FINAL WELL REPORT

PARAMOUNT RESOURCES LTD.

PARA ET AL FORT LIARD I-46

Grid # 60^0 10′, 123^0 15′

DATE: August 3, 2001

COMPANY REPRESENTATIVES:
Wayne Tomm
Dave Block

TABLE OF CONTENTS

D. GEOLOGY Page

1. Geological report.
2. Downhole survey calculation report.
3. Underbalanced drilling surface flow reports.
4. Final survey plan..

A. INTRODUCTION

Paramount Resources Ltd. (Paramount) drilled a 2055 meter exploratory well spudded on November 12, 1999 and finishing on January 15, 2000 to evaluate hydrocarbon potential. The primary target was the Mattson formation at a depth of 1505 mKB. Secondary targets were the Chinkeh formation at 1242 mKB, the Fantasque formation at 1412 mKB, and the Flett formation at 2131 mKB.

The drilling contractor was Precision Drilling based out of Calgary, Alberta. Precision rig # 379 was used and is a land rig rated for 2400 m. The rig had a mud system capacity of 82.2 m^3 and was equipped with a boiler.

The well was drilled on Exploration License No EL381 in which Paramount has a 33.34 % working interest. Operating License No 1871 was issued to Paramount on October 22, 1999.

The exact co-ordinates of the well are as follows:

Latitude: 60^0 05' 32.474"
Longitude: 123^0 22' 53.612"

Cancor Rathole Inc. drilled a 609 mm conductor hole to 12.2 meters. From surface to 7.6 meters was mostly a high plasticity clay and from 7.6 – 12.2 meters was a drier harder clay. A 406 mm, 0.375" wall thickness conductor pipe was set and cemented at 12.2 meters.

Precision #379 was moved onto the location between November 1 – 10, 1999. The diverter was nippled up, the rig was rigged up, and the well was spudded on November 12, 1999 at 14:00 hours. A 311 mm surface was drilled to 190 mKB. Lost circulation was encountered at 36 meters and 51 meters. Circulation was regained with high viscosity pills and sawdust. By 190 meters deviation problems were being encountered so a 222 mm pilot hole was drilled to 505 mKB. The pilot hole was reamed out to 311 mm to 505 mKB. A string of 244.5 mm, 53.6 kg/m, J-55, LT&C surface casing was run to 505 mKB. The casing was cemented with 30 t class 'G' cement plus 1% $CaCl^2$. There were good mud returns reported throughout the cement job with 3 m^3 of cement returned to surface while cementing. The plug was bumped and the float held OK. The plug was down at 10:10 hours on November 21, 1999.

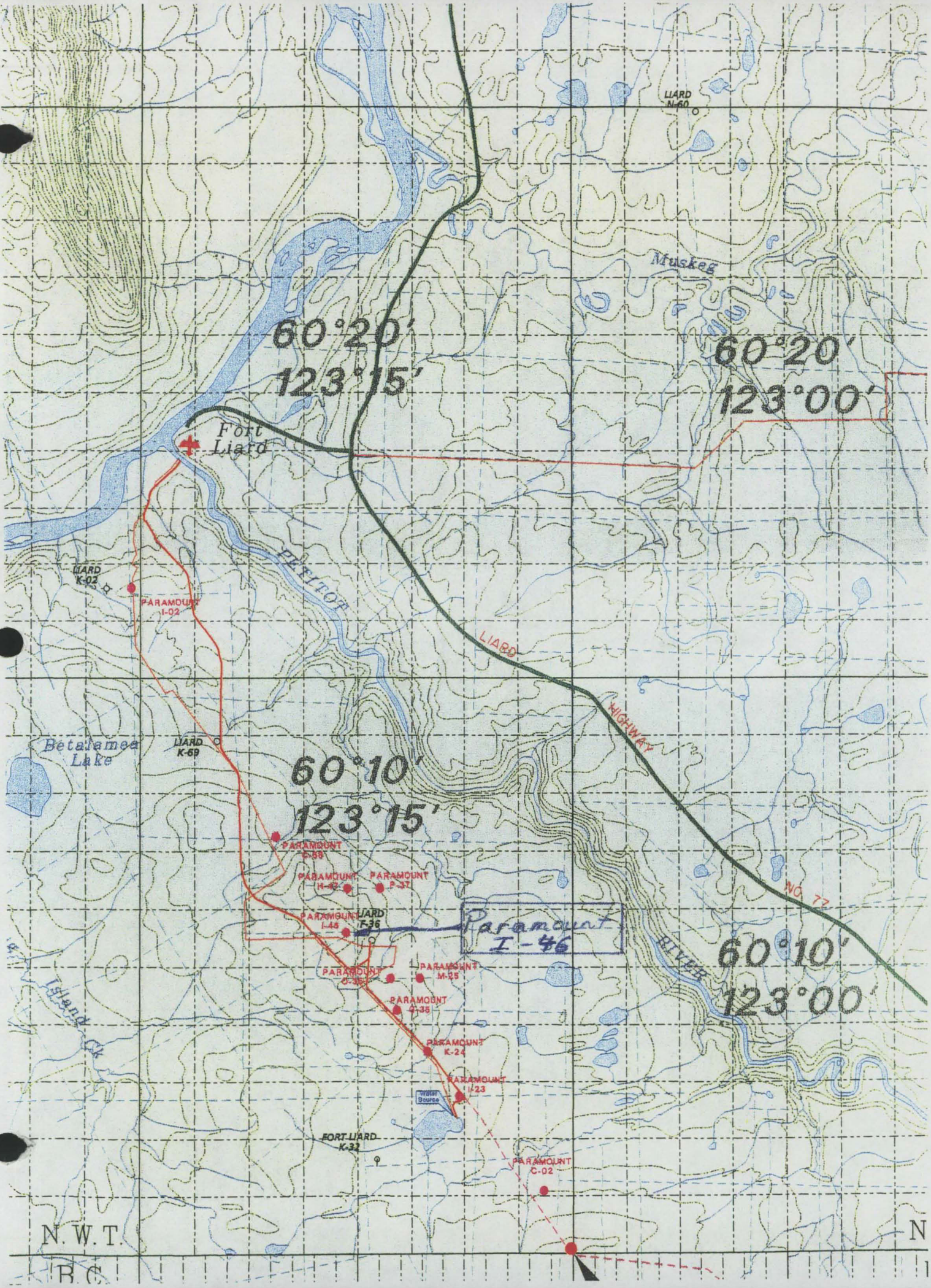
The casing and conductor were trimmed and the casing bowl was welded on. The BOP's were installed and function tested. The BOP's and manifold were pressure tested to 1500 kPa low pressure and 14000 kPa high pressure.

The float collar and shoe were drilled out on November 24, 1999 with a mud motor using an invert mud system. The 222 mm main hole was drilled ahead to 1545 with a combination of rotating and sliding to control deviation problems. There was some minor sloughing noted but any tight spots were easily reamed out. Baker Atlas ran induction, sonic, and density logs from bottom to surface casing. DST's were then run as follows: DST #1 across the Fantasque from 1365 – 1367 mKB, DST #2 across the Belloy from 1323 – 1343 mKB, DST #3 across the Belloy

from 1332 – 1352 mKB, and DST #4 from1213 – 1227 mKB. . A string of 177.8 mm, 38.6 kg/m, J-55, LT&C intermediate casing was run to 1545 mKB. The casing was cemented with 13.2 t 1:1:2 'G' cement plus 0.5% T-10 and 11 t 0:1:0 'G' cement plus 0.8% NFL-2 and 1% A-11. There were no cement returns to surface while cementing. The plug was bumped with 16000 kPa and the float held OK. The plug was down at 16:44 hours on December 12, 1999.

The casing was cut off and the BOP's were nippled up again. A rotating BOP, flow line, and separation equipment were installed. All surface equipment was pressure tested to 1500 kPa low pressure and 21000 kPa high pressure. The float collar and shoe were drilled out and a leak off test performed. Leak off gradient found to be 15.6 kPa. A 156 mm hole was drilled with air to 1685 mKB. Made some gas 20 – 50 10^3m^3/day with up to 21 m^3/hr of water. The well was then displaced to invert mud and drilling resumed. A drilling break was encountered at 1734.5 meters. Stopped drilling at 1740 meters and ran DST #5 across the Mattson from 1734.5 – 1740 mKB. Continued drilling to 2045 mKB with no major hole problems with a penetration rate from 1 – 2 m/hour. Baker Atlas ran induction, sonic, and density logs from bottom to intermediate casing. Baker Atlas also ran their formation multi-tester over various intervals from 1636.0 – 1991.5 mKB. DST #6 was run across the Mattson from 1785 – 1789 mKB and DST #7 was run across the Mattson from 1899 – 1903 mKB. A 114 mm, 17.26 kg/m, J-55, LT&C liner was run and cemented from 2055 – 1504 mKB.

Precision #379 was rigged out and released at 18:00 hours on January 15, 2000.


LIARD N-60
Muskeg
60°20'
123°15'
60°20'
123°00'
Fort Liard
LIARD K-02
PARAMOUNT I-02
PEEL TOP
LIARD HIGHWAY
Betalamea Lake
LIARD K-69
60°10'
123°15'
PARAMOUNT C-88
PARAMOUNT H-42
PARAMOUNT P-37
PARAMOUNT I-46
LIARD F-36
Paramount I-46
PARAMOUNT C-35
PARAMOUNT M-25
PARAMOUNT Q-35
PARAMOUNT K-24
PARAMOUNT I-23
Water Source
FORT LIARD K-32
PARAMOUNT C-02
NO. 77
RIVER
60°10'
123°00'
Island Ck
N.W.T.
B.C.
N

B. GENERAL DATA

1. Well Name: Para et al Fort Liard I-46

   Authority to Drill a Well No: 1871

   Exploration Agreement Number: EL 381

   Location Unit: I

   Section: 46

   Grid Area: 60^0 10' N, 123^0 15' W

   Classification: Exploratory

2. Coordinates:
   Latitude: 60^0 05' 32.474"
   Longitude: 123^0 22' 53.612"

3. Unique Well Identifier: 300I466010123150

4. Operator: Paramount Resources Ltd.

5. Contractor: Precision Drilling

6. Drilling Unit: Precision Rig # 379, Land Rig

7. Position Keeping: N/A

8. Support Craft (Helicopter): N/A

9. Drilling Unit Performance: Good

10. Difficulties and Delays: Nothing major

11. Total Well Cost: $5,925,000

12. Horizontal Deviated Wells Require Bottom Hole Co-ordinates:
    Latitude: same as surface
    Longitude: same as surface

C. SUMMARY OF DRILLING OPERATIONS

1. Elevations:
   Ground: 537.2 m above sea level
   KB: 542.2 m above sea level
   KB to Casing Flange: 4.45 m

2. Total Depth:
   FTD: 2055 mKB
   PBTD: 2043.8 mKB
   TVD: 2055 mKB

3. Date and Hour Spudded: November 12, 1999 at 14:00 hours

4. Date Drilling Completed: January 8, 2000

5. Date of Rig Release: January 15, 2000

6. Well status: Cased and Suspended

7. Hole Sizes and Depths:

Conductor Hole:	609 mm to 12.2 m
Surface Hole:	311 mm to 190 mKB
Intermediate Hole:	222 mm to 1545 mKB
Main Hole:	156 mm to 2055 mKB

8. Casing and Cementing Record:
   Conductor Hole:

Casing Size:	406 mm
Casing Weight:	96 kg/m
Casing Grade:	?
Casing Make:	?
Number of Joints:	?
Thread:	?
Depth Set:	12.2 m
Cut Height:	At Surface
Date Set:	November 5, 1999
Cement Volume:	?
Cement Type:	?
Additives:	?

Surface Hole:

Casing Size:	244.5 mm
Casing Weight:	53.6 kg/m
Casing Grade:	J-55
Casing Make:	Ipsco
Number of Joints:	39
Thread:	LT&C
Depth Set:	505 m (KB)
Cut Height:	At Surface
Date Set:	November 21, 1999
Cement Volume:	30 Tonnes
Float Shoe Depth:	505 mKB
Float Collar Depth:	491.8 mKB
Cement Type:	Class 'G'
Additives:	1% $CaCl_2$
Cement Top:	Surface
Casing Bowl Size:	279 mm x 21 Mpa
Casing Bowl Make:	ABB Vetco

Intermediate Hole:

Casing Size:	177.8 mm
Casing Weight:	38.6 kg/m
Casing Grade:	J-55
Casing Make:	Ipsco
Number of Joints:	118
Thread:	LT&C
Depth Set:	1545 mKB
Cut Height:	At Surface
Date Set:	December 12, 1999
Cement Volume:	13.2 Tonnes
Cement Type:	1:1:2 Class 'G'
Additives:	0.5% T-10
Cement Volume:	11 Tonnes
Cement Type:	0:1:0 Class 'G'
Additives:	0.8% NFL-2 and 1% A-11
Float Shoe Depth:	1545 mKB
Float Collar Depth:	1532.7 mKB
Cement Top:	450m (calculated)
Casing Bowl Size:	229 mm X 21 Mpa
Casing Bowl Make:	ABB Vetco

Main Hole:

Casing Size:	114.3 mm
Casing Weight:	17.26 kg/m
Casing Grade:	J-55
Casing Make:	Ipsco
Number of Joints:	42
Thread:	LT&C
Depth Set:	2055 m KB
Cut Height:	N/A
Date Set:	January 14, 2000
Float Shoe Depth:	2055 mKB
Float Collar Depth:	2043.8 mKB
Cement Volume:	9 Tonnes
Cement Type:	Class 'G'
Additives:	0.4% D-24 & 0.4% R-6 & 0.5% T-10 & 1.0% Sepolite
Cement Top:	1504 mKB

9. Sidetracked Hole: N/A

10. Drilling Fluid:

Conductor Hole: Gel - Chemical
Properties: Not reported

Surface Hole: Gel - Chemical

Properties:		
	Viscosity:	50 - 55 sec/L
	Weight:	1130 kg/m^3
	PH:	9.0
	Water loss:	6.5 cc
	Solids:	
	Gels:	
	Filter Cake:	
	PV / YP:	

Intermediate: Invert

Properties:		
	Viscosity:	54 sec/L
	Weight:	1000 kg/m^3
	PH:	7.0
	Water loss:	5 cc
	Solids:	
	Gels:	
	Filter Cake:	
	PV / YP:	

Main:		Invert	
	Properties:	Viscosity:	64 sec/L
		Weight:	1035 kg/m^3
		PH:	7.0
		Water loss:	7 cc
		Solids:	
		Gels:	
		Filter Cake:	
		PV / YP:	

11. Fishing Operations: **N/A**

12. Well Kicks and Well Control Operations: N/A

13. Formation Leak Off Tests:

Depth:	505 m
Fluid Density:	1000 kg/m^3
Applied Pressure:	5600 kPa
Hydrostatic Pressure:	4954 kPa
Mud Weight Equivalent:	2130 kg/m^3
Casing setting depth:	505 mKB

The surface casing leak-off test was taken to a gradient of 20.9 kPa /m without breaking down the formation.

Depth:	1545 m
Fluid Density:	1005 kg/m^3
Applied Pressure:	8912 kPa
Hydrostatic Press.	15232 kPa
Mud Weight Equi.	1593 kg/m^3
Casing Setting Depth:	1545 mKB

The intermediate casing leak-off test was taken to a gradient of 15.6 kPa /m without breaking down the formation.

14. Time Distribution

Date	Hours	Activity
99/11/09	16.0	Move in / rig up
99/11/10	24.0	Move in / rig up
99/11/11	24.0	Move in / rig up
99/11/12	13.5	Move in / rig up

	0.25	Rig service
	0.25	Survey
	6.25	Drill
	0.25	Circulate
	2.0	Mix LCM
	1.0	Trip
	0.5	Safety meeting
99/11/13	0.5	Rig service
	1.25	Survey
	20.25	Drill
	0.25	Trip
	1.75	Clean screens
99/11/14	0.5	Rig service
	1.0	Survey
	18.75	Drill
	3.75	Trip
99/11/15	0.5	Rig service
	1.25	Survey
	22.25	Drill
99/11/16	0.5	Rig service
	1.5	Survey
	21.75	Drill
	0.25	Clean screens
99/11/17	0.75	Rig service
	1.75	Survey
	21.5	Drill
99/11/18	0.5	Rig service
	2.0	Survey
	15.5	Drill
	0.25	Safety meeting
	0.5	Circulate
	5.25	Trip
99/11/19	0.5	Rig service
	1.5	Survey
	19.5	Drill
	0.25	Circulate

	2.25	Work tight hole
99/11/20	0.25	Rig service
	0.75	Survey
	8.75	Drill
	1.0	Circulate
	6.75	Reaming
	6.0	Trip
	0.5	Rig repair
99/11/21	0.5	Rig service
	1.75	Circulate
	4.75	Nipple up BOP's
	0.5	Safety meeting
	1.0	Cement casin
	6.0	Wait on cement
	3.75	Run casing
	3.0	Trip
	2.75	Weld bowl
99/11/22	10.0	Pressure test BOP's
	3.0	Pick up BHA
	11.0	Nipple up BOP's
99/11/23	0.5	Rig service
	1.0	Survey
	9.5	Drill
	2.0	Leak off test
	3.0	Circulate
	0.75	Safety meeting
	5.25	Trip
	2.0	Drill out
99/11/24	0.75	Rig service
	3.0	Survey
	19.0	Drill
	0.25	Safety meeting
	1.0	Rig repair
99/11/25	0.75	Rig service
	0.75	Survey
	10.75	Drill

	1.25	Circulate
	6.0	Trip
	3.25	Ream
	1.25	Handle tools
99/11/26	0.75	Rig service
	2.75	Survey
	20.5	Drill
99/11/27	0.5	Rig service
	0.5	Survey
	7.25	Drill
	0.5	Circulate
	8.75	Trip
	5.0	Ream
99/11/28	0.75	Rig service
	0.75	Survey
	12.0	Drill
	0.25	Circulate
	0.25	Flow check
	8.25	Reaming
	1.75	Trip
99/11/29	0.5	Rig service
	0.75	Survey
	13.75	Drill
	0.75	Circulate
	0.75	Slip & cut drill line
	0.25	Safety meeting
	7.25	Trip
99/11/30	0.75	Rig service
	0.25	Survey
	19.0	Drill
	0.75	Circulate
	3.0	Trip
	0.25	Flow check
99/12/01	0.25	Rig service
	6.25	Trip
	13.75	Drill

	1.0	Circulate
	2.5	Handle tools
	0.25	BOP drill
99/12/02	1.0	Rig service
	0.25	Survey
	15.25	Drill
	0.5	Circulate
	0.25	Handle tools
	6.75	Trip
99/12/03	0.25	Rig service
	0.25	Survey
	16.5	Drill
	3.75	Trip
	3.25	Ream
99/12/04	0.75	Rig service
	0.25	Survey
	16.75	Drill
	5.25	Trip
99/12/05	0.5	Rig service
	0.5	Survey
	22.75	Drill
	0.25	BOP drill
99/12/06	0.25	Rig service
	0.5	Survey
	5.25	Drill
	3.0	Circulate
	4.25	Logging
	9.25	Trip
	1.5	Handle tools
99/12/07	9.5	DST
	3.5	Logging
	9.5	Trip
	7.5	Wait on orders
99/12/08	0.5	Rig service
	10.0	DST
	12.5	Trip

	0.75	Slip & cut drill line
	0.25	BOP drill
99/12/09	0.5	Rig service
	8.75	DST
	2.0	Circulate
	12.0	Trip
	0.25	Safety meeting
99/12/10	0.25	Rig service
	10.75	DST
	1.5	Fishing
	5.25	Wait on tools
	6.0	Trip
	0.25	Safety meeing
99/12/11	0.5	Rig service
	1.5	Circulate
	11.75	Trip
	10.25	Fishing
99/12/12	0.5	Rig service
	3.5	Circulate
	6.75	Run casing
	1.25	Fishing
	9.5	Trip
	0.25	Safety meeing
	0.75	Slip & cut drill line
99/12/13	0.25	Rig service
	3.75	Circulate
	9.5	Nipple up BOP's
	2.0	Cemet casing
	6.25	Wait on cement
99/12/14	0.25	Rig service
	7.0	Pressure test BOP's
	8.0	Nipple up BOP's
	1.75	Drill out
	6.25	Trip
	0.25	BOP drill
99/12/15	2.25	Handle tools

	0.25	Flow check
	4.0	Circulate
	1.75	Drill out
	11.0	Trip
	4.0	Thaw lines
	0.75	Leak off test
99/12/16	0.5	Rig service
	0.5	Survey
	10.25	Drill
	0.75	Circulate
	0.25	Flow check
	9.0	Trip
	1.75	Handle tools
	1.0	Safety meeting
99/12/17	0.5	Rig service
	10.75	Drill
	3.25	Circulate
	0.25	Flow check
	7.75	Trip
	1.5	Flow well
99/12/18	0.75	Rig service
	6.75	Drill
	4.75	Circulate
	0.75	Slip & cut drill line
	7.5	Trip
	0.75	Handle tools
	2.75	Pressure up with notrogen
99/12/19	0.5	Rig service
	3.0	Drill
	2.25	Circulate
	2.75	Pressure up with notrogen
	1.25	Flow well
	1.0	Handle tools
	13.25	Trip
99/12/20	4.5	Drill
	16.25	Circulate

	0.25	Rig service
	0.5	Survey
	0.75	Trip
	1.75	Flow well
99/12/21	0.75	Rig service
	4.25	Drill
	0.75	Circulate
	1.0	Nipple up BOP
	14.75	Trip
	2.5	Flow well
99/12/22	0.5	Rig service
	23.25	Drill
	0.25	Flow check
99/12/23	0.25	Rig service
	16.75	Drill
	0.5	Survey
	1.25	Circulate
	0.25	Rig repair
	1.75	DST
	3.25	Trip
99/12/24	0.5	Rig service
	2.5	Circulate
	9.75	DST
	10.5	Trip
	0.75	Slip & cut drill line
99/12/25	0.75	Rig service
	1.25	Survey
	22.0	Drill
99/12/26	0.25	Rig service
	1.25	Survey
	19.0	Drill
	0.75	Circulate
	2.75	Trip
99/12/27	0.5	Rig service
	15.25	Drill
	0.25	Circulate

	8.0	Trip
99/12/28	0.5	Rig service
	20.0	Drill
	0.75	Ream
	2.75	Trip
99/12/29	0.25	Rig service
	0.75	Survey
	17.5	Drill
	0.75	Circulate
	4.5	Trip
	0.25	BOP drill
99/12/30	0.5	Rig service
	0.75	Survey
	15.5	Drill
	1.25	Circulate
	6.0	Trip
99/12/31	0.75	Rig service
	11.75	Drill
	0.25	Circulate
	11.0	Trip
	0.25	Rig repair
00/01/01	0.75	Rig service
	0.75	Survey
	22.25	Drill
	0.25	Circulate
00/01/02	0.5	Rig service
	23.5	Drill
00/01/03	0.5	Rig service
	0.5	Survey
	13.25	Drill
	0.75	Circulate
	7.75	Trip
	1.0	Slip & cut drill line
	0.25	BOP drill
00/01/04	0.75	Rig service
	23.25	Drill

00/01/05	0.5	Rig service
	13.5	Drill
	1.25	Circulate
	8.25	Trip
	0.5	Survey
00/01/06	0.75	Rig service
	16.25	Drill
	1.25	Circulate
	5.5	Trip
	0.25	BOP drill
00/01/07	0.5	Rig service
	9.75	Drill
	1.0	Circulate
	9.25	Trip
	1.5	Fishing
	1.75	Ream
	0.25	BOP drill
00/01/08	0.75	Rig service
	0.75	Survey
	8.75	Drill
	1.0	Circulate
	8.0	Logging
	4.75	Trip
00/01/09	0.25	Rig serrvice
	23.75	Drill
00/01/10	0.5	Rig service
	0.25	Circulate
	5.5	Logging
	7.75	Trip
	8.5	DST
00/01/11	0.25	Rig service
	1.0	Circulate
	10.25	Trip
	12.5	DST
00/01/12	0.5	Rig service
	1.75	Circulate

	9.0	Trip
	1.0	DST
	11.75	Logging
00/01/13	0.5	Rig service
	2.75	Circulate
	8.25	Trip
	0.25	Cement casing
	6.5	Logging
	5.0	Run casing
	0.75	Rig up circulating head
	0.25	Safety meeting
00/01/14	12.0	Nipple up BOP
	0.75	Cement casing
	6.0	Trip
	4.5	Install wellhead
	0.75	Circulate
00/01/15		Rig released

Time Break Down by Activity:

Activity	Hours
Move in / rig up:	77.5
Drilling:	716.75
Surveying:	30.75
Mix LCM:	2.0
Circulating:	76.25
Running casing:	18.5
Cementing:	4.25
WOC:	12.25
Rig Service:	31.25
Rig Repair:	2.0
Tripping:	355.25
Reaming:	29.0
Wait on orders:	7.5
Safety meetings:	4.5
Clean screens:	2.0
Work tight hole:	2.25
Nipple up BOP's & flowlines:	49.0
Pressure test BOP's	17.0

Leak off tests:	2.75
Handle tools:	14.25
Flow checks:	3.0
Slip & cut drill line:	4.75
BOP drill:	2.0
Logging:	39.5
DST's:	72.5
Fishing:	14.75
Wait on tools:	5.25
Install welllhead:	4.5
Thaw linws:	4.0
Flow well:	5.5
Pressure up with notrogen:	5.5

15. Deviation Survey: See page 3 of the Geological Report and the Survey Listing in the Attachment Section.

16. Abandonment Plugs: N/A

17. Composite Well Record: See the copy of the atrip log in the Geological Report in the Attachment Section.

18. Completion Record: N/A

D: GEOLOGY

Geological Summary

Tops: See page 2 of the Geological Report in the Attachment Section.

Sample Descriptions: See page 94 of the Geological Report in the Attachment Section.

Total Depth: 2055 mKB

Coring Record: No coring done.

GAS DETECTION REPORT

A gas detector was utilized from the drill out of the conductor pipe to total depth. The gas detector readings are included on the composite geological log at the end of the geological Report in the Apendix Section.

Also included in the Attachment Section are Alpine's Flow Results recorded while drilling the main hole section in an underbalanced state.

DRILL STEM TESTS: See test reports the Attachment Section for details.

DST#1:	Fantasque	1365.0 - 1392.0 mKB
DST#2:	Belloy	1323.0 - 1325.0 mKB
DST#3:	Belloy	1332.0 - 1352.0 mKB
DST#4:	Belloy	1213.0 - 1227.0 mKB
DST#5:	Mattson	1734.5 - 1740.0 mKB
DST#6:	Mattson	1785.0 - 1789.0 mKB

WELL EVALUATION

The following logs were run:

High Definition Induction Log:	505 - 1543 mKB
Compensated Z-Denilog / Compensated Neutron Log:	505 - 1543 mKB
Multipole Array Acoustilog:	505 - 1532 mKB
Cement Volume Log:	505 - 1524 mKB

High Definition Induction Log:	1555 - 2044 mKB
Compensated Z-Denilog / Compensated Neutron Log:	1555 - 2044 mKB
Multipole Array Acoustilog:	1555 - 2034 mKB

Formation Multitester	1636 - 1992 mKB
Cement Volume Log:	1555 - 2054 mKB

GAS, OIL, & WATER ANALYSES: N/A

FORMATION STIMULATION: N/A

FORMATION AND TEST RESULTS: N/A

DETAILED TEST PRESSURE DATA READINGS: N/A

E. ENVIRONMENTAL CONSIDERATIONS

There are no known outstanding environmental considerations on this well. The gel-chem mud system used on the surface hole was hauled and treated at a remote sump. The invert mud system used for the intermediate hole was re-used at another location. The main hole was drilled underbalanced with noitrogen as a carrying medium.

GEOLOGICAL REPORT

ON

PARAMOUNT ET AL LIARD NWT I-46
I-46/60-10, 123-15

FOR

PARAMOUNT RESOURCES LTD.

TABLE OF CONTENTS

November, 1999-January, 2000

Gary Johannson, M. Sc.,
Wellsite Geologist

DECOLLEMENT CONSULTING LTD.

WELL DATA SUMMARY

WELL NAME	Paramount et al Liard NWT I-46
UNIQUE WELL I.D.	300I466010123150
SURFACE LOCATION	I-46/60-10, 123-15
FIELD/REGION	Fort Liard, NWT
OPERATOR	Paramount Resources Ltd.
SITE DATA	
SURFACE COORDINATES	Lat: 60 deg. 05' 32.474" N Long: 123 deg. 22' 53.612" W
BOTTOM HOLE COORDINATES	
SEISMIC LOCATION	N/A
WELL CLASSIFICATION	Exploratory WELL LICENSE # WID 1871
AFE NUMBER	99N910008
DRILLING CONTRACTOR	Precision Drilling Rig #379
ELEVATIONS	
GROUND LEVEL	537.20 (m)
KELLY BUSHING	542.20 (m)
DRILLING DATES	
SPUD DATE	November 12, 1999 **TIME** 14:00 Hrs
F.T.D. DATE	January 8, 2000 **TIME** 09:00 Hrs
RIG RELEASE DATE	January 15, 2000
)LE SIZE & MUD TYPE	
SURFACE	311mm, Gel Chem.
INTERMEDIATE	222 mm, Carbo-TEQ L oil mud.
MAIN	156mm, Nitrified Air to 1685m, Invert mud 1685m to TD.
CASING DATA	
SURFACE	39 joints of 244.5mm, 53.6kg/m, J55-8Rd-LT&C set @ 505.4m KB
INTERMEDIATE	118 joints of 177.8mm, 38.6kg/m, J-55 LT&Cset @ 1545.0m KB.
PRODUCTION	n/a
GEOLOGICAL DATA	
SAMPLE & GAS DETECTION	Surface to T.D.
INTERVAL	
CORES	None
LOGGING SUITE	Intermediate hole: HDIL-MAC-CN-ZDL-GR-XYCAL
	Main hole: 1) HDIL-MAC-GR-XYCAL;
	2) ZDL-CN-GR-CAL; 3) FMT (2 Runs);
	4) FMT (3 Runs)
DRILL STEM TESTS	DST #1: 1365-1392m; DST #2: 1323-1343m; DST #3: 1332-1352m;
	DST #4: 1213-1227m; DST #5: 1734.5-1740m; DST #6: 1785-1789m
	DST #7: 1899-1903m
WELL STATUS	**Cased Gas Well**

FORMATION TOPS

Paramount et al Liard NWT I-46

G.L.(m): 537.20 **K.B.(m):** 542.20

	SAMPLE		*High*	*PROGNOSIS*			*LOGS*		*Isopach*
FORMATION	***MD(m)***	***SS(m)***	***Low (-)***	***MD(m)***	***SS(m)***	***Isopach***	***MD(m)***	***SS(m)***	***(m)***
Dunvegan	n/a	542.2			542.2	178.7	n/a	542.2	162.5
Sully	162.5	379.7	15.2	178.7	363.5	55.0	n/a	n/a	40.1
Sikanni	202.6	339.6	31.1	233.7	308.5	155.0	n/a	n/a	152.4
Lepine	355.0	187.2	33.7	388.7	153.5	520.0	n/a	n/a	526.0
Scatter	881.0	-338.8	27.7	908.7	-366.5	125.0	880.3	-338.1	140.3
Garbutt	1022.0	-479.8	11.7	1033.7	-491.5	130.0	1020.6	-478.4	130.4
Garbutt Radioactive Zone	1154.0	-611.8	9.7	1163.7	-621.5	58.0	1151.0	-608.8	57.0
Chinkeh Siltstone	1212.0	-669.8	9.7	1221.7	-679.5	3.0	1208.0	-665.8	3.3
Chinkeh Sand**	**1215.5**	**-673.3**	**9.4**	**1224.7**	**-682.5**	**13.5**	**1211.3**	**-669.1**	**11.3**
Triassic	1228.2	-686.0	10.0	1238.2	-696.0	100.0	1222.6	-680.4	103.5
Belloy	1325.9	-783.7	12.3	1338.2	-796.0	120.0	1326.1	-783.9	47.2
Fantasque**	**1374.8**	**-832.6**	**83.4**	**1458.2**	**-916.0**	**54.0**	**1373.3**	**-831.1**	**88.0**
Kindle	1464.0	-921.8	n/a	not given	not given	n/a	1461.3	-919.1	37.4
Mattson*	**1497.4**	**-955.2**	**14.8**	**1512.2**	**-970.0**	**653.5**	**1498.8**	**-956.6**	**555.6**
in Mattson M9 Zone	2055.0	-1512.8	n/a	2317.0	-1774.8	n/a	2054.4	-1512.2	n/a

Primary Target Zone *
Secondary Target Zone **

DEVIATION SURVEYS

Paramount et al Liard NWT I-46

Surface Hole

Depth	*Inclination*
29.0	.50°
58.0	misrun
67.0	.13°
96.0	.50°
121.0	.88°
140.0	1.25°
159.0	.25°
178.0	1.25°
190.0	1.50°
218.0	.75°
248.0	1.00°
276.0	1.13°
294.0	1.00°
313.0	.75°
343.0	1.50°
360.0	1.50°
390.0	1.75°
418.0	1.25°
436.0	1.75°
464.0	1.50°
505.0	1.75°

Main Hole

Depth	*Inclination*	*Azimuth*
1586.0	2.50°	23.0°
1650.0	2.00°	23.0°
1760.0	8.00°	14.0°
1765.0	8.00°	14.0°
1798.0	10.00°	10.0°
1838.0	11.00°	1.0°
1866.0	10.25°	1.0°
1914.0	12.00°	1.0°
1957.0	13.50°	Totco
1996.0	15.25°	8.0°
2051.0	13.00°	?

Note: See attached directional surveys for intermediate hole.

December 6, 1999
10:37 am

Onscreen for Windows
Survey Calculation Program
29364

C .omer: Paramount Resources Ltd.
WellName: Para Et Al Ft. Liard I-46
Location: 60-10-123-15

Vertical Section Calculated on: 0.0000
Survey Calculation Method: Minimum Curvature
FileName: C:\ONSWIN31\29364.SR3

#	Depth Meters	Inc Degree	Azimuth Degree	TVD Meters	North Meters	East Meters	Section Meters	Dogleg /30m	BldRate /30m	TrnRate /30m	Subsea Meters
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	542.20
1	505.00	0.00	0.00	505.00	0.00	0.00	0.00	0.00	0.00	0.00	37.20
2	522.10	1.60	45.60	522.10	0.17	0.17	0.17	2.81	2.81	0.00	20.10
3	541.00	1.50	50.30	540.99	0.51	0.55	0.51	0.26	-0.16	7.46	1.21
4	559.40	1.60	50.90	559.38	0.83	0.93	0.83	0.17	0.16	0.98	-17.18
5	578.20	0.50	37.80	578.18	1.06	1.19	1.06	1.79	-1.76	-20.90	-35.98
6	596.80	0.40	214.20	596.78	1.07	1.20	1.07	1.45	-0.16	284.52	-54.58
7	616.20	0.20	222.40	616.18	0.99	1.14	0.99	0.32	-0.31	12.68	-73.98
8	634.80	0.10	146.70	634.78	0.95	1.13	0.95	0.32	-0.16	-122.10	-92.58
9	654.20	0.10	57.70	654.18	0.94	1.15	0.94	0.22	0.00	-137.63	-111.98
10	673.10	0.20	85.40	673.08	0.95	1.20	0.95	0.19	0.16	43.97	-130.88
	691.60	0.20	39.50	691.58	0.98	1.25	0.98	0.25	0.00	-74.43	-149.38
	711.70	0.40	49.90	711.68	1.05	1.33	1.05	0.31	0.30	15.52	-169.48
13	730.90	0.30	43.20	730.88	1.13	1.41	1.13	0.17	-0.16	-10.47	-188.68
14	750.20	0.30	43.00	750.18	1.21	1.48	1.21	0.00	0.00	-0.31	-207.98
15	769.80	0.30	24.00	769.78	1.29	1.54	1.29	0.15	0.00	-29.08	-227.58
16	789.20	0.50	39.40	789.18	1.40	1.61	1.40	0.35	0.31	23.81	-246.98
17	807.80	0.50	24.20	807.78	1.54	1.70	1.54	0.21	0.00	-24.52	-265.58
18	827.00	0.60	38.60	826.98	1.70	1.79	1.70	0.27	0.16	22.50	-284.78
19	846.20	0.50	48.00	846.18	1.83	1.92	1.83	0.21	-0.16	14.69	-303.98
20	875.40	0.60	30.70	875.37	2.05	2.09	2.05	0.20	0.10	-17.77	-333.17
21	894.40	0.50	20.20	894.37	2.21	2.17	2.21	0.22	-0.16	-16.58	-352.17
22	912.70	0.60	46.20	912.67	2.35	2.27	2.35	0.44	0.16	42.62	-370.47
23	931.30	0.60	22.80	931.27	2.51	2.38	2.51	0.39	0.00	-37.74	-389.07
24	950.20	0.40	41.40	950.17	2.65	2.46	2.65	0.40	-0.32	29.52	-407.97
25	968.40	0.50	52.60	968.37	2.75	2.56	2.75	0.22	0.16	18.46	-426.17
26	987.80	0.50	26.50	987.77	2.87	2.67	2.87	0.35	0.00	-40.36	-445.57
27	1007.10	0.60	43.30	1007.07	3.02	2.77	3.02	0.29	0.16	26.11	-464.87
28	1025.50	0.60	51.70	1025.47	3.15	2.92	3.15	0.14	0.00	13.70	-483.27
29	1045.40	0.00	37.40	1045.37	3.22	3.00	3.22	0.90	-0.90	0.00	-503.17
30	1064.30	0.20	33.50	1064.27	3.24	3.02	3.24	0.32	0.32	0.00	-522.07
31	1082.80	0.30	76.40	1082.77	3.28	3.08	3.28	0.33	0.16	69.57	-540.57
32	1101.20	0.40	60.60	1101.17	3.32	3.18	3.32	0.23	0.16	-25.76	-558.97
33	1120.20	0.40	25.40	1120.17	3.42	3.27	3.42	0.38	0.00	-55.58	-577.97

December 6, 1999
10:37 am

Onscreen for Windows
Survey Calculation Program
29364

Customer: Paramount Resources Ltd.
WellName: Para Et Al Ft. Liard I-46
Location: 60-10-123-15

Vertical Section Calculated on: 0.0000
Survey Calculation Method: Minimum Curvature
FileName: C:\ONSWIN31\29364.SR3

#	Depth Meters	Inc Degree	Azimuth Degree	TVD Meters	North Meters	East Meters	Section Meters	Dogleg /30m	BldRate /30m	TrnRate /30m	Subsea Meters
34	1148.10	0.40	22.70	1148.07	3.59	3.35	3.59	0.02	0.00	-2.90	-605.87
35	1167.00	0.50	54.20	1166.97	3.70	3.44	3.70	0.42	0.16	50.00	-624.77
36	1186.20	0.40	35.00	1186.16	3.81	3.55	3.81	0.28	-0.16	-30.00	-643.96
37	1204.10	0.50	34.30	1204.06	3.92	3.63	3.92	0.17	0.17	-1.17	-661.86
38	1223.10	0.60	32.60	1223.06	4.08	3.73	4.08	0.16	0.16	-2.68	-680.86
39	1252.20	0.50	41.00	1252.16	4.30	3.89	4.30	0.13	-0.10	8.66	-709.96
40	1281.60	0.80	39.70	1281.56	4.55	4.11	4.55	0.31	0.31	-1.33	-739.36
41	1298.80	1.30	41.80	1298.76	4.79	4.32	4.79	0.87	0.87	3.66	-756.56
42	1318.10	1.50	47.10	1318.05	5.13	4.65	5.13	0.37	0.31	8.24	-775.85
43	1337.40	2.40	45.90	1337.34	5.58	5.12	5.58	1.40	1.40	-1.87	-795.14
44	1356.80	2.90	56.50	1356.72	6.13	5.82	6.13	1.08	0.77	16.39	-814.52
45	1377.80	3.40	55.30	1377.69	6.78	6.78	6.78	0.72	0.71	-1.71	-835.49
[illegible]	1396.70	3.50	55.30	1396.55	7.43	7.71	7.43	0.16	0.16	0.00	-854.35
47	1416.00	2.90	52.70	1415.82	8.06	8.59	8.06	0.96	-0.93	-4.04	-873.62
48	1431.80	2.70	49.40	1431.60	8.54	9.19	8.54	0.49	-0.38	-6.27	-889.40
49	1451.40	3.10	48.50	1451.18	9.20	9.93	9.20	0.62	0.61	-1.38	-908.98
50	1472.60	2.90	47.60	1472.35	9.94	10.76	9.94	0.29	-0.28	-1.27	-930.15
51	1491.70	2.50	47.30	1491.43	10.55	11.42	10.55	0.63	-0.63	-0.47	-949.23
52	1511.10	2.60	46.40	1510.81	11.14	12.05	11.14	0.17	0.15	-1.39	-968.61
53	1530.60	2.80	46.30	1530.29	11.77	12.72	11.77	0.31	0.31	-0.15	-988.09
Ext	1545.00	2.80	46.30	1544.67	12.26	13.22	12.26	0.00	0.00	0.00	-1002.47

Closure is 18.0309 Meters on an azimuth of 47.1745

WELLSITE BIT RECORD

Paramount et al Liard NWT I-46

SPUD DATE: November 12, 1999
T.D. DATE: January 8, 2000

SURFACE CASING: 39 joints of 244.5mm, 53.6kg/m, J55-8Rd-LT&C set @ 505.4m KB

BIT #	*1A*	*2A*	*3A*	*1Arr*	*2*	*3*	*4*
SIZE (mm)	311	222	311	222	222	222	222
MAKE	Smith	Hughes	Hughes	Hughes	Smith	Smith	Hughes
TYPE	SDS	GT-1	GT-S1	GT-1	F15HP	F27I	GT-S30
SERIAL #	LR4795	H45ZM	G27ZH	H45ZM	LR5726	LR6603	H76ZJ
JETS	2x15.9/1x17.5	3x15.9	2x15.9	open	3x19.1	3x12.7	
DEPTH IN	0.00	190.00	190.00	506.00	849.00	1273.00	1360.00
DEPTH OUT	190.00	506.00	506.00	849.00	1273.00	1360.00	1393.00
METRES	190.00	316.00	316.00	344.00	424.00	87.00	33.00
HOURS	43.75	72.50	29.00	29.50	37.50	25.75	19.00
C. HRS.	43.75	116.25	145.25	174.75	212.25	238.00	257.00
P (m/hr)	4.34	4.36	10.90	11.66	11.31	3.39	1.73
FOB	3-6000	2-5000	3-5000	6-10000	6-9000	8-12000	10-14000
RPM	150-180	160-185	160-180	45-170	45-170	50-70	70-80
PP	2800-6400	2400-3000	2400-2800	5200-7400	7400-8500	5400-5700	7000
DEN	1010-1090	1090-1185	1105-1185	955-965	955-970	960-990	995-1010
VISCOSITY	54-68	49-55	49-52	52-60	51-58	51-56	55-57
MAX DEV.°	1.500°	1.750°	1.750°	1.600°	0.600°	2.900°	3.400°
Condition:	*T/B/G*	*T/B/G*	*T/B/G*	*T/B/G*	*T/B/G*	*T/B/G*	*T/B/G*
Condition:	*IR/OR/D/L*	*IR/OR/D/L*	*IR/OR/D/L*	*IR/OR/D/L*	*IR/OR/D/L*	*IR/OR/D/L*	*IR/OR/D/L*
	2-2-WT-A	3-3-WT-A	2-2-WT-A	4-7-WT-A	2-4-WT-A	3-4-FC-A	3-3-WT-A
	B/G/O/RP	*B/G/O/RP*	*B/G/O/RP*	*B/G/O/RP*	*B/G/O/RP*	*B/G/O/RP*	*B/G/O/RP*
	2-IN-Dev	2-IN-CP	2-IN-CP	7-IN-TQ	7-IN-PR	6-IN-PR	3-IN-BHA
REMARKS	Surface hole	Surface pilot hole	Ream pilot hole	Intermediate hole	Intermediate hole	Intermediate hole	Intermediate hole

WELLSITE BIT RECORD #2

Paramount et al Liard NWT I-46

SPUD DATE: November 12, 1999
T.D. DATE: January 8, 2000

SURFACE CASING: 39 joints of 244.5mm, 53.6kg/m, J55-8Rd-LT&C set @ 505.4m KB

BIT #	*5*	*6*	*7*	*1*	*2*	*3*	*4*
SIZE (mm)	222mm	222mm	222mm	156mm	156mm	156mm	156mm
MAKE	Hughes	Hughes	Smith	Hughes	Drillmaster	Drillmaster	Drillmaster
TYPE	GTS-30	ATJS44G	F4	ATJ-4	Hammer-bit	Hammer-bit	Hammer-bit
SERIAL #	H75ZJ	H73ZJ	LT8998	E15ZD	9A349	9A350	9A354
JETS	3x15.9	3x17.5	3x17.5	Open	Open	Open	Open
DEPTH IN	1393.00	1437.00	1466.00	1545.00	1547.00	1597.00	1638.00
DEPTH OUT	1437.00	1466.00	1545.00	1547.00	1597.00	1638.00	1670.00
METRES	44.00	29.00	79.00	2.00	50.00	41.00	32.00
HOURS	29.00	16.50	44.75	3.00	9.75	11.25	7.75
C. HRS.	286.00	302.50	347.25	350.25	360.00	371.25	379.00
P (m/hr)	1.52	1.76	1.77	0.67	5.13	1.78	4.13
FOB	12-13000	8-12000	12-15000	-	6000	6000	3000
RPM	40-70	40-70	40-70	-	35	35	35
PP	8500-9600	8400-8900	8300-9000	-	Air: 100CFM	Air: 100CFM	Air: 100CFM
DEN	1010-1030	1010-1025	1030-1040	-	-	-	-
VISCOSITY	49-56	49-52	47-52	-	-	-	-
MAX DEV.°	3.500°	3.100°	2.900°	n/a	2.500°	2.000°	2.000°
Condition:	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***
Condition:	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***
	3-8-UG-A	2-6-WT-G	4-4-WT-A		2-8-FC-A	2-8-FC-A	2-2-NO-A
	B/G/O/RP	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***
	7-UG-PR	7-RG-PR	3-IN-CP		2-IN-PR	2-IN-PR	2-IN-PP
REMARKS	Intermediate hole	Intermediate hole	Intermediate hole	Air drill Main Hole	Air drill	Air drill	Air drill

WELLSITE BIT RECORD #3

Paramount et al Liard NWT I-46

SPUD DATE: November 12, 1999
T.D. DATE: January 8, 2000

SURFACE CASING: 39 joints of 244.5mm, 53.6kg/m, J55-8Rd-LT&C set @ 505.4m KB

BIT #	*5*	*6*	*7*	*8*	*9*	*10*	*11*
SIZE (mm)	156mm	156mm	156mm	156mm	156mm	156mm	156mm
MAKE	Drillmaster	Hughes	Reed	RBI	Hughes	Security	Smith
TYPE	Hammer-bit	STR-44CD	EHP62A	CH7DLRGSP	STR-44CD	HZM89F	XR50Y
SERIAL #	9A351	M06YL	KC5423	BW197B	U39YX	707637	LX4423
JETS	Open	Open	12.7/14.2/15.8	15.9/2x10.3	3x14.3	2x11.9/15.9	3x11.9
DEPTH IN	1670.00	1672.00	1687.00	1740.00	1802.00	1814.00	1851.00
DEPTH OUT	1672.00	1687.00	1740.00	1802.00	1814.00	1851.00	1874.00
METRES	2.00	15.00	53.00	62.00	12.00	37.00	23.00
HOURS	1.75	7.75	41.00	41.00	15.25	37.50	15.50
C. HRS.	380.75	388.50	429.50	470.50	485.75	523.25	538.75
P (m/hr)	1.14	1.94	1.29	1.51	0.79	0.99	1.48
FOB	2000	8000	14000	12000	12500	12500	12500
RPM	20-40	50-60	50-60	60-65	60-65	50-65	60-65
PP	Air: 100CFM	5000	4200	4200	4200	4600	5200
DEN	-	1020	1040	1035	1040	1035	1035
VISCOSITY	-	52	52	55	56	58	58
MAX DEV.°	n/a	6.000°	8.000°	10.000°	10.000°	11.000°	10.250°
Condition:	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***
Condition:	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***
	2-2-NO-A	2-2-WT-A	4-5-WT-A	4-4-WT-A	8-3-RG-A	5-4-WT-A	6-7-RG-A
	B/G/O/RP	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***
	2-IN-PR	3-IN-PR	4-IN-PR	4-IN-HR	8-UG-PR	4-IN-PR	7-UG-PR
REMARKS	Air drill	Air drill	Invert mud	Invert mud	Invert mud	Invert mud	Invert mud

WELLSITE BIT RECORD #4

Paramount et al Liard NWT I-46

SPUD DATE: November 12, 1999
T.D. DATE: January 8, 2000

SURFACE CASING: 39 joints of 244.5mm, 53.6kg/m, J55-8Rd-LT&C set @ 505.4m KB

BIT #	*12*	*13*	*14*	*15*	*16*		
SIZE (mm)	156	156	156	156	156		
MAKE	Smith	RBI	RBI	Hughes	Smith		
TYPE	F570DD	C45LRGSP	C45LRGSP	STR50D	F7PS		
SERIAL #	LT7426	BP458B	BR868B	J34ZG	LT5656		
JETS	3x11.9	3x11.9	3x11.1	3x10.3	3x11.9		
DEPTH IN	1874.00	1888.00	1960.00	2006.00	2030.00		
DEPTH OUT	1888.00	1960.00	2006.00	2030.00	2055.00		
METRES	14.00	72.00	46.00	24.00	25.00		
HOURS	11.75	54.50	33.50	24.00	18.75		
C. HRS.	547.25	601.75	635.25	659.25	678.00		
P (m/hr)	1.19	1.32	1.37	1.00	1.33		
WOB	12500	14000	14000	14000	14500		
RPM	60-65	60-65	60-65	55-65	60-65		
PP	5200	5400	5500	5500	5500		
DEN	1035	1045	1035	1040	1035		
VISCOSITY	58	58	62	62	64		
MAX DEV.°	12.000°	13.000°	15.250°	15.000°	10.250°		
Condition:	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***	***T/B/G***
Condition:	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***	***IR/OR/D/L***
	5-5-WT-A	6-6-WT-A	8-6-WT-A	8-8-BT-A	3-3-WT-A		
	B/G/O/RP	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***	***B/G/O/RP***
	4-IN-PR	6-IN-PR	6-IN-PR	8-IN-PR	4-IN-TD		
REMARKS	Invert mud	Invert mud	Invert mud	Invert mud	Invert mud		

BAKER HUGHES

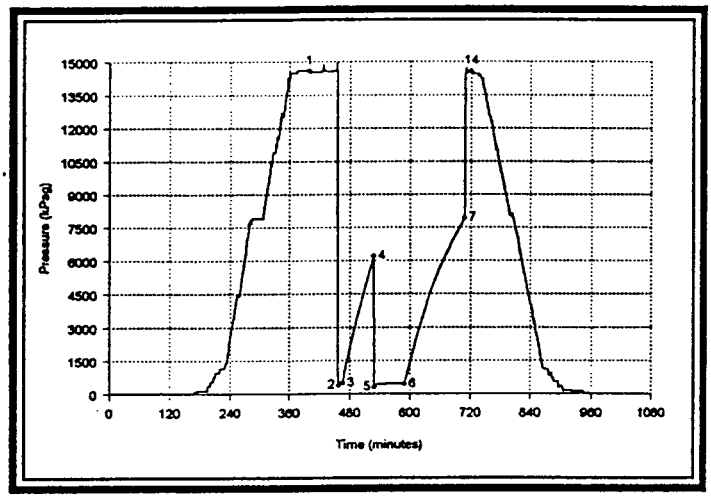
PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1

Baker Oil Tools

Formation: Fantasque
Interval - from: 1,365.00 **to:** 1,392.00 meters

Test Date: 1999-12-07
Test Type : Inflate Straddle

Recorder# K3 at 1,367.00 meters



Btm Hole Temperature @ FSI: 51.5 C

		Pressure (kPag)	*Time (min)*	*Extrapolated Pressure (kPag)*
1	Initial Hydrostatic	14575		
2	Start of 1st Flow	385		
3	End of 1st Flow	464	8.0	
4	End of 1st Shut-in	6196	61.5	
5	Start of 2nd Flow	280		
6	End of 2nd Flow	431	59.5	
7	End of 2nd Shut-in	7914	119.0	
14	Final Hydrostatic	14566		

Liquid Recovery 40.00 meters

Recovery	*Description*
40.00 m	SLIGHTLY GASIFIED INVERT

Blow Description:

PREFLOW: Weak air blow increasing to strong in 15 seconds then steady throughout. No gas to surface.

FINAL FLOW: Strong air blow in 30 secs. Gas to surface in 2 mins - too small to measure - decreasing throughout.

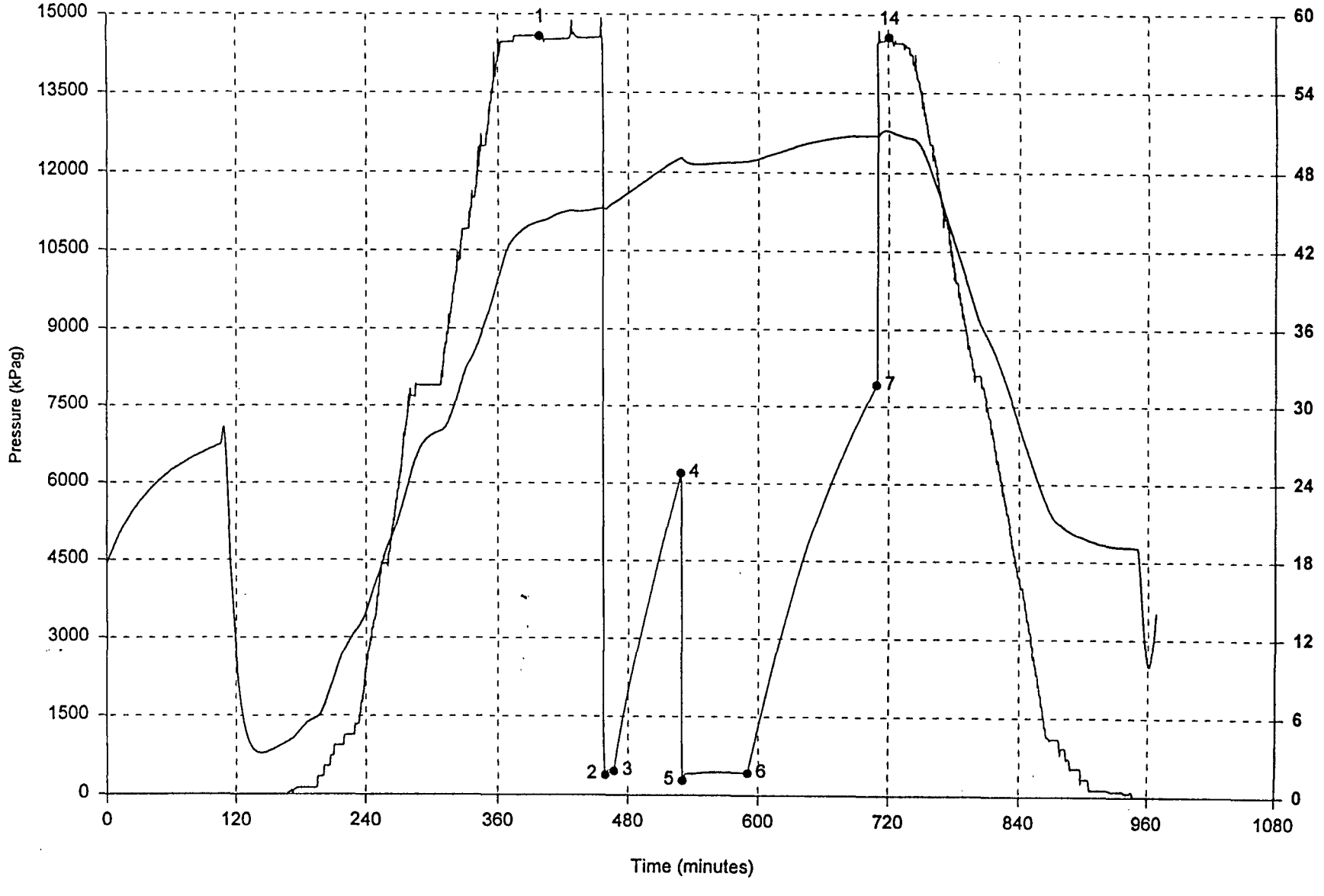
Remarks:

Mechanically successful test. Results suggest very low permeability within the interval tested. The shut-ins were not extrapolated due to insufficient curve development.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 1
Recorder: K3

Pressure (kPag) at Critical Points:

1:	14575	4:	6196	7:	7914
2:	385	5:	280	14:	14566
3:	464	6:	431		

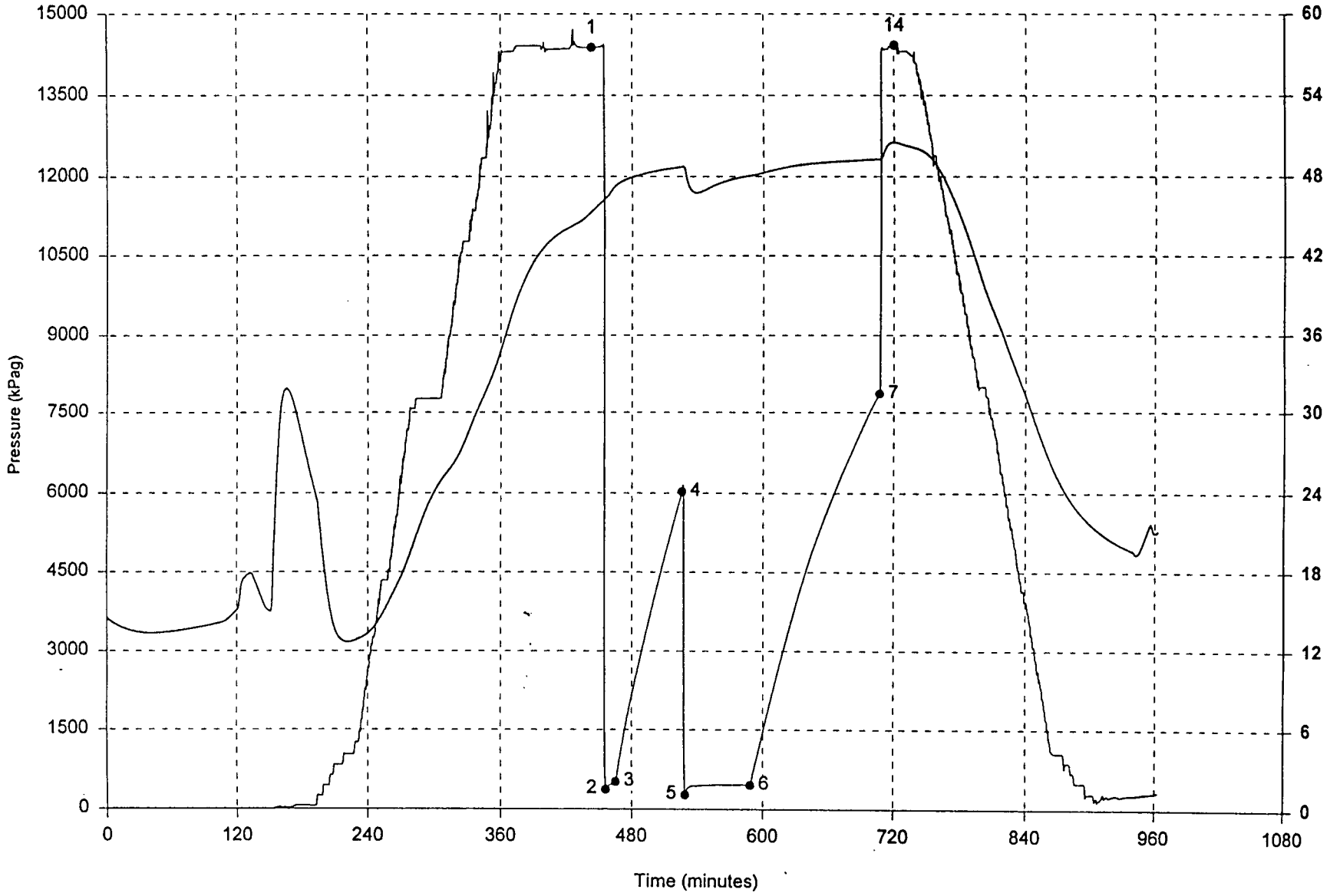


PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 1
Recorder: N37

Pressure (kPag) at Critical Points

1:	14383	4:	6026	7:	7870
2:	373	5:	274	14:	14423
3:	521	6:	459		

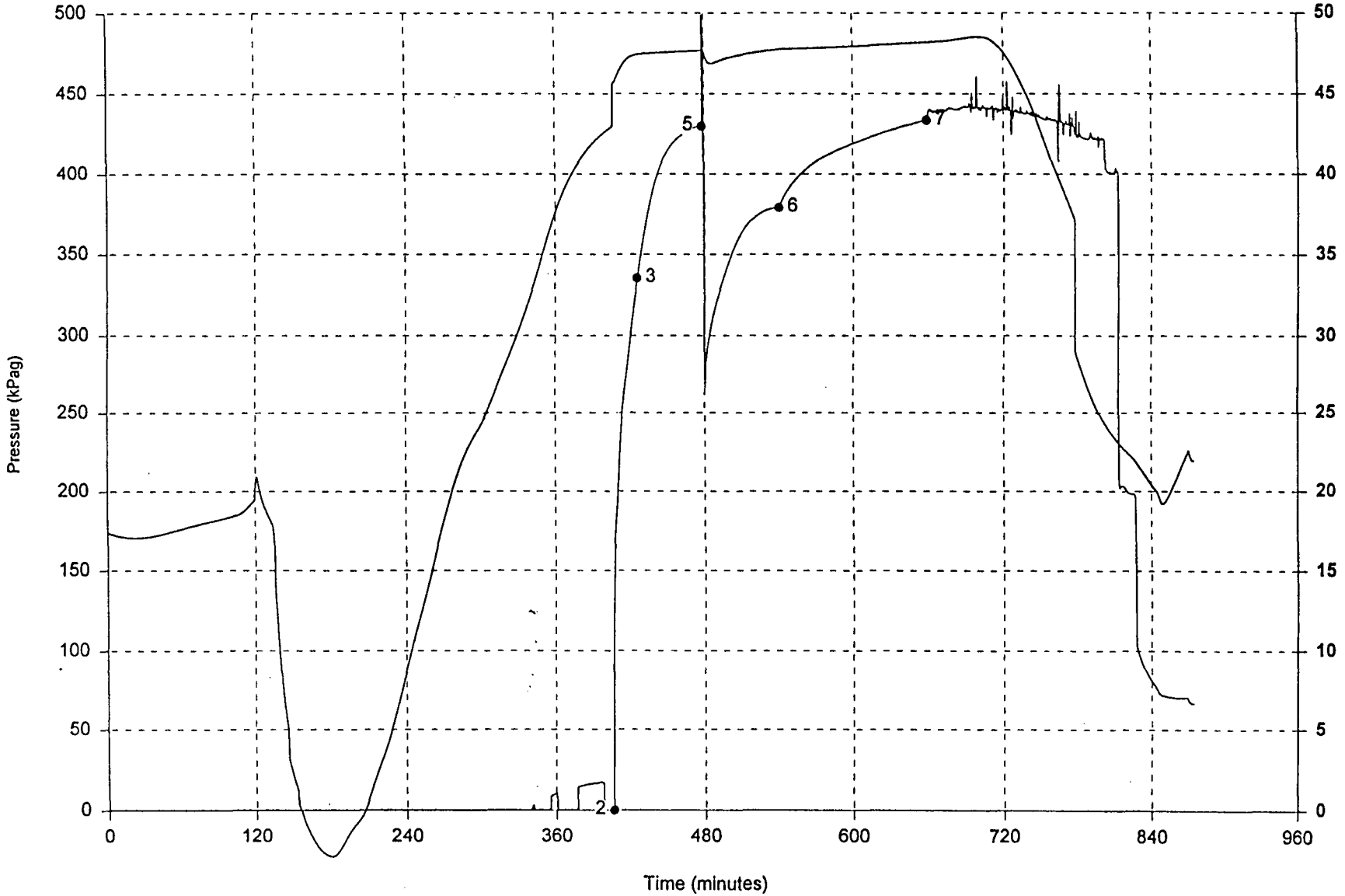
Above interval



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 1
Recorder: N63

Pressure (kPag) at Critical Points.
2: 0 6: 379
3: 335 7: 434
5: 430

Recovery recorder



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1

General Information:

Operator:	Paramount Resources Ltd. 4000, 350 - 7th Avenue S.W. Calgary Alberta T2P 3W5
Licence#:	1861
Tester:	Pugh P
Ticket#:	809302
Reverse Circulated?	N
KB Elevation:	542.20 meters
Ground Elevat'n:	537.20 meters
Total Depth:	1,545.00 meters

Mud Data:

Weight:	1060 kg/m3
Type:	Invert
Viscosity:	51 s/l
Water Loss:	0.0 cc/s
Filter Cake:	0.0 mm

Hole Data:

Drilled Hole Size:	222 mm
Calipered Hole Size:	222 mm
Hole Condition at Test Time:	Good
Conditioned prior to this test?	N

Recorder Summary:

corder#	Type	Position	Capacity	Units	Depth	Comments
3	ZI	Fluid Recovery	41400	kPag	1,352.00	Recovery recorder
N37	ZI	Inside	41400	kPag	1,356.00	Above interval
9487	K-3	Outside	20700	kPag	1,367.00	Loaded Incorrectly
K3	ZI	Outside	82700	kPag	1,367.00	

Distributions:

Reports Sent To: Wayne Tomm

Fluid Samples - no of: 4 Sent To: AGAT

Gas Bomb#	Sent To
11409/4004	AGAT

Bottom Hole Sampler#	Sent To
001	AGAT

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1

Tool Sequence:

Diagram	*Description*	*Length*
	Pump Out Sub	0.33 m
	Double Pin Sub	0.31 m
	Pump Out Sub	0.33 m
	Recorder Carrier	1.38 m
	Hydraulic Tool	1.50 m
	Bottom Hole Sampler	1.03 m
	Recorder Carrier	1.38 m
	Hydraulic Jars	2.22 m
	Safety Joint	0.65 m
	Inflate Pump	2.38 m
	Screen	1.16 m
	Packer Assembly	1.78 m
	Packer Stick Down	0.83 m
	Port Sub	0.42 m
	Recorder Carrier	2.02 m
	Spacing	4.00 m
	Cross Over Sub	0.30 m
	Drill Collar	18.66 m
	Cross Over Sub	0.30 m
	Packer Stick Up	0.43 m
	Packer Assembly	1.90 m
	Perforations	0.31 m
	Belly Spring	2.00 m

Tool String Length:		45.62 m
Drill Collar I.D.:	65 mm	93.25 m
Drill Pipe O.D.:	102 mm	1,264.45 m
Collar Pipe Total:		1,357.70 m
Stick Up:		7.15 m
Tool Above:		14.45 m
Interval Tested:		27.00 m
Bottom Hole Choke Size:		25.40 mm

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1
Recorder# N63

Build-up and Flow Curve Increments

Flow# 1

Chart Label	Time (min)	Pressure (kPag)
2	0.0	385
	1.0	428
	2.0	475
	3.0	492
	4.0	490
	5.0	487
	6.0	481
	7.0	476
3	8.0	464

Shut-in# 1

Chart Label	Time (min)	Delta P (kPag)	Pressure (kPag)	Abscissa (T+dT)/dT	Used for Extrap
	0.0		464		
	2.0	282	746	5.0000	
	4.0	532	995	3.0000	
	6.0	763	1226	2.3333	
	8.0	990	1454	2.0000	
	10.0	1204	1668	1.8000	
	12.0	1413	1877	1.6667	
	14.0	1612	2076	1.5714	
	16.0	1807	2271	1.5000	
	18.0	2000	2463	1.4444	
	20.0	2188	2651	1.4000	
	22.0	2375	2838	1.3636	
	24.0	2559	3022	1.3333	
	26.0	2742	3205	1.3077	
	28.0	2919	3383	1.2857	
	30.0	3093	3557	1.2667	
	32.0	3266	3730	1.2500	
	34.0	3437	3900	1.2353	
	36.0	3617	4081	1.2222	
	38.0	3785	4249	1.2105	
	40.0	3962	4425	1.2000	
	42.0	4127	4590	1.1905	
	44.0	4292	4755	1.1818	
	46.0	4454	4917	1.1739	
	48.0	4621	5085	1.1667	
	50.0	4781	5245	1.1600	
	52.0	4939	5403	1.1538	
	54.0	5100	5563	1.1481	
	56.0	5254	5717	1.1429	
	58.0	5412	5875	1.1379	
	60.0	5572	6035	1.1333	
4	61.5	5732	6196	1.1301	

Flow# 2

Chart Label	Time (min)	Pressure (kPag)
5	0.0	280
	1.5	397
	3.0	412
	4.5	412
	6.0	411

Shut-in# 2

Chart Label	Time (min)	Delta P (kPag)	Pressure (kPag)	Abscissa (T+dT)/dT	Used for Extrap
	0.0		431		
	2.5	247	677	28.0000	
	5.0	468	899	14.5000	
	7.5	687	1117	10.0000	
	10.0	903	1334	7.7500	
	12.5	1118	1549	6.4000	

Note: Increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1
Recorder# K3

Build-up and Flow Curve Increments

Flow# 2

Chart Label	Time (min)	Pressure (kPag)
	7.5	411
	9.0	410
	10.5	413
	12.0	415
	13.5	419
	15.0	425
	16.5	426
	18.0	429
	19.5	433
	21.0	437
	22.5	439
	24.0	431
	25.5	440
	27.0	439
	28.5	441
	30.0	439
	31.5	438
	33.0	441
	34.5	441
	36.0	437
	37.5	431
	39.0	437
	40.5	437
	42.0	438
	43.5	437
	45.0	438
	46.5	436
	48.0	437
	49.5	439
	51.0	435
	52.5	434
	54.0	431
	55.5	437
	57.0	434
	58.5	433
6	59.5	431

Shut-in# 2

Chart Label	Time (min)	Delta P (kPag)	Pressure (kPag)	Abscissa (T+dT)/dT	Used for Extrap
	15.0	1329	1760	5.5000	
	17.5	1539	1970	4.8571	
	20.0	1750	2181	4.3750	
	22.5	1952	2383	4.0000	
	25.0	2169	2599	3.7000	
	27.5	2369	2800	3.4545	
	30.0	2569	3000	3.2500	
	32.5	2759	3189	3.0769	
	35.0	2951	3381	2.9286	
	37.5	3135	3565	2.8000	
	40.0	3320	3751	2.6875	
	42.5	3500	3931	2.5882	
	45.0	3682	4113	2.5000	
	47.5	3854	4285	2.4211	
	50.0	4023	4454	2.3500	
	52.5	4185	4616	2.2857	
	55.0	4349	4780	2.2273	
	57.5	4500	4930	2.1739	
	60.0	4644	5075	2.1250	
	62.5	4792	5223	2.0800	
	65.0	4928	5359	2.0385	
	67.5	5072	5503	2.0000	
	70.0	5209	5639	1.9643	
	72.5	5341	5772	1.9310	
	75.0	5479	5910	1.9000	
	77.5	5608	6039	1.8710	
	80.0	5732	6163	1.8438	
	82.5	5859	6290	1.8182	
	85.0	5979	6410	1.7941	
	87.5	6091	6522	1.7714	
	90.0	6214	6644	1.7500	
	92.5	6331	6762	1.7297	
	95.0	6443	6874	1.7105	
	97.5	6560	6991	1.6923	
	100.0	6676	7107	1.6750	
	102.5	6788	7219	1.6585	
	105.0	6893	7324	1.6429	
	107.5	7000	7431	1.6279	
	110.0	7112	7543	1.6136	
	112.5	7211	7642	1.6000	
	115.0	7319	7750	1.5870	
	117.5	7419	7849	1.5745	
7	119.0	7483	7914	1.5672	

Note: Increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1
Recorder#K3

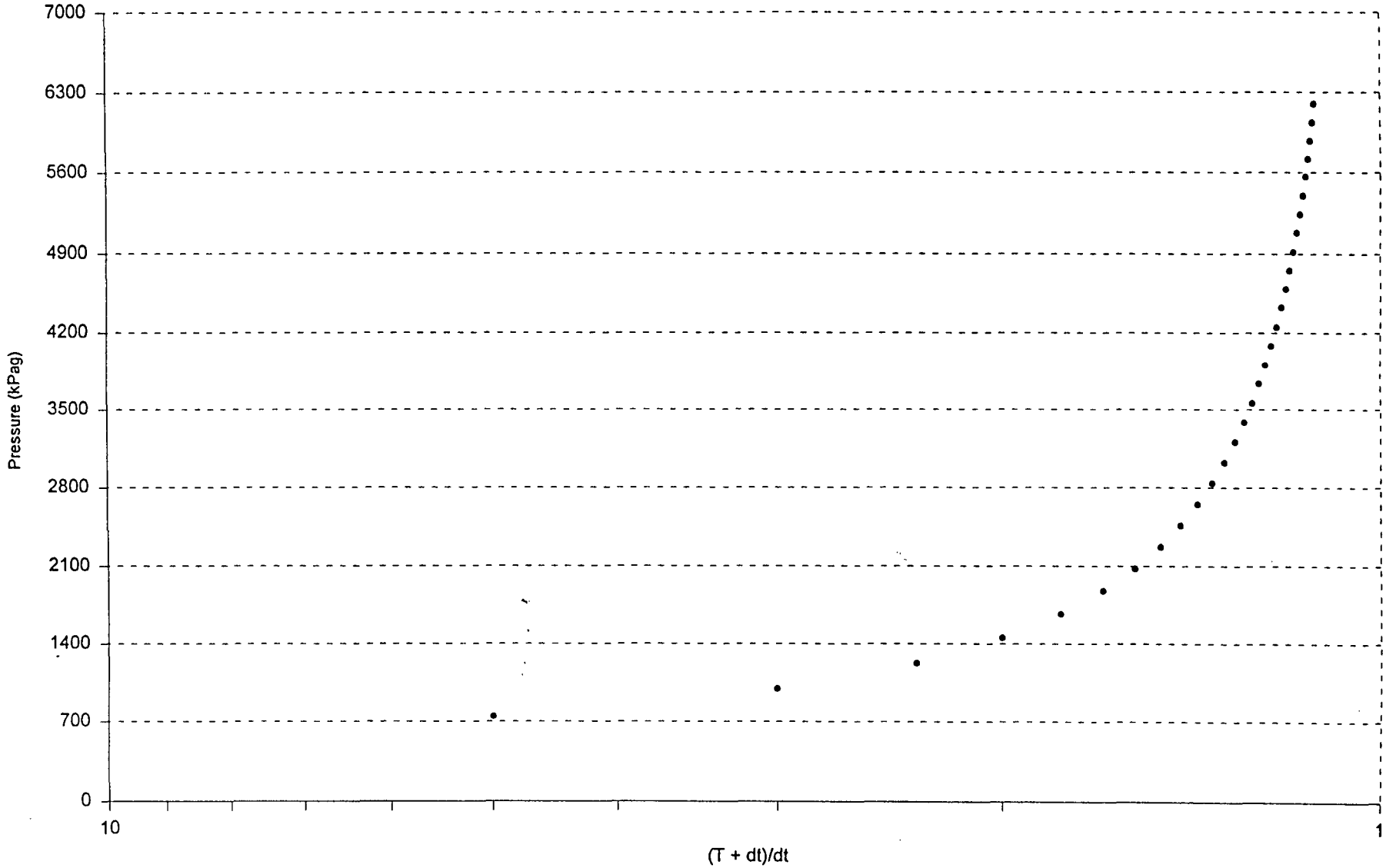
Build-up and Flow Curve Increments

Horner Extrapolation:

Note: Increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

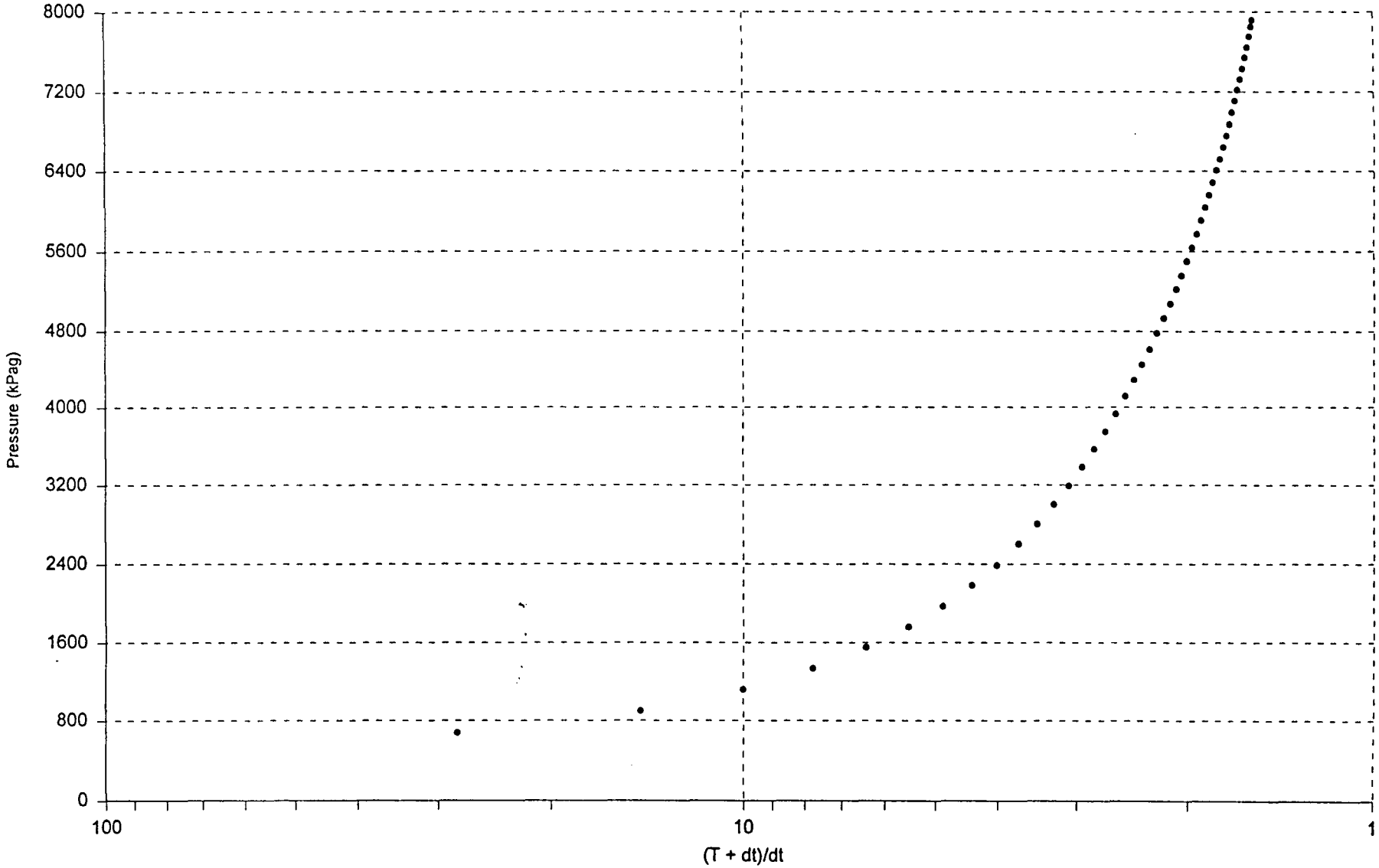
PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 1
Recorder: K3

Shut-in #1



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 1
Recorder: K3

Shut-in #1

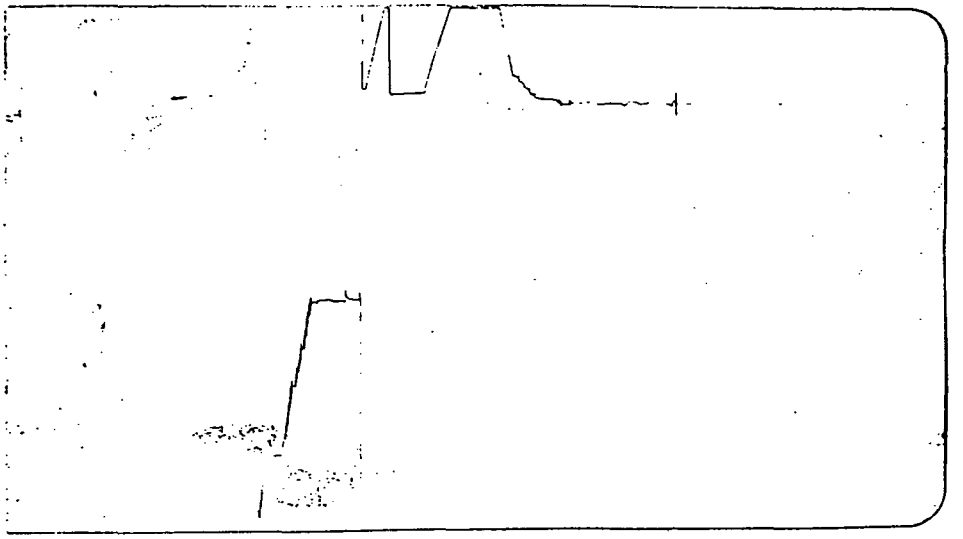


PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1

Recorder# 9487

Depth: 1,367.00 m
Location: Outside

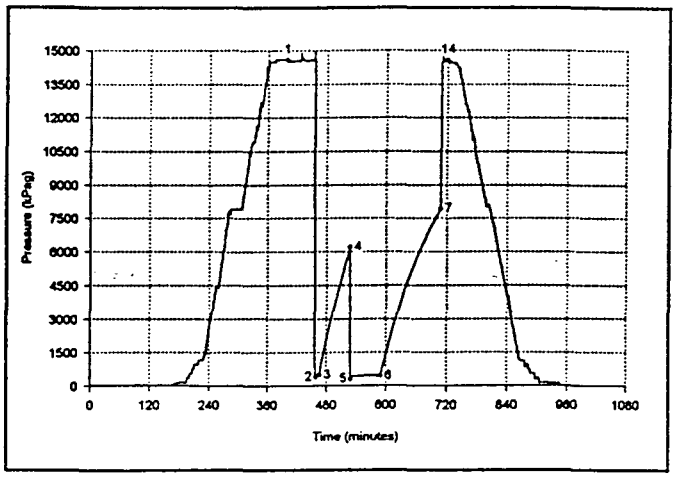
Recorder Type: K-3
Capacity: 20,700 kPag
Comments: Loaded Incorrectly



Recorder# K3

Depth: 1,367.00 m
Temperature: 51.5 C
Location: Outside

Recorder Type: ZI
Capacity: 82,700 kPag



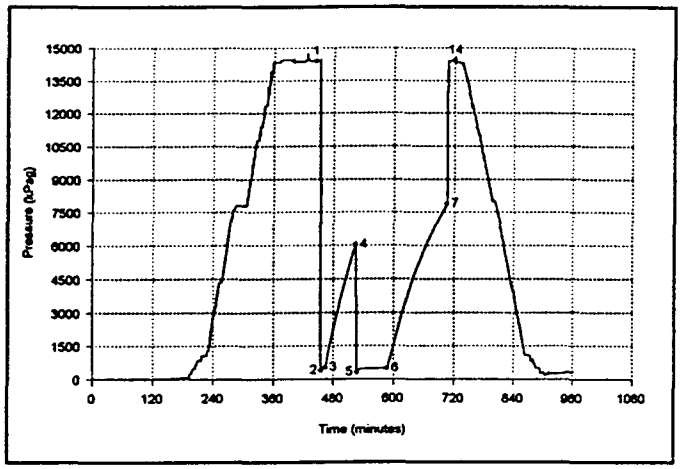
		Pressure (kPag)	Time (min)
1	Initial Hydrostatic	14575	
2	Start of 1st Flow	385	
3	End of 1st Flow	464	8.0
4	End of 1st Shut-in	6196	61.5
5	Start of 2nd Flow	280	
6	End of 2nd Flow	431	59.5
7	End of 2nd Shut-in	7914	119.0
14	Final Hydrostatic	14566	

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 1

Recorder# N37

Depth: 1,356.00 m
Temperature: 50.5 C
Location: Inside

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Above interval

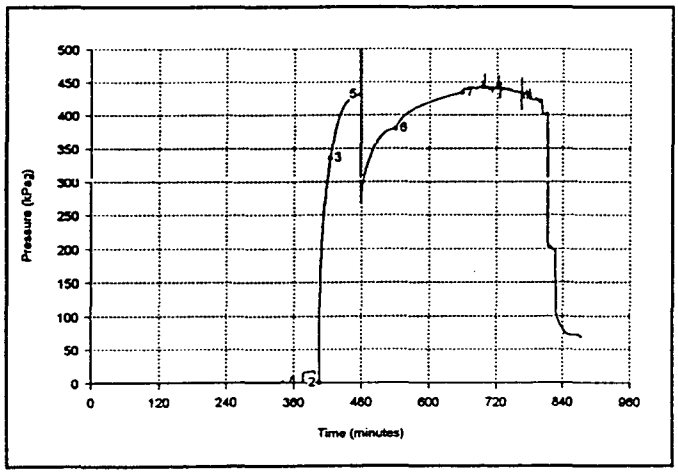


		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	14383	
2	Start of 1st Flow	373	
3	End of 1st Flow	521	8.0
4	End of 1st Shut-in	6026	61.5
5	Start of 2nd Flow	274	
6	End of 2nd Flow	459	59.5
7	End of 2nd Shut-in	7870	119.0
14	Final Hydrostatic	14423	

Recorder# N63

Depth: 1,352.00 m
Temperature: 48.0 C
Location: Fluid Recovery

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Recovery recorder



		Pressure (kPag)	*Time (min)*
2	Start of 1st Flow	0	
3	End of 1st Flow	335	8.0
5	Start of 2nd Flow	430	
6	End of 2nd Flow	379	59.5
7	End of 2nd Shut-in	434	119.0

BAKER HUGHES

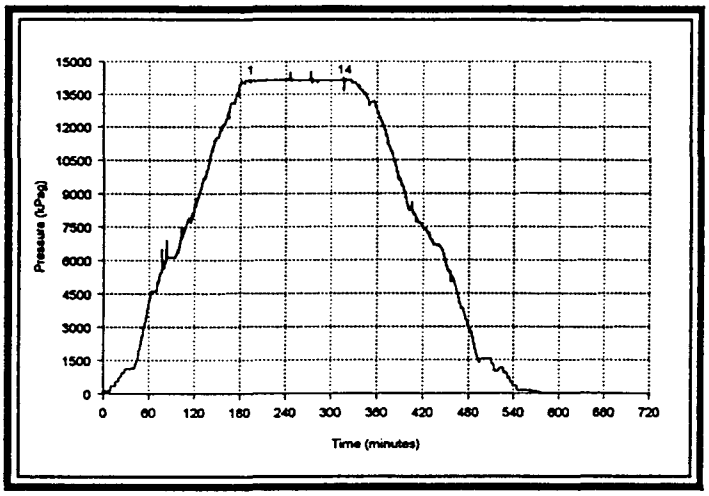
er Oil Tools

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 2

Formation: Belloy
Interval - from: 1,323.00 **to:** 1,343.00 meters

Test Date: 1999-12-08
Test Type : Inflate Straddle

Recorder# K3 at 1,325.00 meters



Btm Hole Temperature @ FSI: 45.8 C

		Pressure (kPag)	*Time* (min)	*Extrapolated Pressure* (kPag)
1	Initial Hydrostatic	14100		
14	Final Hydrostatic	14089		

Liquid Recovery 0.00 meters

Recovery	*Description*
0.00 m	No fluid recovery
0.00 m	

Blow Description:

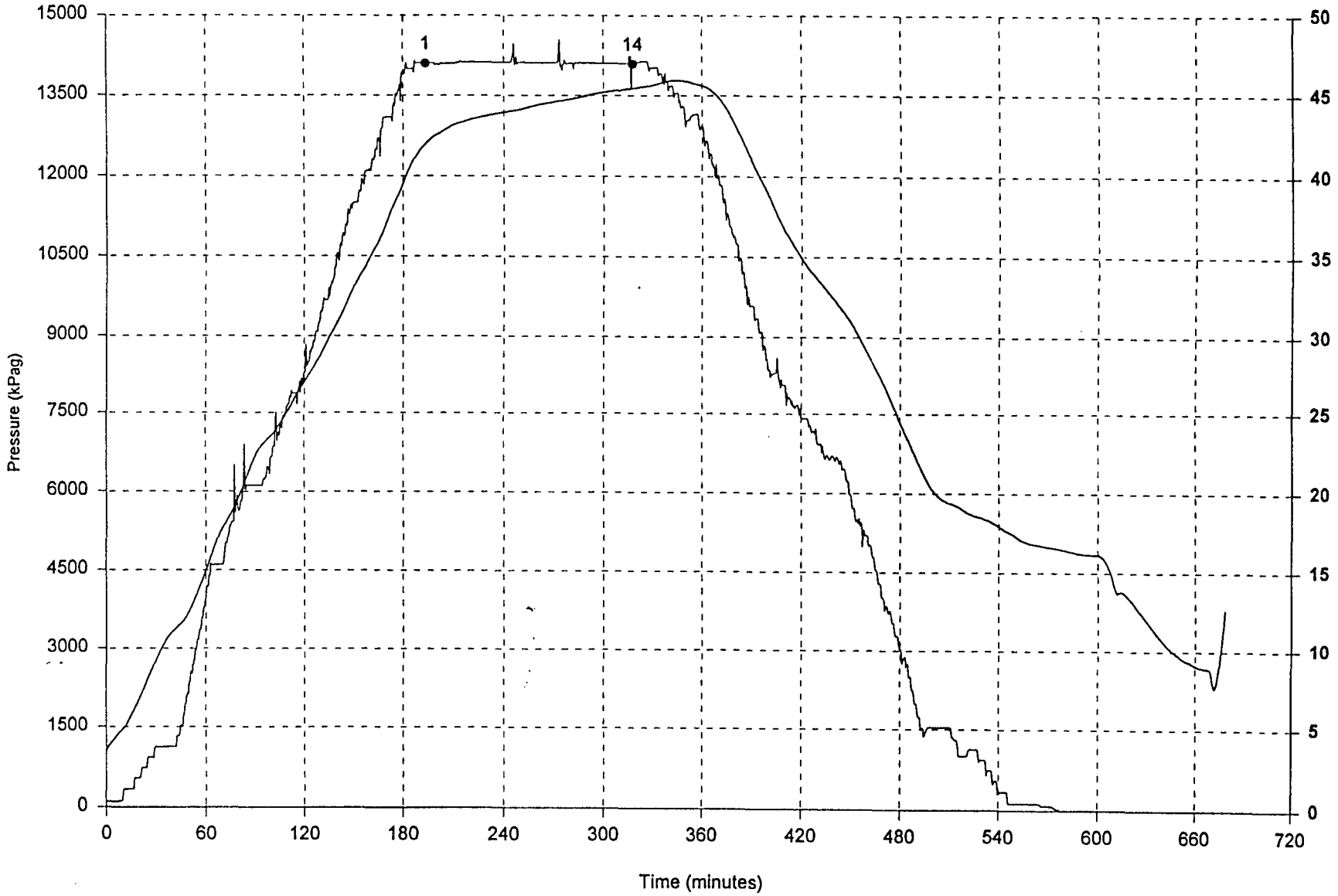
Misrun

Remarks:

Misrun - unable to maintain a stable packer seat. Packers kept skidding in the hole when weight was applied.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 2
Recorder: K3

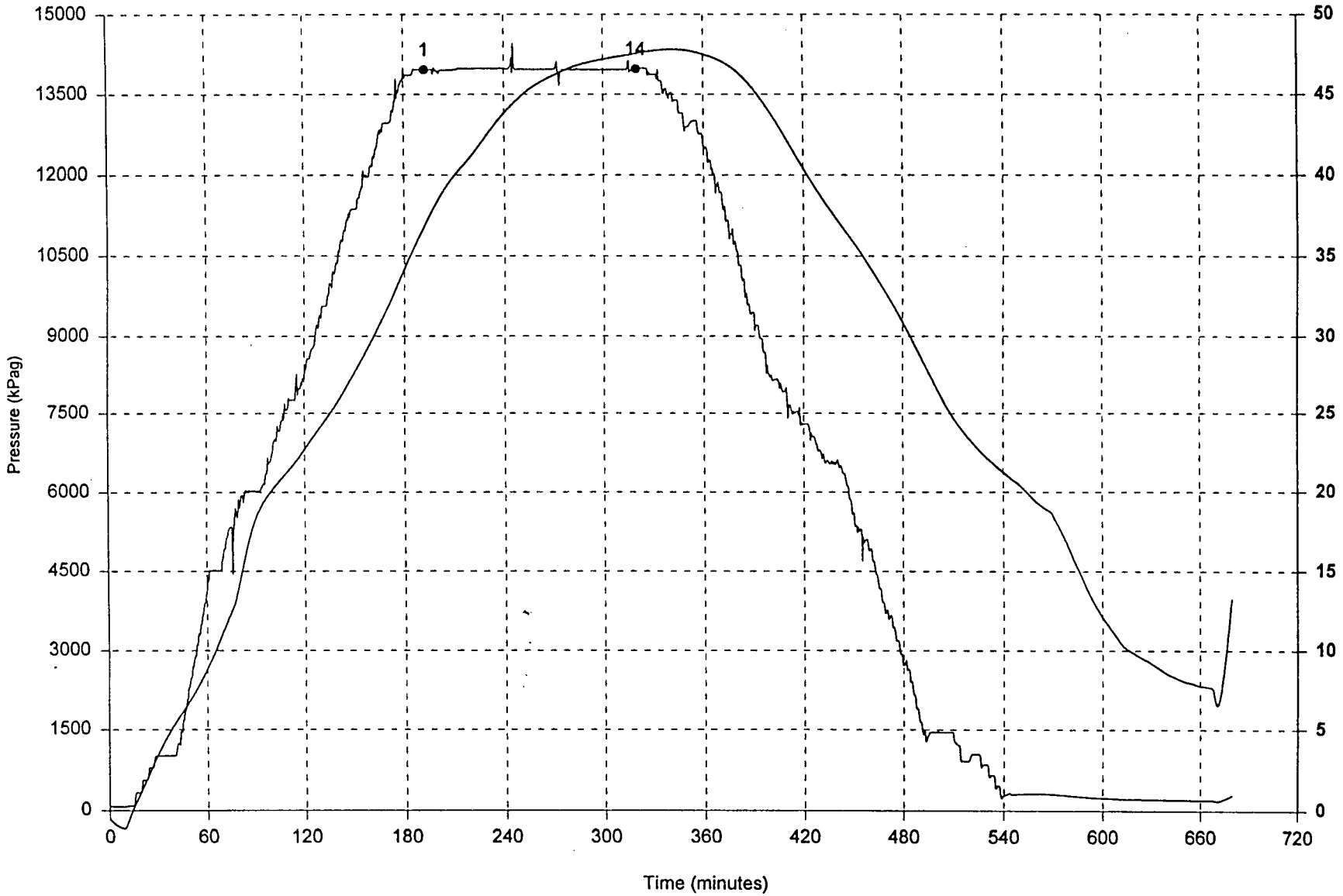
Pressure (kPag) at Critical Points:
1: 14100
14: 14089



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 2
Recorder: N37

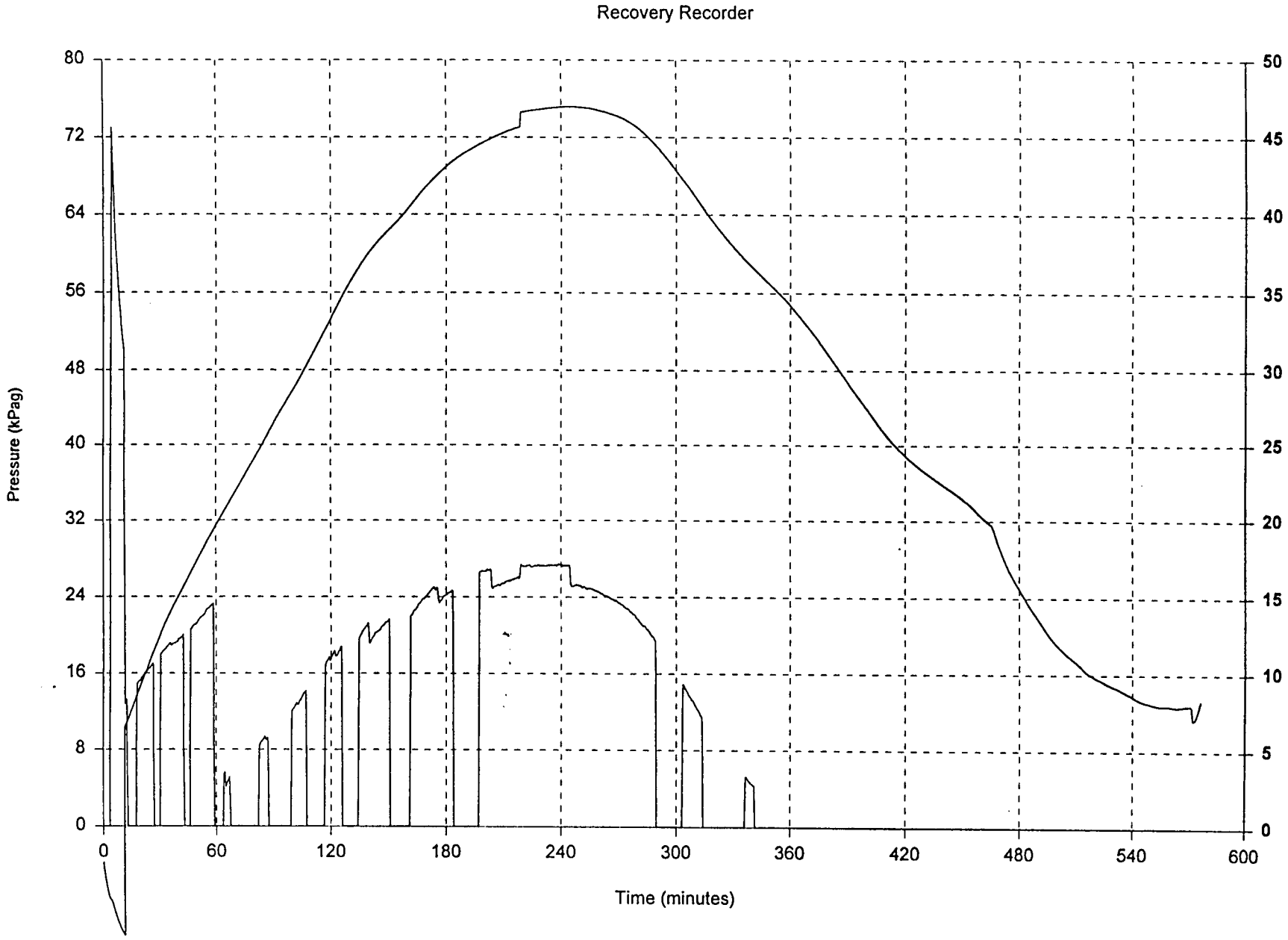
Pressure (kPag) at Critical Points:
1: 13955
14: 13968

Above Interval



BAKER OIL TOOLS / LYNES DRILL STEM TESTING

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 2
Recorder: N63



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 2

General Information:

Operator: Paramount Resources Ltd.
4000, 350 - 7th Avenue S.W.
Calgary Alberta T2P 3W5

Licence#: 1861
Tester: Pugh P
Ticket#: 809303
Reverse Circulated? N
KB Elevation: 542.20 meters
Ground Elevat'n: 537.20 meters
Total Depth: 1,545.00 meters

Mud Data:

Weight: 1060 kg/m3
Type: Invert
Viscosity: 51 s/l
Water Loss: 0.0 cc/s
Filter Cake: 0.0 mm

Hole Data:

Drilled Hole Size: 222 mm
Calipered Hole Size: 222 mm
Hole Condition at Test Time: Good
Conditioned prior to this test? N

Recorder Summary:

·order#	Type	Position	Capacity	Units	Depth	Comments
·3	ZI	Inside	41400	kPag	1,310.00	Recovery Recorder
N37	ZI	Inside	41400	kPag	1,314.00	Above Interval
9487	K-3	Outside	20700	kPag	1,325.00	
K3	ZI	Outside	82700	kPag	1,325.00	

Distributions:

Reports Sent To: Wayne Tomm

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 2

Tool Sequence:

Description	Length
Pump Out Sub	0.33 m
Double Pin Sub	0.31 m
Pump Out Sub	0.33 m
Recorder Carrier	1.38 m
Hydraulic Tool	1.50 m
Bottom Hole Sampler	1.03 m
Recorder Carrier	1.38 m
Hydraulic Jars	2.22 m
Safety Joint	0.65 m
Inflate Pump	2.38 m
Screen	1.16 m
Packer Assembly	1.78 m
Packer Stick Down	0.83 m
Port Sub	0.42 m
Recorder Carrier	2.02 m
Spacing	6.60 m
Cross Over Sub	0.30 m
Drill Collar	9.13 m
Cross Over Sub	0.30 m
Packer Stick Up	0.43 m
Packer Assembly	1.90 m
Perforations	0.31 m
Belly Spring	2.00 m

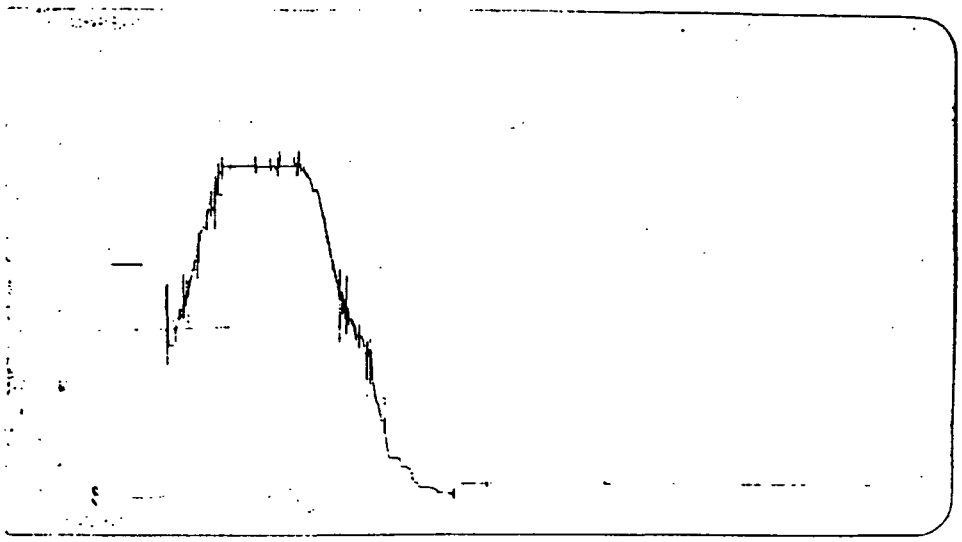
Tool String Length:	38.69 m
Drill Collar I.D.: 65 mm	93.25 m
Drill Pipe O.D.: 102 mm	1,217.96 m
Collar Pipe Total:	1,311.21 m
Stick Up:	2.66 m
Tool Above:	14.45 m
Interval Tested:	20.00 m
Bottom Hole Choke Size:	25.40 mm

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 2

Recorder# 9487

Depth: 1,325.00 m
Location: Outside

Recorder Type: K-3
Capacity: 20,700 kPag

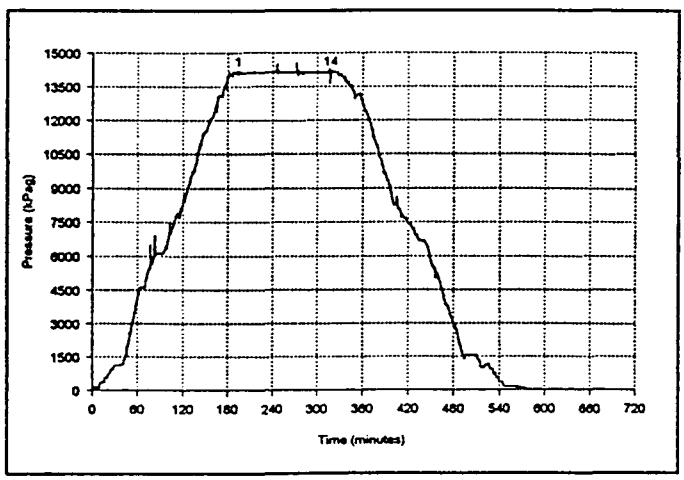


		Pressure (kPag)	Time (min)
1	Initial Hydrostatic	14059	
14	Final Hydrostatic	14045	

Recorder# K3

Depth: 1,325.00 m
Temperature: 45.8 C
Location: Outside

Recorder Type: ZI
Capacity: 82,700 kPag



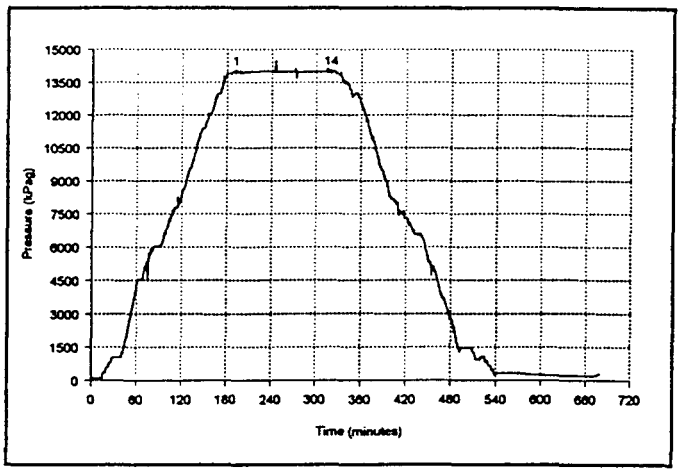
		Pressure (kPag)	Time (min)
1	Initial Hydrostatic	14100	
14	Final Hydrostatic	14089	

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 2

Recorder# N37

Depth: 1,314.00 m
Temperature: 47.6 C
Location: Inside

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Above Interval

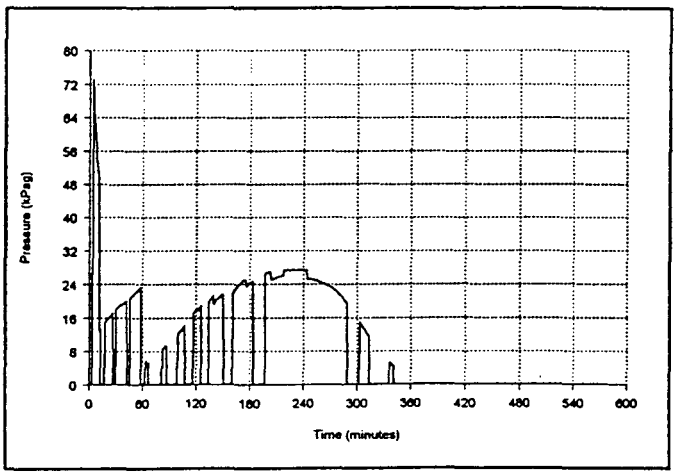


		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	13955	
14	Final Hydrostatic	13968	

Recorder# N63

Depth: 1,310.00 m
Temperature: 47.0 C
Location: Inside

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Recovery Recorder



BAKER HUGHES

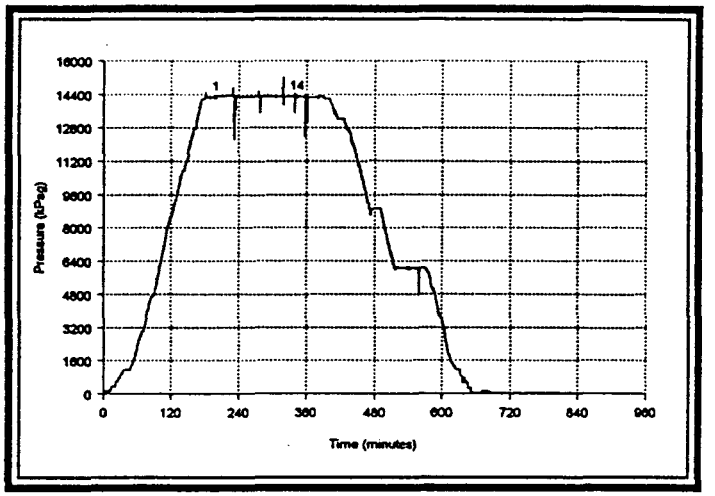
PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 3

er Oil Tools

Formation: Belloy
Interval - from: 1,332.00 **to:** 1,352.00 meters

Test Date: 1999-12-09
Test Type : Inflate Straddle

Recorder# K3 at 1,334.00 meters



Btm Hole Temperature @ FSI: 45.0 C

		Pressure (kPag)	*Time (min)*	*Extrapolated Pressure (kPag)*
1	Initial Hydrostatic	14268		
14	Final Hydrostatic	14268		

Liquid Recovery 0.00 meters

Recovery	*Description*
0.00 m	No fluid recovery

Blow Description:

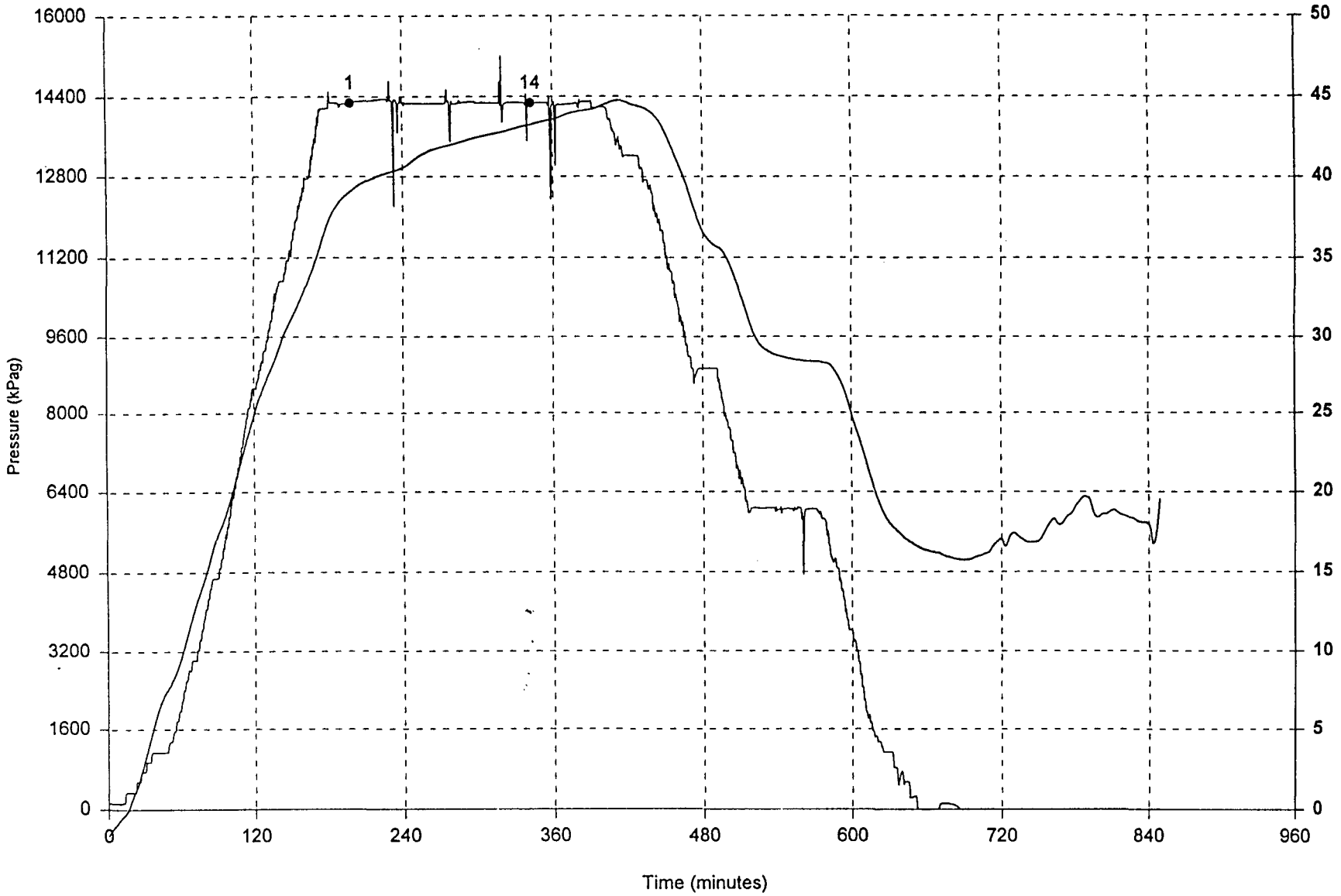
Misrun

Remarks:

Misrun - Unable to obtain a packer seat due to packers skidding when attempting to open tool.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 3
Recorder: K3

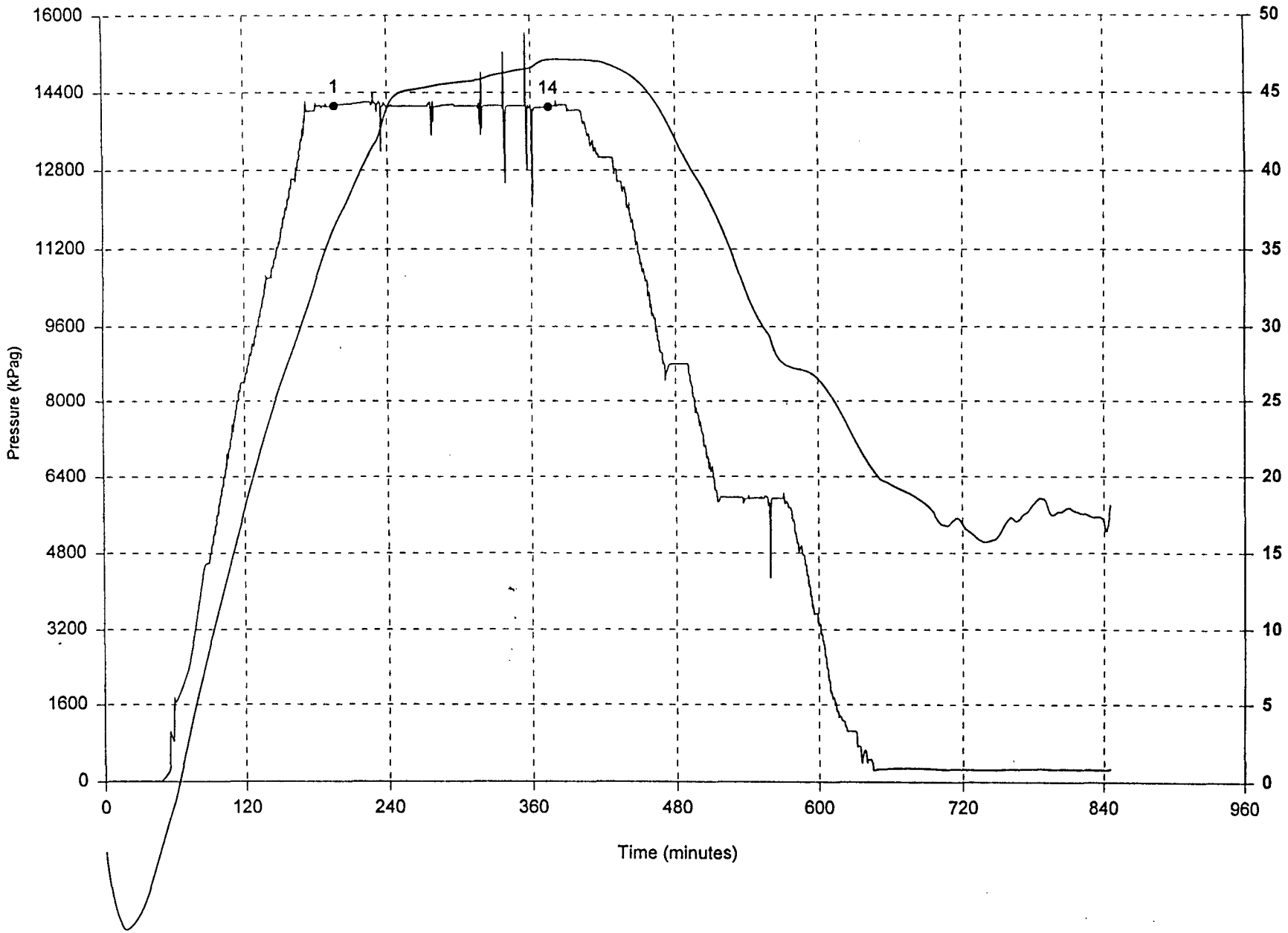
Pressure (kPag) at Critical Points:
1: 14268
14: 14268



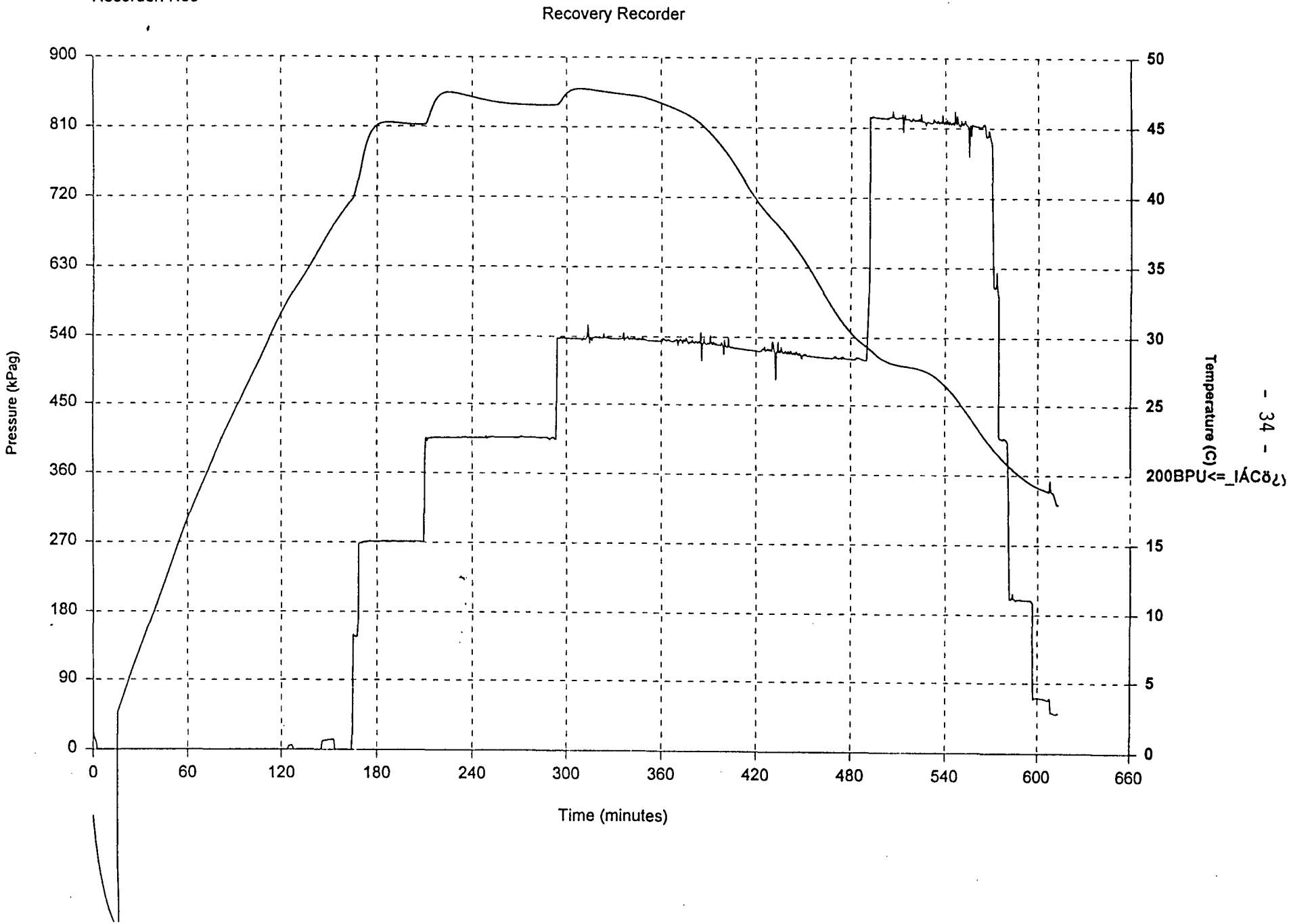
PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 3
Recorder: N37

Pressure (kPag) at Critical Points:
1: 14116
14: 14093

Above Interval



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 3
Recorder: N63



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 3

General Information:

Operator: Paramount Resources Ltd.
4000, 350 - 7th Avenue S.W.
Calgary Alberta T2P 3W5

Licence#: 1861
Tester: Pugh P
Ticket#: 809304
Reverse Circulated? N
KB Elevation: 542.20 meters
Ground Elevat'n: 537.20 meters
Total Depth: 1,545.00 meters

Mud Data:

Weight: 1070 kg/m3
Type: Invert
Viscosity: 53 s/l
Water Loss: 0.0 cc/s
Filter Cake: 0.0 mm

Hole Data:

Drilled Hole Size: 222 mm
Calipered Hole Size: 222 mm
Hole Condition at Test Time: Good
Conditioned prior to this test? Y

Recorder Summary:

:order#	Type	Position	Capacity	Units	Depth	Comments
3	ZI	Inside	41400	kPag	1,319.00	Recovery Recorder
N37	ZI	Inside	41400	kPag	1,323.00	Above Interval
9487	K-3	Outside	20700	kPag	1,334.00	
K3	ZI	Outside	82700	kPag	1,334.00	

Distributions:

Reports Sent To: Wayne Tomm

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 3

Tool Sequence:

Diagram	Description	Length
	Pump Out Sub	0.33 m
	Double Pin Sub	0.31 m
	Pump Out Sub	0.33 m
	Recorder Carrier	1.38 m
	Hydraulic Tool	1.50 m
	Bottom Hole Sampler	1.03 m
	Recorder Carrier	1.38 m
	Hydraulic Jars	2.22 m
	Safety Joint	0.65 m
	Inflate Pump	2.38 m
	Screen	1.16 m
	Packer Assembly	1.78 m
	Packer Stick Down	0.83 m
	Port Sub	0.42 m
	Recorder Carrier	2.02 m
	Spacing	6.60 m
	Cross Over Sub	0.30 m
	Drill Collar	9.13 m
	Cross Over Sub	0.30 m
	Packer Stick Up	0.43 m
	Packer Assembly	1.90 m
	Perforations	0.31 m
	Belly Spring	2.00 m

Tool String Length:	38.69 m
Drill Collar I.D.: 65 mm	93.25 m
Drill Pipe O.D.: 102 mm	1,226.90 m
Collar Pipe Total:	1,320.15 m
Stick Up:	2.60 m
Tool Above:	14.45 m
Interval Tested:	20.00 m
Bottom Hole Choke Size:	25.40 mm

DST#
Recorder#

Build-up and Flow Curve Increments

Flow# Shut-in#

Horner Extrapolation:

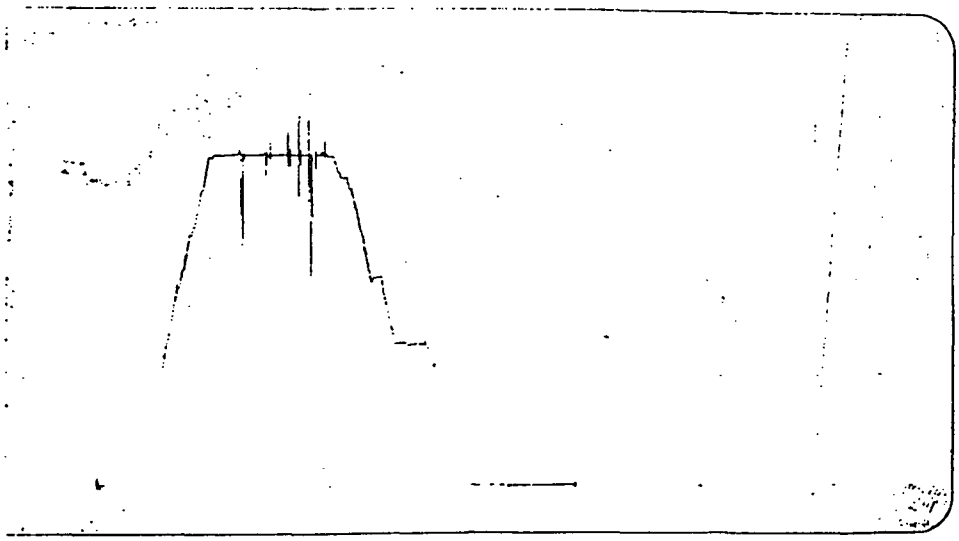
Note: Increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 3

Recorder# 9487

Depth: 1,334.00 m
Location: Outside

Recorder Type: K-3
Capacity: 20,700 kPag

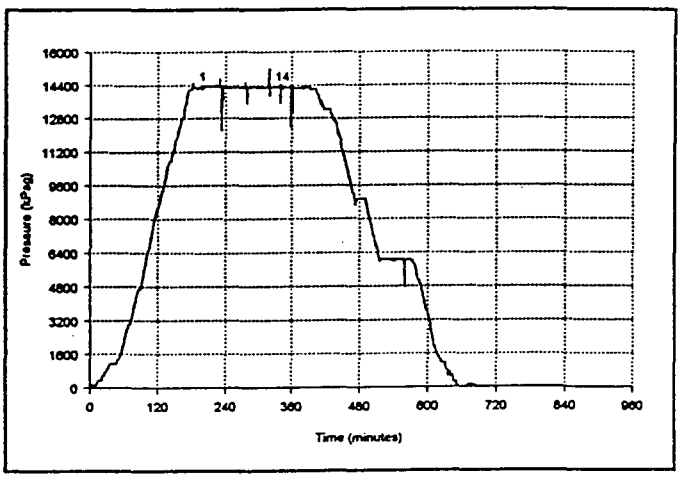


		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	14233	
14	Final Hydrostatic	14233	

Recorder# K3

Depth: 1,334.00 m
Temperature: 45.0 C
Location: Outside

Recorder Type: ZI
Capacity: 82,700 kPag



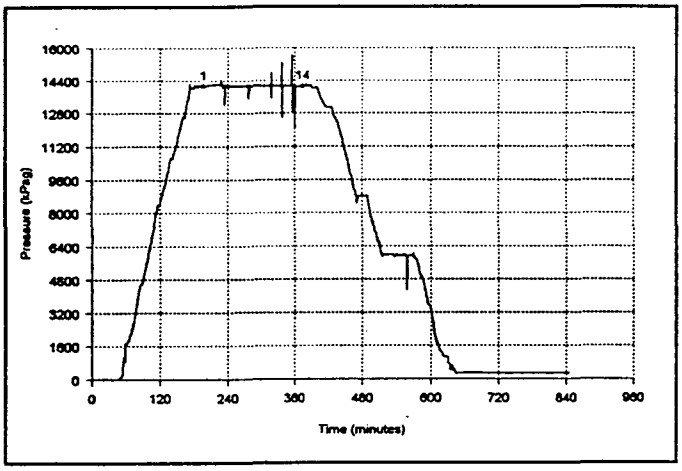
		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	14268	
14	Final Hydrostatic	14268	

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 3

Recorder# N37

Depth: 1,323.00 m
Temperature: 46.3 C
Location: Inside

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Above Interval

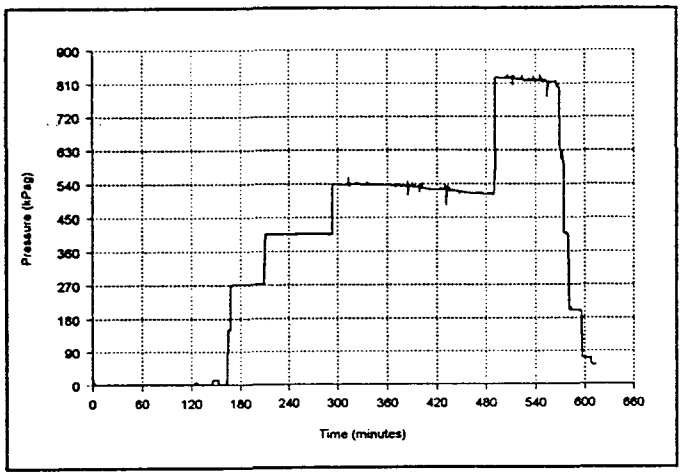


		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	14116	
14	Final Hydrostatic	14093	

Recorder# N63

Depth: 1,319.00 m
Temperature: 46.6 C
Location: Inside

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Recovery Recorder



BAKER HUGHES

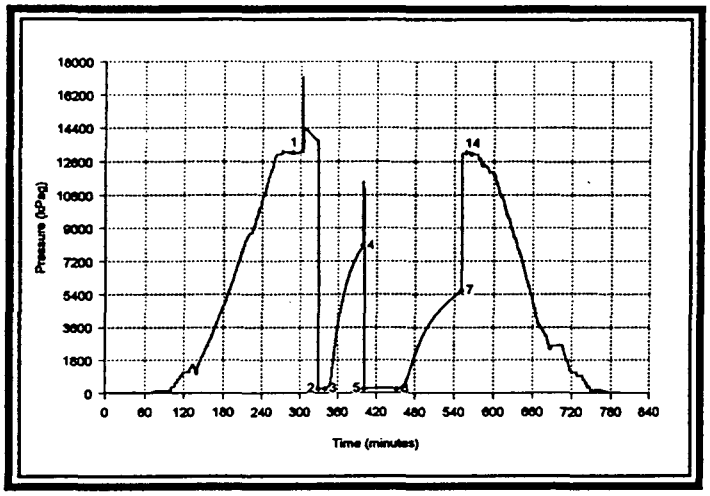
Baker Oil Tools

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4

Formation: Belloy
Interval - from: 1,213.00 **to:** 1,227.00 meters

Test Date: 1999-12-10
Test Type : Inflate Straddle

Recorder# K3 at 1,215.00 meters



Btm Hole Temperature @ FSI: 42.9 C

		Pressure (kPag)	*Time (min)*	*Extrapolated Pressure (kPag)*
1	Initial Hydrostatic	13026		
2	Start of 1st Flow	200		
3	End of 1st Flow	194	11.0	
4	End of 1st Shut-in	8003	58.5	
5	Start of 2nd Flow	218		
6	End of 2nd Flow	187	50.5	
7	End of 2nd Shut-in	5575	99.0	
14	Final Hydrostatic	12959		

Liquid Recovery 2.00 meters

Recovery	*Description*
2.00 m	INVERT MUD

Blow Description:

PREFLOW: Weak air blow decreasing to very weak by the end of the flow. No gas to surface.

FINAL FLOW: Very weak air blow throughout. No gas to surface.

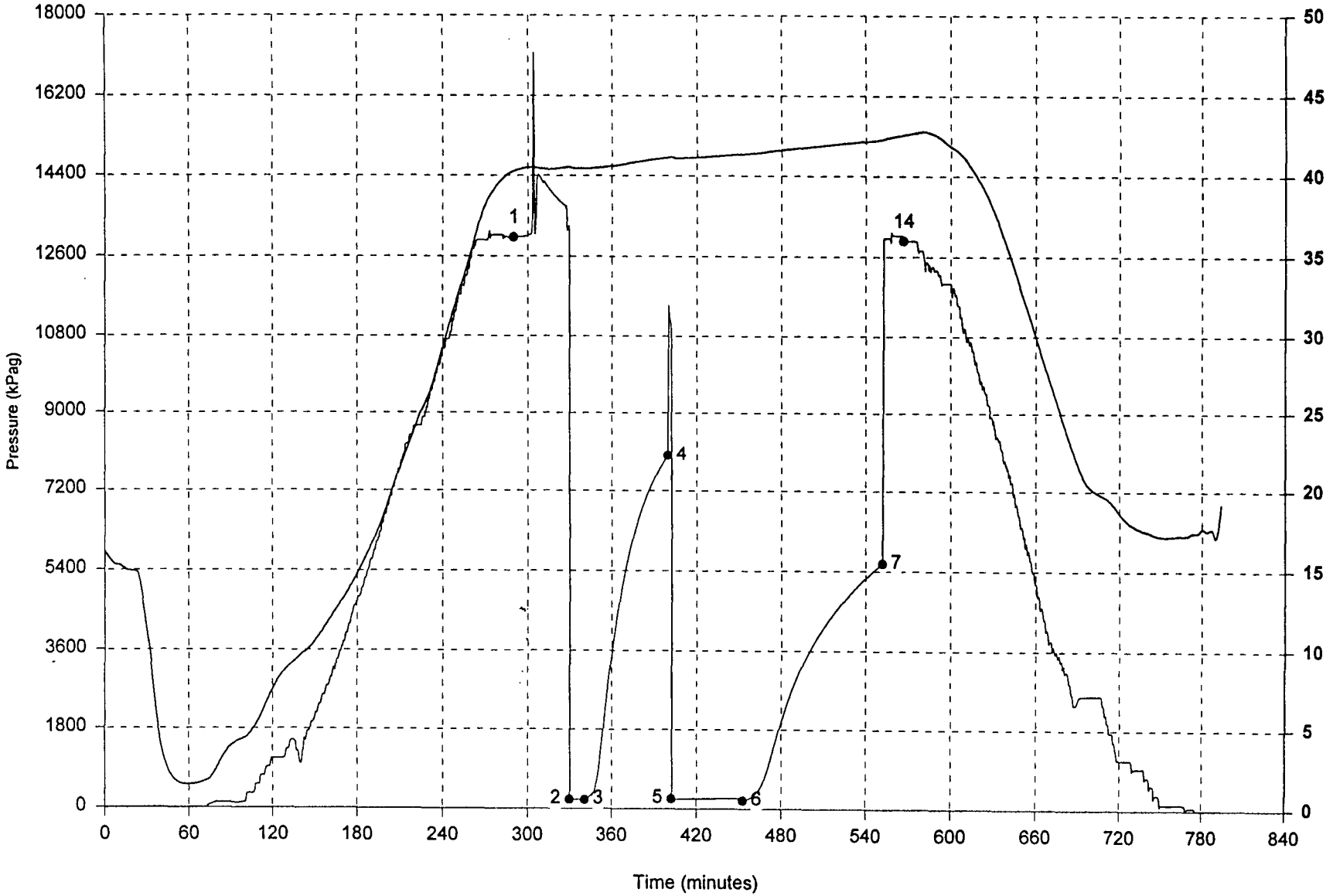
Remarks:

Mechanically successful test. Results suggest very low permeability within the interval tested. The shut-ins were not extrapolated due to insufficient curve development.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 4
Recorder: K3

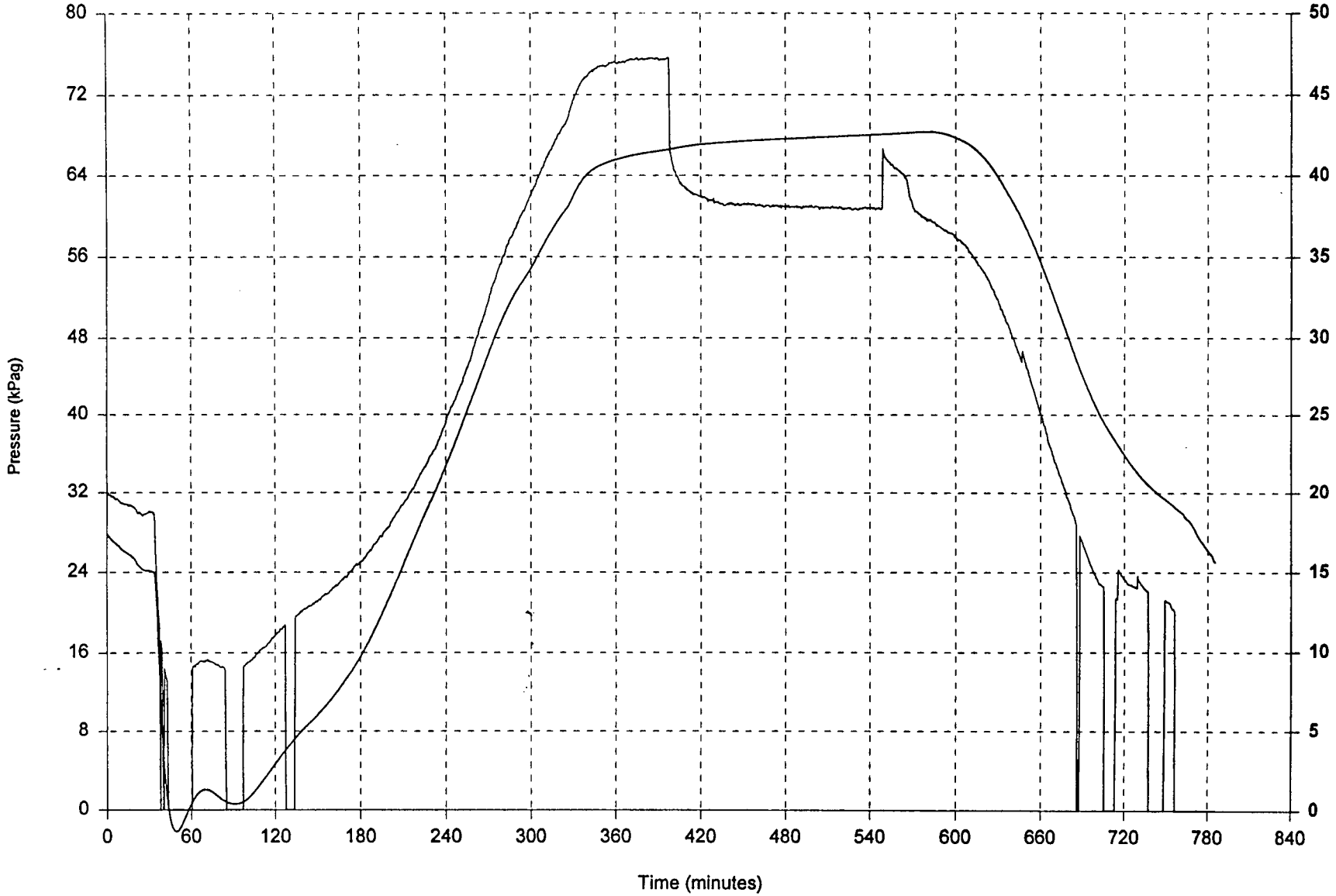
Pressure (kPag) at Critical Points:

1:	13026	4:	8003	7:	5575
2:	200	5:	218	14:	12959
3:	194	6:	187		



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 4
Recorder: N63

Recovery recorder - Recorder Malfunction

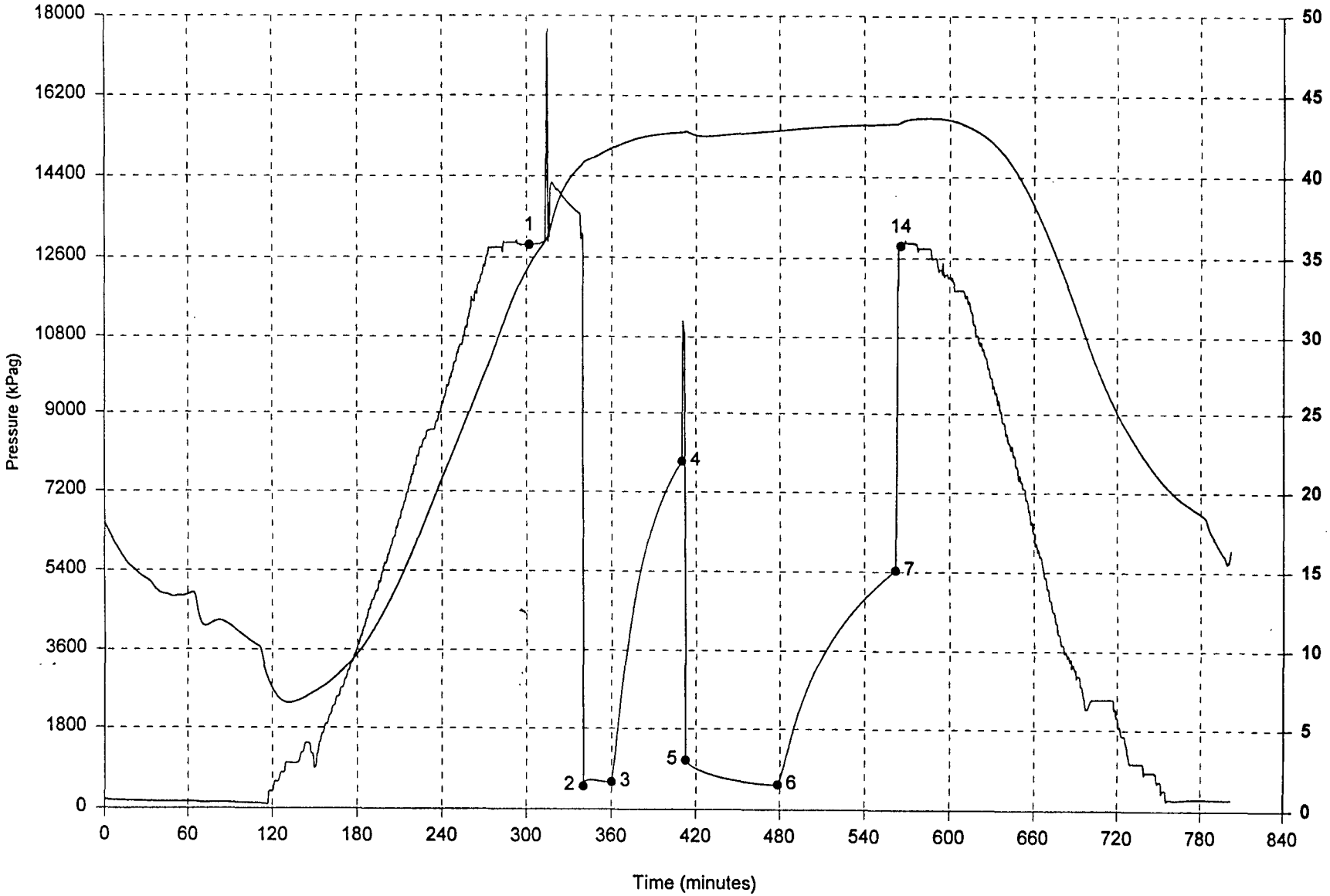


PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 4
Recorder: N37

Pressure (kPag) at Critical Points:

1:	12884	4:	7885	7:	5432
2:	511	5:	1093	14:	12875
3:	603	6:	561		

Above interval



BAKER OIL TOOLS / LYNES DRILL STEM TESTING

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4

General Information:

Operator: Paramount Resources Ltd.
4000, 350 - 7th Avenue S.W.
Calgary Alberta T2P 3W5

Licence#: 1861
Tester: Pugh P
Ticket#: 809305
Reverse Circulated? N
KB Elevation: 542.20 meters
Ground Elevat'n: 537.20 meters
Total Depth: 1,545.00 meters

Mud Data:

Weight: 1070 kg/m3
Type: Invert
Viscosity: 53 s/l
Water Loss: 0.0 cc/s
Filter Cake: 0.0 mm

Hole Data:

Drilled Hole Size: 222 mm
Calipered Hole Size: 222 mm
Hole Condition at Test Time: Good
Conditioned prior to this test? N

Recorder Summary:

·order#	Type	Position	Capacity	Units	Depth	Comments
..03	ZI	Fluid Recovery	41400	kPag	1,200.00	Recovery recorder - Recorder Malfunction
N37	ZI	Inside	41400	kPag	1,204.00	Above interval
9487	K-3	Outside	20700	kPag	1,215.00	
K3	ZI	Outside	82700	kPag	1,215.00	

Distributions:

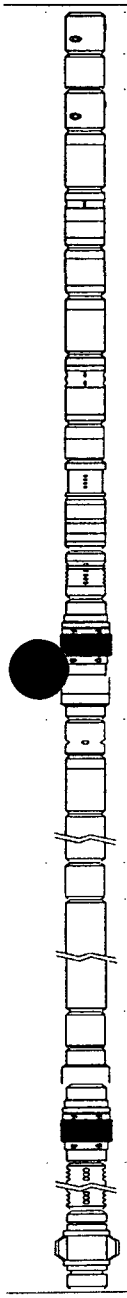
Reports Sent To: Wayne Tomm

Fluid Samples - no of: 1 Sent To: AGAT

Bottom Hole Sampler#	Sent To
004	AGAT

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4

Tool Sequence:



Description	*Length*
Pump Out Sub	0.33 m
Double Pin Sub	0.31 m
Pump Out Sub	0.33 m
Recorder Carrier	1.38 m
Hydraulic Tool	1.50 m
Bottom Hole Sampler	1.03 m
Recorder Carrier	1.38 m
Hydraulic Jars	2.22 m
Safety Joint	0.65 m
Inflate Pump	2.38 m
Screen	1.16 m
Packer Assembly	1.78 m
Packer Stick Down	0.83 m
Port Sub	0.42 m
Recorder Carrier	2.02 m
Spacing	0.60 m
Cross Over Sub	0.30 m
Drill Collar	9.13 m
Cross Over Sub	0.30 m
Packer Stick Up	0.43 m
Packer Assembly	1.90 m
Perforations	0.60 m
Belly Spring	2.00 m

Tool String Length:	32.98 m
Drill Collar I.D.: 65 mm	93.25 m
Drill Pipe O.D.: 102 mm	1,110.07 m
Collar Pipe Total:	1,203.32 m
Stick Up:	4.77 m
Tool Above:	14.45 m
Interval Tested:	14.00 m
Bottom Hole Choke Size:	25.40 mm

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4
Recorder# N37

Build-up and Flow Curve Increments

Flow# 1

Chart Label	Time (min)	Pressure (kPag)
2	0.0	200
	1.0	201
	2.0	201
	3.0	202
	4.0	202
	5.0	202
	6.0	203
	7.0	203
	8.0	203
	9.0	203
	10.0	204
3	11.0	194

Shut-in# 1

Chart Label	Time (min)	Delta P (kPag)	Pressure (kPag)	Abscissa (T+dT)/dT	Used for Extrap
	0.0		194		
	1.5	24	218	8.3333	
	3.0	65	258	4.6667	
	4.5	105	299	3.4444	
	6.0	161	355	2.8333	
	7.5	319	513	2.4667	
	9.0	577	771	2.2222	
	10.5	941	1135	2.0476	
	12.0	1362	1556	1.9167	
	13.5	1811	2005	1.8148	
	15.0	2252	2446	1.7333	
	16.5	2674	2868	1.6667	
	18.0	3073	3267	1.6111	
	19.5	3447	3641	1.5641	
	21.0	3784	3977	1.5238	
	22.5	4107	4301	1.4889	
	24.0	4402	4596	1.4583	
	25.5	4675	4869	1.4314	
	27.0	4931	5125	1.4074	
	28.5	5176	5370	1.3860	
	30.0	5395	5588	1.3667	
	31.5	5599	5793	1.3492	
	33.0	5796	5990	1.3333	
	34.5	5974	6168	1.3188	
	36.0	6150	6343	1.3056	
	37.5	6311	6505	1.2933	
	39.0	6463	6657	1.2821	
	40.5	6603	6797	1.2716	
	42.0	6732	6926	1.2619	
	43.5	6861	7055	1.2529	
	45.0	6982	7176	1.2444	
	46.5	7091	7285	1.2366	
	48.0	7200	7394	1.2292	
	49.5	7301	7494	1.2222	
	51.0	7398	7592	1.2157	
	52.5	7486	7679	1.2095	
	54.0	7576	7769	1.2037	
	55.5	7658	7851	1.1982	
	57.0	7741	7935	1.1930	
4	58.5	7810	8003	1.1880	

Note: Increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4
Recorder# N37

Build-up and Flow Curve Increments

Flow# 2

Chart Label	Time (min)	Pressure (kPag)
5	0.0	218
	1.5	217
	3.0	218
	4.5	219
	6.0	219
	7.5	220
	9.0	221
	10.5	221
	12.0	221
	13.5	221
	15.0	222
	16.5	222
	18.0	223
	19.5	223
	21.0	224
	22.5	225
	24.0	225
	25.5	226
	27.0	226
	28.5	227
	30.0	227
	31.5	227
	33.0	228
	34.5	229
	36.0	230
	37.5	230
	39.0	230
	40.5	231
	42.0	231
	43.5	232
	45.0	232
	46.5	233
	48.0	233
	49.5	233
6	50.5	187

Shut-in# 2

Chart Label	Time (min)	Delta P (kPag)	Pressure (kPag)	Abscissa (T+dT)/dT	Used for Extrap
	0.0		187		
	2.5	21	209	25.6000	
	5.0	53	240	13.3000	
	7.5	113	300	9.2000	
	10.0	195	383	7.1500	
	12.5	316	503	5.9200	
	15.0	497	685	5.1000	
	17.5	741	928	4.5143	
	20.0	1018	1206	4.0750	
	22.5	1300	1488	3.7333	
	25.0	1585	1773	3.4600	
	27.5	1850	2038	3.2364	
	30.0	2099	2286	3.0500	
	32.5	2330	2517	2.8923	
	35.0	2549	2737	2.7571	
	37.5	2750	2938	2.6400	
	40.0	2941	3128	2.5375	
	42.5	3110	3298	2.4471	
	45.0	3273	3460	2.3667	
	47.5	3426	3613	2.2947	
	50.0	3574	3762	2.2300	
	52.5	3706	3894	2.1714	
	55.0	3830	4018	2.1182	
	57.5	3957	4144	2.0696	
	60.0	4071	4258	2.0250	
	62.5	4175	4362	1.9840	
	65.0	4285	4472	1.9462	
	67.5	4385	4573	1.9111	
	70.0	4486	4673	1.8786	
	72.5	4573	4761	1.8483	
	75.0	4666	4853	1.8200	
	77.5	4750	4937	1.7935	
	80.0	4833	5020	1.7688	
	82.5	4908	5095	1.7455	
	85.0	4991	5178	1.7235	
	87.5	5065	5252	1.7029	
	90.0	5142	5329	1.6833	
	92.5	5210	5397	1.6649	
	95.0	5277	5464	1.6474	
	97.5	5351	5538	1.6308	
7	99.0	5387	5575	1.6212	

Note: Increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4
Recorder# K3

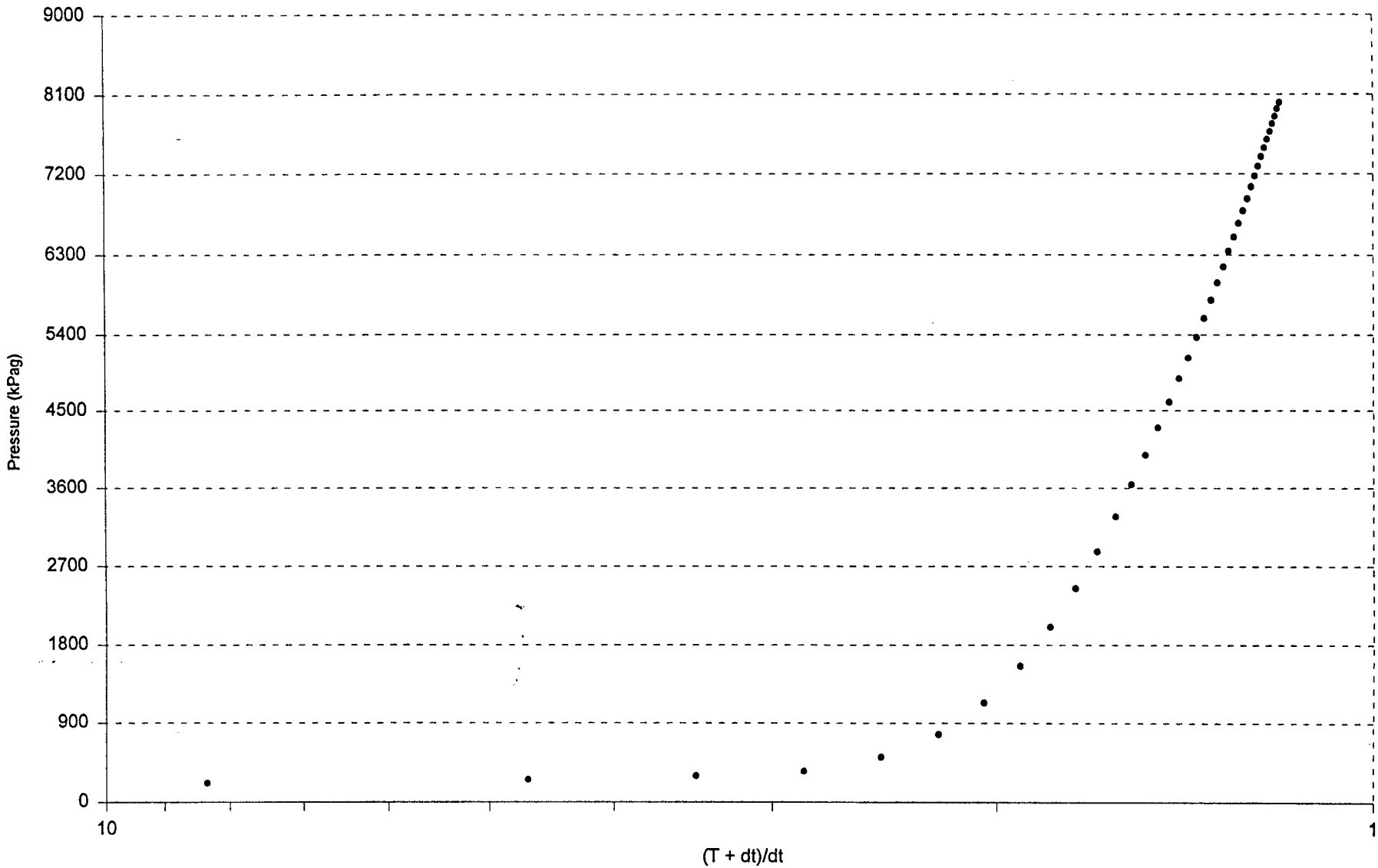
Build-up and Flow Curve Increments

Horner Extrapolation:

No. increment listing is filtered to include critical data only. Complete time/pressure data is available in electronic or printed format.

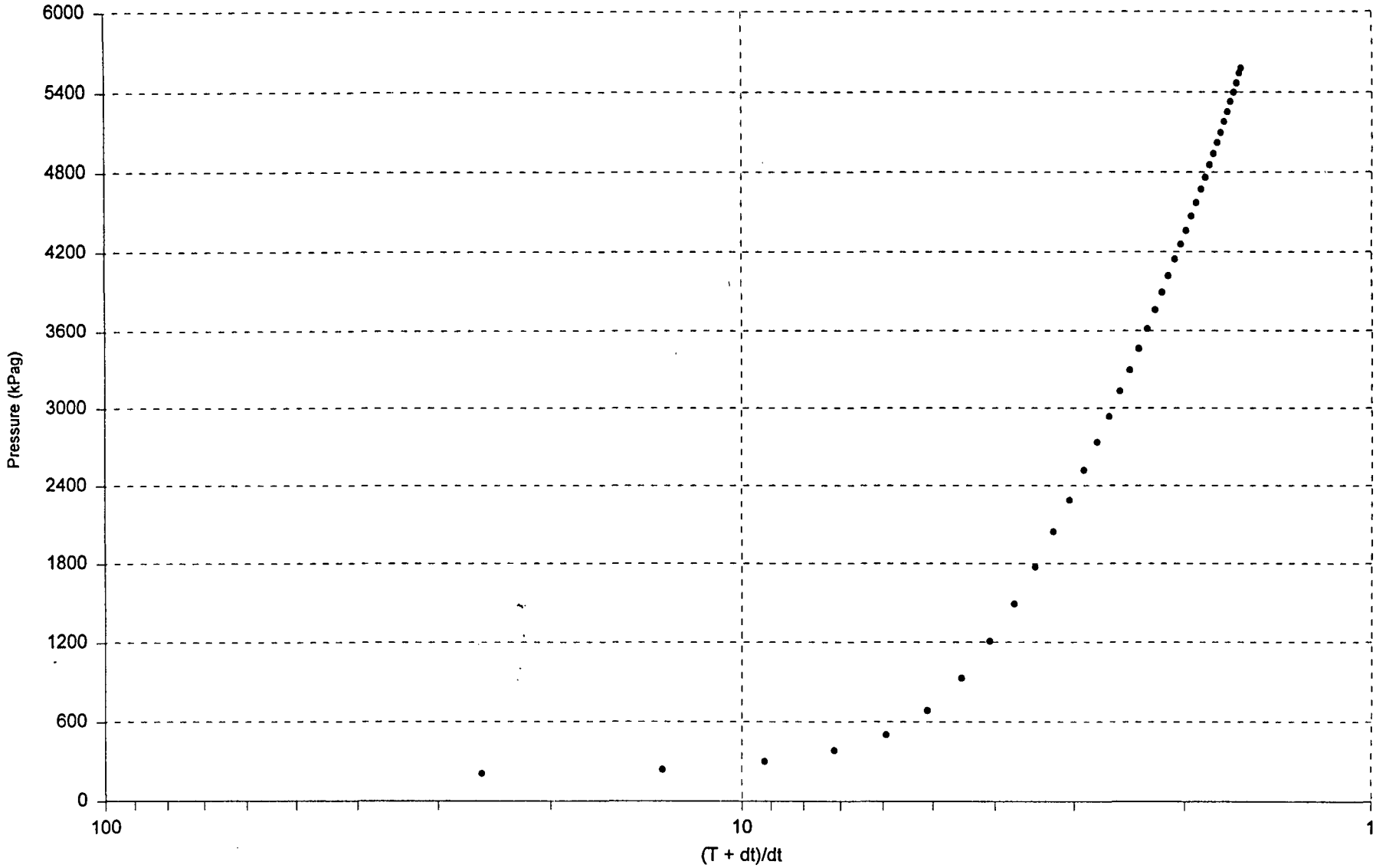
PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 4
Recorder: K3

Shut-in #1



PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST #: 4
Recorder: K3

Shut-in #1

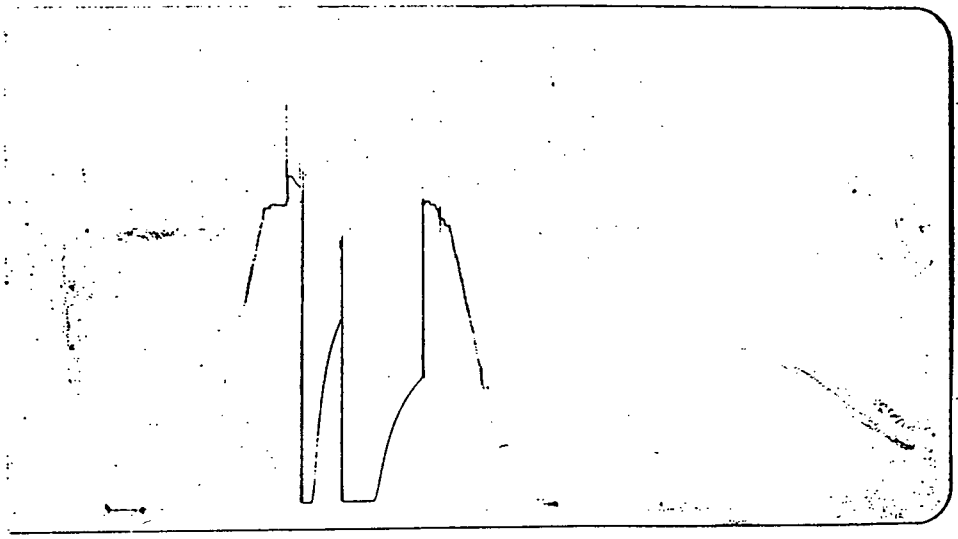


PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4

Recorder# 9487

Depth: 1,215.00 m
Location: Outside

Recorder Type: K-3
Capacity: 20,700 kPag

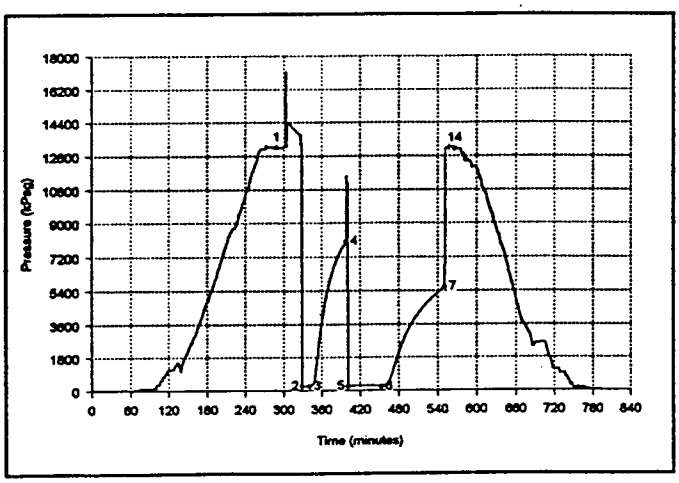


		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	12990	
2	Start of 1st Flow	165	
3	End of 1st Flow	198	11.0
4	End of 1st Shut-in	7946	58.5
5	Start of 2nd Flow	207	
6	End of 2nd Flow	217	50.5
7	End of 2nd Shut-in	5528	99.0
14	Final Hydrostatic	13020	

Recorder# K3

Depth: 1,215.00 m
Temperature: 42.9 C
Location: Outside

Recorder Type: ZI
Capacity: 82,700 kPag



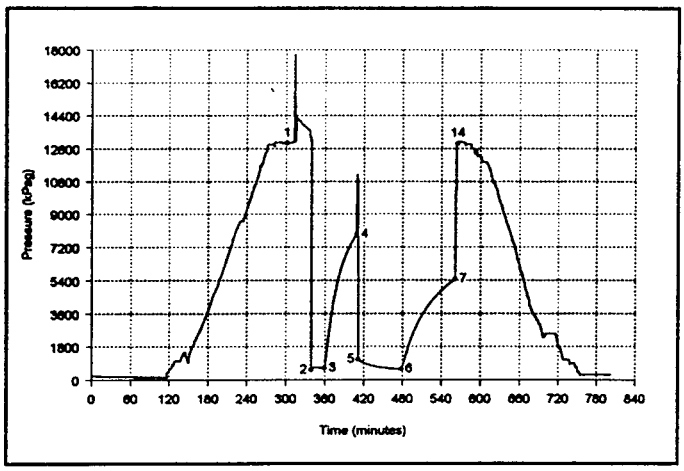
		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	13026	
2	Start of 1st Flow	200	
3	End of 1st Flow	194	11.0
4	End of 1st Shut-in	8003	58.5
5	Start of 2nd Flow	218	
6	End of 2nd Flow	187	50.5
7	End of 2nd Shut-in	5575	99.0
14	Final Hydrostatic	12959	

PARAMOUNT ET AL FORT LIARD I-46
00/ 60.050 / 123.220 /0
DST# 4

Recorder# N37

Depth: 1,204.00 m
Temperature: 43.6 C
Location: Inside

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Above interval

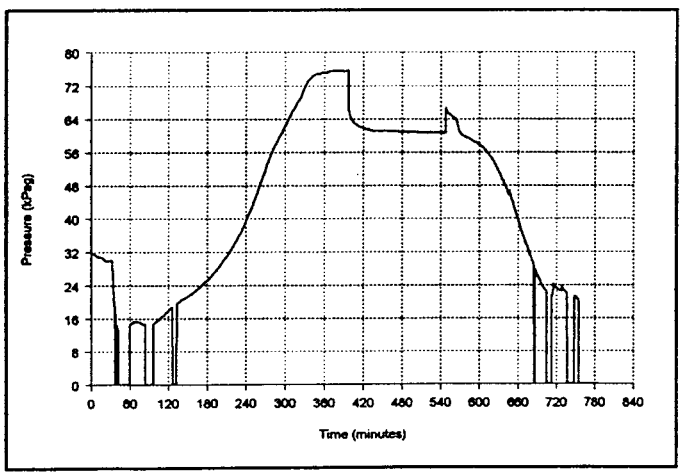


		Pressure (kPag)	*Time (min)*
1	Initial Hydrostatic	12884	
2	Start of 1st Flow	511	
3	End of 1st Flow	603	11.0
4	End of 1st Shut-in	7885	58.5
5	Start of 2nd Flow	1093	
6	End of 2nd Flow	561	50.5
7	End of 2nd Shut-in	5432	99.0
14	Final Hydrostatic	12875	

Recorder# N63

Depth: 1,200.00 m
Temperature: 42.5 C
Location: Fluid Recovery

Recorder Type: ZI
Capacity: 41,400 kPag
Comments: Recovery recorder - Recorder Malfunction

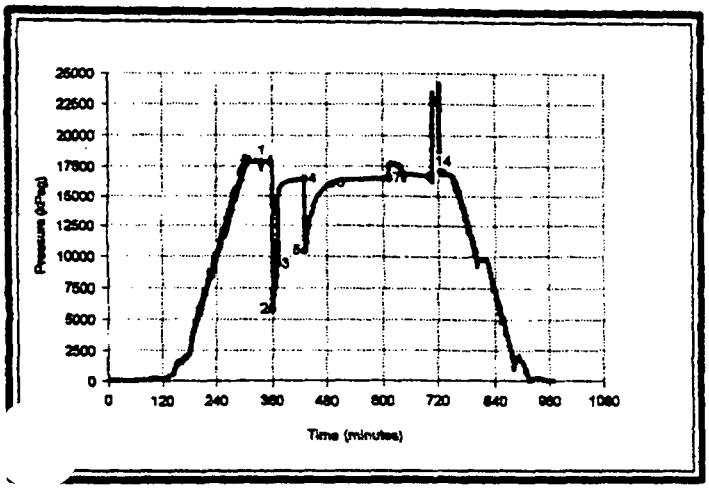


Baker Oil Tools

PARA ET AL FT. LIARD I46
60-05-123-22
DST# 5

Formation: MATTSON
Interval - from: 1734.5 **to:** 1740.0 m

Recorder# N42 at 1737.0 m



Maximum Btm Hole Temperature @ FSI: 63.2 C

		Pressure (kPag)	*Time (min)*	*Extrapolated Pressure (kPag)*
1	Initial Hydrostatic	17793		
2	Start of 1st Flow	5808		
3	End of 1st Flow	9309	10.0	
4	End of 1st Shut-in	16417	60.0	
5	Start of 2nd Flow	10426		
6	End of 2nd Flow	16014	60.0	
7	End of 2nd Shut-in	16484	120.0	
14	Final Hydrostatic	16939		

Liquid Recovery of 1643.00 m

Test was reversed out.

Recovery	*Description*	*Salinity*
643.00 m	FRESH WATER	
1000.00 m	INVERT CUT FRESH WTR	
0.00 m	MUD TANK	

Test Date: 1999-12-24
Test Type: CONV. BOTTOM HOLE
Tester Name: J. PAUL PUGH
Drill Pipe O.D.: 102.00 mm
Drill Collar I.D.: 56.00 mm
Drill Collar Length: 169.30 m
Hole Size: 155.50 mm

Blow Description:

PREFLOW - STRONG AIR BLOW IMMED. . REMAINING STRONG THROUGHOUT. NO GAS TO SURFACE. FINAL FLOW - STRONG BLOW IMMED. WITH GAS TO SURFACE IN 30 MINUTES.TOO SMALL TO MEASURE FOR REST OF FLOW PERIOD.

Remarks:

GOOD MECHANICAL TEST.

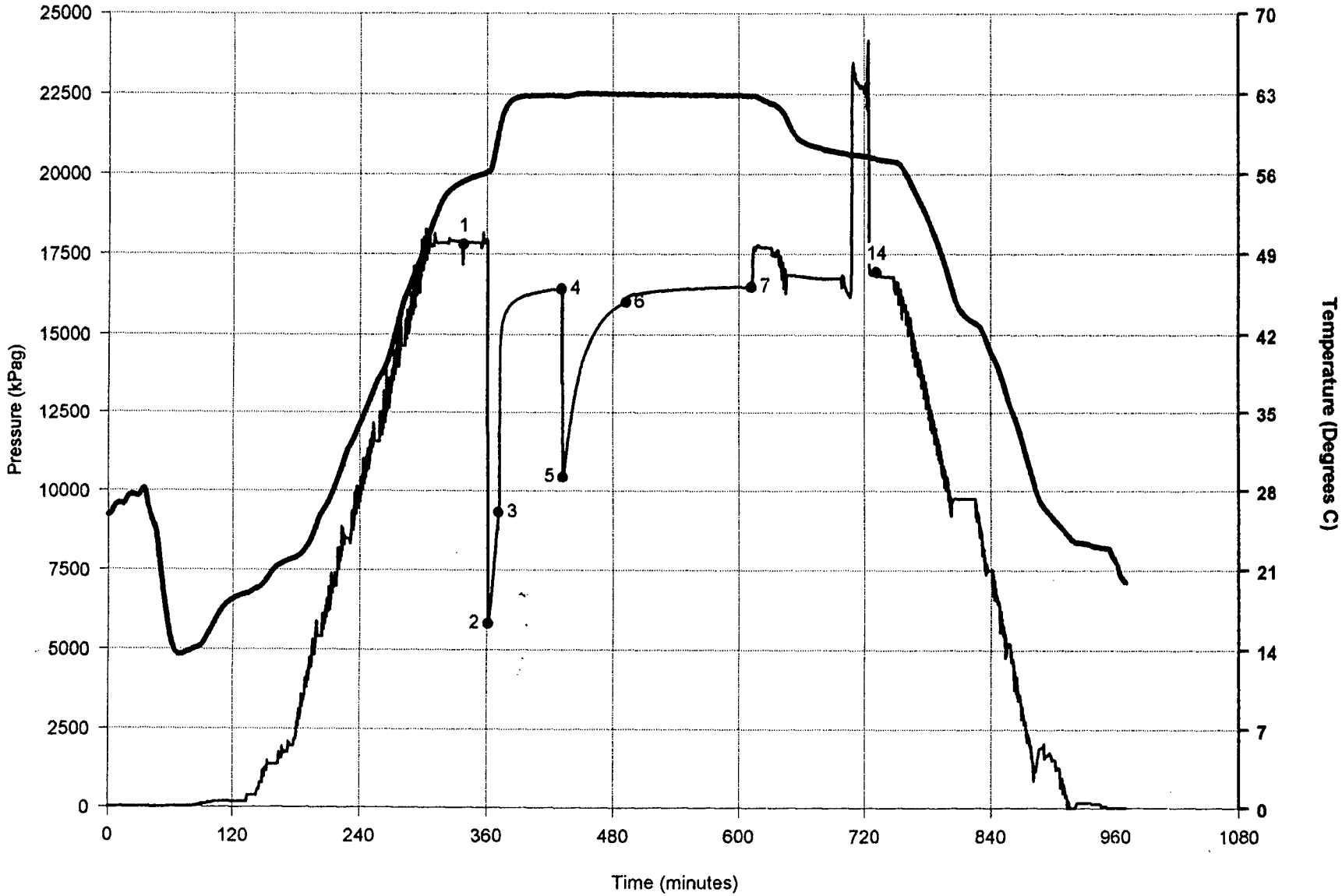
FRESH WATER AT .5 % SALT

Baker Oil Tools Drill Stem Testing

PARA ET AL FT. LIARD I46
60-05-123-22
DST #: 5
Recorder: N42

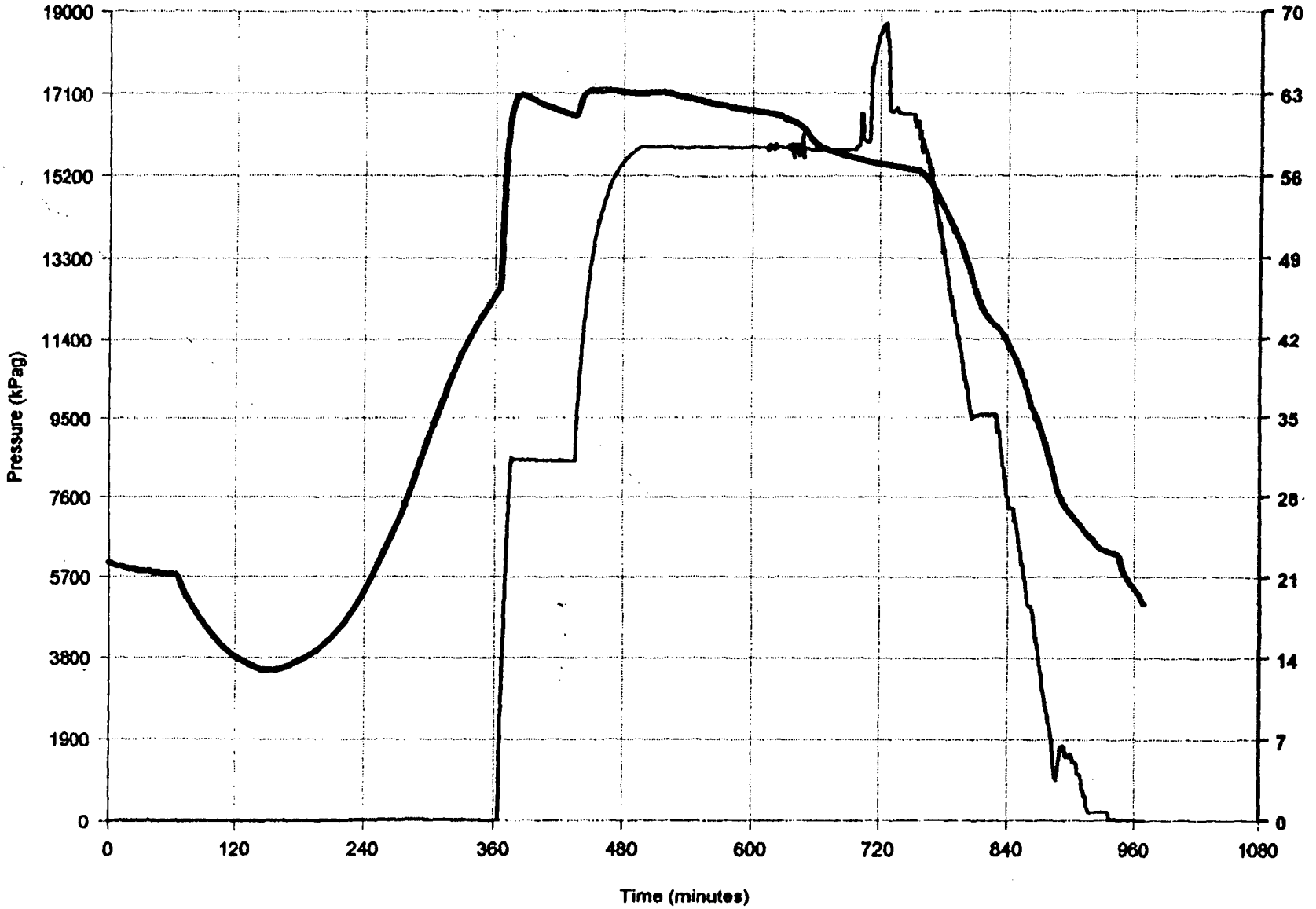
Pressure (kPag) at Critical Points:

1: 17793	4: 16417	7: 16484
2: 5808	5: 10426	14: 16939
3: 9309	6: 16014	



Baker Oil Tools Drill Stem Testing

PARA ET AL FT. LIARD I46
60-05-123-22
DST #: 5
Recorder: V52



Baker Oil Tools — FIELD REPORT

TEST DATA

TEST No 5 LUS. TEST No 5
FORMATION TESTED MATTSON T.D. 1740.0 m
INTERVAL TESTED: From 1734.5 m to 1740.0 m
INTERVAL TESTED 5.5 m
TEST TYPE CONV. BOTTOM HOLE RESET: YES ☐ NO ☒
CUSHION: YES ☐ NO ☒ TYPE AMOUNT m
STARTED IN HOLE @ 01:10 HRS. OPENED TOOL 05:04 HRS.
DATE & TIME OUT OF HOLE 1999-12-24 @ 14:40 HRS.
TEST TIMES:
PRE-FLOW 10 MIN. INITIAL SHUT-IN 60 MIN.
SECOND FLOW MIN. SECOND SHUT-IN MIN.
FINAL FLOW 60 MIN. FINAL SHUT-IN 120 MIN.
PRE-FLOW BLOW DESCRIPTION: STRONG AIR BLOW IMMED. & REMAINING STRONG THROUGHOUT. NO GAS TO SURFACE.

FINAL FLOW BLOW DESCRIPTION: STRONG BLOW IMMED. WITH GAS TO SURFACE IN 30 MINUTES. TOO SMALL TO MEASURE FOR REST OF FLOW PERIOD.

MECHANICAL RECORDERS

No.	INSIDE ☐ OUTSIDE ☐	No.	INSIDE ☐ OUTSIDE ☐	No. 20755	INSIDE ☐ OUTSIDE ☒
DEPTH m		DEPTH m		DEPTH 1737.0 m	
CLOCK		CLOCK		CLOCK 12304	
REC. SEC. #		REC. SEC. #		REC. SEC. # 6379	
No.	INSIDE ☐ OUTSIDE ☐	No.	INSIDE ☐ OUTSIDE ☐	No.	INSIDE ☐ OUTSIDE ☐
DEPTH m		DEPTH m		DEPTH m	
CLOCK		CLOCK		CLOCK	
REC. SEC. #		REC. SEC. #		REC. SEC. #	

ELECTRONIC RECORDERS

[redacted]	INSIDE ☒ OUTSIDE ☐	No. V35	INSIDE ☒ OUTSIDE ☐	No. N42	INSIDE ☐ OUTSIDE ☒
DEPTH 1721.0 m		DEPTH 1727.0 m		DEPTH 1737.0 m	
TEMP.		TEMP.		TEMP. 63.2	
FILE p6005er.dec		FILE p6005e.dec		FILE p6005ee.dec	

FIELD READINGS

REC. No.		REC. No. N42	
DEFLECTION	PRESSURE kPa	DEFLECTION	PRESSURE kPa
1		1	17792.85
2		2	5807.92
3		3	9308.77
4		4	16416.91
5		5	10425.82
6		6	16014.48
7		7	16484.16
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	16938.84

REMARKS

SEQUENCE OF TEST EVENTS:

GOOD MECHANICAL TEST.

FRESH WATER AT .5 & SALT

GENERAL INFORMATION

COMPANY PARAMOUNT RESOURCES LTD.
CONTACT IN CALGARY
CONTACT'S PHONE FAX
WELL NAME PARA ET AL FT. LIARD I46
LOCATION 60-05-123-22
K.B. 542.5 m GROUND ELEV 537.5 m
COMPANY REP WILBERT CALLIHOO
TESTER J. PAUL PUGH
JAR No 209 HYDRAULIC TOOL No 171
UNIT # 35019 PUMP No N/A
CONTRACTOR PRECISION DRLG. RIG No 379
TICKET No 809307 DATE 1999-12-24

MUD & HOLE DATA

HOLE CONDITION @ TEST TIME:
EXCELLENT ☐ GOOD ☒ FAIR ☐ POOR ☐
WAS HOLE CONDITIONED PRIOR TO TEST: YES ☒ NO ☐
HOLE DEVIATION: YES ☐ NO ☒ AMOUNT DEGREES
CALIPER LOG RUN PRIOR TO TEST: YES ☐ NO ☒
CALIPERED HOLE SIZE @ TEST DEPTH MAX. mm
MUD TYPE INVERT
WEIGHT 1040 kg/m³ VISCOSITY 52 WATER LOSS 0
FILTER CAKE 0 mm
DRILL PIPE SIZE: O.D. 102 mm I.D. 65 mm WEIGHT 20.84 kg/m
DRILL COLLARS: O.D. 121 mm I.D. 56 mm RUN 169.30 m
MAIN HOLE OR CASING SIZE 155.5 mm
BOTTOM HOLE OR CHOKE SIZE 25.4 mm
PACKER RUBBER SIZE: DIAM. IN mm 140 LENGTH IN m 1.00
RUBBER LEFT IN HOLE: YES ☐ NO ☒
TOP PACKER: SERIAL No CONV. CONDITION 1
BTM PACKER: SERIAL No CONV. CONDITION 1

GAS MEASUREMENTS

MEASURED WITH:
SIDE STATIC ☐ CRITICAL FLOW PROVER ☐
FLOOR MANIFOLD ☐ ORIFICE WELL TESTER ☐
CLOSED CHAMBER ☐ OTHER TOO SMALL TO MEASURE
RISER SIZE

FLOW #	TIME	CHOKE mm	READING kPa	RATE m3/D

RECOVERY

RECOVERY VERIFICATION SIGNATURE:

TOTAL FLUID RECOVERED 1643 m CONSISTING OF:
643 m OF FRESH WATER SALINITY
1000 m OF INVERT CUT FRESH WTR SALINITY
m OF SALINITY
0 m OF MUD TANK SALINITY
TEST WAS REVERSED OUT: YES ☒ NO ☐

BTM. H. SAMPLER # 303 SENT TO AGAT
9858 / 5000 SENT TO AGAT

BAKER HUGHES

Baker Oil Tools

TEST TOOL & PIPE RECORD

Well Name: PARA ET AL FT. LI... Location: 60-05-123-22 Date 1999-12-24 Ticket # 809307

Interval Tested: from 1734.5 to 1740.0 Total Depth 1740.0 Test No. 5

CONVENTIONAL

Tool	Length
POS	0.33
XOS	0.30
POS	0.83
Car	1.38
RST	2.58
BHS	1.03
Hydr	1.50
Car	1.38
Jar	2.22
SJ	0.65
CP	2.30
CI	1.30
1734.5	Top Packer Seal Depth
CPSD	1.00
Perf	1.52
Car	2.05
Spg	.31
BNose	0.62
1740.0	Btm Packer Seal Depth

DRILL COLLARS

JOINT	LENGTH	JOINT	LENGTH
1	18.93	11	
2	18.78	12	
3	19.16	13	
4	18.91	14	
5	18.92	15	
6	19.06	16	
7	18.58	17	
8	18.46	18	
9	18.50	19	
10		20	
1st TOTAL	169.30	2nd TOTAL	
31	18.72	41	18.71
32	19.02	42	18.70
33	19.04	43	19.04
34	18.73	44	19.35
35	19.32	45	19.03
36	19.02	46	19.39
37	19.33	47	19.38
38	19.06	48	19.02
39	19.42	49	19.01
40	19.03	50	18.74
6th TOTAL	190.69	7th TOTAL	190.37
81	19.50	91	
82	9.71	92	
83	BOP .58	93	
84	9.74	94	
85		95	
86		96	
87		97	
88		98	
89		99	
90		100	
11th TOTAL	39.53	12th TOTAL	

DRILL PIPE

1	19.37	11	19.37	21	19.35
2	19.03	12	18.74	22	19.01
3	18.65	13	18.26	23	18.70
4	19.41	14	19.05	24	19.06
5	18.01	15	18.68	25	18.61
6	19.07	16	19.03	26	19.01
7	18.32	17	19.43	27	19.37
8	19.39	18	19.03	28	18.65
9	19.34	19	18.72	29	18.71
10	19.04	20	19.06	30	18.70
3rd TOTAL	189.63	4th TOTAL	189.37	5th TOTAL	189.17
51	18.73	61	19.04	71	19.39
52	19.08	62	18.33	72	18.72
53	19.06	63	17.98	73	19.06
54	18.78	64	19.45	74	19.50
55	18.36	65	19.07	75	18.45
56	18.75	66	19.08	76	19.69
57	19.39	67	18.74	77	19.49
58	19.38	68	19.40	78	19.59
59	19.06	69	18.67	79	19.09
60	18.70	70	19.05	80	19.49
8th TOTAL	189.29	9th TOTAL	188.81	10th TOTAL	192.47
101					
102					
103					
104					
105					
106					
107					
108					
109					
110					
13th TOTAL					

TOOL	21.30
1st TOTAL	169.30
2nd TOTAL	
3rd TOTAL	189.63
4th TOTAL	189.37
5th TOTAL	189.17
6th TOTAL	190.69
7th TOTAL	190.37
8th TOTAL	189.29
9th TOTAL	188.81
10th TOTAL	192.47
11th TOTAL	39.53
12th TOTAL	
13th TOTAL	

BEFORE TEST IN DERRICK

TOTAL DRILL COLLARS	18
TOTAL DRILL PIPE	162

TESTING	IN	OUT	TOTAL
DRILL COLLARS	18	0	18
DRILL PIPE	164	0	164

CONVENTIONAL PIPE TALLY

BELOW BOTTOM PACKER SEAL	
BETWEEN PACKER SEALS	5.50
TOOL ABOVE PACKER SEAL	15.80
DRILL COLLARS	169.30
DRILL PIPE	1559.33
TOTAL STRING	1749.93
TOTAL DEPTH	1740.00
TOP SINGLE ABOVE TABLE	9.93

INFLATE PIPE TALLY

TOOL ABOVE INTERVAL	
DRILL COLLARS	
DRILL PIPE	
TOTAL STRINGS ABOVE INTERVAL	
BOTTOM OF TOP PACKER SEAL DEPTH	
TOP SINGLE ABOVE TABLE	

INFLATABLE

Tool Length

Top Packer Seal Depth

Btm Packer Seal Depth

Tester Signature _____ Approved by Oil Co. Rep. _____

PARAMOUNT RESOURCES LTD.

DRILL STEM TEST REPORT

WELL NAME:	Para et al Ft. Liard				
LOCATION:	Pera et al Ft. Liard I - 46			DATE:	Dec - 24 - 1999
TEST COMPANY:	Baker Hughes			TESTER:	J. Paul Pugh
HOLE SIZE:	155.6 mm	WELL DEPTH:	1740M	DRILL PIPE SIZE:	101mm
		INTERVAL Top:	1734.5M		
DST #	5	INTERVAL Base:	1740M	ZONE:	M-3 Mattson
TYPE #	Bottom Hole	PACKER O.D.:	140mm		

TIMES		PRESSURES		PRESSURES	
PF	10 Mins.	IHP	17793	FFP	16104
ISI	60 Mins.	PF	5808	FSIP	16484
VO	60 Mins.	ISIP	9309	FHP	16939
FSI	120 Mins.	IFP	10426		

FLOW DESCRIPTION

FLOW: Very Strong Air Blow Immediately on Valve Open - Hose at Bottom of Water Pail at Start of Valve Open - Open Line to Flare Pit - No Gas to Surface - Blow Started to Decrease after 6 Mins of Valve Open - Shut in after 10 Mins.

VALVE OPEN:

Very Strong Air Blow when Valve was Opened - Open Line to Flare Pit - Had Gas to Surface after 30 Mins. - Small 1M Lazy Flare - Too Small to Measure - Decreasing During Valve Open.

GAS FLOW RATES:

TIME	ORIFICE SIZE (mm)	BACK PRESSURE (kPa)	RISER (mm)	RATE (m3/d)	NOTES

RECOVERY:

1640M Water - Small Amount of Salinity - 2200 PPM

Dropped Bar for Pump out Sub and Reverse Circ out Recovery to Vacuum Truck and Put Recovery in Slop Tank on Location to be sent to Disposal.

SAMPLES CAUGHT: YES - 6 Samples

SENT TO: AGAT - Gr Prairie

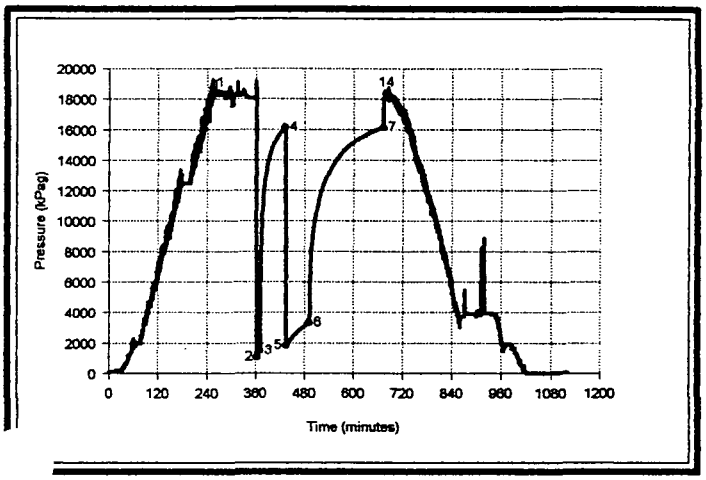
Broke Down and Layed Down Test Tools - Released Tester from Location - All Samples and Bottom Hole Sampler Taken by Tester for furtheance to AGAT Labs in Grande Prairie.

Baker Oil Tools

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST# 6

Formation: MATTSON
Interval - from: 1785.00 **to:** 1789.00 m

Recorder# N42 at 1787.00 m



Maximum Btm Hole Temperature @ FSI: 60.7 C

		Pressure (kPag)	*Time (min)*	*Extrapolated Pressure (kPag)*
1	Initial Hydrostatic	18324		
2	Start of 1st Flow	999		
3	End of 1st Flow	1444	7.5	
4	End of 1st Shut-in	16125	61.0	
5	Start of 2nd Flow	1787		
6	End of 2nd Flow	3293	56.5	
7	End of 2nd Shut-in	16113	180.5	
14	Final Hydrostatic	18299		

Liquid Recovery of 350.00 m

Test was reversed out.

Recovery	*Description*	*Salinity*
350.00 m	CLEAN SALT WATER	22000
0.00 m	MUDTANK SAMPLE	

Test Date: 2000-01-10
Test Type: INFLATE STRADDLE
Tester Name: SHELDON PRYSUNKA
Drill Pipe O.D.: 102.00 mm
Drill Collar I.D.: 53.00 mm
Drill Collar Length: 169.28 m
Hole Size: 156.00 mm

Blow Description:

PREFLOW - WEAK TO STRONG AIR BLOW IN 30 SECONDS. GAS TO SURFACE IN 2 MINUTES. BUILDING THROUGHOUT. SAMPLE TAKEN. AGAT 20075. FINAL FLOW - WEAK TO STRONG GAS BLOW IN 1.5 MIN. DEPLETING AT 35 MIN THROUGHOUT. SAMPLE TAKEN AGAT 21491

Remarks:

ON BOTTOM AT 14:45 HRS. PUMPED UP PACKERS FOR 30 MINUTES. CHECKED SEAT OK. OPENED TOOL AT 15:20 HRS. AT 35 MINUTES INTO THE MAINFLOW THE WELL STARTED TO DEPLETE. SURFACE RESULTS INDICATE AN INFLUX OF LIQUID. SUSPECT WATER DUE TO NO BREAKOUT DURING FINAL SHUTIN. REVERSED OUT AT FLUID. RECOVERED 350 M OF CLEAN SALT WATER WITH A SALINITY OF 22000 PPM. AT SURFACE FOUND BOTH PACKERS TORN AND HAD TO BE REPLACED.

Gas Measured with FLOOR MANIFOLD

Flow#	*Time (min)*	*Surface Choke (mm)*	*Surface Pressure (kPag)*	*Gas Rate (m3/day)*
1	10	6.35	280	2 242
2	10	6.35	50	846
2	20	6.35	90	1 088
2	30	6.35	110	1 210
2	40	6.35	100	1 149
2	50	6.35	90	1 088
2	60	6.35	60	907

Baker Oil Tools — FIELD REPORT

TEST DATA

TEST No 6 LUS. TEST No 6
FORMATION TESTED MATTSON T.D. 2055.00 m
INTERVAL TESTED: From 1785.00 m to 1789.00 m
INTERVAL TESTED 4.00 m
TYPE INFLATE STRADDLE RESET: YES ☐ NO ☒
CUSHION: YES ☐ NO ☒ TYPE AMOUNT m
STARTED IN HOLE @ 09:45 HRS. OPENED TOOL 15:20 HRS.
DATE & TIME OUT OF HOLE 2000-01-11 @ 02:45 HRS.
TEST TIMES:
PRE-FLOW 10 MIN. INITIAL SHUT-IN 60 MIN.
SECOND FLOW MIN. SECOND SHUT-IN MIN.
FINAL FLOW 60 MIN. FINAL SHUT-IN 180 MIN.
PRE-FLOW BLOW DESCRIPTION: WEAK TO STRONG AIR BLOW IN 30 SECONDS. GAS TO SURFACE IN 2 MINUTES. BUILDING THROUGHOUT. SAMPLE TAKEN. AGAT 20075.
FINAL FLOW BLOW DESCRIPTION: WEAK TO STRONG GAS BLOW IN 1.5 MIN. DEPLETING AT 35 MIN THROUGHOUT. SAMPLE TAKEN AGAT 21491

MECHANICAL RECORDERS

No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE
20755	☐ / ☒		☒ / ☐		☒ / ☐
DEPTH 1791.00 m		DEPTH m		DEPTH m	
CLOCK 33615		CLOCK		CLOCK	
REC. SEC. # 6379		REC. SEC. #		REC. SEC. #	
No.	☐ / ☐	No.	☐ / ☐	No.	☐ / ☐
DEPTH m		DEPTH m		DEPTH m	
CLOCK		CLOCK		CLOCK	
REC. SEC. #		REC. SEC. #		REC. SEC. #	

ELECTRONIC RECORDERS

No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE
P99	☒ / ☐	R85	☒ / ☐	N42	☐ / ☒
DE 1771.00 m		DEPTH 1776.00 m		DEPTH 1787.00 m	
TE		TEMP.		TEMP. 60.7	
FILE pi46fr.dec		FILE pi46f.dec		FILE pi46ff.dec	

FIELD READINGS

REC. No. DEFLECTION	PRESSURE kPa	REC. No. N42 DEFLECTION	PRESSURE kPa
1		1	18324.01
2		2	998.62
3		3	1443.56
4		4	16124.56
5		5	1786.76
6		6	3292.88
7		7	16113.42
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	18298.97

REMARKS

SEQUENCE OF TEST EVENTS:

ON BOTTOM AT 14:45 HRS. PUMPED UP PACKERS FOR 30 MINUTES. CHECKED SEAT OK. OPENED TOOL AT 15:20 HRS. AT 35 MINUTES INTO THE MAINFLOW THE WELL STARTED TO DEPLETE. SURFACE RESULTS INDICATE AN INFLUX OF LIQUID. SUSPECT WATER DUE TO NO BREAKOUT DURING FINAL SHUTIN. REVERSED OUT AT FLUID. RECOVERED 350 M OF CLEAN SALT WATER WITH A SALINITY OF 22000 PPM. AT SURFACE FOUND BOTH PACKERS TORN AND HAD TO BE REPLACED.

GENERAL INFORMATION

COMPANY PARAMOUNT RESOURCES LTD.
CONTACT IN CALGARY PAUL PRICE
CONTACT'S PHONE 403-290-3605 FAX
WELL NAME PARAMOUNT ET AL FT. LIARD I-46
LOCATION 60-10 / 123-15
K.B. 542.50 m GROUND ELEV 537.50 m
COMPANY REP WILBERT CALLIHOO
TESTER SHELDON PRYSUNKA
JAR No 209 HYDRAULIC TOOL No 123
UNIT # 35019 PUMP No P462
CONTRACTOR PRECISION DRLG. RIG No RIG 379
TICKET No 809343 DATE 2000-01-10

MUD & HOLE DATA

HOLE CONDITION @ TEST TIME:
EXCELLENT ☐ GOOD ☒ FAIR ☐ POOR ☐
WAS HOLE CONDITIONED PRIOR TO TEST: YES ☐ NO ☒
HOLE DEVIATION: YES ☒ NO ☐ AMOUNT 13 DEGREES
CALIPER LOG RUN PRIOR TO TEST: YES ☐ NO ☒
CALIPERED HOLE SIZE @ TEST DEPTH 156.00 MAX. mm
MUD TYPE INVERT
WEIGHT 1035 kg/m³ VISCOSITY 60 WATER LOSS 0
FILTER CAKE 1 mm
DRILL PIPE SIZE: O.D. 102 mm I.D. 65 mm WEIGHT 20.84 kg/m
DRILL COLLARS: O.D. 120 mm I.D. 53 mm RUN 169.28 m
MAIN HOLE OR CASING SIZE 156.00 mm
BOTTOM HOLE OR CHOKE SIZE 25.400 mm
PACKER RUBBER SIZE: DIAM. IN mm 139 LENGTH IN m 1.78
RUBBER LEFT IN HOLE: YES ☐ NO ☒
TOP PACKER: SERIAL No BAKER HI-TEMP CONDITION 5
BTM PACKER: SERIAL No BAKER HI-TEMP CONDITION 5

GAS MEASUREMENTS

MEASURED WITH:
SIDE STATIC ☐ CRITICAL FLOW PROVER ☐
FLOOR MANIFOLD ☒ ORIFICE WELL TESTER ☐
CLOSED CHAMBER ☐ OTHER
RISER SIZE

FLOW #	TIME	CHOKE mm	READING kPa	RATE m3/D
1	10	6.35	280	2242
2	10	6.35	50	846
2	20	6.35	90	1088
2	30	6.35	110	1210
2	40	6.35	100	1149
2	50	6.35	90	1088
2	60	6.35	60	907

RECOVERY

RECOVERY VERIFICATION SIGNATURE:

TOTAL FLUID RECOVERED 350.00 m CONSISTING OF:
350 m OF CLEAN SALT WATER SALINITY 22000
m OF SALINITY
m OF SALINITY
0 m OF MUDTANK SAMPLE SALINITY
TEST WAS REVERSED OUT: YES ☒ NO ☐

BTM. H. SAMPLER # 666 SENT TO AGAT
GAS BOMB # PF=20075/MF=21491 SENT TO AGAT
No. OF FLUID SAMPLES TAKEN 7 SENT TO AGAT

BAKER HUGHES

Baker Oil Tools

TEST TOOL & PIPE RECORD

Well . e: PARAMOUNT ET AL F... Location: 60-10 / 123-15 Date 2000-01-10 Ticket # 809343

Interval Tested: from 1785.00 to 1789.00 Total Depth 2055.00 Test No. 6

CONVENTIONAL

Tool | Length

DRILL COLLARS

JOINT	LENGTH	JOINT	LENGTH
1	18.94	11	
2	19.17	12	
3	18.79	13	
4	18.91	14	
5	19.07	15	
6	18.92	16	
7	18.57	17	
8	18.40	18	
9	18.51	19	
10		20	
1st TOTAL	169.28	2nd TOTAL	
31	19.05	41	18.69
32	18.67	42	18.68
33	17.94	43	19.07
34	19.37	44	19.07
35	18.73	45	19.03
36	19.00	46	18.29
37	18.72	47	19.06
38	18.32	48	19.04
39	18.69	49	19.39
40	18.71	50	19.40
6th TOTAL	187.20	7th TOTAL	189.72
81	19.49	91	
82	19.47	92	
83	19.49	93	
84	19.52	94	
85	0.57	95	
86	0.80	96	
87	0.54	97	
88	0.48	98	
89	0.40	99	
90		100	
11th TOTAL	80.76	12th TOTAL	

DRILL PIPE

1	19.08	11	19.04	21	18.71
2	19.08	12	19.03	22	18.71
3	19.37	13	18.98	23	18.74
4	18.72	14	19.09	24	19.37
5	19.01	15	19.35	25	19.40
6	19.02	16	18.72	26	19.40
7	19.06	17	19.36	27	19.12
8	19.04	18	19.09	28	19.40
9	19.05	19	19.06	29	19.40
10	18.71	20	18.36	30	19.02
3rd TOTAL	190.14	4th TOTAL	190.08	5th TOTAL	191.27
51	18.73	61	18.65	71	19.09
52	19.06	62	18.63	72	19.05
53	19.03	63	19.38	73	19.53
54	19.40	64	18.78	74	19.49
55	19.05	65	18.69	75	19.45
56	19.06	66	19.07	76	19.48
57	18.65	67	19.34	77	19.68
58	18.37	68	19.36	78	19.46
59	18.00	69	19.34	79	19.60
60	19.37	70	19.37	80	19.44
8th TOTAL	188.72	9th TOTAL	190.61	10th TOTAL	194.27
101					
102					
103					
104					
105					
106					
107					
108					
109					
110					
13th TOTAL					

Top Packer Seal Depth

Btm Packer Seal Depth

TOOL	14.94
1st TOTAL	169.28
2nd TOTAL	
3rd TOTAL	190.14
4th TOTAL	190.08
5th TOTAL	191.27
6th TOTAL	187.20
7th TOTAL	189.72
8th TOTAL	188.72
9th TOTAL	190.61
10th TOTAL	194.27
11th TOTAL	80.76
12th TOTAL	
13th TOTAL	

BEFORE TEST IN DERRICK

TOTAL DRILL COLLARS	18
TOTAL DRILL PIPE	194

TESTING

	IN	OUT	TOTAL
DRILL COLLARS	18	0	18
DRILL PIPE	168	26	194

CONVENTIONAL PIPE TALLY

BELOW BOTTOM PACKER SEAL	
BETWEEN PACKER SEALS	
TOOL ABOVE PACKER SEAL	
DRILL COLLARS	
DRILL PIPE	
TOTAL STRING	
TOTAL DEPTH	
TOP SINGLE ABOVE TABLE	

INFLATE PIPE TALLY

TOOL ABOVE INTERVAL	14.94
DRILL COLLARS	169.28
DRILL PIPE	1602.77
TOTAL STRINGS ABOVE INTERVAL	1786.99
BOTTOM OF TOP PACKER SEAL DEPTH	1785.00
TOP SINGLE ABOVE TABLE	1.99

INFLATABLE

Tool	Length
POS	0.33
XOS	0.30
POS	0.83
Car	1.38
Hydr	1.50
BHS	1.03
Car	1.38
Jar	2.22
SJ	0.65
Pump	2.38
Scr	1.16
TPack	1.78
1785.0 Top Packer Seal Depth	
PSD	0.82
PS	0.42
Car	2.04
Spg	0.30
PSU	0.42
1789.0 Btm Packer Seal Depth	
BPack	1.90
Car	0.00
Perf	0.30
BS	2.00

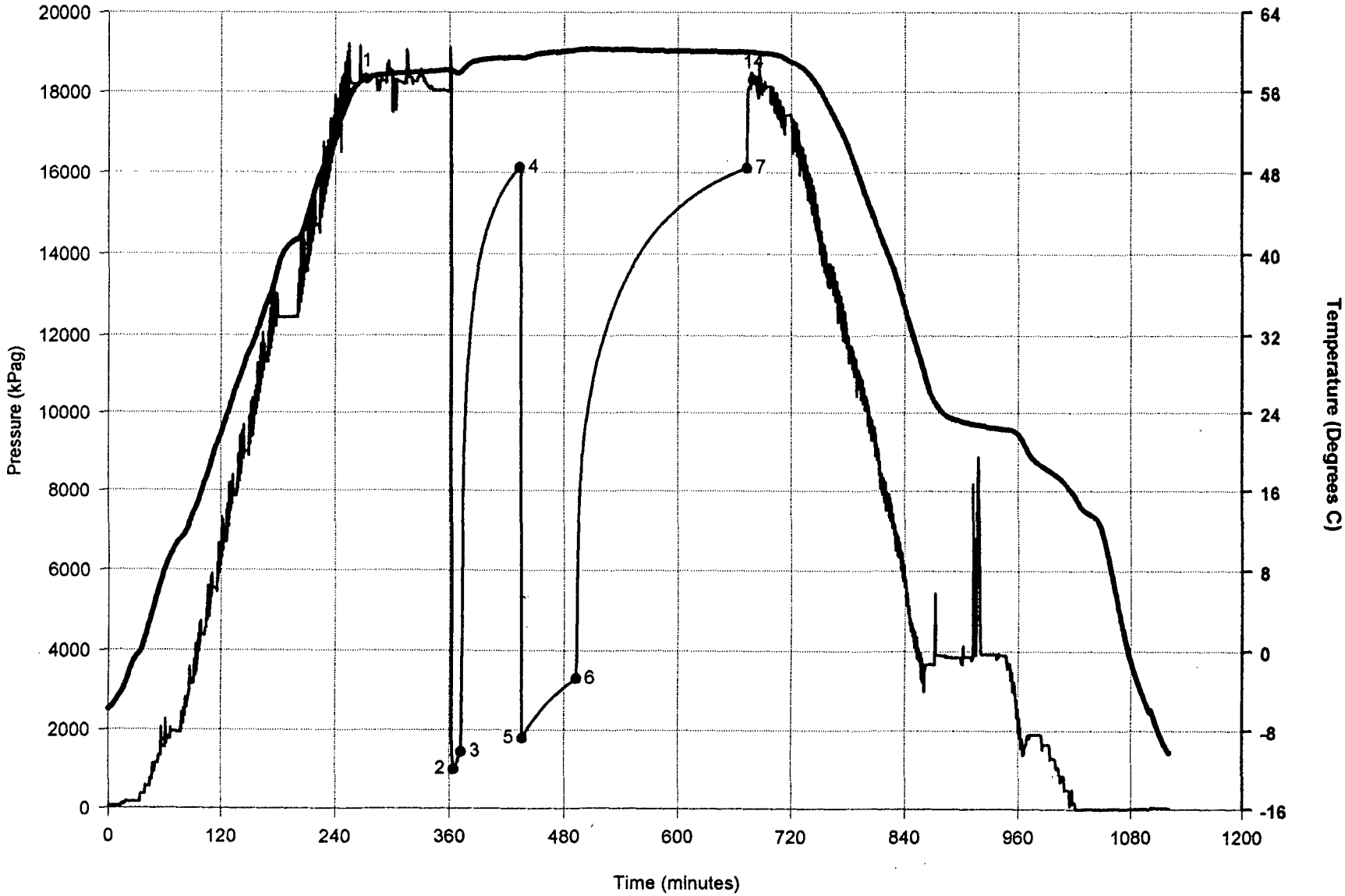
Tester Signature _____ Approved by Oil Co. Rep. _____

Baker Oil Tools Drill Stem Testing

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST #: 6
Recorder: N42

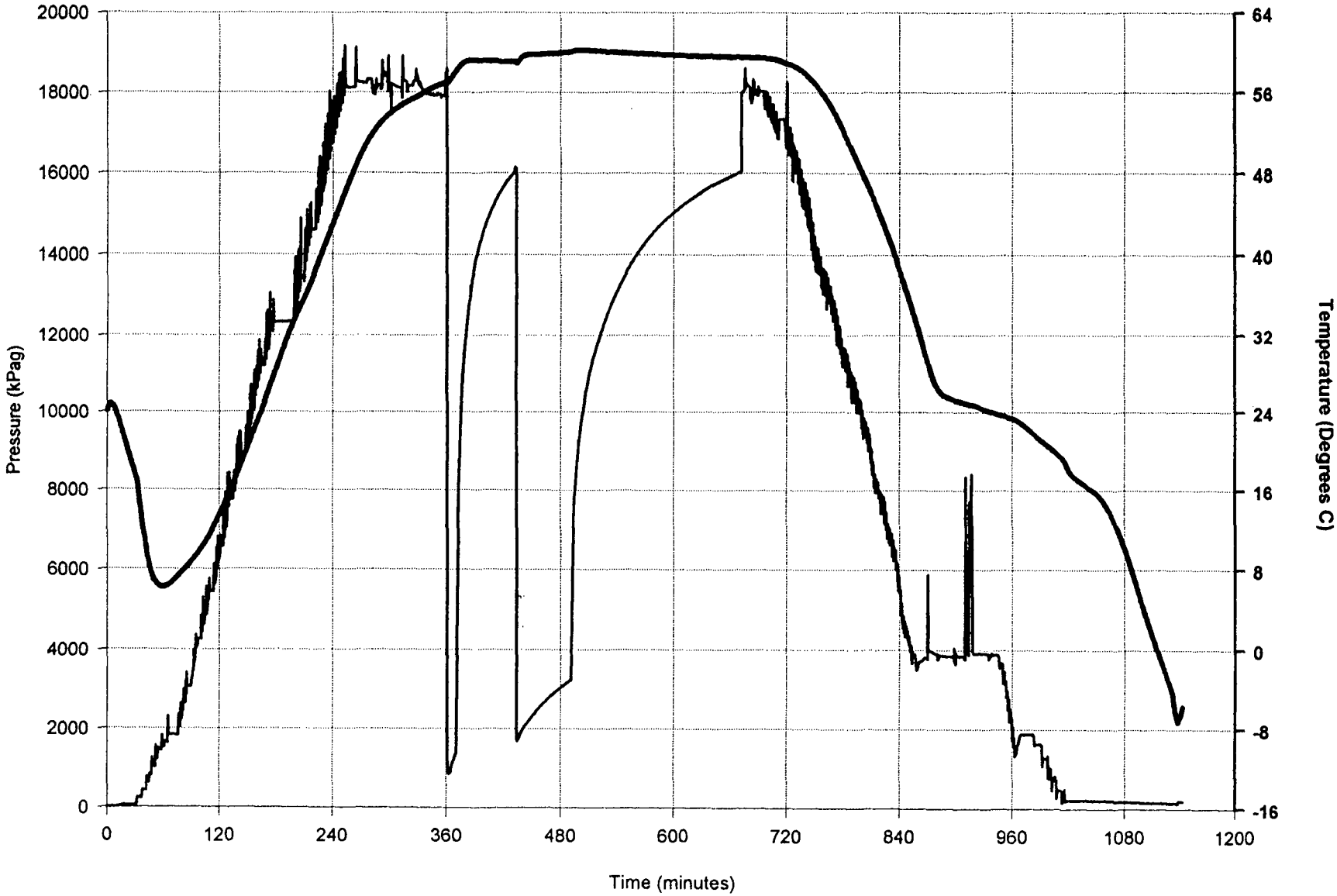
Pressure (kPag) at Critical Points:

1:	18324	4:	16125	7:	16113
2:	999	5:	1787	14:	18299
3:	1444	6:	3293		



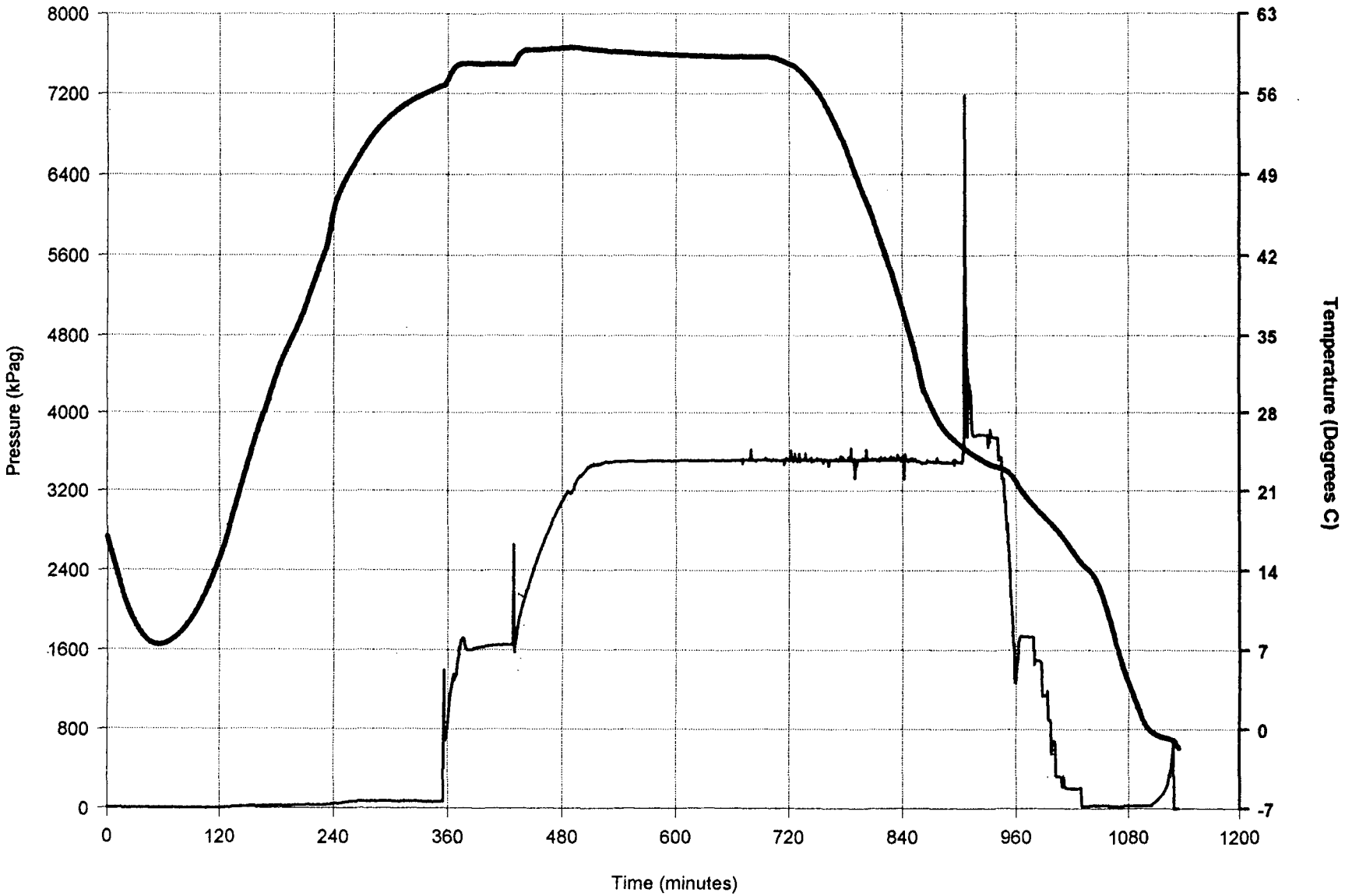
Baker Oil Tools Drill Stem Testing

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST #: 6
Recorder: R85



Baker Oil Tools Drill Stem Testing

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST #: 6
Recorder: P99



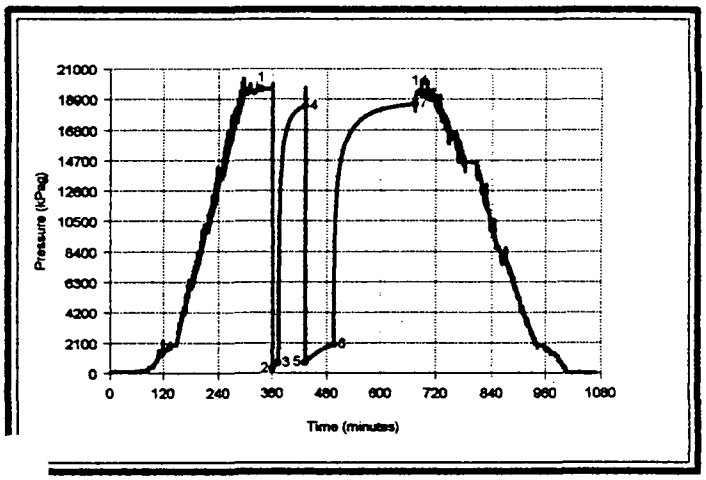
BAKER HUGHES

Baker Oil Tools

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST# 7

Formation: MATTSON
Interval - from: 1899.00 **to:** 1903.00 m

Recorder# N42 at 1901.00 m



Maximum Btm Hole Temperature @ FSI: 64.0 C

		Pressure (kPag)	*Time (min)*	*Extrapolated Pressure (kPag)*
1	Initial Hydrostatic	19551		
2	Start of 1st Flow	264		
3	End of 1st Flow	643	12.5	
4	End of 1st Shut-in	18412	58.5	
5	Start of 2nd Flow	693		
6	End of 2nd Flow	1954	61.0	
7	End of 2nd Shut-in	18539	179.5	
14	Final Hydrostatic	19344		

Liquid Recovery of 160.00 m

[redacted]

Recovery	*Description*	*Salinity*
40.00 m	WATER CUT INVERT	
120.00 m	SALT WATER	50000
0.00 m	MUDTANK SAMPLE	

Test Date: 2000-01-11
Test Type: INFLATE STRADDLE
Tester Name: SHELDON PRYSUNKA
Drill Pipe O.D.: 102.00 mm
Drill Collar I.D.: 53.00 mm
Drill Collar Length: 169.28 m
Hole Size: 156.00 mm

Blow Description:

PREFLOW - VERY WEAK TO WEAK AIR BLOW 10 CM IN PAIL AT 10 MINUTES. BUILDING THROUGHOUT. NO GAS TO SURFACE. FINAL FLOW - VERY WEAK TO WEAK 10 CM IN PAIL AT 25 MIN. STEADY THROUGHTOUT. NO GAS TO SURFACE. PRESUME LIQUID INFLUX.

Remarks:

ON BOTTOM AT 10:30 HRS. PUMPED UP PACKERS FOR 30 MINUTES. CHECKED SEAT OK. OPENED TOOL AT 11:06 HRS. FIRST THREE STANDS OFF BOTTOM WERE VERY TIGHT. .40 M OF THE BOTTOM PACKER RUBBER STAYED IN THE HOLE.

Baker Oil Tools — FIELD REPORT

TEST DATA

TEST No 7 LUS. TEST No 7
FORMATION TESTED MATTSON T.D. 2055.00 m
INTERVAL TESTED: From 1899.00 m to 1903.00 m
INTERVAL TESTED 4.00 m
TYPE INFLATE STRADDLE RESET: YES ☐ NO ☒
CUSHION: YES ☐ NO ☒ TYPE AMOUNT m
STARTED IN HOLE @ 06:30 HRS. OPENED TOOL 11:06 HRS.
DATE & TIME OUT OF HOLE 2000-01-11 @ 21:45 HRS.
TEST TIMES:
PRE-FLOW 10 MIN. INITIAL SHUT-IN 60 MIN.
SECOND FLOW MIN. SECOND SHUT-IN MIN.
FINAL FLOW 60 MIN. FINAL SHUT-IN 180 MIN.
PRE-FLOW BLOW DESCRIPTION: VERY WEAK TO WEAK AIR BLOW 10 CM IN PAIL AT 10 MINUTES. BUILDING THROUGHOUT. NO GAS TO SURFACE.

FINAL FLOW BLOW DESCRIPTION: VERY WEAK TO WEAK 10 CM IN PAIL AT 25 MIN. STEADY THROUGHTOUT. NO GAS TO SURFACE. PRESUME LIQUID INFLUX.

MECHANICAL RECORDERS

No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE
20755	☐ / ☒		☒ / ☐		☒ / ☐
DEPTH 1905.00 m		DEPTH m		DEPTH m	
CLOCK 33615		CLOCK		CLOCK	
REC. SEC. # 6379		REC. SEC. #		REC. SEC. #	
No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE
	☐ / ☐		☐ / ☐		☐ / ☐
DEPTH m		DEPTH m		DEPTH m	
CLOCK		CLOCK		CLOCK	
REC. SEC. #		REC. SEC. #		REC. SEC. #	

ELECTRONIC RECORDERS

No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE	No.	INSIDE / OUTSIDE
P99	☒ / ☐	R85	☒ / ☐	N42	☐ / ☒
DEPTH 1885.00 m		DEPTH 1890.00 m		DEPTH 1901.00 m	
TEMP.		TEMP.		TEMP. 64.0	
FILE 46gr.dec		FILE pi46g.dec		FILE pi46gg.dec	

FIELD READINGS

REC. No. DEFLECTION	PRESSURE kPa	REC. No. N42 DEFLECTION	PRESSURE kPa
1		1	19551.20
2		2	264.20
3		3	642.72
4		4	18411.77
5		5	693.44
6		6	1953.81
7		7	18539.29
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	19344.38

REMARKS

SEQUENCE OF TEST EVENTS:

ON BOTTOM AT 10:30 HRS. PUMPED UP PACKERS FOR 30 MINUTES. CHECKED SEAT OK. OPENED TOOL AT 11:06 HRS. FIRST THREE STANDS OFF BOTTOM WERE VERY TIGHT. .40 M OF THE BOTTOM PACKER RUBBER STAYED IN THE HOLE.

GENERAL INFORMATION

COMPANY PARAMOUNT RESOURCES LTD.
CONTACT IN CALGARY PAUL PRICE
CONTACT'S PHONE 403-290-3605 FAX
WELL NAME PARAMOUNT ET AL FT. LIARD I-46
LOCATION 60-10 / 123-15
K.B. 542.50 m GROUND ELEV 537.50 m
COMPANY REP WILBERT CALLIHOO
TESTER SHELDON PRYSUNKA
JAR No 209 HYDRAULIC TOOL No 123
UNIT # 35019 PUMP No P462
CONTRACTOR PRECISION DRLG. RIG No RIG 379
TICKET No 809344 DATE 2000-01-11

MUD & HOLE DATA

HOLE CONDITION @ TEST TIME:
EXCELLENT ☐ GOOD ☒ FAIR ☐ POOR ☐
WAS HOLE CONDITIONED PRIOR TO TEST: YES ☐ NO ☒
HOLE DEVIATION: YES ☒ NO ☐ AMOUNT 13 DEGREES
CALIPER LOG RUN PRIOR TO TEST: YES ☒ NO ☐
CALIPERED HOLE SIZE @ TEST DEPTH 156.00 MAX. mm
MUD TYPE INVERT
WEIGHT 1035 kg/m^3 VISCOSITY 60 WATER LOSS 0
FILTER CAKE 1 mm
DRILL PIPE SIZE:O.D. 102 mm I.D. 65 mm WEIGHT 20.84 kg/m
DRILL COLLARS:O.D. 120 mm I.D. 53 mm RUN 169.28 m
MAIN HOLE OR CASING SIZE 156.00 mm
BOTTOM HOLE OR CHOKE SIZE 25.400 mm
PACKER RUBBER SIZE: DIAM. IN mm 139 LENGTH IN m 1.78
RUBBER LEFT IN HOLE: YES ☐ NO ☒
TOP PACKER: SERIAL No BAKER HI-TEMP CONDITION 5
BTM PACKER: SERIAL No BAKER HI-TEMP CONDITION 2

GAS MEASUREMENTS

MEASURED WITH:
SIDE STATIC ☐ CRITICAL FLOW PROVER ☐
FLOOR MANIFOLD ☒ ORIFICE WELL TESTER ☐
CLOSED CHAMBER ☐ OTHER
RISER SIZE

FLOW #	TIME	CHOKE mm	READING kPa	RATE m3/D

RECOVERY

RECOVERY VERIFICATION SIGNATURE:

TOTAL FLUID RECOVERED 160.00 m CONSISTING OF:
40 m OF WATER CUT INVERT SALINITY
120 m OF SALT WATER SALINITY 50000
m OF SALINITY
0 m OF MUDTANK SAMPLE SALINITY
TEST WAS REVERSED OUT: YES ☒ NO ✖

BTM. H. SAMPLER # 777 SENT TO AGAT
GAS BOMB # NO GAS TO SURFACE SENT TO AGAT
No. OF FLUID SAMPLES TAKEN 3 SENT TO AGAT

BAKER HUGHES

TEST TOOL & PIPE RECORD

Baker Oil Tools

Well Name: PARAMOUNT ET AL F... Location: 60-10 / 123-15 Date 2000-01-11 Ticket # 809344

Interval Tested: from 1899.00 to 1903.00 Total Depth 2055.00 Test No. 7

CONVENTIONAL

Tool | Length

Top Packer Seal Depth

Btm Packer Seal Depth

DRILL COLLARS

JOINT	LENGTH	JOINT	LENGTH
1	18.94	11	
2	19.17	12	
3	18.79	13	
4	18.91	14	
5	19.07	15	
6	18.92	16	
7	18.57	17	
8	18.40	18	
9	18.51	19	
10		20	
1st TOTAL	169.28	2nd TOTAL	
31	18.71	41	18.63
32	19.03	42	19.38
33	19.40	43	18.78
34	19.05	44	18.68
35	19.05	45	19.06
36	18.64	46	19.34
37	19.37	47	19.35
38	17.99	48	19.33
39	19.36	49	18.36
40	18.65	50	18.74
6th TOTAL	189.25	7th TOTAL	189.65
81	19.50	91	0.57
82	19.47	92	
83	19.49	93	
84	19.48	94	
85	19.49	95	
88	19.43	96	
87	19.48	97	
88	19.48	98	
89	19.52	99	
90	19.48	100	
11th TOTAL	194.82	12th TOTAL	0.57

DRILL PIPE

1	19.08	11	19.04	21	19.04
2	19.08	12	19.03	22	18.98
3	19.39	13	19.07	23	19.08
4	18.72	14	18.28	24	19.35
5	19.01	15	19.05	25	18.72
6	19.02	16	19.04	26	19.37
7	19.06	17	19.39	27	19.09
8	19.04	18	19.40	28	19.06
9	19.06	19	18.73	29	18.36
10	18.71	20	19.06	30	18.72
3rd TOTAL	190.17	4th TOTAL	190.09	5th TOTAL	189.77
51	19.37	61	19.38	71	19.10
52	19.40	62	18.73	72	19.07
53	19.40	63	19.02	73	19.53
54	19.12	64	18.73	74	19.50
55	19.39	65	18.34	75	19.45
56	19.40	66	18.69	76	19.48
57	19.01	67	18.72	77	19.69
58	19.05	68	18.69	78	19.46
59	18.67	69	18.69	79	19.60
60	17.96	70	19.07	80	19.45
8th TOTAL	190.77	9th TOTAL	188.06	10th TOTAL	194.33
101					
102					
103					
104					
105					
106					
107					
108					
109					
110					
13th TOTAL					

BEFORE TEST IN DERRICK

TOTAL DRILL COLLARS	18
TOTAL DRILL PIPE	194

TESTING

	IN	OUT	TOTAL
DRILL COLLARS	18	0	18
DRILL PIPE	180	14	194

CONVENTIONAL PIPE TALLY

BELOW BOTTOM PACKER SEAL	
BETWEEN PACKER SEALS	
TOOL ABOVE PACKER SEAL	
DRILL COLLARS	
DRILL PIPE	
TOTAL STRING	
TOTAL DEPTH	
TOP SINGLE ABOVE TABLE	

TOOL	14.94
1st TOTAL	169.28
2nd TOTAL	
3rd TOTAL	190.17
4th TOTAL	190.09
5th TOTAL	189.77
6th TOTAL	189.25
7th TOTAL	189.65
8th TOTAL	190.77
9th TOTAL	188.06
10th TOTAL	194.33
11th TOTAL	194.82
12th TOTAL	0.57
13th TOTAL	

INFLATE PIPE TALLY

TOOL ABOVE INTERVAL	14.94
DRILL COLLARS	169.28
DRILL PIPE	1717.48
TOTAL STRINGS ABOVE INTERVAL	1901.70
BOTTOM OF TOP PACKER SEAL DEPTH	1899.00
TOP SINGLE ABOVE TABLE	2.70

INFLATABLE

Tool	Length
POS	0.33
XOS	0.30
POS	0.83
Car	1.38
Hydr	1.50
BHS	1.03
Car	1.38
Jar	2.22
SJ	0.65
Pump	2.38
Scr	1.16
TPack	1.78
1899.0 Top Packer Seal Depth	
PSD	0.82
PS	0.42
Car	2.04
Spg	0.30
PSU	0.42
1903.0 Btm Packer Seal Depth	
BPack	1.90
Car	0.00
Perf	0.30
BS	2.00

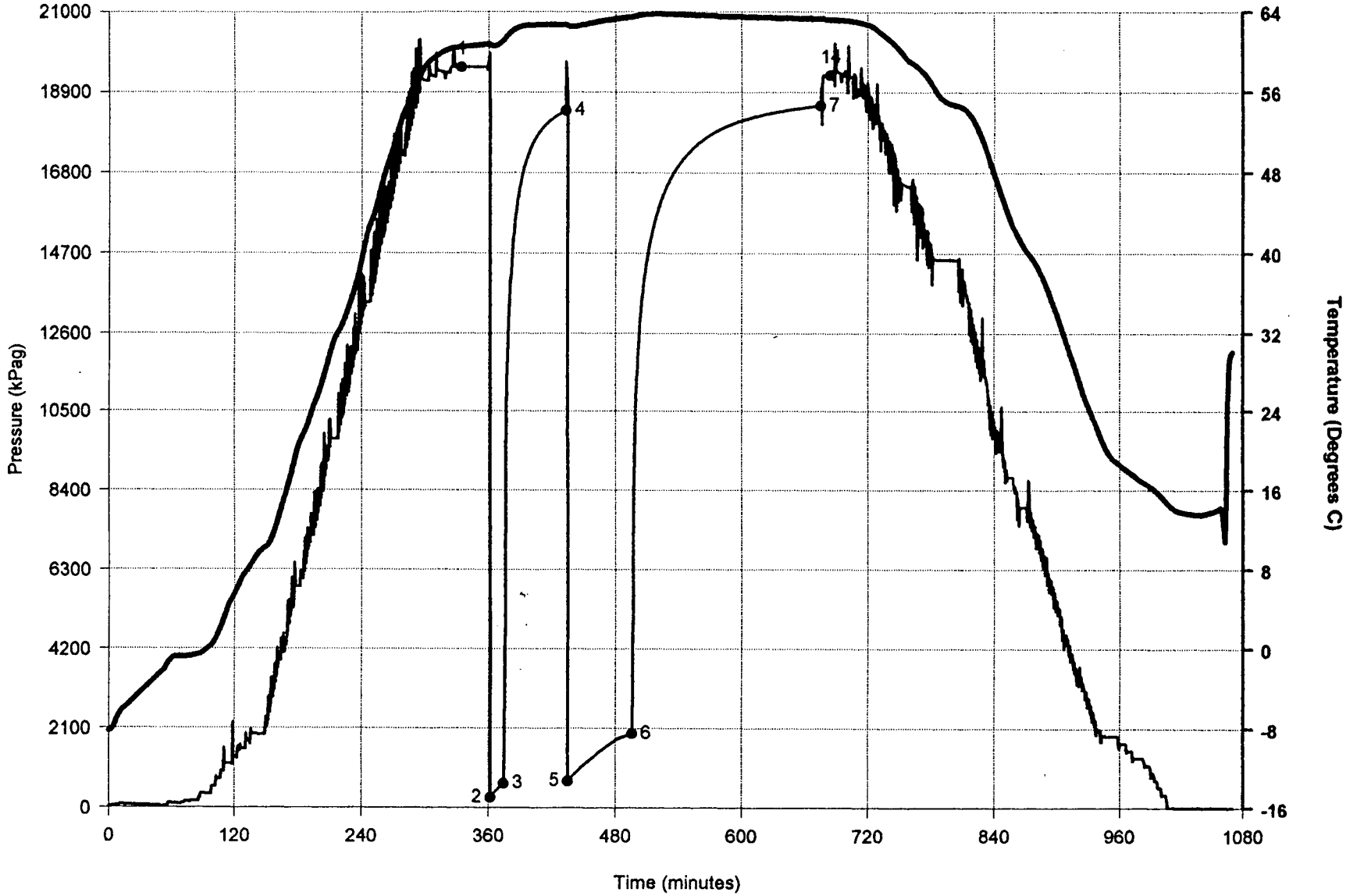
Tester Signature _____ Approved by Oil Co. Rep. _____

Baker Oil Tools Drill Stem Testing

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST #: 7
Recorder: N42

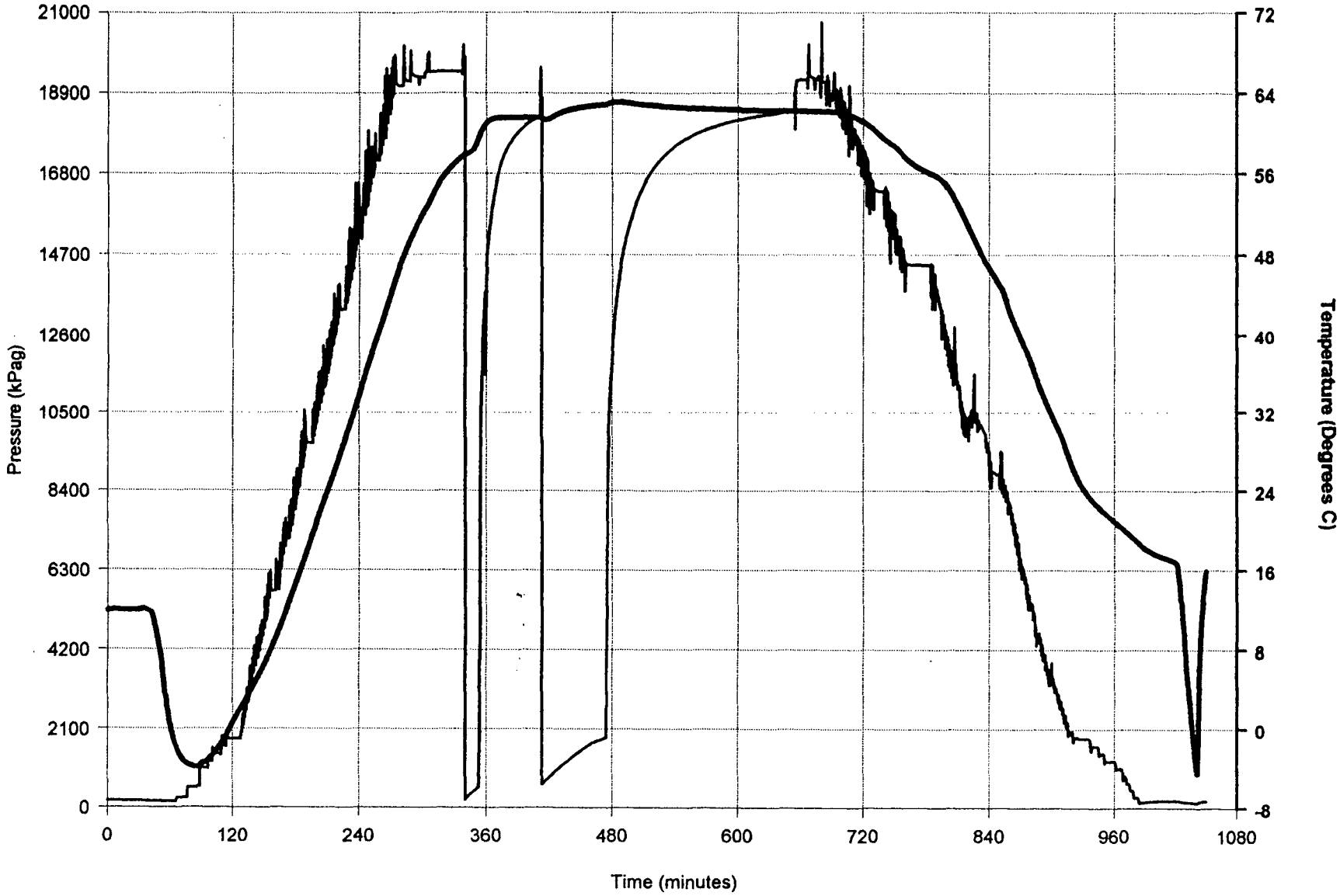
Pressure (kPag) at Critical Points:

1:	19551	4:	18412	7:	18539
2:	264	5:	693	14:	19344
3:	643	6:	1954		



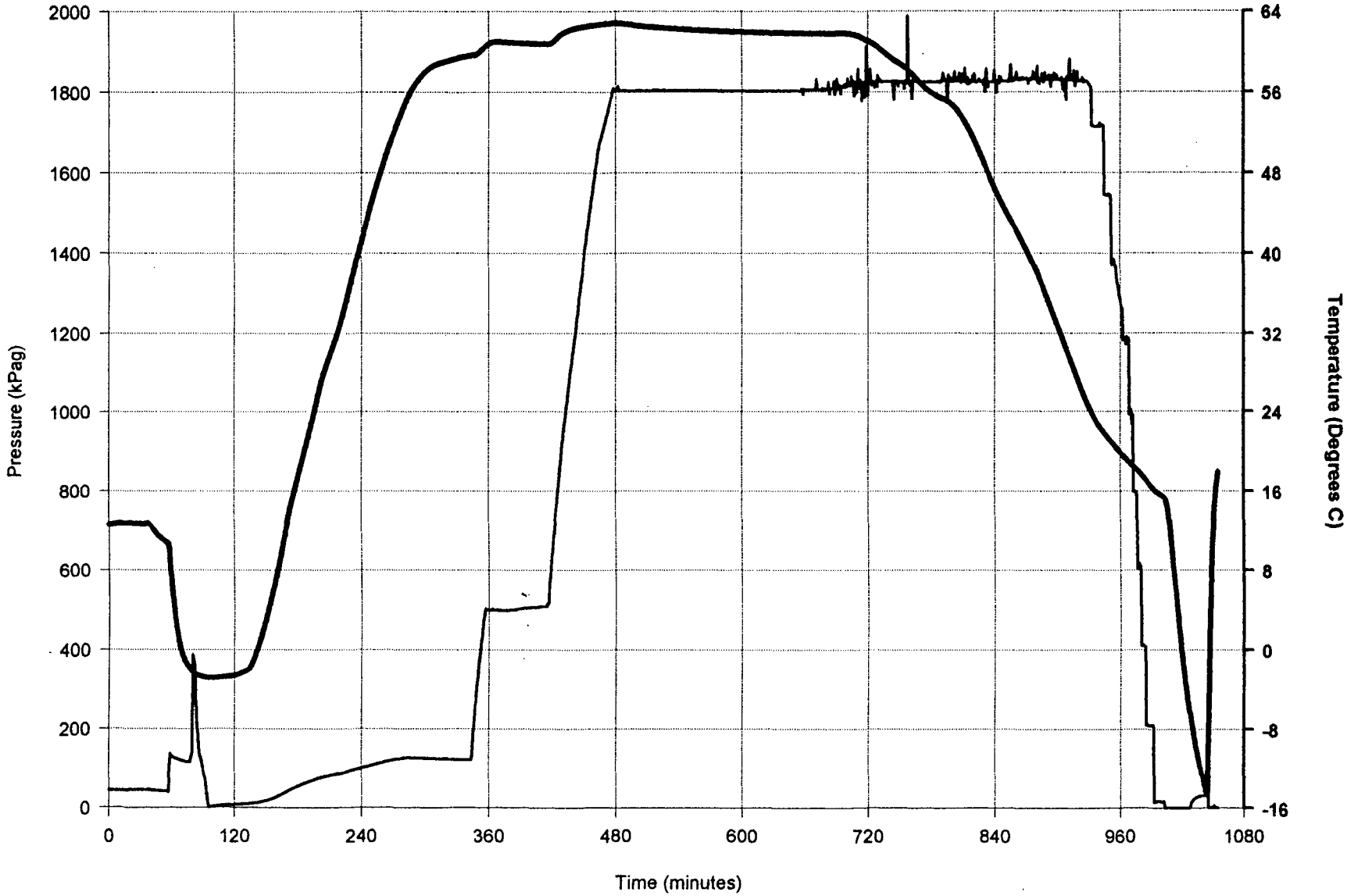
Baker Oil Tools Drill Stem Testing

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST #: 7
Recorder: R85



Baker Oil Tools Drill Stem Testing

PARAMOUNT ET AL FT. LIARD I-46
60-10 / 123-15
DST #: 7
Recorder: P99



DAILY DRILLING SUMMARY

Paramount et al Liard NWT I-46

Midnight			Drilling	ROP	Mud Properties				
Date	Depth	Progress	Hours	(m/hr)	Density	Vis	WL	pH	Operations Summary
11 Nov	0.0	0.0	0.00	n/a	-	-	-	-	Continue rig-up, rig to spud.
12 Nov	51.0	35.0	6.25	5.6	1010	65-68	-	11.0	Complete rig to spud, wait on fuel, spud well @ 14:00hrs, drill from 0-51m.
13 Nov	159.0	108.0	20.25	5.3	1050-1070	54-62	-	8.5-9.0	Drill 51m to 159m.
14 Nov	200.0	41.0	18.75	2.2	1090-1100	51-55	-	8.5	Drill 159m to 190m, trip for bit, RIH with 222mm bit, drill pilot hole from 190m to 200m.
15 Nov	298.0	98.0	22.25	4.4	1105-1150	51-52	-	8.5	Drill 222mm hole from 200m to 298m.
16 Nov	380.0	82.0	21.75	3.8	1130-1185	49-53	-	8.0-9.0	Drill 222mm hole from 298m to 380m.
17 Nov	479.0	99.0	21.50	4.6	1105-1130	50-52	-	8.5-9.0	Drill 222mm hole from 380m to 479m.
18 Nov	506.0	27.0	5.5	4.9	1130-1135	53-55	-	8.5-9.0	Drill from 479m to 506m (sfc. csg. TD), POOH sideways to ream pilot hole, lay down drill pipe, P.U. 311mm bit, RIH, ream 311mm hole from 190m to 333m.
19 Nov	506.0	0.0	0	0.0	1130	54	-	8.5	Ream 311mm hole from 333-343m, back-ream tight hole (2.5hrs), ream from 343m to 444m.
Nov	506.0	0.0	0.00	0.0	1145	142	-	8.5	Ream from 444m to 495m, back-ream & work through tight hole from 435m (3.5hrs), POOH, RIH & re-ream from 466m to 495m, ream 311mm hole from 495m to 506m, commence wiper trip.
21 Nov	506.0	0.0	0.00	0.0	-	-	-	-	Complete wiper trip, rig to & run 244.5mm casing, rig to & cement casing, WOC, weld casing bowl, P.U. & assemble BOP stack.
22 Nov	506.0	0.0	0.00	0.0	-	-	-	-	Complete n.u. BOPs, press. test BOPs, make up BHA for mud-motor, p.u. directional tools & RIH, pressure test pipe rams & annular preventer.
23 Nov	628.0	123.0	9.50	12.9	960	53	-	-	Lay down pipe, displace hole to invert mud, drillout cement, drill from 506-628m.
24 Nov	842.0	214.0	19.00	11.3	955-965	48-58	-	-	Drill from 628m to 842m.
25 Nov	968.0	126.0	10.75	11.7	955-965	54-59	-	-	Drill from 842m to 849m, POOH for bit, RIH, ream from 790m to 848m, drill from 849m to 968m.
26 Nov	1233.0	265.0	20.50	12.9	960-970	51-57	-	-	Drill from 968m to 1233m.
27 Nov	1273.0	40.0	7.25	5.5	965-970	55-57	-	-	Drill from 1233m to 1273m, POOH for bit, lay down dir. tools, RIH, ream from 635-705m (5hrs), RIH to 708m.
28 Nov	1338.0	65.0	12.00	5.4	960-965	51-55	-	-	Work tight hole & ream from 708-806m (5hrs), RIH to 1226m, ream hole to bottom (3.25hrs), drill from 1273-1338m.
29 Nov	1360.0	22.0	13.75	1.6	970-990	51-55	-	-	Drill from 1338-1360m, POOH for bit, commence RIH.
J Nov	1393.0	33.0	19.00	1.7	995-1010	55-57	-	-	Complete RIH, drill 1360-1393m, commence POOH to P.U. directional tools.
01 Dec	1418.0	25.0	13.75	1.8	1010-1030	52-56	-	-	Complete POOH, P.U. directional tools, RIH, drill from 1393-1418m.

02 Dec	1437.0	19.0	15.25	1.2	1010	49-50	-	-	Drill 1418-1437m, POOH for bit, commence RIH.
03 Dec	1466.0	29.0	16.50	1.8	1010-1025	49-52	-	-	Complete RIH, ream from 1406-1437m (3.25hrs), commence POOH for bit.
Dec	1494.0	28.0	16.75	1.7	1030-1040	49-52	-	-	Complete POOH, RIH, drill from 1466-1494m.
05 Dec	1536.0	40.4	22.75	1.8	1040	47-48	-	-	Drill from 1494-1536m.
06 Dec	1545.0	9.0	5.25	1.6	1040-1060	48-51	-	-	Drill from 1536-1545m, POOH & lay down dir. tools, RIH to bottom & circulate, POOH, rig to & commence logging.
07 Dec	1545.0	0.0	0.00	-	-	-	-	-	Complete logging, WOO, rig to & commence DST #1.
08 Dec	1545.0	0.0	0.00	-	-	-	-	-	Complete DST #1, POOH, recover recorders, make up DST #2, RIH, misrun DST #2 (no seat), POOH & lay down test tool, commence RIH with bit.
09 Dec	1545.0	0.0	0.00	-	-	-	-	-	RIH with bit, circ. & cond. hole, POOH for test tool, make up DST #3, RIH, misrun (no seat), POOH, commence WO test tools.
10 Dec	1545.0	0.0	0.00	-	-	-	-	-	WO test tools, make up DST #4, RIH, run DST #4, POOH & recover recorders, make up fishing tools & commence RIH.
11 Dec	1545.0	0.0	0.00	-	-	-	-	-	RIH with fishing tools, circ. & fish for belly spring, hoist fishing tools, WO fishing tools, RIH with fishing tools & fish, commence POOH with fishing tools.
2 Dec	1545.0	0.0	0.00	-	-	-	-	-	POOH with fishing tools, recover fish & lay down tools, RIH for clean-out trip, circulate, POOH, rig to & run int. csg.
13 Dec	1545.0	0.0	0.00	-	-	-	-	-	Circulate, rig to & cement casing, WOC, renipple up BOPs & air drilling equipment.
14 Dec	1545.0	0.0	0.00	-	-	-	-	-	Rig in air equip., nipple up underbalanced equip., press. test, nipple up airflow lines & valves, RIH, drill out cement to 1542m.
15 Dec	1547.0	2.0	3.00	0.7	-	-	-	-	Drill out cmt, drill 1545-1547m, run LOT, POOH to run string floats, RIH, displace to air, POOH for air-hammer, make up BHA.
16 Dec	1598.0	51.0	10.25	5.0	-	-	-	-	RIH, drill from 1547-1597m, POOH, RIH, drill 1597-98m.
17 Dec	1638.0	40.0	10.75	3.7	-	-	-	-	Drill 1598-1638m, blow out hole, POOH, RIH, circulate.
18 Dec	1669.0	31.0	6.75	4.6	-	-	-	-	Circulate, drill 1638-1639m, air hammer not working, run soap & diesel flush, POOH, change out hammer & jars, RIH, drill 1639-1650m, blow hole, run soap flush, drill 1650-1669m.
19 Dec	1672.0	3.0	2.25	1.3	-	-	-	-	Drill 1669-1670m, blow hole, POOH for bit, RIH, drill from 1670-1671m, circ. & work pipe, drill 1671-1672m, POOH to p.u. tri-cone bit, RIH.
20 Dec	1685.0	13.0	4.50	2.9	-	-	-	-	RIH, drill 1672-1683m, work string, circ. & cond. well (taking on fluid), drill 1683-1685m, displace hole to water & kill well, displace to invert, commence POOH.

21 Dec	1688.0	3.0	3.50	0.9	1020	53	-	-	POOH, rig out air equip., rig up flow nipple & line, RIH, drill 1685-1687m, POOH for bit, RIH, drill 1687-1688m.
22 Dec	1716.0	28.0	23.25	1.2	1035	51	-	-	Drill 1688-1716m.
Dec	1740.0	24.0	15.50	1.6	1035-1040	51-52	-	-	Drill 1716-1740m, POOH for DST, make up DST tool.
24 Dec	1740.0	0.0	0.00	0.0	1040	51	-	-	Make up DST tool, RIH, run DST, commence POOH, reverse circ. water out, POOH, lay down DST tool, RIH, slip & cut, circulate.
25 Dec	1777.0	37.0	22.00	1.7	1040-1050	53-62	-	-	Circulate, survey, drill 1740-1777m.
26 Dec	1802.0	25.0	19.00	1.3	1035-1055	54-56	-	-	Drill 1777-1802m, circulate, POOH for bit.
27 Dec	1814.5	12.5	15.25	0.8	1035-1040	55-57	-	-	POOH, drill 1802-1814.5m, POOH for bit, commence RIH.
28 Dec	1835.0	20.5	19.50	1.1	1025-1040	55-60	-	-	Complete RIH, ream 4m,drill 1814.5-
29 Dec	1852.0	17.0	17.50	1.0	1025-1030	55-58	-	-	Drill 1835-1852m, POOH for bit, start RIH.
30 Dec	1874.5	22.5	15.50	1.5	1040	57-58	-	-	RIH, drill 1852-1873m, work pipe (torquing up), drill 1873-1874.5m, POOH for bit.
31 Dec	1888.0	13.5	11.75	1.2	1035	60	-	-	POOH, RIH with bit, drill 1874.5-1888m, POOH for bit, RIH, commence drilling.
01 Jan	1922.0	34.0	22.25	1.5	1035-1045	58-62	-	-	Drill 1888-1921, survey, drill 1921-1922m.
02 Jan	1949.0	27.0	23.50	1.2	1035-1040	59-60	-	-	Drill 1922-1949m.
03 Jan	1967.0	18.0	13.25	1.4	1035	59	-	-	Drill 1949-1960, POOH for bit, RIH, drill 1960-1967m.
04 Jan	1999.0	32.0	22.00	1.5	1035-1040	58-60	-	-	Drill 1967-1999m.
05 Jan	2014.0	15.0	13.50	1.1	1035	59-62	-	-	Drill 1999-2006m, POOH for bit, RIH, drill 2006-2014m.
06 Jan	2030.0	16.0	16.00	1.0	1035-1040	62-63	-	-	Drill 2014-2030m, POOH for bit (missing pieces), make up mill, RIH with mill.
07 Jan	2045.0	15.0	9.00	1.7	1035-1040	62-65	-	-	RIH, mill to 2031m, POOH, RIH with bit, drill 2031-2045m.
08 Jan	2055.0	10.0	8.75	1.1	1035	60-63	-	-	Drill 2045-2055m (FTD @ 0900hrs), circulate, survey, strap out of hole, rig to & start logging Run #1 with Baker Hughes.
09 Jan	2055.0	0.0	n/a	n/a	-	-	-	-	Finish Run #1, log Run #2, log Run #3 (RFT #1), start logging Run #4 (RFT #2).
10 Jan	2055.0	0.0	n/a	n/a	-	-	-	-	Finish Run #4, rig out loggers, make up DST tool, RIH, run DST #6, POOH, reverse circulate.
11 Jan	2055.0	0.0	n/a	n/a	-	-	-	-	POOH, recover recorders, change packer, RIH, run DST #7, POOH, break down tool.
12 Jan	2055.0	0.0	n/a	n/a	-	-	-	-	Recover recorders, rig to & log Run #5 (RFT #3), POOH to check tool (seal leaking), rig out loggers, RIH for clean-out trip (WO new tool), POOH, rig to & log Run #6 (RFT #4).
13 Jan	2055.0	0.0	n/a	n/a	-	-	-	-	Log Run #7 (RFT #5), rig out loggers, geologist released.

BAKER HUGHES INTEQ

DRILLING PARAMETERS RECORD

Job No. 0490-29364 Page 1 of 2

Company Paramount Resources Ltd. Field Fort Liard

Well Name & No. Para Et Al Ft. Liard I-46/60-10-123-15 BHI Rep.

DRILLING DATA

Date	Depth From (m)	Depth To (m)	Drill Mode O/R	TFO	Drill Hrs.	Circ. Hrs.	Total Hrs.	WOB (x1000	Rotary RPM	Rotary Torque (kft-lbs)	Flow Rate (lpm)	SPP (kpa)	Bit No.
23-NOV-99	505	573.6	R		5.75	3.42	9.17	7	45	0	1200	7000	1
23-NOV-99	573.6	580.6	O	130 L	0.92	0.17	1.08	5	0	0	1200	6500	1
23-NOV-99	580.6	631	R		2.58	0.17	2.75	7	45	0	1200	7000	1
24-NOV-99	631	650	R		1.33	0.08	1.42	8	45	140	1200	7000	1
24-NOV-99	650	669.4	R		1.58	0.17	1.75	8	45	140	1200	7000	1
24-NOV-99	669.4	688.5	R		1.33	0.17	1.50	8	45	140	1200	7500	1
24-NOV-99	688.5	707.2	R		1.75	0.08	1.83	8	45	140	1200	7500	1
24-NOV-99	707.2	726.5	R		1.83	0.17	2.00	7	45	140	1200	7500	1
24-NOV-99	726.5	745.9	R		1.92	0.08	2.00	7	45	140	1200	7500	1
24-NOV-99	745.9	765.1	R		1.92	0.17	2.08	7	45	140	1200	7500	1
24-NOV-99	765.1	784	R		2.00	0.08	2.08	7	45	140	1200	7500	1
24-NOV-99	784	803.7	R		1.75	0.17	1.92	7	45	140	1200	7500	1
24-NOV-99	803.7	822.7	R		1.83	0.08	1.92	7	45	140	1200	7500	1
24-NOV-99	822.7	842	R		1.92	0.17	2.08	7	45	140	1200	7500	1
2[illegible]-99	842	849	R		0.75	0.75	1.50	7	45	350	1200	7500	1
[illegible]99	849	861.3	R		0.42	3.75	4.17	10	40	80	1200	7500	2
25-NOV-99	861.3	890	R		1.42	0.08	1.50	10	40	80	1200	7500	2
25-NOV-99	890	909.2	R		1.50	0.17	1.67	10	40	80	1200	7500	2
25-NOV-99	909.2	927.9	R		1.00	0.08	1.08	10	40	80	1200	7500	2
25-NOV-99	927.9	946.5	R		1.50	0.17	1.67	10	40	80	1200	7500	2
25-NOV-99	946.5	965.2	R		1.58	0.08	1.67	10	40	80	1200	7500	2
25-NOV-99	965.2	967	R		0.17	0.00	0.17	10	40	80	1200	7500	2
26-NOV-99	967	983.8	R		1.25	0.08	1.33	10	40	80	1200	7500	2
26-NOV-99	983.8	1003.2	R		1.58	0.17	1.75	10	40	100	1200	7500	2
26-NOV-99	1003.2	1022	R		1.33	0.08	1.42	10	40	100	1200	7500	2
26-NOV-99	1022	1040.7	R		1.50	0.08	1.58	10	40	100	1200	7500	2
26-NOV-99	1040.7	1043.7	O	130 L	0.67	0.08	0.75	6	0	0	1200	7500	2
26-NOV-99	1043.7	1060.1	R		1.50	0.08	1.58	10	40	100	1200	7500	2
26-NOV-99	1060.1	1079.1	R		0.67	0.08	0.75	9	40	120	1200	8000	2
26-NOV-99	1079.1	1097.3	R		0.67	0.17	0.83	9	40	120	1200	8000	2
26-NOV-99	1097.3	1116.3	R		0.83	0.08	0.92	9	40	120	1200	8000	2
26-NOV-99	1116.3	1135	R		0.92	0.08	1.00	9	40	120	1200	8000	2
26-NOV-99	1135	1163.5	R		1.42	0.17	1.58	9	40	120	1200	8000	2
[illegible]-99	1163.5	1181.8	R		0.83	0.08	0.92	9	40	120	1200	8000	2
[illegible]-99	1181.8	1200.8	R		0.83	0.08	0.92	10	40	120	1200	8000	2
26-NOV-99	1200.8	1218.3	R		2.08	0.08	2.17	10	40	120	1200	8000	2
26-NOV-99	1218.3	1233	R		1.75	0.00	1.75	10	40	120	1200	8000	2
27-NOV-99	1233	1238.2	R		1.00	0.17	1.17	10	40	100	1200	7800	2

BAKER HUGHES INTEQ

DRILLING PARAMETERS RECORD

Job No. 0490-29364 Page 2 of 2

Company Paramount Resources Ltd. Field Fort Liard

Well Name & No. Para Et Al Ft. Liard I-46/60-10-123-15 BHI Rep.

DRILLING DATA

Date	Depth From (m)	Depth To (m)	Drill Mode O/R	TFO	Drill Hrs.	Circ. Hrs.	Total Hrs.	WOB (x1000	Rotary RPM	Rotary Torque (kft-lbs)	Flow Rate (lpm)	SPP (kpa)	Bit No.
27-NOV-99	1238.2	1240.2	O	130 L	0.50	0.17	0.67	13	0	0	1200	7800	2
27-NOV-99	1240.2	1274	R		3.83	1.00	4.83	9	40	100	1200	7800	2
01-DEC-99	1393	1397	O	180	2.50	0.33	2.83	12	0	0	1350	9000	3
01-DEC-99	1397	1412.2	R		5.92	0.17	6.08	13	40	100	1350	9200	3
01-DEC-99	1412.2	1416	O	180	3.25	0.00	3.25	12	0	0	1350	9200	3
01-DEC-99	1416	1418	R		1.00	0.00	1.00	13	40	100	1350	9200	3
02-DEC-99	1418	1437	R		14.50	0.50	15.00	8	40	350	1390	9200	3
03-DEC-99	1437	1438.4	R		0.25	2.67	2.92	8	40	50	1390	9200	4
03-DEC-99	1438.4	1450.9	O	130 L	1.25	0.17	1.42	8	0	0	1390	9000	4
03-DEC-99	1450.9	1466	R		11.25	0.50	11.75	8	40	50	1390	9000	4
04-DEC-99	1466	1469.3	R		2.25	0.33	2.58	10	40	50	1390	9000	5
04-DEC-99	1469.3	1474.3	O	180	4.50	0.17	4.67	12	0	0	1390	9000	5
04-DEC-99	1474.3	1488.1	R		7.08	0.17	7.25	13	40	50	1390	8600	5
04-DEC-99	1488.1	1490.1	O	120 L	1.58	0.17	1.75	14	0	0	1390	8900	5
04-DEC-99	1490.1	1494	R		1.50	0.00	1.50	13	40	50	1390	8900	5
04-DEC-99	1494	1506.9	R		7.42	0.17	7.58	13	40	50	1390	8900	5
05-DEC-99	1506.9	1526.5	R		10.42	0.33	10.75	13	40	50	1390	8900	5
05-DEC-99	1526.5	1536	R		5.92	0.17	6.08	13	40	50	1390	8900	5
06-DEC-99	1536	1538.5	O	120 L	1.25	0.00	1.25	15	0	0	1390	8900	5
06-DEC-99	1538.5	1545	R		4.75	1.00	5.75	13	40	50	1390	8900	5

LOGGING REPORT

Depth (Driller's):	1545m	Date:	December 6, 1999
Depth (Strap):	1545.5m	Logging Company:	Baker Hughes
Depth (Logger's):	1545.5m	Logging Engineer:	Dave McCullough
Surface Casing (Driller's):	505.4m	Truck No:	6556
Intermediate Casing:	n/a	Hole Size:	222 mm

MUD DETAILS

Mud Type:	Invert	Weight:	1060
pH:	n/a	Viscosity:	51
Water Loss:	n/a	Salinity:	

OPERATIONS SUMMARY

Hole Condition:	Good
Circulation time after T.D.	One hour
Number of Wiper Trips:	One
Description of Wiper Trips:	TD to surface casing
Hours Logging:	7 hours
additional information	One run with stacked tools

LOGGING SEQUENCE:

Logs	Time Spent (hours)	Remarks
HDIL-MAC-CN-ZDL-GR-XYCAL	4.3	Recording time
	2.7	Rig up & rig out

Number of runs in hole:	Succeeded:	Failed:
1	1	0

REMARKS

Logging went smoothly with no problems.

LOGGING REPORT #2

Depth (Driller's):	2055m	Date:	January 9-11, 2000
Depth (Strap):	2054.8m	Logging Company:	Baker Hughes
Depth (Logger's):	2054.4m	Logging Engineer:	Tim Fisher
Surface Casing (Driller's):	505.4m	Truck No:	6544
Intermediate Casing:	1545.0m	Hole Size:	156 mm

MUD DETAILS

Mud Type:	Invert	Weight:	1035
pH:	n/a	Viscosity:	60
Water Loss:	n/a	Salinity:	

OPERATIONS SUMMARY

Hole Condition:	Good
Circulation time after T.D.	One hour
Number of Wiper Trips:	none
Description of Wiper Trips:	n/a
Hours Logging:	31.5
additional information	Hours logging includes rig up & rig out time

LOGGING SEQUENCE:

Logs	Time Spent (hours)	Remarks
HDIL-MAC-GR-XYCAL	8.75	Includes 2hrs lost time to repair XYCAL tool.
ZDL-CN-GR-CAL	7.25	
FMT	15.5	Two runs.

Number of runs in hole:	Succeeded:	Failed:
4	4	0

REMARKS

After initial problem with inconsistent opening & closing of XY calipers was solved, logging went smoothly.

LOGGING REPORT #3

Depth (Driller's):	2055m	Date:	January 12-13, 2000
Depth (Strap):	2054.8m	Logging Company:	Baker Hughes
Depth (Logger's):	2054.4m	Logging Engineer:	Cory Butler
Surface Casing (Driller's):	505.4m	Truck No:	6544
Intermediate Casing:	1545.0m	Hole Size:	156 mm

MUD DETAILS

Mud Type:	Invert	Weight:	n/a
pH:	n/a	Viscosity:	n/a
Water Loss:	n/a	Salinity:	

OPERATIONS SUMMARY

Hole Condition:	Good
Circulation time after T.D.	n/a
Number of Wiper Trips:	one
Description of Wiper Trips:	TD to intermediate casing
Hours Logging:	16.5
additional information	2 hours circulating on bottom on wiper trip

LOGGING SEQUENCE:

Logs	Time Spent (hours)	Remarks
FMT	5.5	Tool failed after third pressure point.
FMT	6	Includes one hour rig up & rig out time.
FMT	5	Includes one hour rig up & rig out time.

Number of runs in hole:	Succeeded:	Failed:
3	2	1

REMARKS

Failure of a seal on the FMT tool during Run #5 (FMT Run #3) aborted logging run. A cleanout
trip was conducted while awaiting arrival of new tool. The final two runs went smoothly with no
problems.

FORMATION EVALUATIONS

PARAMOUNT ET AL LIARD NWT I-46
I-46-60-10-123-15

INTRODUCTION

The Paramount et al Liard I-46 well is located approximately 17 kilometres SSW of Fort Liard. This vertical exploration well was drilled as a step-out to the Paramount et al Liard F-36 discovery well. The well was spudded on November 12, 1999 by Precision Drilling Rig #379 @ 14:00 hours. A Datalog total gas detector was rigged up and running from surface to T.D. Samples were collected in 5 metre intervals from surface to F.T.D. The well reached F.T.D. at 2055 metres in sandstone and shale of the M9 Zone in the lower Mattson Formation on January 8, 2000 at 09:00 hours.

The primary zone of interest was the Mississippian Mattson Formation, a clastic succession representing 5 different depositional environments of near shore marine to coastal plain systems. There were multiple zones within the succession occurring primarily in the coastal dune complex. Secondary targets in the well were the basal Cretaceous Chinkeh Formation, the Permian Fantasque Formation, and the Mississippian Flett Formation. A decision was taken not to penetrate the Flett Formation due to a high-pressure water-charged fracture system encountered on the nearby Paramount O-35 well. All zones of interest were gas targets.

A number of operational difficulties were encountered during the drilling of this well. Problems with hole viation on the 311mm surface section necessitated drilling with relatively low FOB, slowing the progress he well. At 190m a decision was taken to come out of the hole to change bits to 222mm in order to drill pilot hole to surface casing TD @ 505 metres. Two days of reaming with the 311mm bit were required to complete the surface section which was completed on November 18. The intermediate section from 505-1273m was drilled with a mud-motor to ensure control of potential deviation problems and was completed with no problems on December 6. The casing was set ~46 metres into the Mattson Formation at 1545.0m.

One intermediate logging run was conducted by Baker Hughes commencing on December 6th and completed on December 7th, followed by 4 DST runs commencing on December 7 and completed on December 10. Logging operations went smoothly with no problems; however, problems were encountered on the last three DST runs. Due to the inability to get a adequate packer seat, no pressure data was obtained for the two runs in the Belloy Formation (i.e., DST #2 and 3). The loss of the belly spring from the DST tool on the final run necessitated a fishing operation. The spring was successfully recovered on the second attempt and intermediate casing was run and set at 1545.0 metres.

The main hole was drilled with an air-hammer using nitrified air. Numerous small problems caused significant delays in this phase of the well, as well as the relatively short life of the hammer-bits which made only 30-50 metres each. At 1672 metres a decision was taken to replace the air-hammer with a conventional tri-cone bit due to the increasing presence of fluid (condensate and water) in the hole. At ~1683 metres, the well took on significant water (i.e., 24 m3 in ~one hour) from a water-charged fractured shale unit, necessitating the re-introduction of an invert drilling fluid to the hole. The well was drilled to F.T.D. with this mud system. Prior to FTD, a successful bottom hole DST was run at a depth of 1740 metres in the M3 ne; however, the results showed the zone to be wet.

A significant portion of the middle and lower sections of the Mattson Formation proved to be very hard ing and resulted in extreme wear and short bit life. In particular, the section from ~1800-1890 metres required 4 bits, some of which were badly worn after as little as 12 metres of drilling. Problematically, the rocks in samples did not appear hard enough to produce such extreme wear.

Two conventional logging runs were conducted upon reaching FTD, commencing on January 8th and completed on January 9th, followed by five RFT logging runs; the first two were run on January 9th and 10th with a further three runs conducted on January 11th, 12th and 13th after Drill Stem Tests were completed. Two DSTs were run on January 10th and 11th; the first (i.e., DST #6) on the 1785-1789 metre interval of the M4 Zone on January 10 and the second (i.e., DST #7) on the 1899-1903 metre interval of the M6 Zone on January 11th. There were no significant problems encountered on the DST runs; however, an RFT tool failure on the first run after DSTs were completed required a new tool to be sent out. Thereafter, logging was completed with no further problems.

DUNVEGAN

An incomplete Dunvegan section, which is exposed at surface, comprises ~163m of sandstone with minor interbedded conglomerate and lesser shale and siltstone at this location. Two basic divisions are apparent; a lower division (i.e., ~70-162m) dominated by fine-grained sandstone with minor interbedded siltstone and shale, and an upper division of coarser clastics including pebbly to conglomeratic sandstone and fine pebble conglomerate which appears to form a coarsening-upward megasequence. Although there are a number of reservoir-quality intervals in both sections, these rocks are of no commercial interest due to their structural and stratigraphic position.

CONCLUSION: The Dunvegan Formation has no economic potential at this locality.

SULLY

The Sully Formation comprises 40 metres of siltstone with interbedded sandstone and shale at this locality; the shale is a minor component of the upper section but becomes common in the lower half of the section. Sample quality through this interval was generally poor. The siltstone was typically light to medium grey, quartzose with minor to locally common biotite, trace to minor carbonaceous specks and rare glauconite. The siltstone ranges from clean to variably argillaceous with minor very silty argillaceous laminations and stringers. The rocks are moderately to poorly indurated with siliceous cement and tight. There are no rocks of commercial interest in this formation.

The shale is typically dark grey, sub-platy and non-silty with traces of unusual framboidal pyrite micro-nodules in the basal unit. Traces of hard, dense siderite nodules or stringers were occasionally observed.

CONCLUSION: The Sully Formation has no economic potential at this locality.

SIKANNI

The Sikanni Formation comprises ~152 metres of sandstone with minor interbedded siltstone and shale. The sandstone is a predominantly homogeneous, very fine-grained rock with the exception of the upper ~18 metres, which comprises an atypical coarse-grained unit discussed below. The typical sandstone is a sublitharenite consisting of abundant frosted to clear quartz with minor amounts of dark lithic grains, carbonaceous specks and trace amounts of glauconite and mica. It is well-sorted to very well-sorted with variable trace to locally common amounts of silt and argillaceous material. Argillaceous to silty laminations are ubiquitous and often locally common; the laminations increase in the lower part of the section to locally abundant. These rocks are generally poorly to moderately indurated with cements dominated by common silica with traces of spotty kaolin. In the lower third of the section minor locally common streaky calcareous to occasionally dolomitic cements occur. The sandstone generally had no visible porosity. There were no hydrocarbon shows or gas response in this section.

The coarse-grained unit comprises an 18 metre coarsening-upward sequence of moderately to poorly sorted litharenite that grades from predominantly fine to medium grained sand in the lower section to fine to very coarse, gritty to slightly pebbly sand in the upper 8 metres. The upper sandstone is predominantly disaggregated in samples with minor consolidated cutting with spotty calcareous cement. Porosity is inferred to be good in this unit. Hydrocarbon shows were very poor, consisting of minor spotty dull to moderate yellow fluorescence without cut in the upper unit. Low formation pressures preclude economic potential in such a shallow unit although the upper coarse-grained unit possesses sufficient reservoir-quality and appears to have an adequate seal.

CONCLUSION: The Sikanni Formation has no economic potential at this locality.

LEPINE

The Lepine Formation comprises 525 metres of shale and siltstone at this locality. Three informal subdivisions are apparent; 1) an upper section ~122 metres thick consisting of shale, 2) a middle section ~117 metres thick consisting of siltstone with minor interbedded shale and sandstone, and 3) a thick lower section ~287 metres thick consisting of shale with minor interbedded siltstone. The upper shale is typically dark grey, firm, platy to sub-platy, fissile, variably silty in part, locally carbonaceous and contains trace amounts of fish scales. The siltstone is typically light to medium grey, very quartzose with trace to minor glauconite and dark lithic grains and rare to trace mica. The sandstone is very fine grained, silty and grades from the siltstone. The rocks are predominantly variably argillaceous with common to locally abundant silty argillaceous laminations and very thinly interbedded shale. The siltstone and sandstone are variably indurated, ranging from poorly to very well indurated; however, they are typically moderately indurated. The predominant cement is silica with trace to minor locally abundant streaky calcareous to occasionally dolomitic cement. The siltstone and sandstone are tight and without hydrocarbon shows. There are no rocks of economic interest in this formation.

CONCLUSION: The Lepine Formation has no economic potential at this locality.

TTER

The Scatter at this locality comprises ~141 metres of sandstone with minor interbedded shale and siltstone. The shales were typically dark grey, firm to very firm, sub-blocky to sub-platy, commonly variably silty grading to argillaceous siltstone in part, and generally slightly glauconitic. The siltstone and sandstone were typically quartzose, variably glauconitic, commonly variably argillaceous to locally clean, and generally tight with minor streaky poor porosity. These clastics had no significant hydrocarbon shows or gas response and are of no economic interest.

CONCLUSION: The Scatter Formation has no economic potential at this locality.

GARBUTT

The Garbutt at this locality comprises ~187 metres of shale with interbedded sandstone and minor siltstone. Two basic divisions are apparent at this locality; an upper ~50 metre section which is dominated by sandstone with interbedded shale and minor siltstone, and the rest of the formation which comprises shale.

The sandstone is very similar to the overlying basal Scatter sandstone and there is no clear lithological break between the two formations at this location. The sandstone is a light to medium brown, predominantly clean to variably argillaceous sublitharenite with abundant quartz, trace to minor glauconite and minor dark lithic grains. It is a well-sorted, very fine grained, variably silty sandstone that grades to sandy siltstone in part. There was predominantly no visible porosity in these rocks. Minor streaky poor porosity was occasionally observed. Hydrocarbon shows were generally very poor and consisted of minor to locally common very dull fluorescence with minor slow weak yellow green streaming cut. Slightly better shows were observed in the 1040-1062m interval where there was common to abundant uneven light brown oil staining, minor to locally common very dull fluorescence and minor to common slow, weak yellow to yellow green streaming cut. There were no significant gas shows in this section. Using purely lithological criteria, the upper sandstone section is more properly assigned to the Scatter Formation, as there is no real lithological distinction between basal Scatter sandstone and the upper Garbutt sandstone.

The shale was typically dark grey to black, platy to sub-platy, fissile and commonly brittle. The shale was slightly to moderately silty in part with minor siltstone laminations and locally variably carbonaceous. Rare varicoloured (i.e., white, tan, light grey and green) bentonite stringers were observed in the 15-20 metres overlying the Radioactive Zone. The shale through the Radioactive Zone is very similar to the overlying shale with the addition of a minor to locally common component of brownish black, platy, fissile, firm to soft, bituminous to phosphatic shale. Bentonite increases to a trace to locally minor occurrence and is dominantly white to cream coloured and slightly tuffaceous.

CONCLUSION: The Garbutt Formation has no economic potential.

CHINKEH

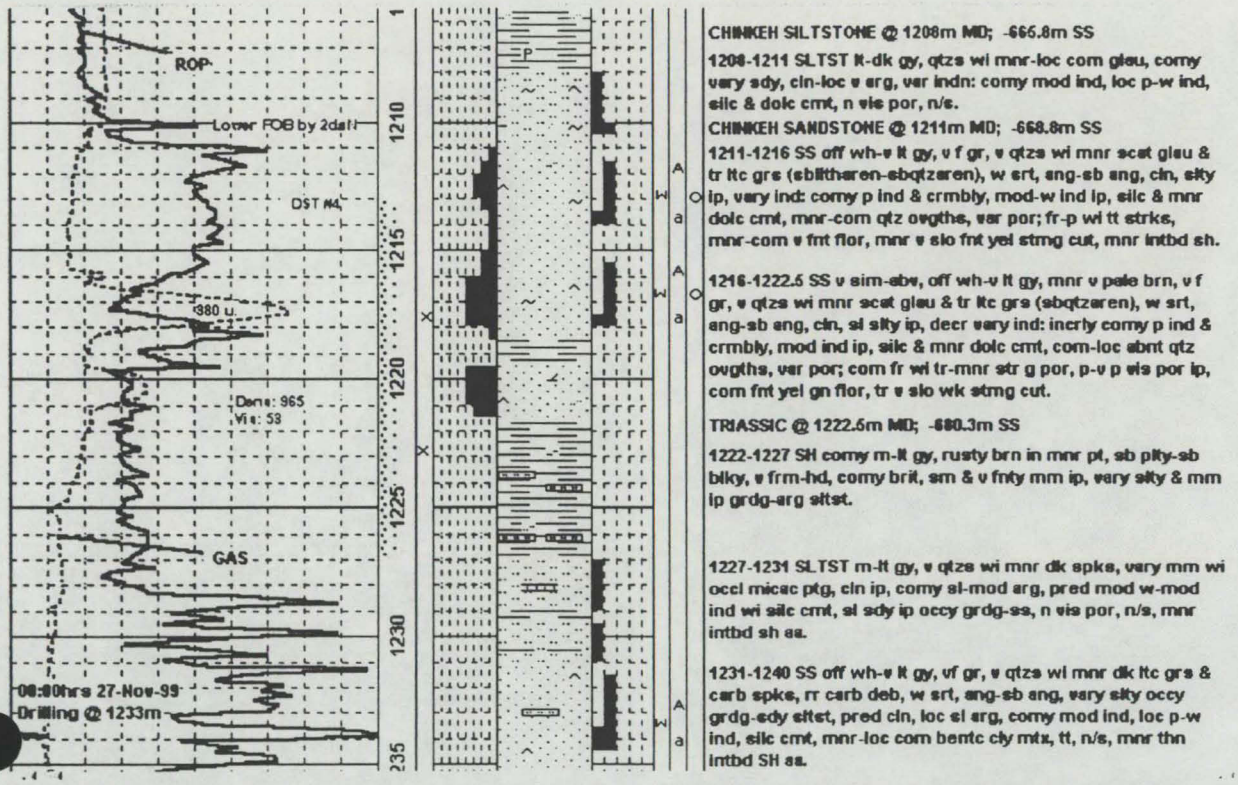


Figure 1. Strip-log section showing the Chinkeh Formation and upper section of the Triassic.

The Chinkeh Sand at this locality comprises ~11 metres of sandstone with minor interbedded shale. There is a thin Chinkeh Silt zone (i.e., ~3 metres) at the top of the section. The sandstone is typically off-white to very light grey, very fine-grained, clean and variably silty in part. The composition is quartzose with minor scattered glauconite and trace dark lithic grains, comprising sublitharenite to subquartzarenite. The rocks are variably indurated, ranging from typically poorly indurated and crumbly to moderately to locally well indurated. Cements consist of common siliceous and minor dolomitic cement. Subhedral quartz overgrowths are generally common and were observed to increase downsection. Visible porosity was variable in samples; typically fair to poor with tight streaks in the upper section increasing downsection to fair with streaky good porosity.

Hydrocarbon shows were poor and consisted of minor to common very faint fluorescence with minor very slow faint yellow streaming cut in the upper Chinkeh. Hydrocarbon shows decreased in the lower Chinkeh, consisting of common faint yellow green fluorescence with traces of very slow weak streaming cut. There was a gas show of 380 units above a background of ~80 units across <2 metres at 1216.5 metres, corresponding with the only crossover on logs.

CONCLUSION: The Chinkeh Sand has some fair to good reservoir-quality intervals at this locality, most notably in the basal 5 metres; however hydrocarbon shows were poor and gas response was minor and

ASSIC (TOAD/GRAYLING FORMATIONS)

The Triassic comprises ~104 metres of shale and generally minor interbedded sandstone. The sandstone occurs mainly in the upper section (i.e., 1227-1247m MD) and consists of off-white to light grey, very fine-grained, well-sorted, very quartzose sublitharenite to quartzolithic wacke. The sandstone is predominantly clean, typically moderately indurated with common siliceous cement and minor to locally common smectitic (i.e., swelling) clay matrix. The sandstone is commonly variably silty and grades to sandy siltstone in part. There was no visible porosity or hydrocarbon shows in these rocks.

The shales consist of two basic types; 1) medium to dark grey, and 2) maroon to rusty red. These two types appear to alternate in sections 10m to 20m thick with minor interbedded siltstone more common in the grey shale section. The grey shale is typically firm to hard, sub-fissile and variably silty with minor argillaceous siltstone laminations and stringers. This shale becomes slightly to moderately dolomitic in the lower section (i.e., ~1295-1314m). The maroon to red shale is typically firm to hard (becoming locally soft in the basal section), fissile and significantly less silty than the grey variety. This shale is non-dolomitic becoming slightly to moderately dolomitic in the lower section. A particular feature of note in the oxidized shale units is the variable content of 'bentonitic' clays (i.e., smectitic swelling clays) which increase downsection, as manifested by abundant red clay in the wash with a significant to major loss of sample volume.

Both these shales are thinly interbedded and interlaminated in minor part, most likely at the transitions between the two facies which appear to represent subaqueous (grey shale and minor siltstone) and periodically or wholly subaerial (oxidized shale) depositional environments.

NCLUSION: The Triassic has no economic potential at this locality.

BELLOY

The Belloy Formation comprises ~47 metres of interbedded chert, dolomite and sandstone. This is considerably thinner than the expected 120 metres of prognosed thickness. Three informal subdivisions can be made at this locality; 1) an upper division from ~1326-1340m consisting of predominantly chert with minor interbedded sandstone, 2) a middle division from ~1340-1357m comprised of argillaceous to cherty sandstone and minor interbedded chert, and 3) a lower division from ~1357-1374m consisting of cherty dolomite with interbedded chert and a basal sandstone unit.

chert ranges in colour from very pale to dark brown and brownish grey. The chert is typically ...oderately to very glauconitic and commonly variably sandy to silty locally grading to cherty sandstone. The chert at the top of the section differs from the typical chert downsection by virtue of a common granular texture on cuttings, locally crumbly nature and a variable argillaceous content that locally grades to minor cherty glauconitic mudstone with trace pyritized spicules and worm burrows. Sponge spicules are generally a trace component except locally in the 1336-1340 metre interval. The chert is generally tight with trace to minor poor to rarely fair microvug to vug porosity. There is inferred local good fracture porosity in the upper section.

The sandstone consists of medium to dark grey, quartzose lithic wacke composed of common to abundant clear to varicoloured quartz, trace to minor lithic grains and common to locally abundant glauconite. Texturally, they range from moderately poorly sorted, very fine to medium grained sandstone in the upper section grading downsection into moderately sorted, very fine to fine grained rocks. The sandstone contains common to abundant silty argillaceous matrix and is typically poorly to moderately indurated with trace to minor dolomitic cement which increases downsection. Locally, the sandstone is variably silicified to cherty and grades to sandy chert. There is no visible porosity or hydrocarbon shows in these rocks.

The dolomite is typically dark grey to greyish brown, cryptocrystalline, hard, dense and commonly variably cherty grading to dolomitic chert in part. The dolomite commonly contains a variable silt component and is locally slightly to moderately calcareous with trace dolomitic limestone stringers. This rock is tight with some inferred local fair to good fracture porosity. There were no hydrocarbon shows in the dolomite.

e contact with the overlying Triassic rocks appears to be sheared as manifested by the presence of apparent shear fabrics. These include minor variably (locally pervasively) mylonitized cutting with common slickensides. The presence of chalky white mottled to anastamosing anhydritic to dolomitic 'stringers' with slickensides is also strongly suggestive of shear; however, these may be bit-generated textures.

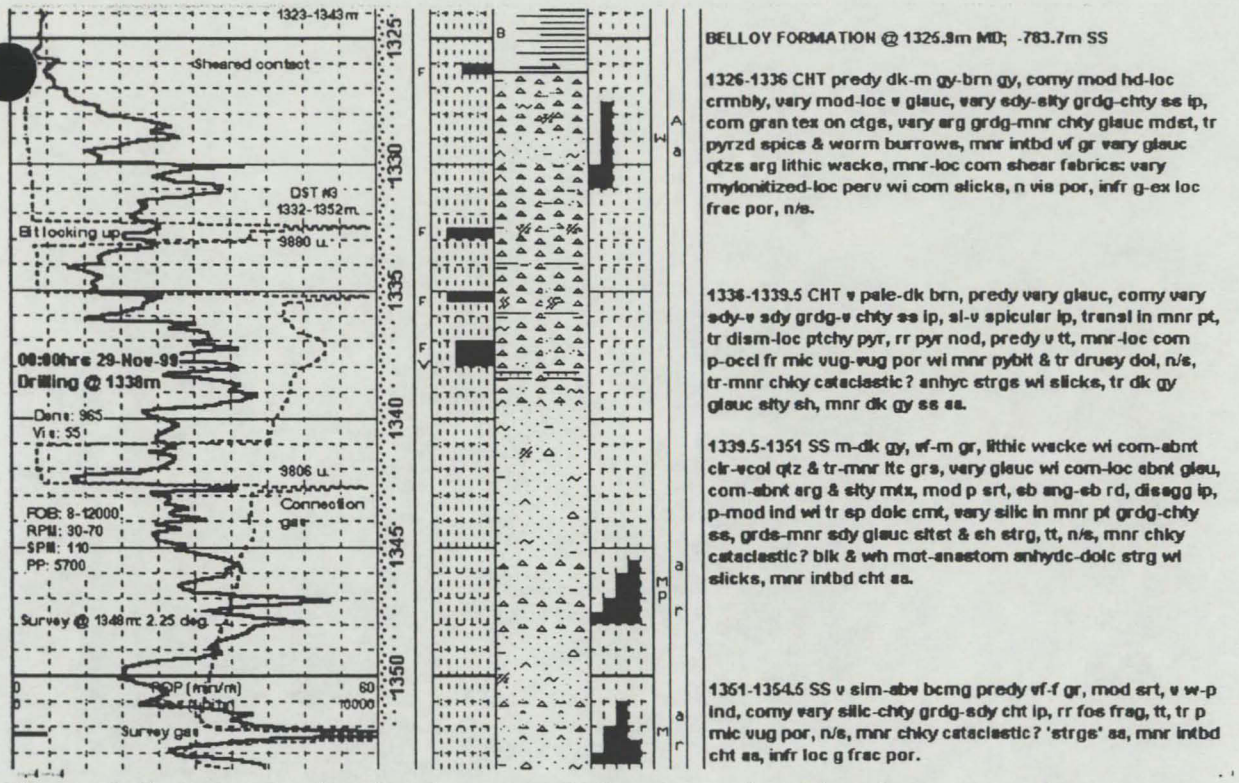


Figure 2. Strip-log section showing upper Belloy Formation. Note fracture gas shows.

There was an immediate increase in gas readings upon penetration of the formation to ~600 units from a background of 30-35 units. Although the Belloy was not considered a target, there were a number of apparently good gas shows in the Belloy that peaked out at 9880 units, which is the maximum reading possible on the Datalog Geologger 2 dilution units. Some of these reading are suspect due to the susceptibility of this unit to saturation of the gas sampling canister after an influx of gas. Two intervals in particular had good gas shows; specifically, between 1333-1340m in fractured chert, and 1360-1362m in fractured chert and dolomite. Both these intervals correspond to e-log intervals with pronounced gas effect but no crossover. Attempts at conducting a DST in two Belloy intervals (i.e., 1323-1343m and 1332-1352m) failed due to the inability to get an adequate packer seat.

CONCLUSION: There is some localized fair to good gas-bearing fracture porosity in the Belloy; however, there does not appear to be sufficient gas for commercial production. The Belloy has marginal to no economic potential at this location but is of potential economic interest in the area if fracture systems are sufficiently developed and gas-charged.

FANTASQUE

The Fantasque Formation consists of 88 metres of predominantly bedded chert with minor carbonate, shale, sandstone and conglomerate. The formation came in ~85 metres high to prognosis and was considerably thicker than anticipated.

The chert is variable with four basic types apparent. The first type (from ~1375-1410m) is generally light to medium brown, commonly translucent and typically slightly to moderately glauconitic. Sponge spicules are generally a trace component in this variety. The chert is also variably silty to sandy in minor part. Locally, the chert is slightly to moderately dolomitic with occasional cherty dolomite stringers. The second variety (from ~1410-1420m) is very pale to medium brown, translucent and commonly spicular to varying degrees. There are traces of glauconite and traces of phosphatic shale stringers. The third variety (from ~1420-1430m) is commonly medium to dark brown, sub-translucent to non-translucent and appears to be slightly argillaceous. The fourth and most common variety (from ~1420-1460m) is typically light grey to pale brown, translucent, and commonly pelletal to mottled. It is distinct by virtue of the common dark brown pellets and mottles which are ubiquitous. Locally, the chert is variably spicular in minor part. This chert shows the most evidence of hydrothermal silicification (discussed below) which increases downsection.

All varieties are typically very hard and dense except the 1388-1393m interval, where the chert is variably argillaceous and crumbly and locally grades to cherty glauconitic shale. Planar fracture surfaces are ubiquitous, though generally minor, throughout the section and are often lined with different varieties of quartz, discussed below. Locally, pyrite was also observed coating fracture surfaces. Porosity consists of localized fractures which are inferred to range from good to excellent to poor. There is rare to trace scattered poor moldic and microvug porosity.

The chert has numerous fractures throughout the section and there are a number of features related to the fractures that are worthy of note. Silica-saturated hydrothermal fluids have been pumped through the fracture systems in at least two stages. The first and primary episode of silica precipitation is manifested in the form of locally common finely laminated chalcedonic and milky quartz fracture linings and 'heals'. The chalcedony occasionally has a colloform habit. The second, apparently minor, stage takes the form of clear subhedral to euhedral quartz crystal linings that are often precipitated on top of chalcedonic or milky quartz fracture linings.

The chalcedonic and milky quartz become increasingly common downsection (i.e., 1440-1461m) where the chert shows evidence of variable degrees of hydrothermal silicification, manifested by the ubiquitous presence of random to localized chalcedonic to milky quartz mottles and 'blebs' in addition to the fracture heals, fillings and linings by the same material. The boundaries are typically diffuse, even with the obvious fracture-related fills, underlining the locally pervasive nature of the alteration.

Another unusual noteworthy occurrence is the presence of a monomictic chert pebble conglomerate in the basal part (i.e., 1455-1461m) of the Fantasque. The amount of conglomerate is difficult to ascertain, as finding unequivocal rounded pebble surfaces is difficult given the very brittle nature of the clasts and their small very angular fragment size; however, it may form a significant or even dominant component in that interval.

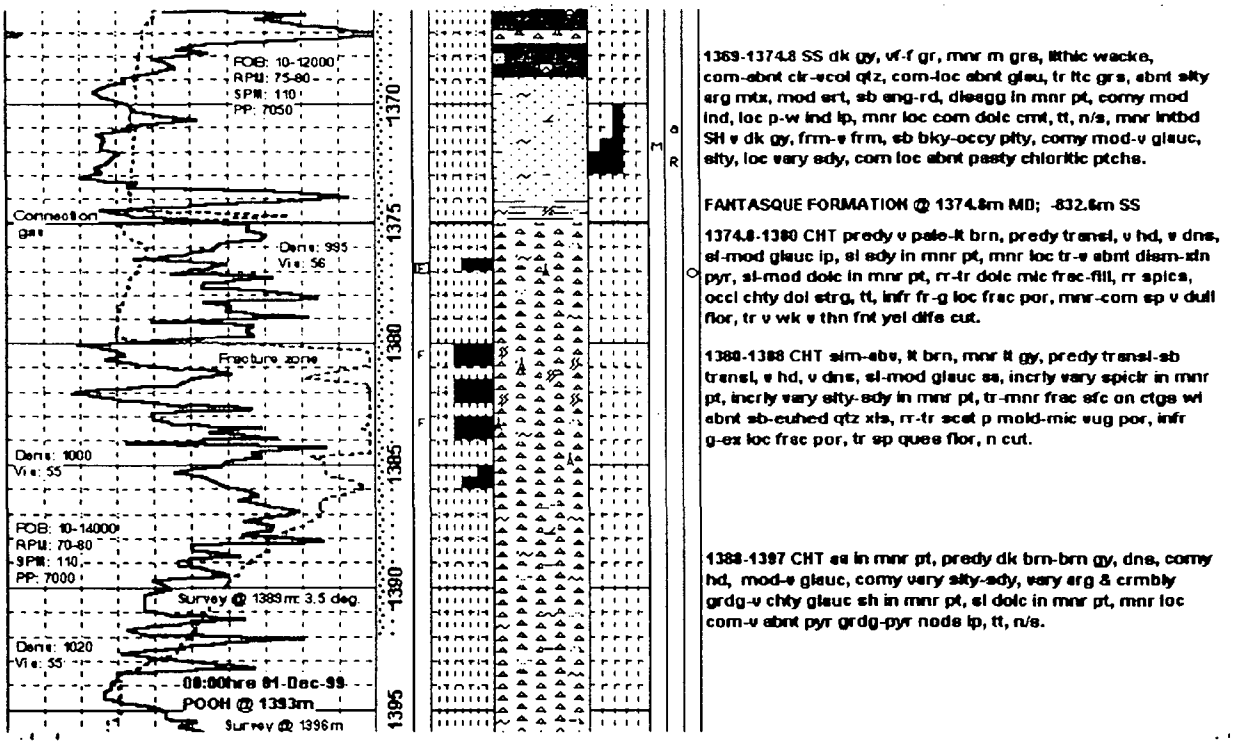


Figure 3. Strip-log section showing lower Belloy and upper Fantasque Formations. Note fracture zone in upper Fantasque with gas show.

Hydrocarbon shows were very poor and typically consisted of trace to minor spotty dull fluorescence with traces of questionable cut, excepting the uppermost interval, where there was minor to common dull fluorescence with trace very weak, very thin yellow diffuse cut. There were two apparently good gas shows in the section; the first immediately peaked at the maximum 9880 units (BGG ~3000-3500 units) upon penetration of the 1380-1386 metre interval and the second immediately peaked at the maximum 9880 units (BGG ~2000 +/- units) upon penetration of the 1411-1432 metre interval. In the latter case, the broad interval of maximum gas readings is an artifact of saturation of the gas sampling canister after the initial show at 1411 metres. Both these intervals show some gas effect but no gas crossover on logs.

CONCLUSION: The Fantasque at this locality has some fair to good localized fracture porosity and good gas response; however, log analysis in Calgary determined that there were no prospective DST intervals in the succession. The Fantasque has marginal economic potential at this location but is of economic interest in the area.

KINDLE

The Kindle Formation comprises 37 metres of siltstone with minor interbedded limestone at this locality. The siltstone is typically medium to dark brown, quartzose, and slightly to locally moderately argillaceous with trace argillaceous partings. The siltstone is generally very dolomitic locally grading to very silty dolostone. The rocks are generally well indurated and tight with abundant dolomitic and local patchy siliceous cements. Hydrocarbon shows consisted of generally common dull florescence and trace to minor very slow, very weak questionable cut. The minor interbedded limestone consists primarily of light brown, chalky soft marl stringers and trace amounts of dark brown, dense, cryptocrystalline, silty limestone.

CONCLUSION: The Kindle Formation has no reservoir-quality intervals and hence, no economic potential his locality.

MATTSON

Approximately 556 metres of the Mattson Formation were penetrated at this locality; FTD was called in the lower part of the M9 Zone in the basal Mattson. Sample quality during the air drilling operation (i.e., 1547-1685m) was generally poor. In some intervals sample lithologies and their relative proportions are not representative of lithology as indicated by logs (in particular, the 1681-1688m interval, which was shale in samples and sandstone on logs). It should also be noted that the MOLE washer used to wash samples has screens too coarse to retain the very fine grained to silt fraction if it is disaggregated and hence, preferentially removes this fraction from many of the reservoir-quality sands, which tend to be variably disaggregated to friable, particularly the eolian sands.

The section was strongly sand-dominated with generally minor carbonate and shale. There are two basic types of sandstone in the Mattson succession that are generally representative of their respective environments; 1) very fine to fine grained quartzarenite to minor sublitharenite of shoreface affinity, 2) upper very fine to lower medium grained quartzarenite to sublitharenite of eolian origin. A third variable type of sandstone consists of very fine to medium grained quartzarenite to quartzose subwackes of transitional facies but are generally of no economic interest.

Shoreface Sandstone

e shoreface sandstone represents two different depositional controls in similar environments; 1) storm-worked shoreface with associated minor carbonate interbeds, including occasional fine to coarse grained dolarenites of tempestite origin, and 2) wave-reworked shoreface, foreshore and backshore. The primary distinction between the two appears to be the presence or absence of minor carbonate interbeds.

The shoreface sandstone is a typically light brown to light grey, well-sorted quartzarenite with trace amounts of dark lithic grains which can occasionally be identified as chert. The quartz is predominantly clear and angular to sub-rounded. These sandstones are predominantly very fine to fine grained with the very fine grained fraction typically dominant. The sandstones are generally variably silty, ranging from trace to common, and locally grade to sandy siltstone in minor part. Argillaceous content is typically nil in these clean quartzarenites. Locally, the sandstone becomes slightly to moderately argillaceous and usually has argillaceous partings and laminae associated with it. Upsection (i.e., 1646-1673m), some quartzarenites have a trace to minor component of outsized (i.e., medium to fine) unusual blue, partly tripolitic chert grains and grade to sublitharenite. Locally, the sandstone becomes a sublitharenite with an added minor component of carbonate grains and skeletal debris.

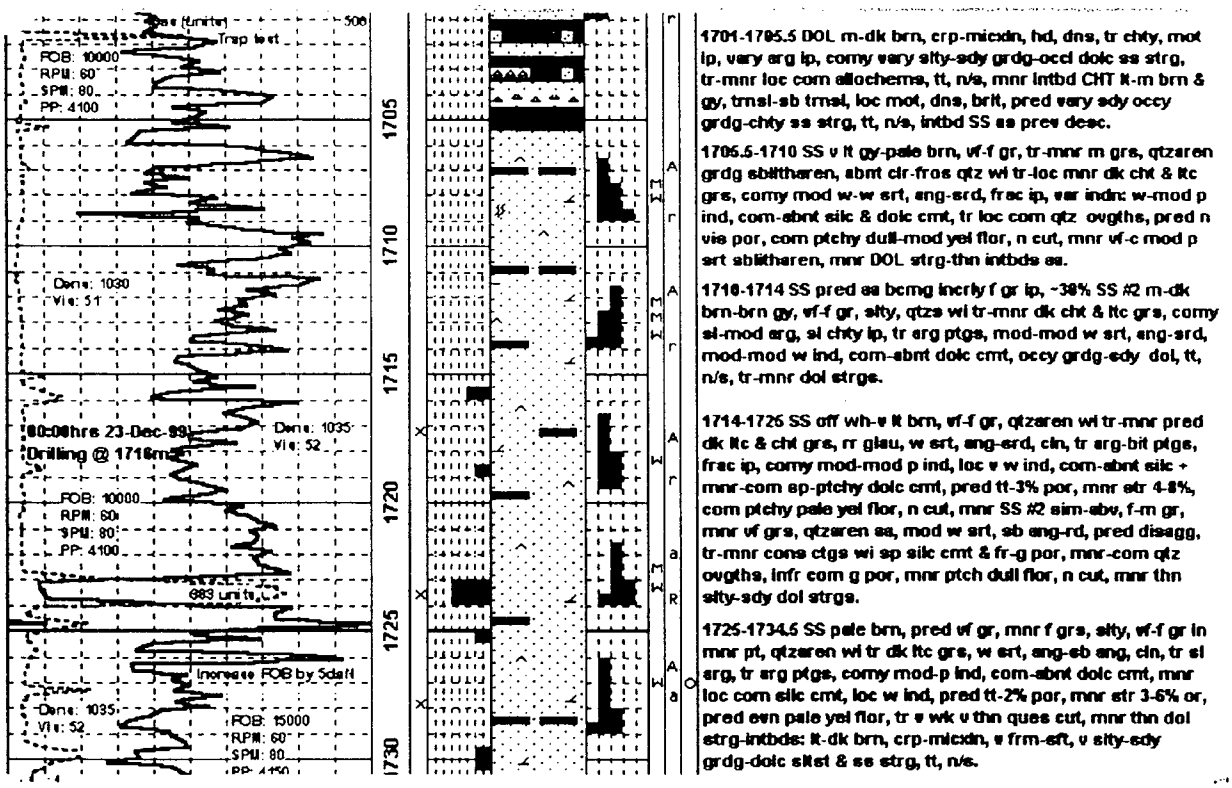


Figure 4. Striplog section showing typical Lithofacies #1 interval (shoreface) in the Mattson Formation. Note gas show at 1723 metres.

The shoreface sandstone is variably indurated throughout the succession, ranging from moderately well to poorly indurated and friable to crumbly. Visible porosity was commonly poor (i.e., tight to 3%), even in some poorly indurated sandstone where matrix porosity is likely to be at least a few percent. Sections with poor to fair and occasionally good porosity was observed; however, this better porosity was a generally minor component. To some degree at least, porosity distribution appears to be of a streaky to patchy nature, given the variability of visible porosity in cutting of the same sandstone. Cements are generally of mixed dolomitic-siliceous type and locally wholly dolomitic. Shoreface sandstone with a larger fine-grained component (i.e., sub-dominant to occasionally dominant; e.g., 1764-1768m) is where most of the better porosity occurs and these quartzarenites tend to have common subhedral to euhedral quartz overgrowths. Good porosity was also observed in one thin (i.e., ~2m) tempestite @ 1685m. Permeability is estimated to be generally poor in most of this lithofacies, given the very fine-grained, silty nature of the sandstone and the typically common to abundant cements.

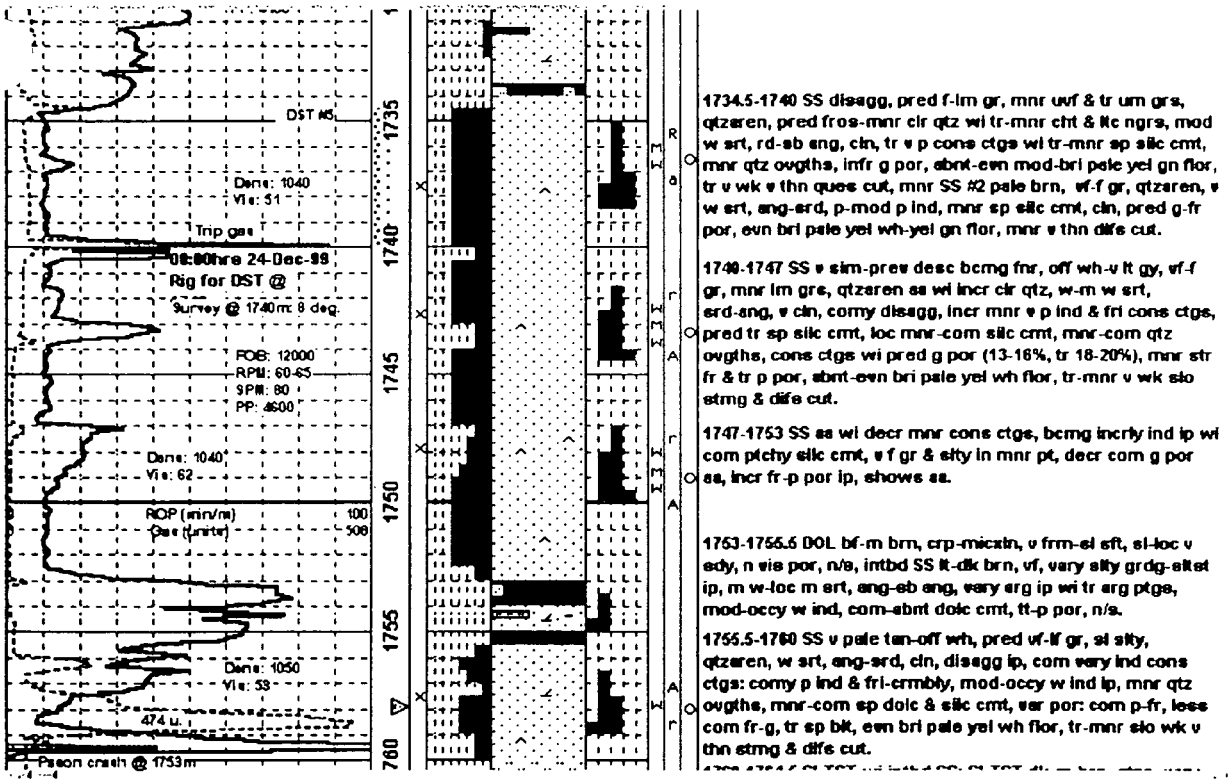


Figure 5. Striplog section showing typical Lithofacies #4 in the Mattson Formation. The eolian facies is /erlain and underlain by shoreface sandstone and minor carbonate of Lithofacies #1.

Eolian Sandstone

Eolian sandstone can be usually distinguished from the shoreface quartzarenite by virtue of its coarser grain size and the presence of frosted quartz grains. The sandstone is typically very light grey to light brown, moderately well to moderately sorted with angular to rounded grains. A much greater degree of rounding than is seen in shoreface sandstone is apparent where grain surfaces have not been modified by quartz overgrowths. These sandstones tend to have less compositional maturity than shoreface sandstone due to a generally higher minor chert fraction. Compositionally, the sandstone consists of abundant quartz with a variably minor to common frosted component and trace to minor predominantly dark varicoloured chert and lithic grains, comprising quartzarenite to sublitharenite. These sandstones are typically very fine to lower medium grained with a fine median grain size. Trace to minor coarse grains are often present. The eolian sandstone tends to be poorly to very poorly indurated and very friable. They are commonly variably to wholly disaggregated in samples. Cements are generally minor and typically siliceous with a spotty to patchy distribution. Locally, patchy to streaky siliceous cement is common. Quartz overgrowths range from minor to common to locally abundant. Rare to trace interstitial pyrite was also commonly observed.

The best porosity in the Mattson appears to be largely lithofacies-dependant and typically confined to eolian deposits. Porosity was variable in the generally minor consolidated fraction and ranged from typically good to fair to locally poor. Porosity was inferred to be predominantly good in most eolian sandstone.

Stratigraphy and Lithofacies

Five separate lithofacies have been identified in the Mattson succession in this area; 1) storm-reworked shoreface, 2) muddy shoreface or lagoon and tidal flat, 3)) wave-reworked shoreface, foreshore and backshore, 4) coastal dune complex, and 5) interdune swamp and paleosoil. All five of these lithofacies are clearly represented at this location. The Mattson Formation at the discovery site has nine separate pay zones (i.e., M1-M9 Zones) which can be broadly correlated with the succession here. Many of the upper pay zones correlate well with regard to log characteristics; however, the extent of the good porosity and gas-bearing reservoir strata are considerably reduced at this location. Some of the lower pay zones do not correlate particularly well on logs and it appears that there are substantial differences with regard to lithofacies and their stacking patterns.

Most of the Mattson succession consists of shallow-marine, predominantly shoreface deposits of Lithofacies #1 and Lithofacies #3 at this locality. There are five clearly eolian intervals in the Mattson at this locality with a further two or three intervals with mixed lithofacies (e.g., 1747-1758m: L1 and L4; 1909-1920m: L4 and L5). Due to the more distal nature of this location, it appears that eolian facies are less developed and sometimes thinner than those seen at the F-36 well. It seems reasonable to assume various degrees of reworking of both eolian and shoreface deposits during subsequent transgressions and regressions, making distinction between the two types sometimes unclear. The basal Mattson (i.e., ~2014-2055m) is dominated by terrestrial deposits of Lithofacies #5.

At least eight main T-R cycles are apparent within the succession. A number of smaller T-R cycles of shorter duration appear to be superimposed on some of the main cycles (e.g., within the primarily regressive 3-1759m interval); however, these may represent lateral facies shifts within a relatively stable eustatic regime rather than bona fide T-R cycles.

Diagenesis

Some general diagenetic associations are apparent with regard to the different lithofacies and are as follows; 1) Siliceous cementation is wholly or strongly dominant in eolian and related depositional environments (i.e., transitional sandstone in interdune swamp and paleosol environments), 2) Dolomitic cementation appears to be largely confined to shoreface environments. Mixed siliceous-dolomitic cements appears to be more common in shoreface environments than purely dolomitic cements, indicating at least two stages of authigenic cementation.

Some of the very-fine to fine grained quartzarenite of apparent shoreface origin likely represents coastal plain environments for part of its depositional and diagenetic history, given the apparent frequency of relative transgressive/regressive episodes as manifested by the frequent lateral facies changes seen in the vertical section at this locality. Consequently, some of the shoreface sandstone has likely had a mixed marine-terrestrial early diagenetic history which may account for the different diagenetic associations observed downsection (i.e., 1975m onward), where sandstone of apparent shoreface origin is predominantly to wholly silica-cemented.

ımon to locally abundant subhedral to euhedral quartz overgrowths are typically associated with the best ₚ..rosity, primarily in eolian deposits. Traces of spotty kaolin were observed in predominantly terrestrial deposits. Pyrite cements and nodules are commonly associated with Lithofacies #5 (terrestrial) where it occurs in massive, crystalline and disseminated forms. The presence of unusual very bituminous claystone and coaly to bituminous shale is a typical co-association.

Hydrocarbon Shows and DST Results

Hydrocarbon shows were generally very poor, typically consisting of variably minor to abundant, patchy to even, dull to bright yellow to yellow white to yellow green fluorescence and trace to minor thin, faint yellow white diffuse to streaming cut to questionable or no cut. Exceptions to the above occur in three intervals, where shows are poor to marginally fair; 1) 1529-1533m: even light brown oil stain, even pale yellow fluorescence, common very thin yellow streaming to diffuse cut; 2) 1869-1881m: common patchy pale to light brown oil staining, abundant bright yellow to yellow white fluorescence, common fast, poor to fair, thin yellow white diffuse and minor streaming cut; 3) 1900-1910m: common spotty to patchy bitumen, common to abundant bright yellow green and pale yellow fluorescence, minor to common poor, thin, diffuse and streaming cut.

In the upper part of the section (i.e., 1545-1685m), the presence of condensate was noted during the air drilling operation. The first significant appearance of bitumen occurs at ~1850 metres where it is found as spotty to patchy pore coatings and fillings. The bitumen (and pyrobitumen) is present locally in trace to ᵐinor amounts throughout the remaining ~200 metres of section.

ɹumerous fair to good gas shows were recorded during the drilling of the Mattson; however, all of these were thin (i.e., 1-3 metres) with the exception of the 1785-1790m interval and the M1 Zone. The M1 Zone (probable fracture zone) initially came in at ~2.2 million ft^3/day and gradually tapered off to 0.6 million ft^3/day after ~three days, after which no flow data was available due to the termination of the air drilling operation. A DST (#6) was run on the 1785-1789m interval and produced a weak to strong air blow in 30 seconds with gas to surface in 2 minutes. The final flow had a weak to strong gas blow in 1.5 minutes but began depleting after 35 minutes. Liquid recovery was 350 metres of clean salt water (22000 ppm). Two other DSTs were run in the Mattson with poor results; 1) DST #5: strong air blow immediately with no gas to surface. The final flow had a strong blow immediately with gas to surface in 30 minutes, which was too small to measure. The liquid recovery was 643 metres of fresh water and 1000 metres of invert cut fresh water; 2) DST #7: very weak to weak air blow 10cm into pail at 10 minutes with no gas to surface. The final flow had a very weak to weak air blow 10cm into pail at 25 minutes with no gas to surface. The liquid recovery was 120 metres of salt water (50000 ppm) and 40 metres of water cut invert.

ICLUSION: The Mattson has numerous fair to good reservoir-quality intervals at this locality and numerous fair to good gas responses; however, most of the significant reservoir intervals either appear wet on induction logs or lack significant gas crossover. DSTs #5 and #7 showed the M3 and M6 Zones (respectively) to be water-bearing. Despite these negative indicators, there are still significant gas-bearing intervals present of commercial interest. This formation has fair economic potential at this location and good to excellent potential in the region.

LITHOLOGICAL DESCRIPTIONS

PARAMOUNT ET AL LIARD NWT I-46
I-46-60-10-123-15

Surface Hole Section (311mm)

16-21 **SANDSTONE:** salt and pepper, predominantly fine to coarse grained, minor very fine and very coarse grains, trace pebble fragments, sublitharenite with abundant frosted to clear to locally ferruginous stained quartz and common dark to light varicolored lithic grains, moderately sorted, angular to subrounded to minor rounded, minor consolidated cuttings with common patchy kaolinitic and spotty siliceous cement, minor to common quartz overgrowths, **locally patchy ferruginous stain, infer good to streaky fair porosity, no shows.**

21-30 **CONGLOMERATE:** disaggregated, predominantly fine pebble, clast supported, polymict with abundant light to dark varicolored very siliceous to silicified predominantly aphanitic volcanic and metasedimentary clasts, common white to clear to occasionally varicolored quartz clasts, trace schistose metamorphic and sandstone clasts, rounded to sub angular, poorly sorted, matrix: very fine to coarse grained sandstone as above, trace spotty kaolinitic and siliceous cement on clasts, **trace patchy ferruginous stain, infer predominantly good to excellent porosity, no shows.**

30-35 **SANDSTONE:** orange to mottled orange white, fine to very coarse grained, pebbly, litharenite to sublitharenite with abundant quartz and common to abundant varicolored lithic grains to clasts as previously described, moderately poorly to moderately sorted, angular to rounded, commonly disaggregated in part, common poorly to moderately indurated consolidated cuttings with abundant limonitic cement &/or matrix, locally common to abundant patchy kaolin, minor hematitic stain and crusts on grains, **infer tight in part with streaky to patchy fair to good porosity, no shows.**

**Note: Samples 40m to 50m were of very poor quality.

35-40 **SANDSTONE and CONGLOMERATE:**: predominantly as described from 16-30m, infer thinly interbedded with variable streaky fair to good porosity, minor interbedded **SANDSTONE:** #2 light to medium grey, salt and pepper, very fine grained, quartzolithic, variably silty and argillaceous with slightly bentonite matrix, slightly tuffaceous with common scattered mica, **tight, no shows,** trace siltstone stringers; medium to dark grey, very argillaceous, slightly sandy, poorly to moderately indurated, tight, no shows, grades to silty bentonitic shale in part.

-50 **SANDSTONE:** predominantly as above, trace **SANDSTONE:** #2 as above, minor to common interbedded **SILTSTONE:** light grey to light brown, quartzose, predominantly variably argillaceous, minor scattered carbonaceous debris and mica, poorly to moderately indurated, grades to very silty shale in part, locally sandy occasionally grading to silty sandstone laminations, minor thin interbedded **SHALE:** light grey, firm, sub platy to sub blocky, sub fissile, commonly variably silty and micromicaceous, locally common carbonaceous specks, slightly bentonitic, sub waxy in part grading to claystone.

**Note: Shaker bypassed from 50 to 75 metres. Samples of suspect quality.

50-65 **SANDSTONE with interbedded SILTSTONE and minor SHALE:**

SANDSTONE: unconsolidated to disaggregated, fine to coarse grained, minor very fine and very coarse grains, occasional pebble, litharenite grading to sublitharenite, abundant clear to frosted quartz with common varicolored lithic grains, minor rounded brown sideritic grains, moderately sorted, angular to subrounded, trace consolidated cuttings with spotty siliceous and kaolinitic cement, **infer good porosity, no shows;**

SILTSTONE: light to medium grey, quartzose, common scattered mica and carbonaceous specks, commonly variably argillaceous to locally clean, poorly indurated, **tight, no shows;**

SHALE: dark grey, firm, sub platy to sub blocky, predominantly variably silty, common scattered carbonaceous debris and occasional coaly partings and laminations, minor interbedded claystone.

65-70.5 **SANDSTONE:** off white, salt and pepper, very fine to medium grained, trace coarse grains, sublitharenite, abundant clear to frosted quartz and common varicolored lithic grains, trace mica, moderately to moderately well sorted, angular to sub angular, predominantly disaggregated, minor consolidated cuttings with common spotty to patchy kaolinitic cement, trace spotty siliceous cement and quartz overgrowths, **infer streaky fair to good porosity, no shows.**

70.5-75.5 **SILTSTONE with interbedded CLAYSTONE:**

SILTSTONE: light to medium grey, quartzose, common scattered mica, minor carbonaceous specks, poorly to moderately indurated with siliceous cement in part, commonly variably argillaceous, locally sandy grading to very fine sandstone stringers, **tight, no shows;**

CLAYSTONE: predominantly light grey, firm to locally soft, brittle in part, sub waxy, variably silty in part occasionally grading to argillaceous siltstone laminations, locally very carbonaceous to coaly, trace sideritic laminations.

. . .5-80 **SILTSTONE with minor interbedded SHALE:**

SILTSTONE: medium brown to orange brown, quartzose, micaceous, minor carbonaceous specks, moderately to poorly indurated, predominantly variably argillaceous grading to silty shale in part, **common to abundant ferruginous stain, tight, no shows;**

SHALE: as above becoming increasingly micromicaceous, trace maroon claystone stringers.

80-84 **SANDSTONE with interbedded SHALE:**

SANDSTONE: very light grey to off white, salt and pepper, fine to medium grained, sublitharenite, abundant frosted to clear quartz with common varicolored lithic grains, rare glauconite, moderately to moderately well sorted, angular to subrounded, commonly disaggregated, minor consolidated cuttings with common to abundant patchy kaolin, minor locally common calcareous cement, **infer predominantly poor porosity, no shows;**

SHALE: light to medium grey, firm, sub blocky, predominantly very silty grading to argillaceous siltstone in part.

. . -89.5 **SANDSTONE with interbedded SILTSTONE and SHALE:**

SANDSTONE: unconsolidated to disaggregated, fine to medium grained, minor very fine and coarse grains, trace very coarse grains, litharenite with abundant clear to frosted to occasionally varicolored quartz and common to abundant varicolored lithic grains, moderately sorted, angular to subrounded, trace consolidated cuttings with spotty to patchy kaolinitic and siliceous cement, minor quartz overgrowths, **infer streaky fair to good porosity, no shows;**

SHALE and SILTSTONE: similar to above.

89.5-95 **SANDSTONE:** off white to light grey, predominantly fine grained, minor very fine and medium grains, sublitharenite grading to litharenite, abundant frosted to clear quartz and common varicolored lithic grains, trace rounded brown sideritic grains, well sorted, angular to subrounded, disaggregated in part, common consolidated cuttings abundant tight calcareous cement, trace to minor spotty kaolin, **tight to streaky poor porosity, no shows.**

100 **SANDSTONE:** light to medium grey, very fine grained, quartzolithic, rare glauconite, commonly variably micaceous, well sorted, angular to sub angular, moderately to poorly indurated with locally common dolomitic cement, commonly variably silty grading to sandy siltstone in part, clean to locally argillaceous, **tight to poor porosity, no shows.**

100-106 **SHALE/CLAYSTONE with minor interbedded SILTSTONE:**

SHALE: dark grey, sub platy, firm, commonly variably silty and micromicaceous, common carbonaceous to coaly debris and partings, trace to minor coaly stringers, **CLAYSTONE:** light to medium grey, brown, sub blocky, smooth to locally silty, carbonaceous to coaly in part, **SILTSTONE:** as above.

106-110 **SANDSTONE:** off white, predominantly fine grained, minor very fine and medium grains, sublitharenite, abundant white to frosted to minor clear quartz with minor to common varicolored lithic grains, well sorted, angular to sub angular, disaggregated in minor part, moderately to moderately poorly indurated with abundant tight calcareous cement, **tight, no shows,** minor thin interbedded shale as above.

110-119 **SANDSTONE with minor interbedded SHALE and SILTSTONE:**

SANDSTONE: as above becoming predominantly fine to medium grained, becomes commonly disaggregated with decreasing minor to common consolidated cuttings as previously described, moderately well sorted, **infer common tight to poor porosity with minor fair streaks, no shows;**

SHALE and SILTSTONE: as previously described.

119-122.5 **SHALE:** medium grey, firm, brittle in part, sub blocky to blocky, predominantly silty and micromicaceous occasionally grading to argillaceous siltstone stringers to laminations, minor locally common carbonaceous debris and partings, trace hard brown sideritic stringers.

122.5-130 **SANDSTONE:** white, predominantly fine grained, minor lower medium and trace upper very fine grains, sublitharenite with abundant clear to frosted quartz and minor predominantly light varicolored lithic grains, tuffaceous texture with common biotite and spotty bentonitic clay matrix, well sorted, angular to subrounded, commonly disaggregated, minor to common consolidated cuttings with minor locally common calcareous cement, **infer common poor porosity with minor fair to good streaks, no shows,** minor pale blue white tuffaceous bentonite stringers, trace siltstone stringers.

140-145 **SANDSTONE:** white, salt and pepper, very fine to medium grained, litharenite grading to sublitharenite, abundant frosted to clear quartz with common dark to light varicolored lithic grains, trace sideritic grains and mica, moderately well sorted, angular to subrounded, predominantly disaggregated, minor consolidated cuttings with spotty kaolinitic and siliceous cement, minor locally common calcareous cement, trace quartz overgrowths, **infer fair to good porosity, no shows,** trace to minor interbedded **SILTSTONE:** medium grey, quartzose, micaceous, commonly variably argillaceous, trace scattered carbonaceous debris, minor shaly laminations.

145-155 **SANDSTONE:** similar to above, unconsolidated to disaggregated, salt and pepper, very fine to medium grained, litharenite grading to sublitharenite, abundant frosted to clear quartz with common varicolored lithic grains, trace biotite, rare glauconite, moderately well sorted, angular to subrounded, trace consolidated cuttings with spotty kaolin, minor calcareous cement, **infer good to streaky fair porosity, no shows,** minor interbedded **SILTSTONE:** medium grey, quartzolithic, scattered mica and carbonaceous specks, predominantly variably argillaceous, moderately indurated trace dolomitic cement, **tight, no shows.**

155-162.5 **SANDSTONE:** as previously described becoming increasingly consolidated in minor part with locally abundant tight calcareous cement and minor spotty kaolin, **infer porosity as above with minor tight to poor streaks, no shows.**

SULLY 162.5 m MD 379.7 m SS

162.5-172 **SILTSTONE:** light grey, minor medium grey, quartzose, minor to locally common biotite, trace to minor carbonaceous specks, rare glauconite, commonly clean to locally variably argillaceous, moderately to poorly indurated, siliceous cement in part, trace to minor carbonaceous parting, locally variably sandy grading to minor very fine sandstone laminations to stringers, **tight to poor porosity, no shows,** minor medium grey very silty shale stringers and laminations, trace to minor medium brown dense hard siderite nodules &/or stringers.

172-182 **SILTSTONE:** similar to above, light to medium grey, quartzose, minor to locally common biotite, trace to minor carbonaceous specks, rare glauconite, commonly variably argillaceous to locally clean, moderately to poorly indurated, siliceous cement in part, trace carbonaceous parting, locally variably sandy grading to minor very fine sandstone laminations to stringers, **tight, no shows,** minor medium grey very silty shale stringers and laminations, trace brown sandy sideritic laminations to stringers.

**Note: Samples 185 and 190 are of poor quality.

,-190 **SHALE with interbedded SILTSTONE:**

SHALE: medium to dark grey, brown grey, firm, sub blocky to sub platy, micromicaceous, predominantly very silty grading to argillaceous siltstone in part, trace carbonaceous specks, **SILTSTONE:** as above.

190-197 **SANDSTONE with interbedded SILTSTONE and SHALE:**

SANDSTONE: disaggregated, very fine to medium grained, minor coarse to very coarse grains and pebble fragments, litharenite grading to sublitharenite, abundant white to frosted quartz with common varicolored lithic grains, rare to trace glauconite, moderately to moderately poorly sorted, angular to subrounded to occasionally rounded, trace consolidated cuttings with abundant tight calcareous cement, **infer tight to poor porosity in part, poor to fair porosity in part, no shows;**

SILTSTONE and SHALE: as above.

197-202.6 **SHALE:** dark grey, firm to locally hard, brittle in part, sub platy, fissile, predominantly smooth, locally slightly silty in minor part, trace framboidal pyrite micro-nodules, rare dark brown slightly dolomitic claystone laminations to stringers.

KANNI 202.6 m MD (339.6 m SS)

202.6-210 **SANDSTONE:** salt and pepper, fine to very coarse grained, gritty to slightly pebbly litharenite, abundant clear to frosted quartz with abundant predominantly dark grey to black chert grains, poorly sorted, angular to rounded, minor consolidated cuttings with common spotty to patchy calcareous cement, minor quartz overgrowths, fining down to similar to below, **infer predominantly good porosity,** rare spotty pyrobitumen? specks, **minor spotty dull to medium yellow fluorescence, no cut.**

210-220 **SANDSTONE:** similar to above becoming finer, fine to medium grained, minor coarse and trace very coarse grains, sublitharenite grading to litharenite, abundant frosted to clear quartz with common predominantly dark chert and lithic grains, rare glauconite, moderately sorted, angular to rounded, predominantly disaggregated, minor consolidated cuttings with common to abundant tight siliceous cement, minor spotty calcareous cement, trace interstitial pyrite, **infer variable porosity, common tight to poor with streaky fair porosity, no shows,** minor thin interbedded **SHALE:**.

220-225 **SANDSTONE:** as above in part, predominantly very light grey to brown grey, very fine grained, sublitharenite with minor dark lithic grains and carbonaceous specks, trace glauconite, well sorted, angular to sub angular, variably silty in part occasionally grading to sandy siltstone laminations, commonly poorly indurated and crumbly with minor spotty siliceous cement, slightly argillaceous in part, **tight to poor porosity, no shows,** minor thin interbedded **SHALE:** medium to dark grey, firm to soft, variably silty and micromicaceous grading to siltstone laminations, trace hard brown sideritic stringers.

225-231 **SANDSTONE:** as above becoming increasingly variably argillaceous in minor part, increasing minor to common shaly and silty laminations, **tight, no shows.**

231-240 **SANDSTONE with minor interbedded SHALE:** .

SANDSTONE: similar to above, off white to very light grey, very fine grained, sublitharenite with minor dark lithic grains and carbonaceous specks, trace glauconite, well sorted, angular to sub angular, commonly moderately to poorly indurated with common siliceous cement, trace spotty kaolin, variably silty and argillaceous in part with locally common silty and shaly laminations, **predominantly tight to minor poor porosity, no shows,** minor thin interbedded **SHALE:** as above.

-250 **SANDSTONE:** as previously described, minor thin interbedded **SHALE:** as above.

250-261 **SANDSTONE:** similar to above, light to medium grey, very fine grained, sublitharenite with minor dark lithic grains and carbonaceous specks, rare to trace glauconite, well sorted, angular to sub angular, commonly moderately to poorly indurated with common siliceous cement, trace spotty kaolin, increasingly variably silty and argillaceous in part with locally common silty and shaly laminations, **predominantly tight to minor poor porosity, no shows,** minor thin interbedded **SHALE:** medium to dark grey, firm to soft, variably silty and micromicaceous.

261-269 **SILTSTONE with minor interbedded SHALE and SANDSTONE:**

SILTSTONE: light grey to brown grey, quartzose, commonly moderately indurated to moderately well indurated with siliceous cement, argillaceous in part with shaly laminations, commonly variably sandy grading to silty very fine sandstone in part, trace dolomitic stringers to laminations, **tight, no shows;**

SANDSTONE: similar to above but predominantly silty grading from siltstone;

SHALE: as above.

ɔ-278	**SANDSTONE:** light grey, very pale brown in part, very fine grained, sublitharenite with minor dark lithic grains and carbonaceous specks, rare to trace glauconite, well sorted, angular to sub angular, commonly moderately well to locally moderately poorly indurated with predominantly siliceous cement, trace spotty dolomitic cement, clean to variably silty, locally argillaceous in part with minor silty and shaly laminations, **tight, no shows.**
278-290	**SANDSTONE:** very similar to above, light to medium grey, very fine grained, sublitharenite, abundant quartz with minor dark lithic grains and carbonaceous specks, trace mica, rare to trace glauconite, well sorted, angular to sub angular, moderately to poorly indurated with common siliceous cement, variably silty in part, minor to common argillaceous laminations and partings, rare carbonaceous parting, **tight, no shows.**
290-300	**SANDSTONE:** as previously described with decreasing argillaceous laminations.
300-312	**SANDSTONE:** very similar to above, light to medium grey, very fine grained, sublitharenite, abundant quartz with minor dark lithic grains and carbonaceous specks, trace mica, rare to trace glauconite, well sorted, angular to sub angular, poorly to moderately indurated with common siliceous cement, minor streaky calcareous cement, variably silty in part, minor to common argillaceous laminations and partings, rare carbonaceous parting, **tight, no shows.**
312-323	**SANDSTONE:** similar to above, light to medium grey, very fine grained, sublitharenite, abundant quartz with minor dark lithic grains and carbonaceous specks, trace mica, rare to trace glauconite, well sorted, angular to sub angular, induration increasing slightly, common siliceous cement, variably silty in part, minor to common argillaceous laminations and partings, rare carbonaceous parting, **tight, no shows.**
323-332	**SANDSTONE:** similar to above, light to medium grey, very fine grained, sublitharenite, abundant quartz with minor dark lithic grains and carbonaceous specks, trace mica, rare to trace glauconite, well sorted, angular to sub angular, slightly decreasing induration, common siliceous cement, minor streaky calcareous cement, variably silty in part, minor to common argillaceous laminations and partings, rare carbonaceous parting, **tight, no shows.**
332-336	**SANDSTONE:** as previously described with increasing common argillaceous and silty laminations, decreasing trace to minor streaky calcareous to dolomitic cement, **tight, no shows.**
336-341	**SANDSTONE:** as previously described with increasing minor to common calcareous cement, decreasingly indurated, common argillaceous and silty laminations as above, **tight, no shows.**

-41-355 **SANDSTONE with minor interbedded SHALE and SILTSTONE:**

SANDSTONE: similar to above, light to medium grey, very fine grained, sublitharenite as above, increasing trace to locally minor carbonaceous specks and debris, trace mica, rare to trace glauconite, moderately to poorly indurated with common siliceous cement, minor to locally common spotty to patchy kaolin, trace spotty calcareous cement, increasingly silty in part grading to minor sandy siltstone laminations and stringers, increasingly argillaceous in part with common to abundant argillaceous laminations and partings, rare carbonaceous parting, **predominantly tight, no shows;** minor **SHALE:** stringers to thin interbeds, dark grey, firm, sub platy, predominantly silty and micromicaceous, locally sandy with silty and sandy laminations; **SILTSTONE:** very dark brown, hard, dense, very siliceous, quartzose with trace dark lithic grains and carbonaceous specks, **tight.**

LEPINE 355 m MD (187.2 m SS)

355-370 **SHALE:** dark grey, firm to locally hard, commonly brittle, commonly platy to sub platy, sub blocky in part, fissile to sub fissile, very slightly silty and faintly micromicaceous in part, commonly variably silty and micromicaceous with occasional silty laminations, trace to minor very fine sandstone stringers as above.

)-380 **SHALE:** very similar to above, dark grey, predominantly firm to locally hard, brittle in part, predominantly platy to sub platy, sub blocky in minor part, fissile to sub fissile, very slightly silty to non-silty and faintly micromicaceous in minor part, commonly variably silty and micromicaceous with occasional silty laminations, rare glauconite, rare fish scales, minor very fine sandstone stringers to very thin interbeds.

380-390 **SHALE:** dark grey to black, firm, locally soft to hard, occasionally brittle, platy to sub platy, sub blocky in minor part, fissile to sub fissile, commonly variably silty and micromicaceous, carbonaceous in part, rare fish scales, minor **SILTSTONE:** stringers to laminations, very quartzose with trace lithic grains and glauconite, well to very well indurated with abundant siliceous and trace to rare spotty dolomitic cement, locally sandy occasionally grading to very fine sandstone stringers, **tight.**

390-401 **SHALE:** dark grey, firm, platy to sub platy, brittle in part, fissile, predominantly faintly micromicaceous, locally silty in minor part, increasing trace fish scales, trace siltstone laminations as above.

401-405 **SHALE:** dark grey, minor black, firm, platy to sub platy, flaky in part, fissile, predominantly faintly micromicaceous, carbonaceous in minor part, variably silty in minor part, rare to trace fish scales.

415-420 **SHALE:** dark grey, firm to locally hard, commonly brittle, predominantly platy to sub platy, sub blocky in minor part, fissile to sub fissile, faintly to moderately micromicaceous, trace locally silty with occasional silty laminations, trace fish scales.

420-428 **SANDSTONE:** as previously described becoming increasingly silty in minor part.

428-435 **SHALE:** dark grey, firm to locally hard, sub blocky to sub platy, sub fissile in part, commonly variably silty and micromicaceous grading to minor argillaceous siltstone laminations, smooth and faintly micromicaceous in part, trace clean white quartzose siltstone to very fine sandstone stringers to laminations, trace medium to dark brown siliceous siltstone laminations to stringers.

435-440 **SHALE:** as previously described with increasing trace white quartzose siltstone to very fine sandstone stringers to laminations as above, rare fish scales.

440-445 **SHALE:** as previously described with decreasing trace siltstone to very fine sandstone stringers to laminations as above, minor black carbonaceous shale stringers.

445-458 **SHALE:** dark to medium grey, firm to very firm, brittle in part, predominantly platy to sub platy, sub blocky in minor part, fissile to sub fissile, predominantly faintly micromicaceous, locally variably silty in minor part, rare argillaceous slightly glauconitic siltstone laminations, trace hard dense sideritic laminations to nodules, rare to trace pyrite.

458-477 **SHALE:** dark grey, firm, brittle in part, predominantly sub platy to platy, minor sub blocky, fissile, commonly slightly to locally variably silty and micromicaceous, smooth and faintly micromicaceous in minor part, trace off white to light brown quartzose siltstone laminations, trace to minor medium grey argillaceous siltstone stringers to laminations as described below increasing down, rare to trace fish scales.

477-487 **SILTSTONE with minor very thin interbedded SHALE:**

SILTSTONE: light to medium grey, very quartzose with trace to minor glauconite and dark lithic grains, trace to rare mica, clean in minor part, predominantly variably argillaceous with common to abundant silty argillaceous laminations, moderately to moderately poorly indurated, predominantly siliceous cement with trace spotty calcareous to dolomitic cement, minor locally abundant streaky calcareous cement, **tight, no shows; SHALE:** dark grey, firm, sub blocky to sub platy, silty and micromicaceous with trace scattered glauconite, very slightly dolomitic in part, grades to argillaceous siltstone.

497-501 **SILTSTONE:** very similar to above, light to medium grey, grey brown, very quartzose as above with increasing minor to locally common glauconite, trace to minor dark lithic grains, rare mica, clean in part, commonly variably argillaceous with common silty argillaceous laminations and occasional stringers, variably indurated: commonly moderately indurated to locally poorly to well indurated, predominantly siliceous cement with trace spotty to locally minor dolomitic cement, decreasing trace to minor locally common to abundant streaky calcareous cement, **tight, no shows,** minor very thin interbedded **SHALE:** very dark grey, firm to very firm, predominantly brittle, platy to sub platy, fissile, commonly slightly silty and micromicaceous, locally very silty grading to argillaceous siltstone, very rare fish scales.

501-505 **SILTSTONE:** as previously described with increasing minor dark lithic grains and decreasing trace to minor glauconite, induration and cements as above with increasing minor locally common to abundant streaky calcareous to dolomitic cement, **tight, no shows.**

Intermediate Hole Section (222mm)

505-510 **SILTSTONE:** inferred lithology from above, sample ~98% cement.

-520 **SILTSTONE with interbedded SHALE:**

SILTSTONE: light to medium grey, very quartzose with trace to minor to occasionally locally common glauconite, trace to minor dark lithic grains, rare to trace mica, clean in part, commonly variably argillaceous with common silty argillaceous laminations and occasional stringers, sandy in minor part grading to silty very fine sandstone, commonly moderately to poorly indurated with common siliceous cement, increasing minor to locally common to abundant streaky calcareous to dolomitic cement, **tight with trace streaky poor porosity, no shows; SHALE:** dark grey, firm, sub blocky to occasionally sub platy, very silty and micromicaceous grading to argillaceous siltstone, trace to minor glauconite.

520-528 **SILTSTONE:** as previously described becoming increasingly clean in part, induration decreasing to poorly to moderately, decreasing trace calcareous cement, trace bentonitic clay matrix, increasingly sandy in part grading to **SANDSTONE:** very light to light grey, very fine grained, silty, very quartzose with minor to locally common glauconite, trace to minor dark lithic grains, well sorted, angular to sub angular, moderately to poorly indurated with common siliceous cement and trace spotty calcareous cement, **tight to poor porosity, no shows,** minor **SHALE:** as above.

530-535 **SANDSTONE with minor interbedded SILTSTONE:**

SANDSTONE: light to medium grey, very fine grained, commonly variably silty grading to siltstone in part, very quartzose (sublitharenite) with minor glauconite, trace to minor lithic grains, well sorted, angular to sub angular, clean in part, variably argillaceous in part with minor to common silty argillaceous laminations, commonly poorly indurated and crumbly to friable, moderately indurated in part, predominantly common siliceous cement, minor spotty kaolin, trace locally common streaky calcareous cement, trace to minor quartz overgrowths, **predominantly tight, minor poor to occasionally fair porosity, no shows; SILTSTONE:** as above.

535-540 **SANDSTONE with interbedded SILTSTONE:**

SANDSTONE: as above, **SILTSTONE:** as previously described becoming increasingly variably argillaceous with common to abundant argillaceous laminations, moderately to poorly indurated with cements as above, **tight, no shows.**

540-550 **SANDSTONE:** as previously described, increasingly silty in part grading to siltstone, increasingly argillaceous in part with common silty argillaceous laminations, poorly indurated as above in part, moderately to moderately well indurated in part with predominantly siliceous cement, **predominantly tight, minor streaky poor to occasionally fair porosity, no shows,** minor very thin **SHALE:** interbeds to stringers.

550-560 **SILTSTONE:** medium to dark grey, quartzose with minor glauconite, predominantly argillaceous grading to very silty shale in part, sandy in part with minor silty very fine sandstone laminations and stringers, poorly to moderately indurated with siliceous cement, **tight, no shows.**

560-566 **SILTSTONE:** as previously described becoming increasingly clean and sandy in part grading to silty sandstone.

566-572 **SANDSTONE with interbedded SILTSTONE:**

SANDSTONE: as previously described with increasing induration; commonly moderately indurated, locally poorly to well indurated, predominantly siliceous cement with trace to locally minor spotty kaolin, **predominantly tight, no shows; SILTSTONE:** as above.

572-581 **SHALE with interbedded SILTSTONE:**

SHALE: very dark to dark grey, firm to locally hard, sub blocky to sub platy, sub fissile in part, predominantly variably silty and micromicaceous grading to argillaceous siltstone in part, carbonaceous in part; **SILTSTONE:** as previously described.

-594 **SANDSTONE with interbedded SILTSTONE:**

SANDSTONE: very similar to previously described, light to medium grey, very fine grained, commonly variably silty grading to siltstone in part, very quartzose (sublitharenite) with minor to locally common glauconite, trace to minor lithic grains, well sorted, angular to sub angular, clean to variably argillaceous in part with minor to common silty argillaceous laminations, commonly moderately to moderately well indurated with predominantly siliceous cement, minor streaky calcareous to dolomitic cement, predominantly tight, no shows; **SILTSTONE:** as previously described, medium to dark grey, quartzose with minor glauconite, predominantly argillaceous to occasionally clean grading to very silty shale in part, sandy in part with minor silty very fine sandstone laminations and stringers, poorly to moderately indurated with siliceous cement, **tight, no shows.**

594-608 **SHALE with minor interbedded SILTSTONE:**

SHALE: dark grey to black, firm to hard, brittle in part, sub blocky to sub platy, fissile in part, commonly slightly silty and micromicaceous, very silty in part grading to argillaceous siltstone laminations and stringers, carbonaceous in part, trace glauconite, **SILTSTONE:** as previously described.

-616 **SILTSTONE:** as previously described, medium to dark grey, quartzose with minor glauconite, predominantly argillaceous to occasionally clean grading to very silty shale in part, sandy in part with minor silty very fine sandstone laminations and stringers, poorly to moderately indurated with siliceous cement, **tight, no shows,** minor thin interbedded **SHALE:** as above.

616-625 **SHALE:** as previously described, dark grey to black, firm to hard, brittle in part, sub blocky to sub platy, fissile in part, commonly slightly silty and micromicaceous, very silty in part grading to argillaceous siltstone laminations and stringers, carbonaceous in part, trace glauconite, minor interbedded **SILTSTONE:** as above.

625-635 **SHALE:** as previously described.

635-648 **SHALE:** very similar to above, dark grey to black, firm to hard, brittle in part, sub blocky to sub platy, fissile in part, slightly silty in part, increasingly silty and micromicaceous in part, increasingly grading to argillaceous siltstone laminations and stringers, carbonaceous in part, trace glauconite, increasing minor interbedded argillaceous **SILTSTONE:** as above.

8-665 **SHALE with interbedded SILTSTONE:**

SHALE: dark grey, firm to hard, brittle in part, blocky to sub blocky, occasionally sub platy, fissile in minor part, predominantly silty and micromicaceous grading to argillaceous siltstone in part, trace to minor glauconite; **SILTSTONE:** similar to previously described, medium to dark grey, quartzose with minor glauconite, predominantly argillaceous to occasionally clean grading to very silty shale in part, locally sandy occasionally grading to silty sandstone laminations to stringers, poorly to moderately indurated with siliceous cement, **tight, no shows.**

665-682 **SILTSTONE with interbedded SHALE:**

SILTSTONE: similar to previously described, predominantly medium to dark grey, minor light grey, quartzose with minor glauconite and trace mica, predominantly variably argillaceous grading to silty shale in part, minor argillaceous laminations, locally clean and sandy grading to silty sandstone laminations to stringers, predominantly moderately to moderately well indurated with common siliceous cement, minor locally common streaky calcareous to dolomitic cement, **tight, no shows; SHALE:** as previously described grading from **SILTSTONE:**.

682-697 **SHALE with minor interbedded SILTSTONE:**

SHALE: dark grey to black, firm to hard, predominantly sub blocky to blocky, minor sub platy, sub fissile in minor part, carbonaceous in part, predominantly variably silty and micromicaceous grading to argillaceous siltstone in part, common silty laminations, trace glauconite, trace very fine sandstone laminations; **SILTSTONE:** as above.

697-704 **SILTSTONE:** similar to previously described, predominantly medium to dark grey, minor light grey, quartzose with trace to minor glauconite, predominantly variably argillaceous grading to silty shale in part, minor argillaceous laminations, clean in minor part, moderately to poorly indurated with common siliceous cement, minor streaky calcareous to dolomitic cement, tight, no shows, minor dark brown hard dense very dolomitic siltstone stringers, minor thin interbedded shale as above.

704-718 **SHALE with minor interbedded SILTSTONE:**

SHALE: dark grey to black, firm to hard, sub blocky to sub platy, sub fissile to fissile in part, carbonaceous in minor part, predominantly silty to very silty and micromicaceous grading to argillaceous siltstone in part, common silty laminations, trace to locally minor glauconite; **SILTSTONE:** as previously described without very dolomitic stringers.

.8-743 **SHALE with interbedded SILTSTONE:**

SHALE: as previously described becoming increasingly silty and increasingly commonly grading to argillaceous siltstone; **SILTSTONE:** similar to previously described, predominantly dark grey, quartzose with trace to minor glauconite, predominantly variably argillaceous grading to silty shale in part, clean in minor part with minor argillaceous laminations, moderately to moderately well indurated with common siliceous cement, minor streaky calcareous to dolomitic cement, **tight, no shows,** rare to trace dark brown hard dense very dolomitic siltstone stringers.

743-758 **SHALE with minor interbedded SILTSTONE:**

SHALE: dark grey to black, firm to hard, sub blocky to sub platy, sub fissile to fissile in part, carbonaceous in minor part, predominantly silty to very silty and micromicaceous grading to argillaceous siltstone in part, common silty laminations, trace to locally minor glauconite; **SILTSTONE:** as previously described grading from **SHALE:** in part.

758-763 **SHALE:** as previously described with trace very fine sandstone laminations with siliceous and dolomitic cement.

3-775 **SHALE with interbedded SILTSTONE:**

SHALE: as previously described, dark grey to black, firm to hard, sub blocky to sub platy, sub fissile to fissile in part, carbonaceous in minor part, predominantly silty to very silty and micromicaceous increasingly grading to argillaceous siltstone in part, common silty laminations, trace to locally minor glauconite; **SILTSTONE:** as previously described grading from **SHALE:** in part, trace very fine sandstone laminations with siliceous and dolomitic cement.

775-785 **SILTSTONE with minor interbedded SHALE:**

SILTSTONE: similar to above, predominantly dark grey, quartzose with minor glauconite, predominantly argillaceous with common argillaceous laminations and stringers, occasionally clean and sandy grading to silty sandstone laminations, commonly moderately to moderately well indurated, poorly indurated in part, siliceous and minor streaky dolomitic to calcareous cement, **tight, no shows;** **SHALE:** as above.

785-795 **SHALE with minor interbedded SILTSTONE:**

SHALE: dark grey to black, firm to hard, brittle in part, sub platy to sub blocky, fissile in part, commonly slightly silty and increasingly carbonaceous in part, variably silty and micromicaceous in part grading to argillaceous siltstone, trace glauconite;

SILTSTONE: dark to light grey, very quartzose with minor glauconite, commonly variably argillaceous, clean and sandy in part grading to minor silty sandstone, poorly to moderately indurated with siliceous and dolomitic cement, **tight, no shows.**

795-810 **SHALE:** very similar to above, dark grey to black, firm to hard, brittle in part, sub platy to sub blocky, fissile in part, commonly carbonaceous, commonly variably silty and micromicaceous, grades to argillaceous siltstone in minor part, trace glauconite, decreasing minor very thin interbedded siltstone as above.

810-825 **SHALE:** similar to previously described, dark grey to black, firm to hard, brittle in part, sub platy to sub blocky, fissile in part, commonly carbonaceous, commonly variably silty and micromicaceous, grades to argillaceous siltstone in minor part, trace glauconite, trace dark brown hard dense siderite stringers to nodules.

825-835 **SHALE:** dark grey to black, firm to hard, brittle in part, sub platy to sub blocky, fissile in part, commonly carbonaceous, commonly variably silty and micromicaceous, increasingly grading to argillaceous siltstone in part, trace glauconite, trace medium grey hard very fine sandstone laminations, rare to trace disseminated and framboidal pyrite.

835-847 **SHALE:** as above with rare to trace hard dense dark brown grey very silty dolomite stringers, rare siderite laminations to nodules.

847-855 **SHALE:** predominantly dark grey, minor black, firm to hard, commonly brittle, platy to sub platy, fissile, minor sub blocky, commonly smooth and faintly micromicaceous, variably silty as above in part.

855-865 No samples caught.

865-881 **SHALE:** very similar to previously described, predominantly dark grey, minor black, firm to hard, commonly brittle, platy to sub platy, fissile, minor sub blocky, commonly smooth and faintly micromicaceous, increasingly variably silty grading to argillaceous and occasionally clean siltstone in part, trace glauconite, minor very thin interbedded **SANDSTONE:** light to medium grey, very fine grained, quartzose, hard, dense, moderately to well indurated with siliceous and dolomitic cement, **tight.**

CUTTINGS 881 m MD (-338.8 m SS)

881-886 **SANDSTONE:** light to medium grey, occasionally brown grey, very fine grained, quartzose with minor to common to locally abundant glauconite, minor dark lithic grains, well sorted, angular to sub angular, variably silty grading to sandy siltstone in part, commonly clean to variably argillaceous in part with trace to minor argillaceous laminations, occasional glauconitic lamination, commonly moderately indurated, locally poorly to well indurated, common streaky calcareous to dolomitic cement, minor to common streaky siliceous cement, **tight to streaky poor porosity, no shows;**

minor interbedded **SHALE:** firm to locally soft, sub platy, sub fissile, slightly silty and micromicaceous in part, very silty and glauconitic in part grading to siltstone in part.

886-893 **SANDSTONE:** similar to previously described with decreasing minor scattered glauconite and increasing minor dark lithic grains, trace mica, variable induration as above with common streaky siliceous and calcareous to dolomitic cement, **predominantly tight with minor streaky poor porosity, no shows,** minor very thin interbedded shale as above.

893-897 **SANDSTONE:** similar to previously described, light to medium grey, very fine grained, commonly variably silty grading to sandy siltstone in part, quartzose with minor glauconite, minor dark lithic grains, well sorted, angular, commonly clean to variably argillaceous with minor argillaceous laminations, minor silty laminations, commonly moderately to locally poorly indurated with siliceous cement, predominantly tight, no shows.

897-909 **SANDSTONE:** similar to previously described becoming decreasingly silty, predominantly clean, minor argillaceous laminations, moderately to poorly indurated with common siliceous cement and trace streaky dolomitic to calcareous cement, rare to trace interstitial pyrite, **tight with streaky poor porosity, no shows.**

909-926 **SANDSTONE:** light grey, very fine grained, quartzose with minor glauconite, minor dark lithic grains, well sorted, angular to sub angular, predominantly clean and variably silty, locally slightly to moderately argillaceous with minor argillaceous laminations, predominantly moderately indurated, locally well to poorly indurated, predominantly siliceous cement, trace dolomitic to calcareous cement, increasing trace to locally minor interstitial pyrite, **tight to streaky poor porosity, no shows.**

ɔ6-932 **SANDSTONE:** light to medium grey, grey brown, very fine grained, quartzose with minor glauconite, minor dark lithic grains, well sorted, angular to sub angular, predominantly clean and variably silty with minor silty laminations, increasingly argillaceous in minor part with minor argillaceous laminations, poorly to moderately indurated with abundant calcareous cement, **tight with minor streaky poor porosity, no shows,** trace dark brown dense cryptocrystalline limestone laminations to stringers.

932-940 **SANDSTONE:** light grey, very fine grained, quartzose with minor glauconite, minor dark lithic grains, well sorted, angular to sub angular, predominantly clean, locally slightly to moderately argillaceous with minor argillaceous laminations, predominantly moderately indurated with siliceous cement, minor streaky calcareous cement, **tight, no shows.**

940-955 **SANDSTONE:** light to medium grey, very fine grained, quartzose as above, well sorted, angular to sub angular, commonly moderately to very silty grading to sandy siltstone in part, commonly variably argillaceous with minor to locally common argillaceous laminations, moderately to poorly indurated with siliceous and minor calcareous cement, tight, no shows.

955-960 **SANDSTONE:** very similar to previously described becoming decreasingly argillaceous in minor part, decreasingly silty.

ɔ0-965 **SANDSTONE:** as previously described becoming increasingly argillaceous in part with increasing minor argillaceous laminations.

965-975 **SANDSTONE:** light to medium grey, very fine grained, quartzose as above, well sorted, angular to sub angular, commonly moderately to very silty grading to sandy siltstone in part, commonly variably argillaceous with minor to locally common argillaceous laminations, moderately to poorly indurated with siliceous and minor calcareous cement, no visible porosity, no shows.

975-981 **SANDSTONE:** similar to previously described becoming commonly argillaceous with increasing minor argillaceous laminations and stringers, increasingly grading to sandy siltstone in part.

.-995 **SANDSTONE:** as above in minor part, predominantly light to medium brown, light grey, very fine grained, quartzose with minor to locally common glauconite, trace to minor dark lithic grains, well sorted, angular to sub angular, predominantly variably silty grading to sandy siltstone in part, predominantly clean, variably argillaceous in part with minor to locally common argillaceous laminations and stringers, poorly to moderately indurated, friable in minor part, siliceous cement, trace calcareous cement, **predominantly no visible porosity, minor streaky poor to trace fair porosity, trace to minor spotty very dull fluorescence, rare to trace very weak questionable cut,** rare micro fracture with fibrous calcareous fill and disseminated pyrite, trace pyrite nodules.

995-1006 **SANDSTONE:** similar to above, predominantly light brown, very fine grained, quartzose with minor to locally common glauconite, trace to minor dark lithic grains, well sorted, angular to sub angular, predominantly variably silty grading to sandy siltstone in part, predominantly clean, variably argillaceous in part with minor to locally common argillaceous laminations and stringers, poorly to moderately indurated, siliceous cement, trace calcareous cement, **predominantly no visible porosity, minor streaky poor to very poor porosity, trace to minor spotty dull yellow gold fluorescence, trace to minor very weak very thin streaming cut,** trace to minor thin interbedded **SHALE:**.

)6-1015 **SANDSTONE with interbedded SHALE:**

SANDSTONE: similar to previously described, light to medium grey brown, quartzose as above, becomes increasingly argillaceous and silty grading to increasing sandy siltstone in part, common silty argillaceous laminations and stringers, increasing trace to minor pyrite nodules, commonly poorly indurated, moderately indurated in part, siliceous cement, **increasing minor spotty dull yellow gold fluorescence, rare to trace cut as above, predominantly no visible porosity; SHALE:** dark to very dark grey, firm to hard, sub blocky to sub platy, predominantly very silty commonly grading to argillaceous siltstone, slightly glauconitic in part.

1015-1022 **SANDSTONE:** similar to above, light to medium grey brown, brown grey, quartzose as above, variably silty grading to sandy siltstone in part, decreasingly variably argillaceous in minor part, increasing trace to minor pyrite nodules, commonly moderately to locally poorly indurated, siliceous cement, trace to minor calcareous cement, **predominantly no visible porosity, trace to minor streaky poor porosity, trace very dull fluorescence, no cut.**

ARBUTT 1022 m MD (-479.8 m SS)

1022-1036 **SHALE with interbedded SANDSTONE:**

SANDSTONE: as previously described commonly grading to siltstone, decreasing trace pyrite nodules, porosity and shows as previously described; **SHALE:** dark grey, firm, commonly brittle, sub platy, sub fissile, slightly silty and faintly micromicaceous in part.

1036-1040 **SANDSTONE:** as previously described becoming increasingly clean in major part, decreasingly silty grading to minor siltstone, moderately to poorly indurated with siliceous cement, **predominantly no visible porosity, increasing minor very dull fluorescence, increasing minor slow yellow green streaming cut.**

1040-1062 **SANDSTONE:** light brown, very fine grained, very quartzose with decreasing trace to minor glauconite, minor dark lithic grains, well sorted, angular to sub angular, predominantly variably silty grading to sandy siltstone in minor part, predominantly clean, locally slightly argillaceous with trace argillaceous laminations, commonly poorly to locally moderately indurated with siliceous cement, trace interstitial pyrite, **predominantly no visible porosity, infer common streaky very poor to poor porosity, common to abundant uneven light brown oil stain, minor to locally common very dull fluorescence, minor to common slow weak yellow to yellow green streaming cut,** minor very thin interbedded **SHALE:** as described below.

1062-1077 **SHALE with interbedded SILTSTONE:**

SILTSTONE: light to medium brown, brown grey, quartzose as above, sandy grading to silty **SANDSTONE:** in part, clean to variably argillaceous with minor to common argillaceous laminations, commonly moderately to locally moderately well indurated with siliceous cement, no visible porosity, trace very dull questionable fluorescence, trace very slow yellow green cut; **SHALE:** dark grey, commonly firm, locally soft to hard, sub blocky to sub platy, brittle in part, sub fissile to fissile in part, variably silty and micromicaceous in part with minor to locally common silty laminations, slightly silty and faintly micromicaceous in part.

1077-1085 **SHALE:** dark grey to occasionally black, firm to very firm, commonly brittle, sub platy to sub blocky, commonly sub fissile to fissile, commonly smooth and faintly micromicaceous, carbonaceous in minor part, slightly silty in part.

1085-1100 **SHALE:** similar to above, dark grey to minor black, firm to very firm, commonly brittle, platy to sub platy, fissile to sub fissile, predominantly smooth & very faintly micromicaceous, carbonaceous in minor part, locally slightly silty in minor part, trace silty laminations.

1100-1120 **SHALE:** very similar to above, dark grey to minor black, firm to very firm, commonly brittle, platy to sub platy, fissile to sub fissile, predominantly smooth & very faintly micromicaceous, increasingly carbonaceous in minor part, increasingly slightly to locally moderately silty in minor part, trace silty laminations.

1120-1130 **SHALE:** as previously described, dark grey to minor black, firm to very firm, commonly brittle, platy to sub platy, fissile to sub fissile, predominantly smooth & very faintly micromicaceous, carbonaceous in minor part, locally slightly silty in minor part, trace silty laminations.

1130-1138 **SHALE:** dark grey to black, commonly firm, locally hard to soft, commonly platy to sub platy, sub blocky in part, brittle in part, predominantly fissile, smooth and faintly micromicaceous in part, commonly slightly to locally moderately silty with minor siltstone laminations, variably carbonaceous in part, rare to trace dark brown dense cryptocrystalline limestone laminations to stringers, very rare white tuffaceous bentonite.

1138-1154 **SHALE:** dark grey to black, firm, commonly brittle, platy to sub platy, minor sub blocky, fissile, predominantly smooth, faintly micromicaceous in part, trace silty with laminations, carbonaceous in part, rare light grey to white to tan to green bentonite, tuffaceous in part.

GARBUTT RADIOACTIVE MARKER 1154 m MD (-611.8 m SS)

1154-1164 **SHALE:** very similar to above, dark grey to black, firm to locally hard, commonly brittle, platy to sub platy, occasionally sub blocky, fissile, predominantly smooth, slightly to moderately silty and faintly micromicaceous in minor part, increasingly commonly carbonaceous in part, trace scattered carbonaceous debris, increasing trace white to light grey to cream bentonite, tuffaceous in part.

1164-1168 **SHALE:** as above with increasing trace white to light grey to occasionally cream bentonite, predominantly very tuffaceous with common biotite and abundant crystal fragments grading to bentonitic sandstone.

1168-1173 **SHALE:** predominantly as above with minor very dark brown black firm to soft slightly bituminous to phosphatic **SHALE:**, decreasing trace predominantly light grey to white bentonite, slightly tuffaceous in part.

1173-1182 **SHALE:** as previously described with increasing minor white to cream to occasionally light grey bentonite, commonly slightly tuffaceous, occasionally very tuffaceous grading to bentonitic sandstone.

1182-1191 **SHALE:** dark grey in part, commonly brown black to black, firm, locally soft to occasionally hard, platy to sub platy, locally flaky, fissile to locally very fissile, commonly smooth, slightly silty in part, bituminous to phosphatic in minor part, trace pyrite nodules, decreasing trace cream to white bentonite.

1191-1203 **SHALE:** as previously described with rare to trace phosphatic debris.

1203-1208 **SHALE:** dark grey to black, firm to hard, sub blocky to sub platy, sub fissile in part, commonly very faintly micromicaceous, slightly silty in minor part, increasing trace pyrite nodules, trace locally common biotite, very rare slickensides?

CHINKEH SILTSTONE 1208.0 m MD (-665.8 m SS)

1208-1211 **SILTSTONE:** light to dark grey, quartzose with minor to locally common glauconite, commonly variably sandy, clean to locally very argillaceous, variable induration: commonly moderately indurated, locally poorly to well indurated, siliceous and dolomitic cement, **no visible porosity, no shows.**

CHINKEH SANDSTONE 1211 m MD (-668.8 m SS)

1211-1216 **SANDSTONE:** off white to very light grey, very fine grained, very quartzose with minor scattered glauconite and trace lithic grains (sublitharenite to subquartzarenite), well sorted, angular to sub angular, clean, silty in part, variably indurated: commonly poorly indurated and crumbly, moderately to well indurated in part, siliceous and minor dolomitic cement, minor to common quartz overgrowths, **variable porosity; fair to poor with tight streaks, minor to common very faint fluorescence, minor very slow faint yellow streaming cut,** minor interbedded shale.

1216-1222.5 **SANDSTONE:** very similar to above, off white to very light grey, minor very pale brown, very fine grained, very quartzose with minor scattered glauconite and trace lithic grains (subquartzarenite), well sorted, angular to sub angular, clean, slightly silty in part, decreasing variably indurated: increasingly commonly poorly indurated and crumbly, moderately indurated in part, siliceous and minor dolomitic cement, common to locally abundant quartz overgrowths, **variable porosity; common fair with trace to minor streaky good porosity, poor to very poor visible porosity in part, common faint yellow green fluorescence, trace very slow weak streaming cut.**

TRIASSIC 1222.5 m MD (-680.3 m SS)

1222-1227 **SHALE:** commonly medium to light grey, rusty brown in minor part, sub platy to sub blocky, very firm to hard, commonly brittle, smooth & very faintly micromicaceous in part, variably silty and micromicaceous in part grading to argillaceous siltstone.

1227-1231 **SILTSTONE:** medium to light grey, very quartzose with minor dark specks, variably micromicaceous with occasional micaceous parting, clean in part, commonly slightly to moderately argillaceous, predominantly moderately well to moderately indurated with siliceous cement, slightly sandy in part occasionally grading to sandstone, **no visible porosity, no shows,** minor interbedded shale as above.

1231-1240 **SANDSTONE:** off white to very light grey, very fine grained, very quartzose with minor dark lithic grains and carbonaceous specks, rare carbonaceous debris, well sorted, angular to sub angular, variably silty occasionally grading to sandy siltstone, predominantly clean, locally slightly argillaceous, commonly moderately indurated, locally poorly to well indurated, siliceous cement, minor to locally common bentonitic clay matrix, **tight, no shows,** minor thin interbedded **SHALE:** as above.

1240-1247 **SANDSTONE:** similar to above, light grey, minor pale orange red, very fine grained, very quartzose as above, well sorted, angular to sub angular, commonly clean to locally slightly argillaceous, commonly moderately well to well indurated, locally moderately poorly indurated, common siliceous cement, increasing minor to locally common smectitic clay matrix, trace spotty dolomitic cement, slightly silty in part, **tight, no shows,** minor interbedded shale as below.

1247-1258 **SHALE:** predominantly red brown with minor interbedded to interlaminated medium grey, firm to hard, predominantly brittle, sub platy to sub blocky, variably 'bentonitic' in part (abundant red clay in wash), commonly sub fissile to fissile, variably silty in minor part, trace medium grey quartzose argillaceous siltstone laminations.

1258-1266 **SHALE:** very similar to above becoming brown rusty red, minor interbedded and interlaminated medium grey shale as above, increasingly platy and fissile.

1266-1279 **SHALE with interbedded SILTSTONE:**

SHALE: medium to dark grey, firm to very firm, sub blocky to sub platy, minor platy, brittle in minor part, commonly sub fissile to fissile, slightly silty in minor part;
SILTSTONE: light to medium grey, blocky, very quartzose with minor dark specks, locally slightly micaceous, predominantly clean to slightly argillaceous, sandy in part grading to minor silty sandstone, commonly moderately to well indurated, locally poorly indurated in minor part, predominantly dolomitic cement, trace disseminated pyrite, **tight, no shows.**

1279-1284 **SHALE:** maroon to rusty red, platy to sub platy, fissile, firm to very firm, locally soft, occasionally brittle, predominantly smooth and faintly micromicaceous, locally slightly silty with occasional silty laminations, variably 'bentonitic' (abundant red clay in wash), slightly dolomitic in part, trace medium grey to grey brown interlaminated shale.

84-1295 **SHALE:** very similar to above, predominantly maroon to rusty red, increasingly medium brown to brown grey in minor part, increasingly micromicaceous in minor part, increasingly silty in part with minor siltstone laminations to stringers, commonly slightly to moderately dolomitic, variably 'bentonitic' as above, minor thin interbedded siltstone as above with increasing trace to locally minor carbonaceous debris.

1295-1314 **SHALE with minor interbedded SILTSTONE:**

SHALE: medium grey, minor interbedded to interlaminated red shale as above, sub blocky to sub platy, sub fissile to fissile, very firm to hard, brittle, smooth and faintly micromicaceous in part, variably silty and moderately to locally very micromicaceous in part occasionally grading to argillaceous siltstone laminations and stringers, slightly to moderately dolomitic in part; **SILTSTONE:** as previously described, light to medium grey, blocky, very quartzose with minor dark specks, locally slightly micaceous, predominantly clean to slightly argillaceous, sandy in part grading to minor silty sandstone, commonly moderately to well indurated, locally poorly indurated in minor part, predominantly dolomitic cement, **tight, no shows**

1314-1326 **SHALE:** rusty red to maroon, trace to minor medium brown and grey, occasionally mottled, commonly firm, locally soft to very firm, brittle in minor part, fissile, commonly smooth and faintly micromicaceous, locally slightly silty and moderately micromicaceous, occasional siltstone laminations and stringers, increasingly 'bentonitic' in part (very abundant red clay in wash), locally slightly dolomitic, rare slickensides at base.

BELLOY 1325.9 m MD (-783.7 m SS)

1326-1336 **CHERT:** predominantly dark to medium grey to brown grey, commonly moderately hard to locally crumbly, variably moderately to locally very glauconitic, sandy to silty grading to cherty sandstone in part, common granular texture on cuttings, variably argillaceous grading to minor cherty glauconitic mudstone, trace pyritized spicules and worm burrows, minor interbedded very fine grained variably glauconitic quartzose argillaceous lithic wacke, minor to locally common shear fabrics: variably mylonitized to locally pervasive with common slickensides, **no visible porosity, infer good to excellent local fracture porosity, no shows.**

1336-1339.5 **CHERT:** very pale to dark brown, predominantly variably glauconitic, commonly variably sandy to very sandy grading to very cherty sandstone in part, slightly to very spicular in part, translucent in minor part, trace disseminated to locally patchy pyrite, rare pyrite nodules, **predominantly very tight, minor to locally common poor to occasional fair micro vug to vug porosity with minor pyrobitumen and trace drusy dolomite, no shows,** trace to minor chalky cataclastic? anhydritic stringers with slickensides, trace dark grey glauconitic silty shale, minor dark grey sandstone as above.

1349.5-1351 **SANDSTONE:** medium to dark grey, very fine to medium grained, lithic wacke with common to abundant clear to varicolored quartz and trace to minor lithic grains, variably glauconitic with common to locally abundant glauconite, common to abundant argillaceous and silty matrix, moderately poorly sorted, sub angular to sub rounded, disaggregated in part, poorly to moderately indurated with trace spotty dolomitic cement, variably silicified in minor part grading to cherty sandstone, grades to minor sandy glauconitic siltstone and shale stringers, **tight, no shows,** minor chalky cataclastic? black and white mottled to anastomosing anhydritic to dolomitic stringers with slickensides, minor interbedded chert as above.

1351-1354.5 **SANDSTONE:** very similar to above becoming predominantly very fine to fine grained, commonly variably silicified to cherty grading to sandy chert in part, rare fossil fragment, **tight, trace poor micro vug porosity, no shows, minor chalky cataclastic? 'stringers' as above, minor interbedded chert as above, infer locally good fracture porosity.**

1354.5-1360 **CHERT:** dark brown to brown grey, dense, variably hard, moderately to very glauconitic, commonly variably dolomitic grading to cherty dolomite in part, commonly variably sandy grading to very cherty sandstone in part, trace to minor disseminated to locally abundant pyrite, **predominantly tight, trace poor micro vug to moldic porosity, no shows,** decreasing trace to minor dolomitic to anhydritic stringers as above.

1360-1369 **DOLOMITE:** dark grey to grey brown, cryptocrystalline to slightly microcrystalline, predominantly hard, dense, commonly silty, commonly variably cherty grading to dolomitic chert in part, locally variably sandy, locally slightly to moderately calcareous with trace to minor dolomitic limestone stringers, trace locally pyritic, minor light brown to grey brown marly limestone stringers; soft, chalky, variably dolomitic grading to calcareous dolomite, slightly mottled, slightly glauconitic, silty to sandy, trace slickensides, **tight, infer good local fracture porosity, no shows.**

1369-1374.8 **SANDSTONE:** dark grey, very fine to fine grained, minor medium grains, lithic wacke, common to abundant clear to varicolored quartz, common to locally abundant glauconite, trace lithic grains, abundant silty argillaceous matrix, moderately sorted, sub angular to rounded, disaggregated in minor part, commonly moderately indurated, locally poorly to well indurated in part, minor locally common dolomitic cement, tight, no shows, minor interbedded **SHALE:** very dark grey, firm to very firm, sub blocky to occasionally platy, commonly moderately to very glauconitic, silty, locally variably sandy, common locally abundant pasty chloritic patches.

ANTASQUE 1374.8 m MD (-832.6 m SS)

1374.8-1380 **CHERT:** predominantly very pale to light brown, predominantly translucent, very hard, very dense, slightly to moderately glauconitic in part, slightly sandy in minor part, minor local trace to very abundant disseminated to crystalline pyrite, slightly to moderately dolomitic in minor part, rare to trace dolomitic micro fracture fill, rare spicules, occasional cherty dolomite stringers, **tight, infer fair to good local fracture porosity, minor to common spotty very dull fluorescence, trace very weak very thin faint yellow diffuse cut.**

1380-1388 **CHERT:** similar to above, light brown, minor light grey, predominantly translucent to sub translucent, very hard, very dense, slightly to moderately glauconitic as above, increasingly variably spicular in minor part, increasingly variably silty to sandy in minor part, trace to minor fracture surfaces on cuttings with abundant sub to euhedral quartz crystals, **rare to trace scattered poor moldic to micro vug porosity, infer good to excellent local fracture porosity, trace spotty questionable fluorescence, no cut.**

1388-1397 **CHERT:** as above in minor part, predominantly dark brown to brown grey, dense, commonly hard, moderately to very glauconitic, commonly variably silty to sandy, variably argillaceous and crumbly grading to very cherty glauconitic shale in minor part, slightly dolomitic in minor part, minor locally common to very abundant pyrite grading to pyrite nodules in part, tight, no shows.

1397-1402.5 **CHERT:** light to medium brown, faintly mottled in part, commonly translucent, very hard and dense, commonly slightly to moderately glauconitic, trace sandy, rare to trace spicules, trace to minor dark grey silty glauconitic shale laminations to stringers, trace to minor fracture surface with common to abundant pyrite, rare micro fracture with pyrite fill, **infer local trace to minor fair to good fracture porosity, no shows.**

1402.5-1410 **CHERT:** very similar to above, decreasingly glauconitic, minor to common planar fracture surfaces on cuttings, minor fracture surfaces with cherty white dolomite or pyrobitumen residue, trace subhedral quartz, rare to trace scattered poor moldic to micro vug porosity, infer minor fair to good fracture porosity, **trace to minor spotty dull fluorescence, no cut,** trace silty glauconitic to phosphatic shale laminations.

1410-1418 **CHERT:** predominantly very pale to medium brown, minor off white and dark brown, faintly mottled in part, predominantly translucent, very hard and dense, commonly variably spicular, trace scattered glauconite, trace phosphatic shale laminations, common fractured cuttings including; minor to common planar clean fracture surfaces, minor to common fracture surfaces with abundant sub to euhedral clear quartz crystals, minor fracture surfaces with white chalcedonic layers, rare pyrobitumen residue, rare very coarse subhedral quartz crystals, **infer common good to excellent fracture porosity, minor spotty very dull fluorescence, trace questionable cut.**

1418-1425 **CHERT:** predominantly medium to dark brown to grey brown, minor light brown, translucent in part, predominantly very hard and dense, slightly 'argillaceous' and less indurated in part, trace glauconite, trace spicules, rare to trace dolomitic specks, fractured in part, trace to minor milky to chalcedonic quartz healed and lined fractures with patchy pyrite, rare to trace sub to euhedral clear crystalline quartz linings, trace disseminated pyrite, **infer trace local poor to fair fracture porosity, trace to minor very dull fluorescence, trace questionable cut.**

1425-1430 **CHERT:** predominantly dark brown, very hard and dense, non-translucent, trace disseminated pyrite, rare spicules, trace very faint worm burrows?, minor to common planar fracture surfaces, increasing minor milky to occasionally chalcedonic quartz fracture linings and heals, increasing trace to minor sub to euhedral clear crystalline quartz linings, minor light brown chalky silty to sandy slightly dolomitic cataclastic? siliceous stringers, **infer minor fair to good local fracture porosity, trace spotty very dull fluorescence, no cut.**

1430-1437 **CHERT:** as previously described with decreasing trace milky quartz fracture fill, rare sub to euhedral crystalline quartz linings, moderately to very fractured? (reduced cuttings size), infer trace poor to fair fracture porosity, trace spotty very dull fluorescence, no cut.

1437-1442 **CHERT:** commonly pale brown, minor medium to dark brown, commonly mottled, very hard and dense, predominantly translucent to sub translucent, variably spicular in minor part, trace slightly sandy, variably fractured in part with trace milky to occasionally chalcedonic quartz fracture heals, minor to common planar fracture surfaces with rare crystalline quartz linings, very rare pyrite micro-fracture fills, trace slightly dolomitic, **infer trace to minor poor to fair fracture porosity, no shows.**

+42-1450 **CHERT:** predominantly very light to light grey with common dark brown pellets and mottles, sub translucent, very hard and dense, commonly variably spicular, trace disseminated pyrite, rare to trace scattered dolomite rhombs, trace slightly sandy, fractured in part, increasing trace milky to chalcedonic quartz fracture heals and occasional linings, increasing trace clear anhedral to subhedral quartz fracture linings and fills, silicified in minor part with trace to minor chalcedonic to milky blebs and mottles, rare calcareous fracture fill, rare pyrobitumen residue, infer minor locally poor to fair fracture porosity, no shows.

1450-1456 **CHERT:** very similar to above becoming increasingly pelletal and locally mottled, minor medium to dark brown and grey mottled chert, increasing fractures, increasing minor to common chalcedonic to milky quartz fracture heals and occasional linings (rare colloform), increasing trace clear sub to euhedral crystalline quartz linings, increasingly silicified in minor part with chalcedonic to milky quartz blebs and mottles, rare calcareous fracture fill, increasing rare to trace pyrobituminous to bituminous residue, **infer increasing minor fair to poor fracture porosity, minor spotty dull fluorescence, trace questionable cut,** trace very fine grained silty quartzose sandstone with dolomitic cement.

1456-1464 **CHERT with interbedded CONGLOMERATE:**

CHERT: similar to above becoming increasingly varicolored: light to medium grey pelletal to mottled, dark grey brown to brown, commonly sub translucent, very hard and dense, increasingly fractured, variably silicified in part with minor to common milky to chalcedonic blebs to mottles and fracture fills, locally slightly to moderately sandy in minor part, increasing trace to minor crystalline quartz fracture and vug? linings, trace disseminated pyrite, rare pyrobitumen residue, infer minor to locally **common fair to good fracture porosity, minor spotty dull fluorescence, trace very weak questionable cut; CONGLOMERATE:** monomict chert pebbles same as bedded chert, trace dark grey brown argillaceous silty to sandy matrix with dolomitic cement, trace to minor subrounded to sub angular surfaces on chert fragments, **infer poor? intergranular porosity.**

KINDLE 1464.0m MD (-921.8 m SS)

1464-1466 **SILTSTONE:** light brown, quartzose, moderately firm to crumbly, sandy in part occasionally grading to silty sandstone, slightly argillaceous, very dolomitic occasionally grading to silty dolostone, occasional dolomite rhombs, **no visible porosity, even dull fluorescence, minor very weak very slow blooming cut.**

1466-1475 **SILTSTONE:** predominantly dark brown, minor light to medium brown, sub blocky, quartzose, slightly to moderately argillaceous, very dolomitic to locally variably calcareous grading to very silty dolostone in part, occasional dolomite rhombs, variably indurated: commonly moderately to very hard and brittle, minor to common poorly indurated and crumbly, trace light brown chalky slightly silty marl stringers, **no visible porosity, common very dull fluorescence, minor very slow very weak streaming and blooming cut.**

1475-1479 **SILTSTONE:** as previously described with increasing minor very thin interbedded marlstone; light brown, chalky to crumbly, slightly to moderately silty, faintly laminated in part, **no visible porosity, decreasing minor to common very dull fluorescence, decreasing trace to minor cut as above.**

1479-1486 **SILTSTONE:** dark to medium brown to occasionally brown grey, quartzose, decreasingly slightly to moderately dolomitic, locally slightly to moderately cherty, slightly to moderately argillaceous, trace argillaceous partings, trace slightly sandy, increasingly indurated in part, locally very well indurated, infer common siliceous cement, **no visible porosity, common very dull questionable fluorescence, trace questionable cut,** trace marly stringers.

1486-1490 **SILTSTONE with minor interbedded LIMESTONE:**

SILTSTONE: as previously described becoming locally very dolomitic to calcareous grading to silty calcareous dolomite, porosity and shows as above; **LIMESTONE:** very dark brown, cryptocrystalline to microcrystalline, firm to hard, dense, very argillaceous, commonly silty, variably dolomitic grading to calcareous dolomite in part, slightly cherty in part, **no visible porosity, common to abundant very dull fluorescence, minor to common slow yellow white streaming cut.**

1490-1497.4 **SILTSTONE:** dark brown to very dark brown grey, quartzose, slightly to locally moderately argillaceous, predominantly moderately to very calcareous to dolomitic grading to very silty dolomite in part, commonly moderately indurated, predominantly calcareous to dolomitic cement, minor locally common siliceous cement, **no visible porosity, decreasing shows as above.**

MATTSON 1497.4 m MD (-955.2 m SS)

1497.4-1506 **SILTSTONE with interbedded SANDSTONE:**

SILTSTONE: light brown, very quartzose with trace lithic grains, rare to trace glauconite, variably sandy in part, clean to slightly argillaceous, poorly indurated and crumbly with abundant calcareous to dolomitic cement, trace fossil fragments, occasionally very argillaceous grading to calcareous dark grey shale laminations, **no visible porosity; SANDSTONE:** very pale to medium brown, very fine grained, variably silty grading from siltstone above in part, quartzose with limestone? grains, well sorted, angular to sub angular, predominantly clean to slightly argillaceous, trace fossil fragments, poorly to moderately indurated with abundant calcareous cement, **minor dull fluorescence, minor slow very thin light yellow green streaming to diffuse cut,** minor white soft chalky limestone stringers.

1506-1510 **SANDSTONE with interbedded SILTSTONE:**

SANDSTONE: commonly light to medium brown, very fine grained, variably silty grading to sandy siltstone in part, quartzose (with recrystallized limestone? grains), rare to trace lithic grains, very rare glauconite, predominantly clean to slightly argillaceous, increasing trace to minor fossil fragments, commonly poorly indurated and crumbly with abundant calcareous cement, moderately to moderately well indurated in part with minor calcareous + siliceous cement, **predominantly no visible porosity, trace poor porosity, minor patchy dead oil stain, minor spotty to patchy dull fluorescence, trace questionable cut; SILTSTONE:** as above, minor chalky limestone as above.

1510-1515 **SANDSTONE:** off white to light grey, very fine grained, variably silty in part occasionally grading to siltstone, very quartzose (quartz arenite), with trace lithic grains and rare glauconite, very well sorted, angular to sub angular, predominantly very clean, occasionally slightly argillaceous, poorly to moderately indurated with siliceous and dolomitic cement, rare to trace interstitial pyrite, **no visible porosity, trace to minor spotty dead oil stain, minor spotty dull fluorescence, trace questionable cut;** trace to minor interbedded **SHALE:** as described below.

1515-1523 **SANDSTONE with minor interbedded SHALE:**

SANDSTONE: similar to previous description becoming predominantly white to very light grey, commonly poorly indurated and crumbly with common to abundant dolomitic to calcareous cement, moderately to moderately well indurated in part with locally common streaky to patchy siliceous + minor spotty dolomitic cement, **no visible porosity, minor to common spotty to patchy dull fluorescence, trace to minor slow very weak streaming to diffuse cut; SHALE:** medium green grey, firm to hard, sub blocky to occasionally sub platy, predominantly non-silty, commonly slightly to moderately dolomitic, locally slightly silty to rarely sandy, trace disseminated pyrite, rare to trace pyrite nodules.

1523-1529 **SANDSTONE with minor interbedded DOLOMITE, LIMESTONE and SHALE:**

SANDSTONE: as previously described, predominantly no visible porosity, trace poor porosity, even very pale fluorescence, trace very weak questionable cut; **DOLOMITE:** buff brown to light grey, cryptocrystalline to microcrystalline, predominantly hard and brittle, commonly variably calcareous locally grading to dolomitic limestone, slightly to moderately cherty in minor part, **tight, no shows; LIMESTONE:** dark to medium brown, silty to sandy, argillaceous in part, variably dolomitic grading to calcareous dolomite, **tight, no shows; SHALE:** dark grey to brown grey, sub platy to sub blocky, sub fissile, firm to very firm, slightly to moderately dolomitic.

1529-1533 **SANDSTONE:** as above in part, common **SANDSTONE:** #2: pale brown, very fine grained, slightly silty in part, quartz arenite with trace lithic grains and rare glauconite, very well sorted, angular to sub angular, very clean, predominantly poorly indurated and crumbly to friable, common calcareous to dolomitic cement, common quartz overgrowths, **variable common fair to streaky good porosity, poor porosity in part, even light brown oil stain, even pale yellow fluorescence, common very thin weak yellow streaming to diffuse cut,** minor interbedded **SHALE:** and trace white chalky limestone stringers.

1533-1540.5 **SANDSTONE with interbedded SHALE:**

SANDSTONE: white to very light grey, very fine grained, commonly variably silty, quartz arenite as above with increasing trace dark lithic grains, clean, moderately to poorly indurated with abundant calcareous to dolomitic cement, **no visible porosity, common pale yellow fluorescence, trace very weak questionable cut; SHALE:** dark grey, sub blocky to sub platy, very firm to hard, faintly micromicaceous in part, very dolomitic with occasional very argillaceous dolomite stringers; minor very dark grey brown argillaceous tight dolomitic siltstone stringers.

40.5-1545 **SANDSTONE:** very similar to previous description becoming increasingly silty grading to siltstone in part, porosity and shows as above, minor interbedded shale as above.

MAIN HOLE SECTION (156mm): Air-drilled

1545-1547 No sample.

Note: Samples from 1550 to 1595m are unrepresentative spot samples.

1547-1555 **SHALE:** dark grey, very firm to hard, sub blocky to sub platy, sub fissile in part, predominantly slightly silty and micromicaceous, locally slightly sandy, moderately dolomitic, very thin interbedded **SANDSTONE:** off white to light grey, very fine grained, silty grading to siltstone, quartz arenite, trace dark lithic grains, rare glauconite, trace shale rip-up clasts, predominantly clean to locally variably argillaceous, minor argillaceous partings, well to very well indurated with abundant calcareous cement, trace locally common disseminated pyrite, **no visible porosity, no shows.**

1555-1563 **SHALE with minor interbedded SANDSTONE:**

SHALE: as previously described with rare to trace fossil fragments, rare patchy pyrite, locally very dolomitic to calcareous grading to very argillaceous limestone stringers; **SANDSTONE:** off white to light grey to occasionally light brown, very fine grained, silty grading to sandy siltstone in part, quartz arenite as above, well sorted, angular to sub angular, predominantly clean to locally slightly argillaceous, trace argillaceous partings, occasional shale rip-up clast, rare to trace fossil fragment, well indurated with very abundant calcareous cement, locally common quartz overgrowths, trace interstitial pyrite, **predominantly no visible porosity, trace poor to rarely fair porosity, minor patchy pale yellow fluorescence, trace very weak questionable cut.**

53-1571 **SANDSTONE with interbedded SHALE:**

SANDSTONE: buff to light brown, very fine grained, variably silty, quartz arenite with increasing trace dark lithic grains, well sorted, angular to sub angular, predominantly clean, trace argillaceous partings, well indurated with very abundant calcareous cement to matrix locally grading to variably sandy tight limestone, minor coarse sparry recrystallized fossil fragments/allochems, minor locally common quartz overgrowths, trace interstitial pyrite, **predominantly no visible porosity, trace poor to rarely fair porosity, minor spotty yellow fluorescence, trace very weak slow thin streaming cut; SHALE:** dark grey to black, firm to hard, sub platy to sub blocky, commonly sub fissile, slightly to moderately silty and micromicaceous, commonly variably carbonaceous to phosphatic, trace to locally minor pyrite, trace locally common pyritized worm burrows, slightly to moderately dolomitic to calcareous, rare ostracode.

1571-1575 **SHALE with minor interbedded SANDSTONE:**

SHALE: as previously described becoming increasingly silty to sandy in part, increasing trace patchy to disseminated pyrite, minor argillaceous siltstone to sandstone laminations to stringers; **SANDSTONE:** as above in part, predominantly medium to light brown, very fine grained, trace fine grains, silty grading to sandy siltstone in part, very quartzose with trace dark lithic grains, well sorted, angular to sub angular, slightly argillaceous, well to very well indurated, common to abundant dolomitic to calcareous cement, trace locally common pyrite, **no visible porosity, no shows,** trace fine to medium loose quartz and blue chert grains, **infer minor streaky fair to good porosity.**

1575-1582 **SHALE with minor interbedded SANDSTONE:**

SHALE: as previously described, no worm burrows; **SANDSTONE:** as previously described increasingly grading to siltstone, increasing minor to locally abundant interstitial pyrite, no visible porosity, no shows.

1582-1590 **SHALE with minor interbedded SANDSTONE:**

SHALE: very dark grey to black, platy to sub platy, minor sub blocky, commonly fissile to sub fissile, very firm, commonly slightly silty and micromicaceous, locally very silty to sandy in minor part, variably phosphatic to carbonaceous, trace to minor disseminated to framboidal pyrite, trace fossil fragments, slightly dolomitic, trace medium green grey platy micromicaceous claystone stringers with trace pyritized worm burrows; **SANDSTONE:** medium to dark brown, very fine grained, trace fine grains, silty grading to siltstone in part, very quartzose as above, commonly slightly argillaceous with minor argillaceous partings, trace locally very argillaceous, rare to trace fossil debris, occasional shale rip-up clast, very well indurated with abundant calcareous to dolomitic cement, minor locally common to abundant interstitial pyrite, **no visible porosity, no fluorescence, trace very weak slow thin streaming cut.**

1590-1595 **SHALE:** as previously described with decreasing rare to trace green grey claystone as above, rare sideritic nodules to stringers, minor thin interbedded **SANDSTONE:** as above, trace fine to medium loose quartz and rare blue to dark grey chert grains.

1595-1600 **SHALE with minor interbedded SANDSTONE:**

SHALE: as previously described with trace ferruginous stringers, slightly to moderately dolomitic, trace pyrite nodules; **SANDSTONE:** as previously described in part, **SANDSTONE:** #2 off white to very pale brown, very fine grained, slightly silty, quartz arenite with trace dark lithic grains, well sorted, angular to sub angular, well indurated with common calcareous to dolomitic and siliceous cement, rare to trace interstitial pyrite, **predominantly tight, minor poor to streaky fair porosity,** trace very fine interstitial bitumen, **minor to common pale yellow green fluorescence, minor thin slow weak yellow streaming and diffuse cut.**

1600-1605 **SHALE with minor interbedded SANDSTONE:**

SHALE: mixed, predominantly as above becoming increasingly black, bituminous in part, increasing trace to minor oxidized ferruginous laminations to stringers, minor **SHALE:** #2 medium green grey, very firm, brittle in part, sub platy, predominantly smooth, trace locally sandy, sub waxy in part grading to claystone, rare to trace disseminated pyrite, non dolomitic; **SANDSTONE:** #2 as previously described.

J5-1614 **SANDSTONE with interbedded SHALE:**

SANDSTONE: similar to above, off white to very pale brown, very fine grained, slightly silty, quartz arenite with trace dark lithic grains, very well sorted, angular to sub angular, rare to trace fossil fragments, rare shale rip-up clasts, well indurated with siliceous and dolomitic cement, minor quartz overgrowths, trace interstitial pyrite, **predominantly tight to 3% porosity, minor streaky 4 to 8% porosity, trace locally common spotty bitumen, common pale yellow fluorescence, minor thin slow weak streaming and diffuse cut;** **SHALE:** medium green grey, medium to dark grey and brown grey, very firm, brittle in part, sub platy, predominantly smooth, increasingly locally sandy in minor part, sub waxy grading to claystone, increasing trace disseminated pyrite, trace pyrite nodules, non-dolomitic.

1614-1621 **SANDSTONE with interbedded CLAYSTONE:**

SANDSTONE: mixed, as above in part, commonly **SANDSTONE:** #2 disaggregated, very fine to upper fine grained, trace lower medium grains, quartz arenite, frosted to minor clear quartz with trace to minor dark grey to blue chert grains, moderately well sorted, sub angular to rounded, **infer good porosity, no shows,** minor **SANDSTONE:** #3 light grey green, very fine grained, silty grading to sandy siltstone in part, common to abundant green clay matrix, occasional claystone rip-up clasts, moderately indurated, trace spotty dolomitic cement, locally very pyritic, **tight, no shows,** minor interbedded **CLAYSTONE:** grading from shale as previously described.

1621-1625 **SANDSTONE with minor interbedded CLAYSTONE:**

SANDSTONE: disaggregated, predominantly upper fine to lower very fine grained, minor lower medium and trace upper medium grains, quartz arenite, frosted to clear quartz with trace lithic and chert grains, moderately well sorted, sub angular to rounded, very clean, rare to trace interstitial pyrite, **infer good porosity, no shows,** minor **SANDSTONE:** #3 as above; **CLAYSTONE:** as previously described, rare fossil fragment.

1625-1631 **SANDSTONE:** as previously described, disaggregated, predominantly upper fine to lower very fine grained, minor lower medium and trace upper medium grains, quartz arenite, frosted to clear quartz with trace lithic and chert grains, moderately well sorted, sub angular to rounded, very clean, rare to trace interstitial pyrite, **infer good porosity, no shows.**

1631-1638 **SANDSTONE with minor interbedded CLAYSTONE:**

SANDSTONE: predominantly as previously described, minor interbedded **SANDSTONE:** off white to very pale brown, very fine grained, slightly silty, quartz arenite with trace dark lithic grains, very well sorted, angular to sub angular, well indurated with siliceous and dolomitic cement, minor quartz overgrowths, trace interstitial pyrite, **predominantly tight to 3% porosity, minor streaky 4 to 7% porosity, trace spotty bitumen, common pale yellow fluorescence, minor thin slow weak streaming and diffuse cut; CLAYSTONE:** as previously described.

1638-1644 **SHALE with interbedded SANDSTONE:**

SHALE: black to brown black, firm to hard, sub platy to sub blocky, commonly sub fissile, bituminous, silty to locally sandy, minor argillaceous siltstone and sandstone laminations to stringers, faintly pyritic, slightly dolomitic to calcareous, minor claystone as above; **SANDSTONE:** white to very pale brown, very fine grained, slightly silty, quartz arenite, well sorted, angular to sub angular, very clean, moderately to poorly indurated, common dolomitic and siliceous cement, minor quartz overgrowths, **tight to 3% porosity in part, common 4 to 8% porosity, common patchy dull to bright pale yellow to yellow green fluorescence, minor fast very thin diffuse cut,** minor **SANDSTONE:** #2 disaggregated, fine to medium, clear to frosted to yellow quartz, trace chert grains, moderately sorted, rounded to sub angular, **infer good porosity, no shows, trace light brown sandy tight wackestone.**

1644-1650 **SANDSTONE:** mixed; predominantly **SANDSTONE:** #1 as above with increasing siliceous cement, increasing trace chert and lithic grains, slightly decreasing porosity and shows as above, **SANDSTONE:** #2 light grey to light brown, very fine to fine grained, trace medium grains, sublitharenite, clear to frosted quartz, trace to minor blue to dark grey chert, trace shale grains, locally slightly argillaceous, moderately to moderately well sorted, angular to subrounded, trace fossil fragment, well indurated, common to abundant dolomitic cement, **predominantly tight to 4% porosity, questionable dull fluorescence, no cut;** minor **SANDSTONE:** #3 disaggregated, fine to medium grained, trace to minor coarse quartz and blue chert grains, sublitharenite grading quartzarenite, moderately sorted, rounded to sub angular, **infer good porosity, no shows,** minor interbedded **SHALE:** as above.

1650-1660 **SANDSTONE with minor interbedded SHALE:**

SANDSTONE: white to very light grey, very fine grained, slightly silty, predominantly quartz arenite locally grading to sublitharenite, clear to frosted quartz, increasing trace to locally minor blue to dark grey to black chert, very rare glauconite, moderately well sorted, angular to sub angular quartz with rounded chert, trace fossil fragment, rare chert and tuff pebbles, well indurated with common dolomitic and siliceous cement, moderately indurated in part, **predominantly tight to 3% porosity, minor 5 to 9% porosity, common patchy bright pale yellow green fluorescence, common fast very thin yellow diffuse and streaming cut;** **SHALE:** similar to above, black to brown black to dark grey, very firm to hard, platy to sub blocky, brittle in part, bituminous to phosphatic, commonly silty to sandy grading to argillaceous siltstone and sandstone in part, commonly non-dolomitic to slightly dolomitic.

1660-1665 **SANDSTONE:** very similar to previous description, white to very light grey, very fine grained, trace fine and rare medium grains, slightly silty, quartz arenite, trace blue to black chert, very rare glauconite, moderately well sorted, angular to sub angular quartz with rounded chert, rare fossil fragment, clean, trace slightly argillaceous, trace argillaceous parting, predominantly well indurated with common siliceous and minor to common dolomitic cement, moderately indurated in part, minor locally common quartz overgrowths, trace interstitial pyrite, rare spotty kaolin, **common tight to 4% porosity, increasing minor to common 5 to 10% porosity, minor patchy dull to bright pale yellow to yellow green fluorescence, trace very weak very thin questionable cut;** minor interbedded **SHALE:** as above.

1665-1670 **SANDSTONE:** as previously described with increasing common siliceous and decreasing minor dolomitic cement, increasingly well to very well indurated, **decreasing minor poor to fair porosity as above, decreasing trace to minor questionable shows as above.**

1670-1675 **CONGLOMERATE with interbedded SANDSTONE:**

SANDSTONE: as above becoming increasingly silty grading to minor sandy siltstone, well indurated with abundant dolomitic cement, minor patchy siliceous cement, **predominantly no visible porosity, questionable shows as above;** **CONGLOMERATE:** fine pebble, oligomict becoming polymict, clast supported, moderately poorly sorted, rounded to subrounded, common rounded surfaces on cuttings, coarse to gritty matrix, predominantly intraformational sedimentary clasts (shale, claystone, siltstone, occasional sandstone and trace chert and tuff clasts), minor patchy to locally abundant crystalline pyrite and pyritized clasts, trace pyrite nodules, **infer good porosity, no shows.**

1675-1680 **SANDSTONE with CONGLOMERATE:**

SANDSTONE: as previously described; **CONGLOMERATE:** as previously described with rare very dark brown argillaceous silty to sandy matrix; minor interbedded **DOLOMITE:** buff to light grey, cryptocrystalline to microcrystalline, dense, hard, trace silty, **tight.**

Switch to Invert mud at 1685 metres

1680-1885 **SHALE:** mixed; predominantly dark grey to brown grey, very firm, brittle in part, blocky to sub platy, commonly fissile, variably silty and micromicaceous, smooth in part, trace siltstone to sandstone laminations, locally variably sandy, trace disseminated to crystalline pyrite, trace to minor pyrite nodules, common to abundant planar fracture surfaces with trace rust stain and striations, trace fossil fragments, sub waxy in minor part, predominantly non-dolomitic, 30% **SHALE:** #2 medium grey green, predominantly blocky, sub fissile, slightly silty, faintly pyritic, predominantly non dolomitic, commonly fractured as above, rare fossil fragment.

1685-1690.5 **DOLOMITE with SANDSTONE:**

DOLOMITE: light brown, light to medium grey, cryptocrystalline to microcrystalline, firm to hard, moderately dense, soft and slightly chalky in part, variably sandy to silty in minor part, **tight, common to abundant dull to moderate fluorescence, trace questionable cut; SANDSTONE:** off white to light brown, very fine to upper coarse, trace to minor very coarse grains, sublitharenite, abundant frosted to clear quartz with common varicolored lithic grains (limestone to dolomite, chert, volcanic?), moderately poorly sorted, predominantly disaggregated, minor poorly indurated and friable consolidated cuttings, minor to locally common dolomitic cement, minor spotty siliceous cement, minor to common quartz overgrowths, **variable porosity; common good to fair, minor tight to poor, trace excellent, infer predominantly good to fair porosity, abundant pale yellow to yellow green fluorescence, minor weak very thin diffuse cut.**

1690.5-1696 **DOLOMITE:** light brown to grey, cryptocrystalline to microcrystalline, predominantly firm to locally hard and brittle, slightly soft and chalky in part, trace to minor light grey to light brown slightly silty to sandy translucent chert stringers to nodules, **no visible porosity, decreasing fluorescence as above, trace questionable cut,** slightly to locally very sandy grading to 30% dolomitic **SANDSTONE:**: predominantly fine to medium grained, minor coarse grains, very quartzose with minor chert and dolomite grains, moderately to moderately well sorted, sub angular to rounded, moderately to poorly indurated with common to abundant dolomitic cement, minor patchy siliceous cement, **no visible porosity.**

)6-1701 **SANDSTONE:** off white to pale brown, very fine grained, silty, trace fine grains, very quartzose with trace to minor chert and lithic grains, rare glauconite, clean, moderately well sorted, angular to subrounded, commonly poorly to moderately poorly indurated, common to abundant dolomitic cement, locally well to very well indurated with locally common to abundant siliceous cement, fractured in part, **no visible porosity, abundant very pale yellow fluorescence, no cut,** interbedded **DOLOMITE:** as above becoming increasingly sandy increasingly grading to dolomitic sandstone.

1701-1705.5 **DOLOMITE:** medium to dark brown, cryptocrystalline to microcrystalline, hard, dense, trace cherty, mottled in part, variably argillaceous in part, commonly variably silty to sandy grading to occasional dolomitic sandstone stringers, trace to minor locally common allochems, **tight, no shows,** minor interbedded **CHERT:** light to medium brown and grey, translucent to sub-translucent, locally mottled, dense, brittle, predominantly variably sandy occasionally grading to cherty sandstone stringers, **tight, no shows,** interbedded **SANDSTONE:** as previously described.

1705.5-1710 **SANDSTONE:** very light grey to pale brown, very fine to fine grained, trace to minor medium grains, quartz arenite grading sublitharenite, abundant clear to frosted quartz with trace to locally minor dark chert and lithic grains, commonly moderately well to well sorted, angular to subrounded, fractured in part, variable induration: well to moderately poorly indurated, common to abundant siliceous and dolomitic cement, trace locally common quartz overgrowths, **predominantly no visible porosity, common patchy dull to moderate yellow fluorescence, no cut,** minor very fine to coarse moderately poorly sorted sublitharenite, minor **DOLOMITE:** stringers to thin interbeds as above.

1710-1714 **SANDSTONE:** predominantly as above becoming increasingly fine grained in part, ~30% **SANDSTONE:** #2 medium to dark brown to brown grey, very fine to fine grained, silty, quartzose with trace to minor dark chert and lithic grains, commonly slightly to moderately argillaceous, slightly cherty in part, trace argillaceous partings, moderately to moderately well sorted, angular to subrounded, moderately to moderately well indurated, common to abundant dolomitic cement, occasionally grading to sandy dolomite, **tight, no shows,** trace to minor dolomite stringers.

1714-1725 **SANDSTONE:** off white to very light brown, very fine to fine grained, quartz arenite with trace to minor predominantly dark lithic and chert grains, rare glauconite, well sorted, angular to subrounded, clean, trace argillaceous to bituminous partings, fractured in part, commonly moderately to moderately poorly indurated, locally very well indurated, common to abundant siliceous + minor to common spotty to patchy dolomitic cement, **predominantly tight to 3% porosity, minor streaky 4 to 8%, common patchy pale yellow fluorescence, no cut,** minor **SANDSTONE:** #2 similar to above, fine to medium grained, minor very fine grains, quartz arenite as above, moderately well sorted, sub angular to rounded, predominantly disaggregated, **trace to minor consolidated cuttings with spotty siliceous cement and fair to good porosity, minor to common quartz overgrowths, infer common good porosity, minor patchy dull fluorescence, no cut,** minor thin silty to sandy dolomite stringers.

1725-1734.5 **SANDSTONE:** pale brown, predominantly very fine grained, minor fine grains, silty, very fine to fine grained in minor part, quartz arenite with trace dark lithic grains, well sorted, angular to sub angular, clean, trace slightly argillaceous, trace argillaceous partings, commonly moderately to poorly indurated, common to abundant dolomitic cement, minor locally common siliceous cement, locally well indurated, **predominantly tight to 2% porosity, minor streaky 3 to 6% porosity, predominantly even pale yellow fluorescence, trace very weak very thin questionable cut,** minor thin dolomite stringers to interbeds: light to dark brown, cryptocrystalline to microcrystalline, very firm to soft, very silty to sandy grading to dolomitic siltstone and sandstone stringers, **tight, no shows.**

1734.5-1740 **SANDSTONE:** disaggregated, predominantly fine to lower medium grained, minor upper very fine and trace upper medium grains, quartz arenite, predominantly frosted to minor clear quartz with trace to minor chert and lithic grains, moderately well sorted, rounded to sub angular, clean, trace very poorly consolidated cuttings with trace to minor spotty siliceous cement, minor quartz overgrowths, **infer good porosity, abundant to even moderate to bright pale yellow green fluorescence, trace very weak very thin questionable cut,** minor **SANDSTONE:** #2 pale brown, very fine to fine grained, quartz arenite, very well sorted, angular to subrounded, poorly to moderately poorly indurated, minor spotty siliceous cement, clean, **predominantly good to fair porosity, even bright pale yellow white to yellow green fluorescence, minor very thin diffuse cut.**

40-1747 **SANDSTONE:** very similar to previous description becoming finer, off white to very light grey, very fine to fine grained, minor lower medium grains, quartzarenite as above with increasing clear quartz, well to moderately well sorted, subrounded to angular, very clean, commonly disaggregated, increasing minor very poorly indurated and friable consolidated cuttings, predominantly trace spotty siliceous cement, locally minor to common siliceous cement, minor to common quartz overgrowths, **consolidated cuttings with predominantly good porosity (13-16%, trace 18-20%), minor streaky fair and trace poor porosity, abundant to even bright pale yellow white fluorescence, trace to minor very weak slow streaming and diffuse cut.**

1747-1753 **SANDSTONE:** with decreasing minor consolidated cuttings, becoming increasingly indurated in part with common patchy siliceous cement, very fine grained and silty in minor part, **decreasing common good porosity as above, increasing fair to poor porosity in part, shows as above.**

1753-1755.5 **DOLOMITE:** buff to medium brown, cryptocrystalline to microcrystalline, very firm to slightly soft, slightly to locally very sandy, no visible porosity, no shows, interbedded **SANDSTONE:** light to dark brown, very fine, variably silty grading to siltstone in part, moderately well to locally moderately sorted, angular to sub angular, variably argillaceous in part with trace argillaceous partings, moderately to occasionally well indurated, common to abundant dolomitic cement, **tight to poor porosity, no shows.**

1755.5-1760 **SANDSTONE:** very pale tan to off white, predominantly very fine to lower fine grained, slightly silty, quartz arenite, well sorted, angular to subrounded, clean, disaggregated in part, common variably indurated consolidated cuttings: commonly poorly indurated and friable to crumbly, moderately to occasionally well indurated in part, minor quartz overgrowths, minor to common spotty dolomitic and siliceous cement, variable porosity: common poor to fair, less common fair to good, **trace spotty bitumen, even bright pale yellow white fluorescence, trace to minor slow weak very thin streaming and diffuse cut.**

1760-1764.5 **SILTSTONE with interbedded SANDSTONE:**

SILTSTONE: dark to medium brown, quartzose, variably firm to locally soft, moderately to very argillaceous, moderately to locally very dolomitic, occasional dolomite laminations, slightly sandy, **tight to poor porosity, common patchy very dull fluorescence, trace very slow faint streaming cut,** minor interbedded **SANDSTONE:** off white to very light grey, very fine, silty, quartz arenite, well sorted, angular to sub angular, clean, poorly indurated, locally moderately indurated, predominantly siliceous and trace spotty dolomitic cement, **predominantly poor to streaky fair porosity, minor good streaks, fluorescence as above, trace questionable cut.**

64.5-1769 **SANDSTONE:** very light grey to pale tan, very fine to fine grained, slightly silty, quartz arenite, well sorted, angular to subrounded, clean, disaggregated in part, common variably indurated consolidated cuttings: common poorly to very poorly indurated and friable to crumbly, locally moderately to occasionally well indurated, minor to locally common spotty to patchy siliceous cement, **variable porosity: common good, minor fair to poor, trace to minor tight to poor, even bright pale yellow white fluorescence, trace to minor very thin faint diffuse cut.**

1769-1774 **SANDSTONE:** pale brown to minor medium brown, very fine grained, trace to minor fine grains, quartz arenite, commonly variably silty, well sorted, angular to subrounded, predominantly clean, locally slightly to moderately argillaceous in minor part, trace argillaceous partings and laminations, commonly moderately to moderately poorly indurated and crumbly, locally moderately well to well indurated, common siliceous and minor streaky dolomitic cement, **predominantly tight to 2% porosity, minor streaky poor to trace fair porosity, trace spotty bitumen to pyrobitumen, abundant dull yellow to minor bright yellow white fluorescence, rare to trace slow thin streaming cut.**

1774-1780 **SANDSTONE:** as previously described with slightly decreasing variable induration, predominantly siliceous and decreasing trace to minor streaky dolomitic cement, decreasing trace variably argillaceous sandstone as above, commonly variably silty as above occasionally grading to sandy siltstone stringers, **increasing variable porosity; common tight to 3%, minor to common 4 to 7%, minor cuttings with common quartz overgrowths and fair to good porosity, shows as above.**

1780-1785.5 **SANDSTONE:** mixed; as above in part, **SANDSTONE:** #2 light grey to very light brown, predominantly very fine to fine grained, minor to locally common varicolored rounded coarse to upper medium chert grains, trace chert pebble fragments, sublitharenite, moderately sorted, angular to rounded, clean, moderately to moderately well indurated with common siliceous and dolomitic cement, **tight,** minor very fine to coarse grained litharenite (chert and dolomite lithic grains) with common to abundant tight siliceous cement, interbedded **SILTSTONE:** dark to medium brown, quartzose with scattered chert grains, hard to firm, occasionally soft, variably argillaceous, very dolomitic grading to silty dolomite in part, **tight.**

1785.5-1790.5 **SANDSTONE:** disaggregated, lower fine to upper medium grained, minor very fine and trace lower to upper coarse grains, sublitharenite grading to quartz arenite, abundant frosted to minor clear quartz with minor predominantly dark varicolored chert, moderately sorted, rounded to sub angular, trace to minor consolidated cuttings with spotty to patchy siliceous cement, trace quartz overgrowths, infer predominantly **good to fair porosity, common dull yellow to bright pale yellow white fluorescence, trace very faint questionable cut.**

1790.5-1796 **SANDSTONE:** light grey, very fine grained, silty, rare to trace fine to medium chert grains, quartz arenite, well sorted, angular to sub angular, clean, predominantly moderately to moderately well indurated, common siliceous cement, minor to locally common streaky dolomitic cement, trace interstitial pyrite, predominantly no visible porosity, trace streaky poor porosity, trace spotty to patchy bitumen to pyrobitumen, **abundant variably dull to bright yellow to yellow green fluorescence, trace very faint questionable cut,** minor interbedded **SHALE:** black to brown black, firm, platy to sub blocky, fissile, bituminous, trace coaly debris, trace pyrite nodules.

1796-1802 **SANDSTONE:** light tan, very fine to fine grained, quartz arenite, commonly silty in part, clean, well sorted, angular to sub angular, moderately well to moderately indurated with common siliceous and spotty to patchy dolomitic cement, **minor poorly indurated cuttings with common quartz overgrowths and fair to good porosity, predominantly tight to 3% porosity, abundant pale yellow green to minor dull yellow fluorescence, trace very faint questionable cut,** minor interbedded medium to dark brown to grey **SANDSTONE:** very fine grained, silty grading to siltstone in part, variably argillaceous, minor argillaceous partings and laminations, poorly to moderately indurated, common to abundant dolomitic cement, **tight to poor porosity,** trace black shale.

1802-1809 **SANDSTONE:** very similar to above, light grey, very fine grained, silty, minor very fine to fine grained sandstone with occasional scattered medium to coarse chert and pebble fragments (poor to fair porosity in part), quartz arenite, well sorted, predominantly angular to sub angular, clean, commonly moderately to moderately well indurated with common siliceous and trace to minor dolomitic cement, **predominantly tight to 2% porosity, minor streaky poor porosity, abundant weak to moderate yellow to occasionally bright pale yellow green fluorescence, trace slow thin streaming cut,** minor very fine to medium grained moderately sorted dolomitic sublitharenite with common argillaceous partings, minor **DOLOMITE:** medium to dark brown to grey, cryptocrystalline, variably silty to sandy grading to dolomitic siltstone stringers, slightly to moderately argillaceous, trace to minor black platy bituminous **SHALE:** with trace pyritized worm burrows.

1809-1815 **SANDSTONE with SILTSTONE, SHALE and DOLOMITE:**

SANDSTONE: light grey, very fine grained, commonly very silty grading to sandy siltstone in part, quartz arenite, well sorted, angular to sub angular, clean, moderately to moderately well sorted, abundant siliceous cement, trace spotty dolomitic cement, **predominantly tight, trace poor porosity, even bright pale yellow white fluorescence, minor faint very thin diffuse cut; SHALE:** dark brown, platy to sub platy, variably hard to firm, soft and earthy to marly in part, moderately to very dolomitic with minor to common microcrystalline to very fine crystalline dolomite rhombs grading to silty argillaceous **DOLOMITE:** in part, variably silty commonly grading to argillaceous dolomitic **SILTSTONE:**, trace to minor chert stringers to nodules.

1815-1820 **SANDSTONE:** as previously described with very rare glauconite, increasing trace argillaceous partings and very fine laminations, **decreasing minor patchy dull to occasionally bright yellow to yellow white fluorescence, trace questionable cut,** trace medium to dark grey platy firm silty and micromicaceous **SHALE:**.

1820-1827 **SANDSTONE:** off white to light grey, very fine to fine grained, trace lower medium grains, slightly silty in part, quartz arenite, rare to trace coarse chert grains, well sorted, angular to rounded, clean, disaggregated in part, moderately poorly to moderately well indurated, common dolomitic and siliceous cement, minor to locally common quartz overgrowths, trace interstitial pyrite, **commonly tight to 3% porosity, minor 5 to 9% porosity, trace good streaks, minor fluorescence as above, trace questionable cut.**

1827-1835 **SANDSTONE:** light tan to light grey, predominantly very fine to fine grained, minor fine to very fine grained with trace lower medium grains, quartz arenite, commonly variably silty occasionally grading to sandy siltstone stringers, well sorted, angular to subrounded to occasionally rounded, clean, commonly moderately to moderately well indurated, locally poorly to very well indurated, common locally abundant dolomitic and minor locally common siliceous cement, trace quartz overgrowths, increasing trace interstitial pyrite, **predominantly tight to 2% porosity, trace to minor streaky poor porosity, minor patchy dull to occasionally bright yellow to yellow white fluorescence, trace questionable cut,** trace dark grey shale.

1835-1841 **SANDSTONE:** similar to above, off white to light grey, very fine to fine grained, rare to trace lower medium grains, quartz arenite, commonly variably silty, moderately well to well sorted, angular to subrounded to occasionally rounded, clean, moderately to moderately well indurated, poorly indurated and crumbly in minor part, decreasing common dolomitic and increasing minor to common siliceous cement, decreasing rare to trace interstitial pyrite, **predominantly tight to 2% porosity, trace streaky poor porosity, minor patchy pale yellow white fluorescence, no cut.**

1841-1848 **DOLOMITE:** light brown, dolarenite, commonly very fine to medium grained, medium to very coarse grained in part, abundant off white to light brown very angular to sub angular dolomite grains, trace to minor quartz grains becoming locally abundant occasionally grading to dolomitic sandstone, moderately to poorly sorted, trace scattered white chert and recrystallized fossil fragments, trace to minor dolomitic matrix to cement, moderately indurated, trace to locally minor pyrite, **minor poor porosity, minor patchy dull to bright fluorescence, no cut;** interbedded **SANDSTONE:** grading from above in part, light brown to light grey, very fine to fine grained, minor medium and trace coarse grains, very quartzose with minor to locally common dolomite grains, moderately sorted, moderately indurated, poorly indurated and crumbly in part, common to abundant dolomitic cement, **predominantly no visible porosity, trace poor to rare fair porosity, trace spotty to patchy bitumen, minor dull fluorescence, no cut.**

,8-1852 SANDSTONE: light grey, very fine grained, minor lower fine grains, variably silty, quartz arenite, well sorted, angular to subrounded, clean, trace argillaceous partings, commonly poorly to moderately indurated and crumbly, well indurated in part, predominantly siliceous + minor spotty dolomitic cement, trace quartz overgrowths, rare to trace spotty kaolin, **commonly tight to 2% porosity, minor streaky poor to fair porosity, minor patchy to spotty bitumen, abundant moderate to bright yellow white to yellow fluorescence, trace faint questionable cut.**

1852-1856 SANDSTONE: very similar to above, light tan to light grey, very fine to fine grained, slightly silty, quartz arenite, well sorted, angular to subrounded to occasionally rounded, clean, commonly poorly indurated and crumbly to friable, moderately indurated in part, minor to common siliceous and trace to minor spotty dolomitic cement, minor quartz overgrowths, **variable porosity: common 6 to 9%, less common 3 to 5%, even moderate pale yellow fluorescence, trace very faint questionable cut.**

1856-1861 SANDSTONE: light grey, very fine, minor to trace lower fine grains, variably silty, quartz arenite, well sorted, angular to subrounded, clean, trace slightly argillaceous, minor argillaceous partings, commonly moderately to moderately well indurated, poorly indurated and crumbly to friable in part, predominantly siliceous and trace to minor spotty dolomitic cement, **tight to 2% porosity, minor streaky poor to fair porosity, minor spotty to patchy bitumen, minor patchy moderate yellow fluorescence, trace faint questionable cut, trace black bituminous silty to sandy shale.**

1861-1864 SANDSTONE: light tan, very fine to fine, trace medium and coarse grains, quartzose with trace to locally common dolomite grains, grades to minor dolarenite, moderately well to moderately sorted, angular to rounded, moderately to poorly indurated and crumbly, common to abundant dolomitic cement, **predominantly no visible porosity, trace streaky poor porosity, trace spotty bitumen, abundant moderate to dull yellow fluorescence, no cut,** trace shale.

1864-1869 SANDSTONE: light grey to light tan, very fine grained, trace to locally minor lower fine grains, variably silty, predominantly quartz arenite, locally trace to minor dolomite grains, well to locally moderately well sorted, angular to rounded, clean, trace argillaceous partings, variable induration: common moderately to poorly indurated, crumbly in part, locally moderately well to well indurated, common dolomitic + minor spotty to patchy siliceous cement, **tight to 2% porosity, minor streaky poor to fair porosity, trace spotty bitumen, common patchy fluorescence as above, no cut.**

1869-1875 **SANDSTONE:** light brown to light grey, upper fine to upper very fine grained, trace to minor lower medium grains, quartz arenite with clear to frosted quartz, moderately well sorted, angular to rounded, very clean, disaggregated in part, friable, poorly to moderately indurated, well indurated in minor part, common spotty to patchy siliceous cement, common to locally abundant quartz overgrowths, **variable porosity: common 7 to 10% with minor good streaks, less common 3 to 6% with trace to minor tight streaks, trace spotty bitumen, common patchy pale to light brown oil stain, abundant bright yellow to yellow white fluorescence, fast poor to fair thin yellow white diffuse and minor streaming cut.**

1875-1881 **SANDSTONE:** very similar to above, very fine to lower fine grained, rare to trace lower medium grains, slightly to moderately silty in part, quartz arenite, well to moderately well sorted, angular to rounded, clean, rare argillaceous partings, disaggregated in minor part, commonly moderately to poorly indurated and crumbly to slightly friable, moderately well indurated in part, common dolomitic and siliceous cement, minor locally common quartz overgrowths, trace interstitial pyrite, **common 6 to 9% porosity with minor good streaks, minor to common 3 to 5% with trace tight streaks, decreasing trace spotty bitumen, common patchy faint to light brown oil stain, decreasing common to abundant fluorescence as above, decreasing poor very thin diffuse and streaming cut,** trace black shale.

1881-1885 **SANDSTONE:** light grey, very fine grained, trace to locally minor fine grains, variably silty, quartz arenite, well sorted, angular to rounded, minor disaggregated grains, clean, commonly moderately to moderately poorly indurated, crumbly in part, locally well indurated, common siliceous + variable trace to common spotty to patchy dolomitic cement, increasing trace to locally minor pyrite, **predominantly tight to 2% porosity, minor streaky poor to rare fair porosity, minor patchy dull to moderate pale yellow fluorescence, trace faint questionable cut.**

1885-1890 **SANDSTONE:** as previously described becoming increasingly silty in part grading to sandy siltstone, increasing common to locally abundant dolomitic and decreasing common to minor patchy siliceous cement, **increasing trace to minor spotty to patchy interstitial pyrite, porosity and shows as above,** increasing trace dark grey to black bituminous shale, pyritic in part.

1890-1894.5 **SANDSTONE with interbedded DOLOMITE:**

SANDSTONE: as above in part becoming decreasingly silty, very fine to fine grained and commonly disaggregated in part, moderately to moderately well sorted, rounded to angular, **infer common fair porosity, shows as above; DOLOMITE:** light to medium grey, cryptocrystalline, very firm to hard, slightly cherty in part, variably silty to sandy grading to very dolomitic siltstone and sandstone laminations to stringers, **tight.**

1894.5-1900 **SANDSTONE:** light grey, very fine grained, trace locally minor fine grains, variably silty occasionally grading to sandy siltstone, quartz arenite, well sorted, angular to subrounded, predominantly clean, locally slightly to moderately argillaceous with trace to minor argillaceous partings, commonly moderately to moderately well indurated, locally poorly to very well indurated, common to abundant siliceous + trace to minor spotty to patchy dolomitic cement, increasing minor to locally common patchy to spotty pyrite, **predominantly tight to 2% porosity, trace to minor streaky poor porosity, minor dull fluorescence, no cut,** trace to minor **SHALE:** light grey green, sub platy, moderately firm to soft, very micromicaceous, very silty to sandy commonly grading to variably argillaceous siltstone.

1900-1907 **SANDSTONE:** light grey, very fine to upper medium grained, quartz arenite with frosted to minor clear quartz, moderately sorted, rounded to sub angular, clean, predominantly disaggregated, minor poorly to very poorly indurated cuttings with spotty siliceous and dolomitic cement, increasing minor locally common patchy to spotty pyrite, trace spotty kaolin, **variable good to poor porosity in consolidated cuttings, infer predominantly good to fair porosity, common spotty to patchy bitumen, common patchy yellow green and pale yellow fluorescence, minor poor faint streaming and diffuse cut,** trace to minor laminated to mottled soft marly to anhydritic stringers.

1907-1910 **SANDSTONE:** light grey to faint brown, very fine to upper fine grained, slightly silty, quartz arenite with common to abundant frosted quartz, clean, moderately well sorted, rounded to angular, predominantly poorly indurated and friable, common dolomitic cement, decreasing minor spotty to patchy pyrite, predominantly variably fair porosity with locally good to poor streaks, trace spotty bitumen, **abundant to even bright pale yellow green fluorescence, common poor thin diffuse and streaming cut.**

1910-1916 **SANDSTONE:** light grey, very fine grained, moderately to very silty grading to siltstone in part, quartz arenite, angular to sub angular, commonly moderately well to very well indurated, common siliceous and minor dolomitic cement, common to locally abundant patchy to spotty pyrite cement, poorly indurated and crumbly in part, **predominantly tight to 3% porosity, minor streaky poor to fair porosity, trace to minor spotty bitumen, abundant pale yellow fluorescence, trace very faint cut as above,** minor anhydritic stringers: white, common to abundant dark brown very fine mottles and laminations, chalky, soft, pyritic in part, trace very pyritic graphite laminations.

1916-1921 **SANDSTONE:** light tan to light grey, very fine to fine grained, slightly silty in part, quartz arenite with predominantly clear quartz, well sorted, angular to rounded, disaggregated in part, poorly to moderately indurated, friable, siliceous cement, minor to common quartz overgrowths, **variable porosity:** common fair with minor good streaks, minor to common poor with trace tight streaks, trace spotty bitumen, **abundant bright yellow white fluorescence, trace faint questionable cut,** minor **SHALE:** black, platy, very firm to hard, brittle, fissile, carbonaceous to bituminous with common coaly debris and partings, minor claystone stringers.

1921-1927 **SANDSTONE and SILTSTONE:**

SANDSTONE: light brown, very fine grained, trace lower fine grains, silty, quartz arenite, moderately well sorted, angular to subrounded, trace argillaceous partings, moderately well to moderately poorly indurated, dolomitic and siliceous cement, **tight to poor porosity, even moderate light yellow fluorescence, no cut,** minor medium brown very fine to fine moderately sorted variably argillaceous sandstone with minor argillaceous partings and common dolomitic cement, **tight,** interbedded **SILTSTONE:** medium to dark brown, firm to hard, locally soft and crumbly, quartzose, variably argillaceous, moderately to very dolomitic, **tight,** minor **SHALE:** similar to above becoming slightly pyritic in part, rare pyritized ostracode, minor marlstone light to medium grey with very fine white mottles and laminations, soft, chalky, trace claystone.

1927-1935 **SANDSTONE:** buff to tan, very fine grained, trace fine grains, silty grading to minor sandy siltstone, very quartzose, well sorted, angular to sub angular, predominantly poorly to moderately indurated with common to abundant dolomitic cement to matrix, grading to minor sandy dolomite, **well indurated in minor part with streaky tight siliceous cement, predominantly no visible porosity, trace streaky poor porosity, common dull to moderate yellow fluorescence, trace faint questionable cut,** trace to minor **DOLOMITE:** medium brown, cryptocrystalline, brittle, recrystallized dolomitized wackestone, **tight.**

1935-1941 **SILTSTONE:** light to medium grey, very quartzose, trace muscovite and dark specks, predominantly hard and dense, slightly to variably sandy occasionally grading to sandstone, common siliceous and dolomitic cement, slightly argillaceous in part, minor to common argillaceous to micaceous partings and laminations, minor to locally abundant pyrite, locally moderately indurated with trace to minor poor porosity, predominantly tight, trace spotty bitumen, **trace to minor dull fluorescence, no cut,** minor **SHALE:** black to black brown, platy, fissile, firm to soft, very micromicaceous, silty to slightly sandy in part, minor medium to very coarse occasionally graphitic pyrite nodules, minor **CLAYSTONE:** light to medium brown, very fine white to light grey mottles and laminations, very soft, bentonitic.

41-1946 **SHALE:** black to brown black, sub platy to sub blocky, firm to hard, fissile, smooth and faintly micromicaceous in part, variably silty to slightly sandy in part occasionally grading to argillaceous siltstone laminations to stringers, trace to minor locally very micromicaceous, carbonaceous to bituminous in part, sub waxy in part grading to claystone, minor pyrite nodules, minor dark brown siderite nodules and stringers.

1946-1952 **SILTSTONE:** light brown, very quartzose, slightly to moderately sandy grading to silty sandstone in part, moderately well to moderately poorly indurated, abundant dolomitic cement to matrix, grades to minor silty to sandy dolomite, slightly argillaceous in minor part, trace argillaceous partings to laminations, minor dolomite allochems, **no visible porosity, common dull fluorescence, no cut;** interbedded **SANDSTONE:** light grey to light brown, very fine grained, silty grading to siltstone in part, quartz arenite, well sorted, angular to sub angular, commonly moderately to moderately well indurated, poorly indurated and crumbly in part, predominantly siliceous + minor spotty to streaky dolomitic cement, **common to abundant dull yellow to moderate yellow white fluorescence, trace faint questionable cut.**

1952-1954.5 **SANDSTONE:** light grey, lower fine to upper medium grained, trace silt and coarse grains, quartz arenite, frosted to clear quartz, moderately to moderately well sorted, rounded to angular, clean, predominantly disaggregated, minor poorly to well indurated cuttings with minor to locally abundant siliceous cement, **variable tight to good porosity in consolidated cuttings, infer common fair to good porosity, trace spotty bitumen, minor dull to bright fluorescence, trace faint questionable cut.**

1954.5-1960 **SANDSTONE:** light brown, very fine grained, trace lower fine grains, moderately silty grading to siltstone in part, quartz arenite, trace dolomite grains, well sorted, angular to sub angular, clean, locally slightly argillaceous, trace argillaceous partings and laminations, moderately well to moderately poorly indurated, common to abundant dolomitic cement, occasionally grades to sandy dolomite, **predominantly tight to 2% porosity, abundant dull yellow fluorescence, trace faint questionable cut,** minor **SANDSTONE:** #2 very fine to fine grained, quartz arenite, well sorted, clean, poorly indurated, crumbly to friable, siliceous cement, minor quartz overgrowths, **common fair to trace streaky good porosity, tight to poor in part, trace to minor spotty bitumen, abundant dull to moderate fluorescence, trace to minor very poor faint diffuse cut.**

1960-1965 **SANDSTONE:** similar to above, light brown, very fine grained, trace to locally minor lower fine grains, variably silty grading to minor siltstone, quartz arenite, well sorted, angular to subrounded, clean, trace to minor argillaceous partings and laminations, moderately well to moderately poorly indurated, locally very well indurated, common to abundant siliceous cement, trace to minor quartz overgrowths, **tight to 2% porosity, minor streaky poor to fair porosity, trace spotty bitumen, abundant bright yellow white fluorescence, minor poor faint diffuse cut,** trace black shale.

65-1974 **SANDSTONE:** light brown to light grey, predominantly very fine grained, trace locally minor lower fine grains, variably silty occasionally grading to sandy siltstone, quartz arenite, well sorted, angular to sub angular, predominantly clean, trace to minor slightly argillaceous, trace argillaceous partings, predominantly moderately to moderately well indurated, locally poorly to very well indurated, predominantly siliceous cement, trace to locally minor spotty to patchy dolomitic cement, trace locally common spotty to patchy kaolin, trace to minor quartz overgrowths, **common poor (3 to 6%) porosity, tight to 2% in part, trace streaky fair porosity, common patchy to spotty to occasionally streaky bitumen to pyrobitumen, abundant to even dull yellow green fluorescence, trace very faint questionable cut,** trace **SHALE:** black, platy, firm, micaceous, bituminous, commonly silty.

1974-1981 **SANDSTONE:** light to medium brown to brown grey, very fine grained, predominantly moderately to very silty commonly grading to sandy siltstone, quartz arenite, well sorted, angular to sub angular, increasingly slightly argillaceous in minor part, minor argillaceous partings, moderately well to poorly indurated and crumbly, siliceous + trace spotty dolomitic cement, trace spotty kaolin, **predominantly no visible porosity, trace to minor streaky poor porosity, minor spotty to patchy pyrobitumen, fluorescence and cut as above.**

1981-1986 **SANDSTONE with interbedded SHALE:**

SANDSTONE: light brown, very fine to fine grained, minor medium grains, quartz arenite, moderately well to moderately sorted, angular to rounded, predominantly clean, slightly to moderately argillaceous in minor part, increasing minor to locally common argillaceous to bituminous partings, disaggregated in part, commonly poorly indurated and friable to crumbly, moderately to moderately well indurated in part, common to locally abundant siliceous cement, common quartz overgrowths, **common tight to 3% porosity, minor to common streaky fair to poor porosity in part, decreasing common to abundant fluorescence as above, cut as above,** minor interbedded **SHALE:** black, platy, firm to soft, micromicaceous, bituminous, slightly to very silty occasionally grading to argillaceous siltstone stringers, minor dark brown soft chalky mottled in part bituminous? claystone, trace anhydritic stringers with dark brown mottles and laminations.

1986-1990 **SANDSTONE with SHALE:**

SANDSTONE: as previously described becoming slightly finer grained, increasingly silty in part, increasing minor to common argillaceous to bituminous partings, increasing minor interbedded **SHALE:** similar to above, black to very dark brown, platy to sub blocky, soft to firm, fissile, bituminous to very bituminous, micromicaceous, sub resinous, trace claystone as above, trace anhydritic stringers as above.

1990-1995 **SANDSTONE:** light brown, very fine to fine grained, trace lower medium grains, quartz arenite, predominantly clear quartz, moderately well sorted, angular to subrounded, occasionally rounded, slightly to moderately silty in part, clean, rare to trace argillaceous partings, disaggregated in part, moderately to well indurated in part, poorly indurated and friable to crumbly in part, common to locally abundant siliceous cement, minor locally common quartz overgrowths, trace spotty kaolin, **common tight to 3% porosity, less common 4 to 8% porosity, trace streaky good porosity, abundant dull yellow green fluorescence, minor poor very thin diffuse and streaming cut,** trace shale stringers as above.

1995-2000 **SANDSTONE:** very similar to above becoming finer, light tan, very fine to fine grained, rare lower medium grains, commonly variably silty, quartz arenite, moderately well sorted, angular to subrounded, predominantly clean. slightly to moderately argillaceous in minor part, trace argillaceous partings, disaggregated in minor part, moderately to well indurated in part, poorly indurated and friable to crumbly in part, common to abundant siliceous cement, minor quartz overgrowths, trace spotty kaolin, **common tight to 2% porosity, minor streaky 4 to 8% porosity, abundant dull to very dull yellow green fluorescence, trace very faint questionable cut,** trace shale as above.

2000-2005 **SANDSTONE:** predominantly as above, minor **SANDSTONE:** #2 light grey, fine to very fine grained, trace lower medium grains, quartz arenite, moderately well sorted, angular to subrounded, clean, commonly disaggregated, minor to common poorly to moderately well indurated consolidated cuttings, common spotty to patchy siliceous cement, common to abundant quartz overgrowths, rare to trace spotty kaolin, **common variable fair to good porosity in consolidated cuttings, minor poor to tight streaks, abundant dull to moderate yellow fluorescence, no cut.**

2005-2010 **SANDSTONE:** very similar to above becoming slightly coarser, light brown, very fine to fine grained, rare lower medium grains, slightly silty, quartz arenite, moderately well sorted, angular to subrounded, clean, trace argillaceous partings, disaggregated in part, moderately to well indurated in part, poorly indurated and friable to crumbly in part, common to abundant siliceous cement, minor to common quartz overgrowths, trace spotty kaolin, **common tight to 2% porosity, minor streaky 4 to 8% porosity, abundant dull to very dull yellow green fluorescence, trace very faint questionable cut.**

10-2015 **SANDSTONE:** light tan, very fine to fine grained, trace lower medium grains, commonly slightly to moderately silty, moderately well sorted, angular to subrounded, clean, trace argillaceous partings, decreasingly disaggregated in minor part, variably moderately poorly to well indurated, common to locally abundant siliceous cement, rare to trace spotty dolomitic cement, minor quartz overgrowths, **trace patchy pyrite, predominantly variably poor to tight porosity, minor streaky fair porosity, common dull yellow to trace bright yellow white fluorescence, no cut,** trace black bituminous shale stringers.

2015-2019 **SANDSTONE:** light to medium brown, very fine, trace fine grains, silty, quartz arenite, well sorted, angular to sub angular, variably argillaceous in minor part, minor to common argillaceous partings, commonly moderately well to very well indurated, common to abundant siliceous cement, trace spotty kaolin, trace patchy pyrite, **locally very fine to fine grained with common quartz overgrowths and fair porosity, minor to common dull fluorescence, trace faint questionable cut,** minor interbedded **SHALE:** and **CLAYSTONE:** as described below.

2019-2022 **CLAYSTONE:** dark brown, very soft, very bituminous with common to abundant fair yellow green cut, variably pyritic in part, minor to locally common irregular to chaotic very fine anhydritic laminations and stringers, locally fissile with abundant carbonaceous to coaly material grading to **SHALE:** black, variably firm to soft, very fissile, very carbonaceous to coaly grading to shaly bituminous to sub-bituminous coal.

2022-2030 **SANDSTONE with interbedded SHALE and CLAYSTONE:**

SANDSTONE: variable: light to medium brown, very fine grained and silty grading to siltstone in part, very fine to fine with trace to minor lower medium grains in part, very quartzose, moderately to moderately well sorted, angular to subrounded, clean to variably argillaceous, common to abundant argillaceous partings, variably very well to moderately indurated, abundant to common siliceous cement, trace kaolin, locally moderately poorly indurated in part, trace locally common patchy pyrite, **predominantly tight to 2% porosity, trace to minor streaky poor to rare fair porosity, minor to common very dull fluorescence, trace very faint cut,** minor light brown very fine to fine grained sandstone, clean quartz arenite, well sorted, moderately poorly to moderately well indurated, common to abundant siliceous cement, common quartz overgrowths, **streaky poor to fair porosity, abundant very dull fluorescence, trace very faint questionable cut;** minor interbedded **CLAYSTONE:** and **SHALE:** as above.

2030-2036 **SANDSTONE with interbedded SHALE and CLAYSTONE:**

SANDSTONE: predominantly as above, minor to common medium brown, very fine to fine grained, trace lower medium grains, silty, very quartzose, moderately sorted, angular to rounded, predominantly slightly to moderately argillaceous, clean in part, common to abundant argillaceous partings, moderately well to moderately poorly indurated, common to abundant siliceous cement, trace spotty kaolin, trace spotty to patchy pyrite, trace to minor sandy pyrite nodules, **predominantly tight to 2% porosity, trace dull fluorescence, rare faint questionable cut; CLAYSTONE:** as above, increasing **SHALE:** as above commonly grading to bituminous coal.

2036-2039 **SANDSTONE:** light brown, very fine grained with trace lower fine grains, very fine to fine grained in minor part, variably silty occasionally grading to sandy siltstone, quartz arenite, well sorted, angular to subrounded, predominantly clean, minor argillaceous partings, moderately well to moderately poorly indurated, abundant to common siliceous cement, trace spotty kaolin, rare to trace spotty dolomitic cement, minor locally common quartz overgrowths, **commonly tight, minor to common streaky poor to fair porosity, abundant very dull fluorescence, no cut,** trace shale as above.

2039-2044 **SANDSTONE:** variable as previously described in part, predominantly very similar to above becoming slightly finer, increasingly silty in part grading to minor sandy siltstone, clean to locally variably argillaceous, increasing minor to common argillaceous partings, very well indurated in part, **decreasing predominantly tight porosity, minor streaky poor porosity, fluorescence and cut as above,** trace to minor coal stringers: black to brown black, soft to firm, bituminous, shaly in part grading to bituminous shale as above, trace bituminous claystone as above.

2044-2050 **SANDSTONE:** light brown, very fine grained, trace lower fine grains, variably silty, quartz arenite, well sorted, angular to sub angular, predominantly clean, trace slightly argillaceous, trace to minor argillaceous partings, variably indurated: moderately to moderately well in part, poorly to moderately poorly and crumbly to friable in part, common to abundant siliceous cement, trace spotty to patchy pyrite, rare to trace spotty kaolin, trace quartz overgrowths, **predominantly tight to 3% porosity, minor streaky poor to fair porosity, trace spotty bitumen, abundant to even dull yellow green fluorescence, trace faint diffuse cut,** trace bituminous shale and coal as above.

2050-2055 **SANDSTONE:** mixed: as above in part, variably brown to brown grey, predominantly very fine grained and variably silty, minor very fine to fine grained, very quartzose to quartz arenite, clean to variably argillaceous, minor very siliceous siltstone, variably poorly to very well indurated, common to abundant siliceous cement, **trace spotty kaolin, trace pyrite, predominantly tight to 2%, minor streaky poor to fair porosity, common patchy dull fluorescence, trace questionable cut;** interbedded **CLAYSTONE:** very bituminous with anhydritic laminations and mottles as above, minor bituminous **COAL:** grading to bituminous **SHALE:** as above, silty to sandy in part, minor to common sandy sideritic stringers to nodules.

Décollement Consulting Ltd.

Scale 1:240 (5"=100') Metric

Well Name:	Paramount et al Liard NWT I-46		
Location:	I-46 / 60-10, 123-15		
Licence Number:	WID 1871	Region:	Ft. Liard
Spud Date:	12-Nov-99 14:00hrs	Drilling Completed:	08-Jan-00 09:00hrs
Surface Coordinates:	Lat: 60 deg. 05' 32.474"		
	Long: 123 deg. 22' 53.612"		
Bottom Hole Coordinates:			
Ground Elevation (m):	537.2	K.B. Elevation (m):	542.2
Logged Interval (m):	20 To: 2055	Total Depth (m):	2055
Formation:	Mattson		
Type of Drilling Fluid:	Gel chem/Invert/Nitrified Air/Invert		

Printed by WellSight Log Viewer from WellSight Systems Inc. 1-800-447-1534 www.wellsight.com

OPERATOR

Company: Paramount Resources Ltd.
Address: 4000 First Canadian Centre
350 - 7th Avenue S.W.
Calgary, Alberta T2P 3W5

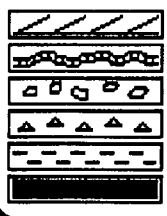
GEOLOGIST

Name: Gary Johannson
Company: Decollement Consulting Ltd.
Address: Suite 200, 1009 - 7th Avenue S.W.
Calgary, Alberta T2P 1A6

DSTs

DST #1: 1365-1392m; DST #2: 1323-1343m; DST #3: 1332-1352m
DST #4: 1213-1227m; DST #5: 1734-1740m; DST #6: 1785-1789m
DST #7: 1899-1903m

ROCK TYPES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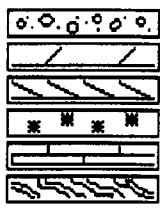
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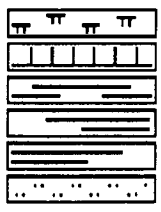
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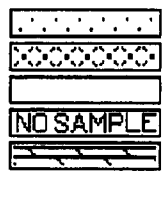


Ss
Till
Blank
Nosample
Siderite

ACCESSORIES

MINERAL
Anhy
Arggrn

Sandy
Silt
Sil

Pelec
Pellet
Pisolite

fracture
Fault
thrust f

ACCESSORIES

MINERAL
- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol
- Feldspar
- Ferrpel
- Ferr
- Glau
- Gyp
- Hvymin
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr
- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff
- cht-nod
- bitumen
- Rhombs

FOSSIL
- Algae
- Amph
- Belm
- Biocist
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite
- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom
- spics
- inoceram
- calcisph
- coral

STRINGER
- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst
- Sltstrg
- Ssstrg
- sidstrg
- clystn
- hematite
- Gravel
- Slickens
- fracture
- Fault
- thrust f
- Chert

TEXTURE
- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest
- cross la
- clmb-rip
- convlam
- hummk-xs
- wvy par
- xbed-trg
- Tab-plnr
- bioturb
- Arg lamn

OTHER SYMBOLS

POROSITY TYPE
- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint
- Vuggy

SORTING
- Well
- Moderate
- Poor

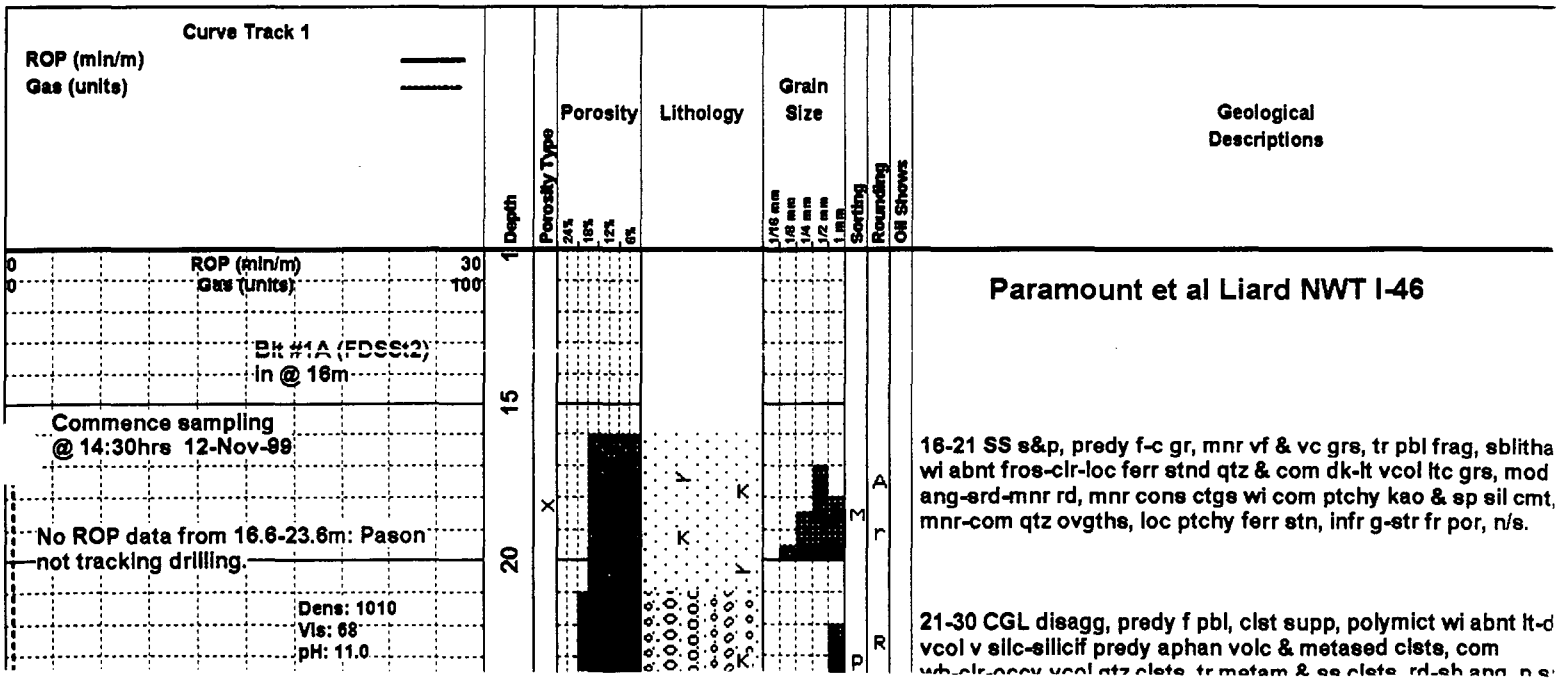
ROUNDING
- Rounded
- Subrnd
- Subang
- Angular

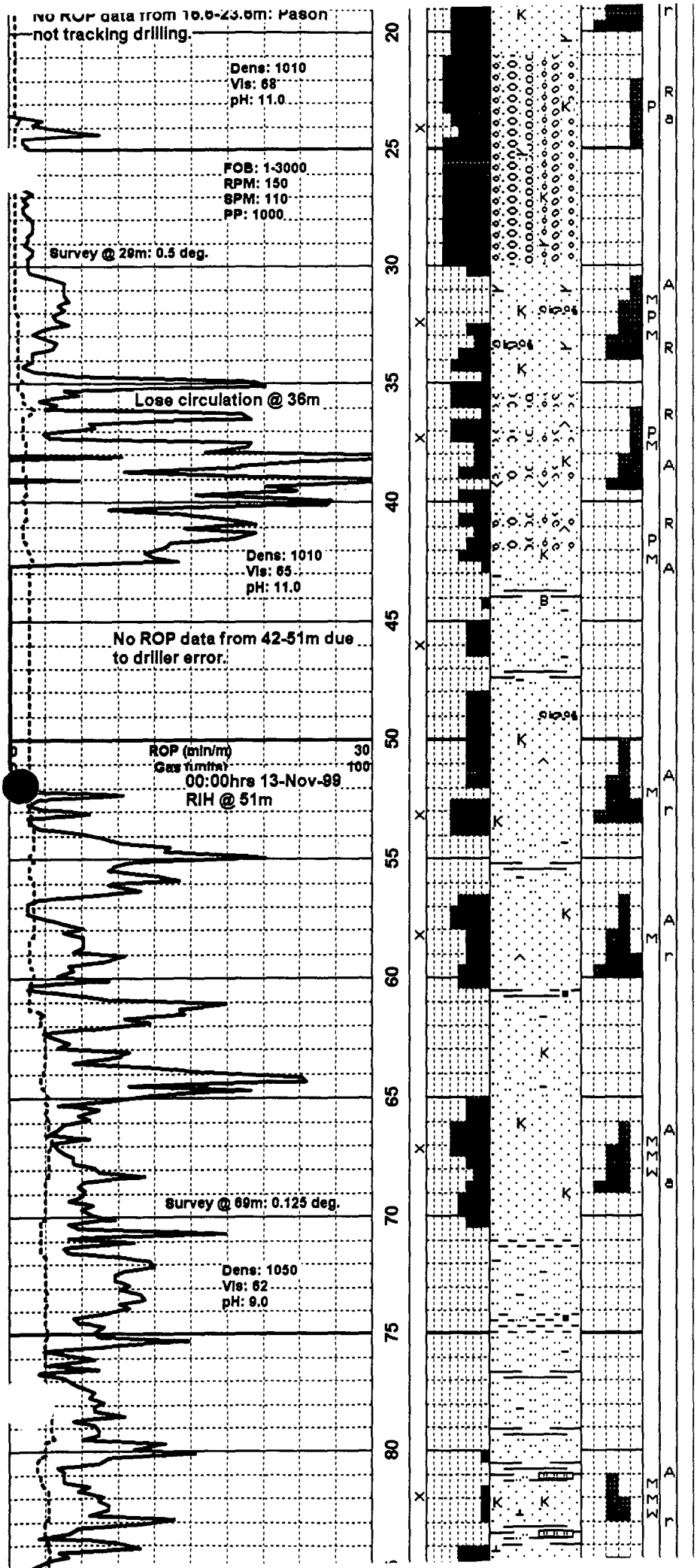
OIL SHOWS
- Even
- Spotted
- Ques
- Dead
- Vspotty

INTERVALS
- None
- Core

- Dst

EVENTS
- Rft
- Sidewall
- Slide
- Casing





mnr-com qtz ovgths, loc ptchy ferr stn, infr g-str fr por, n/s.

21-30 CGL disagg, predy f pbl, clst supp, polymict wi abnt lt-c vcol v silc-silicif predy aphan volc & metased clsts, com wh-clr-occy vcol qtz clsts, tr metam & ss clsts, rd-sb ang, p s mtx: vf-c gr ss aa, tr sp kao & sil cmt on clsts, tr ptchy ferr st infr predy g-ex por, n/s.

30-35 SS orng-mot orng wh, f-vc gr, pbly, litharen-sb litharen abnt qtz & com-abnt vcol ltc grs-clsts as prev desc, mod p-m srt, ang-rd, comy disagg ip, com p-mod ind cons ctgs wi abnt limonitic cmt-mtx, loc com-abnt ptchy kaol, mnr hematitic stn crusts on grs, infr tt ip wi str-ptchy fr-g por, n/s.

**Note: Samples 40-50 were of very poor quality.

35-40 SS & CGL: predy as desc from 16-30m, infr thnly intbd v var str fr-g por, mnr intbd SS #2 lt-m gy, s&p, vf gr, qtzolithic, slty & arg wi sl bent mtx, sl tuffac wi com scat mica, tt, n/s, tr strg; m-dk gy, v arg, sl sdy, p-mod ind, tt, n/s, grds-slty bentc ip.

40-50 SS predy aa, tr SS #2 aa, mnr-com intbd SLTST; lt gy-lt l qtzs, predy vary arg, mnr scat carb deb & mica, p-mod ind, gr slty sh ip, loc sdy occy grdg-slty ss lamn, mnr thn intbd SH; lt frm, sb plty-sb blky, sb fis, comy vary slty & mm, loc com carb spks, sl bentc, sb wxy ip grdg-clyst.

**Note: Shaker bypassed from 50-75m. Samples of suspect quality.

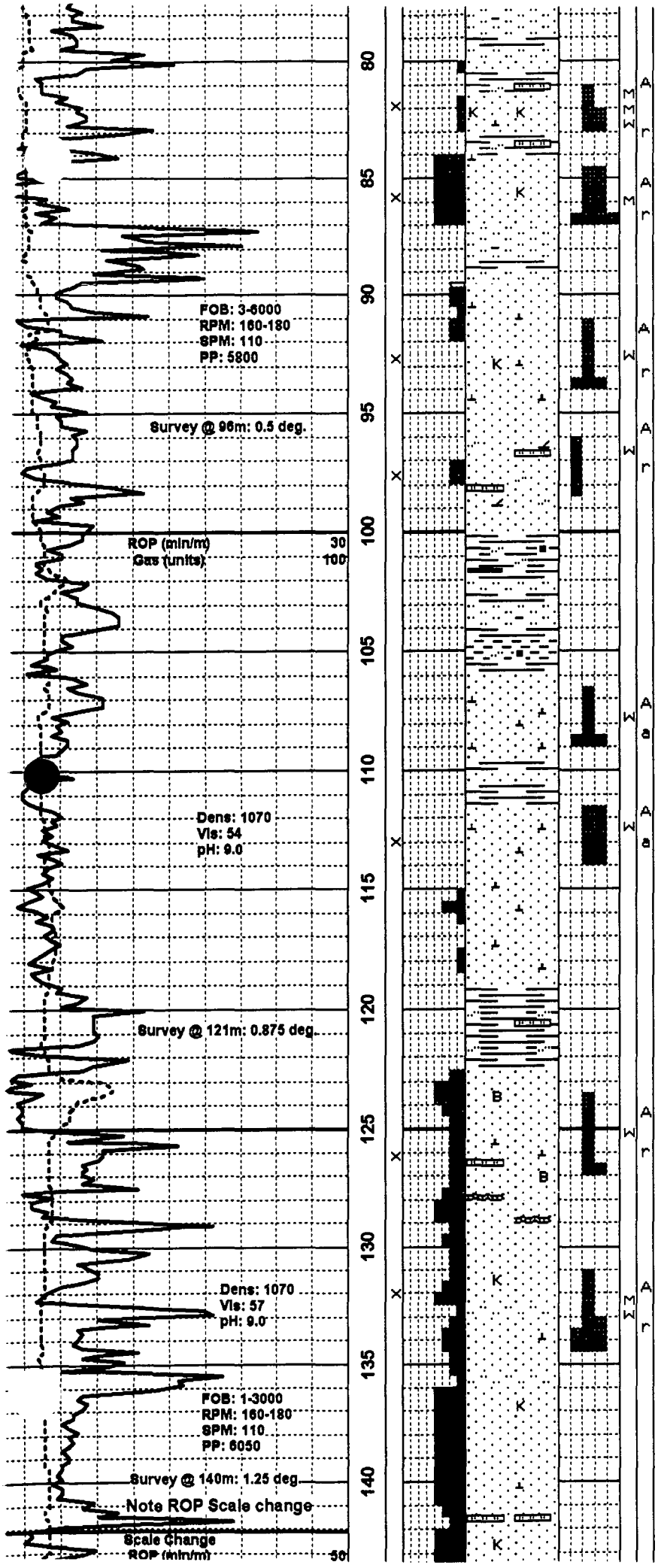
50-65 SS wi intbd SLTST & mnr SH; SS uncons-disagg, f-c gr, mnr vf & vc grs, occl pbl, litharen grdg-sblitharen, abnt clr-fros qtz wi com vcol ltc grs, mnr rd brn sldc grs, mody srt, ang-srd, cons ctgs wi sp sil & kao cmt, infr g por, n/s; SLTST lt-m gy, qt com scat mica & carb spks, comy vary arg-loc cln, p ind, tt, n/s SH dk gy, frm, sb plty-sb blky, predy vary slty, com scat carb d & occl coaly ptgs & lamn, mnr intbd clyst.

65-70.5 SS off wh, s&p, vf-m gr, tr c grs, sblitharen, abnt clr-fro qtz & com vcol ltc grs, tr mica, mod-mod w srt, ang-sb ang, pre disagg, mnr cons ctgs wi com sp-ptchy kao cmt, tr sp silc cmt qtz ovgths, infr str fr-g por, n/s.

70.5-75.5 SLTST wi intbd CLYST; SLTST lt-m gy, qtzs, com sca mica, mnr carb spks, p-mod ind wi silc cmt ip, comy vary arg, lo sdy grdg-vf ss strg, tt, n/s; CLYST predy lt gy, frm-loc sft, brit ip sb wxy, vary slty ip occy grdg-arg sltst lamn, loc v carb-coaly, t sldc lamn.

75.5-80 SLTST wi mnr intbd SH; SLTST m brn-orng brn, qtzs, micac, mnr carb spks, mod-p ind, predy vary arg grdg-slty sh ip com-abnt ferr stn, tt, n/s; SH aa bcmg incrly mm, tr mar clyst st

80-84 SS wi intbd SH; SS v lt gy-off wh, s&p, f-m gr, sblitharen, abnt fros-clr qtz wi com vcol ltc grs, rr glau, mod-mod w srt, ang-srd, comy disagg, mnr cons ctgs wi com-abnt ptchy kao, m loc com calc cmt, infr pred p por, n/s; SH lt-m gy, frm, sb blky, predy v slty grdg-arg sltst ip.



80-84 SS wi intbd SH; SS v lt gy-off wh, s&p, f-m gr, sblitharen, abnt fros-clr qtz wi com vcol ltc grs, rr glau, mod-mod w srt, ang-srd, comy disagg, mnr cons ctgs wi com-abnt ptchy kao, mnr loc com calc cmt, infr pred p por, n/s; SH lt-m gy, frm, sb blky, predy v slty grdg-arg sltst ip.

84-89.5 SS wi intbd SLTST & SH; SS uncons-disagg, f-m gr, mnr vf & c grs, tr vc grs, litharen wi abnt clr-fros-occy vcol qtz & com-abnt vcol ltc grs, mod srt, ang-srd, tr cons ctgs wi sp-ptchy kao & silc cmt, mnr qtz ovgths, infr str fr-g por, n/s; SH & SLTST sim-abv.

89.5-95 SS off wh-lt gy, predy f gr, mnr vf & m grs, sblitharen grdg-litharen, abnt fros-clr qtz & com vcol ltc grs, tr rd brn sidc grs, w srt, ang-srd, disagg ip, com cons ctgs abnt tt calc cmt, tr-mnr sp kao, tt-str p por, n/s.

95-100 SS lt-m gy, vf gr, qtzolithic, rr glau, comy vary micac, w srt, ang-sb ang, mod-p ind wi loc com dolc cmt, comy vary slty grdg-sdy sltst ip, cln-loc arg, tt-p por, n/s.

100-106 SH/CLYST wi mnr intbd SLTST; SH dk gy, sb plty, frm, comy vary slty & mm, com carb-coaly deb & ptgs, tr-mnr coaly strg, CLYST lt-m gy, brn, sb blky, sm-loc slty, carb-coaly ip, SLTST aa.

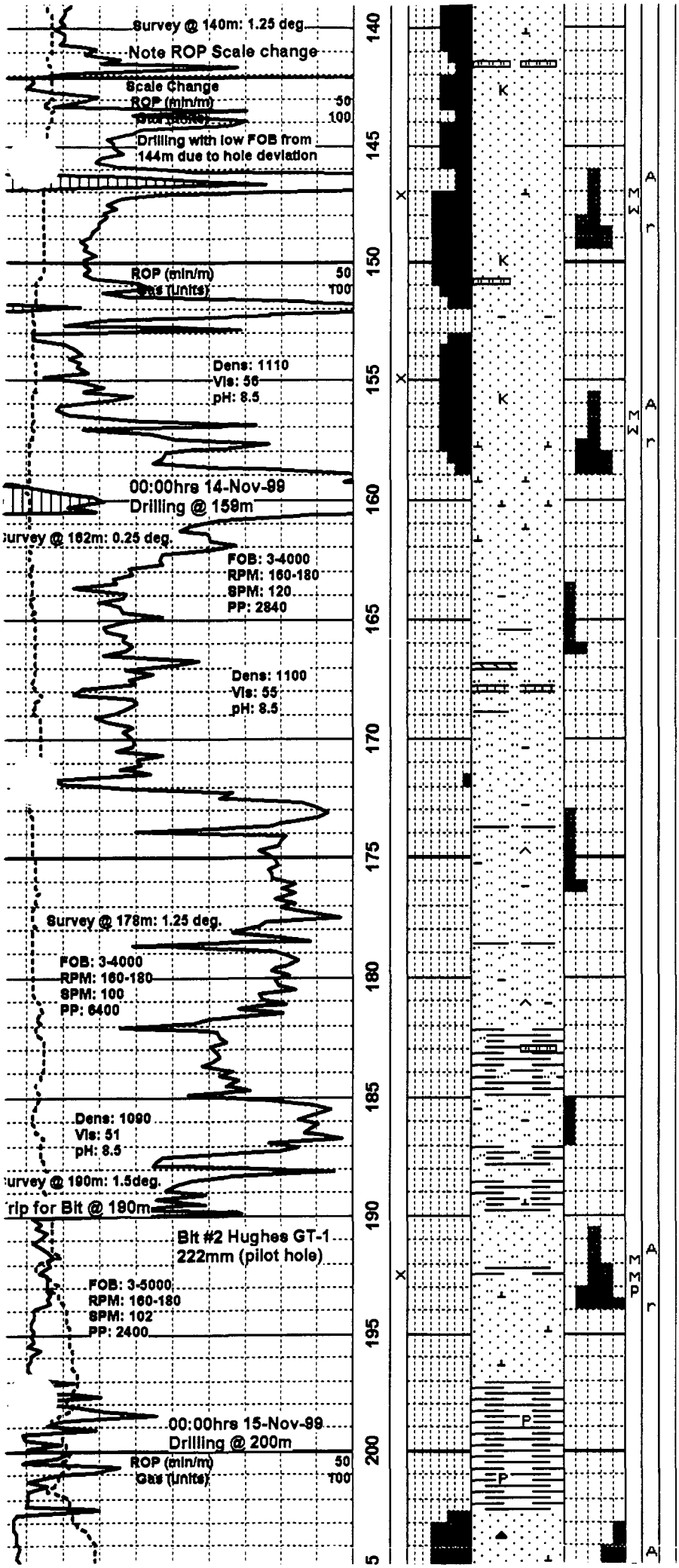
106-110 SS off wh, predy f gr, mnr vf & m grs, sblitharen, abnt wh-fros-mnr clr qtz wi mnr-com vcol ltc grs, w srt, ang-sb ang, disagg in mnr pt, mod-mod p ind wi abnt tt calc cmt, tt, n/s, mnr thn intbd sh aa.

110-119 SS wi mnr intbd SH & SLTST; SS aa bcmg predy f-m gr, bcms comy disagg wi decr mnr-com cons ctgs as prev desc, mod w srt, infr com tt-p por wi mnr fr stks, n/s; SH & SLTST as prev desc.

119-122.5 SH m gy, frm, brit ip, sb blky-blky, predy slty & mm occy grdg-arg sltst strg-lamn, mnr loc com carb deb & ptgs, tr hd brn sidc strg.

122.5-130 SS wh, predy f gr, mnr lm & tr uvf grs, sblitharen wi abnt clr-fros qtz & mnr predy lt vcol ltc grs, tuffac tex wi com biot & sp bentc cly mtx, w srt, ang-srd, comy disagg, mnr-com cons ctgs wi mnr loc com calc cmt, infr com p por wi mnr fr-g stks, n/s, mnr pale blue wh tuffac bent strg, tr sltst strg.

130-145 SS wh, s&p, vf-m gr, litharen grdg-sb litharen, abnt fros-clr qtz wi com dk-lt vcol ltc grs, tr sidc grs & mica, mod w srt, ang-srd, predy disagg, mnr cons ctgs wi sp kao & silc cmt, mnr loc com calc cmt, tr qtz ovgths, infr fr-g por, n/s, tr-mnr intbd SLTST m gy, qtzs, micac, comy vary arg, tr scat carb deb, mnr shly lams.



145-155 SS sim-abv, uncons-disagg, s&p, vf-m gr, litharen grdg-sblitharen, abnt fros-clr qtz wi com vcol ltc grs, tr biot, rr glau, mod w srt, ang-srd, tr cons ctgs wi sp kaol, mnr calc cmt, infr g-str fr por, n/s, mnr intbd SLTST m gy, qtzolithic, scat mica & carb spks, predy vary arg, mod ind tr dolc cmt, tt, n/s.

155-162.5 SS as prev desc bcmg incrly cons in mnr pt wi loc abnt tt calc cmt & mnr sp kaol, infr por aa wi mnr tt-p stks, n/s.

SULLY FORMATION @ 162.5m MD; 379.7m SS

162.5-172 SLTST lt gy, mnr m gy, qtzs, mnr-loc com biot, tr-mnr carb spks, rr glau, comy cln-loc vary arg, mod-p ind, silc cmt ip, tr-mnr carb ptg, loc vary sdy grdg-mnr vf ss lams-strg, tt-p por, n/s, mnr m gy v slty sh strg & lamn, tr-mnr m brn dns hd sid nod-strg.

172-182 SLTST sim-abv, lt-m gy, qtzs, mnr-loc com biot, tr-mnr carb spks, rr glau, comy vary arg-loc cln, mod-p ind, silc cmt ip, tr carb ptg, loc vary sdy grdg-mnr vf ss lams-strg, tt, n/s, mnr m gy v slty sh strg & lamn, tr brn sdy sidc lams-strg.

**Note: Samples 185 & 190 are of poor quality.

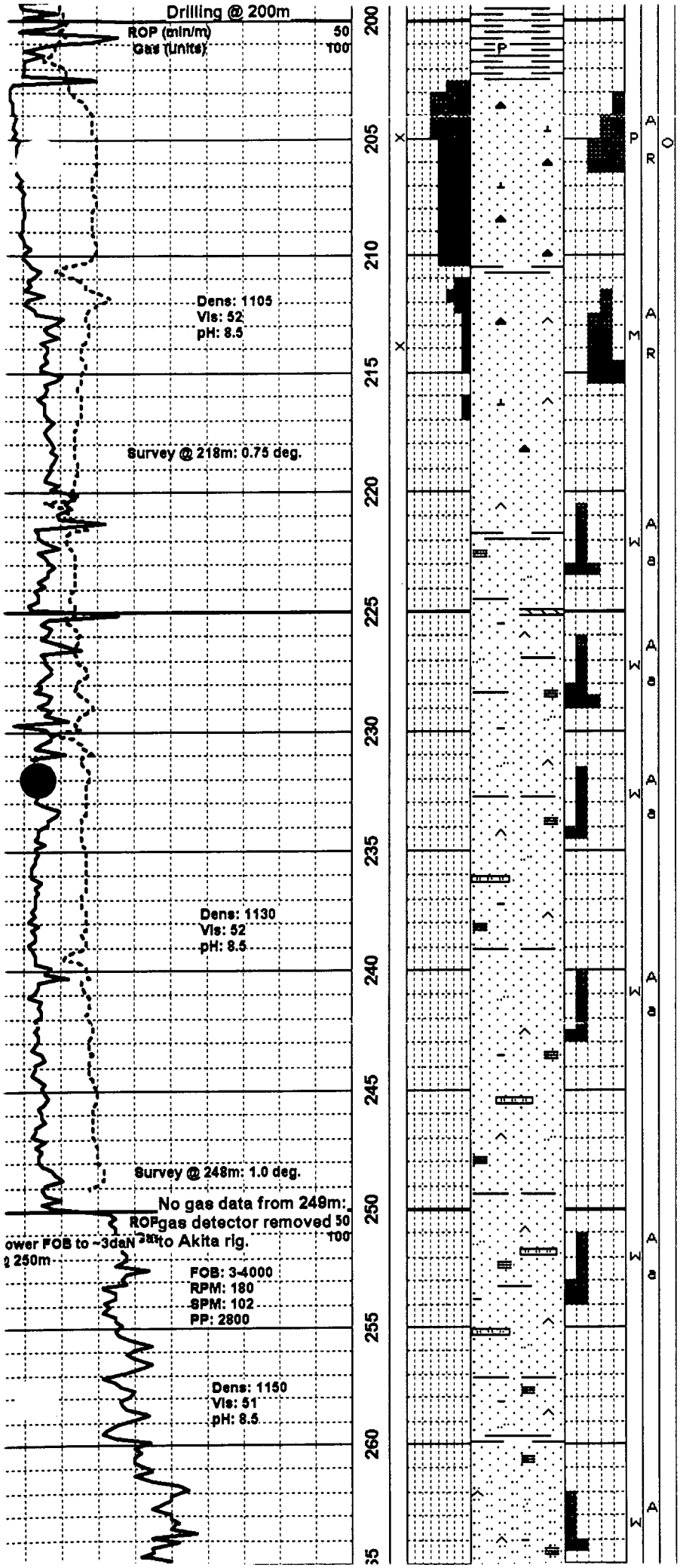
182-190 SH wi intbd SLTST; SH m-dk gy, brn gy, frm, sb blky-sb plty, mm, predy v slty grdg-arg sltst ip, tr carb spks, SLTST aa.

190-197 SS wi intbd SLTST & SH; SS disagg, vf-m gr, mnr c-vc grs & pbl frag, litharen grdg-sblitharen, abnt wh-fros qtz wi com vcol ltc grs, rr-tr glau, mod-mod p srt, ang-srd-occy rd, tr cons ctgs wi abnt tt calc cmt, infr tt-p por ip, p-fr por ip, n/s; SLTST & SH aa.

197-202.6 SH dk gy, frm-loc hd, brit ip, sb plty, fis, predy sm, loc sl slty in mnr pt, tr fram pyr mic nods, rr dk brn sl dolc clyst lams-strg.

SIKANNI FORMATION @ 202.6m MD; 339.6m SS

202.6-210 SS s&p, f-vc gr, gritty-sl pbly litharen, abnt clr-fros qtz wi abnt predy dk gy-blk cht grs, p srt, ang-rd, disagg, mnr cons



SIKANNI FORMATION @ 202.6m MD; 339.6m SS

202.6-210 SS s&p, f-vc gr, gritty-sl pbly litharen, abnt clr-fros qtz wi abnt predy dk gy-blk cht grs, p srt, ang-rd, disagg, mnr cons ctgs wi com sp-ptchy calc cmt, mnr qtz ovgths, fining down to sim-below, infr predy g por, rr sp pybit? spks, mnr sp dull-m yel flor, n cut.

210-220 SS sim-abv bcmg fnr, f-m gr, mnr c & tr vc grs, sblitharen grdg-litharen, abnt fros-clr qtz wi com predy dk cht & ltc grs, rr glau, mod srt, ang-rd, predy disagg, mnr cons ctgs wi com-abnt tt silc cmt, mnr sp calc cmt, tr intstl pyr, infr var por: com tt-p wi str fr por, n/s, mnr thn intbd SH.

220-225 SS aa ip, predy v lt gy-brn gy, vf gr, sblitharen wi mnr dk ltc grs & carb spks, tr glau, w srt, ang-sb ang, vary slty ip occy grdg-sdy sltst lams, comy p ind & crmbly wi mnr sp silc cmt, sl arg ip, tt-p por, n/s, mnr thn intbd SH m-dk gy, frm-sft, vary slty & mm grdg-sltst lams, tr hd brn sidc strg.

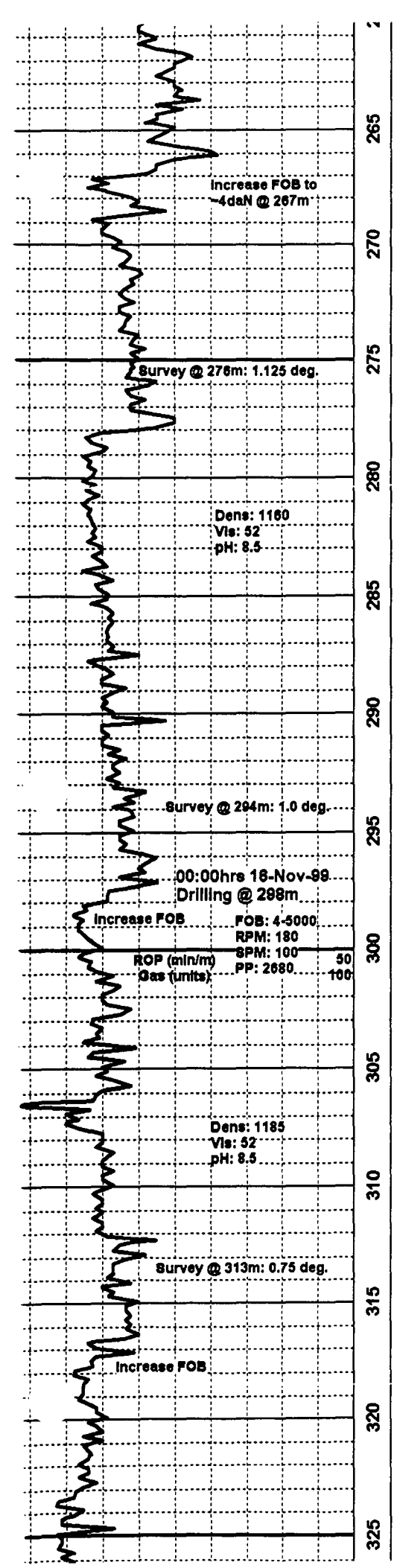
225-231 SS aa bcmg incrly vary arg in mnr pt, incr mnr-com shly & slty lams, tt, n/s.

231-240 SS wi mnr intbd SH; SS sim-abv, off wh-v lt gy, vf gr, sblitharen wi mnr dk ltc grs & carb spks, tr glau, w srt, ang-sb ang, comy mod-p ind wi com silc cmt, tr sp kaol, vary slty & arg ip wi loc com slty & shly lams, predy tt-mnr p por, n/s, mnr thn intbd SH aa.

240-250 SS as prev desc, mnr thn intbd SH aa.

250-261 SS sim-abv, lt-m gy, vf gr, sblitharen wi mnr dk ltc grs & carb spks, rr-tr glau, w srt, ang-sb ang, comy mod-p ind wi com silc cmt, tr sp kaol, incrly vary slty & arg ip wi loc com slty & shly lams, predy tt-mnr p por, n/s, mnr thn intbd SH m-dk gy, frm-sft, vary slty & mm.

261-269 SLTST wi mnr intbd SH & SS; SLTST lt gy-brn gy, qtzs, comy mod ind-mod w ind wi silc cmt, arg ip wi shly lams, comy vary sdy grdg-slty v f ss ip, tr dolc strg-lams, tt, n/s; SS sim-abv but predy slty grdg from sltst; SH aa.



261-269 SLTST wi mnr intbd SH & SS; SLTST lt gy-brn gy, qtzs, comy mod ind-mod w ind wi silc cmt, arg ip wi shly lams, comy vary sdy grdg-slty v f ss ip, tr dolc strg-lams, tt, n/s; SS sim-abv but predy slty grdg from sltst; SH aa.

269-278 SS lt gy, v pale brn ip, vf gr, sblitharen wi mnr dk ltc grs & carb spks, rr-tr glau, w srt, ang-sb ang, comy mod w-loc mod p ind wi predy silc cm, tr sp dolc cmt, cln-vary slty, loc arg ip wi mnr slty & shly lams, tt, n/s.

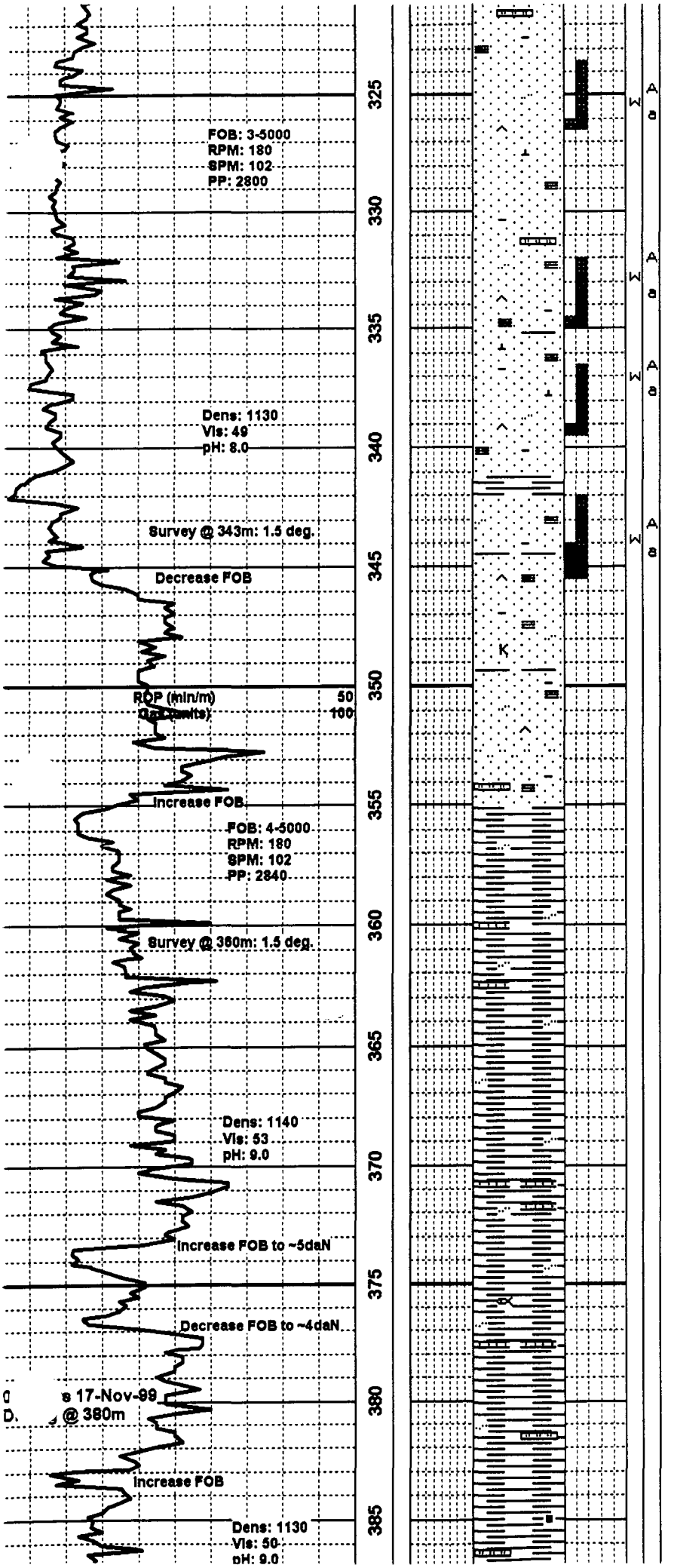
278-290 SS v sim-abv, lt-m gy, vf gr, sblitharen, abnt qtz wi mnr dk ltc grs & carb spks, tr mica, rr-tr glau, w srt, ang-sb ang, mod-p ind wi com silc cmt, vary slty ip, mnr-com arg lams & ptgs, rr carb ptg, tt, n/s.

290-300 SS as prev desc wi decr arg lams.

300-312 SS v sim-abv, lt-m gy, vf gr, sblitharen, abnt qtz wi mnr dk ltc grs & carb spks, tr mica, rr-tr glau, w srt, ang-sb ang, p-mod ind wi com silc cmt, mnr str calc cmt, vary slty ip, mnr-com arg lams & ptgs, rr carb ptg, tt, n/s.

312-323 SS sim-abv, lt-m gy, vf gr, sblitharen, abnt qtz wi mnr dk ltc grs & carb spks, tr mica, rr-tr glau, w srt, ang-sb ang, indn incr sl, com silc cmt, vary slty ip, mnr-com arg lams & ptgs, rr carb ptg, tt, n/s.

323-332 SS sim-abv, lt-m gy, vf gr, sblitharen, abnt qtz wi mnr dk ltc grs & carb spks, tr mica, rr-tr glau, w srt, ang-sb ang, sl decr indn, com silc cmt, mnr str calc cmt, vary slty ip, mnr-com arg



323-332 SS sim-abv, lt-m gy, vf gr, sblitharen, abnt qtz wi mnr dk ltc grs & carb spks, tr mica, rr-tr glau, w srt, ang-sb ang, sl decr indn, com silc cmt, mnr str calc cmt, vary slty ip, mnr-com arg lams & ptgs, rr carb ptg, tt, n/s.

332-336 SS as prev desc wi incr com arg & slty lams, decr tr-mnr str calc-dolc cmt, tt, n/s.

336-341 SS as prev desc wi incr mnr-com calc cmt, decrly ind, com arg & slty lams aa, tt, n/s.

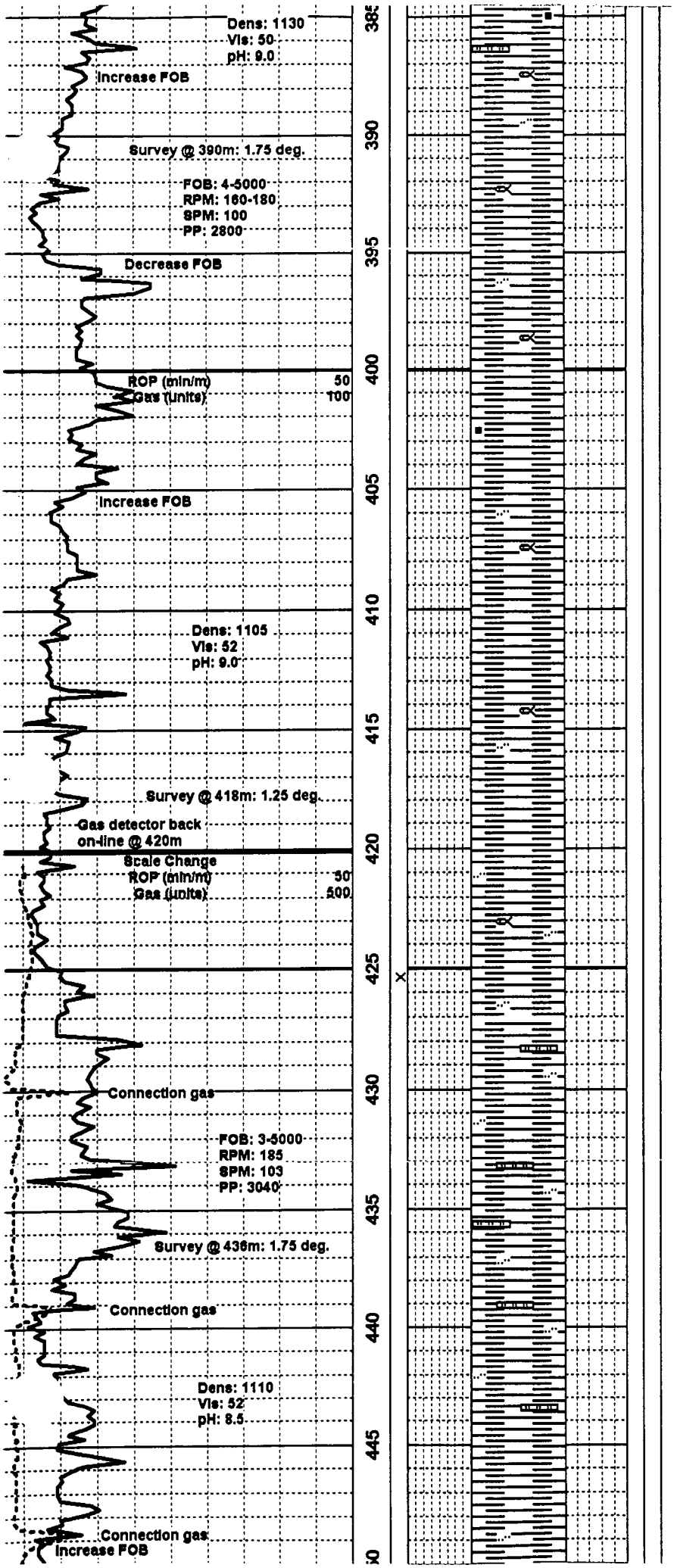
341-355 SS wi mnr intbd SH & SLTST; SS sim-abv, lt-m gy, vf gr, sblitharen aa, incr tr-loc mnr carb spks & deb, tr mica, rr-tr glau, mod-p ind wi com silc cmt, mnr-loc com sp-ptchy kaol, tr sp calc cmt, incrly slty ip grdg-mnr sdy sltst lams & strg, incrly arg ip wi com-abnt arg lams & ptgs, rr carb ptg, predy tt, n/s; mnr SH strg-thn intbd, dk gy, frm, sb plty, predy slty & mm, loc sdy wi slty & sdy lams; SLTST v dk brn, hd, dns, v silc, qtzs wi tr dk ltc grs & carb spks, tt.

LEPINE FORMATION @ 355M MD; 187.2m SS

355-370 SH dk gy, frm-loc hd, comy brit, comy plty-sb plty, sb blky ip, fis-sb fis, v sl slty & fnty mm ip, comy vary slty & mm wi occl slty lams, tr-mnr vf ss strg aa.

370-380 SH v sim-abv, dk gy, predy frm-loc hd, brit ip, predy plty-sb plty, sb blky in mnr pt, fis-sb fis, v sl-non slty & fnty mm in mnr pt, comy vary slty & mm wi occl slty lams, rr glau, rr fsh sc, mnr vf ss strg-v thn intbd.

380-390 SH dk gy-blk, frm, loc sft-hd, occy brit, plty-sb plty, sb blky in mnr pt, fis-sb fis, comy vary slty & mm, carb ip, rr fsh sc, mnr SLTST strg-lams, v qtzs wi tr ltc grs & glau, w-v w ind wi abnt silc & tr-rr sp dolc cmt, loc sdy occy grdg-vf ss strg, tt.



390-401 SH dk gy, frm, plty-sb plty, brit lp, fis, predy fnty mm, loc slty in mnr pt, incr tr fsh sc, tr sltst lams aa.

401-405 SH dk gy, mnr blk, frm, plty-sb plty, flky lp, fis, predy fnty mm, carb in mnr pt, vary slty in mnr pt, rr-tr fsh sc.

405-420 SH dk gy, frm-loc hd, comy brit, predy plty-sb plty, sb blky in mnr pt, fis-sb fis, fnty-mod mm, tr loc slty wi occl slty lams, tr fsh sc.

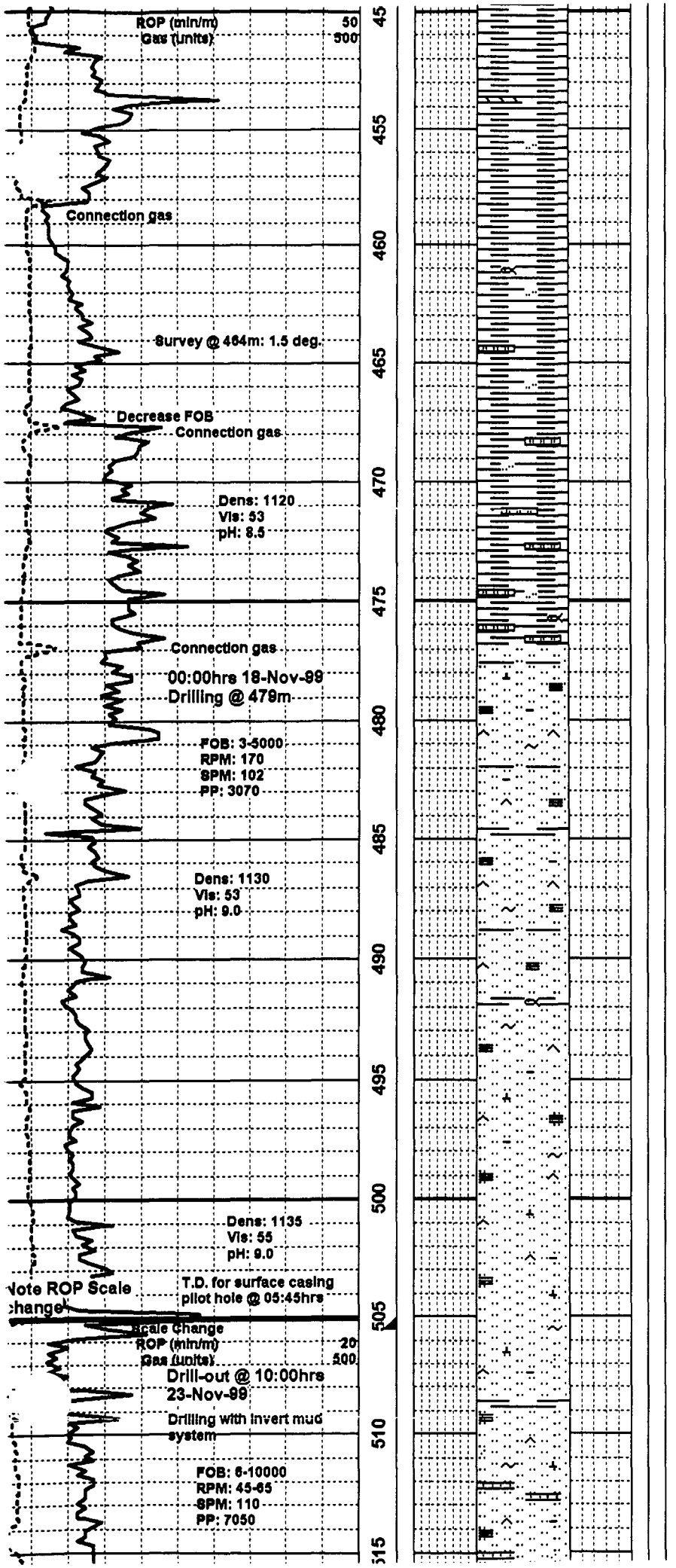
420-428 SS as prev desc bcmg incrly slty in mnr pt.

428-435 SH dk gy, frm-loc hd, sb blky-sb plty, sb fis lp, comy vary slty & mm grdg-mnr arg sltst lams, sm & fnty mm in pt, tr cln wh qtzs sltst-vf ss strg-lams, tr m-dk brn silc sltst lams-strg.

435-440 SH as prev desc wi incr tr wh qtzs sltst-vf ss strg-lams aa, rr fsh sc.

440-445 SH as prev desc wi decr tr sltst-vf ss strg-lams aa, mnr blk carb sh strg.

445-458 SH dk-m gy, frm-v frm, brit lp, predy plty-sb plty, sb blky in mnr pt, fis-sb fis, predy fnty mm, loc vary slty in mnr pt, rr arg sl glauc sltst lams, tr hd dens sidc lams-nods, rr-tr pyr.



458-477 SH dk gy, frm, brit ip, predy sb plty-plty, mnr sb blky, fis, comy sl-loc vary slty & mm, sm & fnty mm in mnr pt, tr off wh-lt brn qtzs sltst lams, tr-mnr m gy arg sltst strg-lams as desc below incr down, rr-tr fsh sc.

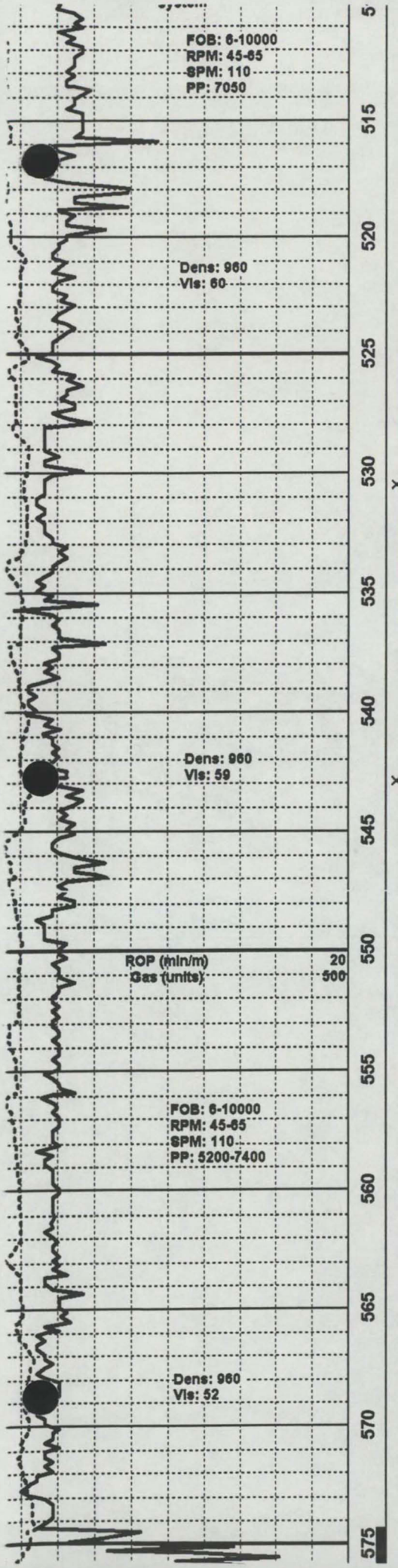
477-487 SLTST wi mnr v thn intbd SH; SLTST lt-m gy, v qtzs wi tr-mnr glau & dk ltc grs, tr-rr mica, cln in mnr pt, predy vary arg wi com-abnt slty arg lams, mod-mod p ind, predy silc cmt wi tr sp calc-dolc cmt, mnr loc abnt str calc cmt, tt, n/s; SH dk gy, frm, sb blky-sb plty, slty & mm wi tr scat glau, v sl dolc ip, grds-arg sltst.

487-501 SLTST v sim-abv, lt-m gy, gy brn, v qtzs aa wi incr mnr-loc com glau, tr-mnr dk ltc grs, rr mica, cln ip, comy vary arg wi com slty arg lams & occl strg, vary ind: comy mod ind to loc p-w ind, predy silc cmt wi tr sp-loc mnr dolc cmt, decr tr-mnr loc com-abnt str calc cmt, tt, n/s, mnr v thn intbd SH v dk gy, frm-v frm, predy brit, plty-sb plty, fis, comy sl slty & mm, loc v slty grdg-arg sltst, v rr fsh sc.

501-505 SLTST as prev desc wi incr mnr dk ltc grs & decr tr-mnr glau, indn & cmts aa wi incr mnr loc com-abnt str calc-dolc cmt, tt, n/s.

505-510 SLTST inferred lithology from abv, spl ~98% cmt.

510-520 SLTST wi intbd SH; SLTST lt-m gy, v qtzs wi tr-mnr-occy loc com glau, tr-mnr dk ltc grs, rr-tr mica, cln ip, comy vary arg wi com slty arg lams & occl strg, sdy in mnr pt grdg-slty vf ss, comy mod-p ind wi com silc cmt, incr mnr-loc com-abnt str calc-dolc cmt, tt wi tr str p por, n/s; SH dk gy, frm, sb blky-occy sb plty, v slty & mm grdg-arg sltst, tr-mnr glau.



510-520 SLTST wi intbd SH; SLTST lt-m gy, v qtzs wi tr-mnr-occy loc com glau, tr-mnr dk ltc grs, rr-tr mica, cln ip, comy vary arg wi com slty arg lams & occl strg, sdy in mnr pt grdg-slty vf ss, comy mod-p ind wi com silc cmt, incr mnr-loc com-abnt str calc-dolc cmt, tt wi tr str p por, n/s; SH dk gy, frm, sb blky-occy sb plty, v slty & mm grdg-arg sltst, tr-mnr glau.

520-528 SLTST as prev desc bcmg incrly cln in pt, indn decr to p-mod, decr tr calc cmt, tr bentc cly mtx, incrly sdy in pt grdg-SS: v lt-lt gy, vf gr, slty, v qtzs wi mnr-loc com glau, tr-mnr dk ltc grs, w srt, ang-sb ang, mod-p ind wi com silc cmt & tr sp calc cmt, tt-p por, n/s, mnr SH aa.

528-535 SS wi mnr intbd SLTST; SS lt-m gy, vf gr, comy vary slty grdg-sltst ip, v qtzs (sblitharen) wi mnr glau, tr-mnr ltc grs, w srt, ang-sb ang, cln ip, vary arg ip wi mnr-com slty arg lams, comy p ind & crmbly-fri, mod ind ip, predy com silc cmt, mnr sp kao, tr loc com str calc cmt, tr-mnr qtz ovgths, predy tt, mnr p-occy fr por, n/s; SLTST aa.

535-540 SS wi intbd SLTST; SS aa, SLTST as prev desc bcmg incrly vary arg wi com-abnt arg lams, mod-p ind wi cmts aa, tt, n/s.

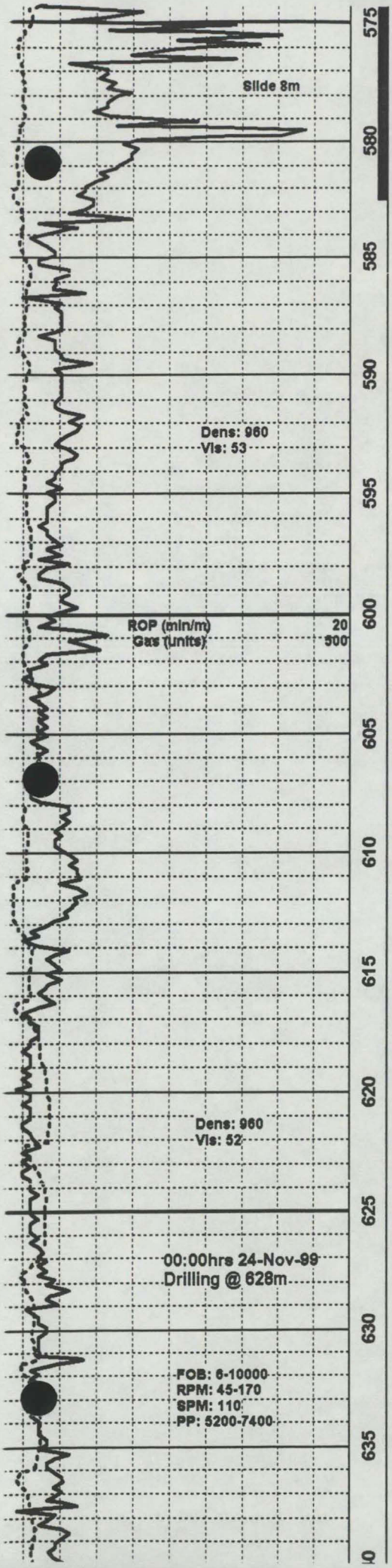
540-550 SS as prev desc, incrly slty ip grdg-sltst, incrly arg ip wi com slty arg lams, p ind aa ip, mod-mod w ind ip wi predy silc cmt, predy tt, mnr str p-occy fr por, n/s, mnr v thn SH intbds-strg.

550-560 SLTST m-dk gy, qtzs wi mnr glau, predy arg grdg-v slty sh ip, sdy in pt wi mnr slty vf ss lams & strg, p-mod ind wi silc cmt, tt, n/s.

560-566 SLTST as prev desc bcmg incrly cln & sdy ip grdg-slty ss.

566-572 SS wi intbd SLTST; SS as prev desc wi incr indn; comy mod ind, loc p-w ind, predy silc cmt wi tr-loc mnr sp kao, predy tt, n/s; SLTST aa.

572-581 SH wi intbd SLTST; SH v dk-dk gy, frm-loc hd, sb blky-sb plty, sb fis ip, predy vary slty & mm grdg-arg sltst ip, carb ip; SLTST as prev desc.



581-594 SS wi intbd SLTST; SS v sim-prev desc, lt-m gy, vf gr, comy vary slty grdg-sltst ip, v qtzs (sblitharen) wi mnr-loc com glau, tr-mnr ltc grs, w srt, ang-sb ang, cln- vary arg ip wi mnr-com slty arg lams, comy mod-mod w ind wi predy silc cmt, mnr str calc-dolc cmt, predy tt, n/s; SLTST as prev desc, SLTST m-dk gy, qtzs wi mnr glau, predy arg-occy cln grdg-v slty sh ip, sdy in pt wi mnr slty vf ss lams & strg, p-mod ind wi silc cmt, tt, n/s.

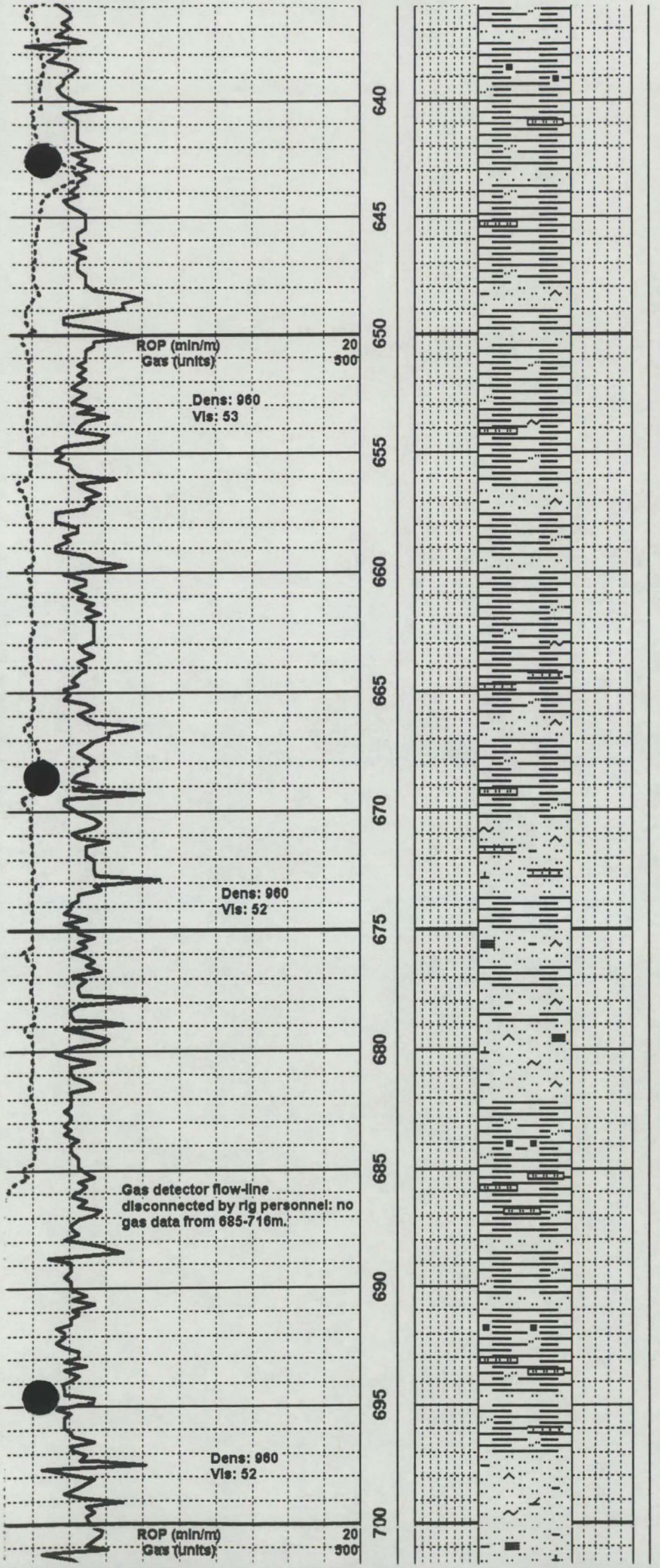
594-608 SH wi mnr intbd SLTST; SH dk gy-blk, frm-hd, brit ip, sb blky-sb plty, fis ip, comy sl slty & mm, v slty ip grdg-arg sltst lams & strg, carb ip, tr glau, SLTST as prev desc.

608-616 SLTST as prev desc, m-dk gy, qtzs wi mnr glau, predy arg-occy cln grdg-v slty sh ip, sdy in pt wi mnr slty vf ss lams & strg, p-mod ind wi silc cmt, tt, n/s, mnr thn intbd SH aa.

616-625 SH as prev desc, dk gy-blk, frm-hd, brit ip, sb blky-sb plty, fis ip, comy sl slty & mm, v slty ip grdg-arg sltst lams & strg, carb ip, tr glau, mnr intbd SLTST aa.

625-635 SH as prev desc.

635-648 SH v sim-abv, dk gy-blk, frm-hd, brit ip, sb blky-sb plty, fis ip, sl slty ip, incrly slty & mm ip, incrly grdg-arg sltst lams & strg, carb ip, tr glau, incr mnr intbd arg SLTST aa.



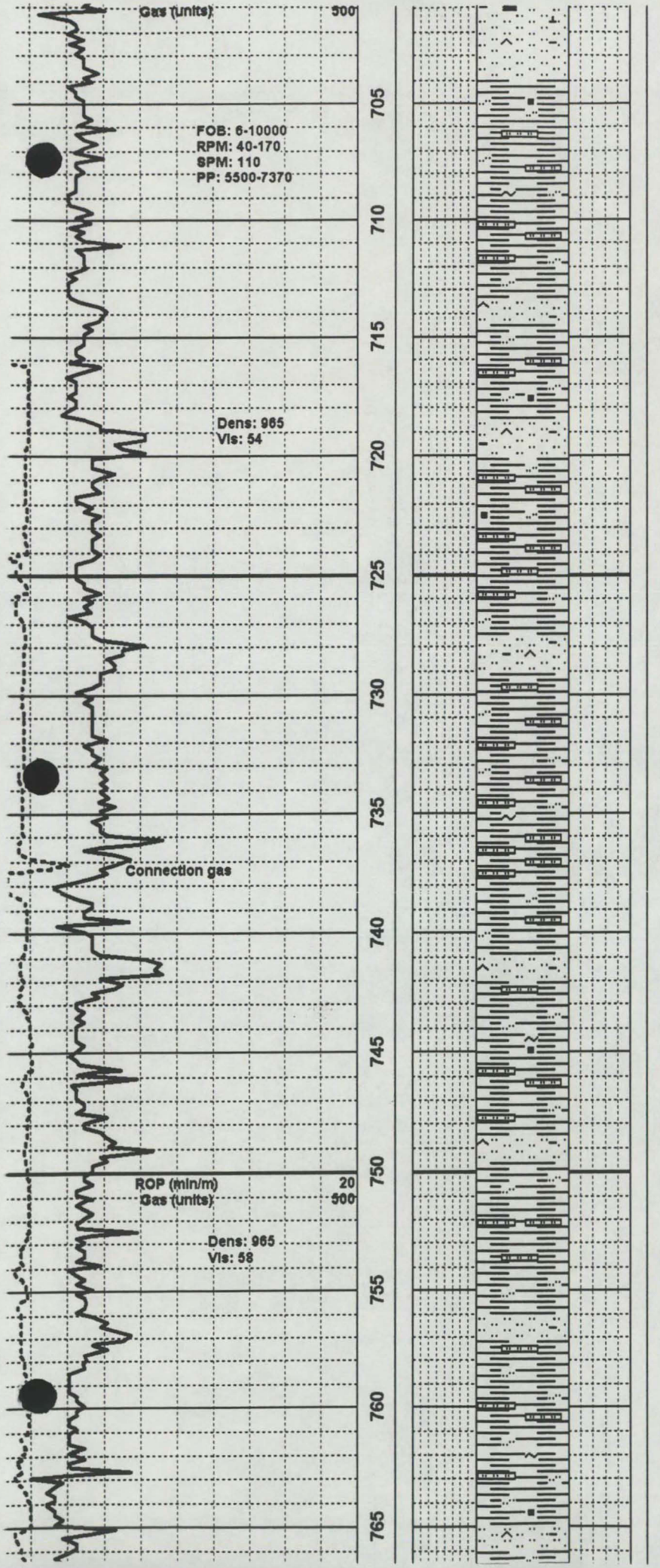
fis ip, sl slty ip, incrly slty & mm ip, incrly grdg-arg sltst lams & strg, carb ip, tr glau, incr mnr intbd arg SLTST aa.

648-665 SH wi intbd SLTST; SH dk gy, frm-hd, brit ip, blky-sb blky, occy sb plty, fis in mnr pt, predy slty & mm grdg-arg sltst ip, tr-mnr glau; SLTST sim-prev desc, m-dk gy, qtzs wi mnr glau, predy arg-occy cln grdg-v slty sh ip, loc sdy occy grdg-slty ss lams-strgs, p-mod ind wi silc cmt, tt, n/s.

665-682 SLTST wi intbd SH; SLTST sim-prev desc, predy m-dk gy, mnr lt gy, qtzs wi mnr glau & tr mica, predy vary arg grdg-slty sh ip, mnr arg lams, loc cln & sdy grdg-slty ss lams-strgs, predy mod-mod w ind wi com silc cmt, mnr loc com str calc-dolc cmt, tt, n/s; SH as prev desc grdg from SLTST.

682-697 SH wi mnr intbd SLTST; SH dk gy-blk, frm-hd, predy sb blky-blky, mnr sb plty, sb fis in mnr pt, carb ip, predy vary slty & mm grdg-arg sltst ip, com slty lams, tr glau, tr v f ss lams; SLTST aa.

697-704 SLTST sim-prev desc, predy m-dk gy, mnr lt gy, qtzs wi tr-mnr glau, predy vary arg grdg-slty sh ip, mnr arg lams, cln in mnr pt, mod-p ind wi com silc cmt, mnr str calc-dolc cmt, tt, n/s, mnr dk brn hd dns v dolc sltst strg, mnr thn intbd sh aa.



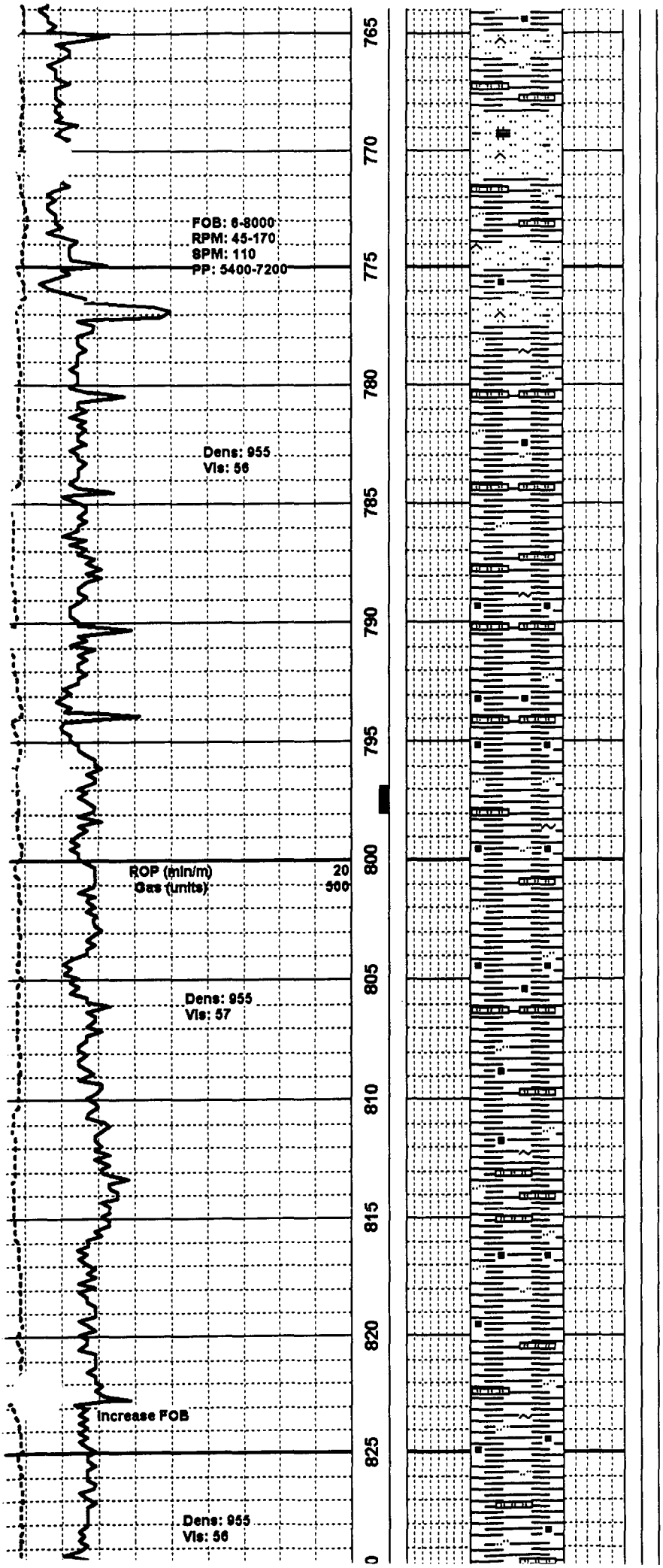
704-718 SH wi mnr intbd SLTST, SH dk gy-blk, frm-hd, sb blky-sb plty, sb fis-fis ip, carb in mnr pt, predy slty-v slty & mm grdg-arg sltst ip, com slty lams, tr-loc mnr glau; SLTST as prev desc w/o v dolc strgs.

718-743 SH wi intbd SLTST; SH as prev desc bcmg incrly slty & incrly comy grdg-arg sltst; SLTST sim-prev desc, predy dk gy, qtzs wi tr-mnr glau, predy vary arg grdg-slty sh ip, cln in mnr pt wi mnr arg lams, mod-mod w ind wi com silc cmt, mnr str calc-dolc cmt, tt, n/s, rr-tr dk brn hd dns v dolc sltst strg.

743-758 SH wi mnr intbd SLTST; SH dk gy-blk, frm-hd, sb blky-sb plty, sb fis-fis ip, carb in mnr pt, predy slty-v slty & mm grdg-arg sltst ip, com slty lams, tr-loc mnr glau; SLTST as prev desc grdg from SH ip.

758-763 SH as prev desc wi tr vf ss lams wi silc & dolc cmt.

763-775 SH wi intbd SLTST; SH as prev desc, dk gy-blk, frm-hd, sb blky-sb plty, sb fis-fis ip, carb in mnr pt, predy slty-v slty & mm incrly grdg-arg sltst ip, com slty lams, tr-loc mnr glau; SLTST as prev desc grdg from SH ip, tr vf ss lams wi silc & dolc cmt.



sb blky-sb plty, sb fis-fis ip, carb in mnr pt, predy slty-v slty & mm incrly grdg-arg sltst ip, com slty lams, tr-loc mnr glau; SLTST as prev desc grdg from SH ip, tr vf ss lams wi silc & dolc cmt.

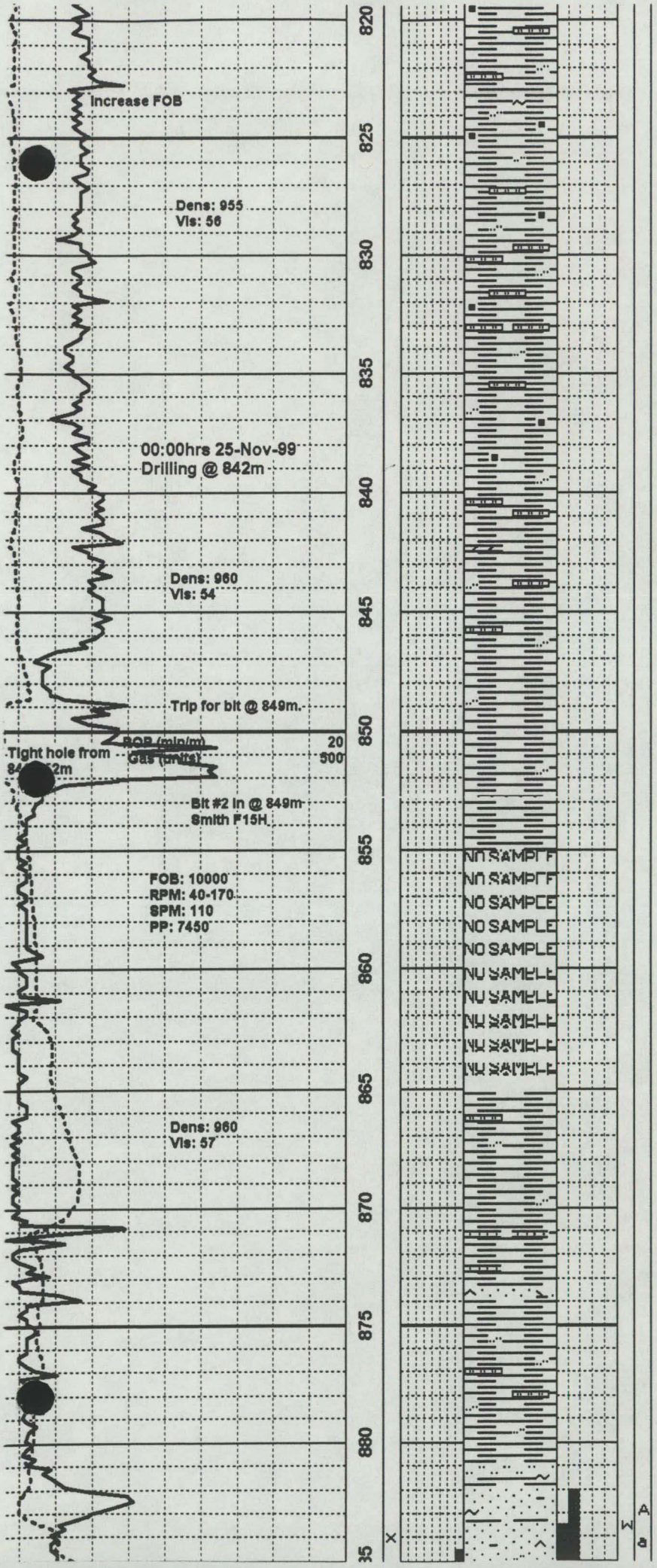
775-785 SLTST wi mnr intbd SH; SLTST sim-abv, predy dk gy, qtzs wi mnr glau, predy arg wi com arg lams & strg, occy cln & sdy grdg-slty ss lams, comy mod-mod w ind, p ind ip, silc & mnr str dolc-calc cmt, tt, n/s; SH aa.

785-795 SH wi mnr intbd SLTST; SH dk gy-blk, frm-hd, brit ip, sb plty-sb blky, fis ip, comy sl slty & incrly carb ip, vary slty & mm ip grdg-arg sltst, tr glau; SLTST dk-lt gy, v qtzs wi mnr glau, comy vary arg, cln & sdy ip grdg-mnr slty ss, p-mod ind wi silc & dolc cmt, tt, n/s.

795-810 SH v sim-abv, dk gy-blk, frm-hd, brit ip, sb plty-sb blky, fis ip, comy carb, comy vary slty & mm, grds-arg sltst in mnr pt, tr glau, decr mnr v thn intbd sltst aa.

810-825 SH sim-prev desc, dk gy-blk, frm-hd, brit ip, sb plty-sb blky, fis ip, comy carb, comy vary slty & mm, grds-arg sltst in mnr pt, tr glau, tr dk brn hd dns sid strg-nod.

825-835 SH dk gy-blk, frm-hd, brit ip, sb plty-sb blky, fis ip, comy carb, comy vary slty & mm, incrly grdg-arg sltst ip, tr glau, tr m gy hd vf ss lams, rr-tr dism & fram pyr.



825-835 SH dk gy-blk, frm-hd, brit ip, sb plty-sb blky, fis ip, comy carb, comy vary slty & mm, incrly grdg-arg sltst ip, tr glau, tr m gy hd vf ss lams, rr-tr diam & fram pyr.

835-847 SH aa wi rr-tr hd dns dk brn gy v slty dol strg, rr sid lam-nod.

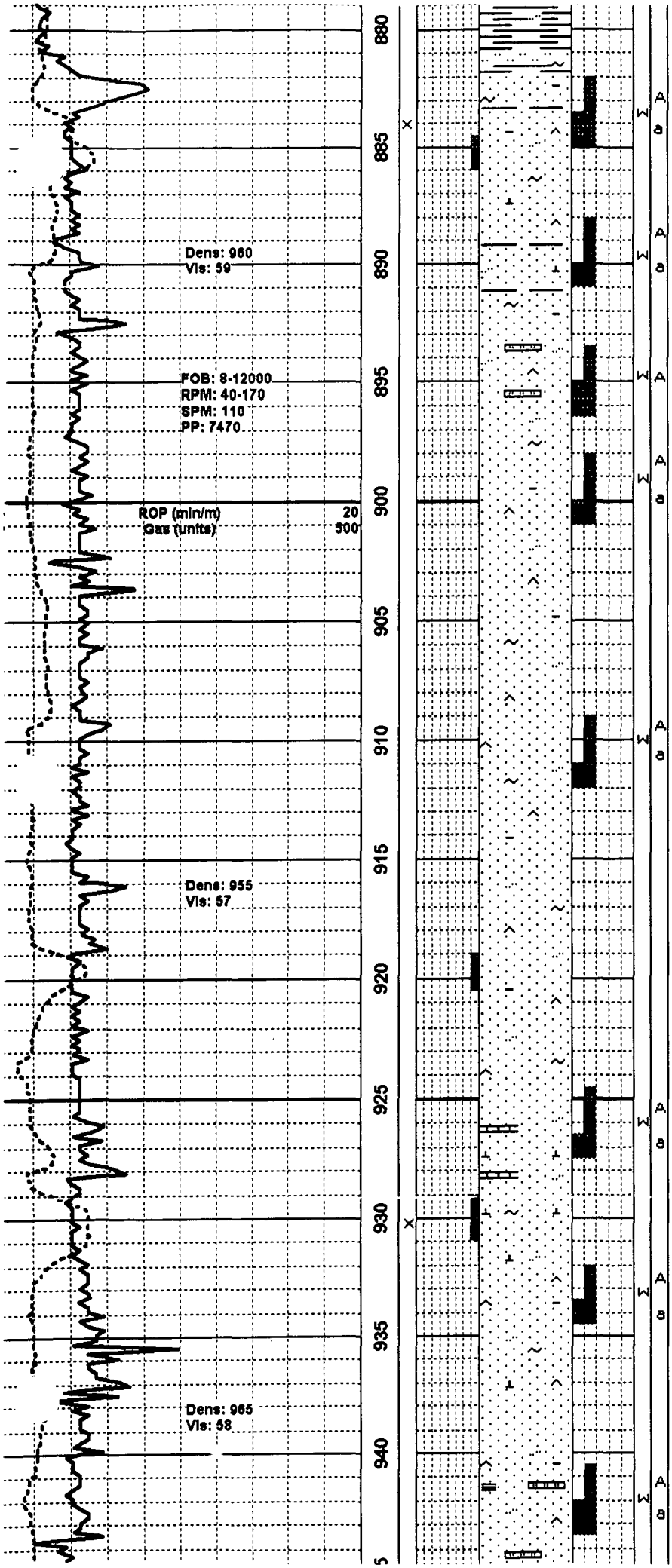
847-855 SH predy dk gy, mnr blk, frm-hd, comy brit, plty-sb plty, fis, mnr sb blky, comy sm & fnty mm, vary slty aa ip.

855-865 No samples caught.

865-881 SH v sim-prev desc, predy dk gy, mnr blk, frm-hd, comy brit, plty-sb plty, fis, mnr sb blky, comy sm & fnty mm, incrly vary slty grdg-arg & occy cln sltst ip, tr glau, mnr v thn intbd SS; lt-m gy, vf gr, qtzs, hd, dns, mod-w ind wi silc & dolc cmt, tt.

SCATTER FORMATION @ 881m MD; -338.8m SS

881-886 SS lt-m gy, occy brn gy, vf gr, qtzs wi mnr-com-loc abnt glau, mnr dk ltc grs, w srt, ang-sb ang, vary slty grdg-sdy sltst ip, comy cln-vary arg ip wi tr-mnr arg lams, occl glauc lam, comy mod ind, loc p-w ind, com str calc-dolc cmt, mnr-com str silc cmt, tt-str p por, n/s; mnr intbd SH frm-loc sft, sb plty, sb fis, sl slty &



SCATTER FORMATION @ 881m MD; -338.8m SS

881-886 SS lt-m gy, occy brn gy, vf gr, qtzs wi mnr-com-loc abnt glau, mnr dk ltc grs, w srt, ang-sb ang, vary slty grdg-sdy sltst ip, comy cln-vary arg ip wi tr-mnr arg lams, occl glauc lam, comy mod ind, loc p-w ind, com str calc-dolc cmt, mnr-com str silc cmt, tt-str p por, n/s; mnr intbd SH frm-loc sft, sb plty, sb fis, sl slty & mm ip, v slty & glauc ip grdg-sltst ip.

886-893 SS sim-prev desc wi decr mnr scat glau & incr mnr dk ltc grs, tr mica, vary indn aa wi com str silc & calc-dolc cmt, predy tt wi mnr str p por, n/s, mnr v thn intbd sh aa.

893-897 SS sim-prev desc, lt-m gy, vf gr, comy var slty grdg-sdy sltst ip, qtzs wi mnr glau, mnr dk ltc grs, w srt, ang, comy cln-vary arg wi mnr arg lams, mnr slty lams, comy mod-loc p ind wi silc cmt, predy tt, n/s.

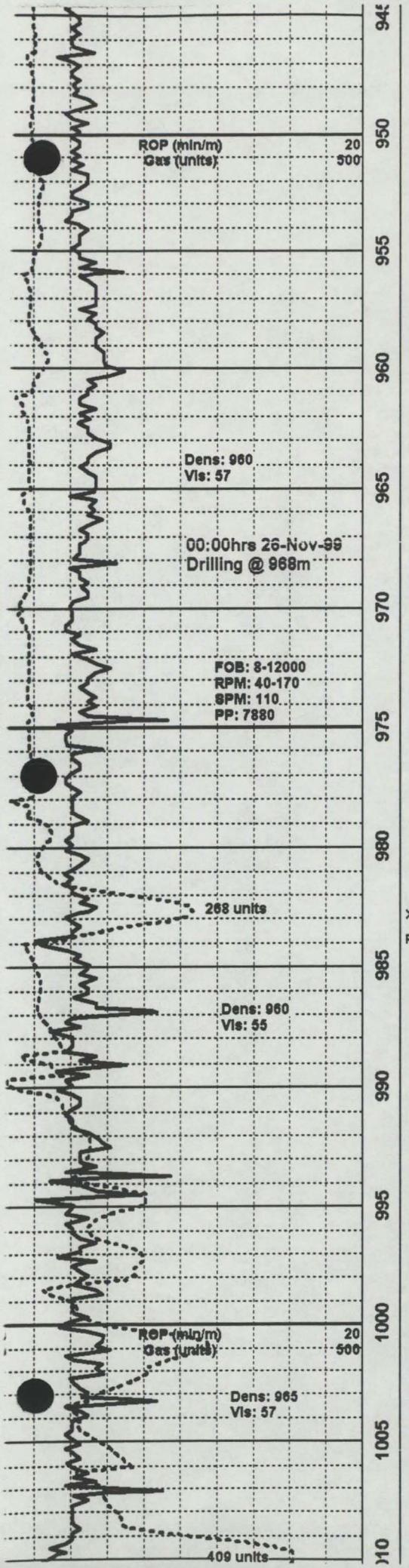
897-909 SS sim-prev desc bcmg decrly slty, predy cln, mnr arg lams, mod-p ind wi com silc cmt & tr str dolc-calc cmt, rr-tr intstl pyr, tt wi str p por, n/s.

909-926 SS lt gy, vf gr, qtzs wi mnr glau, mnr dk ltc grs, w srt, ang-sb ang, predy cln & vary slty, loc sl-mod arg wi mnr arg lams, predy mod ind, loc w-p ind, predy silc cmt, tr dolc-calc cmt, incr tr-loc mnr intstl pyr, tt-str p por, n/s.

926-932 SS lt-m gy, gy brn, vf gr, qtzs wi mnr glau, mnr dk ltc grs, w srt, ang-sb ang, predy cln & vary slty wi mnr slty lams, incrly arg in mnr pt wi mnr arg lams, p-mod ind wi abnt calc cmt, tt wi mnr str p por, n/s, tr dk brn dns crpxl ls lams-strg.

932-940 SS lt gy, vf gr, qtzs wi mnr glau, mnr dk ltc grs, w srt, ang-sb ang, predy cln, loc sl-mod arg wi mnr arg lams, predy mod ind, predy silc cmt, mnr str calc cmt, predy tt, n/s.

940-955 SS lt-m gy, vf gr, qtzs aa, w srt, ang-sb ang, comy mod-v slty grdg-sdy sltst ip, comy vary arg wi mnr-loc com arg lams, mod-p ind wi silc & mnr calc cmt, tt, n/s.



955-960 SS v sim-prev desc bcmg decrly arg in mnr pt, decrly slty.

960-965 SS as prev desc bcmg incrly arg ip wi incr mnr arg lams.

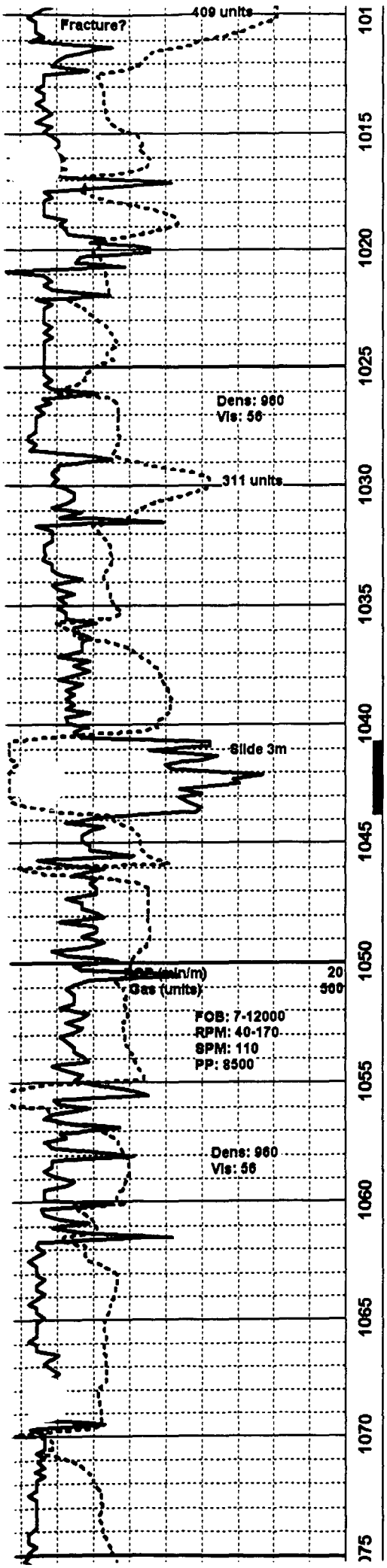
965-975 SS lt-m gy, vf gr, qtzs aa, w srt, ang-sb ang, comy mod-v slty grdg-sdy sltst ip, comy vary arg wi mnr-loc com arg lams, mod-p ind wi silc & mnr calc cmt, n vis por, n/s.

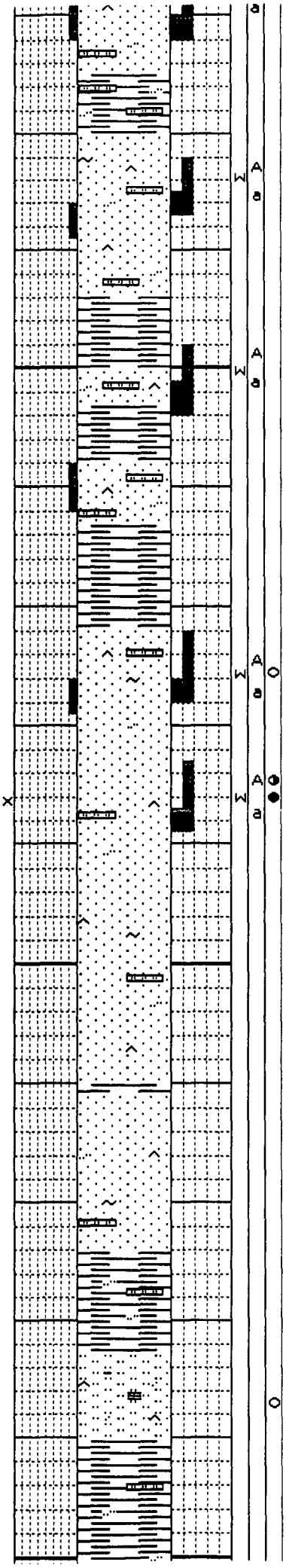
975-981 SS sim-prev desc bcmg comy arg wi incr mnr arg lams & strgs, incrly grdg-sdy sltst ip.

981-995 SS aa in mnr pt, predy lt-m brn, lt gy, vf gr, qtzs wi mnr-loc com glau, tr-mnr dk ltc grs, w srt, ang-sb ang, predy vary slty grdg-sdy sltst ip, pred cln, vary arg ip wi mnr-loc com arg lams & strgs, p-mod ind, fri in mnr pt, silc cmt, tr calc cmt, predy n vis por, mnr str p-tr fr por, tr-mnr sp v dull flor, rr-tr v wk ques cut, rr mic frac wi fib calc fill & dism pyr, tr pyr nods.

995-1006 SS sim-abv, predy lt brn, vf gr, qtzs wi mnr-loc com glau, tr-mnr dk ltc grs, w srt, ang-sb ang, predy vary slty grdg-sdy sltst ip, pred cln, vary arg ip wi mnr-loc com arg lams & strgs, p-mod ind, silc cmt, tr calc cmt, predy n vis por, mnr str p-v p por, tr-mnr sp dull yel gld flor, tr-mnr v wk v thn stmg cut, tr-mnr thn intbd SH.

1006-1015 SS wi intbd SH; SS sim-prev desc, lt-m gy brn, qtzs aa, bcms incrly arg & slty grdg-incr sdy sltst ip, com slty arg lams & strgs, incr tr-mnr pyr nods, comy p ind, mod ind ip, silc cmt, incr mnr sp dull yel gld flor, rr-tr cut aa, predy n vis por; SH dk-v dk gy, frm-hd, sb blky-sb plty, predy v slty comy grdg-arg sltst, sl





gy, frm-hd, sb blky-sb plty, predy v slty comy grdg-arg sltst, sl glauc ip.

1015-1022 SS sim-abv, lt-m gy brn, brn gy, qtzs aa, vary slty grdg-sdy sltst ip, decr vary arg in mnr pt, incr tr-mnr pyr nods, comy mod-loc p ind, silc cmt, tr-mnr calc cmt, predy n vis por, tr-mnr str p por, tr v dull flor, n cut.

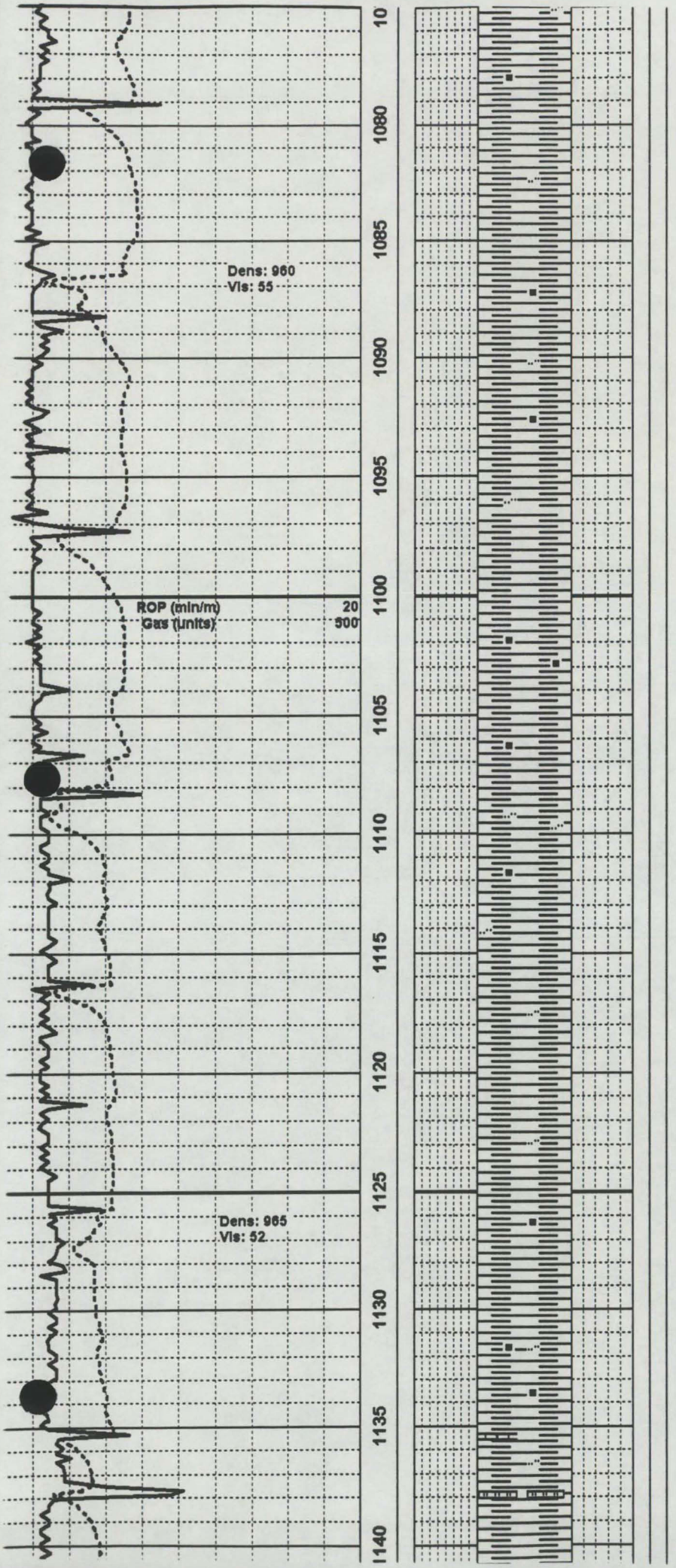
GARBUTT FORMATION @ 1022m MD; -479.8 m SS

1022-1036 SH wi intbd SS; SS as prev desc comy grdg-sltst, decr tr pyr nods, por & shows as prev desc; SH dk gy, frm, comy brit, sb plty, sb fis, sl slty & fnty mm ip.

1036-1040 SS as prev desc bcmg incrly cln in mjr pt, decrly slty grdg-mnr sltst, mod-p ind wi silc cmt, predy n vis por, incr mnr v dull flor, incr mnr slo yel gn stmg cut.

1040-1062 SS lt brn, vf gr, v qtzs wi decr tr-mnr glau, mnr dk ltc grs, w srt, ang-sb ang, predy vary slty grdg-sdy sltst in mnr pt, pred cln, loc sl arg wi tr arg lams, comy p-loc mod ind wi silc cmt, tr intstl pyr, predy n vis por, infr com str v p-p por, com-abnt unevn lt brn o stn, mnr-loc com v dull flor, mnr-com slo wk yel-yel gn stmg cut, mnr v thn intbd SH as desc below.

1062-1077 SH wi intbd SLTST; SLTST lt-m brn, brn gy, qtzs aa, sdy grdg-slty SS ip, cln-vary arg wi mnr-com arg lams, comy mod-loc mod w ind wi silc cmt, n vis por, tr v dull ques flor, tr v slo yel gn cut; SH dk gy, comy frm, loc sft-hd, sb blky-sb plty, brit ip, sb fis-fis ip, vary slty & mm ip wi mnr-loc com slty lams, sl slty & fnty mm ip.



1077-1085 SH dk gy-occy blk, frm-v frm, comy brit, sb plty-sb blky, comy sb fis-fis, comy sm & fnty mm, carb in mnr pt, sl slty ip.

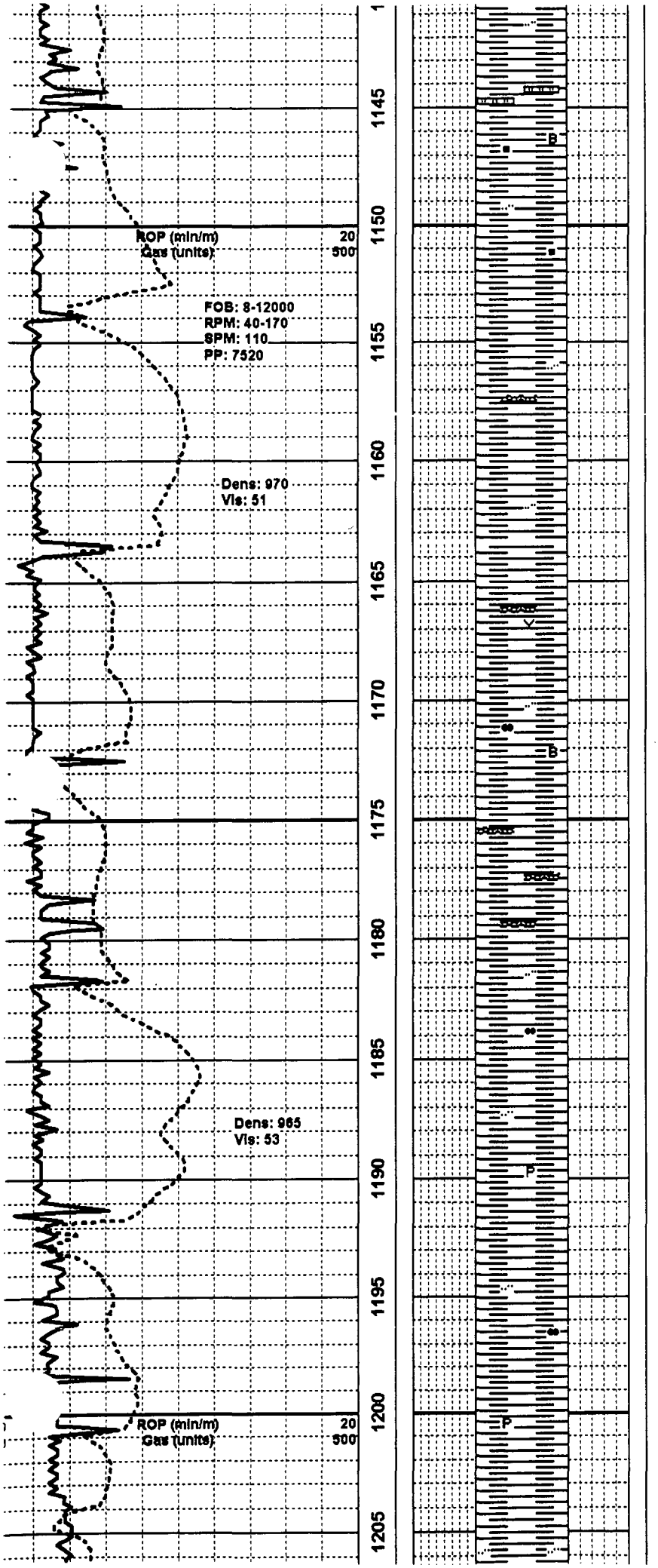
1085-1100 SH sim-abv, dk gy-mnr blk, frm-v frm, comy brit, plty-sb plty, fis-sb fis, predy sm &v fnty mm, carb in mnr pt, loc sl slty in mnr pt, tr slty lams.

1100-1120 SH v sim-abv, dk gy-mnr blk, frm-v frm, comy brit, plty-sb plty, fis-sb fis, predy sm &v fnty mm, incrly carb in mnr pt, incrly sl-loc mod slty in mnr pt, tr slty lams.

1120-1130 SH as prev desc, dk gy-mnr blk, frm-v frm, comy brit, plty-sb plty, fis-sb fis, predy sm &v fnty mm, carb in mnr pt, loc sl slty in mnr pt, tr slty lams.

1130-1138 SH dk gy-blk, comy frm, loc hd-sft, comy plty-sb plty, sb blky ip, brit ip, predy fis, sm & fnty mm ip, comy sl-loc mod slty wi mnr sltst lams, vary carb ip, rr-tr dk brn dns crpxl ls lam-strg, v rr wh tuffac bent.

1138-1154 SH dk gy-blk, frm, comy brit, plty-sb plty, mnr sb blky, fis, predy sm, fnty mm ip, tr slty wi lams, carb ip, rr lt gy-wh-tan-gn bent, tuffac ip.



GARBUTT RADIOACTIVE MARKER @ 1154m MD; -611.8m SS

1154-1164 SH v sim-abv, dk gy-blk, frm-loc hd, comy brit, plty-sb plty, occy sb blky, fis, predy sm, sl-mod slty & fnty mm in mnr pt, incrly comy carb ip, tr scat carb deb, incr tr wh-lt gy-crm bent, tuffac ip.

1164-1168 SH aa wi incr tr wh-lt gy-occy crm bent, predy v tuffac wi com biot & abnt xtal frags grdg-bentc ss.

1168-1173 SH predy aa wi mnr v dk brn blk frm-sft sl blt-phos SH, decr tr predy lt gy-wh bent, sl tuffac ip.

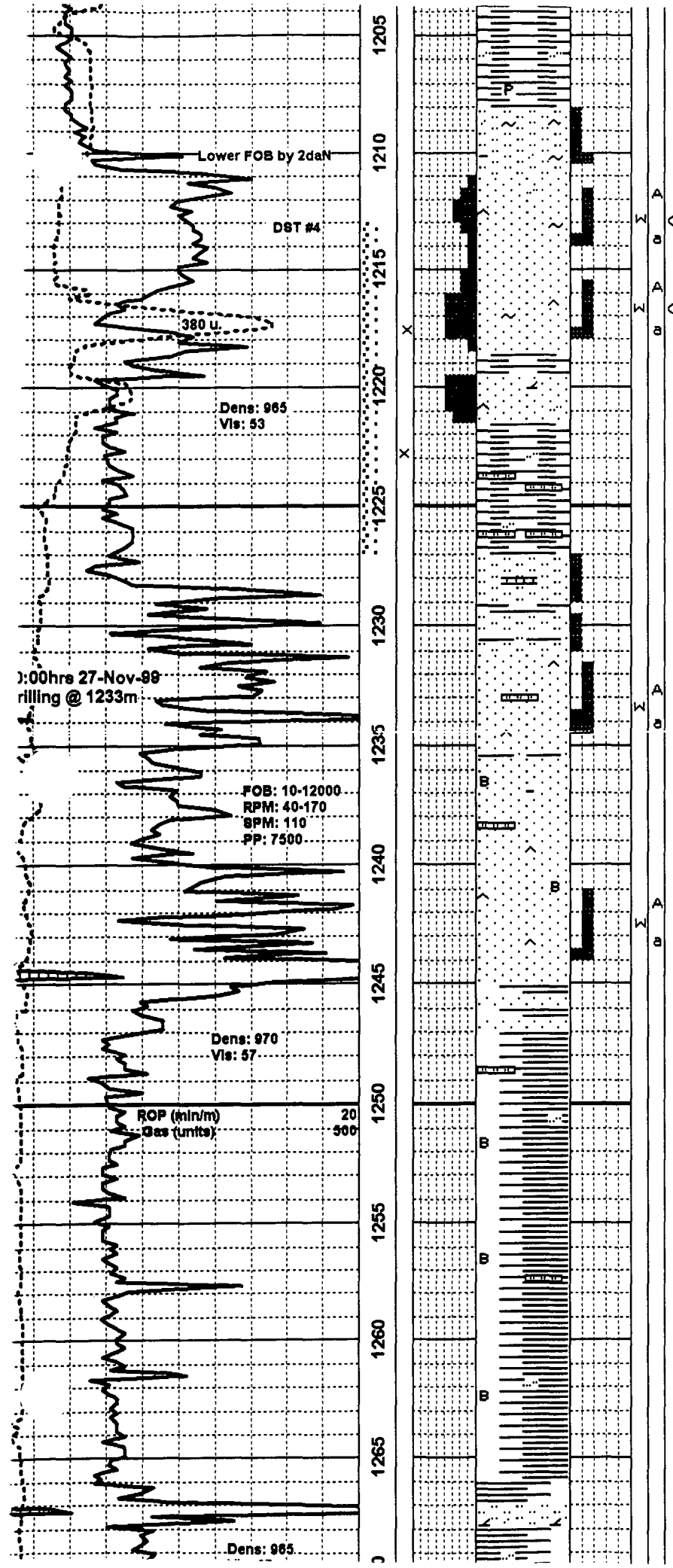
1173-1182 SH as prev desc wi incr mnr wh-crm-occy lt gy bent, comy sl tuffac, occy v tuffac grdg-bentc ss.

1182-1191 SH dk gy ip, comy brn blk-blk, frm, loc sft-occy hd, plty-sb plty, loc flky, fis-loc v fis, comy sm, sl slty ip, blt-phos in mnr pt, tr pyr nods, decr tr crm-wh bent.

1191-1203 SH as prev desc wi rr-tr phos deb.

1203-1208 SH dk gy-blk, frm-hd, sb blky-sb plty, sb fis ip, comy v fnty mm, sl slty in mnr pt, incr tr pyr nods, tr loc com biot, v rr slicks?

QUINKEU SILTSTONE @ 1208m MD; -665.8m SS



fnty mm; sl sty in mnr pt, incr tr pyr nods, tr loc com blot, v rr slicks?

CHINKEH SILTSTONE @ 1208m MD; -665.8m SS

1208-1211 SLTST lt-dk gy, qtzs wi mnr-loc com glau, comy vary sdy, cln-loc v arg, var indn: comy mod ind, loc p-w ind, silc & dolc cmt, n vis por, n/s.

CHINKEH SANDSTONE @ 1211m MD; -668.8m SS

1211-1216 SS off wh-v lt gy, v f gr, v qtzs wi mnr scat glau & tr ltc grs (sblitharen-sbqtzaren), w srt, ang-sb ang, cln, slty ip, vary ind: comy p ind & crmbly, mod-w ind ip, silc & mnr dolc cmt, mnr-com qtz ovgths, var por; fr-p wi tt strks, mnr-com v fnt flor, mnr v slo fnt yel stmg cut, mnr intbd sh.

1216-1222.5 SS v sim-abv, off wh-v lt gy, mnr v pale brn, v f gr, v qtzs wi mnr scat glau & tr ltc grs (sbqtzaren), w srt, ang-sb ang, cln, sl slty ip, decr vary ind: incrly comy p ind & crmbly, mod ind ip, silc & mnr dolc cmt, com-loc abnt qtz ovgths, var por; com fr wi tr-mnr str g por, p-v p vis por ip, com fnt yel gn flor, tr v slo wk stmg cut.

TRIASSIC @ 1222.5m MD; -680.3m SS

1222-1227 SH comy m-lt gy, rusty brn in mnr pt, sb plty-sb blky, v frm-hd, comy brit, sm & v fnty mm ip, vary slty & mm ip grdg-arg sltst.

1227-1231 SLTST m-lt gy, v qtzs wi mnr dk spks, vary mm wi occl micac ptg, cln ip, comy sl-mod arg, pred mod w-mod ind wi silc cmt, sl sdy ip occy grdg-ss, n vis por, n/s, mnr intbd sh aa.

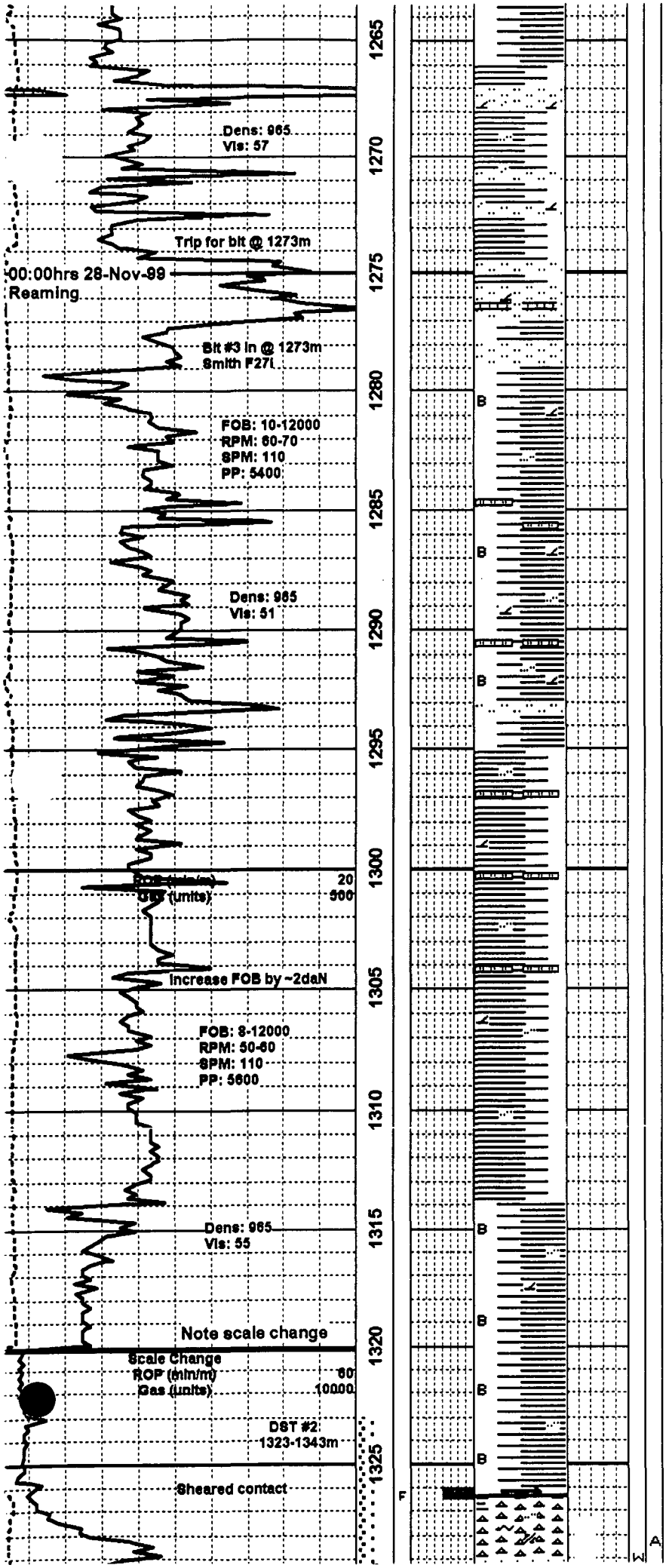
1231-1240 SS off wh-v lt gy, vf gr, v qtzs wi mnr dk ltc grs & carb spks, rr carb deb, w srt, ang-sb ang, vary slty occy grdg-sdy sltst, pred cln, loc sl arg, comy mod ind, loc p-w ind, silc cmt, mnr-loc com bentc cly mtx, tt, n/s, mnr thn intbd SH aa.

1240-1247 SS sim-abv, lt gy, mnr pale orng red, vf gr, v qtzs aa, w srt, ang-sb ang, comy cln-loc sl arg, comy mod w-w ind, loc mod p ind, com silc cmt, incr mnr-loc com smectitic cly mtx, tr sp dolc cmt, sl slty ip, tt, n/s, mnr intbd sh as bel.

1247-1258 SH pred red brn wi mnr intbd-interlam m gy, frm-hd, pred brit, sb plty-sb blky, vary 'bentc' ip (abnt red cly in wash), comy sb fis-fis, vary slty in mnr pt, tr m gy qtzs arg sltst lams.

1258-1266 SH v sim-abv bcmg brn rusty red, mnr intbd & interlamd m gy sh aa, incrly plty & fis.

1266-1279 SH wi intbd SLTST; SH m-dk gy, frm-v frm, sb blky-sb plty, mnr plty, brit in mnr pt, comy sb fis-fis, sl slty in mnr pt; SLTST lt-m gy, blky, v qtzs wi mnr dk spks, loc sl micac, predy cln-sl arg, sdy ip grdg-mnr slty ss, comy mod-w ind, loc p ind in mnr pt, pred dolc cmt, tr diam pyr, tt, n/s.



1266-1279 SH wi intbd SLTST; SH m-dk gy, frm-v frm, sb blky-sb plty, mnr plty, brit in mnr pt, comy sb fis-fis, sl slty in mnr pt; SLTST lt-m gy, blky, v qtzs wi mnr dk spks, loc sl micac, predy cln-sl arg, sdy ip grdg-mnr slty ss, comy mod-w ind, loc p ind in mnr pt, pred dolc cmt, tr dism pyr, tt, n/s.

1279-1284 SH mar-rusty red, plty-sb plty, fis, frm-v frm, loc sft, occy brit, predy sm & fnty mm, loc sl slty wi occl slty lams, vary 'bentc' (abnt red cly in wash), sl dolc ip, tr m gy-gy brn interlamd sh.

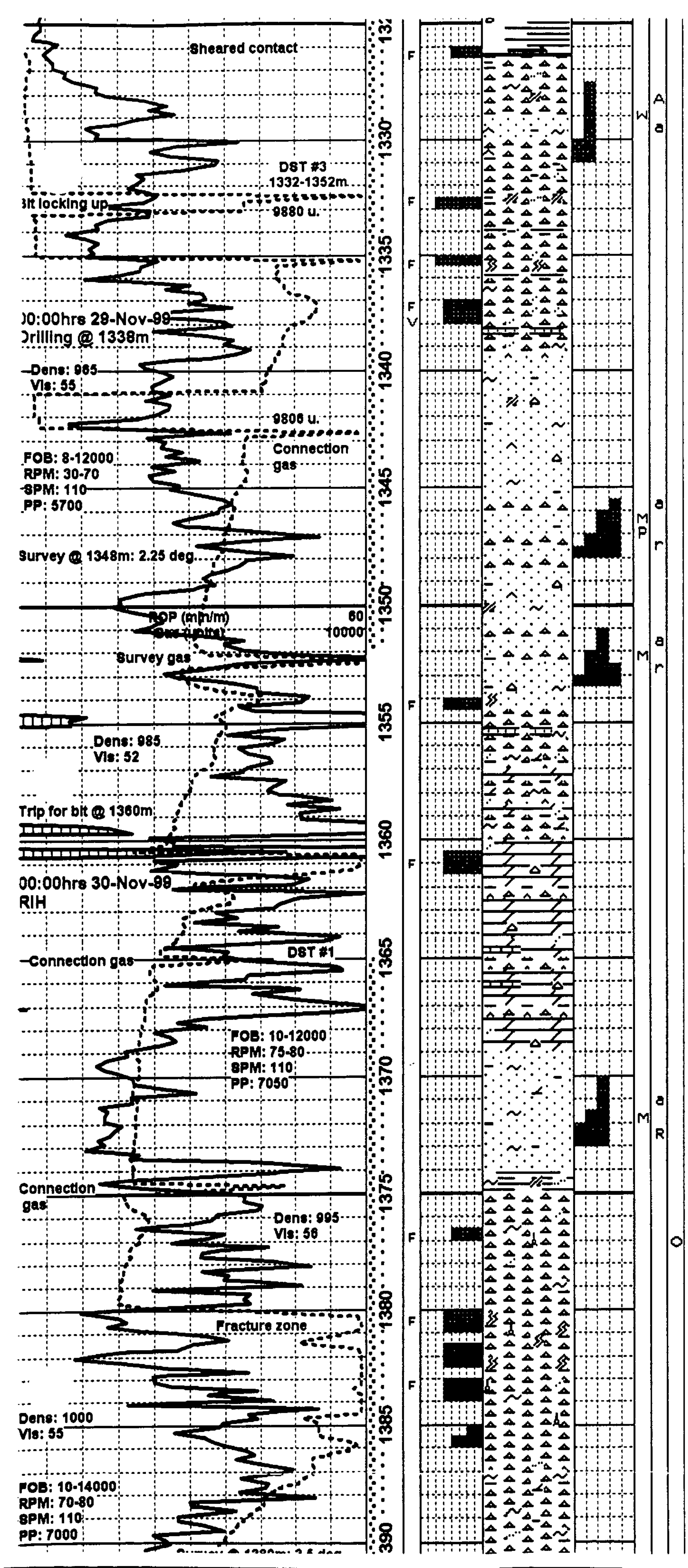
1284-1295 SH v sim-abv, predy mar-rusty red, incrly m brn-brn gy in mnr pt, incrly mm in mnr pt, incrly slty ip wi mnr sltst lams-strgs, comy sl-mod dolc, vary 'bentc' aa, mnr thn intbd sltst aa wi incr tr-loc mnr carb deb.

1295-1314 SH wi mnr intbd SLTST; SH m gy, mnr intbd-interlamd red sh aa, sb blky-sb plty, sb fis-fis, v frm-hd, brit, sm & fnty mm ip, vary slty & mod-loc v mm ip occy grdg-arg sltst lams & strgs, sl-mod dolc ip; SLTST as prev desc, lt-m gy, blky, v qtzs wi mnr dk spks, loc sl micac, predy cln-sl arg, sdy ip grdg-mnr slty ss, comy mod-w ind, loc p ind in mnr pt, pred dolc cmt, tt, n/s

1314-1326 SH rusty red-mar, tr-mnr m brn & gy, occy mot, comy frm, loc sft-v frm, brit in mnr pt, fis, comy sm & fnty mm, loc sl slty & mod mm, occl sltst lams & strgs, incrly 'bentc' ip (v abnt red cly in wash, loc sl dolc, rr slicks at base.

BELLOY FORMATION @ 1325.9m MD; -783.7m SS

1326-1336 CHT predy dk-m gy-brn gy, comy mod hd-loc crmbly, vary mod-loc v glauc, vary sdy-slty grdg-chty ss ip, com gran tex on ctgs, vary arg grdg-mnr chty glauc mdst, tr pyrzd spics & worm burrows, mnr intbd vf gr vary glauc qtzs arg lithic wacke.



BELLOY FORMATION @ 1325.9m MD; -783.7m SS

1326-1336 CHT predy dk-m gy-brn gy, comy mod hd-loc crmbly, vary mod-loc v glauc, vary sdy-slty grdg-chty ss ip, com gran tex on ctgs, vary arg grdg-mnr chty glauc mdst, tr pyrzd spics & worm burrows, mnr intbd vf gr vary glauc qtzs arg lithic wacke, mnr-loc com shear fabrics: vary mylonitized-loc perv wi com slicks, n vis por, infr g-ex loc frac por, n/s.

1336-1339.5 CHT v pale-dk brn, predy vary glauc, comy vary sdy-v sdy grdg-v chty ss ip, sl-v spicular ip, transl in mnr pt, tr dism-loc ptchy pyr, rr pyr nod, predy v tt, mnr-loc com p-occl fr mic vug-vug por wi mnr pybit & tr drusy dol, n/s, tr-mnr chky cataclastic? anhyc strgs wi slicks, tr dk gy glauc slty sh, mnr dk gy ss aa.

1339.5-1351 SS m-dk gy, vf-m gr, lithic wacke wi com-abnt clr-vcol qtz & tr-mnr ltc grs, vary glauc wi com-loc abnt glau, com-abnt arg & slty mtx, mod p srt, sb ang-sb rd, disagg ip, p-mod ind wi tr sp dolc cmt, vary silic in mnr pt grdg-chty ss, grds-mnr sdy glauc sltst & sh strg, tt, n/s, mnr chky cataclastic? blk & wh mot-anastom anhydc-dolc strg wi slicks, mnr intbd cht aa.

1351-1354.5 SS v sim-abv bcmg predy vf-f gr, mod srt, v w-p ind, comy vary silic-chty grdg-sdy cht ip, rr fos frag, tt, tr p mic vug por, n/s, mnr chky cataclastic? 'strgs' aa, mnr intbd cht aa, infr loc g frac por.

1354.5-1360 CHT dk brn-brn gy, dns, vary hd, mod-v glauc, comy vary dolc grdg-chty dol ip, comy vary sdy grdg-v chty ss ip, tr-mn dism-loc abnt pyr, predy tt, tr p mic vug-mold por, n/s, decr tr-mnr dolc-anhyc strgs aa.

1360-1369 DOL dk gy-gy brn, crpxl-sl micxl, predy hd, dns, comy slty, comy vary chty grdg-dolc cht ip, loc vary sdy, loc sl-mod calc wi tr-mnr dolc ls strg, tr loc pyrc, mnr lt brn-gy brn mrly ls strg; sft, chky, vary dolc grdg-calc dol, sl mot, sl glau, slty-sdy, tr slicks, tt, infr g loc frac por, n/s.

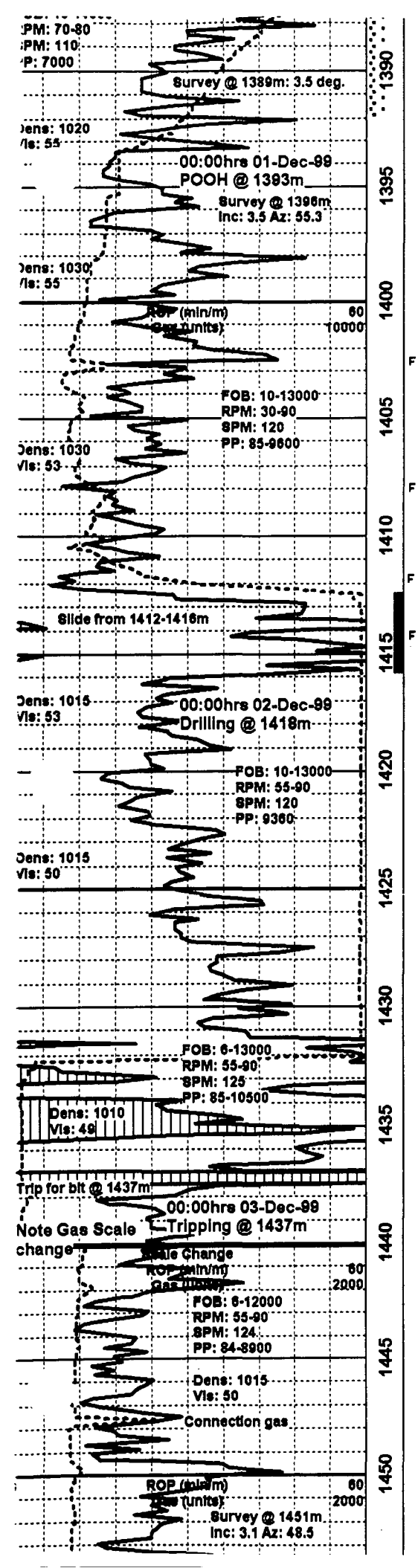
1369-1374.8 SS dk gy, vf-f gr, mnr m grs, lithic wacke, com-abnt clr-vcol qtz, com-loc abnt glau, tr ltc grs, abnt slty arg mtx, mod srt, sb ang-rd, disagg in mnr pt, comy mod ind, loc p-w ind ip, mnr loc com dolc cmt, tt, n/s, mnr intbd SH v dk gy, frm-v frm, sb bky-occy plty, comy mod-v glauc, slty, loc vary sdy, com loc abnt pasty chloritic ptchs.

FANTASQUE FORMATION @ 1374.8m MD; -832.6m SS

1374.8-1380 CHT predy v pale-lt brn, predy transl, v hd, v dns, sl-mod glauc ip, sl sdy in mnr pt, mnr loc tr-v abnt dism-xln pyr, sl-mod dolc in mnr pt, rr-tr dolc mic frac-fill, rr spics, occl chty dol strg, tt, infr fr-g loc frac por, mnr-com sp v dull flor, tr v wk v thn fnt yel difs cut.

1380-1388 CHT sim-abv, lt brn, mnr lt gy, predy transl-sb transl, v hd, v dns, sl-mod glauc aa, incrly vary spiclr in mnr pt, incrly vary slty-sdy in mnr pt, tr-mnr frac sfc on ctgs wi abnt sb-euhed qtz xls, rr-tr scat p mold-mic vug por, infr g-ex loc frac por, tr sp ques flor, n cut.

1388-1397 CHT aa in mnr pt, predy dk brn-brn gy, dns, comy hd, mod-v glauc, comy vary slty-sdy, vary arg & crmbly grdg-v chty glauc sh in mnr pt, sl dolc in mnr pt, mnr loc com-v abnt pyr



1388-1397 CHT aa in mnr pt, predy dk brn-brn gy, dns, comy hd, mod-v glauc, comy vary slty-sdy, vary arg & crmbly grdg-v chty glauc sh in mnr pt, sl dolc in mnr pt, mnr loc com-v abnt pyr grdg-pyr nods ip, tt, n/s.

1397-1402.5 CHT lt-m brn, fnty mot ip, comy transl, v hd & dns, comy sl-mod glau, tr sdy, rr-tr spics, tr-mnr dk gy slty glauc sh lam-strg, tr-mnr frac sfc wi com-abnt pyr, rr mic frac wi pyr fill, infr loc tr-mnr fr-g frac por, n/s.

1402.5-1410 CHT v sim-abv, decrly glauc, mnr-com planar frac sfcs on ctgs, mnr frac sfcs wi chty wh dol or pybit resd, tr sb hed qtz, rr-tr scat p mold-mic vug por, infr mnr fr-g frac por, tr-mnr sp dull flor, n cut, tr slty glauc-phos sh lam.

1410-1418 CHT predy v pale-m brn, mnr off wh & dk brn, fnty mot ip, predy transl, v hd & dns, comy vary spiclr, tr scat glau, tr phos sh lam, com frac ctgs incl; mnr-com planar cln frac sfcs, mnr-com frac sfcs wi abnt sb-euhed qtz xls, mnr frac sfcs wi wh chalcedonic layers, rr pybit res, rr v c sbhed qtz xl, infr com g-ex frac por, mnr sp v dull flor, tr ques cut.

**Note; After initial gas show @ 1411m, maximum readings are an artifact of gas saturation in gas sampling canister. A pre-dilution was introduced to the system @ 1432m.

1418-1425 CHT predy m-dk brn-gy brn, mnr lt brn, transl ip, predy v hd & dns, sl 'arg' & less ind ip, tr glau, tr spics, rr-tr dolc spks, frac ip, tr-mnr milky-chalcedonic qtz healed & lined fracs wi ptchy pyr, rr-tr sb-euhed qtz xl linings, tr dism pyr, infr tr loc p-fr frac por, tr-mnr v dull flor, tr ques cut.

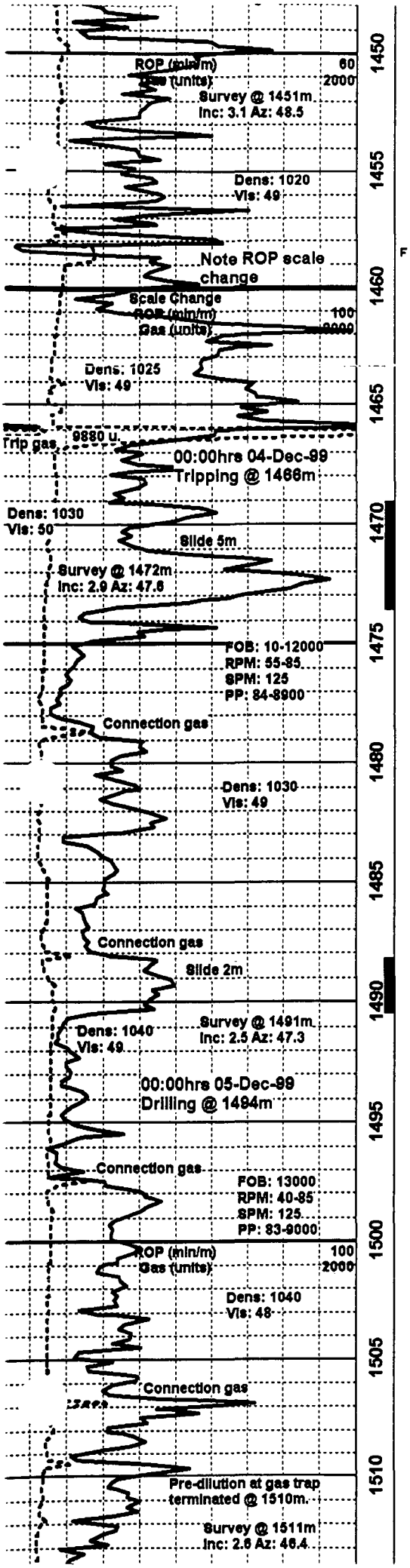
1425-1430 CHT predy dk brn, v hd & dns, non-transl, tr dism pyr, rr spics, tr v fnt worm burrows?, mnr-com planar frac sfcs, incr mnr milky-occy chalcedonic qtz frac linings & heals, incr tr-mnr sb-euhed qtz xl linings, mnr lt brn chky slty-sdy sl dolc cataclastic? silc strgs, infr mnr fr-g loc frac por, tr sp v dull flor, n cut.

1430-1437 CHT as prev desc wi decr tr milky qtz frac fill, rr sb-euhed qtz xl linings, mod-v frac? (reduced ctgs size), infr tr p-fr frac por, tr sp v dull flor, n cut.

1437-1442 CHT comy pale brn, mnr m-dk brn, comy mot, v hd & dns, predy transl-sb transl, vary spiclr in mnr pt, tr sl sdy, vary frac ip wi tr milky-occy chalc qtz frac heals, mnr-com planar frac sfcs wi rr qtz xl linings, v rr pyr mic frac fills, tr sl dolc, infr tr-mnr p-fr frac por, n/s.

1442-1450 CHT predy v lt-lt gy wi com dk brn pel & mots, sb transl, v hd & dns, comy vary spiclr, tr dism pyr, rr-tr scat dol rhombs, tr sl sdy, frac ip, incr tr milky-chalc qtz frac heals & occl linings, incr tr clr an-sbhed qtz frac lings & fills, silic in mnr pt wi tr-mnr chalc-milky blebs & mots, rr calc frac fill, rr pybit resd, infr mnr loc p-fr frac por, n/s.

1450-1456 CHT v sim-abv bcmg incrly pell & loc mot, mnr m-dk brn & gy mot cht, incr frac, incr mnr-com chalc-milky qtz frac heals & occl linings (rr botry), incr tr clr sb-euhed qtz xl linings, incrly silic in mnr pt wi chalc-milky qtz blebs & mots, rr calc frac fill, incr rr-tr pybit-blt resd, infr incr mnr fr-p frac por, mnr sp dull flor, tr ques cut, tr vf gr slty qtzs ss wi dolc cmt.



1450-1456 CHT v sim-abv bcmg incrly pell & loc mot, mnr m-dk brn & gy mot cht, incr frac, incr mnr-com chalc-mlky qtz frac heals & occl linings (rr botry), incr tr clr sb-euhed qtz xl linings, incrly sillc in mnr pt wi chalc-mlky qtz blebs & mots, rr calc frac fill, incr rr-tr pybit-bit resd, infr incr mnr fr-p frac por, mnr sp dull flor, tr ques cut, tr vf gr slty qtzs ss wi dolc cmt.

1456-1464 CHT wi intbd CGL; CHT sim-abv bcmg incrly vcol: lt-m gy pell-mot, dk gy brn-brn, comy sb transl, v hd & dns, incrly frac, vary sillc ip wi mnr-com mlky-chalc blebs-mots & frac fills, loc sl-mod sdy in mnr pt, incr tr-mnr xln qtz frac & vug? linings, tr dism pyr, rr pybit resd, infr mnr-loc com fr-g frac por, mnr sp dull flor, tr v wk ques cut ; CGL monomict cht pbls same as bedded cht, tr dk gy brn arg slty-sdy mtx wi dolc cmt, tr-mnr srd-sb ang sfc on cht frags, infr p? intgran por.

KINDLE FORMATION @ 1464m MD; -921.9m SS

1464-1466 SLTST lt brn, qtzs, mod frm-crmbly, sdy ip occy grdg-slty ss, sl arg, v dolc occy grdg-slty dolostone, occl dol rhomb, n vis por, evn dull flor, mnr v wk v slo blmg cut.

1466-1475 SLTST predy dk brn, mnr lt-m brn, sb blky, qtzs, sl-mod arg, v dolc-loc vary calc grdg-v slty dolostone ip, occl dol rhomb, vary ind: comy mod-v hd & brit, mnr-com p ind & crmbly, tr lt brn chky sl slty marl strg, n vis por, com v dull flor, mnr v slo v wk stmg & blmg cut.

1475-1479 SLTST as prev desc wi incr mnr v thn intbd MRL; lt brn, chky-crmbly, sl-mod slty, fnty lamd ip, n vis por, decr mnr-com v dull flor, decr tr-mnr cut aa.

1479-1486 SLTST dk-m brn-occy brn gy, qtzs, decr sl-mod dolc, loc sl-mod chty, sl-mod arg, tr arg ptgs, tr sl sdy, incrly ind ip, loc v w ind, infr com sllc cmt, n vis por, com v dull ques flor, tr ques cut, tr mrly strg.

1486-1490 SLTST wi mnr intbd LS; SLTST as prev desc bcmg loc v dolc-calc grdg-slty calc dol, por & shows aa; LS v dk brn, crp-micxl, frm-hd, dns, v arg, comy slty, vary dolc grdg-calc dol ip, sl chty ip, n vis por, com-abnt v dull flor, mnr-com slo yel wh stmg cut.

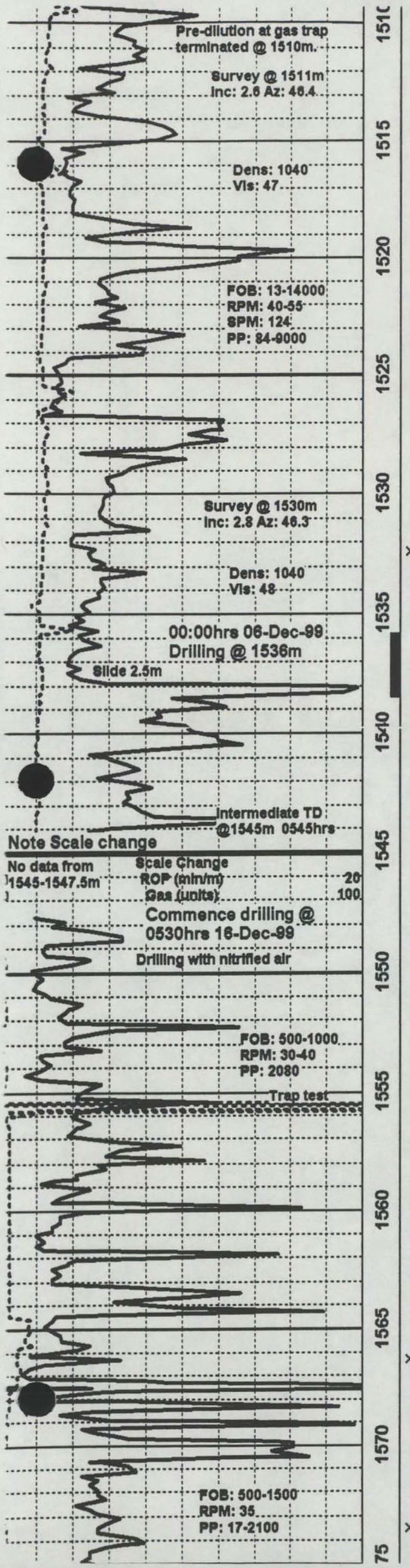
1490-1497.4 SLTST dk brn-v dk brn gy, qtzs, sl-loc mod arg, predy mod-v calc-dolc grdg-v slty dol ip, comy mod ind, predy calc-dolc cmt, mnr loc com sllc cmt, n vis por, decr shows aa.

MATTSON FORMATION @ 1497.4m MD; -955.2m SS

1497.4-1506 SLTST wi intbd SS; SLTST lt brn, v qtzs wi tr ltc grs, rr-tr glau, vary sdy ip, cln-sl arg, p ind & crmbly wi abnt calc-dolc cmt, tr fos frags, occy v arg grdg-calc gy sh lams, n vis por; SS v pale-m brn, vf gr, vary slty grdg from sltst abv ip, qtzs wi ls? grs, w srt, ang-sb ang, predy cln-sl arg, tr fos frags, p-mod ind wi abnt calc cmt, mnr dull flor, mnr slo v thn lt yel gn stmg-difs cut, mnr wh sft chky ls strg.

1506-1510 SS wi intbd SLTST; SS comy lt-m brn, vf gr, vary slty grdg-sdy sltst ip, qtzs (wi rexl ls? grs), rr-tr ltc grs, v rr glau, predy cln-sl arg, incr tr-mnr fos frags, comy p ind & crmbly wi abnt calc cmt, mod-mod w ind ip wi mnr calc + sllc cmt, predy n vis por, tr p por, mnr ptchy dd o stn, mnr sp-ptchy dull flor, tr ques cut; SLTST aa, mnr chky ls aa.

1510-1515 SS off wh-lt gy, vf gr, vary slty ip occy grdg-sltst, v qtzs (qtzaren), wi tr ltc grs & rr glau, v w srt, ang-sb ang, predy v cln, occy sl arg, p-mod ind wi sllc & dolc cmt, rr-tr intstl pyr, n vis por, tr-mnr sp dd o stn, mnr sp dull flor, tr ques cut; tr-mnr intbd SH



1510-1515 SS off wh-lt gy, vf gr, vary slty ip occy grdg-sltst, v qtz (qtzaren), wi tr ltc grs & rr glau, v w srt, ang-sb ang, predy v cln, occy sl arg, p-mod ind wi silc & dolc cmt, rr-tr intstl pyr, n vis por, tr-mnr sp dd o stn, mnr sp dull flor, tr ques cut; tr-mnr intbd SH as desc below.

1515-1523 SS wi mnr intbd SH; SS sim-prev desc bcmg predy wh-v lt gy, comy p ind & crmbly wi com-abnt dolc-calc cmt, mod-mod w ind ip wi loc com str-ptchy silc + mnr sp dolc cmt, n vis por, mnr-com sp-ptchy dull flor, tr-mnr slo v wk stmg-difs cut; SH m gn gy, frm-hd, sb blky-occy sb plty, predy non-slty, comy sl-mod dolc, loc sl slty-rrly sdy, tr dism pyr, rr-tr pyr nod.

1523-1529 SS wi mnr intbd DOL, LS & SH; SS as prev desc, predy n vis por, tr p por, evn v pale flor, tr v wk ques cut; DOL bf brn-lt gy, crp-micxl, predy hd & brit, comy vary calc loc grdg-dolc ls, sl-mod chty in mnr pt, tt, n/s; LS dk-m brn, slty-sdy, arg ip, vary dolc grdg-calc dol, tt, n/s; SH dk gy-brn gy, sb plty-sb blky, sb fis, frm-v frm, sl-mod dolc.

1529-1533 SS aa ip, com SS #2 pale brn, vf gr, sl slty ip, qtzaren wi tr ltc grs & rr glau, v w srt, ang-sb ang, v cln, predy p ind & crmbly-fri, com calc-dolc cmt, com qtz ovgths, var com fr-str g por, p por ip, evn lt brn o stn, evn pale yel flor, com v thn wk yel stmg-difs cut, mnr intbd SH & tr wh chky ls strg.

1533-1540.5 SS wi intbd SH; SS wh-v lt gy, vf gr, comy vary slty, qtzaren aa wi incr tr dk ltc grs, cln, mod-p ind wi abnt calc-dolc cmt, n vis por, com pale yel flor, tr v wk ques cut; SH dk gy, sb blky-sb plty, v frm-hd, fnty mm ip, v dolc wi occl v arg dol strg; mnr v dk gy brn arg tt dolc sltst strg.

1540.5-1545 SS v sim prev desc bcmg incrly slty grdg-sltst ip, poi & shows aa, mnr intbd Sh aa.

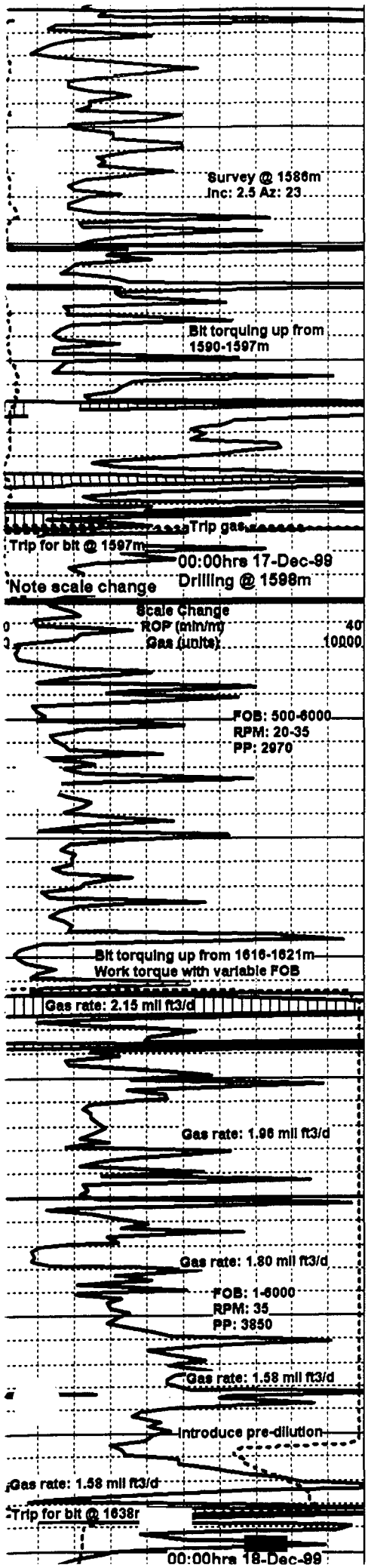
Note: Samples from 1550-1595m are unrepresentative spot samples.

1547-1555 SH dk gy, v frm-hd, sb blky-sb plty, sb fis ip, predy sl slty & mm, loc sl sdy, mody dolc, v thn intbdd SS: off wh-lt gy, vf gr, slty grdg-sltst, qtzaren, tr dk ltc grs, rr glau, tr sh rip-up clsts, predy cln-loc vary arg, mnr arg ptgs, w-v w ind wi abnt calc cmt, tr loc com dism pyr, n vis por, n/s.

1555-1563 SH wi mnr intbd SS; SH as prev desc wi rr-tr fos frag, rr ptchy pyr, loc v dolc-calc grdg-v arg ls strg; SS off wh-lt gy-occy lt brn, vf gr, slty grdg-sdy sltst ip, qtzaren aa, w srt, ang-sb ang, predy cln-loc sl arg, tr arg ptgs, occl sh r.u. clst, rr-tr fos frag, w ind wi v abnt calc cmt, loc com qtz ovgths, tr intstl pyr, predy n vis por, tr p-rrly fr por, mnr ptchy pale yel flor, tr v wk ques cut.

1563-1571 SS wi intbd SH; SS bf-lt brn, vf gr, vary slty, qtzaren wi incr tr dk ltc grs, w srt, ang-sb ang, predy cln, tr arg ptgs, w ind wi v abnt calc cmt-mtx locy grdg-vary sdy tt ls, mnr c sparry rexl fos frag/allochems, mnr loc com qtz ovgths, tr intstl pyr, predy n vis por, tr p-rrly fr por, mnr sp yel flor, tr v wk slo thn stmg cut; SH dk gy-blk, frm-hd, sb plty-sb blky, comy sb fis, sl-mod slty & mm, comy vary carb-phosc, tr-loc mnr pyr, tr loc com pyrzd wm bur, sl-mod dolc-calc, rr ost.

1571-1575 SH wi mnr intbd SS; SH as prev desc bcmg incrly slty-sdy ip, incr tr ptchy-dism pyr, mnr arg sltst-ss lams-strgs; SS aa ip, predy m-lt brn, vf gr, tr f grs, slty grdg-sdy sltst ip, v qtzs wi tr dk ltc grs, w srt, ang-sb ang, sl arg, w-v w ind, com-abnt dolc-calc cmt, tr loc com pyr, n vis por, n/s, tr f-m lse qtz & bl cht grs, infr mnr strky fr? por.



1575-1582 SH wi mnr intbd SS; SH as prev desc, n worm burrows; SS as prev desc incrly grdg-sltst, incr mnr-loc abnt intstl pyr, n vis por, n/s.

1582-1590 SH wi mnr intbd SS; SH v dk gy-blk, plty-sb plty, mnr sb blky, comy fis-sb fis, v frm, comy sl slty & mm, loc v slty-sdy ir mnr pt, vary phosc-carb, tr-mnr dism-fram pyr, tr fos frag, sl dolc, tr m gn gy plty mm clyst strg wi tr pyrzd wm bur; SS m-dk brn, vf gr, tr f grs, slty grdg-sltst ip, v qtzs aa, comy sl arg wi mnr arg ptgs, tr loc v arg, rr-tr fos deb, occl sh r.u. clst, v w ind wi abnt calc-dolc cmt, mnr loc com-abnt intstl pyr, n vis por, n flor, tr v wk slo thn stmg cut.

1590-1595 SH as prev desc wi decr rr-tr gn gy clyst aa, rr sidc nod-strg, mnr thn intbd SS aa, tr f-m lse qtz & rr bl-dk gy cht grs.

1595-1600 SH wi mnr intbd SS; SH as prev desc wi tr ferr strg, sl-mod dolc, tr pyr nod; SS as prev desc ip, SS #2 off wh-v pale brn, vf gr, sl slty, qtzaren wi tr dk ltc grs, w srt, ang-sb ang, w ind wi com calc-dolc & silc cmt, rr-tr intstl pyr, mnr p-str fr por, tt ip, tr vf intstl bit, mnr-com pale yel gn flor, mnr thn slo wk yel stmg & difs cut.

1600-1605 SH wi mnr intbd SS; SH mixed, predy aa bcmg incrly blk, bit ip, incr tr-mnr oxzd ferr lam-strg, mnr SH #2 m gn gy, v frm, brit ip, sb plty, predy sm, tr loc sdy, sb wxy ip grdg-clyst, rr-tr dism pyr, non dolc; SS #2 as prev desc.

1605-1614 SS wi intbd SH; SS slm-abv, off wh-v pale brn, vf gr, sl slty, qtzaren wi tr dk ltc grs, v w srt, ang-sb ang, rr-tr fos frag, rr sh r.u. clst, w ind wi silc & dolc cmt, mnr qtz ovgths, tr intstl pyr, predy tt-3% por, mnr str 4-8% por, tr loc com sp bit, com pale yel flor, mnr thn slo wk stmg & difs cut; SH m gn gy, m-dk gy & brn gy, v frm, brit ip, sb plty, predy sm, incrly loc sdy in mnr pt, sb wxy grdg-clyst, incr tr dism pyr, tr pyr nod, non dolc.

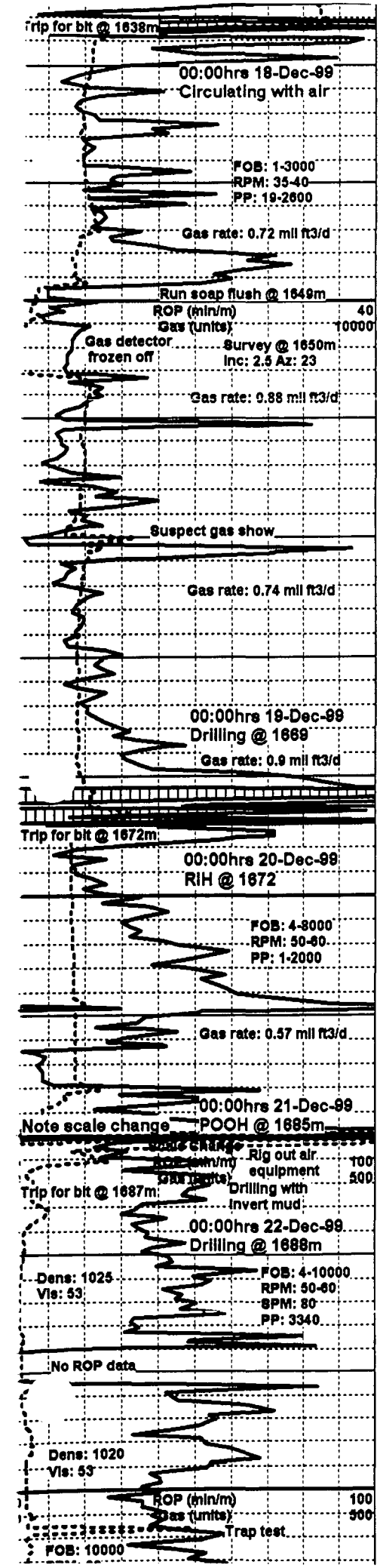
1614-1621 SS wi intbd CLYST; SS mixed, aa ip, comy SS #2 disagg, vf-uf gr, tr lm grs, qtzaren, fros-mnr clr qtz wi tr-mnr dk gy-bl cht grs, mod w srt, sb ang-rd, infr g por, n/s, mnr SS #3 lt gy gn, vf gr, slty grdg-sdy sltst ip, com-abnt gn cly mtx, occl clyst r.u. clst, mod ind, tr sp dolc cmt, loc v pyrc, tt, n/s, intbd CLYST grdg from SH aa.

1621-1625 SS wi mnr intbd CLYST; SS disagg, predy uf-lvf gr, mnr lm & tr um grs, qtzaren, fros-clr qtz wi tr ltc & cht grs, mod w srt, sb ang-rd, v cln, rr-tr intstl pyr, infr g por, n/s, mnr SS #3 aa; CLYST as prev desc, rr fos frag.

1625-1631 SS as prev desc, disagg, predy uf-lvf gr, mnr lm & tr um grs, qtzaren, fros-clr qtz wi tr ltc & cht grs, mod w srt, sb ang-rd, v cln, rr-tr intstl pyr, infr g por, n/s.

1631-1638 SS wi mnr intbd CLYST; SS predy as prev desc, mnr intbd SS off wh-v pale brn, vf gr, sl slty, qtzaren wi tr dk ltc grs, v w srt, ang-sb ang, w ind wi silc & dolc cmt, mnr qtz ovgths, tr intstl pyr, predy tt-3% por, mnr str 4-7% por, tr sp bit, com pale ye flor, mnr thn slo wk stmg & difs cut; CLYST as prev desc.

1638-1644 SH wi intbd SS; SH blk-brn blk, frm-hd, sb plty-sb blky, comy sb fis, bit, slty-loc sdy, mnr arg sltst & ss lams-strgs, fnty pyrc, sl dolc-calc, mnr clyst aa; SS wh-v pale brn, vf gr, sl slty, qtzaren, w srt, ang-sb ang, v cln, mod-p ind, com dolc & silc cmt, mnr qtz ovgths, tt-3% por ip, com 4-8% por, com ptchy dull-bri



comy sb fis, blt, slty-loc sdy, mnr arg sltst & ss lams-strgs, fnty pyrc, sl dolc-calc, mnr clyst aa; SS wh-v pale brn, vf gr, sl slty, qtzaren, w srt, ang-sb ang, v cln, mod-p ind, com dolc & silc cmt, mnr qtz ovgths, tt-3% por ip, com 4-8% por, com ptchy dull-bri pale yel-yel gn flor, mnr fast v thn difs cut, mnr SS #2 disagg, f-m, clr-fros-yel qtz, tr cht grs, m srt, rd-sb ang, infr g por, n/s, tr lt brn sdy tt wkst.

1644-1650 SS mixed; pred SS #1 aa wi incr silc cmt, incr tr cht & ltc grs, sl decr por & shows aa, SS #2 lt gy-lt brn, vf-f gr, tr m grs, sb litharen, clr-fros qtz, tr-mnr bl-dk gy cht, tr sh grs, loc sl arg, m-m w srt, ang-srd, tr fos frag, w ind, com-abnt dolc cmt, pred tt-4% por, ques dull flor, n cut; mnr SS #3 disagg, f-m, tr-mnr c qtz & bl cht grs, sblitharen grdg qtz aren, m srt, rd-sb ang, infr g por, n/s, mnr intbd SH aa.

1650-1660 SS wi mnr intbd SH; SS wh-v lt gy, vf gr, sl slty, pred qtzaren loc grdg-sblitharen, clr-fros qtz, incr tr-loc mnr bl-dk gy-blk cht, v rr glau, mod w srt, ang-sb ang qtz wi rd cht, tr fos frag, rr cht & tuff pbl, w ind wi com dolc & silc cmt, mod ind ip, predy tt-3% por, mnr 5-9% por, com ptchy bri pale yel gn flor, com fast v thn yel difs & stmg cut; SH sim-abv, blk-brn blk-dk gy, v frm-hd, plty-sb blky, brit ip, blt-phosc, comy slty-sdy grdg-arg sltst & ss ip, comy non dolc-sl dolc.

1660-1665 SS v sim prev desc, wh-v lt gy, vf gr, tr f & rr m grs, sl slty, qtzaren, tr bl-blk cht, v rr glau, mod w srt, ang-sb ang qtz wi rd cht, rr fos frag, cln, tr sl arg, tr arg ptg, pred w ind wi com silc & mnr-com dolc cmt, mod ind ip, mnr loc com qtz ovgths, tr intstl pyr, rr sp kao, com tt-4% por, incr mnr-com 5-10% por, mnr ptchy dull-bri pale yel-yel gn flor, tr v wk v thn ques cut; mnr intbd SH aa.

1665-1670 SS as prev desc wi incr com silc & decr mnr dolc cmt, incrly w-v w ind, decr mnr p-fr por aa, decr tr-mnr ques shows aa.

1670-1675 CGL wi intbd SS; SS aa bcmg incrly slty grdg-mnr sdy sltst, w ind wi abnt dolc cmt, mnr ptchy silc cmt, pred n vis por, ques shows aa; CGL f pbl, oligomict bcmg polymict, clst supp, mod p srt, rd-srd, com rd sfcs, c-gritty mtx, pred intraformatl sed clsts (sh, clyst, sltst, occl ss & tr cht & tuff clsts), mnr ptchy-loc abnt xln pyr & pyrzd clsts, tr pyr nod, infr g por, n/s.

1675-1680 SS wi CGL; SS as prev desc; CGL as prev desc wi rr v dk brn arg slty-sdy mtx; mnr intbd DOL bf-lt gy, crpxl-micxl, dns, hd, tr slty, tt.

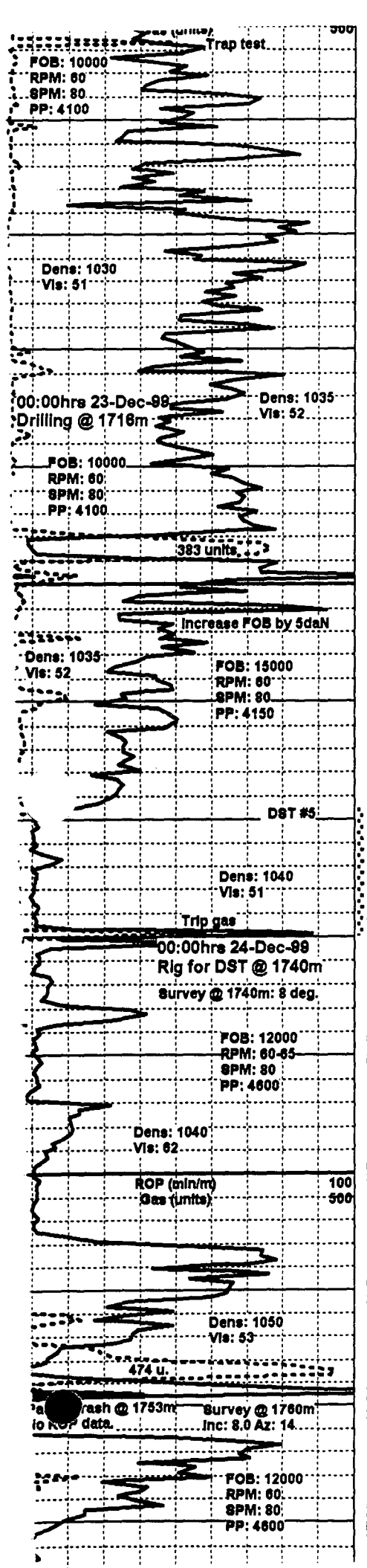
1680-1685 SH mixed; pred dk gy-brn gy, v frm, brit ip, blky-sb plty, comy fis, vary slty & mm, sm ip, tr sltst-ss lam, loc vary sdy, tr dism-xln pyr, tr-mnr pyr nod, com-abnt planr frac sfcs wi tr rust stn & striae, tr fos frag, sb wxy in mnr pt, predy non dolc, 30% SH #2 m gy gn, pred blky, sb fis, sl slty, fnty pyrc, pred non dolc, comy frac aa, rr fos frag.

1685-1690.5 DOL wi SS; DOL lt brn, lt-m gy, crp-micxln, frm-hd, mod dns, sft & sl chky ip, vary sdy-slty in mnr pt, tt, com-abnt dull-mod flor, tr ques cut; SS off wh-lt brn, vf-uc, tr-mnr vc grs, sblitharen, abnt fros-clr qtz wi com vcol ltc grs (ls-dol, cht, volc?), m p srt, pred disagg, mnr p ind & fri cons ctgs, mnr-loc com dolc cmt, mnr sp silc cmt, mnr-com qtz ovgth, var por; com g-fr, mnr tt-p, tr exc, infr pred g-fr, abnt pale yel-yel gn flor, mnr wk v thn difs cut.

1690.5-1696 DOL lt brn-gy, crp-micxl, pred frm-loc hd & brit, sl sft & chky ip, tr-mnr lt gy-lt brn sl slty-sdy trnsl cht strg-nod, n vis por, decr flor aa, tr ques cut, sl-loc v sdy grdg-30% dolc SS: pred-f-m gr, mnr c grs, v qtzs wi mnr cht & dol grs, mod-mod w srt, sb ang-rd, mod-p ind wi com-abnt dolc cmt, mnr ptchy silc cmt, n vis por.

1696-1701 SS off wh-pale brn, vf gr, slty, tr f grs, v qtzs wi tr-mnr cht & ltc grs, rr glau, cln, mod w srt, ang-srd, comy p-mod p ind, com-abnt dolc cmt, loc w-v w ind wi loc com-abnt silc cmt, frac ip, n vis por, abnt v pale yel flor, n cut, intbd DOL aa bcmg incrly sdy incrly grdg-dolc ss.

1701-1705.5 DOL m-dk brn, crp-micxln, hd, dns, tr chty, mot ip, vary arg ip, comy vary slty-sdy grdg-occl dolc ss strg, tr-mnr loc com allochems, tt, n/s, mnr intbd CHT lt-m brn & gy, trnsl-sb



1701-1705.5 DOL m-dk brn, crp-micxln, hd, dns, tr chty, mot ip, vary arg ip, comy vary slty-sdy grdg-occl dolc ss strg, tr-mnr loc com allochems, tt, n/s, mnr intbd CHT lt-m brn & gy, trnsl-sb trnsl, loc mot, dns, brit, pred vary sdy occy grdg-chty ss strg, tt, n/s, intbd SS as prev desc.

1705.5-1710 SS v lt gy-pale brn, vf-f gr, tr-mnr m grs, qtzaren grdg sblitharen, abnt clr-fros qtz wi tr-loc mnr dk cht & ltc grs, comy mod w-w srt, ang-srd, frac ip, var indn: w-mod p ind, com-abnt silc & dolc cmt, tr loc com qtz ovgths, pred n vis por, com ptchy dull-mod yel flor, n cut, mnr vf-c mod p srt sblitharen, mnr DOL strg-thn intbds aa.

1710-1714 SS pred aa bcmg incrly f gr ip, ~30% SS #2 m-dk brn-brn gy, vf-f gr, slty, qtzs wi tr-mnr dk cht & ltc grs, comy sl-mod arg, sl chty ip, tr arg ptgs, mod-mod w srt, ang-srd, mod-mod w ind, com-abnt dolc cmt, occy grdg-sdy dol, tt, n/s, tr-mnr dol strgs.

1714-1725 SS off wh-v lt brn, vf-f gr, qtzaren wi tr-mnr pred dk ltc & cht grs, rr glau, w srt, ang-srd, cln, tr arg-bit ptgs, frac ip, comy mod-mod p ind, loc v w ind, com-abnt silc + mnr-com sp-ptchy dolc cmt, pred tt-3% por, mnr str 4-8%, com ptchy pale yel flor, n cut, mnr SS #2 slm-abv, f-m gr, mnr vf grs, qtzaren aa, mod w srt, sb ang-rd, pred disagg, tr-mnr cons ctgs wi sp silc cmt & fr-g por, mnr-com qtz ovgths, infr com g por, mnr ptch dull flor, n cut, mnr thn slty-sdy dol strgs.

1725-1734.5 SS pale brn, pred vf gr, mnr f grs, slty, vf-f gr in mnr pt, qtzaren wi tr dk ltc grs, w srt, ang-sb ang, cln, tr sl arg, tr arg ptgs, comy mod-p ind, com-abnt dolc cmt, mnr loc com silc cmt, loc w ind, pred tt-2% por, mnr str 3-6% or, pred evn pale yel flor, tr v wk v thn ques cut, mnr thn dol strg-intbds: lt-dk brn, crp-micxln, v frm-sft, v slty-sdy grdg-dolc sltst & ss strg, tt, n/s.

1734.5-1740 SS disagg, pred f-lm gr, mnr uvf & tr um grs, qtzaren, pred fros-mnr clr qtz wi tr-mnr cht & ltc ngrs, mod w srt, rd-sb ang, cln, tr v p cons ctgs wi tr-mnr sp silc cmt, mnr qtz ovgths, infr g por, abnt-evn mod-bri pale yel gn flor, tr v wk v thn ques cut, mnr SS #2 pale brn, vf-f gr, qtzaren, v w srt, ang-srd, p-mod p ind, mnr sp silc cmt, cln, pred g-fr por, evn bri pale yel wh-yel gn flor, mnr v thn difs cut.

1740-1747 SS v sim-prev desc bcmg fnr, off wh-v lt gy, vf-f gr, mnr lm grs, qtzaren aa wi incr clr qtz, w-m w srt, srd-ang, v cln, comy disagg, incr mnr v p ind & fri cons ctgs, pred tr sp silc cmt, loc mnr-com silc cmt, mnr-com qtz ovgths, cons ctgs wi pred g por (13-16%, tr 18-20%), mnr str fr & tr p por, abnt-evn bri pale yel wh flor, tr-mnr v wk slo stmg & difs cut.

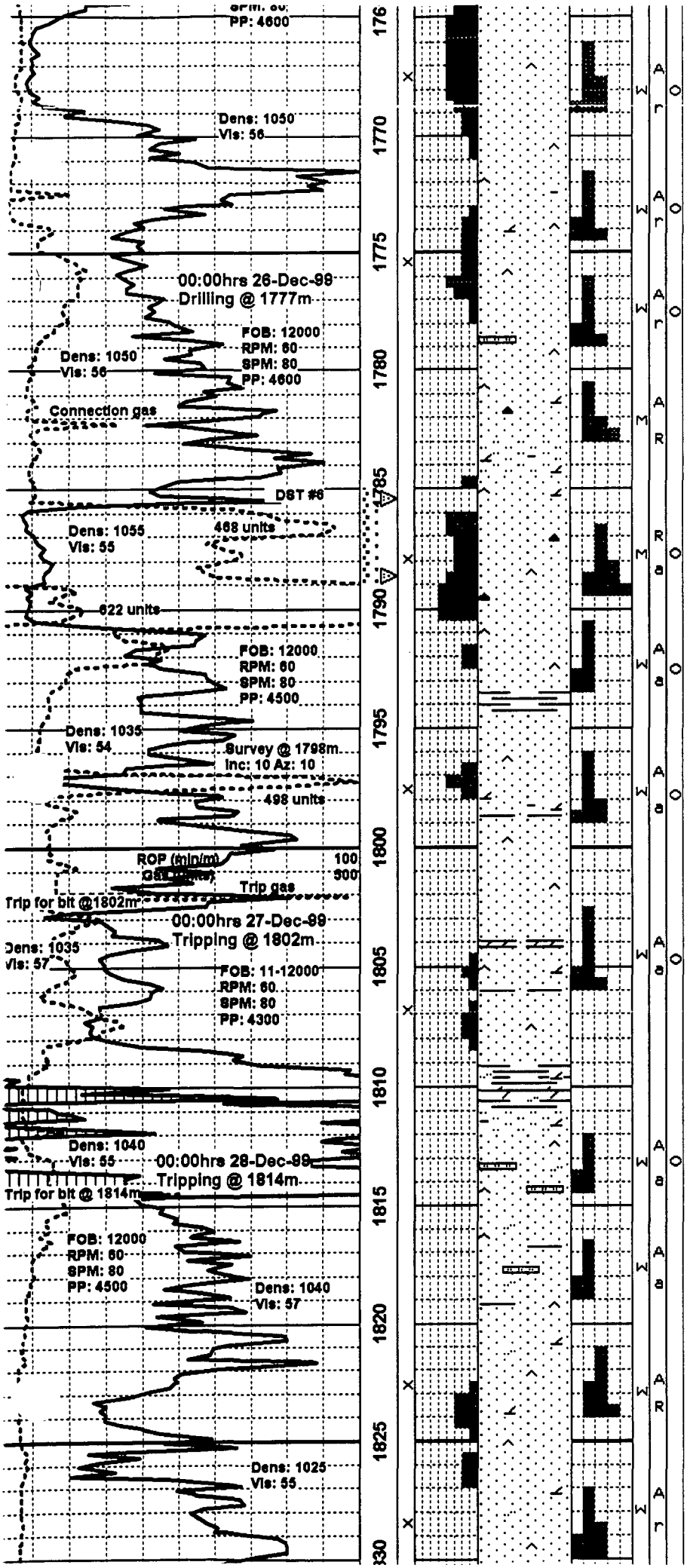
1747-1753 SS aa wi decr mnr cons ctgs, bcmg incrly ind ip wi com ptchy silc cmt, v f gr & slty in mnr pt, decr com g por aa, incr fr-p por ip, shows aa.

1753-1755.5 DOL bf-m brn, crp-micxln, v frm-sl sft, sl-loc v sdy, n vis por, n/s, intbd SS lt-dk brn, vf, vary slty grdg-sltst ip, m w-loc m srt, ang-sb ang, vary arg ip wi tr arg ptgs, mod-occy w ind, com-abnt dolc cmt, tt-p por, n/s.

1755.5-1760 SS v pale tan-off wh, pred vf-lf gr, sl slty, qtzaren, w srt, ang-srd, cln, disagg ip, com vary ind cons ctgs: comy p ind & fri-crmbly, mod-occy w ind ip, mnr qtz ovgths, mnr-com sp dolc & silc cmt, var por: com p-fr, less com fr-g, tr sp bit, evn bri pale yel wh flor, tr-mnr slo wk v thn stmg & difs cut.

1760-1764.5 SLTST wi intbd SS; SLTST dk-m brn, qtzs, vary frm-loc sft, mod-v arg, mod-loc v dolc, occl dol lams, sl sdy, tt-p por, com ptchy v dull flor, tr v slo fnt stmg cut, mnr intbd SS off wh-v lt gy, vf, slty, qtzaren, w srt, ang-sb ang, cln, pred p ind, loc m ind, pred silc & tr sp dolc cmt, pred p-str fr por, mnr g stke, flor aa, tr ques cut.

1764.5-1769 SS v lt gy-pale tan, vf-f gr, sl slty, qtzaren, w srt,



1764.5-1769 SS v lt gy-pale tan, vf-f gr, sl slty, qtzaren, w srt, ang-srd, cln, disagg lp, com vary ind cons ctgs: com p-v p ind & fri-crmbly, loc mod-occy w ind, mnr-loc com sp-ptch silc cmt, var por: com g, mnr fr-p, tr-mnr tt-p, evn bri pale yel wh flor, tr-mnr v thn fnt difs cut.

1769-1774 SS pale brn-mnr m brn, vf gr, tr-mnr f grs, qtzaren, comy vary slty, w srt, ang-srd, pred cln, loc sl-mod arg in mnr pt, tr arg ptgs & lams, comy m-m p ind & crmbly, loc m w-w ind, com silc & mnr str dolc cmt, pred tt-2% por, mnr str p-tr fr por, tr sp bit-pybit, abnt dull yel-mnr bri yel wh flor, rr-tr slo thn stmg cut.

1774-1780 SS as prev desc wi sl decr var indn, pred silc & decr tr-mnr str dolc cmt, decr tr vary arg ss aa, comy var slty aa occy grdg-sdy sltst strg, incr var por; com tt-3%, mnr-com 4-7%, mnr ctgs wi com qtz ovgths & fr-g por, shows aa.

1780-1785.5 SS mixed; aa lp, SS #2 lt gy-v lt brn, pred vf-f gr, mnr-loc com vcol rd c-um cht grs, tr cht pbl, sblitharen, m srt, ang-rd, cln, m-m w ind wi com silc & dolc cmt, tt, mnr vf-c gr litharen (cht & dol grs) wi com-abnt tt silc cmt, intbd SLTST dk-m brn, qtzs wi scat cht grs, hd-frm, occy sft, vary arg, v dolc grdg-slty dol lp, tt.

1785.5-1790.5 SS disagg, lf-um gr, mnr vf & tr l-uc grs, sblitharen grdg-qtzaren, abnt fros-mnr clr qtz wi mnr pred dk vcol cht, mod srt, rd-sb ang, tr-mnr cons ctgs wi sp-ptchy silc cmt, tr qtz ovgths, infr pred g-fr por, com dull yel-bri pale yel wh flor, tr v fnt ques cut.

1790.5-1796 SS lt gy, vf gr, slty, rr-tr f-m cht grs, qtzaren, w srt, ang-sb ang, cln, pred mod-mod w ind, com silc cmt, mnr-loc com str dolc cmt, tr intstl pyr, pred n vis por, tr str p por, tr sp-ptchy bit-pybit, abnt vary dull-bri yel-yel gn flor, tr v fnt ques cut, mnr intbd SH blk-brn blk, frm, plty-sb blky, fis, bit, tr coaly deb, tr pyr nod.

1796-1802 SS lt tan, vf-f gr, qtzaren, comy slty lp, cln, w srt, ang-sb ang, mod w-mod ind wi com silc & sp-ptchy dolc cmt, mnr p ind ctgs wi com qtz ovgths & fr-g por, predy tt-3% por, abnt pale yel gn-mnr dull yel flor, tr v fnt ques cut, mnr intbd m-dk brn-gy SS vf gr, slty grdg-sltst lp, vary arg, mnr arg ptgs & lams, p-mod ind, com-abnt dolc cmt, tt-p por, tr blk sh.

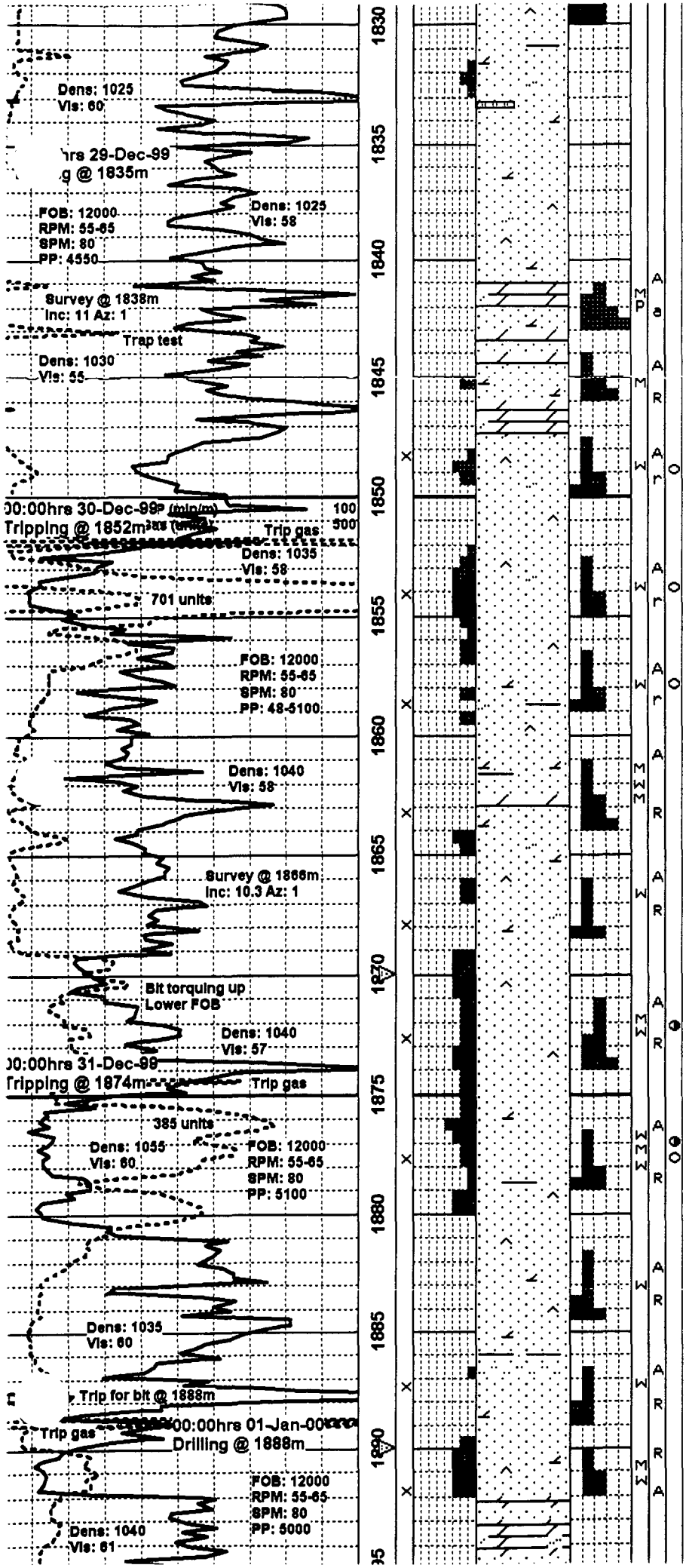
1802-1809 SS v sim-abv, lt gy, v f gr, slty, mnr vf-f wi occl scat m-c cht & pbl frag (p-fr por ip), qtzaren, w srt, pred ang-sb ang, cln, comy m-m w ind wi com silc & tr-mnr dolc cmt, pred tt-2% por, mnr str p por, abnt wk-mod yel-occy bri pale yel gn flor, tr slo thn stmg cut, mnr vf-m gr m srt dolc sblitharen wi com arg ptgs, mnr DOL m-dk brn-gy, crpxl, vary slty-sdy grdg-dolc sltst strg, sl-mod arg, tr-mnr blk plty bit SH wi tr pyrzd wm bur.

1809-1815 SS wi SLTST, SH & DOL; SS lt gy, vf gr, comy v slty grdg-sdy sltst lp, qtzaren, w srt, ang-sb ang, cln, m-m w srt, abnt silc cmt, tr sp dolc cmt, pred tt, tr p por, evn bri pale yel wh flor, mnr fnt v thn difs cut; SH dk brn, plty-sb plty, vary hd-frm, sft & rthy-mrly lp, mod-v dolc wi mnr-com mic-v f xln dol rhmbs grdg-slty arg DOL lp, vary slty comy grdg-arg dolc SLTST, tr-mnr cht strg-nod.

1815-1820 SS as prev desc wi v rr glau, incr tr arg ptgs & v f lams, decr mnr ptchy dull-occy bri yel-yel wh flor, tr ques cut, tr m-dk gy plty frm slty & mm SH.

1820-1827 SS off wh-lt gy, vf-f gr, tr lm grs, sl slty lp, qtzaren, rr-tr c cht grs, w srt, ang-rd, cln, disagg lp, mod p-mod w ind, com dolc & silc cmt, mnr-loc com qtz ovgths, tr intstl pyr, comy tt-3% por, mnr 5-9% por, tr g strk, mnr flor aa, tr ques cut.

1827-1835 SS lt tan-lt gy, predy vf-f gr, mnr f-vf gr wi tr lm grs, qtzaren, comy vary slty occy grdg-sdy sltst strg, w srt, ang-srd-occy rd, cln, comy mod-mod w ind, loc p-v w ind, com loc abnt dolc & mnr loc com silc cmt, tr qtz ovgths, incr tr intstl pyr, predy tt-2% por, tr-mnr str p por, mnr ptchy dull-occy bri yel-yel



abnt dolc & mnr loc com silc cmt, tr qtz ovgths, incr tr intstl pyr, predy tt-2% por, tr-mnr str p por, mnr ptchy dull-occy bri yel-yel wh flor, tr ques cut, tr dk gy sh.

1835-1841 SS sim-abv, off wh-lt gy, vf-f gr, rr-tr lm grs, qtzaren, comy vary slty, mod w-w srt, ang-srd-occy rd, cln, mod-mod w ind, p ind & crmbly in mnr pt, decr com dolc & incr mnr-com silc cmt, decr rr-tr intstl pyr, predy tt-2% por, tr str p por, mnr ptchy pale yel wh flor, n cut.

1841-1848 DOL lt brn, dolaren, comy vf-m gr, m-vc gr ip, abnt off wh-lt brn v ang-sb ang dol grs, tr-mnr qtz grs bcmg loc abnt occy grdg-dolc ss, m-p srt, tr scat wh cht & rexl fos frags, tr-mnr dolc mtx-cmt, m ind, tr-loc mnr pyr, mnr p por, mnr ptchy dull-bri flor, n cut; intbd SS grdg from abv ip, lt brn-lt gy, vf-f gr, mnr m & tr c grs, v qtzs wi mnr-loc com dol grs, m srt, m ind, p ind & crmbly ip, com-abnt dolc cmt, pred n vis por, tr p-rr fr por, tr sp-ptchy blt, mnr dull flor, n cut.

1848-1852 SS lt gy, vf gr, mnr lf grs, vary slty, qtzaren, w srt, ang-srd, cln, tr arg ptgs, comy p-mod ind & crmbly, w ind ip, predy silc + mnr sp dolc cmt, tr qtz ovgths, rr-tr sp kaol, comy tt-2% por, mnr str p-fr por, mnr ptchy-sp blt, abnt mod-bri yel wh-yel flor, tr fnt ques cut.

1852-1856 SS v sim-abv, lt tan-lt gy, vf-f gr, sl slty, qtzaren, w srt, ang-srd-occy rd, cln, comy p ind & crmbly-fri, mod ind ip, mnr-com silc & tr-mnr sp dolc cmt, mnr qtz ovgths, var por: com 6-9%, less com 3-5%, evn mod pale yel flor, tr v fnt ques cut.

1856-1861 SS lt gy, vf, mnr-tr lf grs, vary slty, qtzaren, w srt, ang-srd, cln, tr sl arg, mnr arg ptgs, comy m-m w ind, p ind & crmbly-fri ip, pred silc & tr-mnr sp dolc cmt, tt-2% por, mnr str p-fr por, mnr sp-ptchy blt, mnr ptchy mod yel flor, tr fnt ques cut, tr blk blt slty-sdy sh.

1861-1864 SS lt tan, vf-f, tr m & c grs, qtzs wi tr-loc com dol grs, grds-mnr dolaren, m w-m srt, ang-rd, m-p ind & crmbly, com-abnt dolc cmt, pred n vis por, tr str p por, tr sp blt, abnt mod-dull yel flor, n cut, tr sh.

1864-1869 SS lt gy-lt tan, vf gr, tr-loc mnr lf grs, vary slty, pred qtzaren, loc tr-mnr dol grs, w-loc m w srt, ang-rd, cln, tr arg ptgs, var indn: com m-p ind, crmbly ip, loc m w-w ind, com dolc + mnr sp-ptchy silc cmt, tt-2% por, mnr str p-fr por, tr sp blt, com ptchy flor aa, n cut.

1869-1875 SS lt brn-lt gy, uf-uvf gr, tr-mnr lm grs, qtzaren wi clr-fros qtz, mod w srt, ang-rd, v cln, disagg ip, fri, p-mod ind, w ind in mnr pt, com sp-ptchy silc cmt, com-loc abnt qtz ovgths, var por: com 7-10% wi mnr g stks, less com 3-6% wi tr-mnr tt stks, tr sp blt, com ptchy pale-lt brn o stn, abnt bri yel-yel wh flor, fast p-fr thn yel wh difs & mnr stmg cut.

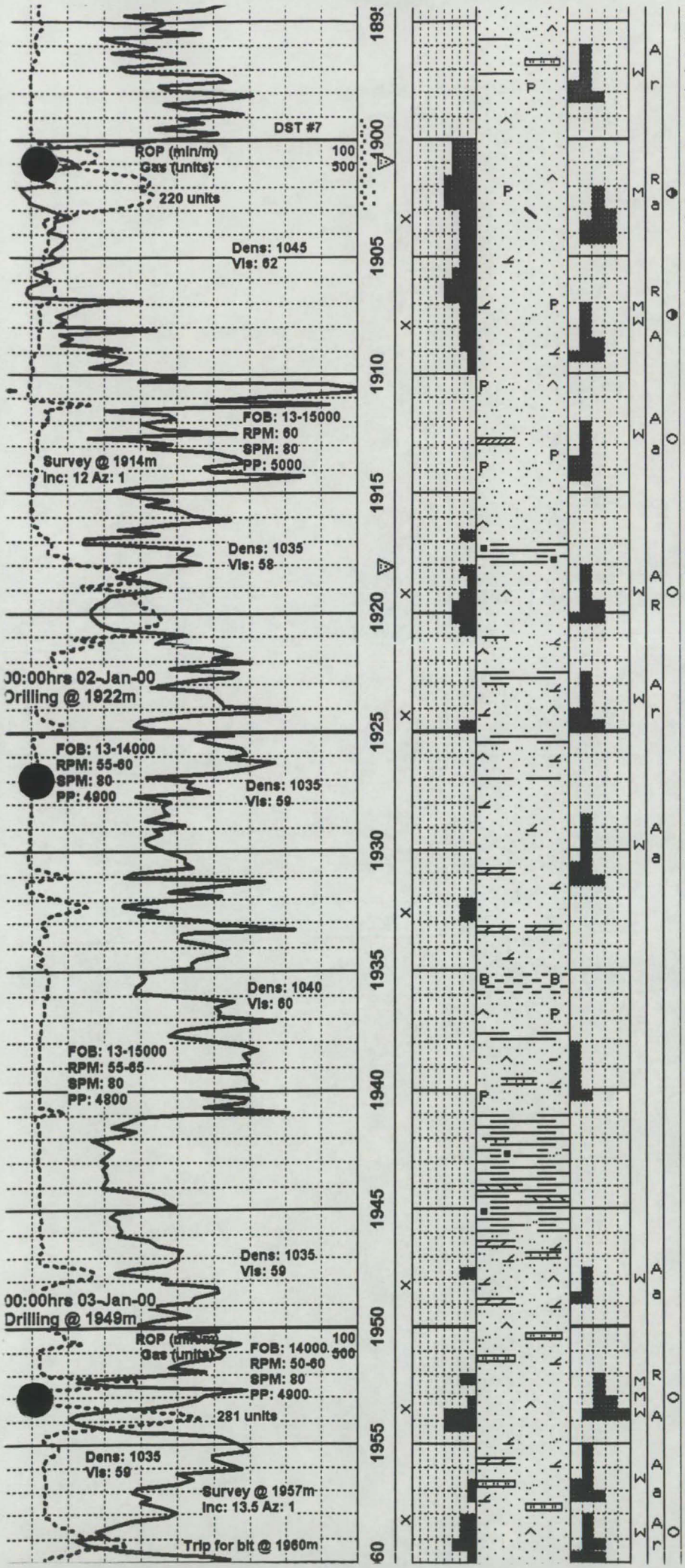
1875-1881 SS v sim-abv, vf-lf gr, rr-tr lm grs, sl-mod slty ip, qtzaren, w-m w srt, ang-rd, cln, rr arg ptgs, disagg in mnr pt, comy m-p ind & crmbly-sl fri, m w ind ip, com dolc & silc cmt, mnr loc com qtz ovgths, tr intstl pyr, com 6-9% por wi mnr g stks, mnr-com 3-5% wi tr tt stks, decr tr sp blt, com ptchy fnt-lt brn o stn, decr com-abnt flor aa, decr p v thn difs & stmg cut, tr blk sh.

1881-1885 SS lt gy, vf gr, tr-loc mnr f grs, vary slty, qtzaren, w srt, ang-rd, mnr disagg grs, cln, comy m-m p ind, crmbly ip, loc w ind, com silc + var tr-com sp-ptchy dolc cmt, incr tr-loc mnr pyr, pred tt-2% por, mnr str p-rr fr por, mnr ptchy dull-mod pale yel flor, tr fnt ques cut.

1885-1890 SS as prev desc bcmg incrly slty ip grdg-sdy siltst, incr com-loc abnt dolc & decr com-mnr ptchy silc cmt, incr tr-mnr sp-ptchy intstl pyr, por & shows aa, incr tr dk gy-blk bit pyrc ip sh.

1890-1894.5 SS wi intbd DOL; SS aa ip bcmg decrly slty, vf-f gr & comy disagg ip, m-m w srt, rd-ang, infr com fr por, shows aa; DOL lt-m gy, crpxln, v frm-hd, sl chty ip,vary slty-sdy grdg-v dolc siltst & ss lams-strg, tt.

1894.5-1900 SS lt gy, vf gr, tr loc mnr f grs, vary slty occy grdg-sdy



sltst, qtzaren, w srt, ang-srd, pred cln, loc sl-mod arg wi tr-mnr arg ptgs, comy m-m w ind, loc p-v w ind, com-abnt silc + tr-mnr sp-ptch dolc cmt, incr mnr-loc com ptchy-sp pyr, pred tt-2% por, tr-mnr str p por, mnr dull flor, n cut, tr-mnr SH lt gy gn, sb plty, m frm-sft, v mm, v slty-sdy comy grdg-vary arg sltst.

1900-1907 SS lt gy, vf-um gr, qtzaren wi fros-mnr clr qtz, mod srt, rd-sb ang, cln, pred disagg, mnr p-v p ind ctgs wi sp silc & dolc cmt, incr mnr loc com ptchy-sp pyr, tr sp kaol, var g-p por in cons ctgs, infr pred g-fr por, com sp-ptchy bit, com ptchy yel gn & pale yel flor, mnr p fnt stmg & difs cut, tr-mnr lam-mot sft mrly-anhydc strg.

1907-1910 SS lt gy-fnt brn, vf-uf gr, sl slty, qtzaren wi com-abnt fros qtz, cln, m w srt, rd-ang, pred p ind & fri, com dolc cmt, decr mnr sp-ptch pyr, pred vary fr por wi loc g-p stks, tr sp bit, abnt-evn bri pale yel gn flor, com p thn difs & stmg cut.

1910-1916 SS lt gy, vf gr, mod-v slty grdg-sltst ip, qtzaren, ang-sb ang, comy m w-v w ind, com silc & mnr dolc cmt, com-loc abnt ptchy-sp pyr cmt, p ind & crmbly ip, pred tt-3% por, mnr str p-fr por, tr-mnr sp bit, abnt pale yel flor, tr v fnt cut aa, mnr anhydc strg: wh, com-abnt dk brn vf mots & lams, chky, sft, pyrc ip, tr v pyrc graphite lams.

1916-1921 SS lt tan-lt gy, vf-f gr, sl slty ip, qtzaren wi pred clr qtz, w srt, ang-rd, disagg ip, p-mod ind, fri, silc cmt, mnr-com qtz ovgths, var por: com fr wi mnr g stks, mnr-com p wi tr tt strks, tr sp bit, abnt bri yel wh flor, tr fnt ques cut, mnr SH blk, plty, v frm-hd, brit, fis, carb-bit wi com coaly deb & ptgs, mnr clyst strg.

1921-1927 SS & SLTST; SS lt brn, vf gr, tr lf grs, slty, qtzaren, m w srt, ang-srd, tr arg ptgs, m w-m p ind, dolc & silc cmt, tt-p por, evn mod lt yel flor, n cut, mnr m brn vf-f m srt vary arg ss wi mnr arg ptgs & com dolc cmt, tt, intbd SLTST m-dk brn, frm-hd, loc sft & crmbly, qtzs, vary arg, mod-v dolc, tt, mnr SH sim-abv bcmg sl pyrc ip, rr pyrzd ost, mnr MARL lt-m gy wi vf wh mots & lams, sft, chky, tr clyst.

1927-1935 SS bf-tan, vf gr, tr f grs, slty grdg-mnr sdy sltst, v qtzs, w srt, ang-sb ang, pred p-mod ind wi com-abnt dolc cmt-mtx, grdg-mnr sdy dol, w ind in mnr pt wi str tt silc cmt, pred n vis por, tr str p por, com dull-mod yel flor, tr fnt ques cut, tr-mnr DOL m brn, crpxln, brit, rexl wkst, tt.

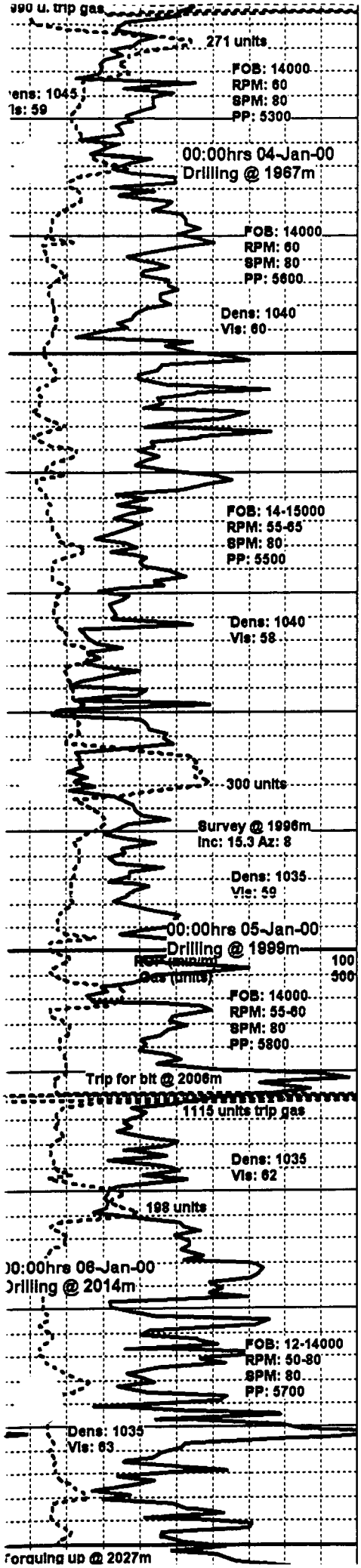
1935-1941 SLTST lt-m gy, v qtzs, tr musc & dk spks, pred hd & dns, sl-vary sdy occy grdg-ss, com silc & dolc cmt, sl arg ip, mnr-com arg-micac ptgs & lams, mnr-loc abnt pyr, loc m ind wi tr-mnr p por, pred tt, tr sp bit, tr-mnr dull flor, n cut, mnr SH blk-blk brn, plty, fis, frm-sft, v mm, slty-sl sdy ip, mnr m-vc occy graphitic pyr nods, mnr CLYST lt-m brn, vf wh-lt gy mots & lams, v sft, bentc.

1941-1946 SH blk-brn blk, sb plty-sb blky, frm-hd, fis, sm & fnty mm ip, vary slty-sl sdy ip occy grdg-arg sltst lams-strgs, tr-mnr loc v mm, carb-bit ip, sb wxy ip grdg-clyst, mnr pyr nods, mnr dk brn sid nods & strgs.

1946-1952 SLTST lt brn, v qtzs, sl-mod sdy grdg-slty ss ip, m w-m p ind, abnt dolc cmt-mtx, grds-mnr slty-sdy dol, sl arg in mnr pt, tr arg ptgs-lams, mnr dol allochems, n vis por, com dull flor, n cut; intbd SS lt gy-lt brn, v f gr, slty grdg-sltst ip, qtzaren, w srt, ang-sb ang, comy m-m w ind, p ind & crmbly ip, pred silc + mnr sp-str dolc cmt, com-abnt dull yel-mod yel wh flor, tr fnt ques cut.

1952-1954.5 SS lt gy, lf-um gr, tr slt & c grs, qtzaren, fros-clr qtz, m-m w srt, rd-ang, cln, pred disagg, mnr p-w ind ctgs wi mnr-loc abnt silc cmt, var tt-g por in cons ctgs, infr com fr-g por, tr sp bit, mnr dull-bri flor, tr fnt ques cut.

1954.5-1960 SS lt brn, vf gr, tr lf grs, mod slty grdg-sltst ip, qtzaren, tr dol grs, w srt, ang-sb ang, cln, loc sl arg, tr arg ptgs & lams, m w-m p ind, com-abnt dolc cmt, occy grds-sdy dol, pred tt-2% por, abnt dull yel flor, tr fnt ques cut, mnr SS #2 vf-f gr, qtzaren, w srt, cln, p ind, crmbly-fri, silc cmt, mnr qtz ovgths, com fr-tr str g por, tt-p ip, tr-mnr sp bit, abnt dull-mod flor, tr-mnr v p



1960-1965 SS sim-abv, lt brn, vf gr, tr-loc mnr lf grs, vary slty grdg-mnr sltst, qtzaren, w srt, ang-srd, cln, tr-mnr arg ptgs & lams, m w-m p ind, loc v w ind, com-abnt silc cmt, tr-mnr qtz ovgths, tt-2% por, mnr str p-fr por, tr sp bit, abnt bri yel wh flor, mnr p fnt difs cut, tr blk sh.

1965-1974 SS lt brn-lt gy, pred vf gr, tr loc mnr lf grs, vary slty occy grdg-sdy sltst, qtzaren, w srt, ang-sb ang, pred cln, tr-mnr sl arg, tr arg ptgs, pred m-m w ind, loc p-v w ind, pred silc cmt, tr-loc mnr sp-ptch dolc cmt, tr loc com sp-ptchy kaol, tr-mnr qtz ovgths, com p (3-6%) por, tt-2% ip, tr str fr por, com ptchy-sp-occy str bit-pybit, abnt-evn dull yel gn flor, tr v fnt ques cut, tr SH: blk, plty, frm, micac, bit, comy slty.

1974-1981 SS lt-m brn-brn gy, vf gr, pred mod-v slty comy grdg-sdy sltst, qtzaren, w srt, ang-sb ang, incrly sl arg in mnr pt, mnr arg ptgs, m w-p ind & crmbly, silc + tr sp dolc cmt, tr sp kaol, pred n vis por, tr-mnr str p por, mnr sp-ptch pybit, flor & cut aa.

1981-1986 SS wi intbd SH; SS lt brn, vf-f gr, mnr m grs, qtzaren, m w-m srt, ang-rd, pred cln, sl-mod arg in mnr pt, incr mnr-loc com arg-bit ptgs, disagg ip, comy p ind & fri-crmbly, m-m w ind ip, com-loc abnt silc cmt, com qtz ovgths, com tt-3% por, mnr-com str fr-p por ip, decr com-abnt flor aa, cut aa, mnr intbd SH blk, plty, frm-sft, mm, bit, sl-v slty occy grdg-arg sltst strg, mnr dk brn sft chky mot ip bit? clyst, tr anhydc strg wi dk brn mots & lams.

1986-1990 SS wi SH; SS as prev desc bcmg sl fnr gr, incrly slty ip, incr mnr-com arg-bit ptgs, incr mnr intbd SH sim-abv, blk-v dk brn, plty-sb blky, sft-frm, fis, bit-v bit, mm, sb res, tr clyst aa, tr anhydc strg aa.

1990-1995 SS lt brn, vf-f gr, tr lm grs, qtzaren, pred clr qtz, m w srt, ang-srd, occy rd, sl-mod slty ip, cln, rr-tr arg ptgs, disagg ip, m-w ind ip, p ind & fri-crmbly ip, com-loc abnt silc cmt, mnr loc com qtz ovgths, tr sp kaol, com tt-3% por, less com 4-8% por, tr str g por, abnt dull yel gn flor, mnr p v thn difs & stmg cut, tr sh strg aa.

1995-2000 SS v sim-abv bcmg fnr, lt tan, vf-f gr, rr lm grs, comy vary slty, qtzaren, m w srt, ang-srd, pred cln, sl-mod arg in mnr pt, tr arg ptgs, disagg in mnr pt, m-w ind ip, p ind & fri-crmbly ip, com-abnt silc cmt, mnr qtz ovgths, tr sp kaol, com tt-2% por, mnr str 4-8% por, abnt dull-v dull yel gn flor, tr v fnt ques cut, tr sh aa.

2000-2005 SS pred aa, mnr SS #2 lt gy, f-vf gr, tr lm grs, qtzaren, m w srt, ang-srd, cln, comy disagg, mnr-com p-m w ind cons ctgs, com sp-ptch silc cmt, com-abnt qtz ovgths, rr-tr sp kaol, com var fr-g por in cons ctgs, mnr p-tt strks, abnt dull-mod yel flor, n cut.

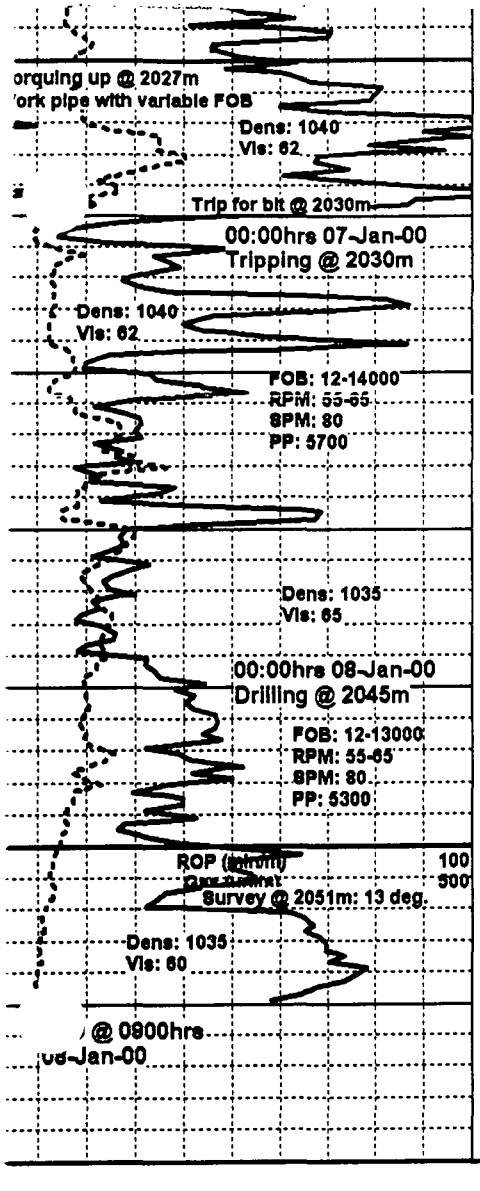
2005-2010 SS v sim-abv bcmg sl csr, lt brn, vf-f gr, rr lm grs, sl slty, qtzaren, m w srt, ang-srd, cln, tr arg ptgs, disagg ip, m-w ind ip, p ind & fri-crmbly ip, com-abnt silc cmt, mnr-com qtz ovgths, tr sp kaol, com tt-2% por, mnr str 4-8% por, abnt dull-v dull yel gn flor, tr v fnt ques cut.

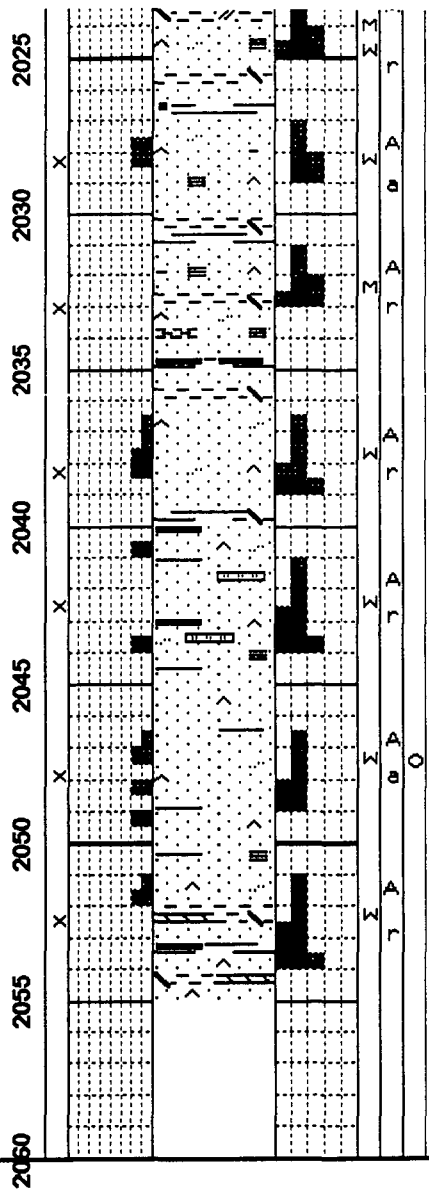
2010-2015 SS lt tan, vf-f gr, tr lm grs, comy sl-mod slty, m w srt, ang-srd, cln, tr arg ptgs, decrly disagg in mnr pt, vary m p-w ind, com-loc abnt silc cmt, rr-tr sp dolc cmt, mnr qtz ovgths, tr ptchy pyr, pred vary p-tt por, mnr str fr por, com dull yel-tr bri yel wh flor, n cut, tr blk bit sh strg.

2015-2019 SS lt-m brn, vf, tr f grs, slty, qtzaren, w srt, ang-sb ang, vary arg in mnr pt, mnr-com arg ptgs, comy m w-v w ind, com-abnt silc cmt, tr sp kaol, tr ptchy pyr, loc vf-f gr wi com qtz ovgths & fr por, mnr-com dull flor, tr fnt ques cut, mnr intbd SH & CLYST as desc bel.

2019-2022 CLYST dk brn, v sft, v bit wi com-abnt fr cut, vary pyrc ip, mnr-loc com irreg-chaot vf anhydrc lams & strg, loc fis wi abnt carb-coaly mat grdg-SH blk, vary frm-sft, v fis, v carb-coaly grdg-shly bit-sb bit coal.

2022-2030 SS wi intbd SH & CLYST; SS var: lt-m brn, vf gr & slty grdg-sltst ip, vf-f wi tr-mnr lm grs ip, v qtzs, m-m w srt, ang-srd, cln-vary arg, com-abnt arg ptgs, vary v w-m ind, abnt-com silc cmt, tr kao, loc m p ind ip, tr loc com ptchy pyr, pred tt-2% por,





grdg-sltst ip, vf-f wi tr-mnr lm grs ip, v qtzs, m-sr w srt, ang-srd, cln-vary arg, com-abnt arg ptgs, vary v w-m ind, abnt-com silc cmt, tr kao, loc m p ind ip, tr loc com ptchy pyr, pred tt-2% por, tr-mnr str p-rr fr por, mnr-com v dull flor, tr v fnt cut, mnr lt brn vf-f ss, cln qtzaren, w srt, m p-m w ind, com-abnt silc cmt, com qtz ovgths, str p-fr por, abnt v dull flor, tr v fnt ques cut; mnr intbd CLYST & SH aa.

2030-2036 SS wi intbd SH & CLYST; SS pred aa, mnr-com m brn, vf-f gr, tr lm grs, slty, v qtzs, m srt, ang-rd, pred sl-mod arg, cln ip, com-abnt arg ptgs, m w-m p ind, com-abnt silc cmt, tr sp kao, tr sp-ptchy pyr, tr-mnr sdy pyr nods, pred tt-2% por, tr dull flor, rr fnt ques cut; CLYST aa, incr SH aa comy grdg-bit coal.

2036-2039 SS lt brn, vf gr wi tr lf grs, vf-f gr in mnr pt, vary slty occy grdg-sdy sltst, qtzaren, w srt, ang-srd, pred cln, mnr arg ptgs, m w-m p ind, abnt-com silc cmt, tr sp kao, rr-tr sp dolc cmt, mnr loc com qtz ovgths, comy tt, mnr-com str p-fr por, abnt v dull flor, n cut, tr sh aa.

2039-2044 SS var as prev desc ip, pred v slm-abv bcmg sl fnr, incrly slty ip grdg-mnr sdy sltst, cln-loc vary arg, incr mnr-com arg ptgs, v w ind ip, decr pred tt por, mnr str p por, flor & cut aa, tr-mnr coal strg: blk-brn blk, sft-frm, blt, shly ip grdg-blt sh aa, tr blt clyst aa.

2044-2050 SS lt brn, vf gr, tr lf grs, vary slty, qtzaren, w srt, ang-sb ang, pred cln, tr sl arg, tr-mnr arg ptgs, vary ind: m-m w ip, p-m p & crmbly-fri ip, com-abnt silc cmt, tr sp-ptchy pyr, rr-tr sp kao, tr qtz ovgths, pred tt-3% por, mnr str p-fr por, tr sp blt, abnt-evn dull yel gn flor, tr fnt difs cut, tr blt sh & coal aa.

2050-2055 SS mixed: aa ip, vary brn-brn gy, pred vf gr & vary slty, mnr vf-f gr, v qtzs-qtzaren, cln-vary arg, mnr v silc sltst, vary p-v w ind, com-abnt silc cmt, tr sp kao, tr pyr, pred tt-2%, mnr str p-fr por, com ptchy dull flor, tr ques cut; intbd CLYST v blt wi anhydc lams & mots aa, mnr blt COAL grdg blt SH aa, slty-sdy ip, mnr-com sdy sidc strgs-nods.

PARAMOUNT RESOURCES LTD.
FORT LIARD

I-46
SRFC.I-46
FORT LIARD
N.W.T. Canada

S U R V E Y L I S T I N G

by
Baker Hughes INTEQ

Your ref : PARAMOUNT FT. LIARD I-46
Our ref : svy10226
License :

Date printed : 29-Dec-1999
Date created : 24-Nov-1999
Last revised : 29-Dec-1999

Field is centred on 467869.990,6704591.610,-123.00000,N
Structure is centred on n60 5 32.156,w123 22 59.643,-123

Slot location is n60 5 32.156,w123 22 59.643
Slot Grid coordinates are N 6661748.463, E 478683.716
Slot local coordinates are 0.00 N 0.00 E

Projection type: mercator - UTM, Spheroid: NAD 83

Reference North is True North

PARAMOUNT RESOURCES LTD.
FORT LIARD,I-46
FORT LIARD,N.W.T. Canada

SURVEY LISTING Page 1
Your ref : PARAMOUNT FT. LIARD
Last revised : 29-Dec-1999

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert Depth	RECTANGULAR COORDINATES	Dogleg Deg/ 30m	Vert Sect
0.00	0.00	0.00	0.00	0.00 N 0.00 E	0.00	0.00
505.00	0.00	0.00	505.00	0.00 N 0.00 E	0.00	0.00
522.10	1.60	45.60	522.10	0.17 N 0.17 E	2.81	0.24
541.00	1.50	50.30	540.99	0.51 N 0.55 E	0.26	0.75
559.40	1.60	50.90	559.38	0.83 N 0.93 E	0.17	1.25
578.20	0.50	37.80	578.18	1.06 N 1.19 E	1.79	1.59
596.80	0.40	214.20	596.78	1.07 N 1.20 E	1.45	1.60
616.20	0.20	222.40	616.18	0.99 N 1.14 E	0.32	1.51
634.80	0.10	146.70	634.78	0.95 N 1.13 E	0.32	1.47
654.20	0.10	57.70	654.18	0.94 N 1.15 E	0.22	1.49
664.10	0.20	85.40	664.08	0.95 N 1.18 E	0.37	1.51
673.10	0.20	85.40	673.08	0.95 N 1.21 E	0.00	1.54
691.60	0.20	39.50	691.58	0.98 N 1.26 E	0.25	1.59
711.70	0.40	49.90	711.68	1.05 N 1.34 E	0.31	1.70
730.90	0.30	43.20	730.88	1.13 N 1.42 E	0.17	1.82
750.20	0.30	43.00	750.18	1.20 N 1.49 E	0.00	1.92
769.80	0.30	24.00	769.78	1.29 N 1.55 E	0.15	2.01
789.20	0.50	39.40	789.18	1.40 N 1.62 E	0.35	2.14
807.80	0.50	24.20	807.78	1.54 N 1.71 E	0.21	2.29
827.00	0.60	38.60	826.98	1.69 N 1.80 E	0.27	2.47
846.20	0.50	48.00	846.18	1.83 N 1.93 E	0.21	2.65
875.40	0.60	30.70	875.37	2.04 N 2.10 E	0.20	2.92
894.40	0.50	20.20	894.37	2.21 N 2.18 E	0.22	3.08
912.70	0.60	46.20	912.67	2.35 N 2.28 E	0.44	3.25
931.30	0.60	22.80	931.27	2.51 N 2.38 E	0.39	3.43

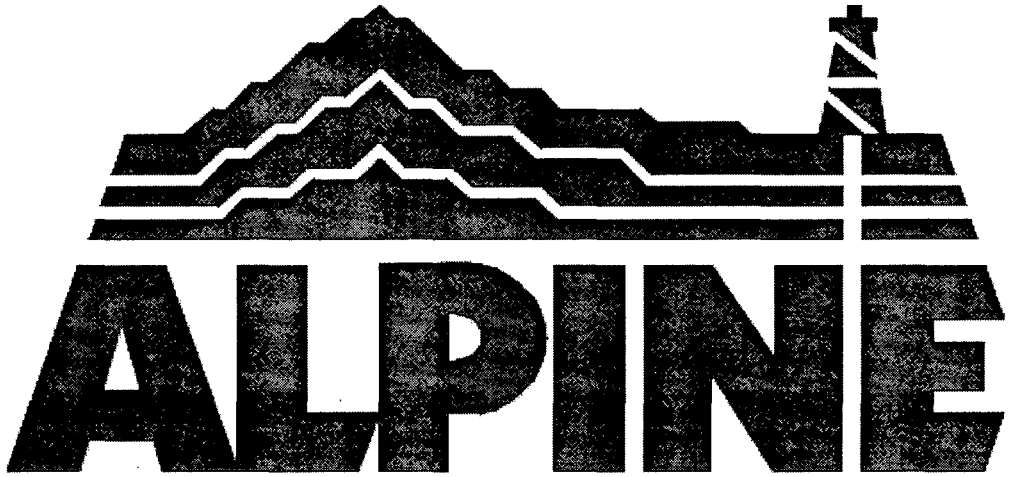
All data is in meters unless otherwise stated.
Coordinates from SRFC.I-46 and TVD from rotary table.
Bottom hole distance is 33.83 on azimuth 32.95 degrees from wellhead.
Vertical section is from wellhead on azimuth 51.10 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert Depth	RECTANGULAR COORDINATES	Dogleg Deg/ 30m	Vert Sect
950.20	0.40	41.40	950.17	2.65 N 2.47 E	0.40	3.58
968.40	0.50	52.60	968.37	2.74 N 2.57 E	0.22	3.72
987.80	0.50	26.50	987.77	2.87 N 2.68 E	0.35	3.88
1007.10	0.60	43.30	1007.07	3.02 N 2.78 E	0.29	4.06
1025.50	0.60	51.70	1025.47	3.15 N 2.92 E	0.14	4.25
1045.40	0.00	37.40	1045.37	3.21 N 3.01 E	0.90	4.36
1064.30	0.20	33.50	1064.27	3.24 N 3.02 E	0.32	4.39
1082.80	0.30	76.40	1082.77	3.28 N 3.09 E	0.33	4.46
1101.20	0.40	60.60	1101.17	3.32 N 3.19 E	0.23	4.57
1120.20	0.40	25.40	1120.17	3.41 N 3.28 E	0.38	4.70
1148.10	0.40	22.70	1148.07	3.59 N 3.36 E	0.02	4.87
1167.00	0.50	54.20	1166.97	3.70 N 3.45 E	0.42	5.01
1186.20	0.40	35.00	1186.16	3.80 N 3.56 E	0.28	5.16
1204.10	0.50	34.30	1204.06	3.92 N 3.64 E	0.17	5.29
1223.10	0.60	32.60	1223.06	4.07 N 3.74 E	0.16	5.47
1252.20	0.50	41.00	1252.16	4.30 N 3.90 E	0.13	5.74
1281.60	0.80	39.70	1281.56	4.55 N 4.12 E	0.31	6.06
1298.80	1.30	41.80	1298.76	4.79 N 4.32 E	0.87	6.37
1318.10	1.50	47.10	1318.05	5.12 N 4.66 E	0.37	6.84
1337.40	2.40	45.90	1337.34	5.58 N 5.13 E	1.40	7.50
1356.80	2.90	56.50	1356.72	6.13 N 5.83 E	1.08	8.39
1377.80	3.40	55.30	1377.69	6.78 N 6.79 E	0.72	9.54
1396.70	3.50	55.30	1396.55	7.43 N 7.72 E	0.16	10.67
1416.00	2.90	52.70	1415.82	8.06 N 8.59 E	0.96	11.75
1431.80	2.70	49.40	1431.60	8.54 N 9.19 E	0.49	12.52

All data is in meters unless otherwise stated.
Coordinates from SRFC.I-46 and TVD from rotary table.
Bottom hole distance is 33.83 on azimuth 32.95 degrees from wellhead.
Vertical section is from wellhead on azimuth 51.10 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert Depth	RECTANGULAR COORDINATES	Dogleg Deg/ 30m	Vert Sect
1451.40	3.10	48.50	1451.18	9.19 N 9.94 E	0.62	13.51
1472.60	2.90	47.60	1472.35	9.94 N 10.77 E	0.29	14.62
1491.70	2.50	47.30	1491.43	10.54 N 11.43 E	0.63	15.52
1511.10	2.60	46.40	1510.81	11.13 N 12.06 E	0.17	16.38
1530.60	2.80	46.30	1530.29	11.77 N 12.72 E	0.31	17.29
1586.00	2.50	23.00	1585.63	13.81 N 14.18 E	0.60	19.71
1650.00	2.00	23.00	1649.58	16.13 N 15.16 E	0.23	21.92
1760.00	8.00	14.00	1759.11	25.33 N 17.76 E	1.65	29.73
1780.00	10.00	10.00	1778.87	28.39 N 18.40 E	3.14	32.15

All data is in meters unless otherwise stated.
Coordinates from SRFC.I-46 and TVD from rotary table.
Bottom hole distance is 33.83 on azimuth 32.95 degrees from wellhead.
Vertical section is from wellhead on azimuth 51.10 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ



CUSTOMER:	Paramount Resources Ltd.	**FILE NAME:**	J-4148.xls
WELL NAME:	Para et al Fort Liard	**CUSTOMER REP:**	W. Calihoo
LOCATION:	I-46	**SUPERVISORS:**	B. Tiedemann
START DATE:	13-Dec-99	**TEST UNIT:**	
FORMATION:		**OPERATION:**	Underbalanced Drilling

Alpine Oil Services Corp.

ALPINE OIL SERVICES CORP.

Job No : 4148 Alpine Supervisor: BRENT TIEDEMANN
Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/13	SPOT AND RIG UP EQUIPMENT. RIG UP ROTATING HEAD.														
99/12/14															
14:00:00	PRESSURE TEST FLOWLINE AND MANIFOLD TO 10,000 kPa.														
15:00:00	START TO RUN IN HOLE TO DRILL OUT CEMENT.														
22:00:00	START DRILLING OUT CEMENT.														
99/12/15															
2:38:00	START TO PULL OUT OF HOLE.														
6:08:00	OUT OF HOLE.														
6:39:00	RUN IN HOLE TO DISPLACE HOLE WITH NITROGEN.														
9:30:00	20 STANDS OFF BOTTOM. DIVERT FLOW LINE FROM SHAKER TO PRESSURE TANK.														
9:45:00	INSTALL BEARING ASSEMBLY IN ROTATING HEAD. PREPARE TO BLOW DOWN HOLE WITH NITROGEN.														
10:00:00	NITROGEN LINE FROZEN FROM STAND PIPE BACK.														
10:00:02	-0.53	-22.08	-0.05	0	0	0	0	0	0	0	0	0			
10:10:02	12.43	-22.08	0.05	0	0	0	0	0	0	0	0	0			
10:20:01	20.1	-22.09	-0.05	0	0	0	0	0	0	0	0	0			
10:30:01	25.99	-22.08	0.2	0	0	0	0	0	0	0	0	0			
10:40:01	28.93	-22.08	0.2	0	0	0	0	0	0	0	0	0			
10:50:01	28.93	-22.08	0.2	0	0	0	0	0	0	0	0	0			
11:00:01	28.93	-22.08	0.2	0	0	0	0	0	0	0	0	0			
11:10:01	27.17	-22.08	0.05	0	0	0	0	0	0	0	0	0			
11:20:01	25.99	-22.08	0.44	0	0	0	0	0	0	0	0	0			
11:30:01	18.33	-22.08	0.05	0	0	0	0	0	0	0	0	0			
11:40:01	14.2	-22.08	0.44	0	0	0	0	0	0	0	0	0			
11:50:01	15.97	-22.06	0.83	0	0	0	0	0	0	0	0	0			
12:00:01	20.68	-22.04	1.23	0	0	0	0	0	0	0	0	0			
12:10:01	14.2	-22.09	0.44	0	0	0	0	0	0	0	0	0			
12:20:01	11.26	-22.08	0.44	0	0	0	0	0	0	0	0	0			
12:25:00	START PUMPING NITROGEN TO DISPLACE HOLE.														
12:30:01	11.26	-22.08	0.2	0	0	0	-48.96	0	0	0	0	34			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/15															
12:40:01	9.49	-13.76	0.29	0	0	0	-48.96	0	0	0	0	34			
12:50:01	12.43	-11.71	0.29	0	0	0	-48.96	0	0	0	0	34			
12:54:00	WATER TO SURFACE.														
13:00:01	183.35	-2.6	9.87	3.84	0	3.84	-45.12	0	0	0	0	34			
13:10:01	76.07	-1.63	46.84	58.79	0	58.79	9.83	1.21	0	1.21	0	34			
13:20:01	53.69	-5.16	33.2	50.25	0	50.25	1.29	1.56	0	1.56	0	34			
13:21:00	STOP PUMPING NITROGEN. 13.45 m3 WATER RECOVERED. CONTINUE TO RUN IN HOLE.														
13:30:01	12.43	-8.11	2.01	0	0	0	0	1.63	0	1.63	0	0			
13:40:01	13.03	-12.42	1.33	0	0	0	0	1.63	0	1.63	0	0			
13:50:01	8.31	-16.48	0.93	0	0	0	0	1.63	0	1.63	0	0			
14:00:01	8.31	-19.49	0.93	0	0	0	0	1.63	0	1.63	0	0			
14:10:01	8.31	-21.76	0.93	0	0	0	0	1.63	0	1.63	0	0			
14:20:01	5.37	-22.08	0.93	0	0	0	0	1.66	0	1.66	0	0			
14:30:01	5.37	-22.08	1.92	0	0	0	0	1.68	0	1.68	0	0			
14:40:01	8.31	-22.05	-0.05	0	0	0	0	1.68	0	1.68	0	0			
14:50:01	-15.26	-22.08	-23.13	0	0	0	0	1.68	0	1.68	0	0			
14:53:00	ON BOTTOM. START PUMPING NITROGEN TO DISPLACE HOLE.														
15:00:01	-12.31	-22.09	-17.48	0	0	0	-48.96	1.7	0	1.7	0	34			
15:10:01	-5.25	-22.09	-9.28	0	0	0	-48.96	1.8	0	1.8	0	34			
15:20:01	7.13	-22.09	-1.62	0	0	0	-48.96	1.9	0	1.9	0	34			
15:30:02	6.54	-22.08	5.7	0	0	0	-48.96	2	0	2	0	34			
15:36:00	WATER TO SURFACE.														
15:40:01	113.17	-5.93	265.93	195.03	0	195.03	146.07	2.49	0	2.49	0	34			
15:50:01	120.27	0.11	76.06	82.33	0	82.33	33.37	3.54	0	3.54	0	34			
16:00:01	68.99	-2.54	41.83	55.16	0	55.16	6.2	3.96	0	3.96	0	34			
16:10:01	58.4	-4.57	40.95	54.18	0	54.18	5.22	4.34	0	4.34	0	34			
16:20:01	55.45	-6.4	40.95	53.47	0	53.47	4.51	4.71	0	4.71	0	34			
16:30:01	55.45	-7.8	40.46	52.23	0	52.23	3.27	5.08	0	5.08	0	34			
16:40:01	55.45	-8.78	38.5	52.44	0	52.44	3.48	5.45	0	5.45	0	34			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/15															
16:50:01	60.15	-9.3	35.69	47.6	0	47.6	-1.36	5.8	0	5.8	0	34			
17:00:00	TOTAL WATER RECOVERED - 22.0 m3. CONTINUE TO DRY HOLE.														
17:00:01	58.4	-9.39	34.81	48.14	0	48.14	-0.82	6.13	0	6.13	0	34			
17:10:01	53.69	-9.42	36.64	49.7	0	49.7	0.74	6.47	0	6.47	0	34			
17:20:01	60.15	-9.48	37.16	49.88	0	49.88	0.92	6.82	0	6.82	0	34			
17:30:01	55.45	-9.89	36.78	49.65	0	49.65	0.69	7.16	0	7.16	0	34			
17:40:01	52.5	-9.99	36.04	48.77	0	48.77	-0.19	7.5	0	7.5	0	34			
17:50:01	53.69	-10.2	34.43	47.43	0	47.43	-1.53	7.84	0	7.84	0	34			
18:00:01	58.4	-9.94	33.83	46.53	0	46.53	-2.43	8.16	0	8.16	0	34			
18:10:01	63.1	-10.29	32.01	44.77	0	44.77	-4.19	8.48	0	8.48	0	34			
18:20:01	52.5	-11.34	27.45	40.71	0	40.71	-8.25	8.77	0	8.77	0	34			
18:30:01	50.74	-12.14	27.8	40.76	0	40.76	-8.2	9.05	0	9.05	0	34			
18:31:00	STOP PUMPING NITROGEN. MONITOR FOR INFLOW.														
18:40:01	61.91	-13.57	4.17	0	0	0	0	9.13	0	9.13	0	0			
18:45:00	CLOSE ANNULUS. MONITOR BUILD UP.														
18:50:01	52.5	-16.01	1.67	0	0	0	0	9.13	0	9.13	0	0			
19:00:01	49.56	-18.24	1.18	0	0	0	0	9.13	0	9.13	0	0			
19:00:00	OPEN ANNULUS. WELL DEAD. PULL OUT OF HOLE.														
19:10:01	55.45	-20.04	1.18	0	0	0	0	9.13	0	9.13	0	0			
19:20:01	57.21	-20.06	1.57	0	0	0	0	9.13	0	9.13	0	0			
19:30:01	50.74	-20.08	1.03	0	0	0	0	9.13	0	9.13	0	0			
19:40:01	49.56	-20.09	1.18	0	0	0	0	9.13	0	9.13	0	0			
19:50:01	52.5	-20.08	0.69	0	0	0	0	9.16	0	9.16	0	0			
20:00:01	52.5	-20.09	0.44	0	0	0	0	9.24	0	9.24	0	0			
20:10:01	47.8	-20.09	0.79	0	0	0	0	9.29	0	9.29	0	0			
20:20:01	49.56	-20.08	1.18	0	0	0	0	9.3	0	9.3	0	0			
20:30:01	52.5	-20.08	1.42	0	0	0	0	9.3	0	9.3	0	0			
20:40:01	60.15	-20.06	1.82	0	0	0	0	9.3	0	9.3	0	0			
20:50:01	52.5	-20.07	1.42	0	0	0	0	9.3	0	9.3	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/15															
21:00:01	52.5	-20.09	1.18	0	0	0	0	9.3	0	9.3	0	0			
21:10:01	57.21	-20.09	1.33	0	0	0	0	9.3	0	9.3	0	0			
21:20:01	49.56	-20.08	1.18	0	0	0	0	9.3	0	9.3	0	0			
21:30:01	49.56	-20.06	0.93	0	0	0	0	9.3	0	9.3	0	0			
21:40:01	54.26	-20.08	1.33	0	0	0	0	9.3	0	9.3	0	0			
21:50:01	49.56	-20.09	0.93	0	0	0	0	9.3	0	9.3	0	0			
22:00:00	OUT OF HOLE.														
22:00:01	49.56	-20.09	0.93	0	0	0	0	9.3	0	9.3	0	0			
22:10:01	50.74	-20.08	0.79	0	0	0	0	9.3	0	9.3	0	0			
22:10:00	RUN IN HOLE WITH AIR HAMMER.														
22:20:01	52.5	-20.09	0.93	0	0	0	0	9.3	0	9.3	0	0			
22:30:01	49.56	-20.08	0.93	0	0	0	0	9.3	0	9.3	0	0			
22:40:01	47.8	-20.09	0.79	0	0	0	0	9.3	0	9.3	0	0			
22:50:01	49.56	-20.09	0.93	0	0	0	0	9.3	0	9.3	0	0			
23:00:01	49.56	-20.08	0.93	0	0	0	0	9.3	0	9.3	0	0			
23:10:01	49.56	-20.08	0.69	0	0	0	0	9.3	0	9.3	0	0			
23:20:01	52.5	-20.09	0.69	0	0	0	0	9.3	0	9.3	0	0			
23:30:01	52.5	-20.09	0.93	0	0	0	0	9.3	0	9.3	0	0			
23:40:01	61.91	-20.09	1.47	0	0	0	0	9.3	0	9.3	0	0			
23:50:01	52.5	-20.08	1.18	0	0	0	0	9.3	0	9.3	0	0			
0:00:01	57.21	-20.07	1.08	0	0	0	0	9.3	0	9.3	0	0			
0:10:03	52.5	-20.08	0.69	0	0	0	0	9.3	0	9.3	0	0			
0:20:03	50.74	-20.08	0.54	0	0	0	0	9.3	0	9.3	0	0			
0:30:03	50.74	-20.06	0.54	0	0	0	0	9.3	0	9.3	0	0			
0:40:03	52.5	-20.06	0.69	0	0	0	0	9.3	0	9.3	0	0			
0:50:03	53.69	-20.08	0.54	0	0	0	0	9.3	0	9.3	0	0			
1:00:03	60.15	-20.06	1.08	0	0	0	0	9.3	0	9.3	0	0			
1:10:03	50.74	-20.08	0.54	0	0	0	0	9.3	0	9.3	0	0			
1:20:03	52.5	-20.09	0.69	0	0	0	0	9.3	0	9.3	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
1:30:03	50.74	-20.09	0.29	0	0	0	0	9.3	0	9.3	0	0			
1:40:03	52.5	-20.09	0.69	0	0	0	0	9.3	0	9.3	0	0			
1:50:03	54.26	-20.08	1.08	0	0	0	0	9.3	0	9.3	0	0			
2:00:03	54.26	-20.08	1.08	0	0	0	0	9.3	0	9.3	0	0			
2:10:03	52.5	-20.08	0.44	0	0	0	0	9.3	0	9.3	0	0			
2:20:03	49.56	-20.06	0.44	0	0	0	0	9.3	0	9.3	0	0			
2:30:03	54.26	-20.06	0.83	0	0	0	0	9.3	0	9.3	0	0			
2:40:03	52.5	-20.09	0.44	0	0	0	0	9.3	0	9.3	0	0			
2:50:03	47.8	-20.07	0.29	0	0	0	0	9.3	0	9.3	0	0			
3:00:03	52.5	-20.09	0.44	0	0	0	0	9.3	0	9.3	0	0			
3:10:03	52.5	-20.06	0.69	0	0	0	0	9.3	0	9.3	0	0			
3:20:03	47.8	-20.08	0.29	0	0	0	0	9.3	0	9.3	0	0			
3:21:00	BACK ON BOTTOM. INSTALL BEARING ASSEMBLY IN ROTATING HEAD.														
3:30:03	54.26	-20.05	1.08	0	0	0	0	9.3	0	9.3	0	0			
3:40:03	55.45	-20.07	0.44	0	0	0	0	9.3	0	9.3	0	0			
3:50:03	50.74	-20.09	0.29	0	0	0	0	9.3	0	9.3	0	0			
3:57:00	START PUMPING NITROGEN AT 36 m3/min.														
4:00:03	57.21	-20.06	14.83	22.65	0	22.65	-29.19	9.34	0	9.34	0	36			
4:10:03	53.69	-16.7	44.01	54.01	0	54.01	2.17	9.63	0	9.63	0	36			
4:15:00	HOLD SAFETY MEETING.														
4:20:03	58.4	-12.02	43.65	54.51	0	54.51	2.67	10.02	0	10.02	0	36			
4:30:03	61.34	-10.7	45.62	56.12	0	56.12	4.28	10.38	0	10.38	0	36			
4:40:03	63.1	-10.13	50.66	59.66	0	59.66	7.82	10.77	0	10.77	0	36			
4:50:03	58.4	-9.82	55.19	63.04	0	63.04	11.2	11.17	0	11.17	0	36			
4:50:00	RIG HOLD BOP DRILL.														
5:00:03	56.64	-9.66	47.44	57.76	0	57.76	5.92	11.58	0	11.58	0	36			
5:10:03	58.4	-9.54	50.04	58.42	0	58.42	6.58	11.97	0	11.97	0	36			
5:10:00	START DRILLING WITH AIR HAMMER.														
5:20:03	58.4	-9.39	6.33	0	0	0	-51.84	12.18	0	12.18	0	36			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
5:30:03	58.4	-9.35	54.21	62.15	0	62.15	10.31	12.66	0	12.66	0	36			
5:40:03	61.34	-9.22	30.89	44.99	0	44.99	-6.85	13.01	0	13.01	0	36			
5:50:03	58.4	-9.08	42.67	54.34	0	54.34	2.5	13.39	0	13.39	0	36			
5:53:00	DROP 1550 m SAMPLE.														
6:00:03	61.34	-8.94	41.44	53.33	0	53.33	1.49	13.76	0	13.76	0	36			
6:10:00	DROP 1555 m SAMPLE.														
6:10:03	61.34	-8.73	49.54	60.61	0	60.61	8.77	14.1	0	14.1	0	36			
6:20:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
6:20:03	70.75	-8.4	67.49	72.59	0	72.59	72.59	14.59	0	14.59	0	0			
6:26:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
6:30:03	56.64	-8.19	20.43	33.88	0	33.88	-17.96	14.88	0	14.88	0	36			
6:40:03	70.75	-8.25	25.03	39.17	0	39.17	-12.67	15.2	0	15.2	0	36			
6:50:03	58.4	-8.6	28.68	43.05	0	43.05	-8.79	15.55	0	15.55	0	36			
7:00:03	67.8	-8.62	70.92	74.8	0	74.8	22.96	15.9	0	15.9	0	36			
7:10:03	66.04	-8.29	64.16	70.86	0	70.86	19.02	16.27	0	16.27	0	36			
7:15:00	DROP 1560 m SAMPLE.														
7:20:03	68.99	-7.92	59.99	67.21	0	67.21	15.37	16.65	0	16.65	0	36			
7:30:03	61.34	-7.39	51.26	61.38	0	61.38	9.54	17.06	0	17.06	0	36			
7:40:00	DROP 1565 m SAMPLE.														
7:40:03	64.29	-7.05	30.89	45.57	0	45.57	-6.27	17.45	0	17.45	0	36			
7:47:00	KELLY DOWN. WORK PIPE.														
7:49:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
7:50:03	67.23	-6.28	49.3	60.22	0	60.22	60.22	17.91	0	17.91	0	0			
7:54:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
8:00:03	61.34	-7.08	30.29	43.7	0	43.7	-8.14	17.96	0	17.96	0	36			
8:10:03	70.75	-7.65	25.73	39.17	0	39.17	-12.67	18.01	0	18.01	0	36			
8:20:03	47.8	-7.61	32.22	46.99	0	46.99	-4.85	18.28	0	18.28	0	36			
8:25:00	RETURNS COMING BACK WET. PICK UP OFF BOTTOM AND CIRCULATE.														
8:30:03	45.43	8.77	26.12	42.04	0	42.04	-9.8	18.66	0	18.66	0	36			

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
8:40:03	152.61	15.71	51.26	61.52	0	61.52	9.68	19.1	0	19.1	0	36			
8:50:03	154.34	4.61	46.24	57.85	0	57.85	6.01	19.51	0	19.51	0	36			
9:00:03	157.29	2.83	45.51	56.95	0	56.95	5.11	19.9	0	19.9	0	36			
9:10:03	156.77	2.74	45.23	56.94	0	56.94	5.1	20.3	0	20.3	0	36			
9:14:00	RETURNS DRYING UP. RESUME DRILLING.														
9:20:03	117.26	2.72	22.78	37.7	0	37.7	-14.14	20.63	0	20.63	0	36			
9:24:00	DROP 1570 m SAMPLE.														
9:30:03	192.63	2.41	43.79	55.08	0	55.08	3.24	20.97	0	20.97	0	36			
9:40:03	164.4	2.46	42.18	54.17	0	54.17	2.33	21.34	0	21.34	0	36			
9:50:04	168.56	2.9	54.81	63.7	0	63.7	11.86	21.75	0	21.75	0	36			
9:55:00	INCREASE NITROGEN INJECTION RATE TO 41 m3/min.														
10:00:00	DROP 1575 m SAMPLE.														
10:00:02	187.97	3.39	64.77	70.79	0	70.79	11.75	22.17	0	22.17	0	41			
10:02:00	KELLY DOWN. WORK PIPE.														
10:05:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
10:08:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
10:10:03	104.27	3.56	24.15	38.19	0	38.19	-20.85	22.63	0	22.63	0	41			
10:20:03	103.73	3.34	23.38	36.17	0	36.17	-22.87	22.9	0	22.9	0	41			
10:30:03	124.89	3.56	39.37	50.61	0	50.61	-8.43	23.23	0	23.23	0	41			
10:40:03	143.77	3.8	55.44	62.87	0	62.87	3.83	23.62	0	23.62	0	41			
10:43:00	DROP 1580 m SAMPLE.														
10:50:03	133.2	4.06	48.92	58.68	0	58.68	-0.36	24.07	0	24.07	0	41			
11:00:03	111.37	4.14	35.06	47.16	0	47.16	-11.88	24.44	0	24.44	0	41			
11:10:03	169.07	4.1	61.22	62.71	0	62.71	3.67	24.84	0	24.84	0	41			
11:15:00	KELLY DOWN. WORK PIPE.														
11:16:00	DROP 1585 m SAMPLE.														
11:20:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
11:20:03	142.04	4.24	63.9	62.36	0	62.36	62.36	25.26	0	25.26	0	0			
11:24:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
11:30:03	99.58	4.23	31.38	39.56	0	39.56	-19.48	25.54	0	25.54	0	41			
11:40:03	99.58	3.74	28.92	36.55	0	36.55	-22.49	25.78	0	25.78	0	41			
11:50:03	139.09	3.56	54.81	55.76	0	55.76	-3.28	26.16	0	26.16	0	41			
12:00:03	120.2	3.43	40.95	45.94	0	45.94	-13.1	26.49	0	26.49	0	41			
12:08:00	DROP 1590 m SAMPLE.											41			
12:10:03	130.78	3.43	58.03	56.15	0	56.15	-2.89	26.87	0	26.87	0	41			
12:20:03	140.83	3.29	64.52	60.62	0	60.62	1.58	27.21	0	27.21	0	41			
12:30:03	131.99	3.36	48.56	51.07	0	51.07	-7.97	27.6	0	27.6	0	41			
12:40:03	114.31	3.35	43.16	46.46	0	46.46	-12.58	27.93	0	27.93	0	41			
12:50:03	134.93	3.34	55.93	55.1	0	55.1	-3.94	28.27	0	28.27	0	41			
13:00:03	138.41	3.33	58.16	55.98	0	55.98	-3.06	28.61	0	28.61	0	41			
13:06:00	KELLY DOWN. WORK PIPE. DROP 1595 m SAMPLE.														
13:08:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
13:10:03	131.99	3.37	61.08	58.12	0	58.12	58.12	29.03	0	29.03	0	0			
13:12:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
13:20:03	111.9	3.46	37.55	41.27	0	41.27	-17.77	29.29	0	29.29	0	41			
13:30:03	118.46	2.95	50.64	50.95	0	50.95	-8.09	29.58	0	29.58	0	41			
13:40:03	116.05	2.51	44.03	47.88	0	47.88	-11.16	29.95	0	29.95	0	41			
13:50:03	134.93	2.24	44.14	46.25	0	46.25	-12.79	30.24	0	30.24	0	41			
14:00:03	129.04	2.05	56.91	59.31	0	59.31	0.27	30.63	0	30.63	0	41			
14:10:03	129.04	1.94	44.39	50.85	0	50.85	-8.19	30.98	0	30.98	0	41			
14:20:03	130.25	1.86	52.11	57.19	0	57.19	-1.85	31.33	0	31.33	0	41			
14:24:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE. PULL OUT OF HOLE FOR BIT.														
14:30:03	62.47	1.88	13.31	17.6	0	17.6	17.6	31.66	0	31.66	0	0			
14:40:03	58.9	2.57	1.47	0	0	0	0	31.68	0	31.68	0	0			
14:50:03	49.5	3.59	0.93	0	0	0	0	31.68	0	31.68	0	0			
15:00:03	49.5	4.32	1.18	0	0	0	0	31.68	0	31.68	0	0			
15:10:03	49.5	4.88	0.93	0	0	0	0	31.68	0	31.68	0	0			
15:20:03	49.5	5.34	0.69	0	0	0	0	31.68	0	31.68	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
15:30:03	51.25	5.61	0.83	0	0	0	0	31.76	0	31.76	0	0			
15:40:03	46.55	5.79	0.2	0	0	0	0	31.86	0	31.86	0	0			
15:50:03	54.2	5.93	0.83	0	0	0	0	31.96	0	31.96	0	0			
16:00:03	44.79	6.08	0.05	0	0	0	0	32.06	0	32.06	0	0			
16:10:03	10.32	6.2	0.29	0	0	0	0	32.1	0	32.1	0	0			
16:20:03	15.02	6.31	0.44	0	0	0	0	32.1	0	32.1	0	0			
16:30:03	15.02	6.4	0.69	0	0	0	0	32.1	0	32.1	0	0			
16:40:03	19.72	6.47	1.08	0	0	0	0	32.1	0	32.1	0	0			
16:50:03	15.02	6.56	0.93	0	0	0	0	32.1	0	32.1	0	0			
17:00:00	OUT OF HOLE.														
17:00:03	15.02	6.65	1.42	0	0	0	0	32.1	0	32.1	0	0			
17:10:03	12.08	6.87	1.42	0	0	0	0	32.1	0	32.1	0	0			
17:20:03	12.08	7.14	1.42	0	0	0	0	32.1	0	32.1	0	0			
17:30:03	15.02	7.34	1.18	0	0	0	0	32.1	0	32.1	0	0			
17:40:03	15.02	7.47	1.42	0	0	0	0	32.1	0	32.1	0	0			
17:50:03	15.02	7.6	1.18	0	0	0	0	32.1	0	32.1	0	0			
18:00:03	10.32	7.76	1.28	0	0	0	0	32.1	0	32.1	0	0			
18:10:03	12.08	7.88	1.18	0	0	0	0	32.1	0	32.1	0	0			
18:20:03	13.27	8.03	0.79	0	0	0	0	32.1	0	32.1	0	0			
18:30:03	15.02	8.16	0.93	0	0	0	0	32.1	0	32.1	0	0			
18:30:00	START TO RUN IN HOLE WITH NEW AIR HAMMER.														
18:40:03	12.08	8.3	0.93	0	0	0	0	32.1	0	32.1	0	0			
18:50:03	10.32	8.42	0.79	0	0	0	0	32.1	0	32.1	0	0			
19:00:03	13.27	8.57	0.79	0	0	0	0	32.1	0	32.1	0	0			
19:10:03	13.27	8.7	0.54	0	0	0	0	32.1	0	32.1	0	0			
19:20:03	13.27	8.83	0.54	0	0	0	0	32.1	0	32.1	0	0			
19:30:03	15.02	8.96	0.93	0	0	0	0	32.1	0	32.1	0	0			
19:40:03	15.02	9.12	0.69	0	0	0	0	32.1	0	32.1	0	0			
19:50:03	13.27	9.26	0.54	0	0	0	0	32.1	0	32.1	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
20:00:03	13.27	9.38	0.54	0	0	0	0	32.1	0	32.1	0	0			
20:10:03	13.27	9.55	0.54	0	0	0	0	32.1	0	32.1	0	0			
20:20:03	15.02	9.7	0.44	0	0	0	0	32.1	0	32.1	0	0			
20:30:03	15.02	9.88	0.44	0	0	0	0	32.1	0	32.1	0	0			
20:40:03	13.27	10	0.29	0	0	0	0	32.1	0	32.1	0	0			
20:50:03	13.27	10.18	0.54	0	0	0	0	32.1	0	32.1	0	0			
21:00:03	13.27	10.27	0.29	0	0	0	0	32.1	0	32.1	0	0			
21:10:03	15.02	10.42	0.44	0	0	0	0	32.1	0	32.1	0	0			
21:20:03	15.02	10.55	0.2	0	0	0	0	32.1	0	32.1	0	0			
21:30:03	13.27	10.69	0.29	0	0	0	0	32.1	0	32.1	0	0			
21:30:00	BACK ON BOTTOM.														
21:40:19	15.02	10.83	0.44	0	0	0	0	32.1	0	32.1	0	0			
21:48:00	START TO RUN IN SURVEY.														
21:50:03	13.27	10.99	0.29	0	0	0	0	32.1	0	32.1	0	0			
22:00:03	12.08	11.11	-0.05	0	0	0	0	32.1	0	32.1	0	0			
22:10:03	16.21	11.25	0.05	0	0	0	0	32.1	0	32.1	0	0			
22:20:03	16.78	11.36	0.59	0	0	0	0	32.1	0	32.1	0	0			
22:30:03	10.32	11.44	-0.2	0	0	0	0	32.1	0	32.1	0	0			
22:40:03	15.02	11.54	0.2	0	0	0	0	32.1	0	32.1	0	0			
22:48:00	SURVEY COMPLETE. START PUMPING NITROGEN AT 37 m3/min.														
22:50:03	22.11	11.54	7.66	17.18	0	17.18	-36.1	32.11	0	32.11	0	37			
23:00:03	60.41	6.55	28.54	36.27	0	36.27	-17.01	32.32	0	32.32	0	37			
23:01:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE PRESSURE.														
23:05:00	CHANGE OUT BEARING ASSEMBLY ON ROTATING HEAD.														
23:10:03	24.42	6.12	0.74	0	0	0	0	32.48	0	32.48	0	0			
23:20:03	15.02	8.03	0.2	0	0	0	0	32.48	0	32.48	0	0			
23:25:00	START PUMPING NITROGEN.														
23:30:03	13.27	7.88	18.47	24.81	0	24.81	-28.47	32.56	0	32.56	0	37			
23:39:00	RESUME DRILLING.														

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/16															
23:40:03	53.32	5.94	45.86	48.16	0	48.16	-5.12	32.83	0	32.83	0	37			
23:50:03	59.21	5.51	36.04	42.06	0	42.06	-11.22	33.15	0	33.15	0	37			
99/12/17															
0:00:02	62.16	5.48	35.8	41.93	0	41.93	-11.35	33.45	0	33.45	0	37			
0:09:00	DROP 1600 m SAMPLE.														
0:10:02	62.16	5.78	48.56	50.11	0	50.11	-3.17	33.76	0	33.76	0	37			
0:20:02	99.25	5.45	31.76	39.05	0	39.05	-14.23	34.11	0	34.11	0	37			
0:30:02	172.39	5.83	47.69	49.75	0	49.75	-3.53	34.46	0	34.46	0	37			
0:37:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
0:40:02	291.96	6.35	46.11	49.08	0	49.08	49.08	34.77	0	34.77	0	0			
0:42:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
0:50:02	210.7	6.59	33.2	39.36	0	39.36	-13.92	35.03	0	35.03	0	37			
1:00:02	267.14	6.75	46.73	49.01	0	49.01	-4.27	35.34	0	35.34	0	37			
1:10:02	198.92	6.84	37.13	42.6	0	42.6	-10.68	35.63	0	35.63	0	37			
1:16:00	DROP 1605 m SAMPLE.														
1:20:02	241.88	7.08	36.53	42.6	0	42.6	-10.68	35.95	0	35.95	0	37			
1:30:02	265.45	7.5	56.91	55.95	0	55.95	2.67	36.28	0	36.28	0	37			
1:40:02	222.49	8	57.51	56.46	0	56.46	3.18	36.66	0	36.66	0	37			
1:50:02	189.33	8.42	48.59	50.95	0	50.95	-2.33	37	0	37	0	37			
2:00:02	139.98	8.76	41.8	45.87	0	45.87	-7.41	37.36	0	37.36	0	37			
2:08:00	DROP 1610 m SAMPLE.														
2:10:02	129.92	9.19	38.99	42.15	0	42.15	-11.13	37.71	0	37.71	0	37			
2:20:02	180.01	9.7	60.1	52.84	0	52.84	-0.44	38.03	0	38.03	0	37			
2:30:02	200.63	10.08	84.9	60.84	0	60.84	7.56	38.38	0	38.38	0	37			
2:40:02	156.44	10.38	55.93	44.45	0	44.45	-8.83	38.71	0	38.71	0	37			
2:47:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
2:50:02	116.92	10.21	52.87	43.39	0	43.39	43.39	39.07	0	39.07	0	0			
2:53:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
3:00:02	95.78	9.93	37.38	35.32	0	35.32	-17.96	39.27	0	39.27	0	37			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/17															
3:10:02	102.2	9.69	38.14	35.8	0	35.8	-17.48	39.55	0	39.55	0	37			
3:20:02	94.57	9.76	43.9	39.11	0	39.11	-14.17	39.85	0	39.85	0	37			
3:25:00	DROP 1615 m SAMPLE.														
3:30:00	BURNABLE GAS TO SURFACE.														
3:30:02	264.2	10.11	127.49	66.63	0	66.63	13.35	40.16	0	40.16	0	37			
3:40:02	372.78	10.43	205.34	113.82	0	113.82	60.54	40.86	0	40.86	0	37			
3:50:02	369.83	10.49	203.13	121.44	0	121.44	68.16	41.68	0	41.68	0	37			
4:00:02	359.72	10.68	186.05	138.99	0	138.99	85.71	42.66	0	42.66	0	37			
4:10:02	346.67	10.76	177.07	131.99	0	131.99	78.71	43.6	0	43.6	0	37			
4:20:02	333.21	10.7	161.5	125.35	0	125.35	72.07	44.49	0	44.49	0	37			
4:27:00	INCREASE NITROGEN INJECTION RATE TO 39.5 m3/min.														
4:30:02	336.15	10.78	161.25	123.68	0	123.68	66.8	45.36	0	45.36	0	39.5			
4:40:02	334.89	11.06	161.12	123.22	0	123.22	66.34	46.22	0	46.22	0	39.5			
4:50:02	290.27	11.06	161.39	123.97	0	123.97	67.09	47.08	0	47.08	0	39.5			
5:00:02	283.12	11.15	152.41	119.58	0	119.58	62.7	47.92	0	47.92	0	39.5			
5:10:02	283.12	11.07	151.19	118.94	0	118.94	62.06	48.75	0	48.75	0	39.5			
5:20:02	265.45	11.13	149.96	117.13	0	117.13	60.25	49.57	0	49.57	0	39.5			
5:22:00	DROP 1620 m SAMPLE.														
5:30:03	253.66	11.13	144.56	114.67	0	114.67	57.79	50.4	0	50.4	0	39.5			
5:40:02	249.01	11.13	143.46	114.71	0	114.71	57.83	51.19	0	51.19	0	39.5			
5:50:02	247.77	11.11	141.86	113.98	0	113.98	57.1	51.99	0	51.99	0	39.5			
6:00:02	247.77	11.18	141.86	114.04	0	114.04	57.16	52.77	0	52.77	0	39.5			
6:10:02	246.52	11.29	140.25	112.19	0	112.19	55.31	53.56	0	53.56	0	39.5			
6:20:02	218.31	11.39	119.27	101.08	0	101.08	44.2	54.31	0	54.31	0	39.5			
6:20:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
6:25:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
6:30:02	203.58	10.98	115.34	98.57	0	98.57	41.69	55.04	0	55.04	0	39.5			
6:40:02	221.25	11.22	128.35	105.39	0	105.39	48.51	55.75	0	55.75	0	39.5			
6:47:00	DROP 1625 m SAMPLE.														

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/17															
6:50:02	235.98	11.34	141.61	112.1	0	112.1	55.22	56.5	0	56.5	0	39.5			
7:00:02	227.15	11.42	135.72	109.52	0	109.52	52.64	57.26	0	57.26	0	39.5			
7:10:02	240.17	11.6	143.22	114.31	0	114.31	57.43	58.03	0	58.03	0	39.5			
7:20:02	235.98	11.68	128.6	105.97	0	105.97	49.09	58.78	0	58.78	0	39.5			
7:30:02	235.98	11.8	132.53	107.74	0	107.74	50.86	59.53	0	59.53	0	39.5			
7:40:03	231.33	11.89	130.69	104.87	0	104.87	47.99	60.28	0	60.28	0	39.5			
7:50:00	DROP 1630 m SAMPLE.														
7:50:02	237.22	11.98	132.66	105.83	0	105.83	48.95	61.01	0	61.01	0	39.5			
8:00:02	238.93	12.03	132.77	105.25	0	105.25	48.37	61.74	0	61.74	0	39.5			
8:10:02	233.04	11.98	131.55	104.73	0	104.73	47.85	62.47	0	62.47	0	39.5			
8:20:02	225.44	12.16	130.94	102.5	0	102.5	45.62	63.2	0	63.2	0	39.5			
8:30:02	228.38	12.29	130.94	102.98	0	102.98	46.1	63.92	0	63.92	0	39.5			
8:40:02	230.09	12.42	130.32	102.83	0	102.83	45.95	64.63	0	64.63	0	39.5			
8:50:02	225.91	12.59	130.68	102.75	0	102.75	45.87	65.34	0	65.34	0	39.5			
8:57:00	KELLY DOWN. WORK PIPE.														
9:00:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
9:00:02	207	12.67	112.15	93.04	0	93.04	36.16	66.04	0	66.04	0	39.5			
9:03:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
9:10:02	190.07	12.37	105.4	90.81	0	90.81	33.93	66.63	0	66.63	0	39.5			
9:20:02	224.2	12.06	125.9	101.39	0	101.39	44.51	67.29	0	67.29	0	39.5			
9:30:02	216.6	11.75	123.57	100.13	0	100.13	43.25	67.99	0	67.99	0	39.5			
9:40:02	224.2	11.68	126.14	100.4	0	100.4	43.52	68.69	0	68.69	0	39.5			
9:44:00	DROP 1635 m SAMPLE.														
9:50:02	220.02	11.71	125.53	99.95	0	99.95	43.07	69.39	0	69.39	0	39.5			
10:00:02	215.36	11.52	124.67	100.19	0	100.19	43.31	70.08	0	70.08	0	39.5			
10:10:02	212.41	11.43	124.18	99.36	0	99.36	42.48	70.77	0	70.77	0	39.5			
10:20:02	212.41	11.61	123.69	99.48	0	99.48	42.6	71.46	0	71.46	0	39.5			
10:30:02	212.41	11.75	123.69	99.28	0	99.28	42.4	72.15	0	72.15	0	39.5			
10:40:02	207.76	11.89	122.1	99.47	0	99.47	42.59	72.84	0	72.84	0	39.5			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.	
Customer Rep: WILBERT CALIHOO / GERRY SANDERS	
Well Name: PARA et al FT LIARD	
Well Location: I-46	

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/17															
10:50:02	206.52	12	120.01	99.3	0	99.3	42.42	73.53	0	73.53	0	39.5			
11:00:02	209.47	12.13	120.01	99.83	0	99.83	42.95	74.23	0	74.23	0	39.5			
11:05:00	STAND PIPE PRESSURING UP. LIFT OFF BOTTOM AND CIRCULATE.														
11:10:02	185.9	12.2	110.68	94.84	0	94.84	37.96	74.88	0	74.88	0	39.5			
11:20:02	199.4	12.32	119.14	99.35	0	99.35	42.47	75.55	0	75.55	0	39.5			
11:24:00	DECREASE NITROGEN INJECTION RATE TO 35 m3/min.														
11:30:02	193.02	12.63	115.71	97.03	0	97.03	46.63	76.24	0	76.24	0	35			
11:40:02	194.74	12.48	115.34	96.44	0	96.44	46.04	76.91	0	76.91	0	35			
11:50:02	188.85	12.45	124.43	100.88	0	100.88	50.48	77.58	0	77.58	0	35			
12:00:02	182.95	12.13	107.98	92.46	0	92.46	42.06	78.23	0	78.23	0	35			
12:10:02	187.62	11.12	107.85	92.41	0	92.41	42.01	78.87	0	78.87	0	35			
12:20:02	190.56	10.12	111.78	94.84	0	94.84	44.44	79.52	0	79.52	0	35			
12:22:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE. MONITOR FLOW.														
12:30:02	129.92	9.32	71.15	70.97	0	70.97	70.97	80.12	0	80.12	0	0			
12:40:02	98.04	8.82	45.89	52.66	0	52.66	52.66	80.56	0	80.56	0	0			
12:50:02	69.25	8.36	32.22	43.68	0	43.68	43.68	80.88	0	80.88	0	0			
12:55:00	PULL OUT OF HOLE FOR BIT.														
13:00:02	71	8.21	31.87	43.53	0	43.53	43.53	81.18	0	81.18	0	0			
13:10:02	66.31	8.32	33.94	45.85	0	45.85	45.85	81.5	0	81.5	0	0			
13:20:02	68.05	8.21	34.57	45.44	0	45.44	45.44	81.81	0	81.81	0	0			
13:30:02	69.8	8.25	34.71	44.41	0	44.41	44.41	82.12	0	82.12	0	0			
13:40:02	66.31	8.58	37.13	44.9	0	44.9	44.9	82.42	0	82.42	0	0			
13:50:02	69.25	9.33	38.85	40.8	0	40.8	40.8	82.72	0	82.72	0	0			
14:00:02	71	9.84	38.25	44.17	0	44.17	44.17	83	0	83	0	0			
14:10:02	71	10.15	38.99	39.97	0	39.97	39.97	83.29	0	83.29	0	0			
14:20:02	73.95	10.29	43.16	44.73	0	44.73	44.73	83.58	0	83.58	0	0			
14:30:02	72.2	10.29	48.18	41.8	0	41.8	41.8	83.88	0	83.88	0	0			
14:40:02	78.63	10.16	39.37	40.39	0	40.39	40.39	84.18	0	84.18	0	0			
14:50:02	73.95	10.03	50.04	42.92	0	42.92	42.92	84.48	0	84.48	0	0			

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/17															
15:00:02	76.89	9.93	50.53	42.06	0	42.06	42.06	84.77	0	84.77	0	0			
15:10:02	76.89	9.93	58.63	41.96	0	41.96	41.96	85.07	0	85.07	0	0			
15:20:02	106.35	10	69.19	39.47	0	39.47	39.47	85.35	0	85.35	0	0			
15:30:02	124.03	10.01	26.96	40.15	0	40.15	40.15	85.62	0	85.62	0	0			
15:40:02	149.32	10.35	30.04	43.32	0	43.32	43.32	85.91	0	85.91	0	0			
15:50:02	129.92	10.27	28.18	40.83	0	40.83	40.83	86.2	0	86.2	0	0			
16:00:02	137.54	9.85	28.57	42.02	0	42.02	42.02	86.48	0	86.48	0	0			
16:09:00	BIT AT SURFACE. CLOSE BLIND RAMS.														
16:10:02	22.67	9.57	2.55	0	0	0	0	86.69	0	86.69	0	0			
16:13:00	DIVERT FLOW THROUGH HCR. REMOVE BEARING ASSEMBLY FROM ROTATING HEAD.														
16:20:02	63.36	11.67	34.18	42.99	0	42.99	42.99	87.06	0	87.06	0	0			
16:30:02	59.21	12.09	29.41	40.56	0	40.56	40.56	87.34	0	87.34	0	0			
16:40:02	54.52	12.35	29.27	41.53	0	41.53	41.53	87.62	0	87.62	0	0			
16:50:02	57.47	12.58	29.76	40.49	0	40.49	40.49	87.91	0	87.91	0	0			
17:00:02	59.21	12.67	30.15	40.61	0	40.61	40.61	88.19	0	88.19	0	0			
17:10:02	59.21	12.72	30.39	40.25	0	40.25	40.25	88.48	0	88.48	0	0			
17:20:02	60.96	12.72	30.53	38.29	0	38.29	38.29	88.76	0	88.76	0	0			
17:30:02	59.21	12.72	30.15	40.34	0	40.34	40.34	89.03	0	89.03	0	0			
17:35:00	START BACK IN HOLE WITH NEW AIR HAMMER.														
17:40:02	60.96	12.73	29.31	37.6	0	37.6	37.6	89.3	0	89.3	0	0			
17:50:02	56.27	12.71	29.41	38.38	0	38.38	38.38	89.58	0	89.58	0	0			
17:53:00	DIVERT FLOW THROUGH FLOW LINE. CLOSE HCR. CONTINUE TO RUN IN HOLE.														
18:00:02	56.27	0.11	28.18	37.2	0	37.2	37.2	89.82	0	89.82	0	0			
18:10:02	59.21	-3.31	30.15	36.53	0	36.53	36.53	90.08	0	90.08	0	0			
18:20:02	49.82	-3.98	28.39	37.55	0	37.55	37.55	90.34	0	90.34	0	0			
18:30:02	57.47	-2.98	29.27	36.99	0	36.99	36.99	90.59	0	90.59	0	0			
18:40:02	62.16	-1.98	28.68	36.61	0	36.61	36.61	90.85	0	90.85	0	0			
18:50:02	59.21	-3.81	27.45	35.63	0	35.63	35.63	91.1	0	91.1	0	0			
19:00:02	59.21	-6.29	27.94	35.56	0	35.56	35.56	91.35	0	91.35	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/17															
19:10:02	66.85	-7.69	28.82	36.23	0	36.23	36.23	91.6	0	91.6	0	0			
19:20:02	54.52	-8.21	28.04	35.65	0	35.65	35.65	91.85	0	91.85	0	0			
19:30:02	56.27	-8.33	28.43	35.93	0	35.93	35.93	92.1	0	92.1	0	0			
19:40:02	60.96	-8.19	28.82	36.05	0	36.05	36.05	92.35	0	92.35	0	0			
19:50:02	56.27	-7.92	27.69	35.5	0	35.5	35.5	92.6	0	92.6	0	0			
20:00:02	56.27	-5.86	27.94	35.89	0	35.89	35.89	92.85	0	92.85	0	0			
20:10:02	54.52	-6.56	27.55	35.52	0	35.52	35.52	93.09	0	93.09	0	0			
20:20:02	56.27	-7.67	27.69	35.39	0	35.39	35.39	93.34	0	93.34	0	0			
20:30:02	85.73	-7.66	45.13	47.9	0	47.9	47.9	93.56	0	93.56	0	0			
20:40:02	56.27	-6.83	27.69	35.73	0	35.73	35.73	93.83	0	93.83	0	0			
20:50:02	58.01	-7.02	27.34	35.14	0	35.14	35.14	94.07	0	94.07	0	0			
21:00:02	51.57	-7.69	26.57	34.75	0	34.75	34.75	94.32	0	94.32	0	0			
21:10:02	51.57	-7.95	26.57	34.91	0	34.91	34.91	94.56	0	94.56	0	0			
21:20:02	53.32	-7.91	26.71	34.98	0	34.98	34.98	94.8	0	94.8	0	0			
21:30:02	51.57	-8.25	26.82	35.04	0	35.04	35.04	95.05	0	95.05	0	0			
21:40:02	58.01	-8.71	27.1	35.04	0	35.04	35.04	95.29	0	95.29	0	0			
21:50:02	59.76	-9.03	27.24	34.97	0	34.97	34.97	95.53	0	95.53	0	0			
22:00:02	51.57	-9.45	26.57	34.62	0	34.62	34.62	95.77	0	95.77	0	0			
22:10:02	50.38	-8.52	26.22	34.38	0	34.38	34.38	96.01	0	96.01	0	0			
22:15:00	BACK ON BOTTOM. START TO RUN IN SURVEY.														
22:20:02	50.38	-6.45	25.98	34.45	0	34.45	34.45	96.25	0	96.25	0	0			
22:25:00	PICK UP KELLY.														
22:28:00	START PUMPING NITROGEN AT 36 m3/min.														
22:30:02	50.38	-4.8	25.73	34.45	0	34.45	-17.39	96.49	0	96.49	0	36			
22:40:02	92.83	-4.43	54.57	55.18	0	55.18	3.34	96.79	0	96.79	0	36			
22:43:00	STAND PIPE PRESSURING UP. STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
22:50:02	100.46	-4.15	60.84	58.78	0	58.78	58.78	97.21	0	97.21	0	0			
23:00:02	47.43	-2.53	25.98	31.19	0	31.19	31.19	97.5	0	97.5	0	0			
23:07:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/17															
23:10:02	53.32	-0.95	26.47	34.46	0	34.46	-17.38	97.75	0	97.75	0	36			
23:20:02	72.74	-2.54	38.39	43.46	0	43.46	-8.38	98.01	0	98.01	0	36			
23:30:02	177.06	-2.41	104.29	81.2	0	81.2	29.36	98.43	0	98.43	0	36			
23:34:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
23:40:02	144.65	-0.51	88.58	72.51	0	72.51	72.51	99	0	99	0	0			
23:43:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
23:50:02	118.14	0.51	63.29	58.83	0	58.83	6.99	99.42	0	99.42	0	36			
99/12/18															
0:00:02	150.55	0.93	94.23	76.26	0	76.26	24.42	99.9	0	99.9	0	36			
0:10:02	144.65	0.97	100.86	80.26	0	80.26	28.42	100.45	0	100.45	0	36			
0:20:02	139.98	1.59	100.98	80.93	0	80.93	29.09	101.01	0	101.01	0	36			
0:24:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
0:29:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
0:30:02	113.46	2.16	81.82	70.56	0	70.56	18.72	101.56	0	101.56	0	36			
0:40:02	112.25	2.1	79.99	70.48	0	70.48	18.64	102.03	0	102.03	0	36			
0:50:02	124.03	2.03	90.3	76.63	0	76.63	24.79	102.54	0	102.54	0	36			
1:00:02	128.19	1.87	93.37	78.63	0	78.63	26.79	103.08	0	103.08	0	36			
1:10:02	132.87	2.18	96.93	80.24	0	80.24	28.4	103.64	0	103.64	0	36			
1:16:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
1:20:02	128.71	2.75	90.92	76.56	0	76.56	76.56	104.19	0	104.19	0	0			
1:21:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
1:30:02	107.56	3.4	76.67	69.21	0	69.21	17.37	104.67	0	104.67	0	36			
1:40:02	121.08	3.1	84.16	73.35	0	73.35	21.51	105.17	0	105.17	0	36			
1:50:02	134.6	2.78	94.11	78.72	0	78.72	26.88	105.7	0	105.7	0	36			
2:00:02	135.81	3.2	97.42	80.48	0	80.48	28.64	106.25	0	106.25	0	36			
2:10:02	135.81	3.69	96.93	80.19	0	80.19	28.35	106.81	0	106.81	0	36			
2:20:02	140.49	3.97	96.56	80	0	80	28.16	107.36	0	107.36	0	36			
2:30:02	134.08	4.31	97.79	80.58	0	80.58	28.74	107.92	0	107.92	0	36			
2:40:02	140.49	4.56	98.28	80.02	0	80.02	28.18	108.48	0	108.48	0	36			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/18															
2:50:02	134.08	4.78	96.8	79.38	0	79.38	27.54	109.03	0	109.03	0	36			
3:00:02	135.81	4.9	96.93	79.19	0	79.19	27.35	109.58	0	109.58	0	36			
3:10:02	135.81	4.84	97.17	79.08	0	79.08	27.24	110.13	0	110.13	0	36			
3:16:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
3:20:02	128.71	5.07	91.9	76.31	0	76.31	24.47	110.68	0	110.68	0	36			
3:22:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
3:30:02	104.62	5.21	73.72	66.24	0	66.24	14.4	111.14	0	111.14	0	36			
3:40:02	134.6	4.8	89.69	76.44	0	76.44	24.6	111.63	0	111.63	0	36			
3:50:02	129.92	4.79	91.77	78.75	0	78.75	26.91	112.18	0	112.18	0	36			
4:00:02	131.14	5.32	96.8	80.69	0	80.69	28.85	112.73	0	112.73	0	36			
4:01:00	INCREASE NITROGEN INJECTION RATE TO 40 m3/min.														
4:02:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE.														
4:05:00	START TO PULL OUT OF HOLE.														
4:10:02	97.51	5.59	66.24	64.74	0	64.74	64.74	113.27	0	113.27	0	0			
4:20:02	63.9	5.97	38.88	42.01	0	42.01	42.01	113.63	0	113.63	0	0			
4:30:02	48.63	6.22	27.8	32.06	0	32.06	32.06	113.89	0	113.89	0	0			
4:40:02	49.18	6.39	25.87	34.39	0	34.39	34.39	114.1	0	114.1	0	0			
4:50:02	44.48	6.59	25.48	29.83	0	29.83	29.83	114.35	0	114.35	0	0			
5:00:02	44.48	6.83	24.99	30.57	0	30.57	30.57	114.59	0	114.59	0	0			
5:10:02	47.43	6.66	25.73	35.5	0	35.5	35.5	114.82	0	114.82	0	0			
5:20:02	52.12	6.82	25.13	28.3	0	28.3	28.3	115.05	0	115.05	0	0			
5:30:02	44.48	7.17	24.26	33.95	0	33.95	33.95	115.28	0	115.28	0	0			
5:40:02	44.48	7.44	23.52	27.44	0	27.44	27.44	115.51	0	115.51	0	0			
5:50:02	44.48	7.87	23.27	36.06	0	36.06	36.06	115.74	0	115.74	0	0			
6:00:02	44.48	8.14	23.27	32.56	0	32.56	32.56	115.97	0	115.97	0	0			
6:10:02	44.48	8.34	23.27	34.97	0	34.97	34.97	116.2	0	116.2	0	0			
6:20:02	53.87	8.56	23.31	35.04	0	35.04	35.04	116.43	0	116.43	0	0			
6:30:02	44.48	8.79	22.78	33.77	0	33.77	33.77	116.66	0	116.66	0	0			
6:40:02	41.54	9.06	22.78	28.44	0	28.44	28.44	116.88	0	116.88	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/18															
6:50:02	44.48	9.54	22.29	35.87	0	35.87	35.87	117.11	0	117.11	0	0			
7:00:02	41.54	9.87	22.29	28.36	0	28.36	28.36	117.33	0	117.33	0	0			
7:10:02	44.48	10.09	22.05	32.18	0	32.18	32.18	117.55	0	117.55	0	0			
7:20:02	49.18	10.36	22.68	30.17	0	30.17	30.17	117.78	0	117.78	0	0			
7:30:02	53.87	10.64	23.07	36.41	0	36.41	36.41	118.01	0	118.01	0	0			
7:40:02	44.48	11.23	22.29	32.54	0	32.54	32.54	118.24	0	118.24	0	0			
7:50:02	39.79	11.79	21.66	28.92	0	28.92	28.92	118.47	0	118.47	0	0			
8:00:00	BIT AT SURFACE. OPEN HCR. CLOSE BLIND RAMS AND FLOW LINE. REMOVE BEARING ASSEMBLY FROM ROTATING HEAD.														
8:00:02	41.54	11.92	21.07	30.45	0	30.45	30.45	118.68	0	118.68	0	0			
8:10:02	46.23	12.17	22.19	34	0	34	34	118.9	0	118.9	0	0			
8:20:02	42.73	12.77	21.9	33.02	0	33.02	33.02	119.13	0	119.13	0	0			
8:30:02	44.48	13.33	21.8	29.33	0	29.33	29.33	119.37	0	119.37	0	0			
8:40:02	44.48	13.76	20.08	29.65	0	29.65	29.65	119.57	0	119.57	0	0			
8:50:02	39.79	13.82	19.2	33.21	0	33.21	33.21	119.78	0	119.78	0	0			
9:00:02	41.54	13.84	18.86	31.64	0	31.64	31.64	120	0	120	0	0			
9:10:00	INSTALL BEARING ASSEMBLY IN ROTATING HEAD. OPEN BLIND RAMS. START BACK IN HOLE WITH AIR HAMMER.														
9:10:02	39.79	13.82	21.41	34.43	0	34.43	34.43	120.22	0	120.22	0	0			
9:20:02	41.54	13.79	20.33	26.71	0	26.71	26.71	120.45	0	120.45	0	0			
9:30:04	44.48	13.7	20.57	34.64	0	34.64	34.64	120.68	0	120.68	0	0			
9:31:00	OPEN FLOW LINE. CLOSE HCR. CONTINUE TO RUN IN HOLE.														
9:40:02	41.54	4.6	18.61	26.14	0	26.14	26.14	120.88	0	120.88	0	0			
9:50:02	46.23	2.59	18.26	33.5	0	33.5	33.5	121.08	0	121.08	0	0			
10:00:00	SLIP AND CUT DRILL LINE.														
10:00:02	38.59	2.05	19.1	32.99	0	32.99	32.99	121.31	0	121.31	0	0			
10:10:02	44.48	2.81	19.84	34.28	0	34.28	34.28	121.54	0	121.54	0	0			
10:20:02	41.54	3.56	19.35	34.28	0	34.28	34.28	121.77	0	121.77	0	0			
10:30:02	38.59	4.12	19.35	33.18	0	33.18	33.18	122.01	0	122.01	0	0			
10:40:02	38.59	4.62	19.1	33	0	33	33	122.24	0	122.24	0	0			
10:50:02	38.59	5.05	18.61	32.63	0	32.63	32.63	122.47	0	122.47	0	0			

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/18															
11:00:00	CONTINUE TO RUN IN HOLE.														
11:00:02	38.59	5.5	18.12	31.7	0	31.7	31.7	122.7	0	122.7	0	0			
11:10:02	39.79	5.31	16.99	25.59	0	25.59	25.59	122.91	0	122.91	0	0			
11:20:02	35.65	3.02	16.4	25.42	0	25.42	25.42	123.08	0	123.08	0	0			
11:30:02	41.54	0.75	18.61	32.56	0	32.56	32.56	123.3	0	123.3	0	0			
11:40:02	38.59	-1.01	18.61	30.47	0	30.47	30.47	123.53	0	123.53	0	0			
11:50:02	39.79	-2.16	19.2	32.82	0	32.82	32.82	123.75	0	123.75	0	0			
12:00:02	38.59	-2.51	19.1	31.03	0	31.03	31.03	123.98	0	123.98	0	0			
12:10:02	36.84	-2.77	18.71	29.16	0	29.16	29.16	124.2	0	124.2	0	0			
12:20:02	41.54	-2.85	19.1	32.46	0	32.46	32.46	124.43	0	124.43	0	0			
12:30:02	41.54	-1.15	18.61	33.44	0	33.44	33.44	124.66	0	124.66	0	0			
12:40:02	38.59	0.29	18.36	31.09	0	31.09	31.09	124.88	0	124.88	0	0			
12:50:02	39.79	-0.21	18.22	29.89	0	29.89	29.89	125.1	0	125.1	0	0			
13:00:02	41.54	-1.86	18.86	31.63	0	31.63	31.63	125.32	0	125.32	0	0			
13:10:02	38.59	-3.05	18.61	33.41	0	33.41	33.41	125.54	0	125.54	0	0			
13:20:02	36.84	-3.43	18.96	31.71	0	31.71	31.71	125.76	0	125.76	0	0			
13:30:02	41.54	-3.47	19.1	32.06	0	32.06	32.06	125.98	0	125.98	0	0			
13:40:02	41.54	-3.26	18.86	29.83	0	29.83	29.83	126.19	0	126.19	0	0			
13:45:00	ON BOTTOM. PICK UP KELLY AND PREPARE TO CIRCULATE.														
13:50:02	40.34	-2.57	18.51	32.66	0	32.66	32.66	126.41	0	126.41	0	0			
14:00:02	41.54	-1.03	17.87	31.87	0	31.87	31.87	126.63	0	126.63	0	0			
14:06:00	START PUMPING NITROGEN.														
14:10:02	50.38	0.34	25.24	37.67	0	37.67	-14.17	126.86	0	126.86	0	36			
14:20:02	112.25	0.45	78.52	68.19	0	68.19	16.35	127.26	0	127.26	0	36			
14:30:02	116.92	0.24	75.94	67.27	0	67.27	15.43	127.74	0	127.74	0	36			
14:40:02	93.36	0.06	55.33	55.88	0	55.88	4.04	128.18	0	128.18	0	36			
14:50:02	101.67	0.39	68.07	63.98	0	63.98	12.14	128.63	0	128.63	0	36			
15:00:02	119.87	0.82	76.68	69.02	0	69.02	17.18	129.09	0	129.09	0	36			
15:03:00	KELLY DOWN. WORK PIPE.														

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/18															
15:06:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
15:10:00	CONNECTION COMPLETE. START PUMPING NITROGEN.														
15:10:02	119.87	1.35	80.61	70.67	0	70.67	18.83	129.62	0	129.62	0	36			
15:20:02	88.68	1.8	57.4	56.67	0	56.67	4.83	129.99	0	129.99	0	36			
15:27:00	DROP 1640 m SAMPLE.														
15:30:02	112.25	1.63	73.6	67.41	0	67.41	15.57	130.43	0	130.43	0	36			
15:40:02	119.87	1.69	76.93	69.02	0	69.02	17.18	130.91	0	130.91	0	36			
15:50:02	119.87	1.83	77.17	69.59	0	69.59	17.75	131.39	0	131.39	0	36			
16:00:02	111.03	2.09	71.28	66.77	0	66.77	14.93	131.89	0	131.89	0	36			
16:10:02	112.25	2.37	74.83	69.49	0	69.49	17.65	132.37	0	132.37	0	36			
16:20:02	107.56	2.53	74.46	69.86	0	69.86	18.02	132.85	0	132.85	0	36			
16:22:00	DROP 1645 m SAMPLE. TRACE OF WATER IN SAMPLE.														
16:30:02	112.25	2.62	75.08	70.39	0	70.39	18.55	133.35	0	133.35	0	36			
16:40:02	116.92	2.71	77.42	72.02	0	72.02	20.18	133.84	0	133.84	0	36			
16:50:02	119.87	2.91	78.4	72.5	0	72.5	20.66	134.34	0	134.34	0	36			
17:00:02	112.25	3.07	78.27	72.52	0	72.52	20.68	134.85	0	134.85	0	36			
17:10:02	119.87	3.2	78.89	73.15	0	73.15	21.31	135.35	0	135.35	0	36			
17:20:02	115.19	3.38	79.5	73.67	0	73.67	21.83	135.86	0	135.86	0	36			
17:30:02	115.19	3.59	79.25	73.27	0	73.27	21.43	136.36	0	136.36	0	36			
17:34:00	KELLY DOWN. WORK PIPE.														
17:40:02	106.35	3.86	73.36	69.75	0	69.75	17.91	136.86	0	136.86	0	36			
17:50:02	115.19	4.15	80.97	73.73	0	73.73	21.89	137.36	0	137.36	0	36			
17:56:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
18:00:02	100.46	4.02	67.22	65.81	0	65.81	65.81	137.87	0	137.87	0	0			
18:10:03	47.43	4.37	26.47	34.87	0	34.87	34.87	138.2	0	138.2	0	0			
18:20:02	41.54	4.7	20.33	24.94	0	24.94	24.94	138.39	0	138.39	0	0			
18:30:02	41.54	4.93	20.33	31.66	0	31.66	31.66	138.6	0	138.6	0	0			
18:32:00	START PUMPING NITROGEN.														
18:40:02	97.51	4.69	69.68	63.27	0	63.27	11.43	138.9	0	138.9	0	36			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/18															
18:50:02	128.19	3.77	97.05	76.85	0	76.85	25.01	139.4	0	139.4	0	36			
18:51:00	INCREASE NITROGEN INJECTION RATE TO 40 m3/min.														
18:52:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
18:57:00	START PUMPING NITROGEN.														
19:00:02	62.16	3.77	38.74	46.91	0	46.91	-10.69	139.82	0	139.82	0	40			
19:10:02	126.98	3.64	91.53	75.94	0	75.94	18.34	140.27	0	140.27	0	40			
19:20:02	135.81	3.21	101.84	81.21	0	81.21	23.61	140.82	0	140.82	0	40			
19:23:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
19:30:02	66.85	3.07	39.13	44.44	0	44.44	44.44	141.32	0	141.32	0	0			
19:32:00	CONNECTION COMPLETE. START PUMPING NITROGEN. RESUME DRILLING.														
19:40:02	97.51	4.05	69.43	64.06	0	64.06	6.46	141.66	0	141.66	0	40			
19:50:02	125.76	3.91	87.73	74.99	0	74.99	17.39	142.13	0	142.13	0	40			
20:00:02	137.54	4.09	98.28	81.24	0	81.24	23.64	142.68	0	142.68	0	40			
20:10:02	141.71	4.29	104.54	85.4	0	85.4	27.8	143.26	0	143.26	0	40			
20:13:00	DROP 1650 m SAMPLE.														
20:20:02	132.87	4.62	95.46	81.11	0	81.11	23.51	143.84	0	143.84	0	40			
20:30:02	132.87	4.98	95.7	82.21	0	82.21	24.61	144.4	0	144.4	0	40			
20:40:02	132.87	5.04	95.7	82.47	0	82.47	24.87	144.97	0	144.97	0	40			
20:50:02	144.65	4.86	101.59	86.75	0	86.75	29.15	145.55	0	145.55	0	40			
20:56:00	DROP 1655 m SAMPLE.														
21:00:02	129.92	4.8	89.56	79.75	0	79.75	22.15	146.12	0	146.12	0	40			
21:10:02	129.92	4.51	91.77	80.94	0	80.94	23.34	146.68	0	146.68	0	40			
21:20:02	137.54	4.34	94.11	82.39	0	82.39	24.79	147.25	0	147.25	0	40			
21:30:02	175.83	4.3	124.05	100.15	0	100.15	42.55	147.87	0	147.87	0	40			
21:32:00	DROP 1660 m SAMPLE.														
21:36:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
21:40:02	106.35	4.49	75.08	71.6	0	71.6	71.6	148.48	0	148.48	0	0			
21:44:00	CONNECTION COMPLETE. START PUMPING NTROGEN. RESUME DRILLING.														
21:50:02	88.68	4.57	58.87	59.79	0	59.79	2.19	148.83	0	148.83	0	40			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/18															
22:00:02	107.56	4.1	77.65	70.74	0	70.74	13.14	149.31	0	149.31	0	40			
22:10:02	98.72	2.92	68.81	66.53	0	66.53	8.93	149.8	0	149.8	0	40			
22:20:02	113.98	2.73	74.23	69.59	0	69.59	11.99	150.26	0	150.26	0	40			
22:30:02	129.92	2.54	89.32	78.58	0	78.58	20.98	150.78	0	150.78	0	40			
22:40:02	132.87	2.31	92.51	80.6	0	80.6	23	151.33	0	151.33	0	40			
22:50:02	137.54	2.21	93.62	80.87	0	80.87	23.27	151.9	0	151.9	0	40			
22:58:00	DROP 1665 m SAMPLE.														
23:00:02	140.49	2.37	97.05	82.83	0	82.83	25.23	152.47	0	152.47	0	40			
23:10:02	138.76	2.47	98.4	84.03	0	84.03	26.43	153.04	0	153.04	0	40			
23:20:02	132.87	2.64	95.7	82.74	0	82.74	25.14	153.62	0	153.62	0	40			
23:30:02	140.49	2.8	95.09	82.29	0	82.29	24.69	154.19	0	154.19	0	40			
23:40:02	137.54	2.95	94.35	82.4	0	82.4	24.8	154.76	0	154.76	0	40			
23:48:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
23:50:02	122.3	3.04	87.23	78.05	0	78.05	78.05	155.33	0	155.33	0	0			
23:56:00	CONNECTION COMPLETE. START PUMPING NITROGEN. RESUME DRILLING.														
99/12/19															
0:00:02	96.31	3.56	60.24	59.98	0	59.98	2.38	155.81	0	155.81	0	40			
0:10:02	118.14	3.63	82.44	74.3	0	74.3	16.7	156.28	0	156.28	0	40			
0:20:02	124.03	3.53	88.83	78.23	0	78.23	20.63	156.81	0	156.81	0	40			
0:30:02	122.81	3.46	85.27	76.13	0	76.13	18.53	157.33	0	157.33	0	40			
0:30:00	DROP 1670 m SAMPLE.														
0:35:00	STOP DRILLING. LIFT OFF BOTTOM AND CIRCULATE TO CLEAN UP HOLE.														
0:40:02	141.71	3.62	99.63	84.95	0	84.95	27.35	157.9	0	157.9	0	40			
0:50:02	132.87	3.72	94.47	82.51	0	82.51	24.91	158.48	0	158.48	0	40			
1:00:02	128.19	3.89	92.87	81.55	0	81.55	23.95	159.05	0	159.05	0	40			
1:10:02	132.87	3.85	93.49	81.93	0	81.93	24.33	159.62	0	159.62	0	40			
1:20:02	129.92	3.72	91.77	80.9	0	80.9	23.3	160.19	0	160.19	0	40			
1:30:02	140.49	3.61	92.88	81.3	0	81.3	23.7	160.74	0	160.74	0	40			
1:40:02	126.98	3.53	93.25	81.79	0	81.79	24.19	161.31	0	161.31	0	40			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/19															
1:42:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
1:50:02	82.78	4.01	52.49	55.69	0	55.69	-1.91	161.83	0	161.83	0	40			
1:51:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
2:00:02	87.47	4.6	56.06	56.15	0	56.15	-1.45	162.18	0	162.18	0	40			
2:10:02	112.25	3.45	78.02	69.61	0	69.61	12.01	162.61	0	162.61	0	40			
2:20:02	133.38	3.24	85.15	74.15	0	74.15	16.55	163.11	0	163.11	0	40			
2:30:02	143.43	3.5	78.64	70.9	0	70.9	13.3	163.61	0	163.61	0	40			
2:40:02	186.39	6.71	128.1	98.26	0	98.26	40.66	164.24	0	164.24	0	40			
2:50:02	200.63	6.53	150.7	107.12	0	107.12	49.52	164.9	0	164.9	0	40			
3:00:02	165.28	6.56	123.93	91.92	0	91.92	34.32	165.62	0	165.62	0	40			
3:10:02	101.67	6.06	72.98	64.54	0	64.54	6.94	166.18	0	166.18	0	40			
3:20:02	124.03	5.67	90.05	74.29	0	74.29	16.69	166.66	0	166.66	0	40			
3:30:02	151.77	5.93	119.4	89.26	0	89.26	31.66	167.33	0	167.33	0	40			
3:40:02	118.14	5.64	87.35	73.04	0	73.04	15.44	167.84	0	167.84	0	40			
3:50:02	217.07	5.9	167.75	112.72	0	112.72	55.12	168.48	0	168.48	0	40			
3:54:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE.														
3:58:00	START TO PULL OUT OF HOLE FOR NEW AIR HAMMER.														
4:00:02	82.78	6.1	55.93	52.65	0	52.65	52.65	169.1	0	169.1	0	0			
4:10:02	44.48	6.08	25.24	24.6	0	24.6	24.6	169.32	0	169.32	0	0			
4:20:02	41.54	6	23.03	22.16	0	22.16	22.16	169.53	0	169.53	0	0			
4:30:02	42.73	6.29	24.36	29.76	0	29.76	29.76	169.74	0	169.74	0	0			
4:40:02	41.54	6.5	22.78	31.92	0	31.92	31.92	169.95	0	169.95	0	0			
4:50:02	49.18	6.74	25.38	30.93	0	30.93	30.93	170.14	0	170.14	0	0			
5:00:02	47.43	7.25	25.73	31.4	0	31.4	31.4	170.33	0	170.33	0	0			
5:10:02	45.68	7.8	25.59	29.55	0	29.55	29.55	170.52	0	170.52	0	0			
5:20:02	50.38	8.26	25.98	29.8	0	29.8	29.8	170.71	0	170.71	0	0			
5:30:02	44.48	8.61	25.98	32.25	0	32.25	32.25	170.9	0	170.9	0	0			
5:40:02	44.48	8.94	25.24	22.65	0	22.65	22.65	171.11	0	171.11	0	0			
5:50:02	52.12	9.15	26.61	27.3	0	27.3	27.3	171.3	0	171.3	0	0			

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/19															
6:00:02	47.43	9.64	25.98	27.52	0	27.52	27.52	171.49	0	171.49	0	0			
6:10:02	49.18	9.84	24.89	23.4	0	23.4	23.4	171.67	0	171.67	0	0			
6:20:02	42.73	10	25.83	29.33	0	29.33	29.33	171.87	0	171.87	0	0			
6:30:02	45.68	10.07	25.1	26.43	0	26.43	26.43	172.06	0	172.06	0	0			
6:40:02	44.48	10.25	25.24	22.93	0	22.93	22.93	172.24	0	172.24	0	0			
6:50:02	44.48	10.57	25.73	31.2	0	31.2	31.2	172.44	0	172.44	0	0			
7:00:02	47.43	10.9	25.24	24.66	0	24.66	24.66	172.64	0	172.64	0	0			
7:10:02	47.43	11.2	25.73	33.22	0	33.22	33.22	172.85	0	172.85	0	0			
7:20:02	44.48	11.57	24.99	31.54	0	31.54	31.54	173.05	0	173.05	0	0			
7:30:02	42.73	11.06	24.61	30.85	0	30.85	30.85	173.27	0	173.27	0	0			
7:38:00	BIT AT SURFACE. OPEN HCR. CLOSE BLIND RAMS AND FLOW LINE. REMOVE BEARING ASSEMBLY FROM ROTATING HEAD.														
7:40:02	36.84	9.49	24.11	19.91	0	19.91	19.91	173.47	0	173.47	0	0			
7:50:03	41.54	9.38	25.24	31.08	0	31.08	31.08	173.67	0	173.67	0	0			
8:00:02	44.48	10.07	24.99	30.09	0	30.09	30.09	173.89	0	173.89	0	0			
8:10:02	41.54	10.67	24.5	29.71	0	29.71	29.71	174.1	0	174.1	0	0			
8:20:02	41.54	11.14	24.26	30.96	0	30.96	30.96	174.31	0	174.31	0	0			
8:30:02	44.48	11.59	23.52	29.91	0	29.91	29.91	174.52	0	174.52	0	0			
8:40:02	39.79	11.99	23.13	30.06	0	30.06	30.06	174.73	0	174.73	0	0			
8:50:02	47.43	12.35	24.99	31.44	0	31.44	31.44	174.94	0	174.94	0	0			
9:00:02	44.48	12.68	21.8	29.65	0	29.65	29.65	175.12	0	175.12	0	0			
9:10:02	49.18	12.86	23.17	31.05	0	31.05	31.05	175.32	0	175.32	0	0			
9:15:00	INSTALL BEARING ASSEMBLY IN ROTATING HEAD. OPEN BLIND RAMS. START BACK IN HOLE WITH AIR HAMMER.														
9:20:02	44.48	12.85	23.03	31.07	0	31.07	31.07	175.53	0	175.53	0	0			
9:30:02	44.48	12.88	22.54	22.44	0	22.44	22.44	175.73	0	175.73	0	0			
9:40:00	OPEN FLOW LINE. CLOSE HCR. CONTINUE TO RUN IN HOLE.														
9:40:02	42.73	12.91	21.9	23.15	0	23.15	23.15	175.91	0	175.91	0	0			
9:50:02	44.48	5	21.56	22.27	0	22.27	22.27	176.09	0	176.09	0	0			
10:00:02	44.48	2.82	21.07	26.24	0	26.24	26.24	176.28	0	176.28	0	0			
99/12/19															

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
10:10:02	49.18	1.83	21.45	29.98	0	29.98	29.98	176.48	0	176.48	0	0			
10:20:02	41.54	1.02	20.57	28.39	0	28.39	28.39	176.68	0	176.68	0	0			
10:30:02	46.23	0.26	20.96	29.17	0	29.17	29.17	176.89	0	176.89	0	0			
10:40:02	46.23	-0.52	20.47	26.42	0	26.42	26.42	177.08	0	177.08	0	0			
10:50:02	43.29	-1.21	19.49	29.75	0	29.75	29.75	177.27	0	177.27	0	0			
11:00:00	SHIP 3.0 m3 SOLIDS AND WATER FROM PRESSURE TANK.														
11:00:02	41.54	-1.48	19.84	29.92	0	29.92	29.92	177.47	0	177.47	0	0			
11:10:02	41.54	-1.81	20.08	25.15	0	25.15	25.15	177.65	0	177.65	0	0			
11:20:02	38.59	-2.08	19.84	26.32	0	26.32	26.32	177.84	0	177.84	0	0			
11:30:02	38.59	-2.42	19.84	26.15	0	26.15	26.15	178.04	0	178.04	0	0			
11:40:02	38.59	-2.75	19.59	27.45	0	27.45	27.45	178.24	0	178.24	0	0			
11:50:02	45.04	-2.95	20.12	30.93	0	30.93	30.93	178.44	0	178.44	0	0			
12:00:02	38.59	-2.98	19.1	24.89	0	24.89	24.89	178.62	0	178.62	0	0			
12:10:02	34.45	-3.11	15.56	15.8	0	15.8	15.8	178.79	0	178.79	0	0			
12:18:00	ON BOTTOM. PICK UP KELLY AND PREPARE TO CIRCULATE.														
12:20:02	38.59	-2.8	18.36	27.9	0	27.9	27.9	178.95	0	178.95	0	0			
12:30:02	38.59	-1.5	19.35	28.1	0	28.1	28.1	179.15	0	179.15	0	0			
12:32:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
12:40:02	38.59	-0.09	19.59	19.6	0	19.6	-35.12	179.33	0	179.33	0	38			
12:50:02	145.87	1.31	103.43	73.25	0	73.25	18.53	179.66	0	179.66	0	38			
13:00:02	156.44	3.23	112.64	75.04	0	75.04	20.32	180.21	0	180.21	0	38			
13:10:02	156.44	3.5	114.11	73.89	0	73.89	19.17	180.72	0	180.72	0	38			
13:13:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
13:19:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
13:20:02	118.14	4.16	84.65	59.79	0	59.79	5.07	181.21	0	181.21	0	38			
13:30:02	138.76	5.46	105.77	68.65	0	68.65	13.93	181.64	0	181.64	0	38			
13:40:02	147.6	5.45	113.13	70.75	0	70.75	16.03	182.13	0	182.13	0	38			
13:50:02	135.81	5.13	102.33	65.99	0	65.99	11.27	182.61	0	182.61	0	38			
14:00:02	146.38	5.3	109.08	69.33	0	69.33	14.61	183.08	0	183.08	0	38			
14:10:02	150.55	5.6	113.62	72	0	72	17.28	183.57	0	183.57	0	38			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/19															
14:20:02	145.87	5.85	115.96	72.75	0	72.75	18.03	184.08	0	184.08	0	38			
14:30:02	151.77	6.02	117.43	73.55	0	73.55	18.83	184.57	0	184.57	0	38			
14:40:02	150.55	6.36	114.85	72.46	0	72.46	17.74	185.07	0	185.07	0	38			
14:50:02	144.65	6.8	111.9	71.73	0	71.73	17.01	185.57	0	185.57	0	38			
14:56:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
15:00:02	135.81	7.06	103.31	69.11	0	69.11	69.11	186.08	0	186.08	0	0			
15:01:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
15:10:02	119.87	7.89	84.54	60.7	0	60.7	5.98	186.52	0	186.52	0	38			
15:20:02	129.92	7.74	98.16	68.9	0	68.9	14.18	186.96	0	186.96	0	38			
15:29:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO POUR SOAPY WATER DOWN DRILL PIPE.														
15:30:02	155.21	8.32	115.71	77.09	0	77.09	77.09	187.49	0	187.49	0	0			
15:35:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														
15:40:02	110.51	8.66	81.09	61.38	0	61.38	6.66	187.95	0	187.95	0	38			
15:50:02	132.87	8.26	99.14	71.46	0	71.46	16.74	188.38	0	188.38	0	38			
16:00:02	137.03	7.45	103.92	72.07	0	72.07	17.35	188.86	0	188.86	0	38			
16:10:02	149.32	7.12	109.33	74	0	74	19.28	189.37	0	189.37	0	38			
16:20:02	141.71	7.06	107.49	74.2	0	74.2	19.48	189.89	0	189.89	0	38			
16:30:02	139.98	7.16	109.33	75.52	0	75.52	20.8	190.4	0	190.4	0	38			
16:39:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE. START TO PULL OUT OF HOLE FOR BIT.														
16:40:02	164.05	7.27	124.05	82.97	0	82.97	82.97	190.96	0	190.96	0	0			
16:50:02	69.8	7.33	39.62	37.91	0	37.91	37.91	191.39	0	191.39	0	0			
17:00:02	47.98	7.42	20.61	19.37	0	19.37	19.37	191.58	0	191.58	0	0			
17:10:02	41.54	7.42	19.84	26.8	0	26.8	26.8	191.75	0	191.75	0	0			
17:20:02	44.48	7.84	20.57	26.08	0	26.08	26.08	191.92	0	191.92	0	0			
17:30:02	41.54	8.48	19.59	19.95	0	19.95	19.95	192.08	0	192.08	0	0			
17:40:02	38.59	9.04	19.35	18.96	0	18.96	18.96	192.25	0	192.25	0	0			
17:50:02	41.54	9.38	19.84	27.11	0	27.11	27.11	192.41	0	192.41	0	0			
18:00:02	41.54	9.52	19.35	27.48	0	27.48	27.48	192.58	0	192.58	0	0			
18:10:02	41.54	9.77	19.59	23.39	0	23.39	23.39	192.75	0	192.75	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/19															
18:20:02	42.73	10.11	20.92	25.95	0	25.95	25.95	192.92	0	192.92	0	0			
18:30:02	41.54	10.21	19.84	25.86	0	25.86	25.86	193.09	0	193.09	0	0			
18:40:02	38.59	10.01	19.59	24.34	0	24.34	24.34	193.26	0	193.26	0	0			
18:50:02	38.59	10.01	18.61	24.68	0	24.68	24.68	193.43	0	193.43	0	0			
19:00:02	36.84	10.25	18.22	26.28	0	26.28	26.28	193.6	0	193.6	0	0			
19:10:02	47.98	10.62	19.63	27.44	0	27.44	27.44	193.77	0	193.77	0	0			
19:20:02	41.54	11.04	19.84	24.69	0	24.69	24.69	193.96	0	193.96	0	0			
19:30:02	41.54	11.34	19.35	21.63	0	21.63	21.63	194.13	0	194.13	0	0			
19:40:02	41.54	11.78	20.57	23.21	0	23.21	23.21	194.31	0	194.31	0	0			
19:50:02	40.34	12.17	16.79	21.96	0	21.96	21.96	194.48	0	194.48	0	0			
20:00:02	39.79	12.56	20.92	24.52	0	24.52	24.52	194.65	0	194.65	0	0			
20:00:00	BIT AT SURFACE. OPEN HCR. CLOSE BLIND RAMS AND FLOW LINE. REMOVE BEARING ASSEMBLY FROM ROTATING HEAD.														
20:10:02	50.93	12.87	21.1	23.64	0	23.64	23.64	194.81	0	194.81	0	0			
20:20:02	41.54	13.22	19.59	24.82	0	24.82	24.82	194.98	0	194.98	0	0			
20:30:02	39.79	13.61	19.45	25.87	0	25.87	25.87	195.14	0	195.14	0	0			
20:40:02	35.65	13.98	19.1	26.42	0	26.42	26.42	195.31	0	195.31	0	0			
20:50:02	38.59	14.3	19.1	24.43	0	24.43	24.43	195.47	0	195.47	0	0			
21:00:02	41.54	14.63	19.59	26.4	0	26.4	26.4	195.64	0	195.64	0	0			
21:00:00	INSTALL BEARING ASSEMBLY IN ROTATING HEAD. OPEN BLIND RAMS. START BACK IN HOLE WITH BIT.														
21:10:02	44.48	14.91	22.05	23.08	0	23.08	23.08	195.79	0	195.79	0	0			
21:20:02	42.73	15.09	21.17	23.03	0	23.03	23.03	195.95	0	195.95	0	0			
21:30:02	36.84	15.16	18.47	20.97	0	20.97	20.97	196.11	0	196.11	0	0			
21:35:00	OPEN FLOW LINE. CLOSE HCR. CONTINUE TO RUN IN HOLE.														
21:40:02	39.79	11.02	20.19	22.45	0	22.45	22.45	196.26	0	196.26	0	0			
21:50:02	41.54	6	18.86	21.44	0	21.44	21.44	196.42	0	196.42	0	0			
22:00:02	38.59	5.02	17.87	21.03	0	21.03	21.03	196.56	0	196.56	0	0			
22:10:02	43.29	4.46	20.23	22.61	0	22.61	22.61	196.71	0	196.71	0	0			
22:20:02	39.79	4.03	19.45	22.32	0	22.32	22.32	196.87	0	196.87	0	0			
22:30:02	38.59	3.7	19.35	22.27	0	22.27	22.27	197.03	0	197.03	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/19															
22:40:02	38.59	3.57	19.1	22.03	0	22.03	22.03	197.18	0	197.18	0	0			
22:50:02	38.59	3.39	18.86	22.01	0	22.01	22.01	197.34	0	197.34	0	0			
23:00:02	41.54	3.02	20.33	23.1	0	23.1	23.1	197.49	0	197.49	0	0			
23:10:02	41.54	2.73	20.57	23.13	0	23.13	23.13	197.65	0	197.65	0	0			
23:20:02	41.54	2.66	20.33	23.3	0	23.3	23.3	197.82	0	197.82	0	0			
23:30:02	41.54	2.57	20.33	23.3	0	23.3	23.3	197.98	0	197.98	0	0			
23:35:00	SHUT IN HYDRIL.														
23:40:02	20.91	2.7	1.67	0	0	0	0	198.1	0	198.1	0	0			
23:50:02	15.02	5.36	-0.05	0	0	0	0	198.1	0	198.1	0	0			
23:55:00	OPEN HYDRIL.														
99/12/20															
0:00:02	44.48	2.36	23.27	25.31	0	25.31	25.31	198.45	0	198.45	0	0			
0:10:02	41.54	2.45	20.08	23.03	0	23.03	23.03	198.61	0	198.61	0	0			
0:20:02	41.54	2.42	20.08	23	0	23	23	198.77	0	198.77	0	0			
0:30:02	35.65	2.18	18.61	21.79	0	21.79	21.79	198.93	0	198.93	0	0			
0:40:02	41.54	2.14	19.59	22.3	0	22.3	22.3	199.08	0	199.08	0	0			
0:40:00	ON BOTTOM. RUN IN SURVEY TOOL.														
0:50:02	44.48	2.63	20.33	22.68	0	22.68	22.68	199.24	0	199.24	0	0			
1:00:02	41.54	3.41	20.08	22.54	0	22.54	22.54	199.4	0	199.4	0	0			
1:10:02	41.54	3.96	20.08	22.44	0	22.44	22.44	199.55	0	199.55	0	0			
1:10:00	SURVEY COMPLETE. PICK UP KELLY AND PREPARE TO CIRCULATE.														
1:18:00	START PUMPING NITROGEN AT 40.5 m3/min.														
1:20:02	41.54	4.34	20.08	22.43	0	22.43	-35.89	199.71	0	199.71	0	40.5			
1:30:02	147.6	4.25	103.56	67.43	0	67.43	9.11	199.98	0	199.98	0	40.5			
1:40:02	171.17	4.44	133.76	74.62	0	74.62	16.3	200.5	0	200.5	0	40.5			
1:41:00	RESUME DRILLING.														
1:50:02	180.01	5.46	139.4	78.61	0	78.61	20.29	201.03	0	201.03	0	40.5			
2:00:02	171.17	6.38	134.98	78.95	0	78.95	20.63	201.58	0	201.58	0	40.5			
2:10:02	165.28	7.06	132.28	76.7	0	76.7	18.38	202.12	0	202.12	0	40.5			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.
Customer Rep: WILBERT CALIHOO / GERRY SANDERS
Well Name: PARA et al FT LIARD
Well Location: I-46

Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/20															
2:20:02	171.17	7.64	136.46	77.43	0	77.43	19.11	202.66	0	202.66	0	40.5			
2:30:02	181.72	8.02	143.2	76.64	0	76.64	18.32	203.19	0	203.19	0	40.5			
2:34:00	DROP 1675 m SAMPLE.														
2:40:02	181.23	8.21	151.07	76.95	0	76.95	18.63	203.72	0	203.72	0	40.5			
2:50:02	194.74	8.25	161.74	74.07	0	74.07	15.75	204.25	0	204.25	0	40.5			
3:00:02	198.17	8.2	156.57	75.31	0	75.31	16.99	204.77	0	204.77	0	40.5			
3:10:02	224.2	8.22	189.24	75.23	0	75.23	16.91	205.29	0	205.29	0	40.5			
3:20:02	222.96	8.28	187.14	73.7	0	73.7	15.38	205.81	0	205.81	0	40.5			
3:30:02	203.58	8.29	168.13	84.94	0	84.94	26.62	206.34	0	206.34	0	40.5			
3:40:02	196.45	8.3	156.94	74.68	0	74.68	16.36	206.87	0	206.87	0	40.5			
3:50:02	169.45	8.38	136.34	74.33	0	74.33	16.01	207.4	0	207.4	0	40.5			
4:00:02	181.72	8.55	147.37	75.65	0	75.65	17.33	207.92	0	207.92	0	40.5			
4:01:00	STOP PUMPING NITROGEN.														
4:03:00	START PUMPING NITROGEN.														
4:05:00	STOP PUMPING NITROGEN. BLEED OFF STAND PIPE TO MAKE CONNECTION.														
4:09:00	START PUMPING NITOGEN.														
4:10:02	83.99	8.68	60.21	40.05	0	40.05	-18.27	208.37	0	208.37	0	40.5			
4:20:02	141.71	9.14	107.49	70.96	0	70.96	12.64	208.76	0	208.76	0	40.5			
4:30:02	147.6	8.9	112.4	73.97	0	73.97	15.65	209.27	0	209.27	0	40.5			
4:40:02	150.55	8.68	114.85	74.33	0	74.33	16.01	209.78	0	209.78	0	40.5			
4:45:00	DROP 1680 m SAMPLE.														
4:50:02	153.49	8.62	119.02	73.92	0	73.92	15.6	210.3	0	210.3	0	40.5			
5:00:02	162.33	8.57	129.09	72.89	0	72.89	14.57	210.81	0	210.81	0	40.5			
5:05:00	GETTING LITTLE RETURNS.														
5:10:02	46.23	8.84	25.13	12.18	0	12.18	-46.14	211.17	0	211.17	0	40.5			
5:15:00	STOP PUMPING NITROGEN. WORK PIPE.														
5:20:02	36.84	9.1	21.66	17.6	0	17.6	17.6	211.2	0	211.2	0	0			
5:30:02	80.37	9.5	56.44	0	0	0	0	211.26	0	211.26	0	0			
5:37:00	START PUMPING NITROGEN. CIRCULATE TO CLEAN UP HOLE.														

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/20															
5:40:02	82.78	16.16	49.54	30.88	0	30.88	-27.44	211.46	0	211.46	0	40.5			
5:43:00	STOP PUMPING NITROGEN. STAND PIPE PRESSURE BUILDING UP.														
5:47:00	START PUMPING NIYROGEN.														
5:47:00	FLUID TO SURFACE.												8	0	8
5:49:00	STOP PUMPING NITROGEN.														
5:50:02	162.33	17.65	113.38	21.4	0	21.4	21.4	211.53	0	211.53	0	0			
5:52:00	START PUMPING NITROGEN.														
6:00:02	253.66	23.23	106.26	51.61	0	51.61	-6.71	211.72	0	211.72	0	40.5	21	13	21
6:10:02	235.98	28.29	133.76	110.7	0	110.7	52.38	212.64	0	212.64	0	40.5			
6:20:02	87.47	27.23	35.2	46.81	0	46.81	-11.51	213.14	0	213.14	0	40.5			
6:30:02	200.63	29.04	105.03	96.01	0	96.01	37.69	213.63	0	213.63	0	40.5			
6:40:02	116.4	29.08	61.69	67.11	0	67.11	8.79	214.19	0	214.19	0	40.5			
6:50:02	141.71	29.81	80.48	78.87	0	78.87	20.55	214.67	0	214.67	0	40.5			
7:00:02	122.3	29.8	66.6	70.33	0	70.33	12.01	215.22	0	215.22	0	40.5	38.562	17.562	38.562
7:10:02	94.57	29.78	32.85	44.2	0	44.2	-14.12	215.62	0	215.62	0	40.5			
7:15:00	STOP PUMPING NITROGEN. BLEED DOWN STAND PIPE.														
7:20:00	CLOSE HYDRIL. OPEN HCR. CHANGE OUT BEARING ASSEMBLY IN ROTATING HEAD.														
7:20:02	129.92	33.15	58.14	61.8	0	61.8	61.8	216.05	0	216.05	0	0			
7:28:00	OPEN HYDRIL. CLOSE HCR. START PUMPING NITROGEN.														
7:30:02	29.75	32.3	8.54	3.47	0	3.47	-54.85	216.37	0	216.37	0	40.5			
7:40:02	23.86	30.46	5.11	0	0	0	-58.32	216.39	0	216.39	0	40.5			
7:50:02	35.65	30.5	7.32	7.74	0	7.74	-50.58	216.53	0	216.53	0	40.5			
8:00:02	390.46	35.91	274.59	181.54	0	181.54	123.22	216.89	0	216.89	0	40.5	54.13	15.568	54.13
8:10:02	148.82	34.75	95.82	88.22	0	88.22	29.9	217.74	0	217.74	0	40.5			
8:20:02	101.67	33.74	53.61	61.22	0	61.22	2.9	218.25	0	218.25	0	40.5			
8:30:02	125.76	33.96	71.28	73.21	0	73.21	14.89	218.7	0	218.7	0	40.5			
8:40:02	197.68	34.56	66.24	71.47	0	71.47	13.15	219.19	0	219.19	0	40.5			
8:40:02	DROP 1685m SAMPLE.														
8:50:02	141.71	34.62	74.34	75.46	0	75.46	17.14	219.72	0	219.72	0	40.5			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/20															
9:00:02	129.92	34.54	75.57	75.56	0	75.56	17.24	220.25	0	220.25	0	40.5	90.863	36.733	90.863
9:10:02	164.05	35.75	80.36	78.85	0	78.85	20.53	220.7	0	220.7	0	40.5			
9:16:00	STOP PUMPING NITROGEN. BLOW DOWN FLOW LINE WITH NITROGEN.														
9:20:02	131.65	36.03	68.09	70.94	0	70.94	70.94	221.31	0	221.31	0	0			
9:24:00	CLOSE PIPE RAMS. OPEN HCR.														
9:30:02	20.91	33.33	2.65	0	0	0	0	221.53	0	221.53	0	0			
9:39:00	START PUMPING NITROGEN.														
9:40:02	26.81	29.84	5.6	13.17	0	13.17	-45.15	221.63	0	221.63	0	40.5			
9:50:02	82.11	33	16.83	27.68	0	27.68	-30.64	221.74	0	221.74	0	40.5			
9:57:00	FLUID INCREASE THIS HOUR DUE TO BLOWING OUT FLOWLINE AND RIG LINES.														
10:00:02	355.1	38.11	240.95	170.08	0	170.08	111.76	222.2	0	222.2	0	40.5	94.331	3.468	94.331
10:02:00	BLEED DOWN STANDPIPE.														
10:10:02	20.91	36.29	3.63	0	0	0	0	222.8	0	222.8	0	0			
10:20:02	27.37	34.73	0	8.76	0	8.76	8.76	222.8	0	222.8	0	0			
10:23:00	START PUMPING INVERT. MAINTAIN 1000 kPa BACK PRESSURE ON ANNULUS AT RIG MANIFOLD.														
10:30:02	1000	33.19	3.98	7.93	0	7.93	7.93	222.87	0	222.87	0.76	0			
10:40:02	1000	31.59	4.86	0	0	0	0	222.93	0	222.93	0.76	0			
10:50:02	1000	29.05	13.21	24.17	0	24.17	24.17	223.02	0	223.02	0.76	0			
11:00:02	1000	28.03	10.55	20.25	0	20.25	20.25	223.17	0	223.17	0.76	0	107.207	12.876	107.207
11:10:02	1000	27.61	8.54	1.93	0	1.93	1.93	223.27	0	223.27	0.76	0			
11:20:02	1000	27.06	9.77	3.49	0	3.49	3.49	223.35	0	223.35	0.76	0			
11:30:02	1000	26.5	10.75	12.76	0	12.76	12.76	223.41	0	223.41	0.76	0			
11:40:02	1000	26.07	-0.54	0	0	0	0	223.45	0	223.45	0.76	0			
11:50:02	1000	25.33	-1.42	8.26	0	8.26	0	223.51	0	223.51	0.76	0			
12:00:02	1000	24.53	-1.03	6.42	0	6.42	0	223.55	0	223.55	0.76	0	115.062	7.855	115.062
12:01:00	STOP PUMPING INVERT. SHUT IN AT RIG MANIFOLD. FLOW CHECK.														
12:10:02	1000	23.92	0.2	3.88	0	3.88	0	223.63	0	223.63	0	0			
12:20:02	1200	23.71	-1.03	6.41	0	6.41	0	223.72	0	223.72	0	0			
12:30:02	1500	22.98	-1.18	0	0	0	0	223.76	0	223.76	0	0			

ALPINE OIL SERVICES CORP.

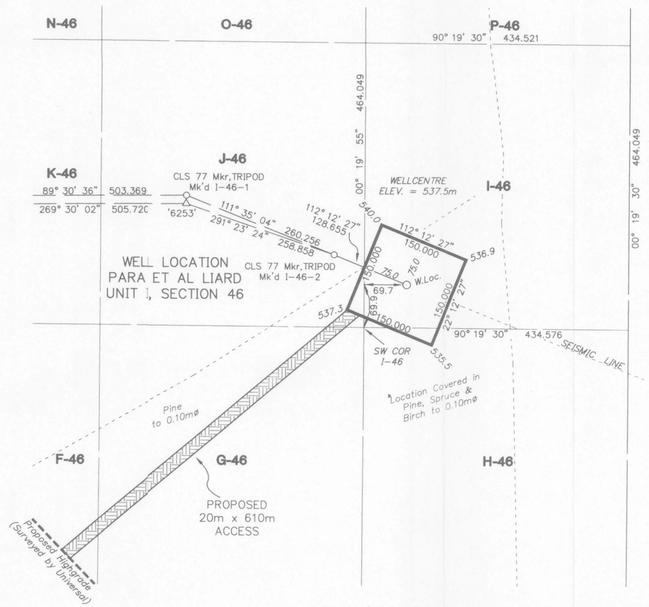
Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/20															
12:40:02	2100	22.29	2.26	10.24	0	10.24	0	223.82	0	223.82	0	0			
12:50:02	3000	21.8	-1.03	0	0	0	0	223.85	0	223.85	0	0			
13:00:02	3300	21.06	-0.79	0	0	0	0	223.88	0	223.88	0	0	117.136	2.074	117.136
13:10:02	3400	19.87	2.65	0	0	0	0	223.92	0	223.92	0	0			
13:20:02	3510	17.01	-0.39	2.44	0	2.44	0	223.95	0	223.95	0	0			
13:30:02	3650	17.27	-0.79	0	0	0	0	223.99	0	223.99	0	0			
13:40:02	3800	17.25	-0.15	11.94	0	11.94	0	224.03	0	224.03	0	0			
13:50:02	3900	17.03	-0.79	0	0	0	0	224.08	0	224.08	0	0			
14:00:02	4000	16.72	-0.79	13.91	0	13.91	0	224.13	0	224.13	0	0	117.43	0.294	117.43
14:10:02	4100	16.36	-0.44	4.13	0	4.13	0	224.18	0	224.18	0	0			
14:20:02	4200	16.02	2.75	0	0	0	0	224.27	0	224.27	0	0			
14:27:00	BLEED DOWN ANNULUS TO 3000 kPa.														
14:30:02	3000	15.45	-0.05	0	0	0	0	224.27	0	224.27	0	0			
14:40:02	3000	15.1	0.69	0	0	0	0	224.33	0	224.33	0	0			
14:50:02	3000	15.1	-0.05	0	0	0	0	224.33	0	224.33	0	0			
15:00:02	3000	15.3	-0.05	0	0	0	0	224.33	0	224.33	0	0	117.43	0	117.43
15:10:02	3000	15.63	57.91	0	0	0	0	224.33	0	224.33	0	0			
15:18:00	START PUMPING WATER TO FILL HOLE.														
15:20:02	1000	15.76	74.47	39.09	0	39.09	0	224.38	0	224.38	0.76	0			
15:30:02	1000	16.04	29.41	0	0	0	0	224.45	0	224.45	0.76	0			
15:40:02	1000	16.13	26.85	0	0	0	0	224.45	0	224.45	0.76	0			
15:50:02	1000	16.2	225.97	70.44	0	70.44	0	224.52	0	224.52	0.76	0			
16:00:02	1000	17.15	87.72	30.55	0	30.55	0	224.74	0	224.74	0.76	0	110.421	-7.009	110.421
16:10:02	1000	18.72	363.31	68.71	0	68.71	0	224.88	0	224.88	0.76	0			
16:20:02	1000	19.18	217.33	0	0	0	0	225.11	0	225.11	0.76	0			
16:25:00	STOP PUMPING FLUID. HOLE IS FULL. 13.0 m3 PRODUCED WATER USED TO FILL HOLE.														
16:30:02	0	19.16	151.81	0	0	0	0	225.15	0	225.15	0	0			
16:40:02	0	19.52	131.55	20.88	0	20.88	0	225.25	0	225.25	0	0			
16:50:02	0	20.04	121.48	16.36	0	16.36	0	225.38	0	225.38	0	0			

ALPINE OIL SERVICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/20															
17:00:02	0	20.34	147.5	0	0	0	0	225.47	0	225.47	0	0	104.43	-5.991	104.43
17:10:02	0	20.75	138.78	0	0	0	0	225.47	0	225.47	0	0			
17:20:02	0	21.13	126.64	0	0	0	0	225.47	0	225.47	0	0			
17:30:02	0	21.27	114.85	0	0	0	0	225.49	0	225.49	0	0			
17:40:02	0	21.34	102.94	0	0	0	0	225.5	0	225.5	0	0			
17:50:02	0	21.33	91.28	0	0	0	0	225.51	0	225.51	0	0			
18:00:02	0	21.28	79.74	18.51	0	18.51	0	225.53	0	225.53	0	0	104.43	0	104.43
18:10:02	0	21.3	68.45	0	0	0	0	225.56	0	225.56	0	0			
18:20:02	0	21.14	55.93	19.01	0	19.01	0	225.67	0	225.67	0	0			
18:25:00	START PUMPING INVERT TO DISPLACE HOLE.														
18:30:02	1000	20.64	51.15	0	0	0	0	225.72	0	225.72	0.76	0			
18:38:00	STOP PUMPING INVERT. REPAIR RIG PUMP.														
18:40:02	1000	20.13	53.96	0	0	0	0	225.72	0	225.72	0	0			
18:45:00	RIG PUMP REPAIRED. START PUMPING INVERT.														
18:50:02	1000	19.71	50.64	0	0	0	0	225.73	0	225.73	0.76	0			
19:00:02	1000	19.32	53.23	0	0	0	0	225.73	0	225.73	0.76	0	107.968	3.538	107.968
19:10:02	1000	18.96	39.72	17.02	0	17.02	0	225.75	0	225.75	0.76	0			
19:20:02	1000	18.64	60.84	0	0	0	0	225.75	0	225.75	0.76	0			
19:30:02	1000	18.36	57.29	0	0	0	0	225.75	0	225.75	0.76	0			
19:40:02	1000	18.02	52.25	0	0	0	0	225.75	0	225.75	0.76	0			
19:41:00	INVERT AT SURFACE. STOP PUMPING INVERT. SHUT IN AT RIG MANIFOLD FOR FLOW CHECK.														
19:50:02	0	17.6	43.9	0	0	0	0	225.76	0	225.76	0	0			
20:00:02	0	17.14	43.79	0	0	0	0	225.76	0	225.76	0	0	133.966	25.998	133.966
20:05:00	OPEN ANNULUS TO SHAKER. RIG OUT FLOWLINE.														
20:10:02	0	16.71	43.16	0	0	0	0	225.76	0	225.76	0	0			
20:15:00	CIRCULATE OVER SHAKER.														
20:20:02	0	16.35	43.54	0	0	0	0	225.76	0	225.76	0	0			
20:30:02	0	16.04	43.16	0	0	0	0	225.76	0	225.76	0	0			
20:40:02	0	15.72	43.3	0	0	0	0	225.76	0	225.76	0	0			

ALPINE OIL S. VICES CORP.

Customer: PARAMOUNT RESOURCES LTD.															
Customer Rep: WILBERT CALIHOO / GERRY SANDERS															
Well Name: PARA et al FT LIARD															
Well Location: I-46															
Date/Time	Ann Press	Ann Temp	Static	Gas Rate 1	Gas Rate 2	Total Gas	Net Gas	Cum Gas 1	Cum Gas 2	Total Gas	Fluid Inj.	N2 Inj.	Surf Vol	Gain/Loss	Cum +/-
yy/mm/dd	kPa	C	kPa	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3/d	10^3m3	10^3m3	10^3m3	l/min	m3/min	m3	m3	m3
99/12/20															
20:50:02	0	15.48	42.92	0	0	0	0	225.76	0	225.76	0	0			
21:00:02	0	15.29	42.92	0	0	0	0	225.76	0	225.76	0	0	133.966	0	133.966
22:45:00	START OUT OF HOLE WITH DRILL STRING.														
23:00:00	END OF DRILL AHEAD REPORT.														

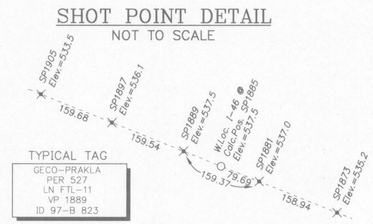


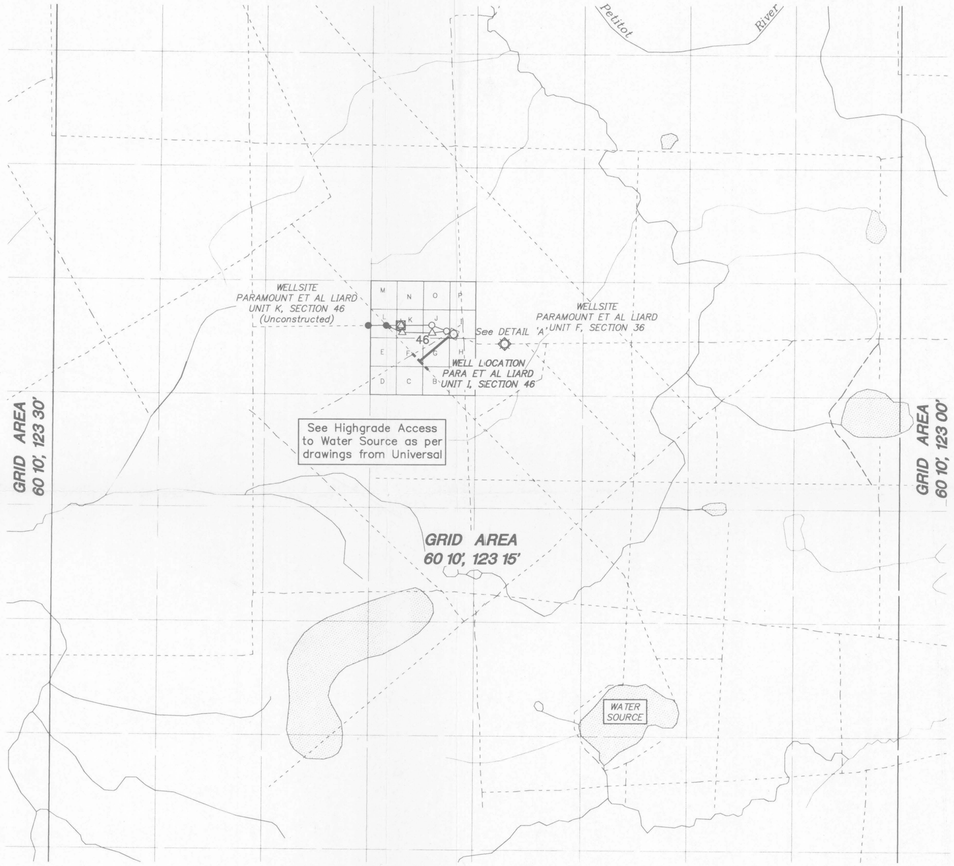
DETAIL 'A'
UNIT I, SECTION 46
SCALE 1:5,000

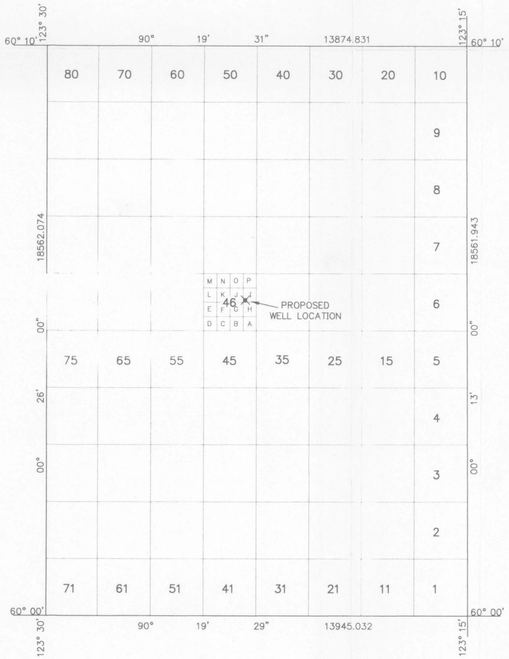
AREAS REQUIRED:

WELLSITE:	150mx150m =	2.25 ha.
ACCESS:	20mx610m =	1.22 ha.
CAMPSITE:	40mx60m =	0.24 ha.
TOTAL:		3.71 ha.

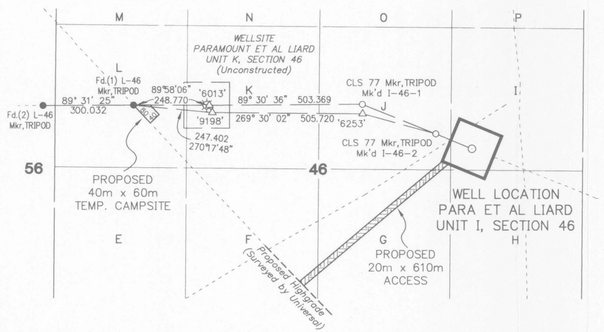
SHOT POINT DETAIL
NOT TO SCALE







GRID AREA 60°10', 123°15'
SCALE 1:100,000



DETAIL 'B'
SCALE 1:10,000

All coordinates shown are on 1927 North American Datum.
They are based on values for Found Wellsite Monuments Fd.CLS(1) L-46
Grid Area 60° 10', 123° 15' and Fd.CLS(2) L-46 Grid Area 60° 10', 123° 15'.

GEOGRAPHIC AND UTM COORDINATES, (1927 NAD)				
Station	Latitude	Longitude(W)	Northings	Eastings
CONTROL MONUMENTS				
L-46-1	60°05'36.782"	123°24'05.680"	6661691.266	477663.419
L-46-2	60°05'36.642"	123°24'25.087"	6661688.773	477363.541
GRID AREA				
NE	60° 10' 00"	123° 15' 00"	6669792.783	486125.259
NW	60° 10' 00"	123° 30' 00"	6669871.559	472250.651
SE	60° 00' 00"	123° 15' 00"	6651230.973	486055.060
SW	60° 00' 00"	123° 30' 00"	6651310.016	472110.252
I-46, NE	60°05'45.214"	123°22'29.999"	6661943.459	479143.204
I-46, NW	60°05'45.214"	123°22'58.124"	6661945.924	478708.690
I-46, SW	60°05'30.214"	123°22'58.124"	6661481.882	478706.002
I-46, SE	60°05'30.214"	123°22'29.999"	6661479.417	479140.571
TRAVERSE STATIONS				
TH '601.3'	60°05'36.835"	123°23'49.587"	6661691.405	477912.070
I-46-1	60°05'37.070"	123°23'17.027"	6661695.711	478415.180
I-46-2	60°05'34.023"	123°23'01.336"	6661600.018	478657.070
TH '6253'	60°05'37.028"	123°23'16.963"	6661694.384	478416.158
TH '9198'	60°05'36.788"	123°23'49.675"	6661689.983	477910.699
PROPOSED WELL				
I-46	60°05'32.474"	123°22'53.612"	6661551.415	478776.125

REV.No.	DESCRIPTION	DATE

McELHANNEY
LAND SURVEYS LTD.
10014 - 97th Ave., Suite 202
Fort St. John, British Columbia
Phone:(250)787-0356, Fax:(250)787-0310

DATE : 99/07/02 JOB No.: 3111-07261WS RT BRC

PLAN AND FIELD NOTES

OF SURVEY OF

PROPOSED EXPLORATORY WELL

PARA ET AL LIARD

IN UNIT I, SECTION 46

GRID AREA 60° 10' , 123° 15'

NORTHWEST TERRITORIES

CANADA OIL AND GAS LAND REGULATIONS

SCALE 1:50,000

0m 500m 1000m 2000m 3000m 4000m 5000m

SURVEYED FOR

PARAMOUNT RESOURCES LTD.

BY : R.O. BLACKALL, CLS
JUNE, 1999.

LEGEND

UTM coordinates are computed for Zone 10, central meridian 123° W.
Bearings were derived from the bearing 89° 31' 25" computed between Fd. CLS 77 Wellsite Control Monuments L-46-1 Grid Area 60° 10', 123° 15' and L-46-2 Grid Area 60° 10', 123° 15' and are referred to the Meridian 123° W.
Distances are expressed in metres and decimals thereof.
Distances shown in traverse are measured distances reduced to the horizontal at general ground level.
For the computation of coordinates measured distances have been reduced to the UTM plane by multiplying them by an average combined scale factor of 0.9995214. Coordinates were then adjusted to fit the control.
Distances shown on grid area subdivisions are UTM plane.
Authorized control monuments found ..... ●
Monuments placed ..... ○
Mkr. denotes metal marker post 2.0m long placed 0.30m N.
Elevations were derived from Geodetic of Canada Monument 'Petitot' Elev. = 218.241m

Survey was completed prior to drilling; therefore well as drilled may not necessarily agree with proposed location.

I, R.O. Blackall, of the City of Fort St. John, British Columbia, Canada Lands Surveyor, make oath and say that I have in my own proper person, according to law and the instructions of the Surveyor General of Canada Lands, faithfully and correctly executed the survey shown by this plan and field notes, and that the said plan and field notes are correct and true to the best of my knowledge and belief.
SO HELP ME GOD

R.O. Blackall, CLS

Sworn before me at Fort St. John, this 06th day of July, 1999.

A Commissioner for Oaths

THIS SURVEY WAS EXECUTED DURING THE PERIOD
JUNE 22nd TO JUNE 23rd 1999. BY R.O. BLACKALL, CLS

PARAMOUNT RESOURCES LIMITED

WITNESS

DATE