

1823

FINAL WELL REPORT

PARAMOUNT ET AL
ARROWHEAD

N-65
60° 40' 122° 45'



Paramount Resources Ltd.

N.E.B. COPY

9211-P33-10-1

NID 1833

MICROFILMED
SUR MICROFILM:

FINAL WELL REPORT

PARAMOUNT ET AL ARROWHEAD N65

60° 40' 122° 45'

Latitude 60° 34' 45.897" Longitude 122° 57' 18.623"

NATIONAL ENERGY BOARD
ENGINEERING BRANCH
JUL 27 1998

Prepared By:
Date:

S. Maaskant, C.E.T.
July 8, 1998

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1. INTRODUCTION

Summary

Paramount Resources Ltd. drilled Arrowhead N65 to evaluate the gas potential of the Nahanni formation and a secondary objective the Flett. Nabors rig 16 spudded this well January 14, 1998 and rig released February 27, 1998.

Minor fluid losses were encountered drilling surface hole overbalanced with minor gas volumes recorded. Logging proved the Flett to be xxxxxx.

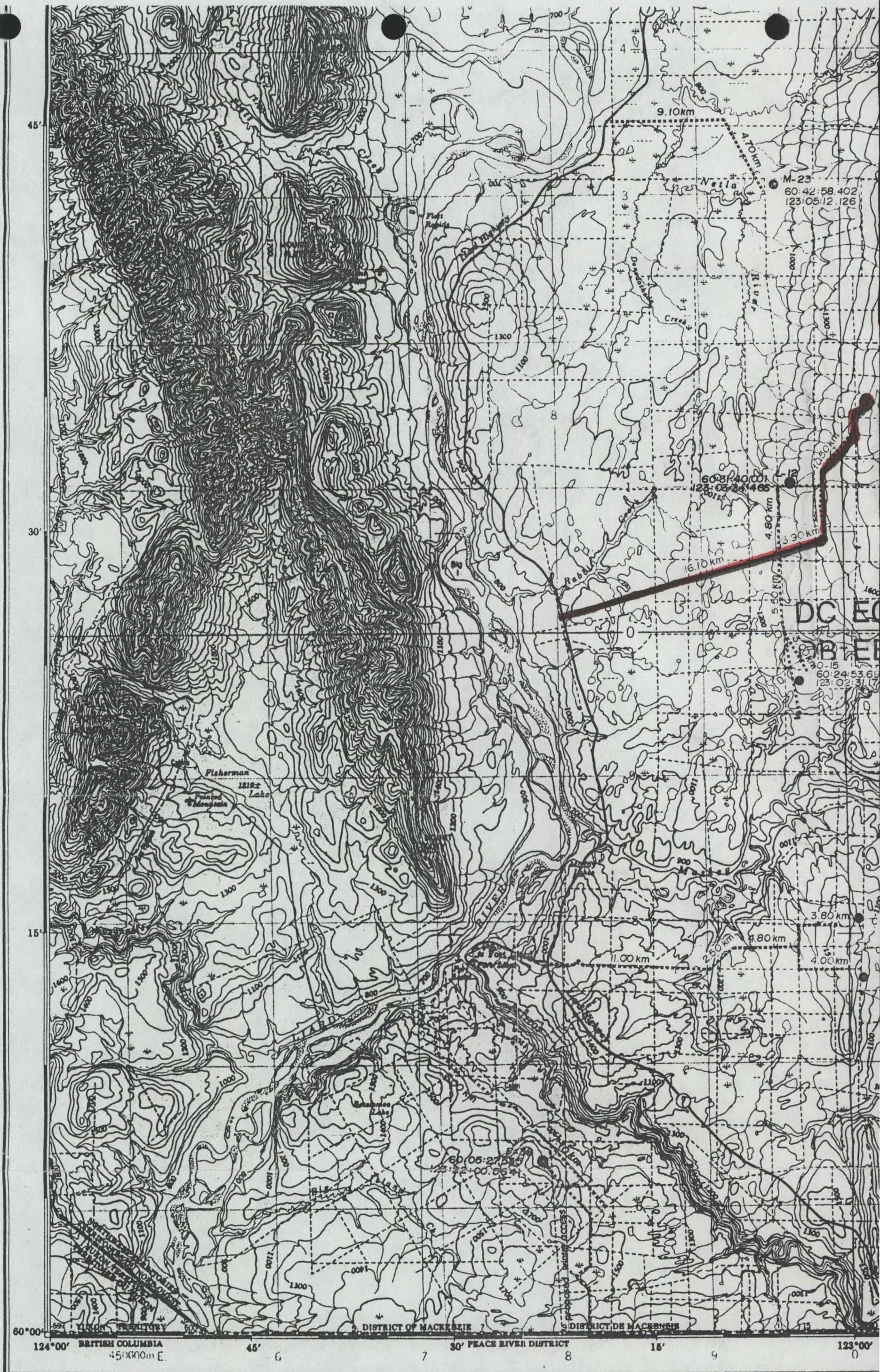
The two intermediate sections of the well were drilled without problem utilizing an air hammer, circulating over to Cutter D to perform logging and casing operations. The second intermediate section was not logged as it covered the Fort Simpson Shale.

The Nahanni was drilled underbalanced utilizing nitrogen and foam. We encountered three specific gas bearing sections ranging from 5 to 28 $10^3 \text{ m}^3/\text{d}$ gas rates with significant water flow associated with each. A liner was cemented in place over the Nahanni to allow for segregation of these sections and in an attempt to shut off the water flow.

The well will be completed to evaluate the Nahanni gas potential.

Location Map (See Figure 1, Following Page)

FIGURE 1
LOCATION MAP



Produced by the SURVEYS AND MAPPING BRANCH,
DEPARTMENT OF ENERGY, MINES AND RESOURCES.
Updated from large scale maps. Information current as shown in
diagram. Published in 1985.

Copies may be obtained from the Canada Map Office,
Department of Energy, Mines and Resources, Ottawa,
or your nearest map dealer.

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Department of Energy, Mines and Resources.

Information concerning bench marks and horizontal survey monuments can
be obtained from Geodetic Survey, Surveys and Mapping Branch, Ottawa.

FORT LI
NORTHWEST TERRITORIES
TERRITOIRES DU NORD-OUEST

Scale 1:250 000

Roads.
loose or stabilized surface, all weather
Routes.
gravel, all weather, all season
2 lanes or more
less than 2 lanes

2. GENERAL DATA

WELL NAME: Paramount Berkley Arrowhead N65

EXPLORATION AGREEMENT: EL 383

DRILLING AUTHORITY: 1833 Issued December 22, 1997

GRID AREA: 60° 40' 122° 45'

CO-ORDINATES: Latitude 60° 34' 45.897"
Longitude 122° 57' 18.623"

UNIQUE WELL IDENTIFIER: 300N656040122450

LESSOR: Shell Canada Ltd. entered into a formal agreement with Paramount covering parcel exploration licence 383.

OPERATOR: Paramount Resources Ltd.
4000, 350 – 7 Ave. S.W.
Calgary, Alberta
T2P 3W5

DRILLING CONTRACTOR: Nabors Drilling Limited
850, 505 – 3 St. S.W.
Calgary, Alberta
T2P 3E6

DRILLING RIG: Nabors 16

POSITION KEEPING: N/A

SUPPORT CRAFT: N/A

DRILLING UNIT PERFORMANCE N/A

DIFFICULTIES & DELAYS: N/A

3. SUMMARY OF DRILLING OPERATIONS

ELEVATIONS: G.L.: 567.9 m
K.B.: 574.6 m

TOTAL DEPTH: Drilled:
Logged:
Plug Back:

SPUD DATE: 1998 – 01 – 14 @ 1400 hours

COMPLETED DRILLING DATE: 1998 – 02 – 14 @ 1830 hours

RIG RELEASE: 1998 – 02 – 26 @ 2400

WELL STATUS: STANDING CASED

HOLE SIZES, CASING See Table 1 – Bit Record

	Hole Size mm	Csg. Size mm	Wt. kg/m	Grade	Landed m
Surface	444	339.7	81.1	J55, ST&C	480
Intermediate 1	311	244.5	64.74	L80, LT&C	1890
Intermediate 2	216	177.8	38.69	MN80, LT&C	2529
Liner	152	139.7	25.3	L80 flush	2856.09

CASING CEMENTING: See Casing & Cementing Reports, Following Pages

SIDETRACKED HOLE: N/A

DRILLING FLUID: See Table 5

Surface Hole: Gel Chemical

1st Intermediate: Air

2nd Intermediate: Air / D-Vis

Main Hole: Nitrogen/Foam

FISHING: N/A

WELL KICKS: N/A
(Note: The Nahanni formation was drilled underbalanced)

LEAK-OFF TESTS: (see attached)
Gradient at 490 m 18.79 kPa/m, no breakdown
Gradient at 1893 m 18.8 kPa/m, no breakdown

TIME DISTRIBUTION: See Table 2

DEVIATION SURVEY: See Attached

ABANDONMENT PLUGS: N/A

COMPOSITE WELL RECORD: See attached, this section

TABLE 1

BIT RECORD

BIT RECORD									
#	Type	Size (mm)	In	Out	Total (m)	Hrs drilled	FOB (daN)	RPM	Cond. T B G
1a	ReedY11	444	0	185m	185m	28.25	3 /10	100/160	3-2-I
2a	S 13	444	185	395m	210m	28.25	3 /11	100/161	8-1-I
3a	SS 81	444	395	480m	85m	34.00	4 /6	160	2-2-I
1	HP51	311	480	490M	10M	1.50	4 / 5	45/50	3-3-I
2	HP43A	311	490	634M	144M	12.75	1/2	45/50	3-3-I
3	H425ZR3	311	634	1890M	1256M	57.25	1	AIR HAMMER	
1	FDT	216	1890	1893M	3M	1.75	3/4	40	1-1-I
2	H42R8R3	216	1893M	2515M	622M	28.75	0/1	AIR HAMMER	
3	HP 53A	216	2515M	2530M	15M	7.00	10/12	70/80	2-1-I
1	HZS84F	156	2530M	2847M	317M	33.25	10/12	50	6-8-I
2	HZS84F	156	2847M	2925M	78M	77.75	10	50	

BIT CONDITION

SCALE

Tooth Wear (T) 0 - 8
 Bearing Wear (B) 0 - 8
 Gauge (G) in or (mm) under

New Bit T=0 B=0 G=in

PARAMOUNT BERKLEY ARROWHEAD N-65

CASING & CEMENTING REPORTS

PARAMOUNT RESOURCES LTD.

CASING SUMMARY

WELL NAME Paramount Berkley Arrowhead LOCATION N-65 DATE 98/01/21
SURFACE (X) INTERMEDIATE () PRODUCTION () LINER ()

[illegible]

Cementing Company	Sanjel			
Wash-Type				Volume: _____
Cement Type	Lead Slurry	see attached cementing reports		Volume: _____
	Additives	_____		
Cement Type	Tail Slurry			Volume: _____
	Additives	_____		
Cement Type	Above Stage Collar			Volume: _____
	Additives	_____		
Displacement Rate:	Max	_____ m3/min	Average	_____ m3/min
Calculated Cement Top(s):	(fill) _____	mKB	(tail) _____	mKB
Returns:	Mud	Cement	4	m3
String Wt. in Mud Wt of:	_____	kg/m3	=	_____ daN
Wt. set on slips:	_____	daN		
Remarks:	_____			

Supervisor

SANJEL CEMENTERS LTD.

2400, 639 - 5th Avenue S.W.

Calgary, Alberta T2P 0M9

Phone #: (403) 269-1420 Fax #: (403) 269-1433

DATE: January 20, 1998

TICKET NUMBER: 51423



WELL NAME: Paramount et al Arrow Head

TYPE OF JOB: Surface Casing

COMPANY REPRESENTATIVE: Rod McEachern

SANJEL REP.: Wayne Bosse

UNIT #: 4429

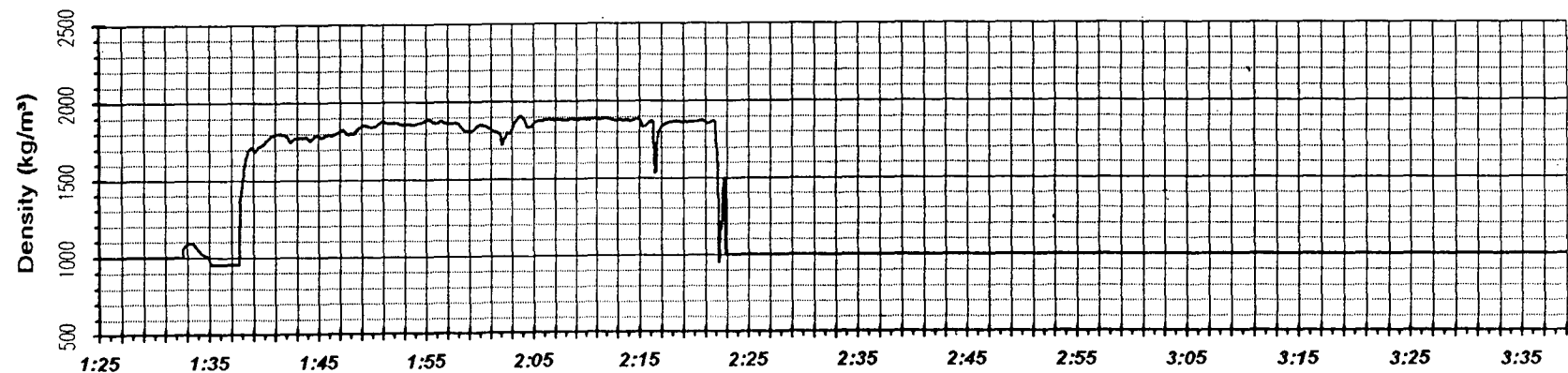
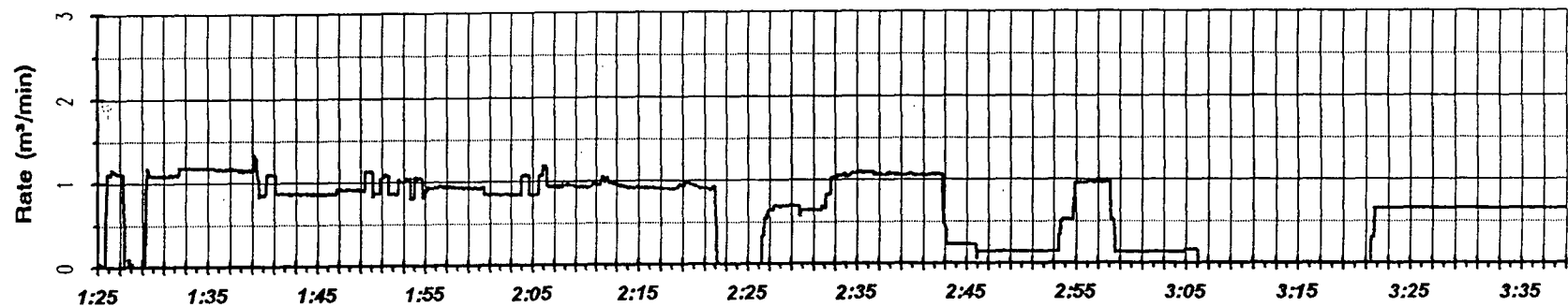
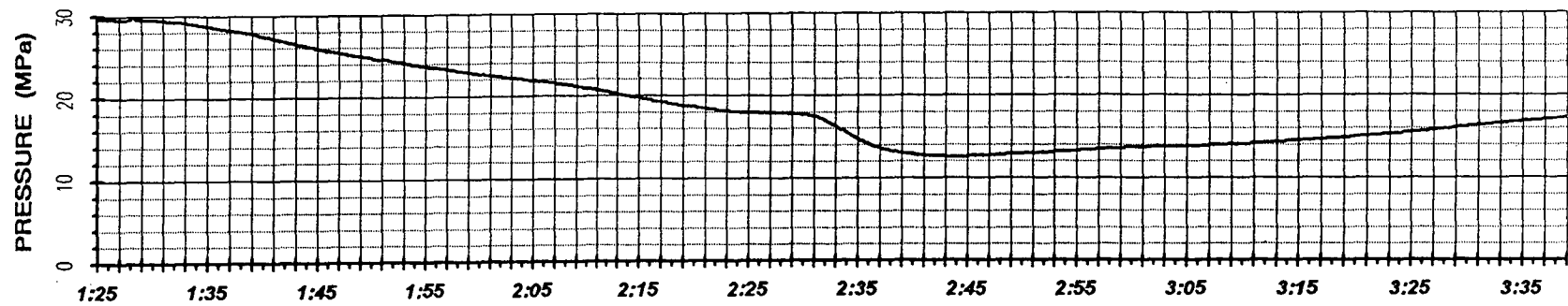
L.S.D:

PDM OPERATOR: SAM

WELL DATA		TUBULARS				SPECIAL TOOLS			
Hole Size	444 mm	Size	339.7 mm	Weight	81.1 kg/m	Interval	481.11 m to surface	Type	
Depth	480 m	Size	mm	Weight	kg/m	Interval		Depth	m
Drill Pipe Size	mm	Size	mm	Weight	kg/m	Interval		Type	
Weight	kg/m	Size	mm	Weight	kg/m	Interval		Depth	m
Interval	Perforations at								
TONNES		CEMENT BLEND				DENSITY (kg/m³)		SLURRY VOLUME (m³)	
32.0		0:1:0 "G" + 1.0% CaCl₂				1901		24.32	
29.0		0:1:0 "G" + 2.0% CaCl₂				1901		22.04	

DESCRIPTION	TIME	VOLUME (m ³)	RATE (m ³ /min)	PRESSURE (MPa)	COMMENTS
Fill Lines	01:26	1.0	1.1	30.0	H ₂ O
Pressure Test					
Preflush	01:29	5.0	1.1	29.0	H ₂ O
Spacer	01:33	4.0	1.2	29.0	Visweep
Fill Cement	01:38	24.32	1.2	28.0	0:1:0 "G" + Additives mixed @ 1901 kg/m ³
Tail Cement	02:03	22.04	0.8	22.0	0:1:0 "G" + Additives mixed @ 1901 kg/m ³
Drop Plug	02:22				Pump out lines
Displacement	02:26	23.6	0.7 - 0.2	18.0 - 14.0	H ₂ O
Bump Plug					Float held. 4.0 m ³ Cement returns.

Paramount et al Arrow Head
Surface Casing / January 20, 1998 / #51423



Time of Day

PARAMOUNT RESOURCES LTD.**CASING SUMMARY**

WELL NAME PARAMOUNT ET AL. LOCATION ARROWHEADN65 DATE 98-02-01
 SURFACE () INTERMEDIATE (^) PRODUCTION () LINER ()

Size: 244.5 mm	NO.	DESCRIPTION	MEASURED	
			LENGTH	KB Depth
KB: 6.7 m	136	244.5MM,64.74 KG/M,L80, LT/C	1891.36	1890.0
KB - CF: 6.97M		Scratchers		
	34	Centralizers		
		Total String	1891.36	
		minus KB to Csg Top (STICK UP)	1.36	Cut-off
		Landed Depth KB	1890.00	Jt. Length
		Hole Depth KB	1890.00	
		Distance Csg Landed Off Bottom	NILL	

Cementing Company SANJEL

Wash-Type PRE FLUSH INVERT, INVERT SPACER Volume: 6M3

Cement Type Lead Slurry LW14, 29 TONN, 1400 KG/M3 Volume: 47M3

Additives 2%,SMS, 2% LWA, 2% CACL2,

Cement Type Tail Slurry 0-1-0 G, 43TONN.,1901 KG/M3. Volume: 32.7 M3.

Additives .4% CFL 3.1% CFL-H,2% SPC2,

Cement Type Above Stage Collar Volume: _____

Additives _____

Displacement Rate: Max 1 m3/min Average 0.7 m3/min

Calculated Cement Top(s): (fill) _____ mKB (tail) _____ mKB

Returns: Mud 157M3 Cement NILL m3

String Wt. in Mud Wt of: 980 kg/m3 = 116,000 daN

Wt. set on slips: 75,000 daN

Remarks: NO CEMENT RETURNS TO SURF ON CEMENT JOB , WORKED CSG
3-5M WHILE MIXING AND MOST OF THE DISPLACEMENT. RECOVERED APP.157
M3, OF CUTTER D" DRILLING FLUID.

Supervisor ROD. MacEACHERN

SANJEL CEMENTERS LTD.

2400, 639 - 5th Avenue S.W.
Calgary, Alberta T2P 0M9
Phone #: (403) 269-1420 Fax #: (403) 269-1433

DATE: January 31, 1998

TICKET NUMBER: 60259-60



WELL NAME: Paramount Arrowhead

TYPE OF JOB: Intermediate Casing

COMPANY REPRESENTATIVE: Rod MacEacheld

SANJEL REP.: Sean Marshall

UNIT #: 4429

L.S.D: Lot 60, 34 Long 122:57 #2449A

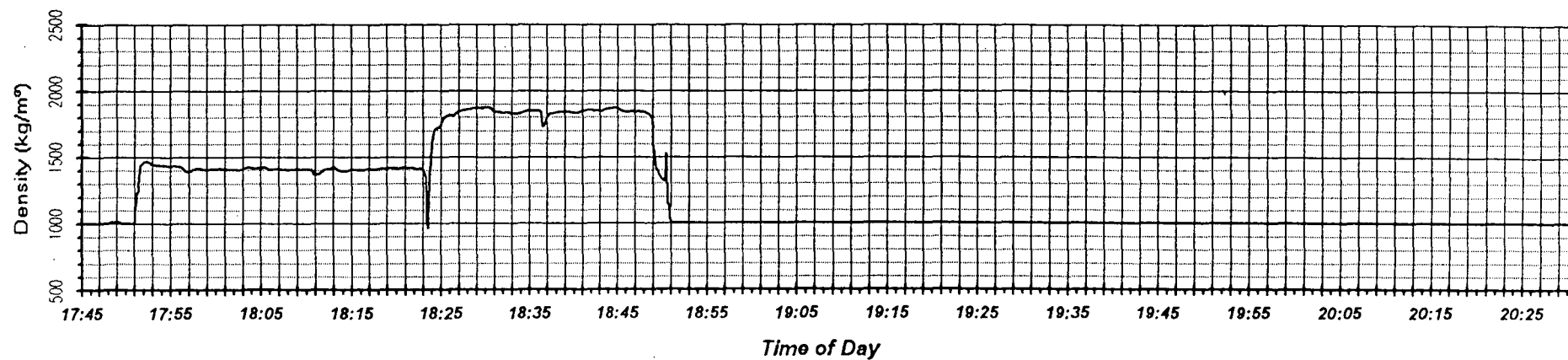
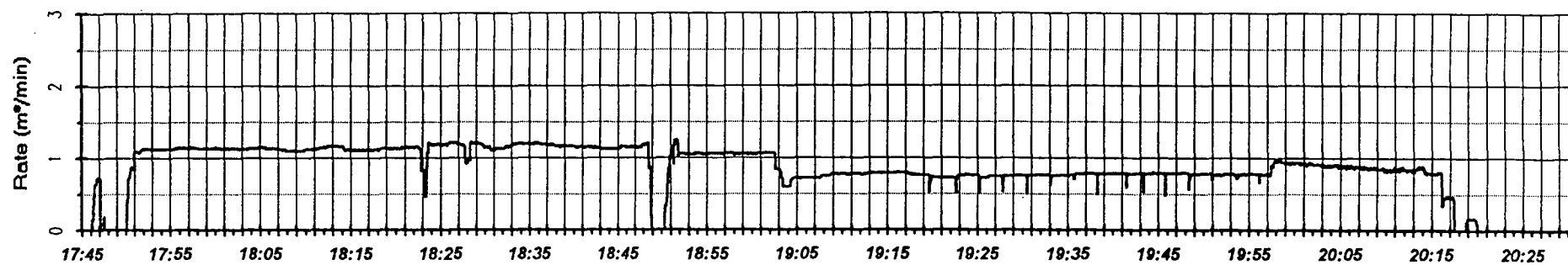
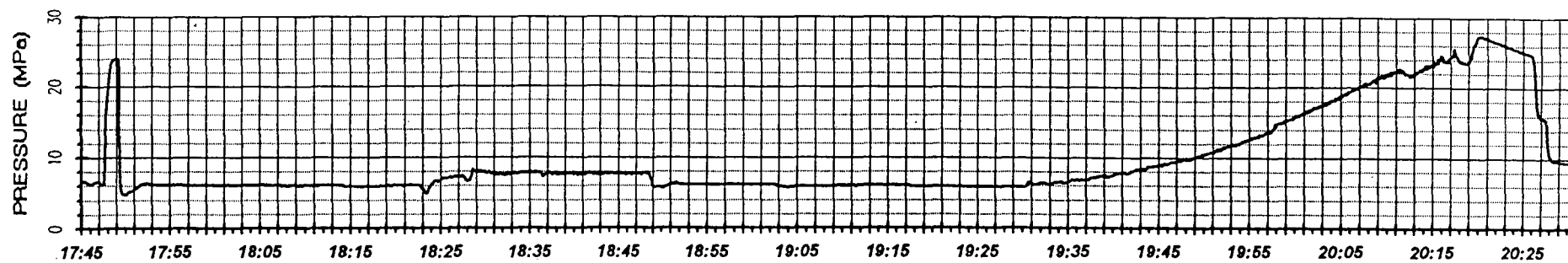
PDM OPERATOR: SAM

WELL DATA		TUBULARS				SPECIAL TOOLS			
Hole Size	311 mm	Size	244 mm	Weight	53.57 kg/m	Interval	1891.35 m to surface	Type	
Depth	1890 m	Size	mm	Weight	kg/m	Interval		Depth	m
Drill Pipe Size	mm	Size	mm	Weight	kg/m	Interval		Type	
Weight	kg/m	Size	mm	Weight	kg/m	Interval		Depth	m
Interval	Perforations at								
TONNES		CEMENT BLEND				DENSITY (kg/m³)		SLURRY VOLUME (m³)	
29.0		LW-14 + 2.0% SMS + 2.0% LWA + 2.0% CaCl₂				1400		47.0	
43.0		0:1:0 'G' + 0.4% CFL-3 + 0.1% CFL-H + 0.2% SPC II				1901		32.7	

DESCRIPTION	TIME	VOLUME (m ³)	RATE (m ³ /min)	PRESSURE (MPa)	COMMENTS
Fill Lines	17:46	0.5	0.7	6.0	H ₂ O
Pressure Test	17:48			24.0	
Preflush	17:50	3.0	0.9	5.0	Invert Preflush
Spacer	17:51	3.0	1.2	6.0	Invert Spacer
Fill Cement	17:55	47.0	1.2	6.0	LW-14 + Additives mixed @ 1400 kg/m ³
Tail Cement	18:24	32.7	1.2	6.0	0:1:0 'G' + Additives mixed @ 1901 kg/m ³
Drop Plug	18:49				Pump out lines
Displacement	18:51	72.9	1.2 - 0.5	6.0 - 25.0	H ₂ O
Bump Plug	20:21			27.0	No Cement returns. Float held.

NOTE: Invert Preflush and Invert Spacer pumped by C & A.

Paramount Arrowhead
Intermediate Casing / January 31, 1998 / #60259 - 60260



PARAMOUNT RESOURCES LTD.

CASING SUMMARY

WELL NAME Paramount Berkley Arrowhead LOCATION N-65 DATE 98/02/06
 SURFACE () INTERMEDIATE (2) PRODUCTION () LINER ()

Size: 339.7mm	NO.	DESCRIPTION	MEASURED LENGTH	KB Depth
KB: 6.7 m	58	177.8 mm, 38.69 kg/m, N80, LT&C	806.01	
KB - CF: 6.97 m		liner c/w Cardium spaded float shoe,		
		latch float collar, Cardium extended		
		bbl rotating liner hanger c/w		
		pack off element for a total length of		
		806.01 m. Overlap inside 244 mm		
		liner 167 m.		
		TOP OF LINER ASSEMBLY 1723.99 M		
		LANDED DEPTH 2529 M		
		Scratchers		
		Centralizers		
	Total String		806.01	
	minus KB to Csg Top (STICK UP)			Cut-off
	Landed Depth KB		2529.00	Jt. Length
	Hole Depth KB			
	Distance Csg Landed Off Bottom			

Cementing Company Sanjel

Wash-Type _____ Volume: _____

Cement Type Lead Slurry see attached cementing reports Volume: _____

Additives _____

Cement Type Tail Slurry _____ Volume: _____

Additives _____

Cement Type Above Stage Collar _____ Volume: _____

Additives _____

Displacement Rate: Max _____ m3/min Average _____ m3/min

Calculated Cement Top(s): (fill) _____ mKB (tail) _____ mKB

Returns: Mud _____ Cement 2 m3

String Wt. in Mud Wt of: _____ kg/m3 = _____ daN

Wt. set on slips: _____ daN

Remarks: _____

Supervisor _____

SANJEL CEMENTERS LTD.

2400, 639 - 5th Avenue S.W.

Calgary, Alberta T2P 0M9

Phone #: (403) 269-1420 Fax #: (403) 269-1433

DATE: February 07, 1998

TICKET NUMBER: 59590



WELL NAME: Paramount et al Arrowhead

TYPE OF JOB: Liner

COMPANY REPRESENTATIVE: Rod McEachern

SANJEL REP.: Richard Harasen

UNIT #: 4405

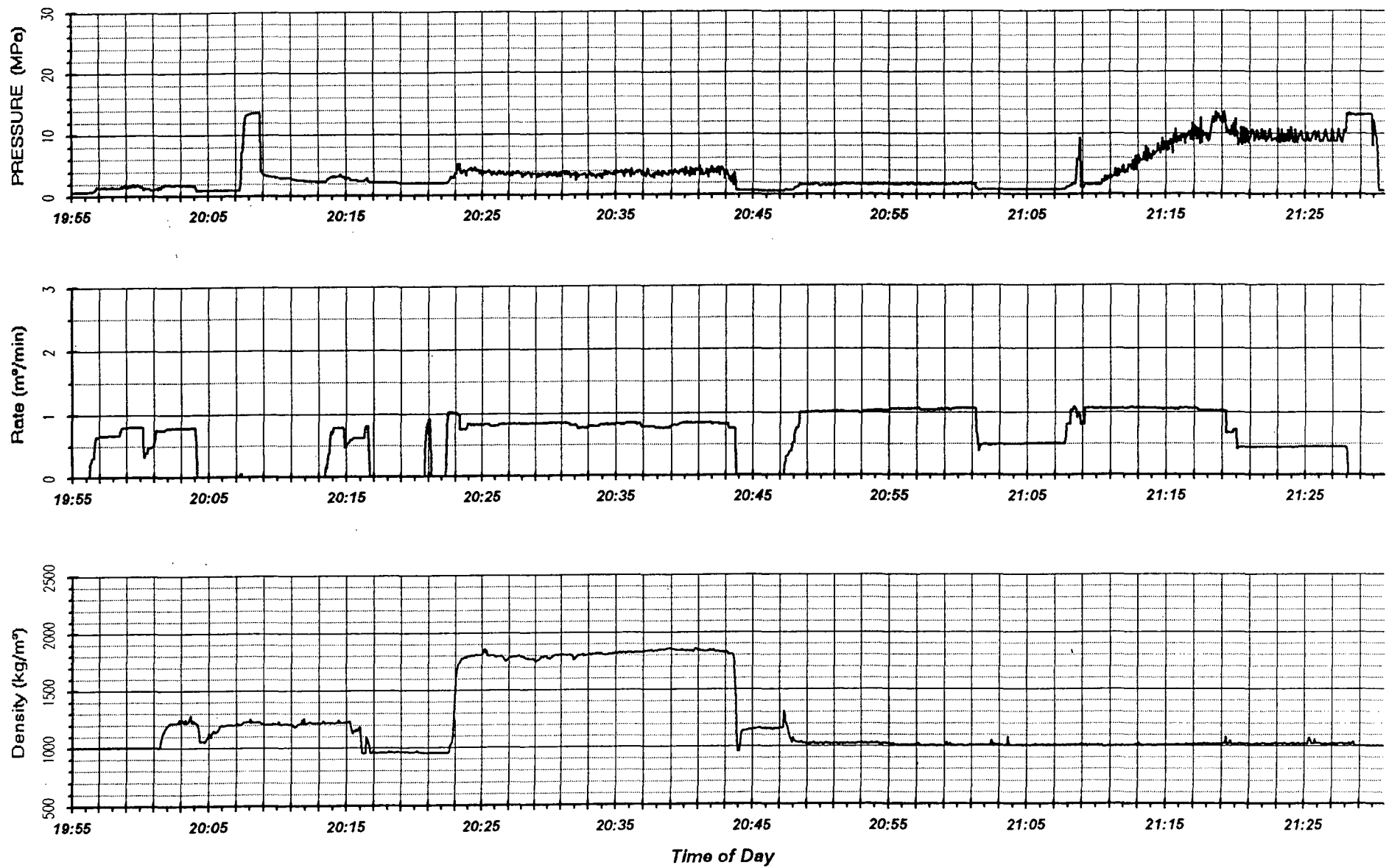
L.S.D: N-65

PDM OPERATOR: SAM

WELL DATA		TUBULARS				SPECIAL TOOLS			
Hole Size	mm	Size	177.8 39.98 mm	Weight	38.69 kg/m	Interval	1724 m to 2530 m	Type	Liner Hanger
Depth	2530 m	Size	mm	Weight	kg/m	Interval	1890 m to 2530 m	Depth	1724 m
Drill Pipe Size	mm	Size	mm	Weight	kg/m	Interval	1724 m to surface	Type	
Weight	kg/m	Size	mm	Weight	kg/m	Interval		Depth	m
Interval	Perforations at								
TONNES		CEMENT BLEND				DENSITY (kg/m ³)		SLURRY VOLUME (m ³)	
19.5		Thermal 40 + 1.0% CFR + 0.35% CFL-2 + 0.35% CFL-H + 0.8% HTR-B + 1.3% LTR				1885		14.6	

DESCRIPTION	TIME	VOLUME (m ³)	RATE (m ³ /min)	PRESSURE (MPa)	COMMENTS
Fill Lines	19:57	3.0	0.7	1.0	Invert preflush
Invert Spacer	20:02	2.0	0.8	2.0	Invert spacer @ 1200 kg/m ³
Pressure Test	20:08			13.0	
Invert Spacer	20:16	1.0	0.6	2.0	Invert spacer @ 1200 kg/m ³
Fill Cement	20:23	14.6	1.0	4.0	Thermal 40 mixed @ 1885 kg/m ³
Drop Plug	20:43				Pump out lines
Displacement	20:48	31.7	1.0 - 0.4	1.0 - 10.0	H ₂ O
Bump Plug	21:28			13.0	Float held. Job complete.

Paramount et al Arrowhead / N-65
Liner / February 6, 1998 / #59590



LINER #2

CASING SUMMARY

WELL NAME PARAMOUNT ET AL. LOCATION _ ARROWHEADN65
 SURFACE () INTERMEDIATE () PRODUCTION () LINER#2 (^)

DATE: 98-02-23/24

Size: 139.7

KB: 6.7 m

KB - CF: 6.97M

NO.	DESCRIPTION	MEASURED LENGTH	KB Depth
39	139.7MM, 25.3KG/M, L80, RG.3, FLUSH HYD 511, ALGOMA, NEW,	553.33	
1	1-SMITH INTERNATIONAL LINER HANGER.	2.73	
	Scratchers		
	Centralizers		
Total String		556.06	
minus KB to Csg Top (STICK UP)			Cut-off
Landed Depth KB		2856.09	Jt. Length
Hole Depth KB		2925.00	
Distance Csg Landed Off Bottom		68.91	

Cementing Company **SANJEL**
 Wash-Type **H2O** Volume: **1.M3**
 Cement Type **Lead Slurry** **THERIMAL 40, 7 TONNES DENSITY 1885KG/l** Volume: **5.2 M3**
 Additives **1% CFR, 89% CFL2, 1.2% LTR, 7% H+R-B.**
 Cement Type **Tail Slurry** Volume:
 Additives
 Cement Type **Above Stage Collar** Volume:
 Additives
 Displacement Rate: Max **0.7** m3/min Average **0.5** m3/min
 Calculated Cement Top(s): (fill) mKB (tail) mKB
 Returns: Mud **FULL** Cement m3
 String Wt. in Mud Wt of: **1075** kg/m3 = **57,000** daN
 Wt. set on slips: daN
 Remarks: **LINER DIFFERENTIAL STUCK @ 2856.09M KB. CEMENTED LINER @ THIS DEPTH. FULL RETURN ON CEMENT JOB, PUT 30M CEMENT PLUG ON TOP OF THE LINER TOP.**

Supervisor **ROD. MacEACHERN**

SANJEL CEMENTERS LTD.

2400, 639 - 5th Avenue S.W.
Calgary, Alberta T2P 0M9
Phone #: (403) 269-1420 Fax #: (403) 269-1433

DATE: February 24, 1998

TICKET NUMBER: 60676



WELL NAME: Paramount et al Arrowhead

TYPE OF JOB: Liner

COMPANY REPRESENTATIVE: Rod McEachern

SANJEL REP.: Richard Harasen

UNIT #: 4405

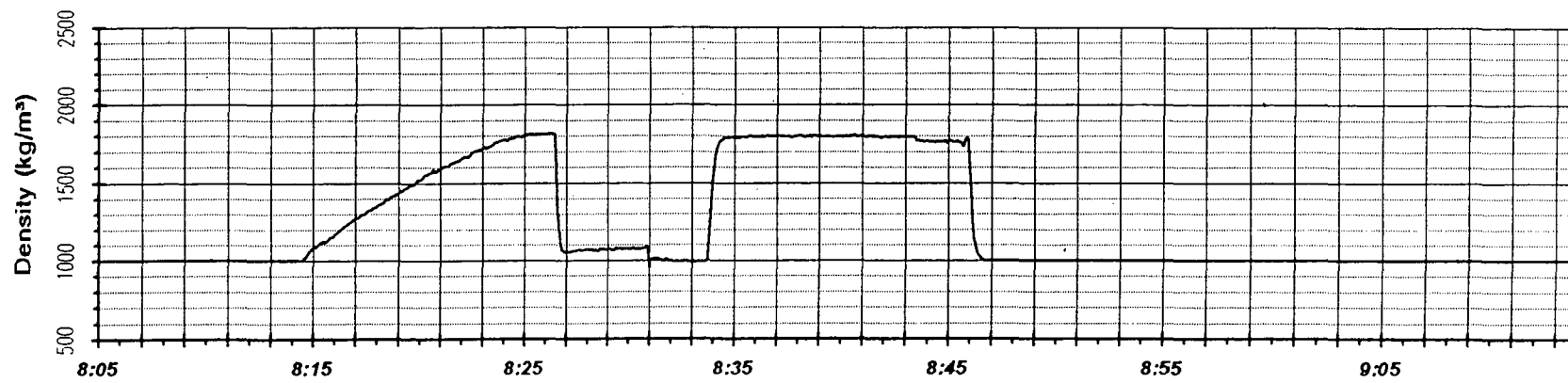
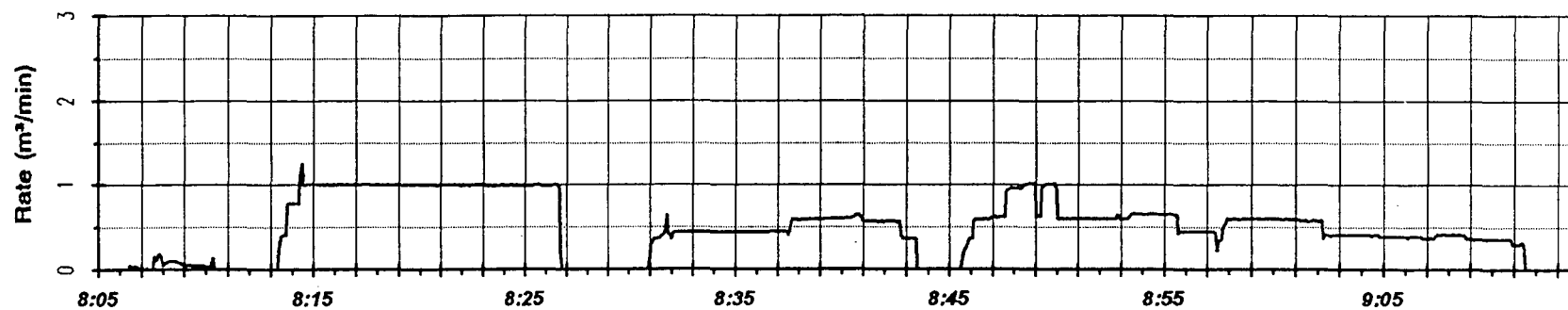
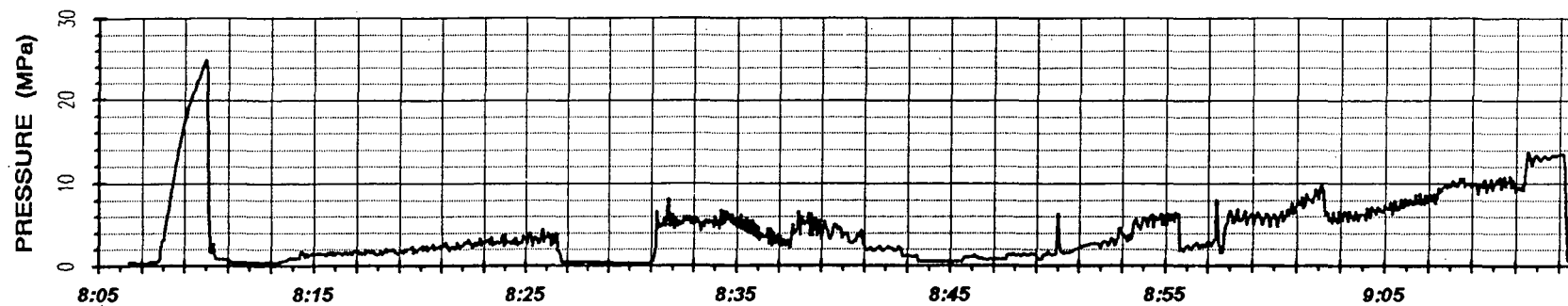
L.S.D: N-65

PDM OPERATOR: SAM

WELL DATA		TUBULARS				SPECIAL TOOLS			
Hole Size	mm	Size	139 mm	Weight	25.3 kg/m	Interval	2302.71 m to 2856.09 m	Type	Liner Hanger
Depth	2302.71 m	Size	mm	Weight	kg/m	Interval	2529 m to 2930 m	Depth	2299.94 m
Drill Pipe Size	mm	Size	mm	Weight	kg/m	Interval	2299.94 m to surface	Type	
Weight	kg/m	Size	mm	Weight	kg/m	Interval		Depth	m
Interval		Perforations at							
TONNES		CEMENT BLEND				DENSITY (kg/m³)		SLURRY VOLUME (m³)	
7.0		Thermal 40 RAS + 1.0% CFR + 1.2% LTR + 0.7% HTR-B + 0.8% CFL-2				1885		5.2	

DESCRIPTION	TIME	VOLUME (m ³)	RATE (m ³ /min)	PRESSURE (MPa)	COMMENTS
Pressure Test	08:09			25.0	
Preflush	08:14	1.0	1.2	1.0	H ₂ O
Batch Mix	08:15	7.0 <i>IL</i>	1.0	1.0	Thermal 40 RAS + Additives batch mixed.
Cement	08:34	5.2	0.4	6.0	Thermal 40 RAS + Additives mixed @ 1885 kg/m ³
Drop Plug	08:43				Pump out lines
Displacement	08:46	13.7	0.6 - 0.4	1.0 - 9.0	H ₂ O
Bump Plug	09:12			13.0	Float held.

Paramount et al / Flowhead / N-65
Liner / February 24, 1998 / #60676



Time of Day

PARAMOUNT BERKLEY ARROWHEAD N-65

MUD DATA

CONCORD DRILLING FLUIDS LTD.

WELL DATA RECAP & SUMMARY

TABLE 5

DRILLING FLUIDS

OPERATOR	PARAMOUNT RESOURCES	SPUD IN DATE	98-01-15	MUD VANS ON LOCATION	YES
WELL NAME	PARAMOUNT ARROWHEAD	DRILL OUT DATE	98-01-24		
LOCATION	N-65	T.D. DATE	98-02-14	HI - BOY ON LOCATION	NO
PROVINCE	NWT	RELEASE DATE	98-02-24		
CONTRACTOR	NABORS #16	TOTAL DEPTH m.	2925	PALLETS or TARPS USED	NO
CONCORD REP.	GARTH SHEWCHUK	TOTAL # DAYS	40		

SURFACE HOLE INTERVAL				OPERATIONS			SURVEY RECORD		
HOLE SIZE mm.	444			Spudded surface hole on January 15, 1998 with Gel Chemical. Drilled to 480 meters with <i>minor lost circulation.</i>			DEPTHS	ANGLE	
INTERVAL m.	0 - 480						64	3/4	
CASING SIZE mm.	339.7						100	1/2	
MUD SYSTEM	GEL CHEMICAL						145	1/2	
DRILLING HRS.	90.5	# BITS	3				199	1/4	
REAMING HRS.		# DAYS	8				Ran and set 339.7 mm surface casing with no problems. Cemented.		
MUD COSTS	\$8,264			AVERAGE MUD COST / M.		\$17.22	303	1/2	
				TOTAL METRES	480	AVERAGE R.O.P. M. / HR.	5.30	361	1/2

INTERMEDIATE HOLE 1 INTERVAL				OPERATIONS					
HOLE SIZE mm.	311							404	1
INTERVAL m.	480 - 1890			Drilled with air to 1890 meters with no hole problems.				479	1 3/4
Casing SIZE mm.	244							522	2
MUD SYSTEM	AIR			Ran Casing and cemented with no hole problems.				588	2 1/8
DRILLING HRS.	61	# BITS	3					627	3
REAMING HRS.		# DAYS	5					737	1
MUD COSTS	N/A							824	3/4
								920	3/4
								1014	1
					AVERAGE MUD COST / M.		\$147.23	1106	1
TOTAL METRES		686	AVERAGE R.O.P. M. / HR.		3.22		1220	1	

INTERMEDIATE HOLE 2 INTERVAL			OPERATIONS			
HOLE SIZE mm.	216		Drilled with Air from 1890 metres to 2515 meters. Displaced hole to "D-VIS OPEN HOLE		1330	3/4
INTERVAL m.	1890 - 2530		OIL" and drilled from 2515 - 2530 meters. Water invasion into oil from cementing the		1445	1
CASING SIZE mm.	177		liner. Required 'hot lime' additions to absorb water out of the oil.		1890	2 3/4
MUD SYSTEM	AIR / D-VIS OPEN HOLE OIL				1956	3
DRILLING HRS.	37.5	# BITS 3			2012	2
REAMING HRS.		# DAYS 8			2099	2
MUD COSTS	\$18,600				2155	4
					2212	2 3/4
			AVERAGE MUD COST / M.		\$29.06	
					2270	4 1/8
TOTAL METRES		640	AVERAGE R.O.P. M. / HR.		17.07	
					2308	5

MAIN HOLE INTERVAL				OPERATIONS			
HOLE SIZE mm.	156					2349	4
INTERVAL m.	2530 - 2925					2385	3
CASING SIZE mm.	139.7			Drilled with Nitrogen from 2530 - 2630 emters. No geological samples.		2414	2 1/4
MUD SYSTEM	NITROGEN / FOAM			Drilled with foam and nitrogen from 2630 - 2925 meters. Took on formation water		2471	2
DRILLING HRS.	38.75	# BITS	2	near total depth of .6 - 1.0 m ³ / min. It was decided to mud up with Polymer to the		2503	1
REAMING HRS.	2	# DAYS	19	formation water and treat losses with Calcium Carbonate.		2529	1
MUD COSTS	\$137,722			The well was logged. A 139.7 mm Liner was run. The liner got stuck at 2856 meters; cemented.			
				Bottom Hole Temperature = 150 °C			
				AVERAGE MUD COST / M.	\$348.66		
TOTAL METRES	395			AVERAGE R.O.P. M. / HR.	10.19		

PRODUCTS USED ;							
GEL	463	HOT LIME	60	CALCIUM CARB.	429	ULTRA SEAL	48
BARITE	693	KWIK SEAL	5	DEFOAMER	1	UNI-DOAM	26
CAUSTIC SODA	61	X-CIDE 207	14	LIGNITE	10	VISCOM	28
VIS PLUS	40	SAWDUST	207	RHODOPOL	20	BENTONE 150	30
SE	12	SODA ASH	2	RHODOCOMP	45	INHIBOX	16
ER D	15 m³	ZINC CARBONATE	21	SAPP	4	CEMENT	6
				SAFE T COAT	46		

ITEM / COST SUMMARY	DEPTHS m.	COSTS	MUD COST SUMMARY	
CIRCULATION (SURF)			INVOICED MUD COST	\$164,585.28
CIRCULATION (MAIN)	2600 - 2926	\$73,000.00	MUD COST / METRE	\$56.27
LAND LEG COST			EQUIPMENT RENTALS	\$2,475.00
			TRUCKING COSTS	\$21,455.00
MATERIALS			VAN / HIBOY RENTAL	\$2,700.00
ANHYDRITE			SERVICE COSTS	\$9,500.00
MUD BREAKERS			RESTOCKING	\$173.90
SLOUGHING HOLE			TOTAL GST	\$14,062.52
			TOTAL COSTS	\$214,955.73

CONCORD FIELD REP.	GARTH SHEWCHUK	PHONE #	403 234 7771
CONCORD SALES REP.	DAN ANDERSON	PHONE #	250 785 4715

PARAMOUNT BERKLEY ARROWHEAD N-65

FORMATION LEAK-OFF TESTS

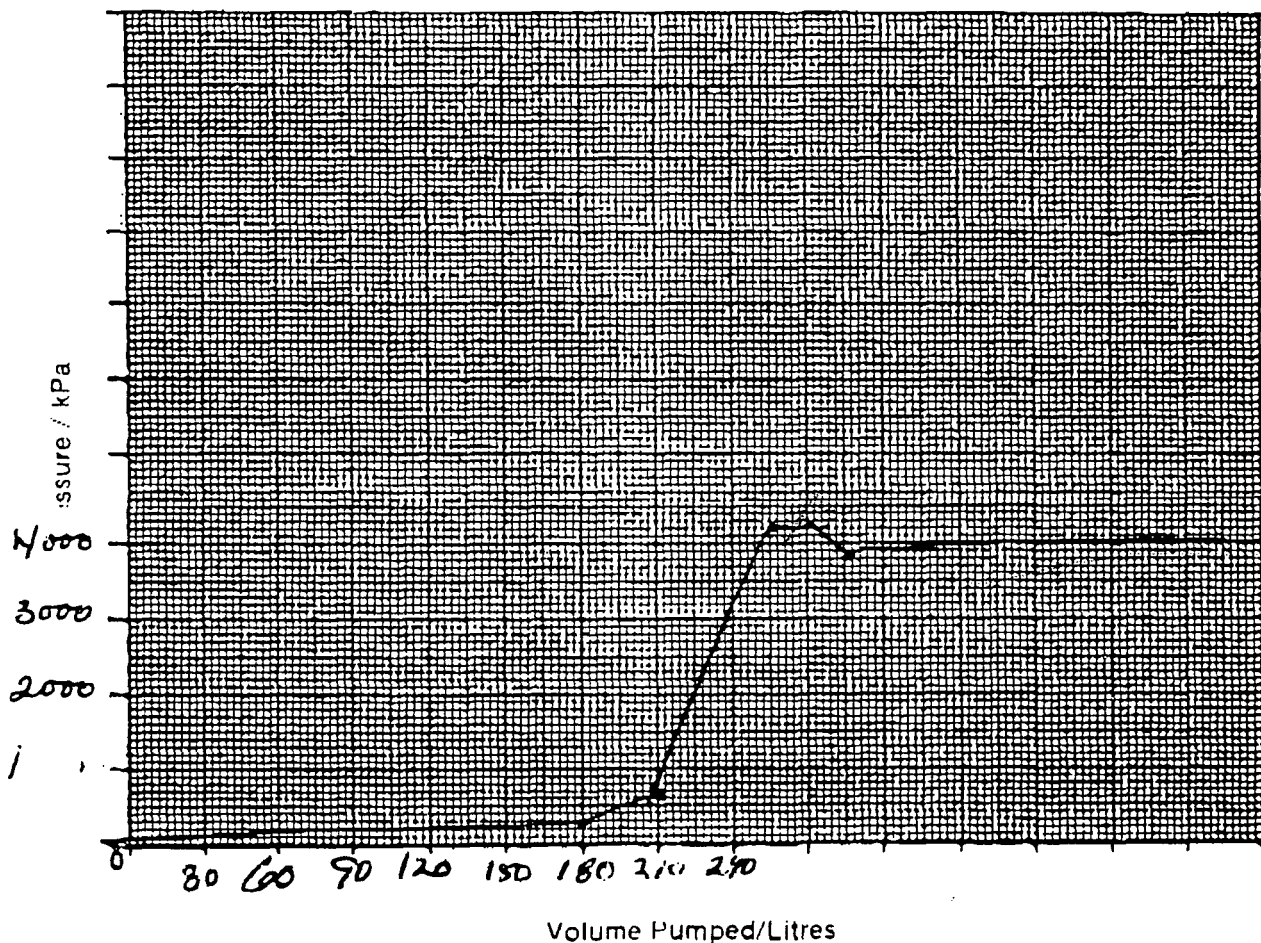
**FALCON
PRESSURE TESTERS LTD.**

8704 - 107th Street, Fort St. John, B.C. V1J 5R6 TELEPHONE (604) 785-4540

FORMATION PRESSURE TEST

Oil Company Paramount Res
Location Lat 60°-34' Long 122°-57'Date 98-1-24
Contractor Nabour's #76

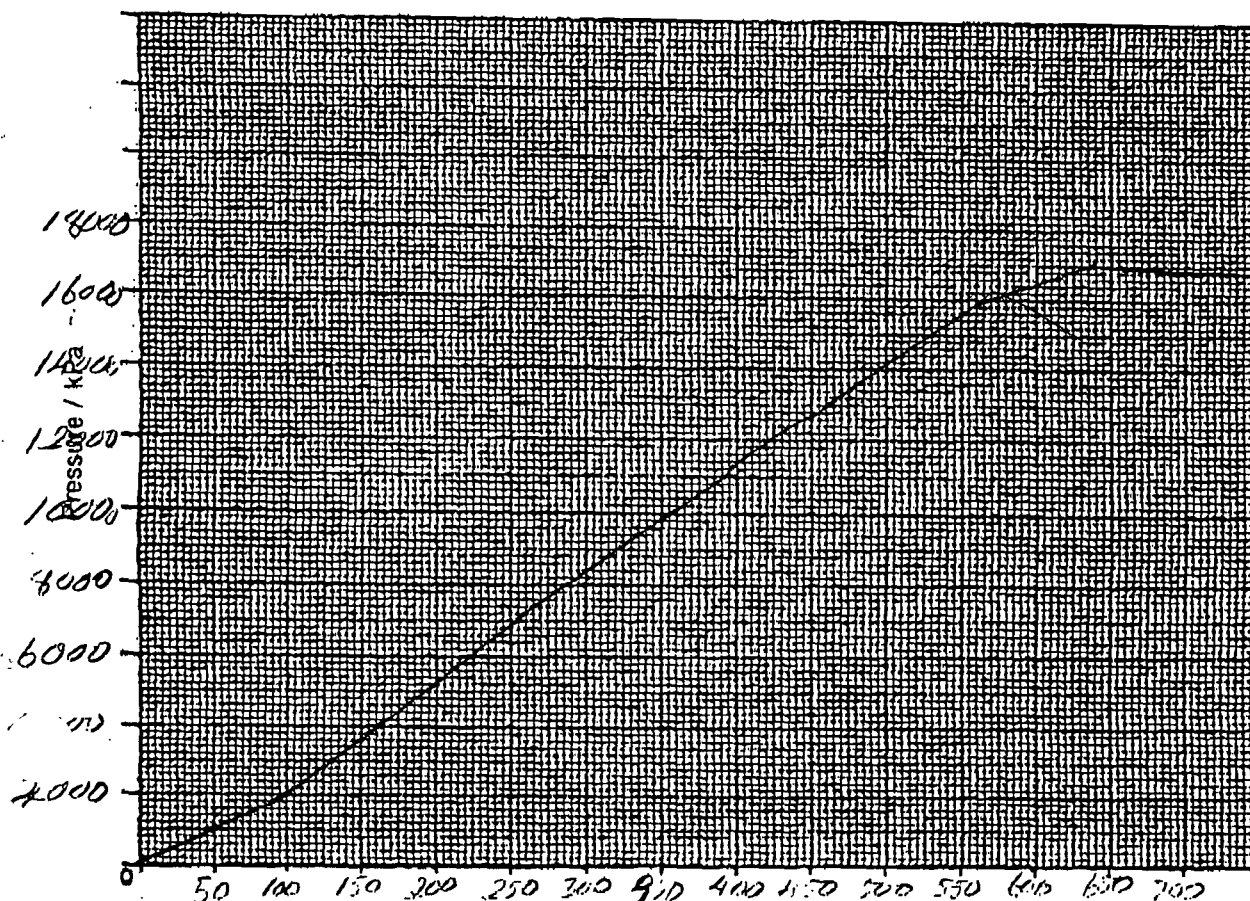
Piston Size 25 mm
Stroke Length 79 mm
Depth of Casing 480
Depth Drilled Out 490
Gradient of Fluid in Hole 1050
Hydrostatic Pressure 4944
Leak-Off Pressure 4176
Total Pressure at Shoe 9020
Formation Gradient 18.79



**FALCON
PRESSURE TESTERS LTD.**

8704 - 107th Street, Fort St. John, B.C. V1J 5R6 TELEPHONE (604) 785-4540

FORMATION PRESSURE TEST

Oil Company PARAMOUNT RESOURCESDate FEB 02 / 98Location LAT 60-34 - Long 122-57Contractor NABORS 16Piston Size 25.4 MMStroke Length 80 MMDepth of Casing 1890Depth Drilled Out 1893 m / KB. 1Gradient of Fluid in Hole 9.81Hydrostatic Pressure 18540Leak-Off Pressure 17000Total Pressure at Shoe 35540Formation Gradient 18.80

Volume Pumped/Litres

266-6032

PARAMOUNT BERKLEY ARROWHEAD N-65

TIME DISTRIBUTION

DRILLING RIG TIME DISTRIBUTION
PARAMOUNT BERKLEY ARROWHEAD N-65

	JANUARY																FEBRUARY									
DATE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6			
DAYS FROM SPUD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
DRILLING	13	15.25	21.25	17	19	15	15	5.5					11.25	19.25	21.5	8				1.75	10.75	15.75	3.25			
TRIPS		6.75		5.5	3.5	6	6	5		1.5	0.5	1.5	4	2.5		8.25	13.75			4.5	7	7.75	15.5			
RIG SERVICE		0.75	0.5	0.5	0.25	0.5	0.5				0.25	3	0.5	0.5	0.5	0.25	1.25	0.25	0.25	0.25	0.5		0.75			
SURVEY	1.5	1.25	2.25	1	0.75	0.75	0.75	1				0.25	2	1.25	2	2					2.5		1			
REAM & COND																										
COND MUD	3.5																									
CIRCULATE					0.5	1	1	3.5		0.25		0.5		0.5		1.25	7.5		5.5	3.25	2.5		2.5			
RIG REPAIRS						0.75	0.75																			
CSG & CMT								9	6.25									8.75	11.75							
FISHING																										
LOGGING																		7.5								
CORING																										
TESTING																										
WAITING TIME																										
NU & PT								17.75	22.25	6.5								6	10.75							
DRILL OUT										16.75	11								3.5							
LOST CIRC																										
LD DP & DC																										
PLUG/ABAND																										
RIG UP OTHER	5											7.75	6.25		4.25	1.5	7			0.75		0.75				
SAFETY MTG	1																	0.5	0.5			0.5	0.25			
TOTAL	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24			

TABLE 2
TIME DISTRIBUTION

DRILLING RIG TIME DISTRIBUTION
PARAMOUNT BERKLEY ARROWHEAD N-65

[illegible]

PARAMOUNT BERKLEY ARROWHEAD N-65

DEVIATION RECORD

DEVIATION SURVEY RECORD

Depth (m)	Deviation	Azimuth	Depth (m)	Deviation	Azimuth
46m	1		2155m	4	
64m	3/4		2241m	2 1/4	
83m	0		2270m	4 1/8	
100m	0		2300m	5	
127m	1/4		2308m	5	
145m	1/2		2385m	3	
173m	1		2414m	2 3/4	
183m	0		2443m	2 7/8	
199m	1/4		2471m	2	
227m	1/4		2503m	1	
242m	3/4		2529m	1	
266m	1/2				
284m	1/2				
303	1/2				
323	1/2				
342m	3/4				
361	1/2				
380m	1/2				
404m	1				
424m	1				
443m	1/2				
462m	2				
471m	2				
480m	1 3/4				
522m	2				
627m	3				
650	2 1/4				
737m	1				
824m	3/4				
920m	3/4				
1014m	1				
1106m	1				
1220m	1				
1330m	3/4				
1445m	1				
153m	1 1/2				
1618m	1 3/4				
1700m	2				
1806m	2				
1884m	2 1/4				
1890m	2 3/4				
1956m	3				
1984m	3				
2012m	2				
2099m	2				

WELLTYPE: WELL98

CLIENT: PARAMOUN

Attn: Greg Elliot

Well Name: N65

FEB. 4/98

Computation Method: 1 (Minimum Curvature)

Plane Of Vert Section 0.00 Height Of TVD Origin Above Field Datum 0.00

Distance Units used m Dogleg Base Length Used 30

Grid Convergence 0.000 Magnetic Declination 0.000

MD	Inc	Dir	Tvd	Vsec	Lat	Dep	Build	Turn	Dleg	Tool
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
480.0	1.75	0.00	479.9	7.3	7.3	0.0	0.1	0.0	0.1	
522.0	2.00	0.00	521.9	8.7	8.7	0.0	0.2	0.0	0.2	
550.0	2.00	0.00	549.9	9.7	9.7	0.0	0.0	0.0	0.0	
588.0	2.13	0.00	587.9	11.0	11.0	0.0	0.1	0.0	0.1	
627.0	3.00	0.00	626.8	12.8	12.8	0.0	0.7	0.0	0.7	
650.0	2.25	0.00	649.8	13.8	13.8	0.0	-1.0	0.0	1.0	
737.0	1.00	0.00	736.8	16.3	16.3	0.0	0.4	0.0	0.4	
824.0	0.75	0.00	823.8	17.6	17.6	0.0	-0.1	0.0	0.1	
920.0	0.75	0.00	919.7	18.9	18.9	0.0	0.0	0.0	0.0	
1014.0	1.00	0.00	1013.7	20.3	20.3	0.0	0.1	0.0	0.1	
1106.0	1.00	0.00	1105.7	21.9	21.9	0.0	0.0	0.0	0.0	
1200.0	1.00	0.00	1219.7	23.9	23.9	0.0	0.0	0.0	0.0	
1300.0	0.75	0.00	1329.7	25.6	25.6	0.0	-0.1	0.0	0.1	
1445.0	1.00	0.00	1444.7	27.4	27.4	0.0	0.1	0.0	0.1	
1533.0	1.50	0.00	1532.7	29.3	29.3	0.0	0.2	0.0	0.2	
1618.0	1.75	0.00	1617.6	31.7	31.7	0.0	0.1	0.0	0.1	
1700.0	2.00	0.00	1699.6	34.4	34.4	0.0	0.1	0.0	0.1	
1806.0	2.00	0.00	1805.5	38.1	38.1	0.0	0.0	0.0	0.0	
1884.0	2.25	0.00	1883.5	41.0	41.0	0.0	0.1	0.0	0.1	
1890.0	2.75	0.00	1889.5	41.2	41.2	0.0	2.5	0.0	2.5	
1956.0	3.00	0.00	1955.4	44.5	44.5	0.0	0.1	0.0	0.1	
1984.0	3.00	0.00	1983.3	46.0	46.0	0.0	0.0	0.0	0.0	
2012.0	2.00	0.00	2011.3	47.2	47.2	0.0	-1.1	0.0	1.1	
2099.0	2.00	0.00	2098.2	50.3	50.3	0.0	0.0	0.0	0.0	
2155.0	4.00	0.00	2154.2	53.2	53.2	0.0	1.1	0.0	1.1	
2182.0	3.50	0.00	2181.1	55.0	55.0	0.0	-0.6	0.0	0.6	
2212.0	2.75	0.00	2211.1	56.6	56.6	0.0	-0.8	0.0	0.7	
2241.0	2.25	0.00	2240.0	57.9	57.9	0.0	-0.5	0.0	0.5	
2270.0	4.13	0.00	2269.0	59.5	59.5	0.0	1.9	0.0	1.9	
2300.0	5.00	0.00	2298.9	61.9	61.9	0.0	0.9	0.0	0.9	
2308.0	5.00	0.00	2306.9	62.6	62.6	0.0	0.0	0.0	0.0	
2330.0	4.00	0.00	2328.8	64.3	64.3	0.0	-1.4	0.0	1.4	
2349.0	4.00	0.00	2347.8	65.6	65.6	0.0	0.0	0.0	0.0	
2390.0	3.88	0.00	2367.7	67.0	67.0	0.0	-0.2	0.0	0.2	
2385.0	3.00	0.00	2383.7	67.9	67.9	0.0	-1.6	0.0	1.6	
2414.0	2.75	0.00	2412.6	69.4	69.4	0.0	-0.3	0.0	0.3	
2443.0	2.88	0.00	2441.6	70.8	70.8	0.0	0.1	0.0	0.1	
2474.0	2.00	0.00	2472.6	72.1	72.1	0.0	-0.8	0.0	0.8	

PARAMOUNT BERKLEY ARROWHEAD N-65

COMPOSITE WELL RECORD

4. GEOLOGY

Drill Cuttings	See following pages for sample descriptions
Sample Distribution:	Washed Cuttings, 5 meter intervals Surface to Total Depth
	Two Sets I.S.P.G., Calgary One Set Paramount
Cores	N/A
Lithology:	See following pages for descriptions
Stratigraphic Column	See Figure 2
Biostratigraphic Column	N/A

PARAMOUNT BERKLEY ARROWHEAD N-65

FORMATION TOPS (m)

GL: 567.9 M

K.B.: 574.6 M

FORMATION		PROGNOSIS	SAMPLE	LOGS	LOG/ SAMPLE SUBSEA
CRET SCATTER	✓	311	276 ?	491	+ 83.6
CRET GARBUTT	✓	349	328 ?	539	+ 35.6
MISS CHINKEH	✓			632	- 57.4
MISS FLETT	✓	451	628	635	- 60.4
MISS BANFF	✓	829	810	779	- 204.4
MISS EXSHAW	✓	1329	1318	1316	- 741.4
DEV KOTCHO	✓	1343	1329	1330	- 755.4
DEV TETCHO	✓	1720	1725	1728	- 1153.4
KAKISA	✓		1845	1844	- 1269.4
FT. SIMPSON	✓	1892	1870	1870	- 1295.4
DEV MUSKWA	✓	2542	2498		- 1923.4
SLAVE POINT	✓		2520		- 1945.4
WATT MTN	✓		2565		- 1990.4
SULPHUR PT	✓		2573		- 1998.4
NAHANNI	✓	2564	2639		- 2064.4
HEADLESS SH	✓		2740		- 2165.4
LANDRY (MANETOE)	✓		2768		- 2193.4
ARNICA	✓		2834		- 2259.4
TOTAL DEPTH		2864	2925		- 2350.4

PARAMOUNT BERKLEY ARROWHEAD N-65

**DRILLING CUTTINGS &
LITHOLOGY DESCRIPTIONS**

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

55 - 80	No sample - NO SAMPLE - predominant lost circulation material;
80 - 100	SANDSTONE - light gray, white, predominant quartzose, salt and pepper in part, very fine grained to fine grained, subangular, well sorted, <u>fair to poor intergranular porosity</u> , no visual show, slightly calcareous, trace carbonaceous laminae in part; SANDSTONE - light gray, white, predominant quartzose, salt and pepper in part, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly calcareous, trace carbonaceous laminae in part;
100 - 120	SANDSTONE - light gray, white, predominant quartzose, salt and pepper in part, very fine grained to fine grained, subangular, well sorted, <u>fair to poor intergranular porosity</u> , no visual show, slightly calcareous, trace carbonaceous laminae in part; SANDSTONE - light gray, white, predominant quartzose, salt and pepper in part, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly calcareous, trace carbonaceous laminae in part;
120 - 125	SANDSTONE - light gray, white, predominant quartzose, salt and pepper in part, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly calcareous, trace carbonaceous laminae in part;
125 - 145	SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, slightly silty in part;
145 - 175	SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, slightly silty in part;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 175 - 195 SANDSTONE - light gray, white, predominant quartzose, salt and pepper in part, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly calcareous, trace carbonaceous laminae in part, scattered argillaceous laminae; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, slightly silty in part; SILTSTONE - medium gray, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite;
- 195 - 205 SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part; SILTSTONE - medium gray, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite;
- 205 - 215 SANDSTONE - gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, slightly silty, occasionally calcareous in part; SILTSTONE - medium gray, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part;
- 215 - 220 SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part;
- 220 - 225 SANDSTONE - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, slightly silty, moderately siliceous in part, trace calcareous streaks in part; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 225 - 230 **SANDSTONE** - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, slightly silty, moderately calcareous in part; **SHALE** - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading **SILTSTONE** in part; **LIMESTONE** - white, translucent, cryptocrystalline, no visual show, no visible porosity, trace sandy streaks in part;
- 230 - 235 **SANDSTONE** - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, moderately calcareous in part; **SHALE** - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading **SILTSTONE** in part;
- 235 - 255 **SANDSTONE** - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, moderately calcareous in part; **SILTSTONE** - medium gray, grading to silty **SHALE**, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; **SHALE** - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading **SILTSTONE** in part;
- 255 - 275 **SANDSTONE** - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular to subrounded, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, trace kaolinitic in part, trace calcareous streaks in small part; **SHALE** - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading **SILTSTONE** in part;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 275 - 295 SANDSTONE - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular to subrounded, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, trace kaolinitic in part, trace calcareous streaks in small part; SILTSTONE - medium gray, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part;
- 295 - 315 SANDSTONE - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular to subrounded, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, trace kaolinitic in part, trace calcareous streaks in small part; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part;
- 315 - 335 SANDSTONE - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular to subrounded, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, trace kaolinitic in part, trace calcareous streaks in small part; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, moderately silty in part, grading SILTSTONE in part;
- 335 - 355 SANDSTONE - light gray, brown in small part, quartz, trace chert, very fine grained to fine grained, subangular to subrounded, well sorted, no visual show, no visible porosity, trace Iron, stained in part, slightly argillaceous, slightly silty, trace kaolinitic in part, trace calcareous streaks in small part; SHALE - medium gray, subfissile to blocky, trace pyrite, trace micromicaceous, trace silty streaks;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 355 - 385 **SANDSTONE** - light gray, brown in small part, quartz, trace chert, very fine grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, with scattered argillaceous laminae, slightly silty, grading to **SILTSTONE** in part, trace kaolinitic in part, trace calcareous streaks in small part; **SILTSTONE** - medium gray, grading to silty **SHALE**, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; **SHALE** - medium gray, subfissile to blocky, scattered **SILTSTONE** streaks, rare pyrite, trace micromicaceous, trace silty streaks;
- 385 - 415 **SANDSTONE** - light gray, brown in small part, quartz, trace chert, very fine grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, with scattered argillaceous laminae, slightly silty, grading to **SILTSTONE** in part, trace kaolinitic in part, trace calcareous streaks in small part; **SHALE** - medium gray, subfissile to blocky, scattered **SILTSTONE** streaks, rare pyrite, trace micromicaceous, trace silty streaks; **LIMESTONE** - white, translucent, cryptocrystalline, no visual show, no visible porosity, trace sandy streaks in part;
- 415 - 430 **SILTSTONE** - medium gray, grading to silty **SHALE**, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; **SHALE** - medium gray, subfissile to blocky, scattered **SILTSTONE** streaks, rare pyrite, trace micromicaceous, trace silty streaks;
- 430 - 445 **SILTSTONE** - medium gray, grading to silty **SHALE**, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; **SHALE** - medium gray, subfissile to blocky, scattered **SILTSTONE** streaks, rare pyrite, trace micromicaceous, trace silty streaks;
- 445 - 455 **SHALE** - medium gray, subfissile to blocky, scattered **SILTSTONE** streaks, rare pyrite, trace micromicaceous in part, trace silty streaks in small part;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

455 - 470	SILTSTONE - medium gray, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; SHALE - medium gray, subfissile to blocky, scattered SILTSTONE streaks, rare pyrite, trace micromicaceous in part, trace silty streaks in small part;
470 - 480	SILTSTONE - medium gray, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; SHALE - medium gray, subfissile to blocky, scattered SILTSTONE streaks, rare pyrite, trace micromicaceous in part, trace silty streaks in small part;
TD SFC HOLE: 480M	
480 - 490	SHALE - medium gray, subfissile, rare pyrite, trace silty streaks in small part;
490 - 505	SHALE - medium gray, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SILTSTONE - medium gray, salt and pepper, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite;
505 - 515	SHALE - medium gray, becoming dark gray in part, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SILTSTONE - medium gray, salt and pepper, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; SANDSTONE - light gray, salt and pepper, quartz, trace chert, predominant siliceous cement, very fine grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, with scattered argillaceous laminae, slightly silty, grading to SILTSTONE in part, trace dolomitic streaks in small part, trace pyrite in small part;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 515 - 525 SHALE - medium gray, becoming dark gray in part, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SILTSTONE - medium gray, salt and pepper, grading to silty SHALE, no visual show, no visible porosity, moderately argillaceous, trace calcareous streaks, trace pyrite; SANDSTONE - light gray, salt and pepper, quartz, trace chert, predominant siliceous cement, very fine grained, subangular, well sorted, no visual show, no visible porosity, scattered argillaceous laminae, slightly silty, rare dolomitic streaks in small part, trace pyrite;
- 525 - 535 SHALE - medium gray, becoming dark gray in part, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SANDSTONE - light gray, brown, quartz, trace chert, predominant siliceous cement, fine grained to very fine grained and some medium grained, subangular to subrounded, well sorted, light brown oil stain, milky white cut, no visible porosity, secondary dolomite cement in part, slightly argillaceous, slightly silty, trace pyrite;
- 535 - 540 SHALE - medium gray, becoming dark gray in part, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SANDSTONE - light gray, brown, quartz, trace chert, predominant siliceous cement, fine grained to very fine grained and some medium grained, subangular to subrounded, well sorted, light brown oil stain, milky white cut, no visible porosity, secondary dolomite cement in part, slightly argillaceous, slightly silty, trace pyrite;
- 540 - 560 SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite;
- 560 - 580 SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
580 - 600	SHALE - medium gray, becoming dark gray in part, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite;
600 - 620	SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite;
620 - 630	SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite; SHALE - Kaolin, white, fissile;
630 - 640	SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite; LIMESTONE - brown, medium gray in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, slightly argillaceous in part, trace pyrite;
640 - 650	SHALE - medium gray, becoming dark gray in part, subfissile, becoming blocky in part, trace pyrite, rare calcareous streaks in part, trace silty streaks; SHALE - dark gray, fissile to subfissile, trace pyrite veining, soft, grading to mudstone in part, trace micromicaceous, rare silty streaks, trace pyrite; LIMESTONE - brown, medium gray in part, indistinct fossil fragments in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, scattered argillaceous laminae in part, rare pyrite;
650 - 660	SHALE - medium gray, becoming dark gray in part, subfissile, trace pyrite, trace micromicaceous, trace calcareous streaks; LIMESTONE - brown, medium gray in part, indistinct fossil fragments in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, scattered argillaceous laminae in part, rare pyrite;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 660 - 670 Limestone - brown, medium gray in part, indistinct fossil fragments in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, scattered argillaceous laminae in part, rare pyrite; SHALE - medium gray, becoming dark gray in part, subfissile, trace pyrite, trace micromicaceous, trace calcareous streaks;
- 670 - 685 Limestone - brown, medium gray in part, indistinct fossil fragments in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, scattered argillaceous laminae in part, rare pyrite; SHALE - medium gray, becoming dark gray in part, subfissile, trace pyrite, trace micromicaceous, trace calcareous streaks;
- 685 - 690 Limestone - brown, medium gray in part, indistinct fossil fragments in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, slightly argillaceous in part, slightly fossiliferous; SHALE - medium gray, becoming dark gray in part, subfissile, trace pyrite, trace micromicaceous, trace calcareous streaks;
- 690 - 695 Limestone - brown, medium gray in part, indistinct fossil fragments in part, trace coral fragments, microcrystalline to cryptocrystalline, no visual show, no visible porosity, slightly argillaceous in part, slightly fossiliferous; SHALE - medium gray, becoming dark gray in part, subfissile, trace pyrite, trace micromicaceous, moderately calcareous, grading to Marlstone in part;
- 695 - 700 SHALE - medium gray, subfissile - fissile, soft, trace pyrite, trace micromicaceous, moderately calcareous, grading to Marlstone in part;
- 700 - 710 SHALE - medium gray, subfissile - fissile, soft, rare pyrite, rare micromicaceous, moderately calcareous, grading to Marlstone in part;
- 710 - 730 SHALE - medium gray, subfissile - fissile, soft, rare pyrite, rare micromicaceous, moderately calcareous, grading to Marlstone in part;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
730 - 750	SHALE - medium gray, becoming dark gray, subfissile - fissile, soft, rare pyrite, rare micromicaceous, moderately calcareous, grading to Marlstone in part;
750 - 760	SHALE - medium gray, becoming dark gray, subfissile - fissile, soft, rare pyrite, rare micromicaceous, moderately calcareous;
760 - 770	SHALE - dark gray, black, fissile, soft, slightly carbonaceous, trace pyrite;
770 - 780	LIMESTONE - mottled buff - light brown, fragmental in part, trace indistinct fossil fragments in part, microcrystalline to medium crystalline, dull yellow fluorescence, weak milky cut, no visible porosity, clean, slightly dolomitic with dolomite micro fracture fill (?), slightly fossiliferous;
780 - 785	LIMESTONE - medium gray, massive, trace indistinct fossil fragments in part, microcrystalline, no visual show, no visible porosity, moderately argillaceous, grading to calcareous SHALE in part, slightly fossiliferous;
785 - 790	SHALE - medium gray, dark gray in part, fissile, soft, trace pyrite, moderately calcareous;
790 - 800	SHALE - medium gray, dark gray in part, fissile, soft, trace pyrite, moderately calcareous; SANDSTONE - light gray - brown, predominantly quartzose, predominant siliceous cement, very fine grained, subangular, well sorted, no visual show, no visible porosity, slightly silty, trace dolomitic cement, trace pyrite; LIMESTONE - mottled buff - light brown, massive, trace indistinct fossil fragments in part, microcrystalline, no visual show, no visible porosity, clean, slightly fossiliferous;
800 - 805	SHALE - dark gray, black, fissile, soft, slightly carbonaceous, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
805 - 810	SHALE - medium gray, dark gray in part, fissile, soft, trace pyrite, moderately calcareous; SANDSTONE - medium gray, predominantly quartzose, predominant siliceous cement, very fine grained to silt grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, trace dolomitic cement, trace pyrite; SHALE - gray - green, soft, fissile, moderately calcareous, grading to calcareous Marlstone in part, scattered quartz grains floating;
810 - 815	SHALE - medium gray, dark gray in part, fissile, soft, trace pyrite, moderately calcareous; SANDSTONE - medium gray, predominantly quartzose, predominant siliceous cement, very fine grained to silt grained, subangular, well sorted, no visual show, no visible porosity, slightly argillaceous, trace dolomitic cement, trace pyrite;
815 - 830	SHALE - medium gray, dark gray in part, fissile, soft, moderately calcareous; LIMESTONE - mottled buff - light brown, massive, trace indistinct fossil fragments in part, microcrystalline, no visual show, no visible porosity, clean, slightly fossiliferous; SHALE - gray - green, soft, fissile, moderately calcareous, grading to calcareous Marlstone in part, scattered quartz grains floating;
830 - 840	LIMESTONE - mottled buff - light brown, massive, trace indistinct fossil fragments in part, microcrystalline to fine crystalline, no visual show, no visible porosity, clean, slightly fossiliferous;
840 - 850	LIMESTONE - mottled buff - light brown, massive, trace indistinct fossil fragments in part, microcrystalline to fine crystalline, no visual show, no visible porosity, clean, slightly fossiliferous; LIMESTONE - mottled buff - light brown, trace indistinct fossil fragments in part, microcrystalline to medium crystalline, <u>bright yellow fluorescence</u> , <u>streaming milky cut</u> , no visible porosity, clean, slightly oolitic, slightly fossiliferous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
850 - 860	SHALE - medium gray, light gray in part, subfissile, moderately calcareous; LIMESTONE - mottled buff - light brown, trace indistinct fossil fragments in part, microcrystalline to medium crystalline, <u>bright yellow fluorescence</u> , <u>streaming milky cut</u> , no visible porosity, slightly oolitic, slightly fossiliferous, slightly argillaceous in part;
860 - 880	SHALE - medium gray, light gray in part, subfissile, moderately calcareous;
880 - 895	SHALE - medium gray, light gray in part, subfissile, moderately calcareous;
895 - 905	SHALE - medium gray, subfissile - fissile, soft, slightly calcareous in part, trace pyrite;
905 - 930	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite;
930 - 955	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite;
955 - 985	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite in part;
985 - 1015	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite in part;
1015 - 1045	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite in part;
1045 - 1050	SHALE - dark gray, medium gray in part, fissile, soft, slightly carbonaceous, trace pyrite in small part, slightly calcareous;
1050 - 1080	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite in part;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1080 - 1100	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite in part;
1100 - 1130	SHALE - medium gray, becoming light gray in part, subfissile, soft, moderately calcareous, trace pyrite in part;
1130 - 1160	SHALE - medium gray, becoming dark gray in part, subfissile, soft, slightly calcareous, trace pyrite in small part;
1160 - 1190	SHALE - medium gray, becoming dark gray in part, subfissile, trace calcareous in small part, scattered pyrite disseminated throughout;
1190 - 1220	SHALE - medium gray, becoming dark gray in part, subfissile, scattered pyrite disseminated throughout;
1220 - 1250	SHALE - medium gray, becoming dark gray in part, subfissile, scattered pyrite disseminated throughout;
1250 - 1280	SHALE - dark gray, medium gray in part, fissile, soft, slightly carbonaceous in small part, trace pyrite disseminated throughout;
1280 - 1300	SHALE - dark gray, medium gray in part, fissile, soft, slightly carbonaceous in small part, trace pyrite disseminated throughout;
1300 - 1305	SHALE - dark gray, brown in part, fissile, soft, slightly carbonaceous in small part, trace pyrite disseminated throughout;
1305 - 1315	SHALE - dark gray, brown in part, fissile, slightly carbonaceous, scattered pyrite crystals;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1315 - 1330	SHALE - medium gray in part, subfissile - fissile, moderately calcareous, marly in part, scattered pyrite disseminated throughout; SHALE - dark gray, brown in part, fissile, slightly carbonaceous, scattered pyrite crystals; SHALE - dark gray to black, brown in part, fissile, possible micro fractures in part, slightly carbonaceous, scattered pyrite crystals, trace calcareous streaks;
1330 - 1360	SHALE - medium gray in part, subfissile - fissile, moderately calcareous, marly in part, scattered pyrite disseminated throughout;
1360 - 1390	SHALE - medium gray in part, light gray in part, subfissile - fissile, moderately calcareous, marly in part, trace pyrite;
1390 - 1420	SHALE - medium - light gray, subfissile - fissile, moderately calcareous, marly in part, trace pyrite;
1420 - 1450	SHALE - medium - light gray, subfissile - fissile, moderately calcareous, marly in part, trace pyrite;
1450 - 1480	SHALE - medium - light gray, subfissile - fissile, moderately calcareous, marly in part, trace pyrite;
1480 - 1510	SHALE - medium - light gray, subfissile - fissile, waxy in part, moderately calcareous, marly in part, trace pyrite;
1510 - 1540	SHALE - medium - light gray, subfissile - fissile, waxy in part, moderately calcareous, marly in part, trace pyrite;
1540 - 1570	SHALE - medium - light gray, subfissile - fissile, waxy in part, moderately calcareous, marly in part, trace pyrite; SHALE - medium gray, subfissile - fissile, scattered pyrite disseminated throughout;
1570 - 1600	SHALE - medium gray, subfissile - fissile, scattered pyrite disseminated throughout;
1600 - 1630	SHALE - medium gray, subfissile - fissile, waxy in part, moderately calcareous, marly in part, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1630 - 1660	SHALE - medium gray, subfissile - fissile, becoming medium - dark gray brown in part, moderately calcareous, marly in part, trace pyrite;
1660 - 1690	SHALE - medium gray, subfissile - fissile, becoming medium - dark gray brown in part, moderately calcareous, marly in part, trace pyrite;
1690 - 1720	SHALE - medium gray, subfissile - fissile, becoming medium - dark gray brown in part, moderately calcareous, marly in part, trace pyrite;
1720 - 1725	SHALE - medium gray, dark gray brown, subfissile - fissile, moderately calcareous, trace pyrite in part;
1725 - 1735	LIMESTONE - light gray brown, medium gray in part, cryptocrystalline, no visual show, no visible porosity, slightly argillaceous, trace pyrite;
1735 - 1750	SHALE - medium gray, dark gray brown, blocky, moderately calcareous, trace pyrite in part; LIMESTONE - light gray brown, medium gray in part, cryptocrystalline, no visual show, no visible porosity, slightly argillaceous, grading to moderately argillaceous in part, trace pyrite;
1750 - 1755	SHALE - medium gray, dark gray in part, blocky, moderately calcareous, trace pyrite; LIMESTONE - light gray brown, medium gray in part, cryptocrystalline, no visual show, no visible porosity, slightly argillaceous, grading to moderately argillaceous in part, trace pyrite;
1755 - 1760	SHALE - medium gray, dark gray brown, blocky, moderately calcareous, trace pyrite in part; LIMESTONE - light gray brown, medium gray in part, cryptocrystalline, no visual show, no visible porosity, slightly argillaceous, trace pyrite;
1760 - 1770	SHALE - medium gray, blocky, moderately calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, grading to very fine grained SANDSTONE in part, no visual show, no visible porosity, slightly argillaceous in part, slightly calcareous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1770 - 1775	SHALE - medium gray, blocky, moderately calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, no visual show, no visible porosity, moderately argillaceous in part, grading to silty calcareous SHALE in part, slightly calcareous;
1775 - 1780	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, no visual show, no visible porosity, moderately argillaceous in part, grading to silty calcareous SHALE in part, trace calcareous streaks in part, becoming dolomitic in part, trace siliceous cement;
1780 - 1785	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, no visual show, no visible porosity, moderately argillaceous in part, grading to silty calcareous SHALE in part, trace calcareous streaks in part, becoming dolomitic in part, trace siliceous cement;
1785 - 1790	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks;
1790 - 1800	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks;
1800 - 1815	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, no visual show, no visible porosity, moderately argillaceous in part, grading to silty calcareous SHALE in part, trace calcareous streaks in part, becoming dolomitic in part, trace siliceous cement;
1815 - 1845	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1845 - 1850	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, grading to very fine grained SANDSTONE in part, no visual show, no visible porosity, slightly argillaceous in part, trace calcareous, becoming slightly dolomitic in part, trace siliceous cement;
1850 - 1860	SHALE - medium gray, blocky, slightly calcareous, trace pyrite in part, scattered SILTSTONE streaks; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, no visual show, no visible porosity, moderately argillaceous in part, grading to silty calcareous SHALE in part, moderately calcareous, grading to silty LIMESTONE in part, trace siliceous cement;
1860 - 1865	SHALE - medium gray, subfissile, blocky in part, slightly calcareous, trace pyrite in small part;
1865 - 1870	SHALE - medium gray, subfissile, blocky in part, slightly calcareous, trace pyrite in small part; LIMESTONE - medium gray brown, cryptocrystalline to microcrystalline, no visual show, no visible porosity, moderately argillaceous, trace pyrite, scattered silty streaks, grading in part to calcareous SILTSTONE; SILTSTONE - light gray, occasionally medium gray in part, predominant quartz, no visual show, no visible porosity, moderately argillaceous in part, grading to silty calcareous SHALE in part, moderately calcareous, grading to silty LIMESTONE in part, trace siliceous cement;
1870 - 1890	SHALE - medium gray, blocky in part, moderately calcareous, trace pyrite disseminated throughout, scattered SILTSTONE streaks;
TD Intermediate Hole	1890m
1890 - 1905	SHALE - medium gray, subfissile - blocky, becoming light gray in part, moderately calcareous streaks, trace pyrite disseminated throughout, scattered SILTSTONE streaks in small part;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1905 - 1935	SHALE - medium gray, subfissile - blocky, becoming light gray in part, moderately calcareous streaks, trace pyrite disseminated throughout, scattered SILTSTONE streaks in small part;
1935 - 1965	SHALE - medium gray, subfissile - blocky, moderately calcareous streaks, trace pyrite disseminated throughout, trace SILTSTONE streaks in small part;
1965 - 1995	SHALE - medium gray, subfissile - blocky, slightly calcareous in part, trace pyrite disseminated throughout, trace SILTSTONE streaks;
1995 - 2025	SHALE - medium gray, subfissile - blocky, slightly calcareous in part, trace pyrite disseminated throughout, trace SILTSTONE streaks;
2025 - 2055	SHALE - medium gray, subfissile - blocky, scattered calcareous streaks, trace pyrite disseminated, trace SILTSTONE streaks in small part;
2055 - 2080	SHALE - medium gray, subfissile - blocky, scattered calcareous streaks, trace pyrite disseminated, trace SILTSTONE streaks in small part;
2080 - 2105	SHALE - medium gray, subfissile - blocky, slightly calcareous streaks, trace pyrite, trace SILTSTONE streaks in small part;
2105 - 2130	SHALE - medium gray, subfissile - blocky, slightly calcareous streaks, trace pyrite, trace SILTSTONE streaks in small part;
2130 - 2155	SHALE - medium gray, subfissile - blocky, slightly calcareous streaks, trace pyrite, rare SILTSTONE streaks in small part;
2155 - 2185	SHALE - medium gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2185 - 2215	SHALE - medium gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite;
2215 - 2245	SHALE - medium gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite;
2245 - 2275	SHALE - medium gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite;
2275 - 2305	SHALE - medium gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite;
2305 - 2320	SHALE - medium gray, becoming dark gray, subfissile - blocky, rare clear dolomite (micro fracture fill ?), trace calcareous streaks in small part, trace pyrite;
2320 - 2335	SHALE - medium gray - dark gray, subfissile - blocky, rare clear dolomite (micro fracture fill ?), trace calcareous streaks in small part, trace pyrite;
2335 - 2350	SHALE - medium gray - dark gray, subfissile - blocky, rare clear dolomite (micro fracture fill ?), trace calcareous streaks in small part, trace pyrite;
2350 - 2380	SHALE - medium gray - dark gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite;
2380 - 2400	SHALE - dark gray to medium gray, slightly brown in part, subfissile, slightly micromicaceous, trace pyrite, rare calcareous streaks in small part;
2400 - 2410	No sample - Blooey line problems;
2410 - 2430	SHALE - dark gray, subfissile, slightly micromicaceous, trace pyrite, rare calcareous streaks in small part;
2430 - 2435	SHALE - medium gray - dark gray, subfissile - blocky, trace calcareous streaks in small part, trace pyrite; SHALE - dark gray, subfissile, slightly micromicaceous, trace pyrite, rare calcareous streaks in small part;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2435 - 2445	SHALE - dark gray - black, brown in part, fissile - subfissile, slightly carbonaceous in part, scattered pyrite throughout, moderately calcareous;
2445 - 2455	SHALE - dark gray brown, fissile - subfissile, slightly carbonaceous in part, scattered pyrite throughout, slightly calcareous in part, becoming dolomitic in small part;
2455 - 2470	SHALE - medium gray - dark gray brown, subfissile - blocky, rare calcareous streaks, trace pyrite;
2470 - 2475	SHALE - medium gray - dark gray brown, subfissile - blocky, scattered calcareous and trace quartz veining, scattered calcareous fracture fill in part, trace calcareous streaks, trace pyrite;
2475 - 2490	SHALE - medium gray - dark gray brown, subfissile - blocky, scattered calcareous and trace quartz veining, scattered calcareous fracture fill in part, trace calcareous streaks, trace pyrite; SHALE - dark gray brown, subfissile, becoming black, fissile, slightly carbonaceous in part, trace pyrite throughout;
2490 - 2500	SHALE - black, fissile, slightly carbonaceous in part, scattered pyrite throughout;
2500 - 2505	SHALE - black, brown in part, fissile - subfissile, slightly calcareous, scattered pyrite throughout;
2505 - 2515	SHALE - black, brown in part, fissile - subfissile, moderately calcareous, scattered pyrite throughout;
2515 - 2520	SHALE - black, brown in part,, moderately calcareous streaks, grading to argillaceous LIMESTONE in part, scattered pyrite; LIMESTONE - light gray, brown, dark gray in part, mottled in part, microcrystalline to cryptocrystalline and some medium crystalline, fragmental in part with rare clear and translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace slickensides in part, rare oolitic streaks, scattered argillaceous laminae, scattered dolomitic streaks, occasional silty;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

2520 - 2525	SHALE - black, brown in part, moderately calcareous streaks, grading to argillaceous LIMESTONE in part, scattered pyrite; LIMESTONE - dark gray, brown, light gray in part, mottled in part, microcrystalline to cryptocrystalline and some medium crystalline, scattered clear calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace slickensides in part, trace argillaceous laminae;
2525 - 2530	LIMESTONE - medium - dark gray, brown, light gray in part, mottled in part, microcrystalline to cryptocrystalline and some medium crystalline, scattered clear calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity;
TD Mainhole section	2530m
2530 - 2640	No sample - No sample returns while drilling with N2;
2640 - 2655	LIMESTONE - light gray, medium gray brown, occasionally mottled in part, microcrystalline and some medium crystalline, trace fracture porosity, scattered clear and white calcite fracture fill - trace euhedral crystals in part, no visual show, no visible porosity, scattered pyrite in part; LIMESTONE - light gray, medium gray brown, occasionally mottled in part, microcrystalline and some medium crystalline, scattered clear and white calcite fracture fill - trace euhedral crystals in part, no visual show, no visible porosity, scattered pyrite in part;
2655 - 2660	LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline and some medium crystalline, scattered clear calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace pyrite disseminated;
2660 - 2665	No sample - No sample returns while drilling with N2;
2665 - 2680	LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline and some medium crystalline, trace clear, translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace pyrite disseminated;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2680 - 2695	No sample - No sample returns while drilling with N2;
2695 - 2700	LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline, trace clear, translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace pyrite disseminated;
2700 - 2720	LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline, trace clear, translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace pyrite veining in part, rare dolomite fracture fill in small part, trace pyrite disseminated; LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline, trace fracture porosity in part, scattered white calcite fracture fill - euhedral crystals in part, rare dolomite fracture fill in part, no visual show, no visible porosity, scattered pyrite veining;
2720 - 2740	LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline, trace clear, translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace pyrite veining in part, rare dolomite fracture fill in small part, trace pyrite disseminated; LIMESTONE - medium - dark gray brown, microcrystalline to cryptocrystalline, trace fracture porosity in part, scattered white calcite fracture fill - euhedral crystals in part, rare dolomite fracture fill in part, no visual show, no visible porosity, scattered pyrite veining;
2740 - 2745	LIMESTONE - medium - dark gray brown, occasionally light brown in part, microcrystalline to cryptocrystalline, trace white - translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, rare dolomitic fracture fill in small part, trace pyrite veining;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 2745 - 2765 **LIMESTONE** - medium - dark gray brown, occasionally light brown in part, microcrystalline to cryptocrystalline, trace white - translucent calcite fracture fill - euhedral crystals in part, no visual show, no visible porosity, rare dolomitic fracture fill in small part, trace pyrite veining;
- 2765 - 2770 **LIMESTONE** - medium - dark gray brown, light gray in part, microcrystalline to cryptocrystalline, scattered white calcite fracture fill - euhedral crystals in part, rare dolomite fracture fill in part, no visual show, no visible porosity, scattered pyrite veining in small part, trace dolomite streaks in part;
- 2770 - 2780 **LIMESTONE** - medium - dark gray brown, light gray in part, microcrystalline to cryptocrystalline, scattered white calcite fracture fill - euhedral crystals in part, rare dolomite fracture fill in part, no visual show, no visible porosity, scattered pyrite veining in small part, trace dolomite streaks in part; **DOLOMITE** - white, mottled light gray in part, medium crystalline to coarse crystalline and some microcrystalline, no visual show, no visible porosity, trace dolomite fracture fill, trace pyrobitumen ?, rare pyrite in small part;
- 2780 - 2790 **LIMESTONE** - medium - dark gray brown, light gray in part, microcrystalline to cryptocrystalline, scattered white calcite fracture fill - euhedral crystals in part, rare dolomite fracture fill in part, no visual show, no visible porosity, scattered pyrite veining in small part, trace dolomite streaks in part; **DOLOMITE** - white, mottled light gray in part, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, no visible porosity, trace dolomite fracture fill, trace pyrobitumen ?, rare pyrite in small part;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

2790 - 2795

LIMESTONE - medium - dark gray brown, light gray in part, cryptocrystalline and some microcrystalline, scattered white dolomite fracture fill - euhedral crystals in part, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part; **DOLOMITE** - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, no visible porosity, trace dolomite fracture fill, trace pyrobitumen interstitial, rare pyrite in small part; **DOLOMITE** - light gray - medium gray, microcrystalline to fine crystalline and some cryptocrystalline, trace fracture porosity, no visual show, trace iron stain, no visible porosity, becoming slightly argillaceous in part, scattered dolomite fracture fill, scattered pyrite, disseminated, trace calcareous streaks, trace argillaceous laminae;

2795 - 2800

LIMESTONE - medium - dark gray brown, dark gray - black in part, cryptocrystalline and some microcrystalline, scattered white dolomite fracture fill - euhedral crystals in part, scattered iron stain, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part; **DOLOMITE** - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, no visible porosity, trace dolomite fracture fill, trace pyrobitumen interstitial, rare pyrite in small part; **DOLOMITE** - light gray - medium gray, microcrystalline to fine crystalline and some cryptocrystalline, trace fracture porosity, no visual show, trace iron stain, no visible porosity, becoming slightly argillaceous in part, scattered dolomite fracture fill, scattered pyrite, disseminated, trace calcareous streaks, trace argillaceous laminae;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 2800 - 2805 Limestone - medium - dark gray brown, dark gray - black in part, cryptocrystalline and some microcrystalline, scattered white calcite and dolomite fracture fill - euhedral crystals in part, scattered iron stain, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part; DOLOMITE - light gray - medium gray, microcrystalline to fine crystalline and some cryptocrystalline, no visual show, trace iron stain, no visible porosity, becoming slightly argillaceous in part, scattered dolomite fracture fill, scattered pyrite, disseminated, trace calcareous streaks, trace argillaceous laminae;
- 2805 - 2810 Limestone - medium - dark gray brown, cryptocrystalline and some microcrystalline, trace white calcite and dolomite fracture fill - euhedral crystals in part, scattered iron stain, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part;
- 2810 - 2815 Limestone - medium - dark gray brown, cryptocrystalline and some microcrystalline, trace white calcite and dolomite fracture fill - euhedral crystals in part, scattered iron stain, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part; DOLOMITE - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, no visible porosity, trace dolomite fracture fill, trace pyrobitumen interstitial, rare pyrite in small part; DOLOMITE - medium gray - light gray in part, microcrystalline to fine crystalline and some cryptocrystalline, no visual show, trace iron stain, no visible porosity, occasionally slightly argillaceous in part, scattered white dolomite fracture fill, scattered pyrite, disseminated, trace calcareous streaks;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

- 2815 - 2820 **LIMESTONE** - medium - dark gray brown, cryptocrystalline and some microcrystalline, trace white calcite and dolomite fracture fill - euhedral crystals in part, scattered iron stain, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part; **DOLOMITE** - light gray, medium gray in part, cryptocrystalline to fine crystalline and some microcrystalline, no visual show, trace iron stain, no visible porosity, scattered white dolomite fracture fill, scattered pyrite, disseminated, trace calcareous streaks;
- 2820 - 2825 **DOLOMITE** - light gray, medium gray in part, cryptocrystalline to fine crystalline and some microcrystalline, no visual show, trace iron stain, no visible porosity, common white dolomite fracture fill, scattered pyrite, disseminated, trace calcareous streaks; **DOLOMITE** - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, no visible porosity, trace dolomite fracture fill, trace pyrobitumen interstitial, rare pyrite in small part; **LIMESTONE** - medium - dark gray brown, cryptocrystalline and some microcrystalline, trace white calcite and dolomite fracture fill - euhedral crystals in part, scattered iron stain, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks in part;
- 2825 - 2830 **DOLOMITE** - light gray, microcrystalline to fine crystalline and some cryptocrystalline, no visual show, common iron stain, no visible porosity, common white dolomite fracture fill, scattered pyrite in part, disseminated;
- 2830 - 2835 **DOLOMITE** - light gray, white, microcrystalline to fine crystalline, no visual show, abundant iron stain, no visible porosity, scattered white dolomite fracture fill, trace white calcite fracture fill in part, rare calcareous streaks; **DOLOMITE** - white, semitransluent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, common iron stain, no visible porosity, trace dolomite fracture fill;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2835 - 2840	DOLOMITE - light gray, white, microcrystalline to fine crystalline, no visual show, abundant iron stain, no visible porosity, scattered white dolomite fracture fill, trace white calcite fracture fill in part, rare calcareous streaks; SHALE - dark gray, black in part, blocky, slightly calcareous, slightly dolomitic, trace pyrite;
2840 - 2845	DOLOMITE - light gray, white, microcrystalline to fine crystalline, no visual show, abundant iron stain, no visible porosity, scattered white dolomite fracture fill, trace white calcite fracture fill in part, rare calcareous streaks;
2845 - 2847	DOLOMITE - light gray, white, microcrystalline to fine crystalline, no visual show, abundant iron stain, no visible porosity, scattered white dolomite fracture fill, trace white calcite fracture fill in part, rare calcareous streaks; LIMESTONE - light gray, cryptocrystalline and some microcrystalline, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic in small part;
2847 - 2860	DOLOMITE - light gray, white, occasionally medium gray in part, microcrystalline to fine crystalline and some cryptocrystalline, no visual show, abundant iron stain, scattered thinly interbedded LIMESTONE , no visible porosity, scattered white dolomite fracture fill, trace white calcite fracture fill in part; DOLOMITE - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, common iron stain, no visible porosity, trace dolomite fracture fill; LIMESTONE - medium gray - dark gray in part, cryptocrystalline, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

2860 - 2865

DOLOMITE - light gray, white, occasionally medium gray in part, microcrystalline, no visual show, abundant iron stain, scattered thinly interbedded **LIMESTONE**, no visible porosity, trace white dolomite fracture fill in part, slightly calcareous streaks in part; **DOLOMITE** - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, common iron stain, no visible porosity, trace dolomite fracture fill; **LIMESTONE** - medium gray - dark gray in part, occasionally light gray in part, cryptocrystalline and some microcrystalline, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks;

2865 - 2875

DOLOMITE - light gray, white, occasionally medium gray in part, microcrystalline and some cryptocrystalline, no visual show, abundant iron stain, scattered thinly interbedded **LIMESTONE**, no visible porosity, trace white dolomite fracture fill in part, slightly calcareous streaks in part; **DOLOMITE** - white, semitranslucent, medium crystalline to coarse crystalline and some microcrystalline, trace fracture porosity, no visual show, common iron stain, no visible porosity, fracture fill in part; **LIMESTONE** - medium gray - dark gray in part, occasionally light gray in part, cryptocrystalline and some microcrystalline, no visual show, no visible porosity, trace pyrite disseminated in part, trace dolomitic streaks;

2875 - 2885

DOLOMITE - light gray, white, occasionally medium gray in part, microcrystalline and some cryptocrystalline, no visual show, abundant iron stain, scattered thinly interbedded **LIMESTONE**, no visible porosity, trace white dolomite fracture fill in part, slightly calcareous streaks in part; **DOLOMITE** - dark gray, black in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, trace white dolomite fracture fill in part, rare calcareous streaks;

LITHOLOGY

Formation tops
Sample interval
(in meters)

SAMPLE DESCRIPTION

2885 - 2895	DOLOMITE - light gray, white, occasionally medium gray in part, microcrystalline and some cryptocrystalline, no visual show, <u>abundant iron stain</u> , no visible porosity, trace white dolomite fracture fill in part, trace calcareous streaks in part; DOLOMITE - dark gray, black in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity, trace white dolomite fracture fill in part, rare calcareous streaks;
2895 - 2905	DOLOMITE - gray, brown, occasionally medium gray in part, microcrystalline and some cryptocrystalline, no visual show, <u>abundant iron stain</u> , no visible porosity, trace white dolomite fracture fill in part;
2905 - 2920	DOLOMITE - gray, brown, occasionally medium gray in part, microcrystalline and some cryptocrystalline, no visual show, common iron stain, no visible porosity, rare white dolomite fracture fill in part, trace pyrite disseminated;
2920 - 2925	DOLOMITE - light gray, brown, occasionally medium gray in part, microcrystalline and some cryptocrystalline, no visual show, scattered iron stain, scattered stylolite, no visible porosity, rare white dolomite fracture fill in part, trace pyrite disseminated; DOLOMITE - dark gray, black in part, microcrystalline to cryptocrystalline, no visual show, no visible porosity;
TD DRILLER 2925m @1800Hrs 98-02-14	

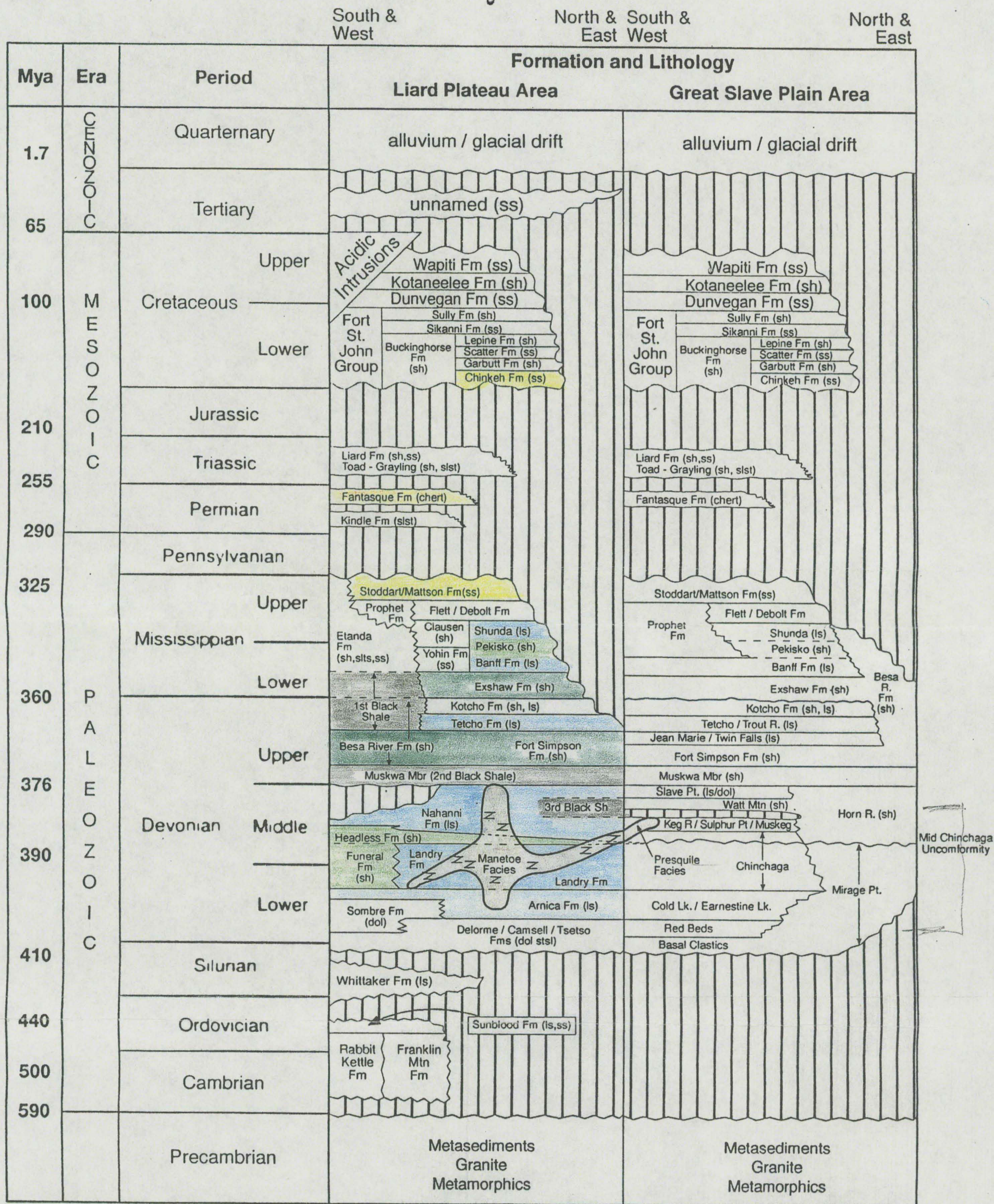
HYDROCARBON SHOW SUMMARY

FORMATION	INTERVAL	REMARKS
Sulphur Pt	2578	No samples - probable frac 20' flare for 3min
Sulphur Pt	2595	No samples - probable frac 3.1mmcf/d
"	2595-2635	avg 1.7mmcf/d
Sulphur Pt/ Nahanni	2636	28.65mmcf/d decr to 19mmcf/d decr to 8.5mmcf/d 250l/min 70,000 ppm
Nahanni	2640-2740	14mmcf/d decr steadily 10mmcf/d 150l/min 120,000ppm
Headless	2740-2768	10mmcf/d decr to 9mmcf/d 250l/min 98,000 ppm
Landry	2768-2812	9mmcf/d decr to 8mmcf/d
	2813	8mmcf/d incr to 10.5mmcf/d 170l/min 110,000 ppm
	2825	10mmcf/d 200l/min 130,000ppm
Arnica	2838-2847	12mmcf/d decr to 8mmcf/d 300 l/min 142,000ppm
	2847-2925	steady 8.5mmcf/d 300 - 600 l/min 130,000ppm

PARAMOUNT BERKLEY ARROWHEAD N-65

STRATIGRAPHIC COLUMN

Figure IV-1
Stratigraphic Chart



5. WELL EVALUATION

Downhole Logs (In Pocket, At The End)

**TABLE 3 DOWNHOLE LOG SUMMARY
OPEN HOLE LOGS**

DATE RUN	TYPE	INTERVAL (m)
	WESTERN ATLAS	
Jan 30/98	High Definition Induction Gamma Ray	479 - 1884
	Compensated Z-Densilog, Compensated Neutron, Gamma Ray, XY Caliper	479 - 1871.1
	Digital Acoustilog, Gamma Ray, XY Caliper	0 - 1878
	Cement Volume	479 - 1878
	COMPUTALOG	
Feb 15/98	GRN	2503.4 - 2643
Feb 16/98	Temperature	1800 - 2543
Feb 17/98	Borehole Compensated Sonic (lost reading)	2524.8 - 2634.6
	SCHLUMBERGER	
Feb 19/98	Azimuthal Laterolog	2529 - 2922.3
	Dipole Sonic Imager	1800 - 2918.7
	Platform Express compensated Neutron Lithodensity	1800 - 2926.4
	Platform Express Microlog	1800 - 2926.4

**TABLE 4 DOWNHOLE LOG SUMMARY
CASED HOLE LOGS**

DATE RUN	TYPE	INTERVAL (m)
	COMPUTALOG	
Mar 11/98	Temperature	994 – 2822.7
	Sector Bond	2223 – 2822
Mar 12/98	Perforating	2568.8 – 2640
Mar 16/98	Sector Bond	2294 – 2660
Mar 21/98	Collar	2224 - 2774

Other Logs: N/A

Synthetic Seismograms: N/A

Formation Stimulation: See Attached Treatment Reports

Formation & Production Tests: No DST's were run, however, the Nahanni formation was drilled underbalanced (See attached underbalanced rates)

PARAMOUNT BERKLEY ARROWHEAD N-65

DETAILS OF FORMATION & PRODUCTION TESTING



PARAMOUNT RESOURCES LTD.

et al Arrowhead N65
Underbalanced Drilling
02/07/98 – 02/23/98

DWIGHT DEVLIN

Report prepared by:
ENTEST Corp.
12-Mar-98

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/09/98	15:00															
SAFETY AND PROCEDURE MEETING																
02/09/98	15:30															
CIRCULATE WELL OVER TO WATER																
02/09/98	17:00															
START TO DRILL OUT SHOE / RETURNS TO RIG TANK																
02/10/98	04:00															
PRESSURE TEST PRIMARY AND SECONDARY FLOW LINES TOO 21000 kPa																
02/10/98	04:45															
SAFETY MEETING																
02/10/98	05:34															
START TO RUN IN HOLE / START AIR INJECTION @ 35.00m ³ /min																
02/10/98	05:46		77.52	0.02				0.00								
FLUID TOO SURFACE																
02/10/98	05:50		86.13	0.02				0.00								
START FLUID INJECTION																
02/10/98	06:15		103.36	0.03				0.00								
SHUT DOWN AIR INJECTION																
02/10/98	06:45		137.81	0.04				0.00								
START AIR INJECTION @ 65.00m ³ /min																
02/10/98	07:18		835.50	0.11	187.77		187.77	0.03								
AIR TO SURFACE																
02/10/98	07:47		714.91	0.59	109.60	1.49	111.10	0.76					"			
LARGE SLUG OF FLUID AND AIR																
02/10/98	09:00		232.56	1.78	90.89	1.34	92.22	6.08								
CONTINUE INJECTING AIR TO DRY ANNULAR																
02/10/98	10:00		249.79	2.78	96.91		96.91	10.14								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																
02/10/98	11:00		232.56	3.78	94.08		94.08	14.14								
CONTINUE INJECTING AIR, FLUID RETURNS STILL AT APPROX. 100 litres / 5 min.																
02/10/98	11:30		180.88	4.27	94.35		94.35	16.08								
CONTINUE PUMPING AIR TO DRY HOLE																
02/10/98	12:00		180.88	4.77	94.80		94.80	18.93								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																

Today's: 22-Feb-98 Page: 2 of 28
 Test Date(s): From: 02/07/98 To: 02/23/98
 Company: Paramount Resources
 Location: et al Arrowhead N65
 Company Rep: Rod MacEachern
 Formation: Nahanni

FOREMOST

ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/10/98	13:00		155.04	5.77	92.81		92.81	22.85								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																
02/10/98	14:00		146.43	6.76			91.27	26.61								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																
02/10/98	15:35		155.04	8.33	94.59		94.59	32.86								
DRILL OUT 1 METER OF REMAINING SHOE TO CHECK FOR RETURNS																
02/10/98	16:00		120.59	8.75	67.37	28.70	96.07	34.50								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																
02/10/98	17:00		111.97	9.74	68.15	26.01	94.16	38.38								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																
02/10/98	18:00		120.59	10.72	68.70	26.86	95.56	42.26								
CONTINUE INJECTING AIR, ANNULAR NOT DRY																
02/10/98	18:05		120.59	10.80	69.35	26.51	95.85	42.59								
DRILL OUT 0.3 METERS TO CHECK RETURNS																
02/10/98	19:00		111.97	11.72	69.10	26.58	95.68	46.20								
CONTINUE BLOWING HOLE DRY																
02/10/98	20:00		111.97	12.71	69.12	27.01	96.13	50.14								
CONTINUE TO BLOW HOLE DRY																
02/10/98	20:08		94.75	12.84	63.83	28.78	92.61	50.67								
SHUT DOWN AIR INJECTION TO CHANGE WILLIAMS HEAD RUBBER																
02/10/98	23:20			13.03			0.00	50.89								
BEGIN TO CIRCULATE WITH N ² AT 42m ³ /min																
02/10/98	23:22		146.43	13.05	63.65	31.16	94.81	50.96								
N ² TOO SURFACE																
02/10/98	23:23		180.88	13.07		33.12	33.12	50.98								
DIRECT FLOW FROM HI STAGE TO LOW STAGE TO PURGE VESSELS																
02/11/98	00:53		146.43	13.54	92.06	51.14	143.20	54.30								
DRILL AHEAD / OPEN HI STAGE BACK PRESSURE																
02/11/98	01:00	2530.00	60.29	13.65	48.62	19.57	68.19	54.69								
02/11/98	01:30	2532.00	51.68	14.15	44.64	15.33	59.97	55.96								
02/11/98	02:00	2533.00	51.68	14.65	45.79	15.61	61.41	57.25								

N² TOO SURFACE.

Formation: Nahanni

FOREMOST
ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611

Unit No: Gemini 3

Test Operator: L Turnbull / T Fox

Operation: Underbalanced Drilling

Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/11/98	11:00	2553.00	77.52	21.26	60.45		60.45	73.08								
02/11/98	11:20	2555.00	77.52	21.59	60.51		60.51	73.90								
NO SAMPLE FOR 2555m																
02/11/98	11:30	2556.00	68.91	21.76	57.39		57.39	74.32								
02/11/98	11:45		68.91	22.01	59.03		59.03	74.93								
NO SAMPLE FOR 2560m																
02/11/98	12:00	2560.00	68.91	22.26	60.36	1.79	62.15	75.55								
02/11/98	12:10		68.91	22.42	59.06		59.06	75.97								
PULL OF BOTTOM TO CIRCULATE																
02/11/98	12:30	2564.00	77.52	22.75	61.02		61.02	76.79								
CONTINUE DRILLING																
02/11/98	13:00	2564.00	86.13	23.25	68.25		68.25	78.19								
02/11/98	13:30	2565.00	94.75	23.75	63.65		63.65	79.60								
NO SAMPLE FOR 2565m																
02/11/98	14:00	2566.00	60.29	24.24	39.65	11.75	51.40	80.88								
02/11/98	14:30	2568.00	8.61	24.89	17.31		17.31	81.71								
02/11/98	14:39		8.61	24.89	17.31		17.31	81.74								
PULL UP TOO INTERMEDIATE CASING TOO CIRCULATE.																
02/11/98	16:13		17.23	25.46	25.55		25.55	81.98								
N ² TOO SURFACE																
02/11/98	16:20	2568.00	60.29	25.58	54.28	1.44	55.72	82.20								
BACK ON BOTTOM DRILLING																
02/11/98	16:30	2570.00	86.13	25.73	61.51		61.51	82.63								
NO SAMPLE FOR 2570m																
02/11/98	17:00	2572.00	17.23	26.17	24.51		24.51	83.60								
PULL OFF BOTTOM TOO CIRCULATE.																
02/11/98	17:19		103.36	26.47	70.43		70.43	84.30								
STOPPED N ² INJECTION / STARTED AIR INJECTION @ 68m ³ /min																

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

UnderBalanced-Drilling Report

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/11/98	18:00		155.04	27.15	89.34		89.34	86.80					68.00			
CONTINUE PUMPING AIR @ 68m³/min																
02/11/98	18:35		163.65	27.73	90.03	1.51	91.55	89.00					45.00			
SHUT DOWN AIR INJECTION / BROUGHT N² BACK ON LINE AT 45m³/min TO PURGE ANNULAR AND VESSEL.																
02/11/98	19:00		86.13	28.14	62.05		62.05	90.19					45.00			
CONTINUE TO PURGE SYSTEM WITH N²																
02/11/98	19:25		103.36	28.40	67.66		67.66	91.21					45.00			
PURGE TEST VESSEL WITH N² / DRILL AHEAD																
02/11/98	19:30	2575.00	94.75	28.48	63.92		63.92	91.44					45.00			
SAMPLE AT 2575 METERS - NO SAMPLE																
02/11/98	19:39	2578.80	111.97	28.63	76.51		76.51	91.87					45.00			
BURNABLE GAS TO SURFACE																
02/11/98	19:41		103.36	28.67	69.77		69.77	91.92					45.00			
BURNABLE GAS STOPPED																
02/11/98	19:46		94.75	28.74	68.94		68.94	92.16					45.00			
SAMPLE AT 2580 METERS - NO SAMPLE																
02/11/98	20:00	2579.00	94.75	28.98	66.48		66.48	92.81					45.00			
02/11/98	20:03		94.75	29.03	66.10		66.10	92.95					45.00			
SAMPLE AT 2585 METERS - NO SAMPLE																
02/11/98	20:18		94.75	29.28	65.63		65.63	93.64					45.00			
SAMPLE AT 2590 METERS - NO SAMPLE																
02/11/98	20:30	2593.00	94.75	29.48	66.14		66.14	94.20					45.00			
02/11/98	20:35		275.63	29.56	137.51		137.51	94.52					45.00			
SAMPLE AT 2595 METERS																
02/11/98	20:36	2596.00	344.54	29.58	170.24		170.24	94.64					45.00		105.44	
BURNABLE GAS TO SURFACE / STOP DRILLING																
02/11/98	20:38		378.99	29.61	191.61		191.61	94.90					45.00			
02/11/98	21:00	2596.00	241.17	29.98	131.56	1.66	133.21	97.19					45.00		47.50	
NO H2S PRESENT																
02/11/98	21:10		232.56	30.14	127.22		127.22	98.09					45.00			
DRILL AHEAD																

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UnderBalanced-Drilling Report

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/11/98	21:25		232.56	30.38	127.31		127.31	99.42					45.00			
SAMPLE AT 2600 METERS - NO SAMPLE																
02/11/98	21:30	2600.00	232.56	30.47	126.88	1.62	128.49	99.86				45.00			63.69	
02/11/98	21:34		232.56	30.53	127.58	12.01	139.59	100.22				45.00				
CONNECTION																
02/11/98	22:00	2600.00	206.72	30.97	118.47		118.47	101.99				45.00			53.67	
02/11/98	22:18		223.95	31.27	122.83		122.83	103.53								
SAMPLE AT 2605 METERS - NO SAMPLE																
02/11/98	22:30	2610.00	223.95	31.47	124.90		124.90	104.56				45.00			60.10	
2610m SAMPLE TAKEN - NO SAMPLE																
02/11/98	22:55	2615.00	223.95	31.88	124.69		124.69	106.72								
2615m SAMPLE TAKEN - NO SAMPLE																
02/11/98	23:00	2618.00	223.95	31.96	123.96		123.96	107.15				45.00			59.16	
02/11/98	23:07	2620.00	223.95	32.08	122.68		122.68	107.74								
2620m SAMPLE TAKEN - NO SAMPLE																
02/11/98	23:25	2625.00	223.95	32.33	122.74		122.74	109.02								
2625m SAMPLE TAKEN - VERY SMALL AMOUNT																
02/11/98	23:30	2627.00	223.95	32.34	122.65		122.65	109.11				45.00			57.85	
02/11/98	23:43		223.95	32.36	122.55		122.55	109.19								
RESET TIME ON COMPUTER 20 MINUTES AHEAD TO CORRISPOND WITH PASON TIME																
02/12/98	00:00	2629.00	241.17	32.64	128.35		128.35	110.69				45.00			63.55	
CONNECTION																
02/12/98	00:23		198.11	33.03	110.21		110.21	112.26								
2630m SAMPLE TAKEN - VERY SMALL AMOUNT																
02/12/98	00:30	2633.15	232.56	33.13	124.95		124.95	112.83				45.00			60.15	
02/12/98	00:37	2635.00	284.24	33.25	143.09		143.09	113.48								
2635m SAMPLE TAKEN - VERY SMALL AMOUNT																
02/12/98	00:43	2636.91	1447.05	33.35	609.21	4.06	613.27	114.64				45.00			544.41	
STOP DRILLING / PULL OFF BOTTOM / INCREASE IN GAS RATE																

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UnderBalanced-Drilling Report

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/12/98	00:48		1894.94	33.43	865.06	6.19	871.25	117.46								
02/12/98	01:00	2636.91	1507.34	33.63	690.04		690.04	123.43				45.00		625.24		
H2S = 0 ppm																
02/12/98	01:30		826.88	34.12	359.09		359.09	133.30				45.00		294.29		
02/12/98	02:00	2636.91	680.46	34.61	318.02		318.02	140.70				45.00		253.22		
CONTINUE TO FLOW WELL / BLACK SLUDGE IN SAMPLE CATCHER																
02/12/98	02:04			34.68	2.28		2.28	141.26								
PRIMARY FLOW LINE PLUGGED OFF / SWITCH FLOW THROUGH SECONDARY LINE																
02/12/98	02:12		8.61	34.68			0.00	141.27				0.00				
SHUT DOWN N ² PUMP																
02/12/98	02:21		34.45	34.79	43.41		43.41	142.99								
PLUGGED OFF AT CHOKE IN RIG'S MANIFOLD SHACK / SWITCH TO FULL 4" FLOW																
02/12/98	02:30	2636.91	1653.77	34.94	595.74		595.74	146.85				0.00		595.74		
FLUID TOO SURFACE / 70 000ppm / H ² S = 25 ppm																
02/12/98	03:00	2636.91	801.04	35.44	311.84		311.84	154.84		7.83	7.83	0.00		311.84		
WORKING ON UNPLUGGING PRIMARY FLOW LINE																
02/12/98	03:30	2636.91	706.30	35.93	286.03		286.03	160.96				0.00		286.03		
02/12/98	04:00	2636.91	680.46	36.43	274.39		274.39	166.74		3.5	11.33	0.00		274.39		
02/12/98	04:30	2636.91	680.46	36.93	269.10		269.10	172.17				0.00		269.10		
02/12/98	04:38		783.82	37.07	307.22		307.22	173.82				45.00				
SWITCH FLOW THROUGH PRIMARY FLOW LINE / START N ² DOWN HOLE @ 45.00m ³ /min																
02/12/98	04:48		826.88	37.23	311.76		311.76	175.93				45.00	0.12			
START PUMPING FOAM DOWN HOLE @ 0.12m ³ /min																
02/12/98	05:00	2636.91	861.34	37.43	335.64		335.64	178.66		1.2	12.53	45.00	0.12			
H ² S READING = 0 ppm / NET GAS 270.84 10 ³ m ³ /d																
02/12/98	05:01		861.34	37.44	335.87		335.87	178.89								
CUMM. BURNABLE GAS TO DATE = 68.00 10 ³ m ³																
02/12/98	05:02		852.72	37.46	332.95		332.95	179.12								
CUMM. WATER PRODUCED TO DATE = 12.53 m ³																

FOREMOST
ENERGY SYSTEMS LTD.

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/12/98	05:30	2636.91	826.88	37.93	302.57	2.50	305.07	184.71			3.4	15.93	45.00	0.12		7.00
NET GAS 240.27 10 ³ m ³ /d																
02/12/98	06:00	2636.91	844.11	38.44	309.95	3.05	313.00	191.20			6.16	22.09	45.00	0.12		
NET GAS 248.20 10 ³ m ³ /d / SALINITY = 64 000ppm																
02/12/98	06:30	2636.91	818.27	38.92	305.85		305.85	197.41			3.77	25.86	45.00	0.12		
NET GAS 241.05 10 ³ m ³ /d / GOOD SAMPLE IN SAMPLE CATCHER																
02/12/98	07:00	2636.91	818.27	39.42	303.86		303.86	203.78			3.77	29.63	45.00	0.12		
NET GAS 239.06 10 ³ m ³ /d / SALINITY = 80 000ppm																
02/12/98	07:30	2636.91	869.95	39.92	287.68		287.68	210.20			2.01	31.64	45.00	0.12		
NET GAS 222.88 10 ³ m ³ /d																
02/12/98	08:00	2636.91	801.04	40.41	316.10		316.10	216.52			5.92	37.56	45.00	0.12		
NET GAS 251.30 10 ³ m ³ /d																
02/12/98	08:20		844.11	40.74	321.66	3.51	325.17	220.70								
STARTED TRANSFERING FLUID TOO RIG TANK / 37.56m ³ PRODUCED TOO PIT.																
02/12/98	08:30	2636.91	852.72	40.91	305.72		305.72	222.97			4.5	49.36	45.00	0.12		
NET GAS 240.92 10 ³ m ³ /d																
02/12/98	09:00	2636.91	904.40	41.40	330.13		330.13	229.92			5.03	54.39	44.00	0.12		
NET GAS 266.77 10 ³ m ³ /d / DECREASE N ² TO 44.00m ³ /min / SALINITY 50 000 ppm																
02/12/98	09:05		878.56	41.48	342.65	4.09	346.74	231.10					0.00	0.12		
BY-PASS N ² TO REPAIR LEAK																
02/12/98	09:15		904.40	41.65	386.15		386.15	233.45								
02/12/98	09:30	2636.91	878.56	41.90	335.66		335.66	236.77			6.34	60.73	44.00	0.12		
NET GAS 272.30 10 ³ m ³ /d / WELL SLUGGING																
02/12/98	09:55		792.43	42.32	147.40		147.40	240.16								
HIGH PRESSURE GAS SAMPLE TAKEN # 21607 @ 451 kPa																
02/12/98	10:00	2636.90	775.20	42.40	172.11		172.11	240.70			3.05	63.78				
NET GAS 172.11 10 ³ m ³ /d / SALINITY 72 000 ppm																
02/12/98	10:05		826.88	42.47	169.42		169.42	241.13								
HIGH PRESSURE GAS SAMPLE #21842 @ 431 kPa / SALINITY 7.2 %																
02/12/98	10:11		766.59	42.57	166.72		166.72	241.81								
HIGH PRESSURE FLUID SAMPLE TAKEN # 21776 @ 350 kPa																
02/12/98	10:15		663.23	42.63	104.38	2.78	107.16	242.22								
HIGH PRESSURE FLUID SAMPLE TAKEN # 21751 @ 320 kPa																

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 Formation: Nahanni

FOREMOST

ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/12/98	10:30	2636.90	542.64	42.88	118.42		118.42	243.82			1.05	64.83				
NET GAS 118.42 10 ³ m ³ /d																
02/12/98	10:43		844.11	43.09	144.85	3.36	148.21	245.01								
N ² TOO BY-PASS																
02/12/98	11:00	2636.90	602.94	43.38	124.63		124.63	246.73			1.36	66.19				
NET GAS 124.63 10 ³ m ³ /d / SALINITY 100 000 ppm																
02/12/98	11:15		568.48	43.63	119.20	2.35	121.56	247.95								
02/12/98	11:30	2636.90	577.10	43.87	123.81	2.21	126.02	249.24			2.56	68.75				
NET GAS 123.81 10 ³ m ³ /d																
02/12/98	11:35		577.10	43.95	122.87		122.87	249.67								
BROUGHT N ² BACK ON LINE @ 45m ³ /min																
02/12/98	12:00	2636.90	869.95	44.37	152.13		152.13	252.11			3.85	72.60	44.00	0.12	88.77	
START DRILLING																
02/12/98	12:05		1360.91	44.45	294.84	2.86	297.70	252.78								
PULL OFF BOTTOM TO CIRCULATE HOLE.																
02/12/98	12:30	2636.90	2239.48	44.86	289.14	4.52	293.66	259.41			7.7	80.30	44.00	0.12	230.30	
FLOW TEMPERATURE 50 DEGREES CELCIUS																
02/12/98	12:33		2161.96	44.91	301.47	4.75	306.21	260.13					0.00			
N ² TOO BY-PASS																
02/12/98	12:55		1886.33	45.28	356.15	9.94	366.09	265.09					40.00			
N ² TOO BACK ON LINE @ 40m ³ /min																
02/12/98	13:00	2636.90	1731.29	45.36	278.41	3.69	282.11	266.04			3.18	83.48	40.00	0.10	224.51	
02/12/98	13:20		1472.89	45.68	237.72	14.36	252.08	269.91								
TEMPERATURE METER MALFUNCTION / SWITCH TO MANUAL TEMPERATURE																
02/12/98	13:21		1533.18	45.69	442.86	2.96	445.82	270.22								
02/12/98	13:30	2636.90	1490.11	45.84	440.00		440.00	273.15			4.12	87.60	40.00	0.10	382.40	
H ² S = 50ppm																
02/12/98	14:00	2639.00	1481.50	46.34	497.36	2.94	500.30	282.15			2.2	89.80	40.00	0.10	442.70	
FLOW LINE TEMPERATURE = 71°C / CONTINUE DRILLING / H ² S = 10ppm																
02/12/98	14:15		1352.30	46.58	338.17	8.90	347.07	286.55								

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UnderBalanced-Drilling Report

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/12/98 14:30		2645.00	1447.05	46.83	428.45	5.74	434.19	291.06			.85	90.65	40.00	0.10	376.59	
FLOW LINE TEMPERATURE = 77°C / SAMPLE 2645m TAKEN																
02/12/98 14:45			1395.37	47.08	430.00	8.16	438.16	295.70								
02/12/98 15:00		2649.00	1309.23	47.33	370.65	34.27	404.92	300.23			7.77	98.42	40.00	0.10	347.32	
02/12/98 15:20			1050.83	47.66	269.86	9.51	279.37	306.16								
SAMPLE 2650 m TAKEN																
02/12/98 15:30		2653.00	1248.94	47.83	295.55		295.55	308.89			8.63	107.05	40.00	0.10	237.93	
02/12/98 15:40			1283.39	47.99	394.38	4.94	399.32	311.73								
SAMPLE 2655m TAKEN																
02/12/98 16:00		2657.00	1274.78	48.33	406.11		406.11	317.30			2.14	109.19	40.00	0.10	348.51	
FLOW LINE TEMPERATURE = 74°C																
02/12/98 16:15			1283.39	48.57	381.25	5.01	386.26	321.17								
02/12/98 16:25			1257.55	48.73	395.04	2.52	397.56	323.95								
SAMPLE 2660m TAKEN																
02/12/98 16:30		2660.00	1240.32	48.82	388.54	2.47	391.00	325.30			2.85	112.04	40.00	0.10	333.40	
FLOW LINE TEMPERATURE = 76°C																
02/12/98 16:45			1223.10	49.07	365.11	66.25	431.36	329.50								
SAMPLE 2665m SAMPLE MISSED / BY-PASS N² TO MAKE CONNECTION																
02/12/98 17:00		2669.00	878.56	49.32	353.61	2.31	355.93	333.70			5.98	118.02	40.00	0.10	298.33	
FLOW LINE TEMPERATURE = 65°C																
02/12/98 17:06			1274.78	49.42	401.69		401.69	334.96								
SAMPLE 2670m TAKEN																
02/12/98 17:15			1214.48	49.57	391.72	2.55	394.26	337.52								
02/12/98 17:30		2675.00	1223.10	49.81	368.23	5.07	373.30	341.44			1.89	119.91	40.00	0.10	315.70	
SAMPLE 2675m TAKEN																
02/12/98 18:00		2683.00	1145.58	50.31	340.23	2.40	342.63	349.22			3.49	123.40	40.00	0.10	285.03	
02/12/98 18:20			1162.80	50.64	346.64	9.01	355.65	354.39								
MAKE CONNECTION																

Today's: 22-Feb-98 Page: 11 of 28
 Test Date(s): From: 02/07/98 To: 02/23/98
 Company: Paramount Resources
 Location: et al Arrowhead N65
 Company Rep: Rod MacEachern
 Formation: Nahanni

FOREMOST

ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/12/98	18:30	2687.00	1076.67	50.81	376.67		376.67	357.07			2.4	125.80	40.00	0.10	319.07	
FLOW LINE TEMPERATURE = 76°C																
02/12/98	18:45		1188.64	51.05	383.43	12.51	395.95	360.58								
02/12/98	18:55		1154.19	51.22	383.54		383.54	363.17								
NO SAMPLE FOR 2690m / SAMPLE CATCHER OUT OF SERVICE																
02/12/98	19:00	2692.00	1093.90	51.30	396.89	2.42	399.31	364.47			6.88	132.68	40.00	0.10	341.71	
FLOW LINE TEMPERATURE = 76°C																
02/12/98	19:10		1111.12	51.47	380.28	2.37	382.65	367.07								
2695m SAMPLE TAKEN																
02/12/98	19:30	2698.00	1085.28	51.80	359.46	9.16	368.62	372.11			2.56	135.24	40.00	0.10	311.02	
02/12/98	19:37		1085.28	51.92	379.03	2.31	381.34	373.90								
2700m SAMPLE TAKEN																
02/12/98	20:00	2705.00	1059.44	52.29	340.50	2.34	342.84	379.49			4.34	1389.58	40.00	0.10	285.24	
2705m SAMPLE TAKEN																
02/12/98	20:12		1033.60	52.48	338.22	2.22	340.44	382.22								
MAKE CONNECTION																
02/12/98	20:30	2707.00	818.27	52.78	338.63	1.29	339.92	386.63			3.53	143.11	40.00	0.10	282.32	
02/12/98	20:48		956.08	53.08	384.61		384.61	391.10								
2710m SAMPLE TAKEN																
02/12/98	21:00	2713.00	895.79	53.27	311.03	2.14	313.17	393.86			4.5	147.61	40.00	0.10	255.57	
02/12/98	21:05	2715.00	534.03	53.35	216.09		216.09	394.61								
2715m SAMPLE TAKEN																
02/12/98	21:27	2720.00	1042.22	53.72	351.37	2.34	353.71	400.12								
2720m SAMPLE TAKEN																
02/12/98	21:30	2720.00	1024.99	53.77	373.70	6.82	380.52	400.85			-2.8	144.81	40.00	0.10	322.92	
02/12/98	21:49	2725.00	1042.22	54.08	305.47	4.75	310.22	405.36								
2725m SAMPLE TAKEN																
02/12/98	22:00	2725.00	1024.99	54.26	409.11	10.60	419.71	408.12			.16	144.97	40.00	0.10	362.11	

FLOW LINE TEMPERATURE = 74°C / SALINITY = 120 000ppm / H₂S = 150ppm

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/12/98	22:15		990.54	54.51	204.48		204.48	411.36								
02/12/98	22:28	2730.00	990.54	54.73	334.33	4.53	338.86	414.67								
2730m SAMPLE TAKEN																
02/12/98	22:30	2730.00	990.54	54.76	358.32	4.33	362.66	415.17			5.93	150.90	40.00	0.10	241.70	
02/12/98	22:49	2735.00	981.92	55.08	323.95		323.95	419.50								
2735m SAMPLE TAKEN																
02/12/98	23:00		990.54	55.26	306.10		306.10	421.99			11.81	162.71	40.00	0.10	185.14	
FLOW LINE TEMPERATURE = 74°C / SALINITY = 108 000ppm / H²S = 20ppm																
02/12/98	23:07		947.47	55.37	318.36	2.61	320.97	423.60								
SAMPLE AT 2740 METERS																
02/12/98	23:30	2745.00	990.54	55.75	316.32	1.88	318.20	428.86			.12	165.36	40.00	0.10	260.60	
FLOW LINE TEMPERATURE = 74°C / CONNECTION / SAMPLE AT 2745 METERS																
02/12/98	23:40		956.08	55.92	262.68		262.68	431.20								
02/13/98	00:00	2748.00	1068.06	56.25	329.85	2.11	331.96	435.48			17.52	182.88	40.00	0.10	274.36	
FLOW LINE TEMPERATURE = 68°C / SALINITY = 112,000ppm / H2S = 20 ppm																
02/13/98	00:13		973.31	56.46	332.72	2.34	335.05	438.70								
SAMPLE AT 2750 METERS																
02/13/98	00:24		930.24	56.64	328.50	2.18	330.68	441.20								
SAMPLE AT 2755 METERS																
02/13/98	00:30	2756.00	973.31	56.74	314.26	2.30	316.56	442.58			3.92	186.80	40.00	0.10	258.96	
FLOW LINE TEMPERATURE = 65°C																
02/13/98	00:44		956.08	56.98	339.12	2.21	341.33	445.73								
SAMPLE AT 2760 METERS																
02/13/98	01:00	2763.00	947.47	57.24	361.27	4.56	365.83	449.30			3.08	189.88	40.00	0.10	308.23	
FLOW LINE TEMPERATURE = 66°C / CONNECTION / SALINITY = 110,000ppm / H2S = 22ppm																
02/13/98	01:24		973.31	57.63	362.81	14.00	376.81	454.58								
SAMPLE AT 2765 METERS																
02/13/98	01:30	2767.00	930.24	57.73	260.07		260.07	455.85			5.15	195.03	40.00	0.10	202.47	
FLOW LINE TEMPERATURE = 61°C																
02/13/98	01:42		930.24	57.93	288.38	2.15	290.53	458.65								
SAMPLE AT 2770 METERS																

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/13/98	02:00	2775.00	921.63	58.23	290.32	8.43	298.75	462.64			6.71	201.74	40.00	0.10	241.45	
FLOW LINE TEMPERATURE = 63°C / SALINITY = 98,000ppm / H2S = 12ppm																
02/13/98	02:25		904.40	58.64	285.74	2.16	287.90	468.06								
SAMPLE AT 2780 METERS																
02/13/98	02:30	2781.00	887.18	58.73	305.02	4.18	309.20	469.13		4.94	206.68	40.00	0.10	251.60		
FLOW LINE TEMPERATURE = 64°C																
02/13/98	02:39		921.63	58.88	316.01	4.53	320.54	471.13								
CONNECTION																
02/13/98	03:00	2785.00	809.66	59.23	266.64		266.64	475.60		2.9	209.58	40.00	0.10	209.04		
FLOW LINE TEMPERATURE = 64°C / SAMPLE AT 2785 / SALINITY = 110,000ppm / H2S = 10ppm																
02/13/98	03:23		878.56	59.60	298.51	2.10	300.61	480.81								
SAMPLE AT 2790 METERS																
02/13/98	03:30	2791.00	878.56	59.72	311.65		311.65	482.33		7.47	217.05	40.00	0.10	254.05		
FLOW LINE TEMPERATURE = 64°C / SHIP 33m³ OFF LOCATION																
02/13/98	03:50		844.11	60.05	299.69	2.09	301.78	486.62								
SAMPLE AT 2795 METERS																
02/13/98	04:00	2798.00	878.56	60.22	276.67	1.98	278.64	488.70		1.89	218.94	40.00	0.10	218.94		
FLOW LINE TEMPERATURE = 64°C / SALINITY = 114,000ppm / H2S = 10ppm																
02/13/98	04:17		869.95	60.50	325.57	6.15	331.71	492.35								
CONNECTION																
02/13/98	04:30	2802.00	783.82	60.72	224.85	13.71	238.55	495.20		2.76	221.70	40.00	0.10	180.95		
FLOW LINE TEMPERATURE = 69°C																
02/13/98	04:50		671.84	61.04	208.71	13.67	222.38	499.08								
SAMPLE AT 2805 METERS																
02/13/98	05:00	2806.00	861.34	61.21	301.12	8.32	309.43	501.32		6.35	228.05	40.00	0.10	251.83		
FLOW LINE TEMPERATURE = 62°C / SALINITY = 98,000ppm / H2S = 10ppm																
02/13/98	05:01		835.50	61.23	293.26	10.53	303.79	501.53								
CUMM 24 HOUR BURNABLE GAS = 264.10 10³m³																
02/13/98	05:02		869.95	61.24	278.76	4.17	282.94	501.73								
CUMM BURNABLE GAS TO DATE = 332.10 10³m³																
02/13/98	05:03		878.56	61.26	283.70	2.17	285.87	501.93								
CUMM 24 HOUR WATER PRODUCTION = 215.52 m³																
02/13/98	05:04		869.95	61.28	323.46	2.20	325.66	502.15								
CUMM FLUID TO DATE = 228.05 m³																

Formation: Nahanni

FOREMOST
ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611

Unit No: Gemini 3

Test Operator: L Turnbull / T Fox

Operation: Underbalanced Drilling

Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/13/98 05:18		2810.00	861.34	61.51	292.07	2.11	294.18	505.10								
2810m SAMPLE TAKEN																
02/13/98 05:30		2812.00	852.72	61.71	301.86	4.27	306.12	507.64			4.94	232.99	40.00	0.10	248.52	
02/13/98 05:45		2815.00	869.95	61.93	282.22	4.18	286.40	510.48								
2815m SAMPLE TAKEN																
02/13/98 06:00		2819.00	852.72	62.18	295.54	1.98	297.52	513.49			.76	233.75	40.00	0.10	239.92	
FLOW LINE TEMPERATURE = 63°C / SALINITY = 100 000ppm / H²S = 10ppm																
02/13/98 06:14			852.72	62.42	280.02	78.81	358.83	516.23								
CONNECTION																
02/13/98 06:30		2822.00	482.35	62.68	211.98		211.98	519.34			7.83	241.58	40.00	0.10	154.38	
FLOW LINE TEMPERATURE = 65°C																
02/13/98 06:43		2825.00	999.15	62.90	287.04		287.04	521.56								
2825m SAMPLE TAKEN																
02/13/98 07:00		2830.00	775.20	63.18	251.33	3.67	255.00	524.88			8.42	249.42	40.00	10.00	193.73	
SAMPLE 2830m TAKEN / SALINITY = 130 000ppm / FLOWLINE TEMPERATURE 65°C																
02/13/98 07:24			930.24	63.58	294.24		294.24	529.14								
SAMPLE AT 2835m																
02/13/98 07:30		2836.00	904.40	63.68	282.58		282.58	530.33			4	253.42	40.00	10.00	224.98	
FLOW LINE TEMPERATURE = 68°C																
02/13/98 07:45		2840.00	904.40	63.93	278.75	2.30	281.05	533.31								
SAMPLE 2840m TAKEN																
02/13/98 08:00		2840.00	930.24	64.18	284.16	39.39	323.56	536.32			.85	254.27	40.00	10.00	226.56	
FLOW LINE TEMPERATURE = 76°C / SALINITY = 110 000ppm / H2S @ 15ppm																
02/13/98 08:03			990.54	64.22	289.64	5.34	294.98	536.96								
MAKE CONNECTION																
02/13/98 08:30		2845.00	973.31	64.67	319.94	2.03	321.97	541.94			1.64	255.91	40.00	10.00	262.34	
FLOW LINE TEMPERATURE = 74°C																
02/13/98 08:35			904.40	64.75	275.79	1.89	277.68	542.87								
SAMPLE 2845m TAKEN																
02/13/98 08:43			792.43	64.88	247.52		247.52	544.37								
STALL BIT / PULL OFF BOTTOM AND CIRCULATE.																
02/13/98 08:50			801.04	65.00	227.45	1.70	229.15	545.51					40.00	0.00		
SHUT FOAM AND PUMP OFF.																

Today's: 22-Feb-98 Page: 15 of 28
 Test Date(s): From: 02/07/98 To: 02/23/98
 Company: Paramount Resources
 Location: et al Arrowhead N65
 Company Rep: Rod MacEachern
 Formation: Nahanni

FOREMOST

ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/13/98	09:00	2847.00	861.34	65.17	260.88		260.88	547.23			4.13	260.04	40.00	0.00	203.28	
FLOW LINE TEMPERATURE = 80°C / SALINITY 130 000ppm / H2S @ 60ppm																
02/13/98	09:01		878.56	65.18	259.44		259.44	547.41								
SAMPLE @ 2847m																
02/13/98	09:02		878.56	65.20	266.95	5.40	272.35	547.60								
HIGH PRESSURE FLUID SAMPLE TAKEN # 21930 @ 342 kPa																
02/13/98	09:05		895.79	65.25	272.06	1.90	273.96	548.16								
HIGH PRESSURE FLUID SAMPLE TAKEN # 22100 @ 383 kPa																
02/13/98	09:10		999.15	65.33	344.58	2.01	346.59	549.24								
HIGH PRESSURE GAS SAMPLE TAKEN # 19554 @ 421 kPa																
02/13/98	09:14		964.70	65.39	374.15	2.40	376.55	550.25								
HIGH PRESSURE GAS SAMPLE TAKEN # 19948 @ 626 kPa																
02/13/98	09:18		809.66	65.46	268.08	12.69	280.76	551.07								
TWO STOCK FLUID SAMPLES TAKEN																
02/13/98	09:30	2847.00	835.50	65.66	225.14	19.87	245.01	553.44			7.57	267.61	40.00	0.10	187.41	
FLOW LINE TEMPERATURE = 82°C / SALINTY 140 000ppm / H2S @ 60ppm																
02/13/98	09:32		1068.06	65.69	219.35	17.46	236.81	553.82					0.00	0.00		
BYPASS N ² / START PULLING UP TOO INTERMEDIATE CASING																
02/13/98	10:00		732.14	66.16	255.35		255.35	559.38			8.91	276.52	0.00	0.00	255.35	
FLOW LINE TEMPERATURE = 78°C / SALINITY = 142 000ppm / H2S @ 10ppm																
02/13/98	10:06		620.16	66.26	236.82		236.82	560.42								
HIGH PRESSURE GAS SAMPLE TAKEN #18438 @ 620 kPa																
02/13/98	10:08		577.10	66.29	227.22		227.22	560.75								
HIGH PRESSURE GAS SAMPLE TAKEN #11198 @ 577 kPa																
02/13/98	10:10		559.87	66.33	212.89	1.62	214.51	561.05								
HIGH PRESSURE FLUID SAMPLE TAKEN #17059 @ 285 kPa																
02/13/98	10:12		542.64	66.36	196.76		196.76	561.32								
HIGH PRESSURE FLUID SAMPLE TAKEN #19574 @ 273 kPa																
02/13/98	10:20		551.26	66.48	199.55		199.55	562.46								
TWO STOCK FLUID SAMPLES TAKEN / ALL SAMPLES DELIVERED TO AGAT IN FT. NELSON, BC																
02/13/98	10:29		525.42	66.63	192.41		192.41	563.65			4.74	281.26	0.00	0.00	192.41	
SHUT IN WELL AT CHOKE / RECORD BUILD-UP																
02/13/98	10:30		1283.39	66.65	32.31		32.31	563.67								

Today's: 22-Feb-98 Page: 16 of 28
 Test Date(s): From: 02/07/98 To: 02/23/98
 Company: Paramount Resources
 Location: et al Arrowhead N65
 Company Rep: Rod MacEachern
 Formation: Nahanni



UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/13/98	10:31		1584.86	66.67	14.90		14.90	563.68								
02/13/98	10:32		1800.19	66.68	3.32		3.32	563.68								
02/13/98	10:33		1981.07	66.70	2.84		2.84	563.69								
02/13/98	10:34		2127.50	66.72			0.00	563.69								
02/13/98	10:36		2325.61	66.72			0.00	563.69								
02/13/98	10:38		2463.42	66.73			0.00	563.69								
02/13/98	10:40		2575.40	66.73			0.00	563.69								
02/13/98	10:42		2678.76	66.73			0.00	563.69								
02/13/98	10:44		2756.28	66.73			0.00	563.69								
02/13/98	10:46		2833.80	66.73			0.00	563.69								
02/13/98	10:48		2911.32	66.73	0.00		0.00	563.69								
02/13/98	10:50		2971.61	66.73	0.00	0.00	0.00	563.69								
02/13/98	10:52		3031.91	66.73			0.00	563.69								
02/13/98	10:54		3100.81	66.73			0.00	563.69								
02/13/98	10:56		3152.49	66.73			0.00	563.69								
02/13/98	10:58		3212.79	66.73			0.00	563.69								
02/13/98	11:00		3273.08	66.73			0.00	563.69								

Today's: 22-Feb-98 Page: 17 of 28
 Test Date(s): From: 02/07/98 To: 02/23/98
 Company: Paramount Resources
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 Company Rep: Rod MacEachern
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FOREMOST

ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/13/98	11:10		3600.39	66.73			0.00	563.69								
02/13/98	11:20		3850.17	66.73			0.00	563.69								
02/13/98	11:30		4125.80	66.73			0.00	563.69								
02/13/98	11:40		4366.98	66.73	0.00		0.00	563.69								
02/13/98	11:50		4608.15	66.73			0.00	563.69								
02/13/98	12:00		4832.10	66.73			0.00	563.69								
02/13/98	12:10		5047.43	66.73			0.00	563.69								
02/13/98	12:20		5254.15	66.73			0.00	563.69								
02/13/98	12:30		5452.26	66.73			0.00	563.69								
02/13/98	12:40		5650.37	66.73			0.00	563.69								
02/13/98	12:50		5848.48	66.73			0.00	563.69								
02/13/98	13:00		6029.36	66.73			0.00	563.69								
02/13/98	13:10		6210.24	66.73			0.00	563.69								
02/13/98	13:20		6391.12	66.73	0.00		0.00	563.70								
02/13/98	13:30		6563.39	66.73	0.00		0.00	563.70								
02/13/98	13:32		6597.84	66.73			0.00	563.70								
02/13/98	13:37		25.84	66.74	46.04		46.04	563.73								

BLEED DOWN PRESSURE TO BEGIN KILLING WELL

Today's: 22-Feb-98 Page: 18 of 28
Test Date(s): From: 02/07/98 To: 02/23/98
Company: Paramount Resources
Location: et al Arrowhead N65
Company Rep: Rod MacEachern
Formation: Nahanni



UnderBalanced-Drilling Report

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	10 ³ m ³ /d	m ³ /d	m ³	m ³	m ³	m ³ /min	m ³ /min	10 ³ m ³ /d	m ³
02/13/98	14:10		671.84	66.93	183.32	22.92	206.24	565.09								
BLED OFF PRESSURE / KILLING WELL																
02/13/98	14:44			67.47			0.00	567.60								
WELL DEAD / PREPARE TO PULL PIPE																
02/13/98	19:00						0.00	567.60								
KICK FROM WELL WHILE TRIPPING																
02/13/98	20:00						0.00	567.60								
BLEED DOWN KICK PRESSURE / PUMP FLUID DOWN ANNULUS / CONTINUE TRIPPING PIPE																
02/14/98	01:45						0.00	567.60								
DRILL PIPE AT 1500m / START N ² @ 23m ³ /min																
02/14/98	02:53						0.00	567.60								
NO RETURNS / INCREASE N ² RATE TO 34.00m ³ /min																
02/14/98	03:09		801.04	68.34	22.45	2.66	25.11	567.61								
FLUID AND N ² TOO SURFACE																
02/14/98	03:30		422.06	68.68	26.84		26.84	568.46								
02/14/98	03:40		835.50	68.85	45.06		45.06	568.66								
BURNABLE GAS TOO SURFACE																
02/14/98	04:00		155.04	69.18	13.31		13.31	569.38								46.78
DIVERT FLOW THROUGH SECONDARY																
02/14/98	04:17		792.43	69.34	83.21		83.21	569.50								
ESTABLISH FLOW THROUGH SECONDARY																
02/14/98	04:30		422.06	69.56	42.42		42.42	570.01								
BYPASS N ² / CONTINUE TO RUN IN HOLE																
02/14/98	05:00			70.03	3.93		3.93	570.41			281.26					25.80
STOP TRIPPING / CHANGE OUT WILLIAMS HEAD RUBBER																
02/14/98	05:01			70.04	2.35		2.35	570.41								
DAILY BURNABLE GAS CUMM = 56.09 10 ³ m ³																
02/14/98	05:02		8.61	70.06			0.00	570.41								
DAILY PRODUCED FLUID CUMM = 53.21 m ³																
02/14/98	05:03		17.23	70.07	2.77		2.77	570.42								
CUMM GAS TO DATE = 388.19 10 ³ m ³																
02/14/98	05:04		8.61	70.08			0.00	570.42								
CUMM FLUID TO DATE = 281.26 m ³																

FOREMOST
ENERGY SYSTEMS LTD.

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

UnderBalanced-Drilling Report

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/14/98	05:30		77.52	70.46	8.48		8.48	570.55				281.26	0.00	0.00	8.48	7.30
TOTAL FLUID PUMPED DOWN HOLE TO KILL WELL = 102.00 m³																
02/14/98	06:00		163.65	70.95	5.01		5.01	571.04				281.26	0.00	0.00	5.01	3.38
FLOW LINE TEMPERATURE = 46°C																
02/14/98	06:30		241.17	71.41	19.02		19.02	571.31				281.26	0.00	0.00	19.02	7.21
FLOW LINE TEMPERATURE = 48°C																
02/14/98	07:00		542.64	71.91	81.30	2.52	83.82	572.18				281.26	0.00	0.00	83.82	7.62
FLOW LINE TEMPERATURE = 53°C																
02/14/98	07:30		869.95	72.41	76.45		76.45	573.93				281.26	0.00	0.00	76.45	9.65
TOTAL KILL FLUID RECOVERED																
02/14/98	08:00		844.11	72.88	226.24		226.24	578.98			19.12	300.38	0.00	0.00	226.24	
FLOW LINE TEMPERATURE = 71°C																
02/14/98	08:30		792.43	73.38	172.35		172.35	582.67			15.18	315.56	0.00	0.00	172.35	
FLOW LINE TEMPERATURE = 68°C																
02/14/98	09:00		904.40	73.88	232.00		232.00	586.75			13.56	329.12	0.00	0.00	232.00	
FLOW LINE TEMPERATURE = 65°C																
02/14/98	09:30		594.32	74.38	136.34		136.34	590.94			12.22	341.34	41.00	0.00	136.34	
START N² @ 41m³/min																
02/14/98	10:00		1050.83	74.88	249.66		249.66	594.80			9.64	350.98	41.00	0.00	190.62	
FLOW LINE TEMPERATURE = 64°C																
02/14/98	10:05		913.02	74.96	291.58		291.58	595.79					41.00	0.08		
FOAM ON LINE @ 80L/min																
02/14/98	10:30		818.27	75.37	201.03		201.03	600.18			15.9	366.88	41.00	0.08	141.99	
02/14/98	10:40		887.18	75.53	221.34	90.65	311.99	601.70								
CONNECTION																
02/14/98	11:00		594.32	75.87	179.36		179.36	605.05			6.42	373.30	41.00	0.08	120.32	
FLOW LINE TEMPERATURE = 62°C / SALINITY = 140 000ppm / H²S = 10ppm																
02/14/98	11:21		844.11	76.22	248.13		248.13	608.25								
GAS COMPOSITION CHANGE / NON-BURNABLE GAS TO SURFACE / TAKE TWO HIGH PRESSURE SAMPLES																
02/14/98	11:22		826.88	76.23	238.00	2.54	240.54	608.42								
GAS SAMPLES - #22057 + #12367																
02/14/98	11:23	2847.00	826.88	76.25	230.88		230.88	608.58								
START DRILLING																

FOREMOST
ENERGY SYSTEMS LTD.

UnderBalanced-Drilling Report

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/14/98	11:30		835.50	76.36	235.11	2.64	237.75	609.73			9.2	382.50	41.00	0.08	178.71	
FLOW LINE TEMPERATURE = 64°C / SALINITY = 122 000ppm																
02/14/98	11:40	2855.00	835.50	76.53	239.86		239.86	611.38								
2855m SAMPLE TAKEN																
02/14/98	12:00	2857.00	835.50	76.86	214.21		214.21	614.64			15.12	397.62	41.00	0.08	155.17	
FLOW LINE TEMPERATURE = 64°C / SALINITY = 125 000ppm																
02/14/98	12:18		913.02	77.16	250.93	19.13	270.05	617.74								
CONNECTION																
02/14/98	12:30	2859.00	792.43	77.36	261.16		261.16	619.97			14.22	411.84	41.00	0.08	202.12	
FLOW LINE TEMPERATURE = 71°C / SALINITY = 118 000ppm																
02/14/98	12:40	2860.00	611.55	77.52	240.20	2.23	242.43	621.66								
2860m SAMPLE TAKEN																
02/14/98	13:00	2864.00	913.02	77.85	254.86		254.86	624.66			6	417.84	41.00	0.08	195.82	
FLOW LINE TEMPERATURE = 70°C																
02/14/98	13:04	2865.00	904.40	77.92	267.01		267.01	625.40								
2865m SAMPLE TAKEN																
02/14/98	13:25	2870.00	895.79	78.27	256.78	2.23	259.01	628.95								
2870m SAMPLE TAKEN																
02/14/98	13:30	2871.00	921.63	78.35	264.68		264.68	629.85			13.44	431.28	41.00	0.08	205.64	
FLOW LINE TEMPERATURE = 74°C / SALINITY = 130 000ppm																
02/14/98	13:50	2875.00	947.47	78.68	267.42		267.42	633.45								
2875m SAMPLE TAKEN																
02/14/98	14:00	2877.00	921.63	78.84	269.44	83.06	352.50	635.39			16.26	447.54	41.00	0.08	293.46	
FLOW LINE TEMPERATURE = 76°C / SALINITY = 130 000ppm / CONNECTION																
02/14/98	14:30	2877.00	456.51	79.34	169.21		169.21	640.69			9.6	457.14	41.00	0.08	110.17	
FLOW LINE TEMPERATURE = 76°C																
02/14/98	14:40	2880.00	1360.91	79.51	208.54	2.50	211.04	641.52								
2880m SAMPLE TAKEN																
02/14/98	15:00	2885.00	938.86	79.83	258.78		258.78	645.49			14.85	471.99	41.00	0.80	199.74	
FLOW LINE TEMPERATURE = 74°C / SALINITY = 134 000ppm																
02/14/98	15:25	2890.00	938.86	80.25	263.68		263.68	649.97								
2890m SAMPLE TAKEN																
02/14/98	15:30	2891.00	930.24	80.33	262.83	2.12	264.95	650.88			12.48	484.47	41.00	0.08	205.91	
FLOW LINE TEMPERATURE = 71°C / 132 000ppm																

FOREMOST
ENERGY SYSTEMS LTD.

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/14/98	15:53	2895.00	938.86	80.72	269.42		269.42	655.07								
2895m SAMPLE TAKEN																
02/14/98	16:00	2896.00	947.47	80.83	268.36	37.86	306.22	656.49			10.74	495.21	41.00	0.08	247.18	
FLOW LINE TEMPERATURE = 72°C / SALINITY = 135 000ppm / CONNECTION																
02/14/98	16:24	2900.00	482.35	81.22	56.62	2.34	58.96	660.84								
2900m SAMPLE TAKEN																
02/14/98	16:30	2903.00	1093.90	81.33	318.29		318.29	661.81			15.19	510.40	41.00	0.08	259.25	
FLOW LINE TEMPERATURE = 74°C / SALINITY = 140 000ppm																
02/14/98	16:38		938.86	81.46	244.40		244.40	663.45								
2905m SAMPLE TAKEN																
02/14/98	17:00	2910.00	921.63	81.81	235.79		235.79	666.90			15.12	525.52	41.00	0.08	176.75	
FLOW LINE TEMPERATURE = 76°C / 2910m SAMPLE TAKEN / SALINITY = 140 000ppm																
02/14/98	17:14	2915.00	938.86	82.03	248.92		248.92	669.28								
2915m SAMPLE TAKEN																
02/14/98	17:26		878.56	82.23	223.06	48.32	271.38	671.47								
CONNECTION																
02/14/98	17:30	2915.00	938.86	82.30	262.62		262.62	672.18			12.12	537.64	41.00	0.08	203.58	
FLOW LINE TEMPERATURE = 75°C / SALINITY = 138 000ppm																
02/14/98	17:52	2920.00	361.76	82.67	35.73	2.11	37.85	675.60								
2920m SAMPLE TAKEN																
02/14/98	18:00	2921.00	1102.51	82.80	232.63		232.63	676.34			18.36	556.00	41.00	0.08	173.59	
FLOW LINE TEMPERATURE = 80°C / SALINITY = 130 000ppm																
02/14/98	18:13	2925.00	895.79	83.02	146.75		146.75	677.92								
2925m SAMPLE TAKEN / PULL OFF BOTTOM AND CIRCULATE																
02/14/98	18:30	2925.00	930.24	83.29	199.79		199.79	680.16			17.25	573.25	41.00	0.08	140.75	
FLOW LINE TEMPERATURE = 84°C / SALINITY = 142 000ppm / 2925m T.D. WELL																
02/14/98	18:45		1033.60	83.54	224.09		224.09	682.43					0.00	0.00		
SHUT DOWN N² AND FOAM INJECTION / PULL 16 STANDS																
02/14/98	19:00		1128.35	83.79	279.64		279.64	685.22			15.12	588.37	0.00	0.00	220.60	
FLOW LINE TEMPERATURE = 94°C / SALINITY = 140 000ppm																
02/14/98	19:30		895.79	84.29	277.40		277.40	689.88			8.7	597.07	0.00	0.00	277.40	
FLOW LINE TEMPERATURE = 71°C																
02/14/98	20:00		775.20	84.78	138.46	2.99	141.45	694.32			6.2	603.27	0.00	0.00	141.45	
FLOW LINE TEMPERATURE = 60°C / SALINITY = 138 000ppm / H²S = 0 ppm																

FOREMOST
ENERGY SYSTEMS LTD.

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

UnderBalanced-Drilling Report

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/14/98	20:01		749.36	84.80	149.47		149.47	694.43								
TAKE TWO HIGH PRESSURE GAS SAMPLES #18114 + #12075 - 68°C - 780 kPa																
02/14/98	20:02		740.75	84.82	131.46		131.46	694.52								
TAKE TWO HIGH PRESSURE FLUID #21741 + #21692 - 68°C - 770 kPa																
02/14/98	20:03		766.59	84.83	141.17		141.17	694.62								
TAKE TWO STOCK FLUID SAMPLES / ALL SAMPLES TO BE DELIVERED TO AGAT LAB.'s																
02/14/98	20:24		413.44	85.18		3.01	3.01	695.45				603.27				
SHUT IN WELL @ B.O.P.s / RIG RECORD SHUT IN PRESSURE'S																
02/14/98	20:25		404.83	85.18		3.01	3.01	695.45								
DAILY CUMM BURNABLE GAS = 105.37 10³m³																
02/14/98	20:26		396.22	85.18		3.02	3.02	695.45								
DAILY CUMM FLUID = 322.01 m³																
02/14/98	20:27		387.60	85.18		3.00	3.00	695.45								
CUMM BURNABLE GAS TO DATE = 437.47 10³m³																
02/14/98	20:28		378.99	85.18		3.00	3.00	695.46								
CUMM FLUID PRODUCED TO DATE = 603.27m³																
02/15/98	18:16		499.58	87.86			0.00	695.49								
COMPUTALOG ON LOCATION TO LOG HOLE / BLEED WELL TO FLARE																
02/15/98	19:20			88.88	12.35		12.35	700.28								
HI PRESSURE GAS SAMPLES #17811, #17692 - 16°C, 4 kPa																
02/15/98	20:27			89.95	3.92		3.92	700.65								
02/15/98	22:50		103.36	91.83			0.00	701.00								
FLUID TOO SURFACE																
02/15/98	23:00		60.29	92.00	27.68		27.68	701.15								
FLOW OF FLUID STOPPED - 3.82m³ RECOVERED																
02/16/98	00:20		25.84	93.32	9.81		9.81	701.51								
PUMP FLUID DOWN HOLE TO PUT WELL ON VACUUM																
02/16/98	00:27			93.40	0.12		0.12	701.53								
WELL ON VACUUM																
02/16/98	03:00			93.44			0.00	701.53								
SAFETY MEETING PRIOR TO LOGGING THE HOLE																
02/16/98	05:00		206.00	93.52		1.34	1.34	701.53								
BLEED OFF WELL PRESSURE																

Today's: 22-Feb-98 Page: 23 of 28
Test Date(s): From: 02/07/98 To: 02/23/98
Company: Paramount Resources
Location: et al Arrowhead N65
Company Rep: Rod MacEachern
Formation: Nahanni



UnderBalanced-Drilling Report

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

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Today's: 22-Feb-98 Page: 24 of 28
 Test Date(s): From: 02/07/98 To: 02/23/98
 Company: Paramount Resources
 Location: et al Arrowhead N65
 Company Rep: Rod MacEachern
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UnderBalanced-Drilling Report

Job No.: 3611
 Unit No: Gemini 3
 Test Operator: L Turnbull / T Fox
 Operation: Underbalanced Drilling
 Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/17/98	05:05		465.12	98.03	40.43		40.43	711.47								
BURNABLE GAS TOO SURFACE																
02/17/98	05:30		258.40	98.44	11.05		11.05	711.90								
TOTAL FLUID RECOVERED = 163.9m³																
02/17/98	06:00		241.17	98.64		1.93	1.93	711.98								
TOTAL FLUID RECOVERED = 168.8m³																
02/17/98	06:30		465.12	98.74		2.03	2.03	712.04								
SWITCH FLOW THROUGH SECONDARY FLOW LINE, SHUT PIPE RAMS / WAIT ON LOGGERS																
02/17/98	07:00		172.27	99.11	4.12	2.19	6.32	712.24								
TOTAL FLUID RECOVERED FROM WELL = 212.85m³																
02/17/98	07:30		223.95	99.25	5.31		5.31	712.32								
WAIT ON ORDERS																
02/17/98	09:35		275.63	99.35	23.59		23.59	712.39								
BLEED OF ANNULUS																
02/17/98	09:43		275.63	99.48	38.58		38.58	712.57								
FLUID TOO SURFACE																
02/17/98	10:00		267.01	99.72			0.00	712.82			3	216.91				
02/17/98	10:30		301.47	99.86			0.00	712.88			10.35	227.26				
02/17/98	11:00		534.03	100.26	35.07		35.07	713.26			16.75	244.01				
START SHIPPING TO PIT																
02/17/98	11:16		310.08	100.46			0.00	713.62			10	254.01				
DECREASE OF FLUID AND GAS RETURNS																
02/17/98	11:30		284.24	100.46			0.00	713.62				254.01				
02/17/98	11:45		387.60	100.68	37.64		37.64	714.02			6	260.01				
02/17/98	12:00		327.31	100.78			0.00	714.07				260.01				
02/17/98	12:30		258.40	100.80			0.00	714.07				260.01				
02/17/98	13:00		327.31	100.80		1.88	1.88	714.07				260.01				

Today's: 22-Feb-98 Page: 26 of 28
Test Date(s): From: 02/07/98 To: 02/23/98
Company: Paramount Resources
Location: et al Arrowhead N65
Company Rep: Rod MacEachern
Formation: Nahanni



UnderBalanced-Drilling Report

Job No.: 3611
Unit No: Gemini 3
Test Operator: L Turnbull / T Fox
Operation: Underbalanced Drilling
Gas Sent To: Flare

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/18/98	08:05		51.68	100.87			0.00	714.10								
STOP PUMPING FLUID																
02/18/98	09:10		60.29	100.87			0.00	714.10								
START PUMPING FLUID																
02/18/98	09:15		120.59	100.87			0.00	714.10								
FLUID TOO SURFACE																
02/18/98	09:20		146.43	100.87			0.00	714.10								
STOP PUMPING FLUID																
02/18/98	09:30		129.20	100.87			0.00	714.10								
N² ON-LINE TO INCREASE FLUID VOLUMES ON SURFACE																
02/18/98	10:00		103.36	100.87			0.00	714.10								
START PUMPING FLUID DOWN HOLE																
02/18/98	11:00		809.66	101.18	59.97		59.97	714.88								
132.83m³ OF FLUID ON SURFACE.																
02/18/98	12:00		508.19	102.14	48.70		48.70	716.49								
200.00 m³ OF FLUID ON SURFACE.																
02/18/98	12:10		551.26	102.31	55.02		55.02	716.80								
SHUT DOWN N² AND FLUID PUMPS / BEGIN ADDING WEIGHT TO MUD																
02/18/98	13:00		301.47	103.02	11.72		11.72	717.58								
PREPARE TO MUD UP																
02/18/98	19:35		387.60	103.25			0.00	717.59								
CIRCULATE HOLE WHILE RUNNING IN TO BOTTOM																
02/18/98	20:14		413.44	103.46			0.00	717.67								
FLUID TOO SURFACE																
02/18/98	20:43		422.06	103.61	10.41		10.41	717.68								
TRANSFER FLOW TO MUD TANKS VIA HI STAGE																
02/18/98	21:03		103.36	103.82	6.57		6.57	717.69								
BURNABLE GAS TOO SURFACE																
02/18/98	21:19		335.92	104.07	57.77	2.55	60.31	717.81								
NO MORE BURNABLE GAS - N² TO SURFACE																
02/18/98	21:40		430.67	104.38			0.00	718.21								
LOSS OF CIRCULATION																
02/18/98	23:00		86.13	104.48			0.00	718.26								
TRIP OUT INTO CASING																

Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/19/98	00:10		43.07	104.50		1.77	1.77	718.27								
CIRCULATE																
02/19/98	00:12		94.75	104.50			0.00	718.27								
FLUID TOO SURFACE																
02/19/98	01:00		163.65	104.50			0.00	718.27								
CONTINUE TO CIRCULATE TO MUD TANKS VIA HI STAGE																
02/19/98	04:00		25.84	104.57			0.00	718.29								
PUMPS DOWN - RUN IN TO BOTTOM																
02/19/98	05:10		17.23	104.57			0.00	718.30								
STOP RUNNING IN - PUMPS ON																
02/19/98	05:15		129.20	104.57			0.00	718.30								
FLUID TOO SURFACE																
02/19/98	05:16		111.97	104.57			0.00	718.30								
STOP PUMPING / FINISH RUNNING IN																
02/19/98	05:26		77.52	104.60			0.00	718.30								
CIRCULATE ON BOTTOM																
02/19/98	05:27		103.36	104.60			0.00	718.30								
FLUID TOO SURFACE																
02/19/98	06:00		34.45	104.61			0.00	718.31								
PUMPS DOWN - PULL UP INTO CASING																
02/19/98	08:00		180.88	104.62			0.00	718.32								
CONTINUE CIRCULATING																
02/19/98	09:00		51.68	104.62			0.00	718.33								
START PULLING OUT OF HOLE																
02/19/98	17:00		51.68	104.62			0.00	718.33								
OUT OF HOLE / RIG UP FOR OPEN HOLE LOGGER'S.																
02/20/98	22:20		8.61	104.93		1.67	1.67	718.33								
WIPER TRIP - DISPLACE FLUID THROUGH HI STAGE																
02/20/98	23:05		17.23	104.93			0.00	718.33								
CHANGE OUT WILLIAMS HEAD RUBBER / SLIP AND CUT																
02/21/98	02:10		25.84	104.97			0.00	718.34								
CONTINUE TO RUN IN HOLE																
02/21/98	05:26		17.23	105.00			0.00	718.35								
CIRCULATE HOLE AT 2530 METERS																

**FOREMOST
ENERGY SYSTEMS LTD.**

UnderBalanced-Drilling Report

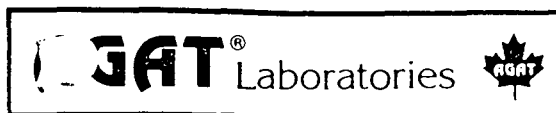
Date	Time	Drill	Inlet	Prod	GAS PRODUCTION				OIL PRODUCTION		WATER PRODUCTION		INJECT	RATE	OPTION A	OPTION B
		Depth	Press	Hours	HPSep_Flow	LPGas_Flow	Total_Flow	Cumm_Gas	Rate	Cumm.	Rate	Cumm.	Gas/N2	Date Liq.	Net Gas	Gain/Loss
		m	kPa		10³ m³/d	10³ m³/d	10³ m³/d	10³ m³/d	m³/d	m³	m³	m³	m³/min	m³/min	10³ m³/d	m³
02/21/98	05:37		86.13	105.00			0.00	718.35								
FLUID TOO SURFACE																
02/21/98	05:44		17.23	105.00		1.71	1.71	718.35								
PUMPS DOWN - RUN IN TO BOTTOM																
02/21/98	06:25		94.75	105.00			0.00	718.36								
ON BOTTOM - PUMPS ON TO CIRCULATE TWICE HOLE VOLUME																
02/21/98	06:26		43.07	105.00			0.00	718.36								
FLUID TOO SURFACE																
02/22/98	09:20						0.00	718.36								
FINISHED LOGGING HOLE / PREPARE TO RUN IN																
02/22/98	12:15						0.00	718.36								
FLUID TOO SURFACE																
02/22/98	15:00						0.00	718.36								
ON BOTTOM / CIRCULATE HOLE																
02/24/98	10:00						0.00	718.36								
CEMENT IN 5.5" LINER / COMPLETE																
02/24/98	19:00						0.00	718.36								
BRIDGE PLUG SET / CIRCULATE OVER TO INHIBITED WATER																
02/24/98	21:30						0.00	718.36								
FINISHED CIRCULATING / START RIG OUT OF GEMINI 3																

6. ENVIRONMENTAL WELL REPORT

Was submitted with drilling application

PARAMOUNT BERKLEY ARROWHEAD N-65

OIL, GAS & WATER ANALYSES



WATER ANALYSIS

CONTAINER IDENTIFICATION: PB 1A

LABORATORY NUMBER: W23116A

OPERATOR NAME: PARAMOUNT RESOURCES LTD.

UNIQUE WELL IDENTIFIER: ARROWHEAD

WELL NAME: PARAMOUNT et al ARROWHEAD

ELEVATIONS: KB m 574.60, GROUND m 567.90

POOL OR ZONE: NAHANNI

NAME OF SAMPLER: [blank]

COMPANY: ENTEST CORP.

TEST TYPE: [blank] NO: [blank]

TEST RECOVERY: H2O FOAMING AGENT/H2S INHIBITOR

SAMPLING POINT: PREMIX TANK

AMT & TYPE OF CUSHION: [blank]

MUD RESISTIVITY/Ω m: [blank] @ 25°C

TEST INTERVAL OR PERFS: [blank]

TYPE OF PRODUCTION: PUMPING, FLOWING, GAS LIFT, SWAB

PRODUCTION RATES: WATER m³/d, OIL m³/d, GAS 10³ m³/d

SEPARATOR, TREATER, RESERVOIR, SOURCE, SAMPLED, RECEIVED

GAUGE PRESSURE kPa, TEMPERATURE °C

DATE SAMPLED (Y-M-D): 98-02-12

DATE RECEIVED (Y-M-D): 98-02-20

DATE REPORTED (Y-M-D): 98-03-04

ANALYST: LN NCO

OTHER INFORMATION: N-65

	mg/L	MASS FRACTION	mmol/L
Na	5050.0	0.182	220.0
K	5110.0	0.184	131.0
Ca	1370.0	0.049	34.2
Mg	220.0	0.008	9.1
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	18.4	0.001	0.3

ION	mg/L	MASS FRACTION	mmol/L
Cl	15500.0	0.559	437.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO ₃	393.0	0.014	6.4
SO ₄	70.9	0.003	0.7
CO ₃	NIL	NIL	NIL
OH	NIL	NIL	NIL
H ₂ S	N.D.	N.D.	N.D.

DISSOLVED

TOTAL SOLIDS mg/L

EVAPORATED AT 110°C: [blank]

EVAPORATED AT 180°C: [blank]

AT IGNITION: [blank]

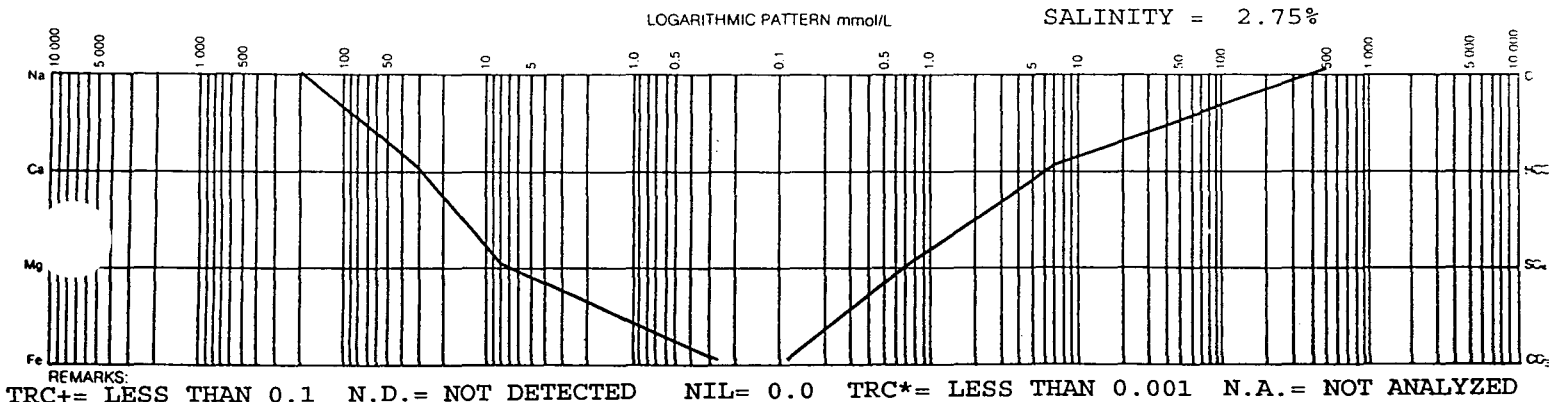
CALCULATED: 27700.0

RELATIVE DENSITY: 1.017 @ 25°C

REFRACTIVE INDEX: N.A. @ 25°C

OBSERVED pH: 7.23 @ 25°C

RESISTIVITY/Ω·m: 0.35 @ 25°C





WATER ANALYSIS

CONTAINER IDENTIFICATION: **PB 8D** LABORATORY NUMBER: **W23116D**

OPERATOR NAME: **PARAMOUNT RESOURCES LTD.**

UNIQUE WELL IDENTIFIER: **PARAMOUNT et al ARROWHEAD** KB m: **574.60** ELEVATIONS GRD m: **567.90**

FIELD OR AREA: **ARROWHEAD** POOL OR ZONE: **NAHANNI** NAME OF SAMPLER: **ENTEST CORP.**

TEST TYPE: **NO** TEST RECOVERY: **PRODUCED H₂O/SOAP/H₂S INHIBITOR**

SAMPLING POINT: **VESSEL FLUID DUMP** AMT & TYPE OF CUSHION: **25° C** MUD RESISTIVITY Ω m: **25° C**

TEST INTERVAL OR PERFS: **TYPE OF PRODUCTION**

PUMPING **FLOWING** **GAS LIFT** **SWAB**

PRODUCTION RATES

WATER m³/d **OIL** m³/d **GAS** 10³ m³/d

SEPARATOR **TREATER** **RESERVOIR** **SOURCE** **SAMPLED** **RECEIVED**

GAUGE PRESSURE kPa **TEMPERATURE °C**

DATE SAMPLED (Y-M-D) **98-02-12** **DATE RECEIVED (Y-M-D)** **98-02-20** **DATE REPORTED (Y-M-D)** **98-03-04** **ANALYST** **LN NCO** **OTHER INFORMATION** **N-65; DRILLING FLUID**

	mg/L	MASS FRACTION	mmol/L	ION	mg/L	MASS FRACTION	mmol/L
Na	30100.0	0.298	1310.0	Cl	62500.0	0.619	1760.0
K	1450.0	0.014	37.1	Br	N.A.	N.A.	N.A.
Ca	5410.0	0.054	135.0	I	N.A.	N.A.	N.A.
Mg	1070.0	0.011	44.0	HCO ₃	220.0	0.002	3.6
Ba	N.A.	N.A.	N.A.	SO ₄	2.0	TRC*	TRC+
Sr	N.A.	N.A.	N.A.	CO ₃	NIL	NIL	NIL
Fe	199.0	0.002	3.6	OH	NIL	NIL	NIL
				H ₂ S	N.D.	N.D.	N.D.

DISSOLVED

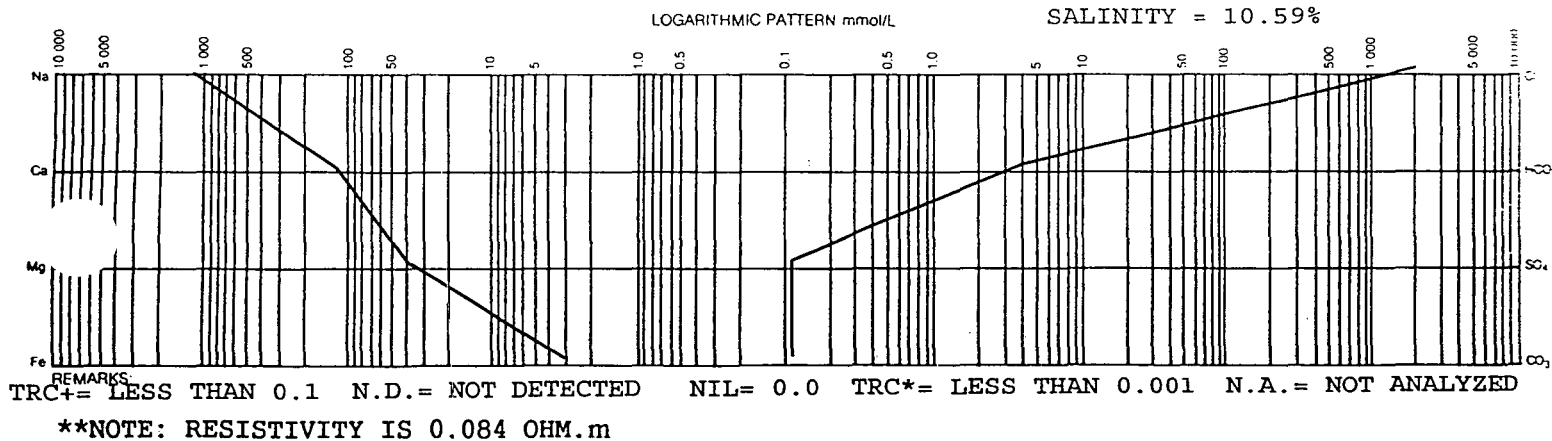
TOTAL SOLIDS mg/L

EVAPORATED AT 110° C: **101000.0** EVAPORATED AT 180° C: **101000.0**

AT IGNITION: **101000.0** CALCULATED: **101000.0**

RELATIVE DENSITY: **1.065 @ 25° C** REFRACTIVE INDEX: **N.A. @ 25° C**

OBSERVED pH: **6.05 @ 25° C** RESISTIVITY OHM *m: **0.08 @ 25° C**





WATER ANALYSIS

CONTAINER IDENTIFICATION: 21776F

LABORATORY NUMBER: W23116F

OPERATOR NAME: PARAMOUNT RESOURCES LTD.

UNIQUE WELL IDENTIFIER: ARROWHEAD

WELL NAME: PARAMOUNT et al ARROWHEAD

KB m ELEVATIONS: 574.60

GRD m ELEVATIONS: 567.90

FIELD OR AREA: ARROWHEAD

POOL OR ZONE: NAHANNI

NAME OF SAMPLER:

COMPANY: ENTEST CORP.

TEST TYPE:

NO:

PRESSURE: 350 KPA

TEST RECOVERY:

SAMPLING POINT: PRESSURE VESSEL

AMT & TYPE OF CUSHION:

MUD RESISTIVITY/Ω m @ 25° C:

TEST INTERVAL OR PERFS:

TYPE OF PRODUCTION:

PRODUCTION RATES:

WATER m³/d:

OIL m³/d:

GAS 10³ m³/d:

SEPARATOR:

TREATER:

RESERVOIR:

SOURCE:

SAMPLED:

RECEIVED:

GAUGE PRESSURE kPa:

TEMPERATURE °C:

DATE SAMPLED (Y-M-D): 98-02-12

DATE RECEIVED (Y-M-D): 98-02-20

DATE REPORTED (Y-M-D): 98-03-04

ANALYST: LN NCO

OTHER INFORMATION: N-65

	mg/L	MASS FRACTION	mmol/L
Na	24300.0	0.300	1060.0
K	1450.0	0.018	37.1
Ca	4380.0	0.054	109.0
Mg	787.0	0.010	32.4
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	547.0	0.007	9.8

ION	mg/L	MASS FRACTION	mmol/L
Cl	48700.0	0.602	1370.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO ₃	759.0	0.009	12.4
SO ₄	9.3	TRC*	0.1
CO ₃	NIL	NIL	NIL
OH	NIL	NIL	NIL
H ₂ S	N.D.	N.D.	N.D.

DISSOLVED

TOTAL SOLIDS mg/L

EVAPORATED AT 110° C:

EVAPORATED AT 180° C:

AT IGNITION:

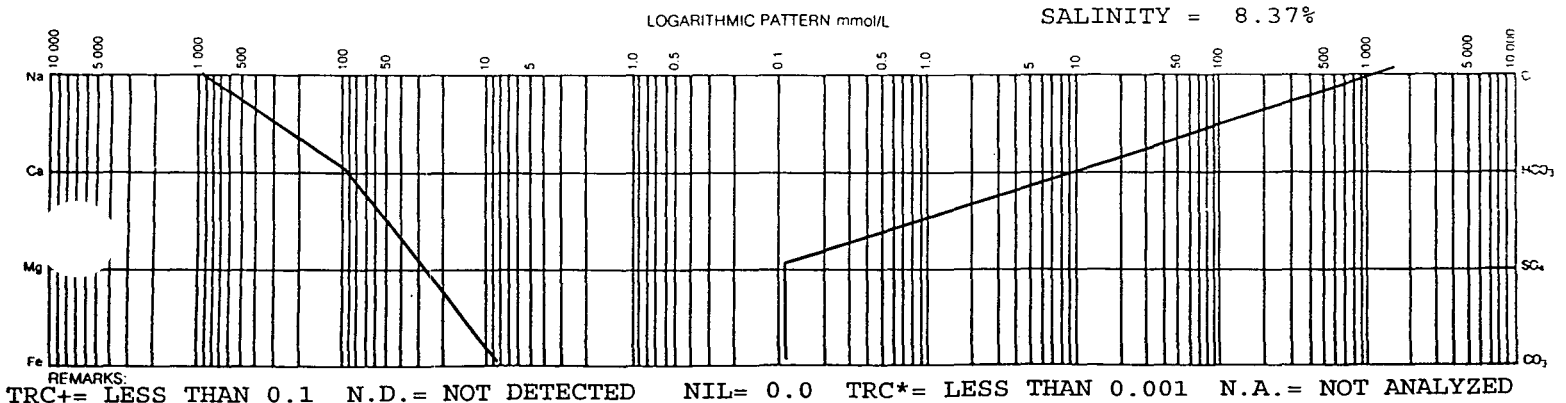
CALCULATED: 80900.0

RELATIVE DENSITY: 1.051 @ 25° C

REFRACTIVE INDEX: N.A. @ 25° C

OBSERVED pH: 6.37 @ 25° C

RESISTIVITY/ΩM *m: 0.10 @ 25° C



WATER ANALYSIS

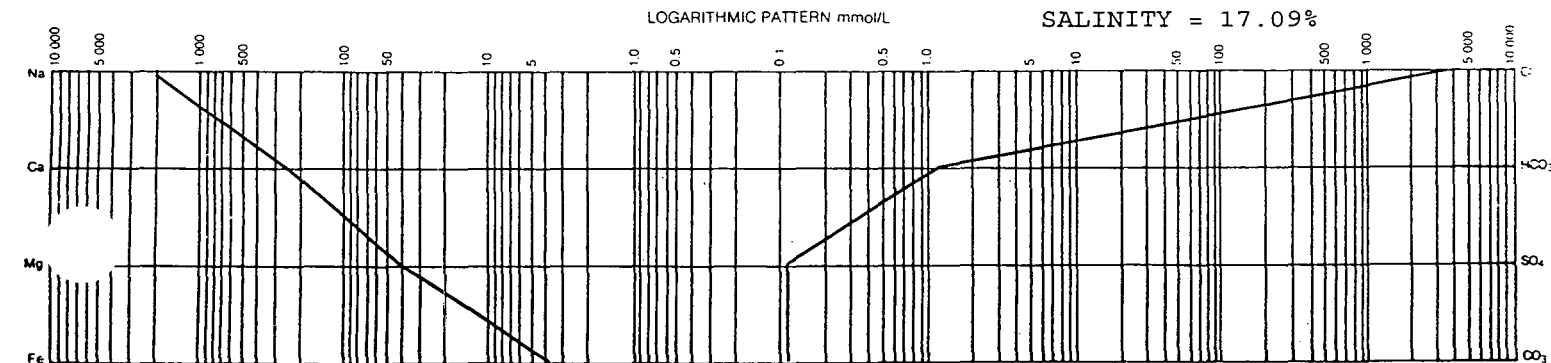
CONTAINER IDENTIFICATION PB 3B		LABORATORY NUMBER W23116B	
OPERATOR NAME PARAMOUNT RESOURCES LTD.			
UNIQUE WELL IDENTIFIER ARROWHEAD	WELL NAME PARAMOUNT et al ARROWHEAD		ELEVATIONS KB m 574.60 GRD m 567.90
FIELD OR AREA ARROWHEAD	POOL OR ZONE NAHANNI	NAME OF SAMPLER ENTEST CORP.	COMPANY ENTEST CORP.
TEST TYPE ☐	NO ☐	TEST RECOVERY STOCK FLUID @ 09:00 AM	
SAMPLING POINT FLUID DUMP		AMT & TYPE OF CUSHION	MUD RESISTIVITY Ω m @ 25° C
TYPE OF PRODUCTION			
☐ PUMPING ☐ FLOWING ☐ GAS LIFT ☐ SWAB			
PRODUCTION RATES			
WATER m^3/d		OIL m^3/d	GAS $10^3 m^3/d$
SEPARATOR		TREATER	RESERVOIR
GAUGE PRESSURE kPa		SOURCE	SAMPLED
TEMPERATURE °C		RECEIVED	
DATE SAMPLED (Y-M-D) 98-02-13	DATE RECEIVED (Y-M-D) 98-02-20	DATE REPORTED (Y-M-D) 98-03-04	ANALYST LN NCO
		OTHER INFORMATION N-65	

	mg/L	MASS FRACTION	mmol/L
Na	50800.0	0.295	2210.0
K	4370.0	0.025	112.0
Ca	10800.0	0.063	269.0
Mg	1120.0	0.006	46.1
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	248.0	0.001	4.4

ION	mg/L	MASS FRACTION	mmol/L
Cl	105000.0	0.609	2960.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO ₃	67.1	TRC*	1.1
SO ₄	TRC+	TRC*	TRC+
CO ₃	NIL	NIL	NIL
OH	NIL	NIL	NIL
H ₂ S	N.D.	N.D.	N.D.

DISSOLVED

TOTAL SOLIDS mg/L	
EVAPORATED AT 110° C	EVAPORATED AT 180° C
AT IGNITION	CALCULATED
	172000.0
RELATIVE DENSITY	
1.109 @ 25° C	REFRACTIVE INDEX
	N.A. @ 25° C
OBSERVED pH	
5.69 @ 25° C	RESISTIVITY OHM *m
	0.06 @ 25° C



REMARKS: TRC+= LESS THAN 0.1 N.D.= NOT DETECTED NIL= 0.0 TRC*= LESS THAN 0.001 N.A.= NOT ANALYZED

**NOTE: RESISTIVITY IS 0.058 OHM.m



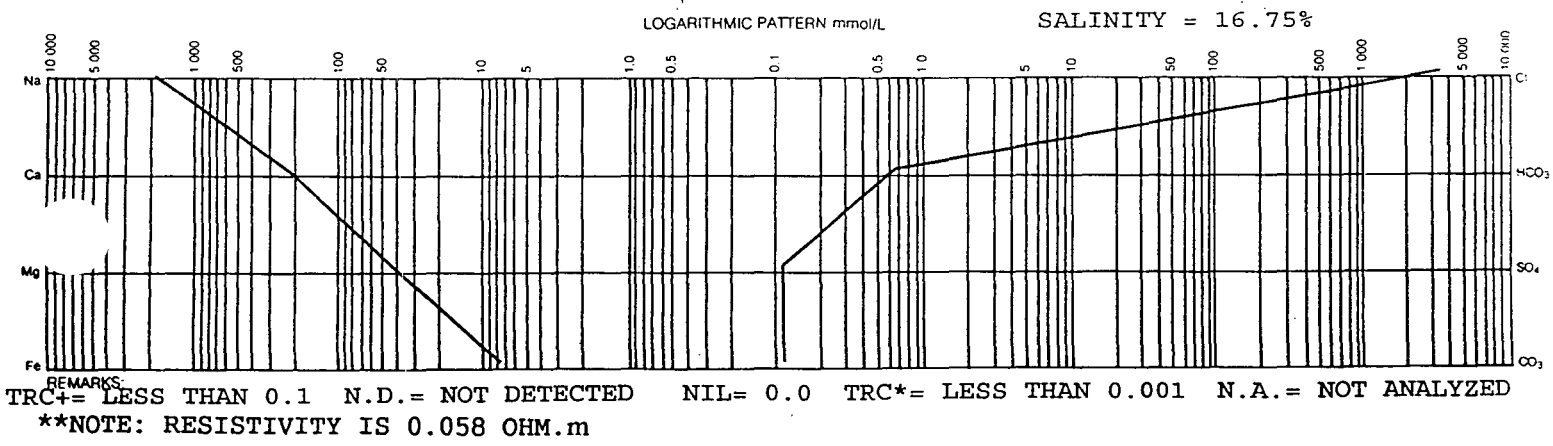
WATER ANALYSIS

CONTAINER IDENTIFICATION: PB 5C
LABORATORY NUMBER: W23116C
OPERATOR NAME: PARAMOUNT RESOURCES LTD.
UNIQUE WELL IDENTIFIER: ARROWHEAD
WELL NAME: PARAMOUNT et al ARROWHEAD
ELEVATIONS: KB m 574.60, GRD m 567.90
FIELD OR AREA: ARROWHEAD
POOL OR ZONE: NAHANNI
NAME OF SAMPLER: ENTEST CORP.
TEST TYPE: NO
TEST RECOVERY: STOCK FLUID @ 10:00 AM
SAMPLING POINT: FLUID DUMP
AMT & TYPE OF CUSHION:
MUD RESISTIVITY: Ω m @ 25° C
TYPE OF PRODUCTION: PUMPING, FLOWING, GAS LIFT, SWAB
PRODUCTION RATES: WATER m³/d, OIL m³/d, GAS 10³ m³/d
SEPARATOR, TREATER, RESERVOIR, SOURCE, SAMPLED, RECEIVED
GAUGE PRESSURE kPa, TEMPERATURE °C
DATE SAMPLED (Y-M-D): 98-02-13
DATE RECEIVED (Y-M-D): 98-02-20
DATE REPORTED (Y-M-D): 98-03-04
ANALYST: LN NCO
OTHER INFORMATION: N-65

	mg/L	MASS FRACTION	mmol/L
Na	48000.0	0.289	2090.0
K	3530.0	0.021	90.3
Ca	9960.0	0.060	249.0
Mg	1200.0	0.007	49.2
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	496.0	0.003	8.9

ION	mg/L	MASS FRACTION	mmol/L
Cl	103000.0	0.620	2900.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO ₃	36.6	TRC*	0.6
SO ₄	TRC+	TRC*	TRC+
CO ₃	NIL	NIL	NIL
OH	NIL	NIL	NIL
H ₂ S	N.D.	N.D.	N.D.

DISSOLVED
TOTAL SOLIDS mg/L
EVAPORATED AT 110° C
AT IGNITION
EVAPORATED AT 180° C
CALCULATED
166000.0
RELATIVE DENSITY
1.110 @ 25° C
REFRACTIVE INDEX
N.A. @ 25° C
OBSERVED pH
5.69 @ 25° C
RESISTIVITY/OHM *m
0.06 @ 25° C





WATER ANALYSIS

CONTAINER IDENTIFICATION: **22100E** LABORATORY NUMBER: **W23116E**

OPERATOR NAME: **PARAMOUNT RESOURCES LTD.**

UNIQUE WELL IDENTIFIER: **ARROWHEAD** WELL NAME: **PARAMOUNT et al ARROWHEAD** ELEVATIONS: KB m **574.60** GRD m **567.90**

FIELD OR AREA: **ARROWHEAD** POOL OR ZONE: **NAHANNI** NAME OF SAMPLER: **ENTEST CORP.**

TEST TYPE: ☐ TEST RECOVERY: ☐ NO ☐ PRESSURE: **383 KPA**

SAMPLING POINT: **PRESSURE VESSEL** AMT & TYPE OF CUSHION: ☐ MUD RESISTIVITY: ☐ @ 25°C

TEST INTERVAL OR PERFS: ☐

TYPE OF PRODUCTION: ☐ PUMPING ☐ FLOWING ☐ GAS LIFT ☐ SWAB

PRODUCTION RATES: WATER ☐ m³/d OIL ☐ m³/d GAS ☐ 10³ m³/d

SEPARATOR: ☐ TREATER: ☐ RESERVOIR: ☐ SOURCE: ☐ SAMPLED: ☐ RECEIVED: ☐

GAUGE PRESSURE kPa: ☐ TEMPERATURE °C: ☐

DATE SAMPLED (Y-M-D): **98-02-13** DATE RECEIVED (Y-M-D): **98-02-20** DATE REPORTED (Y-M-D): **98-03-04** ANALYST: **LN NCO** OTHER INFORMATION: **N-65**

	mg/L	MASS FRACTION	mmol/L	ION	mg/L	MASS FRACTION	mmol/L
Na	46500.0	0.286	2020.0	Cl	101000.0	0.620	2850.0
K	3850.0	0.024	98.5	Br	N.A.	N.A.	N.A.
Ca	9600.0	0.059	240.0	I	N.A.	N.A.	N.A.
Mg	1090.0	0.007	44.7	HCO ₃	97.6	0.001	1.6
Ba	N.A.	N.A.	N.A.	SO ₄	2.6	TRC*	TRC+
Sr	N.A.	N.A.	N.A.	CO ₃	NIL	NIL	NIL
Fe	691.0	0.004	12.4	OH	NIL	NIL	NIL
				H ₂ S	N.D.	N.D.	N.D.

DISSOLVED

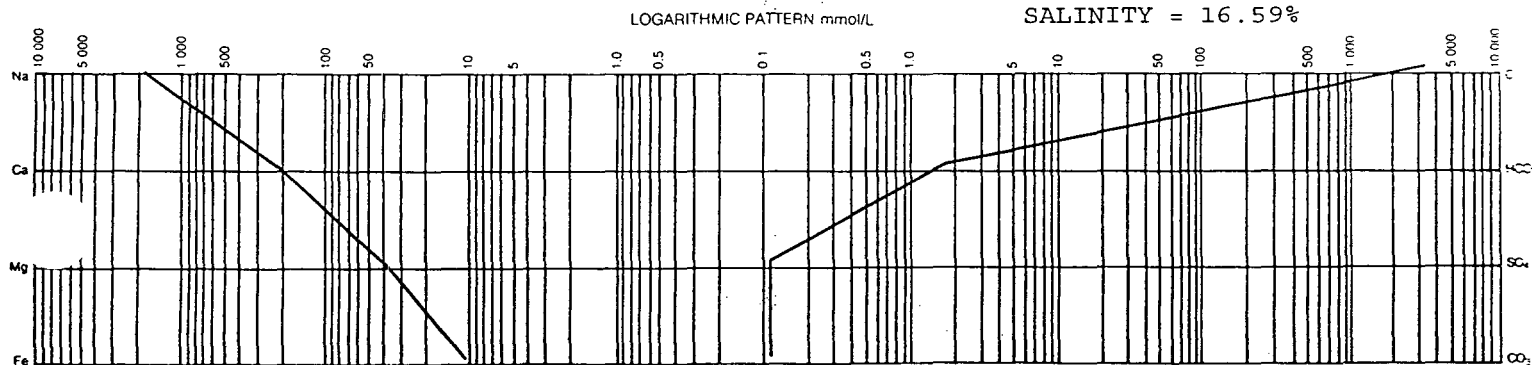
TOTAL SOLIDS: ☐ mg/L

EVAPORATED AT 110°C: ☐ EVAPORATED AT 180°C: ☐

AT IGNITION: ☐ CALCULATED: **163000.0**

RELATIVE DENSITY: **1.099 @ 25°C** REFRACTIVE INDEX: **N.A. @ 25°C**

OBSERVED pH: **5.72 @ 25°C** RESISTIVITY OHM *m: **0.06 @ 25°C**



REMARKS: TRC+ = LESS THAN 0.1 N.D. = NOT DETECTED NIL = 0.0 TRC* = LESS THAN 0.001 N.A. = NOT ANALYZED

**NOTE: RESISTIVITY IS 0.062 OHM.m

WATER ANALYSIS

CONTAINER IDENTIFICATION
PB 1A

LABORATORY NUMBER
WR24566A

OPERATOR NAME
PARAMOUNT RESOURCES LTD.

UNIQUE WELL IDENTIFIER
ARROWHEAD

WELL NAME
PARAMOUNT et al ARROWHEAD

ELEVATIONS
 KB m: **574.60** GRD m: **567.90**

FIELD OR AREA
ARROWHEAD

POOL OR ZONE
NAHANNI

NAME OF SAMPLER
ENTEST CORP.

TEST TYPE
☐ YES ☒ NO

TEST RECOVERY
SWABBING @ 0759 HRS. SWAB #30

TEST INTERVAL OR PERFS

SAMPLING POINT
FLOW LINE

AMT & TYPE OF CUSHION

MUD RESISTIVITY/Ω m
@ 25° C

TYPE OF PRODUCTION

☐ PUMPING
☐ FLOWING
☐ GAS LIFT
☐ SWAB

PRODUCTION RATES

WATER m³/d

OIL m³/d

GAS 10³ m³/d

GAUGE PRESSURE kPa
 TEMPERATURE °C

SEPARATOR

TREATER

RESERVOIR

SOURCE

SAMPLED

RECEIVED

DATE SAMPLED (Y-M-D)
98-03-20

DATE RECEIVED (Y-M-D)
98-03-25

DATE REPORTED (Y-M-D)
98-04-01

ANALYST
LN NCO

OTHER INFORMATION

	mg/L	MASS FRACTION	mmol/L
Na	37000.0	0.201	1610.0
K	3810.0	0.021	97.3
Ca	25100.0	0.137	625.0
Mg	4480.0	0.024	184.0
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	738.0	0.004	13.2

ION	mg/L	MASS FRACTION	mmol/L
Cl	112000.0	0.610	3160.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO ₃	549.0	0.003	9.0
SO ₄	1.5	TRC*	TRC+
CO ₃	NIL	NIL	NIL
OH	NIL	NIL	NIL
H ₂ S	N.D.	N.D.	N.D.

DISSOLVED
 TOTAL SOLIDS mg/L

EVAPORATED AT 110° C

EVAPORATED AT 180° C

AT IGNITION

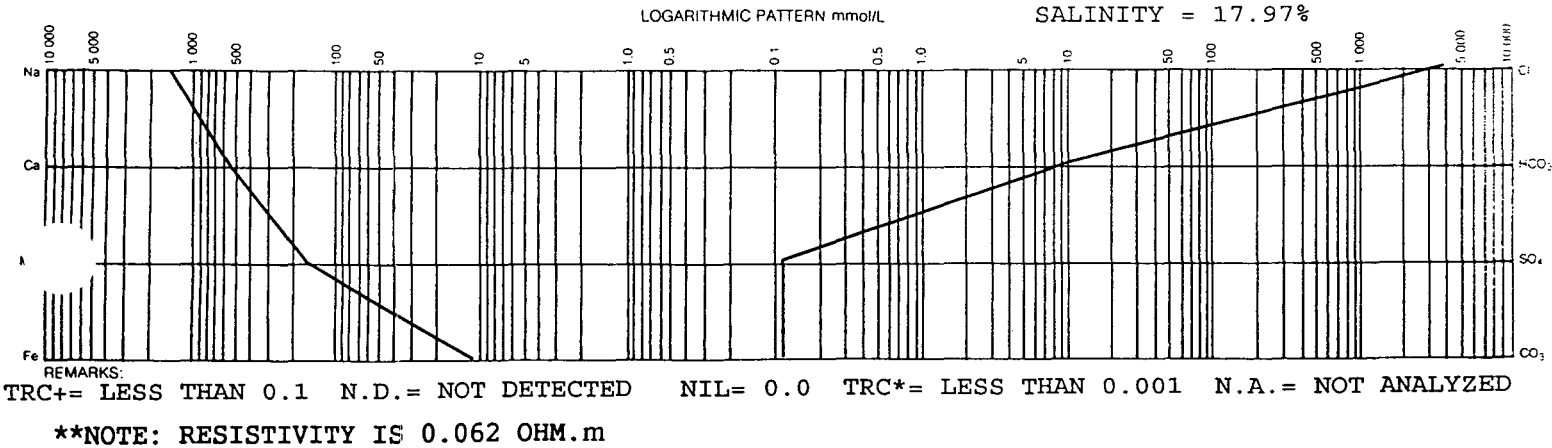
CALCULATED
184000.0

RELATIVE DENSITY
1.125 @ 25° C

REFRACTIVE INDEX
N.A. @ 25° C

OBSERVED pH
5.70 @ 25° C

RESISTIVITY/OHM •m
0.06 @ 25° C





GAS ANALYSIS

CONTAINER IDENTIFICATION

AGAT 18438

LABORATORY NUMBER

G23116B

OPERATOR NAME

PARAMOUNT RESOURCES LTD.

UNIQUE WELL IDENTIFIER

WELL NAME

KB m ELEVATIONS GRD m

PARAMOUNT et al ARROWHEAD

574.60

567.90

FIELD OR AREA

POOL OR ZONE

NAME OF SAMPLER

COMPANY

ARROWHEAD

NAHANNI

ENTEST CORP.

TEST TYPE

NO

TEST RECOVERY

TEST INTERVAL OR PERFS

SAMPLING POINT

PRESSURE VESSEL

GAUGE PRESSURE kPa

TEMPERATURE °C

SEPARATOR

TREATER

RESERVOIR

SOURCE

SAMPLED

RECEIVED

620

620

330

79

79

21

DATE SAMPLED (Y-M-D)

DATE RECEIVED (Y-M-D)

DATE REPORTED (Y-M-D)

ANALYST

OTHER INFORMATION

98-02-12

98-02-20

98-03-02

BD

NCO

N-65

COMP.	MOLE FRACTION		PETROLEUM LIQUID CONTENT mL · m ⁻³
	AIR FREE AS RECEIVED	AIR FREE ACID GAS FREE	
H ₂	0.0002	0.0003	
He	0.0007	0.0009	
N ₂	0.0320	0.0382	
CO ₂	0.1628	0.0000	
H ₂ S	0.0001	0.0000	
C ₁	0.7559	0.9030	
C ₂	0.0339	0.0405	
C ₃	0.0071	0.0084	26.0
IC ₄	0.0015	0.0018	6.6
NC ₄	0.0020	0.0024	8.5
IC ₅	0.0009	0.0011	4.4
NC ₅	0.0008	0.0009	3.8
C ₆	0.0009	0.0011	5.1
C ₇	0.0012	0.0014	7.3
C ₈			
C ₉			
C ₁₀ +			
TOTAL	1.0000	1.0000	61.7

GROSS HEATING VALUE MJm⁻³
15° C AND 101.325 kPa

MOISTURE AND ACID GAS FREE

38.91

AIR FREE AS RECEIVED

32.59

VAPOUR PRESSURE PENTANES PLUS

67.1 kPa

RELATIVE DENSITY

MOISTURE FREE AS SAMPLED

MOISTURE AND ACID GAS FREE

MEASURED

CALCULATED

0.761

MEASURED

CALCULATED

0.614

PSEUDO CRITICAL PROPERTIES (CALCULATED)

AS SAMPLED

ACID GAS FREE

pPc (abs)

5013 kPa

pTc

214.0 K

pPc (abs)

4552 kPa

pTc

196.4 K

RELATIVE MOLECULAR MASS

TOTAL GAS

22.0

C₇ +

104.0

H₂S g/m³

0.09

REMARKS:

EXCEED NORMAL LIMITS : CO₂

FIELD H₂S = 60ppm/LAB = ND



GAS ANALYSIS

CONTAINER IDENTIFICATION

AGAT 19948

LABORATORY NUMBER

G23116A

OPERATOR NAME

PARAMOUNT RESOURCES LTD.

UNIQUE WELL IDENTIFIER

WELL NAME

KB m ELEVATIONS GRD m

PARAMOUNT et al ARROWHEAD

574.60

567.90

FIELD OR AREA

POOL OR ZONE

NAME OF SAMPLER

COMPANY

ARROWHEAD

NAHANNI

LT

ENTEST CORP.

TEST TYPE

NO

TEST RECOVERY

TEST INTERVAL OR PERFS

SAMPLING POINT

PRESSURE VESSEL

GAUGE PRESSURE kPa

SEPARATOR

TREATER

RESERVOIR

SOURCE

SAMPLED

RECEIVED

TEMPERATURE °C

626

626

470

74

74

21

DATE SAMPLED (Y-M-D)

DATE RECEIVED (Y-M-D)

DATE REPORTED (Y-M-D)

ANALYST

OTHER INFORMATION

98-02-13

98-02-20

98-03-02

BN

NCO

N-65

COMP.	MOLE FRACTION		PETROLEUM LIQUID CONTENT mL • m ⁻³
	AIR FREE AS RECEIVED	AIR FREE ACID GAS FREE	
H ₂	0.0004	0.0005	
He	0.0010	0.0012	
N ₂	0.2489	0.3028	
CO ₂	0.1780	0.0000	
H ₂ S	0.0001	0.0000	
C ₁	0.5716	0.6955	
C ₂	TRACE	TRACE	
C ₃	0.0000	0.0000	0.0
IC ₄	0.0000	0.0000	0.0
NC ₄	0.0000	0.0000	0.0
IC ₅	0.0000	0.0000	0.0
NC ₅	0.0000	0.0000	0.0
C ₆	0.0000	0.0000	0.0
C ₇ +	0.0000	0.0000	0.0
C ₈			
C ₉			
C ₁₀ +			
TOTAL	1.0000	1.0000	0.0

GROSS HEATING VALUE MJ/m³
15 °C AND 101.325 kPa

MOISTURE AND ACID GAS FREE

26.26

AIR FREE AS RECEIVED

21.60

VAPOUR PRESSURE PENTANES PLUS

0.0 kPa

RELATIVE DENSITY

MOISTURE FREE AS SAMPLED

MEASURED

CALCULATED

0.828

MEASURED

CALCULATED

0.678

PSEUDO CRITICAL PROPERTIES (CALCULATED)

AS SAMPLED

pPc (abs)

4794 kPa

pTc

194.5 K

ACID GAS FREE

pPc (abs)

4233 kPa

pTc

170.7 K

RELATIVE MOLECULAR MASS

TOTAL GAS

24.0

C₇ +

0.0

H₂S g/m³

0.09

REMARKS:

EXCEED NORMAL LIMITS : N₂ , CO₂

FIELD H₂S = 60ppm/LAB = ND



GAS ANALYSIS

CONTAINER IDENTIFICATION

AGAT 19974

LABORATORY NUMBER

GR24566A

OPERATOR NAME

PARAMOUNT RESOURCES LTD.

UNIQUE WELL IDENTIFIER

WELL NAME

KB m ELEVATIONS GRD m

PARAMOUNT et al ARROWHEAD N65

574.60

567.90

FIELD OR AREA

POOL OR ZONE

NAME OF SAMPLER

COMPANY

N.W.T

NAHANNI

ENTEST CORP.

TEST TYPE

NO

TEST RECOVERY

N65-63-40-122-45 N.W.T. PAR

TEST INTERVAL OR PERFS

SAMPLING POINT

METER RUN

SEPARATOR	TREATER	RESERVOIR	SOURCE	SAMPLED	RECEIVED
			344	344	450
			5	5	21

GAUGE PRESSURE kPa

TEMPERATURE °C

DATE SAMPLED (Y-M-D)

98-03-20

DATE RECEIVED (Y-M-D)

98-03-25

DATE REPORTED (Y-M-D)

98-04-02

ANALYST

BN

NCO

OTHER INFORMATION

COMP.	MOLE FRACTION		PETROLEUM LIQUID CONTENT mL • m ⁻³
	AIR FREE AS RECEIVED	AIR FREE ACID GAS FREE	
H ₂	0.0001	0.0002	
He	0.0014	0.0020	
?	0.0770	0.1114	
CO ₂	0.3086	0.0000	
H ₂ S	0.0001	0.0000	
C ₁	0.6128	0.8864	
C ₂	TRACE	TRACE	
C ₃	0.0000	0.0000	0.0
IC ₄	0.0000	0.0000	0.0
NC ₄	0.0000	0.0000	0.0
IC ₅	0.0000	0.0000	0.0
NC ₅	0.0000	0.0000	0.0
C ₆	0.0000	0.0000	0.0
C ₇	0.0000	0.0000	0.0
C ₈			
C ₁₀ +			
TOTAL	1.0000	1.0000	0.0

GROSS HEATING VALUE MJm⁻³
15° C AND 101.325 kPa

MOISTURE AND ACID GAS FREE

33.48

AIR FREE AS RECEIVED

23.17

VAPOUR PRESSURE PENTANES PLUS

0.0 kPa

RELATIVE DENSITY

MOISTURE FREE AS SAMPLED

MOISTURE AND ACID GAS FREE

MEASURED

CALCULATED

0.883

MEASURED

CALCULATED

0.599

PSEUDO CRITICAL PROPERTIES (CALCULATED)

AS SAMPLED

ACID GAS FREE

pPc (abs)

5363 kPa

pTc

220.4 K

pPc (abs)

4461 kPa

pTc

183.0 K

RELATIVE MOLECULAR MASS

TOTAL GAS

25.6

C₇+

0.0

H₂S g/m³

0.14

REMARKS:

EXCEED NORMAL LIMITS : N₂ , CO₂

FIELD H₂S = 100ppm/LAB = ND

PARAMOUNT BERKLEY ARROWHEAD N-65

COMPLETION DATA

7. APPENDICES TO WELL HISTORY REPORT

Oil, Gas & Water Analyses: (see attached)

Completion Data: (see attached)

A cement squeeze was required to stop gas flow from the production liner which was successful. The lowest section of the Nahanni formation was perforated and acidized. The rig had to move off of the wellbore due to spring break – further completion activities are planned for winter 98/99 season.

Wellbore Diagram: (see attached)

PARAMOUNT BERKLEY ARROWHEAD N-65

DAILY COMPLETION SUMMARY

NOTE: Service Rig operating 24 Hours

March 6 – March 23, 1998

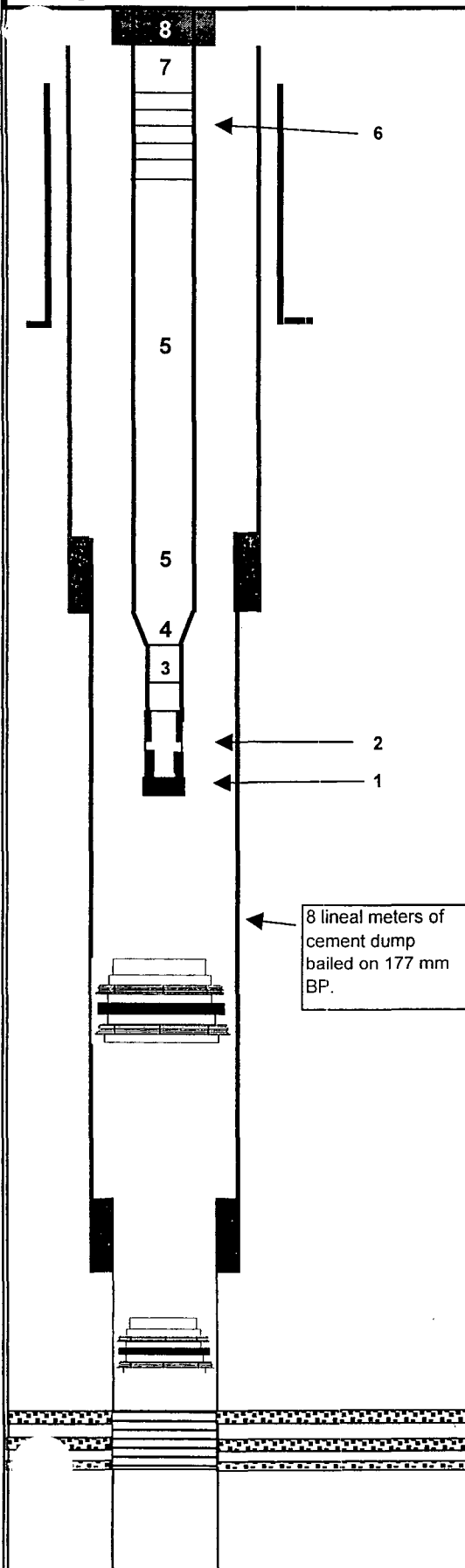
Date	Day	Remarks
March 6/98	1	Rig up Alberta Gold rig 30
March 7	2	NU Class III BOP
March 8	3	PT annulus to 21 MPa. RIH, tag top of 177 mm liner at 1723.93 m KB, tag bridge plug at 1952.9 m KB (set 2000 daN on BP – started moving down hole). Pushed BP to liner top at 2302.59 m KB. (NOTE: Bridge plug was to be drillable – instead it is retrievable)
March 9	4	Retrieve Baker Model “C” 47B bridge plug. RIH with bit.
March 10	5	RIH to 2304.47 m KB (cement top?) Tubing and casing flowing – lots of gas – lost 5.8 m3 during reverse circulation. Broke circulation, ran jt without rotating, circulated gas out – lost a total of 8.7 m3. RIH, tagged PBTD at 2812.6 m KB. Pull 2 jts, pumped 0.56 m3 to catch fluid. Established feed rate pumping 0.4 m3 /m at 7000 kPa (pumped a total of 5 m3 fresh water during test). Drilled to 2821.43 m KB.
March 11	6	RIH with scraper, tag PBTD 2821.43 m KB. Reverse circ – lost 9.82 m3.
March 12	7	Run GR-CCL-VDL-CBL – little cement above 2650 m KB. Run temperature log from 1000 m – PBTD – maximum temperature 130 degrees C – (wellbore was static for at lease 12 hours). RIH with packer and attempt to determine if top of liner is where leak is.
March 13	8	RIH and perforate with 101.4 mm ERHSC 39 gram HMX charges, 17 SPM, 60 degree phasing from 2618 – 2619 m KB. Set cement retainer – middle – at 2616 m KB.
March 14	9	Rig up Sanjel and squeeze with 3 m3 1885 kg/m3 slurry w/ 0.7 CFR, 0.7% CFL2 and FA1 foaming agent at 12 liters/m3 on the fly
March 15	10	Drill out cement from 2504.85 – 2531 m KB, broke through to 2598 m, drill to 2610 m KB – very slow drilling. POOH, drill collars twisted off.

March 16	11	Recover fish. Tag cement at 2808.5 m KB. Bit plugged off.
March 17	12	POOH with mud can – bit missing teeth. Run CBL-VDL-GR-CCL 2660 – 2304 m KB. Tagged fill at 2798.5 m KB. RIH with scraper
March 18	13	RIH with gauge ring. RIH with 101.4 mm ERHSC casing gun loaded w/ 39 gram HMX charges, 18 SPM 60 degree phasing and perforated 2788 – 2790, 2791 – 2792 m KB. (Difficulty getting guns to fire) Well went on vacuum. Run in with same gun assembly and perforate 2777 – 2782 m KB (all but 2 shots fired. RIH with 88.9 mm tubing and set packer assembly at 2757.99 m KB. Pull 14 swabs – recover 9.57 m3, no fluid inflow.
March 19	14	Pull a total of 17 swabs – last two dry. RU Schlumberger and acidize with 15% HCL containing 1.2% A270 inhibitor, 0.2% F75N surfactant, 1% U42 chelating agent, 0.1% friction reducer, 1% A201 inhibitor. Unload well with N2. Rig in frac equipment. Start acid frac pumping 15 m3 of 15% nitrified HCL acid as used earlier today. Start frac balls – maximum pressure obtained 42 MPa (equipment limitation). Flow back well.
March 20	15	Swab well dry
March 21	16	Reverse circulate well to inhibited fresh water. RIH with Cardium 139.7 mm PWPP permanent bridge plug – set at 2769.0 M KB. RIH with Cardium 177.8 mm PWPP permanent bridge plug – set at 2270.0 m KB. Dump bail 8 lineal meters of class G + L10 + D128 + D65 + Silica Flour. RIH w/ 88 mm tubing string.
March 22	17	Pumped 0.5 m3 diesel down tubing and annulus. Rig out rig for season.

PARAMOUNT RESOURCES LTD.

Existing

DOWNHOLE DIAGRAM



WELL NAME: Paramount et al Arrowhead

Prepared by: John Stroh / Randy Hemmingsen

Date 98/03/24

Elevations :

KB (m)	574.60	KB to CF [m]	6.90	TD [m]	2925.00
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GL (m)	567.90	PBDT [m]	2821.43	KB to TF	6.30
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Tubulars	Size [mm]	Wt - Kg/m	Grade	No Jts.	Landing Depth [m]
Surface Casing	339.70	81.10	J-55, ST&C		480.00
Intermed. Casing	244.50	64.74	L80, LT&C		1890.00
Product. Casing	177.80	38.69	MN80, LT&C		2529.00
Product. Liner	139.70	25.30	L80 FLUSH HYDRIL		2856.09
Production Tbg.	88.90	13.84	J-55	234.00	2190.00

Wellhead Description:

Make / Type: ABB Vetco Gray, Flowing style, 2 - Master valves, 1 - Wing valve (choke)

Size / Rating : 2 - 35 Mpa 79 mm ID gate valves. 2 - 35 Mpa 50.8 mm ID Csg valves

Tbg. String: (m) (m)

Date of Tubing Description:			Length	Top @
ITEM	Description	K.B. - Tbg. Flg.	6.3	KB Depth
1	73 mm collar		0.13	2222.56
2	73 mm XN nipple, C/W 58.75 mm profile, 56.01 mm NOG		0.31	2222.25
3	2 - 73 mm J-55 pup Jts. (3.07, 3.07)		6.14	2216.11
4	73 mm x 89 mm swage		0.14	2215.97
5	233 - 88.9 mm J-55, 13.84 kg/m Tbg.		2190.9	25.09
6	5 - 88.9 mm pup Jts. (.61, 1.21, 1.82, 2.43, 3.04 m)		9.11	15.98
7	1 - 88.9 mm J-55, 13.84 kg/m Tbg.		9.47	6.51
8	1 - 88.9 mm EUE Tbg hanger		0.21	6.30
				6.30
				6.30
				6.30
				6.30
				6.30
				6.30
	Bottom of Tubing mKB		2222.69	

NOTES

Csg & Tbg inhibited with fresh water. Both sides topped off with diesel.

Cement in 139.7 mm Csg had been drilled to a depth of 2821.43 mKB.

Parts of 139 mm retainer sitting @ 2799.1 mKB.

139.7 mm BP set @ 2768.0 mKB

177.8 mm BP set @ 2270.0 mKB. Topped with 8 lineal meters of class G oilwell cement.

Perforations :

Zone	Nahanni	Interval : 2777 - 2782, 2788 - 2790, 2791 - 2792 mKB.
Zone		Interval :
Zone		Interval :

Stimulation : 15 m³ of Nitrified 15% HCL w/ balls.

Paramount Resources Ltd.

CCAT
Treatment Report

N-65

*Field*

Arrowhead

Formation

Nahanni Headless

Location

N-65

Country

Canada

Province

Northwest Territories

Prepared for
Treatment No. 811-0350
Date Prepared 03-18-1998

Service Point COIL TUBING GAB
Business Phone (403) 539-4220
FAX No. (403) 539-7532

Prepared by VIC LEMKE
Phone (403) 539-4220
E-Mail Address lemke@grande-prairie.dowell.slb.com

Comments Supply men, materials, and equipment to perform a 38.1mm coiled tubing conveyed 15% HCL wash and squeeze on above location as per above customers request.

Disclaimer Notice

This information is presented in good faith, but no warranty is given by and Dowell assumes no liability for advice or recommendations made concerning results to be obtained from the use of any product or service. The results given are estimates based on calculations produced by a computer model including various assumptions on the well, reservoir and treatment. The results depend on input data provided by the Operator and estimates as to unknown data and can be no more accurate than the model, the assumptions and such input data. The information presented is Dowell's best estimate of the actual results that may be achieved and should be used for comparison purposes rather than absolute values. The quality of input data, and hence results, may be improved through the use of certain tests and procedures which Dowell can assist in selecting.

The Operator has superior knowledge of the well, the reservoir, the field and conditions affecting them. If the Operator is aware of any conditions whereby a neighboring well or wells might be affected by the treatment proposed herein it is the Operator's responsibility to notify the owner or owners of the well or wells accordingly.

Prices quoted are estimates only and are good for 30 days from the date of issue. Actual charges may vary depending upon time, equipment, and material ultimately required to perform these services.

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Schlumberger

Dowell

Client : Perimeter Resources Ltd.
 Well : N-65
 Formation : Natural Gas
 District : Red Deer
 Country : Canada

Section 1: Job Messages

#	Time	Message	Corr Depth (m)	CT Weight (daN)	Circ Pres (kPa)	Tot Pump Rate (SM3/ min)	Wellhead Pres (kPa)
1	7:00:00	Arrive on location	0.0	0.00	-0	0.00	0
2	8:30:00	Start rigging up	0.0	0.00	0	0.00	0
3	9:42:52	Started Acquisition	0.0	0.00	0	0.00	0
4	10:22:14	Safety meeting	3.4	-695.20	-704	0.00	28
5	10:59:31	Reset Volume	3.4	-950.40	-701	0.00	51
6	11:01:06	Press test coil to 35 MPA.	3.4	-950.70	-699	0.24	45
7	11:24:22	Testers not reading press	3.4	-1469.60	2727	0.00	3501
8	11:48:56	ESD valve not working	3.4	-987.60	-563	0.00	139
9	12:34:04	Start to repressure test	3.4	-963.10	-597	0.00	98
10	12:44:41	Reset Volume	3.4	-1124.10	-638	0.00	207
11	12:45:33	Begin RIH CT	3.4	-945.60	-637	0.00	202
12	12:49:30	Repair level wind override	5.6	-1143.70	-619	0.00	174
13	13:06:48	Resume RIH	5.6	-1019.90	-619	0.00	123
14	13:35:14	Start pumping water to fill hole	381.0	-713.40	1785	0.07	102
15	13:53:52	PULL TEST AT METERS	796.7	2070.83	18112	0.20	62
16	14:02:06	PULL TEST AT METERS	923.2	709.90	17609	0.21	57
17	14:17:45	Fluid returns to surface	1296.7	1012.80	22900	0.20	127
18	14:18:36	Stop pumping fluid	1317.6	1240.00	-483	0.00	133
19	14:32:27	PULL TEST AT METERS	1650.0	2165.90	-664	0.00	147
20	15:03:14	PULL TEST AT METERS	2399.7	3268.70	-364	0.00	145
21	15:03:45	PULL TEST AT METERS	2399.0	3940.50	-530	0.00	143
22	15:04:54	Reset Volume	2394.0	3507.90	-410	0.00	144
23	15:06:22	Start Pumping Acid	2431.1	2819.20	6525	0.12	149
24	15:27:53	Stop pumping acid	2786.9	3891.30	-700	0.00	2130
25	15:38:11	Starting Acid	2792.9	1139.60	-685	0.00	1522
26	15:38:38	Stop Pumping	2792.9	2139.30	4682	0.11	1845
27	15:49:20	Starting Fluid	2792.9	2319.80	2393	0.05	2666
28	15:50:56	Stop Pumping	2792.9	1283.00	13306	0.00	14709
29	16:01:04	Starting Acid	2792.9	2577.60	-710	0.00	1374
30	16:02:28	Stop Pumping	2792.9	2188.90	5429	0.04	6280
31	16:12:31	Starting Acid	2792.9	2626.00	-524	0.00	1843
32	16:14:00	Stop Pumping	2792.9	2739.90	-602	0.00	1805
33	16:24:06	Starting Acid	2792.9	2761.90	-711	0.00	1617
34	16:25:31	Stop Pumping	2792.9	2851.30	85	0.05	1101
35	16:34:57	Starting Acid	2792.9	2809.20	-718	0.00	1305
36	16:36:40	Stop Pumping	2792.9	2873.50	-716	0.00	1364
37	16:47:23	Starting Acid	2792.9	2854.90	-713	0.00	1422
38	16:48:23	Starting Fluid	2792.9	2855.80	2356	0.09	1240
39	16:48:41	Stop Pumping	2792.9	2834.40	1552	0.05	1941
40	16:59:22	Start Pumping Water	2792.9	2896.60	-713	0.00	1479
41	17:00:59	Stop Pumping	2792.9	2849.10	600	0.05	2287
42	17:11:06	Start Water	2792.9	2928.00	-710	0.00	1424
43	17:12:35	Stop Pumping	2792.9	2896.90	1551	0.05	1965
44	17:24:08	Start Water	2792.9	2958.70	-496	0.00	1660
45	17:25:36	Stop Pumping	2792.9	2942.50	-179	0.00	1896
46	17:36:37	Start Water	2792.9	2938.10	-163	0.00	1956
47	17:38:14	Stop Pumping	2792.9	2866.60	1765	0.01	3510
48	17:49:13	Start Water	2792.9	3004.90	-287	0.00	1771
49	17:50:34	Stop Pumping	2792.9	3143.30	375	0.05	956
50	18:01:44	Start Water	2792.9	3142.00	-680	0.00	1166



Dowell

Client : Paramount Resources Ltd
 Well : N-66
 Formation : Napiak Reservoir
 District : OCH TUBING G-1
 Country : Canada

#	Time	Message	Corr Depth (m)	CT Weight (daN)	Circ Pres (kPa)	Tot Pump Rate (SM3/ min)	Wellhead Pres (kPa)
51	18:03:05	Stop Pumping	2792.9	3139.00	898	0.05	1367
52	18:14:38	Start Water	2792.9	3166.80	-543	0.00	1416
53	18:15:59	Stop Pumping	2792.9	3043.90	1045	0.00	3133
54	18:26:10	Start Water	2792.9	3057.70	956	0.00	2925
55	18:27:33	Stop Pumping	2792.9	3014.50	3236	0.05	3388
56	18:37:05	Start Water	2792.9	3023.60	1191	0.00	3121
57	18:38:36	Stop Pumping	2792.9	3183.10	1689	0.05	1646
58	18:49:48	Start Water	2792.9	3153.40	326	0.00	2232
59	18:51:17	Stop Pumping	2792.9	3006.30	2120	0.00	3974
60	19:01:24	Start Water	2792.9	3217.40	-9	0.00	1876
61	19:02:47	Stop Pumping	2792.9	3095.90	1684	0.00	3536
62	19:12:34	Start Water	2792.9	3136.10	1284	0.00	3142
63	19:14:02	Stop Pumping	2792.9	3113.20	1538	0.01	3262
64	19:26:42	Start Water	2792.9	3111.50	1749	0.00	3485
65	19:31:45	Remark	2792.9	1093.10	29367	0.07	27692
66	19:36:35	Remark	2792.9	1462.90	33436	0.13	26005
67	19:45:37	Remark	2792.9	2006.60	32876	0.15	21571
68	19:47:15	Stop Pumping	2792.9	2251.90	20368	0.00	20464
69	19:51:22	Pres test N2 line to 30 MPA	2792.9	3628.40	3105	0.00	2614
70	19:53:52	Start pumping N2 at 20 scm/min	2792.9	3845.80	7813	0.00	526
71	20:12:25	Pull up hole to establish circulation	2787.8	4254.90	9849	0.00	431
72	20:39:44	Stop POH CT	2107.0	1472.40	19932	0.00	603
73	20:43:19	Run in hole to unload fluid	2107.0	1277.10	18992	0.00	791
74	21:31:59	Stop RIH for H2S alarm	2686.1	3790.70	8269	0.00	1368
75	21:50:13	Stop at 2792m and circulate for 15min	2792.0	3747.60	9149	0.00	1623
76	22:03:17	Begin POH CT	2792.0	3969.00	8550	0.00	1683
77	23:14:15	Stop pumping N2	448.7	-337.38	7408	0.00	1405
78	23:30:25	CT Back at Surface	1.9	-1446.40	515	0.00	840
79	23:31:08	Close master valve and bleed off press	1.9	-1199.60	434	0.00	797
80	23:31:41	Stopped Recording	1.9	-1180.60	375	0.00	763

Total returns where 17.7 M3.

Customer: Paramount Resources Ltd.

Representative:

Well: N-65

Schlumberger**Dowell**

District: COIL TUBING GAB

DS Supervisor: VIC LEMKE

Date Prepared: 03-18-1998

Treatment Log

Time hh:mm:ss	WH PRESS kPa	CIRC PRESS kPa	CT CORR DEPTH m	TOT DOWN RUN LEN m	TOTAL N2 RATE scm/min	TOT FLUID m3
07:00:00	Arrive on location					
08:30:00	Start rigging up					
09:42:52	Started Acquisition					
10:07:40	0	0	0.0	0.0	0	0.000
10:16:24	28	-702	3.4	0.0	0	0.000
10:22:14	Safety meeting					
10:22:14	28	-705	3.4	0.0	0	0.000
10:26:24	28	-704	3.4	0.0	0	0.000
10:36:24	28	-704	3.4	0.0	0	0.000
10:46:24	39	-705	3.4	0.0	0	0.000
10:56:24	49	-698	3.4	0.0	0	0.000
10:59:31	Reset Volume ☐					
10:59:34	48	-702	3.4	0.0	0	0.396
11:01:06	Press test coil to 35 MPA					
11:01:09	49	-701	3.4	0.0	0	0.000
11:06:24	44	-697	3.4	0.0	0	0.055
11:16:24	47	17634	3.4	0.0	0	1.855
11:24:22	Testers not reading press					
11:24:24	874	805	3.4	0.0	0	3.252
11:26:24	3495	2698	3.4	0.0	0	3.515
11:36:24	3334	2556	3.4	0.0	0	3.515
11:46:24	180	-505	3.4	0.0	0	3.515
11:48:56	ESD valve not working					
11:48:59	148	-561	3.4	0.0	0	3.515
11:56:24	140	-563	3.4	0.0	0	3.515
12:06:24	131	-574	3.4	0.0	0	3.515
12:16:24	115	-585	3.4	0.0	0	3.515
12:26:24	112	-582	3.4	0.0	0	3.515
12:34:04	Start to repressure test					
12:34:04	103	-591	3.4	0.0	0	3.515
12:36:24	98	-597	3.4	0.0	0	3.515
12:44:41	Reset Volume ☐					
12:44:44	101	5637	3.4	0.0	0	3.682
12:45:33	Begin RIH CT					
12:45:34	207	-638	3.4	0.0	0	0.000
12:46:24	200	-635	3.4	0.0	0	0.000
12:49:30	Repair level wind override					
12:49:34	192	-635	5.1	1.7	0	0.000
12:56:24	174	-620	5.6	2.2	0	0.000
13:06:24	146	-614	5.6	2.2	0	0.000
13:06:48	Resume RIH					
13:06:49	121	-617	5.6	2.2	0	0.000
13:16:24	120	-620	5.6	2.2	0	0.000
13:26:24	112	-673	101.9	98.5	0	0.000
13:35:14	Start pumping water to fill hole					
13:35:14	107	-706	214.6	211.2	0	0.095

Well: N-65

Date Prepared: 03-18-1998

Time hh:mm:ss	WH PRESS kPa	CIRC PRESS kPa	CT CORR DEPTH m	TOT DOWN RUN LEN m	TOTAL N2 RATE scm/min	TOT FLUID m3
13:36:24	102	1785	381.0	377.6	0	0.100
13:46:24	101	18762	408.2	404.9	0	0.298
13:53:52	PULL TEST AT METERS					
13:53:54	74	18450	633.5	630.1	0	2.310
13:56:24	62	18059	795.7	794.1	0	3.847
14:02:06	PULL TEST AT METERS					
14:02:09	58	18054	799.9	811.4	0	4.365
14:06:24	58	17537	923.0	934.7	0	5.564
14:16:24	57	19083	1014.8	1029.0	0	6.438
14:17:45	Fluid returns to surface					
14:17:49	112	22927	1263.6	1277.7	0	8.440
14:18:36	Stop pumping fluid					
14:18:39	130	22964	1298.8	1313.0	0	8.727
14:26:24	134	-542	1319.7	1333.8	0	8.779
14:32:27	PULL TEST AT METERS					
14:32:29	145	-514	1515.5	1529.7	0	8.779
14:36:24	148	-671	1649.4	1664.3	0	8.779
14:46:24	142	-540	1717.0	1737.1	0	8.779
14:56:24	138	-529	1972.2	1992.3	0	8.779
15:03:14	PULL TEST AT METERS					
15:03:14	139	-451	2230.8	2250.8	0	8.779
15:03:45	PULL TEST AT METERS					
15:03:49	145	-364	2399.7	2419.8	0	8.779
15:04:54	Reset Volume ☐					
15:04:54	144	-514	2398.5	2419.8	0	8.779
15:06:22	Start Pumping Acid					
15:06:24	144	-410	2394.0	2420.4	0	8.779
15:16:24	148	7692	2433.7	2460.1	0	0.031
15:26:24	516	17548	2672.3	2698.8	0	2.079
15:27:53	Stop pumping acid					
15:27:54	3625	12548	2784.2	2810.7	0	4.106
15:36:24	1520	-725	2787.1	2813.6	0	4.364
15:38:11	Starting Acid					
15:38:14	1583	-701	2792.9	2819.4	0	4.364
15:38:38	Stop Pumping					
15:38:39	1515	738	2792.9	2819.4	0	4.372
15:46:24	2281	4553	2792.9	2819.4	0	4.416
15:49:20	Starting Fluid					
15:49:24	2750	342	2792.9	2819.4	0	4.422
15:50:56	Stop Pumping					
15:50:59	2786	2403	2792.9	2819.4	0	4.430
15:56:24	15104	12795	2792.9	2819.4	0	4.523
16:01:04	Starting Acid					
16:01:04	1541	-705	2792.9	2819.4	0	4.523
16:02:28	Stop Pumping					
16:02:29	1374	-710	2792.9	2819.4	0	4.523
16:06:24	6175	3882	2792.9	2819.4	0	4.624
16:12:31	Starting Acid					
16:12:34	1853	-503	2792.9	2819.4	0	4.624
16:14:00	Stop Pumping					
16:14:04	1841	-524	2792.9	2819.4	0	4.624

Well: N-65

Date Prepared: 03-18-1998

Time hh:mm:ss	WH PRESS kPa	CIRC PRESS kPa	CT CORR DEPTH m	TOT DOWN RUN LEN m	TOTAL N2 RATE scm/min	TOT FLUID m3
16:16:24	1908	-643	2792.9	2819.4	0	4.726
16:24:06	Starting Acid					
16:24:09	1646	-710	2792.9	2819.4	0	4.726
16:25:31	Stop Pumping					
16:25:34	1617	-710	2792.9	2819.4	0	4.726
16:26:24	1057	-554	2792.9	2819.4	0	4.826
16:34:57	Starting Acid					
16:34:59	1190	-738	2792.9	2819.4	0	4.826
16:36:24	1305	-720	2792.9	2819.4	0	4.826
16:36:40	Stop Pumping					
16:36:44	1103	-485	2792.9	2819.4	0	4.927
16:46:24	1384	-720	2792.9	2819.4	0	4.927
16:47:23	Starting Acid					
16:47:24	1423	-711	2792.9	2819.4	0	4.927
16:48:23	Starting Fluid					
16:48:24	1423	-703	2792.9	2819.4	0	4.927
16:48:41	Stop Pumping					
16:48:44	1219	2360	2792.9	2819.4	0	5.008
16:56:24	2222	351	2792.9	2819.4	0	5.032
16:59:22	Start Pumping Water					
16:59:24	1471	-707	2792.9	2819.4	0	5.032
17:00:59	Stop Pumping					
17:00:59	1479	-534	2792.9	2819.4	0	5.034
17:06:24	2287	600	2792.9	2819.4	0	5.139
17:11:06	Start Water					
17:11:09	1432	-703	2792.9	2819.4	0	5.139
17:12:35	Stop Pumping					
17:12:39	1424	-710	2792.9	2819.4	0	5.139
17:16:24	2366	122	2792.9	2819.4	0	5.237
17:24:08	Start Water					
17:24:09	1787	-378	2792.9	2819.4	0	5.237
17:25:36	Stop Pumping					
17:25:39	1657	47	2792.9	2819.4	0	5.238
17:26:24	2232	-8	2792.9	2819.4	0	5.336
17:36:24	2229	132	2792.9	2819.4	0	5.336
17:36:37	Start Water					
17:36:39	1956	-164	2792.9	2819.4	0	5.336
17:38:14	Stop Pumping					
17:38:14	1956	-163	2792.9	2819.4	0	5.336
17:46:24	3510	1765	2792.9	2819.4	0	5.437
17:49:13	Start Water					
17:49:14	1821	-235	2792.9	2819.4	0	5.437
17:50:34	Stop Pumping					
17:50:34	1771	-289	2792.9	2819.4	0	5.437
17:56:24	956	375	2792.9	2819.4	0	5.538
18:01:44	Start Water					
18:01:44	1180	-663	2792.9	2819.4	0	5.539
18:03:05	Stop Pumping					
18:03:09	1166	-680	2792.9	2819.4	0	5.539
18:06:24	1457	-263	2792.9	2819.4	0	5.639
18:14:38	Start Water					

Well: N-65

Date Prepared: 03-18-1998

Time hh:mm:ss	WH PRESS kPa	CIRC PRESS kPa	CT CORR DEPTH m	TOT DOWN RUN LEN m	TOTAL N2 RATE scm/min	TOT FLUID m3
18:14:39	1512	-427	2792.9	2819.4	0	5.639
18:15:59	Stop Pumping					
18:15:59	1415	-545	2792.9	2819.4	0	5.639
18:16:24	3133	1045	2792.9	2819.4	0	5.736
18:26:10	Start Water					
18:26:14	3464	1377	2792.9	2819.4	0	5.736
18:26:24	2858	3042	2792.9	2819.4	0	5.740
18:27:33	Stop Pumping					
18:27:34	1866	1820	2792.9	2819.4	0	5.748
18:36:24	3890	2024	2792.9	2819.4	0	5.834
18:37:05	Start Water					
18:37:09	3166	1239	2792.9	2819.4	0	5.834
18:38:36	Stop Pumping					
18:38:39	3114	3096	2792.9	2819.4	0	5.837
18:46:24	2037	-6	2792.9	2819.4	0	5.941
18:49:48	Start Water					
18:49:49	2311	425	2792.9	2819.4	0	5.941
18:51:17	Stop Pumping					
18:51:19	2231	324	2792.9	2819.4	0	5.941
18:56:24	4304	1986	2792.9	2819.4	0	6.036
19:01:24	Start Water					
19:01:24	2054	192	2792.9	2819.4	0	6.036
19:02:47	Stop Pumping					
19:02:49	1876	-9	2792.9	2819.4	0	6.036
19:06:24	3743	2000	2792.9	2819.4	0	6.137
19:12:34	Start Water					
19:12:34	3531	1693	2792.9	2819.4	0	6.137
19:14:02	Stop Pumping					
19:14:04	3142	1284	2792.9	2819.4	0	6.137
19:16:24	3686	2130	2792.9	2819.4	0	6.236
19:26:24	3628	1863	2792.9	2819.4	0	6.236
19:26:42	Start Water					
19:26:44	3488	1751	2792.9	2819.4	0	6.236
19:31:45	Remark					
19:31:49	3484	1746	2792.9	2819.4	0	6.236
19:36:24	27695	29375	2792.9	2819.4	0	6.558
19:36:35	Remark					
19:36:39	25998	33048	2792.9	2819.4	0	7.041
19:45:37	Remark					
19:45:39	26007	33366	2792.9	2819.4	0	7.076
19:46:24	21549	32837	2792.9	2819.4	0	8.292
19:47:15	Stop Pumping					
19:47:19	21518	26673	2792.9	2819.4	0	8.391
19:51:22	Pres test N2 line to 30 MPA					
19:51:24	20273	20167	2792.9	2819.4	0	8.428
19:53:52	Start pumping N2 at 20 scm/min					
19:53:54	2383	2813	2792.9	2819.4	0	8.428
19:56:24	528	7345	2792.9	2819.4	27	8.428
20:06:24	503	6001	2792.9	2819.4	0	8.428
20:12:25	Pull up hole to establish circulation					
20:12:29	412	2257	2792.9	2819.4	0	8.428

Well: N-65

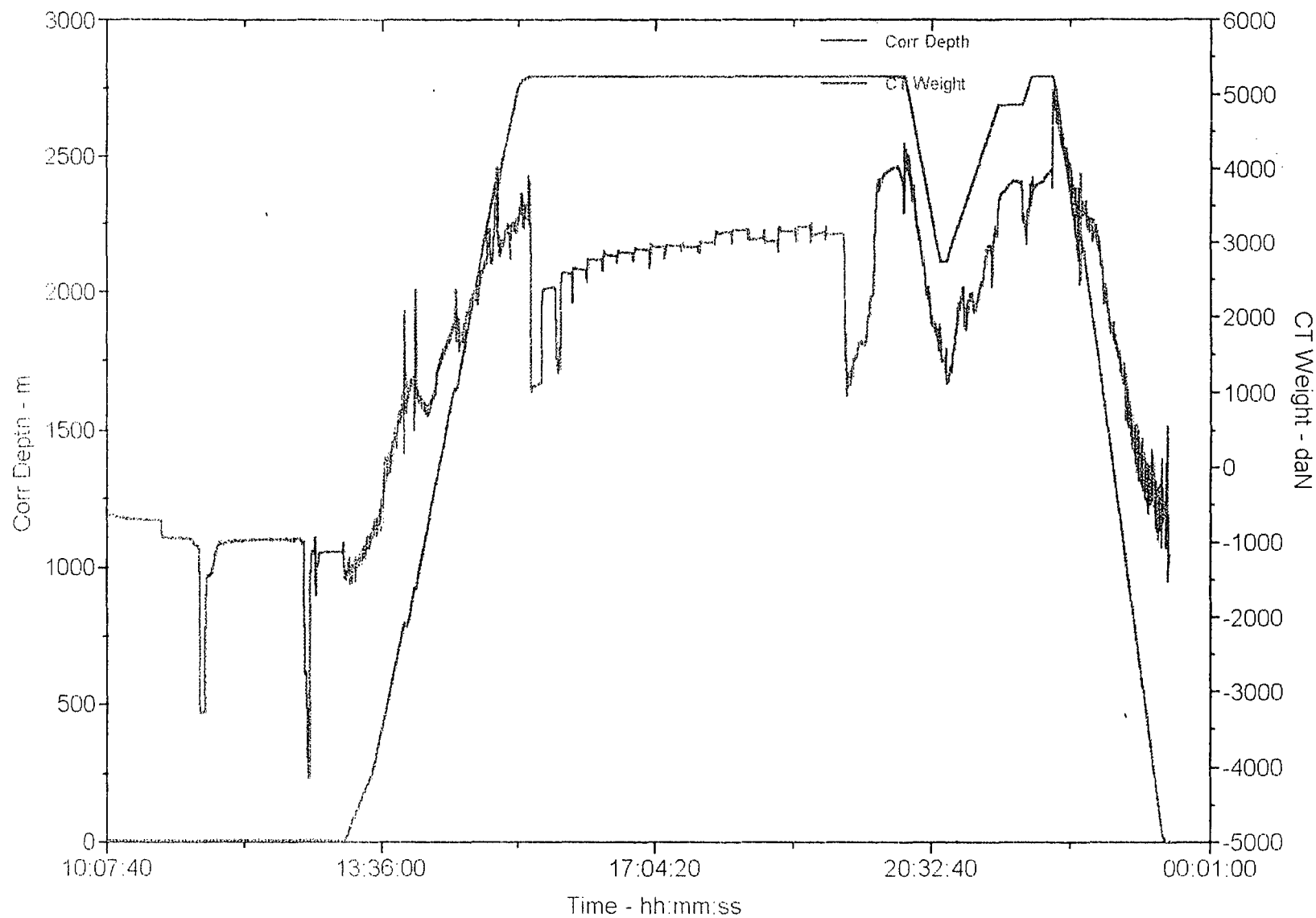
Date Prepared: 03-18-1998

Time hh:mm:ss	WH PRESS kPa	CIRC PRESS kPa	CT CORR DEPTH m	TOT DOWN RUN LEN m	TOTAL N2 RATE scm/min	TOT FLUID m ³
20:16:24	430	9929	2786.2	2819.4	31	8.428
20:26:24	438	12978	2692.6	2819.4	31	8.428
20:36:24	452	17690	2441.3	2819.4	30	8.428
20:39:44	Stop POH CT					
20:39:44	467	20464	2182.4	2819.4	31	8.428
20:43:19	Run in hole to unload fluid					
20:43:19	603	19932	2107.0	2819.4	31	8.428
20:46:24	791	18992	2107.0	2819.4	30	8.428
20:56:24	1371	18001	2152.2	2864.6	30	8.428
21:06:24	2940	13804	2298.8	3011.2	31	8.428
21:16:24	2129	11613	2444.4	3156.7	31	8.428
21:26:24	2532	10577	2593.1	3305.5	31	8.428
21:31:59	Stop RIH for H2S alarm					
21:31:59	1649	6286	2686.1	3398.5	0	8.428
21:36:24	1368	8269	2686.1	3398.5	49	8.428
21:46:24	1172	12101	2686.1	3398.5	49	8.428
21:50:13	Stop at 2792m and circulate for 15min					
21:50:14	1639	9443	2770.9	3483.2	30	8.428
21:56:24	1616	9147	2792.0	3504.4	30	8.428
22:03:17	Begin POH CT					
22:03:19	1103	8817	2792.0	3504.4	30	8.428
22:06:24	1681	8547	2792.0	3504.4	30	8.428
22:16:24	1607	8431	2728.0	3504.4	30	8.428
22:26:24	1415	8110	2378.3	3504.4	30	8.428
22:36:24	1377	7847	2161.6	3538.8	30	8.428
22:46:24	1406	7682	1810.8	3538.8	30	8.428
22:56:24	1402	7593	1457.6	3538.8	30	8.428
23:06:24	1361	7552	1099.6	3538.8	30	8.428
23:14:15	Stop pumping N2					
23:14:19	1372	7510	736.3	3538.8	30	8.428
23:16:24	1408	7402	445.7	3538.8	26	8.428
23:26:24	1423	4839	369.0	3538.8	0	8.428
23:30:25	CT Back at Surface					
23:30:29	1161	1104	20.4	3538.8	0	8.428
23:31:08	Close master valve and bleed off press					
23:31:09	835	507	1.9	3538.8	0	8.428

CAT*

DEPTH/WEIGHT

Paramount Resources Ltd.
N-65
811-0350
03-18-1998



CAT*

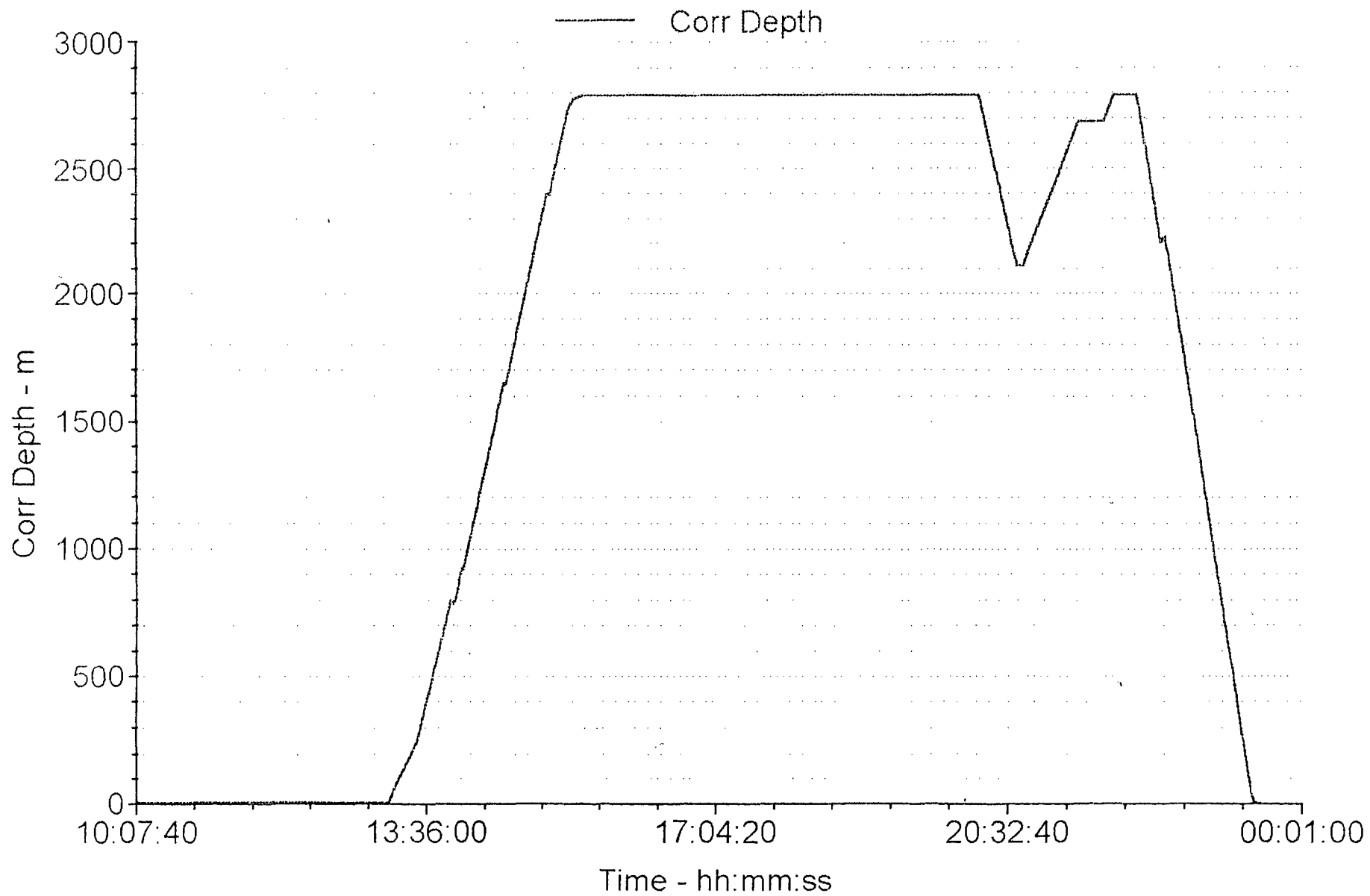
Depth Vs Time

Paramount Resources Ltd.

N-65

811-0350

03-18-1998



COAT*

Foam Circulation

Paramount Resources Ltd.

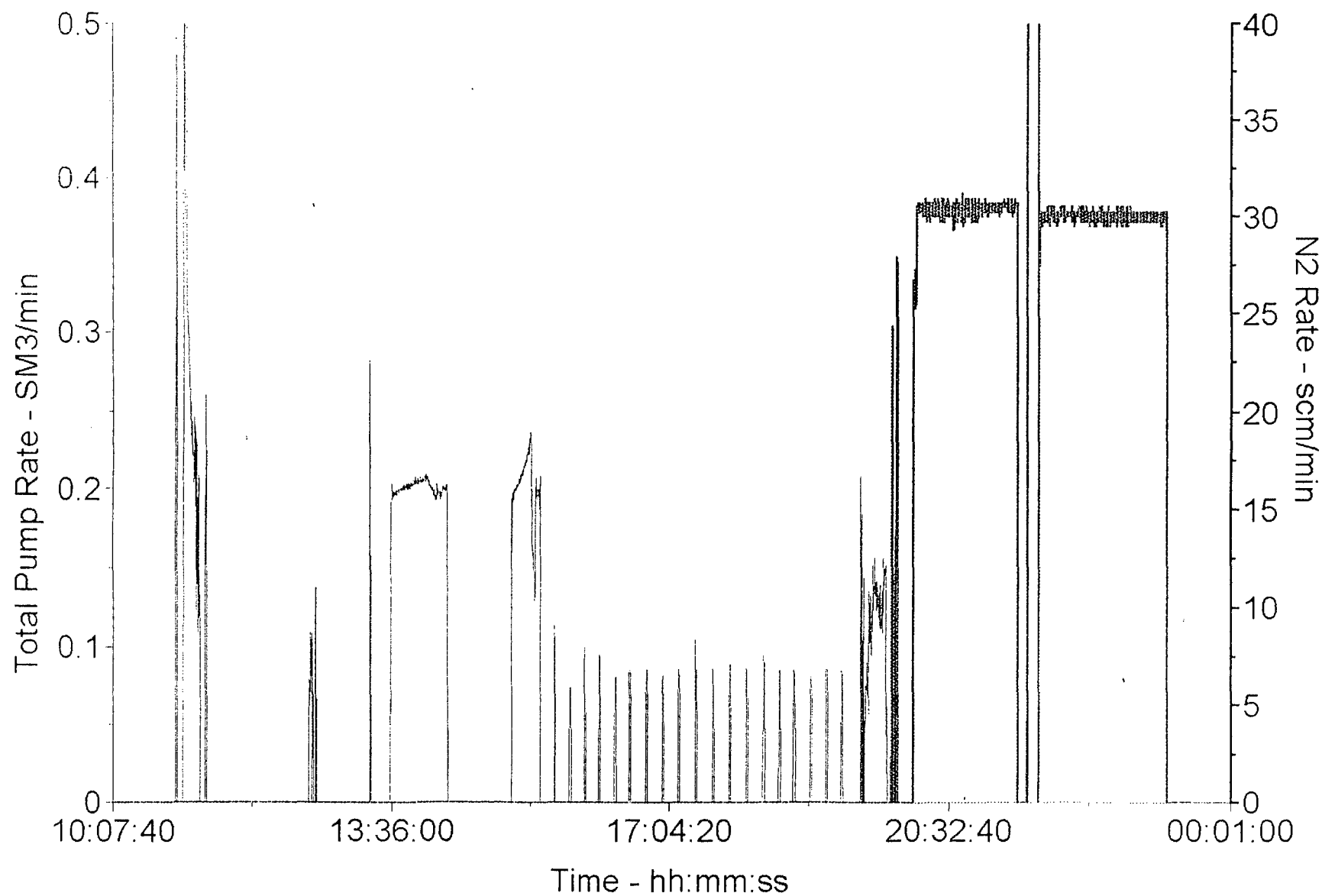
N-65

811-0350

03-18-1998

..... Total Pump Rate

—— N2 Rate



C AT*

Pressure and Rate

Paramount Resources Ltd.

N-65

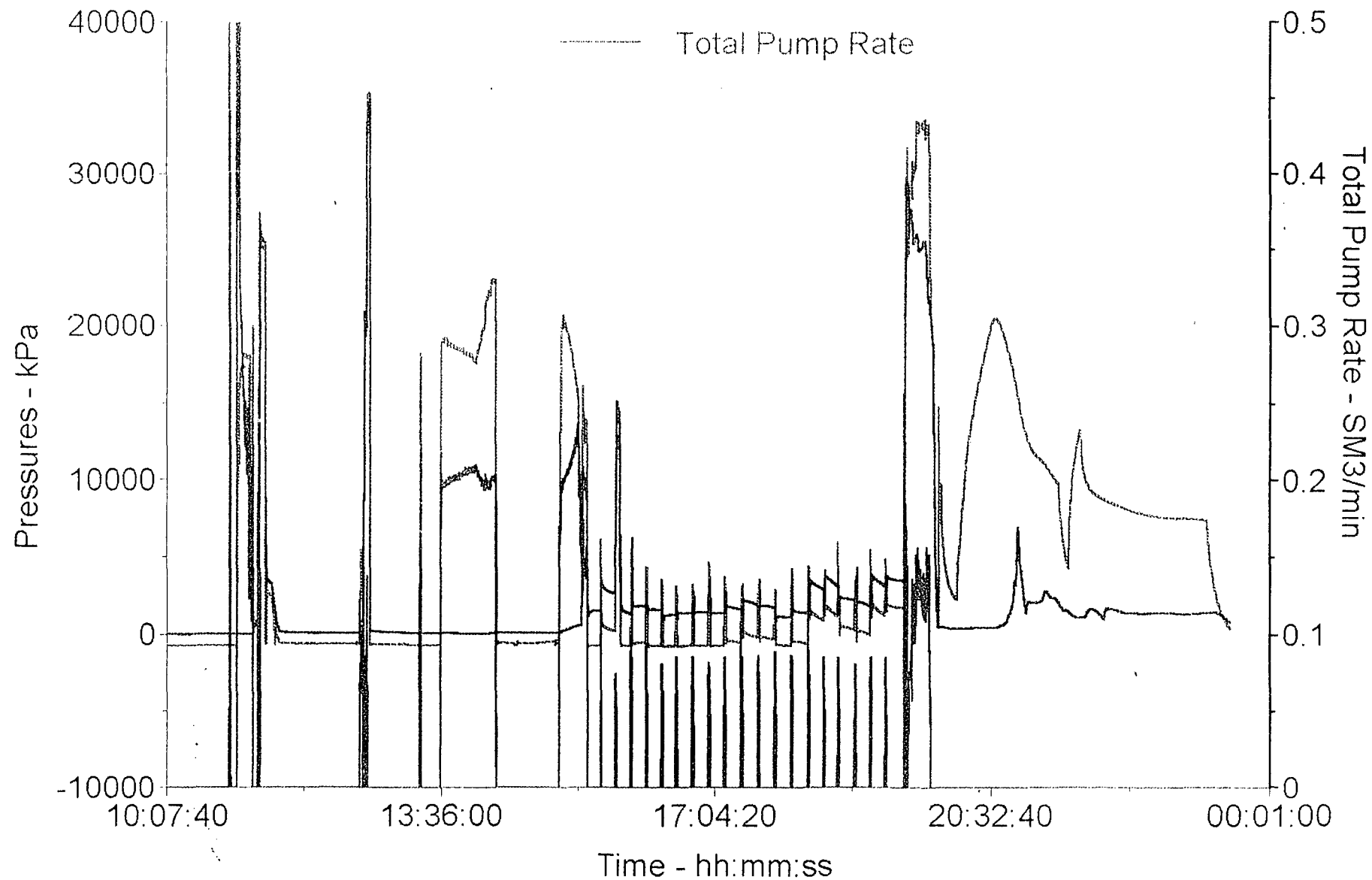
811-0350

03-18-1998

----- Circ. Press.

----- WH Press.

----- Total Pump Rate



Paramount Resources Ltd.

CCAT Treatment Report

N-65



Field

Arrowhead

Formation

Nahanni Headless

Location

N-65

Country

Canada

Province

Northwest Territories

Prepared for
Treatment No. 811-0350
Date Prepared 03-19-1998

Service Point COIL TUBING GAB
Business Phone (403) 539-4220
FAX No. (403) 539-7532

Prepared by VIC LEMKE
Phone (403) 539-4220
E-Mail Address lemke@grande-prairie.dowell.slb.com

Comments Supply men, materials, and equipment to perform a high pressure acid ball job on above location as per above customers request.

Disclaimer Notice

This information is presented in good faith, but no warranty is given by and Dowell assumes no liability for advice or recommendations made concerning results to be obtained from the use of any product or service. The results given are estimates based on calculations produced by a computer model including various assumptions on the well, reservoir and treatment. The results depend on input data provided by the Operator and estimates as to unknown data and can be no more accurate than the model, the assumptions and such input data. The information presented is Dowell's best estimate of the actual results that may be achieved and should be used for comparison purposes rather than absolute values. The quality of input data, and hence results, may be improved through the use of certain tests and procedures which Dowell can assist in selecting.

The Operator has superior knowledge of the well, the reservoir, the field and conditions affecting them. If the Operator is aware of any conditions whereby a neighboring well or wells might be affected by the treatment proposed herein it is the Operator's responsibility to notify the owner or owners of the well or wells accordingly.

Prices quoted are estimates only and are good for 30 days from the date of issue. Actual charges may vary depending upon time, equipment, and material ultimately required to perform these services.

Freedom from infringement of patents of Dowell or others is not to be inferred.



Dowell

Client : Paramount Resources Ltd.
Well : N-66
Formation : Notams, Redden
District : COIL TUBING 347
Country : Canada

Section 1: Job Messages

#	Time	Message	Circ Pres (kPa)	Backup Pres 2 (kPa)	N2 Pump Rate (scm/min)	Flowm eter 1 Rate (SM3/ min)	Tot Fluid Vol (m3)
1	1:58:37	Started Acquisition	0	0	0	0.00	0.000
2	2:11:11	Rig up equipment	0	0	0	0.00	0.000
3	3:42:52	Started Recording	0	0	0	0.00	0.000
4	3:43:30	Set pop valve	-13	-22	0	0.00	0.000
5	5:02:46	Reset Volume	-15	18	0	0.00	0.000
6	5:08:26	Press test lines to 60 MPA	52056	20292	0	0.00	0.000
7	5:09:52	Press up annulas to 21.5 MPA	51586	21309	0	0.00	0.000
8	5:22:35	Start Pumping Acid	3779	20362	0	0.78	0.000
9	5:24:36	Start dropping balls	1081	20231	0	1.16	0.000
10	5:27:02	Start pumping N2	5858	19646	95	0.97	0.000
11	5:38:16	Start Pumping Water	38329	13657	94	0.68	0.000
12	5:50:13	Stop Pumping	40418	19479	0	0.00	0.000
13	5:51:04	Monitor press	36467	19278	0	0.00	0.000
14	6:05:55	Bleed off and rig out	27521	19750	0	0.00	0.000
15	6:54:01	Stopped Recording	-25095	-26124	0	0.00	0.000
16	6:54:05	Stopped Acquisition	-25095	-26124	0	0.00	0.000

Final press was 42.6 MPA and 10 min shutin press was 27.5 MPA.

Customer: Paramount Resources Ltd.

Representative:

Well: N-65

Schlumberger**Dowell**

District: COIL TUBING GAB

DS Supervisor: VIC LEMKE

Date Prepared: 03-19-1998

Treatment Log

Time hh:mm:ss	CIRC PRESS kPa	BACKUP PRESS2 kPa	N2 RATE scm/min	FLOWMETER1 RATE SM3/min
01:58:37	Started Acquisition			
02:11:11	Rig up equipment			
03:42:52	Started Recording			
03:42:53	0	0	0	0.00
03:43:30	Set pop valve			
03:43:30	-13	-16	0	0.00
03:51:45	-13	-22	0	0.00
04:01:45	-13	-36	0	0.00
04:11:45	-12	26720	0	0.00
04:21:45	-10	8	0	0.00
04:31:45	-14	22	0	0.00
04:41:45	-8	16	0	0.00
04:51:45	-6	20	0	0.00
05:01:45	0	22	0	0.00
05:02:46	Reset Volume ☐			
05:02:50	2	20	0	0.00
05:08:26	Press test lines to 60 MPA			
05:08:30	-8	18	0	0.00
05:09:52	Press up annulas to 21.5 MPA			
05:09:55	52023	20818	0	0.00
05:11:45	51563	21266	0	0.00
05:21:45	51130	21078	0	0.00
05:22:35	Start Pumping Acid			
05:22:35	49824	20399	0	0.00
05:24:36	Start dropping balls			
05:24:40	3779	20362	0	0.78
05:27:02	Start pumping N2			
05:27:05	771	20224	0	1.13
05:31:45	6037	19596	96	0.97
05:38:16	Start Pumping Water			
05:38:20	28117	17257	100	0.70
05:41:45	38509	14220	101	0.84
05:50:13	Stop Pumping			
05:50:15	41412	19566	100	0.81
05:51:04	Monitor press			
05:51:05	38903	19431	0	0.00
05:51:45	36299	19265	0	0.00
06:01:45	35164	19211	0	0.00
06:05:55	Bleed off and rig out			
06:05:55	28559	19572	0	0.00
06:11:45	27521	19750	0	0.00
06:21:45	-17	-34	0	0.00
06:31:45	-4	-17	0	0.00
06:41:45	6	2	0	0.00
06:51:45	-25095	-4	0	0.00

C AT*

Pressure and Rate

Paramount Resources Ltd.

N-65

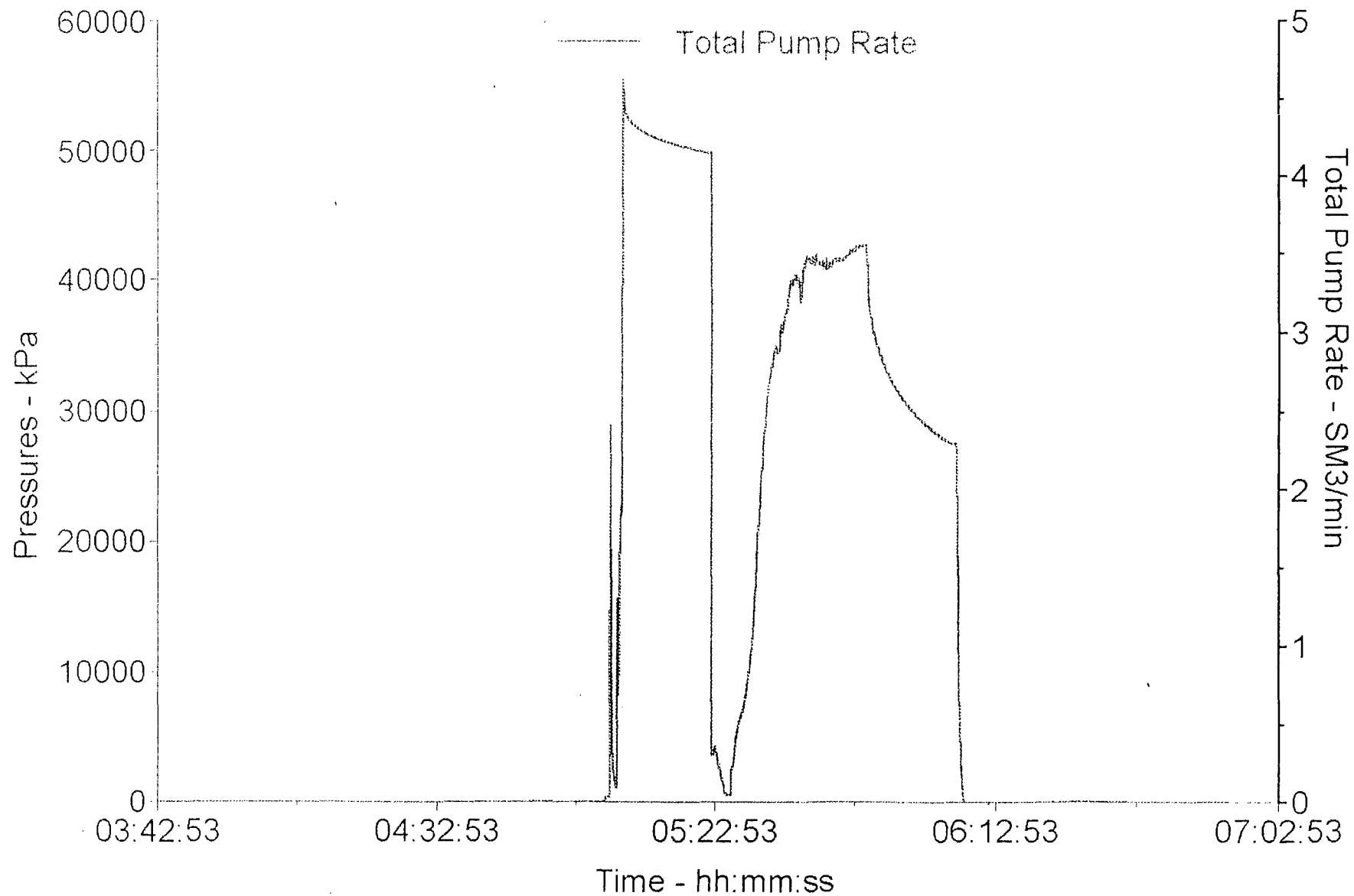
811-0350

03-19-1998

— Circ. Press.

— WH Press.

— Total Pump Rate



PARAMOUNT RESOURCES LTD

N-65-63-40-122-45NWT / NAHANNI

NEW COMPLETION

98-03-05 - 93-03-20

Report prepared by:

ENTEST CORP.

98-03-20

ENTES' CORP.

PRODUCTION SUMMARY

Customer Name: PARAMOUNT RESOURCES LTD
LSD: N-65-63-40-122-45NWT
Operation Description: NEW COMPLETION
Test Dates: 98-03-05 - 93-03-20

Gas Parameters

Meter Run Size: 102.26 mm
Relative Gas Density: 0.65
Mole Fraction Nitrogen (N2):
Mole Fraction Carbon Dioxide (CO2):
Mole Fraction Hydrogen Sulfide (H2S):

Production Totals

Total Production Time: 364.58
Total Amount of Gas Produced: 0.00
Total Amount of Oil/Cond Produced: 0
Total Amount of Water Produced: 69.95999

DAY SUMMARY

Date	Production	Gas		OIL/Condensate		Water	
	Time	Amount Prod	Avg Gas Rate	Amount Prod	Avg Prod Rate	Amount Prod	Avg Prod Rate
	hours	10 ³ m ³	10 ³ m ³ /day	m ³	m ³ /day	m ³	m ³ /day
98-03-05	15.00	0.00		0.00		0.00	
98-03-06	19.00	0.00		0.00		0.00	
98-03-07	14.00	0.00		0.00		0.00	
98-03-08	36.00	0.00		0.00		0.00	
98-03-10	29.00	0.00		0.00		0.00	
98-03-11	24.00	0.00		0.00		0.00	
98-03-12	31.00	0.00		0.00		0.00	
98-03-13	16.00	0.00		0.00		0.00	
98-03-14	24.00	0.00		0.00		0.00	
98-03-15	24.00	0.00		0.00		0.00	
98-03-16	39.50	0.00		0.00		0.00	
98-03-17	20.00	0.00		0.00		0.00	
98-03-18	36.00	0.00		0.00		36.35	48.16
98-03-19	23.54	0.00		0.00		30.73	87.52
03-20	13.54	0.00		0.00		2.88	

ENTES CORP.

Company:

PARAMOUNT RESOURCES LTD

ID:

N-65-63-40-122-45NWT

Zone: NAHANEY

Test Dates:

98-03-05-93-03-20

Operation:

NEW COMPLETION

Operations Summary

Date	Time	Comments
98-03-05	08:00	MOVE EQUIPMENT TO LOCATION
	23:00	SHUT DOWN TILL FOLLOWING A M.
98-03-06	08:00	SPOT EQUIPMENT & RUN FLARE LINE & STAND FLARE STACK & TIE IN
	18:00	SHUT DOWN TILL FOLLOWING AM.
98-03-07	08:00	EQUIPMENT & PERSONEL ON STAND BY
98-03-08	08:00	PERSONEL & EQUIPMENT ON STAND BY
	18:00	LINE HEATER ON LOCATION SPOT & RIG IN
	20:00	SHUT DOWN TILL FOLLOWING A M.
98-03-10	00:00	CONTINUE STAND BY
98-03-11	00:00	CONTINUE STAND BY
	23:30	CONTINUE STAND BY
	00:00	CONTINUE STAND BY
	01:00	CONTINUE STAND BY
98-03-12	00:00	CONTINUE STAND BY
	08:00	CONTINUE STAND BY
98-03-13	00:00	CONTINUE STANDBY
98-03-14	00:00	CONTINUE STANDBY
98-03-15	00:00	CONTINUE STANDBY
98-03-16	00:00	CONTINUE STANDBY
	15:30	CONTINUE STAND BY
98-03-17	00:00	CONTINUE STAND BY
	11:30	CONTINUE STAND BY
98-03-18	00:00	CONTINUE STAND BY
	02:30	RIG UP AND BEGIN TO SWAB
	08:04	RIG DOWN SWAB SWAB EQUIPMENT & RIG UP SCHLUMBERGER
	11:00	HOLD SAFETY MEETING & PRESSURE TEST SURFACE LINES
	13:06	START IN HOLE WITH COIL TUBING
	14:30	START RECOVERING DISPLACEMENT FLUID
	15:00	RECOVERING DISPLACEMENT FLUID
	15:30	TRANSFER 3 / M 3 TO RIG TANK

ENTES / CORP.

Company: PARAMOUNT RESOURCES LTD
JD: N-65-63-40-122-45NWT Zone: NAHANEY
Test Dates: 98-03-05-93-03-20
Operation: NEW COMPLETION

Operations Summary

Date	Time	Comments
98-03-18	16:00	RECOVERED FLUID
	17:00	RECOVERED FLUID
	17:30	RECOVERED FLUID
	18:00	RECOVERED FLUID
	18:30	RECOVERED FLUID
	18:38	RECOVERED FLUID
	19:02	TRANSFER 4.83 / M 3 TO 400 STORAGE
	22:00	GAUGE 400 TANK @ 154 C M. =16.18 M3
	23:30	GAUGE 400 @ 159CM = 16.69M3 AND WAIT ON BULKER
98-03-19	02:55	BULKER ON LOCATION PREPARE TO FRAC
	05:50	COMPLETE ACID & PERF BALL FRAC
	06:35	OPEN TO FLOW BACK ACID ON 50.8 M. M. CHOKE
	09:30	BLEED CASING DOWN TO 0
	11:44	NO TAG ON SWAB # 2 @ 11:44 HRS
	16:05	TRANSFER TO 400 STORAGE 6.03 / M3
	19:27	SHUT DOWN SWABBING AND WAIT TWO HOURS
98-03-20	01:15	OBTAIN WATER SAMPLE @ 01:15 H . R. S. SWAB # 23
	07:59	OBTAIN WATER SAMPLE SWAB# 30
	08:15	TRANSFER TO 400 SORAGE 4.12 / M 3 SHUT DOWN SWABBING
	09:15	RECORD BUILD UPS
	09:30	BUILD UP
	09:45	BUILD UP
	10:00	BUILD UP
	10:15	BUILD UP
	10:30	BUILD UP
	10:45	BUILD UP
	11:00	BUILD UP
	11:15	BUILD UP
	11:30	BUILD UP
	11:45	BUILD UP

ENTEST CORP.

Company:

PARAMOUNT RESOURCES LTD

ID:

N-65-63-40-122-45NWT

Zone: NAHANEY

Test Dates:

98-03-05-93-03-20

Operation:

NEW COMPLETION

Operations Summary

Date	Time	Comments
98-03-20	12:00	BUILD UP
	12:15	OBTAIN 2 GAS SAMPLES CYL # 00019974 & 00019954 AGAT LAB
	12:30	KILL WELL & PROCEED WITH EQUIPMENT RIG OUT
	12:35	TRANSFER BALANCE OF FLUID TO 400 = 6.32 / M ³

E N T E S T C O R P

Company: PARAMOUNT RESOURCES LTD
LSD: N-65-63-40-122-45NWT
Zone: NAHANEY
Test Dates: 98-03-05-93-03-20

Job No: R0004 **Unit:** CUB # 4
Company Rep: RANDY HEMMINGSEN
Test Operator: R. GALLANT
Operation: NEW COMPLETION

Date	Time	Tubing Press (kPa)	Casing Press (kPa)	Swab #	Fluid Level (m)	Swab Depth (m)	Amt Water (m³)	Cum Water (m³)	Amt Oil (m³)	Cum Oil (m³)	Grindout Water %	Grindout Sand %	Grindout Wax %	Salinity (ppm)	PH	API (°)	H2S (ppm)
98-03-05	08:00																
	23:00																
98-03-06	08:00																
	18:00																
98-03-07	08:00																
98-03-08	08:00																
	18:00																
	20:00																
98-03-10	00:00																
	01:00																
98-03-11	01:00																
	00:00																
	23:30																
	00:00																
	01:00																
98-03-12	00:00																
	08:00																
98-03-13	00:00																
98-03-14	00:00																
98-03-15	00:00																

SWAB Summary	Acid/H2O (m³)	Oil/Cond (m³)
Page Recovery (m³)		
Fluid Injected (m³)		
Cum Recovered (m³)		
Fluid To Recover (m³)	0	0

ENTEST COR

Company: PARAMOUNT RESOURCES LTD
 LSD: N-65-63-40-122-45NWT
 Zone: NAHANEY
 Test Dates: 98-03-05-93-03-20

Job No:
 Company Rep:
 Test Operator:
 Operation:

R0004 Unit: CUB # 4
 RANDY HEMMINGSEN
 R. GALLANT
 NEW COMPLETION

Date	Time	Tubing Press (kPa)	Casing Press (kPa)	Swab #	Fluid Level (m)	Swab Depth (m)	Amt Water (m³)	Cum Water (m³)	Amt Oil (m³)	Cum Oil (m³)	Grindout Water %	Grindout Sand %	Grindout Wax %	Salinity (ppm)	PH	API (°)	H2S (ppm)
98-03-16	00:00																
	15:30																
98-03-17	00:00																
	11:30																
98-03-18	00:00																
	02:30			1			1	1									
	02:47	0	0	2			1	2									
	03:00	0	0	3	510	699	1	3									
	03:11	0	0	4	699	883	0.66	3.66									
	03:22	0	0	5	791	971	0	3.66									
	03:33	0	0	6	883	1062	0.33	3.99									
	03:51	0	0	7	883	1062	0.66	4.65									
	04:05	0	0	8	1062	1321	0.66	5.31									
	04:19	0	0	9	1279	1448	0	5.31									
	04:41	0	0	10	1321	1572	1.32	6.63									
	05:03	0	0	11	1572	1810	0.66	7.29									
	05:30	0	0	12	1732	1963	0.33	7.62									
	06:01	0	0	13	1887	2109	0.99	8.61									
	06:28	0	0	14	2145	2358	0.66	9.27									
	06:50	0	0	15	2217	2457	0.33	9.6									

SWAB Summary	Acid/H2O (m³)	Oil/Cond (m³)
Page Recovery (m³)	9.60	0.00
Fluid Injected (m³)		
Cum Recovered (m³)	9.6	
Fluid To Recover (m³)	0.00	0.00

E N T E S T C O R

Company: PARAMOUNT RESOURCES LTD
 LSD: N-65-63-40-122-45NWT
 Zone: NAHANEY
 Test Dates: 98-03-05-93-03-20

Job No:
 Company Rep:
 Test Operator:
 Operation:

R0004 Unit: CUB # 4
 RANDY HEMMINGSEN
 R. GALLANT
 NEW COMPLETION

Date	Time	Tubing Press (kPa)	Casing Press (kPa)	Swab #	Fluid Level (m)	Swab Depth (m)	Amt Water (m³)	Cum Water (m³)	Amt Oil (m³)	Cum Oil (m³)	Grindout Water %	Grindout Sand %	Grindout Wax %	Salinity (ppm)	PH	API (°)	H2S (ppm)
98-03-18	07:27	0	0	16	2322	2358	0	9.6									
	08:04	0	0	17	2322	2358	0	9.6									
	11:00	0	0														
	13:06	0	0														
	14:30	0	0				2.35	11.95									
	15:00	0	0				0.68	12.63									
	15:30	0	0				4.18	16.81									
	16:00	0	0				0.37	17.18									
	17:00	0	0				0.25	17.43									
	17:30	0	0				0.43	17.86									
	18:00	0	0				0.35	18.21									
	18:30	0	0				0	18.21									
	18:38	0	0				0.18	18.39									
	19:00	0	0				0.09	18.48									
	19:02	0	0				0.17	18.65									
	22:00	0	0				11.35	30									
	23:30	0	0				6.35	36.35									
98-03-19	02:55																
	05:50																
	06:35	22000	0														

SWAB Summary	Acid/H2O (m³)	Oil/Cond (m³)
Page Recovery (m³)	26.75	0.00
Fluid Injected (m³)		
Cum Recovered (m³)	36.35	
Fluid To Recover (m³)	0.00	0.00

ENTEST COR

Company: PARAMOUNT RESOURCES LTD
 LSD: N-65-63-40-122-45NWT
 Zone: NAHANEY
 Test Dates: 98-03-05-93-03-20

Job No:
 Company Rep:
 Test Operator:
 Operation:

R0004 Unit: CUB # 4
 RANDY HEMMINGSEN
 R. GALLANT
 NEW COMPLETION

Date	Time	Tubing Press (kPa)	Casing Press (kPa)	Swab #	Fluid Level (m)	Swab Depth (m)	Amt Water (m³)	Cum Water (m³)	Amt Oil (m³)	Cum Oil (m³)	Grindout Water %	Grindout Sand %	Grindout Wax %	Salinity (ppm)	PH	API (°)	H2S (ppm)
98-03-19	06:40	22000															
	06:45	10000															
	06:50	5500	0														
	06:55	3500	0														
	07:10	2300	0														
	07:25	1800	0														
	08:00	2000					12.42	48.77									
	08:30	1900	7000				2.22	50.99									
	09:00	2000	8000				5.31	56.3									
	09:30	1400	8000				1.22	57.52									
	10:00	800	0				0.54	58.06001									
	10:30	300	0				0	58.06001									
	11:22					1191	0.78	58.84								5	
	11:44	0	0				0.61	59.45								5	
	12:07	0	0		1148	1321	0.62	60.07						232000		5	
	12:31	0	0	4	1148	1321	0.27	60.34						230000		5	
	12:49	0	0	5	1448	1652	0.53	60.87						240000		5	
	13:14	0	0	6	1448	1652	0.45	61.32						240000		5	
	13:46	0	0	7	1363	1612	0.44	61.76						225000		5	
	14:01	0	0	8	1407	1652	0.18	61.94						218000		5	600

BLEED CASING DOWN TO 0

NO TAG ON SWAB # 2 @ 11:44 HRS

SWAB Summary	Acid/H2O (m³)	Oil/Cond (m³)
Page Recovery (m³)	25.59	0.00
Fluid Injected (m³)		
Cum Recovered (m³)	61.94	
Fluid To Recover (m³)	0.00	0.00

E N T E S T C O R

Company: PARAMOUNT RESOURCES LTD
 LSD: N-65-63-40-122-45NWT
 Zone: NAHANEY
 Test Dates: 98-03-05-93-03-20

Job No:
 Company Rep:
 Test Operator:
 Operation:

R0004 Unit: CUB # 4
 RANDY HEMMINGSEN
 R. GALLANT
 NEW COMPLETION

Date	Time	Tubing Press (kPa)	Casing Press (kPa)	Swab #	Fluid Level (m)	Swab Depth (m)	Amt Water (m³)	Cum Water (m³)	Amt Oil (m³)	Cum Oil (m³)	Grindout Water %	Grindout Sand %	Grindout Wax %	Salinity (ppm)	PH	API (°)	H2S (ppm)
98-03-19	14:30	0	0	9		1887	0.53	62.47						220000	5		
	14:58	0	0	10	1652	1963	0.44	62.91						220000	5		
	15:23	0	0	11	1810	2037	0.34	63.25						220000	5		
	16:05	0	0	12	2457	2457	0.93	64.18						212000	5		
	16:57	0	0	13	2252	2457	0.52	64.7						220000	5		
	17:26	0	0	14	2322	2587	0.26	64.96						200000	5		
	18:00	0	0	15		2587	0.61	65.57						208000	5		
	18:33	0	0	16		2587	0.18	65.75						212000	5		
	19:05	0	0	17		2587	0.26	66.01						210000	5		
	19:27	0	0	18		2587	0.09	66.1						190000	5		
	21:26	0	0	19		2587	0.45	66.55						220000	5		50
	21:52	0	0	20		2587	0.18	66.73						206000	5		
	23:03	0	0	21		2587	0.35	67.07999						200000	5		
98-03-20	00:04	0	0	22		2587	0.27	67.34999						206000	5		
	01:15	0	0	23		2587	0.27	67.61999						206000	5		
	02:03	0	0	24		2587	0.44	68.05999						210000	5		
	03:03	0	0	25		2587	0.26	68.31999						222000	5		
	04:06	0	0	26		2587	0.18	68.49999						210000	5		
	05:09	0	0	27		2587	0.26	68.75999						216000	5		100
	05:57	0	0	28		2587	0.52	69.27999						214000	5		

TRANSFER TO 400 STORAGE 6.03 / M3

SHUT DOWN SWABBING AND WAIT TWO HOURS

OBTAIN WATER SAMPLE @ 01:15 H. R. S. SWAB # 23

SWAB Summary	Acid/H2O (m³)	Oil/Cond (m³)
Page Recovery (m³)	7.34	0.00
Fluid Injected (m³)		
Cum Recovered (m³)	69.27999	
Fluid To Recover (m³)	0.00	0.00

ENTEST CORP

Company: PARAMOUNT RESOURCES LTD
 LSD: N-65-63-40-122-45NWT
 Zone: NAHANEY
 Test Dates: 98-03-05-93-03-20

Job No:
 Company Rep:
 Test Operator:
 Operation:

R0004 Unit: CUB # 4
 RANDY HEMMINGSEN
 R. GALLANT
 NEW COMPLETION

Date	Time	Tubing Press (kPa)	Casing Press (kPa)	Swab #	Fluid Level (m)	Swab Depth (m)	Amt Water (m³)	Cum Water (m³)	Amt Oil (m³)	Cum Oil (m³)	Grindout Water %	Grindout Sand %	Grindout Wax %	Salinity (ppm)	PH	API (°)	H2S (ppm)
98-03-19	14:58	0	0	10	1652	1963	0.44	62.91						220000	5		
	15:23	0	0	11	1810	2037	0.34	63.25						220000	5		
	16:05	0	0	12	2457	2457	0.93	64.18						212000	5		
	16:57	0	0	13	2252	2457	0.52	64.7						220000	5		
	17:26	0	0	14	2322	2587	0.26	64.96						200000	5		
	18:00	0	0	15		2587	0.61	65.57						208000	5		
	18:33	0	0	16		2587	0.18	65.75						212000	5		
	19:05	0	0	17		2587	0.26	66.01						210000	5		
	19:27	0	0	18		2587	0.09	66.1						190000	5		
	21:26	0	0	19		2587	0.45	66.55						220000	5		50
	21:52	0	0	20		2587	0.18	66.73						206000	5		
	23:03	0	0	21		2587	0.35	67.07999						200000	5		
98-03-20	00:04	0	0	22		2587	0.27	67.34999						206000	5		
	01:15	0	0	23		2587	0.27	67.61999						206000	5		
	02:03	0	0	24		2587	0.44	68.05999						210000	5		
	03:03	0	0	25		2587	0.26	68.31999						222000	5		
	04:06	0	0	26		2587	0.18	68.49999						210000	5		
	05:09	0	0	27		2587	0.26	68.75999						216000	5		100
	05:57	0	0	28		2587	0.52	69.27999						214000	5		

TRANSFER TO 400 STORAGE 6.03 / M3

SHUT DOWN SWABBING AND WAIT TWO HOURS

OBTAIN WATER SAMPLE @ 01:15 H. R. S. SWAB # 23

SWAB Summary	Acid/H2O (m³)	Oil/Cond (m³)
Page Recovery (m³)	69.27999	
Fluid Injected (m³)		
Cum Recovered (m³)	69.27999	
Fluid To Recover (m³)	0	0

PARAMOUNT BERKLEY ARROWHEAD N-65

DOWNHOLE LOGS