SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	1 USCS	2 ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	3 Elec. Cond.	4 F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
1	0.0	OL	$V_{X,r}$				100.3																
	1.3	ML	$V_{X,r}$				43.3				54												
	2.7	OL	$V_{X,r}$				301				15										X		
	3.7	ML	$V_{X,r}$				71.5				46												
	4.2	ML	$V_{X,r}$				92.6				47										X		
	8.5	SP	$V_{X,r}$				18.9																
	10.5	SP	$V_{X,r}$				19.5				67												
	13.5	SP	$V_{X,r}$			4.6	18.1				75												
	18.5	SP-SM	V_X	22	70.2	7.8	13.5					2.71											
	23.5	SP-SM	V_X			11.3	13.0																
	28.5	SM	V_X	18	68.4	13.6	12.1																
	33.5	SM	V_X			13.8	10.6																
	38.5	SM	V_X	17	69.7	13.3	10.4																
	43.5	SM	V_X				9.7																
	48.5	SM	V_X	24	63.3	12.7	8.6																
2	0.1	SP					23.4				100		2.68							X			
	0.3	SP			97.7	2.3	22.8				102		2.69					X					
	0.9	SP					22.0							52.3	2.1								
	2.2	SM		11	75.5	13.5																	
	2.7	SP-SM												45.5	1.9						X		
	2.8	SP-SM				8.6																	
	3.0	SP-SM					23.0							49.7	2.0								
	3.4	SP					22.8				98		2.65					X					
	3.5	SP			96.1	3.9																	
	3.9	SP-SM				10.9																	
	8.4	ML					33.4							50.7	2.1								

1. USCS = Unified Soil Classification System
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3. Elec. Cond. = Electrical Conductivity in mmhos/cm
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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JV	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%)			Moist. Cont. (%)	Atterberg Limits			Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
				Gravel +4	Sand -4 to +200	Fines -200		LL	PL	PI														
2	8.5	ML					26.3	NP	NP	NP	100		2.68							X				
	9.9	ML					31.2				90		2.72					X						
	10.5	ML					30.6							46.4	1.9									
	10.7	ML			15.2	84.8	29.0				94		2.73					X						
	11.3	ML					32.5				89		2.69					X						
	12.9	ML					38.6				80					X								
	14.1	ML					38.8				81		2.70							X				
	14.4	ML					28.7							40.8	1.6									
	14.5	ML					35.7				83					X								
	18.5	MH					51.8							29.9	1.2									
	18.6	MH					48.4				72													
	19.0	ML					46.2							35.0	1.4									
	19.2	ML					42.4				76													
	25.7	ML					55.5				65													
	26.5	ML			7.4	92.6	29.0				86													
	27.3	SM					23.4				99													
	30.0	SM					16.0							36.3	1.4									
	30.2	SM					15.0				98													
	35.0	ML					26.3				99													
	40.2	ML					21.2				106		2.74				X							
	40.7	ML					8.2							68.9	2.8									
	40.8	ML					21.1				107		2.72				X							
	41.6	ML					26.3				96		2.72				X							
	41.7	ML											2.72											
	41.9	ML											2.72											
	46.7	ML				97.3	32.5				89					X								
	51.2	ML					26.0				97					X								

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DRB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	[1] USCS	[2] ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	[3] Elec. Cond.	[4] F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
2	60.5	SM		10	59.3	30.7	13.0							48.1	2.0									
	60.7	SM					14.8				120													
	66.5	GP				1.8	17.7							48.3	2.0									
	67.5	GP					9.1						2.69											
3	0.0	ML					37.9							44.3	1.8									
	1.5	SP		35	60.4	4.6	10.6						2.69	45.7	1.9									
	1.7	SP					18.8				117													
	3.5	SP					18.3							48.2	2.0									
	4.5	SP					2.2							57.2	2.3									
	6.0	SP				0.7	9.9						2.69	52.5	2.1									
	7.5	SP					8.7																	
	9.0	GP-GM		56	36.6	7.4	8.6							54.9	2.2									
	12.0	SP					6.5							51.9	2.1									
	15.0	SP		19	78.8	2.2	22.4							50.5	2.1									
	19.0	GP					8.6						2.69	51.6	2.1									
	25.0	GP					4.8																	
	30.0	GP-GM		50	44.3	5.7	5.8							50.8	2.1									
	30.2	GP-GM					5.3				118													
	50.0	GP-GM	N_{bn}				4.0							30.4	1.2									
4	0.0	ML					26.4				96													
	1.1	SM				21.4																		
	1.7	SP			98.0	2.0																		
	1.8	SP					22.7				101								X					
	2.8	SP					24.5							46.3	1.9									
	3.0	SM					27.1	--	--	NP	97		2.69							X				

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
4	9.5	ML					43.8							44.4	1.8									
	9.6	ML					41.6				77													
	12.0	ML					41.0							43.8	1.8									
	12.4	ML					38.8				78												X	
	13.0	OL					36.3				80	15.9	2.67							X				
	13.3	OL					43.7	33	26	6	75		2.67				X							
	13.8	ML			9.9	90.1	47.5				72		2.67				X							
	14.4	ML					48.7	33	26	6	72		2.7							X				
	15.0	ML					45.5																	
	18.3	MH					70.8				57		2.68			X								
	18.8	CL					74.7				56		2.66				X			X				
	19.0	CL					68.4				58		2.66											
	19.5	CL					74.7	44	26	18														
	19.6	CL					71.1				57		2.66				X							
	20.2	ML					69.0							47.4	1.9									
	25.0	OL					25.9					12.0												
	25.5	SM					9.8							44.3	1.8									
	25.6	SP-SM					9.7				133													
	26.0	SM		7	52.8	40.2	12.9				120													
	30.0	ML				65.6	22.3																	
	31.0	ML					22.8				100													
	40.0	ML					24.4	27	22	5														
	40.2	ML					23.1				105													
	44.5	ML		1	24.1	74.9	22.5				107													
	49.5	SP					21.9							53.1	2.2									
	50.0	SP				2.8	13.7				121		2.69											

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
5	0.1	SP-SM	$V_{X,C}$	14	76.4	9.6	27.1						2.71	61.5	2.5									
	0.5	SP-SM	$V_{X,C}$				16.2							54.3	2.2									
	2.0	SP-SM	$V_{X,C}$				14.0							90.9	4.0							X		
	4.0	SP	$V_{X,C}$			3.5																		
	4.5	SM	$N_{f,bn}$				36.4							26.3	1.0									
	6.0	SM	$N_{f,bn}$				18.0				110													
	6.5	SM	$N_{f,bn}$			22.0	18.3							107.9	4.0									
	6.7	SM	$N_{f,bn}$				18.9				108													
	8.0	SM	$N_{f,bn}$				13.5				122			108.7	5.0							X		
	10.0	SP				1.1	6.9							21.2	0.8									
	10.1	SP					6.2				102													
	16.0	ML					33.0							83.7	3.4									
	16.1	ML					34.8				85													
	16.5	ML					52.0							17.6	0.7									
	16.7	ML					38.4				80													
	19.0	ML					35.5				61					X								
	19.2	CL					39.5				79												X	
	19.5	CL					36.6	31	21	10	87		2.72							X				
	20.3	CL					42.3							78.1	3.2									
	25.5	ML					52.4				66													
	31.1	ML	V_r				43.6							42.9	1.7									
	31.2	ML	V_r				46.3				72													
	45.5	CL	V_r		1.6	98.4	41.9							28.1	1.1									
	45.7	CL	V_r				33.6				86										X		-	
	46.0	CL	V_r		1.0	99.0	36.2				67										X			
	51.0	CL	V_r				27.0							37.9	1.5									
	51.2	CL	V_r				28.8				92													

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE D-5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	[1] USCS	[2] ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	[3] Elec. Cond.	[4] F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
6	0.1	SM			49.3	50.7	31.6							48.6	2.0									
	0.5	SM					22.5							47.3	1.9									
	1.0	SM					22.5							48.1	2.0									
	3.5	ML					29.2							47.3	1.9									
	3.6	ML					30.4				92		2.69							X				
	4.0	ML					34.7							52.1	2.1									
	4.1	ML				84.9	33.4				88		2.68				X							
	4.6	ML					32.3	NP	NP	NP	90		2.69				X							
	5.2	ML					21.3							48.4	2.0									
	5.3	SP-SM		22	68.5	9.5	14.1				121		2.69											
	6.5	SP-SM					18.7							50.1	2.0									
	6.7	ML				52.7	11.4				114													
	7.2	SP-SM					7.4							95.9	3.8									
	9.2	SM					11.4							49.4	2.0									
	9.3	SM					9.3				120													
	12.0	GM					19.1				111													
	12.5	ML					24.1							48.7	2.0									
	12.6	ML					22.5				87													
	13.5	ML											2.71											
	14.1	ML					25.1							34.1	1.3									
	14.3	ML			1.8	98.2																		
	14.7	ML					23.3				99		2.71	37.1	1.5		X							
	15.4	ML					26.2				100						X							
	16.5	ML					23.0				104		2.71											
	21.4	ML					26.4							47.7	1.9									
	21.5	ML					23.1	29	24	5														
	21.7	ML			4.2	95.8	23.1				107		2.73							X				

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DBB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS										SECONDARY TESTS								
BORING NO.	DEPTH (ft)	1 USCS	2 ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	3 Elec. Cond.	4 F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
6	22.1	ML					20.4				106													
	25.0	ML					25.5				101													
	30.0	ML					24.3				102													
	35.5	GP-GM		56	38.7	5.3	6.7						2.68	52.5	2.2									
	35.6	GP-GM					6.0				141													
	40.5	GP				2.8	3.4				123													
7	0.5	OL	$V_{X,r}$				108				34										X			
	1.0	OL	$V_{X,r}$				31.3				80	14.0	2.32											
	1.6	OL	$V_{X,r}$				138				29													
	2.0	OL	$V_{X,r}$				250				19										X			
	5.0	SP-SM	V_X				220				17													
	5.4	SP-SM	V_X				43.1				59													
	5.9	SP-SM	V_X				23.6				79													
	9.0	SM	V_X	8	70.3	21.7																		
	14.0	SP	$V_{X,r}$				245				18													
	15.0	SP	$V_{X,r}$				190				24													
	19.0	SP-SM	V_X				12.9																	
	24.8	ML	$V_{X,r}$				114				36													
	29.0	SM	V_X				7.3																	
	34.0	SP-SM	V_X			7.4	12.8																	
	39.0	SM	V_X	24	58.3	17.7	16.6																	
	44.0	SM	V_X			19.4	14.8																	
	49.0	SM	V_X	41	43.5	15.5	11.9																	
8	0.0	GM		44	26.7	29.3	23.8																	
	0.1	GM					31.8							49.6	2.0									

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JC	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	[1] USCS	[2] ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	[3] Elec. Cond.	[4] F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
8	3.0	SP		15	80.4	4.6	15.4						2.68	51.2	2.1									
	5.0	SP		40	56.4	3.6	9.5							55.9	2.3									
	7.0	SP					8.0							54.9	2.2									
	8.5	SP					9.2							60.2	2.5									
	8.7	SP					6.7				78													
	9.0	SP					15.3				120			72.5	3.0									
	10.2	ML					25.6							78.7	3.2									
	10.4	ML					24.1				100													
	12.2	ML					22.6				103												X	
	12.8	ML					26.0				99		2.73							X				
	13.0	ML					25.3							79.3	3.2									
	14.9	ML					28.8							52.4	2.1									
	15.0	ML					26.4				98					X								
	18.0	ML					23.3							63.1	2.6									
	24.0	SM		10	43.0	47.0	18.7																	
	25.0	SM				36.4	14.0				121													
	37.0	SP-SM		40	52.9	7.1	13.9																	
9	0.0	SM			63.5	36.5	23.7				113													
	0.1	SM					22.5							52.4	2.1									
	0.5	SM					22.1				105												X	
	4.4	SM												50.0	2.1							X		
	4.5	SM					24.7				101		2.71				X							
	5.0	SM					22.5							52.4	2.1									
	5.1	SM					22.7				103		2.70				X							
	5.6	ML					22.6							50.0	2.0									
	5.7	SM					32.1				90		2.72							X				

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DCB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%)			Moist. Cont. (%)	Atterberg Limits			Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
				Gravel +4	Sand -4 to +200	Fines -200		LL	PL	PI														
9	6.6	ML					28.2							53.1	2.2									
	7.0	ML			40.6	59.4																		
	7.3	ML					28.2						2.75	39.8	1.6									
	7.4	ML					26.4				98		2.74				X							
	8.0	ML					34.2							51.8	2.1									
	8.1	ML					28.4				96		2.74				X							
	9.0	ML					27.4	NP	NP	NP	96		2.74				X							
	9.7	ML					35.0				86		2.71							X				
	9.9	ML					28.2							53.9	2.2									
	13.8	ML					37.0							50.7	2.1									
	14.4	ML					41.8				78					X								
	15.0	ML					40.7				77					X								
	19.3	MH					80.4				53		2.66							X				
	19.5	ML					51.3				68					X								
	20.0	ML					37.0							46.0	1.9									
	25.0	ML				67.4																		
	25.4	SM					33.2							42.5	1.7									
	25.5	SM					35.7				79													
	30.0	SM				38.8																		
	31.6	SM					30.2				90					X								
	36.0	SM				23.6																		
	36.3	SM					27.8				96													
	40.9	ML					32.8	35	27	8														
	41.1	ML					34.5							37.8	1.5									
	41.2	ML					32.8				91		2.73							X				
	41.4	CL			1.8	98.2	31.2				90					X								
	41.9	CL					27.6				96					X								

1. USCS = Unified Soil Classification System
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3. Elec. Cond. = Electrical Conductivity in mmhos/cm
4. F.P.D. = Freezing Point Depression, °C
5. NP = Non-Plastic

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-9**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
S	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%)			Moist. Cont. (%)	Atterberg Limits			Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
				Gravel +4	Sand -4 to +200	Fines -200		LL	PL	PI														
9	46.4	CL					29.3				93												X	
	50.5	ML					25.1				97													
	55.5	ML					16.5				112													
	60.0	GP					2.8				106													
	60.5	GP					6.2				96													
	61.0	GP		96.1	3.7	0.2																		
10	0.5	SP-SM	V_C		91.1	8.9																		
	1.0	SP-SM	V_C				23.3							10.5	0.4									
	2.5	SP-SM	V_C				111							23.9	0.9									
	3.0	SP-SM	V_C			10.2																		
	3.5	SP-SM	V_C				23.8							6.2	0.2									
	5.5	SP-SM	V_C				23.2							12.1	0.4									
	7.0	SP-SM	V_C				25.1							12.5	0.4									
	8.5	SP-SM	V_C		89.3	10.7																		
	9.5	SP-SM	V_C				26.9							27.2	1.1									
	12.0	SP-SM	N_f				23.5							109	4.1									
	14.5	SM					19.4				110			106	4.0									
	15.0	SM					23.2				101			90.9	3.9							X		
	16.5	SM					24.4				99													
	18.0	ML	V_r				28.1				85													
	20.5	ML	V_r				28.9				95													
	26.0	ML	$V_{X,r}$				42.7				77													
	31.0	ML	V_r				21.6	27	21	6	108										X			
	40.5	ML	V_r				19.6				107													
	46.0	ML	V_r				27.3				96													
	51.0	ML	V_r				22.7				104													

1. USCS = Unified Soil Classification System
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3. Elec. Cond. = Electrical Conductivity in mmhos/cm
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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-10**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JR	9612,031.08	DRB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
11	0.0	SP					12.2							44.8	1.8									
	4.0	GP		77	22.0	1.0																		
	10.0	GP		82	17.1	0.9	8.4							48.9	2.0									
	15.0	GP		51	45.5	3.5	8.1				109													
	17.0	GP				2.3																		
	19.5	GP					8.5							48.0	2.0									
	19.7	GP					8.3				114													
	22.0	GP		68	31.3	0.7							2.70											
	30.5	GP				0.5																		
	34.0	GP				1.1																		
	34.5	SP-SM				9.7																		
	40.0	SP					8.0				131		2.69											
	41.0	GP-GM		58	33.9	8.1	7.1							49.5	2.0									
	41.2	GP-GM					5.6				124													
	49.0	SP		41.3	54.8	3.9							2.68											
12	0.0	OL	V_X,r				406				11												X	
	0.5	OL	V_X,r				74.1							0.6	0.0									
	0.6	OL	V_X,r				27.6				78										X			
	1.0	Pt	--				100				37													
	1.5	Pt	--								5													
	3.3	ICE	--											0.3	0.0									
	6.2	SM	V_X				429				10													
	6.7	SM	V_X				74.7				45													
	9.0	SM	V_X	3	79.6	17.4	30.0							7.1	0.2									
	9.1	SM	V_X				19.2				93										X			
	9.5	SM	V_X				38.3				65													

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5. NP = Non-Plastic

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
SP	9612,031.08	DFB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%)			Moist. Cont. (%)	Atterberg Limits			Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
				Gravel +4	Sand -4 to +200	Fines -200		LL	PL	PI														
12	14.4	GM	V_X	43	42.5	14.5	41.4				58													
	19.0	SP-SM	V_X			11.3	14.7							9.1	0.3									
	19.2	SP-SM	V_X				20.8																	
	24.0	SP-SM	V_X			9.3	10.4							11.2	0.4									
	24.2	SP-SM	V_X				14.4																	
	29.0	SP-SM	V_X				16.8							22.2	0.8									
	29.2	SP-SM	V_X				15.2				81													
	34.5	ML	V_X				46.9							31.3	1.2									
	34.7	ML	V_X				40.9				72													
	39.0	ML	V_X				25.8																	
	44.0	ML	V_X				17.0																	
	49.3	ML	V_X				27.2				79													
13	0.2	OL	$V_{X,r}$				60.1					15.9		1.6	0.0									
	0.3	OL	$V_{X,r}$				54.9				53										X			
	2.0	ML	$V_{X,r}$				153				24													
	3.0	SP-SM	V_X				21.0				82										X			
	3.8	GP-GM	V_X	49	43.8	7.2																		
	5.0	SP-SM	V_X				8.3							8.3	0.3									
	6.5	SM	V_X			16.1	24.3																	
	10.0	SP-SM	V_X	22	65.5	12.5	15.8							5.8	0.2									
	12.0	SM	V_X				20.0							7.2	0.2									
	17.5	ML	$V_{X,r}$				76.1	34	25	9	52										X			
	18.0	ML	$V_{X,r}$				154				29												X	
	22.3	ML	$V_{X,r}$				48.8							29.9	1.2									
	22.5	ML	$V_{X,r}$				58.6				59													
	27.0	SP-SM	V_X			11.5	6.9																	

1. USCS = Unified Soil Classification System
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4. F.P.D. = Freezing Point Depression, °C
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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-12**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JC	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
13	32.0	SM	V_X	45	41.7	13.3	12.9							23.0	0.9									
	37.0	SM	V_X				11.0																	
	42.0	SM	V_X			12.6	9.8																	
	50.0	SP-SM	V_X	34	55.1	10.9	9.6							17.1	0.6									
14	0.0	SM					21.7				107			47.7	1.9									
	1.5	SM		1	71.9	27.1																		
	1.8	SM					21.6							46.1	1.9									
	2.4	ML					27.1				95		2.72				X							
	2.9	ML					26.7				96		2.71				X							
	6.1	ML					31.1							45.6	1.8									
	6.2	ML					33.1	32	26	6														
	6.3	ML					33.1				89		2.71							X				
	7.3	ML					31.1							44.9	1.8									
	7.9	ML					31.1				90													
	11.0	SM		11	61.1	27.9	25.2							50.4	2.1									
	11.2	SM					23.5				102													
	12.5	SP-SM					16.1							50.1	2.0									
	12.7	SP-SM					14.2				121													
	13.5	SP					6.2																	
	15.0	SP					9.5																	
	15.5	SP					15.1				119													
	16.7	CL					19.5	33	19	14														
	16.8	CL					19.5				112		2.75							X				
	17.0	CL					18.1				113					X								
	19.8	CL					20.4				110													

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-13**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DFB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
14	25.5	CL					22.9				103					X								
	31.1	ML					22.8				105												X	
	35.4	CL					25.1	40	26	14														
	36.0	ML					25.1				101					X								
	40.5	ML					25.1				101					X								
	45.0	GM		47	21.6	31.4	18.9																	
	50.0	GP		64	34.0	2.0	8.7																	
15	0.2	ML					32.8							51.4	2.1									
	1.9	ML					35.0							63.5	2.6									
	2.0	ML					36.0				83					X								
	2.7	ML					39.0							46.4	1.9									
	5.0	ML					43.2							49.4	2.0									
	5.2	ML					40.5	46	31	5	81		2.65							X				
	5.5	ML					47.8							50.3	2.1									
	7.5	SM			52.2	47.8																		
	7.7	SM					27.3				95													
	8.2	SM					26.0							64.5	2.6									
	8.4	MH				83.1	70.2				56						X							
	9.0	MH					81.1	--	--	NP	51		2.43			X								
	9.7	ML					64.9							64.3	2.6									
	10.7	ML					33.4							63.6	2.6									
	10.8	ML					32.2				86					X								
	11.5	SM					28.0							61.5	2.5									
	15.5	SM					18.2				114		2.73				X							
	16.0	SM					18.6				113		2.73				X							
	18.5	SM					15.2							50.8	2.1									

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE D-14

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	1 USCS	2 ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	3 Elec. Cond.	4 F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
15	18.7	SM					18.2				104													
	26.7	ML					18.4							72.0	3.0									
	26.8	ML					21.5				106		2.69							X				
	36.4	SC					16.8							51.8	2.1									
	36.8	CL					26.0				95					X								
	39.5	CL	$V_{X,r}$				30.3	28	21	7				26.2	1.0									
	39.6	CL	$V_{X,r}$				23.5				102										X			
	49.0	CL	$V_{X,r}$				19.2							28.1	1.1									
	49.1	CL	$V_{X,r}$				27.7				92										X			
	55.0	CL	$V_{X,r}$				54.4				68													
16	0.1	SP-SM		23	68.3	8.7																		
	0.8	SP-SM												40.8	1.7							X		
	1.1	SM				39.9	25.1							38.7	1.5									
	2.5	SM					31.9																	
	3.0	SM					32.9							18.0	0.7									
	3.1	SM	$V_{C,S}$				48.9				79										X			
	4.0	SM	$V_{C,S}$				25.2				97													
	5.0	ML	$V_{C,S}$			93.1	27.9							13.7	0.5									
	5.1	ML	$V_{C,S}$				42.6				73										X			
	5.5	SM	$V_{C,S}$				25.7																	
	6.0	SM	$V_{C,S}$				28.5				93													
	7.5	ML	$V_{C,S}$				21.6							26.1	1.0									
	8.0	ML	$V_{C,S}$				30.1				89													
	9.0	SM	$V_{C,S}$			39.1	29.5							7.8	0.3									
	9.1	SM	$V_{C,S}$				28.5				93										X			
	9.5	SM	$V_{C,S}$				29.6				91													

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-15**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DHB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS										SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
16	11.0	SM	$V_{C,S}$				27.7				91													
	11.5	SM	$V_{C,S}$				29.0							8.1	0.3									
	13.0	CL-ML	V_r				29.3							17.5	0.6									
	13.2	CL-ML	V_r				31.2	23	17	6														
	13.5	CL-ML	V_r				31.2	24	18	6	90													
	14.5	SM	V_r				30.7							7.0	0.2									
	15.0	ML	V_r			67.4	30.1				87													
	16.5	SM	V_C				33.8							9.3	0.3									
	17.5	SM	V_C		51.2	48.8	29.6				79													
	24.5	ML	V_r				33.1							11.0	0.4									
	24.6	ML	V_r				25.5				98										X			
17	0.2	SP					21.8				104													
	0.7	SP					19.9							46.8	1.9									
	0.8	SP					22.4				102													
	1.4	SP					19.6							45.2	1.8									
	3.4	CL-ML					32.6	25	21	5														
	3.5	CL-ML					32.6				90		2.71							X				
	3.8	CL-ML					29.7							49.0	2.0									
	4.9	ML					43.4							47.9	1.9									
	6.1	ML					33.1							36.9	1.5									
	6.2	ML		1	5.7	93.3	52.5				67					X								
	6.7	ML					40.5				77					X								
	7.3	SM					50.1							37.4	1.5									
	9.0	GM					25.7				89													
	9.4	GM		44	16.4	39.6	17.2							48.7	2.0									
	9.6	GM					17.8				108													

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Laboratory Test Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-16**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JR	9612,031.08	JEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	[1] USCS	[2] ICE	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	[3] Elec. Cond.	[4] F.P.D.	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
17	10.0	GM					19.4							50.2	2.0									
	11.5	GP				0.4	3.1																	
	13.3	GP					7.2				114													
	16.5	GP-GM					8.6																	
	18.5	ML					18.1																	
	25.7	ML					22.7							67.2	2.8									
	25.9	ML					21.4				106													
	30.4	ML					18.4				114					X								
	35.0	CL						43	26	17														
	35.3	CL					24.7				103		2.78				X							
	35.7	CL					23.9				103		2.78							X				
	36.3	ML					24.3				103		2.78				X							
	40.7	GP-GM		58	34.9	7.1	6.6																	
	49.8	GP-GM					9.8																	
	50.3	GP-GM					5.2				113													
18	0.3	OL	--				149				31												X	
	1.0	OL	--				55.2				55										X			
	18.5	GP-GM	V_x			5.7	20.4																	
	23.5	SP-SM	V_x	46	47.5	6.5	34.5						2.66											
	28.5	SP-SM	V_x				7.2																	
	33.5	SP-SM	V_x	43	47.3	9.7	1.2																	
	38.5	SP-SM	V_x			7.8	9.3																	
	43.5	SP-SM	V_x	32	57.0	11.0	13.7																	
	48.5	SP-SM	V_x			10.4	10.5																	
19	0.0	SP	N_{fbn}				2.8				115													

1. USCS = Unified Soil Classification System
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4. F.P.D. = Freezing Point Depression, °C
5. NP = Non-Plastic

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Pt. Thomson Development Project
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EXXON Company, U.S.A.

PLATE **D-17**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08		4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
19	0.1	SP	Nf,bn	9	89.9	1.1																		
	1.0	SP	Nf,bn										2.73											
	2.2	SP	Nf,bn				2.2				113			8.33	0.4							X		
	4.0	SP	V_X	14	83	3.0	8.8																	
	4.8	SP	V_X				15.0							3.8	0.1									
	6.0	SP	V_X				22.5							9.0	0.3									
	8.0	SP	V_X				24.8							81.0	3.3									
	8.4	SP	V_X				28.3																	
	9.5	SP	V_X				20.2							45.7	1.9									
	11.0	SP-SM	V_X				21.3																	
	12.0	SP-SM	V_X			5.5	24.8							91.2	3.6									
	12.2	SP-SM	V_X				41.2				84													
	14.0	SP	N_f				25.9							93.2	3.7									
	14.2	SP	N_f				28.8																	
	14.5	SP	--				22.5				96													
	15.0	SP-SM	--				21.4							129	4.3									
	15.2	SP-SM	--				16.7				102													
	16.0	ML	V_r				30.4							130	4.3									
	16.2	ML	V_r				28.7				94													
	16.5	ML	V_r				26.8				97			110	4.1									
	24.5	ML	V_r				21.6				108											X		
	24.6	ML	V_r				36.2							73.8	3.0									
	24.7	ML	V_r				37.2	38	26	12														
	29.0	ML	V_r				48.9							62.2	2.6									

1. USCS = Unified Soil Classification System
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3. Elec. Cond. = Electrical Conductivity in mmhos/cm
4. F.P.D. = Freezing Point Depression, °C
5. NP = Non-Plastic

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EXXON Company, U.S.A.

PLATE **D-18**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	JDB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
19	29.2	ML	V_r				54.8				65													
	34.5	ML	V_r				51.1				69													
	44.0	ML	V_r				12.1																	
	49.5	ML	V_r				21.9							60.5	2.5									
	49.7	ML	V_r				21.0				105													
20	0.0	ML					336				25													
	0.1	ML		4	5.3	90.7																		
	0.2	ML					53.8							46.2	1.9									
	2.5	SM					42.9							44.8	1.8									
	4.0	GP					6.6							55.6	2.3									
	6.5	GP-GM		49	44.3	6.7	6.5							48.0	1.9									
	6.7	GP-GM					5.1				139													
	8.0	GP					8.0							50.9	2.1									
	10.0	GP					4.8							52.4	2.1									
	11.5	GP		75	24.1	0.9	3.2																	
	16.5	GP					7.8																	
	40.0	SP-SM		41	52.9	6.1	7.9						2.69											
21	0.0	SP-SM					23.4				106													
	0.1	SP-SM				6.4	22.9							49.1	2.0									
	0.5	SP-SM			92.1	7.9	21.3				102		2.70						X					
	1.5	SP-SM					21.7							38.2	1.5									
	1.7	SP-SM					22.1				102													
	2.0	SP-SM			91.0	9.0	20.8				105		2.72						X					
	2.5	SP-SM												46.50	2.0							X		
	3.1	CL					20.6							36.2	1.4									

1. USCS = Unified Soil Classification System
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Pt. Thomson Development Project
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EXXON Company, U.S.A.

PLATE **D-19**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
21	3.2	CL					20.5	26	19	7														
	3.3	CL					20.1				111		2.76							X				
	4.1	ML					19.3				111		2.74				X							
	4.5	ML					19.6							39.1	1.6									
	4.7	ML			2.1	97.9	18.9				111		2.73				X							
	5.2	ML					20.5				108		2.74				X							
	5.8	ML					20.8							48.7	2.0									
	6.7	ML					21.5							37.4	1.5									
	7.0	ML					19.2				110					X								
	8.2	ML					16.8							52.9	2.2									
	9.0	SM					29.7				92													
	9.6	SM					31.2							61.2	2.5									
	10.6	SM					30.6							62.3	2.6									
	10.8	SM					29.2				93													
	12.9	ML					25.7							63.8	2.6									
	16.1	ML					27.3				97												X	
	16.8	SP-SM					30.2							70.7	2.9									
	18.0	ML					24.0				102		2.73				X							
	18.5	ML					26.6				97		2.74				X							
	19.0	ML					22.4							64.4	2.6									
	25.0	ML			5.6	94.4		22	21	1			2.73											
	25.9	ML					25.2							77.2	3.1									
	26.1	ML					25.9				99		2.76				X							
	26.8	ML					25.9				98		2.78				X							
	27.8	ML					27.0				100		2.81							X				

1. USCS = Unified Soil Classification System
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Pt. Thomson Development Project
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EXXON Company, U.S.A.

PLATE **D-20**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEG	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
21	31.0	CL					24.4				101												X	
	31.5	CL					23.7				100					X								
	32.0	CL					23.0				101					X								
	32.5	CL					26.2							70.9	2.9									
	41.0	CL					24.1							38.3	1.5									
	41.2	CL					22.5				105													
	45.0	CL					18.7				108													
	55.2	CL-ML					44.2	26	20	6														
	55.5	CL					22.0				103													
	60.0	CL					22.6				104													
	62.0	SC		2	72.5	25.5	18.7							50.1	2.1									
22	0.7	SM					30.5																	
	1.0	SM					24.8							45.8	1.9									
	1.2	SM					25.1				81													
	2.2	SM			50.9	49.1								46.5	2.0							X		
	2.5	ML					24.5							49.4	2.0									
	2.7	ML					25.8				99		2.70	45.5	1.9		X					X		
	3.3	ML					27.4							46.7	1.9									
	3.5	ML			28.4	71.6	25.0	24	21	3														
	3.8	ML					30.7				90		2.69				X							
	4.5	ML					42.7																	
	5.0	ML					43.7							47.2	1.9									
	5.2	ML					41.4				78													
	7.5	CL					52.3	35	23	12				47.6	1.9									
	11.5	SP					9.2							49.7	2.0									
	12.0	SP-SM				10.3	15.9																	

1. USCS = Unified Soil Classification System
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5. NP = Non-Plastic

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Pt. Thomson Development Project
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EXXON Company, U.S.A.

PLATE **D-21**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS												SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%)			Moist. Cont. (%)	Atterberg Limits			Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. [3] Cond.	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
				Gravel +4	Sand -4 to +200	Fines -200		LL	PL	PI														
22	13.0	SP		34	65.1	0.9	9.1							50.2	2.0									
	15.5	SP					8.3						2.68	55.4	2:3									
	20.0	SP		37	62.2	0.8	10.6						2.70											
	30.0	GP		54	44.5	1.5	0.9																	
	40.0	GP-GM				5.9	7.6						2.69											
	50.0	GP		63	35.4	1.6	11.3																	
23	0.0	ML	V_X				42.9				55										X			
	0.3	ML	V_X				29.5							3.6	0.1									
	0.5	ML	V_X				30.3				78												X	
	1.0	ML	V_X				23.2	21	13	8	107										X			
	6.3	ICE	--											0.3	0.0									
	8.3	ICE	--											0.3	0.0									
	10.3	SM	V_X				41.6							17.6	0.6									
	10.5	SM	V_X				47.4				63													
	10.8	ML	V_X		11.6	88.4	64.6				54										X			
	12.5	CL	V_r				43.9	33	22	11	70												X	
	14.0	CL	V_r				49.1				65													
	14.5	CL	V_r				30.8							36.5	1.5									
	14.7	CL	V_r				37.8				89													
	15.0	CL	V_r				56.7				62													
	19.0	CL	V_r				31.9				83										X			
	24.5	CL	V_r				24.6				93													
	29.0	SM	N_{be}		84.5	15.5	23.7							10.0	0.4									
	29.2	SM	N_{be}				22.8				58													
	34.0	CL	$V_{X,r}$				32.5				76													
	39.5	CL	$V_{X,r}$				27.7	27	20	7	89										X			

1. USCS = Unified Soil Classification System
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EXXON Company, U.S.A.

PLATE **D-22**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION		SOIL CLASS.		CLASSIFICATION TESTS											SECONDARY TESTS								
BORING NO.	DEPTH (ft)	USCS [1]	ICE [2]	Soil Gradation (%) Gravel +4	Sand -4 to +200	Fines -200	Moist. Cont. (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Org. Loss by Ignition (%)	Spec. Grav.	Elec. Cond. [3]	F.P.D. [4]	TXUU	TXCU	TXCD	D.S.	Consol.	Thaw Consol.	Chem.	Thermal Cond	Comments
23	44.4	CL	$V_{X,n}$				27.2				83												
	49.0	CL	$V_{X,n}$				29.3							35.5	1.4								
	49.2	CL	$V_{X,n}$				25.5				90												

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4. F.P.D. = Freezing Point Depression, °C
5. NP = Non-Plastic

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PLATE **D-23**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

Initially, all of the sample containers were visually inspected for signs of leakage or disturbance. The frozen samples were immediately placed in our cold room and stored at a temperature of approximately -8°C. The remaining specimens were stored as discussed below.

Shelby tubes were placed horizontally in a specially constructed rack to reduce sample disturbance during storage. Additionally, the Shelby tubes were turned 90 degrees every 24 hours to reduce the effects of water migration. Samples contained in brass liners were kept in an upright position on a storage shelf, as were jar samples. The grab samples were placed in moisture-proof plastic bags and stored in a single layer to prevent the bags from tearing or ripping.

Although care was taken to prevent moisture loss within the samples, desiccation is unavoidable. Therefore, we do not believe that samples stored longer than six months should be tested.

2. Shelby Tube Sample Extraction, Visual Classification, and Preparation

After a Shelby tube sample was extruded, an engineer and/or a technician inspected the specimen and logged it in accordance with the Unified Soil Classification System (USCS). These laboratory soil logs are presented as Plates D-24 through D-40. If the soil was bonded, the ice contained in the bonded soil sample was further classified in accordance with the U.S. Army Corps of Engineers' ice classification system. The information recorded on the laboratory soil logs includes comments on structural features and soil constituents, such as sea shells and organic materials. These logs provide more detailed information about the nature of the soils encountered in each boring than could be shown on the field test boring logs presented in Appendix B.

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON — FROZEN JOB NO. 96 LLOTYOE
LOGGED BY: D.G.
DATE: 4/12/82
BORING NO. 1 DEPTH 0' TO 0.5'

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	0'	Top — SHELBY

REMARKS: SAMPLE THAWED ...

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 96 LLOTY02
LOGGED BY: D.G.
DATE: 4/12/82
BORING NO. 2 DEPTH 1.5 TO 4.2

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	1.5	Top — SHELBY
		SLOUGH
		GREY ... (SM)
		THERMAL ... INCREASE ...

REMARKS: SHELBY WAS CUT IN THREE ... SECTIONS TO EXTRUDE ... MOISTURE LOST DUE TO THE THAWING

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 96 LLOTY05
LOGGED BY: D.G.
DATE: 4/1/82
BORING NO. 2 DEPTH 0' TO 0.2'

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	0'	Top — SHELBY
		GREY ... (SM) MEDIUM TO FINE GRAIN ...
	1'	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson JOB NO. 9612.033.08
LOGGED BY:
DATE: 5-1-82
BORING NO. 2 DEPTH 9.5 TO 12.1

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	9.5	Top — SHELBY
	10	Grey Fine Sand ...
	10.5	
	11.0	Grey Silty Fine Sand (SM)
	11.5	Blk Silty Fine Sand (SM)
	12.1	Grey Sandy Silt (ML)

REMARKS:

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Laboratory Soil Logs

Pt. Thomson Development Project
Winter 1982, Geotechnical Study
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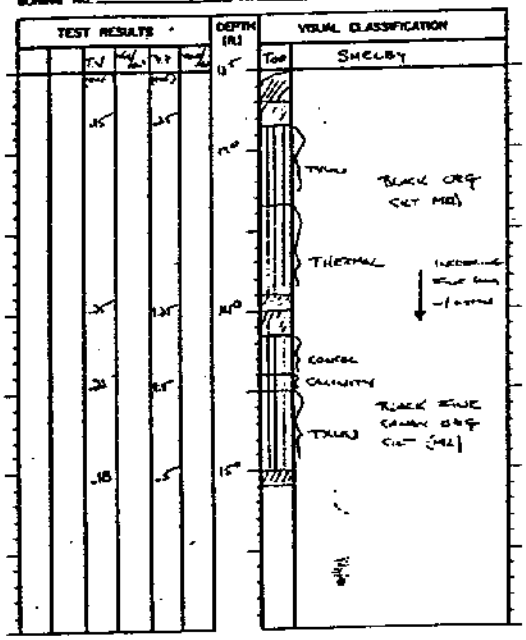
PLATE **D-24**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DRB	4/82		

LOG OF SOIL SAMPLE

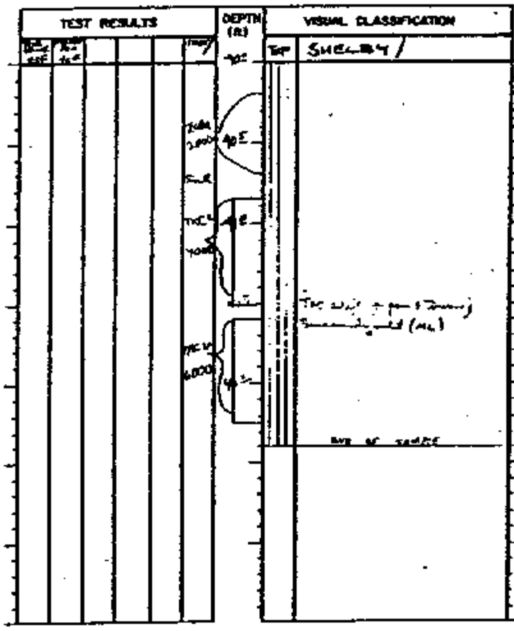
PROJECT: Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY: D.G.
DATE: 4/25/82
BORING NO. 2 — DEPTH 12.5 TO 15



REMARKS:

LOG OF SOIL SAMPLE

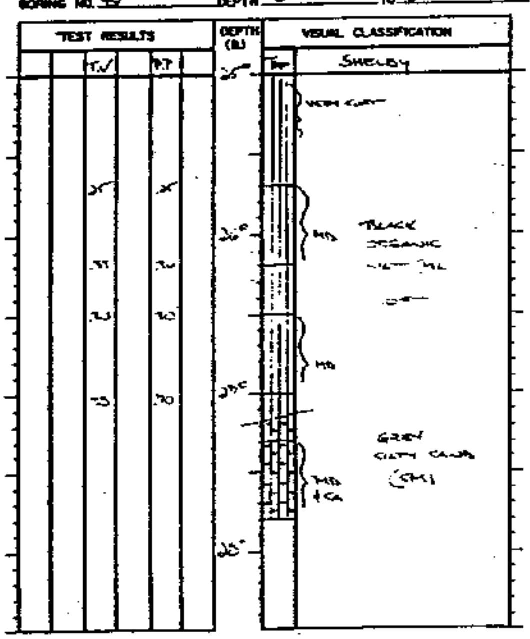
PROJECT: Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY:
DATE:
BORING NO. 2 — DEPTH 40.0 TO 42.1



REMARKS:

LOG OF SOIL SAMPLE

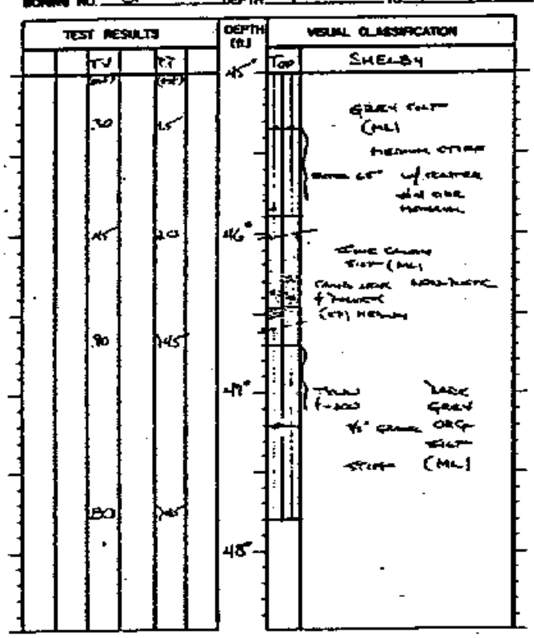
PROJECT: Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY: D.G.
DATE: 4/6/82
BORING NO. 2 — DEPTH 25.0 TO 27.8



REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY: D.G.
DATE: 4/1/82
BORING NO. 2 — DEPTH 45.0 TO 47.8



REMARKS:

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Laboratory Soil Logs

Pt. Thomson Development Project
Winter 1982, Geotechnical Study
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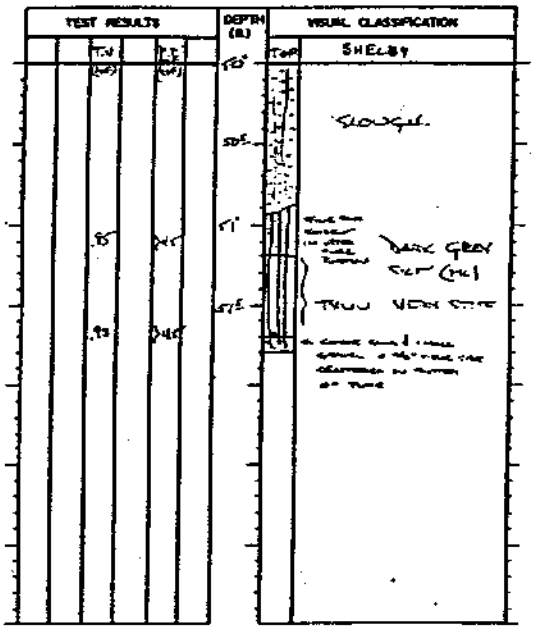
PLATE **D-25**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08		4/82		

LOG OF SOIL SAMPLE

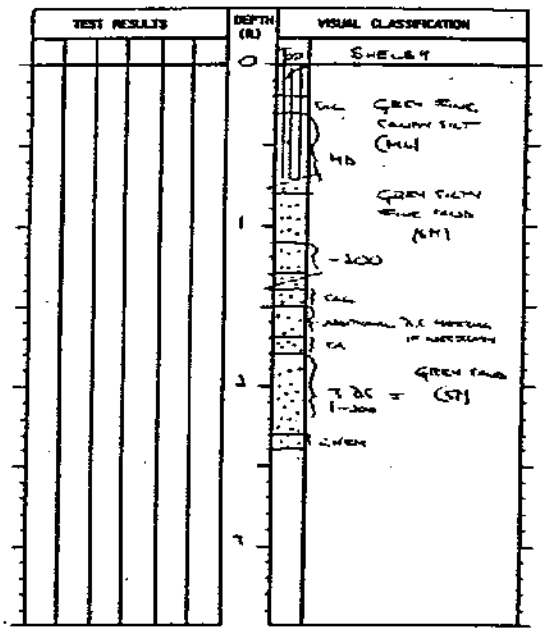
PROJECT Pt. Thomson JOB NO. 9612,031.08
LOGGED BY J.G.
DATE 7/11/82
BORING NO. 2 DEPTH 50' TO 51.5'



REMARKS

LOG OF SOIL SAMPLE

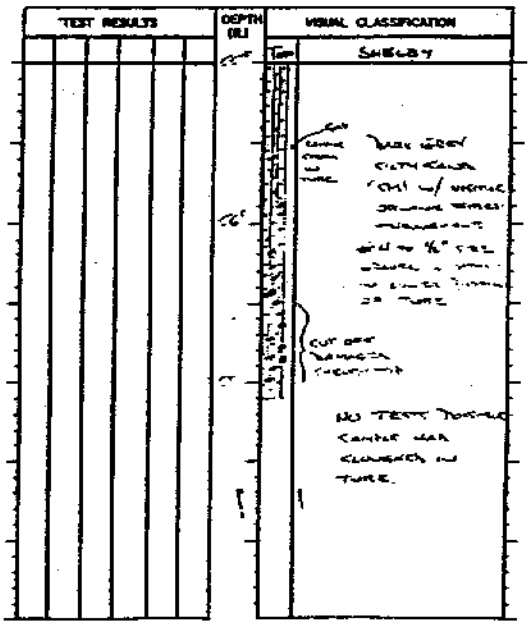
PROJECT Pt. Thomson JOB NO. 9612,031.08
LOGGED BY J.G.
DATE 7/12/82
BORING NO. 4 DEPTH 0' TO 2'



REMARKS

LOG OF SOIL SAMPLE

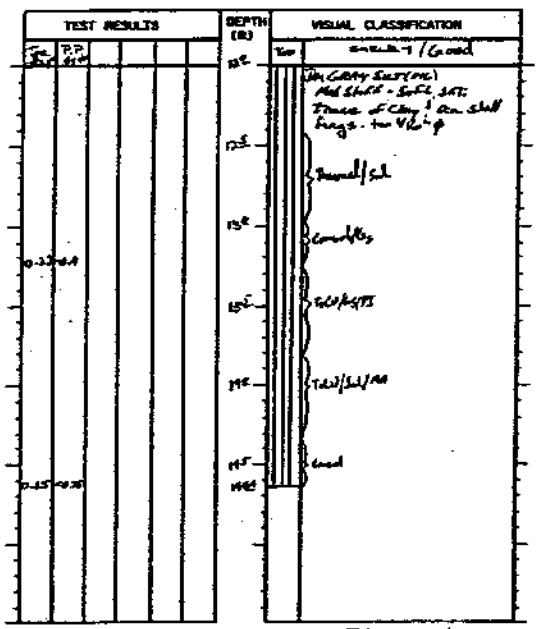
PROJECT Pt. Thomson JOB NO. 9612,031.08
LOGGED BY J.G.
DATE 7/6/82
BORING NO. 2 DEPTH 55' TO 57.5'



REMARKS

LOG OF SOIL SAMPLE

PROJECT Pt. Thomson JOB NO. 82,033.06
LOGGED BY MEM/DKA
DATE 8/19/82
BORING NO. 4 DEPTH 12' TO 14.5'



REMARKS Seen 3¾" @ Top Flush @ Btm, 3½" long Top 0.4' Not Full tube. Some water loss at top of tube, when recovered

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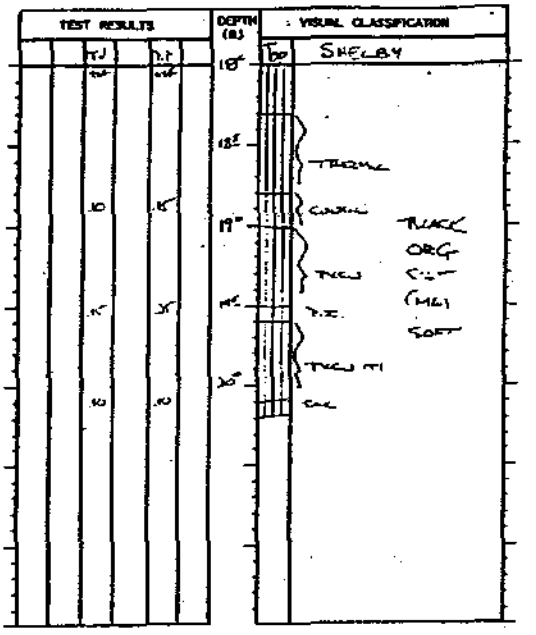
PLATE D-20

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08		4/82		

LOG OF SOIL SAMPLE

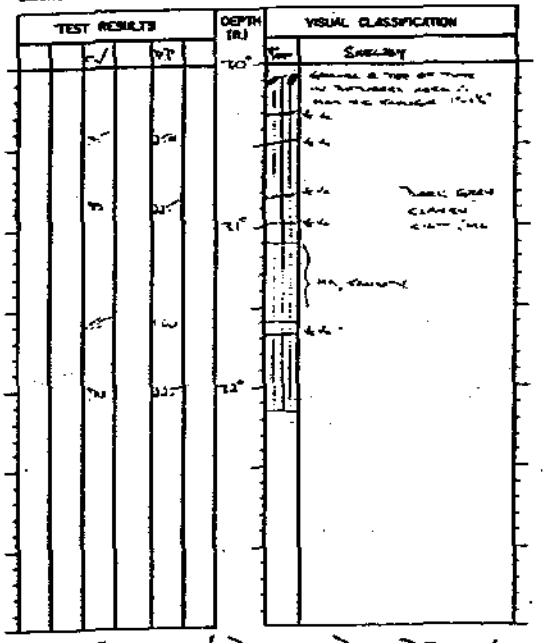
PROJECT Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY D.G.
DATE 7/16/82
BORING NO. 4 — DEPTH 18' — TO 20±



REMARKS

LOG OF SOIL SAMPLE

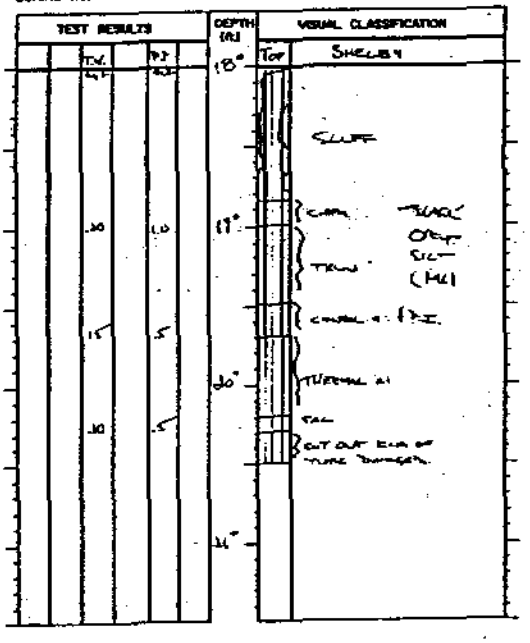
PROJECT Pt. Thomson — JOB NO. 9612,031.08
Frozen Tube
LOGGED BY D.G.
DATE 4/19/82
BORING NO. 5 — DEPTH 30' — TO 32'



REMARKS Torvane & Pocket Pen Readings Taken on Thawed Sample

LOG OF SOIL SAMPLE

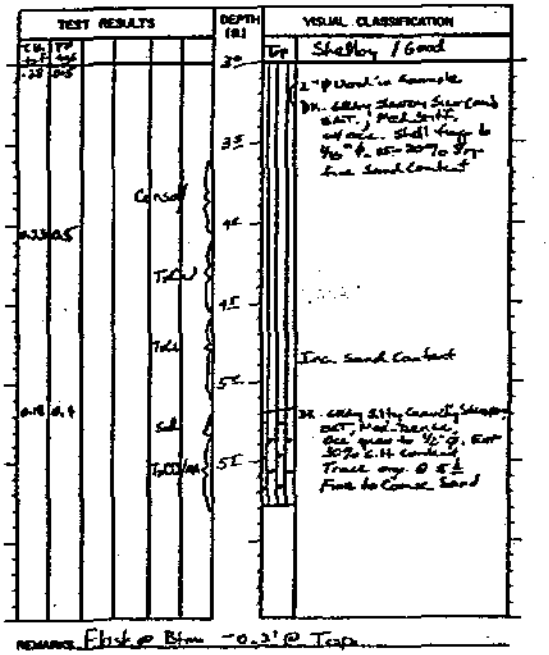
PROJECT Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY D.G.
DATE 7/16/82
BORING NO. 5 — DEPTH 18' — TO 20'



REMARKS

LOG OF SOIL SAMPLE

PROJECT Pt. Thomson — JOB NO. 9612,031.08
LOGGED BY DG/MEM
DATE 3/18/82
BORING NO. 6 — DEPTH 30 — TO 52



REMARKS Fluid Bkm -0.2' @ Top

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PLATE **D-27**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DBB	4/82		

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson
JOB NO.: 9612031.08
LOGGED BY: D.G.
DATE: 4/1/82
BORING NO.: 6
DEPTH: 6'
TO: 7'8"

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	6'	Top — SHELBY
		Slough
		Green gravelly silty sand (SM)
	7'	Grey gravelly silty sand (SM), more organic
		Gravel, #4 (1/4" size)
	8'	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson
JOB NO.: 9612031.08
LOGGED BY: DG
DATE: 4/1/82
BORING NO.: 6
DEPTH: 20'
TO: 22'8"

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.	20'	Top — SHELBY
			Dark green clayey silt (ML)
.30	>.45	20.5'	6" thick — Dark green silt (ML) w/ trace of fine sand
.30	.40	21'	6" gravel; clayey silt (ML)
.40	>.45	21.5'	
.35	>.45	22'	Dark grey silt (ML), frozen
.40	>.45	22.5'	
		23'	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson
JOB NO.: 9612,031.08
LOGGED BY:
DATE:
BORING NO.: 6
DEPTH: 13.5'
TO: 16.2'

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	13.5'	Top — SHELBY
		grey clayey silt with gravelly sand (ML)
	14'	grey fine sandy silt (ML)
	14.5'	
	15'	
	15.5'	
	16'	end of sample

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson
JOB NO.: 9612031.08
LOGGED BY: D.G.
DATE: 4/1/82
BORING NO.: 6
DEPTH: 30'
TO: 31.6'

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.	30'	Top — SHELBY
.35	1.0		Dark green clayey silt (ML) w/ some sand
.35	1.0	31'	with a 1/2" gravel to bottom of tube
		32'	

REMARKS:

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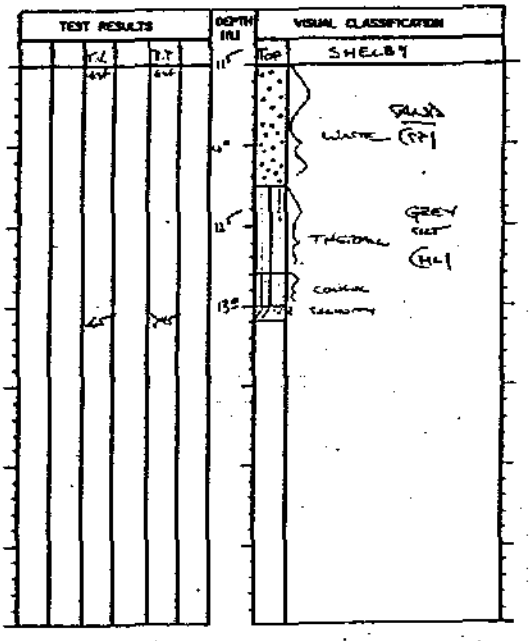
PLATE **D-28**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DEB	4/82		

LOG OF SOIL SAMPLE

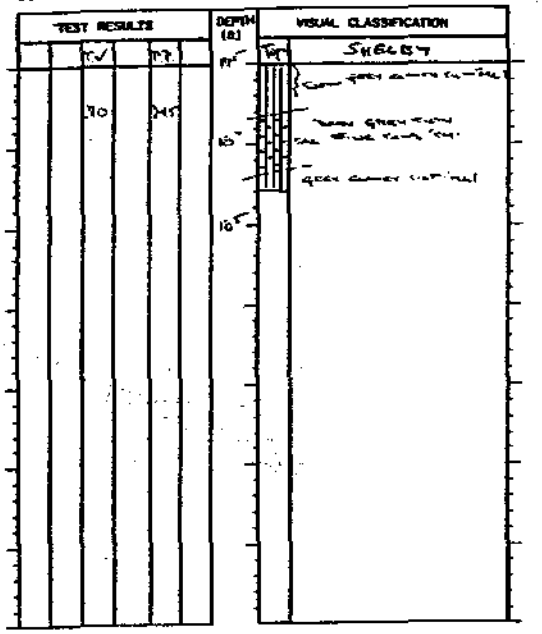
PROJECT Pt. THOMSON — JOB NO. 9612031.08
LOGGED BY D.G.
DATE 3/15/82
BORING NO. 8 — DEPTH 11' — TO 13'



REMARKS

LOG OF SOIL SAMPLE

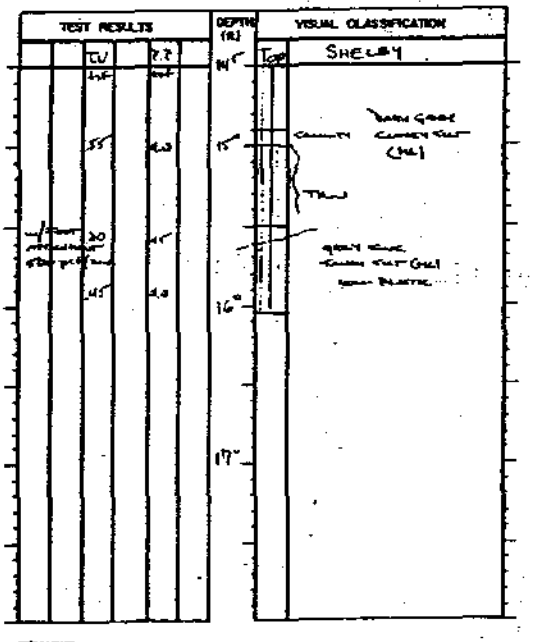
PROJECT Pt. THOMSON — JOB NO. 9612031.08
LOGGED BY D.G.
DATE 4/1/82
BORING NO. 3 — DEPTH 17' — TO 18'



REMARKS DIFFERS FROM BORING LOG ENTRY

LOG OF SOIL SAMPLE

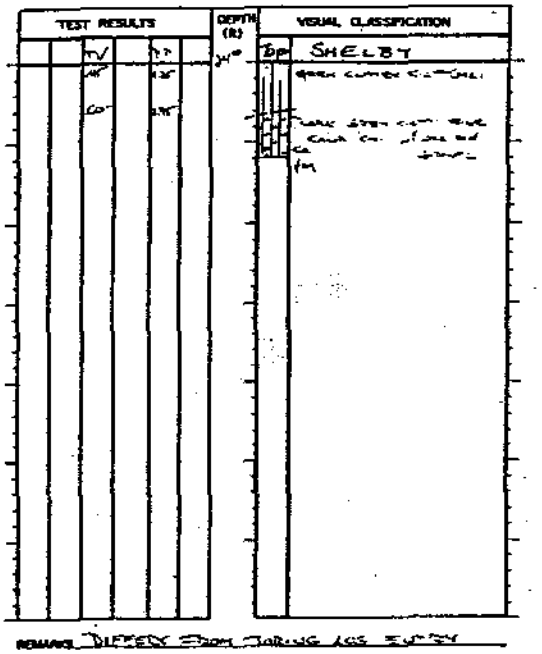
PROJECT Pt. THOMSON — JOB NO. 9612031.08
LOGGED BY D.G.
DATE 4/1/82
BORING NO. 8 — DEPTH 14' — TO 16'



REMARKS

LOG OF SOIL SAMPLE

PROJECT Pt. THOMSON — JOB NO. 9612031.08
LOGGED BY D.G.
DATE 4/6/82
BORING NO. 8 — DEPTH 34' — TO 36'



REMARKS DIFFERS FROM BORING LOG ENTRY

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PLATE **D-29**

PROJECT NUMBER	APPROVED	DATE	REVISED	DATE
9612,031.08	DCB	4/82		

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 9610308
LOGGED BY: D.G.
DATE: 4/27/81
BORING NO. 9 DEPTH 4.0 TO 6.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V. (tsf)	P.P. (tsf)		Top — SHELBY
		4.0	
			CHERT
			THIN — DARK GREY SILT TRACE
.33	1.25	5.0	SEAL — (ML)
			THIN
.20	1.5		SEAL
			CONTAL
		6.0	SOIL CHANGE
			THERMAL — THICK ORG FINE SANDY SILT (ML)
.15	1.25		SEAL — SILT IN LARGE POCKETS.
		7.0	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 9610308
LOGGED BY: D.G.
DATE: 4/-/-
BORING NO. 9 DEPTH 13.0 TO 15.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
TV (tsf)	P.P. (tsf)		Top — SHELBY
		13.0	
			EXTRA 6" SOILS
.30	.75		SEAL
		14.0	THERMAL
.25	.5		DARK GREY SILT (ML)
			THIN (ML)
.20	.5	15.0	SEAL — TRACE ORG THROUGHOUT
			THIN (ML) TUBE
.12	.15		
		16.0	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson JOB NO. 9612,033.08
LOGGED BY:
DATE:
BORING NO. 9 DEPTH 7.0 TO

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
		7.0	SHELBY / (Spl)
			Gray fine sandy silt (ML)
			Gray silty sand (SM)
			Gray sandy silt (ML)
			Gray silty sand (SM)
			Gray sandy silt (ML)
		8.0	Gray silty sand (ML)
			Gray sandy silt (ML)
			Gray sandy fine sand (ML)
			Gray fine sandy silt (ML)
			Gray fine sandy silt
		9.0	Gray fine sandy silt
			Gray fine sandy silt (ML)
		10.0	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 9610108
LOGGED BY: D.G.
DATE: 4/27/81
BORING NO. 9 DEPTH 19.0 TO 20.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
TV (tsf)	P.P. (tsf)		Top — SHELBY
		19.0	
			SOFT
.12	.5		CONTAL — TRACE ORG SILT (ML)
			THIN
.15	1.0	20.0	SEAL

REMARKS:

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PLATE **D-30**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DKB	4/82		

LOG OF SOIL SAMPLE

PROJECT Pt. Thomson JOB NO. 9612,031
LOGGED BY D.G.
DATE 4/7/82
BORING NO. 9 DEPTH 35 TO 37

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V. tsf	P.P. tsf	35	Top — SHELBY
			Dark grey clayey sand (SC); saturated, soft; silt at bottom
w/ root fragments; [illegible] .70	.45	36	Dark grey clayey silt (ML) w/ trace fine sand & gravel to 1/4" gravel throughout
.45	.40	37	

REMARKS

LOG OF SOIL SAMPLE

PROJECT Pt. Thomson JOB NO. 9612,031
LOGGED BY D.G.
DATE 4/7/82
BORING NO. 9 DEPTH 35.5 TO 37.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.	35	Top — SHELBY
		36	Dark green clayey sand (SM); silt to [illegible]; saturated & soft
		37	Gravel at bottom of tube

REMARKS Differs from [illegible]

LOG OF SOIL SAMPLE

Project Pt. Thomson Job No. 9612,031
Logged By D.G.
Date 4/7/82
Boring No. 9 Depth 30 to 32

Test Results		Depth (ft)	Visual Classification
T.V. tsf	P.P. tsf	30	Top — SHELBY
			Dark grey sand (SM)
.65	.35	31	Dark green clayey silt (ML); some 6" sand
.65	.25		
.45	.4	32	Trans

Remarks

LOG OF SOIL SAMPLE

PROJECT Pt. Thomson JOB NO. 9612,031
LOGGED BY D.G.
DATE 3/7/82
BORING NO. 9 DEPTH 40.5 TO 41.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V. tsf	P.P. tsf	40	Top — SHELBY
			Slough (CH)
.65	.25	41	Grey silty clay (CL)
		42	Trans
.40	.25		
		43	

REMARKS

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PLATE **D-31**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
[illegible]	9612,031.08	DEB	4/82		

LOG OF SOIL SAMPLE

PROJECT: PT. THOMSON — JOB NO. 9612031
LOGGED BY: D.G.
DATE: 3/15/82
BORING NO.: 9 — DEPTH: 45 TO 47.0

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.		Top — SHELBY
		45	SLOUGH
		46	GREEN GREY CLAY (CL)
		47	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: PT. THOMSON — JOB NO. 9612031
LOGGED BY: D.G.
DATE: 3/21/82
BORING NO.: 14 — DEPTH: 45 TO 62

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.		Top — SHELBY
		45	
		50	MATERIAL CUTTER
		55	
		60	DARK GREY SILT (ML) MEDIUM STIFF
		65	
		70	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: PT. THOMSON — JOB NO. 9612031
LOGGED BY: D.G.
DATE: 3/20/82
BORING NO.: 14 — DEPTH: 15 TO 42

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.		Top — SHELBY
		15	DARK GREY SILTY SAND SAT. (SM)
		20	MEDIUM TO COARSE
	1.0		
		30	DARK GREY SILT (ML) w/ FINE SAND THROUGHOUT
		40	

REMARKS: DIFFERS FROM BORING LOG. SOIL CHANGE NOT AS DEEP AS ANTICIPATED

LOG OF SOIL SAMPLE

PROJECT: PT. THOMSON — JOB NO. 9612031
LOGGED BY: D.G.
DATE: 3/21/82
BORING NO.: 14 — DEPTH: 75 TO 92

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
T.V.	P.P.		Top — SHELBY
		75	
	2.0	80	DARK GREY SILT (ML) w/ SAND
		90	GREEN GRAVELLY SILTY SAND (SM) GRAVEL up to 1/2"

REMARKS:

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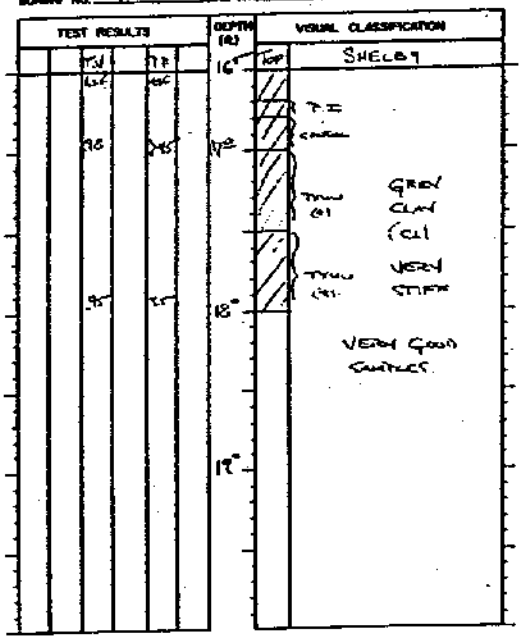
PLATE D-32

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DGB	4/82		

LOG OF SOIL SAMPLE

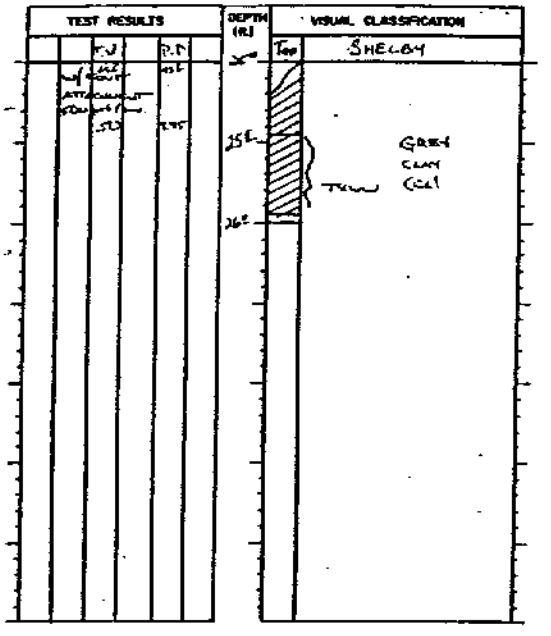
PROJECT Pt. Thomson — JOB NO. 9612031.08
LOGGED BY D.G.
DATE 3/31/82
BORING NO. 14 — DEPTH 16' — TO 18'



REMARKS

LOG OF SOIL SAMPLE

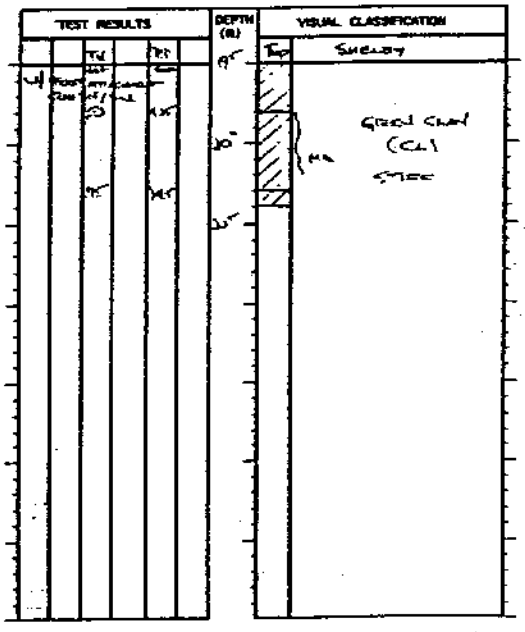
PROJECT Pt. Thomson — JOB NO. 9612031.08
LOGGED BY D.G.
DATE 4/5/82
BORING NO. 14 — DEPTH 25' — TO 26'



REMARKS

LOG OF SOIL SAMPLE

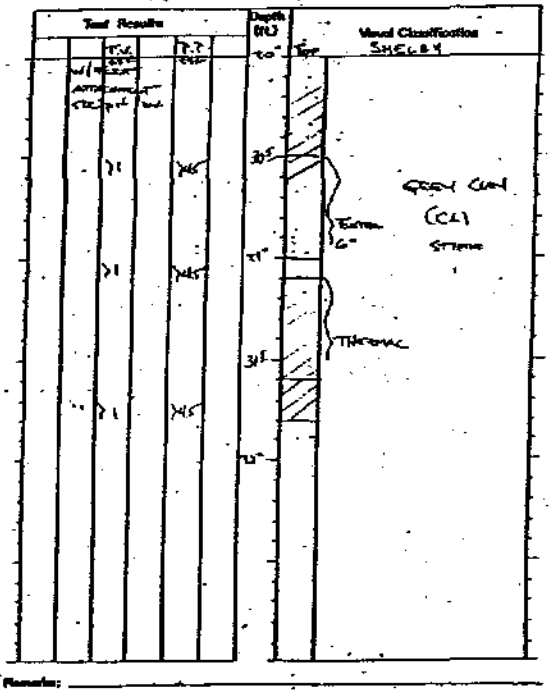
PROJECT Pt. Thomson — JOB NO. 9612031.08
LOGGED BY
DATE 4/1/82
BORING NO. 14 — DEPTH 19' — TO 20'



REMARKS

LOG OF SOIL SAMPLE

Project: Pt. Thomson — Job No. 9612031.08
Logged By D.G. — Date 4/6/82
Boring No. 14 — Depth 30' — to 31'



Remarks:

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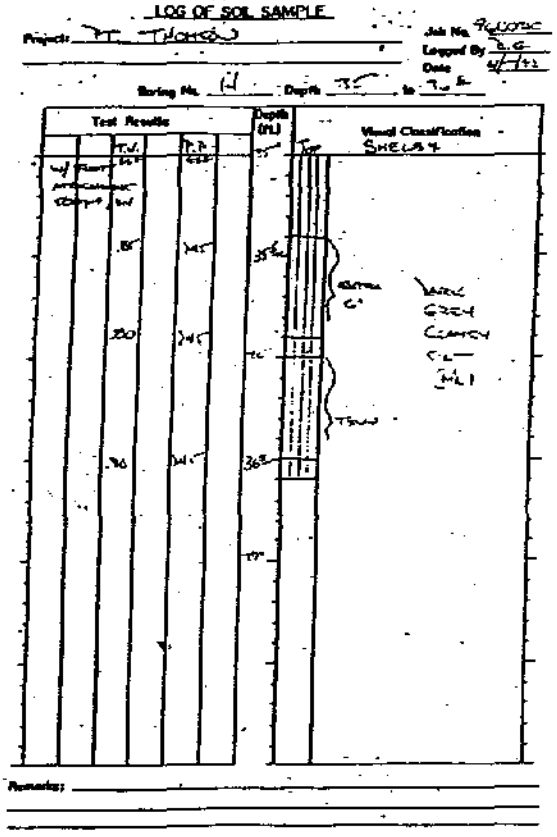
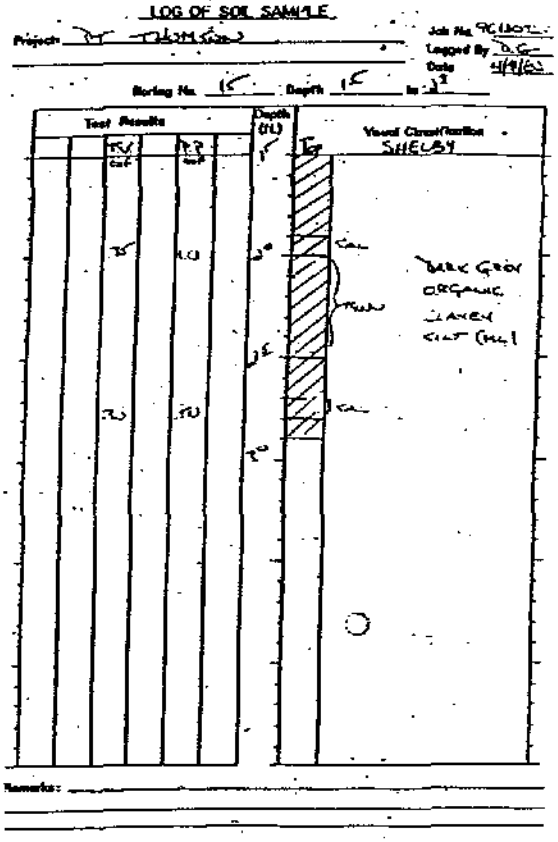
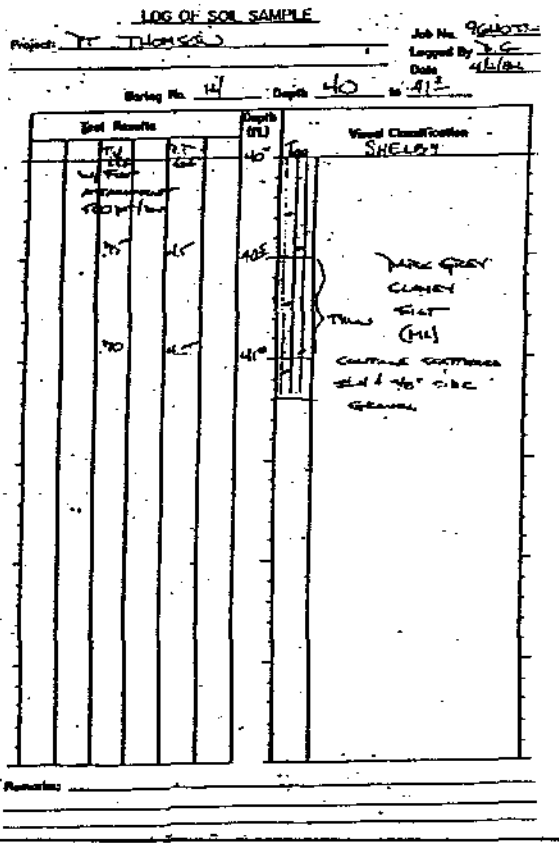
PLATE **D-33**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	PEB	4/82		







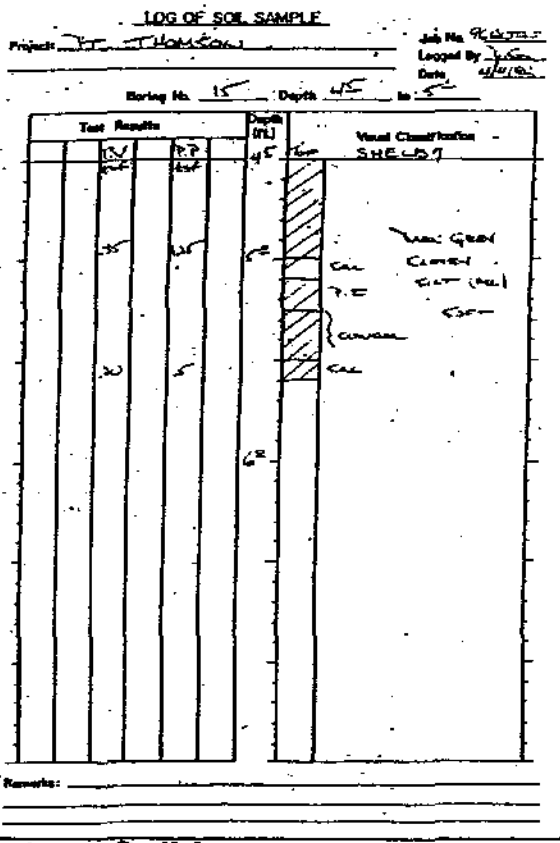


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PLATE
D-34

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DGB	4/82		

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson
JOB NO. 9612,033.08
LOGGED BY:
DATE:
BORING NO. 15 DEPTH 7.5 TO

TEST RESULTS			DEPTH (ft)	VISUAL CLASSIFICATION
			7.5	Shelby
			8.0	Gray-Blk Silt, sand
34	21		8.5	
				Blk sandy silt organic
39	25		9.0	Blk Silt highly organic PT(?)
			9.5	
			9.7	

REMARKS:

LOG OF SOIL SAMPLE

Project: Pt. Thomson
Job No.
Logged By: D.G.
Date:
Boring No. 15 Depth 7.5 to

Test Results		Depth (ft)	Visual Classification
T.V. ksf	P.P. ksf		SHELBY
			GREY SILT (ML)
			GREY SILTY SAND (SM)
			GREY SAND (SP)

Remarks: DIFFERENT FROM BORING LOG ENTRY

LOG OF SOIL SAMPLE

Project: Pt. Thomson
Job No.
Logged By: D.G.
Date:
Boring No. 15 Depth 10.5 to

Test Results		Depth (ft)	Visual Classification
T.V. ksf	P.P. ksf	10.5	SHELBY
			BLACK ORGANIC SILT (ML)
		11.0	
			GREY SILT (ML)
			(BOTTOM 6" CUT OFF TUBE DAMAGE) GREY SAND (SM)
		11.5	

Remarks:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson
JOB NO. 9612,033.08
LOGGED BY: MRM
DATE: 22 Mar. 1982
BORING NO. 16 DEPTH 0.0 TO 1.55

TEST RESULTS			DEPTH (ft)	VISUAL CLASSIFICATION
TV ksf	PP ksf		0.0	SHELBY
				BRN. GRAY SAND (SP) Med. Dense, wet, fine sand, w/ occ. shell frags to 1/8" ϕ
		SA	0.5	gravel to 1½" ϕ @ 0.5
				DK. GRAY SILTY SAND (SM) Med. Dense, w/ occ. shell frags to 1/8" ϕ
			1.0	
			1.5	

REMARKS: 2.05' @ Top, 0.5' cut off bent btm. Water leakage when uncapped. Wash bore caved to ... sand at top.

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PLATE **D-35**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DGB	4/82		

LOG OF SOIL SAMPLE

PROJECT: Pt Thomson — JOB NO. [illegible]
LOGGED BY: D.G.
DATE: 4/6/82
BORING NO.: 17 — DEPTH: 2.0 — TO: 2.5

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	2.0	Top — Shelby
	2.1	[illegible]
	2.2	[illegible]

REMARKS:

LOG OF SOIL SAMPLE

Project: Pt Thomson — Job No. [illegible]
Logged By: D.G.
Date: [illegible]
Boring No. 17 — Depth 6.0 — to 6.5

Test Results		Depth (ft)	Visual Classification
TV	PP	6.0	Top — SHELBY
		8.0	[illegible]

Remarks:

LOG OF SOIL SAMPLE

PROJECT: Pt Thomson — JOB NO. [illegible]
LOGGED BY: D.G.
DATE: [illegible]
BORING NO.: 17 — DEPTH: 3.5 — TO: 4.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
TV	PP	3.5	Top — SHELBY
		4.0	Dark green silt [illegible]
		5.0	
		6.0	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt Thomson — JOB NO. [illegible]
LOGGED BY: D.G.
DATE: 4/10/82
BORING NO.: 17 — DEPTH: 9.0 — TO: 9.5

TEST RESULTS		DEPTH (ft)	VISUAL CLASSIFICATION
TV	PP	9.0	Top — Shelby
			[illegible]

REMARKS:

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EXXON Company, U.S.A.

PLATE **D-3b**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DEB	4/82		

LOG OF SOIL SAMPLE

Project: Pt Thomson — Job No. 9612031 — Logged By: D.G. — Date: 4/7/82

Boring No. 17 — Depth 30° to 31°

Test Results					Depth (ft)	Visual Classification
	T.V. KSF		P.T. KSF		30°	Top SHELBY
	>10		>4.5		30.5	Dark Grey Clayey Silt (ML) Stiff
w/ [illegible]	>10		>4.5		31°	Contains [illegible] fine gravel

Remarks:

LOG OF SOIL SAMPLE

Project: Pt Thomson — Job No. 9612031 — Frozen — Logged By: D.G. — Date: 4/6/82

Boring No. 18 — Depth 0° to 1.2

Test Results	Depth (ft)	Visual Classification
	0°	Top Shelby
	1.0	[illegible]
	2.0	Ice [illegible]

Remarks:

LOG OF SOIL SAMPLE

Project: Pt. Thomson — Job No. 9612.033.08 — Logged By: [illegible] — Date:

Boring No. 17 — Depth 35.0 to 37°

Test Results		Depth (ft)	Visual Classification
Too stiff for small Knife	Too Stiff	35°	Top SHELBY/
		35.5	Dark Grey Layered Silt (ML) w/ gravel
		36	sample has 2 pockets of sluff and free water inside
	2.9 / 2.7	37°	Pocket pen run on end of Tube

Remarks:

LOG OF SOIL SAMPLE

Project: Pt Thomson — Job No. 9612031 — Logged By: D.G. — Date: 4/10/82

Boring No. 20 — Depth 0° to .8

Test Results		Depth (ft)	Visual Classification
T.V.	P.T.	0°	Top Shelby
1.0	>4.5		[illegible]
			[illegible]

Remarks:

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PLATE **D-37**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
[illegible]	9612,031.08	[illegible]	4/82		

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 9612031.08
LOGGED BY: DG
DATE: 4/1/82
BORING NO. 21 DEPTH 3.0 TO 5.0

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
TV / PP	3.0	Top Shelby
.70 / >4.5		Dark grey silt (ML), stiff
	3.5	
	4.0	
.35 / >4.5		
	4.5	Dark grey silt (ML), stiff
.70 / >4.5	5.0	
	5.5	
.35 / >4.5		
	6.0	

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: PT THOMSON JOB NO. 9612031.08
LOGGED BY: DG
DATE: 4/10/82
BORING NO. 21 DEPTH 9.0 TO 11.5

TEST RESULTS	DEPTH (ft)	VISUAL CLASSIFICATION
	9.0	Top Shelby
		Dark grey silty sand (SM)
	10.0	
		Dark grey silty sand (SM) wet
	11.0	
	12.0	

REMARKS:

LOG OF SOIL SAMPLE

Project: PT THOMSON Job No. 9612031.08
Logged By: DG
Date: 4/6/82
Boring No. 21 Depth 6.0 to 8.5

Test Results	Depth (ft)	Visual Classification
TV (tsf) / PP (tsf)	6.0	Top SHELBY
	6.5	Dark grey clayey silt (ML)
>4.5	7.0	
	7.5	Dark grey fine sandy silt (ML)
.55 / >4.5	8.0	
.60 / >4.5		

Remarks:

LOG OF SOIL SAMPLE

Project: PT THOMSON Job No. 9612031.08
Logged By: DG
Date: 4/6/82
Boring No. 21 Depth 11.0 to 12.5

Test Results	Depth (ft)	Visual Classification
	11.0	Top SHELBY
		Dark grey silty fine sand (SM)
	12.0	
	12.5	

Remarks: [remark handwritten; illegible]

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PLATE D-38 [last digit partly cut off]

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08		4/82		

LOG OF SOIL SAMPLE

Project: Pt. Thomson — Job No. 9612.033.08 — Logged By: T.G. — Date: 4/6/82

Boring No. 21 — Depth 15 — to 17½

Test Results					Depth (ft)	Visual Classification
		T.V. (ksf)		P.T. (tsf)	15	Top SHELBY
						DARK GREY SILTY FINE SAND (SM)
						DARK GREY SILTY CLAYEY ...
		.40		1.5		DARK GREY CLAYEY SILT (ML)
						TISSUE — DARK GREY SILTY FINE SAND (SM)
					17	

Remarks: DIFFERS FROM BORING LOG ENTRY

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson — JOB NO. 9612.033.08 — LOGGED BY: — DATE:

BORING NO. 21 — DEPTH 25 — TO

TEST RESULTS						DEPTH (ft)	VISUAL CLASSIFICATION
						25	Top SHELBY / (SLUFF)
						25½	
						26	grey fine sandy silt (ML)
							grey silty sand (SM)
							one inch lense (ML)
							grey silty sand
							silty sand (SM)
							grey fine sandy silt
							grey silty sand (SM)
							grey sandy silt (ML)
							grey silty sand (SM)
						27	end of sample

NOTE: ...

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: Pt. Thomson — JOB NO. 9612.033.08 — LOGGED BY: — DATE:

BORING NO. 21 — DEPTH 18½ — TO 19½

TEST RESULTS						DEPTH (ft)	VISUAL CLASSIFICATION
							Top SHELBY / (ML)
							END OF SAMPLE
							NOTE: No ...

REMARKS:

LOG OF SOIL SAMPLE

PROJECT: PT. THOMSON — JOB NO. 9612... — LOGGED BY: T.G. — DATE: 4/6/82

BORING NO. 21 — DEPTH 30 — TO 32

TEST RESULTS						DEPTH (ft)	VISUAL CLASSIFICATION
		T.V. (ksf)		P.T. (tsf)		30	Top SHELBY
							SLOUGH
						31	TISSUE
		.55		1.75			GREY CLAY (CL) MEDIUM STIFF
							TRIM
		.50		1.75		32	TRIM
							CAL

REMARKS:

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PLATE **D-39**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DB	4/82		

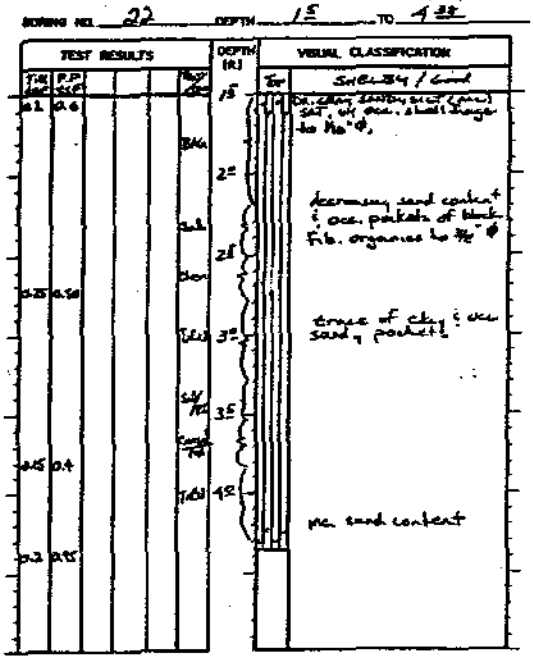
LOG OF SOIL SAMPLE

PROJECT Pt. Thomson JOB NO. 9612,033.08

LOGGED BY MRM

DATE 3/22/82

BORING NO. 22 DEPTH 15 TO 42



REMARKS -0.5'@Top, Rubble Bln

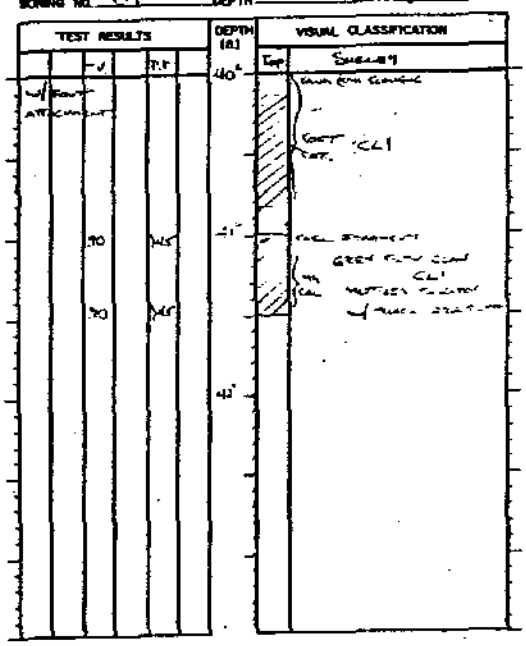
LOG OF SOIL SAMPLE

PROJECT Pt. Thomson JOB NO. 9612,033.08

LOGGED BY MRM

DATE 3/22/82

BORING NO. 21 DEPTH 40 TO 45



REMARKS

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PLATE **D-46**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DEB	4/82		

Torvane and pocket penetrometer readings were performed on all fine-grained soil samples; the values obtained are shown on the laboratory soil logs. However, because of the character of the soils encountered within the project area, these values should be used only to compare the relative consistencies of the soil samples.

Three types of samples were preserved for future use:

Jar Samples. Samples to be saved for primary testing were stored in glass jars. These samples were generally 2 to 4 inches high. The tops of the jars were secured and sealed with electrical tape.

Split Tubes. Some soil samples were preserved in split tubes. These tubes, constructed of brass, are 6 inches long and have an inside diameter of 2.87 inches. The tubes were split in half lengthwise and the soil sample was placed within the split tube. The ends and seams of the tubes were then covered with plastic caps and taped.

Bag Samples. In some cases, there was excess material after all of the desired test specimens were removed. If this remaining material was not suitable for long-term storage in jars or split tubes, it was preserved in a sealed plastic bag and stored as discussed above.

Whenever possible, Shelby tube samples were not extruded until just prior to testing. This procedure kept moisture loss and disturbance of test specimens to a minimum and eliminated the need for sealing the temporary storage containers with wax.

C. Primary Testing of Offshore Materials

1. Moisture Content/Dry Density

Moisture content and dry density tests were performed to evaluate the natural water content and dry density of the soils encountered. These tests served as a basis for correlating the soil engineering characteristics determined from other laboratory tests. Generally, the wet density of a sample was determined by calculating its volume and weight. The specimen was then dried at 105°C, and the weight loss was used for determining the moisture content and dry density.

Moisture content and dry density was determined for all secondary test specimens. Additional moisture-density tests were performed as required to establish moisture and density profiles. The moisture contents and dry densities are reported on the test data sheets, laboratory test summaries and on the test boring logs in Appendix B.

The data indicate that the natural moisture contents of surficial fine-grained sediments generally vary between 15 to 35 percent. In the underlying gravels, the moisture contents are generally less than 15 percent. There appears to be no distinct variation in moisture content with depth at any of the test borings.

The boring logs summarize the variation in dry density with depth. Table IV-6 presents the range in dry density for different soil types.

2. Organic Content

The organic content of selected specimens was determined by the "Standard Method of Test for Organic Content of Soils" (State of Alaska, 1980), also known as the organic ignition test. The sample to be tested was

oven-dried for 24 hours at a temperature of 105°C, and the dry weight was recorded. The sample was then weighed to the nearest 0.1 gram and placed in a tared crucible. Next, the crucible containing the sample was placed in a muffle furnace at a temperature of 950°C ±50°C until all organic matter was combusted. Combustion usually occurred within one to two hours. After cooling the sample to room temperature it was weighed and the percentage of organic material lost by ignition was calculated.

The organic contents are listed in the laboratory test summaries presented in this appendix and on the test boring logs in Appendix B. If the organic contents exceeded five percent by weight, the modifier "O" or term "organic" is used to describe the soil type.

Although deltaic and marine soils commonly contain high percentages of organic material (Kolb, 1967; Moore, 1977), the high compressibility, low shear strength, and high moisture content commonly associated with highly organic soil were not observed. The organic content of the samples that were tested ranged from 12 to 16 percent. Although these soils did exhibit a decreased density and an increased moisture content, when the behavior of the organic silts is compared with that of the non-organic silts, there was neither a noticeably reduced strength nor a significantly increased compressibility.

It has been reported in the literature that when the organic content of a soil is less than about 20 percent, the effect of the organic material is less important than that of minor mineralogical or structural differences (Franklin et al., 1973). The soils tested for this project commonly contained

varying percentages of sands, silts, and clays. It appears that these mineralogical differences have a greater influence on the mechanical properties of the soil than do the percentages of organic materials.

3. Particle Size Analysis

Particle size is important because of its influence on the drainage, shear strength, and compaction characteristics of a soil. Furthermore, the distribution of particle sizes, i.e., gradation, will affect the in situ density of natural deposit of granular soils, in addition to being an indicator of frost susceptibility and stratigraphy. In general, coarse-grained soils drain more freely, have higher shear strengths, and are more readily compactible than fine-grained materials. Also, well graded, granular soil typically has a higher density and a higher shear strength than poorly graded, fine soil.

The quantitative distribution of particle sizes was determined for representative samples by performing sieve and hydrometer tests. Additional samples were also tested to determine only the percentage of material passing the No. 200 sieve size. Samples on which these tests were performed are indicated on the test boring logs in Appendix B. Those tested by mechanical analysis, including a hydrometer test, are marked "MA". The percentage of material passing the No. 4 and No. 200 sieve sizes is also listed on the logs. A summary of the particle size analysis tests is presented on Plates D-41 through D-47. Plate IV-15 presents a graphical summary of the test results.

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)													
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
1	13.5	SP												4.6		
	18.5	SP-SM			100	96	96	78	58.4	47.4	44.0	39.1	15.7	7.8	5.0	0.9
	23.5	SP-SM												11.3		
	28.5	SM				100	97	82	61.4	47.1	42.1	36.1	18.4	13.6		
	33.5	SM												13.8		
	38.5	SM					100	83	56	43.9	39.5	33.7	17.3	13.3		
	48.5	SM				100	98	76	49	37.3	33.6	29.3	16.4	12.7		
2	0.3	SP						100	99.8	99.7	99.3	96.6	17.8	2.3	1.0	0.8
	2.2	SM				100	98	89	83.8	79.5	76.7	72.1	27.0	13.5		
	2.8	SP-SM												8.6		
	3.5	SP						100	99.9	98.5	94.9	79.3	9.0	3.9		
	3.9	SP-SM												10.9		
	10.7	ML									99.8	--	98.4	84.8	23.0	10.5
	26.5	ML							100	99.9	99.9	99.7	98.7	92.6		
	46.7	ML												97.3		
	60.5	SM				100	99	90	86.6	85.7	84.4	79.1	45.5	30.7		
	66.5	GP												1.8		
3	1.5	SP				100	96	65	43.3	33.8	30.5	25.8	9.9	4.6		
	6.0	SP												0.7		
	9.0	GP-GM		100	92	79	71	44	33.5	30.6	29.6	27.8	12.7	7.4		
	15.0	SP			100	95	92	81	76.6	75.4	74.2	63.4	4.4	2.2		
	30.0	GP-GM			100	90	78	50	32.6	24.5	21.9	18.7	8.4	5.7		

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PLATE
D-41

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08		4/82		

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)														
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
4	1.1	SM												21.4		
	1.7	SP						100	99.8	99.6	99.1	97.0	15.0	2.0		
	13.8	ML							99.8	99.8	99.8	99.6	98.2	90.1	49.8	21.8
	26.0	SM				100	98	93	89.8	88.1	87.0	85.3	58.1	40.2		
	30.0	ML												65.6		
	44.5	ML					100	99	99.3	98.9	98.4	97.5	81.3	74.9		
	50.0	SP												2.8		
5	0.1	SP-SM				100	93	86	82.5	80.4	78.5	75.2	17.0	9.6		
	4.0	SP												3.5		
	6.5	SM												22.0		
	10.0	SP												1.1		
	45.5	CL								100	99.8	99.8	99.6	98.4	67.2	28.4
	46.0	ML						100	99.8	99.8	99.8	99.8	99.6	99.0	58.6	25.2
6	0.1	SM							100	99.9	99.7	99.6	95.7	50.7		
	4.1	ML												84.9		
	5.3	SP-SM			100	98	92	78	71.0	67.6	66.1	63.7	33.8	9.5	5.2	2.3
	6.7	ML												52.7		
	14.3	ML									99.4	---	98.6	98.2	62.0	24.0
	21.7	ML							100	99.8	99.6	99.6	98.4	95.8	51.2	21.5
	35.5	GP-GM			100	91	74	44	31.4	24.2	21.4	17.4	7.7	5.3		
	40.5	GP												2.8		

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PLATE **D-42**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)													
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
7	9.0	SM					100	92	83.8	78.5	75.9	69.3	36.7	21.7		
	34.0	SP-SM												7.4		
	39.0	SM				100	99	76	57.1	44.0	40.1	35.2	22.2	17.7		
	44.0	SM												19.4		
	49.0	SM			100	97	89	59	41.3	33.9	31.5	28.6	19.6	15.5		
8	0.1	GM	100	78	78	73	65	56	51.1	49.4	48.6	46.4	35.0	29.3		
	3.0	SP		100	97	97	96	85	77.1	68.6	63.1	50.4	11.5	4.6		
	5.0	SP		100	90	80	---	60	29.8	29.0	28.7	27.6	12.1	3.6		
	24.0	SM			100	92	92	90	89.3	88.3	87.9	87.4	84.0	47.0		
	25.0	SM												36.4		
	37.0	SP-SM			100	97	88	60	48.4	43.5	40.8	36.0	14.5	7.1		
9	0.0	SM						100	99.9	99.8	99.8	99.8	81.0	36.5		
	7.0	ML									99.5	---	93.2	59.4	22.0	9.0
	25.0	ML												67.4		
	30.0	SM												38.8		
	36.0	SM												23.6		
	41.4	CL							100	99.8	99.8	99.6	99.4	98.2	71.2	37.8
	61.0	GP			72.2	59.9	34.1	3.9	1.3	1.2	0.9	0.9	0.4	0.2		
10	0.5	SP-SM							100	99.9	99.5	96.3	12.4	8.9		
	3.0	SP-SM												10.2		
	8.5	SP-SM					100	99.9	99.9	99.5	98.8	93.0	15.2	10.7		

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PLATE
D-43

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DEB	4/82		

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)													
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
11	4.0	GP		100	94	94	64	23	11.1	7.4	6.4	5.3	1.8	1.0		
	10.0	GP		100	96	89	57	18	11.3	8.6	7.5	5.9	1.7	0.9		
	15.0	GP				93	85	49	28.8	25.2	24.2	22.7	7.9	3.5		
	17.0	GP												2.3		
	22.0	GP						32	7.0	3.5	2.8	2.3	1.0	0.7		
	30.5	SP												0.5		
	34.0	GP												1.1		
	34.5	SP-SM												9.7		
	41.0	GP-GM		100	97	93	76	42	29.5	25.9	24.9	23.9	15.5	8.1		
	49.0	SP		100	94.8	90.6	82.5	58.7	50.1	44.7	41.1	31.7	7.2	3.9		
12	9.0	SM				100	99	97	96.2	95.9	95.5	92.1	48.5	17.4		
	14.4	GM			100	87	86	57	50.2	46.5	45.2	43.4	24.0	14.5		
	19.0	SP-SM												11.3		
	24.0	SP-SM												9.3		
13	3.8	GP-GM			100	91	80	51	36.5	30.1	27.9	23.7	9.7	7.2		
	6.5	SM												16.1		
	10.0	SM			100	97	95	78	62.6	53.4	50.3	45.2	18.0	12.5		
	27.0	SP-SM												11.5		
	32.0	SM		100	88	86	77	55	44.7	37.5	35.0	31.6	16.5	13.3		
	42.0	SM												12.6		
	50.0	SP-SM				100	97	66	44.5	35.4	32.4	28.5	14.5	10.9		

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PLATE
D-44

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	JPB	4/82		

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)													
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
14	1.5	SM					100	99	98.9	98.9	98.8	98.7	72.0	27.1		
	11.0	SM				100	99	89	85.8	84.7	83.6	80.4	45.9	27.9		
	45.0	GM	100	75	75	75	69	53	50.8	49.8	49.5	48.9	44.1	31.4		
	50.0	GP				84	69	36	20.6	14.3	12.4	10.2	3.6	2.0		
15	7.5	SM									99.8	99.7	87.5	47.8	16.0	8.0
	8.4	MH												83.1		
16	0.1	SP-SM		90	84	82	80	77	76.1	74.3	70.7	56.4	22.6	8.7		
	1.1	SM												39.9		
	5.0	ML												93.1		
	9.0	SM												39.1		
	15.0	ML												67.4		
	17.5	SM										100	94.3	48.8		
17	6.2	ML					100	99	99.5	99.3	99.3	98.9	95.5	93.3	53.3	21.9
	9.4	GM				100	90	56	51.2	50.3	50.1	49.6	44.8	39.6		
	11.5	GP												0.4		
	40.7	GP-GM			100	93	82	42	24.3	18.1	16.3	14.5	10.1	7.1		

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Particle Size Analysis
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE
D-45

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
X	9612,031.08	DBB	4/82		

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)													
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
18	18.5	GP-GM												5.7		
	23.5	SP-SM			100	96	87	54	34.2	26.4	23.5	19.7	8.9	6.5		
	33.5	SP-SM		100	81	76	73	57	43.2	35.2	32.0	27.3	13.0	9.7		
	38.5	SP-SM												7.8		
	43.5	SP-SM				100	98	68	46.2	36.3	32.9	28.4	14.4	11.0		
	48.5	SP-SM												10.4		
19	0.1	SP				99	95	91	78.0	65.9	60.3	45.9	1.8	1.1		
	4.0	SP				100	99	86	72.4	63.9	59.0	43.3	4.0	3.0		
	12.0	SP-SM												5.5		
20	0.1	ML				100	98	96	96.0	95.9	95.7	95.4	93.1	90.7		
	6.5	GP-GM		100	90	84	79	51	34.7	27.1	24.5	20.9	10.8	6.7		
	11.5	GP			100	72	77	25	10.3	6.7	5.9	4.7	1.5	0.9		
	40.0	SP-SM				100	93	59	40.1	28.2	24.3	20.1	8.5	6.1		
21	0.1	SP-SM												6.4		
	0.5	SP-SM						100	99.4	98.9	98.3	96.4	48.9	7.9		
	2.0	SP-SM							100	99.9	99.7	99.1	60.5	9.0		
	4.7	ML									100	99.8	99.6	97.9	67.8	32.7
	25.0	ML									100	--	99.7	94.4	40.7	16.0
	62.0	SC					100	98	89.0	75.2	63.6	49.4	35.4	25.5	16.4	8.0

SAMPLE DESIGNATION			PARTICLE SIZE ANALYSIS (% Passing)													
BORING NO.	DEPTH (ft)	USCS CLASS.	2"	1-1/2"	1"	3/4"	1/2"	No. 4	No. 10	No. 20	No. 30	No. 40	No. 100	No. 200	.02 mm	.005 mm
22	2.2	SM						100	99.5	99.1	98.9	97.9	93.5	49.1	21.6	9.7
	3.5	ML						100	99.9	99.9	99.9	99.5	97.3	71.6	31.2	13.3
	12.0	SP-SM												10.3		
	13.0	SP				100	98	66	12.3	5.2	3.9	2.9	1.4	0.9		
	20.0	SP				100	94	63	14.4	6.5	4.9	3.5	1.3	0.8		
	30.0	GP			100	97	87	46	25.5	14.4	11.4	8.5	2.7	1.5		
	40.0	GP-GM												5.9		
	50.0	GP				93	88	37	14.5	7.8	6.2	4.9	2.4	1.6		
23	10.8	ML						100	99.7	98.9	98.6	98.1	94.1	88.4		
	29.0	SM									100	99.9	--	15.5		

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Particle Size Analysis
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

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DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612.031.08	DEB	4/82		

Plate IV-15 shows that the gravels (GP) are generally smaller than two inches in diameter, and that they have a mean grain size of about 1/4 inch. The gravels also contain a relatively high percentage of sand and a silt content varying between 5 and 30 percent but generally less than 5 percent. The sands encountered within the project area are fine to coarse grained and typically contain 5 to 50 percent silt. The silts encountered contain varying amounts of sand, ranging from less than 5 and up to 50 percent by weight. Finally, the clays generally contain substantial amounts of silt.

4. Liquid and Plastic Limits

The liquid and plastic limits, i.e., the moisture contents at which liquid and plastic behavior occur, were determined for selected fine-grained soil samples. These two parameters, along with the shrinkage limit, are known as the Atterberg limits. Atterberg limits are used to classify fine-grained soils by measuring differences in mechanical behavior and to aid in estimating the overconsolidation and compression indexes of the material. In classifying fine-grained soils, Atterberg limits are used instead of grain size distribution because it is possible to have two soils, such as clay and fine "rock flour", with similar grain size distributions, yet each exhibits a significantly different mechanical behavior.

Another term that is used to describe the behavior of fine-grained soils is "degree of plasticity". Leonards (1962) relates the plasticity index (liquid limit minus the plastic limit) to the degree of plasticity as follows:

Plasticity Index	Degree of Plasticity
05	non-plastic
5-15	moderately plastic
15-40	plastic
greater than 40	highly plastic

All of the data from these tests are plotted on Plate IV-16, and a numerical summary of the Atterberg limits is presented in the Laboratory Test Summary. Generally, the fine-grained soils in the project area range from non-plastic to moderately plastic. Both silts and clays were encountered, the silt being more plastic than the clay.

5. Specific Gravity

Specific gravity tests were performed to determine the specific gravity, G_s, of the soil constituents of all secondary tests. Additional tests were performed as required. The measured values are shown on the appropriate data sheets, and the results of the tests are summarized below:

Classification	Average
SAND (SP)	2.69
SILTY SAND (SM)	2.70
SILT (ML)	2.70
CLAY (CL)	2.75
GRAVEL (GP)	2.69

These values are within the range considered normal for these soil types.

6. Chemical Tests

Chemical testing of the pore fluids was performed by Chemical and Geological Laboratories of Alaska, Inc. in Anchorage. For these tests the pore water conductivity and total soluble salt concentration were measured using titration methods and the representative freezing point depression (FPD) was determined using standard seawater salt concentration - FPD relationships. The results of these tests are presented on Plate D-48.

Interpretation of the test results was not within the scope of our services. For a detailed discussion of interstitial water chemistry in the Prudhoe Bay region, the reader is referred to Page and Iskandar (1978) and Iskandar, Osterkamp, and Harrison (1978).

7. Electrical Conductivity Tests

The electrical conductivity of selected specimens was measured to determine the salinity of the interstitial fluids. With the salinity known, the freezing point depressions were calculated. The results of the electrical conductivity tests along with the results of tests performed by Chemical and Geological Laboratories of Alaska, Inc. are shown on Plates D-49 and D-54.

The general test procedure is as follows:

1. Approximately 100 grams of material is removed from a representative sample and weighed.

2. Approximately 100 grams of distilled water is added to the soil to create a solution. The solution is placed in a constant temperature bath that is maintained at 25°C.

3. A YSI Conductivity Bridge is inserted into the prepared solution, and the electrical conductivity is recorded.

4. The solution is weighed and oven-dried to determine the moisture content.

Boring No.	Depth (Ft)	USCS	Bonded	Conductivity (mmhos/cm)	Freezing Point Depression (°C)	Interstitial Water Analysis (ppt)							Total Salts (ppt)
						Na	K	Ca	Mg	SO_4	CL	HCO_3	
2	2.7	SP-SM	No	45.45	1.90	10.460	0.365	0.420	0.950	1.700	18.310	0.730	32.935
5	2.0	SP-SM	Yes	90.90	3.95	23.080	0.560	0.900	2.240	2.465	41.820	1.030	72.095
5	8.0	SM	Yes	108.70	5.02	29.690	0.840	1.110	2.720	3.670	53.180	0.975	92.185
9	4.4	SM	No	50.00	2.10	11.72	0.380	0.300	0.985	1.200	20.440	0.870	35.895
10	15.0	SM	No	90.90	3.85	21.87	0.520	0.810	2.730	2.440	41.330	0.810	70.510
16	0.8	SP-SM	No	40.80	1.70	9.330	0.465	0.490	0.760	1.480	16.050	1.290	29.865
19	2.2	SP	Yes	8.33	0.35	0.920	0.515	0.810	0.465	1.090	0.670	5.550	10.020
21	2.5	SP-SM	No	46.50	1.95	10.680	0.350	0.455	0.970	1.660	18.740	0.790	33.645
22	2.2	SM	No	46.50	1.95	10.770	0.525	0.965	0.960	2.410	18.540	0.850	35.020
22	2.7	ML	No	45.45	1.90	10.950	0.470	0.295	0.730	1.330	18.430	0.960	33.165

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Chemical Analysis Summary

Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE
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DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08		4/82		

Boring No.	Depth (ft)	USCS	Bonded	Moisture Content (%)	Electrical Conductivity (mmhos/cm)	FPD* (°C)
2	0.9	SP	No	22.0	52.32	2.13
2	2.7**	SP-SM	No	---	45.45	1.90
2	3.0	SP-SM	No	23.0	49.67	2.02
2	8.4	ML	No	33.4	50.67	2.06
2	10.5	ML	No	30.6	46.42	1.88
2	14.4	ML	No	28.7	40.75	1.64
2	18.5	MH	No	51.8	29.92	1.17
2	19.0	ML	No	46.2	35.01	1.39
2	30.0	SM	No	16.0	36.26	1.44
2	40.7	ML	No	8.2	68.91	2.83
2	60.5	SM	No	13.0	48.07	1.95
2	66.5	GP	No	17.7	48.26	1.97
3	0.0	ML	No	37.9	44.25	1.78
3	1.5	SP	No	10.6	45.70	1.85
3	3.5	SP	No	18.3	48.16	1.95
3	4.5	SP	No	2.2	57.23	2.34
3	6.0	SP	No	9.9	52.48	2.14
3	9.0	GP-GM	No	8.6	54.87	2.24
3	12.0	SP	No	6.5	51.93	2.12
3	15.0	SP	No	22.4	50.48	2.06
3	19.0	GP	No	8.6	51.56	2.10
3	30.0	GP-GM	No	5.8	50.76	2.07
3	50.0	GP-GM	Yes	4.0	30.42	1.19
4	2.8	ML	No	24.5	46.27	1.87
4	9.5	ML	No	43.8	44.44	1.79
4	12.0	ML	No	41.0	43.84	1.77
4	20.2	ML	No	69.0	47.42	1.93
4	25.5	SM	No	9.8	44.34	1.79
4	49.5	SP	No	21.9	53.10	2.18
5	0.1	SP-SM	Yes	27.1	61.47	2.52
5	0.5	SP-SM	Yes	16.2	54.32	2.22
5	2.0**	SP	Yes	14.0	90.90	3.95
5	4.5	SM	Yes	36.4	26.28	1.01
5	6.5	SM	Yes	18.3	107.94	4.04
5	8.0**	SM	Yes	13.5	108.70	5.02

* Calculated according to Page & Iskandar, 1978, other relationships are available.

** Chemical Analysis Data

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Electrical Conductivity Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE **D-49**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9612,031.08	DKB	4/82		

Boring No.	Depth (ft)	USCS	Bonded	Moisture Content (%)	Electrical Conductivity (mmhos/cm)	FPD* (°C)
5	10.0	SP	No	6.9	21.15	0.79
5	16.0	ML	No	33.0	83.66	3.37
5	16.5	ML	No	52.0	17.60	0.65
5	20.3	CL	No	42.3	78.10	3.17
5	31.1	ML	Yes	43.6	42.89	1.73
5	45.5	CL	Yes	41.9	28.13	1.09
5	51.0	CL	Yes	27.0	37.85	1.52
6	0.1	SM	No	31.6	48.57	1.97
6	0.5	SM	No	22.5	47.32	1.92
6	1.0	SM	No	22.5	48.10	1.95
6	3.5	ML	No	29.2	47.27	1.91
6	4.1	ML	No	34.7	52.06	2.12
6	5.2	ML	No	21.3	48.36	1.96
6	6.5	SP-SM	No	18.7	50.08	2.04
6	7.2	SP-SM	No	7.4	95.87	3.75
6	9.2	SM	No	11.4	49.41	2.01
6	12.5	ML	No	24.1	48.69	1.98
6	14.1	ML	No	25.1	34.05	1.34
6	14.7	ML	No	23.3	37.09	1.47
6	21.4	ML	No	26.4	47.72	1.94
6	35.5	GP-GM	No	6.7	52.45	2.15
8	0.1	GM	No	31.8	49.61	2.02
8	3.0	SP	No	15.4	51.24	2.09
8	5.0	SP	No	9.5	55.94	2.29
8	7.0	SP	No	8.0	54.88	2.24
8	8.5	SP	No	9.2	60.17	2.47
8	9.0	SP	No	15.3	72.53	2.96
8	10.2	ML	No	25.6	78.68	3.19
8	13.0	ML	No	25.3	79.27	3.21
8	14.9	ML	No	28.8	52.37	2.14
8	18.0	ML	No	23.3	63.09	2.59
9	0.1	SM	No	19.7	48.46	1.97
9	4.4**	SM	No	---	50.00	2.10
9	5.0	SM	No	22.5	52.39	2.14
9	5.6	ML	No	22.6	50.01	2.03
9	6.6	ML	No	28.2	53.06	2.17
9	7.3	ML	No	28.2	39.77	1.59

* Calculated according to Page & Iskandar, 1978, other relationships are available.

** Chemical Analysis Data

Harding Lawson Associates
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Electrical Conductivity Summary
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

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JOB NUMBER	APPROVED	DATE	REVISED	DATE
9612,031.08	DKB	4/82		

Boring No.	Depth (ft)	USCS	Bonded	Moisture Content (%)	Electrical Conductivity (mmhos/cm)	FPD* (°C)
17	7.3	SM	No	50.1	37.42	1.49
17	9.4	GM	No	17.2	48.65	1.98
17	10.0	GM	No	19.4	50.24	2.04
17	25.7	ML	No	22.7	67.22	2.76
19	2.2**	SP	Yes	---	8.33	0.35
19	4.8	SP	Yes	15.0	3.76	0.12
19	6.0	SP	Yes	22.5	9.01	0.31
19	8.0	SP	Yes	24.8	80.97	3.27
19	9.5	SP	Yes	20.2	45.72	1.85
19	12.0	SP-SM	Yes	24.8	91.24	3.62
19	14.0	SP-SM	Yes	25.9	93.16	3.67
19	15.0	SP-SM	Yes	21.4	129.04	4.30
19	16.0	ML	Yes	30.4	130.12	4.30
19	16.5	ML	Yes	26.8	110.15	4.09
19	24.5	ML	Yes	36.2	73.75	3.01
19	29.0	ML	Yes	48.9	62.21	2.56
19	49.5	ML	Yes	21.9	60.54	2.49
20	0.2	ML	No	53.8	46.17	1.87
20	2.5	SM	No	42.9	44.76	1.81
20	4.0	GP	No	6.6	55.63	2.27
20	6.5	GP-GM	No	6.5	47.95	1.94
20	8.0	GP	No	8.0	50.87	2.07
20	10.0	GP	No	4.8	52.37	2.14
21	0.1	SP-SM	No	22.9	49.09	1.99
21	1.5	SP-SM	No	21.7	38.30	1.52
21	2.5**	SP-SM	No	---	46.50	1.95
21	3.1	CL	No	20.6	36.24	1.43
21	4.5	ML	No	19.6	39.07	1.56
21	5.8	ML	No	20.8	48.67	1.98
21	6.7	ML	No	21.5	37.36	1.48
21	8.2	ML	No	16.8	52.89	2.16
21	9.6	SM	No	31.2	61.15	2.51
21	10.6	SM	No	30.6	62.26	2.55

Calculated according to Page & Iskandar, 1978, other relationships are available.

* Chemical Analysis Data

Boring No.	Depth (ft)	USCS	Bonded	Moisture Content (%)	Electrical Conductivity (mmhos/cm)	FPD* (°C)
21	12.9	ML	No	25.7	63.82	2.62
21	16.8	SP-SM	No	30.2	70.69	2.89
21	19.0	ML	No	22.4	64.36	2.64
21	25.9	ML	No	25.2	77.22	3.14
21	32.5	CL	No	26.2	70.94	2.91
21	41.0	CL	No	24.1	38.29	1.53
21	62.0	SC	No	18.7	50.07	2.05
22	1.0	SM	No	24.8	45.77	1.85
22	2.2**	ML	No	---	46.50	1.95
22	2.5	SM	No	24.5	49.41	2.01
22	2.7**	SM	No	25.8	45.45	1.90
22	3.3	ML	No	27.4	46.66	1.89
22	5.0	ML	No	43.7	47.19	1.91
22	7.5	CL	No	52.3	47.58	1.93
22	11.5	SP	No	9.2	49.66	2.02
22	13.0	SP	No	9.1	50.16	2.04
22	15.5	SP	No	8.3	55.37	2.27
23	0.3	ML	Yes	29.5	3.62	0.11
23	6.3	ICE	Yes	---	0.33	0.01
23	8.3	ICE	Yes	---	0.33	0.01
23	10.3	SM	Yes	41.6	17.60	0.64
23	14.5	CL	Yes	30.8	36.45	1.45
23	29.0	SM	Yes	23.7	10.02	0.35
23	49.0	CL	Yes	29.3	35.46	1.41

* Calculated according to Page & Iskandar, 1978, other relationships are available.

** Chemical Analysis Data

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Electrical Conductivity Summary
Pt. Thomson Development Project
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PLATE
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DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		

The diluted electrical conductivity measurements were converted to a salinity value using the sea water-equivalent salinity content and the para-conductivity relationship that is presented in the Handbook of Chemistry and Physics (1976).

This diluted salinity value was then corrected to represent the salinity of the natural moisture content by applying Equation D-1 and the freezing point depression was calculated by applying the relationship presented in Equation D-2 (Page and Iskandar, 1978).[1] A discussion of the significance of salinity on the freezing point of soil is presented in Chapter IV.

$$C_1 V_1 = C_2 V_2 \qquad \text{(D-1)}$$

Where C_1 = Salinity concentration before dilution, ppt

V_1 = Volume before dilution, gm

C_2 = Salinity concentration after dilution, ppt

V_2 = Volume after dilution, gm

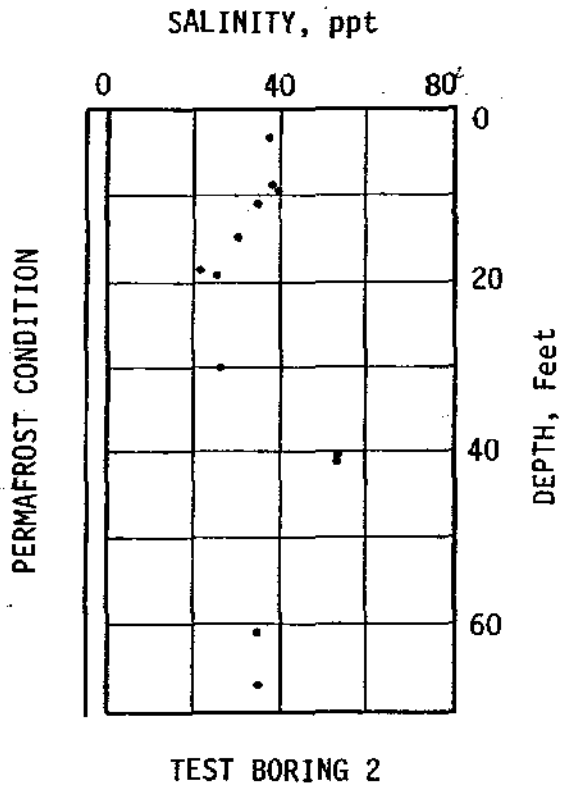
$$FPD = 0.00249 - 0.0533C_1 - 0.0000764C_1^{\,2} + 0.00000187C_1^{\,3} \qquad \text{(D-2)}$$

Where FPD = freezing point depression in degrees centigrade

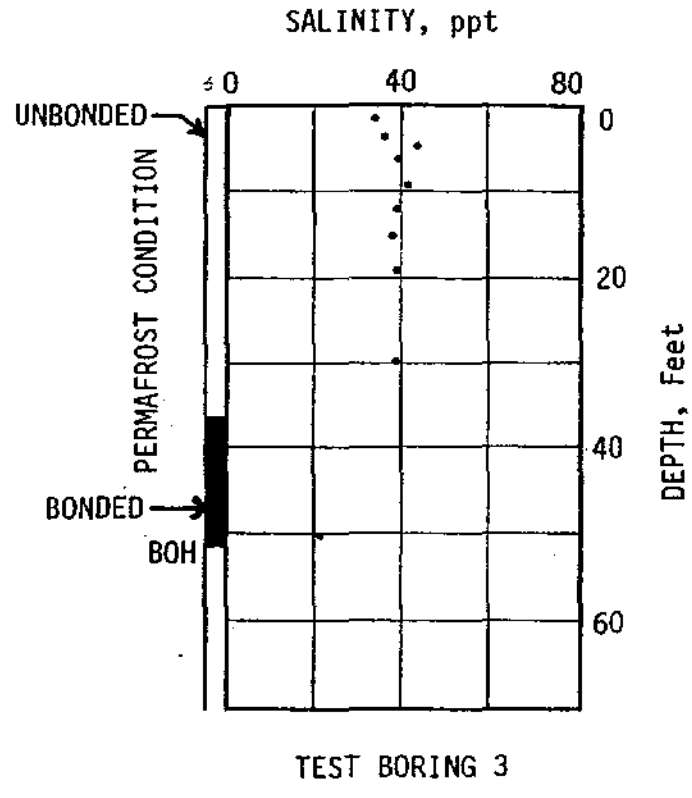
The calculated salinity values for each boring are presented on the Salinity Profile sheets, Plates D-55 through D-59. The calculated freezing point depression values are plotted with measured ground tempeatures on Plate IV-12.

---

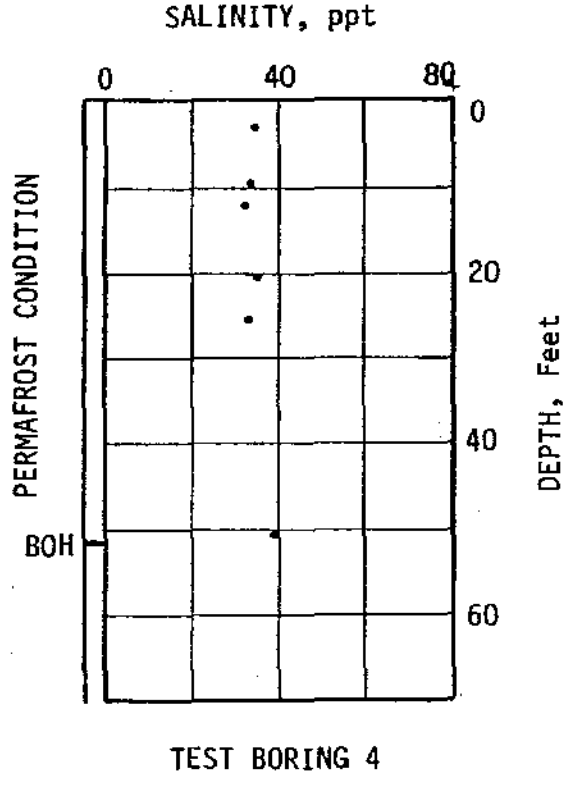
(1) Other relationships exist to compute the freezing point depression.



TEST BORING 2



TEST BORING 3



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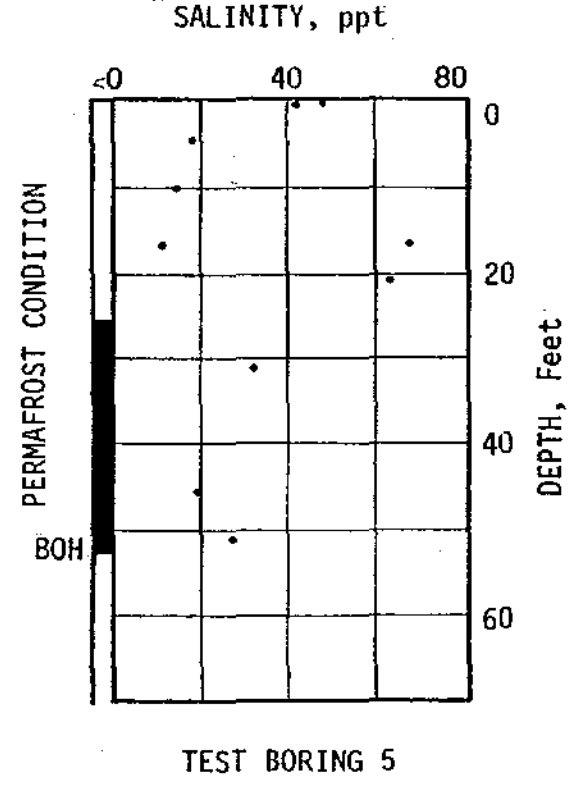

TEST BORING 5

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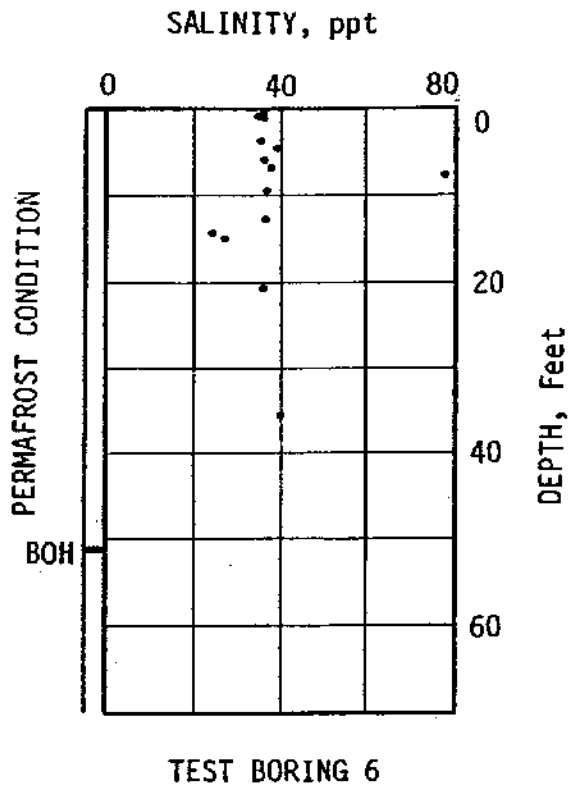
SALINITY PROFILES

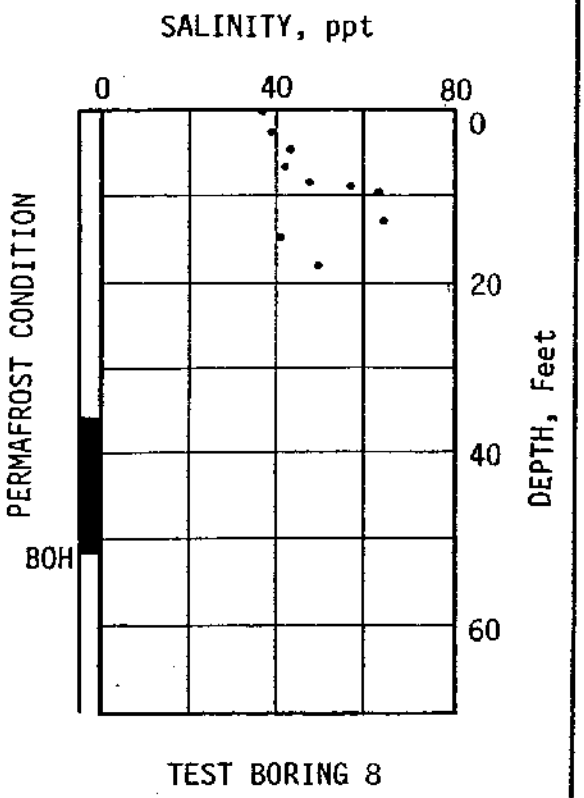
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE
D-55

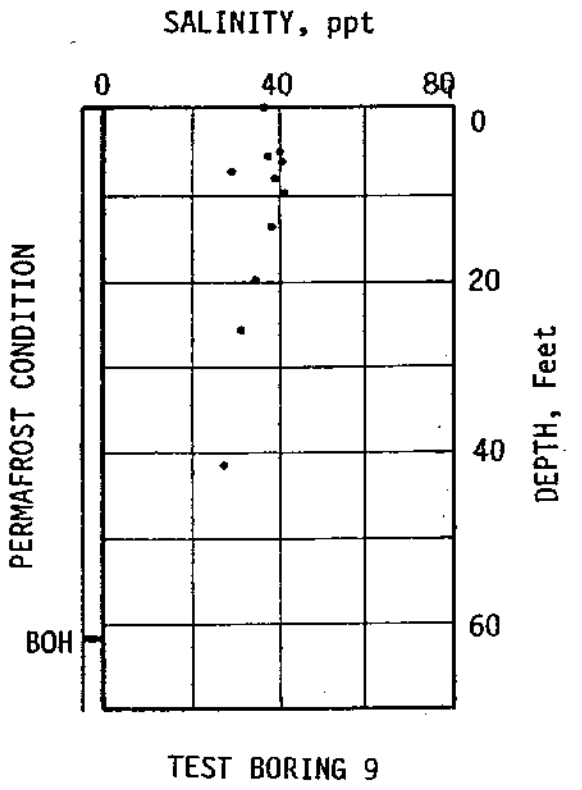
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DGB	4/82		



TEST BORING 6



TEST BORING 8



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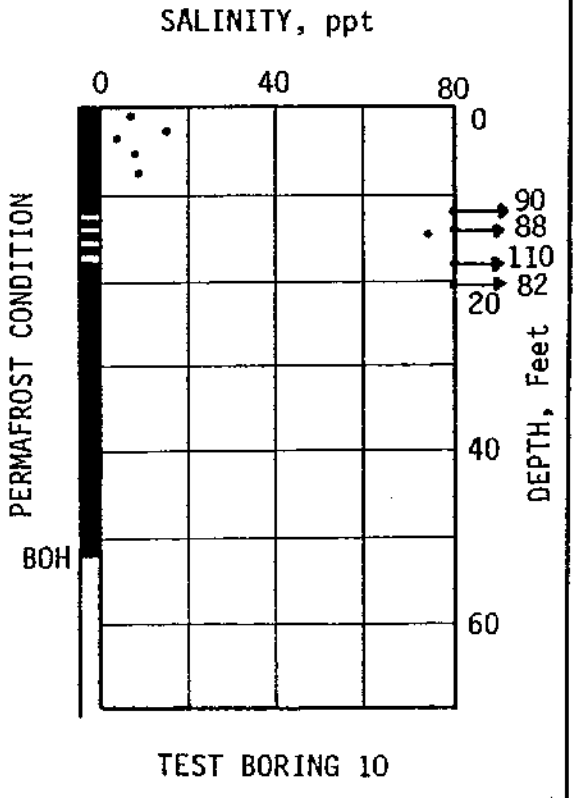

TEST BORING 10

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PLATE
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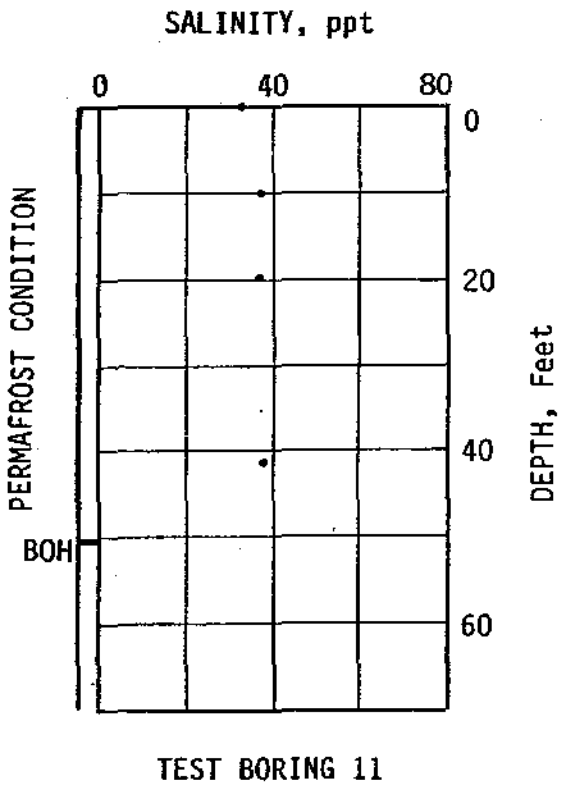
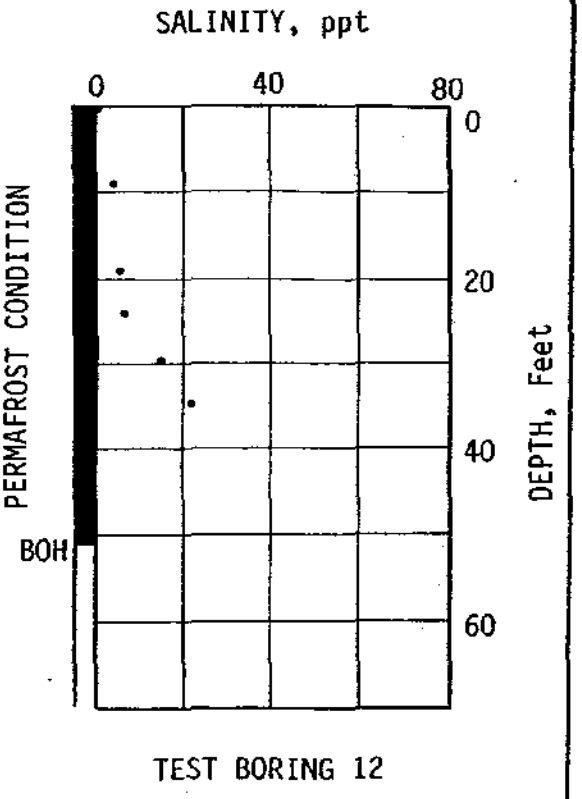
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DCB	4/82		



TEST BORING 11



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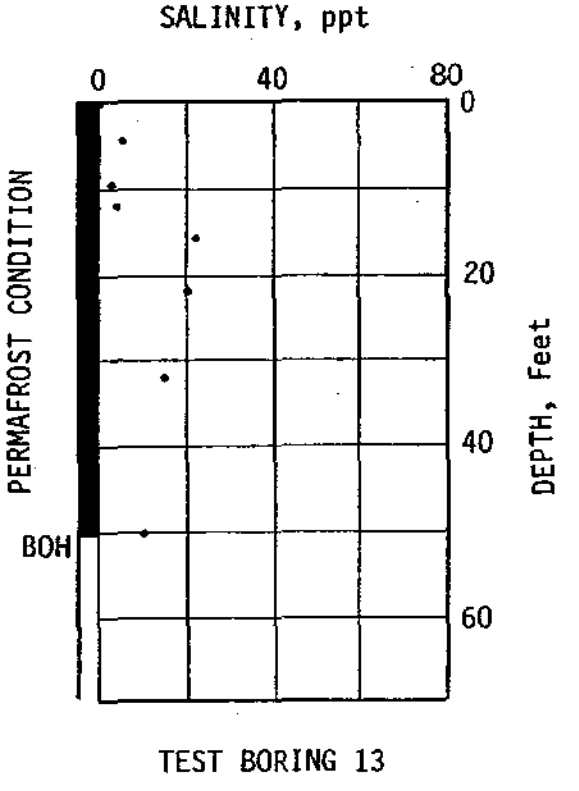

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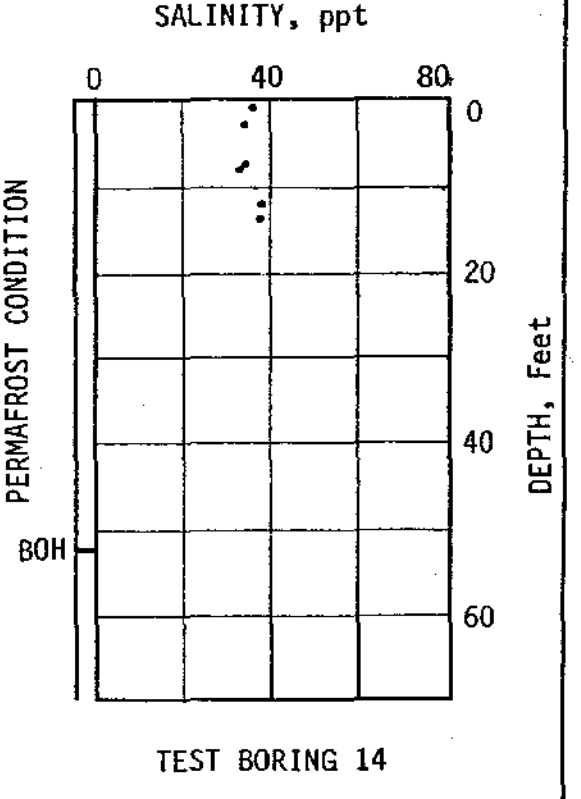

TEST BORING 14

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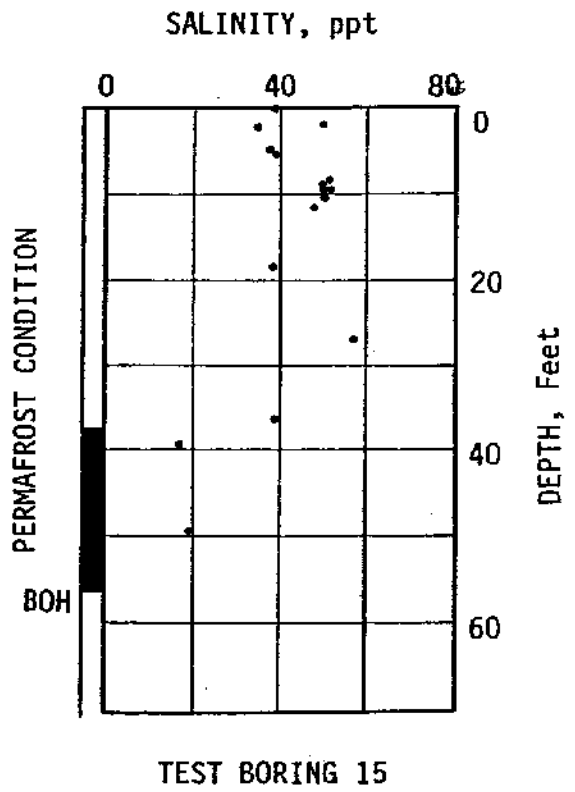
PLATE
D-57

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
X	9612.031.08	DEB	4/82		



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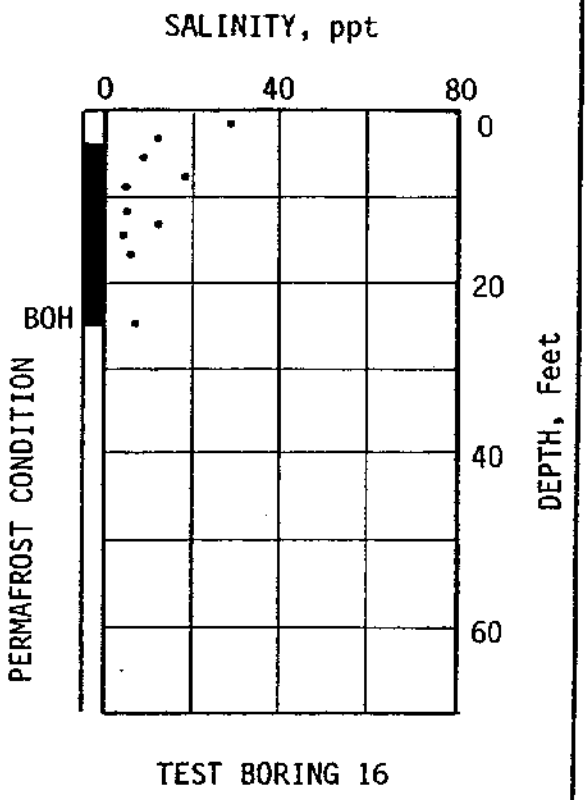
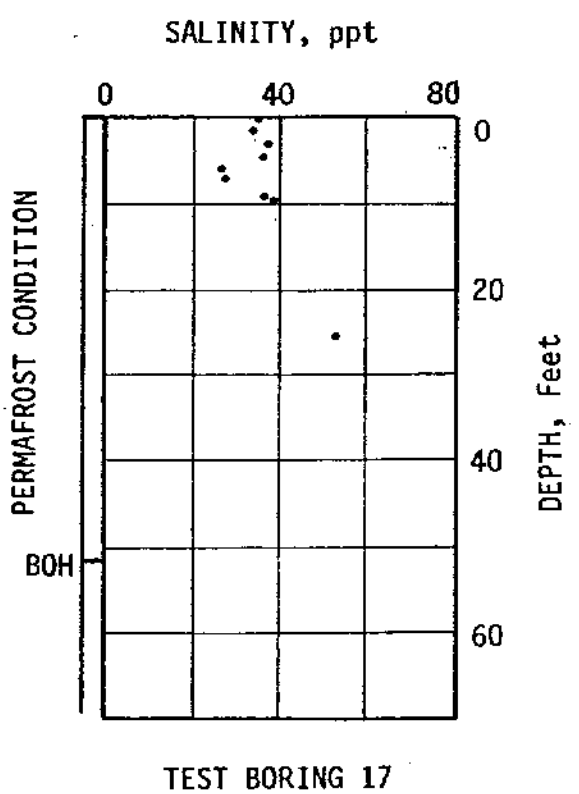


TEST BORING 16



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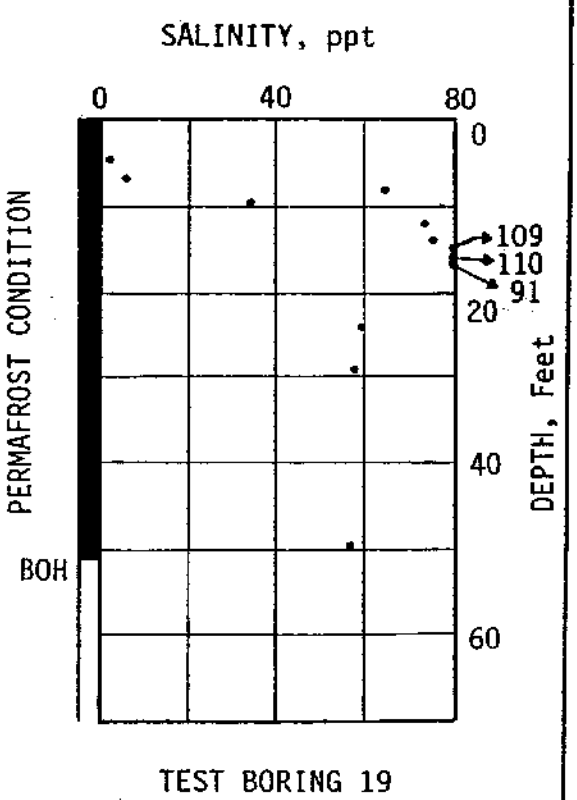

TEST BORING 19

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PLATE
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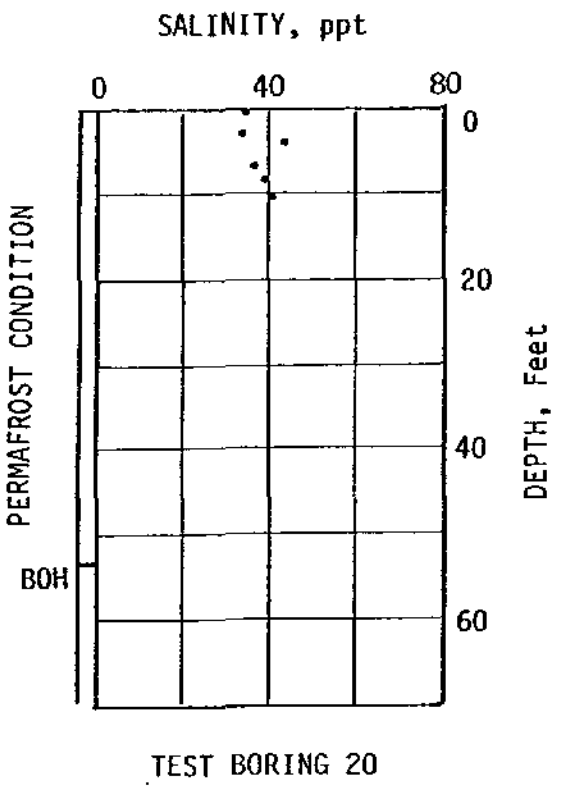
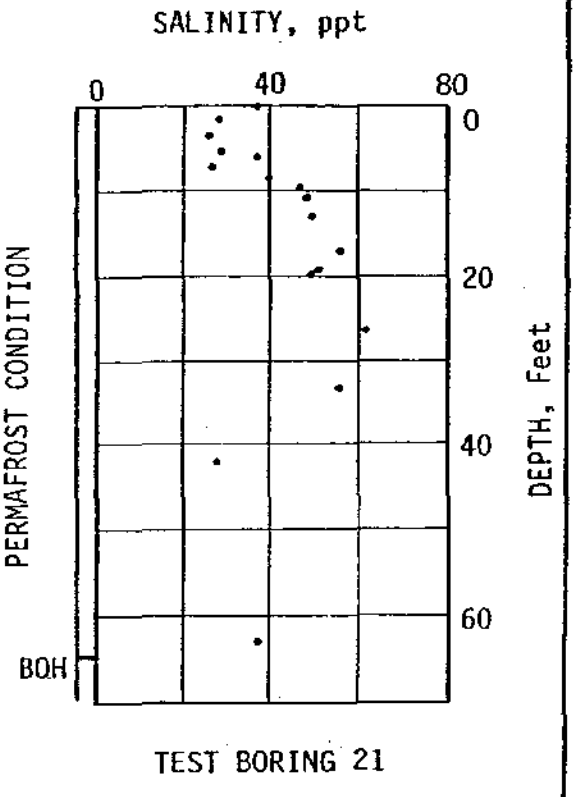
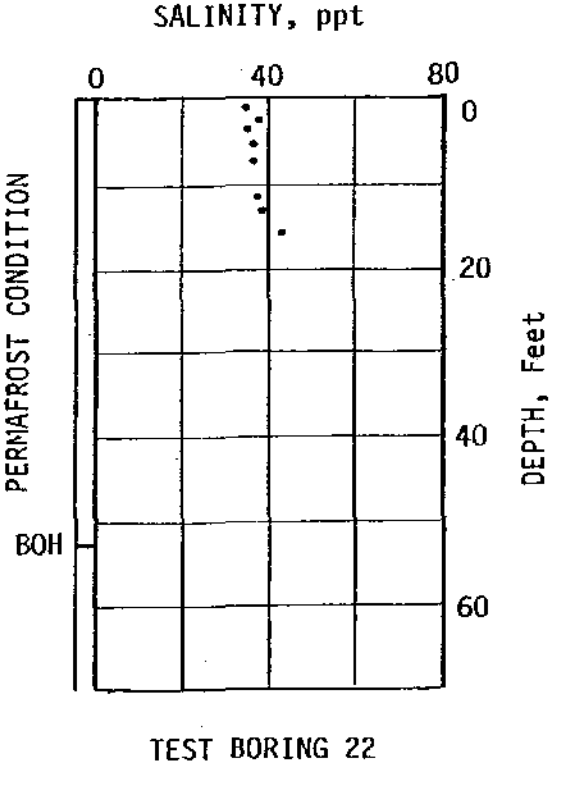
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		



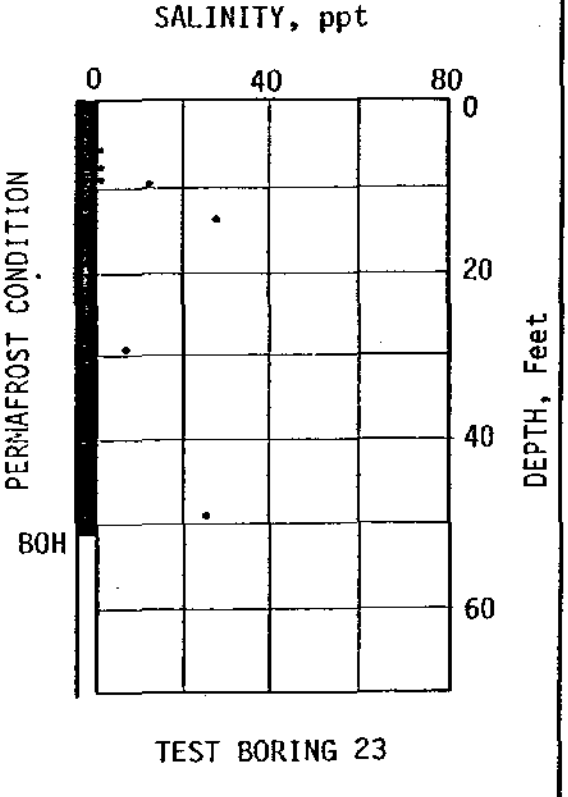
TEST BORING 20



TEST BORING 21



TEST BORING 22



TEST BORING 23

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PLATE
D-59

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DGB	4/82		

D. Strength Testing

1. Triaxial Tests

Soil strength tests conducted under static loading conditions were performed on selected samples of unfrozen sand, silt, and clay to define the shear strength parameters used in engineering analyses. For a complete discussion of the triaxial test, the reader is referred to Bishop and Henkel (1978).

a. Unconsolidated-Undrained Triaxial Shear Tests

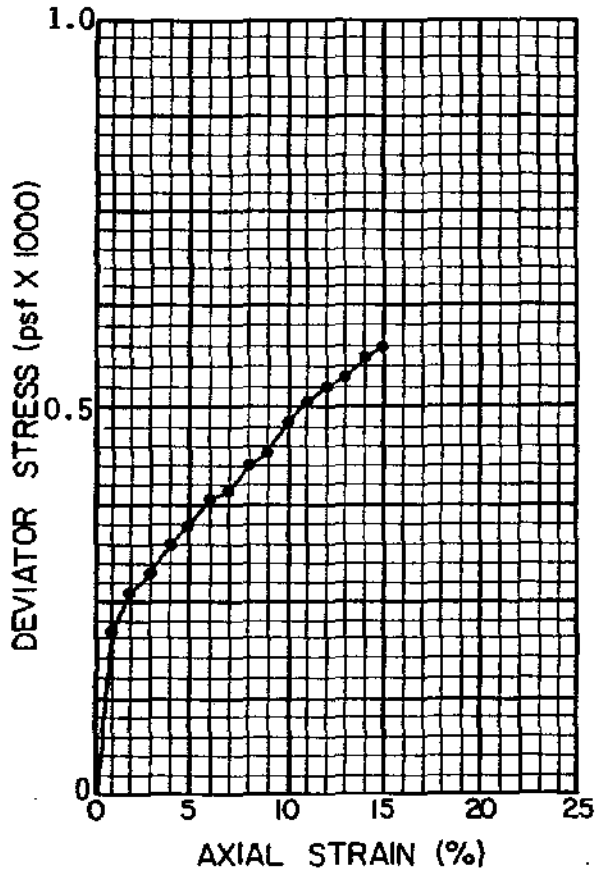
Unconsolidated-undrained triaxial shear (TXUU) tests were conducted on samples of clayey and organic silts. The maximum sample depth was approximately 51 feet below mudline. All samples were tested at their field moisture content and at a constant strain rate of about 1.5 percent per minute. Failure was defined as the peak deviator stress. The test results are summarized on Plate D-60, and the individual test results are presented on Plates D-61 through D-74.

Attempts were made to correlate the undrained shear strength (S_u) with depth and dry density, as well as the ratio of the undrained shear strength/overburden pressure (S_u/P_o) with depth. There are no significant correlations between S_u and S_u/P_o versus depth. However, a reasonable correlation was established between S_u and dry density as shown on Plate IV-17.

b. Consolidated-Undrained Triaxial Shear Tests

Consolidated-undrained triaxial shear (TXCU) tests with pore pressure measurements were conducted to provide information on the undrained shear strength (S_u), the effective angle of internal friction (ϕ'), the effective cohesion (C'), and the stress-strain behavior of selected samples.

Boring	Depth (ft)	USCS	Moisture Content (%)	Dry Density (pcf)	Cell Pressure (psf)	Shear Strength (psf)	Strain @ Peak Stress (%)
2	12.9	ML	38.6	80	3000	290	15.0
2	14.5	ML	35.7	83	1500	480	15.0
2	46.7	ML	32.5	89	5500	1600	6.0
2	51.2	ML	26.0	97	6500	2070	7.0
4	18.3	MH	70.8	57	4000	330	10.0
5	19.0	ML	35.5	61	1500	400	15.0
8	15.0	ML	26.4	98	1875	1320	15.0
9	14.4	ML	41.8	78	1500	620	11.0
9	15.0	ML	40.7	77	3000	560	15.0
9	19.5	ML	51.3	68	2000	360	11.0
9	31.6	SM	30.2	90	4000	1580	10.7
9	41.4	CL	31.2	90	2500	1630	9.0
9	41.9	CL	27.6	96	2500	2460	8.0
14	17.0	CL	18.1	113	2200	4730	7.0
14	25.5	CL	22.9	103	3200	2140	15.0
14	36.0	ML	25.1	101	4500	2380	6.1
14	40.5	ML	25.1	101	5000	2880	5.4
15	2.0	ML	36.0	83	500	790	8.7
15	9.0	MH	81.1	51	1000	800	6.0
15	10.8	ML	32.2	86	1300	710	15.0
15	36.8	CL	26.0	95	4600	520	15.5
17	6.2	ML	52.5	67	800	750	15.0
17	6.7	ML	40.5	77	900	1350	14.0
17	30.4	ML	18.4	114	3800	6450	4.7
21	7.0	ML	19.2	110	900	3820	10.8
21	31.5	CL	23.7	100	4000	1270	8.8
21	32.0	CL	23.0	101	4000	1090	15.2



DIAMETER (in): 2.87

HEIGHT (in): 6.00

MOISTURE CONTENT (%): 38.6

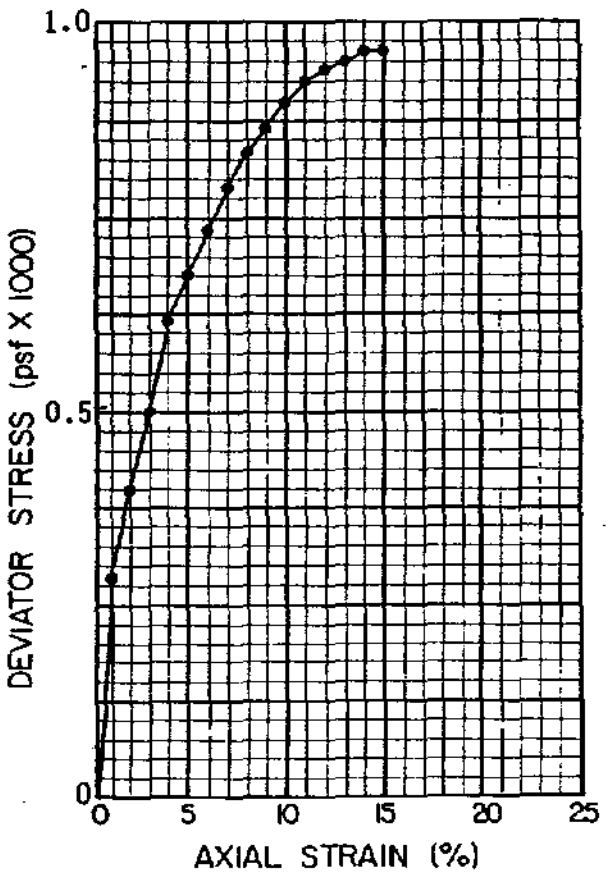
DRY DENSITY (pcf): 80

CELL PRESSURE (psf): 3000

SHEAR STRENGTH (psf): 290

SAMPLE SOURCE: Boring 2 at 12.9'

CLASSIFICATION: SILT (ML)



DIAMETER (in): 2.87

HEIGHT (in): 6.00

MOISTURE CONTENT (%): 35.7

DRY DENSITY (pcf): 83

CELL PRESSURE (psf): 1500

SHEAR STRENGTH (psf): 480

SAMPLE SOURCE: Boring 2 at 14.5'

CLASSIFICATION: SANDY SILT (ML)

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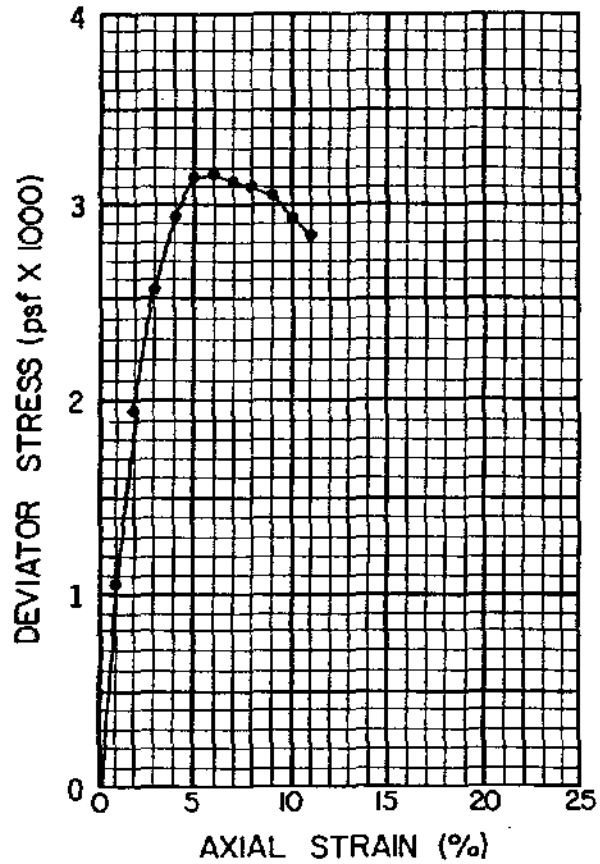
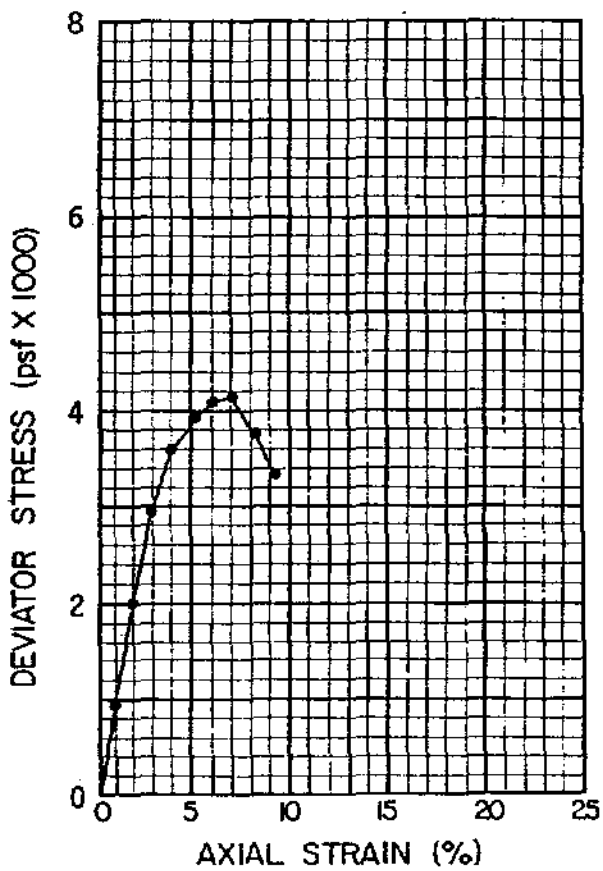
PLATE **D-61**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DGS	4/82		



DIAMETER (in): 2.87
HEIGHT (in): 6.00
MOISTURE CONTENT (%): 32.5
DRY DENSITY (pcf): 89
CELL PRESSURE (psf): 5500
SHEAR STRENGTH (psf): 1600
SAMPLE SOURCE: Boring 2 at 46.7'
CLASSIFICATION: SILT (ML)



DIAMETER (in): 2.87
HEIGHT (in): 5.9
MOISTURE CONTENT (%): 26.0
DRY DENSITY (pcf): 97
CELL PRESSURE (psf): 6500
SHEAR STRENGTH (psf): 2070
SAMPLE SOURCE: Boring 2 at 51.2'
CLASSIFICATION: SILT (ML)

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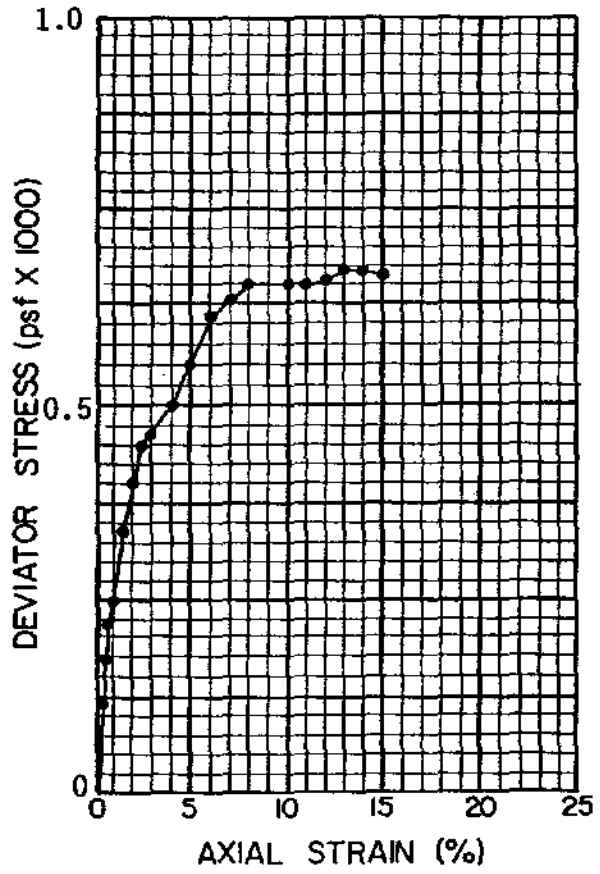
PLATE D-62

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DCB	4/82		



DIAMETER (in): 2.46

HEIGHT (in): 5.60

MOISTURE CONTENT (%): 70.8

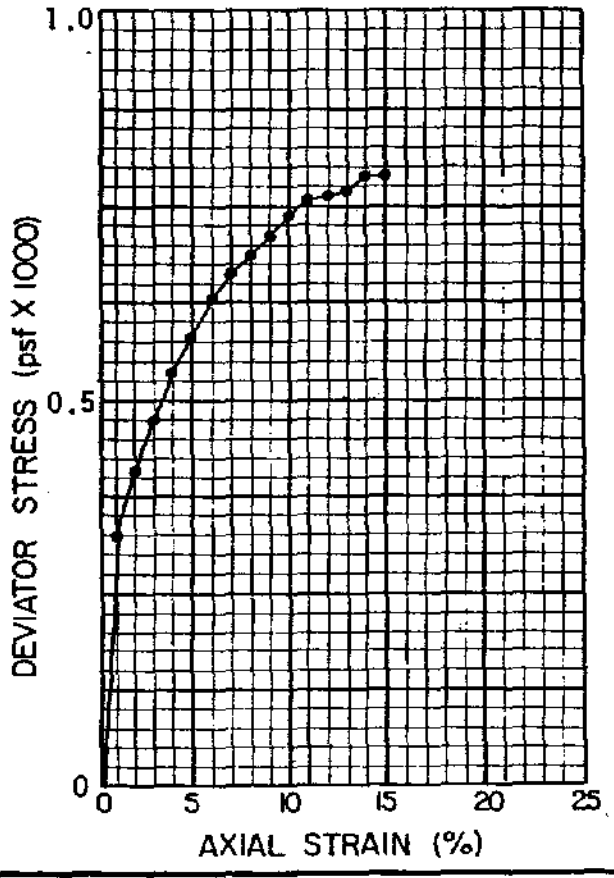
DRY DENSITY (pcf): 57

CELL PRESSURE (psf): 4000

SHEAR STRENGTH (psf): 330

SAMPLE SOURCE: Boring 4 at 18.3'

CLASSIFICATION: SILT (MH)



DIAMETER (in): 2.43

HEIGHT (in): 5.90

MOISTURE CONTENT (%): 35.5

DRY DENSITY (pcf): 61

CELL PRESSURE (psf): 1500

SHEAR STRENGTH (psf): 400

SAMPLE SOURCE: Boring 5 at 19.0'

CLASSIFICATION: CLAYEY SILT (ML)

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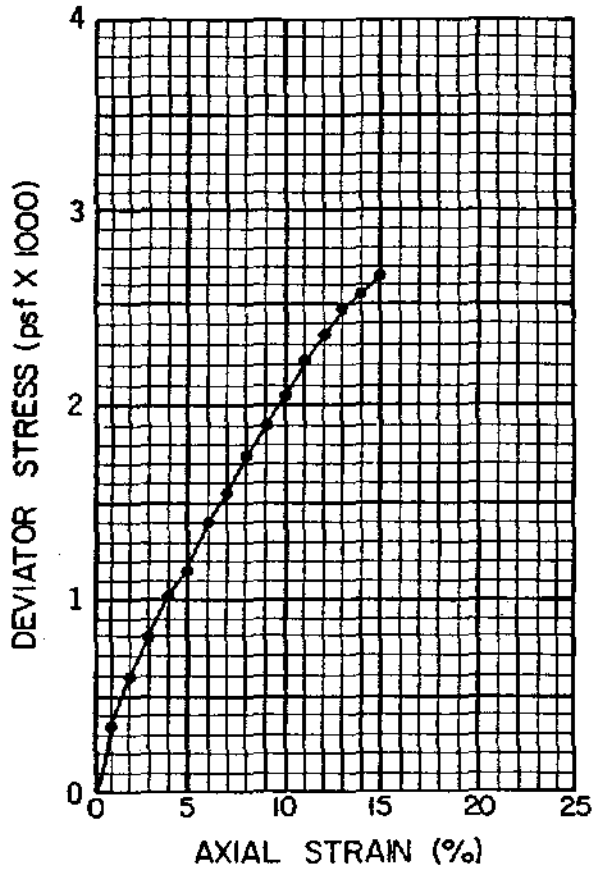
PLATE **D-63**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DGB	4/82		

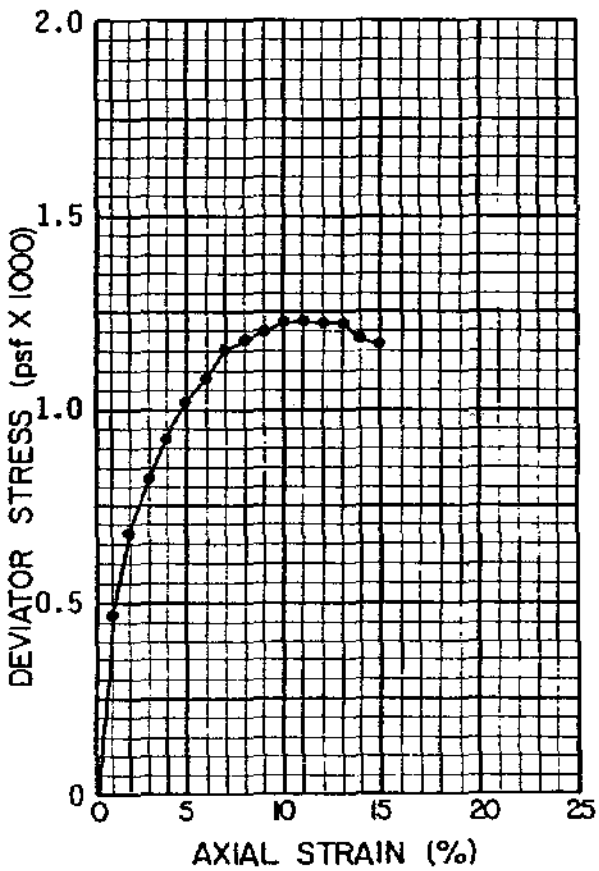


DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 26.4
DRY DENSITY (pcf): 98

CELL PRESSURE (psf): 1875
SHEAR STRENGTH (psf): 1320

SAMPLE SOURCE: Boring 8 at 15.0'
CLASSIFICATION: SILT (ML)



DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 41.8
DRY DENSITY (pcf): 78

CELL PRESSURE (psf): 1500
SHEAR STRENGTH (psf): 620

SAMPLE SOURCE: Boring 9 at 14.4'
CLASSIFICATION: SILT (ML)

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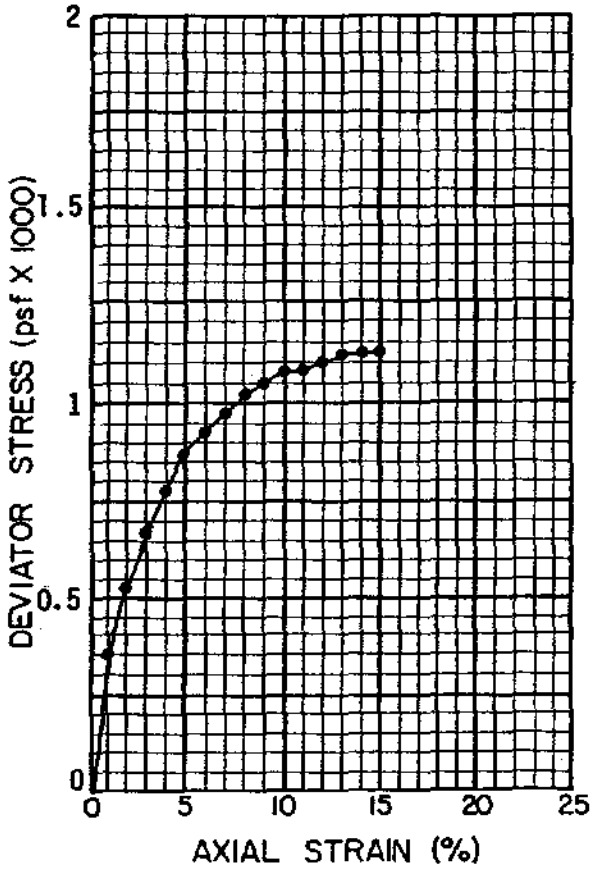
PLATE D-6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	pes	4/82		

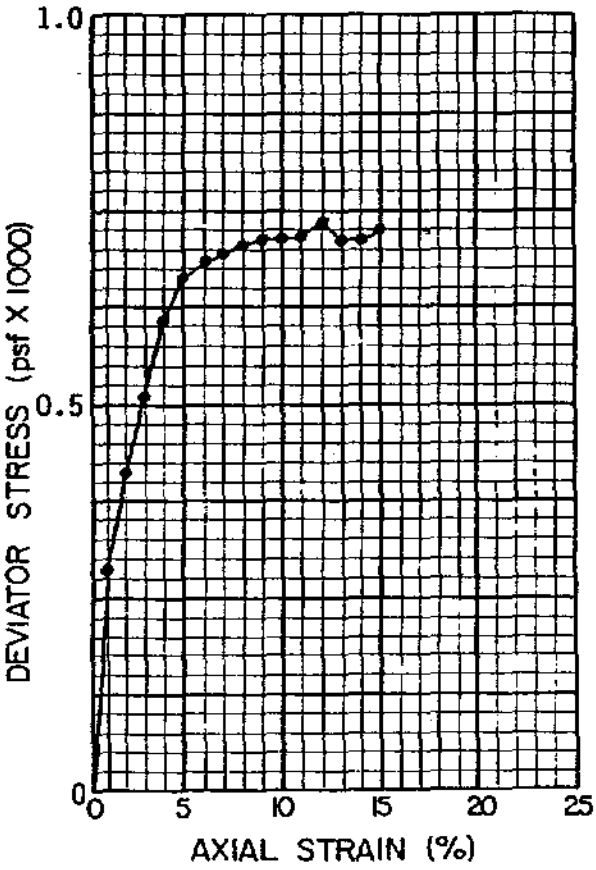


DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 40.7
DRY DENSITY (pcf): 77

CELL PRESSURE (psf): 3000
SHEAR STRENGTH (psf): 560

SAMPLE SOURCE: Boring 9 at 15.0'
CLASSIFICATION: SILT (ML)



DIAMETER (in): 2.87
HEIGHT (in): 5.75

MOISTURE CONTENT (%): 51.3
DRY DENSITY (pcf): 68

CELL PRESSURE (psf): 2000
SHEAR STRENGTH (psf): 360

SAMPLE SOURCE: Boring 9 at 19.5'
CLASSIFICATION: SILT (ML)

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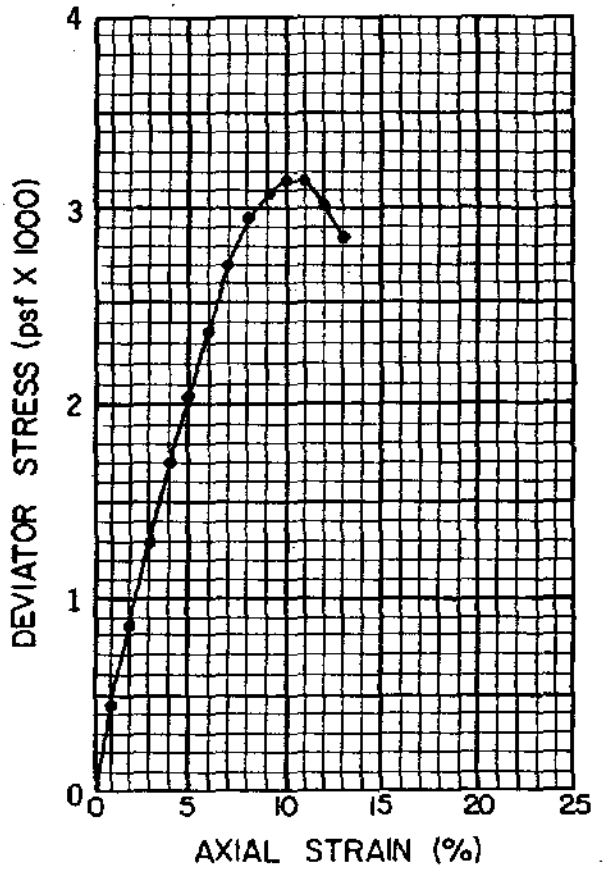
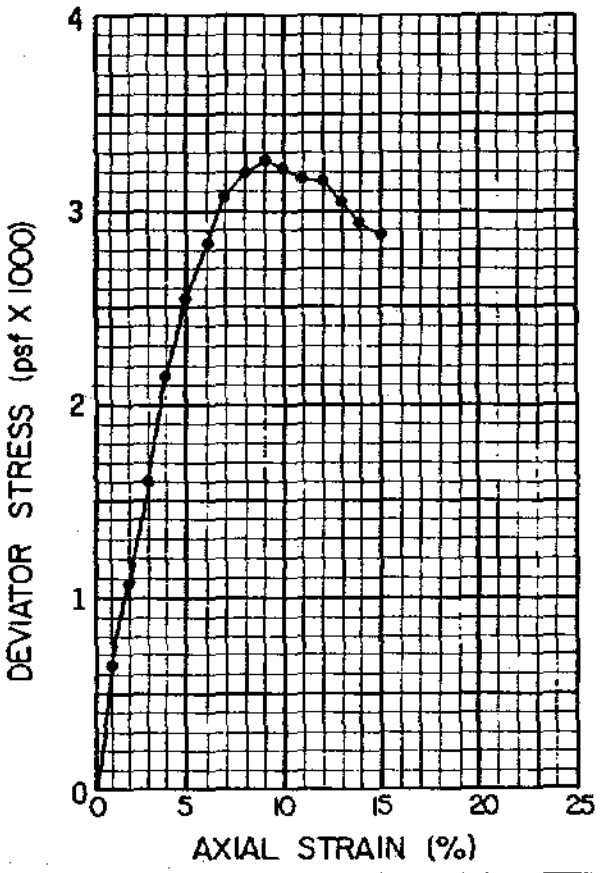
PLATE **D-65**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DEB	4/82		



DIAMETER (in): 2.87
HEIGHT (in): 6.00
MOISTURE CONTENT (%): 30.2
DRY DENSITY (pcf): 90
CELL PRESSURE (psf): 4000
SHEAR STRENGTH (psf): 1580
SAMPLE SOURCE: Boring 9 at 31.6'
CLASSIFICATION: SILTY SAND (SM)



DIAMETER (in): 2.87
HEIGHT (in): 6.00
MOISTURE CONTENT (%): 31.2
DRY DENSITY (pcf): 90
CELL PRESSURE (psf): 2500
SHEAR STRENGTH (psf): 1630
SAMPLE SOURCE: Boring 9 at 41.4'
CLASSIFICATION: CLAY (CL)

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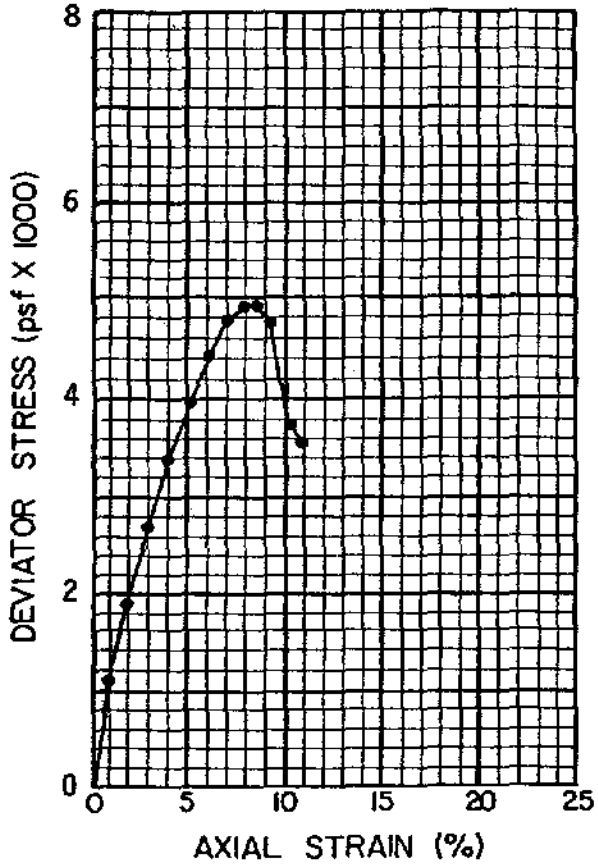
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DGB	4/82		

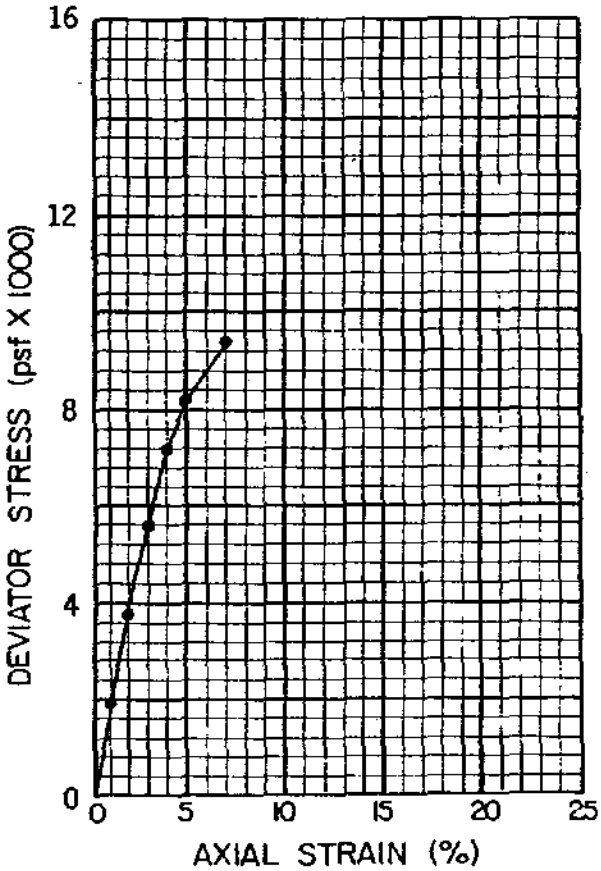


DIAMETER (in): 2.87
HEIGHT (in): 5.90

MOISTURE CONTENT (%): 27.6
DRY DENSITY (pcf): 96

CELL PRESSURE (psf): 2500
SHEAR STRENGTH (psf): 2460

SAMPLE SOURCE: Boring 9 at 41.9'
CLASSIFICATION: CLAY (CL)



DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 18.1
DRY DENSITY (pcf): 113

CELL PRESSURE (psf): 2200
SHEAR STRENGTH (psf): 4730

SAMPLE SOURCE: Boring 14 at 17.0'
CLASSIFICATION: CLAY (CL)

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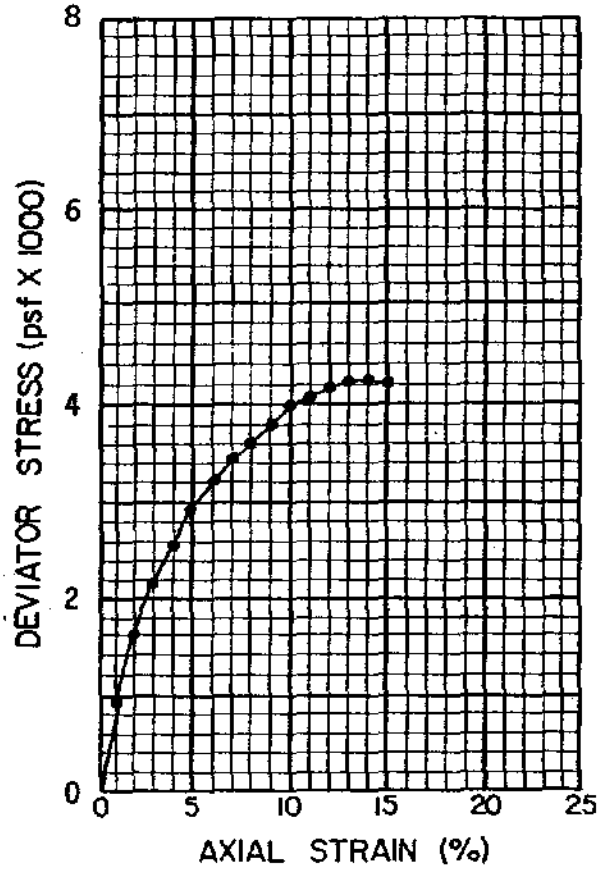
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DGB	4/82		

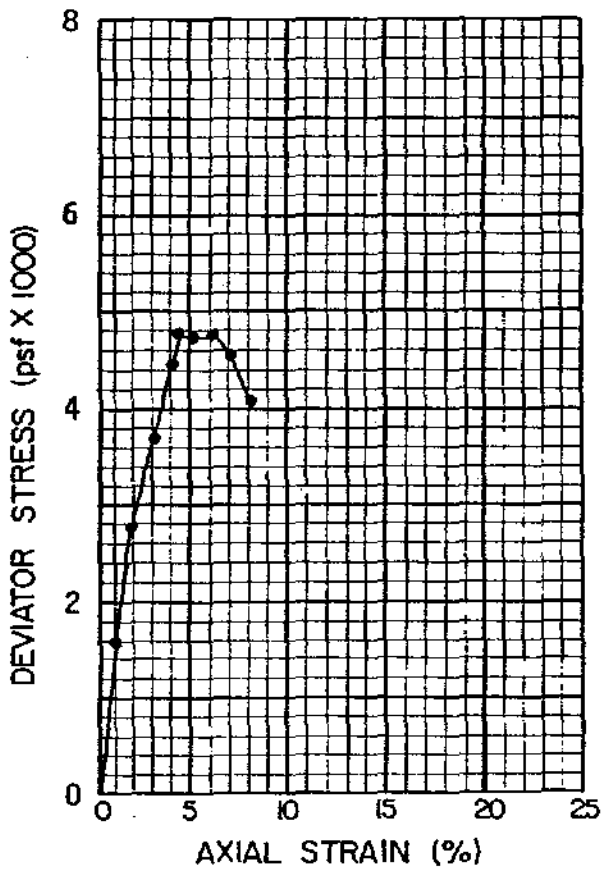


DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 22.9
DRY DENSITY (pcf): 103

CELL PRESSURE (psf): 3200
SHEAR STRENGTH (psf): 2140

SAMPLE SOURCE: Boring 14 at 25.5'
CLASSIFICATION: CLAY (CL)



DIAMETER (in): 2.87
HEIGHT (in): 5.90

MOISTURE CONTENT (%): 25.1
DRY DENSITY (pcf): 101

CELL PRESSURE (psf): 4500
SHEAR STRENGTH (psf): 2380

SAMPLE SOURCE: Boring 14 at 36.0'
CLASSIFICATION: CLAYEY SILT (ML)

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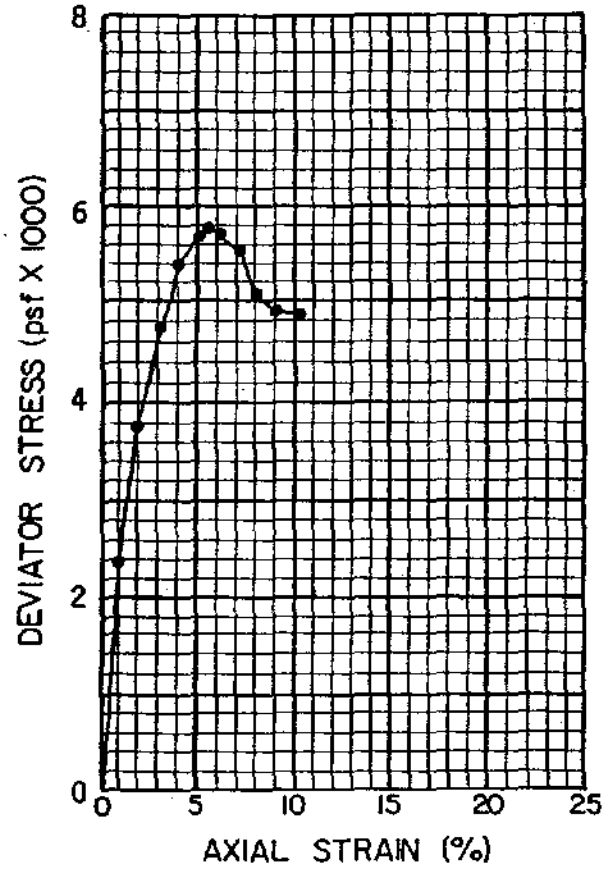
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DGB	4/82		

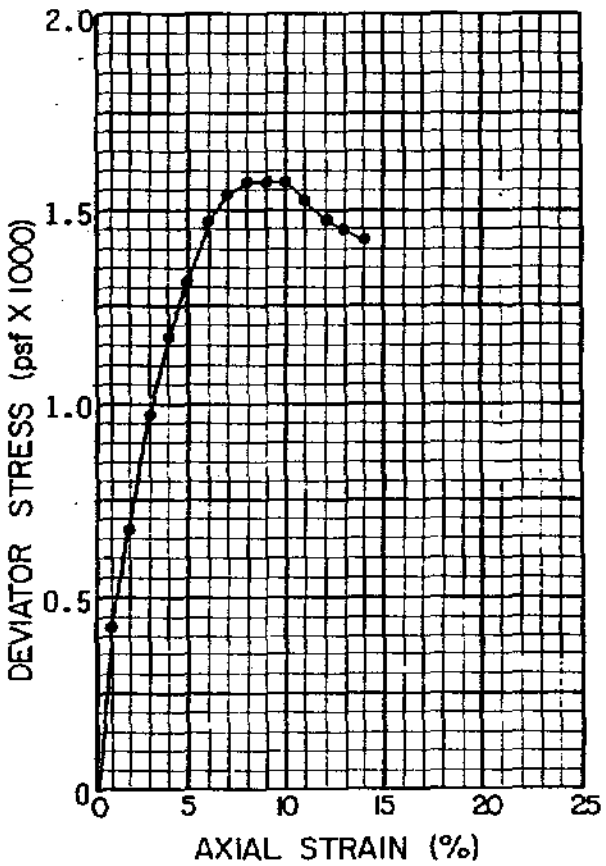


DIAMETER (in): 2.87
HEIGHT (in): 5.90

MOISTURE CONTENT (%): 25.1
DRY DENSITY (pcf): 101

CELL PRESSURE (psf): 5000
SHEAR STRENGTH (psf): 2880

SAMPLE SOURCE: Boring 14 at 40.5'
CLASSIFICATION: CLAYEY SILT (ML)



DIAMETER (in): 2.87
HEIGHT (in): 5.75

MOISTURE CONTENT (%): 36.0
DRY DENSITY (pcf): 83

CELL PRESSURE (psf): 500
SHEAR STRENGTH (psf): 790

SAMPLE SOURCE: Boring 15 at 2.0'
CLASSIFICATION: CLAYEY SILT (ML)

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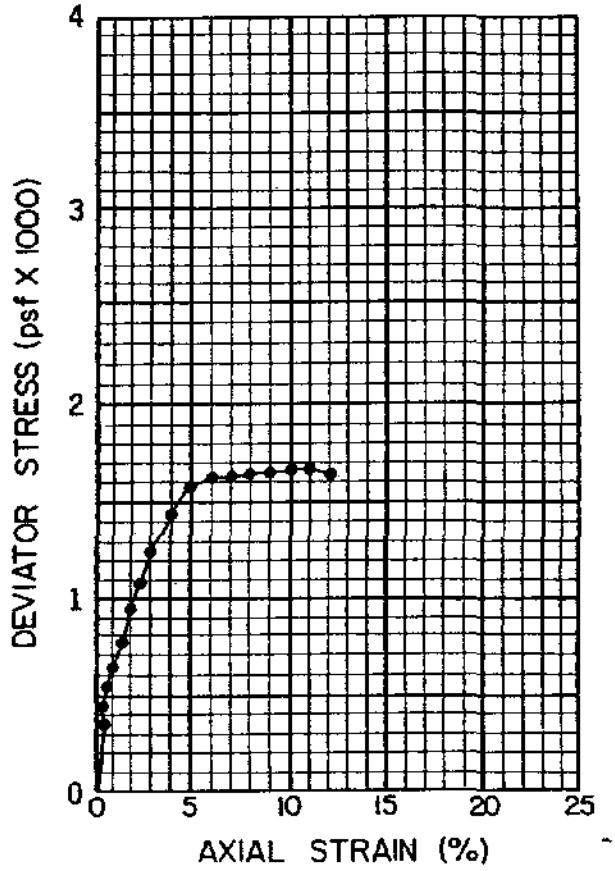
PLATE **D-69**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DCB	4/82		

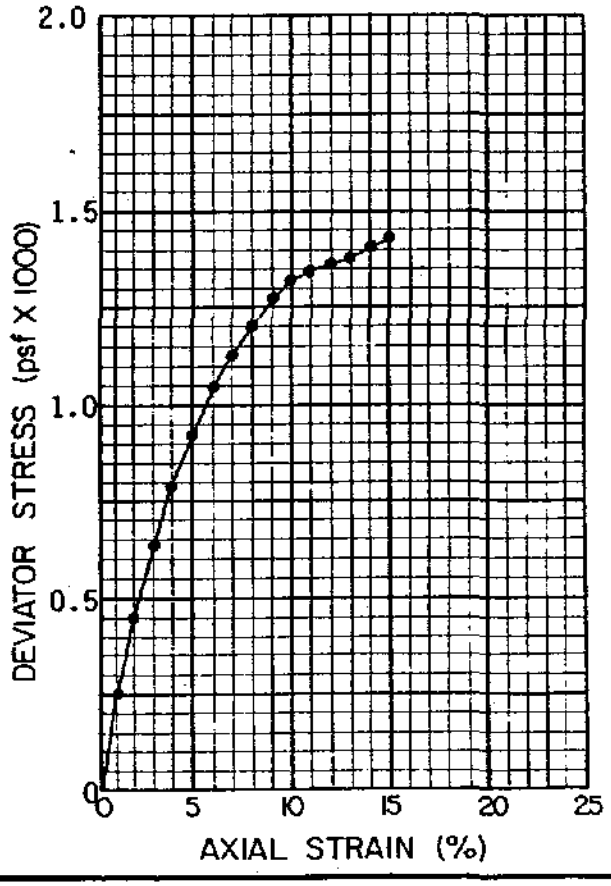


DIAMETER (in): 2.87
HEIGHT (in): 6.45

MOISTURE CONTENT (%): 81.1
DRY DENSITY (pcf): 51

CELL PRESSURE (psf): 1000
SHEAR STRENGTH (psf): 800

SAMPLE SOURCE: Boring 15 at 9.0'
CLASSIFICATION: SILT (MH)



DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 32.2
DRY DENSITY (pcf): 86

CELL PRESSURE (psf): 1300
SHEAR STRENGTH (psf): 710

SAMPLE SOURCE: Boring 15 at 10.8'
CLASSIFICATION: SILT (ML)

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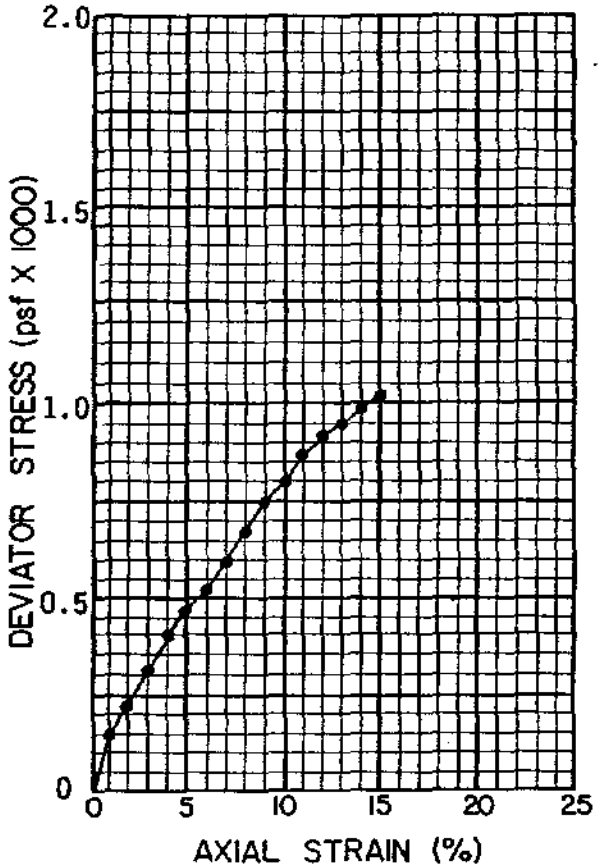
PLATE **D-70**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DGB	4/82		

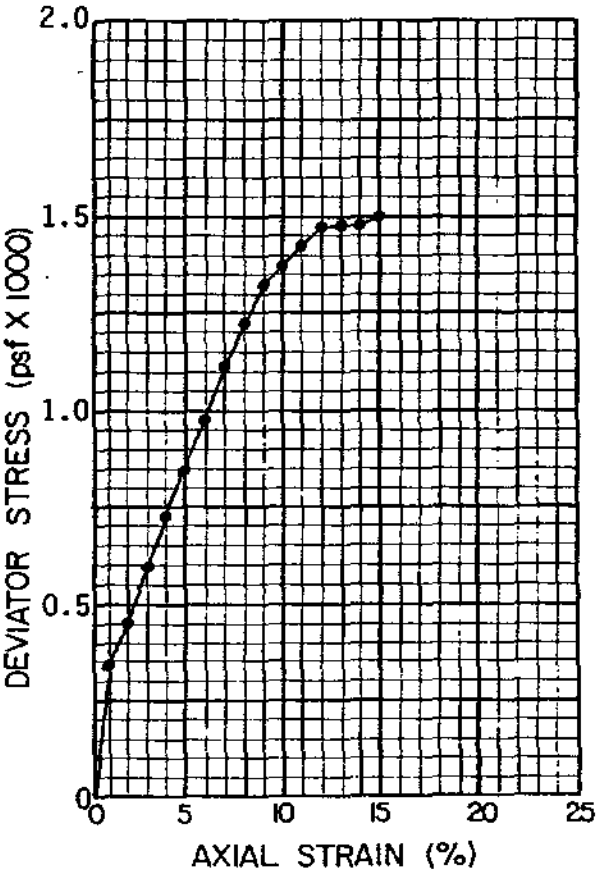


DIAMETER (in): 2.87
HEIGHT (in): 5.80

MOISTURE CONTENT (%): 26.0
DRY DENSITY (pcf): 95

CELL PRESSURE (psf): 4600
SHEAR STRENGTH (psf): 520

SAMPLE SOURCE: Boring 15 at 36.8'
CLASSIFICATION: CLAY (CL)



DIAMETER (in): 2.87
HEIGHT (in): 6.00

MOISTURE CONTENT (%): 52.5
DRY DENSITY (pcf): 67

CELL PRESSURE (psf): 800
SHEAR STRENGTH (psf): 750

SAMPLE SOURCE: Boring 17 at 6.2'
CLASSIFICATION: CLAYEY SILT (ML)

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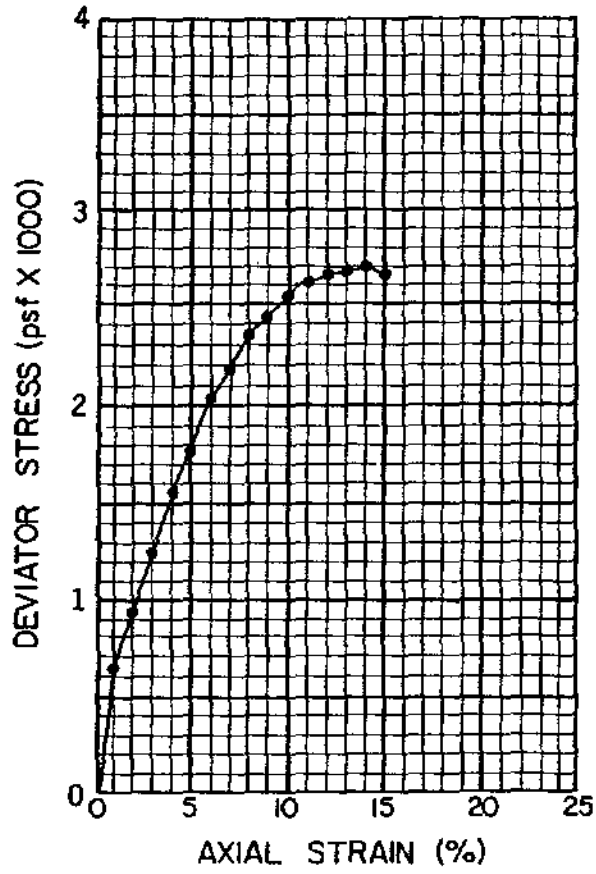
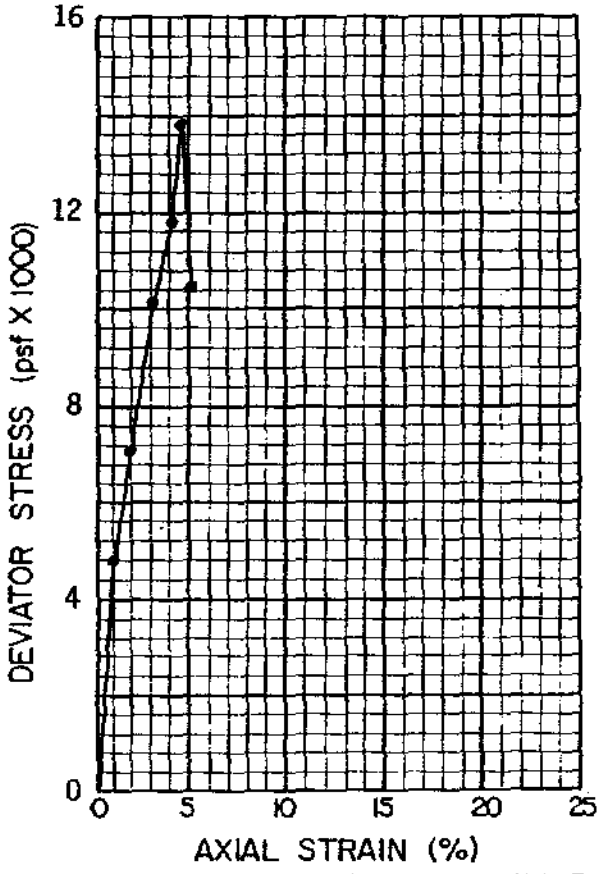
PLATE D-71

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JC	9612,031.08	DCB	4/82		



DIAMETER (in): 2.87
HEIGHT (in): 6.00
MOISTURE CONTENT (%): 40.5
DRY DENSITY (pcf): 77
CELL PRESSURE (psf): 900
SHEAR STRENGTH (psf): 1350
SAMPLE SOURCE: Boring 17 at 6.7'
CLASSIFICATION: CLAYEY SILT (ML)



DIAMETER (in): 2.43
HEIGHT (in): 5.90
MOISTURE CONTENT (%): 18.4
DRY DENSITY (pcf): 114
CELL PRESSURE (psf): 3800
SHEAR STRENGTH (psf): 6450
SAMPLE SOURCE: Boring 17 at 30.4'
CLASSIFICATION: CLAYEY SILT (ML)

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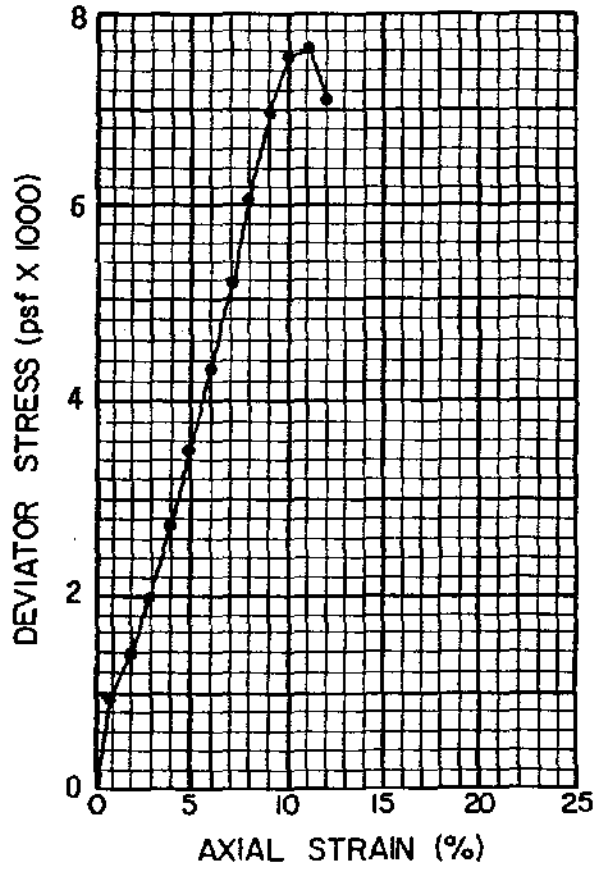
PLATE D-72

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82	-	

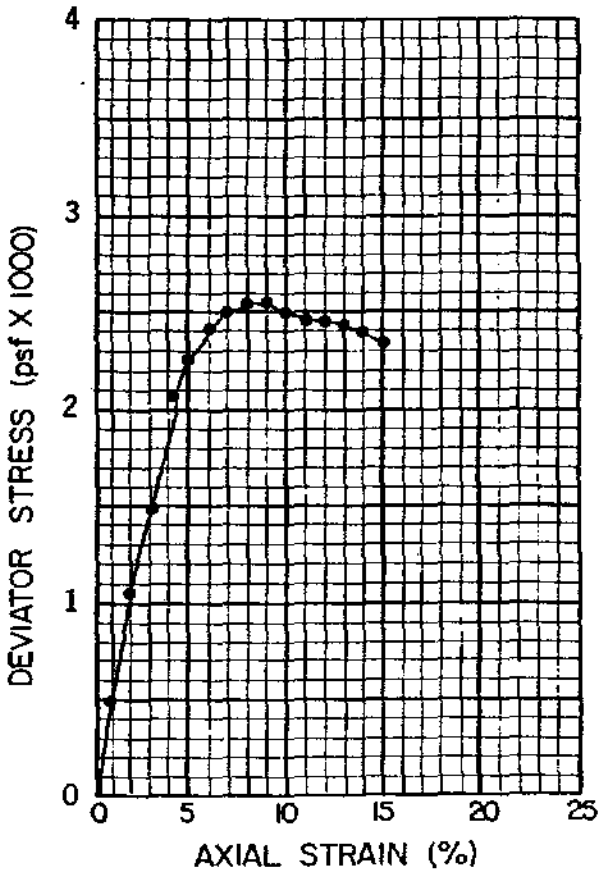


DIAMETER (in): 2.87
HEIGHT (in): 5.95

MOISTURE CONTENT (%): 19.2
DRY DENSITY (pcf): 110

CELL PRESSURE (psf): 900
SHEAR STRENGTH (psf): 3820

SAMPLE SOURCE: Boring 21 at 7.0'
CLASSIFICATION: SANDY SILT (ML)



DIAMETER (in): 2.87
HEIGHT (in): 5.70

MOISTURE CONTENT (%): 23.7
DRY DENSITY (pcf): 100

CELL PRESSURE (psf): 4000
SHEAR STRENGTH (psf): 1270

SAMPLE SOURCE: Boring 21 at 31.5'
CLASSIFICATION: SILTY CLAY (CL)

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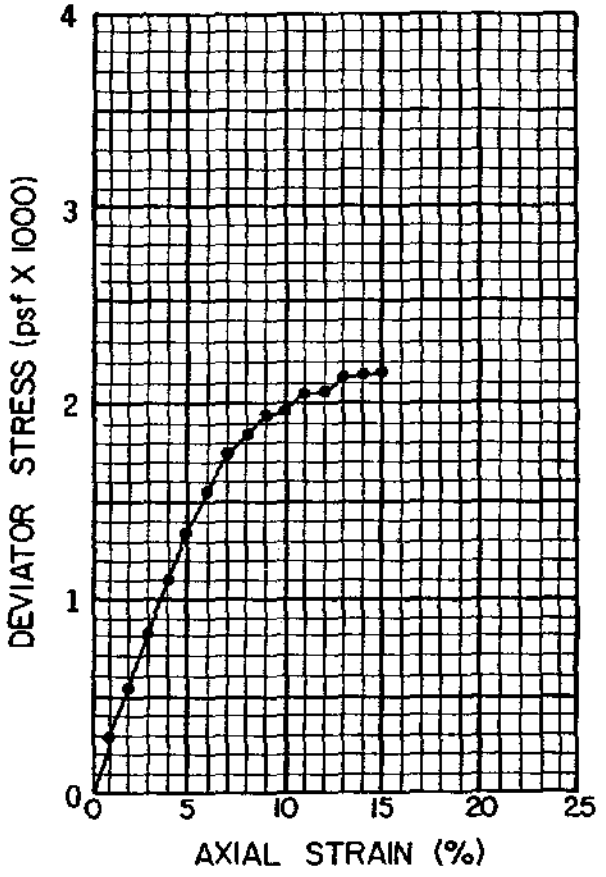
PLATE **D-73**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JP	9612,031.08	DEB	4/82		



DIAMETER (in): 2.87

HEIGHT (in): 5.80

MOISTURE CONTENT (%): 23.0

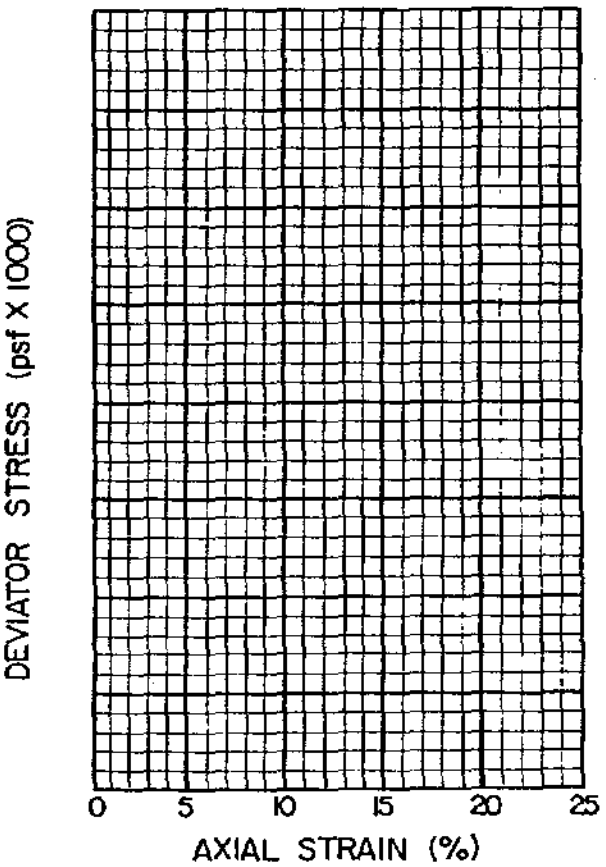
DRY DENSITY (pcf): 101

CELL PRESSURE (psf): 4000

SHEAR STRENGTH (psf): 1090

SAMPLE SOURCE: Boring 21 at 32.0'

CLASSIFICATION: SILTY CLAY (CL)



DIAMETER (in):

HEIGHT (in):

MOISTURE CONTENT (%):

DRY DENSITY (pcf):

CELL PRESSURE (psf):

SHEAR STRENGTH (psf):

SAMPLE SOURCE:

CLASSIFICATION:

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PLATE D-74

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JH	9612,031.08	DHB	4/82		

The following procedure was used for these tests:

1) A 2.87-inch-diameter sample was trimmed to a height of approximately 6.00 inches and placed in a triaxial cell. A confining pressure of 2 psi was immediately applied to the sample to ensure sample integrity.

2) Back pressures, varying between 20 and 50 psi, were applied to achieve complete saturation. The "B parameter", which relates changes in pore water pressure to changes in confining pressure ($B = \Delta u / \Delta \sigma_c$) was calculated to check for sample saturation. If the sample was not saturated, a higher back pressure was employed.

3) The sample was consolidated under a selected confining pressure. During consolidation, the volume change of the sample was recorded and plotted against the logarithm of time. This plot was used to determine when primary consolidation had ended.

4) After completion of the consolidation phase, the drain valve was closed and an axial load was applied at a constant strain rate of approximately 0.1 percent per minute; the actual strain rate depended upon soil type. During loading, pore pressure readings were obtained with a Mercury manometer. The measurement of pore pressure allow direct correlation of TXCU results with TXCD results.

Results of the TXCU tests are summarized on Plate D-75. Both total and effective stresses and strains at failure are presented. Representative total and effective strengths are presented on Mohr's diagram, Plate D-76. The effective stress failure criterion is based on the effective principal stress ratios (σ_1'/σ_3'). If the material is non-dilatant, the maximum stress ratio, $(\sigma_1'/\sigma_3')_{max}$ is taken as the failure stress ratio (σ_1'/σ_3'). If the material is dilatant, the stress ratio at which the

Boring No.	Depth (ft)	USGS	Type of Test	Initial Moisture Content (%)	Initial Dry Density (pcf)	Consolidation Pressure (psf)	Stresses & Axial Strain at $(\sigma_1'/\sigma_3')_f$ (1)				Stress/Strain at $(\sigma_1-\sigma_3)_f$ (2)		Pore Pressure Coefficient at $(\sigma_1-\sigma_3)$ max
							σ_{1f}' (psf)	σ_{3f}' (psf)	$(\frac{\sigma_1'}{\sigma_3'})_f$	ϵ_1 (%)	$(\sigma_1-\sigma_3)_f$ (psf)	ϵ_1 (%)	A_f
2	0.3	SP	TxCD	22.8	102	1500	7310	1440	5.08	2.5	5870	2.5	---
2	3.4	SP	TxCD	22.8	98	3000	17060	3100	5.51	5.0	13950	5.0	---
2	9.9	ML	TxCD	31.2	90	1000	4990	990	5.04	9.0	4000	9.0	---
2	10.7	ML	TxCD	29.0	94	2000	9010	2270	3.96	9.0	6740	9.0	---
2	11.3	ML	TxCD	32.5	89	4000	15410	3930	3.92	12.0	11480	12.0	---
2	40.2	ML	TxCU	21.2	106	2000	11010	2240	4.92	5.0	8770	5.0	-0.03
2	40.8	ML	TxCU	21.1	107	4000	14130	2950	4.79	5.0	15040	8.0	-0.02
2	41.6	ML	TxCU	26.3	96	6000	14420	3960	3.64	8.1	>13050	15.0	0.05
4	13.3	OL	TxCU	43.7	75	3000	4390	950	4.62	9.0	> 3560	11.0	0.57
4	13.8	ML	TxCU	47.5	72	1500	2290	980	4.97	9.0	> 1930	12.0	0.48
4	19.0	CL	TxCU	68.4	58	1000	2190	350	6.33	8.0	1880	5.0	0.38
4	19.6	CL	TxCU	71.1	57	2000	2530	430	5.86	9.0	2100	9.0	0.73
6	4.1	ML	TxCU	33.4	88	3000	5080	1080	4.70	7.0	> 5360	15.0	0.26
6	4.6	ML	TxCU	32.3	90	750	2640	630	4.17	4.0	2550	6.0	-0.01
6	5.3	SP-SM	TxCU	14.1	121	750	3590	970	3.73	2.5	2630	2.5	-0.05
6	14.7	ML	TxCU	23.3	99	1500	7110	1570	4.53	4.0	5540	4.0	-0.16
6	15.4	ML	TxCU	26.2	100	3000	10140	2250	4.51	4.0	10310	6.0	-0.13
9	4.5	SM	TxCU	24.7	101	1600	5600	1270	4.42	2.5	5920	4.1	-0.03
9	5.1	SM	TxCU	22.7	103	3200	9570	2380	4.03	5.1	9280	9.0	0.00
9	7.4	ML	TxCU	26.4	98	3000	6880	1700	4.05	6.0	> 6610	16.0	0.10
9	8.1	ML	TxCU	28.4	96	1870	4940	1180	4.19	5.0	5460	15.2	-0.01
9	9.0	ML	TxCU	27.4	96	860	3330	760	4.38	3.0	7930	4.0	0.80
14	2.4	ML	TxCU	27.1	95	1000	2960	550	5.41	3.1	3990	8.0	-0.03
14	2.9	ML	TxCU	26.7	96	2000	5420	1240	4.37	5.0	> 5220	10.0	0.07
15	8.4	MH	TxCU	70.2	56	750	2300	460	5.01	6.0	1920	8.0	0.13
15	15.5	SM	TxCU	18.2	114	5000	24070	5170	4.66	6.0	18900	6.0	-0.01
15	16.0	SM	TxCU	18.6	113	2250	11010	2320	4.75	2.5	8690	2.5	-0.01
17	35.3	CL	TxCU	24.7	103	2000	6710	1540	4.36	3.2	7170	5.0	-0.04
17	36.3	ML	TxCU	24.3	103	4000	9370	2590	3.62	4.1	9010	10.0	-0.01
21	4.1	ML	TxCU	19.3	111	750	4120	910	4.54	1.1	3210	1.1	-0.10
21	4.7	ML	TxCU	18.9	111	1500	7210	1450	4.95	2.0	7080	2.5	-0.04
21	5.2	ML	TxCU	20.5	108	3000	7410	2130	3.48	2.5	6020	6.0	0.04
21	18.0	ML	TxCU	24.0	102	4000	13280	3680	3.61	10.1	10280	12.2	0.80
21	18.5	ML	TxCU	26.6	97	2000	5710	2040	2.80	7.0	3670	7.0	-0.01
21	26.1	ML	TxCU	25.9	99	5000	14570	3490	4.17	8.0	>14270	15.0	0.01
21	26.8	ML	TxCU	25.9	98	2500	10410	2330	4.47	6.0	9080	7.0	-0.02
22	2.7	ML	TxCU	25.8	99	750	1860	290	6.46	1.5	3480	7.3	-0.05
22	3.8	ML	TxCU	30.7	90	1500	3700	820	4.50	4.0	> 4180	10.0	0.05

NOTES:

(1) For TXCD tests, $(\sigma_1'/\sigma_3')f = (\sigma_1'/\sigma_3')max$; For TXCU tests, $(\sigma_1'/\sigma_3')f = (\sigma_1'/\sigma_3')max$ or (σ_1'/σ_3') at which the pore pressure becomes negative, whichever is smaller.

(2) For TXCD tests, $(\sigma_1-\sigma_3)f = (\sigma_1-\sigma_3)max$. For TXCU tests, $(\sigma_1-\sigma_3) = (\sigma_1-\sigma_3)max$ or the deviator stress at which the pore pressure becomes negative, whichever is smaller.

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Consolidated-Undrained, Consolidated-Drained Triaxial Compression Test Report Summary

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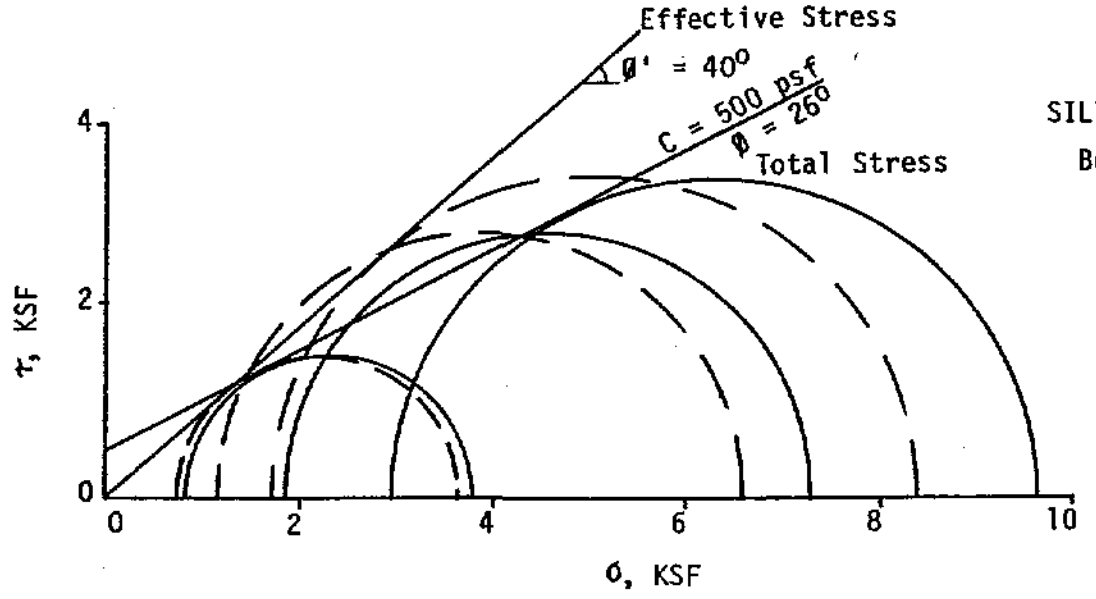
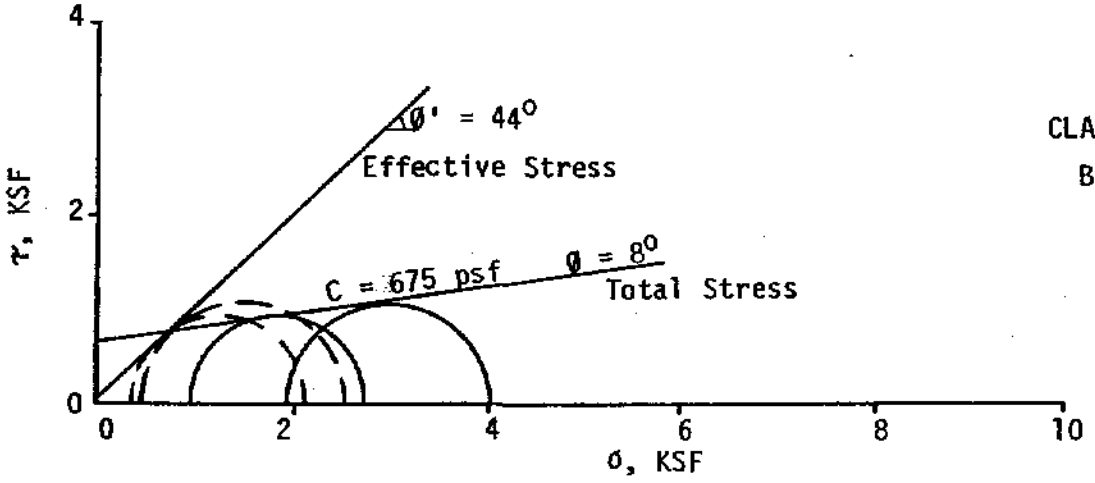
PLATE **D-75**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DFS	4/82		



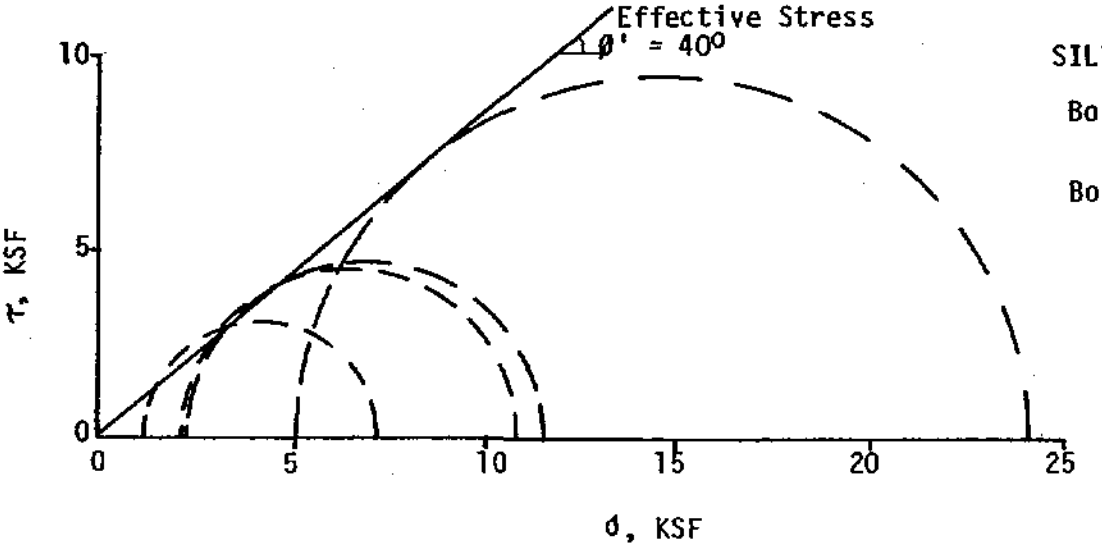
SILT, ML

Boring 9 @ 7.4'
@ 8.1'
@ 9.0'



CLAY, CL

Boring 4 @ 19.0'
@ 19.6'



SILTY SAND (SM)

Boring 9 @ 4.5'
@ 5.1'

Boring 15 @ 15.5'
@ 16.0'

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Total and Effective Strengths
Pt. Thomson Development Project
Winter 1982, Geotechnical Study
EXXON Company, U.S.A.

PLATE
D-76

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JF	9612,031.08	DGB	4/82		

pore pressure becomes zero or $(\sigma_1'/\sigma_3')_{max}$ is taken as $(\sigma_1'/\sigma_3')_f$, whichever is smaller. The effective strengths for all tests are presented on a modified Mohr diagram as shown on Plate IV-19, which yields an effective friction angle of 40 degrees with no cohesion intercept.

The deviator stress, $(\sigma_1-\sigma_3')$, is used as the total stress failure criterion. If the soil is non-dilatant, the maximum deviator stress $(\sigma_1'-\sigma_3)_{max}$ is taken as the failure stress, $(\sigma_1-\sigma_3)_f$. If the soil is dilatant, the $(\sigma_1-\sigma_3)$ at which the pore pressure becomes zero or the $(\sigma_1-\sigma_3)_{max}$ is taken as $(\sigma_1-\sigma_3)_f$, whichever is smaller. The pore pressure parameter, A_f is computed at $(\sigma_1-\sigma_3)_{max}$.

Several series of tests were made with two or more tested at different confining pressures. Results indicate that the rate of increase in undrained shear strength with the increase in consolidation pressure is approximately 0.5, regardless of material type and dry density as shown on Plate IV-18. The undrained shear stengths corresponding to the effective overburden pressures are plotted with TXUU data. The agreement between the TXCU and TXUU results is good as shown on Plate IV-17.

Results of each individual test are presented on Plates D-77 through D-110. The normalized deviator stress and pore pressure, as well as the effective stress ratios and pore pressure parameter A, are plotted versus the consolidation pressure.

c. Consolidated-Drained Triaxial Shear Tests

Consolidated-drained triaxial shear (TXCD) tests were conducted on samples of sandy silt (ML) and sand (SP). In these tests, the samples were saturated by seepage or back pressure, subjected to pressure, and allowed to