P.O. Box 200
Cut Bank, Montana 59427-0200

MONTALBAN OIL AND GAS OPERATIONS, INC.
CUT BANK, MONTANA

Petroleum Consultants & Operation Managers

Office: 406-873-2845
Fax: 406-873-2835

January 5, 2026

Mr. John Gizicki
Underground Injection Control (UIC) Program Director
Montana Board of Oil and Gas Conservation
2535 St. John's Ave.
Billings, MT 59102

RE: Request for injection Permit
MOGO Blackfoot CB-M Sand Unit Vasboe 8-1 located in Section11 T37N R6W
Glacier County, Montana

Dear Mr. Gizicki,

Please find enclosed an Underground Injection Control (UIC) application by Montalban Oil and Gas Operations, Inc. (MOGO) requesting an aquifer exemption for the Cut Bank and Madison Formation in the well, Vasboe 8-1, operated by MOGO in the Blackfoot Cut Bank-Madison Sand Unit, Blackfoot Field. This well is currently shut in and is completed in the Cut Bank Formation as an injection well (enhanced recovery). It is proposed that the existing plugback plug be drill out and the well possibly deepened further into Madison Formation (open hole) and the Cut Bank and Madison will be completed as a water disposal well.

I certify the information contained in this application is, to the best of my knowledge, true and correct and work associated with the operation proposed will be performed by MOGO in conformity with this application and the terms and conditions under which it is approved. MOGO is requesting the application be placed on the docket for MBOGC February 12, 2026, hearing.

The Public Notice/Legal ad is due to print in the Helena Independent Record and the local newspaper this week. We will provide the affidavits of publication once received.

If you have any questions concerning the enclosed application, please contact Mr. Patrick Montalban at 406-873-2845.

Sincerely,

MONTALBAN OIL & GAS OPERATIONS, INC

Patrick M. Montalban
CEO

RECEIVED
JAN 09 2026
MONTANA BOARD OF OIL &
GAS CONSERVATION • BILLINGS

STATE OF MONTANA

Board of Oil and Gas

Docket No.: TBD

Underground Injection Control

Application

Blackfoot Field, Blackfoot Cut Bank-Madison

Sand Unit, Vasboe #8-1

Section 11 Township 37N Range 6W

Glacier County, Montana

Montalban Oil and Gas Operations, Inc.

Hearing Date: February 12, 2026

Underground Injection (UIC) Permit Application
Vasboe #8-1 Injection

The following report and justification are submitted in support of the application by Montalban Oil and Gas Operations, Inc. (MOGO) to permit the conversion of the Blackfoot Cut Bank-Madison Sand Unit (BCBMSU), Vasboe #8-1, which is a shut in Cut Bank Formation Injection well, for the purpose of water injection into the Madison Formation as required by Rule 36.221403 of the Rules and Regulations of the Montana Board of Oil and Gas Conservation.

1(a) Location of Injection Well:

The Vasboe #8-1 well is herein proposed for conversion to a water injection well into the Madison Formation. This well was originally drilled in 1958 to the Madison Formation for oil. Found commercial oil production in both the Cut Bank and Madison Formations. The Madison was completed open hole from 3432'-3437'and produced from 1958 to 1979. The field was unitized for oil production from the Cut Bank and Madison in 1976, by BOGC Order No. 34-76 (See Exhibit 3). The Cut Bank was perforated from 3228'-3248'and 3251'-3269' in 1979 and produced commingled with the Madison from 1979 until 1990, where upon application was made to EPA to convert the well to injection into the Cut Bank Formation. The well was plugged back from the Madison and converted into a Cut Bank injection well in 1990 (EPA Permit No. MTS2471-1931, Exhibit 4). Casing integrity tests have been performed and passed since conversion to a Cut Bank injector. Exhibit 1, shows the surface location and a circle of a quarter (1/4) mile or 1320 ft. radius representing the area of review (AOR).

Vasboe #8-1	853 ft. FSL 2173 ft. FEL	SW SE Section 11 T37N R6W

1(b) Location and Mechanical condition of wells within a Quarter Mile Area of Review (AOR) which penetrate injection zone:

1. MOGO Vasboe #9-1 NW NE Section 14 T37N R6W
   Drilled to the Madison Formation, cased and cemented in 1958.
   Plugged back Madison well (See Well Diagram).
   Recompleted in the Cut Bank through perforations.

Converted to a Cut Bank injection well in 1976, approved by EPA Permit #MT2471-00849(See Exhibit 5).
Casing Integrity tests have been made and passed since conversion in 1976.

2. MOGO Federal #1-4 SE NW SE Section 11 T37N R6W
   Drilled to Madison Formation, cased and cemented in 1983.
   It was not completed in the Madison Formation.
   Completed through perforations in the Cut Bank at 3286'-3304'.
   Well Temporarily Abandoned with CIBP set at 3250' with 20 sack cement plug on top of CIBP, across Cut Bank perforations. Top of cement 3078'.
   Current status: Temporarily Abandoned. (See Exhibit 12)

3. MOGO Federal #1-3 SE NW SE Section 11 T37N R6W
   Drilled to the Madison Formation, cased and cemented.
   Completed Madison oil well open hole in 1958.
   Plugged back and recompleted in the Cut Bank Formation through perforations at 3290'-3312', in 1962 for oil.
   Plugged back and recompleted in the Sunburst Formation through perforations at 3245'-3255' in 1999 for gas.
   Currently, Shut in Sunburst gas well. (See Exhibit 12)

4. MOGO Federal 2-2 NE SE SW Section 11 T37N R6W
   Drilled to the Madison Formation, cased and cemented in 1982.
   Completed noncommercial in the Madison open hole 3415'-3425'.
   Plugged Back to the Cut Bank and perforated from 3254'-3264'.
   Completed Cut Bank oil well. Shut in. (See Exhibit 12)

5. Hyland Oil Corporation, Federal #1, 872 ft. FSL 3300 ft., FEL Section 11 T37N R6W
   Drilled in 1958 to the Madison, cased and cemented.
   Produced from Madison and Cut Bank.
   Plugged and Abandoned 1969. (See Exhibit 12)

1(c) Location of all pipeline which will be used to transport fluids to the well:
Produced water from the Blackfoot field wells will be delivered by an existing pipeline central battery through and injection pump via a manifold system. (See Exhibit 2)

1(d) Area Producing Formations, Freshwater Aquifer, and Water Well Information:
There are two (2) wells capable of producing within the Quarter mile (AOR):

1. MOGO Federal #1-3 NW SE Section 11 T37N R6W
   Plugged back Madison-Cut Bank oil producer.
   Recompleted as a Sunburst gas well. Currently, Shut in.
   Pending Plug and Abandonment, per BLM request.

2. MOGO Federal 2-2 NE SE SW Section 11 T37N R6W
   Completed Cut Bank oil well.
   Currently, Shut In.

Freshwater well data was obtained from the Groundwater Information Center (MBMG Data Center) website https://mbmggwic.mtech.edu/. There are no freshwater wells within the AOR of the proposed injection well. Water wells located outside the AOR, but in the general vicinity of the planned Blackfoot Cut Bank-Madison Sand Unit Vasboe #8-1 are listed below:

Well Name	Location	Use	Distance from proposed SWD	Depth
Tom Tuma	Sec. 11 T37N R6W 48982014,-112.36575	Stock	3650'	260'
Croft Pet.	Sec. 11 T37N R6W 48.984969,-112.353752	Domestic	4150'	85'

(See Exhibit 10 for GWIC Information)

From Croft Petroleum Company well files it was noted that the following well:

Kullberg & Otthouse
Tribal #3
390' FNL 260 FEL of Lot 5
Section 11 T37N R6W

This well was drilled and plugged and abandoned by the operator. The surface owner, Joe Stone et al, reentered the well and completed it as a water well from 735' to 760' for Joe Stone the surface owner, June 1988 (See Exhibit 11).

The Two Medicine Formation is the target for shallow water in this area. The Croft Petroleum water well, Section 11 T37N R6W, does have a full water analysis done

and is included in the exhibit section. TDS is less than 1000 ppm. This well Tom Tuma and Joe Stone are stock water well and are included in the Exhibit10 and 11 section. The depth of these wells ranges from 85' to 760'.

Any potential Underground Sources of Drinking Water (USWD) are protected from the proposed injection zone by surface casing set at 194' and cemented to surface. Secondary protection would be 5 ½" production casing cemented across the Madison to above the Cut Bank into the Kootenai Formation and third protection would be the tubing casing annulus created when the injection packer is set. Proper monitoring of this annulus would preclude any contamination of any shallow aquifer. All production strings in the wells beyond the quarter mile radius of review are cement from the top of the Madison formation up into the Kootenai formation.

Typical for this area is to set the production packer and tubing, above the Cut Bank perforations and inject from there into the Madison. It can be seen in the Blackfoot Cut Bank-Madison Sand Unit (BCBMSU) well Muntzing B-3(7-3), SE NW Section 11 T37N R6W, approved under Board Order 101-2001 (See Exhibit 3), which approves injection into the Cut Bank and Madison. The Cut Bank Formation in this area requires between 2400 to 2500 psig surface pressure to inject into the formation and since maximum surface injection pressure for the Madison is limited to 2195 psig, very little if any fluids would be injected into the Cut Bank with the majority of the fluids going into the Madison. MOGO requests that the BCBMSU Vasboe 8-1 be allowed to be converted in this fashion, since this well is already authorized to inject into the Cut Bank under the original EPA Permit MTS2471-1931 and both Cut Bank and Madison are unitized under Board Order 34-76(See Exhibit 3).

1(e) Name and Geologic Description of Injection Zone:

THE MADISON FORMATION DESCRIPTION

The Blackfoot Cut Bank-Madison Sand Unit Vasboe #8-1 SWD will be completed for disposal into Mississippian Madison Formation. Since the completion is open hole in the Madison, from 3432' to 3237', it may be necessary to deepen the well before completing the well as an injection well to open additional formation for disposal. The best porosity is in the top 50' of the Madison Formation, a microcrystalline dolomite with fair to good intercrystalline porosity, vuggy in part. The upper confining formation is the Rierdon/Ellis Formation which is dense shale grading to a silty marlstone towards the bottom. This separates the current Cut Bank injection

zone (authorized by EPA in 1990, EPA Permit No. MTS2471-1931 (See referenced Permit) from the proposed Madison injection zone. The Rierdon/Ellis confining zone is roughly 120' thick in the area. The lower confining zone would be from the Mission Canyon Formation to the Lodgepole Formation. A dense microcrystalline to cryptocrystalline limestone, about 480' thick. (MOGO, Muntzing D-11, NE NW Section 11 T37NR6W, Devonian test well, See Exhibit 6). Request AE for the Madison from the top of the Madison Formation to the top of the Mission Canyon Formation, approximately 340'.

1(f) THE CUT BANK FORMATION DESCRIPTION

The Blackfoot Cut Bank-Madison Sand Unit Vasboe #8-1 SWD, is also currently completed as an injection well (Enhanced Recovery) in the Cut Bank through perforations from 3228' - 3229' and 3251'-3269' (authorized by EPA under EPA Permit No. MTS2471-1931). The Cut Bank Formation consists of a medium to coarse grained, quartz and chert, salt and pepper sandstone with fair to good intergranular porosity. Confining zone above the Cut Bank Formation is the Kootenai Formation a tight sandstone shale sequence nonproductive. Locally, produces gas from lenticular sandstone lens from the Sunburst sandstone, but does not have a large areal extent. Below the Cut Bank is a confining zone that separates the Cut Bank from the Madison, the Rierdon/Ellis Formation is composed of a tight shale grading to a Marlstone or low grade limestone.

1(g) **Description of Injection Fluid:**

The injection fluids chemistry is not expected to change. The fluid to be injected will consist entirely of mixed water from the Cut Bank Formation and Madison waterflood water from previous injection into the Cut Bank Formation. Injection volumes anticipated will be in the range of 400 to 500 BWPD. Water TDS from the Blackfoot Field central battery, has a 7000 TDS. Typical Cut Bank produced water is 7338 TDS and Madison produced water is 3100 TDS (See Exhibits 7,8,9 Water Analysis Reports).

VOLUME AND FRACTURE PRESSURE CALCULATIONS FOR 1320' RADIUS FOR VASBOE #8-1

Calculations for the volume limit is as follows:

$$V = \frac{(\sim r^{*} hn)}{5.615}$$

	*	Squared
	5.615	conversion factor bbls. to cu.ft.
	r	radius of surface area limit (1320')

n Madison Porosity 10% from porosity e-log used by Mr. Croft (See Exhibit 6)

h thickness of porous formation 39' used by Mr. Croft#

~ 3.14 constant

$$V=\frac{(3.14 \times 1320 \times 39 \times 0.10)}{5.615}$$

V=3,800,077 bbls.

Fracture Pressure at the surface is as follows:

Fracture Pressure SFE = Frac Gradient(psig/ft) – (0.433 X (Sp. Gr. Wtr)) X Depth

Frac Gradient psig/ft from Madison 1.07 from Mr. Croft's Pressures and Gradients
0.433 psig/ft. for 8.34 lbs./gallon weight of freshwater per Halliburton Red Book

1.002 measured Specific Gravity of injection water from Water Analysis 2/21/2001
3437' Depth to bottom of Madison open hole

Fracture Pressure SFE = ((1.07 – (0.433 X 1.002)) X 3437')

Fracture Pressure SFE = 2,186 psig

For the calculation purposes, the 39' in the MOGO D-11, NE NW Section 11 T37NR6W, in this well, is the best porosity interval and was used for porosity and thickness calculation. Since, MOGO Vasboe 8-1 is openhole completed with no porosity log run across the Madison Formation. The MOGO D-11 has a porosity log run from the top of the Madison down to Devonian Formation. For this application MOGO would request the AE be from the top of the Madison Formation to the top of the Mission Canyon Formation, approximately,480' (See Exhibit 6).

1(i) Names and addresses of the leasehold owners, including unleased mineral owners, and the surface owners within the area of review of the input well.
The names and addresses of leasehold and surface owners within the area of review for the proposed injection well are listed in Exhibit 12.

MOGO will notify leasehold owners, surface owners and unleased minerals in accordance with 36.22.1410(1) notification requirements for an underground injection permit. Affidavit of Notification to Surface and Mineral Owners along with an example of the mail notice is attached in Exhibit 14 and Exhibit 15.

LIST OF ALL EXHIBITS

Exhibit 1	Field and Unit Map Blackfoot Field
Exhibit 2	Pipeline Map Blackfoot Field
Exhibit 3	MBOG Unit Order 34-76, Blackfoot CB-M Sand Unit MBOG Order 101-2001
Exhibit 4	EPA Vasboe #8-1 authorization to inject into the Cut Bank FM
Exhibit 5	EPA Vasboe #9-1 authorization to inject into the Cut Bank FM
Exhibit 6	Porosity Log Muntzing D-11 for the Madison FM E-Log DIL for Muntzing D-11 from Madison to Bakken FM
Exhibit 7	Energy Lab Blackfoot Injection water analysis
Exhibit 8	Energy Lab Madison water analysis taken from S24 T33N R6W
Exhibit 9	Water Analysis Cut Bank produced water from Muntzing A-1
Exhibit 10	GWIC well log reports for: Croft Pet., Tom Tuma water wells
Exhibit 11	Well Diagram for Kullberg & Otthouse, Tribal #3 converted to water well
Exhibit 12	Well Diagram for wells within the ¼ mile APR
Exhibit 13	Surface and Mineral Owner List
Exhibit 14	Notification to Surface and Mineral Owners Letter
Exhibit 15	Affidavit of Notification to Surface and Mineral Owners

EXHIBIT !

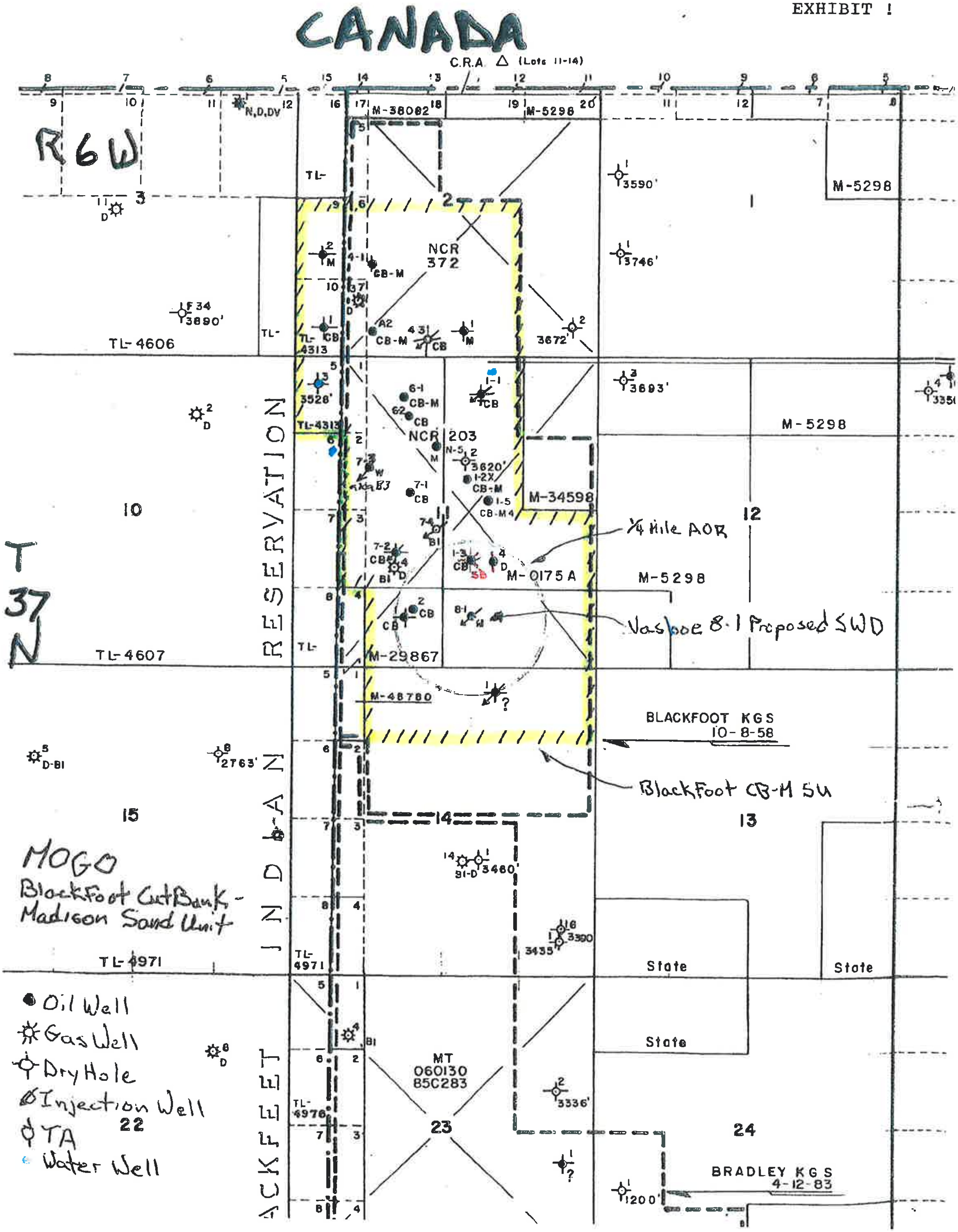

CANADA
C.R.A. △ (Lots 11-14)
R6W
T 37 N
NCR 372
NCR 203
M-38082
M-5298
M-34598
M-0175 A
M-29867
M-48780
TL-4606
TL-4313
TL-4607
TL-4971
TL-4976
INDIAN RESERVATION
BLACKFEET
¼ Mile AOR
Vaskoe 8-1 Proposed SWD
BLACKFOOT KGS
10-8-58
Blackfoot CB-M SU
BRADLEY KGS
4-12-83
MT
060130
85C283
State
MOGO
Blackfoot Cut Bank - Madison Sand Unit
Oil Well
Gas Well
Dry Hole
Injection Well
TA
Water Well

EXHIBIT 2

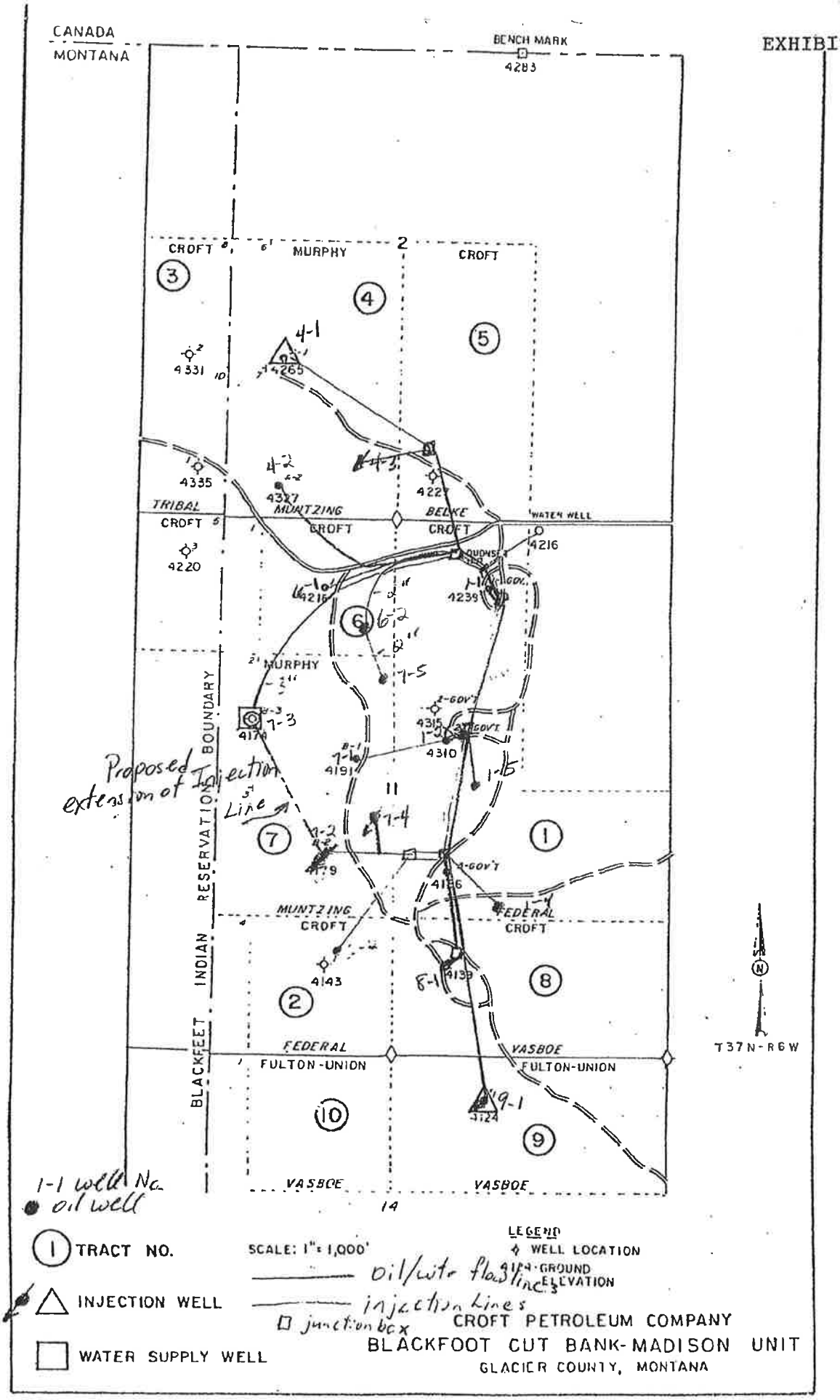

CANADA
MONTANA
BENCH MARK
4283
CROFT
MURPHY
CROFT
TRIBAL
CROFT
MUNTZING
CROFT
BELKE
CROFT
WATER WELL
MURPHY
INDIAN RESERVATION BOUNDARY
BLACKFEET
MUNTZING
CROFT
FEDERAL
CROFT
FEDERAL
FULTON-UNION
VASBOE
FULTON-UNION
VASBOE
VASBOE
Proposed extension of Injection Line
T37N-R6W
1-1 well No.
oil well
1 TRACT NO.
INJECTION WELL
WATER SUPPLY WELL
SCALE: 1"= 1,000'
LEGEND
WELL LOCATION
GROUND ELEVATION
oil/wtr flowline
injection Lines
junction box
CROFT PETROLEUM COMPANY
BLACKFOOT CUT BANK-MADISON UNIT
GLACIER COUNTY, MONTANA

EXHIBIT 3

BEFORE THE BOARD OF OIL AND GAS CONSERVATION
OF THE STATE OF MONTANA

IN THE MATTER OF THE APPLICATION OF CROFT PETROLEUM CO. FOR AN ORDER PROVIDING FOR THE OPERATION AS A UNIT OF AN AREA TO BE KNOWN AS THE BLACKFOOT CUT BANK-MADISON SAND UNIT AREA; APPROVING A UNIT AGREEMENT AND A UNIT OPERATING AGREEMENT FOR THE UNIT OPERATION THEREOF; AND AUTHORIZING THE CONDUCTING OF A WATERFLOOD INJECTION PROGRAM (SECONDARY RECOVERY) IN THE PROPOSED UNIT AREA SITUATED IN THE BLACKFOOT FIELD, GLACIER COUNTY, MONTANA; AND FOR VACATING EXISTING SPACING ORDERS RELATED THERETO. Docket No. 21-76	ORDER NO. 34-76

Report of the Board

The above entitled cause came on regularly for hearing on the 27th day of May, 1976, in the Big Sky Room, Holiday Motel, City of Helena, County of Lewis and Clark, State of Montana, pursuant to the order of the Board of Oil and Gas Conservation of the State of Montana hereinafter referred to as the "Board." The notice of said hearing was duly given as required by law, setting the cause for hearing. At this time and place testimony was presented, statements and exhibits were received, and the Board then took the cause under advisement; and, the Board having fully considered the testimony, statements and exhibits and all things and matters presented to it for its consideration by all parties in the Docket, and being well and fully advised in the premises, finds and concludes as follows:

Findings of Fact

1. Due, proper and sufficient notice was published and given of this matter, the hearing hereon, and of the time and place of said hearing, as well as the purpose of said hearing; all parties were afforded opportunity to present evidence, oral and documentary.

2. More than sixty days prior to filing his application herein, the applicant gave due notification of his intention to make such application by mailing notice to that effect to all persons then known to applicant as owning an interest in the oil and gas within the proposed unit area, and with each notice to the producers, applicant enclosed a copy of his proposed plan of unit operations. Such application was filed on the 30th day of April, 1976, that no objections or complaints to said application were filed within ten days of the application as required by the rules and regulations of the Board. Legal notice as published and given of this matter, of the hearing hereon, and of the time and place for such hearing as well as the purpose thereof. All parties were afforded ample opportunity to present evidence, oral and documentary.

3. Applicant and parties represented by applicant are the owners of leasehold interests underlying more than 60% of the surface within the area delineated as the Blackfoot Cut Bank-Madison Sand Unit Area and it has applied to the Board for an order providing for the unit operation of the Cut Bank and Madison Formations within such delineated area, approving or prescribing a plan for unit operations thereof, approval of the unit agreement therefore, and authorization and approval of a waterflood injection program for secondary recovery.

4. The delineated Blackfoot-Cut Bank Sand Unit Area is composed of the following described lands situated in Glacier County, Montana:

Township 37 North, Range 6 West, MPM
Section 2: Lots 6, 7, 9 and 10, E½SW¼, W½SE¼
Section 11: Lots 1, 2, 3 and 5, W½NE¼, E½NW¼, SE¼, E½SW¼
Section 14: N½NE¼, NE¼NW¼

containing 813.37 acres, more or less.

5. The waterflood project proposed is that of injecting water into the Cut Bank-Madison Sands underlying said unit area. The estimated amount of water to be injected daily will be approximately 2,000 barrels.

6. The primary energy of the reservoir has been substantially depleted, and secondary recovery by water injection is feasible and reasonably necessary to increase the ultimate recovery of oil and gas. The inauguration and conduct of a waterflood injection program such as that proposed by the applicant will result in the recovery of a substantial amount of additional oil which would otherwise remain in place.

7. In order to effectively and efficiently conduct waterflood operations within the delineated area, for pressure maintenance or secondary recovery purposes, there is need for the operation as a unit of the Cut Bank-Madison Sand Formation underlying the above described lands; and it is necessary that the interests of all owners in the oil and gas therein be unitized.

8. Evidence presented by applicant sufficiently showed that it was not possible to effect a wholly voluntary unitization of interests in said reservoir, and that the issuance of an order for the unit operation of that part of the pool within the delineated area is necessary under the provisions of Section 60-131.1 through Section 60-131.13 of the Revised Codes of Montana.

9. The value of the estimated additional recovery of oil less royalties exceeds the estimated additional cost incident to conducting such operations; and

10. The full areal extent of such pool has been reasonably defined and determined by drilling operations; and

11. Applicant's plan for unit operations, as presented at the hearing contains terms and conditions that are just and reasonable, and includes the provisions that are required by Section 60-131.3 of the Revised Codes of Montana, as amended; and

12. The plan allocates to each tract in the unit area its fair share of the oil and gas produced from the unit area and not required or unavoidably lost. The Board considered the relative value that such share of productions bears to the relative value of all of the separately owned tracts in the unit area, exclusive of physical equipment utilized in unit operations. In so considering such relative value, the Board weighed the economic value of the gas to all persons affected as compared to the economic value of the oil to all persons affected; and

13. Such plan for unit operations has been heretofore approved in writing by more than the requisite number of owners and persons, and by more than the requisite percentage of interests in the unit area, than the number or amount specified in Section 60-131.4 of the Revised Codes of Montana, as amended; and

14. The proposed unit, unit agreement, plan for unit operations, and waterflood injection program (secondary recovery) are in the public interest, and are in the interests of conservation of oil and gas and prevention of waste within the State of Montana.

Conclusion of Law

The Board concludes, as a matter of law, that the application of Croft Petroleum Company should be granted as applied for.

Order

IT IS THEREFORE ORDERED by the Board of Oil and Gas Conservation of the State of Montana that the application of Croft Petroleum Company for an order providing for the operation as a unit of the Blackfoot Cut Bank-Madison Sand Unit Area, adopting and approving a plan of unit operations and approving a unit agreement therefor, and authorizing a waterflood injection program in said unit area is hereby granted as applied for. The Board hereby adopts the plan for unit operations incorporated in the Unit Agreement and Unit Operating Agreement attached hereto and by this reference incorporated as a part hereof, and further approves such Unit Agreement and Unit Operating Agreement.

IT IS FURTHER ORDERED that applicant may drill or utilize additional input wells as are necessary to operate said waterflood project without further notice and hearing but subject to the administrative authorization by this Board for such additional injection wells within the unit area. Applicant may drill additional water source wells as necessary without further notice and hearing but subject to the administrative authorization by this Board for such additional water source wells. Applicant may drill additional producing wells as necessary without further notice and hearing but subject to the administrative authorization of this Board for such additional production wells provided that no well may be drilled closer to the unit boundary than 330 feet.

Done and performed by the Board of Oil and Gas Conservation of the State of Montana, at Helena, Montana, this 27th day of May, 1976.

BOARD OF OIL AND GAS CONSERVATION
OF THE STATE OF MONTANA

Richard A. Campbell, Chairman

Carl J. Iverson, Vice Chairman

Milton G. Anderson, Board Member

John P. Moore, Board Member

(SEAL)

ATTEST:

Donald E. Chisholm, Administrator

BEFORE THE BOARD OF OIL AND GAS CONSERVATION
OF THE STATE OF MONTANA

IN THE MATTER OF THE APPLICATION OF CROFT PETROLEUM COMPANY FOR AN AREA INJECTION PERMIT FOR THE MADISON FORMATION UNDERLYING THE BLACKFOOT CUT BANK MADISON SAND UNIT AREA AND FOR PERMISSION TO USE ITS MUNTZING B-3 WELL IN THE SWNW OF SECTION 11, T37N-R6W, GLACIER COUNTY, MONTANA, AS AN INJECTION WELL INTO THE CUT BANK AND MADISON FORMATIONS.

ORDER NO. 101-2001

Docket No. 70-2001

Report of the Board

The above entitled cause came on regularly for hearing on the 5th day of April, 2001, in the Billings Petroleum Club, Billings, Montana, pursuant to the order of the Board of Oil and Gas Conservation of the State of Montana, hereinafter referred to as the Board. At this time and place testimony was presented, statements and exhibits were received, and the Board then took the cause under advisement; and, the Board having fully considered the testimony, statements and exhibits and all things and matters presented to it for its consideration by all parties in the Docket, and being well and fully advised in the premises, finds and concludes as follows:

Findings of Fact

1. Due, proper and sufficient notice was published and given of this matter, the hearing hereon, and of the time and place of said hearing, as well as the purpose of said hearing; all parties were afforded opportunity to present evidence, oral and documentary.

2. The United States Environmental Protection Agency has granted applicant an aquifer exemption for the Madison Formation surrounding the Muntzing B-3 well.

3. Granting the application in the manner hereinafter set forth will serve to protect correlative rights and be in the interest of conservation of oil and gas in the State of Montana.

Order

IT IS THEREFORE ORDERED by the Board of Oil and Gas Conservation of the State of Montana that applicant's request for an Area Injection Permit for the Madison Formation underlying the Blackfoot Cut Bank Madison Sand Unit Area is modified in that only the Muntzing B-3 well in the SWNW of Section 11, T37N-R6W, Glacier County, Montana, is approved as an injection well into the Cut Bank and Madison formations subject to the following conditions:

1. Surface injection pressure is limited to 2195 psig.
2. Injection volume is limited to 950,000 barrels over the life of the well.
3. A successful mechanical integrity test must be performed before injections may begin.

BOARD ORDER NO. 101-2001

Done and performed by the Board of Oil and Gas Conservation of the State of Montana at Billings, Montana, this 5th day of April, 2001.

BOARD OF OIL AND GAS CONSERVATION
OF THE STATE OF MONTANA

David Ballard, Chairman

Denzil Young, Vice-Chairman

Jerry Kennedy, Board Member

Jack King, Board Member

Allen Kolstad, Board Member

Elaine Mitchell, Board Member

ATTEST:

Gary Willis, Board Member

Terri H. Perrigo, Executive Secretary

EXHIBIT 4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

JUL 24 1990

Ref: 8WM-DW

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Jerry Croft, President
Croft Petroleum Company
P.O. Box 397
Cut Bank, Montana 59427

RE: UNDERGROUND INJECTION CONTROL (UIC)
Additional Well in Area Permit
Vasboe #8-1
EPA Permit No. MTS2471-1931
Glacier County, Montana

Dear Mr. Croft:

This letter constitutes approval by the Environmental Protection Agency (EPA) to convert the Vasboe #8-1 production well to an injection well. Existing casing and cement in the Vasboe #8-1 meets the requirements of the existing area permit and conversion may take place as outlined in the enclosed "Well Conversion Procedures". Please be advised that all provisions of the area permit apply to the Vasboe #8-1 well including conversion, operation, monitoring, reporting, and plugging.

The following items must be completed prior to beginning injection into the Vasboe #8-1.

INJECTION FORMATION TESTING

An injectivity test(s) shall be performed prior to full operation of any well. The following information concerning the injection formation shall be determined and included in the completion/conversion report (EPA Form 7520-10):

1) fluid pore pressure; and

2) injection formation "breakdown" pressure and instantaneous shut-in pressure (ISIP) as determined by a step-rate test.

MECHANICAL INTEGRITY TEST (MIT)

The permittee must demonstrate that the well has mechanical integrity in accordance with 40 CFR 146.8

and Part II, Section C. 4. (a), and the permittee has received notice form the Director that such a demonstration is satisfactory. The permittee shall notify EPA thirty (30) days prior to conducting this test so that a representative may be present to observe the test.

This test shall be made for a minimum of forty-five (45) minutes at a pressure of 300 pounds per square inch gauge (psig), measured at the surface. The tubing/casing annulus shall be filled with a non-corrosive fluid (either a non-toxic liquid or the injection liquid) at least twenty-four (24) hours in advance of the test. Pressure values shall be recorded at five-minute intervals or less. A well passes the MIT if there is less than a ten (10) percent decrease in pressure over the forty-five (45) minute period.

DIRECTOR'S REVIEW

Injection may not commence until conversion and testing is complete, and the Director has inspected or otherwise reviewed any new injection wells and finds them in compliance with the conditions of the permit. If the permittee has not received notice from the Director of his or her intent to inspect or otherwise review any of the new injection wells within thirteen (13) days of the date of the receipt of notice of well completion, prior inspection or review is waived and the permittee may commence injection.

This well will not be limited to a specific volume rate, but will be limited by an injection pressure of 3200 psi.

If you need to speak with someone regarding the addition of the Vasboe #8-1 well to the area permit, or if you need to schedule to have a test witnessed, please contact Mr. Chuck Tinsley at the letterhead address, citing **"Mail Code 8WM-DW"**, or by telephone at (303) 293-1684.

Sincerely,

Dale Doddridge for

Max H. Dodson, Director
Water Management Division

enclosure

Emmit Schmidt
303-293-1436

406-449-5486
Jim Boyter Helena.
301 S. Park
Drawer 10096
Helena 59626

RECEIVED AUG 0 2 1996

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

EXHIBIT 5

JUL 24 1996

Ref: 8ENF-T

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Jerry Croft, President
Croft Petroleum Company
Petroleum Center Building
214 N. Central Avenue
P.O. Box 397
Cut Bank, MT 59427

Re: UNDERGROUND INJECTION CONTROL (UIC)
Extension of TA Status for
Vasboe #9-1 (EPA #MT2471-00848) and
Muntzing #4-1 (EPA #MT2471-00849)
Blackfoot Cut Bank Field
Glacier County, MT

Dear Mr. Croft:

We have received the results of the mechanical integrity tests for the Vasboe #9-1 and Muntzing #4-1 wells in the Blackfoot Cut Bank Field. The wells successfully passed mechanical integrity tests on June 26, 1996; the tests were witnessed by a representative of the Environmental Protection Agency. The wells had been temporarily abandoned (TA) for a period exceeding two (2) years.

UIC regulation 40 CFR 144.52(a)(6) requires that after a cessation of operations of two years, a permitted injection well must be plugged and abandoned, or the operator must request and receive EPA approval for an extension of TA status. If warranted, an extension may be granted for a period of up to two (2) years. The well must be tested for mechanical integrity in order to insure that all underground sources of drinking water are adequately protected during the period of continued inactivity. This test must be completed, and passed, before any extension will be granted.

Croft Petroleum has fulfilled the above requirement for the Vasboe #9-1 and the Muntzing #4-1 wells and may retain the wells as TA for an additional two (2) years, to **June 26, 1998.** If either well is not returned to active injection by the extension date, then the well must be plugged and abandoned, unless an additional extension for TA status is requested. In the latter instance, you must state the reason for the extension in writing to this office, and the well must again be tested for mechanical integrity before an extension is granted.

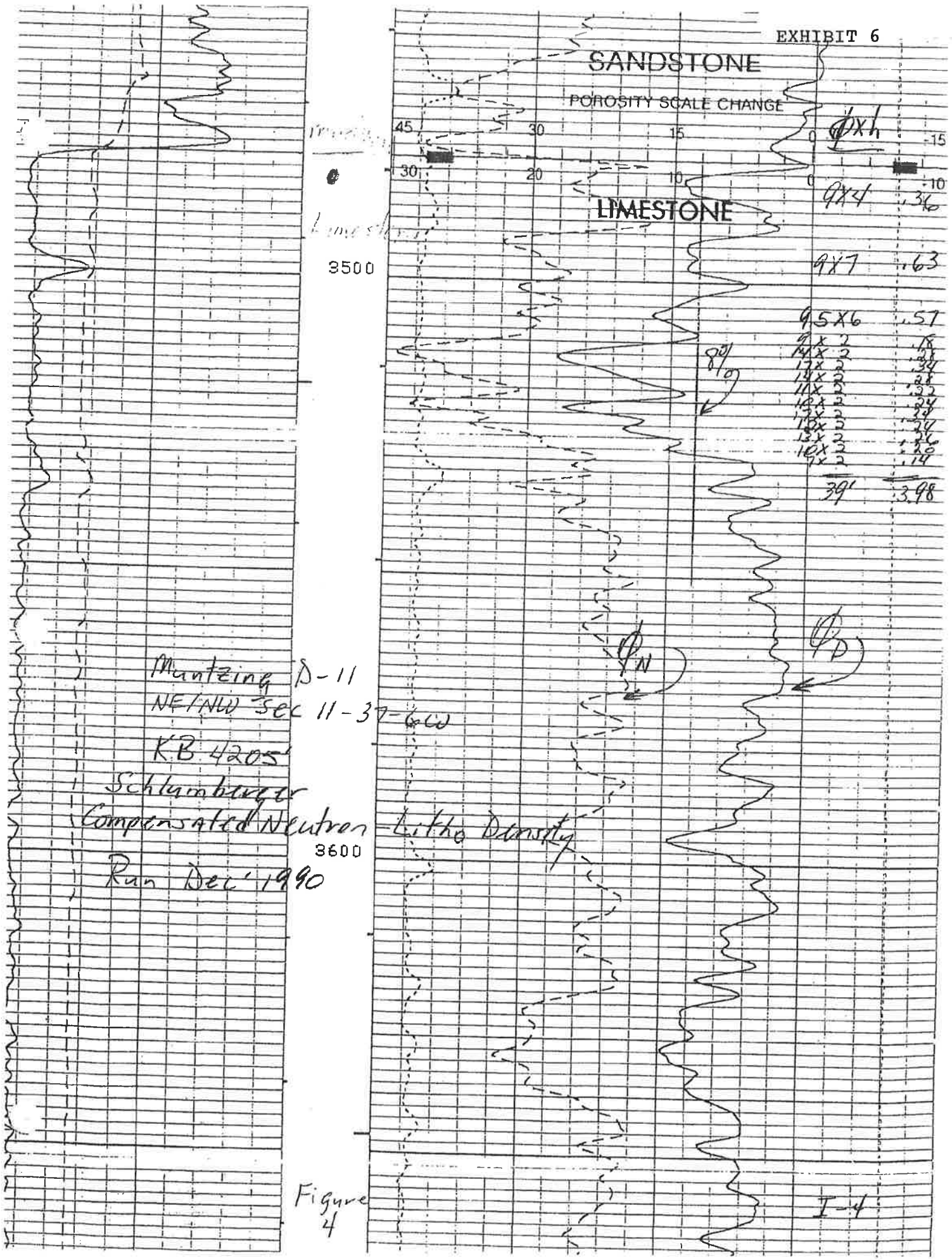
If you have any questions concerning this letter, you may contact John Carson at (303) 312-6203. Also, please direct all correspondence to the attention of John Carson at Mail Code 8ENF-T.

Sincerely,

Sharon L. Kercher, Director
Technical Enforcement Program

cc: Jim Boyter
Montana Office

EXHIBIT 6



ϕ x h | -15 | -10

9 x 4	.36
9 x 7	.63
9.5 x 6	.57
9 x 2	.18
14 x 2	.28
17 x 2	.34
14 x 2	.28
11 x 2	.22
12 x 2	.24
12 x 2	.24
18 x 2	.36
13 x 2	.26
10 x 2	.20
7 x 2	.14
39'	3.98

Figure 4

I-4

Schlumberger

DUAL INDUCTION - SFL

COMPANY CROFT PETROLEUM COMPANY

WELL MUNTZING D-11

FIELD BLACKFOOT

COUNTY GLACIER STATE MONTANA

COUNTY GLACIER
FIELD BLACKFOOT
LOCATION 990' FNL & 1945' FWL
WELL MUNTZING D-11
COMPANY CROFT PETROLEUM COMPANY

LOCATION 990' FNL & 1945' FWL
NE / NW

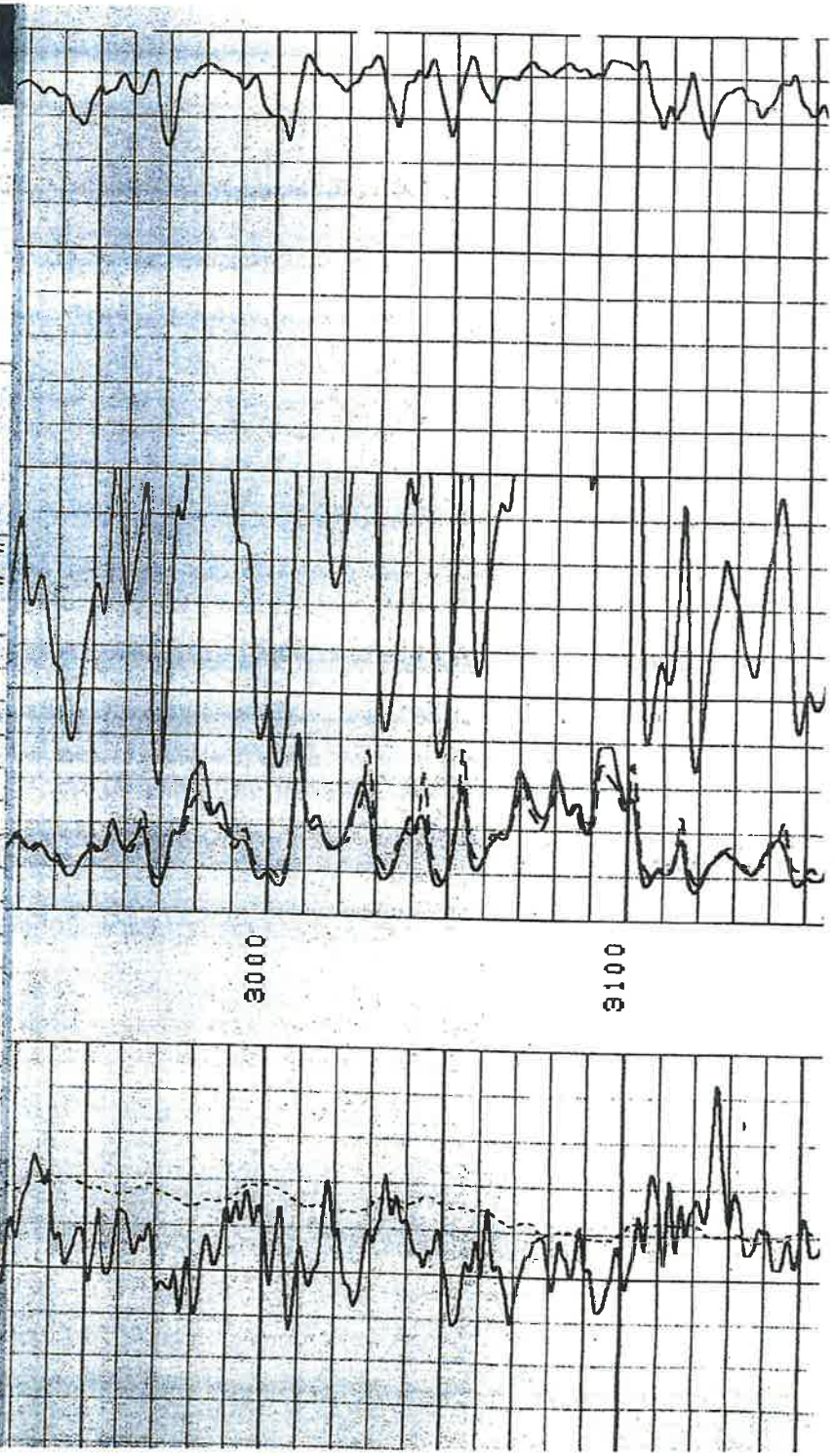
Other Services:
DIL/GR
LDT/CNL/GR
CYBERLOOK

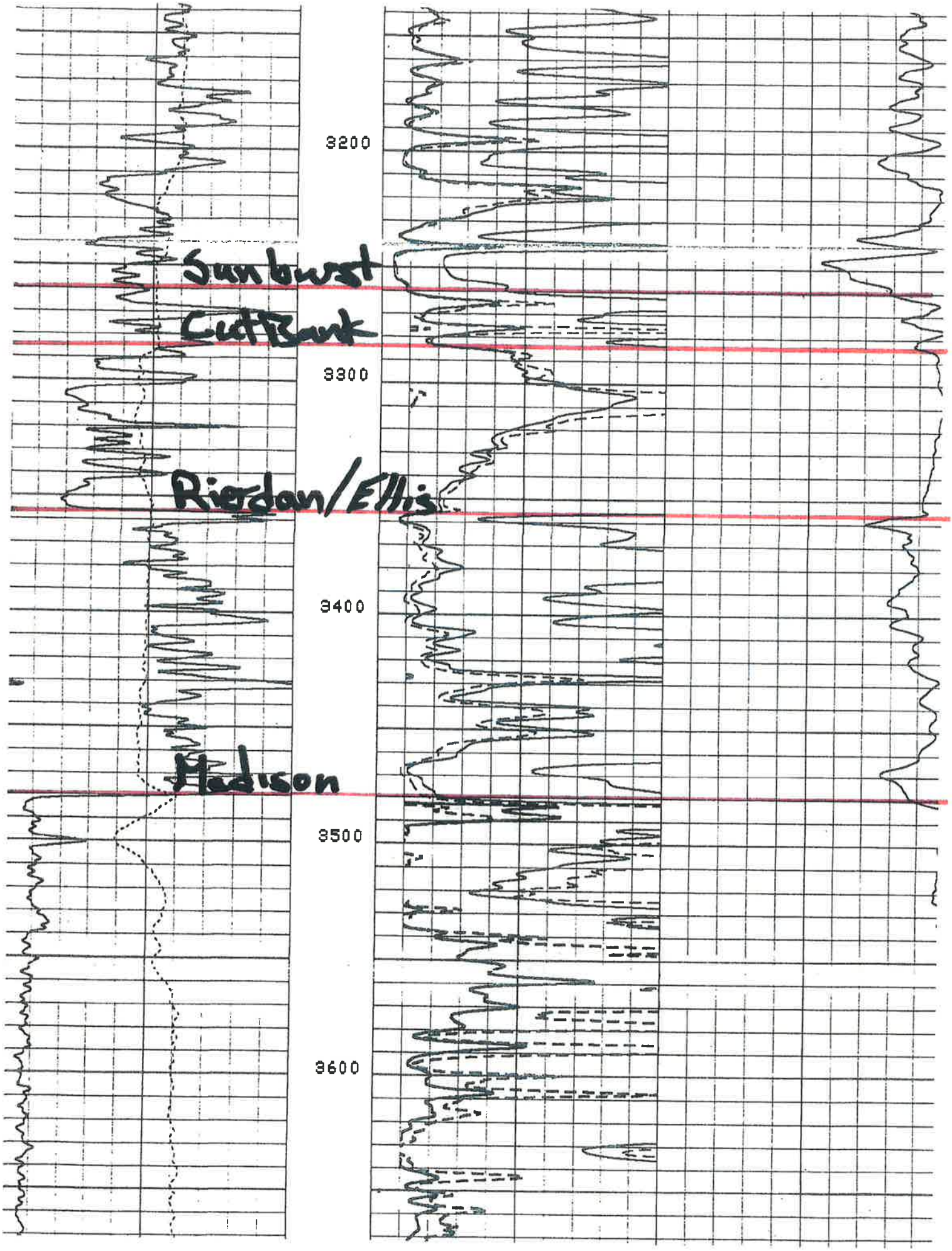
API SERIAL NO.	SECT.	TWP.	RANGE
-	11	37N	6W

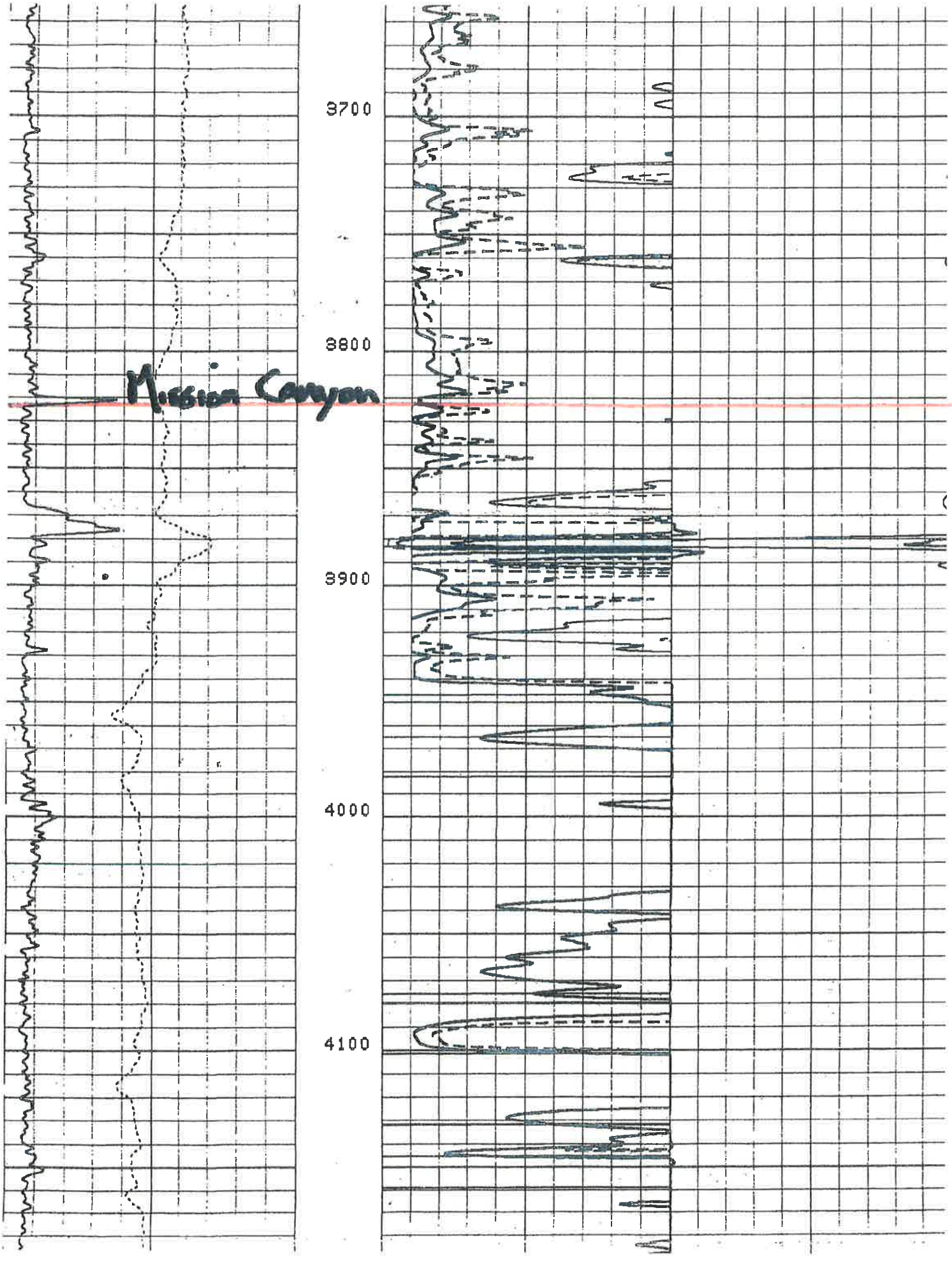
Permanent Datum	GROUND LEVEL	Elev.	4195.0 F
Log Measured From	KELLY BUSHING	10.0 F	above Perm. Datum
Drilling Measured From	KELLY BUSHING		

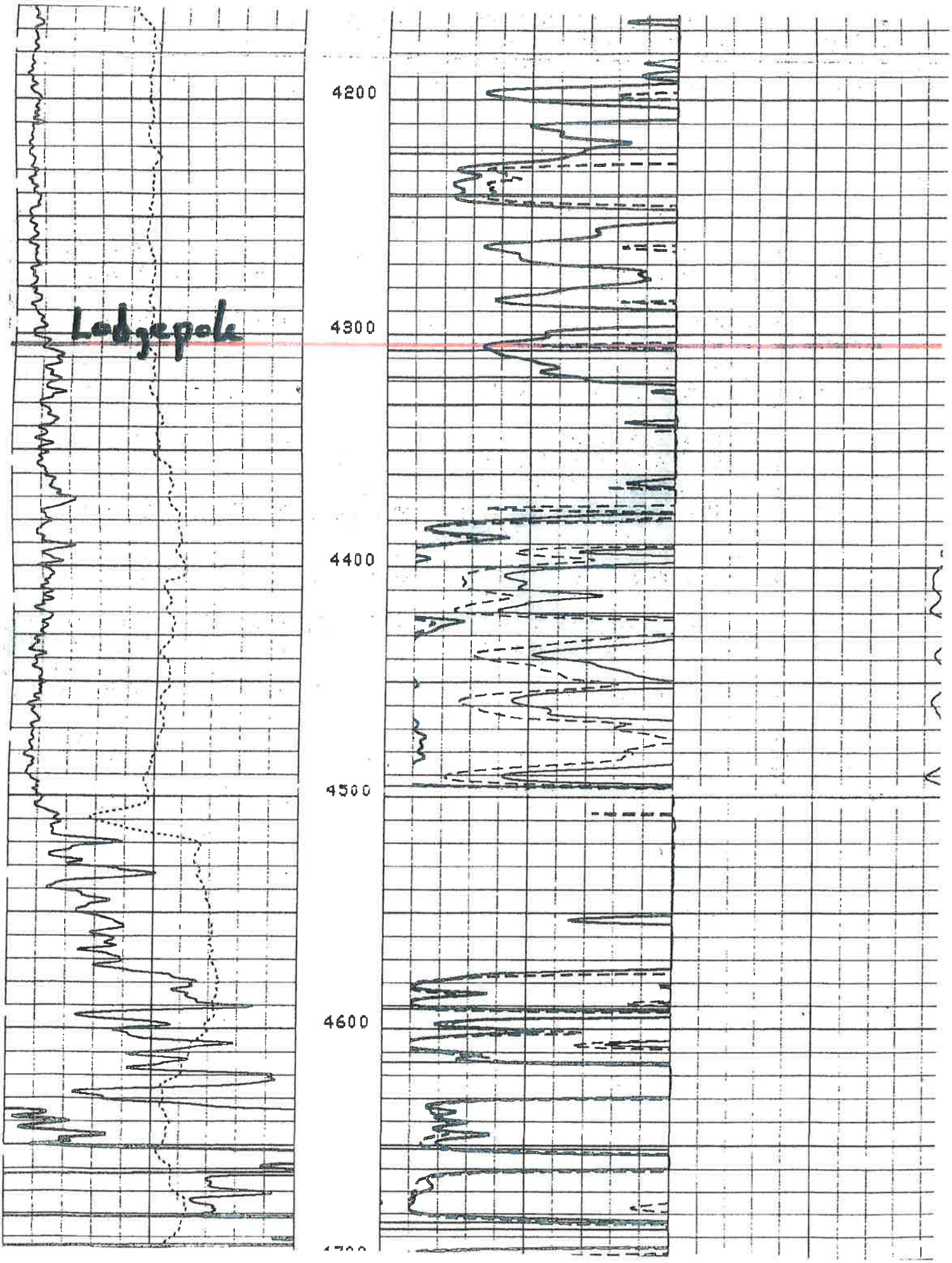
Elev.: K.B. 4205.0 F
D.F. 4204.0 F
G.L. 4195.0 F

Date	05-DEC-1990		
Run No.	ONE		
Depth Driller	4975.0 F		
Depth Logger (Schl.)	4979.0 F		
Btm. Log Interval	4973.0 F		
Top Log Interval	243.0 F		
Casing-Driller	9 5/8 @ 245.0 F	@	@
Casing-Logger	243.0 F		
Bit Size	7 7/8	8 3/4	
Type Fluid in Hole	GEL		
Dens. / Visc.	9.70 LB/G	53.0 S	
pH / Fld. Loss	9.0	12.0 C3	
Source of Sample	FLOWLINE		
Rm @ Meas. Temp.	.582 OHMM @ 78.0 DEGF		@
Rmf @ Meas. Temp.	.393 OHMM @ 64.0 DEGF		@
Rmc @ Meas. Temp.	1.070 OHMM @ 75.0 DEGF		@
Source: Rmf / Rmc	PRESSED	MEASURED	
Rm @ BHT	.500 OHMM @ 92.0 DEGF		@
TIME - Circulation Ended	08:30 DEC 5, 1990		
TIME - Logger on Bottom	12:45 DEC 5, 1990		
Max. Rec. Temp.	92.0 DEGF		
Equip. / Location	8322	CUTBANK	
Recorded By	PALMER		
Witnessed By	CROFT & HEDGLIN		




3200
Sunburst
Cut Bank
3300
Rierdan/Ellis
3400
Madison
3500
3600


3700
3800
Mission Canyon
3900
4000
4100


Ledyepole
4200
4300
4400
4500
4600

ENERGY LABORATORIES, INC. • P.O. Box 30916 • 1120 South 27th Street • Billings, MT 59107-0916
800-735-4489 • 406-252-6325 • 406-252-6069 fax • eli@energylab.com

EXHIBIT 7

Company: Croft Petroleum	**Date : 2/21/2001**
Field : Blackfoot Pump Section	**Sample Date : 2/8/2001**
County : Glacier Co., MT	**Formation : Cut Bank & Madison Forms**
Location : Inj. pump suction-produced water	**Rock Type :**
Lab ID : 001-01-50985	**Depth :**
Comments :	

Water Analysis Report

CATIONS	mg/l	meq/l
Potassium	48	1.23
Sodium	2,640	114.83
Calcium	50	2.50
Magnesium	21	1.73
Iron	nd	nd
Barium	nd	nd
Strontium	nd	nd
SUM +	2,759	120.29

ANIONS	mg/l	meq/l
Sulfate	115	2.39
Chloride	2,130	60.08
Carbonate	<1	0.00
Bicarbonate	4,020	65.90
Bromide	nd	nd
Organic Acids	nd	nd
Hydroxide	<1	0.00
SUM -	6,265	128.37

Solids	
Total Dissolved Solids @180°C	7,000 mg/l
Total Solids, Calculated	7,014 mg/l
Total Solids, NaCl equivalents	5,984 mg/l
Chloride as NaCl	3,511 mg/l
NaCl, % of Total Dissolved Solids	50.06 %
Accuracy	3.86 Sigma

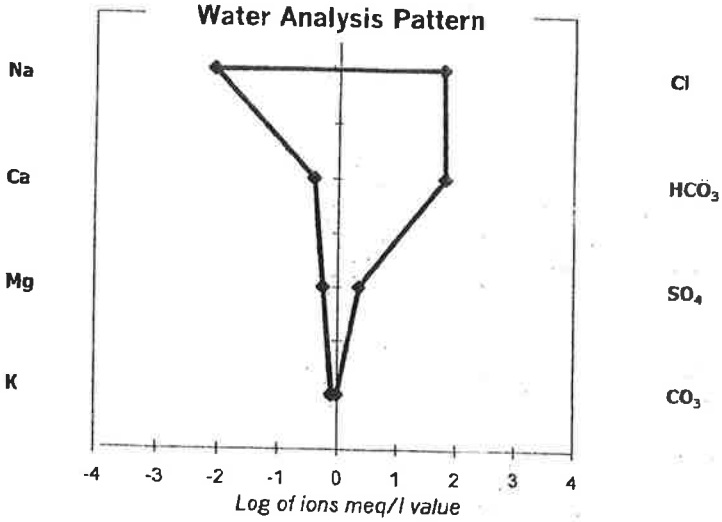
Sample Conditions	
pH, s.u. (Field)	7.30 s.u.
Sample Pressure	14.70 psia
Surface Temp	nd °F
Downhole Temp	nd °F
Ionic Strength	0.129 μ

Dissolved Gases			
Bisulfide ion	nd	Dissolved O_2, aq	nd
Hydrogen Sulfide	nd	Total CO_2, aq	3,228 mg/l
Total Sulfide	nd		

Other Properties			
Calcium Hardness as $CaCO_3$	125 mg/l	Specific Gravity	1.002 measured
Magnesium Hardness as $CaCO_3$	87 mg/l	Specific Gravity	1.006 calculated
Total Hardness as $CaCO_3$	212 mg/l	Resistivity, 68°F	0.99 ohm-m
		Conductivity 25°C	10,100 umhos/cm

Microbiological	
Sulfate Reducing	nd
Aerobic Bacteria	nd

Scaling Conditions	
Calcium Carbonate	$CaCO_3$ +
Calcium Sulfate	$CaSO_4$ - - -
Barium Sulfate	$BaSO_4$ -
Strontium Sulfate	$SrSO_4$ -



Probable Mineral Residue, Dry

Calculation error = 6.7 %

COMPOUND	mg/l
NaHCO3	5,090
NaCl	3,030
Ca(HCO3)2	202
Na2SO4	170
Mg(HCO3)2	126.4
KCl	91.5

Note: nd denotes 'Not Determined'

01/13/00 vEL1.0carney/standish

\\ELI_BL2\PUBLIC\Office\01ROFwater\[50985.xls]Input

EXHIBIT 8

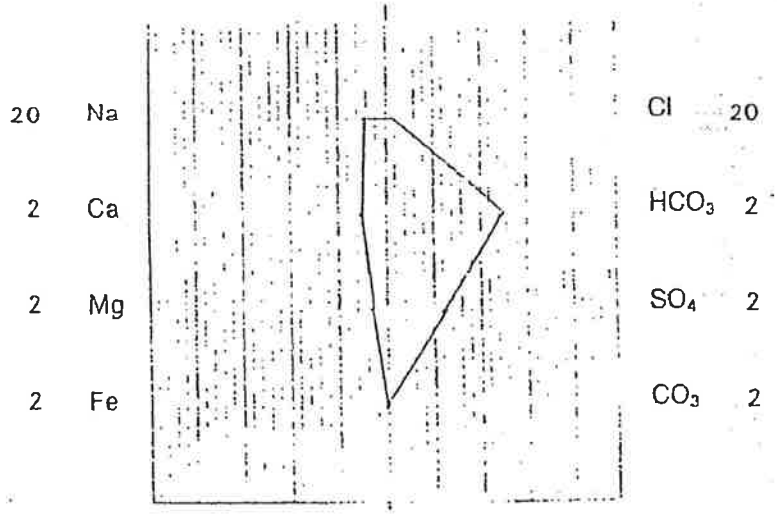
ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-873-5227

WATER ANALYSIS REPORT Lab. No. 91-4308

ld n S.C.C.B.S.U. County Glacier State Montana
ll No. S.C.C.B.S.U., West Plant Location Sec 24 Tusp 33N Rge 6W
mation Madison Depths
erator Unocal Oil & Gas Date Sampled 02/05/91
T. No. Sample Surge Tank Date Submitted 02/07/91
drogen Sulfide: Present X Absent Other Data Sampled by B. Nanini Date Reported 02/20/91
Clear, turbid sample with colorless, clear filtrate.

ATIONS	mg/l	meq/l	ANIONS	mg/l	meq/l
tassium	38	0.966	Sulfate	587	12.2
dium	974	42.3	Chloride	566	16
alcium	105	5.25	Carbonate	0	0
agnesium	42	3.42	Bicarbonate	1580	25.8

WATER ANALYSIS PATTERN
Scale meq/l Per Unit



Total Dissolved Solids, mg/l 3100 Resistivity @ 68°F, ohms/meter³ 2.15
Chloride as NaCl, mg/l 932 Specific Gravity @ 60/60°F 1.002
pH 7.3 Cation-Anion Balance, % Diff. 1.9

NOTE: Milligrams/liter (mg/l) approximately equivalent to ppm. meq/l = milliequivalents per liter.

REMARKS:

EXHIBIT 9

P. O. BOX 593
BILLINGS, MONTANA
123 N. 32ND ST.

WATER ANALYSIS REPORT

Lab. No. 5541-2

Field BLACKFOOT POOL County GLACIER State MONTANA
Well No. MUNTZING A-1 Location SW NE SW 2-37N-6W
Formation CUT BANK Depths
Operator MURPHY CORPORATION Date Sampled
DST No. Sample Date Analyzed 8-3-62
Other Data SAMPLE CLEAR COLORLESS WATER WITH OIL PRESENT.

Constituents	PPM	MEQ.	MEQ. %
Sodium	3,273	142.60	48.91
Calcium	37	1.85	0.64
Magnesium	16	1.32	0.45
Sulfate	0	0	0
Chloride	2,851	80.40	27.58
Carbonate	229	7.63	2.62
Bicarbonate	3,460	57.74	19.80

Total Solids in Parts per Million
By evaporation
After ignition
Calculated 8,145
pH 8.6
Specific Gravity @ 60°F 1.007
Resistivity @ 68°F ohms/meter 0.89

Chloride as NaCl 4,701 PPM. Total Solids From Resistivity as NaCl 7,338 PPM.

NOTE: Sodium and potassium reported as sodium. MEQ.=milliequivalents per liter. PPM=parts per million (milligrams per liter). 1 PPM equivalent to 0.0001%

WATER ANALYSIS PATTERN

Scale MEQ. Per Unit

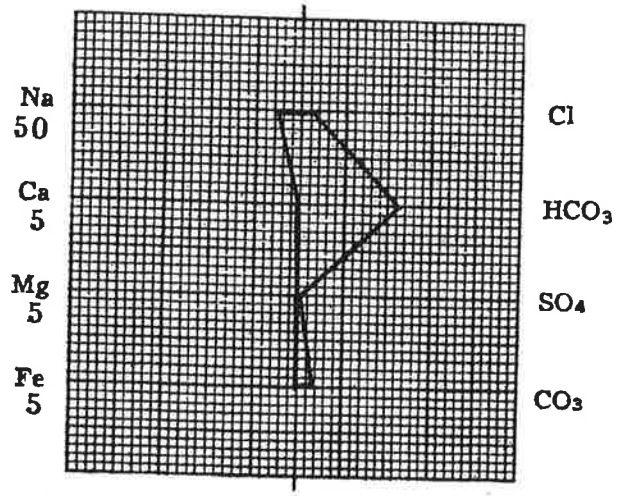


EXHIBIT 10

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View field visits for this site
View water quality for this site

Site Name: CROFT PETROLEUM
GWIC Id: 150359

Section 1: Well Owner(s)

1) CROFT PETROLEUM (MAIL)
N/A
N/A N/A N/A [08/08/1995]

Section 2: Location

Township	Range	Section	Quarter Sections
37N	06W	11	NW¼ NW¼ NE¼ SE¼ NW¼ NE¼

County	Geocode	Parcel
GLACIER		

Latitude	Longitude	Geomethod	Datum
48.984969	-112.353752	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
4215			

Measuring Point Altitude	MP Method	Datum	Date Applies
4215			8/8/1995

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method:
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: N/A

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.
There are no casing strings assigned to this well.
There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 85
Static Water Level:
Water Temperature:

Unknown Test Method *

Yield _ gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

211TMDC - TWO MEDICINE FORMATION (OF MONTANA GROUP)

Lithology Data

There are no lithologic details assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:
License No: -
Date Completed:

Ground-Water Information Center Water Quality Report
Report Date: 12/11/2025

Site Name: CROFT PETROLEUM
Compare to Water Quality Standards

Location Information

Sample Id/Site Id:	1996Q0244 / 150359	Sample Date:	8/8/1995
Location (TRS):	37N 06W 11 ABDABB	Agency/Sampler:	MBMG / PMN
Latitude/Longitude:	48° 59' 5" N 112° 21' 13" W	Field Number:	370611A
Datum:	NAD83	Lab Date:	10/2/1995
Altitude:	4215	Lab/Analyst:	MBMG / TSH
County/State:	GLACIER / MT	Sample Method/Handling:	PUMPED / 3120
Site Type:	WELL	Procedure Type:	DISSOLVED
Geology:	211TMDC	Total Depth (ft):	85
USGS 7.5' Quad:	HEADLIGHT BUTTE NE 7 1/2'	SWL-MP (ft):	NR
PWS Id:		Depth Water Enters (ft):	NR
Project:	GLACCO		

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	68.100	3.398	Bicarbonate (HCO3)	416.800	6.831
Magnesium (Mg)	41.200	3.390	Carbonate (CO3)	0.000	0.000
Sodium (Na)	65.200	2.836	Chloride (Cl)	18.000	0.508
Potassium (K)	5.500	0.141	Sulfate (SO4)	100.000	2.083
Iron (Fe)	<.003	0.000	Nitrate (as N)	5.500	0.393
Manganese (Mn)	<.002	0.000	Fluoride (F)	0.100	0.005
Silica (SiO2)	9.200		Orthophosphate (as P)	<.1	0.000
Total Cations		9.802	**Total Anions**		9.820

Trace Element Results (µg/L)

Aluminum (Al):	<80.	Cesium (Cs):	NR	Molybdenum (Mo):	<10.	Strontium (Sr):	1,347.000
Antimony (Sb):	<2.	Chromium (Cr):	<2.	Nickel (Ni):	2.700	Thallium (Tl):	NR
Arsenic (As):	<1.	Cobalt (Co):	<2.	Niobium (Nb):	NR	Thorium (Th):	NR
Barium (Ba):	60.200	Copper (Cu):	4.800	Neodymium (Nd):	NR	Tin (Sn):	NR
Beryllium (Be):	NR	Gallium (Ga):	NR	Palladium (Pd):	NR	Titanium (Ti):	<10.
Boron (B):	<80.	Lanthanum (La):	NR	Praseodymium (Pr):	NR	Tungsten (W):	NR
Bromide (Br):	50.000	Lead (Pb):	<2.	Rubidium (Rb):	NR	Uranium (U):	NR
Cadmium (Cd):	<2.	Lithium (Li):	33.000	Silver (Ag):	<1.	Vanadium (V):	<10.
Cerium (Ce):	NR	Mercury (Hg):	NR	Selenium (Se):	6.000	Zinc (Zn):	170.000
						Zirconium (Zr):	<20.

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	518.89	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	730.48	Hardness as CaCO3:	339.62	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	851	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	858	Alkalinity as CaCO3 (mg/L):	342.01	Phosphorus, TD (mg/L):	NR
Field pH:	7.67	Ryznar Stability Index:	6.586	Field Nitrate (mg/L):	NR
Lab pH:	7.68	Sodium Adsorption Ratio:	1.5347	Field Dissolved O2 (mg/L):	NR
Water Temp (°C):	8	Langlier Saturation Index:	0.547	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	<.05	Field Redox (mV):	NR
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	NR	Acidity to 8.3 (mg/L CaCO3)	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Additional Parameters

Phosphate T Dis (mg/L - P)	L.2
Sample Condition:	
Field Remarks:	
Lab Remarks:	

Notes

Explanation: **mg/L** = milligrams per Liter; **µg/L** = micrograms per Liter; **ft** = feet; **NR** = No Reading in GWIC

Qualifiers: **A** = Hydride atomic absorption; **E** = Estimated due to interference; **H** = Exceeded holding time; **J** = Estimated quantity above detection limit but below reporting limit; **K** = Na+K combined; **N** = Spiked sample recovery not within control limits; **P** = Preserved sample; **S** = Method of standard additions; **U** = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps

Site Name: TUMA, TOM
GWIC Id: 288120

Section 1: Well Owner(s)

1) TUMA, TOM (MAIL)
PO BOX 776
CUT BANK MT 59427 [07/14/2016]

Section 2: Location

Township	Range	Section	Quarter Sections
37N	06W	11	NW¼ NE¼ SW¼ NW¼

County	Geocode	Parcel
GLACIER		

Latitude	Longitude	Geomethod	Datum
48.982014	-112.36575	MAP	WGS84

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

STOCKWATER (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, July 14, 2016

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	30	7.8
30	260	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	30	6.6	0.25		WELDED	A53A STEEL
0	260	4		160.0	GLUED	PVC-SDR 26

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
160	220	4	72	.1*5	SAW SLOTS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	BENTONITE	
0	260	1/4" WASHED GRAVEL	

Section 7: Well Test Data

Total Depth: 260
Static Water Level: 100
Water Temperature:

Air Test *

5 gpm with drill stem set at 200 feet for 2 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

WELL AT END OF LOSING RD.

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	1	TOPSOIL
1	20	CLAY GRAY
20	22	SHALE GRAY SOFT
22	23	LIMESTONE TAN HARD
23	62	SHALE GRAY SOFT
62	63	SHALE BLACK MEDIUM
63	68	SHALE BLUE SOFT
68	72	LIMESTONE TAN HARD
72	77	SANDSTONE GRAY/GREEN SOFT
77	90	SHALE GRAY SOFT
90	94	SILTSTONE GRAY MEDIUM
94	110	SHALE GRAY SOFT
110	115	SHALE BLACK MEDIUM
115	122	SHALE GRAY MEDIUM
122	132	SILTSTONE GRAY MEDIUM

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

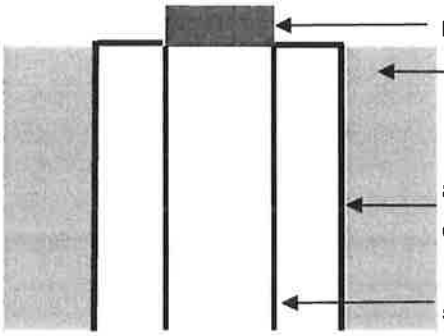
Name: TYREL HLAVNICKA
Company: AQUASOURCE DRILLING LLC
License No: WWC-199
Date Completed: 7/14/2016

Exhibit 11

Operator:	**Joe Stone et al**	**DATE:**	**4-Dec-25**
Well:	**Kullberg & Otthouse (Tribal #3)**	**BY:**	**Joseph Montalban**
API#:	**25-035-07029**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	390' FNL 360' FEL Lot 5		
Notes:	**Drilled Sept - Oct 1957**		
	Completed and then Plugged and Abandoned		
	Re-entered as a water well by Joe Stone et al, Surface owner June 1980		

Bore Hole: 206' KB 12 1/4"

Bore Hole: 3518' KB 7 7/8"



Plug #3 - w/ 15 sacks of cement

Cement Top (0-206')

8 5/8" Set @ 206' KB

Cemented/w 85 Sacks

5-1/2" Set @ 3581' KB

Cemented/w 75 Sacks

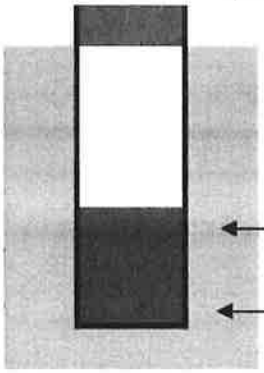
Cement Top (3050' - 3518')

Eagle Water for stock 735' - 760'

Plug #2 - w/ 25 sacks of cement 755' - 770'

Casing stub 5 1/2" - 2900'

Cut Bank - 3351'



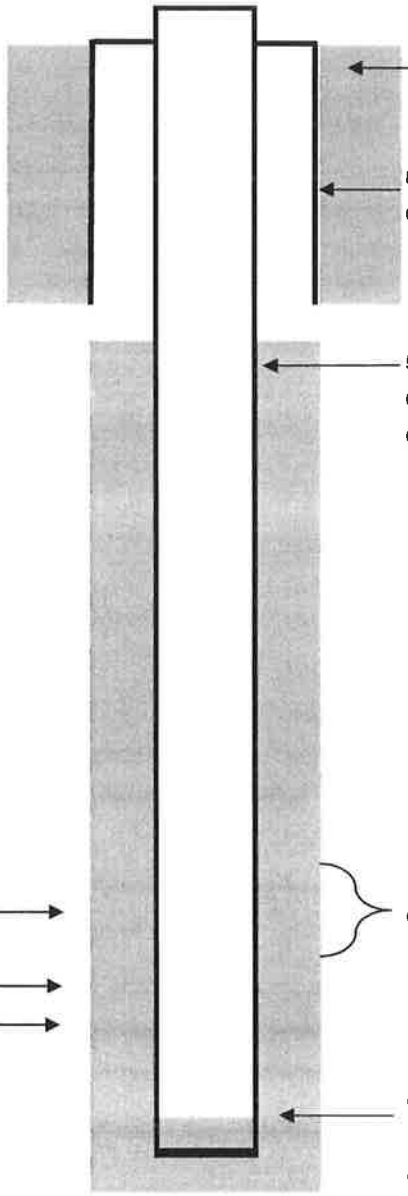
Calculated top of cement - 3050'

Plug #1 - w/ 15 sacks of cement

Top of Plug - 3403'

Total Depth: 3528'

Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Muntzing #B-3 (7-3)**	**BY:**	**Joseph Montalban**
API#:	**25-035-07006**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	E/2 SW NW		



Bore Hole: 173' KB 12 1/4"

Bore Hole: 3462' KB 7 7/8"

Cement Top (0-173')

8 5/8" Set @ 173' KB
Cemented/w 85 Sacks

5-1/2" Set @ 3462' KB
Cemented/w 100 Sacks
Cement Top (2798' - 3462')

Cut Bank - 3272'

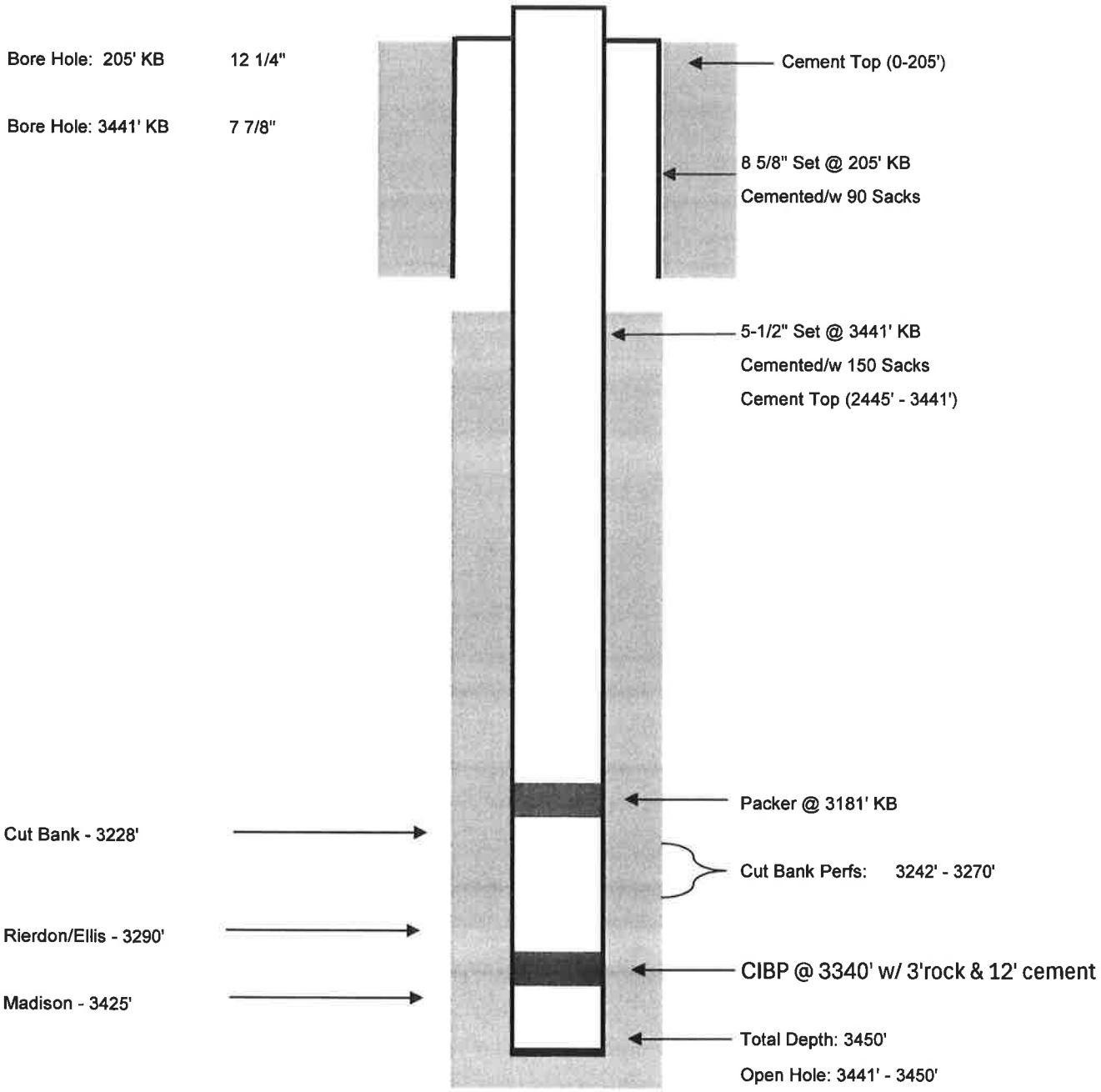
Rierdon/Ellis - 3333'

Madison - 3456'

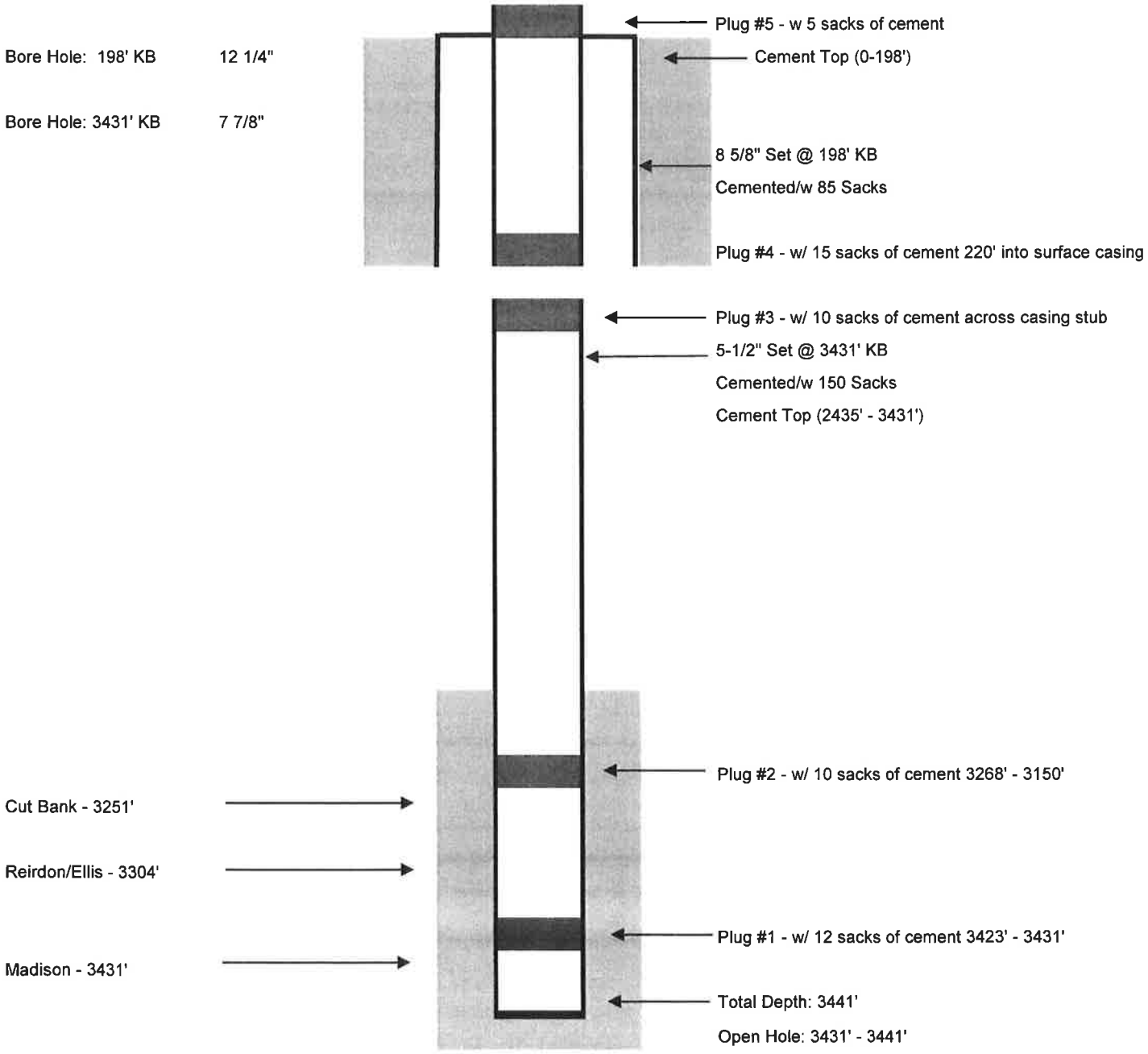
Cut Bank Perfs: 3278' - 3283'
3307' - 3316'

Production Casing Set @ 3472' KB w/ 100 sacks cement
Original TD: 3474'
Deepened TD: 3570'
Open Hole: 3462' - 3570'

Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Vasboe #9-1**	**BY:**	**Joseph Montalban**
API#:	**25-035-06953**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 14 T37N R6W**		**Current/As Built**
	NWNE		
Notes:	**Drilled September 1958 as Madison Oil Well**		
	Converted to Cut Bank Injector in September 1976		



Operator:	**Hyland Oil Corp.**	**DATE:**	**4-Dec-25**
Well:	**Federal #1**	**BY:**	**Joseph Montalban**
API#:	**25-035-06975**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	872' FSL 3310' FEL		
Notes:	**Drilled May 1958**		
	P&A Sept. 1969		



NOTICE OF APPLICATION FOR UIC PERMIT FOR WATER INJECTION WELL

VASBOE 8-1

LIST OF SURFACE OWNERS WITHIN AREA OF REVIEW:

Shane Vasboe
PO Box 214
Cut Bank, Montana 59427-0214

Guy R. Bradley
230 Bradley Road
Cut Bank, Montana 59427-9008

Zenith Colony Inc
PO Box 1109
Cut Bank, Montana 59427-1109

Exhibit 14

BEFORE THE BOARD OF OIL AND GAS CONSERVATION OF THE STATE OF MONTANA

APPLICATION OF MONTALBAN OIL AND GAS OPERATIONS, INC. FOR AN UNDERGROUND INJECTION CONTROL (UIC) PERMIT TO CONVERT VASBOE #8-1 WELL, SW SE, 853' FSL 2173' FEL, SECTION 11 T37N R6W, TO AN INJECTION WELL FOR THE PURPOSE OF SALTWATER DISPOSAL IN THE BLACKFOOT CUT BANK-MADISON SAND UNIT.

NOTICE OF APPLICATION FOR UIC PERMIT FOR INJECTION WELL

Date: December 22, 2025

TO: Current Operators, Lease owners of nonoperated lease, Mineral owner of nonoperated lease And surface owners within the area of review listed in UIC Application

RE: Application for Underground Injection Permit

Ladies and Gentlemen,

Montalban Oil and Gas Operations, Inc. at 33 1st Ave. SW, Cut Bank, Montana 59427, has applied for a permit to convert Vasboe #8-1 well, 853'FSL 2173' FEL, SW SE, Section 11 T37N R6W, Glacier County, Montana to a water disposal well. This letter is being sent in accordance with the Montana Board of Oil and Gas Conservation, Underground Injection Control Rules of Montana (ARM), Title 36, Chapter 22, Subchapter 1410. You have been identified as a Current Operator, Lease Owner of nonoperated lease, Mineral Owner of nonoperated lease, and/or surface owner.

The application will be heard by the Montana Board of Oil and Gas Conservation at its February 12, 2026 hearing beginning at 9:00 AM in the Montana Board of Oil and Gas Hearing Room at 2535 St. John's Avenue, Billings, Montana. A copy of the complete application is on file with the Montana Board of Oil and Gas Conservation, 2535 St. John's Avenue, Billings, MT 59102. If you have any questions concerning the application, please contact Mr. Patrick Montalban, 33 1st Ave. SW, Cut Bank, MT 59427.

Sincerely,

Patrick Montalban
Montalban Oil and Gas Operations, Inc.
33 1st Ave. SW
Cut Bank, MT 59427
Office: 406-873-2235

BEFORE THE BOARD OF OIL & GAS CONSERVATION
OF THE STATE OF MONTANA

IN THE MATTER OF THE APPLICATION OF MONTALBAN OIL & GAS OPERATIONS INC., HEARING ITS REQUEST FOR A UIC PERMIT TO CONVERT THE VASBOE 8-1 WELL IN THE SWSE, SECTION 11 T37N, R6W TO AN INJECTION WELL FOR THE PURPOSE OF DISPOSING OF EXEMPT EXPLORATION AND PRODUCTION WASTES (GLACIER COUNTY, MONTANA)	))))))))	**CERTIFICATE OF MAILING**

Carla Barringer hereby certifies that she served a copy of the attached notice of Hearing upon the interest owners set forth in Exhibit "A" attached hereto at the address indicated for each locatable owner which is the address for each owner as indicated by the records of the County Clerk and Recorder of Glacier County, Montana at the time the Notice was given (or more current address provided by such owner), by mailing a true and correct copy there of this 29th day of December, 2025, postage prepaid, Certified First Class mail. This certificate is given as evidence of compliance with Sec. 36.22.1410, ARM.

Carla Barringer

Carla Barringer

Subscribed and sworn to before me this 2 day of January 2026.

(SEAL)

PAULINE A NYGAARD
NOTARY PUBLIC for the
State of Montana
Residing at Cut Bank, Montana
My Commission Expires
May 07, 2028

Pauline A Nygaard

Notary Public for the State of Montana
Print Name Pauline A Nygaard
Residing at Cut Bank, Montana
My Commission Expires 5-7-2028

Independent Record

AFFIDAVIT OF PUBLICATION

See Proof on Next Page

Helena Independent Record
2222 N. Washington St
Helena, Montana 59602
(123) 456-7890

State of Florida, County of Orange, ss:

Edmar Corachia, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC, duly authorized agent of Helena Independent Record, a newspaper of general circulation published that is a "legal newspaper" as that is published daily in the City of Helena, in the County of Lewis and Clark, State of Montana, and has charge of the Advertisements thereof.

If this certification is for the State of Montana, I hereby certify that I have read sec. 18-7-204 and 18-7-205 MCA, and subsequent revisions, and declare that the price or rate charged the State of Montana for the publication for which claim is made in printed copy in the amount of $184.00 is not in excess of the minimum rate charged any other advertiser for publication of advertisement, set in the same size type and published for the same number of insertions, further certify that this claim is correct and just in all respects, and that payment or credit has not been received.

PUBLICATION DATES: January. 6 2026

NOTICE ID: Gz0qEZPIZm3rsLfJL7t2

PUBLISHER ID: COL-MT-201978
NOTICE NAME: Legal Notice Vasboe 8-1
Publication Fee: $184.00

Edmar Corachia
(Signed)_____

PAMELA BAEZ
Notary Public - State of Florida
Commission # HH 732409
Expires on October 19, 2029

VERIFICATION

State of Florida
County of Orange

Subscribed in my presence and sworn to before me on this: 01/06/2026

_____
Notary Public
Notarized remotely online using communication technology via Proof.

Notice of Intention to Apply for a Class II Injection Well Permit
BEFORE THE BOARD OF OIL AND GAS CONSERVATION OF THE STATE OF MONTANA

In the Matter of the Application of

Montalban Oil & Gas Operations Inc

for a Class II Injection Well Permit

NOTICE OF INTENTION

TO APPLY FOR A CLASS II

INJECTION WELL PERMIT

for a Class II Injection Well Permit

1. P.O. Box 200
33 – 1 st Avenue SW
Cut Bank, Montana 59427

2. Vasboe 8-1
SWSE-Section 11-T37N-R6W
(853' FSL x 2173' FEL)
Glacier County, Montana

3. Injection fluid will consist of produced water from the Cut Bank-Madison water Montalban Oil & Gas Operations, Inc., operated wells in the Blackfoot Field.

4. Proposed injecting produced water into the current Cut Bank perforations at 3228'-3248'and 3251'-3269'. Also, the Madison at a depth of 3404'-3748'. Interval is from the top of the Madison to the estimated top of the Mission Canyon FM (Interval is based on E-Log interval in the MOGO D-11).

5. An aquifer exemption will be requested as part of the application since the proposed injection zone contains water with less than 10,000 ppm total dissolved solids.

Pursuant to Rule 36.22.1409, the Administrative Rules of Montana, the Montana Board of Oil and Gas Conservation will hold a public hearing upon the application of Montalban Oil & Gas Operations, Inc., for a Class II Underground Injection Permit for the well or project set forth above. Said hearing will be held at the Board of Oil and Gas Hearing Room at 2535 St. Johns Ave., Billings, Montana beginning at 9:00 AM Thursday, February 12, 2026.
January 6, 2026 COL-MT-201978 **MNAXLP**

January 5, 2026

Mr. John Gizicki
Underground Injection Control (UIC) Program Director
Montana Board of Oil and Gas Conservation
2535 St. John's Avenue
Billings, MT 59102

RE: Request for Aquifer Exemption
Blackfoot Cut Bank-Madison Sand Unit Vasboe 8-1 located in Section 11 T37N R6W
Glacier County, Montana

Dear Mr. Gizicki,

Please accept the Aquifer Exemption request to supplement the MOGO, BCBMSU Vasboe 8-1 Disposal Application for the February 12, 2026, Montana Board of Oil and Gas hearing.

The Madison Formation is being evaluated for water injection. There is water data available on the Madison Formation. An Aquifer Exemption will be required since the Madison Formation is by definition a USDW and has water that is less than 10,000 ppm total dissolve solids (See Exhibit 5 water analysis).

The Madison Formation in this part of Glacier County produces hydrocarbons along with sulfur water and is at a depth of +3400' makes this USDW very difficult to use and to access for drinking water. Since the cost to drill a water well to this depth is economically out of reach for all domestic and stock water users and if it carries hydrocarbons the water would be difficult if not expensive to make potable.

Based on the data available, the Two Medicine shallow aquifer is the preferred choice for domestic and stock water. Its shallow depth makes it economical to drill for and relatively inexpensive to make potable and is adequate as a stock water source. Typically, the Two Medicine Formation is made up of thin stringer sands with no large areal extent in this area. So, no two wells are completed to the same depth. It is not one thick blanket sand and does not hold large volumes of water. Cut Bank Creek is the largest surface drainage in the area but is about 20 miles to the south of the MOGO Vasboe 8-1, SW SE Section 11 T37N R6W. There are no shallow water wells within a half of a mile around the MOGO Vasboe 8-1

proposed SWD and no water wells that penetrate the Madison or Cut Bank as a source of drinking water, only hydrocarbon wells.

To protect shallow freshwater zones, the drilling practice is to drill through any freshwater zones and then run surface casing. Surface casing is set and cemented to surface to isolate freshwater zones. In addition, production casing run is designed to isolate hydrocarbon fluids to the production casing. The production casing in this area was typically cemented to cover all production zones and top of cement came up behind the production casing approximately to the middle of the Kootenai Formation.

A. Descriptive Data—Plat Map (Exhibit 1) showing boundaries of the exempted aquifer. The Environmental Protection Agency (EPA), in UIC guidance 34, defined the minimum data set needed for aquifer exemptions; these will include at least all oil and gas boreholes within the area, all public and private water wells within the area and at least ¼ mile beyond the boundary of any existing wellhead protection areas and the location of all relevant water samples.

1. There are no known water wells within 1/2-mile radius around the Vasboe 8-1 proposed SWD.
2. The following water wells are the closest to the Vasboe 8-1 proposed SWD (Exhibit 1 Map and Exhibit 6 GWIC data):

Well Name	Location	Use	Distance from proposed SWD	Depth
Tom Tuma	S 11 T37N R6W 48982014,-112.36575	Stock	3650'	260'
Croft Pet.*	S 11 T37N R6W 48.984969,-112.353752	Domestic	4150'	85'
Joe Stone+	S 11 T37N R6W 390' Fnl 260'Fel of lot 5	Stock	4750'	760'

*Water Analysis
+Croft Petroleum Co. well file identified this P&A well as converted to a stock water well

3. No known water wells within the ¼ mile area of review only Cut Bank oil well, a Sunburst gas well and a Cut Bank injection well.

B. Description of the proposed exempt aquifer, listing formation name, approximate depth, confining zone, wireline logs to demonstrate vertical isolation of proposed SWD well from porous zones above and below.

The Muntzing D-11(6-2), SE NE NW Section 11 T37N R6W, is a well drilled in 1990 to the Devonian Formation at a depth of 4979'. Plugged back for a Madison and Cut Bank completion in 1991. A full set of electrical logs were run and will use as the closest well to demonstrate vertical confinement and porosity of the

injection zone (Exhibit. 4). The proposed exempt aquifer would include all of the Madison Formation from 3,404' in the MOGO Vasboe #8-1 to the top of the Mission Canyon Formation at an estimated top at 3,748' (344'). Also, the Cut Bank Formation top at 3228' to top of the Rierdon/Ellis Formation at 3280'(52').

Water quality information for the disposal zone in the immediate area of Vasboe 8-1 is not available, but a water analysis of Madison Formation water (Exhibit 6) sampled in 1991 from UNOCAL's waterflood west plant in Section 24 T33N R6W, Glacier County, Montana, approximately 26 miles to the south of this well. UNOCAL used Madison water from a Madison source well to waterflood their SCCBSU property. The analysis indicates the Madison water has a TDS of 3100 ppm, chloride as NaCl of 932 ppm and a specific gravity of 1.002.
Injection water sampled in 2001 came from the central tank battery injection pump and is a mix of Cut Bank produced water and Madison waterflood water. Water analysis indicates that TDS is 7000 ppm, chloride as NaCl of 3511 ppm and a specific gravity of 1.002 measured.
Cut Bank produced water sample was taken in 1962, analysis came from a previous operator (Murphy Corporation) of the Muntzing A-1, SW NE SW Section 2 T37N R6W.
Water analysis indicates that TDS is 8,145 ppm, Chloride as NaCl is 4,701 ppm and specific gravity is 1.007.

Proposed injection interval in the Vasboe 8-1 SWD are as follows and can be viewed in wellbore diagram in Exhibit 5.

FM	Intvl	Lithology	Top	Bottom	Net	Pay Pres.	Porosity*
Madison	Ave.	Dolomite	3,432'	3,471'	39'	^800 psi+	10% Ave.

*Porosity is from the density porosity log from the Muntzing D-11(6-2) CNL/LD log
+Estimated pay pressure. Original bottom hole pressure for the Madison was1025 psi
^Pay interval may change if well is deepened.

The confining formations for the proposed injection zones are the Kootenai, Rierdon/Ellis and the Mission Canyon.

Formation	Lithology	Top (ft.)	Bottom (ft.)	Thickness (ft.)
Kootenai	sand-shale sequence	2630'	3228'	598'
Rierdan/Ellis	shale-marlstone	3280'	3404'	124'

Mission Canyon	micro-crytoxln Limestone	3748'	4231'	483'

C. Thickness, area and average porosity of the reservoir to be exempted. If the proposed UIC well within the exempted area is an SWD, calculate the volume of connate water that will be displaced by the injectate using the formula (this pore volume figure is made part of the MBOGC permit for the included SWD well. For example, if the pore volume calculation shows the exempted aquifer to contain 5.0 million barrels within the exempted area, the UIC permit will terminate when the cumulative injected volume reaches 5.0 million barrels of saltwater)

Madison Formation Calculations

Pore Volume (in barrels)= (p x r*x h x f)/ 5.63

Where:

* = squared

r = radius of the exempted area, in feet

h = average thickness, in feet, of the proposed exempted aquifer (39' used as the porous thickness in the MOGO D-11 (6-2) well).*

f = average porosity, in decimal, of the proposed exempted aquifer. MOGO Muntzing D-11(6- 2) average density porosity over 39' is 10%.

Madison: (3.140)(1320)*(39) (.10)/5.63 = 3,789,952 bbls.

Minimum Water Injection Rate	0 BWPD
Average Water Injection Rate	250 BWPD
Maximum Water Injection Rate	500 BWPD

Radius of Emplace Fluid

Received Net Thickness	39 ft
Injection Period (10 years)	3650 Days
Injection Rate	7.29 GPM
Injection Rate	250 BWPD
Injection Rate	1,053 Cubic Ft./Day
Porosity	10%
Radius – Emplaced Fluid	648 ft
Radius – Emplaced Fluid	0.123 miles

Formation 344' from the top of the Madison Formation to the estimated top of the Mission Canyon Formation(Exhibit 4 and 4b).

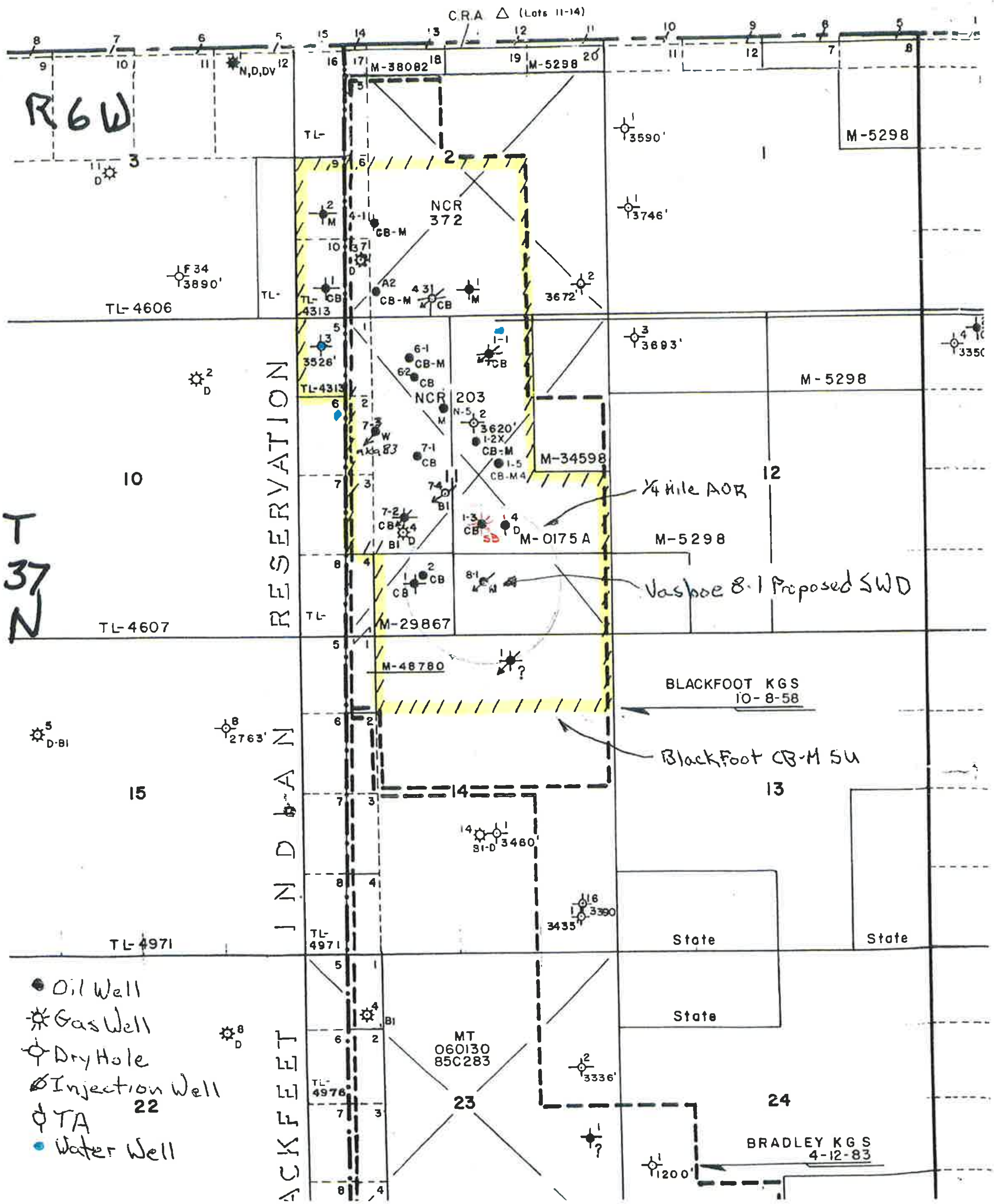
LIST OF EXHIBITS

Exhibit 1	Map of Blackfoot Field, Blackfoot Cut Bank-Madison Sand Unit, Area of Review, freshwater wells, oil wells, gas wells and dryholes in the area.
Exhibit 2	Geologic Cross Section of the Cut Bank/Madison
Exhibit 3	Montana Geological Society Blackfoot Field Information
Exhibit 4 and 4b	Electrical log injection intervals
Exhibit 5	Water Analysis of injection intervals
Exhibit 6	Water Well Information
Exhibit 7	Wellbore Diagrams
Exhibit 8	Notification to Surface Owners
Exhibit 9	Affidavit of Notification of Surface Owners
Exhibit 10	Cost Comparison: Deep vs. Shallow Water Wells
Exhibit 11	Determining the Lower Confining Zone

Sincerely,

Steven Sasaki
Consultant
406-633-0913
sasaki.s@charter.net

Exhibit 1



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M-5298
M-34598
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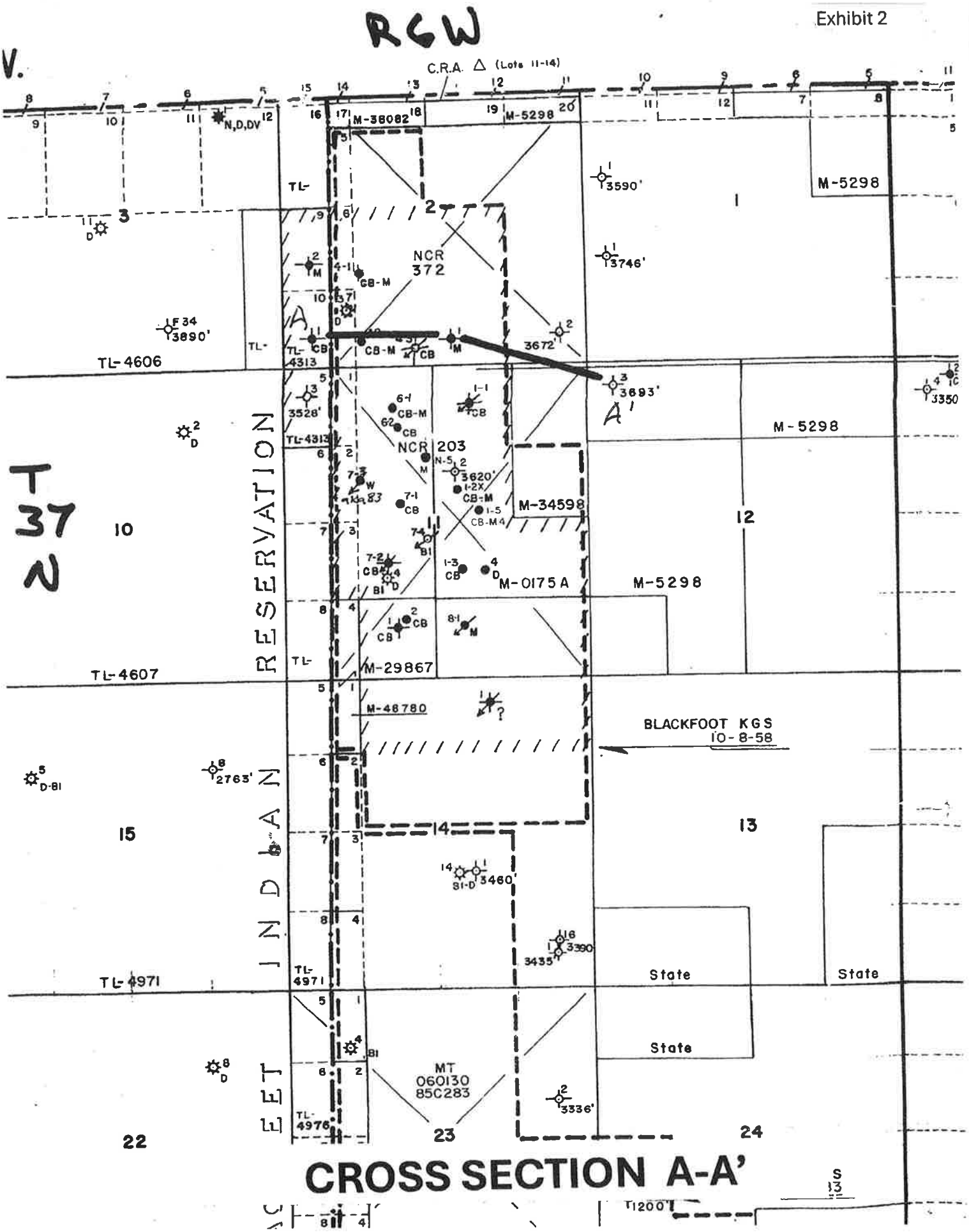
M-48780
TL-4606
TL-4607
TL-4971
TL-4313
INDIAN RESERVATION
BLACKFEET
1/4 Mile AOR
Vashoe 8-1 Proposed SWD
BLACKFOOT KGS 10-8-58
Blackfoot CB-M SU
State
MT 060130 85C283
BRADLEY KGS 4-12-83
Oil Well
Gas Well
Dry Hole
Injection Well
TA
Water Well

Exhibit 2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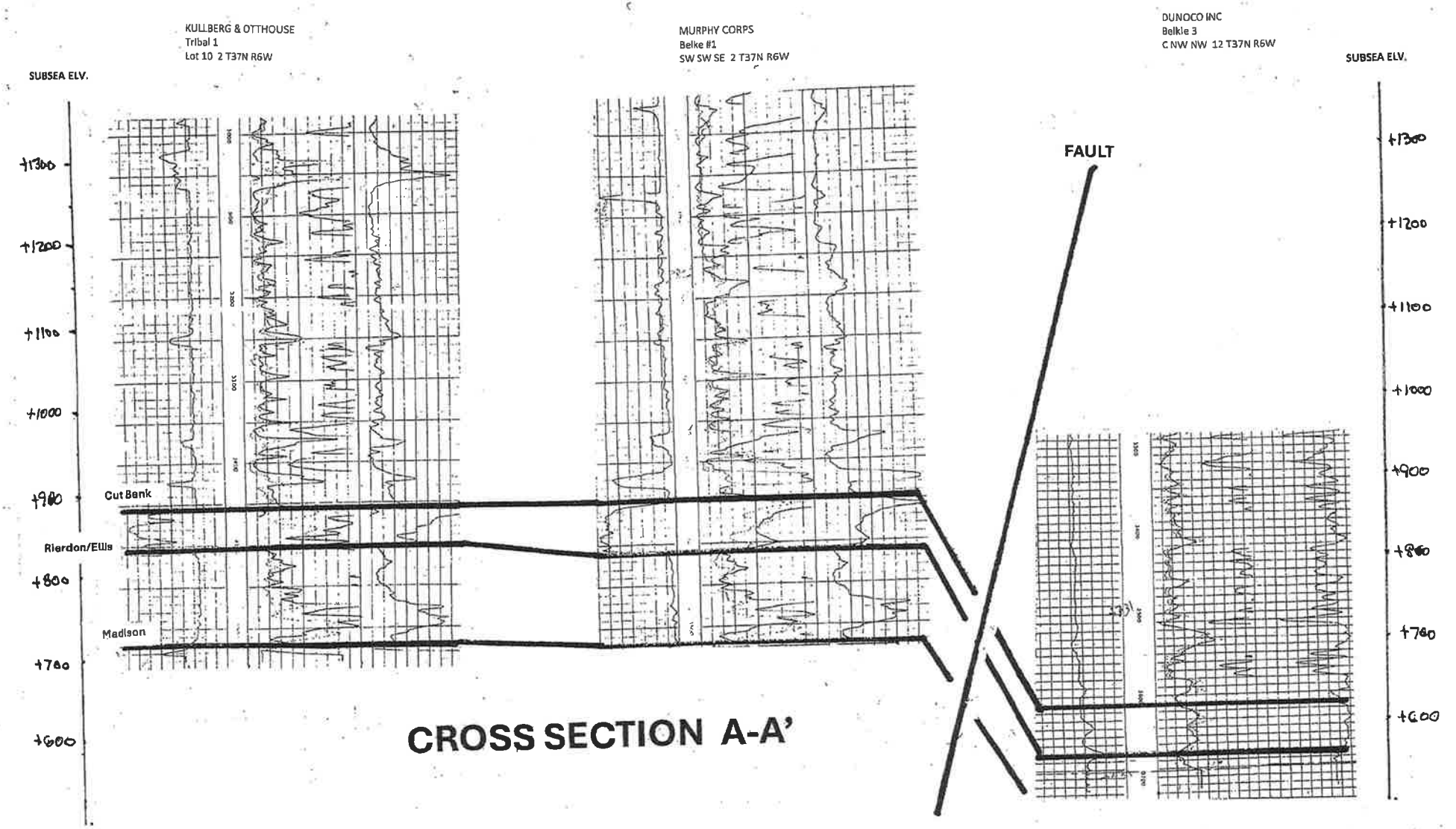
KULLBERG & OTTHOUSE
Tribal 1
Lot 10 2 T37N R6W
MURPHY CORPS
Belke #1
SW SW SE 2 T37N R6W
DUNOCO INC
Belkie 3
C NW NW 12 T37N R6W
SUBSEA ELV.
SUBSEA ELV.
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+1200
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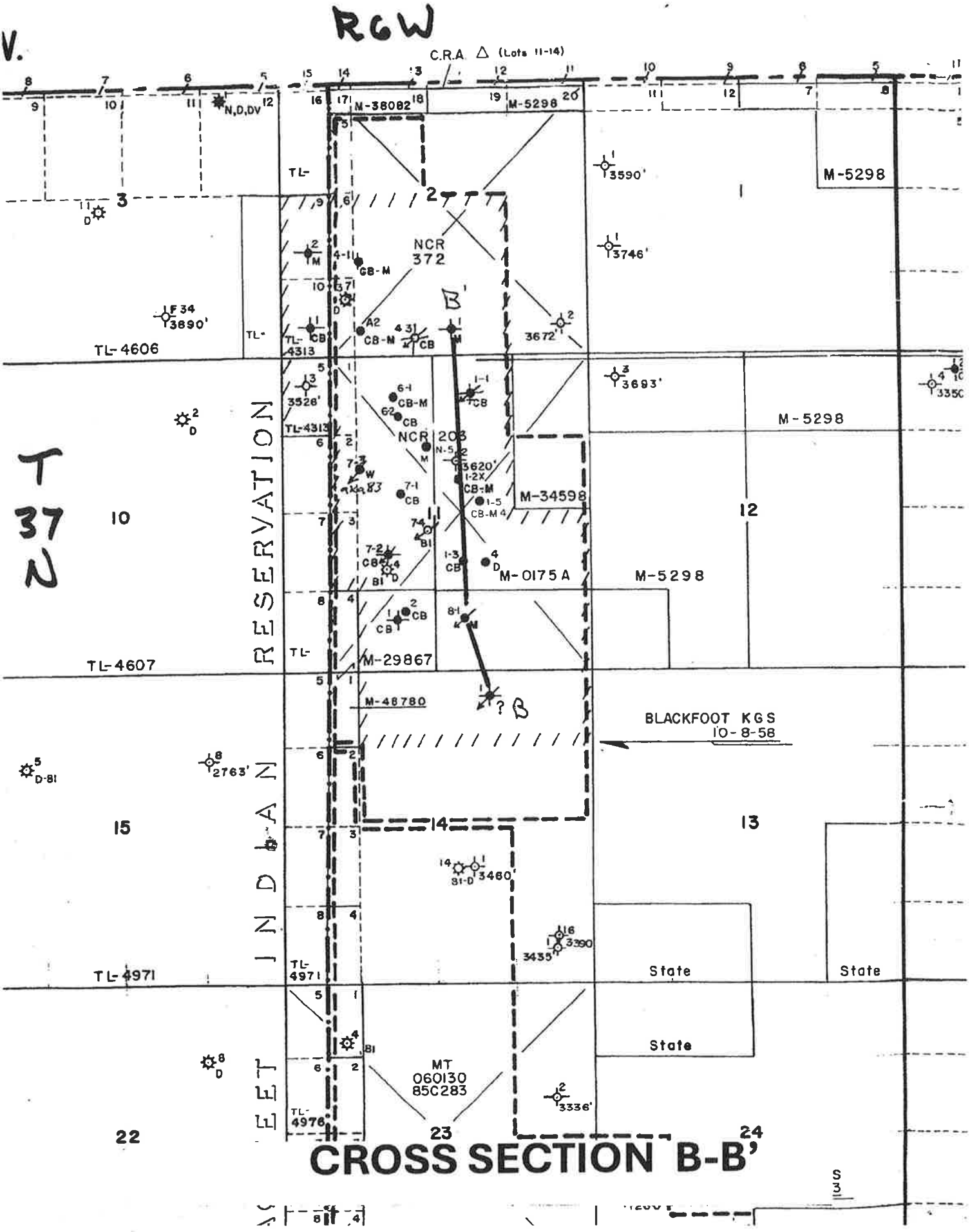
FAULT
Cut Bank
Rierdon/Ellis
Madison
CROSS SECTION A-A'

V.

RGW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TL-4313
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NCR 203
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RESERVATION
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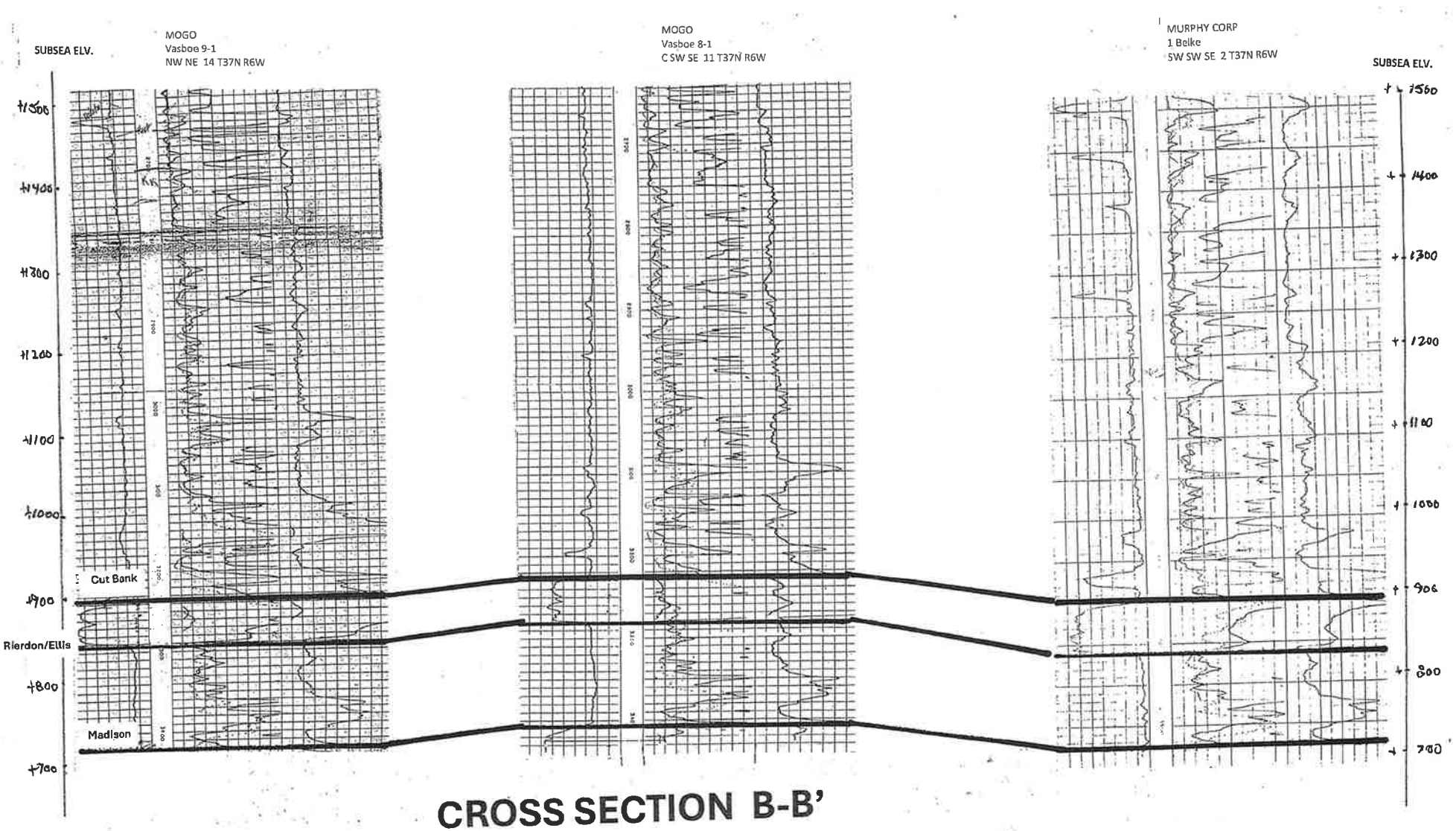
CROSS SECTION B-B'



CROSS SECTION B-B'

By Bill Hedglin
Croft Petroleum Co.
Cut Bank, Montana
December 5, 1984

BLACKFOOT FIELD

T.37 N., R.6 W.
Glacier County, Montana

GENERAL FIELD DATA

Regional Setting:
West flank of the Sweetgrass Arch.

Surface Formations and Elevation:
Two Medicine Formation, 4,100'-4,380' elevation.

Discovery Well and Date:
Union Oil of California, Muntzing #1, 4-56.

Exploration Methods:
Seismic (1950's), mapping from well logs.

Oldest Horizon Penetrated:
Mississippian Sun River Dolomite (Madison).

Horizons with Shows:
Dakota, Sunburst, Cutbank, Madison.

Nature of Trap:
Closure on an anticline along the upthrown side of a normal fault.

Area of Trap:
Cutbank—600 acres
Madison—600 acres

No. of Producing Wells: 8

Abandoned Wells: 4

Shut In/Temp Abdn Wells: 2

Disposal/Injection Wells: 4

Dry Holes: 3

Major Operators:
Croft Petroleum Co., Murphy Oil Co., Union Oil Co.

Drilling and Casing Practices:
Set 200' of surface, case Cutbank, open hole in the Madison.

Logging Suite:
DIL/GR, FDC/CNL.

Testing Practices:
Run DST in Cutbank on the way down, test Madison after logs.

Market:
Oil is sold to Union Oil Co.

RESERVOIR DATA

Producing Formation:
Cutbank, Sun River Dolomite.

Lithology, Continuity, Thickness:
Cutbank—fluvial sand with lateral and vertical variations, 0-30' thick.
Sun River—somewhat continuous calcareous dolomite porosity, near the top of the formation where a major unconformity is present. 15' avg. effective porosity.

Avg. Depth (& MSL):
Cutbank—3,300' (+911')
Sun River—3,500' (+710')

Porosity/Permeability:
Cutbank—13-15% porosity, 50 md permeability
Sun River—11% matrix porosity, 55 md permeability, some fracture porosity is probable.

Oil, Gas Column: (Water Contact MSL):
Cutbank—gas/oil contact +902, oil/water contact +880.
Sun River—gas/oil contact +732, oil/water contact +704.

Avg. Net Pay Thickness:
Cutbank—15'
Sun River—15'

Area this Reservoir:
Cutbank—600 acres
Sun River—600 acres

Order/Docket No. and Spacing Details:
Order No. 3-57 and 34-76. Initially, one well per 40 acres. Cutbank and Madison commingled in the wellbore. Secondary unit started 11-76.

BO/MCF Per Acre-Foot:
Cutbank—615 BO/AF
Sun River—515 BO/AF

Drive Mechanism:
Cutbank—solution gas
Sun River—solution gas/water

Character of Oil/Gas:
Cutbank—31 degrees API
Sun River—28 degrees API

Gas-Oil Ratio:
Both horizons—unknown, very small.

Water Rw, Salinity:
Cutbank—Rw = 0.8, 5,000 ppm Cl
Sun River—Rw = -1.0, 4,200 ppm Cl

Avg. Saturation:
Cutbank—Sw = 35%
Sun River—Sw = 33%

Initial and Present Pressure:
Cutbank—initial 965 psi, present 1,550 psi
Sun River—initial 1,025 psi, present 350 psi

Temperature:
Cutbank—85 degrees F
Sun River—90 degrees F

Initial Potential (High,Low,Avg.):
Cutbank—55 BOPD, 12 BOPD, 20 BOPD
Sun River—330 BOPD, 5 BOPD, 50 BOPD

Decline Rate:
Cutbank—18%
Sun River—15%

Present Daily Avg. Production:
Cutbank—105 BOPD
Sun River—10 BOPD

Amount of Water Produced:
Cutbank—250 BWPD
Sun River—132 BWPD

Completion/Perforation/Treatment:
Cutbank—perforated and sand frac'd.
Sun River—open hole completion and acidized.

Cumulative Production:
Cutbank—826,000 bbls. est.
Sun River—529,000 bbls. est.
Figures estimates due to commingling of reservoirs.

Est. Ultimate Primary Recovery:
Cutbank—713,000 bbls.
Sun River—600,000 bbls.

Est. Ultimate Secondary Recovery:
Cutbank—600,000 bbls.
Sun River—0

Secondary Recovery Method:
Cutbank—waterflood.

DISCUSSION

The Blackfoot Field lies on the crest of a gentle anticline which is fault-bound on the east by a northwest-southeast trending high angle normal fault. This fault dips east-northeastward at approximately 60 degrees in the field area, with an average of 200' of stratigraphic displacement. Closure of 30' at the Cutbank Sand exists over an area of roughly 600 acres comprising the field, which lies on the upthrown (west) side of the fault. Most wells in the field spud on the downthrown side of the fault, crossing to the upthrown side somewhere in the Colorado Shale to Kootenai interval.

The Ellis group (Rierdon and Sawtooth) apparently form an adequate lateral seal against the Madison at the fault contact, as does the Kootenai in juxtaposition with the Cutbank Sand higher in the section. This fault cuts Upper Cretaceous Two Medicine sediments in the field area, dating the fault at latest Cretaceous, or more likely early Tertiary.

REFERENCES

Lanouette, G.D., Feasibility of Waterflooding the Cut Bank Sand, Blackfoot Field, Glacier County, Motnana, 1974. Levorsen, A.I., Geology of Petroleum, second edition, 1967, pp.335-336. Ramsey, P.E., Blackfoot Field—Waterflood Feasibility Study, 1966. Stephens Engineering, Water Flood Performance Analysis, Recommendations and Economic Analysis, Blackfoot-Cut Bank-Madison Unit, Glacier County, Montana, 1978. Appreciation is extended to Jerry Croft of Croft Petroleum Company for supplying much of the production and reservoir data.

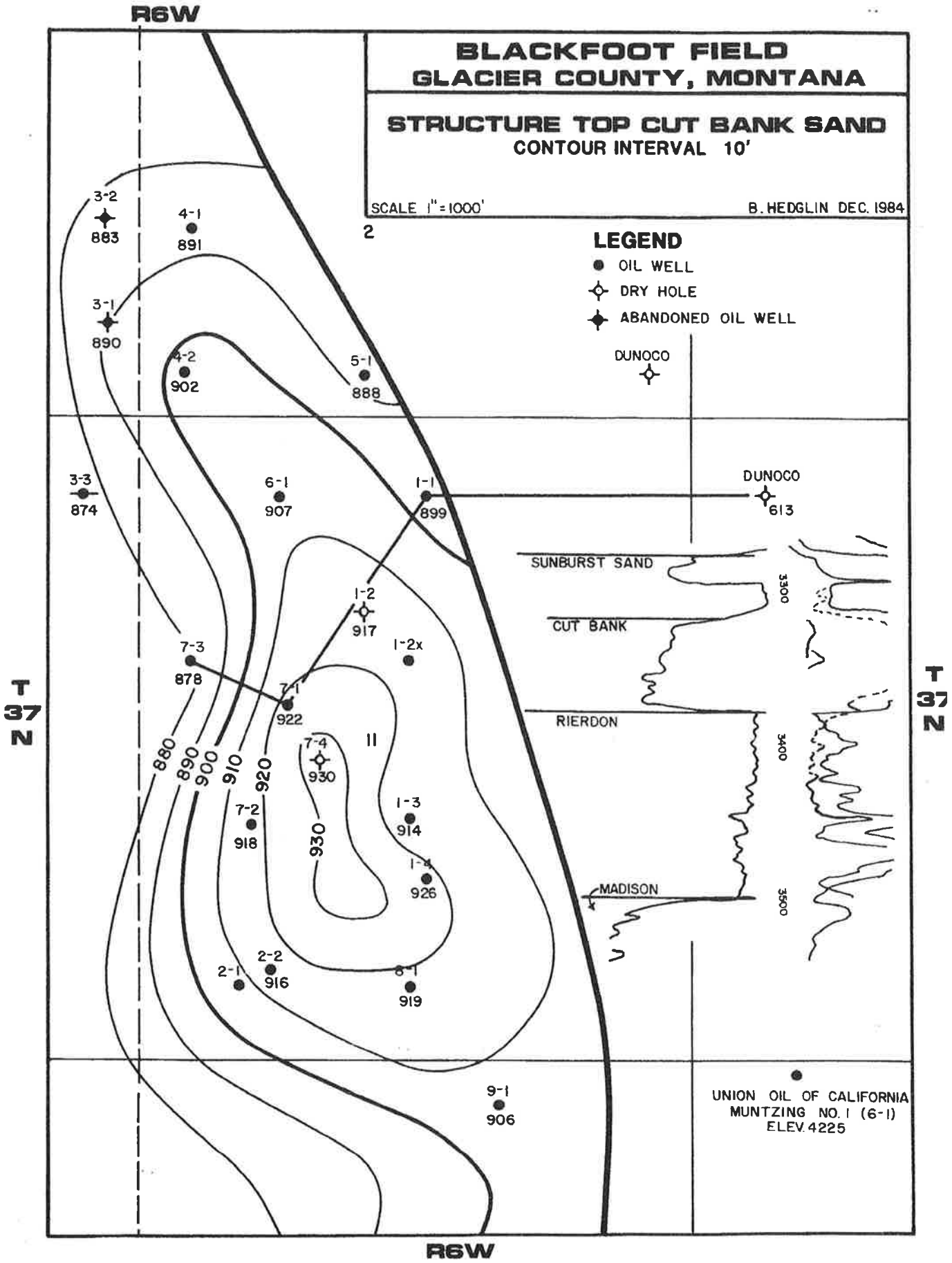
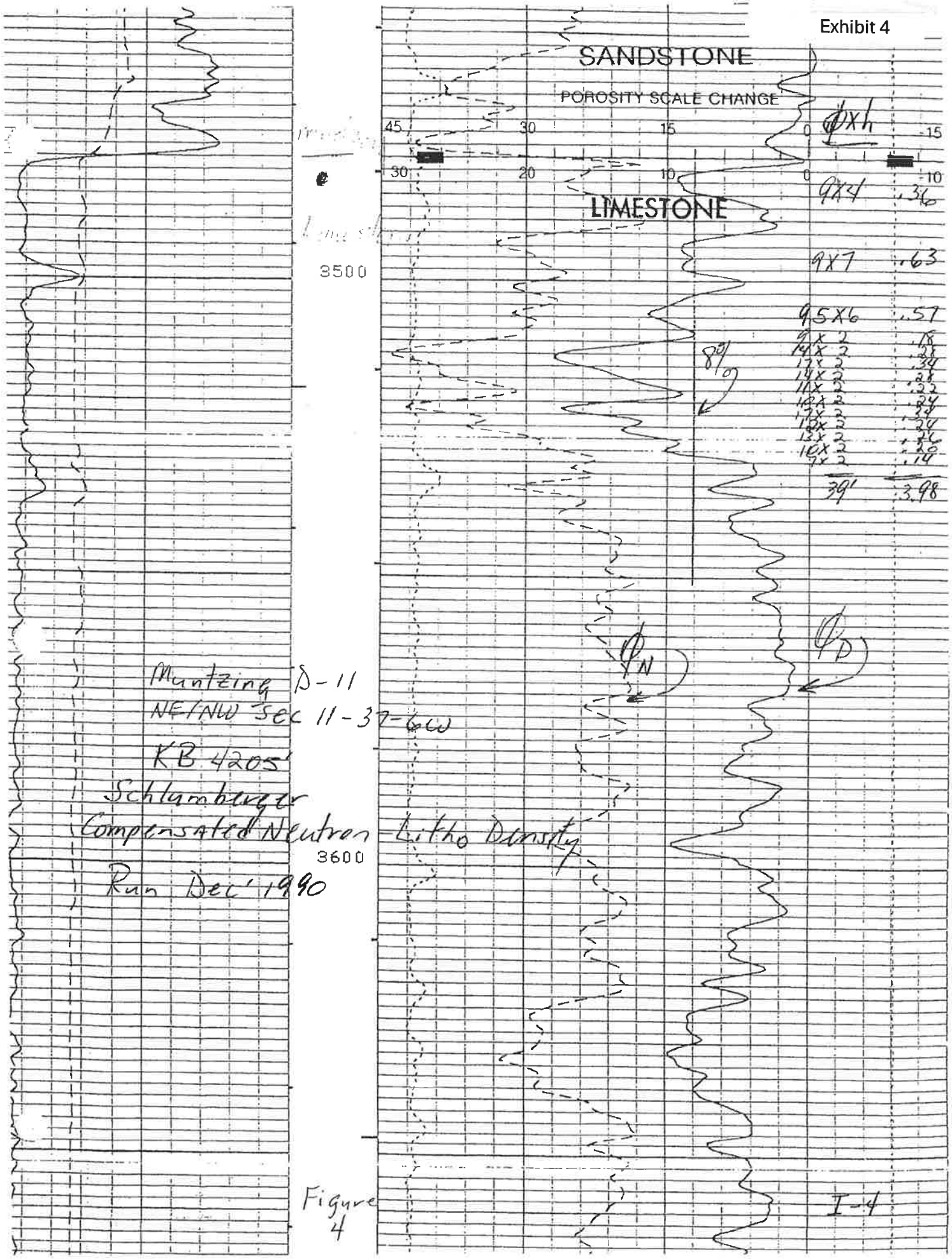

R6W
BLACKFOOT FIELD
GLACIER COUNTY, MONTANA
STRUCTURE TOP CUT BANK SAND
CONTOUR INTERVAL 10'
SCALE 1"=1000'
B. HEDGLIN DEC. 1984
2
LEGEND
OIL WELL
DRY HOLE
ABANDONED OIL WELL
DUNOCO
DUNOCO
613
3-2
883
4-1
891
3-1
890
4-2
902
5-1
888
3-3
874
6-1
907
1-1
899
1-2
917
1-2x
7-3
878
7-1
922
7-4
930
7-2
918
1-3
914
1-4
926
2-1
2-2
916
8-1
919
9-1
906
880
890
900
910
920
930
SUNBURST SAND
CUT BANK
RIERDON
MADISON
3300
3400
3500
T 37 N
T 37 N
R6W
UNION OIL OF CALIFORNIA
MUNTZING NO. 1 (6-1)
ELEV. 4225

Exhibit 4



ϕxh

9X4	.36
9X7	.63
9.5X6	.57
9X2	.18
14X2	.28
17X2	.34
14X2	.28
11X2	.22
12X2	.24
17X2	.34
10X2	.20
13X2	.26
10X2	.20
9X2	.14
39'	3.98

Figure 4

I-4

Schlumberger

LITHO-DENSITY

COMPANY CROFT PETROLEUM COMPANY

WELL MUNTZING D-11

FIELD BLACKFOOT

COUNTY GLACIER STATE MONTANA

LOCATION 990' FNL & 1945' FWL

NE / NW

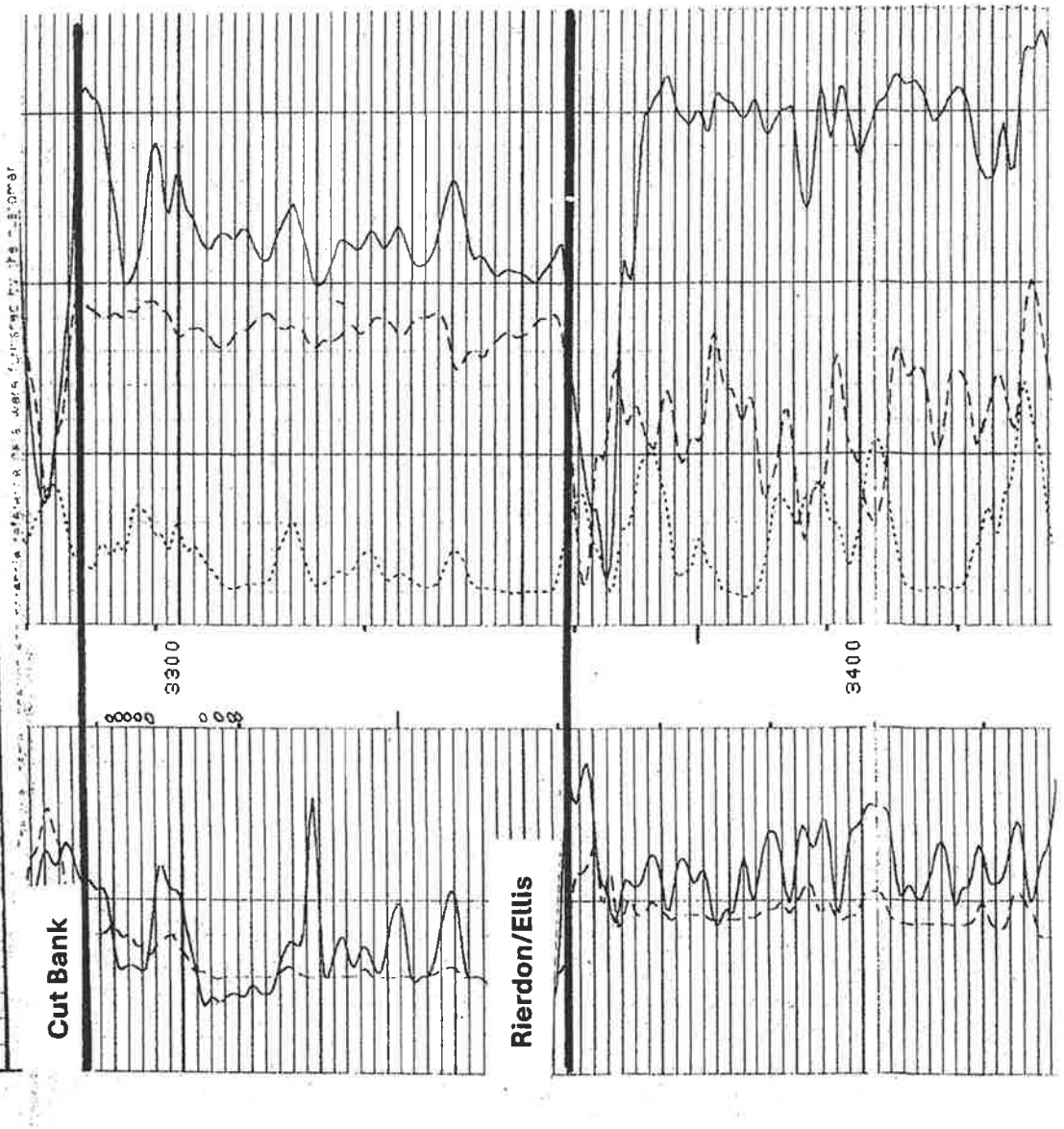
Other Services:
DIL/GR
LDT/CNL/GR
CYBERLOOK

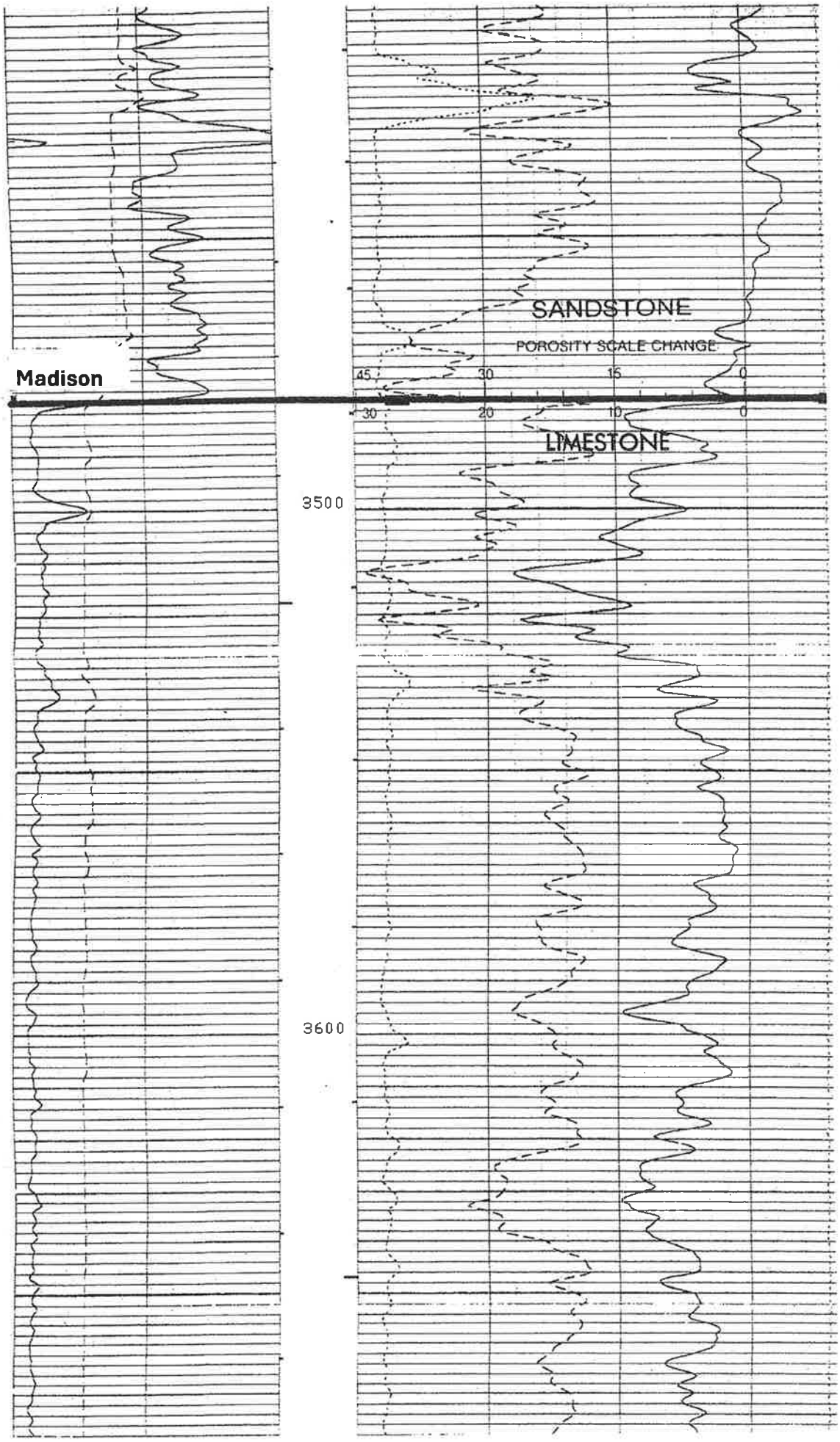
API SERIAL NO. | SECT. 11 | TWP. 37N | RANGE 6W

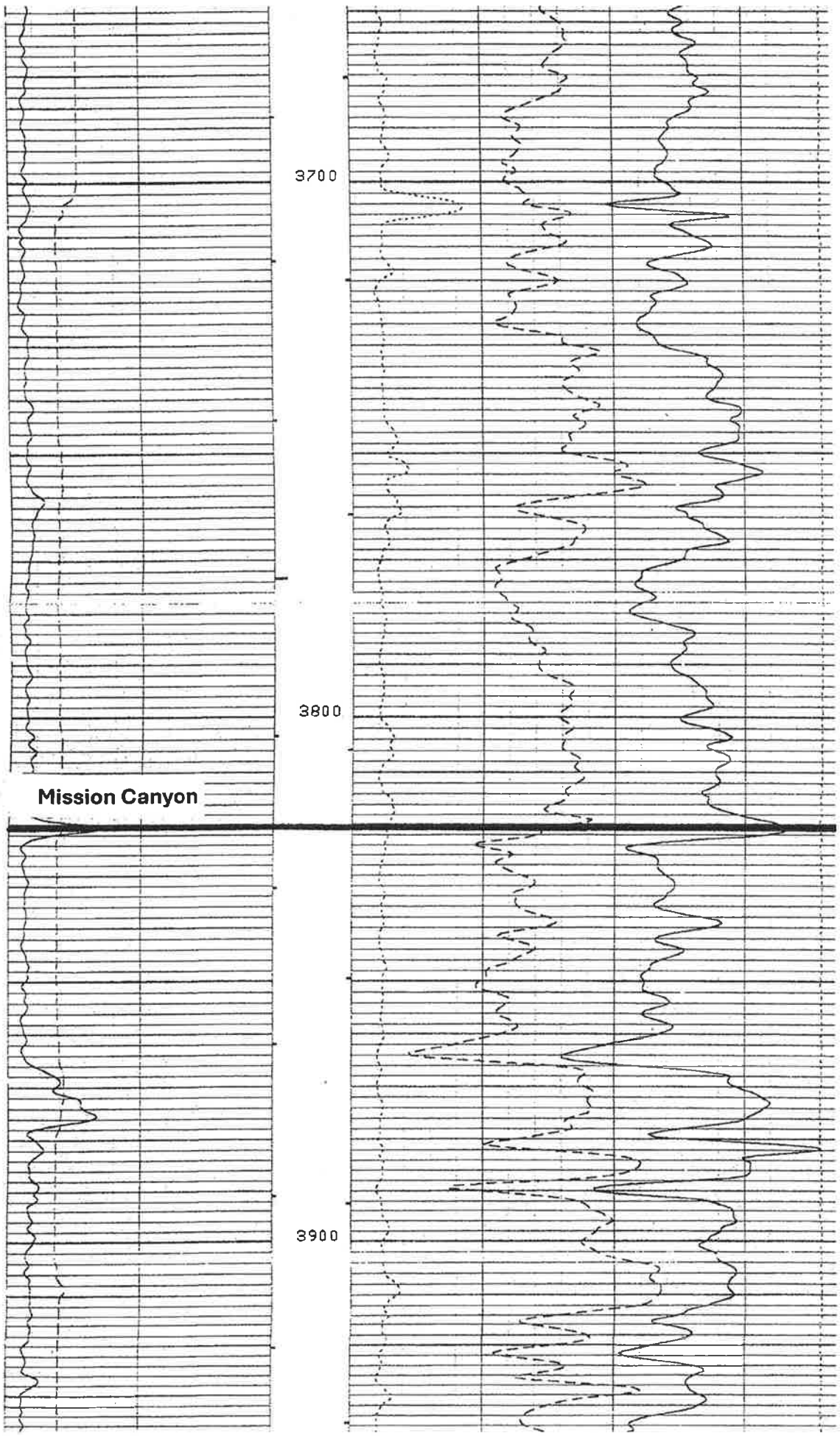
COMPANY CROFT PETROLEUM COMPANY
WELL MUNTZING D-11
LOCATION 990' FNL & 1945' FWL
FIELD BLACKFOOT

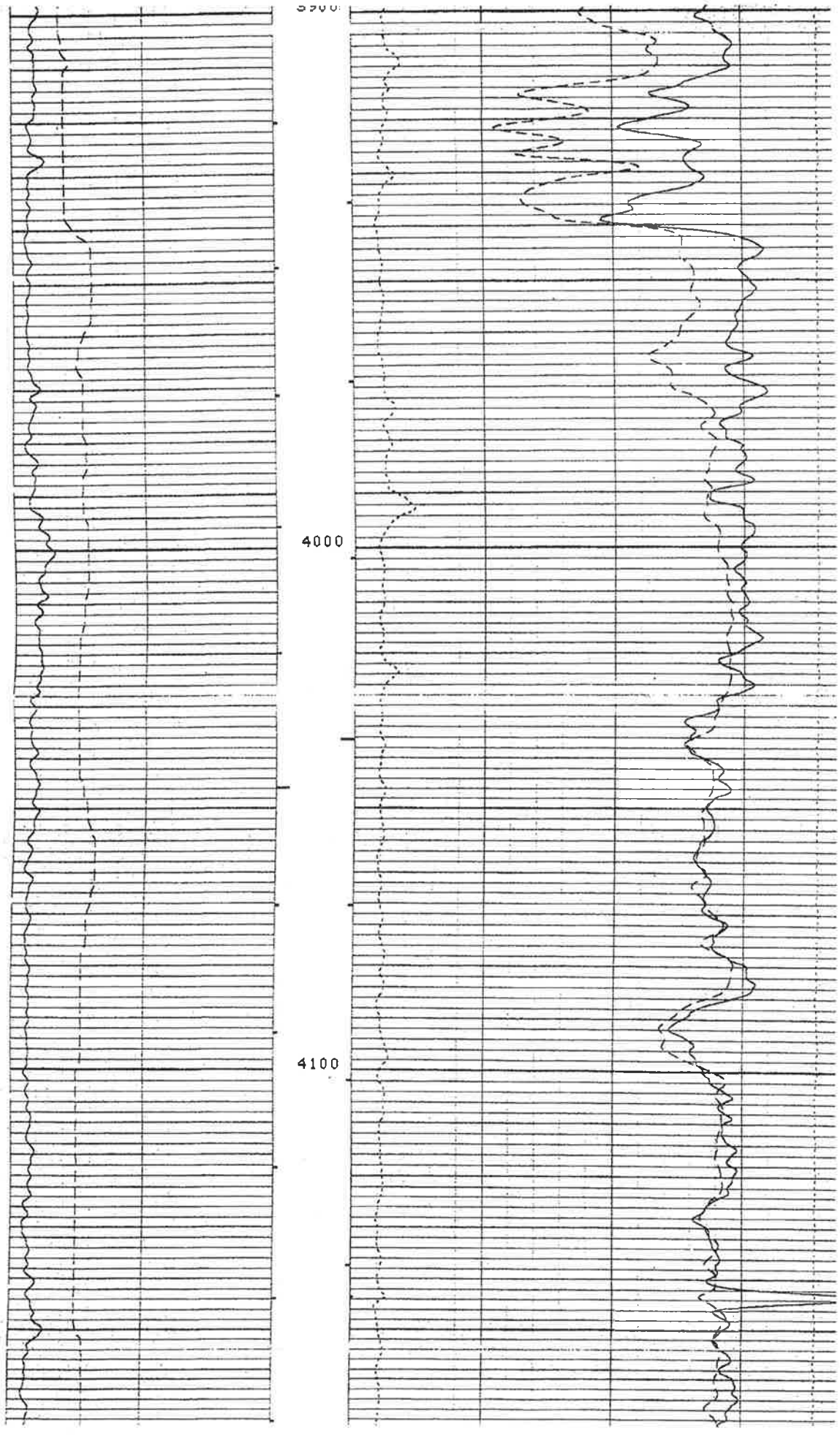
Permanent Datum	GROUND LEVEL	Elev.	4195.0 F	Elev.: K.B. 4205.0 F
Log Measured From	KELLY BUSHING	10.0 F	above Perm. Datum	D.F. 4204.0 F
Drilling Measured From	KELLY BUSHING			G.L. 4195.0 F

Date	05-DEC-1990			
Run No.	ONE			
Depth Driller	4975.0 F			
Depth Logger (Schl.)	4979.0 F			
Btm. Log Interval	4976.0 F			
Top Log Interval	1800.0 F			
Casing-Driller	9 5/8 @ 245.0 F	@		@
Casing-Logger	243.0 F			
Bit Size	7 7/8	8 3/4		
Type Fluid in Hole	GEL			
Dens. / Visc.	9.70 LB/G	53.0 S		
PH / Fld. Loss	9.0	12.0 C3		
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	.582 OHMM @ 78.0 DEGF			@
Rmf @ Meas. Temp.	.393 OHMM @ 64.0 DEGF			@
Rmc @ Meas. Temp.	1.070 OHMM @ 75.0 DEGF			@
Source: Rmf / Rmc	PRESSED	MEASURED		
Rm @ BHT	.500 OHMM @ 92.0 DEGF			@
Time Circulation Ended	09:00 DEC 6, 1990			
Time Logger on Bottom	15:00 DEC 6, 1990			
Max. Rec. Temp.	92.0 DEGF			
Equip. / Location	8322	CUTBANK		
Recorded By	PALMER			
Witnessed By	CROFT & REDGLIN			




SANDSTONE
POROSITY SCALE CHANGE
45
30
15
0
30
20
10
0
LIMESTONE
Madison
3500
3600


3700
3800
Mission Canyon
3900


3900
4000
4100

Schlumberger

DUAL INDUCTION - SFL

COMPANY CROFT PETROLEUM COMPANY

WELL MUNTZING D-11

FIELD BLACKFOOT

COUNTY GLACIER STATE MONTANA

LOCATION 990' FNL & 1945' FWL

NE / NW

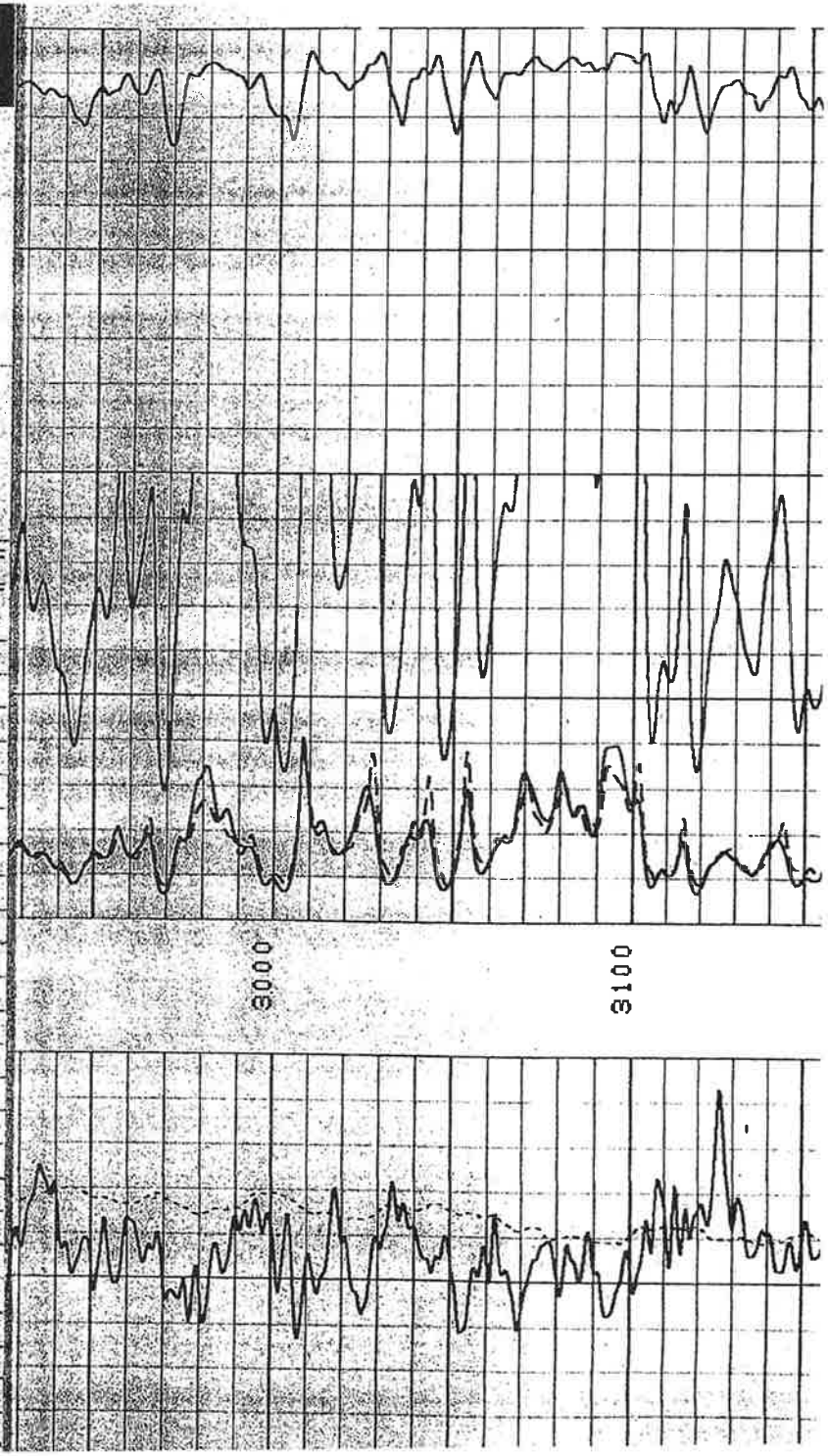
Other Services:
DIL/GR
LDT/CNL/GR
CYBERLOOK

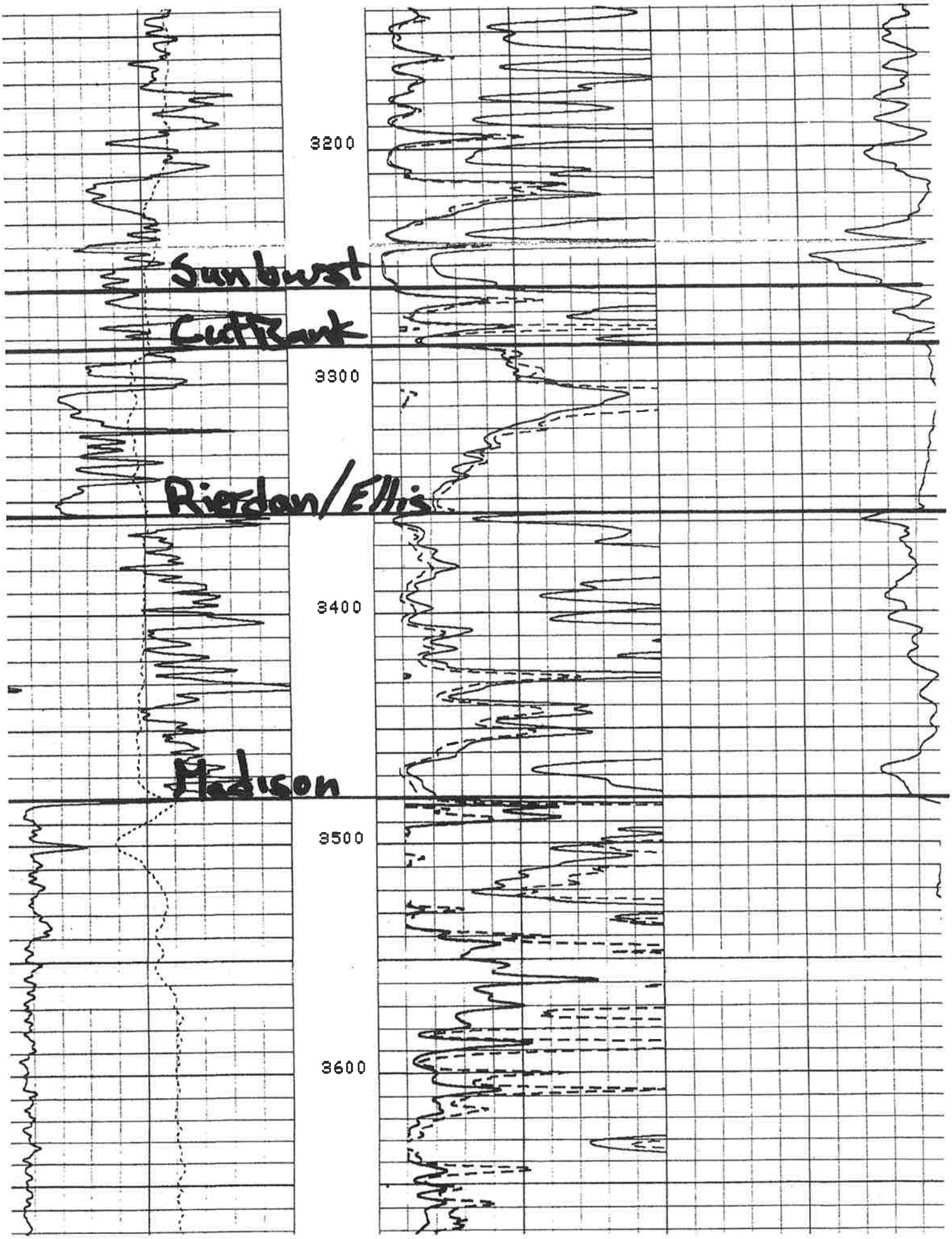
API SERIAL NO.	SECT.	TWP.	RANGE
-	11	37N	6W

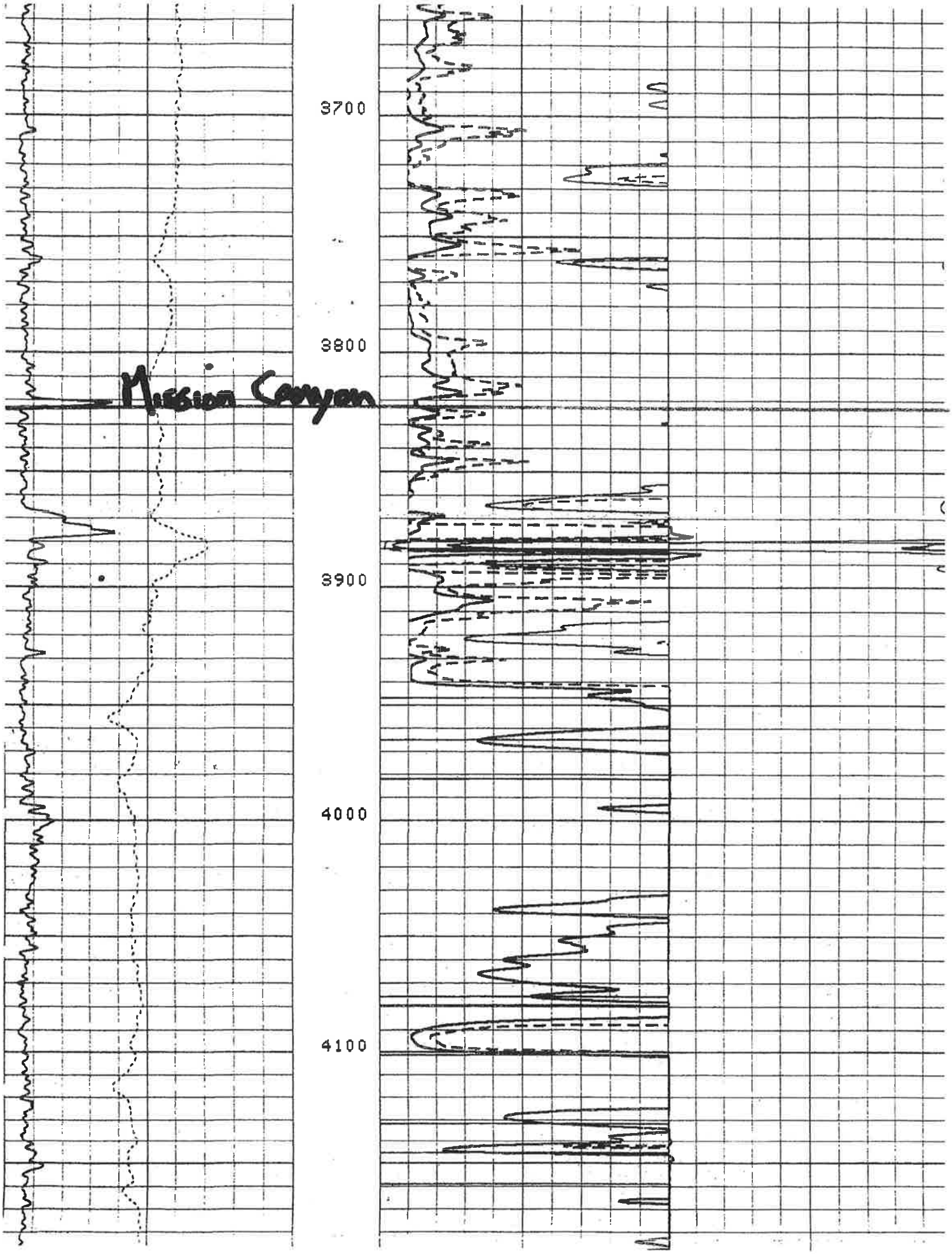
COUNTY GLACIER
FIELD BLACKFOOT
LOCATION 990' FNL & 1945' FWL
WELL MUNTZING D-11
COMPANY CROFT PETROLEUM COMPANY

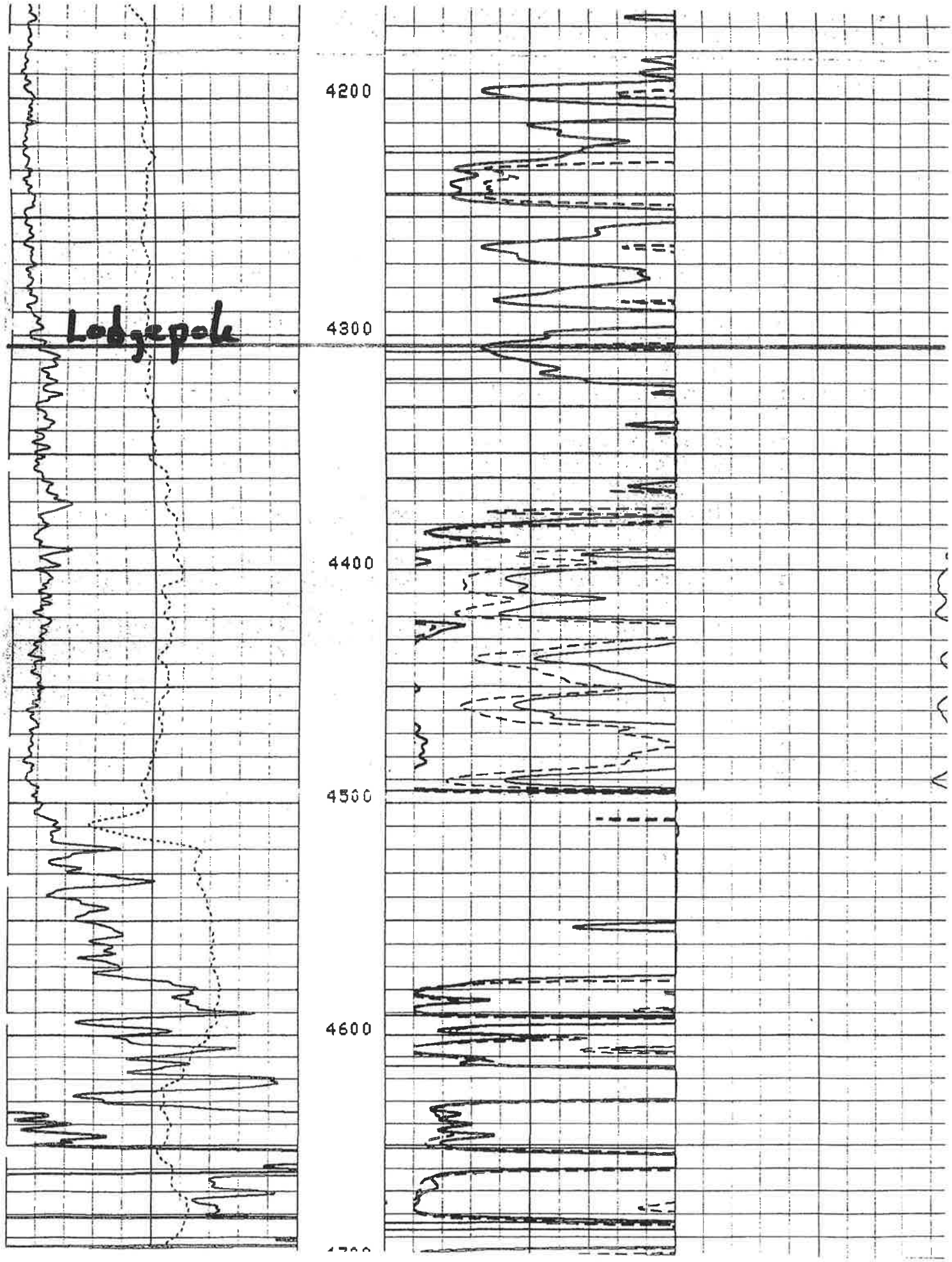
Permanent Datum	GROUND LEVEL	Elev. 4195.0 F	Elev.: K.B.4205.0 F
Log Measured From	KELLY BUSHING	10.0 F above Perm. Datum	D.F.4204.0 F
Drilling Measured From	KELLY BUSHING		G.L.4195.0 F

Date	05-DEC-1990		
Run No.	ONE		
Depth Driller	4975.0 F		
Depth Logger (Schl)	4979.0 F		
Btm. Log Interval	4973.0 F		
Top Log Interval	243.0 F		
Casing-Driller	9 5/8 @ 245.0 F	@	@
Casing-Logger	243.0 F		
Bit Size	7 7/8	8 3/4	
Type Fluid in Hole	GEL		
Dens. / Visc.	9.70 LB/G	53.0 S	
pH / Fld. Loss	9.0	12.0 C3	
Source of Sample	FLOWLINE		
Rm @ Meas. Temp.	.582 OHMM @ 78.0 DEGF		@
Rmf @ Meas. Temp.	.393 OHMM @ 64.0 DEGF		@
Rmc @ Meas. Temp.	1.070 OHMM @ 75.0 DEGF		@
Source: Rmf / Rmc	PRESSED	MEASURED	
Rm @ BHT	.500 OHMM @ 92.0 DEGF		@
TIME - Circulation Ended	08:30 DEC 5, 1990		
TIME - Logger on Bottom	12:45 DEC 5, 1990		
Max. Rec. Temp.	92.0 DEGF		
Equip. / Location	8322	CUTBANK	
Recorded By	PALMER		
Witnessed By	CROFT & HEDGLIN		




3200
Sunburst
Cutbank
3300
Rierdon/Ellis
3400
Madison
3500
3600


3700
3800
Mission Canyon
3900
4000
4100


Lodgepole
4200
4300
4400
4500
4600

ENERGY LABORATORIES, INC. • P.O. Box 30916 • 1120 South 27th Street • Billings, MT 59107-0916
800-735-4489 • 406-252-6325 • 406-252-6069 fax • eli@energylab.com

Exhibit 5

Company: Croft Petroleum	**Date : 2/21/2001**
Field : Blackfoot Pump Section	**Sample Date : 2/8/2001**
County : Glacier Co., MT	**Formation : Cut Bank & Madison Forms**
Location : Inj. pump suction-produced water	**Rock Type :**
Lab ID : 001-01-50985	**Depth :**
Comments :	

Water Analysis Report

CATIONS	mg/l	meq/l
Potassium	48	1.23
Sodium	2,640	114.83
Calcium	50	2.50
Magnesium	21	1.73
Iron	nd	nd
Barium	nd	nd
Strontium	nd	nd
SUM +	2,759	120.29

ANIONS	mg/l	meq/l
Sulfate	115	2.39
Chloride	2,130	60.08
Carbonate	<1	0.00
Bicarbonate	4,020	65.90
Bromide	nd	nd
Organic Acids	nd	nd
Hydroxide	<1	0.00
SUM -	6,265	128.37

Solids		
Total Dissolved Solids @180°C	7,000	mg/l
Total Solids, Calculated	7,014	mg/l
Total Solids, NaCl equivalents	5,984	mg/l
Chloride as NaCl	3,511	mg/l
NaCl, % of Total Dissolved Solids	50.06	%
Accuracy	3.86	Sigma

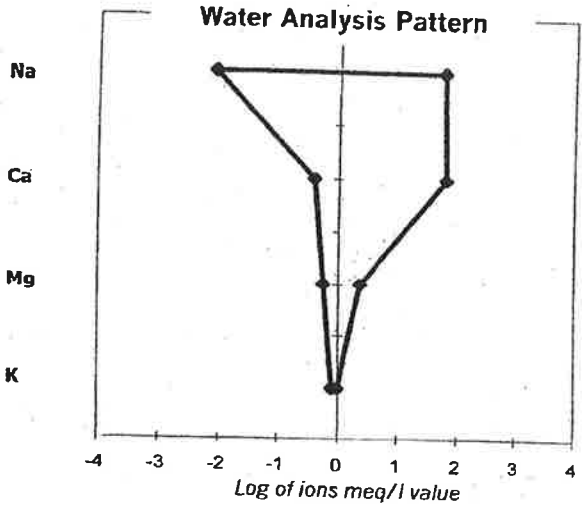
Sample Conditions		
pH, s.u. (Field)	7.30	s.u.
Sample Pressure	14.70	psia
Surface Temp	nd	°F
Downhole Temp	nd	°F
Ionic Strength	0.129	μ

Dissolved Gases				
Bisulfide ion	nd			
Hydrogen Sulfide	nd		Dissolved O_2, aq	nd
Total Sulfide	nd		Total CO_2, aq	3,228 mg/l

Other Properties				
Calcium Hardness as $CaCO_3$	125	mg/l	Specific Gravity	1.002 measured
Magnesium Hardness as $CaCO_3$	87	mg/l	Specific Gravity	1.006 calculated
Total Hardness as $CaCO_3$	212	mg/l	Resistivity, 68°F	0.99 ohm-m
			Conductivity 25°C	10,100 umhos/cm

Microbiological	
Sulfate Reducing	nd
Aerobic Bacteria	nd

Scaling Conditions	
Calcium Carbonate	$CaCO_3$ +
Calcium Sulfate	$CaSO_4$ - - -
Barium Sulfate	$BaSO_4$ -
Strontium Sulfate	$SrSO_4$ -



Probable Mineral Residue, Dry

Calculation error = 6.7 %

COMPOUND	mg/l
NaHCO3	5,090
NaCl	3,030
Ca(HCO3)2	202
Na2SO4	170
Mg(HCO3)2	126.4
KCl	91.5

Note: nd denotes 'Not Determined'

01/13/00 vELI.0carney/standish

\\ELI_BL2\PUBLIC\Office\01ROFwater\[50985.xls]Input

SCHLUMBERGER WELL SURVEYING CORPORATION

HOUSTON, TEXAS

Electrical Log

COUNTY GLACIER
FIELD or LOCATION BLACKFOOT
WELL SEC. 11-37N-6W
COMPANY VASBOE # 1
COMPANY GOOD & ONSTAD

COMPANY GOOD & ONSTAD

WELL VASBOE # 1 (8-1)

FIELD BLACKFOOT

LOCATION SEC. 11-37N-6W

C SW SE

COUNTY GLACIER

STATE MONTANA

15

Other Surveys

ML

Location of Well

RECEIVED
SEP 5 - 1958
1349
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA

Elevation: D.F.:
K.B.: 4147
or G.L.: 4138

FILING No. 282

RUN No.	ONE				
Date	2/13/58				
First Reading	3425				
Last Reading	194				
Feet Measured	3231				
Csg. Schlum.	194				
Csg. Driller	194				
Depth Reached	3426				
Bottom Driller	3435				
Depth Datum	KB 9' ABOVE GL				
Mud Nat.	GEL				
Dens. Visc.	9.5 44				
Mud Resist.	7.0@55 °F	@ °F	@ °F	@ °F	@ °F
" Res. BHT	5.3@75 °F	@ °F	@ °F	@ °F	@ °F
Rmf M	4.6@75 °F	@ °F	@ °F	@ °F	@ °F
Rmc M	3.3@75 °F	@ °F	@ °F	@ °F	@ °F
" pH	- @ °F	@ °F	@ °F	@ °F	@ °F
" Wtr. Loss	- CC 30 min.	CC 30 min.	CC 30 min.	CC 30 min.	CC 30 min.
Bit Size	7 7/8"				
Spcgs.—AM	16"				
AM'	64"				
AO	19'				
Opr. Rig Time	2 HRS				

035-06976

RECEIVED
SEP 4 1958
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA
BILLINGS

Exhibit 4b

LONG NORMAL 100 0 1000

NORMAL 100 0 1000

LATERAL 100 0 1000

RESISTIVITY -ohms. m²/m

RESISTIVITY -ohms. m²/m

3300 Top of Rierdon/Ellis 3,280'

3400 Top of Mission Canyon 3,404'

upper confining zone

10 + -

ONTANEOUS-POTENTIAL millivolts

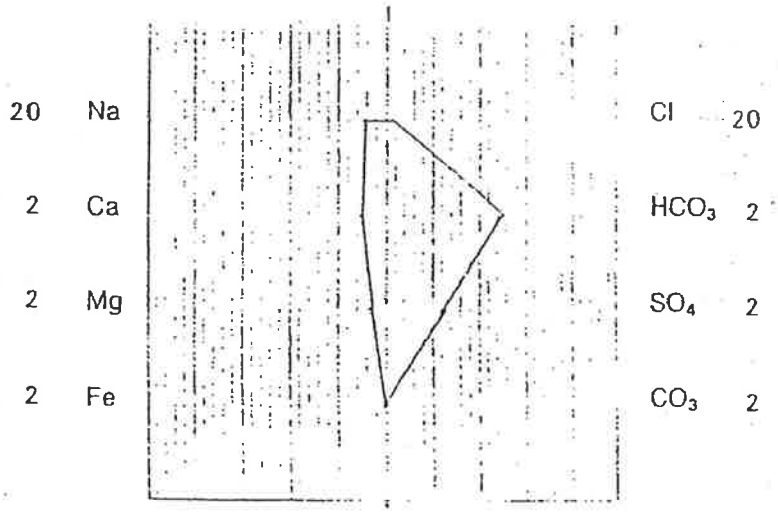
ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-873-5227

WATER ANALYSIS REPORT Lab. No. 91-4308

ld # S.C.C.B.S.U. County Glacier State Montana
ll No. S.C.C.B.S.U., West Plant Location Sec 24 Tusp 33N Rge 6W
rmation Madison Depths
erator Unocal Oil & Gas Date Sampled 02/05/91
T. No. Sample Surge Tank Date Submitted 02/07/91
drogen Sulfide: Present X Absent Other Data Sampled by B. Nanini Date Reported 02/20/91
Clear, turbid sample with colorless, clear filtrate.

ATIONS	mg/l	meq/l	ANIONS	mg/l	meq/l
tassium	38	0.966	Sulfate	587	12.2
dium	974	42.3	Chloride	566	16
alcium	105	5.25	Carbonate	0	0
agnesium	42	3.42	Bicarbonate	1580	25.8

WATER ANALYSIS PATTERN
Scale meq/l Per Unit



otal Dissolved Solids, mg/l 3100 Resistivity @ 68°F, ohms/meter³ 2.15
Chloride as NaCl, mg/l 932 Specific Gravity @ 60/60°F 1.002
pH 7.3 Cation-Anion Balance, % Diff. 1.9

NOTE: Milligrams/liter (mg/l) approximately equivalent to ppm. meq/l = milliequivalents per liter.

REMARKS:

P. O. BOX 593
BILLINGS, MONTANA
123 N. 32ND ST

WATER ANALYSIS REPORT

Lab. No. 5541-2

Field BLACKFOOT POOL
County GLACIER State MONTANA
Well No. MUNTZING A-1
Location SW NE SW 2-37N-6W
Formation CUT BANK
Depths
Operator MURPHY CORPORATION
DST No. Sample
Date Sampled
Date Analyzed 8-3-62
Other Data SAMPLE CLEAR COLORLESS WATER WITH OIL PRESENT.

Constituents	PPM	MEQ.	MEQ. %
Sodium	3,273	142.60	48.91
Calcium	37	1.85	0.64
Magnesium	16	1.32	0.45
Sulfate	0	0	0
Chloride	2,851	80.40	27.58
Carbonate	229	7.63	2.62
Bicarbonate	3,460	57.74	19.80

Chloride as NaCl 4,701 PPM.

Total Solids in Parts per Million
By evaporation
After ignition
Calculated 8,145

pH 8.6

Specific Gravity @ 60°F 1.007

Resistivity @ 68°F
ohms/meter² 0.89

Total Solids From Resistivity as NaCl 7,338 PPM.

NOTE: Sodium and potassium reported as sodium. MEQ.=milliequivalents per liter. PPM=parts per million (milligrams per liter). 1 PPM equivalent to 0.0001%

WATER ANALYSIS PATTERN

Scale MEQ. Per Unit

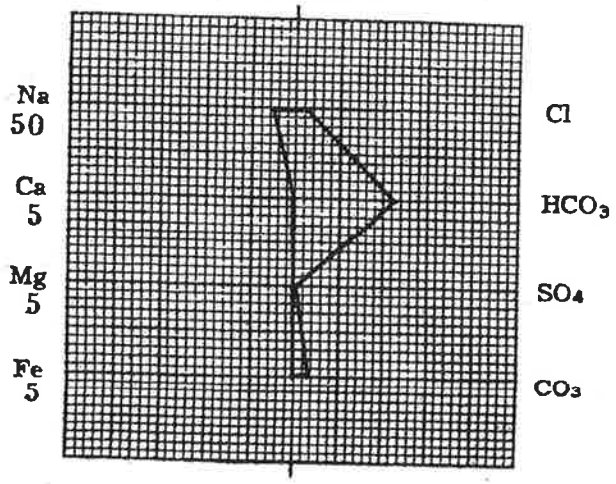


Exhibit 6

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View field visits for this site
View water quality for this site

Site Name: CROFT PETROLEUM
GWIC Id: 150359

Section 1: Well Owner(s)

1) CROFT PETROLEUM (MAIL)
N/A
N/A N/A N/A [08/08/1995]

Section 2: Location

Township	Range	Section	Quarter Sections
37N	06W	11	NW¼ NW¼ NE¼ SE¼ NW¼ NE¼

County	Geocode	Parcel
GLACIER		

Latitude	Longitude	Geomethod	Datum
48.984969	-112.353752	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
4215			

Measuring Point Altitude	MP Method	Datum	Date Applies
4215			8/8/1995

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method:
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: N/A

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.
There are no casing strings assigned to this well.
There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 85
Static Water Level:
Water Temperature:

Unknown Test Method *

Yield _ gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

211TMDC - TWO MEDICINE FORMATION (OF MONTANA GROUP)

Lithology Data

There are no lithologic details assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:	
Company:	
License No:	-
Date Completed:	

Ground-Water Information Center Water Quality Report
Report Date: 12/11/2025

Site Name: CROFT PETROLEUM
Compare to Water Quality Standards

Location Information

Sample Id/Site Id: 1996Q0244 / 150359
Location (TRS): 37N 06W 11 ABDABB
Latitude/Longitude: 48° 59' 5" N 112° 21' 13" W
Datum: NAD83
Altitude: 4215
County/State: GLACIER / MT
Site Type: WELL
Geology: 211TMDC
USGS 7.5' Quad: HEADLIGHT BUTTE NE 7 1/2'
PWS Id:
Project: GLACCO

Sample Date: 8/8/1995
Agency/Sampler: MBMG / PMN
Field Number: 370611A
Lab Date: 10/2/1995
Lab/Analyst: MBMG / TSH
Sample Method/Handling: PUMPED / 3120
Procedure Type: DISSOLVED
Total Depth (ft): 85
SWL-MP (ft): NR
Depth Water Enters (ft): NR

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	68.100	3.398	Bicarbonate (HCO3)	416.800	6.831
Magnesium (Mg)	41.200	3.390	Carbonate (CO3)	0.000	0.000
Sodium (Na)	65.200	2.836	Chloride (Cl)	18.000	0.508
Potassium (K)	5.500	0.141	Sulfate (SO4)	100.000	2.083
Iron (Fe)	<.003	0.000	Nitrate (as N)	5.500	0.393
Manganese (Mn)	<.002	0.000	Fluoride (F)	0.100	0.005
Silica (SiO2)	9.200		Orthophosphate (as P)	<.1	0.000
Total Cations		9.802	**Total Anions**		9.820

Trace Element Results (µg/L)

Aluminum (Al):	<80.	Cesium (Cs):	NR	Molybdenum (Mo):	<10.	Strontium (Sr):	1,347.000
Antimony (Sb):	<2.	Chromium (Cr):	<2.	Nickel (Ni):	2.700	Thallium (Tl):	NR
Arsenic (As):	<1.	Cobalt (Co):	<2.	Niobium (Nb):	NR	Thorium (Th):	NR
Barium (Ba):	60.200	Copper (Cu):	4.800	Neodymium (Nd):	NR	Tin (Sn):	NR
Beryllium (Be):	NR	Gallium (Ga):	NR	Palladium (Pd):	NR	Titanium (Ti):	<10.
Boron (B):	<80.	Lanthanum (La):	NR	Praseodymium (Pr):	NR	Tungsten (W):	NR
Bromide (Br):	50.000	Lead (Pb):	<2.	Rubidium (Rb):	NR	Uranium (U):	NR
Cadmium (Cd):	<2.	Lithium (Li):	33.000	Silver (Ag):	<1.	Vanadium (V):	<10.
Cerium (Ce):	NR	Mercury (Hg):	NR	Selenium (Se):	6.000	Zinc (Zn):	170.000
						Zirconium (Zr):	<20.

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	518.89	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	730.48	Hardness as CaCO3:	339.62	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	851	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	858	Alkalinity as CaCO3 (mg/L):	342.01	Phosphorus, TD (mg/L):	NR
Field pH:	7.67	Ryznar Stability Index:	6.586	Field Nitrate (mg/L):	NR
Lab pH:	7.68	Sodium Adsorption Ratio:	1.5347	Field Dissolved O2 (mg/L):	NR
Water Temp (°C):	8	Langlier Saturation Index:	0.547	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	<.05	Field Redox (mV):	NR
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	NR	Acidity to 8.3 (mg/L CaCO3)	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Additional Parameters

Phosphate T Dis (mg/L - P) L.2
Sample Condition:
Field Remarks:
Lab Remarks:

Notes

Explanation: **mg/L** = milligrams per Liter; **µg/L** = micrograms per Liter; **ft** = feet; **NR** = No Reading in GWIC

Qualifiers: **A** = Hydride atomic absorption; **E** = Estimated due to interference; **H** = Exceeded holding time; **J** = Estimated quantity above detection limit but below reporting limit; **K** = Na+K combined; **N** = Spiked sample recovery not within control limits; **P** = Preserved sample; **S** = Method of standard additions; **U** = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps

Site Name: TUMA, TOM
GWIC Id: 288120

Section 1: Well Owner(s)

1) TUMA, TOM (MAIL)
PO BOX 776
CUT BANK MT 59427 [07/14/2016]

Section 2: Location

Township	Range	Section	Quarter Sections
37N	06W	11	NW¼ NE¼ SW¼ NW¼

County	Geocode	Parcel
GLACIER		

Latitude	Longitude	Geomethod	Datum
48.982014	-112.36575	MAP	WGS84

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

STOCKWATER (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, July 14, 2016

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	30	7.8
30	260	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	30	6.6	0.25		WELDED	A53A STEEL
0	260	4		160.0	GLUED	PVC-SDR 26

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
160	220	4	72	1*5	SAW SLOTS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	BENTONITE	
0	260	1/4" WASHED GRAVEL	

Section 7: Well Test Data

Total Depth: 260
Static Water Level: 100
Water Temperature:

Air Test *

5 gpm with drill stem set at 200 feet for 2 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

WELL AT END OF LOSING RD.

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	1	TOPSOIL
1	20	CLAY GRAY
20	22	SHALE GRAY SOFT
22	23	LIMESTONE TAN HARD
23	62	SHALE GRAY SOFT
62	63	SHALE BLACK MEDIUM
63	68	SHALE BLUE SOFT
68	72	LIMESTONE TAN HARD
72	77	SANDSTONE GRAY/GREEN SOFT
77	90	SHALE GRAY SOFT
90	94	SILTSTONE GRAY MEDIUM
94	110	SHALE GRAY SOFT
110	115	SHALE BLACK MEDIUM
115	122	SHALE GRAY MEDIUM
122	132	SILTSTONE GRAY MEDIUM

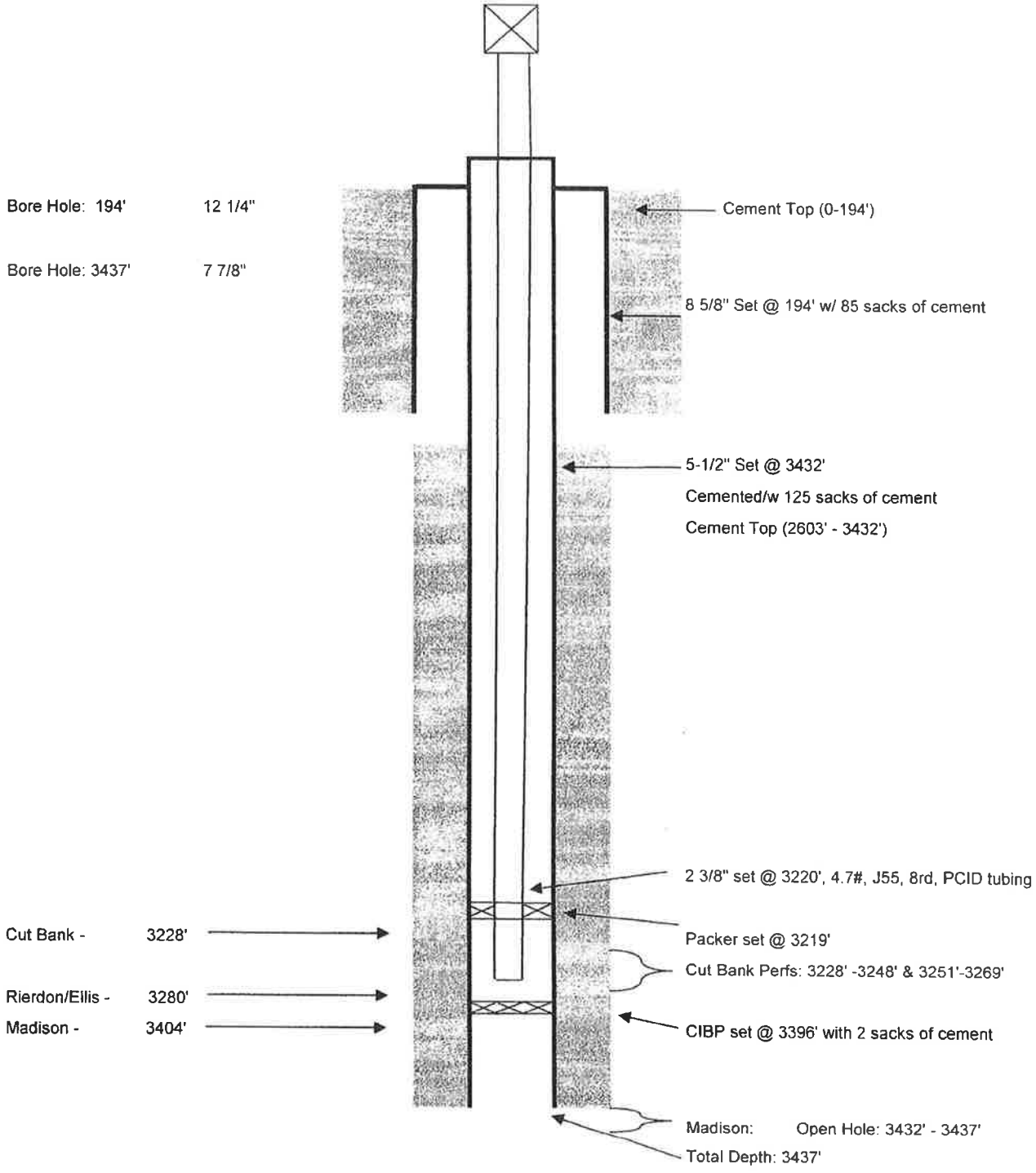
Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: TYREL HLAVNICKA
Company: AQUASOURCE DRILLING LLC
License No: WWC-199
Date Completed: 7/14/2016

Exhibit 7

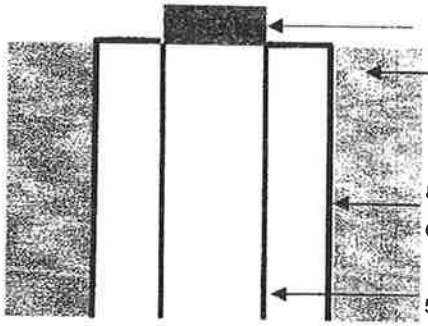
Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Vasboe #8-1**	**BY:**	**Joseph Montalban**
API#:	**25-035-06976**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	853' FSL 2173' FEL SWSE		



Operator:	**Joe Stone et al**	**DATE:**	**4-Dec-25**
Well:	**Kullberg & Otthouse (Tribal #3)**	**BY:**	**Joseph Montalban**
API#:	**25-035-07029**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	390' FNL 360' FEL Lot 5		
Notes:	**Drilled Sept - Oct 1957**		
	Completed and then Plugged and Abandoned		
	Re-entered as a water well by Joe Stone et al, Surface owner June 1980		

Bore Hole: 206' KB 12 1/4"

Bore Hole: 3518' KB 7 7/8"



Plug #3 - w/ 15 sacks of cement

Cement Top (0-206')

8 5/8" Set @ 206' KB

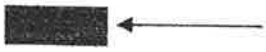
Cemented/w 85 Sacks

5-1/2" Set @ 3581' KB

Cemented/w 75 Sacks

Cement Top (3050' - 3518')

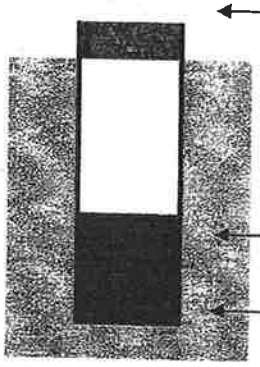
Eagle Water for stock 735' - 760'



Plug #2 - w/ 25 sacks of cement 755' - 770'

Casing stub 5 1/2" - 2900'

Cut Bank - 3351'



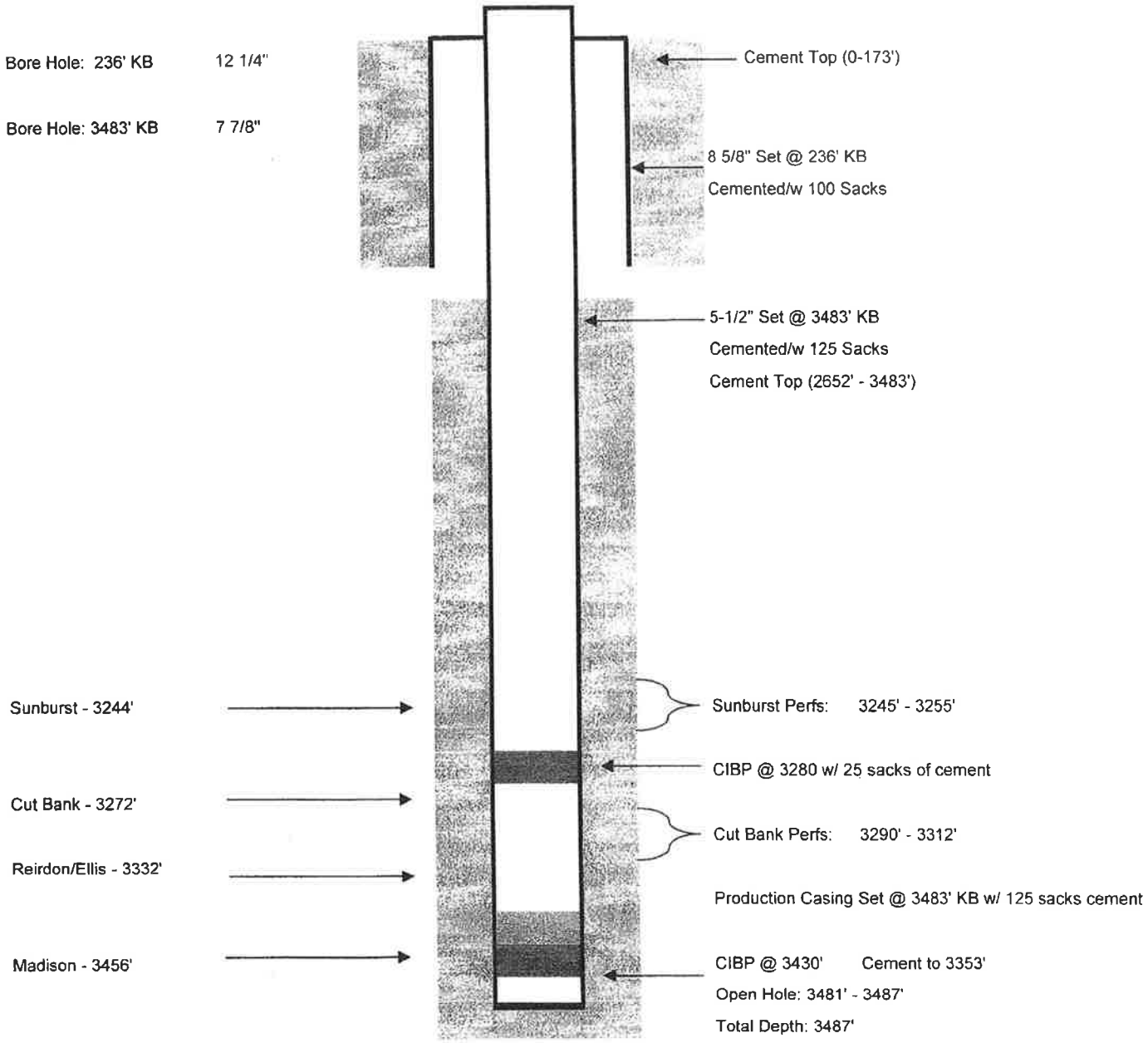
Calculated top of cement - 3050'

Plug #1 - w/ 15 sacks of cement

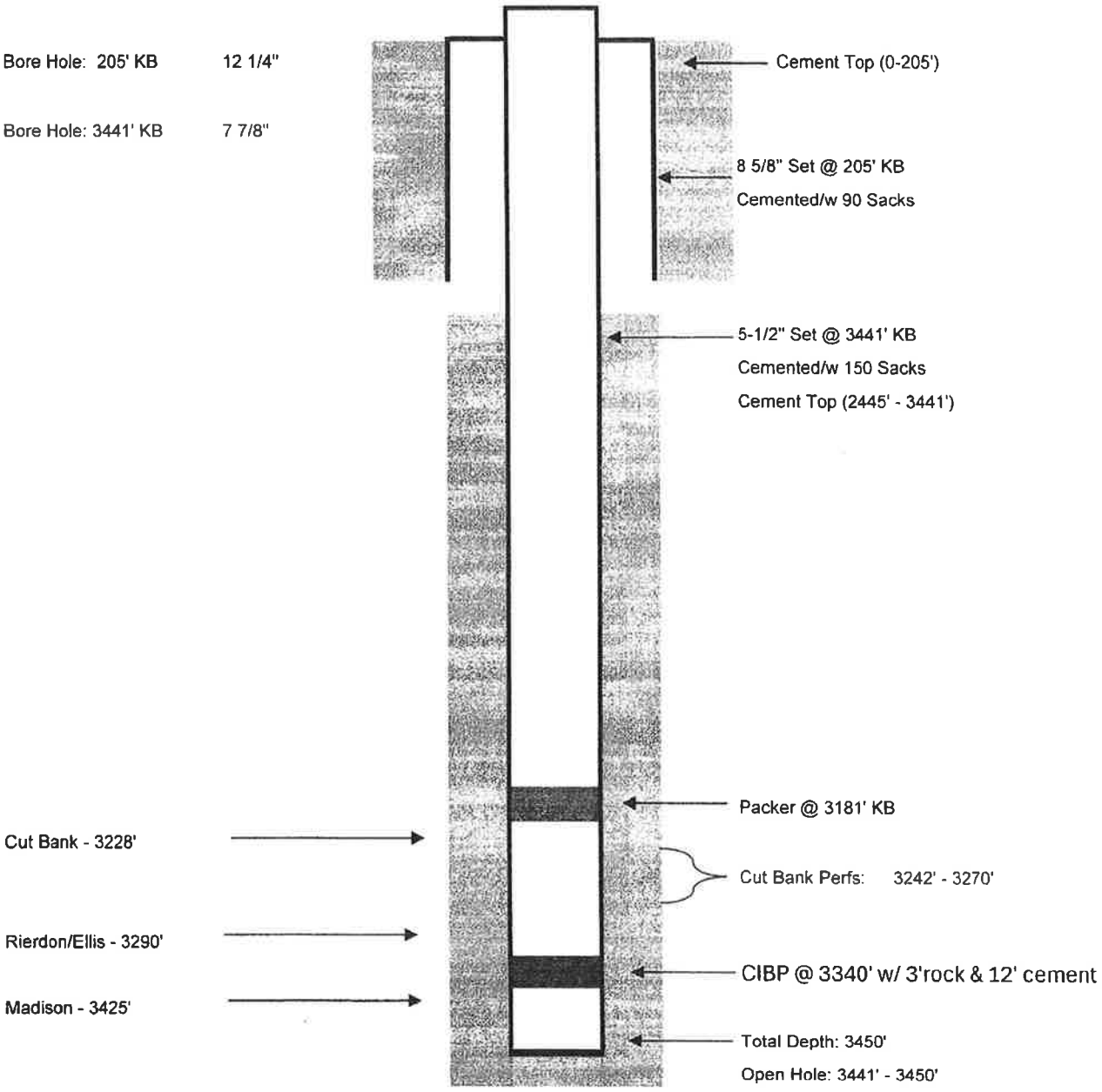
Top of Plug - 3403'

Total Depth: 3528'

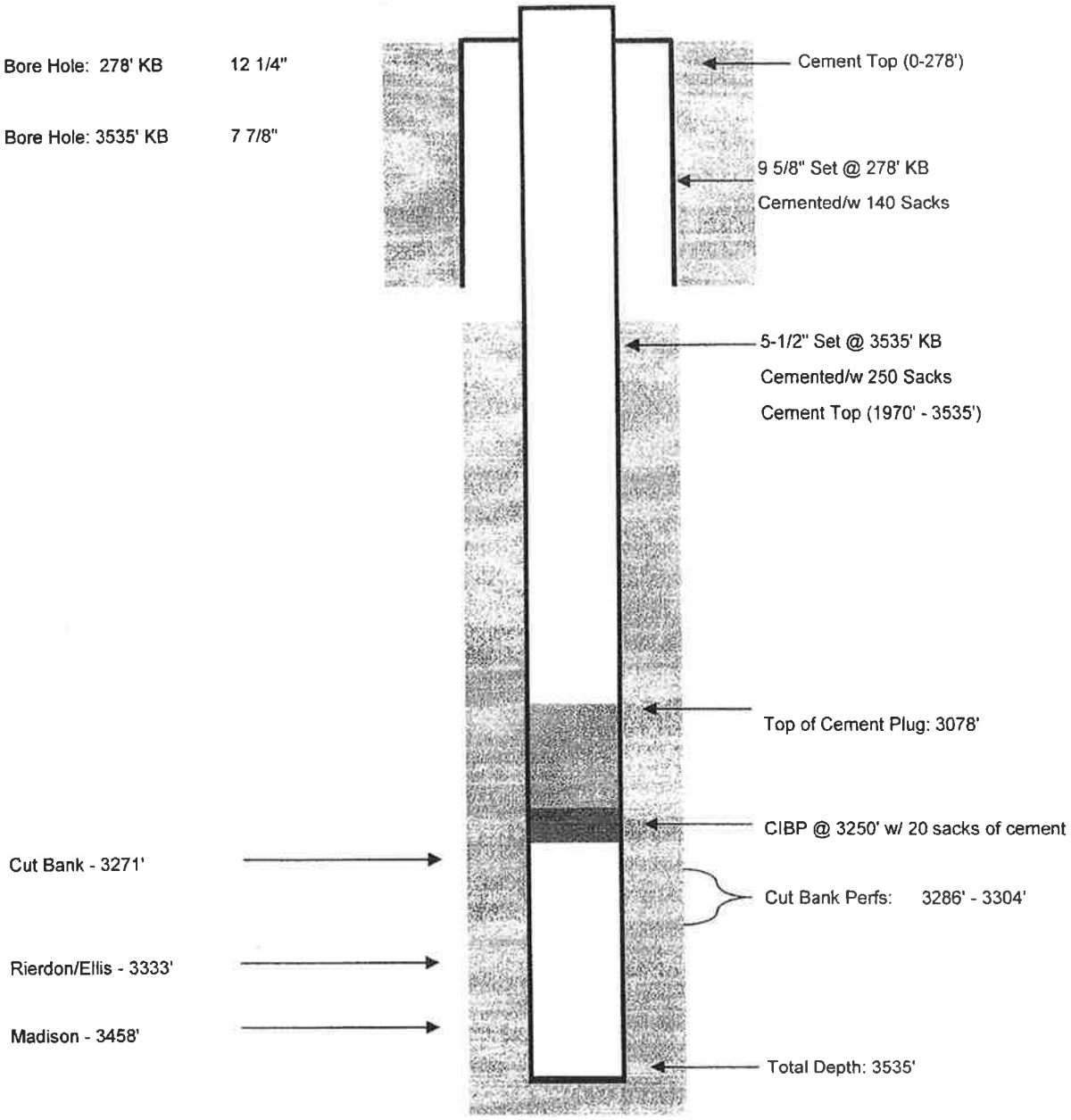
Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Gov't #3 (1-3)**	**BY:**	**Joseph Montalban**
API#:	**25-035-60015**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	NWSE		
Notes:	**Drilled May 1958**		
	Plugged Back Madison, Recomplete Cut Bank June 1962		
	Plugged Back Cut Bank, Recomplete Sunburst Gas 1999		



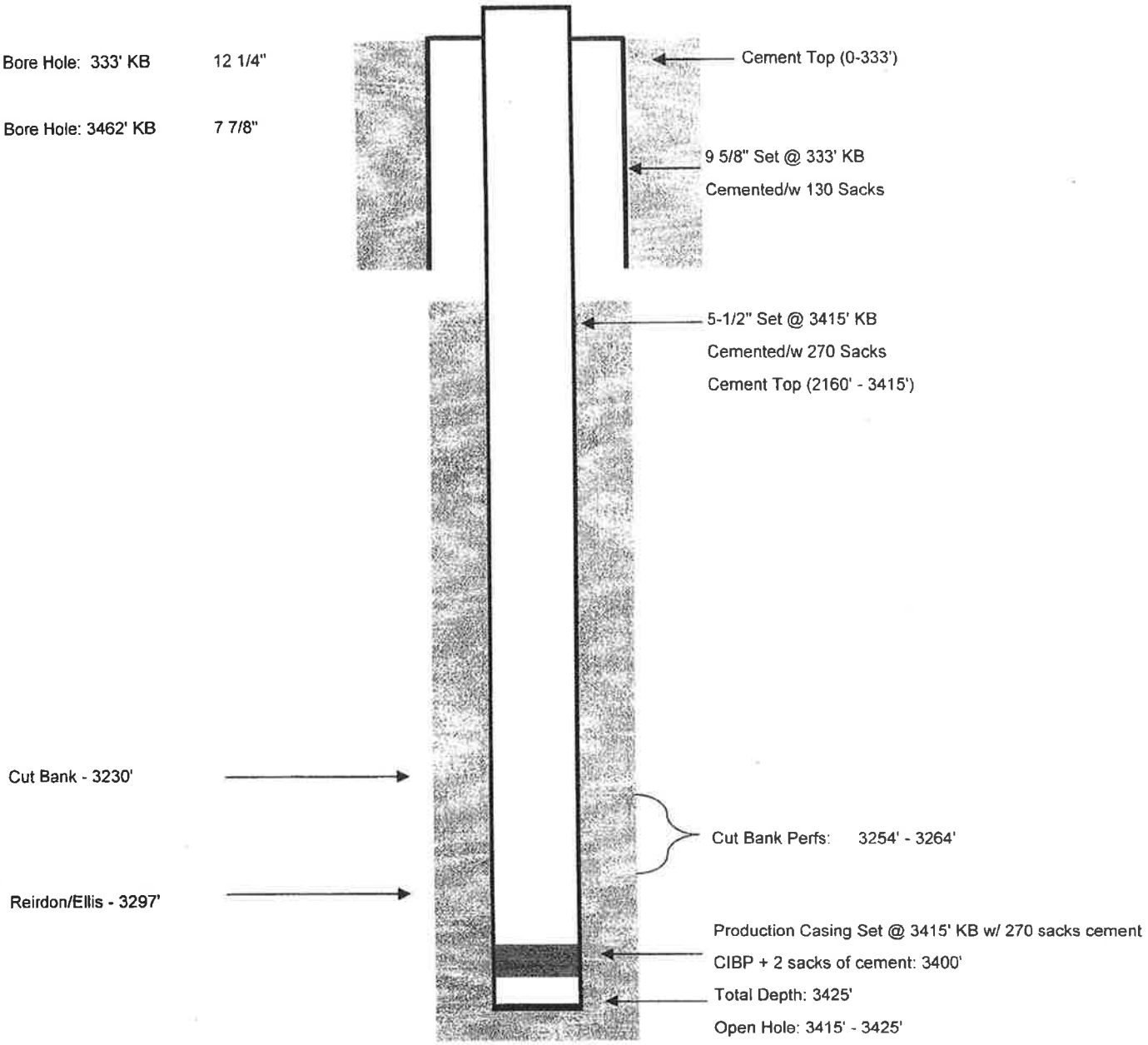
Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Vasboe #9-1**	**BY:**	**Joseph Montalban**
API#:	**25-035-06953**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 14 T37N R6W**		**Current/As Built**
	NWNE		
Notes:	**Drilled September 1958 as Madison Oil Well**		
	Converted to Cut Bank Injector in September 1976		



Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Federal #1-4**	**BY:**	**Joseph Montalban**
API#:	**25-035-21629**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	SENWSE		
Notes:	**Drilled June 1983**		
	Producing Cut Bank		



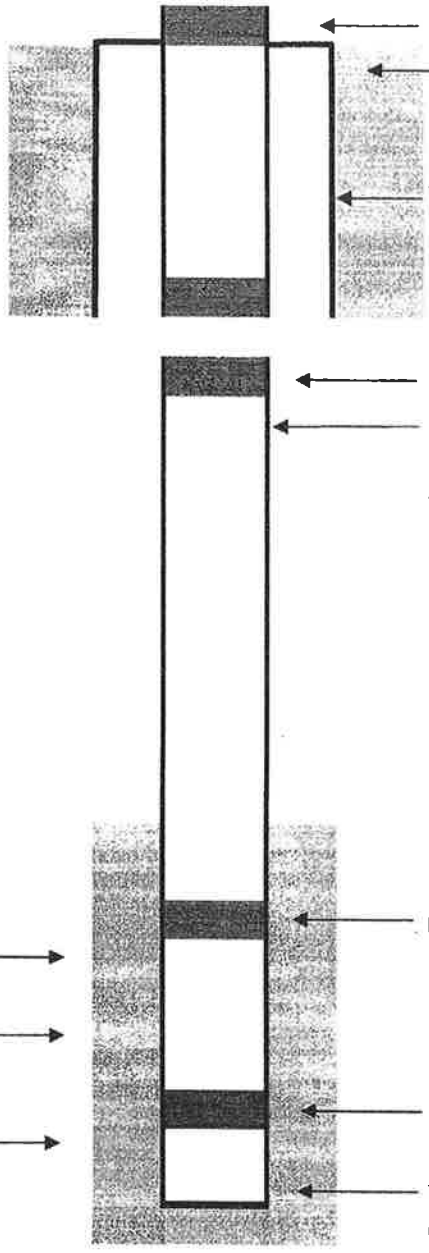
Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Federal #2-2**	**BY:**	**Joseph Montalban**
API#:	**25-035-21618**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	NESESW		
Notes:	**Drilled Nov - Dec 1982**		
	Completed Cut Bank Oil Well		



Operator:	**Hyland Oil Corp.**	**DATE:**	**4-Dec-25**
Well:	**Federal #1**	**BY:**	**Joseph Montalban**
API#:	**25-035-06975**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	872' FSL 3310' FEL		
Notes:	**Drilled May 1958**		
	P&A Sept. 1969		

Bore Hole: 198' KB 12 1/4"

Bore Hole: 3431' KB 7 7/8"



Cut Bank - 3251'

Reirdon/Ellis - 3304'

Madison - 3431'

Operator:	**Montalban Oil and Gas Operations, Inc.**	**DATE:**	**4-Dec-25**
Well:	**Muntzing #B-3 (7-3)**	**BY:**	**Joseph Montalban**
API#:	**25-035-07006**		**Field Manager**
County:	**Glacier**		
Field	**Cut Bank**		**SCHEMATIC**
Location:	**Sec. 11 T37N R6W**		**Current/As Built**
	E/2 SW NW		

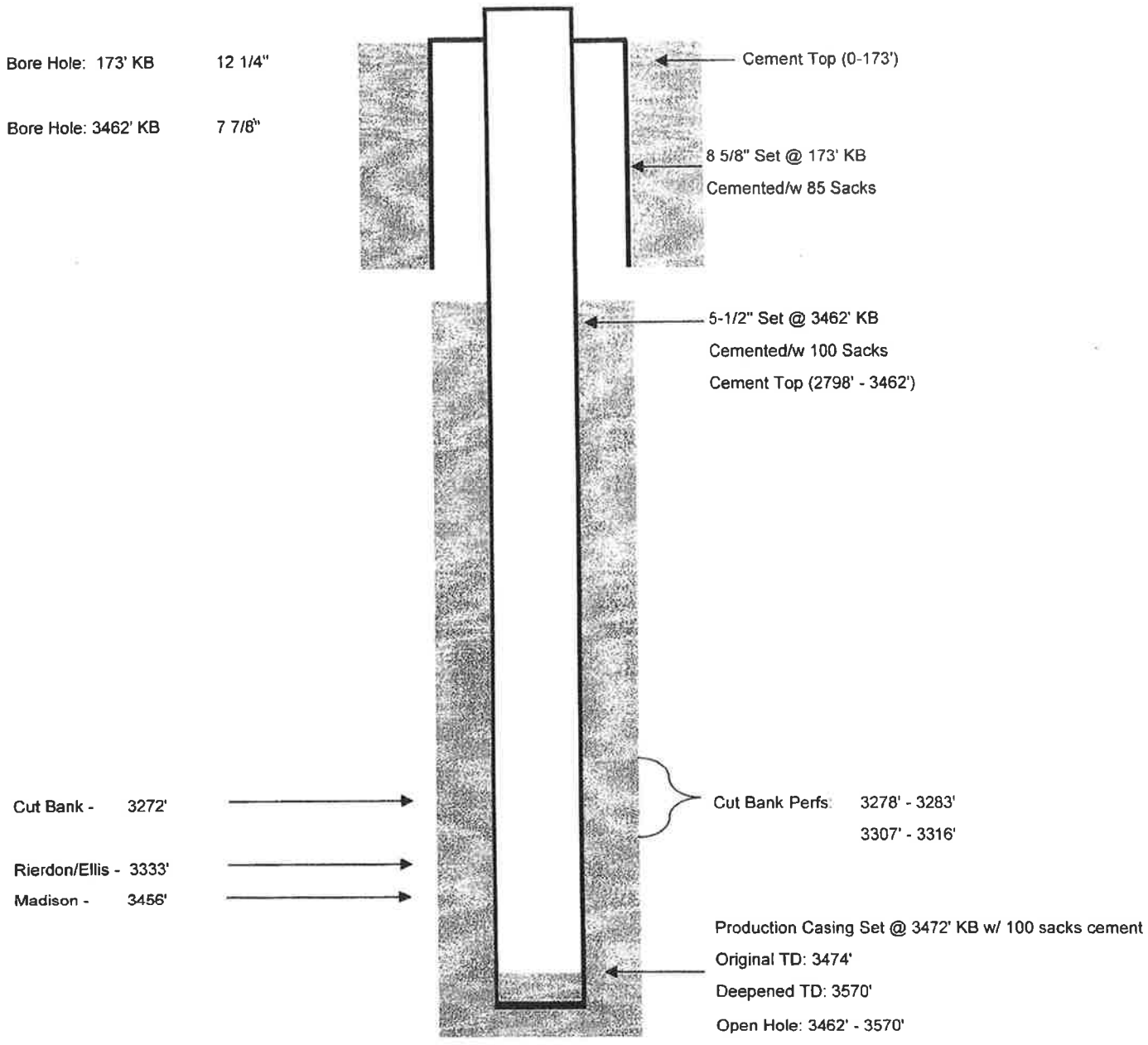


Exhibit 10

Cost Comparison: Shallow vs. Deep Water Wells in Montana

This document compares estimated costs for drilling and completing a domestic water well in Montana using a shallow well depth of **85 feet** and a deep well depth of **3,748 feet**. Estimates reflect typical Montana and Rocky Mountain region drilling practices.

Cost Assumptions Used

- Drilling only: $30–$60 per foot
- Full installation (drilling, casing, pump, wiring): $40–$75 per foot
- Pump systems: $1,500–$6,000+ depending on depth
- Permits and water testing: $450–$1,200

Well Type	Depth (ft)	Drilling Only (Low–High)	Full System Cost (Low–High)
Shallow Well	85	$2,550 – $5,100	$3,400 – $6,375
Deep Well	3,748	$112,440 – $224,880	$149,920 – $281,100

Interpretation

- An 85-foot well is a true shallow domestic well and often encounters unconsolidated material, allowing for faster drilling, reduced casing requirements, and smaller pump systems.
- A 3,748-foot well is extremely deep for water supply and may require heavy steel casing, high-horsepower submersible pumps, engineered well design, and significant electrical infrastructure.
- Costs for deep wells increase non-linearly due to drilling time, materials, energy requirements, and operational complexity.

References

- Angi / HomeAdvisor: Residential well drilling cost ranges by depth
- Montana DNRC: Water well construction guidance and permitting
- Regional Rocky Mountain well drilling contractor pricing data

Exhibit 11

Determination of the Lower Confining Zone for the Visboe 8-1

The Muntzing D 11 (6-2) well is the only well in the area that penetrates the lower confining zone and has an available geophysical log. This well is located approximately 3,600 feet northwest of the Visboe 8-1 well. The lower confining zone in this area is identified as the Mission Canyon Formation.

Based on the Muntzing D 11 (6-2) log, the top of the Madison is encountered at a depth of 3,480 feet. In comparison, the log for the Visboe 8-1 well indicates the top of the Madison at 3,404 feet, representing a depth difference of 76 feet between the two wells.

The Muntzing D 11 (6-2) log shows the top of the Mission Canyon Formation at approximately 3,824 feet. Applying the same 76-foot stratigraphic offset observed in the Madison, the top of the Mission Canyon Formation in the Visboe 8-1 well is estimated to occur at approximately 3,748 feet.