1841

Geological Report

(2)

N.E.B. COPY

PARAMOUNT
ET AL LIARD F-36

60° 05.46' 123° 22.06'

C L Consultants Limited

PARAMOUNT
ET AL LIARD F-36

60° 05.46' 123° 22.06'

File No: 98N-2286

Prepared by:

BARRY CLATTENBURG
Staff Wellsite Geologist
CL Consultants Limited

Prepared for:
Paul Collens
PARAMOUNT RESOURCES LIMITED

PERMIT TO PRACTICE
CL CONSULTANTS LIMITED
Signature: _____
Date: February 9, 1999
PERMIT NUMBER: P 2911
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

C L Consultants Limited

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SYNOPSIS

OPERATOR:	Paramount Resources Ltd.	
WELL NAME:	Paramount et al Liard F-36	
LOCATION:	60o 05.46' 123o 22.06'	
FIELD:	Undefined	
PROVINCE:	Northwest Territories	
ELEVATIONS:	G.L. 464.9m	K.B. 470.3m
RE-ENTRY DATE:	December 23, 1998	22:10 hrs.
T.D. DATE:	January 31, 1999	23:00 hrs.
CONTRACTOR:	Precision Drilling Ltd.	Rig: 373
HOLE SIZE:	155.6 mm	
COLLARS:	121 mm	
MUD COMPANY:	Baker Hughes Inteq	
MUD TYPE:	Nitrified Invert 1494m - 1566m/Invert 1566m - T.D.	
WIRELINE LOGGING CO.:	Baker Atlas	
LOG RECORD:	RUN NO. 2	

1) HDIL-GR 1965.2m - 1494.0m
2) ZDL-CNL-GR-PE-XY CAL 1966.7m - 1494.0m
3) XMAC-GR 1960.7m - 250.0m
4) HEXDIP-CBIL-GR 1960.5m - 250.0m
5) MRIL-GR-CAL 1842m-1923m; 1750m-78m; 1614m-43m; 1525m-78m)
6) VSP

RUN NO. 3

1) HDIL-GR 2107.3m - 1494.0m
2) ZDL-CNL-GR-PE-XY CAL 2108.8m - 1905.0m
3) XMAC-GR 2102.8m - 1905.0m

TESTING COMPANY: Baker Tools/Delta P Test Corp./Canada Tech Data

SYNOPSIS cont.

TEST RECORD:	Flow Test #1 1494m - 1539m (Mattson) Flow Test #2 1494m - 1566m (Mattson) DST #4 1559.7m - 1565.6m (Mattson) DST #5 1662.0m - 1689.0m (Mattson) DST #6 1763.0m - 1777.0m (Mattson) DST #7 1757.0m - 1792.0m (Mattson) DST #8 2085.0m - 2110.0m (Mississippian)
DRILLING SUPERVISION:	Dennis McCulloch
GEOLOGICAL SUPERVISION:	Barry C. Clattenburg
TOTAL DEPTH:	DRILLER: 2110.0 metres LOGGER: 2109.8 metres

FORMATION TOPS (m)

PERIOD / GROUP / FORMATION (LOCAL UNITS)	PROGNOSIS (subsea)	PROGNOSIS (KB)	SAMPLES (driller)	LOGS (KB)	LOGS (subsea)
PERMIAN					
Mattson				1398	-928.6
MISSISSIPPIAN					
Golata					
Flett			2087	2085	-1615
T.D.			2110	2110	-1640

DEVIATION SURVEY RECORD

Depth (m)	Deviation	Azimuth	Depth (m)	Deviation	Azimuth
1555	1.0		1874	2.54	230.31
1604	3.0		1894	2.77	252.32
1633	2.75		1913	2.71	256.73
1660	2.16		1932	1.40	277.41
1698	2.00		1951	0.72	357.56
1766	0.75		1970	1.98	50.37
1860	3.00		1989	3.31	60.03
1878	2.75		2008	5.30	67.39
1907	1.00		2016	6.64	68.49
1956	2.75		2025	7.81	69.78
2012	7.00		2029 (United GC)	7.60	77.60
1513(Gyro/Data)	0.86	126.05	2038	6.40	81.50
1533	0.72	157.81	2048	5.10	83.10
1552	1.12	186.79	2057	4.50	88.90
1571	1.03	205.38	2067	3.80	100.50
1590	1.97	224.97	2076	3.00	95.00
1608	3.28	232.05	2110 (extrap.)	1.80	95.00
1628	2.75	234.00			
1647	2.34	238.91			
1665	2.59	240.08			
1684	2.21	253.51			
1702	2.05	262.91			
1722	2.02	260.05			
1741	2.01	260.01			
1760	1.62	277.77			
1779	1.29	296.82			
1798	1.01	301.07			
1818	1.10	281.19			
1837	0.96	264.76			
1856	1.77	232.41			

BIT RECORD

#	Type	Size (mm)	In	Out	Total (m)	Hrs drilled	FOB (daN)	RPM	Cond. T B G
1	H ATJ4	155	1494	1495	1	1.5	6	45	6-2-1
2	H STR30	155	1495	1524	29	21.50	10	55	6-3-1
3	SM F3	155	1524	1566	42	33.75	10	55	6-3-3
4	SEC PSF	155	1566	1569	3	2.25	5	55	5-3-3
5	R EHP62A	155	1569	1616	47	41.50	10	65	5-4-1
6	RBI C3LRRGS	155	1616	1641	25	25.75	10	65	4-3-I
7	R HP53A	155	1641	1663	22	20.25	6-10	65	4-3-1
8	H STR44CD	155	1663	1666	25	22.50	10	65	8-8-12
9	RBI C4LRG	155	1688	1689	1	1.25	4	65	1-1-1
10	H J4	155	1689	1690	1	1.50	8	50	8-4-I
11	H D41	155	1690	1701	11	17.50	5	55	80%
12	RBI C15LRG	155	1701	1716	15	17.0	8	55	8-8-I
13	RBI C47LRG	155	1716	1806	90	52.25	10-11	100	7-6-I
14	RBI C45LRG	155	1806	1872	66	51.25	10-12	70-75	7-4-3
15	R EHP62	155	1872	1940	68	56.00	11	75	7-4-9.5
16	H STR50	155	1940	1953	13	14.50	8-11	75	7-E-I
17	SM F570DP	155	1953	1968	15	16.75	11	75	3-E-I
18	(RR4)SEC PSF	155	1968	1968	0	CLEAN OUT TRIP AFTER LOGGING			
19	SEC HZM89F	155	1968	2020	52	36.50	10-14	75	8-6-9
20	RBI C45LRG	155	2020	2030	10	10.50	2-5	85-100	2-2-I
21	RBI C5LRGSP	155	2030	2110	80	30.75	10-12	80-100	6-4-I

BIT CONDITION		SCALE
Tooth Wear	(T)	0 - 8
Bearing Wear	(B)	0 - 8
Gauge	(G)	in or (mm) under
New Bit	T=0	B=0 G=in

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
12/24/98	1500m	6m	1.5	Tag cement at 1475m. Drill out float, cement, and shoe. Drill to 1495m. Strap out of hole for bit change. R.I.H. Break circulation. Drill 155mm hole.
12/25/98	1524m	24m	20.0	Drill 155mm hole to 1524m. Blow pipe dry and P.O.O.H. for new bit.
12/26/98	1542m	18m	13.0	Trip out of hole for bit change. Make up B.H.A. and R.I.H. Change out seals on RBOP unit. Drill 155mm hole. Pull 2 suction valves on mud pump. Drill 155mm hole to 1542m. Shut in well and repair Entest valve in cellar. Blow hole dry and flow test well via annulus.
12/27/98	1566m	24m	20.0	Drill 155mm hole. Take on influx of gas at 1565.8m. Shut in well with pipe rams. Flow test with Entest equipment.
12/28/98	1566m	0m	0.0	Shut in well. Rig up Nowsco. Displace gas to invert mud. Circulate and condition mud. Wiper trip. Lay down string float. Survey. Circulate and condition hole.
12/29/98	1566m	0m	0.0	Circulate bottoms up and pump pill. Trip out of hole. Remove RBOP element. Pick up test tools. Run DST #4. Trip out of hole.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
12/30/98	1569m	3m	2.25	Trip out of hole with DST #4. Recover and read recorders. Break and lay down test tools. Make up BHA and install RBOP. Run in hole with bit #4. Circulate and ream packer rubber to bottom. Drill 155mm hole to 1569m. Pump pill and trip out of hole. Rig out Alpine RBOP and Entest equipment.
12/31/98	1587m	18m	13.0	Nipple down RBOP and Entest equipment. Nipple up flow nipple and flow line. R.I.H. with bit #5 to 800m. Circulate bottoms up. Change heads and liners in pump. Finish running in hole. Ream 18m to bottom. Drill 155mm hole.
01/01/99	1610m	23m	23.0	Drill 155mm hole.
01/02/99	1622m	12m	15.0	Drill 155mm hole to 1616m. Survey. Pump pill. Trip out of hole for bit change. Make up BHA and R.I.H. Slip and cut 23m drilling line. Circulate bottoms up. Finish R.I.H. Clean 18m to bottom. No fill. Drill 155mm hole.
01/03/99	1641m	19m	17.0	Drill 155mm hole 1621m to 1641m. Survey. Pump pill. Trip out of hole for bit change. Make up BHA. R.I.H.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
01/04/99	1655m	14m	16.0	R.I.H. with bit #7. Break circulation at 700m and 1400m. Clean 9m to bottom. No fill. Drill 155mm hole. Work on pump. Drill 155mm hole.
01/05/99	1672m	17m	14.0	Drill 155mm hole to 1663m. Circulate up sample. Survey. Trip out of hole. Make up BHA and R.I.H. Break circulation at 700m and 1400m. Clean 12m to bottom. No fill. Drill 155mm hole to 1672m.
01/06/99	1688m	16m	17.0	Drill 155mm hole to 1688m. Circulate up sample and pump pill. Trip out of hole. Make up BHA and R.I.H. to bottom.
01/07/99	1689m	1m	1.0	R.I.H. with bit #9. Clean 1654m to 1683m. Ream under gauge hole 1683m to 1688m. Drill to 1689m. Circulate and condition mud. Wiper trip to casing. Trip out of hole to run DST #5. Pick up and make up test tool. Strap into hole. Make up test head.
01/08/99	1689m	0m	0.0	Perform DST #5. Pull test free and rig out test head. Trip out of hole. Hole not taking proper amount of fluid. Drop bar. Circulate. R.I.H. to 1490m. Circulate and condition mud. Pump pill. Trip out of hole. Recover recorders and lay down test tools.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
01/09/99	1691m	2m	4.0	Lay down test tools. Make up BHA & R.I.H. Clean 18m to bottom. Mill up packer rubber. Drill 155mm hole to 1690m. Pump pill and trip out of hole. Make up bit #11 and R.I.H. Circulate and ream 1520m to bottom. Pattern bit and drill 155mm hole.
01/10/99	1701m	10m	15.0	Drill 155mm hole to 1701m. Circulate. Survey. Pump pill and trip out of hole. Make up BHA and R.I.H. Clean 9m to bottom. No fill.
01/11/99	1716m	15m	17.0	Drill 155mm hole to 1716m. Jack and level rig. Pump pill and trip out of hole for bit change. Make up BHA and R.I.H. Slip and cut 30m drilling line.
01/12/99	1747m	31m	22.0	R.I.H. with bit #13. Clean 16m to bottom. No fill. Drill 155mm hole.
01/13/99	1794m	47m	22.5	Drill 155mm hole. Survey.
01/14/99	1810m	16m	12.75	Drill 155mm hole to 1806m. Circulate bottoms up. Pump pill and trip out of hole for bit change. R.I.H. Ream and clean 18m to bottom. Drill 155mm hole.
01/15/99	1841m	31m	23.0	Drill 155mm hole.
01/16/99	1871m	30m	23.25	Drill 155mm hole.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
01/17/99	1882m	11m	11.25	Drill 155mm hole to 1872m. Circulate and Survey. P.O.O.H. to change bit. R.I.H. with bit #15. Drill 155mm hole. Circulate and survey. Drill 155mm hole.
01/18/99	1910m	29m	22.00	Drill 155mm hole. Survey.
01/19/99	1940m	30m	23.25	Drill 155mm hole to 1940m.
01/20/99	1944m	4m	5.0	Pump pill. P.O.O.H. to change bit. R.I.H. with bit #16. Ream from 1910 to 1940m. Drill 155mm hole.
01/21/99	1959m	15m	15.25	Drill 155mm hole to 1953m. Pump pill. Strap out of hole. R.I.H. with bit #17. Drill 155mm hole.
01/22/99	1968m	9m	11.25	Drill 155mm hole to 1968m. Reached T.D. at 11:45 hrs. Circulate up sample. Pump pill. Wiper trip up into surface casing. Run back to bottom. Circulate and condition mud. Survey. Trip out of hole to log. Rig up line B.O.P. R.I.H. with Induction Log with Baker Atlas.
01/23/99	1968m	0m	0.00	Run HDIL-GR. Run ZDL-CNL-GR-PE-XYCAL. Run MAC-CAL. Run HEXDIP-CBIL-GR.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
01/24/99	1968m	0m	0.00	Run MRIL-GR-CAL. Run VSP. Rig out loggers. Rig out line BOP. Install flow nipple and line. R.I.H. with bit #18 for clean out trip.
01/25/99	1968m	0m	0.00	R.I.H. for clean out. Circulate and condition hole. Trip out of hole. Slip and cut drilling line. Wait on tester. Pick up tools for DST #6. Perform DST #6 over interval 1763-1777m. Packer seat failed. Real time data tool failed. Trip out of hole. Change out damaged packer rubbers.
01/26/99	1968m	0m	0.00	Make up DST #7. Wait on real time data recorder. Make up tool and R.I.H. Rig up testing head and pump up packer. Perform DST #7. Interval 1757-92m. Perform preflow and initial shut in. On VO lost packer seal. Took on fluid into tool. Close tool. Re-pump up packers and try to re-seat. Flowed slightly and died. Shut in tool. Pull packers free and drop bar. Reverse circulated out fluids. Trip out of hole to recover recorders.
01/27/99	1995m	27m	17.25	Lay down test tools. Rig service and function test blind rams. Decision made to continue to drill 155mm hole. Make up BHA and R.I.H. Clean 9m to bottom. 1m fill. Drill 155mm hole.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
01/28/99	2020m	25m	19.25	Drill 155mm hole to 2020m. Circulate up sample. Run survey. 2012m 7 degrees. Trip out of hole for bit change.
01/29/99	2030m	10m	10.50	Trip out of hole for nit change. R.I.H. with NB #20. Ream undergauge hole from 2014m to 2020m. Circulate and condition mud. Drill ahead to 2030m. Circulate up sample. Drop Gyro/Data tool and survey out of hole.
01/30/99	2049m	19m	10.00	Trip out of hole with Gyro/Data tool. Pick up United Geo Com directional tool and MWD tool. R.I.H. with tools. Test MWD and survey every 150m from 1494m to bottom.
01/31/99	2110m	61m	20.75	Directional drill 155mm hole to T.D. of 2110m. Reached T.D. at 23:0 hrs. January 31/99. Circulate up sample.
02/01/99	2110m	0m	0.00	Wait on orders. Wiper trip to surface casing. Circulate and condition hole. Trip out of hole. Lay down directional tools. Make up DST #8. R.I.H. and head up test tools.
02/02/99	2110m	0m	0.00	Perform DST #8. Pull packer free and trip out of the hole. Recover and read recorders. Load out test tools. Rig out flow nipple and flow line. Install in line B.O.P. Run log to bottom. Run HDIL-GR.

DAILY DRILLING CHRONOLOGY cont.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
02/03/99	2110m	0m	0.00	Run HDIL-GR. Run CN-ZDL-GR-XY CAL. Run XMAC-GR-XY. Rig out loggers. Rig out line B.O.P. Install flow nipple. R.I.H. with DCs and 25 stands DP. Rig up lay down machine and lay down pipe and collars. Rig up power tongs and run 51 joints (714.44m) of 114.3mm Prudential casing. Install Cardium liner packer. Double strap and drift DP and R.I.H.

FLOW TEST

FLOW TEST NO. 1

Date: December 26/27, 1998

Formation: Mattson

Interval: 1494m to 1542m

Test Type: Flow Test Via Annulus

Hole Size: 155mm

Drill Pipe: OD: 88.9mm

Collars: OD: 121.0mm

Testing Company: Entest Corp./Baker Oil Tools

Measurement: Blew well dry and flowed through Entest 3" manifold with 2" variable choke using manifold pressure gauge and Baker flow conversion chart. Also see Entest chart results.

Samples: 2 gas samples collected. 1 mud sample (sample 1A) collected from flow line. Samples sent to AGAT Labs, Fort St. John, via Baker Oil Tools tester Ken Willis.

Results:

TIME	CHOKE(mm)	kPa	Rate (M3/D)
22:55	25.40	800	8843
23:00	25.40	800	8843
23:10	19.05	1150	74785
23:15	19.05	1300	83933
23:20	19.05	1310	84603
23:25	19.05	1350	87063
23:30	19.05	1400	90143
23:35	19.05	1400	90143
23:40	19.05	1400	90143
23:45	12.70	1950	53669
23:50	12.70	2200	60437
23:55	12.70	2450	67249
00:00	12.70	2600	71357
00:05	12.70	2700	74105
00:10	12.70	2800	76859
00:15	12.70	2810	77135
00:20	12.70	2850	78239
00:25	12.70	2900	79621
00:30	12.70	2900	79621

FLOW TEST

FLOW TEST NO. 2

Date: December 27/28, 1998

Formation: Mattson

Interval: 1494m to 1566m

Test Type: Flow Test Via Annulus

Hole Size: 155mm

Drill Pipe: OD: 88.9mm

Collars: OD: 121.0mm

Testing Company: Entest Corp.

Measurement: Flowed through Entest 3" manifold with 2" variable choke using manifold pressure gauge and recorder at P tank.

Samples: 3 gas samples collected. 1 mud sample (sample 2A) collected at flow line. All samples sent to AGAT Lab, Fort St. John via Baker Tools tester, Ken Willis.

Results:

TIME	CHOKE(mm)	kPa	RATE (1000M3/D)
23:45	21.43	7500	396.81
23:50	21.43	7000	381.88
23:55	21.43	7000	380.06
00:05	15.87	6900	338.52
00:10	15.87	7000	351.94
00:20	7.14	8900	231.47
00:30	7.14	10300	198.79
00:45	7.14	11000	206.95
01:00	7.14	11000	207.93
01:15	7.14	11000	208.43
01:30	12.70	9400	329.97
01:40	12.70	8700	293.45
01:50	12.70	8700	289.91
02:00	12.70	8690	289.91
02:10	12.70	8690	289.23

Comments: Choke was being cut by well blowing dry sand. Switched to other side of manifold for more accurate readings.

DRILLSTEM TEST

DRILLSTEM TEST No. 4

Date: December 29/30, 1998

Formation: Mattson

Interval: 1559.7m to 1565.6m

Test type: Bottom Hole Inflate

Packers: 136mm

Hole size: 155mm

Drill pipe: OD: 88.9mm ID: 70.21mm

Collars: OD: 121.0mm ID: 55.0mm

Testing Company: Baker Oil Tools/Delta P Test Corp.

	PRESSURES:			Times:	
	IH:	17181	kPa		
1st	IPF:	10347	kPa	PF:	10 min.
	FPF:	11536	kPa		
	ISI:	15911	kPa	ISI:	60 min.
2nd	IF:	10817	kPa	VO:	120 min.
	FF:	11273	kPa		
	FSI:	15920	kPa	FSI:	30 min.
	FH:	17096	kPa	BHT:	57.4C

Results:

Flow comments: 2 gas bombs (30545, 30768) taken during main flow.

Recovery: No fluid in tool.

Test comments: Ran dual bottom hole samplers.
Lost packer seat 0.5 hour into FSI. Tried to re-inflate packer without success.
1 mud sample (sample A) collected from flow line prior to running test.
All samples sent to AGAT Lab, Fort St. John, via Baker Tools tester, Ken Willis.

DRILLSTEM TEST

DRILLSTEM TEST NO. 5

Date: January 7/8, 1999

Formation: Mattson

Interval: 1662.0m to 1689.0m

Test type: Bottom Hole Conventional

Packers: 136mm

Hole Size: 155mm

Drill Pipe: OD: 88.9mm ID: 70.21mm

Collars: OD: 121.0mm ID: 55.0mm

Testing Company: Baker Oil Tools/Canada Tech Data Acquisition

	PRESSURES:		Times:	
	IH:	18450 kPa		
1st	IPF:	938 kPa	PF:	10 min.
	FPF:	543 kPa		
	ISI:	2391 kPa	ISI:	135 min.
2nd	IF:	458 kPa	VO:	150 min.
	FF:	550 kPa		
	FSI:	1693 kPa	FSI:	220 min.
3rd	IF:	783 kPA	3rd VO:	5 min.
	FF:	647 kPa	BHT:	59.8C
	FH:	18456 kPa		

Results:

Flow comments: PF: WAB increasing to SAB in 10 minutes. NGTS.
VO: SAB decreasing to VWAB in 2 minutes.

Recovery: Hole fill volumes were not correct when came out of hole with test tool. Dropped bar, circulated, and ran pipe back to bottom of casing to eliminate any possibility of a kick. Due to circulation pressures the pump-out sub was activated and no fluid recovery was obtained.

Test comments: Ran dual bottom hole samplers.
1 mud sample (sample 5-A) collected at flow line prior to running test.

DRILLSTEM TEST

DRILLSTEM TEST NO. 6

Date: January 25, 1999

Formation: Mattson

Interval: 1763.0m to 1777.0m

Test Type: Inflate Straddle

Hole Size: 155mm

Drill Pipe OD: 88.9mm ID: 70.21mm

Collars: OD: 121.0mm ID: 55.0mm

Testing Company: Baker Oil Tools/Canada Tech Data Acquisition

	PRESSURES:	Times:
	IH: 19794 kPa	
1st	IPF:	PF:
	FPF:	
	ISI:	ISI:
2nd	IF:	VO:
	FF:	
	FSI:	FSI:
	FH: 19746 kPA	BHT: 59.8C

Results

Flow comments:

Recovery:

Test comments: Misrun. Pumped up tool. Tried to set packer. Packer slid. Pumped up tool again. Unable to set packer. Appeared to have blown packer. Real time data tool failed. Top packer was gouged vertically and has 3 cleanly cut 0.75"-1.00" oval vertically aligned holes. Bottom packer damaged.

DRILLSTEM TEST

DRILLSTEM TEST NO. 7

Date: January 26, 1999

Formation: Mattson

Interval: 1757.0m to 1792.0m

Test Type: Inflate Straddle

Hole Size: 155mm

Drill Pipe: OD: 88.9mm ID: 70.21mm

Collars: OD: 121.0mm ID: 55.0mm

Testing Company: Baker Oil Tools/Delta P Test Corp.

	PRESSURES:	Times:
	IH: 19747 kPa	
1st	IPF: 2358 kPa	PF: 10 min.
	FPF: 2808 kPa	
	ISI: 18152 kPa	ISI: 60 min.
2nd	IF: 7279 kPa (real time)	VO:
	FF:	
	FSI: 18118 kPa (real time)	FSI: 60 min.
	FH: 19732 kPa	BHT: 62.2C

Results

Flow comments: PF: Strong initial puff to SAB in 45 sec. GTS in 2.5 min. Building throughout.
VO: Lost seal at start.

Recovery: Fluid in pipe appeared to be invert mud.

DRILLSTEM TEST cont.

DRILLSTEM TEST NO. 7

Test comments: Lost packer seal at start of VO. Pulled up immediately to close tool. Hole took approximately 4m3 of mud to fill. Real time estimated 1200m of drilling fluid entered pipe. Pumped up tool to continue test. Obtained good seat. Opened tool. Flowed 5 litres of fluid then stopped. Shut in tool for 60 minutes. Deflated tool. Reversed circulation and caught samples.
1 mud sample (sample 7-MT) collected from mud tank prior to running test.
2 gas bombs (samples 7-01 and 7-02) were collected during preflow.
9 samples (samples 7A - 7I) were collected from drilling fluid in drill pipe.
Dual bottom hole samplers (nos. 7 & 77) were run.
All samples were sent to AGAT Labs via Baker Oil Tools tester Sheldon Prysunka.

DRILLSTEM TEST

DRILLSTEM TEST NO. 8

Date: February 1-2, 1999

Formation: Mississippian (Flett)

Interval: 2085.0m to 2110.0m

Test Type: Bottom Hole Conventional

Hole Size: 155mm

Drill Pipe: OD: 88.9mm ID: 70.21mm

Collars: OD: 121.0mm ID: 55.0mm

Testing Company: Baker Oil Tools/Delta P Test Corp.

	PRESSURES:	TIMES:
	IH: 23183 kPa	
1st	IPF: 665 kPa	PF: 10 min.
	FPF: 728 kPa	
	ISI: 17352 kPa	ISI: 150 min.
2nd	IF: 545 kPa	VO: 120 min.
	FF: 1021 kPa	
	FSI: 10349 kPa	FSI: 270 min.
	FH: 23109 kPa	BHT: 70.7C

Results

Flow comments: PF: SAB in 35 sec. GTS in 5 min. Lazy 2m flame.
VO: GTS immediately. Lazy 2m flame deceasing to 1m lazy flame.

Recovery: Recovered 92m of fluid. Recovery as reported consisted of 27m of gassy inhibited water over 68m of gassy watery invert. Samples were taken as follows: sample 8-a 65m above tool; sample 8-b 46m above tool; sample 8-c 28m above tool; sample 8-d 9m above tool; sample 8-e At tool.

Test comments: 1 mud sample (sample 8-MT) caught at flow line prior to test.
1 gas sample (gas bomb #cz05278) was collected 9 min. into PF.
1 gas sample (gas bomb #cz06419) was collected 65 min. into VO.
1 water sample from rig water tank (sample 8-WT).
All samples sent to AGAT Labs, FSJ, via tester Dean Pangracs.

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1494 - 1500	**SANDSTONE** - light yellow brown, light gray, very fine grained to fine grained, subangular to angular, well sorted, pale greenish yellow fluorescence, blue white cut, scattered disseminated very fine to fine pyrite, clear quartz, siliceous cemented, moderately calcareous cemented, no observable porosity;
1500 - 1501	**SHALE** - dark gray, blocky, very finely arenaceous in part, non calcareous, moderately carbonaceous, occasionally pyritic;
1501 - 1504	**SANDSTONE** - light yellow brown, light gray, very fine grained to fine grained, subangular to angular, well sorted, pale greenish yellow fluorescence, blue white cut, scattered disseminated very fine to fine pyrite, clear quartz, siliceous cemented, moderately calcareous cemented, no observable porosity;
1504 - 1506	**SANDSTONE** - medium dark gray, very fine grained to fine grained, subangular to angular, well sorted, no observable fluorescence, slow blue white cut, no observable porosity, moderately carbonaceous, moderately argillaceous, very pyritic;
1506 - 1507	**SHALE** - dark gray, blocky, very finely arenaceous in part, non calcareous, moderately carbonaceous, occasionally pyritic;
1507 - 1508	**SANDSTONE** - medium dark gray, very fine grained to fine grained, subangular to angular, well sorted, as above, moderately carbonaceous, occasional pyrite;
1508 - 1512	**SHALE** - dark gray, as above, non calcareous, moderately carbonaceous, occasional pyrite;
1512 - 1517	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, trace intergranular porosity, scattered greenish yellow fluorescence, blue white cut, siliceous cemented, rarely fine grained with trace porosity, rare streaks coarse to very coarse grains in argillaceous carbonaceous matrix with porosity, slightly calcareous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1517 - 1519	**SHALE** - dark gray, as above, non calcareous, moderately carbonaceous;
1519 - 1522	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, scattered greenish yellow fluorescence, blue white cut, moderately calcareous cemented, very rare trace intergranular porosity, very carbonaceous, moderately argillaceous;
1522 - 1525	**SHALE** - medium dark gray, blocky, hard, non calcareous, moderately silty and grading to very argillaceous siltstone, moderately carbonaceous;
1525 - 1527	**SILTSTONE** - medium dark gray, non calcareous, moderately carbonaceous, very argillaceous;
1527 - 1529	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, trace intergranular porosity, greenish yellow fluorescence, blue white cut, siliceous cemented, calcareous cemented, occasional pyrite;
1529 - 1533	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, trace intergranular porosity, trace greenish yellow fluorescence, slow blue cut, siliceous cemented, slightly calcareous to dolomitic cemented, moderately argillaceous in part;
1533 - 1534	**SHALE** - dark gray, very silty, moderately carbonaceous;
1534 - 1540	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, scattered intergranular porosity, very weak greenish yellow fluorescence, very slow blue cut, siliceous cemented, moderately calcareous cemented in part, occasional loose medium grains in sample;
1540 - 1542	**SHALE** - dark gray, very silty, moderately carbonaceous;
1542 - 1545	**SANDSTONE** - light yellow brown to light gray, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, moderately calcareous cemented, trace loose medium grains in sample, no observable porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1545 - 1547	**SHALE** - dark gray, very silty, moderately carbonaceous;
1547 - 1549	**SANDSTONE** - light yellow brown to light gray, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, moderately calcareous cemented, trace loose medium grains in sample, no observable porosity;
1549 - 1551	**SHALE** - dark gray, very silty, moderately carbonaceous;
1551 - 1554	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, slightly calcareous cemented, greenish yellow fluorescence, blue white cut, no observable porosity;
1554 - 1555	**SHALE** - dark gray, very silty, moderately carbonaceous;
1555 - 1559	**SANDSTONE** - medium gray, very fine grained, subangular to angular, well sorted, scattered pale greenish yellow fluorescence, very slow blue cut, slightly argillaceous, very siliceous cemented, slightly calcareous cemented, no observable porosity, very silty;
1559 - 1560	**SHALE** - dark gray, very silty, moderately carbonaceous;
1560 - 1562	**SANDSTONE** - medium gray, very fine grained, subangular to angular, well sorted, scattered pale greenish yellow fluorescence, very slow blue cut, slightly argillaceous, very siliceous cemented, slightly calcareous cemented, no observable porosity, very silty;
1562 - 1563	**SHALE** - dark gray, very silty, moderately carbonaceous;
1563 - 1566	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, scattered intergranular porosity, scattered pale greenish yellow fluorescence, very slow blue cut, siliceous cemented, slightly calcareous cemented;
1566 - 1568	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, very fine disseminated pyrite, very slightly calcareous, siliceous cemented, no observable porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1568 - 1570	**SHALE** - dark gray, non calcareous, grading to very argillaceous siltstone, very silty, moderately carbonaceous;
1570 - 1573	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, moderately calcareous to dolomite cemented, trace pyrite;
1573 - 1574	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, fluorescence and cut as above, trace intergranular porosity;
1574 - 1576	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, moderately calcareous to dolomite cemented, trace pyrite;
1576 - 1584	**SANDSTONE** - light yellow brown, very fine grained to very fine grained, subangular to angular, well sorted, green yellow fluorescence, blue white cut, siliceous cemented, trace pyrite, moderately calcareous to dolomite cemented, rare trace intergranular porosity;
1584 - 1586	**DOLOMITE** - medium brown, microcrystalline, slow blue cut, very fine disseminated pyrite, very fine grains of quartz, spicular, no visible porosity;
1586 - 1591	**SANDSTONE** - light yellow brown, light gray in part, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, moderately calcareous to dolomite cemented, trace pyrite, no observable porosity;
1591 - 1596	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, very slow bluish cut, siliceous cemented, dolomite cemented, pyrobituminous, no visible porosity, moderately argillaceous;
1596 - 1598	**SHALE** - dark gray, as above, moderately silty;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1598 - 1602	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, calcareous to dolomite cemented, very rare trace intergranular porosity, trace pyrite;
1602 - 1603	**SHALE** - dark gray, siliceous, very dolomitic, very silty and grading to argillaceous siltstone;
1603 - 1604	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, as above, no visible porosity;
1604 - 1605	**SHALE** - dark gray, siliceous, very dolomitic, very silty and grading to argillaceous siltstone;
1605 - 1608	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, slow bluish cut, dolomitic cement, occasional medium quartz grains, argillaceous, no visible porosity;
1608 - 1609	**SANDSTONE** - light yellow brown, light gray in part, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, trace intergranular porosity;
1609 - 1610	**SANDSTONE** - light yellow brown, light gray in part, very fine grained to fine grained, subangular to angular, well sorted, fluorescence and cut as above, no observable porosity;
1610 - 1612	**SILTSTONE** - dark gray, medium brown gray, very argillaceous, very dolomitic cemented, non shows, tight;
1612 - 1615	**SANDSTONE** - light yellow brown, light gray in part, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, slightly dolomitic cemented, trace intergranular porosity in part;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1615 - 1617	**SANDSTONE** - dark gray, very fine grained, subangular to angular, well sorted, silty, pyrobituminous and carbonaceous, siliceous cemented, slightly dolomitic cemented, slow bluish cut, rare intergranular porosity, moderately argillaceous;
1617 - 1618	**SANDSTONE** - light yellow brown, light gray in part, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, slightly dolomitic cemented, trace intergranular porosity in part;
1618 - 1619	**SANDSTONE** - dark gray, very fine grained, subangular to angular, well sorted, silty, pyrobituminous and carbonaceous, siliceous cemented, slightly dolomitic cemented, slow bluish cut, rare intergranular porosity, moderately argillaceous;
1619 - 1621	**SANDSTONE** - light yellow brown, occasionally light gray, very fine grained to fine grained, subangular to angular, well sorted, greenish yellow fluorescence, blue white cut, siliceous cemented, very slightly dolomitic cemented, rare white kaolin laminae, very rare very carbonaceous shaley laminae;
1621 - 1629	**SANDSTONE** - light to medium yellow brown, light gray in part, very fine grained to fine grained, subangular to angular, subrounded where medium grained, well sorted, greenish yellow fluorescence, blue white cut, kaolin laminae, siliceous cement, trace intergranular porosity where fine to medium grained;
1629 - 1630	**SHALE** - dark gray, as above, very carbonaceous;
1630 - 1637	**SANDSTONE** - medium yellow brown, very fine grained to fine grained, subangular to angular, subrounded where medium grained, well sorted, greenish yellow fluorescence, blue white cut, kaolin laminae, siliceous cemented, trace to scattered porosity where fine to medium grained;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1637 - 1641	**SANDSTONE** - medium yellow brown, medium gray in part, very fine grained to fine grained, subangular to angular, subrounded where medium grained, well sorted, greenish yellow fluorescence, spotty slow blue white cut, kaolin laminae, siliceous cement, slightly to moderately dolomitic cemented, fair porosity where fine to medium grained;
1641 - 1646	**SANDSTONE** - medium yellow brown, medium gray, very fine grained, subangular to angular, well sorted, no fluorescence, very slow bluish cut, very silty, siliceous cemented, dolomitic cemented, carbonaceous in part, no observable porosity, moderately argillaceous;
1646 - 1647	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, trace kaolin laminae, siliceous cemented, dolomitic cemented, rare intergranular porosity;
1647 - 1648	**SILTSTONE** - dark gray, slightly dolomitic, very argillaceous;
1648 - 1653	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, scattered silt size pyrite, siliceous cemented, kaolin laminae, very rare intergranular porosity in sample;
1653 - 1657	**SANDSTONE** - light yellow brown, light gray, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, silty, argillaceous in part, occasional pyrobitumin, no observable porosity;
1657 - 1660	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, scattered silt size pyrite, siliceous cemented, kaolin laminae, very rare intergranular porosity in sample;
1660 - 1663	**SILTSTONE** - dark gray, occasional dull greenish yellow fluorescence, slow bluish cut, very fine grained in part, siliceous cemented, slightly dolomitic cemented, carbonaceous and pyrobituminous in part, very argillaceous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1663 - 1664	**SANDSTONE** - light gray, light yellow brown in part, very fine grained to fine grained, subangular to angular, well sorted, rare greenish yellow fluorescence, slow bluish cut, siliceous cemented, slightly dolomitic cemented, occasional pyrobitumin, trace intergranular porosity;
1664 - 1666	**SILTSTONE** - dark gray, no fluorescence, slow bluish cut, carbonaceous, siliceous cemented, moderately dolomitic cemented, very fine grained in part, no visible porosity, very argillaceous;
1666 - 1671	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, bluish white cut, rare medium grains in matrix, siliceous cemented, moderately dolomitic cemented, rare intergranular porosity;
1671 - 1673	**SANDSTONE** - light gray, fine grained to medium grained, subangular to subrounded, well sorted, scattered greenish yellow fluorescence, slow bluish cut, siliceous cemented, trace intergranular porosity;
1673 - 1679	**SANDSTONE** - light gray, medium yellow brown in part, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, slow bluish cut in part, siliceous cemented, slightly dolomitic cemented, streaks of fine to medium grained with subrounded medium gray chert, occasional intergranular porosity;
1679 - 1681	**SANDSTONE** - dark gray, medium yellow brown, very fine grained, subangular to angular, well sorted, no fluorescence, slow bluish cut, silty, argillaceous, scattered pyrobitumin, no observable porosity;
1681 - 1683	**SANDSTONE** - light gray, medium yellow brown in part, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, slow bluish cut in part, siliceous cemented, slightly dolomitic cemented, streaks of fine to medium grained, occasional intergranular porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1683 - 1688	**SANDSTONE** - dark gray, dark yellow brown, very fine grained, subangular to angular, well sorted, no fluorescence, slow bluish cut, silty in part, siliceous cemented, slightly dolomitic cemented, argillaceous, carbonaceous and pyrobituminous, no visible porosity;
1688 - 1691	**SANDSTONE** - dark gray, dark yellow brown, very fine grained, subangular to angular, well sorted, as above, siliceous cemented, slightly dolomitic cemented, carbonaceous and pyrobituminous in part, moderately argillaceous;
1691 - 1698	**SANDSTONE** - medium gray, medium brown gray, very light gray in part, very fine grained to fine grained, subangular to angular, well sorted, trace intergranular porosity, occasional greenish yellow fluorescence with bright bluish white cut, fine to medium grained in part, pyrobitumin in part, siliceous cemented, slightly to moderately dolomitic cemented, rare glauconite;
1698 - 1700	**SILTSTONE** - very dark gray, siliceous cemented, very fine grained in part, shaly in part, moderately argillaceous, occasional pyrite;
1700 - 1701	**SANDSTONE** - very light gray, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish cut in part, siliceous cemented, slightly to moderately dolomitic cemented, no visible porosity;
1701 - 1702	**SANDSTONE** - light gray to light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, very slow bluish cut, streaks of fine to medium grained and cherty in part, siliceous cemented, scattered intergranular porosity, scattered pyrite;
1702 - 1710	**SANDSTONE** - light gray to light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, very slow bluish cut, fine to medium grained and cherty in part, siliceous cemented, scattered intergranular porosity, scattered pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1710 - 1713	**SANDSTONE** - medium gray, very fine grained to fine grained, subangular to angular, well sorted, medium gray and argillaceous in part, trace pyrobitumin, as above, slightly argillaceous;
1713 - 1716	**SANDSTONE** - light gray to light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, scattered greenish yellow fluorescence, very slow bluish cut, siliceous cemented, very slightly dolomitic cemented, rarely fine to medium grained, no observable porosity;
1716 - 1718	**SANDSTONE** - as above, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, slow bluish cut, as above, trace medium gray pyritic shaly laminae;
1718 - 1724	**SANDSTONE** - very light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut in part, occasionally fine to medium grained, trace pyrobitumin, siliceous cemented, slightly dolomitic cemented, scattered intergranular porosity, trace pyrite;
1724 - 1730	**SANDSTONE** - light medium gray, very fine grained to fine grained, subangular to angular, well sorted, fluorescence as above, occasional bright bluish white cut, occasionally fine to medium grained, scattered pyrobitumin, trace intergranular porosity;
1730 - 1734	**SANDSTONE** - light medium gray, light yellow brown in part, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence in part, slow bluish cut, trace carbonaceous laminae, thin dark gray argillaceous siltstone interbeds, no observable porosity;
1734 - 1737	**SANDSTONE** - light medium gray, light gray, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence in part, slow bluish cut, carbonaceous laminae, siliceous cemented, dolomitic cemented in part, pyrobitumin, scattered intergranular porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1737 - 1741	**SANDSTONE**- medium gray in part, very fine grained to fine grained, subangular to angular, well sorted, as above, no observable porosity, moderately argillaceous;
1741 - 1748	**SANDSTONE** - light gray, very fine grained to very fine grained, subangular to angular, well sorted, as above, interbeds of dark gray very argillaceous siltstone, no observable porosity, moderately argillaceous;
1748 - 1754	**SANDSTONE** - light yellow brown, light gray, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, fine to medium grained in part, rare kaolin laminae, siliceous cemented, rare carbonaceous laminae, scattered intergranular porosity;
1754 - 1756	**SANDSTONE** - as above, medium gray and fine to medium grained in part with trace intergranular porosity in sample.
1756 - 1765	**SANDSTONE** - light yellow brown, light gray, very fine to fine grained, as above, rare pyrobitumin, occasional shaly laminae, trace intergranular porosity;
1765 - 1768	**SANDSTONE** - medium gray, light gray to light medium brown in part, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, scattered very fine disseminated pyrite, no observable porosity;
1768 - 1773	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, siliceous cemented, very rare pyrobitumin, trace to scattered porosity in sample;
1773 - 1775	**SILTSTONE** - dark gray, very fine grained, very slightly dolomitic, very argillaceous;
1775 - 1777	**SANDSTONE** - light gray, light yellow brown, fine grained to medium grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, slow bluish cut, siliceous cemented, trace porosity in sample;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1777 - 1782	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, scattered dull greenish yellow fluorescence, slow bluish white cut, occasional thin interbeds of medium gray shale, siliceous cemented, rare intergranular porosity;
1782 - 1785	**SHALE** - dark gray, interbedded with sandstone, as above, very silty;
1785 - 1789	**SANDSTONE** - light yellow brown, light gray, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, fine to medium grained in part, rare kaolin laminae, siliceous cemented, rare carbonaceous laminae, scattered intergranular porosity, trace pyrite, dark gray and pyrobituminous with scattered intergranular porosity in part;
1789 - 1791	**SHALE** - dark gray, as interbeds in sand, very silty;
1791 - 1794	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish to bright bluish white cut where dark gray and pyrobituminous, siliceous cemented, moderately dolomitic cemented in part, fine to medium grained in part, trace intergranular porosity;
1794 - 1796	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, as above, no observable porosity, trace pyrite;
1796 - 1798	**SHALE** - dark gray, slightly dolomitic cemented, carbonaceous, moderately silty;
1798 - 1803	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence in part, slow bluish cut, rarely medium grained, siliceous cemented, moderately dolomitic cemented in part, trace intergranular porosity, scattered pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1803 - 1804	**SHALE** - dark gray, slightly dolomitic cemented, carbonaceous, moderately silty;
1804 - 1806	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence in part, slow bluish cut, rarely medium grained, siliceous cemented, moderately dolomitic cemented in part, trace intergranular porosity, scattered pyrite;
1806 - 1807	**SHALE** - medium to dark gray, grading to very argillaceous silty sandstone in part, moderately silty;
1807 - 1811	**SANDSTONE** - medium gray, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, slightly dolomitic cemented, no visible porosity, moderately silty, moderately argillaceous;
1811 - 1817	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, fine to medium grained in part, siliceous cemented, slightly dolomitic cemented, rarely cherty, trace intergranular porosity;
1817 - 1820	**SILTSTONE** - dark gray, silty, non calcareous, very fine grained in part, slightly dolomitic cemented, moderately carbonaceous;
1820 - 1822	**SHALE** - dark gray, slightly dolomitic cemented, carbonaceous, grading to very argillaceous siltstone, moderately silty;
1822 - 1823	**SILTSTONE** - dark gray, as above, very argillaceous;
1823 - 1829	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence, slow bluish cut, siliceous cemented, slightly dolomitic cemented, fine to medium grained in part, trace intergranular porosity;
1829 - 1831	**SHALE** - dark gray, slightly dolomitic cemented, carbonaceous, grading to very argillaceous siltstone, moderately silty;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1831 - 1835	**SILTSTONE** - dark gray, as above, very argillaceous;
1835 - 1837	**SANDSTONE** - light yellow brown, light gray, very fine grained to fine grained and some medium grained, subangular to angular, well sorted, dull yellow fluorescence in part with slow bluish cut, siliceous cemented, very rare glauconite, trace pyrobitumin, occasional carbonaceous shaly laminae, rare intergranular porosity;
1837 - 1839	**SHALE** - dark gray, as above, silty, moderately carbonaceous;
1839 - 1841	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, trace shaly laminae, rarely pyrobituminous, occasional thin interbeds of very dolomitic sandstone;
1841 - 1843	**SHALE** - dark gray, as above;
1843 - 1844	**SANDSTONE** - light gray, light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, trace shaly laminae, rarely pyrobitumous, occasional thin interbeds of very dolomitic sandstone;
1844 - 1846	**SILTSTONE** - dark gray, as above;
1846 - 1855	**SANDSTONE** - dark gray, medium yellow brown, very fine grained to fine grained, subangular to angular, well sorted, no apparent fluorescence, slow bluish cut in part, very siliceous cemented, moderately argillaceous, moderately pyrobituminous, slightly to moderately dolomitic cemented, fine to medium grained with trace porosity in part;
1855 - 1859	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, very siliceous and cherty, no observable porosity, moderately argillaceous;
1859 - 1861	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, as above, no shows, no observable porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1861 - 1862	**SHALE** - dark gray, as above;
1862 - 1870	**SANDSTONE** - light gray, light yellow brown, rarely medium yellow brown, very fine grained to fine grained, subangular to angular, well sorted, dull greenish yellow fluorescence and bluish white cut where medium yellow brown, siliceous cemented, trace pyrite, trace intergranular porosity in part;
1870 - 1873	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, very siliceous cemented in part, non to moderately dolomitic cemented, rarely fine to medium grained with trace intergranular porosity;
1873 - 1876	**SANDSTONE** - medium gray, very fine grained to fine grained, subangular to angular, well sorted, non apparent fluorescence, slow bluish cut, siliceous cemented, slightly to moderately dolomitic cemented, very carbonaceous, moderately argillaceous;
1876 - 1878	**SANDSTONE** - light yellow brown, very fine grained to fine grained, subangular to angular, well sorted, trace intergranular porosity, as above, trace intergranular porosity where fine to medium grained;
1878 - 1880	**SANDSTONE** - medium gray, very fine grained to fine grained, subangular to angular, well sorted, non apparent fluorescence, slow bluish cut, siliceous cemented, slightly to moderately dolomitic cemented, very carbonaceous, moderately argillaceous;
1880 - 1882	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish white cut, silty, siliceous cemented, slightly to moderately dolomitic cemented, occasionally fine to medium grained, no visible porosity, very carbonaceous, moderately argillaceous;
1882 - 1884	**SANDSTONE** - light to medium yellow brown, very fine grained to fine grained and some medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, occasional carbonaceous laminae, siliceous cemented, rare kaolin infilling, trace intergranular porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1884 - 1886	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish white cut, silty, siliceous cemented, slightly to moderately dolomitic cemented, occasional fine to medium grained, no visible porosity, very carbonaceous, moderately argillaceous;
1886 - 1891	**SANDSTONE** - light gray, light to medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, siliceous cemented, occasional carbonaceous laminae, very rare trace intergranular porosity;
1891 - 1892	**SANDSTONE** - dark gray, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish white cut, silty, siliceous cemented, slightly to moderately dolomitic cemented, occasionally fine to medium grained, no visible porosity, very carbonaceous, moderately argillaceous;
1892 - 1894	**SANDSTONE** - light to medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, siliceous cemented, occasional carbonaceous laminae, trace intergranular porosity;
1894 - 1901	**SANDSTONE** - dark gray, very fine grained, subangular to angular, well sorted, no fluorescence, slow bluish white cut, silty, dark gray shale interbeds, very carbonaceous, moderately argillaceous;
1901 - 1903	**SANDSTONE** - light to medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slightly blue cut, siliceous cemented, as above, trace intergranular porosity;
1903 - 1909	**SANDSTONE** - dark gray, very fine grained, subangular to angular, well sorted, no fluorescence, slow bluish white cut, silty, dark gray shale interbeds, very carbonaceous, moderately argillaceous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1909 - 1914	**SANDSTONE** - medium grey to medium yellow brown, very fine to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish cut, siliceous cemented, trace carbonaceous laminae, moderately carbonaceous, moderately argillaceous, trace intergranular porosity;
1914 - 1915	**SHALE** - dark gray, silty, micromicaceous, non dolomitic, very carbonaceous;
1915 - 1916	**SANDSTONE** - medium grey to medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, as above, trace intergranular porosity;
1916 - 1918	**SHALE** - dark gray, as above, very carbonaceous;
1918 - 1923	**SANDSTONE** - medium yellow brown to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, carbonaceous laminae, trace dark gray very argillaceous very carbonaceous siltstone interbeds, trace intergranular porosity, moderately argillaceous, moderately carbonaceous;
1923 - 1925	**SILTSTONE** - dark gray, very finely arenaceous in part, shaley in part, very argillaceous, very carbonaceous;
1925 - 1928	**SANDSTONE** - medium yellow brown to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, siliceous cemented, rare intergranular porosity, moderately argillaceous, moderately carbonaceous;
1928 - 1929	**SHALE** - dark gray, as above, very carbonaceous;
1929 - 1930	**SANDSTONE** - medium yellow brown to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, carbonaceous laminae, trace dark gray very argillaceous very carbonaceous siltstone interbeds, trace intergranular porosity, moderately argillaceous, moderately carbonaceous;
1930 - 1933	**SANDSTONE** - medium yellow brown, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish cut, siliceous cement, moderately argillaceous, moderately carbonaceous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1933 - 1934	**SANDSTONE** - medium yellow brown to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, carbonaceous laminae, trace dark gray very argillaceous very carbonaceous siltstone interbeds, trace intergranular porosity, moderately argillaceous, moderately carbonaceous;
1934 - 1935	**SHALE** - dark gray, as above, very carbonaceous;
1935 - 1936	**SANDSTONE** - medium yellow brown to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, carbonaceous laminae, trace dark gray very argillaceous very carbonaceous siltstone interbeds, trace intergranular porosity, moderately argillaceous, moderately carbonaceous;
1936 - 1939	**SANDSTONE** - medium yellow brown, medium gray, dark gray, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish cut, siliceous cemented, trace pyrite, scattered very dark gray to black carbonaceous silty shaly laminae, very rare trace intergranular porosity;
1939 - 1943	**SANDSTONE** - medium to dark gray, medium yellow brown, very fine grained to fine grained, subangular to angular, well sorted, no fluorescence, slow bluish cut, scattered to abundant carbonaceous very silty laminae, siliceous cemented, occasionally medium grained with trace intergranular porosity;
1943 - 1948	**SANDSTONE** - medium yellow brown, fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish cut, siliceous cemented, scattered carbonaceous silty laminae, trace intergranular porosity;
1948 - 1950	**SANDSTONE** - medium yellow brown, medium to dark gray, very fine grained to fine grained, subangular to angular, well sorted, scattered very silty carbonaceous laminae;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1950 - 1952	**SANDSTONE** - light gray, very fine grained to medium grained, subangular to subrounded, well sorted, no fluorescence, slow bluish white cut, siliceous cemented, slightly dolomitic cemented in part, trace intergranular porosity;
1952 - 1957	**SHALE** - very dark gray to black, blocky, silty in part, very carbonaceous, interbedded with very fine to fine grained sandstone, as above;
1957 - 1958	**SANDSTONE** - medium gray to medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, no visible fluorescence, slow bluish white cut, siliceous cemented, abundant very argillaceous micromicaceous carbonaceous laminae, trace porosity in part;
1958 - 1962	**SANDSTONE** - medium gray to medium yellow brown, very fine grained to fine grained, subangular to angular, well sorted, no visible fluorescence, slow bluish white cut, siliceous cemented, abundant argillaceous very carbonaceous micromicaceous shaley laminae and interbeds;
1962 - 1966	**SANDSTONE** - light gray to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, trace greenish yellow fluorescence, bright white cut, siliceous cemented, slightly dolomitic cemented, abundant carbonaceous laminae, dark gray very argillaceous and silty in part;
1962 - 1964	**SANDSTONE** - light gray to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, trace greenish yellow fluorescence, bright white cut, siliceous cemented, slightly dolomitic cemented, abundant carbonaceous laminae, dark gray very argillaceous and silty in part;
1964 - 1966	**SANDSTONE** - medium to dark gray, very fine grained to fine grained, subangular to angular, well sorted, as above;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1966 - 1967	**SANDSTONE** - medium yellow brown, light gray, very fine grained to medium grained, subangular to subrounded, well sorted, trace greenish yellow fluorescence, bright white cut, siliceous cemented, slightly dolomitic cemented, as above, trace intergranular porosity;
1967 - 1968	**SANDSTONE** - medium to dark gray, very fine grained to fine grained, subangular to angular, well sorted, as above;
1968 - 1973	**SANDSTONE** - light to medium gray, medium yellow brown, dark gray in part, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, slightly dolomitic cemented in part, abundant very dark gray very carbonaceous shaly laminae, rare porosity;
1973 - 1974	**SHALE** - very dark gray, non calcareous, very carbonaceous;
1974 - 1978	**SANDSTONE** - fine grained to medium grained, subangular to subrounded, well sorted, as above, shaly carbonaceous laminae;
1978 - 1979	**SHALE** - very dark gray, non calcareous, very carbonaceous;
1979 - 1983	**SANDSTONE** - fine grained to medium grained, subangular to subrounded, well sorted, as above, abundant carbonaceous laminae, trace porosity;
1983 - 1987	**SANDSTONE** - very fine grained to fine grained, subangular to angular, well sorted, as above, abundant very carbonaceous laminae;
1987 - 1988	**SANDSTONE** - medium yellow brown, fine grained to medium grained, subangular to subrounded, well sorted, occasional dull greenish yellow fluorescence, bluish white cut, siliceous cemented, rare carbonaceous material, trace intergranular porosity;
1988 - 1989	**SHALE** - very dark gray, non calcareous, very carbonaceous;
1989 - 1990	**SANDSTONE** - medium yellow brown, fine grained to medium grained, subangular to subrounded, well sorted, occasional dull greenish yellow fluorescence, bluish white cut, siliceous cemented, rare carbonaceous material, trace intergranular porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1990 - 1991	**SHALE** - very dark gray, as above, very carbonaceous;
1991 - 1994	**SANDSTONE** - light gray, very fine grained to fine grained, subangular to angular, well sorted, siliceous cemented, abundant carbonaceous laminae, rare trace porosity;
1994 - 1995	**SHALE** - very dark gray, micromicaceous, non calcareous, very carbonaceous;
1995 - 1998	**SANDSTONE** - light gray, medium yellow brown, very fine grained to fine grained and some medium grained, subangular to subrounded, well sorted, occasional dull greenish yellow fluorescence, bluish white cut, siliceous cemented, abundant carbonaceous laminae as above, very siliceous appearance in part, rare trace porosity;
1998 - 1999	**SHALE** - very dark gray, micromicaceous, non calcareous, very carbonaceous;
1999 - 2001	**SANDSTONE** - light gray, medium yellow brown, very fine grained to fine grained and some medium grained, subangular to subrounded, well sorted, occasional dull greenish yellow fluorescence, bluish white cut, siliceous cemented, abundant carbonaceous laminae as above, very siliceous appearance in part, rare trace porosity;
2001 - 2003	**SHALE** - very dark gray, micromicaceous, non calcareous, very carbonaceous;
2003 - 2005	**SANDSTONE** - light gray, medium yellow brown, very fine grained to fine grained and some medium grained, subangular to subrounded, well sorted, occasional dull greenish yellow fluorescence, bluish white cut, siliceous cemented, abundant carbonaceous laminae as above, very siliceous appearance in part, rare trace porosity;
2005 - 2006	**SHALE** - very dark gray, micromicaceous, non calcareous, very carbonaceous;
2006 - 2012	**SANDSTONE** - medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, occasional fluorescence and cut as above, siliceous cemented, abundant carbonaceous laminae, trace intergranular porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2012 - 2013	**SHALE** - very dark gray, micromicaceous, non calcareous, very carbonaceous;
2013 - 2014	**SANDSTONE** - medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, occasional fluorescence and cut as above, siliceous cemented, carbonaceous laminae, trace intergranular porosity;
2014 - 2015	**SANDSTONE** - light gray, medium yellow brown, very fine grained to fine grained and some medium grained, subangular to subrounded, well sorted, occasional dull greenish yellow fluorescence, bluish white cut, siliceous cemented, abundant carbonaceous laminae as above, very siliceous appearance in part, rare trace porosity;
2015 - 2020	**SANDSTONE** - medium yellow brown, occasional medium gray and argillaceous, very fine grained to medium grained, subangular to subrounded, well sorted, siliceous cemented, carbonaceous laminae as above;
2020 - 2023	**SANDSTONE** - medium to dark gray, medium yellow brown, very fine grained to fine grained, subangular to angular, well sorted, trace greenish yellow fluorescence, bluish cut, very siliceous cemented, light gray and very slightly dolomitic cement in part, argillaceous and silty, muscovite, abundant very carbonaceous micromicaceous laminae;
2023 - 2024	**SHALE** - very dark gray, non calcareous, micromicaceous, very carbonaceous;
2024 - 2026	**SANDSTONE** - medium to dark gray, very fine grained to fine grained, angular to subangular, well sorted, trace greenish yellow fluorescence, bluish fluorescence, siliceous cemented, abundant carbonaceous laminae, argillaceous and silty in part;
2026 - 2027	**SHALE** - very dark gray, non calcareous, micromicaceous, very carbonaceous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2027 - 2029	**SANDSTONE** - medium to dark gray, very fine grained to fine grained, angular to subangular, well sorted, trace greenish yellow fluorescence, bluish fluorescence, siliceous cemented, abundant carbonaceous laminae, argillaceous and silty in part;
2029 - 2031	**SANDSTONE** - light gray, fine grained to medium grained, subangular to subrounded, well sorted, dull greenish yellow fluorescence, bluish cut, siliceous cement, trace intergranular porosity;
2031 - 2033	**SHALE** - very dark gray, non calcareous, very carbonaceous, soft, occasional white kaolinitic specks;
2033 - 2035	**SANDSTONE** - light to medium gray, dark gray in part, very fine grained to fine grained, subangular to angular, well sorted, no apparent fluorescence, bluish white cut, abundant carbonaceous laminae, siliceous cemented, dolomitic cemented in part;
2035 - 2043	**SANDSTONE** - light to medium gray, very fine grained to medium grained, subangular to subrounded, well sorted, poor intergranular porosity, blue white cut, siliceous cemented, slightly to moderately dolomite cemented, shale interbeds, carbonaceous lm, rare intergranular porosity, very argillaceous;
2043 - 2044	**SHALE** - very dark gray, non calcareous, very carbonaceous;
2044 - 2049	**SANDSTONE** - dark gray to dark brown gray, very fine grained to fine grained, subangular to angular, well sorted, no apparent fluorescence, bluish white cut, very argillaceous and carbonaceous, moderately siliceous cemented, slightly dolomitic cemented, with shale interbeds;
2049 - 2059	**SANDSTONE** - medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, siliceous cemented, occasional carbonaceous shaly laminae, very rare trace intergranular porosity;
2059 - 2060	**SHALE** - light medium gray to very dark gray, non calcareous, kaolin specks, sand lenses and laminae, very carbonaceous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2060 - 2067	**SANDSTONE** - light gray to medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, as above, scattered dark gray carbonaceous laminae, siliceous cemented, moderately dolomitic cemented in part, dark gray very fine grained cherty laminae, very rare trace of intergranular porosity;
2067 - 2070	**SHALE** - dark gray, non calcareous, very carbonaceous;
2070 - 2077	**SANDSTONE** - dark yellow brown, medium gray, very fine grained to fine grained, subangular to angular, well sorted, as above, very siliceous cemented, slightly dolomitic cemented, very rare glauconite, no visible porosity;
2077 - 2080	**SANDSTONE** - medium yellow brown, very fine grained to medium grained, subangular to subrounded, well sorted, very siliceous, very limy in part, trace fossil fragments in sample, no visible porosity;
2080 - 2082	**SILTSTONE** - dark yellow brown, limy in part, rare Crinoid, trace other fossils and fossil fragments, very argillaceous;
2082 - 2083	**SHALE** - dark gray, as above, very carbonaceous, white chalky kaolinite laminae, rare Ostracod and Byrozoan, very rare waxy green shale;
2083 - 2085	**SANDSTONE** - medium yellow brown, dark gray, very fine grained to fine grained, subangular to angular, well sorted, silty, limy in part, rare fossils, no visible porosity, moderately argillaceous, abundant chalky kaolinite interbeds;
2085 - 2086	**SILTSTONE** - dark yellow brown, limy in part, rare Crinoid, trace other fossils, very argillaceous;
2086 - 2087	**SHALE** - dark gray, abundant chalky kaolin laminae and interbeds, very carbonaceous;

Mississippian (Flett) 2087m Sample 2085m Log

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
2087 - 2093	**LIMESTONE** - medium to dark yellow brown, very fine grained to fine grained, no fluorescence, slow bluish cut, dark gray and argillaceous in part, rare pellets, rare Oolite, trace kaolin, slightly dolomitic, no visible porosity;
2093 - 2099	**LIMESTONE** - medium to dark yellow brown, occasionally pale yellow brown, very fine grained to coarse grained, very argillaceous where dark yellow brown, no visible porosity in sample;
2099 - 2103	**LIMESTONE** - very fine grained to coarse grained, as above, occasional shale laminae, fossils, rare Coral, scattered chert laminae with very coarse rounded quartz, chert, fossil fragments and rock fragments;
2103 - 2110	**LIMESTONE** - dark yellow brown, very fine grained to coarse grained, very argillaceous in part, dolomitic in part, abundant dark brown chert laminae, chalky kaolin laminae in part, rare Brachiopod, rare Ostracod, no shows, no visible porosity;
2110m	**TOTAL DEPTH**

GEOLOGICAL SUMMARY AND CONCLUSIONS

Paramount et al Liard F-36 located at 60o 05.46' 123o 22.06' was re-entered December 23, 1998.

This hole had been drilled to 1494 metres in March, 1998. Drilling was suspended in the Permian Mattson Sands due to spring break-up, deteriorating lease road conditions, and road bans. 177.8 mm casing was set at 1494.0 metres.

The purpose of the re-entry was to deepen the hole to 1970 metres and evaluate the Mattson sands.

Hole size was 155.6mm. In order to avoid formation damage and prevent invasion of the formation by drilling fluids, drilling took place with nitrogen, using a calcium chloride invert mud. The well was drilled underbalanced until 1566m when gas flow required the weighting up of the mud and discontinuance of drilling with nitrogen.

A wellsite geologist was on location from drill out at 1494 metres to T.D. 5 metre samples were collected and washed from 1495 metres to T.D. As required 2 sets of washed samples were processed for the National Energy Board and 1 set for Paramount Resources Ltd. 1 set of washed, dried, bagged samples was also collected for the National Energy Board.

A Continental Laboratories Minipac 2100 gas detection system was set up and operated from drill out to T.D. Due to the closed system nature of nitrogen drilling gas readings were taken from the standpipe on the gas separation tank until 1569 metres when readings were taken from a gas trap located in the shaker box.

Gas readings to 1524 metres ranged from 5 to 79 units. There was no flow into the well despite the fact we were drilling well under balanced. Gas readings while tripping for a new bit at 1524 metres varied widely from a low of 44 units to a high of 9558 units indicating gas migration into the hole.

Gas readings increased significantly starting at 1532 metres. Gas readings went from a background of 50 - 117 units to 3362 units. No flow into the well was encountered at that time. Gas readings continued to increase until the well began to flow at 15:30 hours, December 26, at a depth of 1537 metres. The flare stack was ignited and drilling continued. Drilling rates from 1534 metres to 1539 metres were 18 to 26 minutes/metre. Lithology was a very fine to fine grained sandstone with pale greenish yellow fluorescence, bluish white cut, and scattered intergranular porosity. Drilling was stopped at 1542 metres to run a flow test through the annulus. The flow rate from flow test No. 1 was 79621m3/day (2.8mmft3/day) as measured through a 12.7 mm choke. No liquids appeared to have entered the wellbore.

GEOLOGICAL SUMMARY AND CONCLUSIONS cont.

Underbalanced drilling with nitrified invert continued. A drilling break occurred at 1563.0 metres to 1565.8 metres. The drilling rate increased from 41 minutes/metre to 6.8-10.7 minutes/metre. The well flow increased significantly and the well was shut in. Lithology was interpreted as a fine grained sandstone with scattered intergranular porosity. Sample quality was poor; therefore, the possibility exists that the gas came from fracture porosity. Flow test No. 2 was conducted through the annulus at 1565.8 metres. A flow rate of 289230 m3/day (10.2mmft3/day) through a 12.70mm choke was obtained. No liquids appeared to have entered the wellbore. Because of high pressures the decision was made to kill the well and run a DST.

DST #1,2,3 were run on original well prior to this re-entry.

DST #4, a bottom hole inflate test, was run over the interval 1559.7 metres to 1565.6 metres. Times were 10-60-120-30. PF produced GTS in 90 seconds. Final PF pressure was 11536kPa. Pressure at the end of the 1st shut in was 15911kPa. On VO had GTS immediately. Pressure at end of VO was 11273kPa. Surface pressure at floor manifold stabilized at 3500kPa through a 19.07mm choke. This calculated as a gas rate of 223080m3/day (7.9mmft3/day). Lost packer seat 0.5 hour into the FSI. Tried unsuccessfully to re-inflate packer. FSI pressure was 15920kPa. There was no liquid recovery. DST #1 indicated a dry gas reservoir with excellent permeability.

A drilling break occurred from 1608 metres to 1609 metres. Penetration rate went from 81 minutes/metre to 16.8 minutes/metre. 0.4 metre of this interval drilled in 2.5 minutes and may have indicated a fracture. Gas readings over the interval 1608 metres to 1609 metres increased from background gas readings of 56 to 75 units to a peak of 2777 units. Mud weight was 1100 kg/m3. Lithology in samples was a light yellowish brown, very fine to fine grained sandstone with greenish yellow fluorescence and bluish white cut. The sand was silica cemented and exhibited traces of intergranular porosity in samples. There was no sign of oil over the shaker. Background gas after 1609 metres was 411 to 484 units. Trip gas after trip at 1615 metres peaked at 3552 units. It was decided not to test this zone on penetration. Penetration rate increase, good gas detection response, and an increase in background gas after penetration indicated good potential from this interval.

There were traces of porosity in samples from 1621 metres to 1641 metres. There were no large increases in gas readings over this interval. Lithology was a light to medium yellow brown, very fine to fine grained sandstone with greenish yellow fluorescence and bluish white cut. There were streaks of fine to medium grained sand. The interval 1637 metres to 1641 metres exhibited an increase in gas readings from 70 units to a peak of 194 units, despite a decrease in penetration rate from 30 minutes/metre to 82 - 138 minutes/metre. This was probably attributable to a worn bit. The 1635 - 1641 metre sample showed fair porosity in sample (10 - 12% in part).

GEOLOGICAL SUMMARY AND CONCLUSIONS cont.

Drilling rate changed in the interval 1648 metres to 1653 metres from 80 - 101 minutes/metre to 23 - 37 minutes/metre. No increase in gas readings occurred over this interval. Samples showed a light grey, very fine to fine grained, siliceous cemented sandstone with greenish yellow fluorescence, a slow bluish cut, and very rare traces of intergranular porosity.

A drilling break from 1668 metres to 1673 metres produced a penetration rate change from 48 minutes/metre to 23 - 34 minutes/metre. Gas readings increased gradually from 51 units at 1670 metres to 138 units at 1673 metres. The faster drilling from 1671 metres to 1673 metres is a light medium grey, fine to medium grained, siliceous cemented sandstone with scattered greenish yellow fluorescence, bluish white cut, and traces of intergranular porosity in samples.

Although there were no fast drilling breaks samples in the interval 1673 metres to 1683 metres samples indicated a light grey, very fine to fine grained sandstone with streaks of fine to medium grained sandstone, with a dull greenish yellow fluorescence, slow bluish cut, and occasional intergranular porosity in samples. Gas readings showed a slow increase from 26 units at 1668 metres to 182 units at 1682 metres. Based on a probable correlation with a cored sand (Core #3) in the UCEL Liard K-02 well, and porosity in samples a decision was made to run DST #5, a bottom hole conventional test, over the interval 1662 metres to 1689 metres.

DST #5 times were 10-135-150-220. PF produced a weak air blow increasing to strong air blow in 10 minutes with no gas to surface. Initial PF pressure was 938 kPa. Final PF pressure was 543 kPa. ISI pressure was 2391 kPa. VO produced a strong air blow decreasing to very weak air blow in 2 minutes. IF pressure was 458 kPa with FF pressure of 550 kPa. FSI pressure was 1693 kPa. A 3rd VO for 5 minutes was performed in an attempt to catch a sample of gas in the bottom hole samplers. Hole fill volumes were not correct when we came out of hole with the test tool; therefore, the bar was dropped and pipe was run back to bottom of the casing to eliminate any possibility of a kick. Due to circulation pressure the pump-out sub was activated and no fluid recovery was obtained. DST #5 indicated the test interval contained a very low permeability reservoir.

Drilling continued with a number of drilling breaks and low magnitude increases in gas readings from 1691 metres to 1968 metres. Gas increases were in the order of 157 to 291 units. Traces of porosity were observed in the very fine to fine grained, siliceous cemented, sandstones. Scattered intergranular porosity was observed in samples where grain size increased to fine to medium grained. Oil shows were weak with dull greenish yellow fluorescence and slow bluish cut. Because of the lower magnitude of the gas detector responses it was decided not to test any additional sands until logs were run and permeability could be assessed. The chart at the end of the geological summary includes drilling breaks, gas detector response, and lithology from 1691

GEOLOGICAL SUMMARY AND CONCLUSIONS cont.

metres to 1768 metres.

A depth correction of +1.5 metres was made following strap in and out at 1953 metres. T.D. of 1968 metres was reached at 11:45 hours, January 22, 1999. Logging took place using Baker Atlas equipment. Logger's T.D. was 1967.7 metres. The following logs were run: High Definition Induction-Gamma Ray Log (1965.2 metres to 1894.0 metres); Compensated Z-Densilog Compensated Neutron Gamma Ray XY Caliper Log (1966.7 metres to 1494.0 metres); Multipole Array Acoustilog- Gamma Ray (1960.7 metres to 250.0 metres); Hexagonal Diplog (1960.5 metres to 250.0 metres); Circumferential Borehole Imaging Log (1967.2 metres to 250.0 metres); Magnetic Resonance Imaging Log (over selected intervals); and a Vertical Seismic Profile.

Logs confirmed the presence of gas at those intervals that produced high gas detector responses and the presence of porosity as seen in samples and inferred by drilling breaks. Zones of gas crossover included 1534.5 metres to 1538.0 metres; 1563.5 metres - 1567.5 metres; 1617.5 metres to 1629.9 metres; and 1631.0 metres to 1636.0 metres. Logs indicated 1534.4 metres to 1535.5 metres may be a gas cap overlaying an oil bearing zone from 1535.5 metres to 1540.0 metres. The MRIL log indicated 1617 metres to 1637 metres to be oil bearing.

After evaluation of the logs it was decided to run 2 DSTs. DST #6, a straddle inflate, was run over the interval 1763.0 metres to 1777.0 metres. DST #6 was declared a misrun after lost packer seat on preflow.

DST #7, an inflate straddle over the interval 1757.0 metres to 1792.0 metres, produced a strong air blow and gas to surface in 2.5 minutes. Initial shut in was 60 minutes. On valve open lost packer seal immediately. 1200 metres of drilling mud entered the drill pipe. Flow rate on preflow was 35902m3/day (1.27mmft3/day). Initial shut in pressure was 18152 kPa. Real time reported final shut in pressure of 18118 kPa.

DST #8 (1613 - 1641 metres) was cancelled. The decision was made to deepen the hole to penetrate the Mississippian Flett formation.

Drilling recommenced at 06:00 hrs on January 27, 1999. At bit trip at 2020 metres the survey indicated a deviation of 7 degrees at 2012 metres. A new bit was run in to hole and fanned to prevent deviation from increasing. A Gyro Data survey tool was dropped and tripped to retrieve and read recorder. It showed a maximum deviation of 7.8 degrees with an azimuth of 69.81 degrees. Samples showed no indication of the Flett limestone. The deviation appeared to be caused by the presence of the known thrust fault which trends northwest to southest in the structure. Directional drillers were called in and drilling continued using a mud motor and MWD tool. The purpose of the directional drilling was to get the hole gradually back to vertical.

GEOLOGICAL SUMMARY AND CONCLUSIONS cont.

There were a number of drilling breaks from 2030 metres to 2089 metres but no associated significant gas reading increases.

The Mississippian unconformity was marked by the presence of large amounts of chalky kaolinite in samples. The top of the true Mississippian (Flett) was picked at 2087 metres; however, because drilling took place using directional tools with alternating periods of sliding and rotating, and frequent weight and rpm changes the penetration rate curve was not totally reflective of lithology and made it difficult to pick the formation tops.

At 2090 metres the gas increased from 35 units to 6814 units. There was no associated drilling break and samples indicated a medium yellow brown, very fine to finely grained limestone with no observable porosity. This suggested a fracture as the origin of this gas. Background gas increased in magnitude by a factor of 5 after this zone was penetrated.

T.D. at 2110 metres was reached at 23:00 hrs, January 31, 1999. The decision was made to run a bottom hole DST over the interval 2085 metres to 2110 metres. DST #8 produced a strong air blow in 35 seconds and gas to surface in 5 minutes on preflow. After an initial shut in of 150 minutes with an ISI pressure of 17352kPa, a valve open of 120 minutes produced gas to surface immediately with a lazy 2 metre flame decreasing to a lazy 1 metre flame. Final shut in pressure was 10349kPa after a final shut in period of 270 minutes. Recovery was 27 metres of gassy inhibited water over 68 metres of gassy watery invert. DST #8 may indicate a low permeability or depleting reservoir over the test interval.

Logging run no. 3 used Baker Atlas equipment. Logger's T.D. was 2109.8 metres. The following logs were run: High Definition Induction-Gamma Ray Log (2107.3 metres to 1494.0 metres); Compensated Z-Densilog-Compensated Neutron-Gamma Ray-XY Caliper Log (2108.8 metres to 1905.0 metres); Multipole Array Accoustilog-Gamma Ray (2102.8 metres to 1905.0 metres).

A 114.3mm liner was run to the bottom of the hole.

A number of the Mattson sands should be capable of production.

Perforating and testing through casing will be required to indicate which of the Mattson sands and fracture zones are produceable and the rate of production for each zone.

SUMMARY OF DRILLING BREAKS AND GAS INCREASES

Interval	Formation	P.R. Change(min/m)	Gas Change(units)	Lithology
1512-17m	Mattson	81 to 7-24	4 to 72	SS/os/tr por
1527-40m	**Mattson**	**70 to 12-39**	**118 to 3996(flow)***	SS/os/scat por
1563-65.8m	**Mattson**	**41 to 7-11(frac?)**	**No Readings(flow)***	SS/os/scat por
1573-74m	Mattson	37 to 18	83 to 108	SS/os/tr por
1576-84m	Mattson	56 to 17-30	72 to 112	SS/os/tr por
1599-02m	Mattson	59 to 35-47	72 to 90	SS/os/rr por
1608-10m	**Mattson**	**81 to 17**	**75 to 2777**	SS/os/tr por
1612-14m	Mattson	87 to 38-48	585 to 484	SS/os/tr por
1622-29m	Mattson	51 to 34-52	73 to 81	SS/os/tr por
1630-37m	Mattson	84 to 16-35	109 to 72	SS/os/scat por
1637-41m	Mattson	30 to 82-138	70 to 194	SS/os/tr por
1648-53m	Mattson	80-101 to 23-37	45 to 52	SS/os/rr por
1657-60m	Mattson	89 to 41-55	94 to 62	SS/os/rr por
1663-64m	Mattson	69 to 31	39 to 49	SS/os/rr por
1668-70m	Mattson	49 to 28-34	26 to 51	SS/os/rr por
1671-73m	Mattson	45 to 15-23	88 to 138	SS/os/rr por
1675-77m	Mattson	51 to 37-42	129 to 146	SS/os/occ por
1681-83m	Mattson	72 to 51-54	175 to 182	SS/os/occ por
1684-86m	Mattson	54 to 82 (bit?)	135 to 160	SS/os/tr por
1691-98m	Mattson	140 to 42-73	100 to 21-33	SS/os/scat por
1701-02m	Mattson	84 to 59	18 to 100	SS/os/tr por
1704-10m	Mattson	78 to 31-52	44 to 34-53	SS/os/scat por
1713-16m	Mattson	91 to 58	26 to 40	SS/tr por
1718-24m	Mattson	75 to 19-45	46 to 163	SS/os/scat por
1734-37m	Mattson	43 to 23-27	66 to 200	SS/os/scat por
1748-51m	Mattson	46 to 36-29	51 to 66	SS/os/tr por
1751-52m	Mattson	29 to 13	66 to 191	SS/os/scat por
1753-57m	MAttson	35 to 16-28	52 to 108	SS/os/scat por
1758-62m	Mattson	36 to 23-28	99 to 148	ss/os/scat por
1763-65m	Mattson	42 to 28-34	72 to 99	SS/os/scat por
1768-73m	Mattson	33 to 11-17	57 to 173	SS/os/scat por
1775-77m	Mattson	38 to 16-20	81 to 120	SS/os/tr por
1785-89m	**Mattson**	**50 to 11-17**	**72 to 291**	**SS/os/scat por**
1791-94m	Mattson	40 to 13-19	81 to 189	SS/os/tr por
1798-03m	Mattson	50 to 32-41	81 to 68	SS/os/tr por
1804-06m	Mattson	50 to 37-40	62 to 74	SS/os/tr por
1811-13m	Mattson	52 to 30	44 to 112	SS/os/tr por
1814-17m	Mattson	42 to 34-39	46 to 39	SS/os/tr por
1823-28m	Mattson	48 to 25-33	No Increase	SS/os/tr por
1835-37m	Mattson	43 to 22-27	25 to 87	SS/os/tr por
1851-54m	Mattson	46 to 24-27	59 to 81	SS/tr por
1859-61m	Mattson	54 to 35-40	38 to 40	SS/tr por
1864-66m	Mattson	39 to 27-32	38 to 66	SS/os/tr por
1876-78m	Mattson	78 to 52-53	14 to 7-10	SS/tr por
1882-84m	Mattson	90 to 32-42	7 to 49	SS/os/tr por

SUMMARY OF DRILLING BREAKS AND GAS INCREASES cont.

1892-94m	Mattson	61 to 34-35	21 to 42	SS/os/tr por
1901-03m	Mattson	44 to 33-35	33 to 65	SS/os/tr por
1909-16m	Mattson	51 to 38-44	20 to 34	SS/tr por
1918-23m	Mattson	49 to 29-41	13 to 27	SS/tr por
1929-30m	Mattson	64 to 41	27 to 51	SS/tr por
1933-34m	Mattson	51 to 35	31 to 34	SS/tr por
1935-36m	Mattson	55 to 37	No Increase	SS/tr por
1957-58m	Mattson	73 to 31	35 to 38	SS/tr por
1966-67m	Mattson	72 to 49	12 to 26	SS/tr por
2013-14m	Mattson	61 to 27	20 to 50	SS/tr por
2024-25m	Mattson	70 to 50	12 to 61	SS/rr por
2029-30m	Mattson	63 to 37	9 to 13	SS/rr por
2049-53m	Mattson	20-30 to 12-14	No Increase	SS/rr por
2089-90m	**Miss.**	**No Change(frac?)**	**35 to 6814**	**LS/n v por**
2095-98	Miss.	20 to 15-19	70 to 215	LS/n v por

NOTE: Most significant intervals are in bold type.
Gas readings are maximum reading in the interval.
os indicates significant fluorescence and cut.

*Underbalanced drilling with nitrified invert.
Flow Test No. 1: 1542m - 1494m 79621m3/day (2.8mmft3/day).
Flow Test No. 2: 1566m - 1494m 289230m3/day (10.2mmft3/day).
DST #4: 1559.7m - 1565.6m FSI 15920KPa 223080m3/day (7.9mmft3/day).
DST #5 1662m - 1689m FSI 1693KPa NGTS. Low Permeability Reservoir.
DST #6 1763m - 1792m Misrun.
DST #7 1757m - 1792m FSI 18119KPa GTS. 35902m3/day (1.27mmft3/day).
DST #8 2085m - 2110m FSI 10349KPa GTS. TSTM.

SUMMARY OF TRIP GAS AND CONNECTION GAS

Depth (m)	Trip Gas (units)	Connection Gas (units)
1495	631	
1524	9558	
1525		1143
1615	3552	
1616		1009
1626		1525
1636 (survey)		2342
1641	1966	
1654		3908
1663	4122	2290
1668	5318	
1673		319
1682		1035
1689	5332	
1691		183
1698 (survey)		130
1700		385
1701	9294	
1713		546
1716	9979*	
1720		876
1729		1491
1740		776
1749		1632
1759		1492
1768 (survey)		5595
1777		971
1786		199
1796		601
1806	9979	
1815		1671
1824		363
1834		294
1844		55
1853		927
1863		503
1872	7032	
1873		330
1882 (survey)		2855
1891		364
1900		443
1910 (survey)		3834
1919		577
1929		105
1938		503

SUMMARY OF TRIP GAS AND CONNECTION GAS

Depth (m)	Trip Gas (units)	Connection Gas (units)
1940	2787	
1948		187
1953	4614	
1959		280
1968 (wiper trip)	1998	
1968 (clean out trip)	5648	
1968	4380	
1977		173
1986		208
1996		79
2005		497
2013		3898
2015		2728
2020	3976	
2025		3054
2031		537
2031	3664	
2036		64
2040 (survey)		226
2049 (survey)		38
2059 (survey)		30
2069 (survey)		81
2079 (survey)		125
2088 (survey)		190
2098 (survey)		1596
2107		515
2110 (wiper trip)		3653

*Maximum gas detector reading

SAMPLE LOG

C L Consultants Limited

		FILE:	98N-2286
COMPANY:	Paramount Resources Ltd.		
WELL:	Paramount et al Liard F-36		
LOCATION:	60o 05.46' 123o 22.06'		
FIELD:	Undefined		
PROVINCE:	N.W.T.		
GEOLOGIST:	Barry C. Clattenburg		
SPUD DATE:	Re-entry 12/23/98	DATA FROM:	1490 m
FINISH DATE:	February 5, 1999		
ELEVATION K.B.:	470.3 m	T.D. DRILLER:	2110 m
ELEVATION G.L.:	464.8 m	T.D. LOGGER:	2109.8 m
K.B. - CSG BOWL:	5.5 m	HOLE SIZE:	155.6 mm

PRODUCING FORMATION:	Mattson
BOTTOM FORMATION:	Mississippian (Flett)
STATUS:	Potential Gas Well
CASING:	114.3mm liner to bottom.
RIG RELEASED:	Unreleased
CONTRACTOR:	Precision Drilling Rig 373
MUD SYSTEM:	Nitrified Invert/Invert
SAMPLE QUALITY:	Fair to Good
REMARKS:	Re-entry of 177.8mm Cased Hole at 1495 metres.
REMARKS:	

DST #1:	See Detailed Test Reports
E.LOGS #2:	HDIL-GR/ZDL-CNL-GR-XYCAL/XMAC-GR/HEXDIP-CBIL-GR/MRIL-GR-CAL/VSP
E.LOGS #3:	HDIL-GR/ZDL-CNL-GR-XYCAL/XMAC-GR

ALL LITHOLOGIC SYMBOLS ARE CANSTRAT COMPATIBLE

OIL STAIN
- D - dead
- ○ - questionable (no fluorescence in solvent)
- ◑ - spotty (fluorescence in solvent)
- ● - live

POROSITY
- e - earthy
- f - fracture
- m - moldic
- o - inter[oolitic]/[peletal]; organic
- p - pinpoint
- v - vuggy
- x - inter[granular]/[fragmental]/[crystalline]

ROUNDNESS
- R - rounded
- r - subrounded
- a - subangular
- A - angular

SORTING
- w - well
- m - moderate
- p - poor

PENETRATION RATE [MIN/CHART DIV.]

TOTAL GAS [units]

OIL INDICATOR [C1/(C3+C4)]

0.1 1 10 100

OIL STAIN | POROSITY | % | p (6%) f (12%) g (18%) e (24%) | silt vf f m c | GRS % | ROUNDING | SORTING | SAMPLE DESCRIPTION

SS-lt yel brn, lt gy, pale gn yel F, bl wh C, scat dis vf-f pyr, clr qtz, sil cmtd, mod calc cmtd, n obs por;

SH-dk gy, blky, vf aren ip, n calc, mod carb, occ pyr; SS-lt yel brn, lt gy, pale gn yel F, bl wh C, scat dis vf-f pyr, clr qtz, sil cmtd, mod calc cmtd, n obs por;

SS-m dk gy, n obs F, slw bl wh C, n obs por, mod carb, mod arg, v pyr;

SH-dk gy, blky, vf aren ip, n calc, mod carb, occ pyr; SS-m dk gy, a/a, mod carb, occ pyr;

SH-dk gy, a/a, n calc, mod carb, occ pyr;

SS-lt gy, scat gn yel F, bl wh C, sil cmtd, rr f gr/tr por, rr stks c to v c grns in arg carb mat/por, sl calc;

SH-dk gy, a/a, n calc, mod carb;

SS-dk gy, scat gn yel F, bl wh C, mod calc cmtd, v rr tr ig por, v carb, mod arg;

SH-m dk gy, blky, hd, n calc, grdg to v arg slt, mod slty, mod carb;

SLT-m dk gy, n calc, mod carb, v arg;

SS-lt yel brn, gn yel F, bl wh C, sil cmtd, calc cmtd, tr ig por, occ pyr;

SS-dk gy, tr gn yel F, sl bl C, sil cmtd, sl calc to dol cmtd, mod arg ip,;

SH-dk gy, v slty, mod carb;

SS-lt gy, v wk gn yel F, v sl bl C, sil cmtd, mod calc cmtd ip, occ lse m grns in smpl, scat por;

SH-dk gy, v slty, mod carb;

SS-lt yel brn to lt gy, gn yel F, bl wh C, sil cmtd, mod calc cmtd, tr lse m grns in smpl, n obs por;

SH-dk gy, v slty, mod carb;

SS-lt yel brn to lt gy, gn yel F, bl wh C, sil cmtd, mod calc cmtd, tr lse m grns in smpl, n obs por; SH-dk gy, v slty, mod carb;

SS-lt yel brn, sil cmtd, sl calc cmtd, n obs por;

SH-dk gy, v slty, mod carb;

SS-m gy, scat p gn yel F, v sl bl C, sl arg, v sil cmtd, sl calc cmtd, n obs por, v slty;

SH-dk gy, v slty, mod carb;

SS-m gy, scat p gn yel F, v sl bl C, sl arg, v sil cmtd, sl calc cmtd, n obs por, v slty;

SH-dk gy, v slty, mod carb;

SS-lt gy, scat p gn yel F, v sl bl C, sil cmtd, sl calc cmtd, scat por;

SS-lt gy, gn yel F, bl wh C, vf dis pyr, v sl calc, sil cmtd, n obs por;

SH-dk gy, n calc, grdg to v arg slt, v slty, mod carb;

SS-lt yel brn, gn yel F, bl wh C, sil cmtd, mod calc to dol cmtd, tr pyr;

SS-lt yel brn, F & C, a/a, tr ig por;

SS-lt yel brn, gn yel F, bl wh C, sil cmtd, mod calc to dol cmtd, tr pyr;

SS-lt yel brn, gn yel F, bl wh C, sil cmtd, tr pyr, mod calc to dol cmtd, rr tr por;

DOL-m brn, sl bl C, vf dis pyr, vf grns of qtz, spic, n v por;

SS-lt yel brn, lt gy ip, gn yel F, bl wh C, sil cmtd, mod calc to dol cmtd, tr pyr, n obs por;

SS-dk gy, v sl blu, sil cmtd, dol cmtd, pyrobit, n v por, mod arg;

SH-dk gy, a/a, mod slty;

SS-lt yel brn, gn yel F, bl wh C, sil cmtd, calc to dol cmtd, v rr tr por;

SH-dk gy, sil, v dol, v slty & grdg to arg

SS-lt yel brn, a/a, n v por;

SH-a/a;

SS-dk gy, sl bl C, dol cmtd, occ m qtz grns, arg, n v por;

SS-lt yel brn, lt gy ip, gn yel F, bl wh C, sil cmtd, tr ig por;

SLT-dk gy, m brn gy, v arg, v dol cmtd, n shws, tt;

SS-lt yel brn, lt gy ip, gn yel F, bl wh C, sil cmtd, sl dol cmtd, tr ig por ip;

SS-dk gy, slty, pyrobit & carb, sil cmtd, sl dol cmtd, rr ig por, mod arg;

SS-lt yel brn, occ lt gy, gn yel F, bl wh C, sil cmtd, v sl dol cmtd, rr wh kao lm, v rr v carb shly lm; SS-lt to m yel brn, lt gy ip, gn yel F, bl wh C, kao lm, sil cmt, tr ig por wh f to m grnd;

SH-dk gy, a/a, v carb;

SS-m yel brn, gn yel F, bl wh C, kao lm, sil cmtd, tr to scat por wh f to m grnd;

SS-m yel brn, m gy ip, gn yel F, s bl wh C, kao lm, sil cmt, sl to mod dol cmtd, fr por wh f to m grnd;

SS-m yel brn, m gy, n F, v sl bl C, v slty, sil cmtd, dol cmtd, carb i/p, n obs por, mod arg;

SS-lt gy, tr kao lm, sil cmtd, dol cmtd, rr ig por; SLT-dk gy, sl dol, v arg;

SS-lt gy, dl gn yel F, sl bl C, scat slt size pyr, sil cmtd, kao lm, v rr ig por in smpl;

SS-lt yel brn, lt gy, sil cmtd, slty, arg ip, occ pyrobit, n obs por;

SS-lt gy, dl gn yel F, sl bl C, scat slt size pyr, sil cmtd, kao lm, v rr ig por in smpl;

SLT-dk gy, occ dl yel F, sl bl C, vf grnd ip, sil cmtd, sl dol cmtd, carb & pyrobit ip, v arg;

SS-lt gy, lt yel brn ip, a/a;

SLT-dk gy, n F, sl bl C, carb, sil cmtd, mod dol cmtd, vf grnd ip, n v por, v arg;

SS-lt gy, scat dl yel F, bl wh C, rr m grns in mtx, sil cmtd, mod dol cmtd, rr ig por;

SS-lt gy, scat gn yel F, sl bl C, sil cmtd, tr ig por;

SS-lt gy, m yel brn ip, scat dl yel F, sl bl C ip, sil cmtd, sl dol cmtd, str of f to m grnd/ m gy r cht, occ ig por;

SS-dk gy, m yel brn, n F, sl bl C, slty, arg, scat pyrobit, n obs por;

SS-lt gy, m yel brn ip, scat dl yel F, sl bl C ip, sil cmtd, sl dol cmtd, stks of f to m grnd, occ ig por; SS-dk gy, dk yel brn, n F, sl bl C, slty ip, sil cmtd, sl dol cmtd, arg, carb & pyrobit, n v por;

SS-dk gy, dk yel brn, a/a, sil cmtd, sl dol cmtd, carb & pyrobit ip, mod arg;

SS-m gy, m brn gy, v lt gy ip, occ gn yel F/bri bl wh C, f to m grnd ip, pyrobit ip, sil cmtd, sl to mod dol cmtd, rr glau; SS-m gy, m brn gy, v lt gy ip, occ gn yel F/bri bl wh C, f to m grnd ip, pyrobit ip, sil cmtd, sl to mod dol cmtd, rr glau, tr-scat ig por;

SLT-v dk gy, sil cmtd, vf grnd ip, shly ip, mod arg, occ pyr;

SS-v lt gy, n F, sl bl C ip, sil cmtd, sl to mod dol cmtd, n v por; SS-lt gy to lt yel brn, scat dl gn yel F, v sl bl C, stks of f to m grnd & chty ip, sil cmtd, scat ig por, scat pyr; SS-lt gy to lt yel brn, scat dl gn yel F, v sl bl C, stks of f to m grnd & chty ip, sil cmtd, scat ig por, scat pyr;

SS-a/a, m gy ip, tr pyrobit, sl arg;

SS-lt gy to lt yel brn, scat dl gn yel F, sl bl C, sil cmtd, v sl dol cmtd, rrly f to m grnd, tr to n obs por;

SS-scat dl yel F, sl bl C, a/a, tr m gy pyr shly lm;

SS-v lt gy, lt yel brn, dl gn yel F, sl bl C ip, occ f to m grnd, tr pyrobit, sil cmtd, sl dol cmtd, scat ig por;

SS-lt m gy, F a/a, occ bri bl wh C, occ f to m grnd, scat pyrobit, tr ig por;

SS-lt m gy, lt yel brn ip, dl gn yel F ip, sl bl C, tr carb lm, thn dk gy arg slt interbds, n obs por;

SS-lt m gy, lt gy, dl gn yel F ip, sl bl C, carb lm, sil cmtd, dol cmtd ip, pyrobit, scat ig por;

SS-m gy ip, a/a, n obs por, mod arg;

SS-lt gy, a/a, interbds of dk gy v arg slt, mod dol cmtd ip, n obs por;

SS-lt yel brn, lt gy, dl gn yel F, sl bl C, f to m grnd ip, rr kao lm, sil cmtd, rr carb lm, scat ig por;

SS-a/a, m gy & f to m grnd ip/tr ig por;

SS-a/a, rr pyrobit;

SS-a/a, occ shly lm;

SS-m gy, lt gy to lt m brn ip, sil cmtd, scat vf dis pyr, n obs por;

SS-lt yel brn, dl gn yel F, sl bl C, sil cmtd, v rr pyrobit, tr to scat por in smpl;

SLT-dk gy, vf grnd, v sl dol, v arg;

SS-lt gy, lt yel brn, scat dl gn yel F, sl bl C, sil cmtd, tr por in smpl;

SS-lt gy, lt yel brn, scat dl gn yel F, sl bl wh C, occ thn interbds of m gy sh, sil cmtd, rr ig por;

SH-dk gy, interbd/ss, a/a, v slty;

SS-lt yel brn, lt gy, dl gn yel F, sl bl C, f to m grnd ip, rr kao lm, sil cmtd, rr carb lm, scat ig por; SS-lt gy, scat dl gn yel F, sl bl C, tr pyr, dk gy & pyrobit/scat ig por ip; SH-dk gy, as interbds in ss, v slty;

SS-lt gy, lt yel brn, dl gn yel F, sl bl to bri bl wh C wh dk gy & pyrobit, sil cmtd, mod dol cmtd ip, f to m grnd ip, tr ig por;

SS-lt gy, lt yel brn, a/a, n obs por;

SH-dk gy, sl dol cmtd, carb, mod slty;

SS-lt gy, lt yel brn, dl gn yel F ip, sl bl C, rrly m grnd, sil cmtd, mod dol cmtd ip, tr ig por, scat pyr;

SH-dk gy, sl dol cmtd, carb, mod slty;

SS-lt gy, lt yel brn, dl gn yel F ip, sl bl C, rrly m grnd, sil cmtd, mod dol cmtd ip, tr ig por, scat pyr; SH-m to dk gy, grdg to v arg slty ss ip; SS-m gy, sil cmtd, sl dol cmtd, n v por, mod slty, mod arg;

SS-lt yel brn, dl gn yel F, sl bl C, f to m grnd ip, sil cmtd, sl dol cmtd, rr' chty, tr ig por;

SLT-dk gy, n calc, vf grnd ip, sl dol cmtd, mod carb, v arg;

SH-dk gy, sl dol cmtd, carb, grdg to v arg slt;

SLT-dk gy, a/a, v arg;

SS-lt yel brn, dl gn yel F, sl bl C, sil cmtd, sl dol cmtd, f to m grnd ip, tr ig por;

SH-dk gy, sl dol cmtd, carb, grdg to v arg slt, mod slty;

SLT-dk gy, a/a, v arg;

SS-lt yel brn, lt gy, dl gn yel F ip/sl bl C, sil cmtd, v rr glau, tr pyrobit, occ carb shly lm, rr ig por; SH-dk gy, a/a, slty, mod carb;

SS-lt gy, lt yel brn, sil cmtd, tr shly lm, rrly pyrobit, occ thn interbds of v dol ss;

SH-dk gy, a/a;

SS-a/a;

SLT-dk gy, a/a;

SS-dk gy, m yel brn, n app F, sl bl C ip, v sil cmtd, mod arg, mod pyrobit, sl to mod dol, f to m grnd/tr por ip;

SS-a/a, scat ig por ip;

SS-dk gy, v sil & chty, n obs por, mod arg;

SS-lt gy, sil cmtd, a/a, n shws, n obs por;

SH-dk gy, a/a;

SS-lt gy, lt yel brn, rrly m yel brn, dl gn yel F & bl wh C wh m yel brn, sil cmtd, tr pyr, tr ig por ip;

SS-lt yel brn, sil cmtd, v sil cmtd ip, n to mod dol cmtd, rr f to m grnd/tr por;

SS-m gy, n app F, sl bl C, sil cmtd, sl to mod dol cmtd, v carb, mod arg;

SS-lt yel brn, a/a, tr ig por wh f to m grnd;

SS-m gy, n app F, sl bl C, sil cmtd, sl to mod dol cmtd, v carb, mod arg;

SS-dk gy, n F, sl bl wh C, slty, sil cmtd, sl to mod dol cmtd, occ f to m grnd, n v por, v carb, mod arg; SS-lt to m yel brn, n F, sl bl wh C, occ carb lm, sil cmtd, rr kao inflg, tr ig por; SS-dk gy, a/a

SS-lt gy, lt to m yel brn, n F, sl bl wh C, sil cmtd, occ carb lm, v rr tr ig por;

SS-dk gy, a/a;

SS-lt to m yel brn, n F, sl bl wh C, sil cmtd, occ carb lm, tr ig por;

SS-dk gy, n F, sl bl wh C, slty, dk gy sh interbds,, v carb, mod arg;

SS-lt to m yel brn, n F, sl bl C, sil cmtd, a/a, tr ig por;

SS-dk gy, n F, sl bl wh C, slty, dk gy sh interbds, v carb, mod arg;

SS-m gy to m yel brn, arg ip, sil cmtd, n F, sl bl C, rr kao inflg, carb lm, tr ig por;

SH-dk gy, slty, mm, n dol, v carb;

SS-m gy to m yel brn, a/a, tr ig por;

SH-dk gy, a/a, v carb,/ss interbds;

SS-m yel brn to m gy, n F, sl bl wh C, carb lm, tr ig por, mod arg, mod carb;

SLT-dk gy, vf aren ip, shly ip, v arg, v carb;

SS-m yel brn to m gy, n F, sl bl wh C, sil cmtd, rr ig por, mod arg, mod carb;

SH-dk gy, a/a, v carb;

SS-m yel brn to m gy, n F, sl bl wh C, carb lm, tr dk gy v arg v carb slt interbds, tr ig por, mod arg, mod carb; SS-m yel brn, n F, sl bl C, sil cmt, mod arg, mod carb;

SS-a/a, vf-m grnd, tr ig por;

SH-dk gy, a/a, v carb;

SS-a/a;

SS-m yel brn, m gy, dk gy, n F, sl bl C, sil cmtd, tr pyr, scat v dk gy to blk carb slty shly lm, v rr tr ig por;

SS-m to dk gy, m yel brn, n F, sl bl C, scat to abt carb v slty lm, sil cmtd, occ m grnd/tr ig por;

SS-m yel brn, n F, sl bl C, sil cmtd, scat carb slty lm, tr ig por;

SS-m yel brn, m to dk gy, scat v slty carb lm;

SS-lt gy, n F, sl bl wh C, sil cmtd, sl dol cmtd ip, tr ig por;

SH-v dk gy to blk, blky, slty ip, v carb;

SH-dk gy to blk, interbd/vf to f grnd ss, n v por, v slty, v carb;

SS-m gy to m yel brn, n v F, sl bl wh C, sil cmtd, abt v arg mm carb lm, tr por ip; SS-m gy to m yel brn, n v F, sl bl wh C, sil cmtd, abt arg v carb mm lm & interbds;

SS-lt gy to m gy, tr gn yel F, bri wh C, sil cmtd, sl dol cmtd, abt carb lm, dk gy v arg & slty ip; SS-m to dk gy, a/a;

SS-m yel brn, lt gy, tr gn yel F, bri bl C, sil cmtd, sl dol cmtd, a/a, tr ig por;

SS-m to dk gy, a/a; SS-lt to m gy, m yel brn, dk gy ip, sil cmtd, sl dol cmtd ip, abt v dk gy v carb shly lm, rr por;

SH-v dk gy, non calc, v carb;

SS-a/a;

SH-v dk gy, non calc, v carb;

SS-a/a, abt carb lm, tr por;

SS-a/a, abt v carb lm;

SS-m yel brn, occ dl gn yel F, bl wh C, sil cmtd, rr carb mat, tr ig por; SH-v dk gy, non calc, v carb; SS-a/a;

SH-v dk gy, a/a, v carb;

SS-lt gy, sil cmtd, abt carb lm, rr tr por;

SH-v dk gy, mm, n calc, v carb;

SS-lt gy, m yel brn, occ dl gn yel F, bl wh C, sil cmtd, abt carb lm a/a, v sil app ip, rr tr por;

SH-v dk gy, mm, n calc, v carb;

SS-lt gy, m yel brn, occ dl gn yel F, bl wh C, sil cmtd, abt carb lm a/a, v sil app ip, rr tr por; SH-v dk gy, mm, n calc, v carb;

SS-lt gy, m yel brn, occ dl gn yel F, bl wh C, sil cmtd, abt carb lm a/a, v sil app ip, rr tr por; SH-v dk gy, mm, n calc, v carb;

SS-abt carb lm, occ F & C a/a, sil cmtd, tr ig por;

SH-v dk gy, mm, n calc, v carb;

SS-sil cmtd, abt carb lm a/a, v sil app ip, rr tr por; SS-m yel brn, occ m gy & arg, sil cmtd, carb lm, a/a;

SS-m to dk gy, m yel brn, tr gn yel F, bl C, v sil cmtd, lt gy & v sl dol cmt ip, arg & slty, m, abt v carb mm lm;

SH-v dk gy, n calc, mm, v carb;

SS-m to dk gy, tr gn yel F, bl C, sil cmtd, abt carb lm, arg & slty ip;

SH-v dk gy, n calc, mm, v carb;

SS-m to dk gy, tr gn yel F, bl F, sil cmtd, abt carb lm, arg & slty ip;

SS-a/a, tr dl gn F, bl C, tr ig por;

SH-v dk gy, n calc, v carb, occ wh kao spks;

SS-lt to m gy, dk gy ip, n app F, bl wh C, abt carb lm, sil cmtd, dol cmtd ip;

SS-lt to m gy, bl wh C, sil cmtd, sl to mod dol cmtd, sh interbds, carb lm, rr ig por, v arg;

SS-a/a, rr ig por;

SH-v dk gy, n calc, v carb, wh dol kao spks;

SS-dk gy to dk brn gy, n app F, bl wh C, v arg & carb, mod sil cmtd, sl dol cmtd,/sh interbds;

SS-m yel brn, sil cmtd, occ carb shly lm, v rr tr ig por;

SH-lt m gy to v dk gy, n calc, kao spks, ss lns & lm, v carb; SS-lt gy to m yel brn, a/a, scat dk gy carb lm, sil cmtd, mod dol cmtd ip, dk gy vf gr chty lm;

SH-dk gy, n calc, v carb, sft;

SS-dk yel brn, m gy, a/a, v sil cmtd, sl dol cmtd, v rr glau, n vis por;

SS-m yel brn, v sil, v lmy ip, tr fos frags in smpl, n v por;

SLT-dk yel brn, lmy ip, fos frags, rr crin,

SH-a/a, v carb, wh chlky kao lm, rr ost & bry

SS-m yel brn, dk gy, slty, lmy ip, rr fos, n vis por, mod arg, abt chky kao interbds;

SH-dk gy, abt chky kao lm and interbds, v carb; LS-m to dk yel brn, n F, sl bl C, dk gy & arg ip, rr pel, rr ool, tr kao, sl dol, n v por;

LS-m to dk yel brn, occ p yel brn, arg wh dk yel brn, n v por in smpl;

LS-a/a, occ sh lm, fos, rr cor, scat cht lm/v crs R qtz, cht, fos frags, rx frags;

LS-dk yel brn, v arg ip, dol ip, abt dk brn cht lm, chky kao lm ip, rr brac, rr ost;

C L Consultants Limited

SAMPLE LOG

FILE: 98N-2286

COMPANY:	Paramount Resources Ltd.
WELL:	Paramount et al Liard F-36
LOCATION:	60o 05.46' 123o 22.06'
FIELD:	Undefined
PROVINCE:	N.W.T.
GEOLOGIST:	Barry C. Clattenburg
SPUD DATE:	Re-entry 12/23/98
FINISH DATE:	February 5, 1999
ELEVATION K.B.:	470.3 m
ELEVATION G.L.:	464.8 m
K.B. - CSG BOWL:	5.5 m
DATA FROM:	1490 m
T.D. DRILLER:	2110 m
T.D. LOGGER:	2109.8 m
HOLE SIZE:	155.6 mm

PRODUCING FORMATION:	Mattson
BOTTOM FORMATION:	Mississippian (Flett)
STATUS:	Potential Gas Well
CASING:	114.3mm liner to bottom.
RIG RELEASED:	Unreleased
CONTRACTOR:	Precision Drilling Rig 373
MUD SYSTEM:	Nitrified Invert/Invert
SAMPLE QUALITY:	Fair to Good
REMARKS:	Re-entry of 177.8mm Cased Hole at 1495 metres.
REMARKS:	

DST #1:	See Detailed Test Reports
E.LOGS #2:	HDIL-GR/ZDL-CNL-GR-XYCAL/XMAC-GR/HEXDIP-CBIL-GR/MRIL-GR-CAL/VSP
E.LOGS #3:	HDIL-GR/ZDL-CNL-GR-XYCAL/XMAC-GR

ALL LITHOLOGIC SYMBOLS ARE CANSTRAT COMPATIBLE

OIL STAIN

- D - dead
- ○ - questionable (no fluorescence in solvent)
- ◑ - spotty (fluorescence in solvent)
- ● - live

POROSITY

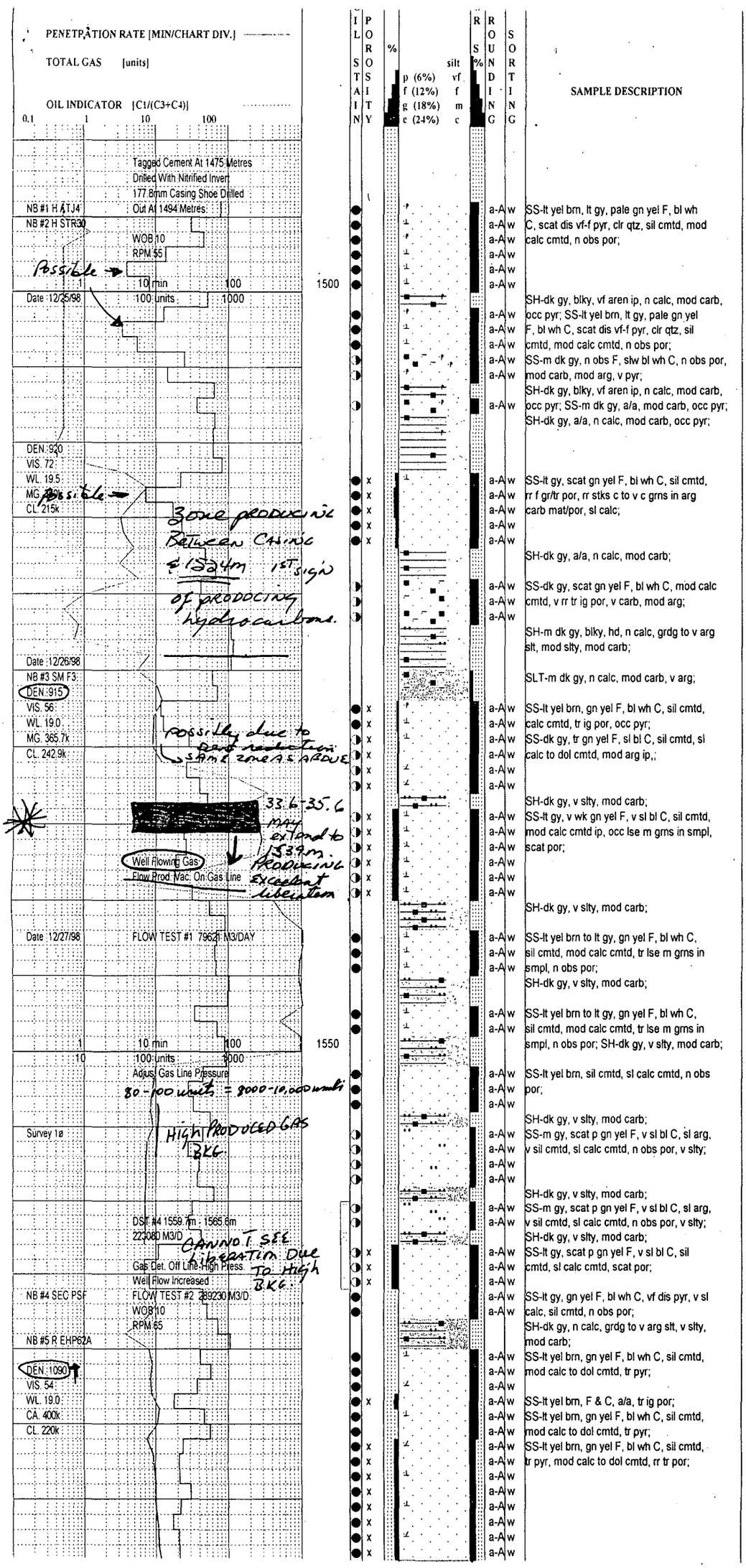
- e - earthy
- f - fracture
- m - moldic
- o - inter[oolitic]/[peletal]; organic
- p - pinpoint
- v - vuggy
- x - inter[granular]/[fragmental]/[crystalline]

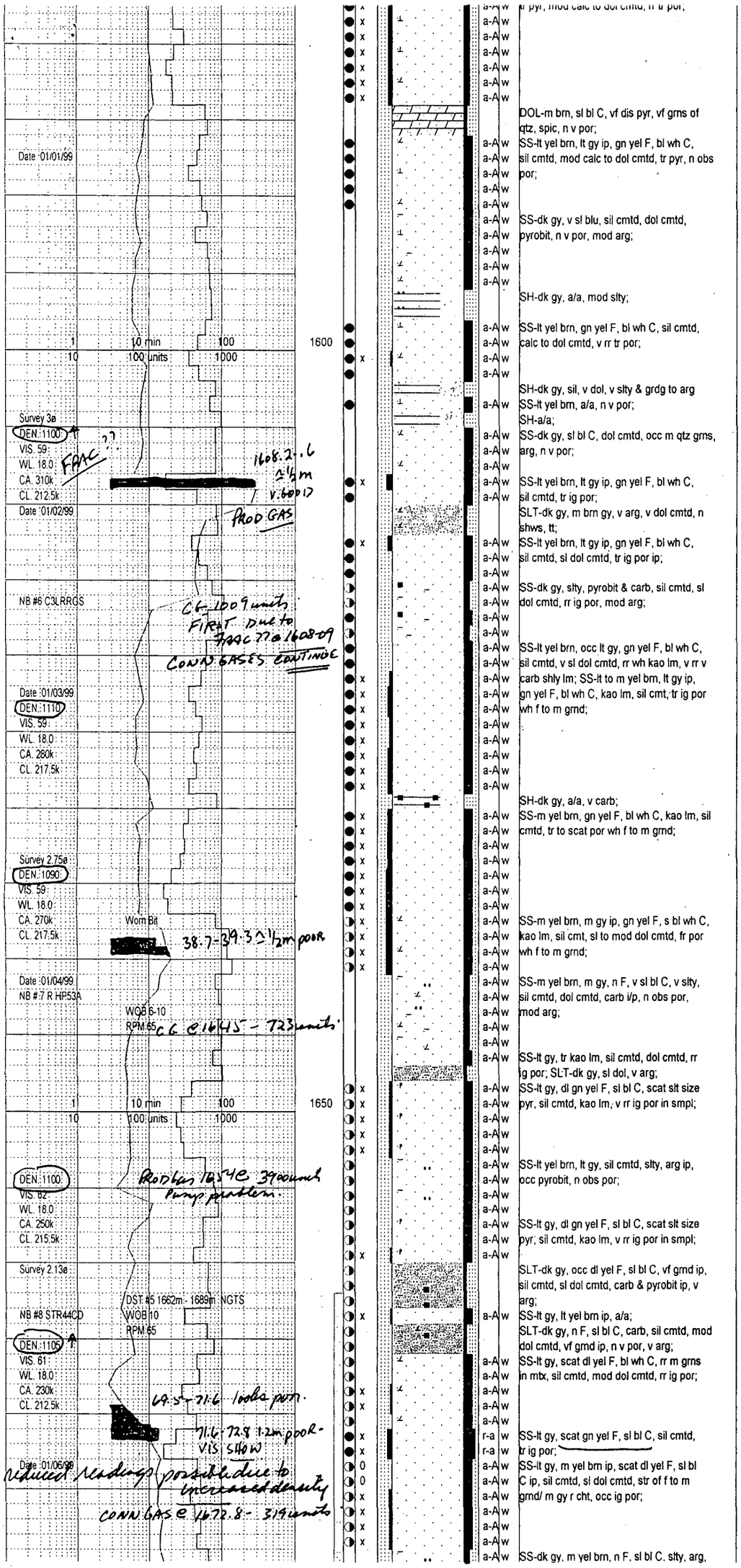
ROUNDNESS

- R - rounded
- r - subrounded
- a - subangular
- A - angular

SORTING

- w - well
- m - moderate
- p - poor


PENETRATION RATE [MIN/CHART DIV.]
TOTAL GAS [units]
OIL INDICATOR [C1/(C3+C4)]
0.1
1
10
100
Tagged Cement At 1475 Metres
Drilled With Nitrified Invert
177.8mm Casing Shoe Drilled
Out At 1494 Metres
NB #1 H ATJ4
NB #2 H STR30
WOB 10
RPM 55
Possible
10 min
100
1500
Date :12/25/98
100 units
1000
DEN :920
VIS. 72
WL. 19.5
MG. 365.6k
CL. 215k
Possible
Zone producing
Between Casing
& 1524m 1ST sign
of producing
hydrocarbons.
Date :12/26/98
NB #3 SM F3
DEN :915
VIS. 56
WL. 19.0
MG. 365.7k
CL. 242.9k
possibly due to
bad reduction
SAME ZONE AS ABOVE
33.6-35.6
may extend to
539m
PRODUCING
excellent
liberation
Well flowing Gas
Flow Prod. Vac. On Gas Line
Date :12/27/98
FLOW TEST #1 7962 M3/DAY
1
10 min
100
1550
10
100 units
1000
Adjus. Gas Line Pressure
80-100 units = 8000-10,000 units
HIGH PRODUCED GAS
BKG
Survey 1ø
DST #4 1559.7m - 1565.6m
22,080 M3/D
CANNOT SEE
LIBERATION DUE
TO HIGH
BKG.
Gas Det. Off Line-High Press.
Well Flow Increased
NB #4 SEC PSF
FLOW TEST #2 39230 M3/D
WOB 10
RPM 65
NB #5 R EHP62A
DEN :1090
VIS. 54
WL. 19.0
CA. 400k
CL. 220k
p (6%) silt
f (12%) vf
g (18%) f
e (24%) m
c
SAMPLE DESCRIPTION
SS-lt yel brn, lt gy, pale gn yel F, bl wh C, scat dis vf-f pyr, clr qtz, sil cmtd, mod calc cmtd, n obs por;
SH-dk gy, blky, vf aren ip, n calc, mod carb, occ pyr; SS-lt yel brn, lt gy, pale gn yel F, bl wh C, scat dis vf-f pyr, clr qtz, sil cmtd, mod calc cmtd, n obs por;
SS-m dk gy, n obs F, slw bl wh C, n obs por, mod carb, mod arg, v pyr;
SH-dk gy, blky, vf aren ip, n calc, mod carb, occ pyr; SS-m dk gy, a/a, mod carb, occ pyr;
SH-dk gy, a/a, n calc, mod carb, occ pyr;
SS-lt gy, scat gn yel F, bl wh C, sil cmtd, rr f gr/tr por, rr stks c to v c grns in arg carb mat/por, sl calc;
SH-dk gy, a/a, n calc, mod carb;
SS-dk gy, scat gn yel F, bl wh C, mod calc cmtd, v rr tr ig por, v carb, mod arg;
SH-m dk gy, blky, hd, n calc, grdg to v arg slt, mod slty, mod carb;
SLT-m dk gy, n calc, mod carb, v arg;
SS-lt yel brn, gn yel F, bl wh C, sil cmtd, calc cmtd, tr ig por, occ pyr;
SS-dk gy, tr gn yel F, sl bl C, sil cmtd, sl calc to dol cmtd, mod arg ip,;
SH-dk gy, v slty, mod carb;
SS-lt gy, v wk gn yel F, v sl bl C, sil cmtd, mod calc cmtd ip, occ lse m grns in smpl, scat por;
SH-dk gy, v slty, mod carb;
SS-lt yel brn to lt gy, gn yel F, bl wh C, sil cmtd, mod calc cmtd, tr lse m grns in smpl, n obs por;
SH-dk gy, v slty, mod carb;
SS-lt yel brn, sil cmtd, sl calc cmtd, n obs por;
SH-dk gy, v slty, mod carb;
SS-m gy, scat p gn yel F, v sl bl C, sl arg, v sil cmtd, sl calc cmtd, n obs por, v slty;
SH-dk gy, v slty, mod carb;
SS-lt gy, scat p gn yel F, v sl bl C, sil cmtd, sl calc cmtd, scat por;
SS-lt gy, gn yel F, bl wh C, vf dis pyr, v sl calc, sil cmtd, n obs por;
SH-dk gy, n calc, grdg to v arg slt, v slty, mod carb;
SS-lt yel brn, gn yel F, bl wh C, sil cmtd, mod calc to dol cmtd, tr pyr;
SS-lt yel brn, F & C, a/a, tr ig por;
SS-lt yel brn, gn yel F, bl wh C, sil cmtd, mod calc to dol cmtd, tr pyr;
SS-lt yel brn, gn yel F, bl wh C, sil cmtd, tr pyr, mod calc to dol cmtd, rr tr por;



a-A w ...pyr, mod calc to dol cmtd, tr ...por;

DOL-m brn, sl bl C, vf dis pyr, vf grns of qtz, spic, n v por;

a-A w SS-lt yel brn, lt gy ip, gn yel F, bl wh C, sil cmtd, mod calc to dol cmtd, tr pyr, n obs por;

a-A w SS-dk gy, v sl blu, sil cmtd, dol cmtd, pyrobit, n v por, mod arg;

SH-dk gy, a/a, mod slty;

a-A w SS-lt yel brn, gn yel F, bl wh C, sil cmtd, calc to dol cmtd, v rr tr por;

SH-dk gy, sil, v dol, v slty & grdg to arg

a-A w SS-lt yel brn, a/a, n v por;

SH-a/a;

a-A w SS-dk gy, sl bl C, dol cmtd, occ m qtz grns, arg, n v por;

a-A w SS-lt yel brn, lt gy ip, gn yel F, bl wh C, sil cmtd, tr ig por;

SLT-dk gy, m brn gy, v arg, v dol cmtd, n shws, tt;

a-A w SS-lt yel brn, lt gy ip, gn yel F, bl wh C, sil cmtd, sl dol cmtd, tr ig por ip;

a-A w SS-dk gy, slty, pyrobit & carb, sil cmtd, sl dol cmtd, rr ig por, mod arg;

a-A w SS-lt yel brn, occ lt gy, gn yel F, bl wh C, sil cmtd, v sl dol cmtd, rr wh kao lm, v rr v carb shly lm; SS-lt to m yel brn, lt gy ip, gn yel F, bl wh C, kao lm, sil cmt, tr ig por wh f to m grnd;

SH-dk gy, a/a, v carb;

a-A w SS-m yel brn, gn yel F, bl wh C, kao lm, sil cmtd, tr to scat por wh f to m grnd;

a-A w SS-m yel brn, m gy ip, gn yel F, s bl wh C, kao lm, sil cmt, sl to mod dol cmtd, fr por wh f to m grnd;

a-A w SS-m yel brn, m gy, n F, v sl bl C, v slty, sil cmtd, dol cmtd, carb i/p, n obs por, mod arg;

a-A w SS-lt gy, tr kao lm, sil cmtd, dol cmtd, rr ig por; SLT-dk gy, sl dol, v arg;

a-A w SS-lt gy, dl gn yel F, sl bl C, scat slt size pyr, sil cmtd, kao lm, v rr ig por in smpl;

a-A w SS-lt yel brn, lt gy, sil cmtd, slty, arg ip, occ pyrobit, n obs por;

a-A w SS-lt gy, dl gn yel F, sl bl C, scat slt size pyr, sil cmtd, kao lm, v rr ig por in smpl;

SLT-dk gy, occ dl yel F, sl bl C, vf grnd ip, sil cmtd, sl dol cmtd, carb & pyrobit ip, v arg;

a-A w SS-lt gy, lt yel brn ip, a/a;

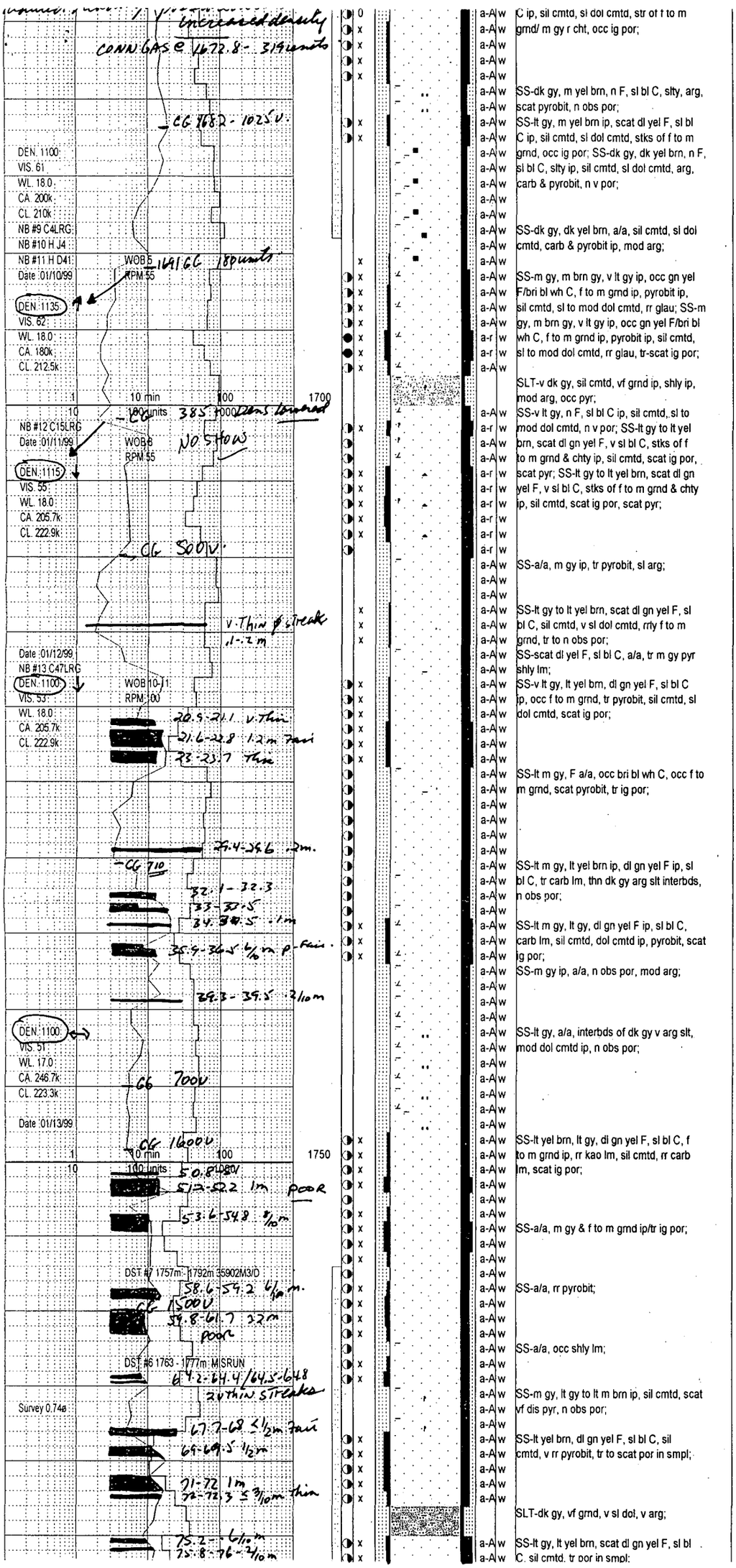
SLT-dk gy, n F, sl bl C, carb, sil cmtd, mod dol cmtd, vf grnd ip, n v por, v arg;

a-A w SS-lt gy, scat dl yel F, bl wh C, rr m grns in mtx, sil cmtd, mod dol cmtd, rr ig por;

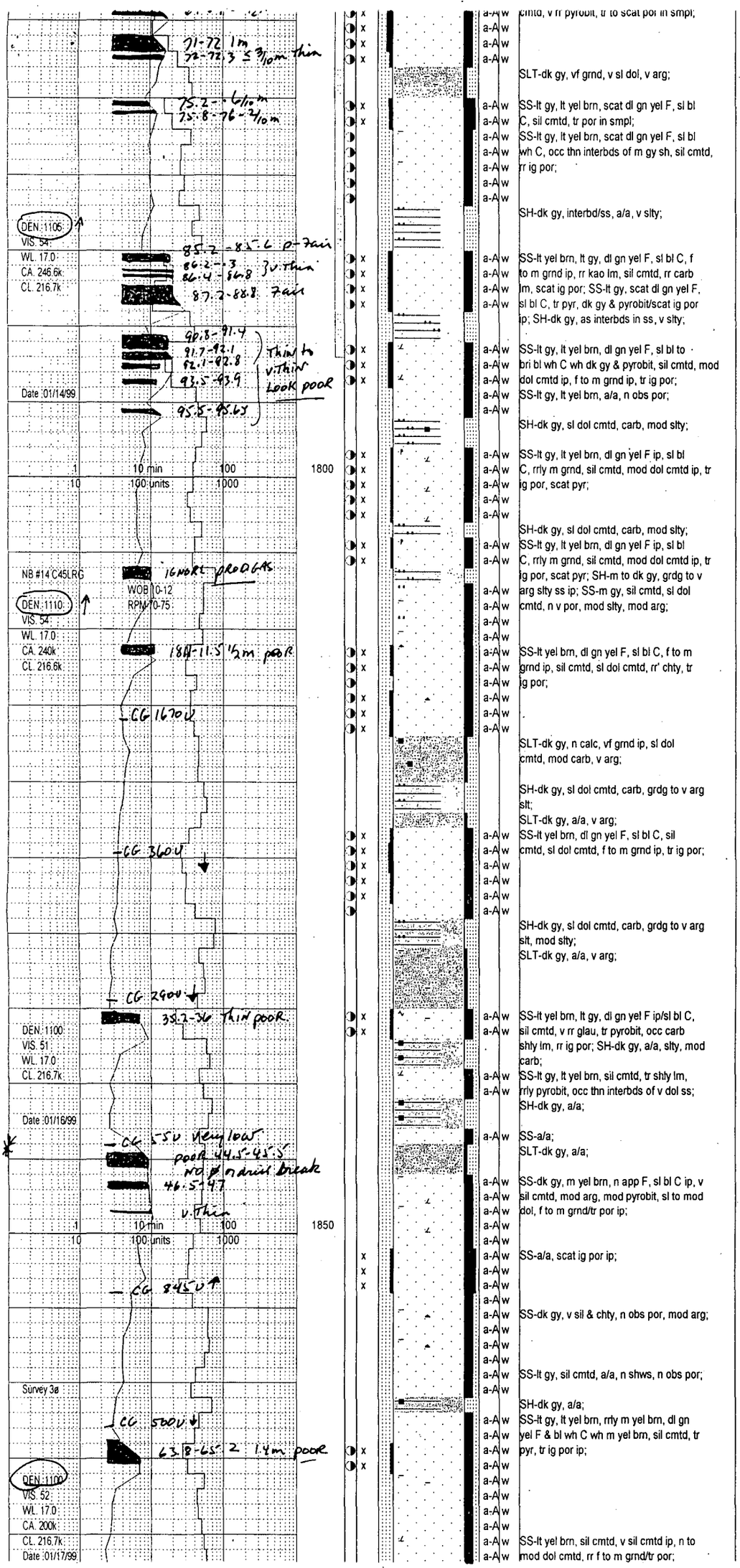
r-a w SS-lt gy, scat gn yel F, sl bl C, sil cmtd, r-a w tr ig por;

a-A w SS-lt gy, m yel brn ip, scat dl yel F, sl bl C ip, sil cmtd, sl dol cmtd, str of f to m grnd/ m gy r cht, occ ig por;

a-A w SS-dk gy, m yel brn, n F, sl bl C. slty, arg,



	0			a-A	w	C ip, sil cmtd, sl dol cmtd, str of f to m
	x			a-A	w	grnd/ m gy r cht, occ ig por;
	x			a-A	w	
	x			a-A	w	
	x			a-A	w	
			..	a-A	w	SS-dk gy, m yel brn, n F, sl bl C, slty, arg,
			..	a-A	w	scat pyrobit, n obs por;
	x			a-A	w	SS-lt gy, m yel brn ip, scat dl yel F, sl bl
	x			a-A	w	C ip, sil cmtd, sl dol cmtd, stks of f to m
			■	a-A	w	grnd, occ ig por; SS-dk gy, dk yel brn, n F,
				a-A	w	sl bl C, slty ip, sil cmtd, sl dol cmtd, arg,
			■	a-A	w	carb & pyrobit, n v por;
				a-A	w	
			■	a-A	w	
			■	a-A	w	SS-dk gy, dk yel brn, a/a, sil cmtd, sl dol
			■	a-A	w	cmtd, carb & pyrobit ip, mod arg;
	x		■	a-A	w	
	x		∠	a-A	w	SS-m gy, m brn gy, v lt gy ip, occ gn yel
	x			a-A	w	F/bri bl wh C, f to m grnd ip, pyrobit ip,
	x		∠	a-A	w	sil cmtd, sl to mod dol cmtd, rr glau; SS-m
	x			a-A	w	gy, m brn gy, v lt gy ip, occ gn yel F/bri bl
	x		∠	a-r	w	wh C, f to m grnd ip, pyrobit ip, sil cmtd,
	x			a-r	w	sl to mod dol cmtd, rr glau, tr-scat ig por;
	x		∠	a-A	w	
						SLT-v dk gy, sil cmtd, vf grnd ip, shly ip,
						mod arg, occ pyr;
			∠	a-A	w	SS-v lt gy, n F, sl bl C ip, sil cmtd, sl to
	x			a-r	w	mod dol cmtd, n v por; SS-lt gy to lt yel
			∠	a-A	w	brn, scat dl gn yel F, v sl bl C, stks of f
	x			a-r	w	to m grnd & chty ip, sil cmtd, scat ig por,
	x		▲	a-r	w	scat pyr; SS-lt gy to lt yel brn, scat dl gn
	x			a-r	w	yel F, v sl bl C, stks of f to m grnd & chty
	x		▲	a-r	w	ip, sil cmtd, scat ig por, scat pyr;
	x			a-r	w	
	x		▲	a-r	w	
				a-r	w	
				a-A	w	SS-a/a, m gy ip, tr pyrobit, sl arg;
				a-A	w	
				a-A	w	
	x			a-A	w	SS-lt gy to lt yel brn, scat dl gn yel F, sl
	x			a-A	w	bl C, sil cmtd, v sl dol cmtd, rrly f to m
	x			a-A	w	grnd, tr to n obs por;
				a-A	w	SS-scat dl yel F, sl bl C, a/a, tr m gy pyr
				a-A	w	shly lm;
	x			a-A	w	SS-v lt gy, lt yel brn, dl gn yel F, sl bl C
	x			a-A	w	ip, occ f to m grnd, tr pyrobit, sil cmtd, sl
	x			a-A	w	dol cmtd, scat ig por;
	x			a-A	w	
	x			a-A	w	
				a-A	w	SS-lt m gy, F a/a, occ bri bl wh C, occ f to
				a-A	w	m grnd, scat pyrobit, tr ig por;
				a-A	w	
				a-A	w	
				a-A	w	
				a-A	w	
				a-A	w	SS-lt m gy, lt yel brn ip, dl gn yel F ip, sl
				a-A	w	bl C, tr carb lm, thn dk gy arg slt interbds,
				a-A	w	n obs por;
				a-A	w	
	x		∠	a-A	w	SS-lt m gy, lt gy, dl gn yel F ip, sl bl C,
	x			a-A	w	carb lm, sil cmtd, dol cmtd ip, pyrobit, scat
	x		∠	a-A	w	ig por;
			∠	a-A	w	SS-m gy ip, a/a, n obs por, mod arg;
			∠	a-A	w	
			∠	a-A	w	
			∠	a-A	w	
			..	a-A	w	SS-lt gy, a/a, interbds of dk gy v arg slt,
			∠	a-A	w	mod dol cmtd ip, n obs por;
			..	a-A	w	
			∠	a-A	w	
			..	a-A	w	
			∠	a-A	w	
			..	a-A	w	
	x			a-A	w	SS-lt yel brn, lt gy, dl gn yel F, sl bl C, f
	x			a-A	w	to m grnd ip, rr kao lm, sil cmtd, rr carb
	x			a-A	w	lm, scat ig por;
	x			a-A	w	
				a-A	w	
	x			a-A	w	
	x			a-A	w	SS-a/a, m gy & f to m grnd ip/tr ig por;
	x			a-A	w	
	x			a-A	w	
				a-A	w	
	x			a-A	w	SS-a/a, rr pyrobit;
	x			a-A	w	
	x			a-A	w	
	x			a-A	w	
				a-A	w	SS-a/a, occ shly lm;
	x			a-A	w	
	x			a-A	w	
				a-A	w	SS-m gy, lt gy to lt m brn ip, sil cmtd, scat
				a-A	w	vf dis pyr, n obs por;
				a-A	w	
	x			a-A	w	SS-lt yel brn, dl gn yel F, sl bl C, sil
	x			a-A	w	cmtd, v rr pyrobit, tr to scat por in smpl;
	x			a-A	w	
	x			a-A	w	
	x			a-A	w	
						SLT-dk gy, vf grnd, v sl dol, v arg;
	x			a-A	w	SS-lt gy, lt yel brn, scat dl gn yel F, sl bl
	x			a-A	w	C, sil cmtd, tr por in smpl;



cmtd, v fr pyrobit, tr to scat por in smpl;

SLT-dk gy, vf grnd, v sl dol, v arg;

SS-lt gy, lt yel brn, scat dl gn yel F, sl bl C, sil cmtd, tr por in smpl;

SS-lt gy, lt yel brn, scat dl gn yel F, sl bl wh C, occ thn interbds of m gy sh, sil cmtd, rr ig por;

SH-dk gy, interbd/ss, a/a, v slty;

SS-lt yel brn, lt gy, dl gn yel F, sl bl C, f to m grnd ip, rr kao lm, sil cmtd, rr carb lm, scat ig por; SS-lt gy, scat dl gn yel F, sl bl C, tr pyr, dk gy & pyrobit/scat ig por ip; SH-dk gy, as interbds in ss, v slty;

SS-lt gy, lt yel brn, dl gn yel F, sl bl to bri bl wh C wh dk gy & pyrobit, sil cmtd, mod dol cmtd ip, f to m grnd ip, tr ig por; SS-lt gy, lt yel brn, a/a, n obs por;

SH-dk gy, sl dol cmtd, carb, mod slty;

SS-lt gy, lt yel brn, dl gn yel F ip, sl bl C, rrly m grnd, sil cmtd, mod dol cmtd ip, tr ig por, scat pyr;

SH-dk gy, sl dol cmtd, carb, mod slty;

SS-lt gy, lt yel brn, dl gn yel F ip, sl bl C, rrly m grnd, sil cmtd, mod dol cmtd ip, tr ig por, scat pyr; SH-m to dk gy, grdg to v arg slty ss ip; SS-m gy, sil cmtd, sl dol cmtd, n v por, mod slty, mod arg;

SS-lt yel brn, dl gn yel F, sl bl C, f to m grnd ip, sil cmtd, sl dol cmtd, rr' chty, tr ig por;

SLT-dk gy, n calc, vf grnd ip, sl dol cmtd, mod carb, v arg;

SH-dk gy, sl dol cmtd, carb, grdg to v arg slt;
SLT-dk gy, a/a, v arg;

SS-lt yel brn, dl gn yel F, sl bl C, sil cmtd, sl dol cmtd, f to m grnd ip, tr ig por;

SH-dk gy, sl dol cmtd, carb, grdg to v arg slt, mod slty;
SLT-dk gy, a/a, v arg;

SS-lt yel brn, lt gy, dl gn yel F ip/sl bl C, sil cmtd, v rr glau, tr pyrobit, occ carb shly lm, rr ig por; SH-dk gy, a/a, slty, mod carb;

SS-lt gy, lt yel brn, sil cmtd, tr shly lm, rrly pyrobit, occ thn interbds of v dol ss;
SH-dk gy, a/a;

SS-a/a;
SLT-dk gy, a/a;

SS-dk gy, m yel brn, n app F, sl bl C ip, v sil cmtd, mod arg, mod pyrobit, sl to mod dol, f to m grnd/tr por ip;

SS-a/a, scat ig por ip;

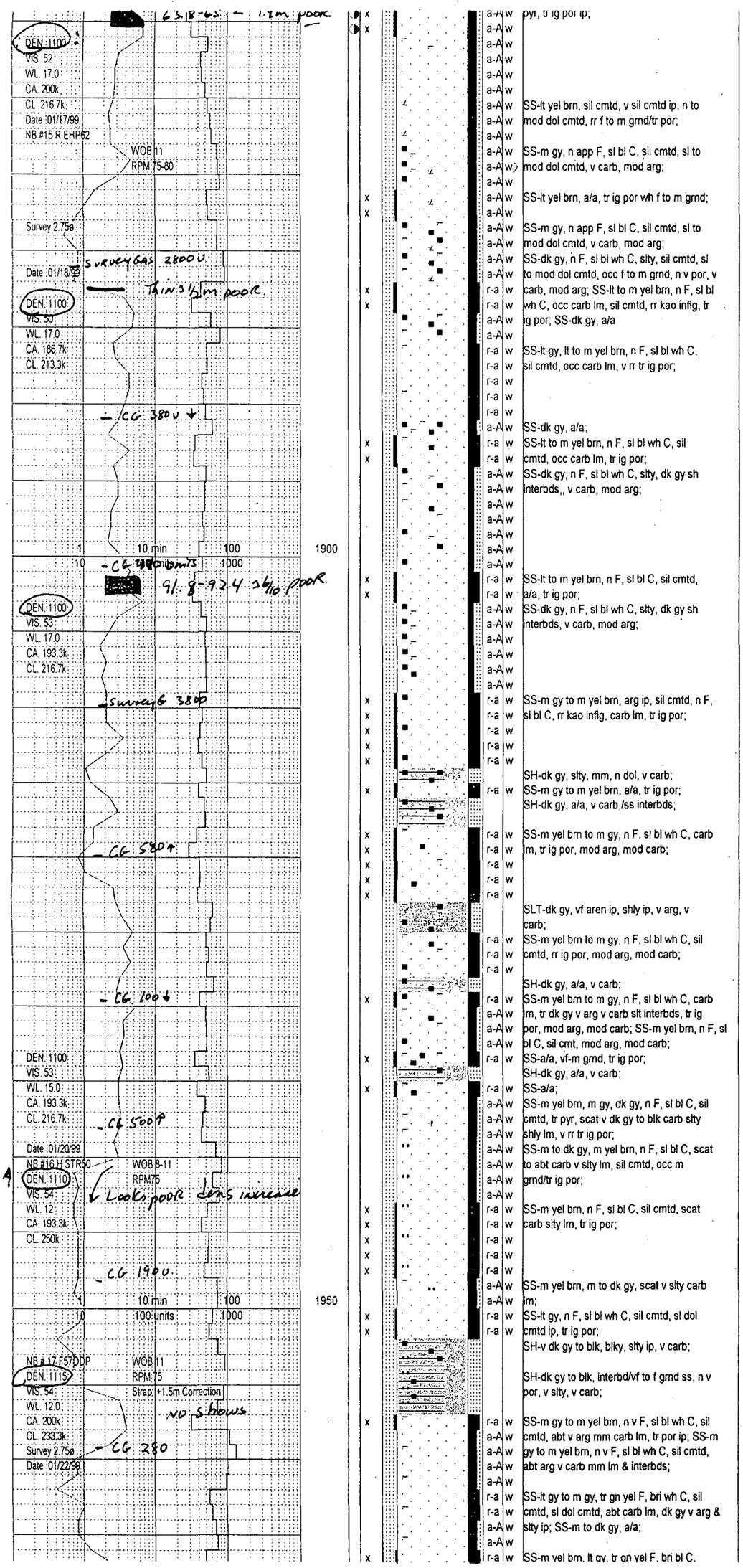
SS-dk gy, v sil & chty, n obs por, mod arg;

SS-lt gy, sil cmtd, a/a, n shws, n obs por;

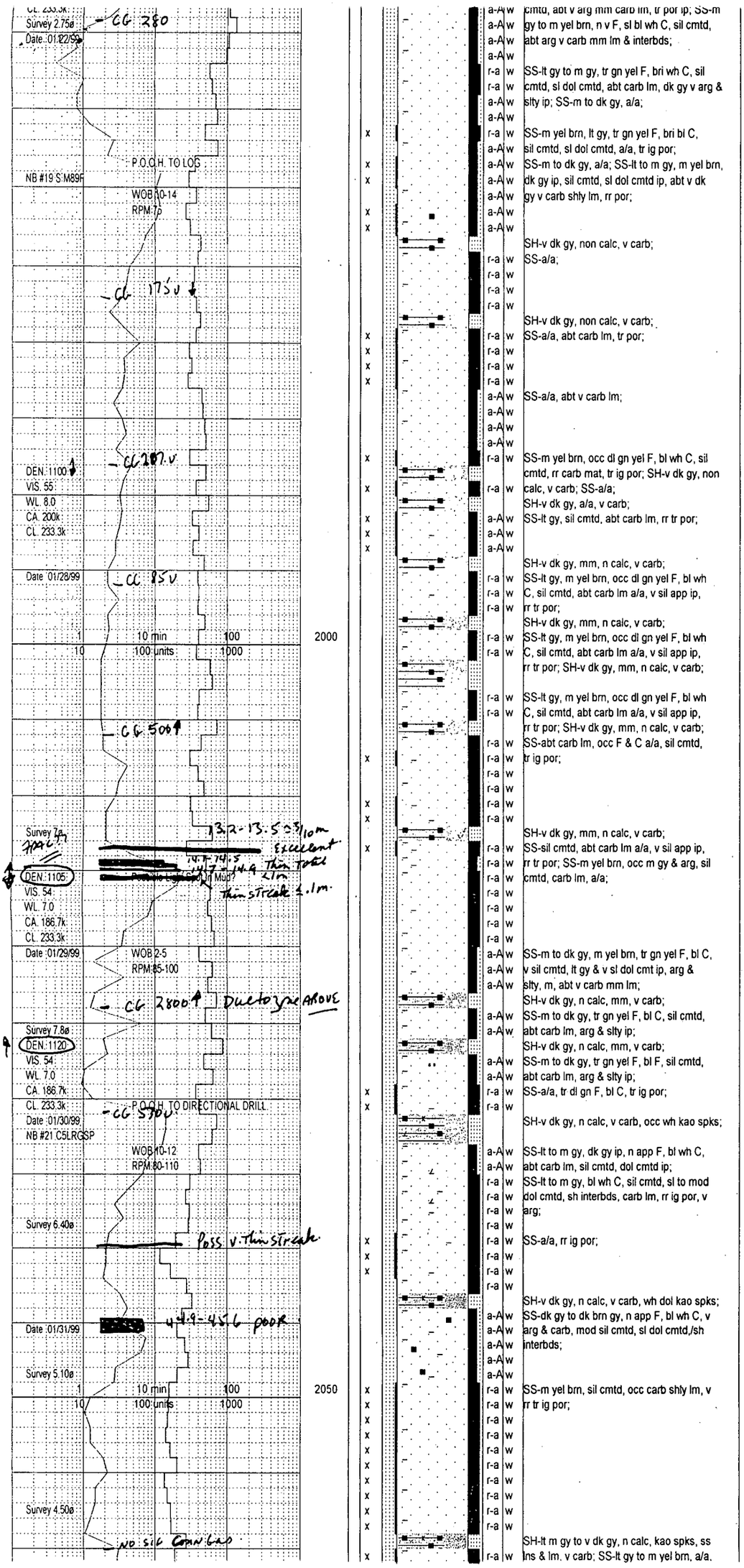
SH-dk gy, a/a;

SS-lt gy, lt yel brn, rrly m yel brn, dl gn yel F & bl wh C wh m yel brn, sil cmtd, tr pyr, tr ig por ip;

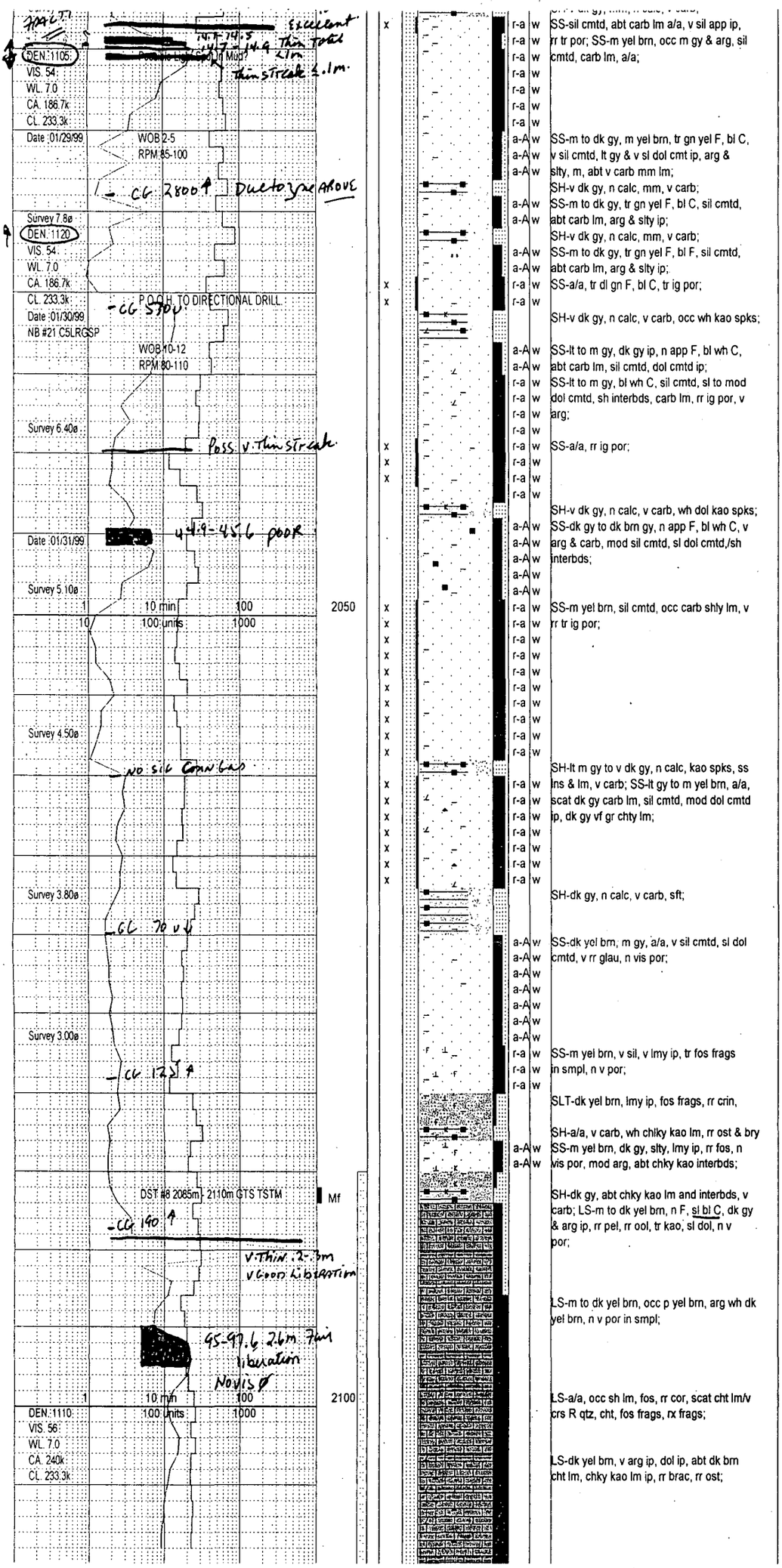
SS-lt yel brn, sil cmtd, v sil cmtd ip, n to mod dol cmtd, rr f to m grnd/tr por;



	x	a-A	w	pyr, tr ig por ip;
	x	a-A	w	
		a-A	w	
		a-A	w	
		a-A	w	
		a-A	w	
		a-A	w	SS-lt yel brn, sil cmtd, v sil cmtd ip, n to
		a-A	w	mod dol cmtd, rr f to m grnd/tr por;
		a-A	w	
		a-A	w	SS-m gy, n app F, sl bl C, sil cmtd, sl to
		a-A	w	mod dol cmtd, v carb, mod arg;
		a-A	w	
	x	a-A	w	SS-lt yel brn, a/a, tr ig por wh f to m grnd;
	x	a-A	w	
		a-A	w	SS-m gy, n app F, sl bl C, sil cmtd, sl to
		a-A	w	mod dol cmtd, v carb, mod arg;
		a-A	w	SS-dk gy, n F, sl bl wh C, slty, sil cmtd, sl
		a-A	w	to mod dol cmtd, occ f to m grnd, n v por, v
	x	r-a	w	carb, mod arg; SS-lt to m yel brn, n F, sl bl
	x	r-a	w	wh C, occ carb lm, sil cmtd, rr kao inflg, tr
		a-A	w	ig por; SS-dk gy, a/a
		a-A	w	
		r-a	w	SS-lt gy, lt to m yel brn, n F, sl bl wh C,
		r-a	w	sil cmtd, occ carb lm, v rr tr ig por;
		r-a	w	
		r-a	w	
		r-a	w	
		a-A	w	SS-dk gy, a/a;
	x	r-a	w	SS-lt to m yel brn, n F, sl bl wh C, sil
	x	r-a	w	cmtd, occ carb lm, tr ig por;
		a-A	w	SS-dk gy, n F, sl bl wh C, slty, dk gy sh
		a-A	w	interbds,, v carb, mod arg;
		a-A	w	
		a-A	w	
		a-A	w	
		a-A	w	
	x	r-a	w	SS-lt to m yel brn, n F, sl bl C, sil cmtd,
	x	r-a	w	a/a, tr ig por;
		a-A	w	SS-dk gy, n F, sl bl wh C, slty, dk gy sh
		a-A	w	interbds, v carb, mod arg;
		a-A	w	
		a-A	w	
		a-A	w	
		a-A	w	
	x	r-a	w	SS-m gy to m yel brn, arg ip, sil cmtd, n F,
	x	r-a	w	sl bl C, rr kao inflg, carb lm, tr ig por;
	x	r-a	w	
	x	r-a	w	
	x	r-a	w	
				SH-dk gy, slty, mm, n dol, v carb;
	x	r-a	w	SS-m gy to m yel brn, a/a, tr ig por;
				SH-dk gy, a/a, v carb,/ss interbds;
	x	r-a	w	SS-m yel brn to m gy, n F, sl bl wh C, carb
	x	r-a	w	lm, tr ig por, mod arg, mod carb;
	x	r-a	w	
	x	r-a	w	
	x	r-a	w	
				SLT-dk gy, vf aren ip, shly ip, v arg, v carb;
		r-a	w	SS-m yel brn to m gy, n F, sl bl wh C, sil
		r-a	w	cmtd, rr ig por, mod arg, mod carb;
		r-a	w	
				SH-dk gy, a/a, v carb;
	x	r-a	w	SS-m yel brn to m gy, n F, sl bl wh C, carb
		a-A	w	lm, tr dk gy v arg v carb slt interbds, tr ig
		a-A	w	por, mod arg, mod carb; SS-m yel brn, n F, sl
		a-A	w	bl C, sil cmt, mod arg, mod carb;
	x	r-a	w	SS-a/a, vf-m grnd, tr ig por;
				SH-dk gy, a/a, v carb;
	x	r-a	w	SS-a/a;
		a-A	w	SS-m yel brn, m gy, dk gy, n F, sl bl C, sil
		a-A	w	cmtd, tr pyr, scat v dk gy to blk carb slty
		a-A	w	shly lm, v rr tr ig por;
		a-A	w	SS-m to dk gy, m yel brn, n F, sl bl C, scat
		a-A	w	to abt carb v slty lm, sil cmtd, occ m
		a-A	w	grnd/tr ig por;
		a-A	w	
	x	r-a	w	SS-m yel brn, n F, sl bl C, sil cmtd, scat
	x	r-a	w	carb slty lm, tr ig por;
	x	r-a	w	
	x	r-a	w	
	x	r-a	w	
		a-A	w	SS-m yel brn, m to dk gy, scat v slty carb
		a-A	w	lm;
	x	r-a	w	SS-lt gy, n F, sl bl wh C, sil cmtd, sl dol
	x	r-a	w	cmtd ip, tr ig por;
				SH-v dk gy to blk, blky, slty ip, v carb;
				SH-dk gy to blk, interbd/vf to f grnd ss, n v por, v slty, v carb;
	x	r-a	w	SS-m gy to m yel brn, n v F, sl bl wh C, sil
		a-A	w	cmtd, abt v arg mm carb lm, tr por ip; SS-m
		a-A	w	gy to m yel brn, n v F, sl bl wh C, sil cmtd,
		a-A	w	abt arg v carb mm lm & interbds;
		a-A	w	
		r-a	w	SS-lt gy to m gy, tr gn yel F, bri wh C, sil
		r-a	w	cmtd, sl dol cmtd, abt carb lm, dk gy v arg &
		a-A	w	slty ip; SS-m to dk gy, a/a;
		a-A	w	
	x	r-a	w	SS-m yel brn, lt gy, tr gn yel F, bri bl C,



		a-A	w	cmtd, abt v arg mm carb lm, tr por ip; SS-m
		a-A	w	gy to m yel brn, n v F, sl bl wh C, sil cmtd,
		a-A	w	abt arg v carb mm lm & interbds;
		a-A	w	
		r-a	w	SS-lt gy to m gy, tr gn yel F, bri wh C, sil
		r-a	w	cmtd, sl dol cmtd, abt carb lm, dk gy v arg &
		a-A	w	slty ip; SS-m to dk gy, a/a;
		a-A	w	
x		r-a	w	SS-m yel brn, lt gy, tr gn yel F, bri bl C,
		a-A	w	sil cmtd, sl dol cmtd, a/a, tr ig por;
x		a-A	w	SS-m to dk gy, a/a; SS-lt to m gy, m yel brn,
x		a-A	w	dk gy ip, sil cmtd, sl dol cmtd ip, abt v dk
		a-A	w	gy v carb shly lm, rr por;
x		a-A	w	
x		a-A	w	
				SH-v dk gy, non calc, v carb;
		r-a	w	SS-a/a;
		r-a	w	
		r-a	w	
		r-a	w	
				SH-v dk gy, non calc, v carb;
x		r-a	w	SS-a/a, abt carb lm, tr por;
x		r-a	w	
x		r-a	w	
x		r-a	w	
		a-A	w	SS-a/a, abt v carb lm;
		a-A	w	
		a-A	w	
		a-A	w	
x		r-a	w	SS-m yel brn, occ dl gn yel F, bl wh C, sil
				cmtd, rr carb mat, tr ig por; SH-v dk gy, non
x		r-a	w	calc, v carb; SS-a/a;
				SH-v dk gy, a/a, v carb;
x		a-A	w	SS-lt gy, sil cmtd, abt carb lm, rr tr por;
x		a-A	w	
x		a-A	w	
				SH-v dk gy, mm, n calc, v carb;
		r-a	w	SS-lt gy, m yel brn, occ dl gn yel F, bl wh
		r-a	w	C, sil cmtd, abt carb lm a/a, v sil app ip,
		r-a	w	rr tr por;
				SH-v dk gy, mm, n calc, v carb;
		r-a	w	SS-lt gy, m yel brn, occ dl gn yel F, bl wh
		r-a	w	C, sil cmtd, abt carb lm a/a, v sil app ip,
				rr tr por; SH-v dk gy, mm, n calc, v carb;
		r-a	w	SS-lt gy, m yel brn, occ dl gn yel F, bl wh
		r-a	w	C, sil cmtd, abt carb lm a/a, v sil app ip,
				rr tr por; SH-v dk gy, mm, n calc, v carb;
		r-a	w	SS-abt carb lm, occ F & C a/a, sil cmtd,
x		r-a	w	tr ig por;
		r-a	w	
		r-a	w	
x		r-a	w	
x		r-a	w	
				SH-v dk gy, mm, n calc, v carb;
x		r-a	w	SS-sil cmtd, abt carb lm a/a, v sil app ip,
		r-a	w	rr tr por; SS-m yel brn, occ m gy & arg, sil
		r-a	w	cmtd, carb lm, a/a;
		r-a	w	
		r-a	w	
		r-a	w	
		r-a	w	
		a-A	w	SS-m to dk gy, m yel brn, tr gn yel F, bl C,
		a-A	w	v sil cmtd, lt gy & v sl dol cmt ip, arg &
		a-A	w	slty, m, abt v carb mm lm;
				SH-v dk gy, n calc, mm, v carb;
		a-A	w	SS-m to dk gy, tr gn yel F, bl C, sil cmtd,
		a-A	w	abt carb lm, arg & slty ip;
				SH-v dk gy, n calc, mm, v carb;
		a-A	w	SS-m to dk gy, tr gn yel F, bl F, sil cmtd,
		a-A	w	abt carb lm, arg & slty ip;
x		r-a	w	SS-a/a, tr dl gn F, bl C, tr ig por;
x		r-a	w	
				SH-v dk gy, n calc, v carb, occ wh kao spks;
		a-A	w	SS-lt to m gy, dk gy ip, n app F, bl wh C,
		a-A	w	abt carb lm, sil cmtd, dol cmtd ip;
		r-a	w	SS-lt to m gy, bl wh C, sil cmtd, sl to mod
		r-a	w	dol cmtd, sh interbds, carb lm, rr ig por, v
		r-a	w	arg;
		r-a	w	
x		r-a	w	SS-a/a, rr ig por;
x		r-a	w	
x		r-a	w	
		r-a	w	
				SH-v dk gy, n calc, v carb, wh dol kao spks;
		a-A	w	SS-dk gy to dk brn gy, n app F, bl wh C, v
		a-A	w	arg & carb, mod sil cmtd, sl dol cmtd,/sh
		a-A	w	interbds;
		a-A	w	
		a-A	w	
x		r-a	w	SS-m yel brn, sil cmtd, occ carb shly lm, v
x		r-a	w	rr tr ig por;
x		r-a	w	
x		r-a	w	
x		r-a	w	
x		r-a	w	
x		r-a	w	
x		r-a	w	
x		r-a	w	
x		r-a	w	
				SH-lt m gy to v dk gy, n calc, kao spks, ss
x		r-a	w	lns & lm, v carb; SS-lt gy to m yel brn, a/a,



		r-a	w		SS-sil cmtd, abt carb lm a/a, v sil app ip,
		r-a	w		rr tr por; SS-m yel brn, occ m gy & arg, sil
		r-a	w		cmtd, carb lm, a/a;
		r-a	w		
		r-a	w		
		r-a	w		
		r-a	w		
		a-A	w		SS-m to dk gy, m yel brn, tr gn yel F, bl C,
		a-A	w		v sil cmtd, lt gy & v sl dol cmt ip, arg &
		a-A	w		slty, m, abt v carb mm lm;
					SH-v dk gy, n calc, mm, v carb;
		a-A	w		SS-m to dk gy, tr gn yel F, bl C, sil cmtd,
		a-A	w		abt carb lm, arg & slty ip;
					SH-v dk gy, n calc, mm, v carb;
		a-A	w		SS-m to dk gy, tr gn yel F, bl F, sil cmtd,
		a-A	w		abt carb lm, arg & slty ip;
	x	r-a	w		SS-a/a, tr dl gn F, bl C, tr ig por;
	x	r-a	w		
					SH-v dk gy, n calc, v carb, occ wh kao spks;
		a-A	w		SS-lt to m gy, dk gy ip, n app F, bl wh C,
		a-A	w		abt carb lm, sil cmtd, dol cmtd ip;
		r-a	w		SS-lt to m gy, bl wh C, sil cmtd, sl to mod
		r-a	w		dol cmtd, sh interbds, carb lm, rr ig por, v
		r-a	w		arg;
		r-a	w		
	x	r-a	w		SS-a/a, rr ig por;
	x	r-a	w		
	x	r-a	w		
		r-a	w		
					SH-v dk gy, n calc, v carb, wh dol kao spks;
		a-A	w		SS-dk gy to dk brn gy, n app F, bl wh C, v
		a-A	w		arg & carb, mod sil cmtd, sl dol cmtd,/sh
		a-A	w		interbds;
		a-A	w		
		a-A	w		
	x	r-a	w		SS-m yel brn, sil cmtd, occ carb shly lm, v
	x	r-a	w		rr tr ig por;
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
					SH-lt m gy to v dk gy, n calc, kao spks, ss
	x	r-a	w		ins & lm, v carb; SS-lt gy to m yel brn, a/a,
	x	r-a	w		scat dk gy carb lm, sil cmtd, mod dol cmtd
	x	r-a	w		ip, dk gy vf gr chty lm;
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
	x	r-a	w		
					SH-dk gy, n calc, v carb, sft;
		a-A	w		SS-dk yel brn, m gy, a/a, v sil cmtd, sl dol
		a-A	w		cmtd, v rr glau, n vis por;
		a-A	w		
		a-A	w		
		a-A	w		
		a-A	w		
		a-A	w		
		r-a	w		SS-m yel brn, v sil, v lmy ip, tr fos frags
		r-a	w		in smpl, n v por;
		r-a	w		
					SLT-dk yel brn, lmy ip, fos frags, rr crin,
					SH-a/a, v carb, wh chky kao lm, rr ost & bry
		a-A	w		SS-m yel brn, dk gy, slty, lmy ip, rr fos, n
		a-A	w		vis por, mod arg, abt chky kao interbds;
					SH-dk gy, abt chky kao lm and interbds, v
					carb; LS-m to dk yel brn, n F, sl bl C, dk gy
					& arg ip, rr pel, rr ool, tr kao, sl dol, n v
					por;
					LS-m to dk yel brn, occ p yel brn, arg wh dk
					yel brn, n v por in smpl;
					LS-a/a, occ sh lm, fos, rr cor, scat cht lm/v
					crs R qtz, cht, fos frags, rx frags;
					LS-dk yel brn, v arg ip, dol ip, abt dk brn
					cht lm, chky kao lm ip, rr brac, rr ost;