PCI

ET AL

HOOSIER RIDGE N-22

9211-P28-1-1

D.A.#1127

E.A.# 159

Canada Oil and Gas Lands Administration | Administration du pétrole et du gaz des terres du Canada

Nova Scotia	☐	West Coast	☐	Exploratory	☒
Newfoundland	☐	Northern	☒	Development	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	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: PCI et al HOOSIER RIDGE N-22

Operator: PETRO CANADA INC. | Drilling Program No.: n/a

Contractor: ATCO | Permit or Lease No.: n/a

Drilling Rig or Unit: ATCO #76 | Estimated Well Cost: $7,700,000

Location-Unit: N | Section: 22 | Grid Area: 65-30-127-30

Coordinates: Lat.: 65° 21' 56.63" | Long.: 127° 34' 48.65"

Area: Imperial Hills | Field/Pool: Undefined

Elevation ~~RT~~/KB: 159.1 m (ASL) | Ground Elev.: 154.1 m (ASL) ~~(BSL)~~

Approx. Spud Date: Mid-January, 1984 | Estimated Days on Location: 35 days

Anticipated Total Depth: 1,300 m | Target Horizon(s) Primary: Key Scarp
Secondary: Basal Cretaceous Sand

EVALUATION PROGRAM

Ten-metre sample intervals

Five metre sample intervals 350-1300 m (3 bottled sets, 1 bagged set)

Canned sample intervals 350-1300 m (every 10 m)

Conventional cores at 1-18 m core (B.Cretaceous Sand, 474 m) 1-18 m (Kee Scarp, 879 m)
1-18 m (Kee Scarp, 972 m)

Logs and Tests DLL, CNL-LDT-NGT, DI-SFL, BHC-WE-GR-CAL,
HDT, Directional Survey (TD-Surface Casing Shoe) 1-DST
(B. Cretaceous Sand) 2-DST (Kee Scarp)

CASING AND CEMENTING PROGRAM

O.D.	Weight:	Grade:	Setting Depth Below Seafloor:	Cementing Program (Volumes):
339.7mm	101.2 kg/m	K-55 BT&C	30 m	6.0 tonnes permafrost cement
244.5mm	59.5 kg/m	K-55 SOO-95 LT&C	350 m	30.9 tonnes permafrost cement
177.8mm	43.2 kg/m	SOO-95 LT&C	1300 m	28.0 tonnes Class "G" + 0.5% FR

B.O.P Equipment: 1-346 mm, 21 MPa, Hydril Annular
1-346 mm, 21 MPa, Hydril Single Studded Gate
1-346 mm, 34 MPa, Hydril Single Studded Gate

Other Information: Diverter system will be used on Surface hole
Consists of: 340 mm, 21,000 kPa Mud Cross complete with automatic H.C.R. Valve
346 mm, 21,000 kPa Hydril Annular preventer

Signed: Ken McDonald | Title: Manager - Land Drilling

Date: 83.12.15 | Company: Petro-Canada Inc.

APPROVAL

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

Signed: [signature]
Engineering Branch

Date: 11 Jan 84

File: 9211P28-1-1

Department of Energy Mines and Resources | Department of Indian Affairs and Northern Development

Ministère de l'Énergie des Mines et des Ressources | Ministère des Affaires indiennes et du Nord Canadien

Canada

Canada Oil and Gas Lands Administration
Administration du pétrole et du gaz des terres du Canada

				Well Status	
Nova Scotia	☐	West Coast	☐	Suspended	☒
Newfoundland	☐	Northern	☒	Completed	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	Abandoned	☐

APPLICATION TO ALTER CONDITION OF A WELL

This application form is to be submitted in triplicate to the District Conservation Engineer at least 45 days before commencement of operations.

Well Name: PCI et al HOOSIER N-22 Area: HOOSIER RIDGE

Coordinates: Lat: 65°21'56.63" Long: 127°34'48.65"

Operator: PETRO CANADA INC. Contractor: Beta Well Servicing

Drilling Rig or Unit: #60 Depth: 1094 m KB

Date ATDW Issued: Jan. 11, 1984 Date of Last Operation 84-04-06

TYPE OF OPERATION

Well Abandonment

SUMMARY OF PROPOSED OPERATIONS

see attached program

Signed: R.D. Heilli Title: District Manager

Date: February 12, 1985 Company: PETRO-CANADA INC.

APPROVAL

An approved copy of this notice should be posted at each wellsite.

Signed: L. S. Thomas
Conservation Engineer

Date: 22 Feb 85

ATDW No: 1127 File: 9211-P28-1-1RE

Department of Energy, Mines and Resources — Ministère de l'Énergie, des Mines et des Ressources

Department of Indian Affairs and Northern Development — Ministère des Affaires indiennes et du Nord canadien

Canada

PCI et al HOOSIER N-22

ABANDONMENT PROGRAM

FEBRUARY, 1985

OBJECTIVE:

To abandon the Upper Middle Devonian Kee Scarp formation.

WELL DATA:

Location:	Unit N, Section 22, Grid Area 65° 30', 127° 30'
Co-ordinates	North Latitude 65° 21' 56.63" West Longitude 127° 34' 48.65"
KB Elevation:	160.33 m
Ground Elevation:	154.33 m
TD:	1094 m KB
PBTD:	756 m KB
Conductor Casing:	340 mm, 101 kg/m, K-55, BT & C @ 37 m KB
Surface Casing:	244.5 mm, 59.5 kg/m, 500.95, LT & C. Landed @ 357m KB
Production Casing:	177.8 mm, 43.2 kg/m, 500.95, LT & C. Landed @ 1094m KB
Spud:	84-01-31
Rig Release:	84-03-04
Interest:	PETRO-CANADA INC. 66.67% WESTCOAST PETROLEUM 33.33%
Perforation Intervals:	1) 850.5 - 854.0 2) 819.5 - 822.0 3) 813.0 - 815.0 4) 808.0 - 810.0 5) 800.5 - 805.0 6) 784.0 - 788.0 7) 774.5 - 781.0 8) 763.0 - 767.0 9) 743.0 - 751.0 10) 735.0 - 740.0
Bridge Plugs:	1) 843.5 (TOP) 2) 756.0 (TOP)

..../2

PROCEDURE:

1). Move service rig to location complete with pump, tanks, boiler and a camp.

2). Hold a safety meeting to discuss rig safety and regulations concerning operation in the Northwest Territories.

3). Rig up service rig. Circulate fresh water through wellhead to ensure well is dead. Install B.O.P.'s and pressure test to 21 MPa.

NOTE: Well is left with diesel in tubing annulus and surface casing. A wellhead back pressure valve is installed in the dognut which allows circulation, through wellhead.

4). Pull and lay down tubing.

5). Rig in wireline unit. Run in and set a 177.8 mm, 43.2 kg/m Model S bridge plug at 730 m KB. Pressure test bridge plug to 10 MPa. Dump bail 5 m (0.1 m^3) of cement on top of bridge plug. Dump bail 10 m (0.2 m^3) of cement from 15 to 5 m KB. Rig out wireline unit.

6). Rig out B.O.P.'s and wellhead to the surface casing flange. Dig out casing.

7). Cut casing off 1 m below ground level.

8). Weld a steel plate over the well that completely closes off the wellbore and the annulli between casing strings.

9). Weld length of steel pipe to the cover of the casing that extends 1.5 m above ground level and painted an irridescent orange. On the marker weld a steel plate that is 5 mm thick and measures 500 mm x 300 mm, on which the well name and location co-ordinates are bead welded.

10). Clear all the refuse from the drill site and restore the drill site to the satisfaction of a conservation engineer.

11). Move equipment to Norman Wells for storage or transport south.

APPROVED:

B.H. Wells
PRODUCTION ENGINEER

K.W. Gillanders
ENGINEERING SUPERVISOR

C.E. Dedora
COMPLETIONS SUPERINTENDENT

R.D. Heikkinen
DISTRICT MANAGER

85/02/14

D.A. # 1127
E.A. # 159

Canada Oil and Gas Lands Administration | Administration du pétrole et du gaz des terres du Canada

				Well Status	
Nova Scotia	☐	West Coast	☐	Suspended	☐
Newfoundland	☐	Northern	☒	Completed	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	Abandoned	☒

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: PCI et al Hoosier Ridge N-~~21~~22 Area: Hoosier Ridge, N.W.T

Grid Area: 65-30 -127-30 Field/Pool: N/A

Permit or Lease No.: N/A Final Coordinates: Lat.: 65° 21' 56.63" Long. 127° 34' 48.65"

Servicing Unit: Beta Well Servicing Rig #60 Elevations-RT/KB: 160.33 m SF/GL: 154.33

Spud Date: 84-01-31 Rig Released: 84-03-04 Total Depth: 1094 m

CASING AND CEMENTING

O.D.:	Weight:	Grade:	Depth Set:	Cement and Additives:
340 mm	101 kg/m	K-55	37 m KB	98 t Arctic Set Neat
244.5 mm	59.5 kg/m	S00-95	357 m KB	34t Arctic Set Neat
177.8 mm	432 Kg/m	S00-95	1094 m KB	252t Class G 0.5% T.I. 0.1% retarder

PLUGGING PROGRAM

Approval of the following program was obtained by (person) Brian Wells from (person) Ken Singh of the Canada Oil and Gas Lands Administration by means of telephone on February 19 19 85

Type of Plug:	Interval:	Felt:	Cement and Additives:
Baker Model S	843.5-849.5	Yes	5 m, ClG Neat
Baker Model S	761-756	No	5 m, ClG Neat
Baker Model F	727-694	No	30 m, ClG Neat
Cement	20m - 5m	No	10 m, ClG Neat

Lost Circulation/Overpressure Zones:

Equipment left on Seafloor (Describe):

Provision for Re-entry (Describe and attach sketch):

Cores: Type: Conventional Intervals: 739-748, 748-757, 850-860 mKb

Other Downhole Completion/Suspension Equipment:

CERTIFICATION

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

Signed: R.D. Heikkinen P. Eng. Title: District Manager

Name: R.D. Heikkinen Date: 85/03/07

Acknowledged by: L. Thomas
Engineering Branch

Date: 2 April 1985

File: 9211-P28-1-1

Department of Energy, Mines and Resources | Ministère de l'Énergie, des Mines et des Ressources

Department of Indian Affairs and Northern Development | Ministère des Affaires indiennes et du Nord canadien

Canada

WELL HISTORY REPORT

PCI ET AL HOOSIER RIDGE N-22

PETRO CANADA INC.

CALGARY, ALBERTA

APRIL 1984

B. Rose

WELL HISTORY REPORT

PCI et al Hoosier Ridge N-22

PCI ET AL HOOSIER RIDGE N-22

WELL SUMMARY

PCI et al Hoosier Ridge N-22, located in the MacKenzie Plains Area of the Northwest Territories was drilled to a total depth of 1095 m in 34 days.

The location coordinates for this well are 65° 21' 56.63" (65.3657306°) north latitude and 127° 34' 48.65" (127.5801805°) west longitude. The ground elevation is 154.13 meters above sea level.

The primary objective of this exploratory well was oil in the Kee Scarp formation. The secondary objective was oil in the Basal Cretaceous Sand.

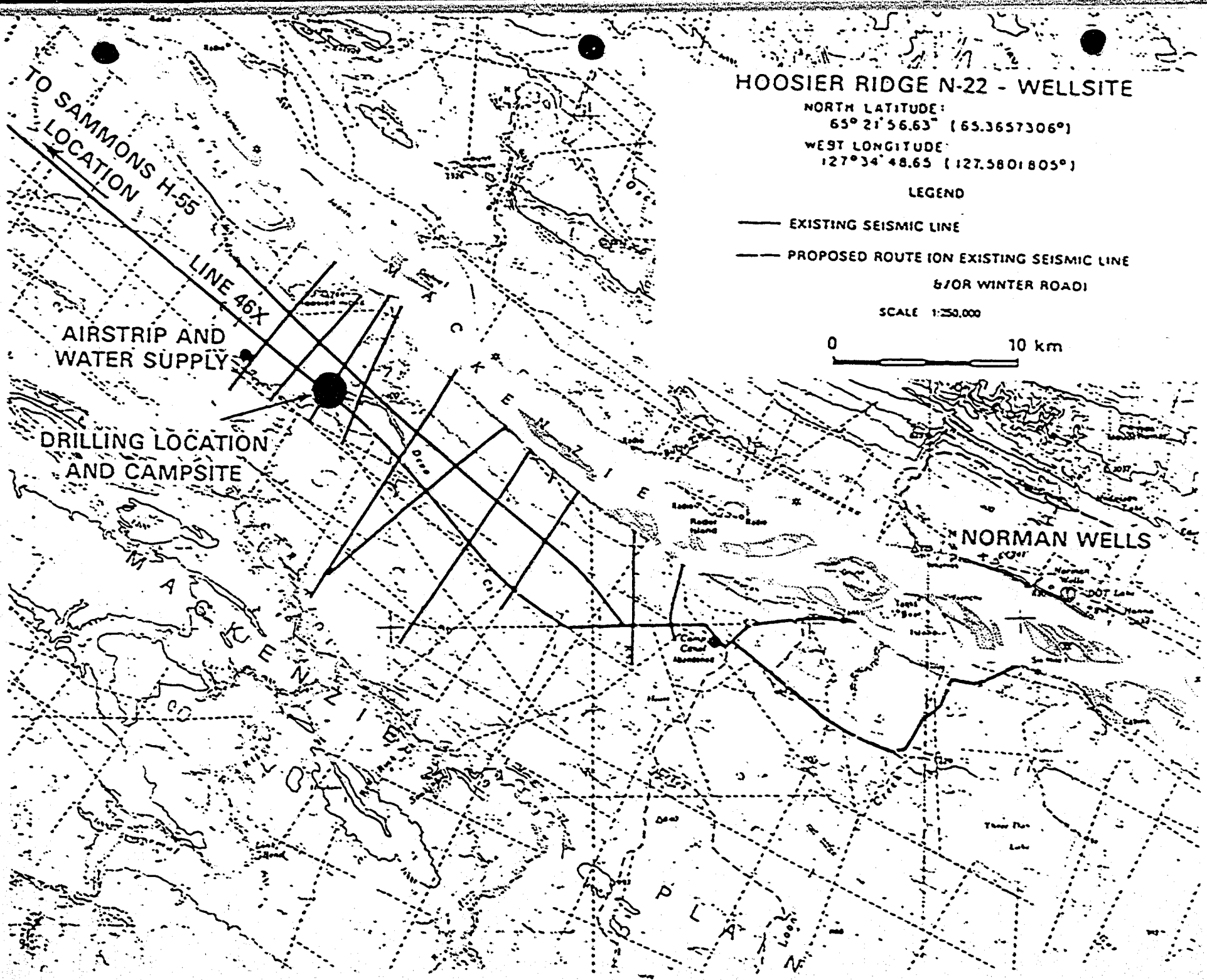
Petro-Canada Inc. of Calgary was the operator of the well. Atco Drilling Ltd. of Calgary, using Atco/Equtak #76, a diesel mechanical rig built in 1983, was the contractor.

PCI et al Hoosier Ridge was spudded on 1984-01-31 at 0330 hrs. A 508 mm conductor barrel had been set at 10.04 m prior to spud.

Within one day, a 415 mm conductor hole was drilled and 340 mm casing set at 37 m. Within eight days, using a 346 mm, 21,000 kPa diverter stack a 311 mm surface hole was drilled to 357 mm with 245 mm casing set at 344 m.

A 346 mm, 21,000 kPa B.O.P. was nippled up and the 216 mm main hole was drilled and logged to 1095 m with 177.8 mm casing set at 1095 m. Three cores were cut and one drill stem test run in the Kee Scarp formation. Penetration rates for the main hole averaged 5 m an hour. A downtime of 92.5 hours duration occurred when the travelling blocks were pulled into the crown section of the derrick. No injuries resulted and the delay was for the repair to two legs of the crown section that were damaged. A small kick was taken at a depth of 922 m with no shut-in pressures developing. The Atco/Equtak #76 was released on 1984-03-04 at 2400 hrs.

PCI et al Hoosier Ridge N-22 is presently suspended prior to re-evaluation.


HOOSIER RIDGE N-22 - WELLSITE
NORTH LATITUDE:
65° 21' 56.63" (65.3657306°)
WEST LONGITUDE:
127° 34' 48.65 (127.5801805°)
LEGEND
EXISTING SEISMIC LINE
PROPOSED ROUTE (ON EXISTING SEISMIC LINE &/OR WINTER ROAD)
SCALE 1:250,000
0
10 km
TO SAMMONS H-55 LOCATION
LINE 46X
AIRSTRIP AND WATER SUPPLY
DRILLING LOCATION AND CAMPSITE
NORMAN WELLS
MACKENZIE
MACKENZIE PLAIN

GENERAL DATA

2.1	Well Name and Number:	PCI et al Hoosier Ridge N-22
2.2	Well Location:	North Latitude: 65° 21' 56.63" (65.3657306°) N West Longitude: 127° 34' 48.65" (127.5801805°) W
2.3	Unique Well Identifier:	3ØØN22653Ø1273ØØ
2.4	Operator:	Petro Canada Inc. P.O. Box 2844 Calgary, Alberta T2P 3E3
	Contractor:	Atco Drilling Ltd. 700 - 800 - 6th Avenue S.W. Calgary, Alberta
2.5	Drilling Unit:	Name: Atco/Equtak Rig #76 Type: Triple, diesel-mechanical Year Built: 1983 Location: Nisku, Alberta
2.6	Position Keeping:	N/A to the well
2.7	Support Craft:	N/A to the well
2.8	Drilling Unit Performance:	N/A to the well
2.9	Difficulties and Delays:	A delay of 92.5 hours duration occurred between day 23 and day 26 of the drilling operation when the travelling blocks were pulled into the crown section of the derrick. The derrick was lowered and the crown section removed to repair two legs that had been damaged.

SUMMARY OF DRILLING OPERATIONS

3.1	Elevations:	Ground: 154.13 m Kelly Bushing: 160.33 m
3.2	Total Depth:	Drilled: 1095 m Logged: 1094 m PBD: 1079.87 m
3.3	Date and Hour Spudded:	1984/01/31 / 0330 hrs.
3.4	Date Drilling Completed:	1984/02/29 / 0900 hrs.
3.5	Date of Rig Release:	1984/03/04 / 2400 hrs.
3.6	Well Status:	Suspended prior to re-evaluation

3.7 Hole Sizes and Depths:

Classification	Hole Size	Interval
Conductor barrel	660.4 mm	0 - 10 m
Conductor	444.5 mm	0 - 37 m
Surface	311.2 mm	37 - 357 m
Main	215.9 mm	357 - 1095 m

3.8 Casing and Cement Details:

Hole Classification:	Conductor	Surface	Main
Hole Size:	445 mm	311 mm	216 mm
Casing Size:	339.7 mm	244.5 mm	177.8 mm
Weight:	101 kg/m	59.5 mm	43.2 kg/m
Grade:	K-55	25 jts S0095 3 jts K-55	S0095
Coupling:	Buttress	8 rd LT&C	8 rd LT&C
No. of Joints:	3	28	95
No. of Scratchers:	0	0	6
No of Centralizers:	0	4	9
Date of Run:	1984-01-31	1984-02-07	1984-03-04
Shoe Depth:	37 m K.B.	357 m K.B.	1094 m K.B.
Tonnes of Cement:	9.8 tonnes	34 tonnes	25.2 tonnes
Type of Cement:	Arctic Set	Arctic Set	Class "G"
Additives:	None	None	.5% D65 + 0.1% D13
Height of Cement:	Surface	Surface	Surface
Based On:	Returns to Surface	Returns to Surface	Returns to Surface

3.9 Sidetracked Hole: N/A to the well

3.10 Drilling Fluid: A Gel/DF-VIS mud system was utilized for the entire well. See Appendix for complete details of mud properties.

SUMMARY OF MUD PROPERTIES

SECTION	INTERVAL	PROPERTIES (MAX FOR INTERVAL)				
	m	Weight kg/m^3	PV mPa	YP pa	WL cm^3	pH
Surface	37-357	1100	25	13	18	10
Main	357-1095	1210	39	25.5	10	10

3.11 Fishing Operations: N/A to the well

3.12 Well Kicks: On day 28, severely gas cut mud returns were experienced and the well was shut in using the annular preventor. No shut in pressures were recorded and the gasified and oil stained mud was circulated out through the BOP manifold, the poor boy degasser and to the shale shaker box. The density of the drilling fluid was then increased from 1100 kg/m^3 to 1120 kg/m^3 which reduced the gas content of the mud from 2000 units to 100 units. The mud density was subsequently increased to 1200 kg/m^3 for the remainder of the well which resulted in the reduction of background gas to 20 units and the elimination of connection gas.

3.13 Formation Leak-Off Tests: A formation leak-off test was run on day 10 after drilling out the surface casing shoe joint set at 344 m. Drilling mud (density 1055 kg/m^3) was used for the test and a pressure of 9000 kPa was reached (equivalent mud weight 3618 kg/m^3). The formation did not break down. Leak-off gradient 35.5 kg/m.

3.14 Time Distribution

3.14.1 Daily Activity

DATE	DAYS SINCE SPUD	ACTIVITY
1984-01-31	1	Spudded hole with 444.5 mm OSC3J bit. Drilled ahead to 37 m. Ran and cemented 340 mm conductor casing.
1984-02-01	2	W.O.C. Welded on bowl. Nippled up diverter stack.
1984-02-02	3	RIH with 311 mm XDV bit. Pressure test diverter stack. Could not penetrate displacement plug. POOH. RIH with 311 mm X3A bit. Drilled out plug, cement & shoe. Drilled ahead to 69 m.
1984-02-03	4	Drilled ahead to 78 m. POOH for stabilization. RIH with pendulum BHA. Drilled ahead to 162 m.
1984-02-04	5	Drilled ahead to 285 m.
1984-02-05	6	POOH. RIH with 311 mm XDV bit. Drilled ahead to 336 m.
1984-02-06	7	Continued drilling to 340 m. POOH. RIH with 311 mm JD7 bit. Drilled ahead to 357 m. POOH. Ran 244.5mm surface casing. Float shoe landed at 344 m.
1984-02-07	8	Cemented 244.5 mm casing. WOC. Welded on casing bowl. Nippled up BOP stack.
1984-02-08	9	Completed nipple up. Pressure tested BOP system.
1984-02-09	10	Completed pressure testing. RIH with 216 mm JD7 bit. Drilled out float collar, cement and float shoe. Drilled ahead to 358 m. Conducted PIT.
1984-02-10	11	Drilled ahead to 393 m. POOH for stabilization. RIH with 216 mm J22 bit. Drilled ahead to 411 mm. Control drilled from 408 m.
1984-02-11	12	Continued control drilling to 504m.

3.14 Time Distribution

3.14.1 Daily Activity

DATE	DAYS SINCE SPUD	ACTIVITY
1984-02-12	13	Continued control drilling to 514m. POOH. RIH with 216 mm JD7 bit. Control drilled to 532 m. POOH to log. Ran: Log #1 - DISFL from 532m to 357 m; Log #2 - CNFDC-GR-Cal from 532 m to 357 m with CNL-GR to surface.
1984-02-13	14	Completed logging. Ran Log #3 - Microlog from 532 m to 357 m. RIH with 216 mm JD7 bit. Drilled ahead to 588 m.
1984-02-14	15	Continued drilling to 635 m. POOH for bit and change BHA.
1984-02-15	16	RIH with 216 mm JD7 bit. Drilled ahead to 730 m.
1984-02-16	17	Continued drilling to 739 m. POOH to core. RIH with core barrel and 171.5 m C201 diamond bit. Cut core #1 from 739 m - 748 m. POOH with core.
1984-02-17	18	Completed POOH with core. RIH with 216 mm JD4 bit. Ream 171.5 mm rathole. POOH. RIH with barrel and 171.5 mm C201 diamond bit. Cut core #2 from 748-755.5 m.
1984-02-18	19	Continued cutting core #2 to 757 m. POOH with core. RIH with 216 mm JD4 bit. Ream 171.5 rathole. POOH for DST #1.
1984-02-19	20	RIH with DST #1 tool. Run DST #1. Hoisted same.
1984-02-20	21	RIH with 216 mm JD4 bit. Drilled ahead to 804 m.
1984-02-21	22	Drilled ahead to 850 m. POOH for bit.
1984-02-22	23	Continued POOH. Pulled travelling blocks into crown. Two legs were damaged. Inspected and began repairs of crown section in order to lay down drill string to complete repairs.

3.14 Time Distribution

3.14.1 Daily Activity

DATE	DAYS SINCE SPUD	ACTIVITY
1984-02-23	24	Repaired crown section temporarily to lower derrick. Inspected with ultrasonic and magnetic particles. Laid down D.P. & kelly. Laid down derrick and unstrung blocks.
1984-02-24	25	Removed crown section.
1984-02-25	26	Repaired and inspected crown section. Pin crown section. Raise derrick. Rig up floor. POOH for core #3.
1984-02-26	27	Completed POOH. RIH with 18 m core barrel and 171.5 mm C201 diamond bit. Cut core #3 from 850 m to 860.2 m. Core jammed off at 860.2m. POOH with core. RIH with 216 mm J22 bit.
1984-02-27	28	Completed RIH. Reamed 171.5 mm rathole and drilled ahead to 922 m. Mud returns highly gas cut & oil stained, no shut in pressure. Circulated out gas & oil cut mud. Increased mud density to 1120 kg/m^3. Drilled ahead to
1984-02-28	29	925 m.
1984-02-29	30	Continued drilling ahead to 1062m.
1984-02-31	31	Continued drilling ahead to 1095 m (T.D). Dummy trip. Condition hole. POOH to log.
1982-03-02	32	Logged with Schlumberger. Ran: Log #4 DIL-MSFL with CAL-GR from TD to 500 m; Log #5-CNL-LDT-NGT from TD to 500 m; Log #6-DISFL with BHC sonic CAL-GR from TD to 357 m.
		Completed logging. Ran: Log #7-BHC sonic wave trane from TD to 700 m; Log #8-HDT from TD to 700 m with MLL & ML to 500 m. Run in hole with 216 mm bit. Circulate & condition hole. Laid down drill string. Prepared to run casing. Power tongs would not operate.

3.14 Time Distribution

3.14.1 Daily Activity

DATE	DAYS SINCE SPUD	ACTIVITY
1984-03-03	33	Ran 177.8 mm casing with rope & rig tongs. Casing landed at 1094 m K.B. Ran 6 scratchers and 9 centralizers. Circulated & conditioned hole. Rigged up cementers. Cementing unit broke down. Circulated casing. W.O. cementing unit.
1984-03-04	34	Continued circulating 177.8 mm casing. Cemented 177.8 mm casing from TD to surface. Set casing slips. Displaced top 10 m of casing ID with Glycol. Released rig: 1984-03-04 - 2400 hrs.

3.14.2

TIME BREAKDOWN

OPERATION	TOTAL HOURS	% OF TOTAL	TOTAL HOURS BY GROUP	% OF TOTAL BY GROUP
Drilling	253.00	31.00		
Tripping	96.57	11.86		
Reaming & Cleaning	23.00	2.82		
Conditioning hole/mud	34.25	4.20		
Rig Service	6.75	0.83		
Survey	23.75	2.91		
Casing & WOC	40.00	4.90		
Head up & Pressure Test	61.50	7.54		
Mechanical Downtime	4.00	0.49		
			543.00	66.55
Coring	50.25	6.16		
Logging	47.50	5.82		
Drill Stem Testing	23.00	2.82		
			120.75	14.80
Repair Derrick	92.50	11.33		
Freeze Ups	4.25	0.52		
Pick Up DC	3.50	0.43		
BOP Drills	0.75	0.09		
Evaluation	3.50	0.43		
Standby	10.00	1.23		
			114.50	14.03
Completion	23.25	2.85		
Tear Out	14.50	1.77		
			37.75	4.62
GRAND TOTAL	816 hours	100%	816 hours	100%

3.14.2

TIME BREAKDOWN

CONDUCTOR HOLE

OPERATION	TOTAL HOURS	% OF TOTAL	TOTAL HOURS BY GROUP	% OF TOTAL BY GROUP
Drilling	6.50	16.67		
Tripping	2.75	7.05		
Reaming & Cleaning	-	-		
Conditioning hole/mud	3.50	8.97		
Rig Service	-	-		
Survey	0.75	1.92		
Casing & WOC	22.00	56.42		
Head up & Pressure Test	-	-		
Mechanical Downtime	-	-		
			35.50	91.03
Coring	-	-		
Logging	-	-		
Drill Stem Testing	-	-		
Standby	-	-		
Pick Up DC	3.50	8.97		
			3.50	8.97
Completion	-	-		
Tear Out	-	-		
GRAND TOTAL	39 hours	100%	39 hours	100%

3.14.2

TIME BREAKDOWN

SURFACE HOLE

OPERATION	TOTAL HOURS	% OF TOTAL	TOTAL HOURS BY GROUP	% OF TOTAL BY GROUP
Drilling	67.50	47.54		
Tripping	15.50	10.92		
Reaming & Cleaning	8.75	6.16		
Conditioning hole/mud	3.75	2.64		
Rig Service	0.75	0.53		
Survey	7.75	5.46		
Casing & WOC	18.00	12.68		
Head up & Pressure Test	17.00	11.97		
Mechanical Downtime	3.00	2.10		
			142	100
Coring	-	-		
Logging	-	-		
Drill Stem Testing	-	-		
Standby	-	-		
Completion	-	-		
Tear Out	-	-		
GRAND TOTAL	142 hours	100%	142 hours	100%

3.14.2

TIME BREAKDOWN

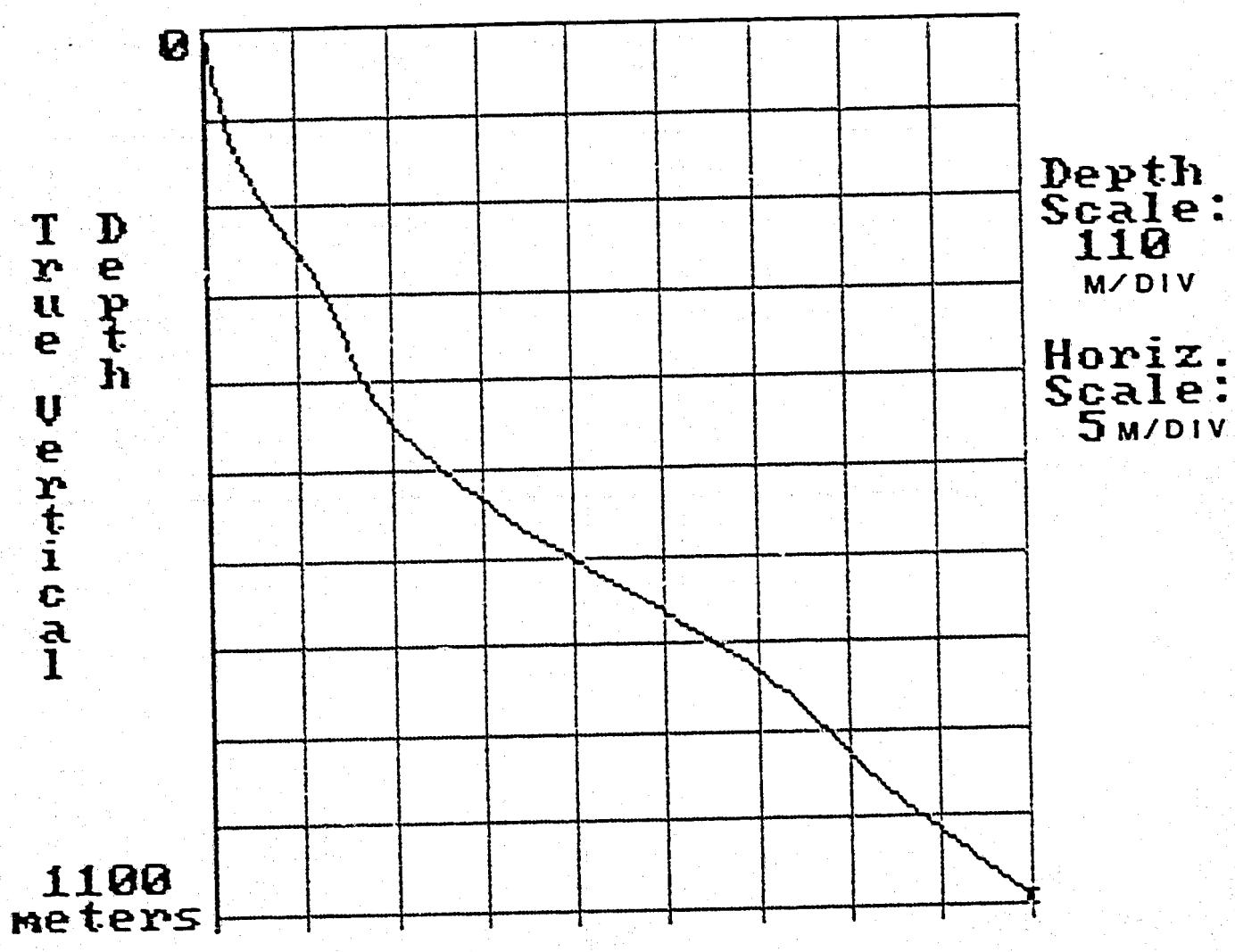
MAIN HOLE

OPERATION	TOTAL HOURS	% OF TOTAL	TOTAL HOURS BY GROUP	% OF TOTAL BY GROUP
Drilling	179.50	28.19		
Tripping	78.50	12.36		
Reaming & Cleaning	14.25	2.24		
Conditioning hole/mud	27.00	4.25		
Rig Service	6.00	0.94		
Survey	15.25	2.40		
Casing & WOC	-	-		
Head up & Pressure Test	44.50	7.01		
Mechanical Downtime	1.00	0.16		
			368.50	57.55
Coring	50.25	7.91		
Logging	47.50	7.48		
Drill Stem Testing	23.00	3.62		
			120.75	19.01
Repair Derrick	92.50	14.75		
Freeze Ups	4.25	0.67		
BOP Drills	0.75	0.12		
Evaluation	3.50	0.55		
Standby	10.00	1.59		
			111.00	17.50
Completion	23.25	3.66		
Tear Out	14.50	2.28		
			37.75	5.94
GRAND TOTAL	635 hours	100%	635 hours	100%

3.15	Deviation Survey:	Directional surveys were taken approximately every 30 m. The final survey was taken at 1088 m. The hole coordinates at 1088 m, in relation to the wellhead, are 43.04 m west and 12.81 m north. See the following pages.
3.16	Abandonment Plug:	PBD 1079.87 m (top of float collar)
3.17	Composite well records:	See Geology Section

PCI ET AL HOOSIER RIDGE N-22

HORIZONTAL DISPLACEMENT VS DEPTH



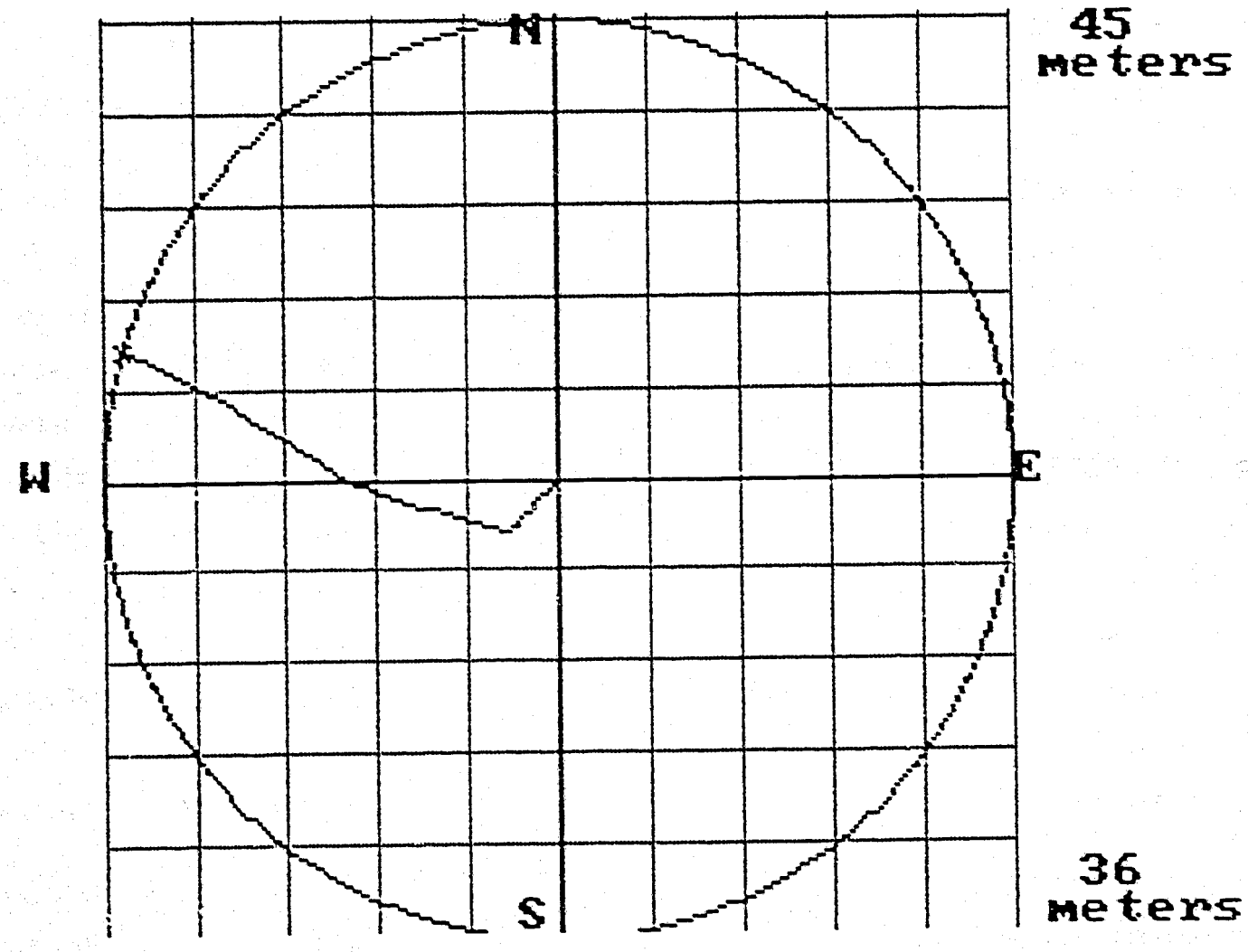
MAXIMUM DOGLEG SEVERITY:
2.90 DEG/30 M AT 753 METERS

TOTAL MEASURED DEPTH:
1095 METERS

TRUE VERTICAL DEPTH:
1093.57 METERS

PCI ET AL HOOSIER RIDGE N-22

HORIZONTAL WELLBORE DISPLACEMENT



EACH GRID = 9 METERS

BOTTOM HOLE CO-ORDINATES:
12.81 METERS NORTH
43.04 METERS WEST

CLOSURE DISTANCE:
44.90 METERS

CLOSURE DIRECTION:
NORTH 73 DEG 25 MIN WEST

DAILY MUD STATUS REPORT

DATE	DEPTH (m)	WEIGHT	FUNNEL VISC. S/L	WATER LOSS cm^3	pH	REMARKS
84-02-02	67	1040	44	13	9	Drill 311mm Sur.Hole
84-02-03	141	1060	48	18	9.5	Drill 311mm Sur.Hole
84-02-04	253	1090	46	11	10	Drill 311mm Sur. Hole
84-02-05	310	1090	55	9	10	Drill 311mm Sur.Hole
84-02-06	357	1100	60	8	9.5	T.D. 311mm Sur.Hole
84-02-07						Run 244.5mm Csg. WOC
84-02-08	357	1055	47	14	9.5	Nipple up
84-02-09						Pressure Test
84-02-10	398	1060	50	8	10	Drill 216mm Main Hole
84-02-11	471	1070	47	10	11	Drill 216mm Main Hole
84-02-12	517	1110	65	6.5	10	Drill 216mm Main Hole
84-02-13	546	1100	48	7	10	Logging
84-02-14	632	1110	54	6.5	10	Drill 216mm Hole
84-02-15	671	1120	62	6	10	Cir.up sample-POOH
84-02-15	736	1120	55	6.5	10	RIH for Core #1
84-02-17	750	1120	55	6.5	10	RIH for Core #2
84-02-18	757	1120	65	6.5	10	Ream Rathole. POOH to test
84-02-19	757					Testing
84-02-20	758	1130	57	6.5	9.5	Finish testing. Drill 216mm
84-02-21	816	1125	57	6	10	Drill 216mm Hole.
84-02-22	842	1110	54	6.5	10	Drill 216mm Hole
84-02-23	850	1110	60	6.5	10	Ran blocks into crown
84-02-24	850	1110	60	6.3	10	Repairing derrick

DAILY MUD STATUS REPORT

DATE	DEPTH (m)	WEIGHT	FUNNEL VISC. S/L	WATER LOSS cm^3	pH	REMARKS
84-02-25	850	1110	55	6.4	9.5	Repair derick. RIH
84-02-26	852	1120	60	6.3	10	Cut core #3
84-02-27	863	1100	54	6.5	9	Drill rathole 216mm
84-02-28	952	1130	56	6.4	10	Drill 216mm Hole
84-02-29	1095	1210	75	9.5	9.5	T.D. 216mm Hole

PETRO-CANADA

PETRO-CANADA
DIRECTIONAL DRILLING PROGRAM

PCI et al HOOSIER N22 N.W.T.
Single shot directional survey. File: Hoosier

Measured Depth (meters)	Drift Angle (deg min)	Drift Direction (deg)	Course Length (meters)	True Vertical Depth (meters)	Vertical Section (meters)	Rectangular Co-ordinates (meters)		Closure Distance (meters)	Closure Direction (deg min)	Dogleg Severity (deg/30 m)
0.0	0 0	N 0 E	30.0	0.00	0.00	0.00 N	0.00 E	0.00	N 0 0 E	0.22
30.0	0 30	S 12 W	30.0	30.00	0.00	0.13 S	0.03 W	0.13	S 11 60 W	0.50
60.0	0 45	S 31 W	30.0	60.00	0.00	0.41 S	0.20 W	0.45	S 25 37 W	0.32
90.0	0 45	S 48 W	30.0	90.00	0.00	0.71 S	0.44 W	0.84	S 32 3 W	0.22
120.0	0 45	S 34 W	30.0	119.99	0.00	1.01 S	0.70 W	1.23	S 34 54 W	0.18
150.0	1 0	S 49 W	30.0	149.99	0.00	1.35 S	1.00 W	1.68	S 36 41 W	0.34
180.0	1 15	S 54 W	30.0	179.98	0.00	1.71 S	1.46 W	2.26	S 40 31 W	0.27
210.0	1 30	S 49 W	30.0	209.97	0.00	2.16 S	2.03 W	2.96	S 43 10 W	0.28
240.0	1 45	S 42 W	30.0	239.96	0.00	2.76 S	2.63 W	3.81	S 43 41 W	0.32
270.0	1 45	S 40 W	30.0	269.95	0.00	3.45 S	3.24 W	4.73	S 43 10 W	0.05
300.0	1 30	S 47 W	30.0	299.94	0.00	4.07 S	3.82 W	5.58	S 43 13 W	0.32
325.0	1 30	S 38 W	25.0	324.93	0.00	4.55 S	4.26 W	6.23	S 43 8 W	0.28
376.0	1 30	N 90 W	51.0	375.91	0.00	5.11 S	5.42 W	7.45	S 46 40 W	0.77
410.0	1 30	N 62 W	34.0	409.90	0.00	4.90 S	6.28 W	7.96	S 52 1 W	0.64
440.0	1 45	N 87 W	30.0	439.89	0.00	4.68 S	7.09 W	8.49	S 56 36 W	0.74
467.0	2 45	N 65 W	27.0	466.87	0.00	4.42 S	8.11 W	9.24	S 61 25 W	1.45
497.0	3 30	N 75 W	30.0	496.82	0.00	3.86 S	9.65 W	10.39	S 68 11 W	0.92
515.0	2 45	N 71 W	18.0	514.79	0.00	3.57 S	10.59 W	11.17	S 71 20 W	1.30
546.0	3 30	N 75 W	31.0	545.75	0.00	3.08 S	12.20 W	12.58	S 75 50 W	0.75
565.0	4 0	N 80 W	19.0	564.71	0.00	2.81 S	13.41 W	13.71	S 78 10 W	0.94
585.0	3 30	N 65 W	20.0	584.66	0.00	2.42 S	14.66 W	14.86	S 80 38 W	1.64
622.0	4 30	N 67 W	37.0	621.57	0.00	1.37 S	17.02 W	17.07	S 85 24 W	0.82
654.0	4 30	N 74 W	32.0	653.47	0.00	0.53 S	19.38 W	19.39	S 88 26 W	0.51
672.0	4 30	N 62 W	18.0	671.42	0.00	0.00 S	20.69 W	20.69	S 89 59 W	1.57
691.0	4 15	N 62 W	19.0	690.36	0.00	0.68 N	21.97 W	21.98	N 88 14 W	0.39
732.0	4 45	N 55 W	41.0	731.24	0.00	2.36 N	24.71 W	24.82	N 84 33 W	0.54
743.0	5 0	N 64 W	11.0	742.20	0.00	2.83 N	25.51 W	25.67	N 83 40 W	2.19
753.0	4 45	N 53 W	10.0	752.16	0.00	3.27 N	26.24 W	26.44	N 82 53 W	2.90
770.0	4 30	N 55 W	17.0	769.11	0.00	4.08 N	27.35 W	27.65	N 81 31 W	0.52
800.0	3 53	N 60 W	30.0	799.03	0.00	5.26 N	29.19 W	29.66	N 79 48 W	0.72
819.0	3 15	N 57 W	19.0	817.99	0.00	5.87 N	30.20 W	30.77	N 78 60 W	1.04
839.0	3 30	N 53 W	20.0	837.95	0.00	6.55 N	31.17 W	31.85	N 78 8 W	0.51
856.0	3 0	N 65 W	19.0	856.92	0.00	7.10 N	32.09 W	32.87	N 77 31 W	1.33
886.0	2 30	N 53 W	28.0	884.89	0.00	7.79 N	33.24 W	34.14	N 76 48 W	0.81
915.0	2 30	N 55 W	29.0	913.86	0.00	8.54 N	34.26 W	35.31	N 76 0 W	0.08

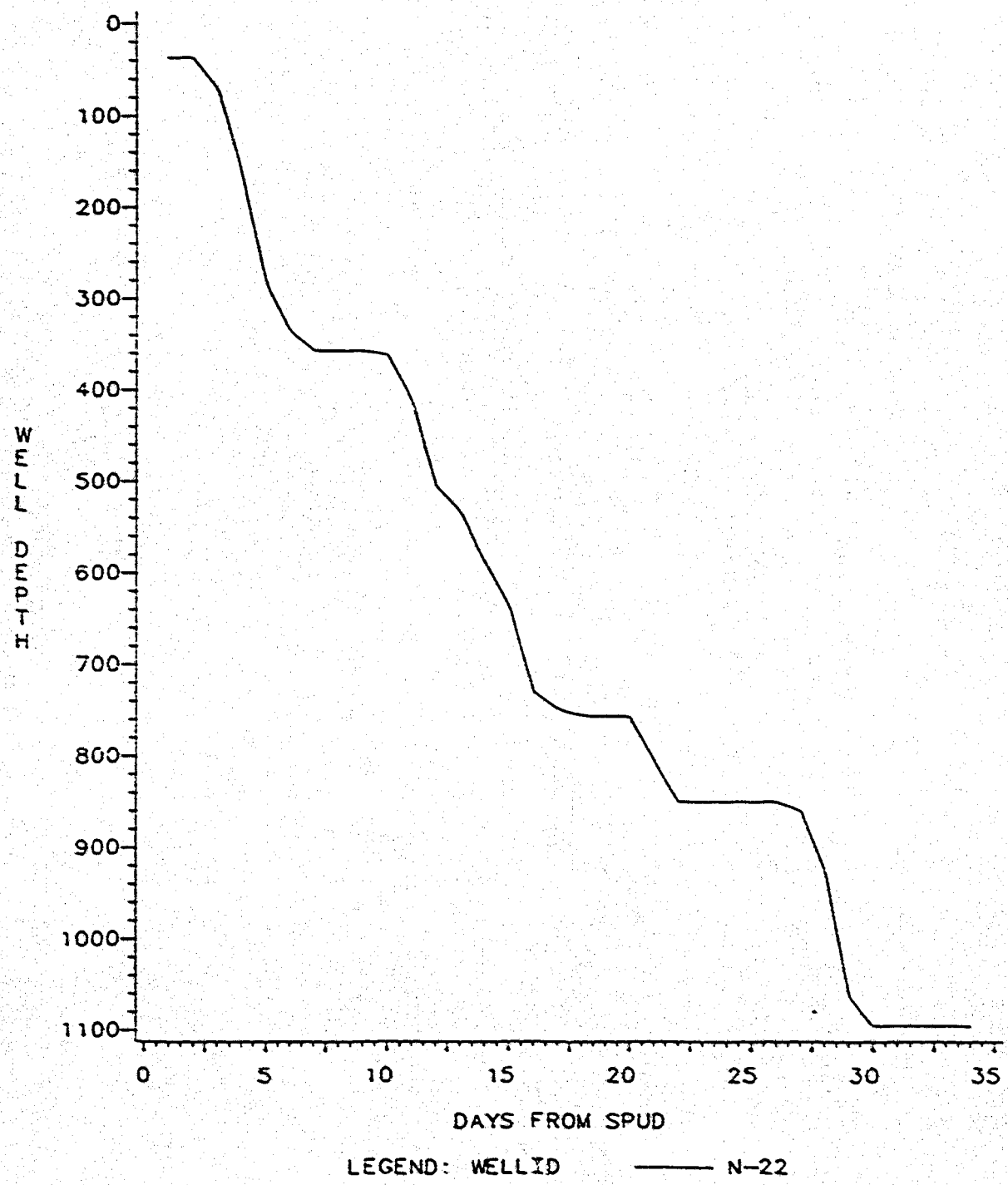
Measured Depth (meters)	Drift Angle (deg min)	Drift Direction (deg)	Course Length (meters)	True Vertical Depth (meters)	Vertical Section (meters)	Rectangular Co-ordinates (meters)		Closure Distance (meters)	Closure Direction (deg min)	Doglog Severity (deg/30 M)
953.0	3 0	N 65 W	38.0	951.82	0.00	9.45 N	35.84 W	37.06	N 75 14 W	0.55
1020.0	3 30	N 67 W	67.0	1018.71	0.00	10.99 N	39.31 W	40.82	N 74 23 W	0.23
1060.0	3 30	N 61 W	40.0	1058.64	0.00	12.06 N	41.50 W	43.22	N 73 48 W	0.27
1088.0	3 30	N 67 W	28.0	1086.58	0.00	12.81 N	43.04 W	44.90	N 73 25 W	0.39

Based upon Radius of Curvature calculations except in cases of no change in Drift Direction or Drift Angle. In those cases Angle Averaging method has been used.

There is no Vertical Section as Target Bottom Hole Co-ordinates were 0.00 N 0.00 E.

PCI ET AL HOOSIER N-22

PENETRATION CURVE



Yellowknife

GEOLOGICAL WELLSITE REPORT

FOR

P.C.I. ET AL HOOSIER RIDGE N-22

Lat. 65° 21' 56.63" N
Long. 127° 34' 48.65" W

Prepared For

PETRO CANADA EXPLORATION LTD.

By

T.A. VADER

PRO GEO CONSULTANTS

MARCH 7, 1984

PRO GEO CONSULTANTS

INDEX

WELL SUMMARY

WELL NAME:	P.C.I. et al Hoosier Ridge N-22
CO-ORDINATES:	Lat. 65° 21' 56.63" N, Long. 127° 34' 48.65" W
LOCATION:	
ELEVATIONS:	Ground: 154.13 m K.B.: 160.33 m
OPERATOR:	Petro Canada Exploration Ltd.
DRILL CONTRACTOR:	Atco/Equtak #76
WELLSITE SUPERVISION:	Toolpusher: D. Kennedy Engineer: J. Durrell/Y. Hope/P. Walsh Geologist: T. Vader
WELL SPUDDED:	0330 hours January 31, 1984
DRILLING COMPLETED:	0900 hours February 29, 1984
BIT SIZES:	(A) Surface: 445 mm (B) Surface: 311 mm Downhole:216 mm
CASING SIZES:	(A) Surface: 340 mm (B) Surface: 245 mm Production: 177.8 mm
TOTAL DEPTH:	Driller: 1095 m Logger: 1096 m
BOTTOMHOLE FORMATION:	Hume Formation
CORES CUT:	Core #1: 739-748; Core #2: 748-757; Core #3: 850-860
LOGS RUN:	Run #1: 532 m-Surface Casing (357 m) DISFL, CNL-FDG-GR-CAL, MICROLOG Run #2: 1096-532 m-DISFL, BHCS, CNL-LDT, DIPMETER, SONIC WAVETRAIN
DRILLSTEM TESTS:	DST #1: 739-757 m (Kee Scarp)

ADDITIONAL:

RIG RELEASED: 2400 hours March 4, 1984

WELL STATUS: Kee Scarp Oilwell

DAILY SUMMARY

1984-01-31

- Spud @ 0330 hours
- Drill 445 mm hole to 37 m with Bit #1A (HW OSC 35)
- Circulate and condition hole
- Run 340 mm casing
- Cement 340 mm casing P.D. 2239 hours
- W.O.C.

1984-02-01

- W.O.C.
- Head up BOP's and diverter lines

1984-02-02

- Head up BOP's and diverter lines
- Drill out shoe with Bit #2A (H.W. XDV)
- Could not drill rubber plug
- P.O.O.H.
- R.I.H. with Bit #3A (H.W. X3A) 311 mm
- Drill out plug, cement and float shoe
- Drill ahead to 69 m

1984-02-03

- Drill 311 mm hole to 78 m
- Circulate and clean hole
- Wait on water
- P.O.O.H. to add stabilizers
- Make up B.H.A. and R.I.H.
- Drill 311 mm hole to 162 m

1984-02-04

- Drill ahead to 285 m
- Prepare to trip for bit

1984-02-05

- P.O.O.H. for bit
- R.I.H. with Bit #4A (RR #2 HW X3A)
- Drill ahead to 336 m

1984-02-06

- Drill ahead to 340 m
- P.O.O.H. to drill collars (wiper trip)
- R.I.H. with Bit #5A (HW X3A)
- Drill ahead to 357 m
- P.O.O.H. to run casing
- Run 245 mm surface casing

1984-02-07

- Cement 245 mm surface casing
- W.O.C.
- Head up BOP's

1984-02-08

- Head up BOP's
- Run multi-shot gyroscopic survey
- Pressure test BOP's

1984-02-09

- Pressure test BOP's
- R.I.H. with Bit #6 (HW JD7) 216 mm
- Drill out float collar
- Pressure test

1984-02-10

- Drill ahead to 364 m
- Run P.I.T.
- Drill ahead to 393 m
- P.O.O.H. to add Monel D.C. and stabilization
- R.I.H. with Bit #7 (HW J-22)
- Drill ahead to 410 m

1984-02-11

- Drill ahead to 508 m

1984-02-12

- Drill ahead to 532 m
- P.O.O.H. for logging run #1
- Run DISFL
- Run CNL-FDC-GR-CAL

1984-02-13

- Run Microlog-Microlaterolog
- R.I.H. with stiff assambly and Bit #8 (HW JD7)
- Drill ahead with reduced fob to correct deviation
- Drill ahead to 588 m

1984-02-14

- Drill ahead to 636 m with reduced fob
- P.O.O.H. for new bit
- R.I.H. with Bit #9 (HW JD7)
- Drill ahead to 730 m

1984-02-15

- Drill 216 mm hole to 736.5 m
- Circulate sample
- W.O.O.
- Drill 216 mm hole to 737.5 m
- Circulate sample
- W.O.O.
- P.O.O.H. to cut core #1

1984-02-16

- Strap out, correct depth to 739.0 m
- Make up core barrel and bit C 201 (diamond)
- R.I.H. with core barrel and Bit 1C
- Cut core #1 (739.0-748.0)
- P.O.O.H. with core #1

1984-02-17

- P.O.O.H. with core #1
- Recover core #1 (recovered 9.0 m)
- R.I.H. with bit
- Ream rat hole
- P.O.O.H. to cut core #2
- Run in hole with core barrel and Bit #2C
- Cut core #2 to 755 m

1984-02-18

- Cut core #2 to 757 m (748.0-757.0)
- P.O.O.H. with core #2
- Recover core #2 (recovered 9.0 m)
- R.I.H. with bit
- Ream 171 mm rat hole (748.0-757.0)
- Circulate and condition mud and hole
- Rig up testing equipment
- P.O.O.H. for DST #1
- Make up test tool

1984-02-19

- Make up test tool
- R.I.H. for DST #1
- Run DST #1 (739.0-757.0)
- P.O.O.H. with test tool
- Lay down tools
- R.I.H. to resume drilling 216 mm hole

1984-02-20

- R.I.H. with new bit (HW JD4)
- Circulate bottoms up
- Drill 216 mm hole to 764 m
- Circulate sample
- Drill 216 mm hole to 803 m

1984-02-21

- Drill 216 mm hole to 850 m
- P.O.O.H. for bit

1984-02-22

- P.O.O.H. for bit
- Travelling blocks hit crown
- Inspect derrick for damage

1984-02-23

- Lay down derrick with crane
- Repair derrick

1984-02-24

- Repair derrick

1984-02-25

- Repair derrick
- Run in hole
- Circulate
- P.O.O.H. to cut core #3
- Make up core barrel and Bit 3C

1984-02-26

- Cut core #1 (850.0-860.0)
- P.O.O.H. with core #3
- Recover core #3
- Lay down core barrel
- Ream 171 mm rat hole with NB (HW J-22)

1984-02-27

- Ream rathole
- Drill 216 mm main hole to 921 m
- Survey
- Circulate out kick
- Circulate and condition mud through poor boy degasser
- Drill ahead to 925 m

1984-02-28

- Drill ahead to 1062 m

1984-02-29

- Drill ahead to 1095 m
- Circulate and condition hole and mud
- P.O.O.H. into casing
- Run back to bottom
- P.O.O.H. to log
- Logging with Schlumberger

1984-03-01

- Logging with Schlumberger

1984-03-02

- Logging with Schlumberger

1984-03-03

- Condition hole prior to running casing
- Run casing

1984-03-04

- Run 177.8 mm production casing
- Cement production casing
- Rig release @ 2400 hours

CASING SUMMARY

Surface Casing (A)

Ran 3 joints 340 mm 101 kg/m, K 55, BT&C, conductor casing, Watco float shoe. Cemented by Dowell with 9.8 tonnes of Arctic set cement. Landed at 37 m K.B. Plug down @ 2239 hours January 31, 1984. Good cement returns to surface.

Surface Casing (B)

Ran 28 joints 245 mm, 59.5 kg/m LT&C surface casing. Cemented by Dowell with 34.0 tonnes Arctic set cement. Landed at 357 m. Plug down @ 0215 hours February 7, 1984. 4 m^3 cement returns to surface.

Production Casing

Ran 95 joints 177.8 mm, 43.2 kg/m, Soo-95, LT&C production casing. Cemented by Dowell with 25.2 tonnes of Class "G" plus .5% D-65 plus .1% D-13. Landed at 1094 m. Plug down March 4, 1984.

DRILLSTEM TEST SUMMARY

DST #1 Interval: 739-757 m Formation: Kee Scarp
Type: Dual Conventional Bottom Hole (Closed Chamber Test)

Times: 13/180/180/240

On Preflow: Dead at surface

On VO: Dead at surface

Recovery: 3.66 m of very slightly oil cut mud (only mud in sample chamber

HP: 8394/8308 kPa SIP: 6378/3568
FP: 293/327.5/413.7/293

Other Information: Bottom hole temperature-28°C; zone had very poor transmissibility and did not flow at a measurable rate

P.C.I. et al Hoosier Ridge N-22 was drilled as an exploration well to further define and delineate existence of Kee Scarp biohermal development in the Norman Wells area. Seismic interpretation defined a thickening in the Kee Scarp in the Hoosier Ridge area. Due to a lack of existing wells in the area seismic information as well as exposed section measurements were used to determine prognosed formation depths for the well.

A secondary possible production zone in the well was the Basal Cretaceous sand which overlies Upper to Middle Devonian sediments in the area.

The Cretaceous section in this well consisted of thickly interbedded sandstones and shales. The sand generally had an argillaceous matrix which reduced their effective porosity to poor. In the lower part of the Cretaceous (326-526 m) however, slight hydrocarbon shows were discerned visually and with the aid of the fluoroscope. The shows consisted of a trace of live oil staining, weak yellow fluorescence and a very weak yellow massive cut in many of the light grey brown, very fine to fine grained sandstone beds.

The Basal Cretaceous sand showed at 496 metres and consisted of a light to medium grey silt to very fine grained quartz sandstone with an argillaceous matrix. The upper part of the sand (496-520 metres) had traces of very weak orange fluorescence and a very weak to weak slow yellow massive cut. Mud gas detection equipment was unable to discern any appreciable increases through this zone. From visual shows described through the Cretaceous it was decided that logs should be run to determin if any of the shows were producable. Logs were run from 532 metres (6 metres into the Devonian Imperial formation) to surface casing at 357 metres. Subsequent log analysis showed all of the sand zones to be water wet.

The Imperial formation showed as a medium to dark grey micromicaceous shale. No Imperial sandstone was developed in this well.

The Canol formation showed up about 140 metres high to prognosis in this well and occurred as a dark brown to black bituminous shale. The basal portion of the Canol also contained thin bands of micritic-detrital limestone.

The Kee Scarp formation also came in about 140 metres high to prognosis at a drilled depth of 735.5 metres. Two metres of the reef were drilled up and a decision was then made to cut a 9 metre core. A second 9 metre core was cut after the first. Visual porosity estimates of the core ranged from 3 to 5%. Core analysis as well as subsequent log evaluation showed the porosities to be as high as 12% with an average porosity of the cored zones of 7 to 8%. The porosity is developed in a calcilutite matrix of detrital material formed from extensive weathering of the main reefal body. The matrix is generally interspersed with common cylindrical and bulbous stromatoporoidal fragments and blocks. The skeletal material has very poor to poor tight porosity shows. The matrix is oil saturated and has very poor permeability. Visual shows consisted of live oil saturation, abundant yellow gold fluorescence, and a slow weak streaming cut in the cores along with oil and gas bleeding. Mud gas detection equipment showed little response in the Kee Scarp probably due to slow penetration rates. The remainder of the Kee Scarp showed much the same but with increased depth the proportion of skeletal remains increased, reducing total porosity. The lower section of the Kee Scarp (platform) became micritic with skeletal remains and the porosity was further reduced. The platform section of the reef also showed minor dead oil staining throughout.

The upper part of the hare Indian River formation showed as interbedded limestones and shales. After 20 metres this graded into a dark grey/brown calcareous shale. At 916 metres in the Hare Indian Shale a gas show of 2000 units over a background of 15 units was recorded on the total gas detector. The hydrogen flame chromatograph discerned that the show contained heavy hydrocarbons which was confirmed by oil in the drilling mud. Due to porous reservoir rock being observed in the chip samples, it was believed that the show came from fracture porosity in the shale. An argument supportive of this theory was that there were minor amounts of clear calcite crystals in chip samples taken over the zone

which may indicate calcite veining of fractures. The mud density had to be raised abount 80 kilograms per cubic metre to control this zone. Connection, survey and trip gas from this zone remained until the well was drilled to total depth.

The well was drilled to a total depth of 1095 metres; 52 metres into the Hume formation. The Hume consisted of a light to medium grey/brown micritic limestone which was slightly bituminous in part.

FORMATION TOPS

FORMATION	SAMPLE		LOG	
	Depth (m)	Subsea	Depth (m)	Subsea
Basal Cretaceous Sand	494.0	-333.67	494.0	-333.67
Imperial	523.0	-362.67	523.0	-362.67
Canol	720.0	-559.67	720.0	-559.67
Kee Scarp	735.5	-575.17	734.0	-573.67
Hare Indian River	873.0	-718.67	879.0	-718.67
Hume	1043.0	-882.67	1044.0	-883.67
F.T.D.	1095.0	-934.67	1096.0	-935.67

SAMPLE DESCRIPTIONS

DEPTH(m)	DESCRIPTION
95-107	Shale; dark grey, subfissile, micromicaceous, soft, slightly carbonaceous to inoceramus
107-150	Shale; dark grey, subfissile, micromicaceous, soft, slightly carbonaceous to carbonaceous in part, trace inoceramus, trace white kaolinitic shale, occassional quartz and chert grains, occassional carbonaceous flecks, occassional unidentifiable fossil fragments
150-180	Shale; dark grey, subfissile, micromicaceous, soft, slightly carbonaceous, trace inoceramus, trace of kaolinitic shale, traces of pyrite, traces of brown sideritic shale
180-207	Shale; dark grey, blocky to subfissile, micromicaceous, soft, slightly carbonaceous, traces of dissemenated pyrite, traces of brown sideritic shale
207-232	Shale; dark grey, blocky to subfissile, very micromicaceous, trace of dissemenated pyrite, soft, trace of medium brown sideritic shale, trace of pyrite, common glauconite
232-238	Sandstone; light to medium grey, quartz, lithic fragments, silt to very fine graned, calcite cement, trace of pyrite cement, silica cement, argillaceous to very argillaceous matrix, poor effective intergranular porosity
238-248	Shale; medium to dark grey, blocky, slightly calcareous, slightly silty and sandy to silty and sandy, trace of sandstone (as above)
248-251	Sandstone; light grey, quartz, lithic fragments, mica flakes, calcite silica and minor pyrite cement, argillaceous matrix, silt to very fine grained, poor effective intergranular porosity

251-265	Shale; dark grey, blocky to subfissile, micromicaceous, slightly silty and sandy in part, trace of siltstone
265-284	Shale; dark grey to black, subfissile, micromicaceous, slightly carbonaceous in part, trace of disseminated pyrite; trace of carbonaceous matter, trace of unidentifiable fossil fragments, trace of brown sideritic shale
284-298	Interbeds of shale; dark grey to black, subfissile, micromicaceous, slightly carbonaceous sandy and silty in part, and sandstone; medium grey brown, quartz, very fine grained, subangular, well sorted, calcite cement, silica cement, trace of pyrite cement, argillaceous matrix, poor effective intergranular porosity
298-308	Interbeds of shale; dark grey to black, blocky to subfissile, micromicaceous, carbonaceous in part, occassional carbonaceous flecks, trace of calcite veining, and sandstone; medium grey brown, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of calcite cement, trace of pyrite cement, slightly argillaceous to argillaceous matrix, poor effective intergranular porosity, occassional medium to coarse grained quartz and chert grains
308-326	Shale; as above with stringers of sandstone; medium grey/brown, to dark grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of calcite cement, trace of pyrite cement, argillaceous to very argillaceous matrix, poor effective intergranular porosity, occassional medium to coarse grained quartz and chert grains

326-328	Sandstone; light grey/brown, quartz, very fine to fine grained, occassional medium grains, subangular to angular, well sorted, silica cement, slightly argillaceous matrix in part, fair effective intergranular porosity, trace of very weak yellow fluorescence, trace of fast very weak yellow massive cut
328-330	Shale; black, blocky, micromicaceous in part, slightly carbonaceous in part
330-333	Sandstone; light grey, quartz, very fine to medium grained, occassionally coarse grained, occassional pebbles, subangulart to subrounded, moderate to poor sorting, silica cement, argillaceous martrix in part, fair intergranular porosity, trace of live oil staining, common weak yellow fluorescence, fast weak yellow massive cut
333-336	Shale; as above
336-342	Sandstone; light grey/brown, quartz, very fine grained, occassional medium grains, well sorted, silica cement, argillaceous matrix, carbonaceous matter, poor intergranular porosity, trace of weak yellow fluorescence, fast weak yellow massive cut
342-348	Shale; medium grey blocky, micromicaceous, silty and sandy
348-357	Sandstone; as above
357-360	Interbeds of sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of pyrite cement, argillaceous to very argillaceous matrix, grades to sandy shale in part, very poor effective porosity, trace of very weak orange fluorescence, very weak slow yellow massive cut and shale; medium grey subfissile, micromicaceous, silty and sandy in part, grades to shaly sandstone in part

360-374	Sandstone; as above with trace of live oil staining, common weak orange fluorescence, slow weak yellow massive cut with occassional thin bands of shale; as above
374-390	Shale; medium grey, subfissile, micromicaceous, silty and sandy, siliceous and bands of sandstone; as above commonly fining to bands of siltstone, very slight traces of orange fluorescence, slow very weak yellow massive cut
390-395	Missed sample
395-408	Interbeds of Shale; medium grey, blocky to subfissile, micromicaceous, siliceous, silty and sandy, grades to shaly sandstone in part; and sandstone; medium grey, quartz, silt to fine grained, subangular, well sorted, silica cement, argillaceous to very argillaceous matrix, very poor effective intergranular porosity, common siltstone
408-413	Interbeds of shale; as above; and sandstone; as above; and siltstone; medium grey, quartz, silt, subangular, well sorted silica cement, argillaceous to very argillaceous matrix, very poor porosity
413-416	Shale; medium grey, blocky to subfissile, micromicaceous, siliceous silty and sandy in part; with minor bands of sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, argillaceous to very argillaceous matrix, very poor effective intergranular porosity; and siltstone; as above

416-424	Shale; medium grey, blocky to subfissile, micromicaceous, siliceous silty and sandy in part, becoming slightly carbonaceous interbedded with sandstone; as above with traces of very weak orange fluorescence and a trace of a very weak slow massive yellow cut and siltstone; as above with very slight shows as above
424-436	Shale; as above interbedded with sandstone; light to medium grey, quartz, silt to very fine grained, subangulart, well sorted, silica cement, trace of calcite cement, argillaceous matrix, very poor effective intergranular porosity, very slight shows (fluorescence and cut), trace of siltstone
436-442	Shale; medium grey, blocky to subfissile, micromicaceous, very silty in part, trace of carbonaceous matter with a thin band of sandstone; as above with a very argillaceous matrix and a thin band of limestone; micritic-skeletal, white to dark brown, dolomitic in part, argillaceous in part, slightly bituminous in part, calcite cement, (abundant ostracods in a micrite matrix) trace of belemnites
442-447	Sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of pyrite cement, argillaceous matrix, poor effective intergranular porosity, grades to siltstone in part, minor shale bands
447-448	Sandstone; white to light grey, silt to very fine grained, quartz, subangular, well sorted, very abundanct calcite cement, very poor intergranular porosity, grades to sandy micritic limestone

448-452	Sandstone; light, grey, quartz, silt to very fine grained, subangular, well sorted, abundant calcite cement, trace of pyrite cement, slightly argillaceous matrix, poor effective intergranular porosity, minor weak orange fluorescence, fast yellow massive cut
452-462	Sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, trace of calcite cement, silica cement, slightly argillaceous to argillaceous matrix, poor effective intergranular porosity, no shows
462-472	Interbedded shale; medium grey, blocky to subfissile, micromicaceous, siliceous, silty and sandy in part; and sandstone; as above; and siltstone; medium grey, quartz, silt, subangular, well sorted, silica cement, argillaceous matrix, very poort effective intergranular porosity
472-491	Shale; medium grey, blocky to subfissile, micromicaceous, silty and sandy in part, occassional carbonaceous flecks; with occassional bands and beds of sandstone; light to medium grey, quartz, silt to fine grained, subangular, well sorted, silica cement, minor calcite cement, trace of pyrite cement, argillaceous matrix in part, poor effective intergranular porosity, and minor bands of siltstone; medium grey, quartz, silt, subangular, well sorted, silica cement, trace of calcite cement, argillaceous matrix, very poor effective intergranular porosity
491-496	Shale; medum grey, occassionally dark grey, blocky to subfissile, micromicaceous, silty and sandy in part, occassional carbonaceous flecks

496-511 Sandstone; light to medium grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, argillaceous matrix in part, poor effective intergranular porosity, trace of very weak to weak orange fluorescence, very weak to weak slow yellow massive cut, rare thin shale bands

511-520 Sandstone; light to medium grey, quartz, silt to fine grained, subangular, well sorted, silica cement, trace of calcite cement, argillaceous matrix, poor effective intergranular porosity, trace of weak orange fluorescence, weak slow yellow massive cut

520-526 Sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of calcite cement, argillaceous to very argillaceous matrix, very poor effective intergranular porosity, no shows, rare shale bands

526-532 Shale; medium to dark grey, blocky, micromicaceous, siliceous, slightly silty and sandy in part, minor amounts of sandstone and siltstone

TOPS	Basal Cretaceous Sand	496	(-335.7)
	Imperial	526	(-365.7)

532-544 Shale; medium to dark grey, blocky, micromicaceous, siliceous, silty and sandy in part

544-545 Sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, abundant silica cement, trace of calcite cement, argillaceous matrix, poor effective intergranular porosity

545-557	Interbeds of shale; as above and sandstone; light to medium grey, quartz, silt to fine grained, subangular, well sorted, calcite cement, silica cement trace of pyrite cement, argillaceous matrix, poor effective intergranular porosity, trace of ostracods
557-561	Interbeds of shale; medium to dark grey, blocky, slightly carbonaceous, silty in part and, sandstone; medium grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of calcite cement, argillaceous matrix, poor effective intergranular porosity
561-570	Shale; as above
570-575	Missed sample
575-585	Shale; medium to dark grey, blocky, slightly carbonaceous, silty in part
585-586	Sandstone; medium to light grey, quartz, silt to very fine grained, subangular, well sorted, silica cement, trace of calcite cement, argillaceous matrix, very poor porosity, grading to siltstone; medium grey, quartz, silt, silica cement, trace of calcite cement, argillaceous matrix, very poor porosity
586-602	Shale; medium to dark grey, blocky, micromicaceous, slightly calcareous in part, silty and sandy in part, minor pyrite inclusions
602-603	Shale; as above with occassional laminae and thin bands of sandstone; and siltstone; as above
613-635	Shale; dark grey, blocky, micromicaceous, silty and sandy in part, trace of pyrite inclusions, traces of sandstone and siltstone

635-653	Shale; medium to dark grey, blocky, subfissile in part, micromicaceous, silty slightly calcareous in part, occassional laminae of siltstone and sandstone
653-657	Shale; medium grey, blocky to subfissile, micromicaceous, slightly silty in part
657-677	Shale; medium grey, blocky, micromicaceous, silty and sandy in part, trace of dark grey shale
677-691	Shale; medium to dark grey, blocky micromicaceous, silty and sandy in part
691-720	Shale; medium to dark grey, blocky to subfissile, micromicaceous, slightly silty in part, trace of dark brown slightly sideritic shale, occassional siltstone laminae

CANOL FORMATION (-599.17)

720-735.5	Shale; dark grey/brown to black, blocky, slightly bituminous at top, bituminous at base, trace disseminated pyrite inclusions, petroliferous odor, low specific gravity (small fragments float on wash water) with occassional stringers of limestone; micritic detrital, cream to dark brown, very fine granular, micritic matrix, occassional quartz grains, argillaceous to very argillaceous, tight to very poor porosity, trace of pyrite inclusions

KEE SCARP FORMATION (-575.17)

735.5-737.5	Limestone; micritic-detrital, white to tan, micritic to chalky (chalky possible due to bit damage-crushing), slightly argillaceous in part, pyrite inclusions, poor earthy porosity, strong petroliferous odor on heating, common bright yellow fluorescence, slow weak yellow massive cut
757-763	Limestone; skeletal micritic, white to medium brown, non identifiable skeletal material with minor calcilutite to micrite infill of voids, tight - very poor (1-2%) pinpoint porosity, trace of live oil staining, trace of golden yellow fluorescence, slow weak yellow massive cut
763-764	Limestone; detrital, medium brown, calcilutite to very fine grained, soft, leached?, rotten appearance, poor effective earthy porosity, trace of live oil staining, trace of golden yellow fluorescence, slow weak yellow massive cut
764-785	Limestone; skeletal-micritic, white to tan, micritic to very fine granular, calcite cement, tight trace of dead oil staining, very slight trace of live oil staining, fluorescence and cut
785-795	Limestone; skeletal-micritic, white to light brown, unidentifiable skeletal matter with minor micrite to calcilutite infill of voids, common calcite cement, slightly argillaceous in part, tight to very poor (2%) pinpoint porosity, trace of dead oil staining, trace of live oil staining and very weak fluorescence and cut

795-815 Limestone; skeletal-micritic, white to cream, skeletal matter with very minor infill of voids with micrite, calcite cement, tight, no shows

815-830 Limestone; skeletal-micritic, white to light brown, skeletal matter with very minor micrite infill of voids, calcite cement, tight, trace of dead oil staining

830-835 Limestone; skeletal micritic, white to medium brown, skeletal matter with abundant micrite infill of voids, calcite cement, slightly argillaceous in part, tight-trace porosity, trace of dead oil staining

735-850 Limestone; as above, commonly bitumen engrained, occassional shale laminations, dead oil stained

860-870 Limestone; micritic-skeletal, white to light grey/brown, skeletal, fragments in a micrite matrix, abundant clear calcite cement, sligthly argillaceous in part, tight, traces of bituminous laminae and black bituminuous shale laminae

870-873 Limestone; as above with increasing amounts of bituminous laminae and black bituminous shale bands

HARE INDIAN RIVER FORMATION 879 m

879-885 Interbeds of limestone; micritic-skeletal, white to medium grey/brown, minor skeletal fragments in a micrite matrix, abundant calcite cement, slightly argillaceous to argillaceous, tight; and shale; medium to dark grey, blocky, micro-micaceous, common finely disseminated pyrite, occassional pyrite blebs, slightly calcareous

885-898	Interbeds of Shale; as above and limestone; detrital-micritic, white to light brown, chalky to detrital fragments in a minor micritic matrix, calcite cement, slightly argillaceous, trace of disseminated pyrite, very poor porosity, traces of ostracods and crinoids
898-906	Shale; dark grey/brown, blocky to sub-fissile, micromicaceous, trace of disseminated pyrite, calcareous, slightly bituminous, soft, traces of crinoids and ostracods
906-910	Shale; medium to dark grey, grey/brown, blocky, slightly silty, abundantly micromicaceous, calcareous, common disseminated pyrite with occassional thin stringers of limestone; micritic-detrital, white to tan, minor very fine grained detrital fragments and skeletal fragments in a micritic matrix, calcite cement, very poor porosity, trace of dead oil staining (bitumen), trace of very slight cut fluoresence, trace of crinoids
916-918	Well took slight kick. Oil and gas in mud, gas detector peak of 2000/15 units, C_1, C_2, C_3, C_4, NC_4, trace of euhedral calcite crystals in limestone; (possible vuggy porosity), show also possibly from fracture porosity in shale, or show from uphole due to decrease in mud density from 1130-1100 kg/m^3
920-940	Shale; medium grey, blocky to sub-fissile, abundantly micromicaceous, silty in part, disseminated pyrite, slightly calcareous
940-955	Shale; medium grey, blocky to sub-fissile, very micromicaceous in part, slightly silty in part, trace of disseminated pyrite, slightly calcareous
955-975	Shale; medium grey, blocky to sub-fissile, micromicaceous, trace of disseminated pyrite, slightly calcareous

975-987	Shale; medium to dark grey, blocky to sub-fissile, micromicaceous, trace of pyrite, slightly calcareous, slightly silty in part
987-1012	Shale; medium to dark grey, blocky to sub-fissile, micromicaceous, slightly calcareous, trace of siltstone, occassional trace of limestone
1012-1015	Shale; as above with minor dark grey bituminous shale
1015-1040	Shale; dark brown to black, blocky, micromicaceous, bituminous, slightly calcareous, with minor amounts of grey shale as above decreasing towards base
1040-1043	Shale; dark brown to black, blocky, micromicaceous, bituminous, fractured, veined with calcite and micritic limestone, occassional chalky limestone flecks

HUME FORMATION 1043 m

1043-1056	Limestone; light grey to medium brown micritic to very fine granular, argillaceous, chalky in part, calcite cement, bituminous in part, slightly silty in part, tight to very poor porosity with minor black shale: as above
1056-1060	Limestone; light to medium grey brown, micritic to chalky, occassionally very fine grained, calcite cement, argillaceous in part, bituminous in part, tight to very poor porosity
1060-1080	Limestone; light to medium grey/brown, occassionally dark brown, micritic to chalky, occassionally very fine granular, calcite cement, argillaceous in part, bituminous in part, tight to very poor porosity

CORE DESCRIPTION

Coring Times: 11/20/16/22/13, 15/12/15/15/13, 12/10/9/9/10, 8/8/10/9/10, 8/9/8/8/8, 7/10/9/8/7, 8/7/9/7/8, 11/10/9/6/8, 7/7/9/9/9

739.0-739.6 Limestone; detrital-skeletal fragments in a calcilutite to very fine grained calcarenite martrix, medium to dark brown, minor calcite cement, slightly argillaceous, poor intergranular and pinpoint porosity (3-5%) live oil saturated matrix, abundant yellow-gold flurescense, slow weak yellow streaming cut, abundant skeletal remains, amphipora, idiostromata, stachyodes, minor brachopoda

739.6-740.2 Limestone; skeletal, white, large bulbous strom, tight, no shows, occassional patches of amphiporoid limestone as above

740.2-741.5 Limestone; detrital-skeletal, white skeletal fragments in a dark brown calcilutite to very fine grained calcarenite matrix, matrix has 3-5% intergranular and pinpoint porosity, liver oil saturated, abundant yellow-gold fluorescence, show weak yellow streaming cut oil and gas bleeding throughout, common amphipora, idiostromata and stachyodes (cylindrical stroms)

741.5-741.95 Limestone; detrital, dark brown, calcilatite to very fine grained calcarenite, no identifiable skeletal remains, argillaceous and poor (3-5%) intergranular and pinpoint porosity, trace of hairline fracture porosity, live oil saturated oil and gas bleeding, abundant yellow-gold fluorescense, slow weak yellow streaming cut

741.95-742.15 Limestone; same as 739.0-739.6, trace of stylolites, trace of bulbous stroms (2.5 cm diameter), live oil saturated, bleeding oil, abundant yellow gold fluorescense, slow weak yellow streaming cut

742.15-748.0 Limestone; detrital, dark brown, calcilutite, to very fine granular calcarenite, argillaceous, occassional bands and pockets with calcite cement poor (3-5%) intergranular and pinpoint porosity, hairline vertical and horizontal fracture porosity, abundant yellow-gold fluorescense, live oil saturated, slow streaming weak yellow cut oil and gas bleeding, scattered amphipora, idiostromata, stachyodes and bulbous stromatoporoids, occassional strom fragments, occassional stylolites

"TIGHT"

PETRO CANADA INC.

REPORT ON NEW COMPLETION

OF

PCI ET AL HOOSIER RIDGE N-22

MARCH 12 - APRIL 6, 1984

Distribution List

Petro Canada Inc.
FSJ Well File
Calgary Well File
E. Wichert - Calgary

Prepared by: Clem Dedora

Approved by: R. T. Lien, P. Eng.,
District Manager

84/04/12

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INTRODUCTION

This report contains the details of the completion of PCI et al Hoosier Ridge N-22 from March 13th to April 6th, 1984.

The Hoosier N-22 well was drilled to 1095m KB as an exploration well to exploit the Keescarp formation. A string of 177.8mm casing was run and cemented to 1094 m KB. Ten intervals were perforated as indicated in discussion.

DISCUSSION

Roll'n Well Servicing, single service rig was moved in and rigged up. The tubing spool and BOP's were installed. Pressure tested casing seals to 17 mPa. Held ok. 73mm EUE tubing was run with casing scraper to PBTD at 971m KB to ensure clean casing over perforating interval. Computalog ran a cement bond log from 950-700m KB with a pressure pass at 5 mPa. Approximate cement top at 311m KB. Pressure test BOP's to 21 mPa, held ok. Perforated intervals 850.5-854, 819.5-822, 813-815, 808-810, 800.5-805, 784-788, 774.5-781 and 763-767m KB with 101mm HSC casing gun at 13 JSPM. Ran in 177mm Baker Model "C" bridge plug and Baker 410 packer. Set bridge plug at 857m KB and 410 packer at 849m KB. Acidize interval No. 10, 850.5-854m KB with 6.5m³ of 15% HCL and additives. Acid away at approximately 7 mPa and .5m³/min. Swabbed back load water and acid also 12m³ of new formation water, with Ph of 6.4 and salinity of 28,600 to 23,100 PPM salt. Fluid level at 400m. Squeeze back swabbed fluids. Lay down packer and bridge plug. Set 177mm drillable bridge plug at 848.5m KB and dump bale 5m of cement above. Re-ran 410 packer and Model "C" bridge plug. Set bridge plug at 825m KB and packer at 823m KB. Acidize interval 819.5-822m KB with 4.7m³ of 15% HCL + additives. Squeeze at .5m³/min and 6 mPa. Release packer and raise bridge plug to 818.5m KB. Set packer at 812m KB. Acidize interval 813-815m KB with 3.9m³ of 15% HCL acid at .16m³/min and 3 mPa. Ave. rate was .3m³/min and 3 mPa. Pressure dropped to "0" mPa. Raise bridge plug to 824m KB. Raise and set packer through perf. interval, found communication between interval No. 2 to No. 6th interval. Swabbed back acid and load water 37.5m³ also 123.87m³ of fresh water. Trip out packer and bridge plug. Set Baker model "K" cement retainer at 797m KB. Ran in stinger on tubing. Squeeze 77 saxs of Class "G" cement and additives at .2m³/min and 1 mPa. Trip out stinger. Ran in with 152mm bit and casing scraper. Drill out cement from 782.9 to 797m KB. Hoist drilling equipment. Ran open ended tubing to 796m KB. Braidenhead 50 saxs of Class "G" cement + additives. Squeezed cement with no pressure. Trip out tubing. Ran in with bit and scraper. Tag cement at 782.32m KB. Hoist drilling equipment. Ran in open end tubing to 781m KB. Braidenhead squeeze 100 saxs of Class "G" cement + additives. Well went on vaccum. Hoist tubing. Ran bit and scraper again. Tag cement at 782.32m KB. Trip out drilling equipment. Ran open ended tubing to 770m KB. Swabbed fluid level down from 100 to 400m. Braidenhead squeeze 100 saxs of Class "G" cement + additives. Hoist tubing. Ran in with bit. Tag cement at 779m KB. Hoist tubing and bit. Reran open ended tubing. Braidenhead squeeze plug No. 5 100 saxs of Class "G" plus additives. Well on small vacuum. Pull 17 jts. of tubing. Swab fluid level down from 150m to 320m KB. Trip out remaining tubing. Ran in with bit and scraper. Tag cement at 779m KB. Hoist drilling equipment. Set Baker Model "K" cement retainer at 771m KB. Run tubing and stinger into retainer. Squeeze 200 saxs of Class "G" cement + additives. Pressure increased to 1 mPa on last .8m³ of cement. Hoist stinger. Ran in with bit and scraper. Drill out cement from 764 to 770m KB. Trip out drilling equipment. Re-perforate 8th interval 763-767m KB. Ran in with Baker 410 packer. Set with bottom of tailpipe at

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DISCUSSION CON'T.....

763m KB. Squeeze 7.5m³ of 15% HCL acid into formation at .1m³/min. Well went on vacuum. Swabbed back load acid and water also 52.7m³ of fresh water. Hoist tubing and packer. Set Model "K" cement retainer at 760m KB. Ran in tubing with stringer. Squeezed 250 saxs of Class "G" cement in stages. Pressure increased to 3.5 mPa on last stage. Backwash cement and hoist stinger. Ran in with bit and scraper. Drilled out retainer at 760m KB and cement to retainer at 771m KB. Drill out retainer and cement to retainer at 797m KB. Drill on retainer. Drop free to 811m KB. Drill out retainer and drop free. Lower bit to 843.5m KB. Pressure test casing to 4 mPa. Drop to 3.3 mPa in 15 min. Made trip with casing scraper to 843.5m KB. Ran cement bond log from 943-675m KB, with pressure pass at 5 mPa. Ran 101mm HSC casing gun. Perforate 819-819.3m KB (4 shots). Ran in 410 packer on tubing. Set packer at 816.5m KB. Est. feedrate at .09m³/min. and 5 mPa. Ran tracer log pumping water at .1m³/min. Radio active material through perfs at 818m down to storage area 825-835m KB, and out into formation. Ran temp. log, found fluid also flowing to storage area (825-835). Hoist tubing and packer. Ran 101mm HSC casing gun. Perforate 795-795.3m KB. (4 shots). Re-ran tubing and 410 packer. Set packer at 798m KB. Pressure up annulus to 3.6 mPa. Slow leak off to 2.9 mPa in 30 mins. Hoist tubing and packer. Set Model "S" drillable bridge plug at 761m KB. Dump bale 5m of cement above. Perforate 9th interval 743-748m KB with 101mm HSC casing gun at 13 SPM. Ran in with tubing and 410 packer, squeeze 2.5m³ of 15% HCL and additive into 9th interval at .1m³/min and 2 mPa. Swab well and recover acid and load water. Also 23.4m³ of new formation water. Oil cut varied from 2% to a trace, water was yellow colored, and salinity diminished to "0" PPM, PH = 6.8. Hoist tubing and 410 packer. Set Model "S" bridge plug at 741m KB. Ran in 101mm HSC casing gun, perf. 10th interval 735-740m KB (13 SPM). Ran 410 packer on tubing. Set packer at 722m KB. Acidize with 9.3m³ of 15% HCL + additives in stages from .16 to .23m³/min. at 3 mPa. Swabbed back 11.8m³ of load acid and water, also 14.7m³ of clear water (fresh). Hoist tubing and packer. Ran 152mm mill on tubing. Drill out bridge plug at 741m KB. Hoist tubing and mill. Ran 410 packer and tubing. Set packer at 741m KB. Pump down tubing. Got circulation up annulus at .4m³/min. Reset packer at 753m KB. Pressure to 10 mPa on tubing. Held ok. Pump down annulus at .4m³/min. Trip out packer. Ran in with tailpipe assembly on tubing string. Land in tubing hanger. Pump diesel into tubing, annulus and surface casing. Remove BOP's. Install wellhead back pressure valve in dognut. Bullplug chain and lock wellhead. Rig out rig and equipment.

CONCLUSION

The Hoosier Ridge N-22 well is suspended due to warm weather and ice road conditions. This well will be abandoned as soon as possible in the next drilling season.

WELL DATA SUMMARY

LOCATION: PCI et al Hoosier N-22

DATE: 84/04/05

KB: 160.33m GL: 154.13m KB-GL: 4.10m

KB-TDF: 3.57m TD: 1100m PBD: 756m KB

SURFACE CASING: 244mm 59.5 kg/m, S00-95, LT + C landed at 357m KB.

PRODUCTION CASING: 177.8mm, 43.2 kg/m, S00-95, LT + C landed at 1100m KB

LINER:

PRODUCTION PACKERS:

NIPPLES:

PERFORATIONS: (1) 850.5 - 854m, 13 SPM (2) 819.5 - 822m, 13 SPM
(3) 813 - 815m, 13 SPM (4) 808-810m, 13 SPM
(5) 800.5 - 805m, 13 SPM (6) 784 - 788m, 13 SPM
(7) 774.5 - 781m, 13 SPM (8) 763 - 767m shot twice with 13 SPM.
(9) 743 - 748m, 13 SPM (10) 735 - 740m, 13 SPM
PBTD at 756m KB.
Perforations No. 9 and 10 are open.
Well suspended with tubing in hole 84/04/05.

WELL NAME PCI et al Hoosier N-22

Date of Equipment Installation 84/04/05

Measurements: K.B. to Casing Bowl Flange 4.10 m

K.B. to Tubing Hanger Flange 3.57 m

NON-RETRIEVABLE SUBSURFACE EQUIPMENT

DESCRIPTION	DEPTH K.B. TO TOP
Baker Model "S" Bridge Plug	848.5m KB
Baker Model "S" Bridge Plug	761m KB

RETRIEVABLE SUBSURFACE EQUIPMENT (List From Bottom Up)

DESCRIPTION	LENGTH	DEPTH K.B. TO TOP
Depth Bottom of Tubing String Below K.B.		
KB to TH	3.57	
McEvoy Tubing hanger 73mm EUE w/ BPV thread	.25	
77 jts. - 73mm EUE tubing 9.67 k/m	727.52	
73mm EUE x 60mm EUE X over collar	.14	
1 jt. 60mm EUE tubing w/ bottom 6m perforated	9.66	
Baker 60mm EUE "F" nipple w/ 46mm profile	.23	
1 jt. 60mm EUE tubing	9.66	
1 - 60mm EUE pup	1.21	
TOTAL LENGTH	752.24	

Work Supervised by J. Quick

PETRO CANADA

PERFORATING DATA

DATE 84-03-14

Well Name: PCI et al Hoosier Location: N-22

Reason for Perforating: Production

Formation Perforated: Keescarp

Description of Casing (Perforated Interval) Size: 177.8mm Weight: 43.2 k/m Grade: S00-95 LT

K. B. to Casing Flange: _____ K. B. to Top Tubing Spool: _____

Service Company: Computalog Gearhart Ltd

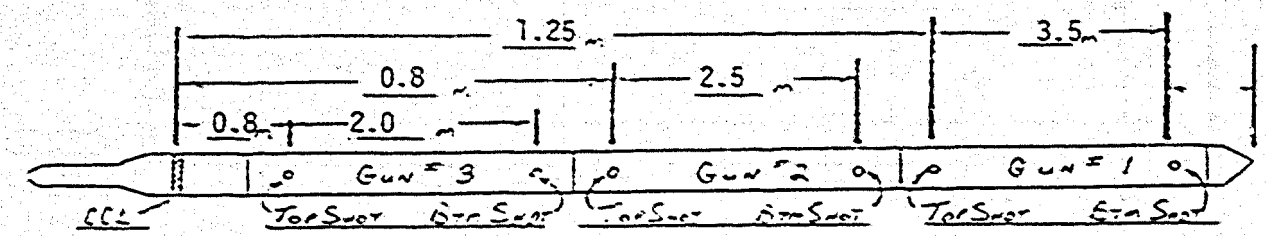
WIRE LINE

Type of Gun and Size of Perforations: 101.6mm R.H.S.C. 23 gram

O. D. of Tool: 101.6mm No. of Runs: _____

Height Fluid in Well: Full Type of Fluid: Fresh Water B. H. Temp. _____

GUN #	PERFORATED LOG DEPTH	DENSITY OF SHOTS (SPM)	TOTAL NO. OF SHOTS
One	850.5m to 854m	13/m	46
Two	819.5m to 822m	13/m	33
Three	813m to 815m	13/m	27



RECORD OF MEASUREMENTS

What Log Was Used For Correlation: GR Neutron CCL DATE: 84-03-14

Remarks: _____

LOG PRESENTATION:

1. Run pass across perf interval with collar locator showing 7 collars if possible. Also use tension device to show pick up off bottom where applicable.

2. When preparing to shoot, log 3 collars below perf interval. Stop and shoot gun. At that point shift pen recording collars and log 3 collars above the perforated interval. This method will allow for exact point where gun was fired to be determined from log.

NOTE: Mark with asterisk (*) collar used for positioning

REMARKS

WORK SUPERVISED BY: J. Quick

PETRO CANADA

PERFORATING DATA

Date: 84-03-15

Well Name: PCI et al Hoosier Location: N-22

Reason for Perforating: Production

Formation Perforated: Keescarp

Description of Casing (Perforated Interval) Size: 177.8mm Weight: 43.2 kg/m Grade: S00-95 LT

K. B. to Casing Flange: _____ K. B. to Top Tubing Spool: _____

Service Company: Computalog Gearhart Ltd.

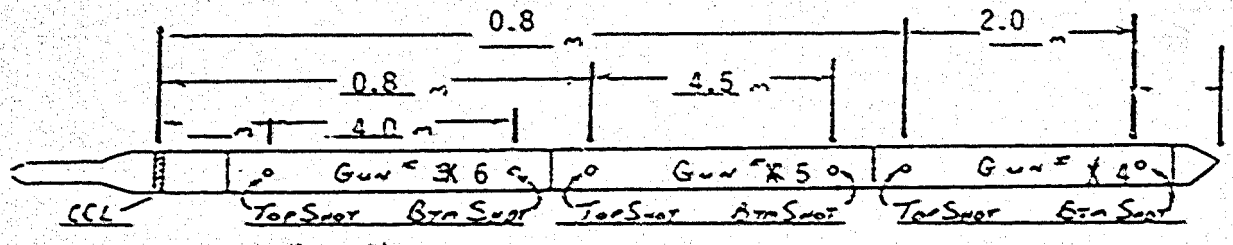
WIRE LINE

Type of Gun and Size of Perforations: 101.6mm R.H.S.C. 23 gram

O. D. of Tool: 101.6mm No. of Runs: 3

Height Fluid in Well: Full Type of Fluid: Fresh Water B. H. Temp.: _____

GUN#	PERFORATED LOG DEPTH	DENSITY OF SHOTS (SPM)	TOTAL NO. OF SHOTS
Four	808m to 810m	13/m	27
Five	800.5m to 805m	13/m	59
Six	784m to 788m	13/m	53



RECORD OF MEASUREMENTS

What Log Was Used For Correlation: GR Neutron CCL DATE: 84/03/14

Remarks: _____

LOG PRESENTATION:

1. Run pass across perf interval with collar locator showing 7 collars if possible. Also use tension device to show pick up off bottom where applicable.

2. When preparing to shoot, log 3 collars below perf interval. Stop and shoot gun. At that point shift pen recording collars and log 3 collars above the perforated interval. This method will allow for exact point where gun was fired to be determined from log.

* Mark with asterisk (*) collar used for positioning.

Remarks: _____

WORK SUPERVISED BY: J. Quick

PETRO-CANADA

PERFORATING DATA

Date: 84/03/15

Well Name: PCI et al Hoosier Location: N-22

Reason for Perforating: Production

Formation Perforated: Keescarp

Description of Casing (Perforated Interval) Size: 177.8mm Weight: 43.2 kg/m Grade: S00-95 LT

K. B. to Casing Flange: 4.10m K. B. to Top Tubing Spool: 3.57m

Service Company: Computalog Gearhart

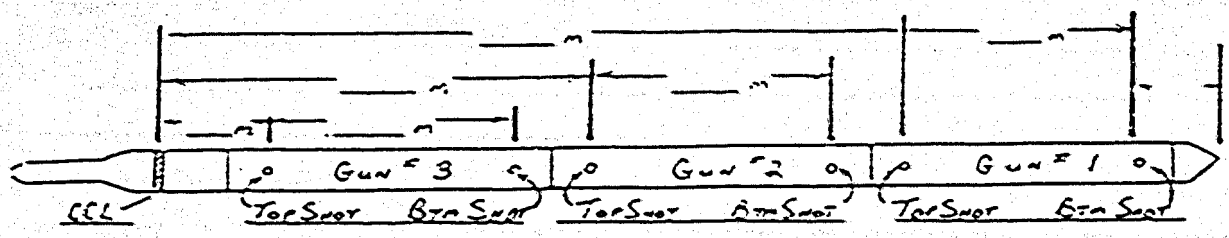
WIRE LINE

Type of Gun and Size of Perforations: 101.6mm R.H.S.C. 23 gram

O. D. of Tool: 101.6mm No. of Runs: 2

Height Fluid in Well: Full Type of Fluid: Fresh Water B. H. Temp.:

GUN#	PERFORATED LOG DEPTH	DENSITY OF SHOTS (SPM)	TOTAL NO. OF SHOTS
Seven	774.5m to 781m	13/m	85
Eight	763m to 767m	13/m	53



RECORD OF MEASUREMENTS

What Log Was Used For Correlation: GR Neutron CCL DATE: 84/03/14

Remarks:

LOG PRESENTATION:

1. Run pass across perf interval with collar locator showing 7 collars if possible. Also use tension device to show pick up off bottom where applicable.

2. When preparing to shoot, log 3 collars below perf interval. Stop and shoot gun. At that point shift pen recording collars and log 3 collars above the perforated interval. This method will allow for exact point where gun was fired to be determined from log.

Work with detents (?) collar used for positioning.

Remarks:

WORK SUPERVISED BY:

PETRO-CANADA

PERFORATING DATA

DATE 84/03/24

Well Name: PCI et al Hoosier Location: N-22

Reason for Perforating: Production

Formation Perforated: Keescarp

Description of Casing (Perforated Interval) Size: 177mm Weight: 43.2 kg/m Grade: S00-95

K. B. to Casing Flange: 410m K. B. to Top Tubing Spool: 3.57m

Service Company: Computalog

WIRE LINE

Type of Gun and Size of Perforations: 101.6mm R.H.S.C. 23 Gram

O. D. of Tool: 101.6mm No. of Runs: 1

Height Fluid in Well: Full Type of Fluid: Fresh Water B. H. Temp.:

HYDRAULIC

Setting depth of tool determined by:

O. D. of Tool: No. Jets in Tool: Size of Jets:

Type of Fluid used for Jetting: Conc. and Size of Sand:

Time of Jetting for each interval: Pump Rate:

Surface Pumping Pressure:

INTERVAL LOG DEPTH	PERFORATED LOG DEPTH	DENSITY OF SHOTS (SPM)	TOTAL NO. OF SHOTS
Reperforate No. 8	763 to 767m	13 SPM	53

RECORD OF MEASUREMENTS

How was perforating depth related to pay zone depth? Corrolated to GR Neutron CCL log on 84-03-14

DEPTH OF COLLAR BELOW K. B.

PIPE TALLY	COLLAR LOCATOR	PERF. COLLAR LOCATOR

NOTE: Mark with asterisk (*) collar used for positioning.

ODOMETER ZEROED ON BOTTOM SHOT

RUN NO.	DIST. COLLAR LOCATOR TO LOWEST SHOT	LOWEST SHOT AT
One	1	

REMARKS

WORK SUPERVISED BY: J. Quick

819-8210

PETRO-CANADA

PERFORATING DATA

DATE 84/03/31

Well Name PCI et al Hoosier Location N-22

Reason for Perforating Production

Formation Perforated Keescarp

Description of Casing (Perforated Interval) Size 177.8mm Weight 43.2 kg/m Grade S00-95 LT

K. B. to Casing Flange _____ K. B. to Top Tubing Spool _____

Service Company Computalog Gearhart

WIRE LINE

Type of Gun and Size of Perforations 101.6mm R.H.S.C. 23 gram

O. D. of Tool 101.6mm No. of Runs one

Height Fluid in Well Full Type of Fluid Fresh Water B. H. Temp. _____

HYDRAULIC

Setting depth of tool determined by _____

O. D. of Tool _____ No. Jets in Tool _____ Size of Jets _____

Type of Fluid used for Jetting _____ Conc. and Size of Sand _____

Time of Jetting for each interval _____ Pump Rate _____

Surface Pumping Pressure _____

INTERVAL LOG DEPTH	PERFORATED LOG DEPTH	DENSITY OF SHOTS (SPM)	TOTAL NO. OF SHOTS
Nine	743m to 748m	13/m	65

RECORD OF MEASUREMENTS

How was perforating depth related to pay zone depth? Corrolated to GR Neutron CCL Logged on 84/03/14.

DEPTH OF COLLAR BELOW K. B.

PIPE TALLY	COLLAR LOCATOR	PERF. COLLAR LOCATOR

NOTE: Mark with asterisk (*) collar used for positioning

ODOMETER ZEROED ON BOTTOM SHOT

RUN NO	DIST COLLAR LOCATOR TO LOWEST SHOT	LOWEST SHOT AT
One	5.8m	748m

REMARKS

WORK SUPERVISED BY J. Quick

619-6210

PETRO-CANADA

PERFORATING DATA

DATE 84/04/04

Well Name: PCI et al Hoosier Location: N-22

Reason for Perforating: Production

Formation Perforated: Keescarp

Description of Casing (Perforated Interval) Size: 177.8 Weight: 43.2 k/m Grade: S00-95 LT

K. B. to Casing Flange: _____ K. B. to Top Tubing Spool: _____

Service Company: Computalog Gearhart

WIRE LINE

Type of Gun and Size of Perforations: 101.6mm R.H.S.C. 23 gram

O. D. of Tool: 101.6mm No. of Runs: one

Height Fluid in Well: Full Type of Fluid: Fresh Water B. H. Temp. _____

HYDRAULIC

Setting depth of tool determined by: _____

O. D. of Tool _____ No. Jets in Tool _____ Size of Jets _____

Type of Fluid used for Jetting _____ Conc. and Size of Sand _____

Time of Jetting for each interval _____ Pump Rate _____

Surface Pumping Pressure _____

INTERVAL LOG DEPTH	PERFORATED LOG DEPTH	DENSITY OF SHOTS (SPM)	TOTAL NO. OF SHOTS
Ten	735m to 740m	13/m	66

RECORD OF MEASUREMENTS

How was perforating depth related to pay zone depth? Corrolated to GR Neutron CCL. logged on 84-03-14.

DEPTH OF COLLAR BELOW K. B.

PIPE TALLY	COLLAR LOCATOR	PERF. COLLAR LOCATOR

NOTE: Mark with asterisk (*) collar used for positioning

ODOMETER ZEROED ON BOTTOM SHOT

RUN NO.	DIST. COLLAR LOCATOR TO LOWEST SHOT	LOWEST SHOT AT
One	5.8m	740m

REMARKS

WORK SUPERVISED BY: J. Quick

819-8210

WIRELINE DATA

LOCATION: PCI et al Hoosier N-22 DATE: 84/04/05

PACKERS:

TYPE _____ SIZE _____

SET AT _____ KB TENSION _____ daN. COMPRESSION _____ daN.

REMARKS: _____

TYPE _____ SIZE _____

SET AT _____ KB TENSION _____ daN. COMPRESSION _____ daN.

REMARKS: _____

CEMENT RETAINERS:

TYPE Baker Model K-1 SIZE 177.8mm

SET AT 797m KB

REMARKS: Drilled out retainer on 84/03/28.

TYPE Baker Model K-1 SIZE 177.8mm

SET AT 771m KB

REMARKS: Set on 84/03/23. Drilled out 84/03/28.

BRIDGE PLUGS:

TYPE Baker Model "S" SIZE 177.8mm

SET AT 848.5 KB CAPPED WITH 5 SAX.

REMARKS: PBTD at 843.5m KB. Set on 84/03/16.

TYPE Baker Model "S" SIZE 177.8mm

SET AT 761m KB CAPPED WITH 5 SAX.

REMARKS: PBTD - 756m KB. Set on 84/03/30.

TYPE Baker Model "S" SIZE 177.8mm

SET AT 741m KB CAPPED WITH nil SAX.

REMARKS: Drilled out Model S bridge plug at 741m on 84/04/05.

WIRELINE DATA

LOCATION: _____ DATE: _____

PACKERS:

TYPE _____ SIZE _____

SET AT _____ KB TENSION _____ daN. COMPRESSION _____ daN.

REMARKS: _____

TYPE _____ SIZE _____

SET AT _____ KB TENSION _____ daN. COMPRESSION _____ daN.

REMARKS: _____

CEMENT RETAINERS:

TYPE Baker Model K-1 SIZE 177.8mm

SET AT 760m KB

REMARKS: Set on 84/03/25. Drilled out retainer on 84/03/26.

TYPE _____ SIZE _____

SET AT _____ KB

REMARKS: _____

BRIDGE PLUGS:

TYPE _____ SIZE _____

SET AT _____ KB CAPPED WITH _____ SAX.

REMARKS: _____

TYPE _____ SIZE _____

SET AT _____ KB CAPPED WITH _____ SAX.

REMARKS: _____

TYPE _____ SIZE _____

SET AT _____ KB CAPPED WITH _____ SAX.

REMARKS: _____

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME: PCI et al Hoosier N-22

DATE: 84/03/15

FORMATION TREATED: Keescarp

INTERVAL: 850.5-854m

PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell

PACKER TYPE: 410-C AT 844.38m K.B.

TUBING SIZE: 73mm DEPTH: 844.38

CASING SIZE: 177.8mm DEPTH: 1100m

TUBING CAPACITY: 2.53 m^3

MAX. ALLOWABLE TREATING PRESSURE: 25 mPa

CASING CAPACITY – BASE OF TUBING TO PERFS: 0.11 m^3

ANNULUS CAPACITY: 12.8 m^3

TYPE TREATMENT AND OBJECT: Acidize for production.

MATERIALS MIXED: 6.5m^3 15% HCL acid + 13L-A200 + 13l L-F 75N + 33l - W35
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity)

TO FORMATION: 6.5m^3 15% HCl (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
					Rig up lines.
20:00					Pre-Job Meeting.
20:20		25	.2		Pressure test lines.
20:23			2.2		Spot acid in tubing.
20:30	3				Close unloader valve.
20:30		21			Start squeeze.
20:38		25			Pressure up on tubing.
20:40		20		0.4	Formation break down.
	0	17	3.0	0.5	
		10	6.7	0.5	
20:57		7	10.35	0.5	Start displacement.
21:04					Shut down, ISP 6.2 mPa.

SUPERVISOR: J. Quick

518A-8307

PETRO-CANADA

ACID - CHEMICAL - SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/03/17

FORMATION TREATED: Keescarp INTERVAL: 819.5m - 822m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: Baker 410 AT: 817m K.B.

TUBING SIZE: 73mm DEPTH: 817 CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.45 m^3 MAX. ALLOWABLE TREATING PRESSURE: 14 mPa

CASING CAPACITY - BASE OF TUBING TO PERFS: 0.05m^3 m^3 ANNULUS CAPACITY: - m^3

TYPE TREATMENT AND OBJECT: Acid squeeze.

MATERIALS: MIXED: 4.7m^3 15% HCL, 10L A200, 10L F75N, 23L - W35.
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: 4.7m^3 (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
16:30					Pre-job Meeting.
16:45			.2		Fill line with water.
16:46		25			Pressure test.
16:46	3	3	2.0		Start acid.
16:53					Close unloader.
16:55					Start acid squeeze.
16:56	0	13	0.2	0.5	Formation break down.
		6	0.8	0.5	After 3.0m^3 rate 0.5m^3/m at 6 mPa.
17:00	4				Shut down.
17:01	4	4	1.7	0.2	Start pump.
17:07		5	3.2	0.2	Start displacement.
17:20					Shut down, finish displacement.
		4.2			Instant shut down pressure.

SUPERVISOR: J. Quick

818A-6301

PETRO-CANADA

ACID - CHEMICAL - SQUEEZE

WELL NAME: PCI et al Hoosier N-22

DATE: 84/03/17

FORMATION TREATED: Keescarp

INTERVAL: 813-815m

PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell

PACKER TYPE: Baker 410 AT 811m K.B.

TUBING SIZE: 73mm DEPTH: 811m

CASING SIZE: 177mm DEPTH: 1100

TUBING CAPACITY: 2.43 m^3

MAX. ALLOWABLE TREATING PRESSURE: 4 mPa

CASING CAPACITY - BASE OF TUBING TO PERFS: 0.02 m^3

ANNULUS CAPACITY: - m^3

TYPE TREATMENT AND OBJECT: Acid squeeze

MATERIALS: MIXED: 3.7m^3 15% HCL, 7L-A200, 7L - F75N, 19L - W35.
(Quantity, Concentrations, Etc.)

BACKWASHED: - (Quantity)

TO FORMATION: 3.7m^3 (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3 / MIN	REMARKS
18:45					Pre-job meeting.
18:50			0.4		Fill lines with water.
18:59					Pre-test lines to 25 mPa.
19:01			2.0		Start acid.
19:04					Close unloader.
19:06		3	1.7	0.16	Start acid squeeze.
19:15		4		0.5	Increase rate.
19:16			3.5	0.2	Start displacement.
19:30					Shut down on vacuum.

SUPERVISOR: J. Quick

516A-6301

PETRO-CANADA

ACID - CHEMICAL - SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/03/19

FORMATION TREATED _____ INTERVAL No. 2,3,4,5,6, and 7 were Open 819.5-822m PERFS/OPEN HOLE Perfs

SERVICE COMPANY Dowell Retainer ~~XXXXXX~~TYPE Model K-1 AT 797m K.B.

TUBING SIZE 73mm DEPTH 797 CASING SIZE 177mm DEPTH 1100m

TUBING CAPACITY 2.39 m^3 MAX. ALLOWABLE TREATING PRESSURE 3 mPa

CASING CAPACITY - BASE OF TUBING TO PERFS - m^3 ANNULUS CAPACITY - m^3

TYPE TREATMENT AND OBJECT Cement behind casing. Perfs open 819.5 to 822m 813m-815m, 808-810m, 800.5-805m, 784-788m and 774.5-781m. Circ cement behind casing.

MATERIALS: MIXED 77 saxs O.W.G. + 0.5% D65.
(Quantity, Concentrations, Etc.)

BACKWASHED Nil (Quantity) TO FORMATION 77 saxs (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3 / MIN	REMARKS
00:00					Pre-job meeting.
00:30					Press. test lines 10 mPa.
00:36		1	2.1	0.2	Start cement after 1.0m^3 pumped.
					Well on vacuum - 0 mPa.
00:48		1	2.25	0.2	Stop cement. Start displace.
00:57		3			End displacement.
					Pull out stinger from retainer, hoist tubing

SUPERVISOR J. Quick

81RA-10C1

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/03/21

FORMATION TREATED: Keescarp INTERVAL: 774.5-781m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: _____ AT: _____ K.B.

TUBING SIZE: 7.3mm DEPTH: 796m CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.4 m^3 MAX. ALLOWABLE TREATING PRESSURE: _____

CASING CAPACITY – BASE OF TUBING TO PERFS: _____ m^3 ANNULUS CAPACITY: _____ m^3

TYPE TREATMENT AND OBJECT: Set cement plug over perfs.

MATERIALS: MIXED: 50 saxs O.W.G., 2% CaC_2, 0.5% D65
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: _____ (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
					Pre-job meeting.
23:00					Batch mix cement.
00:30			0.2		Pressure test lines 10 mPa
00:34		0	1.5	0.4	Start cement, spot over perfs.
00:37		0	2.1	0.4	Start displacement.
00:42					Stop displacement.
00:45					Fill casing with rig pump. Attempt to
					pressure up, no pressure. Shut down pump,
					hoist tubing.

SUPERVISOR: J. Quick

818A-8301

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/03/21

FORMATION TREATED: Keescarp INTERVAL: 774.5-781m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: – AT: – KB.

TUBING SIZE: 73mm DEPTH: 782m CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.35 m^3 MAX. ALLOWABLE TREATING PRESSURE:

CASING CAPACITY - BASE OF TUBING TO PERFS: – m^3 ANNULUS CAPACITY: – m^3

TYPE TREATMENT AND OBJECT: Spot cement over perfs.

MATERIALS MIXED: 100 saxs O.W.G. + 3% $CaCl_2$, + 0.5% D65.
Slurry 1893 kg/m Plug No. 3 (Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
15:30					Rig in lines.
15:35			0.2		
15:36					Pressure test lines 10 mPa.
					Batch mix cement.
16:34			2.8	0.4	Start cement.
16:40			1.0	0.4	Spot cement over perfs.
					Stop pump.
					Well on vacuum.
					Hoist tubing.

SUPERVISOR: J. Quick

8168-8301

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME: PCI et al Hoosier N-22

DATE: 84/03/22

FORMATION TREATED: Keescarp INTERVAL: 774.5-781m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: - AT: - K.B.

TUBING SIZE: 73mm DEPTH: 781m CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.35 m^3 MAX. ALLOWABLE TREATING PRESSURE: -

CASING CAPACITY - BASE OF TUBING TO PERFS: - m^3 ANNULUS CAPACITY: - m^3

TYPE TREATMENT AND OBJECT: Spot cement over perfs.

MATERIALS: MIXED: 100 saxs, O.W.G. + 0.5% D65, + 3% $CaCl_2$.
(Quantity, Concentrations, Etc.)
Slurry 1893 kg/m.

BACKWASHED: Nil (Quantity) TO FORMATION: (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
14:30					Pre-job meeting.
14:35					Batch mix cement.
15:12			0.2		Fill line w/ water.
15:13					Pressure test lines 10 mPa.
15:15			2.8		Pump cement.
15:22					Spot cement over perfs.
15:27					Stop pump, well on vacuum.
					Rig out lines
					Hoist tubing.

SUPERVISOR: J. Quick

816A-8301

PETRO-CANADA

ACID - CHEMICAL - SQUEEZE

WELL NAME: PCI et al Hoosier N-22

DATE: 84/03/23

FORMATION TREATED: Keescarp INTERVAL: 774.5-779m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: Nil AT: - K.B.

TUBING SIZE: 73mm DEPTH: 778m CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.35 m^3 MAX. ALLOWABLE TREATING PRESSURE:

CASING CAPACITY - BASE OF TUBING TO PERFS: - m^3 ANNULUS CAPACITY: - m^3

TYPE TREATMENT AND OBJECT: Spot cement and squeeze into perfs.

MATERIALS: MIXED: 100 saxs O.W.G. + 0.5% D65 + 3% $CaCl_2$.
Slurry 1893 kg/m (Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES		m^3 PUMPED	PUMP RATE m^3 / MIN	REMARKS
	CASING	TUBING			
02:30					Batch mix cement.
03:00					Pre-job meeting.
03:08			0.2		Pressure test lines 10 mPa.
03:10			2.8		Start cement.
03:17			2.1		Spot cement over perfs.
03:21					Stop, rig out lines.
03:25					Well on vacuum.

SUPERVISOR: J. Quick

818A-8301

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME: PCI et al Hoosier N-22

DATE: 84/03/23

FORMATION TREATED: Keescarp

INTERVAL: 774.5-779

PERFS/OPEN HOLE: Perf

SERVICE COMPANY: Dowell

PACKER TYPE: retainer Model K-1 AT 771m K.B.

TUBING SIZE: 73mm DEPTH: 771m

CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.31 m^3

MAX. ALLOWABLE TREATING PRESSURE:

CASING CAPACITY – BASE OF TUBING TO PERFS: m^3

ANNULUS CAPACITY: m^3

TYPE TREATMENT AND OBJECT: Cement squeeze off perfs.

MATERIALS MIXED: 200 sacks O.W.G. + 0.5% D65. (Quantity, Concentrations, Etc.)
Slurry 1893 kg/m.

BACKWASHED: Nil (Quantity)

TO FORMATION: 200 saxs. (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
15:45		2.2	0.5	0.5	Est. feed rate.
16:30					Batch mix cement.
17:55					Pre-job meeting
17:58			.2		Pressure test lines 10 mPa
18:00		0	3.0	0.5	Start pumping cement.
18:06					Shut down stage No. 1.
		0	2.6	0.2	Stage cement over 5 stages at 15 mins. intervals.
19:21		0	1.0	0.2	Start displace with water.
19:26					Stop pumping.
19:44		1	0.8	0.2	Start pump.
19:46		1			Stop pump 1 mPa.
					Pull out of retainer.

SUPERVISOR: J. Quick

518A-8301

PETRO-CANADA

ACID - CHEMICAL - SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/03/24

FORMATION TREATED: Keescarp INTERVAL: 763m-787m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: Baker 410 AT: 752.17 K.B.

TUBING SIZE: 73mm DEPTH: 763m CASING SIZE: 177mm DEPTH: 1100

TUBING CAPACITY: 2.3 m^3 MAX. ALLOWABLE TREATING PRESSURE: _____

CASING CAPACITY - BASE OF TUBING TO PERFS: - m^3 ANNULUS CAPACITY: - m^3

TYPE TREATMENT AND OBJECT: Acid wash and squeeze.

MATERIALS MIXED: 7.5m^3 15% HCL, 15-A200, 37.52 - W35, 15L-F 75N.
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: 7.5m^3 (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES		m^3 PUMPED	PUMP RATE m^3 / MIN	REMARKS
	CASING	TUBING			
17:00					Pre-job meeting.
17:20			0.2		Fill lines.
17:27					Pressure test lines to 25 mPa.
17:30			2.5		Spot acid over perfs for wash.
17:44		2/4	0.8		Stage for 5 min. intervals (9)
18:14					Wash complete.
18:15			1.3		Circ. acid back into tubing.
18:20					Pull up, set packer.
18:30					Pressure lines to 25 mPa.
		8	1.3	0.2	Squeeze acid wash to formation.
18:42					Shut down, mix acid.
18:49					Open unloader.
18:53		0	6.5	0.1	Start squeeze, acid well on vacuum
			2.5		Adjust rate w/ Hammer valve to 0.1m^3/min.
					Shut down, rig out. Well on vacuum.

SUPERVISOR: J. Quick

818A-6307

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME	DATE
PCI et al Hoosier	84/03/31

FORMATION TREATED: Keescarp INTERVAL: 743-748m KB PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: Nil AT: _____ K.B.

TUBING SIZE: 73mm DEPTH: 749 CASING SIZE: 177.8 DEPTH: 1095

TUBING CAPACITY: 2.25 m^3 MAX. ALLOWABLE TREATING PRESSURE: 7000 kPa

CASING CAPACITY - BASE OF TUBING TO PERFS: Nil m^3 ANNULUS CAPACITY: – m^3

TYPE TREATMENT AND OBJECT: Acid wash and squeeze.

MATERIALS: MIXED: 2500L 15% HCL, 5.0L - A-200, 5.0L F75-H, 13.0L W-35
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: 2.5 (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES		m^3 PUMPED	PUMP RATE m^3/MIN	REMARKS
	CASING	TUBING			
14:15					Pre-job safety meeting.
14:23			0.2		Circ hole. PSI test lines to 15.0 mPa
14:25	2.0	2.0			Start acid in tubing.
14:39			2.5		Acid at perfs.
15:59			1.5		Wash complete.
16:03	2.0	2.0	1.1	0.1	Squeeze to formation.
16:20	2.0	2.0	1.7		Change line to annulus.
					Squeeze wash acid to perfs.
16:35	2.0	2.0		0.1	Stop pump.
16:35	2.0	2.0			ISIP.
16:51	2.0	2.0			Release PSI.
17:45					PSI released, flow back 1.1m^3.

SUPERVISOR: J. Quick

618A-6301

PETRO-CANADA

ACID - CHEMICAL - SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/04/02

FORMATION TREATED: Keescarp INTERVAL: 743m to 748m PERFS/OPEN HOLE: Perfs 13 SPM

SERVICE COMPANY: Dowell PACKER TYPE: Baker 410 AT: _____ K.B.

TUBING SIZE: 73mm DEPTH: 743m CASING SIZE: 177mm DEPTH: 1100

TUBING CAPACITY: 2.25 m^3 MAX. ALLOWABLE TREATING PRESSURE: 7000 kPa

CASING CAPACITY - BASE OF TUBING TO PERFS: - m^3 ANNULUS CAPACITY: - m^3

TYPE TREATMENT AND OBJECT: Acid squeeze.

MATERIALS: MIXED: $10m^3$ 15% HCL, 20L-A200, 20L-F75N, 120L-W-35
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: $10m^3$ (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES		m^3 PUMPED	PUMP RATE m^3 / MIN	REMARKS
	CASING	TUBING			
03:00					Pre-job meeting.
03:10					Press test lines to 13 mPa.
03:15			2.25	0.2	Start pump acid to fill tubing.
03:24		4	7.75	0.4	Squeeze acid into formation.
03:45		4	2.5	3.45	Displace acid.
03:52					Shut down ISP 4 mPa.
04:06					Hold pressure on tubing 10 min.
					Open to tank flow back $5.6m^3$

SUPERVISOR: J. Quick

6164-6301

PETRO-CANADA

ACID – CHEMICAL – SQUEEZE

WELL NAME	DATE
PCI et al Hoosier N-22	84/04/12

FORMATION TREATED: Keescarp INTERVAL: 735m to 740m PERFS/OPEN HOLE: Perfs

SERVICE COMPANY: Dowell PACKER TYPE: Baker 410 AT: _____ K.B.

TUBING SIZE: 73mm DEPTH: 740.5m CASING SIZE: 177mm DEPTH: 1100m

TUBING CAPACITY: 2.2m³ m³ MAX. ALLOWABLE TREATING PRESSURE: 4 mPa

CASING CAPACITY - BASE OF TUBING TO PERFS: - m³ ANNULUS CAPACITY: - m³

TYPE TREATMENT AND OBJECT: Acid wash and squeeze.

MATERIALS: MIXED: 9.3m³ 15% HCL, 140L-W50, 19L-A200, 19L-F75
(Quantity, Concentrations, Etc.)

BACKWASHED: Nil (Quantity) TO FORMATION: 9.3m³ (Quantity)

PROGRAM

TIME RECORD

TIME	PRESSURES CASING	PRESSURES TUBING	m³ PUMPED	PUMP RATE m³/MIN	REMARKS
					Pre-job Meeting.
09:30					Pressure test lines 15 mPa.
10:09			2.3		Spot acid over perfs.
10:11					Shut down stage 5 min.
		2	0.9		Pump .1m³ every 5min. for 9 stages
					After stage No. 5 - back pressure drop from
					2 mPa to 1 mPa.
11:03			1.2		Circ acid back into tubing.
11:12		2	8.3	0.16	Start acid squeeze
		3.6		0.23	2.1m³ acid left in tubing
12:00		3.8	2.3	0.32	Start displace acid w/ water
12:06		3.9			Instant shut down pressure 3.8 mPa
12:25					Shut in 20 min. No bleed back.

SUPERVISOR: J. Quick

81AA-6301

PETRO-CANADA

CASING AND TUBING TALLY SHEET

WELL NAME	LOCATION	DATE (YR-MO-DAY)
PCI et al Hoosier	N-22	84/04/05
TYPE OF STRING: Tubing	SIZE: 73 mm	

NO	LENGTH / m	NO	LENGTH / m	NO	LENGTH / m	NO	LENGTH / m	NO	LENGTH / m	NO	LENGTH / m		TOTAL / m
1	9.61	11	9.11	21	9.90	31	9.90	41	9.84	51	9.41	1	92.56
2	8.95	12	9.10	22	9.35	32	9.66	42	9.34	52	8.41	2	93.29
3	9.85	13	9.72	23	9.84	33	9.61	43	9.25	53	9.35	3	96.15
4	9.50	14	9.61	24	9.88	34	9.93	44	9.72	54	9.64	4	96.40
5	9.18	15	9.45	25	9.90	35	9.50	45	9.33	55	9.69	5	95.56
6	9.67	16	9.25	26	9.85	36	9.25	46	9.89	56	9.26	6	92.25
7	8.41	17	8.11	27	8.28	37	9.88	47	9.40	57	9.47		
8	9.32	18	9.96	28	9.85	38	9.46	48	9.45	58	8.08		
9	8.72	19	9.58	29	9.46	39	9.91	49	9.64	59	9.04		
10	9.35	20	9.40	30	9.84	40	9.30	50	9.70	60	9.90		
TOTAL	92.56		93.29		96.15		96.40		95.56		92.25		

NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m		TOTAL / m
61	9.88	71	9.54	81	9.24	91	9.00	101	9.70	111	9.19	1	94.63
62	9.75	72	9.84	82	9.66	92	9.58	102	9.45	112		2	93.59
63	9.40	73	8.82	83	8.73	93	9.40	103	9.64	113		3	
64	9.82	74	9.34	84	9.60	94	9.96	104	9.33	114		4	
65	9.70	75	9.88	85	9.46	95	8.15	105	9.25	115		5	
66	9.25	76	9.86	86	9.58	96	9.25	106	9.84	116		6	
67	9.88	77	9.40	87	9.63	97	9.45	107	9.31	117			
68	7.76	78	9.21	88	9.82	98	9.61	108	8.28	118			
69	9.31	79	8.24	89	9.64	99	9.11	109	9.61	119			
70	9.88	80	9.46	90	9.67	100	8.42	110	8.83	120			
TOTAL	94.63		93.59										

NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m		TOTAL / m
121		131		141		151		161		171		1	
122		132		142		152		162		172		2	
123		133		143		153		163		173		3	
124		134		144		154		164		174		4	
125		135		145		155		165		175		5	
126		136		146		156		166		176		6	
127		137		147		157		167		177			
128		138		148		158		168		178			
129		139		149		159		169		179			
130		140		150		160		170		180			
TOTAL													

NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m	NO.	LENGTH / m		TOTAL / m
181		191		201		211		221		231		1	
182		192		202		212		222		232		2	
183		193		203		213		223		233		3	
184		194		204		214		224		234		4	
185		195		205		215		225		235		5	
186		196		206		216		226		236		6	
187		197		207		217		227		237			
188		198		208		218		228		238			
189		199		209		219		229		239			
190		200		210		220		230		240			
TOTAL													

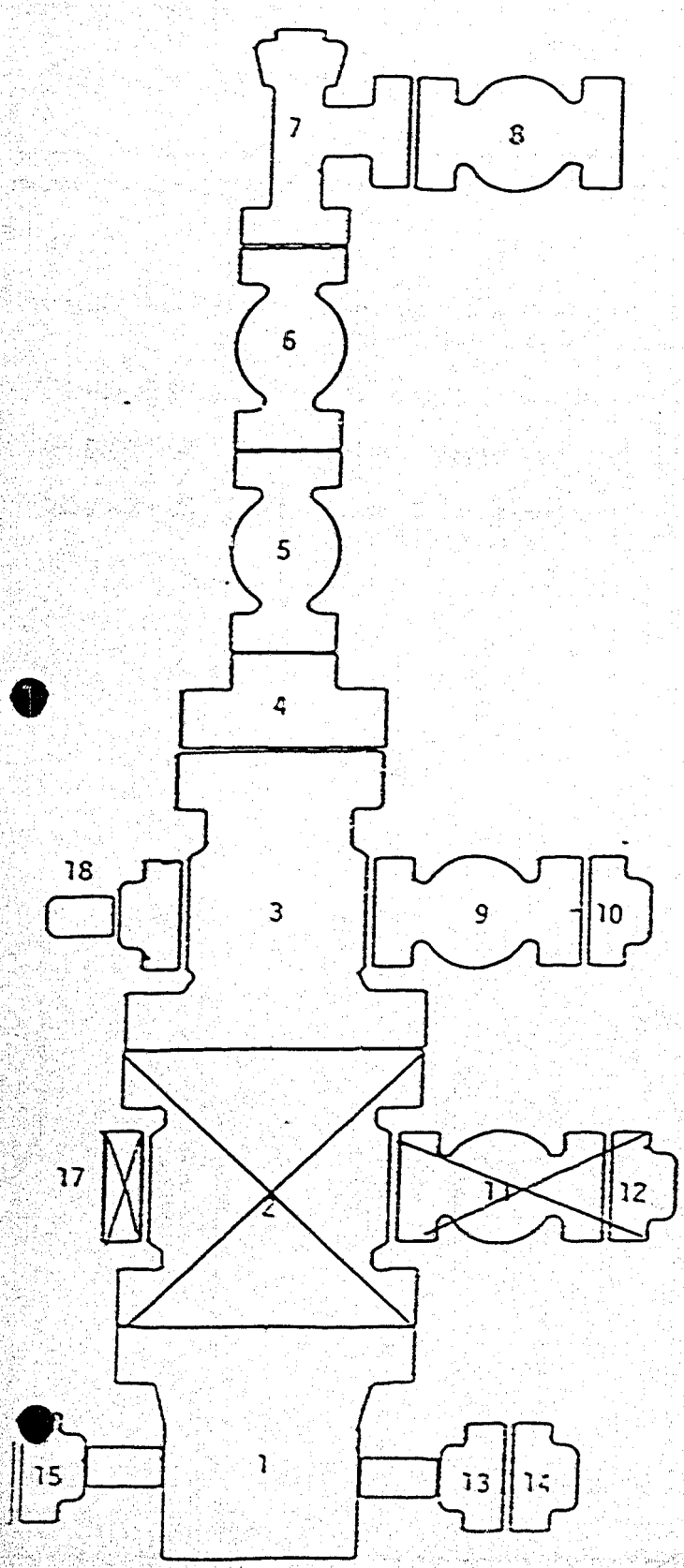
REMARKS

SIGNATURE OF COMPANY REPRESENTATIVE: J. Quick

All joints delivered to lease must be tallied. Circle joints not run and left on rack.

5007-8301

DATE 84/04/05



1. McEvoy Casing bowl 254mm x 20,682 kPa Bore 244mm w/ 2-50.8mm x 20,682 kPa flanged outlets. R-53.
3. McEvoy tubing hanger spool 254mm x 152.4mm x 20,682 kPa w/ 2-50.8mm studded outlets R-53, R-45, R-24.
4. 152.4mm x 63.5mm 20,682 bonnet flange R-27, R-45.
5. McEvoy 63.5mm x 20,682 kPa Master Valve.
6. McEvoy 63.5mm x 20,682 kPa Master Valve.
7. 63.5mm x 50.8mm x 20,682 kPa flow Tee w/ hammer on cap. 73mm EUE thread inside.
8. 50.8mm x 20,682 kPa McEvoy Wing Valve.
9. 50.8mm x 20,682 kPa McEvoy Valve.
10. 50.8mm x 20,682 kPa flange w/ 50.8mm LP Thread.
14. 50.8mm x 20,682 kPa blind flange.
16. 50.8mm x 20,682 kPa flange w/ 50.8mm LP thread and standard casing vent.
18. 50.8mm x 20,682 kPa flange w/ 50.8mm LP thread w/ 50.8 tape bull plug and needle valve.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

				1
PCI ET AL HOOSIER N-22		KEESCARP	X	84 03 13
ROLL'N NO. 53	J. Quick	C. Dedora	$ NO COSTS	84 03 12

Rigging up rig and equipment.

07:30	-	Trucks arrived with equipment in Norman Wells.
07:30-11:45	-	Fuel up and obtain permits from Esso to travel to lease. Unload propane tanks and Wireline unit in Norman Wells.
11:45-15:00	-	Move rig and equipment to location.
15:00-18:00	-	Unload trucks and spot equipment.
18:00-23:00	-	Start light plant and boiler. Shut in for nite at 23:00 hrs.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

						2
PCI ET AL HOOSIER N-22		KEESCARP				84 03 14
ROLL'N NO. 53	J. Quick	C. Dedora	$ 9,340	$ 93,260		84 03 13

Prepare to run bond log.

07:00-21:00	-	Rig up rig. Cut off 177mm casing. Install tubing spool. Pressure test seals to 17 mPa. Held ok for 20 min. Install BOP's. Prepare to run tubing.
21:00-01:00	-	Ran in 177mm casing scraper on 73mm EUE tubing. Measure and drift tubing. Found PBTD at 971m KB.
01:00-02:30	-	Circ well and scrape casing.
02:30-03:00	-	Steam pump lines.
03:00-07:00	-	Trip out tubing. Lay down casing scraper.
07:00-08:00	-	Rig up Computalog equipment.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

					3
PCI ET AL HOOSIER N-22		KEESCARP	[X]		84 03 15
ROLL'N NO. 53	J. Quick M. Ewasik	C. Dedora	$11,435	$104,695	84 03 14

Perforating 8th interval.

08:00-18:00	-	Ran GR-CCL, CBL and VDL from 950-700m KB. Ran pressure pass at 5000 kPa. Found bond ok with poorer bond across 10th interval. Approx. cement top at 311m KB.
18:00-18:30	-	Close blind rams. Pressure test casing and BOP's to 21 mPa. Held ok for 15 min.
18:30-22:30	-	Perforated int. 850.5-854, 819.5-822 and 813-815m KB. Had problem with wireline unit.
22:30-01:30	-	Exchange line truck.
01:30-06:00	-	Perforated from 808-810, 800.5 - 805, 784-788 and 774.5-781 with 101 mm HS casing gun at 13 SPM.
06:00-08:00	-	Had misrun. Repairing gun for last interval. Weather windy and cold.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

Well Name / Location	Formation	Job Operation	Report Date
PCI ET AL HOOSIER N-22	KEESCARP	[x] Completion [ ] Workover	84 03 16

Rig Number	Rig Manager	Report Taken By	Daily Cost	Cumulative Cost	Activity Date
ROLL'N NO. 53	J. Quick	C. Dedora	$25,250	$130,945	84 03 15

Report Date Objective: A. Ewasik

Swab back acid from 850.5-854 interval.

Operations (Activity Date)

08:00-08:30	-	Repair gun for 8th interval.
08:30-09:30	-	Perforate 763-767m KB with 101mm HSC casing gun. Rig out logging truck.
09:30-11:30	-	Ran in w/ 177mm Mod "C" bridge plug and Baker 410 packer. Stuck at 20m.
11:30-13:00	-	Ran casing scraper. Work same at 20m and lay down scraper.
13:00-19:00	-	Reran Model "C" bridge plug and 410 packer. Set bridge plug at 857m KB. Pressure test to 6 mPa. Reset packer at 849m KB.
19:00-21:00	-	Dowell acidized int. No. 850.5 - 854 w/ 6500 L of 15% HCL and additives. Squeeze at .5m^3/min. form broke at 24 mPa. Pressure dropped to 7 mPa. ISIP = 6.2 mPa in 10 min at 6 mPa.
21:00-21:30	-	Rig out acid unit.
21:30-07:30	-	Prepare to swab and wait for daylight. Lay down 10 jts. of tubing from derrick.
07:30-08:00	-	Swab back, displace water.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

REPORT NO. 5

WELL NAME	LOCATION	FORMATION	JOB OPERATION		REPORT DATE
ET AL HOOSIER N-22		KEESCARP	[X] COMPLETION [ ] WORKOVER		84 03 17
RIG NO.	RIG PERSONNEL	REPORT WRITTEN BY	DAILY COST	CUMULATIVE COST	ACTIVITY DATE
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$55,190	$ 186,135	84 03 16

CURRENT DATE OBJECTIVE

Running packer and bridge plug.

CHRONOLOGICAL (ACTIVITY DATE)

08:00-17:00 - Swabbed well, pull 1 swab, well flowed 3.6m³ of acid water. Pull 21 swabs. Recover 18.9m³ of acid and new formation water. Recover 12m³ of new formation water. Fluid level stable at 400m. PH = 6.4 and salinity = 26,800 to 23,100. Rig out swab equipment.

17:00-20:30 - Pump acid and form. water back into zone. Displace with 4m³ fresh water.

20:30-22:30 - Repeat displacing water into formation.

22:30-01:00 - Release packer, pick up bridge plug. Hoist tubing. Lay down bridge plug and packer.

01:00-04:00 - Rig up Computalog. Ran 177mm drillable bridge plug. Set at 848.50m KB. Dump bale 5m. Cement plug above. PBTD = 843.5m KB. Rig out loggers.

04:00-05:00 - Repair power tongs.

05:00-08:00 - Pick up bridge plug and 410 packer. Running in with same.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

Report No.	Well Name	Location	Formation	Job Operation	Report Date
6	ET AL HOOSIER N-22		KEESCARP	X Completion / Workover	84 03 18

Contractor/Rig No.	Field Personnel	Report Written By	Daily Cost	Cumulative Cost	Activity Date
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$ 19,100	$ 205,235	84 03 17

Report Date Objective:

Swabbing well to evaluate.

Operations (Activity Date)

08:00-11:30	-	Trip in with tubing, Baker 410 packer and Model "C" bridge plug.
11:30-16:00	-	Attempt to set bridge plug at 825m KB. Ran into 842m. Set plug at 825m and packer at 823m. Pressure test to 5 mPa. Held ok. Reset packer at 817m KB.
16:00-17:30	-	Rig up Dowell to acidize 819.5m - 822m KB w/ 4.7m³, 15% HCL. Pressure test lines to 25 mPa. Pump 2.2m³ acid. Close unloader valve. Start squeeze with 2.4m³ in form. Broke at 13 mPa. Pump at 0.5m³/min. w/ 5.2 m³ away. Press. dropped to 6 mPa. Annulus pressure at 6 mPa. Pump at 0.2m³/min. at 5 mPa. Displace acid with 3.2 m³ fresh water, ann. press at 5 mPa. ISIP = 4.2 mPa. in 10 min. - vacuum. Rig out acid equipment.
17:30-18:30	-	Release packer. Raise bridge plug at 818.5m KB. Set packer at 816m. Pressure test to 7 mPa. Held ok. Move packer to 812m KB.
18:30-19:30	-	Rig to acidize int. No. 813 - 815m KB. Pressure test lines. Circ. 2m³ acid down tubing. Close unloader valve. Start squeeze at 0.16m³/min. at 3 mPa. After 3.7m³ away annulus at 1 mPa. Incr. rate to 0.5 m³/min. for 1 minute. 4 mPa on tubing annulus at 2 mPa. Slow rate to 0.2m³/min. Displace acid with 3.5m³ fresh water. Pressure to 0 mPa on displacement annulus at 0 mPa. ISIP = 0 mPa. Well on vacuum. Used 3.7m³ BEL on number 3 interval.
19:30-02:00	-	Release packer. Pick up bridge plug. Set bridge plug at 824m. Set packer at 827m. Unable to fill annulus. Raise packer to 797m KB, unable to fill annulus. Raise packerto 752 mKB. Annulus holding. Lower packer to 769m KB. Annulus holding. Lower packer to 782m KB. Unable to fill annulus. Raise packer to 769m KB. Fill annulus (Holding).
02:00-07:00	-	Rig to swab. Pull 2 swabs. Recovered 3m³. Displace water. 3rd swab was acid water. Pull 15 swabs. Recover 19.7m³ acid water and fresh water. Fluid level at 400m KB.
07:00-08:00	-	Mix caustic - bring PH to 6.4. Pump across to pit. Swabbing well.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

						7
ET AL HOOSIER N-22		KEESCARP	[X]			84 03 19
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$11,830	$217,065		84 03 18

Swabbing well to evaluate. (TIGHT).

08:00-08:00 - Pull 19 swabs. Recover 24.48m³ of fresh water. PH = 6.8-6.4 salinity 5,760 and 3840 PPM salt. Continued swabbing. Pulled 88 swabs. Recover 117.18m³ of fresh water. PH = 6.8 with "0" salinity last 24 hrs. Pulled 107 swabs. Recovered 141.66m³ total fresh water. Grand total swabbed - 161.37m³ fluid. Level stable at 400m. Load fluid was 37.5m³.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

						8
ET AL HOOSIER N-22		KEESCARP	X			84 03 20
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$ 26,540	$ 243,615		84 03 19

Waiting on cement.
TIGHT:

08:00-09:30	-	Lay down swab equipment. Pump formation fluid into well.
09:30-12:00	-	Latch onto bridge plug. Trip out tubing and equipment.
12:00-19:30	-	Wait for cement retainer and stinger.
19:30-23:00	-	Rig up Computalog. Ran Baker Model "K" cement retainer. Set at 797m KB. Rig out logging equipment. Ran with stinger on 73mm EUE tubing. Sting into retainer.
23:00-24:00	-	Circulate 3.18m³ fresh water down tubing.
24:00-01:00	-	Batch mix 77 saxs of Class 'G' cement with 0.5% of D-65 (Fluid loss additive.) Circ. cement down at 0.2m³/min. Displace cement with 2.25m³ of water at 0.2m³/min. Plug down at 01:00 hrs. Pressure = 1 mPa. Slight air blow on annulus.
01:00-02:30	-	Pull out of retainer. Trip out tubing.
02:30-08:00	-	Wait on cement.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

					9
ET AL HOOSIER N-22	(TIGHT)	KEESCARP	[x]		84 03 21
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$ 20,270	$263,875	84 03 20

Waiting on cement.
Weather Temp. = -15

08:00-12:30	-	Wait on cement.
12:30-14:30	-	Ran in w/ 152mm bit and casing scraper. Tag cement at 782.9m KB. Fill hole with water. Perfs at 774.5-781m KB, taking water at 0.2m³/min.
14:30-20:00	-	Rig up power swivel and pack off. Drill out cement from 782.9m to 797m KB. Lost 27m³ water to formation while drilling.
20:00-23:30	-	Lay down swivel, pull 73mm tubing. Lay down bit and scraper. Ran in with open end tubing to 796m KB.
23:30-01:00	-	Rig up Dowell. Batch mix 50 saxs Class 'G' cement and 2% CaCL and 0.5% fluid loss additive. Circ cement down at 0.4m³/min. Displace cement with 2.1m³ water at .4m³/min. Hole full after displacement. Break out cement head. Well on vacuum. Pull 12 jts. Fill ann. with 1.59m³ water. Squeeze cement. No pressure inc. after 0.2m³ water in. Rig out Dowell equipment.
01:00-02:00	-	Trip out 73mm tubing. Fill hole with 3.5m³ water. No returns.
02:00-08:00	-	Wait on cement.

PETRO CANADA

MORNING REPORT — PRODUCTION OPERATIONS

10

ET AL HOOSIER N-22 (TIGHT)		KEESCARP	X		84 03 22
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$20,080	$283,955	84 03 21

Swabbing well to reduce hydro static.
Weather - Temp. = -20 - Windy.

08:00-09:00	-	Wait on cement.
09:00-10:00	-	Ran in bit and casing scraper on 73mm tubing. Tag cement at 782.32m KB.
10:00-12:30	-	Pick up swivel and pack off. Annulus took 6.04m³ water to fill.
12:30-15:30	-	Lay down swivel and packoff. Hoist tubing and bit. Lay down bit and scraper. Ran in open ended tubing to 781m KB.
15:30-16:45	-	Rig up Dowell equipment. Ran cement plug. 100 saxs of Class 'G' cement with 3% CaCl and .5% fluid loss additive. Batch mixed to 1893 kg/m³. Pump in 2.8m³ of slurry, follow with 1m³ water. No pressure. Tubing went on vacuum.
16:45-20:30	-	Hoist tubing and wait on cement.
20:30-21:45	-	Ran in bit and casing scraper to 500m KB. Tag fluid level at 215m.
21:45-12:30	-	Wait on cement.
12:30-05:30	-	Ran remaining tubing. Tag cement at 782.32m KB. Fill hole with 2.8m³ water. Trip out tubing. Lay down bit and scraper. Ran open ended tubing with PSN above 1st joint. Land at 770.34m KB. Rig to swab.
05:30-08:00	-	Fluid level at 100m. Pull 18 swabs. Recover 22m³ water. Fluid level at 400m.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

11

ET AL HOOSIER N-22 (TIGHT)		KEESCARP	X		84 03 23
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$ 12,375	$296,330	84 03 22

Wait on Cement.
Weather = -25 - Windy.

08:00-12:00	-	Wait for cement retainer. Did not arrive.
12:00-14:00	-	Prepare for Braidenhead cement squeeze. Swab well down to 405m.
14:00-15:30	-	Rig up Dowell. Batch mix 100 saxs of oilwell Class 'G' cement with 3% CaCl and .5% D-65. Slurry of 1893 kg/m³. Pump 2.8m³ of slurry, follow with 2m³ water at 0 mPa.
15:30-20:30	-	Hoist tubing, and wait on cement.
20:30-22:00	-	Ran in with bit and casing scraper on tubing. Tag cement top at 779m KB. Fill hole with 2.7m³ water. Leaks off.
22:00-02:00	-	Hoist tubing, lay down bit and scraper. Trip in open end tubing to run plug No. 5.
2:00-03:30	-	Rig in Dowell equipment. Batch mix 100 saxs oilwell Class 'G' w/ 3% CaCl and .5% D-65. Slurry at 1893 kg/m³. Pump 2.8m³ of slurry, displace with 2m³ water at 0 mPa. Cementing at 03:30. Well on light vacuum.
03:30-05:00	-	Pull 17 jts. tubing. Rig to swab. Swab well down to 320m KB. Recover 3.2m³ water. Initial fluid level = 150m.
05:00-06:30	-	Trip out tubing.
06:30-08:00	-	Wait on cement.

PETRO CANADA

MORNING REPORT — PRODUCTION OPERATIONS

FT AL HOOSIER N-22	(TIGHT)	KEESCARP	[x]	[ ]	12 / 84 03 24
ROLL'N NO. 12	J. Quick A. Ewasik	C. Dedora	$40,990	$37,320	84 03 23

Rigging up to reperforate 763-767.
Weather - Temp. = -26 - wind 20 kph

08:00-09:00	-	Wait on cement. Plug No. 5.
09:00-12:30	-	Ran in with bit and casing scraper. Tag cement at 779m KB. Plug No. 5 lost. Fill hole with 2.8m³ water. Leaks off. Hoist and lay down bit and scraper.
12:30-14:00	-	Ran Baker Model K cement retainer. Set at 771m KB.
14:00-15:30	-	Ran 73mm tubing with stinger.
15:30-16:30	-	Rig up Dowell, establish feed rate at .5m³/min. at 2.2 mPa.
16:30-20:00	-	Batch mix 200 saxs of Class 'G' cement and 0.5% D-65. Slurry to 1893 kg/m³. Pump 2.5m³ cement into tubing. Then .5m³ into formation. Stop for 15 min. Stage 5 stages in 15 min. intervals of .5m³ each. Pressure to 1 mPa on last 0.8m³ of cement. Pull out of retainer.
20:00-22:45	-	Hoist tubing. Cement dropped out of tubing.
22:45-12:00	-	Ran in bit and casing scraper on 70 joints.
12:00-02:00	-	Wait on cement.
02:00-06:30	-	Ran remaining tubing. Tag cement at 764m. Drill out cement to 770m KB. Circulate well clean.
06:30-08:00	-	Trip out tubing. Lay down bit and scraper.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

						13
ET AL HOOSIER N-22	(TIGHT)	KEESCARP	[x]	[ ]		84 03 25
ROLL'N No. 53	J. Quick A. Ewasik	C. Dedora	$ 28,300	$365,620		84 03 24

Swabbing 8th interval to evaluate.
Weather = -22, no wind.

08:00-09:30	-	Rig up Computalog and perforate 763-767m KB with 127mm HSC casing gun. (13 SPM) 22 gram charges, a total of 53 shots.
09:30-13:00	-	Wait on cement to acidize.
13:00-15:30	-	Ran in with 1 jt., Baker 410 packer, PSN and tubing to surface. Land with btm of tailpipe at 768m KB.
15:30-17:00	-	Rig up Dowell to acidize.
17:00-18:30	-	Pressure test lines and mix acid. Spot $1m^3$ 15% HCL with $.2m^3$ across perfs. Wash in $.2m^3$ stages, wait 5 min. Holding 2-4 mPa back pressure. Circ acid back to tubing. Raise tubing bottom to 763m KB. Set packer.
18:30-20:45	-	Squeeze wash acid into formation. Broke at 8 mPa. Drop to 0 mPa. Rate = $0.2m^3$/min. Mix remaining $6.5m^3$ acid. Spot acid. Close unloader valve. Squeeze acid, well on vacuum. Control acid at $.1m^3$/min. On vacuum. Follow acid with $2.5m^3$ fresh water at $.1m^3$/min. Well on vacuum.
20:45-07:00	-	Rig to swab. Pull 40 swabs. First 15 was acid water and 25 swabs fresh water. PH = 6.8, Sal = 0 PPM. Recovered $48.4m^3$ of fresh and acid water. Load fluid $11m^3$ of acid and water. Fluid level stable at 350m KB.
07:00-08:00	-	Clean rig tank.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

14

ET AL HOOSIER N-22 (TIGHT)		KEESCARP	X		84 03 26
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$ 19,995	$385,615	84 03 25

Waiting on cement.
Weather -10 C, light snow.

08:00-10:30	-	Pull 12 swabs. Recover 15.3m³ fresh water. PH = 6.8, Sal = 0 PPM. Rig out swab equipment.
10:30-12:00	-	Hoist tubing and lay down packer.
12:00-15:00	-	Rig up Computalog. Ran in and set Baker Model 'K' cement retainer at 760m KB.
15:00-17:30	-	Rig up Dowell cementing equipment. Batch mix 100 saxs Class 'G' cement + 1.5% CaCl +.5% D-65 also mix 100 saxs with only .5% D-65. Slurry at 1893 kg/m³. Pressure test to 10 mPa.
17:30-21:15	-	Pump 4.6m³ slurry down tubing. Stage away in 15 min stages. Batch mix 125 saxs Class 'G' + .5% D-65. Pump 4 stages of .5m³/stage, 15 min. each. Pump 4 more stages of 0.2m³/stage at 20 minute intervals. Well on vacuum to last stage. Fill tubing pressure up on last stage. Final pressure = 3.5 mPa. Pull stinger out of retainer.
21:15-21:45	-	Reverse circulate cement out of tubing. Used a total of 6.25m³ slurry into formation (250 saxs) Dumped 1.2m³ of slurry.
21:45-02:30	-	Hoist tubing, lay down stinger. Ran in with bit and casing scraper. Circ clean to 760m KB. Trip out bit and scraper.
02:30-08:00	-	Wait on cement to perforate next interval.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

15

ET AL HOOSIER N-22	(TIGHT)	KEESCARP	[x]		84 03 27
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$ 12,885	$ 398,500	84 03 26

Drilling out cement.
Weather -12 C. - No wind.

08:00-12:00	-	Wait on cement.
12:00-15:30	-	Ran in with J-4 bit on 73mm tubing. Install pack off and rig up swivel.
15:30-05:30	-	Drilling out Baker Model 'K' cement retainer at 760m KB.
05:30-08:00	-	Drilling out cement to 768.0m KB.

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MORNING REPORT —
PRODUCTION OPERATIONS

					16
ET AL HOOSIER N-22	(TIGHT)	KEESCARP	x		84 03 28
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$ 12,415	$410,915	84 03 27

Continue milling on retainer.
Weather -11 C. No wind.

08:00-08:30	-	Drill out cement to 771m KB.
08:30-22:30	-	Drilling on retainer at 771m at 25 mm/hr.
22:30-02:00	-	Hoist tubing, remove bit. Run in with clusterite junkmill on tubing.
02:00-06:00	-	Milling on cement retainer at 771m KB.
06:00-08:00	-	Repair hydraulic line to power swivel.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

ET AL HOOSIER N-22	(TIGHT)	KEESCARP	[x]		17 / 84 03 29
ROLL'N NO. 53	A. Ewasik	C. Dedora	$9,190	$420,105	84 03 28

Drilling out cement retainer.
Weather = -22 C. Wind - 15 km/h.

08:00-10:00	-	Milling cement retainer at 771m KB. No progress.
10:00-13:00	-	Trip out tubing and plugged mill. Ran in with 152mm bit on tubing.
13:00-19:30	-	Finish drilling out Baker retainer at 771m KB.
19:30-01:30	-	Drilling out cement from 771-797m KB.
01:30-05:00	-	Drilling on retainer at 797m KB. Retainer broke loose. Follow to 811m KB. Lost 1.5m³ water. No cement from 797-811m KB.
05:00-08:00	-	Drilling on retainer at 811m KB. No more drilling fluid loss.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

ET AL HOOSIER N-22 (TIGHT)		KEESCARP	[x]	[ ]	19 84 03 30	
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$ 9,590	$429,695	84 03 29	

Re-running cement bond log.

08:00-12:00	-	Drilling on cement retainer at 797m KB. Slip down 4m to 801m. Drill out same and thu cement drop free.
12:00-14:15	-	Lower drill string to 843.5m KB. Circulate hole clean.
14:14-14:45	-	Pressure test casing to 4 mPa. Held 15 min. Pressure drop to 3.3 mPa.
14:45-17:00	-	Hoist tubing and bit. Ran in with bit and csng. scraper to 843.5m KB.
17:00-17:45	-	Circulate clean.
17:45-19:00	-	Hoist tubing, lay down bit and scraper.
19:00-24:00	-	Rig up Computalog. Ran CBL tool, pull back out. Ran base temperature log.
24:00-02:30	-	Repairing bond log tool.
02:30-08:00	-	Ran cement bond log, not working properly. Repairing tool.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

					19
ET AL HOOSIER N-22 (TIGHT)		KEESCARP	X		84 03 31
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$10,810	$440,505	84 03 31

Waiting for perforating interval.
Weather = -4 C. Light snow.

08:00-11:15	-	Run cement bond log from 943-675m KB. Ran pressure pass at 5 mPa. Ran in with 101mm HSC casing gun. Perf. 818-819m KB. 4 shots.
11:15-13:30	-	Ran Baker 410 packer on 73mm tubing. Set packer at 816.5m KB.
13:30-13:45	-	Est. feed rate at 0.09m³/min at 5 mPa.
13:45-15:30	-	Rig up Computalog, repair CBL tool.
15:30-19:00	-	Ran tracer log pumping water. Rate of 0.1m³/min. Ran temp. log from 843-810m KB. Rig out Computalog.
19:00-20:30	-	Hoist 73mm tubing and 410 packer.
20:30-22:30	-	Rig up Computalog and ran 101 HSC casing gun (4 shots). Perf 795-795.3m KB.
22:30-23:30	-	Ran in tubing with 410 packer. Set at 798m KB.
23:30-00:30	-	Pressure test annulus. Attempt to est. communication. Pressure to 3600 kPa. Slow leak to 2900 kPa in 30 min.
00:30-01:30	-	Release packer and hoist tubing.
01:30-04:30	-	Ran in with Baker Mod 'S' drillable bridge plug. Set at 761m KB. Pressure test to 15 mPa. Held ok. Ran 5m of cement above with baler. Rig out Computalog.
04:30-08:00	-	Wait on orders to perforate.

PETRO-CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

20

ET AL HOOSIER N-22 (TIGHT)		KEESCARP	[x]		84 04 01
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$34,820	$474,825	84 03 31

Swabbing to evaluate well.
Weather = Temp. -8C. Clear.

08:00-09:00	-	Wait on perforators.
09:00-11:00	-	Rig up Computalog. Ran in 101mm HSC casing gun and perf No. 9 interval 743-748m KB. 13 SPM. Rig out Computalog.
11:00-13:30	-	Ran in 1 jt. tubing, Baker 410 packer and remainder tubing. Land with btm at 749m KB.
13:30-14:15	-	Rig up Dowell acid equipment. Mix 2.5m³ of 15% HCL + 5L of A-200 and 5L of F-75N and 13L of W-75.
14:14-17:00	-	Pressure test line to 15 mPa. Pump 2.5m³ of acid to perfs on 0.1m³ over perfs. Wash 1.5m³ past perfs in 0.1m³ stages in 5 min. intervals. Hold 2 mPa backpressure. Increased back pressure on last 4 stages to 4 mPa. Start to feed in. Squeeze 1m³ acid to formation at 0.1m³/min at 2 mPa. Squeeze 1.5m³ wash acid into perfs at .1m³/min and 2 mPa. Shut in 10 min. Pressure remained at 2 mPa.
17:00-18:00	-	Bled off tubing. Flow back 1.1m³ water. Raise packer and set at 733.8 m KB. Bottom of tubing at 743m KB.
18:00-18:15	-	Rig to swab.
18:15-21:00	-	Pull 12 swabs. Rec. 3.4m³ displ. water and spent acid. PH = 2, Sal = 72,000 PPM.
21:00-23:00	-	Swab No. 13. Rec. .04m³ of 10% oil 90% acid H_2O.
23:00-08:00	-	Swab No. 16. Rec. = .15m³ of 94% oil, 6% Acid H_2O. Pull 1 swab/hr. Rec. .04m³/swab. 20-25% water. Remainder oil. Last swab = .07m³ 10% water 90% oil. PH = 6, Sal = 28,600 PPM salt on H_2O test. Rec 4.3 m³ fluid in 25 swabs. Approximately 5.0m³ water and acid, .4m³oil. Fluid level = 700m.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

21

ET AL HOOSIER N-22 (TIGHT)		KEESCARP	[X]	[ ]	84 04 03
ROLL'N NO. 53	A. Ewasik J. Quick	C. Dedora	$ 61.277	$ 536.102	84 04 01

Swabbing well to evaluate.
Weather = -8C. No wind.

08:00-02:00	-	Pull 19 swabs, recover 1.1m³ of fluid.cuts = 75% water, 25% oil. Sal. = '0' PPM salt. PH = 6.4-7. Fluid level stable at 690m. Pulled 1 swab/hr. Entry rate = .08m³/hr.
02:00-03:00	-	Rig out swab equipment. Prepare Dowell to acidize.
03:00-05:00	-	Circ. 10m³ of 15% HCL + 20L of A-200, 20L of F75N and 120L of W35 to 9th perfs. Start squeeze at .04m³/min. and 4 mPa. Displace with 2.5 m³ water. Hold pressure on tubing for 10 min and release to rig tank. Flow back 5.6m³ water and acid. Rig out Dowell. Prepare to swab.
05:00-08:00	-	Pull 10 swabs. Rec. 2.7m³ of acid water. Pulling 1 swab/1/2 hr. Fluid level = 600m. Total load fluid to recover = 4.2m³.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

					22
ET AL HOOSIER N-22	(TIGHT)	KEESCARP	[x]	[ ]	84 04 03
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$ 14,601	$550,703	84 04 02

Swabbing well to evaluate.
Weather = -2 C. Cloudy.

08:00-13:45 - Pull 14 swabs. Rec. 4.2m³ of acid water, trace of oil. Sal = 35,700 PPM PH = 5 Total load fluid rec. = 12.5m³, fluid level at 600 m.

13:45-08:00 - 1 swab each 1/2 hr. Pull 35 swabs. Recover 8.8m³ of fluid. 2% reducing to a trace of oil. Sal = "0" PPM. PH to 6.8 on swab no. 24, Sal = 5,760 PPM and on 25th swab sal to "0" PPM. Total of 49 swabs today. Recover 13m³ of fluid. Grand total of 21.3m³ of fluid. Final fluid level = 600m. Entry rate = .08m³ each 1/2 hr. Yellow colored water.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

					23
ET AL HOOSIER N-22	(TIGHT)	KEESCARP	X		84 04 04
ROLL'N NO. 53	J. Quick E. Ewasik	C. Dedora	$ 12,245	$562,948	84 04 03

Rigging up Dowell to acidize well.
Weather = -5C. Light wind.

08:00-17:00	-	Pull 1 swab each 1/2 hr. 18 swabs total, recover 6.36m³ of fluid. Approximately 1% oil. PH = 6.8 Sal = '0' PPM, grand total recovered 27.66m³. Fluid level at 600m.
17:00-00:30	-	Wait for Computalog Wireline unit.
00:30-02:00	-	Release and hoist 410 packer and tubing.
02:00-05:30	-	Rig up Computalog. Set Baker Model 'S' bridge plug at 741m KB. Pressure test to 15 mPa. No leak off for 15 min. Ran in 101mm HSC casing gun. Perf interval No. 10, 735-740m KB. 13 SPM for a total of 66, 23 grm shots. Rig out Computalog.
05:30-08:00	-	Ran in 1 jt. Baker 410 packer and tubing to surface.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

24

T AL HOOSIER N-22	(TIGHT)	KEESCARP	X		84 04 05
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$ 52,462	$615,410	84 04 04

Pulling tubing and mill.
Weather = -10C. Clear.

08:00-10:00	-	Dowell mixing acid and prepare to acidize well. Pressure test lines to 15 mPa.
10:00-12:30	-	Displace 2.3m³ acid down tubing. Cover perfs from 735-740m KB with 0.1m³ of 15% HCL acid and 140L of W-50, 19L of A-200, 19L of F75. Wait 5 min. Wash perfs with 0.1m³ stages. 9 stages, waiting 5 minutes for stages, hold 2mPa backpressure. After stage No. 5 back pressure dropped to 1 mPa. Same on last 3 stages. Backwash acid into tbg. Raise tubing btm to 734m KB. Packer at 722.55m KB. Squeeze 1m³ of wash acid and 8.3m³ of new acid into perfs. Start at .16m³/min and 2 mPa inc. to .23m³/min at 3.9mPa. ISIP = 3.8 mPa in 20 min. to '0' mPa. Rig out Dowell.
12:30-18:15	-	Rig to swab. Pull 10 swabs. Recover 12.7m³ acid water. 23,100 PPM salinity. Pull 12 swabs. Rec. 13.85m³ clear water. Sal = '0' PPM. PH = 6.8. No sign of oil. Fluid level = 300m. Total fluid swabbed 26.5m³. Load fluid was 11.8m³.
:15-18:45	-	Rig out swab equipment. Inject 4.7m³ water down tubing at .4m³/min. at 1 mPa. Shut down pump tubing on vaccum.
18:45-22:30	-	Unset packer. Hoist tubing. Lay down packer. Ran in 152mm mill. Rig up swivel and packoff.
22:30-07:30	-	Drilling out Baker mod "S" bridge plug at ~~741m~~ KB.
07:30-08:00	-	Lay down swivel. Hoist tubing and mill.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

					25
ET AL HOOSIER N-22	(TIGHT)	KEESCARP	X		84 04 06
ROLL'N NO. 53	J. Quick A. Ewasik	C. Dedora	$ 10,080	$625,490	84 04 05

Well suspended, to be abandoned next drilling season.
Weather = -16C. Overcast.

08:00-09:30	-	Trip out tubing and 152mm mill. Pick up and run in Baker 410 on tubing.
09:30-12:00	-	Set packer at 741m KB. Pump down tubing, got circ. up ann. Pump down ann. Got same result at .4m³/min. Release 410 packer, set at 753m KB. Pressure up down tubing to 10 mPa, no leak off. Feed down annulus at .4m³/min and 1.5mPa.
12:00-13:00	-	Release packer and trip out.
13:00-15:30	-	Wait on orders.
15:30-17:30	-	Make up 1 - 60mm x 1.2mm pup jt., 1 - jt. 60mm EUE tubing, 1 - 60mm F-nipple (46mm profile) 1 jt. of 60mm tubing with btm 6m perforated + changeover. Ran in on 72 jts of 73mm tubing. Land dognut. Pump .15m³ diesel in tubing and .2m³ diesel in annulus. Also .15m³ diesel in surface casing.
17:30-24:00	-	Remove BOP's, install wellhead. Back pressure valve in tubing hanger. Bull plug, chain and lock wellhead. Rig out rig and equipment.
24:00-03:00	-	Load up trucks.
03:00-07:00	-	Had problems hauling equipment to Norman Wells.
07:00-08:00	-	Break out flare line and clean up lease.

PETRO CANADA

MORNING REPORT —
PRODUCTION OPERATIONS

						26
T AL HOOSIER N-22 (TIGHT)		KEESCARP	[x]			84 04 07
ROLL'N NO. 53	J. Quick	C. Dedora	$23,955	$649,445		84 04 06

Well suspended.
FINAL REPORT!!!

08:00-13:00 - Cleaning up location. Raise cement pallets on planks. Stack tubing and rods. Haul prefab and light plant at airstrip to location.

HUGH W. REID & ASSOCIATES LTD.
PETROLEUM CONSULTANTS
#302, 602 - 11th Avenue S.W.
Calgary, Alberta, Canada
T2R 1J8

Telephone
(403) 262-1261

PCI et al HOOSIER RIDGE N-22 65°31'56.6"N 127°34'48.7" DST #1 739 - 757m

Closed Chamber DST Report

LOCATION: 65°21'56.6"N 127°34'48.7"W

WELL NAME: PCI et al HOOSIER RIDGE N-22

DST NO.: One INTERVAL: 739 - 757m

TESTED BY: DYNA WELL TEST LTD.

HWR HUGH W. REID & ASSOCIATES LTD.*
PETROLEUM CONSULTANTS
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Calgary, Alberta, Canada
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CLOSED CHAMBER DST REPORT

GENERAL DATA

WELL NAME:	PCI et al HOOSIER RIDGE N-22	TEST DATE:	1984-02-19
LOCATION:	65°21'56.6"N 127°34'48.7"W	CHAMBER VOLUME:	4.83 m^3 (30.41 bbls)
DST NO.:	1	DOWNHOLE CHOKE DIAMETER:	12.7mm (½")
INTERVAL:	739 - 757m	RECOVERY:	Reported as 3.66 m (12ft) "very slightly oil flecked mud".
FORMATION:	Kee Scarp		

SUMMARY OF CONCLUSIONS OF REPORT

1. The zone co-produced very low rate gas (<1 $s.m^3/D$) and mud at approximately 1 B/D (0.18 m^3/D) during main flow.
2. The characteristics of the downhole pressure charts indicate that formation liquid, probably oil, displaced the rathole mud from the sump to the chamber.
3. The gas produced is either free gas or solution gas from oil, although the latter is more probable.
4. The fact that no free oil was recovered is likely due to relative permeability effects (explained in comment #4).
5. The zone has inherently low permeability and it is not known if the future deliverability would be commercial. Similar DST's in carbonates in Alberta often yield low rate pumping oil wells (refer to comment #5).

These conclusions are explained in detail in the pages immediately following.

* Report prepared on behalf of DYNA WELL TEST LTD. who conducted the field test.

TEST DISCUSSION

1. RECOVERY AND FLOW RATES

The reported recovery of 3.66 metres (12 ft) of oil flecked mud would appear to be slightly pessimistic. The recovery has been recomputed utilizing the final flowing pressure measured by the upper inside gauge (135 kPa) and the mud gradient (11.3 kPa/m) as 11.9 metres (39 ft) of mud. This amounts to a volume of 0.005 m^3 (0.31 bbls).

2. AVERAGE LIQUID FLOW RATES (Computations shown on pages A-3 and A-4)

Of the total liquid volume recovered some 53% (0.03 m^3) was produced during the preflow. The remaining 0.02 m^3 (0.14 bbls) was produced relatively constantly over the 180 minute main flow period yielding an average influx rate of only 0.18 m^3/D (1.12 B/D).

3. ASSOCIATED MINOR GAS RATES

Very low rate gas was produced at the rates tabulated in Table 1 and graphed in Figure 2. In summary, the rates are as follows.

Preflow: Between the 4th and 12th minutes of preflow the rates increased somewhat erratically from 0.5 s.m^3/D to 7.5 s.m^3/D (0.02 to 0.26 Mscf/D). (For the previous 4 minutes the surface pressure declined due to residual liquid in the test head draining into the pressure hose. The data could not be used for gas rate computations.)

Main Flow: Apart from a minor initial surge to 6.5 s.m^3/D for the first minute, the rates were all less than 1 s.m^3/D and fluctuated rather erratically between a low of 0.05 to a maximum of 0.99 s.m^3/D with an average of 0.142 s.m^3/D (0.005 Mscf/D).

These rates (derived from the surface pressure change and Equation 8 - Alexander, SPE 6024) have been independently verified utilizing the Equation for Corresponding States (refer to Appendix pages A-5 and A-6). It is thought that this gas represents solution gas from oil in the zone, as discussed below.

4. CONTENT OF ZONE

Referring to the downhole pressure charts in the attached Lynes United Services report, the gradual inverted S-shape at the start of the FSI is thought to represent solution gas being dissolved in oil in the zone. This configuration is typical of tests of oil zones. Gas breaks

HWR

out of solution from the oil in the pore space in the immediate wellbore vicinity during the flow period when the flowing pressure is well below the bubble point of the oil. This gas then simply redissolves as the pressure rises when the well is shut in again. Such a configuration also occurs in tests of gas zones which are "cleaning up", however, the surface pressure behaviour does not indicate any rate cleanup. Thus, the zone is probably an oil zone, or is in the transition (oil/water) zone below free oil*.

5. RESERVOIR QUALITY AND FUTURE PRODUCIBILITY

The fact that the downhole shut in pressure buildup is extremely slow indicates an inherently low permeability zone. The pressure buildup curve had not stabilized sufficiently for any quantitative Horner type reservoir analysis for properties such as permeability, radius of investigation, etc. and the future deliverability on completion cannot be predicted accurately.

Despite these comments, the configuration of the pressure buildup of this DST resembles other DST's of rather low porosity carbonates in Alberta, particularly the Pekisko in the Twining region and the Crossfield member of the Wabamun. These DST's look initially very unpromising but after careful completion the wells often become commercial low rate pumping oil wells.

An example of a DST with very comparable pressure charts is found in the Swan Hills carbonate in 12-21-69-9 W5 Shell Swan Hills, DST #1 (7070 - 7176 ft) which recovered 60 feet of gas cut mud and 2 gallons of oil cut mud. After completion and an acid job, the zone flowed at 60 BOPD. The chart from this DST is illustrated as Figure 3 and may be used to compare with the charts from the subject DST, particularly from Rec. #009772, which had the same position in the string as the example chart from the Swan Hills well.

6. ADVANTAGES OF CLOSED CHAMBER TEST IN THIS WELL

It can be demonstrated that had this test been run as a conventional DST without the surface valve closed and the surface pressures being recorded, the presence of gas from oil in the test zone would not have been detected.

At an average preflow rate of 0.2 Mscf/D the gas would have taken 825 minutes to displace the 165 scf of air in the pipe, reach surface and thereby be detected. Since the total flow time was only 192 minutes long, obviously no gas would have been detected, instead all that would have been reported would have been "a very weak air blow". Such non-quantitative description is useless to diagnose zone content.

(It is recommended that the contents of the bottomhole sampler be closely inspected to determine if any trace of free oil was present.)

---

* The fact that no free oil was produced in not terribly significant. The total volume of the recovery is less than the sump volume, thus, most of the recovery is just from the sump.

HWR

TABLE &
FIGURES

TABLE 1

TABULATION OF SURFACE PRESSURES & GAS FLOW RATES

Well Location : 65°21' 56.6"N 127°34' 48.7"W Dst. No : 1
Interval : 739 - 757m

STATUS	TIME (MINS)	TRADITIONAL UNITS PRESS (PSI)	PR CHANGE (PSI/MIN)	GAS FLOW (MCF/DAY)	S.I. UNITS PRESS (KPA)	PR CHANGE (KPA/MIN)	GAS FLOW (M3/DAY)	
PRE-FLOW								
Surface Valve SHUT, Downhole Valve OPEN								
	.00	14.231						
	.50	14.279	.096		98.48	.66		
	1.00	14.272	-.014		98.43	-.10		
	1.50	14.268	-.008		98.40	-.06		*
	2.00	14.261	-.014		98.35	-.10		
	2.50	14.254	-.014		98.30	-.10		
	3.00	14.251	-.006		98.28	-.04		
	4.00	14.241	-.010		98.21	-.07		
	6.00	14.243	.001	.02	98.23	.01	.50	
	8.00	14.248	.003	.04	98.26	.02	1.24	
	9.00	14.254	.006	.11	98.30	.04	2.98	
	10.00	14.269	.015	.26	98.41	.10	7.45	
	12.00	14.294	.012	.22	98.58	.09	6.21	
INITIAL SHUTIN								
Surface Valve SHUT, Downhole Valve SHUT								
	.00	14.294						
	1.00	14.305	.011		98.66	.08		
	2.00	14.299	-.006		98.61	-.04		
	3.00	14.294	-.005		98.58	-.03		
	4.00	14.289	-.005		98.54	-.03		
	5.00	14.269	-.020		98.41	-.14		
	10.00	14.321	.010		98.77	.07		Irregular response as air is blown through and vented from surface hose to clear the residual liquid from the system.
	15.00	14.363	.008		99.06	.06		
	21.00	14.358	-.001		99.02	-.01		
	30.00	14.337	-.002		98.88	-.02		
	40.00	14.344	.001		98.92	.00		
	50.00	14.337	-.001		98.88	-.00		
	60.00	14.307	-.003		98.67	-.02		
	75.00	14.281	-.002		98.49	-.01		
	85.00	14.280	-.000		98.48	-.00		
	100.00	14.281	.000		98.49	.00		
	120.00	14.277	-.000		98.46	-.00		
	140.00	14.274	-.000		98.44	-.00		
	160.00	14.302	.001		98.63	.01		
	180.00	14.301	-.000		98.63	-.00		
	190.50	14.299	-.000		98.61	-.00		
MAIN FLOW								
Surface Valve SHUT, Downhole Valve OPEN								
	.00	14.299						
	1.00	14.312	.013	.23	98.70	.09	6.46	
	2.00	14.313	.001	.02	98.71	.01	.50	
	3.00	14.313	.000	.00	98.71	.00	.00	
	4.00	14.314	.001	.02	98.72	.01	.50	
	5.00	14.316	.002	.04	98.73	.01	.99	
	10.00	14.318	.000	.01	98.74	.00	.20	

* Decline in surface pressure due to residual liquid in the test head draining into the pressure hose.

TABULATION OF SURFACE PRESSURES & GAS FLOW RATES

Well Location : 65°21' 56.6"N 127°34' 48.7"W
Interval : 739 - 757m

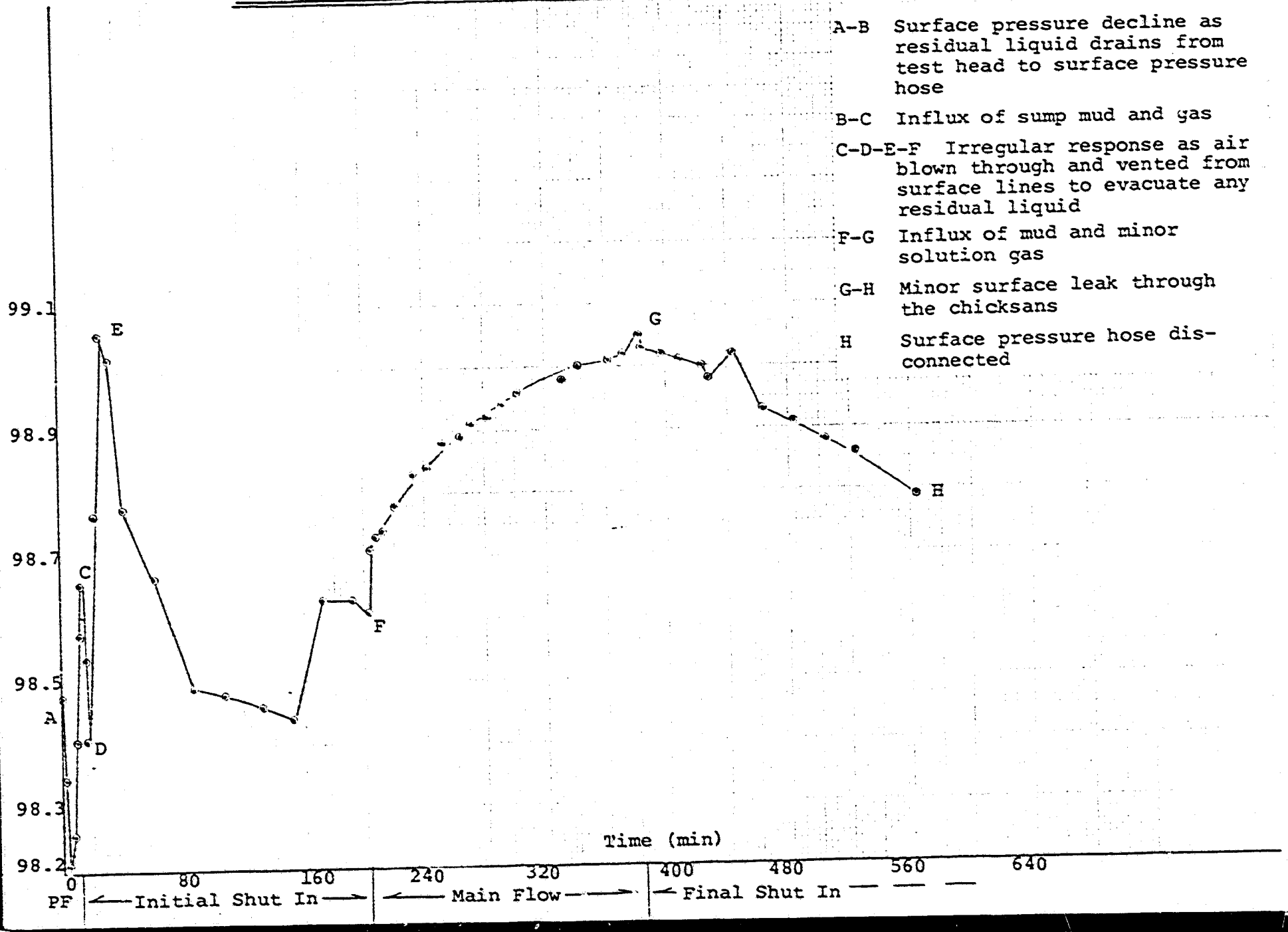
Dst. No : 1

STATUS	TIME (MINS)	TRADITIONAL UNITS PRESS (PSI)	PR CHANGE (PSI/MIN)	GAS FLOW (MCF/DAY)	S.I. UNITS PRESS (KPA)	PR CHANGE (KPA/MIN)	GAS FLOW (M3/DAY)
MAIN FLOW	(Cont'd)						
	15.00	14.321	.001	.01	98.77	.00	.30
	19.00	14.323	.000	.01	98.78	.00	.25
	25.00	14.326	.001	.01	98.80	.00	.25
	31.00	14.330	.001	.01	98.83	.00	.33
	40.00	14.332	.000	.00	98.84	.00	.11
	45.00	14.333	.000	.00	98.85	.00	.10
	50.00	14.337	.001	.01	98.88	.01	.40
	60.00	14.339	.000	.00	98.89	.00	.10
	70.00	14.342	.000	.01	98.91	.00	.15
	80.00	14.344	.000	.00	98.92	.00	.10
	90.00	14.346	.000	.00	98.94	.00	.10
	100.00	14.349	.000	.01	98.96	.00	.15
	110.00	14.350	.000	.00	98.97	.00	.05
	120.00	14.351	.000	.00	98.97	.00	.05
	130.00	14.352	.000	.00	98.98	.00	.05
	140.00	14.352	.000	.00	98.98	.00	.00
	150.00	14.355	.000	.01	99.00	.00	.15
	160.00	14.357	.000	.00	99.01	.00	.10
	170.00	14.358	.000	.00	99.02	.00	.05
	180.00	14.362	.000	.01	99.05	.00	.20
FINAL SHUTIN							
Surface Valve SHUT, Downhole Valve SHUT							
	.00	14.362					
	1.00	14.361	-.001		99.04	-.01	Minor surface air leak through chicksans
	2.00	14.360	-.001		99.03	-.01	
	4.00	14.360	.000		99.03	.00	
	5.50	14.361	.001		99.04	.00	
	10.00	14.358	-.001		99.02	-.00	
	17.00	14.358	.000		99.02	.00	
	22.00	14.356	-.000		99.01	-.00	
	27.00	14.356	.000		99.01	.00	
	37.00	14.355	-.000		99.00	-.00	
	47.00	14.352	-.000		98.98	-.00	
	57.00	14.358	.001		99.02	.00	
	77.00	14.345	-.001		98.93	-.00	
	97.00	14.342	-.000		98.91	-.00	
	117.00	14.337	-.000		98.88	-.00	
	137.00	14.335	-.000		98.86	-.00	
	157.00	14.330	-.000		98.83	-.00	
	177.00	14.325	-.000		98.79	-.00	

Surface pressure hose disconnected after 177 minutes of FSI time.

65 21'56.6"N 127 34'48.7"W DST #1 739-757m

SURFACE PRESSURE vs. TIME (ENTIRE TEST - FLOW AND SHUT IN PERIODS)



A-B Surface pressure decline as residual liquid drains from test head to surface pressure hose

B-C Influx of sump mud and gas

C-D-E-F Irregular response as air blown through and vented from surface lines to evacuate any residual liquid

F-G Influx of mud and minor solution gas

G-H Minor surface leak through the chicksans

H Surface pressure hose disconnected

FIGURE 1

65°21'56.6"N 127°34'48.7"W DST # 1 739-757m

DETAILED FLOW RATE AND SURFACE PRESSURE vs. TIME DURING MAIN FLOW PERIOD

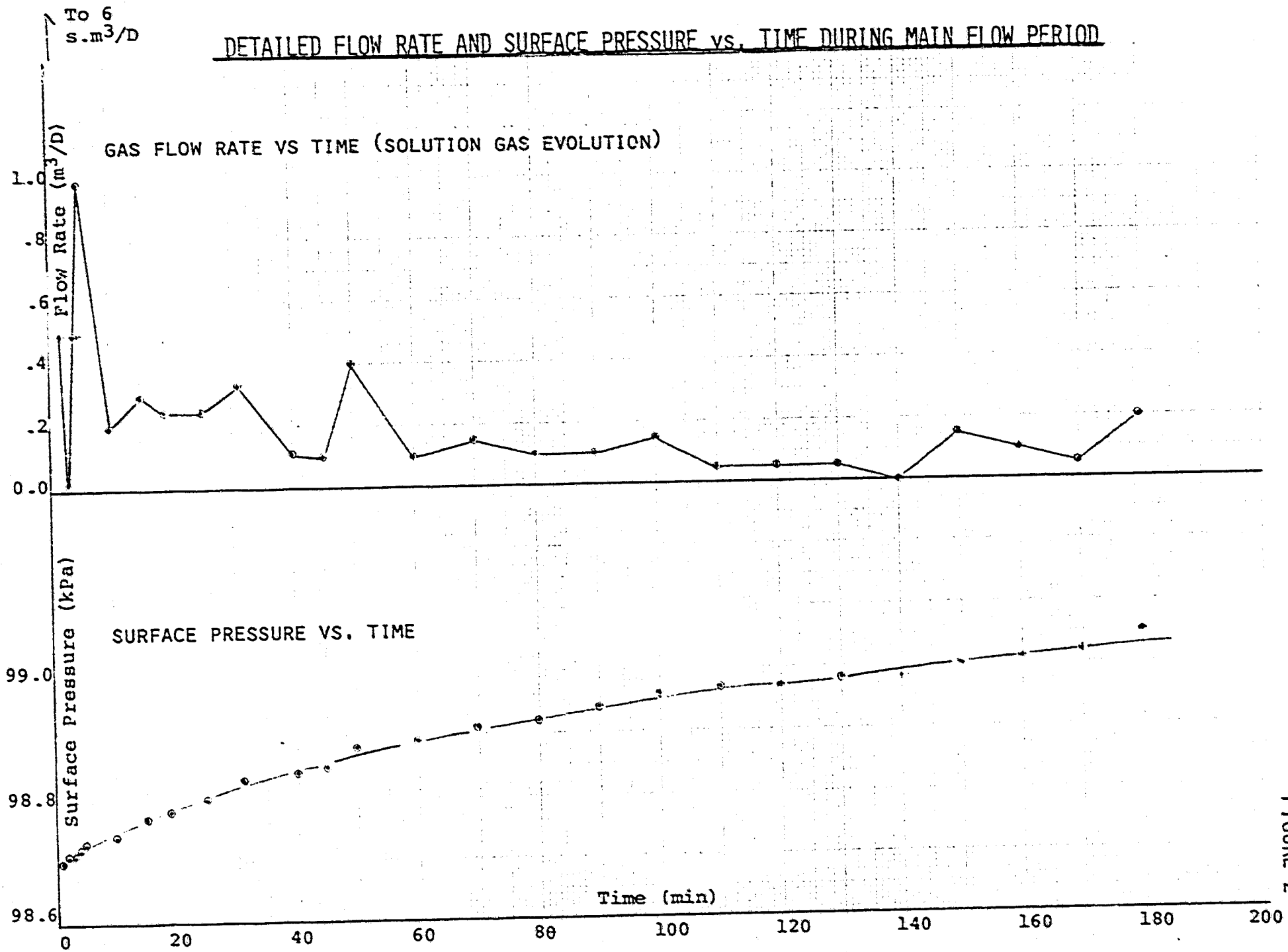
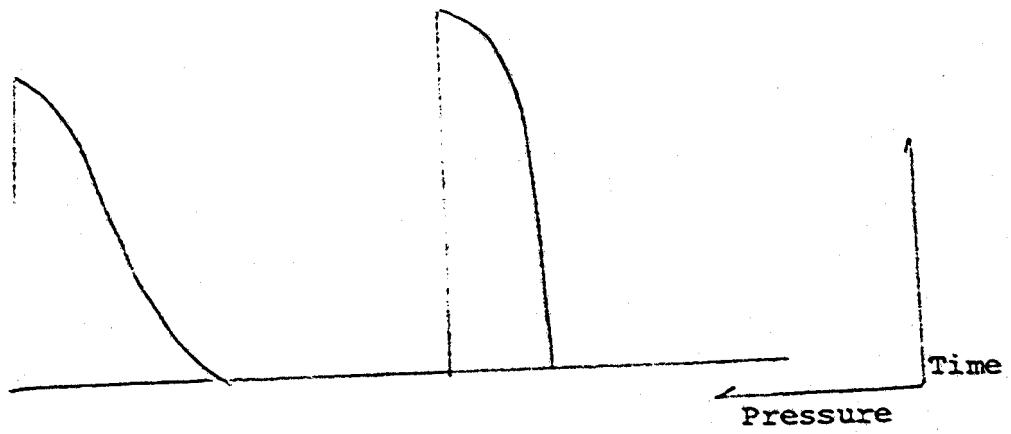


FIGURE 2

FIGURE 3

12-21-69-9 W5
Shell Swan Hills
DST #1 (7070 - 7176 ft)

PRESSURE CHART



Recovery: 60ft of gas cut mud, 2 gal. of oil cut mud
R sult after completion: 60 BOPD - GOR: 300 scf/STB

ILLUSTRATION OF CHART FROM SWAN HILLS DST TO SHOW SIMILARITY WITH PRESENT HOOSIER RIDGE N-22 TEST (See text page 3)

APPENDIX

PRETEST PLANNING SUMMARY

Calculations utilizing the parameters shown on page A-2 indicate the following:-

PHASE	MAXIMUM POSSIBLE RATES	INITIAL SURFACE PRESSURE CHANGE
Gas	183852 scm/D (6527 Mscf/D)	2548 kPa/min (370 psi/min)
Gas Saturated Water	117117 scm/D* (4158 B/D) *	25.5 kPa/min (3.7 psi/min)
Gas Free Water	117117 scm/D (4158 B/D)	9.3 kPa/min (1.35 psi/min)

From the above parameters it is clear that a surface pressure change greater than 2548 kPa/min would not occur during this test. Surface pressure changes greater than 25.5 kPa/min indicate hydrocarbon influx, and pressure changes below 9.3 kPa/min may indicate liquid or low rate gas.

If gas is produced, a surface pressure increase of 1 kPa/min corresponds to 72.5 m^3/D of gas influx to the chamber. (1 psi/min corresponds to 17.66 Mscf/D.)

* With solution gas breakout.

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PCI ET AL HOOSIER RIDGE N22
65°21'56.6"N 127°34'48.7"W
DST 1
KEY SCARP
FEBRUARY 1984
733-757

PRE-TEST PLANNING

1	GAS GRAVITY	.60	
2	FM DEPTH	2454.07	FT.K.B.
3	FM TEMP.	79.27	DEG F
4	FM. PRESS.	1104.33	PSIA
5	SURFACE PRES	14.20	PSIA
6	SUMP VOLUME	7.00	BBLS
7	WATER CUSH.	0.00	FT.
8	GAS CUSH.	0.00	PSIA
9	CHOKE DIA.	.50	FRACT IN
10	CHOKE COEFF.	4.31	MCFD/PSI
11	SOL'N GAS	1.65	SCSL/BBL
12	CHAMBER TEMP	59.63	DEG F
13	TOP PACKER	2424.54	FT.K.B.
14	PACKER/VALVE	38.79	FT.
15	STICK-UP KB.	15.42	FT.
16	TEST VALVE	2385.76	FT.
17	CHAMBER LEN.	2401.18	FT.
18	COLLAR LEN.	562.60	FT.
19	COLLAR I.D.	2.87	IN.
20	COLLAR CAPC	.80	BBLS/100
21	COLLAR VOL.	4.51	BBLS
22	L PIPE LEN.	1838.44	FT.
23	L PIPE I.D.	3.87	IN
24	L PIPE CAPC	1.42	BBLS/100
25	L PIPE VOL	25.90	BBLS
26	U PIPE LEN	0.00	FT.
27	U PIPE I.D.	0.00	IN
28	U PIPE CAPC	0.00	BBLS/100
29	U PIPE VOL	0.00	BBLS
30	CHAMBER VOL	30.41	BBLS
31	CUSHION VOL	0.00	BBLS
32	NET VOLUME	30.41	BBLS

TEMP GRAD 1.60 DEG F/100FT
PRESS GRAD .45 PSI/FT

DERIVATION OF LIQUID FLOW RATES

1. TOTAL RECOVERY VOLUME IN CHAMBER AT END OF TEST

Computed Liquid Column at End of Test

$$= \frac{FFP}{\nabla m} = \frac{135 \text{ kPa}}{11.3 \text{ kPa/m}} = 11.94 \text{ m} \quad (39 \text{ ft})$$

Liquid Volume at End of Test

= Length x Capacity (DC)
= 39 ft x 0.008 bbls/ft = 0.31 bbls (0.05 m^3)

2. PREFLOW LIQUID VOLUME AND RATE

A. VOLUME PRODUCED DURING PREFLOW

$$= \frac{\text{Final Preflow Pressure}}{\text{Final Main Flow Pressure}} \times \text{Total Recovery}$$

$$= \frac{83 \text{ kPa}}{155 \text{ kPa}} \times 0.31 \text{ bbl} = 0.17 \text{ bbl} \quad (0.03 \text{ m}^3)$$

B. PREFLOW RATE q_{pf}

$$q_{pf} = 1440 \text{ (min/D)} \times \frac{V_p \text{ (bbls)}}{t_f \text{ (min)}}$$

$$= \frac{1440 \times 0.17}{12} = 20.4 \text{ B/D} \quad (3.2 \text{ m}^3\text{/D})$$

Where V_p = volume produced (bbls)
t_f = effective flow time (min)

Thus, the average preflow rate = 20.4 B/D (3.2 m^3/D)

HWR

3. MAIN FLOW VOLUME PRODUCED AND RATE

A. LIQUID VOLUME PRODUCED V_p

$$V_p \text{ main flow} = V_p \text{ total} - V_p \text{ preflow}$$
$$= (0.31 - 0.17) \text{ bbls}$$
$$= 0.14 \text{ bbls}$$

B. AVERAGE MAIN FLOW RATE $\bar{q}$

$$= \frac{1440 \times 0.14}{180} = 1.12 \text{ B/D} \quad (0.18 \text{ m}^3/\text{D})$$

Thus, the average main flow rate = 1.12 B/D (0.18 m^3/D)

HWR

VERIFICATION OF AVERAGE GAS RATE DURING MAIN FLOW UTILIZING THE EQUATION FOR CORRESPONDING STATES

1. Volume of Air in Chamber at Start Main Flow (V_1 start)

$$\frac{p_1 V_1}{T_1 Z_1} = \frac{p_2 V_2}{T_2 Z_2} \quad . \quad . \quad . \quad (i)$$

Equation (i) is solved for V_1 start

Where V_1 start = volume of air in chamber at start main flow (scf)
p_1 = standard pressure = 14.65 psia
T_1 = standard temperature = 520°R
Z_1 = gas deviation factor = 0.99
p_2 = initial chamber pressure = 14.299 psia
T_2 = initial chamber temperature = 519.6°R
Z_2 = gas deviation factor at p_2 and T_2 = 0.99
V_2 = chamber volume at start main flow = 30.23 bbls
= 171 cu.ft.

$$\therefore \quad V_1 \text{ start} = \frac{p_2 V_2 (520) Z_1}{14.65\ T_2 Z_2} = \frac{14.299 \times 171 \times 520 \times 0.99}{14.65 \times 520 \times 0.99}$$

$$= \underline{\underline{165 \text{ scf}}}$$

2. Volume of Air and Gas in Chamber at End of Main Flow Period (V_1 end)

Equation (i) is solved for V_1 end

Where $p_1 T_1 Z_1$ are at standard conditions
and $p_2 T_2 Z_2$ represent stable conditions

N.B. V_2 = volume at end main flow = original volume less the recovery volume
= (30.4 - 0.31) bbls = 30.09 bbls = 169 cu.ft.

$$\therefore V_1 \text{end} = \frac{14.362 \times 169 \times 520 \times 0.99}{14.65 \times 520 \times 0.99} = \underline{\underline{165.6 \text{ scf}}}$$

HWR

3. Total Gas Volume Which Entered During Main Flow ($V_{total\ gas}$)

$$V_{total\ gas} = V_1\ end - V_1\ start$$

$$= (165.6 - 165.0)\ scf$$

$$= \underline{0.6\ scf}$$

4. Average Main Flow Gas Rate $\bar{q}$

$$\bar{q} = \frac{1440 \times V_{total\ gas}}{t_{eff}}$$

Where t_{eff} = effective flow time

$$= \frac{1440 \times 0.6}{180} = 4.8\ scf/D$$

$\therefore$ Average main flow gas rate = 0.005 Mscf/D (0.1425 m^3/D)

HWR

REF#:C-70-999-67076-66

TEST DATE: 84/02/19

LAT: 65° 21' 56.6 "
LONG: 127° 34' 48.7 "

PCI ET AL HOOSIER RIDGE N-22
400/ 65.210 / 127.340 /00
DST#01
739.00m to 757.00m
KEE SCARP

DEPTH: 743.00m

RECORDER # 001760

	PRESSURE kPa
1)Initial Hydro :	8412.
2)1st Flow Start:	293.
3)1st Flow End :	310.
4)END 1st Shutin:	6378.
5)2nd Flow Start:	328.
6)2nd Flow End :	431.
7)END 2nd Shutin:	3568.
14)Final Hydro. :	8308.

TEST TIMES(MIN)	
1stFLOW :	14.
SHUTIN:	178.
2ndFLOW :	179.
SHUTIN:	240.

RECOVERY DATA

THIS IS A CLOSED CHAMBER TEST. TOTAL FLUID RECOVERY CONSISTS OF 3.66 M OF SLIGHTLY OIL FLECKED DRILLING MUD.

REMARKS AND TEST SUMMARY

Test results indicate a mechanically successful test. Bottom hole pressures and the shape of the shut-in curves suggest RELATIVELY LOW PERMEABILITY within the interval tested. Electronic DMR recorder #1760 - pressures are recorded in kPa(a); increments for this recorder are included. Recorder #9772 - was run between the shut-in tool and the above hydraulic tool, therefore does not record hydrostatic pressures, only flows and shut-in data. The initial and final shut-in curves were incremented but not extrapolated due to insufficient curve development.

TABLE OF CONTENTS

LYNES UNITED SERVICES LTD
DST#01 REPORT

Well name : PCI ET AL HOOSIER RIDGE N-22
Location : 400/ 65.210 / 127.340 /00
Interval : 739.00m to 757.00m
Test Date : 84/02/19
Test Type : DUAL CONVENTIONAL BOTTOM HOLE
Formation : KEE SCARP

K.B.Elevation : 160.33m
Grd.Elevation : 154.13m
TD @ test Date: 757.00m
Ticket Number : 67076
Unit Number :

Started in hole at : 2345 hrs
Tool opened at : 0456 hrs
Reverse circulated?: NO
Contractor & Rig No: ATCO #76
Lynes#1 : 1 of 1 on the same trip.

Operator: PETRO-CANADA INC.
ROOM 937 WEST
150 - 6TH AVE. S.W.
CALGARY ALBERTA
T2P3E3

Company Rep : WALSH P
Testers : MARSHALL L

12 REPORTS(S) TO: STEVE BENKO
Company:

BLOW DESCRIPTION

Closed chamber run by Dyna Well.

TOTAL LIQUID RECOVERY : 3.66m

For DST# 1 through DST# 1

2 Fluid Samples
Sent to: KEPT ON LOCATION

3.66m SLIGHTLY OIL FLECKED DRILLING MUD.

GAS MEASUREMENTS

No Gas Measurements

DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

TOOL SEQUENCE

SUB	LENGTH (m)
PUMP OUT SUB	.33
CROSS OVER SUB	.30
SHUT-IN TOOL	2.58
BTM. HOLE SAMPLER	1.03
INSIDE RECORDER	1.38
HYDRAULIC TOOL	1.50
INSIDE RECORDER	1.38
HYDRAULIC JARS	2.25
SAFETY JOINT	.65
TOP CONV. PACKER	2.43
TOP CONV. PACKER	2.28
TOP CONV. PACKER	1.24
PACKER STICK DOWN	1.04
PERFORATED SPACING	1.53
PERFORATED SPACING	1.53
RECORDER CARRIER	2.06
SPACING	1.24
CROSS OVER SUB	.33
DRILL COLLAR	9.54
CROSS OVER SUB	.33
BULL NOSE	.40

******** TOOL TOTAL 35.35

DRILL COLLARS
ID= 72.0mm: 171.48
ID= :

DRILL PIPE
OD=114.3mm: 554.41
OD= :

COLLAR-PIPE TOTAL 725.89

STICK UP ABOVE TABLE : 4.24
TOOL ABOVE INTERVAL : 17.35
TOTAL INTERVAL : 18.00
BOTTOM CHOKE SIZE: 25.40 mm

RECORDER SUMMARY

1) NUMBER : 001760 — ELECTRONIC GAUGE. TEMPERATURE AND PRESSURES.
TYPE : DMRB
LOCATION: OUTSIDE
RANGE: 68900.00kPa
DEPTH : 743.00m

2) NUMBER : 005539
TYPE : K-3
LOCATION: OUTSIDE
RANGE: 10000.00kPa
DEPTH : 743.00m

3) NUMBER : 009772 — ABOVE INTERVAL RECORDER.
TYPE : K-3
LOCATION: INSIDE
RANGE: 13400.00kPa
DEPTH : 727.00m

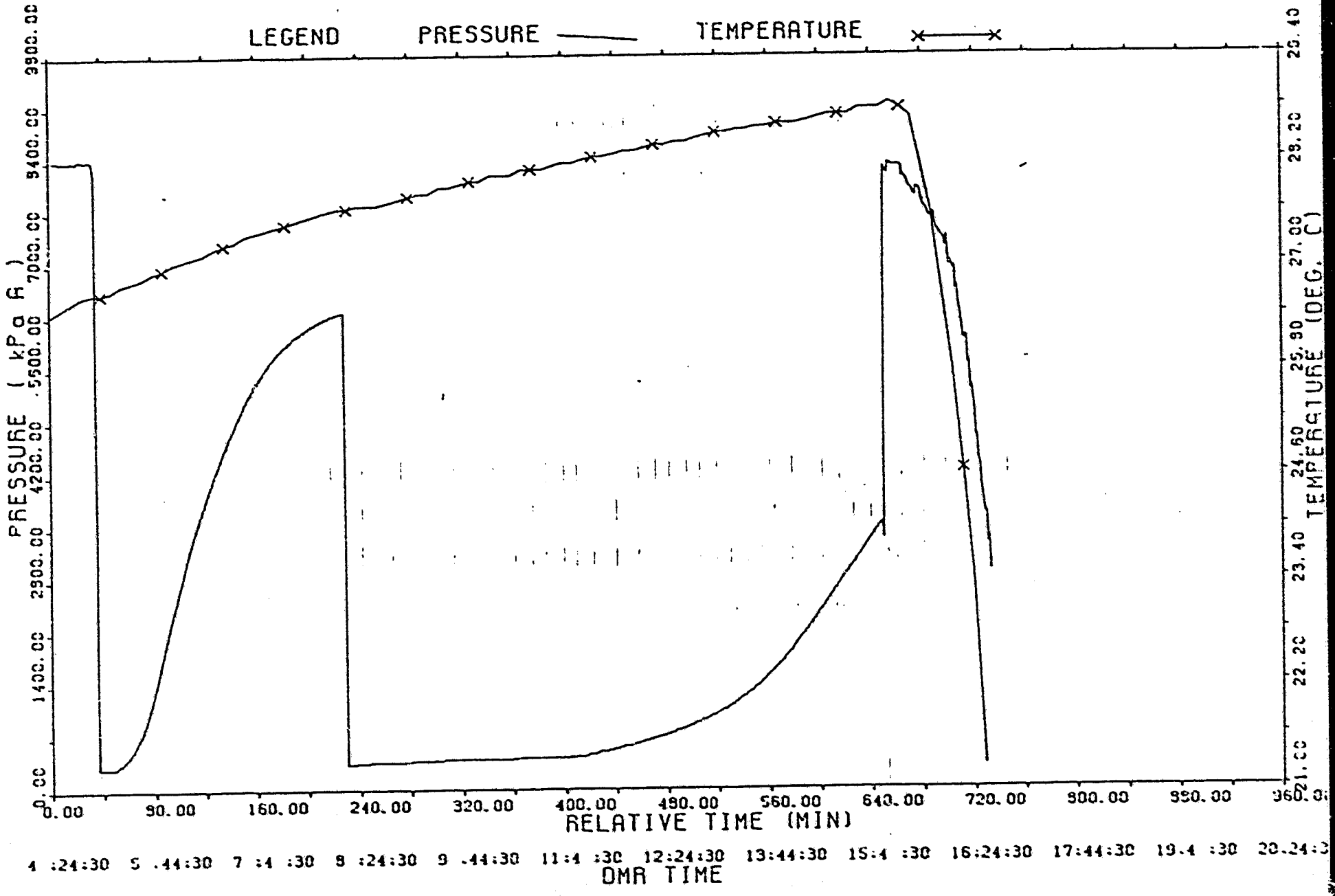
4) NUMBER : 009993 — ABOVE INTERVAL RECORDER.
TYPE : K-3
LOCATION: INSIDE
RANGE: 20300.00kPa
DEPTH : 730.00m

5) NUMBER : 013967
TYPE : K-3
LOCATION: OUTSIDE
RANGE: 20300.00kPa
DEPTH : 743.00m

MUD AND HOLE DATA

Calipered Hole Size @ Test Depth:
Hole Condition at Test Time : GOOD
Hole Conditioned Prior to Test? : YES
Mud Weight : 1120.0 kg/m3
Mud Type : GEL CHEMICAL
Viscosity : 65.0s/l
Water Loss : 7.0cc/s
Filter Cake:
Main Hole Size: 216.00mm
Temperature @743.00m = 28.7C

PCI ET AL HOOSIER RIDGE
65.210 127.34 DST #1
ELECTRONIC GAUGE #1760



DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

PRESSURE RECORDER NUMBER : 001760

DEPTH : 743.00m LOCATION : OUTSIDE
TYPE : DMRB CAPACITY : 68900.00kPa

***** TEMPERATURE AT RECORDER DEPTH = 28.7 C

	PRESSURE kPa
1)Initial Hydro :	8412.
2)1st Flow Start:	293.
3)1st Flow End :	310.
4)END 1st Shutin:	6378.
5)2nd Flow Start:	328.
6)2nd Flow End :	431.
7)END 2nd Shutin:	3568.
14)Final Hydro. :	8308.

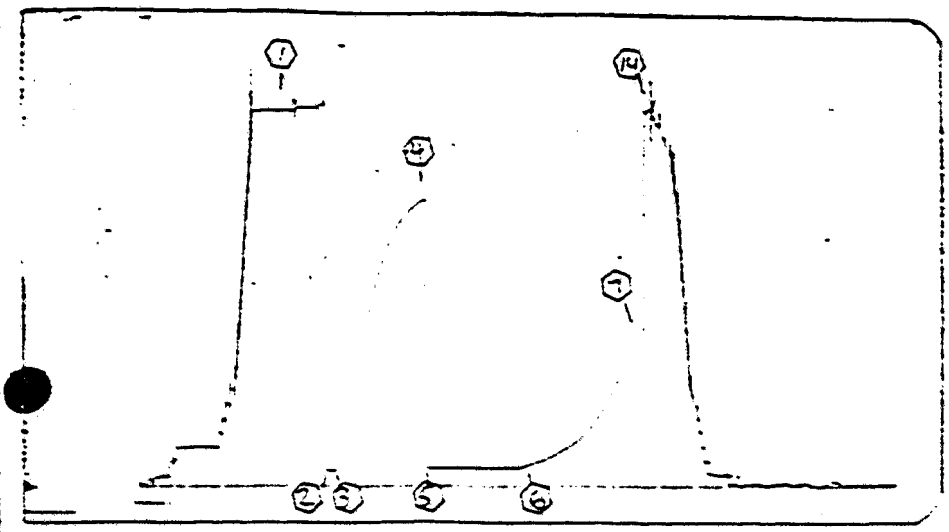
ELECTRONIC GAUGE.
TEMPERATURE AND
PRESSURES.

TEST TIMES(MIN)
1st FLOW : 14.
SHUTIN: 178.
2nd FLOW : 179.
SHUTIN: 240.

PRESSURE RECORDER NUMBER : 005539

DEPTH : 743.00m LOCATION : OUTSIDE
TYPE : K-3 CAPACITY : 10000.00kPa

	PRESSURE kPa
1)Initial Hydro :	8405.
2)1st Flow Start:	353.
3)1st Flow End :	336.
4)END 1st Shutin:	6337.
5)2nd Flow Start:	399.
6)2nd Flow End :	382.
7)END 2nd Shutin:	3499.
14)Final Hydro. :	8295.

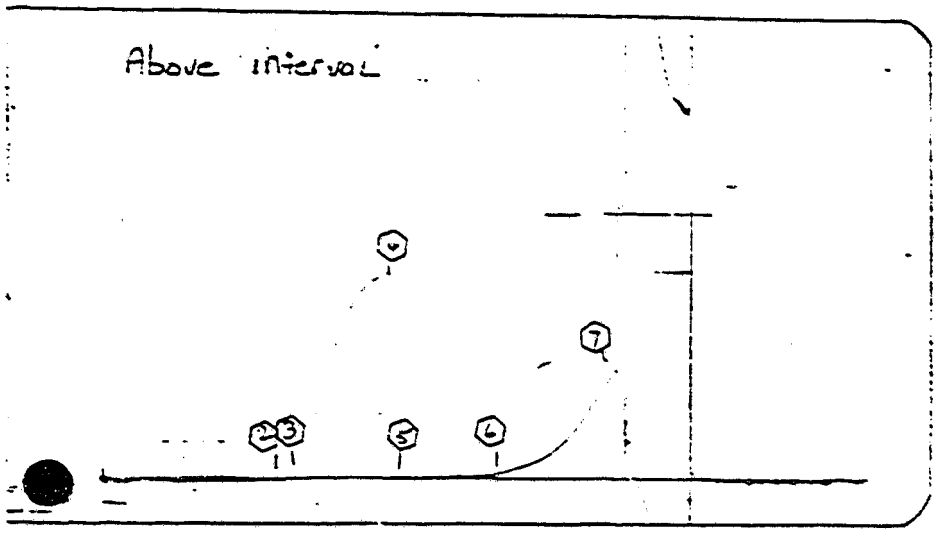


DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

PRESSURE RECORDER NUMBER : 009772

DEPTH : 727.00m LOCATION : INSIDE
TYPE : K-3 CAPACITY : 13403.00kPa

	PRESSURE kPa
1)Initial Hydro :	
2)1st Flow Start:	83.
3)1st Flow End :	83.
4)END 1st Shutin:	6072.
5)2nd Flow Start:	133.
6)2nd Flow End :	155.
7)END 2nd Shutin:	3212.
14)Final Hydro. :	



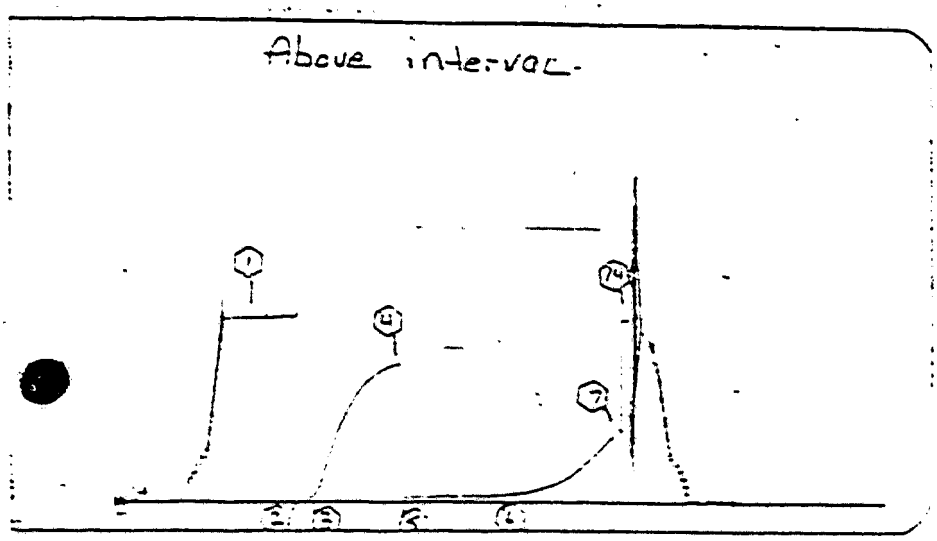
ABOVE INTERVAL
RECORDER.

TEST TIMES(MIN)
1st FLOW : 14.
SHUTIN: 178.
2nd FLOW : 179.
SHUTIN: 240.

PRESSURE RECORDER NUMBER : 009993

DEPTH : 730.00m LOCATION : INSIDE
TYPE : K-3 CAPACITY : 20300.00kPa

	PRESSURE kPa
1)Initial Hydro :	8287.
2)1st Flow Start:	366.
3)1st Flow End :	299.
4)END 1st Shutin:	6166.
5)2nd Flow Start:	291.
6)2nd Flow End :	415.
7)END 2nd Shutin:	3306.
14)Final Hydro. :	8135.



ABOVE INTERVAL
RECORDER.

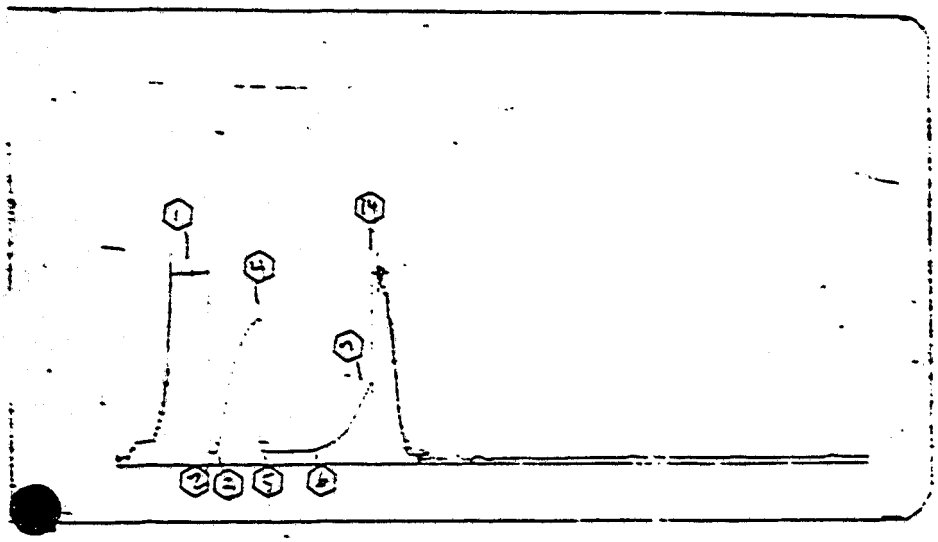
DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

PRESSURE RECORDER NUMBER : 013967

DEPTH : 743.00m
TYPE : K-3

LOCATION : OUTSIDE
CAPACITY : 20300.00kPa

	PRESSURE kPa
1)Initial Hydro :	8403.
2)1st Flow Start:	478.
3)1st Flow End :	453.
4)END 1st Shutin:	6298.
5)2nd Flow Start:	495.
6)2nd Flow End :	470.
7)END 2nd Shutin:	3447.
14)Final Hydro. :	8276.



TEST TIMES(MIN)

1st FLOW	:	14.
SHUTIN	:	178.
2nd FLOW	:	179.
SHUTIN	:	240.

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

OIL ANALYSIS

CONTAINER IDENTITY	Plastic
LABORATORY NUMBER	7022-84-399
OPERATOR	Petro-Canada Inc.
PAGE	1 of 3
LOCATION	65° 21' 56.63" NL 127° 34' 48.65" WL
WELL OR SAMPLE LOCATION	PCI et al Hoosier Ridge N-22
KB ELEV m	
GRD ELEV m	
FIELD OR AREA	
POOL OR ZONE	
SAMPLER	
TEST TYPE & NO.	
TEST RECOVERY	
POINT OF SAMPLE	Swab #9
AMT. & TYPE CUSHION	
MUD RESISTIVITY	@ °C
TEST INTERVALS OR PERFS m	

PUMPING ______ FLOWING ______ GAS LIFT ______ SWAB ______

WATER ______ m³/d OIL ______ m³/d GAS ______ m³/d

PRESSURES, kPa: SEPARATOR ______ RESERVOIR ______ ______ CONTAINER WHEN SAMPLED ______ @ °C CONTAINER WHEN RECEIVED ______ @ °C

TEMPERATURES °C: SEPARATOR ______ ______

DATE SAMPLED (Y/M/D)	DATE RECEIVED (Y/M/D)	DATE ANALYSED (Y/M/D)	ANALYST	REMARKS
	84 04 19	84 04 23	BVF	

SAMPLE PROPERTIES

COLOR OF CLEAN OIL	WATER	BS	TOTAL BS&W
	0.18	0.12	0.30

GRAVITY

SPECIFIC AS RECEIVED	SPECIFIC AFTER CLEANING	A.P.I. @ 15.6°C AS RECEIVED	A.P.I. @ 15.6°C AFTER CLEANING
	0.9659		15.0

POUR POINT

TOTAL SULPHUR MASS FRACTION	TOTAL SALT kg/m³	U.S.B.M.	A.S.T.M.
0.0050	0.278		-15°C

CARBON RESIDUE

R.V.P.	CONRADSON	RAMSBOTTOM

VISCOSITY

TEMP °C	mPa·s	mm²/s	
20	2172	2265	
30	506.3	531.3	
40	281.7	297.8	

DISTILLATION

FRACTION DISTILLED	TEMP °C
CRACKED	

METHOD	ASTM
BAROM. PRESS. kPa OR Hg	
ROOM TEMP. (°C)	
INITIAL BOIL PT. (°C)	

DISTILLATION SUMMARY

204°C NAPHTHA	
274°C KEROSENE	
343°C LIGHT GAS/OIL	
RECOVERED	
RESIDUE	
DISTILLATION LOSS	

SPECIFIC GRAVITY

DISTILLATE	
RESIDUE	

BASE TYPE ______

CHARACTERIZATION FACTOR ______

REMARKS

Distillation not done due to very high foaming tendency.
Residual water in sample analyzed - 0.033 mass fraction.

CORE LABORATORIES - CANADA LTD.

CALGARY, ALBERTA

COMPANY Petro-Canada Inc.
WELL PCI et al Hoosier Ridge N-22
LOCATION 65° 21' 56.63" NL
127° 34' 48.65" WL

FILE 7022-84-399
DATE 1984 04 27

Sampled From: Swab #9

TRACE METAL ANALYSIS

Element	Result
Tin	10 mg/kg
Lead	17
Copper	6
Aluminum	131
Silicon	440
Iron	852
Chromium	2
Silver	Not Detected
Zinc	38
Magnesium	>741
Nickel	4
Barium	101
Sodium	60
Calcium	>3085
Vanadium	8
Phosphorous	15
Molybdenum	Not Detected
Boron	10
Manganese	15

CORE LABORATORIES-CANADA LTD.

COMPANY Petro-Canada Inc.
LOCATION 65° 21' 56.63" NL
SAMPLED FROM 127° 34' 48.65" WL
Swab #9

FILE 7022-84-399
DATE 1984 04 27

Analysis to C30+

Boiling Point Range (C)	Component	Carbon Number	Mole Fraction	Mass Fraction
-161.7	Methane	C1	0.0000	0.0000
- 88.9	Ethane	C2	0.0000	0.0000
- 42.2	Propane	C3	0.0000	0.0000
- 11.7	Iso Butane	C4	0.0000	0.0000
- 0.6	Normal Butane	C4	0.0000	0.0000
27.8	Iso Pentane	C5	0.0000	0.0000
36.1	Normal Pentane	C5	0.0000	0.0000
36.1- 68.9	Hexanes	C6	0.0000	0.0000
68.9- 98.3	Heptanes	C7	0.0003	0.0001
98.3-125.6	Octanes	C8	0.0031	0.0010
125.6-150.6	Nonanes	C9	0.0038	0.0014
150.6-173.9	Decanes	C10	0.0083	0.0035
173.9-196.1	Undecanes	C11	0.0254	0.0117
196.1-215.0	Dodecanes	C12	0.0398	0.0199
215.0-235.0	Tridecanes	C13	0.0555	0.0301
235.0-252.2	Tetradecanes	C14	0.0559	0.0326
252.2-270.6	Pentadecanes	C15	0.0610	0.0381
270.6-287.8	Hexadecanes	C16	0.0575	0.0383
287.8-302.8	Heptadecanes	C17	0.0464	0.0328
302.8-317.2	Octadecanes	C18	0.0564	0.0421
317.2-330.0	Nonadecanes	C19	0.0437	0.0384
330.0-344.4	Eicosanes	C20	0.0395	0.0328
344.4-357.2	Heneicosanes	C21	0.0374	0.0326
357.2-369.4	Docosanes	C22	0.0369	0.0337
369.4-380.0	Tricosanes	C23	0.0390	0.0372
380.0-391.1	Tetracosanes	C24	0.0306	0.0305
391.1-401.7	Pentacosanes	C25	0.0283	0.0293
401.7-412.2	Hexacosanes	C26	0.0255	0.0275
412.2-422.2	Heptacosanes	C27	0.0207	0.0232
422.2-431.7	Octacosanes	C28	0.0227	0.0263
431.7-441.1	Nonacosanes	C29	0.0194	0.0233
441.1 PLUS	Triacontanes Plus	C30+	0.2336	0.4123
	AROMATICS			
80.0	Benzene	C6H6	0.0000	0.0000
110.6	Toluene	C7H8	0.0006	0.0002
136.1-138.9	Ethylbenzene, p + m-Xylene	C8H10	0.0010	0.0003
144.4	o-Xylene	C8H10	0.0007	0.0002
168.9	1,2,4 Trimethylbenzene	C9H12	0.0018	0.0006
	NAPHTHENES			
48.9	Cyclopentane	C5H10	0.0000	0.0000
72.2	Methylcyclopentane	C6H12	0.0000	0.0000
81.1	Cyclohexane	C6H12	0.0000	0.0000
101.1	Methylcyclohexane	C7H14	0.0002	0.0000
	TOTAL		1.0000	1.0000

The above boiling ranges refer to the normal paraffin hydrocarbon boiling in that range. Other hydrocarbons (aromatics, olefins, naphthenes and branched hydrocarbons) may have higher or lower carbon numbers, but are grouped and reported according to their boiling point.

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7021-84-259 — LABORATORY NUMBER

Petro-Canada Exploration Inc. — OPERATOR

1 of 2 — PAGE

65° 21' 56.63" NL
127° 34' 48.65" WL — LOCATION

PCI et al Hoosier Ridge N-22 — WELL OR SAMPLE LOCATION NAME

KB ELEV. — GRD. ELEV.

FIELD OR AREA — POOL OR ZONE — SAMPLER

TEST TYPE & NO. — TEST RECOVERY

Swab Sample — POINT OF SAMPLE — AMT. & TYPE CUSHION — @ °C MUD RESISTIVITY

TEST INTERVALS OR PERFS.

PUMPING — FLOWING — GAS LIFT — SWAB

WATER m³/d — OIL m³/d — GAS m³/d

SEPARATOR — RESERVOIR — @ °C CONTAINER WHEN SAMPLED — @ °C CONTAINER WHEN RECEIVED — SEPARATOR

PRESSURES, kPa — TEMPERATURES, °C

DATE SAMPLED (Y/M/D) — 84 03 24 DATE RECEIVED (Y/M/D) — 84 03 26 DATE ANALYZED (Y/M/D) — ANALYST — REMARKS

ION	mg/L	mg Fraction	MEQ/L
Na	40.	0.0674	1.7
K	2.	0.0034	0.1
Ca	140.	0.2367	7.0
Mg	11.	0.0182	0.9
Ba			
Sr			
Fe	NOT DETECTED		

ION	mg/L	mg Fraction	MEQ/L
Cl	262.	0.4418	7.4
Br			
I			
HCO_3	131.	0.2206	2.1
SO_4	7.	0.0118	0.1
CO_3	0.	0.0000	0.0
OH	0.	0.0000	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS mg/L

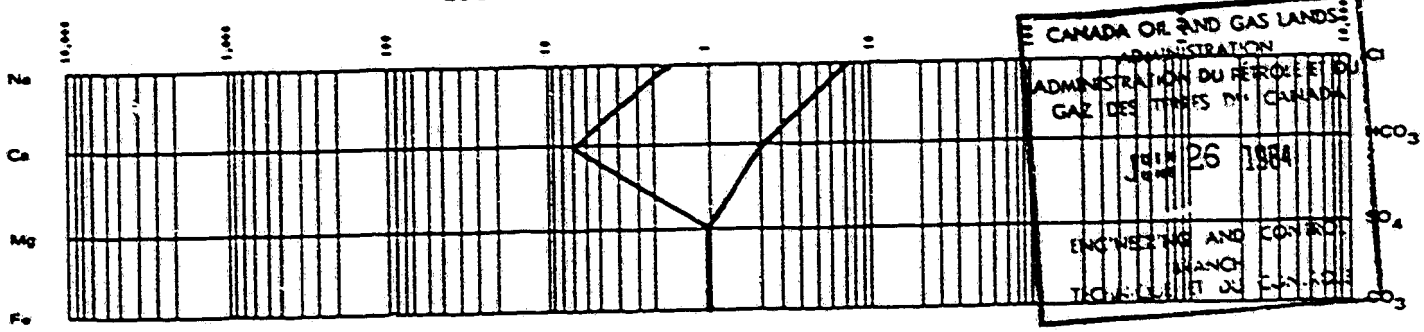
BY EVAPORATION @ 110°C — BY EVAPORATION @ 180°C

AT IGNITION — 593. CALCULATED

1.0000 @ 15.4°C SPECIFIC GRAVITY — 1.3314 @ 22. REFRACTIVE INDEX

6.8 pH — 9.700 @ 25°C RESISTIVITY (OHMS/METERS)

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS NaCl equiv. 498.

FORM NO. 7021-1

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7021-84-259 — LABORATORY NUMBER

Petro-Canada Exploration Inc. — OPERATOR

2 of 2 — PAGE

65° 21' 56.63" WL
127° 34' 48.65" NL — LOCATION

PCI et al Boosier Ridge N-22 — WELL OR SAMPLE LOCATION NAME

KB ELEV. — GND. ELEV.

FIELD OR AREA — POOL OR ZONE — SAMPLER

TEST TYPE & NO. — TEST RECOVERY

Swab Sample — POINT OF SAMPLE — CHT. & TYPE CUSHION — @ °C MUD RESISTIVITY

TEST INTERVALS OR PERFS.

PUMPING — FLOWING — GAS LIFT — SWAB

WATER m³/d — OIL m³/d — GAS m³/d

SEPARATOR — RESERVOIR — @ °C CONTAINER WHEN SAMPLED — @ °C CONTAINER WHEN RECEIVED — SEPARATOR

PRESSURES, kPa — TEMPERATURES, °C

DATE SAMPLED (Y/M/D) — 84 03 23 DATE RECEIVED (Y/M/D) — 84 03 26 DATE ANALYSED (Y/M/D) — ANALYST — REMARKS

ION	mg/L	mg Fraction	MEQ/L
Na	35.	0.0877	1.5
K	2.	0.0050	0.1
Ca	74.	0.1860	3.7
Mg	12.	0.0306	1.0
Ba			
Sr			
Fe	NOT DETECTED		

ION	mg/L	mg Fraction	MEQ/L
Cl	142.	0.3547	4.0
Br			
I			
HCO_3	129.	0.3235	2.1
SO_4	5.	0.0125	0.1
CO_3	0.	0.0000	0.0
OH	0.	0.0000	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS mg/L

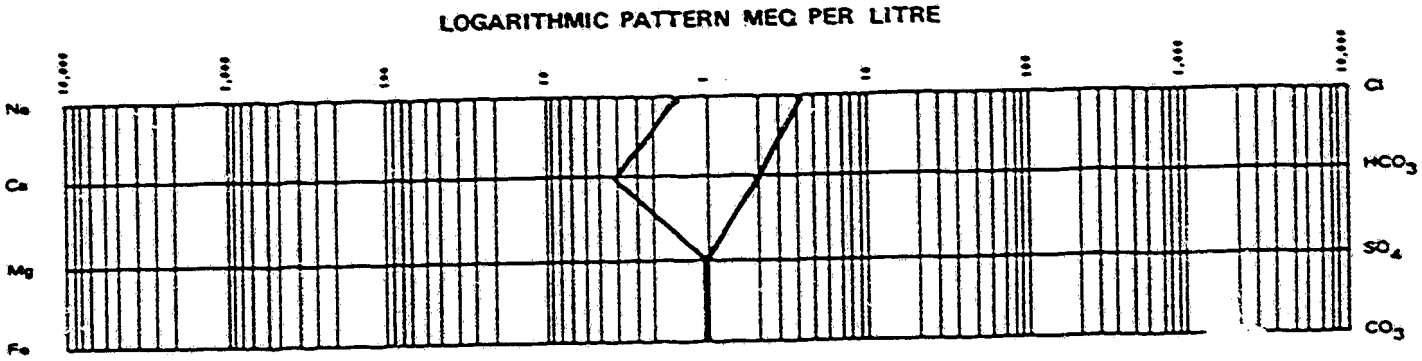
BY EVAPORATION @ 110°C — BY EVAPORATION @ 180°C

AT IGNITION — 399. CALCULATED

1.0000 @ 15.4°C SPECIFIC GRAVITY — 1.3314 @ 22. REFRACTIVE INDEX

6.9 pH — 13.500 @ 25°C RESISTIVITY (OHMS/METERS)

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS NaCl equiv. 311.

FORM NO. 7021-1

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY, ALBERTA

Canada Oil and Gas Lands Administration
Administration du pétrole et du gaz des terres du Canada
APR 6 1984

WATER ANALYSIS

LABORATORY NUMBER: 7021-84-259

PAGE: 1 of 2

CONTAINER IDENTITY: Plastic

OPERATOR: Petro-Canada Exploration Inc.

LOCATION: 65° 21' 56.63" NL 127° 34' 48.65" WL

WELL OR SAMPLE LOCATION: PCI et al Hoosier Ridge N-22

GRD. ELEV.

FIELD OR AREA

POOL OR ZONE: Zone 3

SAMPLER

TEST TYPE & NO.

TEST RECOVERY

MUD RESISTIVITY °C

POINT OF SAMPLE: Swab Sample

ANT. & TYPE CUSHION

PUMPING FLOWING GAS LIFT SWAB

TEST INTERVALS OR PERFS.

WATER m³/d OIL m³/d GAS m³/d

SEPARATOR RESERVOIR

CONTAINER WHEN SAMPLED °C

CONTAINER WHEN RECEIVED °C

SEPARATOR

PRESSURES, kPa

TEMPERATURES, °C

DATE SAMPLED (Y/M/D)

DATE RECEIVED (Y/M/D): 84 03 24

DATE ANALYSED (Y/M/D): 84 03 26

ANALYST

REMARKS

ION	mg/L	mg Fraction	MEQ/L
Na	40.	0.0674	1.7
K	2.	0.0034	0.1
Ca	140.	0.2367	7.0
Mg	11.	0.0182	0.9
Ba			
Sr			
Fe	NOT DETECTED		

ION	mg/L	mg Fraction	MEQ/L
Cl	262.	0.4418	7.4
Br			
I			
HCO_3	131.	0.2206	2.1
SO_4	7.	0.0118	0.1
CO_3	0.	0.0000	0.0
OH	0.	0.0000	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS mg/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

AT IGNITION

CALCULATED: 593.

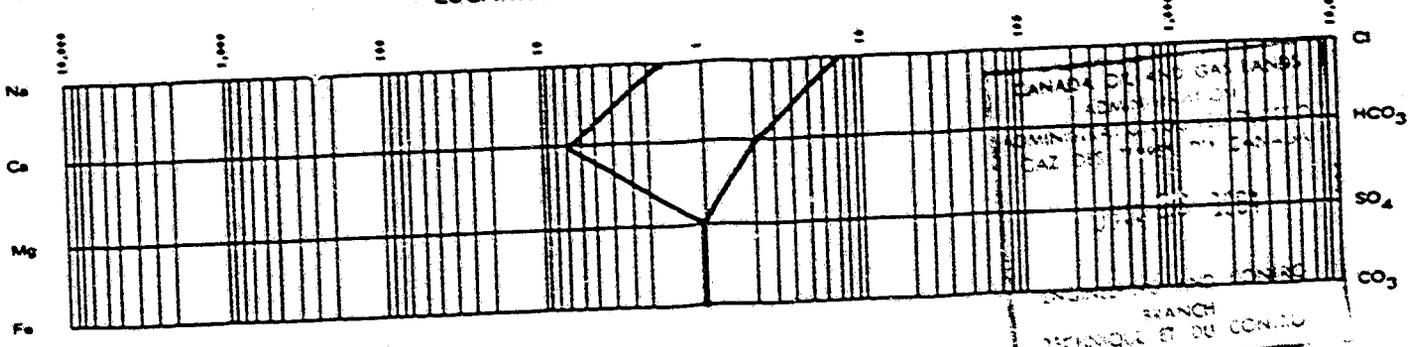
SPECIFIC GRAVITY: 1.0000 @ 15.4°C

REFRACTIVE INDEX: 1.3314 @ 22.

pH: 6.8

RESISTIVITY (OHM/METERS): 9.700 @ 25°C

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS NaCl equiv. 498.

FORM NO. 7021-1

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7021-84-259 — LABORATORY NUMBER

Petro-Canada Exploration Inc. — OPERATOR

2 of 2 — PAGE

65° 21' 56.63" WL
127° 34' 48.65" NL — LOCATION

PCI et al Hoosier Ridge N-22 — WELL OR SAMPLE LOCATION NAME

GR. ELEV. GRD. ELEV.

FIELD OR AREA — POOL OR ZONE — SAMPLER

TEST TYPE & NO. — TEST RECOVERY

Swab Sample — POINT OF SAMPLE — AMT. & TYPE CUSHION — @ °C MUD RESISTIVITY

TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER m³/d OIL m³/d GAS m³/d

SEPARATOR RESERVOIR — @ °C CONTAINER WHEN SAMPLED — @ °C CONTAINER WHEN RECEIVED — SEPARATOR

PRESSURES, kPa — TEMPERATURES, °C

DATE SAMPLED (Y/M/D) — 84 03 23 DATE RECEIVED (Y/M/D) — 84 03 26 DATE ANALYZED (Y/M/D) — ANALYST — REMARKS

ION	mg/L	mg Fraction	MEQ/L
Na	35.	0.0877	1.5
K	2.	0.0050	0.1
Ca	74.	0.1860	3.7
Mg	12.	0.0306	1.0
Ba			
Sr			
Fe	NOT DETECTED		

ION	mg/L	mg Fraction	MEQ/L
Cl	142.	0.3547	4.0
Br			
I			
HCO_3	129.	0.3235	2.1
SO_4	5.	0.0125	0.1
CO_3	0.	0.0000	0.0
OH	0.	0.0000	0.0
H_2S	NOT DETECTED		

TOTAL SOLIDS mg/L

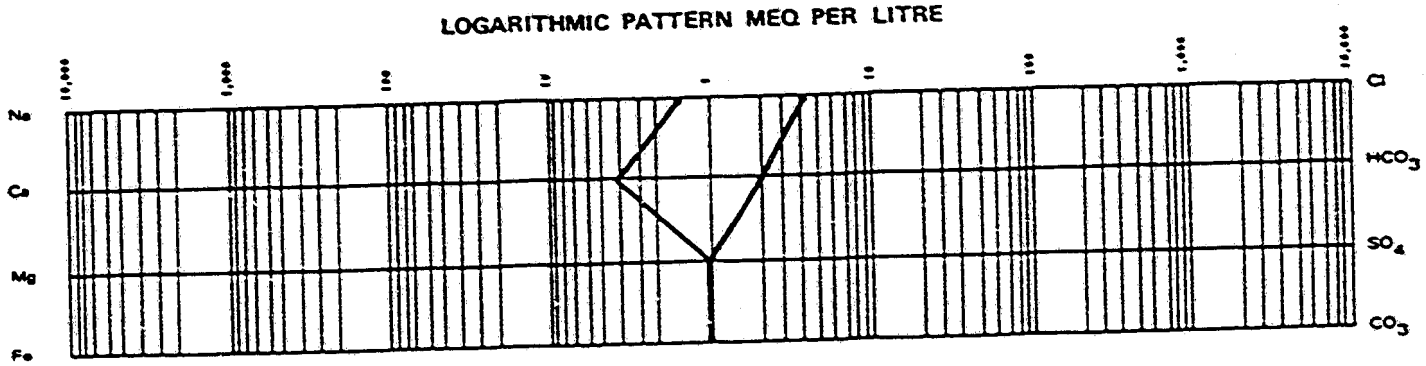
BY EVAPORATION @ 110°C — BY EVAPORATION @ 180°C

AT IGNITION — 399. CALCULATED

1.0000 @ 15.4°C SPECIFIC GRAVITY — 1.3314 @ 22. REFRACTIVE INDEX

6.9 pH — 13.500 @ 25°C RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS NaCl equiv. 311.

FORM NO. 7021-1

Ottawa

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7021-84-334 — LABORATORY NUMBER

Petro-Canada Inc. — OPERATOR

1 of 2 — PAGE

LOCATION

PCI Hoosier Ridge N-22 — WELL OR SAMPLE LOCATION NAME

KB ELEV. GRD. ELEV.

FIELD OR AREA

POOL OR ZONE

SAMPLER

TEST TYPE & NO.

TEST RECOVERY

Swabbed Water — POINT OF SAMPLE

AMT. & TYPE CUSHION

@ °C — MUD RESISTIVITY

#9 — TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER m³/d OIL m³/d GAS m³/d

SEPARATOR RESERVOIR

@ °C — CONTAINER WHEN SAMPLED

@ °C — CONTAINER WHEN RECEIVED

SEPARATOR

PRESSURES, kPa

TEMPERATURES, °C

DATE SAMPLED (Y/M/D)

84 04 18 — DATE RECEIVED (Y/M/D)

84 04 18 — DATE ANALYSED (Y/M/D)

LS — ANALYST

REMARKS

ION	mg/L	mg Fraction	MEQ/L
Na	1168.	0.0816	50.8
K	28.	0.0020	0.7
Ca	3775.	0.2636	188.4
Mg	135.	0.0094	11.1
Ba			
Sr			
Fe		TRACE	

ION	mg/L	mg Fraction	MEQ/L
Cl	8308.	0.5801	234.3
Br			
I			
HCO_3	906.	0.0632	14.8
SO_4	2.	0.0001	0.0
CO_3	0.	0.0000	0.0
OH	0.	0.0000	0.0
H_2S	NOT	DETECTED	

TOTAL SOLIDS mg/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

AT IGNITION

14321. — CALCULATED

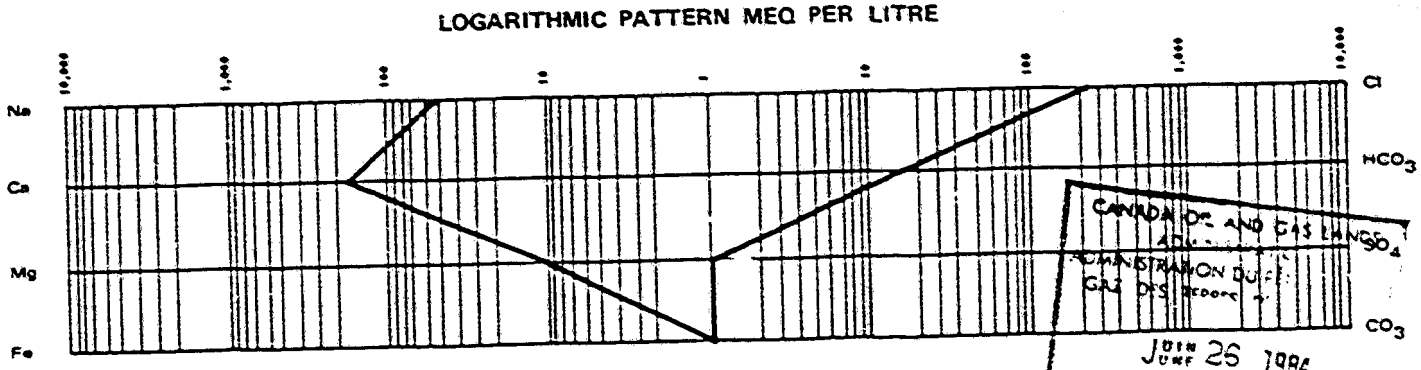
1.0112 @ 15.4°C — SPECIFIC GRAVITY

1.3346 @ 22. — REFRACTIVE INDEX

6.3 — pH

0.430 @ 25°C — RESISTIVITY (OHM/METERS)

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS NaCl equiv. 13606.

FORM NO. 7021-1

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY ALBERTA

WATER ANALYSIS

Plastic — CONTAINER IDENTITY

7021-84-334 — LABORATORY NUMBER

Petro-Canada Inc. — OPERATOR

2 of 2 — PAGE

LOCATION

PCI Hoosier Ridge N-22 — WELL OR SAMPLE LOCATION NAME

KB ELEV. GND. ELEV.

FIELD OR AREA

POOL OR ZONE

SAMPLER

TEST TYPE & NO.

TEST RECOVERY

Swab #10 — FORM OF SAMPLE

AMT. & TYPE CUSHION

@ °C — MUD RESISTIVITY

TEST INTERVALS OR PERFS.

PUMPING FLOWING GAS LIFT SWAB

WATER m^3/d OIL m^3/d GAS m^3/d

SEPARATOR RESERVOIR

@ °C CONTAINER WHEN SAMPLED

@ °C CONTAINER WHEN RECEIVED

PRESSURES, kPa

SEPARATOR

TEMPERATURES, °C

DATE SAMPLED (Y/M/D)

84 04 18 DATE RECEIVED (Y/M/D)

84 04 19 DATE ANALYSED (Y/M/D)

LS ANALYST

REMARKS

ION	mg/L	mg Fraction	MEQ/L
Na	213.	0.0323	9.3
K	10.	0.0015	0.3
Ca	2115.	0.3209	105.5
Mg	9.	0.0014	0.7
Ba			
Sr			
Fe		PRESENT	

ION	mg/L	mg Fraction	MEQ/L
Cl	3810.	0.5782	107.5
Br			
I			
HCO_3	413.	0.0627	6.8
SO_4	20.	0.0030	0.4
CO_3	0.	0.0000	0.0
OH	0.	0.0000	0.0
H_2S	NOT	DETECTED	

TOTAL SOLIDS mg/L

BY EVAPORATION @ 110°C

BY EVAPORATION @ 180°C

AT IGNITION

6589. CALCULATED

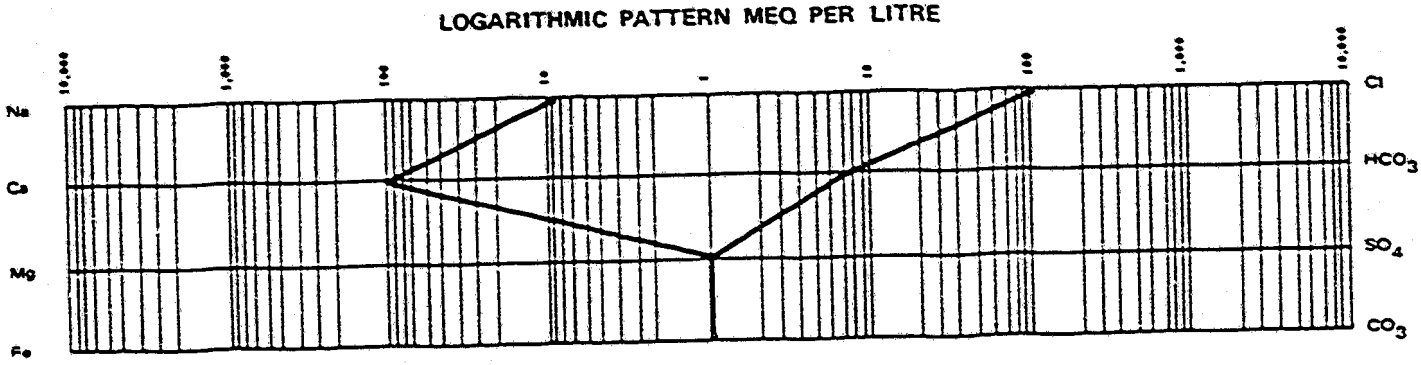
1.0050 @ 15.4°C SPECIFIC GRAVITY

1.3330 @ 22. REFRACTIVE INDEX

6.1 pH

0.950 @ 25°C RESISTIVITY (OHMS/METERS)

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS NaCl equiv. 6181.

FORM NO. 7021-1

REF#:C-70-999-67076-66

TEST DATE: 84/02/19

LAT: 65° 21' 56.6 "
LONG: 127° 34' 48.7 "

PCI ET AL HOOSIER RIDGE N-22
400/ 65.210 / 127.340 /00
DST#01
739.00m to 757.00m
KEE SCARP

DEPTH: 743.00m

RECORDER # 001760

	PRESSURE kPa
1)Initial Hydro :	8412.
2)1st Flow Start:	293.
3)1st Flow End :	310.
4)END 1st Shutin:	6378.
5)2nd Flow Start:	328.
6)2nd Flow End :	431.
7)END 2nd Shutin:	3568.
14)Final Hydro. :	8308.

TEST TIMES(MIN)	
1stFLOW :	14.
SHUTIN:	178.
2ndFLOW :	179.
SHUTIN:	240.

RECOVERY DATA

THIS IS A CLOSED CHAMBER TEST. TOTAL FLUID RECOVERY CONSISTS OF 3.66 M OF SLIGHTLY OIL FLECKED DRILLING MUD.

REMARKS AND TEST SUMMARY

Test results indicate a mechanically successful test. Bottom hole pressures and the shape of the shut-in curves suggest RELATIVELY LOW PERMEABILITY within the interval tested. Electronic DMR recorder #1760 - pressures are recorded in kPa(a); increments for this recorder are included. Recorder #9772 - was run between the shut-in tool and the above hydraulic tool, therefore does not record hydrostatic pressures, only flows and shut-in data. The initial and final shut-in curves were incremented but not extrapolated due to insufficient curve development.

TABLE OF CONTENTS

LYNES UNITED SERVICES LTD
DST#01 REPORT

Well name : PCI ET AL HOOSIER RIDGE N-22
Location : 400/ 65.210 / 127.340 /00
Interval : 739.00m to 757.00m
Test Date : 84/02/19
Test Type : DUAL CONVENTIONAL BOTTOM HOLE
Formation : KEE SCARP

K.B.Elevation : 160.33m
Grd.Elevation : 154.13m
TD @ test Date: 757.00m
Ticket Number : 67076
Unit Number :

Started in hole at : 2345 hrs
Tool opened at : 0456 hrs
Reverse circulated?: NO
Contractor & Rig No: ATCO #76
Lynes#1 : 1 of 1 on the same trip.

Operator: PETRO-CANADA INC.
ROOM 937 WEST
150 - 6TH AVE. S.W.
CALGARY ALBERTA
T2P3E3

Company Rep : WALSH P
Testers : MARSHALL L

12 REPORTS(S) TO: STEVE BENKO
Company:

BLOW DESCRIPTION

Closed chamber run by Dyna Well.

TOTAL LIQUID RECOVERY : 3.66m

For DST# 1 through DST# 1

2 Fluid Samples
Sent to: KEPT ON LOCATION

3.66m SLIGHTLY OIL FLECKED DRILLING MUD.

GAS MEASUREMENTS

No Gas Measurements

DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

TOOL SEQUENCE

SUB	LENGTH (m)
PUMP OUT SUB	.33
CROSS OVER SUB	.30
SHUT-IN TOOL	2.58
BTM. HOLE SAMPLER	1.03
INSIDE RECORDER	1.38
HYDRAULIC TOOL	1.50
INSIDE RECORDER	1.38
HYDRAULIC JARS	2.25
SAFETY JOINT	.65
TOP CONV. PACKER	2.43
TOP CONV. PACKER	2.28
TOP CONV. PACKER	1.24
PACKER STICK DOWN	1.04
PERFORATED SPACING	1.53
PERFORATED SPACING	1.53
RECORDER CARRIER	2.06
SPACING	1.24
CROSS OVER SUB	.33
DRILL COLLAR	9.54
CROSS OVER SUB	.33
BULL NOSE	.40
******** TOOL TOTAL	35.35
DRILL COLLARS ID= 72.0mm:	171.48
ID= :	
DRILL PIPE OD=114.3mm:	554.41
OD= :	
COLLAR-PIPE TOTAL	725.89

STICK UP ABOVE TABLE : 4.24
TOOL ABOVE INTERVAL : 17.35
TOTAL INTERVAL : 18.00
BOTTOM CHOKE SIZE: 25.40 mm

RECORDER SUMMARY

1) NUMBER : 001760 — ELECTRONIC GAUGE. TEMPERATURE AND PRESSURES.
TYPE : DMRB
LOCATION: OUTSIDE
RANGE: 68900.00kPa
DEPTH : 743.00m

2) NUMBER : 005539
TYPE : K-3
LOCATION: OUTSIDE
RANGE: 10000.00kPa
DEPTH : 743.00m

3) NUMBER : 009772 — ABOVE INTERVAL RECORDER.
TYPE : K-3
LOCATION: INSIDE
RANGE: 13400.00kPa
DEPTH : 727.00m

4) NUMBER : 009993 — ABOVE INTERVAL RECORDER.
TYPE : K-3
LOCATION: INSIDE
RANGE: 20300.00kPa
DEPTH : 730.00m

5) NUMBER : 013967
TYPE : K-3
LOCATION: OUTSIDE
RANGE: 20300.00kPa
DEPTH : 743.00m

MUD AND HOLE DATA

Calipered Hole Size @ Test Depth:
Hole Condition at Test Time : GOOD
Hole Conditioned Prior to Test? : YES
Mud Weight : 1120.0 kg/m3
Mud Type : GEL CHEMICAL
Viscosity : 65.0s/l

Water Loss : 7.0cc/s
Filter Cake:
Main Hole Size: 216.00mm
Temperature @743.00m = 28.7C

DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00 m to 757.00 m

Location: 400/ 65.210 / 127.340 /00
Test Type: DUAL CONVENTIONAL BOTTOM HOLE
Formation: KEE SCARP

Recorder Number: 001760
Recorder Depth: 743.00 m
Subsea* Depth: -582.67 m

TIME-PRESSURE LISTING

CHART LABEL	COMMENTS	TIME MIN.	DELTA P kPa	PRESSURE kPa	(T+dt)/dt ABSCISSA
1	INITIAL HYDROSTATIC			8412	
2	START OF 1st FLOW	0.0		293	
		1.		293	
		2.		293	
		3.		293	
		5.		293	
		6.		293	
		7.		293	
		8.		293	
		9.		293	
		10.		293	
		11.		293	
		13.		293	
3	END OF 1st FLOW	14.		310	
	1st SHUTIN PERIOD	0.0		310	
		5.	69	379	3.8000
		11.	190	500	2.2727
		17.	362	672	1.8235
		23.	603	914	1.6087
		28.	896	1207	1.5000
		34.	1293	1603	1.4118
		40.	1724	2034	1.3500
		45.	2068	2379	1.3111
		51.	2465	2775	1.2745
		57.	2844	3154	1.2456
		63.	3189	3459	1.2222
		68.	3465	3775	1.2059
		74.	3758	4068	1.1892
		80.	4016	4326	1.1750
		85.	4223	4533	1.1647
		91.	4464	4775	1.1538
		97.	4688	4999	1.1443

* VALUES USED FOR EXTRAPOLATIONS

DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00 m to 757.00 m

Location: 400/ 65.210 / 127.340 /00
Test Type: DUAL CONVENTIONAL BOTTOM HOLE
Formation: KEE SCARP

Recorder Number: 001760
Recorder Depth: 743.00 m
Subsea Depth: -582.67 m

TIME-PRESSURE LISTING

CHART LABEL	COMMENTS	TIME MIN.	DELTA P kPa	PRESSURE kPa	(T+dt)/dt ABSCISSA
		103.	4895	5206	1.1359
		108.	5050	5361	1.1296
		114.	5223	5533	1.1228
		120.	5361	5671	1.1167
		125.	5464	5774	1.1120
		131.	5585	5895	1.1069
		137.	5671	5981	1.1022
		143.	5757	6067	1.0979
		148.	5809	6119	1.0946
		154.	5878	6188	1.0909
		160.	5929	6240	1.0875
		165.	5981	6291	1.0848
		171.	6016	6326	1.0819
		177.	6050	6360	1.0791
4	END OF 1st SHUTIN	178.	6067	6378	1.0787
5	START OF 2nd FLOW	0.0		328	
		11.		345	
		21.		362	
		31.		362	
		41.		362	
		52.		379	
		62.		379	
		72.		379	
		83.		396	
		93.		396	
		103.		396	
		113.		396	
		124.		396	
		134.		414	
		144.		414	
		155.		414	
		165.		431	
		175.		431	
6	END OF 2nd FLOW	179.		431	

* VALUES USED FOR EXTRAPOLATIONS

DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00 m to 757.00 m

Location: 400/ 65.210 / 127.340 /00
Test Type: DUAL CONVENTIONAL BOTTOM HOLE
Formation: KEE SCARP

Recorder Number: 001760
Recorder Depth: 743.00 m
Subsea Depth: -582.67 m

TIME-PRESSURE LISTING

CHART LABEL	COMMENTS	TIME MIN.	DELTA P kPa	PRESSURE kPa	(T+dt)/dt ABSCISSA
	2nd SHUTIN PERIOD	0.0		431	
		6.	0	431	33.1667
		13.	34	465	15.8462
		20.	69	500	10.6500
		27.	86	517	8.1481
		34.	121	552	6.6765
		41.	138	569	5.7073
		48.	172	603	5.0208
		54.	207	638	4.5741
		61.	241	672	4.1639
		68.	276	707	3.8382
		75.	310	741	3.5733
		82.	362	793	3.3537
		89.	414	845	3.1685
		96.	448	879	3.0104
		102.	500	931	2.8922
		109.	552	983	2.7706
		116.	621	1051	2.6638
		123.	689	1120	2.5691
		130.	776	1207	2.4846
		137.	862	1293	2.4088
		144.	965	1396	2.3403
		150.	1069	1500	2.2867
		157.	1189	1620	2.2293
		164.	1327	1758	2.1768
		171.	1465	1896	2.1287
		178.	1620	2051	2.0843
		185.	1793	2224	2.0432
		192.	1948	2379	2.0052
		198.	2103	2534	1.9747
		205.	2275	2706	1.9415
		212.	2448	2879	1.9104
		219.	2620	3051	1.8813
		226.	2792	3223	1.8540
		233.	2965	3396	1.8283

* VALUES USED FOR EXTRAPOLATIONS

DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00 m to 757.00 m

Location: 400/ 65.210 / 127.340 /00
Test Type: DUAL CONVENTIONAL BOTTOM HOLE
Formation: KEE SCARP

Recorder Number: 001760
Recorder Depth: 743.00 m
Subsea Depth: -582.67 m

TIME-PRESSURE LISTING

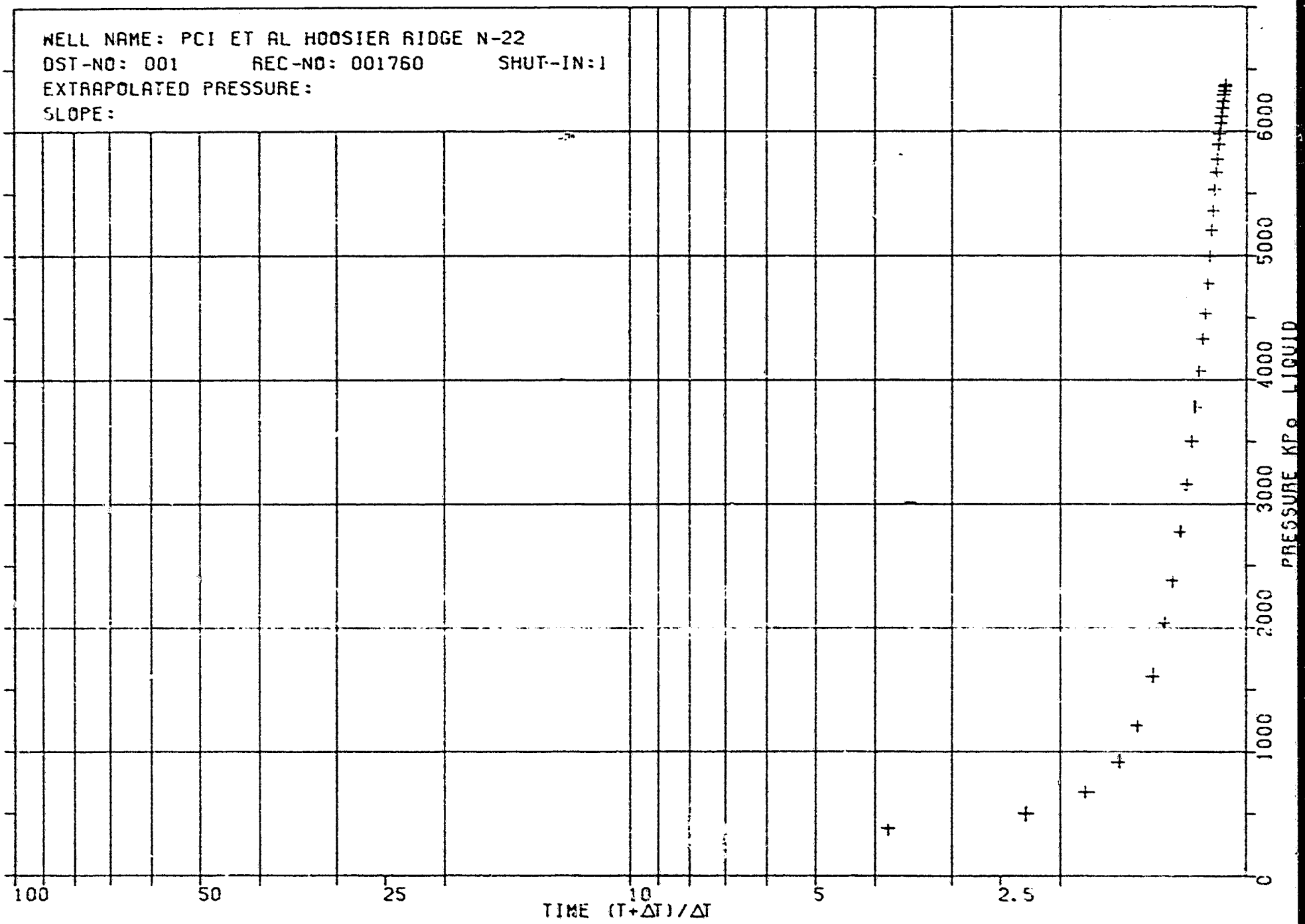
CHART LABEL	COMMENTS	TIME MIN.	DELTA P kPa	PRESSURE kPa	(T+dt)/dt ABSCISSA
7	END OF 2nd SHUTIN	240.	3137	3568	1.8042
14	FINAL HYDROSTATIC			8308	1

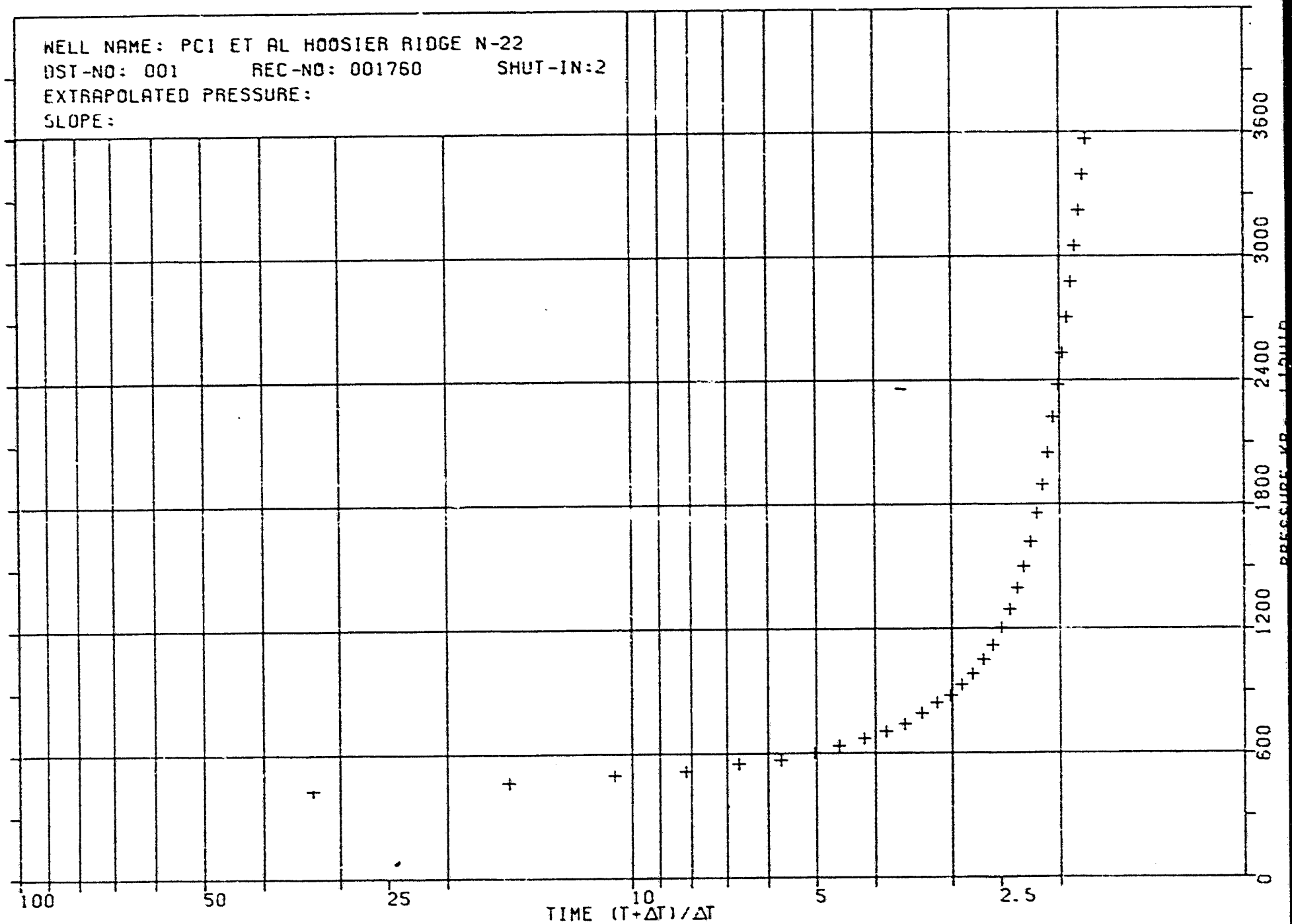
* VALUES USED FOR EXTRAPOLATIONS

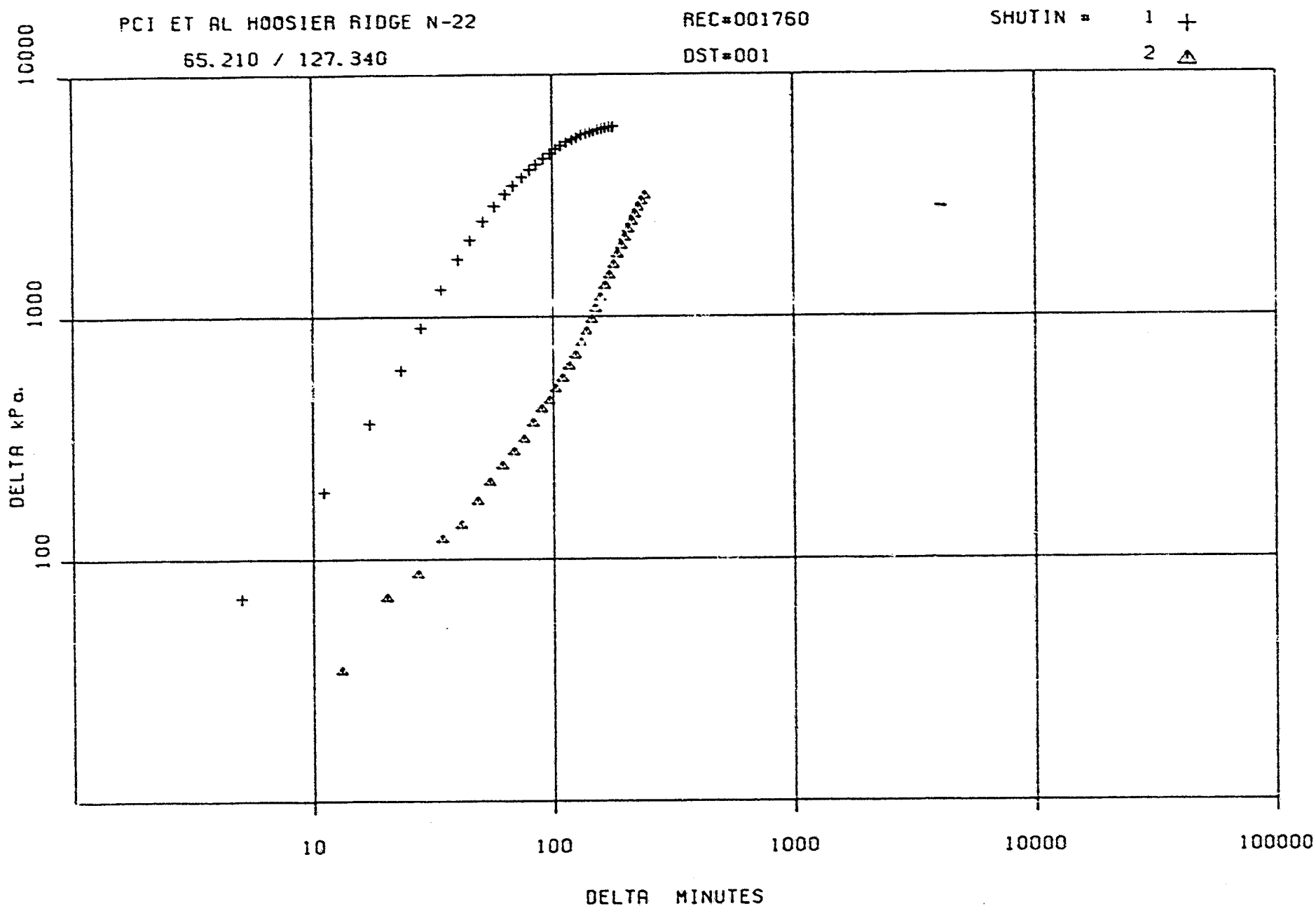
1st SHUT-IN
HORNER EXTRAPOLATION .00 kPa
HORNER SLOPE .00000 kPa/cycle

2nd SHUT-IN
HORNER EXTRAPOLATION .00 kPa
HORNER SLOPE .00000 kPa/cycle

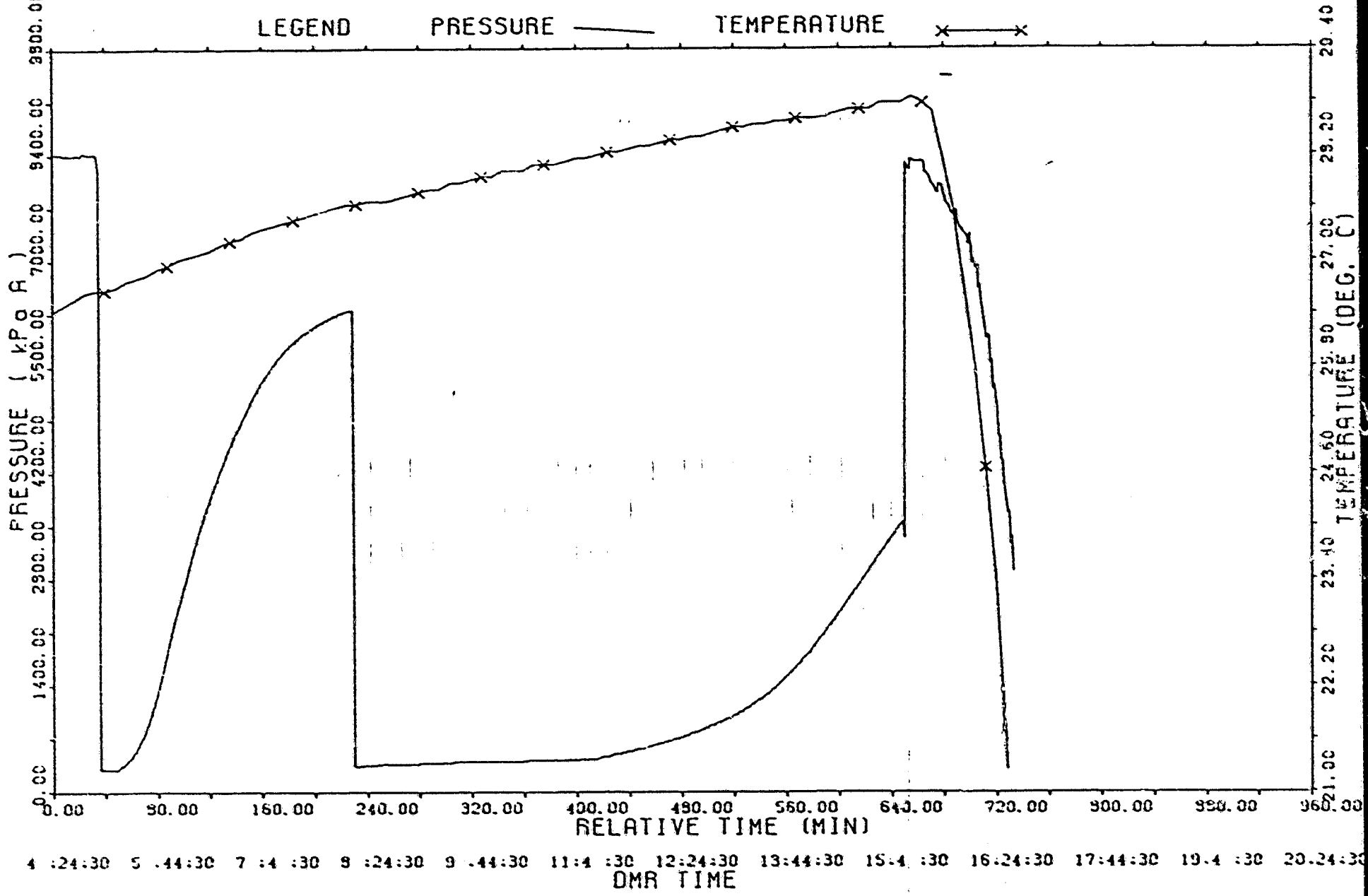
WELL NAME: PCI ET AL HOOSIER RIDGE N-22
DST-NO: 001 REC-NO: 001760 SHUT-IN:1
EXTRAPOLATED PRESSURE:
SLOPE:




WELL NAME: PCI ET AL HOOSIER RIDGE N-22
DST-NO: 001 REC-NO: 001760 SHUT-IN:2
EXTRAPOLATED PRESSURE:
SLOPE:
100
50
25
10
5
2.5
TIME (T+ΔT)/ΔT
0
600
1200
1800
2400
3000
3600


PCI ET AL HOOSIER RIDGE N-22
65.210 / 127.340
REC=001760
DST=001
SHUTIN = 1 +
2 △
10000
1000
100
DELTA kPa.
10
100
1000
10000
100000
DELTA MINUTES

PCI ET AL HOOSIER RIDGE
65.210 127.34 DST #1
ELECTRONIC GAUGE #1760



DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

PRESSURE RECORDER NUMBER : 001760

DEPTH : 743.00m LOCATION : OUTSIDE
TYPE : DMRB CAPACITY : 68900.00kPa

***** TEMPERATURE AT RECORDER DEPTH = 28.7 C

	PRESSURE kPa
1)Initial Hydro :	8412.
2)1st Flow Start:	293.
3)1st Flow End :	310.
4)END 1st Shutin:	6378.
5)2nd Flow Start:	328.
6)2nd Flow End :	431.
7)END 2nd Shutin:	3568.
14)Final Hydro. :	8308.

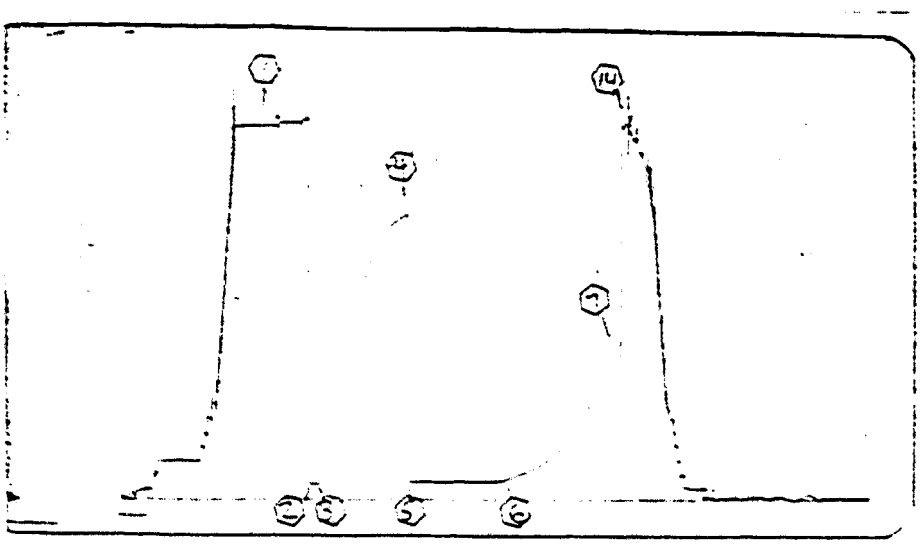
ELECTRONIC GAUGE.
TEMPERATURE AND
PRESSURES.

TEST TIMES(MIN)	
1st FLOW :	14.
SHUTIN:	178.
2nd FLOW :	179.
SHUTIN:	240.

PRESSURE RECORDER NUMBER : 005539

DEPTH : 743.00m LOCATION : OUTSIDE
TYPE : K-3 CAPACITY : 10000.00kPa

	PRESSURE kPa
1)Initial Hydro :	8405.
2)1st Flow Start:	353.
3)1st Flow End :	336.
4)END 1st Shutin:	6337.
5)2nd Flow Start:	399.
6)2nd Flow End :	382.
7)END 2nd Shutin:	3499.
14)Final Hydro. :	8295.

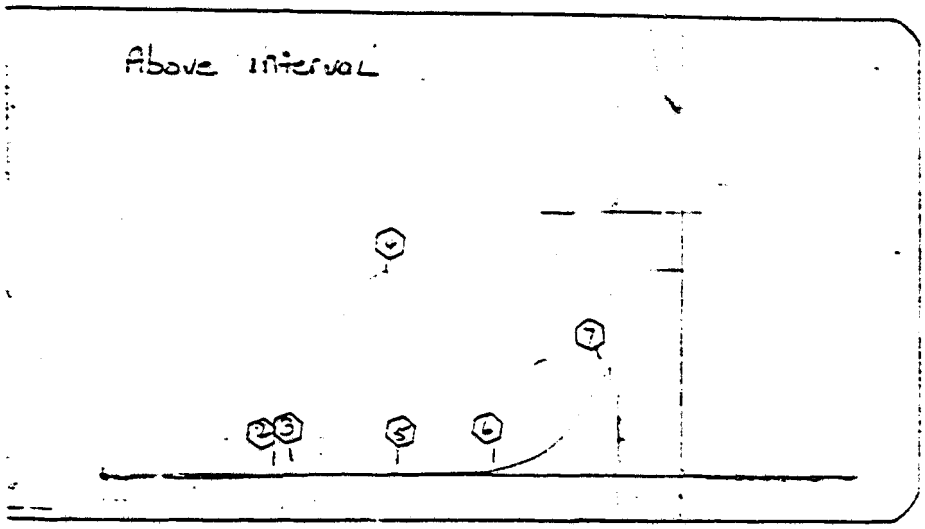


DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

PRESSURE RECORDER NUMBER : 009772

DEPTH : 727.00m LOCATION : INSIDE
TYPE : K-3 CAPACITY : 13403.00kPa

	PRESSURE kPa
1)Initial Hydro :	
2)1st Flow Start:	83.
3)1st Flow End :	83.
4)END 1st Shutin:	6072.
5)2nd Flow Start:	133.
6)2nd Flow End :	155.
7)END 2nd Shutin:	3212.
14)Final Hydro. :	



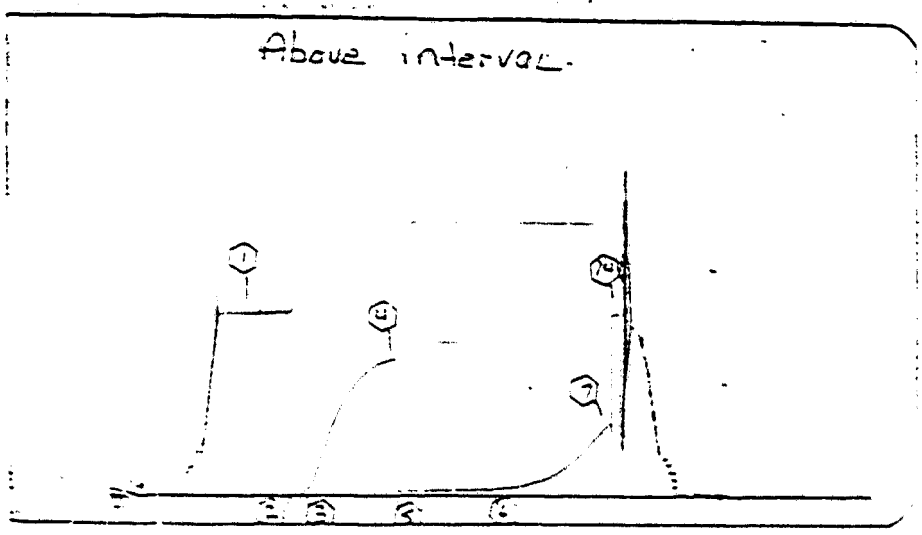
ABOVE INTERVAL
RECORDER.

TEST TIMES(MIN)
1st FLOW : 14.
SHUTIN: 178.
2nd FLOW : 179.
SHUTIN: 240.

PRESSURE RECORDER NUMBER : 009993

DEPTH : 730.00m LOCATION : INSIDE
TYPE : K-3 CAPACITY : 20300.00kPa

	PRESSURE kPa
1)Initial Hydro :	8287.
2)1st Flow Start:	366.
3)1st Flow End :	299.
4)END 1st Shutin:	6166.
5)2nd Flow Start:	291.
6)2nd Flow End :	415.
7)END 2nd Shutin:	3306.
14)Final Hydro. :	8135.



ABOVE INTERVAL
RECORDER.

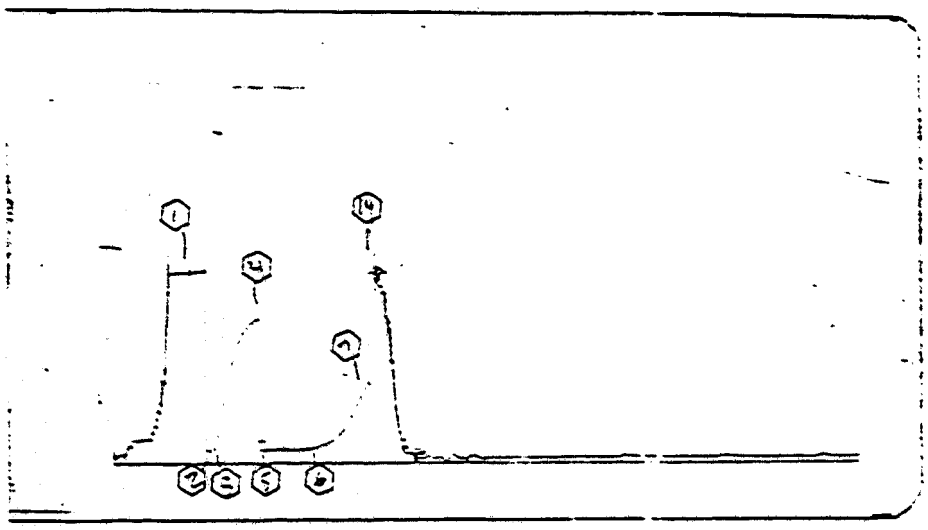
DST#01
PCI ET AL HOOSIER RIDGE N-22
739.00m to 757.00m

PRESSURE RECORDER NUMBER : 013967

DEPTH : 743.00m
TYPE : K-3

LOCATION : OUTSIDE
CAPACITY : 20300.00kPa

	PRESSURE kPa
1)Initial Hydro :	8403.
2)1st Flow Start:	478.
3)1st Flow End :	453.
4)END 1st Shutin:	6298.
5)2nd Flow Start:	495.
6)2nd Flow End :	470.
7)END 2nd Shutin:	3447.
14)Final Hydro. :	8276.



TEST TIMES(MIN)

1st FLOW	:	14.
SHUTIN:		178.
2nd FLOW	:	179.
SHUTIN:		240.

CORE LABORATORIES - CANADA, LTD.

Petroleum Reservoir Engineering

CORE ANALYSIS

PETRO-CANADA INC.
PCI ET AL HOOSIER RIDGE N-22
HOOSIER RIDGE, NORTHWEST TERRITORY
65 21'56.63" N LAT. 127 34'48.65" W LONG.
84-02-18

CORE LABORATORIES - CANADA, LTD.

COMPANY PETRO-CANADA INC.
WELL PCI ET AL HOOSIER RIDGE N-22
FIELD HOOSIER RIDGE, NORTHWEST TERRITORY
LOCATION 65 21'56.63" N LAT. 127 34'48.65" W LONG.

FORMATION KEYSCARP
CORING EQUIPMENT DIAMOND
CORE DIAMETER.(mm) 88
CORING FLUID WATER BASE MUD

PAGE 1
FILE 7004-84-201
DATE 84-02-18
ANALYSTS RP

FULL DIAMETER ANALYSIS

Sample Number	Depth Metres (m)	m Rep.	Sample Length	Permeability to Air Millidarcys mD Max.	mD 90 des.	mD V	Perm. X m	Porosity	Porosity X m	Density kg/m3 Bulk	Grain	Residual Saturation (Frac of Pore Vol) Oil	Water	VISUAL EXAMINATION
	CORE NO. 1 739.00 m - 748.00 (core received 9.20 m) (7 Boxes)													
SP 1	739.00-39.13	0.13		2.25	-	-	0.290	0.109	0.014	-	2700	0.449	0.219	ls i
2	739.13-39.39	0.26	.21	1.88	0.96	1.71	0.489	0.109	0.028	2410	2700	0.558	0.113	ls i foss vfrac
3	739.39-39.61	0.22	.13	0.63	0.39	0.36	0.139	0.081	0.018	2480	2700	0.568	0.099	ls i foss frac
-	739.61-40.15	0.54	-	-	-	-	-	-	-	-	-	-	-	ls
SP 4	740.15-40.30	0.15	-	0.16	-	-	0.024	0.028	0.004	-	2690	0.469	0.115	ls i sty
5	740.30-40.46	0.16	.09	0.57	0.25	0.18	0.091	0.058	0.009	2540	2700	0.581	0.069	ls i foss vfrac
6	740.46-40.83	0.37	.14	0.84	0.37	0.20	0.311	0.062	0.023	2530	2700	0.557	0.065	ls i foss sty frac
7	740.83-41.18	0.35	.18	1.00	0.91	0.14	0.350	0.071	0.025	2510	2700	0.702	0.076	ls i foss sty frac
8	741.18-41.54	0.36	.20	3.31	0.74	1.70	1.192	0.085	0.031	2470	2700	0.416	0.066	ls i foss sty vfrac
9	741.54-41.86	0.32	.13	*	1.41	*	0.451	0.131	0.042	2350	2700	0.442	0.129	ls i foss vfrac
10	741.86-42.10	0.24	.15	2.62	0.80	0.59	0.629	0.074	0.018	2500	2700	0.592	0.100	ls i foss vfrac
SP 11	742.10-42.24	0.14	-	2.26	-	-	0.316	0.131	0.018	-	2700	0.509	0.173	ls i
12	742.24-42.60	0.36	.10	10.0	2.85	8.27	3.600	0.167	0.060	2250	2700	0.470	0.062	ls i foss vfrac
13	742.60-42.85	0.25	.09	132.	1.38	**	33.003	0.121	0.030	2370	2690	0.575	0.136	ls i vfrac
14	742.85-43.29	0.44	.19	6.31	3.70	7.49	2.777	0.117	0.051	2380	2700	0.519	0.138	ls i sty vfrac
15	743.29-43.87	0.58	.13	*	3.75	*	2.175	0.127	0.074	2350	2690	0.510	0.134	ls i
SP 16	743.87-43.99	0.12	-	2.65	-	-	0.318	0.131	0.016	-	2700	0.506	0.119	ls i
17	743.99-44.13	0.14	.11	6.27	3.64	2.30	0.878	0.124	0.017	2360	2690	0.539	0.153	ls i
18	744.13-44.32	0.19	.12	1.62	1.44	1.11	0.308	0.104	0.020	2410	2690	0.556	0.122	ls i sty frac
19	744.32-44.54	0.22	.16	19.5	9.18	13.8	4.290	0.138	0.030	2320	2690	0.580	0.102	ls i sty vfrac
20	744.54-44.90	0.36	.14	3.22	2.94	1.02	1.159	0.125	0.045	2360	2690	0.476	0.155	ls i sty frac
SP 21	744.90-45.01	0.11	-	0.77	-	-	0.085	0.104	0.011	-	2700	0.413	0.126	ls i
-	745.01-45.06	0.05	-	-	-	-	-	-	-	-	-	-	-	ls

CORE LABORATORIES - CANADA, LTD.

COMPANY PETRO-CANADA INC.
WELL PCI ET AL HOOSIER RIDGE N-22

FORMATION KEYSCARP
CORING EQUIPMENT DIAMOND

FILE 7004-84-201

FULL DIAMETER ANALYSIS

Sample Number	Depth Metres (m)	m Rep.	Sample Length	Permeability to Air Millidarcys mD Max.	mD 90 des.	mD V	Perm. X m	Porosity	Porosity X m	Density kg/m3 Bulk	Grain	Residual Saturation (Frac of Pore Vol) Oil	Water	VISUAL EXAMINATION
	CORE NO. 1 CONTINUED													
22	745.06-45.25	0.19	.13	2.26	1.73	1.46	0.429	0.122	0.023	2370	2700	0.518	0.101	ls i sty frac
SP 23	745.25-45.32	0.07	-	1.11	-	-	0.078	0.115	0.008	-	2700	0.510	0.080	ls i
24	745.32-45.76	0.44	.20	0.91	0.86	0.19	0.400	0.105	0.046	2420	2700	0.618	0.165	ls i ppv sty vfrac
25	745.76-46.01	0.25	.19	0.77	0.66	0.15	0.192	0.095	0.024	2440	2700	0.526	0.105	ls i
26	746.01-46.17	0.16	.08	1.87	1.34	1.14	0.299	0.117	0.019	2380	2700	0.509	0.096	ls i vfrac
27	746.17-46.54	0.37	.14	1.59	1.10	0.51	0.588	0.106	0.039	2420	2700	0.573	0.076	ls i sty frac
28	746.54-46.73	0.19	.14	1.91	1.82	1.04	0.363	0.104	0.020	2430	2710	0.241	0.154	ls i
SP 29	746.73-46.82	0.09	-	2.04	-	-	0.184	0.141	0.013	-	2710	0.561	0.075	ls i sty
30	746.82-47.15	0.33	.19	1.87	1.51	0.48	0.617	0.122	0.040	2370	2700	0.472	0.147	ls i sty frac
31	747.15-47.43	0.28	.20	1.81	1.01	0.69	0.507	0.107	0.030	2410	2700	0.475	0.153	ls i
32	747.43-47.64	0.21	.08	1.43	1.37	0.86	0.300	0.117	0.025	2390	2700	0.462	0.130	ls i
SP 33	747.64-47.71	0.07	-	1.10	-	-	0.077	0.111	0.008	-	2700	0.480	0.100	ls i sty
34	747.71-48.03	0.32	.20	0.72	0.70	0.03	0.230	0.067	0.021	2510	2690	0.568	0.124	ls i sty
35	748.03-48.20	0.17	.10	0.98	0.95	0.46	0.167	0.104	0.018	2420	2710	0.475	0.117	ls i
	CORE NO. 2 748.00 m - 757.00 (core received 9.10 m) (7 Boxes)													
36	748.20-48.38	0.18	.12	1.44	1.15	1.06	0.259	0.115	0.021	2390	2700	0.493	0.150	ls i
37	748.38-48.78	0.40	.20	1.52	1.15	0.53	0.608	0.115	0.046	2390	2700	0.460	0.155	ls i sty
38	748.78-48.98	0.20	.14	*	4.96	*	0.992	0.122	0.024	2370	2700	0.526	0.102	ls i vfrac
39	748.98-49.15	0.17	.14	0.21	0.18	0.04	0.036	0.072	0.012	2500	2690	0.488	0.088	ls i
40	749.15-49.37	0.22	.17	1.41	1.25	0.51	0.310	0.117	0.026	2380	2700	0.413	0.231	ls i
41	749.37-49.78	0.41	.15	1.59	1.33	0.29	0.652	0.103	0.042	2420	2700	0.438	0.185	ls i
42	749.78-49.99	0.21	.12	1.05	1.02	0.69	0.220	0.079	0.017	2490	2700	0.395	0.197	ls i sty

CORE LABORATORIES - CANADA, LTD.

COMPANY PETRO-CANADA INC.
WELL PCI ET AL HOOSIER RIDGE N-22

FORMATION KEYSCARP
CORING EQUIPMENT DIAMOND

FILE 7004-84-201

FULL DIAMETER ANALYSIS

Sample Number	Depth Metres (m)	Rep.	Sample Length	Permeability to Air Millidarcys mD Max.	mD 90 des.	mD V	Perm. X m	Porosity	Porosity X m	Density kg/m3 Bulk	Grain	Residual Saturation (Frac of Pore Vol) Oil	Water	VISUAL EXAMINATION
	CORE NO. 2 CONTINUED													
43	749.99-50.25	0.26	.14	0.58	0.49	0.32	0.151	0.067	0.017	2530	2710	0.473	0.172	ls i sty
44	750.25-50.55	0.30	.10	0.33	0.24	0.14	0.099	0.043	0.013	2580	2700	0.326	0.186	ls i
45	750.55-50.78	0.23	.12	1.17	0.75	0.38	0.269	0.070	0.016	2510	2700	0.463	0.152	ls i
46	750.78-51.13	0.35	.24	2.49	2.03	0.46	0.871	0.070	0.024	2510	2700	0.506	0.098	ls i sty
47	751.13-51.40	0.27	.10	0.31	0.29	0.08	0.084	0.055	0.015	2550	2700	0.401	0.093	ls i
48	751.40-51.66	0.26	.17	0.39	0.38	0.19	0.101	0.052	0.014	2560	2700	0.000	0.203	ls i sty
49	751.66-51.81	0.15	.08	0.28	0.13	0.12	0.042	0.035	0.005	2610	2700	0.441	0.110	ls i
50	751.81-52.09	0.28	.13	4.98	1.54	0.51	1.394	0.080	0.022	2490	2690	0.555	0.081	ls i
51	752.09-52.31	0.22	.19	1.04	0.54	0.15	0.229	0.005	0.001	2690	2700	0.531	0.054	ls i sty frac
52	752.31-52.53	0.22	.17	2.22	0.86	0.21	0.488	0.066	0.015	2520	2700	0.520	0.053	ls i sty
53	752.53-52.80	0.27	.19	0.40	0.35	0.12	0.108	0.047	0.013	2570	2700	0.574	0.059	ls i sty
54	752.80-53.05	0.25	.14	0.34	0.31	0.22	0.085	0.048	0.012	2570	2700	0.576	0.077	ls i
55	753.05-53.27	0.22	.17	27.9	3.57	0.19	6.138	0.043	0.009	2580	2700	0.402	0.087	ls i sty frac
56	753.27-53.53	0.26	.10	0.38	0.37	0.24	0.099	0.058	0.015	2550	2710	0.603	0.104	ls i sty
57	753.53-53.87	0.34	.20	0.03	0.02	0.02	0.010	0.024	0.008	2633	2700	0.334	0.278	ls i
58	753.87-54.14	0.27	.12	0.34	0.33	0.06	0.092	0.057	0.015	2550	2700	0.478	0.074	ls i sty
59	754.14-54.27	0.13	.10	0.16	0.15	0.02	0.021	0.041	0.005	2590	2700	0.358	0.102	ls i
60	754.27-54.43	0.16	.09	0.58	0.53	0.14	0.093	0.101	0.016	2440	2710	0.463	0.054	ls i
61	754.43-54.62	0.19	.16	0.68	0.53	0.26	0.129	0.041	0.008	2592	2700	0.270	0.077	ls i
62	754.62-54.88	0.26	.21	0.65	0.61	0.39	0.169	0.053	0.014	2560	2700	0.244	0.150	ls i
63	754.88-55.09	0.21	.07	0.49	0.45	0.38	0.103	0.056	0.012	2540	2700	0.243	0.155	ls i
64	755.09-55.49	0.40	.23	1.38	0.77	0.21	0.552	0.054	0.022	2560	2700	0.295	0.160	ls i
65	755.49-55.80	0.31	.15	0.71	0.26	0.23	0.220	0.053	0.016	2560	2700	0.384	0.163	ls i sty frac
66	755.80-56.09	0.29	.18	1.58	1.01	0.12	0.458	0.042	0.012	2590	2710	0.265	0.151	ls i sty frac
67	756.09-56.37	0.28	.20	0.25	0.25	0.13	0.070	0.040	0.011	2590	2710	0.176	0.091	ls i

CORE LABORATORIES - CANADA, LTD.

COMPANY PETRO-CANADA INC.
WELL PCI ET AL HOOSIER RIDGE N-22

FORMATION KEYSCARP
CORING EQUIPMENT DIAMOND

FILE 7004-84-201

FULL DIAMETER ANALYSIS

Sample Number	Depth Metres (m)	m Rep.	Sample Length	Permeability to Air Millidarcys mD Max.	mD 90 des.	mD V	Perm. X m	Porosity	Porosity X m	Density:kg/m3 Bulk	Grain	Residual Saturation (Frac of Pore Vol) Oil	Water	VISUAL EXAMINATION
	CORE NO. 2 CONTINUED													
							0.432	0.046	0.018	2580	2710	0.279	0.178	ls i sty
68	756.37-56.77	0.40	.21	1.08	0.79	0.17	0.281	0.047	0.025	2570	2700	0.252	0.130	ls i
69	756.77-57.30	0.53	.21	0.53	0.53	0.52								
	CORE NO. 3 850.00 m - 860.00 (core received 9.70 m) (7 Boxes)													
							0.028	0.057	0.011	2560	2710	0.000	0.395	ls i
70	850.00-50.20	0.20	.16	0.14	0.09	0.10	0.016	0.048	0.011	2590	2720	trace	0.212	ls i
71	850.20-50.43	0.23	.14	0.07	0.07	0.04	0.022	0.045	0.010	2590	2720	trace	0.264	ls i
72	850.43-50.65	0.22	.16	0.10	0.08	0.05	0.032	0.061	0.014	2560	2720	trace	0.082	ls i
73	850.65-50.88	0.23	.09	0.14	0.13	0.02	0.021	0.051	0.008	2580	2710	trace	0.160	ls i
74	850.88-51.03	0.15	.11	0.14	0.13	0.05	0.048	0.065	0.010	2550	2720	trace	0.171	ls i
75	851.03-51.19	0.16	.09	0.30	0.28	0.04	0.096	0.058	0.017	2560	2720	trace	0.401	ls i
76	851.19-51.48	0.29	.24	0.33	0.20	0.19	0.113	0.066	0.019	2550	2730	trace	0.215	ls i foss
77	851.48-51.77	0.29	.21	0.39	0.37	0.27	0.052	0.058	0.012	2560	2720	trace	0.185	ls i
78	851.77-51.97	0.20	.16	0.26	0.22	0.10	0.070	0.063	0.016	2550	2720	trace	0.149	ls i sty
79	851.97-52.23	0.26	.14	0.27	0.20	0.11	0.030	0.058	0.009	2550	2710	trace	0.112	ls i
80	852.23-52.39	0.16	.12	0.19	0.18	0.04	0.020	0.035	0.009	2610	2700	trace	0.282	ls i sty
81	852.39-52.64	0.25	.16	0.08	0.08	0.05	0.022	0.032	0.009	2610	2700	0.000	0.089	ls i
82	852.64-52.92	0.28	.14	0.08	0.04	<0.01	0.007	0.022	0.004	2630	2690	0.000	0.128	ls i sty
83	852.92-53.09	0.17	.13	0.04	0.03	0.02	0.009	0.017	0.003	2650	2690	0.000	0.216	ls i
84	853.09-53.27	0.18	.12	0.05	0.04	0.03	-	-	-	-	-	-	-	ls
-	853.27-53.66	0.59	-	-	-	-	0.013	0.005	0.001	2700	2710	trace	0.239	ls i sty
85	853.86-54.04	0.18	.14	0.07	0.04	<0.01	0.021	0.005	0.001	2660	2690	trace	0.171	ls i sty
86	854.04-54.27	0.23	.10	0.09	0.05	<0.01	-	-	-	-	-	-	-	ls
-	854.27-55.88	1.61	-	-	-	-								

CORE LABORATORIES — CANADA, LTD.

COMPANY PETRO-CANADA INC.
WELL PCI ET AL HOOSIER RIDGE N-22

FORMATION KEYSCARP
CORING EQUIPMENT DIAMOND

FILE 7004-84-201

FULL DIAMETER ANALYSIS

Sample Number	Depth Metres (m)	m Rep.	Sample Length	Permeability to Air Millidarcys mD Max.	mD 90 des.	mD V	Perm. X m	Porosity	Porosity X m	Density:kg/m3 Bulk	Grain	Residual Saturation (Frac of Pore Vol) Oil	Water	VISUAL EXAMINATION
	CORE NO. 3 CONTINUED													
87	855.88-56.07	0.19	.11	0.01	0.01	<0.01	0.002	0.005	0.001	2690	2700	0.000	0.212	ls i
88	856.07-56.37	0.30	.17	0.03	0.03	<0.01	0.009	0.007	0.002	2690	2710	0.000	0.167	ls i sty
89	856.37-56.64	0.27	.13	<0.01	<0.01	<0.01	-	0.009	0.002	2680	2710	0.000	0.218	ls i sty
90	856.64-57.03	0.39	.15	0.01	0.01	<0.01	0.004	0.010	0.004	2680	2700	0.000	0.200	ls is ty
91	857.03-57.35	0.32	.15	0.15	0.03	<0.01	0.048	0.008	0.003	2680	2700	0.000	0.176	ls i sty
92	857.35-57.65	0.30	.11	0.11	0.07	0.07	0.033	0.025	0.008	2680	2750	0.000	0.175	ls i sty
-	857.65-57.85	0.20	-	-	-	-	-	-	-	-	-	-	-	ls
93	857.85-58.02	0.17	.13	3.83	2.64	3.17	0.651	0.016	0.003	2660	2700	0.000	0.189	ls i sty vfrac
-	858.02-58.34	0.32	-	-	-	-	-	-	-	-	-	-	-	ls
94	858.34-58.50	0.16	.12	*	0.08	*	0.013	0.027	0.004	2630	2700	0.000	0.129	ls i sty vfrac
95	858.50-58.85	0.35	.18	0.12	0.02	0.10	0.042	0.037	0.013	2600	2700	0.000	0.257	ls i sty vfrac
96	858.85-58.98	0.13	.09	0.09	0.08	0.03	0.012	0.067	0.009	2520	2700	0.000	0.442	ls i sty
SP 97	858.98-59.26	0.28	-	0.04	-	-	0.011	0.048	0.013	-	2700	0.000	0.299	ls i
98	859.26-59.48	0.22	.09	*	0.08	*	0.018	0.055	0.012	2550	2700	0.000	0.258	ls i sty vfrac
99	859.48-59.70	0.22	.09	*	0.06	*	0.013	0.056	0.012	2550	2710	0.000	0.182	ls i sty vfrac
LC	859.70-60.00	0.30	-	-	-	-	-	-	-	-	-	-	-	Lost core

CORE LABORATORIES - CANADA, LTD.

WELL PCI ET AL HOOSIER RIDGE N-22

FORMATION KEYSCARP

FILE 7004-84-201

SUMMARY INTERVAL 739.00- 860.00

TOTAL 121.00

METRES ANALYZED 24.69

METRES NOT ANALYZED: TOTAL 96.31 DENSE 3.31 LOST 0.30 *NA 0.00 DRILLED 92.70 RUBBLE 0.00

SUMMARY OF ANALYZED CORE:	METRES	FRACTION OF ANALYZED CORE	WEIGHTED AVERAGE POROSITY	POROSITY METRES	WEIGHTED AV. HORIZONTAL PERMEABILITY	PERMEABILITY METRES	WEIGHTED AVERAGE RESID. OIL	WEIGHTED AVERAGE TOT. WATER
TOTAL	24.690	1.000	0.070	1.732	3.023	74.648	0.407	0.140
BY PERM RANGES								
LESS THAN 0.01 mD	0.270	0.011	0.009	0.002	0.005	0.001	0.000	0.218
0.01 0.09 mD	3.750	0.152	0.028	0.104	0.053	0.199	0.026	0.237
0.10 0.49 mD	6.100	0.247	0.049	0.296	0.262	1.599	0.195	0.166
0.50 0.99 mD	3.750	0.152	0.071	0.267	0.709	2.658	0.481	0.122
1.0 9.99 mD	9.770	0.396	0.095	0.932	2.371	23.163	0.481	0.133
GREATER THAN 9.99 mD	1.050	0.043	0.124	0.130	44.789	47.028	0.515	0.090

*NOT ANALYZED BY REQUEST

CORE LABORATORIES - CANADA, LTD.

CODE KEY - DESCRIPTIONS

anhy = Anhydrite
AST = Appears similiar to
bk = Break
bldr = Boulder
c = Coarse
calc = Calcite (areous)
carb = Carbonaceous
cbl = Cobble
CEC = Cation exchange capacity
cgl = Conglomerate
cht = Chert
coal = Coal/Coal Inclusion
dol = Dolomite
f = Fine
fest = Ironstone
foss = Fossil (iferous)
frac = Fracture
fri = Friable
glauc = Glauconite (ic)
grnl = Granule
gyp = Gypsum
h frac = Horizontal fracture

hal = Halite (Salt)
i = Intergranular
lam = Laminae (Laminated)
lmy = Limy
ls = Limestone
lv = Large vug
m = Medium
mi = Mud invaded
mic = Micaceous
mshy or shy = Moderately shaly (20-40%)
mv = Medium vug
NA = Not analysed by request
NP = No permeability measurement
ool = Oolitic
OB = Overburden
P = Preserved for future studies
pbl = Pebble
POA = portion removed for oil analysis
ppv = Pinpoint Vug
PSA = Particle size analysis
pyr = Pyrite (ic)
pyrbit = Pyrobitumen

SCAL = removed for special core analysis
sdy = Sandy
SEM = Scanning electron microscope analysis
sh = Shale
sltst = Siltstone
slty = Silty
ss = Sandstone
sshy = Slightly Shaly(<20%)
sty = Stylolite (ic)
sulf = Sulphur
sv = wet/dry sieve analysis
tr = Trace
TS = Thin section
uncons = Unconsolidated
vfrac = Vertical fracture
vf = Very fine
VOB = Vertical overburden sample
vshy = Very shaly (>40%)
vug = Vuggy (ular)
* = broken core
** = Permeability > 10240 mD

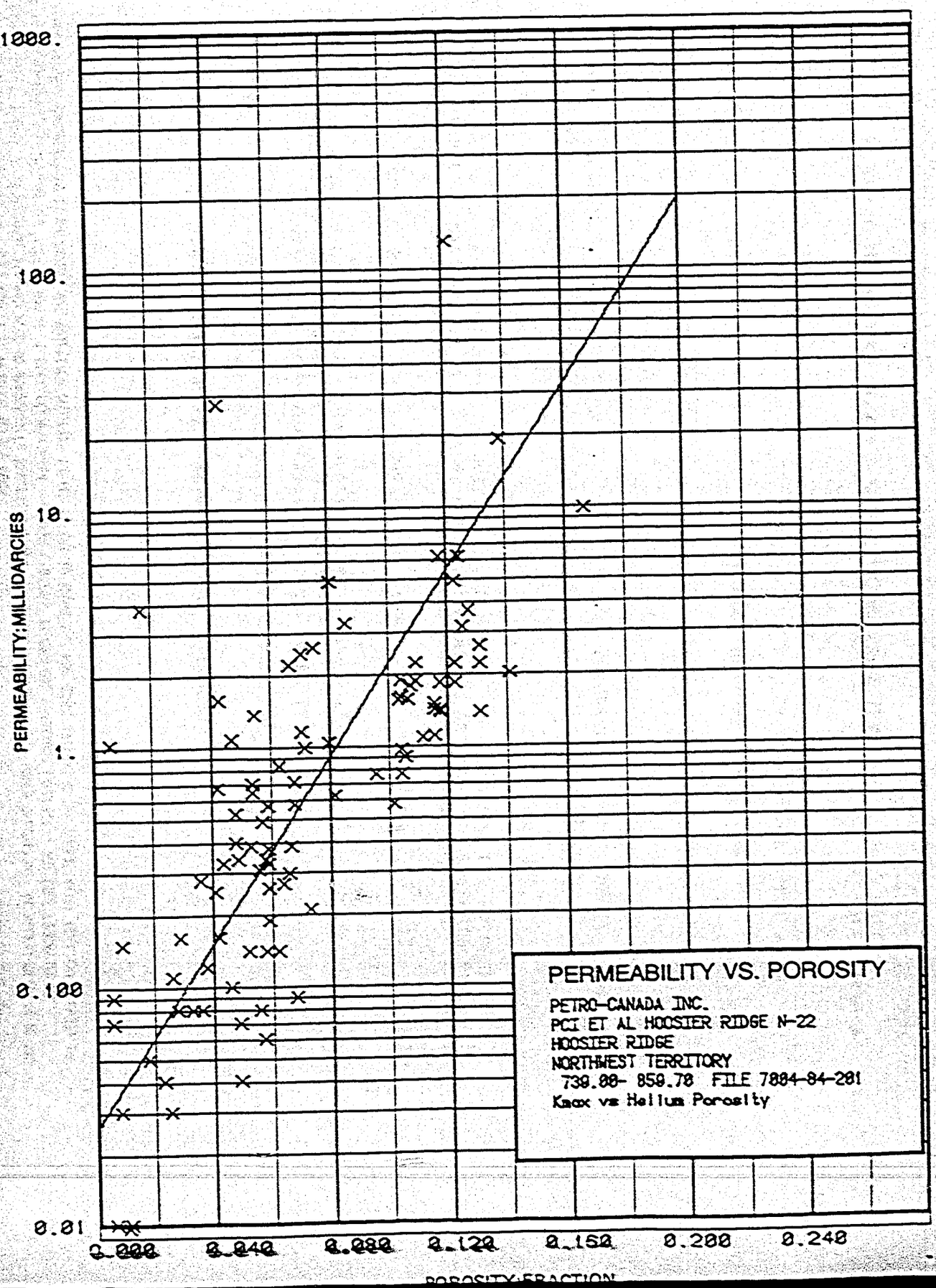
CLEANING

Solvent	TOLUENE
Extraction Equipment	VAPOR PHASE EXTRACTOR
Extraction Time	6 DAYS
Drying Equipment	GRAVITY OVEN
Drying Time	48 HOURS
Drying Temperature	132 DEGREES C

ANALYSIS

Pore volume measured by Boyle's Law in a Hassler holder using He
Grain vol msrd by Boyle's Law in a modified U.S.B.M. porosimeter using He
X Grain volume measured by Boyle's Law in a matrix cup using He
Bulk volume measured by calipering
Bulk Volume by Archimedes Principle
X Porosity determined by summation of fluids (retort)
Fluid saturations by retort on end pieces of full diameter samples
Fluid saturation by retort
Water saturations by Dean-Stark
Oil saturations by weight difference in Dean-Stark
Permeabilities measured on 20mm cubes
X Permeabilites measured on 25 mm diameter drilled plugs
X Core Gamma Composite
Core Gamma Spectral

REMARKS:


PERMEABILITY VS. POROSITY
PETRO-CANADA INC.
PCI ET AL HOOSIER RIDGE N-22
HOOSIER RIDGE
NORTHWEST TERRITORY
739.00- 859.70 FILE 7804-84-201
Kmax vs Helium Porosity
PERMEABILITY;MILLIDARCIES
1000.
100.
10.
1.
0.100
0.01
0.000
0.040
0.080
0.120
0.160
0.200
0.240
POROSITY;FRACTION

PERMEABILITY VS POROSITY

FILE: 7004-84-201

COMPANY: PETRO-CANADA INC.

FIELD : HOOSIER RIDGE

FORMATION: KEYSCARP

WELL : PCI ET AL HOOSIER RIDGE N-22

PROVINCE: NORTHWEST TERRITORY

AIR PERMEABILITY : MD - MAXIMUM (UNCORRECTED FOR SLIPPAGE)
POROSITY : FRACTION (HELIUM)

DEPTH INTERVAL	METERS ANALYZED	RANGE & SYMBOL	PERMEABILITY MINIMUM	PERMEABILITY MAXIMUM	POROSITY MIN.	POROSITY MAX.	POROSITY AVERAGE	PERMEABILITY AVERAGES ARITHMETIC	HARMONIC	GEOMETRIC
739.00 - 859.70	24.69	1 (X)	0.000	200.0	0.000	0.460	0.070	3.0	0.12	0.59

EQUATION OF REDUCED LINE RELATING PERMEABILITY(K) TO POROSITY :

LOG(K) = (SLOPE)(POROSITY) + LOG OF INTERCEPT

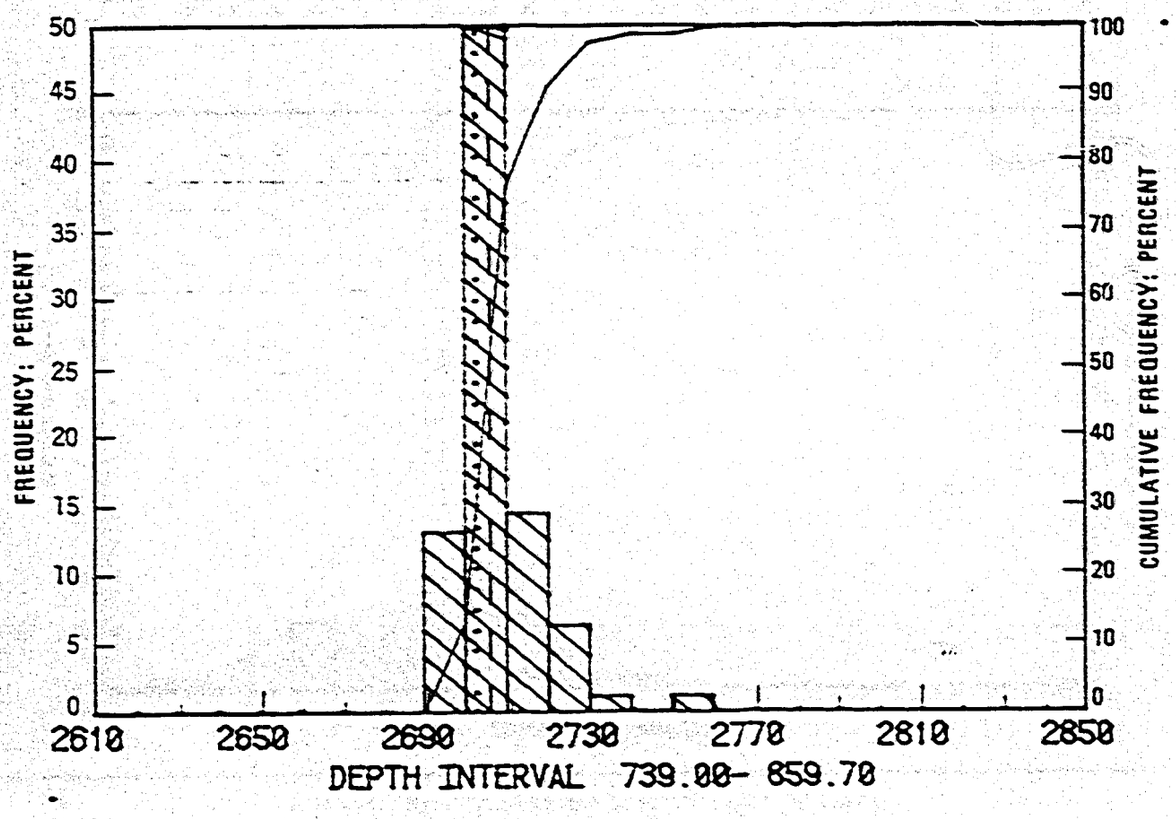
K = ANTILOG((SLOPE)(POROSITY) + LOG OF INTERCEPT)

RANGE	EQUATION OF THE LINE
1	PERM = ANTILOG((0.1935)(POROSITY) + -1.5837)

CORE LABORATORIES – CANADA, LTD. CORE LAB *Petroleum Reservoir Engineering*

COMPANY	PETRO-CANADA INC.			FILE NO.	7004-84-201
WELL	PCI ET AL HOOSIER RIDGE N-22			DATE	
FIELD	HOOSIER RIDGE	FORMATION	KEYSCARP	ELEV.	
PROVINCE	NORTHWEST TERRITORY	DRLG. FLD.	WATER BASE MUD	CORES	1,2,3
LOCATION	65°21'56.63" N LAT. 127°34'48.65" W LONG.				

GRAIN DENSITY HISTOGRAM



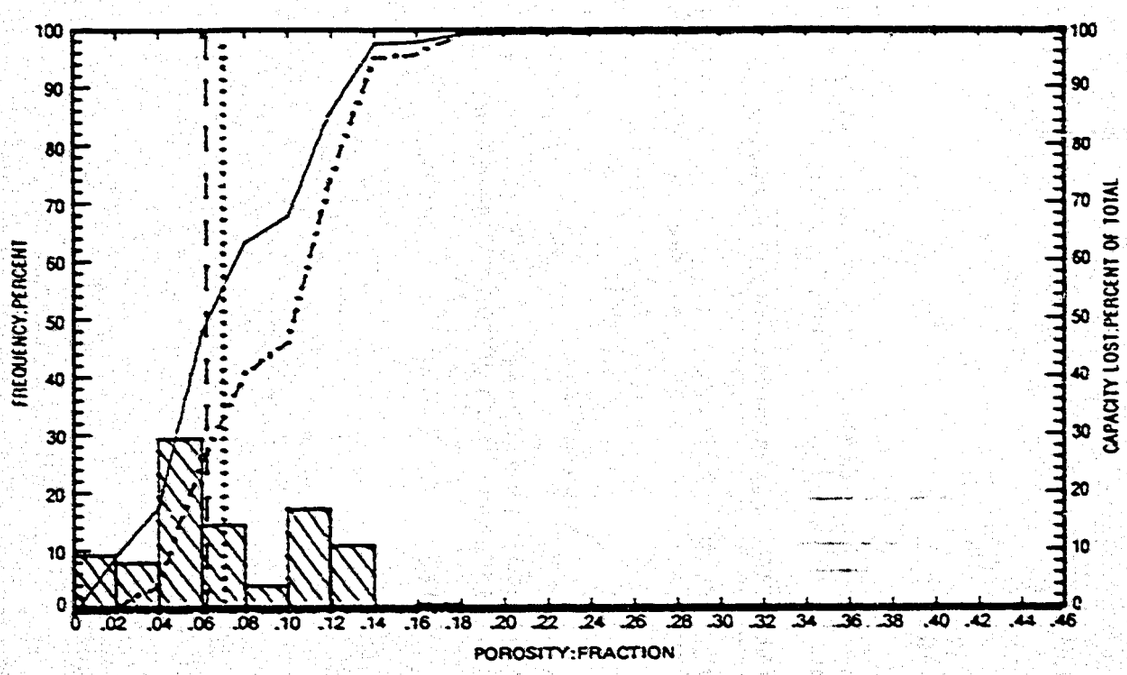
LEGEND

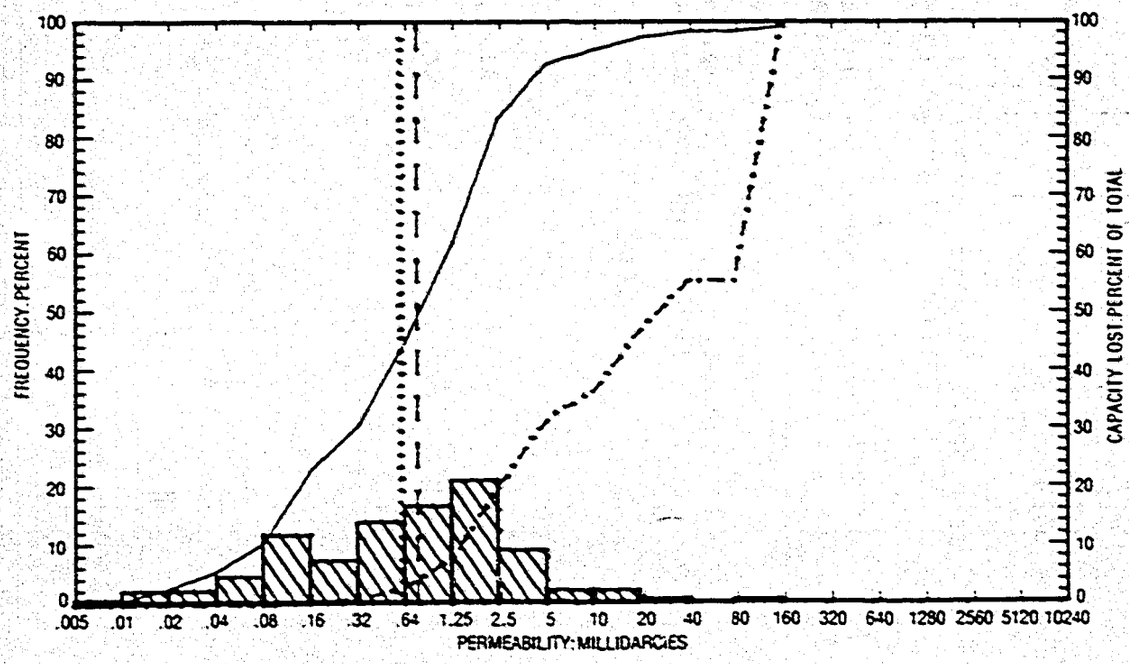
ARITHMETIC MEAN GRAIN DENSITY ·····

MEDIAN VALUE — — —

CUMULATIVE FREQUENCY ———

7004B





PERMEABILITY AND POROSITY HISTOGRAMS

PETRO-CANADA INC.
PCI ET AL HOOSIER RIDGE N-22
HOOSIER RIDGE
NORTHWEST TERRITORY
739.00- 859.70 FILE 7004-84-201
Kmax and Helium Porosity

LEGEND

ARITHMETIC MEAN POROSITY	----------
GEOMETRIC MEAN PERMEABILITY	----------
MEDIAN VALUE	— — —
CUMULATIVE FREQUENCY	————
CUMULATIVE CAPACITY LOST	—·—·—

7004-4

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

FILE 7004-84-201 LS

COMPANY: PETRO-CANADA INC.
FIELD : HOOSIER RIDGE

WELL : PCI ET AL HOOSIER RIDGE N-22
PROVINCE: NORTHWEST TERRITORY

AIR PERMEABILITY : MD. (MAXIMUM) RANGE USED 0.000 TO 200.
POROSITY : FRACTION (HELIUM) RANGE USED 0.000 TO .46

(PERMEABILITY UNCORRECTED FOR SLIPPAGE)

DEPTH LIMITS : 739.00 - 859.70 INTERVAL LENGTH : 120.70
METRES ANALYZED IN ZONE : 24.69 LITHOLOGY EXCLUDED : NONE

DATA SUMMARY

POROSITY AVERAGE	PERMEABILITY AVERAGES ARITHMETIC	HARMONIC	GEOMETRIC
0.070	3.0	0.12	0.59

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

FILE 7004-84-201 LS

COMPANY: PETRO-CANADA INC.
FIELD : HOOSIER RIDGE

WELL : PCI ET AL HOOSIER RIDGE N-22
PROVINCE: NORTHWEST TERRITORY

GROUPING BY POROSITY RANGES

POROSITY RANGE	METRES IN RANGE	AVERAGE POROSITY	AVERAGE PERM. (GEOM.)	AVERAGE PERM. (ARITH)	FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (%)
0.000 -0.020	2.5	0.009	0.055	0.403	9.9	9.9
0.020 -0.040	2.2	0.030	0.083	0.099	8.7	18.6
0.040 -0.060	7.4	0.050	0.381	1.3	30.1	48.7
0.060 -0.080	3.8	0.068	0.696	1.0	15.4	64.1
0.080 -0.100	1.1	0.085	1.9	2.6	4.5	68.6
0.100 -0.120	4.5	0.109	1.6	1.9	18.1	86.6
0.120 -0.140	2.9	0.126	4.6	16.	11.5	98.2
0.140 -0.160	0.1	0.141	2.0	2.0	0.4	98.5
0.160 -0.180	0.4	0.167	10.	10.	1.5	100.0

TOTAL NUMBER OF METRES = 24.69

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PETRO-CANADA INC.
FIELD : HOOSIER RIDGE

WELL : PCI ET AL HOOSIER RIDGE N-22
PROVINCE: NORTHWEST TERRITORY

GROUPING BY PERMEABILITY RANGES

PERMEABILITY RANGE	METRES IN RANGE	AVERAGE PERM. (GEOM.)	AVERAGE PERM. (ARITH)	AVERAGE POROSITY	FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (%)
0.005 - 0.010	0.3	0.005	0.005	0.009	1.1	1.1
0.010 - 0.020	0.6	0.010	0.010	0.008	2.3	3.4
0.020 - 0.039	0.6	0.030	0.030	0.016	2.6	6.0
0.039 - 0.078	1.3	0.053	0.055	0.035	5.1	11.1
0.078 - 0.156	3.0	0.106	0.109	0.036	12.3	23.5
0.156 - 0.312	1.9	0.242	0.247	0.052	7.8	31.3
0.312 - 0.625	3.5	0.421	0.431	0.056	14.2	45.5
0.625 - 1.250	4.2	0.866	0.882	0.070	17.0	62.5
1.250 - 2.500	5.3	1.7	1.8	0.101	21.6	84.0
2.500 - 5.000	2.3	3.6	3.7	0.101	9.4	93.4
5.- 10.	0.6	6.3	6.3	0.119	2.3	95.7
10.- 20.	0.6	13.	14.	0.156	2.3	98.1
20.- 40.	0.2	28.	28.	0.043	0.9	99.0
80.- 160.	0.2	132.	132.	0.121	1.0	100.0

TOTAL NUMBER OF METRES = 24.69

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PETRO-CANADA INC.
FIELD : HOOSIER RIDGE

WELL : PCI ET AL HOOSIER RIDGE N-22
PROVINCE: NORTHWEST TERRITORY

POROSITY-METRES OF STORAGE CAPACITY LOST FOR SELECTED POROSITY CUT OFF

POROSITY CUT OFF	METRES LOST	CAPACITY LOST (%)	METRES REMAINING	CAPACITY REMAINING (%)	ARITH MEAN	MEDIAN
0.000	0.0	0.0	24.7	100.0	0.070	0.062
0.020	2.5	1.2	22.2	98.8	0.077	0.068
0.040	4.6	4.9	20.1	95.1	0.082	0.074
0.060	12.0	26.5	12.7	73.5	0.101	0.106
0.080	15.8	41.3	8.9	58.7	0.115	0.115
0.100	16.9	46.8	7.8	53.2	0.119	
0.120	21.4	75.0	3.3	25.0	0.131	
0.140	24.2	95.8	0.5	4.2	0.162	0.168
0.160	24.3	96.5	0.4	3.5	0.167	
0.180	24.7	100.0	0.0	-0.0	0.000	

TOTAL STORAGE CAPACITY IN POROSITY-METRES = 1.732

STATISTICAL DATA FOR POROSITY AND PERMEABILITY HISTOGRAM

COMPANY: PETRO-CANADA INC.
FIELD : HOOSIER RIDGE

WELL : PCI ET AL HOOSIER RIDGE N-22
PROVINCE: NORTHWEST TERRITORY

MILLIDARCY-METRES OF FLOW CAPACITY LOST FOR SELECTED PERMEABILITY CUT OFF

PERMEABILITY CUT OFF	METRES LOST	CAPACITY LOST (%)	METRES REMAINING	CAPACITY REMAINING (%)	GEOM MEAN	MEDIAN
0.005	0.0	0.0	24.7	100.0	0.59	0.75
0.010	0.3	0.0	24.4	100.0	0.63	0.77
0.020	0.9	0.0	23.8	100.0	0.69	0.81
0.039	1.5	0.0	23.2	100.0	0.75	0.85
0.078	2.8	0.1	21.9	99.9	0.88	0.94
0.156	5.8	0.6	18.9	99.4	1.23	1.21
0.312	7.7	1.2	17.0	98.8	1.49	1.38
0.625	11.2	3.2	13.5	96.8	2.07	1.74
1.250	15.4	8.2	9.3	91.8	3.06	
2.500	20.8	20.7	3.9	79.3	6.65	
5.	23.1	32.1	1.6	67.9	15.84	13.24
10.	23.6	37.0	1.1	63.0	26.36	
20.	24.2	47.6	0.5	52.4	63.77	83.40
40.	24.4	55.8	0.3	44.2	132.00	
80.	24.4	55.8	0.3	44.2	132.00	
160.	24.7	100.0	0.0	0.0	1.00	

TOTAL FLOW CAPACITY IN MILLIDARCY-METRES(ARITHMETIC) = 74.65

CORE LABORATORIES — CANADA, LTD.

LAB

Petroleum Reservoir Engineering

COMPANY PETRO-CANADA INC.

FILE NO. 7004-84-201

WELL PCI ET AL HOOSIER RIDGE N-22

DATE

FIELD HOOSIER RIDGE FORMATION KEYSCARP

ELEV.

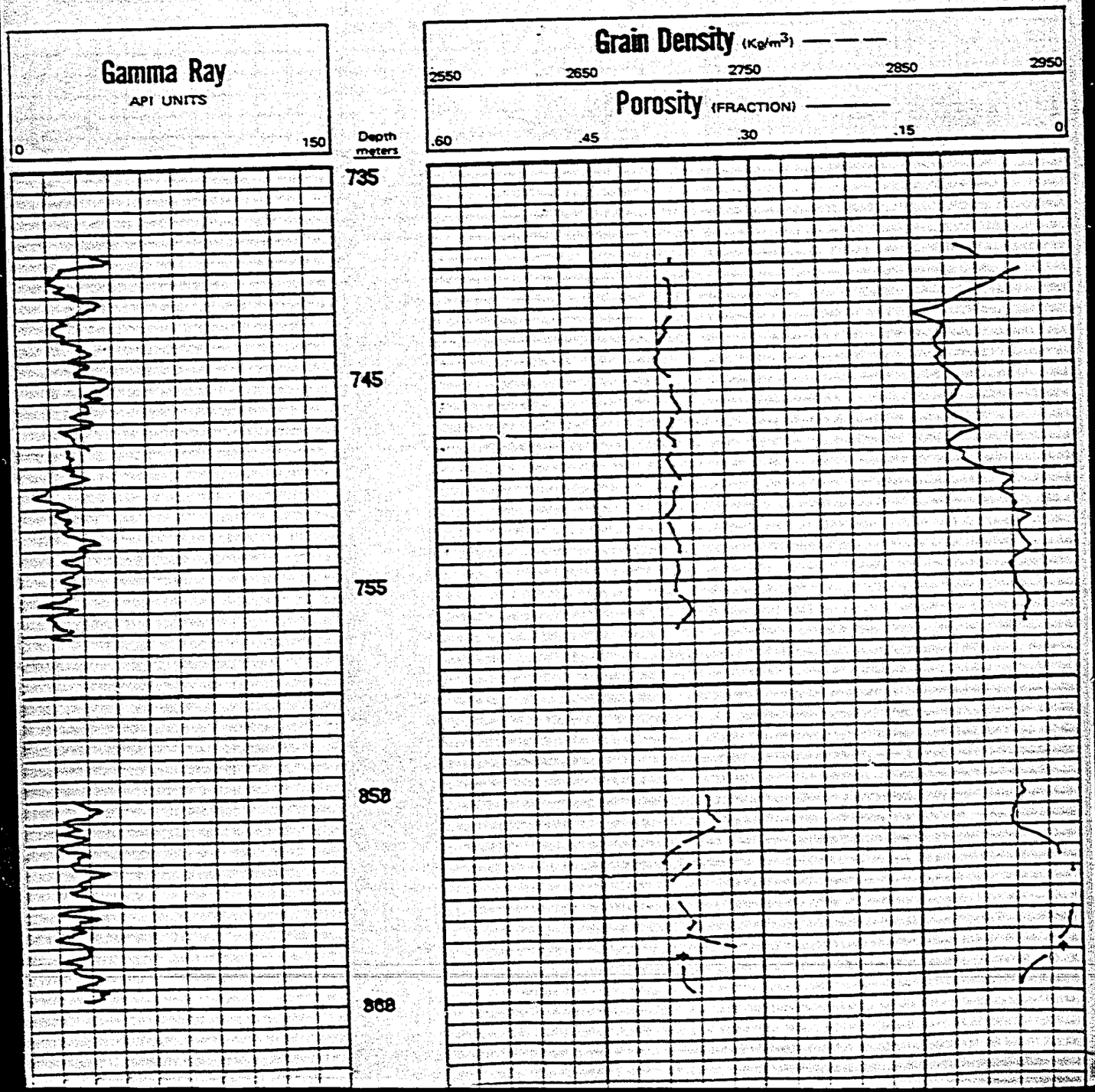
PROVINCE NORTHWEST TERRITORY DRLG. FLD. WATER BASE MUD

CORES 1,2,3

LOCATION 65°21'56.63" N LAT. 127°34'48.65" W LONG.

CORRELATION COREGRAPH

VERTICAL SCALE: 10cm = 24m



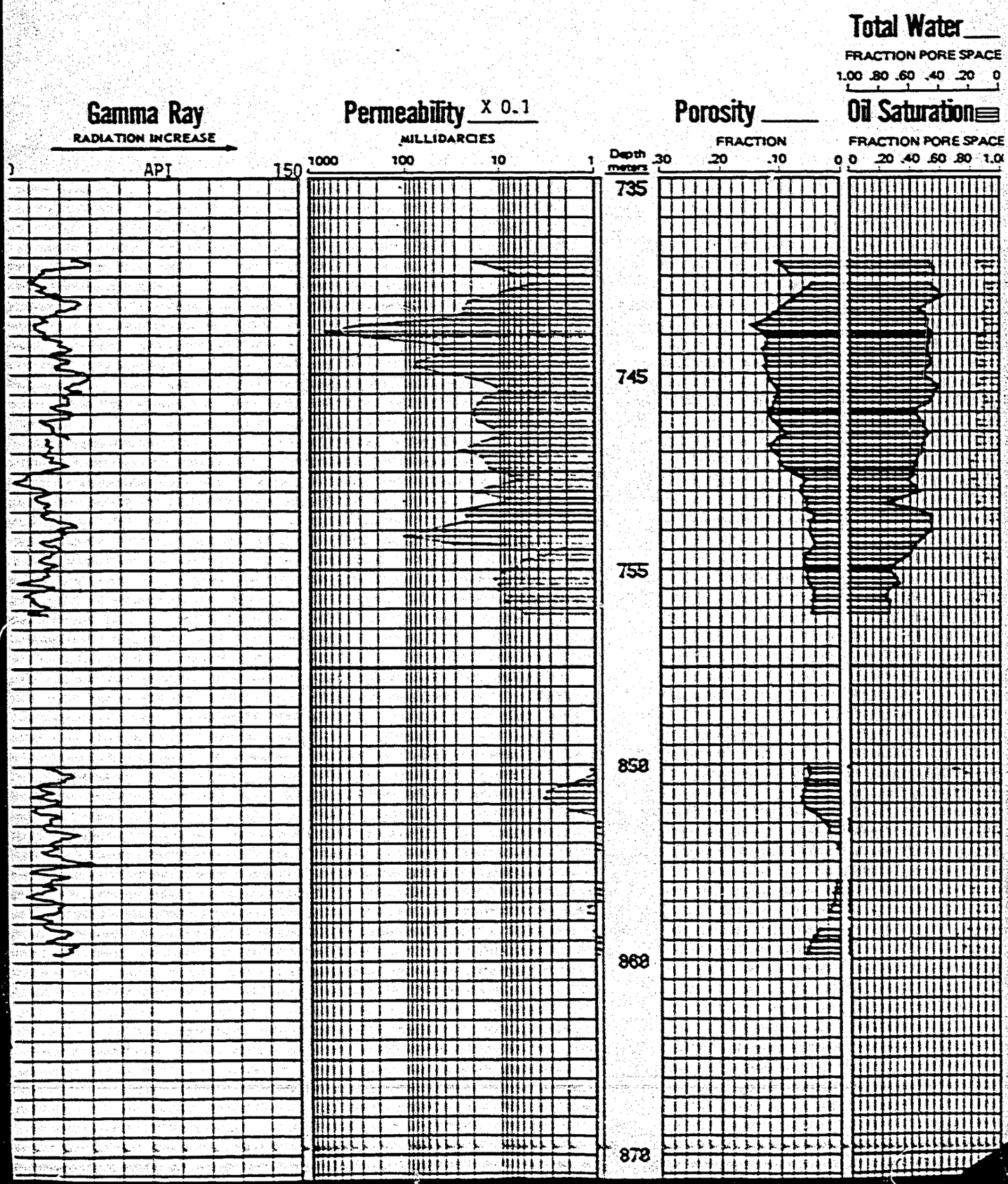
CORE LABORATORIES — CANADA, LTD.

CORE LAB *Petroleum Reservoir Engineering*

COMPANY	PETRO-CANADA INC.			FILE NO.	7004-84-201
WELL	PCI ET AL HOOSIER RIDGE N-22			DATE	
FIELD	HOOSIER RIDGE	FORMATION	KEYSCARP	ELEV.	
PROVINCE	NORTHWEST TERRITORY	DRLG. FLD.	WATER BASE MUD	CORES	1,2,3
LOCATION	65°21'56.63" N LAT. 127°34'48.65" W LONG.				

CORRELATION COREGRAPH

VERTICAL SCALE: 10cm = 24m



BEARSPAW LOGGING SERVICES LTD.

OPERATOR PETRO-CANADA

WELL PCI et al Hoosier Ridge N-22

STATE or PROV. Northwest Territories
LOCATION: Lsd ___ Sec ___ Twp ___ Rge ___ W ___
Lat 65°22' N
Long 127° 35 W
ELEVATION K.B. 106.33 m
DATE SPUDDED 3 [illegible] 84
SCALE 1:600
TECHNICIANS Solomon/Frew/Whitmer

MUD LEGEND

W WEIGHT IN [illegible]
V VISCOSITY
WL WATER LOSS IN CC
FC FILTER CAKE
PH ALKALINITY
Rm MUD RESISTIVITY IN [illegible]
Rmf FILTRATE RESISTIVITY IN [illegible]

DRILLING LEGEND

NB NEW BIT
RB RUNNING BIT
DB DIAMOND BIT
DCB DIAMOND CORE BIT
TB TURBO DRILL
DS DEVIATION SURVEY
W/B WEIGHT ON BIT
RPM ROTATION
PP PUMP PRESSURE
SPM PUMP STROKES
LC LOST CIRCULATION
TG TRIP GAS
NR NO RETURNS

LITHOLOGY LEGEND

SANDSTONE, ANHYDRITE, GLACIAL TILL, SILTSTONE, GYPSUM, METAMORPHIC, SHALE, SALT, BRECCIA, LIMESTONE, COAL, CONGLOMERATE, DOLOMITE, IGNEOUS, CHERT, CLAYSTONE, TUFF

ENGINEERING LEGEND

CT CORE NO. 1 — RECOVERY 95%
DST 1 DRILLSTEM TEST NO. 1
OIL
WATER
OIL
GAS

GAS FROM MUD: TOTAL GAS, METHANE, ETHANE, PROPANE, ISO-BUTANE, BUTANE (0 .1 .3 1.0 10 100)

PENETRATION RATE min./m: SCALE 1 (.1 1.0 10); SCALE 2 (1.0 10 100)

GRAIN SIZE (0 50 100) — PERCENT LITH.

DEPTH — FLUOR — CORES — DST

DESCRIPTION

Pumps 182: Emsco D 500, liner size 152
l/stroke: 23.1

PF Csg: 340min K55 ST&C
101kg/m Set @ 57m

E: dmN x1000
PP: kPa x1000

COMMENCE LOGGING at 100m

Scale 2

03 RR
3A
HW
X
3
A

W 1030-1060
V 45
PH 9.5

F 4
RPM 80
SPM 48
PP 2000
l/min 1109

DRILLING FOREMEN JIM DURELL, YUGON HOPE, PETER WALSH
GEOLOGIST TIM TINDER
CONTRACTOR ATCO RIG 76
TOOLPUSH

Sil
m
m

DS 0.25°

02

W 1060
V 46.25
PH 10.0

F 4
RPM 80
SPM 48
PP 4000
l/min 1109

DS 0.5°

04

CARBIDE LAG 1min 2units

DS 0.75°

W 1080
V 52
PH 10.2

F 8-10
RPM 80
SPM 48
PP 4000

DEPTH: 100, 150, 200

SH m gy, fis, mod hd, micmica, sli calc

SH m gy, fis, mod hd, micmica, sli calc

SH m-dk gy, blky (occ fis), mod hd, micmica occ carb

SH m-dk gy, blky, mod hd, micmica, occ carb v mnr clyst, v mnr wh ss

SH m-dk gy, blky, sb fis in pt, micmica, tr ss tr dism pyr & pyr nod, sh is mod hd, v sli calc in pt

SH lt gy-m gy, lt ton-brn, fis, cly, mod hd, hd in pt tr dism pyr, tr pyr nod

SH m-dk gy, gy-brn in pt, micmica in pt, mnr clyst occ sli calc, dism pyr, pyr nod, tr lt wh vfgr ss, mod hd v tr sli calc

W 1060
V 49·32
PH 10·0

84
04

CARBIDE LAG 7min 2units

W 1080
V 32
PH 10·5

02

W 1080
V 53
PH 9·5

W 1090
V 51·55
PH 10·0
WL 9

02

BLENDER ANALYSIS %
- 1 - 3.5 - - 10 -

W 1090

W 1120

84
06

TG/6.5hrs

02

84

W 1055·70
V 38·43
PH 9·10

F 4
RPM 80
SPM 48
PP 4000
l/min 1109

DS 0.5°

DS 0.75°

F 8·10
RPM 80
SPM 48
PP 4000
l/min 1109

DS 1.0°

DS 1.0°

F 8·10
RPM 80
SPM 48
PP 4000
l/min 1109

248 m in 44 hrs
Cond 4-4 in

84
05 NB 4a H W X D V

F 4310
RPM 80
SPM 48
PP 4000
l/min 1169

DS 1.5°

0
2
0
0

5
0

3
0
0

5
0

NB No 6A HW J D 7 2 1

SH m-dk gy,blky,mod hd,micmica,occ carb v mnr clyst,v mnr wh ss

SH m-dk gy,blky,sb fis in pt,micmica,rr tr ss tr dism pyr & pyr nod,sh is mod hd,v sli calc in pt

SH lt gy-m gy,tr tan-brn,fis,cly,mod hd,hd in pt tr dism pyr,tr pyr nod

SH m-dk gy,gy-brn in pt,micmica in pt,mnr clyst occ sli calc,dism pyr,pyr nod,rr tr wh vfgr ss,mod hd v rr sli calc

SH m dk gy,gy brn,mic mica,blky,abnt glauc, tr clyst,sft mod hd,rr tr ss,tr qtz

SH pred oc,mnr pyr,tr qtz

SH med dk gy, blky,m hd,mic mica,v mnr pyr, occ glauc

SS wh vfg sb-ang,w srt,p-m cons,p intgrn & mnr glauc SH m gy, blky, m hd,mic mica,occ glauc

SS wh,vfg,sb ang,w srt,p-m cons,p intgrn & sl arg,rr SH lt-m gy, blky, mod. mic mica,occ glauc mnr dism & nod pyr

SH lt-m gy, blky,hd,mic mica,occ glauc

SH oc mnr ss wh vfg mnr pyr

SH lt-m gy, blky,occ fis,hd mica mic mnr pyr nod

SH m gy blky occ fis,mic mica,occ sl calc,mnr dism pyr, sft m hd

SS lt gy,tan,lt brn,m brn in pt,vfgr slty,grdg to sltst in pt, sb ang,sb rnd, sil,glauc,rr, rr dism pyr & pyr nod,no shows

SH m gy,blky, fis in pt,sl calc,rr dism pyr,m hd

SS tan,lt brn,crm gy,vfgr slty,rr f ltg fgr,sb rnd,sb ang,abnt glauc,rr,SH m dk gy,fis, blky,med hd

SS gy wh,vf gr,m srt,w cons,sil,arg,rr SH dk gy,blk,blky,hd, mic mica,occ carb,SS dk gy,vfgr,w srt,w cons,sil cmt,v arg,rr

SS dk gy,vfgr,w srt,w cons,sil cmt,v arg,rr

SS tan,lt brn,smky,f-m gr,arg in pt,glauc, ang sb ang,rnd,sb rnd,cgl in pt,f srt,f cons rr tr chrt & qtz frags

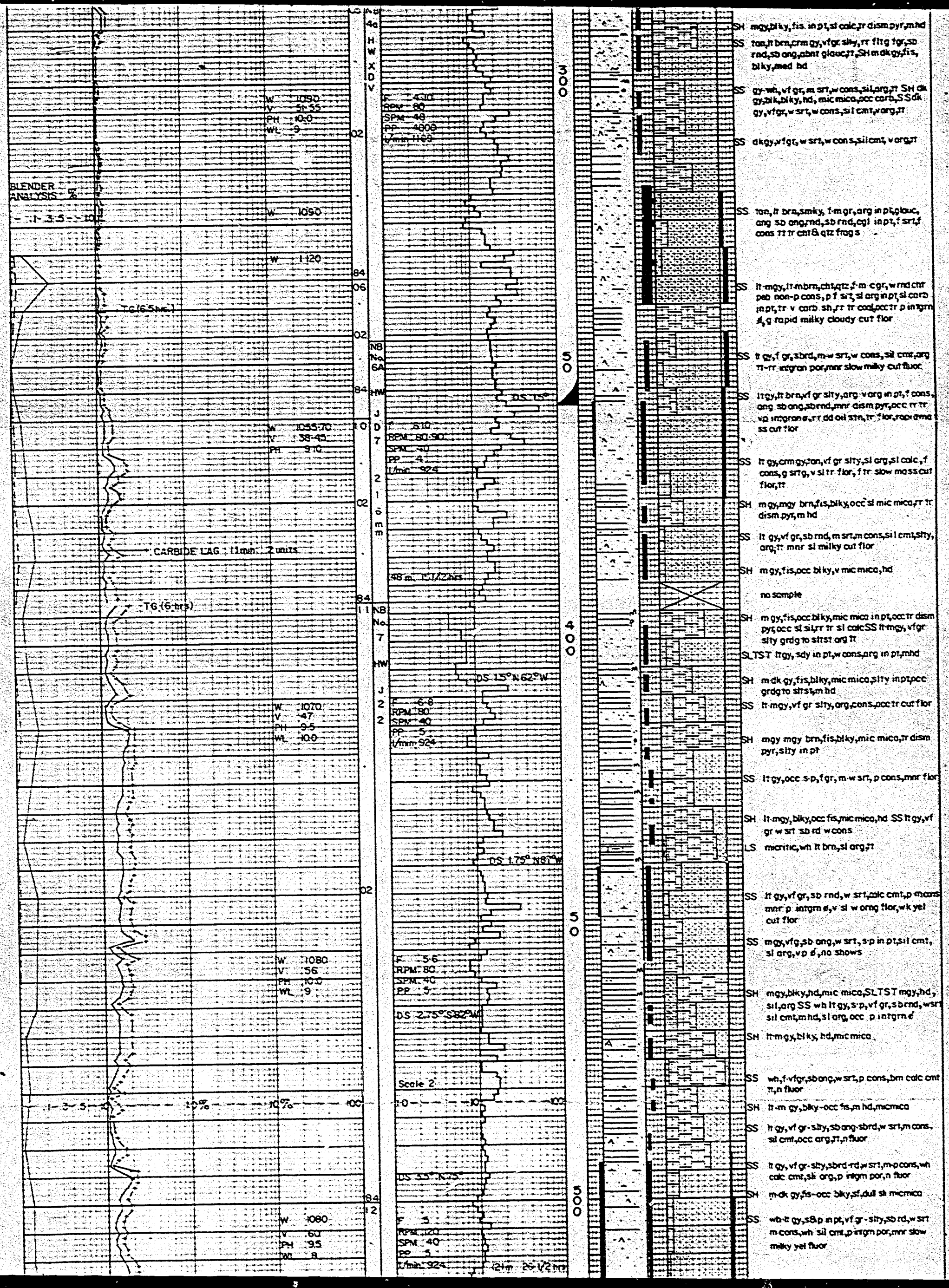
SS lt-m gy,lt m brn,cht,qtz,f-m-c gr,w rnd cht peb non-p cons,p f srt,sl arg in pt,sl carb in pt,tr v carb sh,rr tr coal,occ tr p intgrn & g rapid milky cloudy cut flor

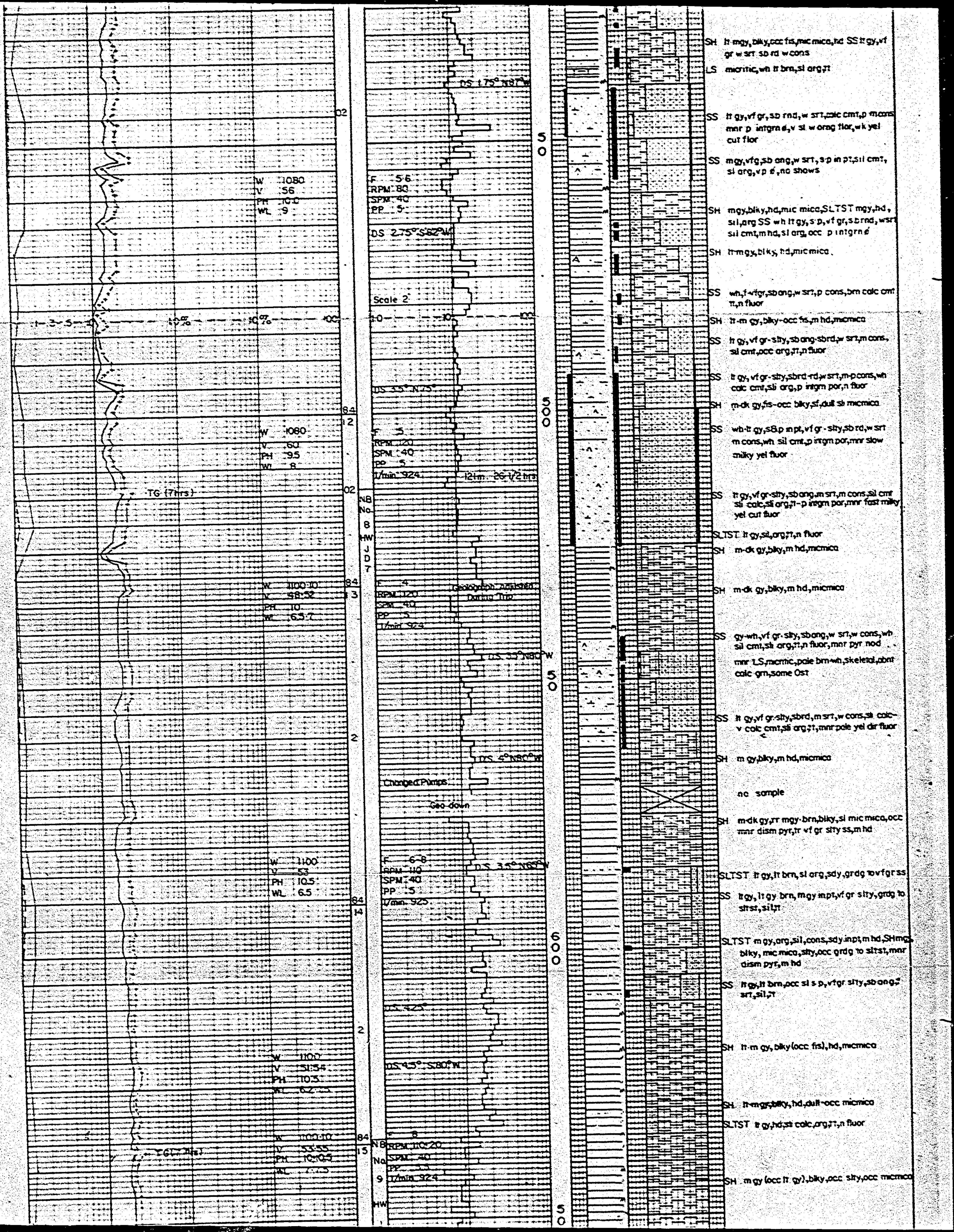
SS lt gy,f gr,sbrd,m-w srt,w cons,sil cmt,arg rr-tr intgran por,mnr slow milky cut fluor

SS lt gy,lt brn,vf gr slty,arg-v arg in pt,f cons, ang sb ang-sb rnd,mnr dism pyr,occ rr tr vp intergran,rr od oil stn,tr flor,rap dmss cut flor

SS lt gy,crm gy,tan,vf gr slty,sl arg,sl calc,f cons,g srtg,v sl tr flor,f tr slow mass cut flor,tr

SH m cy,m-y brn,fis,blky,occ sl mic mica,rr tr


W 1090
V 51-55
PH 10.0
WL 9
BLENDER ANALYSIS %
W 1090
W 1120
TG (6.5 hrs)
W 1055-70
V 38-42
PH 9.10
CARBIDE LAG 11 min. 2 units
TG (6 hrs)
W 1070
V 47
PH 9.5
WL 10.0
W 1080
V 56
PH 10.0
WL 9
W 1080
V 60
PH 9.5
WL 8
F 4.10
RPM 80
SPM 48
PP 4000
L/min 1169
DS 15°
F 5.10
RPM 80-90
SPM 40
PP 4
L/min 925
48 m. 1 1/2 hrs
F 6-8
RPM 80
SPM 40
PP 5
L/min 924
DS 15° N 62° W
F 5-6
RPM 80
SPM 40
PP 5
DS 2.75° S 82° W
DS 1.75° N 81° W
Scale 2
F 5
RPM 120
SPM 40
PP 5
L/min 924
121 m 2 1/2 hrs
DS 35° N 15°
HWXDV
NB No. 6A
HW J D 7
2 1 0 m m
NB No. 7
HW J 2 2
300
50
400
500
SH mgy,blky,fis sm pt,sl calc,rr dism pyr,m hd
SS tan,lt brn,crm gy,vf gr sily,rr fltg fgr,sb rnd,sb ang,abnt glauc,rr,SH m dk gy,fis, blky,med hd
SS gy-wh,vf gr,m srt,w cons,sil,arg,rr SH dk gy,blk,blky,hd,mic mica,occ carb,SS dk gy,vf gr,w srt,w cons,sil cmt,v arg,rr
SS dk gy,vf gr,w srt,w cons,sil cmt,v arg,rr
SS tan,lt brn,smky,f-m gr,arg in pt,glauc, ang sb ang,rnd,sb rnd,cgl in pt,f srt,f cons rr lt cht & qtz frags
SS lt-mgy,lt-m brn,cht,qtz,f-m-cgr,w rnd cht peb non-p cons,p f srt,sl arg in pt,sl carb in pt,tr v carb sh,rr lt coal,occ tr p intgrn ø,g rapid milky cloudy cut flor
SS lt gy,f gr,sbrd,m-w srt,w cons,sil cmt,arg rr-tr intgrn por,mnr slow milky cut fluor
SS lt gy,lt brn,vf gr silty,arg v arg in pt,f cons, ang sb ang,sb rnd,mnr dism pyr,occ rr lt vp intgrn ø,rr dd oil stn,tr flor,rare dmd ss cut flor
SS lt gy,crm gy,tan,vf gr silty,sl arg,sl calc,f cons,g srtg,v sl tr flor,f tr slow mass cut flor,rr
SH m gy,mgy brn,fis,blky,occ sl mic mica,rr lt dism pyr,m hd
SS lt gy,vf gr,sb rnd,m srt,m cons,sil cmt,silty, arg,rr mnr sl milky cut flor
SH m gy,fis,occ blky,v mic mica,hd
no sample
SH m gy,fis,occ blky,mic mica in pt,occ tr dism pyr,occ sl silt,rr lt sl calc SS lt-mgy,vf gr silty grdg to slt st arg lt
SLTST lt gy,sdy in pt,w cons,arg in pt,m hd
SH m-dk gy,fis,blky,mic mica,silty in pt,occ grdg to slt st,m hd
SS lt-mgy,vf gr silty,arg,cons,occ tr cut flor
SH mgy mgy brn,fis,blky,mic mica,tr dism pyr,silty in pt
SS lt gy,occ s-p,f gr,m-w srt,p cons,mnr flor
SH lt-mgy,blky,occ fis,mic mica,hd SS lt gy,vf gr w srt sb rd w cons
LS micritic,wh lt brn,sl arg,rr
SS lt gy,vf gr,sb rnd,w srt,calc cmt,p m cons mnr p intgrn ø,v sl w org flor,w k yel cut flor
SS mgy,vfg,sb ang,w srt,s-p in pt,sil cmt, sl arg,v p ø,no shows
SH mgy,blky,hd,mic mica,SLTST mgy,hd, sil,arg SS wh lt gy,s-p,vf gr,sb rnd,w srt sil cmt,m hd,sl arg,occ p intgrn ø
SH lt-mgy,blky,hd,mic mica
SS wh,f-vfgr,sb ang,w srt,p cons,brn calc cmt rr,n fluor
SH lt-m gy,blky-occ fis,m hd,mic mica
SS lt gy,vf gr-silty,sb ang-sbrd,w srt,m cons, sil cmt,occ arg,rr,n fluor
SS lt gy,vf gr-silty,sbrd-rd,w srt,m-p cons,wh calc cmt,sli arg,p intgrn por,n fluor
SH m-dk gy,fis-occ blky,sf,dull sh mic mica
SS wh-lt gy,s&p in pt,vf gr-silty,sb rd,w srt m cons,wh sil cmt,p intgrn por,mnr slow milky yel fluor



SH lt mgy, blky, occ fis, mic mica, hd SS lt gy, vf gr w srt sb rd w cons

LS micritic, wh lt brn, sl arg, tt

SS lt gy, vf gr, sb rnd, w srt, calc cmt, p m cons mnr p intgrn ø, v sl w orng flor, wk yel cut flor

SS mgy, vfg, sb ang, w srt, s-p in pt, sil cmt, sl arg, v p ø, no shows

SH mgy, blky, hd, mic mica, SLTST mgy, hd, sil, arg SS wh lt gy, s-p, vf gr, sb rnd, w srt sil cmt, m hd, sl arg, occ p intgrn ø

SH lt-mgy, blky, hd, mic mica.

SS wh, f-vf gr, sb ang, w srt, p cons, brn calc cmt tt, n fluor

SH lt-m gy, blky-occ fis, m hd, micmica

SS lt gy, vf gr-slty, sb ang-sbrd, w srt, m cons, sil cmt, occ arg, tt, n fluor

SS lt gy, vf gr-slty, sbrd-rd, w srt, m-p cons, wh calc cmt, sli arg, p intgrn por, n fluor

SH m-dk gy, fis-occ blky, sf, dull sb micmica

SS wh-lt gy, s&p in pt, vf gr-slty, sb rd, w srt m cons, wh sil cmt, p intgrn por, mnr slow milky yel fluor

SS lt gy, vf gr-slty, sb ang, m srt, m cons, sil cmt sli calc, sli arg, tt-p intgrn por, mnr fast milky yel cut fluor

SLTST lt gy, sil, arg, tt, n fluor

SH m-dk gy, blky, m hd, micmica

SH m-dk gy, blky, m hd, micmica

SS gy-wh, vf gr-slty, sb ang, w srt, w cons, wh sil cmt, sli arg, tt, n fluor, mnr pyr nod

mnr LS, micritic, pale brn-wh, skeletal, abnt calc grn, some Ost

SS lt gy, vf gr-slty, sbrd, m srt, w cons, sli calc-v calc cmt, sli arg, tt, mnr pale yel dir fluor

SH m gy, blky, m hd, micmica

no sample

SH m-dk gy, tr mgy-brn, blky, sl mic mica, occ mnr dism pyr, tr vf gr slty ss, m hd

SLTST lt gy, lt brn, sl arg, sdy, grdg to vf gr ss

SS lt gy, lt gy brn, mgy inpt, vf gr slty, grdg to sltst, sil, tt

SLTST m gy, arg, sil, cons, sdy inpt, m hd, SH mgy, blky, mic mica, slty, occ grdg to sltst, mnr dism pyr, m hd

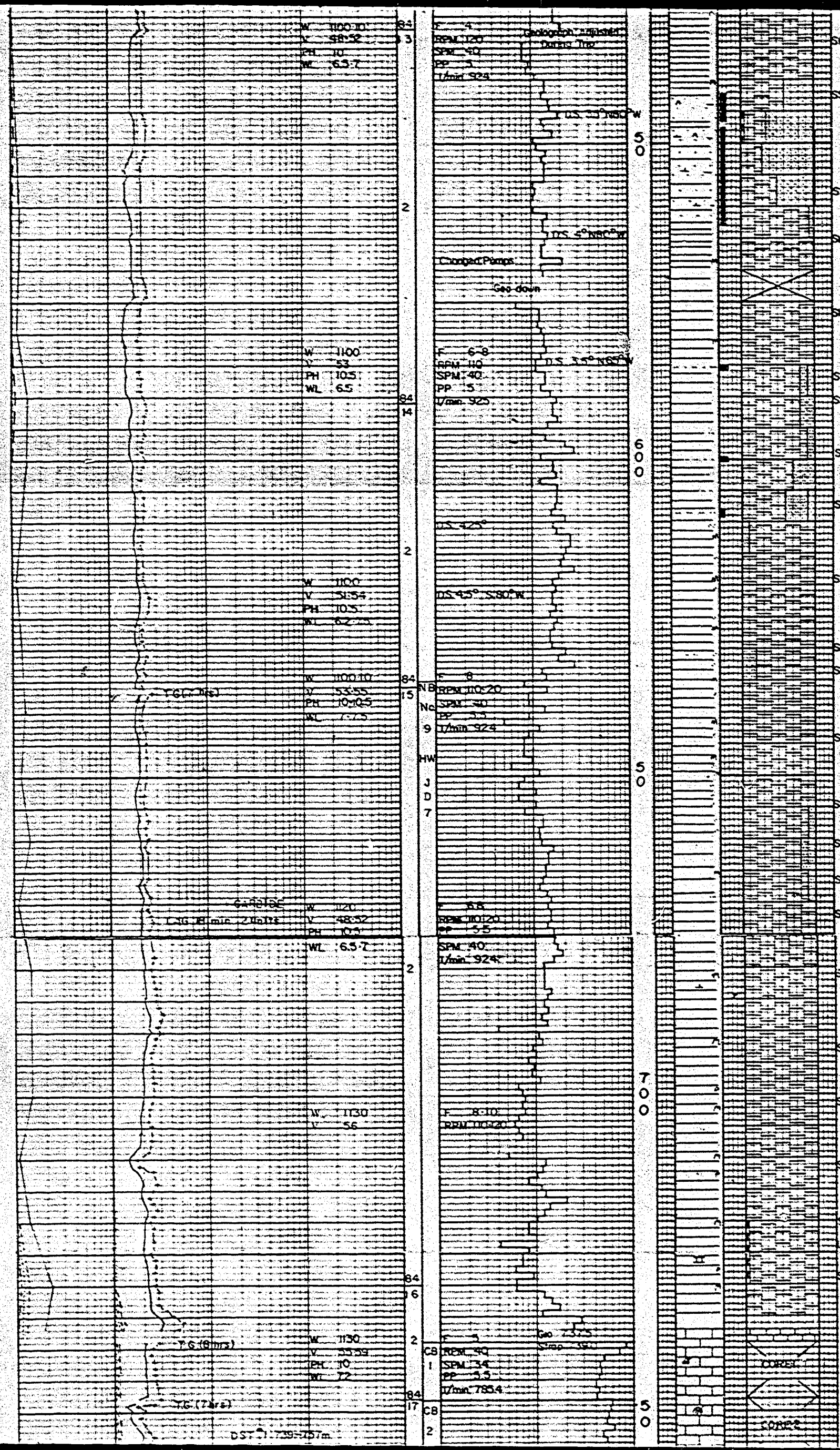
SS lt gy, lt brn, occ sl s p, vf gr slty, sb ang, srt, sil, tt

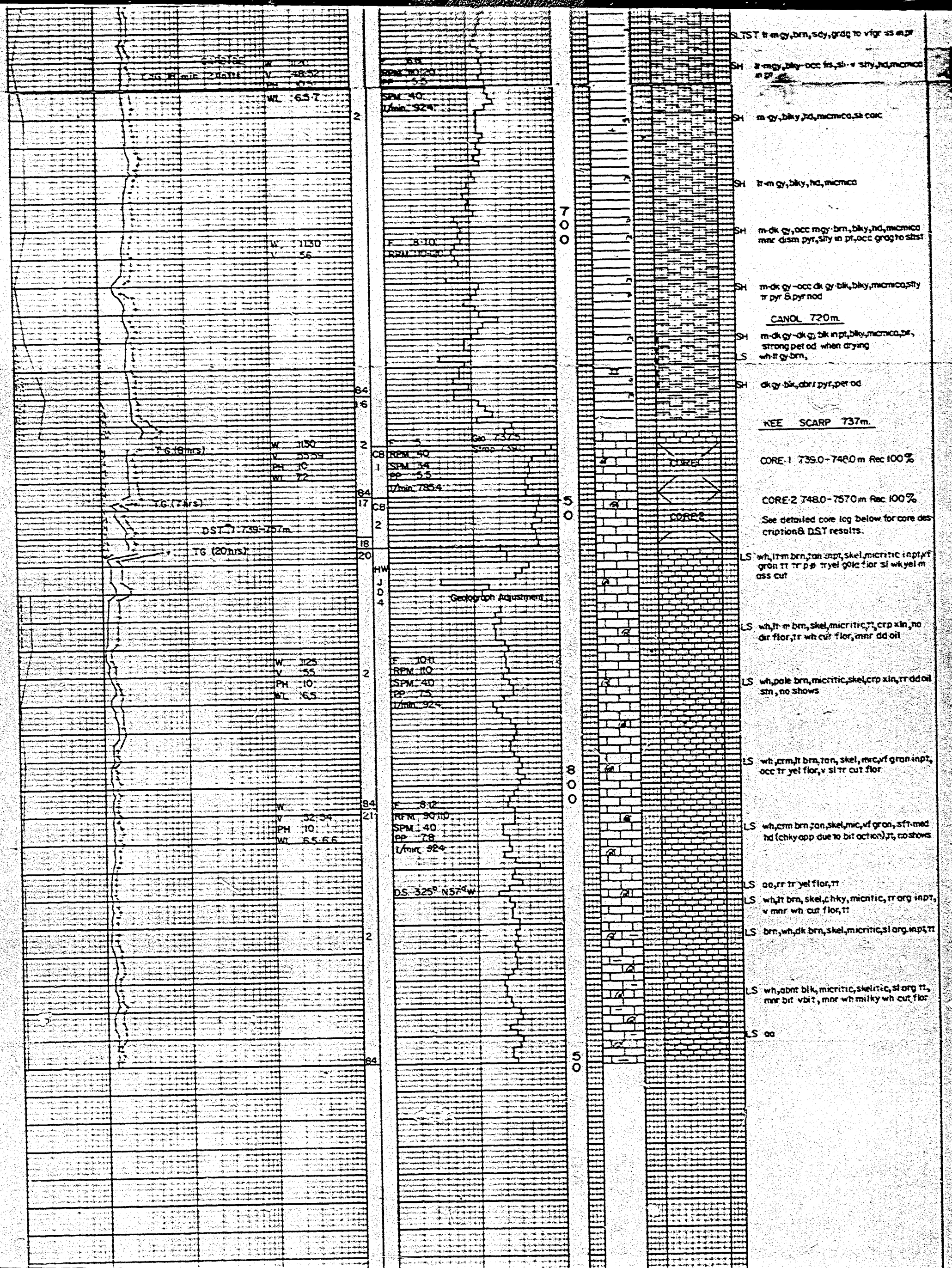
SH lt-m gy, blky (occ fis), hd, micmica

SH lt-mgy, blky, hd, dull-occ micmica

SLTST lt gy, hd, sli calc, org, tt, n fluor

SH m gy (occ lt gy), blky, occ slty, occ micmica


Geologist Installed During Trip
Changed Pumps
Geo down
DST 1 739-757m
CORE 1
CORE 2
SH m-dk gy,blky,m hd,micmica
SS gy-wh,vf gr-slty,sbang,w srt,w cons,wh sil cmt,sb org,tr,n fluor,mnr pyr nod
mnr LS,micmic,pale brn-wh,skeletal,abnt calc grn,some Ost
SS lt gy,vf gr slty,sbrd,m srt,w cons,sli calc-v calc cmt,sb org,tr,mnr pale yel dir fluor
SH m gy,blky,m hd,micmica
no sample
SH m-dk gy,tr mgy-brn,blky,sl mic mica,occ mnr dism pyr,tr vf gr slty ss,m hd
SLTST lt gy,lt brn,sl org,sdy,grdg to vf gr ss
SS lt gy,lt gy brn,m gy in pt,vf gr slty,grdg to sltst,sil,tr
SLTST m gy,org,sil,cons,sdy in pt,m hd,SH mgy,blky,mic mica,slty,occ grdg to sltst,mnr dism pyr,m hd
SS lt gy,lt brn,occ sl s-p,vf gr slty,sb ang,srt,sil,tr
SH lt-m gy,blky (occ fis),hd,micmica
SH lt-mgy,blky,hd,dull-occ micmica
SLTST lt gy,hd,sli calc,org,tr,n fluor
SH m gy (occ lt gy),blky,occ slty,occ micmica
SH m gy,blky-occ fis,hd,slty-occ grdg to sltst,micmica
SLTST m gy,org,sil,grdg to sh in pt,hd
SLTST lt-m gy,brn,sdy,grdg to vf gr ss in pt
SH lt-mgy,blky-occ fis,sl-v slty,hd,micmica in pt
SH m-gy,blky,hd,micmica,sli calc
SH lt-m gy,blky,hd,micmica
SH m-dk gy,occ mgy-brn,blky,hd,micmica mnr dism pyr,slty in pt,occ grdg to sltst
SH m-dk gy-occ dk gy-blk,blky,micmica,slty tr pyr & pyr nod
CANOL 720m
SH m-dk gy-dk gy blk in pt,blky,micmica,bit, strong pet od when drying
LS wh-lt gy-brn,
SH dk gy-blk,abnt pyr,pet od
KEE SCARP 737m.
CORE 1 739.0-748.0 m Rec 100%
CORE 2 748.0-757.0 m Rec 100%
See detailed core log below for core description & DST results


SLTST lt-m gy,brn,sdy,grdg to vfgr ss in pt
SH lt-m gy,blky-occ fis,sl-v slty,hd,micmica in pt
SH m-gy,blky,hd,micmica,sl calc
SH lt-m gy,blky,hd,micmica
SH m-dk gy,occ m gy-brn,blky,hd,micmica mnr dism pyr,slty in pt,occ grdg to sltst
SH m-dk gy-occ dk gy-blk,blky,micmica,slty tr pyr & pyr nod
CANOL 720m.
SH m-dk gy-dk gy blk in pt,blky,micmica,bit, strong pet od when drying
LS wh-lt gy-brn,
SH dk gy-blk,abnt pyr,pet od
KEE SCARP 737m.
CORE-1 739.0-748.0 m Rec 100%
CORE-2 748.0-757.0 m Rec 100%
See detailed core log below for core description & DST results.
LS wh,lt-m brn,tan,sdpt,skel,micritic in pt,tr gran,tr tr p ø tr yel gold flor sl wk yel m ass cut
LS wh,lt-m brn,skel,micritic,tr crp xln,no dir flor,tr wh cut flor,mnr dd oil
LS wh,pale brn,micritic,skel,crp xln,rr dd oil stn,no shows
LS wh,crm,lt brn,tan,skel,mic,vf gran in pt, occ tr yel flor,v sl tr cut flor
LS wh,crm brn,tan,skel,mic,vf gran,sft-med hd (chky app due to bit action),tr,no shows
LS aa,rr tr yel flor,tr
LS wh,lt brn,skel,chky,micritic,tr org in pt, v mnr wh cut flor,tr
LS brn,wh,dk brn,skel,micritic,sl org in pt,tr
LS wh,abnt blk,micritic,skelitic,sl org tr, mnr bit vbit,mnr wh milky wh cut flor
LS aa
CORE1
CORE2
Geologrph Adjustment
DS 325° N57°W
TG (8hrs)
TG (7hrs)
DST 739-757m
TG (20hrs)
HW
J
D
4
CB
1
CB
2
700
500
800
500

W 1125
V 55
PH 10
WL 6.5

W
V 32.34
PH 10
WL 6.5 6.5

F 10 11
RPM 110
SPM 40
PP 75
l/min 924

F 8 12
RPM 90 110
SPM 40
PP 78
l/min 924

DS 325° N57°W

8
0
0

5
0

dur flor, fr wh cut flor, mnr dd oil

LS wh, pale brn, micritic, skel, crp xln, fr dd oil stn, no shows

LS wh, crm, lt brn, tan, skel, mic, vf gran inpt, occ fr yel flor, v sl fr cut flor

LS wh, crm brn, tan, skel, mic, vf gran, sft-med hd (chky app due to bit action), fr, no shows

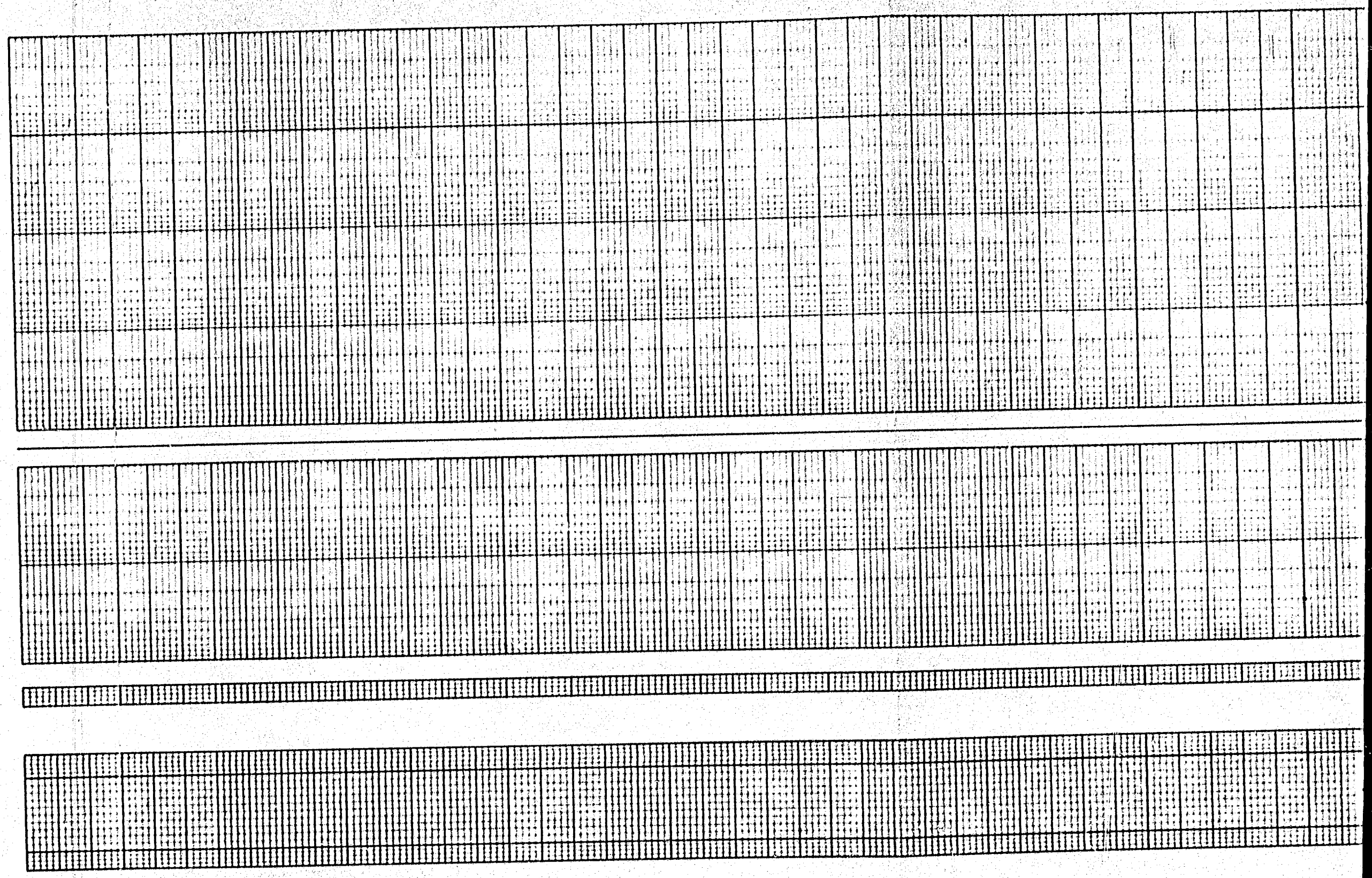
LS aa, rr fr yel flor, fr

LS wh, lt brn, skel, chky, micritic, rr org inpt, v mnr wh cut flor, fr

LS brn, wh, dk brn, skel, micritic, sl org, inpt, fr

LS wh, abnt blk, micritic, skelitic, sl org fr, mnr bit vbit, mnr wh milky wh cut flor

LS aa



PRO GEO CONSULTANTS

SAMPLE AND CORE LOG

WELL NAME PCI et al HOOSIER RIDGE N 22 Prov. N.W.T.

Location 65° 21' 56.63" N. LAT 127° 34' 48.65" W. LONG Field EXPLORATION

Elevation K.B. 160.33 m GL 154.13 m

Spudded 84-01-31 @ 0330 hrs Rig Released _____ Status _____

Total Depth 1095 DRILLER Formation HUME Logs Run SEE LOG BOTTOM

Interval Logged 100 – 1095 Casing Record 37 m x 340 mm with 9.3 Tonnes
357 m x 245 mm with 34.0 Tonnes
_____ x _____ with _____ Tonnes

REMARKS _____

GEOLOGIST T. VADER Date _____

LIMESTONE: Crypto-Crystalline; Pelletoidal; Bioclastic-Fragmental; Oolitic; Algal; Crinoidal; Cherty; Coral; Lithographic

DOLOMITE: Crystalline

EVAPORITES: Anhydrite; Salt

CLASTICS: Shale; Siltstone; Sandstone; Conglomerate; Coal; Arkose

IGNEOUS-METAMORPHIC: Granite; Metamorphic

ADDITIONAL SYMBOLS: Calcareous; Dolomitic; Anhydritic; Calcite Crystal; Dolomite Crystal; Bentonite; Brecciated; Earthy; Sandy; Argillaceous; Bituminous; Chert-Siliceous; Ironstone; Ostracod; Spore; Silty; Glauconite; Marl Calcareous; Marl Dolomitic; Siderite; Clr Calcite Cmt.; Pyrite; Bryozoa; Fossil

SHOWS: Good; Slight; Pyrobitumen

SORTING: W Well; M Medium; P Poor

TEST & CORE: Test Interval; Core Interval; Perforation; Wire Line Test

POROSITY: I Intergranular; V Vugular; E Earthy; F Fracture, closed; F Fracture, open

ROUNDING: A Angular; a Sub-angular; r Sub-round; R Round

MILLIMETERS: 0, 10, 20, 30, 40, 50, 60, 70, 80

DRILLING TIME LOG

DEPTH	DST&CORE	GRAPHIC LOG	SHOWS • STAINING	POROSITY: POOR, FAIR, GOOD	GRAIN OF CRYSTAL SIZE: SILT, V. FINE, FINE, MED., COARSE	LITHOLOGY — ROCK DESCRIPTION PROCEDURE
METRES						GROSS ROCK TYPE; COLOR; COMPOSITION; GRAIN SIZE; ROUNDING, SORTING, INDURATION; CEMENTATION; POROSITY; PERMEABILITY; STAINING, FLOURESCENCE, CUT; STRUCTURES
35	4-10mm Hole					

Sandstone | Arkose | IGNEOUS-METAMORPHIC | Granite | Metamorphic

POROSITY: Intergranular, Vugular, Earthy, Fracture, closed, Fracture, open

ROUNDING: Angular, Sub-angular, Sub-round, Round

Perforation, Wire Line Test

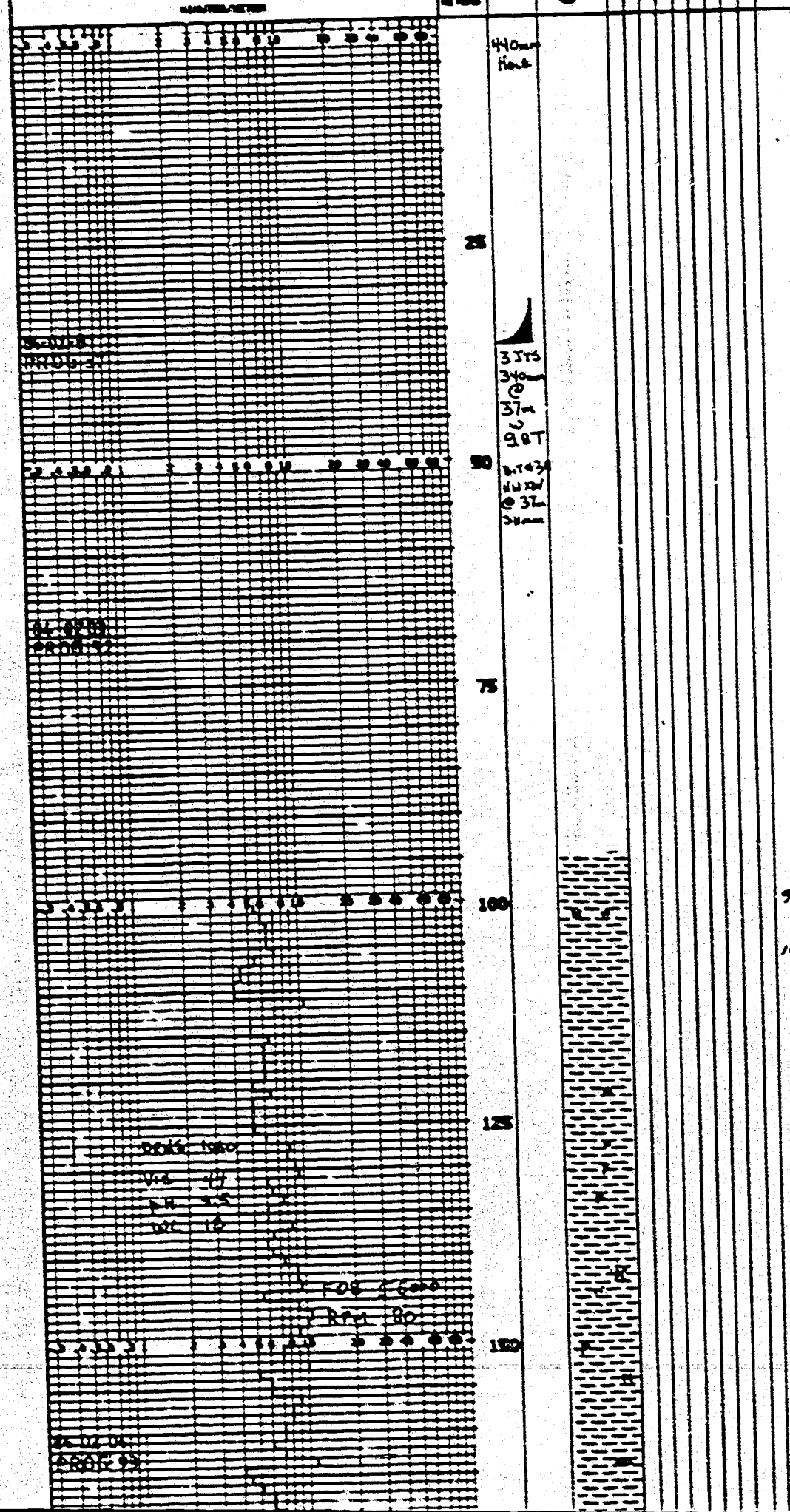
DRILLING TIME LOG

DEPTH	DST&CORE	GRAPHIC LOG	SHOWS + STAINING	POROSITY: POOR, FAIR, GOOD	GRAIN OR CRYSTAL SIZE: SILT, V. FINE, FINE, MED., COARSE	LITHOLOGY

ROCK DESCRIPTION PROCEDURE

GROSS ROCK TYPE
COLOR
COMPOSITION
GRAIN SIZE
ROUNDING, SORTING, INDURATION
CEMENTATION

POROSITY
PERMEABILITY
STAINING, FLOURESCENCE, CUT
STRUCTURES



95-107m SHALE: DK GY, SUB FISS, MIC-MICA, SOFT, SL CARB, tr INOC

107-150 SHALE: DK GY, SUB FISS, MIC-MICA, SOFT, SL CARB-CARB ⅓, tr INOC, tr WH KAO SH, OCNL QTZ & CHT GRNS, OCNL CARB FLECKS, OCNL ? FOSS FRAGS

OCNL QTZ & CHT GRNS

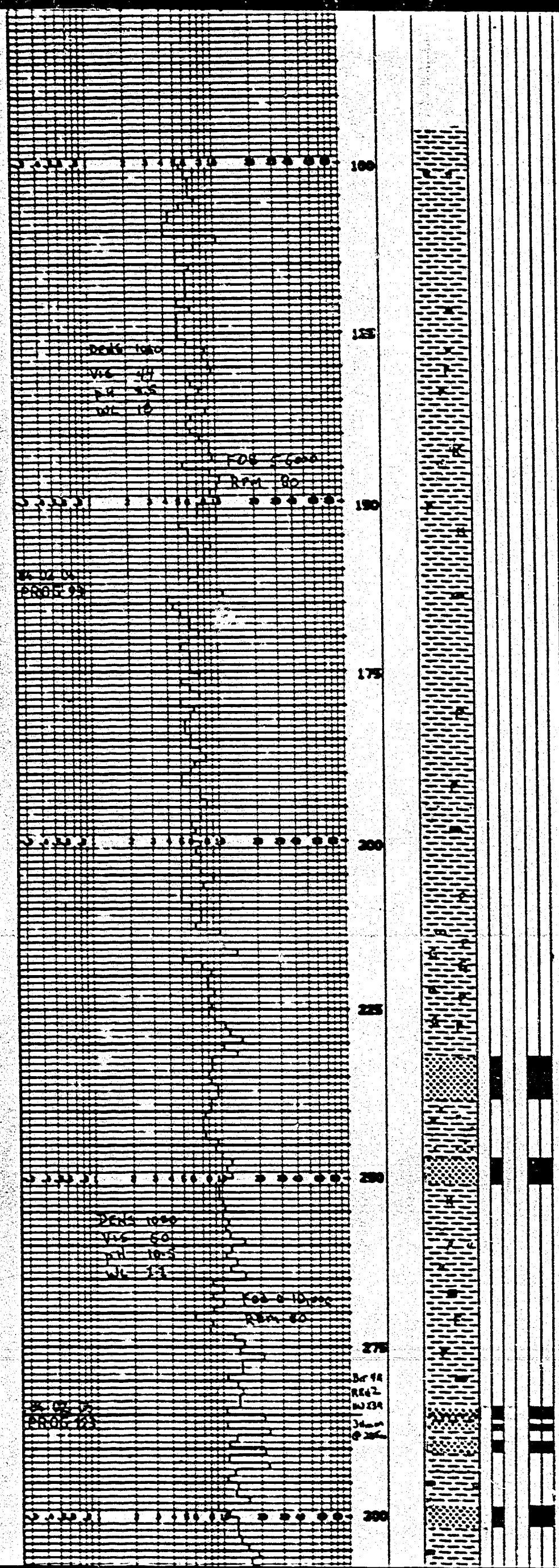
UNIDENTIFIABLE FOSS FRAGS

COM WH KAO SH W RBHT MICA FLAKES tr ss

150-180 SHALE: DK GY, SUB FISS, MIC-MICA, SOFT, SLICARB, tr INOC, tr KAO SH, tr PYR

tr WH KAO SH

tr PYR tr BRN SID SH



95-107 SHALE: DK GY, SUB FISS, MIC-MICA, SOFT, SL CARB, tr INOC

107-150 SHALE: DK GY, SUB FISS, MIC-MICA, SOFT, SL CARB-CARB ⅓, tr INOC, tr WH Kao SH, OCNL QTZ & CHT GRNS, OCNL CARB FLECKS, OCNL ? FOSS FRAGS

OCNL QTZ & CHT GRNS

UNIDENTIFIABLE FOSS FRAGS

COM WH Kao SH W RBHT MICA FLAKES tr ss

150-180 SHALE: DK GY, SUB FISS, MIC-MICA, SOFT, SLCARB, tr INOC, tr Kao SH, tr pyr

tr WH Kao SH

tr pyr tr BRN SID SH

180-207 SHALE: DK GY, BLKY-SUB FISS, MIC-MICA, SOFT, SL CARB tr pyr

tr pyr

tr BRN SID SH

207-232 SHALE: DK GY, BLKY-SUB FISS, V. MIC-MICA, SL DISS PYR, SOFT.

tr MED BRN SID SH, tr pyr

COM GLAUC INCL

232-238 SANDSTONE: LT-MED GY, QTZ, LITH FRAGS, SLT-VFG, CALC CMT, tr pyr CMT, SIL CMT, ARG-V. ARG MATRIX, POOR EFF INTRGRN ϕ

238-248 SHALE: MED-DK GY, BLKY, SL CALC, SL SLTY & SDY - SLTY & SDY

tr SS: A/A

248-251 SANDSTONE: LT GY, QTZ, LITHIC FRAGS, MICA FLAKES, CALC SIL & MINOR PYR CMT, ARG MATRIX, SLT-VFG, POOR EFF INTRGRN ϕ

251-265 SHALE: DK GY, BLKY-SUB FISS, MIC-MICA, SL SLTY & SDY ⅓, tr SLTST,

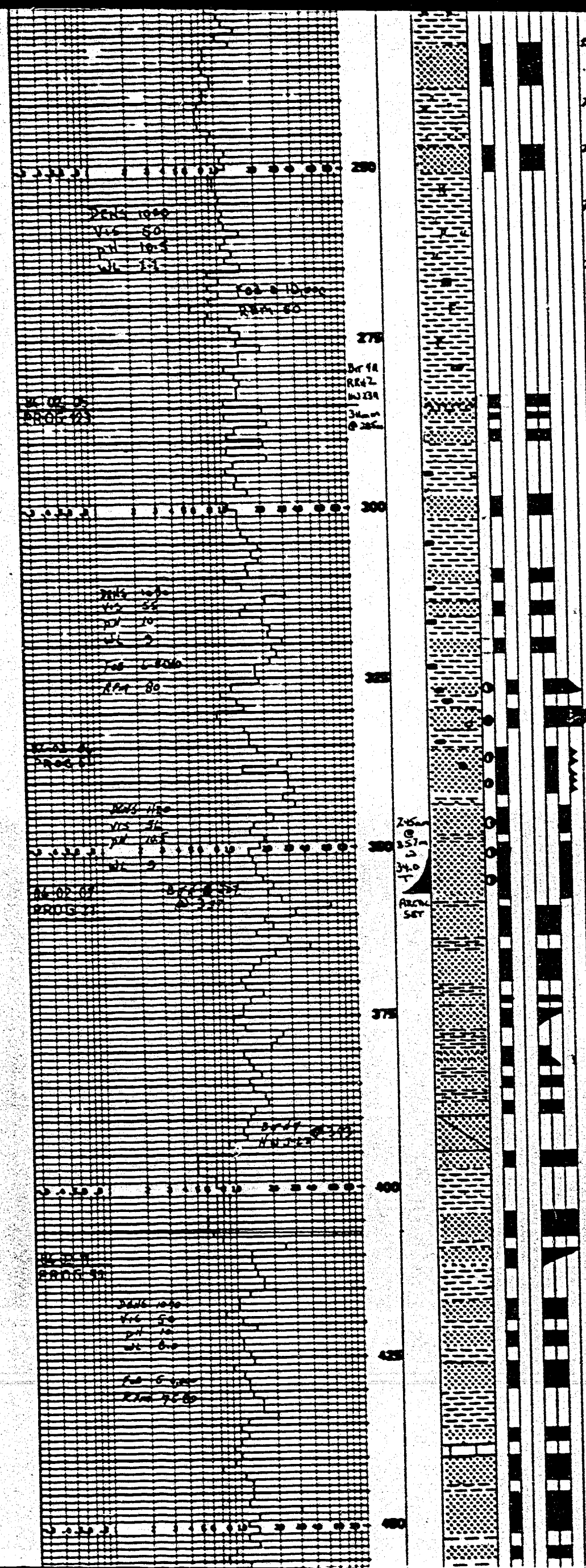
265-284 SHALE: DK GY-BLK, SUB FISS, MIC-MICA, SL CARB ⅓, tr DISS PYR, tr CARB MATTER,

UNIDENT FOSS FRAG

tr BRN SID SH

284-298 INTERBEDS OF SHALE: DK GY-BLK, SUB FISS, MIC-MICA, SL CARB, SDY & SLTY ⅓ + SANDSTONE: MED GY/BRN QTZ, VFG, SA, WS, CALC CMT, SIL CMT, tr pyr CMT, ARG MATRIX, POOR EFF INTRGRN ϕ

298-308 INTERBEDS OF SHALE: DK GY-BLK, BLKY-SUB FISS, MIC-MICA, CARB ⅓ OCNL CARB FLECKS, tr CALC VEIN, & SANDSTONE: MED GY/BRN-DK GY, QTZ, SLT-VFG, SA, WS, SIL CMT tr CALC



232-238 SANDSTONE: LT-MED GY, QTZ, LITH FRAGS, SLT-VFG, CALC CMT, tr PYR CMT, SIL CMT, ARG-V ARG MATRIX, POOR EFF INTERGRN Φ

238-248 SHALE: MED-DK GY, BLKY, SL CALC, SL SLTY & SDY — SLTY & SDY
tr SS: A/A

248-251 SANDSTONE: LT GY, QTZ, LITHIC FRAGS, MICA FLAKES, CALC SIL & MINOR PYR CMT, ARG MATRIX, SLT-VFG, POOR EFF INTERGRN Φ

251-265 SHALE: DK GY, BLKY-SUB FISS, MIC-MICA, SL SLTY & SDY Y/P, tr SLTST,

265-284 SHALE: DK GY-BLK, SUB FISS, MIC-MICA, SL CARB Y/P, tr DISS PYR, tr CARB MATTER,
UNIDENT FOSS FRAG

tr BRN SID SH

284-298 INTERBEDS OF SHALE: DK GY-BLK, SUB FISS, MIC-MICA, SL CARB, SDY & SLTY Y/P & SANDSTONE: MED GY/BRN QTZ, VFG, SR, WS, CALC CMT, SIL CMT, tr PYR CMT, ARG MATRIX, POOR EFF INTERGRN Φ

298-308 INTERBEDS OF SHALE: DK GY-BLK, BLKY-SUB FISS, MIC-MICA, CARB Y/P, OCNL CARB FLECKS, tr CALC VEIN, & SANDSTONE: MED GY/BRN-DK GY, QTZ, SLT-VFG, SR, WS, SIL CMT, tr CALC CMT, tr PYR CMT, BLACK ARG MATRIX, POOR EFF INTERGRN Φ
OCNL M-C GRN QTZ.

308-326 SHALE: A/A WITH STRINGERS OF SANDSTONE: A/A BUX BCOMG & ARG Y/P

326-328 SANDSTONE: LT GY/BRN, QTZ, VF-FG, OCNL MG, SR-R, WS, SIL CMT, SL ARG MATRIX Y/P, OCNL PEBL FAIR EFF Φ tr WK YEL FLUOR, tr FAST V. WK YEL CUT

328-330 SHALE: BLK, BLKY, MIC-MICA Y/P, SL CARB Y/P

330-333 SANDSTONE: LT GY, QTZ, VF-MG, OCNL CG SR-SR, M-PS, SIL CMT, ARG MATRIX Y/P, FAIR INTERGRN Φ, tr LOS, COM WK YEL FLUOR, FAST, WK YEL MASS CUT, OCNL PEBL

333-336 SHALE: A/A

336-342 SANDSTONE: LT GY/BRN, QTZ, VFG, OCNL MG, MS, SIL CMT, ARG MATRIX CARB MATTER, POOR INTERGRN Φ, tr WK YEL FLUOR, FAST WK YEL MASS CUT

342-344 SH: A/A

344-348 SANDSTONE: MED GY/BRN, QTZ, FG, SR, WS, SIL CMT, ARG MATRIX, POOR EFF INTERGRN Φ tr LOS, tr WK ORNG FLUOR, tr SLOW WK YEL STRMG CUT

348-350 SHALE: A/A

350-357 SANDSTONE: A/A

357-360 INTERBEDS OF SANDSTONE: MED GY, QTZ, SLT-VFG, SR, WS, SIL CMT, tr PYR CMT, ARG-V ARG MATRIX, GRADES TO SDY SH Y/P, V. POOR Φ, tr V. WK ORNG FLUOR, SL YEL MASS FLUOR & SHALE: MED GY, SUB FISS, MIC-MICA, SLTY & SDY Y/P, GRADES TO SHY SS Y/P

360-374 SANDSTONE: A/A W tr LOS, COM WK YEL FLUOR, SLOW WK YEL MASS CUT, W OCC THIN BANDS OF SHALE: A/A

374-390 SHALE: MED GY, SUB FISS, MIC-MICA, SLTY & SDY, SK, W BANDS OF SANDSTONE: A/A COMMONLY FINING TO BANDS OF SLTST, V. SL tr OF ORNG FLUOR, SLOW V WK YEL MASS CUT

390-395 MISSED SAMPLE

395-408 INTERBEDS OF SHALE: MED GY, BLKY-SUB FIS, MIC-MICA, SIL, SLTY & SDY, GRADES TO SHY SS Y/P, AND SANDSTONE: MED GY, QTZ, SLT-FG, SR, WS, SIL CMT, ARG-V ARG MATRIX, V. POOR EFF INTERGRN Φ, COM SLTST

408-413 INTERBEDS OF SHALE: A/A & SS: A/A & SLTST: MED GY, QTZ, SLT, SR, WS, SIL CMT, ARG-V ARG, V. POOR Φ

413-416 SHALE: MED GY, BLKY-SUB FIS, MIC-MICA, SIL, SLTY & SDY Y/P, W MOR BANDS OF SANDSTONE: MED GY, QTZ, SLT-VFG, SR, WS, SIL CMT, ARG-V ARG MATRIX, V. POOR EFF INTERGRN Φ & MOR SLTST: A/A

416-424 SHALE: MED GY, BLKY-SUB FIS, MIC-MICA, SIL, SLTY & SDY Y/P, BCOMG SL CARB INTBD W SANDSTONE: A/A W tr WK ORNG FLUOR, & tr V. WK SLOW YEL CUT

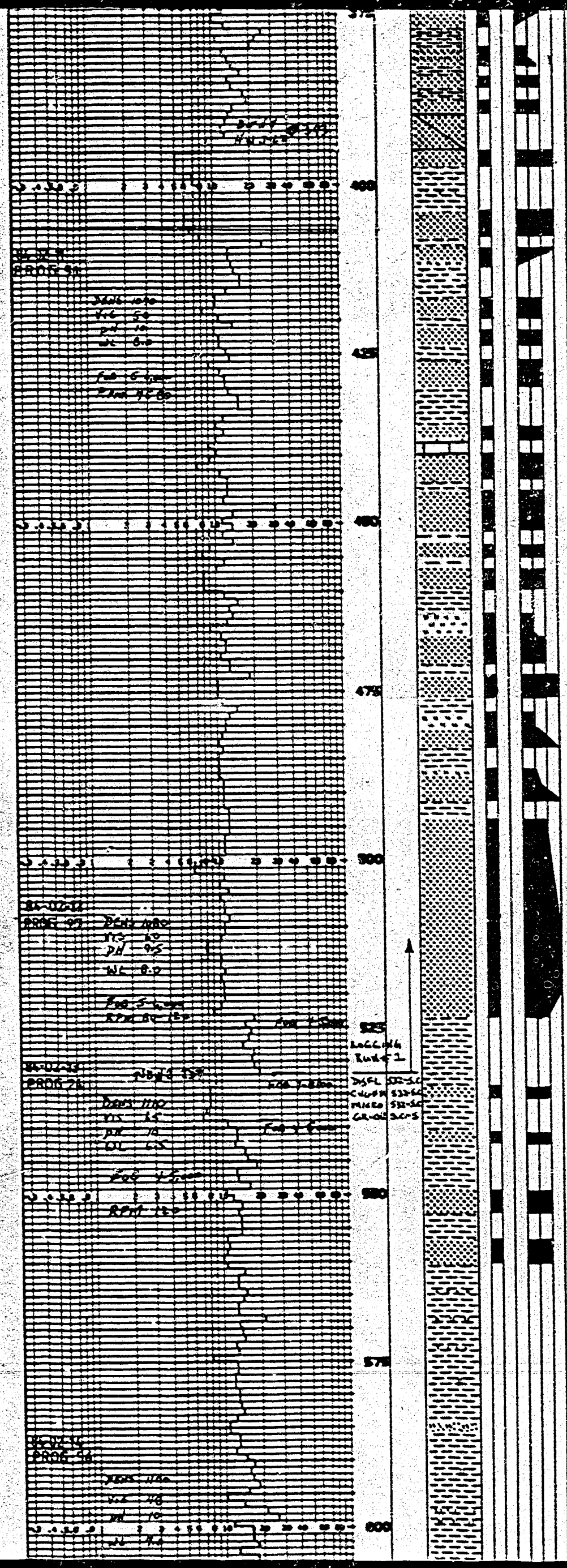
424-436 SH A/A INTBD W SANDSTONE: LT-MED GY, QTZ, SLT-V-FG, SR, WS, SIL CMT tr CALC CMT, ARG MATRIX, V. POOR EFF INTERGRN Φ, V. SL SHOWS, tr SLTST

436-442 SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, V. SLTY Y/P, tr CARB MAT W A THIN BAND OF SANDSTONE: A/A W A V. ARG MATRIX & LIMESTONE: MICRITIC-SKELETAL, WH-DK BRN, DOL Y/P, ARG Y/P, SL BIT Y/P, CALC CMT (ABNT OBT IN MICRITE MATRIX)

442-447 SANDSTONE: MED GY, QTZ, SLT-FG, SR, WS, SIL CMT, tr PYT CMT, ARG MATRIX, POOR EFF INTERGRN Φ, GRADES TO SLTST Y/P, OCC SH

447-448 SANDSTONE: WH-LT GY, QTZ, SLT-VFG, SR, WS, V. ABNT CALC CMT, V. POOR INTERGRN Φ. GRADES TO SDY MICRITIC LS

448-452 SANDSTONE: LT GY, QTZ, SLT-FG, SR, WS, ABNT CALC CMT, tr PYT CMT, SL ARG MATRIX, [illegible]



374-390 SHALE: MED GY, SUB FISS, MIC-MICA, SLTY & SDY, SIL, W BANDS OF SANDSTONE: A/A COMMONLY FINING TO BANDS OF SLTST, V. SL tr OF ORGN FLOOR, SLOW V WK YEL MASS CUT

390-395 MISSED SAMPLE

395-408 INTERBEDS OF SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, SIL, SLTY & SDY, GRADES TO SDY SS YP, AND SANDSTONE: MED GY, QTZ, SLT-FG, SA, WS, SIL CMT, ARG-V ARG MATRIX, V. POOR EFF INTERGRN Φ, COM SLTST

408-413 INTERBEDS OF SHALE: A/A & SS: A/A & SLTST: MED GY, QTZ, SLT, SA, WS, SIL CMT, ARG-V ARG, V. POOR Φ

413-416 SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, SIL, SLTY & SDY YP, W MOR BANDS OF SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, ARG-V. ARG MATRIX, V. POOR EFF INTERGRN Φ + MINR SLTST: A/A

416-424 SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, SIL, SLTY & SDY YP, SLIGHT SL CARB INTBD W SANDSTONE: A/A W tr WK ORGN FLOOR, & tr V. WK SLOW MASS YEL CUT

424-436 A/A INTBD W SANDSTONE: LT-MED GY, QTZ, SLT-V. FG, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, V. POOR EFF INTERGRN Φ, V. SL SHOWS, tr SLTST

436-442 SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, V. SLTY YP, tr CARB MAT W A THIN BAND OF SANDSTONE: A/A W A V. ARG MATRIX & LIMESTONE: MICRITIC-SKELETAL, WD-DK BRN, DOL YP, ARG YP, SL BIT YP, CALC CMT (ABNT OST IN MICRITE MATRIX)

442-447 SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, tr PYR CMT, ARG MATRIX, POOR EFF INTERGRN Φ, GRADES TO SLTST YP, MOR SH

447-448 SANDSTONE: WD-LT GY, QTZ, SLT-VFG, SA, WS, V. ABNT CALC CMT, V. POOR INTERGRN Φ, GRADES TO SDY MICRITIC LS

448-452 SANDSTONE: LT GY, QTZ, SLT-VFG, SA, WS, ABNT CALC CMT, tr PYR CMT, SL ARG MATRIX, POOR EFF INTERGRN Φ, MOR WK ORGN FLOOR, FAST YEL MASS CUT

452-462 SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, tr CALC CMT, SIL CMT, SL ARG-ARG MATRIX, POOR EFF INTERGRN Φ, NO SHOWS

462-472 INTBD SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, SIL, SLTY & SDY YP & SANDSTONE: A/A & SILTSTONE: MED GY, QTZ, SLT, SA, WS, SIL CMT, ARG MATRIX, V. POOR EFF INTERGRN Φ

472-491 SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, SLTY & SDY YP, OCNL CARB FLECKS, W OCNL BANDS & BLEBS OF SANDSTONE: LT-MED GY, QTZ, SLT-FG, SA, WS, SIL CMT, MOR CALC CMT, tr PYR CMT, ARG MATRIX YP, POOR Φ, + MOR BANDS OF SILTSTONE: MED GY, QTZ, SLT, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, V. POOR Φ

491-496 SHALE: MED GY, OCNL DK GY, BLKY-SUB FISS, MIC-MICA, SLTY & SDY YP, OCNL CARB FLECKS

496-511 SANDSTONE: LT-MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, ARG MATRIX YP, POOR & tr V. WK-WK ORGN FLOOR, V. WK-WK SLOW YEL MASS CUT, RARE THIN SHALE BANDS

511-520 SANDSTONE: LT-MED GY, QTZ, SLT-FG, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, POOR EFF INTERGRN Φ, tr WK ORGN FLOOR, WK SLOW YEL MASS CUT

520-526 SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, tr CALC CMT, ARG-V. ARG MATRIX, V. POOR EFF INTERGRN Φ, NO SHOWS RARE SHALE BANDS

IMPERIAL FMTN 523■ (~362.67)

526-532 SHALE: MED-DK GY, BLKY, MIC-MICA, SIL, SL SLTY & SDY YP, MOR PARTS OF SS + SLTST: A/A

532-544 SHALE: MED-DK GY, BLKY, MIC-MICA, SIL, SLTY & SDY YP W OCNL BANDS OF SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, ABNT SIL CMT, tr CALC CMT, ARG MATRIX, POOR EFF INTERGRN Φ

545-557 INTERBEDS OF SHALE: A/A AND SANDSTONE: LT-MED GY, QTZ, SLT-VFG, SA, WS, CALCITE CMT, SIL CMT, tr PYR CMT, ARG MATRIX, POOR EFF INTERGRN Φ, tr OSTRACODS

557-561 INTERBEDS OF SHALE: MED-DK GY, BLKY, SL CARB, SLTY YP, AND SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, POOR EFF INTERGRN Φ

561-570 SHALE: A/A

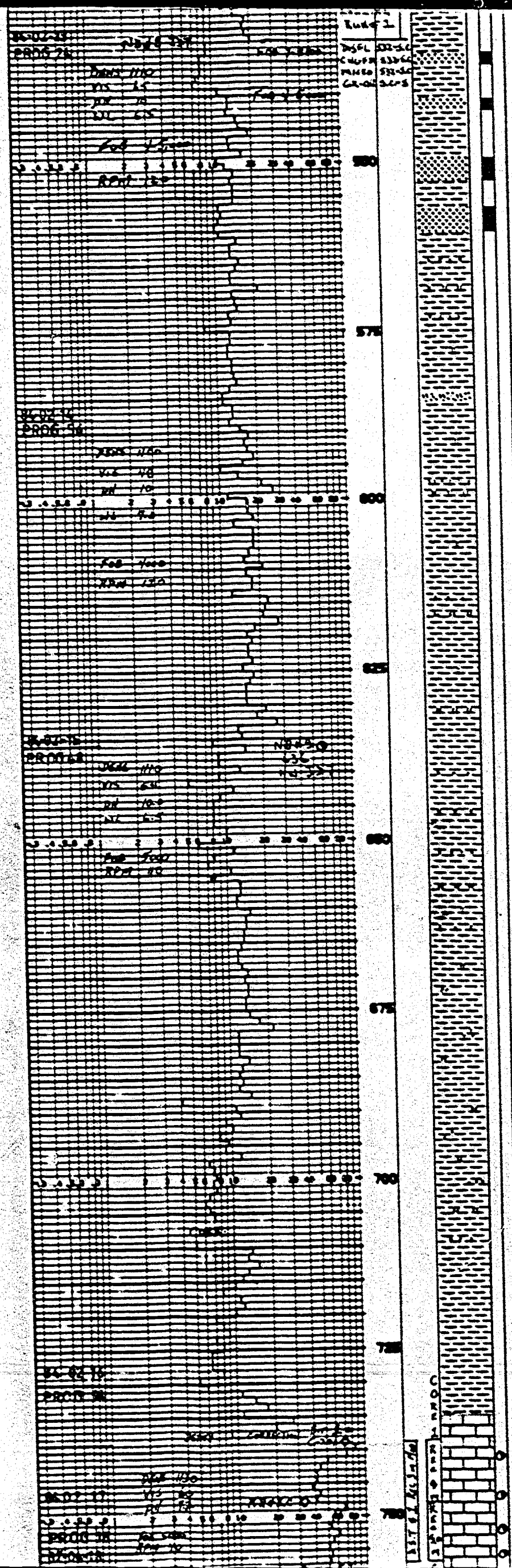
570-575 MISSED SAMPLE

575-585 SHALE: MED-DK GY, BLKY, SL CARB, SLTY YP

585-586 SANDSTONE: LT-MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, V. POOR Φ, GRADING TO SILTSTONE: MED GY, QTZ, SLT, SIL CMT, tr CALC CMT, ARG MATRIX, V. POOR Φ

586-602 SHALE: MED-DK GY, BLKY, MIC-MICA, SL CALC YP, SLTY & SDY YP, MINOR PYR INCLUSIONS

602-613 SHALE: A/A W OCNL LAMINAE & THIN BANDS OF DS: & SLTST: A/A



SH SL SLTY & SDY YP, MINR INCL OF SS & SLTST: A/A

532- 549 SHALE: MED-DK GY, BLKY, MIC-MICA, SL, SLTY & SDY YP W OCNL BANDS OF SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, ABNT SIL CMT, tr CALC CMT, ARG MATRIX, POOR EFF INTERGRN ϕ

549-557 INTERBEDS OF SHALE: A/A AND SANDSTONE: LT-MED GY, QTZ, SLT-VFG, SA, WS, CALCITE CMT, SIL CMT, tr PYR CMT, ARG MATRIX, POOR EFF INTERGRN ϕ, tr OSTRACODS

557-571 INTERBEDS OF SHALE: MED-DK GY, BLKY, SL CARB, SLTY YP, AND SANDSTONE: MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, POOR EFF INTERGRN ϕ

571-575 SHALE: A/A

575-575 MISSED SAMPLE

575-585 SHALE: MED-DK GY, BLKY, SL CARB, SLTY YP

585-586 SANDSTONE: LT-MED GY, QTZ, SLT-VFG, SA, WS, SIL CMT, tr CALC CMT, ARG MATRIX, V. POOR ϕ, GRADING TO SILTSTONE: MED GY, QTZ, SLT, SIL CMT, tr CALC CMT, ARG MATRIX, V. POOR ϕ

586-602 SHALE: MED-DK GY, BLKY, MIC-MICA, SL CALC YP, SLTY & SDY YP, MINOR PYR INCLUSIONS

602-613 SHALE: A/A W OCNL LAMINAE & THIN BANDS OF SS: & SLTST: A/A

613-635 SHALE: DK GY, BLKY, MIC-MICA, SLTY & SDY YP, tr PYR INCL, tr OF SS: & SLTST

635-653 SHALE: MED-DK GY, BLKY, SUB FISS YP, MIC-MICA, SLTY, SL CALC YP, OCNL LAM OF SLTST & SS

653-657 SHALE: MED GY, BLKY-SUB FISS, MIC-MICA, SL SLTY YP

657-677 SHALE: MED GY, BLKY MIC-MICA, SLTY & SDY YP, tr DK GY SH

677-691 SHALE: MED-DK GY, BLKY, MIC-MICA, SLTY & SDY YP

691-720 SHALE: MED-DK GY, BLKY-SUB FISS MIC-MICA, SL SLTY YP, tr OF DK BRN SL SLD SH, OCNL SLTST LAM

CANOL FMTN (-559.17)

720-735.5 SHALE: DK GY/BRN-BLK, BLKY, SL BIT @ TOP, BIT @ BASE, tr DISS PYR INCL, PETROLIFEROUS ODOR, LOW S.G. (SMALL FRAGS FLOAT ON WASHWATER, W OCNL STRKS OF LIMESTONE: MICRITIC-DETRITAL, CRM-DK BRN, VFG, MICRITIC MATRIX, OCNL ATS GERATLGHT

KEE SCARP FMTN (-575.17)

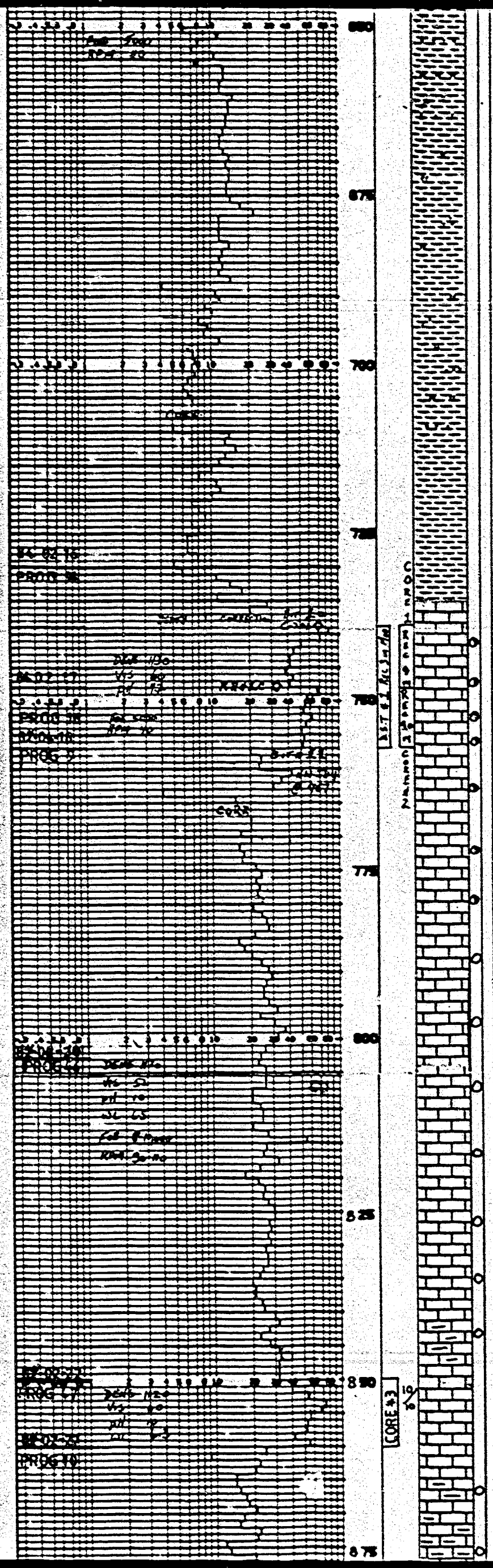
735.5-737.5 LIMESTONE: MICRITIC-DETRITAL, WH TO TAN, MICRITIC-CHKY, (CHKY POSS DUE TO BIT DAMAGE) SL ARG YP, PYR INCL, POOR EFF INTERGRN ϕ (35%) STRKS PET ODOR ON FRAGS, COM BRI YEL FLOR, SLOW WHITE MASS CUT

CORE #1, 739.0—748.0, REC 9.0

CORE #2, 748.0—757.0, REC 9.0

SEE DETAILED CORE DESCRIPTION

6



653-657 SHALE: MED GY, BLKY - SUB FISS, MIC-MICA, SL SLTY YP

657-677 SHALE: MED GY, BLKY MIC-MICA, SLTY & SDY YP, tr DK GY SH

677-691 SHALE: MED-DK GY, BLKY, MIC-MICA, SLTY & SDY YP

691-720 SHALE: MED-DK GY, BLKY - SUB FISS MIC-MICA, SL SLTY YP, tr OF DK BRN SL SLD SH, OCNL SLTST LAM

CANOL FMTN (-559.17)

720-735.5 SHALE: DK GY/BRN - BLK, BLKY, SL BIT @ TOP, BIT @ BASE, tr DISS PYR INCL, PETROLIFEROUS ODOR, LOW S-G, (SMALL FRAGS FLOAT ON WASHWATER, W OCNL STRKS OF LIMESTONE: MICRITIC-DETRITAL, CRM-DK BRN, VFG, MICRITIC MATRIX, OCNL ATR GRAD, TIGHT

KEE SCARP FMTN (-575.17)

735.5-737.5 LIMESTONE: MICRITIC-DETRITAL, WH TO TAN, MICRITIC-CALC, (CLKY POLG DUE TO BIT DAMAGE) SL ARG YP, PYR INCL, POOR EARTHY Φ (3%) STRONG PET ODOR ON FRAGS, COM BRN YEL FLOR, SLOW WK YEL MASS CUT

CORE #1, 739.0—748.0, REC 9.0

CORE #2, 748.0—757.0, REC 9.0

SEE DETAILED CORE DESCRIPTION

757-763 LIMESTONE: SKELETAL-MICRITIC, WH-MED BRN, HOM IDENT SKEL MAT W MNR CALCILUTITE-MICRITE INFILL OF VOIDS, TIGHT- V POOR (1-2%) Φ, tr LOS, tr GOLD/YEL FLOR, SLOW WK YEL MASS CUT

763-764 LIMESTONE: DETRITAL, MED BRN, CALCILUTITE - V.F. GRANULAR, SOFT, LEACHED?, ROTTEN APP, POOR EFF EARTHY Φ, tr LOS, tr GOLD/YEL FLOR, SLOW WK YEL MASS CUT

764-785 LIMESTONE: SKELETAL-MICRITIC, WH-TAN, MICRITIC - V.F. GRANULAR MATRIX, CALCITE CEMENT, tr DOL, V.SL tr OF LOS, FLOR & CUT

785-795 LIMESTONE: SKELETAL-MICRITIC, WH-LT BRN, NON IDENT SKEL MAT WITH MNR MICRITE - CALCILUTITE INFILL OF VOIDS, COM CALC CMT, SL ARG YP, TIGHT - V.POOR (2%) Φ, tr D.O.S. tr LOS, V. WK FLOR & CUT

795-815 LIMESTONE: SKELETAL-MICRITIC, WH-CRM, SKEL MATTER W V. MNR INFILL OF VOIDS WITH MICRITE, CALC CMT, TIGHT, NO SHOWS

815-830 LIMESTONE: SKELETAL-MICRITIC, WH-LT BRN, SKEL MATTER W V MNR MICRITE INFILL OF VOIDS CALCITE CMT, TT, tr D.O.S

830-836 LIMESTONE: SKELETAL-MICRITIC, WH-MED BRN, SKEL MATTER W ABNT MICRITE INFILL OF VOIDS CALC CMT, SL ARG YP, tr-tr Φ tr D.O.S.

836-850 LIMESTONE: A/A, COMMONLY BITUMEN, ENGRAINED, OCNL SH LAMINATIONS DEAD OIL STAINED

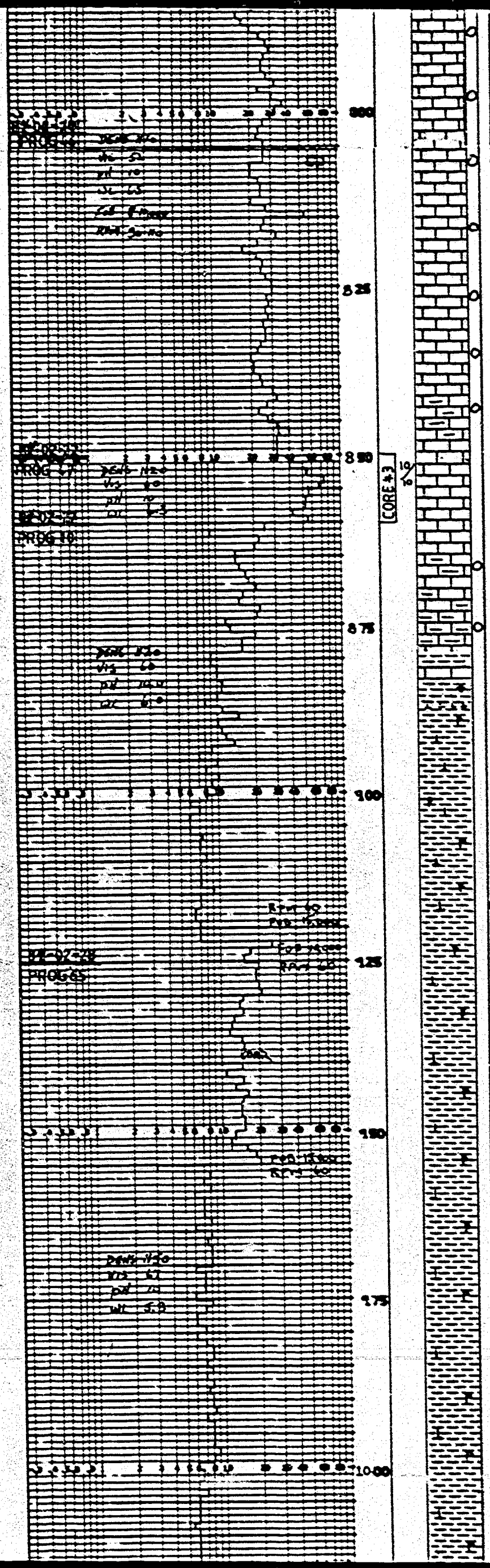
CORE # 3, 850.0—860.0

REC. 10.0

SEE DETAILED CORE DESCRIPTION

860-870 LIMESTONE: MICRITIC-SKELETAL, WH-LT GY/BRN, SKEL PEELS IN A MICRITE MATRIX, ABNT CLR CALC CMT, SL ARG YP, TT, tr BIT LAM & BLK BIT SH LAM

870-875 LIMESTONE: A/A WITH INCREASING AMOUNTS OF BIT LAM & BLK-BIT SH LAM & BANDS



BRN, NON IDENT SKEL MAT WITH MNR MICRITE - CALCILUTITE INFILL OF VOIDS, COM CALC CMT, SL ARG YP, TIGHT - V. POOR (2%) φ, tr D.O.S. tr LOS, V. WK FLUOR & CUT

795-815 LIMESTONE: SKELETAL-MICRITIC, WH - CRM, SKEL MATTER W V. MNR INFILL OF VOIDS WITH MICRITE, CALC CMT, TIGHT, No SHOWS

815-830 LIMESTONE: SKELETAL-MICRITIC, WH - LT BRN, SKEL MATTER W V MNR MICRITE INFILL OF VOIDS CALCITE CMT, TT, tr D.O.S.

830-835 LIMESTONE: SKELETAL-MICRITIC, WH - MED BRN, SKEL MATTER W ABNT MICRITE INFILL OF VOIDS CALC CMT, SL ARG YP, ++ - tr φ tr D.O.S.

835-850 LIMESTONE: A/A, COMMONLY BITUMED, ENGERMINED, OCCL SH LAMINATIONS DEAD OIL STAINED

CORE # 3. 850.0 — 860.0

REC. 10.0

SEE DETAILED CORE DESCRIPTION

860-870 LIMESTONE: MICRITIC-SKELETAL, WH - LT GY/BRN, SKEL FRAGS IN A MICRITE MATRIX, ABNT CLR CALC CMT, SL ARG YP, TT, tr BIT LAM + BLK BIT SH LAM

870-879 LIMESTONE: A/A WITH INCREASING AMOUNTS OF BIT LAM + BLK BIT SH LAM + BANDS

HARE INDIAN FMTN (-718.67)

879-885 INTERBEDS OF LIMESTONE: MICRITIC - SKELETAL, WH - MED GY/BRN, MNR SKEL FRAGS IN A MICRITE MATRIX, ABNT CALC CMT, SL ARG - ARG, TIGHT; AND SHALE: MED - DK GY, BLKY, MIC - MICA, COM DISS PYR, OCCL PYR BLEBS, SL CALC

885-888 INTERBEDS OF SHALE: A/A & LIMESTONE: DETRITAL-MICRITIC?, WH - LT BRN, SHKY - VFG DETRITAL FRAGS IN A MINOR MICRITIC MATRIX CALC CMT, SL ARG, tr DISS PYR, & POOR φ tr OST + CRIN

888-906 SHALE: DK GY/BRN, BLKY - SUB FISS, MIC-MICA, tr DISS PYR, CALC, SL BIT, SOFT, tr OS CRIN + OST

906-920 SHALE: MED-DK GY, GY/BRN, BLKY, SL SLTY, ABNT MIC-MICA, CALC, COM DISS PYR, OCCL STRINGERS OF LIMESTONE: MICRITIC - DETRITAL, WH - TAN, MNR VFG DETRITAL FRAGS + SKEL FRAGS IN A MICRITE MATRIX, CALC CMT, VL POOR φ, tr BRL, tr V. SL YEL CUT FLUOR tr CRIN

(916-918) OIL + GAS IN MUD, GAS DET PEAK OF 2000/15 UNITS, C_1 C_2 C_3 C_4 IC_4, tr EUHEDRAL CALC XL INCLS. POSS FRAC φ?

920-940 SHALE: MED GY, BLKY - SUB FISS, V. MIC-MICA, SLTY YP, tr DISS PYR, SL CALC

940-955 SHALE: MED GY, BLKY - SUB FISS, V. MIC-MICA YP, SL SLTY YP, tr DISS PYR, SL CALC

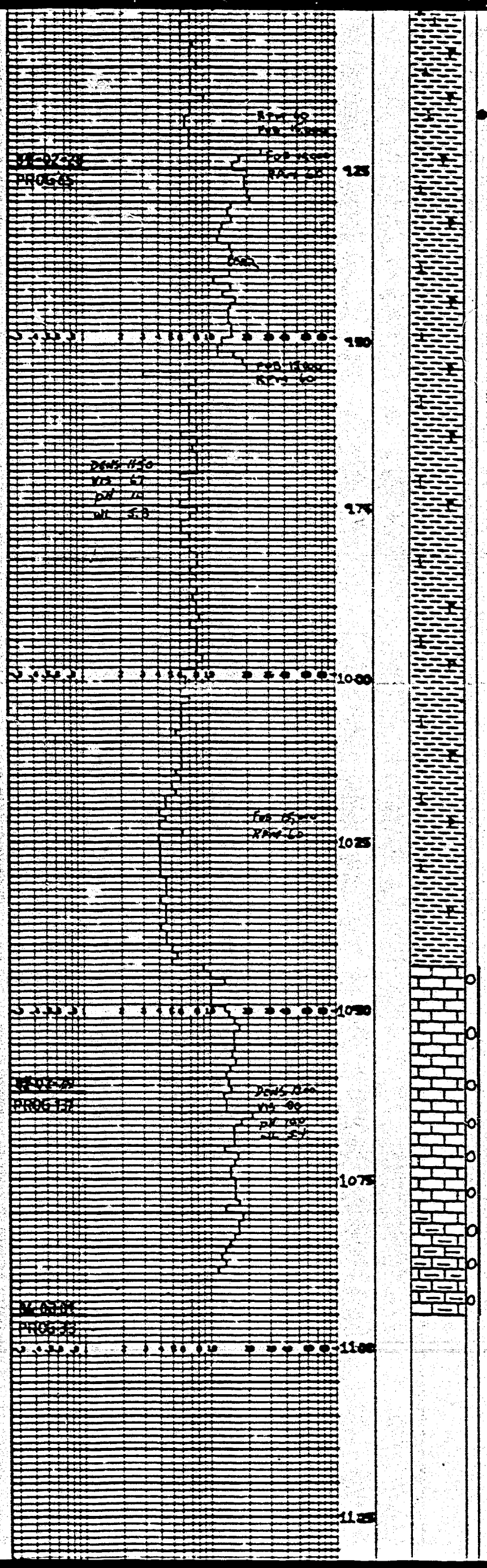
955-975 SHALE: MED-DK GY, BLKY-SUB FISS, MIC-MICA, tr DISS PYR, SL CALC

975-987 SHALE: MED-DK GY, BLKY-SUB FISS, MIC-MICA, tr PYR, SL CALC, SL SLTY YP

987-1012 SHALE: MED-DK GY, BLKY-SUB FISS, MIC-MICA, SL CALC, tr SLTST, OCCL tr LS.

1012-1015 SHALE: A/A W MNR DK GY BIT SH

1015-1020 SHALE: DK BRN - BLK, BLKY, MIC-MICA, [illegible] GY SH A/A



MICA, tr DISS PYR, CALC, SL BIT, SOFT, tr of GRIN → PET

820-840 SHALE: MED-DK GY, GY/BRN, BLKY, SL SLTY, ABNTY MIC-MICA, CALC, COM DISS PYR, OCNL STRINGERS OF LIMESTONE: MICRITIC-DETRITAL, WH-TAN, MOD VFG DETRITAL FRAGS + SKEL FRAGS IN A MICRITIC MATRIX; CALC CMT, V. POOR Φ, tr BRS, tr V. SL YEL CUT FLUOR tr GRIN

(816-818) OIL & GAS IN MUD, GAS DET PEAK OF 2000/15 UNITS, C_1 C_2 C_3 C_4 IC_4, tr EUHEDRAL CALC XL IN LG. POSS FRAC Φ?

840-940 SHALE: MED GY, BLKY-SUB FISS, V. MIC-MICA, SLTY Y/P, tr DISS PYR, SL CALC

940-955 SHALE: MED GY, BLKY-SUB FISS, V. MIC-MICA Y/P, SL SLTY Y/P, tr DISS PYR, SL CALC

955-975 SHALE: MED-DK GY, BLKY-SUB FISS, MIC-MICA, tr DISS PYR, SL CALC

975-987 SHALE: MED-DK GY, BLKY-SUB FISS, MIC-MICA, tr PYR, SL CALC, SL SLTY Y/P

987-1012 SHALE: MED-DK GY, BLKY-SUB FISS, MIC-MICA, SL CALC, tr SLTST, OCNL tr LS.

1012-1015 SHALE: A/A W MOR DK GY BIT SH

1015-1040 SHALE: DK BRN-BLK, BLKY, MIC-MICA, BIT, SL CALC; W MOR AMOUNT OF GY SH A/A DECREASING TOWARDS BASE.

1040-1043 SHALE: DK BRN-BLK, BLKY, MIC-MICA, BIT, FRACTURED, VEINED W CALC + MICRITIC LS, OCNL CHKY LS FLOCKS

HUME FMTN (-882.67)

1043-1056 LIMESTONE: LT GY-MED BRN, MICRITIC-VF GRAN, ARG, CHKY Y/P, CALC CMT, BIT Y/P, SL SLTY Y/P, TIGHT-V. POOR Φ, W MOR BLK SH BANDS + PTGS A/A

1056-1060 LIMESTONE: LT-MED GY/BRN, MICRITIC-CHKY, OCNLY VF GRAN, CALC CMT, ARG Y/P, BIT Y/P, TIGHT-V. POOR Φ

1060-1080 LIMESTONE: LT-MED GY/BRN, OCNLY DK BRN, MICRITIC-CHKY, OCNLY VF GRAN, CALC CMT, ARG Y/P, BIT Y/P, TIGHT-V. POOR Φ

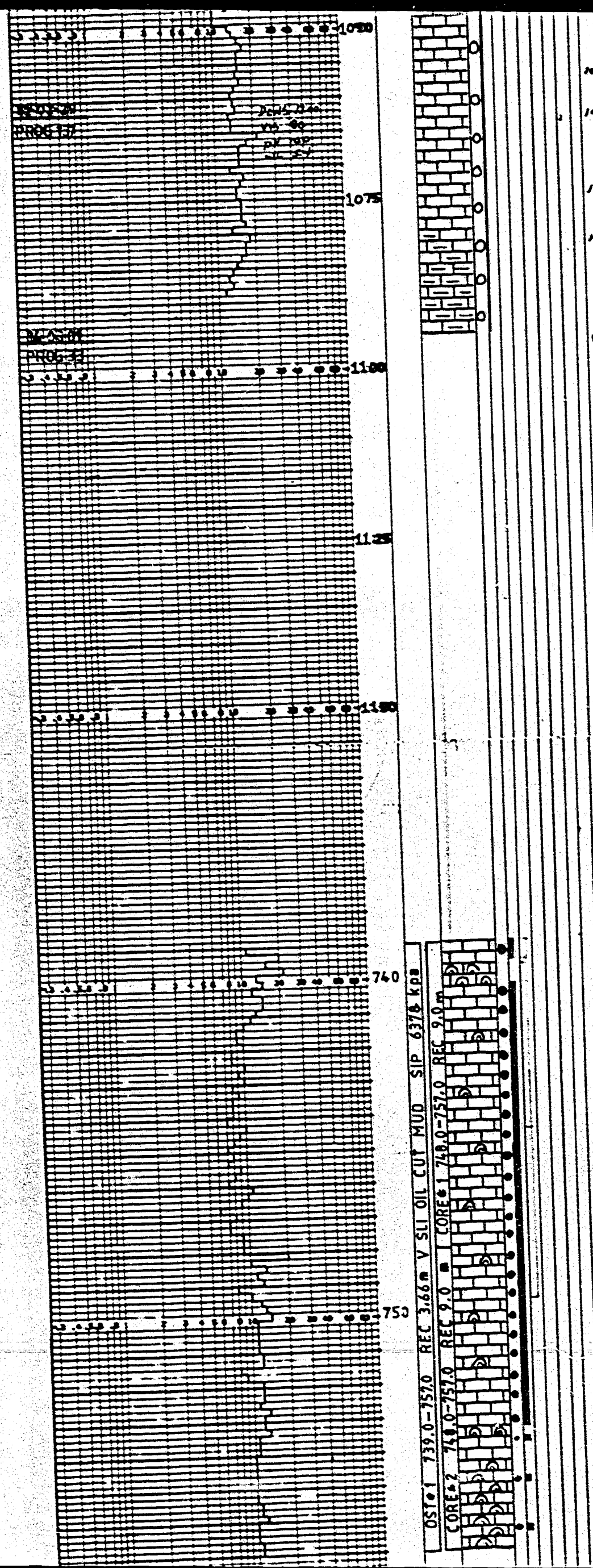
1080-1085 LIMESTONE: LT-MED GY/BRN, MICRITIC, CHKY Y/P, CALC CMT, SL ARG, SL BIT Y/P, TIGHT-V. POOR Φ

1085-1095 LIMESTONE: LT-MED GY/BRN, MICRITIC, CHKY Y/P, SL ARG-ARG Y/P, SL BIT Y/P, TIGHT-V. POOR Φ W MOR OCNL BANDS + LAMS OF SHALE: DK BRN-BLK, BLKY, MIC-MICA Y/P, BIT, CALC, tr GRIN

1095 F.T.D. (DRILLER)

LOG TOPS

	DEPTH	SUBSEA
BASAL CRET SAND		
IMPERIAL		
CANOL		
KEE SCARP		
HARE INDIAN		
HUME		
F.T.D.		



VF GRAIN, ARG, CALC CMT, [illegible] SLTY V/P, TIGHT - V. POOR ϕ, W MNR BLK OIL BANDS & PTCHS N/A

1056-1060 LIMESTONE: LT. MED GY/BRN, MICRITIC - CHKY, OCNLY VF GRAIN, CALC CMT, ARG V/P, BIT V/P, TIGHT - V. POOR ϕ

1060-1080 LIMESTONE: LT- MED GY/BRN, OCNLY DK BRN, MICRITIC - CHKY, OCNLY VF GRAIN, CALC CMT, ARG V/P, BIT V/P, TIGHT - V POOR ϕ

1080-1085 LIMESTONE: LT- MED GY/BRN, MICRITIC, CHKY V/P, CALC CMT, SL ARG, SL BIT V/P, TIGHT - V. POOR ϕ

1085-1095 LIMESTONE: LT- MED GY/BRN, MICRITIC, CHKY V/P, SL ARG - ARG V/P, SL BIT V/P, TIGHT - V. POOR ϕ W MNR OCNL BANDS & LAMS OF SHALE: DK BRN-BLK, BLKY, MIC-MICA V/P, BIT, CALC, tr GRIN

1095 F.T.D. (DRILLER)

LOG TOPS

	DEPTH	SUBSEA
BASAL CRET SAND		
IMPERIAL		
CANOL		
KEE SCARP		
HARE INDIAN		
HUME		
F.T.D.		

LOGS RUN

RUN # 1 532 — 357m
DISFL, CNL-FDC-GR-CAL, MICROLOG

RUN # 2 1095 — 532 m 357m

DETAILED CORE DESCRIPTION

739.0-739.6 LIMESTONE: DETRITAL - SKELETAL, SKEL FRAGS, IN A CALCILUTITE - VF GRANULAR CALCARENITE MATRIX, MED- DKBRN, MNR CALC CMT, SL ARG, POOR INTRGRN & PINPOINT ϕ, LNE OIL SAT, ABNT YEL/GOLD FLOR, SLOW WK YEL STRNG CUT, AMPHI, IDIOSTROMA, STACYODES MNR BRACHS.

739.6-740.2 LIMESTONE: SKELETAL, WH, WH LG BULB STRMS, TT, NO SHOWS, OCNL PATCHES OF AMPHI LS: N/A

740.2-740.50 LIMESTONE: DETRITAL-SKELETAL, WH SKEL FRAGS, IN & DK BRN, CALCILUTITE - VF GRANULAR CALCARENITE MATRIX, MATRIX HAS (3-5%) INTRGRN & PP ϕ, L.O.S., ABNT YEL/GOLD FLOR, SLOW WK YEL STRNG CUT, OIL & GAS BLEEDING TRK, COM AMPHIS, IDIOSTROMA, & STACYODES

740.50-740.95 LIMESTONE: DETRITAL, DK BRN, CALCILUTITE - VF GRAIN CALCARENITE; NO SKEL FRAGS, ARG, POOR (3-5%) INTRGRN & PP ϕ, tr FRAC ϕ, L.O.S., OIL & GAS BLEEDING, ABNT YEL/GOLD FLOR, SLOW WK YEL STRNG CUT

740.95-742.15 LS: SAME AS 739.00-739.60 SHOW N/A tr BULBOUS STRMS (UPTO 2.5 cm DIA)

742.15-748.00 LIMESTONE: DETRITAL, DK BRN, CALCILUTITE - V.F GRAIN CALCARENITE, ARG, OCNL BANDS & POCKETS, W CALC CMT, POOR (3-5%) ESP INTRGRN & PP ϕ, MNR VERT SHORTZ FRAC ϕ (DUE TO PRESSURE RELEASING?) L.O. SAT. ABNT YEL/GOLD FLOR, SLOW WK YEL STRNG CUT OIL & GAS BLEEDING, AMPHI, IDIOSTROMA, STACY, BULB STRMS, OCNL STYLOLITES

748.00-749.6 LS: N/A

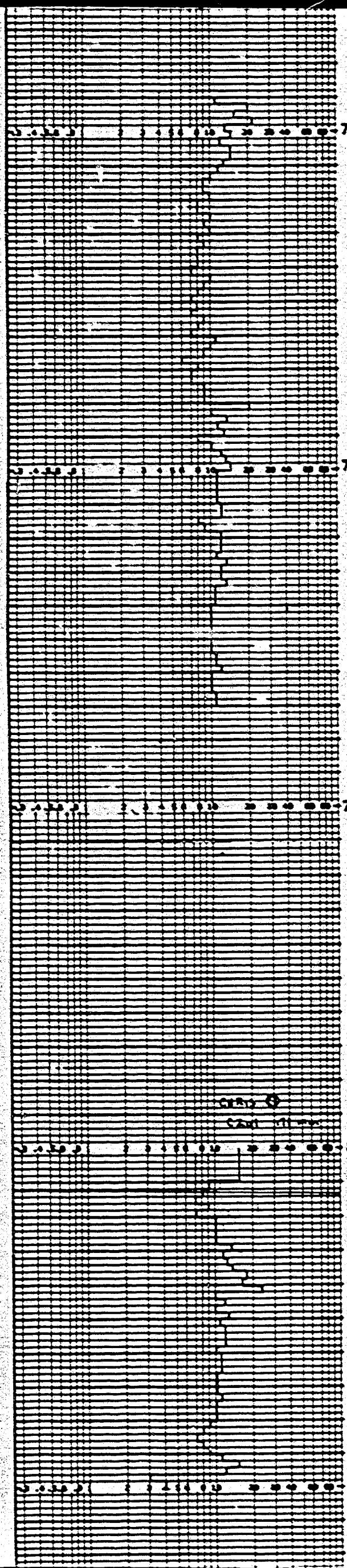
749.60-753.35 LIMESTONE: SKELETAL-DETRITAL, WH, DK BRN, SKEL FRAGS IN A CALCILUTITE - CALCARENITE MATRIX, BULB STRMS, IDIOSTROMA, STACY, MATRIX HAS POOR (3-5%) INTRGRN & PP ϕ, POOR ϕ, L.O. SAT., ABNT BLEEDING OIL & GAS TRK, ABNT GOLD/YEL FLOR, SLOW WK YEL MASS CUT

753.35-753.70 LS: WH, SKELETAL, MASSIVE OR BULBOUS STRMS tight

753.70-754.28 LS: SAME AS 749.60-753.35 m

754.28-757.00 LIMESTONE: SKELETAL - DETRITAL, WH, DK BRN, PATCHES, SKEL FRAGS (BRECCIATED?) WITH MNR INFIL OF INTER FRAGMENTAL VOIDS WITH A CALCILUTITE to V.F. GRAIN CALCARENITE MATRIX, SKEL FRAGS ARE TIGHT, MATRIX HAS POOR (3-5%) INTRGRN & PP ϕ, L.O.S. PATCHY GOLD/YEL FLOR, SLOW WK YEL MASS CUT, SKEL FRAGS ARE BULB STRMS, IDIOSTROMA, & STACYODES, tr STYLOLITES

⊗ = STROMATOROIDAL



DETAILED CORE DESCRIPTION

739.0 – 733.6 LIMESTONE: DETRITAL – SKELETAL, SKEL FRAGS, IN A CALCILUTITE – V.F. GRANULAR CALCARENITE MATRIX, MED – DK BRN, MNR CALC CMT, SL ARG, POOR INTERGRN & PINPOINT Φ, LNE ON SAT, ABNT YEL/GOLD FLOR SLOW WK YEL STRMG CUT, AMPHI, ECHINOSTROMA, STACHYODES MNR BRACHI.

733.6 – 740.2 LIMESTONE: SKELETAL, WH, WH LG BULB STROM, TT, NO SHOWS, OCCL PATCHES OF AMPHI LS: A/A

740.2 – 740.0 LIMESTONE: DETRITAL – SKELETAL, WH SKEL FRAGS, IN A DK BRN, CALCILUTITE – V.F. GRANULAR CALCARENITE MATRIX. MATRIX HAS (3-5%) INTERGRN & PP Φ, L.O.S., ABNT YEL/GOLD FLOR, SLOW WK YEL STRMG CUT, OK & GAS BLEEDING THRU, COM AMPHI, ECHINOSTROMA, & STACHYODES

740.50 – 741.05 LIMESTONE: DETRITAL, DK BRN, CALCILUTITE – V.F. GRAN CALCARENITE; NO SKEL FRAGS, ARG, POOR (3-5%) INTERGRN & PP Φ, tr FRAC Φ, L.O.S., O & G BLEEDING, ABNT YEL/GOLD FLOR, SLOW WK YEL STRMG CUT

741.05 – 741.15 LS: SAME AS 739.00–739.60 SLOW A/A tr BULBOUS STROMS (UP TO 2.5 CM DIA)

742.15 – 745.00 LIMESTONE: DETRITAL, DK BRN, CALCILUTITE – V.F. GRAN CALCARENITE, ARG, OCCL BANDS & POCKETS, IN CALC CMT, POOR (3-5%) PP INTERGRN & PP Φ, MNR VERT SHRINK FRAC Φ (DUE TO PRESSURE RELEASE?) L.O. SAT ABNT YEL/GOLD FLOR, SLOW WK YEL STRMG CUT OK & GAS BLEEDING, AMPHI, ECHINOSTROMA, STACH, BULB STROMS, OCCL STYLOLITES

745.00 – 749.6 LS: A/A

749.60 – 753.35 LIMESTONE: SKELETAL – DETRITAL, WH, DK BRN SKEL FRAGS IN A CALCILUTITE – CALCARENITE MATRIX, BULB STROMS, ECHINOSTROMA, STACH, MATRIX HAS POOR (3-5%) INTERGRN & PP Φ, POOR VK, L.O. SAT., ABNT BLEEDING O & G THRU, ABNT GOLD/YEL FLOR, SLOW WK YEL MASS CUT

753.35 – 753.70 LS: WH, SKELETAL, MASSIVE OR BULBOUS STROM TIGHT

753.70 – 754.28 LS: SAME AS 749.60 – 753.35 m

754.28 – 757.00 LIMESTONE: SKELETAL – DETRITAL, WH, DK BRN, PATCHES, SKEL FRAGS (BRECCIATED?) WITH MNR INFIL OF INTER FRAGMENTAL VOIDS WITH A CALCILUTITE TO V.F. GRAN CALCARENITE MATRIX, SKEL FRAGS ARE TIGHT, MATRIX HAS POOR (3-5%) INTERGRN & PP Φ, L.O.S., PATCHY GOLD/YEL FLOR, SLOW WK YEL MASS CUT, SKEL FRAGS ARE BULB STROMS, ECHINOSTROMA, & STACHYODES, tr STYLOLITES

⊕ = STROMATOROIDAL

CORE #3

CUT 10.0 REC 9.7

INTERVAL 850.0 – 860.0

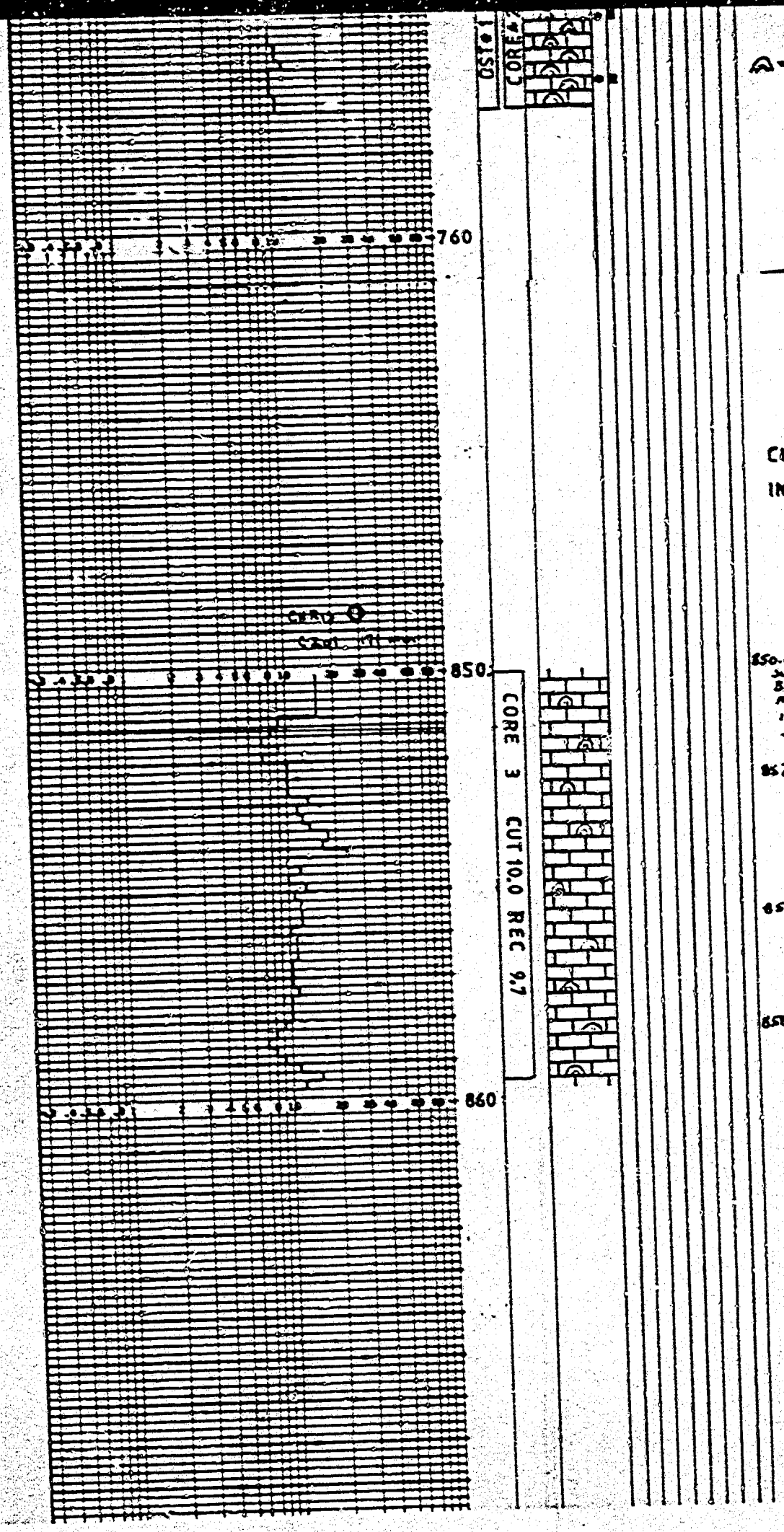
850.0 – 852.8 LIMESTONE: WH, LT/BRN, DK BRN YT, SL-MOD ARG, MICRITIC, NO CMT FLOR, RARE tr BIT FLOR ALONG CONTACT BETWEEN STROMS & MATRIX, SKELETAL, STROMS ARE 40-60 CM IN DIA & TIGHT, & BIT ALONG CONTACTS BETWEEN STROMS & STYLOLITES, tr STYLOLITES tr V. WK SLOW YEL CUT FLOR

852.8 – 856.0 LIMESTONE: LT-DK BRN, MICRITIC, CRYPTOXLN, TIGHT, NO SHOWS, STROMS (3-5 CM) ELONGATED I/P. tr POOR FRAC Φ WITH PYRO-BITUMIN, ALSO RARE tr FRAC Φ, ALONG CONTACTS BETWEEN STROMS & MATRIX, PYROBITUMIN INFILL

856.0 – 858.37 LIMESTONE: MED – DK BRN, MICRITIC SKELETAL, CRYPTOXLN, RELATIVELY CLEAN, TIGHT, NO SHOWS, STROMS (.5-3.0 CM) BITUMINOUS ALONG CONTACT BETWEEN STROMS & MATRIX, RARE MNR STYLOLITES, STROMS ARE ABNT THROUGHOUT INTERVAL & ARE OCCL STUND

858.37 – 859.70 LIMESTONE: MED LT – LT BRN, MICRITIC-SKELETAL, SL BIT, TIGHT, NO SHOWS, ABNT STROMS THROUGHOUT (1-3 CM) OCCLY ARG, BIT ALONG CONTACT BETWEEN STROMS & MATRIX, tr STYLOLITES

CORE #3 DESCRIBED BY D. FREW
K. WHITTIER



△ = STROMATOLITE-BOTRYOIDAL

CORE #3

CUT 10.0 REC 9.7

INTERVAL 850.0 – 860.0

850.0 – 852.8 LIMESTONE: MD, GY/BRN, DK BRN VF, SL-MOD ARG, MICRITIC, NO CUT FLOOR, RARE BT BIT FLOOR ALONG CONTACT BETWEEN STROMS & MATRIX, SKELETAL, STROMS ARE 1.0-4.0 cm IN DIA & TIGHT, SL BIT ALONG CONTACTS BETWEEN STROMS & STYLOLITES, tr STYLOLITES tr V. WK SLOW YEL CUT FLOOR

852.8 – 856.0 LIMESTONE: LT-DK BRN, MICRITIC, CRYPTOXLN, TIGHT, NO SHOWS, STROMS (3-5 cm) ELONGATED I/P, tr POOR FRAC Φ WITH PYRO-BITUMIN, ALSO RARE tr FRAC Φ, ALONG CONTACTS BETWEEN STROMS & MATRIX PYRO-BITUMIN INFILL

856.0 – 858.37 LIMESTONE: MED-DK BRN, MICRITIC SKELETAL, CRYPTOXLN, RELATIVELY CLEAN, TIGHT, NO SHOWS, STROMS (.5-3.0 cm) BITUMINOUS ALONG CONTACT BETWEEN STROMS & MATRIX, RARE MINR STYLOLITES, STROMS ARE ABNT THROUGHOUT INTERVAL & ARE OCNL CYLND

858.37 – 859.70 LIMESTONE: MED LT-DK BRN, MICRITIC-SKELETAL, SL BIT, TIGHT, NO SHOWS, ABNT STROMS THROUGHOUT (1-7 cm) OCNLY ARG, BIT ALONG CONTACT BETWEEN STROMS & MATRIX, tr STYLOLITES

Core #3 DESCRIBED BY D. FREW
K. WHITTIER

J Vader.

Ottawa

EDMONTON · FORT ST. JOHN · CALGARY

WATER ANALYSIS

LABORATORY NUMBER: F84-4524-1

CONTAINER IDENTITY: A

LICENCE NUMBER:

OPERATOR NAME: PETRO-CANADA RESOURCES

LOCATION: N-22

WELL NAME: PCI ET AL HOOSIER N-22

ELEVATIONS (K.B. / Ground) / GRD.:

FIELD OR AREA: HOOSIER

POOL OR ZONE:

NAME OF SAMPLER:

COMPANY:

TEST TYPE:

NO.:

TEST RECOVERY:

MULTIPLE RECOVERY: Y N

SAMPLING POINT: SWAB FROM INTERVAL #1

AMT. & TYPE OF CUSHION:

MUD RESISTIVITY: @ 25°C

Test Interval (metres):

Perforations (metres):

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

PRODUCTION RATES: WATER m^3/d | OIL m^3/d | GAS $10^3m^3/d$

GAUGE PRESSURE kPa: SEPARATOR | TREATER | RESERVOIR | SOURCE

TEMPERATURE °C: SEPARATOR | TREATER | RESERVOIR | SOURCE

DATE SAMPLED (Y-M-D):

DATE RECEIVED (Y-M-D): 84/03/28

DATE REPORTED (Y-M-D): 84/04/03

ANALYST: M.E.

OTHER INFORMATION: AFE A423309

P.O. LS160574F

ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$	ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$
Na	507	0.0489	22.05	Cl	5 610	0.5410	158.20
K	9	0.0009	0.23	Br			
Ca	3 291	0.3174	82.11	I			
Mg	287	0.0277	11.80	HCO_3	512	0.0494	8.40
Ba				SO_4	152	0.0147	1.58
Sr				CO_3	0	0.0000	0.00
Fe	PRESENT			OH	0	0.0000	0.00
				H_2S	NIL		

TOTAL SOLIDS $m \cdot V^{-1}$ $g \cdot m^{-3}$

EVAPORATED @ 110°C	EVAPORATED @ 180°C
11 490	

AT IGNITION	CALCULATED
8 750	10 368

ORGANICS: TRACE

RELATIVE DENSITY	REFRACTIVE INDEX
1.002 @ 25°C	1.3346 @ 25°C

OBSERVED pH	RESISTIVITY (Ohm-m)
7.2 @ 17 °C	1.62 @ 25°C

REMARKS

Sample consisted of colorless water.

LOGARITHMIC PATTERN $c/mol \cdot m^{-3}$

WATER ANALYSIS

CONTAINER IDENTITY:

LABORATORY NUMBER: E84-4524-2

LICENCE NUMBER:

OPERATOR NAME: PETRO-CANADA RESOURCES

LOCATION: N-22

WELL NAME: PCI ET AL HOOSIER N-22

ELEVATIONS K.B. / GROUND / GRD:

FIELD OR AREA: HOOSIER

POOL OR ZONE:

NAME OF SAMPLER:

COMPANY:

TEST TYPE:

NO.:

TEST RECOVERY:

MULTIPLE RECOVERY: Y N

SAMPLING POINT: SWAB FROM INTERVAL #8

AMT. & TYPE OF CUSHION:

MUD RESISTIVITY: @ 25°C

Test Interval (metres):

Perforations (metres):

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

PRODUCTION RATES: WATER m^3/d | OIL m^3/d | GAS $10^3m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SOURCE
GAUGE PRESSURE kPa				
TEMPERATURE °C				

DATE SAMPLED (Y-M-D)	DATE RECEIVED (Y-M-D)	DATE REPORTED (Y-M-D)	ANALYST	OTHER INFORMATION
	84/03/28	84/04/03	M. F.	AFE A423309

P.O. NO. LS160574F

ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$	ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$
Na	109	0.0760	4.74	Cl	273	0.1902	7.70
K	6	0.0042	0.15	Br			
Ca	156	0.1087	3.89	I			
Mg	27	0.0188	1.11	HCO_3	671	0.4676	11.00
Ba				SO_4	193	0.1345	2.01
Sr				CO_3	0	0.0000	0.00
Fe	PRESENT			OH	0	0.0000	0.00
				H_2S	NIL		

TOTAL SOLIDS $m \cdot V^{-1}$ $g \cdot m^{-3}$

EVAPORATED @ 110°C	EVAPORATED @ 180°C
1 610	

AT IGNITION	CALCULATED
820	1 435

ORGANICS: NIL

RELATIVE DENSITY	REFRACTIVE INDEX
1.001 @ 25°C	1.3332 @ 25°C

OBSERVED pH	RESISTIVITY (Ohm-m)
7.6 @ 17°C	6.25 @ 25°C

REMARKS

The sample consisted of colorless water.

LOGARITHMIC PATTERN $c/mol \cdot m^{-3}$