PARSONS LAKE GAS PLANT
PARSONS LAKE, N.W.T.

1976 GEOTECHNICAL SURVEY

PART II

PREPARED FOR

GULF OIL CANADA LIMITED
CALGARY, ALBERTA

R.M.HARDY & ASSOCIATES LT
CONSULTING ENGINEERING & PROFESSIONAL SERVIC
GEOTECHNICAL DIVISI

APPENDIX “B”

PLANT SITE

SECTION B.1 TEST HOLE LOGS

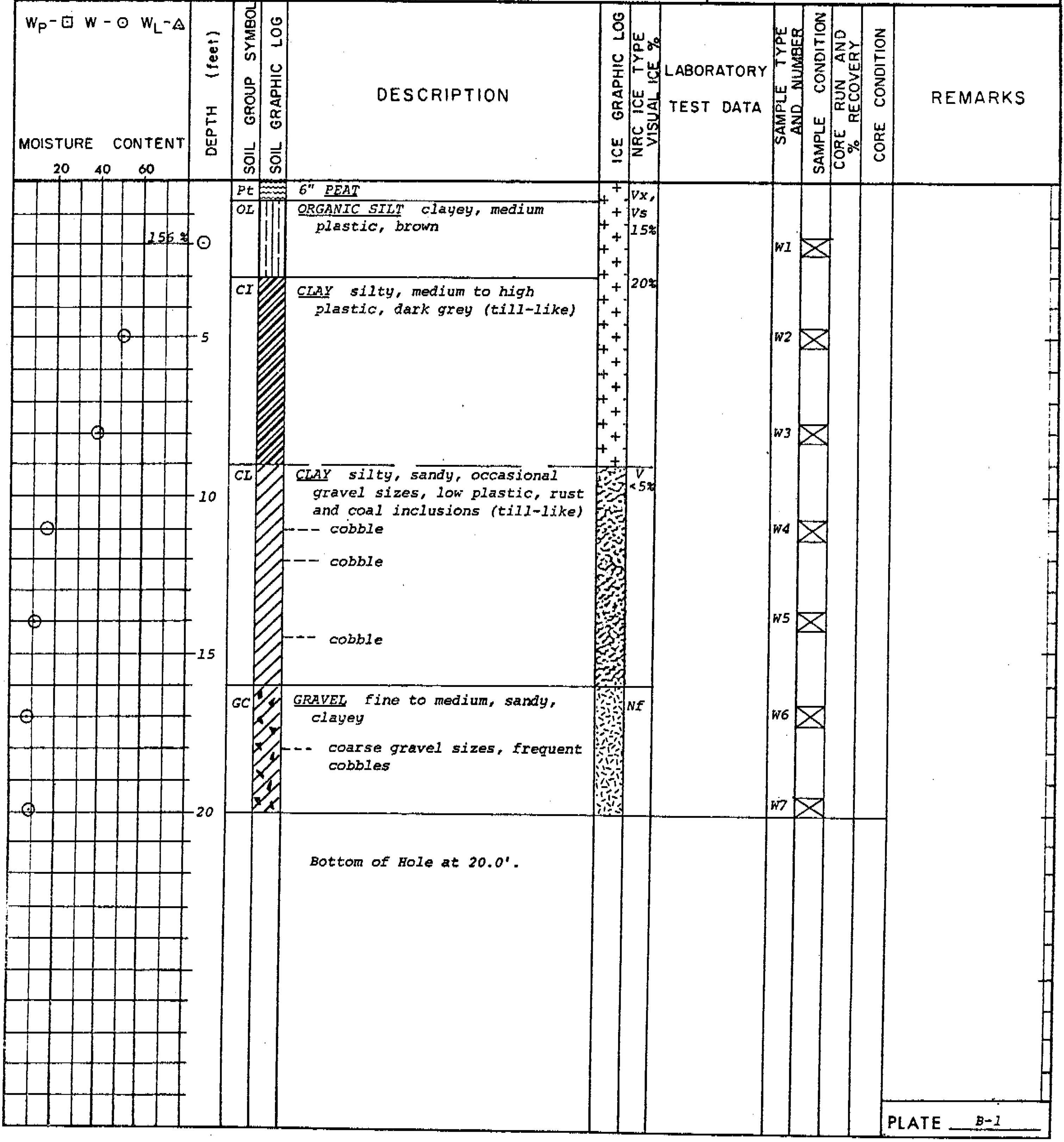
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. AA0

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 7, 1976
RIG Heli Drill
METHOD AIR
START 17:00
FINISH 17:35
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



6" *PEAT*

ORGANIC SILT clayey, medium plastic, brown

CLAY silty, medium to high plastic, dark grey (till-like)

CLAY silty, sandy, occasional gravel sizes, low plastic, rust and coal inclusions (till-like)
- cobble
- cobble
- cobble

GRAVEL fine to medium, sandy, clayey
- coarse gravel sizes, frequent cobbles

Bottom of Hole at 20.0'.

PLATE B-1

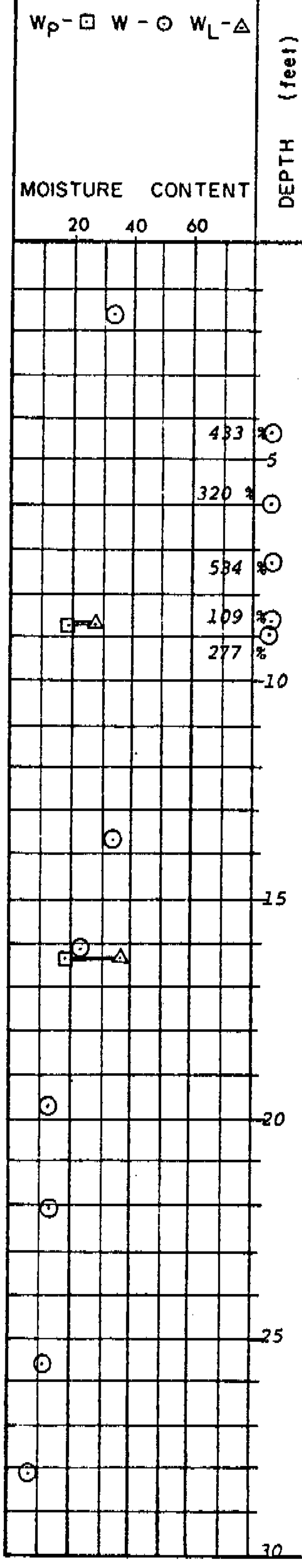
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. AA2

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 10, 1976
RIG Heli Drill
METHOD AIR
START 11:40
FINISH 16:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* 4"	N				IV	
OL-OH	*ORGANIC CLAY* silty, trace sand, medium to high plastic, coal and rust inclusions, brown, rootlets	Vr 5-10%		C1 C2	95% 100%	II IV	
	ICE trace silt, non plastic	ICE		C3	100%	II	
Pt	*ICE AND PEAT*	ICE+ 75%		C4	90%	IV III	
Pt-OL	*PEAT* fibrous, dark brown to black low plastic silt layers	Vs 10% Vc 5-10% Vs V 10%		C5 C6 C7 W4	100% 100% 100%	I I IV	γ_{bulk} = 85 pcf γ_d = 41 pcf
CI	*CLAY* silty, trace sand, trace organic, medium plastic, dark grey	V 15-20%		W5 W6			
	silty, trace sand, occasional gravel sizes, medium plastic, occasional rust and coal inclusions (till-like)	V 10%					
GC	*GRAVEL* sizes to 3/4"ϕ, low to medium plastic	V 5%		W7			
	sandy, trace silt, sizes to 3/4"ϕ, grey			W8 W9			
GP	*GRAVEL* non plastic, occasional cobbles	Nf		W10			

PLATE B-2

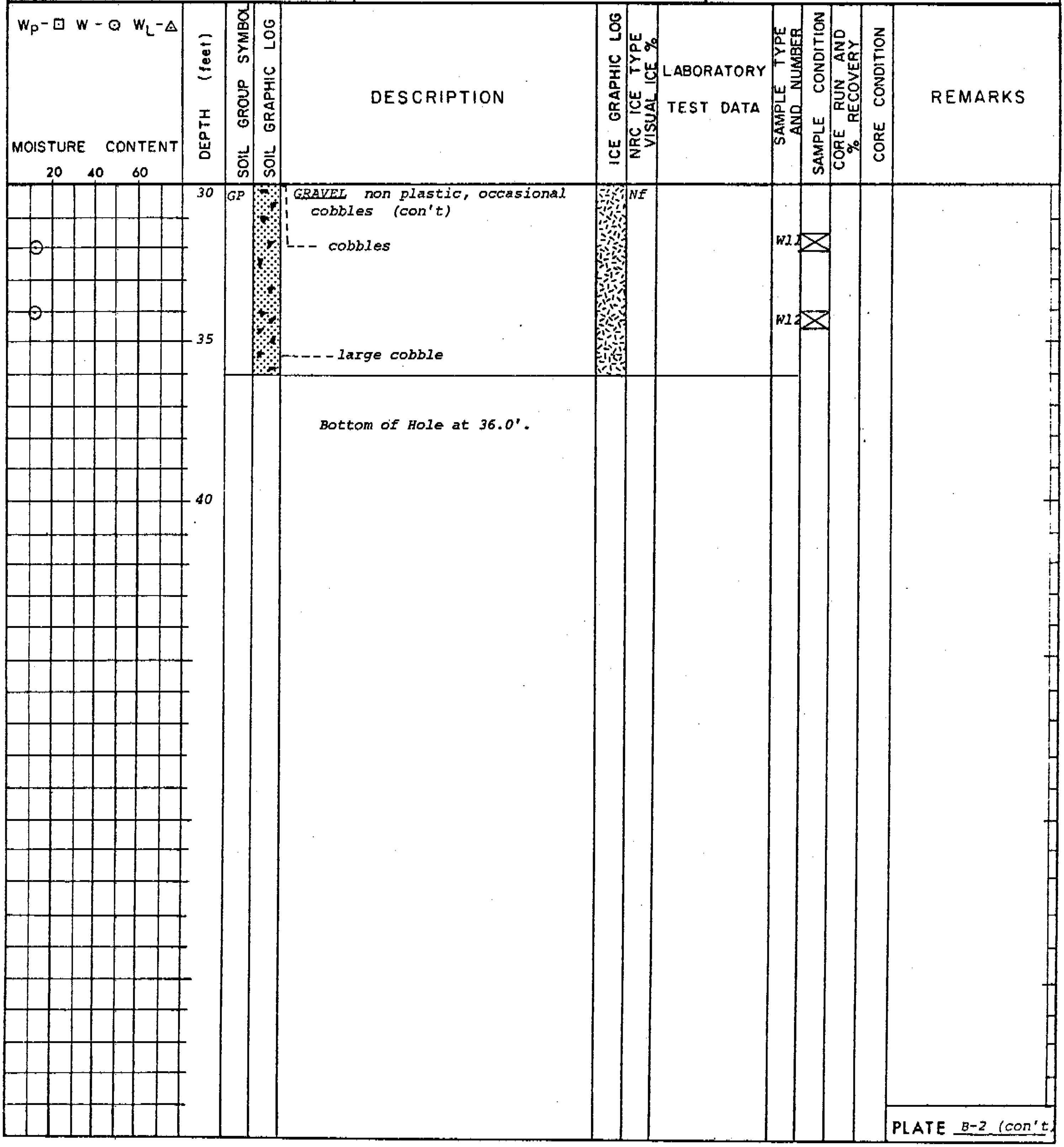
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *AA2 (con't)*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 10, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *11:40*
FINISH *16:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GP	*GRAVEL non plastic, occasional cobbles (con't)*	Nf						
		cobbles			W11	☒			
					W12	☒			
35		*large cobble*							
		Bottom of Hole at 36.0'.							
40									

PLATE *B-2 (con't)*

R.M.HARDY & ASSOCIATES LTD.
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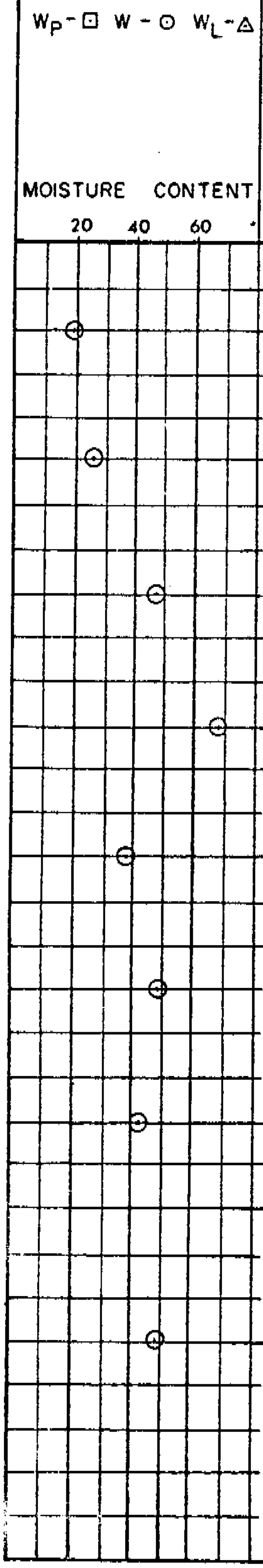
TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. AA4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 8, 1976
RIG Heli Drill
METHOD AIR
START 16:00
FINISH 16:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	4" PEAT							
	CI	CLAY silty, trace sand, organic, medium plastic, occasional gravel sizes, brown (till-like)	Nbe						
					W1	☒			
	CL to CI	very gravelly, occasional cobbles	Nbe 20%						
5					W2	☒			
		cobble, medium plastic							
					W3	☒			
10									
		silty, low plastic	35%		W4	☒			
					W5	☒			
15		silty, trace sand, occasional gravel sizes, medium plastic, grey	10% V <5%						
	CI	trace gravel			W6	☒			
20					W7	☒			
25					W8	☒			
		Bottom of Hole at 25.0'.							

PLATE B-3

R.M.HARDY & ASSOCIATES LTD.
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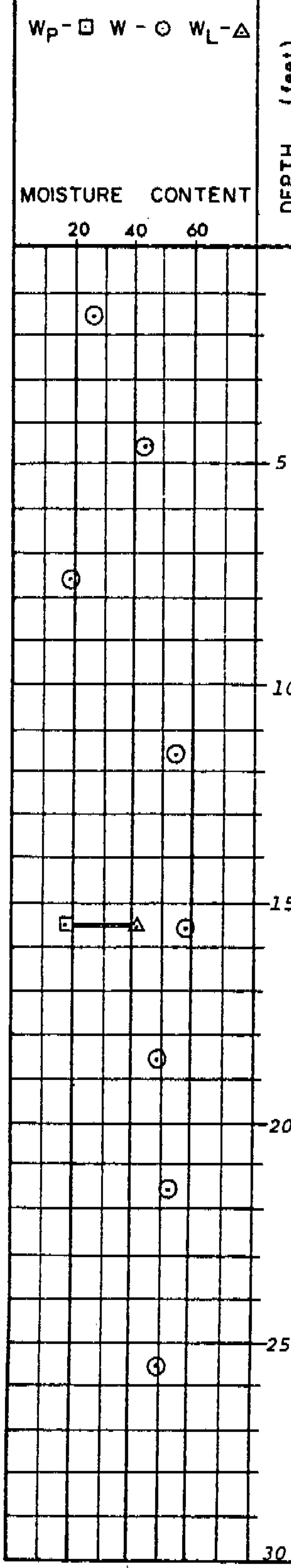
TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. 285

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 12:05
FINISH 12:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	_PEAT_	F						
CI	_CLAY_ silty, medium plastic, trace coarse sand, brown (till-like)	V <5%		W1	☒			
				W2	☒			
		30%						
	--- sandy, gravelly, to 1/2"ø			W3	☒			
				W4	☒			
		10%	Grain Size Plate B-45	W5	☒			
				W6	☒			
	--- trace fine sand, grey			W7	☒			
				W8	☒			
	Bottom of Hole at 26.0'.							

PLATE B-4

R.M.HARDY & ASSOCIATES LTD.
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TEST HOLE LOG

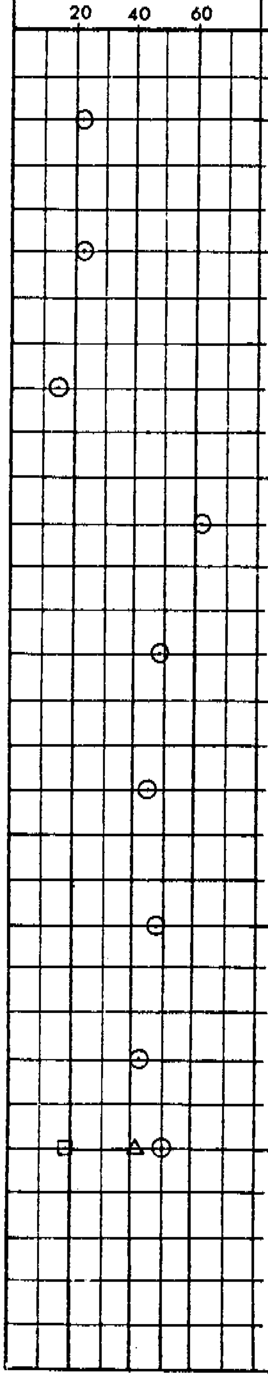
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *AA7*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 8, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *15:15*
FINISH *15:40*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ○ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*4" PEAT*	*Vs, Vx*						
	CI	*CLAY silty, gravelly, trace sand, medium plastic (till-like)*			*W1*	☒			
		more gravelly, sandy, low to non plastic	*10%*						
5				*Grain Size Plate B-46*	*W2*	☒			
	GC	*GRAVEL coarse, sandy, clayey, low plastic*	*Vx, Vc 15%*	*Grain Size Plate B-47*	*W3*	☒			
10		*very silty, low plastic*			*W4*	☒			
	CL-CI	*CLAY very silty, trace sand and gravel, low to medium plastic (till-like)*	*Vx <5%*		*W5*	☒			
15		*clayey, trace gravel, medium plastic*			*W6*	☒			
20					*W7*	☒			
					W8	☒			
25		*medium plastic*			*W9*	☒			

Bottom of Hole at 25.0'.

PLATE *B-5*

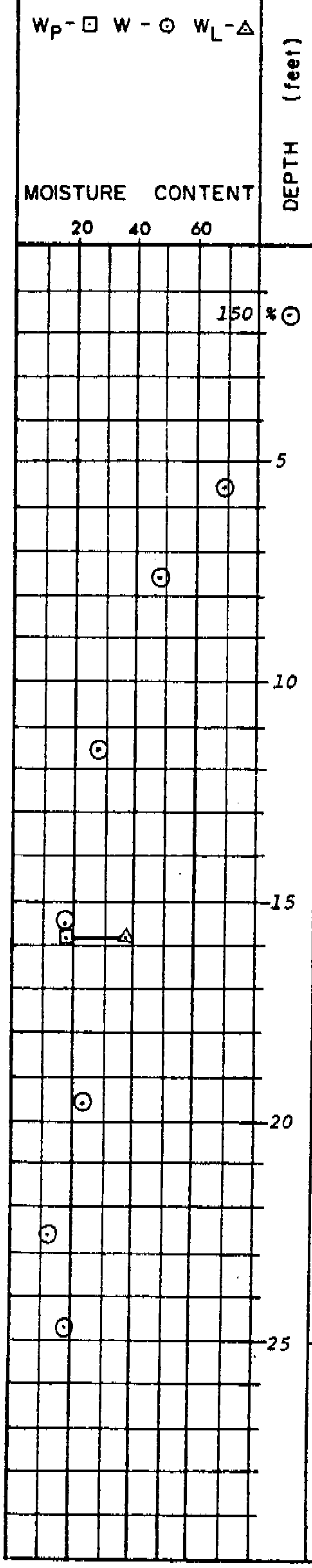
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *BB1*

LOGGED BY *GCD*
DRAWN BY
CHECKED *RST*
DATE *March 24, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *11:35*
FINISH *11:55*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	*F*						
	OL	*ORGANIC SILT* low plastic, brown	*Vx* *70%*		*W1*	☒			
	CI	*CLAY* silty, trace sand, medium plastic, brownish-grey	*V*						
5					*W2*	☒			
					W3	☒			
		occasional gravel sizes to 3/8"ø (till-like)							
10									
		rust coloured organic inclusions	*10%*		*W4*	☒			
15				*Grain Size Plate B-48*	*W5*	☒			
		gravel sizes to 1/2"ø (till-like)							
20		organic inclusions, black			*W6*	☒			
					W7	☒			
		sandy with angular gravel sizes							
25					*W8*	☒			
		Bottom of Hole at 25.0'.							

PLATE *B-6*

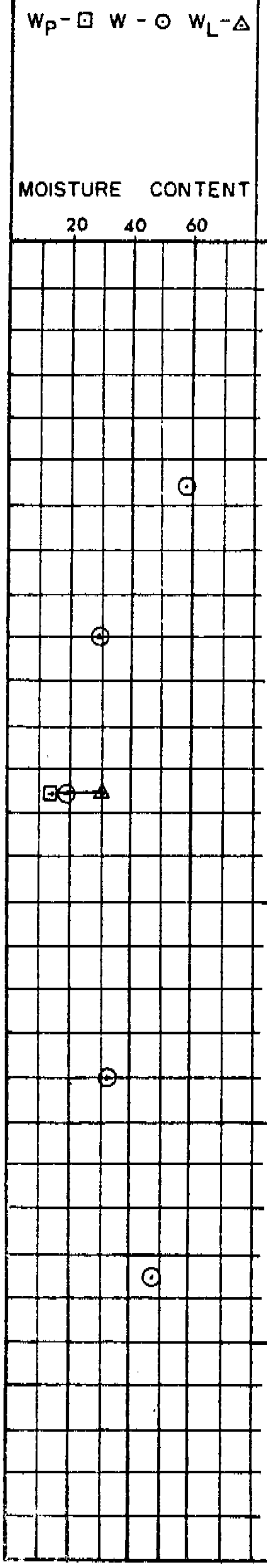
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *PP3*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 24, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *1:30*	FINISH *1:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
	Pt	*PEAT*	F			
	CL	*CLAY gravelly, low plastic, brown*				
		ICE	ICE			
	CI	*CLAY silty, trace sand, fine to coarse grained, medium plastic, brown, (till-like)*	ICE+ 90%			
5			V 20%		W1	
		--- medium to high plastic	5%			
					W2	
10		*--- gravelly with occasional coal inclusions (till-like)*	<5%			
					W3	
		--- 3" ice lens	ICE			
15	GP	*ICE AND GRAVEL fine grained, (to 3/4" dia.) sandy, silty*	ICE+ 50%			
	GP	*GRAVEL coarse rounded and sub-angular to 1" ⌀, badly fractured, less ice*	V 30%		W4	
20		*--- cobbles*				
					W5	
25		*--- coarse to medium gravel sizes*	40-50%			
		Bottom of Hole at 27.0'.				
30						

PLATE *B-7*

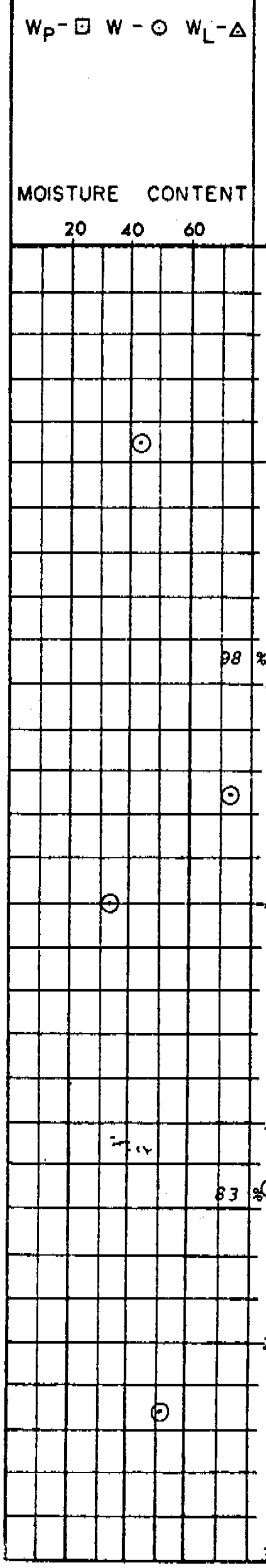
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. BB6

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 2:50
FINISH 3:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
OL	*ORGANIC SILT* occasional gravel	F						
ML	*SILT* sandy, fine to coarse grained, low plastic, brownish grey	V 80%						
		V 20-30%		W1	☒			
	trace gravel sizes	V 40%		W2	☒			
				W3	☒			
GP	*GRAVEL* fine to medium, very sandy, fine to coarse grained, trace silt, grey	V 25%		W4	☒			
GP	*ICE AND GRAVEL*	ICE+ 80-90%						
GP	*GRAVEL* rounded gravel sizes to 1/2"ø, badly fractured	V 40%		W5	☒			
	4" ice lens	ICE						
	sub-angular gravel sizes to 3/4"ø, badly fractured	V 15%		W6	☒			

Bottom of Hole at 27.0'.

PLATE B-8

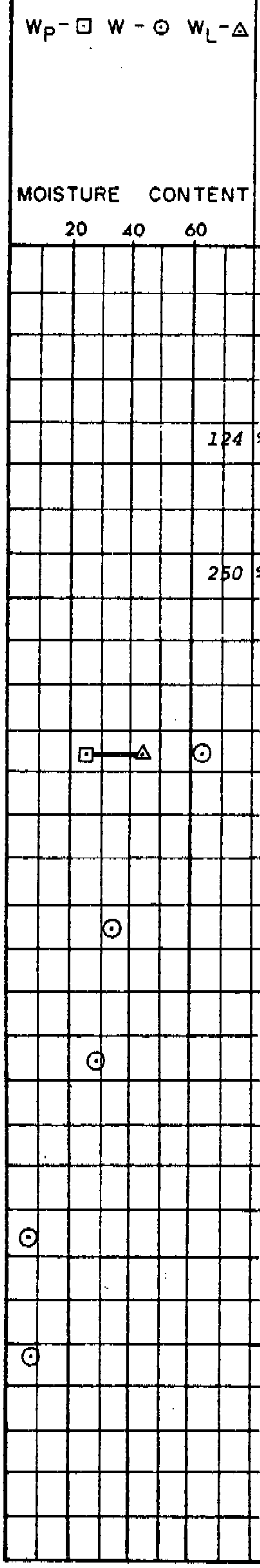
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. CC1

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 11:00	FINISH 11:20
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT	N						
	OL	ORGANIC SILT non plastic, dark brown							
		ICE	ICE						
5	OL	ORGANIC SILT sandy, fine to medium grained, non plastic, brown	V 20%		W1	☒			
	Pt	PEAT			W2	☒			
10	CI-CL	CLAY silty, trace sand, low to medium plastic, brown, peat-like organic inclusions			W3	☒			
15				Grain Size Plate B-49	W4	☒			
					W5	☒			
		--- little fine gravel							
20	GC-SC	GRAVEL rounded and angular, sandy, fine to coarse grained, to 1/2"ø, trace silt, trace clay, low plastic, brown, cobbles	Nf		W6	☒			
		--- low plastic, brown							
25		--- cobbles			W7	☒			
		Bottom of Hole at 25.5'.							
30									

PLATE B-9

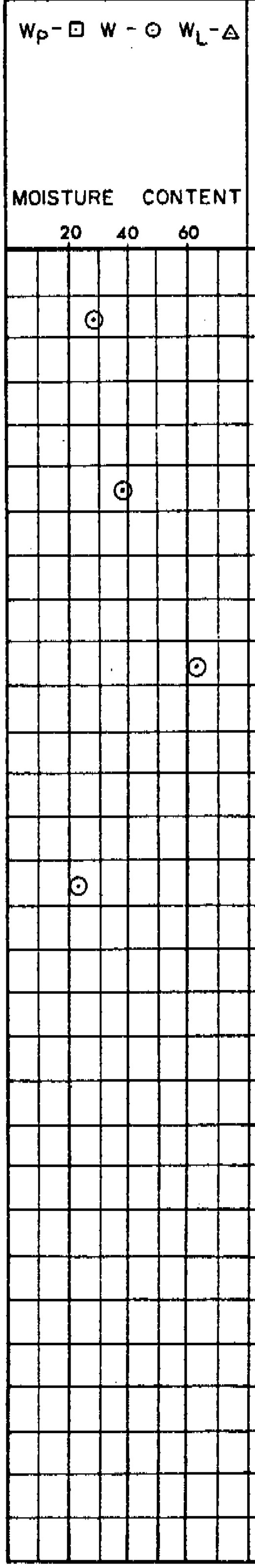
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. CC3

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 2:00
FINISH 2:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI	CLAY trace sand, fine to medium grained, low to medium plastic, brown	F		W1	☒			
		ice-rich	V 50%						
5		sandy, fine to coarse grained, trace gravel sizes, medium to high plastic, dark grey	V 15%		W2	☒			
	GP	GRAVEL fine to medium grained, rounded to 1/2"ø, sandy, fine to coarse grained, trace silt, grey	V 10-15%		W3	☒			
10		4" ice lens	ICE						
		cobbles	V 10-15%						
	GP	ICE AND GRAVEL	ICE+ 50%						
15	GP	GRAVEL coarse to medium sizes	V 10-15%		W4	☒			
		coarse sizes							
		2" ice lens							
		3" ice lens							
20	GP	ICE AND GRAVEL	ICE+ 60%						
25		Bottom of Hole at 22.0'.							

PLATE B-10

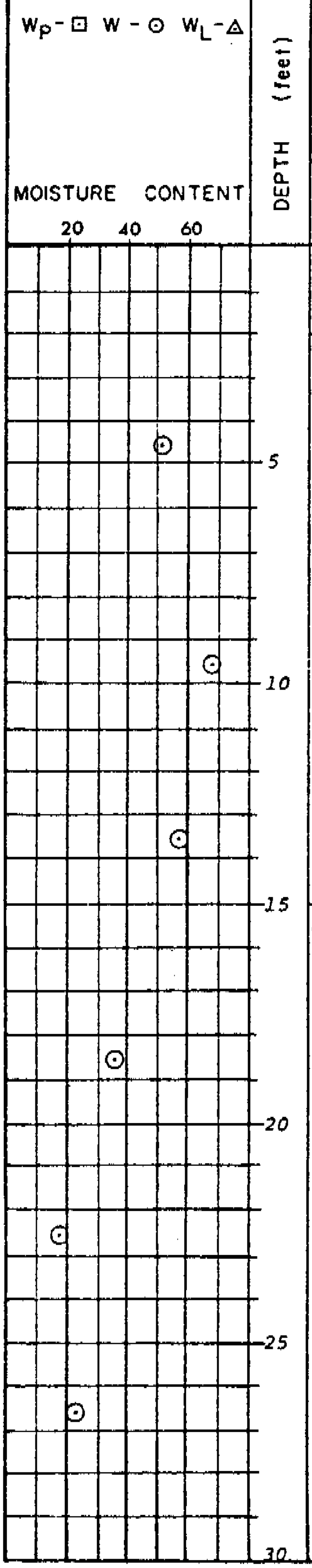
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. CC4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 0:45
FINISH 1:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
ML	*SILT* roots	F			
CI	*CLAY* silty, trace sand, fine to coarse grained, occasional gravel sizes, medium plastic, grey (till-like)	V 60%			
		V 30%		W1 ☒	
	--- low plastic				
				W2 ☒	
		V 20%			
				W3 ☒	
GP	*GRAVEL* coarse, rounded to 3/4"ø, sandy, trace silt, trace clay	V 10%			
	--- 2" ice lens				
				W4 ☒	
	--- numerous cobbles	5- 10%			
				W5 ☒	
	--- 2" ice lens			W6 ☒	
		N			

PLATE B-11

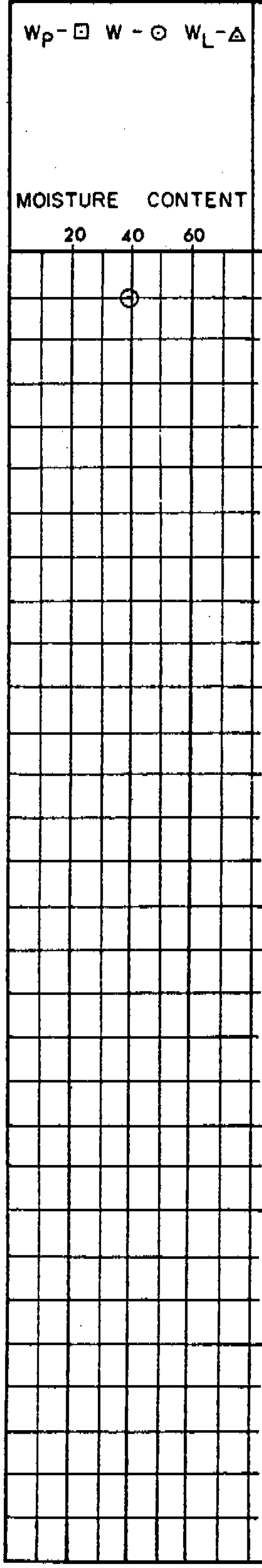
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. CC4
(con't)

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 0:45	FINISH 1:10
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GP- SP	▨	*GRAVEL* sandy, occasional fine to medium gravel sizes, trace silt, clayey (con't)	▨	V 5%		W7	☒			
			Bottom of Hole at 32.0'.								
35											

PLATE B-11 (con't)

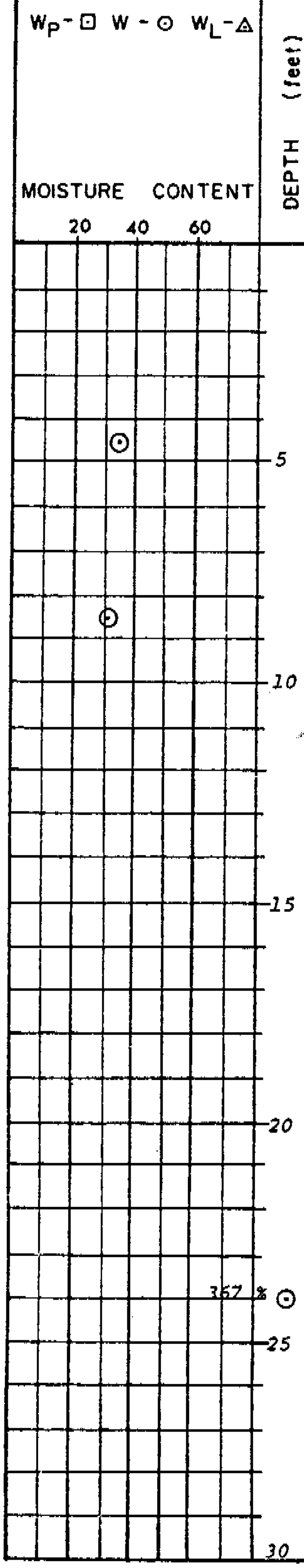
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *CC5*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 23, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *3:25*	FINISH *3:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	*SILT* sandy, fine to coarse grained, occasional gravel sizes, low plastic, grey-brown	*F*						
	ice-rich	*V 80%*						
		V 15%						
				W1	☒			
GP	*GRAVEL* fine to medium grained, sizes to 1"ø, sandy, fine to coarse grained, trace silt and clay, grey	*V 25%*						
				W2	☒			
	6" ice lens							
	ICE	*ICE*						
	trace gravel							
				W3	☒			
SP	*SAND* fine to medium grained, trace silt, grey, ice-rich	*V 70%*						

PLATE *B-12*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. CC5
(con't)

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 23, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *3:25*	FINISH *3:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

W_P-⊡ W-⊙ W_L-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*SP*		*SAND* *fine to medium grained, trace silt, grey (con't)*		*V* *70%*						
				ICE		*ICE*						
156 % ⊙	35	*SP*		*ICE AND SAND* *fine grained*		*V* *60-70%*		*W4*	☒			
⊙		*GP*		*GRAVEL* *very coarse, sub-angular to 3/4"ø, very sandy, fine to coarse grained, grey-brown*		*V* *5-10%*		*W5*	☒			
	40			*Bottom of Hole at 40.0'.*								

PLATE *B-12 (con't)*

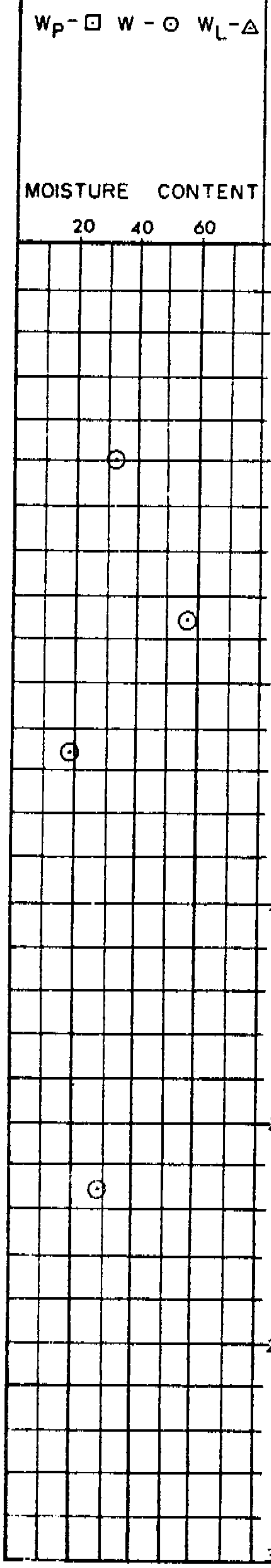
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *CC6*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 23, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *1:00*
FINISH *1:55*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI	*CLAY sandy, fine to coarse grained, trace fine gravel sizes, medium plastic, grey*	*F*						
			V 50%						
5			*V 5%*		*W1*	☒			
	GP	*GRAVEL fine to medium grained, very sandy, fine to coarse grained, trace silt and clay, grey*							
			V 15%		*W2*	☒			
10		*very coarse gravel sizes to 1"ϕ*	*5%*						
					W3	☒			
		cobbles							
15	*GM*	*ICE AND GRAVEL silty*	*V 80%*						
		ICE	*ICE*						
20									
	GP	*GRAVEL sizes to 1/2"ϕ, very sandy, fine to coarse grained, trace silt, grey*	*V 10%*		*W4*	☒			
25									
	GP	*ICE AND GRAVEL trace sand*	*ICE+ 80-90%*						
30									

PLATE *B-13*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. CC6 (con't)

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 23, 1976
RIG Heli Drill	METHOD AIR	START 1:00	FINISH 1:55
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ○ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	GP		*ICE AND GRAVEL* trace sand		ICE+ 90- 90%						
				ICE		ICE						
	35	ML		*SILT* trace fine sand, non plastic grey, ice-rich		V 60%						
				Bottom of Hole at 37.0'.								
	40											

PLATE B-13 (con't)

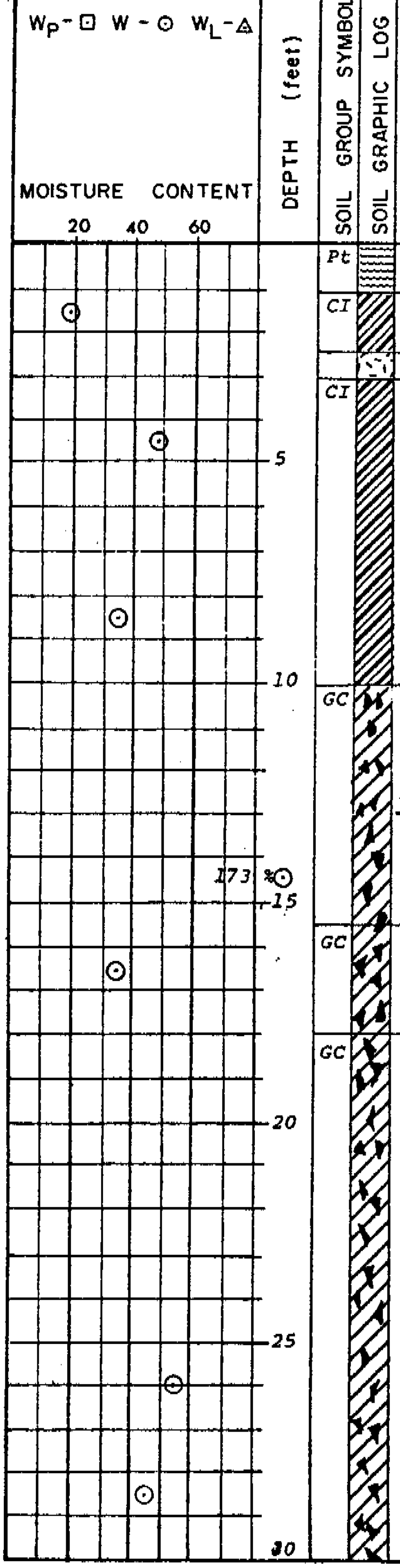
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. CC7

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD AIR	START 2:35 AM	FINISH 3:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	F						
CI	CLAY silty, trace of sand, medium plastic	F		W1	☒			
	ICE layer (2.5 - 3.0')	ICE						
CI	CLAY silty, trace of sand, medium plastic, gravel sizes to 1" ø, brown (till-like)	V 25%		W2 W3	☒ ☒			
GC	ICE AND GRAVEL coarse, sandy, trace of silt and clay, brownish grey (till-like) - - clayey	ICE+ 60%		W4	☒			
GC	GRAVEL coarse, sandy, trace of silt and clay, less ice	V		W5	☒			
GC	ICE AND GRAVEL sandy, trace silt, clayey	ICE+ 90% ICE+ 75%		W6 W7	☒ ☒			

PLATE B-14

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

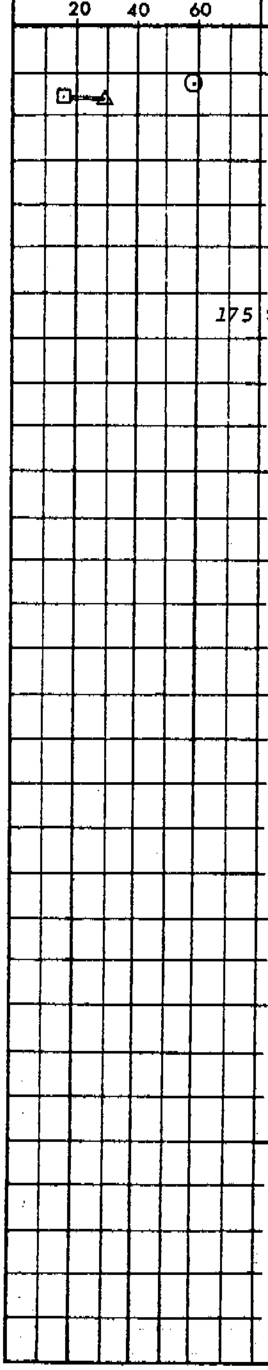
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. CC7 (con't)

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD AIR	START 2:35 AM	FINISH 3:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ○ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	CL-CI		*CLAY* silty, sandy, gravelly, low to medium plastic, brown (till-like)		V 10-15%		W8	☒			
35	CL-CI		*ICE AND CLAY* silty, sandy, gravelly, low to medium plastic, grey		ICE+ 75%		W9	☒			
40			Bottom of Hole at 37.0'.								

PLATE B-14 (con't)

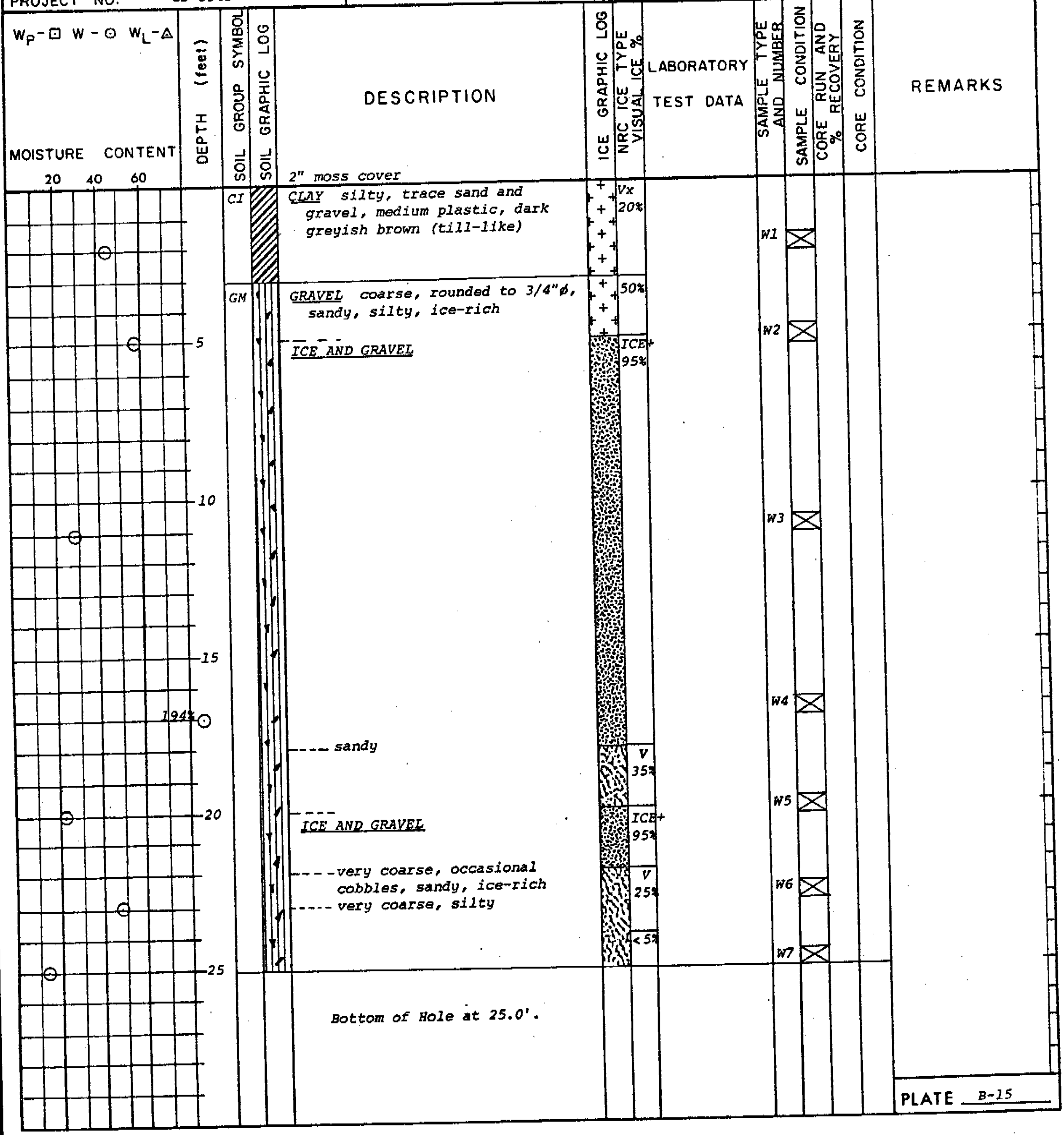
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DDO

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 8, 1976
RIG Heli Drill
METHOD AIR
START 16:20
FINISH 16:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	SAMPLE TYPE AND NUMBER
	2" moss cover		
CI	CLAY silty, trace sand and gravel, medium plastic, dark greyish brown (till-like)	Vx 20%	W1
GM	GRAVEL coarse, rounded to 3/4"ø, sandy, silty, ice-rich	50%	W2
	ICE AND GRAVEL	ICE+ 95%	W3 W4
	sandy	V 35%	W5
	ICE AND GRAVEL	ICE+ 95%	
	very coarse, occasional cobbles, sandy, ice-rich	V 25%	W6
	very coarse, silty	<5%	W7

Bottom of Hole at 25.0'.

PLATE B-15

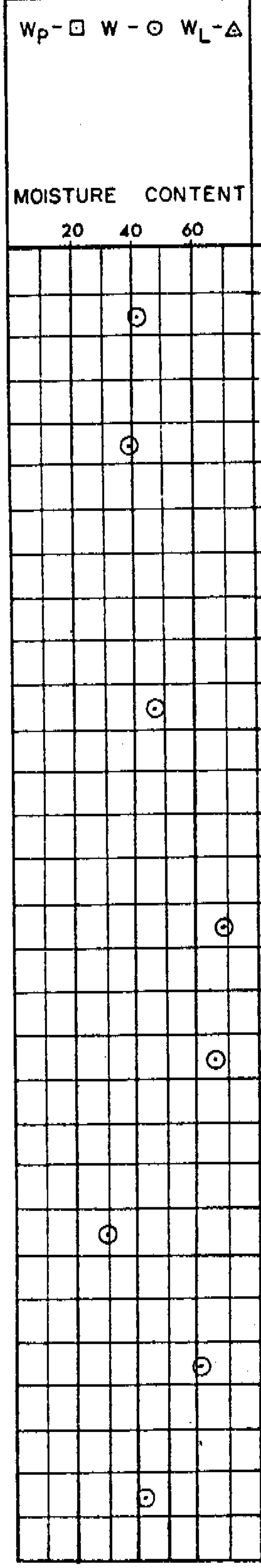
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DD3

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 3:05	FINISH 3:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ML	*SILT* sandy, fine to medium grained, occasional gravel sizes, low plastic, grey-brown	F						
			V 40%		W1	☒			
					W2	☒			
5	GP	*GRAVEL* fine to medium, sandy, fine to coarse grained, trace silt, grey	V 10%						
	GP	*ICE AND GRAVEL*	V 60%						
10	GP	*GRAVEL* very coarse, rounded to 3/4"ø, little sand, occasional cobbles	V 25%		W3	☒			
			15-20%						
15					W4	☒			
					W5	☒			
20			20%						
					W6	☒			
		trace silt and clay							
25		very sandy, fine to coarse grained			W7	☒			
		cobbles	5%						
					W8	☒			
30									

PLATE B-16

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DD3 (con't)

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 3:05	FINISH 3:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	GP		GRAVEL sandy, trace silt (con't)		V 10-20%						
				Bottom of Hole at 32.0'.								
	35											

PLATE B-16 (con't)

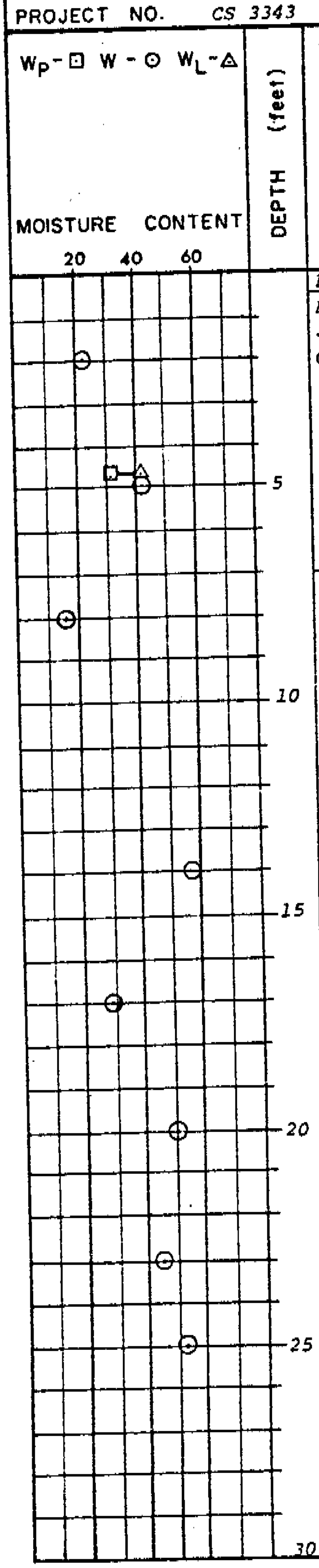
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DD4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 8, 1976
RIG Heli Drill
METHOD AIR
START 16:45
FINISH 17:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	6" PEAT	Vx						
ML - OL	SILT clayey, trace sand and gravel, organic inclusions, occasional rust and coal inclusions, low to medium plastic (till-like)	V 10%		W1	☒			
		10%		W2	☒			
	----cobble							
GM	GRAVEL coarse, rounded to 3/4"ø, sandy, silty			W3	☒			
	ICE lens from 10' to 11'	ICE+ 95%						
	---trace clay	35%		W4	☒			
	----few cobbles							
		70%		W5	☒			
	ICE AND GRAVEL little coarse sand	ICE+ 95%						
				W6	☒			
	ICE from 21' to 22' ---coarse, rounded to 3/4"ø, sandy, silty	20-30%		W7	☒			
			Grain Size Plate B-50	W8	☒			
	Bottom of Hole at 26.0'.							

PLATE B-17

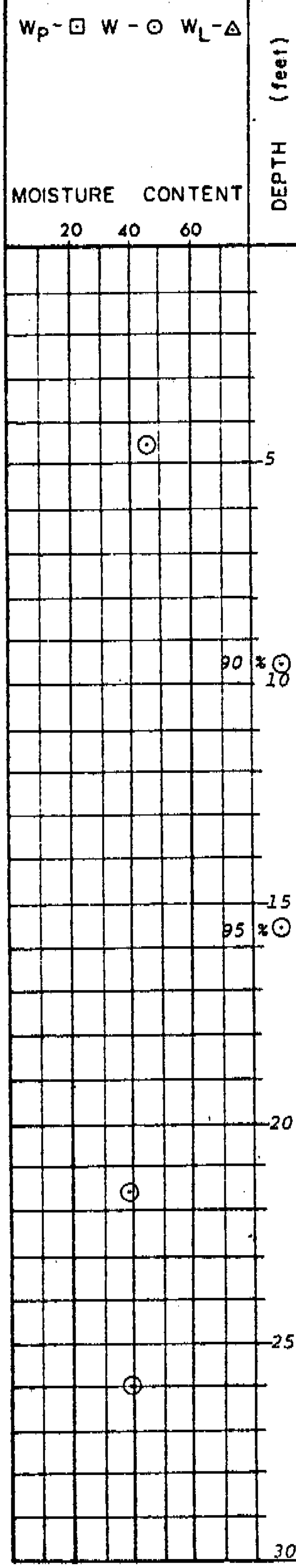
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DD5

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 3:55
FINISH 4:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt-OL	*PEAT* silty --- cobble	F						
		ICE	ICE						
	CI	*CLAY* silty, trace gravel sizes, medium plastic, olive grey (till-like)	V 20%						
					W1	☒			
5									
	GP	*GRAVEL* coarse and sub-angular to 1"ø, very sandy, fine to medium grained, brown	V 15%						
			V 40%						
					W2	☒			
10									
	GP-GC	--- trace clay, low plastic	30- 40%						
	GP	--- coarse gravel to 1/2"ø							
15					W3	☒			
			V 20%						
		--- 2" ice layer							
20		--- very coarse gravel sizes to 1 1/4"ø	5- 10%						
					W4	☒			
	GP	--- very sandy, silty, trace clay, grey-brown	5%						
25									
					W5	☒			
		--- very coarse gravel sizes, rounded to 3/4"ø, sandy	<5%						
30									

PLATE B-18

TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

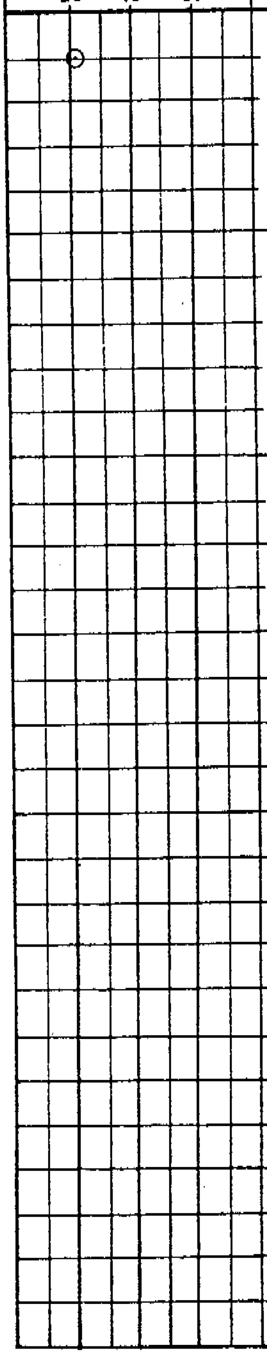
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DD5
(con't)

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 23, 1976
RIG Heli Drill	METHOD AIR	START 3:55	FINISH 4:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT
20 40 60



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GP	▨	GRAVEL very coarse sizes, rounded to 3/4"ø, sandy (con't)	▨	V 5%		W6	☒			
			Bottom of Hole at 32.0'.								
35											

PLATE B-18 (con't)

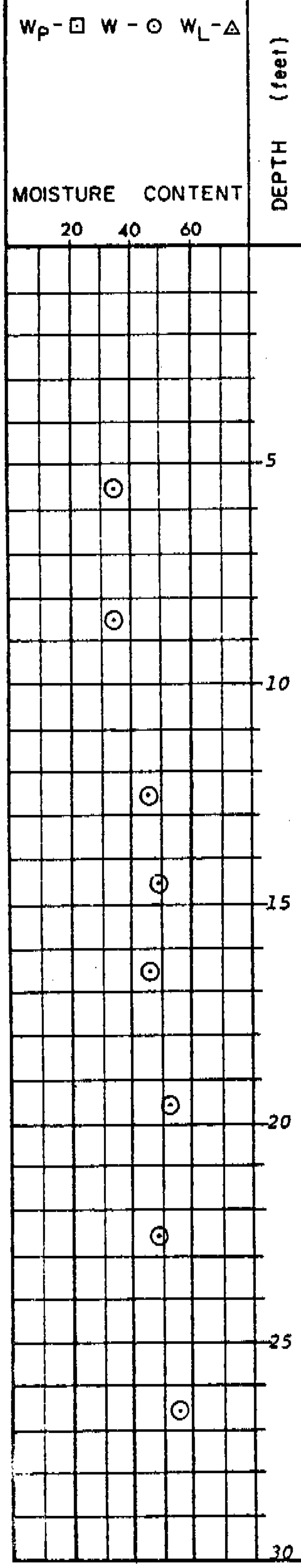
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DD6

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 0:05
FINISH 0:55
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	F						
OL	ORGANIC SILT low plastic, brown							
	ICE	ICE						
CI	ICE AND CLAY silty, trace gravel sizes	ICE+ 80%						
CI	CLAY silty, trace gravel sizes, medium plastic, olive brown	V 15%		W1 W2	☒ ☒			
GP-GC	GRAVEL rounded to 3/4"ø, clayey, sandy, olive brown	V 10%						
GP	sandy, fine to medium grained, gravelly, trace clay			W3 W4	☒ ☒			
	coarse, rounded gravel to 1"ø	<5%		W5	☒			
	very coarse gravel	15%						
		Nf		W6	☒			
CI	CLAY silty, gravelly, medium plastic, grey-brown (till-like)	V 20%		W7	☒			
GP	GRAVEL subangular to 1/2"ø, sandy, medium plastic, brown	V 5-10%		W8	☒			
GP	ICE AND GRAVEL	V 80%						

PLATE B-19

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DD6 (con't)*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 23, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *0:05*	FINISH *0:55*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

W_P-□ W-⊙ W_L-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*GP*		*ICE AND GRAVEL* (con't)		*V* *40%*						
102 ⊙								*W9*	☒			
				Bottom of Hole at 32.0'.								
	35											

PLATE *B-19 (con't*

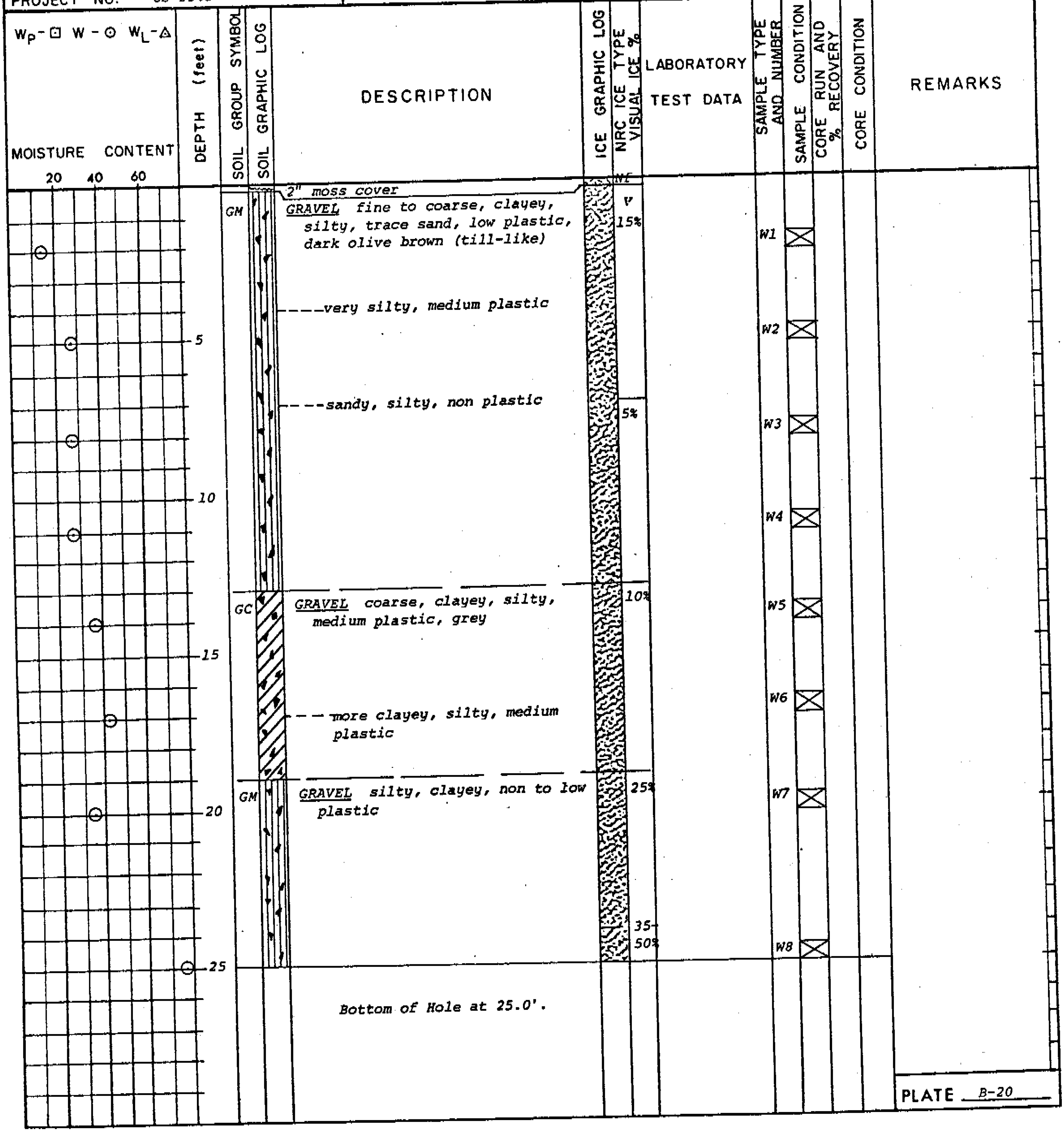
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DD7

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 8, 1976
RIG Heli Drill
METHOD AIR
START 14:00
FINISH 14:50
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



2" moss cover

GRAVEL fine to coarse, clayey, silty, trace sand, low plastic, dark olive brown (till-like)

---very silty, medium plastic

---sandy, silty, non plastic

GRAVEL coarse, clayey, silty, medium plastic, grey

--- more clayey, silty, medium plastic

GRAVEL silty, clayey, non to low plastic

Bottom of Hole at 25.0'.

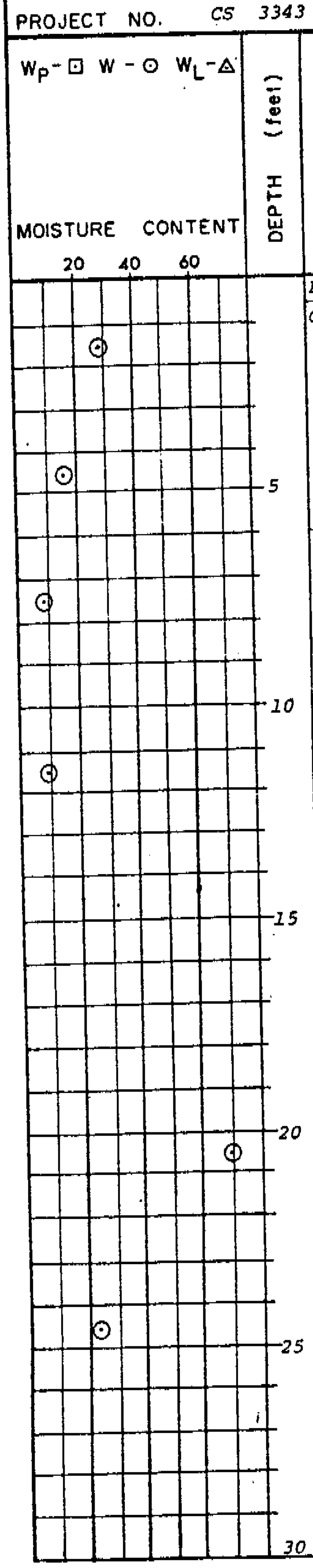
PLATE B-20

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT
TEST HOLE NO. FF1

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR FLUSH
START 10:00
FINISH 10:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	V 30%						
CI	CLAY silty, trace sand, coarse grained, medium plastic, brown, occasional organic inclusions			W1 W2	☒ ☒			
GP	GRAVEL subangular to subrounded to 1/2"ø, sandy, fine to coarse grained, trace silt, non plastic brown (till-like) --- coarser gravel sizes	V <5% Nbn	Grain Size Plate B-51	W3 W4	☒ ☒			
	ICE	ICE						
ML-SM	SILT sandy, fine grained, occasional gravel sizes to 1/2"ø, non plastic, brown	V 30%		W5	☒			
SM	SAND fine grained, very silty, occasional gravel sizes to 1/2"ø brown			W6	☒			

Bottom of Hole at 26.0'.

PLATE B-21

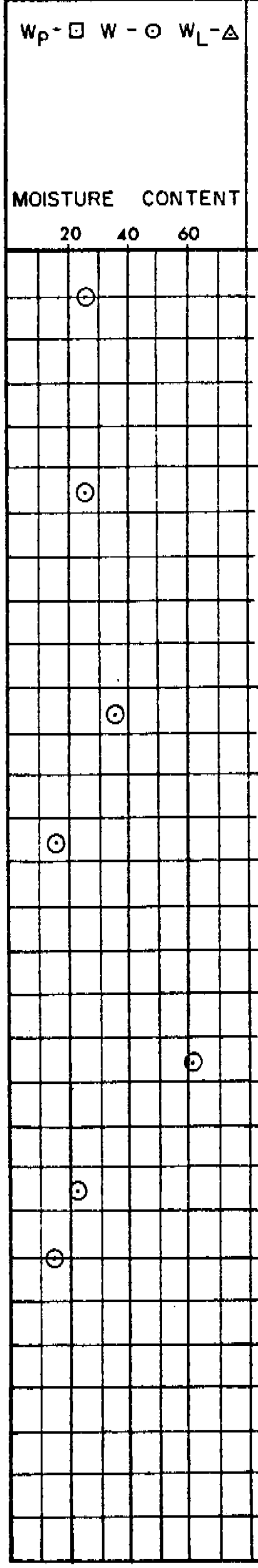
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. EE3

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 3:35	FINISH 4:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI	*CLAY* silty, trace sand, fine to coarse grained, brown (till-like)	F		W1	☒			
	CI	*ICE AND CLAY*	V 60%						
5	GC	*GRAVEL* rounded to 1/2"ø, sandy, clayey, trace silt, medium plastic, olive-brown	V 5-10%		W2	☒			
		coarse, subangular to 3/4"ø, sandy, trace silt							
		2" ice lens							
		4" ice lens							
10					W3	☒			
		occasional cobbles, more ice	V 20%						
		very coarse, round to 1"ø			W4	☒			
15									
					W5	☒			
		cobble or boulder							
20		trace silt, clayey, very dense	Nf		W6	☒			
					W7	☒			
25		Bottom of Hole at 24.0'.							

PLATE B-22

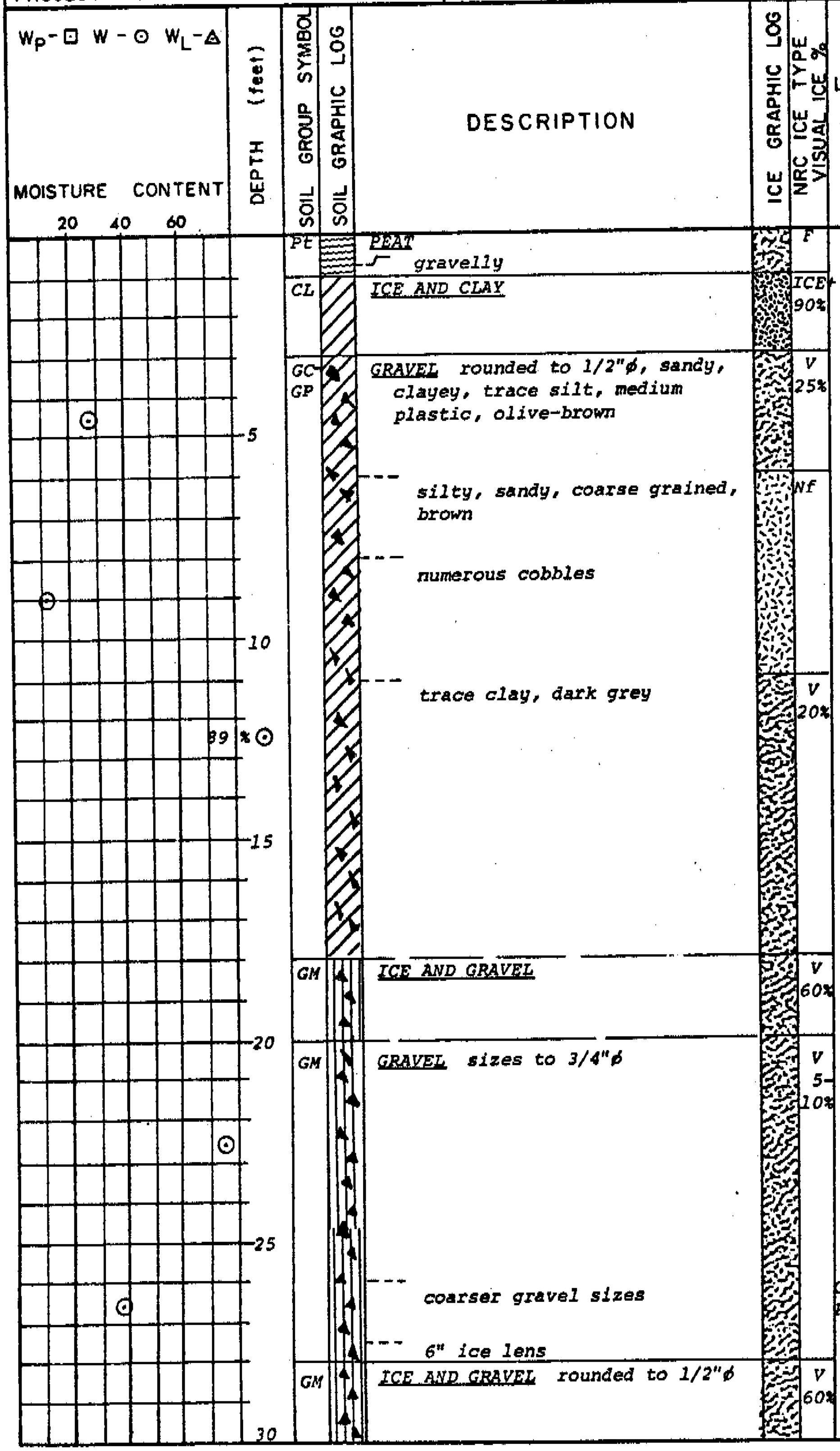
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. EE4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 23:05
FINISH 0:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT gravelly	F						
CL	ICE AND CLAY	ICE+ 90%						
GC-GP	GRAVEL rounded to 1/2"ø, sandy, clayey, trace silt, medium plastic, olive-brown	V 25%		W1	☒			
	silty, sandy, coarse grained, brown	Nf						
	numerous cobbles			W2	☒			
	trace clay, dark grey	V 20%		W3	☒			
GM	ICE AND GRAVEL	V 60%						
GM	GRAVEL sizes to 3/4"ø	V 5-10%		W4	☒			
	coarser gravel sizes		Grain Size Plate B-52	W5	☒			
	6" ice lens							
GM	ICE AND GRAVEL rounded to 1/2"ø	V 60%						

PLATE B-23

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. EE4 (con't)

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 23, 1976
RIG Heli Drill	METHOD AIR	START 23:05	FINISH 0:05
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND CORE % RECOVERY	CORE CONDITION	REMARKS
	30	GM		*ICE AND GRAVEL* rounded to 1/2"ø (con't)		V 60%						
				Bottom of Hole at 32.0'.								
	35											

PLATE B-23 (con't)

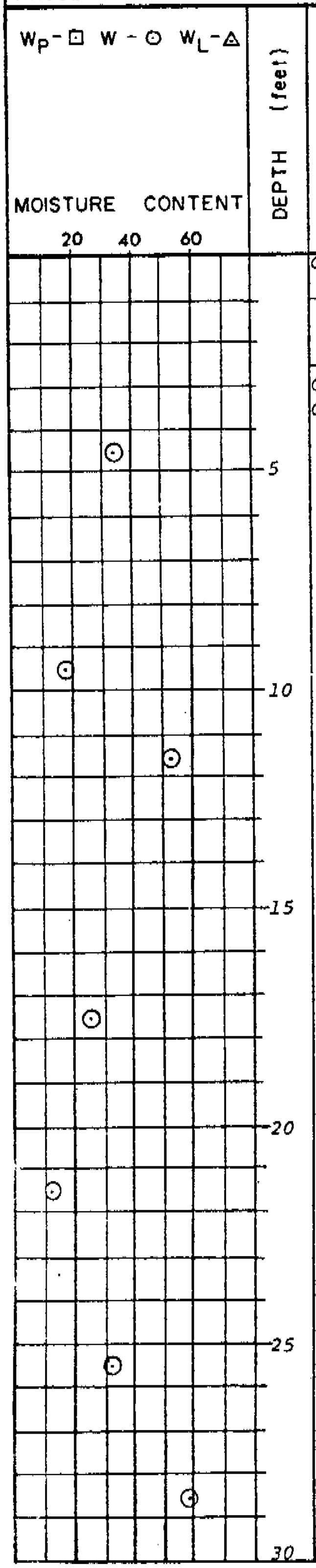
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. EE5

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 5:00
FINISH 5:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CL	*CLAY* silty, trace gravel sizes, low plastic, brown	F						
	ICE	ICE						
GP-GC	*GRAVEL* coarse, rounded to 1/2"ø, clayey, silty, trace sand, fine to coarse grained, low plastic, brown, (till-like)	V 30%		W1	☒			
	coarser, less ice, trace pebble	V <5%						
	coarser, to 1 1/2"ø, subangular			W2	☒			
	coarse, sandy, fine to coarse, trace silt, brown	V 30-40%		W3	☒			
	cobbles, subangular and rounded fine to coarse sizes to 1"ø			W4	☒			
	till-like texture, sandy			W5	☒			
	sandy, gravel sizes to 1/2"ø	10%		W6	☒			
	2" ice lens							
	less sand	20%		W7	☒			

PLATE B-24

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *EE5* *(con't)*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 23, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *5:00*
FINISH *5:45*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*GP*		*ICE AND GRAVEL*		*ICE+* *90%*						
				Bottom of Hole at 32.0'.								
	35											

PLATE *B-24 (con't)*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

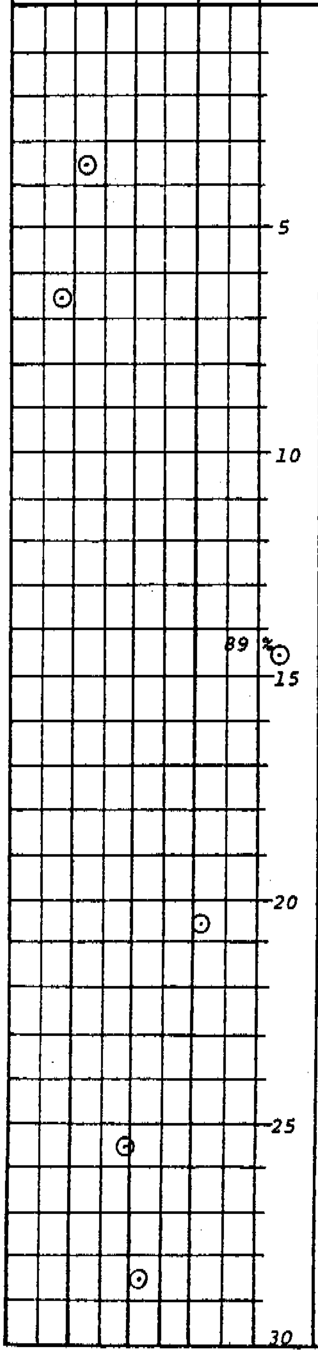
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. EE6

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 22, 1976
RIG Heli Drill	METHOD AIR	START 22:25	FINISH 22:45
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT
20 40 60



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	<u>PEAT</u>	F						
ML	<u>ICE AND SILT</u>	V 70%						
GP	<u>GRAVEL</u> sandy, medium to coarse grained, subangular to 3/4"ø, trace silt, olive brown	V 15%		W1	☒			
GC	<u>GRAVEL</u> very clayey, trace silt, low to medium plastic, gravel sizes to 3/4"ø	V 5%		W2	☒			
GP	<u>ICE AND GRAVEL</u> subangular and rounded to 3/4"ø	V 60-70%						
GM	<u>SILT AND GRAVEL</u> trace clay, low to non plastic, grey	V 35%		W3	☒			
GP	<u>GRAVEL</u> very coarse, rounded to 1"ø, sandy, trace silt, ice-rich	V 75%						
	less ice	25%		W4	☒			
		10%		W5	☒			
	medium gravel, sandy, brown	Nf		W6	☒			

PLATE B-25

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *EE6 (con't)*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 22, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *22:25*
FINISH *22:45*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

WWp-⊡ W-⊙ WL-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*GP*	▨	*GRAVEL medium grained, sandy, brown (con't)* *— sandy, trace silt*	▨	*V* *10-* *15%*						
				Bottom of Hole at 32.0'.								
	35											

PLATE *B-25 (con't*

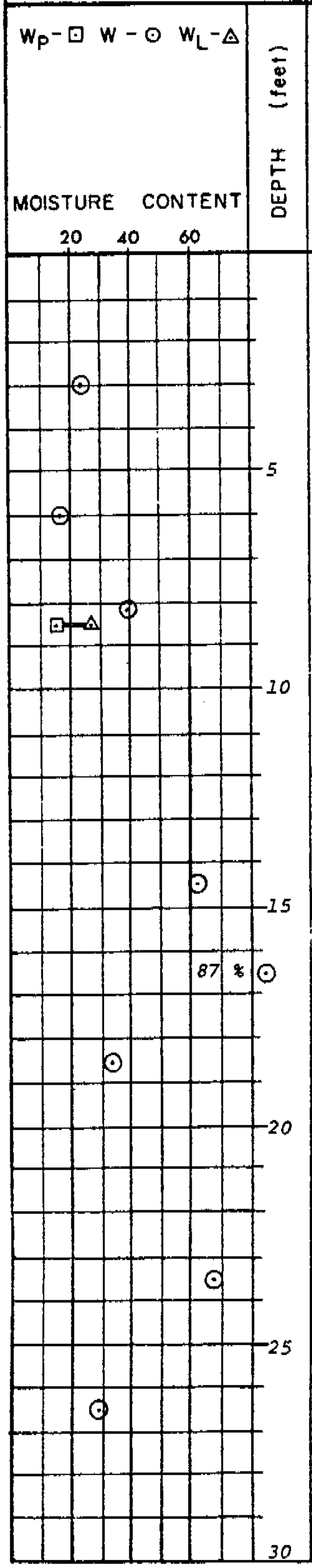
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. EE7

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD AIR	START 3:20	FINISH 3:50
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
CL-CI	*CLAY* silty, sandy, gravelly, medium plastic, brown (till-like)	V 10%			
				W1	
	--- silty, sandy, fine to coarse grained, occasional gravel sizes, low to medium plastic			W2	
				W3	
GM	*ICE AND GRAVEL* sandy, trace clay trace of silt, brown (till-like)	ICE+ 80%			
	--- silty			W4	
				W5	
GM	*GRAVEL* very sandy, silty	V	Grain Size Plate B-53	W6	
	--- clayey			W7	
	--- ice-rich	50%			
				W8	
	ICE	ICE			
GM	*GRAVEL* very sandy, silty	V			

PLATE B-26

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

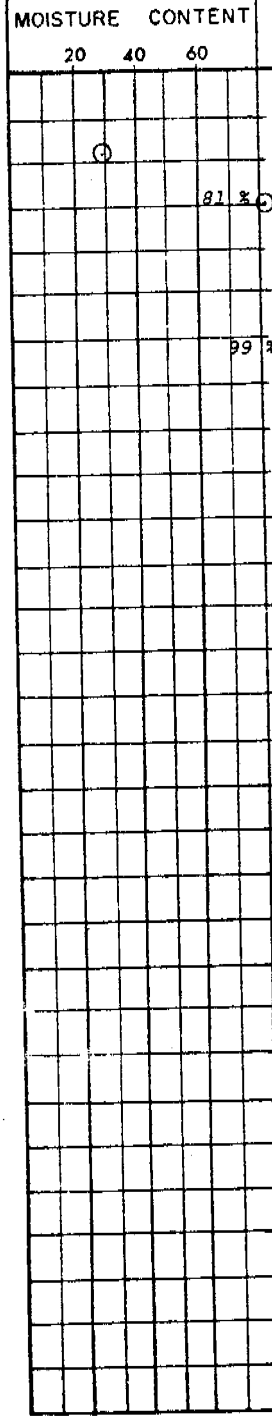
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. EE7 (con't)

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD AIR
START 3:20
FINISH 3:50
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

Wp - ⊡ W - ⊙ WL - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GM	GRAVEL very sandy, silty (con't)	V						
					W9	☒			
		--- less ice, trace clay	25-30%						
					W10	☒			
35		--- clayey							
					W11	☒			
		Bottom of Hole at 37.0'.							
40									

PLATE B-26 (con't)

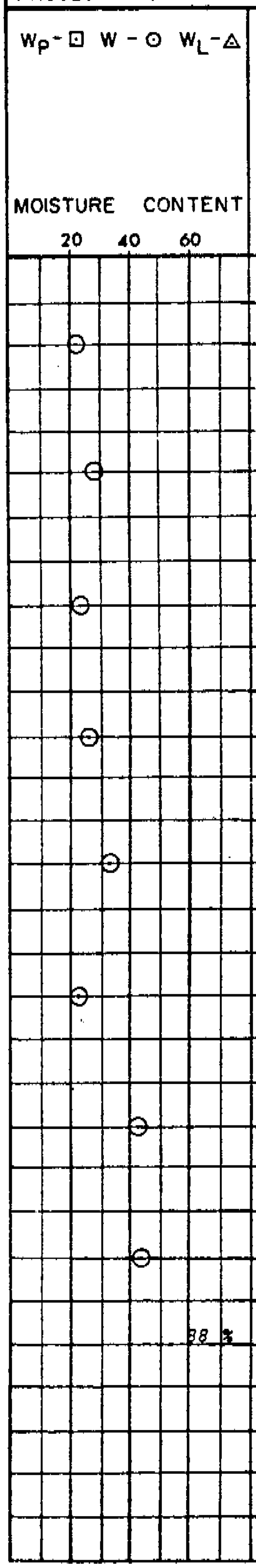
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *FF0*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 9, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *15:10*	FINISH *15:30*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*4" PEAT*	*Nf*						
	CI	*CLAY silty, sandy, gravelly, trace organics, rust and coal inclusions, medium plastic, brown (till-like)* *sandier, low to medium plastic*	*V* *5%*		*W1*	☒			
5	GM	*GRAVEL coarse to 1 1/4"ø, silty, sandy*	*10%*		*W2*	☒			
					W3	☒			
10		*more ice*	*15%*		*W4*	☒			
					W5	☒			
15					*W6*	☒			
		fewer silt sizes, ice-rich	*25-35%*						
20					*W7*	☒			
					W8	☒			
25					*W9*	☒			

Bottom of Hole at 25.0'.

PLATE *B-27*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

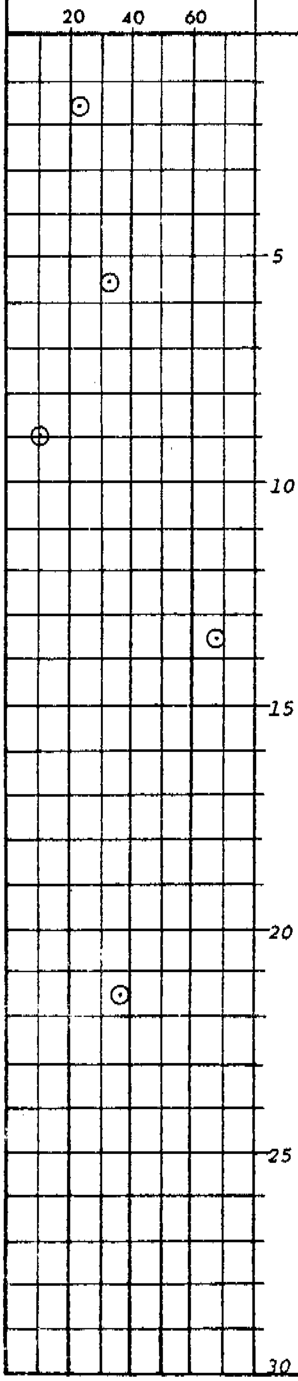
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *FF2*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 24, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *5:30*
FINISH *6:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI-CH	*CLAY silty, trace sand, low to medium plastic, brown*	*F*						
	medium to high plastic, trace gravel (till-like)	*V 20%*		*W1*	☒			
GC-GP	*GRAVEL clayey, angular to 1/2"ø*	*V 10-15%*		*W2*	☒			
	subangular to 1/2"ø, very sandy, clayey, trace silt	*V <5%*		*W3*	☒			
	cobbles							
	rounded to 3/4"ø, sandy	*V 20%*		*W4*	☒			
	silty, low to non plastic	*V 30%*						
	rounded to 1/2"ø, very sandy, trace silt, grey			*W5*	☒			
		10%						
	higher ice content	*25-30%*						
	3" ice lens							
	Bottom of Hole at 27.0'.							

PLATE *B-28*

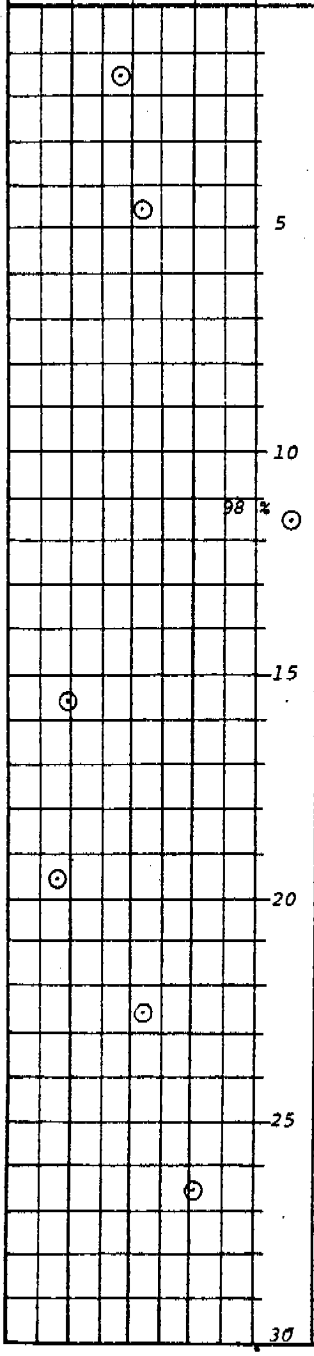
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. FF3

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 4:30
FINISH 5:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt		*PEAT*		F						
	CI		*CLAY* silty, sandy, fine to coarse grained, trace gravel sizes, medium plastic, grey-brown				W1	☒			
			ICE		ICE						
5	CI		*CLAY AND ICE* very silty, high to medium plastic		V 40%		W2	☒			
	GP		*ICE AND GRAVEL*		ICE+ 50%						
10	GP		*GRAVEL* subangular to 1"ø, sandy, trace silt, occasional cobbles – 2" ice lens		V 20%		W3	☒			
			coarse, round to 1/2"ø		5- 10%						
15							W4	☒			
			6" ice lens								
			cobbles, very coarse gravel sizes		<5%		W5	☒			
20			very dense		Nf						
					V 5%		W6	☒			
25			very sandy, silty, trace clay, low to medium plastic		10- 15%		W7	☒			
	GP		*ICE AND GRAVEL* silty		ICE+ 50%						
30	GP		*GRAVEL* sizes to 3/8"ø, trace sand		V 20%						

PLATE B-29

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. FP3 (con't)

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 4:40
FINISH 5:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ○ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	GP	▨	GRAVEL, sizes to 3/8"ϕ, trace sand (con't) cobble	▨	V 20%						
				Bottom of Hole at 31.0'.								
	35											

PLATE B-29 (con't)

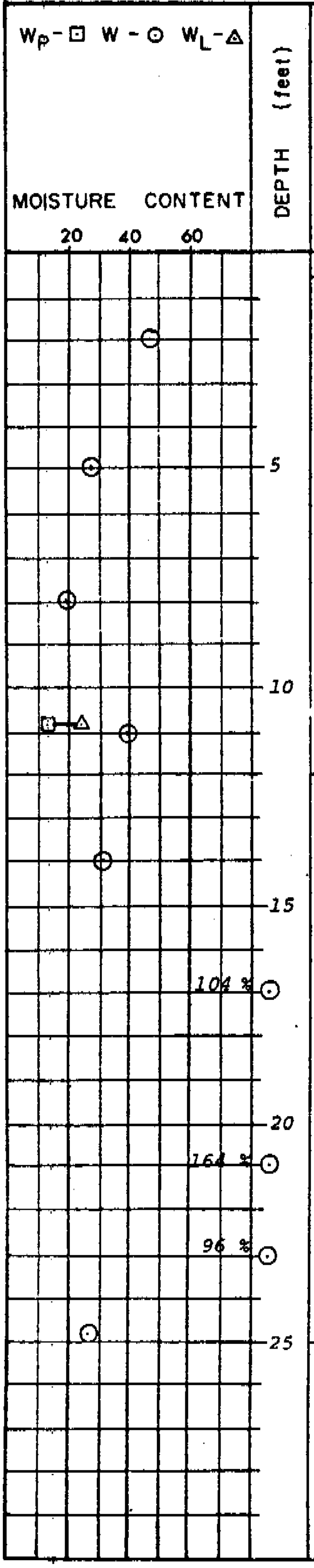
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. FF4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE May 8, 1976
RIG Heli Drill
METHOD AIR
START 17:45
FINISH 18:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt		6" *PEAT*		N						
CI		*CLAY* silty, trace sand and gravel medium plastic, brown, organic inclusions		V 35%		W1	☒			
		----silty, sandy (till-like)		10%		W2	☒			
		---- sandier, low plastic				W3	☒			
CL		*CLAY* silty, gravelly, sandy, coarse grained, low plastic		45%		W4	☒			
GP		*ICE AND GRAVEL* gravel sizes to 1/2"ø, sandy, coarse grained, trace silt, non plastic		ICE+ 70%		W5	☒			
				80- 95%		W6	☒			
						W7	☒			
		---- gravel sizes to 3/4"ø		70%						
						W8	☒			
						W9	☒			
		Bottom of Hole at 25.0'.								

PLATE B-30

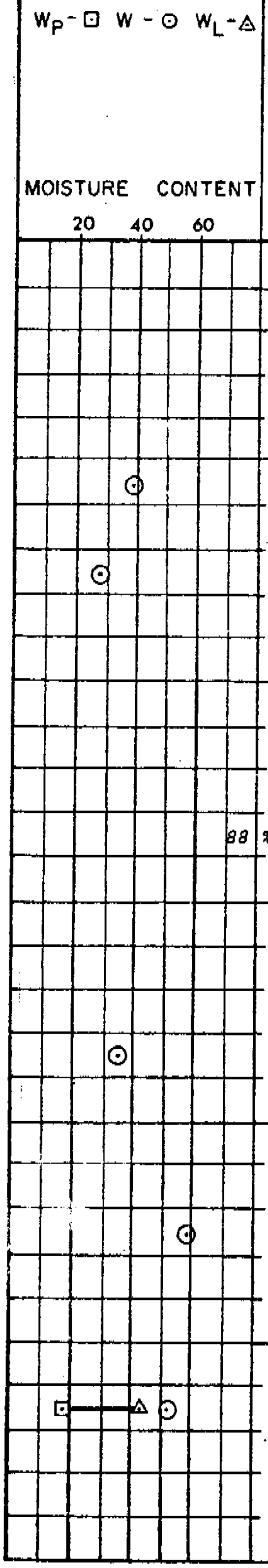
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. FF5

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 20:30
FINISH 20:55
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI	*CLAY* trace gravel sizes, low to medium plastic	F						
5	CI	*ICE AND CLAY* very gravelly, low plastic --- medium plastic	ICE+ 50%		W1	☒			
	CI-CH	*CLAY* gravelly, angular to 1 1/4"ø medium to high plastic	V 20% V 5%		W2	☒			
10		*ICE*	ICE						
	GP	*ICE AND GRAVEL* sandy, coarse to fine grained	ICE+ 30-40%		W3	☒			
15		*ICE*	ICE						
20	GP	*GRAVEL* very coarse grained, sandy --- trace silt and clay	V 30% 10%		W4 W5	☒ ☒			
25	CI	*CLAY* silty, trace sand, medium to high plastic, dark grey (till-like) --- 2" ice lens	V 5%	Grain Size Plate B-54	W6	☒			
30	GP	*GRAVEL* coarse, subangular to 1/2"ø, sandy, trace silt	V 15%						

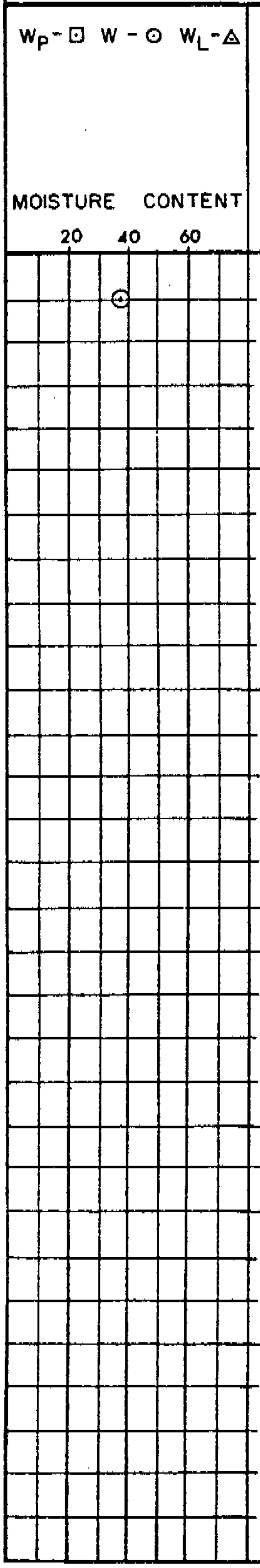
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. FP5 (con't)

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23, 1976
RIG Heli Drill
METHOD AIR
START 20:30
FINISH 20:55
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GP	▨	GRAVEL coarse, subangular to 1/2"ø, sandy, trace silt (con't)	▨	V 15%		W7	☒			
			Bottom of Hole at 32.0'.								
35											

PLATE B-31 (con't)

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. FF6

LOGGED BY GNL

DRAWN BY

CHECKED RST

DATE March 22, 1976

RIG Heli Drill

METHOD AIR

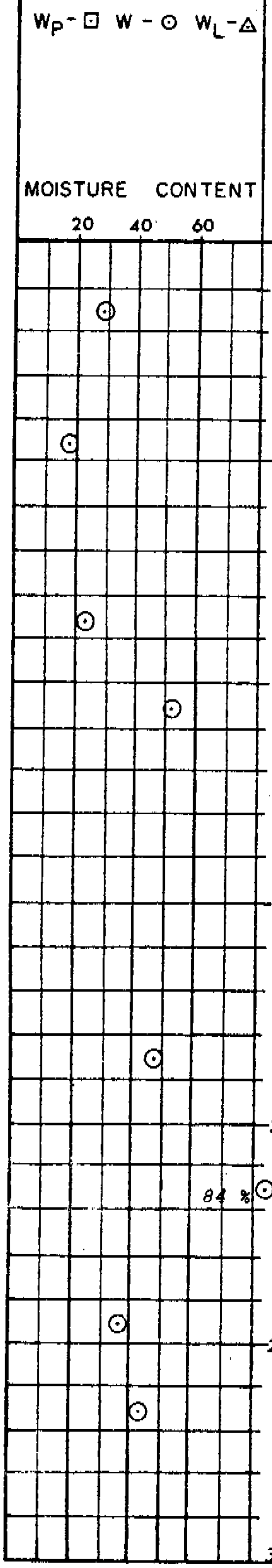
START 23:00

FINISH 23:25

PROJECT NO. CS 3343

ELEVATION

AIR TEMPERATURE



Depth (feet): 5, 10, 15, 20, 25, 30

SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	F						
CL	CLAY silty, trace gravel sizes, low plastic, brown, trace organics	V 10-15%		W1	☒			
GP	GRAVEL very coarse, rounded to 1"ø, trace clay, brown	Nf		W2	☒			
	very sandy, fine gravel sizes, trace silt, grey	V 15-20%		W3	☒			
	clayey, low to non plastic			W4	☒			
	fine gravel, ice-rich	ICE+ 60-70%						
	coarse gravel	V 30-35%		W5	☒			
	fine gravel, sandy	V 30%		W6	☒			
	occasional cobbles, medium gravel to 1/2"ø, trace silt, brown	V <5% Nf		W7 W8	☒ ☒			
	trace silt and clay	V <5%						
	Bottom of Hole at 28.0'.							

PLATE B-32

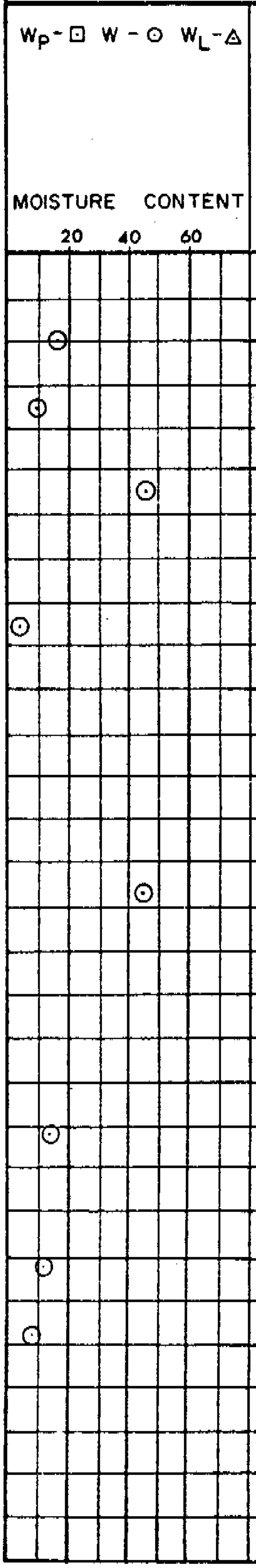
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. FF7

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 8, 1976
RIG Heli Drill	METHOD CRREL, VTM, AIR	START 9:45 AM	FINISH 13:40
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT* fibrous, dark brown	Vx 5-10%					
	ML	*SILT* sandy, trace clay, gravelly, non to low plastic, trace organic			C1	60%		
		---clayey, some gravel to 1/2"ϕ, low plastic	V 15%		C2	80%		
		---cobbles						
5	SW	*SAND* medium to coarse grained, some gravel to 1 1/2"ϕ, trace silt, greyish	Vs 10%		C3	100%	IV	
					C4	0%		
	GP	*ICE AND GRAVEL* to 1"ϕ, sandy, coarse grained, dark grey	ICE+ 80%		C5	15%		
10			60%					
15					W1			
		---coarse, sandy, grey	Vx 15%					
20		---very coarse gravel			W2			
		---occasional cobbles	Nf					
		--- brown to grey, sandy, trace silt			W3			
25					W4			

Bottom of Hole at 25.0'.

PLATE B-33

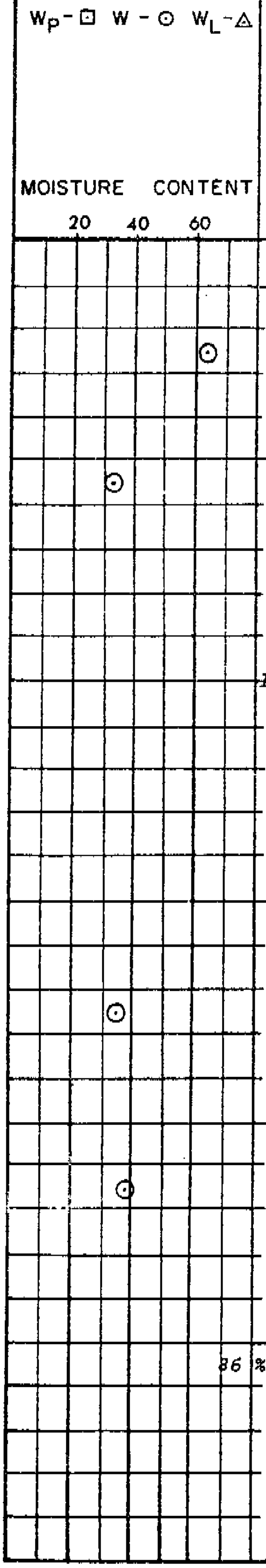
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. GG1

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 9:30	FINISH 9:45
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	F						
	ICE	ICE						
CI	*CLAY* silty, sandy, trace gravel sizes to 3/4"ø, medium plastic, brown (till-like)	V 40% 20%		W1 W2	☒ ☒			
	ICE	ICE						
GC	*GRAVEL* rounded, sub-rounded, sandy, fine to coarse grained, trace silt and clay, brown	V 20%		W3	☒			
GW	*GRAVEL* coarse, less sand	V 40%		W4	☒			
GW	*ICE AND GRAVEL*	ICE+ 60%		W5	☒			

Bottom of Hole at 26.0'.

PLATE B-34

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

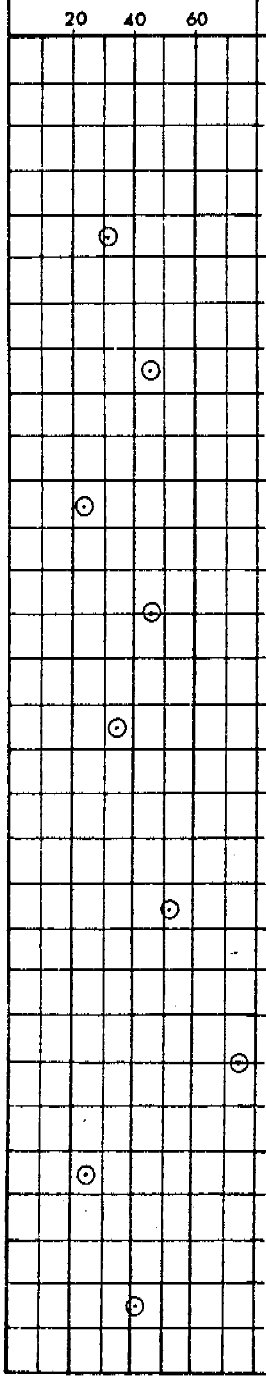
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. GG3

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 11, 1976
RIG Heli Drill
METHOD AIR
START 11:10
FINISH 15:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	N						
	CI	*ICE AND CLAY* silty, sandy, medium plastic, brown	ICE+ 95%						
	CI-CH	*CLAY* trace gravel, medium to high plastic, dark brown	V 20%		W1	☒			
5		more silty, medium to high plastic	30%						
	GP-GW	*GRAVEL* coarse, sandy, silty, trace clay, brown	V 40-60%		W2	☒			
		cobble							
10		frequent cobbles, silty	10%		W3	☒			
		6" ice lens	60%		W4	☒			
		clay layer							
15		some rounded pebbles to 3/4"ø	15-20%		W5	☒			
			40-50%		W6	☒			
20					W7	☒			
25		coarser, rounded and sub-angular gravel sizes, sandy	10%		W8	☒			
	SC	*SAND* clayey, silty, gravelly, low plastic, dark grey	V <5%	Grain Size Plate B-55	W9	☒			
30									

PLATE B-35

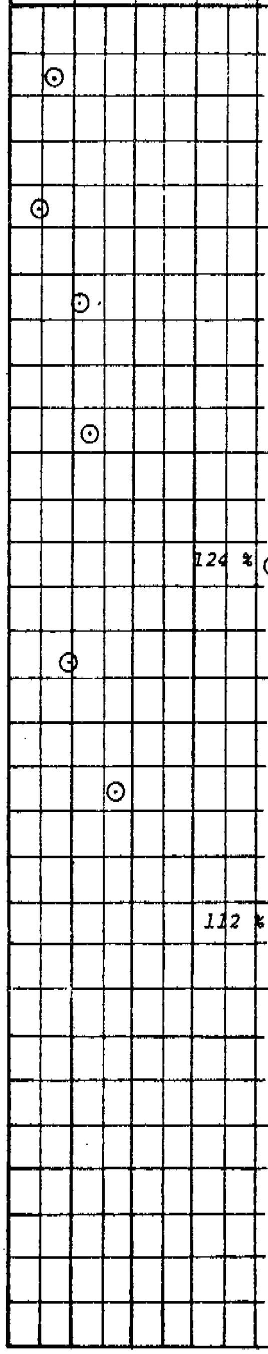
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. GG3 (con't)

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 11, 1976
RIG Heli Drill
METHOD AIR
START 11:10
FINISH 15:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GP-SP	*GRAVEL* very coarse gravel sizes, very sandy, trace silt, rounded to 1/2"ø (con't)	Nf						
		cobbley			W10	☒			
		sandy, coarse grained							
35					W11	☒			
		very sandy layer			W12	☒			
	GP	*GRAVEL AND ICE*	V 35-40%						
40	GP	*ICE AND GRAVEL* coarse, subangular 1 1/2"ø, trace silt	ICE+ 60- 80%		W13	☒			
					W14	☒			
					W15	☒			
45	GP	*GRAVEL* coarse, sandy	V 10%						
			V <5%						
					W16	☒			
		sandy	V 15%						
50					W17	☒			
55		Bottom of Hole at 53.0'.							

PLATE B-35 (con't)

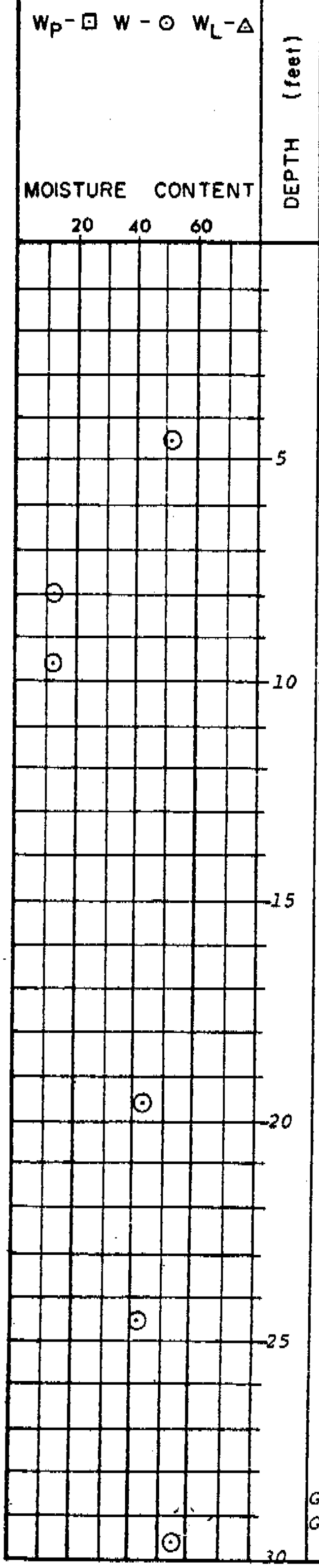
R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. GG4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 23,1976
RIG Heli Drill
METHOD AIR
START 22:05
FINISH 23:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
Pt	*PEAT AND MOSS*	F			
CI	*ICE AND CLAY* silty, trace sand, occasional gravel sizes, medium plastic, brown	ICE+ 50%			
	cobbles			W1	
	medium plastic, trace gravel				
GP	*GRAVEL* coarse, subangular to 1"ø, sandy, trace silt and clay, frequent cobbles	Nf			
				W2	
	very dense				
	cobbles			W3	
	numerous fine gravel sizes				
	rounded to 1/2"ø, sandy, trace silt				
	6" ice lens	V <5%		W4	
				W5	
	2" ice lens				
GP-GC	sandy, clayey, low plastic, dark grey	V 15%		W6	

PLATE B-36

Bottom of Hole at 36.0'.

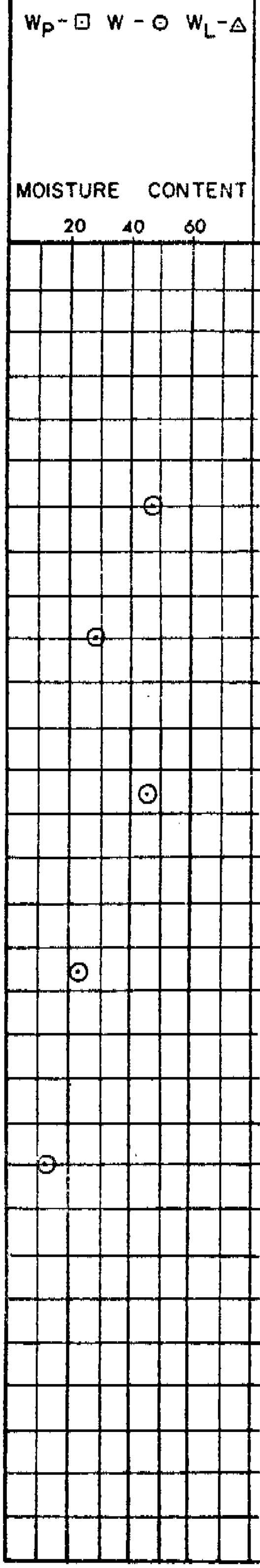
TEST HOLE LOG

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. GG5

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 23, 1976
RIG Heli Drill	METHOD AIR	START 21:05	FINISH 21:35
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
	Pt	*PEAT AND MOSS*	F			
		ICE	ICE			
	GC	*GRAVEL angular, sandy, clayey, low plastic, olive brown*	V 15-25%			
5					W1	
		sandy, clayey, medium plastic, brown	V 5%		W2	
10		*cobbles, very sandy*				
		cobbles			W3	
		very coarse, trace sand, brown	Nf			
15					W4	
		very dense			W5	
20		*cobble*				
		Bottom of Hole at 22.0'.				
25						

PLATE B-37

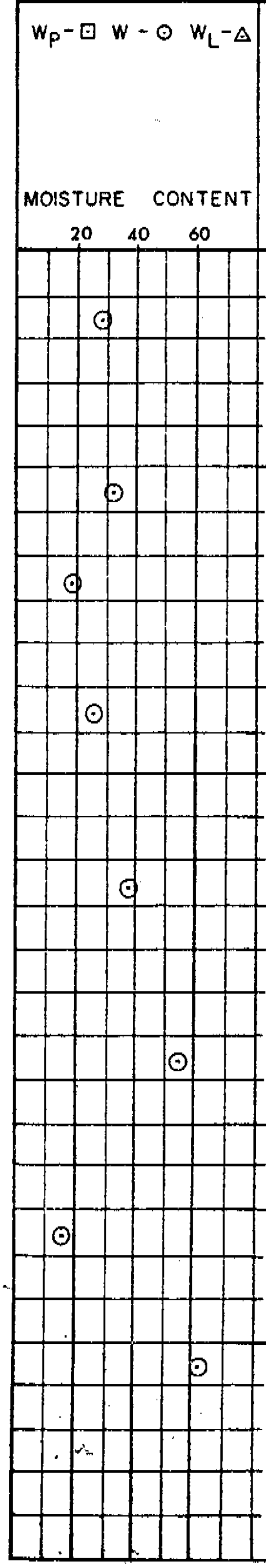
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. GG6

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD AIR
START 9:35
FINISH 10:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI	*CLAY* silty, trace sand, medium plastic, brown, occasional organics	V <5%						
					W1	☒			
		cobble							
5		sandy, angular gravel sizes to 1/2"ø (till-like)			W2	☒			
	GC	*GRAVEL* very clayey, sandy, non to low plastic, brown	V		W3	☒			
10					W4	☒			
		very sandy, trace silt							
15		angular to 1/2"ø,sandy, fine to coarse grained , trace silt trace clay		Grain Size Plate B-56	W5	☒			
		clayey, trace fine sand, low plastic, grey	V <5%		W6	☒			
20		angular and rounded to 3/4"ø, sandy, fine to coarse grained, trace silt, brown			W7	☒			
25		very clayey, trace silt, sandy medium plastic (till-like)	V 25%		W8	☒			
		angualr gravel sizes to 3/4"ø, sandy, trace silt, brown							
30									

PLATE B-38

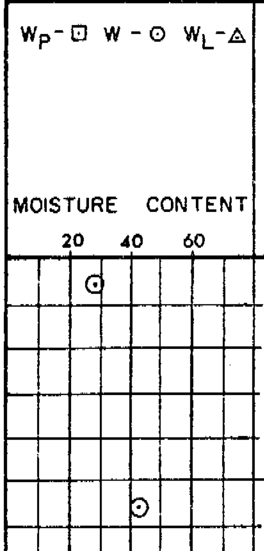
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. GG6 (con't)

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD AIR
START 9:35
FINISH 10:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	GP		*GRAVEL* angular gravel sizes to 3/4"ϕ, sandy, trace silt, brown (con't)		V		W9	☒			
35	SP-GP		*SAND* fine to coarse grained, very gravelly, angular to 1/2"ϕ, brown		V <5%		W10	☒			

Bottom of Hole at 36.0'.

PLATE B-38 (con't

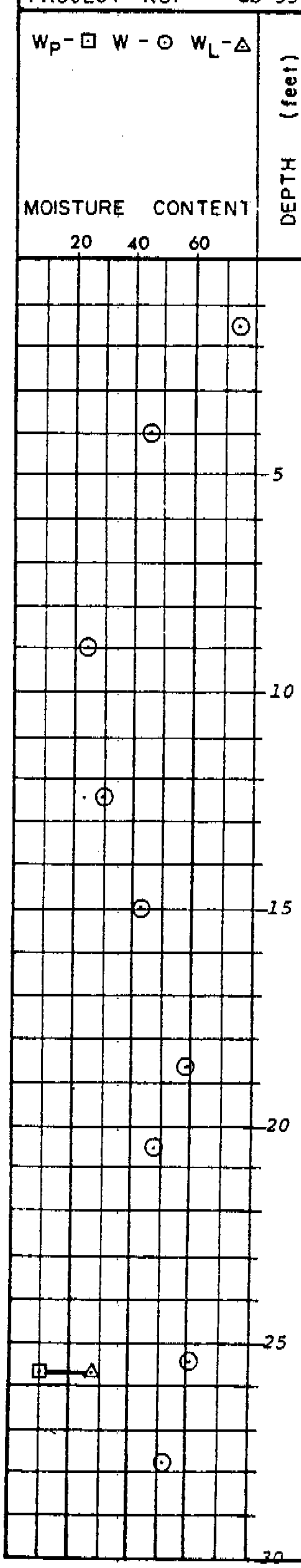
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. GG7

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD AIR
START 4:40 AM
FINISH 5:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	F						
CI	CLAY silty, trace of sand, brown, medium plastic	V 40%		W1 W2	☒ ☒			
	--- gravelly,			W3	☒			
GM	GRAVEL sandy, trace of silt and clay, brown (till-like)	V 20%		W4	☒			
	--- silty			W5	☒			
CL-CI	CLAY silty, trace of sand, gravel sizes, brownish-grey (till-like)	V 10-15%		W6	☒			
	--- cobble			W7	☒			
	--- very gravelly, silty, grey			W8 W9	☒ ☒			
GC	GRAVEL sandy, clayey, trace of silt, brown to grey (till-like)	V 5%						

PLATE B-39

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *GG7 (con't)*

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 21, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *4:40 AM*	FINISH *5:20*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

W_P-⊡ W-⊙ W_L-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
⊙	*30*	*GC*	▨	*GRAVEL sandy, clayey, trace of silt, brown to grey (till-like)*	▨	*V* *5%*		*W10*	☒			
				Bottom of Hole at 31.0'.								
	35											

PLATE *B-39 (con't)*

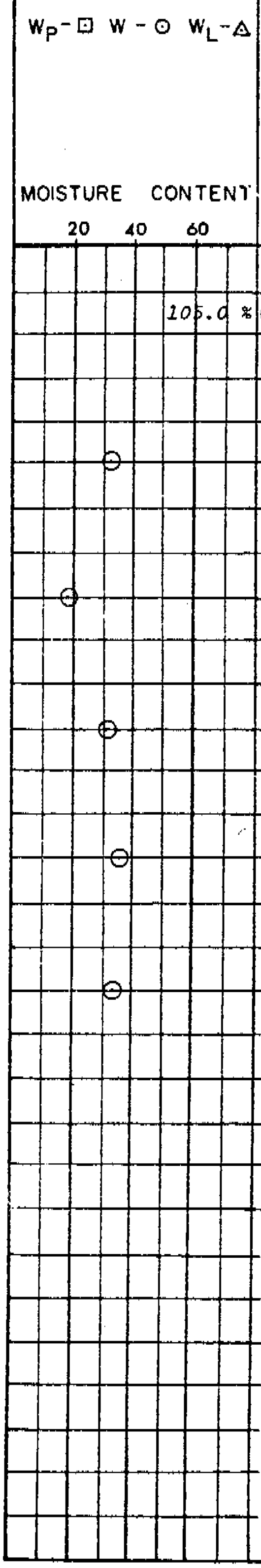
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. HHO

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 9, 1976
RIG Heli Drill
METHOD CRREL, VTM, AIR
START 12:40
FINISH 15:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT* fibrous, brown	Nbn					
	OL	*SILT* clayey, some organics, low plastic, brown	Vs 10%		C1	95%		
	ML	*SILT* trace organics, non plastic, dark grey						
5	CI	*CLAY* silty, little fine gravel, medium plastic, dark grey, occasional rust inclusions (till-like)	V 3%		C2	50%	IV	
	GP	*GRAVEL* fine to coarse sizes, sandy, trace silt, grey	3- 10%		W1			
10					W2			
15					W3			
		---coarser gravel sizes	15%					
		--- cobbles			W4			
20		Bottom of Hole at 18.0'.						

PLATE B-40

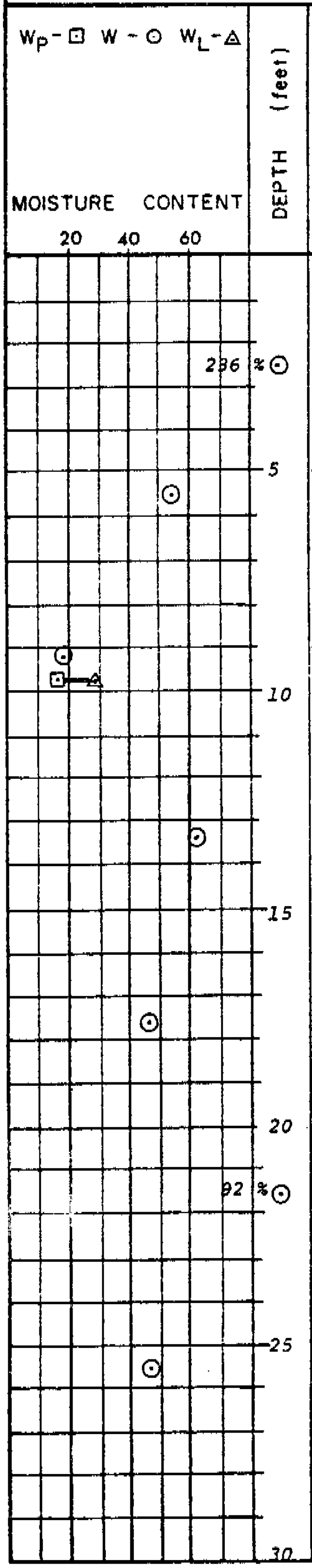
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. HH2

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 24, 1976
RIG Heli Drill	METHOD AIR	START 8:55	FINISH 9:20
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE / VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	V 20%		W1	☒			
CI	*CLAY* silty, sandy, fine grained, medium plastic, grey (till-like)	V 30%		W2	☒			
GC-GP	*GRAVEL* angular, very clayeu, sandy, coarse to fine grained, low plastic, brown	Nbn V 40%		W3	☒			
	rounded to sub angular, sandy, fine to coarse grained, trace clay and silt			W4	☒			
	angular gravel sizes to 1/2"ø			W5 W6	☒ ☒			
	very sandy, fine to coarse grained	10%		W7	☒			
	Bottom of Hole at 26.0'.							

PLATE B-41

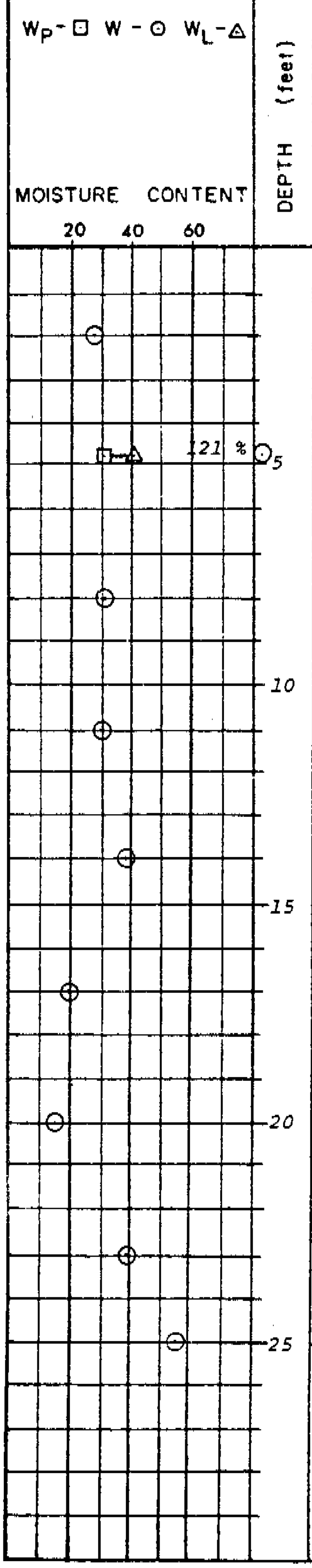
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *HH4*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 8, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *18:15*
FINISH *18:45*
PROJECT NO. *ı 6 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	6" PEAT	Vx, Vs						
CI	CLAY silty, trace sand, medium plastic, orange-brown, occasional coal inclusions (till-like)			W1	☒			
	trace gravel, grey	5%						
	silty, medium plastic			W2	☒			
	gravelly, silty, sandy, medium plastic (till-like)	10-15%						
	silty, medium plastic, trace gravel			W3	☒			
				W4	☒			
	gravelly, low plastic	5%		W5	☒			
GM	GRAVEL coarse, sandy, trace clay,			W6	☒			
	coarse grained, very low plastic	<5%						
	non plastic, silty							
	coarser gravel sizes to 1"ø			W7	☒			
				W8	☒			
				W9	☒			
	Bottom of Hole at 25.0'.							

PLATE *B-42*

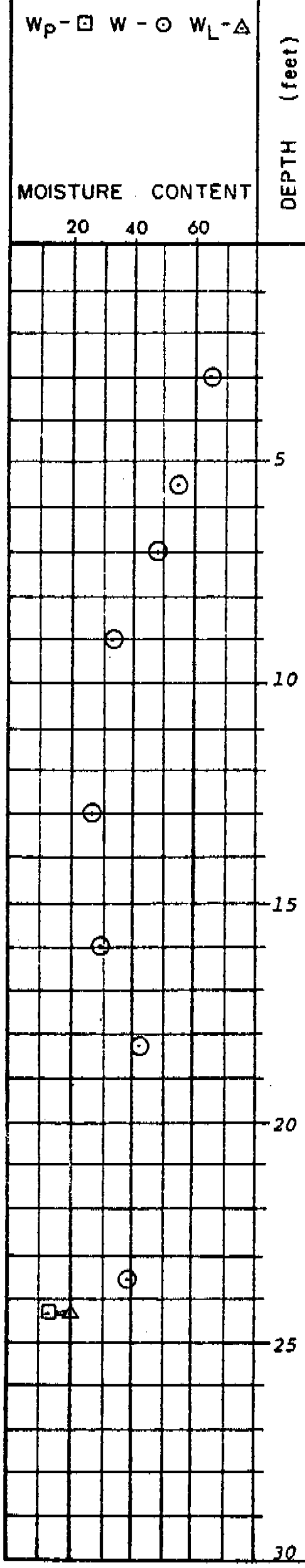
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. HH6

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD AIR/CRREL	START 5:25 AM	FINISH 6:30
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
OL	*ICE AND ORGANIC SILT* trace clay, low plastic	ICE+ 60%		W1			
CI	*CLAY* silty, trace of sand, medium to high plastic, brown, ice-rich	V 40%		W2			
				C1	100%	II I	Ybulk = 98 pcf γ_d = 66 pcf
	--- gravelly			W3			
GC	*GRAVEL* sandy, clayey, trace of silt, brown, dense (till-like)	V 20%		W4			
CI	*CLAY* silty, trace to little sand, occasional gravel sizes, brown (till-like)	V 5-10%		W5			
	--- gravelly			W6			
	--- very silty, sandy, gravelly, low plastic, grey (till-like)			W7			
	Bottom of Hole at 27.0'.						

PLATE B-43

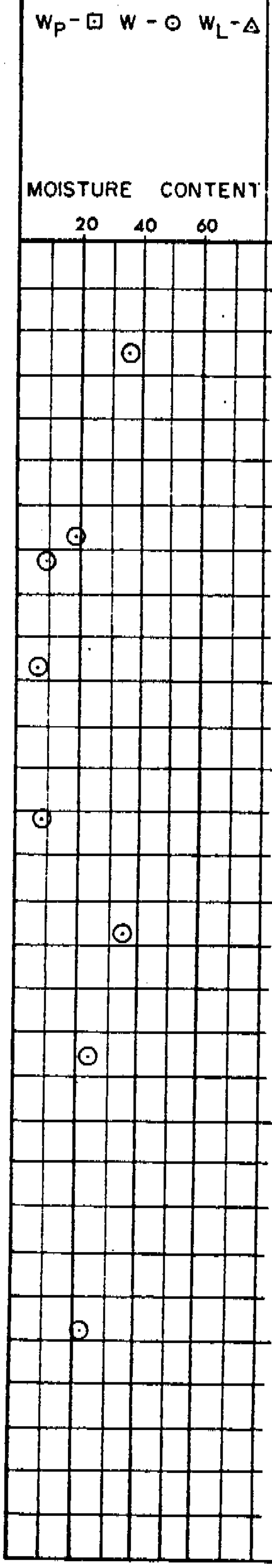
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. HH7

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 7, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 4:50 pm	FINISH 6:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT	Vx					
	Pt	ICE AND PEAT clayey	ICE+ 75%					
	ML	SILT organic, non plastic, brown	Nbe		W1			
		---- clayey, no organics	Vs 45%		C1	100%	III	
5	CI	CLAY silty, medium plastic, dark grey-dark brown -- silty, some gravel, medium plastic, grey (till-like) -- cobbles	Vx, Vr 10-15%		W2			
	GP	GRAVEL to cobble sizes, sandy, medium to coarse grained	Vc 5-10%		W3			
10					W4			
		---- sandy	25%					
					W5			
15	SC-GC	SAND fine, silty, clayey	Nbe 15%					
		---- very silty, trace clay			W6			
		---- medium grained, some silt low to medium plastic						
		--- gravelly		Grain Size Plate B-57	W7			
20					W8			
		---- medium grained, trace silt	<5%					
25					W9			

Bottom of Hole at 25.5'.

PLATE B-44

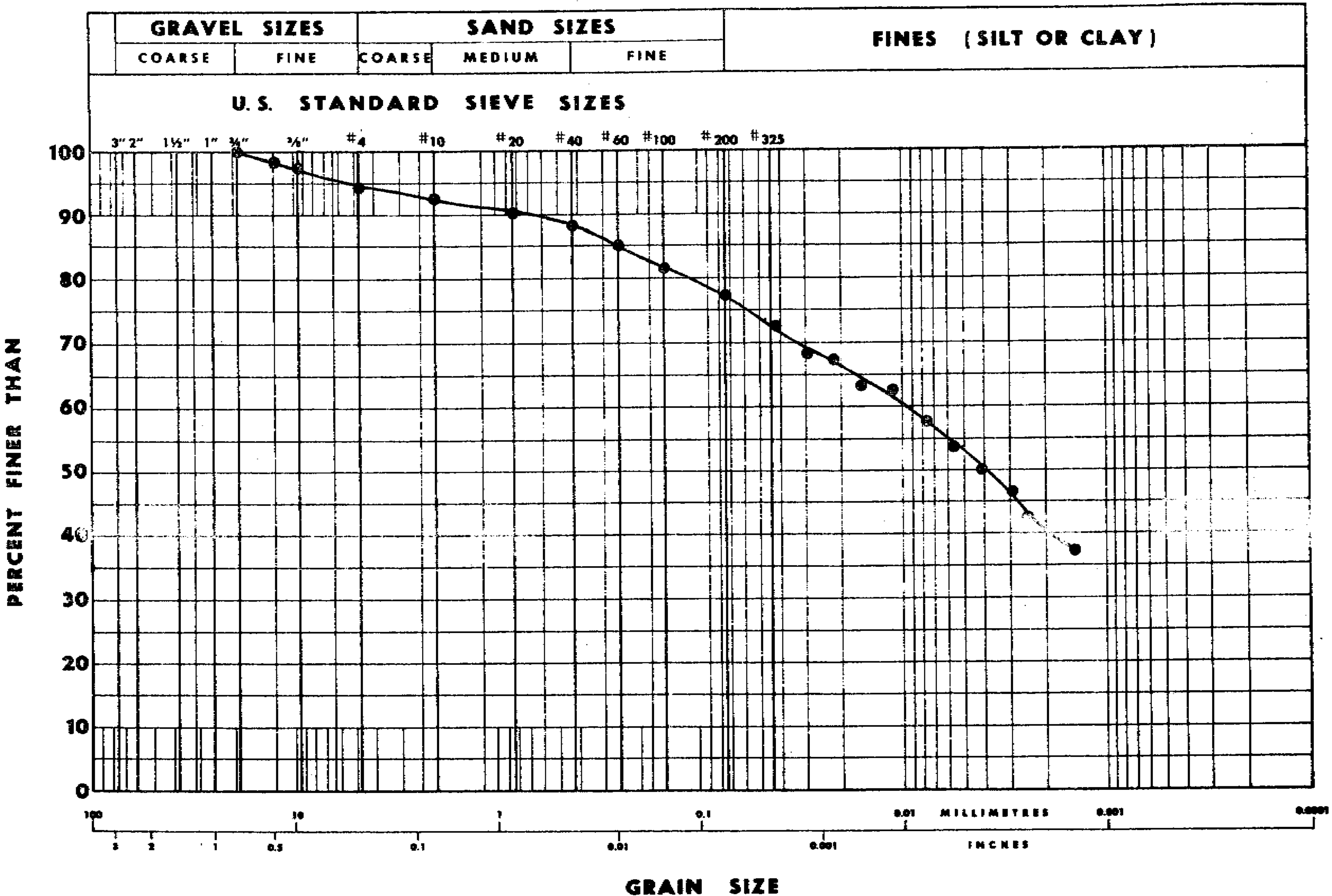
APPENDIX "B"

SECTION B.2 PARTICLE SITE ANALYSES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
HOLE AA5 DEPTH 15-16'
TECHNICIAN CS DATE TESTED Apr/76



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

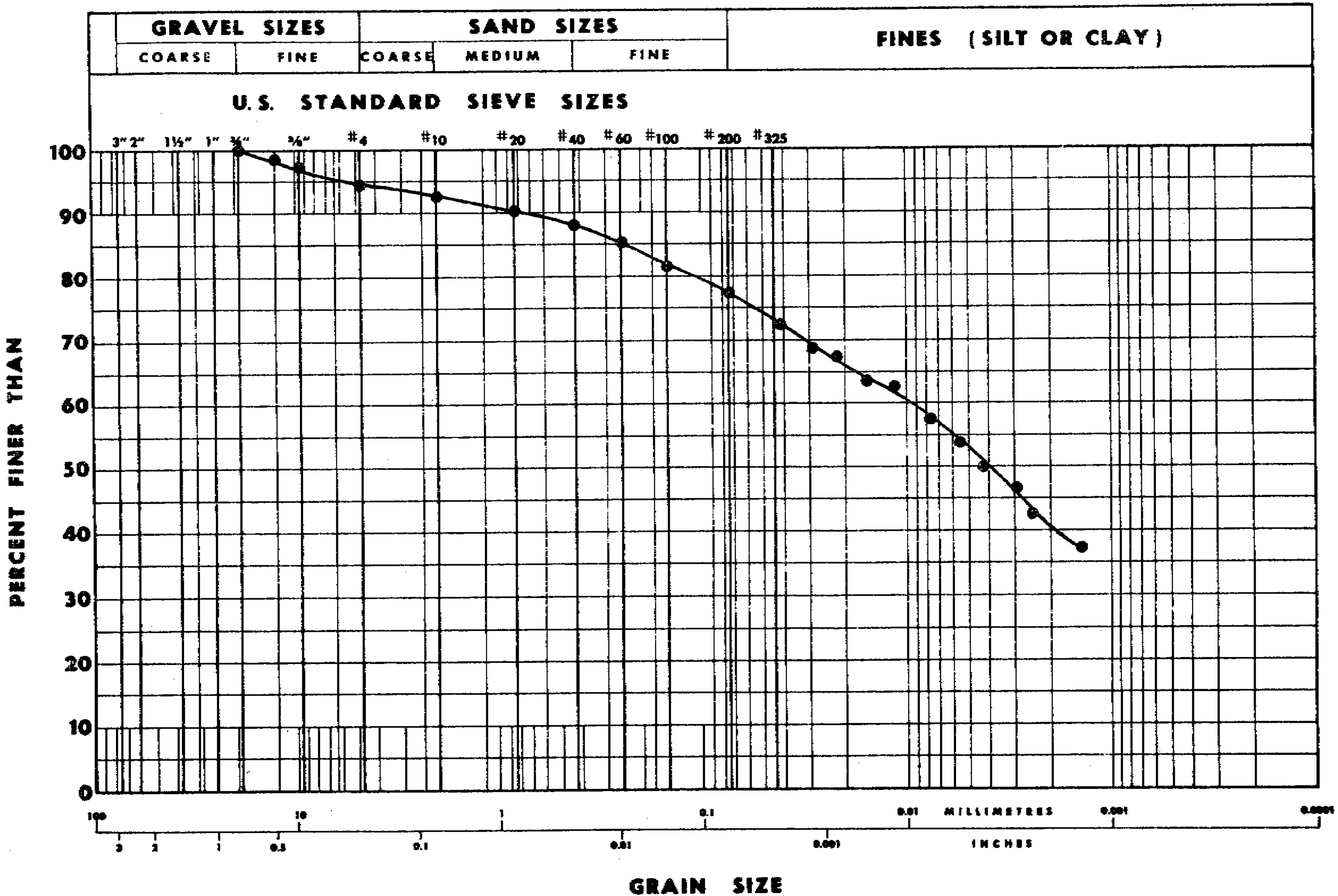
D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

PLATE B-45

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W2
SOURCE Parson's Lake N.W.T.
HOLE AA7 DEPTH 5' DATE REC'D.
TECHNICIAN CS DATE TESTED Apr/76

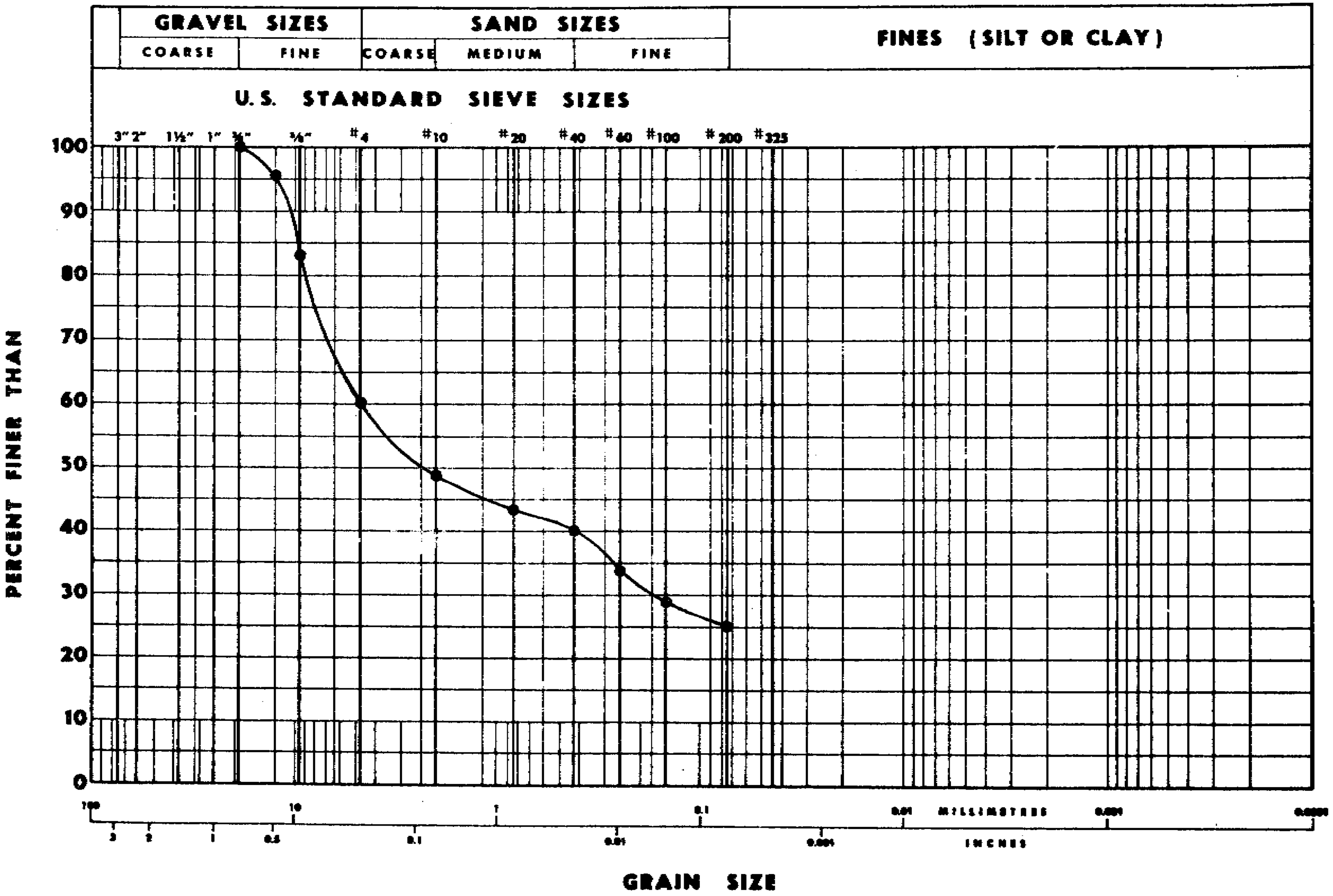


REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-46



REMARKS:

Larger sizes fractured with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

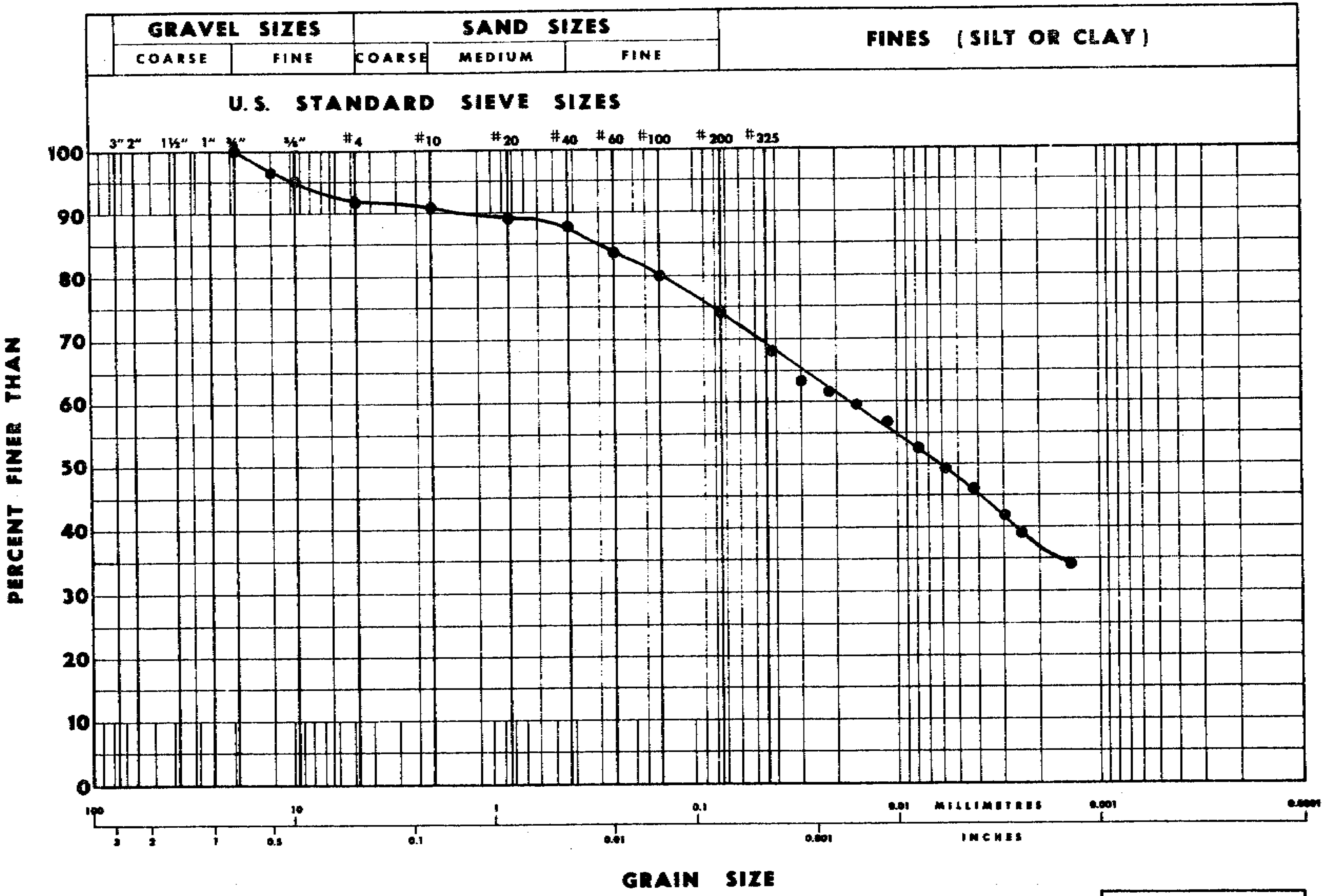
LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole AA7 @ 8'
TECHNICIAN MS
DATE TESTED May/76

PLATE B-47

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
HOLE BB1 DEPTH 15-16'
TECHNICIAN CS DATE TESTED Apr/76



REMARKS: ____________________

D_{10}= ________ MM.
D_{30}= ________ MM.
D_{60}= ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-48

02-0375

R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

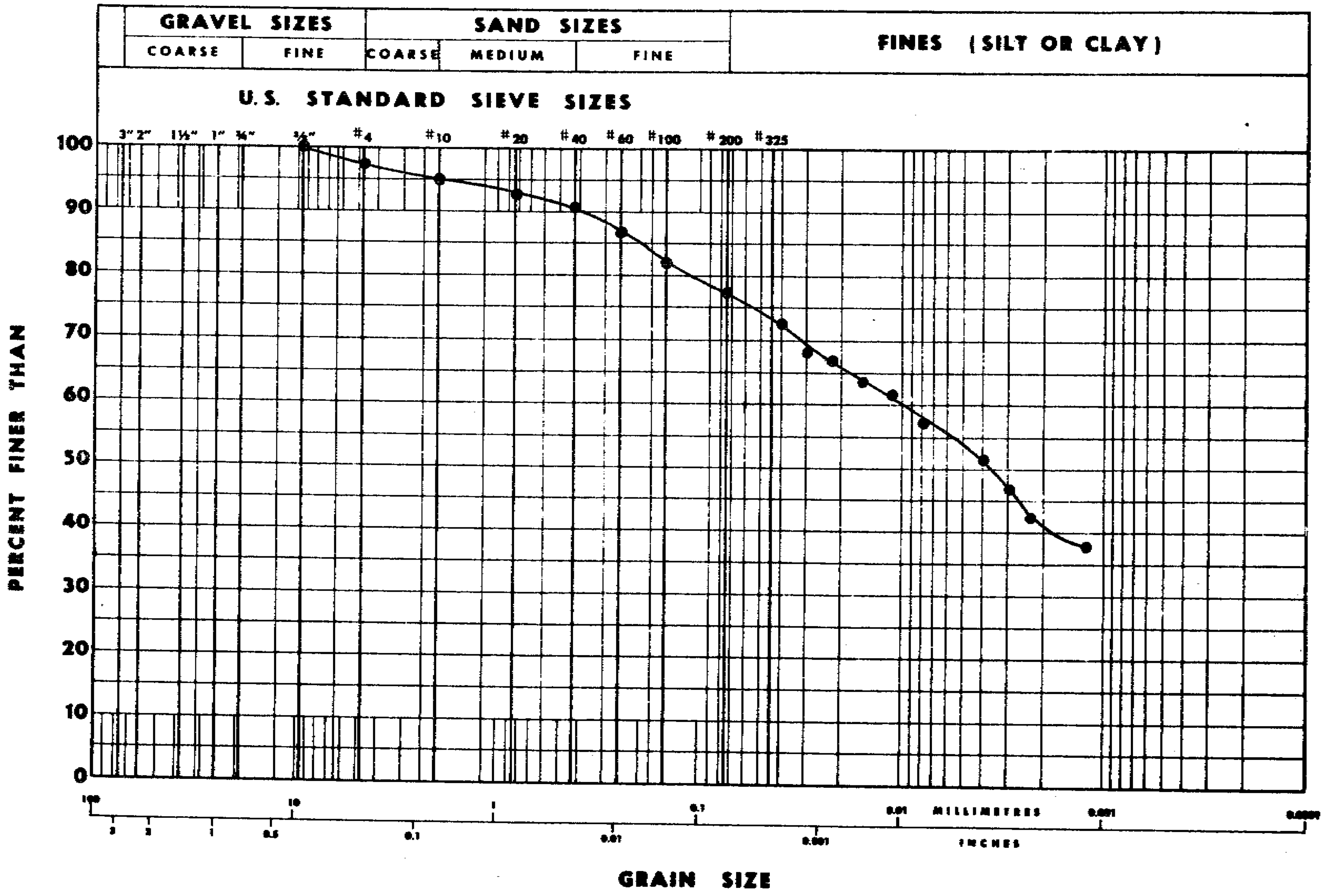
LAB ORDER NO. CS3343

CLIENT G.O.C.L.

SAMPLE W4

SOURCE Parson's Lake N.W.T.
Hole CC1 @ 15-16'

TECHNICIAN CS **DATE TESTED** Apr.76



REMARKS: ____________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

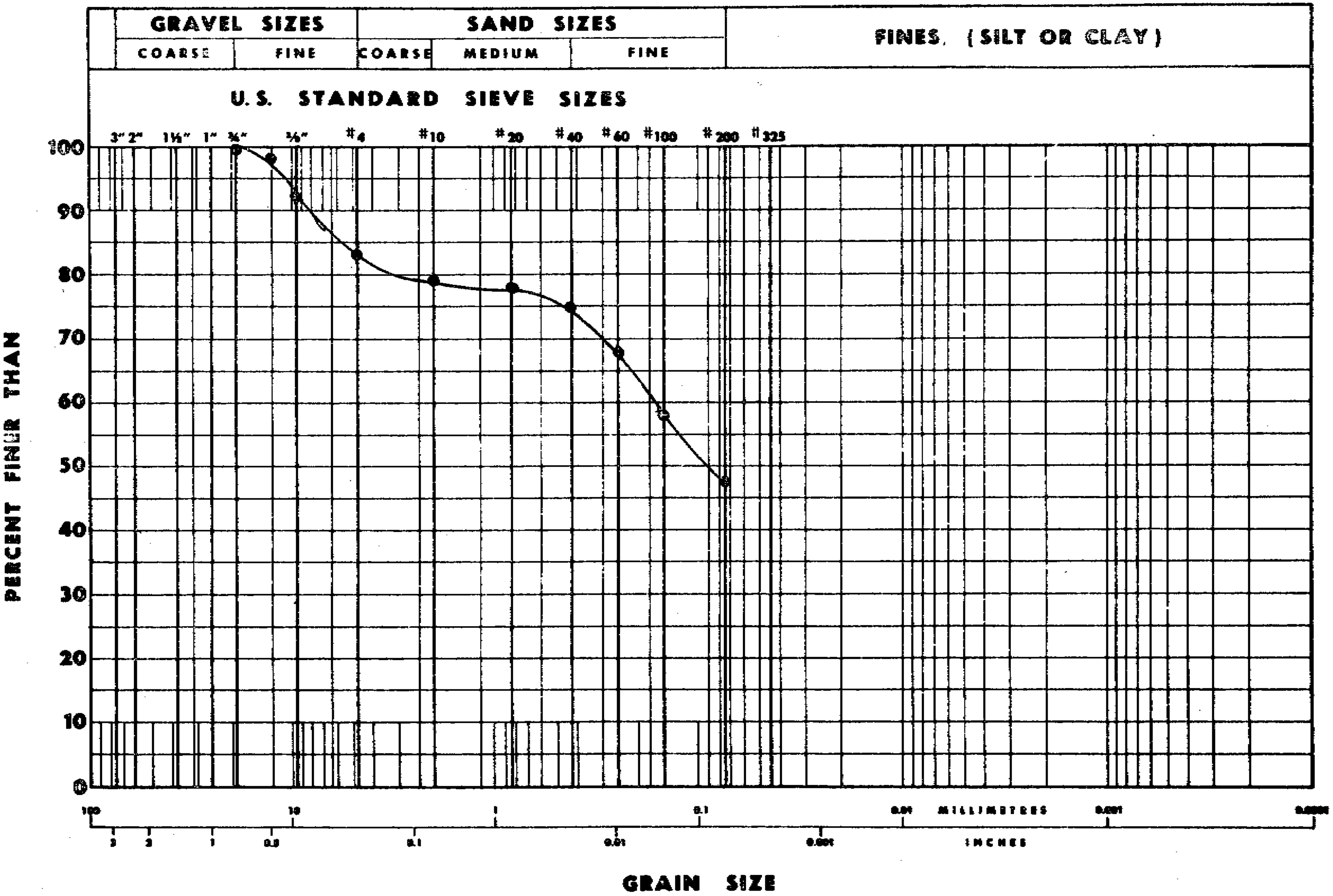
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-49

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W18
SOURCE Parson's Lake N.W.T.
Hole DD4 @ 25'
TECHNICIAN CS
DATE TESTED Apr/76



REMARKS: ____________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

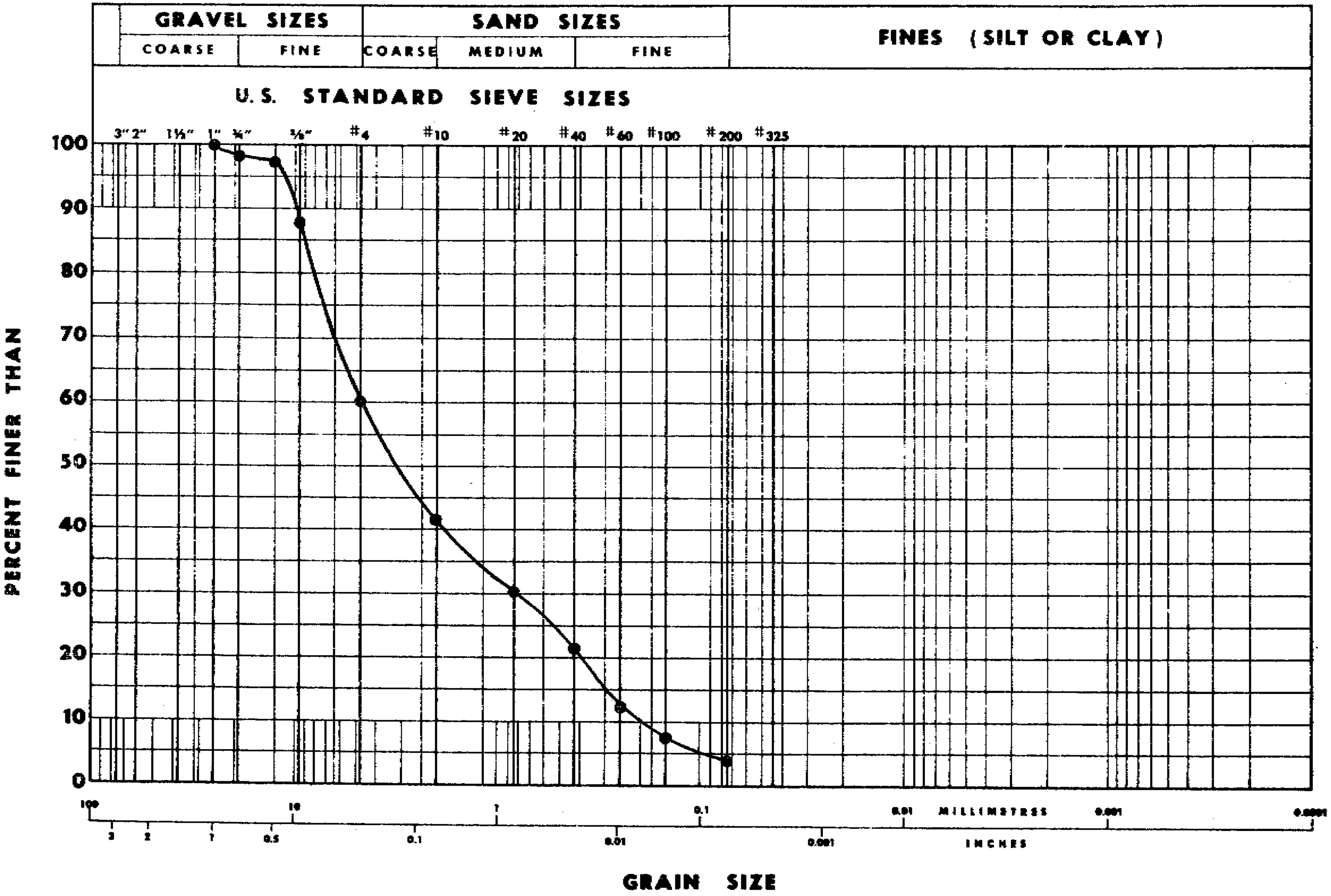
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-50

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
HOLE EE1 DEPTH 11-12' DATE REC'D.
TECHNICIAN CW DATE TESTED Apr./76



REMARKS:

Larger sizes fractured by rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

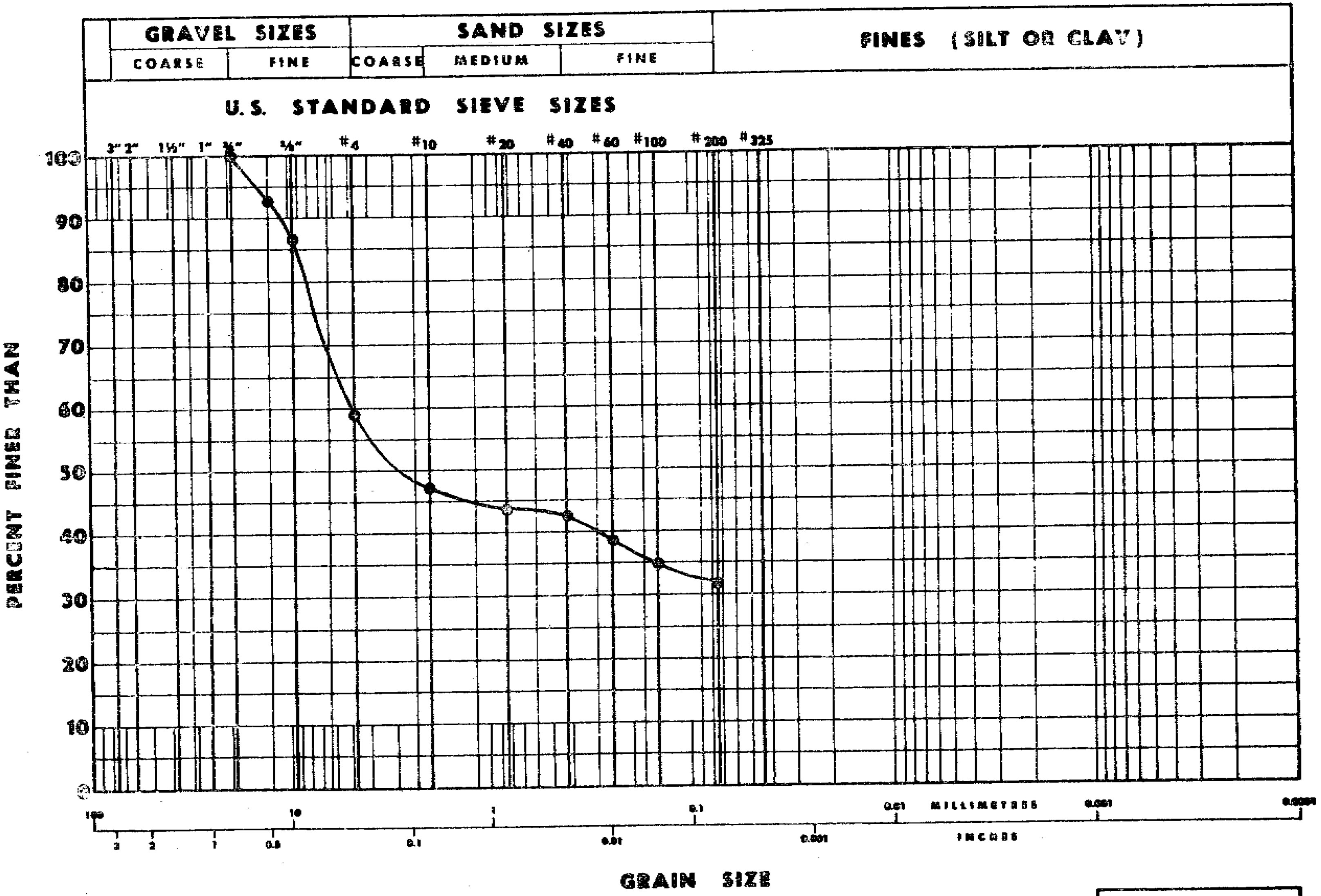
D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

PLATE B-51

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole EE4 @ 26-27'
TECHNICIAN CS
DATE TESTED May/76



REMARKS:

Larger sizes fractured with rock bit

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_u ______
C_c ______

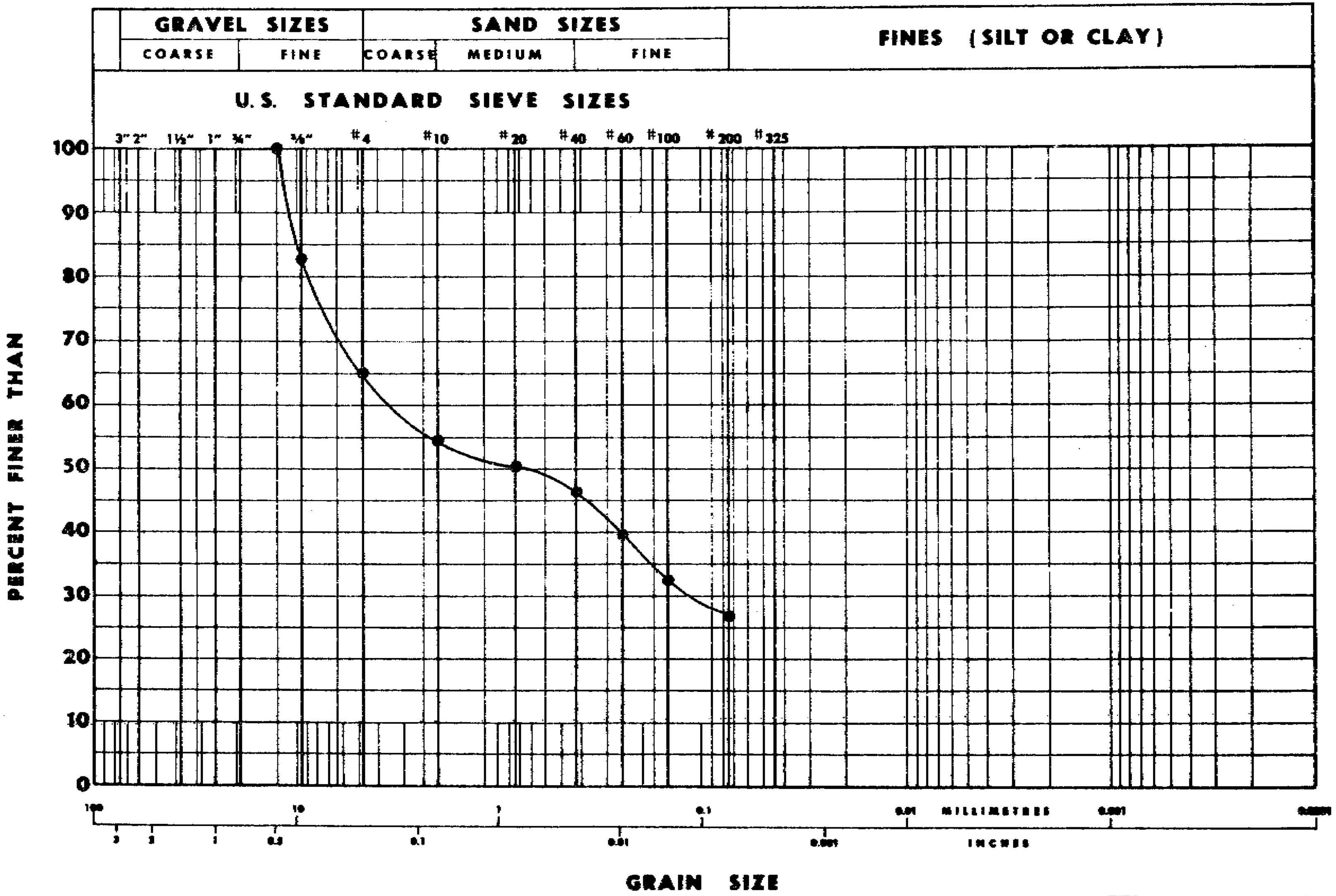
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-52

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W6
SOURCE Parson's Lake N.W.T.
Hole EE7 @ 18 - 19'
TECHNICIAN CS **DATE TESTED** Apr/76



REMARKS:

Larger sizes fractured with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

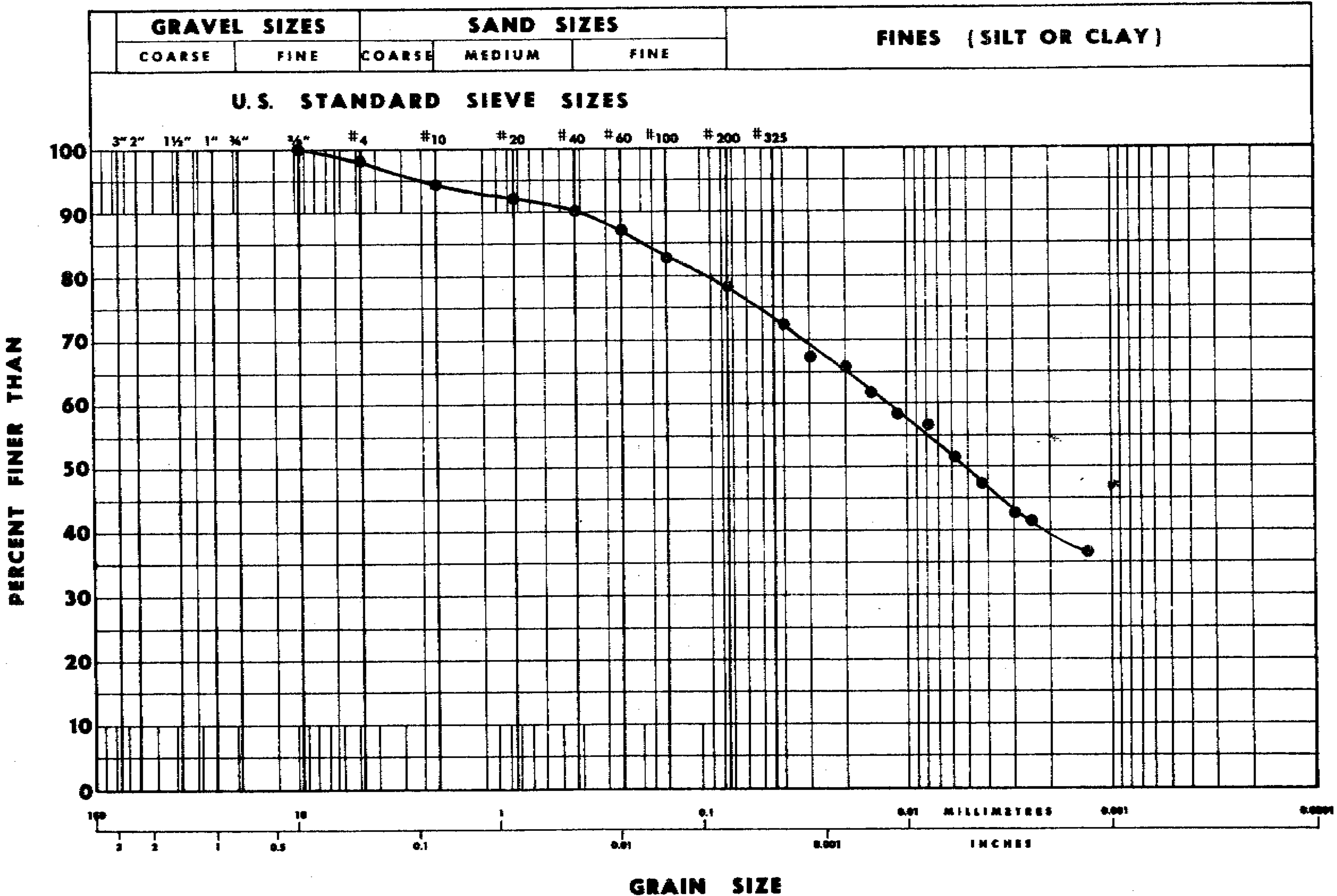
PLATE B-53

GU202-0375

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W6
SOURCE Parson's Lake N.W.T.
HOLE FF5 DEPTH 26-27' DATE REC'D.
TECHNICIAN MS DATE TESTED May/7



REMARKS:

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

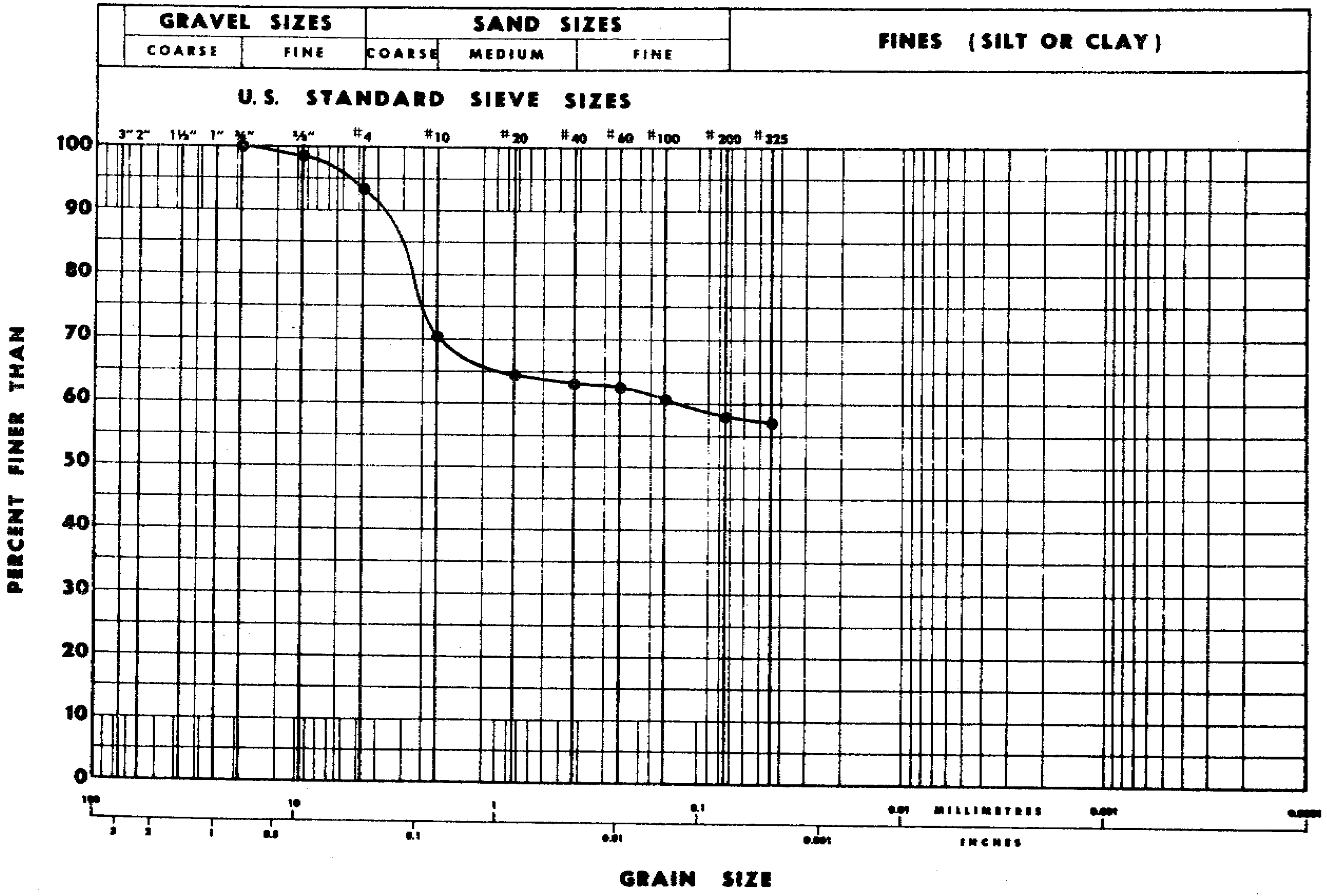
PLATE B-54

202-0375

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W9
SOURCE Parson's Lake N.W.T.
Hole GG3 @ 28-29'
TECHNICIAN CS
DATE TESTED May/76



REMARKS: ____________________

____

____

____

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

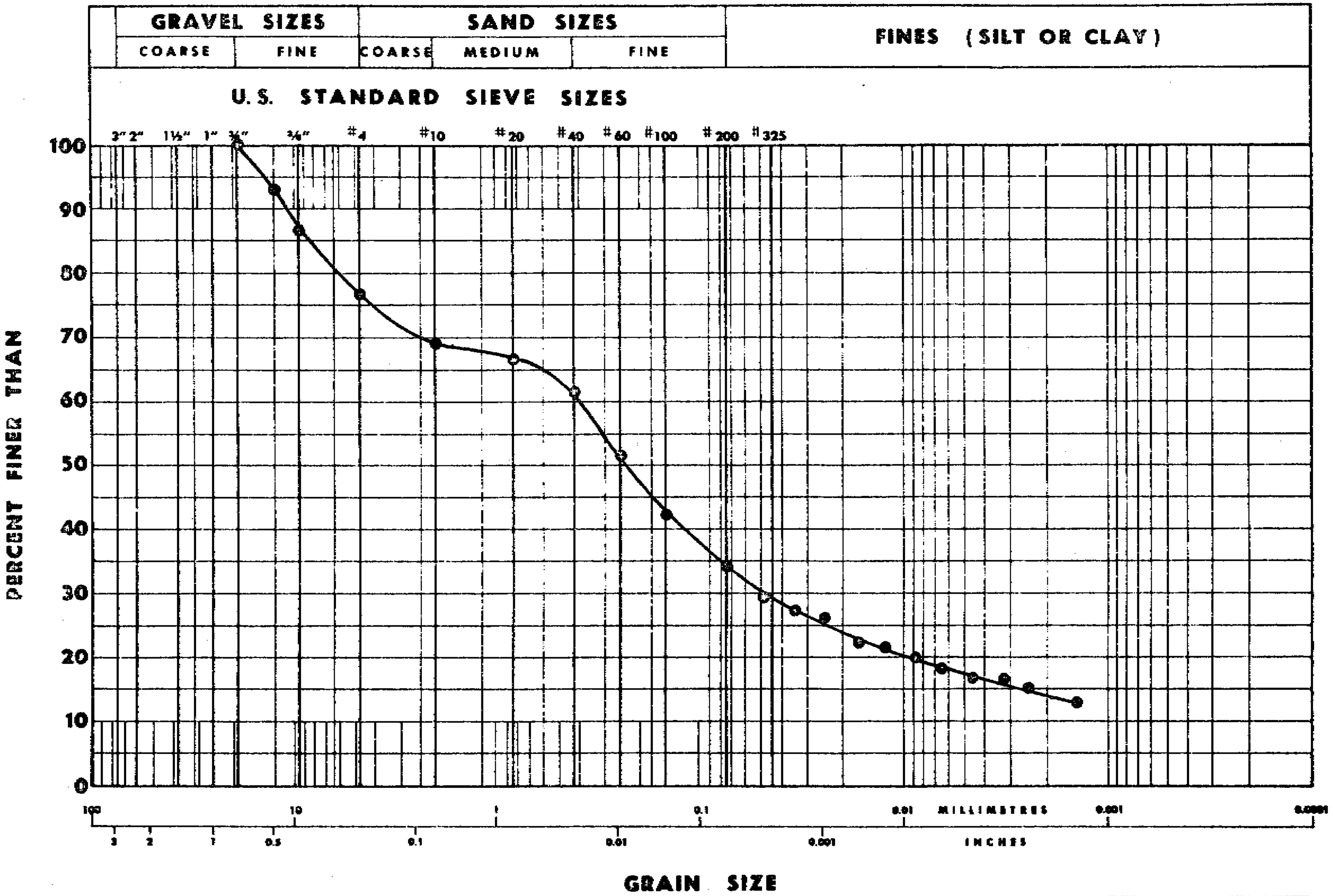
D_{10}= ________ MM.
D_{30}= ________ MM.
D_{60}= ________ MM.
C_U ________
C_C ________

PLATE B-55

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
HOLE GG6 DEPTH 14-15'
TECHNICIAN CS DATE TESTED Apr/76

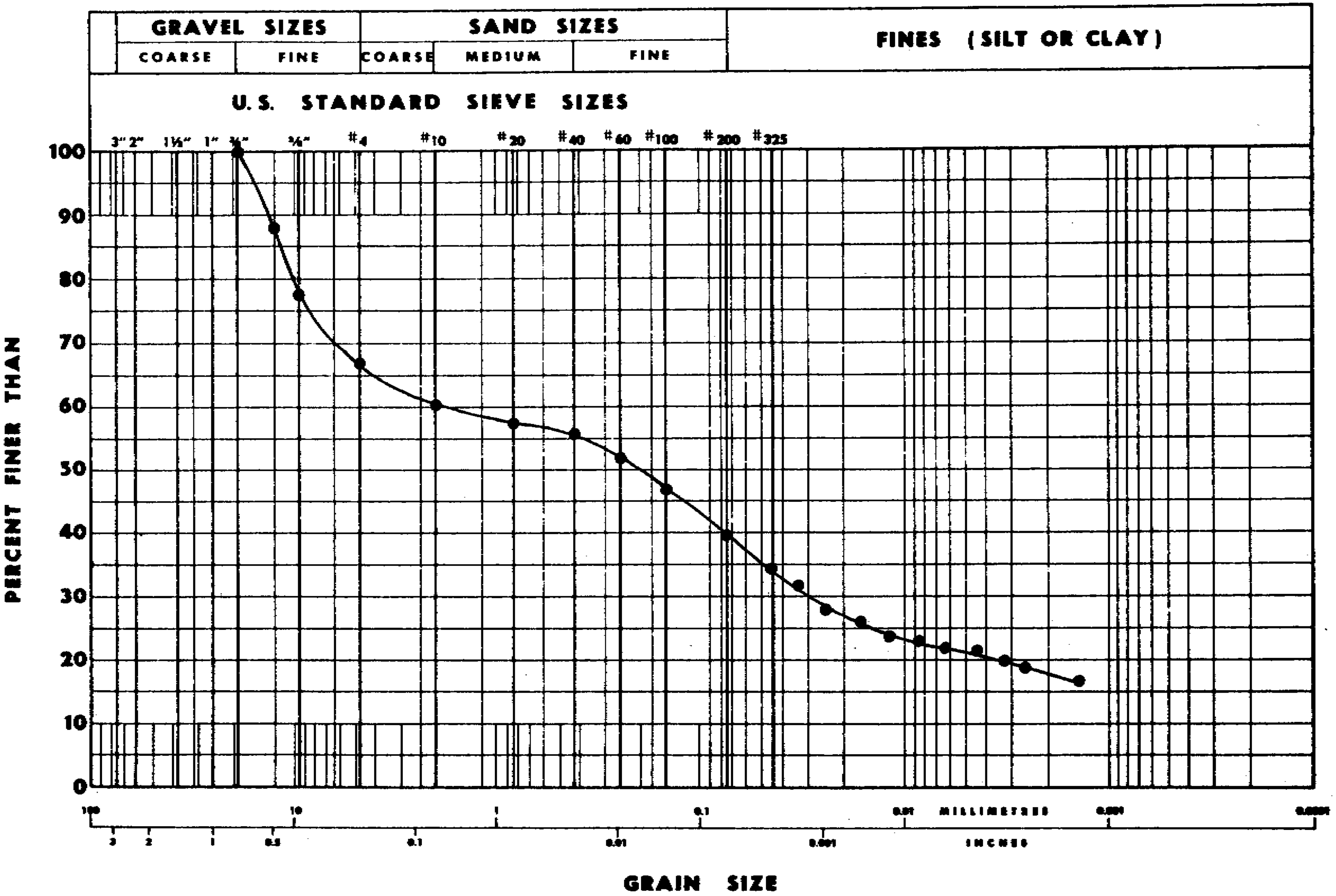


REMARKS: ______

D$_{10}$= ______ MM.
D$_{30}$= ______ MM.
D$_{60}$= ______ MM.
C$_U$ ______
C$_C$ ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-56



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE B-57

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.T.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole HH7 @ 19'
TECHNICIAN CS
DATE TESTED Apr. 76

APPENDIX "B"

SECTION B.3 SUMMARY OF LABORATORY TESTING

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Pla
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
AA2	8-10	C7	PT	PEAT fibrous,silty,dark brown to black	27	19	8				85	41	109	
AA2	16-16.5	W6	Cl	CLAY silty,trace sand,organic low to medium plastic,dk. grey	36	18	18							
AA5	15-16	W5	Cl	CLAY silty,medium plastic, little coarse sand,brown (till-like)	42	11	25	23	37	40				
AA7	4.5-5	W2	CI	CLAY silty,gravelly,sandy, low to non plastic				22	30	40				
AA7	8-9	W3	GC	GRAVEL coarse,sandy,clayey,low plastic				75	25	*fine				Gravel 4
AA7	24-25	W9	CI	CLAY very silty,trace sand, medium plastic,	42	18	24							
BB1	15-16	W5	CI	CLAY silty,trace sand,medium plastic,brownish grey, gravel sizes ½"Ø(till-like	38	18	20	26	37	37				
BB3	12-13	W3	CI	CLAY silty,trace sand,fine to coarse grained,low to med. plastic,brown,gravelly with occ.coal incl.(till-like)	30	15	15							
CC1	11-12	W3	CI	CLAY silty,trace sand,medium plastic,brown,pebbles, peat-like,organic incl.	44	26	18							
CC1	15-16	W4	CI CL	CLAY silty,trace sand,med. plastic,brown,peat-like, organic inclusions				23	26	41				
CC7	31-32	W8	CL CI	CLAY silty,sandy,gravelly,low to med.plastic,brown (till like)	29	16	13							
DD4	4.5-5	W2	ML OL	SILT clayey,trace sand and gravel,organic incl.occ. rust and coal incl.low to med.plastic(till-like)	42	32	10							
DD4	25.5-26	W8	GM	GRAVEL coarse,rounded to 3/4" Ø sandy,silty				52	48	*fines				
EE1	11-12	W4	GP	GRAVEL subangular to subrounded to ½"Ø,sandy,coarse grained,trace silt,non plastic,brown(till like)				96	4	-*				Gravel 4 Sand 56% Silt 4%
EE4	26-27	W5	GM	GRAVEL coarse sizes to 3/4" Ø- sandy,silty				69	32	*fines				Gravel 4 Sand 27 Fines 32

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
EE7	8-9	W3	CL CI	CLAY silty,sandy,fine to coarse grained,occ.gravel sizes, low to medium plastic										
EE7	18-19	W6	GM	GRAVEL very sandy,silty				73	27	-*				Gravel 35% Sand - 38% Fines 27%
FF4	10-11	W4	CL	CLAY silty,gravelly,sandy, coarse grained,low plastic	24	16	8							
FF5	26-27	W6	CI	CLAY silty,trace sand,medium plastic,dark grey(till-like)	42	18	24	22	39	39				
GG3	28-29	W9	SC	SAND clayey,silty,gravelly,low plastic				42	58	fines				
GG6	14-15	W5	GC	GRAVEL angular to ½" Ø, sandy, fine to coarse grained, trace silt,trace clay				66	20	14				
GG7	25-26	W8	CL	CLAY silty,trace sand and gravel sizes, brownish grey,low plastic(till like	27	15	12							
HH2	9-10	W3	GC GP	GRAVEL angular,very clayey,sandy coarse to fine grained, medium plastic,brown	28	17	11							
HH4	1.5-5.5	W2	CI	CLAY silty,medium plastic	41	31	10							
HH6	6.5-7	C1	CI	CLAY silty,trace sand,medium to high plastic,brown, ice rich							98	66	48	frozen core
HH6	24-25	W7	CL	CLAY very silty,sandy,gravelly low plastic,grey(till like)	20	12	8							
HH7	19	W7	SC GC	SAND medium grained,very gravelly,silty,clayey, low to medium plastic				60	28	18				Gravel 33%
				*Larger sizes fractured with rock bit										

APPENDIX "B"

SECTION B.4 TEST HOLE ELEVATIONS

PLANTSITE TEST HOLE ELEVATIONS

Test Hole No.	Elevation *	Geodetic Elevation
AA0	945.0	120.5
2	951.0	126.5
4	968.0	143.5
5		146.0
7	972.0	147.5
BB1		130.0
3		139.0
6		150.0
CC1		137.5
3		144.0
4		150.5
5		151.0
6		148.5
7		143.0
DD0	966.0	141.5
3		150.0
4	975.5	151.0
5		150.0
6		146.5
7	966.5	142.0
EE1		141.5
3		146.5
4		147.5
5		143.5
6		141.5
7		137.5
FF0	964.5	140.0
2		140.0
3		139.5
4	964.0	139.5
5		138.5
6		136.0
7	958.5	134.0
GG1		134.5
3		133.0
4	956.0	131.5
5		129.0
6		127.5
7		126.0

PLANTSITE TEST HOLE ELEVATIONS (continued)

Test Hole No.	Elevation *	Geodetic Elevation
HH0	952.5	128.0
2	951.0	126.5
4	949.5	125.0
6		119.0
7	941.5	117.0

* Elevation relative to top of flange on 0-27 wellhead (Elevation = 999.80 - provided by C.E.S.L. of Edmonton).

APPENDIX "B"

SECTION B.5 ALTERNATE PLANT SITE

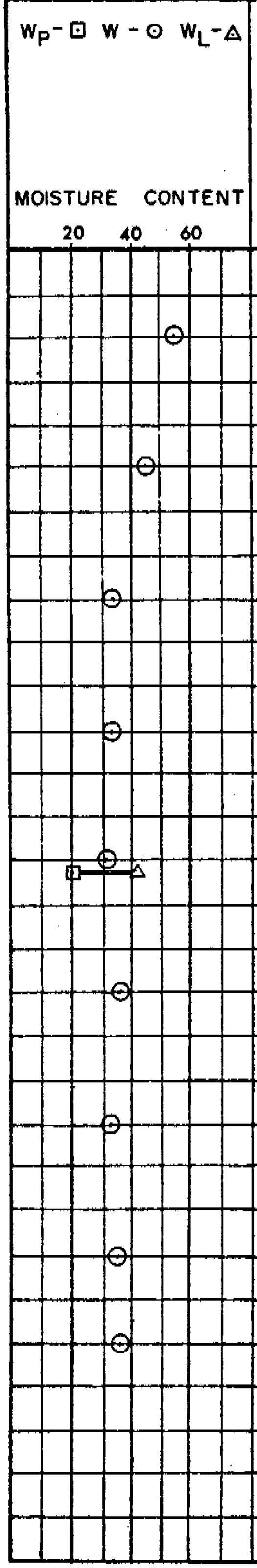
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT

TEST HOLE NO. PB1

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 9, 1976
RIG Heli Drill	METHOD AIR	START 18:00	FINISH 18:20
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	F						
	OL	*ICE AND CLAY* some organics, silty medium plastic	ICE+ 80%						
	CI	*CLAY* silty, trace sand, medium to high plastic, dark grey	V 15%		W1	☒			
5					W2	☒			
					W3	☒			
10		---less silt, trace sand, trace rock fragments, high plastic	20-25%		W4	☒			
		---occasional rust and coal inclusions (till-like)		Grain Size Plate B-64	W5	☒			
15			15-20%		W6	☒			
20			20-25%		W7	☒			
					W8	☒			
25					W9	☒			

Bottom of Hole at 25.0'.

PLATE B-62

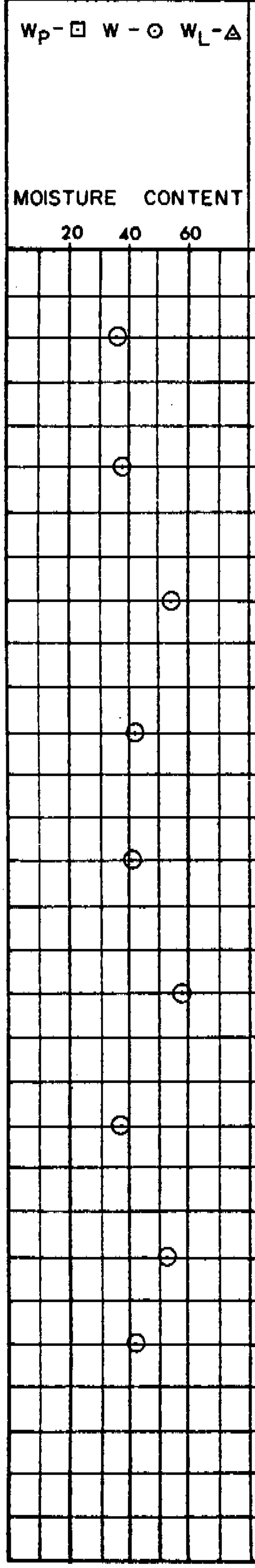
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT

TEST HOLE NO. PB2

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 9, 1976
RIG Heli Drill	METHOD AIR	START 18:30	FINISH 18:45
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



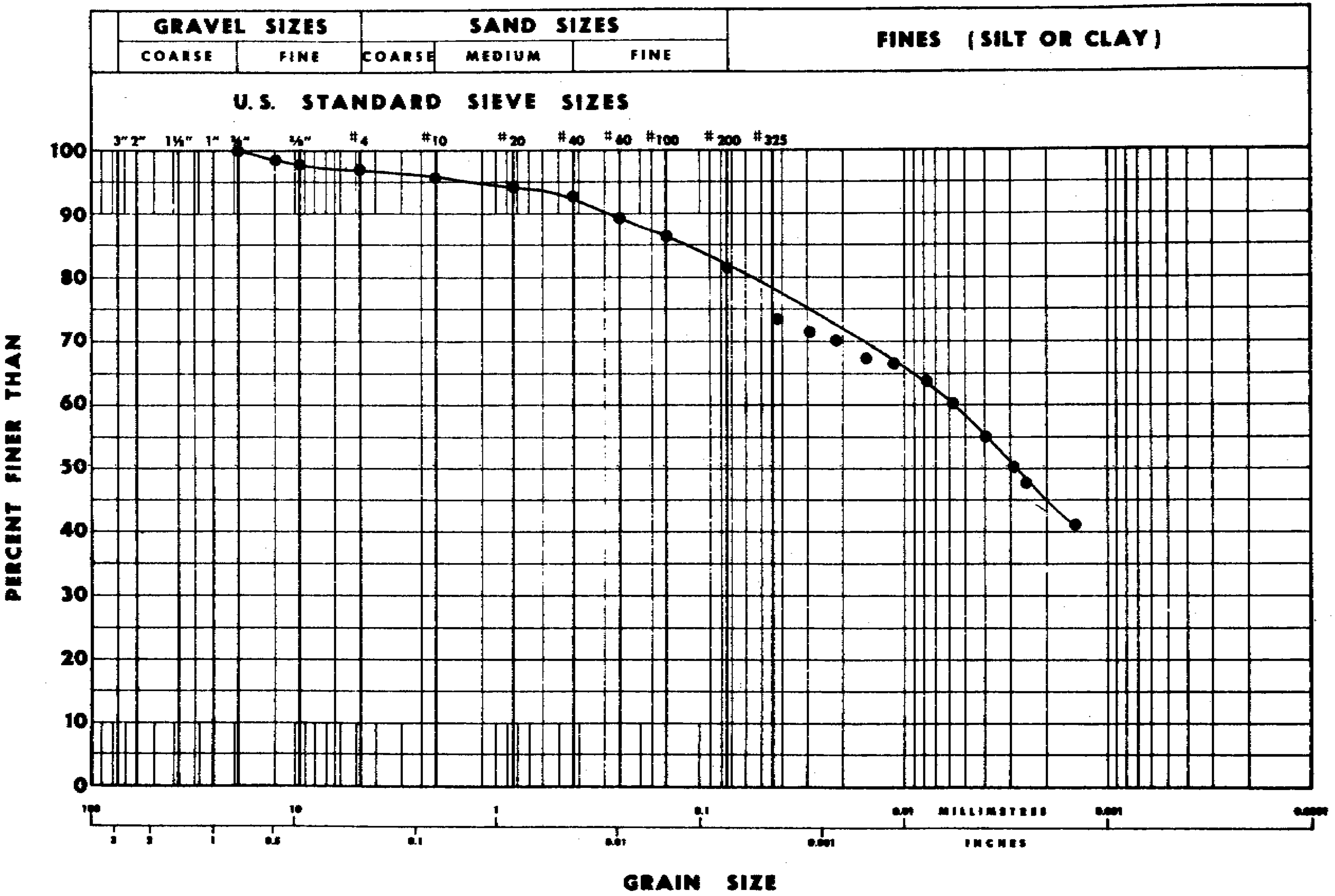
DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	▤	PEAT		Vs						
	CI-CH	▨	CLAY silty, some organics, medium to high plastic		V 25%						
		▨	---- ice lens		100%		W1	☒			
		▨	---- little silt, medium to high plastic, grey		V 25%						
5		▨					W2	☒			
		▨	---- trace sand, high plastic, ice-rich		V		W3	☒			
10		▨			40-60%		W4	☒			
		▨					W5	☒			
15		▨					W6	☒			
		▨	---- less ice		V						
20		▨			10-15%		W7	☒			
		▨					W8	☒			
25		▨					W9	☒			
			Bottom of Hole at 25.0'.								

PLATE B-63

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parsons Lake Gas Plant
Hole PB1 @ 14'
TECHNICIAN CS DATE TESTED Apr.76



REMARKS:

D$_{10}$= ______ MM.
D$_{30}$= ______ MM.
D$_{60}$= ______ MM.
C$_U$ ______
C$_C$ ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE B-64

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
PB1	14.5 15.5	W5	Cl	CLAY occasional rust and coal inclusions (till like)	41	20	21	18	37	45				

Plate B-65

APPENDIX “C”

S.T.O.L. AIRSTRIP

SECTION C.1 TEST HOLE LOGS

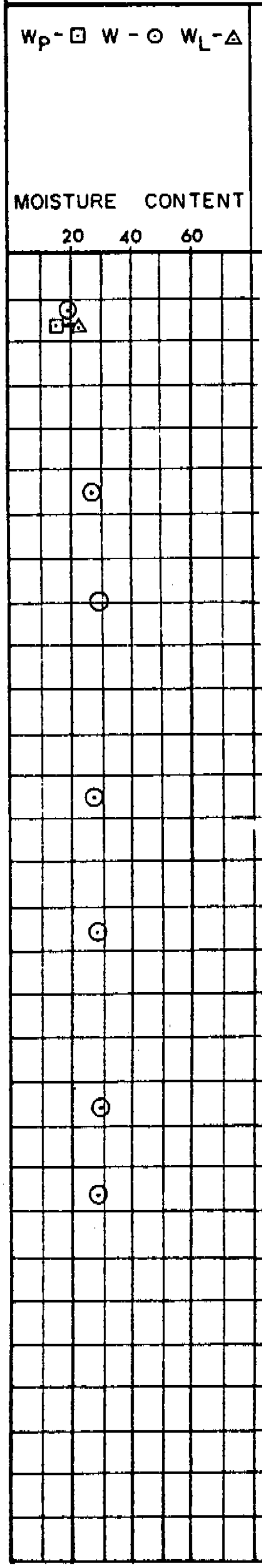
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA1

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 22, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 18:00	FINISH 18:45
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT	F					
	CL	CLAY silty, sandy, low plastic, brown, trace organic inclusions	Nbn		W1			
		-- sandy, fine grained, brown						
5	SC	SAND fine grained, silty, clayey, grey	Nbe	Grain Size Plate C-15	W2			
	CL	CLAY silty, sandy, low to medium plastic, grey	V 50%		C1	65%	I	γ_{bulk} = 115 pcf γ_d = 90 pcf
10	SM	SAND fine grained, silty, clayey, trace coarse sand, brown-grey	Nbn		W3			
15				Grain Size Plate C-16	W4			
		--- fine grained, silty, clayey, grey						
		--- pockets of clay			W5			
20	CI	CLAY silty, sandy, low to medium plastic, dark grey-brown	V 15%		W6			
25		--- fine gravel sizes	30%					
		Bottom of Hole at 25.5'.						
30								

PLATE C-1

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

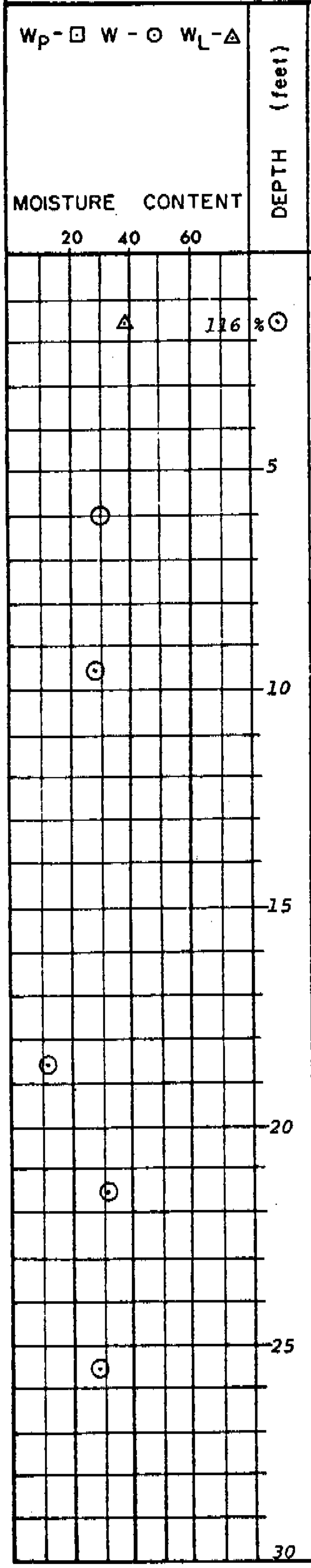
TEST HOLE LOG

PROJECT

PARSONS LAKE GAS PLANT

TEST HOLE NO. SA2

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 22, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 12:15	FINISH 17:50
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT						
	OL	ORGANIC SILT sandy, trace clay, non plastic, brown, fine organics ice-rich	V 75%		W1			
	ML	SILT clayey, trace sand, fine to coarse grained, low plastic, brown	V 15%					
5	SM	SAND fine and coarse grained, silty, clayey	V 15%	Grain Size Plate C-17	C1	65%	I	γ_{bulk} = 115 pcf γ_d = 88 pcf
	SM	SAND silty, fine grained, brown	Nbn		W2			
10								
15					C2	0%	V	
					W3			
		more silty						
20								
		less silty			W4			
25					W5			
		Bottom of Hole at 26.0'.						
30								

PLATE C-2

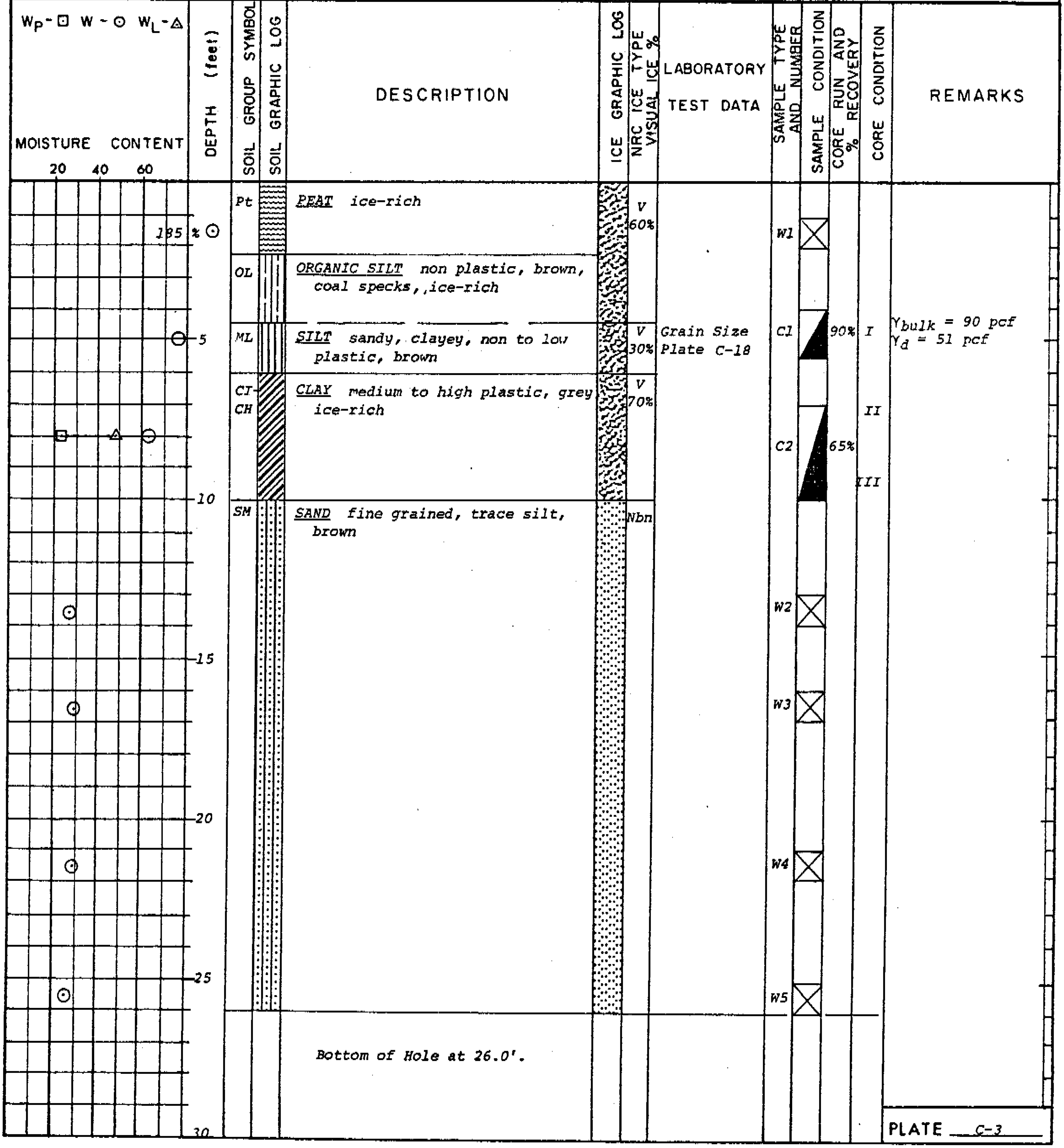
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA3

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 22, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 11:20	FINISH 12:05
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT ice-rich	V 60%		W1			
	OL	ORGANIC SILT non plastic, brown, coal specks,,ice-rich						
5	ML	SILT sandy, clayey, non to low plastic, brown	V 30%	Grain Size Plate C-18	C1	90%	I	γ_{bulk} = 90 pcf γ_d = 51 pcf
	CI-CH	CLAY medium to high plastic, grey ice-rich	V 70%		C2	65%	II III	
10	SM	SAND fine grained, trace silt, brown	Nbn		W2 W3 W4 W5			

Bottom of Hole at 26.0'.

PLATE C-3

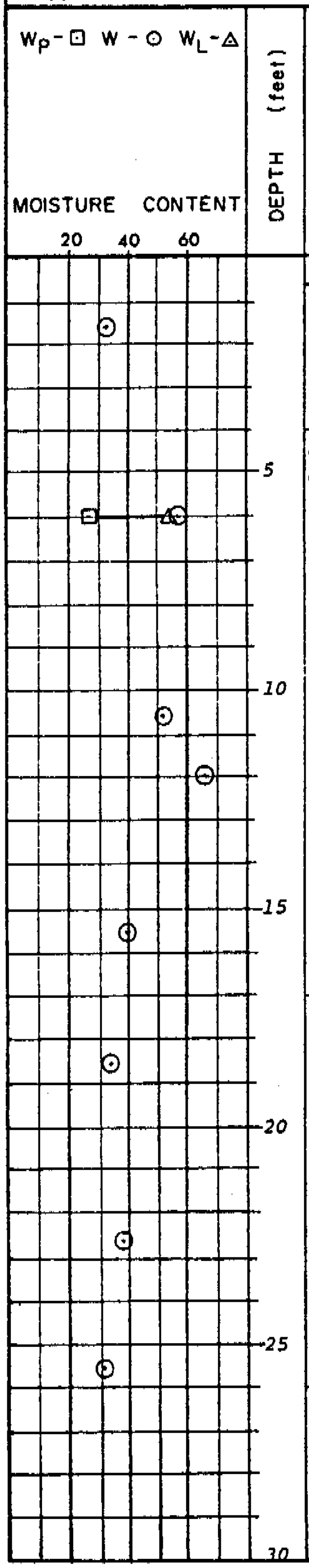
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA4

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 22, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 9:55
FINISH 10:40
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	F					
SM	*ICE AND SAND* silty, fine grained, brown --- ice lenses --- clayey	ICE+ 75%		W1			
CI-CH	*CLAY* silty, trace sand, medium to high plastic, dark grey to olive brown , ice-rich	Vr 60%		C1	65%	II III	γ_{bulk} = 97 pcf γ_d = 61 pcf
				W2			
	--- low plastic			C2	80%	III	
	--- very silty, low plastic, coal particles			W3			
SM	*SAND* fine to medium grained, trace silt, brown, coal inclusions	Nbe		W4			
				W5			
	--- clay inclusions			W6			
	Bottom of Hole at 26.0'.						

PLATE C-4

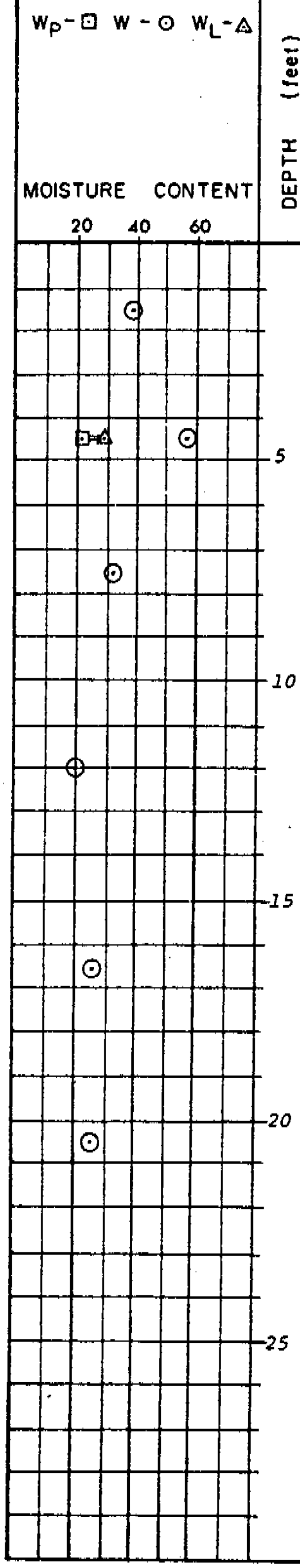
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA5

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 22, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 5:05 AM
FINISH 6:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	V					
SC	SAND fine grained, very clayey, silty, brown, fine organics	20%		W1			
SC	ICE AND SAND clayey	ICE+ 70%					
ML	SILT clayey, trace sand, low to medium plastic, dark grey-brown	V 15%	Grain Size Plate C-19	W2			
	--- very silty, low plastic			W3			
	--- sandy, trace clay, low plastic coal inclusions, grey	Vs, Vr 25%		C1	100%	I	
SM	SAND fine to medium grained, trace silt, greyish-brown, occasional particles of gravel and coal	Nbe 5%,		W4			
	--- silty, trace clay, broken coal fragments			W5			
	Bottom of Hole at 22.0'.						

PLATE C-5

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

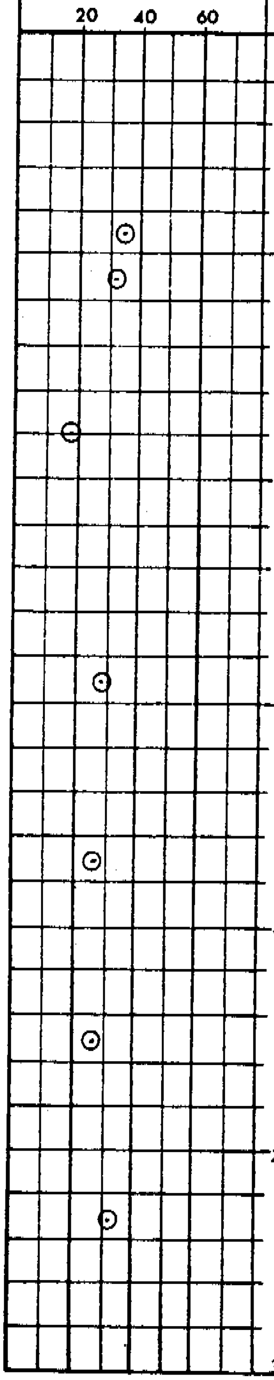
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA6

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 22, 1976
RIG Heli Drill	METHOD CRREL	START 3:55 AM	FINISH 4:40
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P-☐ W-⊙ W_L-△

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	F					
	CI	*ICE AND CLAY* silty, medium plastic, brown	ICE+ 75%					
5	SM	*SAND* fine grained, very silty, trace clay, non plastic, brown, trace fine organics	Nbe 5%		W1 W2			
		occasional coal specks			C1	100%	II	
			Vc 35%	Grain Size Plate C-20	C2	100%	II III	γ_{bulk} = 125 pcf γ_d = 106 pcf
10		low plastic						
15		trace organics			W3			
		trace black coal-like sand			W4			
20								
					W5			
		ICE (1") occasional particles of gravel and coal						
25		numerous broken coal fragments			W6			
		Bottom of Hole at 27.0'.						
30								

PLATE C-6

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

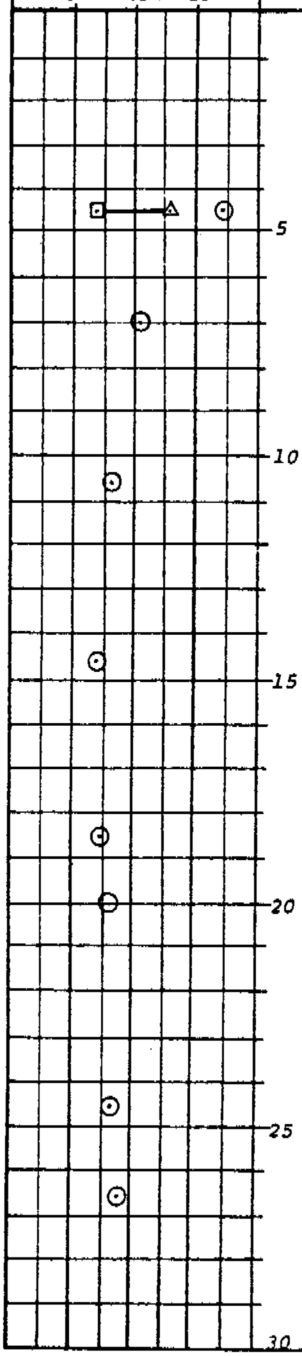
TEST HOLE NO. SA7

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 22, 1976
RIG Heli Drill	METHOD AIR/CRREL	START 3:15 AM	FINISH 3:50

PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE

Wp - ☐ W - ⊙ WL - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI-CH	CLAY silty, medium to high plastic, brown	ICE+ 90%					
5	CI-CH	CLAY silty, medium to high plastic grey-brown	V 30-40%		W1			
		high plastic	Vs, Vr Vs, Vr 25%	15%	C1	100%	II	
10	SM	SAND fine grained, silty, brownish-grey,	Nbe 5-10%		W2			
15		trace silt, very occasional particles of gravel			W3			
					W4			
20					W5			
		coal fragments						
		particles of gravel						
25					W6			
		numerous coal fragments			W7			
		Bottom of Hole at 27.0'.						

PLATE C-7

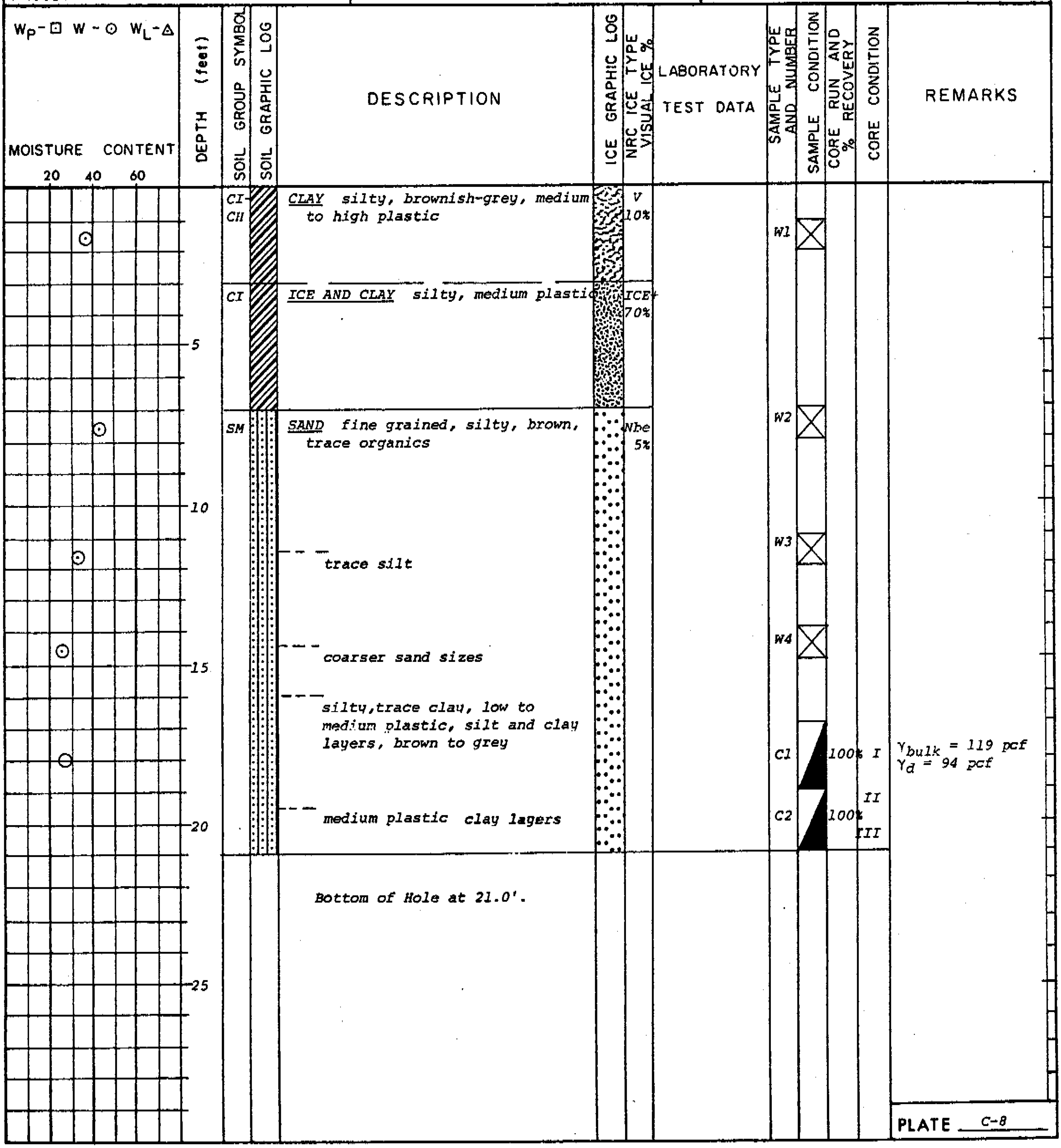
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *SA8*

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 22, 1976*
RIG *Heli Drill*	METHOD *CRREL/AIR*	START *1:42 AM*	FINISH *2:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI-CH	*CLAY* silty, brownish-grey, medium to high plastic	V 10%		W1			
CI	*ICE AND CLAY* silty, medium plastic	ICE+ 70%					
SM	*SAND* fine grained, silty, brown, trace organics	Nbe 5%		W2			
	trace silt			W3			
	coarser sand sizes			W4			
	silty,trace clay, low to medium plastic, silt and clay layers, brown to grey			C1	100%	I	γ_{bulk} = 119 pcf γ_d = 94 pcf
	medium plastic clay layers			C2	100%	II III	

Bottom of Hole at 21.0'.

PLATE *C-8*

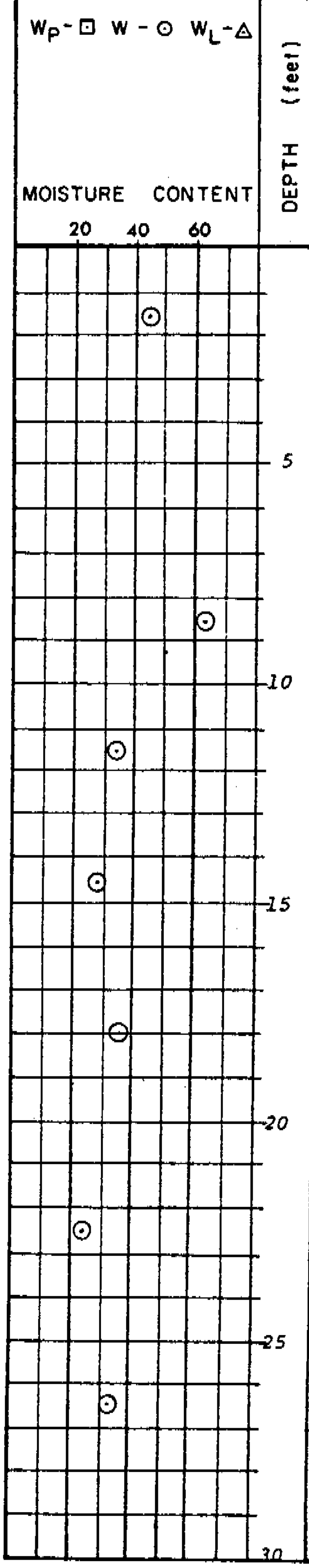
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. SA9

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 22, 1976
RIG Heli Drill
METHOD AIR/CRREL
START 12:45 AM
FINISH 1:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	F					
ML	*SILT* clayey, sandy, fine grained, low plastic, brown	V 20%		W1			
ML	*ICE AND SILT* clayey	ICE+ 70%					
CI	*CLAY* trace sand, fine grained, trace gravel, medium to high plastic, olive brown, ice-rich	V 70%		W2			
SM	*SAND* fine to coarse grained, very silty, non plastic, grey, occasional particles of subangular black coal	Nbe 10%		W3			
	occasional coal spots	10%	Grain Size Plate C-21	W4			
	trace organics, black	5%		C1	100%	III	
	occasional coal spots			W5			
				W6			
	Bottom of Hole at 27.0'.						

PLATE C-9

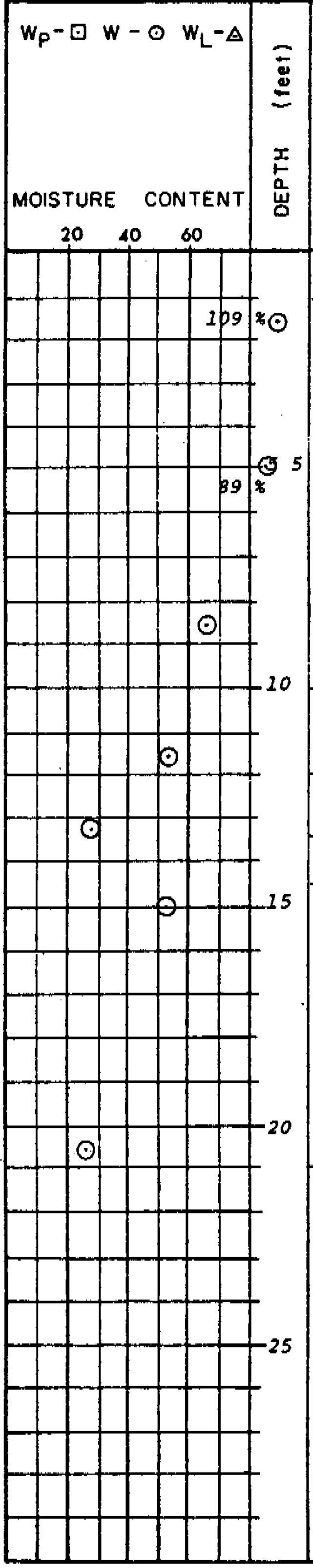
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *SA10*

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 22, 1976*
RIG *Heli Drill*
METHOD *AIR / CRREL*
START *11:10 PM*
FINISH *12:10*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	F					
	ML	*SILT sandy, fine grained, trace clay, dark brown, non to low plastic*	V 20%		W1			
5			30%		W2			
		--- clayey, very sandy, low plastic, brown	40%	*Grain Size Plate C-22*	W3			
10	CI	*CLAY silty, trace of sand, grey-brown, medium plastic*	30%		W4			
	ML	*SILT sandy, fine grained, brown, occasional layer to 1" of sand*	Nbe 5%		C1	100%	III	γ_{bulk} = 111 pcf γ_d = 87 pcf
	OL	*ORGANIC SILT black, peat-like*	Vx, Vs	20%				
15	CI	*CLAY silty, trace of sand, brown, medium plastic*	Nbn		C2	100%	II	
			Vs, Vr 25%					
20					W5			
25		*Bottom of Hole at 21.0'.*						

PLATE *C-10*

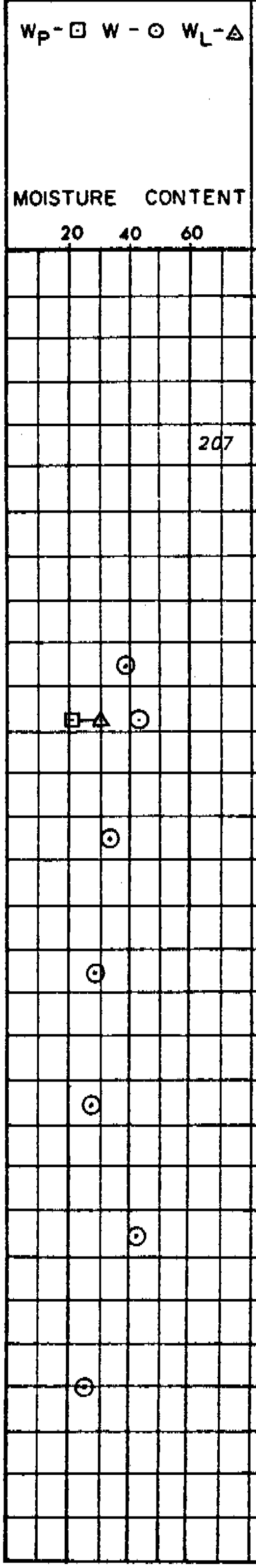
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA 11

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 9:57 PM
FINISH 11:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	F						
	CL	*ICE AND CLAY* silty, brown, low to medium plastic, occasional fine organics	ICE+ 70%						
5	ML	*SILT* trace clay, non plastic, fine organics , brown	V 40%		W1	☒			
		--- very sandy, trace clay, grey, non to very low plastic	V 10%		W2	☒			
10	CL- CI	*CLAY* silty, trace to little sand, occasional gravel sizes to 1/2"ø medium plastic, brown (till-like)	Vs, Vr 10%		C1		100%	I	γ_{bulk} = 105 pcf γ_d = 74 pcf
	SP	*SAND* fine grained, trace silt, brown, non plastic	Nbn		W3	☒			
15					W4	☒			
20					W5	☒			
		--- trace clay			W6	☒			
25		--- cobble							
	CL- CI	*CLAY* silty, sandy, occasional particles of gravel, low to medium plastic, grey-brown	Nbn		W7	☒			
30		Bottom of Hole at 27.0'.							

PLATE C-11

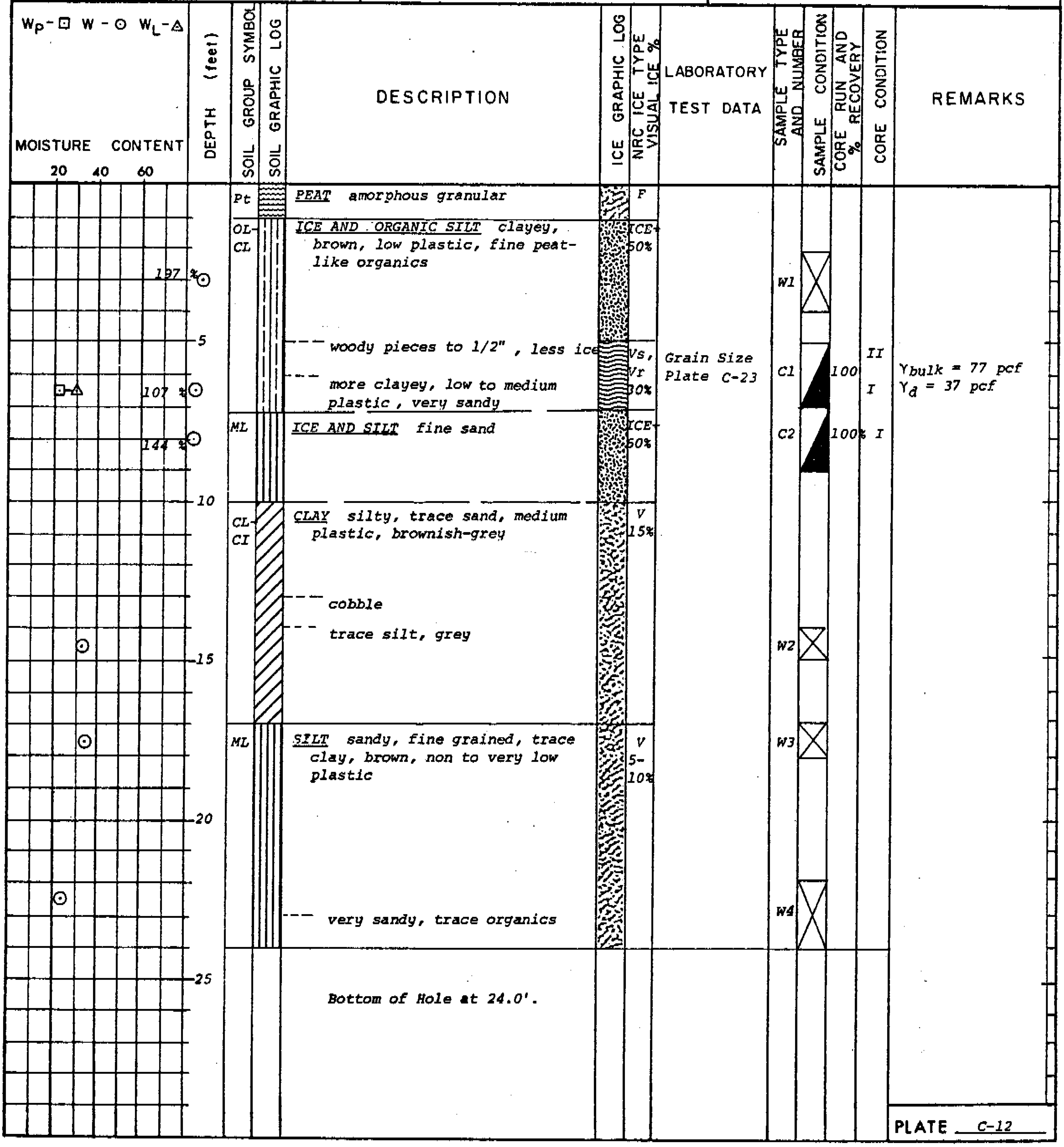
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *SA 12*

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 21, 1976*
RIG *Heli Drill*
METHOD *AIR/CRREL*
START *8:45 PM*
FINISH *9:50*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



MOISTURE CONTENT	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT* amorphous granular	F					
197 %	OL-CL	*ICE AND ORGANIC SILT* clayey, brown, low plastic, fine peat-like organics	ICE+ 50%		W1			
		--- woody pieces to 1/2" , less ice	Vs, Vr 30%	Grain Size Plate C-23	C1	100	II	γbulk = 77 pcf
107 %		--- more clayey, low to medium plastic , very sandy					I	γ$_d$ = 37 pcf
144 %	ML	*ICE AND SILT* fine sand	ICE+ 60%		C2	100%	I	
	CL-CI	*CLAY* silty, trace sand, medium plastic, brownish-grey	V 15%					
		--- cobble						
		--- trace silt, grey			W2			
	ML	*SILT* sandy, fine grained, trace clay, brown, non to very low plastic	V 5-10%		W3			
		--- very sandy, trace organics			W4			
		Bottom of Hole at 24.0'.						

PLATE *C-12*

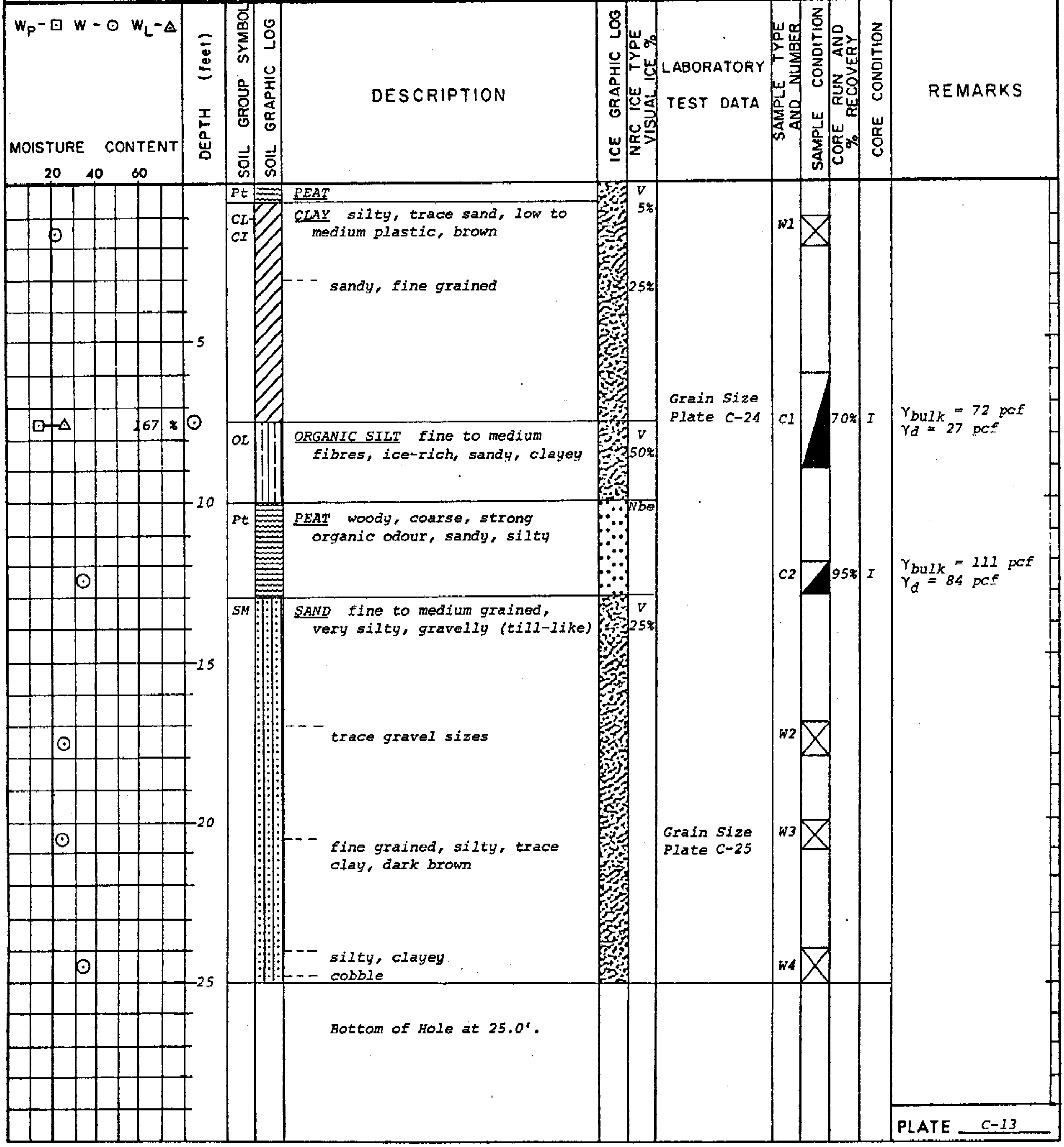
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA13

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 18:00	FINISH 18:40
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	V					
CL-CI	CLAY silty, trace sand, low to medium plastic, brown	5%		W1			
	sandy, fine grained	25%					
			Grain Size Plate C-24	C1	70%	I	γ_{bulk} = 72 pcf γ_d = 27 pcf
OL	ORGANIC SILT fine to medium fibres, ice-rich, sandy, clayey	V 50%					
Pt	PEAT woody, coarse, strong organic odour, sandy, silty	Nbe		C2	95%	I	γ_{bulk} = 111 pcf γ_d = 84 pcf
SM	SAND fine to medium grained, very silty, gravelly (till-like)	V 25%					
	trace gravel sizes			W2			
	fine grained, silty, trace clay, dark brown		Grain Size Plate C-25	W3			
	silty, clayey			W4			
	cobble						

Bottom of Hole at 25.0'.

PLATE C-13

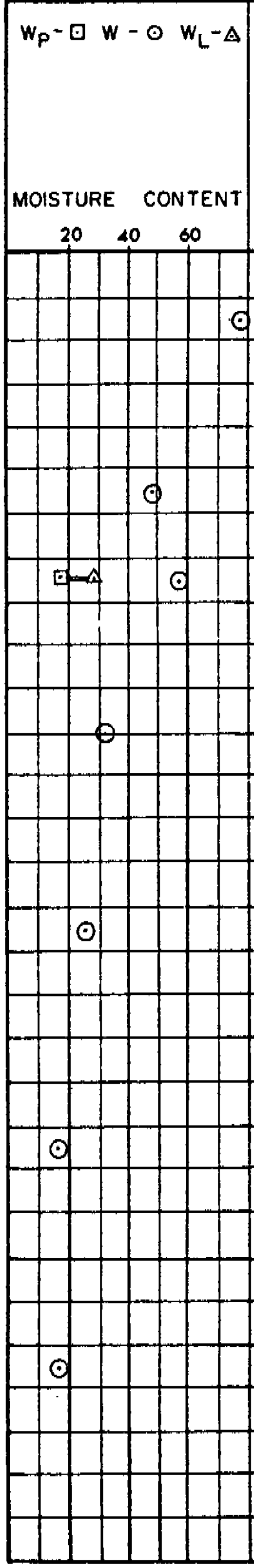
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. SA14

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 16:20
FINISH 17:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT	F					
		ICE	ICE					
	CL	CLAY very silty, sandy, fine grained, low plastic, trace organics, grey	V 30%		W1			
5					W2			
		sandy, fine grained	20%		W3			
10		grey, no sand sizes, clayey	Vx 5%		C1	95%	I	$\gamma_{bulk} = 111$ pcf $\gamma_d = 84$ pcf
		sandy, fine grained						
15	SM	SAND fine to medium grained, silty, coal specks, grey	Nf		W4			
20		fine grained, gravelly, silty			W5			
	CL	CLAY very silty, trace sand, fine gravel, low plastic, grey	Nbn					
25					W6			
		Bottom of Hole at 26.0'.						
30								

PLATE C-14

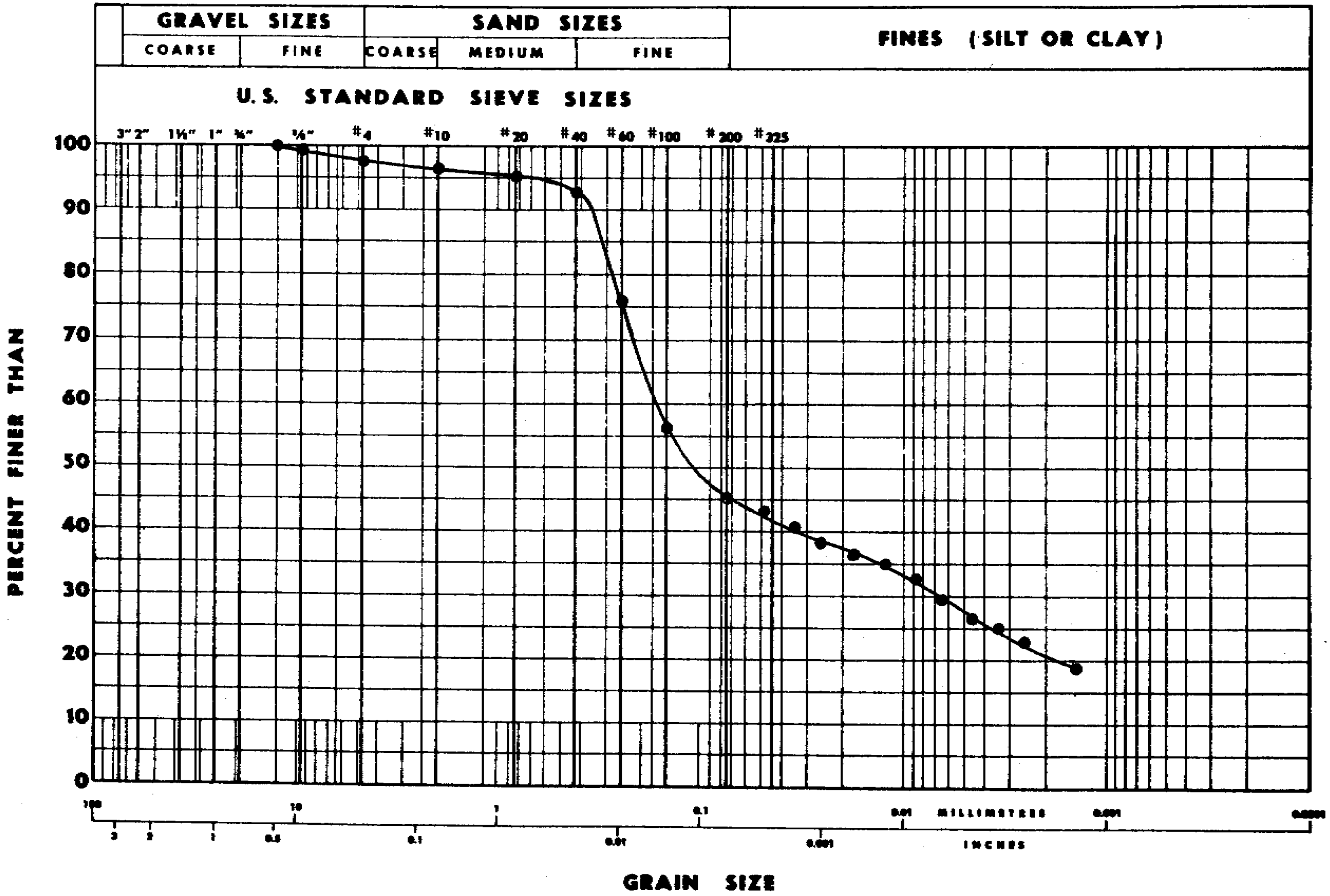
APPENDIX "C"

SECTION C.2 PARTICLE SIZE ANALYSES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W2
SOURCE Parsons Lake Gas Plant
Hole SA1 @ 5-6'
TECHNICIAN CS **DATE TESTED** Apr/76



REMARKS: ____________________

D_{10} = ________ mm
D_{30} = ________ mm
D_{60} = ________ mm
C_U ________
C_C ________

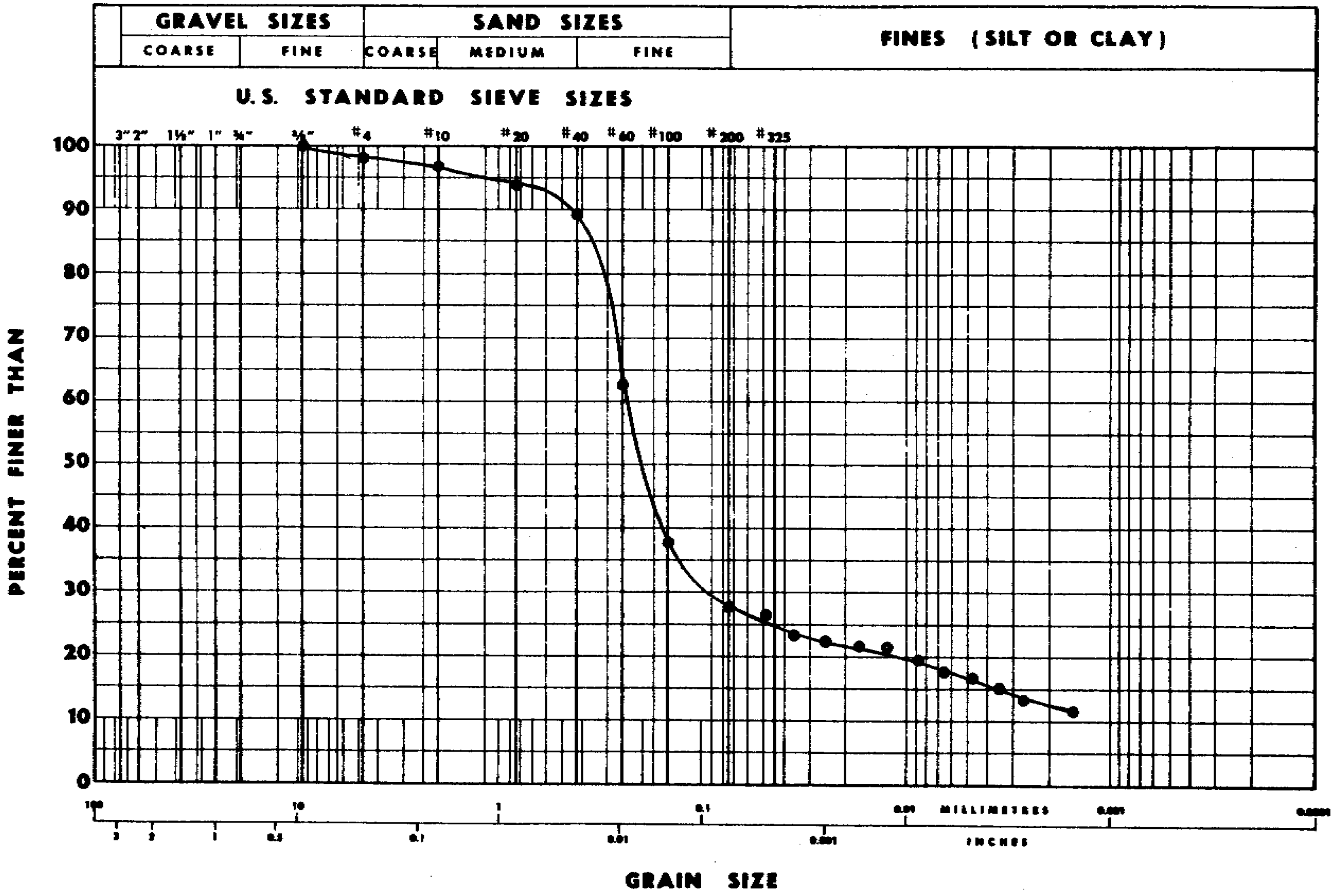
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-15

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
Hole SA1 @ 15-16'
TECHNICIAN CS
DATE TESTED Apr/76



REMARKS: ____________________

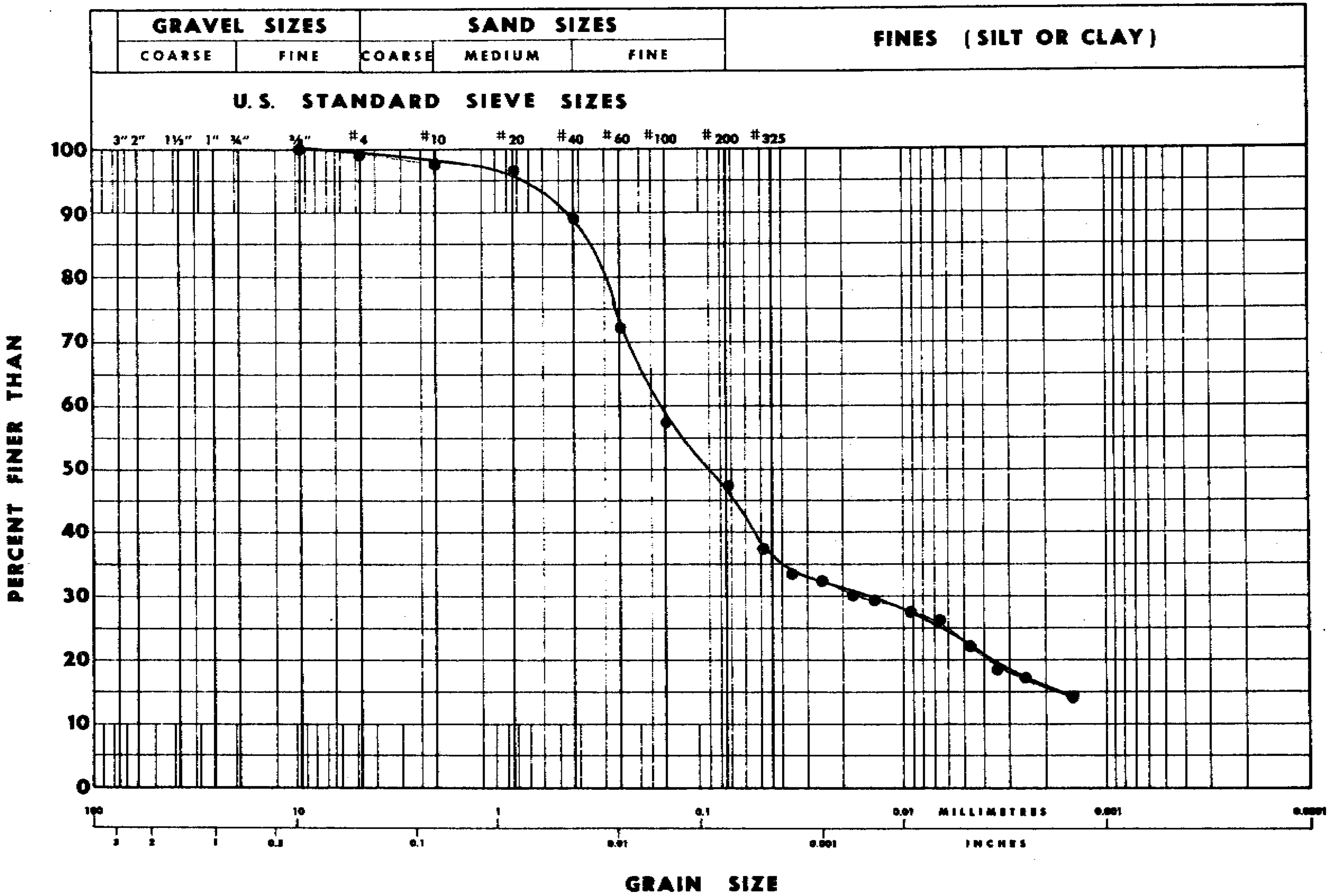
D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-16

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE



LAB ORDER NO. CS3343

CLIENT G.O.C.L.

SAMPLE C1

SOURCE Parsons Lake N.W.T.

HOLE SA2 DEPTH 5-7' DATE REC'D.

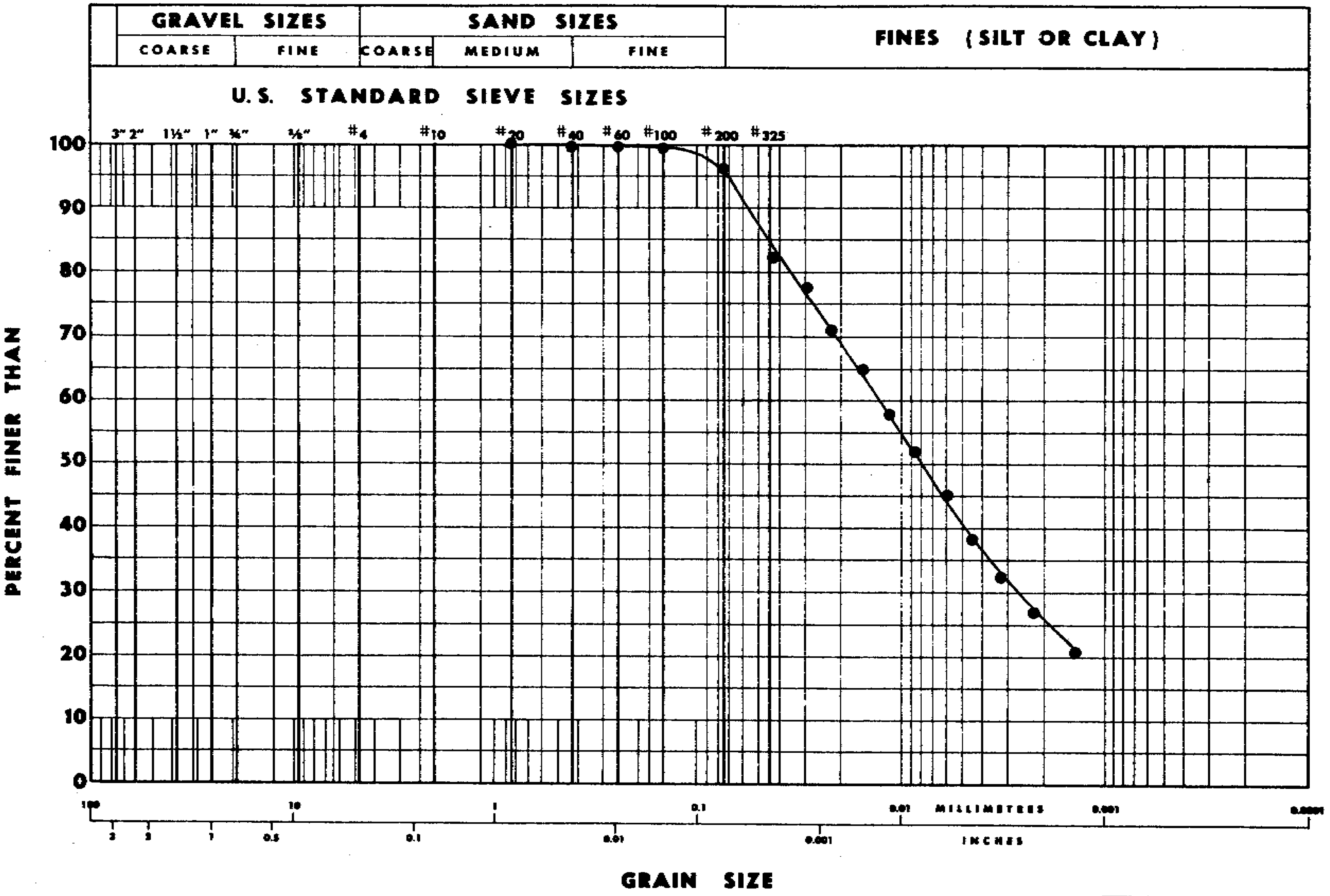
TECHNICIAN CS DATE TESTED May/76

REMARKS: ________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-17



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

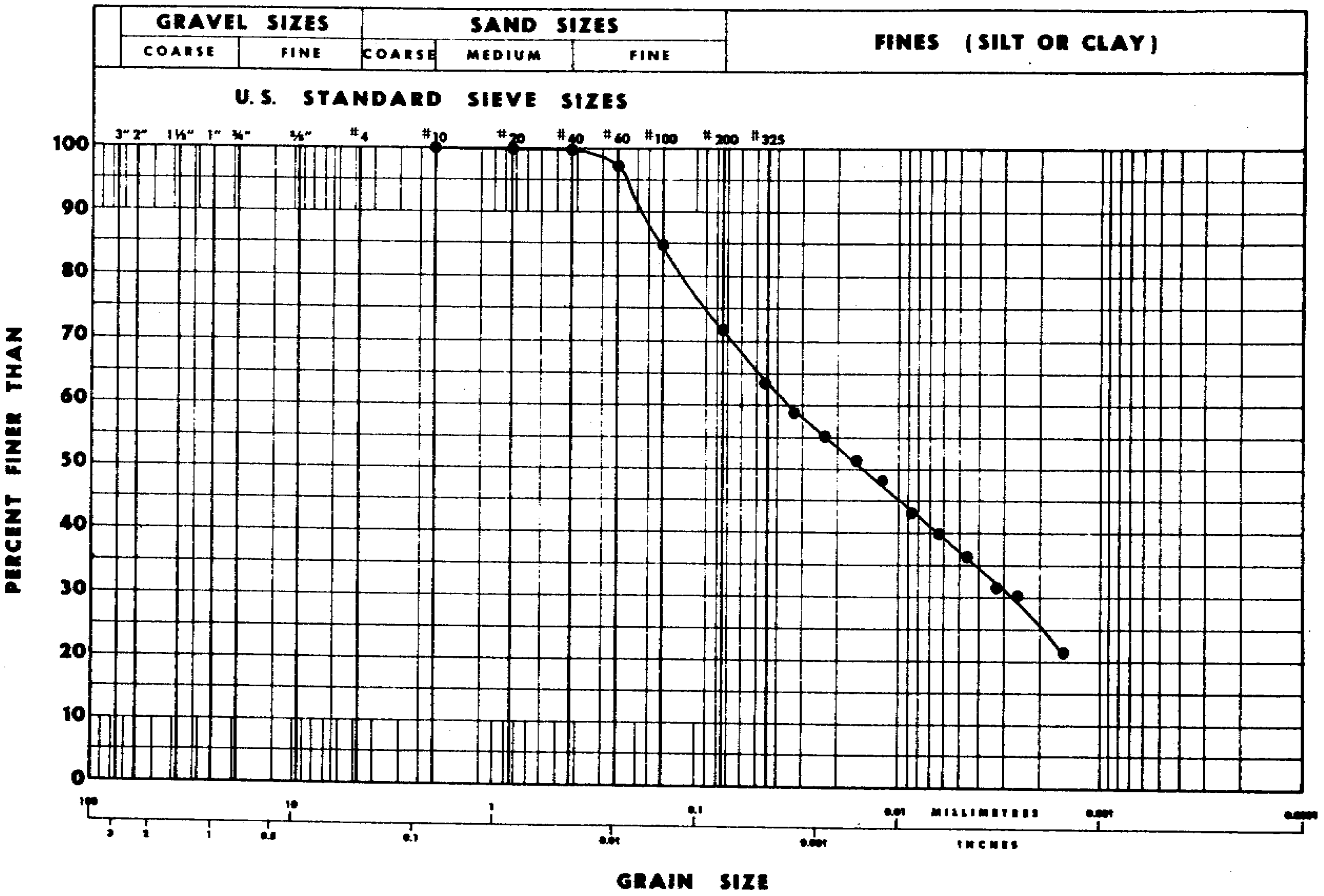
D_{10}= MM.
D_{30}= MM.
D_{60}= MM.
C_U
C_C

PLATE C-18

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE C1
SOURCE Parsons' Lake N.W.T.
HOLE SA3 DEPTH 4-5½' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76



REMARKS:

D_{10} = MM.

D_{30} = MM.

D_{60} = MM.

C_U

C_C

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-19

R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343

CLIENT G.O.C.I.

SAMPLE W2

SOURCE Parsons Lake Gas Plant

Hole SA5 @ 4-5'

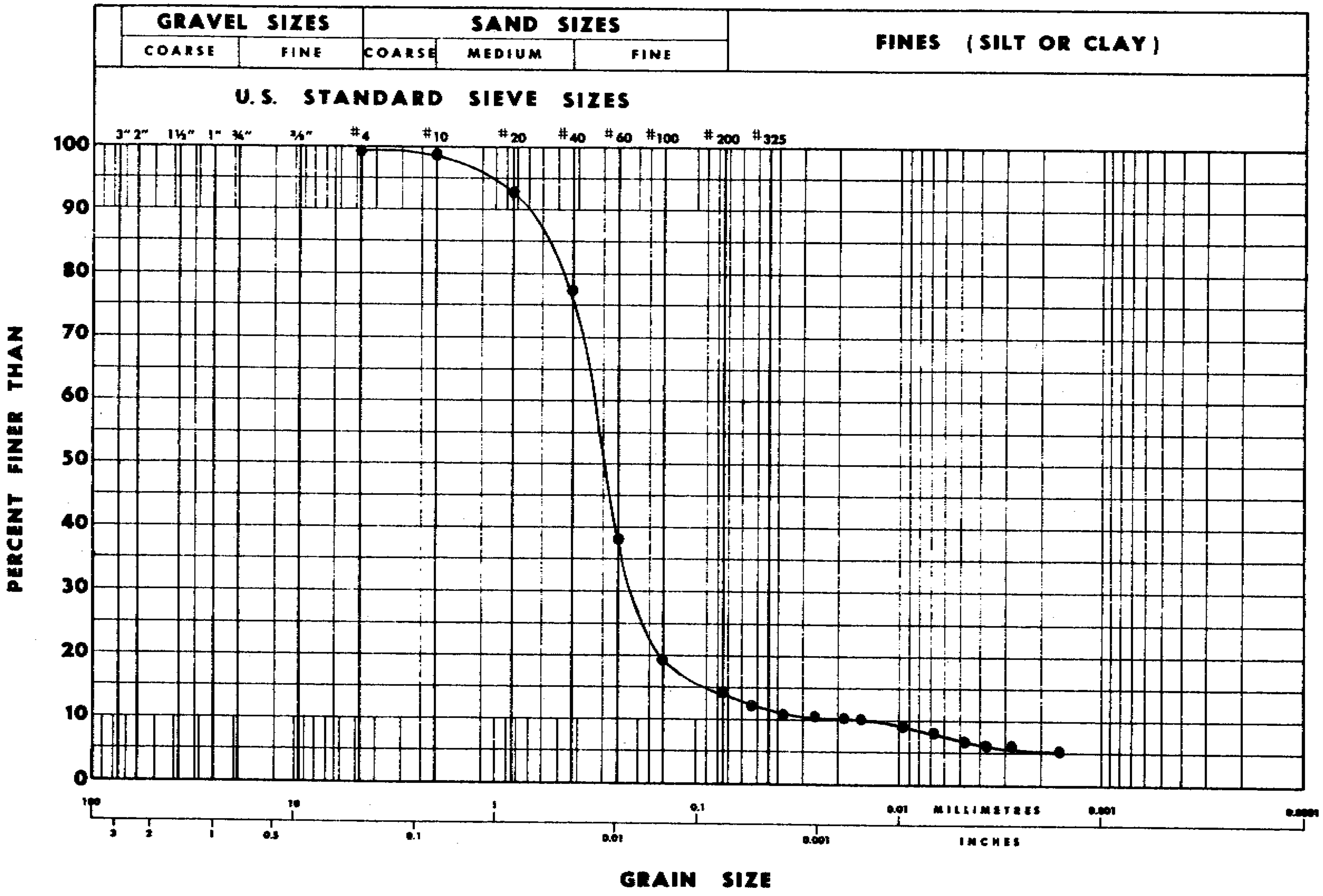
TECHNICIAN CS

DATE TESTED Apr 76

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343
CLIENT G.O.C.L.
SAMPLE C2
SOURCE Parsons Lake Gas Plant
HOLE SA6 DEPTH 8-10' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

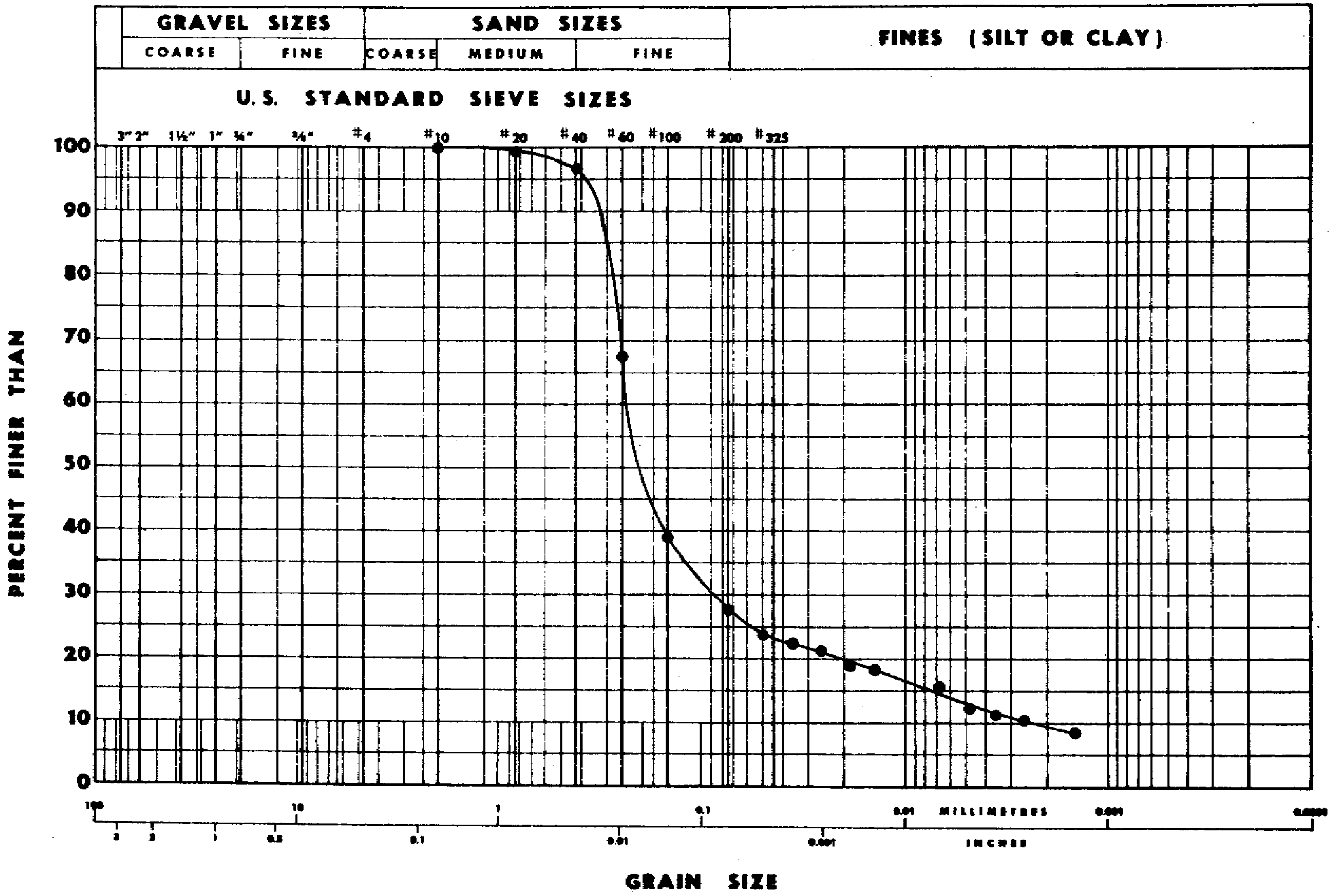


REMARKS:

D$_{10}$= MM.
D$_{30}$= MM.
D$_{60}$= MM.
C$_U$
C$_C$

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-20



REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

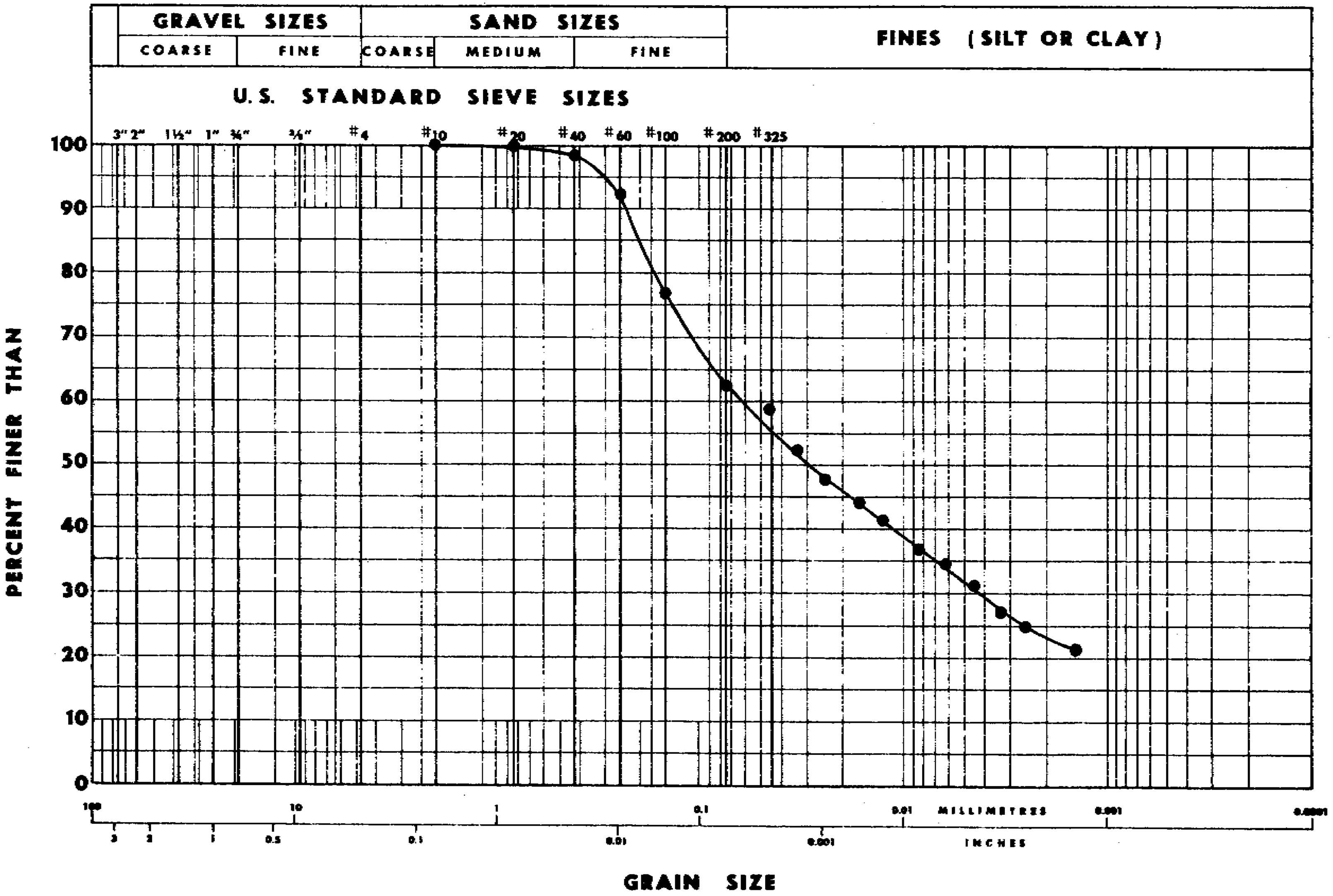
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
Hole SA9 @ 14-15'
TECHNICIAN CS
DATE TESTED Apr./76

PLATE C-21



REMARKS:

D₁₀ = ______ MM.
D₃₀ = ______ MM.
D₆₀ = ______ MM.
C$_U$ ______
C$_C$ ______

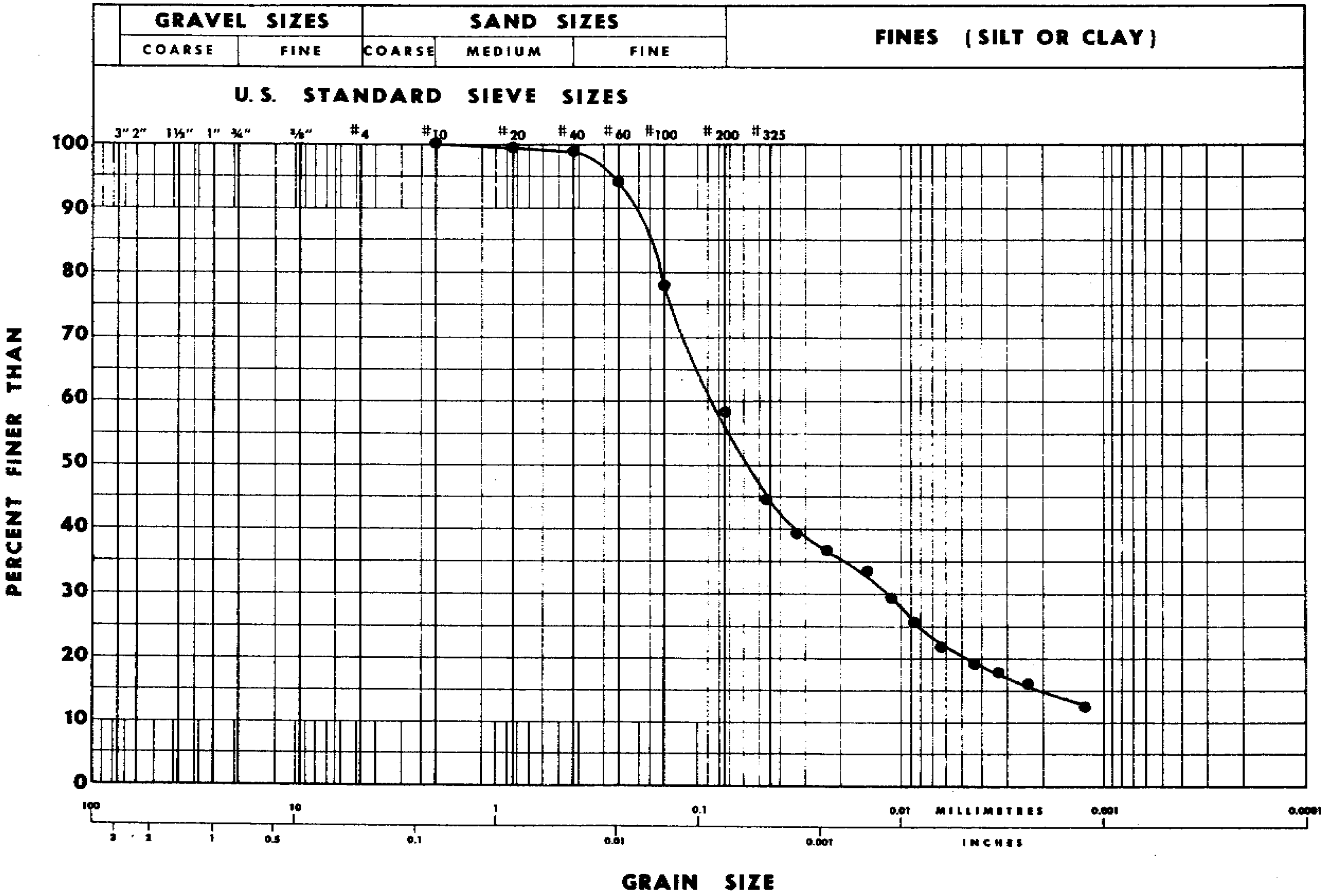
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson Lake Gas Plant
HOLE SA10 DEPTH 8-9' DATE REC'D.
TECHNICIAN CS DATE TESTED Apr.76

PLATE C-22



REMARKS:

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-23

GRAIN SIZE CURVE

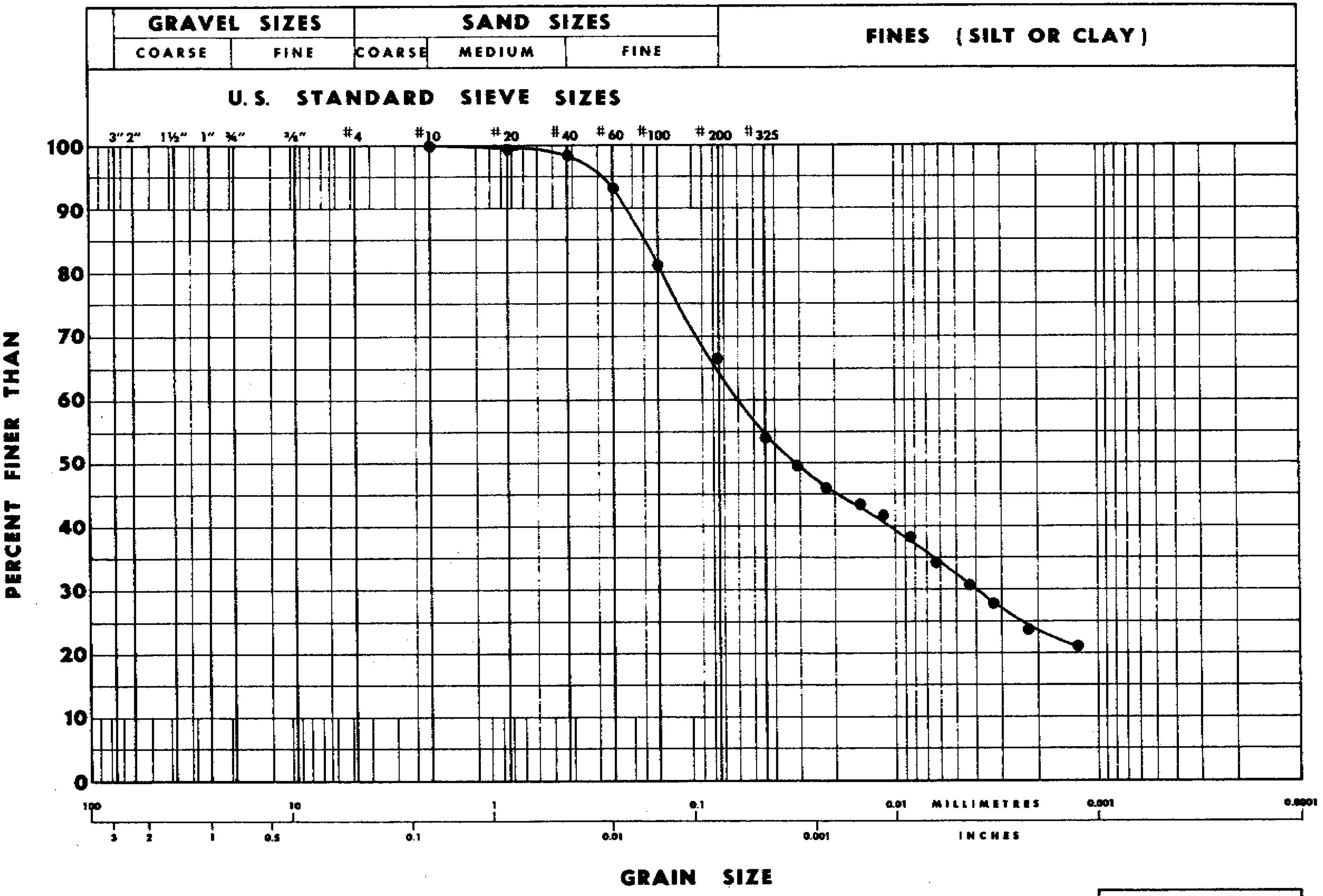
R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE C1
SOURCE Parson's Lake N.W.T.
HOLE SA12 DEPTH 5-7' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

GRAIN SIZE CURVE

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE C1
SOURCE Parson's Lake N.W.T.
HOLE SA13 DEPTH 6-9' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76



REMARKS: ____________________

D$_{10}$= ________ MM.
D$_{30}$= ________ MM.
D$_{60}$= ________ MM.
C$_U$ ________
C$_C$ ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

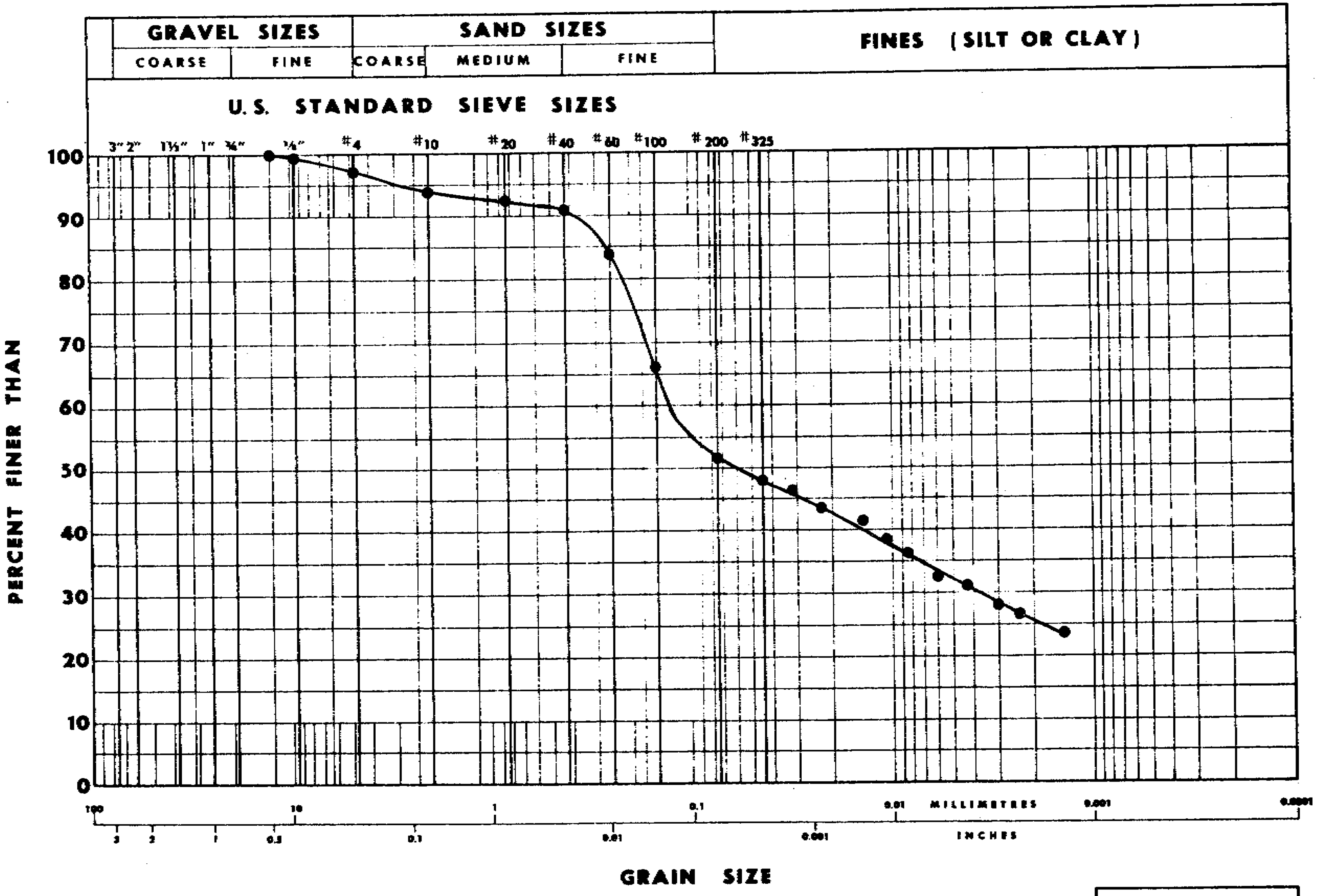
PLATE C-24

R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W3
SOURCE Parsons Lake Gas Plant
HOLE SA13 DEPTH 20-21' DATE REC'D.
TECHNICIAN CS DATE TESTED Apr. 76



REMARKS: ______________________

D$_{10}$ = ________ MM.
D$_{30}$ = ________ MM.
D$_{60}$ = ________ MM.
C$_U$ ________
C$_C$ ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE C-25

APPENDIX “C”

SECTION C.3 SUMMARY OF LABORATORY RESULTS

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
SA1	1-2	W1	CL	CLAY silty,sandy,low plastic brown,trace organic inclusions	22	15	7							
SA1	5-6	W2	SC	SAND fine grained,silty, clayey,grey				55	24	21				
SA1	7-9	C1	CL	CLAY silty,sandy,low to medium plastic,grey							115	90	29	frozen core
SA1	15-16	W4	SM	SAND fine grained,silty, clayey,trace coarse sand, brown-grey				72	15	13				
SA2	1-2	W1	OL	ORGANIC SILT sandy,trace clay,non plastic,brown,fine organic	39	(Liquid only)								
SA2	5-7	C1	SM	SAND silty,fine to coarse grained,clayey,rootlets				53	31	16	115	88	30	frozen core
SA3	4-5.5	C1	MH	SILT clayey,medium to high plastic,brown				4	70	26	90	51	76	frozen core
SA3	7-10	C2	CI	CLAY medium plastic,grey,ice rich	48	23	25							
SA4	5-7	C1	CI CH	CLAY silty,trace sand,medium to high plastic,dark grey to olive brown,ice rich	54	27	27				97	61	57	frozen core
SA5	4-5	W2	ML	SILT clayey,trace sand,low plastic,dark grey-brown	28	22	6	28	46	26				
SA6	8-10	C2	SM	SAND fine grained,very silty, trace clay,low plastic, brown,trace fine organics				86	9	5	125	106	18	frozen core
SA7	4-5	W1	CH	CLAY silty,medium to high plastic,grey-brown	52	27	25							
SA8	17-19	C1	SM	SAND silt and sand layers,low to medium plastic,brown to grey							119	94	27	frozen core
SA9	14-15	W4	SM	SAND fine to coarse grained, silty,trace clay,non plastic,grey,occ.coal spot				72	21	9				frozen core
SA10	8-9	W3	ML	SILT very sandy,clayey,low plastic,brown				37	40	23				

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Pl
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
SA10	12-14	C1	ML	SILT sandy,fine grained, brown,occasional layer to 1" of sand							111	87	28	frozer core
SA11	10-11.5	C1	CL	CLAY silty,trace to little sand occ.gravel size to ½" Ø, low to med.plastic,brown (till-like)	30	21	9				105	74	43	frozer core
SA12	5-7	C1	OL CL	ICE AND ORGANIC SILT clayey,low plastic,fine peat like organics,sandy	30	22	8	43	42	15	77	37	107	frozer core
SA13	6-9	C1	OL	ORGANIC SILT fine to medium sand ,ice rich	27	17	10	35	42	23	72	27	167	frozer core
SA13	12-13	C2	PT	PEAT woody,coarse,strong organic odour,sandy, silty							111	84	33	frozer core
SA13	20-21	W3	SM	SAND fine grained,silty, clayey,brown				48	27	25				
SA14	10-12	C1	CL	CLAY sandy,fine grained,silty low plastic							111	84	32	frozer core
SA14	7-8	W3	CL	CLAY sandy,fine grained,silty low plastic	28	17	11							

APPENDIX "C"

SECTION C.4 TEST HOLE ELEVATIONS

AIRSTRIP TEST HOLE ELEVATIONS

Test Hole No.	Elevation *	Geodetic Elevation
SA1	842.5	18.0
2	843.5	19.0
3	842.5	18.0
4	843.0	18.5
5	846.0	21.5
6	847.0	22.5
7	853.5	29.0
8	852.5	28.0
9	854.0	29.5
10	856.5	32.0
11	860.5	36.0
12	862.0	37.5
13	865.0	40.5
14	869.0	44.5

* Elevation relative to top of flange on 0-27 wellhead (Elevation = 999.80 - provided by C.E.S.L. of Edmonton)

APPENDIX "D"

BARGE DOCK AND STAGING AREA

SECTION D.1 BARGE DOCK TEST HOLE LOGS

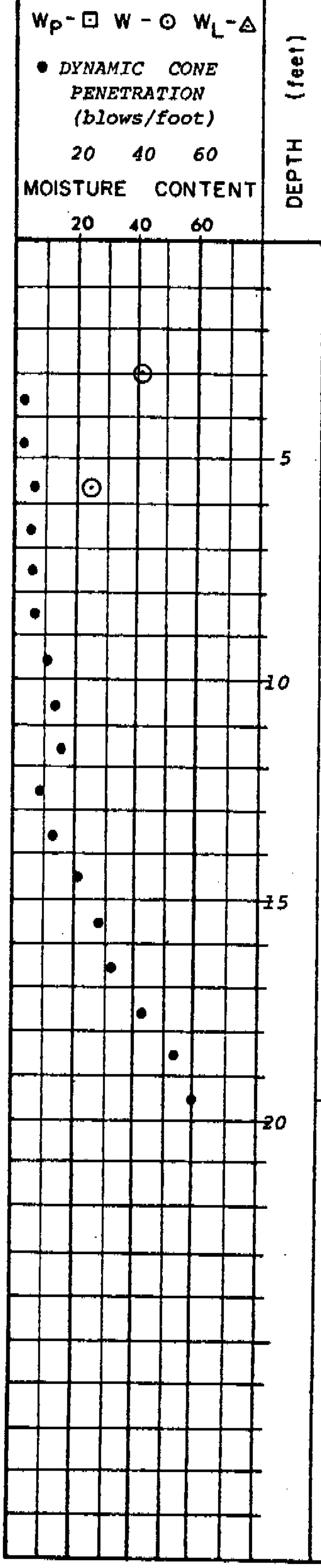
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW1

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 15, 1976
RIG Heli Drill
METHOD AIR
START 10:05
FINISH 10:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
		ICE		ICE						
SM		*SAND* fine grained, silty, trace clay, dark grey to brown		V 30%	Grain Size Plate D-33	W1	☒			
		saturated		UF		W2	☒			
		free water								
				F						
		Bottom of Hole at 19.5'.								

PLATE D-1

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW2

LOGGED BY *SA*	DRAWN BY	CHECKED *RST*	DATE *March 12, 1976*
RIG *Mobile Augers Rig B-61*	METHOD *Splitspoon, Shelby*	START *14:15*	FINISH *18:30*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

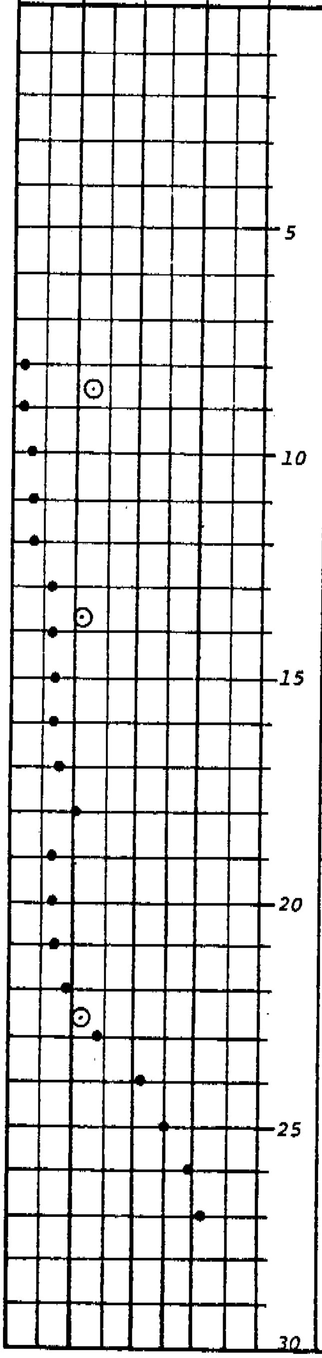
W_P - ☐ W - ⊙ W_L - △

● *DYNAMIC CONE PENETRATION (blows/foot)*

20 40 60

MOISTURE CONTENT

20 40 60



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
	ICE	ICE			
	WATER				
SM	*SAND fine grained, some silt, grey*	UF		U1	
	fine to medium grained, trace silt, grey			S1	*N=6 blows/foot*
CI	*CLAY silty, trace of sand, medium plastic, firm, occasional pebble to 3/8"ø, occasional coal inclusions, grey*	UF		S2	*N=11 blows/foot*
	silty, trace fine to coarse sand, little gravel sizes to 1 1/2"ø, medium plastic, firm, grey (till-like)			U2	*Undrained triaxial* *Plate D-52* q_u = 2904 psf γ_w = 130 pcf γ_d = 109 pcf

PLATE D-2

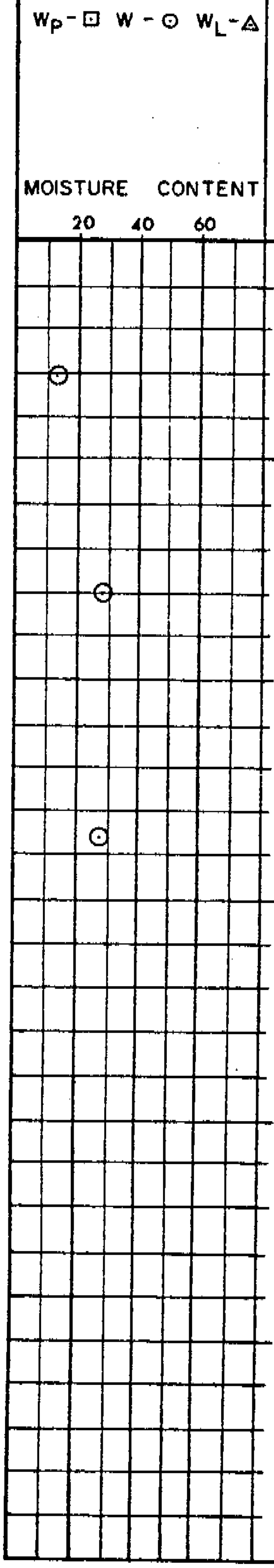
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW2 (con't)*

LOGGED BY *SA*
DRAWN BY
CHECKED *RST*
DATE *March 12, 1976*
RIG *Mobile Augers Rig B-61*
METHOD *Splitspoon, Shelby*
START *14:15*
FINISH *18:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	CI	*CLAY silty, trace fine to coarse sand, little gravel sizes to 1 1/2"ø, medium plastic, firm, grey (till-like) (con't)*	UF						
		frozen, silty, little fine sand, trace wood chips, grey			S3	☒			*N=9 blows/foot*
35									
			Nbe		S4	☒			*N=30 blows/foot*
40									
	ML	*SILT sandy, trace clay, organic, peat layers, frozen, dark brown*	Nbe		S5	☒			
45		*Bottom of Hole at 44.0'.*							

PLATE *D-2 (con't)*

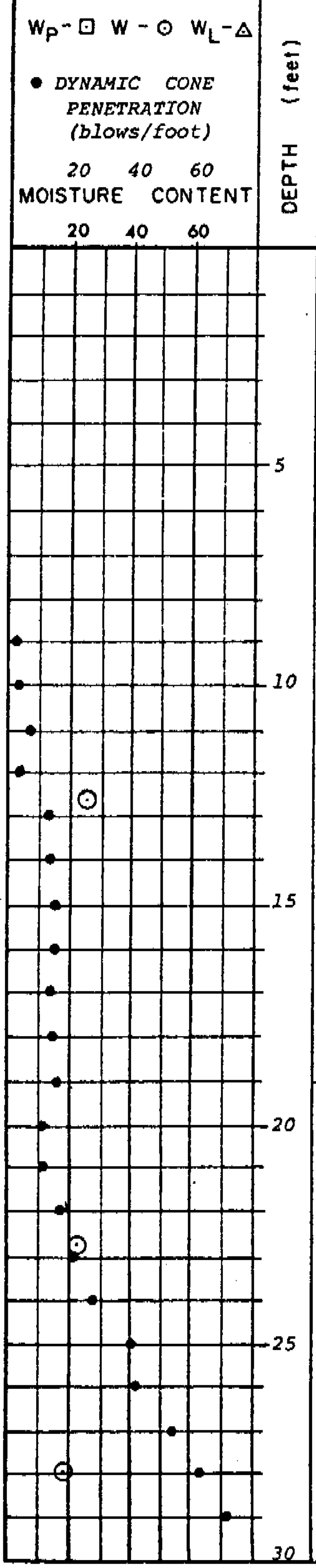
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DH3

LOGGED BY SA & TM
DRAWN BY
CHECKED RST
DATE March 13, 1976
RIG Mobile Augers Rig B-61
METHOD Splitstpoon, Shelby
START 9:30
FINISH 14:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
		ICE		ICE						
		WATER								
SP		SAND fine to medium grained, trace silt, brownish-grey		UF						
						S1	☒			N=7 blows/foot
CI		CLAY trace silt, trace sand, medium plastic, occasional coal inclusions, grey (till-like)		UF						
						S2	☒			N=15 blows/foot
		trace silt, trace fine sand, occasional pebbles, medium plastic, stiff, grey								
						U1	◪			Undrained Triaxial Plate D-52 q_u = 3917 psf γ_w = 135 pcf γ_d = 115 pcf

PLATE D-3

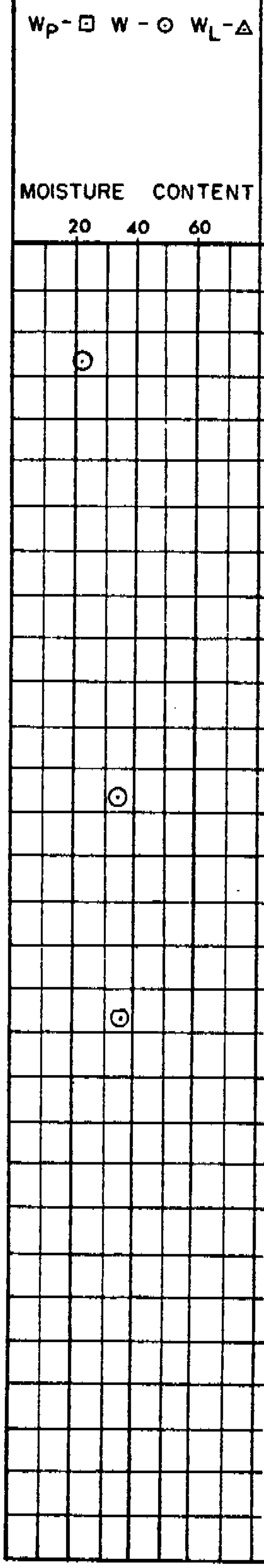
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DH3 (con't)

LOGGED BY SA & TM
DRAWN BY
CHECKED RST
DATE March 13, 1976
RIG Mobile Augers Rig B-61
METHOD Splitspoon , Shelby
START 9:30
FINISH 14:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
30	CI	CLAY trace silt, trace fine sand, occasional pebbles, medium plastic, stiff, grey (con't)	UF			
	SP	SAND fine to medium grained, little silt, grey	UF		S3	N=5 blows/foot
35						
			Nbe			
40		fine grained, trace silt, grey				
		fine grained, trace of silt, grey-brown, non plastic			S4	
45						
		occasional small lenses of clayey silt, dark grey to brown, non plastic			S5	N=68 blows/foot
50		Bottom of Hole at 48.5'.				

PLATE D-3 (con't)

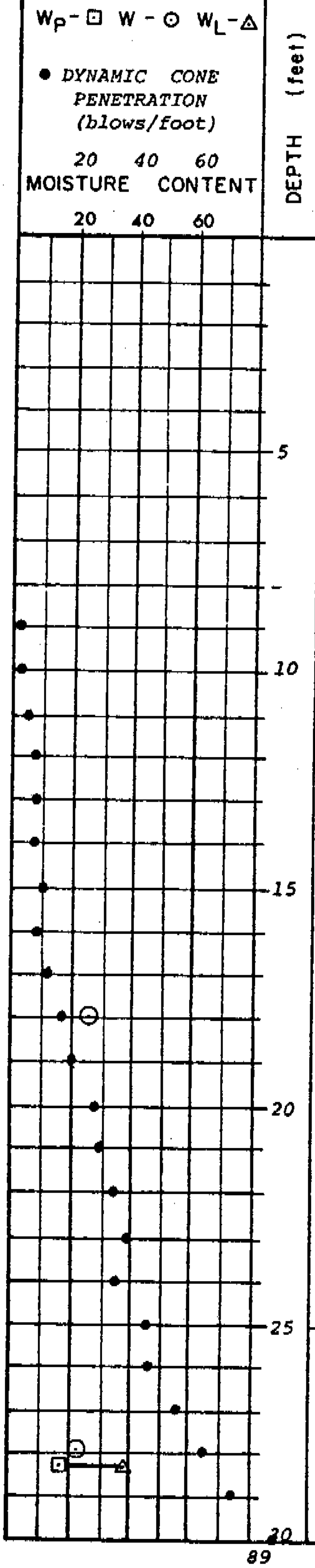
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. D-4

LOGGED BY *SA & TM*
DRAWN BY
CHECKED *RST*
DATE *March 13, 1976*
RIG *Mobile Augers Rig B-61*
METHOD *Splitspoon, Shelby*
START *14:15*
FINISH *16:45*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
	ICE	*ICE*			
	WATER				
SM	*SAND little silt, fine grained, grey*	*UF*			
				S1	*N=7 blows/foot*
	fine to medium grained, trace of silt, dark grey-brown, moist, non plastic			*S2*	*N=13 blows/foot*
CI	*CLAY silty, trace sand, occasional pebbles to 1"ø, firm, medium plastic, grey*	*UF*			
				S3	*N=15 blows/foot*

PLATE *D-4*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

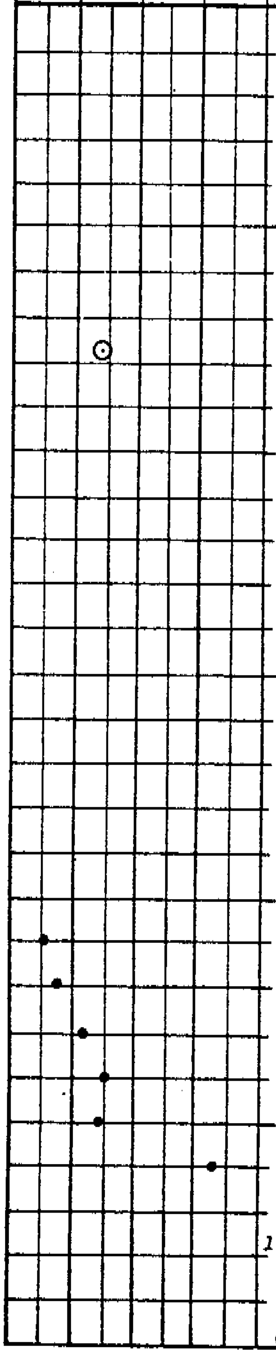
TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW4 (con't)

LOGGED BY SA & TM
DRAWN BY
CHECKED RST
DATE March 13, 1976
RIG Mobile Augers Rig B-61
METHOD Splitspoon, Shelby
START 14:15
FINISH 16:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △
● DYNAMIC CONE PENETRATION (blows/foot) 20 40 60
MOISTURE CONTENT 20 40 60



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
30	CI	▨	*CLAY* silty, trace sand, occasional pebbles to 1"ø, firm, medium plastic, grey (con't)		UF						
		▨	trace silt, trace fine sand, little fine gravel, stiff, grey				U1	◪			q_u = 2054 psf γ_w = 132 pcf γ_d = 105 pcf
35	SP		*SAND* trace silt, organic layers, non plastic, dark grey-brown, fine to medium grained		UF						
							S4	☒			N=12 blows/foot
40											
45			trace silt, organic layers, silt pockets, grey								
							S5	☒			N=21 blows/foot
50											
55			permafrost		F						
			Bottom of Hole at 57.0'.								
60											

PLATE D-4 (con't)

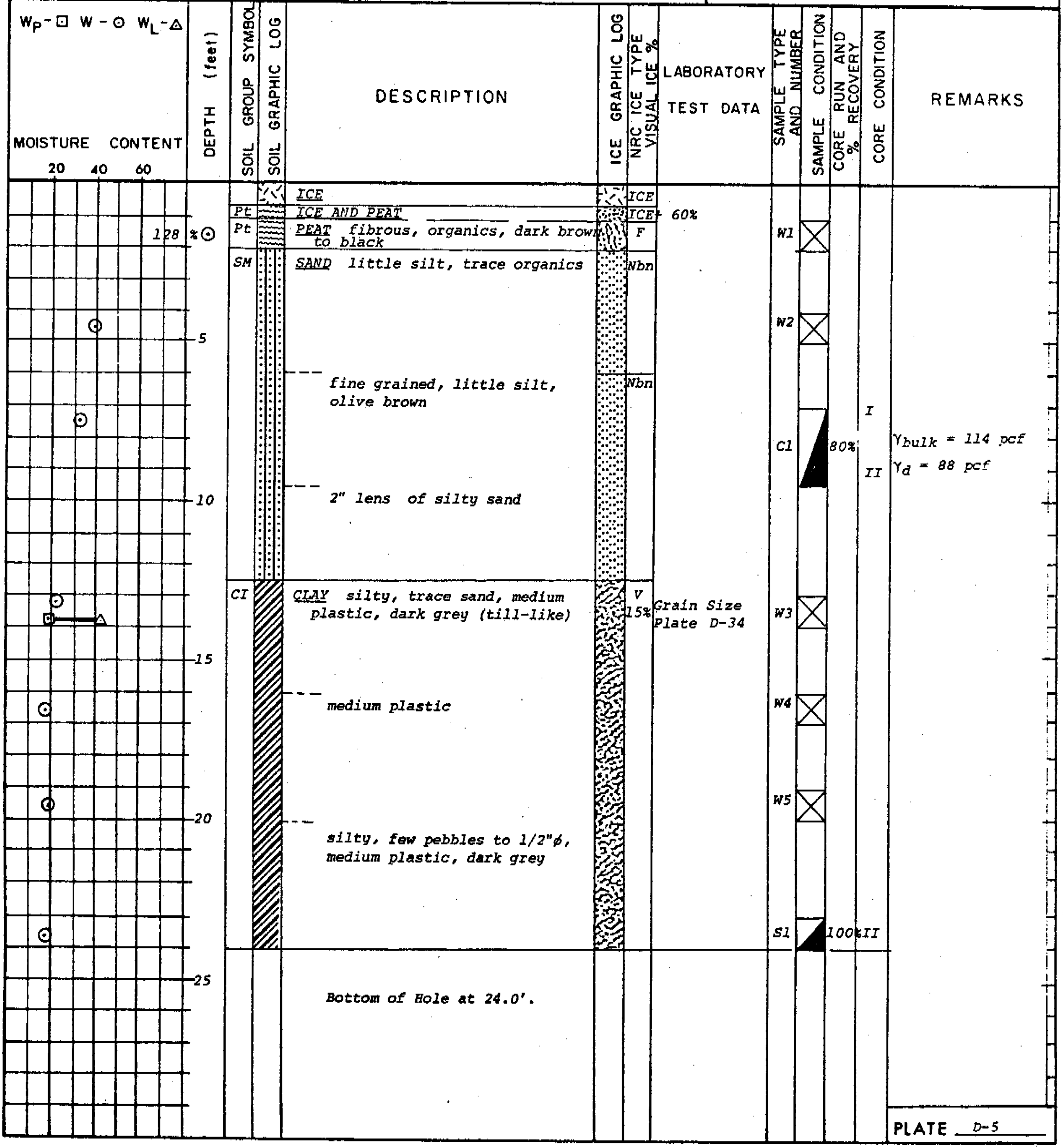
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW5

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 13, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 11:50	FINISH 14:30
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE	ICE					
	Pt	ICE AND PEAT	ICE + 60%					
	Pt	PEAT fibrous, organics, dark brown to black	F		W1			
	SM	SAND little silt, trace organics	Nbn					
5					W2			
		fine grained, little silt, olive brown	Nbn					
					C1	80%	I II	γ_{bulk} = 114 pcf γ_d = 88 pcf
10		2" lens of silty sand						
	CI	CLAY silty, trace sand, medium plastic, dark grey (till-like)	V 15%	Grain Size Plate D-34	W3			
15		medium plastic			W4			
					W5			
20		silty, few pebbles to 1/2"ϕ, medium plastic, dark grey						
					S1	100%	II	
25		Bottom of Hole at 24.0'.						

PLATE D-5

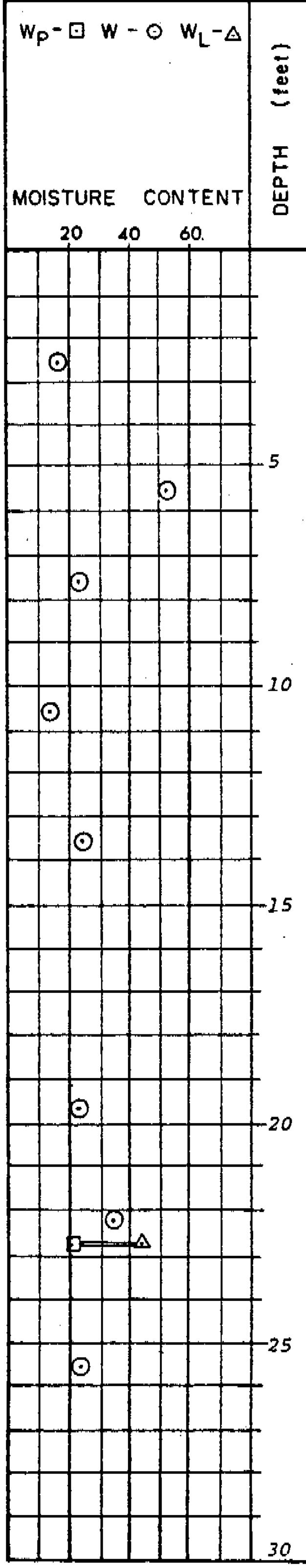
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW6

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 14, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 16:00
FINISH 16:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	ICE						
SP	*SAND* medium grained, some gravel, dark grey, layered	Nf		W1	☒			
	medium to coarse grained, gravelly organics inclusions, brown			W2	☒			
	clayey, silt layer, trace gravel		Grain Size Plate D-35	S1	☒			
	gravelly, well graded			W3	☒			
	very gravelly, sizes to 3/4"ø							
				W4	☒			
	little silt, occasional gravel sizes to 3/8"ø, brown			W5	☒			
CI	*CLAY* silty, medium plastic, some gravel, pebbles rounded to 1 1/2"ø, dark grey	V <5%		C1		57%	I	
			Grain Size Plate D-36	W6	☒			
	2" ice lens, trace gravel, trace sand	5%		W7	☒			
	silty, trace of sand, medium plastic, dark grey	10%		W8	☒			
	Bottom of Hole at 26.0'.							

PLATE D-6

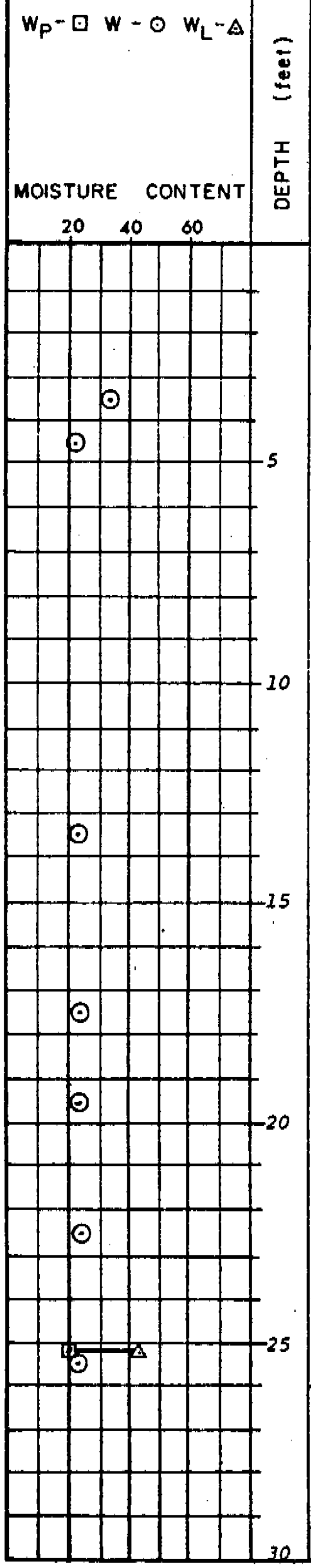
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW7

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 14, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 16:45	FINISH 17:05
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	ICE					
SM	*SAND* fine grained, silty, grey, non plastic	V <5%		W1			
	fine to medium grained, gravelly, pebbles to 3/8"ø, saturated	Nf		W2			
	6" gravel layer, sand sizes to 1/2"ø			C1	75%	III I	
	trace gravel						
	occasional pebbles, trace of silt, brown, non plastic, moist to wet		Grain Size Plate D-37	W3			
	trace silt, grey to dark brown, non plastic			W4			
				W5			
				W6			
CI	*CLAY* silty, trace gravel, medium plastic, dark grey (till-like)	Nf		W7			
	Bottom of Hole at 26.0'.						

PLATE D-7

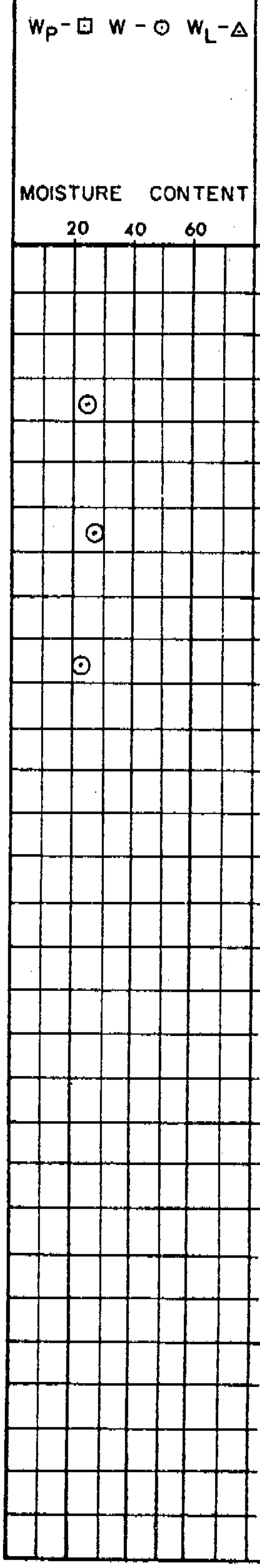
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DN8

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 15, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 10:18
FINISH 10:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE	ICE						
	SP	*SAND* fine to medium grained, little silt, greyish brown	V 5%		W1	☒			
5			N		W2	☒			
		medium grained			W3	☒			
10			UF						
		free water							
15			F						
20									
25		trace gravel, medium grained, dark brown, non plastic							
	CL	*CLAY* silty, little sand, dark grey, medium plastic	F						
30		Bottom of Hole at 28.0'.							

PLATE D-8

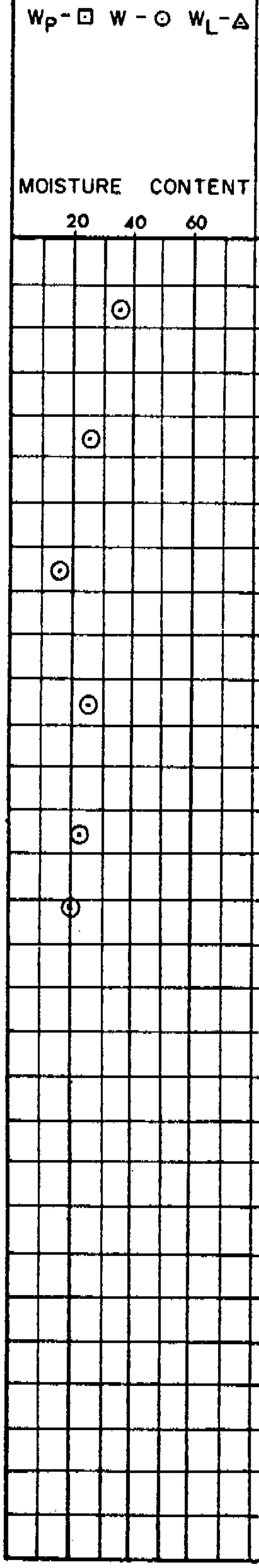
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW9*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 18, 1976*
RIG *Heli Drill*	METHOD *CRREL/AIR*	START *18:00*	FINISH *18:50*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	SP		*SAND* fine to medium grained, trace silt, trace organic, dark brown		*F*		*W1*	☒			
5			fine to coarse grained, trace gravel, greyish brown		*Nf*		*W2*	☒			
			fine to coarse grained, trace silt, occasional gravel sizes to 1"ø, greyish brown			*Grain Size Plate D-38*	*W3*	☒			
10	*CI*		*CLAY* silty, little fine to medium sand, medium plastic, occasional pebbles, dark grey(till-like)		*Vc 5%*		*W4*	☒			
			medium plastic				*W5*	☒			
15			gravelly		*Nf*		*C1*		*90%*	*III*	
			gravelly, sizes to 3"ø, rounded								
20			*Bottom of Hole at 18.0'.*								

PLATE *D-9*

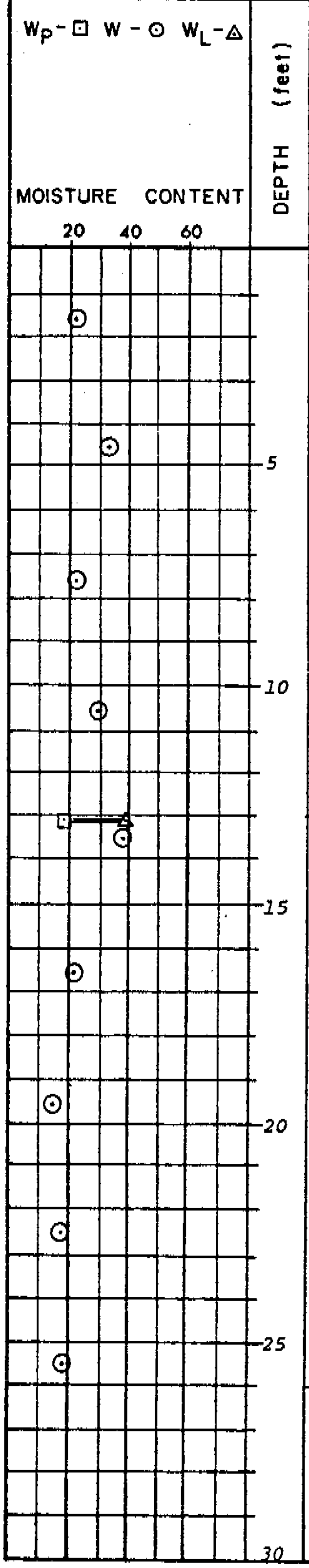
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW10

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 14, 1976
RIG Heli Drill	METHOD AIR	START 15:10	FINISH 15:50
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
SP		*ICE AND SAND*		V 50%						
SP		*SAND* fine to medium grained, some fine gravel, dark grey to brown		Nf		W1	☒			
		--- frequent coal particles				W2	☒			
						W3	☒			
		--- fine to medium grained, trace silt, occasional gravel sizes to 3/8"ϕ, non plastic, dark grey to black				W4	☒			
CL-CI		*CLAY* silty, trace sand, gravelly, medium plastic, dark grey		V 10-15%		W5	☒			
				<5%		W6	☒			
		--- very gravelly, silty, trace sand, medium plastic, dark grey		N		W7	☒			
		--- sandy, trace gravel sizes to 3/8"ϕ, low to medium plastic, dark grey		<5%	Grain Size Plate D-39	W8	☒			
						W9	☒			
		Bottom of Hole at 26.0'.								

PLATE D-10

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

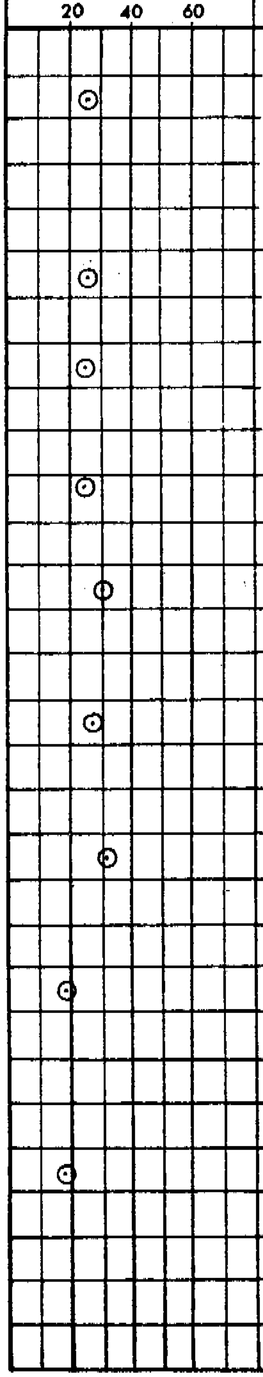
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW11

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 14, 1976*
RIG *Heli Drill*
METHOD *CRREL/AIR*
START *17:50*
FINISH *18:25*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE	*ICE*					
	SP	*ICE AND SAND* *silty*	*ICE+ 60%*					
	SP	*SAND fine to medium grained, trace of silt, occasional gravel sizes to 3/8"ø, occasional coal particles, brown, non plastic*	*N*		*W1*			
		gravelly			*W2*			
5								
		silty, non plastic, brown			*W3*			
10	*SP-SM*	*silty*		*Grain Size Plate D-40*	*C1*	*82%*	*I*	γ_{bulk} = *136 pcf* γ_d = *108 pcf* γ_{bulk} = *113 pcf* γ_d = *86 pcf*
		fine to medium grained, silty	*Vs 5-10%*					
		fine to medium grained, silty, dark grey, non plastic	*N*					
15					*W4*			
	CL-CI	*CLAY silty, low to medium plastic trace gravel, dark grey, wet*	*V <5%*		*W5*			
20		*gravelly*						
		silty, trace of sand, rounded oxidized gravel sizes to 3/8" diameter, medium plastic, dark grey			*W6*			
25		*gravelly, silty*			*W7*			
		Bottom of Hole at 26.0'.						
30								

PLATE *D-11*

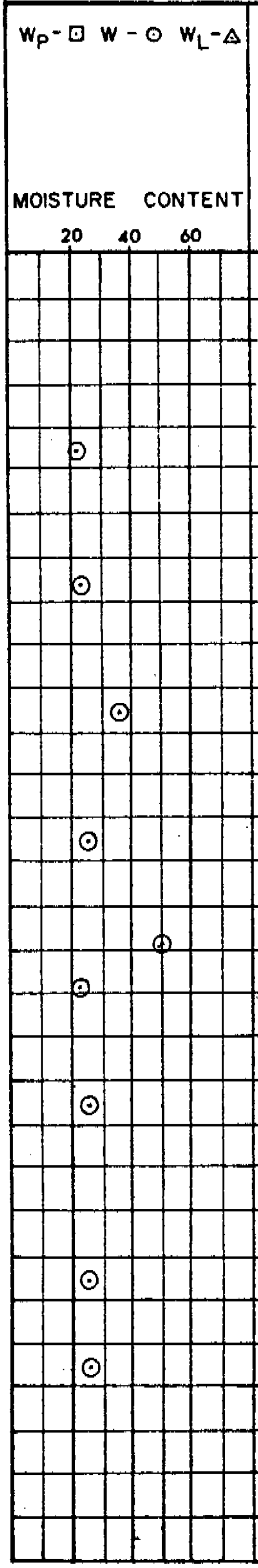
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW12*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 15, 1976*
RIG *Heli Drill*
METHOD *CRREL/AIR*
START *11:40*
FINISH *12:15*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE	*ICE*					
5	*SP-SM*	*SAND fine to coarse grained, trace gravel and silt, grey to brown*	*Nf*		*W1*			
		fine to medium grained, silty, olive brown			*W2*			
10		*fine grained, silty*			*W3* *W4*			
15		*silty, trace of fine gravel (till-like)*			*C1*	*98%*	*I*	γ_{bulk} = *100 pcf* γ_d = *67 pcf* γ_{bulk} = *122 pcf* γ_d = *99 pcf*
20 25		*fine to medium grained, little silt, brown*			*W5* *W6* *W7*			
30		*Bottom of Hole at 26.0'.*						

PLATE *D-12*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW13

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 13, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 15:00
FINISH 15:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
				ICE		ICE						
⊙		SP		*SAND* fine grained, occasional gravel sizes to 1/2"ϕ, trace silt, greyish brown to black		F		W1	☒			
						UF		C1		95%	IV	
				saturated								
⊙	5			fine to medium grained, silty, trace of gravel, rounded to 1"ϕ, dark grey to brown				W2	☒			
				dark olive brown								
	10					F						
	15			Bottom of Hole at 13.0'.								

PLATE D-13

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW14

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 13, 1976
RIG Heli Drill
METHOD AIR
START 15:30
FINISH 15:35
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - □ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
				ICE		ICE						
⊙		CL		*CLAY AND ICE* very silty, trace organics and sand, low plastic, brown		V 30% UF		W1	☒			
	5			Bottom of Hole at 3.5'.								

PLATE D-14

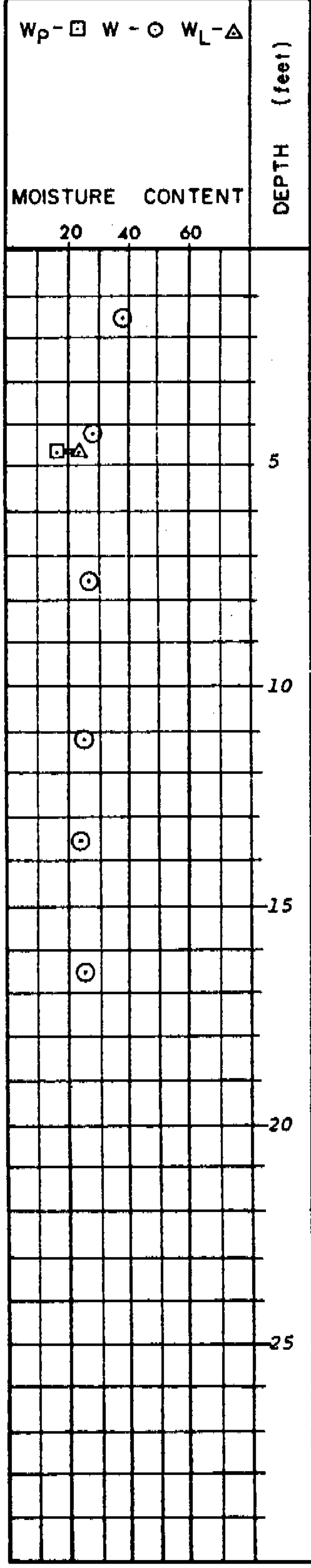
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW15

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 13, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 15:35
FINISH 16:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE		ICE						
SM		SAND fine to medium grained, silty, dark grey to brown		V 30%		W1	☒			
CL		CLAY very silty, occasional gravel sizes to 3/8"ø, non to low plastic, dark grey to brown (till-like) — layer of low to medium plastic clay		V 10%	Grain Size Plate D-41	W2	☒			
SP		SAND fine to medium grained, trace gravel, little silt, dark grey		V 5-15%		W3	☒			
CL-CI		CLAY silty, little sand, low to medium plastic, gravel sizes to 1"ø, coal inclusions, dark grey to brown (till-like)		Nbn		C1		90%	II	
						C2		66%	II	
		— coal specks, few pebbles				W4	☒			
				V 20-30%		W5	☒			
		— silty, little fine to coarse sand, medium plastic, grey to brown								

Bottom of Hole at 22.0'.

PLATE D-15

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

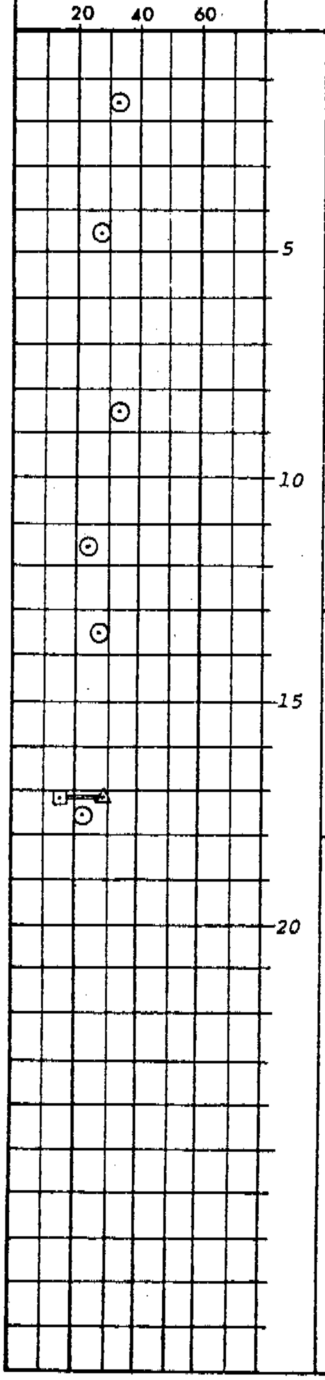
PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW16*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 13, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *16:40*
FINISH *17:15*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	*ICE*						
CL-ML	*CLAY silty, trace sand, low plastic, dark grey*	*V 30%*		*W1*	☒			
	medium plastic clay layer	*UF*		*W2*	☒			
	saturated							
ML	*SILT sandy, fine grained, trace clay, occasional gravel sizes to 1/2"ø, dark grey, non plastic*	*V <5%*	*Grain Size Plate D-42*	*W3*	☒			
	non to low plastic			*W4*	☒			
	clayey, low to medium plastic							
CL	*CLAY very silty, little sand, trace of gravel, low plastic, dark grey to brown , coal inclusions (till-like)*	*Nbn*		*W5*	☒			
	silty, little sand, medium plastic, brown			*W6*	☒			

Bottom of Hole at 18.0'.

PLATE *D-16*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW17*

LOGGED BY *SA*

DRAWN BY

CHECKED *RST*

DATE *March 10, 1976*

RIG *Mobile Augers Rig B-61*

METHOD *Dynamic Cone*

START *15:30*

FINISH *18:30*

PROJECT NO. *CS 3343*

ELEVATION

AIR TEMPERATURE

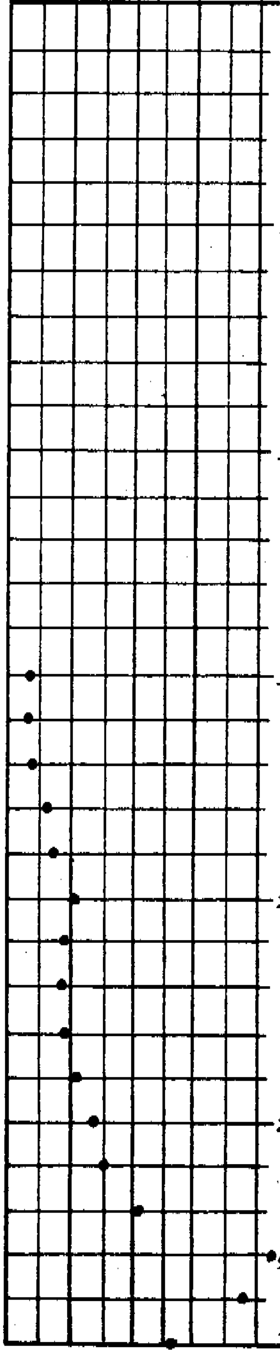
W_P - ☐ W - ○ W_L - △

● *DYNAMIC CONE PENETRATION (blows/foot)*

20 40 60

MOISTURE CONTENT

20 40 60



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
0			*ICE*		*ICE*						
			WATER								
			Soil to 68.5 feet.		*UF*						

PLATE *D-17*

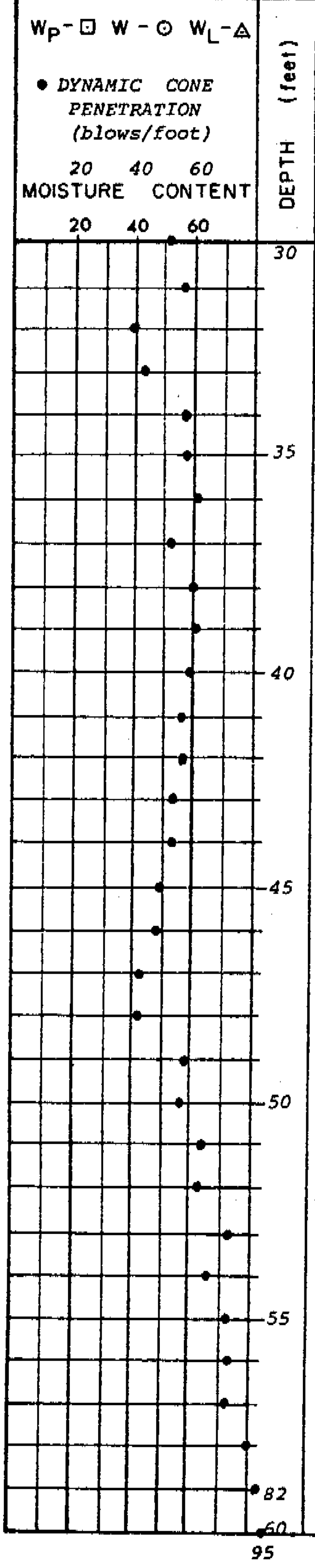
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW17 (con't)*

LOGGED BY *SA*
DRAWN BY
CHECKED *RST*
DATE *March 10, 1976*
RIG *Mobile Augers Rig B-61*
METHOD *Dynamic Cone*
START *15:30*
FINISH *18:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30					*UF*						

PLATE *D-17 (con't)*

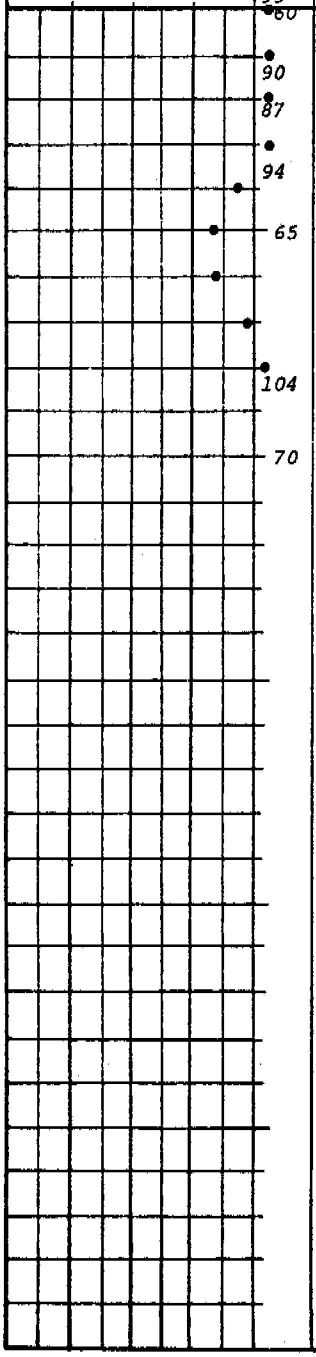
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW17 (con't)

LOGGED BY SA
DRAWN BY
CHECKED RST
DATE March 10, 1976
RIG Mobile Augers Rig B-61
METHOD Dynamic Cone
START 15:30
FINISH 18:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



W_P-⊡ W-⊙ W_L-△ ● DYNAMIC CONE PENETRATION (blows/foot) 20 40 60 MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	60					UF						
	65											
	70			Bottom of Hole at 68.5'.								

PLATE D-17 (con't

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO: DN18

LOGGED BY SA
DRAWN BY
CHECKED RST
DATE March 12, 1976
RIG Mobile Augers Rig B-61
METHOD Dynamic Cone
START 9:15
FINISH 10:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △ ● DYNAMIC CONE PENETRATION (blows/foot) 20 40 60 MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % CORE RECOVERY	CORE CONDITION	REMARKS
				ICE		ICE						
				WATER								
				Soil to 34.0 feet.		UF						

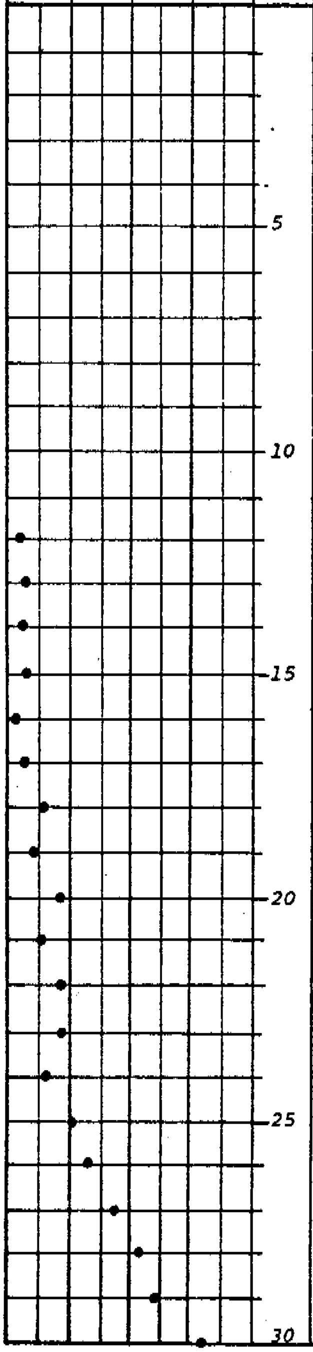


PLATE D-18

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

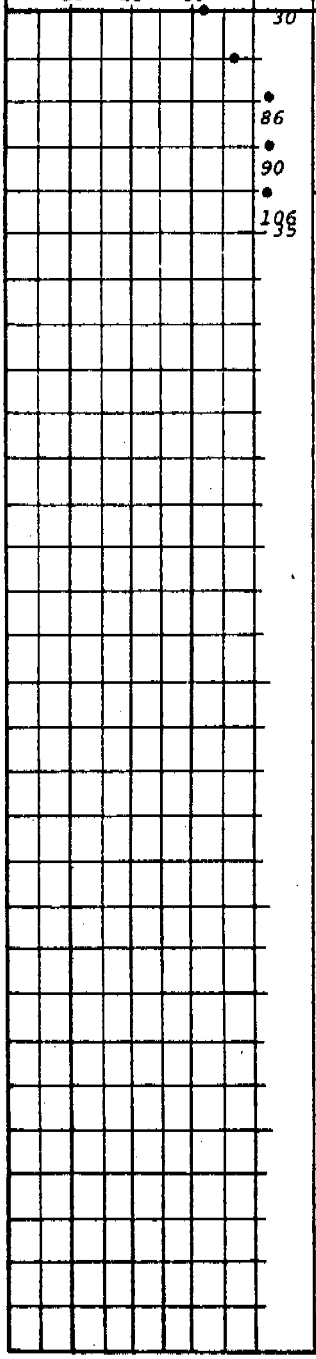
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW18 (con't)*

LOGGED BY *SA*
DRAWN BY
CHECKED *RST*
DATE *March 12, 1976*
RIG *Mobile Augers Rig B-61*
METHOD *Dynamic Cone*
START *9:15*
FINISH *10:15*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

● *DYNAMIC CONE PENETRATION (blows/foot)*
20 40 60
MOISTURE CONTENT
20 40 60



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30					*UF*						
			Bottom of Hole at 34.0'.								

PLATE *D-18 (con't)*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW19

LOGGED BY *SA & TM*	DRAWN BY	CHECKED *RST*	DATE *March 14, 1976*
RIG *Mobile Augers Rig B-61*	METHOD *Splitspoon, Shelby*	START *9:00*	FINISH *11:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

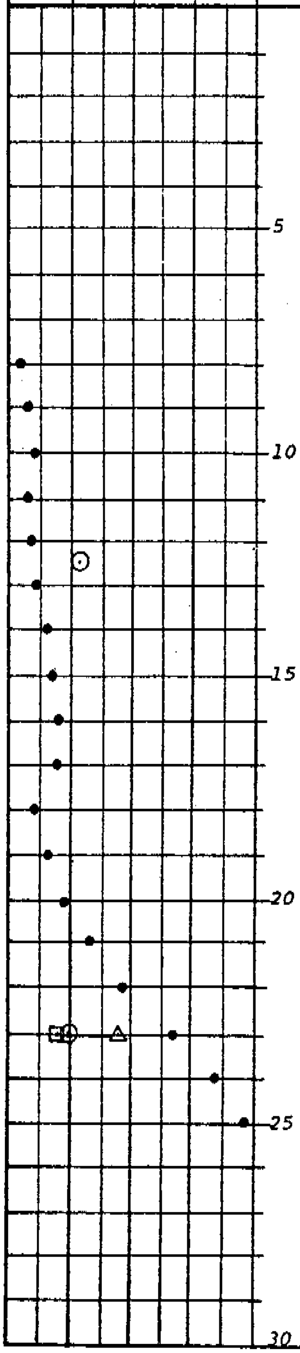
W_P - ☐ W - ⊙ W_L - △

● *DYNAMIC CONE PENETRATION (blows/foot)*

20 40 60

MOISTURE CONTENT

20 40 60



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	ICE						
	WATER							
SM	*SAND* fine to medium grained, little silt, grey, saturated	UF	Grain Size Plate D-43	S1	☒			N=13 blows/foot
CI	*CLAY* trace silt, trace coarse sand, trace of fine gravel, coal specks, medium plastic, firm, grey (till-like)	UF		S2	☒			N=16 blows/foot
	little fine to medium grained gravel, subrounded			U1	◪			Undrained Triaxial Plate D-52 ϕ = 19.50 c = 5 psi

PLATE D-19

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW19 (con't)

LOGGED BY SA & TM

DRAWN BY

CHECKED RST

DATE March 14, 1976

RIG Mobile Augers Rig B-61

METHOD Splitspoon, Shelby

START 9:00

FINISH 11:45

PROJECT NO. CS 3343

ELEVATION

AIR TEMPERATURE

Wp-⊡ W-⊙ WL-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	CI	▨	CLAY trace silt, trace coarse sand, trace fine gravel, coal specks, medium plastic, firm, grey (till-like) (con't)		UF						
⊙				--- very silty, very sandy,			Grain Size Plate D-44	S3	☒			N=13 blows/foot
		SP	░	SAND fine grained, trace silt, grey		UF						
	35											
				--- fine grained, silty, grey								
	40											
	45											
	50											
	55											
	60			Bottom of Hole at 61.0'.								

PLATE D-19 (con't

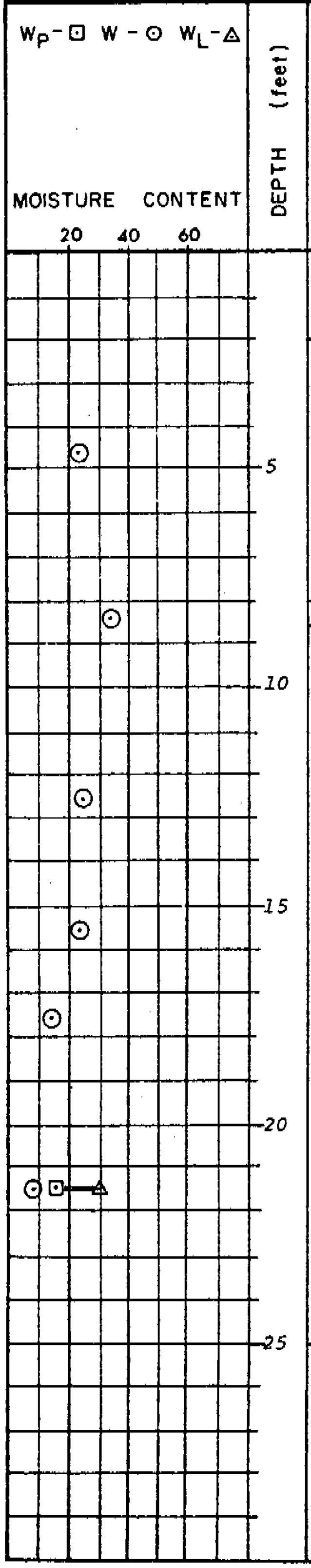
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW20

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 14, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 8:45
FINISH 10:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	ICE					
SP	*SAND* fine to medium grained, olive grey to brown	Nf					
				W1			
	--- trace clay and silt			C1		I IV I	γ_{bulk} = 113 pcf γ_d = 85 pcf
	ICE	ICE					
CL-CI	*CLAY* silty, trace of sand, occasional coal particles, medium plastic, dark grey	Vr 15%					
		Vr 10%		W2			
	--- medium plastic			W3			
	--- silty, little sand, some gravel, low to medium plastic, dark grey brown (till-like)	N		W4			
	--- gravelly						
				W5			

Bottom of Hole at 25.0'.

PLATE D-20

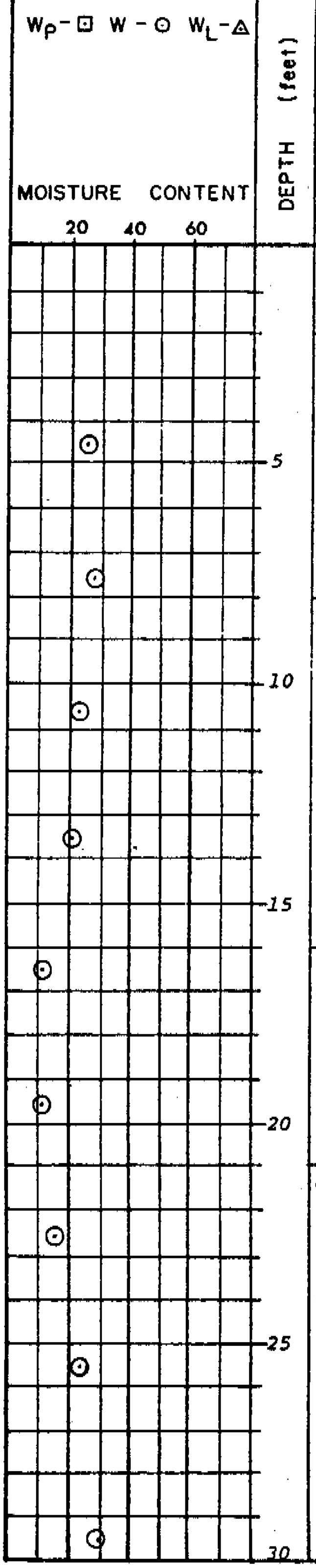
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW21

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 14, 1976
RIG Heli Drill
METHOD AIR
START 11:15
FINISH 12:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	ICE						
SP	SAND fine to medium grained, some silt, trace of organics, dark grey	N		W1	☒			
				W2	☒			
	--- 4" ice layer	ICE						
CI	CLAY silty, trace of sand, medium plastic, dark grey (till-like)	V 30%						
	--- occasional coal inclusions	10%		W3	☒			
	--- trace fine gravel sizes			W4	☒			
SM-GM	SAND silty, gravelly, fine to coarse, to 1"ø, trace clay, low plastic (till-like)	N	Grain Size Plate D-45	W5	☒			
				W6	☒			
CI	CLAY gravelly, traces of silt, medium plastic, dark grey	V <5%		W7	☒			
	--- silty, medium plastic, grey			W8	☒			
	--- trace gravel			W9	☒			

PLATE D-21

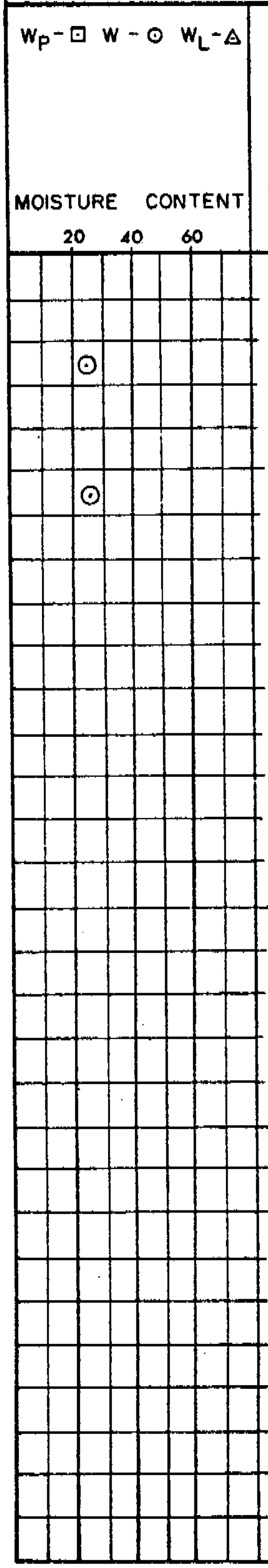
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW21
(con't)

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 14, 1976
RIG Heli Drill	METHOD AIR	START 11:15	FINISH 12:10
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	CI	▨	CLAY gravelly, traces of silt, medium plastic, dark grey (con't		N						
		▨	--- silty, medium plastic				W10	☒			
35		▨	--- fine gravel sizes (till-like)				W11	☒			
			Bottom of Hole at 36.0'.								
40											

PLATE D-21 (con't

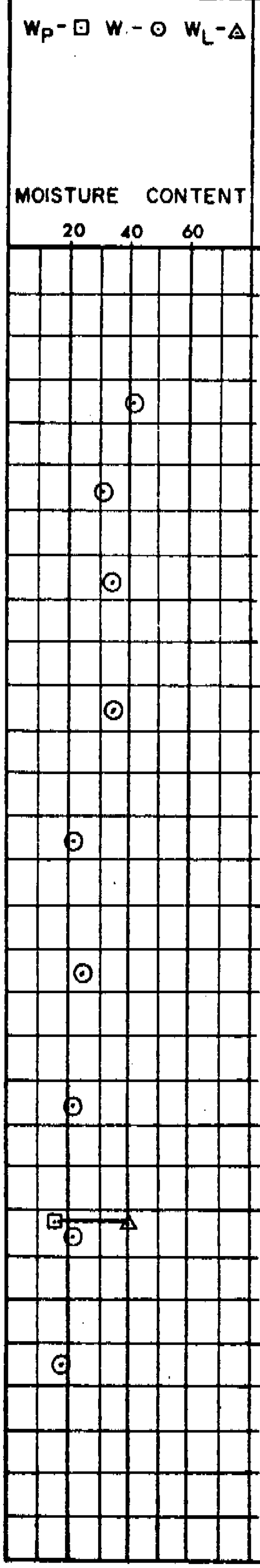
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW22*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 14, 1976*
RIG *Heli Drill*
METHOD *CRREL/AIR*
START *12:25*
FINISH *13:05*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE	*ICE*					
	SM-ML	*SAND fine to medium grained, very silty, trace organics, dark grey to brown*	*N*		*W1*			
5					*W2*			
					W3			
		silty, trace organics						
10	*CI*	*CLAY silty, trace sand and gravel medium plastic, dark grey (till-like)*	*Vs 15%* *Vr, Vs*	*25-30%*	*C1*	*80%*	*IV* *II*	*γ_{bulk} = 113 pcf* *γ_d = 85 pcf*
		silty, medium plastic, occasional coal and rust specks	*V 5%*		*W4*			
15								
		2" lens of ice	*5-10%*		*W5*			
					W6			
20								
		silty, gravelly, sizes to 1/2"⌀						
		silty, trace of sand, medium plastic, some coal and rust specks			*W7*			
		gravelly						
25					*W8*			
		Bottom of Hole at 26.0'.						
30								

PLATE *D-22*

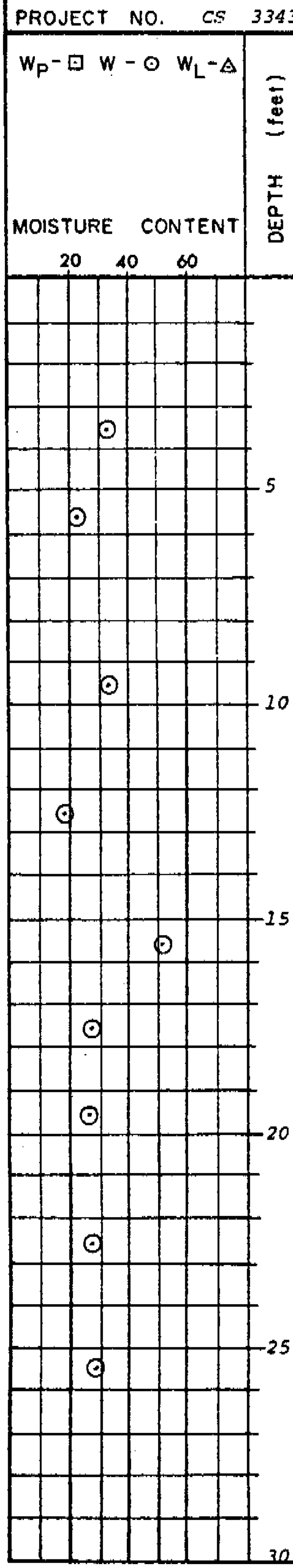
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DH23

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 14, 1976
RIG Heli Drill
METHOD AIR
START 14:00
FINISH 14:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ICE	ICE						
ML	*SILT* very sandy, clayey, brown to dark grey	N	Grain Size Plate D-46	W1 W2	☒ ☒			
	sandy, non plastic, brown							
SM	*SAND* fine to medium grained, silty, trace of gravel, dark grey to black	V 5%		W3	☒			
CL-CI	*CLAY* silty, trace sand, occasional gravel sizes to 1/2"ø, low to medium plastic, occasional rust and coal specks (till-like)			W4 W5	☒ ☒			
	silty, medium plastic, trace gravel, dark grey (till-like)	V 5% 5-10%		W6 W7	☒ ☒			
SP	*SAND* fine to medium grained, little silt, dark brown	V 5%		W8	☒			
	gravelly	Nf						
	fine gravel			W9	☒			
	Bottom of Hole at 26.0'.							

PLATE D-23

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW24*

LOGGED BY *SA*
DRAWN BY
CHECKED *RST*
DATE *March 10, 1976*
RIG *Mobile Augers Rig B-61*
METHOD *Dynamic Cone*
START *14:00*
FINISH *15:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △ ● *DYNAMIC CONE PENETRATION (blows/foot)* *20 40 60* MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
				ICE		*ICE*						
				WATER								
				Soil to 32.0 feet.		*UF*						

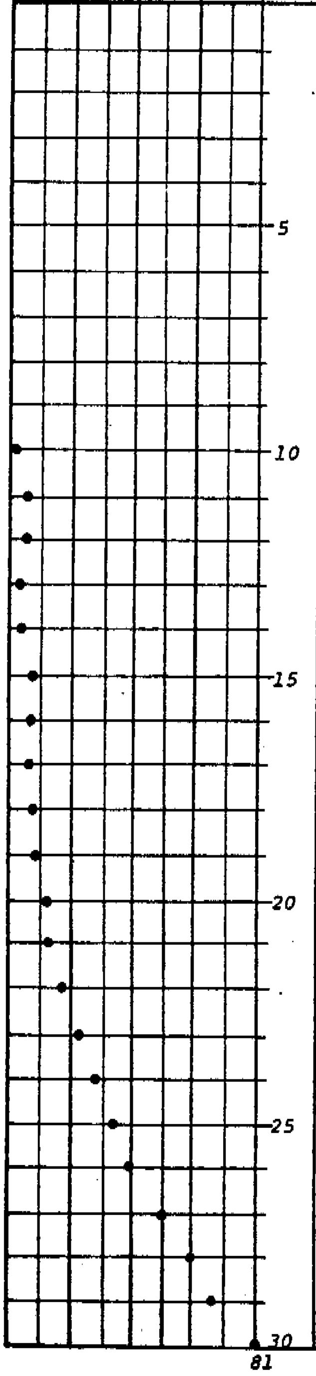


PLATE *D-24*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW24 (con't)*

LOGGED BY *SA*	DRAWN BY	CHECKED *RST*	DATE *March 10, 1976*
RIG *Mobile Augers Rig-61*	METHOD *Dynamic Cone*	START *14:00*	FINISH *15:00*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △ ● *DYNAMIC CONE PENETRATION (blows/foot)* *20 40 60* MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
● *81*	*30*					*UF*						
● *93*												
● *97*												
				Bottom of Hole at 32.0'.								

PLATE *D-24 (con't)*

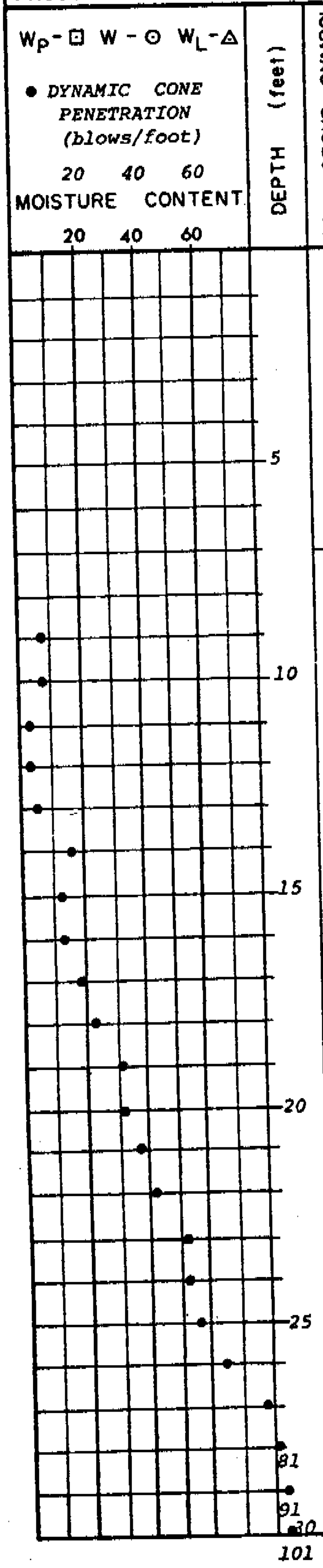
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DW25

LOGGED BY SA	DRAWN BY	CHECKED RST	DATE March 10, 1976
RIG Mobile Augers Rig B-61	METHOD Dynamic Cone	START 13:00	FINISH 14:00
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE		ICE						
		WATER								
		Soil to 30.0 feet.		UF						
		Bottom of Hole at 30.0'.								

PLATE D-25

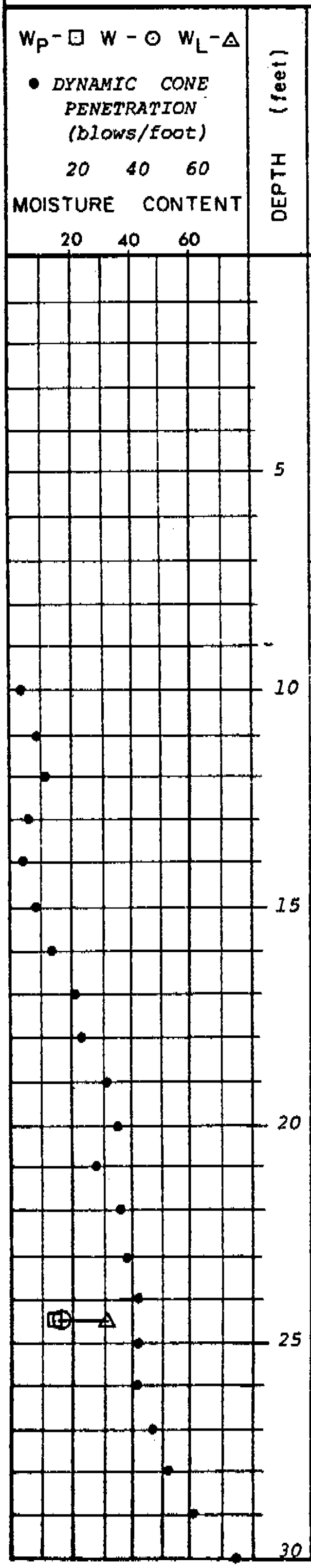
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DW26

LOGGED BY SA & TM	DRAWN BY	CHECKED RST	DATE March 14, 1976
RIG Mobile Augers Rig B-61	METHOD Splitspoon, Shelby	START 13:00	FINISH 16:00
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ICE		ICE						
		WATER								
SC		*SAND* clayey, grey, loose, little fine to medium gravel, subrounded, unfrozen		UF						
						S1	☒			N=7 blows/foot
						U1	◢			
CI		*CLAY* little fine sand, trace fine gravel, soft, grey, medium plastic (till-like)		UF		S2	☒			N=8 blows/foot
SP		*SAND* fine grained, trace silt, grey		UF		U2	◺			

PLATE D-26

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *DW26 (con't)*

LOGGED BY *SA & TM*
DRAWN BY
CHECKED *RST*
DATE *March 14, 1976*
RIG *Mobile Augers Rig B-61*
METHOD *Splitspoon, Shelby*
START *13:00*
FINISH *16:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △ ● *DYNAMIC CONE PENETRATION (blows/foot)* 20 40 60 MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*SP*	▒	*SAND fine grained, trace silt, grey (con't)*		*UF*						
●	*98*		▒									
	35		▒									
	40		▒									
	45		▒									
	50		▒									
			▒	*fine grained, silty, grey, permafrost*	⁘	*Nbe*						
	55		▒		⁘			*S3*	☒			*N=100 blows/foot*
				Bottom of Hole at 55.25'.								
	60											

PLATE *D-26 (con't)*

APPENDIX "D"

SECTION D.2 STAGING AREA TEST HOLE LOGS

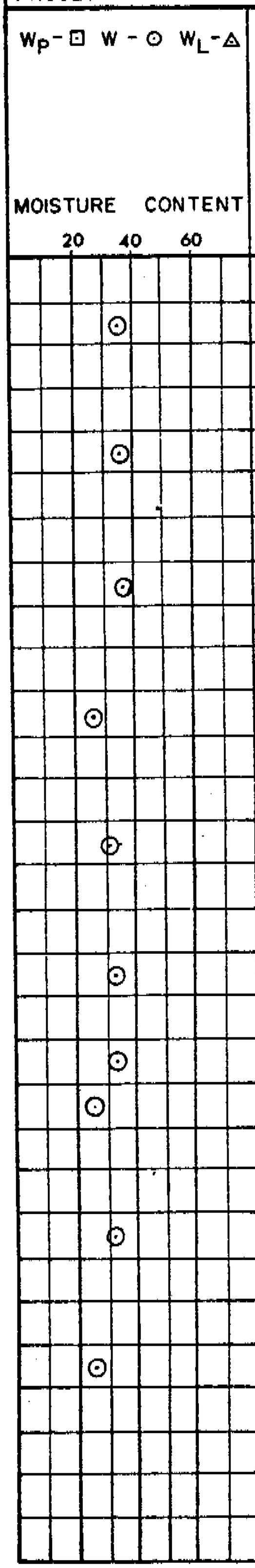
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DL1

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 13, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 10:05	FINISH 11:10
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT	F						
	SM	SAND fine grained, silty, olive brown, layered	V 15%		W1	☒			
5		fine grained	5-10%		W2	☒			
		dark grey							
					W3	☒			
		lenses of clayey silt of medium plasticity, occasional fine gravel size, grey-brown	<5%						
10		very silty, occasional fine gravel sizes and coal inclusions	N		W4	☒			
		silty, trace clay, dark grey							
					W5	☒			
15		very silty			W6	☒			
	ML-SM	SILT very clayey, sandy, low plastic, ice lenses to 1/8" thick dark grey, trace organics	Vs 10%		C1		100%	III	
			N		C2		100%	I	
20		non to low plastic, sandy, trace clay, silty, trace organics, dark grey to black	V <5%						
		clayey, sandy, low plastic, dark grey			W7	☒			
25		very sandy, fine grained, black to dark grey			W8	☒			
30		Bottom of Hole at 26.0'.							

PLATE D-27

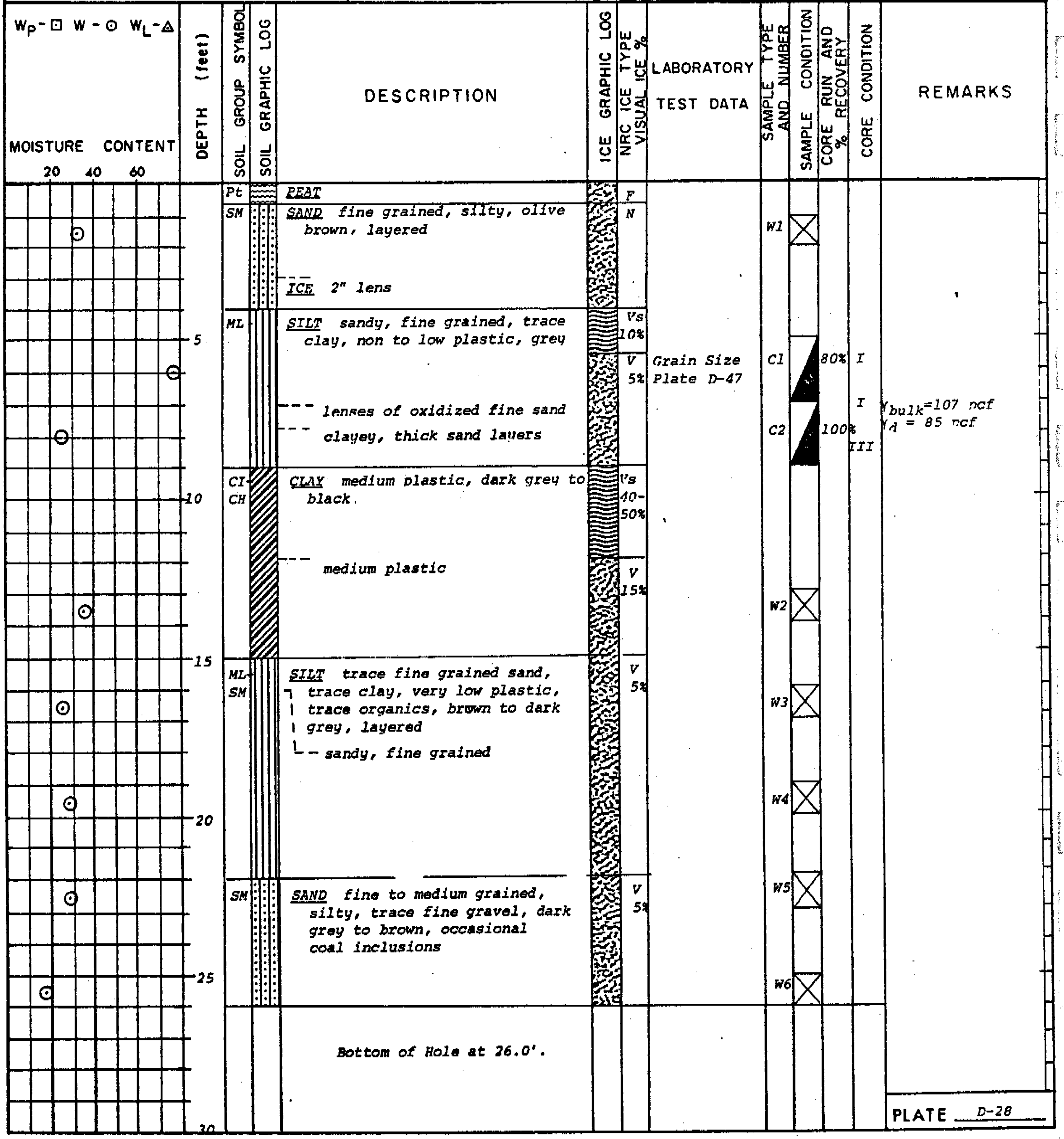
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DL2

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 12, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 14:40
FINISH 15:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	F					
SM	*SAND* fine grained, silty, olive brown, layered	N		W1			
	ICE 2" lens						
ML	*SILT* sandy, fine grained, trace clay, non to low plastic, grey	Vs 10%					
		V 5%	Grain Size Plate D-47	C1	80%	I	
	lenses of oxidized fine sand					I	γ_{bulk}=107 pcf γ_d = 85 pcf
	clayey, thick sand layers			C2	100%	III	
CI-CH	*CLAY* medium plastic, dark grey to black.	Vs 40-50%					
	medium plastic	V 15%		W2			
ML-SM	*SILT* trace fine grained sand, trace clay, very low plastic, trace organics, brown to dark grey, layered	V 5%		W3			
	sandy, fine grained			W4			
SM	*SAND* fine to medium grained, silty, trace fine gravel, dark grey to brown, occasional coal inclusions	V 5%		W5 W6			

Bottom of Hole at 26.0'.

PLATE D-28

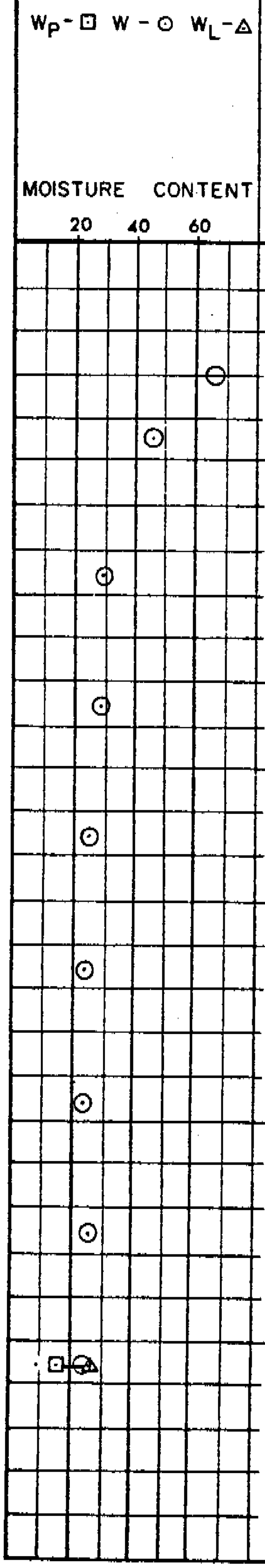
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DL3

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 12, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 12:50
FINISH 13:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT occasional fine gravel sizes	F						
	SM	SAND silty, trace clay, dark grey	V 25% Vs, Vr	25%	C1		95%	I	γbulk = 97 pcf γd = 58 pcf
	SM	ICE AND SAND trace silt and clay	Vs 60%					II	
5	SM	SAND fine grained, silty, trace clay, non to low plastic, dark olive brown to grey	V 20%		C2		100%	III	γbulk = 85 pcf γd = 58 pcf
	CL-CI	CLAY silty, trace sand, low to medium plastic, occasional coal inclusions, grey to brown (till-like)	V 5%		W1	☒			
10	ML	SILT sandy, fine grained, trace clay, low to very low plastic	V <5%		W2	☒			
	SM	SAND fine grained, silty, trace clay, occasional coal inclusions, brown, layered	V <5%		W3	☒			
15			N	Grain Size Plate D-48	W4	☒			
20		trace fine gravel, brown to grey			W5	☒			
		very silty, non to low plastic dark brown			W6	☒			
25	CL	CLAY silty, sandy, occasional fine gravel size, low plastic, dark brown to grey (till-like)	N		W7	☒			
30		Bottom of Hole at 26.0'.							

PLATE D-29

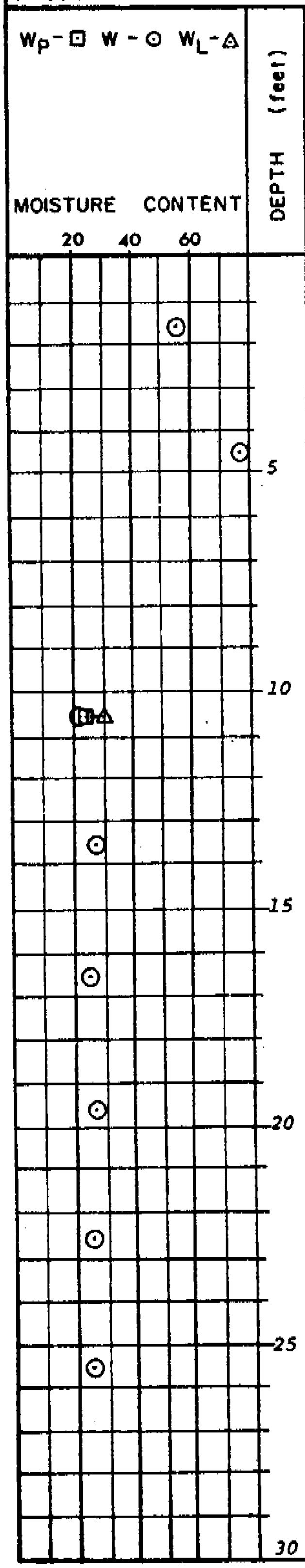
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. DL4

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 12, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 15:30
FINISH 16:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	F					
CL-ML	ICE AND CLAY silty, trace sand, fine grained, low plastic, dark grey	ICE+ 60%		W1			
	trace sand, brown			W2			
CL-CI	CLAY silty, low to medium plastic dark greyish brown , layered	V 40%					
	medium plastic silt, black	Vs 30%		C1	70%	III	
	1/2" ice lens, silty, non to low plastic, grey	Vs 10%		C2	70%	III	γ_{bulk} = 122 pcf γ_d = 99 pcf
	low plastic clayey silt layer	V 5- 10%					
SM	SAND fine to medium grained, trace gravel, trace silt, brown, layered	V < 5%		W3			
	fine to coarse grained, silty, gravelly		Grain Size Plate D-49	W4			
	lens of silty clay, trace organics			W5			
				W6			
	fine gravel sizes to 1/2"ø			W7			
	Bottom of Hole at 26.0'.						

PLATE D-30

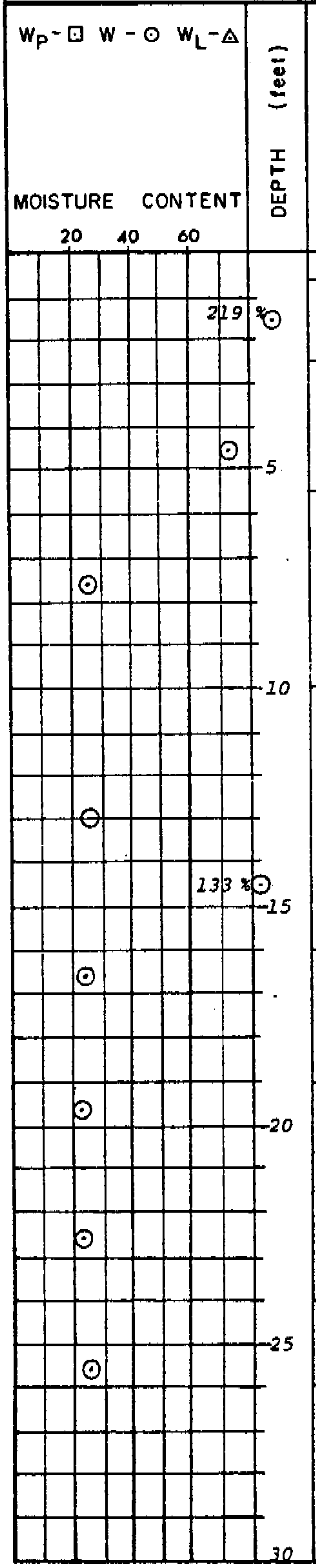
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DL5

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 12, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 16:13
FINISH 17:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT fibrous, dark brown	F					
Pt	ICE AND PEAT	ICE+ 60%		W1			
ML	ICE AND SILT trace clay, trace fine sand, low plastic, brown to grey	ICE+ 50%		W2			
SM	SAND fine to medium grained, silty trace clay, trace organics, dark grey-brown	V 10%		W3			
CL-CI	CLAY silty, sandy, medium to low plastic, brown to grey, occasional coal inclusions ice lenses 1/8" thick, medium plastic clay occasional gravel size	V <5% Vs 5-10%		C1 C2	100% 100%	I II I	γ_{bulk} = 92 pcf γ_d = 40 pcf
ML	SILT clayey, sandy, low to medium plastic	V <5%	Grain Size Plate D-50	W4			
SM	SAND fine to medium grained, silty trace clay, occasional coal inclusions, dark grey	V <5%		W5 W6			
ML	SILT sandy, fine grained, trace clay, low plastic, grey to brown	N	Grain Size Plate D-51	W7			

Bottom of Hole at 26.0'.

PLATE D-31

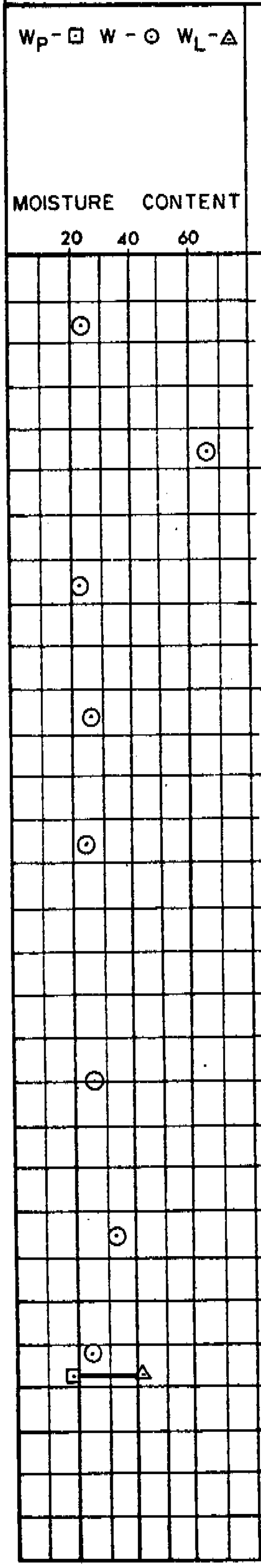
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. DL6

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 12, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 17:30	FINISH 18:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

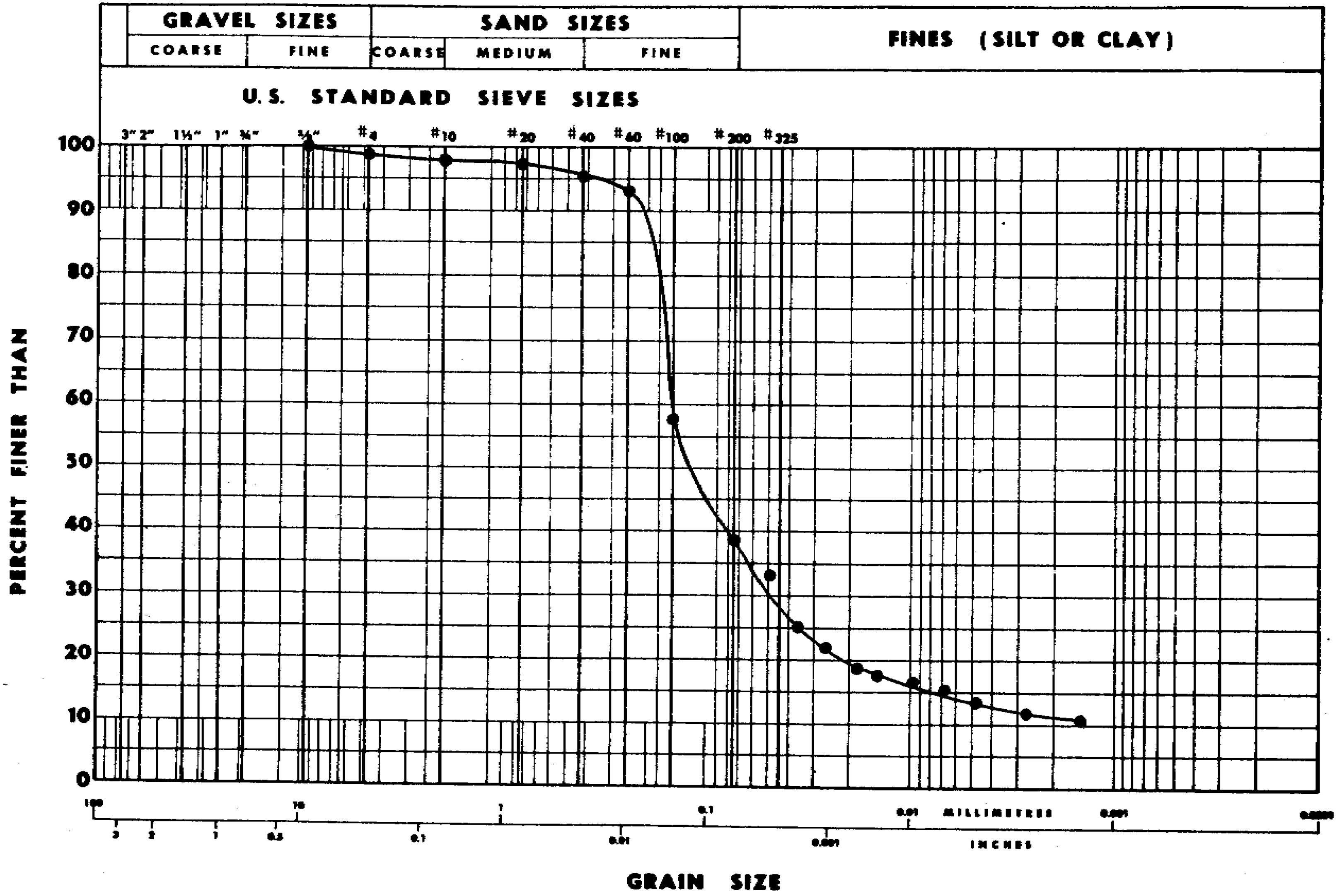


DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*						
	SM	*SAND* fine grained, silty, brown, layered	V 10%		W1			
5		silty, trace clay, occasional gravel sizes, ice-rich, dark grey	V 40-50%		W2			
		fine to medium grained, silty, grey-brown	V 5%		W3			
10		siltier, coal inclusions	<5%		W4			
		medium grained, silty, grey-brown			W5			
15		fine grained, silty, grey	Nbn		C1	90%	I	
20		very silty, coal inclusions, dark brown			W6			
25	CI	*CLAY* silty, trace fine sand, medium plastic, dark grey brown	V 5%		W7			
30		Bottom of Hole at 26.0'.						

PLATE D-32

APPENDIX "D"

SECTION D.3 PARTICLE SIZE ANALYSES



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

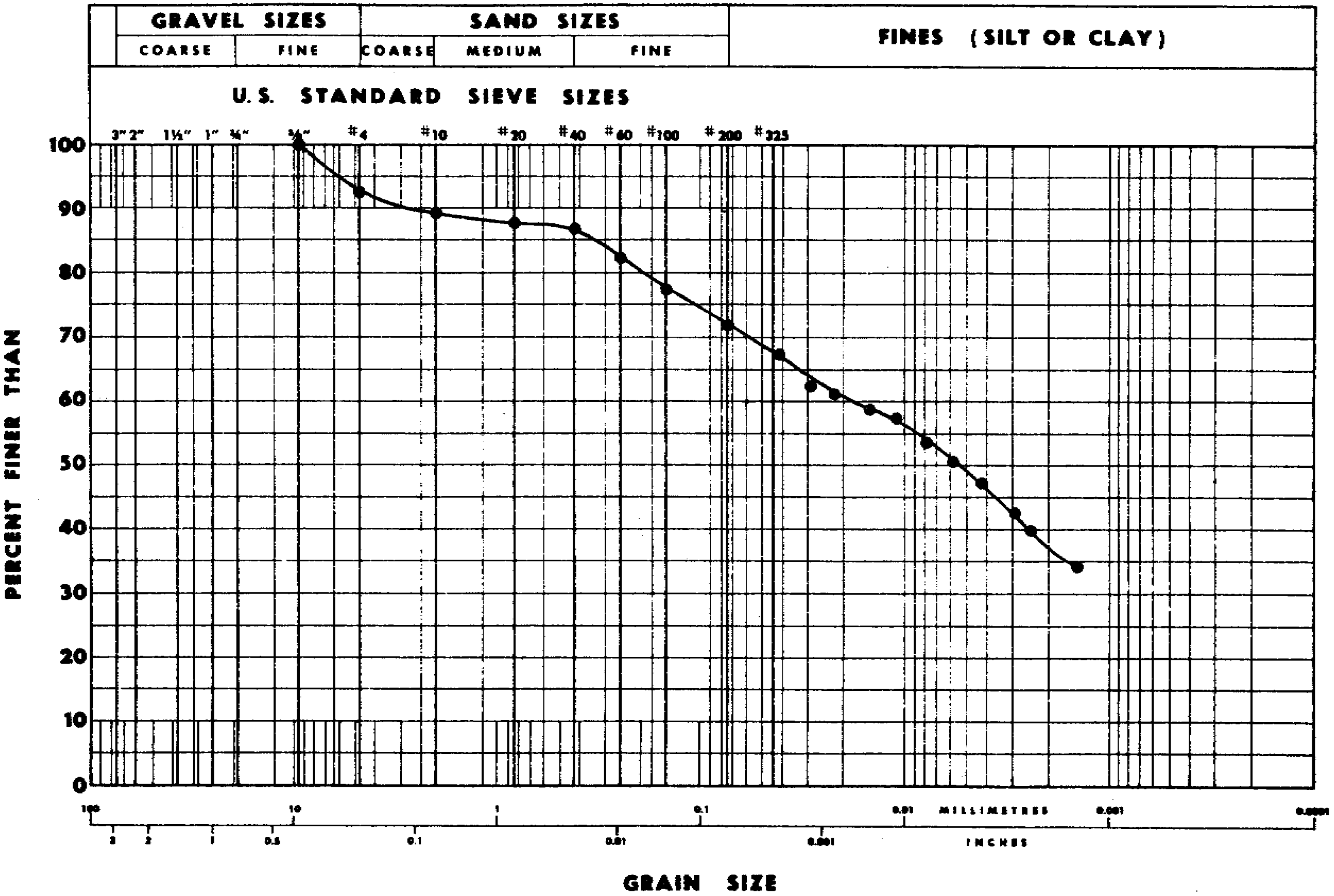
D₁₀ = ______ MM.
D₃₀ = ______ MM.
D₆₀ = ______ MM.
Cu ______
Cc ______

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE WI
SOURCE Parson's Lake N.W.T.
Hole DW1 @ 3.5'-4.5'
TECHNICIAN CS
DATE TESTED Apr./7

PLATE D-33



REMARKS: ____________________

D_{10}= ________ MM.

D_{30}= ________ MM.

D_{60}= ________ MM.

C_U ________

C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

R.M.HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343

CLIENT G.O.C.L.

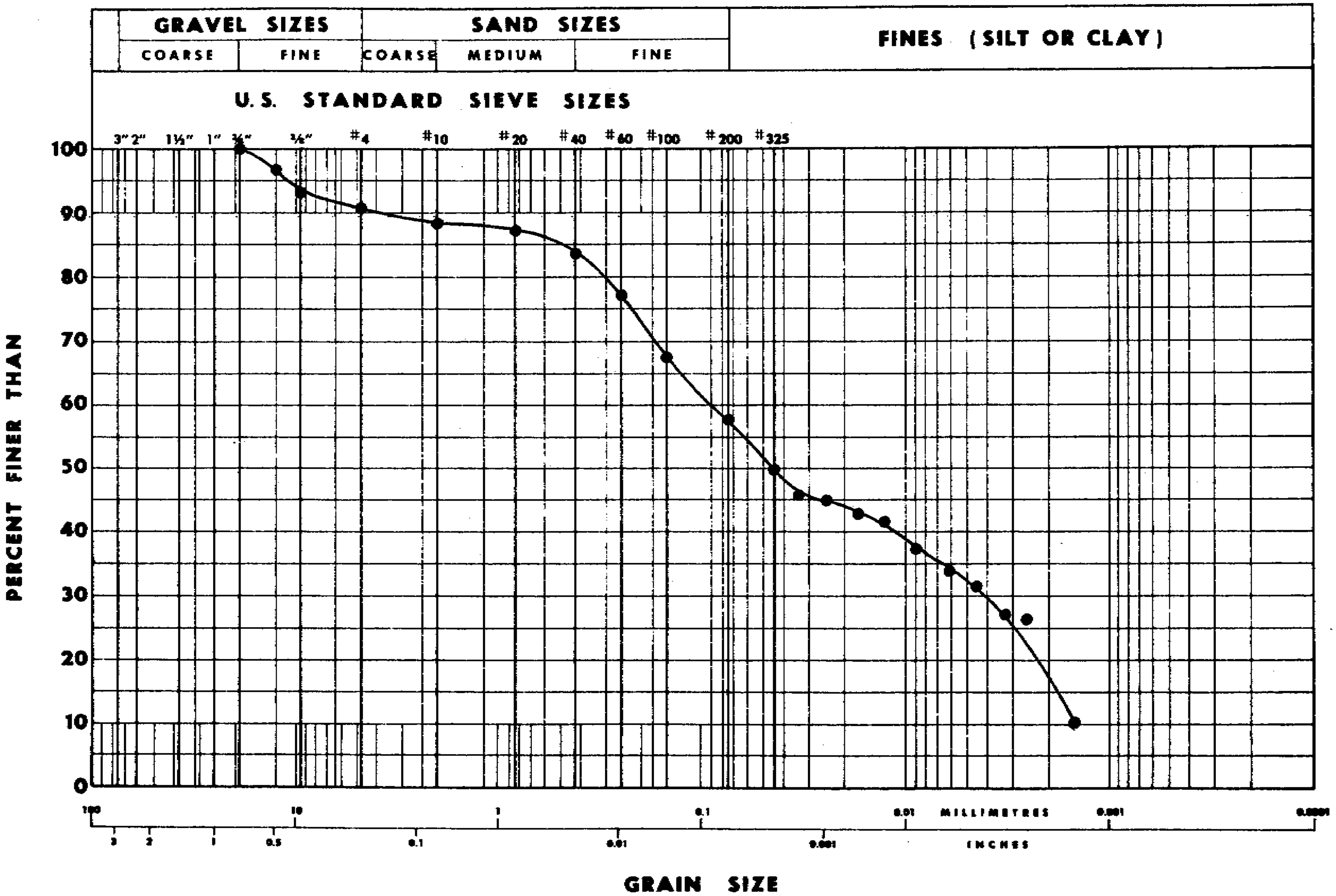
SAMPLE W3

SOURCE Parsons Lake N.W.T.

HOLE DW5 DEPTH 13-14'

TECHNICIAN CS DATE TESTED May/76

PLATE D-34



REMARKS: ____________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-35

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

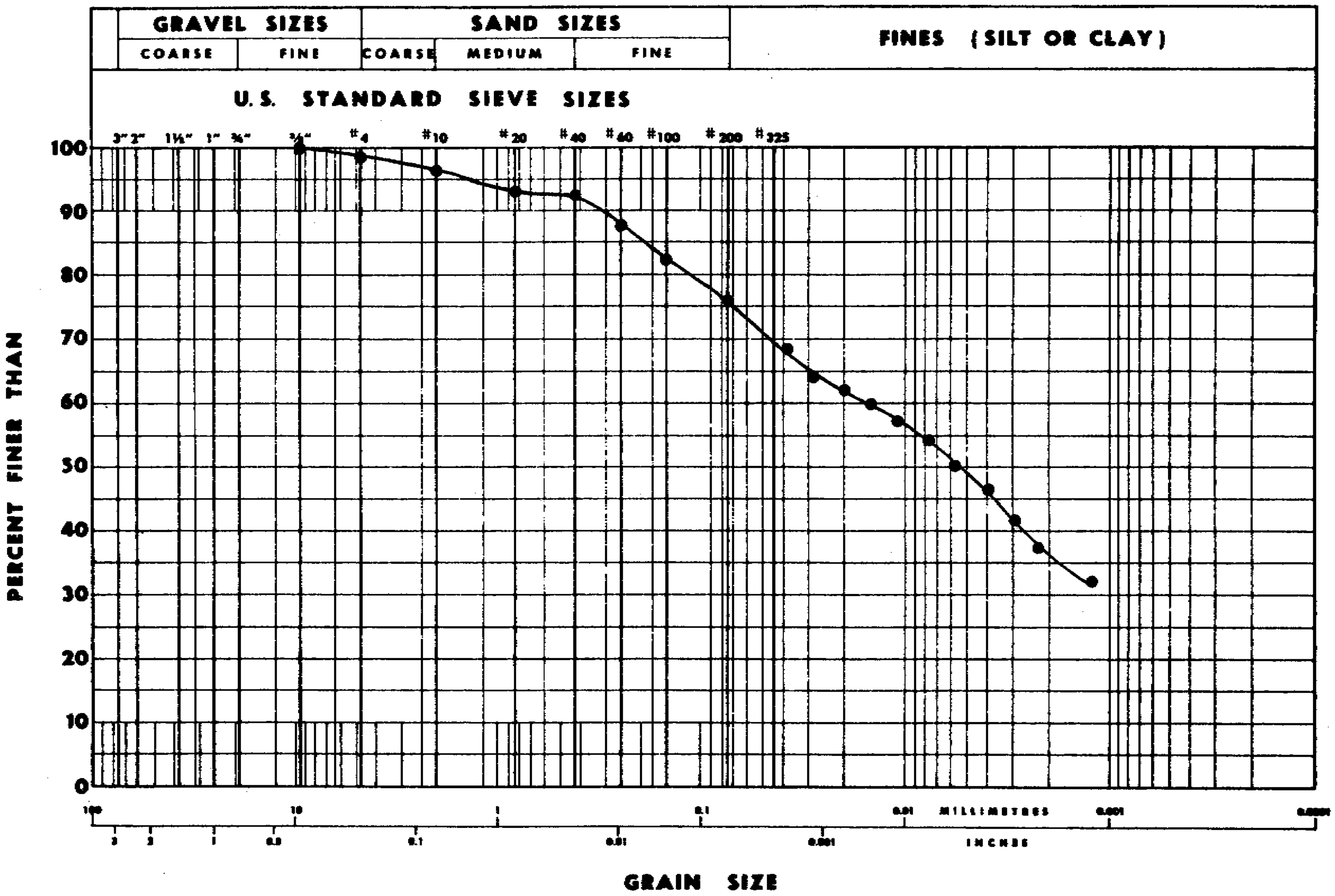
GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE S1
SOURCE Parson's Lake N.W.T.
HOLE DW6 DEPTH 6-7'
TECHNICIAN CS DATE TESTED May/76

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W6
SOURCE Parson's Lake N.W.T.
Hole DW6 @ 19-20'
TECHNICIAN CS DATE TESTED Apr/76



REMARKS: ______

______

______

______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

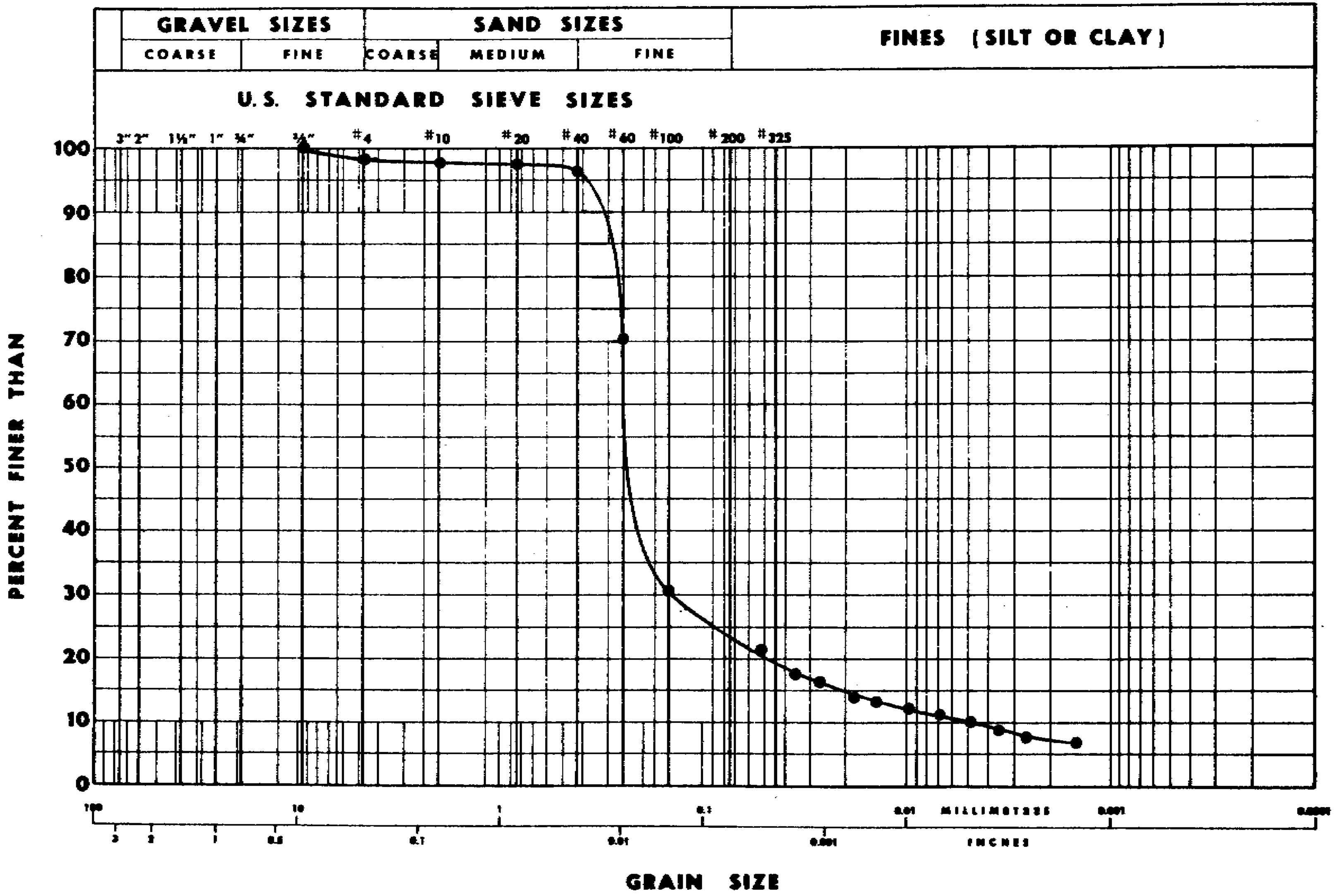
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE D-36

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.T.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole DW7 @ 13-14'
TECHNICIAN CS **DATE TESTED** Apr/76

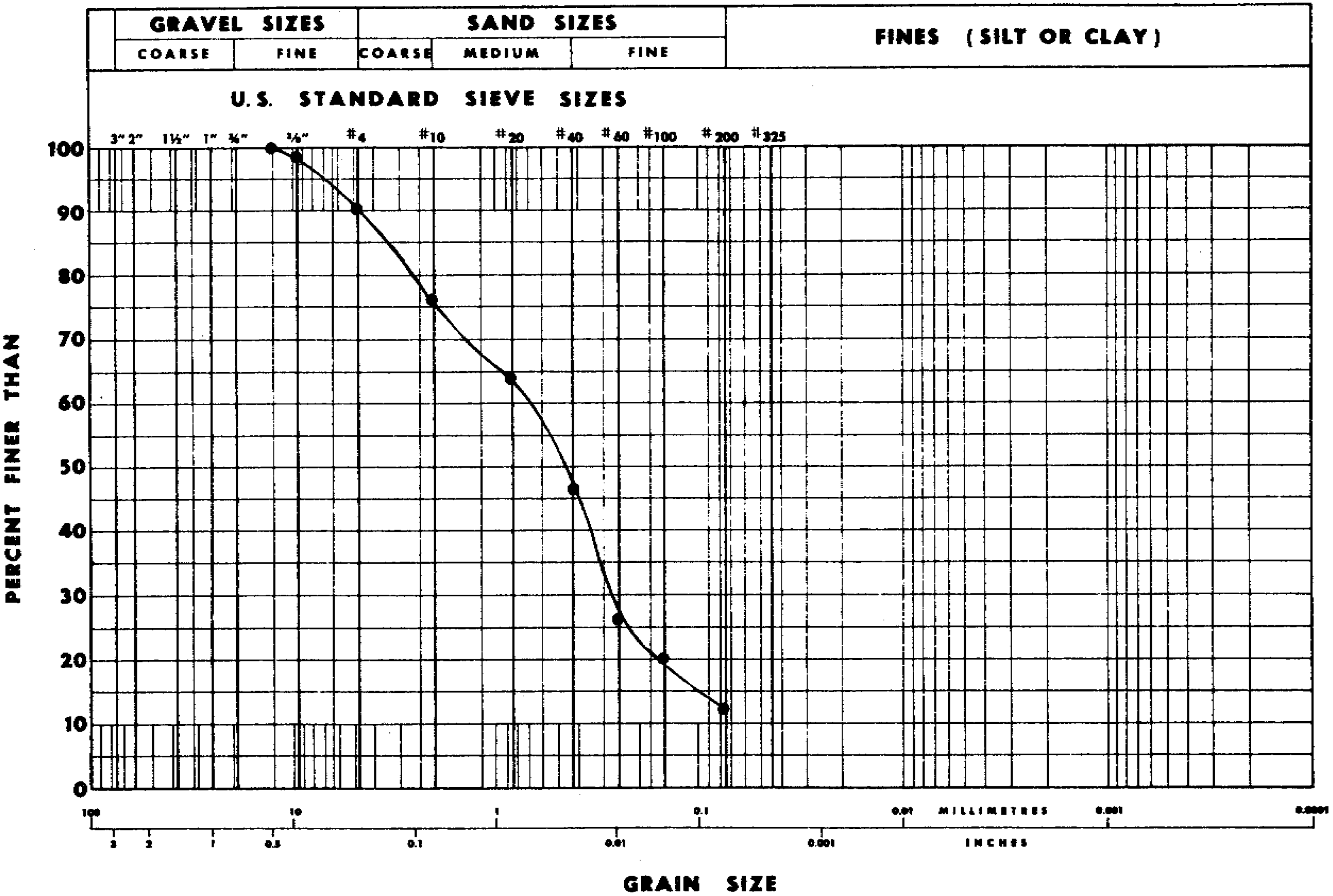


REMARKS: ______

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-37



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE D-38

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

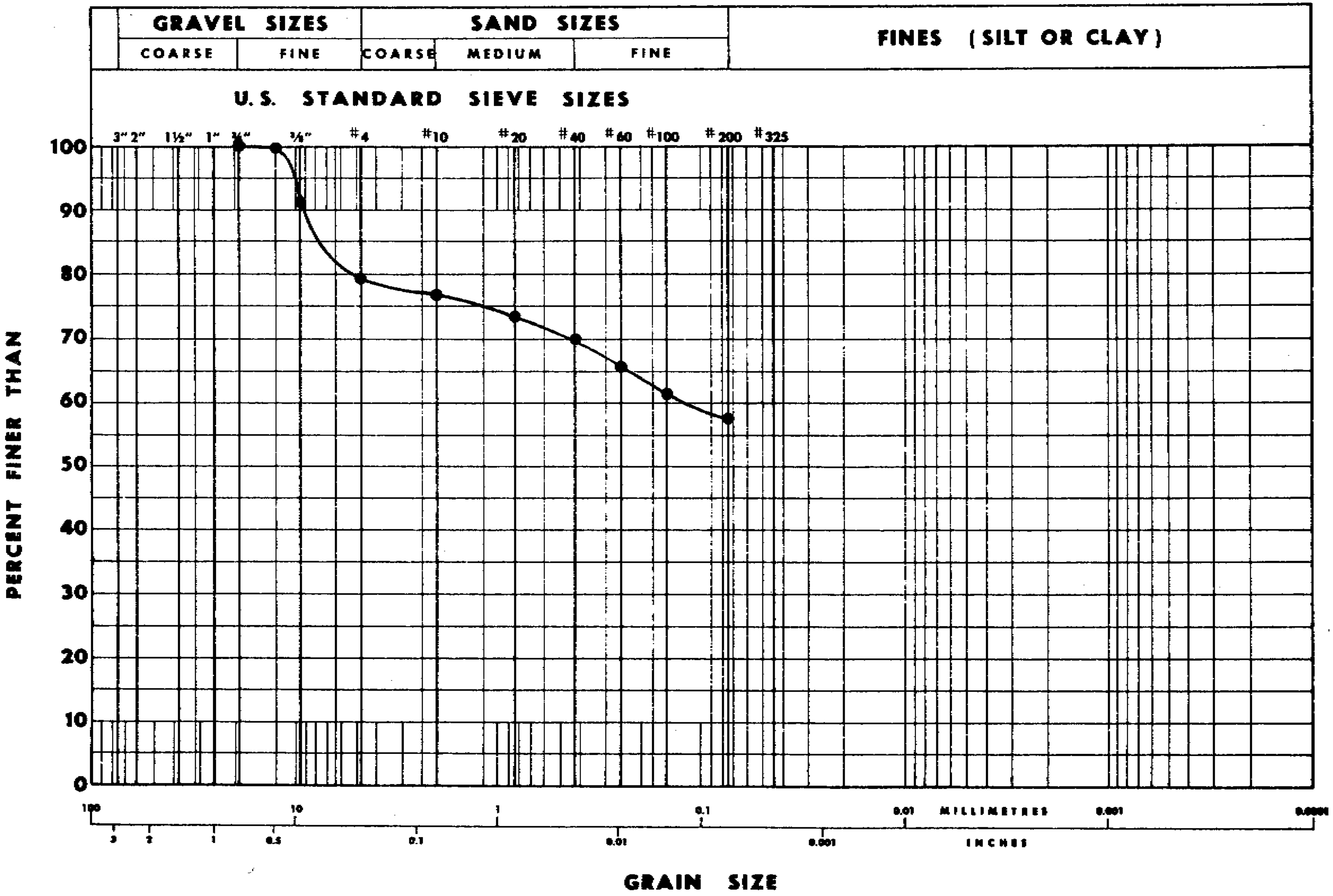
GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
HOLE DW 9 DEPTH 7-8' DATE REC'D.
TECHNICIAN CW DATE TESTED Apr./76

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W8
SOURCE Parson's Lake N.W.T.
HOLE DW10 DEPTH 22-23'
TECHNICIAN CS DATE TESTED Apr.76

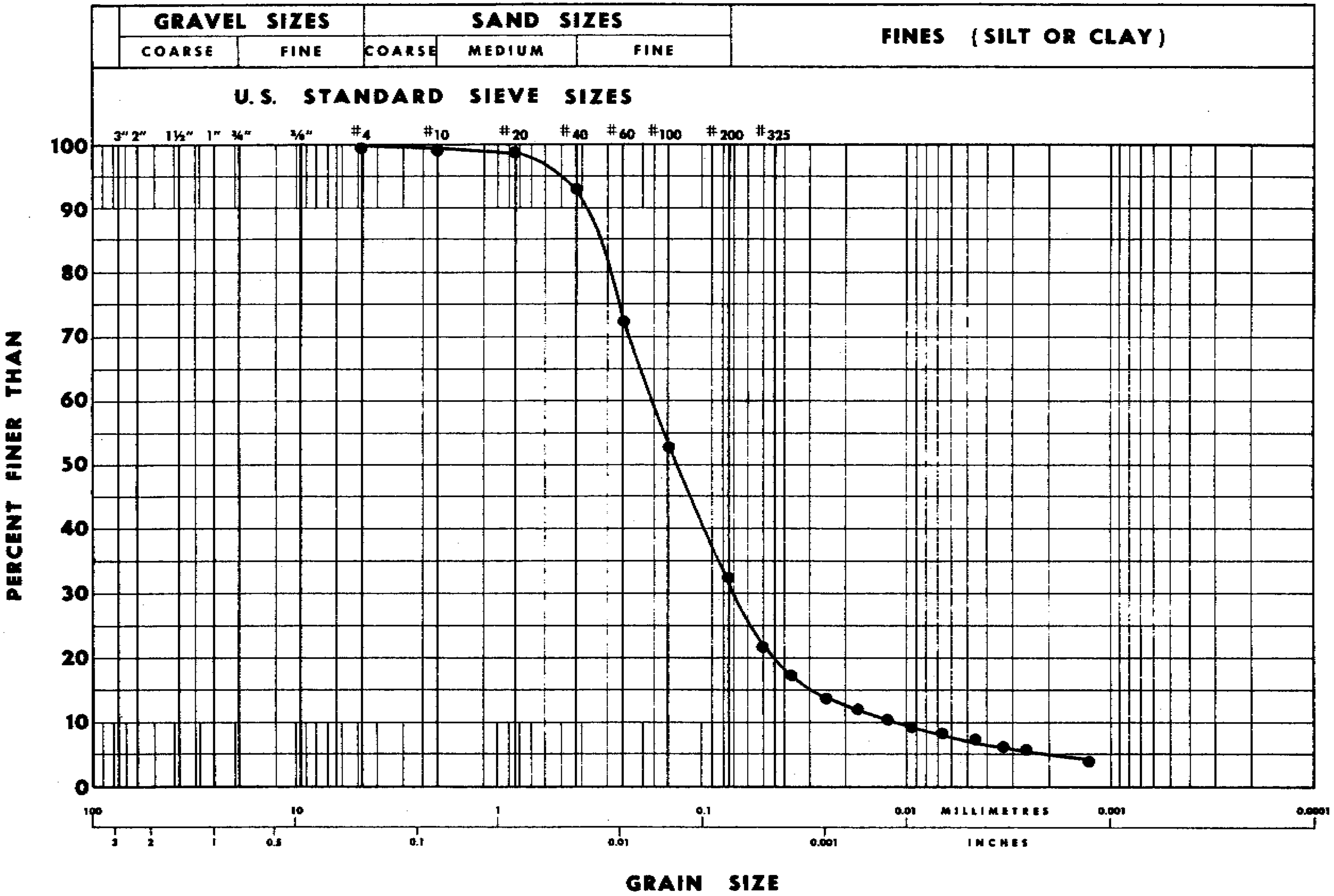


REMARKS: ____________________

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-39



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

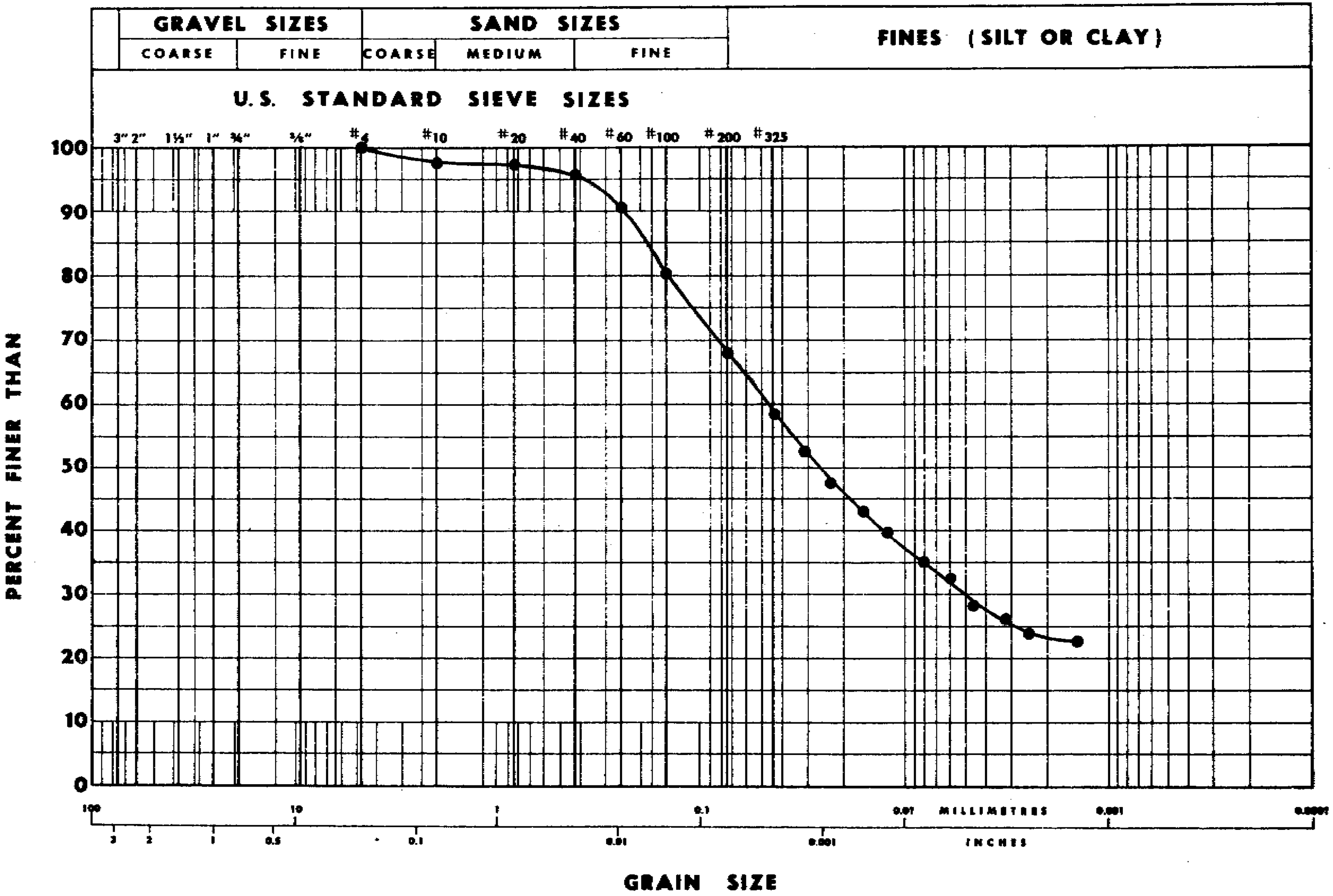
LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE C1
SOURCE Parson's Lake N.W.T.
HOLE DW11 DEPTH 0-13'
TECHNICIAN CS DATE TESTED May/76

PLATE D-40

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W2
SOURCE Parson's Lake N.W.T.
HOLE DW15 DEPTH 4-5' DATE REC'D.
TECHNICIAN CS DATE TESTED Apr/76

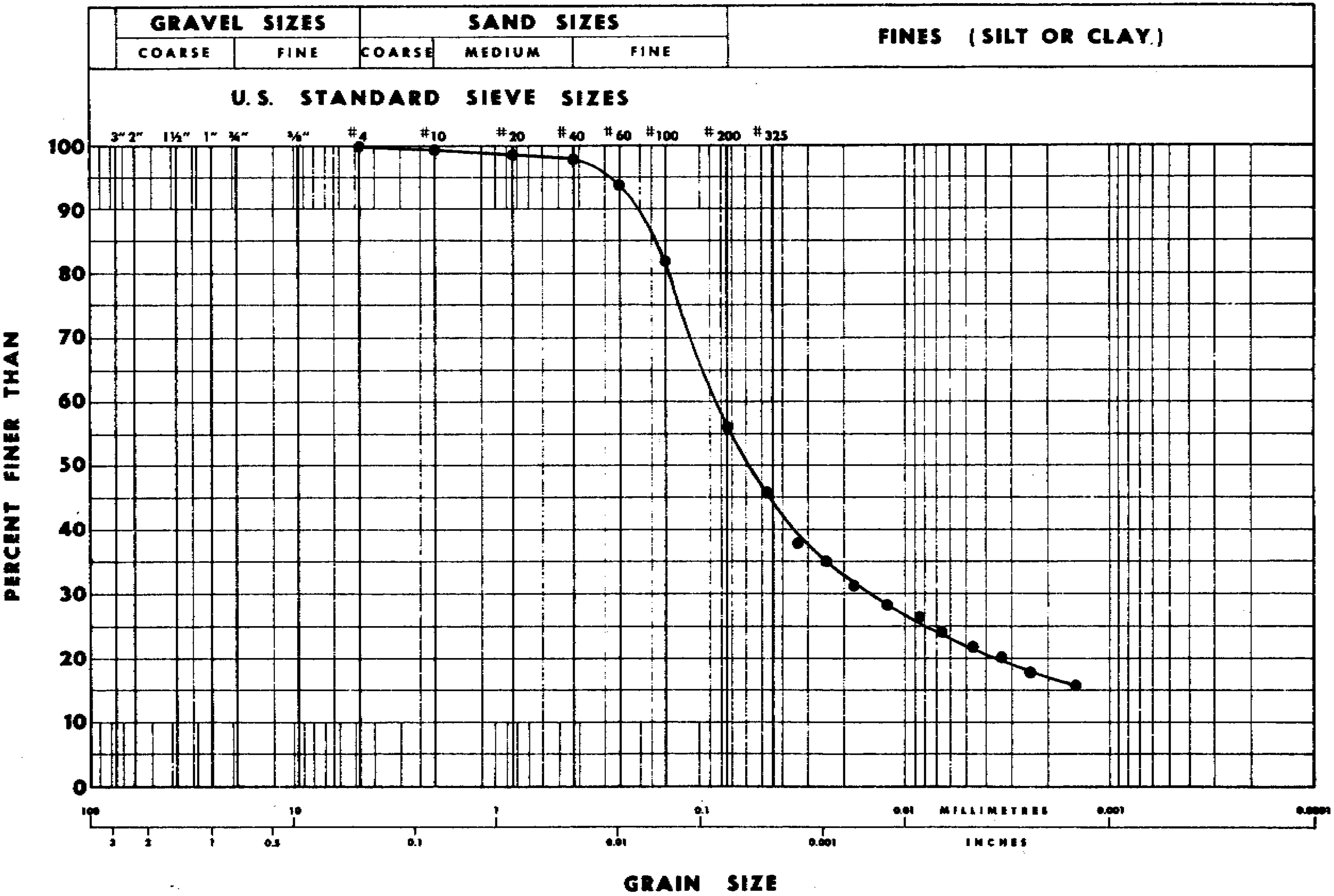


REMARKS: ______

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-41



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

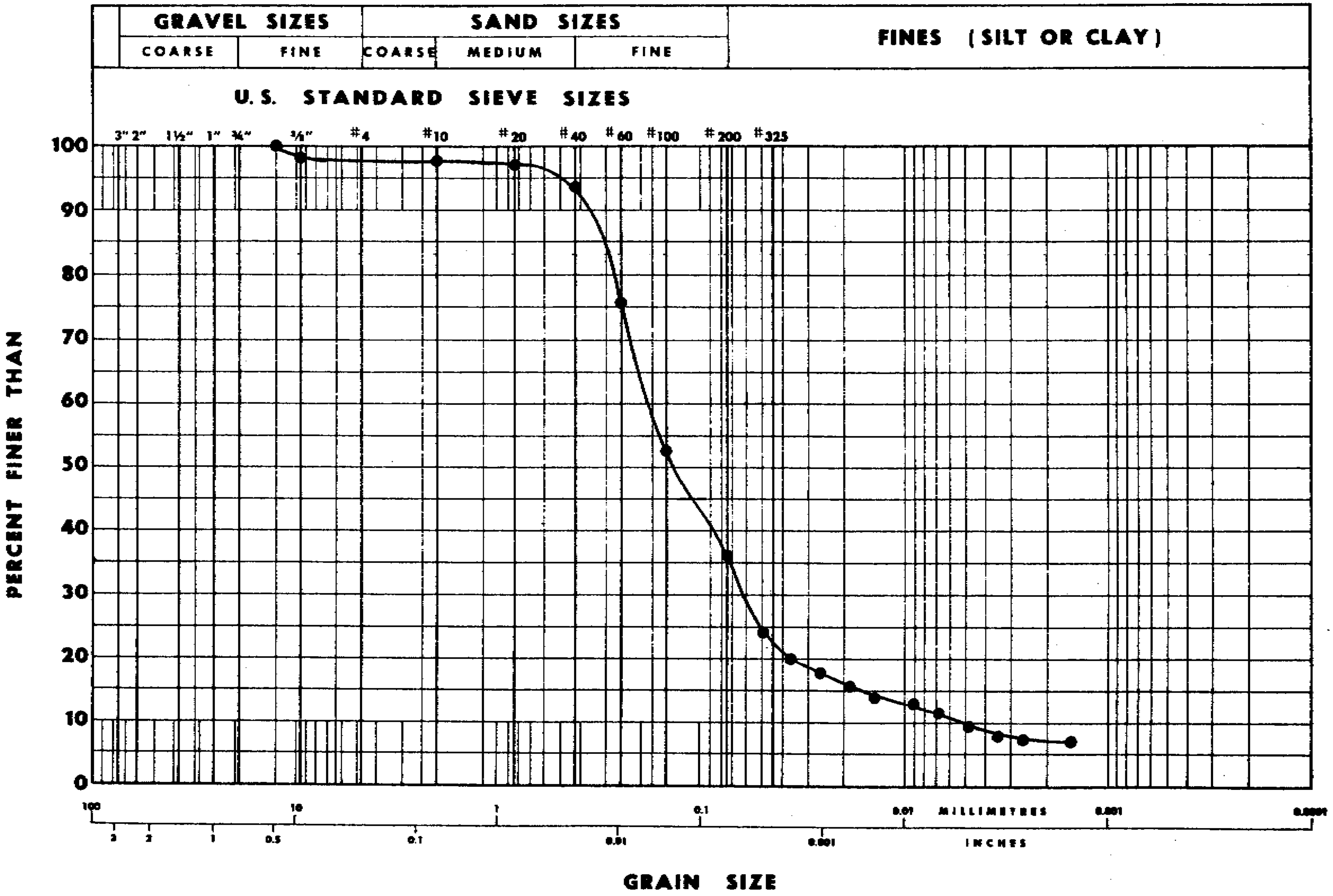
D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
HOLE DW16 DEPTH 8-9' DATE REC'D.
TECHNICIAN CS DATE TESTED Apr/76

PLATE D-42



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D$_{10}$ = ____ MM.
D$_{30}$ = ____ MM.
D$_{60}$ = ____ MM.
C$_U$ ____
C$_C$ ____

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

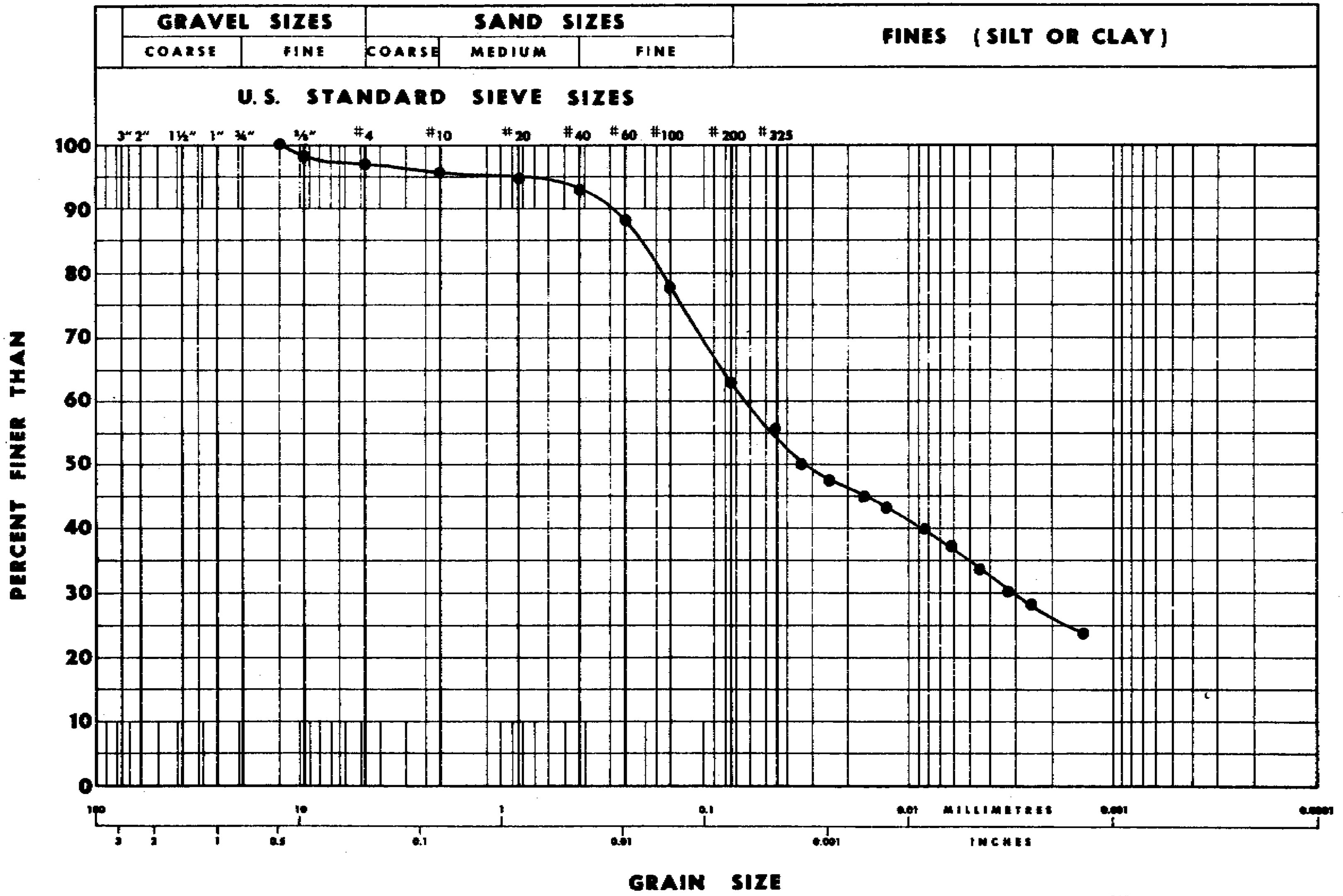
LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE S1
SOURCE Parson's Lake N.W.T.
HOLE DW19 DEPTH 12-13.5'
TECHNICIAN CS DATE TESTED May/76

PLATE D-43

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE S3
SOURCE Parson's Lake N.W.T.
HOLE DW19 DEPTH 32' - 33.5'
TECHNICIAN CS DATE TESTED May/76



REMARKS: ____________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

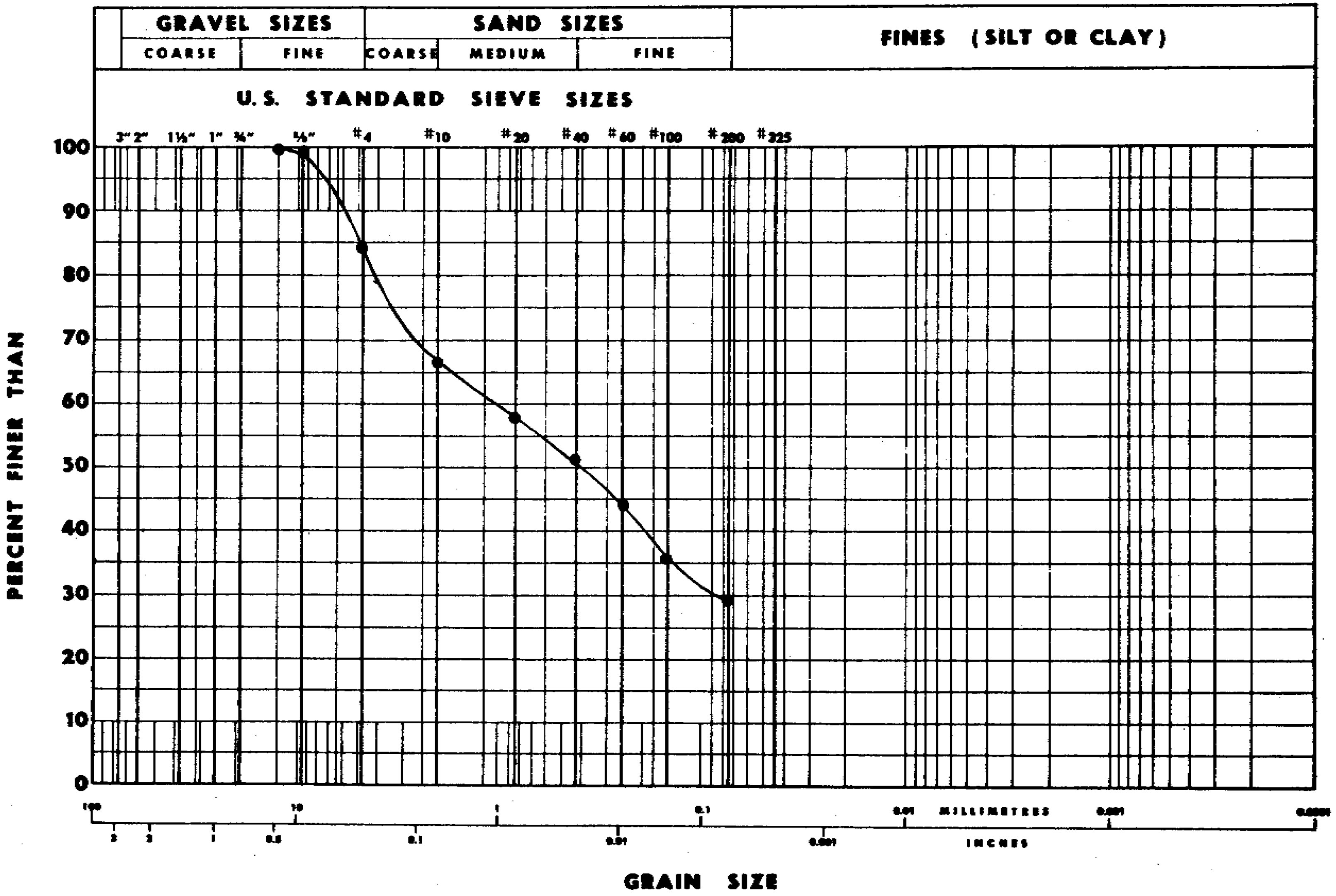
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-44

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole DW-21 @ 16-17'
TECHNICIAN CW
DATE TESTED Apr/76



REMARKS: ____________________

D₁₀ = ________ mm.
D₃₀ = ________ mm.
D₆₀ = ________ mm.
C_u ________
C_c ________

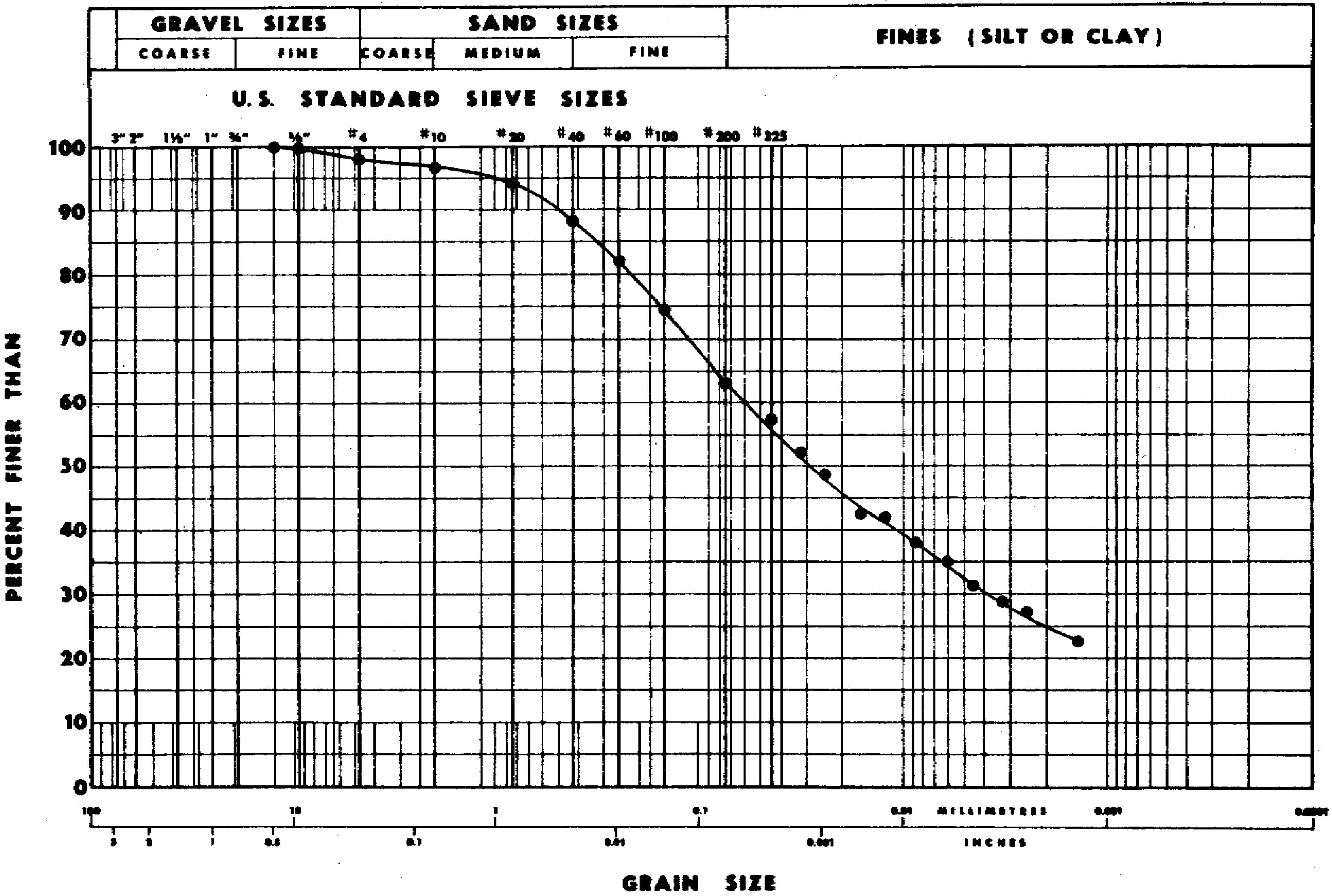
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-45

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
Hole DW23 @ 3-4'
TECHNICIAN CS **DATE TESTED** Apr/76



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

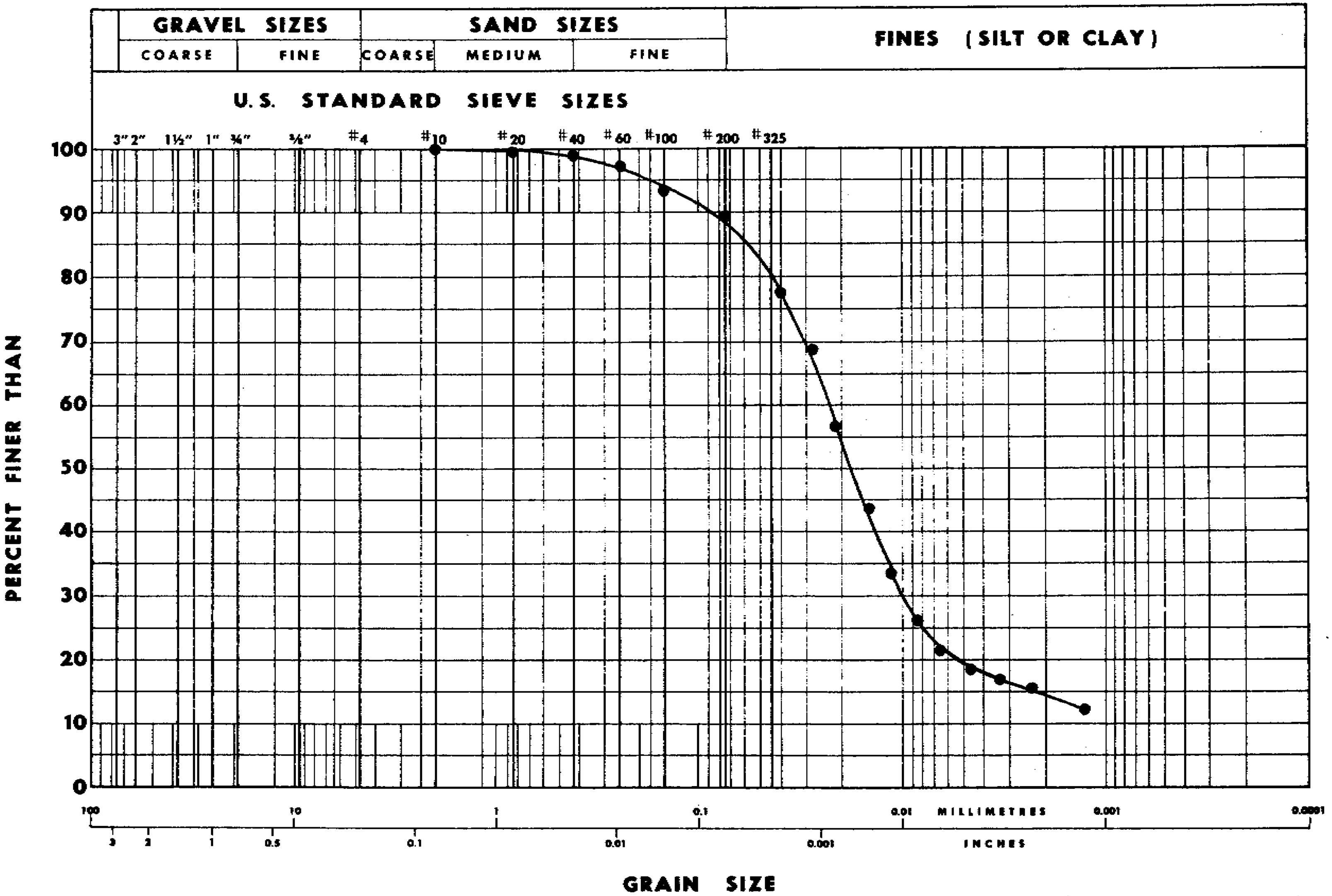
D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

PLATE D-46

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE C1
SOURCE Parson's Lake N.W.T
HOLE DI2 DEPTH 5-7' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

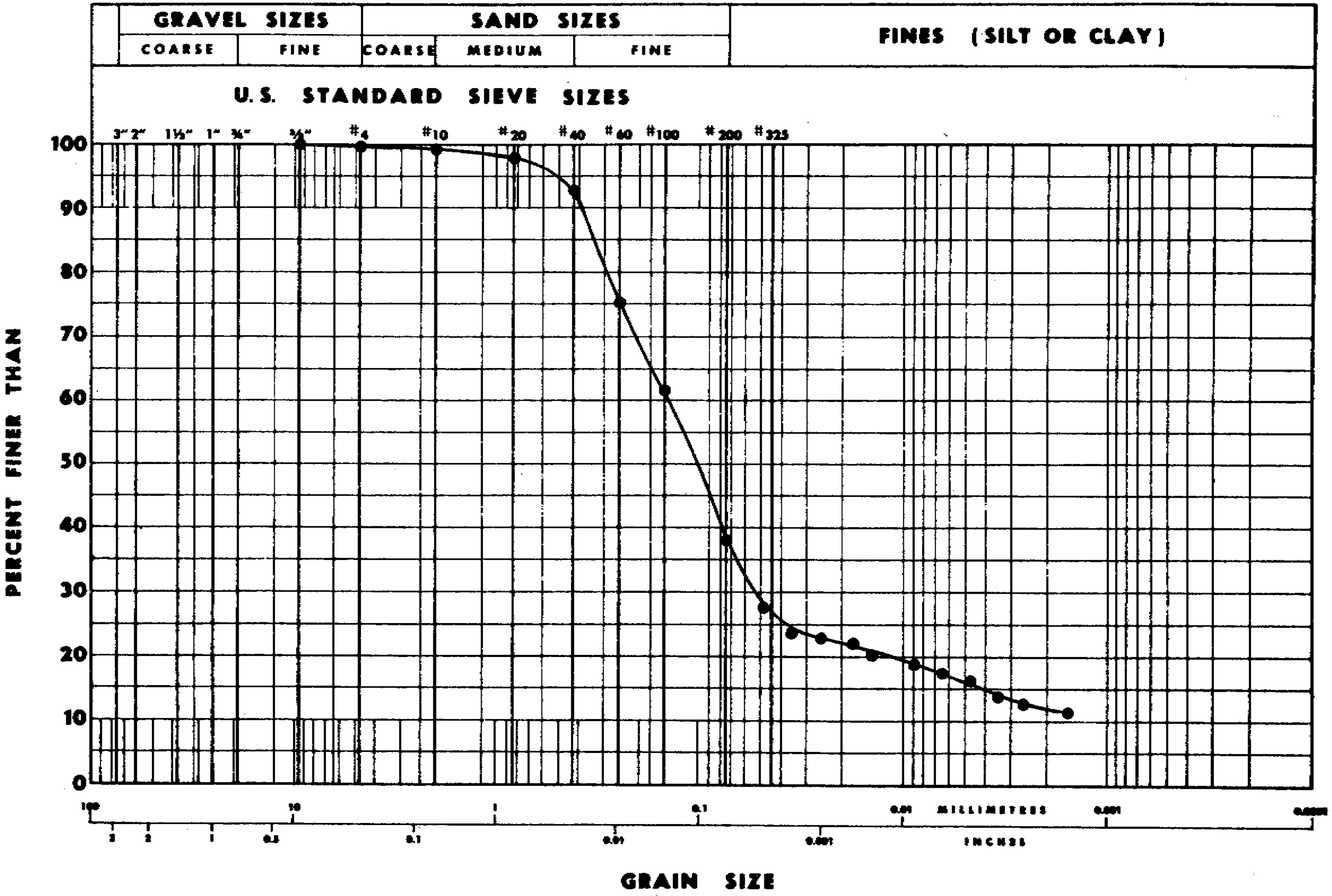


REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-47



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

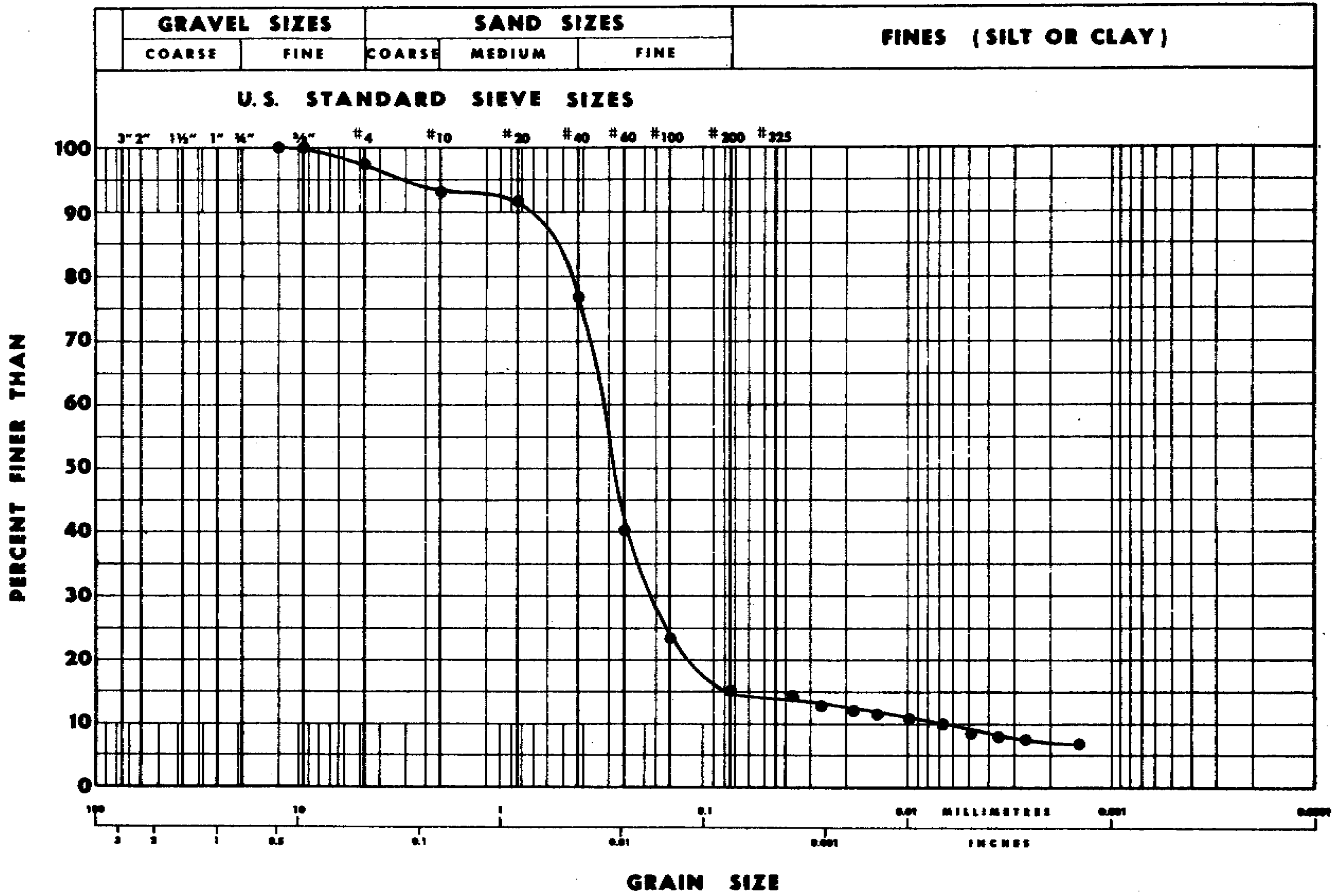
LAB ORDER NO. CS 3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE DL3 at 16' - 17'
TECHNICIAN CS **DATE TESTED** Apr./76

REMARKS: ____________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-48



REMARKS:

D₁₀ = ______ MM.

D₃₀ = ______ MM.

D₆₀ = ______ MM.

C_U ______

C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-49

R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343

CLIENT Gulf Oil Canada Ltd.

SAMPLE W4

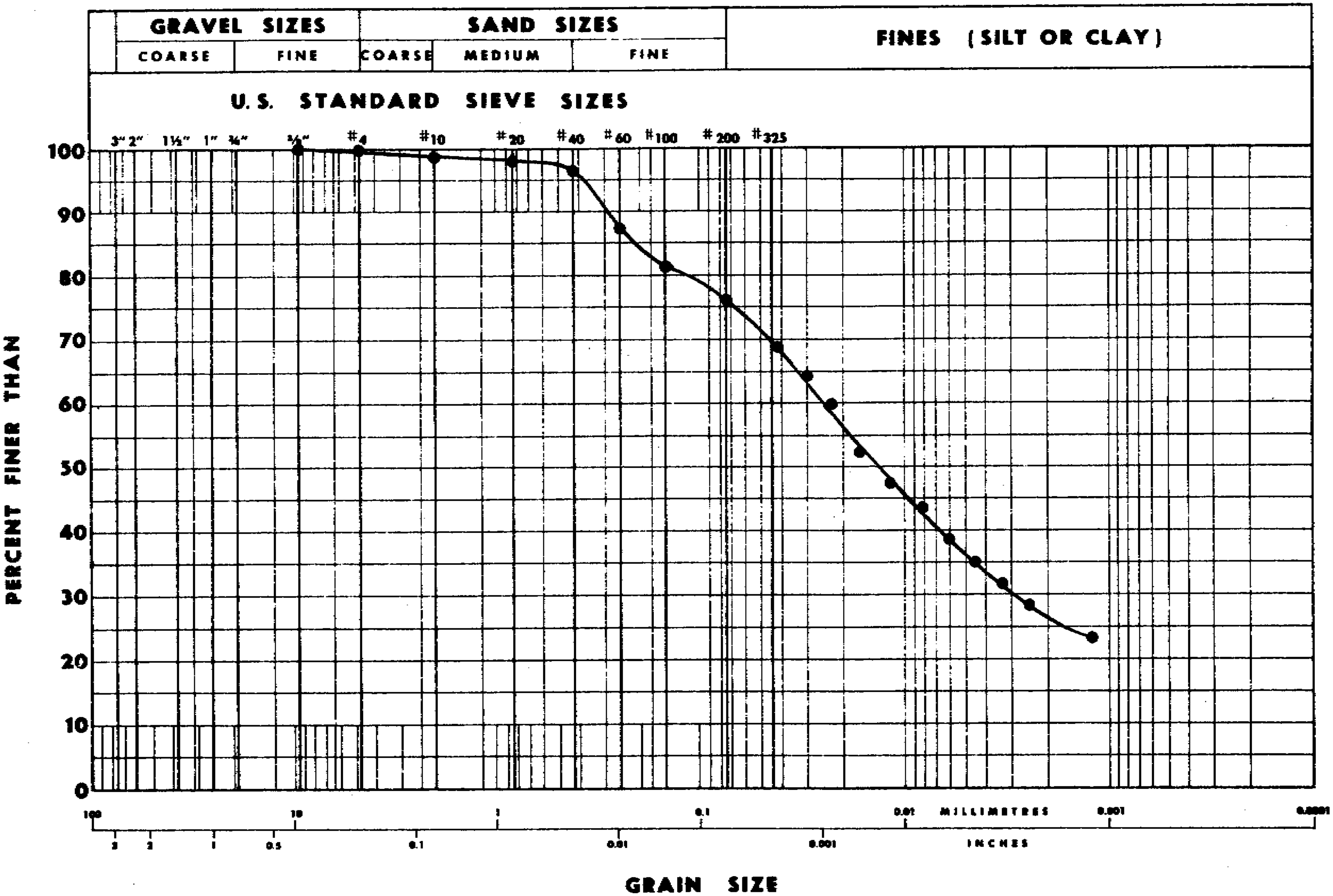
SOURCE Patsons Lake Gas Plant

HOLE DL4 at 16' - 17'

TECHNICIAN CS DATE TESTED Apr./76

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE



REMARKS: ____________________

D$_{10}$= ________ MM.
D$_{30}$= ________ MM.
D$_{60}$= ________ MM.
C$_U$ ________
C$_C$ ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

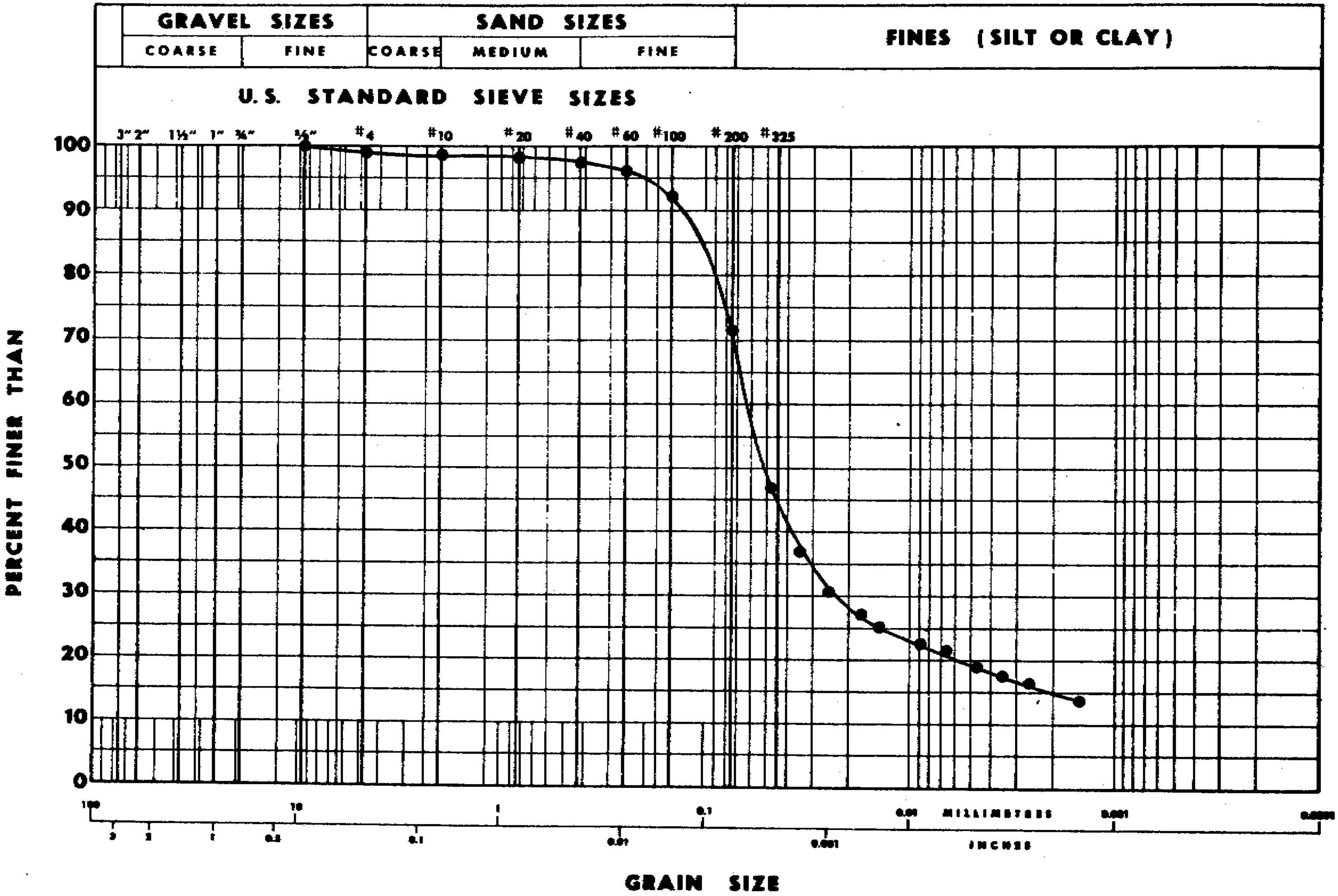
LAB ORDER NO. CS 3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE DL5 at 16' - 17'
TECHNICIAN CS
DATE TESTED Apr/76

PLATE D-50

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W7
SOURCE Parsons Lake Gas Plant
HOLE DL5 at 25' - 26'
TECHNICIAN CS DATE TESTED Apr./76



REMARKS: ______________________

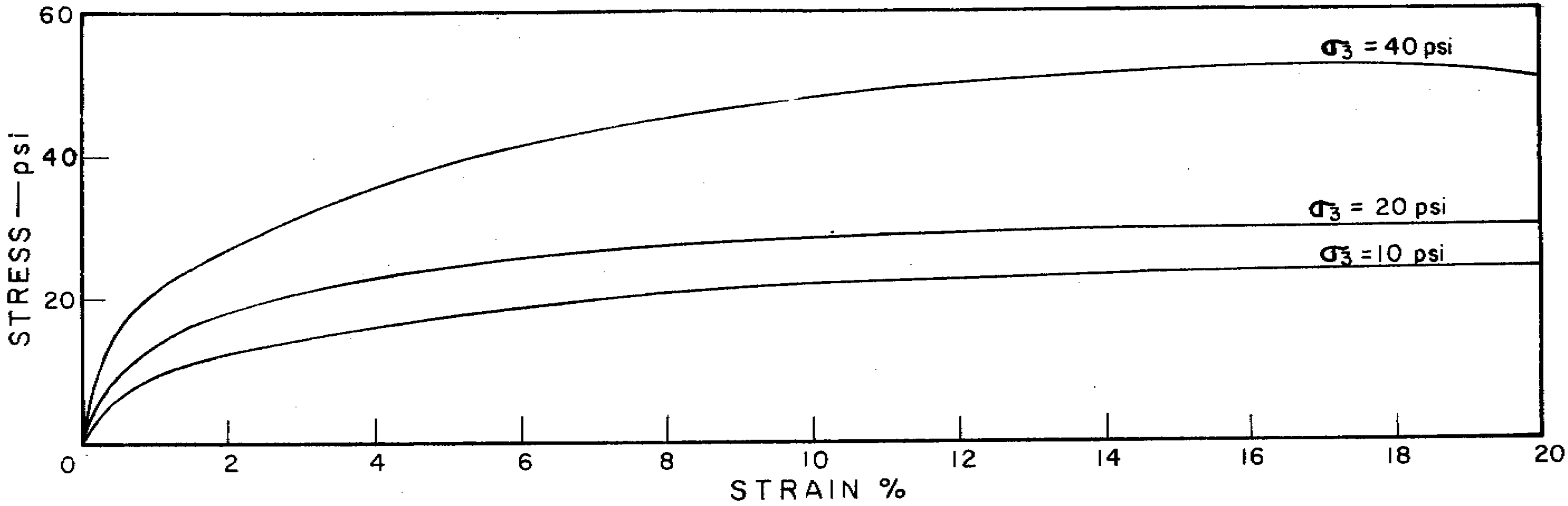
D~10~= ________ MM.
D_{10}= ________ MM.
D_{30}= ________ MM.
D_{60}= ________ MM.
C_U ________
C_C ________

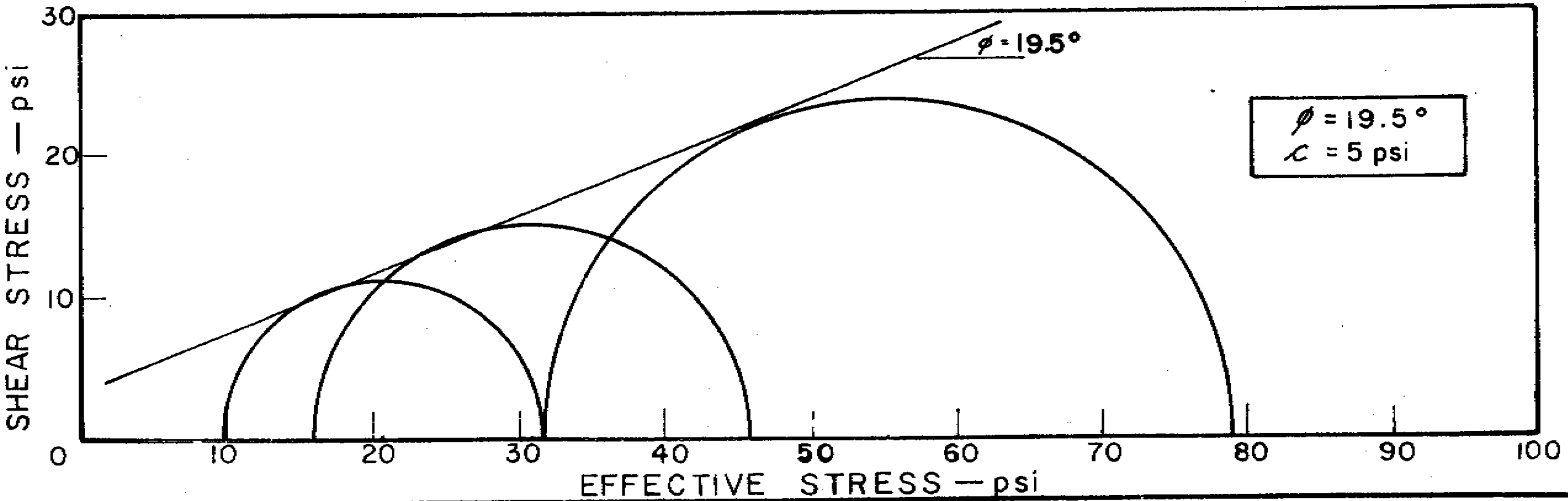
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE D-51

APPENDIX "D"

SECTION D.4 SUMMARY OF LABORATORY TESTING





R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PARSONS LAKE GAS PLANT
CONSOLIDATED UNDRAINED TRIAXIAL
COMBINED SAMPLE DW 2,38 19 (19-21')

SCALE	**DATE**	**MADE**	**CHKD.**	**JOB:**	**PLATE** D-52

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS 3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
DW1	2.5-3.5	W1	SM	SAND fine grained, silty, brown to dark grey				62	27	11				
DW2	26-27	U2	CI	CLAY silty, trace fine to coarse sand, little gravel sizes to 1 1/2"ø, medium plastic, firm, grey (till-like)							130	109	19	Undrained Triaxial Plate D-52 q_u = 2904psf
DW3	27-28	U1	CI	CLAY trace silt, trace fine sand, occasional pebbles, medium plastic, stiff, grey							135	115	18	Undrained Triaxial Plate D-52 q_u = 3917psf
DW4	26.5-28.5	S3	CI	CLAY silty, trace sand, occasional pebbles to 1"ø, firm, medium plastic, grey	39	17	22							
DW4	32-33	U1	CI	CLAY trace silt, trace fine sand, little fine gravel, stiff, grey							132	105	25	q_u = 2054psf
DW5	7.0-9.5	C1	SM	SAND fine grained, little silt, olive brown							114	88	31	frozen core
DW5	13-14	W3	CI	CLAY silty, trace sand, medium plastic, dark grey (till-like)	42	15	27	28	36	36				
DW6	6.0-7.0	S1	SP	SAND clayey, silt layers, trace gravel				42	41	17				
DW6	19-20	W6	CI	CLAY silty, medium plastic, some gravel, pebbles, rounded to 1 1/2"ø, dark grey				24	40	36				
DW6	22-23	W7	CI	CLAY silty, medium plastic, trace gravel, trace sand, dark grey	43	20	23							
DW7	13-14	W3	SM	SAND occasional pebbles, trace silt, brown, non plastic, moist to wet				77	16	7				
DW7	25-26	W7	CI	CLAY silty, trace gravel, medium plastic, dark grey	44	20	24							
DW9	7.0-8.0	W3	SP	SAND fine to coarse grained, trace silt, occasional gravel sizes to 1"ø, greyish-brown				78	12	-				
DW10	13-14	W5	CL-CI	CLAY silty, trace sand, medium plastic, dark grey	39	19	20							
DW10	22-23	W8	CI	CLAY very silty, sandy, trace gravel sizes to 3/8"ø, low to medium plastic, dark grey				42	58	*fines				

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS 3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
DW11	10-12.5	C1	SM	SAND fine to medium grained, silty, gravelly, occasional coal particles, non plastic, brown				68	27	5	136 113	108 86	25 30	frozen core
DW12	15-18	C1	SP-SM	SAND fine to coarse gravel, silty, trace fine gravel (till-like)							100 122	67 99	50 25	frozen
DW15	4.0-5.0	W2	CL-ML	CLAY very silty, occasional gravel sizes to 3/8"ø, low plastic, dark grey to brown (till-like)	23	17	6	32	45	23				
DW16	8.0-9.0	W3	ML	SILT very sandy, fine grained, clayey, occasional gravel sizes to 1/2"ø, dark grey, non plastic				44	39	17				
DW16	17-18	W6	CL	CLAY silty, little sand, medium plastic, brown, saturated	28	15	13							
DW19	12-13.5	S1	SM	SAND fine to medium grained, little silt, grey, saturated				64	29	7				
DW19	22-23.5	S2	CI	CLAY trace silt, trace sand, trace fine gravel, coal specks, medium plastic, firm, grey (till-like)	37	17	20							
DW19	27-28	U1	CI	CLAY trace silt, trace coarse sand, little fine to medium gravel										Undrained Triaxial Plate D-52 ø=19.5 c=5psi
DW19	32-33.5	S3	CI	CLAY very silty, very sandy, little fine to medium gravel				37	37	26				
DW20	7.0-9.0	C1	SP	SAND fine to medium grained, trace clay, trace silt, olive grey to brown							113	85	33	frozen core
DW20	20.5-21.5	W5	CL-CI	CLAY silty, trace sand, gravelly, occasional coal particles, medium plastic, brown to dark grey, saturated	30	15	15							
DW21	16-17	W5	SM-GM	SAND silty, very fine gravel to 1"ø, trace clay, low plastic (till-like)				71	29	-				
DW22	10-11.5	C1	CI	CLAY silty, trace sand and gravel, medium plastic, dark grey (till-like)							113	85	35	frozen core
DW22	22-23	W7	CI	CLAY silty, trace sand, medium plastic, some coal and rust specks	40	16	24							
DW23	3.0-4.0	W1	ML	SILT very sandy, clayey, low plastic, brown to dark grey				37	38	25				

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS 3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
DW26	24-25.5	S2	CI	CLAY little fine sand, trace fine gravel , soft, grey, medium plastic (till-like)	31	15	16							
DL2	5.0-7.0	C1	ML	SILT clayey, trace sand, very low plastic				11	75	14				
DL2	7.0-9.0	C2	ML	SILT lenses of oxidized fine sand, trace clay, non to low plastic							107	85	26	frozen core
DL3	2.0-4.0	C1	SM	SAND silty, trace clay, dark grey							97	58	67	frozen core
DL3	4.0-5.0	C2	SM	SAND fine grained, silty, trace clay, non to low plastic, dark olive brown to grey							85	58	47	frozen core
DL3	16-17	W4	SM	SAND fine grained, silty, trace clay, occasional coal inclusions				62	26	12				
DL3	25-26	W7	CL	CLAY silty, sandy (till-like)	26	17	9							
DL4	10-11	C2	ML	SILT very clayey, low plastic, grey	30	24	6				122	99	23	frozen core
DL4	16-17	W4	SM	SAND fine to medium grained, trace gravel, trace silt, brown				85	8	7				
DL5	13.5-15	C2	CL-CI	CLAY silty, sandy, medium to low plastic, occasional gravel sizes							92	40	133	frozen core
DL5	16-17	W4	ML	SILT clayey, sandy, low to medium plastic				24	49	27				
DL5	25-26	W7	ML	SILT sandy, fine grained, trace clay, low plastic				28	57	15				
DL6	25-26	W7	CI	CLAY silty, trace of fine sand, medium plastic, grey-brown	42	19	23							

APPENDIX "D"

SECTION D.5 TEST HOLE ELEVATIONS

BARGE DOCK AND STAGING AREA TEST HOLE ELEVATIONS

Staging Area

Test Hole No.	Elevation *	Geodetic Elevation
DL1	838.5	14.0
2	840.0	15.5
3	840.5	16.0
4	840.5	16.0
5	841.0	16.5
6	840.5	16.0

Barge Dock

Test Hole No.	Elevation *	Geodetic Elevation
DW1	838.5	14.0
2	840.0	15.5
3	840.5	16.0
4	840.5	16.0
5	841.0	16.5
6	840.5	16.0

The remaining test holes at the barge dock site were not surveyed, and it was assumed that the ice surface of Hans Bay lay at an elevation of 840.0 (15.5) ±0.5 ft.

* Elevation relative to top of flange on 0-27 wellhead (Elevation - 999.80 - provided by C.E.S.L. of Edmonton)

APPENDIX "E"

TRANSPORTER AND ACCESS ROADS

SECTION E.1 TRANSPORTER ROAD TEST HOLE LOGS

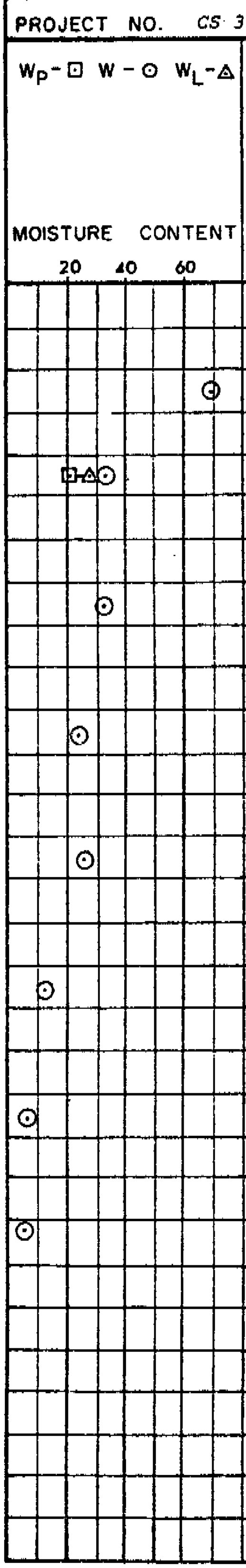
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP10*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 11, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *16:05*
FINISH *16:25*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt		*PEAT*		*N*						
	SC-GC		*SAND gravelly, trace low to medium plastic clayey silt pockets, dark olive brown*		*V 30-40%*						
							W1	☒			
			low plastic								
						Grain Size Plate E-22	*W2*	☒			
5											
			trace fines		*10%*		*W3*	☒			
10	*CI*		*CLAY silty, trace sand, medium plastic, dark grey*		*V 5-10%*		*W4*	☒			
							W5	☒			
15	*GP*		*GRAVEL sandy, silty, trace clay, dark grey*		*N*						
							W6	☒			
			coarse								
							W7	☒			
20			*trace fines*								
							W8	☒			
25			*Bottom of Hole at 23.5'.*								

PLATE *E-1*

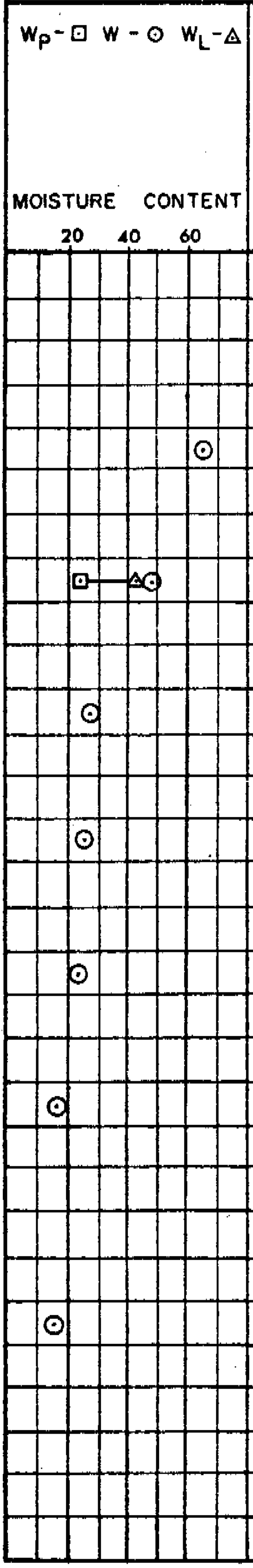
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP11*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 11, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *16:35*	FINISH *16:55*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	N						
	OL	*ICE AND ORGANIC SILT trace sand, non plastic*	ICE+ 80%						
5	CL-CI	*CLAY silty, sandy, low to medium plastic, dark olive grey, trace organics*	V 30-40%		W1	☒			
					W2	☒			
10		*medium plastic, dark brown*	10%						
					W3	☒			
		low to medium plastic, very silty	<5%	*Grain Size Plate E-23*	W4	☒			
15		*silty, sandy, fine grained, occasional fine gravel sizes, low plastic, dark brown*			W5	☒			
20		*occasional coal inclusions (till-like)*			W6	☒			
25	SM	*SAND fine grained, silty, trace gravel, trace clay, dark grey*	N		W7	☒			
		Bottom of Hole at 25.0'.							

PLATE *E-2*

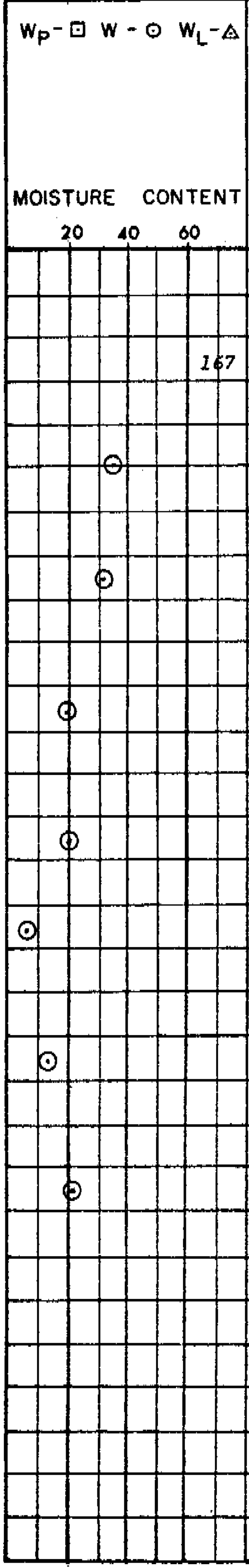
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP12

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 1, 1976
RIG Heli Drill
METHOD AIR
START 17:20
FINISH 17:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	PT	PEAT	N						
	OL	ICE AND ORGANIC SILT	ICE+						
	ML	SILT trace clay, low to medium plastic, organics	V 15%		W1	☒			
5	ML-CL	SILT clayey, low plastic, dark brown to grey	V 5%	Grain Size Plate E-24	W2	☒			
		ICE lens (3") low to medium plastic	<5%		W3	☒			
10		clayey, trace sand, very low plastic	5-10%		W4	☒			
					W5	☒			
15	GW	GRAVEL fine, sandy, brown-grey	Nf		W6	☒			
		sandy, trace clay			W7	☒			
20	CI	CLAY silty, trace sand, little gravel, medium plastic, dark grey (till-like)	N		W8	☒			
25									

PLATE E-3

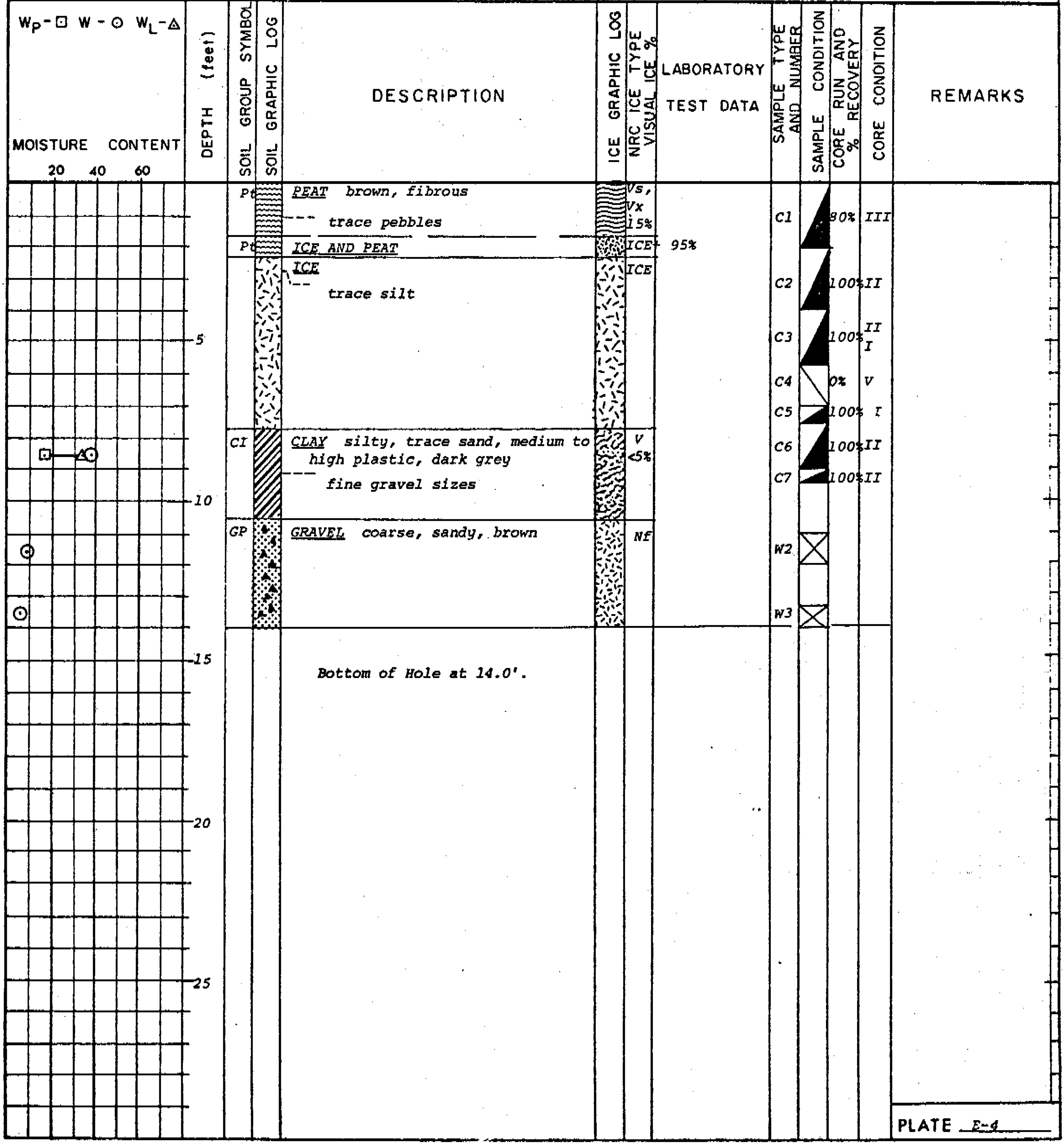
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP13

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 11, 1976
RIG Heli Drill	METHOD CRREL / AIR	START 18:10	FINISH 18:55
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT* brown, fibrous --- trace pebbles	Vs, Vx 15%		C1	80%	III	
	Pt	*ICE AND PEAT*	ICE+	95%				
		ICE --- trace silt	ICE		C2	100%	II	
5					C3	100%	II I	
					C4	0%	V	
					C5	100%	I	
	CI	*CLAY* silty, trace sand, medium to high plastic, dark grey --- fine gravel sizes	V <5%		C6	100%	II	
10					C7	100%	II	
	GP	*GRAVEL* coarse, sandy, brown	Nf		W2			
					W3			
15		Bottom of Hole at 14.0'.						
20								
25								

PLATE E-4

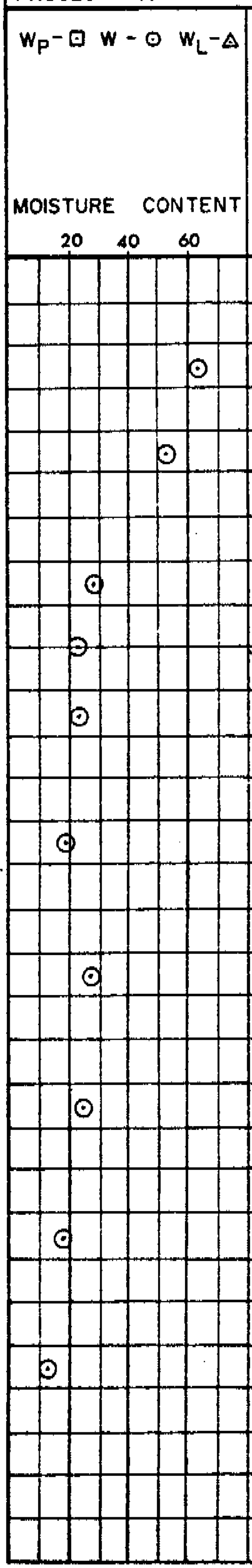
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP14

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 12, 1976
RIG Heli Drill	METHOD AIR	START 10:10	FINISH 10:35
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	F						
		ICE	ICE						
	CL	*ICE AND CLAY* silty, trace sand, low to medium plastic, grey	ICE+ 50%		W1	☒			
5	CL	*CLAY* silty, sandy, low to medium plastic, dark grey	V 15%		W2	☒			
	ML-CL	*SILT* very sandy, trace clay, low plastic, dark grey --- clayey, sandy, low to medium plastic, grey	V 5-10%		W3 C1	☒ ◩		III	
10	SM	*SAND* silty, trace gravel, dark grey --- silty, trace clay	V <5%	Grain Size Plate E-25	W4 W5	☒ ☒			
15	CI	*CLAY* silty, trace sand, low to medium plastic, dark grey	V <5%		W6	☒			
20	SC	*SAND* clayey, silty, very low plastic, occasional coal inclusions, grey-brown	V <5%		W7	☒			
25	CL	*CLAY* silty, sandy, trace gravel, small rust and coal inclusions, dark brown (till-like) --- very gravelly, grey	N		W8 W9	☒ ☒			
30		Bottom of Hole at 26.0'.							

PLATE E-5

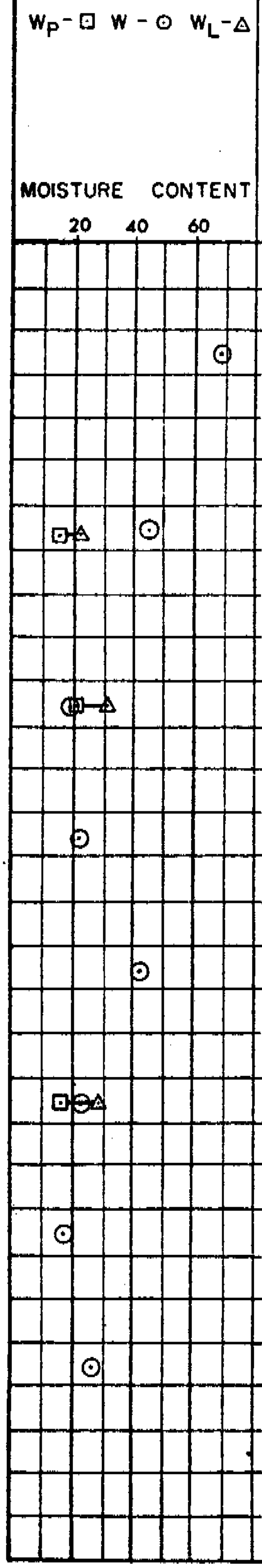
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP15

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 12, 1976
RIG Heli Drill
METHOD CRREL /AIR
START 11:12
FINISH 11:50
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE/ TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT	F					
	Pt	PEAT AND ICE fibrous, brown	V					
	OL	ORGANIC SILT AND ICE very clayey, trace fine sand, low to medium plastic, brown to grey	40%		W1			
5	CL	CLAY silty, trace fine sand, low plastic, dark grey	V <5%					
		--- very clayey, trace sand, low plastic			C1	90%	I	γ_{bulk} = 103 pcf γ_d = 71 pcf
10	SM	SAND fine grained, silty, trace clay, dark olive grey, low to medium plastic clay layers	N		W2			
		--- trace organic, clayey, low plastic			W3			
15								
	CL	CLAY silty, trace fine sand, low plastic, dark grey, trace organic	V <5%		W4			
				Grain Size Plate E-26	W5			
20		--- sandy						
		~~occasional gravel sizes~~						
	CL-CI	--- gravelly, silty, trace sand, low to medium plastic, dark grey (till-like)			W6			
		--- medium to high plastic						
25					W7			
		Bottom of Hole at 26.0'.						
30								

PLATE E-6

APPENDIX "E"

SECTION E.2 TEST HOLE LOGS: BORROW SOURCE ACCESS ROADS

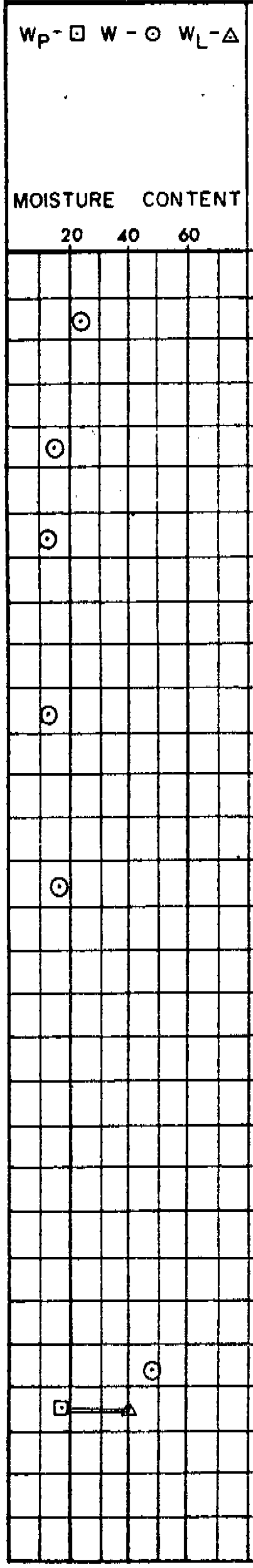
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP16

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 15, 1976
RIG Heli Drill
METHOD AIR
START 10:55
FINISH 11:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	GP	*GRAVEL* fine, sandy							
	SM	*SAND* fine to coarse grained, some fine gravel, silty, brown, non plastic	V 10%		W1	☒			
5	GP	*GRAVEL* fine to coarse, sandy, fine to coarse, clayey	V 5%		W2	☒			
		less sand, coarse grained, trace silt		Grain Size Plate E-27	W3	☒			
		gravel to 1 1/2" - 2" ø							
10	GM	*GRAVEL* sandy, fine grained, silty	V 10%		W4	☒			
		fine gravel sizes, very sandy, fine grained, little coarse sand, silty, brown							
15	GP	*GRAVEL* fine to trace coarse, sandy, fine to coarse grained			W5	☒			
		ICE	ICE						
20 25	CL-CI	*CLAY* silty, sandy, fine grained, low plastic, high ice content	V						
30		very silty, medium plastic	Vbe 5%		W6	☒			

PLATE E-7

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

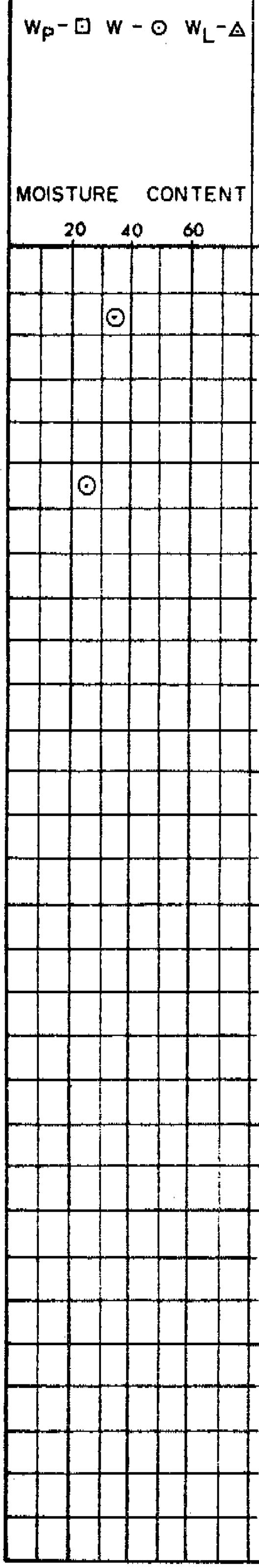
TEST HOLE LOG

PROJECT

PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP16 (con't)*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 15, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *10:55*
FINISH *11:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	SP	▒	*SAND* fine grained, trace silt, trace fine gravel, brown	▒	V 10%		W7	☒			
35							W8	☒			
			Bottom of Hole at 36.0'.								
40											

PLATE *E-7 (con't)*

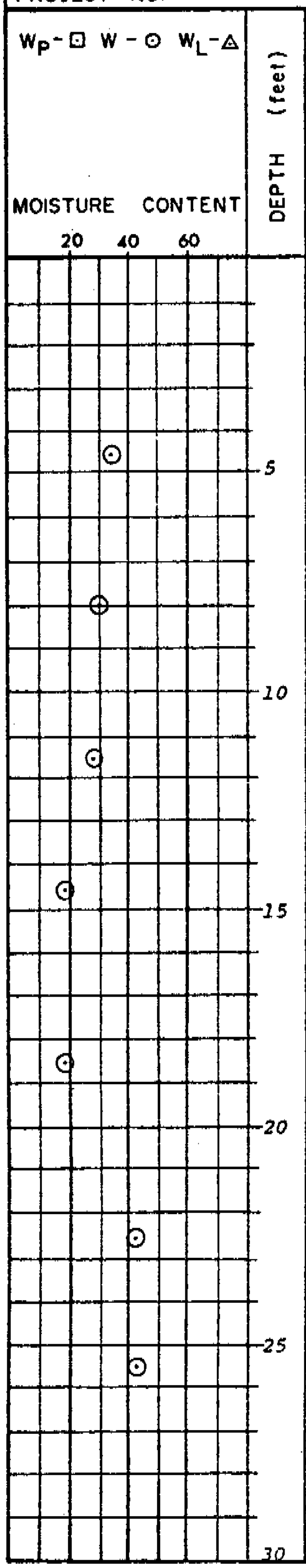
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP17

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 16, 1976
RIG Heli Drill
METHOD AIR /CRREL
START 11:50
FINISH 12:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	Nbe					
ML	SILT sandy, brown						
	ICE	ICE					
CL	CLAY very silty, sandy, fine grained, low plastic, brown, trace organics	Nbe		W1			
	1" ice lens silty, sandy, fine grained, low plastic, brown	Nbn		C1	70%	I V	γ_{bulk} = 113 pcf γ_d = 87 pcf
	very silty, low to medium plastic			W2			
SP	SAND medium to coarse grained, very gravelly, fine, trace clay, dark brown	V 5%		W3			
	fine to coarse grained, gravelly, fine						
	medium to coarse grained, fine gravel sizes			W4			
SC	SAND fine to coarse grained, very clayey, silty, fine gravel sizes, low to medium plastic, grey	Vs, Vx 40%		W5			
	fine grained, clayey, trace fine gravel	25%		W6			
	Bottom of Hole at 26.0'.						

PLATE E-8

TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP18

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 16, 1976
RIG Heli Drill	METHOD AIR	START 17:30	FINISH 15:10
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △
MOISTURE CONTENT 20 40 60

MOISTURE CONTENT	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		Pt	PEAT							
⊙		GP	GRAVEL fine to coarse, to 2"ø, silty, sandy, fine grained	V <5%		W1	☒			
⊙		CI	CLAY very silty, sandy, low to medium plastic, grey brown	Nbe		W2	☒			
⊙	5	GM	GRAVEL coarse, some fine gravel, sandy, fine to coarse grained, trace clay	V 5%		W3	☒			
128 % ⊙	10	SM	ICE AND SAND fine grained, silty, brown	ICE+ 50%		W4	☒			
138 % ⊙	15		fine grained, little medium sand, silt, trace clay, gravelly	80%	Grain Size Plate E-28	W5	☒			
⊙						W6	☒			
		GP	GRAVEL coarse, little fine gravel trace sand	V 20%						
⊙	20		silty	30%		W7	☒			
	25		Bottom of Hole at 23.5'.							

PLATE E-9

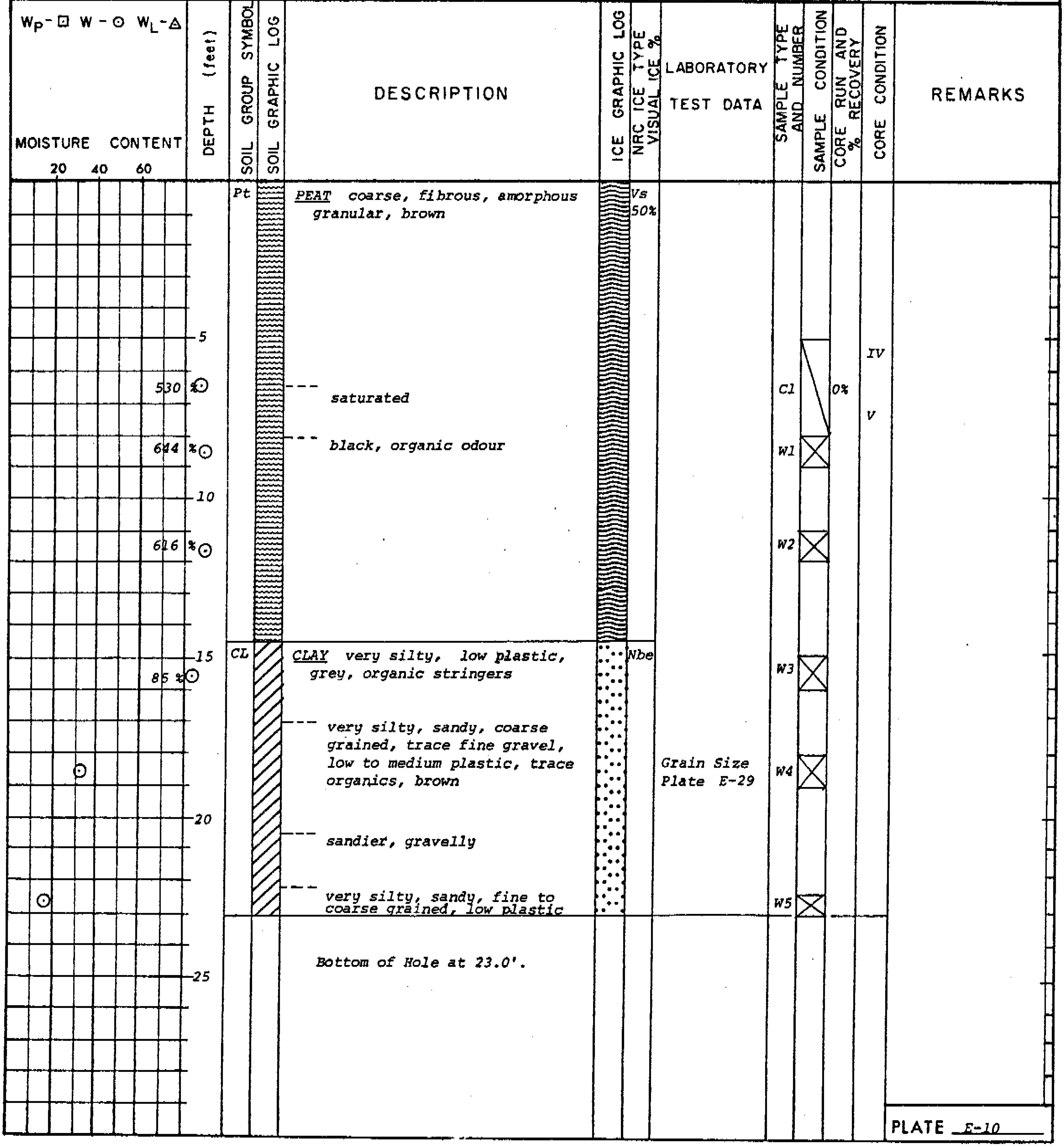
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP19

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 19, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 13:35
FINISH 14:40
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



W_P-⊡ W-⊙ W_L-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		Pt		PEAT coarse, fibrous, amorphous granular, brown		Vs 50%						
	5										IV	
530 %				saturated				C1		0%	V	
644 %				black, organic odour				W1	☒			
	10											
616 %								W2	☒			
85 %	15	CL		CLAY very silty, low plastic, grey, organic stringers		Nbe		W3	☒			
				very silty, sandy, coarse grained, trace fine gravel, low to medium plastic, trace organics, brown			Grain Size Plate E-29	W4	☒			
	20			sandier, gravelly								
				very silty, sandy, fine to coarse grained, low plastic				W5	☒			
				Bottom of Hole at 23.0'.								
	25											

PLATE E-10

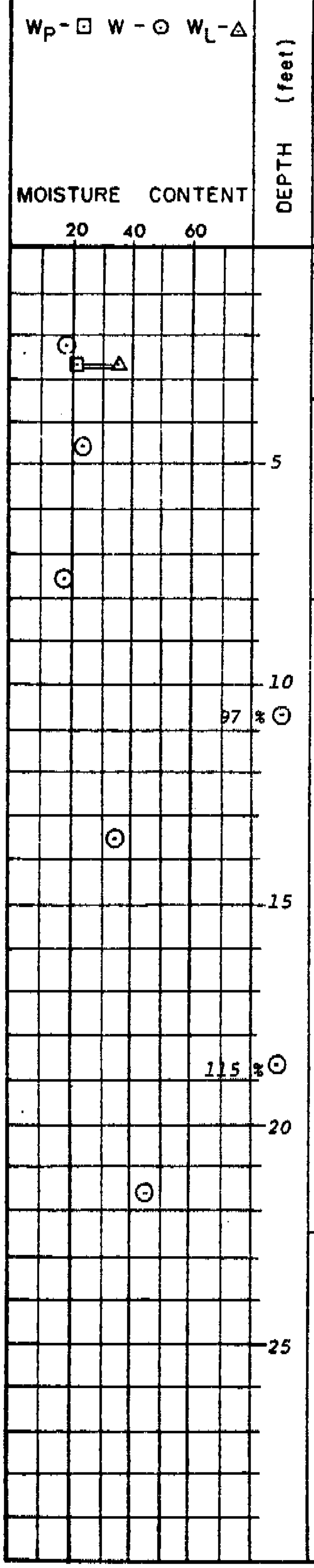
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP20

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 16, 1976
RIG Heli Drill
METHOD AIR
START 16:20
FINISH 16:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT							
CI	CLAY very silty, sandy, medium plastic, occasional fine gravel sizes, brown	V 5%		W1	☒			
GP-GM	GRAVEL fine to coarse, to 1 1/2" diameter, sandy, fine to coarse grained, silty	V 5%		W2	☒			
	- - - sandy, silty, brown			W3	☒			
GP	ICE AND GRAVEL	ICE+		W4	☒			
	- - - trace fines			W5	☒			
				W6	☒			
				W7	☒			
	Bottom of Hole at 22.5'.							

PLATE E-11

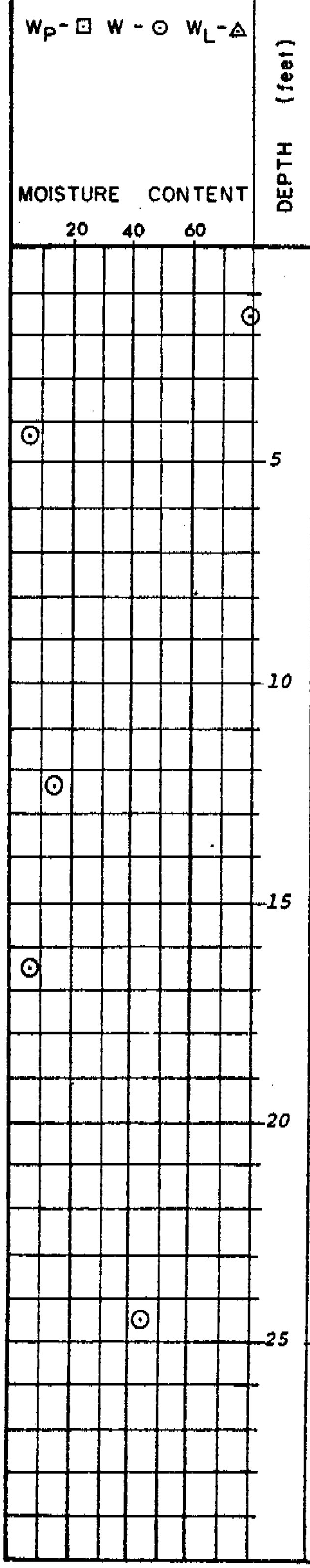
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP21

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 13:50
FINISH 14:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
Pt	PEAT	Nbe						
ML	SILT sandy, clayey, low plastic, brown, trace gravel	V 50%	Grain Size Plate E-30	W1	☒			
GW	GRAVEL sandy, fine to coarse grained	Nbn		W2	☒			
SP	SAND fine grained	Nbn						
SP	ICE AND SAND fine grained	ICE+ 95%						
GW	GRAVEL sand, fine to coarse grained, some boulders	V <5%		W3	☒			
	sandy, fine to coarse grained			W4	☒			
SP	SAND fine grained	V 40%		W5	☒			

Bottom of Hole at 25.0'.

PLATE E-12

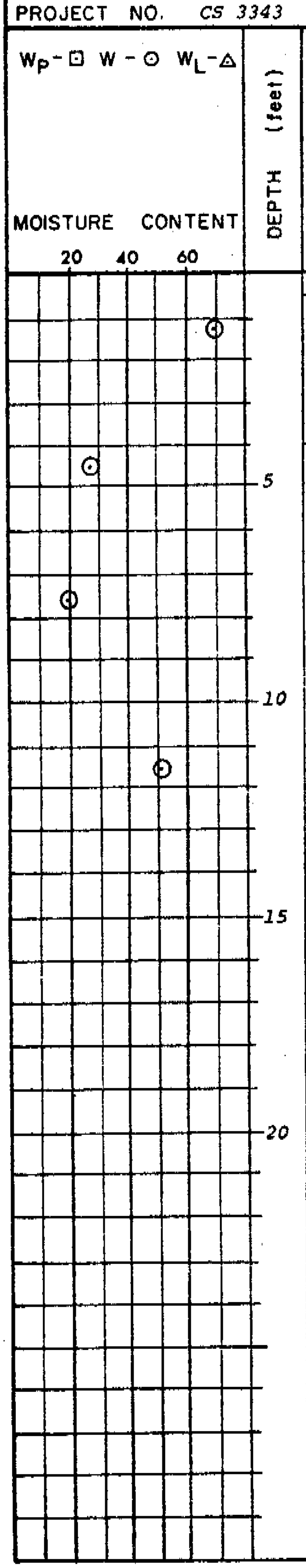
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP22

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR
START 14:45
FINISH 15:40
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	Nbn						
ML	SILT sandy, fine to coarse grained occasional fine gravel sizes, low plastic, cobble at 1' depth	Vs 60%		W1	☒			
SM	SAND fine to coarse grained, some fine gravel, silty, trace organics, brown	V 20%		W2	☒			
	--- no organics			W3	☒			
	--- organic peat stringers			W4	☒			
GM	GRAVEL silty, sandy, fine to coarse grained	V 10%		W5	☒			
	--- cobble to 4" diameter							

Bottom of Hole at 19.0'.

PLATE E-13

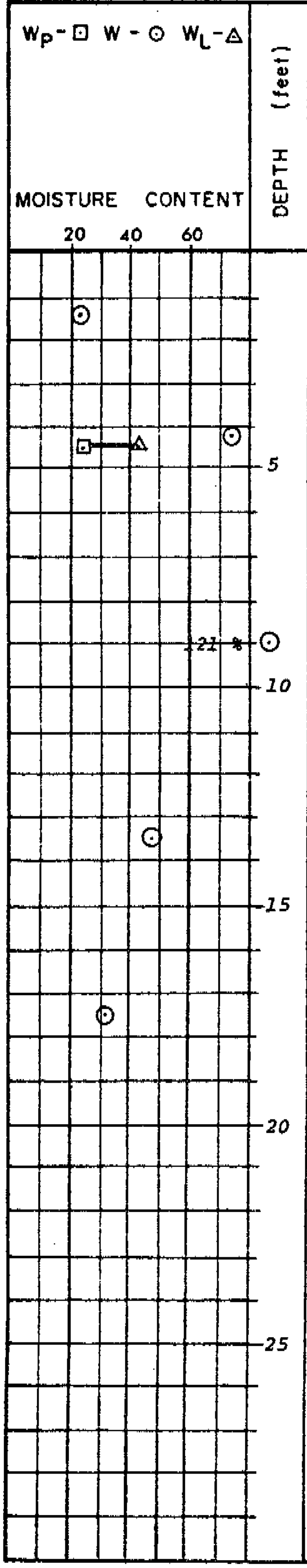
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP23

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 16, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 17:00
FINISH 18:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE % RUN AND RECOVERY	CORE CONDITION	REMARKS
CL-CI	*CLAY* silty, occasional fine gravel sizes, trace fine sand, low to medium plastic, grey-brown, trace organics	Nbn		W1			
CI	*CLAY* very silty, sandy, medium plastic, grey	V 60%	Grain Size Plate E-31	W2			
	medium plastic, grey, silty, some fine sand			CI	100%	II	γ_{bulk} = 76 pcf γ_d = 35 pcf
	very silty, trace sand, medium plastic, brown low to medium plastic	40%		W3			
	very silty, low to medium plastic, grey	20%		W4			
	some fine gravel (till-like)	10%					

Bottom of Hole at 22.0'.

PLATE E-14

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP24

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 18, 1976
RIG Heli Drill
METHOD AIR/CRREL
START 6:00 AM
FINISH 7:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT 20 40 60	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
269 %⊙	Pt	*PEAT* amorphous granular, silty, dark brown	V 40%		W1	☒			
	CL-CI	*ICE AND CLAY* very silty, trace sand, low to medium plastic, brown	ICE+ 90%						
155 %⊙	CL-CI	*CLAY* silty, brown, low to medium plastic, occasional rust specks (till-like)	Vx, Vs 15%		W2	☒			
83 %⊙ ⊙	CL-CI	ICE AND CLAY silty, low to medium plastic, grey	ICE+ 70%		W3	☒			
	CL-CI	CLAY silty, sandy, low to medium plastic	Vx, Vs 15-20%		C1		100%	II	
	CL-CI	*ICE AND CLAY* silty, trace of fine sand, low to medium plastic, brown	ICE+ 90%						
	GP	*ICE AND GRAVEL* sandy	ICE+ 80%						

DEPTH (feet): 5, 10, 15, 20, 25, 30

PLATE E-15

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP24 (cont)*

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 18, 1976*
RIG *Heli Drill*
METHOD *AIR/CRREL*
START *6:00 AM*
FINISH *7:10*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

Wp-⊡ W-⊙ WL-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	GP		*ICE AND GRAVEL* sandy (con't)		ICE+ 80%						
⊙	35							W4	☒			
				Bottom of Hole at 36.0'.								
	40											

PLATE *E-15 (con't)*

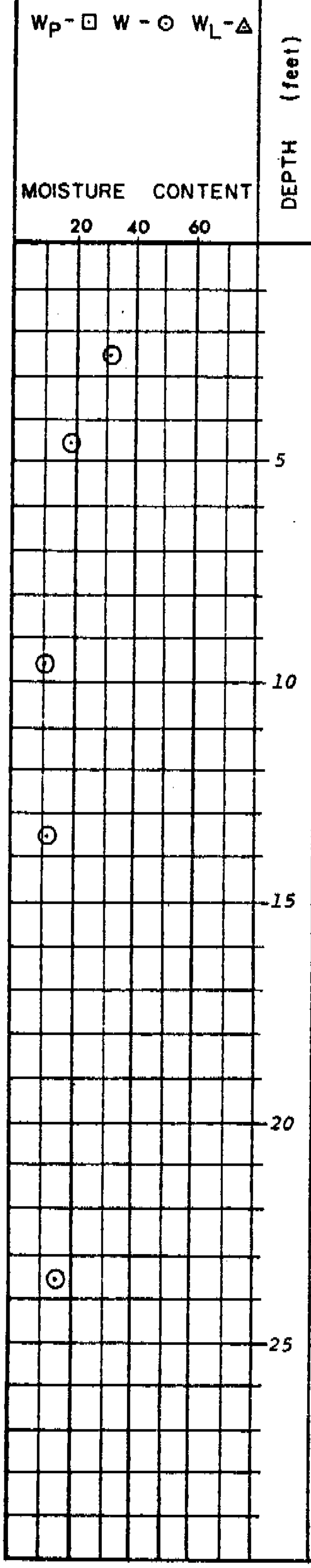
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP25

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 18, 1976
RIG Heli Drill
METHOD AIR
START 9:05
FINISH 9:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI	CLAY silty, trace sand, medium plastic, occasional pebbles, grey to brown, mottled	V 50%		W1	☒			
CL	CLAY silty, numerous coarse sand and fine gravel sizes, low plastic	V >5%		W2	☒			
	ICE	ICE						
CL	CLAY AND ICE gravelly	V 50%						
	ICE	ICE						
CL	CLAY AND ICE gravelly	V 50%						
GP	GRAVEL fine to occasional coarse sizes, sandy, coarse to fine grained	Vx, Vc 10%		W3 W4	☒ ☒			
	ICE	ICE						
SM	ICE AND SAND fine grained, silty	ICE+ 50%						
GW	GRAVEL fine to medium grained, brown	V 15%		W5	☒			
	Bottom of Hole at 25.0'.							

PLATE E-16

APPENDIX "E"

SECTION E.3 TEST HOLE LOGS: S.T.O.L. AIRSTRIP ACCESS ROAD

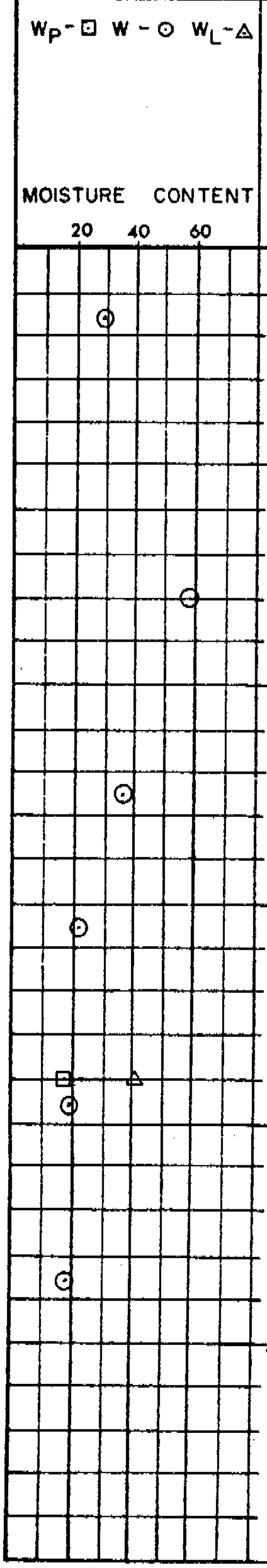
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. PS1

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 10:50
FINISH 11:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
CI	*CLAY* silty, trace sand, medium plastic, brown	V 20%		W1	☒			
CI	*ICE AND CLAY* silty, medium plastic, grey — — trace fine sand	ICE+ 70%						
CI	*CLAY* silty, medium plastic, grey	Vr 15%		C1		50%	III	γ_{bulk} = 98 pcf γ_d = 63 pcf
	— — silty, sandy, fine to coarse grained, medium plastic, occasional coal inclusions, grey-brown (till-like)	Vx 10%		W2	☒			
	— — occasional gravel sizes	<5%		W3	☒			
		Nbn						
	— — silty, grey, medium plastic, trace gravel		Grain Size Plate E-32	W4	☒			
	— — gravelly			W5	☒			
	— cobble							

DEPTH (feet): 5, 10, 15, 20, 25

Bottom of Hole at 25.0'.

PLATE E-17

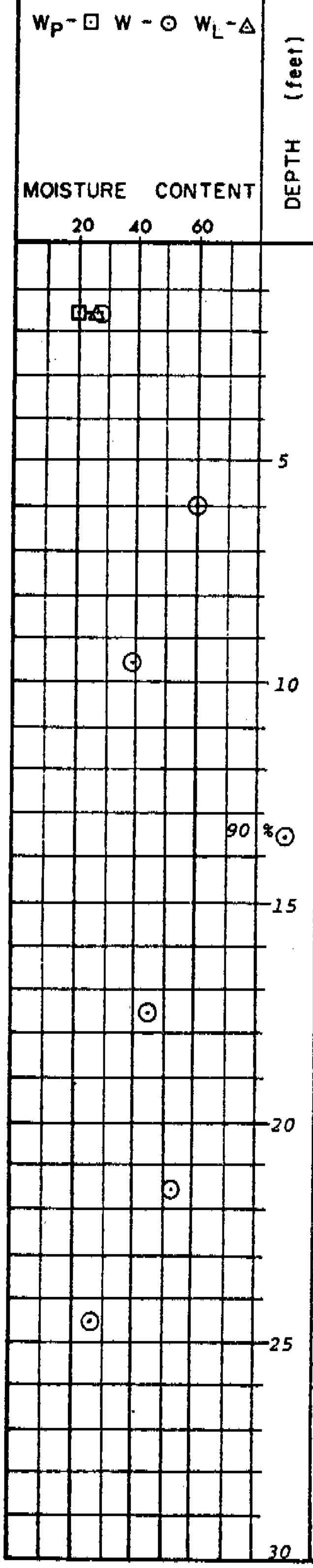
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. PS2

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 12:40
FINISH 13:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI	*CLAY* silty, trace sand and fine gravel, medium plastic, grey	V 15%		W1			
	very gravelly, sandy						
	silty, sandy, gravel sizes to 1"ø, medium to low plastic, grey	Vx, Vs 40-50%		C1	50%	IV II	γ_{bulk} = 95 pcf γ_d = 59 pcf
		V 10%					
	trace coarse sand			W2			
CI	*CLAY AND ICE* silty, sandy	V 70%		W3			
GP	*GRAVEL* sandy, fine to coarse grained	V 10%					
SM-SP	*SAND* fine grained, silty, gravelly, fine, grey	V 25%	Grain Size Plate E-33	W4 W5			
	ICE	ICE					
SM	*SAND* medium grained, gravelly, fine	V <5%		W6			
	ICE	ICE					

PLATE E-18

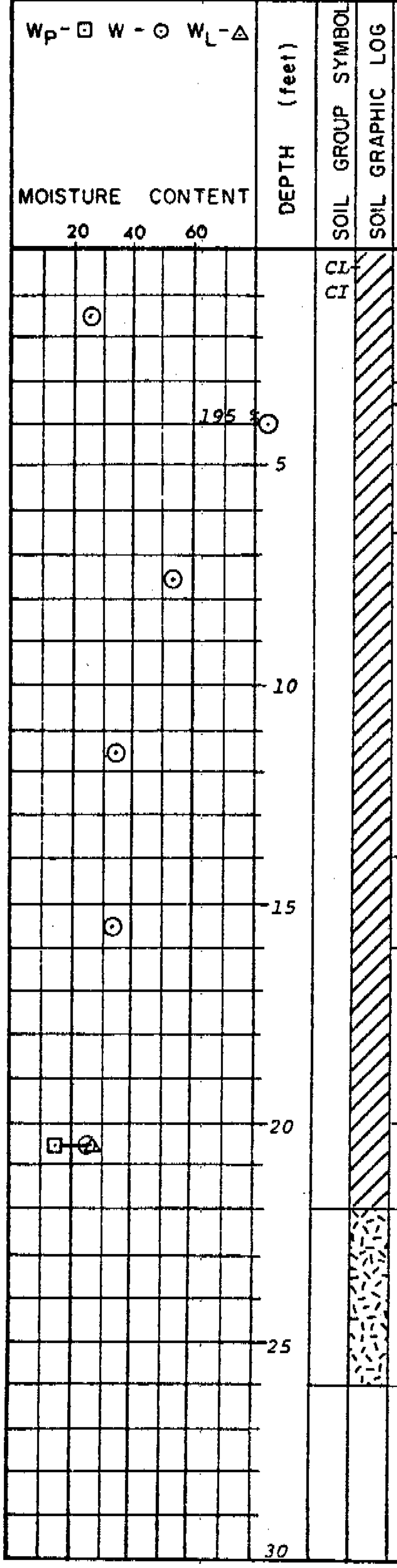
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. PS3

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD AIR / CRREL
START 13:35
FINISH 14:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CL-CI	*CLAY* silty, trace fine to medium grained sand, low to medium plastic, grey-brown (till-like) layered	V 5%		W1			
	very silty, organics						
	low to non plastic, brown, silt layer, sandy	Vs, Vr 30%	Grain Size Plate E-34	C1	80%	I	γbulk = 69 pcf γd = 24 pcf
	silty, some clay						
	silty, trace sand, low to medium plastic, grey	V 5%		W2			
		Nbn		W3			
	very silty, sandy, low plastic, brown						
				W4			
	gravelly, sandy, silty						
	silty, sandy, fine to medium grained, low plastic, grey			W5			
	ICE	ICE					

Bottom of Hole at 26.0'.

PLATE E-19

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

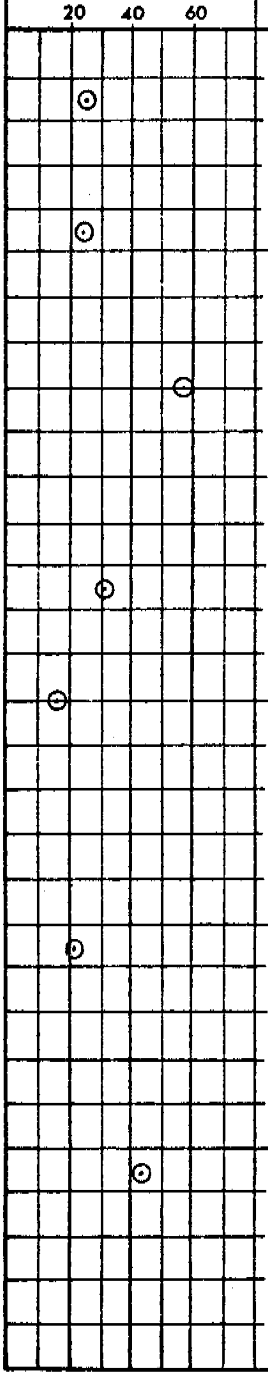
PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. PS4

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 14:40	FINISH 15:05
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	*SILT* clayey, sandy, fine grained, low plastic, brown	V 15%		W1	☒			
SM	*SAND* fine grained, silty, brown	Nbn	Grain Size Plate E-35	W2	☒			
CH	*CLAY* silty, medium to high plastic, grey	Vs, Vx 40%		C1	◣	90%	I	γ_{bulk} = 99 pcf γ_d = 63 pcf
SM	*SAND* fine grained, silty, clayey, grey fine to coarse grained, trace fine gravel, silty	Nf		W3 W4	☒ ☒			
CL	*CLAY* silty, trace fine gravel, low to medium plastic, dark grey very silty, sandy, fine to medium grained, low plastic, gre	V 5%		W5 W6	☒ ☒			
	Bottom of Hole at 26.0'.							

PLATE E-20

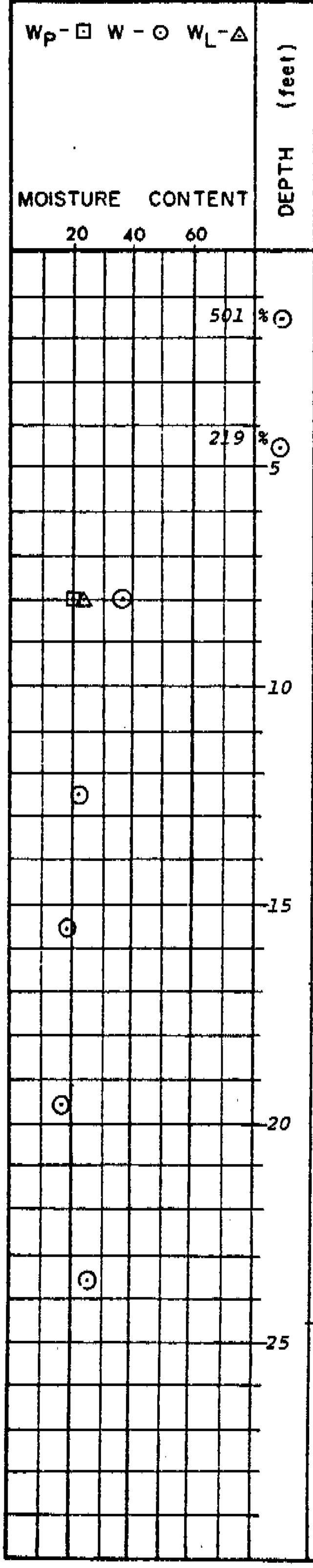
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. PS5

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 21, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 15:15
FINISH 16:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* fibrous, reddish-brown, trace sand	V 5%		W1			
	ICE	ICE					
Pt	*PEAT* fibrous, woody, organics, reddish --- silty	V 5%		W2			
CL	*CLAY* silty, low plastic, grey	Vs 25%		C1	90%	I	γ_{bulk} = 114 pcf γ_d = 86 pcf
		V 5%					
	--- sandy, fine grained, trace gravel			W3			
	--- silty, sandy, trace fine gravel low to medium plastic, grey-brown			W4			
	--- occasional fine gravel sizes, low plastic	Nbn					
				W5			
	--- very silty, grey, low plastic	V 5%		W6			
	Bottom of Hole at 24.5'.						

PLATE E-21

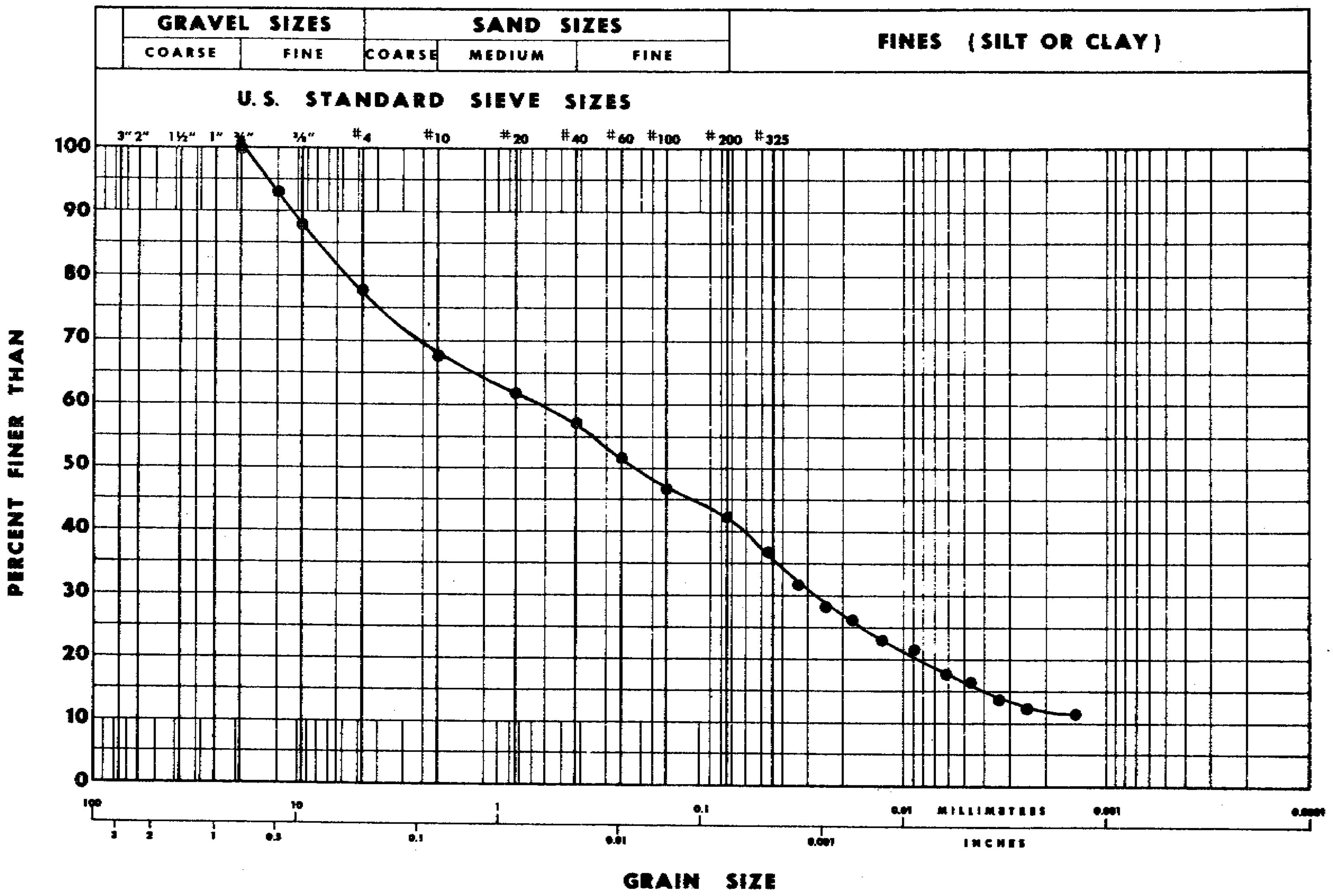
APPENDIX "E"

SECTION E.4 PARTICLE SIZE ANALYSES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO.	CS3343
CLIENT	G.O.C.L
SAMPLE	W2
SOURCE	Parson's Lake N.W.T.
HOLE	VP10
DEPTH	4-5
DATE REC'D.	
TECHNICIAN	CS
DATE TESTED	May/76

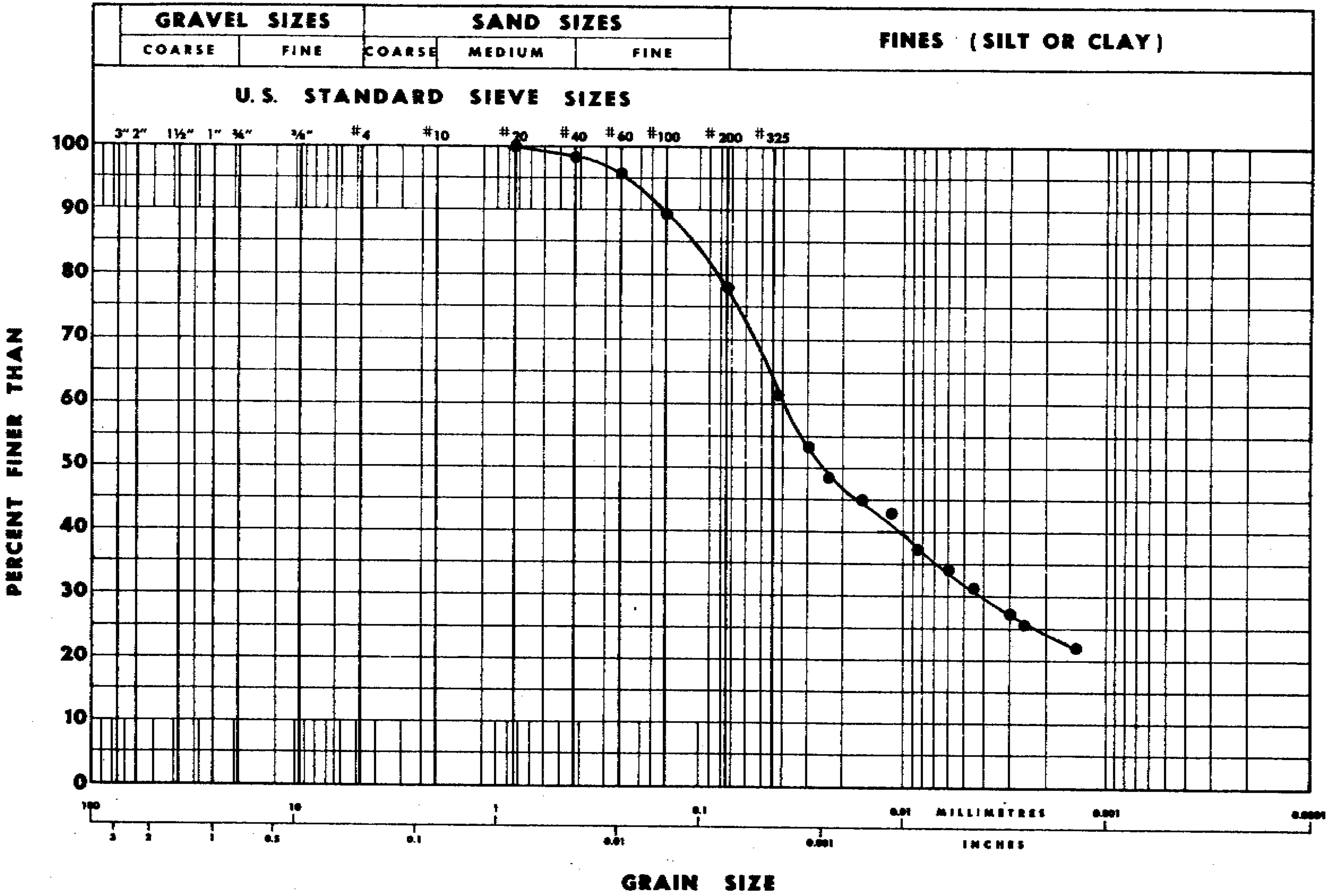


REMARKS:

D$_{10}$= MM.
D$_{30}$= MM.
D$_{60}$= MM.
C$_{U}$
C$_{C}$

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-22



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
HOLE VP11 DEPTH 13-14 DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

PLATE E-23

R.M.HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343

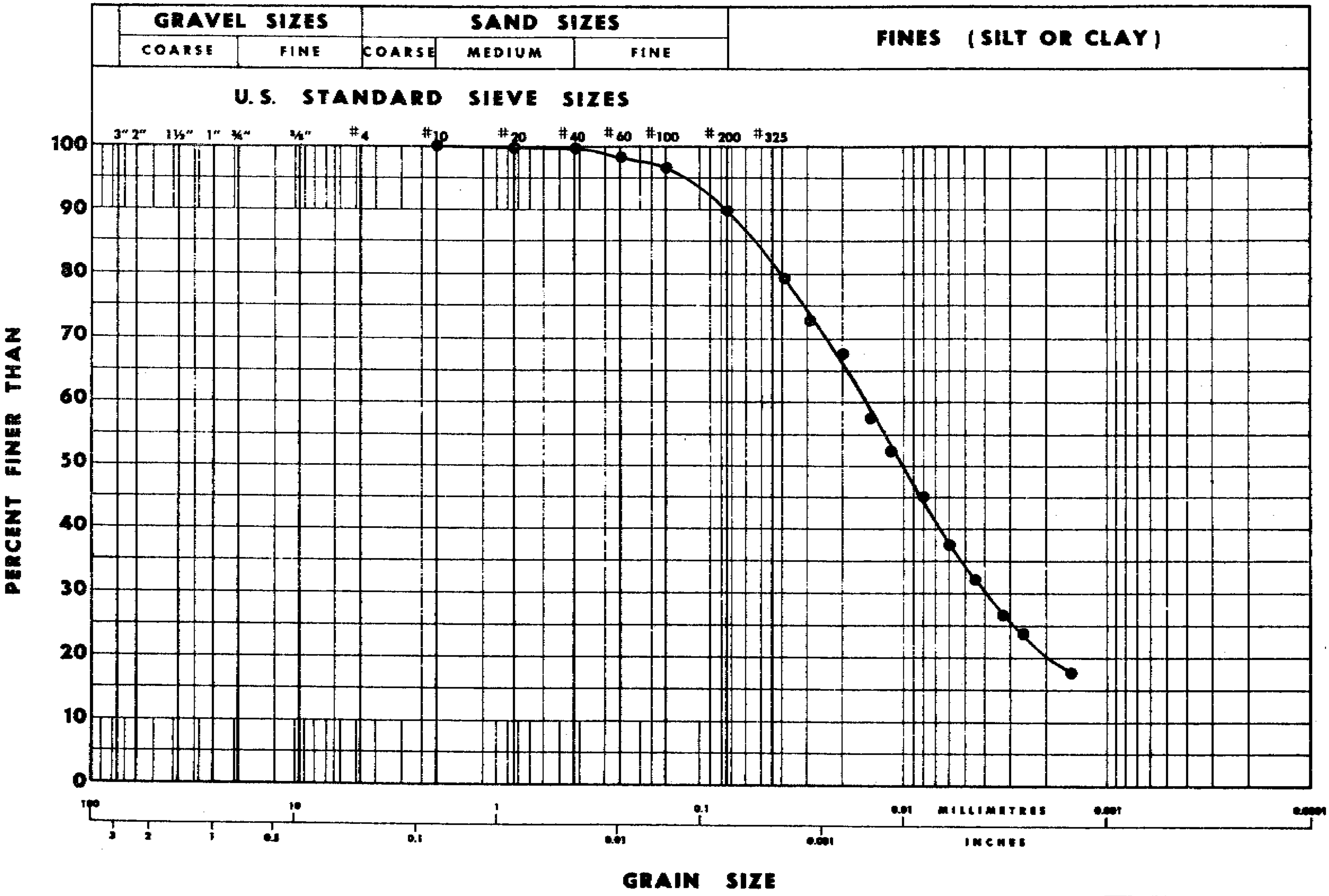
CLIENT G.O.C.L.

SAMPLE W2

SOURCE Parson's Lake N.W.T.

HOLE VP12 DEPTH 4.5-5.5'

TECHNICIAN CS DATE TESTED May/76



REMARKS: __________

D$_{10}$= ______ MM.

D$_{30}$= ______ MM.

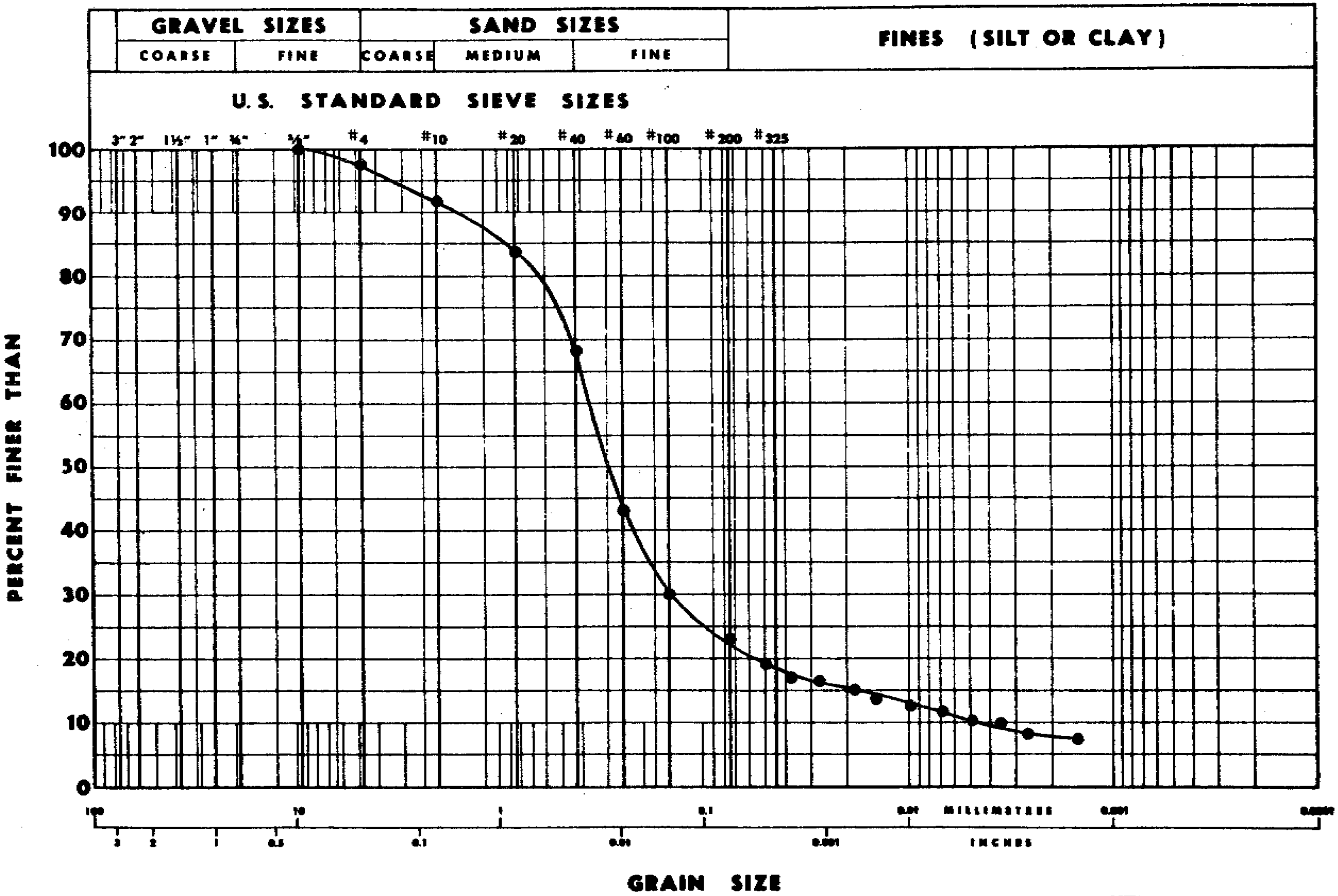
D$_{60}$= ______ MM.

C$_U$ ______

C$_C$ ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-24



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

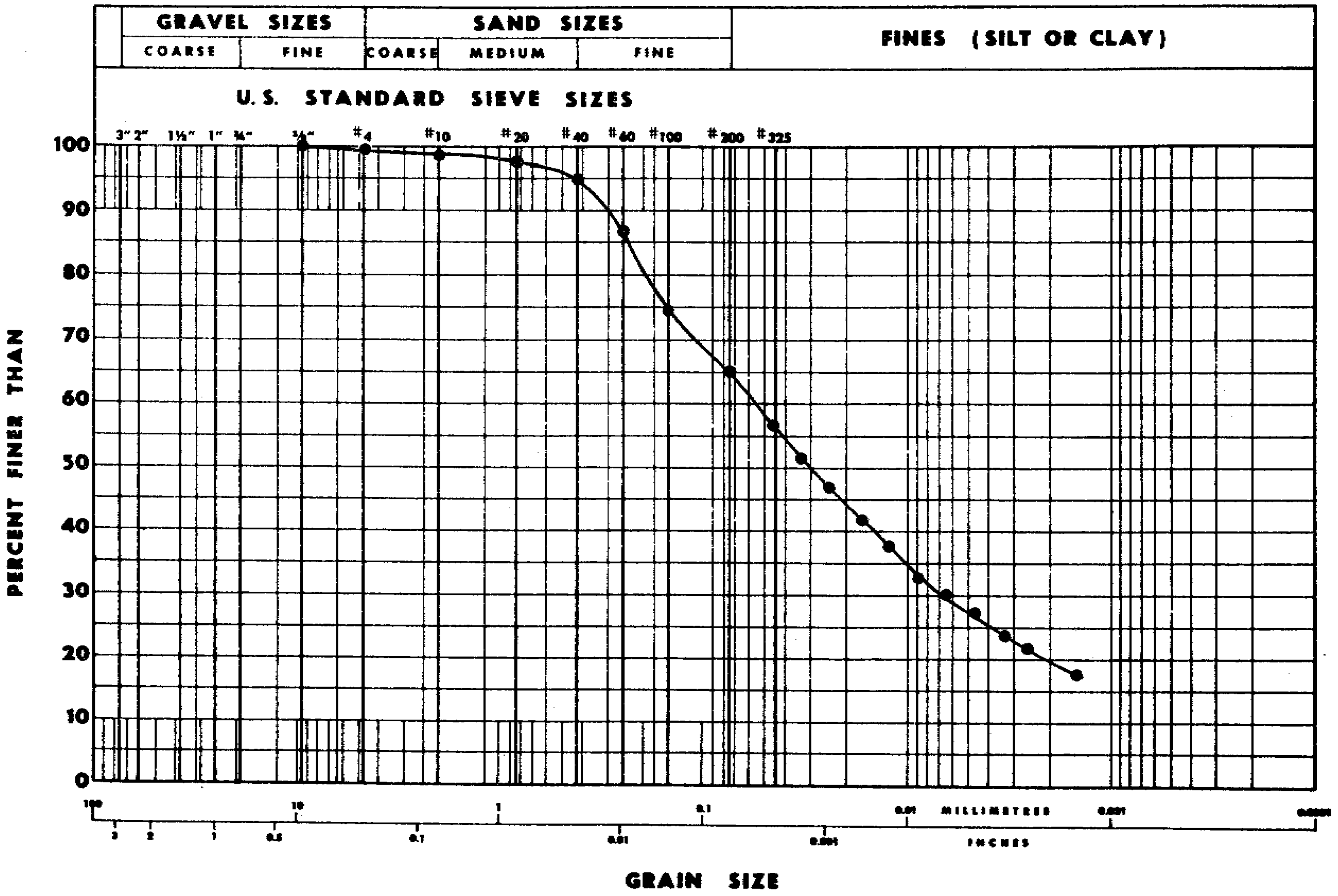
LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
Hole VP14 @ 10-11'
TECHNICIAN CS
DATE TESTED Apr. 76

REMARKS: __________

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-25



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

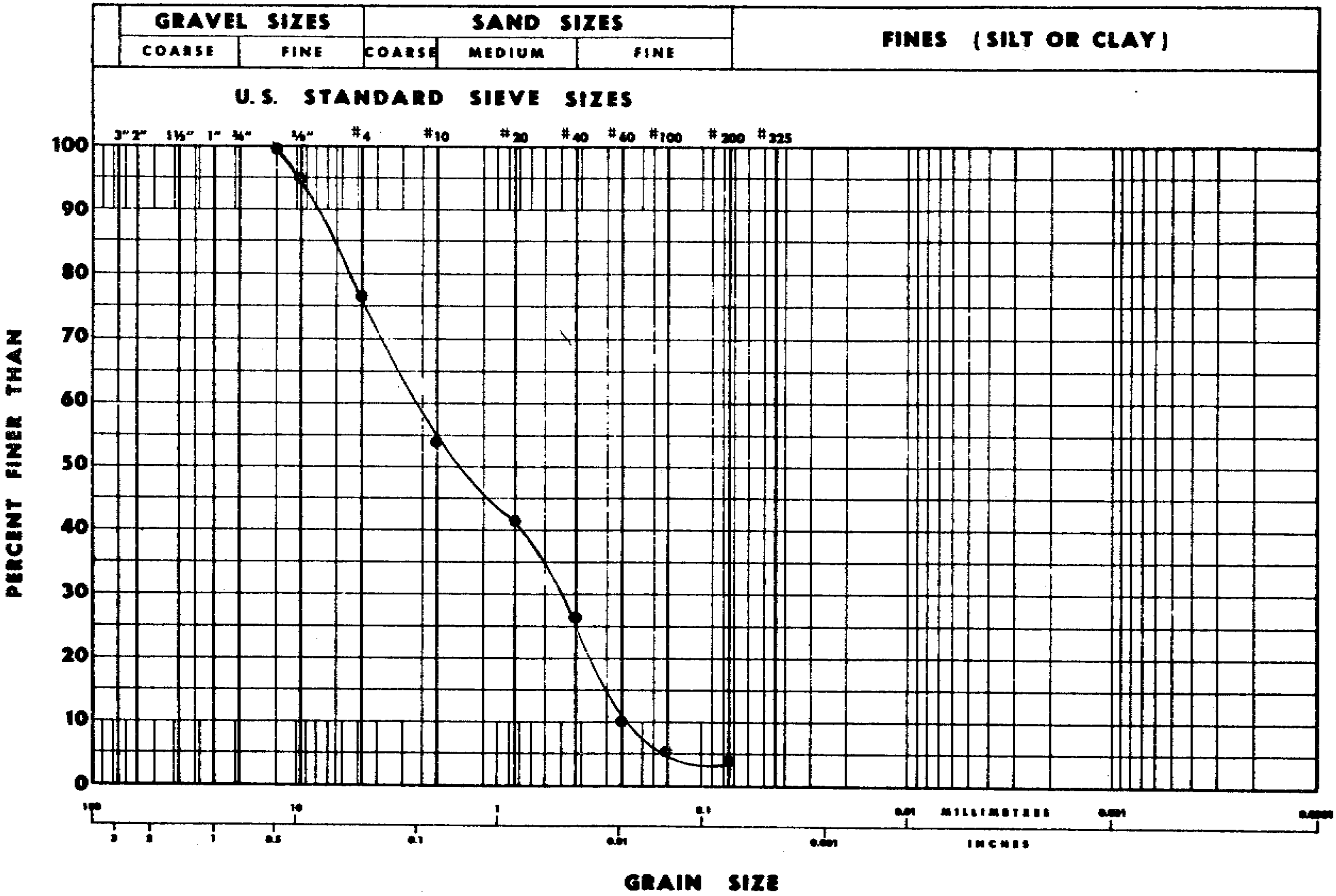
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE E-26

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole VP15 @ 19-20'
TECHNICIAN CS
DATE TESTED Apr.76



REMARKS:

D_{10}= ________ MM.
D_{30}= ________ MM.
D_{60}= ________ MM.
C_U ________
C_C ________

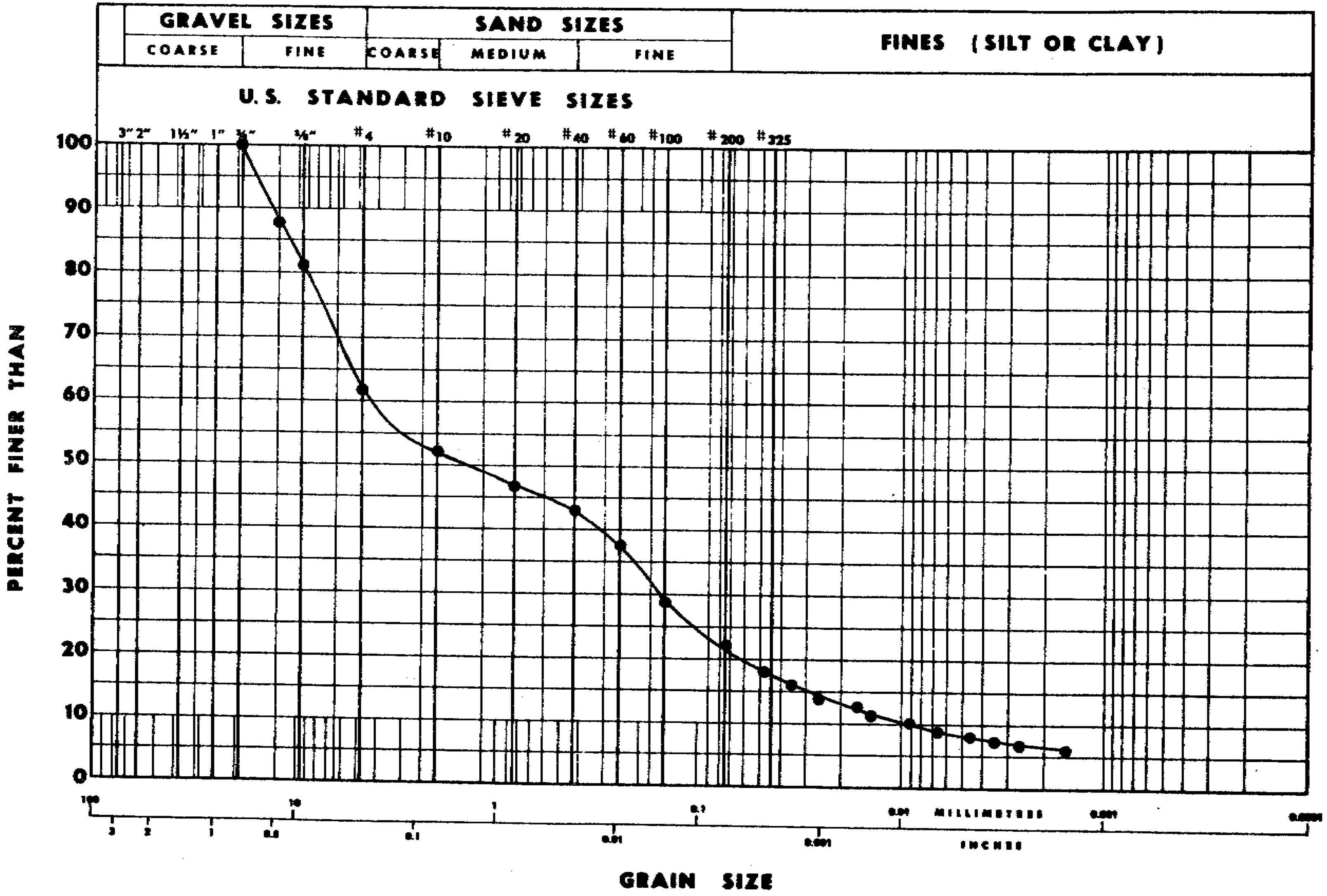
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-27

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole VP16 @ 6-7'
TECHNICIAN CS
DATE TESTED Apr/76



R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343

CLIENT G.O.C.T.

SAMPLE W5

SOURCE Parson's Lake N.W.T.

Hole VP-18 @ 14-15'

TECHNICIAN CS.

DATE TESTED Apr.76

REMARKS:

D_{10} = ________ MM.

D_{30} = ________ MM.

D_{60} = ________ MM.

C_U ________

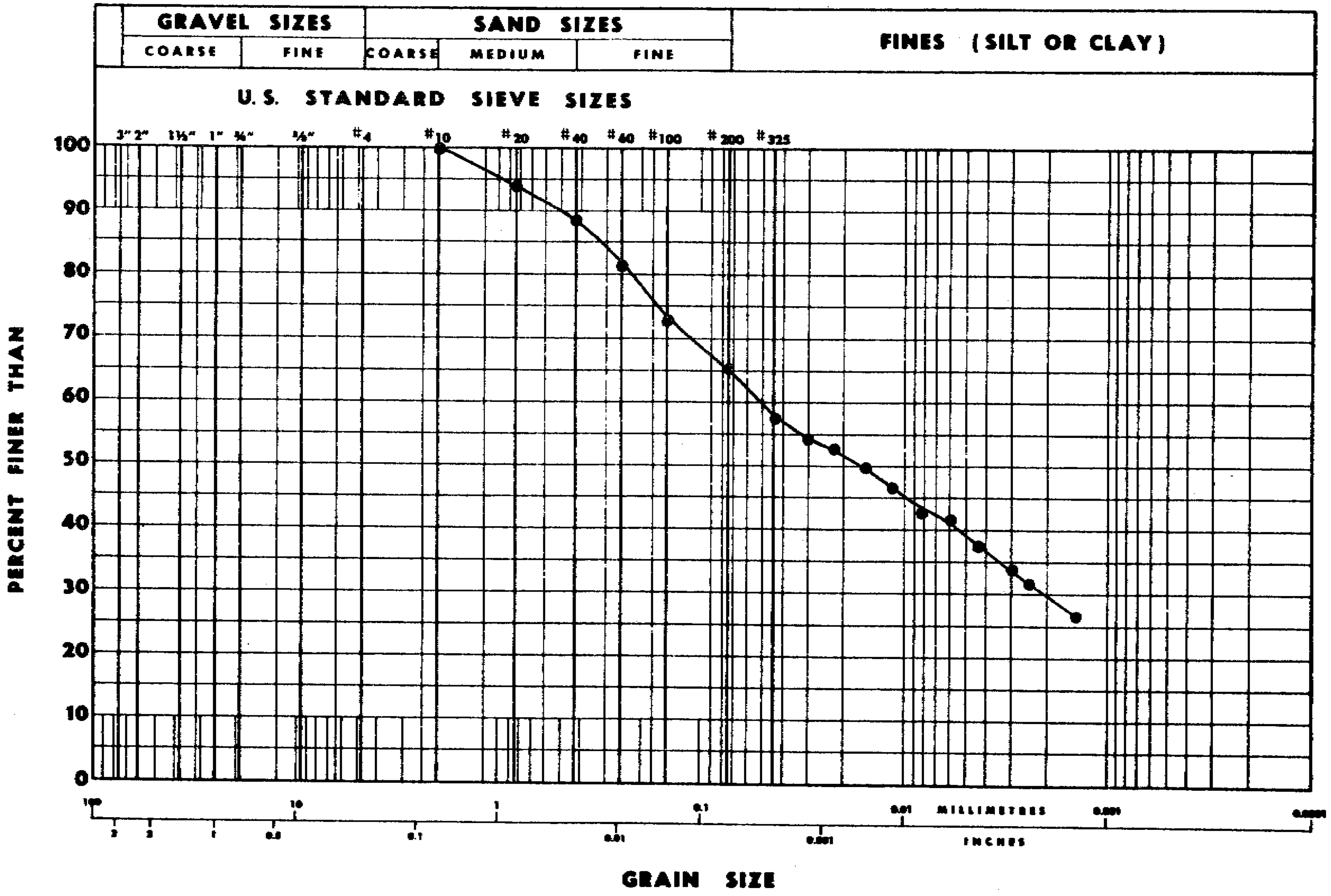
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-28

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE



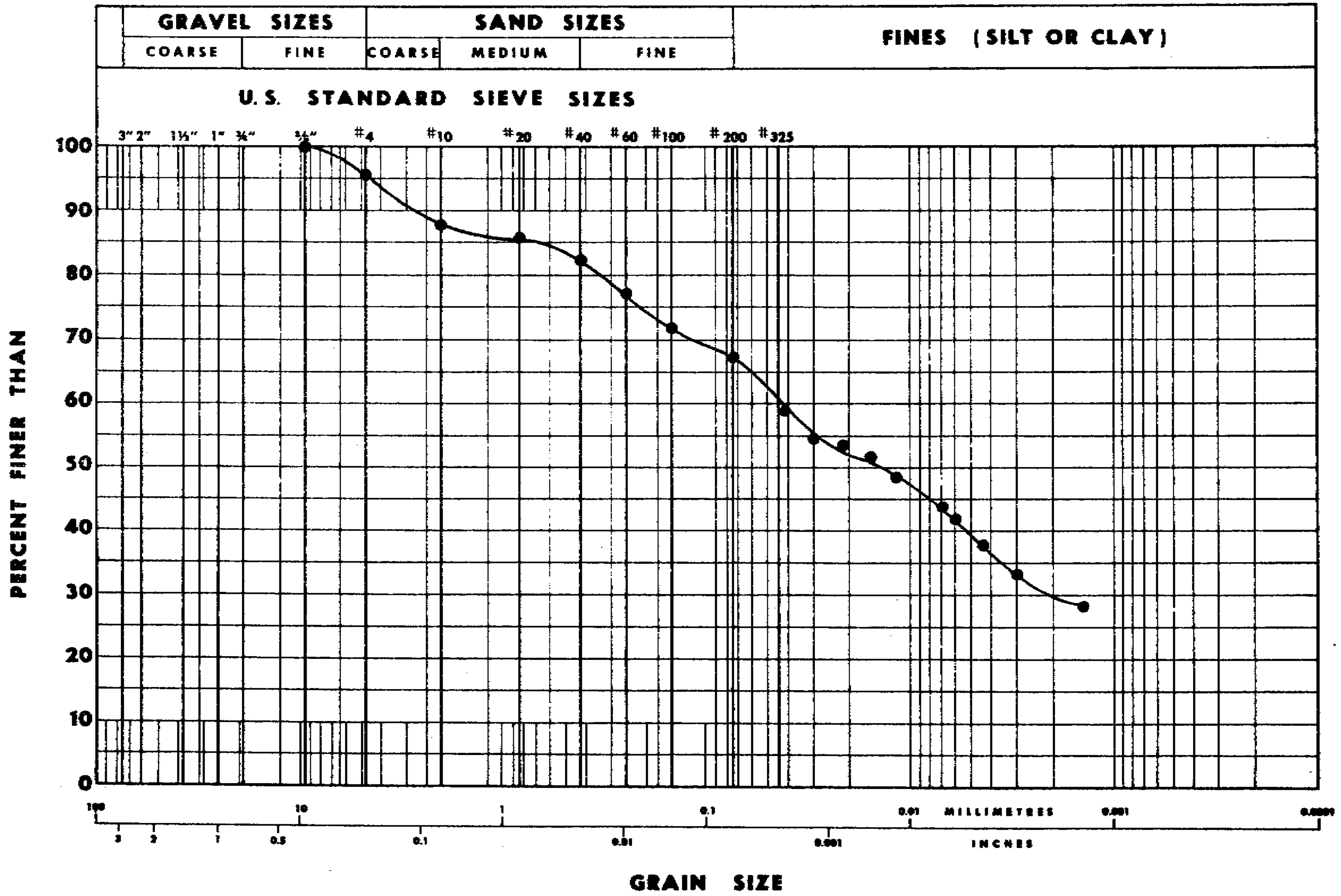
REMARKS:

D10 = ______ MM.
D30 = ______ MM.
D60 = ______ MM.
CU ______
CC ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Hole/TP 19 @ 18-19'
TECHNICIAN CS
DATE TESTED Apr. 76

PLATE E-29



REMARKS:

D_{10}=		MM.
D_{30}=		MM.
D_{60}=		MM.
C_U		
C_C		

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-30

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
HOLE VP21 DEPTH 1-2' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

R.M.HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343

CLIENT G.O.C.L.

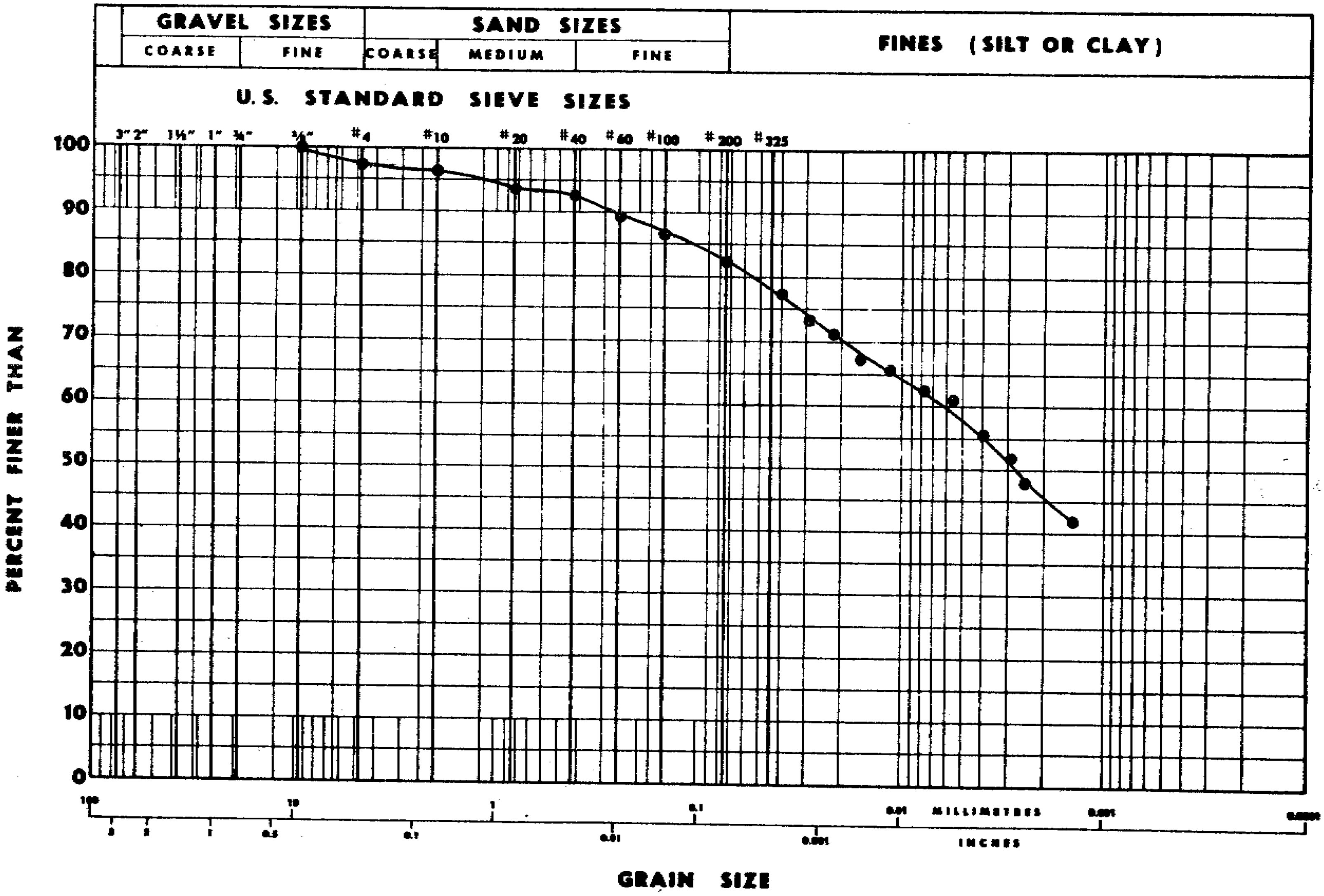
SAMPLE W2

SOURCE Parson's Lake N.W.T.

Hole VP23 @ 4-5'

TECHNICIAN CS

DATE TESTED Apr.76



REMARKS:

D_{10} = ______ MM.

D_{30} = ______ MM.

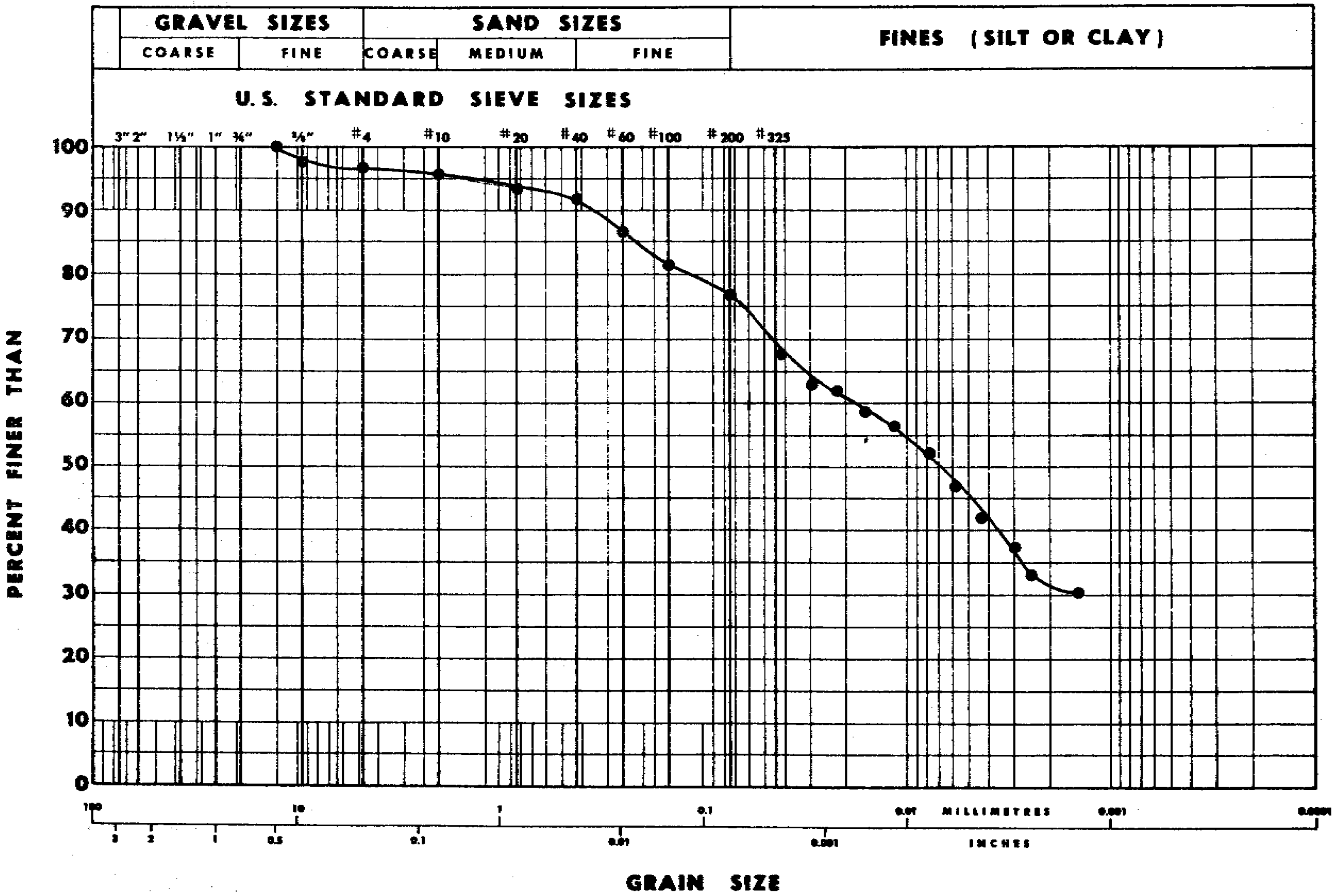
D_{60} = ______ MM.

C_U ______

C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-31



REMARKS:____________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-32

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

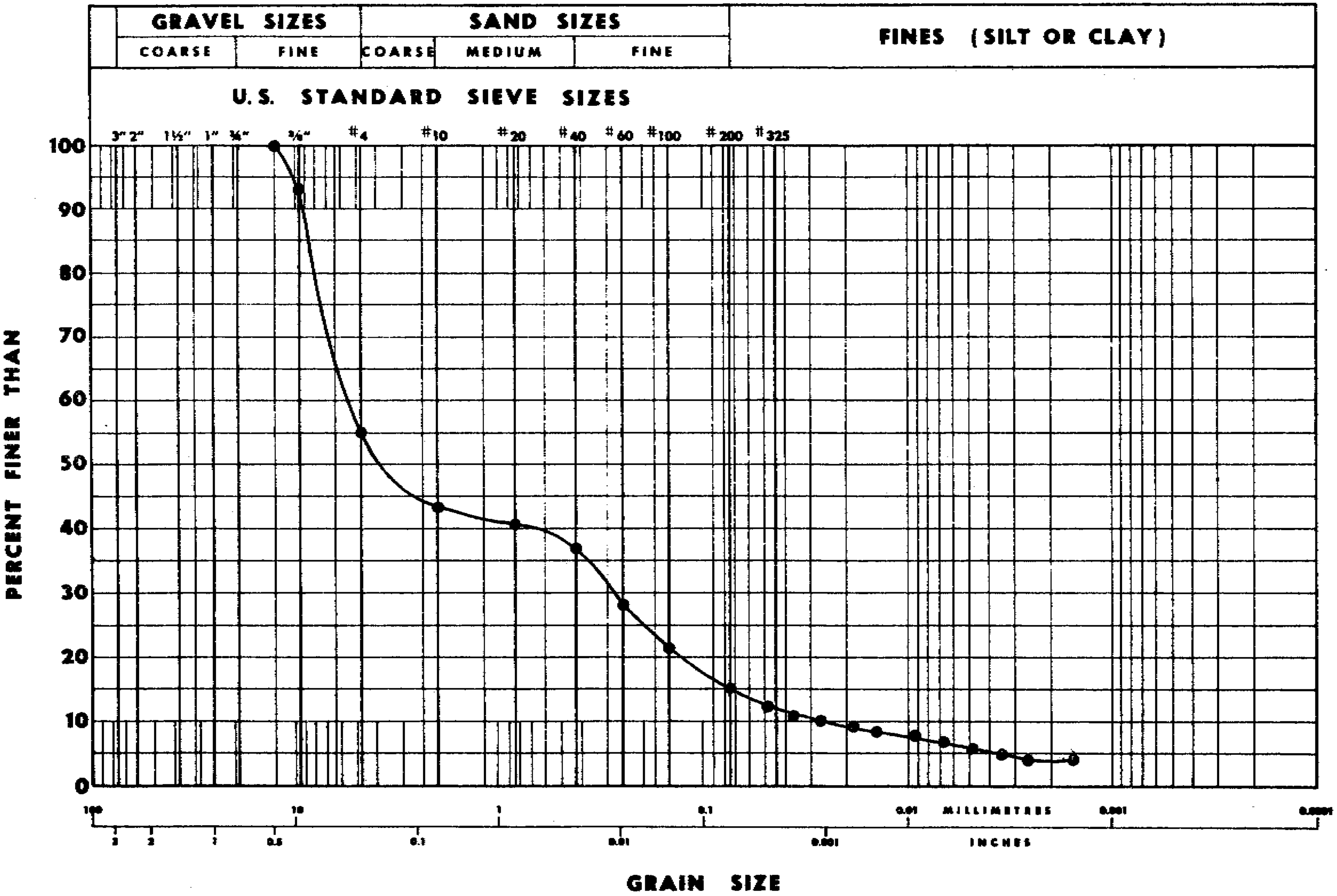
GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE PS1 DEPTH 19-20 DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE PS2 DEPTH 17-18' DATE REC'D.
TECHNICIAN MS DATE TESTED May/76

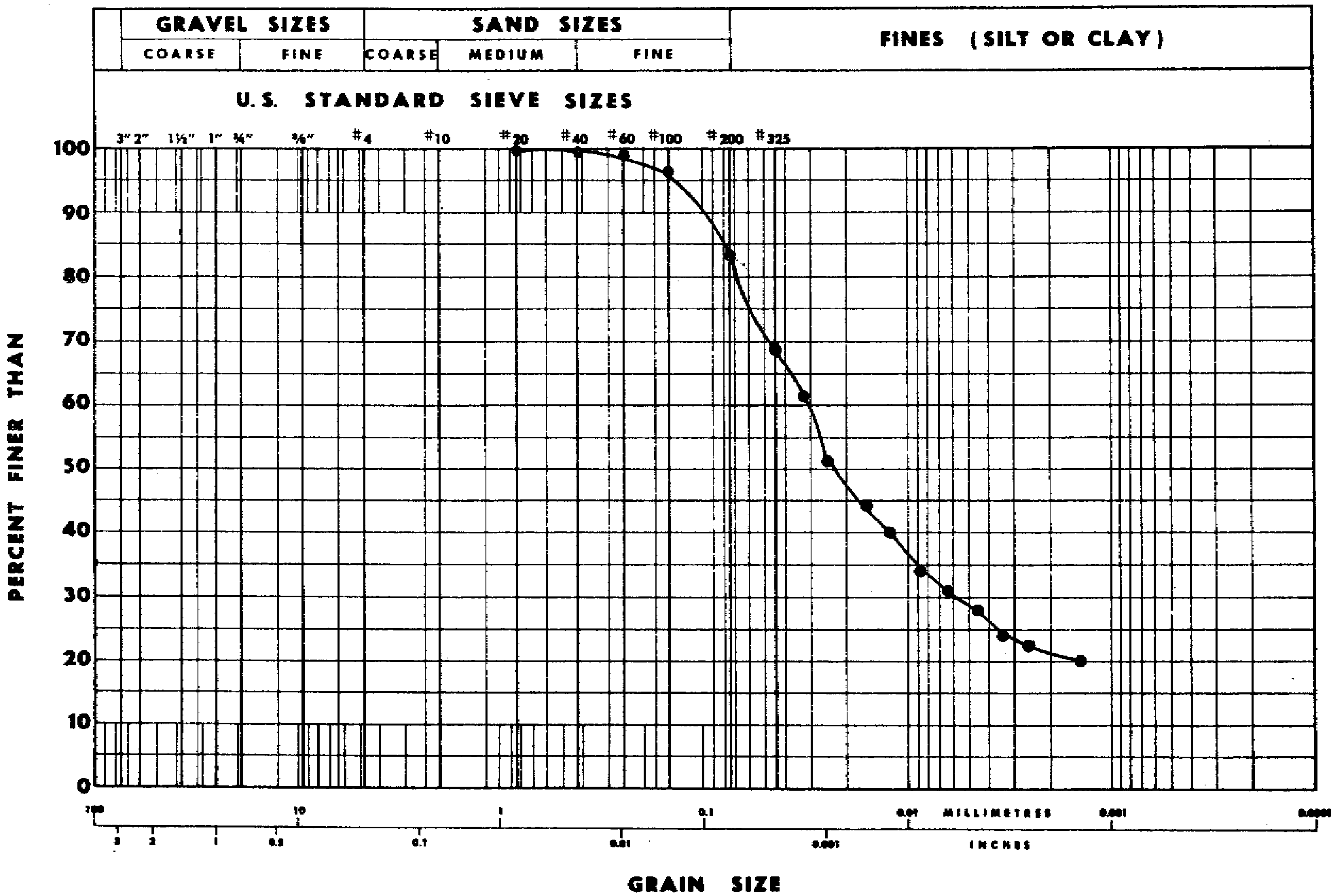


REMARKS:

D$_{10}$= ______ MM.
D$_{30}$= ______ MM.
D$_{60}$= ______ MM.
C$_U$ ______
C$_c$ ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-33



REMARKS: ____________________

D$_{10}$ = ________ MM.
D$_{30}$ = ________ MM.
D$_{60}$ = ________ MM.
C$_U$ ________
C$_C$ ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

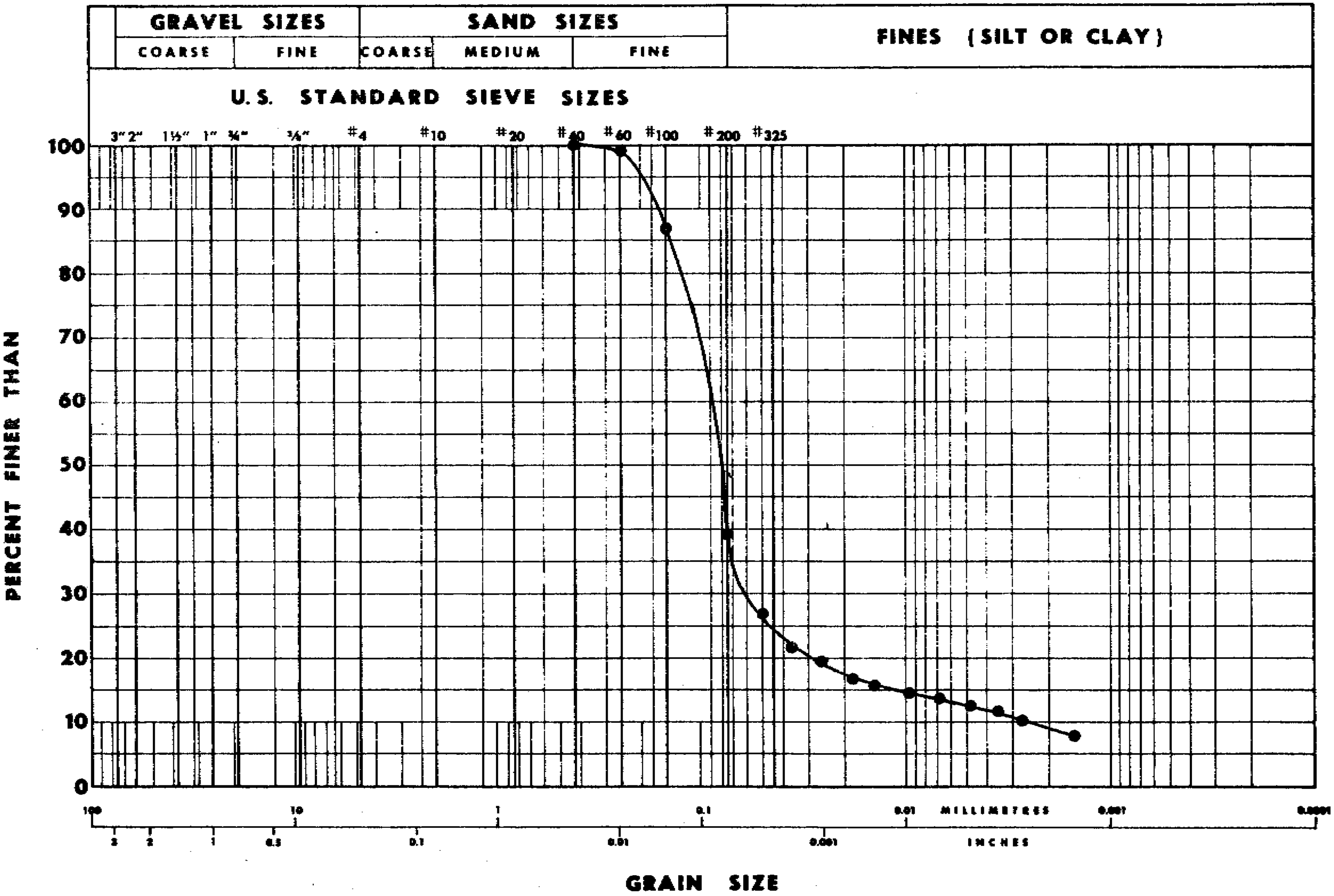
LAB ORDER NO. CS3343
CLIENT G.O.C.T.
SAMPLE C1
SOURCE Parson's Lake N.W.T.
HOLE PS3 DEPTH 3-5' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

PLATE E-34

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W2
SOURCE Parsons Lake Gas Plant
HOLE PS4 DEPTH 4-5' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76



REMARKS:

D$_{10}$= ______ MM.
D$_{30}$= ______ MM.
D$_{60}$= ______ MM.
C$_U$ ______
C$_C$ ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE E-35

APPENDIX "E"

SECTION E.5 SUMMARY OF LABORATORY TESTING

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION		CLASSIFICATION TESTS						OTHER TESTS			
						ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION			LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
VP10	4-5	W2	SC GC	SAND	gravelly,low plastic, clayey,silt,dark olive brown	28	21	7	58	30	12				Gravel 22%
VP11	13-14	W4	CL	CLAY	low to medium plastic, silty,sandy,brown				22	54	24				
VP12	4-5	W2	ML CL	SILT	clayey,low plastic, dark brown to grey				10	70	20				
VP13	8-9	W1	CI	CLAY	silty,trace sand,low to medium plastic,dark grey	34	17	17							
VP14	10-11	W4	SM	SAND	silty,trace gravel dark grey				75	15	8				
VP15	5-7.5	C1	CL	CLAY	silty,trace sand,and low plastic	22	15	7				103	71	45	frozen core
VP15	10-11	W2	CL CI	CLAY	layer andy fine grained silty dark olive grey, low to medium plastic	31	21	10							
VP15	19-20	W5	CL	CLAY	very silty,sandy,low plastic,dark grey, trace organics	28	17	11	35	45	20				
VP16	6-7	W3	GP	GRAVEL	sandy,coarse grained, trace silt				96	4	-*				Gravel 24%
VP16	25-27	W6	CI	CLAY	very silty,sandy,fine grained,medium plastic	40	18	22							
VP17	6-9	C1	CL	CLAY	silty,sandy,fine grained low plastic,brown, 1" ice lens							113	87	30	frozen core
VP18	14-15	W5	SM	SAND	fine grained,little medium sand,gravelly trace silt and clay				78	15	7				Gravel 38%
VP19	18-19	W4	CL	CLAY	very silty,sandy,coarse grained,trace fine gravel low to med.plastic,trace organics,brown				35	35	30				
VP20	2-3	W1	CI	CLAY	very silty,sandy,low to medium plastic,occ.fine gravel sizes, brown	35	21	14							
VP21	1-2	W1	ML	SILT	sandy,clayey,low plastic,brown				33	37	30				

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
VP23	4-5	W2	CI	CLAY medium plastic, grey very silty, sandy	42	25	17	17	38	45				
VP23	7-10	C1	CI	CLAY medium plastic, grey silty, some fine sand							76	35	121	frozen core
				*Larger sizes fractured with rock bit										

Plate E-37

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
PS1	7-9	C1	CL	CLAY silty,medium plastic,grey							98	63	57	frozen core
PS1	19-20	W4	CI	CLAY silty,grey,medium plastic, trace gravel	41	17	24	23	45	32				
PS2	1-2	W1	CI	CLAY silty,trace sand and fine gravel,medium plastic,grey	36	20	16							
PS2	5-7	C1	CI	CLAY silty,sandy,gravel sizes to 1"Ø,medium to low plastic							95	59	60	frozen core
PS2	17-18	W4	SM	SAND gravelly,silty,trace silt and clay				85	11	4				Gravel 35%
PS3	3-5	C1	ML	SILT layers,clay,organics,low to non plastic,brown				17	61	22	69	24	195	frozen core
PS3	20-21	W5	CL CI	CLAY silty,sandy,fine to medium grained, low plastic,grey	26	15	11							
PS4	4-5	W2	SM	SAND fine grained, silty,trace clay				61	30	9				
PS4	7-9	C1	CH	CLAY silty,medium to high plastic,grey							98	63	57	frozen core
PS5	7-9	C1	CL	CLAY silty,low plastic,grey	23	20	3				114	86	33	frozen core

APPENDIX "E"

SECTION E.6 TEST HOLE ELEVATIONS

TRANSPORTER ROAD TEST HOLE ELEVATIONS

Test Hole No.	Elevation *	Geodetic Elevation
VP10	912.0	87.5
11	893.5	59.0
12	908.0	83.5
13	869.0	44.5
14	854.5	30.0
15	841.0	16.5

* Elevation relative to top of flange on 0-27 wellhead (Elevation = 999.80 - provided by C.E.S.L. of Edmonton)

ROAD TO AIRSTRIP

Test Hole No.	Elevation *	Geodetic Elevation
PS1	896.5	72.0
2	921.0	96.5
3	927.0	102.5
4	906.0	81.5
5	882.5	58.0

ROAD TO BORROW SOURCES

Test Hole No.	Elevation *	Geodetic Elevation
VP16	928.0	103.5
17	934.0	109.5
18	950.0	125.5
19	951.5	127.0
20	1007.5	183.0
21	1009.0	184.5
22	not surveyed	
23	not surveyed	
24	not surveyed	
25	not surveyed	

APPENDIX “F”

SERVICE CORRIDOR

SECTION F.1 TEST HOLE LOGS: CLUSTER NO. 2 TO CLUSTER NO. 3 ROAD TO PLANT SITE

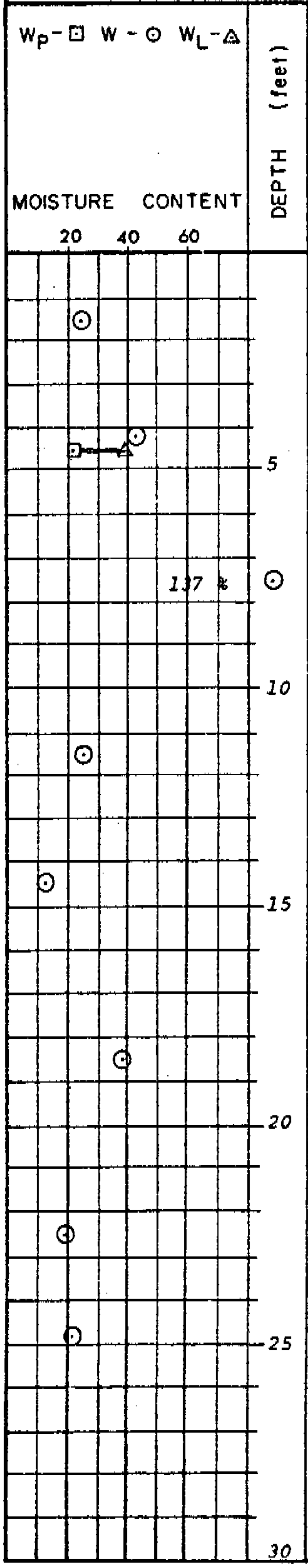
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP1*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 20, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *14:05*
FINISH *14:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	*SILT clayey, trace fine sand, occasional gravel sizes, low plastic, rusty to grey colour*	*Nbn*		*W1*	☒			
CI	*CLAY very silty, trace sand, medium plastic, brown to grey*	*Vr, Vs 25%*		*W2*	☒			
SM	*SAND fine to medium grained, very silty, fine gravel sizes, non plastic, brown*	*V*		*W3*	☒			
GP	*GRAVEL fine, little coarse sizes, sandy, fine to coarse grained, trace silt, brown*	*V 50%*		*W4*	☒			
	--- coarse gravel sizes, less sandy	*20%*		*W5*	☒			
	ICE AND GRAVEL	*ICE+*						
	--- coarse, little fine gravel, sandy, fine grained, trace fines, grey	*60%* *75%*		*W6* *W7* *W8*	☒ ☒ ☒			

Bottom of Hole at 26.0'.

PLATE *F-1*

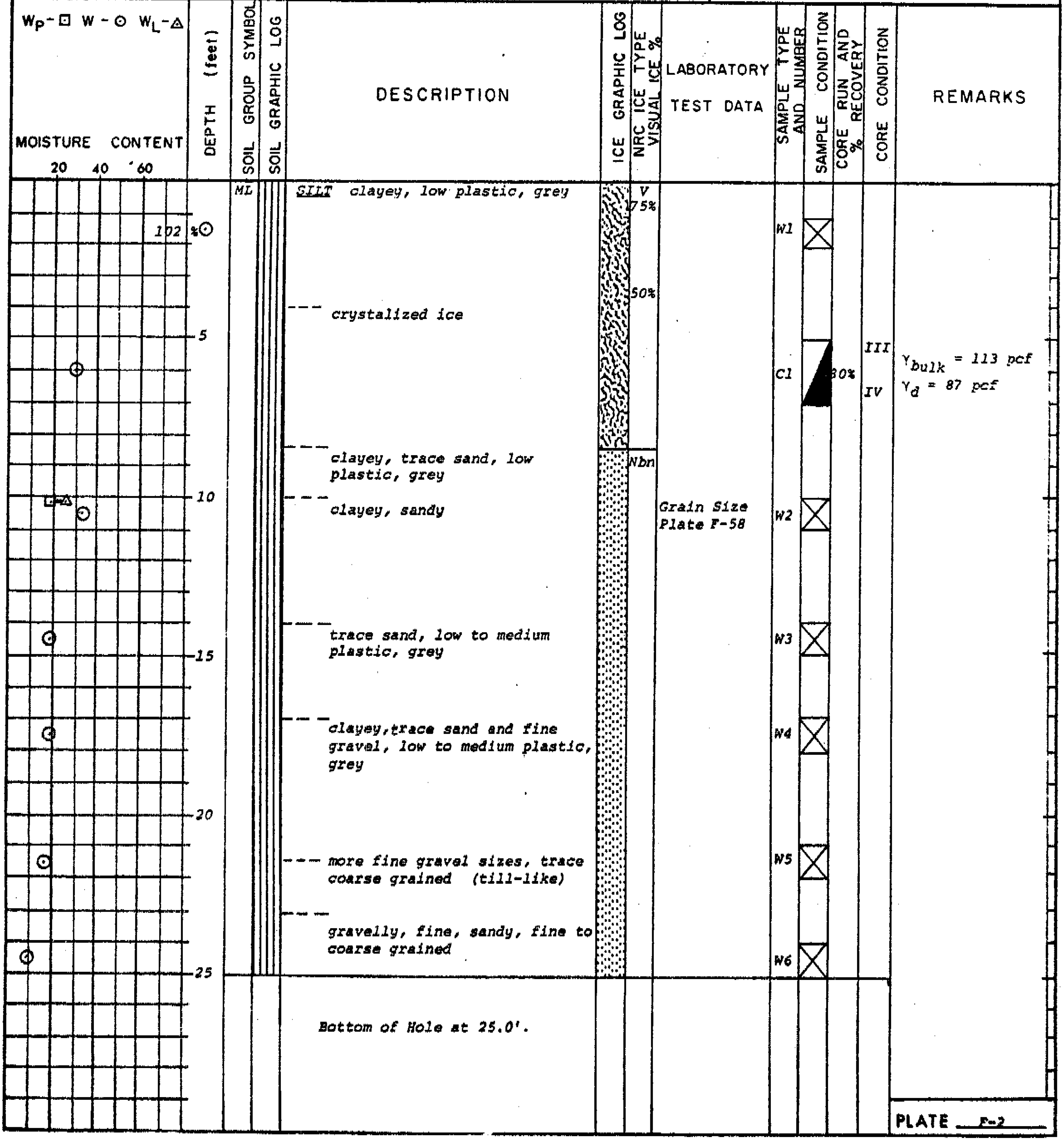
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP2

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 15:05
FINISH 15:50
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



MOISTURE CONTENT	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		ML	SILT clayey, low plastic, grey	V 75%					
102 % ⊙						W1			
				50%					
			crystalized ice						
	5								
						C1	80%	III IV	γ_{bulk} = 113 pcf γ_d = 87 pcf
			clayey, trace sand, low plastic, grey	Nbn					
	10		clayey, sandy		Grain Size Plate F-58	W2			
			trace sand, low to medium plastic, grey			W3			
	15								
			clayey, trace sand and fine gravel, low to medium plastic, grey			W4			
	20								
			more fine gravel sizes, trace coarse grained (till-like)			W5			
			gravelly, fine, sandy, fine to coarse grained			W6			
	25		Bottom of Hole at 25.0'.						

PLATE F-2

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

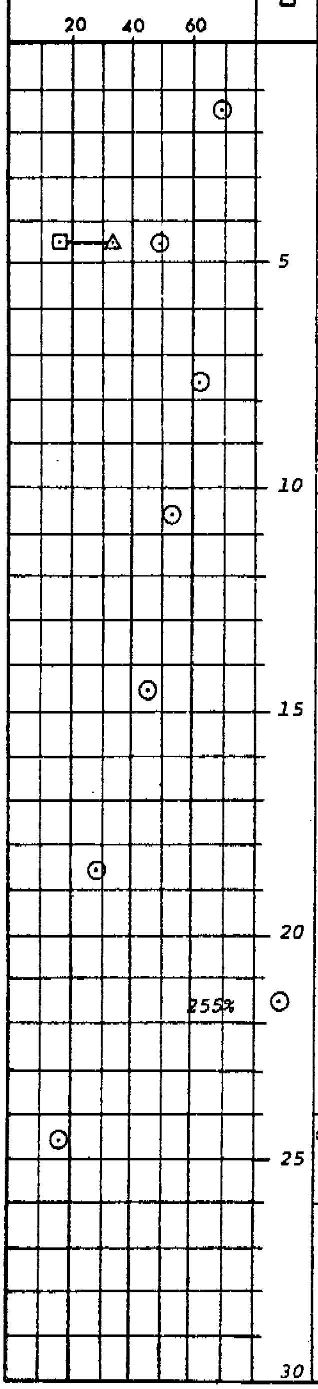
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP3

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD AIR
START 16:05
FINISH 16:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CL	CLAY very silty, trace sand, occasional fine gravel sizes, grey to brown, low plastic	ICE+ 70%		W1	☒			
CI	CLAY very silty, trace sand, low to medium plastic, grey	V 40%		W2	☒			
	ICE lens 4" thick	30%		W3	☒			
GM	GRAVEL coarse, sandy, fine to coarse grained, silty	V 50%						
		30%		W4	☒			
		20%	Grain Size Plate F-59	W5	☒			
	--- coarse, sandy	40%		W6	☒			
	ICE AND GRAVEL	ICE+						
				W7	☒			
	--- very sandy							
GW	GRAVEL fine to coarse, sandy, fine to coarse grained	V 5%		W8	☒			
	Bottom of Hole at 26.0'.							

PLATE F-3

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP4*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 20, 1976*
RIG *Heli Drill*
METHOD *AIR/3" CRREL*
START *17:15*
FINISH *17:45*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P-□ W-○ W_L-△

MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		Pt	*PEAT* fibrous, brown to black	V 60%						
749 % ⊙						W1	☒			
		OL	*ORGANIC SILT* fibres, non plastic, brown, ice-rich	V 60%						
209 % ⊙	5					W2	☒			
			ICE with soil inclusions			C1		90%	III	
		CL-CI	*CLAY* silty, some organics, low to medium plastic, grey	V 80%						
	10									
			CLAY very silty, medium plastic, brown	Nbn						
⊙						W3	☒			
	15									
⊙			silty, trace sand and fine gravel, low plastic, grey			W4	☒			
	20									
⊙			medium plastic, grey (till-like)			W5	☒			
		GC	*GRAVEL* coarse, little fine gravel trace sand, clayey, low to medium plastic	V <5%						
⊙			cobble			W6	☒			
	25									
			Bottom of Hole at 25.0'.							

PLATE *F-4*

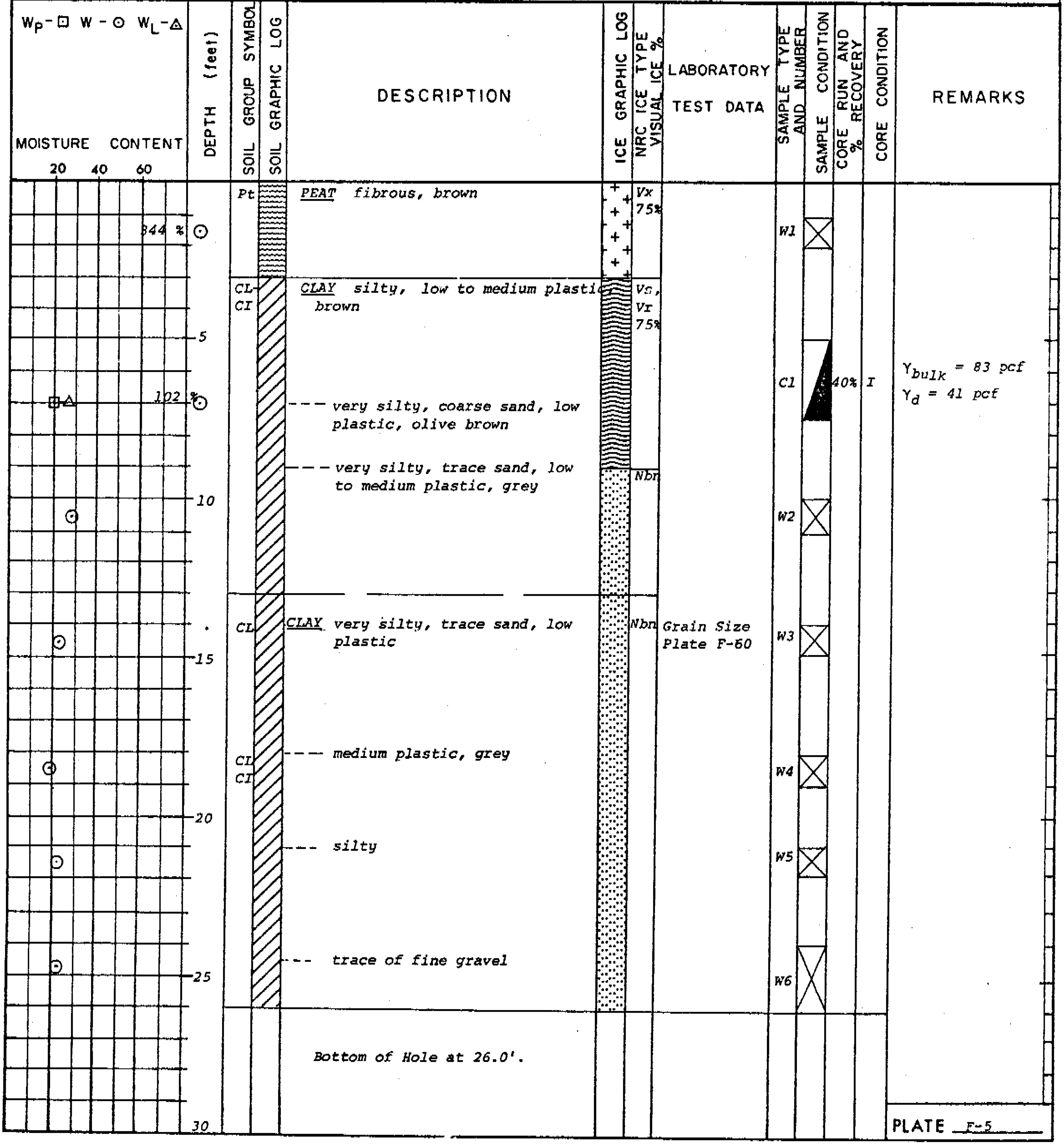
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP5*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 20, 1976*
RIG *Heli Drill*
METHOD *CRREL/AIR*
START *18:00*
FINISH *18:35*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



PEAT fibrous, brown

CLAY silty, low to medium plastic, brown

--- very silty, coarse sand, low plastic, olive brown

--- very silty, trace sand, low to medium plastic, grey

CLAY very silty, trace sand, low plastic

--- medium plastic, grey

--- silty

--- trace of fine gravel

Bottom of Hole at 26.0'.

Grain Size Plate F-60

$\gamma_{bulk} = 83$ pcf
$\gamma_d = 41$ pcf

PLATE *F-5*

TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

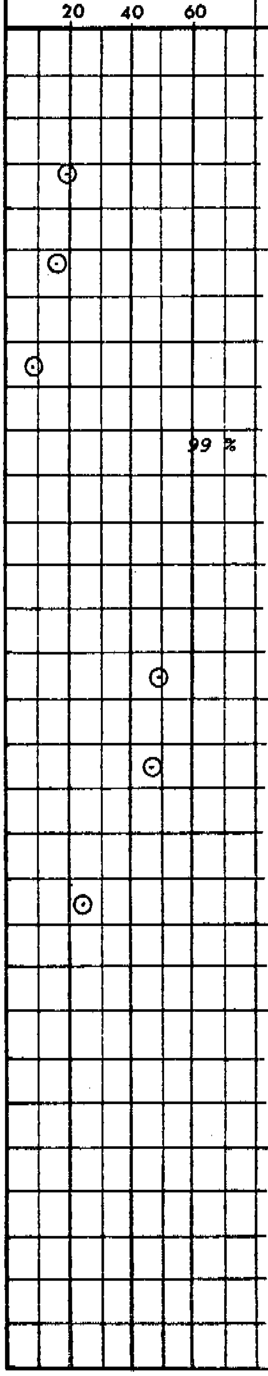
PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP6

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD AIR
START 20:30
FINISH 21:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	<u>PEAT</u> granular amorphous, one 4" cobble	F						
	CI	<u>ICE AND CLAY</u> silty, trace of sand brown, medium plastic	ICE+ 90%						
	GP	<u>GRAVEL</u> fine, sandy, fine to coarse grained, trace of silt, brown	Vc 5%		W1	☒			
5		--- no silt, coarser	Nf		W2	☒			
			Vc 5%		W3	☒			
		<u>ICE AND GRAVEL</u> sandy, trace of silt	ICE+ 60%		W4	☒			
10									
	SM	<u>SAND</u> fine to coarse grained, silty, fine to coarse gravel sizes, brown	Nbe 20%	Grain Size Plate F-61	W5	☒			
15					W6	☒			
	GP	<u>GRAVEL</u> fine to coarse, sizes to 1" diameter, sandy	Vc 5%		W7	☒			
20									
	SM	<u>ICE AND SAND</u> silty	ICE+ 90%						
25									
		Bottom of Hole at 26.0'.							
30									

PLATE F-6

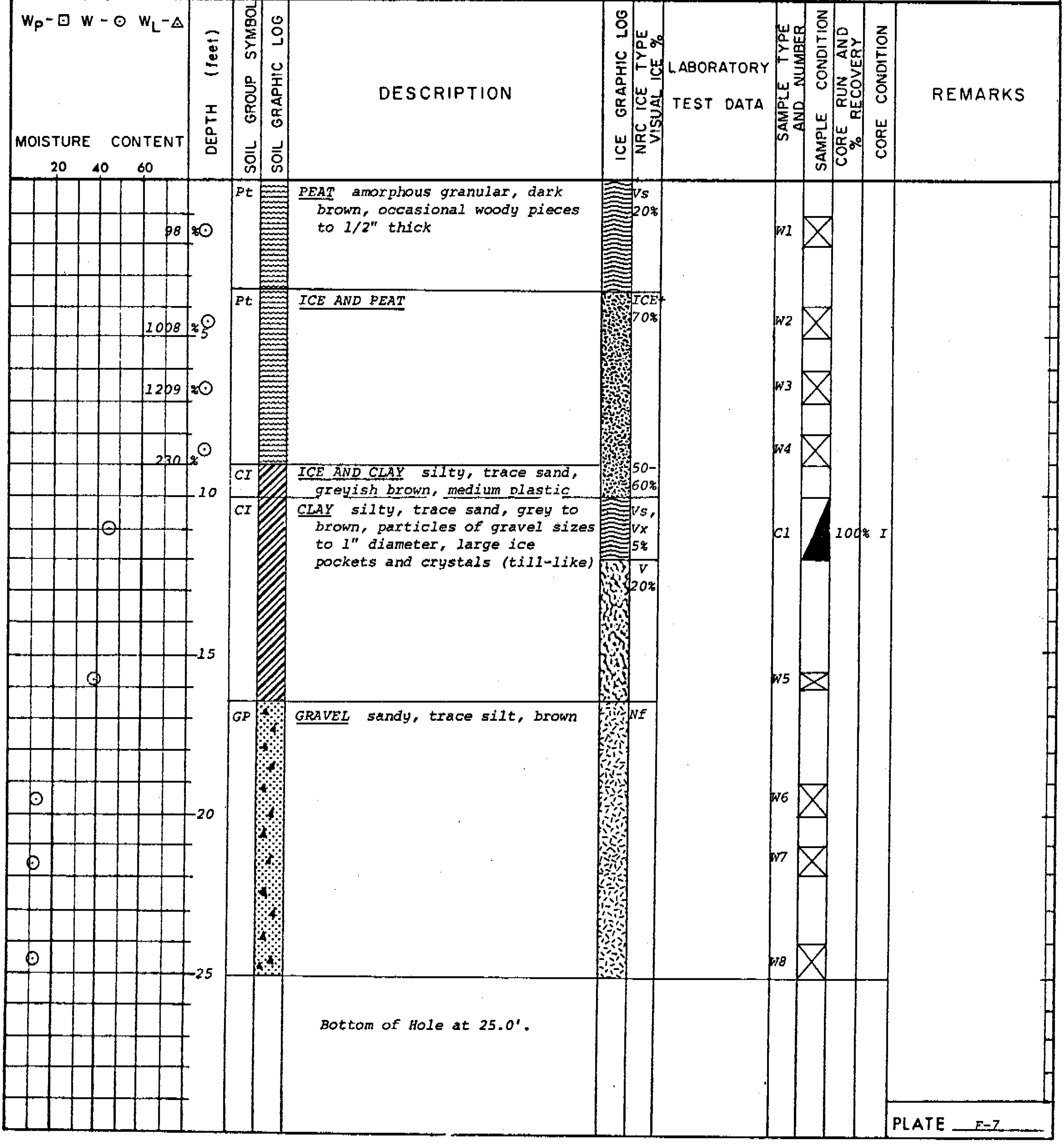
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. VP7

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 20, 1976
RIG Heli Drill	METHOD AIR AND 3" CRREL	START 22:15	FINISH 23:10
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* amorphous granular, dark brown, occasional woody pieces to 1/2" thick	Vs 20%		W1	☒			
Pt	*ICE AND PEAT*	ICE+ 70%		W2 W3 W4	☒ ☒ ☒			
CI	*ICE AND CLAY* silty, trace sand, greyish brown, medium plastic	50- 60%						
CI	*CLAY* silty, trace sand, grey to brown, particles of gravel sizes to 1" diameter, large ice pockets and crystals (till-like)	Vs, Vx 5% V 20%		C1 W5	◪ ☒	100%	I	
GP	*GRAVEL* sandy, trace silt, brown	Nf		W6 W7 W8	☒ ☒ ☒			

Bottom of Hole at 25.0'.

PLATE F-7

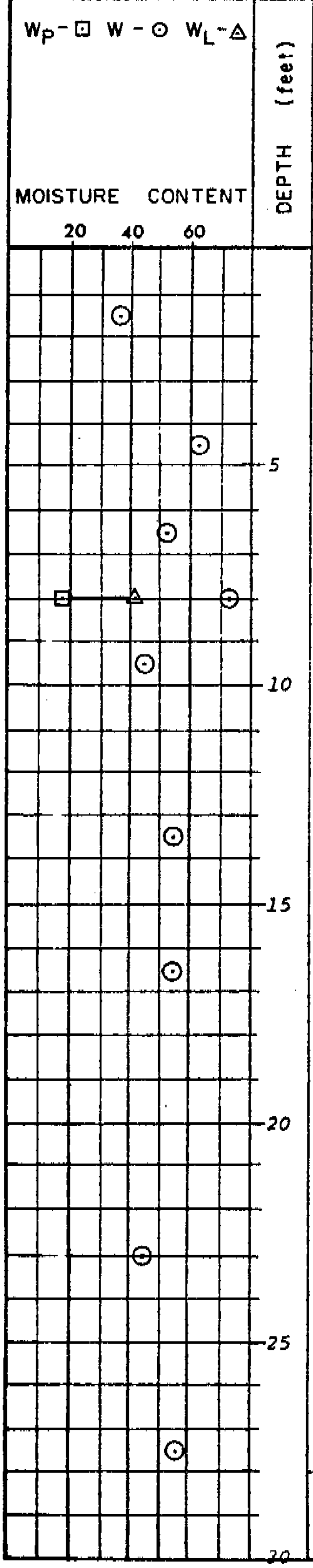
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT: PARSONS LAKE GAS PLANT

TEST HOLE NO. *VP8*

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 20, 1976*
RIG *Heli Drill*
METHOD *COMP. AIR & CRREL*
START *23:45*
FINISH *0:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	*F*						
CI	*CLAY silty, trace of sand, medium to high plastic, brown*	*Vx, Vs 20%*		*W1*	☒			
	ICE AND CLAY	*ICE 90%*	+					
	less ice	*V*						
	grey	*30%*	*Grain Size Plate F-62*	*W2*	☒			
		15%						
				W3	☒			
	with occasional particles of coarse sand and coarse gravel to 1" ø (till-like)	*10%*						
				C1	◣	*100%*	*III*	
				W4	☒			
				W5	☒			
				W6	☒			
		20%						
				W7	☒			
				W8	☒			
	Bottom of Hole at 28.0'.							

PLATE *F-8*

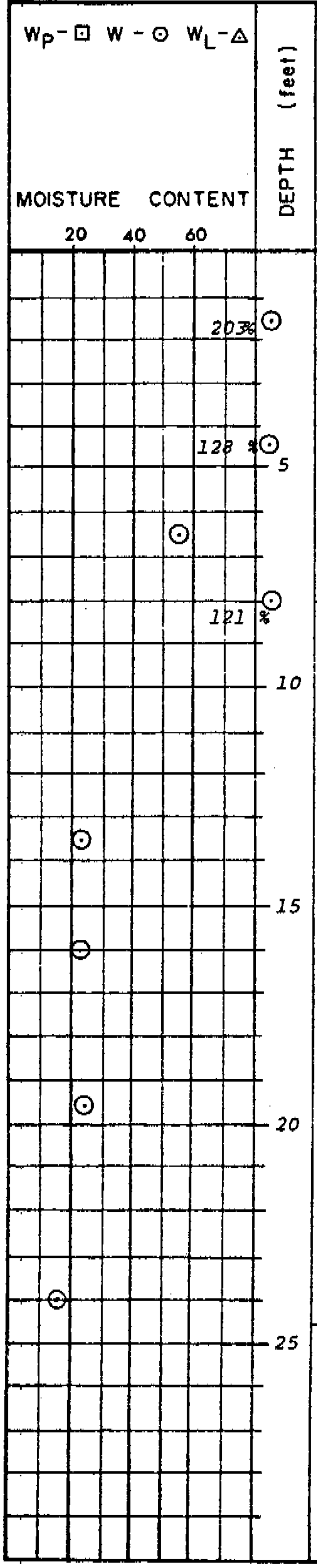
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. VP9

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 21, 1976
RIG Heli Drill	METHOD AIR /CRREL	START 0:50	FINISH 1:40
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* amorphous granular	Vx,					
OL	*ORGANIC SILT* dark brown, low plastic	15%		W1			
	— very sandy, trace clay, low to medium plastic, low organic content, dark brownish-grey to black		Grain Size Plate F-63	W2			
				W3			
	— very sandy						
CI	*CLAY* silty, trace of sand, occasional particles of gravel, fine, medium plastic, brown (till-like)	V 25%		C1	100%	III I	γ_{bulk} = 76 pcf γ_d = 35 pcf
	— cobble	< 5%		W4			
				W5			
				W6			
	— cobble			W7			

Bottom of Hole at 24.5'.

PLATE F-9

APPENDIX “F”

SECTION F.2 TEST HOLE LOGS: CLUSTER NO. 2 TO CLUSTER NO. 3

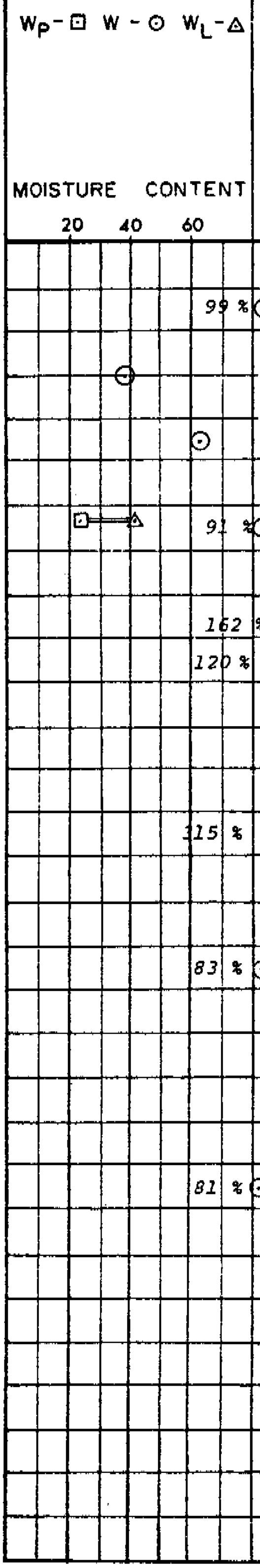
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV1

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 19, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 9:00 AM	FINISH 10:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	3" PEAT	Vx, Vr 50%						
	CL-CI	CLAY very silty, trace sand, low plastic, grey to brown, organics cobble at surface			W1	☒			
					C1		75%	III	Ybulk = 100 pcf Yd = 73 pcf
		--- silty, sandy, low plastic, brown							
		--- silty, trace sand and fine gravel, occasional coal specks medium plastic (till-like)			W2	☒			
5			Vx 10%						
					W3	☒			
	CI	ICE + CLAY medium plastic, clay lenses	ICE+ 80%						
10	CL-CI	CLAY silty, trace sand, fine to coarse grained, low to medium plastic, grey, ice-rich, layered	V 25%		W4	☒			
		--- clayey, silt layer, trace sand, grey		Grain Size Plate F-64	W5	☒			
15					W6	☒			
		--- silty, sandy, fine to medium grained, low to medium plastic, grey	35%						
20					W7	☒			
		ICE	ICE						
25									
		Bottom of Hole at 26.0'.							
30									

PLATE F-10

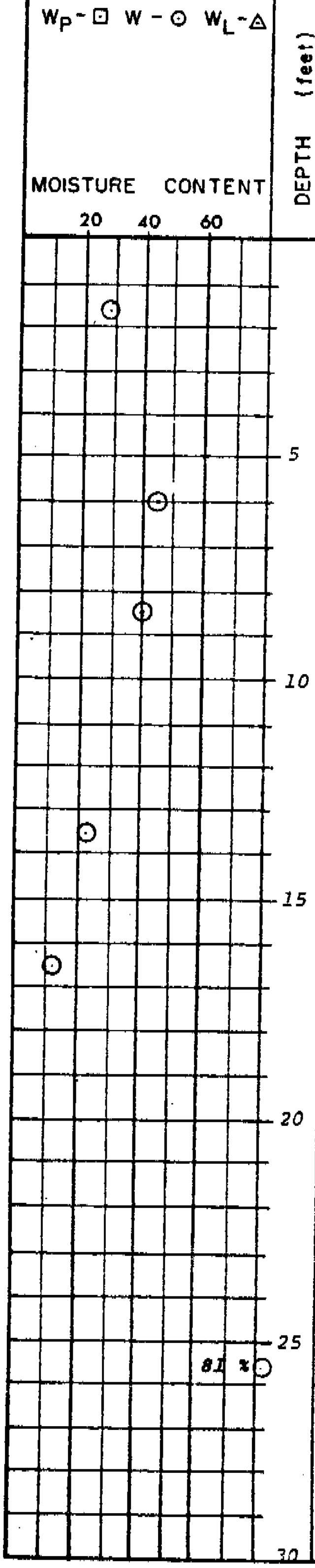
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV2*

LOGGED BY *GCD*
DRAWN BY
CHECKED *RST*
DATE *March 19, 1976*
RIG *Heli Drill*
METHOD *CRREL/AIR*
START *11:00*
FINISH *11:55*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
	2" Pt cover						
CI	*CLAY silty, trace fine to medium sand, occasional fine gravel sizes, grey, medium plastic (till-like)*	*Vx, Vr 30%*		*W1*			
	ICE	*ICE*					
CI	*CLAY silty, trace sand and fine gravel*	*Vx, Vr 40%*					
	clay, silty, little sand, medium plastic, brown			*C1*	*70%*	*III*	γ_{bulk} = 103 pcf γ_d = 71 pcf
				C2	*90%*	*IV*	
				C3	*100%*	*IV*	
ML	*SILT clayey, sandy, fine to coarse grained, occasional gravel sizes, brown*	*Vx 10%*					
	increasing sand content						
	gravelly			*W2*			
GM	*GRAVEL sandy, fine to medium grained, silty, trace clay*	*V 20%*		*W3*			
	ICE	*ICE*					
GM	*GRAVEL sandy, fine to coarse grained, silty*	*V 30%*		*W4*			
	Bottom of Hole at 26.0'.						

PLATE *F-11*

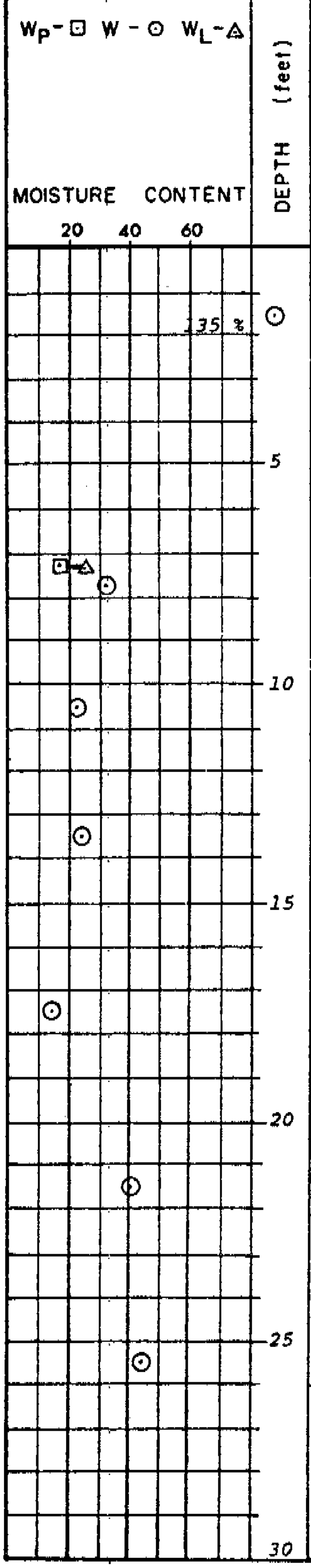
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV3

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 19, 1976
RIG Heli Drill
METHOD 3" CRREL/AIR
START 12:15
FINISH 13:25
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT fibrous	Vr, Vs 60%						
ML	SILT high organics, sandy, fine grained, brown, low plastic			W1	☒			
	occasional gravel sizes, grey, no organics (till-like)			C1		70%	II IV	
	very clayey, trace sand, low to medium plastic, occasional small coal inclusions, coarse gravel sizes (cobbles)	V 10%		W2	☒			
	very sandy, fine grained, non to low plastic, grey		Grain Size Plate F-65	W3	☒			
	trace sand and clay, brown, occasional fine gravel sizes			W4	☒			
	very sandy, trace gravel sizes very low plastic	10%		W5	☒			
	cobble (3" diameter)							
	sandy, fine grained, occasional cobbles			W6	☒			
	no gravel sizes, very sandy, grey			W7	☒			

Bottom of Hole at 26.0'.

PLATE F-12

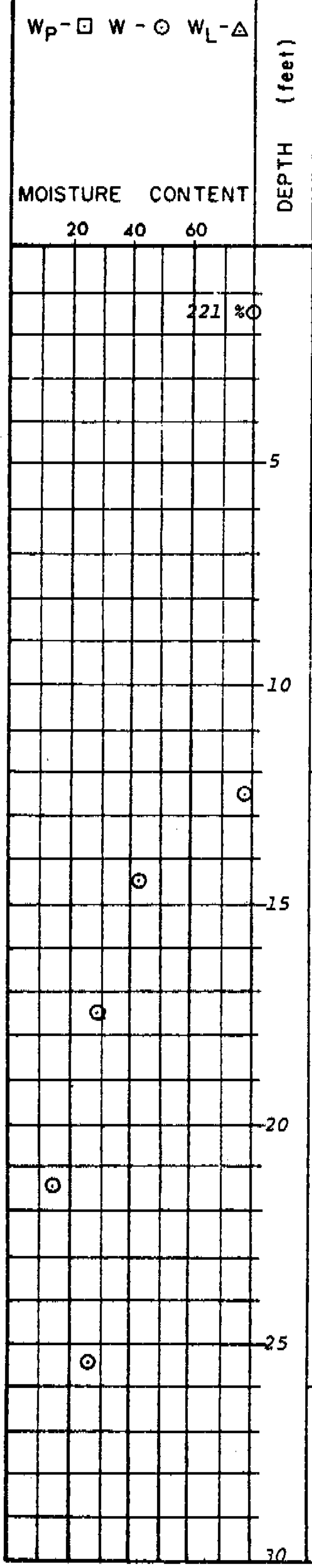
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV4*

LOGGED BY *GCD*	DRAWN BY	CHECKED *RST*	DATE *March 19, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *14:30*	FINISH *14:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
Pt	*PEAT*	*F*						
ML	*ICE AND SILT* little fine sand, grey, non plastic	*ICE+* *90%*		*W1*	☒			
	ICE	*ICE*						
ML	*SILT* sandy, fine grained, trace clay, non to low plastic, grey	*Vx,* *Vr* *40%*		*W2*	☒			
		V *20%*		*W3*	☒			
		10%		*W4*	☒			
	--- cobble			*W5*	☒			
	--- very sandy, fine grained			*W6*	☒			
	Bottom of Hole at 26.0'.							

PLATE *F-13*

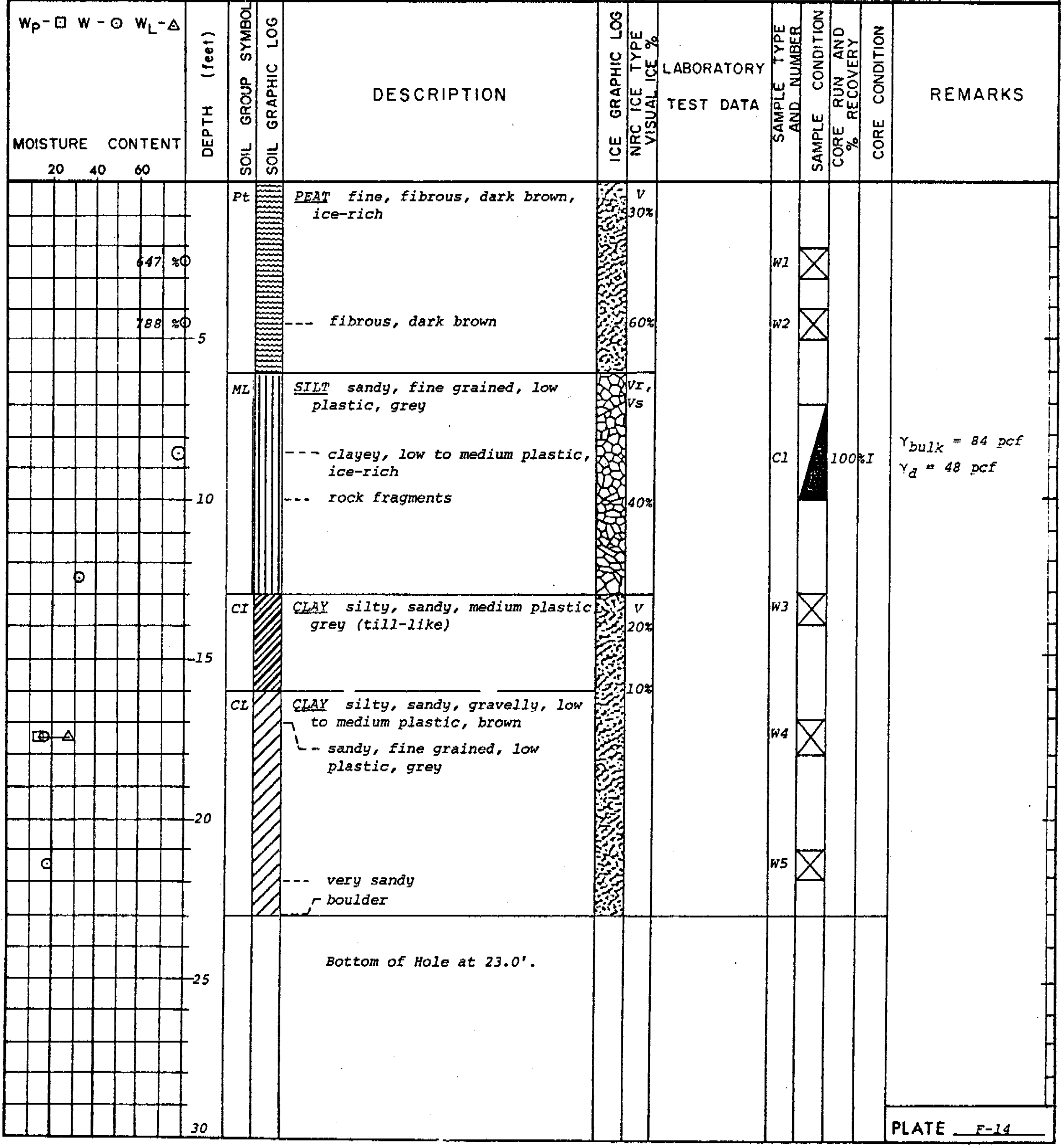
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV5

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 19, 1976
RIG Heli Drill
METHOD 3"CRREL/AIR
START 15:20
FINISH 15:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



MOISTURE CONTENT	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	REMARKS
	Pt	PEAT fine, fibrous, dark brown, ice-rich	V 30%				
647 %					W1		
788 %		--- fibrous, dark brown	60%		W2		
	ML	SILT sandy, fine grained, low plastic, grey	Vr, Vs				
		--- clayey, low to medium plastic, ice-rich			C1	100%I	γ_{bulk} = 84 pcf γ_d = 48 pcf
		--- rock fragments	40%				
	CI	CLAY silty, sandy, medium plastic grey (till-like)	V 20%		W3		
			10%				
	CL	CLAY silty, sandy, gravelly, low to medium plastic, brown					
		- sandy, fine grained, low plastic, grey			W4		
					W5		
		--- very sandy					
		boulder					
		Bottom of Hole at 23.0'.					

PLATE F-14

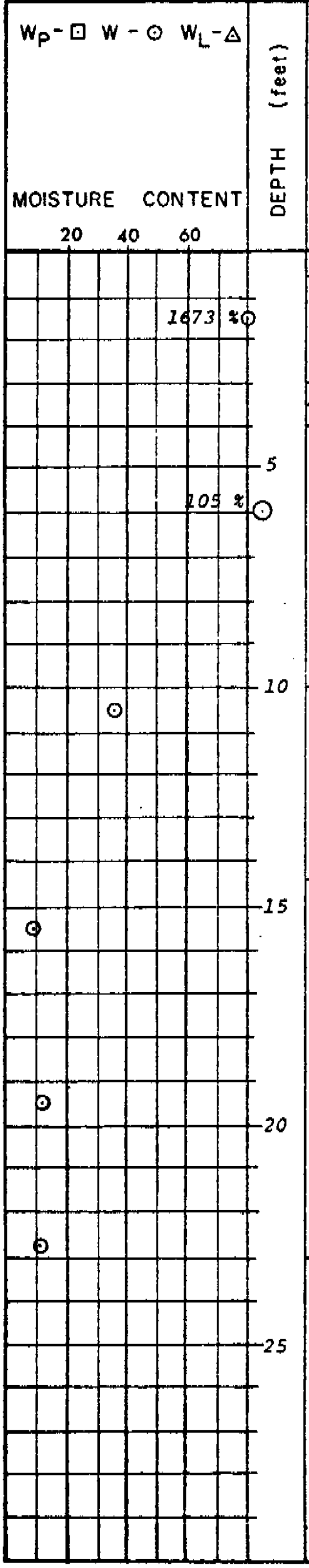
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV6

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 19, 1976
RIG Heli Drill
METHOD 3" CRREL/AIR
START 15:55
FINISH 16:35
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		grass cover						
		ICE	ICE					
	Pt	PEAT fibrous, organic, dark brown	Vs 50%		W1			
		ICE	ICE					
	Pt	PEAT	Vs	50%				
5	ML	SILT sandy, fine grained, low plastic, brown to grey --- trace sand --- occasional fine gravel sizes	Vr, Vs 30%		C1	90%	III	γ_{bulk} = 80 pcf γ_d = 39 pcf
10	CI	CLAY medium to high plastic, organic inclusions, grey	V 10%		W2			
15	GM	GRAVEL fine to coarse, occasional cobbles, very sandy, fine to coarse grained, silty, trace clay, non plastic, grey	<5%		W3			
20				Grain Size Plate F-66	W4			
					W5			
25		Bottom of Hole at 23.0'.						

PLATE F-15

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV7

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 19, 1976
RIG Heli Drill	METHOD 3" CRREL/ AIR	START 17:15	FINISH 17:50
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ○ W_L - △

MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
			ICE 6"	ICE					
730 % ○		Pt	*PEAT* fine, fibrous, dark brown	Vs, Vr 25%		W1			
129 % ○	5		silty, dark brown to black			W2			
		CI	*CLAY* silty, sandy, gravelly, medium plastic, brown	Vs, Vr 40%					
☐ △						C1	85%	IV	γ_{bulk} = 104 pcf γ_d = 78 pcf
	10		cobble sizes						
○		SC	*SAND* fine grained, silty, clayey, trace gravel	V 10%	Grain Size Plate F-67	W3			
	15								
○		GP	*GRAVEL* very sandy, coarse grained trace silt, sub-rounded-sub-angular	V 5%		W4			
○	20			Nbe		W5			
		GM	silt layer, sandy, fine grained						
			silty, cobble						
	25		Bottom of Hole at 24.0'.						

PLATE F-16

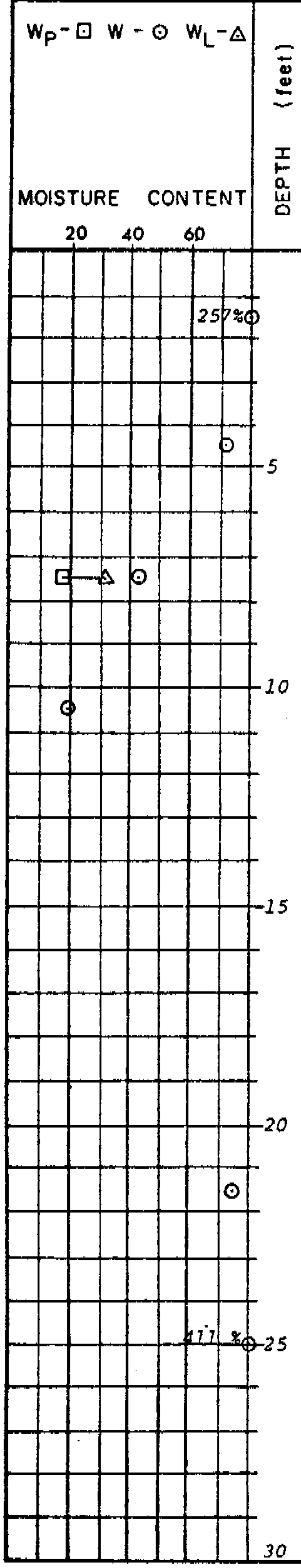
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV8

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 19, 1976
RIG Heli Drill
METHOD AIR
START 18:20
FINISH 18:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	*SILT* sandy, fine grained, organic low plastic, brown	V 30%		W1	☒			
	--- end of organics							
	--- sandy, fine to coarse grained, trace fine gravel sizes, trace clay, very low plastic, brown	40%		W2	☒			
CI-CL	*CLAY* very silty, sandy, low to medium plastic, brown	Vx 15%		W3	☒			
	--- gravel layer, very sandy			W4	☒			
ML	*ICE AND SILT* sandy, fine grained, fine gravel sizes	ICE+ 80%						
	--- very sandy, fine to medium grained, trace fine gravel			W5	☒			
		90%		W6	☒			
	Bottom of Hole at 26.0'.							

PLATE F-17

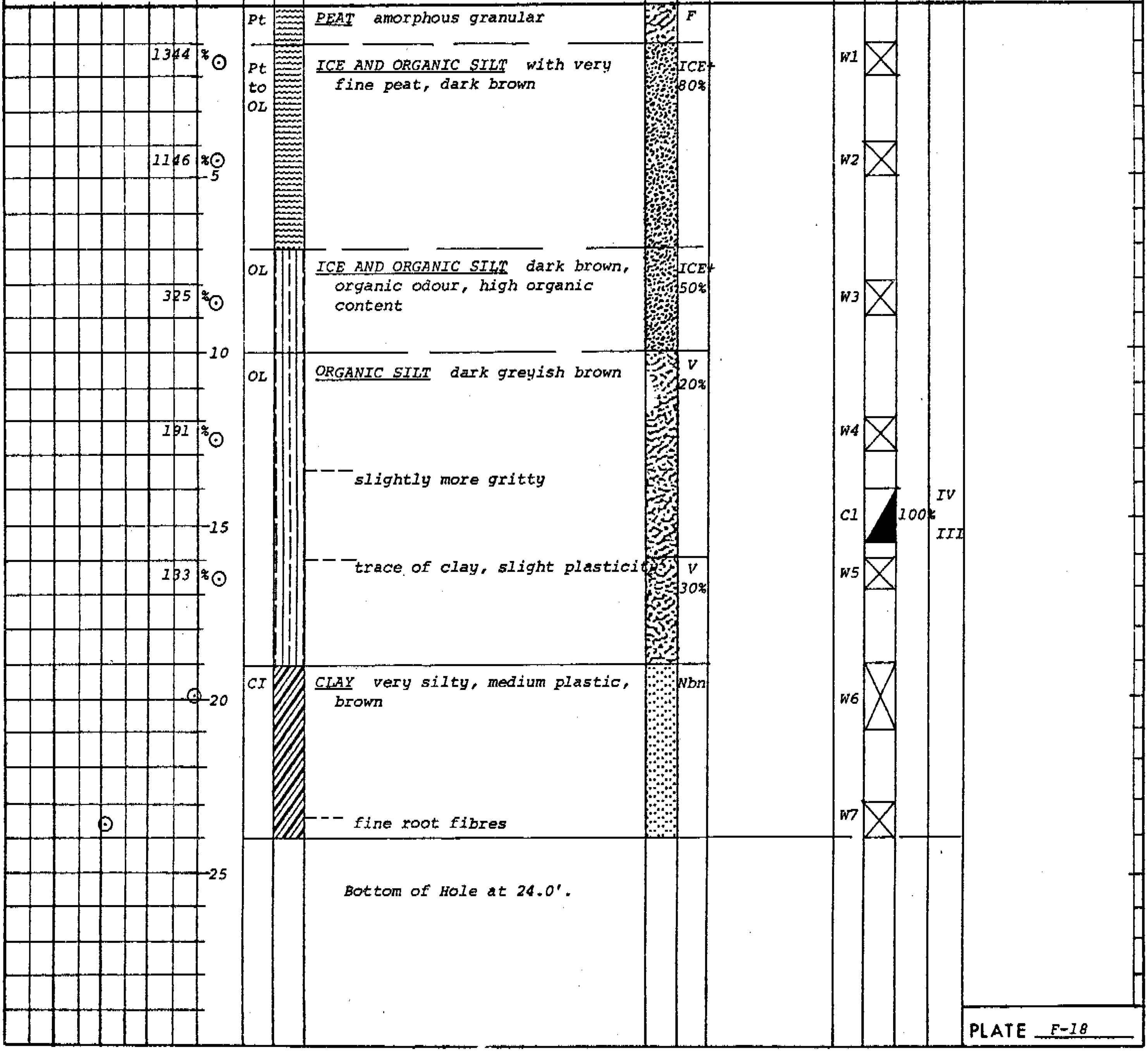
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV9

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD CRREL /AIR
START 10:45 PM
FINISH 12:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



MOISTURE CONTENT	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		Pt	*PEAT* amorphous granular	F					
1344 % ⊙		Pt to OL	*ICE AND ORGANIC SILT* with very fine peat, dark brown	ICE+ 80%		W1			
1146 % ⊙						W2			
	5								
		OL	*ICE AND ORGANIC SILT* dark brown, organic odour, high organic content	ICE+ 50%					
325 % ⊙						W3			
	10								
		OL	*ORGANIC SILT* dark greyish brown	V 20%					
191 % ⊙						W4			
			slightly more gritty						
						C1	100%	IV III	
	15								
133 % ⊙			trace of clay, slight plasticity	V 30%		W5			
		CI	*CLAY* very silty, medium plastic, brown	Nbn					
⊙	20					W6			
⊙			fine root fibres			W7			
	25								
			Bottom of Hole at 24.0'.						

PLATE F-18

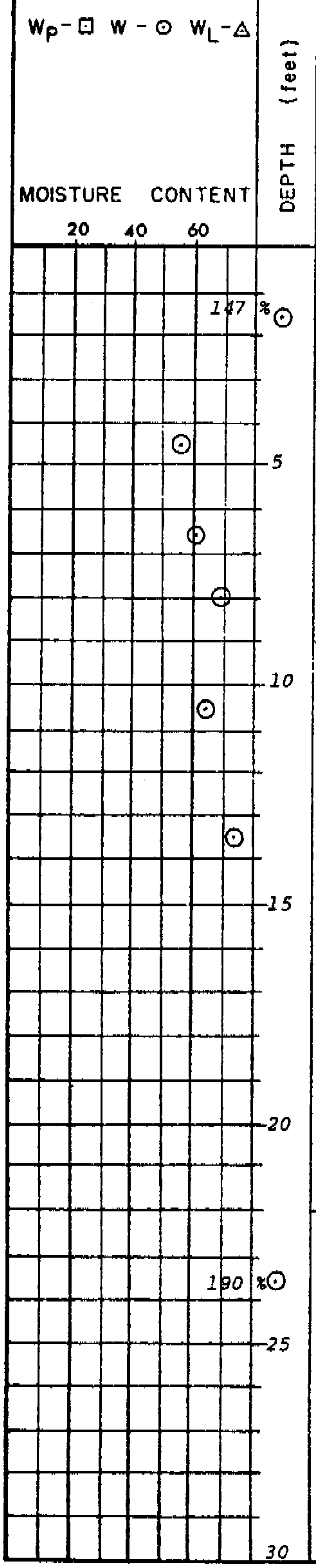
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV10

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD AIR /CRREL
START 1:45
FINISH 2:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
OL	ORGANIC SILT brown	F						
	ICE	ICE						
CI	CLAY very silty, trace sand, non plastic, brown	V 20%		W1	☒			
	medium plastic	30%		W2	☒			
	gravel particle (1" dia.),	20%		W3	☒			
	brownish-grey	60%		C1		50%	IV	
CI	ICE AND CLAY silty, trace sand, medium plastic, grey	ICE+ 70%		W4	☒			
	very silty			W5	☒			
	ICE AND TRACE OF CLAY	90- 95%						
	silty, brownish-grey, medium plastic to high plastic							
SM	ICE AND SAND fine to medium grained, silty, trace clay, non plastic, grey	ICE+ 80%		W6	☒			

PLATE F-19

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV10 (con't)

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD AIR /CRREL
START 1:45
FINISH 2:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
280 % ⊙	30	GM		*GRAVEL AND ICE* sandy, trace silt, clayey, non to low plastic, dark brown to grey		V 30%		W7	☒			
⊙								W8	☒			
	35											
⊙		GM		*GRAVEL* coarse, sandy, less silty, brown		V 10%		W9	☒			
				Bottom of Hole at 37.0'.								
	40											

PLATE F-19 (con't)

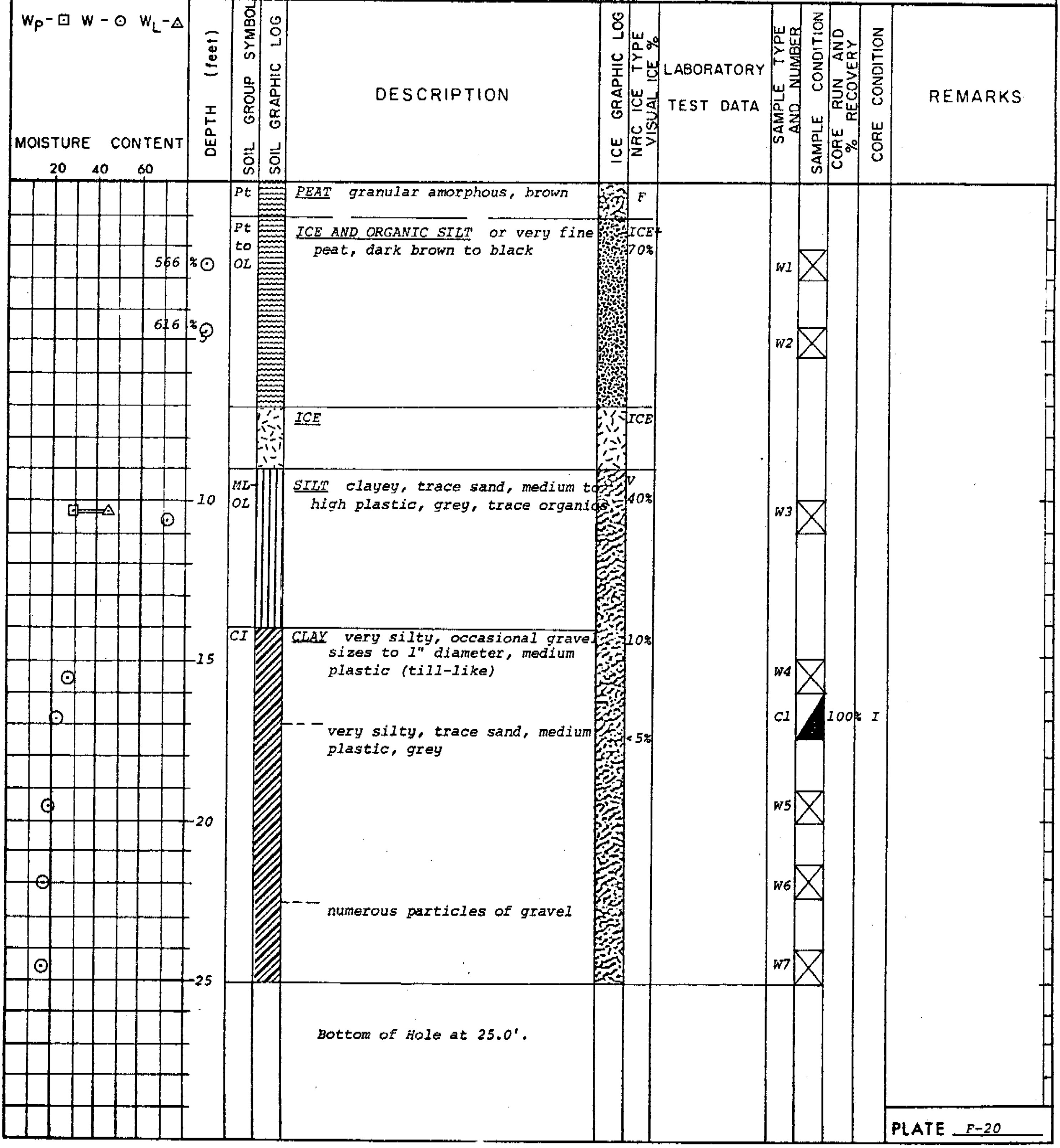
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV11

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 20, 1976
RIG Heli Drill	METHOD CRREL/ AIR	START 3:55 AM	FINISH 5:55 AM
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT* granular amorphous, brown	F					
	Pt to OL	*ICE AND ORGANIC SILT* or very fine peat, dark brown to black	ICE+ 70%		W1 W2			
		ICE	ICE					
10	ML-OL	*SILT* clayey, trace sand, medium to high plastic, grey, trace organics	V 40%		W3			
15	CI	*CLAY* very silty, occasional gravel sizes to 1" diameter, medium plastic (till-like)	10%		W4 C1	100%	I	
		very silty, trace sand, medium plastic, grey	<5%		W5			
20					W6			
		numerous particles of gravel						
25					W7			

Bottom of Hole at 25.0'.

PLATE F-20

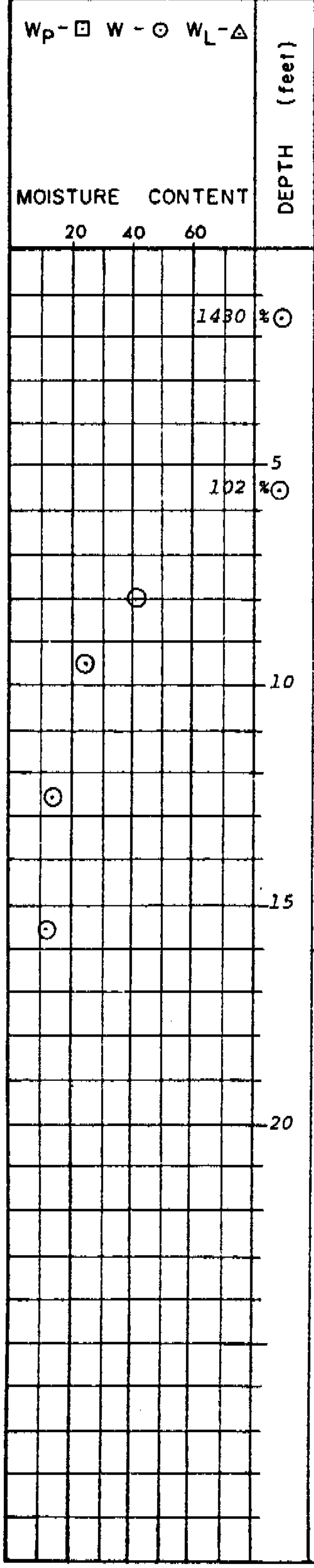
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV12

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 5:55 AM
FINISH 6:35 AM
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT granular amorphous, brown	F					
	ICE	ICE					
Pt	PEAT granular amorphous, small woody and non woody pieces, silty	V 10%		W1			
OL	ORGANIC SILT clayey, brownish-grey, low plastic, trace of fine organics occasional gravel sizes	V 10%		W2			
CI-CH	CLAY silty, trace of sand, coarse grained, occasional gravel sizes to 1" diameter, medium to high plastic, numerous inclusions of ice to 1/4", grey to brown (till-like) silty, little sand, low plastic, gravel sizes to 3/8"ø	Vs, Vr 25-30% 10%		C1 C2	100% 100%	II I	γ_{bulk} = 112 pcf γ_d = 80 pcf
GP	GRAVEL sandy, brown sandy, some medium plastic clay, cobbles	Nf		W3 W4			

Bottom of Hole at 16.0'.

PLATE F-21

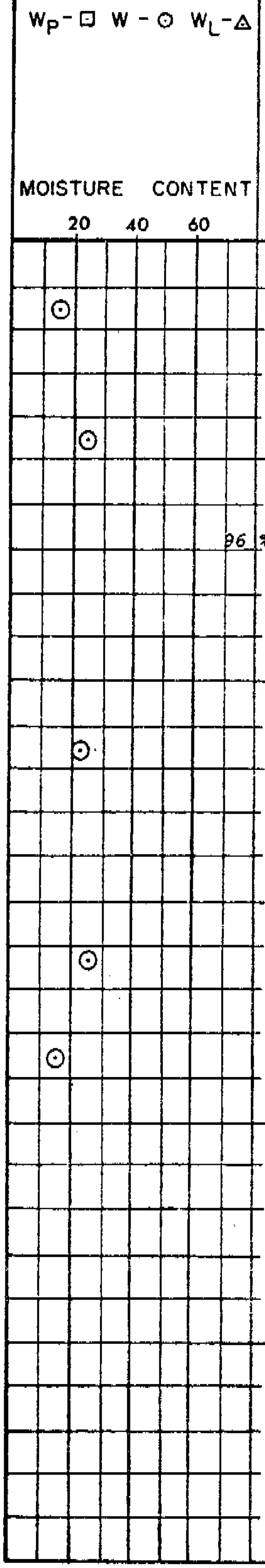
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV13*

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 20, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *7:27 AM*
FINISH *8:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*							
	CL	*CLAY silty, trace of sand, brown, numerous particles of gravel to 2" diameter, low plastic (till-like)*	*V* *5%*		*W1*	☒			
					W2	☒			
5	*GP*	*GRAVEL sandy, rock fragments, ice-rich*	*V* *50%*		*W3*	☒			
10					*W4*	☒			
		less ice	*20%*						
15					*W5*	☒			
		coarser gravel sizes, no ice	*Nf*		*W6*	☒			
20		*Bottom of Hole at 18.5'.*							

PLATE *F-22*

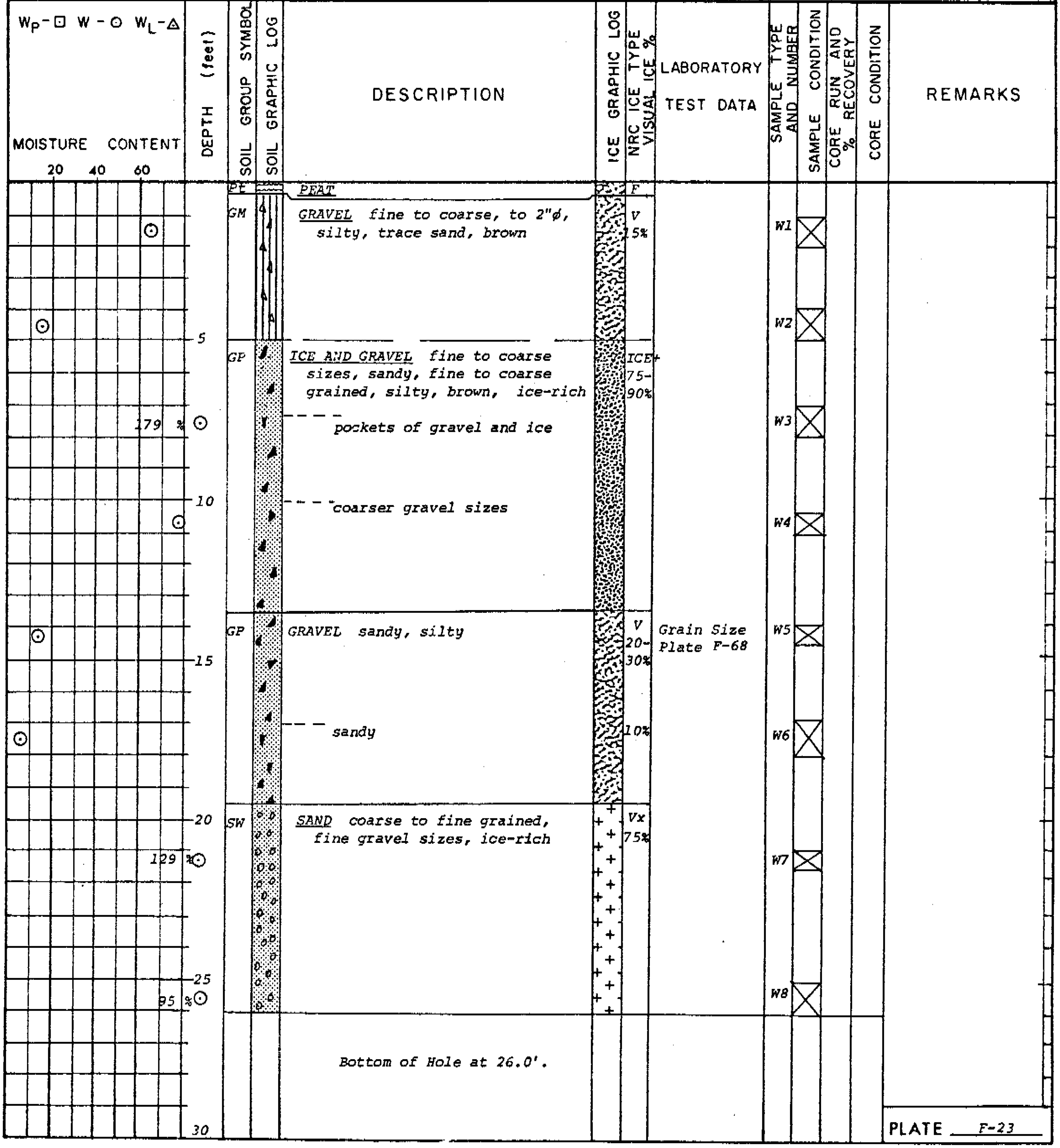
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV14

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD AIR
START 9:10
FINISH 10:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



MOISTURE CONTENT	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER
	PT	PEAT	F		
	GM	GRAVEL fine to coarse, to 2"ø, silty, trace sand, brown	V 15%		W1 W2
179 %	GP	ICE AND GRAVEL fine to coarse sizes, sandy, fine to coarse grained, silty, brown, ice-rich pockets of gravel and ice coarser gravel sizes	ICE+ 75-90%		W3 W4
	GP	GRAVEL sandy, silty sandy	V 20-30% 10%	Grain Size Plate F-68	W5 W6
129 % 95 %	SW	SAND coarse to fine grained, fine gravel sizes, ice-rich	Vx 75%		W7 W8
		Bottom of Hole at 26.0'.			

PLATE F-23

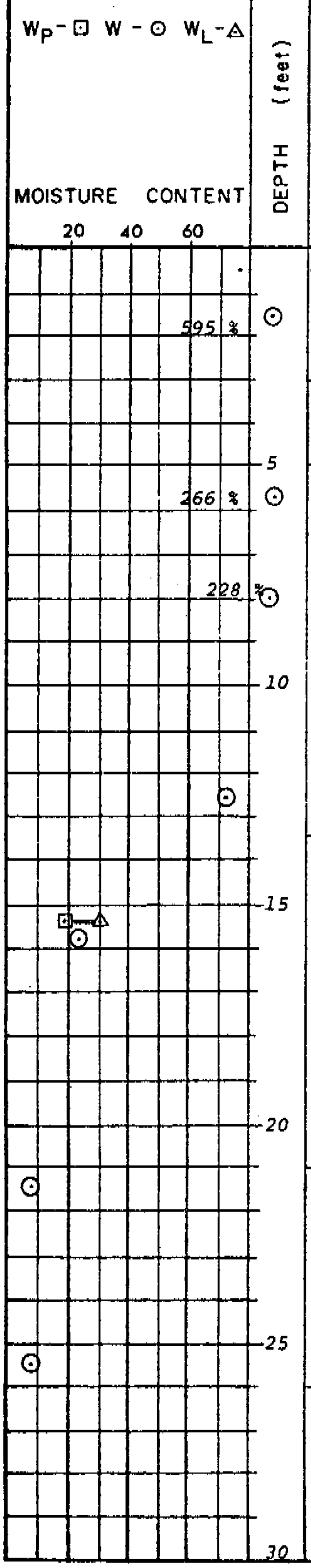
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV15

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 20, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 10:50
FINISH 12:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
Pt	PEAT fibrous, wood chips	Vx, Vs 50%		W1			
	ICE	ICE					
OL	ORGANIC SILT black	Vx 75%		W2			
	— trace fine gravel						
	— organics, fibrous, rootlets and wood chips			C1	80%	I	γ_{bulk} = 69 pcf γ_d = 21 pcf
	— more clayey, blackish-grey			W3			
CL	CLAY silty, trace sand, fine grained, fine gravel sizes, low to medium plastic, dark brown (till-like)	V 20%		W4			
	— gravelly, fine to coarse, sandy						
	— sandy, fine to medium grained, low plastic						
GC	GRAVEL coarse to fine, sandy, fine to coarse grained, clayey, grey			W5			
				W6			

Bottom of Hole at 26.0'.

PLATE F-24

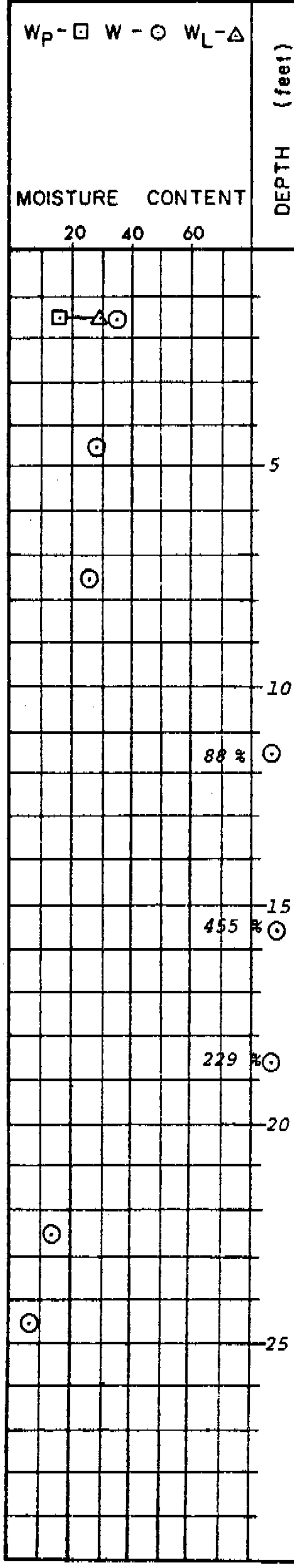
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV16

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 17:50
FINISH 18:20
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
SC		SAND silty, clayey, gravelly, low plastic, brown (till-like)		V 30%	Grain Size Plate F-69	W1	☒			
SM		SAND fine grained, very silty, little fine gravel, trace clay, very low plastic		V 30%		W2	☒			
SP		SAND fine grained, gravelly, silty				W3	☒			
SP		SAND AND ICE fine grained, occasional gravel sizes, brown		V 80%		W4	☒			
		-- gravelly								
		-- fine grained, silty, fine gravel sizes				W5	☒			
		-- silty, fine gravelly				W6	☒			
GP		GRAVEL fine, sandy, fine to coarse grained		V 10%		W7 W8	☒ ☒			
		Bottom of Hole at 25.0'.								

PLATE F-25

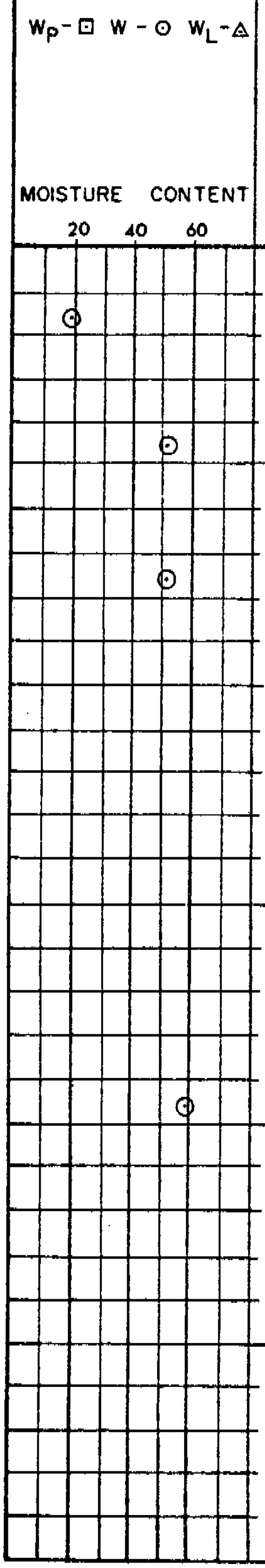
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV17*

LOGGED BY *GCD*
DRAWN BY
CHECKED *RST*
DATE *March 24, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *18:35*
FINISH *18:50*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	*N*						
CL-CI	*CLAY silty, trace sand, low to medium plastic, brown*	*V 5%*		*W1*	☒			
	fine gravel sizes	*50%*		*W2*	☒			
				W3	☒			
SM	*ICE AND SAND fine grained, very silty*	*ICE+ >95%*						
	fine to medium grained, silty, gravelly, trace clay	*75%*		*W4*	☒			
	Bottom of Hole at 22.0'.							

PLATE *F-26*

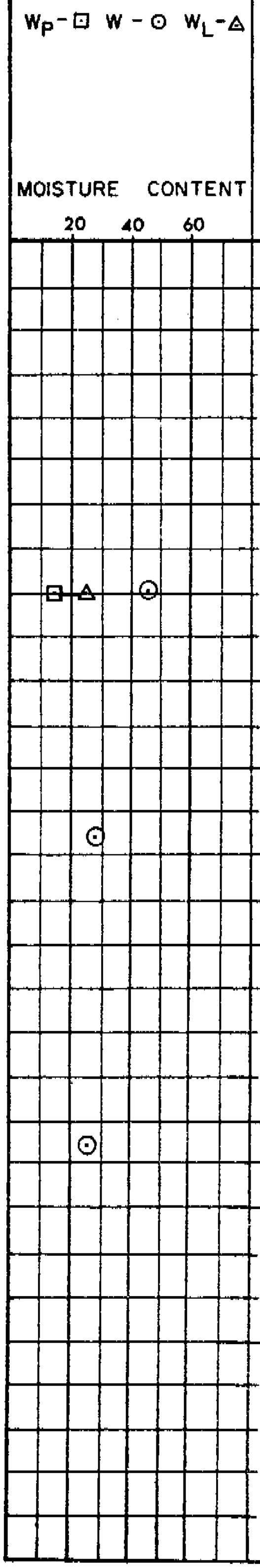
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV18

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD AIR
START 20:50
FINISH 21:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE / VISUAL ICE %	SAMPLE TYPE AND NUMBER
Pt	PEAT 4"	V	
Pt	ICE AND PEAT fibrous	ICE+ 30-40%	
	--- trace silt		
	--- clayey, trace organics		
GC	GRAVEL clayey, sandy, medium plastic, grey	V 10%	W1
	--- gravel to 3/4"ø, occasional cobbles, clayey	5%	W2
CI-CH	CLAY silty, gravelly, medium to high plastic (till-like)	Nbn	
	--- cobble		W3
	Bottom of Hole at 23.0'.		

LABORATORY TEST DATA

SAMPLE CONDITION

CORE RUN AND % RECOVERY

CORE CONDITION

REMARKS

PLATE F-27

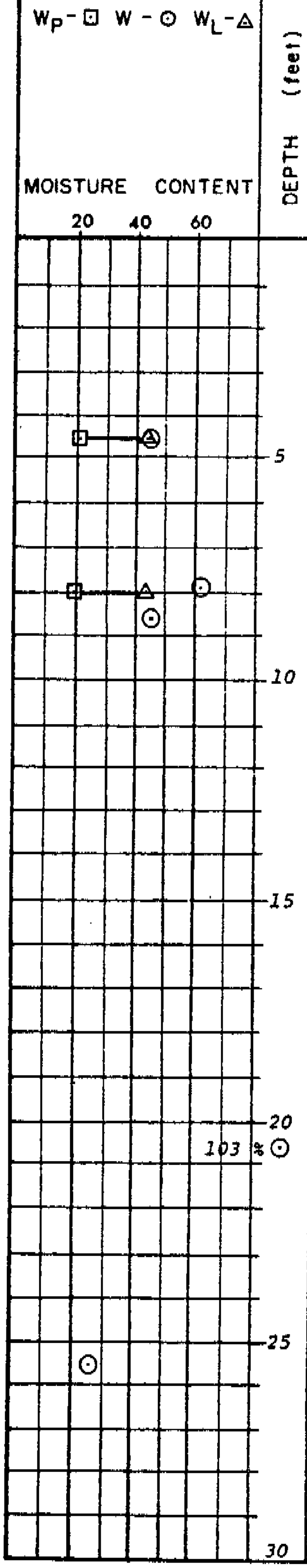
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV19

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 24, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 21:40
FINISH 21:55
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	F						
CI	CLAY silty, trace sand, occasional gravel sizes, medium plastic, grey	Vx 60%						
CI	CLAY AND ICE silty, occasional gravel sizes, medium plastic, dark grey (till-like)	Vs, Vx 25-30%						
	– less ice			W1	☒			
	trace gravel							
	thin lenses of ice			C1		100%	II	γ_{bulk} = 92 pcf γ_d = 57 pcf
	some gravel sizes							
GC	GRAVEL AND ICE fine gravel, clayey	V 30-40%						
GP	ICE AND GRAVEL trace sand	ICE+ 60%		W2	☒			
GP	GRAVEL fine to coarse, sandy	V 15%		W3	☒			

Bottom of Hole at 27.0'.

PLATE F-28

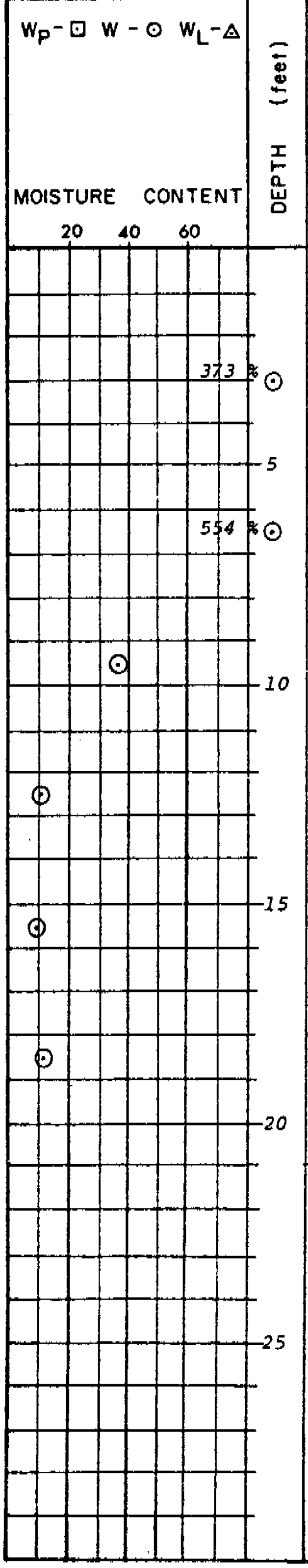
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV20

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR
START 0:45
FINISH 1:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* woody, fibrous, black	F						
				W1	☒			
Pt	*PEAT AND ICE*	V 20%						
				W2	☒			
GP	*GRAVEL* very sandy, trace clay, grey	V 15%		W3	☒			
	sandy, silty, trace clay, low plastic	Nf						
	coarse gravel sizes, sandy			W4	☒			
				W5	☒			
	frequent cobbles, very coarse gravel, trace silt			W6	☒			
	cobble or boulder							
	Bottom of Hole at 21.0'.							

PLATE F-29

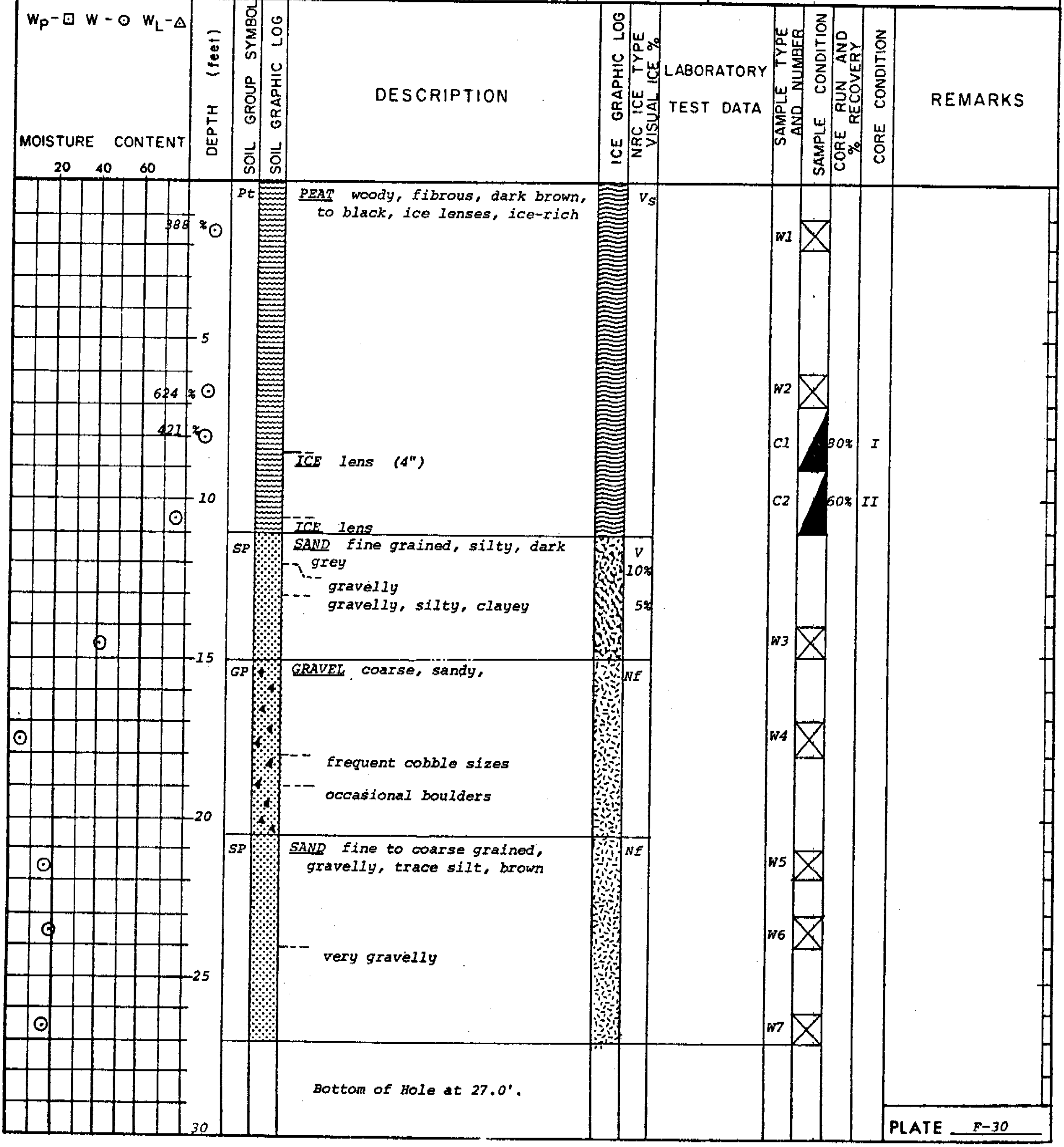
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV21*

LOGGED BY *GNL*	DRAWN BY	CHECKED *RST*	DATE *March 25, 1976*
RIG *Heli Drill*	METHOD *CRREL/AIR*	START *1:40*	FINISH *2:10*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT woody, fibrous, dark brown, to black, ice lenses, ice-rich*	*Vs*		*W1*			
				W2			
				C1	*80%*	*I*	
	ICE lens (4")						
				C2	*60%*	*II*	
	ICE lens						
SP	*SAND fine grained, silty, dark grey*	*V*					
	gravelly	*10%*					
	gravelly, silty, clayey	*5%*					
				W3			
GP	*GRAVEL coarse, sandy,*	*Nf*					
				W4			
	frequent cobble sizes						
	occasional boulders						
SP	*SAND fine to coarse grained, gravelly, trace silt, brown*	*Nf*		*W5*			
				W6			
	very gravelly						
				W7			
	Bottom of Hole at 27.0'.						

PLATE *F-30*

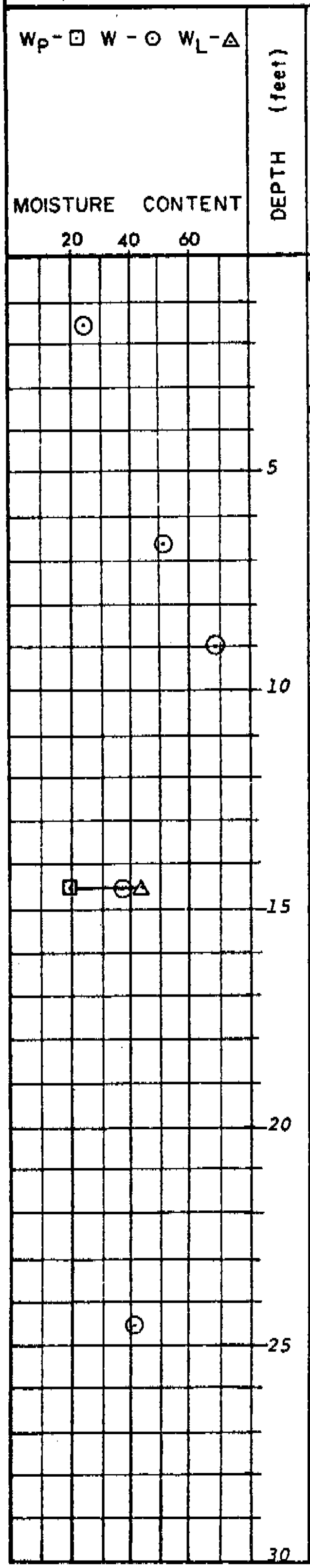
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV22

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 3:40
FINISH 3:55
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CL	*CLAY* very silty, low plastic, trace organics	V <5%		W1	☒			
CI	*CLAY AND ICE* silty, trace sand, medium to high plastic, dark brown, occasional coarse gravel or cobble	Vx 30-40%		W2 C1	☒ ◢	50%	IV	
	occasional gravel sizes	V 25%						
	fine gravel sizes, silty, medium to high plastic, grey (till-like)	20%		W3	☒			
	more ice	25-30%		W4	☒			

Bottom of Hole at 27.0'.

PLATE F-31

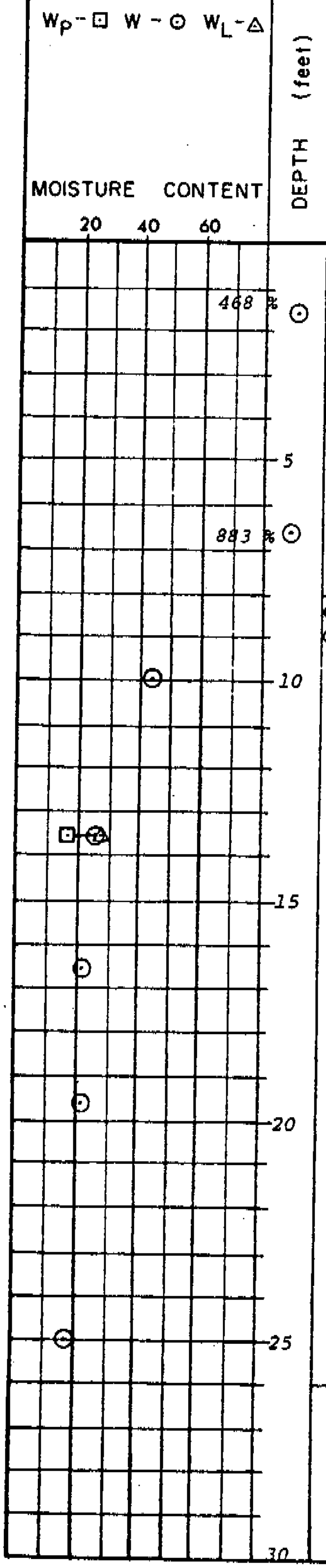
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV23*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 25, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *5:50*
FINISH *6:15*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
Pt	*PEAT woody*	*V 10%*		*W1*	☒			
	more ice	*V 25%*		*W2*	☒			
CL-CI	*CLAY very silty, gravelly, numerous cobbles, low plastic, dark grey (till-like)*	*V 5-10%*	*Grain Size Plate F-70*	*W3*	☒			
	cobbles							
	low to medium plastic, trace fine to coarse sand, greyish-brown			*W4*	☒			
	more gravel sizes, medium plastic, sub-angular to 1/2"ø	*V 5%*		*W5*	☒			
				W6	☒			
	cobble, little gravel							
	cobbles, sandy, fine grained, silty, some gravel sizes, low to medium plastic (till-like)	*Nbn*		*W7*	☒			

Bottom of Hole at 26.0'.

PLATE *F-32*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

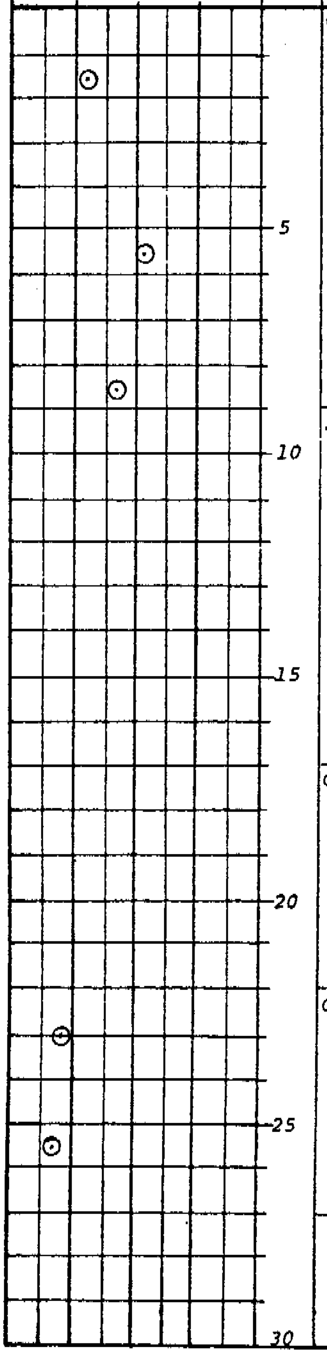
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV24

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR
START 6:55
FINISH 7:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
CI	CLAY silty, trace sand, fine to coarse grained, trace gravel sizes, medium plastic, brown, trace organics (till-like)	V <5%		W1	
	--- medium to high plastic	5-10%		W2	
	--- very gravelly (till-like)			W3	
SP	ICE AND SAND coarse to fine grained, gravelly, trace silt	ICE+ 90%			
GP	ICE AND GRAVEL fine, silty, sandy trace clay	ICE+ 95%			
GP	GRAVEL coarse gravel sizes, rounded to 1/2"ø, sandy	V 5-10%		W4	
	--- very sandy, fine to coarse grained	<5%		W5	
		Nf			

Bottom of Hole at 27.0'.

PLATE F-33

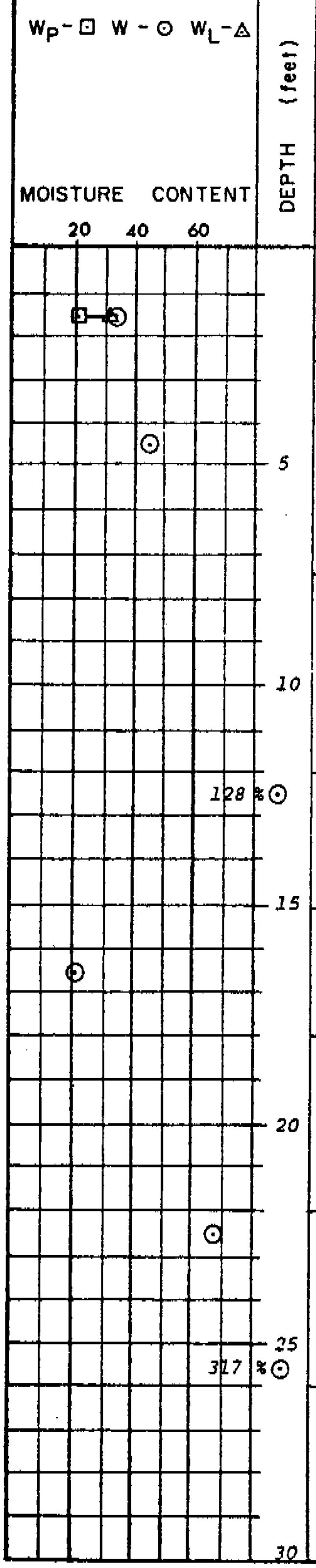
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV25

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR
START 8:55
FINISH 9:15
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI	CLAY very silty, trace sand, medium plastic, brown, rootlets	Nbe		W1	☒			
	ICE	ICE						
CI	CLAY silty, some gravel sizes, medium plastic (till-like)	V		W2	☒			
	ICE	ICE						
SM	ICE AND SAND silty, little fine gravel and clay, non plastic	ICE+	Grain Size Plate F-71	W3	☒			
SP	SAND fine to coarse grained, very gravelly, fine, trace fines, brown	V 15%		W4	☒			
	ICE	ICE						
SP	ICE AND SAND fine grained, silty, occasional gravel sizes, grey	ICE+		W5 W6	☒ ☒			
	Bottom of Hole at 26.0'.							

PLATE F-34

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

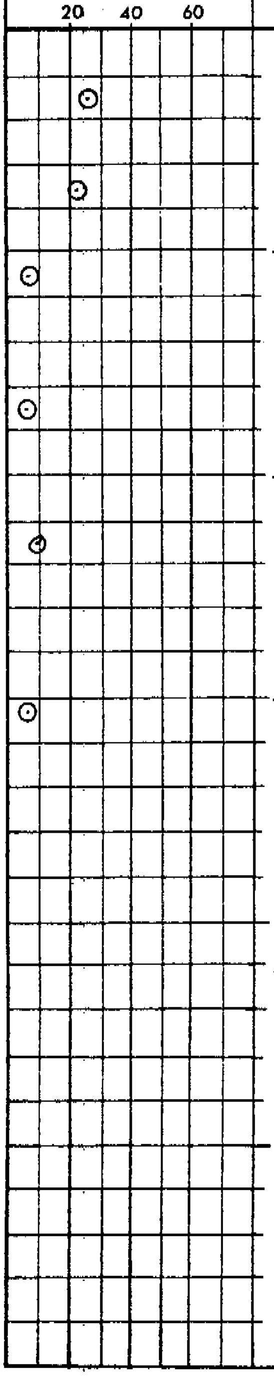
PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV26

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 25, 1976
RIG Heli Drill	METHOD AIR	START 9:40	FINISH 10:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ⊙ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CL		*CLAY* silty, sandy, fine to coarse grained, low plastic, brown		Nbe		W1	☒			
			ICE		ICE						
	SP		*SAND* fine to medium grained, trace fine, brown		Nbe		W2	☒			
5	GP		*GRAVEL* fine, sandy, coarse to fine grained, brown		Nbn		W3	☒			
			occasional coarse gravel sizes				W4	☒			
10			coarse to fine, trace sand, mainly coarse grained				W5	☒			
15			cobble				W6	☒			
			Bottom of Hole at 15.5'.								
20											

PLATE F-35

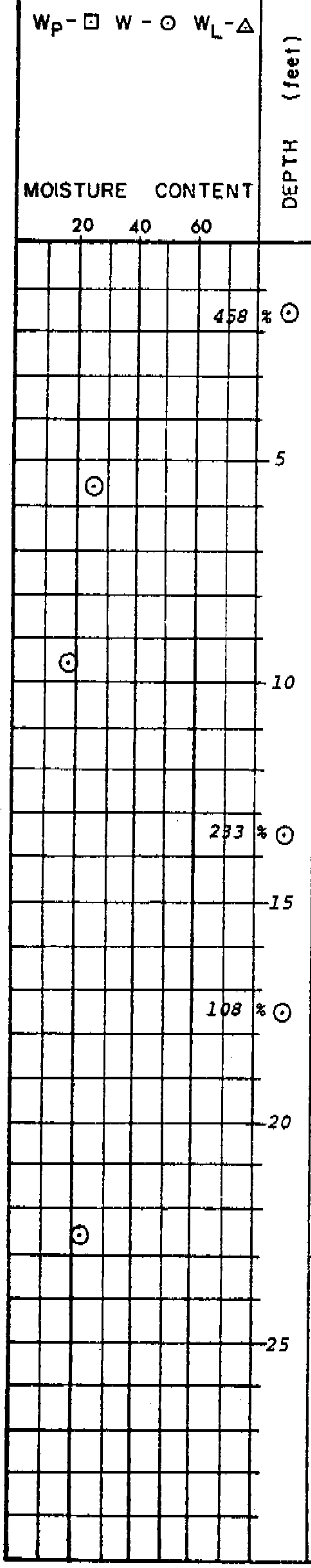
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV27

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR
START 8:45
FINISH 9:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT fibrous, woody, dark brown	Vx		W1	☒			
SM	SAND fine grained, silty, gravelly, trace clay, grey	V 5%		W2	☒			
	some gravel		Grain Size Plate F-72	W3	☒			
	ICE	ICE						
SM	SAND silty, little gravel	V 30%		W4	☒			
	ICE	ICE						
SM	SAND silty	Vr	30%					
	ICE	ICE						
SM	SAND silty	V	30%					
	ICE	ICE		W5	☒			
SM	ICE AND SAND silty, fine grained	ICE+ 90%						
	very gravelly cobble	V 10%		W6	☒			

Bottom of Hole at 23.0'.

PLATE F-36

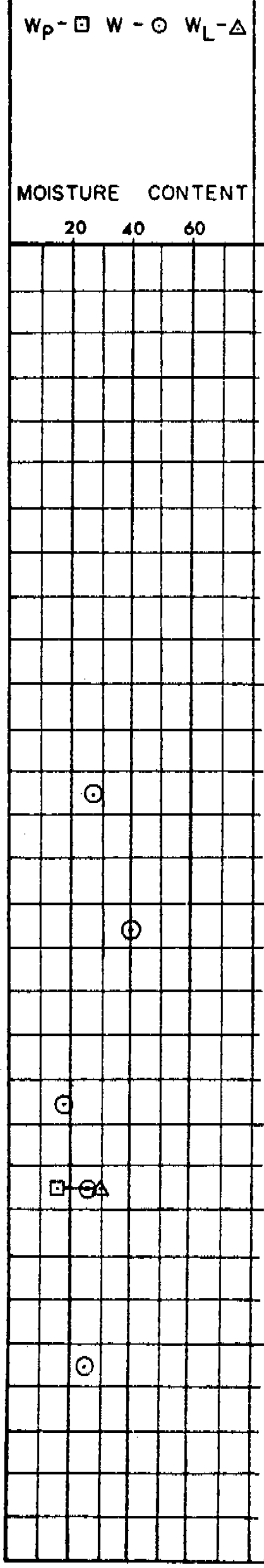
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV28

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR
START 8:15
FINISH 8:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	REMARKS
Pt	PEAT	V				
OL	ORGANIC SILT low plastic	30%				ICE (100%) to 8.0 feet in hole drilled 10.0 feet north.
	thin gravel layer					
CI	CLAY silty, sandy, fine grained, occasional fine gravel sizes, medium plastic, grey (till-like)	V 20-30%				
	gravelly					
CI	ICE AND CLAY very gravelly	ICE+ 60%				
CI	CLAY gravelly, sandy, silty, grey, low to medium plastic	V 30-40%				
	coarser gravel sizes		Grain Size Plate F-73	W1	☒	Gravel sizes broken down with bit.
	medium to high plastic, dark grey to black			W2	☒	
	sandy, low to medium plastic	15%				
				W3	☒	
	silty, medium plastic, frequent cobble sizes			W4	☒	
				W5	☒	

Bottom of Hole at 26.0'.

PLATE F-37

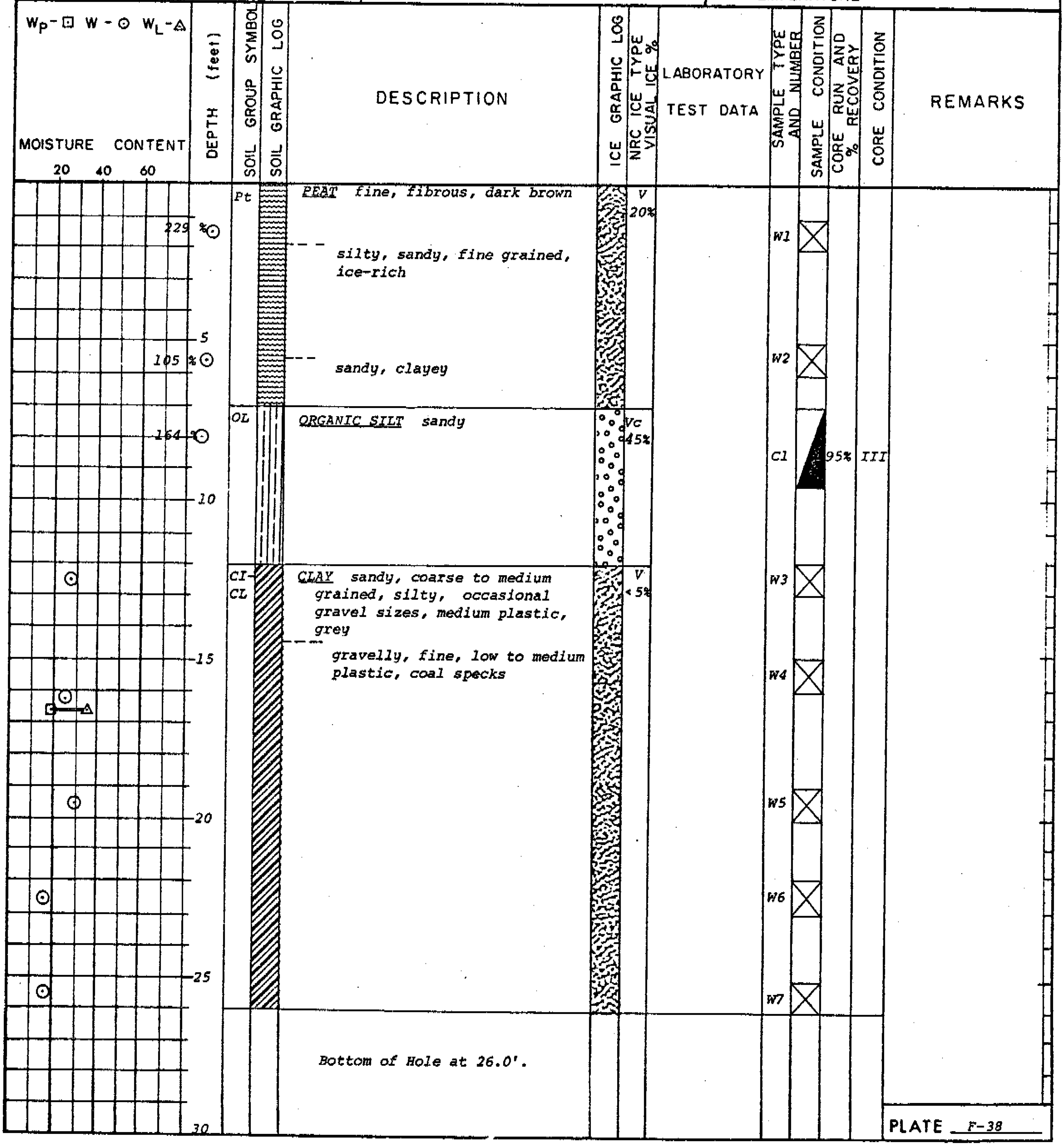
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV29*

LOGGED BY *GCD*
DRAWN BY
CHECKED *RST*
DATE *March 26, 1976*
RIG *Heli Drill*
METHOD *AIR/CRREL*
START *9:20*
FINISH *9:50*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



PEAT fine, fibrous, dark brown

silty, sandy, fine grained, ice-rich

sandy, clayey

ORGANIC SILT sandy

CLAY sandy, coarse to medium grained, silty, occasional gravel sizes, medium plastic, grey

gravelly, fine, low to medium plastic, coal specks

Bottom of Hole at 26.0'.

PLATE *F-38*

APPENDIX "F"

SECTION F.3 TEST HOLE LOGS: CLUSTER NO. 3 TO CLUSTER NO. 4

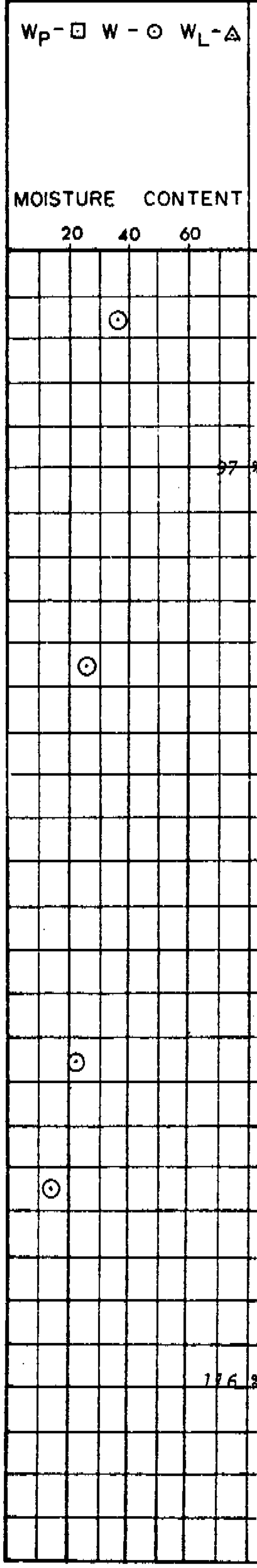
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV30

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 25, 1976
RIG Heli Drill	METHOD AIR	START 11:10	FINISH 11:30
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
CL	CLAY silty, occasional gravel sizes, low plastic, brown	Nbe						
	ICE	ICE		W1	☒			
CL	CLAY silty, gravelly, brown	Nbe						
	ICE	ICE						
CL	CLAY very silty, gravelly, brown	Nbe		W2	☒			
		ICE						
SP	SAND gravelly, silty, clayey	Nbe	Grain Size Plate F-74	W3	☒			
ICE	ICE	ICE						
GP	GRAVEL fine to coarse, to 1 1/2"ø sandy, coarse to medium grained, trace silt, occasional cobble	V 20%		W4 W5	☒ ☒			
GP	ICE AND GRAVEL	ICE+ 90%		W6	☒			

Bottom of Hole at 26.0'.

PLATE F-39

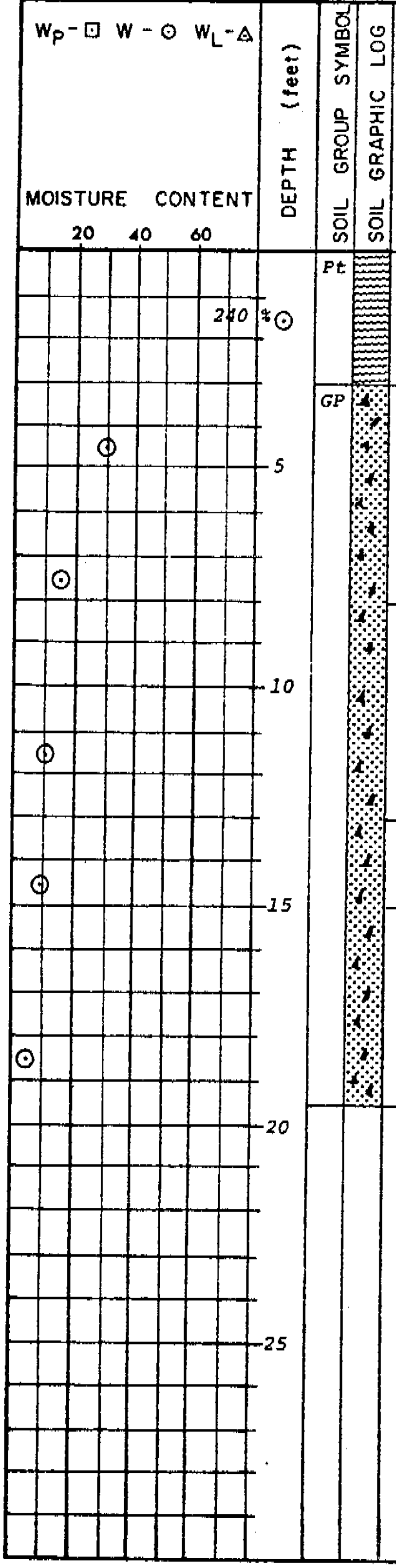
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV31

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 25, 1976
RIG Heli Drill	METHOD AIR	START 12:05	FINISH 12:55
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	<u>PEAT</u> fibrous, wood chips, brown	+	Vx 40%		W1	☒			
GP	<u>GRAVEL</u> coarse to fine, trace sand	+	Vx 10%		W2	☒			
		+		Grain Size Plate F-75	W3	☒			
	coarser gravel sizes, sandy	+							Gravel sizes broken down with rockbit.
		+			W4	☒			
	3" layer of medium plastic clay	+							
		+			W5	☒			
	sandy, fine to coarse grained	+							
		+			W6	☒			
	Bottom of Hole at 19.5'.								

PLATE F-40

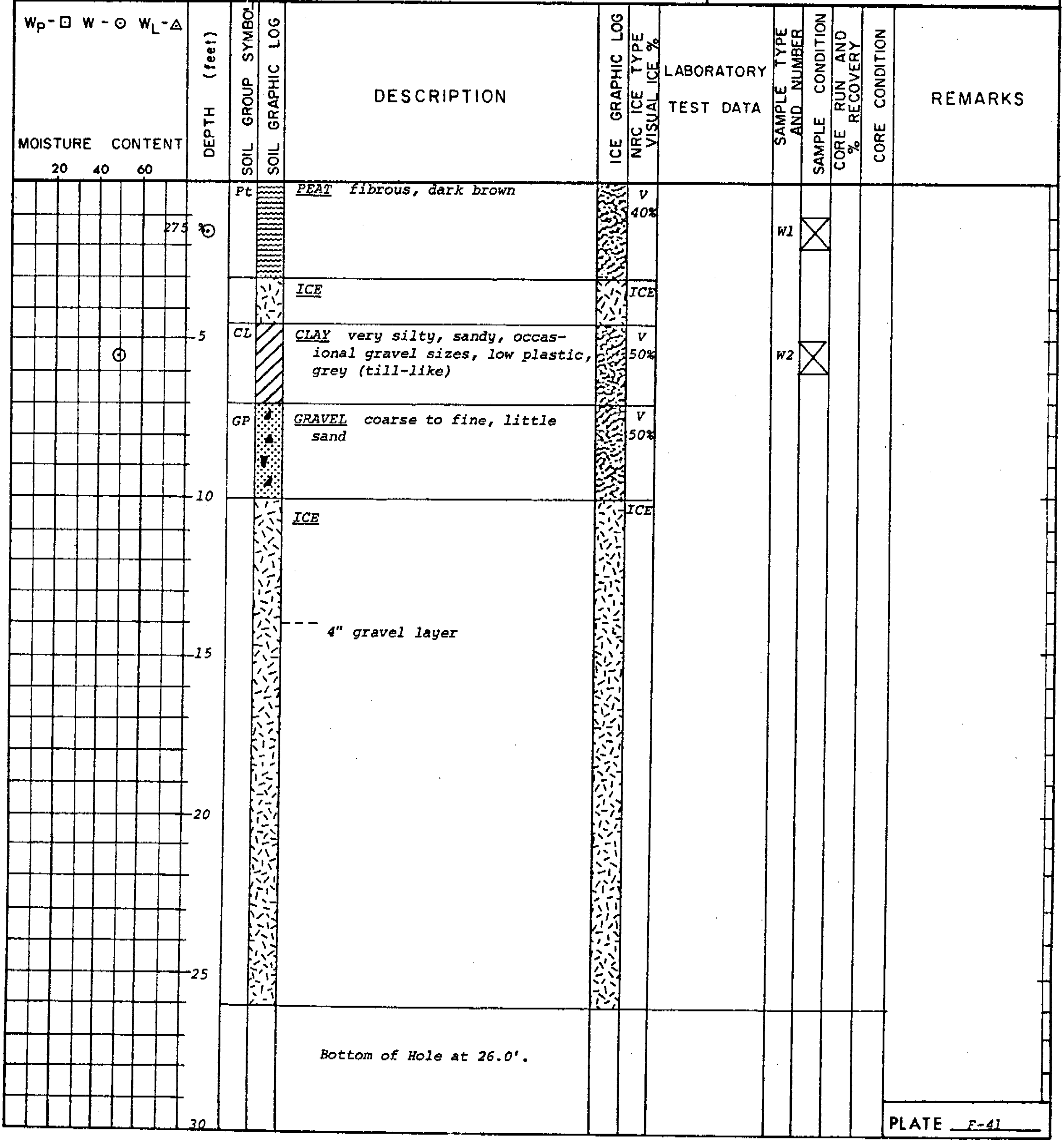
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV32

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 25, 1976
RIG Heli Drill	METHOD AIR	START 14:05	FINISH 14:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
Pt	*PEAT* fibrous, dark brown	V 40%		W1	
	ICE	ICE			
CL	*CLAY* very silty, sandy, occasional gravel sizes, low plastic, grey (till-like)	V 50%		W2	
GP	*GRAVEL* coarse to fine, little sand	V 50%			
	ICE 4" gravel layer	ICE			
	Bottom of Hole at 26.0'.				

PLATE F-41

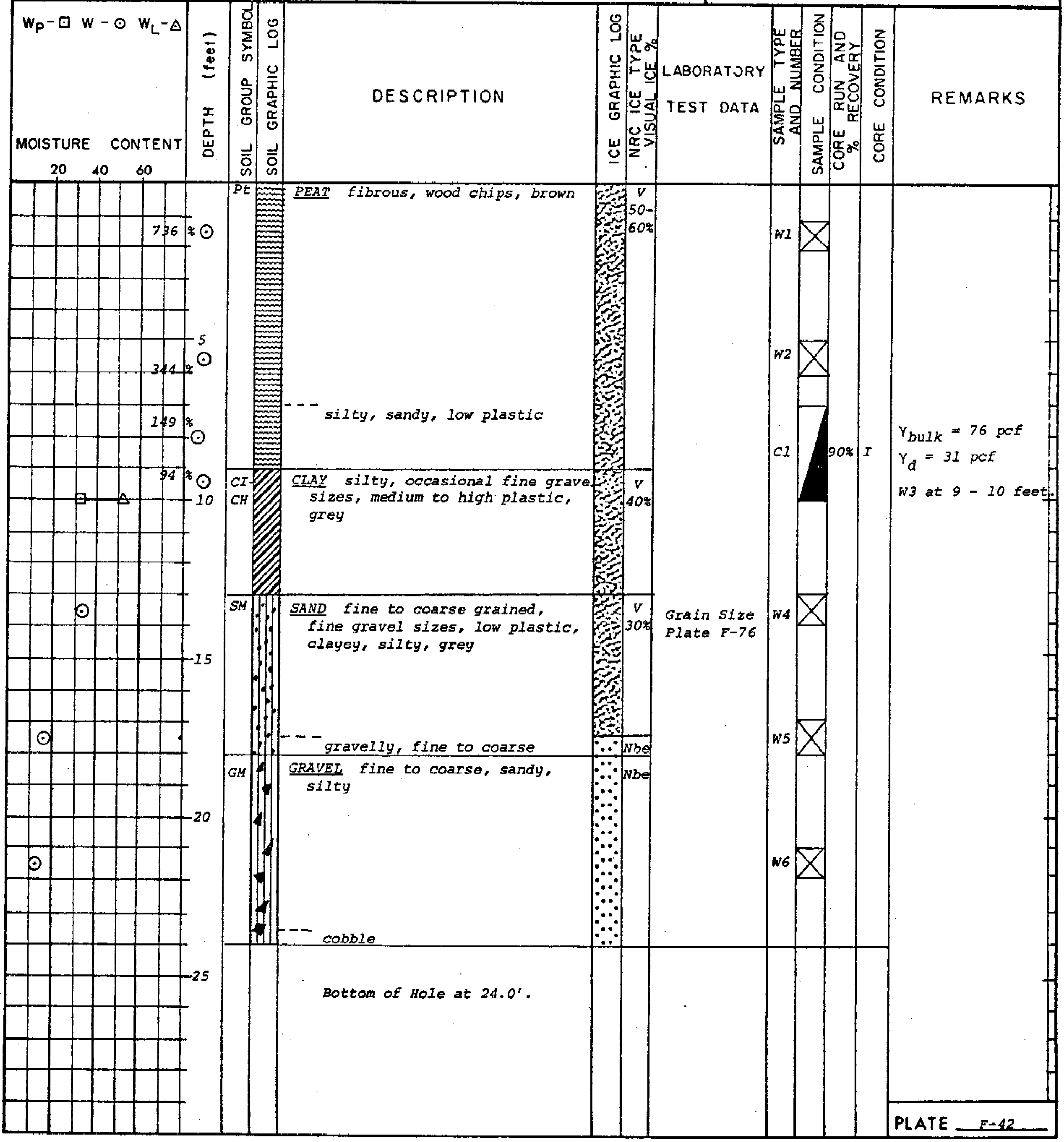
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV33

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 25, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 14:30	FINISH 14:50
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE . VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* fibrous, wood chips, brown	V 50-60%		W1			
				W2			
	--- silty, sandy, low plastic			C1	90%	I	γ_{bulk} = 76 pcf γ_d = 31 pcf W3 at 9 - 10 feet.
CI-CH	*CLAY* silty, occasional fine gravel sizes, medium to high plastic, grey	V 40%					
SM	*SAND* fine to coarse grained, fine gravel sizes, low plastic, clayey, silty, grey	V 30%	Grain Size Plate F-76	W4			
	--- gravelly, fine to coarse	Nbe		W5			
GM	*GRAVEL* fine to coarse, sandy, silty	Nbe		W6			
	--- cobble						
	Bottom of Hole at 24.0'.						

PLATE F-42

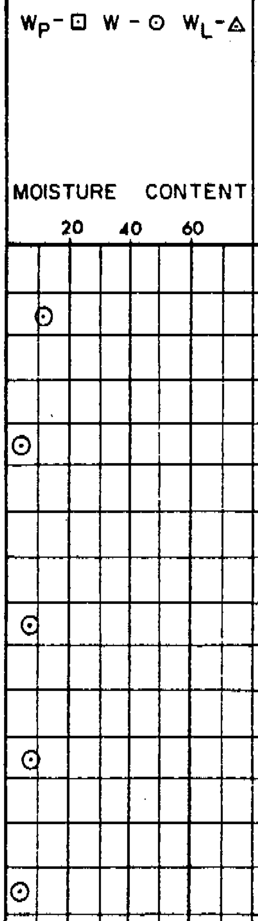
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV34*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 25, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *15:35*
FINISH *16:10*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt		*PEAT 4"*		*Nbn*						
	GP		*GRAVEL coarse to fine, sandy, medium to coarse grained*								
							W1	☒			
			mainly coarse gravel sizes to 1 - 1 1/2" diameter				*W2*	☒			
5											
			trace silt				*W3*	☒			
10											
							W4	☒			
							W5	☒			
15											
			Bottom of Hole at 15.0'.								

PLATE *F-43*

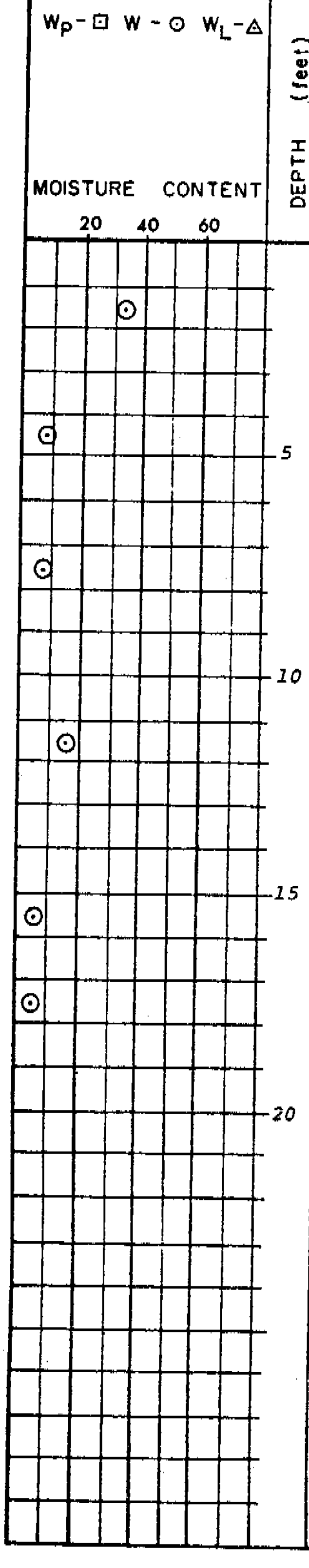
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV35

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR
START 17:00
FINISH 17:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	V						
SM	SAND fine, silty, brown	20%	Grain Size Plate F-77	W1	☒			
GP	GRAVEL coarse to fine, sandy, coarse to medium grained	Nbn		W2	☒			
GC	GRAVEL fine, sandy, fine to coarse grained, clayey	Nbn		W3	☒			
	clay layer, silty, sandy, low plastic, grey			W4	☒			
GP	GRAVEL fine to coarse, sandy, fine to coarse grained, trace silt	Nbn		W5	☒			
	cobble			W6	☒			

Bottom of Hole at 18.0'.

PLATE F-44

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV36

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR, CRREL
START 17:40
FINISH 18:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		Pt	*PEAT* coarse, fibrous, wood chips	V 60%						
699 % ⊙						W1	☒			
285 % ⊙	5					W2	☒			
				45%						
519 % ⊙			highly organic silt	85%		C1		90%	II	
	10	OL	*ORGANIC SILT AND PEAT* grey, low plastic	V 50%						
150 % ⊙						W3	☒			
	15	CI	*CLAY* silty, medium plastic, dark grey	V 30%						
⊡—△ ⊙						W4	☒			
⊙	20		very silty, trace sand, grey	70%	Grain Size Plate F-78	W5	☒			
695 % ⊙	25		less ice			W6	☒			
			Bottom of Hole at 25.5'.							
	30									

PLATE F-45

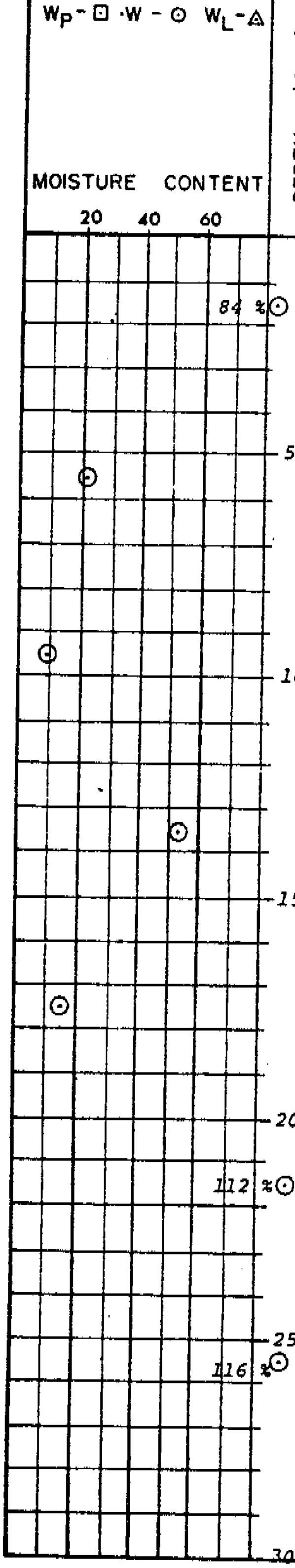
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV37

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 25, 1976
RIG Heli Drill
METHOD AIR
START 18:15
FINISH 18:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	SILT low plastic, brown, peat inclusions	Vx, Vr 35%		W1	☒			
GM	GRAVEL fine, sandy, silty, clayey	Nbn		W2	☒			
GP	GRAVEL coarse to fine, sandy	Nbn		W3	☒			
	ICE	ICE						
GP	GRAVEL coarse	V 50%		W4	☒			
	ICE	ICE						
GP	GRAVEL coarse to fine, trace sand, fine to coarse grained	V 60%		W5	☒			
		65%		W6	☒			
		40%		W7	☒			

Bottom of Hole at 26.0'.

PLATE F-46

APPENDIX "F"

SECTION F.4 TEST HOLE LOGS: CLUSTER NO. 1 TO CLUSTER NO. 3 VIA CLUSTER NO. 5

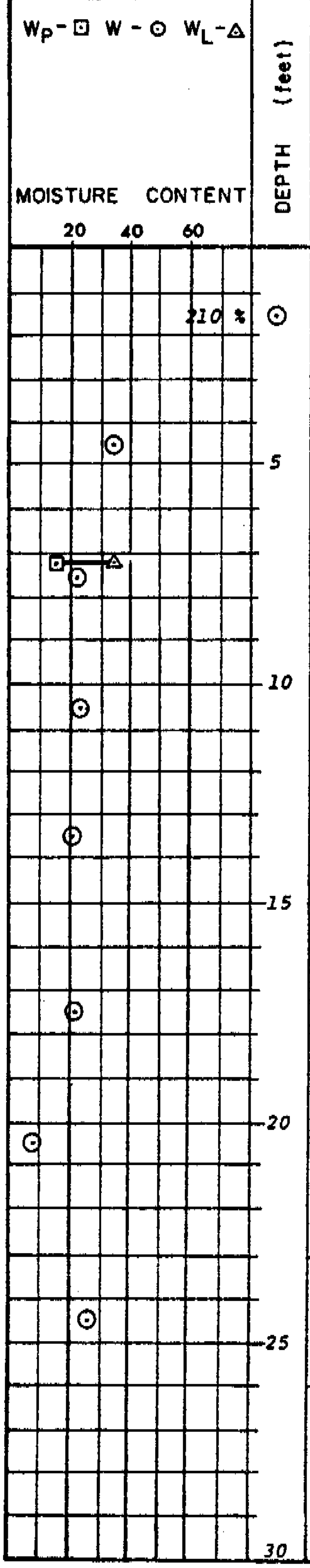
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV42

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 27, 1976
RIG Heli Drill	METHOD AIR FLUSH	START 10:35	FINISH 10:55
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt		*PEAT* coarse fibrous, wood chips, dark brown to black	+ + + + +	Vx, Vs 40%		W1	☒			
CI-CL		*CLAY* silty, trace sand, low to medium plastic, grey		V 40%		W2	☒			
		--- medium plastic		40%		W3	☒			
		--- silty, sandy, fine to coarse grained (till-like)		20%	Grain Size Plate F-79	W4	☒			
		--- sandy, fine grained, trace fine gravel		10%		W5	☒			
GP		*GRAVEL* fine, sandy, fine to coarse grained		Nf						
SP		*SAND* fine grained, occasional gravel sizes, trace clay, grey		Nbe		W6	☒			
GP		*GRAVEL* fine, sandy, fine to coarse grained		Nf		W7	☒			
SP		*SAND* medium grained, trace coarse sand, brown		Nbn		W8	☒			
		Bottom of Hole at 26.0'.								

PLATE F-47

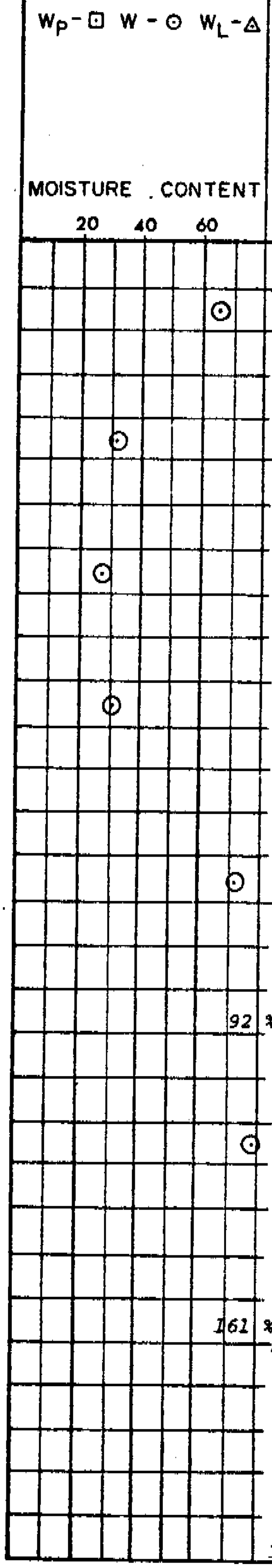
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV43

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 27, 1976
RIG Heli Drill
METHOD AIR FLUSH
START 9:30
FINISH 9:50
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	ML		SILT clayey, sandy, fine to medium grained, occasional fine gravel sizes, low plastic, brown		V 40%	Grain Size Plate F-80	W1	☒			
5	CL-CI		CLAY silty, sandy, fine to coarse grained, occasional gravel sizes low to medium plastic, brown		15%		W2	☒			
			silty, gravelly, fine to coarse, low plastic, brown				W3	☒			
10			medium plastic, fine gravel sizes, grey				W4	☒			
					75%						
					50%		W5	☒			
15	SM		ICE AND SAND silty, fine grained, very low plastic		ICE+		W6	☒			
20	SM		SAND silty, ice-rich, little fine gravel sizes		V 60%		W7	☒			
25	SM		ICE AND SAND silty		ICE+		W8	☒			
30			Bottom of Hole at 26.0'.								

PLATE F-48

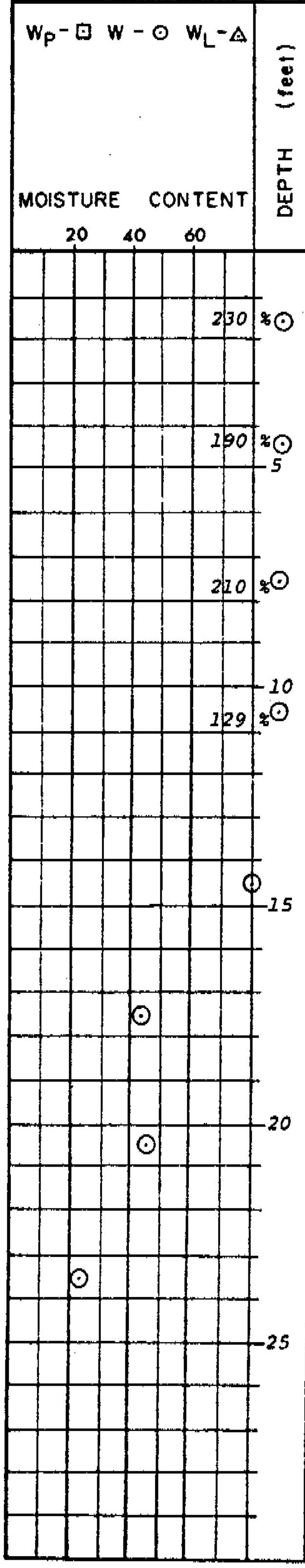
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV44

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 27, 1976
RIG Heli Drill	METHOD AIR FLUSH	START 8:50	FINISH 9:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



MOISTURE CONTENT	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		Pt	*PEAT* fibrous, silty, dark brown to black	V 40%						
230 %				75%		W1	☒			
190 %	5			30%		W2	☒			
		ML	*SILT* trace fine sand, non to low plastic, brown-grey	V 35%						
210 %						W3	☒			
129 %	10				Grain Size Plate F-81	W4	☒			
			clayey, low to medium plastic, grey	30%						
	15					W5	☒			
		SM	*SAND* fine to medium grained, silty, dark grey, organics	V 50%		W6	☒			
	20	SC	fine grained, silty, low plastic, clayey, grey	60%		W7	☒			
			brown to grey, fine gravel size	35%		W8	☒			
	25		Bottom of Hole at 24.0'.							

PLATE F-49

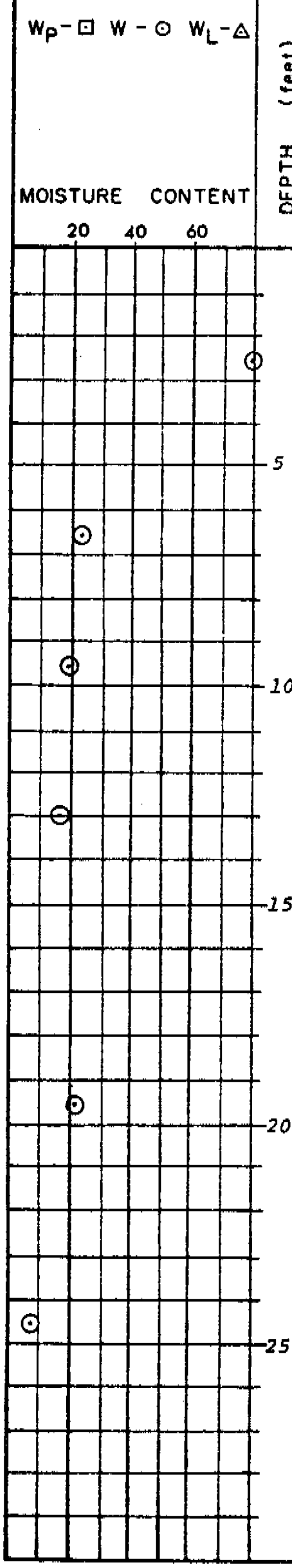
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV45*

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 27, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *6:15*
FINISH *6:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
OL	*ORGANIC SILT AND PEAT* low plastic dark brown to black cobble	*F*		*W1*	☒			
CL-CI	*CLAY* silty, trace sand, low to medium plastic, grey gravel particles	*V* *10%* *5%*		*W2* *W3* *W4*	☒ ☒ ☒			
SM	*SAND* fine grained, silty, non plastic, brown	*Nbn*		*W5*	☒			
GP	*GRAVEL* coarse, sandy, brown	*Nf*		*W6*	☒			

Bottom of Hole at 25.0'.

PLATE *F-50*

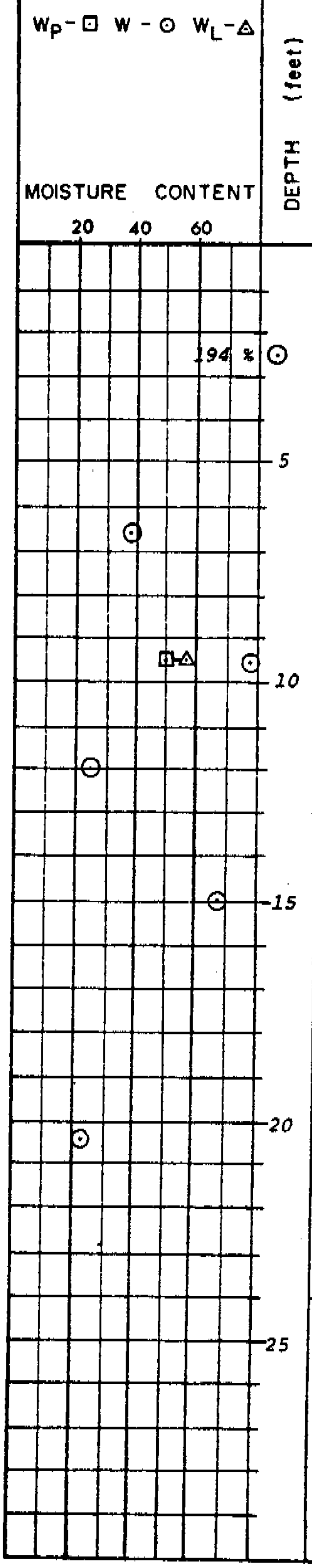
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV46

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR , CRREL
START 11:45 AM
FINISH 1:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	V					
OL	ORGANIC SILT trace of clay, non plastic, brown		Grain Size Plate F-82	W1			
CL	CLAY very silty, trace organics, low plastic, dark brown	V 30%					
		15%		W2			
CL-CI	CLAY silty, greyish brown, medium plastic	V 40-50%		W3			
	silt layers, high plastic						
	ICE lenses to 3"	Vs, Vr 20%		C1	85%	III	
	trace fine sand						
	very silty, trace sand, low plastic			W4			
	occasional gravel sizes	V 10%					
	medium plastic, occasional fine gravel sizes			W5			
	Bottom of Hole at 24.0'.						

PLATE F-51

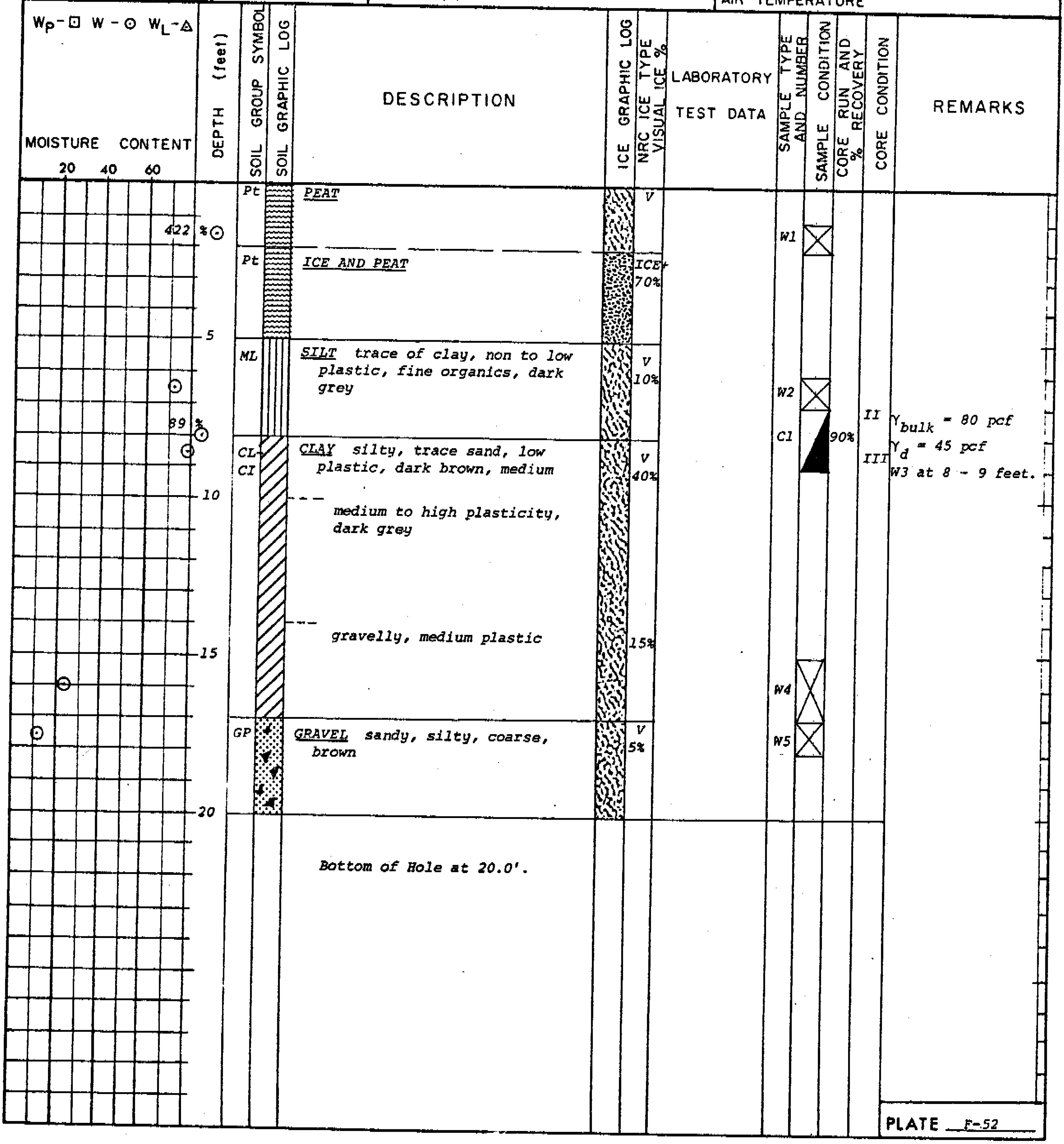
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *UV47*

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 26, 1976*
RIG *Heli Drill*	METHOD *COMP. AIR/CRREL*	START *10:45. PM*	FINISH *11:40*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	V		W1			
	Pt	*ICE AND PEAT*	ICE+ 70%					
5	ML	*SILT trace of clay, non to low plastic, fine organics, dark grey*	V 10%		W2		II	γ_{bulk} = 80 pcf
	CL-CI	*CLAY silty, trace sand, low plastic, dark brown, medium*	V 40%		C1	90%	III	γ_d = 45 pcf W3 at 8 - 9 feet.
10		*medium to high plasticity, dark grey*						
		gravelly, medium plastic	15%					
15					W4			
	GP	*GRAVEL sandy, silty, coarse, brown*	V 5%		W5			
20								

Bottom of Hole at 20.0'.

PLATE *F-52*

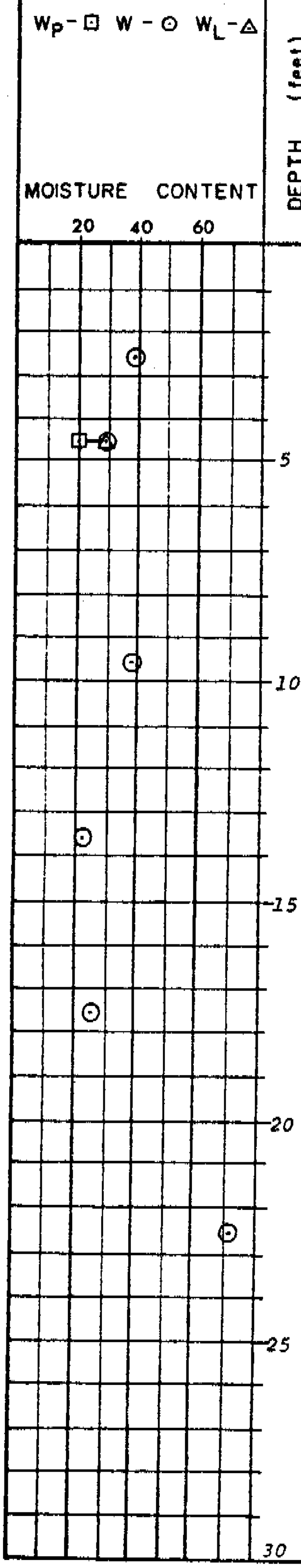
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV48

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR
START 8:55 PM
FINISH 9:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	PEAT	V						
GP	GRAVEL AND SAND	V						
CL- CI	CLAY very silty, trace of sand, low to medium plastic, occasional gravel sizes, brown	40% 15%		W1	☒			Adjacent hole (3' North): very gravelly, boulder at 6.0 feet.
	gravelly, low to medium plastic			W2	☒			
	ICE lens (6") very sandy, gravelly			W3	☒			
	silty, trace sand, medium plastic, occasional gravel sizes			W4	☒			
	gravel sizes							
SM	SAND fine grained, silty, brown to grey	V 5%		W5	☒			
CL	CLAY silty, medium plastic, brown	V						
	gravel particles							
CL	ICE AND CLAY very sandy, gravelly silty, low plastic, brown	ICE+ 70-80%		W6	☒			
	Bottom of Hole at 27.0'.							

PLATE F-53

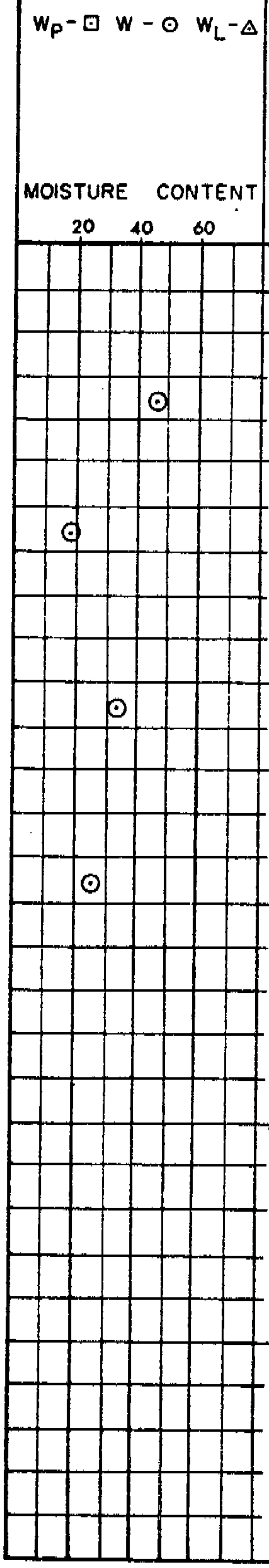
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV49

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR
START 8:15 PM
FINISH 8:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
0	GP	*GRAVEL* very sandy, trace of silt and clay, brown	V 5-10%		W1	☒			
6	GP	*ICE AND GRAVEL*	ICE+ 70%		W2	☒			
10		less ice, lenses to 3" thick	V 10%		W3	☒			
14		cobbles, no fines			W4	☒			
16		Bottom of Hole at 16.0'.							

Depth scale: 5, 10, 15, 20

PLATE F-54

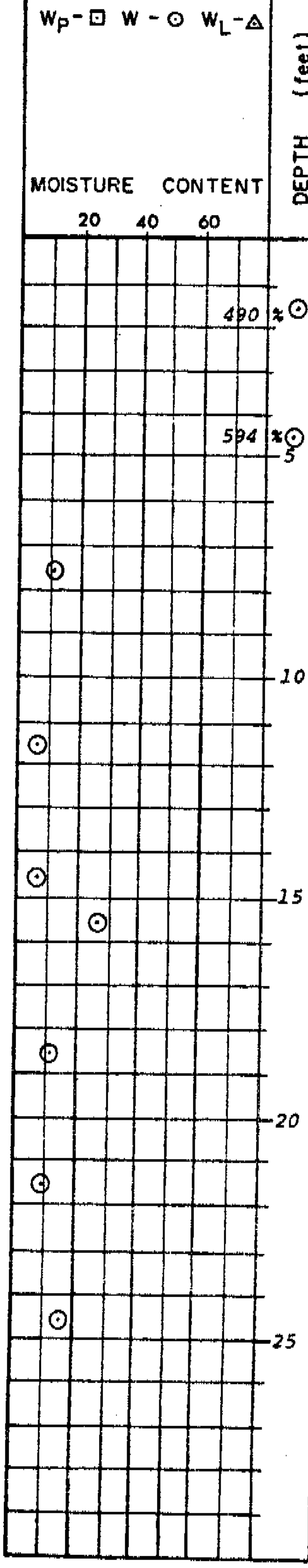
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV50

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR
START 17:15
FINISH 18:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
Pt	PEAT dark brown, fine, fibrous, wood chips	V 10%		W1 W2	
GW	GRAVEL sandy, fine to coarse grained, trace fines	V 10%		W3	
	sandy, fine grained	Nf	Grain Size Plate F-83	W4 W5	
SC	SAND fine grained, clayey, silty, fine gravel sizes, dark grey to black very gravelly layer clayey, gravelly	Nbn		W6 W7	
CL	CLAY silty, trace sand, fine grained, fine gravel sizes, low to medium plastic, grey very gravelly, sandy layer	Nbn		W8 W9	
	Bottom of Hole at 25.0'.				

PLATE F-55

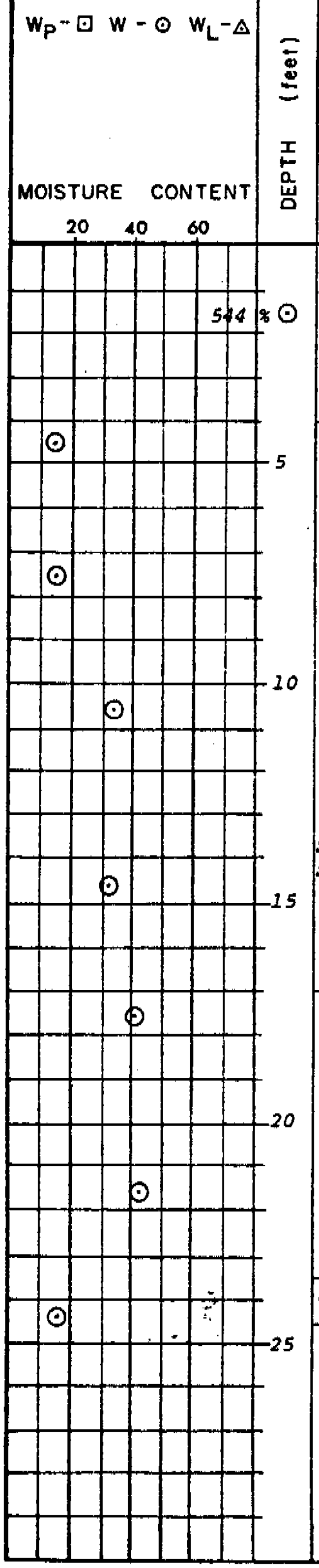
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. UV51

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 26, 1976
RIG Heli Drill	METHOD AIR FLUSH	START 16:10	FINISH 16:35
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
Pt	PEAT fibrous, brown	V 10%		W1	
SP	SAND fine to coarse grained, very gravelly	V <5%		W2 W3	
	fine grained, trace silt, occasional gravel sizes, grey			W4	
SP-SM	silty, grey		Grain Size Plate F-84	W5	
ML	SILT very sandy, fine grained, trace fine gravel, low plastic, grey	V <5%		W6	
	clayey, trace sand, fine grained, low to medium plastic, grey			W7	
GM	GRAVEL sandy, silty	V		W8	

Bottom of Hole at 24.5'.

PLATE F-56

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

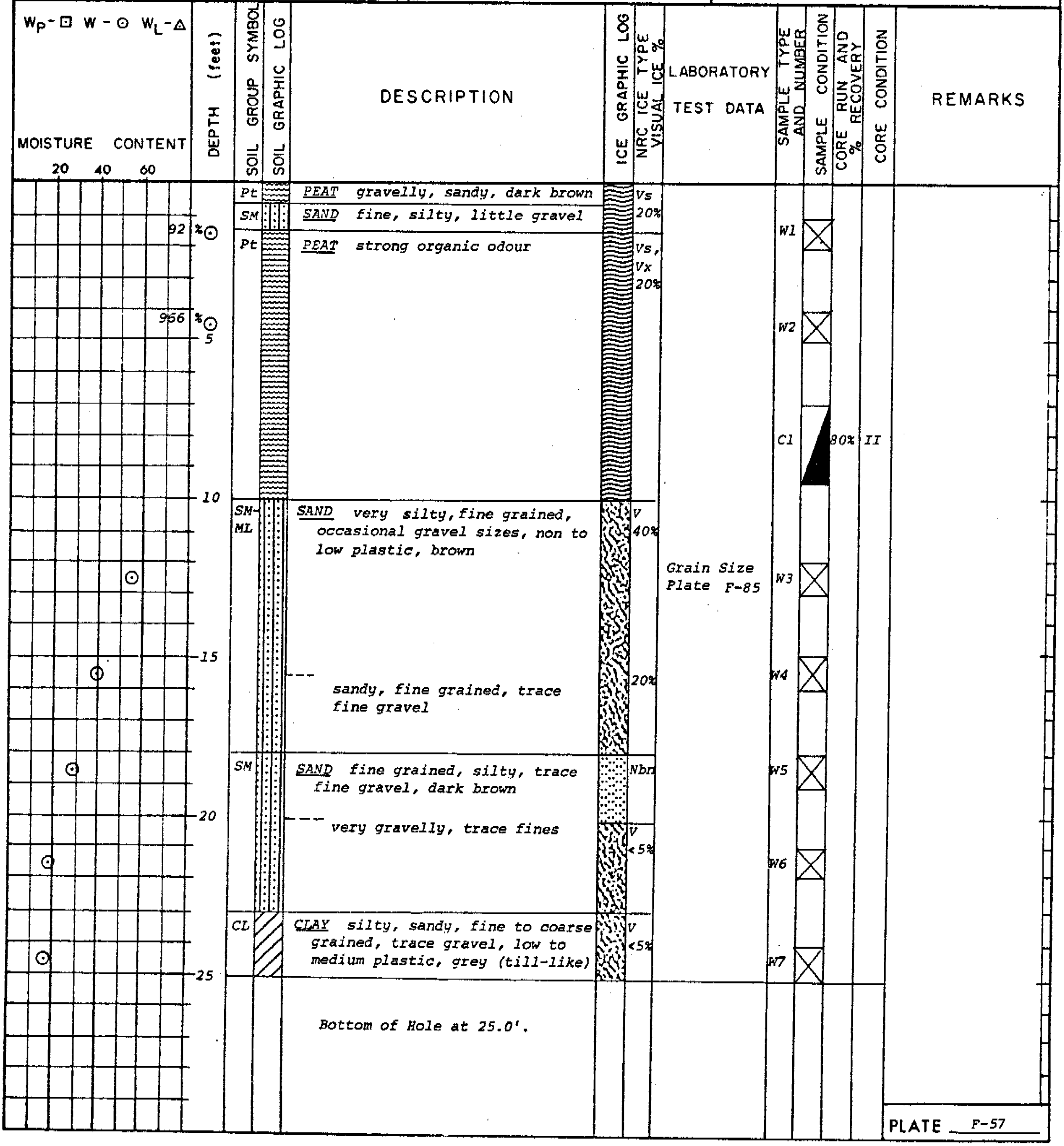
TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. UV52

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 26, 1976
RIG Heli Drill	METHOD AIR/3" CRREL	START 15:30	FINISH 15:55
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △



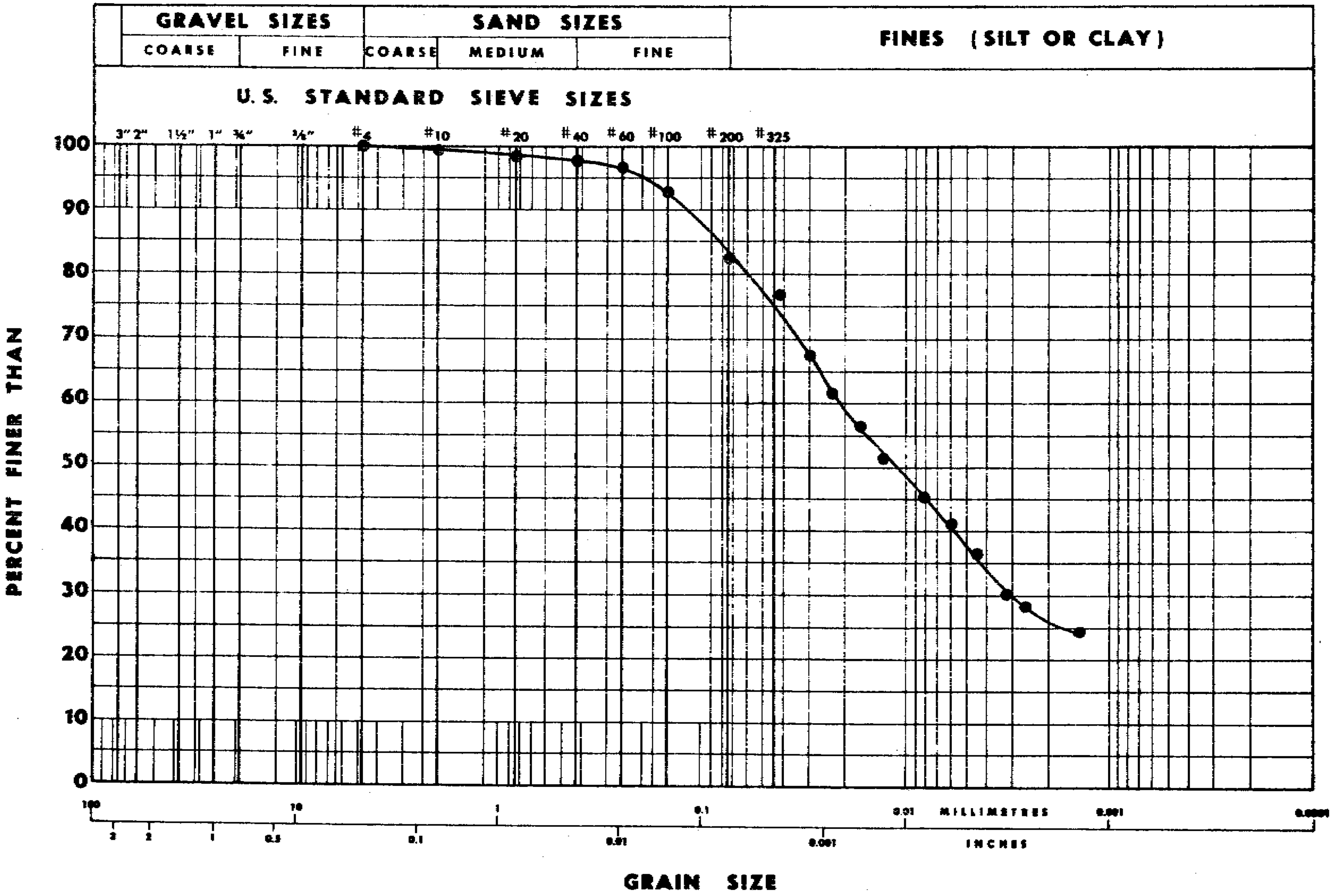
SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND RECOVERY %	CORE CONDITION
Pt	PEAT gravelly, sandy, dark brown	Vs				
SM	SAND fine, silty, little gravel	20%		W1		
Pt	PEAT strong organic odour	Vs, Vx 20%		W2		
				C1	80%	II
SM-ML	SAND very silty, fine grained, occasional gravel sizes, non to low plastic, brown	V 40%	Grain Size Plate F-85	W3		
	sandy, fine grained, trace fine gravel	20%		W4		
SM	SAND fine grained, silty, trace fine gravel, dark brown	Nbn		W5		
	very gravelly, trace fines	V <5%		W6		
CL	CLAY silty, sandy, fine to coarse grained, trace gravel, low to medium plastic, grey (till-like)	V <5%		W7		

Bottom of Hole at 25.0'.

PLATE F-57

APPENDIX "F"

SECTION F.5 PARTICLE SIZE ANALYSES



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

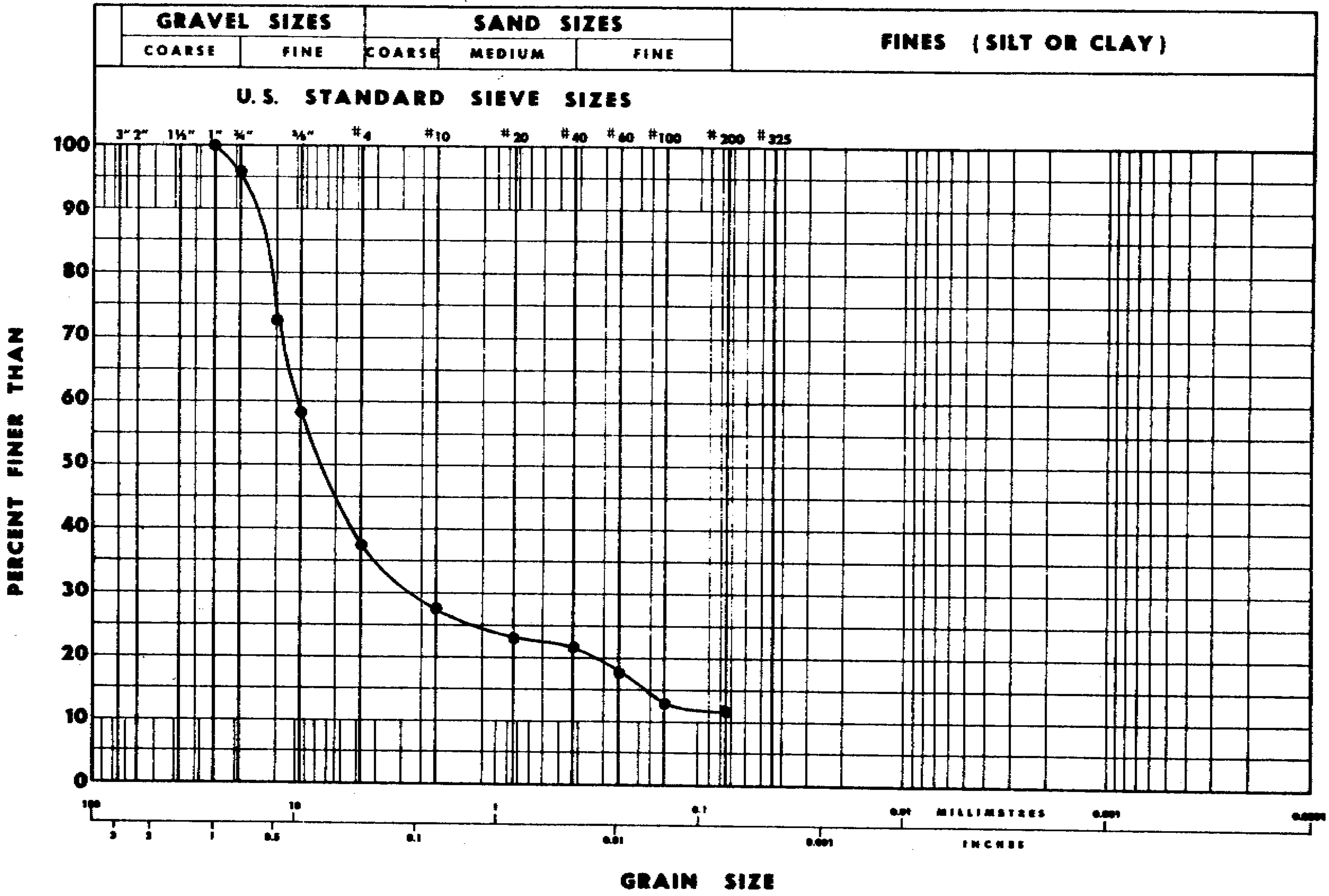
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE F-58

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W2
SOURCE Parsons Lake NWT
HOLE VP2 DEPTH 10-11 DATE REC'D.
TECHNICIAN CS DATE TESTED May/76



REMARKS:

~~Larger sizes fractured with rock bit~~

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

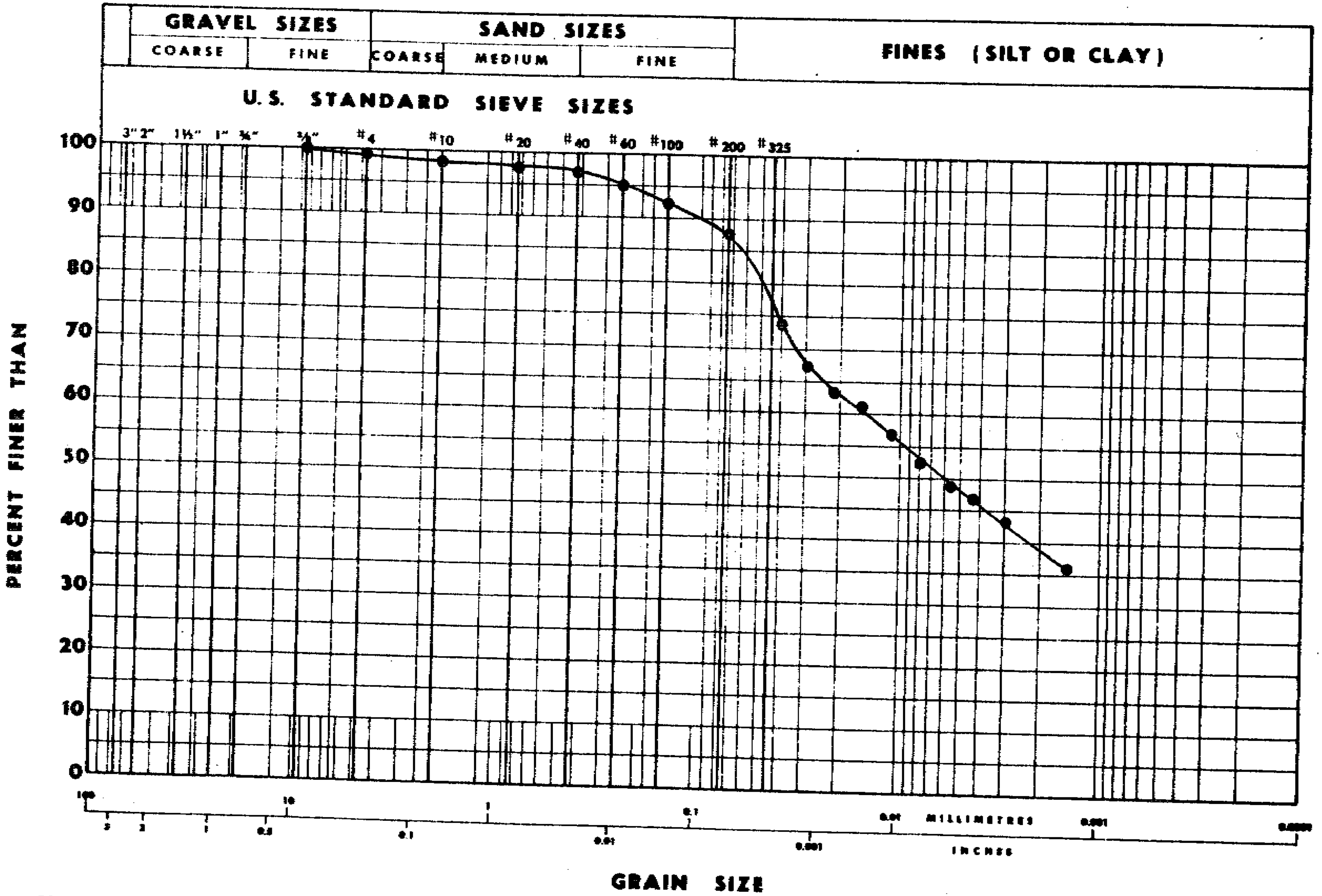
D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole VP3 @ 14-15'
TECHNICIAN CS
DATE TESTED May/76

PLATE F-59



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole VP5 @ 14-15'
TECHNICIAN CS
DATE TESTED Apr. 76

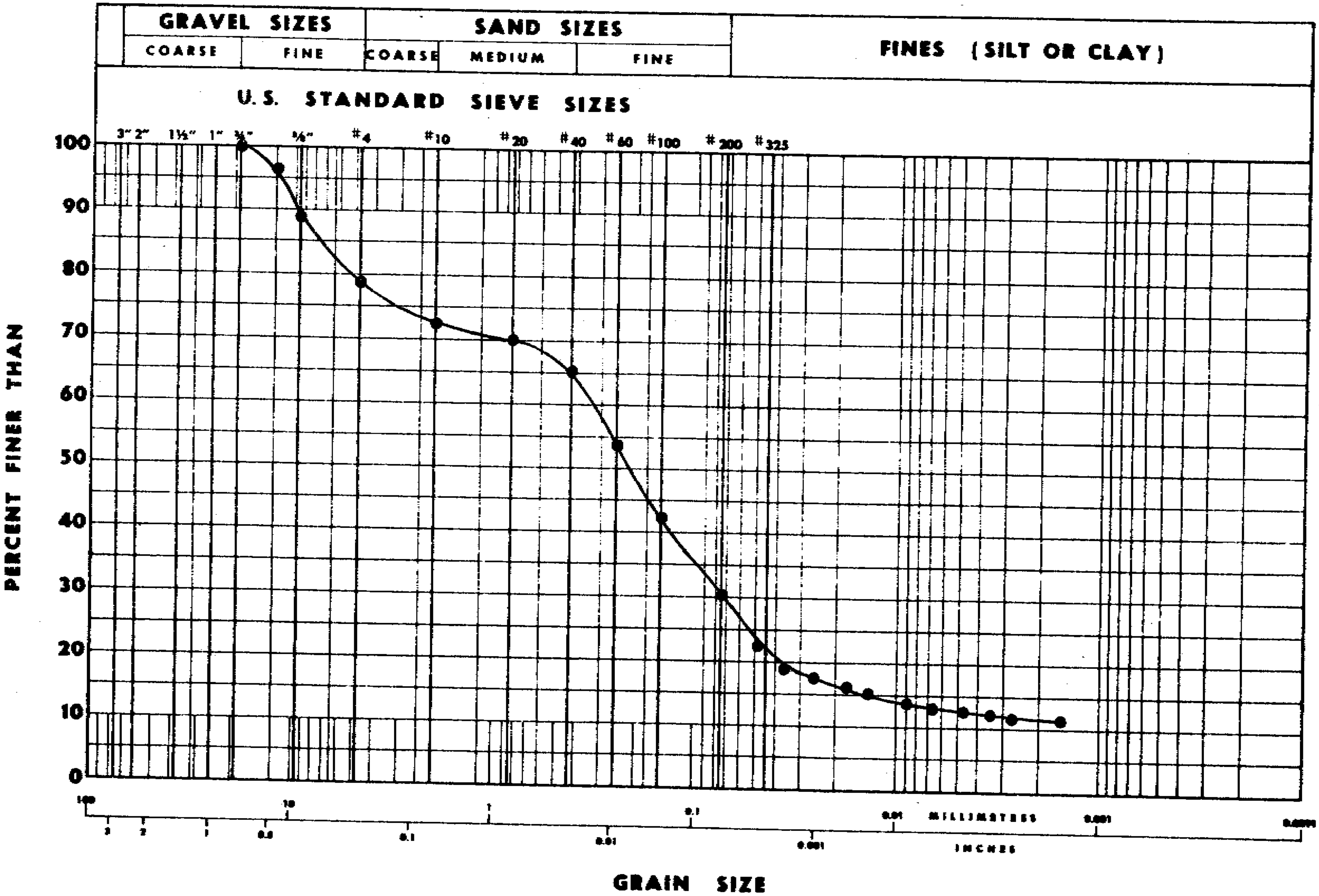
REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_u ______
C_c ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-60

1202.0373



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole VP6 @ 14-15'
TECHNICIAN CS **DATE TESTED** Apr. 76

REMARKS: ____________________

D10= ________ MM.
D30= ________ MM.
D60= ________ MM.
Cu ________
Cc ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

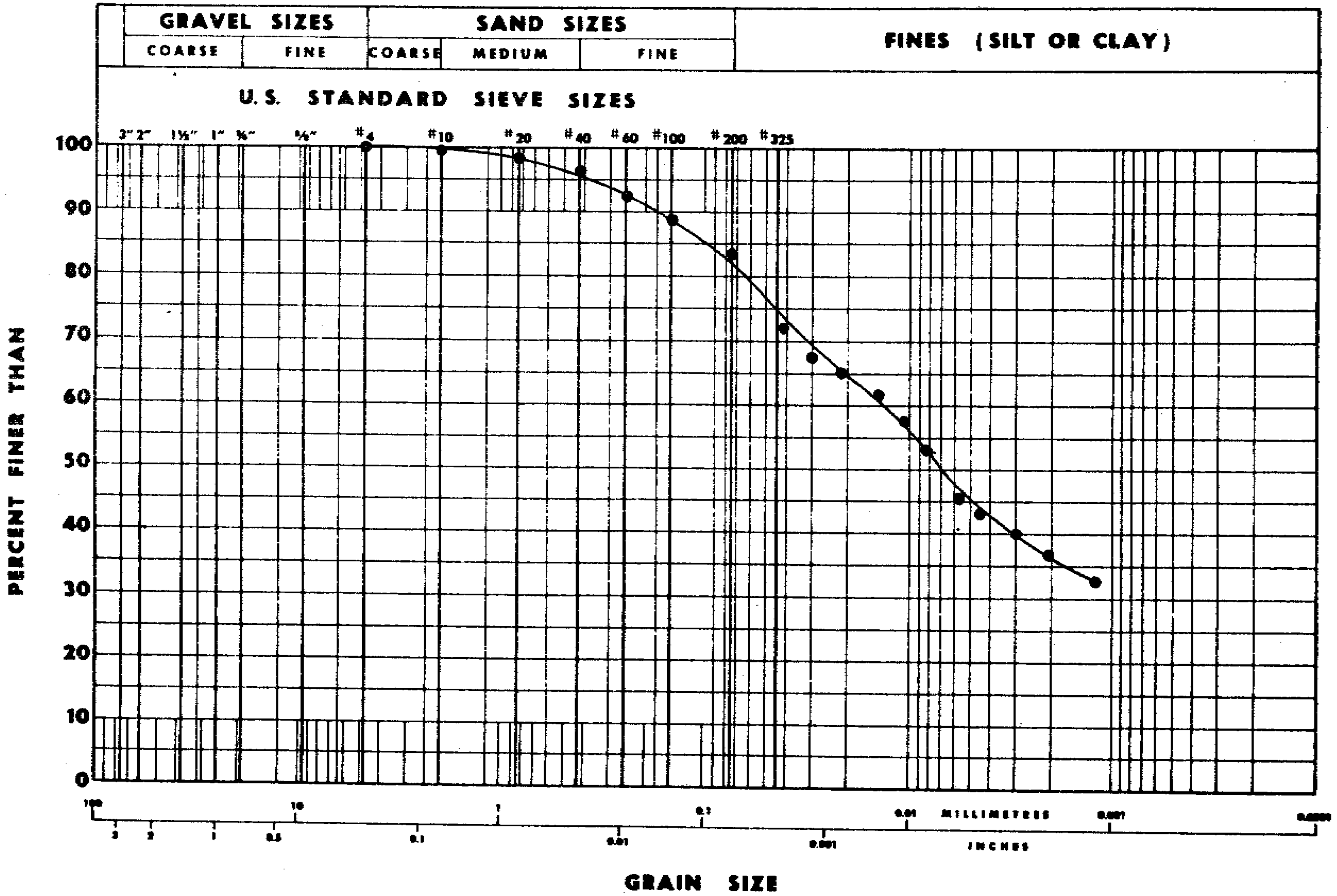
PLATE F-61

1202-0375

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W2
SOURCE Parsons Lake N.W.T.
Hole VP8 @ 4-5'
TECHNICIAN CS
DATE TESTED May/76



REMARKS: ____________________

D₁₀ = ________ MM.
D₃₀ = ________ MM.
D₆₀ = ________ MM.
C_U ________
C_C ________

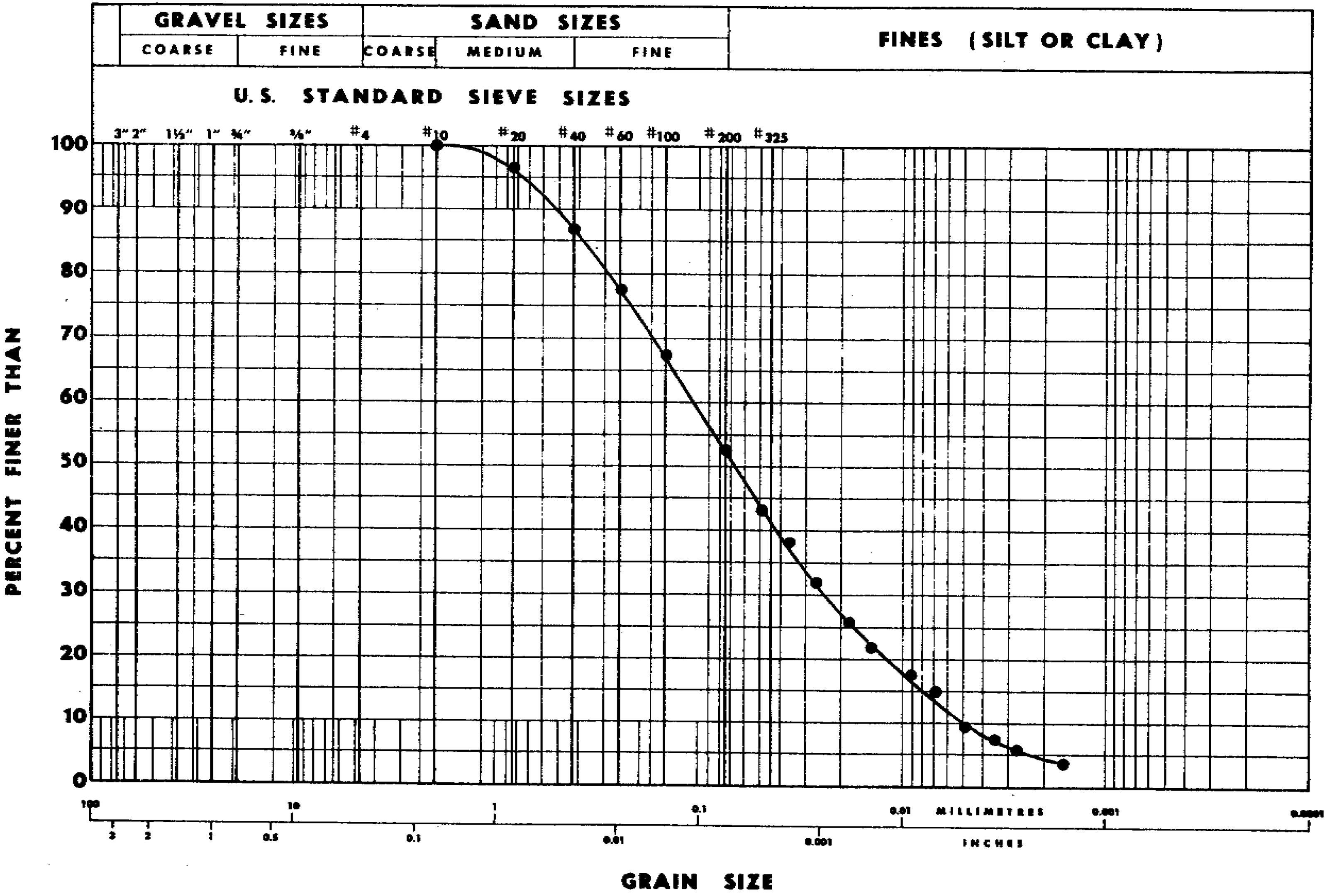
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-62

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W2
SOURCE Parson's Lake N.W.T.
HOLE VP9 DEPTH 4-5' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

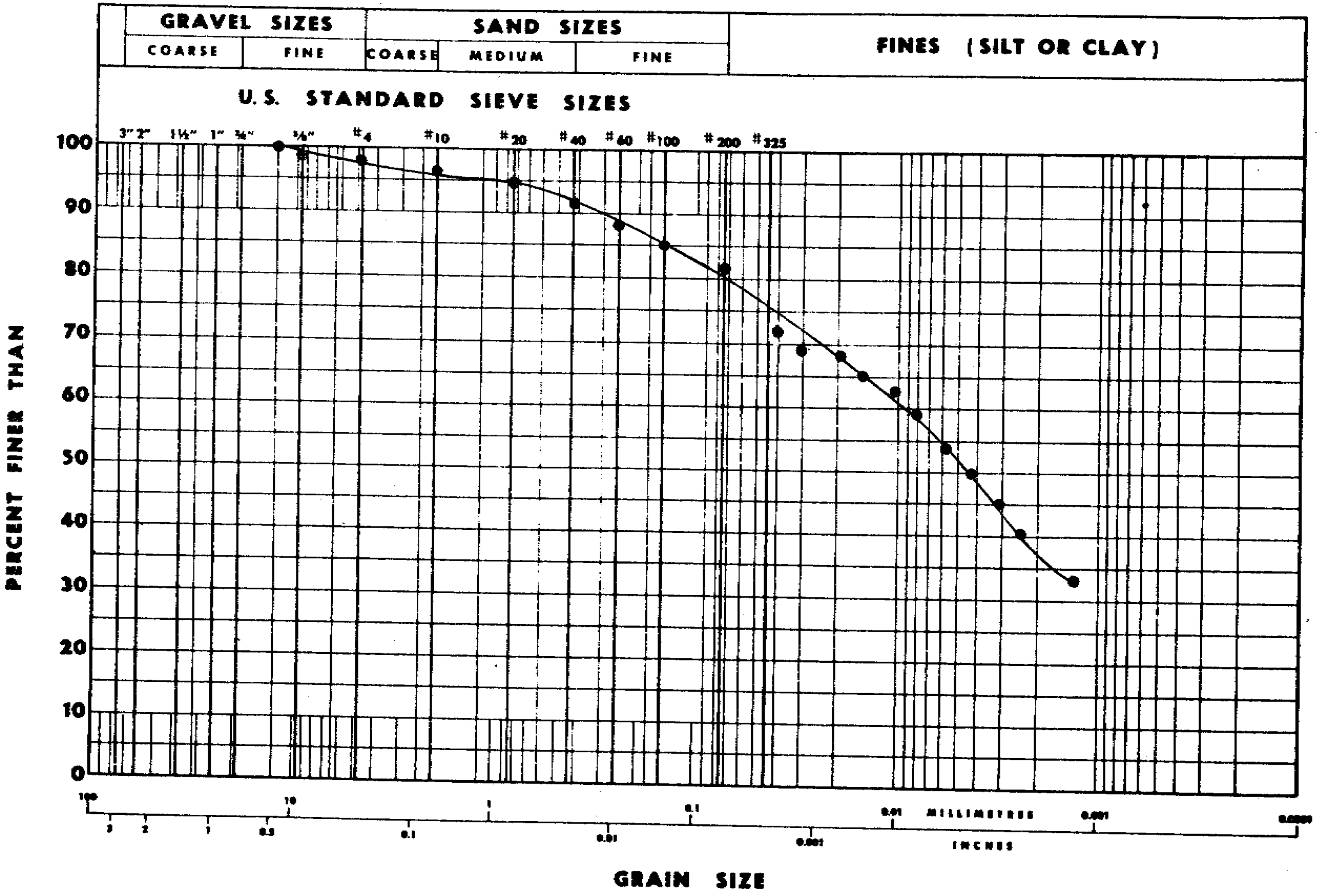


REMARKS: ____________________

D_{10} =	MM.
D_{30} =	MM.
D_{60} =	MM.
C_U	
C_C	

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-63



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

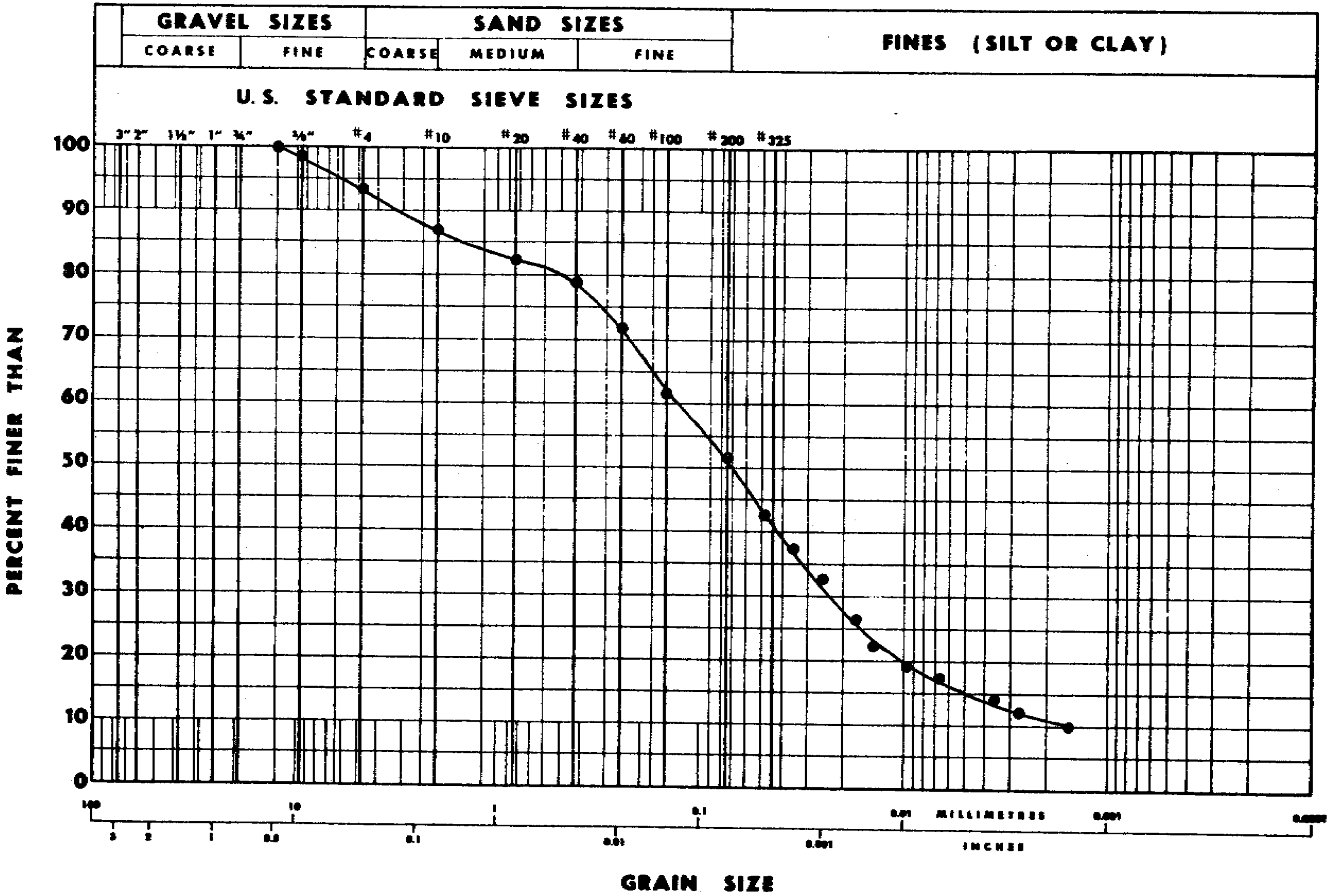
LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole UV1@ 13-14'
TECHNICIAN CS DATE TESTED Apr. 76

REMARKS: __________

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-64



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = _____ MM.
D_{30} = _____ MM.
D_{60} = _____ MM.
C_U _____
C_C _____

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

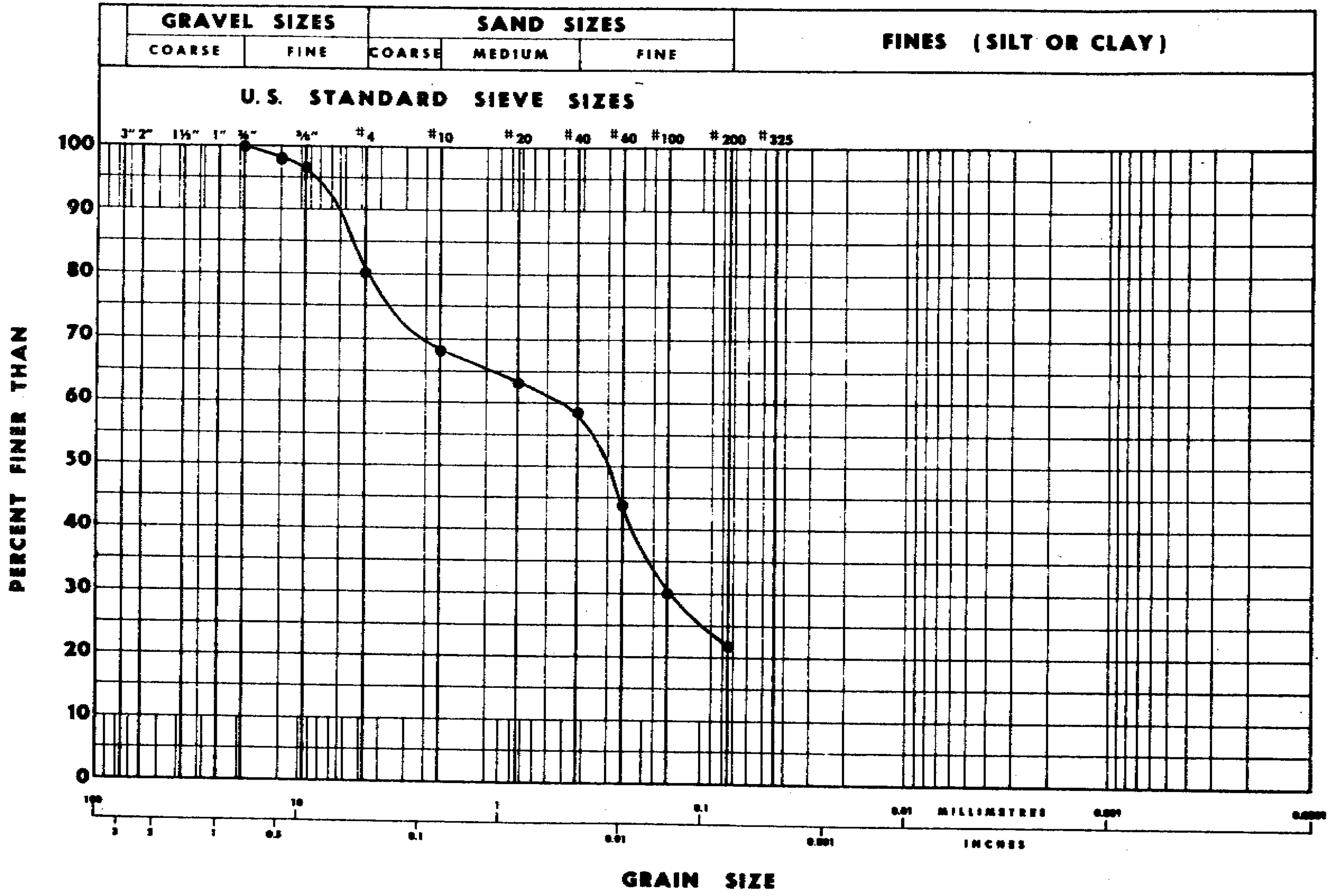
LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole UV3 @ 10-11'
TECHNICIAN CS
DATE TESTED Apr.76

PLATE F-65

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
Hole UV6 @ 19-20'
TECHNICIAN CS
DATE TESTED May/76



REMARKS:

Larger sizes fractured with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

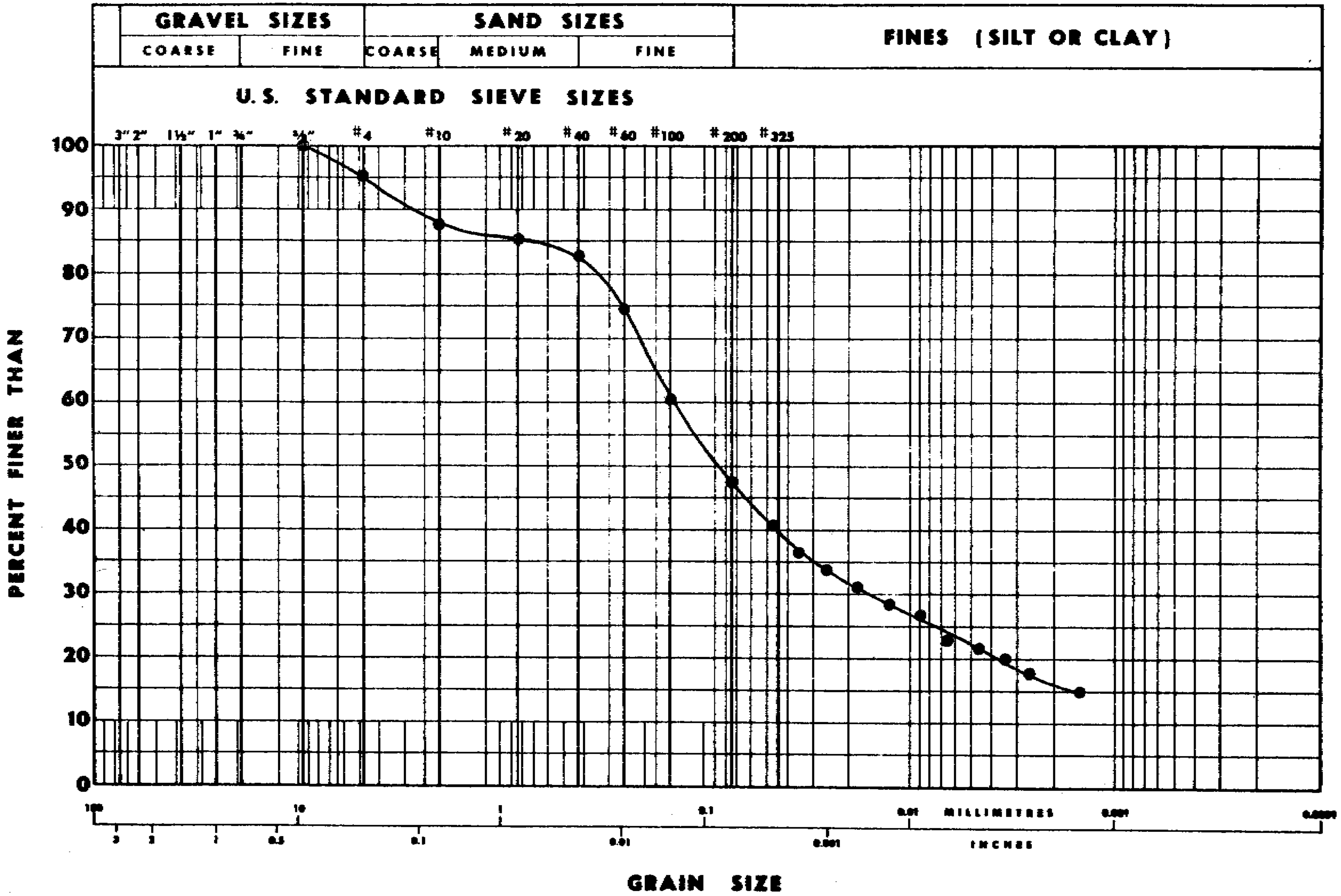
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE F-66

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole UV7 @ 12-13'
TECHNICIAN CS
DATE TESTED Apr.76



REMARKS: ______________________

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

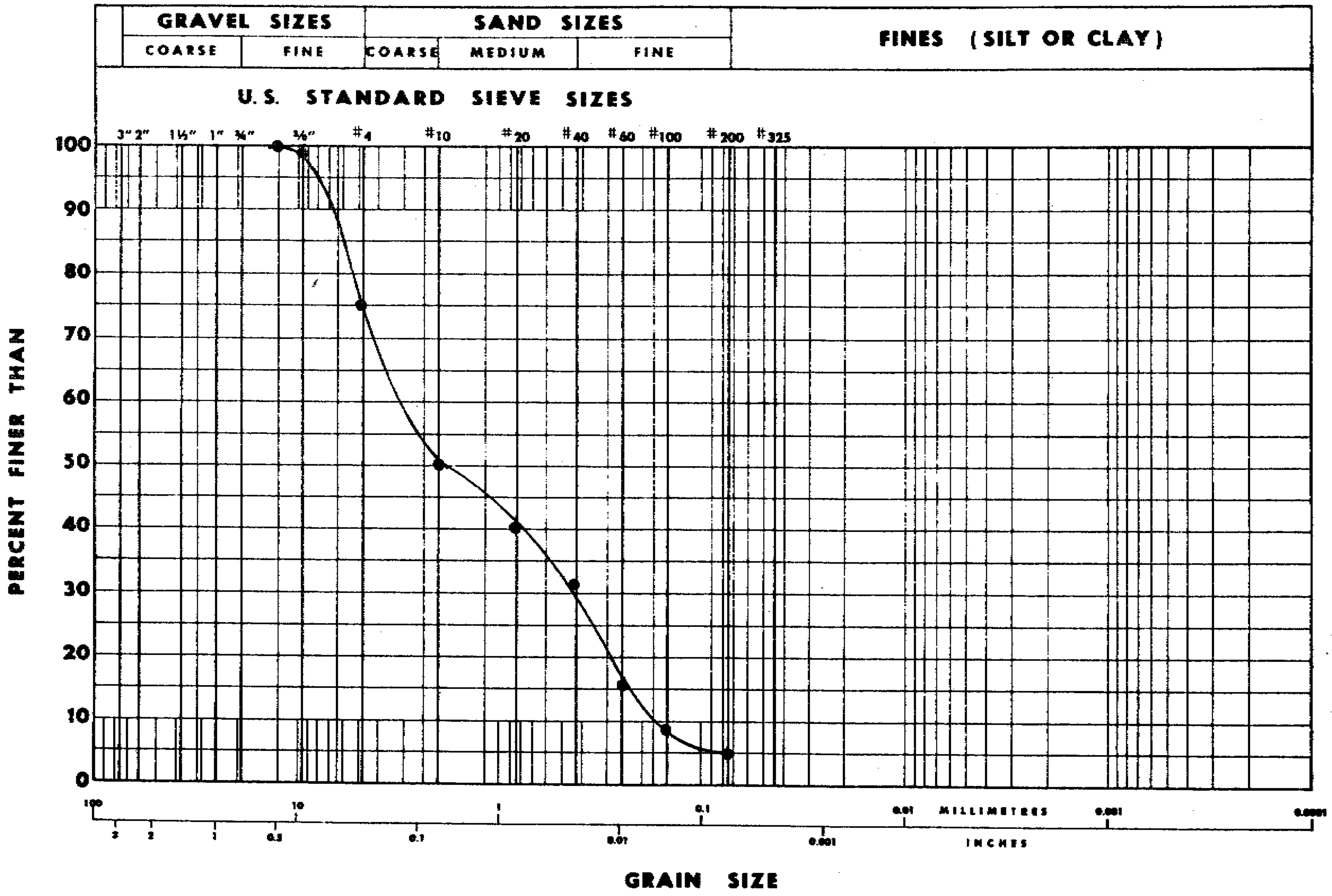
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-67

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
HOLE UV14 DEPTH 14-14.5'
TECHNICIAN CW DATE TESTED May/76



REMARKS:

Larger sizes fractured with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

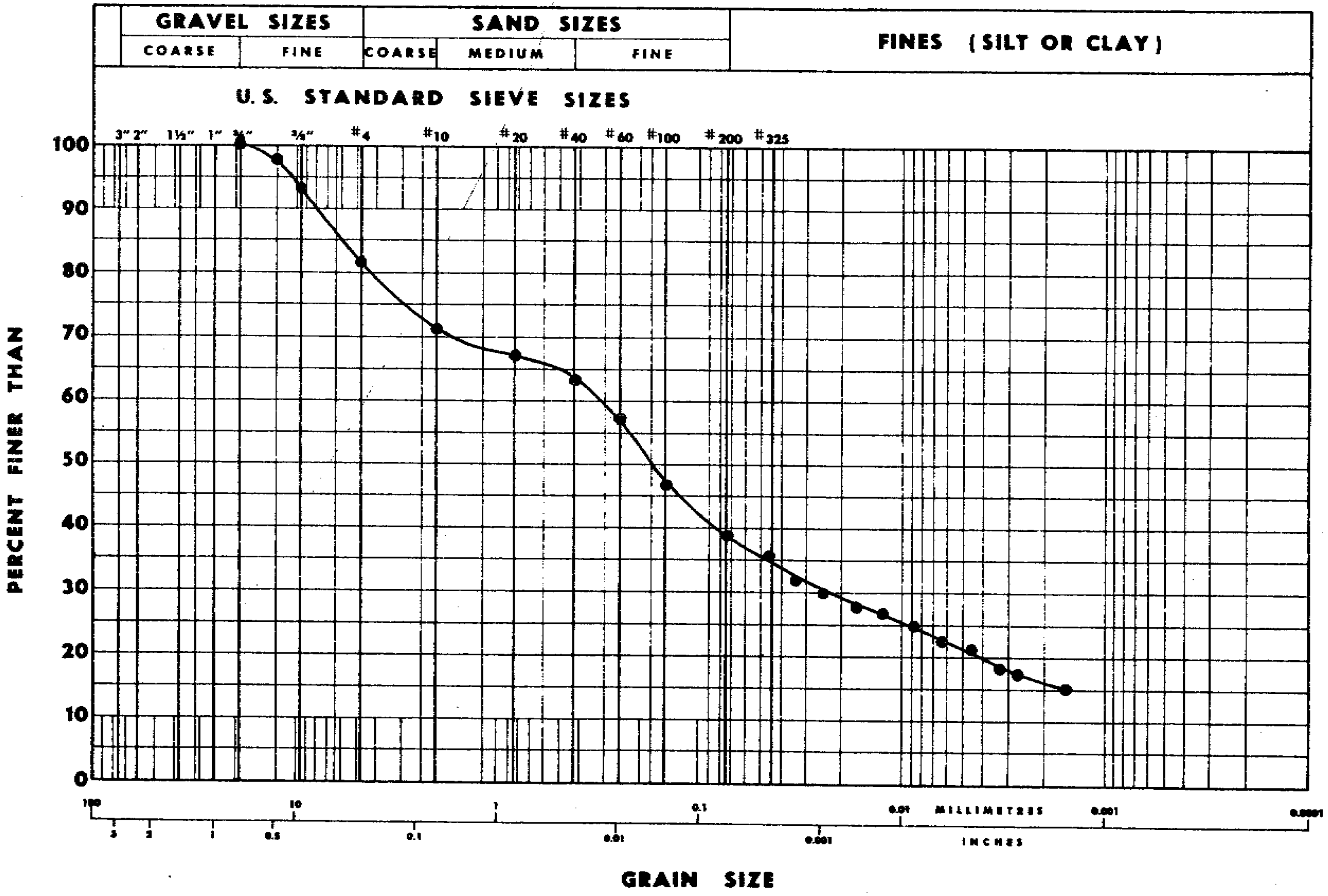
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE F-68

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
HOLE UV16 DEPTH 1-2' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76



REMARKS:

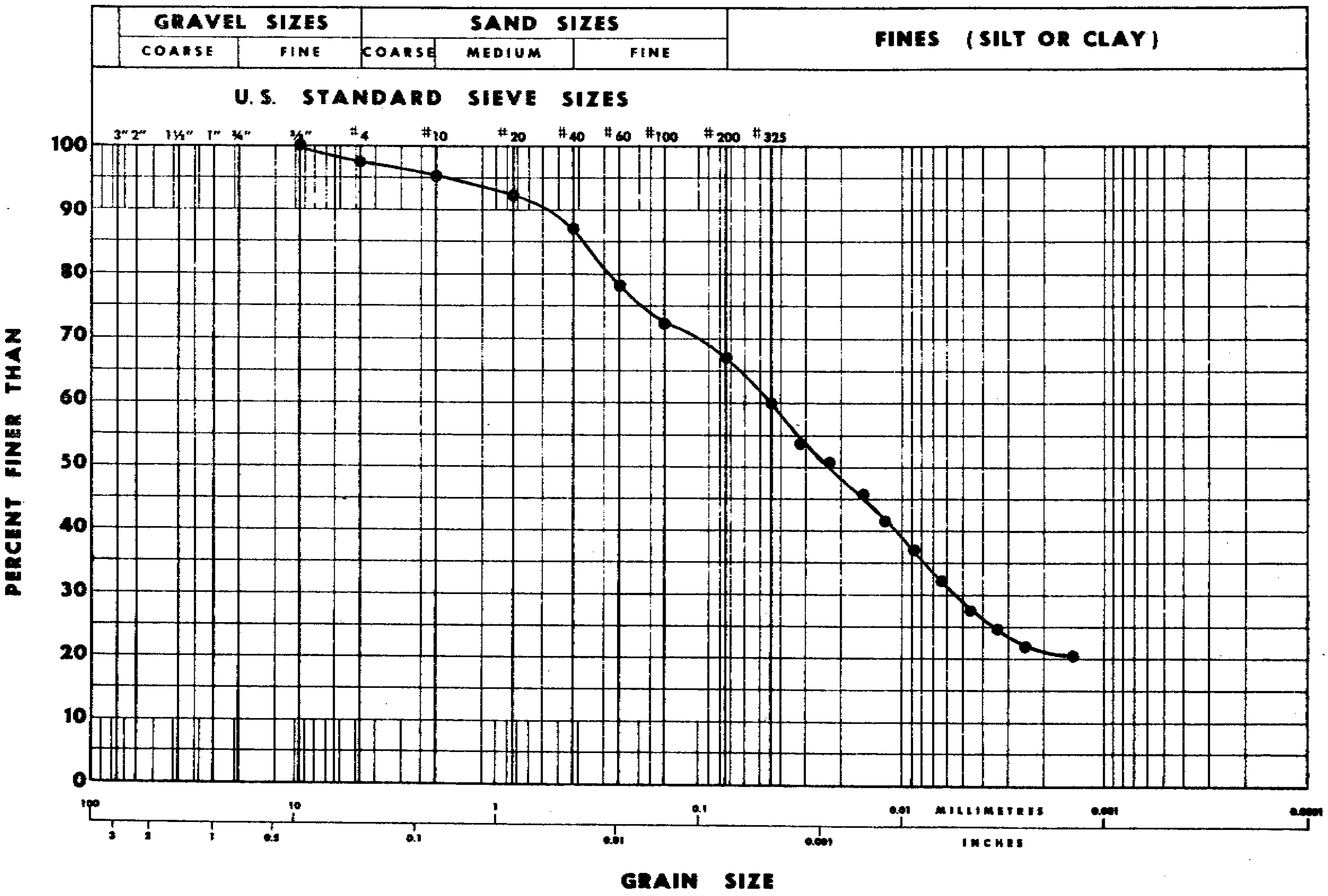
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_u ______
C_c ______

PLATE F-69

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE



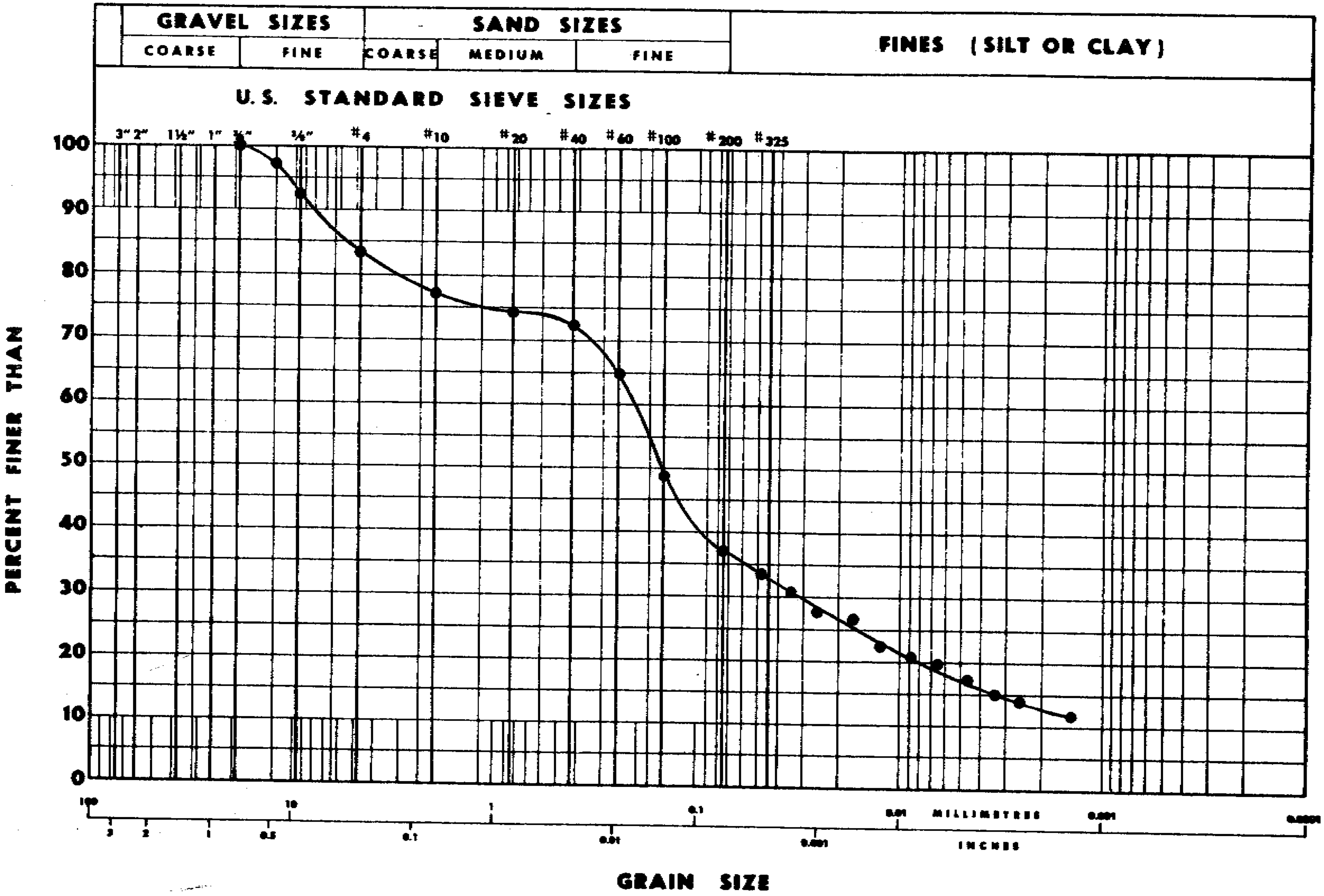
REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
HOLE UV23 DEPTH 9-11' DATE REC'D.
TECHNICIAN MS DATE TESTED May/76

PLATE F-70



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

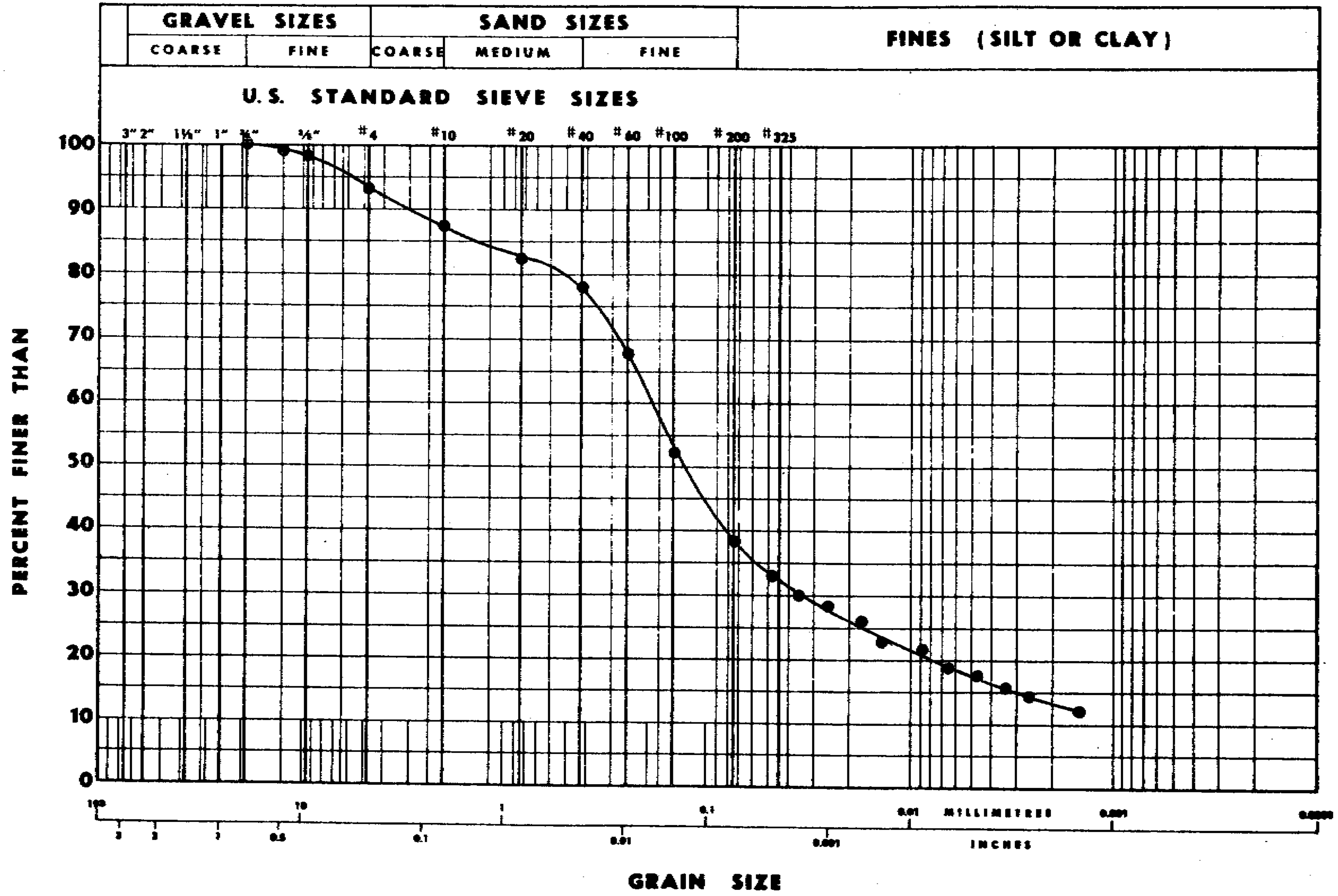
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.T.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole UV25 @ 12-13'
TECHNICIAN CS
DATE TESTED Apr/76

PLATE F-71



REMARKS:

D10= MM.
D30= MM.
D60= MM.
Cu
Cc

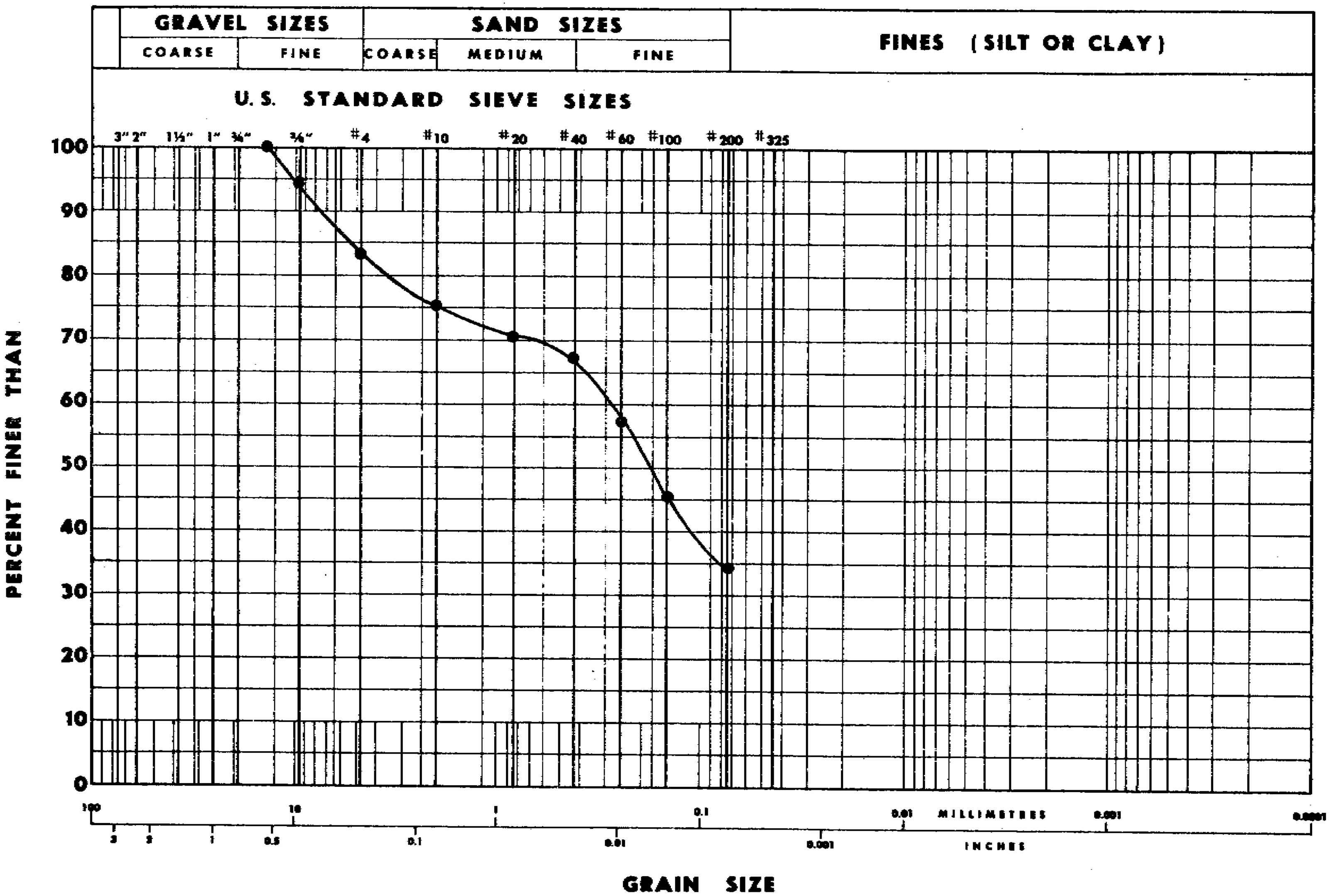
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-72

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole UV27 @ 9-10'
TECHNICIAN CS DATE TESTED Apr/76



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
HOLE UV28 DEPTH 12-13' DATE REC'D.
TECHNICIAN ML DATE TESTED Apr/76

REMARKS:

Larger sizes fractured with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

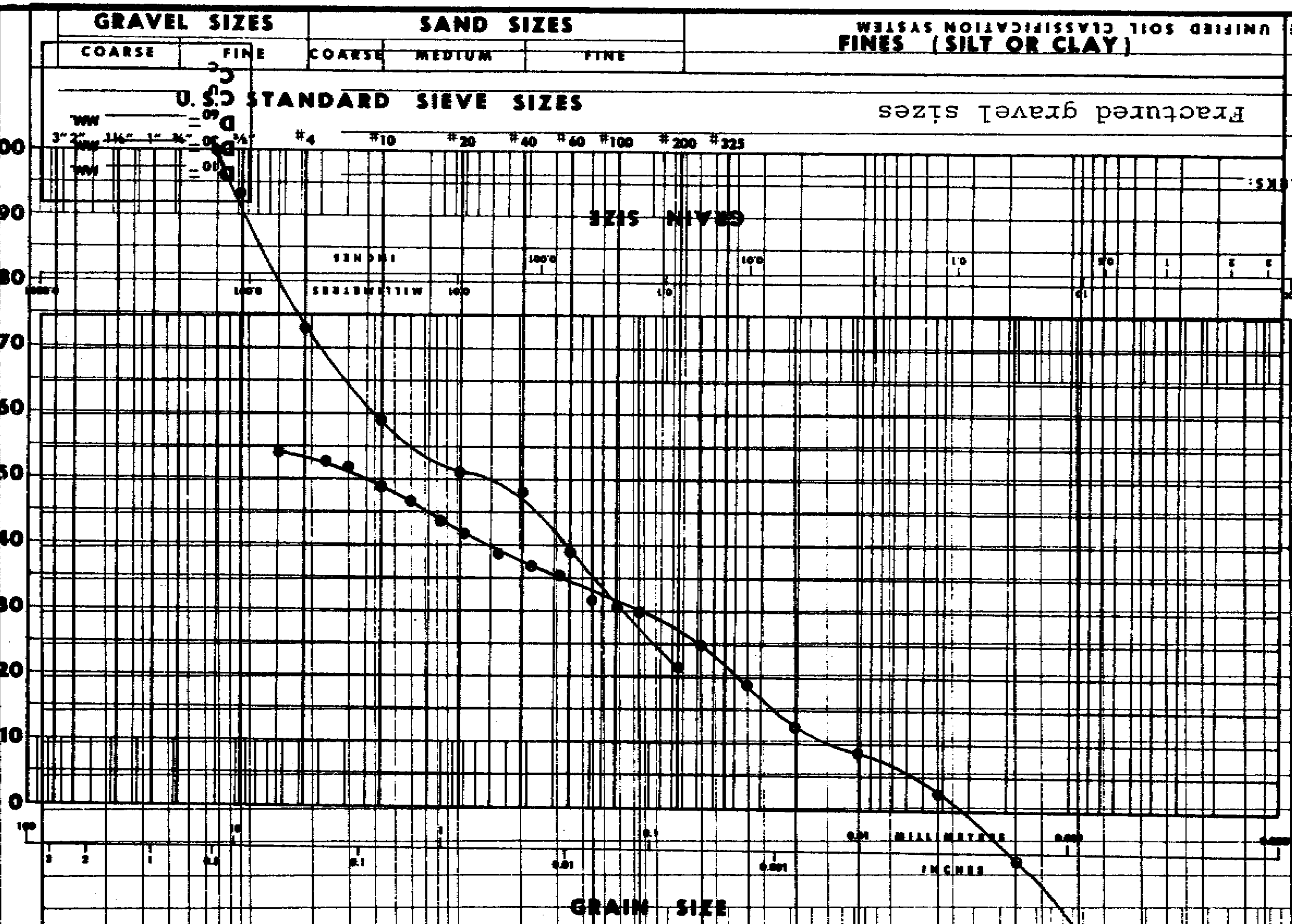
PLATE F-73

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

F-7

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parsons' Lake N.W.T.
PERCENT FINER THAN 9-10'
DATE REC'D.
DATE TESTED May/76
TECHNICIAN CS



REMARKS: Gravel sizes broken down with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

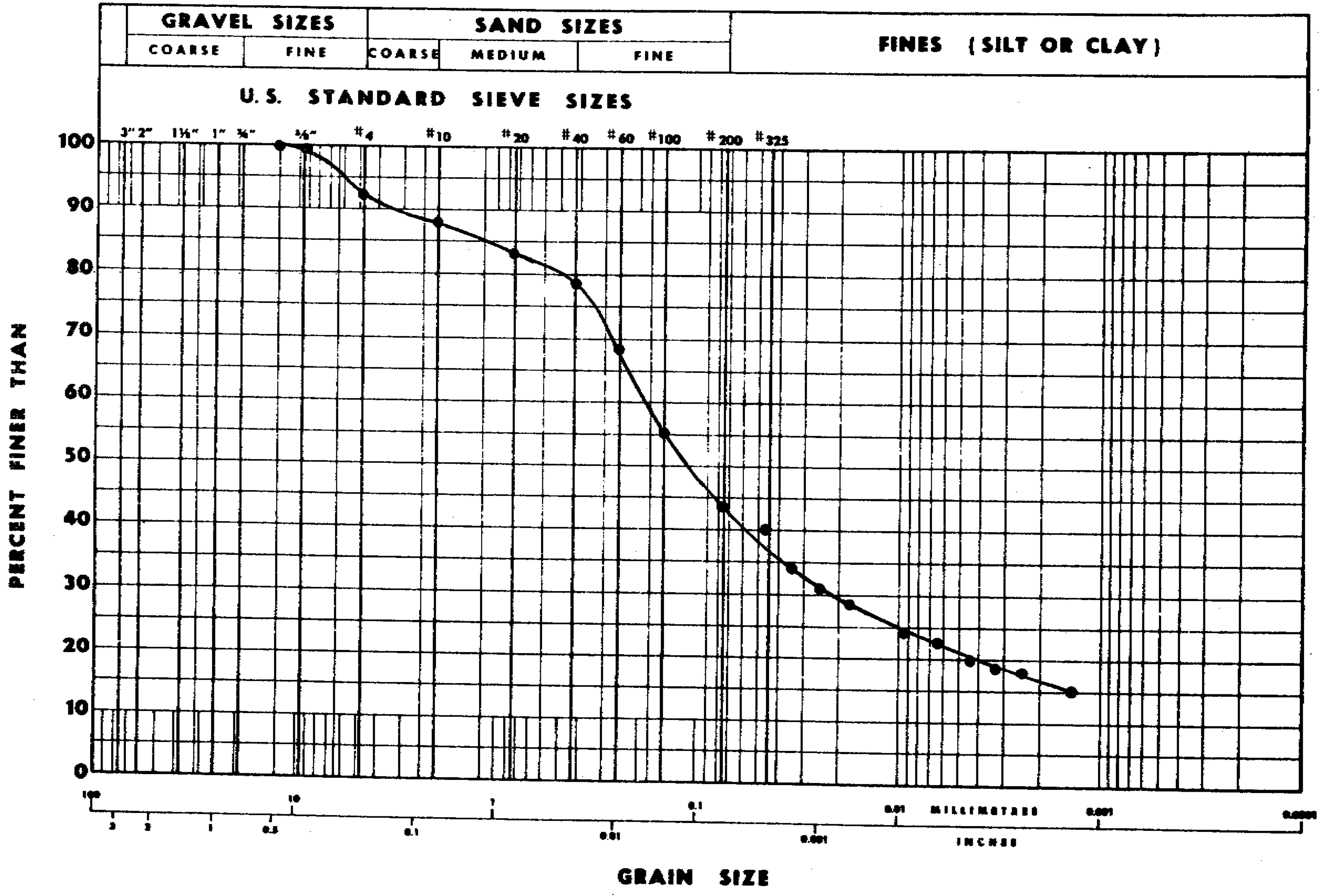
F-7

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
PERCENT FINER THAN 7-8'
DATE TESTED Apr/76
TECHNICIAN CS

REMARKS: Fractured gravel sizes

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ________ MM.

D_{30} = ________ MM.

D_{60} = ________ MM.

C_U ________

C_C ________

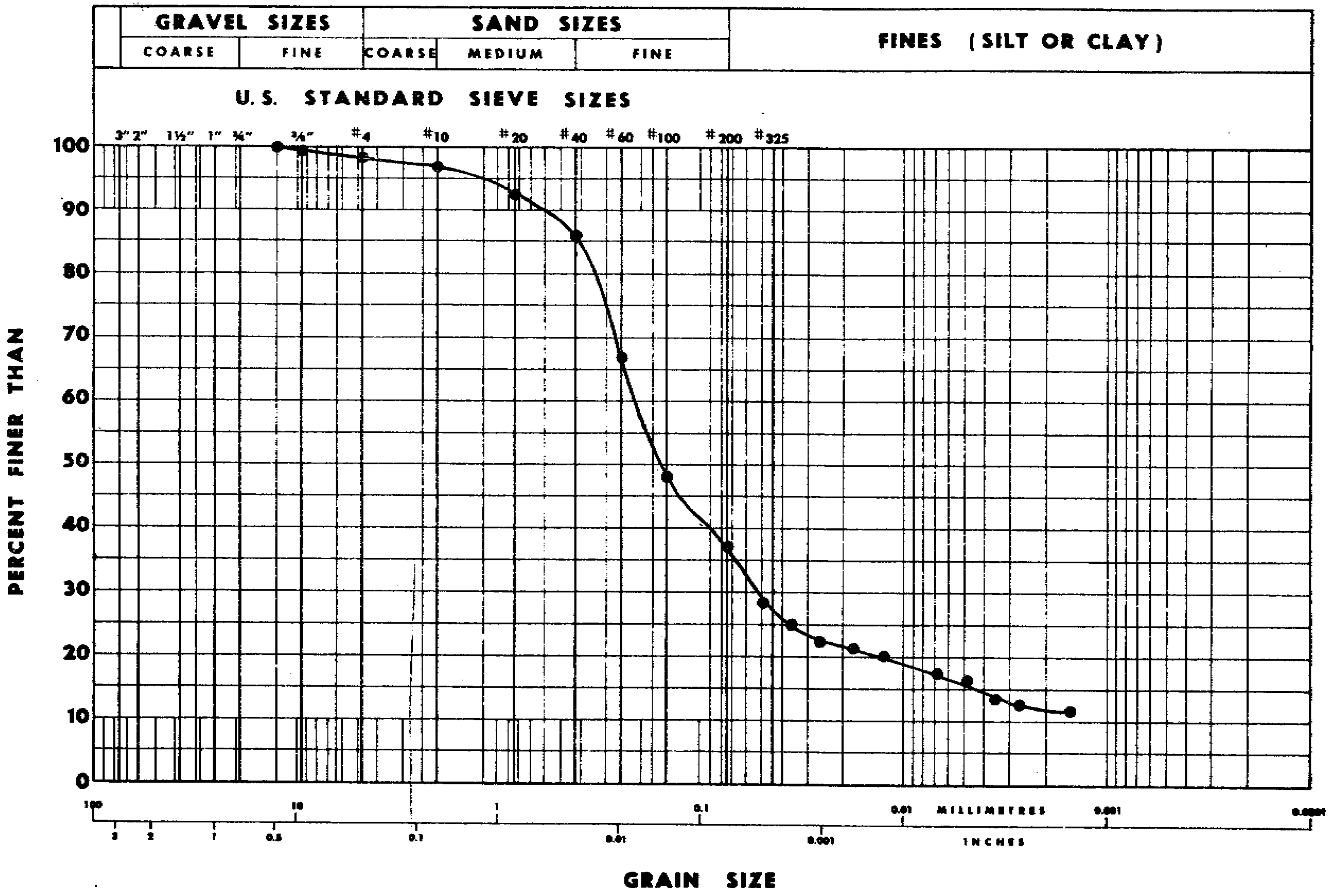
PLATE F-76

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
Hole UV33 @ 13-14'
TECHNICIAN CS **DATE TESTED** Apr/76

14



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

PLATE F-77

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

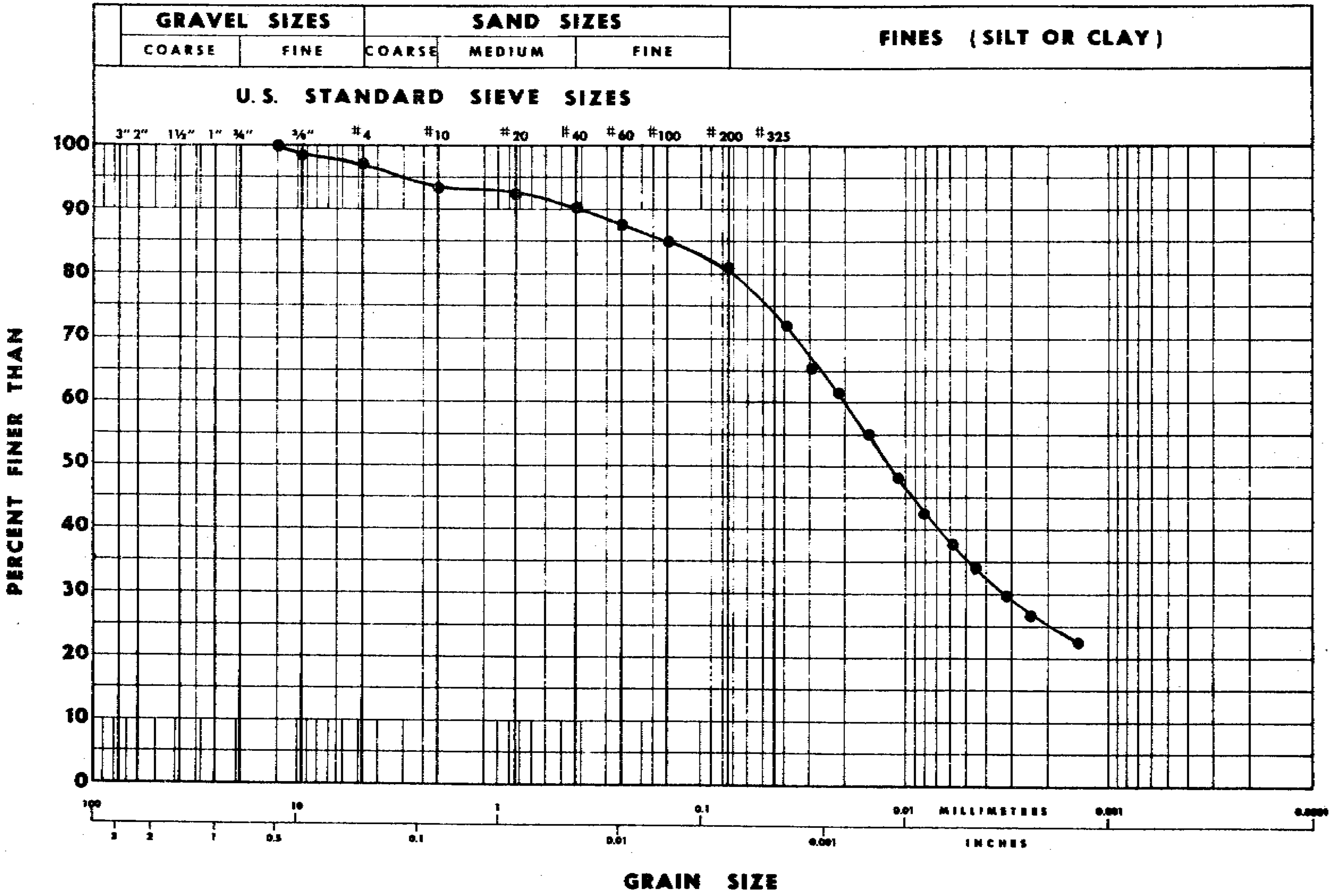
GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
HOLE UV35 DEPTH 1-2' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
HOLE UV36 DEPTH 19-20 DATE REC'D.
TECHNICIAN CS DATE TESTED Apr/76



REMARKS:

D_{10}= MM.
D_{30}= MM.
D_{60}= MM.
C_U
C_C

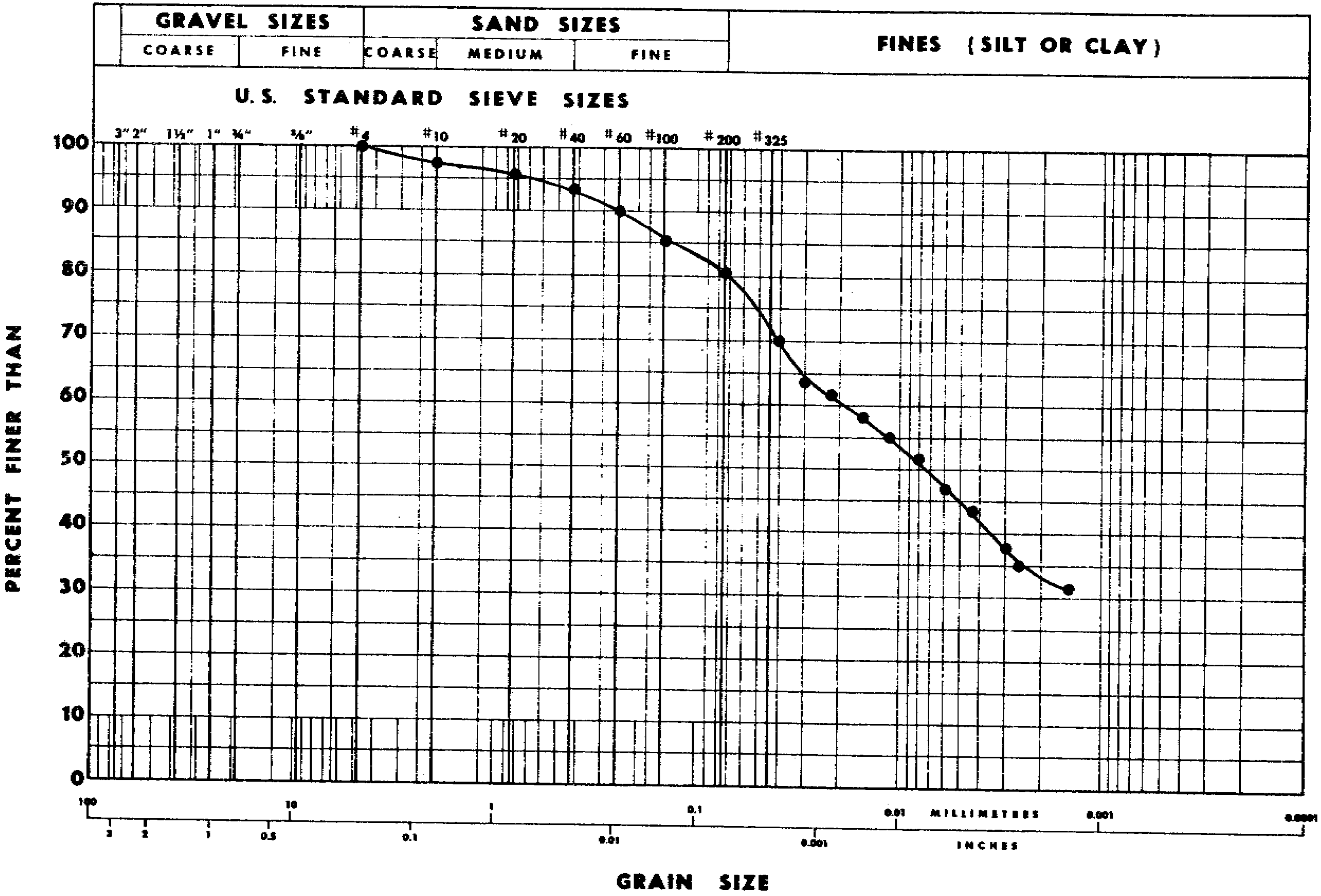
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-78

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
HOLE UV42 DEPTH 10-11 DATE REC'D.
TECHNICIAN CS DATE TESTED Apr/76

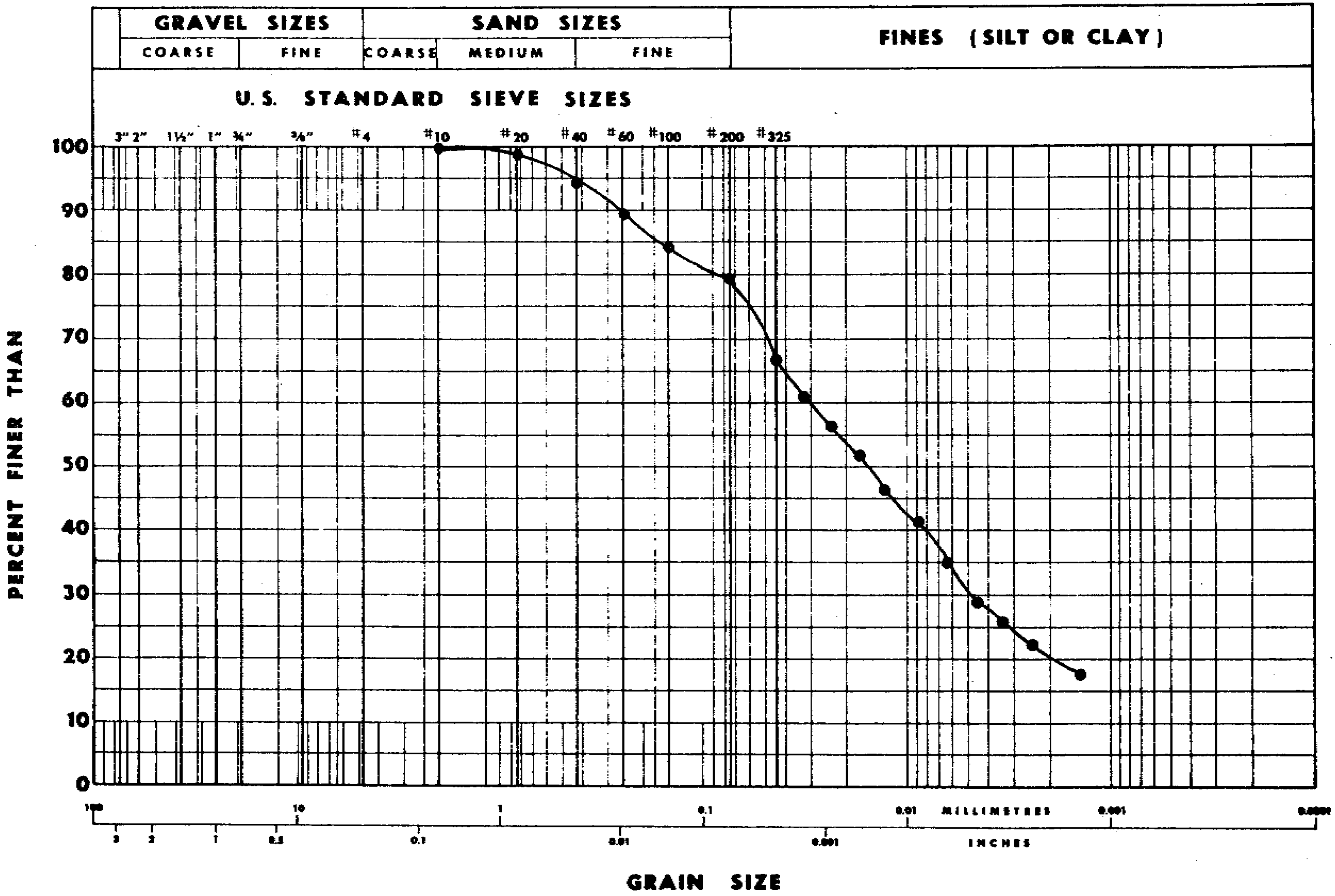


REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = _____ MM.
D_{30} = _____ MM.
D_{60} = _____ MM.
C_U _____
C_C _____

PLATE F-79



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE F-80

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

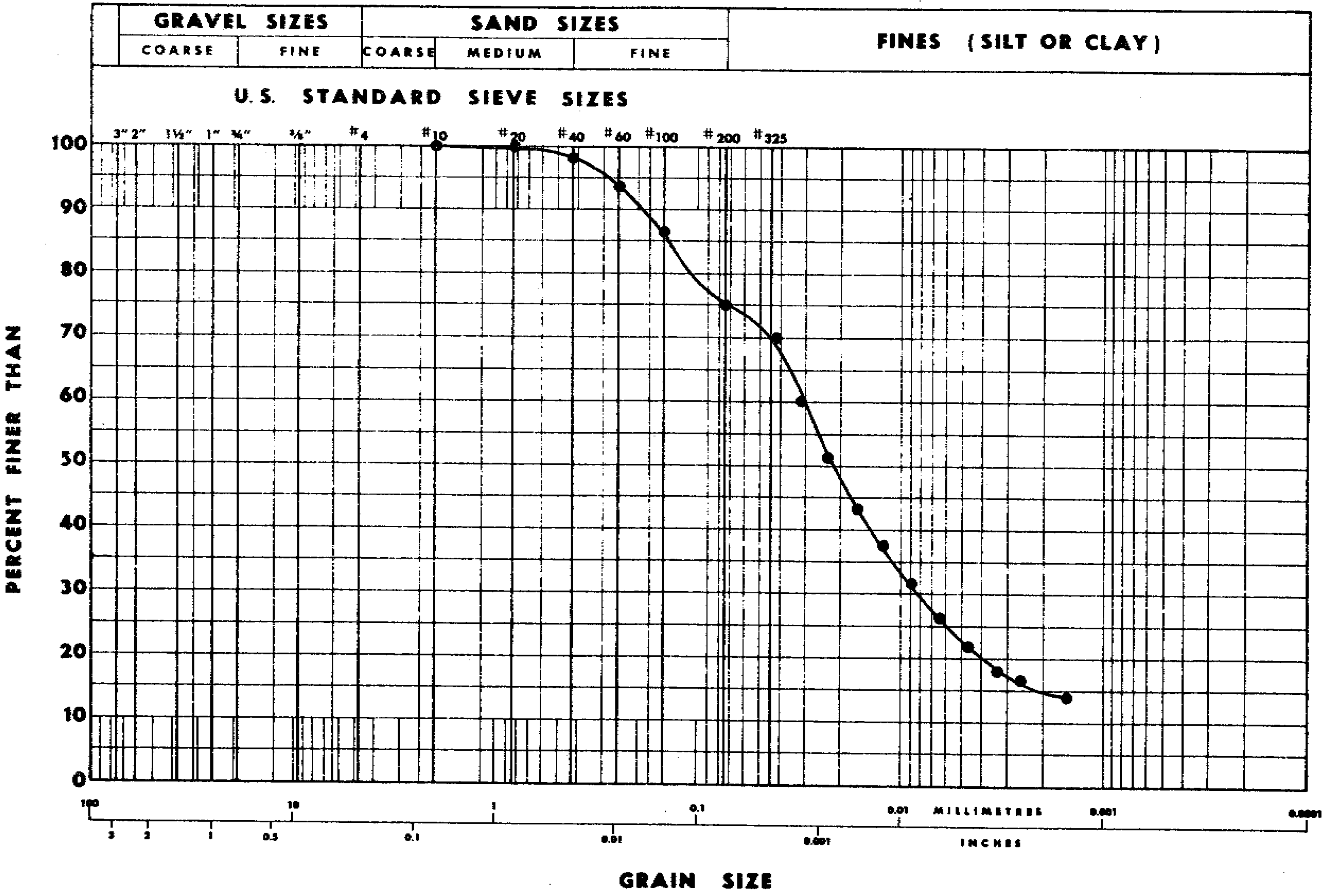
GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
HOLE UV43 DEPTH 1-2' DATE REC'D.
TECHNICIAN CS DATE TESTED May/76

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
HOLE UV44 DEPTH 10-11 DATE REC'D.
TECHNICIAN CS DATE TESTED May/76



REMARKS: ____

D$_{10}$ = ____ MM.
D$_{30}$ = ____ MM.
D$_{60}$ = ____ MM.
C$_U$ ____
C$_C$ ____

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

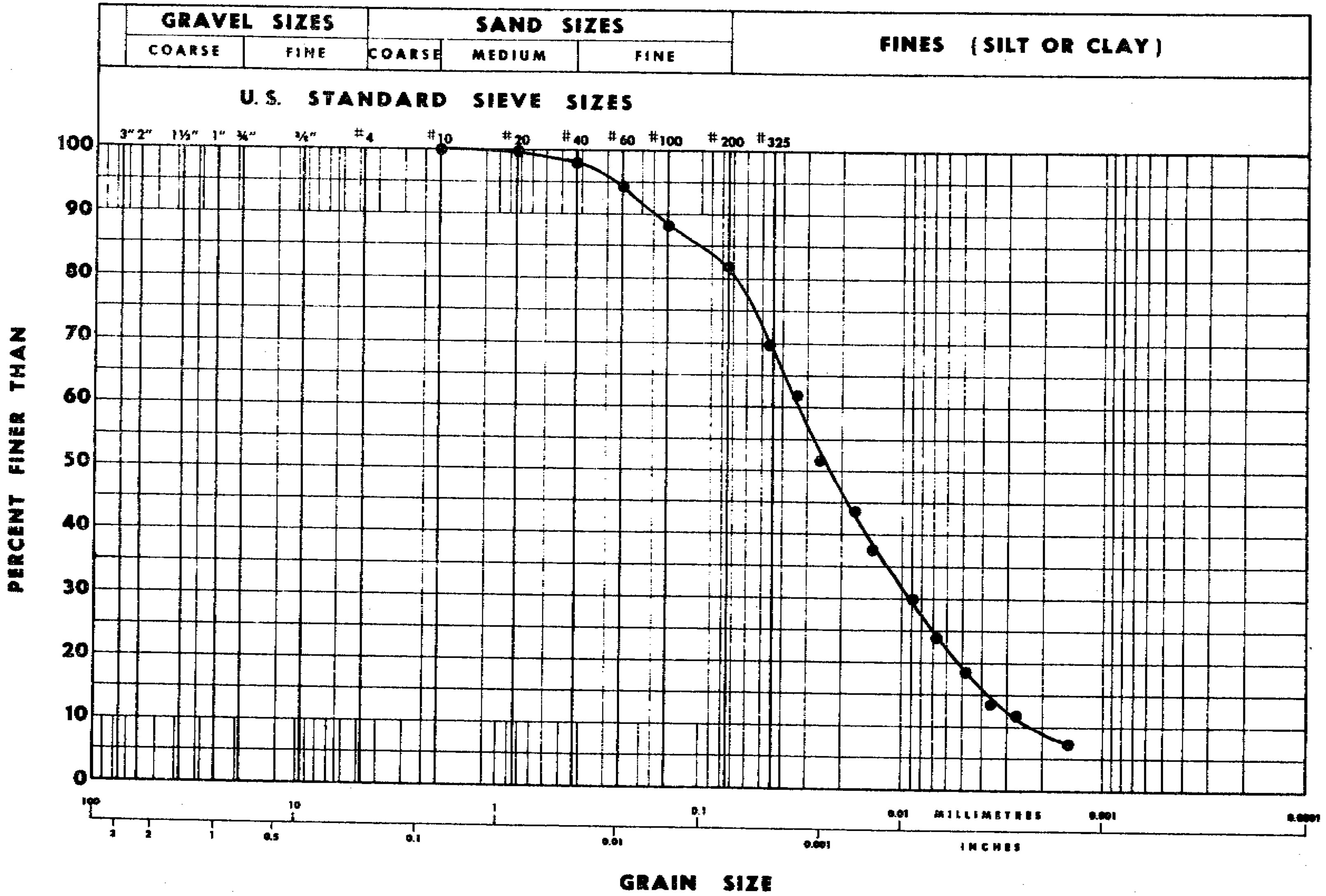
PLATE F-81

202.0373

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W1
SOURCE Parson's Lake N.W.T.
HOLE UV46 **DEPTH** 2-3' **DATE REC'D.**
TECHNICIAN CS **DATE TESTED** May/76



REMARKS: ______________________

____

____

____

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

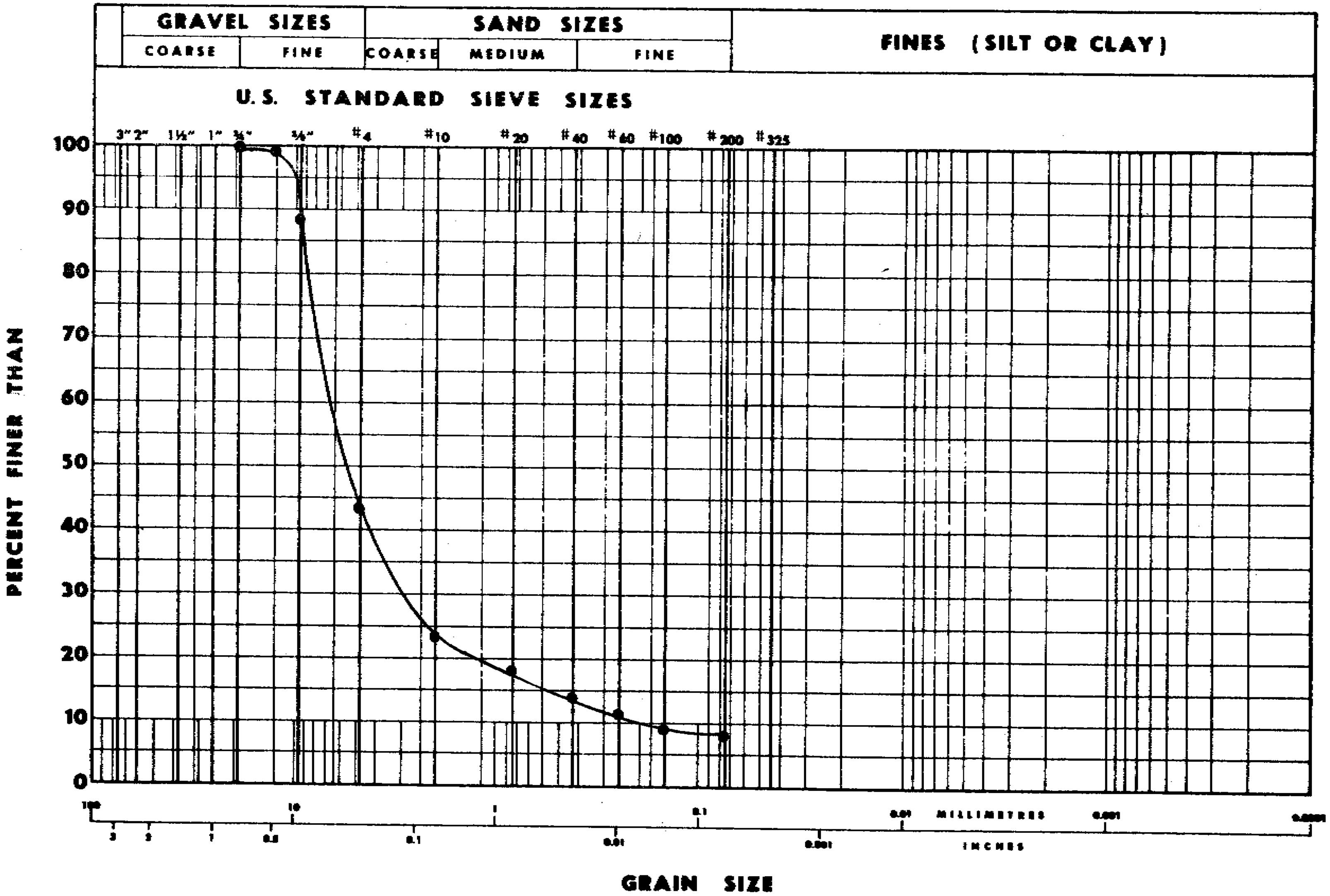
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-82

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parson's Lake N.W.T.
Hole UV50 @ 11-11.5'
TECHNICIAN CW **DATE TESTED** Apr/76



REMARKS:

Larger sizes fractured by rock bit

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

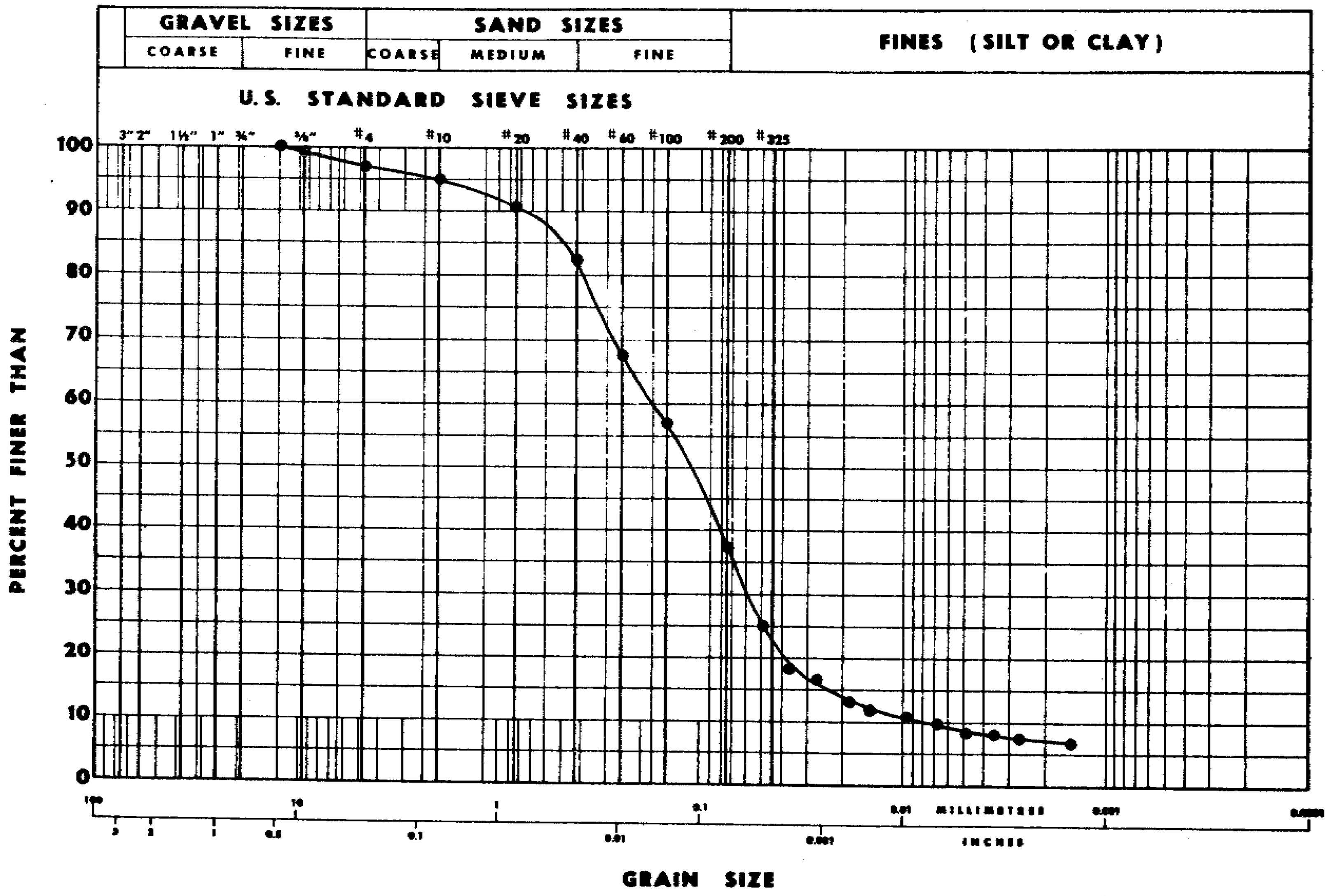
PLATE F-83

02-0373

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parson's Lake N.W.T.
Hole UV51 @ 14-15'
TECHNICIAN CS **DATE TESTED** Apr/76



REMARKS: ______

D₁₀ = ______ MM.
D₃₀ = ______ MM.
D₆₀ = ______ MM.
Cᵤ ______
C꜀ ______

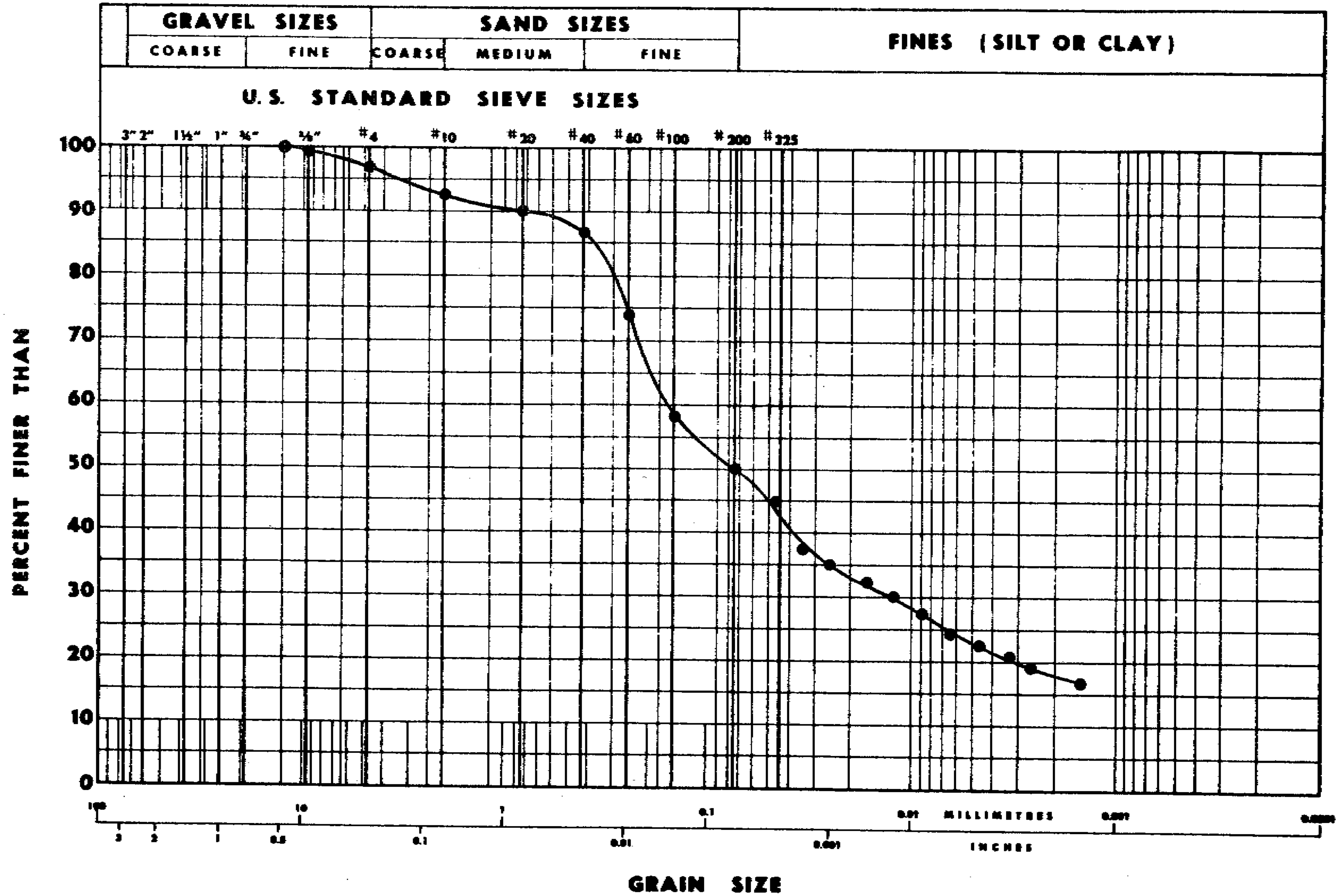
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-84

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parson's Lake N.W.T.
Hole UV52 @ 12-13'
TECHNICIAN CS
DATE TESTED Apr/76



REMARKS: ____________________

D$_{10}$ = ________ MM.
D$_{30}$ = ________ MM.
D$_{60}$ = ________ MM.
C$_U$ ________
C$_C$ ________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE F-85

APPENDIX "F"

SECTION F.6 SUMMARY OF LABORATORY TESTING

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Pla
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
UV1	2-4	C1	CL CI	CLAY silty,sandy,low plastic brown							100	73	37	frozen core
UV1	6 7	W3	CL CI	CLAY silty,trace sand and fine gravel,occ.coal specks, medium plastic(till-like)	42	23	19							
UV1	13-14	W5	CL CI	CLAY very silty,trace sand, grey				20	43	37				
UV2	5-7	C1	CI	CLAY silty,little sand,medium plastic,brown							103	71	46	frozen core
UV3	7-8	W2	ML	SILT very clayey,trace sand, plastic,occ.small coal incl.coarse gravel sizes	25	17	8							
UV3	10-11	W3	ML	SILT very sandy,fine grained, non to low plastic,grey				48	41	11				
UV5	7-10	C1	ML	SILT clayey,sandy,low to medium plastic,ice-rich							84	48	77	frozen core
UV5	17-18	W4	CL	CLAY sandy,fine grained,low plastic,grey	27	14	13							
UV6	5-7	C1	ML	SILT sandy,trace sand,fine grained,ice-rich							80	37	105	frozen core
UV6	19-20	W4	GM	GRAVEL fine to coarse,occasional cobbles,very sandy, fine to coarse grained,silty trace clay,non plastic,				78	22	fine*				Gravel 20
UV7	7-9	C1	CI	CLAY silty,sandy,medium plastic,brown	35	17	18				104	78	34	frozen core
UV7	12-13	W3	SC	SAND fine grained,silty,clayey trace gravel				53	31	16				
UV8	7-8	W3	CI	CLAY very silty,sandy,low to medium plastic,brown	32	18	14							
UV11	10-11	W3	ML OL	SILT clayey,trace sand,medium to high plastic,grey,trace organics	45	29	14							
UV12	7-9	C1	CI CH	CLAY silty,trace of sand, coarse grained,occ.gravel sizes to 1"0,med.to high plastic,grey tc brown (till-like)							112	80	41	frozen core

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
UV14	13.5-14.5	W5	GP	GRAVEL coarse,very sandy				95	5	-*				Gravel 28%
UV15	7-9	C1	OL	ORGANIC SILT trace fine gravel							69	21	229	frozen
UV15	15-16	W4	CL	CLAY silty,trace sand,fine grained,fine gravel sizes low to med.plastic,dark brown(till-like)	30	18	12							
UV16	1-2	W1	SC	SAND clayey,silty,gravelly, low plastic	29	17	9	61	23	16				
UV18	8	W1	GC	GRAVEL clayey,low plastic	24	15	9							
UV19	4-5	W1	CI	CLAY silty,occasional sizes medium plastic,ice-rich, dark grey	44	21	23							
UV19	7-9	C1	CI	CLAY silty,occasional sizes medium plastic,ice-rich, dark grey	43	19	24				92	57	62	frozen core
UV22	14-15			CLAY silty,trace sandy medium plastic,dark brown	44	20	24							
UV23	9-11	W3	CL CI	CLAY very silty,gravelly, numerous cobbles,low plastic,dark grey(till like)				33	46	21				
UV23	13-14	W4	CL	CLAY very silty,gravelly, cobbles,low plastic, dark grey	27	17	10							
UV25	1-2	W1	CI	CLAY very silty,trace sand, medium plastic,brown	32	21	11							
UV25	12-13	W3	SM	SAND silty,trace to little gravel and clay,non plastic				63	24	13				
UV27	9-10	W3	SM	SAND silty,clayey,trace fine gravel				62	25	13				
UV28	12-13	W1	GM	GRAVEL sandy,silty, low plastic,grey				86	34	-*				
UV28	21-22	W4	CL	CLAY silty,low to medium plastic,cobbles	29	16	13							

*Larger sizes fractured with rock bit

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
UV29	16-17	W4	CI CL	CLAY silty,sandy,low to medium plastic,coal specks,occ. fine gravel sizes	35	19	14							
UV30	9-10	W3	SP	SAND gravelly,silty, clayey				55	23	22				
UV31	7 8	W3	GP	GRAVEL coarse to fine, sandy				78	22	-*				
UV33	7-9	C1	PT	PEAT sandy,low plastic							76	31	149	frozen core
UV33	9-10	C1	CH	CLAY silty,occasional gravel sizes,high plastic	52	32	20							
UV33	13-14	W4	SM	SAND fine to coarse grained, fine gravel sizes,silty, low plastic,clayey				57	28	15				
UV35	1-2	W1	SM	SAND fine grained,silty,brown				63	25	12				
UV36	15-16	W4	ML OL	SILT clayey,medium plastic, dark grey	44	28	16							
UV36	19-20	W5	ML OL	SILT clayey,sandy,medium plastic				19	56	25				
UV42	7-8	W3	CI	CLAY silty,trace sand,low to medium plastic, grey	34	15	19							
UV42	10-11	W4	CI	CLAY very silty,sandy,fine to coarse grained,(till-like) medium plastic				19	48	33				
UV43	1-2	W1	ML	SILT sandy,clayey,trace gravel,brown				21	59	20				
UV44	10-11	W4	ML	SILT sandy,fine grained,clayey non to low plastic,brown grey				25	60	15				
UV46	2-3	W1	OL	ORGANIC SILT sandy,trace of clay,non plastic,brown				18	74	8				
UV46	9-10	W3	MH	SILT layer clayey,high plastic	57	50	7							

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
UV47	7-9	C1	ML	SILT trace clay,non to low plastic,fine							80	45	77	
UV48	4-5	W2	CL	CLAY silty,gravelly,low to non plastic,brown	28	20	8							
UV50	10.5-11	W4	GW	GRAVEL sandy,fined grained				92	8	-*				Gravel 57% Sand 35% Silt 8%
UV51	14-15	W5	SM	SAND fine grained,silty, occasional gravel sizes, grey				63	30	7				
UV52	12-13	W3	SM ML	SAND very silty,fine grained, occasional gravel sizes non to low plastic,brown				50	32	18				

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parson's Lake Gas Plant
LOCATION Parson's Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
VP1	4-5	W2	CI	CLAY very silty,trace sand, medium plastic,brown to grey	39	22	17							
VP2	5-7	C1	ML	SILT clayey,low plastic,grey crystalized ice							113	87	30	frozen core
VP2	10-11	W2	ML	SILT clayey,sandy,low plastic grey	24	19	5	17	57	26				
VP3	4-5	W2	CI	CLAY very silty,trace sand, low to medium plastic, grey	33	17	16							
VP3	14-15	W5	GM	GRAVEL coarse,sandy,fine to coarse,grained,silty				88	12	-*				Gravel 62% Sand 26% Silt 12%
VP5	5-7	C1	CL	CLAY silty,coarse sand,low plastic,olive brown	20	17	3				83	41	102	frozen core
VP5	14-15	W3	CL	CLAY very silty,trace sand, low plastic				12	50	38				
VP6	14-15	W5	SM	SAND fine to coarse grained, silty,fine to coarse gravel sizes,brown				69	19	12				
VP8	4-5	W2	CI	CLAY very silty,sandy,medium plastic				17	46	37				
VP8	7-9	C1	CI	CLAY silty with occasional particles of coarse sand and coarse gravel to 1"0 medium plastic(till-like)	42	18	14							
VP9	4-5	W2	OL	ORGANIC SILT very sandy,trace clay, low to med.plastic,low organic content,dark brownish grey to black				47	49	4				
VP9	7-9	C1	CI	CLAY silty,trace of sand,occ. particles of gravel,fine medium plastic,brown							76	35	121	frozen core

APPENDIX "F"

SECTION F.7 TEST HOLE ELEVATIONS

SERVICE CORRIDOR TEST HOLE ELEVATIONS

Cluster No. 2 to Cluster No. 3 Road to Plantsite

Test Hole No.	Elevation *	Geodetic Elevation
VP1	1012.5	188.0
2	953.5	129.0
3	1017.0	192.5
4	949.0	124.5
5	945.0	120.5
6	957.0	132.5
7	944.0	119.5
8	983.5	159.0
9	947.0	122.5

Cluster No. 2 to Cluster No. 3

UV1	1045.0	220.5
2	1014.0	189.5
3	994.0	169.5
4	981.5	157.0
5	965.5	141.0
6	961.0	136.0
7	958.5	134.0
8	980.0	155.5
9	947.0	122.5
10	1002.5	178.0
11	968.5	144.0
12	944.0	119.5
13	972.0	147.5
14	993.0	168.5
15	957.5	133.0
16	1011.5	187.0
17	1036.0	211.5
18	1006.0	181.5
19	1019.5	195.0
20	946.5	122.0
21	949.5	125.0
22	1026.5	202.0
23	944.5	120.0
24	1005.5	181.0
25	1030.0	205.5
26	973.0	148.5
27	988.0	163.5
28	936.5	112.0
29	940.5	116.0

* Elevation relative to top of flange on 0-27 wellhead (Elevation = 999.80 - provided by C.E S.L. of Edmonton).

Cluster No. 3 to Cluster No. 4

Test Hole No.	Elevation *	Geodetic Elevation
UV30	1028.5	204.0
31	954.5	130.0
32	1008.0	183.5
33	938.0	113.5
34	932.5	108.0
35	925.0	100.5
36	923.5	99.0
37	961.5	137.0

Cluster No. 1 to Cluster No. 3, via Cluster No. 5

UV42	998.0	173.5
43	1007.5	183.0
44	970.0	145.5
45	981.5	157.0
46	950.0	125.5
47	937.0	112.5
48	999.5	175.0
49	1013.5	189.0
50	950.0	125.5
51	937.5	113.0
52	943.5	119.0

* Elevation relative to top of flange on 0-27 wellhead (Elevation = 999.80 - provided by C.E.S.L. of Edmonton)

APPENDIX “G”

WELL CLUSTER SITES

SECTION G.1 TEST HOLE LOGS: WELL CLUSTER NO.2

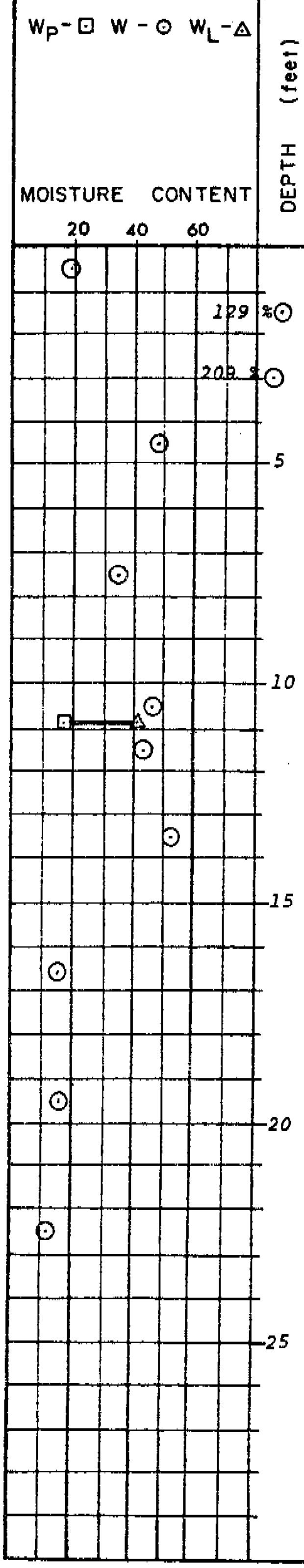
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U1

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 18, 1976
RIG Heli Drill
METHOD AIR/CRREL
START 10:00
FINISH 10:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT amorphous granular	F					
	CL-ML	CLAY silty, trace sand, dark brown, organics, fines, low plastic	V 25%		C1	90%	III I	CRREL cores from B-61 Rig. Adjacent hole to 4.5 feet north.
		ICE	ICE					
	CI	CLAY silty, brown, medium plastic gravel sizes to 1 1/2"ø (till-like)	V		C2	90%	IV	Moisture content from air wash samples- Heli Drill.
5								W1 at 1 - 2 feet. W2 at 4 - 5 feet.
		--- trace sand, occasional rust and coal specks, occasional rounded gravel to 3/4"ø (till-like)	15%		W3			
10		--- trace fine to coarse sand, grey, medium plastic, ice pockets to 3" diameter		Grain Size Plate G-25	W4			
					W5			
		--- more gravel sizes						
15								
	SP-GP	SAND very gravelly, sizes to 1"ø, trace silt	V	Grain Size Plate G-26	W6			
		--- coarser gravel sizes	5-10%					
20					W7			
					W8			
		--- occasional cobble sizes						
25		Bottom of Hole at 24.0'.						

PLATE G-1

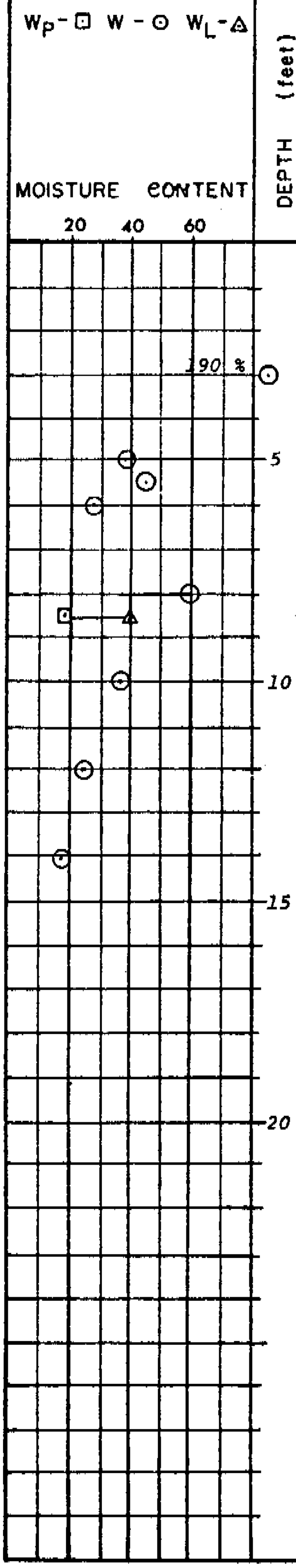
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U2

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 18, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 10:55 PM	FINISH 2:20 AM
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND RECOVERY %	CORE CONDITION	REMARKS
CT	*CLAY* silty, medium plastic	Vx, Vs 30%		C1		III III	
OL	*ORGANIC SILT* dark brown						
CL	*CLAY* silty, brown, low plastic cobble very silty, non to low plastic			C2		III	
CL	*ICE AND CLAY* silty	ICE+ 75%					
Pt	*ICE AND PEAT* fine amorphous granular, sandy, dark brown	ICE+ 90%		C3		IV	
CI	*CLAY* silty, trace of sand, occasional coarse sand and fine gravel sizes, brown, low to medium plastic fine to coarse gravel sizes	Vs, Vx 25-30% Vs 20% Nbn 5%		C4 C5 C6	100% 100%	IV II IV II I III II	γ_{bulk} = 101 pcf γ_d = 70 pcf B - 61 C2 - 8.3-8.7' γ_{bulk} = 100 pcf γ_d = 63 pcf
SM	*SAND* fine to coarse grained, silty, occasional gravel size trace silt, gravelly, brown cobbles	Nbe 10-15%	Grain Size Plate G-27	C7 W1	100%	IV	

Bottom of Hole at 16.0'.

PLATE G-2

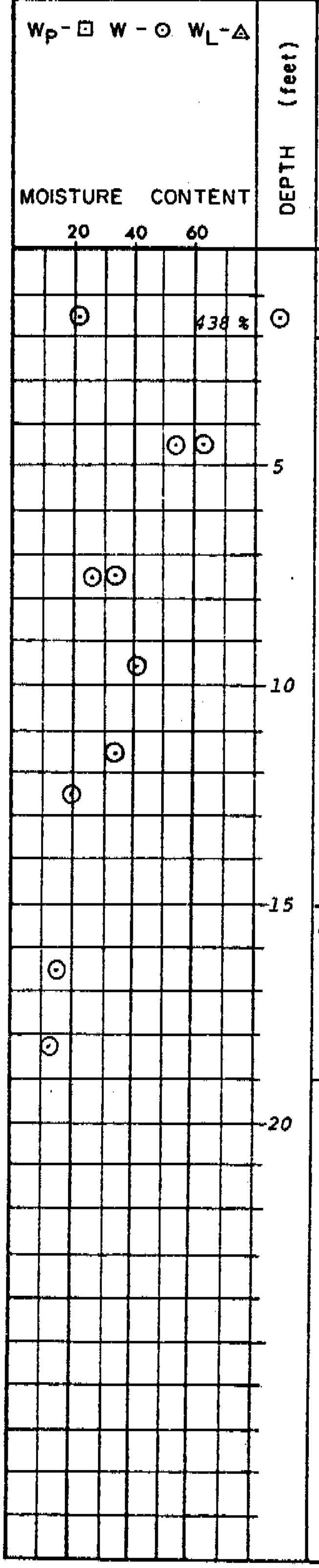
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U3

LOGGED BY MR	DRAWN BY	CHECKED RST	DATE March 19, 1976
RIG Heli Drill	METHOD AIR/CRREL	START 5:25 AM	FINISH 6:00
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* amorphous granular, occasional woody pieces	Vs		C1		III	CRREL Cores from B-61 Rig Adjacent hole to 15.0 feet.
CI	*CLAY* very silty, trace fine sand, medium plastic, grey	Vs 30%		C2		I	
				C3		IV	Moisture content from air wash samples - Heli Drill.
	silty, trace sand, occasional gravel sizes, rust and coal inclusions, brown, medium plastic (till-like)	5-10%		C4		III	W1 at 1 - 2 feet. W2 at 4 - 5 feet. W3 at 7 - 8 feet.
	occasional particles of gravel to 3/8" ϕ			C5		IV	
	more gravelly (to 1 1/2" ϕ)			C6		IV	
				C7		IV	
				W4			
SP	*SAND* very gravelly, trace silt and clay, cobble sizes, brown (till-like)	15%		W5			
	coarser gravel sizes			W6			
	Bottom of Hole at 19.0'.						

PLATE G-3

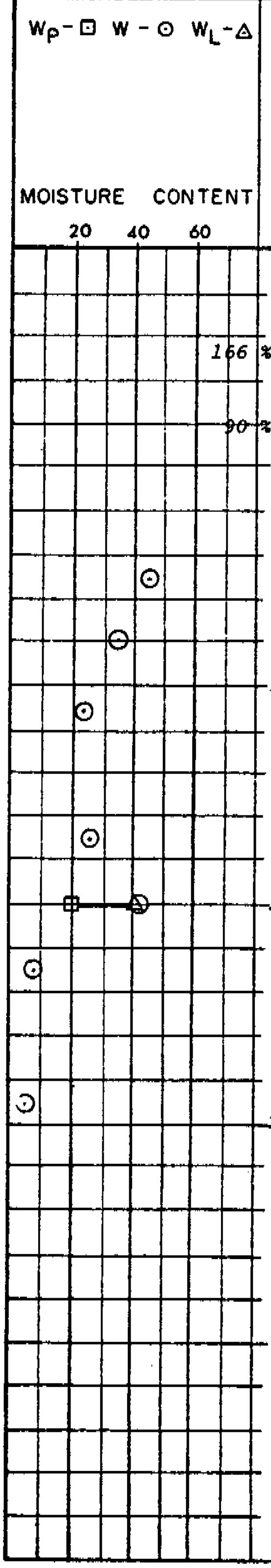
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U4*

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 19, 1976*
RIG *Heli Drill*	METHOD *AIR /CRREL*	START *2:40 AM*	FINISH *3:10*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION
			ICE		ICE		C1		100%	II
							C2		75%	III
	ML		*SILT* trace clay, dark brown, non to low plastic, occasional fine organics		Vs 60%					
5	CI		*CLAY* silty, trace sand, brown, medium plastic (till-like)		Vs 40%		C3		80%	III
			less ice		20%		C4		80%	I
10			occasional gravel sizes, rust and coal inclusions, dark brown (till-like) very sandy		5%		C5		100%	I
							C6		100%	I
15	GC		*GRAVEL* fine to coarse, sandy, medium to coarse grained, medium plastic clay matrix		Nf		W5			
							W6			
			very dense, coarser gravel sizes							
20							W7			
			Bottom of Hole at 20.0'.							

REMARKS

CRREL cores from B-61 Rig. Adjacent hole to 19.5 feet.

Moisture content from air wash samples-Heli Drill

W1 at 2.5 feet.
W2 at 4.5 feet.
W3 at 7.5 feet.
W4 at 10.5 feet.

PLATE *G-4*

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U5

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 19, 1976
RIG Heli Drill
METHOD AIR
START 4:15 AM
FINISH 5:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE

WP - ⊡ W - ⊙ WL - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
178 % ⊙		Pt		*PEAT* silty, amorphous granular, brown		V 30%		W1	☒			
149 % ⊙		CI		*CLAY* silty, trace sand, low to medium plastic, brown, small coal and rust inclusions (till-like)		V 30%						
	5											
⊙	10			with occasional gravel sizes to 1/2" diameter		20%		W2	☒			
⊙		GP		*GRAVEL* sandy, fine to coarse grained, trace silt, brown		V 5%		W3	☒			
	15			denser, more coarse gravel sizes								
⊙	20							W4	☒			
				very dense								
				Bottom of Hole at 22.0'.								
	25											

PLATE G-5

APPENDIX “G”

SECTION G.2 TEST HOLE LOGS: WELL CLUSTER NO.3

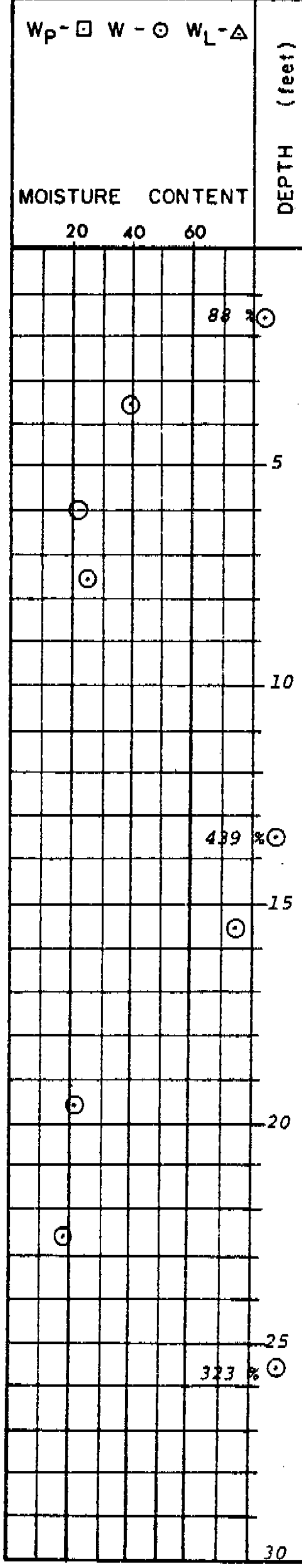
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U6

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR FLUSH
START 10:30
FINISH 10:55
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
OL	*ORGANIC SILT* clayey, brown — cobble	V 5%		W1	☒			
CL	*CLAY* sandy, silty, trace fine gravel, low to medium plastic, grey	V 30%		W2	☒			
				C1	☒	80%	II	γ_{bulk} = 116 pcf γ_d = 95 pcf
SM	*SAND* fine grained, very silty, clayey, occasional fine gravel sizes, very grey	V 40%	Grain Size Plate G-28	W3	☒			
	ICE	ICE						
SM	*ICE AND SAND* silty, clayey	ICE+ 60%						
	ICE	ICE						
SM	*ICE AND SAND* very silty, clayey, occasional gravel size, grey	ICE+ 60%		W4	☒			
				W5	☒			
	— — cobble	90%						
GP	*GRAVEL* fine, very sandy, fine to coarse grained, brown to grey	V 10%		W6	☒			
				W7	☒			
GP	*ICE AND GRAVEL* sandy	ICE+ 70%		W8	☒			

Bottom of Hole at 26.0'.

PLATE G-6

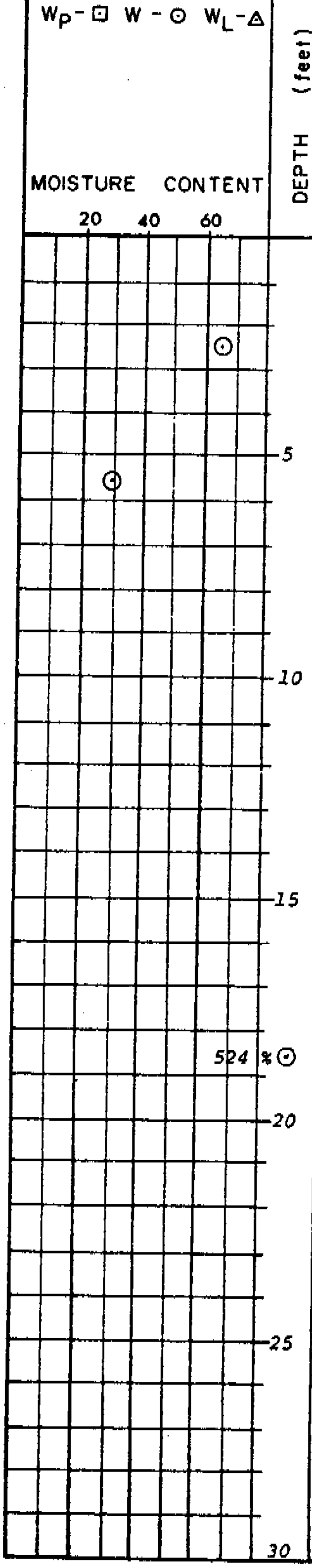
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U7

LOGGED BY GCD
DRAWN BY
CHECKED RST
DATE March 26, 1976
RIG Heli Drill
METHOD AIR FLUSH
START 11:15
FINISH 11:35
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	*SILT* sandy, fine to medium grained, low plastic trace organics, grey to brown gravelly	V 40% 20%		W1	☒			
SM	*SAND* fine grained, silty, gravell grey,	V		W2	☒			
	ICE	ICE						
SM	*ICE AND SAND*	ICE+	70%					
	ICE	ICE						
SM	*ICE AND SAND* fine grained, silty	ICE+ 95%		W3	☒			
	ICE	ICE						
	Bottom of Hole at 26.0'.							

PLATE G-7

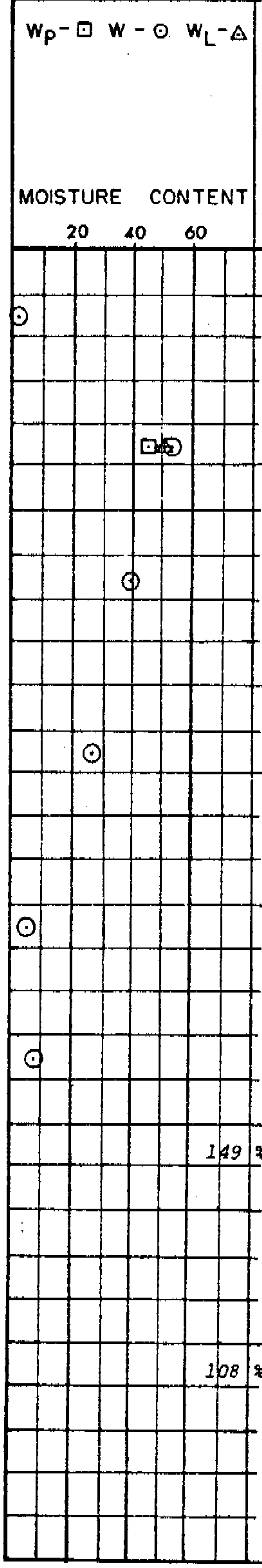
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U8

LOGGED BY *GCD*
DRAWN BY
CHECKED *RST*
DATE *March 26, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *12:35*
FINISH *13:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	GW	*FILL gravel, fine to coarse, very sandy*	*Nf*		*W1*	☒			
5	OH	*ORGANIC SILT sandy, fine grained, occasional fine gravel sizes, brown*	*V 20%*		*W2*	☒			
10	CL	*CLAY very silty, very sandy, fine grained, gravel sizes, low to medium plastic, grey*	*V 10%*	*Grain Size Plate G-29*	*W3*	☒			
	SP	*SAND fine grained, clayey, gravelly, fine*	*V 5%*		*W4*	☒			
15	GW-SW	*GRAVEL fine to coarse, frequent cobbles, very sandy, fine to coarse grained, trace fines*	*Nf*	*Grain Size Plate G-30*	*W5* *W6*	☒ ☒			
20 25	CL	*CLAY very sandy, fine grained, trace fine gravel, low to medium plastic, grey, ice-rich* --- *very sandy, silty*	*V 50%*		*W7* *W8*	☒ ☒			
30		*Bottom of Hole at 26.0'.*							

PLATE *G-8*

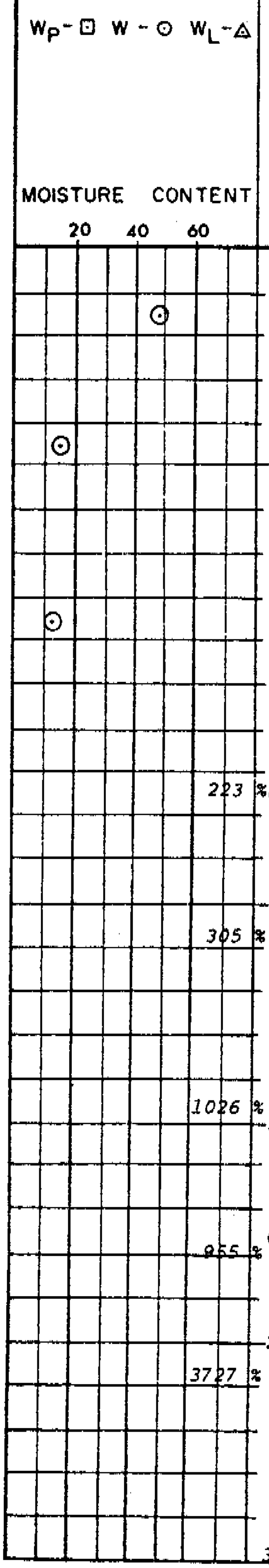
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U10

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 26, 1976
RIG Heli Drill	METHOD AIR FLUSH	START 14:05	FINISH 14:15
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
0	OL		*ORGANIC SILT* peat inclusions, clayey, trace sand, low plastic, brown		Nbn						
					V 10%		W1	☒			
5	SP		*SAND* fine to coarse grained, very gravelly, brown		V 5%		W2	☒			
							W3	☒			
10	SM		*ICE AND SAND* fine grained, silty		ICE+ 90%						
			very silty				W4	☒			
15			silty, occasional gravel sizes				W5	☒			
20							W6	☒			
							W7	☒			
25							W8	☒			
30			Bottom of Hole at 26.0'.								

PLATE G-10

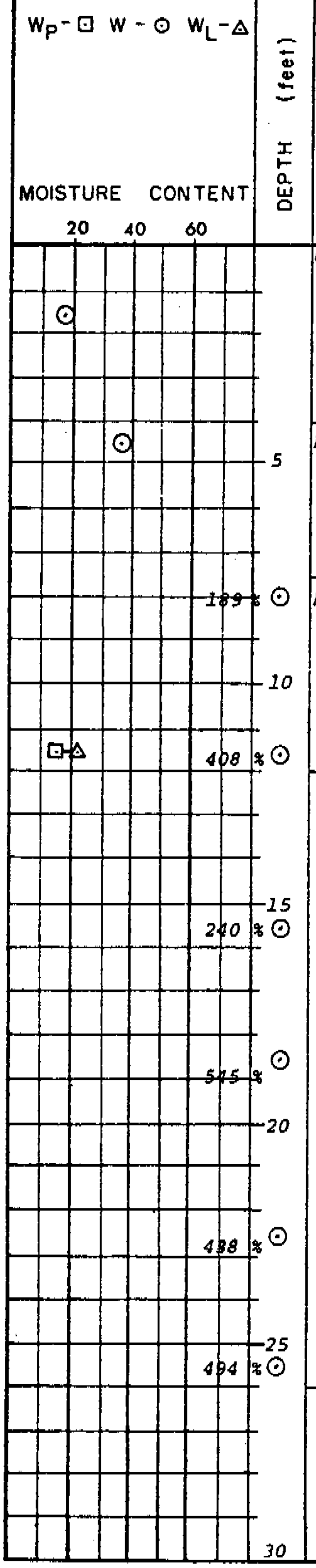
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U9

LOGGED BY GCD	DRAWN BY	CHECKED RST	DATE March 26, 1976
RIG Heli Drill	METHOD AIR FLUSH	START 13:40	FINISH 13:55
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
OL	*ORGANIC SILT* clayey, sandy, fine grained, trace gravel, dark grey	V 5%		W1	☒			
ML	*SILT* sandy, fine grained, low plastic, grey	V 30%		W2	☒			
ML - CL	*ICE AND SILT* clayey, trace sand, fine grained, occasional gravel sizes, low plastic	ICE+ 80%		W3 W4	☒ ☒			
SM	*ICE AND SAND* fine to medium grained, silty, occasional fine gravel size - - occasional fine gravel size, grey	ICE+ 90%		W5 W6 W7 W8	☒ ☒ ☒ ☒			
	Bottom of Hole at 26.0'.							

PLATE G-9

APPENDIX “G”

SECTION G.3 TEST HOLE LOGS: WELL CLUSTER NO.4

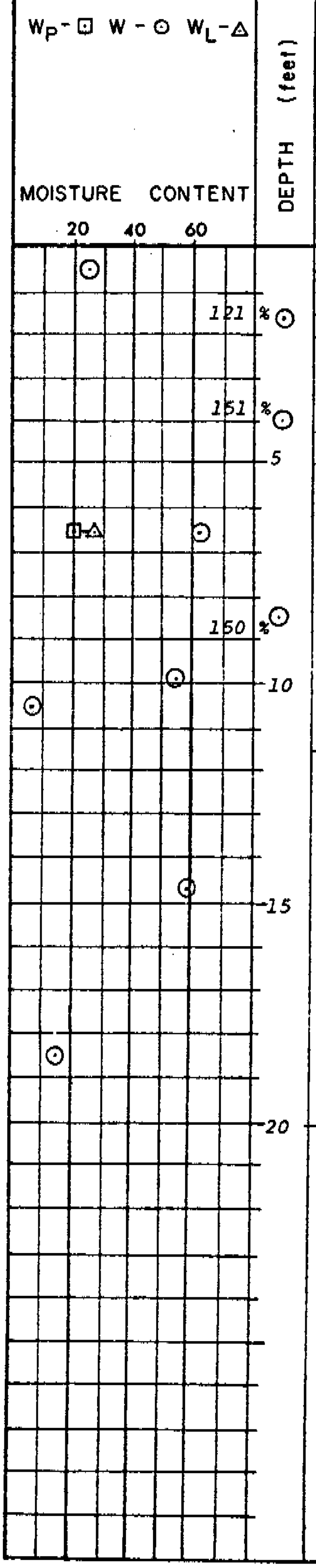
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. H11

LOGGED BY SA
DRAWN BY
CHECKED RST
DATE March 9, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 17:00
FINISH 18:35
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* organics, fibrous	V 20%		C1	90%	III	
OL	*ORGANIC SILT* trace clay, brown						
ML	*ICE AND SILT*	ICE+					W1 at 1 - 2 feet.
CL	*CLAY* low to medium plastic, occasional fine gravel sizes, brown	N		C2 C3	80% 90%	IV III	
CL	*ICE AND CLAY*	ICE+					
ML-CL	*SILT* clayey, trace sand, occasional fine gravel to 3/8"ϕ, low plastic, layered, brown	Vs 25%	Grain Size Plate G-31	C4 C5	100% 100%	III III	W2 at 6 - 7 feet.
	very silty, trace fine sand, low plastic, layered	20%		C6	100%	I	
	silty, low to medium plastic						
	silty, trace clay, fine gravel sizes, brown, low plastic	20- 30%		C7	100%	I	
	grey-brown, gravelly sizes to 2" diameter			C8 C9	100% 100%	II II	γ_{bulk} = 115 pcf γ_d = 74 pcf W3 at 10 - 11 feet.
GC	*GRAVEL* fine to coarse, to 2"ϕ, clayey, silty, low to medium plastic, clayey, brown	Vx 40%		W4			
		<5%		W5			

Bottom of Hole at 20.0'.

PLATE G-11

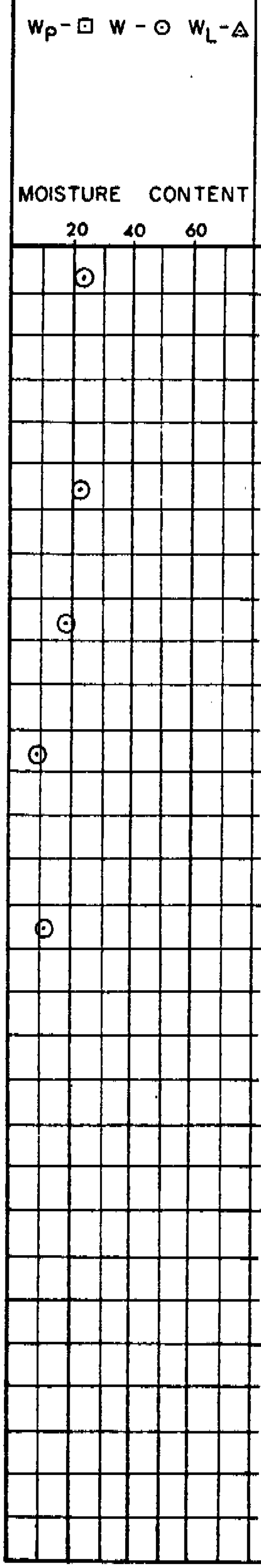
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U12*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 25, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *21:20*
FINISH *22:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt		*PEAT ice-rich*		*F* *V* *25%*		*W1*	☒			
	OL		*ICE AND CLAY trace peat and organics, low plastic*		*V* *30%*						
5	*GP*		*GRAVEL very coarse, to 1 1/4" ø, trace silt and sand*		*V* *<5%*		*W2*	☒			
			--- *very sandy, clayey, low plastic, gravel sizes to 1"ø*				*W3*	☒			
10			--- *sandy, trace fines, numerous cobbles*		*Nf*		*W4*	☒			
			--- *frequent cobbles, boulders*								
15			--- *very sandy*				*W5*	☒			
			Bottom of Hole at 16.5'.								
20											

PLATE *G-12*

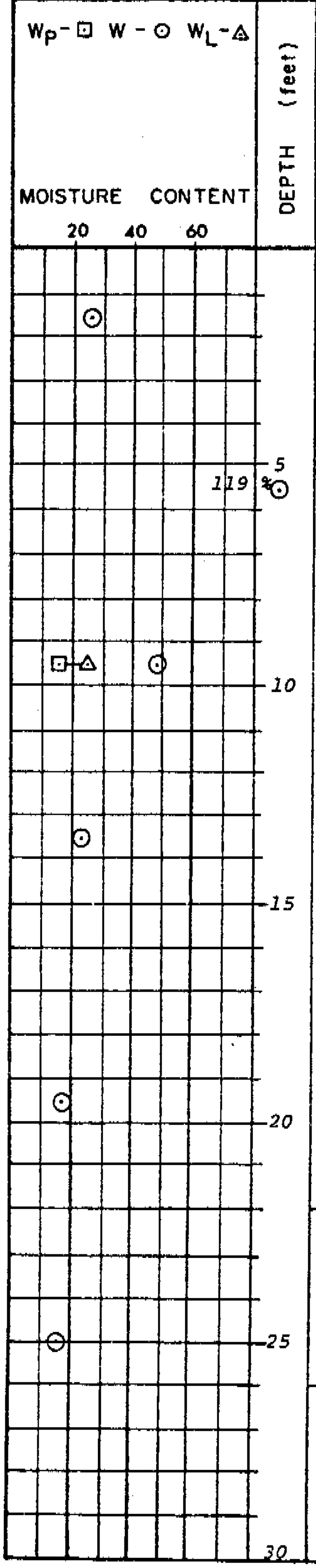
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. 113

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 25, 1976
RIG Heli Drill	METHOD CRREL/AIR	START 22:30	FINISH 23:00
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CI	CLAY very silty, trace sand, medium plastic, brown	F		W1	☒			
	CI	ICE AND CLAY medium plastic, dark grey	ICE+ 70%						
5	CI-CH	CLAY trace silt, medium to high plastic, dark grey, layered	V 30-40%		W2	☒			
		medium to high plastic layers	Vs 15%		C1		100%	III IV	
10		very silty, low plastic layers		Grain Size Plate G-32	W3	☒			
		silty, trace sand, medium grained, gravelly, medium plastic (till-like)	V 5%						
		gravelly			W4	☒			
15		some gravel, high plastic, dark grey							
		very gravelly, silty, medium to high plastic, dark grey (till-like)			W5	☒			
20		very gravelly							
25	GM	GRAVEL fine, sandy, fine to medium grained, silty, trace clay dark grey to black	V		W6	☒			
30		Bottom of Hole at 26.0'.							

PLATE G-13

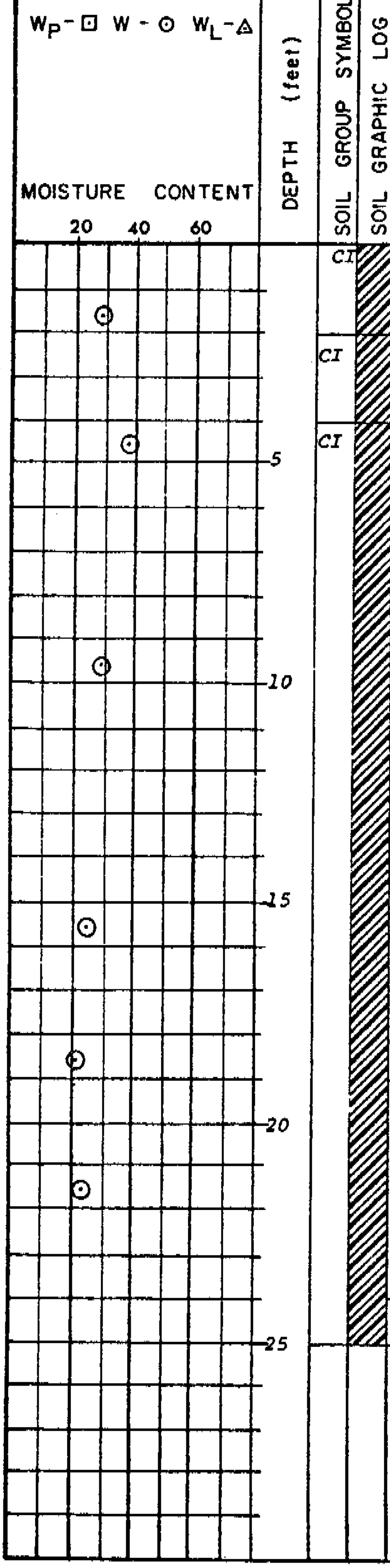
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U14

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 25-26, 1976
RIG Heli Drill
METHOD CRREL/AIR
START 23:25
FINISH 0:10
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI	*CLAY* silty, medium plastic, brown	F		W1	☒			
CI	*ICE AND CLAY*	ICE+ 70%						
CI	*CLAY* silty, sandy, fine gravel sizes, medium to high plastic, dark grey	V 25%		W2	☒			
	gravelly, (till-like)	10-15%		W3	☒			
	silty, trace sand, high plastic, trace gravel , coal specks, grey (till-like)	Vs 5-10%				95%	III II	
	trace gravel			W4	☒			
	gravelly	V 5%		W5	☒			
	very gravelly							
	gravelly			W6	☒			
	gravelly							

Bottom of Hole at 25.0'.

PLATE G-14

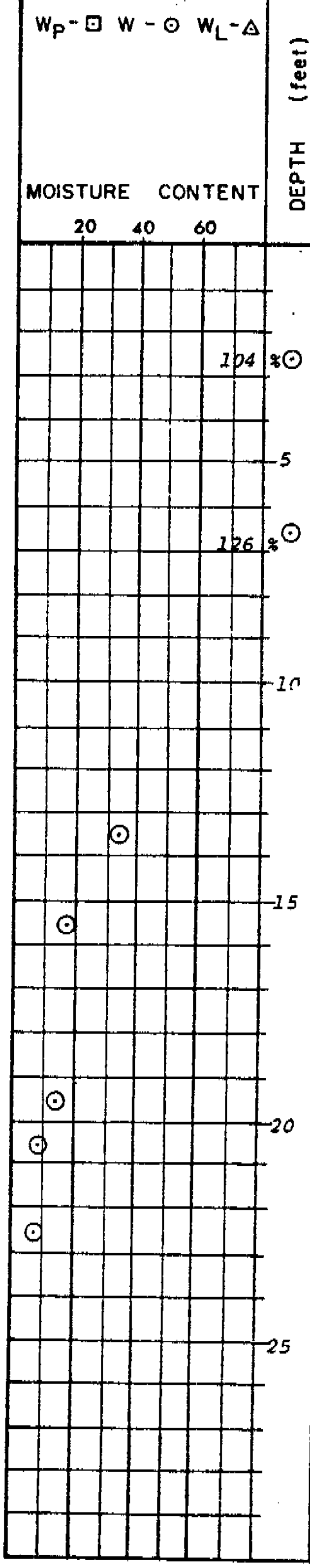
TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U15*

LOGGED BY *GNL*
DRAWN BY
CHECKED *RST*
DATE *March 25, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *1:25*
FINISH *2:05*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



MOISTURE CONTENT	DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
		CI	*FILL* clay, medium plastic, trace gravel	V 10%						
		Pt	*PEAT* woody	V 5%						
104 %		OL	*ORGANIC SILT* sandy, dark brown to black			W1	☒			
		CL	*ICE AND CLAY* low to medium plastic	ICE+ 40-50%						
126 %	5	CL	*CLAY* silty, sandy, fine to coarse grained, low plastic, brown	V 25%		W2	☒			
		CI	*CLAY AND ICE* trace silt, medium plastic	ICE+ 50-60%						
	10	CH-GC	*CLAY* gravelly, rounded to 3/8"ø, high plastic, dark grey (till-like)	V 10%		W3	☒			
			gravelly							
	15	GP-SP	*GRAVEL* sandy, fine to medium grained, silty, medium plastic, grey	V <5%		W4	☒			
		GC	very clayey, medium plastic, angular gravel sizes to 1/2"ø	Nf		W5	☒			
	20	GC-GW	clayey, trace sand and silt			W6	☒			
		GP	very coarse gravel sizes, occasional cobbles, trace clay	Nf		W7	☒			
	25		Bottom of Hole at 24.0'.							

PLATE *G-15*

APPENDIX "G"

SECTION G.4 TEST HOLE LOGS: WELL CLUSTER NO.5

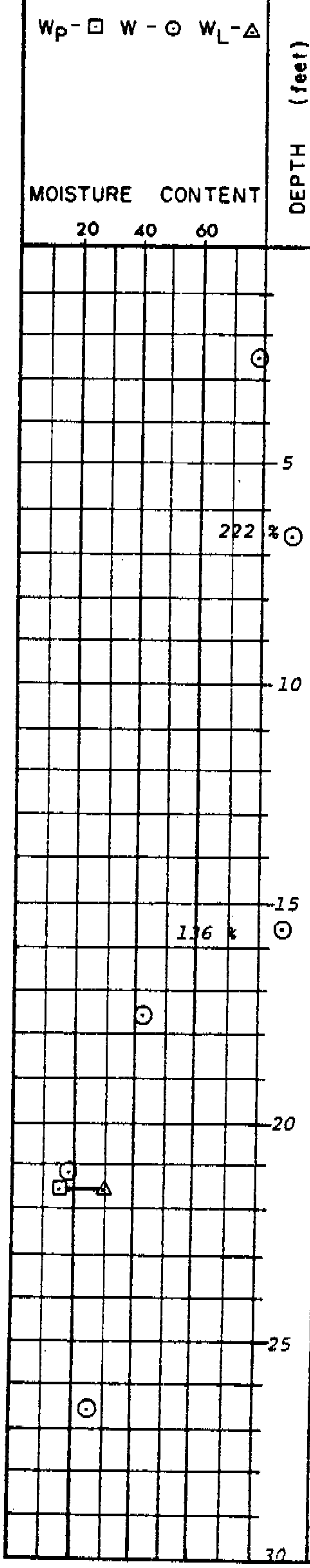
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U16

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 27, 1976
RIG Heli Drill
METHOD AIR
START 2:00 AM
FINISH 2:45
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT* brown	F						
Pt-OL	*ICE AND PEAT AND ORGANIC SILT* low plastic, brown	ICE+ 50-60%		W1	☒			
	black			W2	☒			
	low to non plastic, dark brown peat inclusions			W3	☒			
CL	*CLAY* very silty, trace sand, low plastic, brown	V 10%		W4	☒			
	cobble							
	silty, occasional gravel sizes, low to medium plastic, grey (till-like)			W5	☒			
				W6	☒			
	Bottom of Hole at 27.0'.							

PLATE G-16

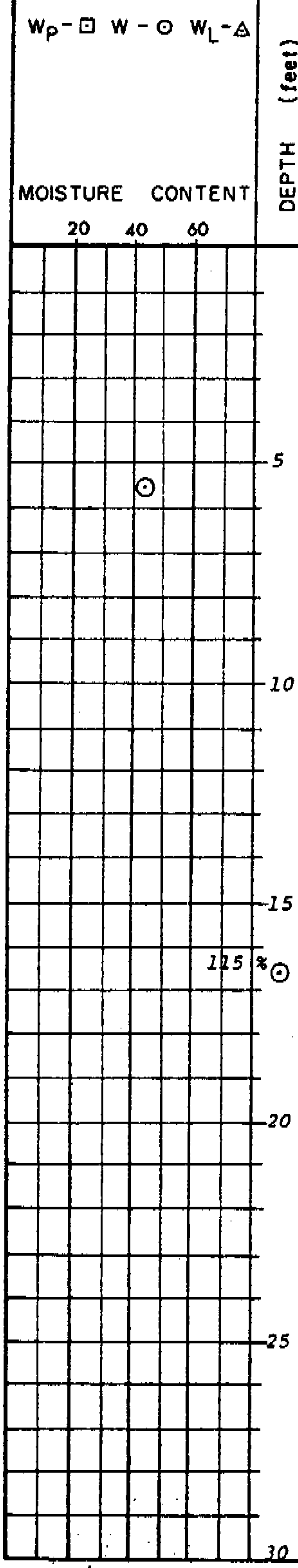
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U17

LOGGED BY MR
DRAWN BY
CHECKED RST
DATE March 27, 1976
RIG Heli Drill
METHOD AIR
START 3:25
FINISH 3:42
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
CI	*ICE AND CLAY* silty, trace sand, medium plastic, brown	ICE+ 60%						
CI	*CLAY* silty, trace sand, occasional gravel sizes, medium plastic, brown	V 30%		W1	☒			
CL-CI	*ICE AND CLAY* silty, low to medium plastic, occasional gravel sizes, brown	ICE+ 80%						
	very silty, sandy, non to low plastic, grey	ICE+ 50-60%		W2	☒			
		ICE+ 80-90%						

PLATE G-17

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

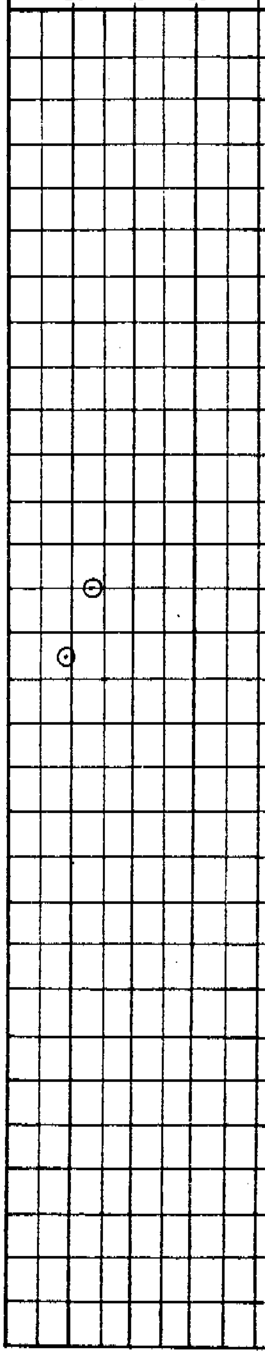
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U17*
(con't)

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 27, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *3:25*
FINISH *3:42*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	*CL-CI*	*ICE AND CLAY* silty, low to medium plastic, occasional gravel sizes brown (con't)	*ICE+ 80-90%*						
35									
40									
	GP	*ICE AND GRAVEL*	*ICE+ 60%*		*W3*	☒			
	GP	*GRAVEL* to 1/2"ø, sandy, coarse to medium grained, brown, dense	*V 10%*		*W4*	☒			
45									

Bottom of Hole at 45.0'.

PLATE *G-17 (con't)*

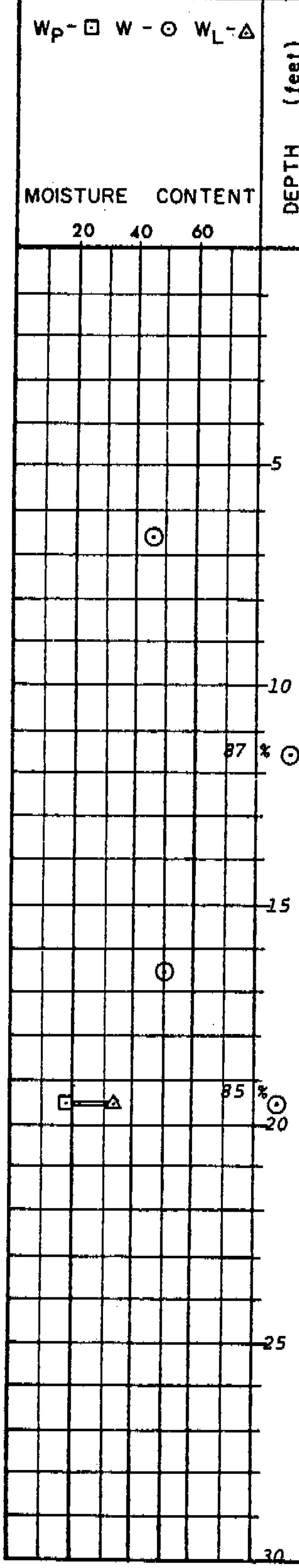
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U18

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 27, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *4:00 AM*	FINISH *4:30*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
Pt	*PEAT*	F						
CI	*ICE AND CLAY silty, trace sand, medium plastic, grey-brown*	ICE+ 60%						
CI	*CLAY*	V 30%		W1	☒			
	occasional gravel sizes	V 70%						
SM	*ICE AND SAND very silty, occasional gravel sizes to 1/2"ϕ, grey, non plastic*	ICE+ 70%		W2 W3	☒ ☒			
CI	*ICE AND CLAY silty, trace sand, medium plastic, grey*	ICE+		W4	☒			
SM-SP	*ICE AND SAND fine grained, silty, occasional gravel sizes to 3/8"ϕ grey*	ICE+ 60- 70%						

PLATE *G-18*

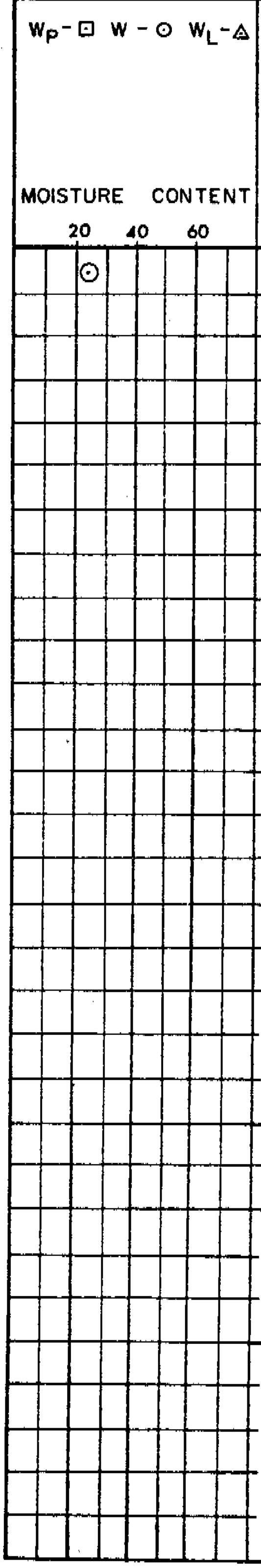
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U18*
(con't)

LOGGED BY *MR*
DRAWN BY
CHECKED *RST*
DATE *March 27, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *4:00 AM*
FINISH *4:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	SM-SP	⁘	*ICE AND SAND* fine grained, silty, occasional gravel sizes to 3/8"ø grey (con't)	▨	ICE+ 60-70%	Grain Size Plate G-33	W5	☒			
35											
40											
45											
50											
55											
			Bottom of Hole at 57.0'.								
60											

PLATE *G-18 (con't)*

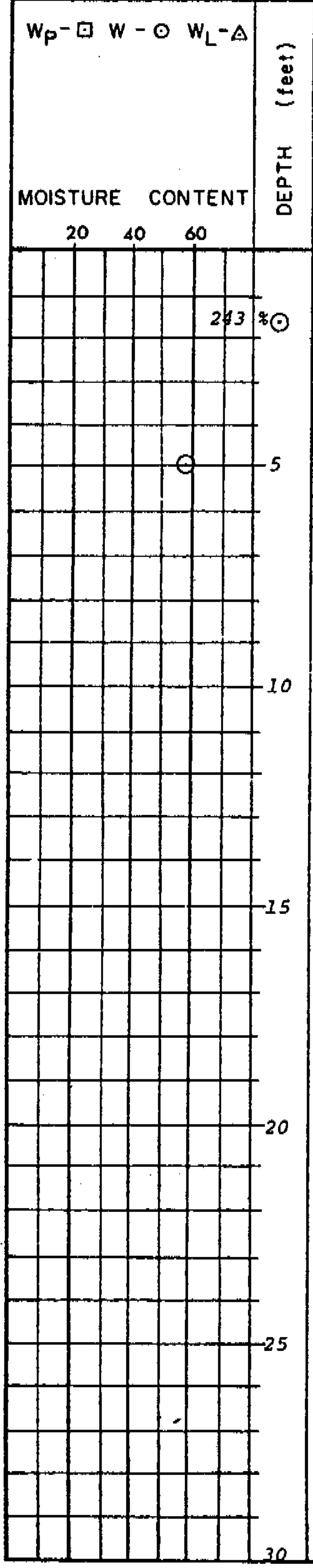
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U19

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 27, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *5:00 AM*	FINISH *5:20*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt		*PEAT*		F		W1	☒			
	CL-CI		*ICE AND CLAY very silty, trace sand, occasional gravel sizes, low to medium plastic, brown*		ICE+ 60-70%		W2	☒			

PLATE G-19

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U19* *(con't)*

LOGGED BY *MR*	DRAWN BY	CHECKED *RST*	DATE *March 27, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *5:00*	FINISH *5:20*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*CL-CI*		*ICE AND CLAY* very silty, trace sand, occasional gravel sizes, low to medium plastic, brown (con't)		*ICE+ 60-70%*						
	35	*SM*		*ICE AND SAND* fine grained, silty, brown		*ICE+ 90%*						
	40											
	45											
	50											
				4" layer of silt, brown								
	55											
				Bottom of Hole at 57.0'.								
	60											

PLATE *G-19 (con't)*

APPENDIX “G”

SECTION G.5 TEST HOLE LOGS: WELL CLUSTER NO.1

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

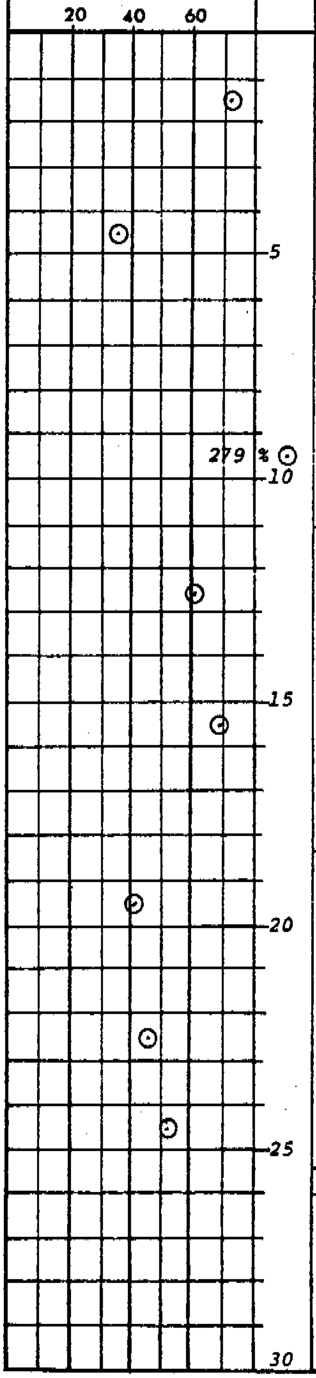
TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U21

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 27, 1976
RIG Heli Drill	METHOD AIR	START 11:05	FINISH 11:25
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ⊙ W_L - △
MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
ML	*SILT* clayey, sandy, trace of organics, low plastic, brown	V 40%		W1	☒			
GM	*GRAVEL* fine, sandy, fine to coarse grained, silty, trace clay, brown more coarse gravel sizes	V 20%		W2	☒			
	ICE occasional fine silt stringers	ICE+ 99%		W3	☒			
SM	*SAND* fine grained, silty, grey	V 60%		W4	☒			
SM	*ICE AND SAND*	ICE+ 95%		W5	☒			
SM	*SAND* fine grained, silty, grey	V 50%	Grain Size Plate G-34	W6 W7 W8	☒ ☒ ☒			
	ICE	ICE						

Bottom of Hole at 26.0'.

PLATE G-20

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

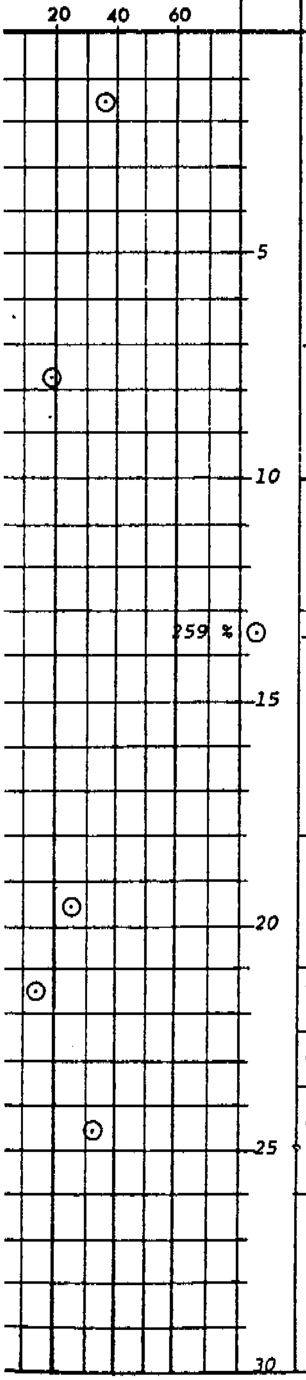
PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *U22*

LOGGED BY *TKM*	DRAWN BY	CHECKED *RST*	DATE *March 27, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *11:40*	FINISH *12:40*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
GW	*FILL gravel, coarse to fine, very sandy, coarse to fine grained, organic silt inclusions, dark brown*	*Nf*		*W1*	☒			
GP	*GRAVEL fine, sandy, medium to coarse grained*	*V* *15%*		*W2*	☒			
	ICE	*ICE*						
GP	*GRAVEL 6" layer, fine*	*Nf*		*W3*	☒			
	ICE	*ICE*						
GP	*GRAVEL fine, sandy, fine to coarse grained*	*V* *10%*		*W4*	☒			
SP	*SAND fine grained, trace fine gravel, brown*	*Nbn*		*W5*	☒			
	4" ice lens	*ICE*						
GP	*GRAVEL fine*	*V 10%*						
	4" ice lens	*ICE*						
SM	*SAND fine grained, trace coarse sand, silty*	*Nbe*		*W6*	☒			

Bottom of Hole at 26.0'.

PLATE *G-21*

TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. U23

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 27, 1976
RIG Heli Drill	METHOD AIR	START 13:25	FINISH 13:45
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

Wp-⊡ W-⊙ WL-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
287 %⊙		OL		*ORGANIC SILT* non plastic, dark brown		V 40%		W1	☒			
⊙	5	CI		*CLAY* very silty, low to medium plastic, grey to brown		V 25%		W2	☒			
	10			*ICE* --- fine gravel stringer at 7'		ICE						
177 %⊙		SM		*ICE AND SAND* fine to coarse grained, silty, occasional fine gravel sizes, brown		ICE+		W3	☒			
	15			*ICE*		ICE						
⊙		GP		*GRAVEL* fine, sandy, fine to coarse grained, brown		V 40%		W4	☒			
⊙		SP		*SAND* fine grained, gravelly, fine, trace fines, brown		V 25%		W5	☒			
	20			*ICE*		ICE						
343 %⊙	25 30	SM-ML		*ICE AND SAND* fine grained, very silty, non plastic, brown		ICE+		W6	☒			

PLATE G-22

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U23 (con't)*

LOGGED BY *TKM*	DRAWN BY	CHECKED *RST*	DATE *March 27, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *13:25*	FINISH *13:45*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	

MOISTURE CONTENT W_P - ☐ W - ⊙ W_L - △ 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
212 %	30 ⊙	*SM-ML*	▨	*ICE AND SAND fine grained, very silty, non plastic, brown (con't)*	▨	*ICE+*		*W7*	☒			
	35		▨	*ICE*	▨	*ICE*						
				Bottom of Hole at 36.0'.								
	40											

PLATE *G-22(con't)*

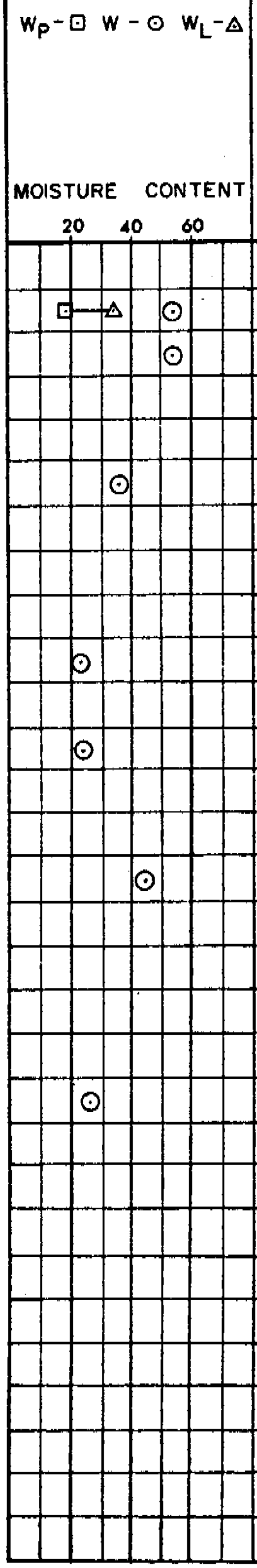
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. *U24*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 27, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *14:10*
FINISH *14:30*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	CL	*CLAY* very silty, trace sand, low plastic, brown	*V* *40%*		*W1*	☒			
5	*SM*	*SAND* fine grained, silty, brown to grey	*V* *5%*		*W2*	☒			
10 15	*SP*	*SAND* fine grained, trace silt, brown	*V* *10%*		*W3* *W4* *W5* *W6*	☒ ☒ ☒ ☒			
20		*ICE*	*ICE*						
25	*SM*	*ICE AND SAND* fine grained, silty	*ICE+*						
30		*Bottom of Hole at 27.0'.*							

PLATE *G-23*

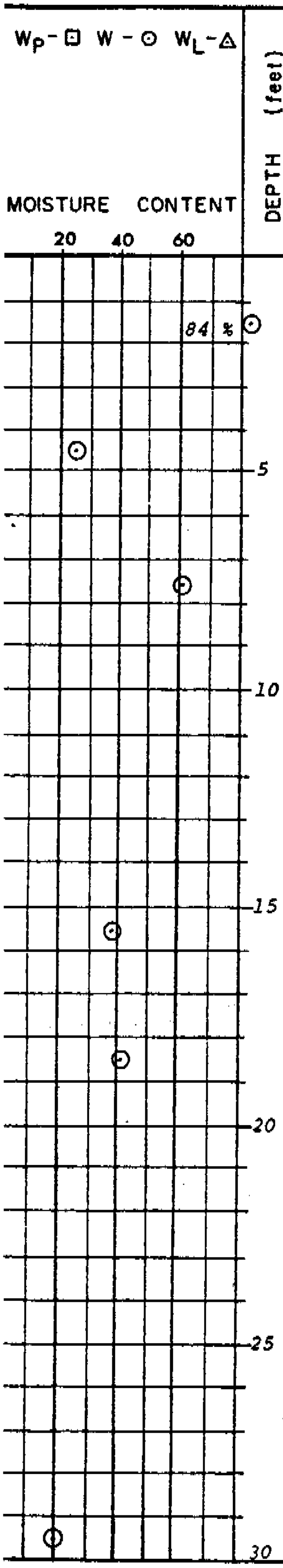
TEST HOLE LOG

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. U25

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 27, 1976
RIG Heli Drill	METHOD AIR	START 14:45	FINISH 15:05
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
GW	*FILL* gravel, very sandy	Nf						
ML	*SILT* sandy, clayey, low plastic, brown, root fibres	Vr 40%		W1	☒			
	ICE	ICE						
SM	*SAND* fine grained, silty, brown	Nbe		W2 W3	☒ ☒			
	ICE	ICE						
SM	*SAND* fine grained, silty	Nbe		W4	☒			
	very gravelly, fine sandy, fine to coarse grained, trace silt	V 25%	Grain Size Plate G-35	W5	☒			
	ICE	ICE						
SP	*SAND* medium to coarse grained, gravelly	V 15%		W6	☒			

PLATE G-24

TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *U25* *(con't)*

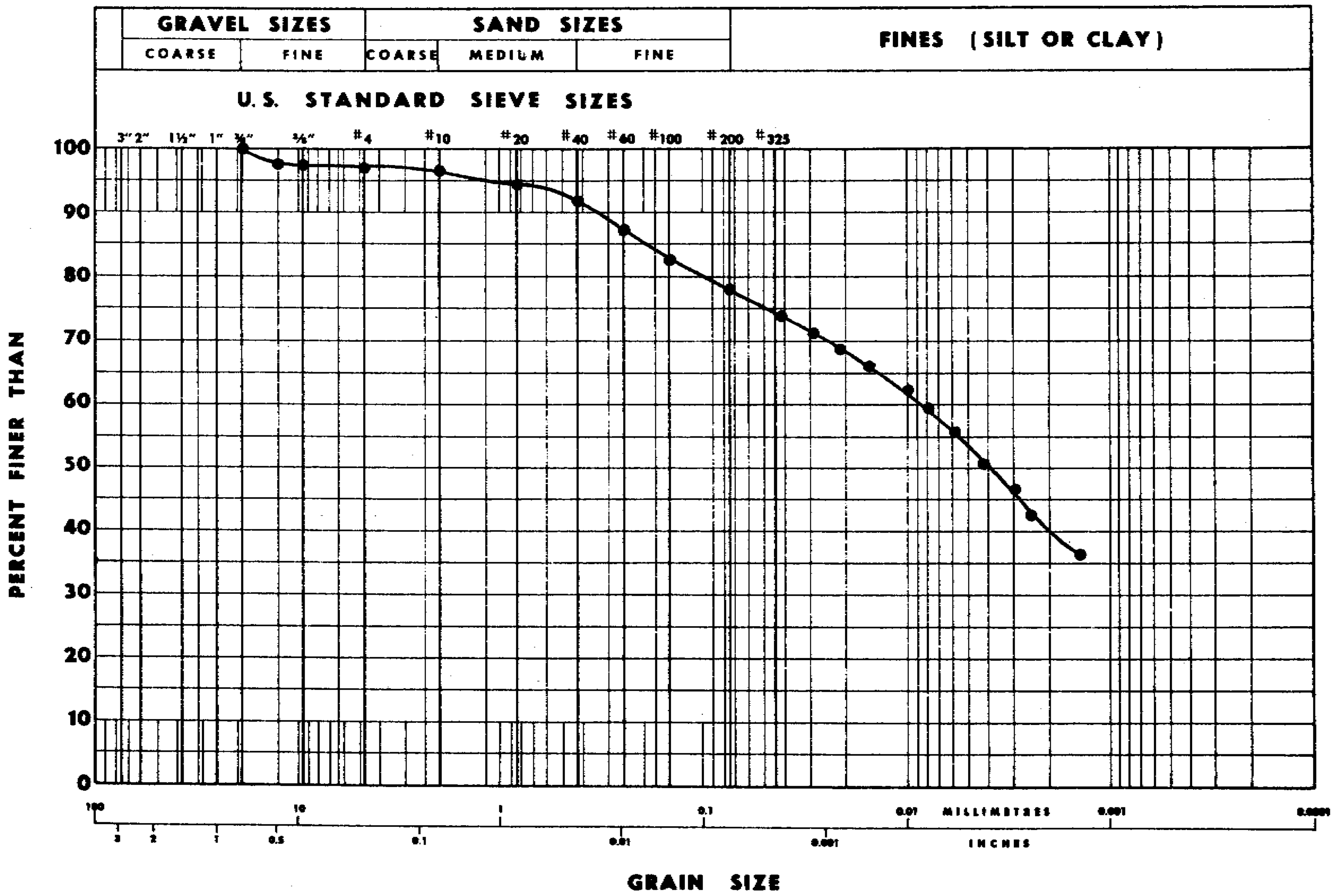
LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 27, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *14:45*
FINISH *15:05*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P-⊡ W-⊙ W_L-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	*SP*		*SAND* medium to coarse grained, gravelly (con't)		*V* *15%*						
		SM		*SAND* fine grained, silty		*Nbe*						
	35			*ICE*		*ICE*						
				Bottom of Hole at 36.0'.								
	40											

PLATE *G-24 (con't)*

APPENDIX "G"

SECTION G.6 PARTICLE SIZE ANALYSES



R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

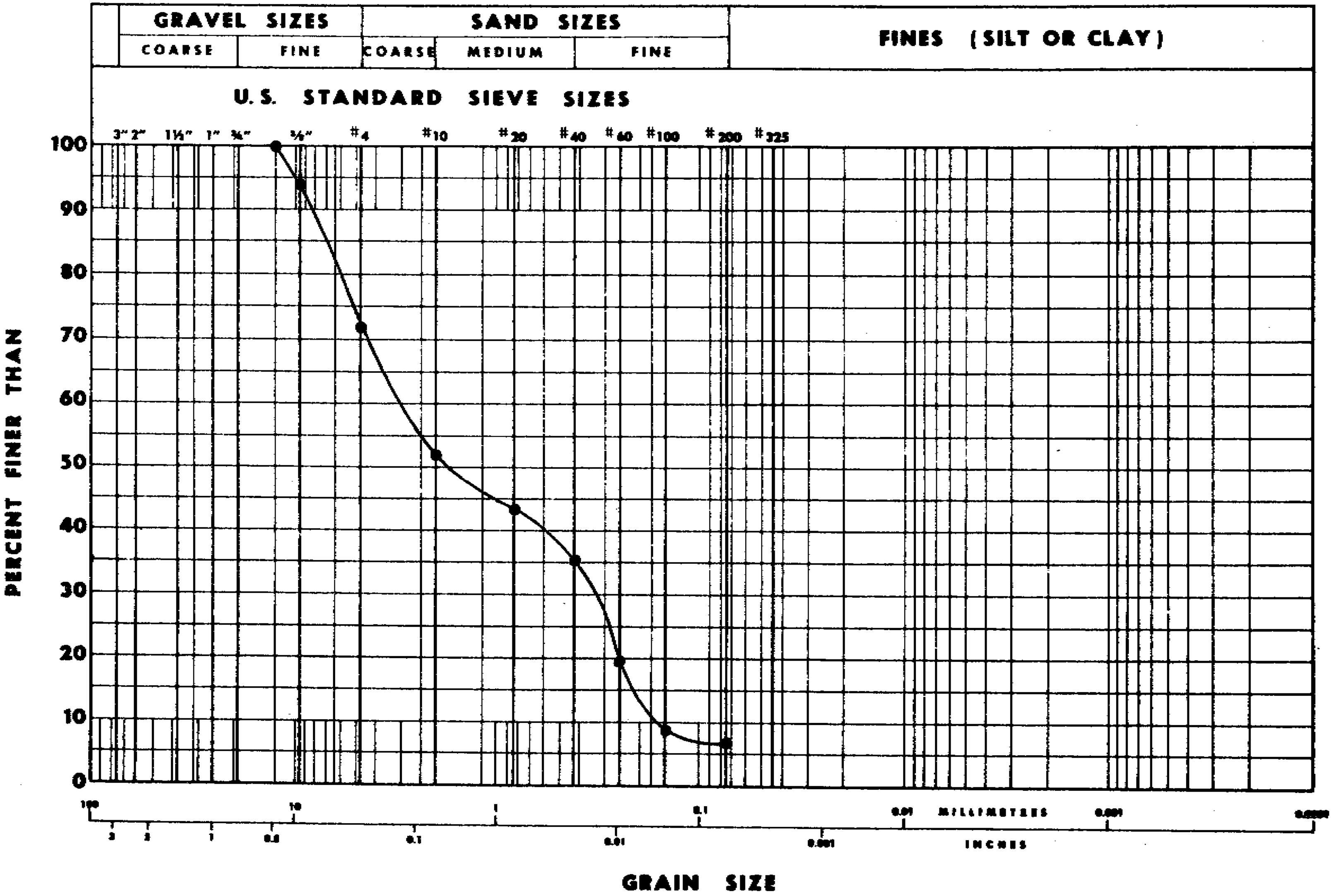
LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE U1 DEPTH 10-11' DATE REC'D.
TECHNICIAN CS DATE TESTED Apr/76

REMARKS: __________

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE G-25



REMARKS:

Larger sizes fractured with rock bit

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ______ mm.
D_{30} = ______ mm.
D_{60} = ______ mm.
C_U ______
C_C ______

PLATE G-26

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

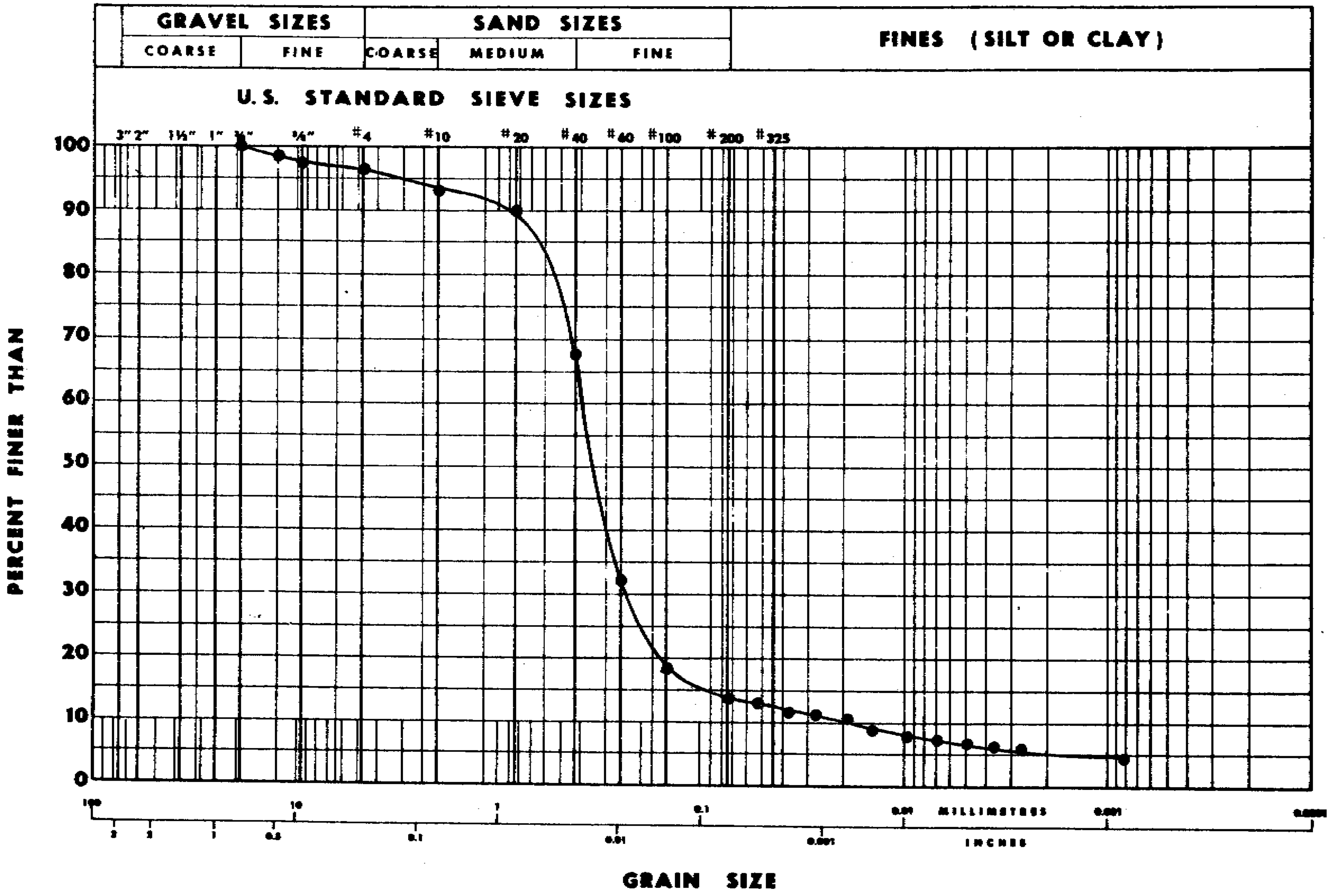
GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W6
SOURCE Parsons Lake Gas Plant
Hole U1 @ 16'-17'
TECHNICIAN
DATE TESTED May/76

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE WI
SOURCE Hole U2 @ 14-15'
TECHNICIAN CS
DATE TESTED Apr. 76

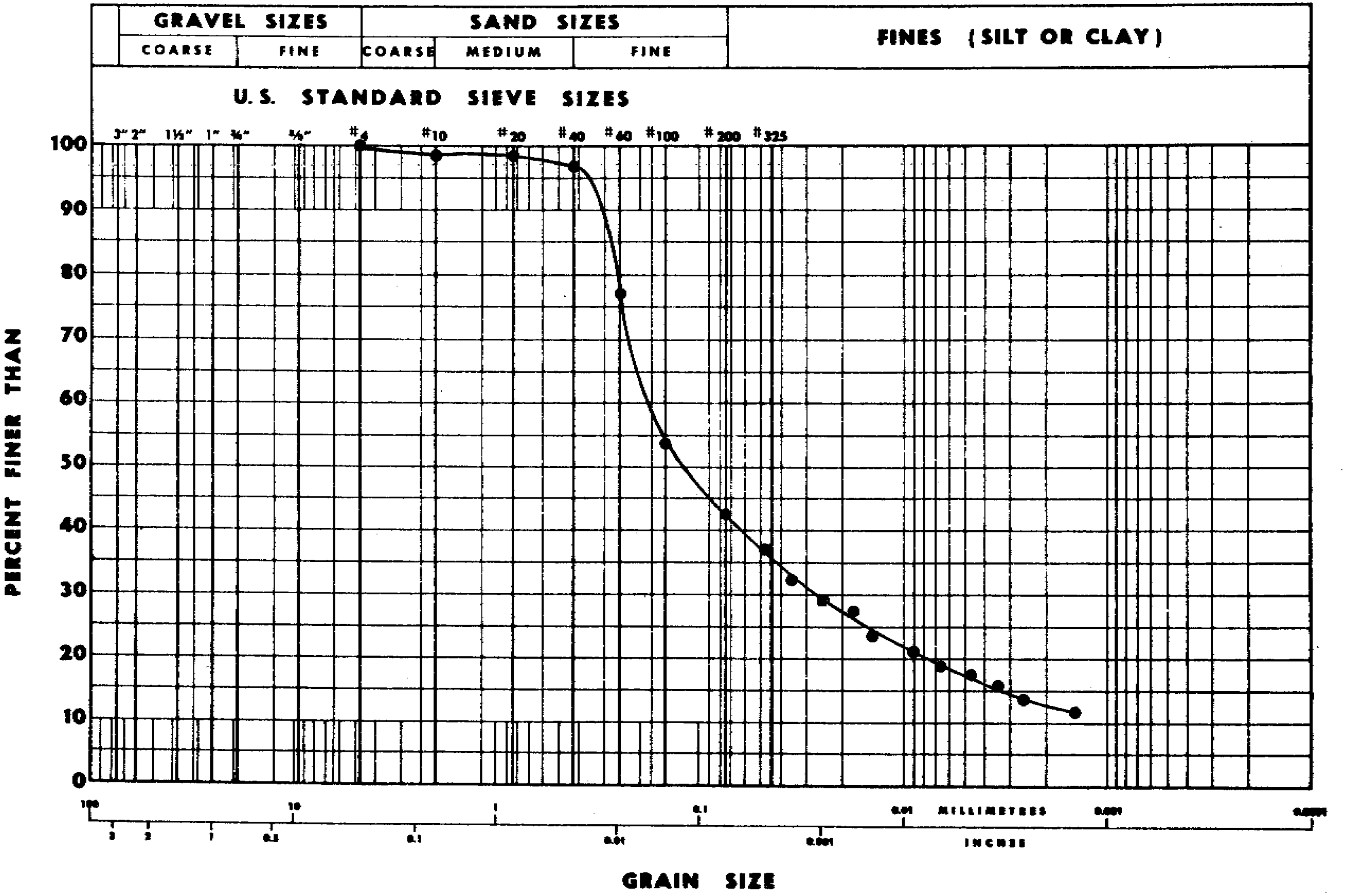


REMARKS: ____________________

D₁₀ = ______ MM.
D₃₀ = ______ MM.
D₆₀ = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE G-27



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS5343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parsons Lake Gas Plant
Hole U6 @ 7-8'
TECHNICIAN CS DATE TESTED Apr.76

REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

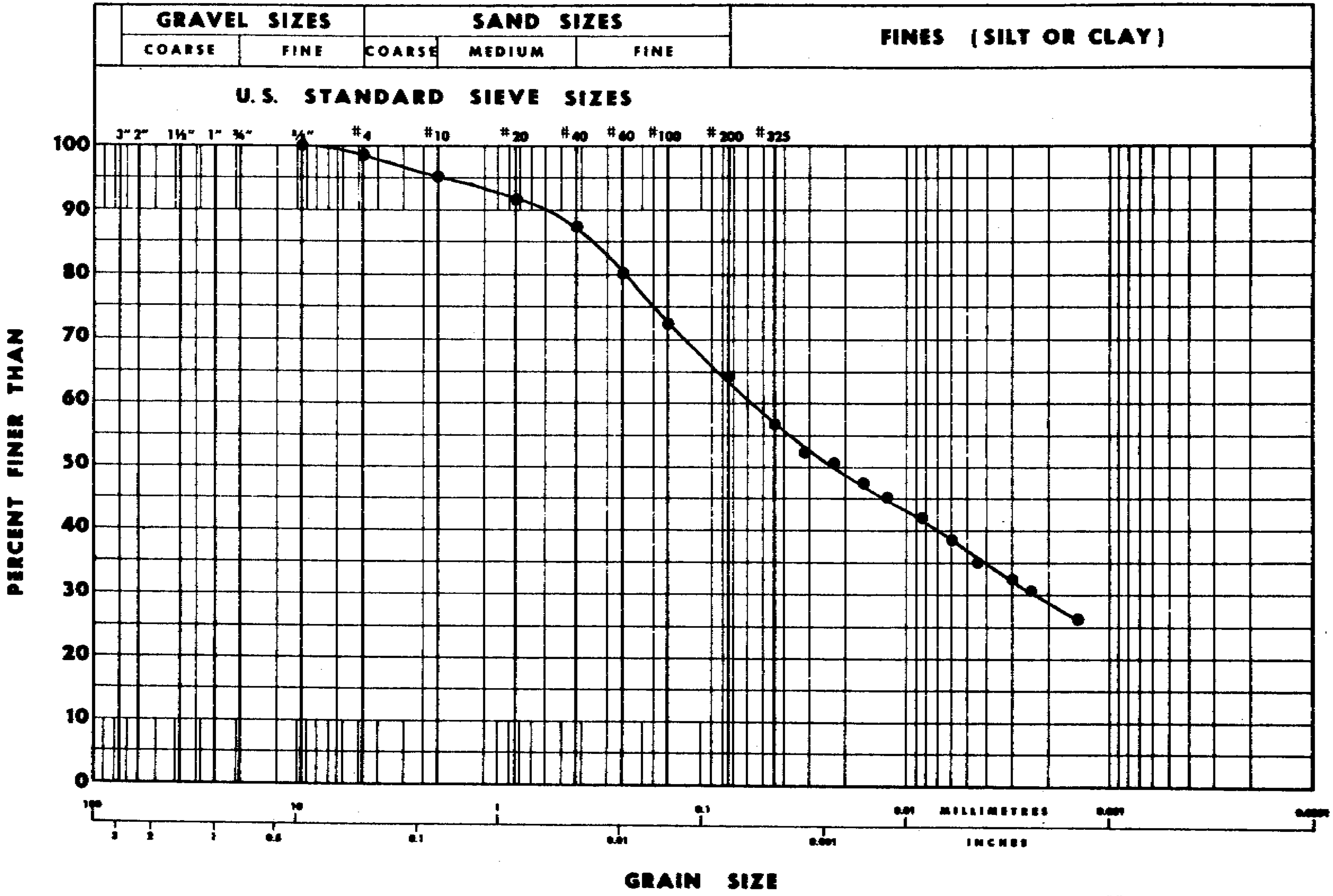
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE G-28

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L
SAMPLE W3
SOURCE Parsons Lake Gas Plant
Hole U8 @ 7-8'
TECHNICIAN CS
DATE TESTED Apr.76



REMARKS: ____________________

____

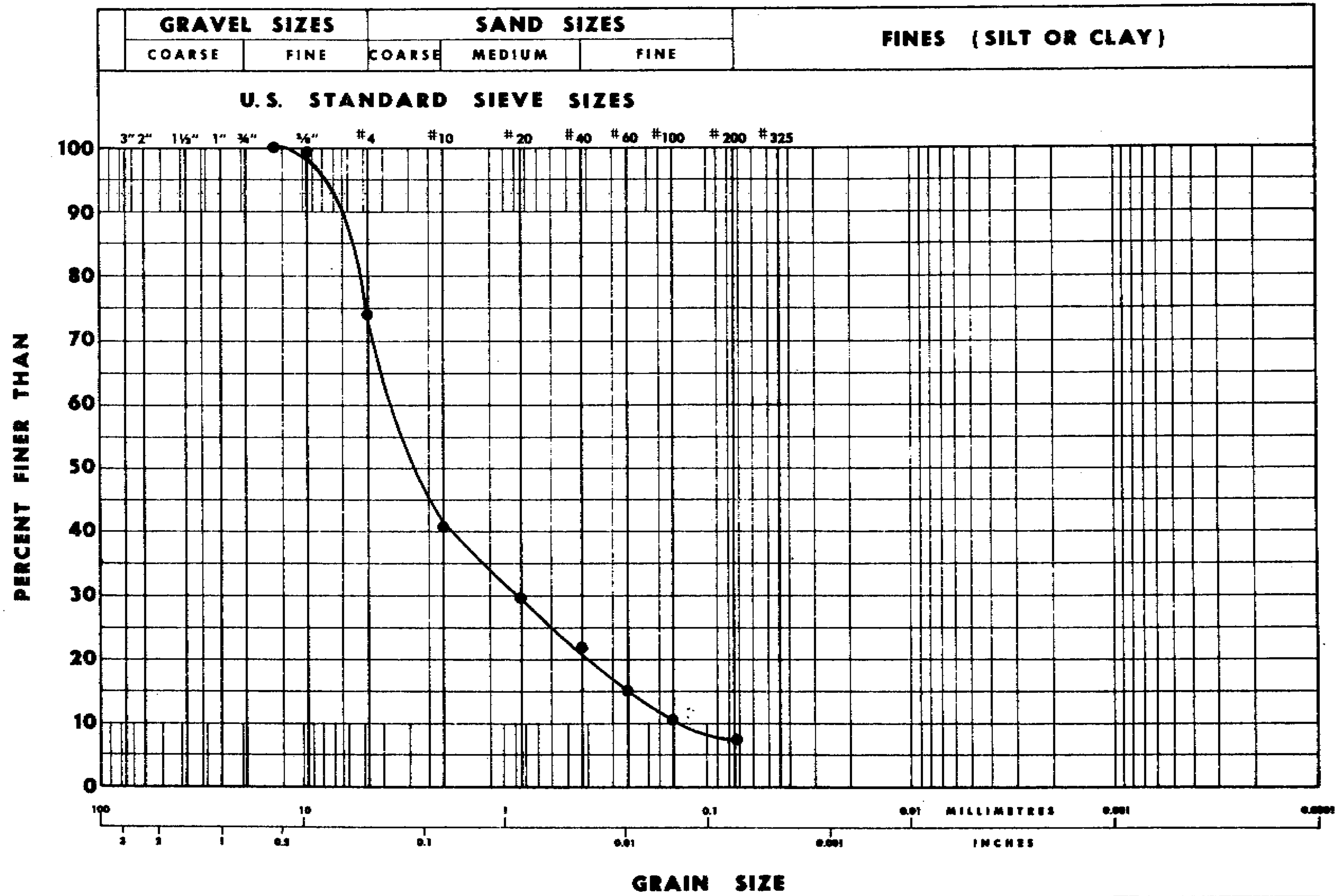
____

____

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

PLATE G-29



REMARKS:

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

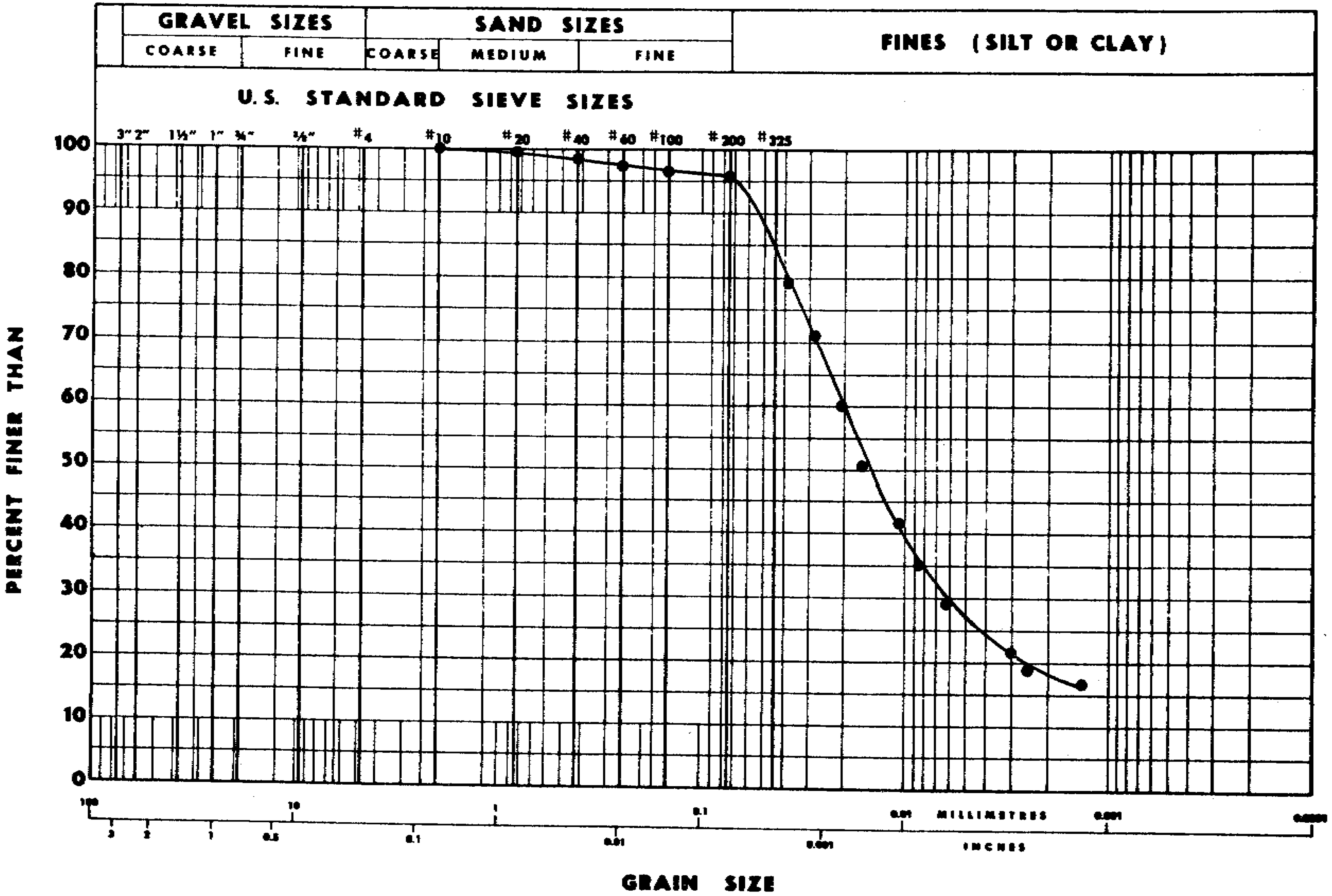
D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

PLATE G-30

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W5
SOURCE Parsons Lake Gas Plant
HOLE U8 DEPTH 15-16' DATE REC'D.
TECHNICIAN ML DATE TESTED Apr/76



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

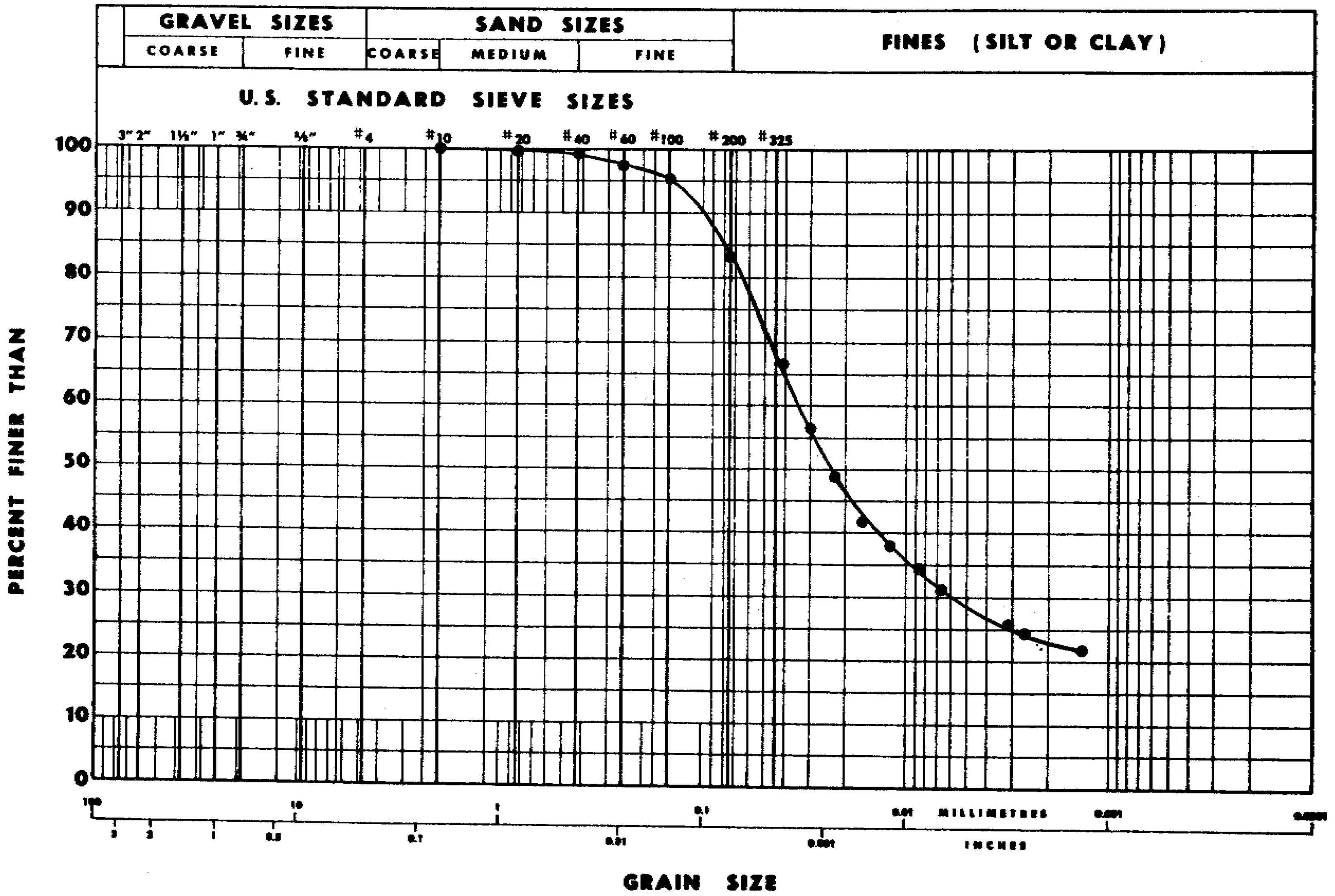
D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W2
SOURCE Parsons Lake Gas Plant
Hole No. III1 @ 6-7'
TECHNICIAN CS
DATE TESTED Apr/76

PLATE G-31



R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W3
SOURCE Parsons Lake Gas Plant
Hole U13 @ 9-10'
TECHNICIAN CS
DATE TESTED May/76

REMARKS: ______

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

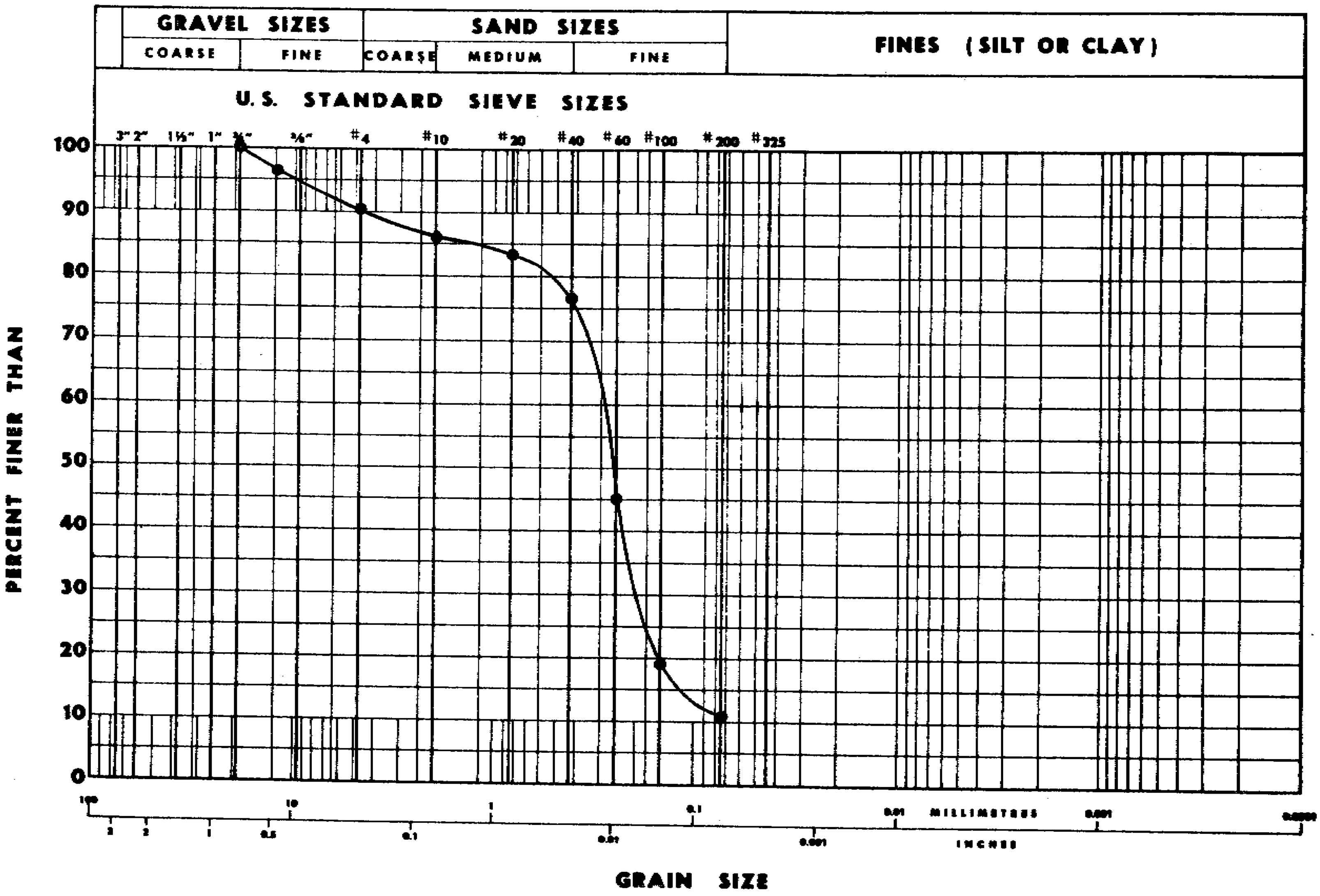
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE G-32

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W5
SOURCE Parsons Lake Gas Plant
Hole U18 @ 30-31'
TECHNICIAN CS **DATE TESTED** Apr./7



REMARKS: ______________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

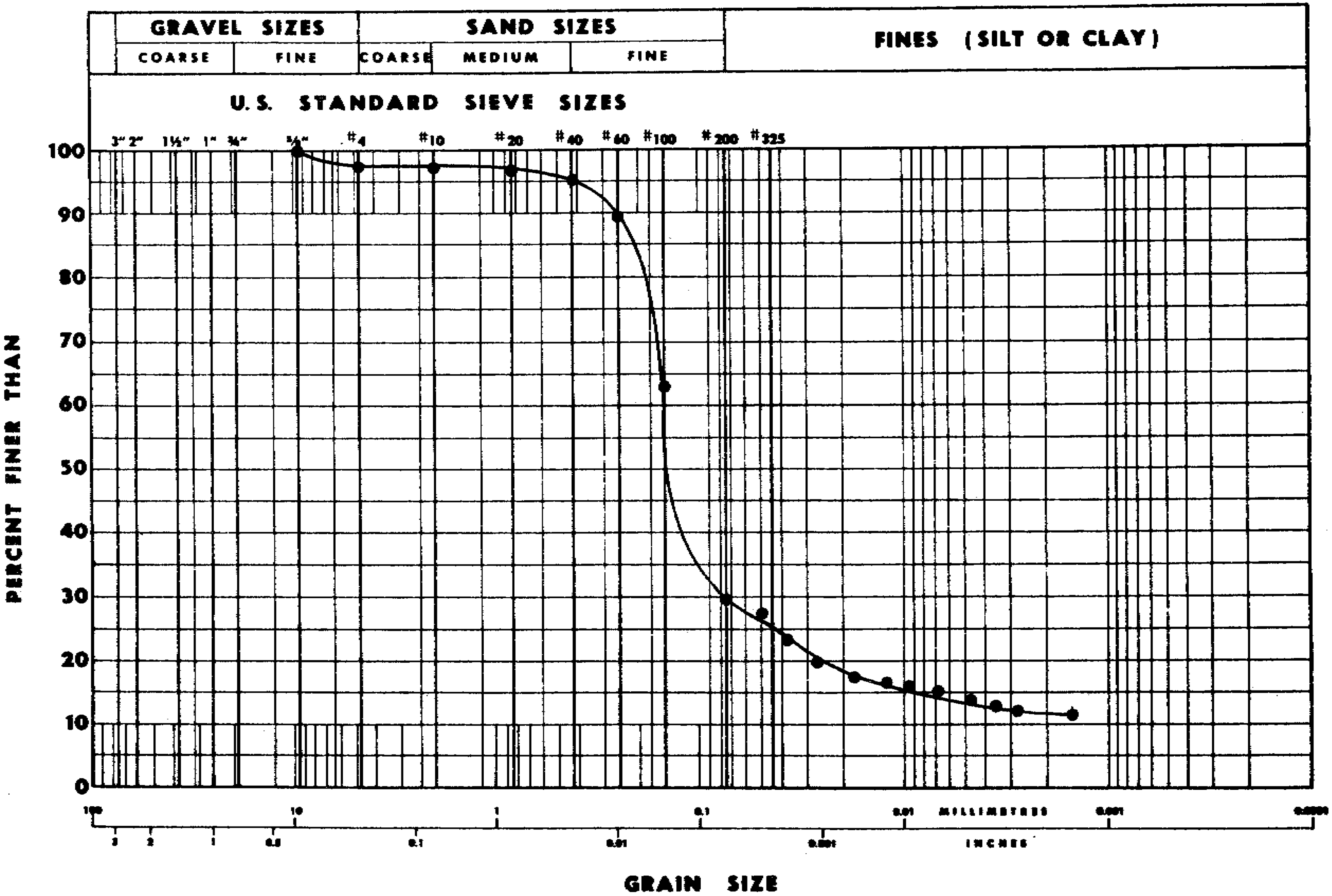
D_{10}= ________ MM.
D_{30}= ________ MM.
D_{60}= ________ MM.
C_U ________
C_C ________

PLATE G-33

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT G.O.C.L.
SAMPLE W6
SOURCE Parsons Lake Gas Plant Hole U21 @ 19-20'
TECHNICIAN CS
DATE TESTED Apr.76



REMARKS: ______

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

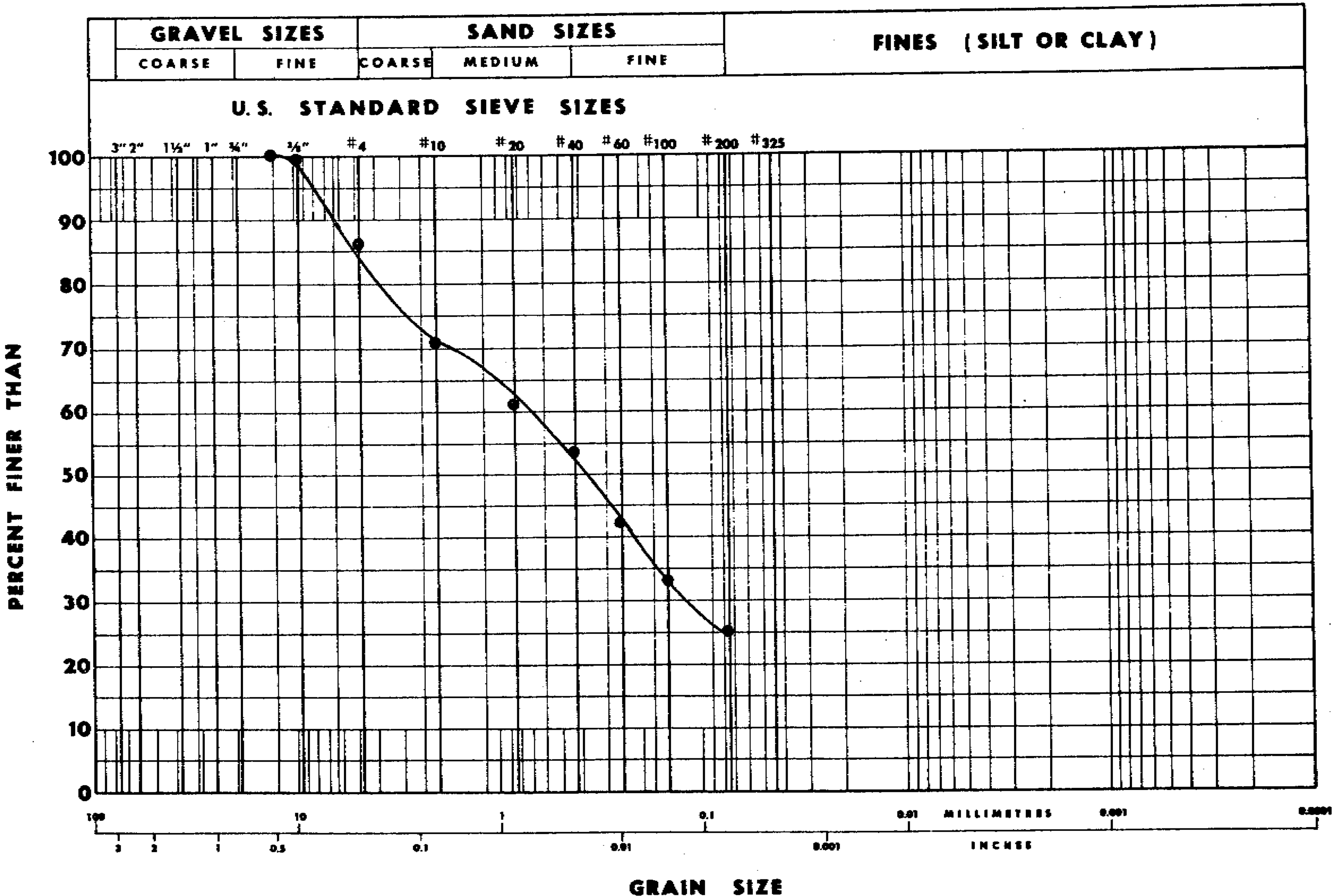
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE G-34

GRAIN SIZE CURVE

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

LAB ORDER NO. CS3343
CLIENT G.O.C.I.
SAMPLE W5
SOURCE Parsons Lake Gas Plant
HOLE U25 **DEPTH** 18-19 **DATE REC'D.**
TECHNICIAN ML **DATE TESTED** May/76



REMARKS: ____________________

D_{10} =	______ MM.
D_{30} =	______ MM.
D_{60} =	______ MM.
C_u	______
C_c	______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE G-35

APPENDIX "G"

SECTION G.7 SUMMARY OF LABORATORY TESTING

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
U1	9-10	W4	CI	CLAY very silty,sandy,medium plastic	42	17	25	22	38	40				
U2	16-17	W6	SP GP	SAND very gravelly to 1" Ø (larger sizes fractured with rock bit				93	7					Gravel 28% Sand 65% Silt 7%
U2	5.3-5.8	C4	CI	CLAY silty,trace sand,low to medium plastic							101	70	44	frozen core
U2	8.3-8.7	C5	CI	CLAY silty,trace sand,low to medium plastic	40	19	21				100	63	59	frozen core
U2	14-15	W1	SM	SAND fine to coarse grained, trace silt,trace clay				86	9	5				
U4	14.5 15.5	W5	GC	GRAVEL fine to coarse,sandy,med. to coarse grained, medium plastic,clay matrix	42	20	22							
U6	5-6.5	C1	CL	CLAY sandy,silty,trace fine gravel, low plastic							116	95	22	frozen core
U6	7-8	W3	SM	SAND fine grained,very silty, clayey				57	30	13				
U8	4-5	W2	OH	ORGANIC SILT sandy,fine grained,occ. fine gravel size,brown	52	46	6							
U8	7-8	W3	CL	CLAY very silty,dry,very sandy fine grained,low plastic				36	36	28				
U8	15-16	W5	GW SW	GRAVEL fine to coarse,frequent cobbles,very sandy,trace fines				92	8					Gravel 26% Sand 66% Silt 8%
U9	11-12	W4	ML CL	SILT clayey,trace sand,occ. gravel size, low plastic	23	16	7							
U11	6-7	W2	ML-CL	SILT clayey,trace sand,low plastic,layered	27	20	7	4	78	18				
U11	9.6 10	C8	ML-CL	SILT clayey,gravel sizes to 2" Ø, grey-brown							115	74	55	frozen core
U13	9-10	W3	CL	SAND layered,very silty,sandy low plastic,grey	25	16	9	17	60	23				

Plate G-36

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

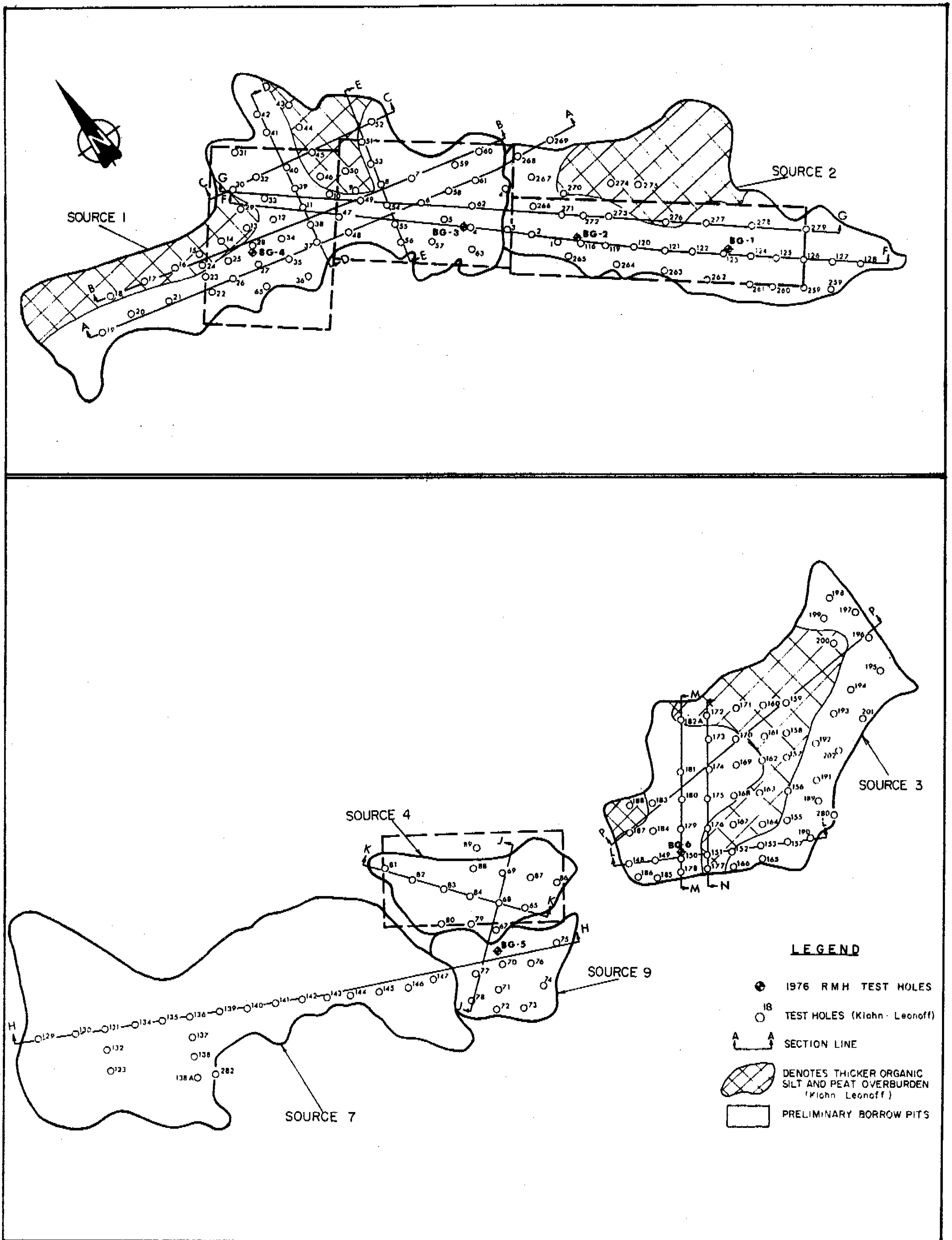
PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
U16	21-22	W5	CL	CLAY very silty,trace sand, low plastic,brown	29	14	15							
U18	19-20	W4	CI	CLAY silty,trace sand,medium plastic,grey	33	18	15							
U18	30-31	W5	SM-SP	SAND fine to coarse grained, silty,trace gravel				88	12					
U21	19-20	W6	SM	SAND fine grained,silty, clayey				70	18	12				
U24	1-2	W1	CL	CLAY very silty,trace sand, low plastic,brown	34	18	16							
U25	18-19	W5	SP	SAND fine to coarse grained, silty,gravelly				75	25					Gravel 17% Sand 58% Silt 25%

APPENDIX “H”

BORROW SOURCE AREAS

SECTION H.1 -CROSS SECTIONS



SCALE
DATE MAY 1976
MADE DS
CHKD. YK
APPD. RT

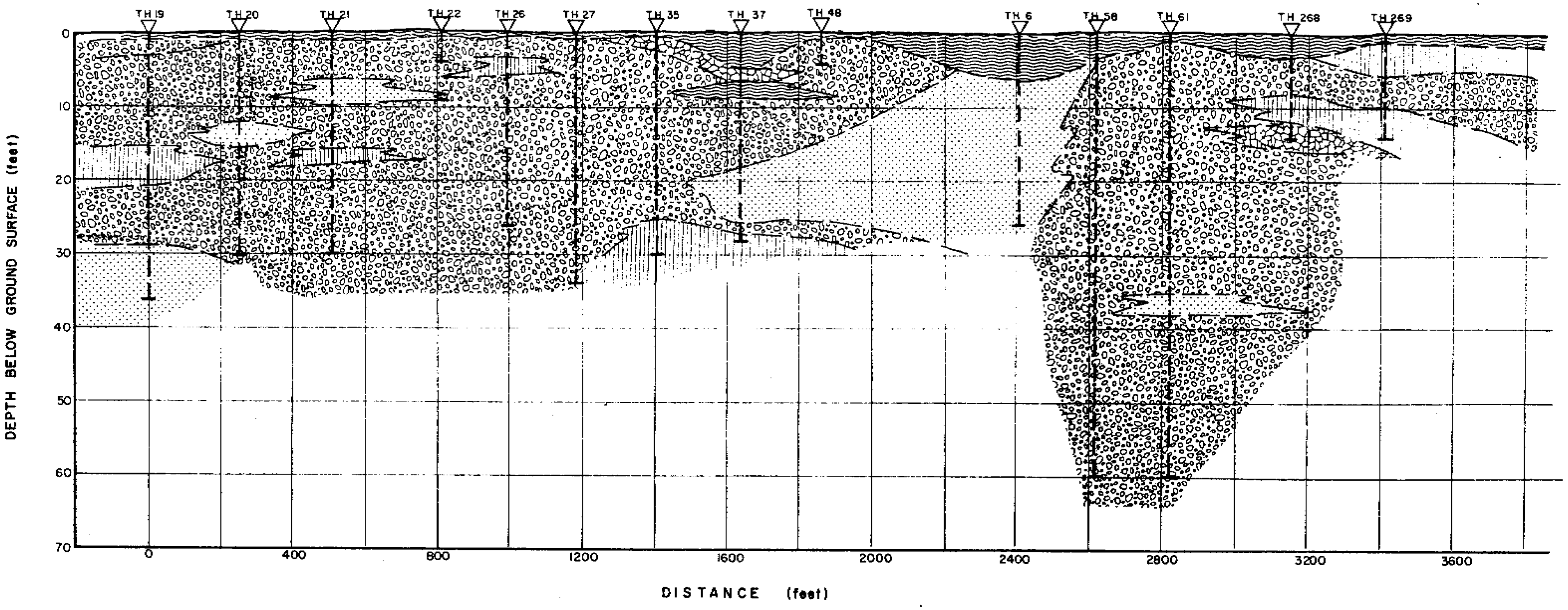
R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

BORROW SOURCE SECTION PLAN

No. CS 3343

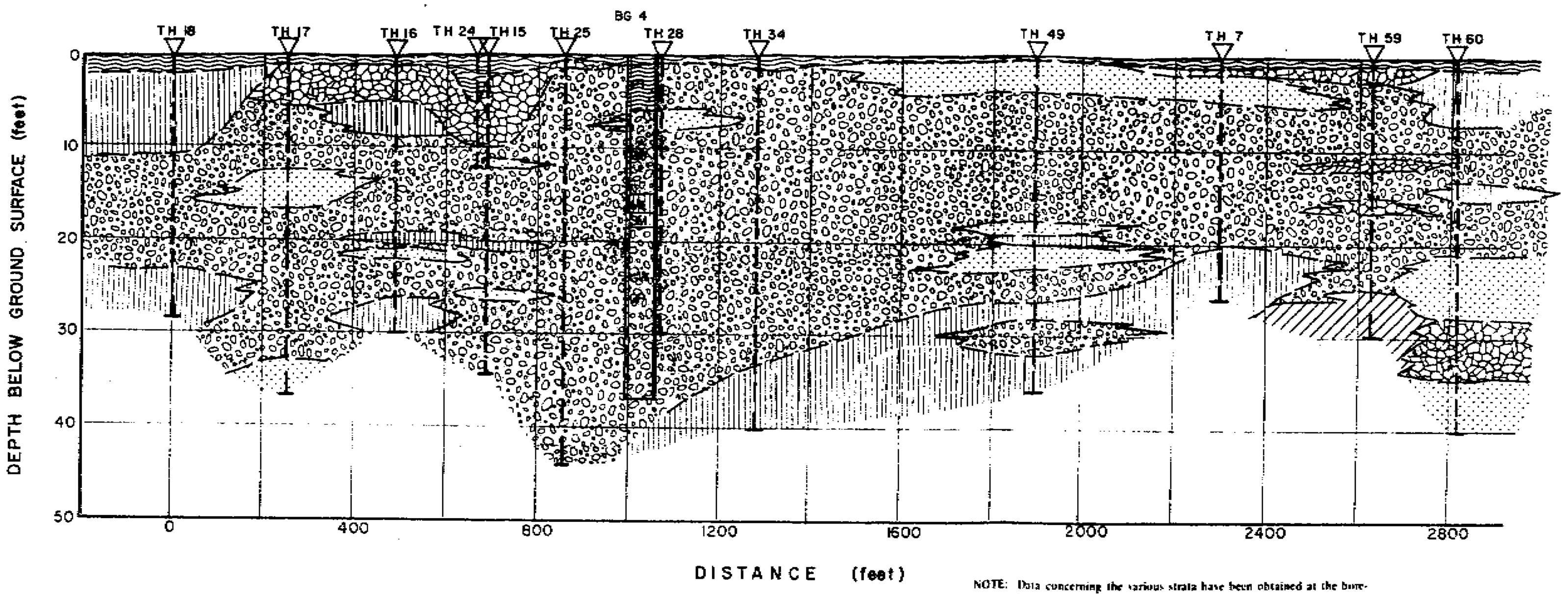
PLATE H-1

SECTION A — A



- ▤ PEAT
- ▥ SILT
- ░ SAND
- ▦ ICE
- ▨ CLAY
- ▩ GRAVEL

SECTION B — B



NOTE: Data concerning the various strata have been obtained at the borehole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown.

No	REVISION	DATE	BY

GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

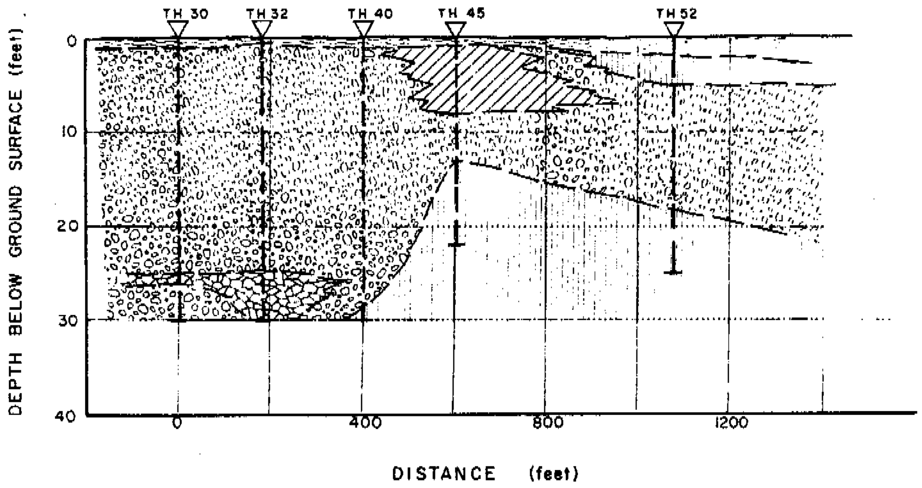
REFERENCES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

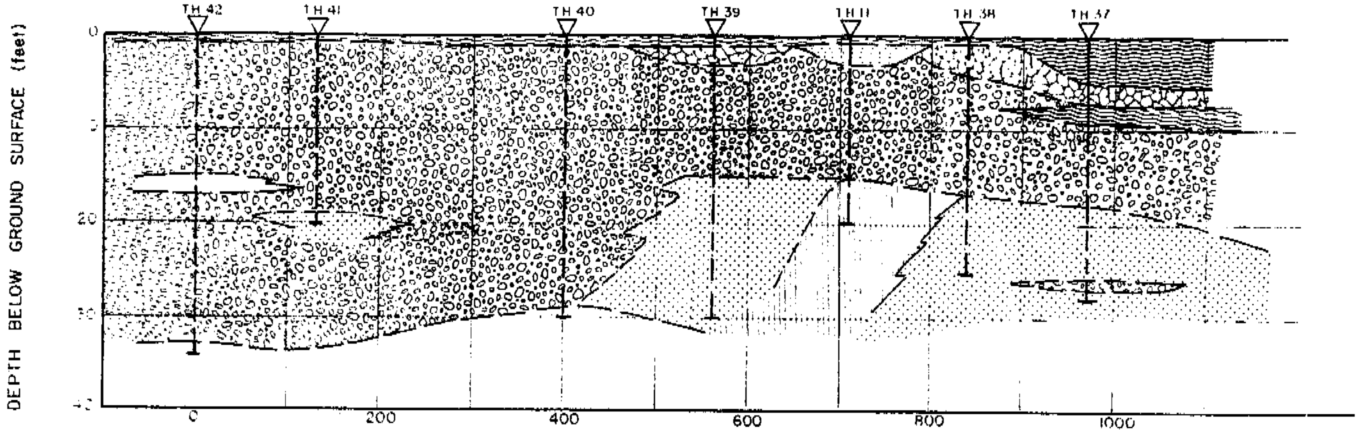
PARSONS LAKE GAS PLANT
BORROW SOURCE — 1 & 2

SCALE	DATE	MADE	CHKD	APPD	
No.					PLATE H2

SECTION C — C



SECTION D — D



NOTE Data concerning the various strata have been obtained at the borehole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown

Reference: GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

LEGEND

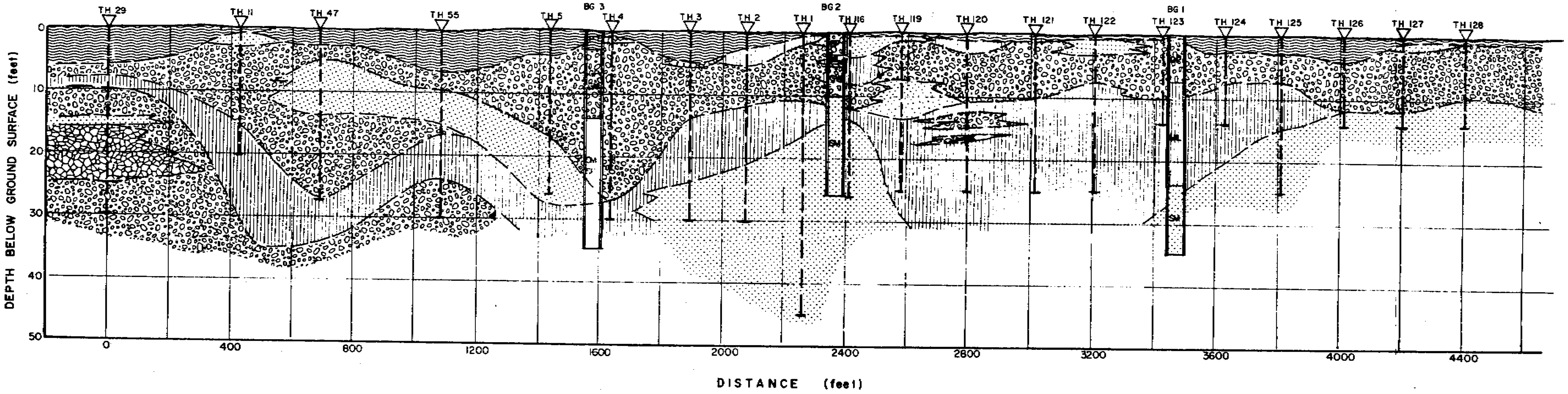
▤	Peat	▨	Ice
☐	Silt	▦	Gravel
░	Sand		

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

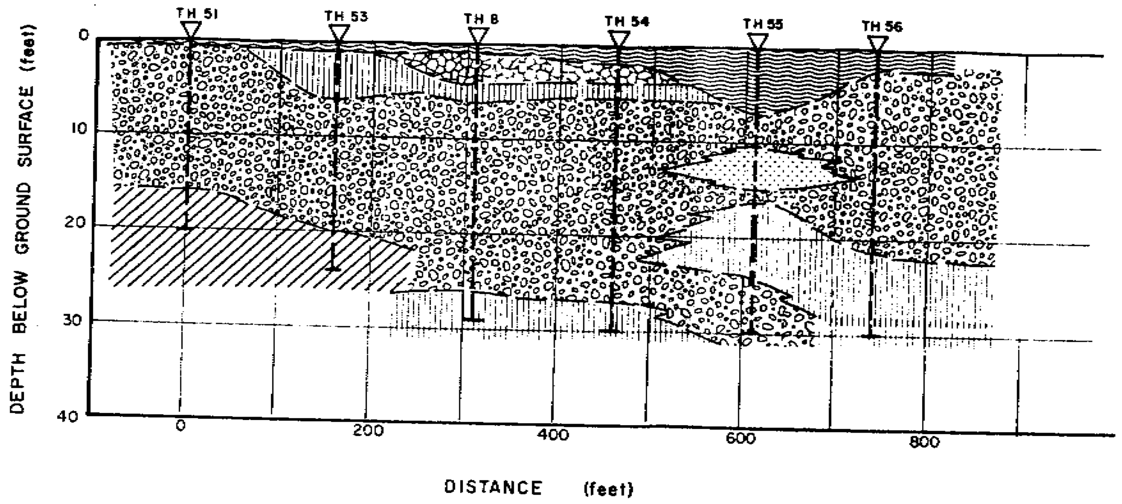
PARSONS LAKE GAS PLANT
BORROW SOURCE—I

PLATE H3

SECTION F — F



SECTION E — E



▤ PEAT

▥ SILT

░ SAND

▦ ICE

▨ CLAY

▩ GRAVEL

NOTE: Data concerning the various strata have been obtained at the borehole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown.

No. REVISION DATE BY

GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

REFERENCES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

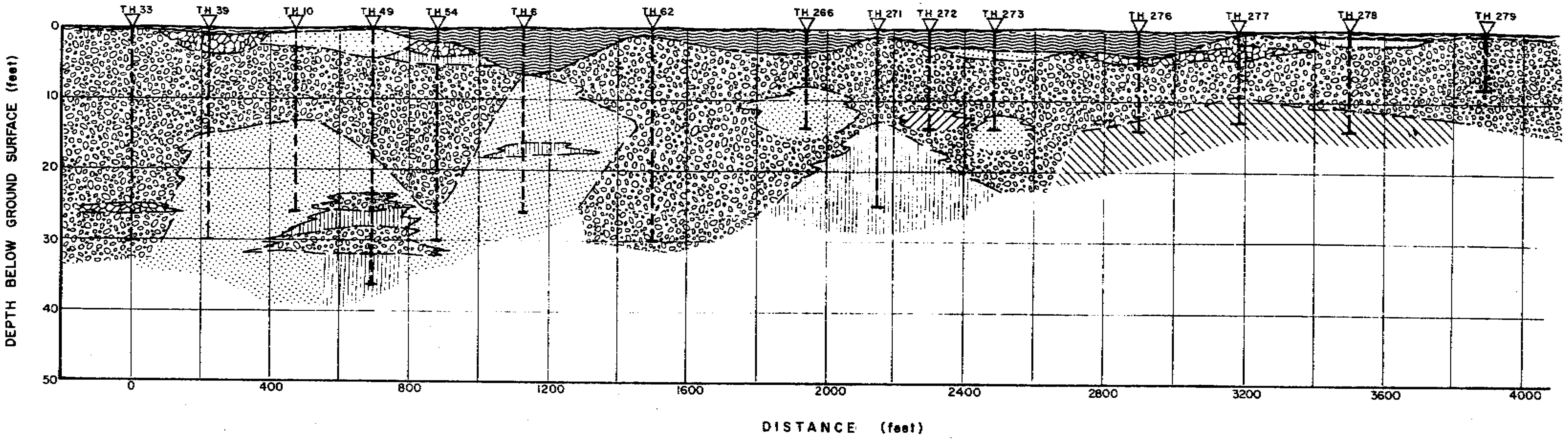
PARSONS LAKE GAS PLANT
BORROW SOURCE—1&2

SCALE DATE MADE CHKD APPD

No.

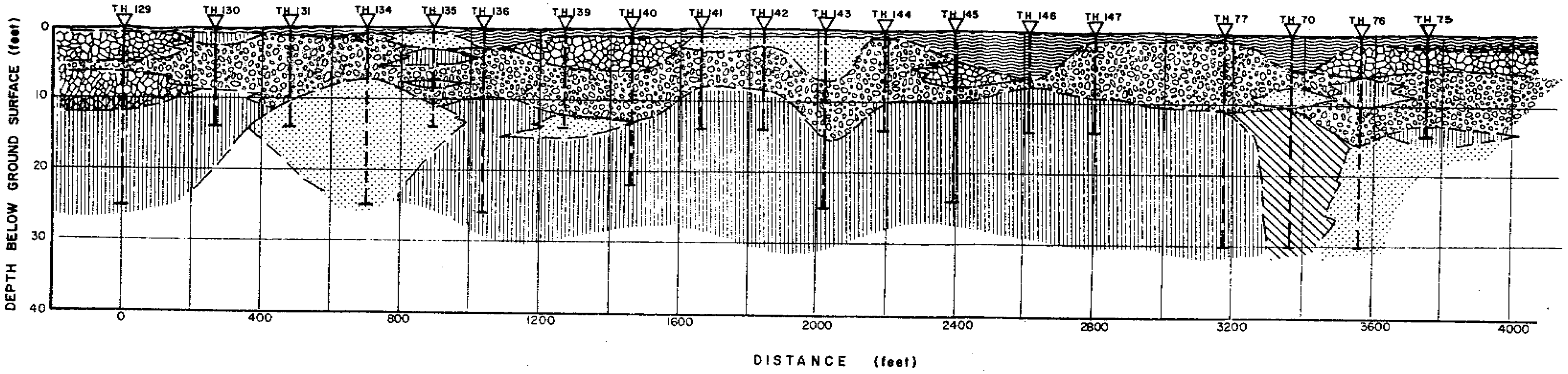
PLATE
H4

SECTION G — G



- ▤ PEAT
- ▥ SILT
- ░ SAND
- ▦ ICE
- ▨ CLAY
- ▩ GRAVEL

SECTION H — H



NOTE: Data concerning the various strata have been obtained at the borehole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown.

No.	REVISION	DATE	BY

GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

REFERENCES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

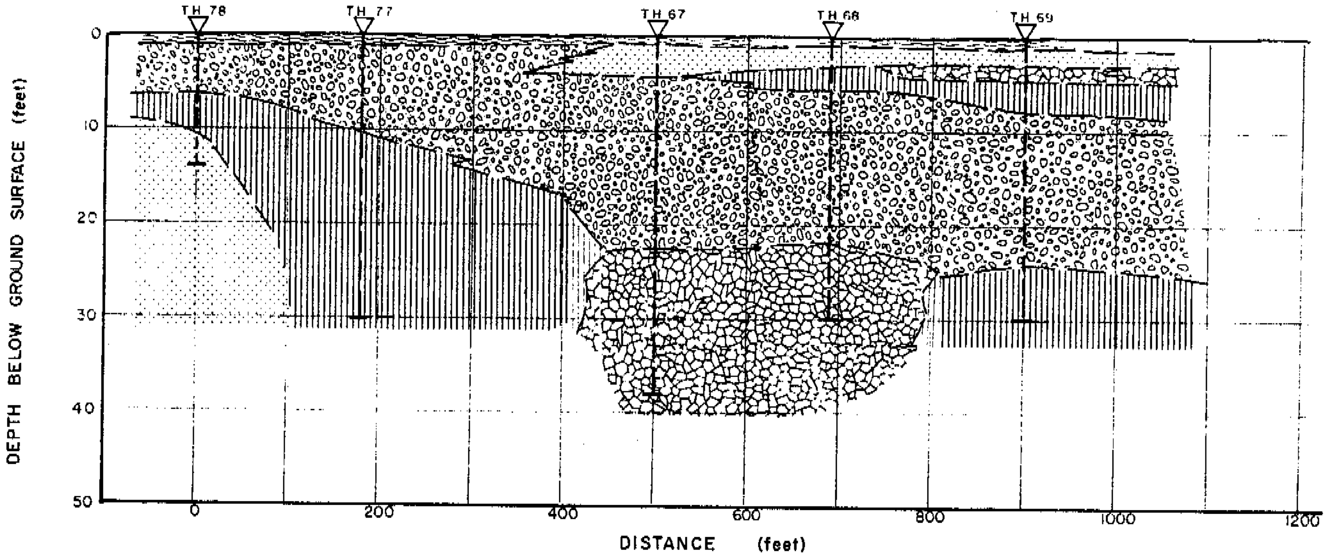
PARSONS LAKE GAS PLANT
BORROW SOURCE — 1& 2-7&9

SCALE DATE MADE CHKD APPD

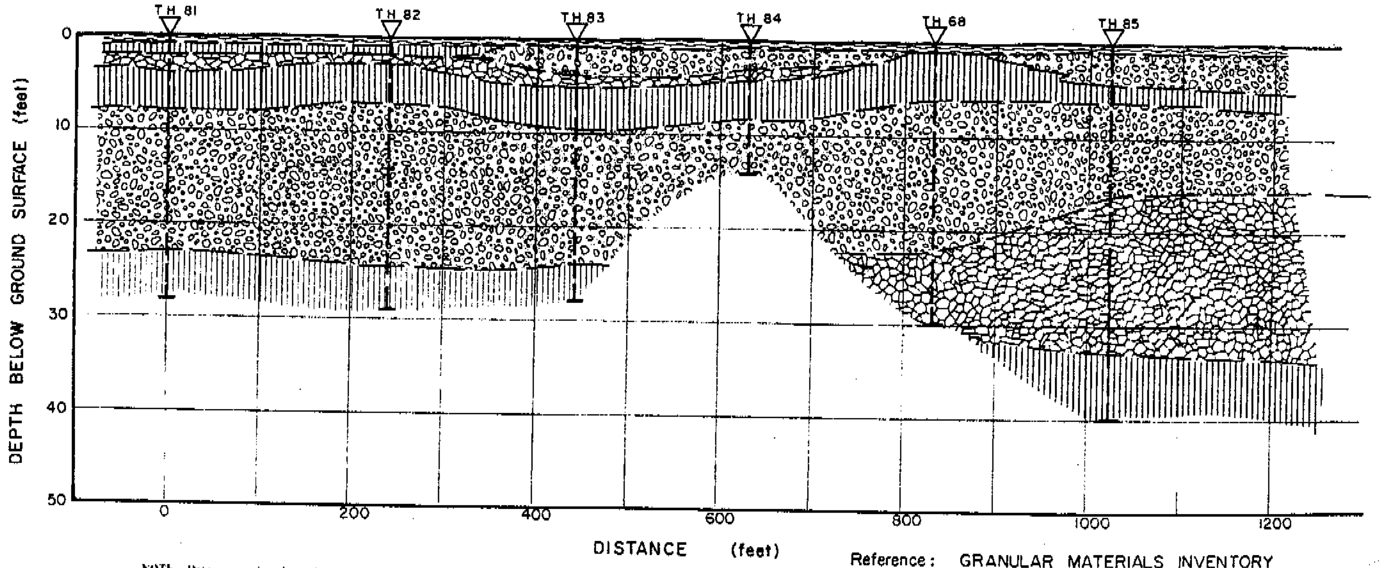
No.

PLATE
H5

SECTION J — J



SECTION K — K



NOTE Data concerning the various strata have been obtained at the borehole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown.

Reference: GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

LEGEND

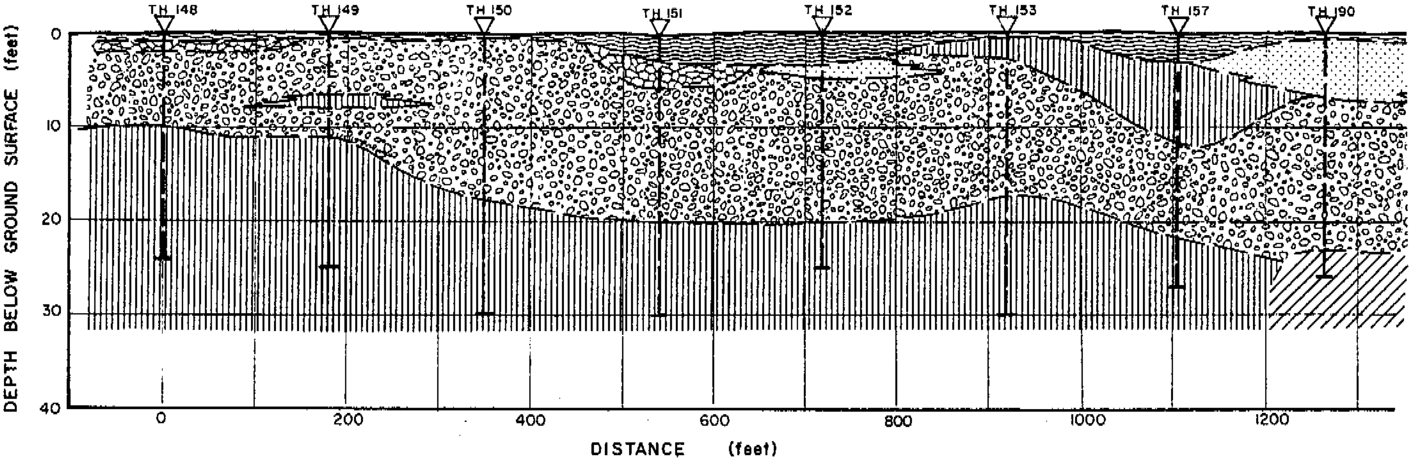
▤	Peat	▨	Ice
▥	Silt	░	Gravel
⠿	Sand		

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

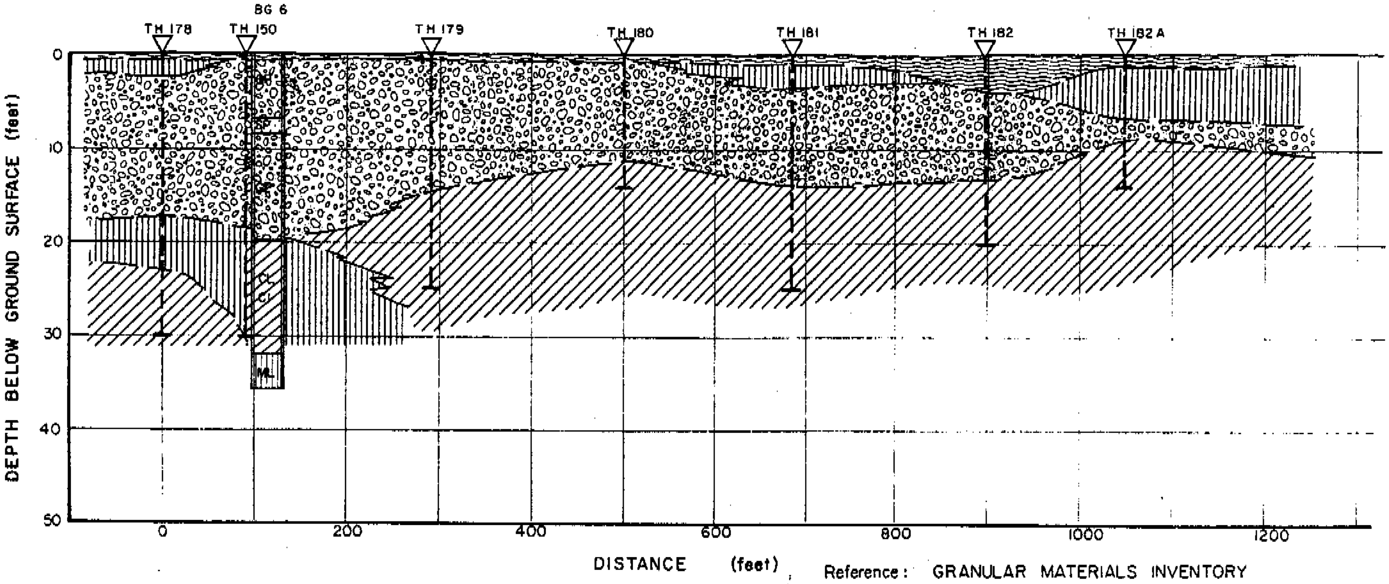
PARSONS LAKE GAS PLANT
BORROW SOURCE—489

PLATE H6

SECTION L — L



SECTION M — M



NOTE Data concerning the various strata have been obtained at the borehole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown.

Reference: GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

LEGEND

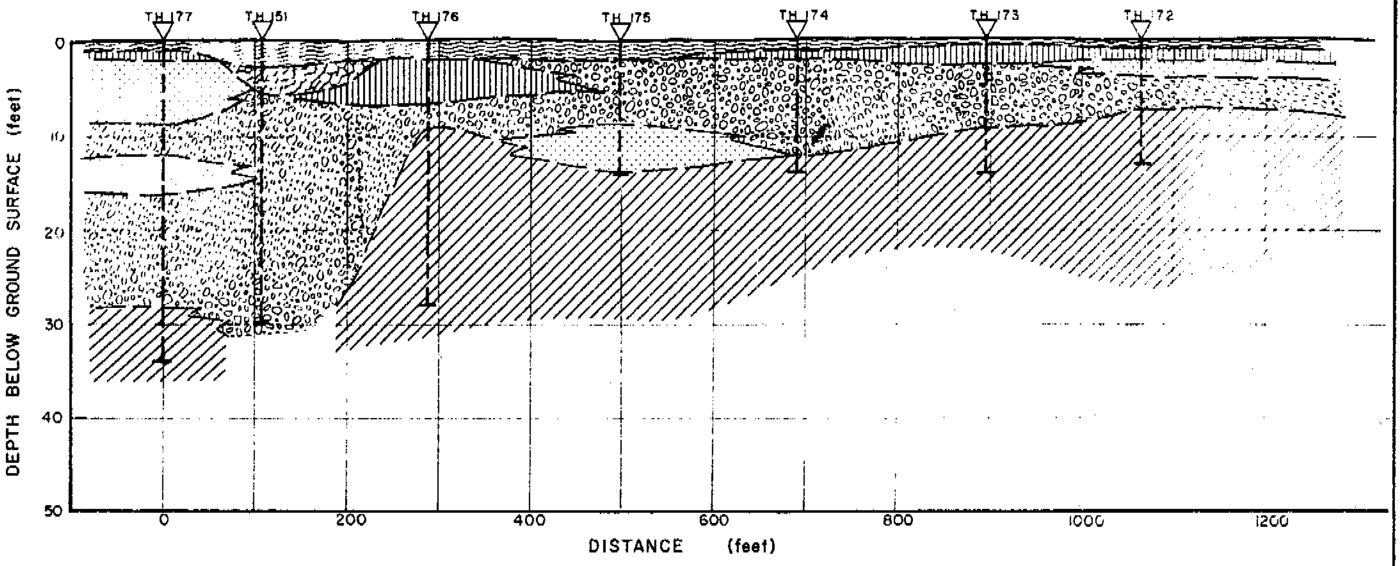
▤	Peat	▨	Ice
▥	Silt	▨	Clay
░	Sand	▨	Gravel

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

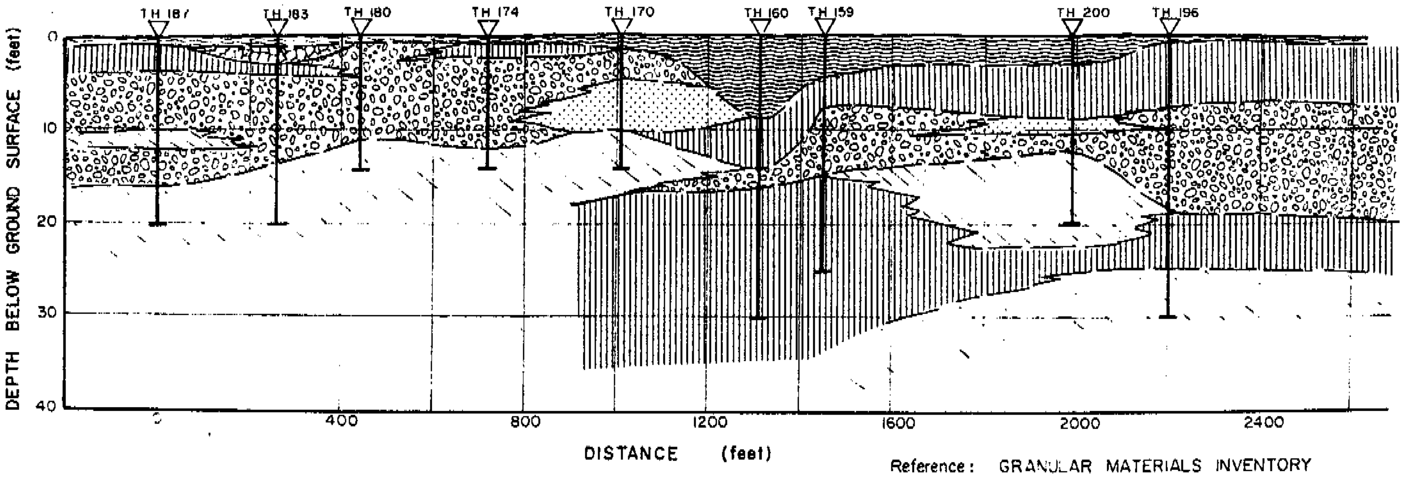
PARSONS LAKE GAS PLANT
BORROW SOURCE—3

PLATE H7

SECTION N — N



SECTION P — P



NOTE Data concerning the various strata have been obtained at the bore hole locations only. The soil stratigraphy between boreholes has been inferred from geological evidence and so may vary from that shown.

Reference: GRANULAR MATERIALS INVENTORY
Parsons Lake
Klohn Leonoff Consultants, Ltd.
October, 1974

LEGEND

▨	Peat	▨	Ice
▨	Silt	▨	Clay
▨	Sand	▨	Gravel

R.M.HARDY & ASSOCIATES LTD.
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PARSONS LAKE GAS PLANT
BORROW SOURCE — 3

PLATE H8

APPENDIX "H"

SECTION H.2 TEST HOLE LOGS

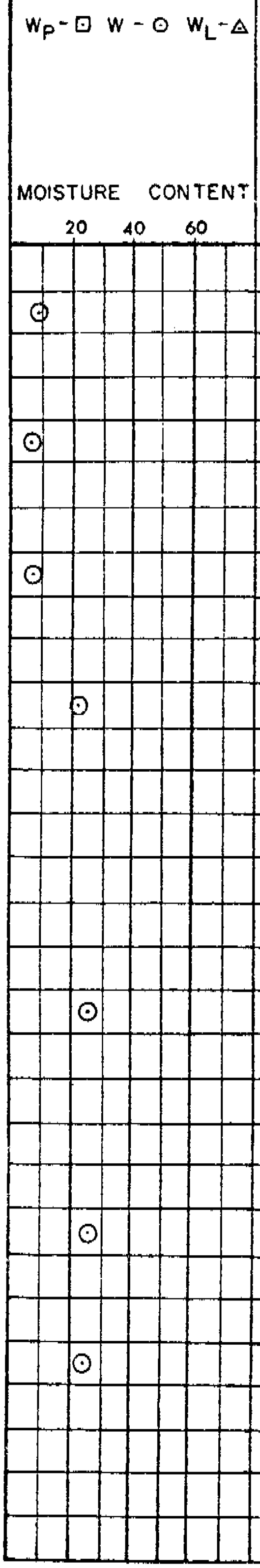
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. BG1

LOGGED BY *TKM*	DRAWN BY	CHECKED *RST*	DATE *March 18, 1976*
RIG *Heli Drill*	METHOD *AIR*	START *9:50*	FINISH *11:05*
PROJECT NO. *CS 3343*	ELEVATION	AIR TEMPERATURE	



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT*	Vc						
	GP	*GRAVEL fine, to 1/2"ø, sandy, coarse to medium grained, trace silt, brown*	<5%	Grain Size Plate H-15	W1	☒			
		--- sandy							
		--- coarser gravel sizes to 1 1/2" ø			W2	☒			
5									
		--- coarser gravel to 2 1/2" - 3" ø, finer sand sizes			W3	☒			
	ML	*SILT trace fine sand and fine gravel, non plastic, brown to grey*	Nbn						
10					W4	☒			
					W5	☒			
15									
		--- sandy, fine grained, occasional gravel sizes to 3/8"ø, non plastic, grey to brown			W6	☒			
20									
		--- trace fine sand, grey			W7	☒			
	SM	*SAND fine grained, silty, non plastic, brown to grey*	V 15%						
25					W8	☒			
30									

PLATE H-9

TEST HOLE LOG

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

PROJECT
PARSONS LAKE GAS PLANT

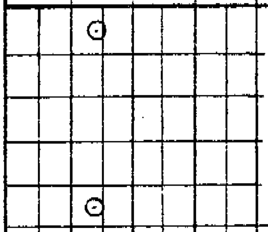
TEST HOLE NO. *BG1 (con't)*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 18, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *9:50*
FINISH *11:05*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

W_P - ⊡ W - ⊙ W_L - △

MOISTURE CONTENT

20 40 60



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	*SM*		*SAND fine grained, silty, non plastic, brown to grey (con't)*		*V* *15%*		*W9*	☒			
			--- grey								
							W10	☒			
35											
			Bottom of Hole at 35.0'.								

PLATE *H-9 (con't)*

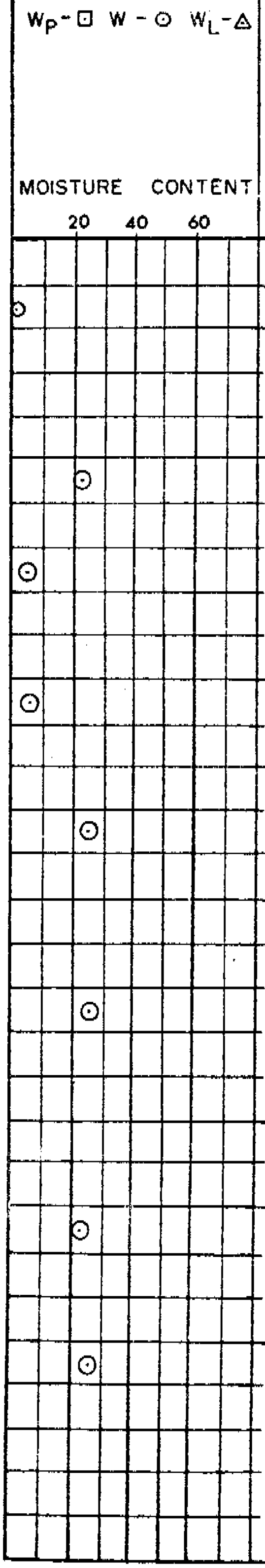
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. BG2

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 18, 1976
RIG Heli Drill
METHOD AIR
START 12:10
FINISH 13:05
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	2" *PEAT*	Nf						
	GW	*GRAVEL* coarse to fine, trace sand coarse to medium grained, occasional cobble sizes, poorly graded	5%	Grain Size Plate H-16	W1 W2	☒ ☒			
			Vx 5%						
	ML	*SILT* sandy, fine grained, non plastic, brown	15%						
5	CL	*CLAY* silty, low plastic	25%						
		ICE	ICE		W3	☒			
	GW	*GRAVEL* coarse to fine, sandy, fine to coarse grained, trace silt and clay, grey	Nbe 5%		W4	☒			
10	SM	*SAND* fine grained, silty, occasional gravel sizes, grey-brown	V 10%		W5	☒			
		---grey, occasional gravel sizes to 3/4"ø			W6	☒			
15		---fine grained, silty, occasional gravel sizes, grey-brown	15%		W7	☒			
20					W8	☒			
25					W9	☒			
		Bottom of Hole at 26.0'.							
30									

PLATE H-10

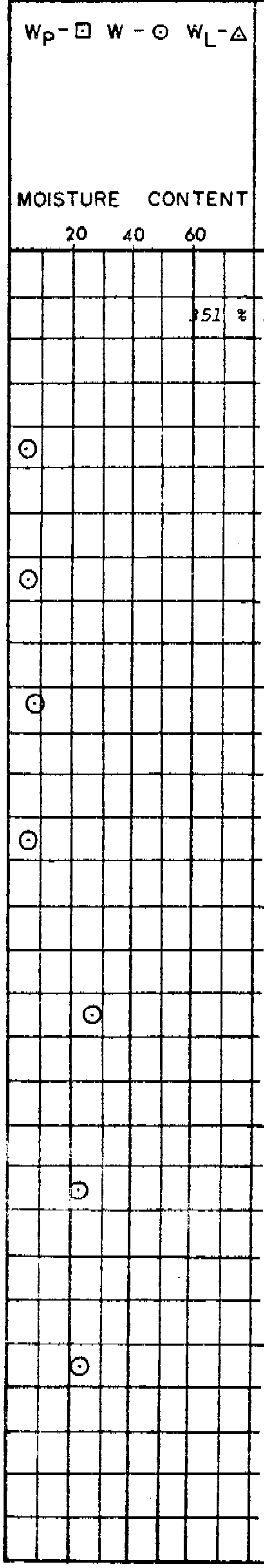
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. B33

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 18, 1976
RIG Heli Drill
METHOD AIR
START 14:00
FINISH 14:30
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	Pt	*PEAT* fibrous	V 50%						
					W1	☒			
	GP GM	*GRAVEL* fine to coarse grained, sandy, coarse to fine grained, silty, gravel sizes to 1 1/2"ø	V 5%		W2	☒			
5									
			15%						
	GP	--- fine to coarse, sizes to 1 1/2 inches ø	5%		W3	☒			
10				Grain Size Plate H-17	W4	☒			
		--- silty	10%						
		--- little coarse to fine sand sizes			W5	☒			
	SM SP	*SAND* fine to medium grained, occasional gravel sizes, trace silt, poorly graded, grey	V 30%						
15									
			20%						
					W6	☒			
20									
		--- trace silt							
					W7	☒			
25		--- occasional gravel sizes, silty			W8	☒			
30									

PLATE H-11

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. BG3 (con't)

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 18, 1976
RIG Heli Drill	METHOD AIR	START 14:00	FINISH 14:30
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

W_P - ☐ W - ⊙ W_L - △ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
⊙	30	SM SP	⁝	SAND fine to medium grained, occasional gravel sizes, silty (con't) wood chips, silty	▨	V		W9	☒			
⊙	35		⁝	occasional gravel sizes to 1/2" diameter	▨	25%		W10	☒			

Bottom of Hole at 35.0'.

PLATE H-11 (con't)

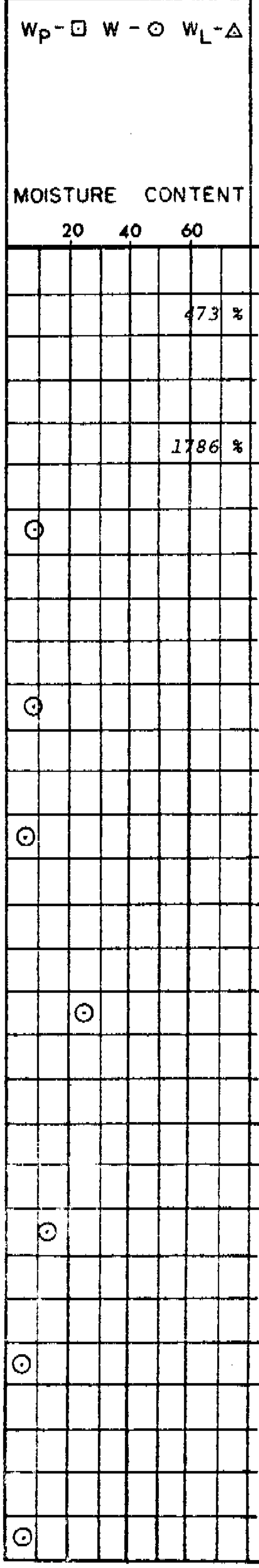
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. BG4

LOGGED BY TKM
DRAWN BY
CHECKED RST
DATE March 18, 1976
RIG Heli Drill
METHOD AIR
START 14:55
FINISH 17:00
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
	Pt	*PEAT* fibrous, wood chips, brown	Vx, Vr 60%		W1	
5	Pt	*ICE AND PEAT*	ICE+		W2	
	GP	*GRAVEL* coarse to fine, sizes to 2"ϕ, sandy, silty, brown	Nbe 5%		W3	
10		---- gravel sizes 2" to 3" ϕ ---- sandier, fine to coarse grained			W4 W5	
15	ML	*SILT* sandy, low plastic, brown	Vx 20%			
	SM	*SAND* fine grained, silty, brown to grey	Nbe 20%		W6	
20	GW	*GRAVEL* fine, trace coarse gravel, sandy, medium to coarse grained, trace silt	V 10%		W7	
25		----little coarse gravel, occasional cobble to 5"ϕ, sandy, silty ----less sand and silt sizes				
	GP	----fine to coarse, sandy			W8	
30		---- grey to brown			W9	

PLATE H-12

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. *BG4 (cont)*

LOGGED BY *TKM*
DRAWN BY
CHECKED *RST*
DATE *March 18, 1976*
RIG *Heli Drill*
METHOD *AIR*
START *14:55*
FINISH *17:00*
PROJECT NO. *CS 3343*
ELEVATION
AIR TEMPERATURE

Wp-⊡ W-⊙ WL-△ MOISTURE CONTENT 20 40 60	DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
	30	GP		*GRAVEL fine, trace coarse gravel, sandy, medium to coarse grained, trace silt, grey to brown (con't)*		V						
				--- fine, little coarse gravel, sandy, coarse to medium grained		>5%		W10	☒			
⊙	35											
⊙						15%		W11	☒			
				Bottom of Hole at 37.0'.								
	40											

PLATE *H-12 (con't)*

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

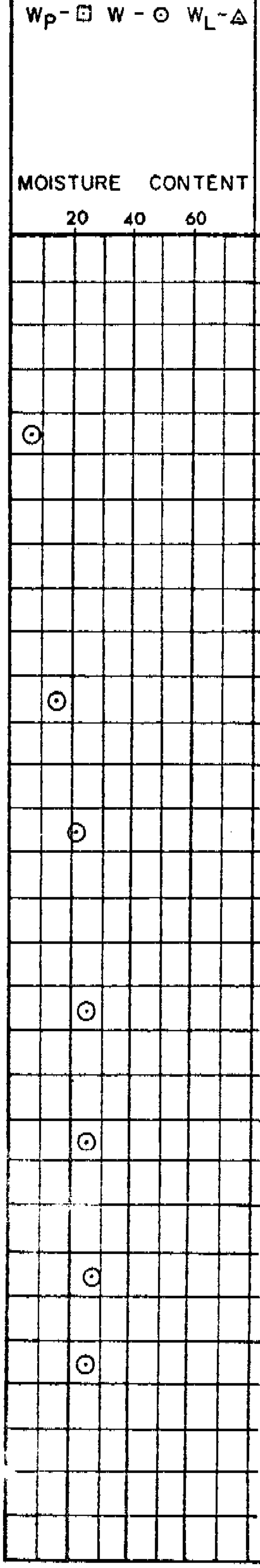
PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. BG5

LOGGED BY TKM	DRAWN BY	CHECKED RST	DATE March 15, 1976
RIG Heli Drill	METHOD AIR	START 17:55	FINISH 18:45
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	

Wp - ☐ W - ⊙ WL - △

MOISTURE CONTENT



DEPTH (feet)	SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND CORE % RECOVERY	CORE CONDITION	REMARKS
	Pt	PEAT coarse, fibrous	Nbn						
	ML	SILT clayey, trace sand, fine grained, low plastic, grey			W1	☒			
	GP	GRAVEL coarse and fine sizes, sub-angular and sub-rounded to 3" ø, trace sand, coarse grained brown	V 10-15%	Grain Size Plate H-18	W2	☒			
5		sandy, coarse to fine grained							
		sandy, brown							
	ML	SILT clayey, low plastic, grey	Nbe						
	GP	GRAVEL fine sizes, sandy	V 5%						
	CI	CLAY very silty, trace fine sand, trace fine gravel sizes, medium plastic, grey (till-like)	Nbe <5%						
10					W3	☒			
		gravel sizes to 1/2"ø			W4	☒			
15									
	SM	SAND very silty, fine grained, trace clay, occasional gravel sizes to 1/2"ø, non plastic, dark brown	Nbe <5%		W5	☒			
20					W6	☒			
		less silt							
					W7	☒			
25					W8	☒			
		Bottom of Hole at 26.0'.							
30									

PLATE H-13

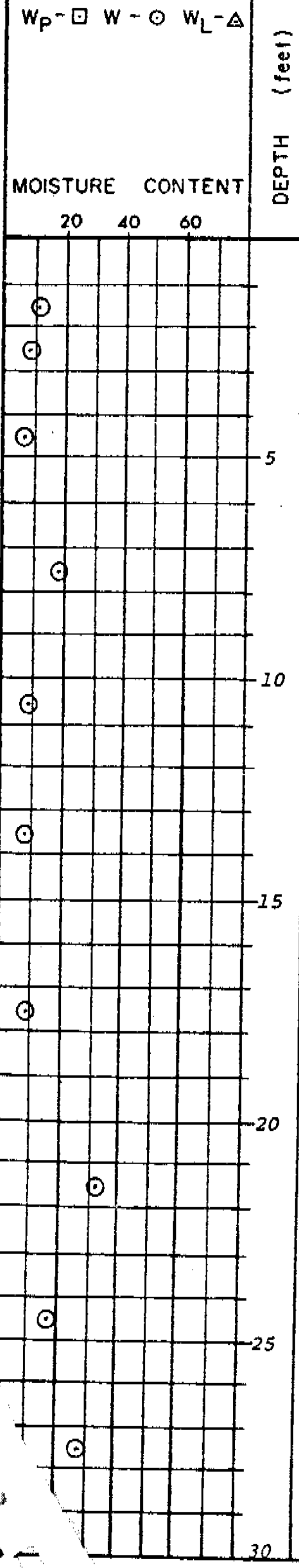
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT
PARSONS LAKE GAS PLANT

TEST HOLE NO. BG6

LOGGED BY GNL	DRAWN BY	CHECKED RST	DATE March 15, 1976
RIG Heli Drill	METHOD AIR	START 14:25	FINISH 15:50
PROJECT NO. CS 3343	ELEVATION	AIR TEMPERATURE	



SOIL GROUP SYMBOL	DESCRIPTION	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	REMARKS
Pt	PEAT	F			
GP	GRAVEL coarse, rounded to 1/2"ø, sandy, trace silt, brown	Nf		W1 W2	
	gravel sizes to 3/4"ø			W3	
SP	SAND medium grained to coarse, gravelly, grey		Grain Size Plate H-19	W4	
GP	GRAVEL medium grained, sandy, silty, grey			W5	
	coarse gravel sizes				
	little coarse sand	V 5-10%		W6	
		V <5%		W7	
CL-CI	CLAY very silty, trace fine sand, low to medium plastic, dark grey			W8	
	trace gravel sizes (till-like)			W9	
	very silty, little gravel, medium to high plastic layer	V 10-15%		W10	

PLATE H-14

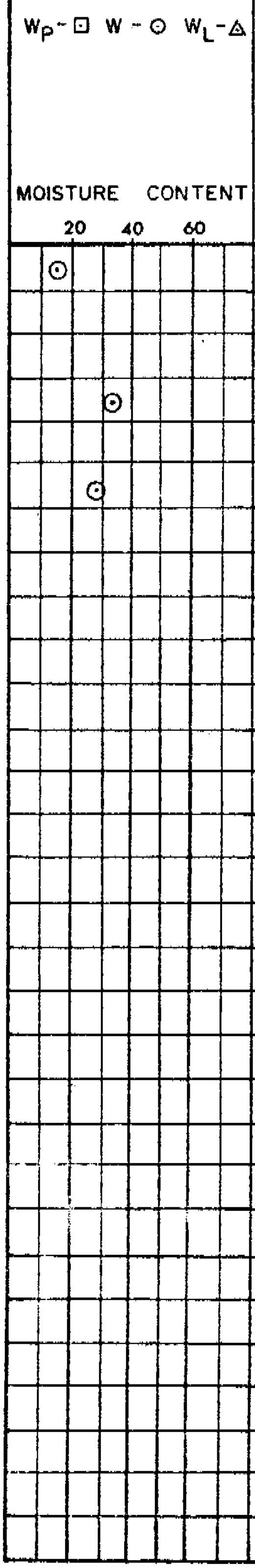
R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

TEST HOLE LOG

PROJECT PARSONS LAKE GAS PLANT

TEST HOLE NO. BG6 (con't)

LOGGED BY GNL
DRAWN BY
CHECKED RST
DATE March 15, 1976
RIG Heli Drill
METHOD AIR
START 14:25
FINISH 15:50
PROJECT NO. CS 3343
ELEVATION
AIR TEMPERATURE



DEPTH (feet)	SOIL GROUP SYMBOL	SOIL GRAPHIC LOG	DESCRIPTION	ICE GRAPHIC LOG	NRC ICE TYPE VISUAL ICE %	LABORATORY TEST DATA	SAMPLE TYPE AND NUMBER	SAMPLE CONDITION	CORE RUN AND % RECOVERY	CORE CONDITION	REMARKS
30	CL- CI	▨	*CLAY* very silty, trace fine sand, low to medium plastic, grey(cont - trace gravel sizes	▨	V 10%		W11	☒			
35	ML	▥	*SILT* sandy, fine grained, trace clay, trace gravel sizes, dark grey (till-like) very sandy,dark grey, non plastic	▨	V <5%		W12 W13	☒ ☒			
40			Bottom of Hole at 36.0'.								

PLATE H-14 (con't)

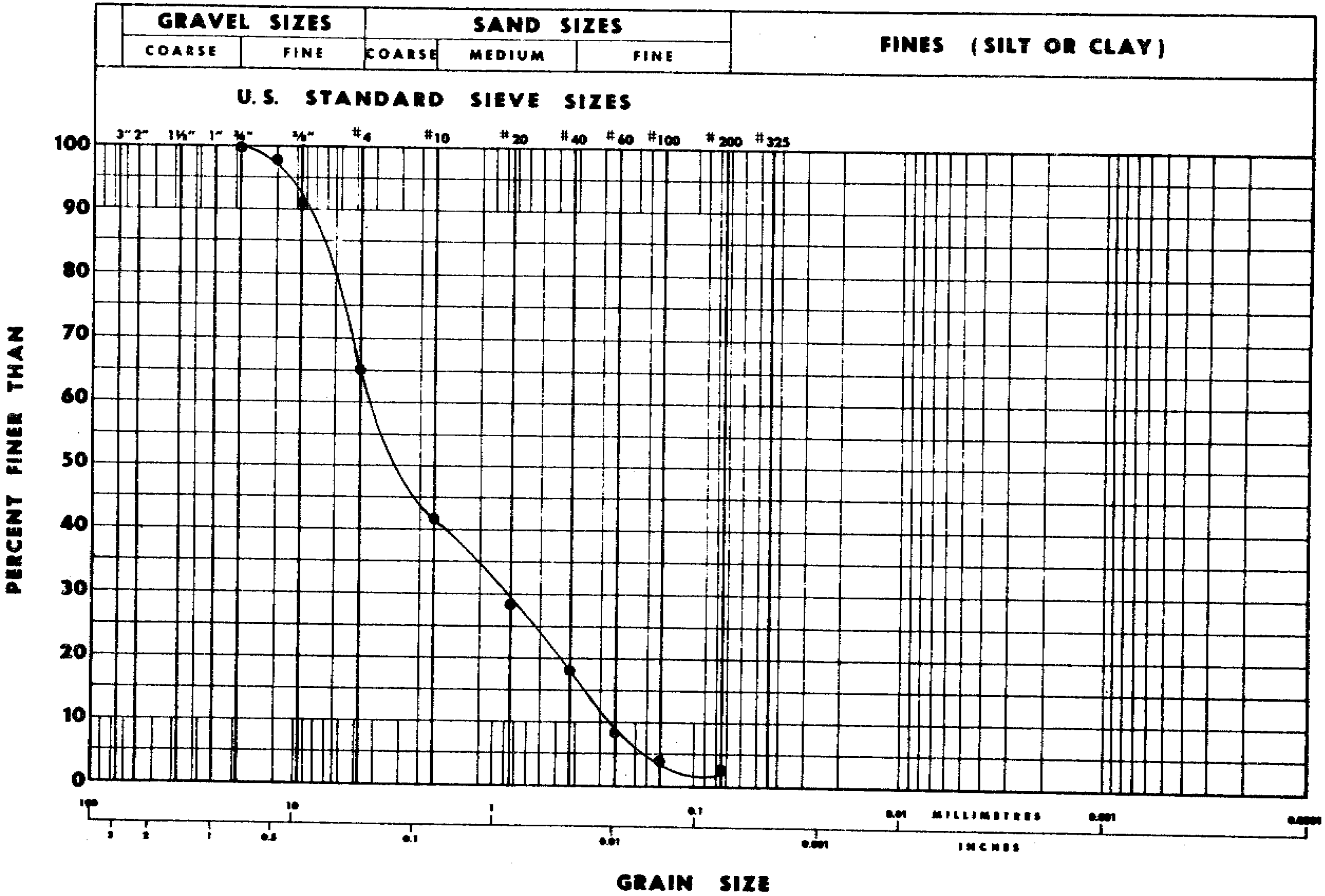
APPENDIX "H"

SECTION H.3 PARTICLE SIZE ANALYSES

R.M.HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W1
SOURCE Parsons Lake Gas Plant
HOLE BG1 at 1' - 2'
TECHNICIAN CW **DATE TESTED** Apr.7/76



REMARKS: Larger sizes broken down by rock bit.

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

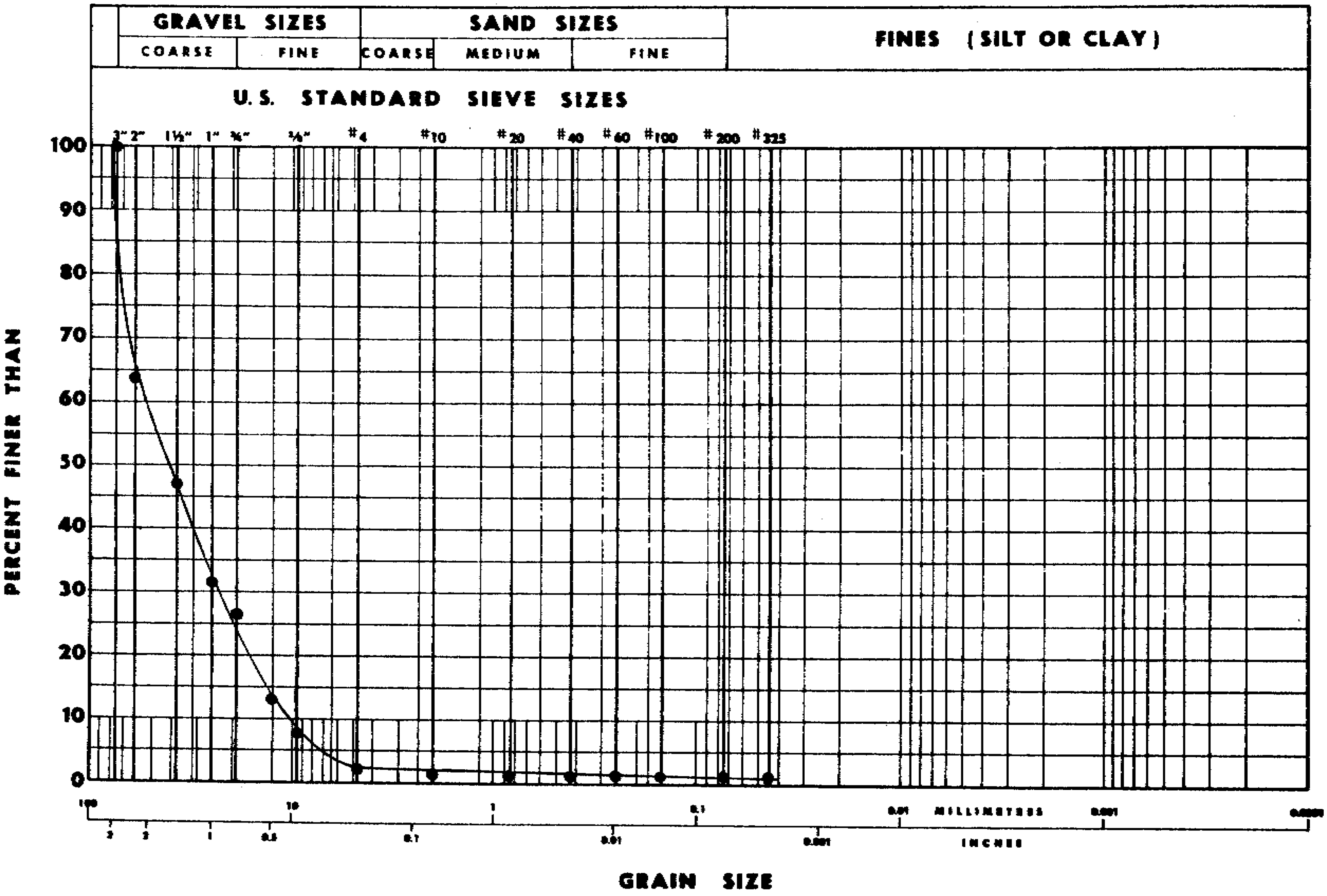
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE H-15

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W2
SOURCE Parsons Lake Gas Plant
HOLE BG2 at 1' - 1.5'
TECHNICIAN CW DATE TESTED Apr. 7/76



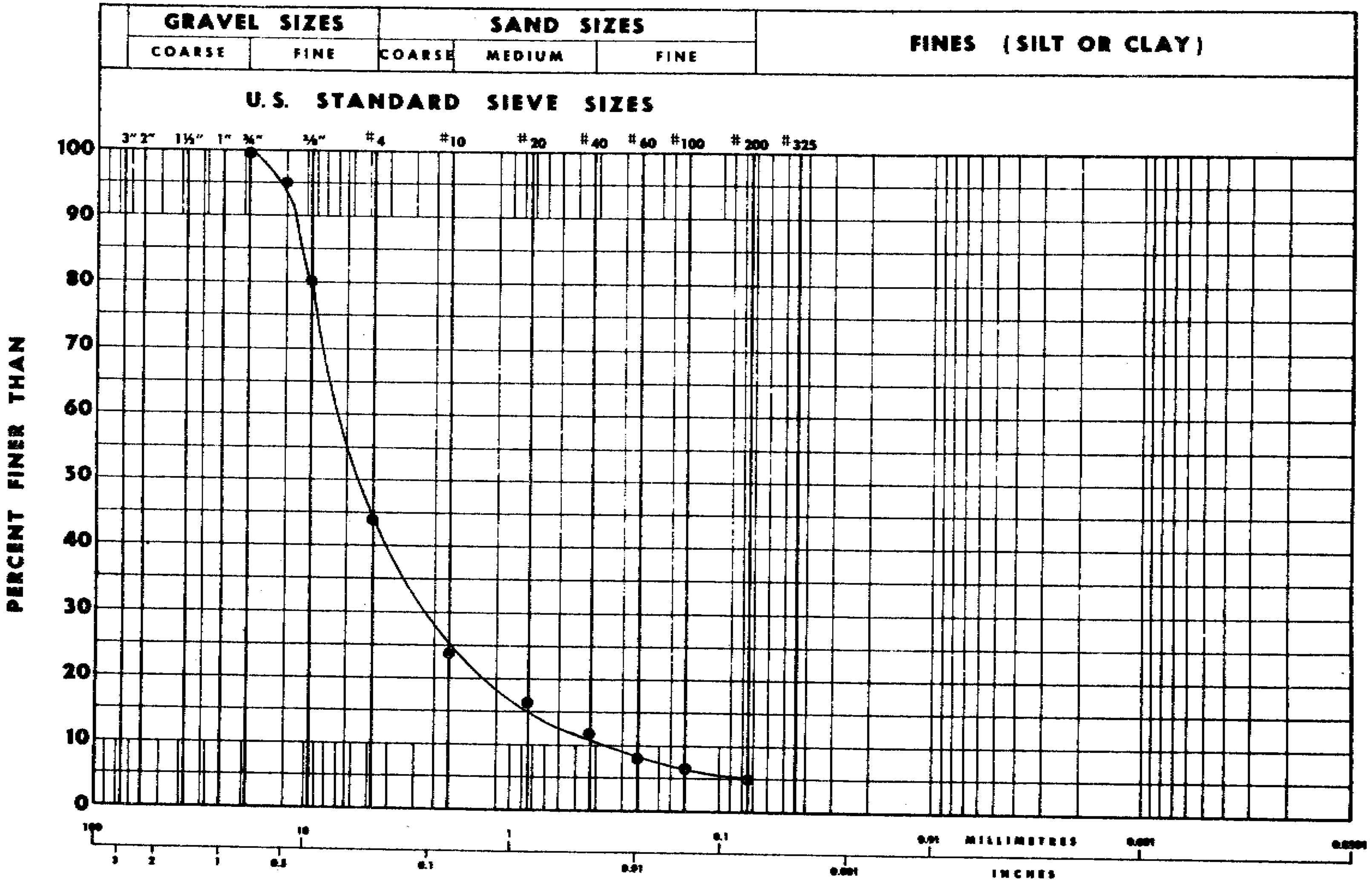
REMARKS:

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE H-16

2·0373



GRAIN SIZE

REMARKS: *Larger sizes broken down by rock bit.*

D_{10} = ______ MM.
D_{30} = ______ MM.
D_{60} = ______ MM.
C_U ______
C_C ______

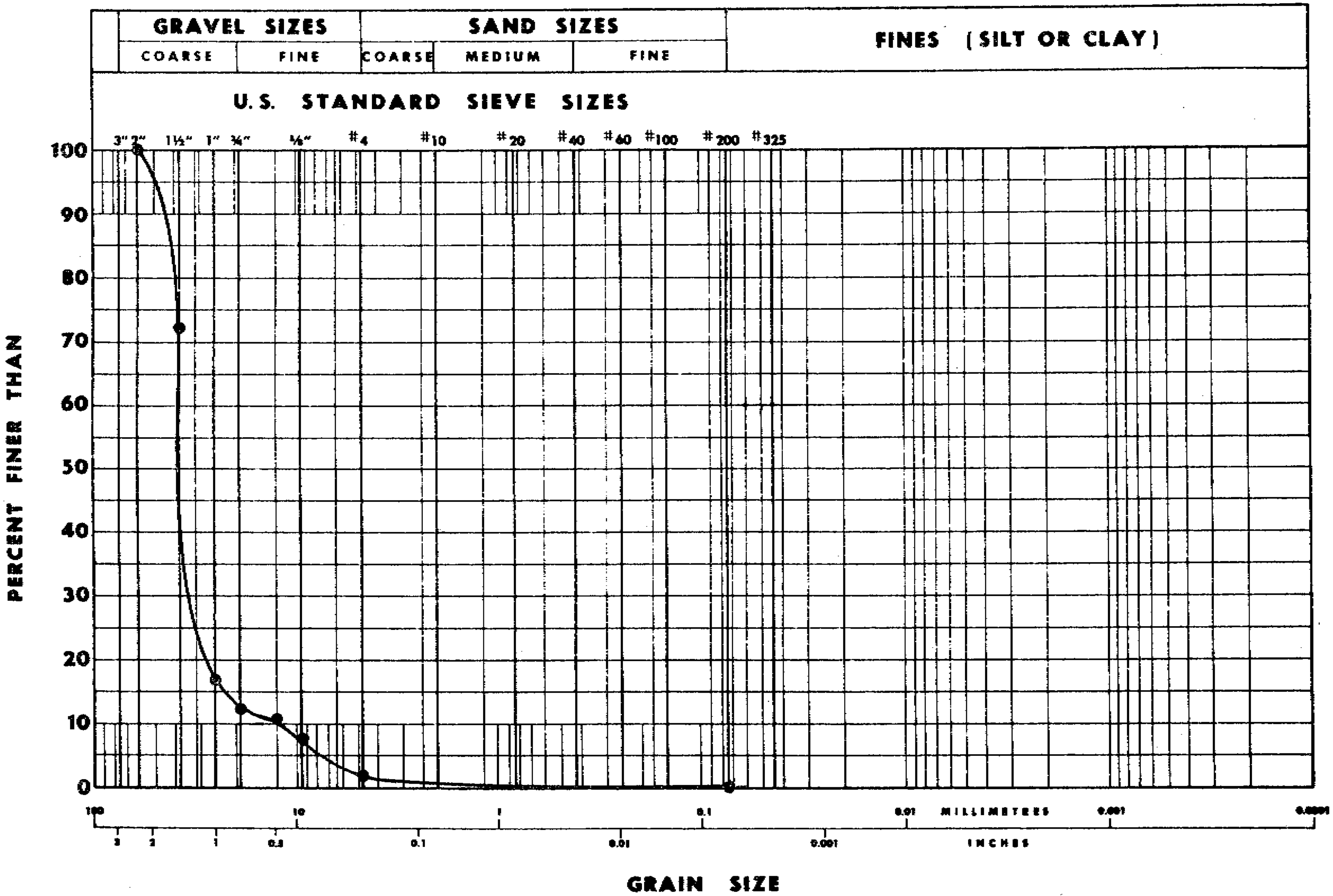
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE H-17

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE BG3 at 10' - 10.5'
TECHNICIAN CW DATE TESTED Apr.7/76



R.M. HARDY & ASSOCIATES LTD.

CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS 3343

CLIENT Gulf Oil Canada Ltd.

SAMPLE W2

SOURCE Parsons Lake Gas Plant

HOLE BG5 at 4' - 5'

TECHNICIAN CW **DATE TESTED** Apr.7/76

REMARKS: ______

D_{10}= ______ MM.
D_{30}= ______ MM.
D_{60}= ______ MM.
C_U ______
C_C ______

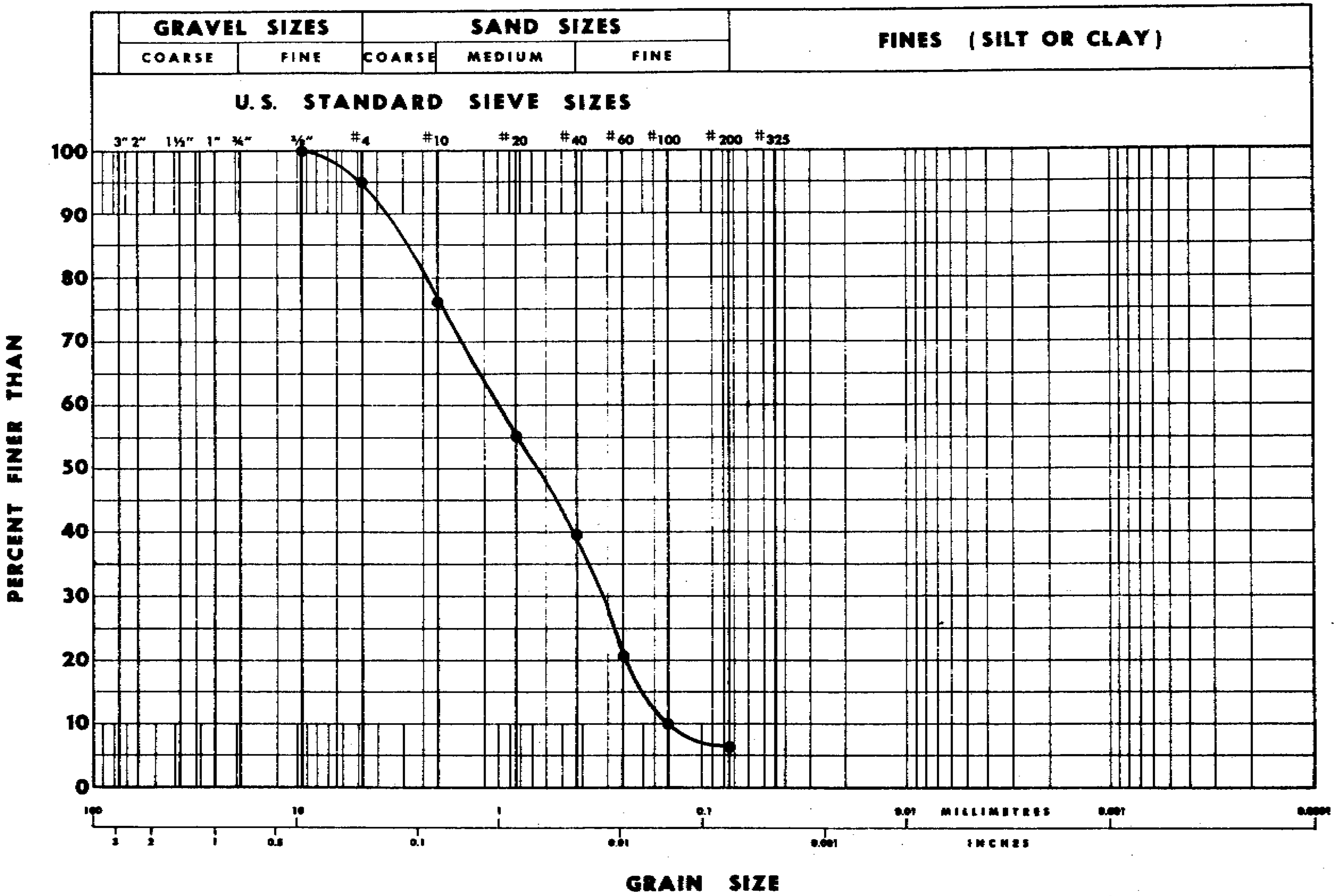
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE H-18

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & TESTING

GRAIN SIZE CURVE

LAB ORDER NO. CS3343
CLIENT Gulf Oil Canada Ltd.
SAMPLE W4
SOURCE Parsons Lake Gas Plant
HOLE BG6 at 7' - 8'
TECHNICIAN MS
DATE TESTED Apr. 76



REMARKS: ____________________

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

D_{10} = ________ MM.
D_{30} = ________ MM.
D_{60} = ________ MM.
C_U ________
C_C ________

PLATE H-19

APPENDIX "H"

SECTION H.4 SUMMARY OF LABORATORY TESTING

R.M. HARDY & ASSOCIATES LTD.
CONSULTING ENGINEERING & PROFESSIONAL SERVICES

SUMMARY OF LABORATORY TESTING

PROJECT Parsons Lake Gas Plant
LOCATION Parsons Lake, N.W.T.
DATE March, 1976
JOB NO. CS3343

SAMPLE DATA				SOIL DESCRIPTION	CLASSIFICATION TESTS						OTHER TESTS			
					ATTERBERG LIMITS			TEXTURE (%)						
TEST HOLE	DEPTH (ft)	SAMPLE NO	CLASSIFICATION		LIQUID	PLASTIC	PLASTICITY INDEX	SAND	SILT	CLAY	WET DENSITY (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	
BG-1	1-2	W1	GP	GRAVEL, fine, sandy, coarse to fine grained, trace silt, brown				97*	3					Gravel 35% Sand 62% Silt 3%
BG-2	1-1.5	W2	GW	GRAVEL, coarse to fine, trace sand 3"Ø, maximum size				98	2					Gravel 97% Sand 1% Silt 2%
BG-3	10-10.5	W4	GP	GRAVEL, fine to coarse, sandy, coarse to fine grained, silt				95*	5					Gravel 56% Sand 39% Silt 5%
BG-5	4-5	W2	GP	GRAVEL, coarse to fine, size to 3" Ø, trace sand				100*						Gravel 98% Sand 2% Poor sampl
BG-6	7-8	W4	SP	SAND fine to coarse grained, trace gravel, trace silt				94	6					Gravel 5% Sand 89% Silt 6%
				*Larger sizes fractured by rock bit.										

APPENDIX "H"

SECTION H.5 PETROGRAPHIC ANALYSES

VISUAL PETROGRAPHIC EXAMINATION OF COARSE AGGREGATE

Source No. 9 Test Hole No. BG-5 Project No. CS3343

a) Sieve Size

#4

b) Particle Shape

subrounded to rounded - 40%, isometric - 60% flat, rodlike - 40%
subangular to angular - 60%, isometric - 40% flat, rodlike - 60%

c) Particle Surface

subrounded to rounded - smooth
subangular to angular - coarse, jagged

clean, very
minor
calcareous
coating

d) Mineral Composition

silicious sandstones	18.1%
silicious siltstones	15.7%
melanocratic cherts	9.4%
leucocratic cherts	2.4%
silicious acid volcanics	0.4%
granite	8.3%
quartzitic sandstone	18.9%
quartzite	21.3%
quartz	5.1%
friable sandstone	0.4%

e) Deleterious Components

chert

f) Particle Counts

621

g) Comments

slightly weathered

PLATE No. H-21

VISUAL PETROGRAPHIC EXAMINATION OF COARSE AGGREGATE

Source No. 3 Test Hole No. BG-6 Project No. CS3343

a) Sieve Size

#4

b) Particle Shape

subrounded to rounded - 20%, isometric - 70% flat, rodlike - 30%
subangular to angular - 80%, isometric - 30% flat, rodlike - 70%

c) Particle Surface

subrounded to rounded - smooth
subangular to angular - jagged, rough

clean, trace of
calcareous coating

d) Mineral Composition

quartzite	14.7%
quartzitic sandstone	24.2%
silicious siltstone	13.0%
silicious acid volcanics	2.4%
basalt	0.3%
limestone	0.3%
granite	5.3%
friable sandstone	0.3%
sandstone	24.2%
melanocratic chert	4.2%
leucocratic chert	4.5%

e) Deleterious Components -quartz 6.6%

chert

f) Particle Counts

786

g) Comments

slightly weathered, sandstone are very slightly friable

VISUAL PETROGRAPHIC EXAMINATION OF COARSE AGGREGATE

Source No. 1

Test Hole No. BG-1
BG-2

Project No. CS3343

a) Sieve Size

#4

b) Particle Shape

subrounded to rounded-40%, isometric-80% flat,rodlike - 20%
subangular to angular-60%, isometric-40% flat,rodlike - 60%

c) Particle Surface

subrounded to rounded - smooth, shiny,
subangular to angular-rough, irregular

clean,no
calcareous coating

d) Mineral Composition

quartzite	23.0%
quartzitic sandstone	18.6%
quartz	4.1%
sandstone	18.9%
silicified siltstone	9.4%
silicified acid volcanics	4.4%
leucocratic chert	2.5%
melanocratic chert	11.6%
friable sandstone	0.6%

e) Deleterious Components -granite 6.9%

Chert

f) Particle Counts

680

g) Comments

slight weathering

PLATE No. H-23

VISUAL PETROGRAPHIC EXAMINATION OF COARSE AGGREGATE

Source No. 2 Test Hole No. BG-3 & BG-4 Project No. CS3343

a) Sieve Size

#4

b) Particle Shape

subrounded to rounded - 40%, isometric - 70% flat, rodlike - 30%
subangular to angular - 60%, isometric - 30% flat, rodlike - 70%

c) Particle Surface

subrounded to rounded - smooth
subangular to angular - rough, jagged

clean, traces of calcareous coating

d) Mineral Composition

silicious siltstone	12.9%
sandstone	19.2%
silicious acid volcanics	8.2%
quartz	5.5%
granite	7.5%
melanocratic chert	7.5%
leucocratic chert	3.5%
quartzite	12.9%
quartzitic sandstone	22.4%
friable sandstone	0.4%

e) Deleterious Components

Chert

f) Particle Counts

671

g) Comments

slight weathering

APPENDIX "H"

SECTION H.6 TEST HOLE ELEVATIONS

BORROW SOURCE TEST HOLE ELEVATIONS

Test Hole No.	Elevation *	Geodetic Elevation
BG1	917.5	93.0
2	925.0	100.5
3	942.0	117.5
4	950.0	125.5
5	907.5	146.0
6	Not surveyed	

* Elevation relative to top of flange on 0-27 wellhead (Elevation = 999.80 - provided by C.E.S.L. of Edmonton)

APPENDIX "I"

PLATE I.1 MODIFIED UNIFIED SOIL CLASSIFICATION SYSTEM

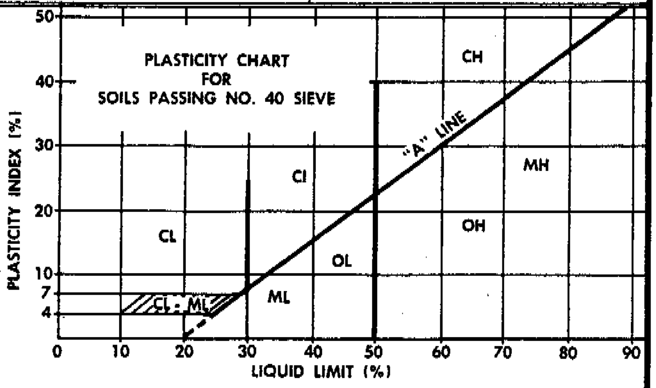
PLATE I.2 NRC GROUND ICE CLASSIFICATION

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION			GROUP SYMBOL	GRAPH SYMBOL	COLOR CODE	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 200 SIEVE)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	▨	RED	WELL GRADED GRAVELS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 4$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3	
			GP	▨	RED	POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		DIRTY GRAVELS (WITH SOME FINES)	GM	▨	YELLOW	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
			GC	▨	YELLOW	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
	SANDS MORE THAN HALF FINE GRAINS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW	▨	RED	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 6$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3	
			SP	▨	RED	POORLY GRADED SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		DIRTY SANDS (WITH SOME FINES)	SM	▨	YELLOW	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
			SC	▨	YELLOW	CLAYEY SANDS, SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES 200 SIEVE)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 50\%$	ML	▨	GREEN	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (see below)	
		$W_L > 50\%$	MH	▨	BLUE	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS		
	CLAYS ABOVE "A" LINE ON PLASTICITY CHART NEGLIGIBLE ORGANIC CONTENT	$W_L < 30\%$	CL	▨	GREEN	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS		
		$30\% < W_L < 50\%$	CI	▨	GREEN-BLUE	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS		
		$W_L > 50\%$	CH	▨	BLUE	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
	ORGANIC SILTS & CLAYS BELOW "A" LINE ON CHART	$W_L < 50\%$	OL	▨	GREEN	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY	
		$W_L > 50\%$	OH	▨	BLUE	ORGANIC CLAYS OF HIGH PLASTICITY		
HIGHLY ORGANIC SOILS			Pt	▨	ORANGE	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE	

SPECIAL SYMBOLS

▨	BEDROCK (UNDIFFERENTIATED)	▩	OVERBURDEN (UNDIFFERENTIATED)
░	SANDSTONE	☐	
☰	SHALE	☐	
▦	LIMESTONE	☐	
▓	CONGLOMERATE	☐	
■	COAL	☐	


PLASTICITY CHART FOR SOILS PASSING NO. 40 SIEVE

1. ALL SIEVE SIZES MENTIONED ON THIS CHART ARE U.S. STANDARD, A.S.T.M. E.11.
2. BOUNDARY CLASSIFICATIONS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN COMBINED GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL SAND MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%.

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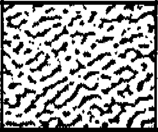
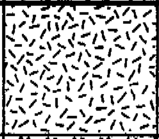
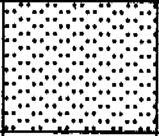
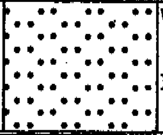
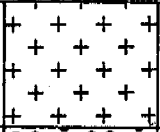
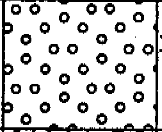
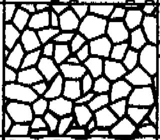
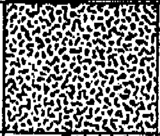
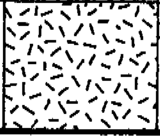
Plate 1.1

CATEGORY	GROUP SYMBOL	SUBGROUP SYMBOL	GRAPHIC SYMBOL	DESCRIPTION
	F, V or N			Frozen - Subgroup Symbol Undifferentiated
Non-visible ice	N	Nf		Poorly bonded or friable frozen soil
		Nbn		Well bonded frozen soil with no excess ice
		Nbe		Well bonded frozen soil with excess ice. Free water present when sample thawed
Visible Ice less than one inch thick	V	Vx		Individual ice crystals or inclusions
		Vc		Ice coatings on particles
		Vr		Random or irregularly oriented ice formations
		Vs		Stratified or distinctly oriented ice formations
Visible Ice greater than one inch thick	ICE	ICE + soil type		Ice greater than one inch thick with soil inclusions
		ICE		Ice greater than one inch thick without soil inclusions

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GROUND ICE CLASSIFICATION

SCALE ____ DATE ____ MADE ____ CHKD. ____ JOB: CS 3343 FIGURE I.2