TWEED LAKE

A. Discovery Well:

PCI Canterra Tweed Lake M-47

Spud: 85-01-11

R.R.: 85-02-24

T.D.: 4,659 ft (1 420 m)

B. Test Results:

DST SUMMARY - PCI CANTERRA TWEED LAKE M-47

DST	Int/Fm	PF/VO/Times	Recovery
1	1212-1227m Upper Sand and top part Lower Sand Mt. Clark Fm.	CLOSED CHAMBER Flowed gas at Max. 30,100 m^3/d (107 MMcf/d) decreased to 18,300 m^3/d (0.65 MMcf/d) after 20 min. 5, 91, 18, 118	65 m sl GCDM
2	1188-1199 Lower Sand Mt. Cap Fm.	CLOSED CHAMBER Flowed gas at 1,350 m^3/d (48 Mcf/d) 5.5, 90, 210, 548	35 m GCDM
3	1155-1170 Upper Sand Mt. Clark Fm.	WAB dead in 2 minutes, NGTS 5, 120, 66, 120, 15	10 m DM
4	1221-1236 Lower Sand Mt. Clark Fm.	GTS in 4 minutes at 84,400 m^3/d (2.98 MMcf/d) decreased gradually to 72,400 m^3/d (2.6 MMcf/d) 6, 121, 420, 960	170 m Cond. and 10 m SW 76.8° API
5	1206-1216.5 Upper Sand Mt. Clark Fm.	Flowed gas at 5-800 m^3/d (0.18-0.28 MMcf/d) 3, 121, 236, 486	35 m GCDM

C. Reserve Calculation:

This well was drilled to test a seismically defined closure on the top of the Precambrian surface. The play was to find Mt. Clark sandstones draped over a subtle high later faulted during the Laramide orogeny into 2 separate structures. Sands are described as cream to light brown, very fine to fine grained, oilstained, well sorted, subangular with silica cement and a slightly argillaceous matrix; porosity is intergranular.

RESERVES - MOUNT CLARK FORMATION

Possible Reserves

1.	Area of Oil Reserves	11,324 ha
2.	Initial Oil in Place	$70.7 \times 10^6 m^3$ (445 MM BBLS)
3.	Recoverable Oil	$14.1 \times 10^6 m^3$ (89 MM BBLS)
4.	Area of Gas Reserves	4,327 ha
5.	Initial Gas in Place	$6.77 \times 10^9 m^3$ (240.2 Bcf)
6.	Sales Gas	$4.23 \times 10^9 m^3$ (150 Bcf)

RESERVES - MOUNT CAP FORMATION

Possible Reserves

1.	Area	5,871 ha
2.	Initial Gas in Place	$1.53 \times 10^9 m^3$ (54.3 Bcf)
3.	Sales Gas	$0.95 \times 10^9 m^3$ (33.9 Bcf)

TWEED LAKE POOL

PRELIMINARY GAS RESERVE

NET PAY	11.23 M
POROSITY	12 %
WATER SATURATION	30 %
TEMPERATURE	543 ^{O}R
PRESSURE	1854 KPA
COMPRESSIBILITY	0.78
IMPURITIES	22.50 %
RECOVERY FACTOR	80 %
RECOVERABLE GAS	353 MCF PER ACRE FOOT
AREA BEST CURRENT ESTIMATE	10,700 ACRES
AREA TOPSIDE	20,440 ACRES

RECOVERABLE GAS:

BEST CURRENT ESTIMATE	(353)(10,700)(11.23)(3.281)
	= 139 BCF
TOPSIDE	(353)(20440)(11.23)(3.281)
	= 266 BCF

GAS RESERVE DATA

FIELD/WELL	Tweed Lake		
FORMATION	Mount Clark (Cambrian)		
INTERVAL	to -1010 *		
K.B.			
GAS/WATER CONTACT	-1010 (Topside Reserve)		
SPECIFIC GRAVITY (AIR = 1.00)	0.825		
CONSTANT	43,560		(1)
AREA (PLANIMETERED, ESTIMATE)	20,440	ACRES	(2)
PAY NET 11.23 M GROSS 19 M	11.23	M	(3)
ACRE FEET (2)(3)	753,116		(4)
POROSITY (ϕ)	12	%	(5)
WATER SATURATION	30	%	(6)
STANDARD TEMPERATURE (Ts)	520	^{o}R	(7)
STANDARD PRESSURE (Ps) (82.8 + 460)	14.65		(8)
RESERVOIR TEMPERATURE (Tf)(F^{0} + 460)	542.8	^{o}R	(9)
RESERVOIR PRESSURE (Pi) 12780 KPa	1854	PSIA	(10)
ABANDONMENT PRESSURE	250	PSIA	(11)
DATUM DEPTH PRESSURE 12780 KPa	1230	M	(12)
PSEUDO CRITICAL PRESSURE	4304.3		(13)
PSEUDO CRITICAL TEMPERATURE	191.0° K		(14)
PSEUDO REDUCED PRESSURE (10)/(13)	2.97		(15)
PSEUDO REDUCED TEMPERATURE (9)/(14)	1.50		(16)
COMPRESSIBILITY FACTOR ORIGINAL (Zi)	0.78		(17)
COMPRESSIBILITY FACTOR ABANDONMENT (Za)	1.00		(18)
HEATING VALUE	34.4	MJ/m^3	
METHANE	78	%	
LIQUIDS	0	bbls per MM	(19)
GAS IN PLACE = $\frac{(1546.2)(5)(1-(6))(10)}{(9)(17)}$	570	MCF/AC-FT	(20)
SHRINKAGE FACTOR	22.50	%	(21)
RECOVERY FACTOR	80.00	%	(22)
RECOVERABLE GAS (20)(21)(22)	353	MCF/AC-FT	(23)
RECOVERABLE GAS (23)(2)(3)	266	BCF	
RECOVERABLE CONDENSATE (24)(19)	0	bbls	

* Top sand in C-12 is -1013.

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RESERVOIR PRESSURE (P1) 12780 KPa	1854	PSIA	(10)
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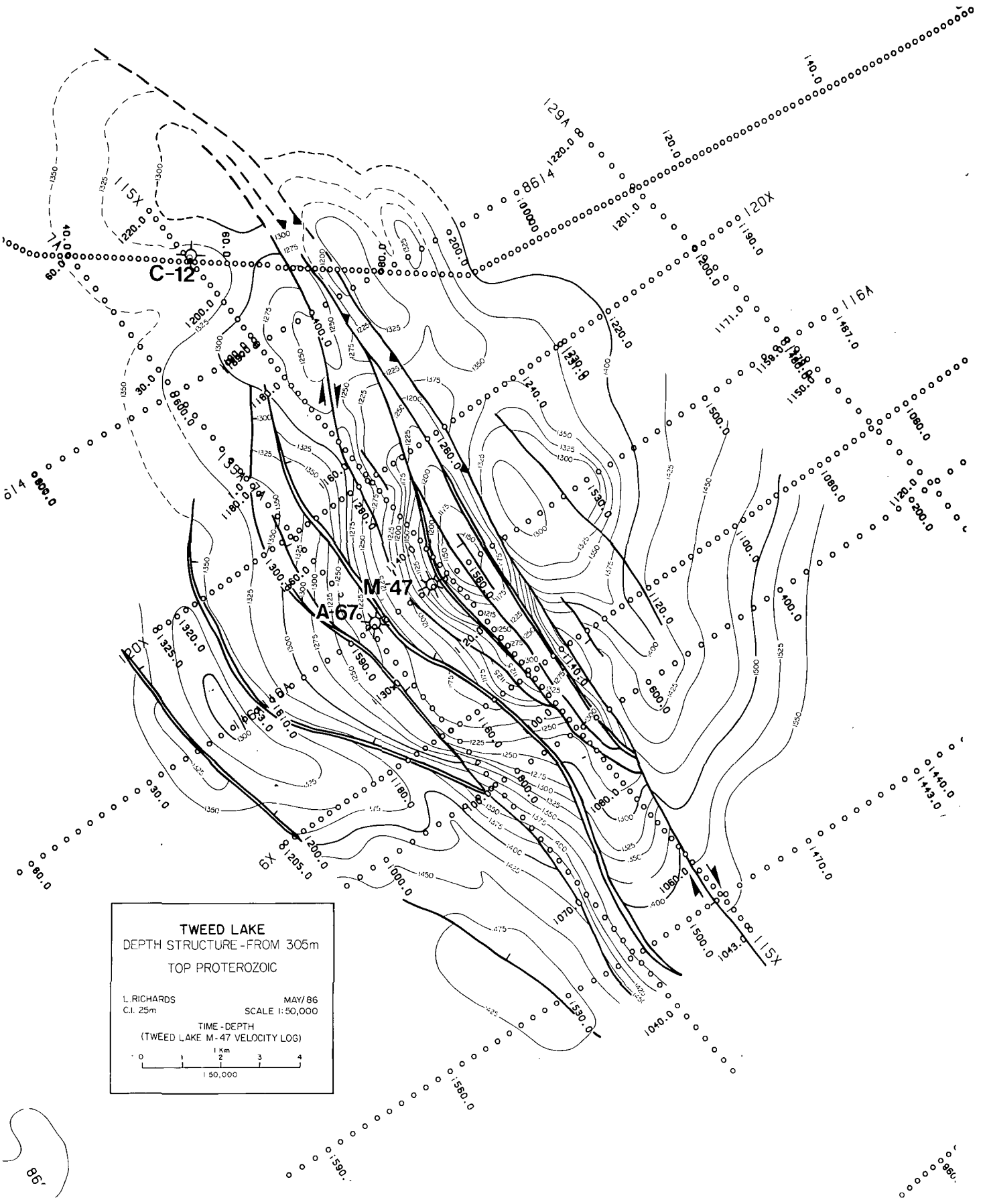
C-12
M-47
A-67
TWEED LAKE
DEPTH STRUCTURE - FROM 305m
TOP PROTEROZOIC
L. RICHARDS
MAY/86
C.I. 25m
SCALE 1:50,000
TIME - DEPTH
(TWEED LAKE M-47 VELOCITY LOG)
1 Km
0 1 2 3 4
1:50,000

ESTIMATED RECOVERABLE GAS RESERVES IN TWEED LAKE PROSPECT, DISTRICT OF MACKENZIE, N.W.T.

RESERVOIR PARAMETERS

1.	Formation	Mount Cap and Mount Clark
2.	Type of Hydrocarbon	Gas and condensate
3.	Oil Gravity	35° API
4.	Gas Specific Gravity	0.72
5.	Formation Temperature	14°C
6.	Initial Reservoir Pressure (M-47)	12,780 kPa
7.	Z Factor	0.777
8.	Area of Structure	15,976 ha
9.	Closing Contour	-1025 m (West Block) -1150 m (East Block)
10.	Average Net Pay	2 m (Mt. Cap) 9 m (Mt. Clark Oil-leg) 12 m (Mt. Clark Gas Cap)
11.	Average Porosity	15% (Mt. Cap) 12% (Mt. Clark)
12.	Average Water Saturation	35% (Mt. Cap) 30% (Mt. Clark)
13.	Taper Factor	0.9
14.	Hydrocarbon Factor (less inerts)	0.78
15.	Oil Recovery Factor	0.2
16.	Gas Recovery Factor	0.8