

AUTHORITY TO
DRILL A WELL



Exploratory XXXXXXXX
Development

Delineation
Service

AUTHORITY TO DRILL A WELL

APPLICATION

This application is submitted with Section 82 of the Canada Oil and Gas Drilling Regulations. When approved under Section 83 of the Regulations, it is the requisite authority for the commencement of drilling operations.

Well Name in Full: ... IMP MURPHY DISCOVERY RIDGE D-04
Operator: ... IMPERIAL OIL RESOURCES Drilling Program No.: ... 9251-2-23-J1
Contractor: ... SHENTAH DRILLING Permit or Lease No.: ... Exploration License No. 388
Drilling Rig or Unit: ... Rig. #1. Estimated Well Cost: ... 2058. KS
Location-Unit: ... D Section: ... 04 Grid Area: ... 65° 30' .. 126° 45'
Coordinates: Lat.: ... 65° 23' 12.637" Long.: ... 126° 46' 46.778"
Area: ... Field/Pool: ...
Elevation-RT/KB: ... 466.43 m Seafloor: ... N/A ... (BRT)
Approx. Spud Date: ... 1998.01.15 Estimated Days on Location: ... 19 Days
Anticipated Total Depth: ... 760 mKB Target Horizon(s) ... Kee Scarp

EVALUATION PROGRAM

Ten-metre sample intervals ... N/A
Five-metre sample intervals ... Kee Scarp
Canned sample intervals ... N/A
Conventional cores at ... Possible core of Kee Scarp after DST
Logs and Tests ... 222 mm Open Hole Logs. GR-CAL-CNL-LDT-DLL. PISFL-BIICS
DST of Kee Scarp

CASING AND CEMENTING PROGRAM

| OD | Weight: | Grade: | Setting Depth | Below Seafloor: | Cementing Program (Volumes) |
|----------|-----------|-----------|---------------|-----------------|---------------------------------|
| 244.5 mm | 53.6 kg/m | K-55 LT&C | 150 mKB | | Cement to Surface - Gauge + 60% |
| 177.8 mm | 34.2 kg/m | K-55 LT&C | 760 mKB | | Cement to Surface, Caliper +20% |

BOP Equipment: ... Per DPA File: 9251-2-23-J1

Other Information: ...

Signed: ... *John Baker* ... Title: Drilling & Completions Technical Leader
Date: ... 1998.11.13 ... Company: Imperial Oil Resources

APPROVAL

An approved copy of this notice is to be posted at each wellsite

Signed: ... *John Baker* ...
Chief Conservation Officer
Date: ... Nov. 23/98 ...
File: ... 9211-J1-2-2, WID 1837 ...
UWI 300D046530126450

Canada

**WELL
TERMINATION
RECORD (with
attachment)**



WELL TERMINATION RECORD

This record is submitted in triplicate in compliance with Section 184 of the Canada Oil and Gas Drilling Regulations

WELL DATA

Well Name: Imp Murphy Discovery Ridge D-04 Area: Norman Wells
Grid Area: 65° 30' 126° 45' Field/Pool: _____
Lease No.: Ex-License# 388 Final Coordinates: Lat: 65° 23' 12.637" Long: 126° 46' 46.778"
Drilling Unit: Shehtah 1 Elevations-RT/KB: 466.43 8F/GI: 461.93
Rig Data: 1999 01 14 Rig Released: 1999 01 24 Total Depth: 520 m

CASING AND CEMENTING

| I.D. | Weight: | Grade: | Depth Set: | Cement and Additives: |
|--------|-----------|--------|------------|-------------------------|
| 340 mm | 81.1 kg/m | H-40 | 29 mKB | 10 tonnes Arctic Set II |
| 244 mm | 53.6 kg/m | J-55 | 200.5 mKB | 20 tonnes Arctic Set II |
| | | | | |
| | | | | |

PLUGGING PROGRAM

Approval of the following program was obtained by (person) John Evans from
(person) Andrew Graw by means of
telephone & fax on January 22 1999

| Type of Plug: | Interval: | Felt: | Cement and Additives: |
|---------------|-----------|---|-----------------------------|
| Abandonment | 520-350 m | Reverse circulated at 348 m - good cement returns | 10.5 t Class G + 0.5% CaCl2 |
| Abandonment | 350-150 m | Tag @ 151 m with drillpipe | 12.6 t Class G + 0.5% CaCl2 |
| | | | |
| | | | |

lost Circulation/Overpressure Zones: None

Equipment left on Seafloor (Describe): N/A

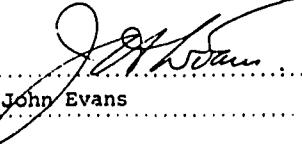
Revision for Re-entry (Describe and attach sketch): N/A

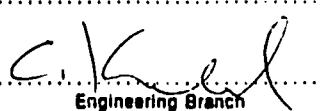
cores: Type: Intervals: N/A

Other Downhole Completion/Suspension Equipment: N/A

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

Signed:  P. Eng. Title: Drilling Engineer
Name: John Evans Date: 1999 02 19

Acknowledged by: 
Engineering Branch

Date: Feb. 24/99

File: 9211-31-2-1

WID #1837

UWI: 300D046530126450

Well Status
Suspended
Completed
Abandoned

Canada

IMP MURPHY DISCOVERY RIDGE D-4

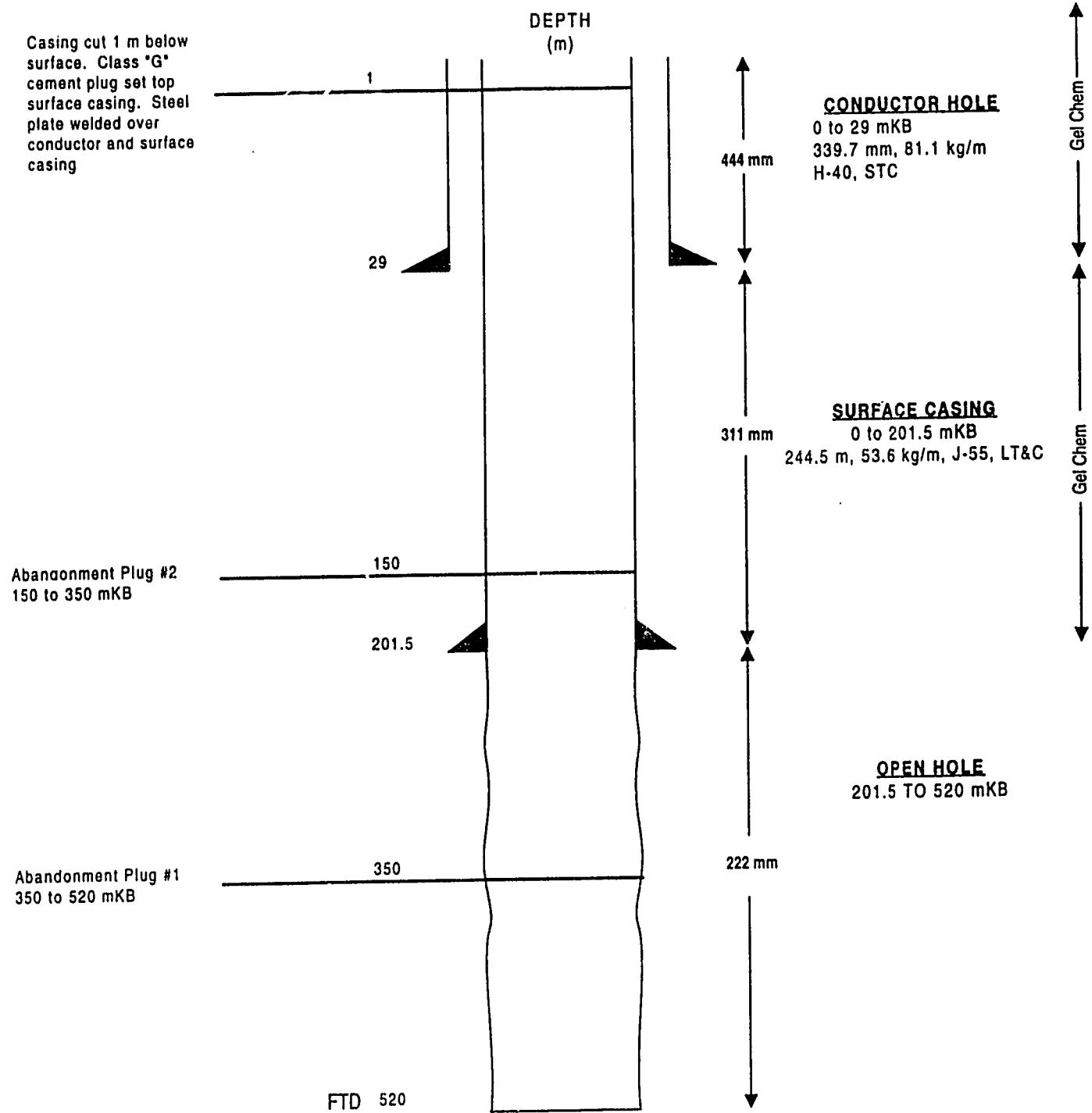
Drilling Eng John Evans
 Location Imp Murphy Discovery Ridge D-4
 License # WID # 1837
 ICIS Code P15718

TIGHT HOLE

Est. Ground Level Elev. 461.93 m
 Estimated KB Elevation 467.33 m
 Rig: Shehtah 1

WELLHEAD
 244 mm X 279 mm CASING
 BOWL 21,000 kPa

CASING MUD



FINAL WELL REPORT

N.E.B. COPY

FINAL WELL REPORT

IMPERIAL OIL RESOURCES

IMP MURPHY DISCOVERY RIDGE D-04

Grid # 65° 23' 126° 46'

DATE: September 15, 1999

COMPANY REPRESENTATIVE: BRETT REGIER

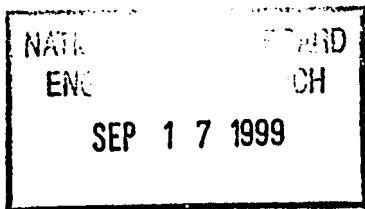


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IMP MURPHY DISCOVERY RIDGE D-4

Drilling Eng John Evans
Location Imp Murphy Discovery Ridge D-4
License # WID # 1837
ICIS Code P15718

TIGHT HOLE

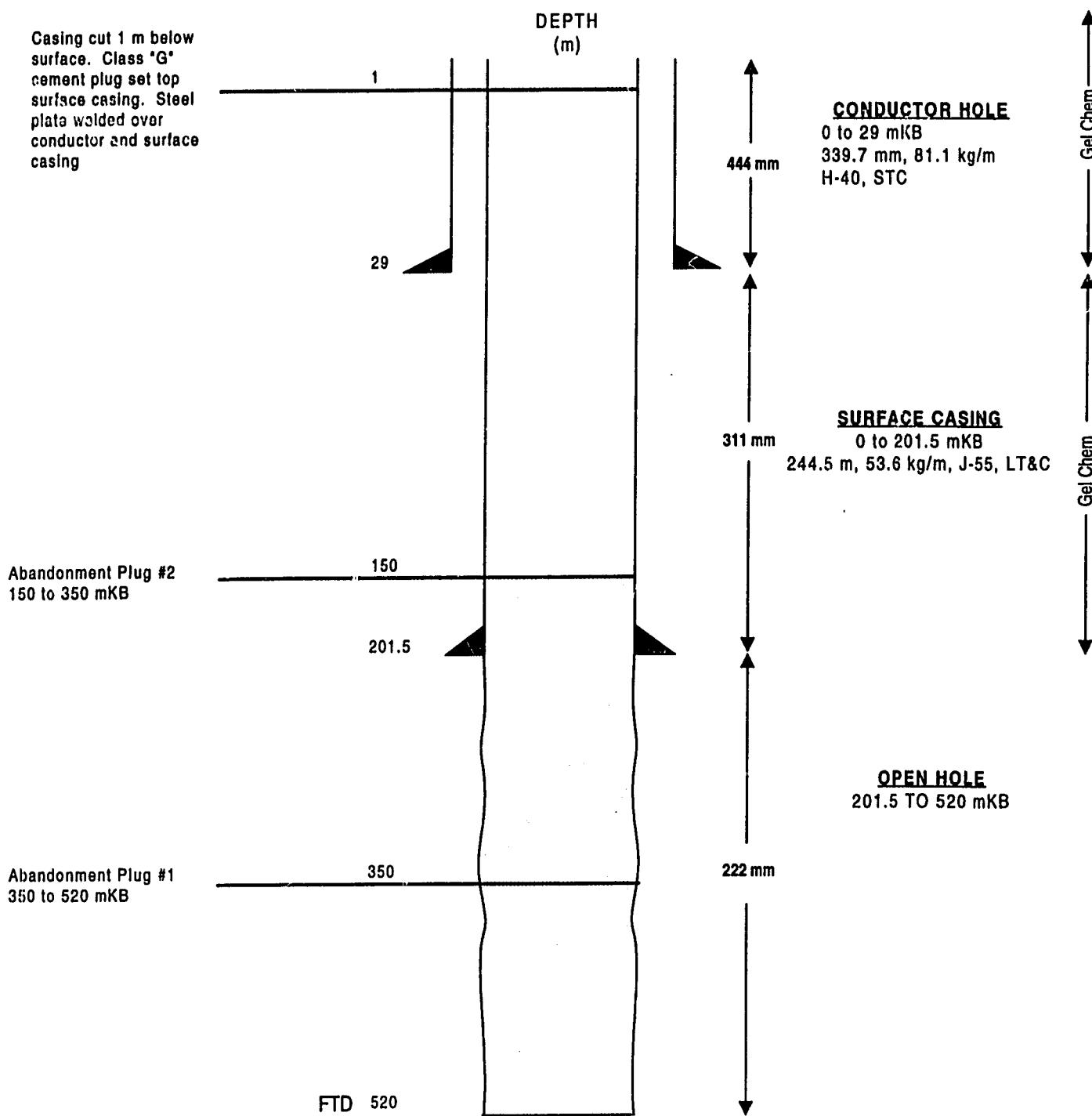
Est. Ground Level Elev.
Estimated KB Elevation
Rig:

461.93 m
467.33 m
Shehtah 1

**WELLHEAD
244 mm X 279 mm CASING
BOWL 21,000 kPa**

CASING MUD

Casing cut 1 m below surface. Class "G" cement plug set top surface casing. Steel plate welded over conductor and surface casing



A. INTRODUCTION

Imperial Oil Resources (IOL) drilled a 520 metre exploratory well spudded on January 14, 1999 and finishing on January 24, 1999 to test the Felix Lake anomaly in the Kee Scarp formation at a depth of 437 mKB.

The drilling contractor was Shehtah Drilling based out of Calgary, Alberta. The drilling rig used was a Diesel Electric land rig rated for 2800 m. The rig had a 47.7 m³ mud system and was equipped with two boilers.

The well was drilled on Exploration License No 388 in which (IOL) have a 50 % working interest. Operating License No.1837 was issued to (IOL) on November 23, 1998.

The well, which was located approximately 12 km north of the Norman Wells townsite, lies on the eastern flank of the Mackenzie Plains along the southwestern margin of the Franklin Mountain disturbed belt. The exact co-ordinates of the well are as follows:

Latitude: 65° 23' 12.637"
Longitude: 126° 46' 46.778"

The rig was moved onto the location January 6, 1999 and the well spudded on January 14, 1999 at 09:00 hours to drill the 222 mm conductor hole to a depth of 29 m and then opened to 444 mm. While drilling the conductor hole, boulders were encountered which required drilling mud to clean the hole. The 339.7 mm X 81.1 kg/m X H-40 ST&C conductor pipe was set with the shoe depth being at 29 m. The conductor pipe was cemented with good mud returns throughout the cement job and 0.5 m³ returns of cement. The diverter was nippled up and functioned tested with the HCR.

The conductor shoe was then drilled out and the 311 mm surface hole was drilled ahead to 201.5 m. The 244.5 mm surface casing was run without any problems and consisted of 15 joints of 53.5 kg/m J-55 LTC. The casing was cemented with 18 tonnes Arctic Set II + 12% BWOW D44 + .5% D65 + .75% B71.

There was good mud returns reported throughout the cement job with 5 m³ cement returns. The plug was down at 22:05 hours on 99 01 17. The surface casing was set at 200.48 m.

The BOP's were installed and pressure tested. The blind rams, manifold valves, chokes, kill line valves, casing bowl, annular BOP, pipe rams, stabbing valve, and HCR valve were all pressure tested to 1400 kpa low and 10,500 kpa high for 10 min. each. The accumulator precharge bottles were checked and the accumulator function tested prior to drilling out.

The float collar and shoe were drilled out on January 19, 1999. A formation integrity test was done with a result of 2300 kg/m³ EQ mud density. The 222 mm main hole was drilled ahead to a total depth of 520 m in the Hare Indian formation.

After total depth had been reached the open hole was logged by Schlumberger. The following logs were run in 3 passes from 520 to 201m; CNL-LDT-NGT-GR, DLL-GR-Cal and DS1-GR. 21 unsuccessful attempts to obtain formation pressures were made with the MDT tool (tight formations).

After the logs were evaluated it was decided to abandon the well and cement plugs were run. Plug # 1 was run from 520 m to 350 m using 10.5 tonnes of 10:1:0 Class "G" cement + .5 % CaCl_2 . The drill pipe was pulled up to 348 m to run plug # 2. Plug # 2 was run from 350 m to 150 m using 12.6 tonnes 0:1:0 Class "G" cement + .5 % CaCl_2 . The second plug was tagged at 151 m. The rig was then rigged out and released at 01:00 hours on 99 01 24.

Casing was cut off 1m below surface and a 10m accelerated class "G" cement plug was set in the top of the surface casing. A steel plate was welded over both conductor and surface casing. A surface marker was installed and site cleaned up

B. GENERAL DATA

1. Well Name: Imp Discovery Ridge D-04

Authority to Drill a Well No: 1837

Exploration Agreement Number: 388

Location Unit: D

Section: 04

Grid Area: 65° 23' 126° 46'

Classification: Exploratory

2. Well Location:
Coordinates: Latitude: 65° 23' 126.37"
Longitude: 126° 46' 46.788"

3. Unique Well Identifier: 300D046530126450

4. Operator: Imperial Oil Resources

5. Contractor: Shehtah Drilling

6. Drilling Unit: Rig #1
Diesel Electric, Land Rig
7. Position Keeping: Not Applicable, Land Rig
8. Total Well Cost: 1596 K\$

C. SUMMARY OF DRILLING OPERATIONS

1. Elevations:
Ground: 461.93 (m above sea level)
KB: 467.3 (m above sea level)
KB To Casing Flange: 4.5 (KB to CF)
2. Total Depth:
FTD: 520 mKB
PBTD: 520 mKB
TVD: 520 mKB
3. Date and Hour Spudded: 1999 01 14 09:00
4. Date Drilling Completed: 1999 01 21
5. Date of Rig Release: 1999 01 24
6. Well status: Dry and Abandoned
7. Hole Sizes and Depths:
Conductor Hole: 444 mm to 29 mKB
Surface Hole: 311 mm to 201.5 mKB
Main Hole: 222 mm to 520 mKB
8. Casing and Cementing Record:
Conductor Hole:
Casing Size: 339.7 mm
Casing Weight: 81.1 kg/m
Casing Grade: H-40
Casing Make: Ipsco
Number of Joints: 10
Thread: ST&C
Depth Set: 29 m (KB)
Cut off Depth: 1 m below surface casing during abandonment
Date Set: January 15, 1999
Cement Volume: 7.8 m³
Cement Type: Arctic Set II

Additives: 12% Suppressant
0.5% D65
0.75% B71

Surface Hole:

Casing Size: 244.5 mm
Casing Weight: 53.6 kg/m
Casing Grade: K-55
Casing Make: Ipsco
Number of Joints: 14
Thread: LT&C
Depth Set: 200.48 m (KB)
Date Set: January 17, 1999
Cement Volume: 15 m³
Float Shoe Depth: 199.96 m
Float Collar Depth: 186.83 m
Cut Off Depth: 1 m below surface during abandonment
Cement Type: Arctic Set II
Additives: 12% Suppressant
0.5% D65
0.75% B71
Cement Top: Surface (mKB)
Casing Bowl Size: 279 mm X 244.5 mm X 21 kpa
Casing Bowl Make: CC-29

9. Drilling Fluid:

Conductor Hole: Gel - Chemical
Properties: Viscosity: 59 sec/L
Weight: 1120 kg/m³
Solids: 0.72
Gels: 9 / 13
PV / YP: 19 / 11

Surface Hole: Gel - Chemical
Properties: Viscosity: 40 sec/L
Weight: 1210 kg/m³
PH: 8.5
Solids: 0.18
Gels: 5.5 / 22
Filter Cake: 2
PV / YP: 12 / 3

Main: Gel - Chemical
Properties: Viscosity: 39 sec/L
Weight: 1135 kg/m³
PH: 7.0

Water loss: 7.6 cc
 Solids: 0.36
 Gels: 2 / 3.5
 Filter Cake: 1
 PV / YP: 12 / 2

10. Formation Leak Off Tests:

Depth: 206 m
 Fluid Density: 1020 kg/m³
 Applied Pressure: 2500 kPa
 Mud Weight Equi. 2300 kg/m³
 Casing Setting Depth: 200.48 mKB

11. Time Distribution

| Date | Time | Activity |
|------------|-------|---|
| 1999/01/14 | 0:00 | 9:00 Rig up and prepare rig for spud: Work on kelly spinner installation, complete mixing of mud, prepare shakers, rig up escape line. Work on mud pumps |
| | 9:00 | 10:45 Spud in and drill 222mm pilot hole as planned to depth 15m. *NEB notified of spud 09:00* |
| | 10:45 | 11:00 Rig service. Check and tighten swivel and kelly quill connection as required. |
| | 11:00 | 13:00 Drill ahead 444mm conductor hole as planned to depth 15m. The drilling to this depth was mostly trouble free, with one hard spot at approx. 10m. |
| | 13:00 | 17:00 Change bit size and drill mousehole as required using 222mm bit. |
| | 17:00 | 17:45 Drill ahead 444mm conductor hole from depth 15 - 24m [9m] This section drilled quite good, with no rough areas. |
| | 17:45 | 18:00 Rig service. Repair swivel washpipe. |
| | 18:00 | 18:30 Work on mousehole installation. The mousehole sleeve had to be pounded into place using the kelly. |
| | 18:30 | 20:30 Drill ahead 444mm conductor hole from depth 24 - 29m [5m] Smooth drilling was encountered to 29m. |
| | 20:30 | 20:45 Circulate and work hole clean - No problems. |
| | 20:45 | 21:30 Blow kelly - Rack same - Install elevator bails and elevators as required. |
| | 21:30 | 22:30 Lay out 171mm drill collars and BHA |
| | 22:30 | 0:00 Rig to and run 339mm conductor casing: Clean up floor area prior to running casing. Pre job meeting held with personnel. |
| 1999/01/15 | 0:00 | 0:15 Pre job safety meeting: Running 339mm casing |
| | 0:15 | 2:30 Run conductor casing as described: Run 10 joints of 339.7mm 81.1 kg/m H-40 STC for a total length of 30.3m, to be set at depth 29m. Washover shoe was installed on the bottom |
| | 2:30 | 3:15 Circulate casing and thin mud back to lighter viscosity of approx. 28-35. |
| | 3:15 | 3:30 Pre job safety meeting: Cement conductor csg. |
| | 3:30 | 6:00 Cement 339mm conductor casing as described: Pump 3m ³ water ahead, mix and pump 10 tonnes of Arctic Set II to obtain cement returns to surface - Displace 2m ³ with water and hold pressure on casing. Cement held at surface as required. |
| | 6:00 | 10:00 Wait on cement samples as required |
| | 10:00 | 13:00 Cut conductor landing joint and lay down same. Cut and dress casing, weld 356mm x 339mm diverter flange in place - Allow to cool as reqd. |
| | 13:00 | 16:00 Nipple up 356mm diverter system |

| | | | |
|------------|-------|-------|---|
| | 16:00 | 19:00 | Redrill mousehole due to conductor cement job: The cement was quite hard to drill down. |
| | 19:00 | 0:00 | Nipple up 356mm diverter system: Complete the installation of the diverter components. Lay out and secure the blooey line. Visually inspect the function of the diverter and associated blooey valve. |
| 1999/01/16 | 0:00 | 2:45 | Complete nipple up of diverter system, and all associated equipment. Prepare mud system for water drilling, with standby mud premix. |
| | 2:45 | 4:30 | Make up 311mm BHA and trip in to 25m |
| | 4:30 | 4:45 | Rig service. Fct. diverter & blooey valve: Imperial rep. witness function test. |
| | 4:45 | 5:45 | Pick up 229mm drill collar & tag cement in conductor casing at depth 27.9m. |
| | 5:45 | 6:15 | Drill 311mm surface hole from depths 28 - 34m [5m] - Cement returns were routed to slug tank for isolation. |
| | 6:15 | 6:30 | Displace cement drilling water over to the main system for drilling surface hole. Discard cement water as required. |
| | 6:30 | 6:45 | Rig repair: Change swivel washpipe unit. |
| | 6:45 | 11:45 | Drill ahead 311mm surface hole from depths: 34 - 62m [28m] 10:15-11:15 [1.0hr] was spent unplugging the rig flow line due to sticky cuttings [partial mud ring]. |
| | 11:45 | 12:00 | Survey at depth 30m [.25 degs] Totco survey |
| | 12:00 | 14:00 | Drill ahead 311mm hole from depth 62 - 92m |
| | 14:00 | 14:15 | Rig service. Fct. diverter and blooey valve |
| | 14:15 | 19:00 | Drill ahead 311mm hole from depth 92 - 175m: This was picked as wiper trip depth, with final surface depth goint to be approx. 201m. |
| | 19:00 | 20:00 | Accumulated connection and survey time for totco wireline surveys. |
| | 20:00 | 20:15 | Circulate and condition hole for wiper trip. |
| | 20:15 | 0:00 | Down for rig repair: Work on SCR unit - Lost drawworks blower assignment. The well could be circulated but not hoisted or rotated. |
| 1999/01/17 | 0:00 | 2:00 | Shut down for rig repairs: SCR repairs were required - Drawworks blower assignment was not functioning. Well was circulated throughout process. |
| | 2:00 | 4:45 | Trip out as planned for wiper trip [Strap pipe]: The hole was quite tight throughout the trip, with a large mud ring being attached to the lower drill collars. |
| | 4:45 | 5:15 | Clean off mud ring material from the 229mm drill collars as required. |
| | 5:15 | 6:15 | Trip back in the hole to depth 175m [No problem encountered on trip back in] |
| | 6:15 | 9:15 | Clean surface equipment of large amount of mud ring material - The surface flow line was plugged solid, which required total rig out to clean. |
| | 9:15 | 10:15 | Drill ahead 311mm hole from depth: 176 - 185m [9m] |
| | 10:15 | 10:30 | Rig service. Fct. annular diverter. |
| | 10:30 | 11:30 | Drill ahead 311mm hole from depth: 185-201.5m [16.5m]-Surface section TD |
| | 11:30 | 12:45 | Circ. & condition hole for surface casing run - Work pipe & clean the hole. |
| | 12:45 | 14:15 | Trip out as planned to run surface casing: Slightly tight off bottom for 3m. |
| | 14:15 | 14:30 | Safety meeting held with crew: Laying down 229mm drill collars. |
| | 14:30 | 15:00 | Lay down 2 x 229mm drill collars |
| | 15:00 | 15:15 | Clean rig floor area - Hold safety meeting pertaining to running 244.5mm surface casing as required. |
| | 15:15 | 19:15 | Rig to and run 244.5mm surface casing: Run 15 joints of 244.5mm 53.5 kg/m J-55 LTC casing for a total length of 201.48m, to be set at depth 200.48m No problems running casing - Although snug for the entire run in. |
| | 19:15 | 20:15 | Circulate and condition mud for cementing |
| | 20:15 | 20:30 | Pre job safety meeting: Cementing 244.5mm surface casing. |
| | 20:30 | 22:15 | Cement surface casing as described: Pump 5m3 water ahead, mix and pump 18 tonnes Arctic Set II, displace with water for a total of 7.5m3 and bump plug - Obtain 5m3 good cement returns. |

| | | | |
|------------|-------|-------|---|
| | 22:15 | 0:00 | Wait on cement time as planned - Flush and clean out conductor casing/diverter system. |
| 1999/01/18 | 0:00 | 2:00 | Nipple down 356mm diverter system as planned. |
| | 2:00 | 4:30 | Cut 339mm conductor casing> Cut and dress 244.5mm casing stub> Weld 279mm 21,000 kpa 244.5mm CC-29 casing bowl. Allow to cool for approx. 60mins. |
| | 4:30 | 11:45 | Nipple up 279mm x 21,000 kpa BOP stack and associated components. |
| | 11:45 | 12:00 | Rig service |
| | 12:00 | 16:00 | Nipple up well control equipment as planned |
| | 16:00 | 21:00 | Pressure test BOPs and related equipment: Test blind rams, manifold valves, chokes, kill line valves, casing bowl and surface casing to 1400 kpa low - 10,500 kpa high for 10min each. |
| | 21:00 | 0:00 | Continued rig up of well control equipment: Rig in degasser circ line, poor boy vent line, flare lines, heat trace and insulate all circulating lines to and from the manifold shack. |
| 1999/01/19 | 0:00 | 2:30 | Complete installation of all well control equipment: Heat trace and insulate circulating lines to and from manifold shack. Check and work on pressure gauges. |
| | 2:30 | 4:00 | Make up production drilling assembly and trip in and tag cement @ 171m. |
| | 4:00 | 8:00 | Pressure testing BOPs and related equipment: Test annular BOP, pipe rams, stabbing valve and inside BOP, HCR valve, kill line valves to 1400 kpa low/10,500 kpa high for 10min each. |
| | 8:00 | 8:15 | BOP drill held with crew [Pre drill out]: Well secure in 1min, 10secs. Hold pre drillout discussion with crew and onsite personnel. |
| | 8:15 | 8:30 | Rig service. Fct. pipe rams |
| | 8:30 | 10:00 | Drill out 244.5mm float equipment and float shoe> Drill ahead 222mm hole from depth 201.5 - 206m [4.5m] Circulate and perform formation integrity test as follows: 1020 kg/m3 density in the hole 2500 kpa applied surface pressure [Jug test] EQ mud density is 2300 kg/m3 |
| | 10:00 | 13:15 | Drill ahead 222mm production hole from depth: 206 - 230m [24m] |
| | 13:15 | 13:30 | Rig service. Fct. annular BOP and remote choke. |
| | 13:30 | 14:30 | Rig repair: Change out broken tong line shieves, which were most likely damaged by the power tongs. |
| | 14:30 | 15:00 | Drill ahead 222mm hole from depths: 230 - 237m [7m] |
| | 15:00 | 18:30 | Rig down due to electrical problems: Power to the air compressors have shorted out. We continued to pump, with the inability to rotate or hoist the string. |
| | 18:30 | 20:00 | Drill ahead 222mm hole from depth: 237 - 258m [21m] |
| | 20:00 | 20:15 | BOP drill conducted with night crew: Well secure in 90 secs. Fct. annular BOP and remote choke. |
| | 20:15 | 0:00 | Drill ahead 222mm hole from depth: 258 - 309m [51m] Bit balling problems were experienced at depth 281m - With no major problems dealing with it on a go forward basis [approx. 60mins were slow due to balling in total] |
| 1999/01/20 | 0:00 | 0:15 | Drill from 309 m to 314 m. |
| | 0:15 | 0:45 | Circulate and survey at 301 m. |
| | 0:45 | 7:45 | Drill from 414 m to 408 m. |
| | 7:45 | 8:00 | Rig service. Function pipe rams and remote choke. |
| | 8:00 | 10:00 | Drill from 408 m to 418 m. Pipe spiraling on connection and penn. rate dropping. Decision to trip to check hole for mud ring and check bit. |
| | 10:00 | 12:45 | Hoist bit #3 to check for mud ring and check bit. * Hole pulled tight at 222 m. Pulled free after rotating. * Bit balled up but in good shape. |
| | 12:45 | 13:00 | Rig service. Function blind rams. |
| | 13:00 | 14:30 | Trip in with bit RR3. Hole good. |

| | | | |
|------------|-------|-------|--|
| | 14:30 | 15:00 | Pick up kelly and wash 9 m to bottom. No fill. |
| | 15:00 | 21:45 | Drill from 418 m to 464 m. * Bit balling and hard to drill. * Circulate up sample at 447 m. |
| | 21:45 | 22:15 | Circulate and survey at 451 m. |
| | 22:15 | 23:45 | Drill from 464 m to 489 m. |
| | 23:45 | 0:00 | Total circulate up samples. |
| 1999/01/21 | 0:00 | 2:00 | Drill from 489 m to 520 m. TD. |
| | 2:00 | 4:30 | Circulate and condition mud for logging. |
| | 4:30 | 7:00 | Wiper trip to casing shoe at 201 m. Hole good. |
| | 7:00 | 7:30 | Circulate and condition mud for logging. |
| | 7:30 | 10:00 | Hoist to log non rotating. Hole good. |
| | 10:00 | 10:15 | Rig service. Function blind rams. |
| | 10:15 | 12:00 | Rig to log with Schlumberger. |
| | 12:00 | 12:15 | BOP drill with crew. |
| | 12:15 | 16:30 | Log # 1 CNL-LDT-NGT-AMS-GR-CAL from 519 m to 190 m. |
| | 16:30 | 21:00 | Log # 2 DLL from 519 m to 190 m. |
| | 21:00 | 0:00 | Log # 3 MDT. |
| 1999/01/22 | 0:00 | 6:00 | Log # 3, MDT. Unable to get samples. |
| | 6:00 | 6:15 | BOP Drill with crew. Function blind rams |
| | 6:15 | 11:45 | Log # 4 DSI. |
| | 11:45 | 12:00 | Rig service. |
| | 12:00 | 13:30 | Log # 4 DSI. |
| | 13:30 | 13:45 | Rig service. Function blind rams. |
| | 13:45 | 15:00 | Trip in for clean out for plugs. |
| | 15:00 | 17:00 | Circulate and condition mud for plugs. |
| | 17:00 | 19:00 | Hoist drill pipe. |
| | 19:00 | 19:15 | Safety meeting prior to laying down collars. |
| | 19:15 | 20:00 | Lay down drill collars and heviwate drill pipe. |
| | 20:00 | 22:45 | Pick up 25 singles of drill pipe, and run in hole. |
| | 22:45 | 0:00 | Circulate and condition for plugs. |
| 1999/01/23 | 0:00 | 2:30 | Circulate and condition mud for cement plugs. |
| | 2:30 | 2:45 | Safety meeting prior to cementing. |
| | 2:45 | 4:00 | Pump cement plug # 1 from 520 m to 350 m. Pumped 10.5 tonnes of 10:1:0 class 'G' + .5 % CaCl2, total volume 7.95 m3. |
| | 4:00 | 5:00 | Pull stands up to 348 m and circulate out excess cement. Good cement returns at bottoms up. |
| | 5:00 | 6:15 | Pump cement plug # 2 from 350 m to 150 m. Pumped 12.6 tonnes of 0:1:0 class 'G' + .5 % CaCl2, total volume 9.54 m3 |
| | 6:15 | 7:30 | Pull stands up to 142 m and circulate out excess cement. |
| | 7:30 | 10:00 | Lay down drill pipe and break kelly. |
| | 10:00 | 13:00 | Wait on cement. Rig out prefabs and clean mud tanks. |
| | 13:00 | 13:30 | Run in with drill pipe to 160 m to feel plug. Unable to tag. |
| | 13:30 | 14:00 | Hoist drill pipe to clean. |
| | 14:00 | 17:00 | Wait on cement. Clean mud tanks, unwrap flare lines, take down prefabs. |
| | 17:00 | 17:15 | Trip in drill pipe and tag plug at 151 m. |
| | 17:15 | 18:00 | Lay down drill pipe and kelly. |
| | 18:00 | 21:30 | Rig out BOP. Clean mud tanks. |
| | 21:30 | 22:30 | Cut off casing bowl, cut off casing and conductor 1 m below ground level. |
| | 22:30 | 0:00 | Place a 10 m accelerated class 'G' cement plug in the top of the 244 mm surface casing. |
| 1999/01/24 | 0:00 | 0:45 | Weld cap on surface and conductor casings. |
| | 0:45 | 1:00 | Rig out welder and clean up cellar. ** Rig Released 99 01 24 @ 01:00 hr. |
| | 1:00 | 10:45 | Rig out and prepare to lay down derrick. |

10:45 11:00 Pre job meeting for laying down derrick.
 11:00 11:30 Lay down derrick.
 11:30 20:00 Rig out and prepare to move.
 20:00 0:00 Break tour and shut down for the night.

Time Break Down

| <u>Activity</u> | <u>Days</u> |
|---------------------------------|-------------|
| Drill & Set Conductor: | 1.4 |
| Drill Surface Hole: | 1.4 |
| Head Up, Drill Out PIT: | 1.8 |
| Drill Prod. Hole: | 1.8 |
| Log: | .8 |
| MDT: | .4 |
| Case/Abdn/Rig Release: | 1.5 |
| Mech. Rig Problem Time: | .46 |
| Hole Conditioning Problem Time: | .15 |

12. Abandonment Plugs:

| | Plug 1 | Plug 2 |
|----------------------|---------------------------|--------------------------|
| Date | 99-01-23 | 99-01-23 |
| Interval (KB) | 520 - 350 | 350 - 150 |
| Formation Name | Cretaceous to Hare Indian | Quaternary to Cretaceous |
| Formation Depth (KB) | 520 - 350 | 350 - 150 |
| Tonnes of Cement | 10.5 | 12.6 |
| Additives | .5% CaCl ₂ | .5% CaCl ₂ |
| Felt Plug Depth (KB) | N/A | 151m |
| Fluid Between Plugs | Gel-Chem mud | Gel-Chem mud |

D: GEOLOGY

Geological Summary

Tops:

| Formation | Subsea | Prog Top | Subsea | Sample Top | Subsea | Log Top |
|-------------------|--------|-------------|--------|---------------|--------|------------|
| Pleistocene Drift | 385 | 82.3 | | | | |
| Cretaceous | 285 | 182.3 | | | | |
| Cretaceous Sand | | | 94.3 | 373 | 94.3 | 373 |
| Imperial | 30 | 437.3 | | absent ? | | absent ? |
| Canol | 10 | 457.3 | | absent ? | | 390.5 |
| Kee Scarp | -20 | 487.3 | 29.9 | 437.4 | 30.3 | 437.4 |
| Hare Indian | -90 | 557.3 | -14.7 | 482 | 6.1 | 456.5 |
| FTD | -100 | 567.3 | -52.7 | 520 | -47.7 | 519.6 |

SAMPLE DESCRIPTIONS: See attached wellsite geological report including strip log.

GAS DETECTION REPORT: Total gas detector run by wellsite geologist - see geological strip log.

SUMMARY:

There were hydrocarbon shows observed in drill cutting samples in the Kee Scarp and Hare Indian formations. The hydrocarbon shows in these zones were evaluated as poor.

The limestone target has poor porosity with virtually no permeability. Visual shows in this zone indicate oil. Results indicate there are no commercial accumulations of hydrocarbons in this well.

WELL EVALUATION

| | |
|------------------------------|--|
| The following logs were run: | Depths |
| CNL-LDT-NGT-AMS-GR-CAL: | 519 - 190m |
| DLL: | 519 - 190m |
| MDT: | 465 - 190 m (unable to obtain either pressures or samples) |
| DSI: | 515 - 190 m |

FORMATION AND TEST RESULTS: Unable to obtain formation pressures or samples with MDT due to the absence of both porosity and permeability.

Geological Summary

This well, Imp Murphy Discovery Ridge D-4, was drilled to evaluate the Devonian Kee Scarp Formation.

Sample study began at 320 metres in the Lower Cretaceous Formation.

The well was drilled to 520 metres with a gel-chem mud system.

A very good reservoir sandstone was encountered at 373-390 metres. This lower Cretaceous sand is predominantly fine to medium-grained and generally quartzose and very clean. There are 12-15 metres of good porosity and permeability noted in samples. A drilling break and a poor gas response occurred over the entire interval. This zone has very good reservoir potential, but appears to be "wet".

The primary zone of interest, 437.4-461.5 metres, is the Devonian Kee Scarp Reef. The main rock type is a crypto to medium crystalline limestone with common grainstone. There is abundant evidence of fossil remains, indicating reef. The upper zone, 437.4-457, is mostly interbedded limestone and shale, with more siltstone and shale in the lower part of the interval. Best porosity is estimated at 2-3% microcrystalline and vuggy. It is ineffective porosity with common to minor dead-oil plugging. There is very little evidence of permeability. This zone had a very slight to no gas response.

A very clean limestone, with common to minor fossil debris, occurs at 457-461.5 metres. There is evidence of streaks and bands of 5-7% microcrystalline porosity, with abundant fluorescence and cut. A trace live-oil show was noted while catching samples during this interval. There is very little evidence of permeability. This zone was tested

with Schlumberger's MDT tool. There were no fluid recoveries and the intervals tested indicate virtually no permeability.

Total depth is 520 metres in the Devonian Hare Indian Formation.

The well was logged by Schlumberger.

This well was plugged and abandoned January 24, 1999.

Sample Descriptions

Imp Murphy Discovery Ridge D-4

- sample study began @ 320 metres in the Cretaceous

| Interval | Description |
|----------|--|
| 320-330 | <i>Shale: grey-dark grey, silty in part, trace carbonaceous material, occasionally calcareous with numerous <u>inoceramus</u> prisms scattered thru' interval with some argillaceous-carbonaceous lining, trace to minor sandstone: grey-light grey, some dark grey, slight salt and pepper texture, very fine to fine grained, traces lower medium grained, subangular-rounded, moderately sorted, friable to some loose sand grains, slightly calcareous, predominantly dolomitic, in part siliceous, common argillite grans, no visible effective porosity, no shows, carbonaceous in part.</i> |
| 330-335 | <i>Mostly shale with some sand stringers, common <u>inoceramus</u> prisms, more shale with depth.</i> |
| 335-340 | <i>Shale: as above, darker, occasionally carbonaceous, silty to slightly silty, trace speckled shales, abundant <u>inoceramus</u> prisms, traces sandstone.</i> |
| 340-350 | <i>Shale: grey-grey green, dark grey, more silty, trace speckled shales, less prisms, trace brown calcite crystals, trace sandstone.</i> |
| 350-360 | <i>Shale: grey-medium grey, some dark grey, carbonaceous in part, occasionally micaceous, trace mica flakes, generally more silty, trace to minor <u>inoceramus</u> prisms, trace veining, trace sandstone.</i> |
| 360-373 | <i>Shale: medium-dark grey, grey brown, sandy in part, silty-slightly silty, carbonaceous in part, interbedded with minor Sandstone: grey brown, dark grey, some clear quartz and off-white, very fine to fine grained, occasionally lower medium grained, streaks of intergranular porosity, no shows, poor permeability.</i> |
| 373-390 | <i>Sandstone: off-white, clear quartz, fine to lower coarse grained, subangular-rounded, some well rounded, moderately to poorly sorted, occurs mainly as loose sand grains, estimate 20% + intergranular porosity, no shows, good reservoir, trace to minor pyrite, very slightly calcareous, common to more abundant silica overgrowths, traces very fine to fine grained sandstone, patchy to trace kaolin cement, with some shale streaks and interbeds, more shale with depth.</i> |
| 390-395 | <i>Shale: grey-dark grey, occasionally black, carbonaceous in part, slightly bituminous odor, generally silty, micaceous, interbedded with Sandstone: white, clear quartz, some translucent, common clear vitreous silica overgrowths, trace to minor kaolin, slightly calcareous, generally fine to medium grained.</i> |
| 395-400 | <i>Shale: grey brown, grey, occasionally dark grey, trace carbonaceous material, silty, less micaceous, with minor sand interbeds: white, light grey, very fine to lower medium grained, more consolidated, poor to fair intergranular porosity, no shows, more kaolin, dolomitic and calcite cemented.</i> |

400-415 *Shale: mostly dark grey-black, dark grey brown, grey brown, generally silty, occasionally calcareous, micaceous, carbonaceous with a fairly strong petrolierous odor, trace to minor coal- probable very thin coal seams, with minor sandstone.*

415-425 *Shale: dark grey-black, some dark grey brown, silty, micaceous to very micaceous, occasionally calcareous, carbonaceous in part, pyritic to trace pyritic, with occasional thin sand stringers- more sand in 425 m sample: generally fine to medium grained, mostly unconsolidated, no shows, good porosity.*

425-434 *Shale: dark grey-dark grey brown, some light colored, calcareous in part, more silty and carbonaceous, trace coal- black, soft, vitreous texture, with some loose fine to medium grained quartz grains.*

434-437.4 *Shale: dark grey to mostly black, fairly rich organic shale with coal lenses, trace black soft glassy coal.*

Note: Imperial and Canol Formations are absent.

Unconformity / Kee Scarp 437.4 m

437.4-447 *Interbedded Limestone and Shale*
Limestone: light brown, white, grey, micro-medium crystalline, some grainstone, very slightly dolomitic, chalky texture in part, common scattered "critters" - crinoids, crinoid stems, trace stachiodes, trace gastropods, some evidence of stromatoporoidea, some indistinct fossil debris, poor porosity and permeability, some dead oil staining, minor live oil staining, fairly strong petrolierous odor, interbedded with Shale: grey brown-dark grey, calcareous in part, slightly silty-silty, micaceous, trace fossil remains.

447-450 *Interbedded Shale and Limestone, more fossil debris- some crinoids, occasional stem, traces indistinct fossil remains, streaks of poor intercrystalline porosity, trace vuggy porosity, some dead oil staining, more cryptocrystalline, slightly argillaceous, trace druse crystals lining chips, generally brown-dark brown, with some white chalky textured limestone, occasionally pyritic, trace siltstone.*

450-457 *Siltstone: light grey green, light grey, calcareous, slightly dolomitic, sandy in part, pyritic, no visible porosity, interbedded with Shale and Limestone, more shale, trace fossil remains, limestone generally more argillaceous and cryptocrystalline, no visible porosity, mostly siltstone in upper part of interval.*

457-461.5 *Limestone: similar lithology to Norman Wells reef, buff-light brown-brown, some granular, occasionally mottled, common to minor druse crystals lining chips, traces dead oil staining, massive fairly fast cut- some streaming- generally a straw-colored cut, streaks and bands of microcrystalline porosity, some vuggy porosity, probable poor permeability, slight oil show in drilling fluid, common yellow fluorescence, minor indistinct fossil remains, traces: crinoids, stroms, occasional stems, trace coral.*

461.5-470 *Intermixed and interbedded Limestone, Shale and Siltstone, trace pyritic, trace to minor fossil debris- trace crinoid, minor stroms, trace stems, spotty fluorescence and cut, streaks intercristalline porosity, trace vuggy porosity, white, light brown-brown, occasionally cryptocrystalline, some grainstone, minor dolomite crystals lining chips, trace sparry calcite, more siltstone lower part of interval- very pyritic in part.*

470-482 *Mainly as above but darker, more shale and siltstone, with evidence of stroms and other fossil debris, trace crinoid, spotty to trace fluorescence, common micaceous material; very pyritic, mostly light green-grey siltstone in lower part of interval, less limestone with depth, some lithology similar to Hare Indian.*

Hare Indian 482 m

482-490 *Siltstone: grey-grey green, light grey, calcareous to very slightly calcareous, occasionally dolomitic, micaceous to very micaceous with numerous mica flecks, some biotite, traces chalky white limestone and some light brown-buff granular limestone, pyritic- mostly disseminated, with minor shale: dark grey-dark grey brown.*

490-500 *Interbedded Siltstone and Shale
Shale: dark grey, dark grey brown, very silty, very micaceous, calcareous in part, some disseminated pyrite, interbedded with Siltstone: grey-grey brown, argillaceous, micaceous, pyritic in part, occasionally sandy, generally darker than above, trace limestone.*

500-510 *Mostly light colored siltstone and some shale, trace silty sandstone, no visible porosity, no shales, generally calcareous to slightly calcareous, trace limestone.*

510-520 *Siltstone: as above, less micaceous in part, with more shale: grey brown, very silty and micaceous.*

FTD: 520 metres January 21, 1999 0210 hrs

Brian Christensen

Brian Christensen, B.Sc.

GEOLOGICAL REPORT

N.E.B. COPY

Imperial Oil Resources Limited

Imp Murphy Discovery Ridge D-4

LT 65 23' LG 126 46'

Geological Report

Report for: Mr. Bob Millen

*Prepared by: Brian Christensen Enterprises Ltd.
112 Sunhaven Close, S.E.
Calgary, Alberta
1-403-256-3259*

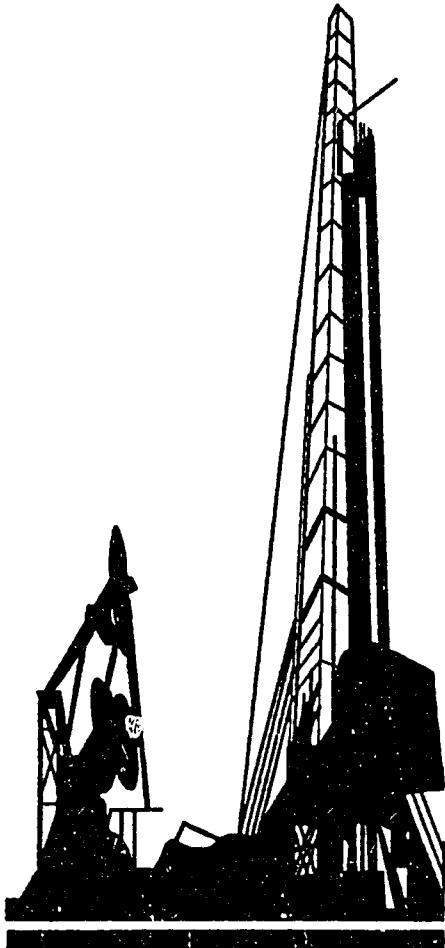


Table of Contents

- 1. Well Data Summary*
- 2. Geological Summary*
- 3. Formation Tops*
- 4. Sample Descriptions*
- 5. Strip Log*

Well Data Summary

| | |
|---------------|--------------------------------|
| Well Name: | Imp Murphy Discovery Ridge D-4 |
| Location: | Li 65 23' Lg 126 46' |
| Province: | North West Territories |
| AFE#: | P15718 |
| Licence #: | WID # 1837 |
| UWI #: | 300D048530126450 |
| Co-ordinates: | 65 23' 12.6" 126 46' 46.8" |
| Field: | Discovery Ridge |

Drilling Information

| | | |
|---------------|-----------------|----------|
| Contractor: | Shehtah Rig # 1 | |
| Status: | | |
| Elevations: | KB: | 467.3 m |
| | Grd: | 461.9 m |
| Spud: | 99-01-14 | 0900 hrs |
| Total Depth: | 99-01-21 | 0210 hrs |
| Rig Released: | 99-01-24 | |

Casing Information

| | |
|----------------------|---|
| Surface Casing: | 244.5 mm surface csg, landed at 200.5 m |
| Intermediate Casing: | |
| Production Casing: | Plugged and Abandoned |

Geology

| | |
|-----------------|------------------------------|
| NEB: | 380-TD |
| Geologist: | Brian Christensen |
| Mud Gas: | Continental MP 2100 |
| Mud System: | Gel-Chem |
| Sidewall Cores: | nil |
| SFT's: | nil |
| Cores: | nil |
| DST's | Ran MDT's for fluid recovery |

Remarks:

Well was drilled to evaluate the Devonian Kee Scarp Formation.

Well was logged by Schlumberger

Plugged and Abandoned

Geological Summary

This well, Imp Murphy Discovery Ridge D-4, was drilled to evaluate the Devonian Kee Scarp Formation.

Sample study began at 320 metres in the Lower Cretaceous Formation.

The well was drilled to 520 metres with a gel-chem mud system.

A very good reservoir sandstone was encountered at 373-390 metres. This lower Cretaceous sand is predominantly fine to medium-grained and generally quartzose and very clean. There are 12-15 metres of good porosity and permeability noted in samples. A drilling break and a poor gas response occurred over the entire interval. This zone has very good reservoir potential, but appears to be "wet".

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A very clean limestone, with common to minor fossil debris, occurs at 457-461.5 metres. There is evidence of streaks and bands of 5-7% microcrystalline porosity, with abundant fluorescence and cut. A trace live-oil show was noted while catching samples during this interval. There is very little evidence of permeability. This zone was tested

with Schlumberger's MDT tool. There were no fluid recoveries and the intervals tested indicate virtually no permeability.

Total depth is 520 metres in the Devonian Hare Indian Formation.

The well was logged by Schlumberger.

This well was plugged and abandoned January 24, 1999.

Formation Tops

| KB: | Subsea | Prog | Subsea | Sample | Subsea | Log |
|-------------------|--------|-------|--------|----------|--------|-------|
| | | Top | | Top | | Top |
| Pleistocene Drift | 385 | 82.3 | | | | |
| Cretaceous | 285 | 182.3 | | | | |
| Cretaceous Sand | | | 94.3 | 373 | 94.3 | 373 |
| Imperial | 30 | 437.3 | | absent | | |
| Canol | 10 | 457.3 | | absent ? | | |
| Kee Scarp | -20 | 487.3 | 29.9 | 437.4 | 30.3 | 437 |
| Platform | | | 10.3 | 457 | 10.6 | 456.7 |
| Hare Indian | -90 | 557.3 | -14.7 | 482 | 6.1 | 461.2 |
| FTD | -100 | 567.3 | -52.7 | 520 | -47.7 | 519.6 |
| | | | | | | |

Primary Zones of Interest: Kee Scarp

Log picks: DSI

Logging Summary:

Imperial Resources Limited: Dave Dudas, Logging Analyst
 Logging Company: Schlumberger

Logging Run #1

CNL-LDT-NGT-AMS-GR-CAL 520-201 m
 DLL-GR-CAL: 520-201 m
 MDT
 DSI: 520-195 m

Driller's Total Depth: 520.0 m
 Pipe Tally: 519.0 m
 Logger's Total Depth: 519.6 m

Coring Summary:

No coring

Drill Stem Test Summary:

No drill stem testing

Sample Descriptions

Imp Murphy Discovery Ridge D-4

- sample study began @ 320 metres in the Cretaceous

| <i>Interval</i> | <i>Description</i> |
|-----------------|--|
| 320-330 | <i>Shale: grey-dark grey, silty in part, trace carbonaceous material, occasionally calcareous with numerous <u>inoceramus prisms</u> scattered thru' interval with some argillaceous-carbonaceous lining, trace to minor sandstone: grey-light grey, some dark grey, slight salt and pepper texture, very fine to fine grained, traces lower medium grained, subangular-rounded, moderately sorted, friable to some loose sand grains, slightly calcareous, predominantly dolomitic, in part siliceous, common argillite grans, no visible effective porosity, no shows, carbonaceous in part.</i> |
| 330-335 | <i>Mostly shale with some sand stringers, common <u>inoceramus prisms</u>, more shale with depth.</i> |
| 335-340 | <i>Shale: as above, darker, occasionally carbonaceous, silty to slightly silty, trace speckled shales, abundant <u>inoceramus prisms</u>, traces sandstone.</i> |
| 340-350 | <i>Shale: grey-grey green, dark grey, more silty, trace speckled shales, less prisms, trace brown calcite crystals, trace sandstone.</i> |
| 350-360 | <i>Shale: grey-medium grey, some dark grey, carbonaceous in part, occasionally micaceous, trace mica flakes, generally more silty, trace to minor <u>inoceramus prisms</u>, trace veining, trace sandstone.</i> |
| 360-373 | <i>Shale: medium-dark grey, grey brown, sandy in part, silty-slightly silty, carbonaceous in part, interbedded with minor Sandstone: grey brown, dark grey, some clear quartz and off-white, very fine to fine grained, occasionally lower medium grained, streaks of intergranular porosity, no shows, poor permeability.</i> |
| 373-390 | <i>Sandstone: off-white, clear quartz, fine to lower coarse grained, subangular-rounded, some well rounded, moderately to poorly sorted, occurs mainly as loose sand grains, estimate 20% + intergranular porosity, no shows, good reservoir, trace to minor pyrite, very slightly calcareous, common to more abundant silica overgrowths, traces very fine to fine grained sandstone, patchy to trace kaolin cement, with some shale streaks and interbeds, more shale with depth.</i> |
| 390-395 | <i>Shale: grey-dark grey, occasionally black, carbonaceous in part, slightly bituminous odor, generally silty, micaceous, interbedded with Sandstone: white, clear quartz, some translucent, common clear vitreous silica overgrowths, trace to minor kaolin, slightly calcareous, generally fine to medium grained.</i> |
| 395-400 | <i>Shale: grey brown, grey, occasionally dark grey, trace carbonaceous material, silty, less micaceous, with minor sand interbeds: white, light grey, very fine to lower medium grained, more consolidated, poor to fair intergranular porosity, no shows, more kaolin, dolomitic and calcite cemented.</i> |

400-415 Shale: mostly dark grey-black, dark grey brown, grey brown, generally silty, occasionally calcareous, micaceous, carbonaceous with a fairly strong petroliferous odor, trace to minor coal- probable very thin coal seams, with minor sandstone.

415-425 Shale: dark grey-black, some dark grey brown, silty, micaceous to very micaceous, occasionally calcareous, carbonaceous in part, pyritic to trace pyritic, with occasional thin sand stringers- more sand in 425 m sample: generally fine to medium grained, mostly unconsolidated, no shows, good porosity.

425-434 Shale: dark grey-dark grey brown, some light colored, calcareous in part, more silty and carbonaceous, trace coal- black, soft, vitreous texture, with some loose fine to medium grained quartz grains.

434-437.4 Shale: dark grey to mostly black, fairly rich organic shale with coal lenses, trace black soft glassy coal.

Note: Imperial and Canol Formations are absent.

Unconformity / Kee Scarp 437.4 m

437.4-447 *Interbedded Limestone and Shale*
Limestone: light brown, white, grey, micro-medium crystalline, some grainstone, very slightly dolomitic, chalky texture in part, common scattered "critters"- crinoids, crinoid stems, trace stachioides, trace gastropods, some evidence of stromatoporoidea, some indistinct fossil debris, poor porosity and permeability, some dead oil staining, minor live oil staining, fairly strong petroliferous odor, interbedded with Shale: grey brown-dark grey, calcareous in part, slightly silty-silty, micaceous, trace fossil remains.

447-450 *Interbedded Shale and Limestone, more fossil debris- some crinoids, occasional stem, traces indistinct fossil remains, streaks of poor intercrystalline porosity, trace vuggy porosity, some dead oil staining, more cryptocrystalline, slightly argillaceous, trace druse crystals lining chips, generally brown-dark brown, with some white chalky textured limestone, occasionally pyritic, trace siltstone.*

450-457 *Siltstone: light grey green, light grey, calcareous, slightly dolomitic, sandy in part, pyritic, no visible porosity, interbedded with Shale and Limestone, more shale, trace fossil remains, limestone generally more argillaceous and cryptocrystalline, no visible porosity, mostly siltstone in upper part of interval.*

457-461.5 *Limestone: similar lithology to Norman Wells reef, buff-light brown-brown, some granular, occasionally mottled, common to minor druse crystals lining chips, traces dead oil staining, massive fairly fast cut- some streaming- generally a straw-colored cut, streaks and bands of microcrystalline porosity, some vuggy porosity, probable poor permeability, slight oil show in drilling fluid, common yellow fluorescence, minor indistinct fossil remains, traces: crinoids, stroms, occasional stems, trace coral.*

461.5-470 *Intermixed and Interbedded Limestone, Shale and Siltstone, trace pyritic, trace to minor fossil debris- trace crinoid, minor stroms, trace stems, spotty fluorescence and cut, streaks intercrystalline porosity, trace vuggy porosity, white, light brown-brown, occasionally cryptocrystalline, some grainstone, minor dolomite crystals lining chips, trace sparry calcite, more siltstone lower part of interval- very pyritic in part.*

470-482 *Mainly as above but darker, more shale and siltstone, with evidence of stroms and other fossil debris, trace crinoid, spotty to trace fluorescence, common micaceous material; very pyritic, mostly light green-grey siltstone in lower part of interval, less limestone with depth, some lithology similar to Hare Indian.*

Hare Indian 482 m

482-490 *Siltstone: grey-grey green, light grey, calcareous to very slightly calcareous, occasionally dolomitic, micaceous to very micaceous with numerous mica flecks, some biotite, traces chalky white limestone and some light brown-buff granular limestone, pyritic- mostly disseminated, with minor shale: dark grey-dark grey brown.*

490-500 *Interbedded Siltstone and Shale*
Shale: dark grey, dark grey brown, very silty, very micaceous, calcareous in part, some disseminated pyrite, interbedded with Siltstone: grey-grey brown, argillaceous, micaceous, pyritic in part, occasionally sandy, generally darker than above, trace limestone.

500-510 *Mostly light colored siltstone and some shale, trace silty sandstone, no visible porosity, no shows, generally calcareous to slightly calcareous, trace limestone.*

510-520 *Siltstone: as above, less micaceous in part, with more shale: grey brown, very silty and micaceous.*

FTD: 520 metres January 21, 1999 0210 hrs

Brian Christensen

Brian Christensen, B.Sc.

SURVEY PLAN

OVERSIZED

DOCUMENT

FILMED

ON

35m m

8 SIS

GPS CONTROL DETAIL
SCALE 1:50,000

| GPS TRAVERSE TABLE (NAD 27) | | | |
|-----------------------------|---------------|--------------|-----|
| FROM | GRID DISTANCE | GRID BEARING | TO |
| 1 | 1641.10 | 159°43'46" | 519 |
| 2 | 1636.63 | 159°05'00" | 519 |
| 3 | 1624.14 | 159°36'34" | 519 |
| 4 | 1524.17 | 179°36'35" | 519 |
| 5 | 1683.40 | 176°29'32" | 519 |
| 6 | 1655.42 | 175°51'58" | 519 |
| 7 | 1755.14 | 167°37'50" | 519 |
| 8 | 230.12 | 171°51'58" | 519 |
| 9 | 137.87 | 106°41'57" | |
| 10 | 4160.22 | 105°29'06" | 3 |
| 11 | 6216.91 | 109°14'49" | 4 |
| 12 | 6232.53 | 123°17'23" | 5 |
| 13 | 6217.71 | 123°17'45" | 5 |
| 14 | 1270.64 | 229°20'45" | 7 |
| 15 | 6324.55 | 286°13'43" | 8 |
| 16 | 4022.35 | 106°28'47" | 3 |
| 17 | 6079.17 | 09°15'15" | 4 |
| 18 | 6152.13 | 121°15'15" | 5 |
| 19 | 6162.64 | 126°04'13" | 6 |
| 20 | 2070.72 | 114°39'04" | 4 |
| 21 | 2569.00 | 157°23'37" | 5 |
| 22 | 2759.16 | 157°23'37" | 6 |
| 23 | 4211.01 | 323°15'37" | 7 |
| 24 | 10484.75 | 286°19'50" | 8 |
| 25 | 1530.25 | 204°55'14" | 5 |
| 26 | 1791.99 | 205°01'16" | 6 |
| 27 | 6276.65 | 309°25'00" | 7 |
| 28 | 1625.13 | 111°20'00" | 8 |
| 29 | 261.75 | 205°36'32" | 6 |
| 30 | 6700.42 | 316°17'19" | 7 |
| 31 | 12436.57 | 295°55'00" | 8 |
| 32 | 5592.37 | 275°09'46" | 8 |

NOTE: 519 DENOTES CONTROL MONUMENT No. 519017

SEE DETAIL 'B'
PL. CLS 77
SEE DETAIL 'A'
PL. CLS 77

GPS CONTROL DETAIL
SCALE 1:50,000

DETAIL 'B'
SCALE 1:10,000
DISTANCES ARE GROUND DISTANCES

F.C. CLS CIO
UNREGISTERED PLAN BY CURTIS HENRIE, C.L.S.

PROPOSED WELL CENTRE
LOCATION
N 7253267.663
E 603098.061

N 7253279.906
E 603460.979

UNREGISTERED PLAN BY CURTIS HENRIE, C.L.S.
F.C. CLS CIO

PROPOSED WELL CENTRE
LOCATION
N 7252803.485
E 60314.415

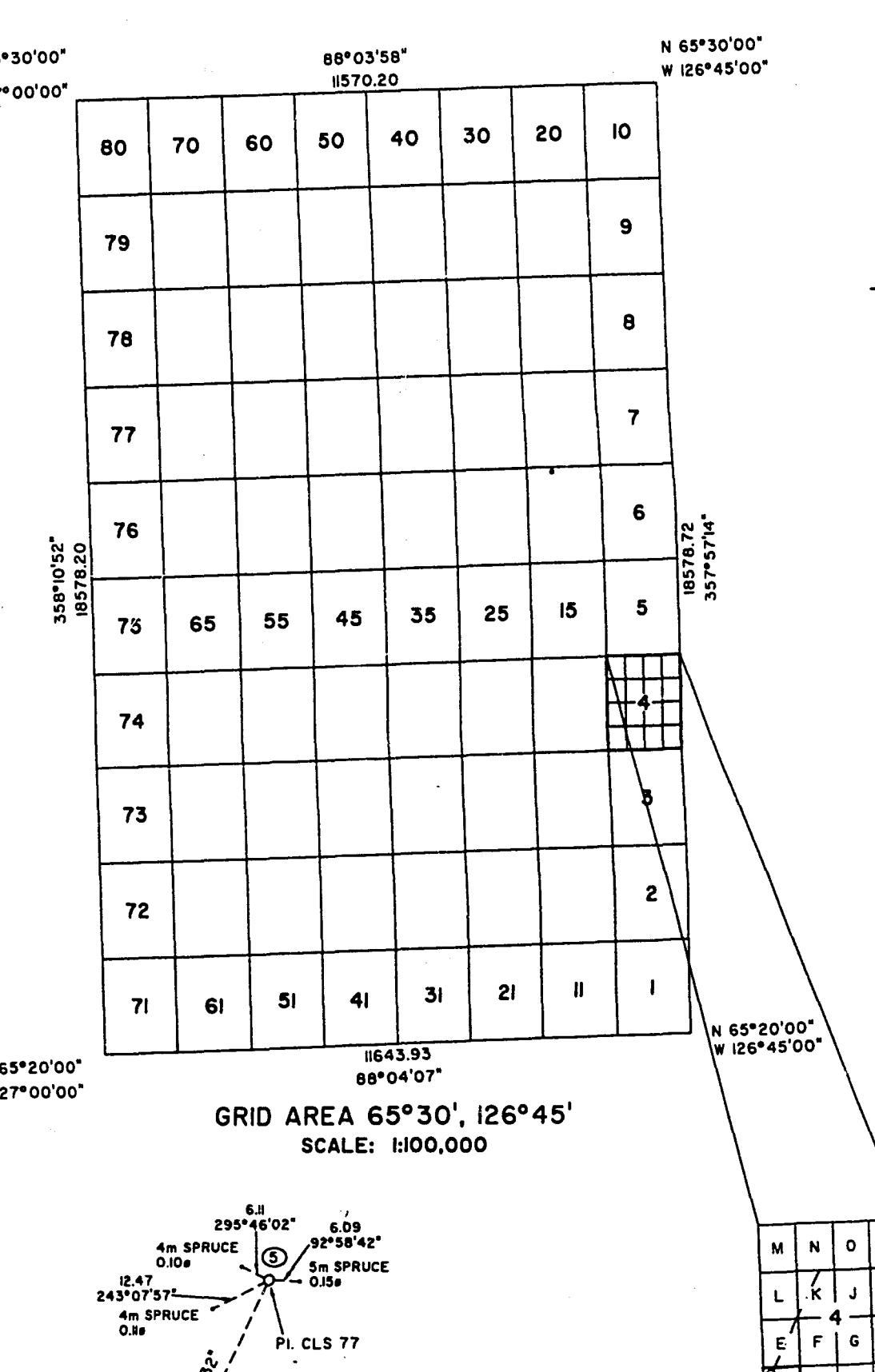
N 7252815.729
E 603477.390

DETAIL 'A'
UNIT 'D', SECTION 4
SCALE 1:5,000
DISTANCES ARE GROUND DISTANCES

TO CONTROL MONUMENT 519017

| GEOGRAPHIC AND UTM COORDINATES (NAD 27) | | | | |
|---|-------------|-------------|---------------|----------------|
| STATION | NORTHING | EASTING | LATITUDE | LONGITUDE |
| TRAVERSE STATIONS | | | | |
| 1 | 7252847.734 | 657774.041 | 65°43'56.99" | 126°45'00.99" |
| 2 | 7252850.599 | 6572435.733 | 65°43'56.79" | 126°45'00.79" |
| 3 | 725306.681 | 6076373.246 | 65°24'44.65" | 126°48'30.98" |
| 4 | 7254203.006 | 6036452.448 | 65°23'44.647" | 126°46'07.587" |
| 5 | 725285.228 | 6030000.426 | 65°23'00.58" | 126°47'01.933" |
| 6 | 725285.228 | 6030000.426 | 65°23'00.58" | 126°47'01.933" |
| 7 | 725742.447 | 598257.895 | 65°25'54.563" | 126°52'56.420" |
| 8 | 725804.750 | 591701.493 | 65°26'00.561" | 127°01'33.338" |
| 10 | 725280.078 | 597784.201 | 65°24'28.201" | 126°43'44.744" |
| 11 | 725280.078 | 597784.201 | 65°24'28.201" | 126°43'44.744" |
| 14 | 725379.618 | 598000.609 | 65°25'47.703" | 126°53'17.531" |
| 19 | 725390.928 | 603045.417 | 65°23'03.584" | 126°46'57.557" |
| 20 | 725328.592 | 603440.034 | 65°23'10.536" | 126°45'49.327" |
| 21 | 725328.592 | 603480.345 | 65°23'10.536" | 126°45'49.327" |
| CONTROL MONUMENT | | | | |
| 519017 | 7240954.089 | 603728.514 | 65°16'36.941" | 126°46'57.405" |
| PROPOSED WELL CENTRE | | | | |
| | 603105.009 | 603175.347 | 65°23'22.553" | 126°46'46.730" |
| GRID AREA | | | | |
| N.E. | 7265849.274 | 604101.956 | 65°30'00.000" | 126°45'00.000" |
| N.W. | 7265458.036 | 5923538.447 | 65°30'00.000" | 126°47'00.000" |
| S.E. | 7247262.359 | 6047653.237 | 65°20'00.000" | 126°43'00.000" |
| D.N.E. | 7253279.906 | 603460.979 | 65°23'15.065" | 126°46'24.361" |
| D.N.W. | 7253267.663 | 603098.061 | 65°23'15.083" | 126°46'24.508" |
| D.S.E. | 725285.228 | 6030000.426 | 65°23'00.585" | 126°46'24.380" |

| BEARING TREE TABLE | | | |
|--------------------|--------------|-----------------|--------------|
| STATION | GRID BEARING | GROUND DISTANCE | DESCRIPTION |
| 5 | 243°07'57" | 12.47 | 2.5m SPRUCE |
| | 259°30'02" | 6.81 | 10 cm SPRUCE |
| | 329°54'23" | 0.59 | 5 cm SPRUCE |
| 6 | 115°54'23" | 13.97 | 7 cm SPRUCE |
| | 267°30'02" | 10.87 | 4 cm SPRUCE |
| | 329°59'56" | 15.17 | 5 cm SPRUCE |



UNIT 'D', SECTION 4
GRID AREA 65°30', 126°45'
SCALE: 1:50,000

WITNESS
IMPERIAL OIL RESOURCES LTD.
UMA GEOMATICS
A DIVISION OF LAND ENGINEERING LTD.
2640 KENMOR ROAD NW, CALGARY, ALBERTA T4B 2E0
PROJECT NO. C996-II7-00-06 DRAWING 97100017 REV I
DATE 01/01/99 ORIGINAL ISSUE KJS/JC
REVISION DATE 01/01/99 REVISION DESCRIPTION DRN

CANADA LANDS SURVEYS RECORDS
8 2 2 1 2
DATE FEBRUARY 19, 1999

PLAN AND FIELD NOTES
OF SURVEY OF

PROPOSED EXPLORATORY WELL
DISCOVERY RIDGE
IN UNIT D, SECTION 4
GRID AREA 65°30', 126°45'

NTS MAP 96E/7
NORTHWEST TERRITORIES
CANADA OIL AND GAS LAND REGULATIONS

SCALE: AS SHOWN
SURVEYED FOR

IMPERIAL OIL RESOURCES LTD.

THIS SURVEY WAS EXECUTED DURING THE PERIOD
OCTOBER 10th TO OCTOBER 14, 1997, BY
FRED CHENG, C.L.S.

LEGEND

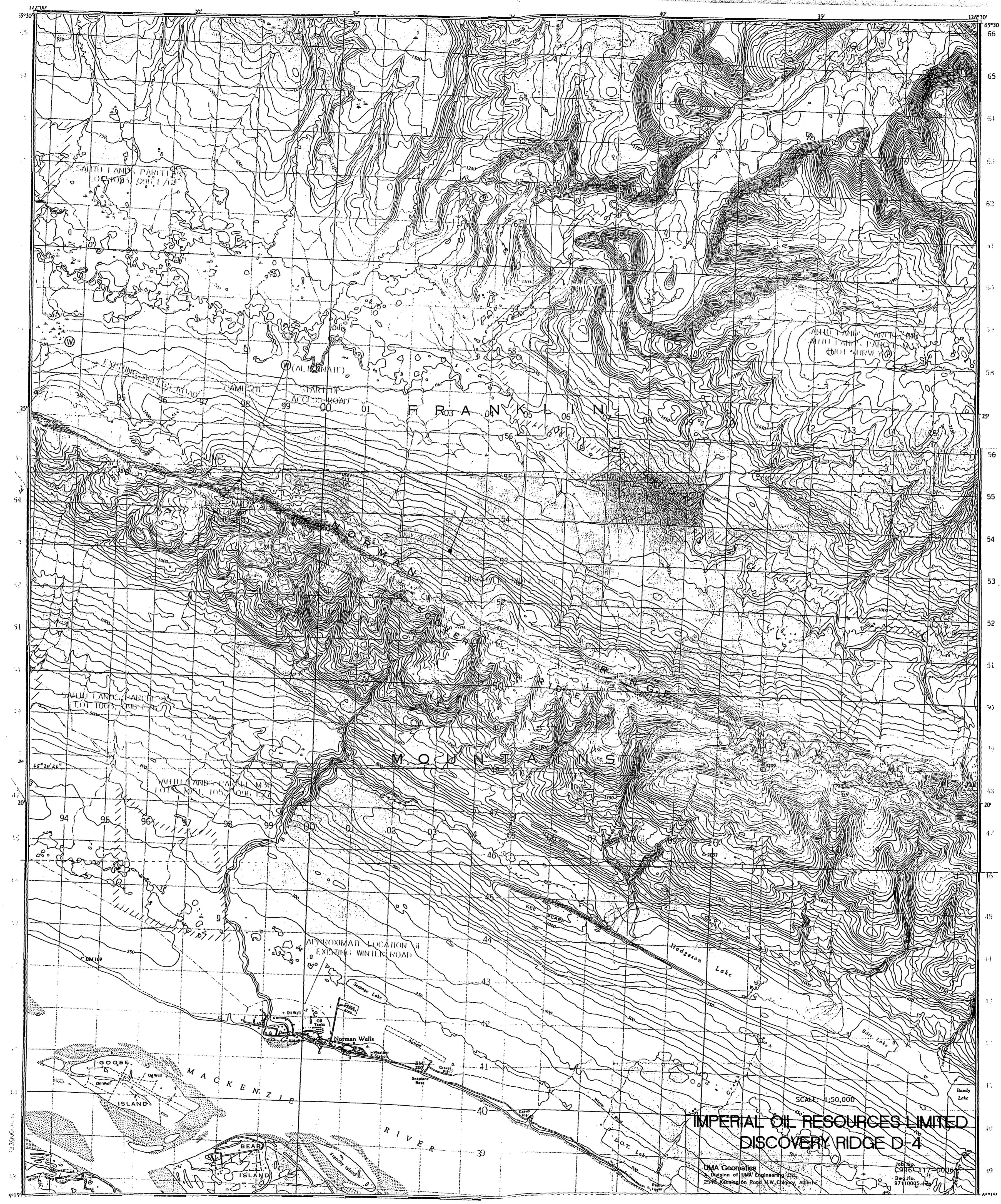
UTM COORDINATES ARE COMPUTED FOR ZONE 9; CENTRAL MERIDIAN 129°W.
BEARINGS WERE DERIVED BY GPS AND ARE REFERRED TO THE MERIDIAN
THROUGH 129° WEST LONGITUDE.
DISTANCES ARE EXPRESSED IN METRES AND DECIMALS THEREOF.
FOR THE COMPUTATION OF COORDINATES MEASURED DISTANCES HAVE BEEN
REDUCED TO THE UTM PLANE BY MULTIPLYING THEM BY AN AVERAGE COMBINED
SCALE FACTOR OF 1.000000.
DISTANCES SHOWN ON GRID AREA SUBDIVISIONS ARE ON THE UTM PLANE.
AUTHORIZED CONTROL MONUMENTS PLACED SHOWN THUS: ●
CLS 77 MONUMENTS FOUND SHOWN THUS: ●
TRAVERSE POINTS PLACED SHOWN THUS: ▲
DISTANCES SHOWN FOUND SHOWN THUS: ▲
GPS DENOTES GLOBAL POSITIONING SYSTEM OBSERVATIONS

I, FRED CHENG, OF THE CITY OF CALGARY, ALBERTA, CANADA LANDS
SURVEYOR, MAKE OATH AND SAY THAT I HAVE IN MY OWN PROPER PERSON,
ACCORDING TO LAW AND THE INSTRUCTIONS OF THE SURVEYOR GENERAL OF
CANADA LANDS, FAITHFULLY AND CORRECTLY EXECUTED THE SURVEY SHOWN
BY THIS PLAN AND FIELD NOTES, AND THAT THE SAID PLAN AND FIELD NOTES
ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.
SO HELP ME GOD

SWORN BEFORE ME AT CALGARY, ALBERTA CANADA LANDS SURVEYOR
THIS 22nd DAY OF JANUARY, 1999

W. Cheng
A COMMISSIONER FOR THE
IN AND FOR THE PROVINCE OF ALBERTA
CHARMAINE HEMMING Esq. JULY 29, 1999.

24X

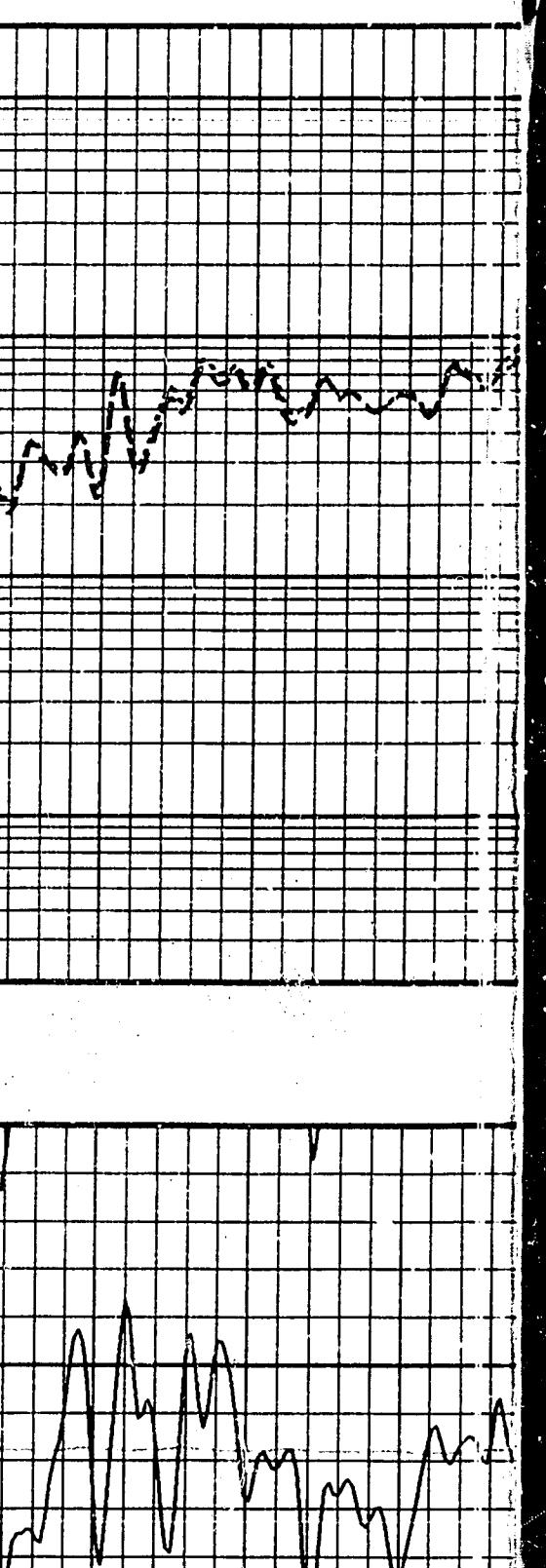
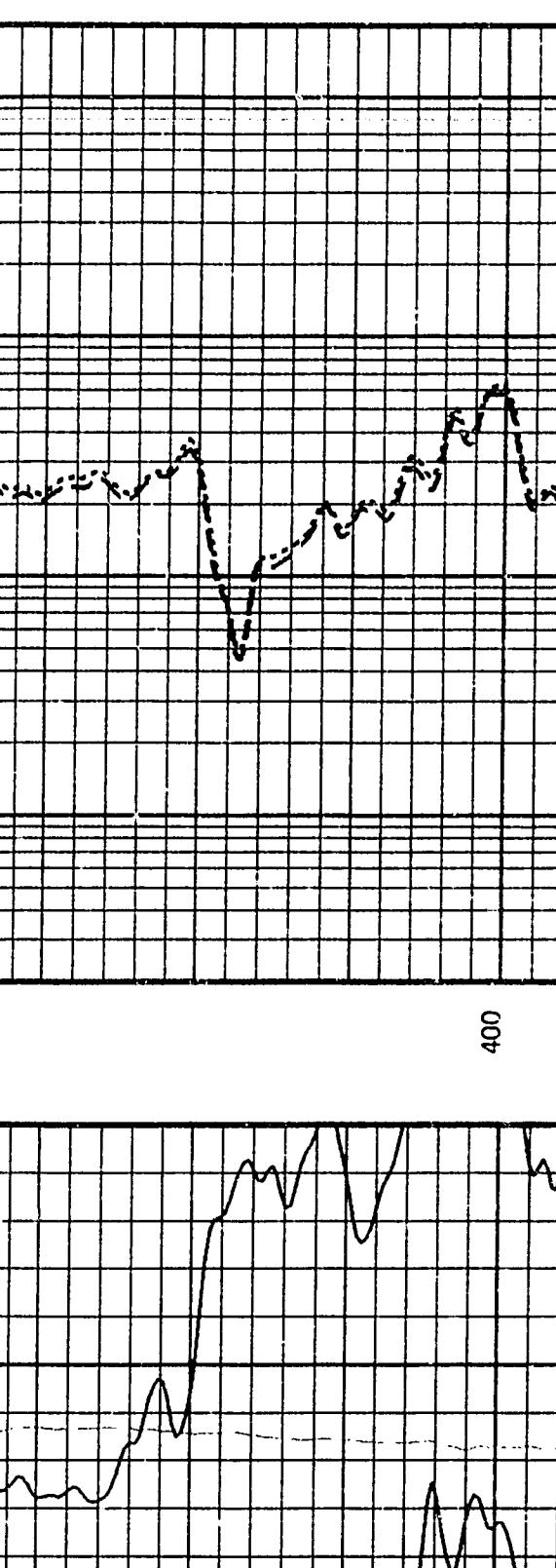
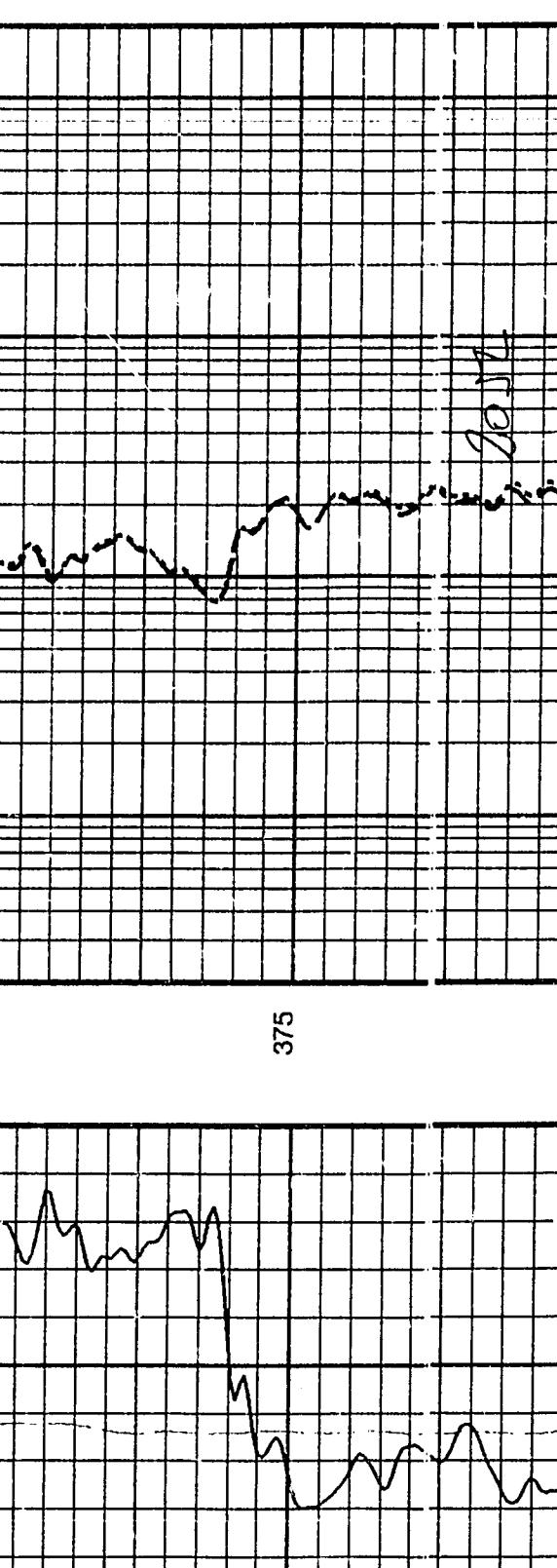
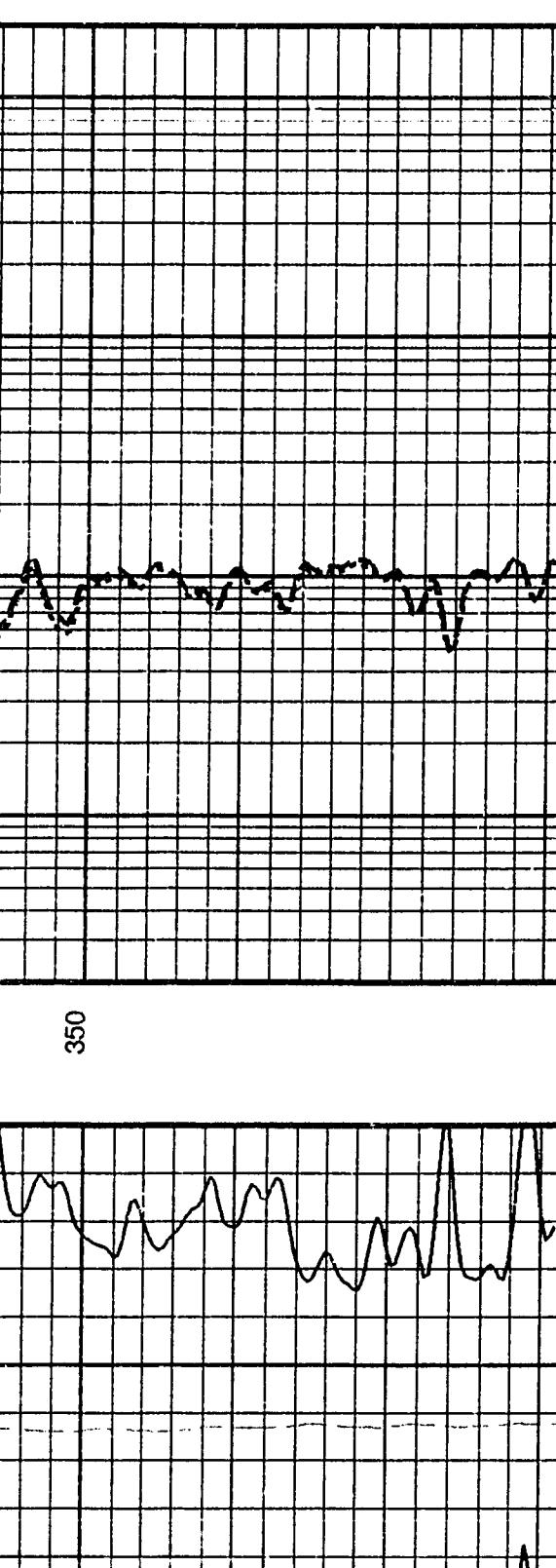
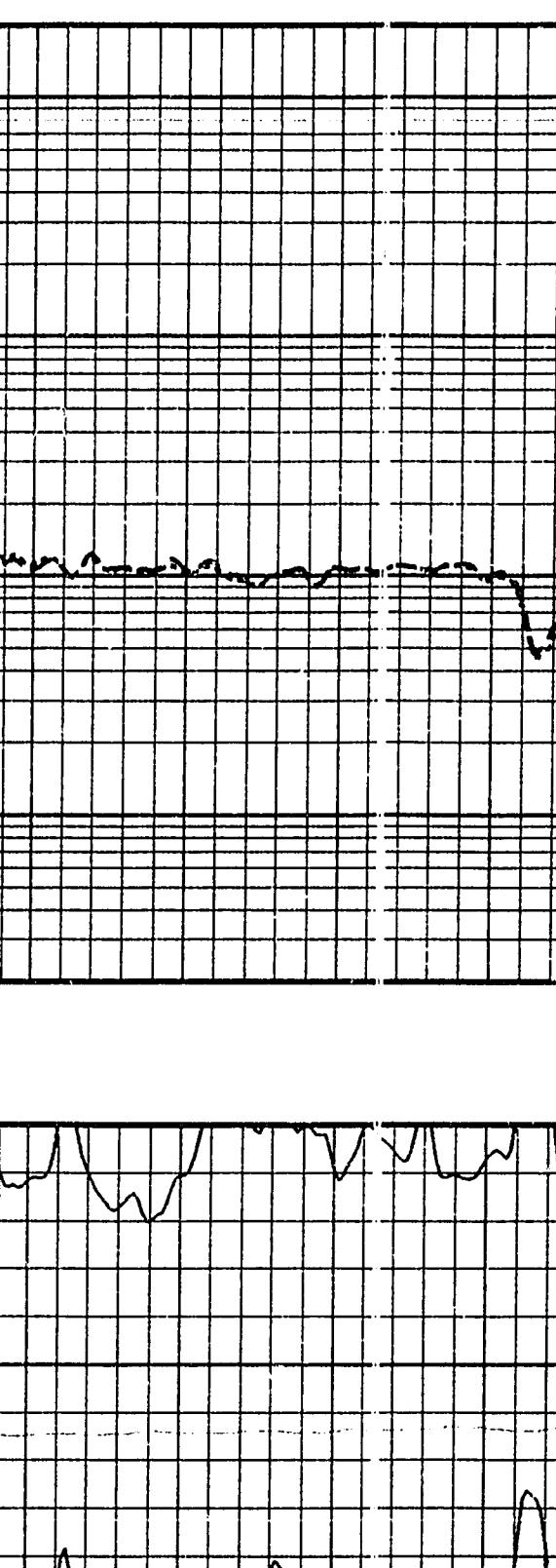
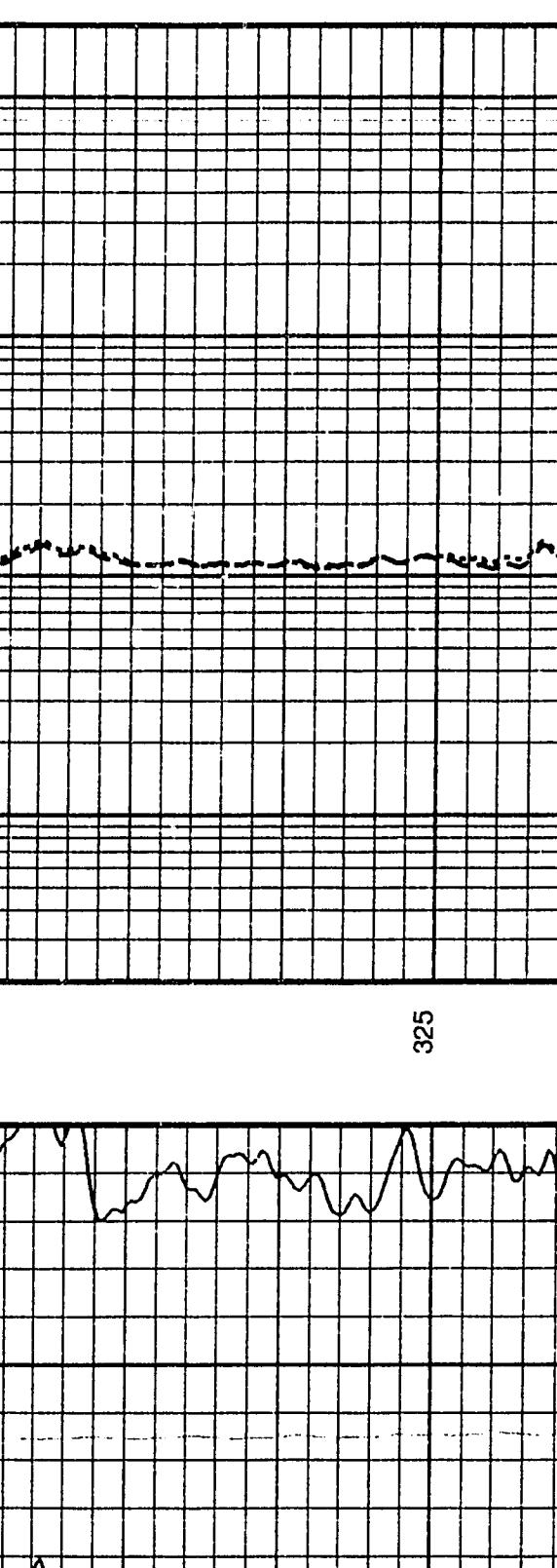
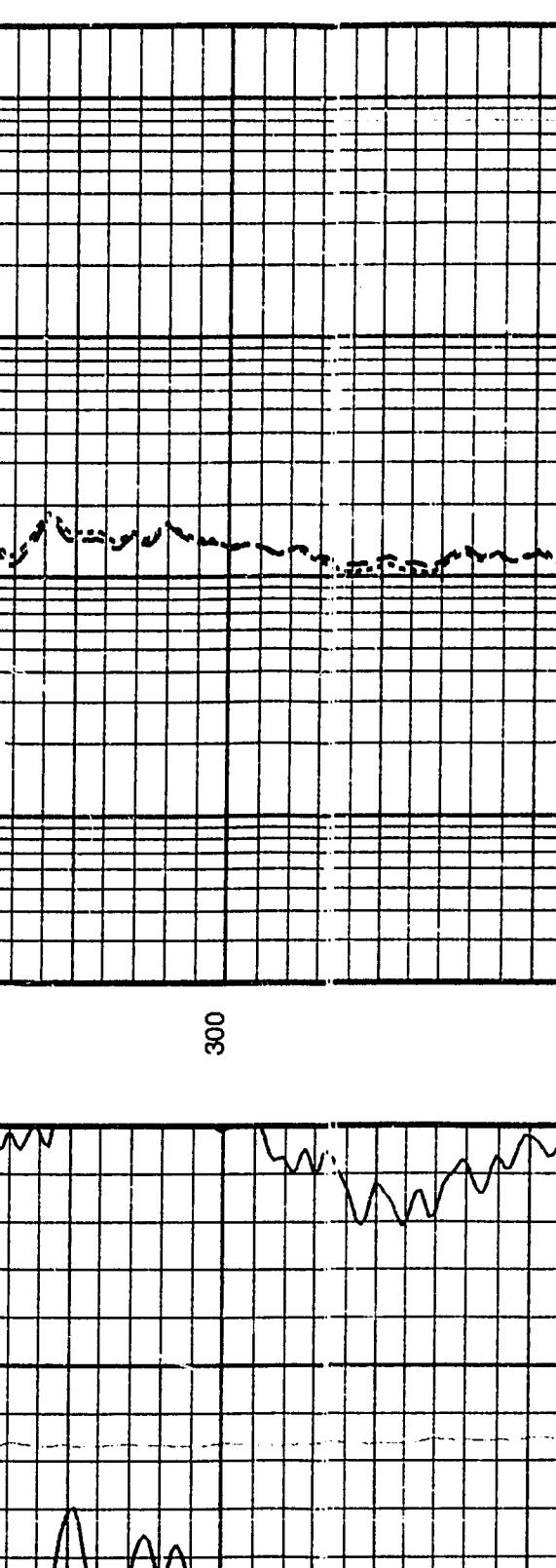
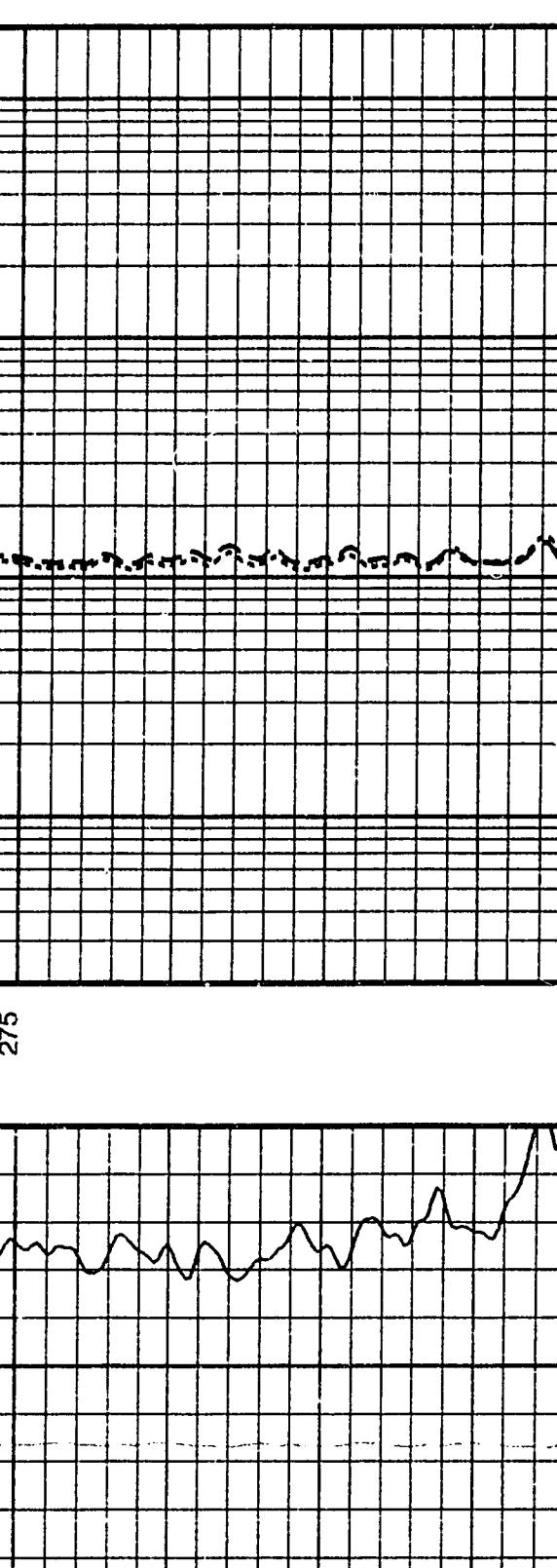
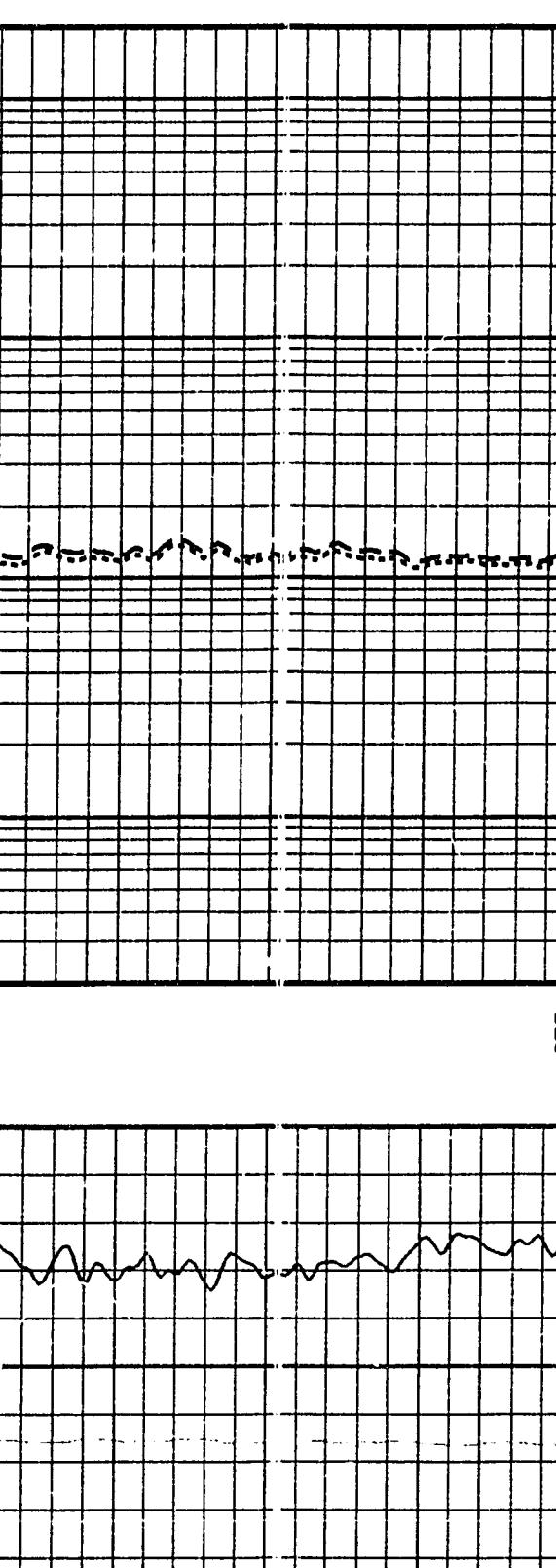
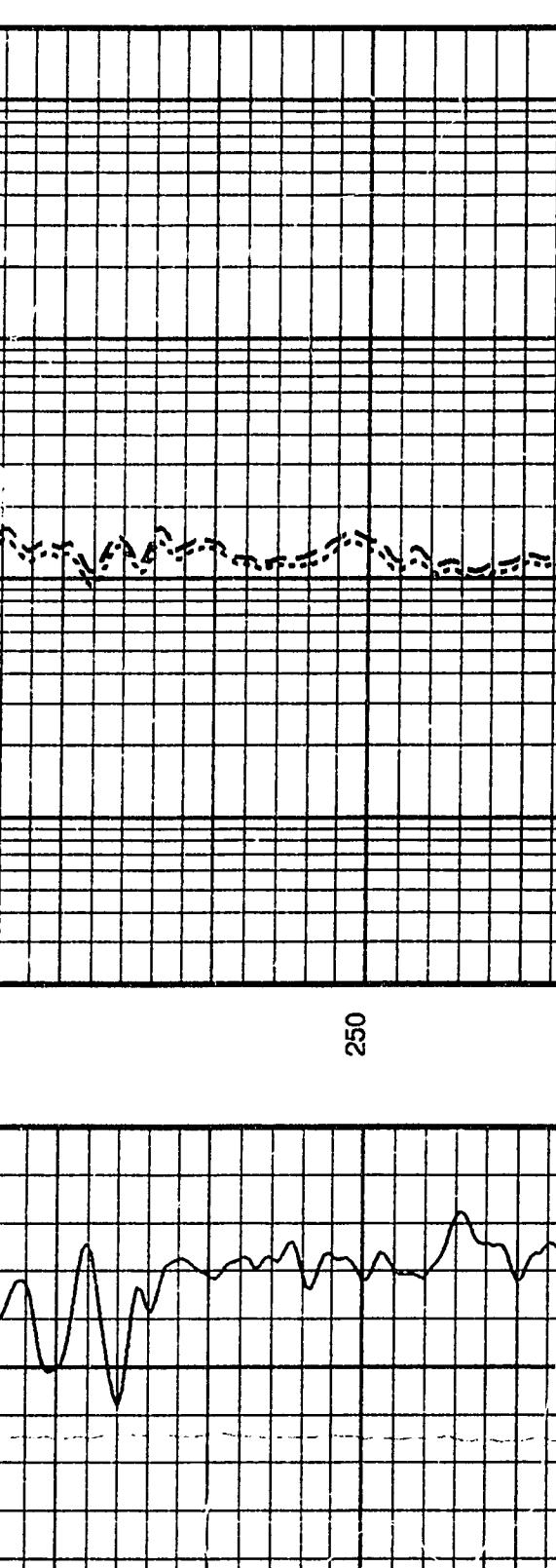
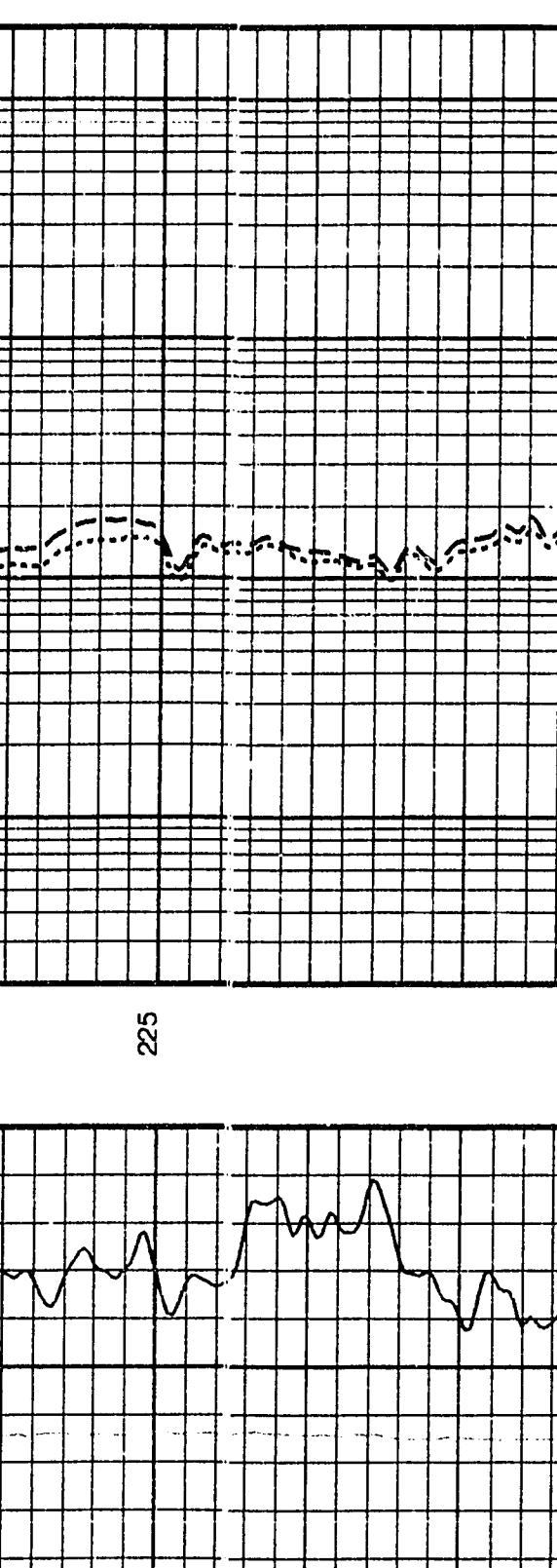
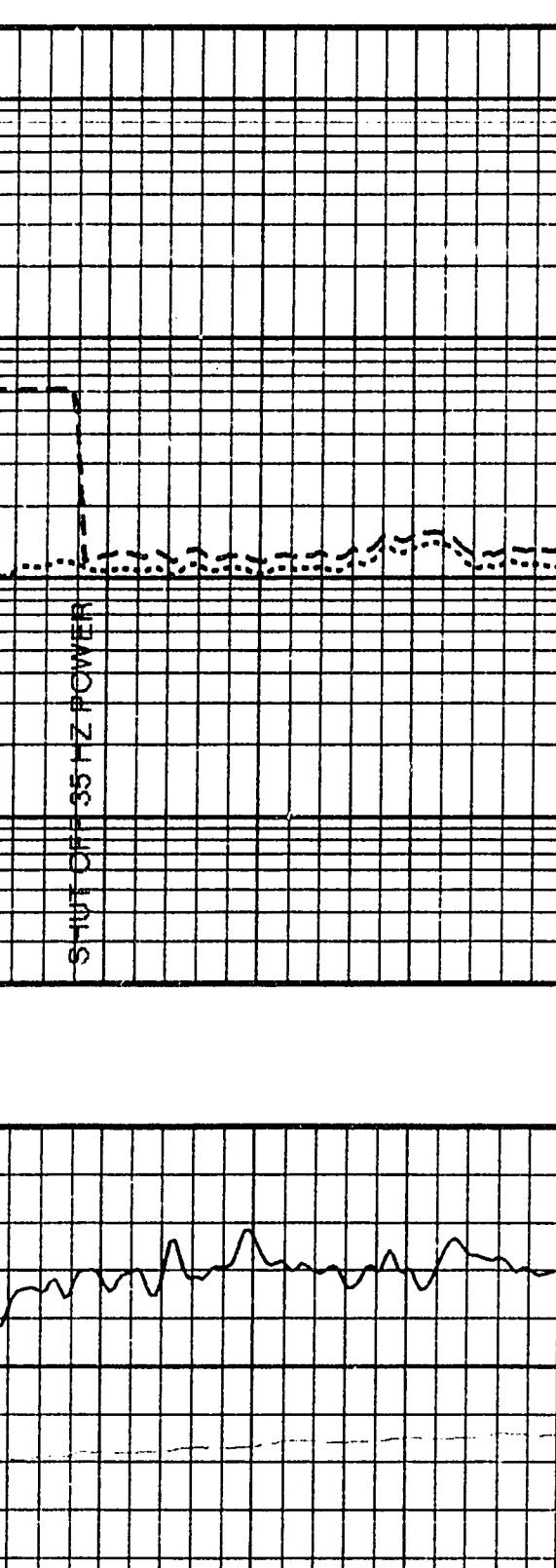
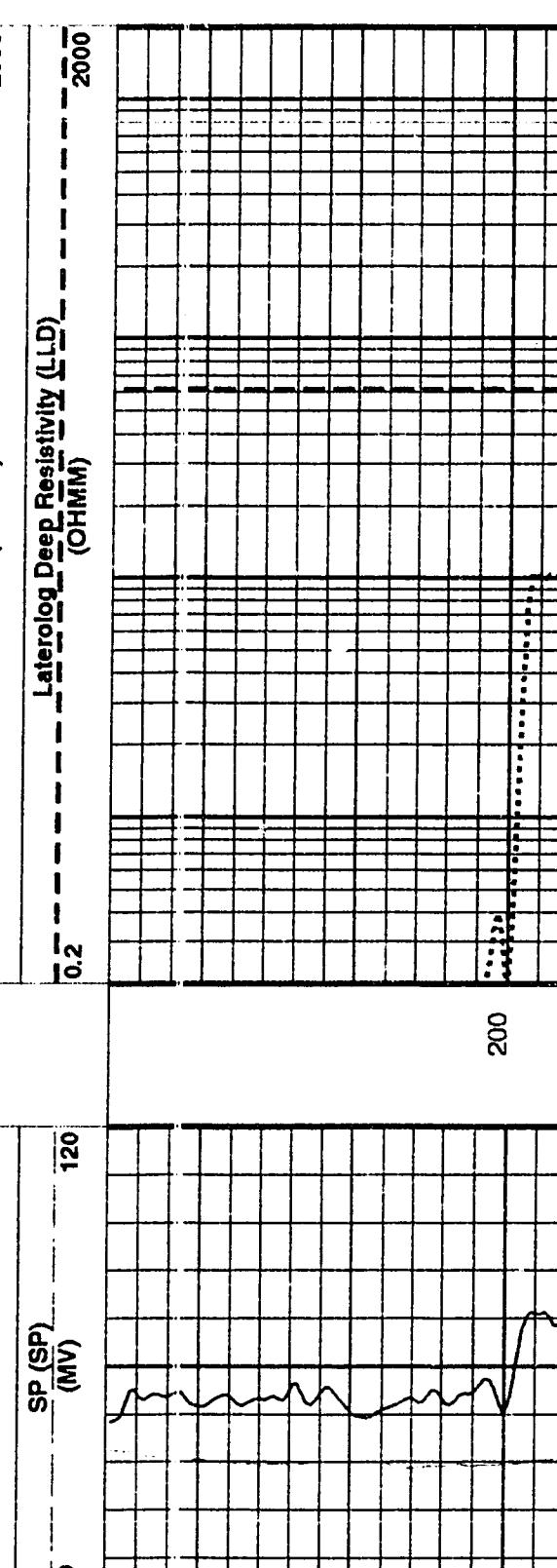
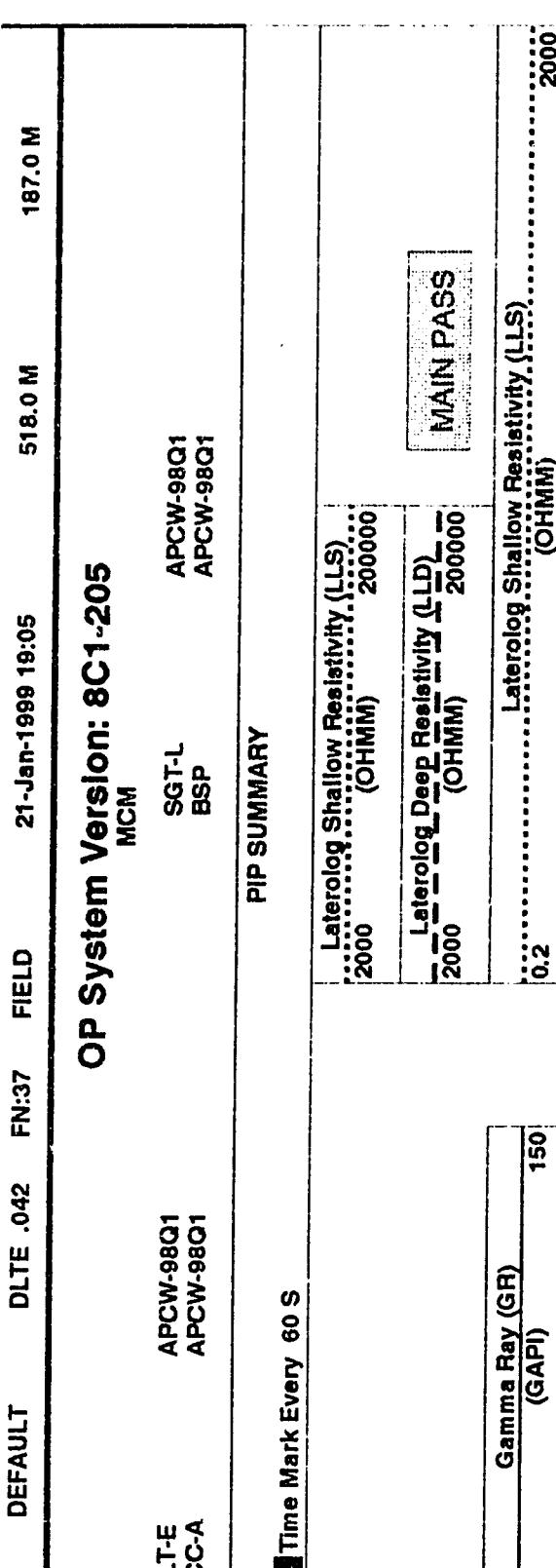
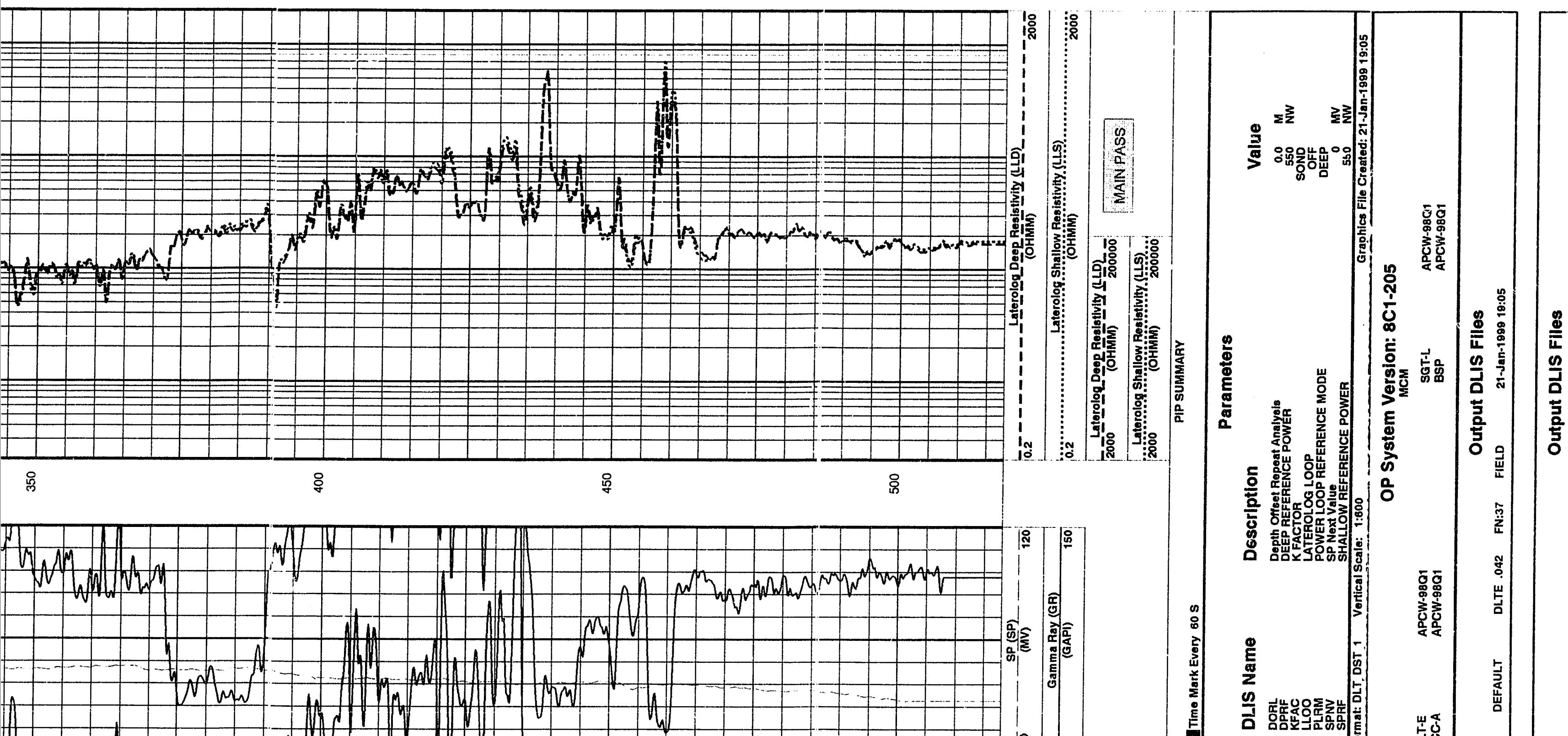


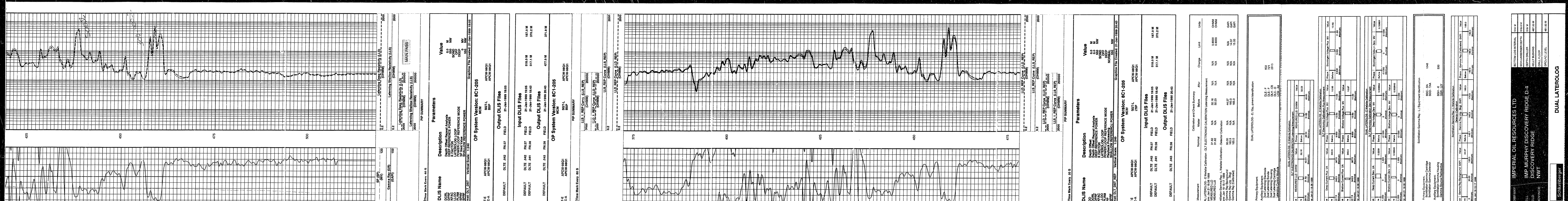
IMPERIAL OIL RESOURCES LIMITED

DISCOVERY RIDGE D-4

UMA Geomatics
A Division of UMA Engineering Ltd.
2510 Kensington Road, N.W., Calgary, Alberta
Job No. C996-T17-00067
Dwg. No. 97110005.dwg

RESISTIVITY/ CONDUCTIVITY





SONIC

N.E.B. COPY

1837

Schlumberger

GEOFRAME
PROCESSED
INTERPRETATION

Dipole Shear Sonic Imager

MD Logs

Using the following logs: DSI-CNL-GR

A Mark of Schlumberger

COMPANY: IMPERIAL OIL RESOURCES LTD

WELL: IMP MURPHY DISCOVERY RIDGE D-4

FIELD: DISCOVERY RIDGE

PROVINCE: NWT

COUNTRY: 22-JAN-1999

Date Logged: 25-JAN-1999

Well Location:

Elevations: KB: 467.33m DF: 461.93m

API Number: WID# 1837 Job Number: 6078668

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone reading from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

Field Recording: 6864 Software Version: 8C1-205 Engineer: SEAN MCCONKEY

Office Recording: Location: ICS Center: Calgary Baseline: Log Analyst: J. Serrao

Mud and Borehole Measurements:

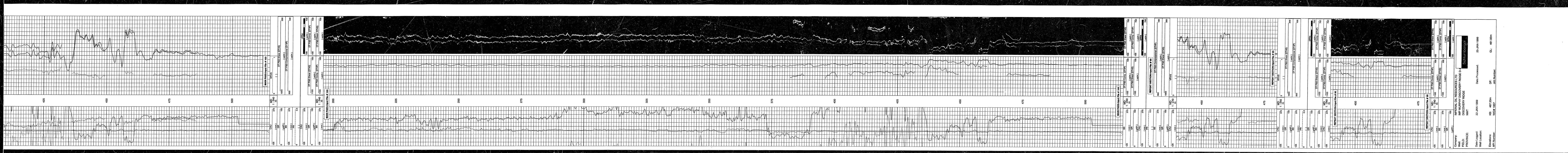
Rm @ Measured Temperature: 44.10hm.m @ 17degC BHT: 18degC Bit size: 222mm

Rm @ Measured Temperature: 45.30hm.m @ 18degC Type Fluid in Hole: GEL CHEM

Rm @ Measured Temperature: 53.10hm.m @ 18degC Mud Density: 1180kg/m3

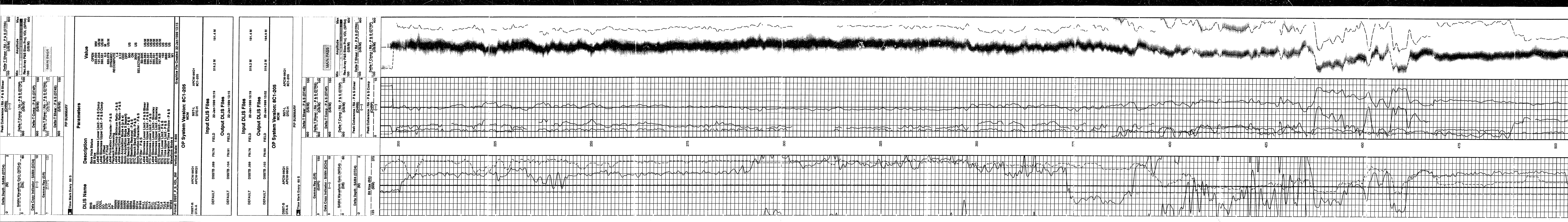
Remarks:

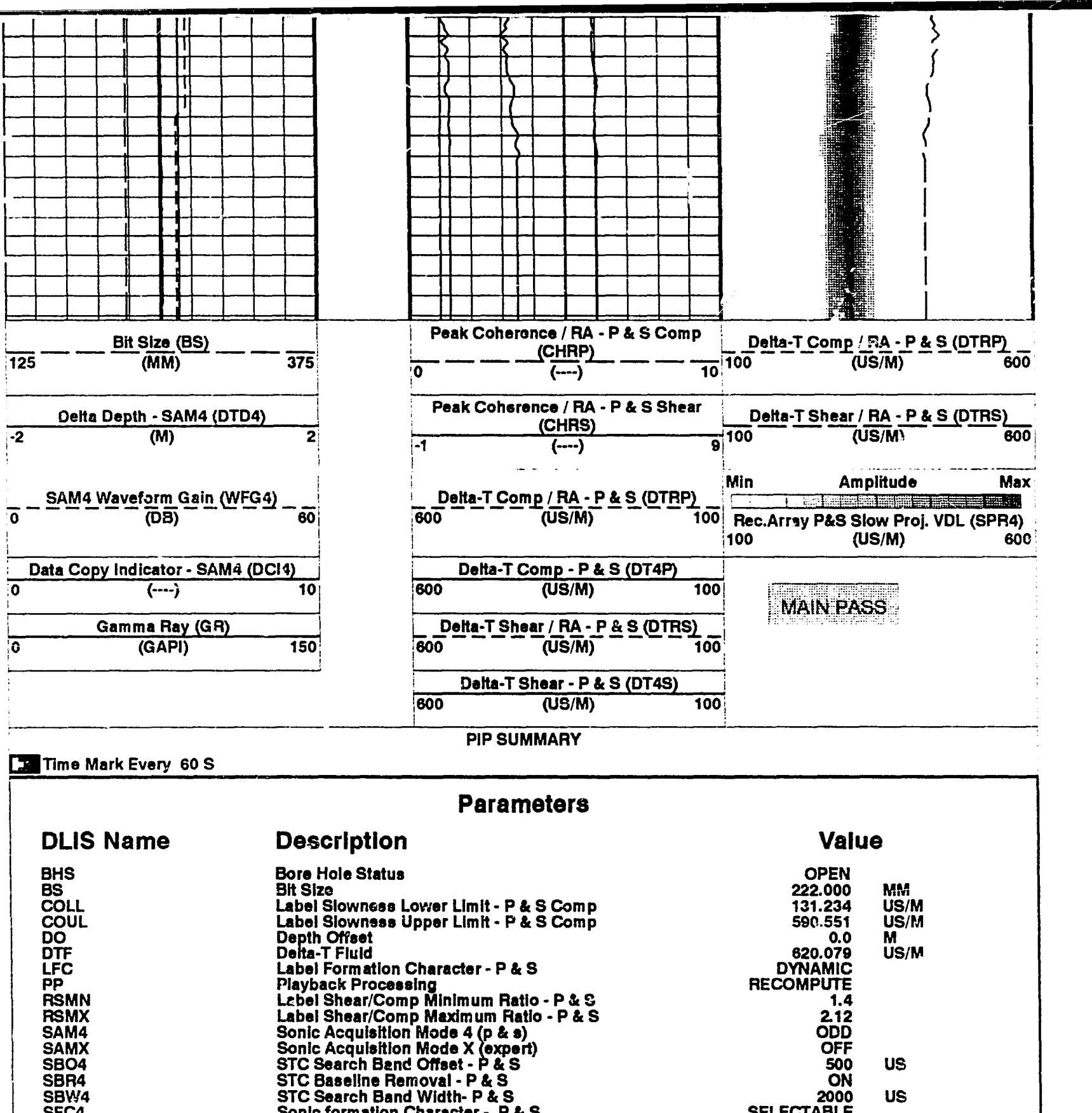




**LEGIBILITY
OF LOG
COULD VARY
DUE TO
COLOR
CONTENT**







SFC4
SFM4
SHLL
SHUL

er Limit - Stoneley
er Limit - Stoneley
er Limit - P & S
er - P & S

| | | | |
|-----------------------------------|-------------------------------------|-------|--|
| TEL4 | STC Time Lower Limit - P & S | 150 | US |
| TUL4 | STC Time Upper Limit - P & S | 3660 | US |
| TWI4 | STC Integration Time Window - P & S | 500 | US |
| WFM4 | Waveform Mode 4 | W1 | |
| DSST-B | Vertical Scale: 1:240 | | |
| DSST-B | DSST_P_S_VDL_BW | | Graphics File Created: 22-Jan-1999 13:02 |
| DTA-A | | | |
| DSST-B | APCW-98Q1 | SGT-L | APCW-98Q1 |
| DTA-A | APCW-98Q1 | DTC-H | 8C1-205 |
| OP System Version: 8C1-205 | | | |
| MCM | | | |
| Input DLIS Files | | | |
| DEFAULT | DSSTB .089 | FN:76 | FIELD |
| | | | 22-Jan-1999 10:19 |
| | | | 519.2 M |
| | | | 191.4 M |
| Output DLIS Files | | | |
| DEFAULT | DSSTB .103 | FN:90 | FIELD |
| | | | 22-Jan-1999 13:02 |
| Input DLIS Files | | | |
| DEFAULT | DSSTB .091 | FN:78 | FIELD |
| DEFAULT | DSSTB .089 | FN:76 | FIELD |
| | | | 22-Jan-1999 11:48 |
| | | | 22-Jan-1999 10:19 |
| | | | 482.7 M |
| | | | 519.2 M |
| | | | 425.3 M |
| | | | 191.4 M |
| Output DLIS Files | | | |
| DEFAULT | DSSTB .095 | FN:82 | FIELD |
| | | | 22-Jan-1999 12:12 |
| | | | 482.7 M |
| | | | 438.0 M |
| OP System Version: 8C1-205 | | | |
| MCM | | | |
| DSST-B | APCW-98Q1 | SGT-L | APCW-98Q1 |
| DTA-A | APCW-98Q1 | DTC-H | 8C1-205 |
| PIP SUMMARY | | | |
| Time Mark Every: 60 S | | | |

Time Mark Every 60 S

DT4S_

600 (US/M)
DSST_STC_DTRS REP Curve (REP)

10

DSST_STC_DT4P REP Curve (DT4P REP)
600 (LS/M) 100

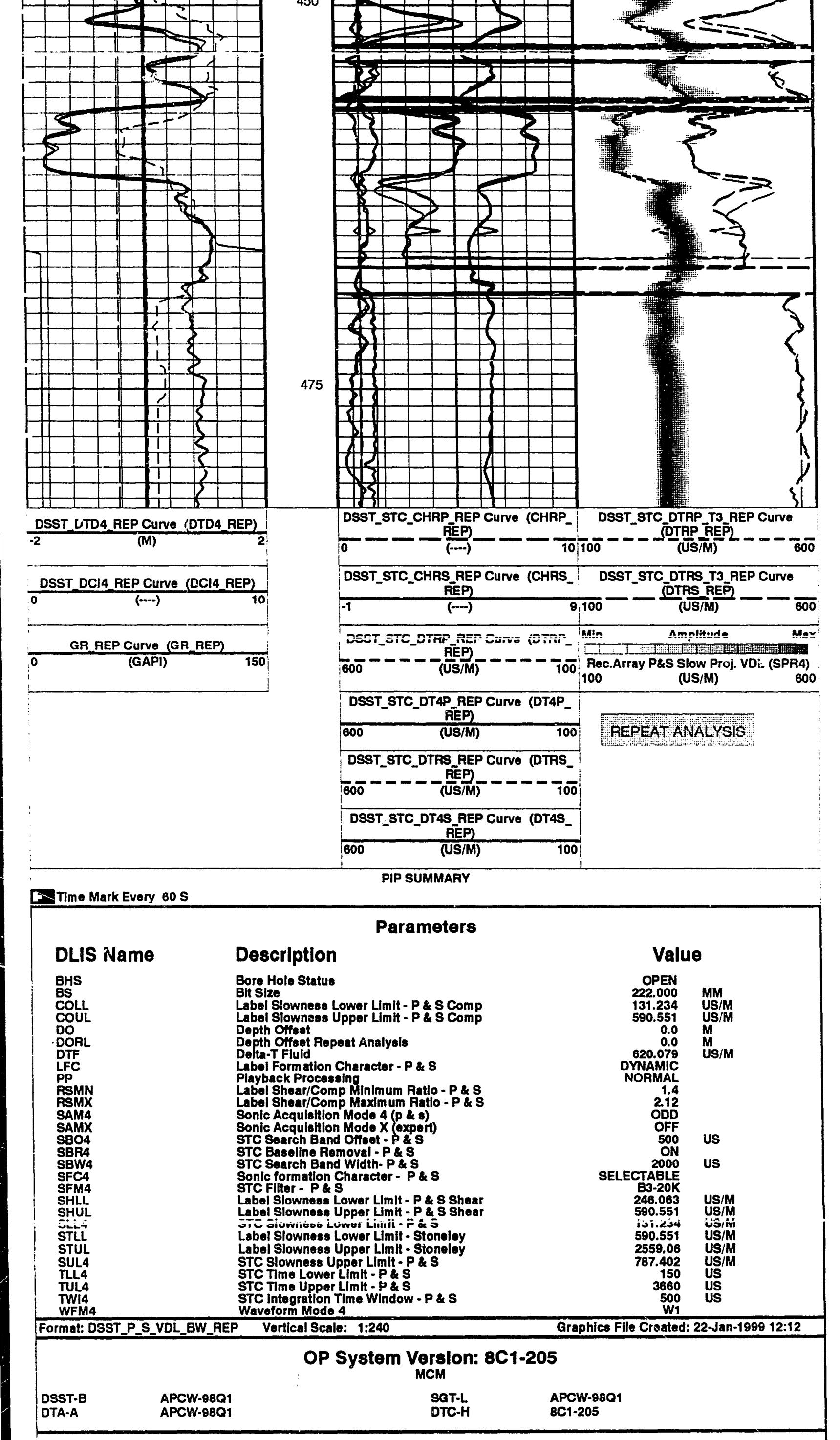
DSST_STC_DTRP REP

DSST DCI4 REP Curve (DCI4 REP) DSST_STC_CHRS REP Curve (CHRS REP) DSST_STC_DTRS T3 REP

0 REP (---)

A hand-drawn sketch of a wavy line on a grid background. The line starts at the top left, descends, then rises sharply, dips, and rises again, ending at the bottom right. The sketch is done in black ink on a white background with a light gray grid.

3



DEFAULT

D 22-Jan

| | |
|----------------|----------------|
| 462.7 M | 463.0 M |
| 519.2 M | 191.4 M |

RIDGE D-4

DENSITY

Geological Log for Well 8C1-205

| Depth (ft) | Lithology | Gamma Ray (API) | Density (ppm) |
|------------|-----------|-----------------|---------------|
| 1800 | Shale | 100 | 1180 |
| 1750 | Sandstone | 100 | 1180 |
| 1700 | Sandstone | 100 | 1180 |
| 1650 | Sandstone | 100 | 1180 |
| 1600 | Sandstone | 100 | 1180 |
| 1550 | Sandstone | 100 | 1180 |
| 1500 | Sandstone | 100 | 1180 |
| 1450 | Sandstone | 100 | 1180 |
| 1400 | Sandstone | 100 | 1180 |
| 1350 | Sandstone | 100 | 1180 |
| 1300 | Sandstone | 100 | 1180 |
| 1250 | Sandstone | 100 | 1180 |
| 1200 | Sandstone | 100 | 1180 |
| 1150 | Sandstone | 100 | 1180 |
| 1100 | Sandstone | 100 | 1180 |
| 1050 | Sandstone | 100 | 1180 |
| 1000 | Sandstone | 100 | 1180 |
| 950 | Sandstone | 100 | 1180 |
| 900 | Sandstone | 100 | 1180 |
| 850 | Sandstone | 100 | 1180 |
| 800 | Sandstone | 100 | 1180 |
| 750 | Sandstone | 100 | 1180 |
| 700 | Sandstone | 100 | 1180 |
| 650 | Sandstone | 100 | 1180 |
| 600 | Sandstone | 100 | 1180 |
| 550 | Sandstone | 100 | 1180 |
| 500 | Sandstone | 100 | 1180 |

Well Log Plot for Well 8C1-205

Logs: Gamma Ray (GR), Resistivity (R), Density (D), Sonic (S)

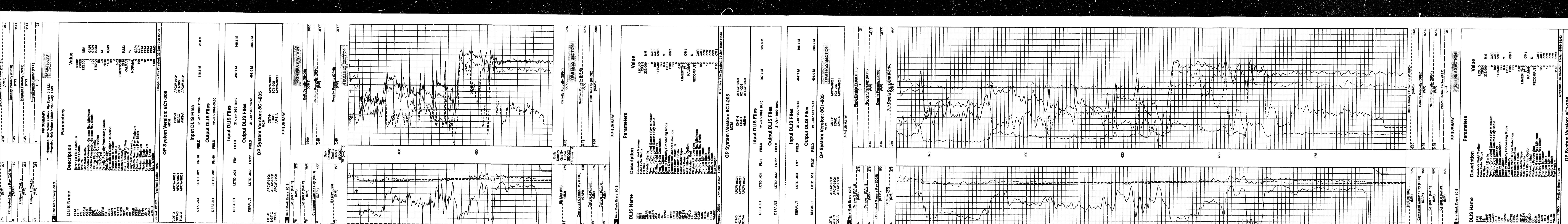
Vertical Scale: 1800 to 500 feet

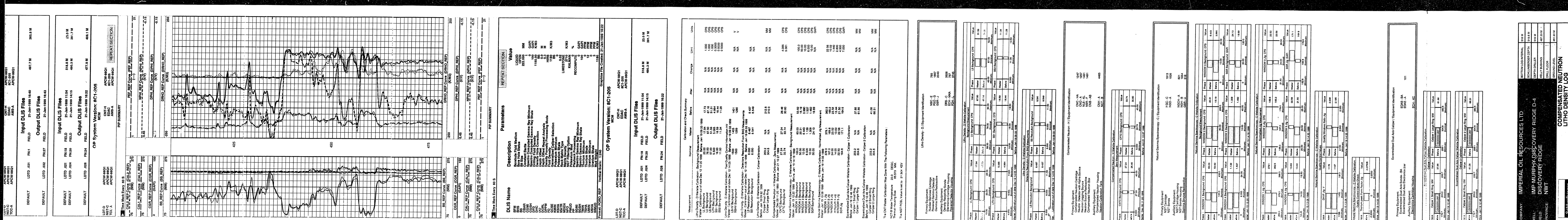
Horizontal Scale: 0 to 1000 feet

Legend: GR (Gamma Ray), R (Resistivity), D (Density), S (Sonic)

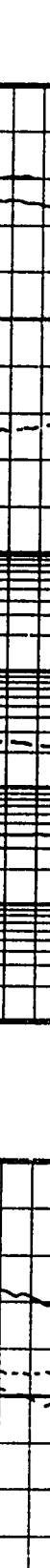
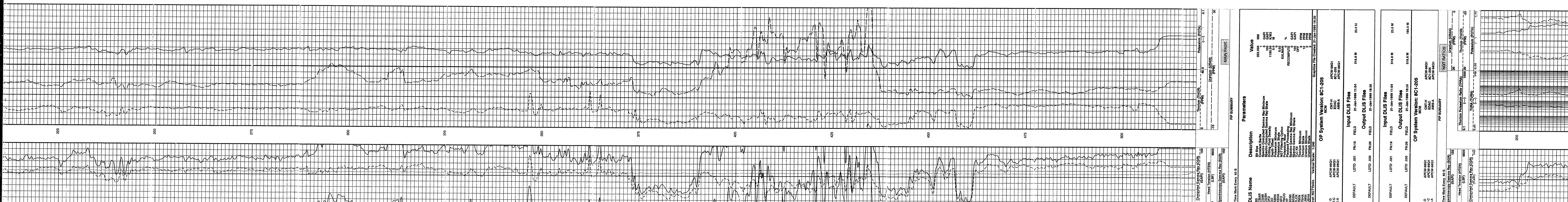
Scale Bar: 0, 250, 500, 750 feet

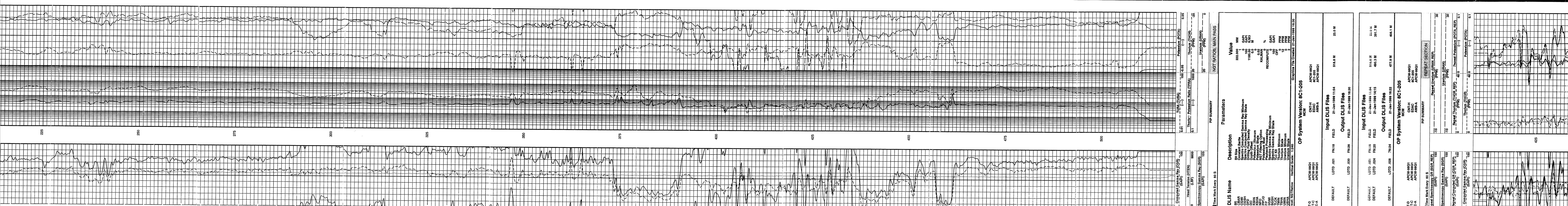
North Arrow

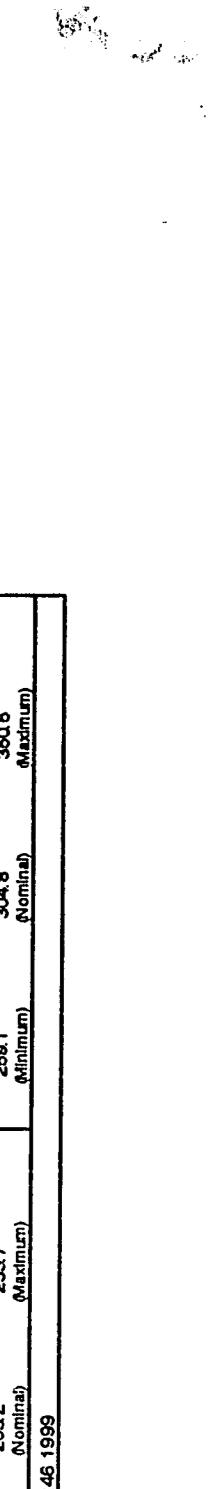
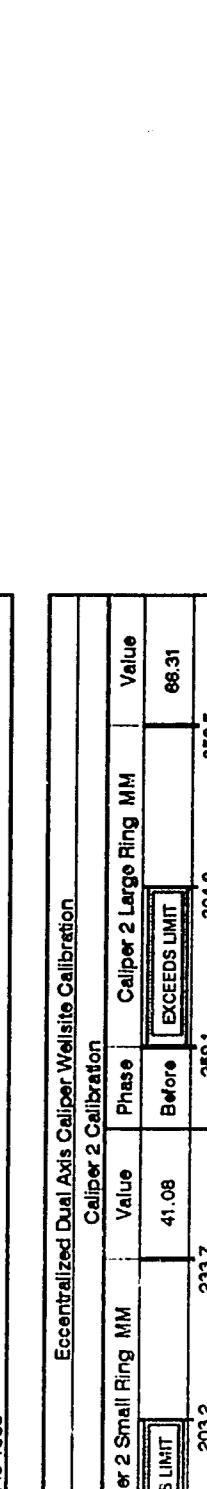
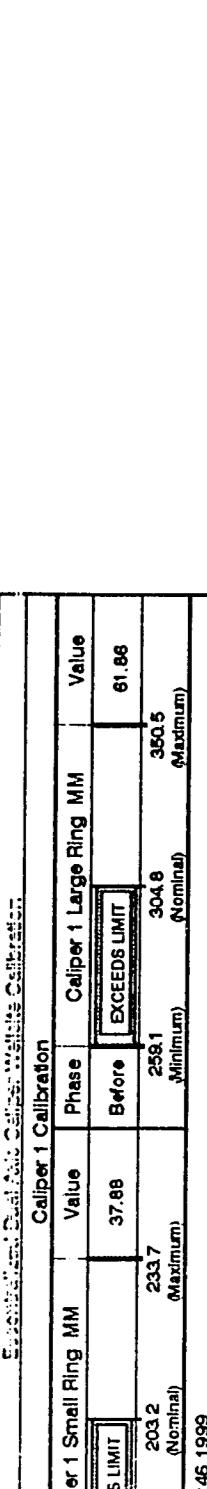
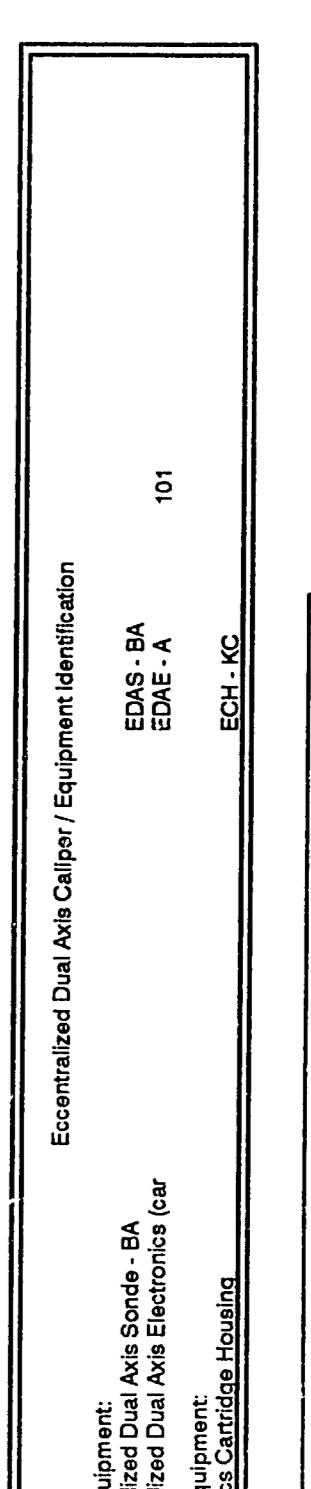
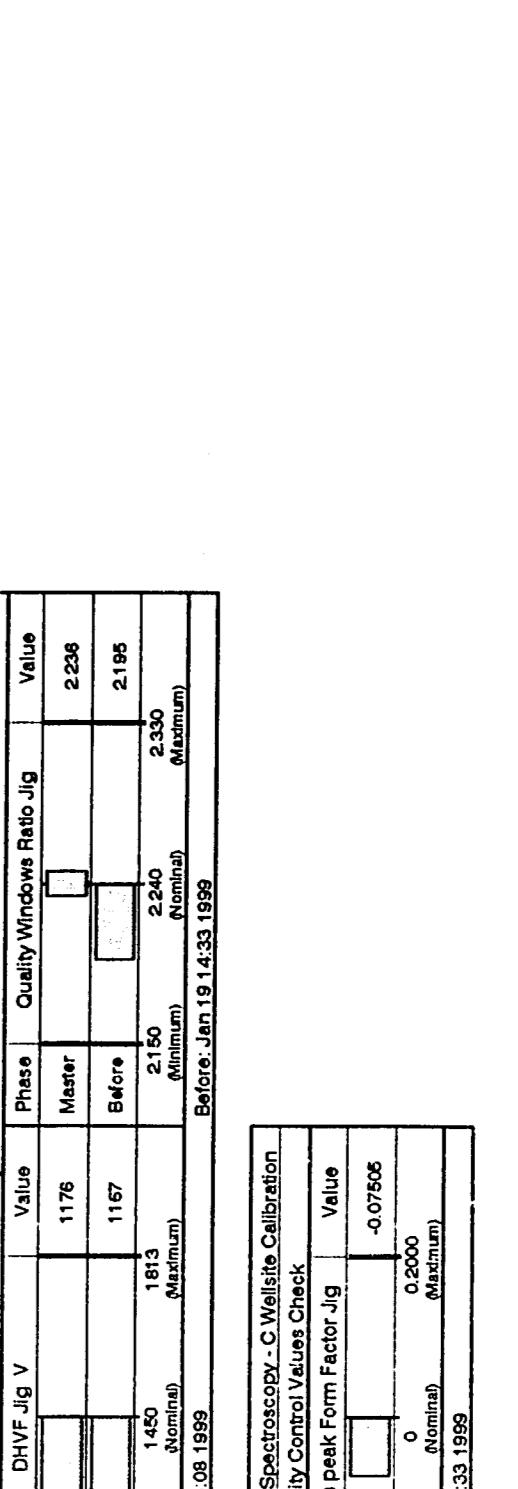
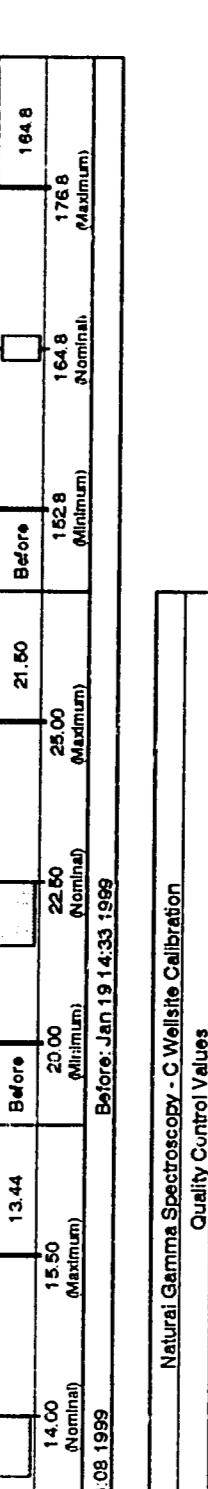
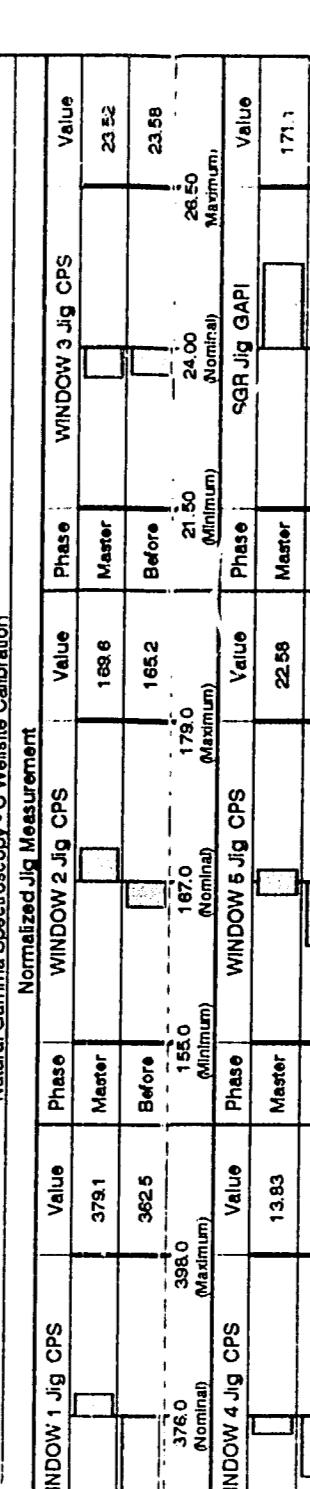
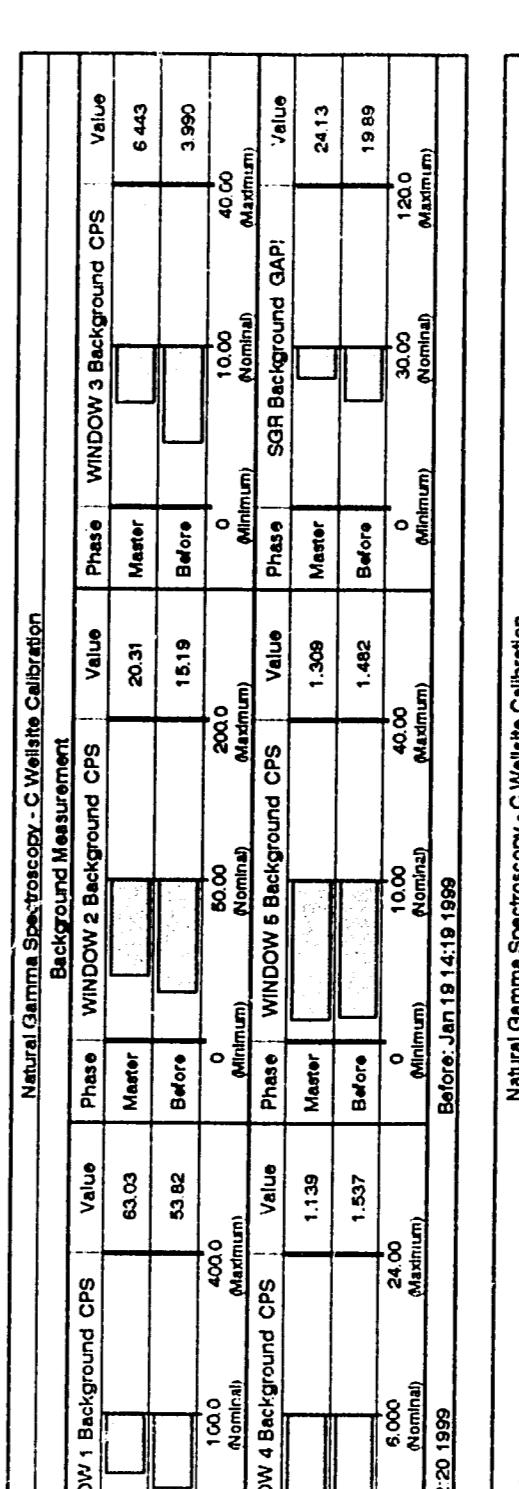
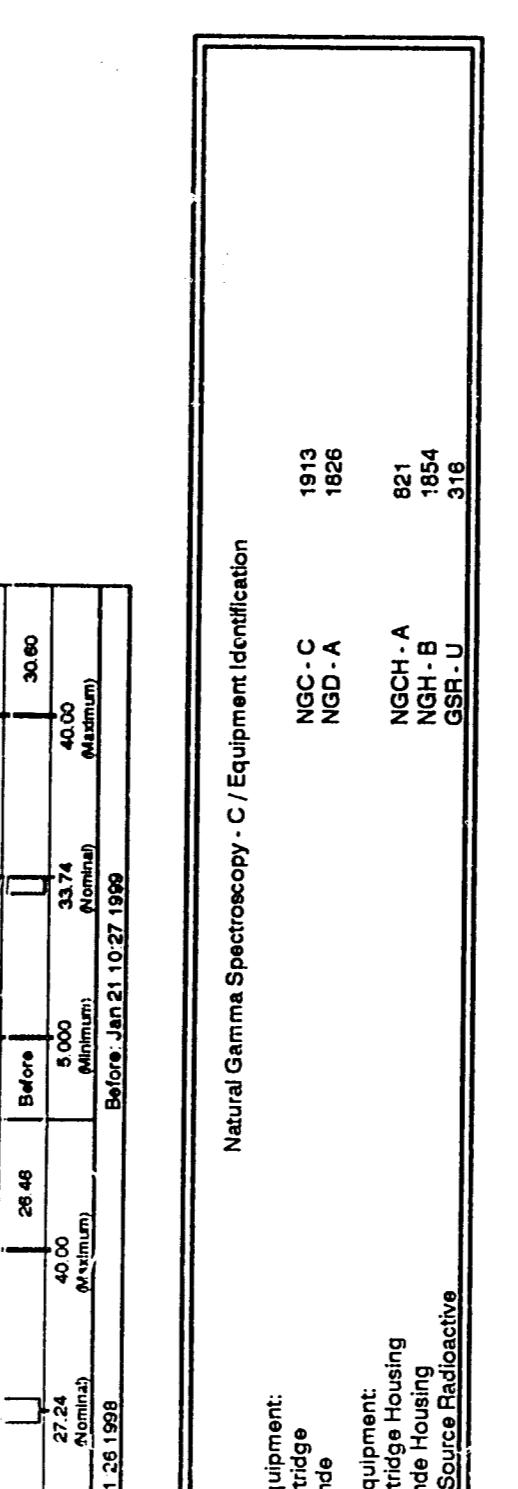
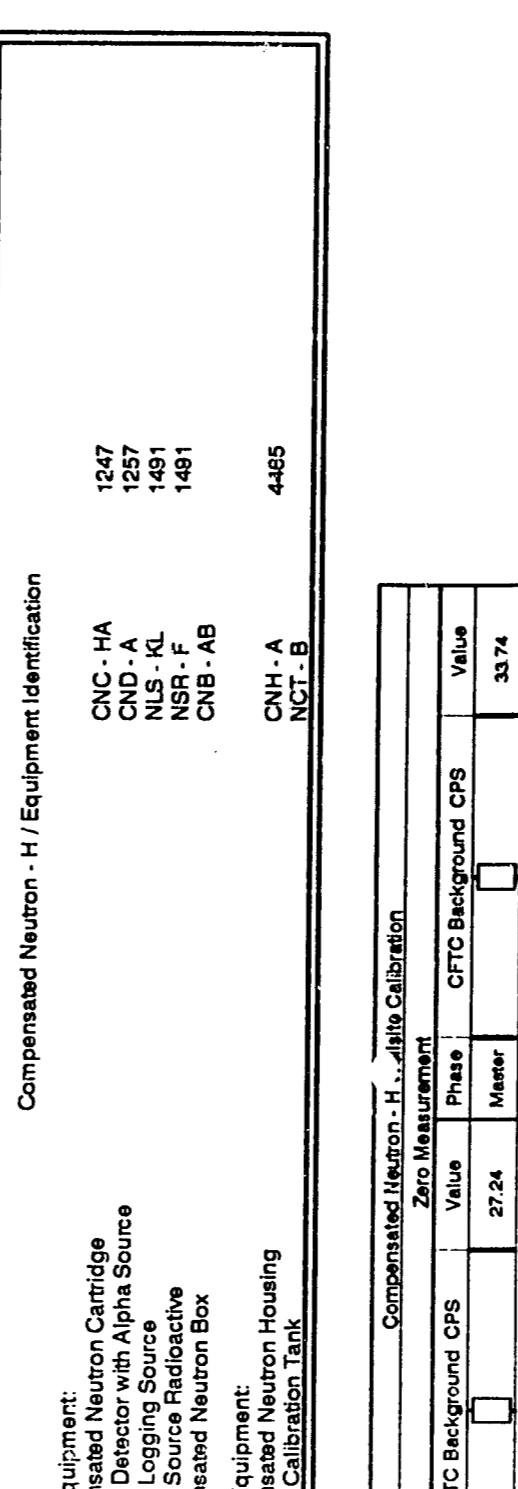
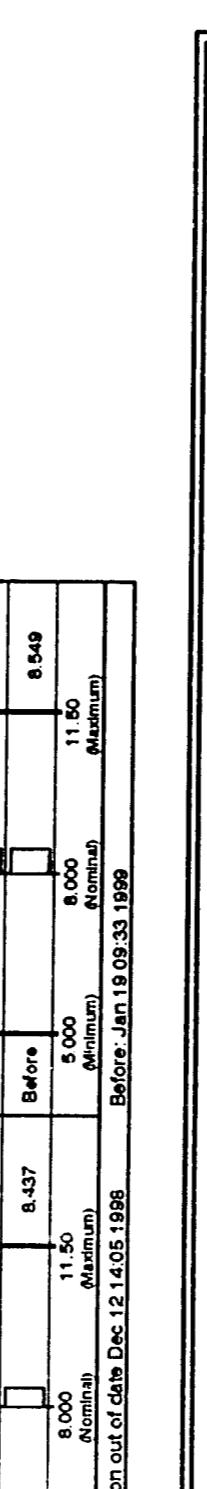
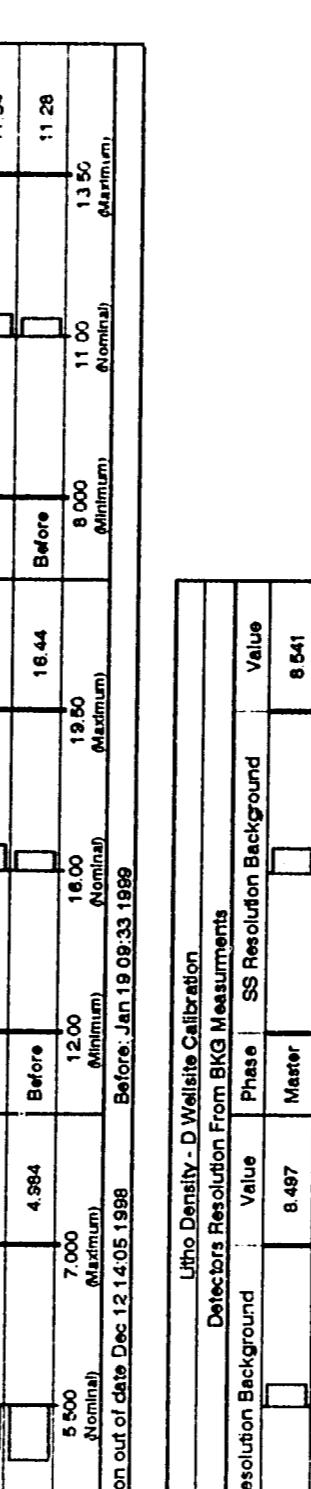
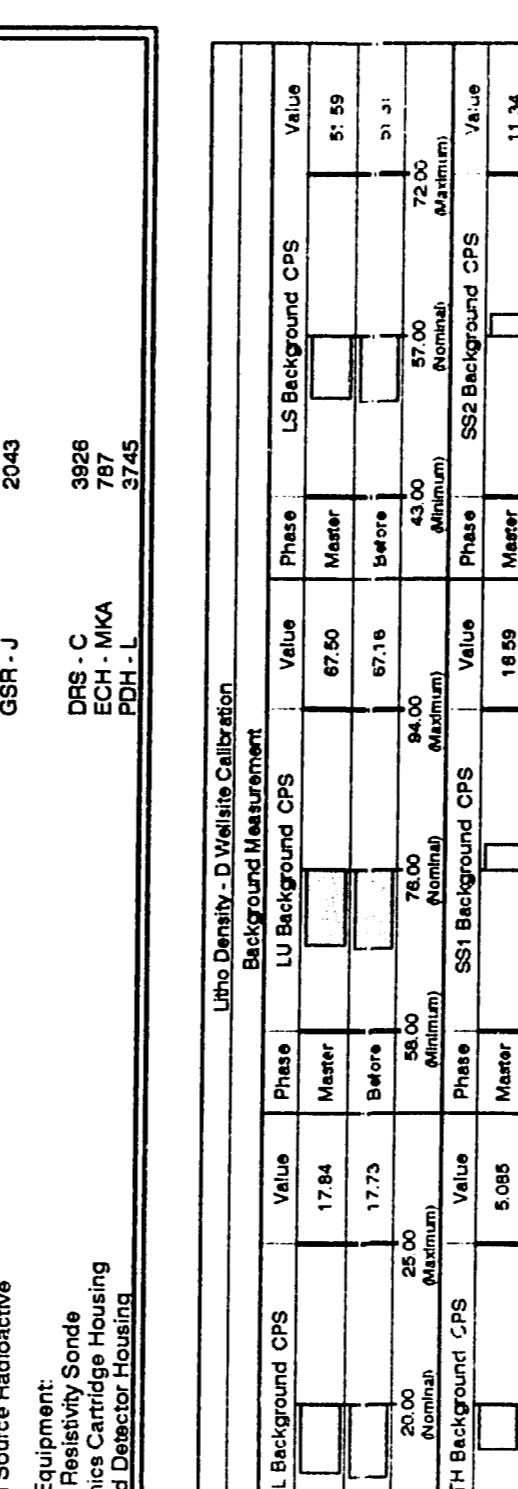
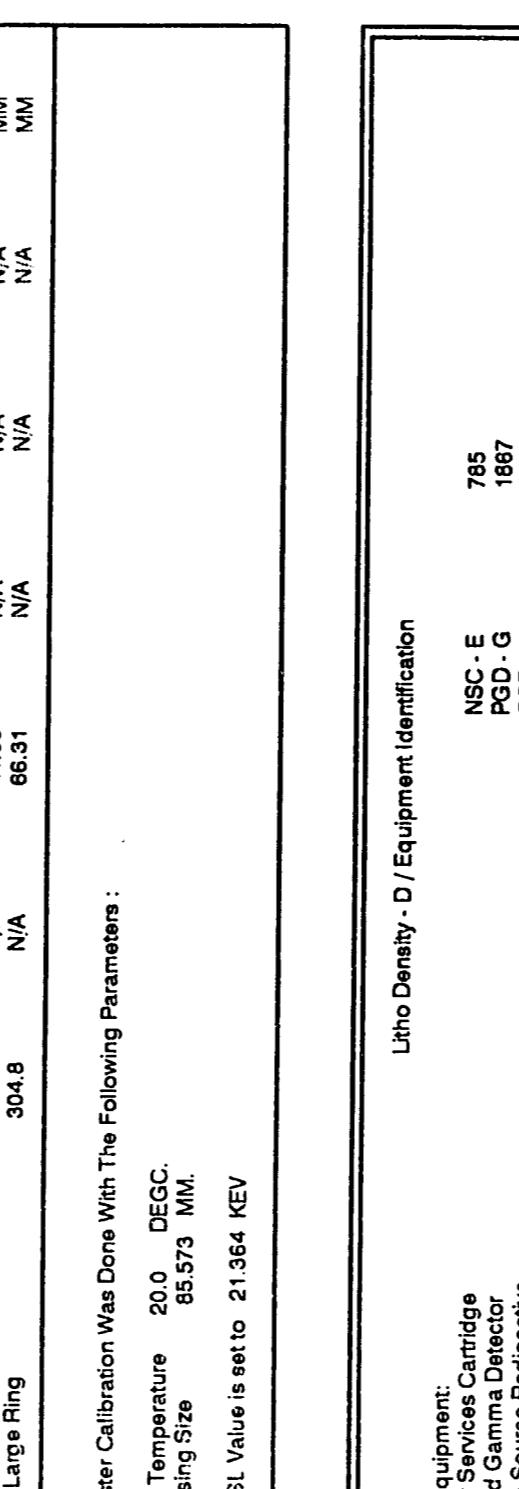
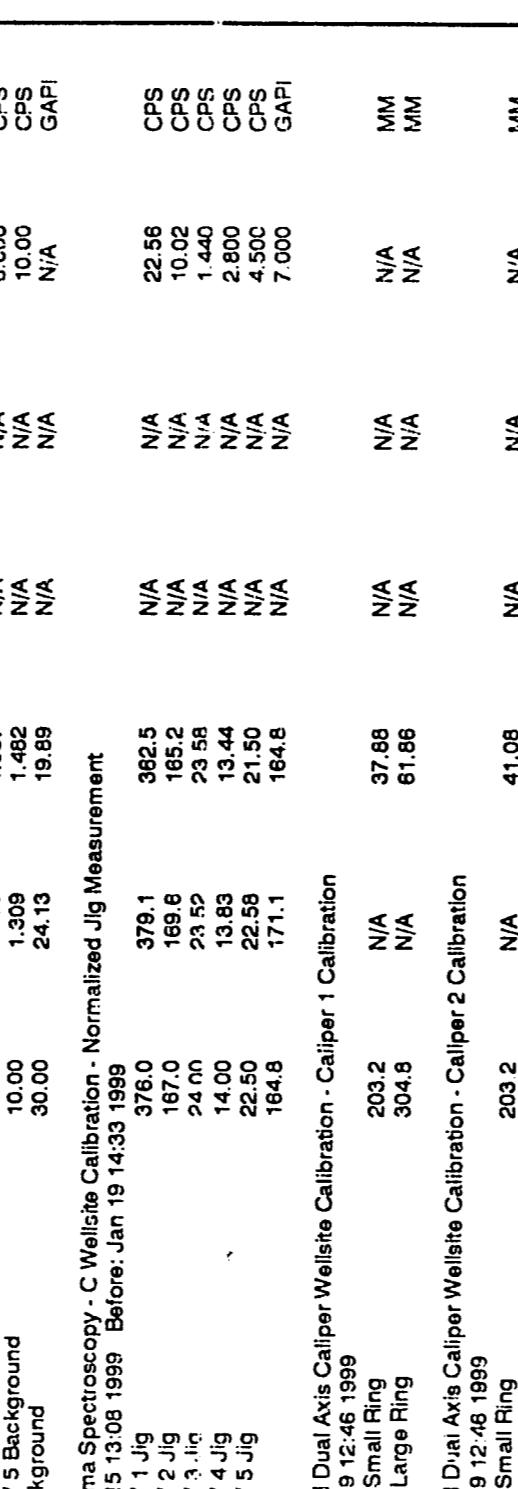
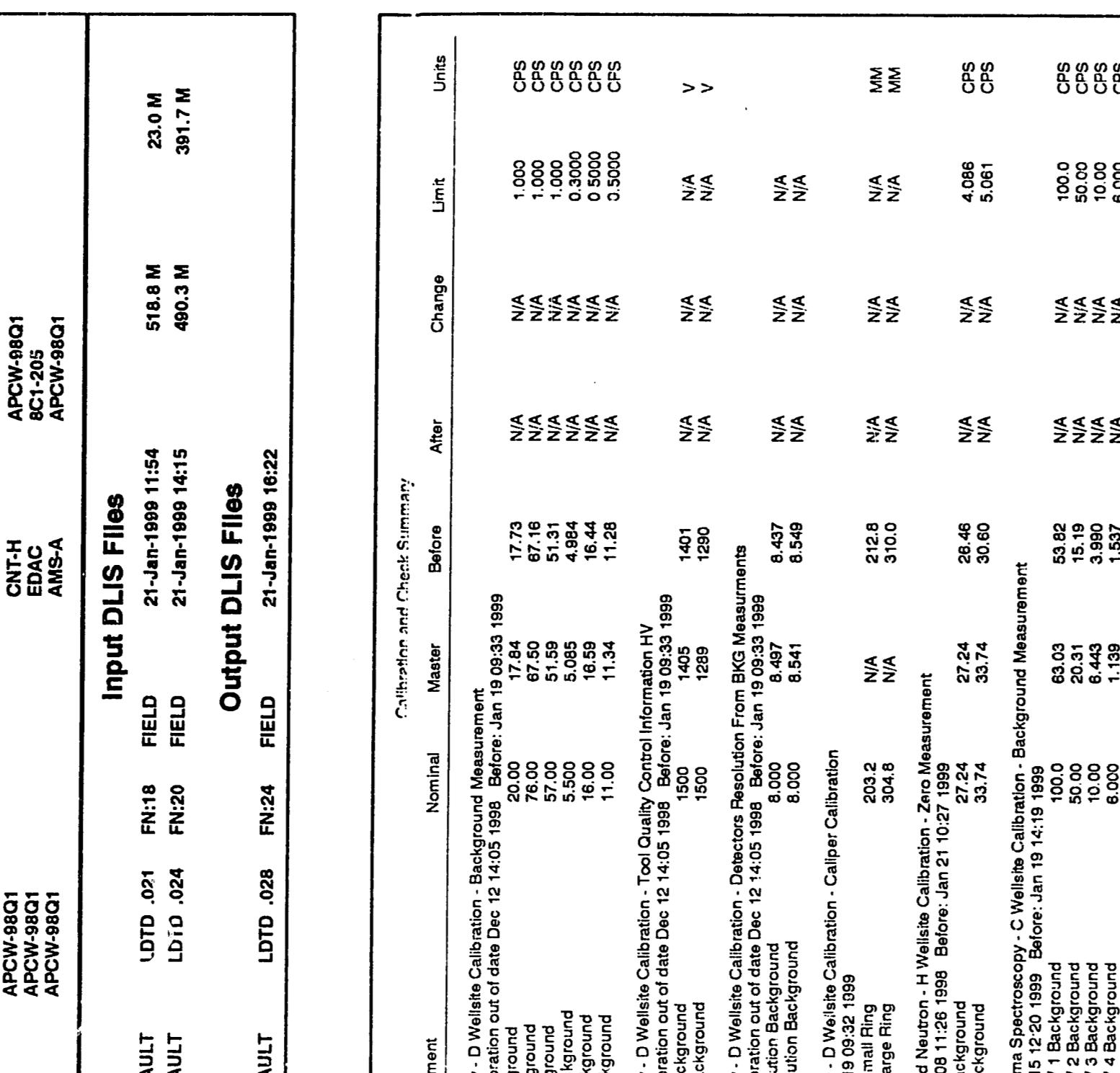
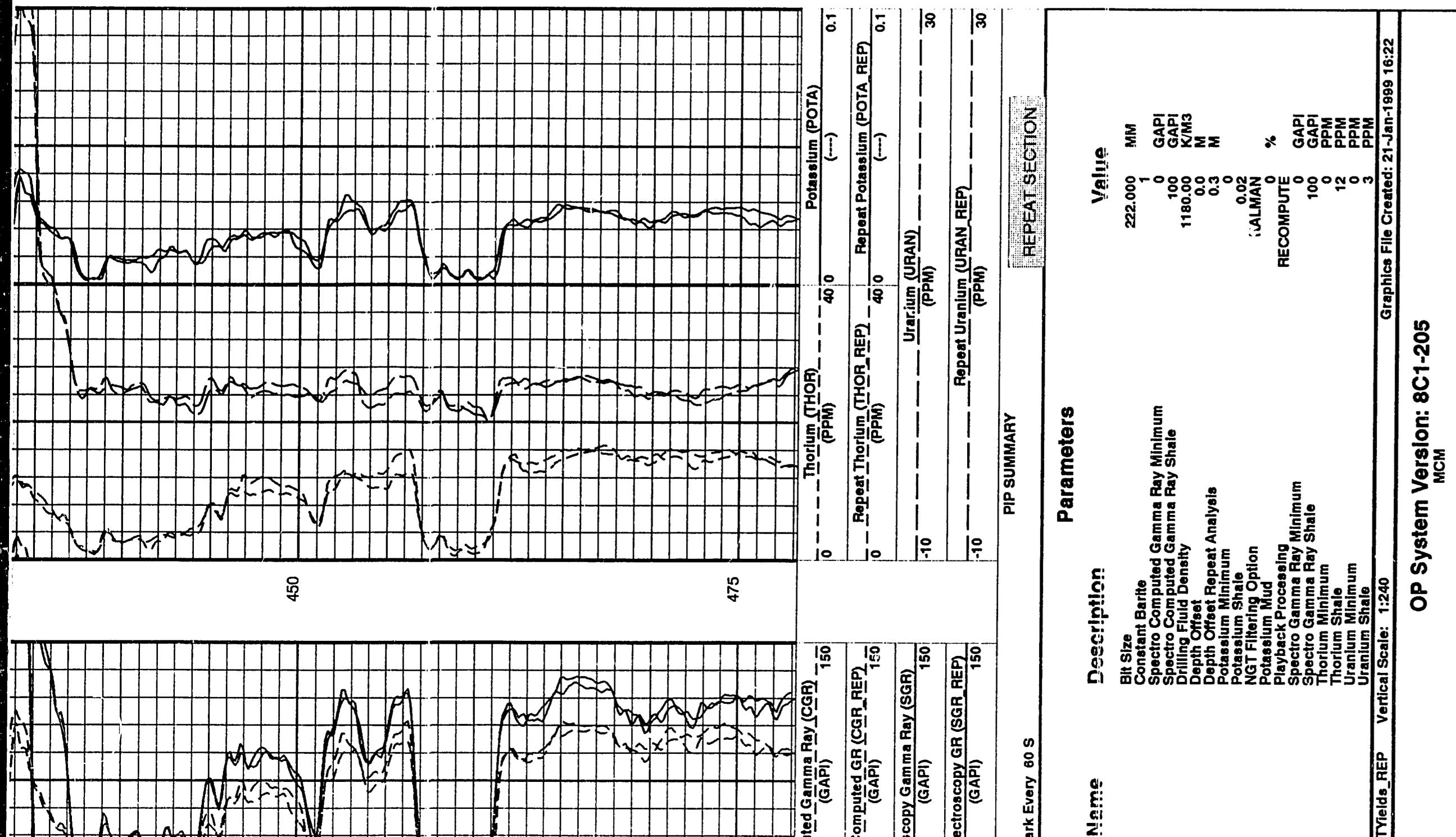




MISCELLANEOUS

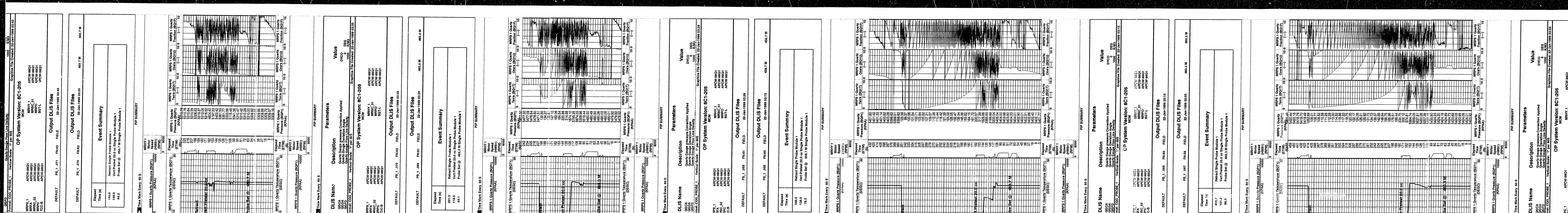


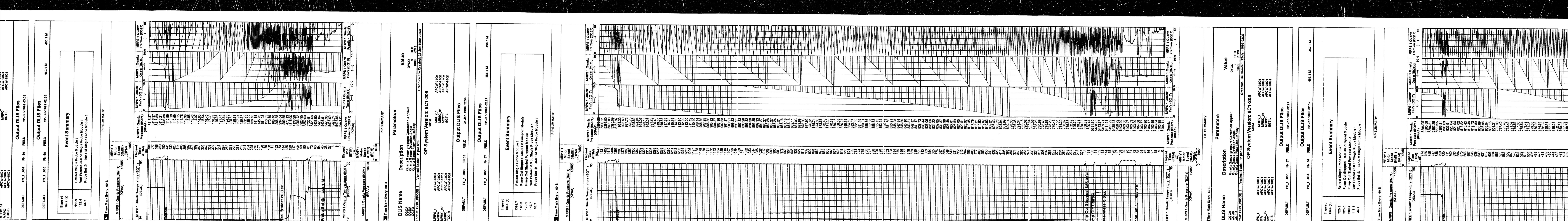


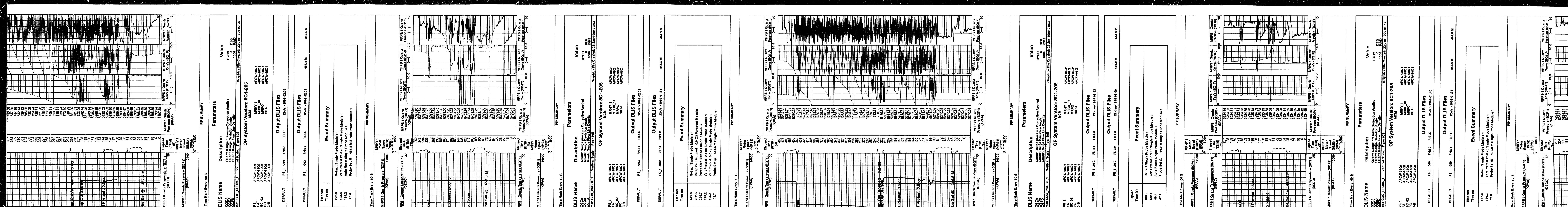


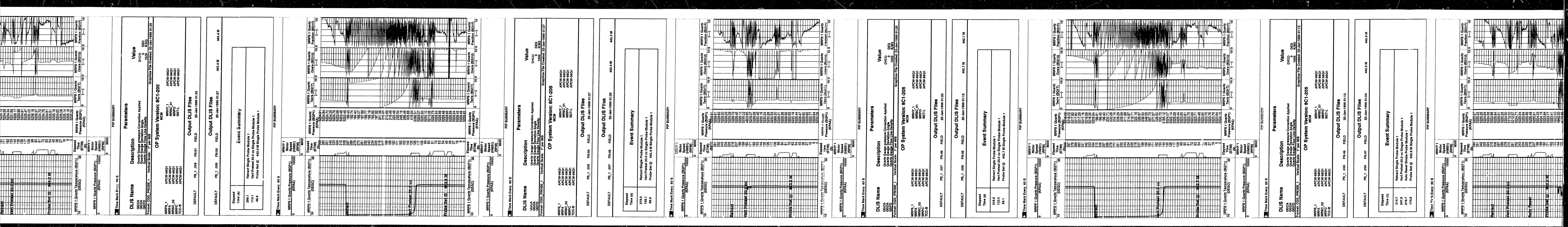
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1837

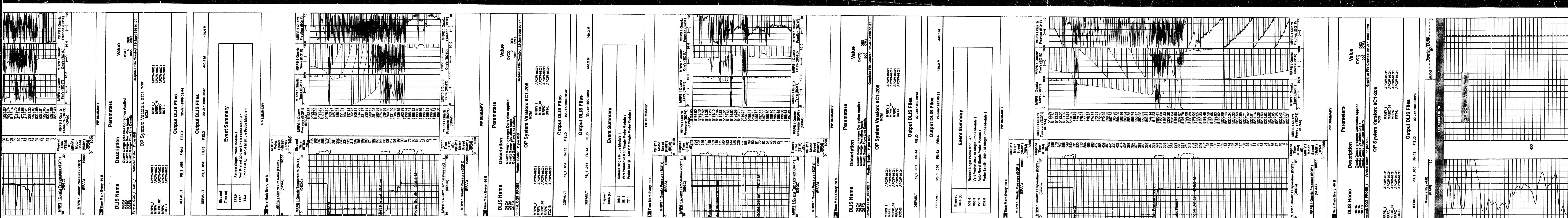
| | | | | | |
|--|--|-------------------------|--|--|--|
| COMPANY: IMPERIAL OIL RESOURCES LTD | | | | | |
| WELL: IMP MURPHY DISCOVERY RIDGE D-4 | | | | | |
| FIELD: DISCOVERY RIDGE | | | | | |
| PROVINCE: NWT | | | | | |
| MODULAR FORMATION DYNAMICS TESTER (PS-HY-FA-SC-SC-PO-PC) | | | | | |
| Schlumberger | | | | | |
| G21-J1-2-1 | | | | | |
| Drill Rig: DISCOVERY RIDGE | | | | | |
| Location: IMP MURPHY DISCOVERY RIDGE | | | | | |
| Elev: K.B. 467.33 M | | | | | |
| Elev: G.L. 461.93 M | | | | | |
| D.F. | | | | | |
| Permanent Datum: GROUND LEVEL | | Elev: 461.93 M | | | |
| Log Measured From: KELLY BUSHING | | 5.4 M above Perm. Datum | | | |
| Drilling Measured From: KELLY BUSHING | | | | | |
| API Serial No. WID# 1637 | | SECTION | | | |
| SECTION | | TOWNSHIP | | | |
| TOWNSHIP | | RANGE | | | |
| Logging Date 21-JAN-1999 | | | | | |
| Run Number 1 | | | | | |
| Depth Driller Schlumberger Depth 519 M | | | | | |
| Bottom Log Interval 519.6 M | | | | | |
| Top Log Interval 465 M | | | | | |
| Casing Driller Size @ Depth 498.5 M | | | | | |
| Casing Schlumberger 244.500 MM @ 200.5 M | | | | | |
| Bit Size 200.5 M | | | | | |
| Type Fluid In Hole GEL CHEM | | | | | |
| Density 1180 K/M3 | | 51 S | | | |
| Viscosity 6 C3 | | 7 | | | |
| Fluid Loss PH | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature 44.100 OHMM @ 17 DEGC | | | | | |
| RMF @ Measured Temperature 45.300 OHMM @ 19 DEGC | | | | | |
| RMC @ Measured Temperature 83.100 OHMM @ 18 DEGC | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures 39.036 @ 22 DEGC | | 42.179 @ 22 | | | |
| Circulation Stopped Time 21-JAN-1999 | | 8:00 | | | |
| Logger On Bottom Time 21-JAN-1999 | | 20:00 | | | |
| Unit Number 8416 | | 6861 | | | |
| Location MCCONKEY / LEPINE | | | | | |
| Recorded By CLIFF MILLER | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |
| Source RMF RMC | | | | | |
| RM @ MRT RMF @ MRT | | | | | |
| Maximum Recorded Temperatures | | | | | |
| Circulation Stopped Time | | | | | |
| Logger On Bottom Time | | | | | |
| Unit Number | | | | | |
| Location | | | | | |
| Recorded By | | | | | |
| Witnessed By | | | | | |
| Field: IMPERIAL OIL RESOURCES LTD | | Run 1 | | | |
| Well: IMP MURPHY DISCOVERY RIDGE D-4 | | Run 2 | | | |
| Run Date: 21-JAN-1999 | | Run 3 | | | |
| Run Date: 21-JAN-1999 | | Run 4 | | | |
| API Serial No. WID# 1637 | | | | | |
| SECTION | | | | | |
| TOWNSHIP | | | | | |
| RANGE | | | | | |
| Logging Date | | | | | |
| Run Number | | | | | |
| Depth Driller | | | | | |
| Bottom Log Interval | | | | | |
| Top Log Interval | | | | | |
| Casing Driller Size @ Depth | | | | | |
| Casing Schlumberger | | | | | |
| Bit Size | | | | | |
| Type Fluid In Hole | | | | | |
| Density | | | | | |
| Viscosity | | | | | |
| Fluid Loss | | | | | |
| Source Of Sample | | | | | |
| RM @ Measured Temperature | | | | | |
| RMF @ Measured Temperature | | | | | |
| RMC @ Measured Temperature | | | | | |

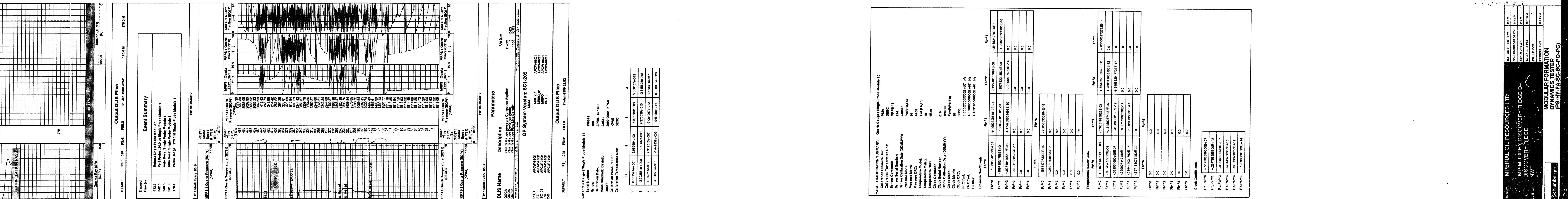












| IMPERIAL OIL RESOURCES LTD | | MODULAR FORMATION | |
|----------------------------|-------------------|-------------------|------------------------|
| IMPERIAL OIL RESOURCES LTD | MODULAR FORMATION | DYNAMICS TESTER | (PS-HY-FA-SC-SC-PO-PC) |
| MURPHY DISCOVERY RIDGE D-4 | D-4 | SCHLUMBERGER | SCHLUMBERGER |
| DISCOVERY RIDGE | | DEPTH DRILLER | DEPTH DRILLER |
| NWT | | KELLY BUSHING | KELLY BUSHING |
| WINNIE | | DRILL FLOOR | DRILL FLOOR |
| | | GROUND LEVEL | GROUND LEVEL |

1837

COMPANY: IMPERIAL OIL RESOURCES LTD

WELL: IMP MURPHY DISCOVERY RIDGE D-4

FIELD: DISCOVERY RIDGE

PROVINCE: NWT

Field: DISCOVERY RIDGE

Location: IMP MURPHY DISCOVERY RIDGE

Company: IMPERIAL OIL RESOURCES LTD

Permanent Datum: GROUND LEVEL Elev.: K.B. 467.33 M G.L. 461.93 M D.F.

Log Measured From: KELLY BUSHING 5.4 M above Perm. Datum

Drilling Measured From: KELLY BUSHING

API Serial No. WID# 1837

SECTION

TOWNSHIP

RANGE

Logging Date 21-JAN-1999

Run Number 1

Depth Driller 519 M

Schlumberger Depth 519.6 M

Bottom Log Interval 518 M

Top Log Interval 25 M

Casing Driller Size @ Depth 244.500 MM @ 200.5 M

Casing Schlumberger 200.5 M

Bit Size 222.000 MM

Type Fluid In Hole GEL CHEM.

MUD Density 1180 K/M3

Fluid Loss 6 C3

Source Of Sample 51 S

RM @ Measured Temperature 17 DEGC

RMF @ Measured Temperature 19 DEGC

RMC @ Measured Temperature 18 DEGC

Source RMF RMC

RM @ MRT RMF @ MRT 39.036 @ 22 42.179 @ 22

Maximum Recorded Temperatures 22 DEGC

Circulation Stopped Time 21-JAN-1999 8:00

Logger On Bottom Time 21-JAN-1999 14:13

Unit Number 8416

Location 6864

Recorded By SEAN MCCONKEY

Witnessed By CLIFF MILLER

AMS TEMPERATURE LOG

S211-J7-2-1
Schlumberger

Run 1 Run 2 Run 3 Run 4

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY SCHLUMBERGER OR ITS EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CHANGE UPON FURTHER REVIEW OF THE DATA OR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES: OS1: MDT OS2: DLL OS3: DS1 OS4: CNTLDT OS5: SSI OS6: CNTLDT OS7: CNTLDT OS8: CNTLDT OS9: CNTLDT OS10: CNTLDT OS11: CNTLDT OS12: CNTLDT OS13: CNTLDT OS14: CNTLDT OS15: CNTLDT OS16: CNTLDT OS17: CNTLDT OS18: CNTLDT OS19: CNTLDT OS20: CNTLDT OS21: CNTLDT OS22: CNTLDT OS23: CNTLDT OS24: CNTLDT OS25: CNTLDT OS26: CNTLDT OS27: CNTLDT OS28: CNTLDT OS29: CNTLDT OS30: CNTLDT OS31: CNTLDT OS32: CNTLDT OS33: CNTLDT OS34: CNTLDT OS35: CNTLDT OS36: CNTLDT OS37: CNTLDT OS38: CNTLDT OS39: CNTLDT OS40: CNTLDT OS41: CNTLDT OS42: CNTLDT OS43: CNTLDT OS44: CNTLDT OS45: CNTLDT OS46: CNTLDT OS47: CNTLDT OS48: CNTLDT OS49: CNTLDT OS50: CNTLDT OS51: CNTLDT OS52: CNTLDT OS53: CNTLDT OS54: CNTLDT OS55: CNTLDT OS56: CNTLDT OS57: CNTLDT OS58: CNTLDT OS59: CNTLDT OS60: CNTLDT OS61: CNTLDT OS62: CNTLDT OS63: CNTLDT OS64: CNTLDT OS65: CNTLDT OS66: CNTLDT OS67: CNTLDT OS68: CNTLDT OS69: CNTLDT OS70: CNTLDT OS71: CNTLDT OS72: CNTLDT OS73: CNTLDT OS74: CNTLDT OS75: CNTLDT OS76: CNTLDT OS77: CNTLDT 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