore Pressure Measurements  
 CD Consolidated Drained Triaxial  
 O Organic Content  
 S Salinity  
 TS Thaw Strain  
 SG Specific Gravity

Project Number: 101C-94115      Reviewed By: T.R. Murphy      P.Eng.  
 Page 1 of 1





AMAULIGAK F-24

BOREHOLE AF85S06B



**SUMMARY OF TEST RESULTS**

Sample Number	Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density	GRAIN SIZE DISTRIBUTION					SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST RESULTS SEPARATELY TABULATED				
									Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency		P <sub>0</sub>	P <sub>c</sub>	C <sub>c</sub>	
1A	B	0.00 - 0.70	CH		-1.3	103			64	32	56	41	1	-		PV	4		V. Soft				S=28ppt	
1B	T	0.00 - 0.70																						
2A	B	0.90 - 1.40			-1.2	88										PV	5		V. Soft					
2B	T	0.90 - 1.40																						
3A	B	1.83 - 2.40	CH		-1.2	65			53	27						PV	5		V. Soft					S=24ppt
3B	T	1.83 - 2.40																						
4A	B	2.74 - 3.39			-1.2	70										PV	9		V. Soft					
4B	T	2.74 - 3.39																						
5A	B	3.66 - 4.41	CH		-1.1	48			62	29	57	43	-	-		PV	26		Firm					S=24ppt
5B	T	3.66 - 4.41																						SG=2.75
6A	B	4.57 - 4.89			-1.1	53										PV	15		Soft					
6B	G	4.57 - 4.89																						
7B	T	5.49 - 6.25			-1.0	47										PV	20		Soft					

**LEGEND AND NOTES**

B - Bag Sample  
 G - Gas Sample  
 L - Liner Sample  
 P - Piston Sample  
 NR - No Recovery  
 NS - No Sample Remaining

C - Frozen Core  
 PW - Porowater Sample  
 T - Sample Stored in Tube  
 W - Waxed Sample  
 RC - Radiocarbon sample

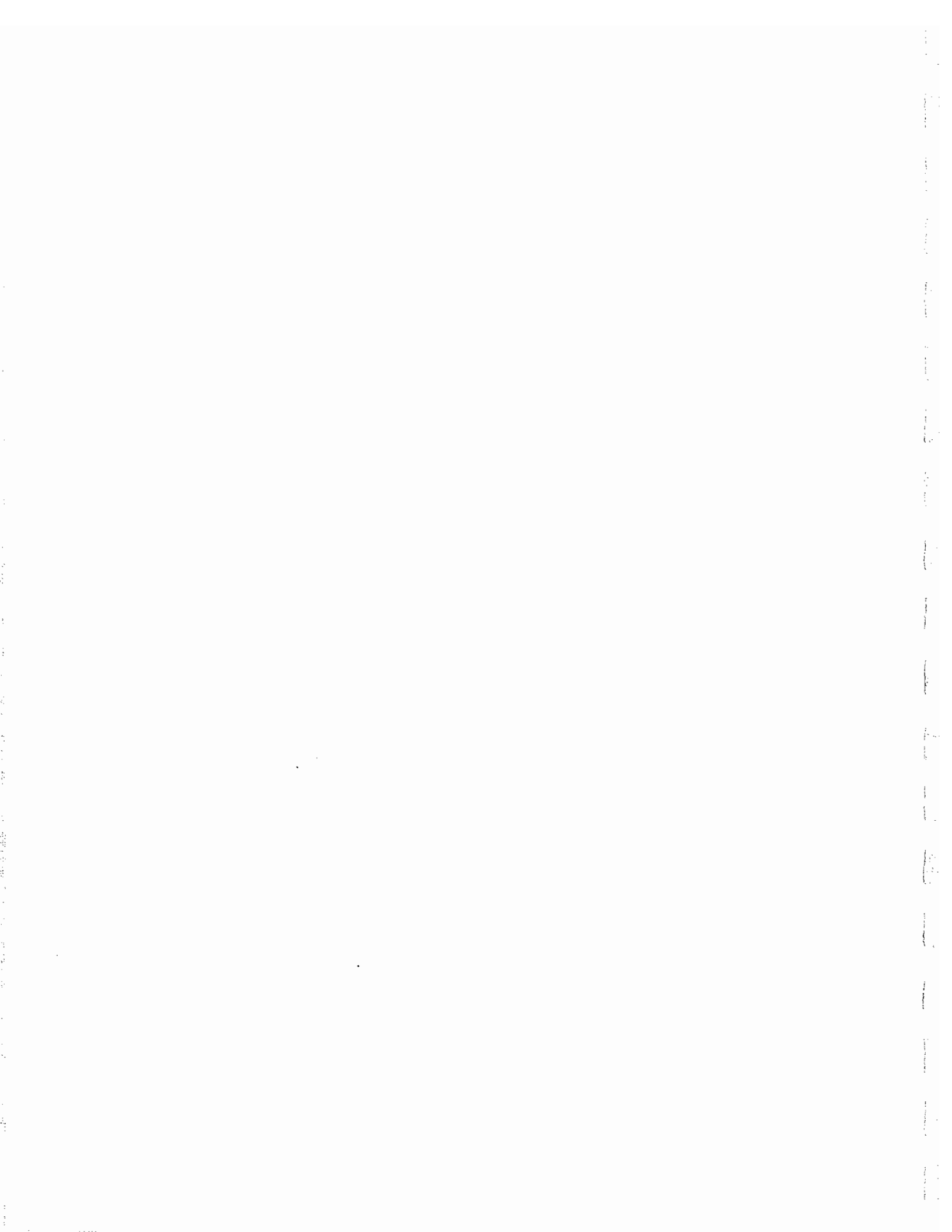
MV - Minivane  
 FC - Fall Cone  
 TV - Torvane  
 PV - Pilon Vane  
 RV - Remote Vane

UU - Unconsolidated Undrained Triaxial  
 UUp - UU Triaxial with Pore Pressure Measurements  
 CU - Consolidated Undrained Triaxial  
 CUp - CU Triaxial with Pore Pressure Measurements  
 CD - Consolidated Drained Triaxial

O - Organic Content  
 S - Salinity  
 TS - Thaw Strain  
 SG - Specific Gravity

GULF CANADA RESOURCES  
 1985 OFFSHORE SITE INVESTIGATION  
 AMAULIGAK F-24  
 BOREHOLE AF85S06B

Project Number: 101C-4416  
 Reviewed By: T.R. Murphy  
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Sample Number	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density	GRAIN SIZE DISTRIBUTION					SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST RESULTS PARALLEL TO STRATIFICATION							
								Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency		P <sub>o</sub>	P <sub>c</sub>	C <sub>c</sub>				
8A	B 6.40 - 6.85	CH		-0.6	46			57	28					PV	24						S=2ppt					
8B	T 6.40 - 6.85																									
9A	T 7.32 - 8.00																									
9B	B 7.32 - 8.00			-1.0	45									PV	20											
10A	T 8.23 - 8.90																									
10B	B 8.23 - 8.90			-1.3	48			61	29					PV	20									S=24ppt		
11A	T 9.10 - 9.70																									
11B	B 9.10 - 9.70				59					62	38			PV	16										SG=2.7H	
12A	T 10.10 - 10.80																									
12B	B 10.10 - 10.80	CH		-1.1	46			60	27					PV	20										S=20ppt	
13A	B 10.90 - 11.00			0.5	52																				S=22ppt	
13B	B 11.00 - 11.10				28																					
13C	C 10.90 - 11.10																									
14	NR 11.90																									
15	NR 12.80																									

**LEGEND AND NOTES**  
 C - Frozen Core  
 PW - Porewater Sample  
 T - Sample Stored in Tube  
 W - Washed Sample  
 RC - Radiocarbon sample  
 NS - No Sample Remaining  
 MV - Miniature  
 FC - Fall Cone  
 TV - Torvane  
 PV - Plicon Vane  
 RV - Remote Vane  
 UU - Unconsolidated Undrained Triaxial Pressure Measurements  
 CU - Consolidated Undrained Triaxial Pressure Measurements  
 CD - Consolidated Drained Triaxial Pressure Measurements  
 O - Organic Content  
 S - Salinity  
 TS - Thaw Strain  
 SG - Specific Gravity

**GULF CANADA RESOURCES**  
 1985 OFFSHORE SITE INVESTIGATION  
 ANAULIGAK F-24  
 BOREHOLE AF85S06B



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**SUMMARY OF TEST RESULTS**

Sample Number	Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	ATTERBERG LIMITS			GRAIN SIZE DISTRIBUTION				SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST RESULTS SPARATED LY	
								Bulk Density	Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	P <sub>0</sub>		P <sub>c</sub>
16A	B	13.70 - 14.00			0.6	22															S=20ppt	
17A	B	14.90 - 15.30			0.4	21																
18A	B	18.00 - 18.40			0.8	22																
19A	B	18.90 - 19.20	SM		0.5	26																S=30ppt
19B	B	19.20 - 19.40	SP			17																
20A	B	21.00 - 21.40	SM		1.7	21																S=20ppt
21A	B	21.90 - 22.50				23																SG=2.66
22A	B	24.10 - 24.50	SP		3.0	21																S=20ppt
23A	B	25.60 - 26.90				26																
24A	B	26.50 - 26.90	SP			18																S=12ppt
25	MR	28.70																				

**GULF CANADA RESOURCES**  
**1985 OFFSHORE SITE INVESTIGATION**  
**AMAULICAK F-24**  
**BOREHOLE AF85S06B**

**LEGEND AND NOTES**  
 C - Frozen Core  
 PW - Porewater Sample  
 T - Sample Stored in Tube  
 W - Washed Sample  
 RC - Radiocarbon sample  
 NS - No Sample Remaining  
 MV - Minivane  
 FC - Fall Cone  
 TV - Torvane  
 PV - Pitcon Vane  
 RV - Remote Vane  
 UU - Unconsolidated Undrained Triaxial  
 UU<sub>p</sub> - UU Triaxial with Pore Pressure Measurements  
 CU - Consolidated Undrained Triaxial  
 CU<sub>p</sub> - CU Triaxial with Pore Pressure Measurements  
 CD - Consolidated Drained Triaxial  
 O - Organic Content  
 S - Salinity  
 TS - Thaw Strain  
 SG - Specific Gravity

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**SUMMARY OF TEST RESULTS**

Sample Number	Sample Type	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground for Description (%)	Temp. (°C)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	GRAIN SIZE DISTRIBUTION				SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST RESULTS SEPARATELY				
									Bulk Density	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency		P <sub>o</sub>	P <sub>c</sub>	C <sub>c</sub>	
26A	R	29.60 - 29.90				20																	
27A	B	31.70 - 32.60				22																	
28A	B	34.80 - 35.00	SP			23			6	72	22										S=21ppt		
29A	T	37.80 - 38.60																				SG=2.74	
29B	B	37.80 - 38.60	CI		1.8	28	46	26	42	57	1											S=19ppt	
30A	T	38.70 - 39.40																					
30B	B	38.70 - 39.40	CI		1.8	29	42	26															
30C	G	38.70 - 39.40																					
31A	T	39.60 - 40.30																					
31B	B	39.60 - 40.30			1.6	30																	S=27ppt
32A	T	40.50 - 41.20																					
32B	B	40.50 - 41.20	CI		2.3	27	41	25	37	63													
33A	T	41.45 - 42.05																					
33B	B	41.45 - 42.05				28																	

**LEGEND AND NOTES**

B - Bag Sample  
 G - Gas Sample  
 L - Liner Sample  
 P - Piston Sample  
 NR - No Recovery  
 NS - No Sample Remaining

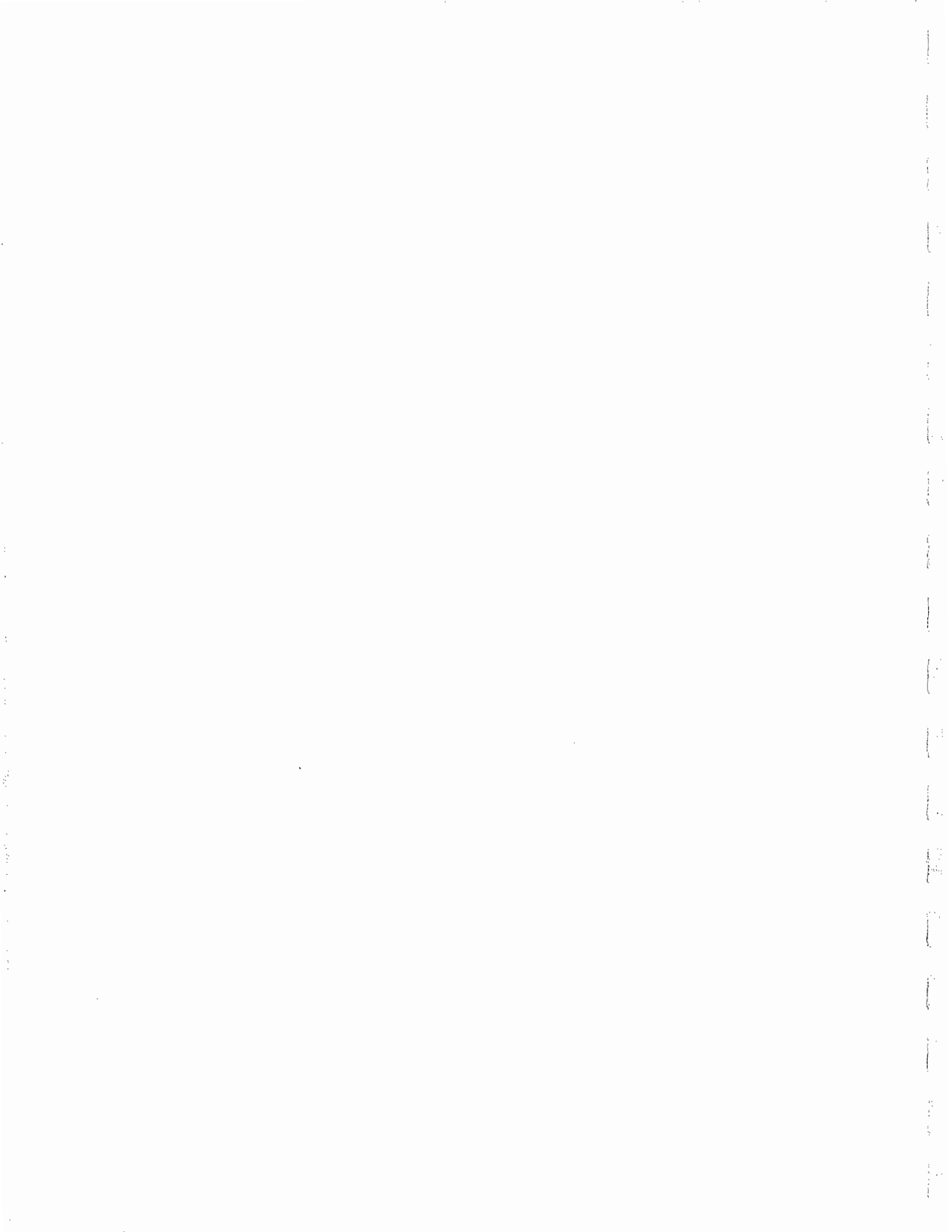
C - Frozen Core  
 PW - Porewater Sample  
 T - Sample Stored in Tube  
 W - Waxed Sample  
 RC - Radiocarbon sample

MV - Mini-vane  
 FC - Fall Cone  
 TV - Torvane  
 PV - Pileon Vane  
 RV - Remote Vane

UU - Unconsolidated Undrained Triaxial  
 UUp - UU Triaxial with Pore Pressure Measurements  
 CU - Consolidated Undrained Triaxial  
 CU<sub>p</sub> - CU Triaxial with Pore Pressure Measurements  
 CD - Consolidated Drained Triaxial

O - Organic Content  
 S - Salinity  
 TS - Thaw Strain  
 SG - Specific Gravity





**SUMMARY OF TEST RESULTS**

Sample Number	Type	Depth (meters) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	ATTERBERG LIMITS					GRAIN SIZE DISTRIBUTION				SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST METHOD															
								Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency	P <sub>0</sub>	P <sub>c</sub>	C <sub>c</sub>																	
33C	G	41.45 - 42.05																																				
34A	B	42.37 - 43.07	ML&OL		0.8	28																																
34B	T	42.37 - 43.07																																				
35A	T	43.28 - 43.78																																				
35B	B	43.28 - 43.78			0.9	29																																
36A	B	44.20 - 44.65			0.8	30																																
36B	T	44.20 - 44.65	CI-ML																																			
37A	T	45.11 - 45.61																																				
37B	B	45.11 - 45.61			0.5	30																																
39A	T	46.02 - 46.47																																				
39B	B	46.02 - 46.47	CH		0.0	29																																
39A	T	46.94 - 47.47																																				
39B	B	46.94 - 47.47			1.1	29																																
39C	G	46.94 - 47.47																																				

**LEGEND AND NOTES**

B Bag Sample  
 G Gas Sample  
 L Liner Sample  
 P Piston Sample  
 NH No Recovery  
 NS No Sample Remaining

C Frozen Core  
 PW Porewater Sample  
 T Sample Stored in Tube  
 W Washed Sample  
 HC Radiocarbon Sample

MV Minivane  
 FC Fall Cone  
 TV Torvane  
 PV Picon Vane  
 RV Remote Vane

UU Unconsolidated Undrained Triaxial  
 UU<sub>p</sub> UU Triaxial with Pore Pressure Measurements  
 CU Consolidated Undrained Triaxial  
 CU<sub>p</sub> CU Triaxial with Pore Pressure Measurements  
 CD Consolidated Drained Triaxial

O Organic Content  
 S Salinity  
 TS Thaw Strain  
 SG Specific Gravity





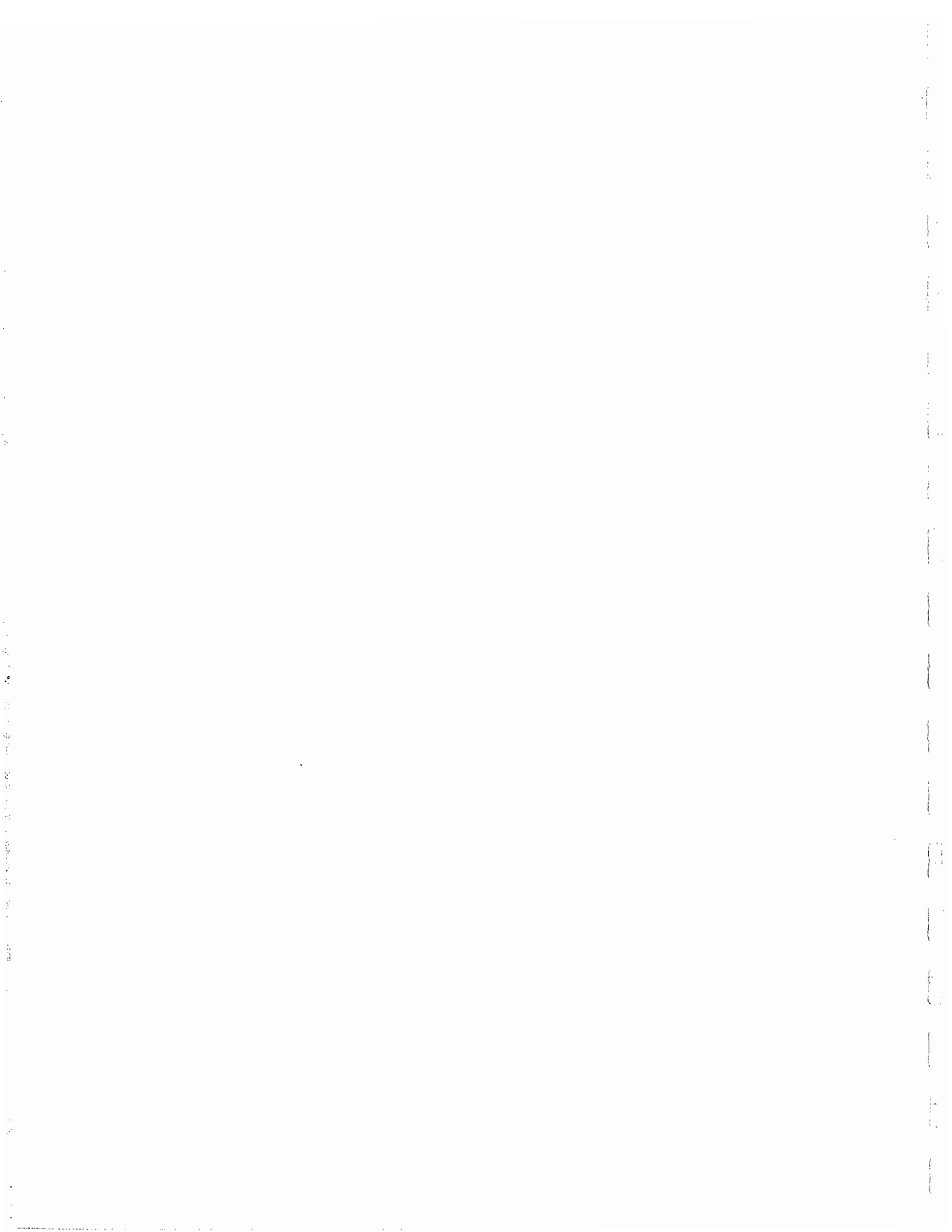


**SUMMARY OF TEST RESULTS**

Sample Number	Depth (metres) *Sample Photographed	Unified Soil Classification	Ground Ice Description (%)	Temp. (°C)	Moisture Content (%)	Frozen Moisture Content (%)	Bulk Density (g/cm³)	GRAIN SIZE DISTRIBUTION					SHEAR STRENGTH			CONSOLIDATION CHARACTERISTICS			TEST RESULTS SEPARATELY TABULATED			
								Liquid Limit (%)	Plastic Limit (%)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	D <sub>50</sub> (µm)	Test	Shear Strength (kPa)	Failure Strain (%)	Consistency		P <sub>o</sub>	P <sub>c</sub>	C <sub>c</sub>
40A	17.85 - 48.45	CIH-OH			32			13	29	53	47	-	-	PV	90		Stiff					
40B	47.85 - 48.45																					
41A	48.77 - 49.37			0.8	28									PV	125+		V. Stiff				3=27ppt	
41B	48.77 - 49.37																					
42A	49.68 - 50.15				26									PV	125+		V. Stiff					
42B	49.68 - 50.15	ML&OL		-0.5																		
43A	50.60 - 50.25			0.4	32									PV	125+		V. Stiff				5G-2.71	
43B	50.60 - 50.25	ML&OL																			5=22ppt	
44A	51.50 - 51.95				24																	
44B	51.50 - 51.95	CI		-0.4																		
45B	52.43 - 52.88	HL&OL	HF	-1.5	22																	
46A	53.34 - 53.44		libn	-1.0	23																	
END OF BOREHOLE																						

**LEGEND AND NOTES**  
 C - Frozen Core  
 B - Bag Sample  
 G - Gas Sample  
 L - Liner Sample  
 P - Piston Sample  
 NR - No Recovery  
 NS - No Sample Remaining  
 MV - Minivans  
 FC - Fall Cone  
 TV - Torvane  
 PV - Picon Vane  
 RV - Remote Vane  
 C - Consolidated Undrained Triaxial  
 UU - Unconsolidated Undrained Triaxial  
 UUp - UU Triaxial with Pore Pressure Measurements  
 CU - Consolidated Undrained Triaxial with Pore Pressure Measurements  
 CD - Consolidated Drained Triaxial  
 O - Organic Content  
 S - Salinity  
 TS - Thaw Strain  
 SG - Specific Gravity



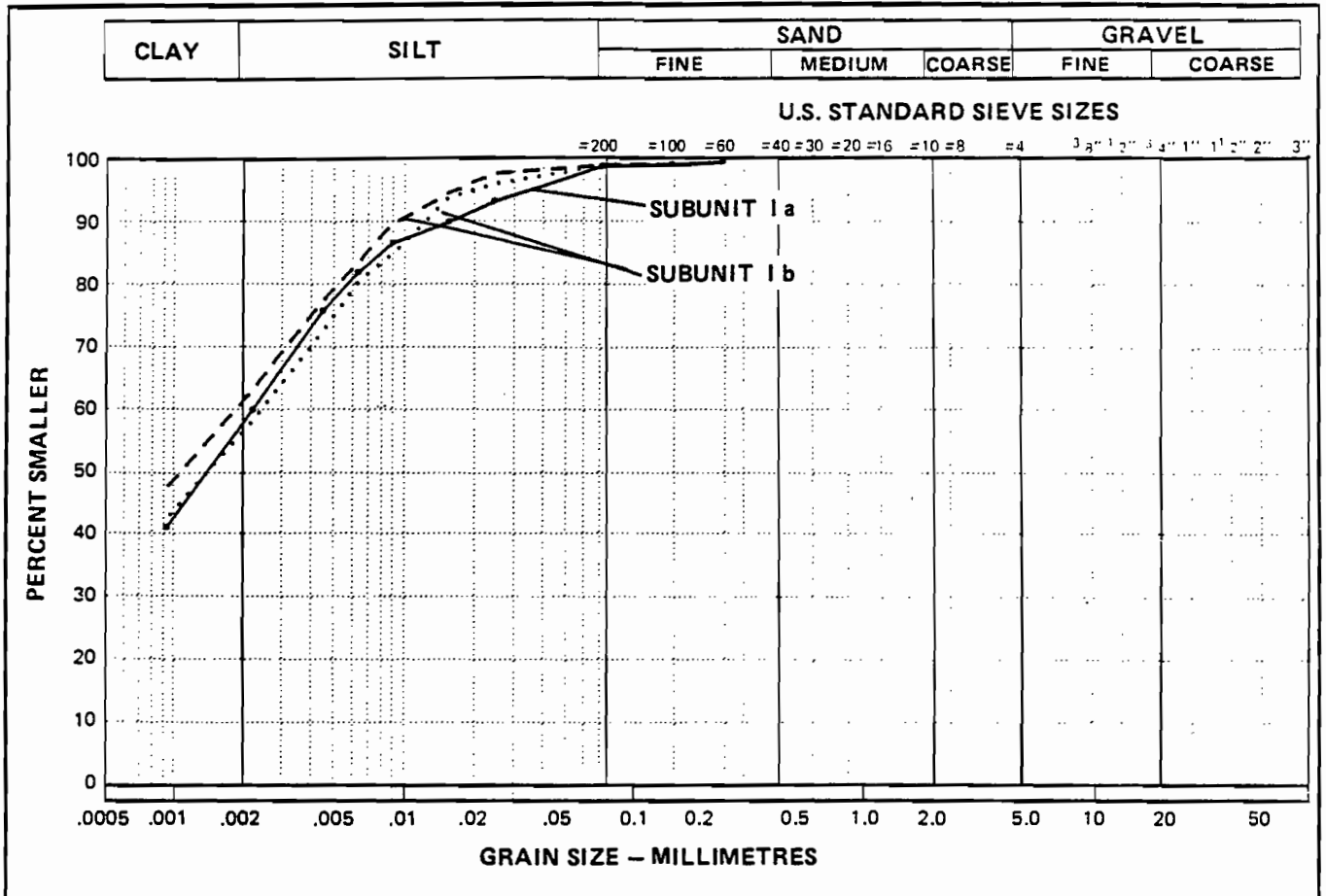


APPENDIX D

PARTICLE SIZE ANALYSES

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**PARTICLE - SIZE ANALYSIS OF SOILS**



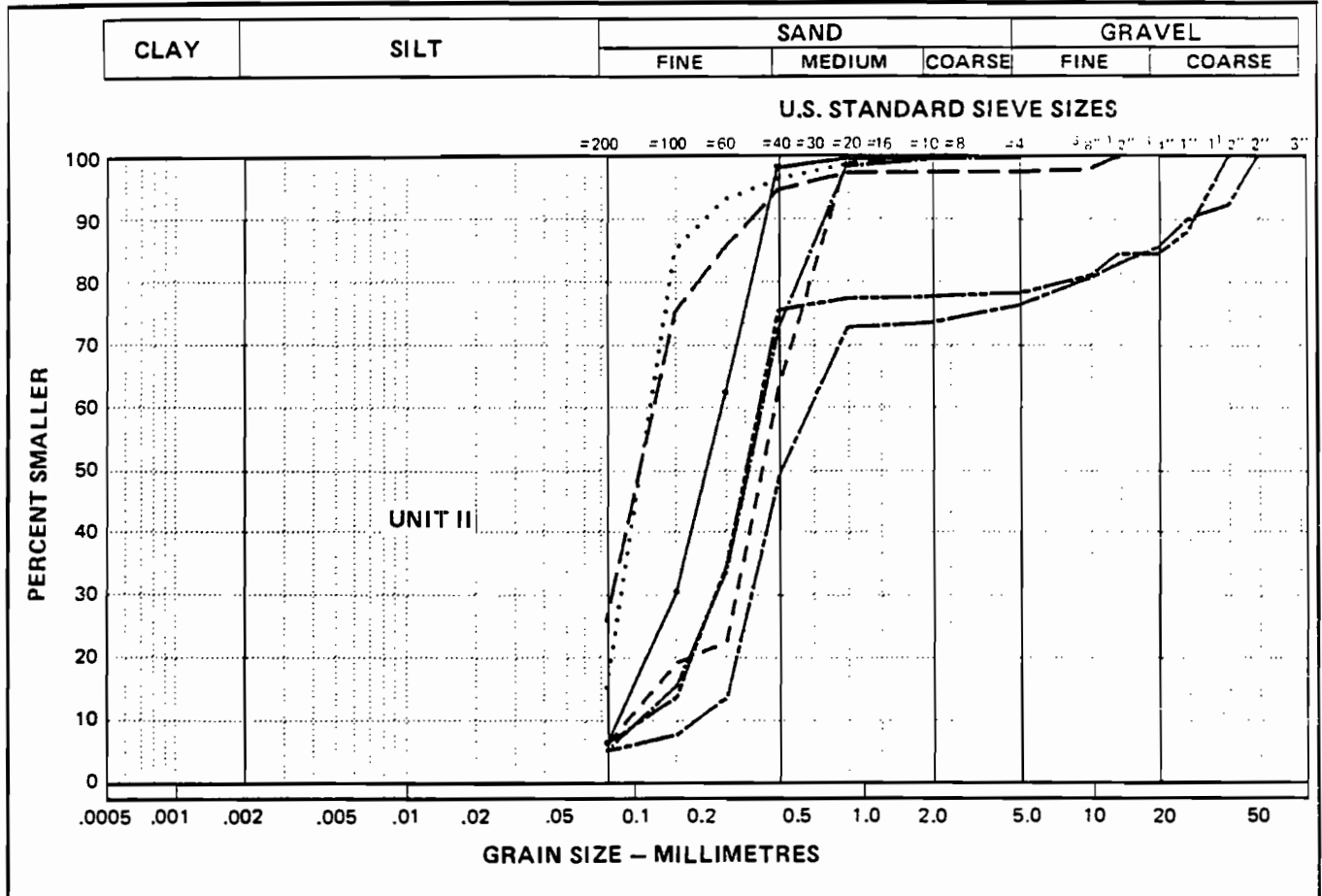
SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C.
			CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)			
—	AF85S06B	0.00 - .70	57.8	41.6	.6	0.0	-	-	-
.....	AF85S06B	3.66 - 4.41	56.8	42.9	.3	0.0	-	-	-
---	AF85S06B	9.10 - 9.70	61.6	38.2	.2	0.0	-	-	-

**JOB NO. 101 -4416**

**DATE 851023**



PARTICLE - SIZE ANALYSIS OF SOILS



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C.
			CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)			
_____	AF85S06B	13.70 - 14.00	-	5.4	94.6	0.0	2.9	1.1	SP-SM
.....	AF85S06B	18.90 - 19.20	-	14.4	85.6	0.0	-	-	-
----	AF85S06B	19.20 - 19.40	-	5.4	94.6	0.0	4.3	2.0	SP-SM
_____	AF85S06B	21.00 - 21.40	-	25.4	72.3	2.3	-	-	-
-----	AF85S06B	24.10 - 24.50	-	4.4	95.6	0.0	3.3	1.4	SP
-----	AF85S06B	26.50 - 26.90	-	4.3	71.9	23.8	3.0	.9	SP
-----	AF85S06B	34.80 - 35.00	-	5.5	72.6	21.9	3.1	1.3	SP-SM

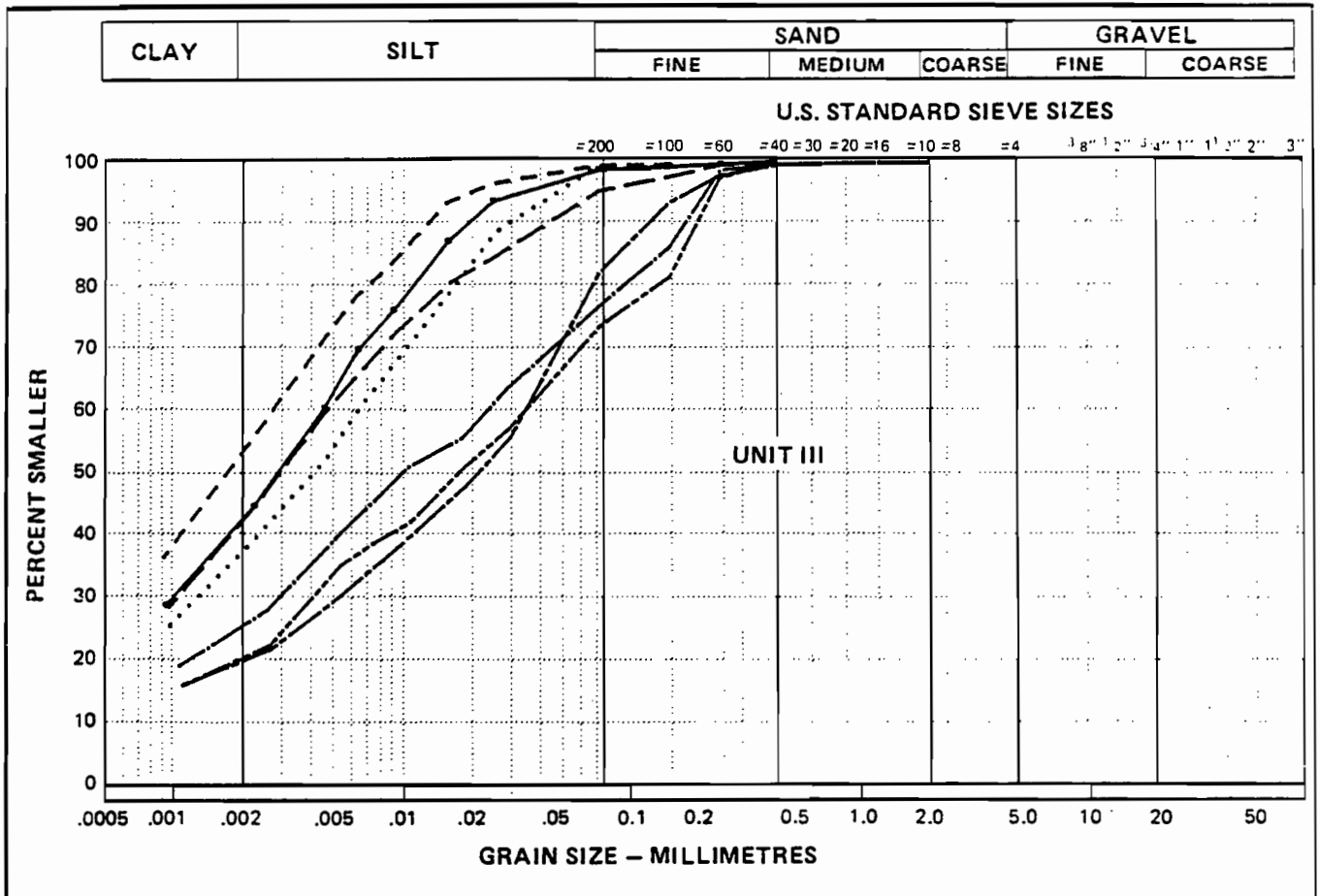
JOB NO. 101 -4416

DATE





PARTICLE - SIZE ANALYSIS OF SOILS



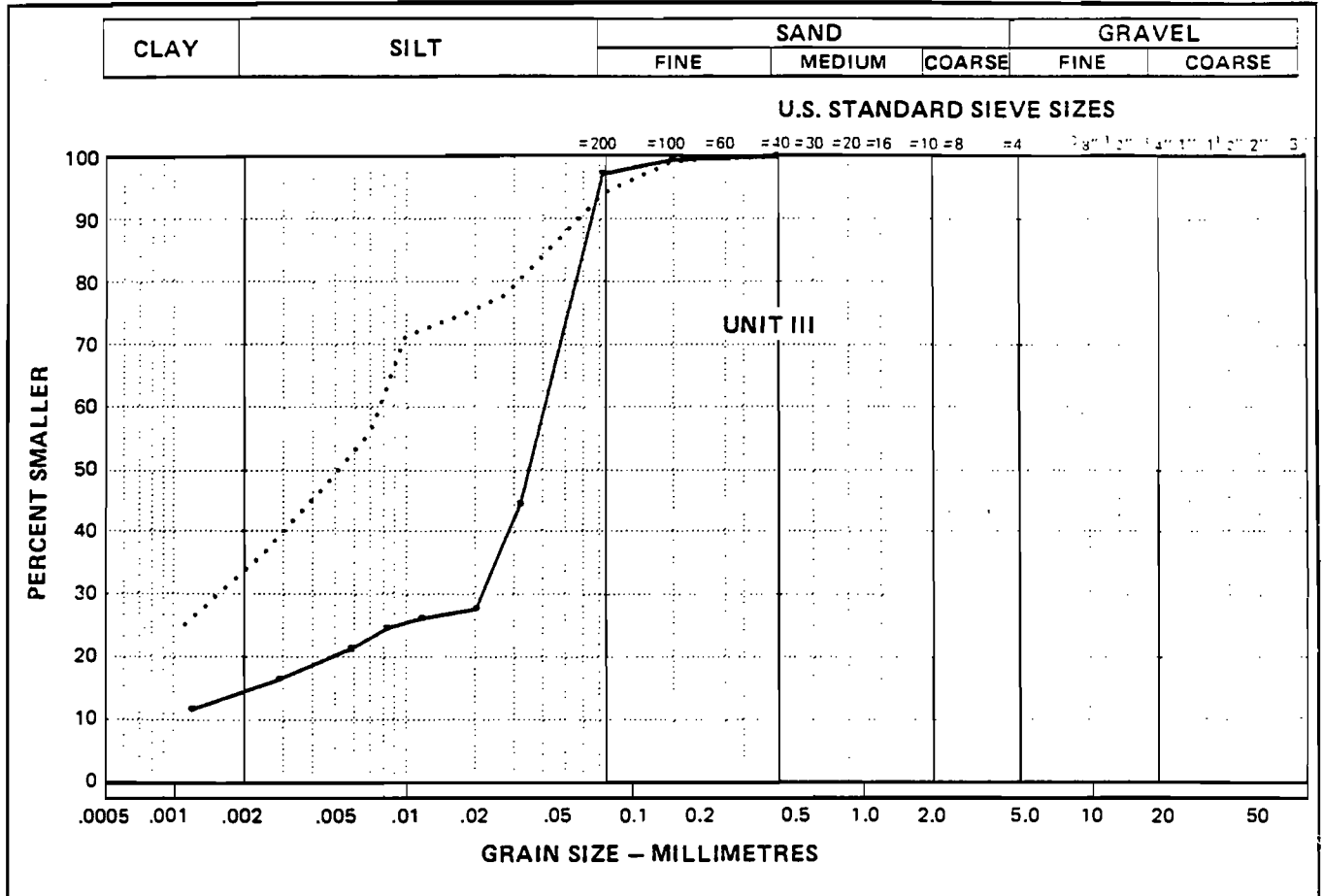
SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C.
			CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)			
—	AF85S06B	37.80 - 38.60	42.0	56.8	1.2	0.0	-	-	-
.....	AF85S06B	40.50 - 41.20	37.0	62.8	.2	0.0	-	-	-
- - -	AF85S06B	47.80 - 48.40	53.1	46.7	.2	0.0	-	-	-
—	AF85S06B	50.60 - 51.20	41.8	53.8	4.4	0.0	-	-	-
—	AF85S06B	51.50 - 51.90	25.2	51.7	23.1	0.0	-	-	-
—	AF85S06B	52.40 - 52.80	19.6	62.7	17.7	0.0	-	-	-
—	AF85S06B	53.30 - 53.40	20.0	53.6	26.4	0.0	-	-	-

JOB NO. 101 -4416

DATE 85-10-17



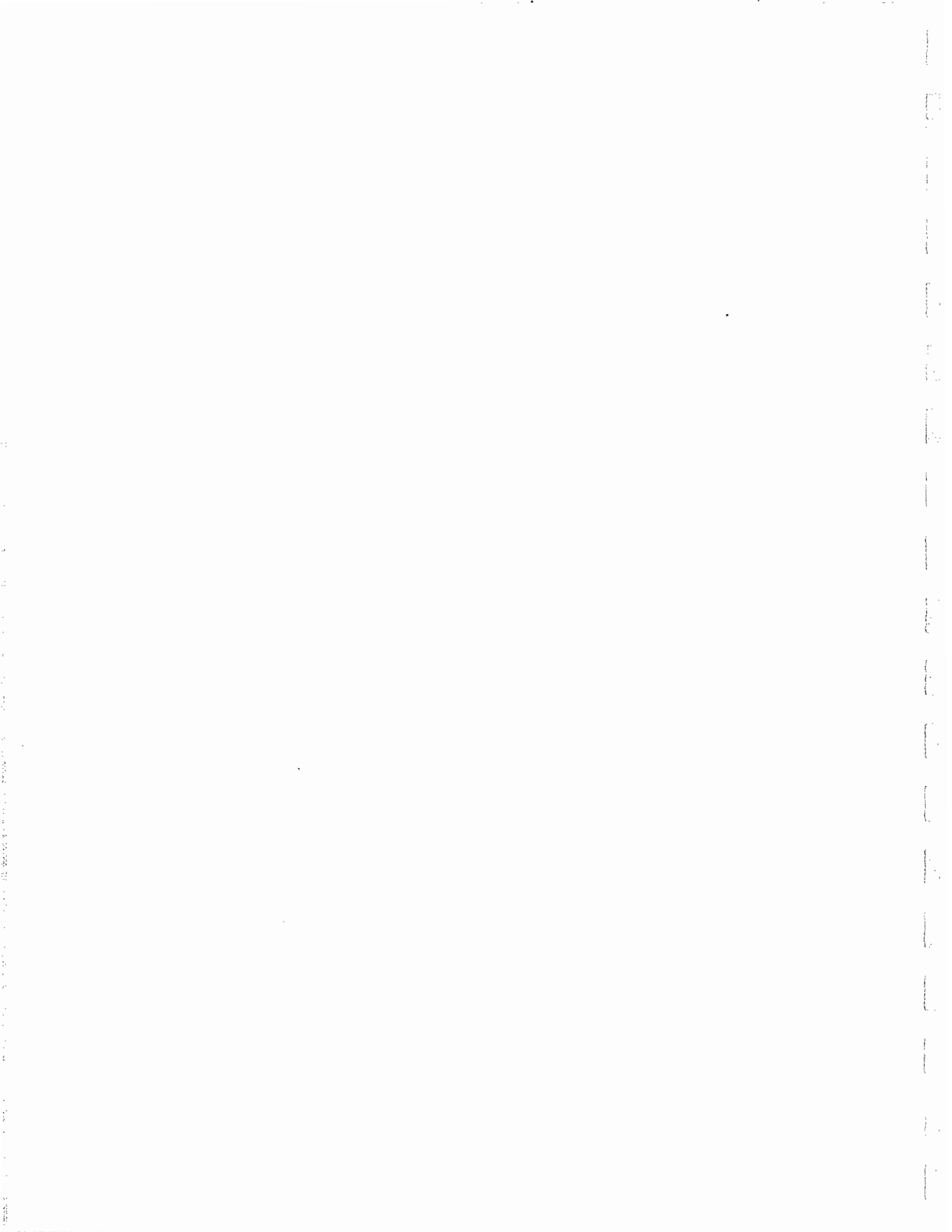
**PARTICLE - SIZE ANALYSIS OF SOILS**



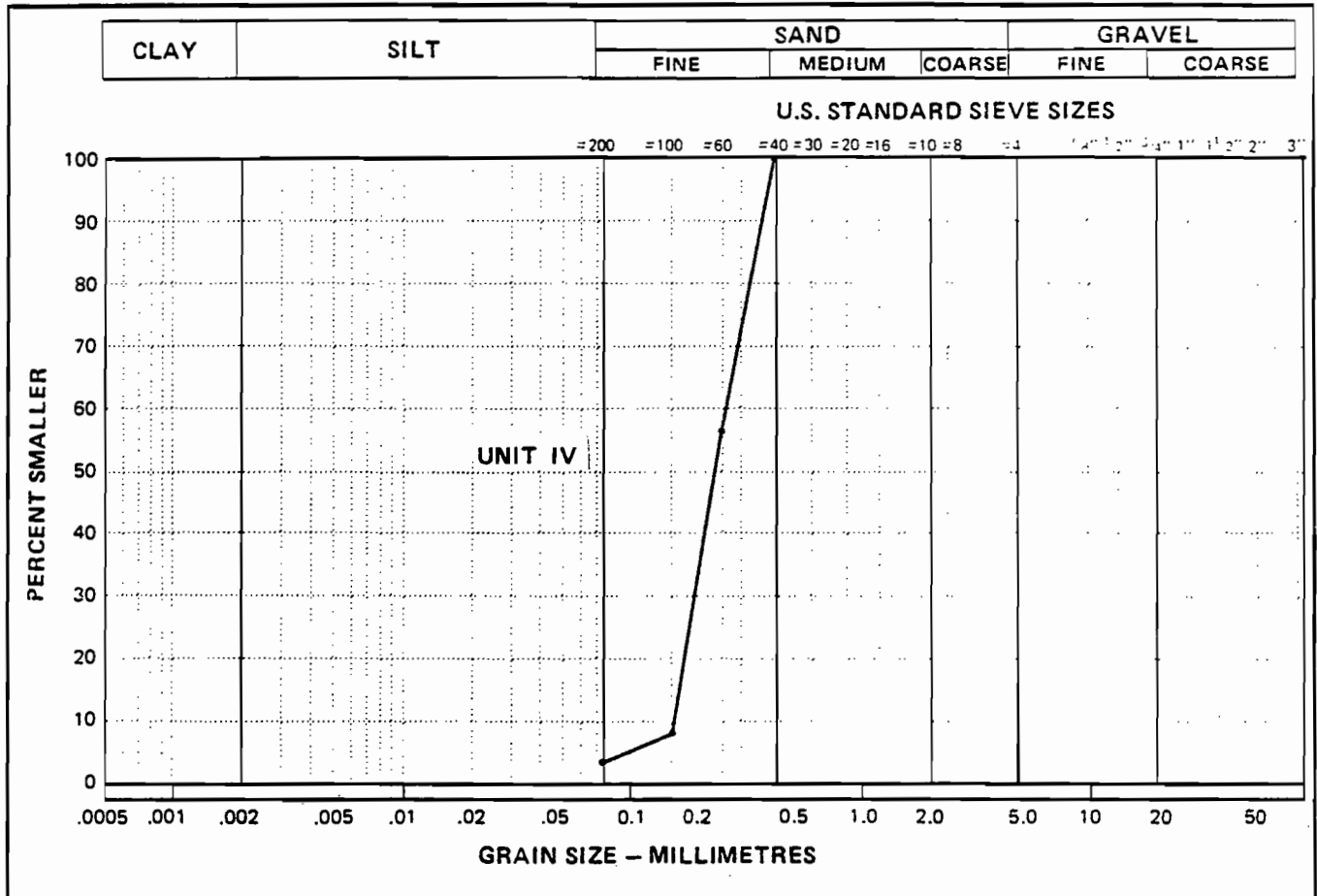
SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C.
			CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)			
_____	AF85S05	59.80 - 60.00	13.9	83.5	2.6	0.0	-	-	-
.....	AF85S05	62.80 - 62.80	33.3	61.0	5.7	0.0	-	-	-

**JOB NO. 101 -4416**

**DATE 85-10-17**



**PARTICLE - SIZE ANALYSIS OF SOILS**



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C.
			CLAY (%)	SILT (%)	SAND (%)	GRAVEL (%)			
	AF85S05	68.60 - 68.60	-	2.3	97.7	0.0	1.7	.9	SP

**JOB NO. 101 -4416** **DATE**



APPENDIX E

HYDROCARBON GAS ANALYSIS RESULTS

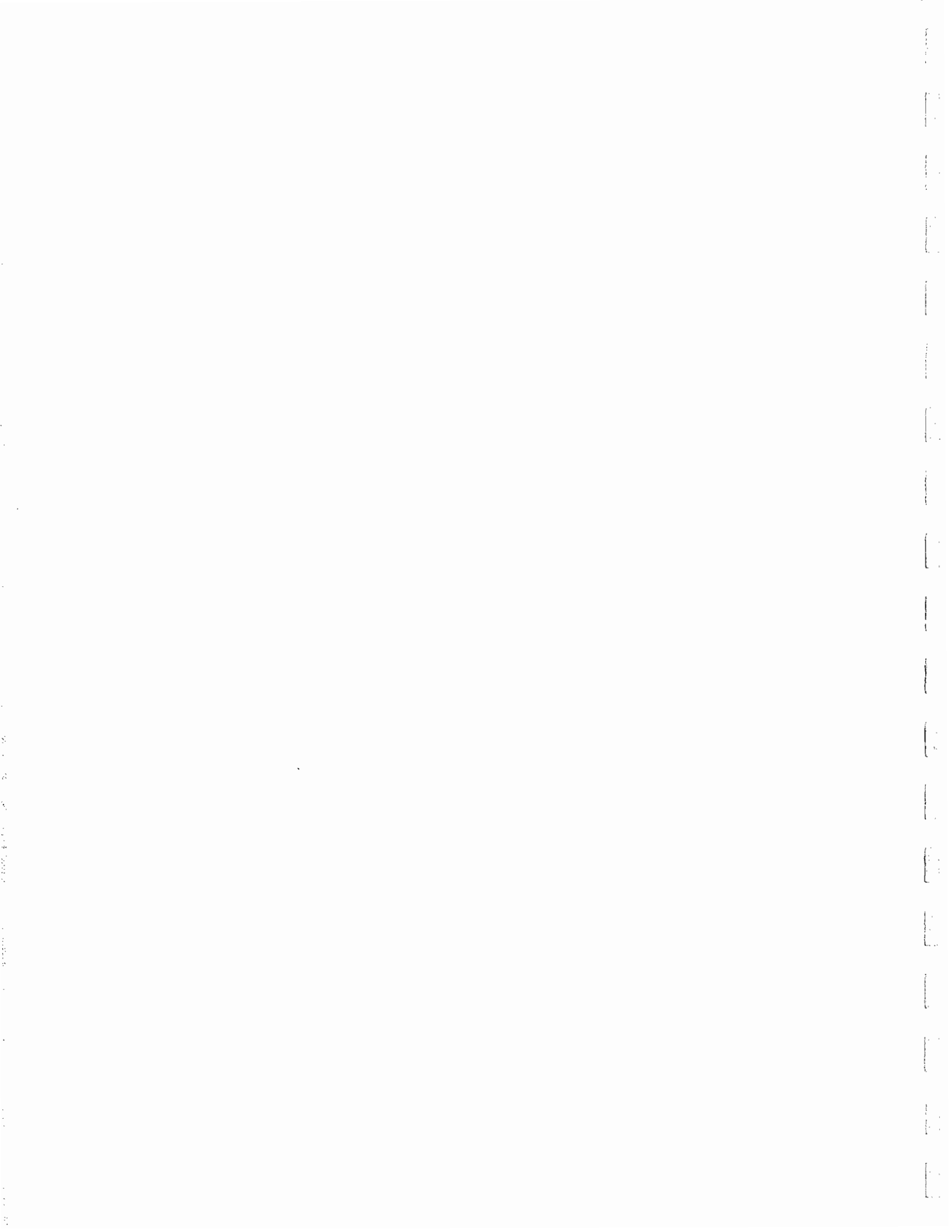




## ANALYTICAL METHOD

### HYDROCARBON GAS ANALYSES

Sediment samples for hydrocarbon gas analysis were sealed in cans in a brine solution at the drill site. To prepare the samples for analysis, 100cc of sea water was displaced from the can using helium. The cans were then mechanically agitated for one hour to displace the hydrocarbon gases into the head space. The head space gas was analyzed for methane, ethane, propane, ethylene and propylene. Results are reported as gas volume hydrocarbon component per  $10^6$  volumes of wet sediment (ppm vol/vol). This method of reporting is the same as that used in past reports.



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PROJECT: 85-5628-1  
 DATE: 85-10-28

HYDROCARBON ANALYSIS

101C-4416 AMAULIGAK F-24

CONCENTRATION (ppm)

BOREHOLE #	SAMPLE #	DEPTH (meters)	METHANE	ETHANE	PROPANE	ETHYLENE	PROPYLENE
AF85S06B	6B	4.6M	11.3	<.1	<1	<1	<1
AF85S06B	13C	10.9M	13.6	<.1	<1	<1	<1
AF85S06B	30C	38.7-39.4M	14000	<.1	<1	<1	<1
AF85S06B	33C	42.0M	57200	<.1	<1	<1	<1
AF85S06B	39C	47.3M	43200	<.1	<1	<1	<1
AF85P06	2B	41.5M	32000	<.1	<1	<1	<1
AF85S05	3B	60.0M	3250	<.1	<1	<1	<1



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HYDROCARBON ANALYSIS

101C-4416 AMAULIGAK F-24

CONCENTRATION (ppm)

BOREHOLE #	SAMPLE #	DEPTH (meters)	METHANE	ETHANE	PROPANE	ETHYLENE	PROPY-LENE
AF85S05	4C	62.0M	22900	<.1	<1	<1	<1
SEAWATER			3.10	<.1	<1	<1	<1



