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METALLIC AND INDUSTRIAL MINERALS ASSESSMENT WORK REPORT

Metallic and Industrial Minerals Permit Numbers

093 9393080123, 093 9393080251, and 093 9393080252

Index Number 19950023
Assessment Report on the Cdn Land Mediat Property
V. Jo-Ann Patterson (St. Clair Pipelines Ltd.)
Canadian Landmasters Resource Services Ltd. and
Rich Mineral Corp.
NTS 72L/9, 16
Salt
Permit No. 9393080123, 0251, 0252

Prepared by St. Clair Pipelines Ltd. on behalf of Canadian Landmasters Resource Services Ltd. and Rich Minerals Corporation

October 27, 1995

CONFIDENTIAL

METALLIC AND INDUSTRIAL MINERALS

ASSESSMENT WORK REPORT

Metallic and Industrial Minerals Permit Numbers: 093 9393080123, 093 9393080251 and 093 9393080252.

Prepared by **St. Clair Pipelines Ltd.** on behalf of **Canadian Landmasters Resource Services Ltd. and Rich Minerals Corporation.**

Submitted: **October 27, 1995**

This Assessment Work Report is filed pursuant to Section 15 of the Metallic and Industrial Minerals Regulation, being Alberta Regulation 66/93.

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1.0 SUMMARY

A test well was drilled with the primary purpose of establishing the stratigraphy of the permitted areas (shown in Figure 1). Core samples were obtained from the upper Nisku formation and from the Prairie Evaporite formation. The well was spudded on January 6, 1994 and reached TD on January 24, 1994. The well was subsequently plugged back on January 30, 1994. An application to reclassify the test well to a suspended well was submitted on October 24, 1995.

A geological review of the permitted areas was completed. The well confirmed the presence of the Prairie Evaporite and adequate salt thickness and purity for solution mining.

2.0 INTRODUCTION

A program was carried out to determine the suitability of the Prairie Evaporite for solution mining. The program consisted of well drilling, logging, core and fluid analysis, and a geological review. The program focused on determining the extent and purity of the Prairie Evaporite salt. The Nisku formation was also evaluated to determine the ability of the formation to be used for brine disposal.

3.0 LOCATION AND ACCESS

Figure 1 shows the permit boundaries and permit numbers. The location of the test well is shown on the reference map provided in Figure 2. The stratigraphic test well, Cdn Land Medhat, was drilled at 14-36-20-01 W4M.

4.0 PERMIT TABULATION

This Assessment Work Report is filed by St. Clair Pipelines Ltd., on behalf of Canadian Landmasters Resource Services Ltd., the registered owner of Metallic and Industrial Minerals Permit 093 9393080123 and Rich Minerals Corporation, the registered owner of Metallic and Industrial Minerals Permits 093 9393080251 and 093 9393080252. Canadian Landmasters Resource Services Ltd. has acquired an interest in Sections 1, 2, 11, and 12, Township 21, Range 01 (Permit 093 9393080252) from Rich Minerals Corporation. Copies of the surrender of interest, permits and land descriptions are provided in Appendix A1.

Figure 1
Permit Boundary Map

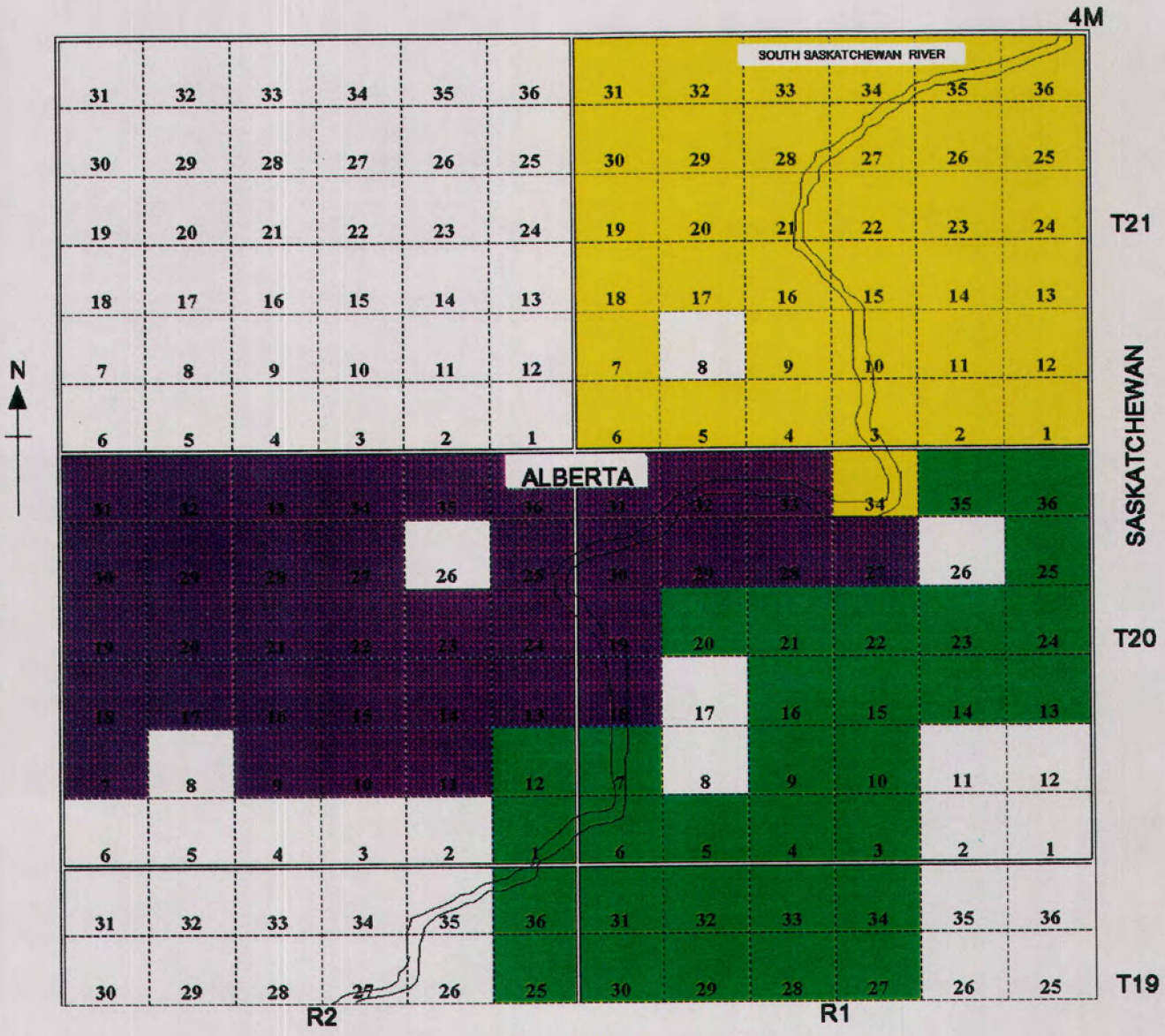
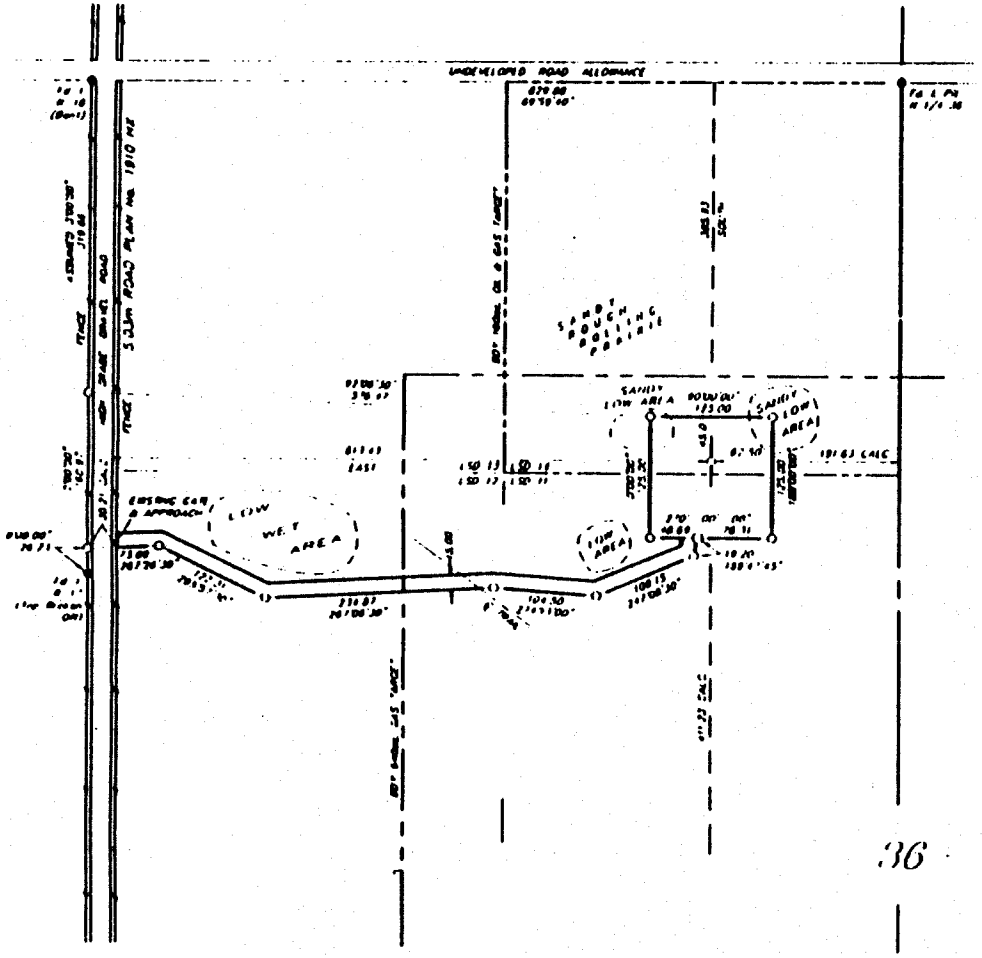
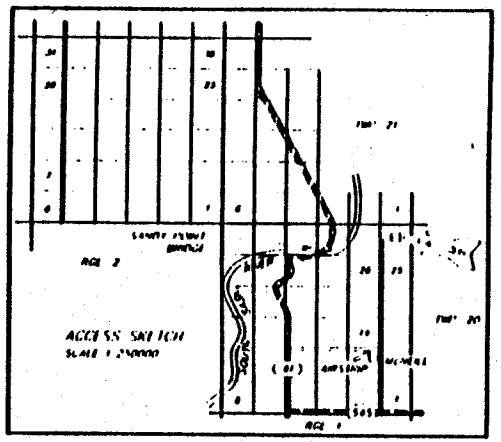


Figure 2
Reference Map - Test Well Location





'Revised'

CDN LAND MEDHAT 14-36-20-1

Well Site And Access Road

L.S. 14 Sec. 36 Twp. 20 Rge. 1 W.4M.

M.D. OF CYPRESS No. 1

I certify that the survey represented by this plan is correct to the best of my knowledge and was completed on the 9th day of November, 1991

[redacted]
Gordon H Kopp
Alberta Land Surveyor

[redacted]
Witness

MIDWEST SURVEYS INC.

ALBERTA LAND SURVEYORS' ASSOC. PERMIT NUMBER P034 MIDWEST SURVEYS INC.

LICENCING INFORMATION.

IN PART 3 OF A GAS CON REG'S (AR 151/71)

THE PROPOSED WELL CENTRE IS

- At least 200m from any surface improvements unless shown otherwise
- At least 100m from the Ordinary High Water Mark of any significant body of water or permanent stream
- At least 200m from any water well
- At least 40m from a surveyed roadway or road allowance outside a potential coal development area
- At least 90.5m from a lighted aerodrome
- At least 18.1m from an unlighted aerodrome
- At least 1.5 km from the Corporate limits of a City, Town or Village
- At least 18.1m from any residence

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.

CO-ORDINATES:

385.93 South of North bdy
611.43 East of West bdy
} Sec

ELEVATIONS: 721.17 Ground

Well Site Corner Elevations

N.W.	722.60	N.E.	722.51
S.W.	721.66	S.E.	722.14

AREAS:

	hectares	acres
Well Site	1.562	1.86
Access Road	0.929	2.29
Total	2.491	6.15

SCALE - 1:5000

Survey monuments found shown thus ●
Survey monuments planted shown thus ○
Wooden hubs planted shown thus ▮▮
Portions referred to bounded thus ——
Distances are in metres and decimals thereof

I/We have no objection to this location and to the Energy Resources Conservation Board issuing a drilling licence.
Accepted this day of , A.D. 19

Witness

Witness

Revisions
Added ERCB Statement - Nov. 11th, 1991

5.0 WORK PERFORMED

5.1 Summary

The work that is described and submitted in this work assessment report was performed during the two-year period ending August 26, 1995. The work included: i) well drilling; ii) coring; iii) logging; and iv) geological review, including mineralogic analyses of salt samples. A detailed break down of expenditures and a description of the work performed follows.

5.2 Expenditures

Section 14(1) of the Metallic and Industrial Minerals Regulation (Alberta Reg. 66/93) stipulates minimum expenditures requirements. This assessment reports that expenditures for the two-year period ending August 26, 1995 were $985,982.26. An amount of $119,650 is to be credited for the first and second year of the term of permits 093 9393080123, 093 9393080251, and 093 9393080252.

Section 14(2) allows for excess amounts to be credited against the remaining expenditure requirements under Section 14(1). Accordingly, $800,350 is to be credited against the permits for the remaining eight years of the term of permits 093 9393080123 and 093 9393080252. The remaining amount of $65,982.26 is to be credited for the third and fourth year of the term of permit 093 9393080251.

Table 1 summarizes the amounts credited against each permit for the first and second year of the term of the permits ($5 per hectare). The table also summarizes the amounts credited against permits for the remaining eight years of the term of the permits ($50 per hectare).

Table 1
Work Credit Summary Statement

Permit Number	Hectares	Work Credits Applied Yrs 1 - 2	Work Credits Applied Yrs 3 - 10	Total Work Credits Applied
93 9393080123	8,650	$43,250.00	$432,500.00	$475,750.00
93 9393080251	7,923	39,615.00	65,982.26	105,597.26
93 9393080252 (Sections 1, 2, 11, 12 of 21-1 W4M only)	1,036	5,180.00	51,800.00	56,980.00
93 9393080252 (Remainder)	6,321	31,605.00	316,050.00	347,655.00
Total	23,930	$119,650.00	$866,332.26	$985,982.26

Table 2
Detailed Statement of Expenditures

Item	Description	Cost
1	Rig Move	$82,420.00
2	Daywork	179,804.00
3	Footage	4,100.00
4	Camp, Crew Travel	22,864.44
5	Fuel, Power, Water	27,612.78
6	Location, Row, Roads, Surface Lease	55,624.53
7	Professional Services	30,583.51
8	Drilling Bits	24,998.33
9	Tubular Testing & Inspection	1,384.00
10	Casing Crews/Tools	5,695.63
11	Float Equipment, Centralizers, Scratchers	2,164.25
12	Cement & Services	24,405.03
13	Coring & Analysis	29,312.96
14	Electric Logging	72,548.33
15	Drill Stem Tests	77,709.10
16	Equipment Rentals	67,921.78
17	Transportation - Trucking of Materials	56,563.17
18	Direct Company Charges	3,428.09
19	Insurance	454.55
20	Miscellaneous Non Operated	2,545.00
21	Administrative Overhead	11,631.55
22	Service Rig	10,063.45
23	Well Stimulation	23,127.00
24	Surface Casing	22,445.90
25	Production Casing & Liner	48,523.56
26	Wellhead Equipment	4,296.30
27	Surface Well Production Equipment	2,479.20
28	Mud and Additives	49,180.82
29	Surface Well Production Equipment	42,095.00
	Total	$985,982.26

5.3 Well Drilling

A stratigraphic test well was drilled into the Prairie Evaporite formation. A copy of the application and license for the test well is provided in Appendix A2. The stratigraphic test well, Cdn Land Medhat, was drilled at 14-36-20-01 W4 by Enron Oil Canada.

The test well was drilled to evaluate the suitability of the Prairie Evaporite formation for solution mining and to determine brine disposal potential in the Nisku. The well confirmed the presence of the Prairie Evaporite and that the salt thickness and salt purity are adequate.

The test well was spudded on January 6, 1994 and reached a total depth of 1704 metres on January 24, 1994. The well was then plugged back to 1540 metres, on January 29, 1994. An application to reclassify the test well to a suspended well was submitted on October 24, 1995. The drilling curve and the daily drilling activity reports are provided in Appendix B.

5.4 Formation Evaluations

5.4.1 Core and Fluid Analyses

A core analysis was conducted to evaluate the suitability of the Nisku for brine disposal. To facilitate the analysis, the Nisku formation was cored from 1158.0 metres to 1203.8 metres. Core and fluid samples were analyzed by Core Laboratories. The Nisku core analysis is provided in Appendix C1. The fluid analysis is provided in Appendix C2.

Additional core samples were recovered from the Beaverhill Lake, First Red Bed, Dawson Bay, Second Red Bed, Prairie Evaporite, and the Winnipegosis formations. These samples were analyzed by RE/SPEC Inc. and are included in Appendix C3.

5.4.2 Drill Stem Test

Four drill stem tests were performed from, January 15, 1994 to January 17, 1994, to determine hydrocarbon potential in the Nisku and to estimate disposal rates into the Nisku. Two drill stem tests (1180.0-1203.0 metres and 1157.0-1175.0 metres) were successful and confirmed that there is no apparent hydrocarbon potential in the Nisku. The results of the tests were inconclusive with respect to disposal rates. Drill stem test results are provided in Appendix D.

5.5 Logging

A suite of logs were successfully run in the test well to assist in developing the geological description of the permitted area. The date logs were run, type of logs run, and logging interval are given in Table 3. Copies of all logs were filed with the ERCB office in Calgary and are available through ERCB staff.

Table 3
Summary of Logging Runs

Date Log Run	Type of Log(s) Run	Logging Interval (metres)
January 23, 1994	FMI	1704 - 1600
January 26, 1994	DLL, MSFL, GR CNL, LDT, NGR	1704 - 391 1704 - 725
January 28, 1994	FMI DSI, GR	1704 - 1585 1704 - 391

5.6 Geological Review

The Prairie Evaporite and the overlying and underlying formations were reviewed during the geological evaluation. The Dawson Bay Formation directly overlies the Prairie Evaporite in the central part of the Elk Point Basin. The Prairie Evaporite in this area is underlain by the Winnipegosis. A detailed geological report, prepared by Wm. Baillie Resources Ltd., is provided in Appendix E.

5.6.1 Regional Stratigraphy of the Upper Elk Point Group

The Prairie Evaporite Formation occurs within the Middle Devonian Upper Elk Point. This subgroup is comprised of a succession of shallow water carbonates (mainly basin filling), evaporites and some siliclastics. The attached Table of Formations (Figure 3) shows the succession to consist of Winnipegosis, Prairie Evaporite and Dawson Bay (Watt Mountain equivalent in the area of interest). The depositional history of the Upper Elk Point is discussed in Section 5.6.7.

The type locality of the Prairie Evaporite is the well Imperial Davidson #1 in 16-08-27-1 W3. Deposits of the Prairie Formation comprise one of the most widespread and thick evaporite successions in the world (Campbell 1992).

The Prairie Evaporite includes three members. The Geological Atlas of the Western Canadian Sedimentary Basin describes the members as follows. The lower or Whitkow member is composed mainly of halite but may also locally consist of interbedded halite and anhydrite. The middle or Shell Lake member is relatively thin and composed of anhydrite. The upper or Leofnard member, predominantly halite, forms the bulk of the Prairie Evaporite Formation.

In the immediate area of interest the Shell Lake and Whitkow members cannot be differentiated and consist of interbedded salt, anhydrite and dolomite. The south to north cross section (Figure 4) shows the Prairie Evaporite to consist mostly of Halite with rare thin Anhydrite beds in the upper part of the section. The basal 10 metres consists of interbedded anhydrite and salt. Rare shales occur in the upper part of the section. The test well 14-36-20-01 W4 cored the entire Prairie Evaporite section.

5.6.2 Lithologic Characteristics

The lithologic characteristics of the Prairie Evaporite and the overlying and underlying formations are shown in Figure 5. The Prairie Evaporite was cored and a detailed log of its lithology is shown in Figure 6.

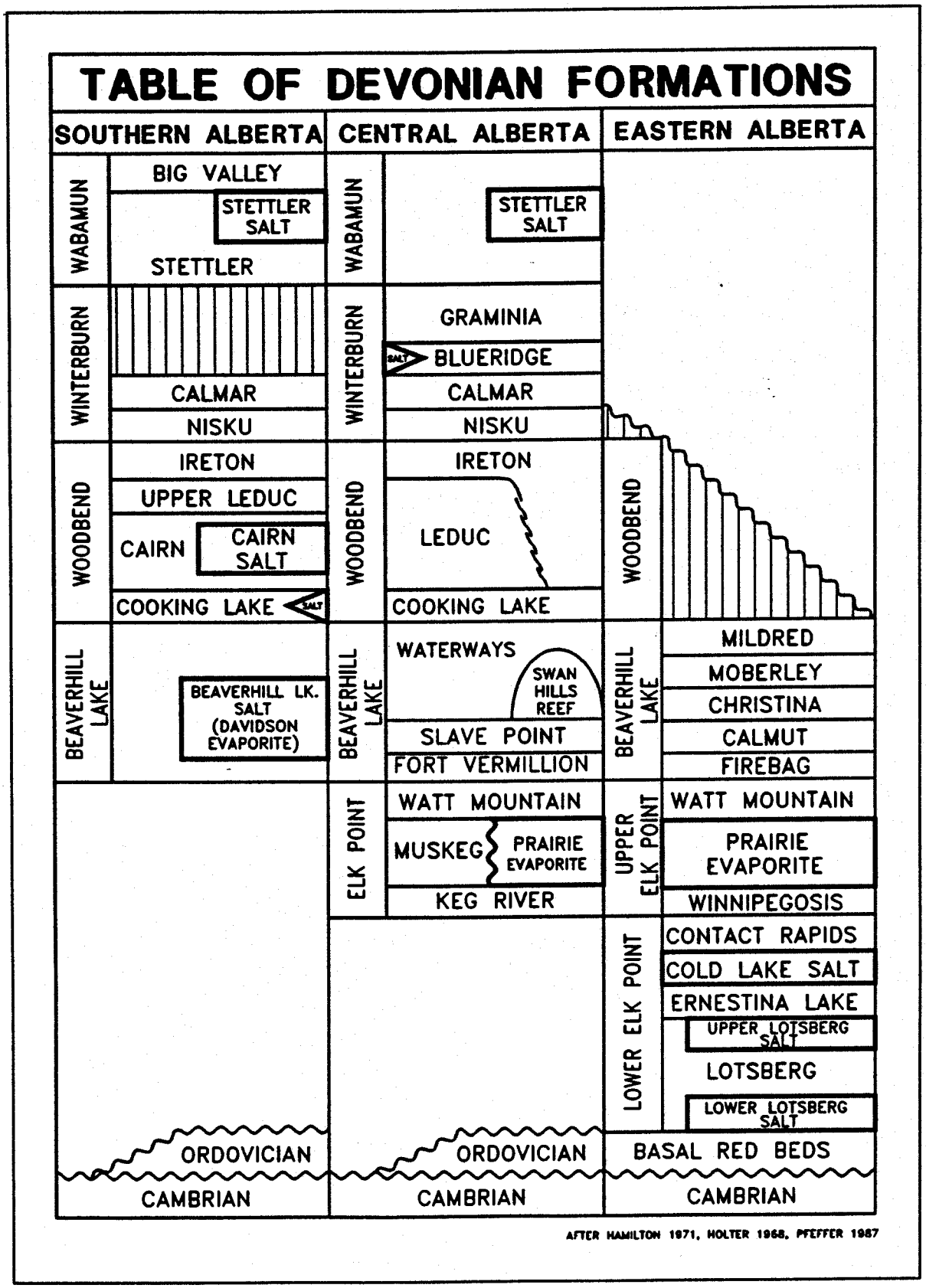
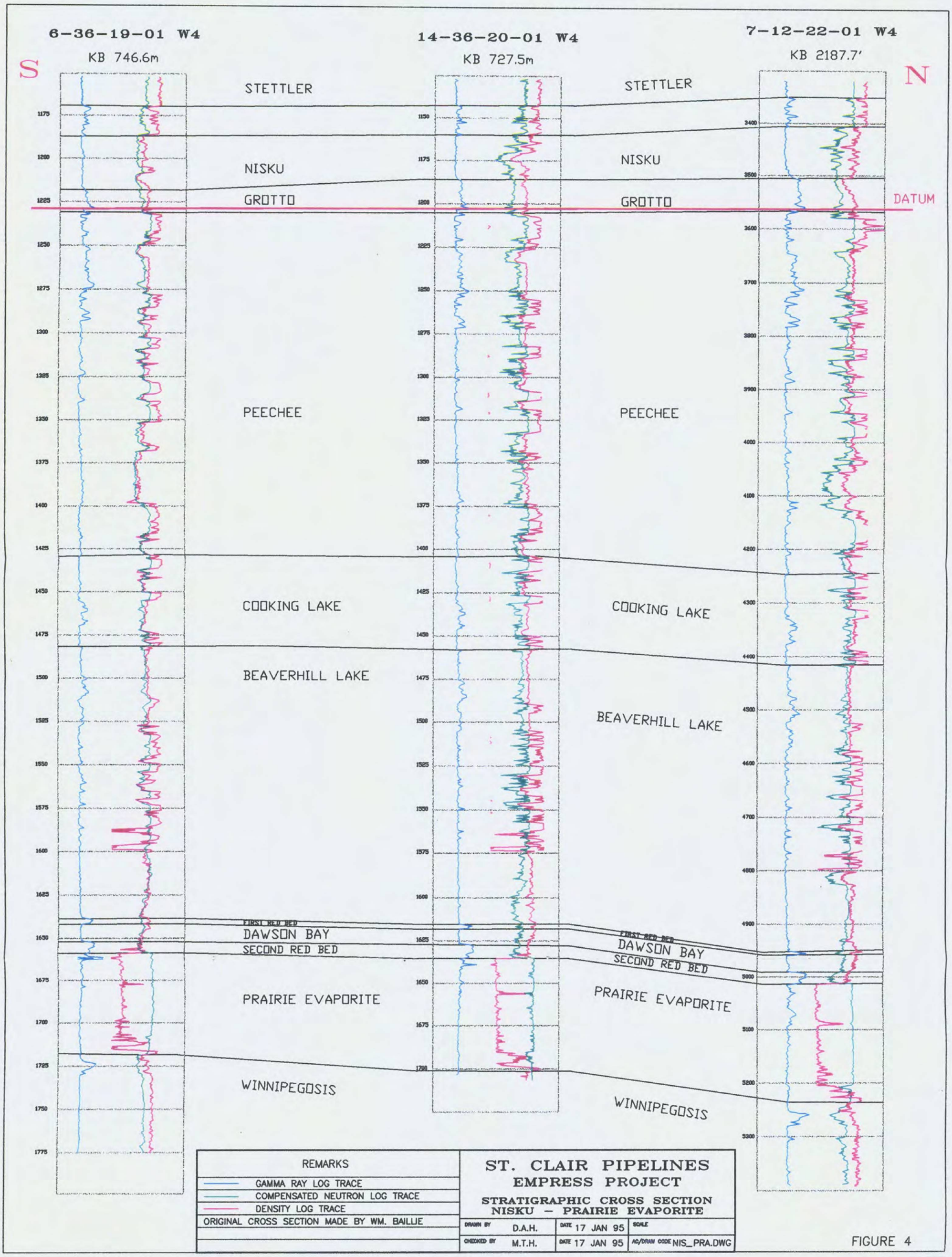


Figure 3 Table of Devonian Formations



REMARKS
GAMMA RAY LOG TRACE
COMPENSATED NEUTRON LOG TRACE
DENSITY LOG TRACE
ORIGINAL CROSS SECTION MADE BY WM. BAILLIE

ST. CLAIR PIPELINES
EMPRESS PROJECT
STRATIGRAPHIC CROSS SECTION
NISKU – PRAIRIE EVAPORITE

DRAWN BY	D.A.H.	DATE 17 JAN 95	SCALE
CHECKED BY	M.T.H.	DATE 17 JAN 95	AC/DRAW CODE NIS_PRA.DWG

FIGURE 4

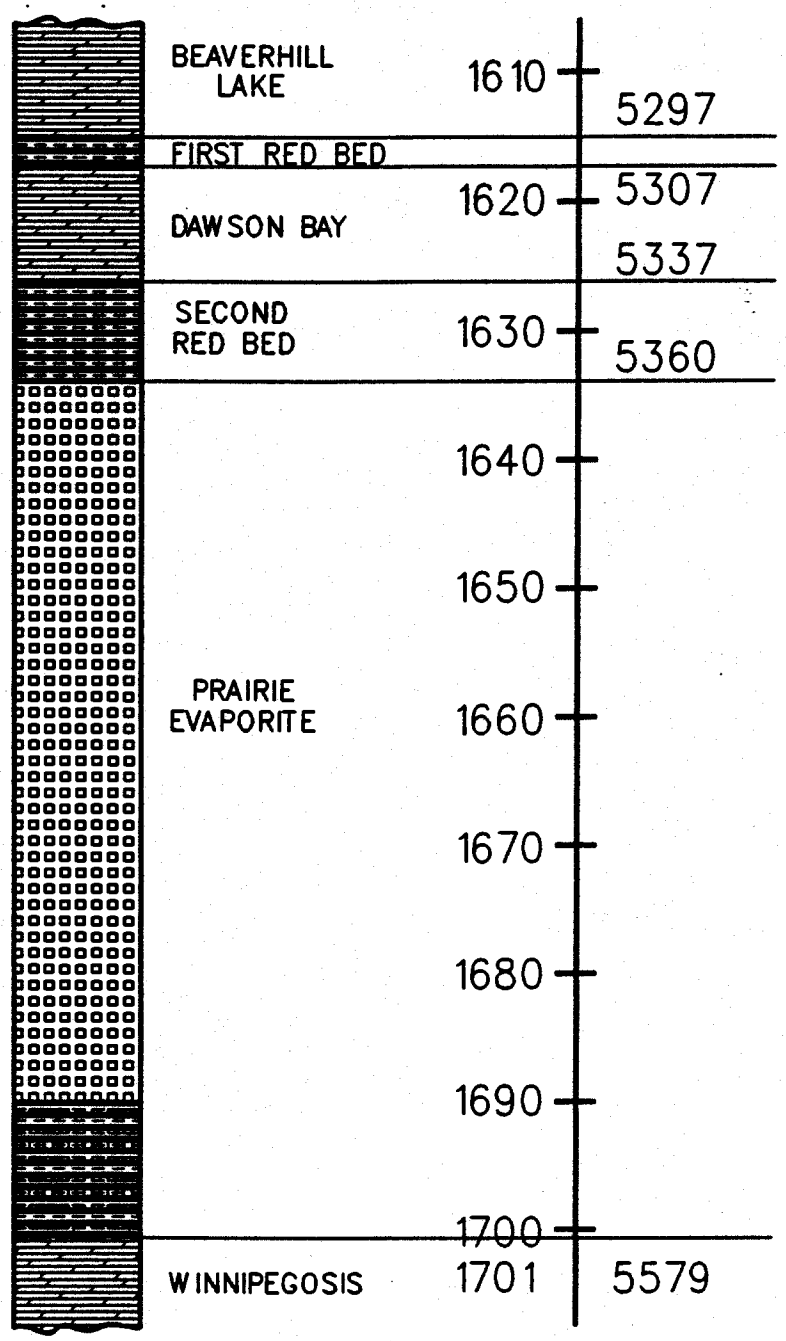


Figure 5

Lithology 14-36-20-1 W4M

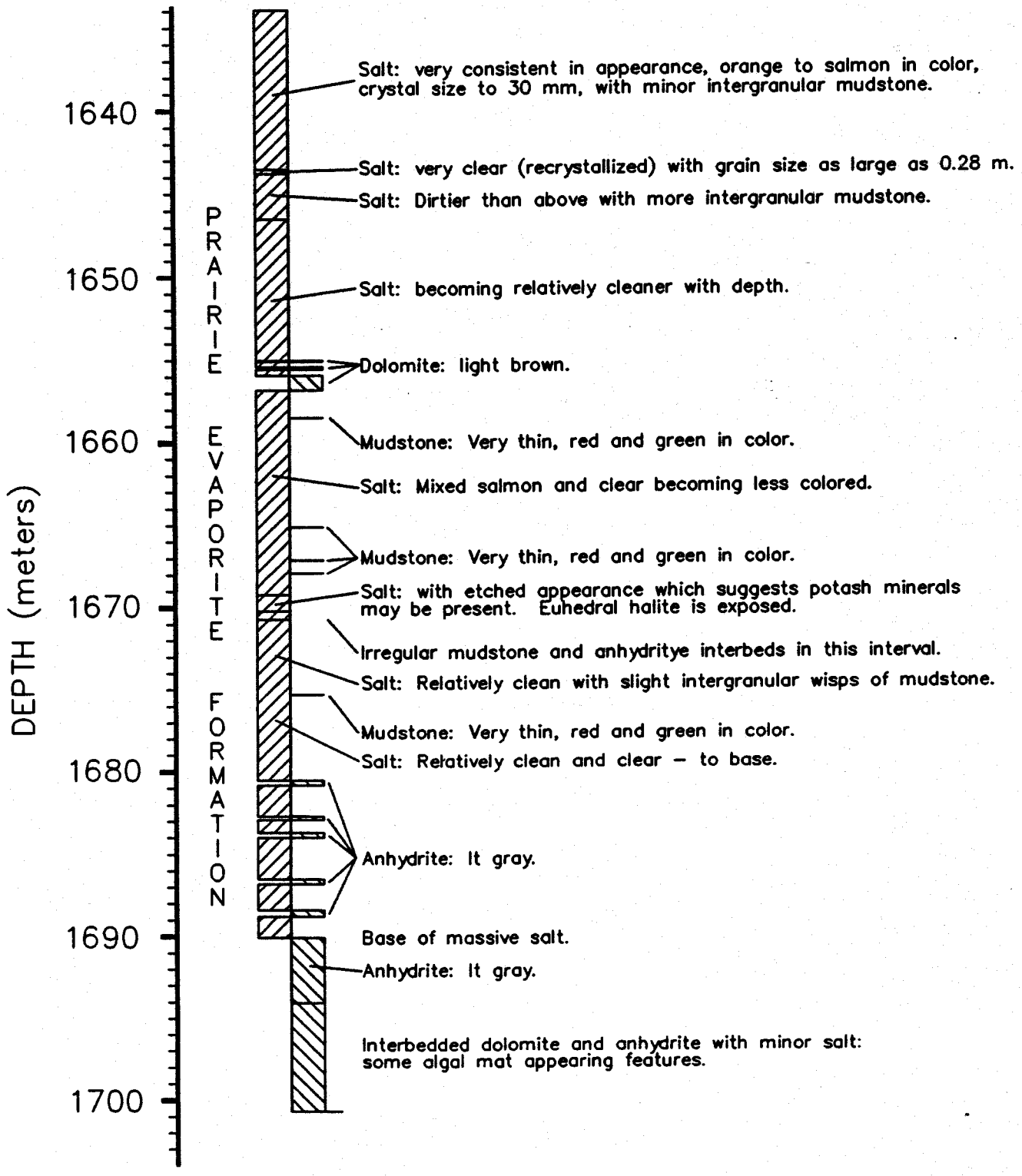


Figure 6

Detailed Lithology 14-36-20-1 W4M

5.6.3 Salt Analyses

Mineralogic analyses of the salt samples were performed and a summary of the results is provided in Table 4 and Table 5.

Table 4
X-Ray Analyses of Salt Specimens
(Weight Percent)

Specimen ID	Halite	Anhydrite	Quartz	Sylvite	Carnallite	Total
EN/88/2-2	95.6	1.0	ND	3.4	ND	100.0
EN/106/2-2	94.0	ND	ND	ND	6.0	100.0
En/120/1/3/1-2	96.7	2.4	0.7	0.2	ND	100.0

Table 5
Chemical Analyses of Salt Specimens
(Weight Percent)

Specimen ID	% Ca	% Na	% Cl	% SO_4	% K	% Mg	% Water Insoluble	Total
EN/88/2-2	0.18	33.50	59.40	0.76	2.62	ND	0.85	97.31
EN/106/2-2	0.08	34.10	67.50	0.14	0.79	0.24	1.41	104.26
En/120/1/3/1-2	0.38	31.80	67.30	0.90	2.51	ND	1.44	104.33

5.6.4 Local Distribution and Thickness of the Prairie Evaporite

The south to north cross section (Figure 4) shows the Prairie Evaporite to be of fairly consistent thickness of 60-67 metres from Twp 19 through 22 Range 1 W4.

The structure on top of the Prairie Evaporite (Figure 7) in the immediate area of interest is from -890 to -915 metres subsea. The isopach of the Prairie Evaporite seen in Figure 8 in the immediate area (Twp 19-20 and Range 1-2 W4) is from 50 - 67 metres. The evaporite thins to 38 metres to the west in Ranges 2 to 3 W4M.

5.6.5 Dawson Bay Formation (Watt Mountain Equivalent)

In this central part of the Elk Point Basin the Dawson Bay Formation directly overlies the Prairie Evaporite (Figures 4,5). The red and green shales termed the Second Red Beds form the base of the Dawson Bay. On the cross section this shale zone is 6 to 8 metres thick. The next unit in the Dawson Bay is a 10 metre thick dolomite. The shale and dolomite were also tested by Re/Spec and the sequence found to act as a competent and impermeable cap rock to the Prairie Evaporite salt.

5.6.6 Winnipegosis and Ashern Formations

The Prairie Evaporite in this area is underlain by the Winnipegosis. The Winnipegosis consists of reef and inter-reef deposits. In the immediate area the Winnipegosis is a thin carbonate (approximately 4 metres as seen in Figure 4). Below the Winnipegosis is the Ashern Formation. Typically the Ashern Formation is thin bedded red, green and grey shale, dolomitic siltstone and argillaceous dolomite. In the area of interest it is 4 to 7 metres thick.

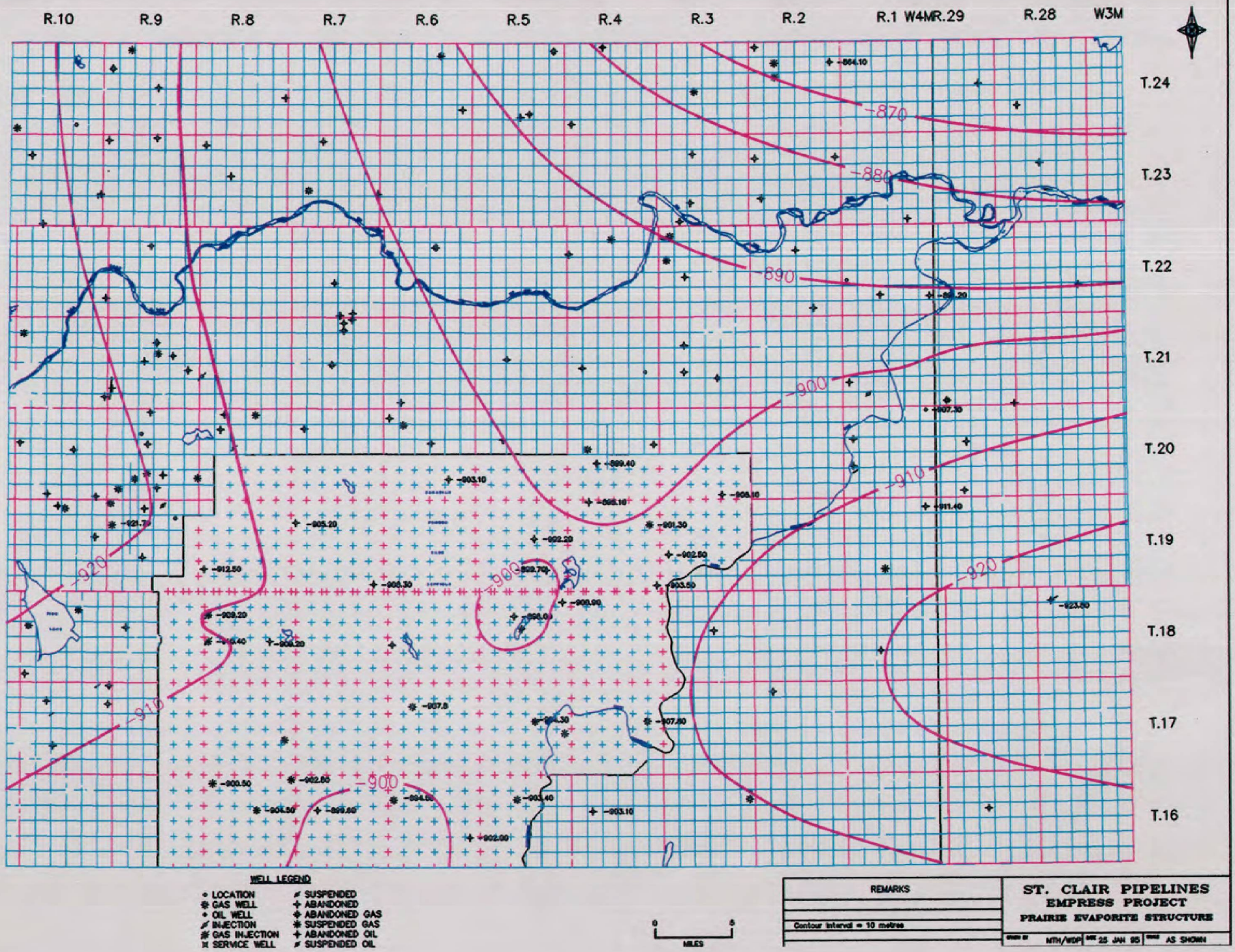
5.6.7 Depositional History of the Upper Elk Point Group
(Meijer Drees, 1994, Martindale and MacDonald 1990, and Schmidt, McDonald and McIlreath 1977)

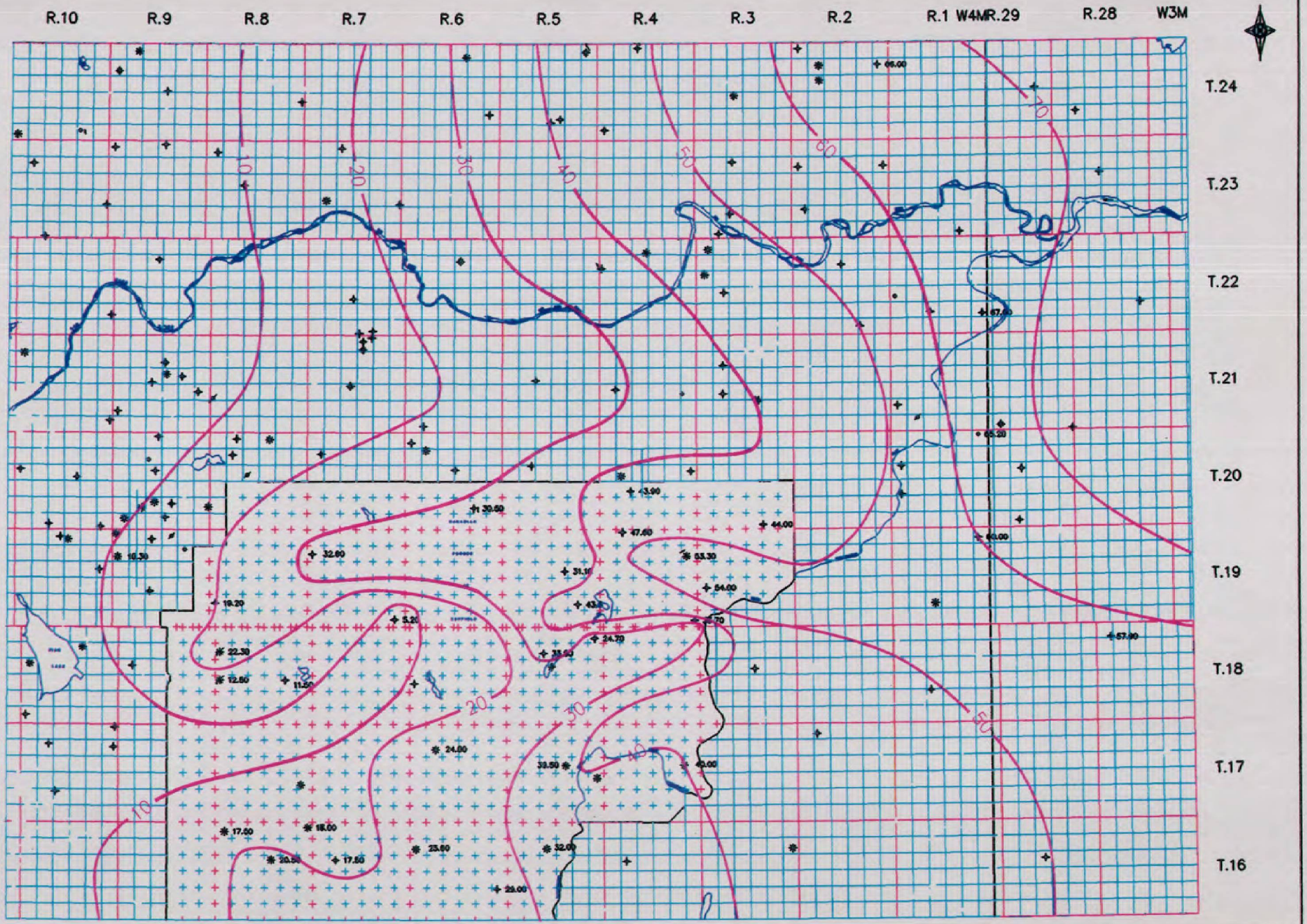
The formations in the upper part of the Elk Point group are widely distributed and outline the Elk Point Embayment that extended southeastward from northeastern British Columbia and the District of Mackenzie into the Williston Basin of southern Saskatchewan, Manitoba and North Dakota.

Winnipegosis/Lower Keg River sedimentation was initiated during a marine transgression. An increase in the rate of subsidence or a rise in sea level coupled with a reduction in the production of carbonate sediments initiated vertical reef growth. The reef mounds at the entrance of the Elk Point Embayment amalgamated with inter reef deposits to form the Presqu'ile Barrier. The formation of this reefal barrier limited the flow of sea water into the embayment to the southeast and conditions became restricted. During periods of low water level and excessive evaporation, anhydrite and salt of the Prairie Evaporite accumulated in the supratidal flats, coastal lagoons and ephemeral lakes behind the barrier by the process of evaporitic drawdown.

Sea level fell after the accumulation of these evaporites and the entire embayment became emergent. The southeastern part of the embayment remained emergent and here the salt deposits were partly leached and recrystallized into potash rich minerals. The Prairie Evaporite salt deposits are absent in the area southwest of Regina and south of Saskatoon due to dissolution. The Second Red Bed is probably an eolian deposit.

During the next phase of sea level rise (late Givetian to Early Frasnian) fossiliferous carbonates of the Dawson Bay prograded in to the southeastern part of the Embayment. Evaporitic conditions followed with windblown deposits of green and reddish brown silt and siliceous clays being present in the First Red Beds (and upper part of the Watt Mountain Formation).


R.10
R.9
R.8
R.7
R.6
R.5
R.4
R.3
R.2
R.1 W4MR.29
R.28
W3M
T.24
T.23
T.22
T.21
T.20
T.19
T.18
T.17
T.16
-870
-880
-890
-900
-910
-920
WELL LEGEND
LOCATION
GAS WELL
OIL WELL
INJECTION
GAS INJECTION
SERVICE WELL
SUSPENDED
ABANDONED
ABANDONED GAS
SUSPENDED GAS
ABANDONED OIL
SUSPENDED OIL
0
5
MILES
REMARKS
Contour Interval = 10 metres
ST. CLAIR PIPELINES
EMPRESS PROJECT
PRAIRIE EVAPORITE STRUCTURE
DRAWN BY MTH/WDP
DATE 25 JAN 95
SCALE AS SHOWN


R.10
R.9
R.8
R.7
R.6
R.5
R.4
R.3
R.2
R.1 W4MR.29
R.28
W3M
T.24
T.23
T.22
T.21
T.20
T.19
T.18
T.17
T.16
17
10
20
30
40
50
60
70
WELL LEGEND
LOCATION
GAS WELL
OIL WELL
INJECTION
GAS INJECTION
SERVICE WELL
SUSPENDED
ABANDONED
ABANDONED GAS
SUSPENDED GAS
ABANDONED OIL
SUSPENDED OIL
0
5
MILES
REMARKS
Contour Interval 10 metres
ST. CLAIR PIPELINES
EMPRESS PROJECT
PRAIRIE EVAPORITE ISOPACH
MTH/WDP
25 JAN 93
AS SHOWN

6.0 CONCLUSIONS

The results of the analyses conducted reveal that the Prairie Evaporite formation has sufficient thickness, and is of suitable quality, for solution mining.

This Report has been prepared by V. Jo-Ann Patterson, P.Eng. Attached is the statutory declaration of the undersigned as to the veracity of the contents of this report.

7.0 BIBLIOGRAPHY

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8.0 STATUTORY DECLARATION

I, V. Jo-Ann Patterson, P.Eng., of the City of Chatham, in the Province of Ontario, DO SOLEMNLY DECLARE THAT:

1. The contents of this Assessment Work Report are true to the best of my knowledge.

2. That I am of the full age of eighteen years.

AND I MAKE this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

DECLARED BEFORE ME at the City of Chatham, in the Province of Ontario, this 20th day of October, A.D. 1995.

A Commissioner for Oaths in and for the Province of Ontario.

[redacted]

V. Jo-Ann Patterson, P.Eng.

APPENDIX A1

RMC CORPORATION

August 23, 1994

Canadian Landmasters Resource Services Ltd.
P.O. Box 6806, Station "D"
Calgary, Alberta
T2P 2E7

Attention: Mr. Mervyn L. Henkelman, President and General Manager

Dear Mervyn;

Re: Metallic and Industrial Minerals Permits
December 17, 1993 Letter Agreement between Rich Minerals Corporation and Canadian Landmasters Resource Services Ltd.

As requested, please find enclosed an executed Surrender of Interest addressed to the Crown in Right of Alberta and copies of the permit documents for the following four sections.

Sections 1, 2, 11 and 12, all in Township 21, Range 1, West of the fourth meridian

I trust the enclosed are in order.

Yours truly,

RICH MINERALS CORPORATION

[redacted]

Debra L. Senger
Director of Mergers & Acquisitions

DLS/hlb

encl.

925 - 26 Street N.E. Calgary, Alberta, Canada T2A 6K8
Telephone: (403) 531-9100 Facsimile: (403) 531-9699

SURRENDER OF INTEREST

TO: THE CROWN IN RIGHT OF ALBERTA

WHEREAS RICH MINERALS CORPORATION ("Rich") is the holder of Metallic and Industrial Minerals Permits No. 9393080252 and No. 939308251 (the "Permits"); and

WHEREAS Rich wishes to surrender unto the Crown in right of Alberta its interest in Sections 1, 2, 11 and 12, all in Township 21, Range 1, West of the fourht meridian within the Permits insofar as it relates to the Prairie Evaporite formation (between the intervals of 5100 feet and 5600 feet) (the "Surrendered Interest").

NOW THEREFORE Rich does hereby surrender, assign, set over, transfer and release unto the Crown in right of Alberta the Surrendered Interest unconditionally, absolutely and forever, together with all benefits and advantages to be derived therefrom.

RICH MINERALS CORPORATION

Per: [redacted]

925 - 26 Street N.E. Calgary, Alberta, Canada T2A 6K8
Telephone: (403) 531-9100 Facsimile: (403) 531-9699

Alberta
ENERGY
Mineral Resources Division

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393080252

Date of Issue: 1993 August 18

Term Commencement Date: 1993 August 18

In this Permit:

(a) "Date of Issue" means the date shown above as the Date of Issue;

(b) "Location" means the tract or tracts of land described under the heading "Description of Location" in the Appendix to this Permit;

(c) "Metallic and Industrial Minerals" means the minerals described under the heading "Permitted Substances" in the Appendix to this Permit;

(d) "Permit Holder" means Rich Minerals Corporation

(e) "Term Commencement Date" means the date shown above as the Term Commencement Date.

(f) a reference in this Permit to the Mines and Minerals Act or to any other Act of the Legislature of Alberta shall be construed as a reference to

(i) that Act, as amended from time to time,

(ii) any replacement of all or part of that Act from time to time enacted by the Legislature, as amended from time to time, and

(iii) any regulations, orders, directives, by-laws or subordinate legislation from time to time made under any enactment referred to in paragraph (i) and (ii), as amended from time to time.

This Permit grants to the Permit Holder the right to explore for Metallic and Industrial Minerals that are the property of the Crown in right of Alberta in the Location subject to the following terms and conditions:

1. The Permit Holder shall comply with all provisions of the Mines and Minerals Act that pertain or relate to Metallic and Industrial Mineral Permits and those provisions shall be deemed to be incorporated into and to form part of this Permit.

2. Nothing in this Permit shall be construed as removing the necessity to obtain, in relation to the conduct of exploration on the Location, a right of entry, user and taking of the surface of the Location or an exploration approval for the conduct of the exploration, if such a right of entry or exploration approval is required by the Mines and Mineral Act or by any other Act of the Legislature of Alberta.

3(1) The Permit Holder shall comply with

(a) the provisions of the Mines and Minerals Act that relate to, apply to or affect the rights and obligations of a holder of metallic and industrial minerals rights that are the property of Her Majesty, or that relate to, apply to or affect the Permit Holder in the conduct of its operations or activities under this Permit, and

(b) the provisions of any other Act of the Legislature of Alberta relating to, applying to or affecting the rights and obligations of holders of metallic and industrial minerals rights that are the property of Her Majesty, or relating to, applying to or affecting the Permit Holder in the conduct of its operations or activities under this Permit.

(2) The provisions of the Acts and regulations referred to in section 3(1) of this Agreement shall be deemed to be incorporated into and to form part of this Permit.

(3) In the event of conflict between a provision of this Permit and a provision of an Act referred to in section 3(1) of this Agreement, the provision of the Act prevails.

4. This Permit is subject to the special provisions, if any, contained in the Appendix to this Permit.

B. Hudson

For Minister of Energy
on behalf of Her Majesty

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393080252

AGGREGATE AREA:

7 357 HECTARES

DESCRIPTION OF LOCATION:

4-01-020: 34WP,SEP
PORTION(S) LYING OUTSIDE THE PROPOSED MERIDIAN DAM AND RESERVOIR.
4-01-021: 1;2E,WP;3WP;4-7;9;10NP,SP;11E,SWP,NW;12-14;15NP,SEP;
16SEP,SW,NWP,L10P;17-20;21NP,SWP;22NP,SP;23;24;25S,NWP,
NE;26NEP;27SP,NWP;28N,SEP,SW;29-33;34N,SEP,SW;35NP,SP;36SP
PORTION(S) LYING OUTSIDE THE PROPOSED MERIDIAN DAM AND RESERVOIR.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

1284

Alberta
ENERGY
Mineral Resources Division

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393080251

Date of Issue: 1993 August 18

Term Commencement Date: 1993 August 18

In this Permit:

(a) "Date of Issue" means the date shown above as the Date of Issue;

(b) "Location" means the tract or tracts of land described under the heading "Description of Location" in the Appendix to this Permit;

(c) "Metallic and Industrial Minerals" means the minerals described under the heading "Permitted Substances" in the Appendix to this Permit;

(d) "Permit Holder" means Rich Minerals Corporation

(e) "Term Commencement Date" means the date shown above as the Term Commencement Date.

(f) a reference in this Permit to the Mines and Minerals Act or to any other Act of the Legislature of Alberta shall be construed as a reference to

(i) that Act, as amended from time to time,

(ii) any replacement of all or part of that Act from time to time enacted by the Legislature, as amended from time to time, and

(iii) any regulations, orders, directives, by-laws or subordinate legislation from time to time made under any enactment referred to in paragraph (i) and (ii), as amended from time to time.

This Permit grants to the Permit Holder the right to explore for Metallic and Industrial Minerals that are the property of the Crown in right of Alberta in the Location subject to the following terms and conditions:

1. The Permit Holder shall comply with all provisions of the Mines and Minerals Act that pertain or relate to Metallic and Industrial Mineral Permits and those provisions shall be deemed to be incorporated into and to form part of this Permit.

2. Nothing in this Permit shall be construed as removing the necessity to obtain, in relation to the conduct of exploration on the Location, a right of entry, user and taking of the surface of the Location or an exploration approval for the conduct of the exploration, if such a right of entry or exploration approval is required by the Mines and Mineral Act or by any other Act of the Legislature of Alberta.

3(1) The Permit Holder shall comply with

(a) the provisions of the Mines and Minerals Act that relate to, apply to or affect the rights and obligations of a holder of metallic and industrial minerals rights that are the property of Her Majesty, or that relate to, apply to or affect the Permit Holder in the conduct of its operations or activities under this Permit, and

(b) the provisions of any other Act of the Legislature of Alberta relating to, applying to or affecting the rights and obligations of holders of metallic and industrial minerals rights that are the property of Her Majesty, or relating to, applying to or affecting the Permit Holder in the conduct of its operations or activities under this Permit.

(2) The provisions of the Acts and regulations referred to in section 3(1) of this Agreement shall be deemed to be incorporated into and to form part of this Permit.

(3) In the event of conflict between a provision of this Permit and a provision of an Act referred to in section 3(1) of this Agreement, the provision of the Act prevails.

4. This Permit is subject to the special provisions, if any, contained in the Appendix to this Permit.

B. Hodgson

For Minister of Energy
on behalf of Her Majesty

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393080251

AGGREGATE AREA:

7 923 HECTARES

DESCRIPTION OF LOCATION:

4-01-020: 18EP,SWP;19EP,L14P;27S,NP;28NP,SP;29NP,SEP,SW;30NP,SP;
31N,SEP,SW;32NW,NEP,L5P;33N,SP
PORTION(S) LYING OUTSIDE THE PROPOSED MERIDIAN DAM AND RESERVOIR.
4-02-020: 7;9-11;13NP,SP;14N,SEP,SW;15-23;24NP,SP;25N,SEP,SW;
27-36
PORTION(S) LYING OUTSIDE THE PROPOSED MERIDIAN DAM AND RESERVOIR.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

SPECIAL PROVISIONS:

NIL

FORM C
MINES AND MINERALS ACT
(Section 135)

TRANSFER OF AGREEMENT(S)

B E T W E E N:

RICH RESOURCE INVESTMENTS LTD., a body corporate incorporated under the laws of the Province of Alberta (hereinafter called the "Transferor")

- and -

CANADIAN LANDMASTERS RESOURCE SERVICES LTD., a body corporate, incorporated under the laws of the Province of Alberta (hereinafter called the "Transferee")

The Transferor, being the holder of Alberta Crown Metallic and Industrial Minerals Permit No. 9393080123 dated August 26, 1993 in consideration of the sum of One Dollar ($1.00) and other valuable consideration, payment of which is hereby acknowledged by the Transferor, hereby transfers to the Transferee Alberta Crown Metallic and Industrial Minerals Permit No. 9393080123.

AND the Transferee hereby accepts this transfer.

DATED this 3 day of February, 1994.

RICH RESOURCE INVESTMENTS LTD.

[redacted]

Per: _____
Title:

Per: _____
Title:

c/s

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.

Per: _____
Title:

Per: _____
Title:

c/s

FORM B

MINES AND MINERALS ACT

NOTICE OF CHANGE OF OFFICIAL
ADDRESS FOR SERVICE

TO: THE MINISTER OF ENERGY

Take notice that the official address for service for the agreement(s) listed below is changed from:

Rich Resource Investments Ltd.
11003 - 84th Avenue
Edmonton, AB
T6G 0V6

to

Canadian Landmasters Resource Services Ltd.
700, 808 - 4th Avenue S.W.
Calgary, AB
T2P 3E8

LIST OF AGREEMENTS:

Alberta Crown Metallic and Industrial Minerals Permit No. 9393080123

Dated this 3 day of February, 1994.

RICH RESOURCE INVESTMENTS LTD.

[redacted]

Per: _____

Per: _____
c/s

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.

Per: _____

Per: _____
c/s

Alberta
ENERGY
Mineral Resources Division

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393080123

Date of Issue: 1993 August 26

Term Commencement Date: 1993 August 26

In this Permit:

(a) "Date of Issue" means the date shown above as the Date of Issue;

(b) "Location" means the tract or tracts of land described under the heading "Description of Location" in the Appendix to this Permit;

(c) "Metallic and Industrial Minerals" means the minerals described under the heading "Permitted Substances" in the Appendix to this Permit;

(d) "Permit Holder" means

RICH RESOURCE INVESTMENTS LTD.

(e) "Term Commencement Date" means the date shown above as the Term Commencement Date.

(f) a reference in this Permit to the Mines and Minerals Act or to any other Act of the Legislature of Alberta shall be construed as a reference to

(i) that Act, as amended from time to time,

(ii) any replacement of all or part of that Act from time to time enacted by the Legislature, as amended from time to time, and

(iii) any regulations, orders, directives, by-laws or subordinate legislation from time to time made under any enactment referred to in clause (a) or (b), as amended from time to time.

This Permit grants to the Permit Holder the right to explore for Metallic and Industrial Minerals that are the property of the Crown in right of Alberta in the Location subject to the following terms and conditions:

APPENDIX

TO

METALLIC AND INDUSTRIAL MINERALS PERMIT NO. 9393080123

AGGREGATE AREA:

8 650 HECTARES

TRACT ONE

DESCRIPTION OF LOCATION:

4-01-019: 27-30;31S,NWP,NE;32-34
4-01-020: 3-5;6SP,NP;7SP,NP;9;10;13-16;20-25;35E,WP;36
4-02-019: 25;36SP,NP
4-02-020: 1SP,NW,NEP;12
PORTION(S) LYING OUTSIDE THE PROPOSED MERIDIAN DAM AND RESERVOIR.

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS

TRACT TWO

DESCRIPTION OF LOCATION:

4-01-020: 1;2;11;12;17

PERMITTED SUBSTANCES:

METALLIC AND INDUSTRIAL MINERALS
EXCEPTING METALLIC AND INDUSTRIAL MINERALS IN THE PRAIRIE EVAPORITE FM
AS DESIGNATED IN ZD 3843
INTERVAL: 1 662.00 - 1 707.50 METRES
KEY WELL: 00/06-36-019-01W4/0
LOG TYPE: COMPENSATED DENSILOG COMPENSATED NEUTRON

SPECIAL PROVISIONS:

NIL

em

APPENDIX A2

ERCB Energy Resources Conservation Board 640 Fifth Avenue SW Calgary, Alta. T2P 3G4

WELL LICENCE

LICENCE NO.: 0162547
WELL NAME : CDN LAND MEDHAT 14-36-20-1
LICENSEE : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
PURPOSE : INJECT WATER INTO THE NISKU
SURFACE LOCATION : LSD 14-36-020-01 W4M
SURFACE CO-ORDINATES: 385.9 METRES SOUTH 613.4 METRES EAST
(AS MEASURED OR CALCULATED FROM THE EXTERIOR BOUNDARIES OF THE QUARTER SECTION)

UNIQUE ID	: 100/14-36-020-01W4/00	SURFACE RIGHTS	: FREEHOLD
FIELD	: MEDICINE HAT	MINERAL RIGHTS	: CROWN
LAHEE CLASS:	NPW (C)	PROJECTED DEPTH	: 2200 METRES
AREA OFFICE:	MEDICINE HAT (Ph 403-527-3385)	TERMINATING ZONE:	PRECAM SY
		GROUND ELEVATION:	723.2 METRES

THIS LICENCE IS GRANTED IN ACCORDANCE WITH AND SUBJECT TO THE PROVISIONS OF THE OIL AND GAS CONSERVATION ACT AND REGULATIONS PURSUANT THERETO, AND SUBJECT TO THE FOLLOWING SPECIAL PROVISIONS OR SUCH FURTHER REQUIREMENTS AS MAY BE DIRECTED BY A BOARD REPRESENTATIVE:

- CASING PROGRAM:

SURFACE	385 - 0M	244.5MM	53.5KG/M	J-55	LT&C	NEW
PRODUCTION	2200 - 1800M	177.8MM	38.7KG/M	J-55	LT&C	NEW
-	1800 - 0M	177.8MM	34.2KG/M	J-55	LT&C	NEW

- THIS WELL SHALL NOT BE DRILLED BEYOND THE PRECAMBRIAN AT A DEPTH OF APPROXIMATELY 2200 METRES.

- ALL USEABLE GROUND WATER AQUIFERS IN THIS WELL SHALL BE ISOLATED BEHIND SURFACE CASING OR ADEQUATELY COVERED BY THE CEMENTING OF THE NEXT CASING STRING OR, IF THE WELL IS TO BE ABANDONED, WITH THE APPROPRIATE OPEN-HOLE ABANDONMENT PLUG(S).

- THE PRODUCTION CASING IS TO BE CEMENTED FULL LENGTH. IF CEMENT RETURNS ARE NOT MAINTAINED AT SURFACE, A CEMENT TOP LOCATING LOG SHALL BE RUN. THE LOG ALONG WITH A PROPOSED REMEDIAL CEMENTING PROGRAM SHALL BE SUBMITTED TO THE BOARD'S DRILLING AND PRODUCTION DEPARTMENT.

- FLUID SHALL NOT BE INJECTED INTO THIS WELL UNTIL THE REQUIREMENTS OF ERCB INFORMATIONAL LETTER IL 84-12 HAVE BEEN COMPLIED WITH.

- NOT MORE THAN 500 CUBIC METRES OF FLUID SHALL BE INJECTED INTO THIS WELL EXCEPT IN ACCORDANCE WITH A SCHEME APPROVAL BY THE BOARD.

DATED AT CALGARY, ALBERTA THIS 24TH DAY OF NOVEMBER 1993

FOR ENERGY RESOURCES CONSERVATION BOARD

DeP 11 88-08 (BL03)

ERCB

Energy Resources Conservation Board

640 Fifth Avenue SW
Calgary, Alberta
Canada T2P 3G4

Telephone (403) 297-8311
Fax (403) 297-7040

DRILL CUTTINGS SAMPLE REQUIREMENT

WELL CDN LAND MEDHAT 14-36-20-1 W4M

Under provision of the Oil and Gas Conservation Regulations, section 11.010, the Board has set the drill cuttings sample requirement for the above identified well as follows:

Samples required

___ metre intervals from

to .

5 metre intervals from 30 metres above the Viking

to Total Depth .

The samples shall be a separate set, washed, dried and packaged in cotton bags of the type and size available for purchase at the Core Research Centre.

Each bag shall be labelled in waterproof ink showing the well name, location and sample depth. Whipstock and circulation samples are to be identified.

Bulk sacks containing bags shall be labelled with the well name and location and shall contain samples from one well only.

The drill cuttings samples shall be delivered prepaid, within two weeks of the well's finished drilling date to the CORE RESEARCH CENTRE, 3545 Research Way N.W., Calgary, Alberta, T2L 1Y7.

M. J. Vrskovy, P. Geol.
Assistant Manager
Geology Department

G5C 88-03

ERCB Energy Resources Conserv Board
640 Fifth Avenue SW Calgary, A T2P 3G4

APPLIC ION FOR A WELL LICENCE

NOTE: THIS FORM MUST BE COMPLETED IN ACCORDANCE WITH THE INSTRUCTIONS SPECIFIED IN ERCB GUIDE G-33

1 PURPOSE

THIS APPLICATION FOR A WELL LICENCE IS MADE UNDER SECTION 2.020 ☒ 2.030 ☐ 2.040 ☐ OF THE OIL AND GAS CONSERVATION REGULATIONS

THE PURPOSE OF THE PROPOSED WELL WILL BE TO: 2100 m stratagraphic test

2 LOCATION AND DEPTH

WELL NAME: Cdn Land Medhat (MAXIMUM LENGTH OF WELL NAME IS 36 CHARACTERS INCLUDING LOCATION. (MERIDIAN NOT TO BE IN NAME))

SURFACE LOCATION OF THIS WELL IS IN:
LSD 14 SEC 36 TWP 020 RGE 01 W 4

PROJECTED TOTAL DEPTH 2200 (m) TVD (m)

GROUND ELEVATION 723.2 (m)

PROJECTED BOTTOM LOCATION OF THIS WELL IS IN: A. SAME AS THE SURFACE ☒
B. LSD SEC TWP RGE W

ANTICIPATED SPUD DATE: 93-11-21

THE SURFACE COORDINATES AS MEASURED FROM THE EXTERIOR BOUNDARIES OF THE QUARTER SECTION CONTAINING THE WELL ARE:
3185.9 (m) NORTH ☐ SOUTH ☒ 613.4 (m) EAST ☒ WEST ☐

THE WELL WILL BE DRILLED: 1. VERTICAL ☒ 2. DIRECTIONAL ☐ 3. HORIZONTAL ☐ 4. SLANT ☐ 5. SPECIAL MUD SYSTEM ☐ 6. OTHER ☐

THE WELL WILL TERMINATE: 1. IN THE Precambrian
2. NOT MORE THAN _____ METRES BELOW THE BASE OF THE _____

3 ERCB USE

TERM. FORM. CODE	LAHEE	L CODE	EXPLORATORY BELOW	CONF. FORM. CODE	INCENTIVE CERT. NO.

UNIQUE I.D. 1 / - - - W / | FIELD/SECTOR | CODE

MINERAL RIGHTS C ☐ F ☐ B ☐ SURFACE RIGHTS C ☐ F ☐ | AREA OFFICE | CODE

4 MINERAL RIGHTS

1. THE APPLICANT HAS THE RIGHT TO PRODUCE AS BELOW:
   A. ☒ FROM ALL FORMATIONS DOWN TO AND INCLUDING TERMINATING FORMATION
   B. ☐ FROM ALL FORMATIONS BELOW THE BASE OF THE _____
   C. ☐ OTHER _____
1. IN ALL OF SEC 36
2. IN Twp. 20, Rg 1, W4M OF SECTION _____

THE HEAD LESSORS ARE: ALBERTA CROWN ☒ FREEHOLD ☐ ALBERTA CROWN/FREEHOLD ☐

AGREEMENT TYPE(S) P&NG NO(S). 0490060039 EXPIRY DATE(S) June 15/95

5 SPG

TYPE OF PRODUCTION EXPECTED: OIL ☐ GAS ☒ BOTH ☐ CRUDE BITUMEN ☐ OTHER ☐ | IF OIL ON TARGET: YES ☐ NO ☐ | IF GAS ON TARGET: YES ☒ NO ☐

6 ERCB USE

SPACING ORDER	OIL DSU/TARGET	GAS DSU/TARGET

POOL IN	POOL ADJACENT	APPLICANT ABBREV.	CODE

SURFACE CASING ADEQUATE	LICENCE NO.	AGENT CODE
YES ☐ NO ☐		

ONLY WELL IN DSU	SCHEME APPROVAL NO.	EXPIRY DATE
YES ☐ NO ☐		

7

SURVEY COMPANY: Midwest Surveys Ltd. | DATE OF SURVEY PLAN: November 9, 1993 | DRILLING CONTRACTOR: Sedco Drilling

8 CASING

CASING TYPE	INTERVAL LENGTH (m) BOTTOM JOINT TO TOP JOINT	SIZE (mm)	WEIGHT (kg/m)	GRADE	COUPLING TYPE	NEW, USED OR IN-HOLE	TVD OF BOTTOM JOINT
S	385 m to 0 m	244.5	53.51	J-55	LT&C	New	
P	2200 m to 1800 m	177.8	38.69	J-55	LT&C	New	
	1800 m to 0 m	177.8	34.23	J-55	LT&C	New	

CASING CONFORMS TO API STANDARDS (SEE GUIDE G-33) YES ☒ NO ☐

9

DATE	AMOUNT RECEIVED	BY	RECEIPT NO.

PAGE 2 OF APPLICATION FOR 14-36-20-01 W4M WELL LOCATION (BOTTOM HOLE)

10 IMPACTS

IF THE RESPONSE TO ANY OF THE FOLLOWING STATEMENTS IS "NO" ADDITIONAL INFORMATION IS REQUIRED (SEE G-33)

	YES	NO
THE PROPOSED WELL IS AT LEAST 1.5 km FROM THE CORPORATE LIMITS OF A CITY, TOWN, OR VILLAGE	☒	☐
THE RURAL AUTHORITIES HAVE BEEN CONTACTED AS PER ID 88-2	☒	☐
THE PROPOSED WELL IS OUTSIDE ANY POTENTIAL COAL DEVELOPMENT AREA	☒	☐
THE PROPOSED LOCATION IS ENVIRONMENTALLY ACCEPTABLE AS PER IL 90-20	☒	☐
THE PROPOSED WELL IS AT LEAST 100 m FROM ANY SURFACE IMPROVEMENTS AND AT LEAST 40 m FROM ANY SURVEYED ROAD	☒	☐
THE PROPOSED WELL IS AT LEAST 5.0 km FROM A LIGHTED AERODROME	☒	☐
THE PROPOSED WELL IS AT LEAST 1.6 km FROM AN UNLIGHTED AERODROME	☒	☐
THE WORKING INTEREST OWNER IS THE APPLICANT-100%	☒	☐
OFFSET DRILLING RECORDS HAVE BEEN SEARCHED FOR HOLE PROBLEMS	☒	☐
THE CEMENTING PROGRAM WILL COVER ALL USABLE WATER ZONES	☒	☐
THE H_2S RELEASE RATE HAS BEEN ADDRESSED IN ACCORDANCE WITH ID 87-2 AND IS ATTACHED	☒	☐

11 SURFACE RIGHTS

SURFACE OWNER(S) Harold F. Wittig MAILING ADDRESS P.O. Box 38

(NOTE: FOR CROWN LAND PROVIDE THE ADMINISTRATING DEPARTMENT, DIVISION, BRANCH, OR BOARD)

CITY Burstall PROVINCE Sask. POSTAL CODE S0N 0H0 TELEPHONE 306 679-4604

SURFACE OWNER(S) AGREE(S) TO THE LOCATION OF THE WELL SITE AND ACCESS ROAD: YES ☒ NO ☐

THE INFORMATION PACKAGE WAS RECEIVED BY THE SURFACE OWNER(S) ON November 5, 1993

SURFACE OCCUPANT(S) None MAILING ADDRESS

CITY PROVINCE POSTAL CODE TELEPHONE

SURFACE OCCUPANT(S) AGREE(S) TO THE LOCATION OF THE WELL SITE AND ACCESS ROAD: YES ☐ NO ☐

THE INFORMATION PACKAGE WAS RECEIVED BY THE SURFACE OCCUPANT(S) ON

☒ THERE ARE NO OCCUPANTS OF THE LAND OTHER THAN THE SURFACE OWNER

WITH RESPECT TO THE RIGHT OF ACCESS TO THE LAND SURFACE, THE APPLICANT
1. ☒ HAS
2. ☐ HAS APPLIED FOR
3. ☐ WILL BE APPLYING FOR

1. ☐ SURFACE LEASE DATED 93-11-11
2. ☐ LETTER OF AUTHORITY ON THE MSL
3. ☐ RIGHT OF ENTRY ORDER
4. ☐ OTHER

12 AUTHORITY

APPLICANT Canadian Landmasters Resources Services Ltd. MAILING ADDRESS 700, 808 - 4 Avenue SW

CITY CALGARY PROVINCE Alberta POSTAL CODE T2P 2E7

AGENT N/A MAILING ADDRESS

CITY PROVINCE POSTAL CODE

THE APPOINTMENT OF THE ABOVE AGENT HAS BEEN REGISTERED WITH THE ERCB (SEC 83(1) OIL AND GAS CONSERVATION ACT) YES ☐ NO ☐

THIS APPLICATION DATED AT Calgary THIS 15 DAY OF November 19 93

SIGNATURE TITLE President & General Manager TELEPHONE 262-6988

NAME (PRINT) M. L. Henkelman COMPANY Canadian Landmasters Resource Services Ltd.

FOR ADDITIONAL INFORMATION CONTACT Lyle Verstraete TELEPHONE 297-9111

13 ERCB USE

PROVISIONS	NOTES

PROCESSED BY	CHECKED BY	APPROVED BY

ENRON
Oil Canada Ltd.

MEMORANDUM

DATE 12 November 1993

TO M. L. Henkelman,
Canadian Landmasters Resource Services Ltd.

FROM David Monroe

RE: **EMPRESS DRILLING LOCATION 14-36-20-01 W4M**
MAXIMUM POTENTIAL H_2S RELEASE RATE

Based on the following information, the proposed well should be assigned a **maximum H_2S release rate of zero:**

1) A search of available gas analyses in the region from Twp. 16, Rg. 1 W4M to Twp. 26, Rg. 5 W4M found no wells with H_2S present.

2) Prospective horizons to the Cambrian were DST'd at nearby location 7-12-22-1 W4M with no significant hydrocarbons and no H_2S.

3) Nearby location 6-36-19-1 W4M encountered no productive sour horizons to the Pre-Cambrian.

Please let me know if you require further information.

[redacted]

DM:cas

APPENDIX 7 SURFACE CASING CHECK SHEET
(May be attached to Application for Well Licence)

Waiver of surface casing - Section 3.1 of G-8
(For wells where only conductor casing will be set)

Well is within area shown in Appendix 1 of G-8 and will terminate no more than 15 m below the base of the Milk River, 20 m of conductor casing and a Class 1 BOP will be installed. ☐

Well is within the Surface Mineable Oil Sands Area (Appendix 2 of G-8); conductor casing and a diverter system will be installed. ☐

Well is within 10 km of the Surface Mineable Oil Sands Area and will not exceed 200 m in depth; conductor casing and a diverter system will be installed. ☐

Well is in the Heavy Oil/Oil Sands Area (Appendix 3 of G-8) and:

- ERCB approval letter to waive surface casing is attached ☐
- an application to waive surface casing is attached which includes all details per section 3.1(3) of G-8 ☐

NORMAL SURFACE CASING REQUIRED - SECTION 3.2 OF G-8

(1) Maximum of the most representative pressure measurements in area: 9578 kPa

(2) Depth of Recorder: 906.4 (m) Source: (DST)/AOF/Build Up/Stat. Grad./AWS/Other

Reference Well: 00/08-25-020-01 W4

Higher pressures were found but were discounted. ☐ Reason:

Max. Gradient: = (1) ÷ (2) = 10.56 kPa/m

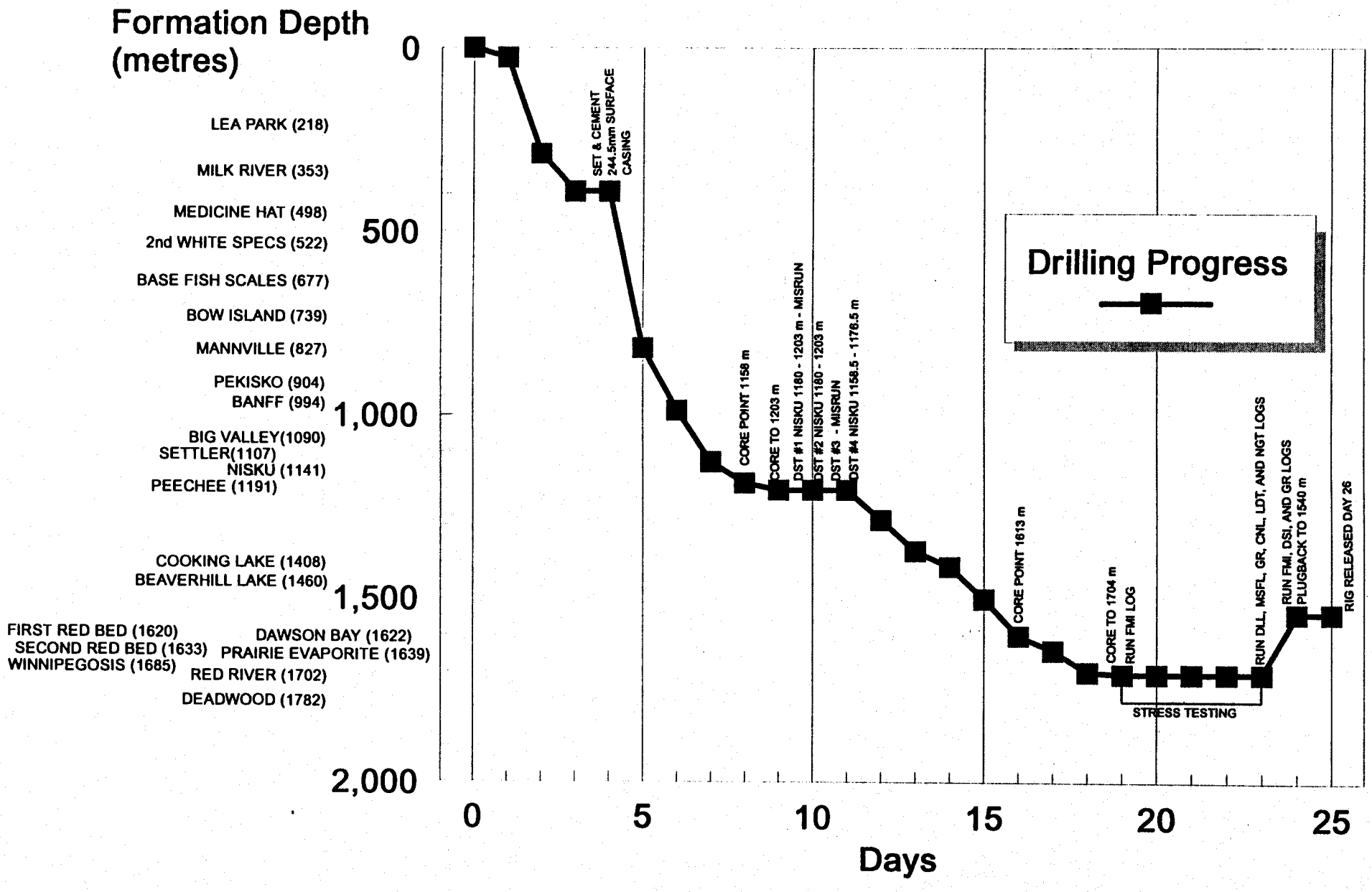
$$\text{Surface Casing Depth Required} = \frac{\text{Max. Gradient} \times \text{TVD} \times (.5 - .0000625\ \text{TVD})}{22} = 383 \text{ m (3)}$$

If (3) less than 10% TVD, use 10% TVD = ——— m (3')

If well is in the Senex-Kidney-Trout Area or High Hazard Area (South-Eastern Alberta) see sections 3.3 or 3.4 of G-8.

APPENDIX B1

DRILLING CURVE



APPENDIX B2

C-JDW, WCF
'94/01/31

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT
LSD: 14-36-20-01 W4M

DAY: 25 | DATE: 30 January 1994 | AT 0800 HRS.

DEPTH: PBD 1540 m | PROGRESS: 0 m | K.B.: 727.48 m | G.L.: 723.7 m

OPERATION AT 0800 HRS.: RIG RELEASED

TIME BREAKDOWN (HOURS)		MUD RECORD		HYDRAULICS	DEVIATION	
		PROPERTIES	ADDITIVES - SX		m	degree
Rig Service . .	0.25	Density (kg/m3)		PUMP: EW15EW600		
Condn. Mud . .	1.75	Viscosity (s/L)		SIZE: 140 mm LINER x 381 mm STROKE LENGTH		
Cementing . . .	2.00	pH		SPEED: strokes/min.		
Run Casing . .	4.00	Water Loss (cm3)		PRESSURE: kPa		
Tear Out . . .	8.00	Plastic Visc.(MPa-s)		RATE: m3/min.		
		Yield Point (Pa)		ANNULAR VELOCITY: m/s		
		In/Fin.Gel.Str		NOZZLE VELOCITY: m/s		
		Solids Content		BHP: kw		
		Sand Content				
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS:	Bit No.			
	Size - mm			
DRILL PIPE:	Type			
	Serial No.			
MISCELLANEOUS EQUIPMENT:	Depth - IN m KB			
	- OUT m KB			
	Distance Drilled - m			
	Time - hr.			
	Speed - r/min.			
	Force on Bit - 10.3 daN			
	Nozzle Sizes - mm			
	Bit Condition - T/B/G			
	Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Run 105 jts. of 177.8 mm, 34.23 kg/m, J-55, LT&C IPSCO casing. Total string length with float and shoe 1403.52 m. Landed @ 1402.52 m.
Hole condition good.

Circulate and condition mud to viscosity 40 sec/L and density 1240 kg/m^3 + .50% T-10 Fill cement, and 8 tonnes of 0:1:0 "G" + 18% NACL + .8% NFL-2 tail cement. Displace with 28.63 m^3 of water. Bumped plug with 3500 kPa over. Plug held good. Plug down @ 1542 hrs. 94-01-29. Had 4 m^3 of good cement returns.

Tear out BOP and set slips with 20,000 daN string weight. Tear out rig and clean mud tanks.

RIG RELEASED @ 2400 HRS. 94-01-29.

DAILY COST:	$118,891	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER:
CUMULATIVE COST:	$969,154	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: GOOD
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

- JDW, WCF
94/01/31

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT LSD: 14-36-20-01 W4M	DAY: 24	DATE: 29 January 1994	AT 0800 HRS.
DEPTH: PBD 1540.0 m	PROGRESS: 0 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0800 HRS.: RUNNING 177.8 mm CASING

TIME BREAKDOWN (HOURS)		MUD RECORD		HYDRAULICS	DEVIATION	
		PROPERTIES	ADDITIVES - SX		m	degree
Tripping . . .	7.50	Density (kg/m3)		PUMP: EW15EW600		
Rig Service . .	0.50	Viscosity (s/L)		SIZE: 140 mm LINER x 381 mm STROKE LENGTH		
Circulate . . .	2.00	pH		SPEED: strokes/min.		
Logging	8.75	Water Loss (cm3)		PRESSURE: kPa		
Cementing . . .	0.50	Plastic Visc.(MPa-s)		RATE: m3/min.		
L/D Pipe . . .	3.00	Yield Point (Pa)		ANNULAR VELOCITY: m/s		
Run Casing . .	1.75	In/Fin.Gel.Str		NOZZLE VELOCITY: m/s		
		Solids Content		BHP: kw		
		Sand Content				
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS:	Bit No.			
DRILL PIPE:	Size - mm			
	Type			
MISCELLANEOUS EQUIPMENT:	Serial No.			
	Depth - IN m KB			
	- OUT m KB			
	Distance Drilled - m			
	Time - hr.			
	Speed - r/min.			
	Force on Bit - 10.3 daN			
	Nozzle Sizes - mm			
	Bit Condition - T/B/G			
	Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Log with Schlumberger. Run #1 - DST log Run #2 - FMI log.
RIH open ended to 1704 m. Circulate 1 hr. Condition good.
Rig up Nowsco cementers and run bottom hole plug from 1704 - 1575 m.
Cement with 8.5 tonnes 0:1:0 "G" +15% NACL + .5% T-10.
Cement calculated to 1575 m from hole volume log + 20% excess.
Plug down @ 1937 hrs. 94-01-28.
Pull slow out of plug for 15 stands and stand pipe in derrick.
Run in 165 mm DC's and lay down same.
Make up Bit (222 mm) and RIH. Tagged top of cement @ 1540.0 m.
Set 4000 daN string weight on plug. Lay down DP and 158 mm DC's.
Pick up power tong and run 177.8 mm casing.

DAILY COST: $ 65,894	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -4° Windy	
CUMULATIVE COST: $855,263	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good	
REPORT FROM: ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5	

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN EAND MEDHAT	DAY: 23	DATE: 28 January 1994	AT 0800 HRS
LD: 14-36-20-01 W4M			
EPTH: 1704 m	PROGRESS: 0 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0800 HRS: - LOGGING WITH SCHLUMBERGER

TIME BREAKDOWN (HOURS)		MUD RECORD		HYDRAULICS	DEVIATION	
		PROPERTIES	ADDITIVES - SX		m	degree
Tripping	10.75	Density (kg/m3)		PUMP: EW15EW600		
Rig Service	0.50	Viscosity (s/L)		SIZE: 140 mm LINER		
Slip & Cut Line	0.50	pH		x 381 mm STROKE LENGTH		
Logging	2.25	Water Loss (cm3)		SPEED: strokes/min.		
SITU Testing	6.75	Plastic Visc.(MPa-s)		PRESSURE: kPa		
Handle Tools	3.25	Yield Point (Pa)		RATE: m3/min.		
		In/Fin.Gel.Str		ANNULAR VELOCITY: m/s		
		Solids Content		NOZZLE VELOCITY: m/s		
		Sand Content		BHP: kw		
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS:	Bit No.			
DRILL PIPE:	Size - mm			
	Type			
MISCELLANEOUS EQUIPMENT:	Serial No.			
	Depth - IN m KB			
	- OUT m KB			
	Distance Drilled - m			
	Time - hr.			
	Speed - r/min.			
	Force on Bit - 10.3 daN			
	Nozzle Sizes - mm			
	Bit Condition - T/B/G			
	Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Finish logging and lay down logging tools.
Slip and cut line and pick up Baker packer assembly.
Strap in hole (run in slow) with Baker packer.
Head up Halliburton testing head and frac test 1622 - 1624 m.
Deflate packer and move up hole.
Could not get packer seat.
POOH and change packer from 158 mm to 177 mm (both packers damaged).
RIH and set packer @ 1619 m to 1621 m.
Got good packer seat but could not get pressure.
Deflated packer and moved seat but still could not get pressure.
POOH and lay down packer assembly.
R/U and log with Schlumberger.

DAILY COST:	$ 106,159	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -15°C, O/C
CUMULATIVE COST:	$ 789,369	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 564-1686 / 940-6544	RIG: PRECISION #5

- JDW, WCF
94/01/27 JL

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 22 | DATE: 27 January 1994 | AT 0800 HRS.

SD: 14-36-20-01 W4M

DEPTH: 1704 m | PROGRESS: 0 m | K.B.: 727.48 m | G.L.: 723.3 m

OPERATION AT 0800 HRS: LOGGING w/ SCHLUMBERGER

TIME BREAKDOWN (HOURS)

Tripping	8.75
Rig Service	0.25
Circulate	1.50
Logging	10.50
Load Out Tools	1.00
W/O Loggers	2.00

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1260	Barite	10
Viscosity (s/L)	45		
pH	7		
Water Loss (cm3)	25		
Plastic Visc.(MPa-s)			
Yield Point (Pa)			
In/Fin.Gel.Str			
Solids Content			
Sand Content			
Cl-Content (mg/L)			
Ca++Cont.(mg/L)			

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: strokes/min.
PRESSURE: kPa
RATE: m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kW

DEVIATION

m	degree

DRILL STRING ASSEMBLY

DRILL COLLARS:

DRILL PIPE:

MISCELLANEOUS EQUIPMENT:

BIT RECORD

Bit No.	5			
Size - mm	200			
Type	J-3			
Serial No.	35584			
Depth - IN m KB				
- OUT m KB	Clean			
Distance Drilled - m	Out			
Time - hr.	Trip			
Speed - r/min.				
Force on Bit - 10.3 daN				
Nozzle Sizes - mm				
Bit Condition - T/B/G				
Penetration Rate- m/hr.				

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Finish RIH with overshot.
Circulate and latch onto fish.
Chain out of hole. Pull slow.
Recovered complete packer assembly.
Load out all testing tools.

Strap in hole on clean out trip. No fill on bottom.
Strap 1703.05, Tally 1704.0 m. (Circulate to bottom from 1667 - 1704 m).
Circulate and condition hole.

POOH to log. W/O Loggers for 2 hrs.
Rig up and log with Schlumberger.

DAILY COST: $ 57,176	AFE: C93E1479, LIC#: 0182547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER:
CUMULATIVE COST: $683,210	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM: ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 21 | DATE: 26 January 1994 | AT 0800 HRS.
LSD: 14-36-20-01 W4M

DEPTH: 1704 m | PROGRESS: 0 m | K.B.: 727.48 m | G.L.: 725.2 m

OPERATION AT 0500 HRS.: RUN IN HOLE WITH OVERSHOT (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD PROPERTIES	MUD RECORD ADDITIVES - SX	HYDRAULICS	DEVIATION m	DEVIATION degree
Tripping	12.75	Density (kg/m3)		PUMP: EW15EW600		
Rig Service	0.25	Viscosity (s/L)		SIZE: 140 mm LINER x 381 mm STROKE LENGTH		
Fishing	3.00	pH		SPEED: strokes/min.		
W/O Fish Tool	5.75	Water Loss (cm3)		PRESSURE: kPa		
Handle Tools	2.25	Plastic Visc.(MPa-s)		RATE: m3/min.		
		Yield Point (Pa)		ANNULAR VELOCITY: m/s		
		In/Fin.Gel.Str		NOZZLE VELOCITY: m/s		
		Solids Content		BHP: kW		
		Sand Content				
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY

DRILL COLLARS:

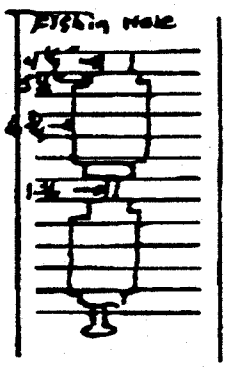
DRILL PIPE:

MISCELLANEOUS EQUIPMENT:
Fishing Assembly

BIT RECORD

Bit No.			
Size - mm			
Type			
Serial No.			
Depth - IN m KB			
- OUT m KB			
Distance Drilled - m			
Time - hr.			
Speed - r/min.			
Force on Bit - 10.3 daN			
Nozzle Sizes - mm			
Bit Condition - T/B/G			
Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:



Break down overshot. Recovered spring from top of packer.
Busted grapple in overshot.
Wait on new grapple and overshot.
RIH with overshot. Tagged top of fish @ 1672 m.
Circulate and work over fish.
Pressured up to 10,000 kPa. Had circulation through packer. Good returns.
Chain out of hole. Did not recover anything.
Run back in with 4-1/4" overshot.
Circulate and work over fish.
Pressured up to 9,000 kPa and pulled 6,000 daN over string weight at start, and drop to string weight of 36,000 daN.
Chain out of hole. Recovered 8" of 4-1/2" O.D. top packer sub.
Removed skirt off overshot and tack weld bottom of grapple.
RIH with overshot.
Total length left of 4-1/4" OD stick up is 7".

DAILY COST:	$ 34,374	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -20° O/C, Foggy
CUMULATIVE COST:	$626,034	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM: ROY DOCKEN		MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON CANADA LTD.
DAILY DRILLING REPORT

WELL: CDN LAND Med HAT	DAY: 20	DATE: 94-01-25	AT 0800 HRS.
LSD: 14-36-20-1 W4			
DEPTH: 1704 (m)	PROGRESS: 0 (m)	KB ELEV.: 737.48 (m)	

OPERATION AT 0800 HRS.: Pull out hole with fish. (Estimated T.D.:)

TIME BREAKDOWN (HOURS)	MUD RECORD		HYDRAULICS	DEVIATION	
	PROPERTIES	ADDITIVES - KG		m KB	degree
Drilling Tripping 7.50 Rig Serv. .25 Surveying Cond'n.Mud Circulate Clean to Btm. DST/Core Slip & Cut Line Logging Cmtg. SASITU Testing - 7.00 Rigout Tools - 1.00 W.O. Fish. Tool - 5.75 Fishing - 2.50	Density (kg/m³) Viscosity (s/L) pH Water Loss (cm³) Plastic Visc.(MPa-s) Yield Point (Pa) In/Fin.Gel.Str (Pa) Solids Content Sand Content Cl Content (mg/L) Ca++Cont.(mg/L)		PUMP: EW/SEW 600 SIZE: 140 mm LINER x 981 mm STROKE LENGTH SPEED: strokes/min. PRESSURE: kPa RATE: m³/min. ANNULAR VELOCITY: m/min. NOZZLE VELOCITY: m/s BHP: W		

DRILL STRING ASSEMBLY	BIT RECORD		
DRILL COLLARS: m of mm OD x mm ID x Connections m of mm OD x mm ID x Connections DRILL PIPE: m of mm OD x Connections m of mm OD x Connections MISCELLANEOUS EQUIPMENT: Fishing Assembly	Bit No. Size - mm Type Serial No. Depth - IN m KB - OUT m KB Distance Drilled - m Time - hr. Speed - r/min. Force on Bit - 10³ daN Nozzle Sizes - mm Bit Condition - T/B/G Penetration Rate - m/h		

DESCRIPTION OF OPERATIONS:

1. Repair leaks in Halliburton line on Pressure Test. Blew 2" Nipple out of Lubricator Head. Pull out Recorder and Rep. Head. Run Back in Recorder, Circ Through packer and Pressure up to Set Packers. In Situ Test with Rig/Rec. Lost All Pressure. Pressure Dropped @ 21000 KPa to 0
2. Rigout All Testing Equipment and P.C.N. Tested Both Packers
3. Wait on Fishing Tools.
4. Make up Fishing Tools and R.I.H. Tagged Top @ 1671 m. Cable Cond. Good. Circ and Tried To Work over Fish. Fish Skidded 8 m. Couldn't get hold of Fish.
5. Chain out of Hole.

DAILY COST: $ 38.764	AFE NO.: C93E1479	WEATHER: -10 Light Snow
CUMULATIVE COST: $ 591.660	ENRON GEOLOGIST: Bill Baillie	LEASE COND'NS: Good
REPORT FROM: Ray Dacken	MOBILE NO.: 554-1684 570-6544	RIG: Precision DRLG #5

- JDW, WCF
94/01/24

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 19 | DATE: 24 January 1994 | AT 0800 HRS.

LD.: 14-36-20-01 W4M

DEPTH: 1704 m | PROGRESS: Core 6 m | K.B.: 727.48 m | G.L.: 723.2 m

(Estimated T.D.: 2200 m)

OPERATION AT 0800 HRS.: RUN IN SITU TEST WITH HALLIBURTON

TIME BREAKDOWN (HOURS)		MUD RECORD PROPERTIES	MUD RECORD ADDITIVES - SX	HYDRAULICS	DEVIATION m	DEVIATION degree
Tripping	5.00	Density (kg/m3)		PUMP: EW15EW600		
Core	2.00	Viscosity (s/L)		SIZE: 140 mm LINER x 381 mm STROKE LENGTH		
Logging	6.50	pH		SPEED: strokes/min.		
Recover Core	1.50	Water Loss (cm3)		PRESSURE: kPa		
WO XO Sub	3.00	Plastic Visc.(MPa-s)		RATE: m3/min.		
SITU Testing	6.00	Yield Point (Pa)		ANNULAR VELOCITY: m/s		
		In/Fin.Gel.Str		NOZZLE VELOCITY: m/s		
		Solids Content		BHP: kw		
		Sand Content				
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS:	Bit No.	6C		
	Size - mm	199		
DRILL PIPE:	Type	Diam. CD93		
	Serial No.	4930440		
MISCELLANEOUS EQUIPMENT:	Depth - IN m KB	1694		
SITU packer and drill pipe	- OUT m KB	1704		
	Distance Drilled - m	10		
	Time - hr.	5.50		
	Speed - r/min.	110		
	Force on Bit - 10.3 daN	3		
	Nozzle Sizes - mm			
	Bit Condition - T/B/G	Good		
	Penetration Rate- m/hr.	1.81		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Finish cutting Core #6 from 1694 to 1704 m.
POOH. Recover core and lay down core barrels.
Pick up log and log FMI log with Schlumberger. Loggers's TD 1703.5 m.
Wait on XO Sub and make up packer assembly.
RIH to 1672 m.
R/U Halliburton Lubricator and lines. Run in recorder to packer.
Held safety meeting with crews and all service company personnel.
Try to pressure test surface equipment. Lots of leaks to repair.

DAILY COST:	$ 23,790	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L. Enron Gas Services/Morgan Hydroc.	WEATHER: -14°, O/C Windy
CUMULATIVE COST:	$552,896	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

- JDW. WCF 94/01/24

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT
LSD: 14-36-20-01 W4M

DAY: 18 | DATE: 23 January 1994 | AT 0800 HRS.

DEPTH: 1698 m | PROGRESS: Core 58 m | K.B.: 727.48 m | G.L.: 723.2 m

OPERATION AT 0800 HRS.: CUTTING CORE #6 (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Tripping	9.75
Rig Service	0.50
Circulate	0.50
Core	9.50
Slip & Cut Line	0.50
Recover Core	3.25

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1290	Salt	105
Viscosity (s/L)	47	Starch	8
pH	8	Gel	7
Water Loss (cm3)	19.8	KP700	2
Plastic Visc.(MPa-s)	14	Defoam	1
Yield Point (Pa)	6.5		
In/Fin.Gel.Str	2.5/9.0	(55,993)	
Solids Content	0.089		
Sand Content	0.001		
Cl-Content (mg/L)	140,000		
Ca++Cont.(mg/L)	1800		

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 92 strokes/min.
PRESSURE: 6500 kPa
RATE: 1.02 m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kW

DEVIATION

m	degree

DRILL STRING ASSEMBLY

DRILL COLLARS:
53.94 m of 152 mm OD x 63 mm ID x H90 Connections

DRILL PIPE:
1602.63 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .20 m, 3 Core Barrels 28.44 m, XO .28 m, Bit Sub .92 m, XO .65 m, 2 Pup Jts. 5.85 m

BIT RECORD

	4C	5C	6C
Bit No.	199	199	199
Size - mm	Diam. CD93	Diam.CD93	Diam.CD93
Type	4930440	4930440	4930440
Serial No.	1640	1667	1694
Depth - IN m KB	1667	1694	-
- OUT m KB	27	27	6
Distance Drilled - m	2.50	3.50	3.50
Time - hr.	110	110	110
Speed - r/min.	3	3	3
Force on Bit - 10.3 daN	-	-	-
Nozzle Sizes - mm	Good	Good	- - -
Bit Condition - T/B/G	10.8	7.71	1.14
Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Recover core #3. Recovered 25.7 m of core.
Service core barrels and RIH. No fill on bottom.
Circulate and drop core ball.
Cut Core #4 from 1640 - 1667 m.
Hoist core #4.
Recover core and service core barrels.
Recovery - full.
RIH. Circulate and drop core ball. Hole condition good.
Cut Core #5 from 1667 to 1694 m.
Hoist core #5. Recover core and service core barrel.
Full recovery.
RIH to 380 m. Slip and cut line and finish RIH.
No fill on bottom. Circulate and drop core ball.
Cut Core #6.

DAILY COST:	$ 17,273	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -10°. Partly O/C
CUMULATIVE COST:	$529,106	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

JAN 24 94 08:37AM ENRON OIL CANADA

JDW, WCF
94/01/24

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 17 | DATE: 22 January 1994 | AT 0800 HRS.
LSD: 14-36-20-01 W4M

DEPTH: 1640 m | PROGRESS: Drill 13/Core 27 m | K.B.: 727.48 m | G.L.: 723.2 m

OPERATION AT 0800 HRS.: HOIST CORE #3 | (Estimated T.D.: 3200 m)

TIME BREAKDOWN (HOURS)

Drilling	0.50
Tripping	9.75
Rig Service	0.50
Circulate	3.00
Clean to Btm	0.50
Core	8.00
Handle Core Bbls.	1.75

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1260	Salt	225
Viscosity (s/L)	48	Starch	27
pH	7.5	Defoamer	4
Water Loss (cm3)	21.0	Lime	2
Plastic Visc.(MPa-s)	14	Barite	20
Yield Point (Pa)	5		
In/Fin.Gel.Str	2.5/9.0	(51,744)	
Solids Content	0.09		
Sand Content	0.001		
Cl-Content (mg/L)	240,000 ppm		
Ca++Cont.(mg/L)	180		

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 52 strokes/min.
PRESSURE: 6500 kPa
RATE: 1.02 m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kw

DEVIATION

m	degree

DRILL STRING ASSEMBLY

DRILL COLLARS:
53.94 m of 152 mm OD x 63 mm ID x NC90 Connections

DRILL PIPE:
1535.91 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
.30 m, 3 core bbls 28.44 m, XO .28 m, Bit Sub .92m, ..65 m, 2 pup jts. 5.85 m

BIT RECORD

Bit No.	4	3C
Size - mm	222	199
Type	ATM33	Diam.CD93
Serial No.	F65W5	4930440
Depth - IN m KB	1372	1613
- OUT m KB	1613	1640
Distance Drilled - m	241	27
Time - hr.	54	8
Speed - r/min.	80/90	100
Force on Bit - 10.3 daN	14/16	3
Nozzle Sizes - mm	3x10.3	
Bit Condition - T/B/G	3/2/1	
Penetration Rate- m/hr.	4.46	3.37

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill to core point of 1613.0 m. Circulate up sample for geologist.
Dummy trip 12 stands. Hole condition good.
Circulate and strap out to pick up core barrel.
Strap 1441.15, Tally 1440.76, Diff. .39 m. N/C.
Pick up and service core barrels.
Pick up 152 mm DC's (6) and RIH.
Pick up 8 DP to replace 165 mm DC's. No fill on bottom.

Circulate, drop ball and cut Core #3 from 1613 to 1640 m.
Hoist core #3.
Hole condition good.

DAILY COST:	$ 22,124	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L. Enron Gas Services/Morgan Hydroc.	WEATHER: -8°C, Partly O/C
CUMULATIVE COST:	$511,833	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 16 | DATE: 21 January 1994 | AT 0600 HRS.
[redacted]: 14-36-20-01 W4M

DEPTH: 1600 m | PROGRESS: 100 m | K.B. 727.45 m | G.L. 723.2 m

OPERATION AT 0600 HRS: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Drilling	22.00
Rig Service	0.50
Surveying	1.50

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1230	Salt	505
Viscosity (s/L)	49	Lime	6
pH	8.0	Defoamer	2
Water Loss (cm3)	25.5	Lignite	5
Plastic Visc.(MPa-s)	9	Starch	45
Yield Point (Pa)	8.5	Bio-Cida	6
In/Fin.Gel.Str	7/15	KD-700	3
Solids Content	0.09		
Sand Content	0.001		
Cl-Content (mg/L)	115,000		
Ca++Cont.(mg/L)	1800		

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 64 strokes/min.
PRESSURE: 9500 kPa
RATE: 1.26 m3/min.
ANNULAR VELOCITY: 44/73 m/s
NOZZLE VELOCITY: 84 m/s
BHP: 83 kw

DEVIATION

m	degree
1506	3/4
1581	Misrun
1581	3/4

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
1412.72 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	4
Size - mm	222
Type	ATM33
Serial No.	F65W5
Depth - IN m KB	1372
- OUT m KB	-
Distance Drilled - m	228
Time - hr.	52.50
Speed - r/min.	80
Force on Bit - 10.3 daN	14/16
Nozzle Sizes - mm	3x10.3
Bit Condition - T/B/G	- - -
Penetration Rate- m/hr.	4.34

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill and survey.
Hole condition good on connections.

Est. Core Point @ 1610 m.

RSPP 3800 kPa @ 32 spm.

DAILY COST:	$ 32.195	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L. Enron Gas Services/Morgan Hydroc.	WEATHER: -16° O/C
CUMULATIVE COST:	$489,709	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

JDW-WCF 94-01-20

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT
LSD: 14-36-20-01 W4M

DAY: 15 DATE: 20 January 1994 AT 0800 HRS.

DEPTH: 1500 m PROGRESS: 88 m K.B.: 727.48 m G.L.: 723.2 m

OPERATION AT 0800 HRS.: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD				HYDRAULICS	DEVIATION	
		PROPERTIES		ADDITIVES - SX			m	degree
Drilling	22.75	Density (kg/m3)	1165	Reef Pac	1	PUMP: EW15EW600	1422	1
Rig Service	0.75	Viscosity (s/L)	48	Thinz	1	SIZE: 140 mm LINER x 381 mm STROKE LENGTH		
Surveying	0.50	pH	9.5	Salt	375	SPEED: 64 strokes/min.		
		Water Loss (cm3)	18.5	Defoamer	4	PRESSURE: 10,000 kPa		
		Plastic Visc.(MPa-s)	13	KD-700	10	RATE: 1.26 m3/min.		
		Yield Point (Pa)	7	Starch	9	ANNULAR VELOCITY: 44/75 m/s		
		In/Fin.Gel.Str	3.5 /17	Lignite	18	NOZZLE VELOCITY: 84 m/s		
		Solids Content	0.089			BHP: 93 kW		
		Sand Content	0.001					
		Cl-Content (mg/L)	900	(26,581)				
		Ca++Cont.(mg/L)	800					

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
1318.32 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	4		
Size - mm	222		
Type	ATM33		
Serial No.	FL5W5		
Depth - IN m KB	1372		
- OUT m KB	-		
Distance Drilled - m	128		
Time - hr.	30.5		
Speed - r/min.	20/90		
Force on Bit - 10.3 daN	14		
Nozzle Sizes - mm	3x10.3		
Bit Condition - T/B/G			
Penetration Rate- m/hr.	4.19		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill and survey.
Hole condition good on connections.
Penetration rate varies from 3 m/hr to 6 m/hr.

RSPP 3100 kPa @ 31 spm.

DAILY COST:	$ 35,005	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L. Enron Gas Services/Morgan Hydroc.	WEATHER: -15° O/C
CUMULATIVE COST:	$457,514	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

- JDW
WCF - 94-01-17

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 14 | DATE: 19 January 1994 | AT 0800 HRS.
LSD: 14-36-20-01 W4M
DEPTH: 1412 m | PROGRESS: 43 m | K.B.: 727.48 m | G.L.: 723.2 m

OPERATION AT 0800 HRS: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Drilling	9.25
Tripping	4.25
Rig Service	0.75
Circulate	0.75
Reaming	9.00

MUD RECORD

PROPERTIES

Density (kg/m3)	1130
Viscosity (s/L)	47
pH	10.3
Water Loss (cm3)	11.0
Plastic Visc.(MPa-s)	15
Yield Point (Pa)	7.5
In/Fin.Gel.Str	4.5/19
Solids Content	0.089
Sand Content	0.002
Cl-Content (mg/L)	500
Ca++Cont.(mg/L)	680

ADDITIVES - SX

Reef Pac	3
Cf II	3
Barite	20
Lime	2
	(13,081)

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 64 strokes/min.
PRESSURE: 9800 kPa
RATE: 1.26 m3/min.
ANNULAR VELOCITY: 44/73 m/s
NOZZLE VELOCITY: 84 m/s
BHP: 93 kw

DEVIATION

m	degree

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
1224.89 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	3RR2	4
Size - mm	222	222
Type	ATJ22S	ATM33
Serial No.	T02BF	F65W5
Depth - IN m KB	1203	1372
- OUT m KB	1372	-
Distance Drilled - m	169	40
Time - hr.	37.25	7.75
Speed - r/min.	80/90	80
Force on Bit - 10.3 daN	14	14
Nozzle Sizes - mm	2x9.5 1x10.3	3x10.3
Bit Condition - T/B/G	8/6/4	- - -
Penetration Rate- m/hr.	4.53	5.16

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill to 1372 m.
Hoist bit # 3RR2. Hole got tight @ 1334 m and had to back ream from 1334 m to 1326 m, and from 1203 m to 1195 m. Remainder of hole condition good.

Changed bits and run in DC's. Slip and cut line and finish running in hole to 1165 m. Ream tight spots @ 1165 m to 1183 m, 1211 m to 1240 m, and from 1316 m to 1372 m.

Continue drilling 222 mm hole

RSPP 3100 kPa @ 31 spm.

DAILY COST:	$ 15,745	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L. Enron Gas Services/Morgan Hydroc.	WEATHER: -20° O/C
CUMULATIVE COST:	$422,509	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
[illegible] ROY DOCKEN		MOBILE NO.: 554-1686 / 940-8544	RIG: PRECISION #5

- JDW
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ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 15 | DATE: 14 January 1994 | AT: 0800 HRS.
LSD: 14-36-20-01 W4M

DEPTH: 1369 m | PROGRESS: 36 m | K.B.: 727.48 m | G.L.: 723.2 m

OPERATION AT 0800 HRS: DRILLING (Estimated T.D.: 1200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD PROPERTIES		MUD RECORD ADDITIVES - SX		HYDRAULICS	DEVIATION m	DEVIATION degree
Drilling	22.75	Density (kg/m3)	1140	Reefpac	7	PUMP: EW15EW600	1345	3/4
Rig Service	1.00	Viscosity (s/L)	49	CF II	8	SIZE: 140 mm LINER x 381 mm STROKE LENGTH		
Surveying	0.25	pH	10.5	Gel	40	SPEED: 64 strokes/min.		
		Water Loss (cm3)	10.8	Lime	4	PRESSURE: 10,000 kPa		
		Plastic Visc.(MPa-s)	15	Plythin	2	RATE: 1.29 m3/min.		
		Yield Point (Pa)	7.5			ANNULAR VELOCITY: 44/74 m/s		
		In/Fin.Gel.Str	5/21	(11,769)		NOZZLE VELOCITY: 97 m/s		
		Solids Content	0.089			BHP: 128 kw		
		Sand Content	0.001					
		Cl-Content (mg/L)	450					
		Ca++Cont.(mg/L)	680					

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 78 mm ID x XH Connections

DRILL PIPE:
1186.45 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	3RR2		
Size - mm	222		
Type	ATJ22S		
Serial No.	TQ2BF		
Depth - IN m KB	1205		
- OUT m KB	-		
Distance Drilled - m	165		
Time - hr.	35.75		
Speed - r/min.	90		
Force on Bit - 10.3 daN	14		
Nozzle Sizes - mm	2x9.5 1x10.3		
Bit Condition - T/B/G	- - -		
Penetration Rate- m/hr.	4.61		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drilling and surveying. Hole condition good.

Drilled lots of anhydrite.
Averaged 2 m/hr. in anhydrite.
Remainder of drilling averaged 4 m/hr.

RSPP 3000 kPa @ 28 spm.
Check BOP's on BOP's.

DAILY COST:	$ 18,651	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -26° O/C
CUMULATIVE COST:	$406,764	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT LSD: 14-36-20-01 W4M	DAY: 12	DATE: 17 January 1994	AT 0800 HRS.
DEPTH: 1295 m	PROGRESS: 82 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0800 HRS.: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Drilling	13.00
Tripping	4.00
Rig Service	0.50
Surveying	0.25
Clean to Btm	0.75
DST	3.00
Handle DST Tool	2.50

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1140	Lime	3
Viscosity (s/L)	55		
pH	11.0		
Water Loss (cm3)	11.0		
Plastic Visc.(MPa-s)	24		
Yield Point (Pa)	8		
In/Fin.Gel.Str	3/20		
Solids Content	0.089		
Sand Content	0.001		
Cl-Content (mg/L)	450		
Ca++Cont.(mg/L)	680		

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 64 strokes/min.
PRESSURE: 9600 kPa
RATE: 1.29 m3/min.
ANNULAR VELOCITY: 44/74 m/s
NOZZLE VELOCITY: 97 m/s
BHP: 125 kw

DEVIATION

m	degree
1270	3/4

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
1101.67 m of 114 mm OD 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	3 RR2		
Size - mm	222		
Type	ATJ22S		
Serial No.	T028P		
Depth - IN m KB	1203		
- OUT m KB	-		
Distance Drilled - m	82		
Time - hr.	13		
Speed - r/min.	90		
Force on Bit - 10.3 daN	16		
Nozzle Sizes - mm	2x9.5 1x10.3		
Bit Condition - T/B/G			
Penetration Rate- m/hr.	6.30		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Finish testing Nisku formation from 1158.5 - 1176.5 m.
Pull loose and hoist 5 stands DP and hit fluid.
Rig up and pump out fluid to rig mud tank.
Continue POOH and load out tester.

DST #4:	NISKU 1158.5 - 1176.5 m (continued)
PF:	Strong initial puff decreasing to fair.
VO:	Fair blow increasing to strong after 25 mins. Holding throughout.
REC:	28 m of muddy water and 952 m of brackish water.
PRESS:	IHP 13173, PF 7389, ISI 10338, IF 7306, PF 9995, FSI 10308, FHP 13023 kPa.

Make up bit and RIH. Cleaned 5 m of fill to bottom. Remainder of hole condition good.
continue drilling 222 mm hole.

RSPP 2800 kPa @ 28 spm.

DAILY COST:	$ 42,951	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -29° C. O/C
CUMULATIVE COST:	$388,133	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT LSD: 14-36-20-01 W4M	DAY: 11	DATE: 16 January 1994	AT 0800 HRS.
DEPTH: 1203 m	PROGRESS: 0 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0800 HRS.: TESTING ON F.S.T. (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD		HYDRAULICS	DEVIATION	
		PROPERTIES	ADDITIVES - SX		m	degree
Tripping	10.75	Density (kg/m3)		PUMP: EW15EW600	1200	3/4
Rig Service	0.50	Viscosity (s/L)		SIZE: 140mm LINER x 381 STROKE LENGTH		
Surveying	0.75	pH		SPEED: strokes/min.		
Circulate	1.00	Water Loss (cm3)		PRESSURE: kPa		
DST	5.25	Plastic Visc.(MPa-s)		RATE: m3/min.		
Handle DST Tools	6.25	Yield Point (Pa)		ANNULAR VELOCITY: m/s		
		In/Fin.Gel.Str		NOZZLE VELOCITY: m/s		
		Solids Content		BHP: kw		
		Sand Content				
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS:	Bit No.			
DRILL PIPE:	Size - mm			
MISCELLANEOUS EQUIPMENT: Testing Tools	Type			
	Serial No.			
	Depth - IN m KB			
	- OUT m KB			
	Distance Drilled - m			
	Time - hr.			
	Speed - r/min.			
	Force on Bit - 10.3 daN			
	Nozzle Sizes - mm			
	Bit Condition - T/B/G			
	Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Recover recorder and service core barrels. RIH (strap in). Hit bridge @ 1077 m. Tied to work through it with no results.
DST #3: MISRUN.

POOH and lay down testing tool. P/U bit and RIH. Reamed bridges @ 1070 to 1125 m and from 1178 to 1203 m. Circulate and condition hole and strap out of hole. Strap 1026.20 m, Tally 1024.55 m, Diff. 1.65 m.

P/U testing tool and RIH. Head up testing head and pump up packer. Tried 3 times with no results. Pulled up 3 m and pull tight. Deflated packer @ first testing interval 1157 to 1175 m. Went down to top packer at 1158.5 m, and pump up packer. Got good packer seat.

DST #4: NISKU (TOP) from 1158.5 m - 1176.5 m. 10/60/60/90.
PF: Strong initial puff and decreased to fair.
VO: Fair to strong throughout.

DAILY COST:	$ 17,429	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -23° C, O/C Light Snow
CUMULATIVE COST:	$345,162	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM: ROY DOCKEN		MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.

DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT LSD: 14-36-20-01W4M	DAY: 10	DATE: 15 January 1994	AT 0800 HRS.
DEPTH: 1203 m	PROGRESS: 0 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0800 HRS: RECEIVED CHARTS FROM DST #2 (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Tripping	9.75
Rig Service	0.50
Circulate	1.00
DST	7.25
Slip & Cut Line	0.50
Reaming	0.75
Handle DST Tool	4.25

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1120	Barite	10
Viscosity (s/L)	70		
pH	10		
Water Loss (cm3)	11.6		
Plastic Visc.(MPa-s)	10		
Yield Point (Pa)	5		
In/Fin.Gel.Str	3/19		
Solids Content	~~0.009~~		
Sand Content	0.001		
Cl-Content (mg/L)	450		
Ca++Cont.(mg/L)	760		

HYDRAULICS

PUMP: EU15EU600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: strokes/min.
PRESSURE: kPa
RATE: m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kw

DEVIATION

m	degree

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH connections

DRILL PIPE:

MISCELLANEOUS EQUIPMENT:
Testing Tools

BIT RECORD

Bit No.	RR2		
Size - mm	222		
Type	ATJ22S		
Serial No.	702BP		
Depth - IN m KB	Ream		
- OUT m KB	Rat Hole		
Distance Drilled - m	(Drill 485m		
Time - hr.	to 1203 m		
Speed - r/min.	2.75 hrs)		
Force on Bit - 10.3 daN	2x9.5		
Nozzle Sizes - mm	1x10.3		
Bit Condition - T/B/G			
Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Finish ream rat hole to 1203 m. Circulate and POOH for DST #1. Pick up and make up DST #1.
DST #1: Nisku 1203 - 1180 m. - MISRUN.

RIH and try to pump up packer. Tried 3 times with no results.
POOH (chained out) and check out DST tools. Everything looked o.k. Install another packer rubber.
RIH and pumped up packers and got good seat on DST #2. Test DST #2.

DST #2:	Nisku 1203 - 1180 m. Times: 10/60/60/90.
PF:	Weak air blow increasing to fair throughout. NGTS on PV or VO.
VO:	Weak air blow increasing to strong in 25 mins. Decreasing to fair throughout.
REC:	28 m muddy water and 198 m of brackish water.
PRESS:	IHP 13558, PF 1301 / 1474 kPa, ISI 10720, IF 1434, FF 2935, FSI 10700, FHP 13457 kPa.

Trip out with DST #2. Hole condition good. Chained out.

DAILY COST:	$ 17,534	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -18° O/C
CUMULATIVE COST:	$327,733	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

-- Wolrik, Fay - 94/01/14

DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT
LSD: 14-36-20-01 W4M

DAY: 7 DATE: 14 January 1994 AT: 0800 HRS.

DEPTH: 1158 m PROGRESS: Core 27 m K.B.: 727.48 m G.L.: 723.2 m

OPERATION AT 0800 HRS: REAMING RAT HOLE (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Tripping	10.25
Rig Service	0.75
Circulate	0.50
Core	2.50
Ream Rat Hole	4.50
Handle Core & Bbls	5.50

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1120	Thinz	2
Viscosity (s/L)	70	Lime	4
pH	10	Barite	12
Water Loss (cm3)	12		
Plastic Visc.(MPa-s)	14		
Yield Point (Pa)	7		
In/Fin.Gel.Str	2.5 / 15		
Solids Content	0.089		
Sand Content	0.001		
Cl-Content (mg/L)	450		
Ca++Cont.(mg/L)	750		

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 53 strokes/min.
PRESSURE: 7500 kPa
RATE: 1.0 m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kw

DEVIATION

m	degree

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
1005.64 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, B.S. .91 m

BIT RECORD

Bit No.	1C	2C
Size - mm	199	199
Type	C93 Diam.DBS	CD93 Diam.
Serial No.	4930440	4930448
Depth - IN m KB	1158	1185
- OUT m KB	1185	1203.8
Distance Drilled - m	27	13.8
Time - hr.	5.00	2.25
Speed - r/min.	1.0	110
Force on Bit - 10.3 daN	3	3
Nozzle Sizes - mm	-	-
Bit Condition - T/B/G		Good
Penetration Rate- m/hr.	5.4	8.3

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Cut Core #1: NISKU 1158 - 1185.0 m (27 m) Hoist core #1.
Recovered 27 m of core.
Service core barrel and stand in derrick.
Make up bit and RIH. Hole condition good.
Ream rat hole from 1158 to 1185 m with 2-3000 daN weight & 660 rpm.
Circulate and condition hole and hoist out for core barrels.
Pick up core barrels and unload 152 mm DC's.
RIH with core barrels. Circulate and drop core barrels.
Cut Core #2 GRETTO 1185 - 1203.8 m (18.8 m).
Hoist Core #2.
Recover core and lay down core barrels. Full recovery (18.8 m)
Make up bit and RIH. Break circulation and ream rat hole.

DAILY COST:	$ 18,239	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -22°C, Light Snow
CUMULATIVE COST:	$310,199	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

:c- Wolnik
Fax -94-01-13

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT/ | DATE: 13 January 1994 | AT 0600 HRS.
LSD: 14-36-20-03W4M | RIG: | FOOTAGE: | DAYS: | DEPTH: 1158m

DEPTH: 1158m | FOOTAGES: Drill 31, Core 26 m | P.B.: 727.46 m | G.L.: 723.2 m

OPERATION AT 0600 HRS: POOH FOR CORE #1 | (Estimated TD: 2200 m)

TIME BREAKDOWN (HOURS)

Drilling	9.00
Tripping	6.25
Rig Service	0.50
Circulate	2.25
Clean to Btm	0.25
Core	4.75
Pick up Core Bbl	1.00

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1140	Lime	0
Viscosity (s/l)	75	Polythin	18
pH	10	Thinz	21
Water Loss (cm3)	12	Barite	10
Plastic Visc.(MPa-s)	18	Gel	40
Yield Point (Pa)	9		
1m/10m.Gel.Str	10/40		
Solids Content	0.096		
Sand Content	0.001		
Cl-Content (mg/L)	350		
Ca++Cont.(mg/L)	580		

HYDRAULICS

PUMP: EW15EW600
SIZE: 140 mm LINER x 381 mm STROKE LENGTH
SPEED: 55 strokes/min.
PRESSURE: 7500 kPa
RATE: 1.0 m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kw

DEVIATION

m	Degrees

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
999.14 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
3 - core barrels 28.44 m, Jars 2.31, XO .22, BS .91 m

BIT RECORD

Bit No.	2	1C
Size - mm	222	199
Type	ATJ22S	Diam. DBS
Serial No.	T02BP	4930440
Depth - IN m KB	917	1155
- OUT m KB	1158	-
Distance Drilled m	241	26
Time - hr.	44	4.75
Speed - r/min	90/100	110
Force on Bit - 10.3 daN	14	5
Nozzle Sizes - mm	2x9.5 1x10.3	- - -
Bit Condition - T/B/G	-	
Penetration Rate- m/hr.	5.4	5.47

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill to core point of 1158.0 m.
Circulate and strap out on dummy trip to DC's.
Strap 978.36 m, Tally 977.65 m. Diff. .71 m - D/C.

Circulate and POOH for core barrels.
Pick up core barrels and run in hole.
Hole condition good. No fill on bottom.
Circulate and drop ball.

CUT CORE #1.

DAILY COST:	$ 21,753	AFE: C93E1479, LIC#: 0187547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -21°, O/C
CUMULATIVE COST:	$281,980	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1606 / 940-0544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 7 | DATE: 12 January 1994 | AT 0800 HRS.
LSD: 14-36-20-01 W4M

DEPTH: 1127 m | PROGRESS: 120 m | K.B.: 727.48 m | G.L.: 723.2 m

OPERATION AT 0800 HRS: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD				HYDRAULICS	DEVIATION	
		PROPERTIES		ADDITIVES - SX			m	degree
Drilling	22.75	Density (kg/m3)	1140	Gel	35	PUMP: EW15EW600	1043	1/2
Rig Service	0.75	Viscosity (s/L)	45	Reef Floc	2	SIZE: 140 mm LINER x 381 mm STROKE LENGTH	1118	7/8
Surveying	0.50	pH	10	CF II	26	SPEED: 66 strokes/min.		
		Water Loss (cm3)	10	Caustic	8	PRESSURE: 9000 kPa		
		Plastic Visc.(MPa-s)	18			RATE: 1.32 m3/min.		
		Yield Point (Pa)	7.5			ANNULAR VELOCITY: 46/76 m/s		
		In/Fin.Gel.Str	3/19			NOZZLE VELOCITY: 97 m/s		
		Solids Content	0.089			BHP: 129 kw		
		Sand Content	0.001					
		Cl-Content (mg/L)	350					
		Ca++Cont.(mg/L)	50					

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
940.24 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	2		
Size - mm	222		
Type	ATJ22S		
Serial No.	T02BP		
Depth - IN m KB	917		
- OUT m KB	-		
Distance Drilled - m	210		
Time - hr.	35		
Speed - r/min.	90/100		
Force on Bit - 10.3 daN	14/15		
Nozzle Sizes - mm	2x9.5		
	1x10.3		
Bit Condition - T/B/G	- - -		
Penetration Rate- m/hr.	6.0		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill and survey.
Hole conditon and rig operation good.

DAILY COST:	$ 21,220	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgen Hydroc.	WEATHER:
CUMULATIVE COST:	$270,207	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

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ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 6 | DATE: 11 January 1994 | AT 0600 HRS.
SD: 14-36-20-4-3W4M | PROGRESS: 224 m | K.B.: 727.48 m | G.L.: 723.2 m
DEPTH: 967 m | (Estimated T.D.: 2200 m)
OPERATION AT 0600 HRS.: DRILLING

TIME BREAKDOWN (HOURS)		MUD RECORD PROPERTIES		ADDITIVES - SX		HYDRAULICS	DEVIATION m	DEVIATION degree
Drilling	18.50	Density (kg/m3)	1120	Reef Pac	13	PUMP: EW15EW600	816	1/4
Tripping	4.00	Viscosity (s/L)	45	Caustic	1	SIZE: 140 mm LINER x 381 mm STROKE LENGTH	891	1/2
Rig Service	.0.75	pH	11.0	Soda Ash	5	SPEED: 66 strokes/min.	969	1/2
Surveying	0.75	Water Loss (cm3)	11.5	Gel	50	PRESSURE: 9000 kPa		
		Plastic Visc.(MPa-s)		CF II	1	RATE: 1.32 m3/min.		
		Yield Point (Pa)				ANNULAR VELOCITY: 46/76 m/s		
		In/Fin.Gel.Str				NOZZLE VELOCITY: 97 m/s		
		Solids Content				BHP: 129 kW		
		Sand Content						
		Cl-Content (mg/L)						
		Ca++Cont.(mg/L)						

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XH Connections

DRILL PIPE:
799.94 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, S.S. 2.87 m

BIT RECORD

Bit No.	1	2
Size - mm	222	222
Type	HP11	ATJ22S
Serial No.	BM6878	T028P
Depth - IN m KB	393	917
- OUT m KB	917	0
Distance Drilled - m	524	70
Time - hr.	19.75	12.25
Speed - r/min.	120	90/110
Force on Bit - 10.3 daN	10	10/14
Nozzle Sizes - mm	3x12.7	2x9.5 1x10.3
Bit Condition - T/B/G	4/3/1	- - -
Penetration Rate- m/hr.	26.53	5.71

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill and survey to 917.0 m.
Strap out of hole for Bit #2.
Strap 733.95 m, Tally 733.83 m, Diff .12 m - N/C.

Make up bit and shock sub and RIH.
Hole condition good. 3 m fill on bottom.
Continue drilling and surveying.

Est. top of Pekisko 914.0 m
RSPP 2500 kPa @ 33 spm.
Shock sub started 94-01-10.

DAILY COST:	$ 23,476	AFE: C93E1479, LIC#: 0182547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -23° O/C
CUMULATIVE COST:	$248,987	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Good
ROY ROCKEN		MOBILE NO - 554-1686 / 940-8544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT | DAY: 5 | DATE: 10 January 1994 | AT 0800 HRS.
LSD: 14-36-20-01 W4M

DEPTH: 816 m | PROGRESS: 423 m | K.B.: 727.48 m | G.L.: 723.2 m

OPERATION AT 0800 HRS: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD PROPERTIES		MUD RECORD ADDITIVES - SX		HYDRAULICS	DEVIATION m	DEVIATION degree
Drilling	13.50	Density (kg/m3)	1000	Enviroflac	10	PUMP: EM15EW600	439	3/4
Rig Service	.75	Viscosity (s/L)	29	Reef Flac	15	SIZE: 140 mm LINER	514	3/8
Surveying	1.50	pH				x 381 mm STROKE	589	3/4
Drill out cement	7.00	Water Loss (cm3)		(1250)		LENGTH	665	1/4
Repairs	1.00	Plastic Visc.(MPa-s)				SPEED: 66	740	1/4
BOP Drill	0.25	Yield Point (Pa)				strokes/min.		
		In/Fin.Gel.Str				PRESSURE: 5000 kPa		
		Solids Content				RATE: 1.37 m3/min.		
		Sand Content				ANNULAR VELOCITY:		
		Cl-Content (mg/L)				48/79 m/s		
		Ca++Cont.(mg/L)				NOZZLE VELOCITY:		
						59 m/s		
						BHP: 45 kw		

DRILL STRING ASSEMBLY

DRILL COLLARS:
171.52 m of 165 mm OD x 73 mm ID x XO Connections

DRILL PIPE:
630.42 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .25 m, Bit sub .90 m

BIT RECORD

Bit No.	1		
Size - mm	222		
Type	HP11		
Serial No.	BM6878		
Depth - IN m KB	393		
- OUT m KB	-		
Distance Drilled - m	423		
Time - hr.	13.50		
Speed - r/min.	90/128		
Force on Bit - 10.3 daN	10,000		
Nozzle Sizes - mm	3x12.7		
Bit Condition - T/B/G	- - -		
Penetration Rate- m/hr.	31.33		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill out cement, float and shoe from 300 m to 393 m.
Hold BOP drill and continued drilling 222 mm hole.

Repairs were 1/2 hr. working on kelly spinner and 1/2 hr. working on pump.

Hole conditions good on connections.

Started mudding up @ 780 m.

DAILY COST:	$ 19,644	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services Morgan Hydroc.	WEATHER: -26° O/C
CUMULATIVE COST:	$225,511	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Fair
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 554-1686 / 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT LSD: 14-36-20-01 W4M	DAY: 4	DATE: 9 January 1994	AT 0800 HRS.
DEPTH: 393 m	PROGRESS: 0 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0800 HRS: DRILLING OUT CEMENT (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD PROPERTIES	ADDITIVES - SX	HYDRAULICS	DEVIATION m	DEVIATION degree
Trippingz	1.25	Density (kg/m3)		PUMP: EW15EW600		
Rig Service	0.25	Viscosity (s/L)		SIZE: 140 mm LINER		
Circulate	0.50	pH		381 x mm STROKE LENGTH		
Drill Out	1.50	Water Loss (cm3)		SPEED: strokes/min.		
Cementing	0.25	Plastic Visc.(MPa-s)		PRESSURE: kPa		
WOC	4.00	Yield Point (Pa)		RATE: m3/min.		
N/U BOP's	8.75	In/Fin.Gel.Str		ANNULAR VELOCITY: m/s		
Pressure Test	3.50	Solids Content		NOZZLE VELOCITY: m/s		
Clean Mud Tanks & Rig	4.00	Sand Content		BHP: kw		
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS: 171.52 m of 165 mm OD x 73 mm ID x XH Connections **DRILL PIPE:** 132.5 m of 114 mm OD x 114 mm XH Connetions **MISCELLANEOUS EQUIPMENT:** Bit .25 m, Bit Sub .90 m	Bit No.	1		
	Size - mm	222		
	Type	HP11		
	Serial No.	BM6878		
	Depth - IN m KB	393		
	- OUT m KB			
	Distance Drilled - m			
	Time - hr.			
	Speed - r/min.			
	Force on Bit - 10.3 daN			
	Nozzle Sizes - mm	3x12.7		
	Bit Condition - T/B/G			
	Penetration Rate- m/hr.			

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Finish cementing with Nowsco. WOC 4 hrs. Cut off conductor barrel. Clean collar and install thread on casing bowl. N/U BOP's. Weather very cold and had to clean mud for BOP's. Pressure tested blind rams, all manifold valves and HCR valve to 1400 kPa low and 14000 kPa high for 10 mins. each.
Make up Bit #1 and RIH. Circulate out air in pipe. Pressure test pipe rams aznd hydril and all string valves to 1400 kPa low and 14000 kPa high for 10 mins. each. Only went 10,500 kPa on hydril. Clean out mud tanks. Very slow cleaning out tanks due to vacuum truck. Had to haul 110 km around trip in cold weather.

Drill out cement in casing. Cement top @ 390 m.

DAILY COST:	$ 13,563	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -20° O/C
CUMULATIVE COST:	$205,867	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Fair
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT LSD: 14-36-20-01 W4M	DAY: 3	DATE: 8 January 1994	AT 0600 HRS.
DEPTH: 393 m	PROGRESS: 105 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0600 HRS: CEMENT 244.5 mm CASING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Drilling	4.25
Tripping	4.00
Rig Service	0.50
Surveying	0.50
Condn Mud	2.25
Circulate	1.50
Cementing	1.50
Inst. Sump Tanks	1.50
Clean Flowline	4.25
Run Casing	3.75

MUD RECORD

PROPERTIES		ADDITIVES - SX	
Density (kg/m3)	1180	Soda Ash	6
Viscosity (s/L)	65	PF II	17
pH	9.0		
Water Loss (cm3)	N/C		
Plastic Visc.(MPa-s)	53		
Yield Point (Pa)	17		
In/Fin.Gel.Str	8/32		
Solids Content	.0.15		
Sand Content	0.004		
Cl-Content (mg/L)	250		
Ca++Cont.(mg/L)	200		
MBT	64.12 kg/m³		

HYDRAULICS

PUMP: 2/EW15EW600
SIZE: 127/140 mm LINER x 381 mm STROKE LENGTH
SPEED: 50/50 strokes/min.
PRESSURE: 7000 kPa
RATE: 2.40 m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: ku

DEVIATION

m	degree
309	3/4
347	3/4
386	1/2

DRILL STRING ASSEMBLY

DRILL COLLARS:

DRILL PIPE:

MISCELLANEOUS EQUIPMENT:
Run Casing

BIT RECORD

Bit No.	2A
Size - mm	349
Type	S33J
Serial No.	475/33
Depth - IN m KB	243
- OUT m KB	393
Distance Drilled - m	150
Time - hr.	6.75
Speed - r/min.	150+
Force on Bit - 10.3 daN	8
Nozzle Sizes - mm	3/15.9
Bit Condition - T/B/G	4/2/I
Penetration Rate- m/hr.	22.22

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill to 375 m. Circulate 1/4 hr. POOH on dummy trip.
Run in hole and break circulation. Mud clobbered. Plugged flowline. Clean out flowline 5 times while circulating out mud ring. Drill to surface hole TD of 393 m and circulate 3/4 hr. POOH and lay down 9 DC's.

Pick up power tongs and run 31 jts., 244.5 mm, 53.56 kg/m, J-55, LT&C casing. Hole condition good.
Total casing string length 397.44 m. Casing landed @ 391.19 m.

Circulate 1-1/2 hrs.
Rig up cementers and cement with 40 tonnes 0:1:0 "G" + 2% $CaCl_2$. Plug down @ 0815 hrs. 94-01-08. Had 3 m^3 good cement returns. Left 3 m^3 of cement in pipe due to vacuum truck quitting and having no place for cement returns.
Very cold and windy weather conditions during completing casing and cement job.

DAILY COST:	$ 63,130	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -22°, Windy & Cold
CUMULATIVE COST:	$192,304	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Fair
REPORT FROM:	ROY DOCKEN	MOBILE NO.: 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT
14-36-20-01 W4M

DAY: 2 DATE: 7 January 1994 AT 0600 HRS.

DEPTH: 390 m PROGRESS: 264 m K.B.: 727.48 m G.L.: 723.2 m

OPERATION AT 0600 HRS.: DRILLING (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)

Drilling	14.25
Tripping	2.50
Rig Service	0.75
Surveying	2.75
Repair	1.75
Clean Flowline	2.00

MUD RECORD

PROPERTIES

Density (kg/m3)	1150
Viscosity (s/L)	55
pH	8.0
Water Loss (cm3)	
Plastic Visc.(MPa-s)	
Yield Point (Pa)	
In/Fin.Gel.Str	
Solids Content	
Sand Content	
Cl-Content (mg/L)	
Ca++Cont.(mg/L)	

ADDITIVES - SX

Gel	10
Soda Ash	1
Caustic	1
Pelthin	1

HYDRAULICS

PUMP: 2/EU 15EW600
SIZE: 127/140 mm LINER x 381 mm STROKE LENGTH
SPEED: 50/50 strokes/min.
PRESSURE: 6000 kPa
RATE: 2.40 m3/min.
ANNULAR VELOCITY: m/s
NOZZLE VELOCITY: m/s
BHP: kw

DEVIATION

m	degree
34	1/8
62	1/2
148	1
176	1/4
205	3/4
262	3/4

DRILL STRING ASSEMBLY

DRILL COLLARS:
18.97 m of 228 mm OD x 73 mm ID x H90 Connections
171.52 m of 165 mm OD x 63 mm ID x H90 Connections

DRILL PIPE:
85.6 m of 114 mm OD x 114 mm XH Connections

MISCELLANEOUS EQUIPMENT:
Bit .30 m, XO .65 m, XO .60 m, KD 12.50 m

BIT RECORD

Bit No.	1A	2A
Size - mm	349	349
Type		J33J
Serial No.	DB419	475133
Depth - IN m KB	0	243
- OUT m KB	243	-
Distance Drilled - m	243	47
Time - hr.	12.75	2.50
Speed - r/min.	150+	150+
Force on Bit - 10.3 daN	2/7	6
Nozzle Sizes - mm	3x15.9	3x15.9
Bit Condition - T/B/G	4/3/I	- -
Penetration Rate- m/hr.	19.05	18.8

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Drill and survey to 243.0 m.
Dummy trip to surface (change bits).
Hole tight in spot on trip out.
Strap 253.16 m, Tally 253.06 m. Diff. .10 m.
Worked tight spot on trip in.
When on bottom circulate out mud ring and clean out flow line.
Continue drilling.
Hole condition good.

DAILY COST:	$ 23,374	AFE: C93E1479, LIC#: 0162547 NPW(C) Info: Enron Gas Marketing, St. Claire P/L, Enron Gas Services/Morgan Hydroc.	WEATHER: -15° C, O/C
CUMULATIVE COST:	$129,174	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Fair
[illegible] ROY ROCKEN		MOBILE NO.: 940-6544	RIG: PRECISION #5

ENRON OIL CANADA LTD.
DAILY DRILLING REPORT

SUPER TIGHT

WELL: CDN LAND MEDHAT	DAY: 1	DATE: 6 January 1994	AT 0600 HRS.
SD: 14-36-20-01 W4M			
DEPTH: 26 m	PROGRESS: 26 m	K.B.: 727.48 m	G.L.: 723.2 m

OPERATION AT 0600 HRS: DRILLING 349 mm SURFACE HOLE (Estimated T.D.: 2200 m)

TIME BREAKDOWN (HOURS)		MUD RECORD		HYDRAULICS	DEVIATION	
		PROPERTIES	ADDITIVES - SX		m	degree
Drilling . . .	1.00	Density (kg/m3)		PUMP:		
Rigging Up . .	23.00	Viscosity (s/L)		SIZE: mm LINER x mm STROKE LENGTH		
		pH		SPEED: strokes/min.		
		Water Loss (cm3)		PRESSURE: kPa		
		Plastic Visc.(MPa-s)		RATE: m3/min.		
		Yield Point (Pa)		ANNULAR VELOCITY: m/s		
		In/Fin.Gel.Str		NOZZLE VELOCITY: m/s		
		Solids Content		BHP: kw		
		Sand Content				
		Cl-Content (mg/L)				
		Ca++Cont.(mg/L)				

DRILL STRING ASSEMBLY	BIT RECORD			
DRILL COLLARS: 9.62 m of 228 mm OD x 73 mm ID x H90 Connections	Bit No.	1A		
DRILL PIPE:	Size - mm	349		
	Type	RR1		
	Serial No.	D841		
	Depth - IN m KB	0		
	- OUT m KB	-		
MISCELLANEOUS EQUIPMENT: Bit .30 m, Bit Sub 1.11 m, 2 XO 1.25 m.	Distance Drilled - m	26		
	Time - hr.	1		
	Speed - r/min.	80		
	Force on Bit - 10.3 daN	All		
	Nozzle Sizes - mm	3x15.9		
	Bit Condition - T/B/G	. . .		
	Penetration Rate- m/hr.	26		

DESCRIPTION OF OPERATIONS FOR PAST 24 HOURS:

Rig up. Very cold conditions for starting motor.

Rig to spud.

SPUD WELL IN @ 0700 HRS. 94-01-06.

DAILY COST:	$ 105,800	AFE: C93E1479, LIC#: 0162547 NPW(C) INFO TO:: Enron Gas Marketing/St. Claire P/L, City Medicine Hat-5%, Enron Gas &Services/Morgan Hydrocarbons	WEATHER: -30° C, Overcast
CUMULATIVE COST:	$ 105,800	ENRON GEOLOGIST: PETER AUBRECHT WELLSITE GEOLOGIST: BILL BAILLIE	LEASE COND'NS: Poor

APPENDIX C1

CORE ANALYSIS REPORT

FOR

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.

CDN LAND MEDHAT 14-36-20-1
LSD XX/14-36-020-01 W4M/X
MEDICINE HAT, ALBERTA

CORE LABORATORIES

Company : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
Well : CDN LAND MEDHAT 14-36-20-1
Location : LSD XX/14-36-020-01 W4M/X
Province : ALBERTA

Field : MEDICINE HAT
Formation : NISKU
Coring Equip.: DIAMOND
Coring Fluid : WATER BASE MUD

File No.: 52131-94-0023
Date : 94-01-14
Analysts: LGM
Core Dia: 99 mm

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH m	INTVL REP m	SAMPLE LENGTH m	PERMEABILITY (MAXIMUM) Kair mD	PERMEABILITY (90 DEG) Kair mD	PERMEABILITY (VERTICAL) Kair mD	CAPACITY (MAXIMUM) Kair mD-m	POROSITY (HELIUM) fraction	CAPACITY (HELIUM) ϕ-m	BULK DENSITY kg/m3	GRAIN DENSITY kg/m3	SATURATION (PORE VOLUME) OIL frac	SATURATION (PORE VOLUME) WATER frac	DESCRIPTION
CORE NO. 1 1158.00 - 1185.00 m (CORE RECEIVED 27.00 m) (25 BOXES)														
-	1158.00- 58.33	0.33												sh dol anhy
NA	1158.33- 59.08	0.75												dol anhy shy
1	1159.08- 59.23	0.15	0.10	58.2	34.7	7.90	8.730	0.107	0.016	2550.	2850.	0.000	0.510	dol i ppv sv anhy frac
NA	1159.23- 59.47	0.24												dol
2	1159.47- 59.58	0.11	0.08	35.1	34.9	13.6	3.861	0.111	0.012	2530.	2850.	0.000	0.264	dol i ppv sv anhy
3	1159.58- 59.78	0.20	0.08	9.35	7.13	0.62	1.870	0.074	0.014	2630.	2840.	TRACE	0.156	dol i ppv sv anhy frac
NA	1159.78- 60.29	0.51												dol anhy
4	1160.29- 60.43	0.14	0.09	2.04	1.26	0.58	0.286	0.076	0.011	2640.	2860.	0.000	0.360	dol i ppv sv anhy vfrac
NA	1160.43- 61.48	1.05												dol anhy
5	1161.48- 61.66	0.18	0.12	0.35	0.29	0.05	0.063	0.047	0.009	2680.	2820.	TRACE	0.092	dol i ppv lam frac
NA	1161.66- 62.66	1.00												dol shy
-	1162.66- 63.58	0.92												anhy dol
NA	1163.58- 63.81	0.23												dol anhy
6	1163.81- 64.01	0.20	0.10	11.9	9.11	0.98	2.380	0.086	0.018	2600.	2840.	TRACE	0.412	dol i ppv sv anhy frac
NA	1164.01- 64.77	0.76												dol anhy
7	1164.77- 64.93	0.16	0.11	13.0	11.9	6.19	2.080	0.194	0.030	2290.	2840.	TRACE	0.575	dol i ppv sv anhy frac
NA	1164.93- 65.61	0.68												dol anhy
-	1165.61- 65.78	0.17												anhy dol
NA	1165.78- 66.06	0.28												dol anhy
-	1166.06- 66.20	0.14												anhy
NA	1166.20- 66.75	0.55												dol anhy
8	1166.75- 67.01	0.26	0.21	3.27	3.22	1.07	0.850	0.094	0.023	2560.	2830.	TRACE	0.235	dol i ppv sv anhy sty frac
9	1167.01- 67.18	0.17	0.12	1.85	1.77	0.08	0.315	0.095	0.015	2550.	2820.	0.035	0.333	dol i ppv sv anhy vfrac
-	1167.18- 67.80	0.62												anhy dol
NA	1167.80- 67.95	0.15												dol anhy

CORE LABORATORIES

Company : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
Well : CDN LAND MEDHAT 14-36-20-1
Field : MEDICINE HAT
Formation : NISKU
File No.: 52131-94-0023
Date : 94-01-14

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH m	INTVL REP m	SAMPLE LENGTH m	PERMEABILITY (MAXIMUM) Kair mD	PERMEABILITY (90 DEG) Kair mD	PERMEABILITY (VERTICAL) Kair mD	CAPACITY (MAXIMUM) Kair mD-m	POROSITY (HELIUM) fraction	CAPACITY (HELIUM) ϕ-m	BULK DENSITY kg/m3	GRAIN DENSITY kg/m3	SATURATION (PORE VOLUME) OIL frac	SATURATION (PORE VOLUME) WATER frac	DESCRIPTION
10	1167.95- 68.08	0.13	0.08	9.08	7.32	1.69	1.180	0.089	0.012	2590.	2840.	TRACE	0.354	dol i ppv sv anhy sty frac
NA	1168.08- 68.90	0.82												dol anhy
11	1168.90- 69.05	0.15	0.12	267.	251.	16.8	40.050	0.209	0.032	2240.	2830.	0.020	0.465	dol i ppv sv mv
NA	1169.05- 69.23	0.18												anhy
12	1169.23- 69.34	0.11	0.05	309.	241.	21.9	33.990	0.176	0.020	2320.	2820.	TRACE	0.449	dol i ppv sv vfrac
NA	1169.34- 70.21	0.87												dol
13	1170.21- 70.40	0.19	0.12	153.	137.	50.6	29.070	0.224	0.042	2210.	2850.	0.000	0.592	dol i ppv sv
14	1170.40- 70.61	0.21	0.17	125.	117.	56.5	26.250	0.264	0.055	2100.	2850.	0.000	0.483	dol i ppv sv
NA	1170.61- 70.78	0.17												dol
15	1170.78- 70.98	0.20	0.11	475.	440.	57.9	95.000	0.256	0.052	2120.	2850.	TRACE	0.417	dol i ppv sv lam
NA	1170.98- 71.32	0.34												dol
16	1171.32- 71.50	0.18	0.14	104.	104.	46.1	18.720	0.281	0.050	2060.	2860.	TRACE	0.616	dol i ppv sv
NA	1171.50- 71.86	0.36												dol
17	1171.86- 72.04	0.18	0.10	145.	142.	4.80	26.100	0.273	0.049	2070.	2850.	TRACE	0.591	dol i ppv sv lam
18	1172.04- 72.66	0.62	0.22	162.	162.	56.9	100.440	0.297	0.186	2010.	2850.	0.000	0.560	dol i ppv svdol
19	1172.66- 72.83	0.17	0.13	223.	156.	26.4	37.910	0.303	0.051	1990.	2860.	TRACE	0.546	dol i ppv sv
20	1172.83- 73.77	0.94	0.24	155.	148.	53.8	145.700	0.249	0.235	2140.	2850.	0.000	0.435	dol i ppv sv
21	1173.77- 74.73	0.96	0.24	104.	65.5	39.2	99.840	0.179	0.173	2320.	2830.	0.000	0.372	dol i ppv sv mv
22	1174.73- 74.91	0.18	0.15	224.	137.	60.4	40.320	0.201	0.036	2250.	2810.	TRACE	0.647	dol i ppv sv sshy frac
23	1174.91- 75.85	0.94	0.24	431.	340.	30.4	405.140	0.189	0.179	2280.	2810.	0.000	0.258	dol i ppv sv sty frac
24	1175.85- 76.00	0.15	0.12	183.	144.	24.0	27.450	0.165	0.025	2360.	2830.	TRACE	0.465	dol i ppv sv anhy frac
NA	1176.00- 76.27	0.27												dol anhy
25	1176.27- 76.43	0.16	0.13	43.9	39.2	16.5	7.024	0.121	0.019	2490.	2830.	TRACE	0.423	dol i ppv sv
NA	1176.43- 76.75	0.32												dol anhy
26	1176.75- 76.94	0.19	0.13	46.1	40.4	7.07	8.759	0.126	0.025	2470.	2830.	TRACE	0.336	dol i ppv sv anhy frac
NA	1176.94- 77.62	0.68												dol anhy
27	1177.62- 77.80	0.18	0.12	21.7	16.3	1.72	3.906	0.104	0.018	2530.	2830.	0.000	0.358	dol i ppv anhy frac
NA	1177.80- 78.94	1.14												dol anhy
28	1178.94- 79.09	0.15	0.11	58.4	55.1	2.90	8.760	0.104	0.015	2530.	2830.	TRACE	0.415	dol i ppv anhy frac

CORE LABORATORIES

Company : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
Well : CDN LAND MEDHAT 14-36-20-1
Field : MEDICINE HAT
Formation : NISKU
File No.: 52131-94-0023
Date : 94-01-14

CORE ANALYSIS RESULTS

SAMPLE NUMBER	DEPTH m	INTVL REP m	SAMPLE LENGTH m	PERMEABILITY (MAXIMUM) Kair mD	PERMEABILITY (90 DEG) Kair mD	PERMEABILITY (VERTICAL) Kair mD	CAPACITY (MAXIMUM) Kair mD-m	POROSITY (HELIUM) fraction	CAPACITY (HELIUM) ϕ-m	BULK DENSITY kg/m3	GRAIN DENSITY kg/m3	SATURATION (PORE VOLUME) OIL frac	SATURATION (PORE VOLUME) WATER frac	DESCRIPTION
NA	1179.09- 79.26	0.17												dol anhy
29	1179.26- 79.43	0.17	0.13	35.6	24.8	1.76	6.052	0.118	0.020	2490.	2820.	TRACE	0.488	dol i ppv anhy frac
NA	1179.43- 80.59	1.16												dol anhy
30	1180.59- 80.79	0.20	0.17	46.7	29.8	30.0	9.340	0.169	0.034	2350.	2830.	TRACE	0.505	dol i ppv sv anhy vfrac
NA	1180.79- 81.04	0.25												dol
31	1181.04- 81.23	0.19	0.14	54.9	43.6	18.8	10.431	0.157	0.030	2390.	2830.	TRACE	0.609	dol i ppv mv frac
NA	1181.23- 81.49	0.26												dol
32	1181.49- 81.68	0.19	0.14	1.17	0.87	0.48	0.222	0.071	0.013	2640.	2840.	TRACE	0.555	dol i ppv mv anhy frac
NA	1181.68- 81.89	0.21												dol anhy
33	1181.89- 82.12	0.23	0.18	22.7	20.7	7.42	5.221	0.116	0.028	2510.	2830.	0.000	0.365	dol i ppv mv anhy frac
NA	1182.12- 82.72	0.60												dol
34	1182.72- 82.96	0.24	0.20	62.6	40.6	15.2	15.024	0.118	0.029	2490.	2830.	TRACE	0.335	dol i ppv mv anhy frac
35	1182.96- 83.24	0.28	0.18	51.2	49.4	19.0	14.336	0.121	0.034	2490.	2830.	0.075	0.412	dol i ppv mv anhy frac
NA	1183.24- 83.69	0.45												dol
36	1183.69- 83.94	0.25	0.16	13.2	8.32	2.19	3.300	0.085	0.023	2590.	2830.	0.000	0.456	dol i ppv anhy frac
NA	1183.94- 85.00	1.06												dol shy
	CORE NO. 2 1185.00 - 1203.80 m (CORE RECEIVED 18.70 m) (17 BOXES)													
NA	1185.00- 85.39	0.39												dol shy
37	1185.39- 85.59	0.20	0.14	1.93	1.10	0.52	0.386	0.113	0.022	2470.	2790.	0.000	0.548	dol i ppv sty frac
NA	1185.59- 85.97	0.38												dol shy
38	1185.97- 86.13	0.16	0.12	2.61	1.29	0.02	0.418	0.093	0.014	2490.	2750.	0.000	0.408	dol i ppv sshy frac
NA	1186.13- 87.02	0.89												dol shy
39	1187.02- 87.27	0.25	0.20	0.45	0.42	0.02	0.112	0.101	0.025	2490.	2760.	TRACE	0.437	dol i ppv sshy
NA	1187.27- 88.69	1.42												dol shy
40	1188.69- 88.96	0.27	0.21	0.05	0.02	0.01	0.014	0.068	0.019	2590.	2770.	0.050	0.223	dol i ppv sshy
NA	1188.96- 90.86	1.90												dol shy
41	1190.86- 91.07	0.21	0.16	0.18	0.08	<.01	0.038	0.071	0.015	2610.	2810.	TRACE	0.311	dol i ppv

CORE LABORATORIES

Company : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
Well : CDN LAND MEDHAT 14-36-20-1
Field : MEDICINE HAT
Formation : NISKU
File No.: 52131-94-0023
Date : 94-01-14

C O R E A N A L Y S I S R E S U L T S

SAMPLE NUMBER	DEPTH m	INTVL REP m	SAMPLE LENGTH m	PERMEABILITY (MAXIMUM) Kair mD	PERMEABILITY (90 DEG) Kair mD	PERMEABILITY (VERTICAL) Kair mD	CAPACITY (MAXIMUM) Kair mD-m	POROSITY (HELIUM) fraction	CAPACITY (HELIUM) ϕ-m	BULK DENSITY kg/m3	GRAIN DENSITY kg/m3	SATURATION (PORE VOLUME) OIL frac	SATURATION (PORE VOLUME) WATER frac	DESCRIPTION
NA	1191.07- 93.08	2.01												dol shy
42	1193.08- 93.32	0.24	0.19	1.65	0.42	0.02	0.396	0.081	0.019	2570.	2800.	TRACE	0.331	dol i ppv vfrac
NA	1193.32- 94.04	0.72												dol shy
43	1194.04- 94.29	0.25	0.20	0.06	0.05	<.01	0.015	0.075	0.020	2580.	2790.	TRACE	0.398	dol i ppv
NA	1194.29- 00.60	6.31												dol shy
44	1200.60- 00.79	0.19	0.11	0.18	0.07	0.02	0.034	0.053	0.009	2690.	2840.	TRACE	0.265	dol i ppv sv anhy
45	1200.79- 00.99	0.20	0.17	6.47	6.10	2.39	1.294	0.079	0.016	2620.	2850.	TRACE	0.290	dol i ppv sv anhy frac
NA	1200.99- 01.55	0.56												dol shy anhy
46	1201.55- 01.75	0.20	0.15	30.8	22.7	7.63	6.160	0.125	0.026	2490.	2850.	TRACE	0.356	dol i ppv sv anhy frac
NA	1201.75- 01.97	0.22												dol shy
47	1201.97- 02.13	0.16	0.08	20.0	13.9	4.34	3.200	0.121	0.019	2490.	2830.	TRACE	0.357	dol i ppv sv anhy frac
NA	1202.13- 02.63	0.50												dol shy
48	1202.63- 02.86	0.23	0.20	13.1	10.7	12.7	3.013	0.163	0.037	2380.	2840.	TRACE	0.275	dol i ppv sv anhy vfrac
NA	1202.86- 03.06	0.20												dol shy
49	1203.06- 03.24	0.18	0.14	9.18	8.59	3.17	1.652	0.188	0.034	2290.	2820.	0.000	0.303	dol i ppv sv anhy frac
-	1203.24- 03.70	0.46												sh dol
	1203.70- 03.80	0.10												Lost core

CORE LABORATORIES

CODE KEY - DESCRIPTIONS

A = (Prefix A) Plug taken from full diameter sample due to fracture or mud invasion to measure horizontal matrix permeability
ACA = Removed for advanced core analysis
anhy = Anhydrite
AST = Appears similar to
bit = Bitumen
bk = Break
bldr = Boulder
c = Coarse
calc = Calcite (calcareous)
carb = Carbonaceous
cbl = Cobble
CEC = Cation exchange capacity
cem = Cemented
cgl = Conglomerate
cht = Chert
coal = Coal/coal inclusion
dol = Dolomite
f = Fine
FD = Full diameter analysis including three directional permeabilities, porosity and densities
foss = Fossil (fossiliferous)
frac = Fracture (undifferentiated)
fri = Friable
glauc = Glauconite (glauconitic)
gnl = Granule
gyp = Gypsum
HSP = Humidity analysis of small plug sample at 60 degrees Celsius and 50 percent relative humidity
hfrac = Horizontal fracture
hal = Halite (salt)
I = Intercrystalline
incl = Inclusions
lam = Laminae (laminated)
lmy = Limy
ls = Limestone
lv = Large vug
m = Medium
ml = Mud invaded
mic = Micaceous
ML = Mineralog™
mv = Medium vug
NA = Not analyzed by request
NP = No permeability measurement possible due to poor sample quality
NR = Not received
ool = Oolitic
OB = Overburden sample (permeability and porosity measured at net overburden stress)
P = Preserved for future studies
pbl = Pebble
PET = Removed for petrographic analysis
ppv = Pinpoint vug
PSA = Particle size analysis
pyr = Pyrite (pyritic)
pyrbit = Pyrobitumen
RU = Rubble
SA = Sieve analysis
sdy = Sandy
SEM = Scanning electron microscope analysis
sh = Shale
shy = Moderately shaly (20% - 40%)
sid = Siderite
sltst = Siltstone
slty = Silty
SP = Small plug (sample drilled from core in maximum horizontal direction and parallel to bedding plane where possible) permeability, porosity and grain density are measured
ss = Sandstone
sshy = Slightly shaly (<20%)
sty = Stylolite (ic)
sulf = Sulphur
sv = Small vug
TEC = Thermal Extraction Chromatography to determine oil richness
TS = Thin section
uncons = Unconsolidated
vc = Very coarse
vfrac = Vertical fracture
vf = very fine
VIS = Viscosity of oil measured
VOB = Vertical overburden sample (vertical permeability measured at net overburden stress)
vshy = Very shaly (>40%)
VSP = Vertical small plug drilled from whole core to measure vertical permeability and occasionally porosity
vug = Vuggy (vuggular)
ws = Water sand
XRD = X-ray diffraction
* = Perm unavailable due to broken core

CORE LABORATORIES

Company : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
Well : CDN LAND MEDHAT 14-36-20-1
Field : MEDICINE HAT
Formation : NISKU
File No.: 52131-94-0023
Date : 94-01-14

ANALYTICAL PROCEDURES AND QUALITY ASSURANCE

HANDLING & CLEANING

Core Transportation	:
Solvent	: TOLUENE
Extraction Equipment	: CO2 EXTRACTOR
Extraction Time	: 9 DAYS
Drying Equipment	: GRAVITY OVEN
Drying Time	: 2 DAYS
Drying Temperature	: 115 DEGREES C.

ANALYSIS

Grain volume measured by Boyle's Law in a modified U.S.B.M. porosimeter using He
Bulk volume measured by calipering
Fluid saturations by retort
Core Gamma Spectral

CORE LABORATORIES

Company : CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
Well : CDN LAND MEDHAT 14-36-20-1
Field : MEDICINE HAT
Formation : NISKU
File No.: 52131-94-0023
Date : 94-01-14

TABLE I

SUMMARY OF CORE DATA

ZONE AND CUTOFF DATA

ZONE:
- Identification ---------- NISKU
- Top Depth ---------- 1158.00 m
- Bottom Depth ---------- 1203.80 m
- Number of Samples -------- 49

DATA TYPE:
- Porosity ---------- (HELIUM)
- Permeability ---------- (MAXIMUM) Kair

CUTOFFS:
- Porosity (Minimum) ------- 0.000 frac
- Porosity (Maximum) ------- 1.000 frac
- Permeability (Minimum) --- 0.0000 mD
- Permeability (Maximum) --- 100000. mD
- Water Saturation (Maximum) 1.000 frac
- Oil Saturation (Minimum) - 0.000 frac
- Grain Density (Minimum) -- 2000. kg/m3
- Grain Density (Maximum) -- 3000. kg/m3
- Lithology Excluded ------- NONE

CHARACTERISTICS REMAINING AFTER CUTOFFS

ZONE:
- Number of Samples ----- 49
- Thickness Represented - 12.05 m

POROSITY:
- Storage Capacity ------ 1.903 ϕ-m
- Arithmetic Average ---- 0.158 frac
- Minimum ---------- 0.047 frac
- Maximum ---------- 0.303 frac
- Median ---------- 0.118 frac
- Standard Deviation ---- ±0.071 frac

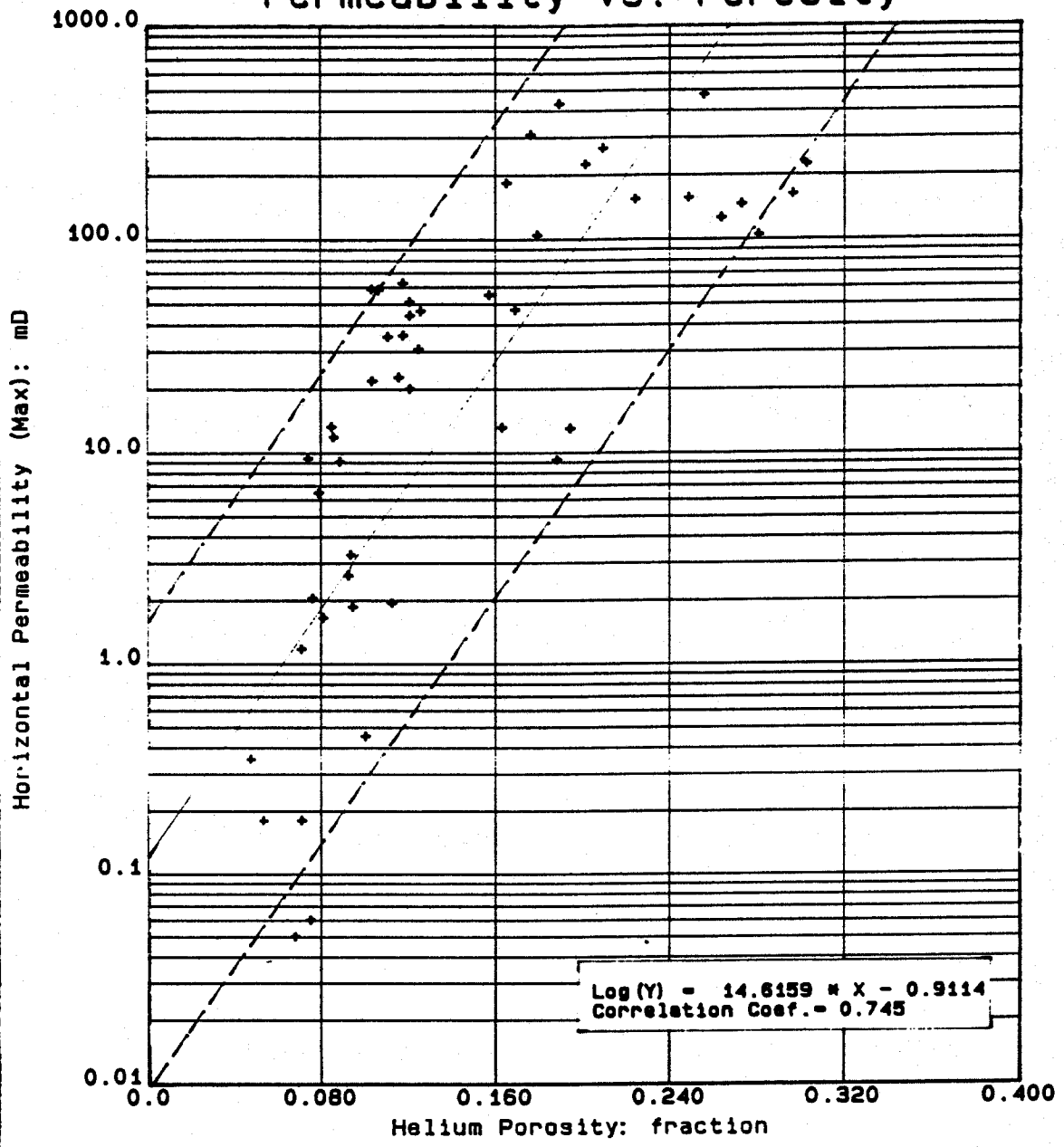
GRAIN DENSITY:
- Arithmetic Average ---- 2828. kg/m3
- Minimum ---------- 2750. kg/m3
- Maximum ---------- 2860. kg/m3
- Median ---------- 2830. kg/m3
- Standard Deviation ---- ±24. kg/m3

PERMEABILITY:
- Flow Capacity --------- 1256.68 mD-m
- Arithmetic Average ---- 104. mD
- Geometric Average ----- 24.9 mD
- Harmonic Average ------ 0.87 mD
- Minimum ---------- 0.05 mD
- Maximum ---------- 475. mD
- Median ---------- 30.8 mD
- Standard Dev. (Geom) -- $K \cdot 10^{\pm 1.044}$ mD

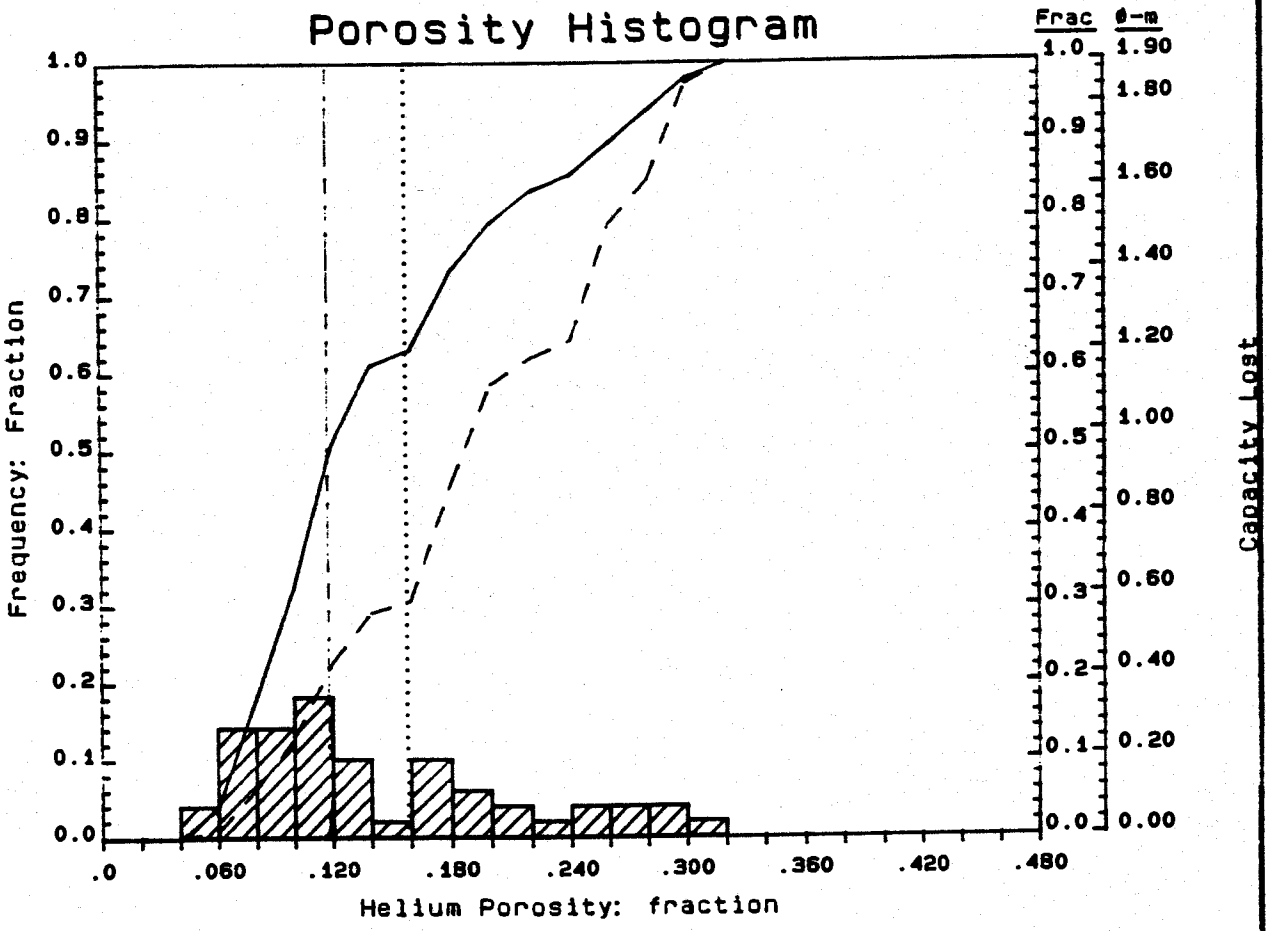
HETEROGENEITY (Permeability):
- Dykstra-Parsons Var. -- 0.904
- Lorenz Coefficient ---- 0.484

AVERAGE SATURATIONS (Pore Volume):
- Oil ---------- 0.003 frac
- Water ---------- 0.428 frac

Permeability vs. Porosity



CANADIAN LANDMASTERS RESOURCE SERVICES LTD. CDN LAND MEDHAT 14-36-20-1 MEDICINE HAT NISKU (1158.00 - 1203.70 m) Core Laboratories	- LEGEND - NISKU



CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.80 m)

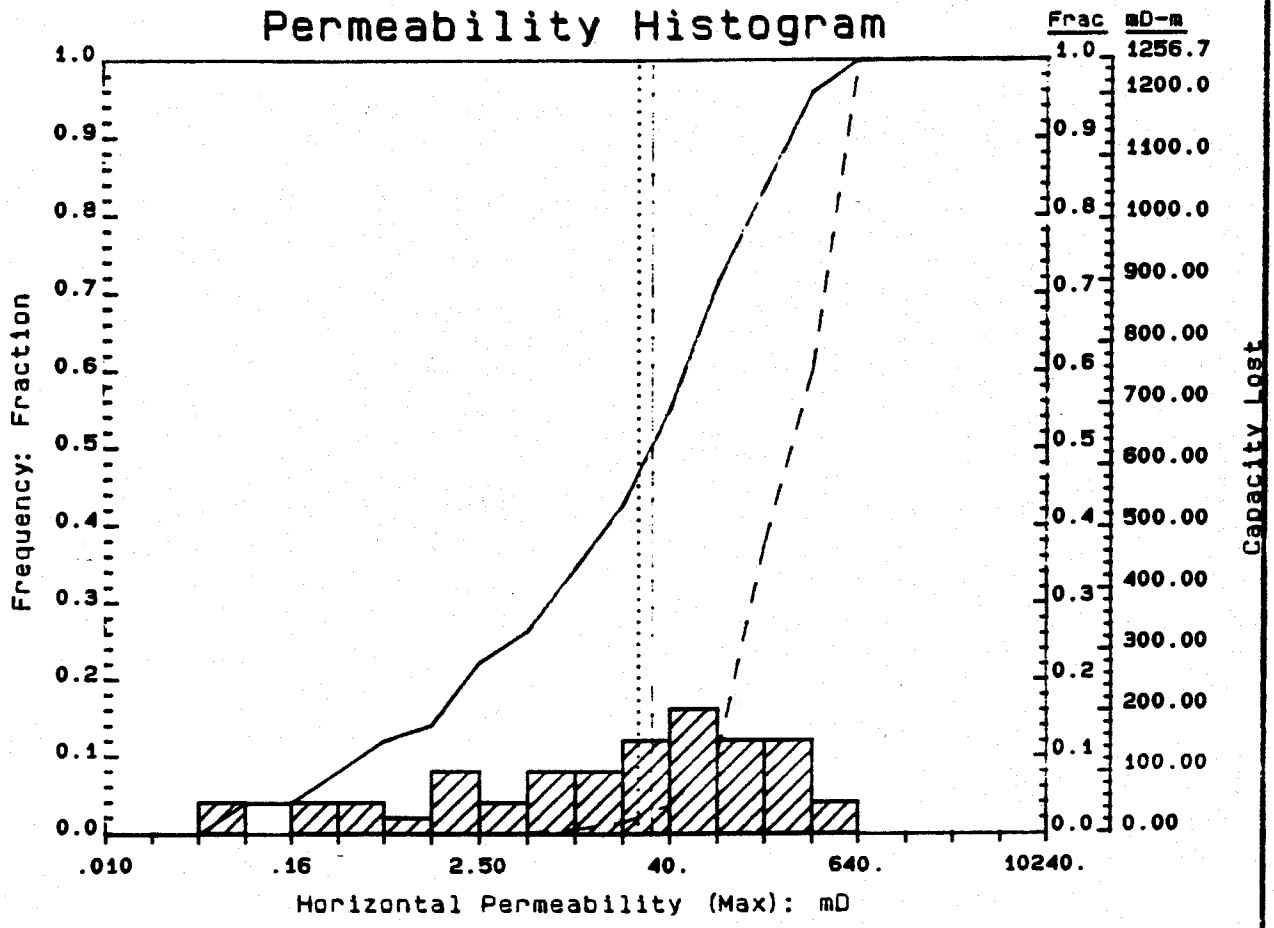
Core Laboratories

- LEGEND -

——— - Median Value (0.118)
..... Arith. Average (0.158)
——— Cumulative Frequency
— — - Cumulative Capacity Lost

49 Samples

Permeability Histogram



CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.80 m)

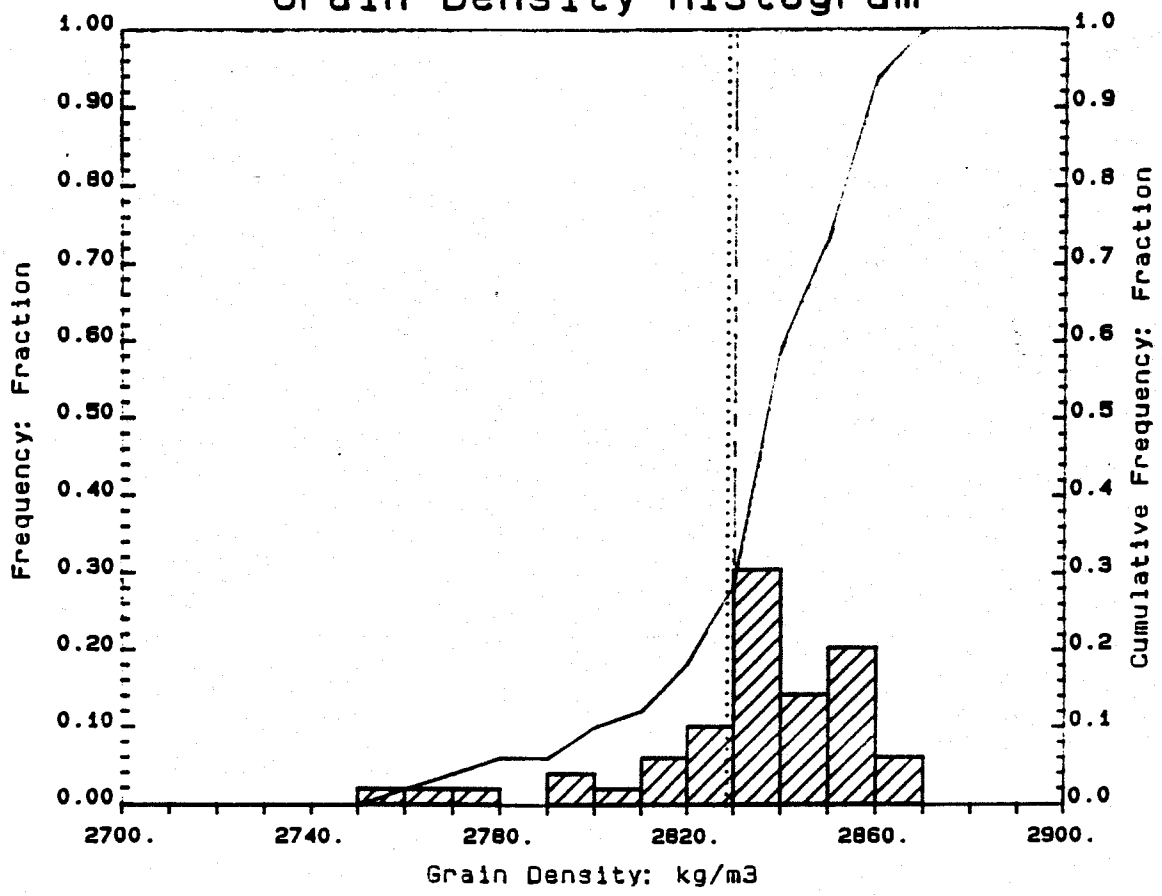
Core Laboratories

- LEGEND -

——— - Median Value (30.8)
..... Geom. Average (24.9)
——— Cumulative Frequency
— — — Cumulative Capacity Lost

49 Samples

Grain Density Histogram



CANADIAN LANDMASTERS RESOURCE SERVICES LTD. CDN LAND MEDHAT 14-36-20-1 MEDICINE HAT NISKU (1158.00 - 1203.80 m) Core Laboratories	- LEGEND - ——— - Median Value (2830) ..... Arith. Average (2828) ——— Cumulative Frequency 49 Samples

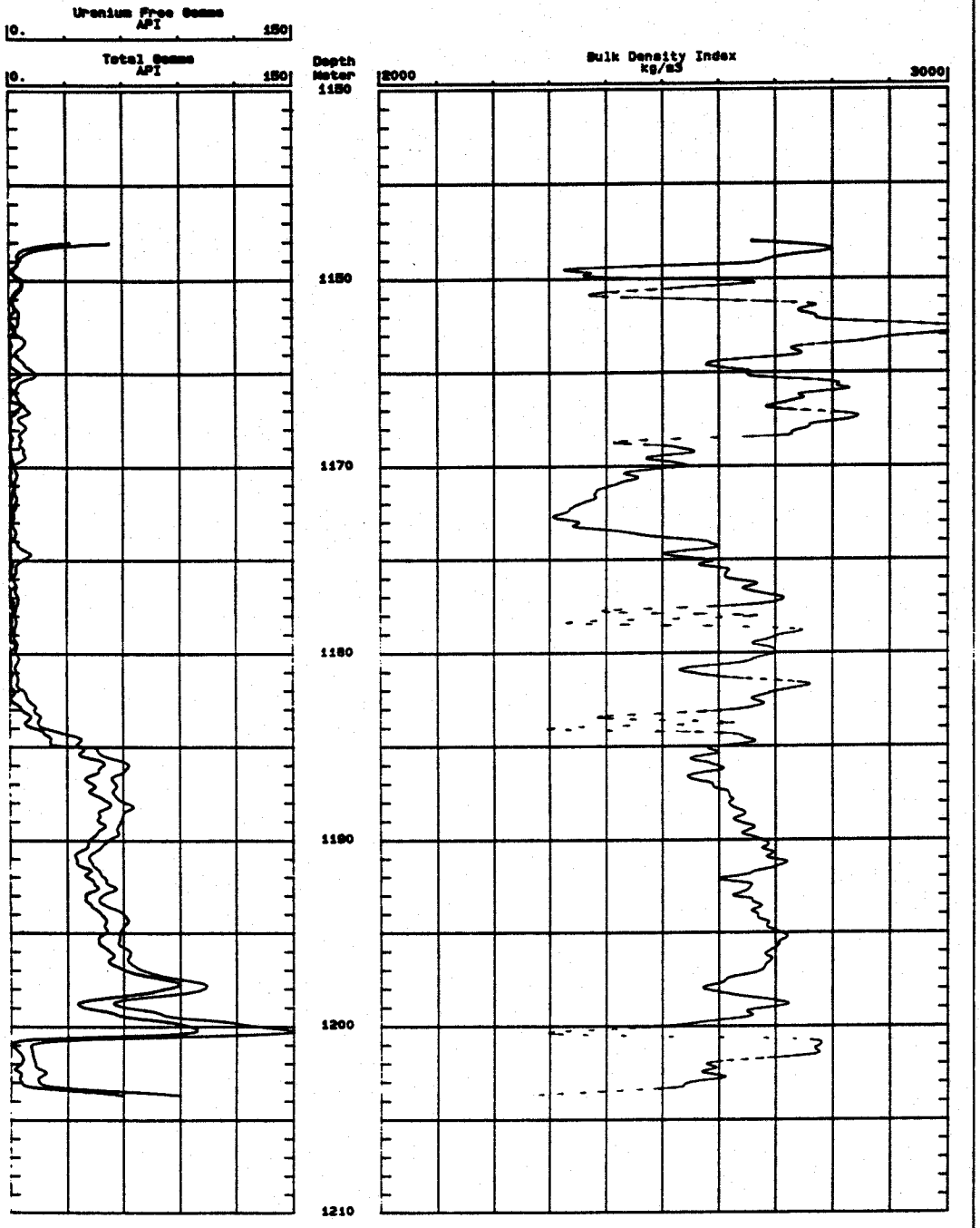
BULK DENSITY INDEX

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.80 m)

Core Laboratories

Vertical Scale
10.00 cm = 24.0 meter



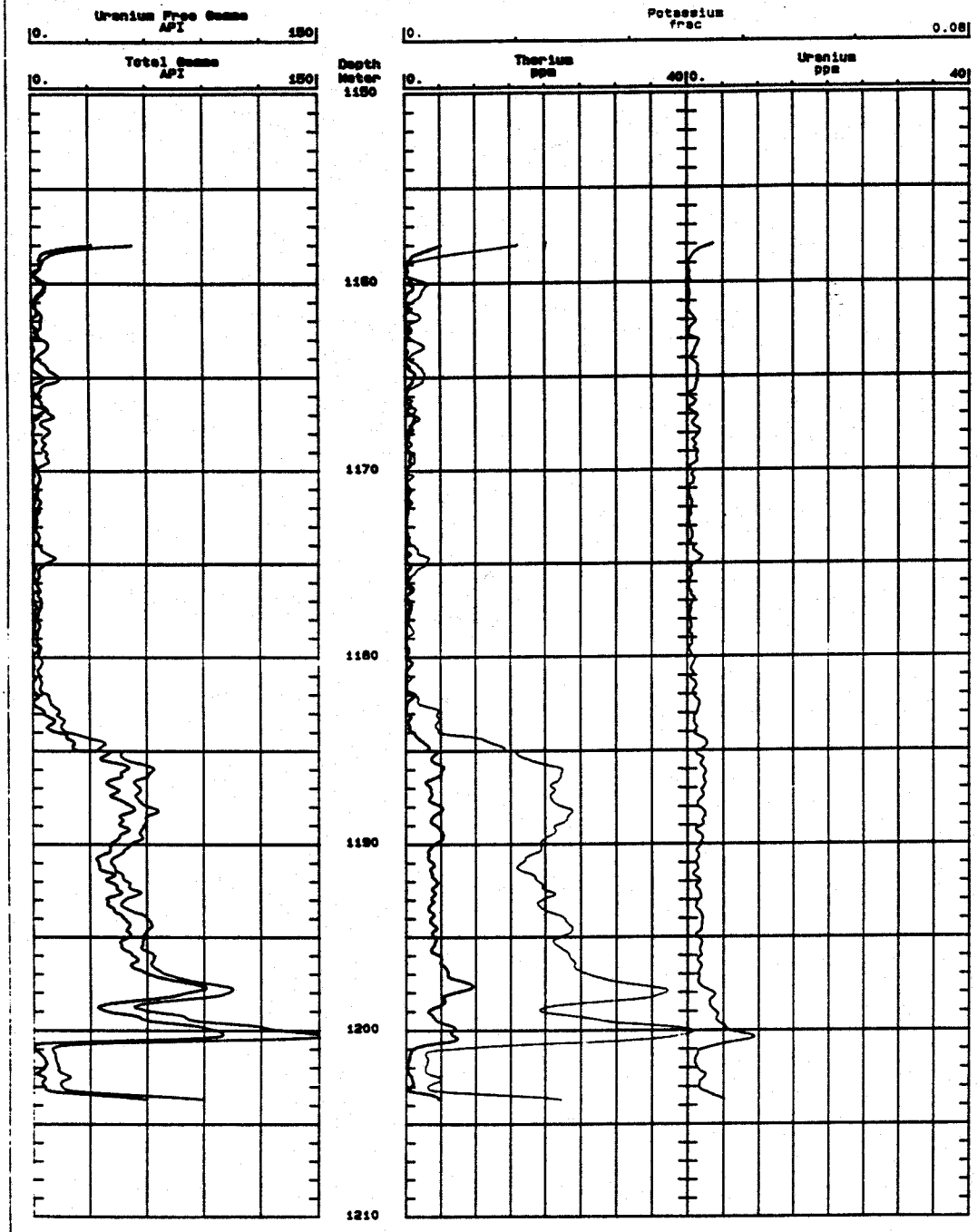
CORE SPECTRAL GAMMA

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
CON LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.80 m)

Core Laboratories

Vertical Scale
10.00 cm = 24.0 meter



CORRELATION COREGRAPH

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

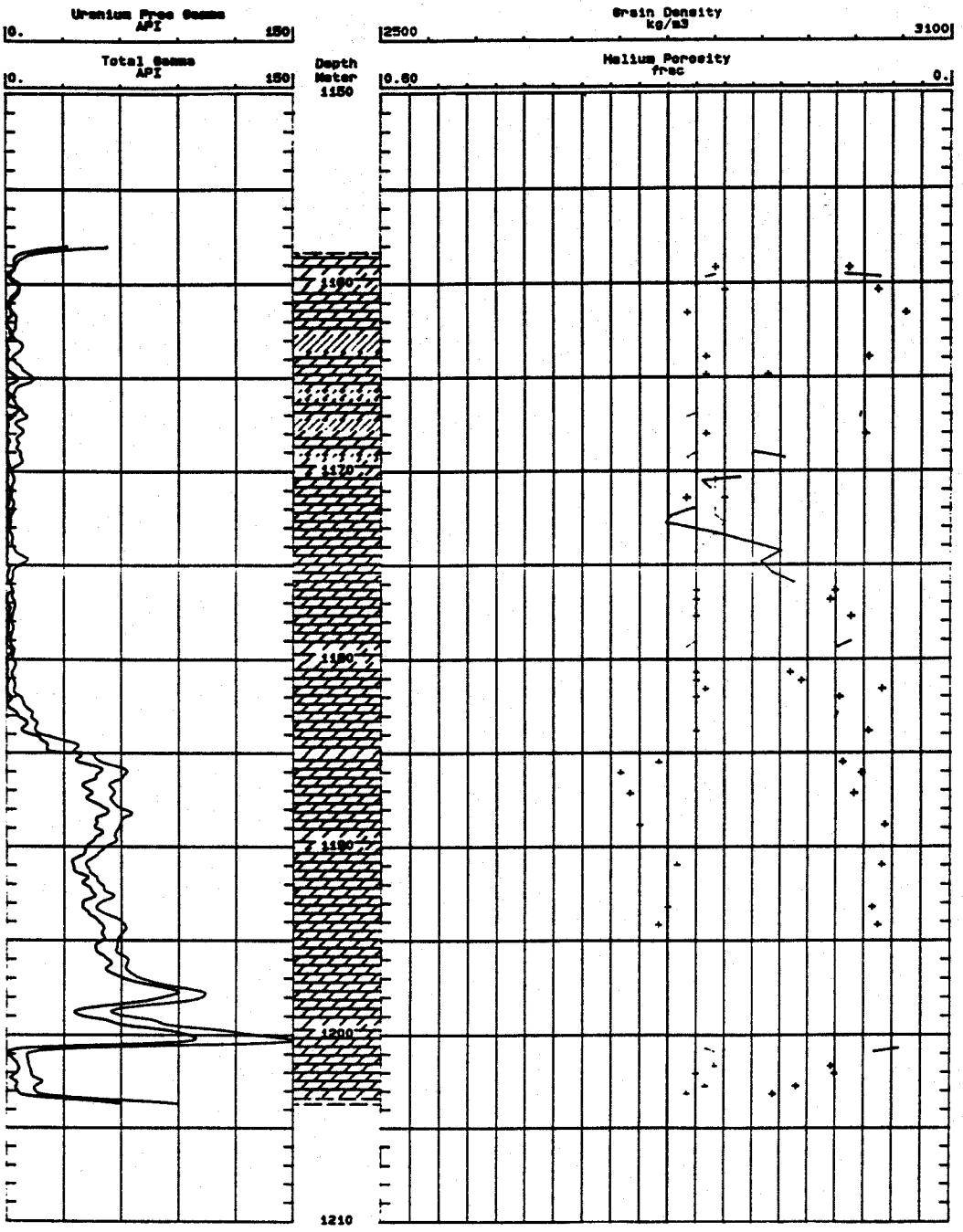
NISKU (1158.00 - 1203.80 m)

Core Laboratories

Vertical Scale
10.00 cm = 24.0 meter

- Lithology Legend -

Shale Dolomite Anhydrite



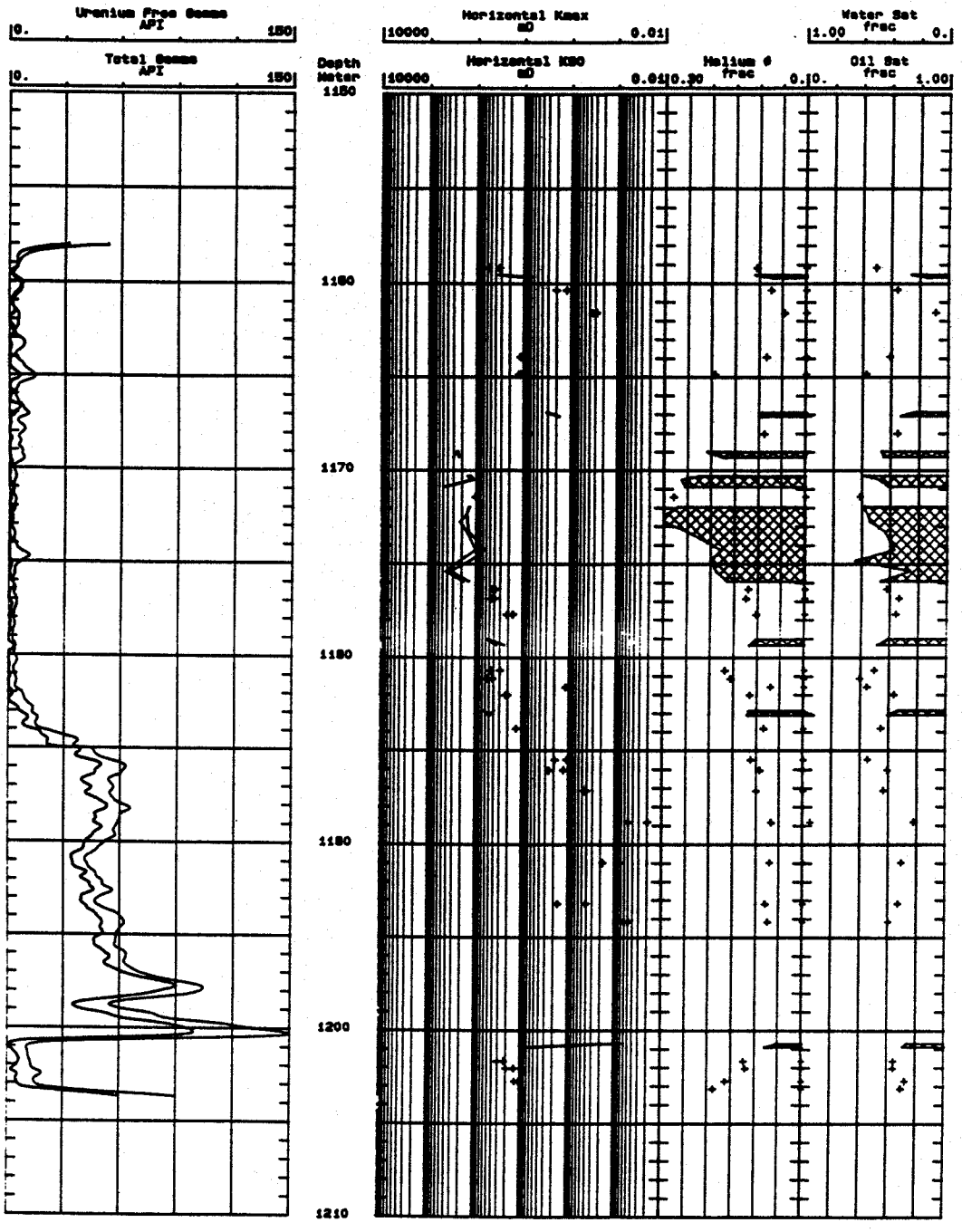
CORRELATION COREGRAPH

CANADIAN LANDMASTERS RESOURCE SERVICES LTD.
CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.80 m)

Core Laboratories

Vertical Scale
10.00 cm = 24.0 meter



APPENDIX C2

Reservoir Fluids Report
for

Enron Oil Canada Ltd.

CDN Land Medicine Hat 14-36-020-01
Medicine Hat
Alberta

52134-94-0123
1994 02 07

A product of
Core Laboratories
a division of Western Atlas Canada Ltd.

Reports Distributed to: Lyle Verstraete - Enron, Calgary - 2 Copies + Invoice

Western Atlas Canada Ltd

Servicing & Depletion of Bottomhole Sampler

V5968 (CONTAINER IDENTITY)			52134-94-0123 (LABORATORY NUMBER)
Enron Oil Canada Ltd. (OPERATOR)			1 of 4 (PAGE)
LSD 14-36-020-01 W4M (LOCATION)	CDN Land Medicine Hat 14-36-020-01 (WELL OR SAMPLE LOCATION)		727.48 (KB ELEV (m)) / 723.18 (GR ELEV)
Medicine Hat, Alberta (FIELD OR AREA)	Nisku (POOL OR ZONE)	Alpine (SAMPLER)	
DST #2 (TEST TYPE & NO.)	TOOL: 2000cc of water (TEST RECOVERY)		
DST Chamber (POINT OF SAMPLE)		AMT. & TYPE CUSHION	@ MUD RESISTIVITY

1180 - 1203 (TEST INTERVAL (meters))	PUMPING	FLOWING	GAS LIFT	SWAB
	WATER m^3/d	OIL m^3/d	GAS	

Pressures, kPa (gauge)

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

Temperatures, °C

SEPARATOR	

94 01 15 (DATE SAMPLED (Y/M/D))	94 01 21 (DATE RECEIVED (Y/M/D))	94 01 28 (DATE ANALYZED (Y/M/D))	GA (ANALYST)	(SIGNATURE)

The following data was compiled from the DST Chamber.

The recovery was determined as being:

2000cc of Water.

The gas was not analyzed as per the clients request.

Western Atlas Canada Ltd.

ADVANCED TECHNOLOGY CENTRE

WATER ANALYSIS

024 (CONTAINER IDENTITY)	52134-94-0123 (LABORATORY NUMBER)
Enron Oil Canada Ltd. (OPERATOR)	2 of 4 (PAGE)
LSD 14-36-020-01 W4M (LOCATION)	CDN Land Medicine Hat 14-36-020-01 (WELL OR SAMPLE LOCATION)
727.48 (KB ELEV (m))	723.18 (GR ELEV.)
Medicine Hat, Alberta (FIELD OR AREA)	Nisku (POOL OR ZONE)
Alpine (SAMPLER)	
DST #2 (TEST TYPE & NO.)	(TEST RECOVERY)
DST Chamber (POINT OF SAMPLE)	(AMT & TYPE CUSHION)
(MUD RESISTIVITY)	
1180 -1203 (TEST INTERVAL (meters))	PUMPING / FLOWING / GAS LIFT / SWAB
WATER m³/d	OIL m³/d
GAS -	
SEPARATOR	RESERVOIR
Pressures, kPa (gauge)	@ °C CONTAINER WHEN SAMPLED
@ °C CONTAINER WHEN RECEIVED	SEPARATOR
Temperatures, °C	
94 01 15 (DATE SAMPLED (Y/M/D))	94 01 21 (DATE RECEIVED (Y/M/D))
94 02 04 (DATE ANALYZED (Y/M/D))	LZ/MB (ANALYST)
(SIGNATURE)	

CATIONS

ION	mg/L	mg Fraction	meq/L
Na	5090	0.2864	221.4
K	220	0.0124	5.6
Ca	857	0.0482	42.8
Mg	185	0.0104	15.2
Ba			
Sr			
Fe	Pres.		
Mn			

ANIONS

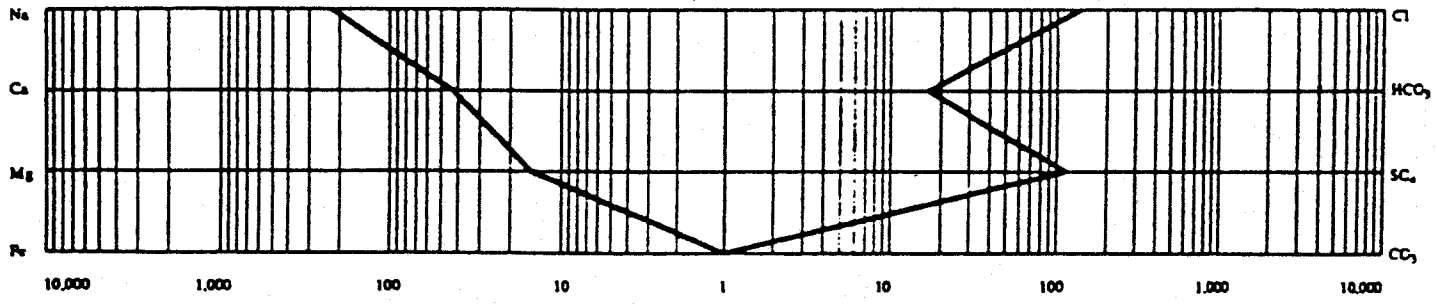
ION	mg/L	mg Fraction	meq/L
Cl	4901	0.2758	138.2
Br			
I			
HCO_3	1036	0.0583	17.0
SO_4	5481	0.3084	114.1
CO_3	0	0.0000	0.0
OH	0	0.0000	0.0
H_2S	N.D		

Total Solids (mg/L)

By Evaporation @ 110 °C	By Evaporation @ 18[illegible]
At Ignition	17770 Calculated
1.0139 @ 15.6 °C Specific Gravity	1.3328 @ 21 Refractive Index
7.3 pH	0.520 @ 2[illegible] Resistivity (Ohm-Meter)

LOGARITHMIC PATTERNS OF DISSOLVED IONS

(meq/L)



Remarks: N.D-Not Detected.

Pres.-Analyte Present.

Western Atlas Canada Ltd

Servicing & Depletion of Bottomhole Sampler

V5863 (CONTAINER IDENTITY)	52134-94-0123 (LABORATORY NUMBER)
Enron Oil Canada Ltd. (OPERATOR)	3 of 4 (PAGE)
LSD 14-36-020-01 W4M (LOCATION)	CDN Land Medicine Hat 14-36-020-01 (WELL OR SAMPLE LOCATION)
727.48 (KB ELEV (m))	723.18 (GR ELE)
Medicine Hat, Alberta (FIELD OR AREA)	Nisku (POOL OR ZONE)
Alpine (SAMPLER)	
DST #4 (TEST TYPE & NO)	TOOL: Gas Only (TEST RECOVERY)
DST Chamber (POINT OF SAMPLE)	(AMT. & TYPE CUSHION)
(MUD RESISTIVITY)	
1157 -1175 (TEST INTERVAL (meters))	PUMPING / FLOWING / GAS LIFT / SWAB
WATER m³/d	OIL m³/d
GAS	
SEPARATOR	RESERVOIR
● °C (CONTAINER WHEN SAMPLED)	<7 ● 22 °C (CONTAINER WHEN RECEIVED)
SEPARATOR	
Pressures, kPa (gauge)	Temperatures, °C
94 01 16 (DATE SAMPLED (Y/M/D))	94 01 21 (DATE RECEIVED (Y M/D))
94 01 28 (DATE ANALYZED (Y/M/D))	GA (ANALYST)
(SIGNATURE)	

The following data was compiled from the DST Chamber.

On arrival the opening pressure was <7 kPa @ 22.0 Deg. C.

The recovery was determined as being:

Gas Only.

The gas was not analyzed as per the clients request.

Western Atlas Canada Ltd.

CORE LABORATORIES
ADVANCED TECHNOLOGY CENTRE

WATER ANALYSIS

027 — CONTAINER IDENTITY

52134-94-0123 — LABORATORY NUMBER

Enron Oil Canada Ltd. — OPERATOR

4 of 4 — PAGE

LSD 14-36-020-01 W4M — LOCATION

CDN Land Medicine Hat 14-36-020-01 — WELL OR SAMPLE LOCATION

727.48 — KB ELEV (m)

723.18 — GR ELEV

Medicine Hat, Alberta — FIELD OR AREA

Nisku — POOL OR ZONE

Alpine — SAMPLER

DST #4 — TEST TYPE & NO

TEST RECOVERY

Bottom — POINT OF SAMPLE

AMT. & TYPE CUSHION

MUD RESISTIVITY

1157 -1175 — TEST INTERVAL (meters)

PUMPING | FLOWING | GAS LIFT | SWAB

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

SEPARATOR | RESERVOIR | CONTAINER WHEN SAMPLED °C | CONTAINER WHEN RECEIVED °C

Pressures, kPa (gauge)

SEPARATOR

Temperatures, °C

94 01 16 — DATE SAMPLED (Y/M/D)

94 01 21 — DATE RECEIVED (Y/M/D)

94 02 04 — DATE ANALYZED (Y/M/D)

LZ/MB — ANALYST

SIGNATURE

CATIONS

ION	mg/L	mg Fraction	meq/L
Na	7140	0.2858	310.6
K	440	0.0176	11.3
Ca	1265	0.0506	63.1
Mg	351	0.0141	28.9
Ba			
Sr			
Fe	Trace		
Mn			

ANIONS

ION	mg/L	mg Fraction	meq/L
Cl	9151	0.3663	258.1
Br			
I			
HCO_3	2015	0.0807	33.0
SO_4	4620	0.1849	96.2
CO_3	0	0.0000	0.0
OH	0	0.0000	0.0
H_2S	N.D		

Total Solids (mg/L)

By Evaporation @ 110 °C

By Evaporation @ 180 °C

At Ignition

24982 — Calculated

1.0190 @ 15.6 °C — Specific Gravity

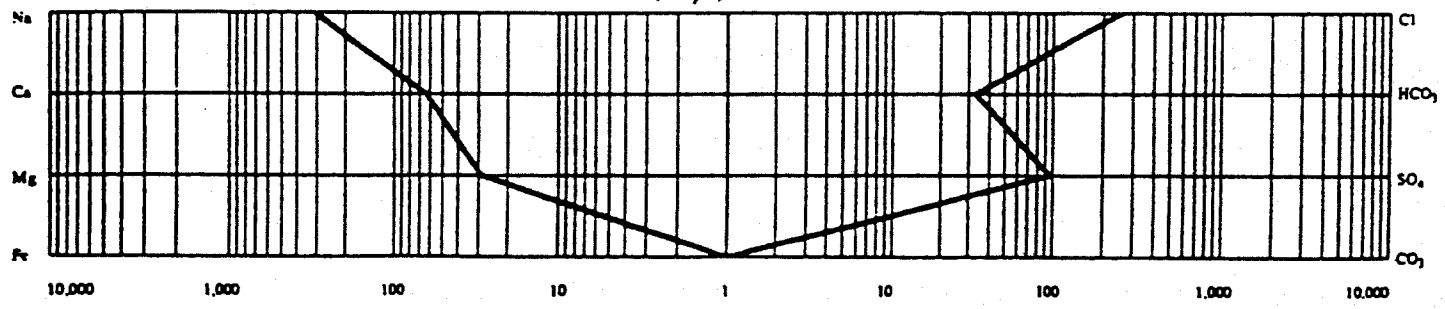
1.3339 @ 21 °C — Refractive Index

6.9 — pH

0.440 @ 25 °C — Resistivity (Ohm-Meters)

LOGARITHMIC PATTERNS OF DISSOLVED IONS

(meq/L)



Remarks:

APPENDIX C3

CORING ACTIVITIES
CDN LAND MEDHAT 14-36-20-1W4
MEDICINE HAT, ALBERTA, CANADA

Topical Report RSI-0497

by

Tim J. Vogt
RE/SPEC Inc.
P.O. Box 725
Rapid City, South Dakota 57709

prepared for

Enron Gas Services Corporation
1400 Smith Street
Suite 4804
Houston, TX 77002

February 1994

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2.0 FIELD PROCEDURES 2

3.0 CORING DESCRIPTION 3

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3-2	CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc.	8

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1.0 INTRODUCTION

Enron Gas Services Company is evaluating underground natural gas storage in solution-mined wells in the bedded salt of the Prairie Evaporite Formation in Southeastern Alberta.

The CDN LAND MEDHAT 14-36-20-1W4 Well, located in Alberta approximately 12 kilometers northwest of Burstall, Saskatchewan, is being drilled to investigate the evaporite section. Core samples were collected from the lower portion of the Beaverhill Lake sequence, First Red Bed, Dawson Bay Formation, Second Red Bed, Prairie Evaporite Formation, and the uppermost Winnipegosis Formation. The cored samples will be used to provide information on lithology and impurities and to provide samples to be used to determine mechanical, chemical, and mineralogical properties of the evaporite sequence.

RE/SPEC Inc. was engaged to participate in the field examination and logging of the core. In addition to examining and logging the core, Mr. Tim Vogt from RE/SPEC Inc. prepared samples for shipment to Calgary and then to RE/SPEC's laboratory in Rapid City, South Dakota. The field examination and logging was carried out in cooperation with Mr. William Baillie, consulting geologist.

Prior to RE/SPEC's arrival, two core runs had been completed in the upper Nisku Formation. A total of four trips were made into the hole to retrieve core from the lower Beaverhill Lake sequence through the upper Winnipegosis between January 21 and January 23, 1994. Approximately 89.6 meters of core was recovered between the depths of 1,613.00 meters and 1,704.00 meters. All core was labeled, field logged, and photographed. The core was packaged for shipment to Core Laboratories in Calgary where a complete photographic record was completed. The core was repackaged for shipment to RE/SPEC's office in Rapid City, South Dakota.

Chapter 2.0 of this report describes the procedures used and activities completed at the field site in support of the coring. Chapter 3.0 is a description of the coring operation. Appendix A is made up of the field logs describing the core and Appendix B includes photographs of the core taken in the field.

2.0 FIELD PROCEDURES

All activities completed at the field site are in accordance with the following RE/SPEC procedures or as modified in accordance with specific directives of the personnel on site.

- **Test Procedure 01 (TP-01)**, 9/21/87, RSI Standard Procedure for SAMPLE ACQUISITION, STORAGE, and SHIPPING, Revision 3.
- **Test Procedure 09 (TP-09)**, 9/21/87, RSI Standard Procedure for LOGGING AND PRESERVING ROCK CORE AT A FIELD SITE, Revision 1.

The coring assembly was 27 meters in length. The core was removed from the inner tube of the core barrel on the drill rig floor. In most cases, particularly for nonsalt core portions, the core was in pieces short enough to be easily handled. Some portions of the core were manually broken into segments which could be safely handled. All of the core was hand-carried off the floor of the rig and laid out in the proper sequence in a heated core van near the drill rig for examination and logging.

The individual pieces of core were "reassembled" as well as possible so that a valid measurement of the actual length of the core could be obtained. Each piece of core was marked with a sequential number, beginning with the top-most piece for identification. The nominal depth of the core in meters was marked on the core. Two colored parallel lines were also scribed on the core to maintain orientation of the pieces. The core was measured and the length and depth of each individual piece recorded. All depths recorded are measured from the Kelly Bushing. Photographs were taken of the core to aid in the recording of lithology and petrographic features and for quality assurance. A brief petrographic description was completed for comparison with downhole geophysical logs.

All core was first wrapped in Saran Wrap™, sleeved in polyethylene tubing, and carefully wrapped in protective "bubble-pak" material (nonsalt core was not wrapped in Saran Wrap™). This entire package was placed snugly in 6-inch-diameter PVC tubing cut to length for the piece or pieces to be included. End caps and tape secured the core from shifting during shipment. This method of packaging core for shipment yields excellent results in providing core protection and preservation.

The core was delivered to Core Laboratories in Calgary, Alberta, by the driver of the core van late on January 23, 1994. On January 25–27, 1994, all of the core was unpacked, reassembled in proper sequence, and photographed. The photography performed by Core Laboratories was required as a condition of the permit to remove the core from Canada. This photography could only be produced practically in the laboratory setting. Upon the completion of this photography, all core was repackaged for shipment to RE/SPEC's laboratory in Rapid City, South Dakota.

3.0 CORING DESCRIPTION

Two trips into the drill hole had been completed earlier to recover samples of the Nisku Formation. Therefore, the coring activities described in this report begin with Core Run Number 3.

The coring assembly was capable of recovering 27 meters of core in one trip. All core was nominally 102 mm (4 inches) in diameter. Run 3 was recovered at the surface at 8:00 a.m. on January 22, 1994. Drilling and tripping times were quite short resulting in the recovery of three 27 meter-length runs being recovered at the surface in less than 24 hours. The final core run, Run 6, was approximately 10 meters in length. Run 6 was recovered at the surface at about 1:00 p.m. on January 23, 1994.

The top of Core Run 3 is at a depth of 1,613.00 meters below the Kelly Bushing. The depths reported here have not been corrected with subsequent wireline depths. Run 3 included (in descending order) the base of the Beaverhill Lake sequence, First Red Bed, Dawson Bay Formation, Second Red Bed, and the top-most part of the Prairie Evaporite Formation. Runs 4 and 5 included only Prairie Evaporite Formation and Run 6 included the remainder of the Prairie Evaporite Formation and the top-most portion of the Winnipegosis Formation.

The top of Run 3, the Beaverhill Lake sequence, consists of dolomite; light brown to buff, slightly fossiliferous with an indistinct chickenwire texture and minor anhydrite clasts. The base of this unit was located at 1,615.03 meters below the Kelly Bushing.

The First Red Bed, located between the depths of 1,615.03 and 1,617.30 meters, consists of medium gray dolomitic shale. This unit is quite dense and competent-appearing but does tend to break along bedding planes, particularly as the core dries slightly.

The Dawson Bay Formation is generally a mottled light brown dolomite; massive in appearance. Near the top of this unit some vugular areas which may represent healed brecciation are infilled with halite. Near the base of this unit some slight very thin bedding is present as it grades into the unit below. The Dawson Bay Formation extends from 1,617.30 meters to 1,626.15 below the Kelly Bushing.

The Second Red Bed is found between 1,626.15 meters and 1,633.90 meters below the Kelly Bushing. The top of this calcareous to dolomitic shale unit is gray and quite massive in appearance, grading to reddish and bedded or laminated near the base. Like the First Red Bed, as the core dries the shaly nature of this unit results in many partings which divide the core into thin disks.

The Prairie Evaporite is located between 1,633.90 meters and 1,700.70 meters below the Kelly Bushing. This unit is predominately salt which varies in color from colorless (clear) to slightly gray to strongly salmon-orange. Most of the color variation is due to inclusions of nonhalite material, some slight amounts of red and gray-green clay, and probably some potash minerals. Some of the salt had a preferentially etched appearance which also suggests the presence of nonhalite minerals. The grain sizes which were observed are fairly large, generally ranging from 10 mm to 30 mm. Some grains are significantly larger. In general, the salt is fairly uniform in appearance and lacks some of the interbedded mudstones which many bedded salts exhibit. Some very thin beds of anhydrite or dolomite are present and a few very thin clay beds are present throughout. The base of the massive salt is at about 1,690.00 meters of depth. Below that point the salt is interbedded with dolomitic material.

The upper portion of the Winnipegosis Formation was encountered from 1,700.70 to 1,704.00 meters below the Kelly Bushing. The Winnipegosis is a compact light brown dolomite with some salt filled vugs.

All core had been logged, field photographed, and securely packaged for shipment by about 7:00 p.m. on January 23, 1994. The core was delivered by heated van to Core Laboratories in Calgary that evening. On January 25–27, 1994, under the supervision of Mr. Vogt, the core was unpacked, reassembled, and photographed under more controlled conditions to meet requirements. Finally, the core was securely repacked for shipment to the RE/SPEC laboratory in Rapid City, South Dakota.

Field notes which briefly describe the core for each run are included as Appendix A. Photographs of the core in each run are included in Appendix B. Figure 3-1 illustrates the cored portion of the CDN LAND MEDHAT 14-36-20-1W4 Well. Information in this figure includes:

- Formations cored
- Depth
- Gamma ray and velocity logs
- Core run intervals
- Lithology.

Figure 3-2 illustrates lithologic details of the Prairie Evaporite interval.

Table 3-1 provides the depths and coring dates for each core run. Table 3-2 describes each of the samples shipped to Rapid City for testing and storage.

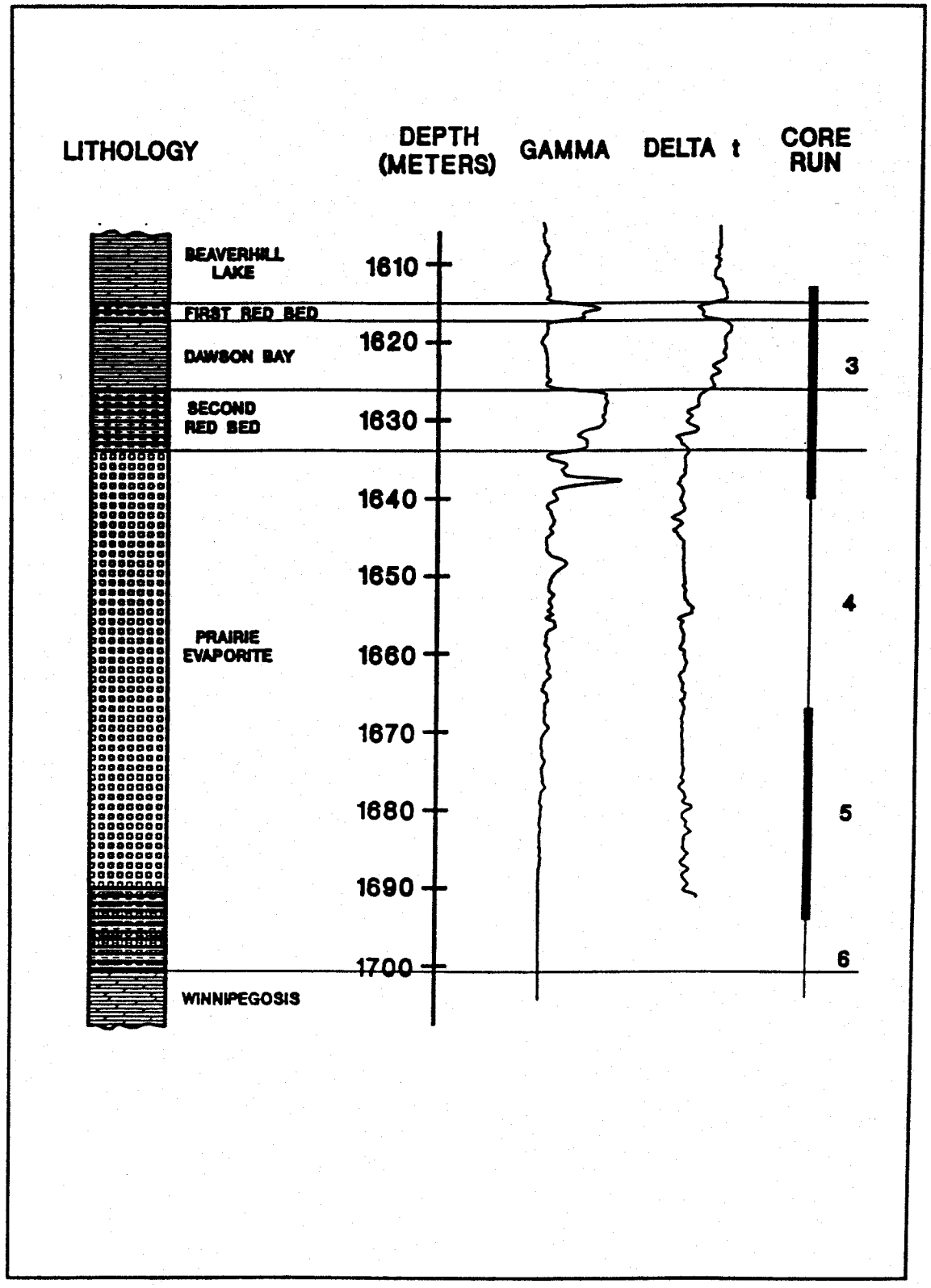


Figure 3-1. CDN LAND MEDHAT 14-36-20-1W4 Well Logs and Core Intervals.

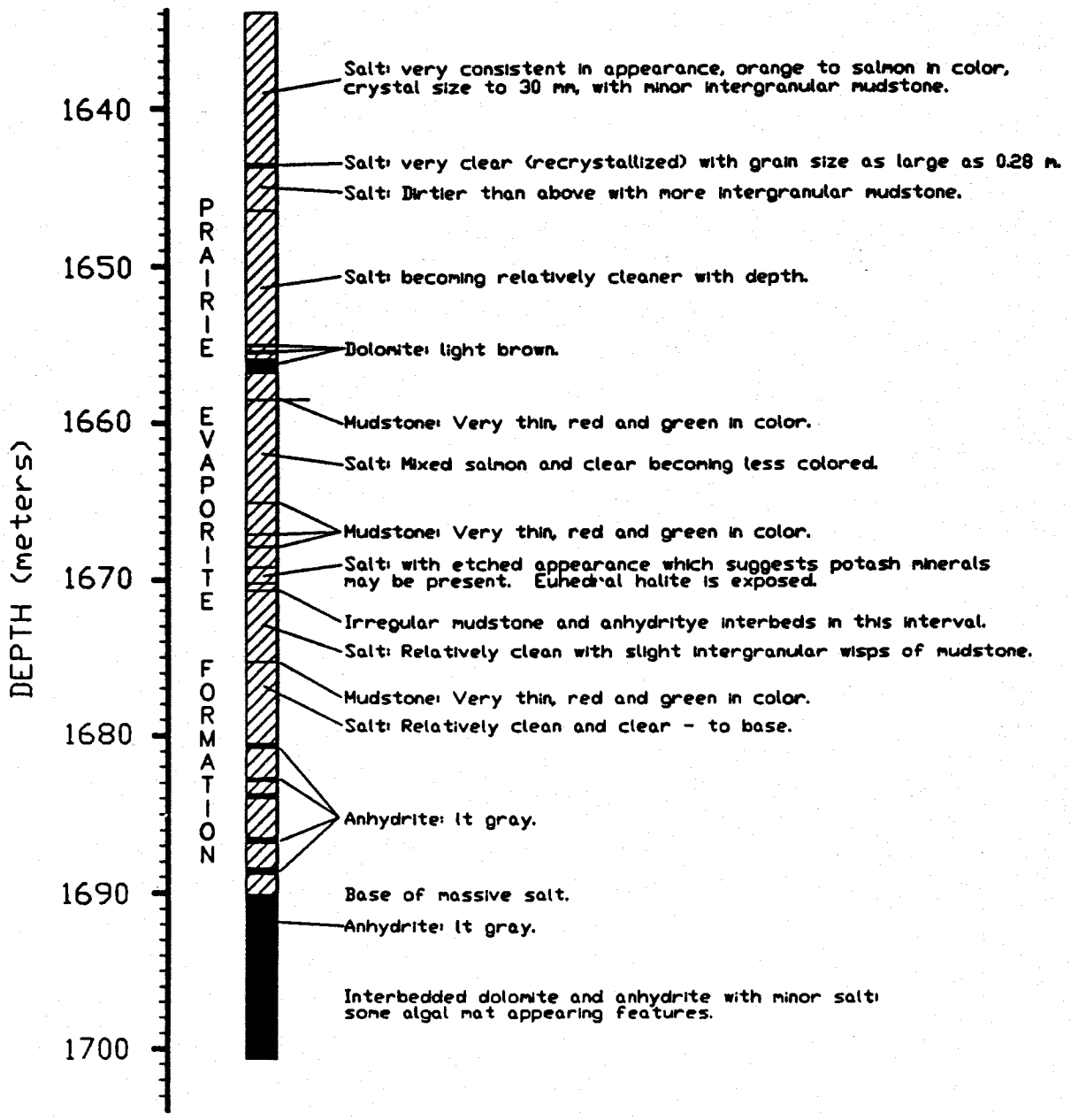


Figure 3-2. Detailed Lithology of Prairie Evaporite for CDN LAND MEDHAT 14-36-20-1W4 Well.

Table 3-1. Nominal Depths and Coring Dates for Each Core Run From the CDN LAND MEDHAT 14-36-20-1W4 Well

Core Run	Date	Top of Interval (Meters)	Base of Interval (Meters
3	1/22/94	1,613	1,640
4	1/22/94	1,640	1,667
5	1/23/94	1,667	1,694
6	1/23/94	1,694	1,704

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 1 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
3	1	1,613.00	0.62	B
3	2	1,613.62	1.13	B
3	3	1,614.75	1.04	B/1
3	4	1,615.79	0.15	1
3	5	1,615.94	0.69	1
3	6	1,616.63	0.06	1
3	7	1,616.69	0.06	1
3	8	1,616.75	0.05	1
3	9	1,616.80	0.15	1
3	10	1,616.95	0.77	1/D
3	11	1,617.72	0.38	D
3	12	1,618.10	0.66	D
3	13	1,618.76	0.22	D
3	14	1,618.98	0.55	D
3	15	1,619.53	0.30	D
3	16	1,619.83	0.21	D
3	17	1,620.04	0.67	D
3	18	1,620.71	0.41	D
3	19	1,621.12	0.58	D
3	20	1,621.70	0.13	D
3	21	1,621.83	0.67	D
3	22	1,622.50	0.10	D
3	23	1,622.60	0.04	D
3	24	1,622.64	0.29	D
3	25	1,622.93	0.31	D

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 2 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
3	26	1,623.24	0.05	D
3	27	1,623.29	0.68	D
3	28	1,623.97	0.08	D
3	29	1,624.05	0.42	D
3	30	1,624.47	0.24	D
3	31	1,624.71	0.09	D
3	32	1,624.80	0.30	D
3	33	1,625.10	0.07	D
3	34	1,625.17	0.10	D
3	35	1,625.27	0.06	D
3	36	1,625.33	0.10	D
3	37	1,625.43	0.28	D
3	38	1,625.71	0.44	D
3	39	1,626.15	0.55	2
3	40	1,626.70	1.13	2
3	41	1,627.83	0.13	2
3	42	1,627.96	1.09	2
3	43	1,629.05	0.10	2
3	44	1,629.15	0.06	2
3	45	1,629.21	0.14	2
3	46	1,629.35	0.14	2
3	47	1,629.49	0.60	2
3	48	1,630.09	0.08	2
3	49	1,630.17	0.23	2
3	50	1,630.40	0.28	2

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 3 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
3	51	1,630.68	0.21	2
3	52	1,630.89	0.09	2
3	53	1,630.98	0.04	2
3	54	1,631.02	0.23	2
3	55	1,631.25	0.28	2
3	56	1,631.53	0.45	2
3	57	1,631.98	0.14	2
3	58	1,632.12	0.22	2
3	59	1,632.34	0.20	2
3	60	1,632.54	0.20	2
3	61	1,632.74	0.08	2
3	62	1,632.82	0.08	2
3	63	1,632.90	0.27	2
3	64	1,633.17	0.19	2
3	65	1,633.36	0.19	2
3	66	1,633.55	0.06	2
3	67	1,633.61	0.10	2
3	68	1,633.71	0.09	2
3	69	1,633.80	0.60	P
3	70	1,634.40	1.23	P
3	71	1,635.63	1.17	P
3	72	1,636.80	0.79	P
3	73	1,637.59	1.03	P
3	74	1,638.62	0.10	P
4	75	1,640.00	0.85	P

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 4 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
4	76	1,640.85	1.36	P
4	77	1,642.21	1.28	P
4	78	1,643.49	0.28	P
4	79	1,643.77	0.72	P
4	80	1,644.49	0.45	P
4	81	1,644.94	0.16	P
4	82	1,645.10	0.43	P
4	83	1,645.53	0.94	P
4	84	1,646.47	0.20	P
4	85	1,646.67	0.80	P
4	86	1,647.47	1.31	P
4	87	1,648.78	0.83	P
4	88	1,649.61	1.29	P
4	89	1,650.90	0.22	P
4	90	1,651.12	1.23	P
4	91	1,652.35	0.48	P
4	92	1,652.83	1.28	P
4	93	1,654.11	0.61	P
4	94	1,654.72	1.28	P
4	95	1,656.00	0.09	P
4	96	1,656.09	0.28	P
4	97	1,656.37	0.23	P
4	98	1,656.60	0.57	P
4	99	1,657.17	1.21	P
4	100	1,658.38	0.12	P

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 5 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
4	101	1,658.50	0.58	P
4	102	1,659.08	1.26	P
4	103	1,660.34	0.51	P
4	104	1,660.85	0.76	P
4	105	1,661.61	1.34	P
4	106	1,662.95	1.30	P
4	107	1,664.25	0.34	P
4	108	1,664.59	1.24	P
4	109	1,665.83	1.25	P
4	110	1,667.08	0.43	P
5	111	1,667.00	0.13	P
5	112	1,667.13	0.59	P
5	113	1,667.72	1.48	P
5	114	1,669.20	0.90	P
5	115	1,670.10	0.70	P
5	116	1,670.80	1.34	P
5	117	1,672.14	1.23	P
5	118	1,673.37	1.27	P
5	119	1,674.64	1.20	P
5	120	1,675.84	1.28	P
5	121	1,677.12	1.38	P
5	122	1,678.50	0.96	P
5	123	1,679.46	1.11	P
5	124	1,680.57	0.89	P
5	125	1,681.46	1.24	P

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 6 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
5	126	1,682.70	0.55	P
5	127	1,683.25	0.33	P
5	128	1,683.58	0.32	P
5	129	1,683.90	1.20	P
5	130	1,685.10	1.26	P
5	131	1,686.36	0.77	P
5	132	1,687.13	1.31	P
5	133	1,688.44	0.36	P
5	134	1,688.80	0.89	P
5	135	1,689.69	0.41	P
5	136	1,690.10	0.70	P
5	137	1,690.80	0.30	P
5	138	1,691.10	0.42	P
5	139	1,691.52	0.36	P
5	140	1,691.88	0.53	P
5	141	1,692.41	0.70	P
5	142	1,693.11	0.16	P
5	143	1,693.27	0.12	P
5	144	1,693.39	0.04	P
6	145	1,694.00	0.62	P
6	146	1,694.62	1.10	P
6	147	1,695.72	0.92	P
6	148	1,696.64	1.04	P
6	149	1,697.68	1.13	P
6	150	1,698.81	1.10	P

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

Table 3-2. CDN LAND MEDHAT 14-36-20-1W4 Well Samples Shipped to RE/SPEC Inc. (Page 7 of 7)

Core Run	Piece	Top (Meters)	Length (Meters)	Unit[a]
6	151	1,699.91	0.53	P
6	152	1,700.44	0.34	P
6	153	1,700.78	1.09	W
6	154	1,701.87	0.31	W
6	155	1,702.18	0.42	W
6	156	1,702.60	0.71	W
6	157	1,703.31	0.45	W
6	158	1,703.76	0.10	W
6	159	1,703.86	0.10	W

(a) B=Beaverhill Lake; 1=First Red Bed; D=Dawson Bay; 2=Second Red Bed; P=Prairie Evaporite; W=Winnipegosis.

APPENDIX A

FIELD LOGS AND CORE DESCRIPTION

Run #3

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. Cdn. Land Medicine Hat 14-36 PAGE 1 OF

WELL OWNER Ennon Oil of Canada
SUPERVISED BY Roy Dacken
PROPERTY 14-36-20-1W4
LOCATION North of AB 545 9.2Km
East of 41 4.1Km
COORD - WELL HEAD —
ELEV. - WELL HEAD —
gnd WELL HEAD - KB DIST. 4.3 or 4.6 m
DEPTH MEASURED FROM KB
RIG precision #5
CORED BY John - Diamond-Boart
NOTES 00/14-36-020-01 W4/0

WELL I.D. Cdn Land Med Hat 14-36
BEARING 0
INCLINATION 0
CORE BARREL LENGTH 27 metres
CORE DIAMETER 4 inches (4")
TOP CORE INTERVAL 1613 m
BOTTOM CORE INTERVAL 1640
LENGTH CORED INTERVAL 27m -
RECOVERY 25.72 m
TIME RECOVERED 8:00 am
DATE RECOVERED 1-22-94
LOGGED BY TJV

40
630.72
1.28

GENERAL	DEPTH	LENGTH	#		ROD		DESCRIPTION
	1613		1				
Beaverhill Lake				.62		pw	drill bit nipple @ top
							(1) ~~Core~~ 1613 - 1613.62 Plane of weakness
dolomitic, sl. fossiliferous compact w/ anhydrite knots lt brown on surface v. dk grey clay-like texture	1614	1.0	2				
							(2) 1613.62 - 1614.75 shale parting + horiz. cavitation
	1615	2.0					
1615.03			3				
131 Red bed							
mid grey dolomitic shale - v. competent w/ sl. vert parting & rocks - hard.	1616	3.0	4				(3) 1614.75 - 1615.79 - no obvious -
							(4) 1615.79 - 1615.94 - parting
			5				(5) 1615.94 - 1616.63 5°
			6				(6) 1616.63 - 1616.69 hori
	1617	4.0	7 8 9				(7) 1616.69 - 1616.75 core down
1617.3							(8) 1616.75 - 1616.80 curved
			10				(9) 1616.80 - 1616.95 "
Dawson Bay							
light brown dolomite	1618	5.0	11				(10) 1616.95 - ~~1617.97~~ 1617.72
							(11) 1617.72 - 1618.1
some brecciated zone top w/ salt infilling. generally compact			12				(12) 1618.1 - 1618.76
	1619	6.0	13				(13) 1618.76 - 1618.98
			14				(14) 1618.98 - 1619.53
			15				(15) 1619.53 - 1619.83
	1620	7.0	16				(16) 1619.83 1620.04

Run 3

Run 1

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. _____

GENERAL	DEPTH	LENGTH	#	RQD	DESCRIPTION
		7.0	17		(17) 1620.04 – 1620.71
Some bedding is evident as "shale partings"					(18) 1620.71 – 1621.12
	1621	0.0	18		(19) 1621.12 – 1621.70
			19		(20) 1621.70 – 1621.83
			20		(21) 1621.83 – 1622.50
	1622	9.0	21		(22) 1622.50 – 1622.60
			22 23		(23) 1622.60 – 1622.64
			24		(24) 1622.64 – 1622.93
	1623	6.0	25 26		(25) 1622.93 1623.24
			27		(26) 1623.24 – 1623.29
	1624	11	28 29 30 31		(27) 1623.29 – 1623.97
	1625	12	32 33 34 35 36 37		28 1623.97 – 1624.05 29 1624.05 – 1624.47 30 1624.47 – 1624.71 31 1624.71 – 1624.80 32 1624.80 – 1625.10 33 1625.10 – 1625.17 34 1625.17 – 1625.27 35 1625.27 – 1625.33 36 1625.33 1625.43 37 1625.43 1625.71 38 1625.71 1626.15 39 1626.15 1626.70 40 1626.70 – 1627.83
1626.13 2nd Red Bed	1626	13	38 39		
To 1629' fg massive calcareous shale - V. rough surface texture – turns red dish more shaly bedding -	1627	14	40		
	1628	15	41 42		(41) 1627.83 – 1627.96 42 1627.96 1629.05 43 1629.05 1629.15 44 1629.15 1629.21 45 1629.21 1629.35 46 1629.35 – 1629.49
	1629	16	43 44 45 46		

angle

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. Run #3

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
			47				47 1629.99 - 1630.09
	1630	17	48				48 1630.09 - 1630.17
			49				49 1630.17 - 1630.40
			50				50 1630.40 - 1630.68
Several additional breaks in packing			51				51 1630.68 - 1630.89
	1631	18	52 53				52 1630.89 - 1630.98
			54				53 1630.98 - 1631.02
			55				54 1630.02 - 1631.25
			56				55 1630.25 - 1631.53
	1632	19	57				56 1631.53 - 1631.98
			58				57 1631.98 - 1632.12
			59				58 1632.34 - 1632.34
			60 61				59 1632.54 - 1632.54
	1633	20	62				60 1632.54 - 1632.74
			CW/CS				61 1632.74 - 1632.82
			66				62 1632.82 - 1632.90
1633.90			67 68				63 1632.90 - 1633.17
Top Salt	1634	21	69				64 }
Salt w/ strong salmon coloration, some cms, not large xtals - ingneral.							65 } 1633.17 - 1633.55
							66 1633.55 - 1633.61
							67 1633.61 - 1633.71
	1635	22	70				68 1633.71 - 1633.80
							69 1633.80 - 1634.40
							70 1634.40 - 1635.63
quite consistent looking bedded appearance -	1636	23	71				71 1635.63 - 1636.80
							72 1636.80 - 1637.54
	1637	24	72				73 1637.54 - 1638.62
							74 1638.62 - 1638.72
	1638	25	73				
			74				Total Core 1638.72.
	1639	26					

Run # 4

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. Cdn Lond Med Hat 14-36 PAGE 1 OF 4

WELL OWNER Enron Oil of Canada
SUPERVISED BY Ray Docken
PROPERTY 14-36-20-1W4
LOCATION NE of Burstall Sask
COORD - WELL HEAD —
ELEV. - WELL HEAD —
WELL HEAD - KB DIST. 4.3 or 4.6
DEPTH MEASURED FROM KB
RIG Precision #5
CORED BY Diamond Boart - John
NOTES

WELL I.D. ~~00~~/14-36-020-01-4/0
BEARING 0
INCLINATION 0
CORE BARREL LENGTH 27 m
CORE DIAMETER 4"
TOP CORE INTERVAL 1640
BOTTOM CORE INTERVAL 1669
LENGTH CORED INTERVAL 27
RECOVERY 25.51
TIME RECOVERED 16:30
DATE RECOVERED 1-22-94
LOGGED BY TPI

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
Salt - "all" orange variable some opaque to light.	1640		75				75 #1640.0 - 1640.85
	1641	1	76				
	1642	2					76 1640.85 - 1642.21
			77				77 1642.21 - 1643.49
	1643	3					
V clean salt (#78)			78				78 1643.49 - 1643.77
	1644	4	79				79 1643.77 - 1644.49
Bright garnet dirty - salt mostly ms.			80				(80) 1644.49 - 1644.94
	1645	5	81				(81) 1644.94 - 1645.1
			82				(82) 1645.1 - 1645.53
	1646	6	83				(83) 1645.53 - 1646.47
			84				(84) 1646.47 - 1646.67
clean -			85				85 1646.67 - 1647.47
	1647	7					

Run R 4

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. _____

GENERAL	DEPTH	LENGTH	#	RQD	DESCRIPTION
relatively clean w/ various calcareous/anhydrite stringers	1648	8	85		(85) 1647.47 – 1648.78
	1649	9	87		(87) 1648.78 – 1649.61
			88		(88) 1649.61 – 1650.90
	1650	10			
	1651	11	89		(89) 1650.90 – 1651.12
			90		(90) 1651.12 – 1652.35
	1652	12			
			91		(91) 1652.35 – 1652.83
	1653	13	92		(92) 1652.83 – 1654.11
	1654	14	93		(93) 1654.11 – 1654.72
Begin Stringers → 1655.0 – 1655.06 1655.4 – 1655.55 1655.9 – 1656.80	1655	15	94		(94) 1654.72 – 1656.0
	1656	16	95		(95) 1656.0 – 1656.09
			96		(96) 1656.09 – 1656.37
			97		(97) 1656.37 – 1656.60

Run # 4

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. _____

PAGE 3 OF 4

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
phd string #3			98				(98) 1656.60 - 1657.17
Salt	1657	17					
			99				(99) 1657.17 - 1658.38
	1658	18					
			100				(100) 1658.38 - 1658.50
MS stringer →			101				(101) 1658.50 - 1659.08
	1659	19	102				(102) 1659.08 1660.34
	1660	20					
			103				(103) 1660.34 - 1660.85
	1661	21	104				(104) 1660.85 - 1661.61
			105				(105) 1661.61 - 1662.95
	1662	22					
	1663	23	(106)				(106) 1662.95 - 1664.25
	1664	24					
			107				(107) 1664.25 - 1664.59
			108				(108) 1664.59 - 1665.83
MS @ 15-20°	1665	25					(109) 1665.83 - 1667.08
(brick)							
	1666	26	109				

Run 4

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL ID. _____

PAGE 4 OF 4

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
MS	1667	2.7	109 110				(110) 1667.08 – 1667.37
		2.6					Recovered 27.51
							assumed 1640 top – probable that ≈ .8m of this core belongs w/ Run 1

Run # 5

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL ID. Can Land Med Hat 14-36 PAGE 1 OF 4

WELL OWNER Essex / Can Land Med Hat
SUPERVISED BY Ray Dodson
PROPERTY 14-36-20-1W4
LOCATION NW of Bassell SK.

COORD - WELL HEAD —
ELEV. - WELL HEAD —
WELL HEAD - KB DIST. 4.3 - 4.6 m
DEPTH MEASURED FROM KB
RIG Precision #5
CORED BY Diamond Board
NOTES

WELL I.D. 14-36-20-1W4
BEARING 0
INCLINATION 0
CORE BARREL LENGTH 27m.
CORE DIAMETER 4"
TOP CORE INTERVAL 1669
BOTTOM CORE INTERVAL 1696
LENGTH CORED INTERVAL 27m
RECOVERY 26.43
TIME RECOVERED 1130 hrs
DATE RECOVERED 1-23-94
LOGGED BY TJV

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
Salt... ms. clm.	1667		111 112				(111) 1667.0 - 1667.13
							(112) 1667.13 - 1667.72
V. even orangish color to salt v. few nodules impurities.	1668	1	113				(113) 1667.72 - 1669.2
							(114) 1669.2 - 1670.10
	1669	2	114				
several zones which have exposed euhedral salt xtals - dissolution pores?							
	1670	3	115				(115) 1670.10 - 1670.8
small irregular zones of red / green ms-w/ anhydrite							
	1671	4	116				(116) 1670.8 1672.14
quite clean - large xtals v. thin irregular ms/anhy shells not oriented. rotted?	1672	5	117				(117) 1672.14 - 1673.37
	1673	6					
			118				(118) 1673.37 - 1674.64
	1674	7					

Run # 5

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL ID. _____

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
			119				(119) 1674.64 - 1675.84
	1675	8					
Slickensided @ high angle & 45° and only @ 30°							
	1676	9	120				(120) 1675.84 - 1677.12
	1677	10	121				(121) 1677.12 - 1678.5
Salt losing color slowly	1678	11					
			122				(122) 1678.5 - 1679.46
	1679	12					
			123				(123) 1679.46 1680.57
V. little color (orange) in salt.	1680	13					
.3 m anhydrite/ carbonate.			124				(124) 1680.57 - 1681.46
	1681	14					
			125				(125) 1681.46 - 1682.7
clear salt	1682	15					
broken only? 2061			126				(126) 1682.7 - 1683.25
	1683	16					
			127				(127) 1683.25 - 1683.58

Run # 5

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. _____

GENERAL	DEPTH	LENGTH	#		ROD		DESCRIPTION
			128				(128) 1683.58 - 1683.90
anhydrite	1684	17	129				(129) 1683.90 - 1685.1
Clear salt - v. little anhyd							
	1685	18	130				(130) 1685.1 - 1686.36
	1686	19					
			131				(131) 1686.36 - 1687.13
anhydrite stringers	1687	20	132				(132) 1687.13 - 1688.44
	1688	21					
anhydrite			133				(133) 1688.44 - 1688.80
	1689	22	134				(134) 1688.8 - 1689.69
			135				(135) 1689.69 - 1690.1
Base of massive salt	1690	23	136				(136) 1690.1 - 1690.8
Top mostly anhyd / ddo? Chaotic bedding w/ minor salt.							(137) 1690.8 - 1691.1
	1691	24	137				
			138				(138) 1691.1 - 1691.52
			139				(139) 1691.52 - 1691.88
	1692	25	140				(140) 1691.88 - 1692.41
			141				(141) 1692.41 1693.11
	1693	26					

Run #5

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL ID. _____

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
	1694	27	142 143 144				(142) 1693.11 - 1693.27 (143) 1693.27 - 1693.39 (144) 1693.39 - 1693.43 Total Recov. 1693.43

Run # 6

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

WELL I.D. Cdn Land Mid Hat 14-36 PAGE 1 OF

WELL OWNER Encan
SUPERVISED BY Ray DocKin
PROPERTY 14-36-20-1W4
LOCATION NW of Bantry SK

COORD - WELL HEAD -
ELEV. - WELL HEAD -
WELL HEAD - KB DIST. 4.3 or 4.6
DEPTH MEASURED FROM KB
RIG Precision #5
CORED BY Diamond Base
NOTES

WELL I.D. 14-36-20-1W4
BEARING 0
INCLINATION 0
CORE BARREL LENGTH 27m
CORE DIAMETER 4"
TOP CORE INTERVAL 1694
BOTTOM CORE INTERVAL 1704
LENGTH CORED INTERVAL 10 m.
RECOVERY 9.96
TIME RECOVERED 13:00
DATE RECOVERED 1-23-94
LOGGED BY TJV

103.96

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
.07 dolomitic anhydrite	1694		145				(145) 1694.0 - 1694.62
.57 salt			146				(146) 1694.62 - 1695.72
.66 Dolo. mats salt filled	1695	1					
1.20 Banded mats			147				(147) 1695.72 - 1696.94
1.44 Dolo mats	1696	2					
1.69 salt							
1.99 mats & salt	1697	3	148				(148) 1696.94 - 1697.68
2.59 salt			149				(149) 1697.68 - 1698.81
2.69 Dolo.	1698	4					(150) 1698.81 - 1699.91
2.72 salt							(151) 1699.91 1700.44
3.30 dolo salt mat	1699	5	150				(152) 1700.44 1700.78
3.92 salt							(153) 1700.78 1701.87
3.98 compact dolo?	1700	6	151				(154) 1701.87 - 1702.18
3.60 salt & minor stringers							(155) 1702.18 1702.60
	1700.70		152				(156) 1702.60 1703.36
4.45			153				(157) 1703.36 1703.76
	1704	7					(158) 1703.76 1703.86
							(159) 1703.86 1703.96

4.45 mat
4.65 salt (1-2")
4.81 mat & salt
5.50 solid compact anhy.
6.70 dolo

Run # 6

RE/SPEC Inc.
3824 JET DRIVE
RAPID CITY, SOUTH DAKOTA

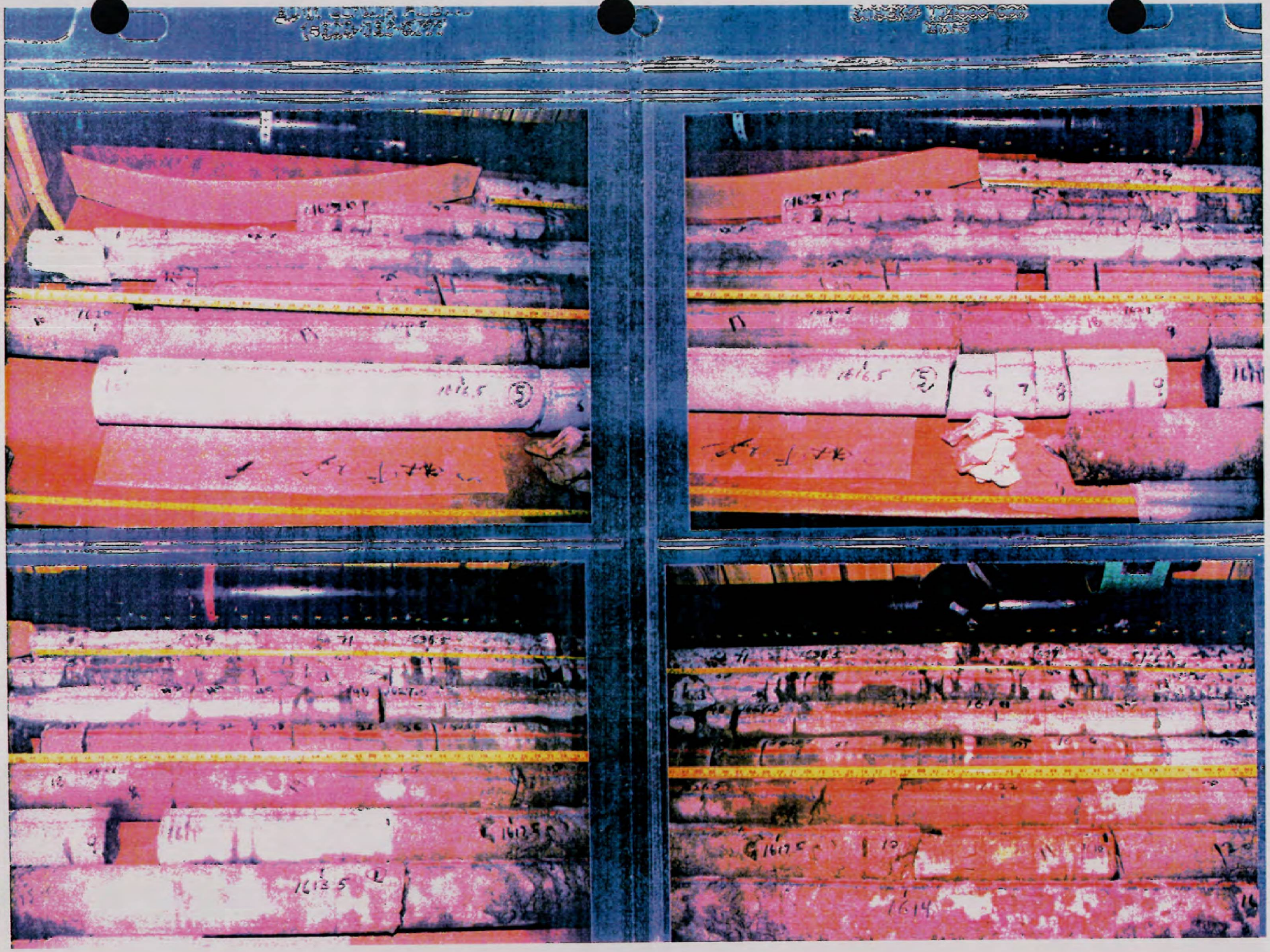
WELL I.D. _____

PAGE ___ OF ___

GENERAL	DEPTH	LENGTH	#		RQD		DESCRIPTION
6.70 dolo- Winnipeg	1702	8	154				
			155				
9.85 ?			156				
	1703	9					
			157				
			158				
			159				
	1704	10					
Winnipegosis compact dolomite w/ anhydrite TOP @ vuggular fossil space w/ salt water base							

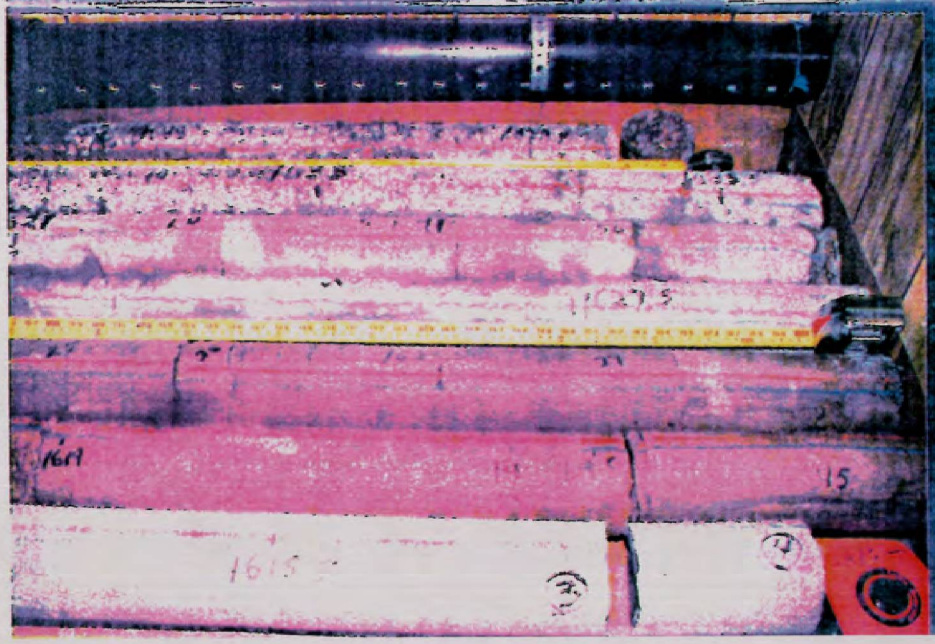
APPENDIX B

FIELD PHOTOGRAPHS OF CORE




1615


1615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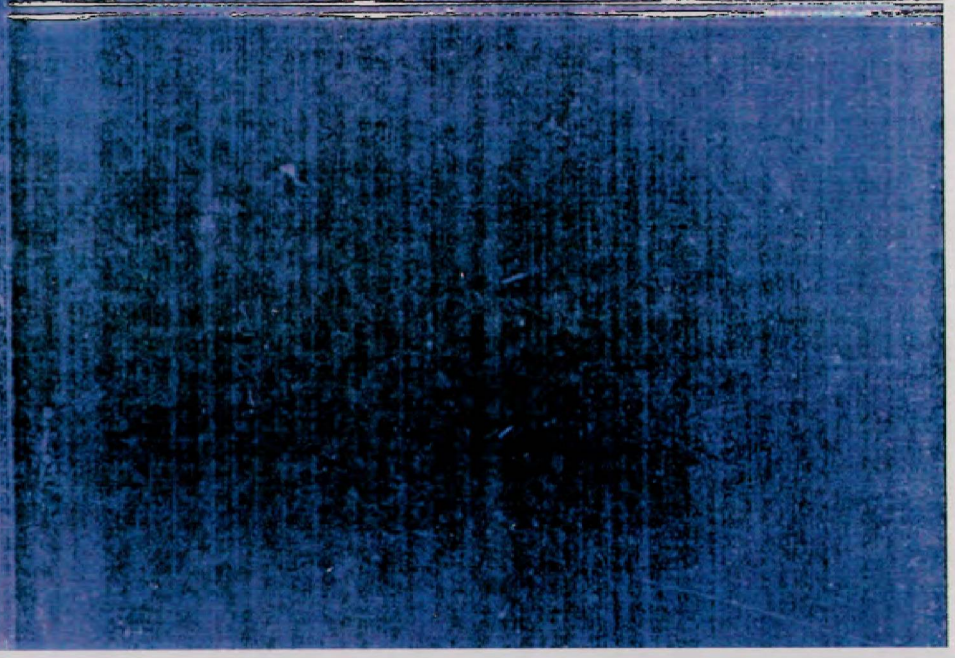

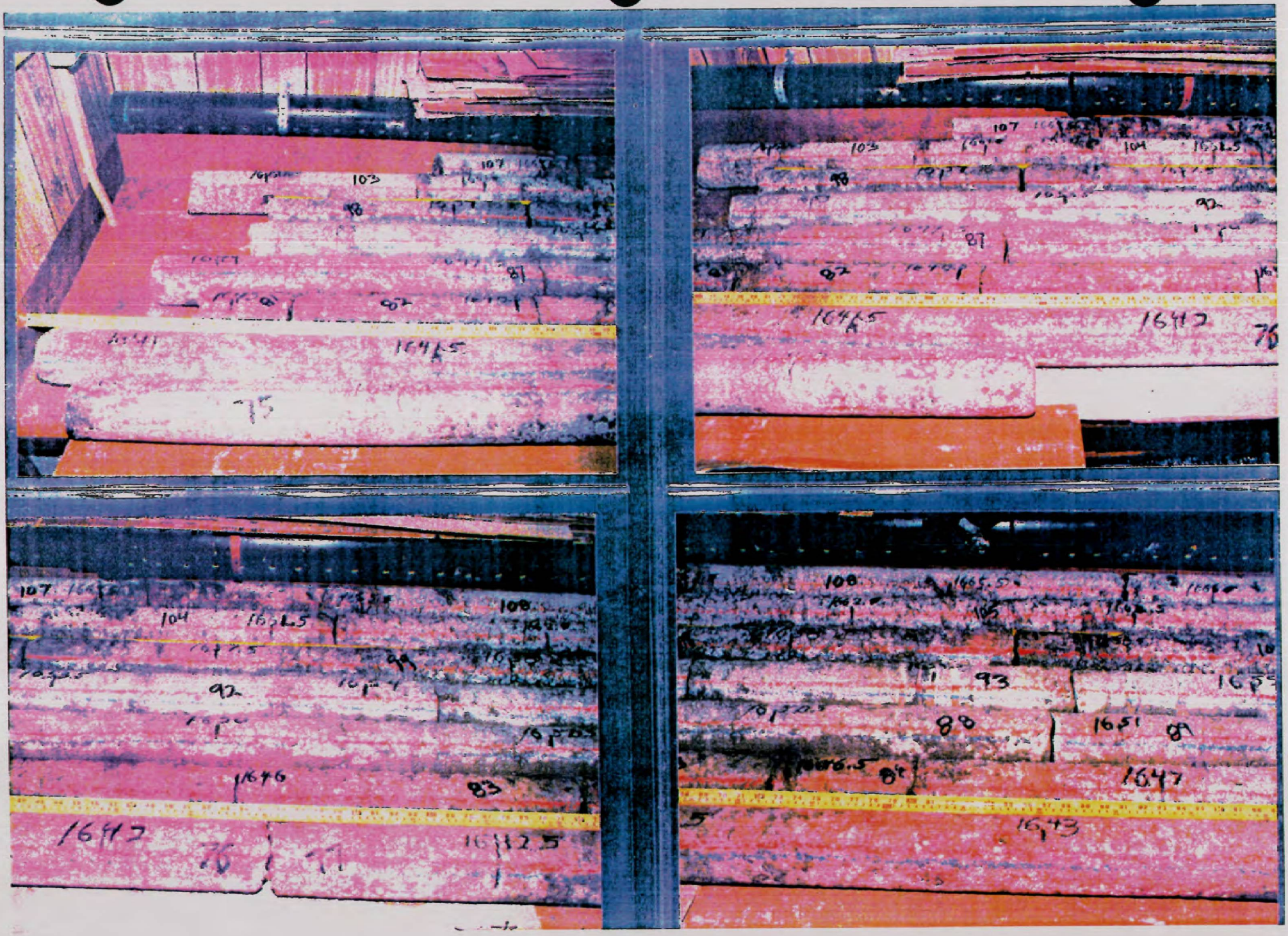

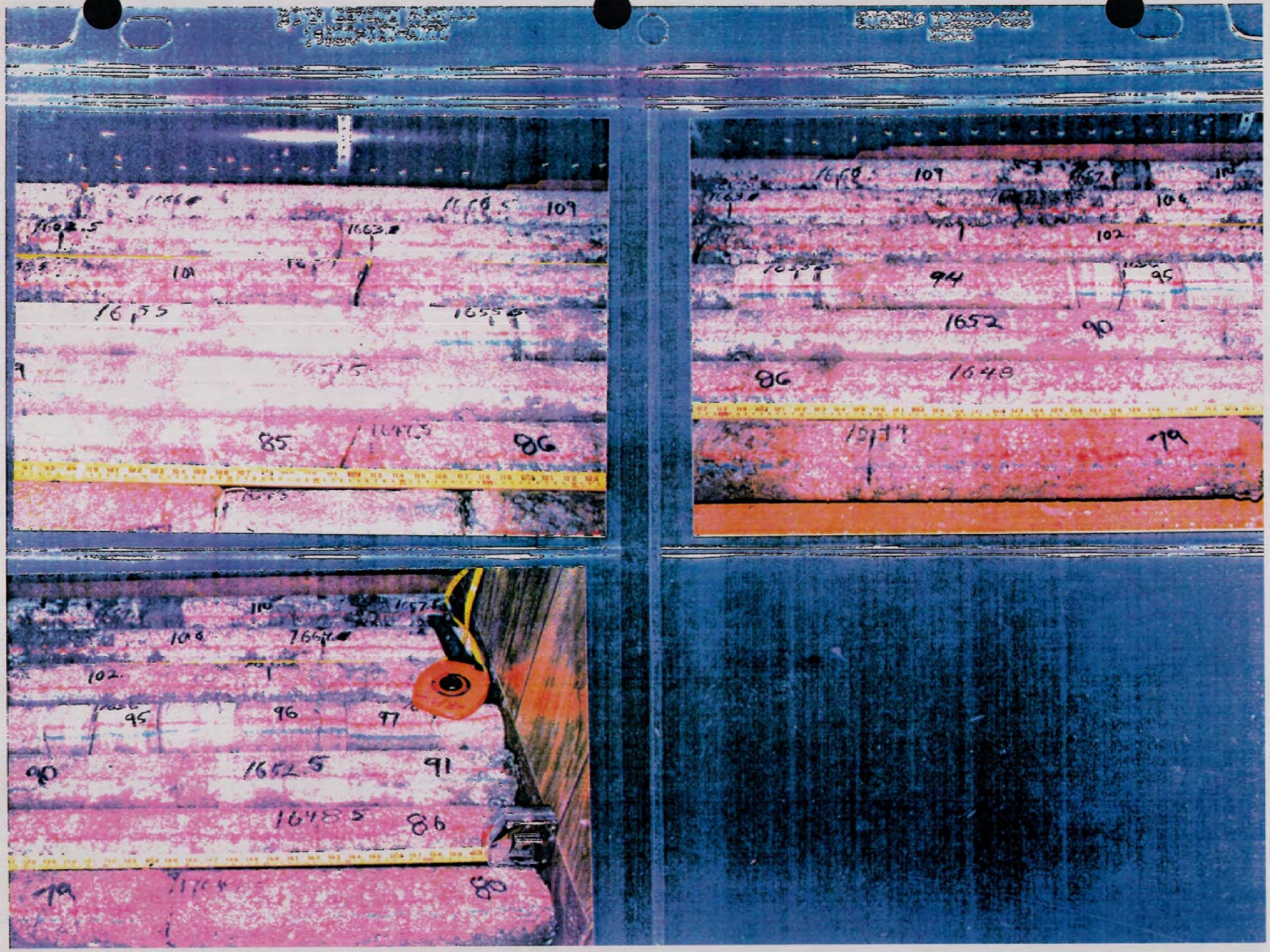

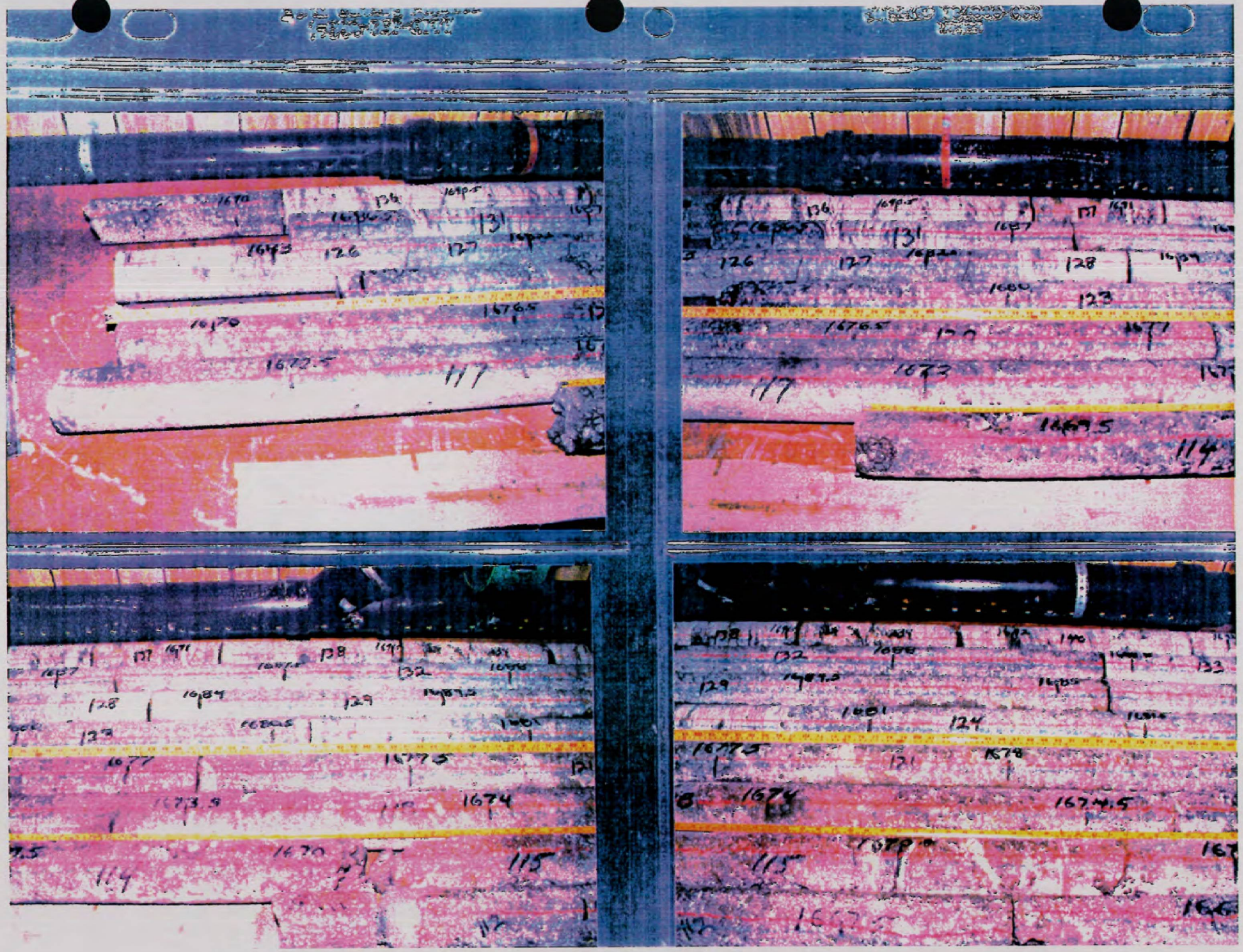

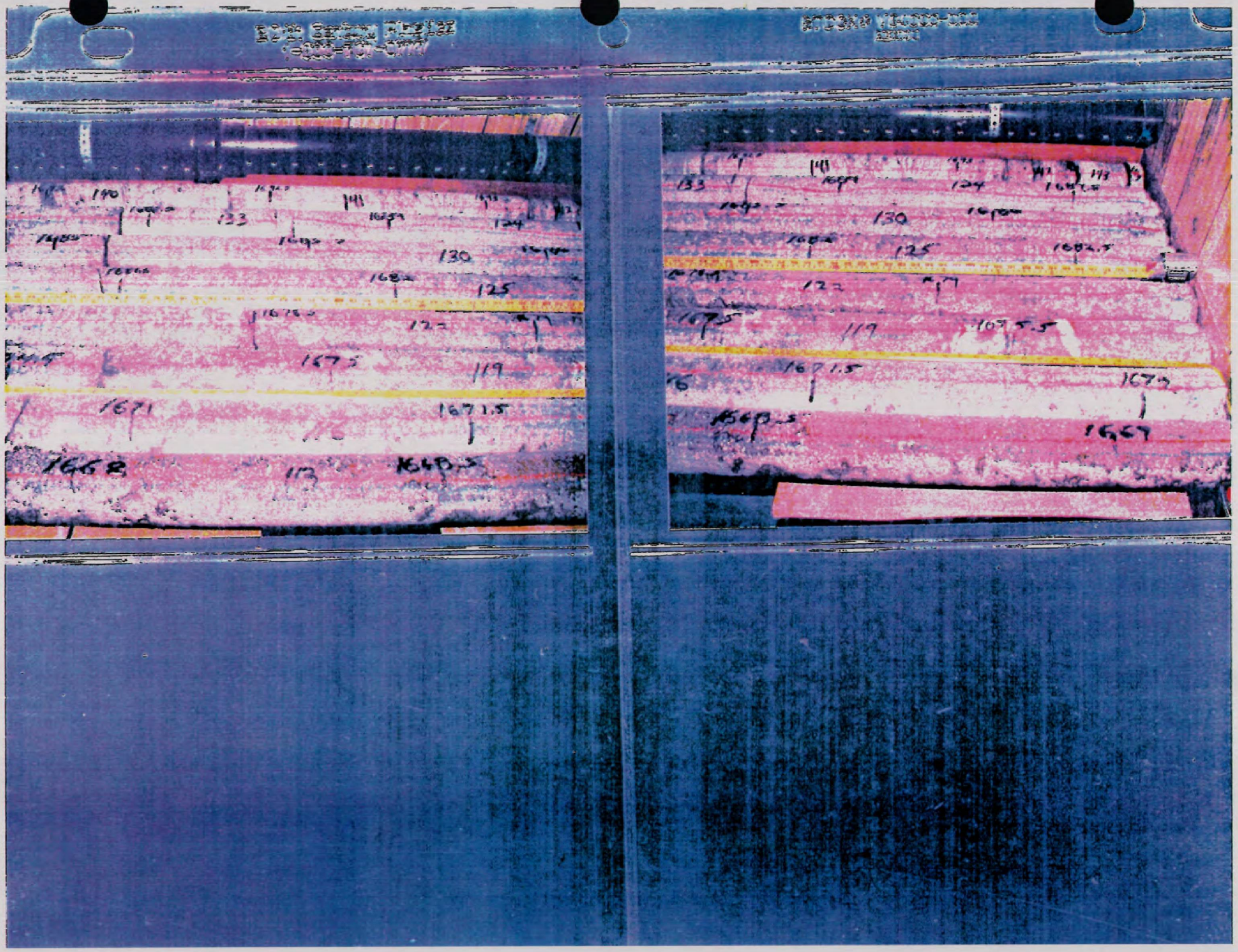
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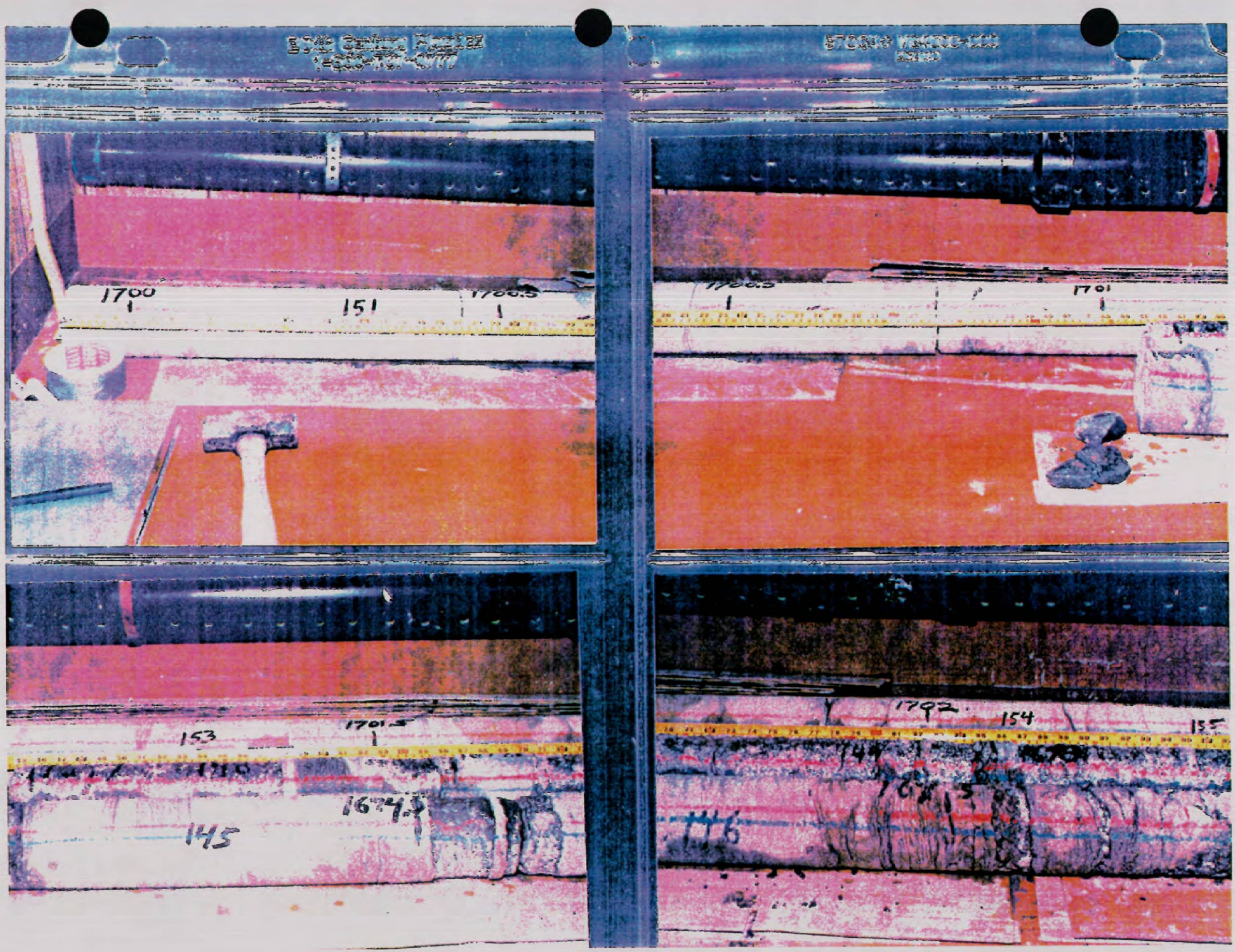
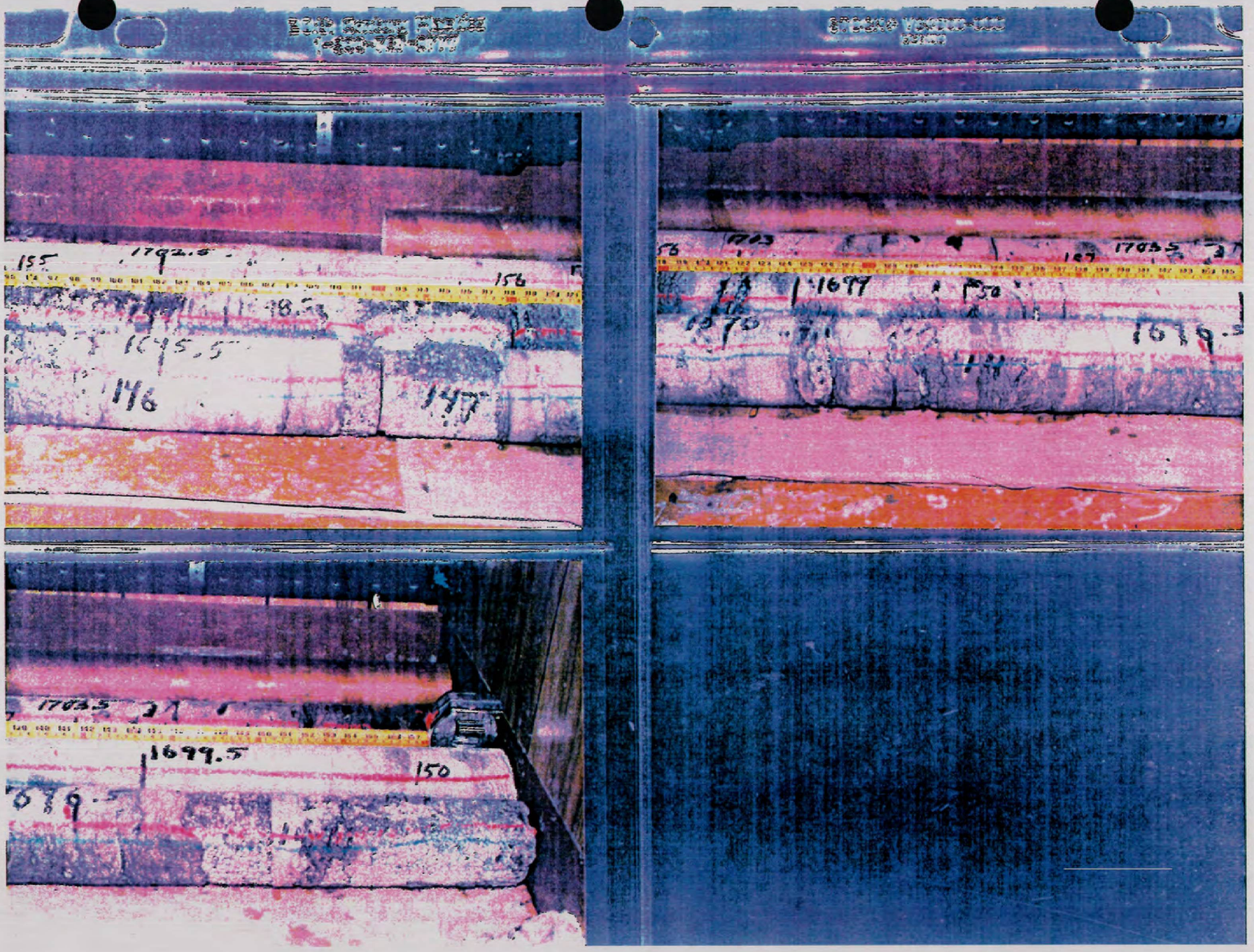
133
141
124
130
125
122
119
167.5
167.1.5
167.1
167.5.5
167.9


1700
151
1700.5
1700.5
1701
153
1701.5
1674.7
145
1702
154
155
146


155
1692.5
156
1695.5
146
147
1703.5
1699.5
150

APPENDIX D

Union Gas

MEMORANDUM

TO: J. P. Hayes **DEPT/OFFICE:** Head Office **DATE:** 1994-01-31

FROM: C. E. Smart **DEPT/OFFICE:** Head Office

SUBJECT: Enron Oil - Drill Stem Test Analyses

During the period of January 14/94 through to January 16/94, Alpine Testers conducted four drill stem tests on CDN Land Medhat 14-36-20-1 W4M. The results of these tests have been reviewed using Fekete Well Test Package v.4.00 and are summarized below.

D.S.T #1
Date : January 14, 1994
Perforation Interval : **1180.0 - 1203.0m (core #2)**
Gauge Location : Outside (pressure measurement open to the annulus)
Average Recovery Rate : 0.0 m^3/d
Assumed Porosity : 7.806%

- D.S.T #1 was never initiated due to a problem achieving the packer seat. The tool was recovered from the well and prepared for D.S.T #2.

D.S.T #2
Date : January 14, 1994
Perforation Interval : **1180.0 - 1203.0m (core #2)**
Gauge Location : Outside (pressure measurement open to the annulus)
Average Recovery Rate : 38.135 m^3/d
Assumed Porosity : 7.806%

- Two tests were analyzed within D.S.T #2; the build up to the preflow (a) and the build up to the actual test run (b).
- (a) At the time of shut in the recorder was measuring at a one minute sampling interval. Consequently, wellbore storage effects are not visible on the typecurve or the Horner plots.
  The onset of infinite acting radial flow appeared at approximately 21 minutes into the shut in. This corresponded to a radial extent of approximately 15m. At this point it appears that the limitations of the recorder had been reached.
  Modelling the data permitted values of local permeability (k) and skin effect (s) to be estimated. They are as follows:
  k_i = **11.7 mD**
  s = **30.7**

(b) Significantly more data was available for the test run than the preflow. Still however, a one minute sampling interval at shut in limited the data available to identify wellbore storage effects.
The derivative response on the typecurve indicates a possible constant pressure boundary at approximately 13m from the wellbore. However due to insufficient data and recorder limitations this hypothesis cannot be confirmed.
Modelling the data resulted in the following estimates of local permeability and skin effect.

k_1 = **12.8 mD**
s = **27.1**

D.S.T #3
Date : January 15, 1994
Perforation Interval : **1157.0 - 1175.0m (core #1)**
Gauge Location : Outside (pressure measurement open to the annulus)
Average Recovery Rate : 0.0 m^3/d
Assumed Porosity : 13.156%

- Upon running into the wellbore for D.S.T #3, a bridge was encountered at 1077.0 m. Consequently the recorder had to be recovered and the obstruction removed prior to any further test attempts.

D.S.T #4
Date : January 16, 1994
Perforation Interval : **1157.0 - 1175.0m (core #1)**
Gauge Location : Outside (pressure measurement open to the annulus)
Average Recovery Rate : 173.635 m^3/d
Assumed Porosity : 13.156%

- During both shut in periods (i.e. preflow and actual test flow) the sampling rate was set at 5 minutes. This rate was insufficient for the reservoir resulting in small data sets (<30 test points) from which to try and identify skins and permeabilities. Since the preflow itself lasted only 5.04 minutes all of the preflow data was lost.
The lengthy sampling rate coupled with the apparently high permeability in this zone hindered the measurement of any wellbore storage effects.
Modelling the data permitted estimates of local permeability and skin which have a relative compliance with the core analyses. They are as follows:

k_1 = **188.7mD**
s = **-3.4**

- I would like to emphasize caution in the usage of these figures. In general the data sets were very limited and due to the nature of the testing and the assumptions inherent in the analysis, there is likely to be some error associated with the results.

If you have any questions or would like to see the diagnostic plots please do not hesitate to call me at extension 2395.

Thank you,

[redacted]

Carolyn E. Smart
Asst. to Reservoir Engineer

cc. J. B. Carlson

APPENDIX E

GEOLOGICAL REPORT

CDN LAND MEDHAT

14-36-20-01 W4M

FOR

ENRON OIL CANADA LTD.

BY

WM. BAILLIE RESOURCES LTD.
2515 34th Avenue N.W.
Calgary, Alberta
T2L 0V4
Tel: (403)282-8416

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DRILLSTEM TESTS.....7

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SAMPLE LOG.....POCKET

WELL DATA

LICENSEE:	Canadian Landmasters Resource Services Ltd.
LICENCE NO:	0162547
WELL NAME:	Cdn. Land Medhat 14-36-20-01W4
LOCATION:	Lsd 14-36-20-01W4M Co-ordinates 385.9m South, 613.4m East
ELEVATIONS:	K.B. 727.48m Grnd. 723.17m
TOTAL DEPTH:	1704m Winnipegosis
SPUD:	January 6, 1994
RIG RELEASE:	January 29, 1994
STATUS:	Potential Saltwater Disposal Well
HOLE SIZE:	Surf - 393m 349mm 393m -1613m 222mm 1613m -1704m 200mm.
MUD:	Water Surface - 800 Gel 800 - 1120 Gel Chemical 1120 - 1550 Salt Saturated 1550 - 1704
CASING:	244.5mm, 53.5 Kg/m, J-55, LT&C @ 391.2m 177.8mm, 38.7 Kg/m, J-55, LT&C @1402.5m
DRILLSTEM TESTS:	DST#1 1180-1203 (Bsl. Nisku) Misrun DST#2 1180-1203 (Bsl, Nisku) DST#3 1157-1175 (Nisku) Misrun DST#4 1158.5-1176.5 (Nisku)
CORES:	Core #1 1158-1185 (27) Nisku, Rec.27 Core #2 1185-1203 (18) Grotto, Rec.18 Core #3 1613-1640 (27) 1st Rd.Bd.-Pr.Evp.Rec.25.7 Core #4 1640-1667 (27) Prairie Evap., Rec. 27.5 Core #5 1667-1694 (27) Prairie Evap., Rec. 26.4 Core #6 1694-1704 (10) Pr. Evp.-Winnpg's.,Rec.10
LOGS:	Run #1 Schl. FMI, GR 1704-1600 Run #2 Schl. DLL, MSFL, GR. 1704-391 CNL, LDT, 1704-725 GR, NGT 1704-391 Run #3 Schl. DSI, GR 1704-391 FMI, GR 1704-1585

SUMMARY OF DAILY OPERATIONS

DATE	DAY NO.	DEPTH	PROG.	OPERATION
06	1	26	26	Drilling 349mm Surface Hole. Spud 07:00 hrs. 01/06/94
07	2	290	264	Drilling Surface Hole. Trip for Bit @ 243m Bit 1A 349mm HP11 Surf-243m(243m) RPM 80-150+ Wt. 2-7x1000 daN PP 6000kpa
08	3	393	103	Cementing Surface Casing Drilled to 393m POH and Ran 31 jts. 244.5mm, 53.56kg/m, J-55, LT&C Landed @ 391.19m. Cemented w/ 40 Tonnes 0:1:0 G +2% CaCl2. Plug Down @ 08:15hrs 01/08/94 Left 3m3 cement in D.P. due to Vacuum Truck breakdown Bit 2A 349mm S33J 243m-393m(150m) RPM 150+ Wt. 8x1000daN PP. 7000kpa
09	4	393	0	Drilling out cement Top Cement @ 291m
10	5	816	423	Drilling 222mm Hole
11	6	987	171	Drilling Trip for Bit @ 917m. Bit 1 222mm HP11 393m-917m(524m) RPM 90-100 Wt. 10-14x1000daN PP. 9000kpa
12	7	1127	140	Drilling
13	8	1184	57	Cutting Core #1 Trip for Core Barrel @ 1158m. RIH w/ Core Barrel & 199mm Core Bit RPM 80-110 Wt. 2-3x1000daN PP. 7500kpa Bit 2 222mm ATJ22S,917m-1158m(241m) RPM 90-100 Wt. 10-14x1000daN PP. 9000kpa
14	9	1203	19	Reaming Core Hole Cut Core #1 1158-1185 (27)Rec.27 Reamed Core Hole Cut Core #2 1185-1203 (18) Rec.18 Reamed Core Hole

DATE	DAY NO.	DEPTH	PROG.	OPERATION
15	10	1203	0	Recovering Charts from DST #2 Finished reaming Core Hole, POH.PU Test Tool & RIH DST #1 1180-1203 (Bsl. Nisku) Misrun-Packer wouldn't inflate POH Chang'd Packer,RBIH w/Test Tool DST #2 1180-1203 (Bsl. Nisku) Rec.226m Fluid, 28m MW+198m Brk.Wtr.
16	11	1203	0	Running FSI on DST#4 RIH w/Test Tool to run DST#3 Misrun Hit Bridge @ 1077. POH. RIH w/Bit.Cleaned out Bridges 1070-1125 and cleaned out 1178-1203 POH. PU Test Tool. RIH for DST#4 1158.5-1176.5 (Nisku)
17	12	1285	82	Drilling Finished running DST#4 DST #4 1158.5-1176.5 (Nisku) Rec. 980m Fluid, 28m MW+952m Brk.Wtr. RIH w/ Bit #3 RRBit #2 222mm ATJ22S Cleaned out 5m fill on bottom and drilled ahead.
18	13	1369	84	Drilling Cont'd drilling w/ Bit #3.
19	14	1412	43	Drilling Trip for Bit @ 1372. Pulled tight @ 1334 on way out. Back reamed 1334-1326 and 1203-1195. Rest of hole clean. RIH w/ Bit #4 222mm, ATM 33, Reamed tight spots 1165-1183, 1211-1240 and 1316-1372. Drilled ahead. Bit #3 RR2 222mm ATJ22S, 1203m-1372m(169m) RPM 80-90 Wt. 14x1000daN PP. 9800kpa
20	15	1500	88	Drilling Cont'd drilling w/ Bit #4 Began converting mud to Salt
21	16	1600	100	Drilling Cont'd drilling w/ Bit #4 Mud now converted to Salt Saturated System.

DATE	DAY NO.	DEPTH	PROG.	OPERATION
22	17	1640	40	POH w/ Core #3 Cont'd drilling w/Bit #4 to 1613 POH. PU Core Barrel & 199mm Core Bit. RIH cut Core #3 1613-1640 (27) Bit#4 222mm ATM33 1372m-1613m(214m) RPM 80-90 Wt. 14-16x1000daN PP.9500-10000kpa
23	18	1698	58	Cutting Core #6 Rec'd Core#3 1613-1640 (27)Rec.25.7 RBIH w/ Core Barrel and cut Core #4 1640-1667 (27) Rec.27.5. RBIH w/ Core Barrel and cut Core #5 1667-1694 (27) Rec. 26.4. RBIH w/ Core Barrel and began cutting Core #6.
24	19	1704	6	Running IN SITU STRESS TEST #1 Cut Core #6 1694-1704 (10)Rec.10 Layed down Core Barrel. Rigged up Schlumberger and ran FMI Log from TD 1704-1600. Rig up Halliburton to run IN SITU STRESS TEST. Press Test Surface equipment, Numerous leaks.
25	20	1704	0	POH after Fishing for Packers. Repaired leaks in Halliburton surface lines. Pressure up packers to run IN SITU STRESS TEST #1 1672. Instananeous press.drop from 21000kpa-0. POH w/ Test Tool. Left Packers in hole. Test Tool ruptured above packer assembly. Released Schl. RIH w/ Overshot for Fishing Run #1. Tagged top of Fish @ 1671. Circl & try to work over top of Fish. Fish skidded 8m. Unable to get hold of Fish. Strapped out of hole.
26	21	1704	0	RIH w/ Overshot. Breakdown Overshot. Rec. spring from top of Packer. Grapple in Overshot broken. RBIH with Overshot for Fishing Run #2. Tagged Top of Fish @ 1672. Circl and work over Fish. Pressured up to 10000kpa. Circl'd thro' packers w/ good returns. POH w/ Overshot No Recovery. RBIH w/ 4 1/4" Overshot

DATE	DAY NO.	DEPTH	PROG.	OPERATION
26 (cont'd)				for Fishing Run #3. Circl. & work over Fish. Pressured up to 9000kpa. Pulled 6000daN over string wt. at start and dropped to string wt.of 36000daN about 40m above Fish (1630). Cont'd POH w/ Overshot Rec. 8" of 4 1/2" pipe on top of Packer. Total length of 4 1/2" left above packer is 7". Removed skirt from Overshot and tack weld bottom of grapple. RIH w/ Overshot for Fishing Run #4.
27	22	1704	0	Logging Finished RIH w/ Overshot. Circl. & latch on to Fish. POH slowly. Rec. complete Packer Assembly. Lay down Test Tool. RIH for cleanout trip. No fill on bottom. Circl. & cond. hole. POH. to log. WO Schl. 2 hrs. Rig up Schl. & run. DLL, MSFL, GR Log.
28	23	1704	0	Logging Ran CNL, LDT, GR, NGT Log. Rig down Schl. and PU Baker packer assembly. RIH w/ Test Tool to run IN SITU STRESS TEST #2 1622-1624 (Dawson Bay).Complete test.Move up hole to run IN SITU STRESS TEST #3. Could not get packer seat.POH. Both packers damaged. Change Packer Assembly. RIH to run IN SITU TEST #4 1619-1621 (Dawson Bay).Obtained packer seat but could not get pressure build up. Deflated packer & moved packer seat but could not get pressure build up. POH and lay down Test Tool. Rig up Schl. and run DSI Log.
29	24	1540 PBD	0	Running 177.8mm Casing Ran FMI log and Rig down Schl. RIH open ended to 1704. Circl 1 hr. Rig up NOWSCO and run BHP 1704-1575 8.5 Tonnes 0:1:0 G + 15% NaCl + 0.5% T-10. Plug down @ 19:37 hrs. 01/28/94. POH. Stand pipe in derrick & lay down 165mm DC's. RIH w/ 222mm Bit.

DATE	DAY NO.	DEPTH	PROG.	OPERATION
29	(cont'd)			Tagged top cement @ 1540. Set 4000daN string wt. on plug. POH. Lay down drill pipe & 158mm DC's. PU Power Tongs and begin running 177.8mm casing.
30	25	1540 PBD	0	Rig Released Finished running 177.8mm casing. Ran 105 jts. 177.8mm, 34.23 kg/m J-55 LT & C Landed @ 1402.52. Circl & cond mud. Cement w/ 8 Tonnes 0:1:0 G + 18% NaCl + 0.8 % NFL -2 Tail Cement. Displace w/ 28.63m3 Water. Bumped plug w/ 3500kpa. Plug held. Plug down 15:42 hrs. 01/29/94. Had 4m3 cement returns. Tear out BOP's.Set slips w/ 20000daN string wt. Rig down & clean mud tanks. Rig Released 24:00 hrs. 01/29/94.

DRILLSTEM TESTS

DST #1 1180-1203 (Bsl Nisku) Misrun could not inflate packer

DST #2 1180-1203 (Bsl Nisku)

10/60/60/90

PF-WK Air blow incrs'g thr'out to Fair-NO GTS
VO-WK Air Blow incrs'g to strn'g in 25 mins.
Fair Air Blow thr'out - NO GTS

Water Cushion - Nil

Rec. 226m Fluid; 28m MW + 198m Brak. Wtr.

HP 13 558 - 13 457
PF 1301 - 1474
VO 1434 - 2935
SIP 10720 - 10700 BHT 37.70C

DST #3 1157-1175 (Nisku) Misrun - Hit Bridge @ 1077

DST #4 1158.5 - 1176.5 (Nisku)

10/60/60/90

PF-Wk. to Strn'g init'l puff in 1 min
Dcrs'g to Fair Air Blow - NO GTS
VO-Strn'g Air Blow in 1 min
Constant thr'out - NO GTS

Water Cushion - Nil

Rec. 980m Fluid; 28m MW + 952m Brak. Wtr.

HP 13173 - 13023
PF 7389 - (Final PF not readable)
VO 7306 - 9995
SIP 10338 - 10308 BHT 37.0C

FORMATION TOPS

KB. 727.5

FORMATION	SAMPLE LOG	SCHLUMBERGER (SUBSEA)	SCHLUMBERGER CNL/LDT
CRETACEOUS			
2nd White Specks	-	(+99.6)	627.9
Base Fish Scales	-	(+44.0)	683.5
Bow Island	740.0	(-19.7)	747.2
Joli Fou	785.0	(-67.5)	795.0
Mannville	835.0	(-111.3)	838.8
MISSISSIPPIAN			
Pekisko	914.0	(-194.5)	922.0
Banff	982.0	(-247.5)	974.4
Bakken	1094.0	(-368.3)	1095.8
UPPER DEVONIAN			
Big Valley	1100.0	(-373.5)	1101.0
Stettler	1116.0	(-389.4)	1116.9
Calmar	?	(-416.0)	1143.5
Nisku	1158.3	(-432.7)	1160.2
Grotto	1186.0	(-458.5)	1186.0
Peechee	1206.0	(-475.2)	1202.8
Cooking Lk.	1401.0	(-675.2)	1402.7
Beaverhill Lk.	1459.0	(-728.2)	1455.7
1st Salt Marker	1563.5	(-835.3)	1562.8
2nd Salt Marker	1570.2	(-842.7)	1570.2
MIDDLE DEVONIAN			
1st Red Beds	1615.0	(-888.2)	1615.7
Dawson Bay	1617.3	(-890.5)	1618.0
2nd Red Beds	1626.2	(-899.3)	1626.8
Prairie Evaporite	1633.9	(-907.3)	1634.8
Winnipegosis	1700.7	(-972.5)	1700.0
TOTAL DEPTH	1704.0	(-974.9)	1702.4

SAMPLE DESCRIPTIONS

700-35	Shale:	med.gy., firm, fiss, micromic
735-40	Shale:	as abv. w/tr. shell frag's
		BOW ISLAND 740
740-70	Sndstn:	lt.gy, fn., ang., w.srt'd, kaol'c, cgl'c in pt.w/ w.rdd. v.crs-gran.qtz &blk cht. f.-g. por.,tr. pyr., & tr. rsty fn - v.fn. sidrt'c ss. No Fluor or Cut
770-85	Sndstn:	lt. brn. fn-v.fn, argill, tt, No Fluor or Cut
		JOLI FOU 785
785-35	Shale:	med. gy. firm fiss, micromic
		MANNVILLE 835
835-45	Sndstn:	lt. gy, fn-med qtz.,ang.,sbrdd, uncns'l in pt. f-g intgran, por. No Fluor or Cut
845-55	Sndstn & Shale:	intbd'd Sndstn: lt. gy, v.fn-fn. kaol'c, tt No Fluor or Cut Shale: med-dkgy, slty, w/ intbds, fn.ss grd'g to sltstn.
855-70	Sndstn:	buff, fn, kaol'c in pt. p-f intgran por., mnr.intbds shale as abv. - tr. coal
870-75	Shale:	med. - dkgy., slty v.fn sdy, w/ intbd'd sltstn.
875-85	Sndstn:	lt. gy, fn, ang. qtz., p.cns'l, kaol'c in pt. intbd's, buff, dol'c, sltstn, tr. coal & pyr. No Fluor, Tr. lt yell. wht. cut from one ss. frag.
885-90	Shale:	med.dk gy, slty - v,fn. sdy intbd's sltstn.
890-95	Sndstn:	lt.gy - buff, fn, ang.qtz., argill, kaol'c, f intgran por., intbd'd w/sh & sltsln. as abv.
895-00	Shale:	med. dk gy, slty - v.fn sdy, intbds sltstn. as abv. tr.clystn: buff, mottl'd red
900-05	Sndstn:	lt. gy - buff, fn. ang.qtz. argill kaol'c intbd. w/sltstn as abv.
905-10	Shale:	med. dk.gy slty - v. fn. sdy w/intbd's sltstn
910-20		TRIP - NO RELIABLE SAMPLES
		PEKISKO 914
920-25	Lmstn:	lt. buff, crpxln tt. No Fluor or Cut - tr.fract'd. clr. qtz & lt. buff cht. from ovly'g Bsl Qtz.

925-40 Lmstn: buff-wh., crpxln. tt. tr. milky cht. frag's. tr. contam. dd.hvy oil stn'g from thin lm ss.in Bsl. Mann.
940-80 Lmstn: wh.-lt. buff, crpxln, tt, as abv.

BANFF 982

980-53 Lmstn: tan-buff, crpxln, tt argill.
1053-59 Lmstn: as abv. bcm'g more argill.
1059-70 Lmstn: lt. buff - wh, v.fn xln - v.fn sdy, p-f intgran por. No Fluor or Cut - grd'g v.fn calc. ss.
1070 95 Sndstn: & Shale - intbd'd
Sndstn: lt. buff-wh, v.fn., calc., mnr. p. intgran por. to tt.

BAKKEN 1094

1095-00 Shale: dk brn. blk., firm, fiss.

BIG VALLEY 1100

1100-02 Lmstn: lt.grn-gy, to buff, crpxln. sli argill, tt, tr.pyr. crin'd osscl's & bry'z
1102-16 Shale: lt grn. firm, fiss, tr. bry'z. crind's & pyr.

STETTLER 1116

1116-23 Dol: lt. brn - buff, crpxln anhy'c, tt
1123-43 Anhy: lt. buff-wh.,micxln - crpxln, mnr. intbds Dol: lt.brn - buff.crpxln anhy'c tt

CALMAR ?

1143-58 Dol & Anhy: intbd'd w/ mnr. sh
Dol: buff, crpxln, anhy'c tt, Anhy: lt buff wh.crpxln
Shale: brick red mottl'd gy in pt. sli dol'c & anhy'c

NISKU 1158.3

1158-85 See Core Descriptions
Core #1 1158-1185(27)Rec.27

GROTTO 1186.0

1185-03 See Core Descriptions
Core #2 1185-1203 (18) Rec.18

1203-06 REAMED COREHOLE - No reliable samples

PEECHEE 1206

1208-10	Dol:	lt. buff, v.fn - fn xln, tr.f.por. No Fluor or Cut ovl'n by Shale; lt.grn. firm
1210-27	Anhy:	wh.-lt. buff., crpxln, mnr. intbd. dol. buff v. fn, xln. tt.
1227-33	Dol:	lt. gy micxln, argill,tt - f intxln por. No Fluor or Cut
1233-52	Shale:	lt. grn. gy., firm, fiss, calc.
1252-55	Dol:	lt. gy crpxln - v.fn. argill, tt
1255-64	Anhy:	wh - lt. buff-gy, mnr. intbd's Dol:buff. micxln,tt
1264-70	Lmstn.	lt. buff, micxln, argill, tt
1270-75	Lmstn:	lt. gy, micxln, argill, tt
1275-82	Dol:	buff, micxln, tt.
1282-88	Anhy:	wh. - lt. buff. mnr. intbd's Dol: as abv. tt.
1288-08	Dol:	buff. fn xln. p-f. intxln por. No Fluor or Cut
1308-13	Anhy:	wh.-lt. buff. crpxln
1313-18	Dol:	buff, micxln,tt.
1318-32	Anhy:	buff-wh, crpxln mnr. intbds Dol: buff crpxln
1332-35	Lmstn:	lt. buff wh. micxln, tt.
1335-46	Dol:	buff, v.fn-fn xln. tt - f intxln. por. No Fluor or Cut tr. dk. brn. hvy. oil stn'g (lt. yell. wh. strm'g cut) contam. from 1 m hvy oil sd. in Bsl. Mann.
1346-49	Anhy & Dol: intbd'd	
	Anhy:	buff wh. crpxln Dol: buff crpxln. tt.
1349-72	Lmstn:	lt. buff - wh. micxln, stng's f-intxln. por. tr. dk. brn hvy oil stn'g & mnr. globs free v. hvy tarry oil - contam from 1m hvy oil sd. in Bsl. Mann.
1372-74		TRIP - No Reliable Samples
1374-90	Anhy:	buff -wh. crpxln, mnr. intbd's micxln - v.fn. dol. grd'g to lmstn. tt. - tr. dk. brn. hvy oil stn'g w/ faint yell. cut - contam. from 1m hvy oil sd. in Bsl. Mann.
1390-95	Lmstn:	lt. buff.- wh, micxln, chky, micxln grns flt'g in wht. mic. tt.
1395-01	Lmstn:	lt.buff wh. crpxln. chky. tt.
		COOKING LK. 1401
1401-06	Dol:	lt. buff. micxln grd'g - v.fn. xln. tt
1406-11	Anhy:	buff - wh. crpxln
1411-20	Dol:	buff. - lt.gy, fn xln, p-f intxln. por. tr. pyrobit. No Cut intbd'd w/ buff crpxln. dol.tt. & Anhy: buff-wh. crpxln
1420-25	Dol:	lt. buff. crpxln tt intbd'd w/ Anhy as abv.
1425-30	Anhy:	buff - wh. crpxln
1430-44	Dol:	buff crpxln tt intbd'd w/ Anhy as abv.
1444-52	Dol:	buff. v. fn xln. tr.p. intxln por.

1452-59	Dol:	buff mostly micxln tt. intbdd w/ Anhy: buff-wh.crpxln.
		BEAVERHILL LK. 1459
1459-85	Lmstn:	buff crpxln tt. intbd'd w/ lt. gy crpxln tt.
1485-95	Lmstn:	lt. gy - buff. crpxln dol'c tt.
1495-00	Lmstn:	lt. gy v.fn.pellets in mic., mtx,tt
1500-10	Lmstn:	pred. buff crpxln intbd'd w/ mnr lt. gy dol'c crpxln tt, local thin string's v.fn-fn xln. buff lmstn. w/ tr.p. intxln. por.
1510-29	Anhy & Lmstn:	intbd'd
	Anhy:	buff-wh. crpxln w/ mnr. intbds Dol: buff crpxln tt.
	Lmstn:	pred. buff crpxln. tt w/mnr. tt.gy crpxln. locly grd'g to micxln tt.
1529-31	Dol:	buff. micxln, earthy text., p.pp intxln -vug por.
1531-36	Dol:	pred. buff crpxln w/mnr. lt.gy crpxln tt., mnr. intbds. Anhy: lt. buff - wh. crpxln
1536-40	Dol:	buff. v. fn xln. tr. p-f.intxln. por. No Cut grd'g dwn to crpxln tt.
1540-44	Anhy:	buff-wh.crpxln
1544-48	Dol:	buff. v. fn.xln. p-poss.f intxln. por. No Cut
1548-61	Anhy:	buff - wh. crpxln
1561-65	Dol:	lt. buff. crpxln tt. - prob. contains 0.3m Salt bed
		1st SALT MARKER 1563.5
1565-70	Anhy:	buff-wh. crpxln. w/ mnr.dol: buff. v.fn. xln p.intxln. por. - locl'y earthy text
		2nd SALT MARKER 1570.2
1570-72	Salt:	No evid. por. in smpl's. Drill Time 3 mins/M
1572-77	Dol:	buff crpxln tt.
1577-91	Lmstn:	buff. crpxln tt. mnr. intbds lt. buff-gy to tt.,brn. micxln
1591-96	Lmstn:	lt. - med. brn. fn-med xln dol'c & sli argill. tr. vug. por. sli cut
1596-13	Dol:	buff. v.fn. xln. p-f intxln. por. No Cut
1613-40	See Core Descriptions	
	Core #3 1613-1640 (27) Rec.25.7	

1st RED BEDS 1615.0

DAWSON BAY 1617.3

2nd RED BEDS 1626.2

PRAIRIE EVAPORITE 1633.9

1640-67 See Core Descriptions
Core #4 1640-1667 (27)Rec.27.5

1667-94 See Core Descriptions
Core #5 1667-1694 (27)Rec. 26.4

1694-04 See Core Descriptions
Core #6 1694-1704 (10)Rec.10

WINNIPEGOSIS 1700.7

1704 TOTAL DEPTH

CORE DESCRIPTIONS

CORE #1 1158-1185 (27)REC. 27

1158.00-58.33	(0.33) Sh:	lt.grn w/thin wavy lamin's of dol. and local thin anhy.lamins's & nodules, bsl. contact w/undrly'g dol. a large ripple
		NISKU
1158.33-59.10	(0.77)Dol:	buff, fn. xln., upper 1/2 contains lt.grn sh.prtg's tr.blind pp.vugs. essent.tt, patchy appar.lt. oil stn'g Brt. yell. fluor.
1159.10-62.49	(3.39)Dol:	buff., fn xln, irreg. wavy bdd'g., poor-fair pp.vug & intxln por. appar. lt. oil stn'g Brt.yell. fluor.
1162.49-63.51	(1.02)Anhy:	wh. locl'y irreg. wavy bdd'g w/some dol. lenses.
1163.51-66.88	(3.37)Dol:	buff., fn xln, some irreg. wavy bdd'g bioturb'd.in pt. common anhy.lenses nodules., fair to locl'y good intxln and pp - 1 cm vug por., appar. lt oil stn'g Brt-yell. fluor.
1166.88-67.89	(1.01)Dol:	buff. fn xln, faint irreg. wavy bdd'g. w/anhy veins, lamin's & nodules fair pp. vug. por., appar. lt.oil stn'g Brt,yell fluor.
1167.89-70.29	(2.40)Dol:	buff fn xln, faint irreg. wavy bdd'g good to excell. intxln & pp to vug por. up to 2 cms.,appar. lt.oil stn'g. Brt.yell fluor.
1170.29-73.15	(2.86)Dol:	essent. identical to ovly'g intv'l separt'd by 5cm. micxln(?) tt dol.band, appar. lt. oil stn'g Dull yell. fluor,poss. fading due to exposure.
1173.15-76.81	(3.66)Dol:	buff.fn xln occas. faint wavy bdd'g appar. bioturb'd mostly good to excell. intxln to pp vug por., minor anhy. lamin's, veins & nodules, appar. lt. oil stn'g. Brt. yell. fluor.
1176.81-79.51	(2.70)Dol:	buff fn xln. irreg. faint wavy bdd'g, scatt'd anhy. nodules, por.poor-fair overall w/intxln & pp to 1cm vugs, appar. lt.oil stn'g Brt.yell. fluor

1179.51-82.98 (3.47)Dol: buff. fn xln mottl'd skeletal hash, leach'd skeletal vugs,overall por fair to good, appar.lt. oil stn'g Dull yell. fluor. Prob. wet from top of this intv'l down.

1182.98-84.05 (1.07)Dol: buff fn xln irreg faint wavy discont. bdd'g.,mnr. pp vug. overall por. poor, dull yell. fluor.

1) Most of core displayed minor pin point bleeding to occasional narrow strip bleeding of live light brown oil shortly after being layed on the deck.
2) All of the sample intervals caught while coring were examined but no cut was obtained.
3) The apparent staining and fluorescence were impressive but the core did not have the aroma that is usually present in an oil zone.

CORE #2 1185-1203.8 (18.8)REC.18.8

1185.00-86.15 (1.15)Dol: buff.fn xln.,bioturb'd mottl'g,burrows infill'd w/med.brn.sh., one anhy nod. (2cms.) scatt'd. pp-3cm vug. prob. blind & tt. No Fluor.

GROTTO

1186.15-86.07 (0.55)Dol: buff. fn xln, faint to obvious irreg. wavy lamin's occas. med.brn. sh prtg's. infill'g ripple mks. w/some soft. sed.defm'n, tr.pp-0.5 cm. vugs. essent.tt No Fluor.

1186.70-87.30 (0.60)Dol: buff, fn xln, bioturb'd mottl'g burrows infill'd w/med. brn sh., scatt'd pp-2 cm. vugs, prob. blind &tt No Fluor.

1187.30-90.70 (3.40)Dol: buff. fn- micxln,faint irreg. wavy bdd'g poss. horiz. burrow'g, mnr. irreg. med. buff argill. dol. infill'g ripple mks. tr. pp-1cm vugs., prob. blind essent.tt Dull yell.-orange fluor.

1190.70-93.37 (2.67)Dol: buff, intbd'd micxln argill dol & fn xln.dol, micxln dol. bcm'g more argill dwnw'd, scatt'd. 1-2cm vugs prob. blind, poor overall por. No Fluor.

1193.37-96.30 (2.93)Dol: buff intbd'd micxln argill dol & fn xln dol. as abv. but becm'g. prog.thinner bd'd dwnw'd - no appar. por tt.No Fluor

1196.30-98.15 (1.85)Dol: buff, micxln-crpxln, argill, lamin'd (varved) interspersed w/ Ls: wh., crs, xln, tt.,lower 1/2 intrv'l appar. horiz. burrowed. No Fluor

1198.15-99.42 (1.27)Sh&Ls.lamin'd Sh; grd'g from buff crpxln argill.dol dwn to dk. brn varved calc. Sh.,Ls:lt gy-wh. crs xln as thin lamin's & occas. lenses & nodules, horiz burrw'g in upper 1/2. No Fluor.

1199.42-02.26 (2.84)Dol:buff fn-v.fn xln mass to thin wavy bdd'g w/dk. brn sh. lamin's in lw'r part, mnr.Anhy. blebs in upper 1/2, upper contact of interval soft sed. defm'n., poor pp. vug. por thr'out Dull Yell-orange Fluor in bsl. 6-8cms.

1202.26-02.66 (0.40)Sh: lt. grn hd.w/thin intbd's & lamins of lt.gy -wh. to buff, v. fn xln.dol.Bsl. 6-8cm. fract'd rubble w/Brt.yell fluor on fract's.

CORE #3 1613-1640 (27) REC. 25.7

1613.00-15.03 (2.03)Dol:buff fn xln(?), minor indctn's faint indistinct bedd'g appears bioturb'd,tr. Anhy blebs, tt.
Precise contact w/underlying unit faint and indistinct over a few cms.

1st RED BEDS

1615.03-17.31 (2.28)Sh: med. grn-gy hard dense no appar. fissil'ty highly indur'd mudstn. develops fissility when dry. Precise contact w/dunderlying unit faint.

DAWSON BAY

1617.31-24.71 (7.40)Dol:buff fn xln(?) massive,upper 1/2 intv'l. sev'l 1-5cm vugs all salt plugged partially leached (prob. during coring)

1624.71-26.15 (1.44)Dol:buff prob. mic-crpxln, lamin'd w/hair line dk. Sh.lamin's tr. pp. vug por. Bsl. 8 cms. lamin'd dol & dk. Sh. 40% Sh., cont. ripple mk'd w/some minor bioturb'n. Fair sharp contact w/underlying unit

2ND RED BEDS

1626.15-29.25 (3.10)Sh: med grn-gy. no appar. fissility hard dense highly indur'd mudstn. - develops fissility when dry.
1629.25-33.87 (4.62)Sh: brick red hard dense occas.faint indictn's bdd'g little indicat'n of fisility, occas.thin intbds 0.5-4cms. med grn-gy sh. as above - develops fissility when dry.
Contact w/undrlying unit distinct.

PRAIRIE EVAPORITE

1633.87-38.72 (4.85)Salt:mixture orange-red(Salmon) and clear v.crs xtals, massive, 5cm band. red sh as abv. about 5cms below top.

Coring times indicate that the core barrel probably jammed temporarily while cutting the lower 3m of the 2nd Red Beds. The 2nd Red Bed/Prairie Evaporite contact is intact. There are no milled surfaces in the recovered salt section and the total recovery of salt equates with the total relatively fast coring times for the salt. It is believed that some of the 2nd Red Bed section was milled-up while the core barrel was jammed, probably about 0.8m . Therefore, the top of the Prairie Evaporite could be about 0.8m lower than indicated. The additional 0.5m of missing core probably was recovered at the top of Core #4. Therefore, all depths on Core #4 probably are 0.5m deeper than they should be.

<u>CORE #4 1640-1667(27) REC. 27.5</u>

1640.00-43.50 (3.50)Salt:pred.salmon clr'd v, crs. xln
1643.50-43.77 (0.27)Salt:clr. mass
1643.77-44.94 (1.17)Salt:pred. salmon clr'd. v.crs. xln, mixed w/clr. v.crs. xln, lamins soft brick red cly & some lt.gy near top.
1644.94-49.51 (4.57)Salt:mixed salmon & clr. v.crs. xln, 2 lt. gy. Anhy bnd's. (2mm) 0.42m abv.bse.
1649.51-55.40 (5.89)Salt:pred. clr., v.crs. xln,w/mnr. v.crs. xln salmon clr'd salt, occas 1mm - 5.5 cm dol bnds w/some upper surfaces ripple mkd.

MIDDLE PRAIRIE EVAPORITE DOLOMITE MARKER

1655.40-55.55 (0.15)Dol: buff micxln - crpxln intrlamin'd w/salt
1655.55-55.91 (0.36)Salt:mixed salmon clr'd & clr v.crs. xln

1655.91-56.60 (0.69)Dol: buff micxln - crpxln upper 2/3 w/ fine lamin's. clr. salt, occas ripple mks.
1656.60-67.50 (10.90)Salt:mixed salmon clr'd &clr v.crs.xln.

CORE #5 1667-1694 (27) REC. 26.4

1667.00-67.14 (0.14)Salt: salmon clr'd v.crs xln
1667.14-67.19 (0.05)Clystn:lt.gy sft to firm
1667.19-69.95 (2.76)Salt: mixed clr. & salmon clr'd, v.crs xln portn's of lwr. 1.25m strongly leached creating large vugs up to 0.19m -suspect highly soluble K20 minl's
1669.95-70.25 (0.30)Salt: mixed salmon clr'd & clr. v.crs.xln w/discont. intbd's Anhy lt.gy-wh., Clystn lt.gy & brick red. rng'g from 0.5-3.0cms.
1670.25-80.55 (10.30)Salt: mixed but pred. clr. w/mnr salmon clr'd v.crs xln mnr. scatt'd impurities thr'out, short discont. whisps lt.gy clystn. btwn xtls & mnr Anhy bnd's lt gy-wh up to 2 cms.
1680.55-80.85 (0.30)Anhy: lt gy-wh to buff fnly lamin'd w/mnr irreg. bnds. clr. salt up to 2 cms.
1680.85-82.68 (1.83)Salt: clr. v. crs. xln
1682.68-82.92 (0.24)Anhy: buff lt. gy wh. irreg. fn lamin's w/ mnr blebs. clr. salt.
1682.92-83.68 (0.76)Salt: clr. v.crs. xln
1683.68-84.02 (0.34)Anhy: lt.gy wh. fnl'y lamin'd locl'y irreg. w/ intb'd clr. salt in upper 1/2
1684.02-86.62 (2.60)Salt: clr. v. crs. xln
1686.62-86.86 (0.24)Anhy: buff to lt. gy-wh. fn irreg. lamin's w/mnr intbds salt.
1686.86-88.44 (1.58)Salt: clr. v. crs. xln
1688.44-88.86 (0.42)Anhy: buff to lt.gy wh. fnl'y lamin to irregl'y lamin'd, sft. sed. defm'n w/mnr. interlamins of clr. salt.
1688.86-90.10 (1.24)Salt: clr. v.crs. xln

LOWER PRAIRIE EVAPORITE INTERBEDDED ANHYDRITE, SALT & DOLOMITE MMBR

1690.10-93.43 (3.33)Anhy: lt.gy-wh to buff, fnl'y lamin'd to irreg. lamin's w/sft. sed, defm'n & mnr interlamn's clr.salt.

CORE #6 1694-1704 (10)REC.9.96

1694.00-94.51	(0.51)Anhy:	lt.gy-wh to lt.gy lamin'd dol'c w/ intrlamin's salt filled algal mat. upper 7cm. dol buff micxln algal mat.
1694.51-94.65	(0.14)Salt:	clr. mass, 1 cm. lt gy wh. dol'c anhy bnd in middle
1694.65-95.65	(1.00)Dol:	buff, micxln., lamin'd algal mat., plugged w/ salt. mostly clr., some salmon clr'd salt in middle. occas, bnds 1cm clr salt & lamin's Anhy, lt, gy-wh dol'c up to 7cms.
1695.65-95.81	(0.16)Salt:	clr. mass
1695.81-96.60	(0.79)Dol&Anhy:	intbd'd, Dol: buff, micxln algal mat, salt plugged, mnr. intbd's Anhy, lt gy -wh.
1696.60-98.81	(2.21)Salt:	clr. mass. prob.v.crs.xln on fresh surf, occas. 3cms - 0.18m bnds of Dol.buff, micxln, algal mat, salt plugged,mnr. bnds Anhy lt. gy-wh.
		BASE BEDDED SALT IN PRAIRIE EVAPORITE
1698.81-99.60	(0.79)Anhy:	lt. gy wh lamn'd algal mat plugged w/ salt dol'c in pt.
1699.60-00.70	(1.10)Anhy:	lt gy-wh dol'c in pt. w/mnr lamin's dol. buff micxln algal mat.
		WINNIPEGOSIS
1700.70-03.96	(3.26)Dol:	buff,micxln,poor vug por. pp-2cms in upper 1/2, all appear to be salt plugged, vugs in lower 1/3 incrs'g in size up to 3cms. all salt plugged. some Anhy: lt gy-wh. blebs and bnd'g in upper 0.9m - Bsl. 0.1m shaly and sandy w/dk gy. blk. sh. prtg's,would not dry, bld'g salt water.

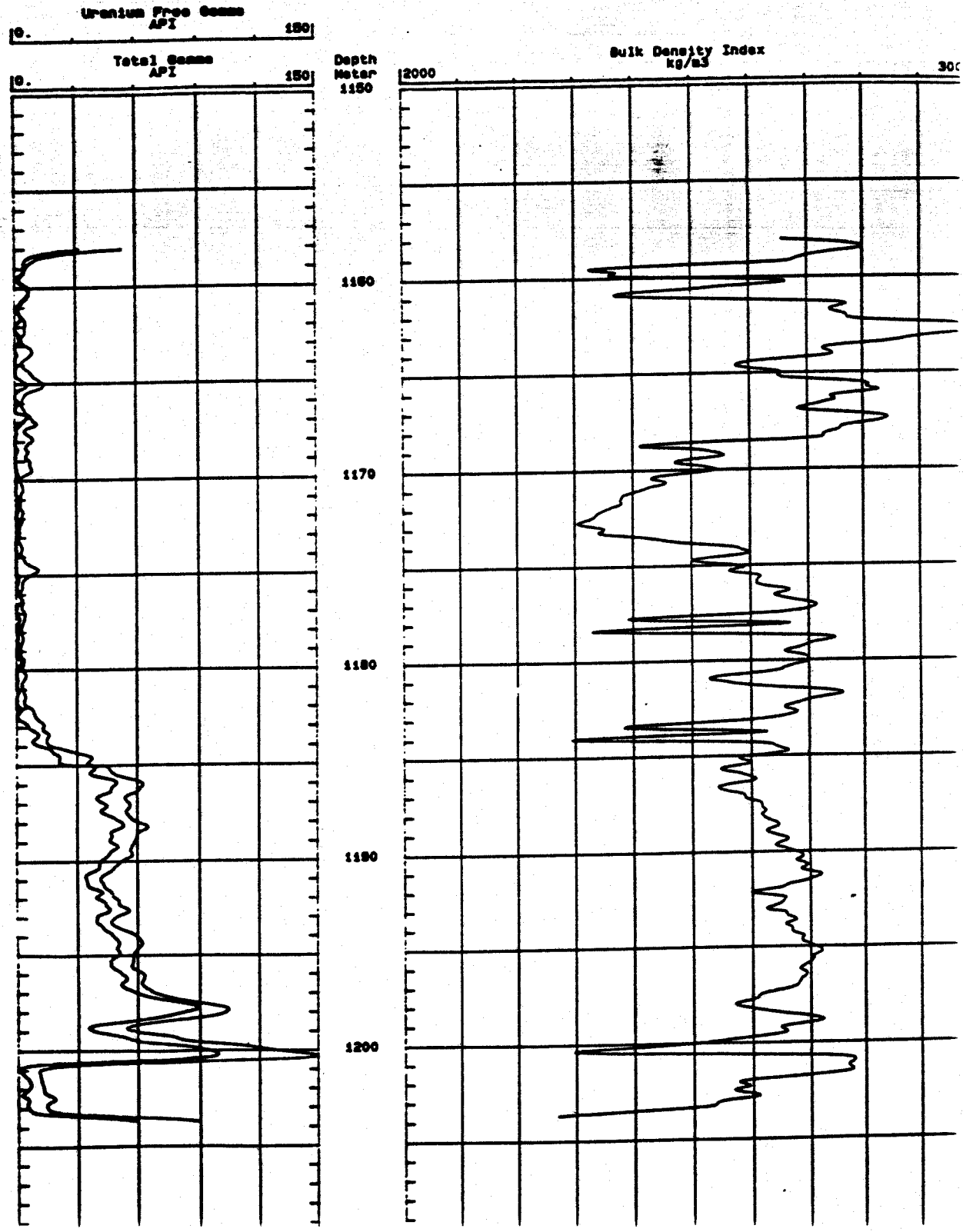
BULK DENSITY INDEX

CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.70 m)

Core Laboratories

Vertical Scale
10.00 cm = 24.0 meter



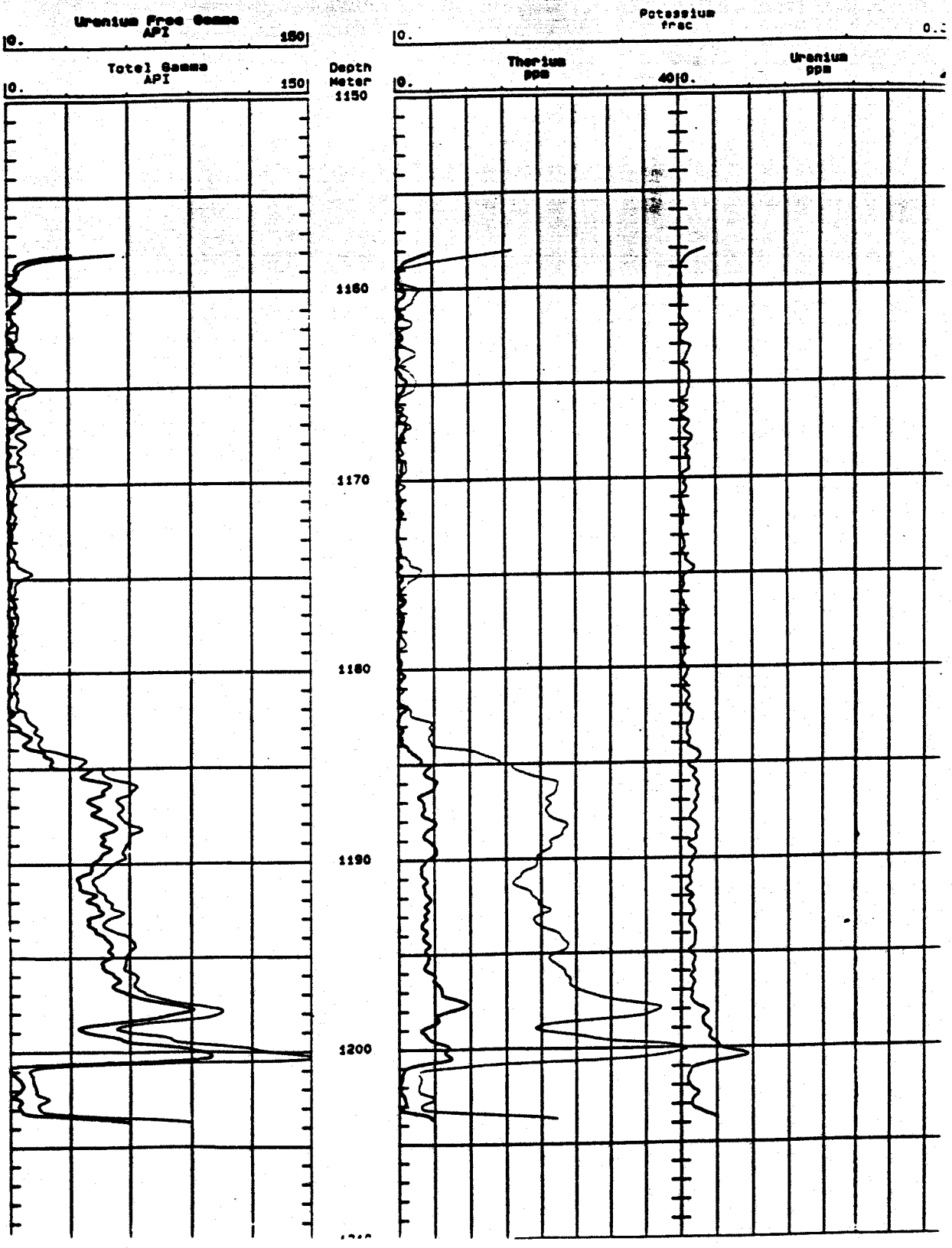
CORE SPECTRAL GAMMA

CDN LAND MEDHAT 14-36-20-1
MEDICINE HAT

NISKU (1158.00 - 1203.70 m)

Core Laboratories

Vertical Scale
10.00 cm = 24.0 meter



UNIVERSAL GEOLOGICAL LOG

COMPANY: Enron Oil Canada Ltd.
WELL: Cdn Land Medhat 14-36-20-01 W4
LOCATION: Lsd 14-36-20-01 W4
FIELD: —
PROVINCE: Alberta

CONTRACTOR: Precision Drilling (1987) Ltd.
SPUDDED: January 6, 1994 RIG RELEASED: Jan. 29/94
TOTAL DEPTH: Driller: 1704 m; Logger: 1703.6 m.
Plugged Back: 1540 m.
BOTTOM HOLE FORMATION: Winnipegosis
STATUS: Potential Salt Water Disposal Well

ELEVATIONS
KB: 727.48 m
GL: 723.17 m

CASING RECORD
244.5 mm J55 53.56 kg/m x LT&C @ 391.2 m with 40 0:1:0 G+2% CaCl₂ tonnes
x with tonnes
177.8 mm J55 34.23 kg/m x LT&C @ 1402.5 m with 8 0:1:0 G+18% NaCl tonnes

CORES

No.	INTERVAL	FORMATION	RECOVERY
1 & 2	1158-1203 (45)	Nisku - Grotto	45
3 - 6	1613-1704 (91)	1Ro. Bo. - Wpgs.	89.6

DRILLSTEM TESTS

No.	INTERVAL	FORMATION
1	1180-1203 (misrun)	Nisku
2	1180-1203	Nisku
3	1157-1175 (misrun)	Nisku
4	1158.5-1176.5	Nisku

GEOLOGIST: Wm. Baillie, P. Geol.

OPEN HOLE LOGS
COMPANY: Schlumberger
DATE(S):

LOGS RUN	INTERVAL
1/23/94 FMI	1704-1600
1/26/94 DLL, MSFL, GR	1704-391
CNL, LDT, NGT	1704-725
1/28/94 FMI	1704-1585
DSI, GR	1704-391

DATE: February 3, 1994

REMARKS:

LEGEND

BRECCIA; CONGLOMERATE
SANDSTONE
SILTSTONE
SHALE
CHERT
LIMESTONE
DOLOMITE; SIDERITE
MARLSTONE; CALCAREOUS; DOLOMITIC
ANHYDRITE; GYPSUM
SALT
COAL
IGNEOUS; METAMORPHIC

SILTY; SANDY; PEBBLES
ARGILLACEOUS; SILICEOUS
CALCAREOUS; DOLOMITIC
ANHYDRITIC; GYPSIFEROUS
NODULES
GLAUCONITE
BENTONITE
PYRITE
KAOLIN
FISH REMAINS
PLANT REMAINS
FOSSILS

OIL SHOWS
● EVEN
◐ SPOTTED
○ QUESTIONABLE
D DEAD (BITUMEN)

POROSITY
X INTERCRYSTALLINE/INTERGRANULAR
V; PP VUGGY; PIN POINT
F; E FRACTURE; EARTHY
CORED INTERVAL (IN DEPTH COLUMN)

SORTING
W; M; P WELL; MEDIUM; POOR

ROUNDING
A; a ANGULAR; SUBANGULAR
R; r ROUNDED; SUBROUNDED