Release in Full

[redacted]

Region 8
13649

HISTORY

History
EPU #3

17 P

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET - SUITE 300
DENVER, CO 80202-2466
http://www.epa.gov/region08

Ref: 8EPR-ER

November 7, 2001

Erika Zimmer Enger, Esq.
Themkin Wielga & Hardt, LLP
1900 Wazee St., Suite 303
Denver, CO 80202

Re: Freedom of Information Act (FOIA) Request 08-RIN-00341-01

Dear Ms. Enger:

Attached are additional documents, that is not considered exempted under FOIA due to enforcement confidentiality or being pre-decisional, that were placed in the file after our last response to your FOIA. Also attached are documents that maybe considered exempted under FOIA as pre-decisional, but would be required to be released under disclosure, so we are choosing to send those now. Documents received from or sent to Copper Mountain Resorts; Themkin Wieldga & Hardt, LLP; and Pendergast Sarni Itell are not included, as specified in the FOIA request. Two emails between EPA personnel and the EPA attorney are FOIA exempt due to attorney-client privilege, three documents are exempt due to enforcement confidentiality, and one document was "redacted" to remove conversational material between attorney and client.

Sincerely,

Martha A. Wolf
On-Scene Coordinator

Printed on Recycled Paper

6p

C. H. MURPHY JR., ET AL
EAST POPLAR UNIT #3
Roosevelt County, Montana

PRODUCTION DEPT.

Second File Copy

C. H. MURPHY JR., ET AL

EAST POPLAR UNIT #3

C SW SW Sec. 1, Twp. 28N, Rge. 51E
Roosevelt County, Montana

Elevation 2204' K.B.

History.....Page 1

Electro Log Data.....Page 3

Core Descriptions.....Page 4

Core Analysis.....Page 16

Drill Stem Tests.....Page 26

Water Analysis.....Page 28

Completion Data.....Page 29

Production Test Data.....Page 30

Sample Description.....Page 31

C. H. MURPHY JR., ET AL

EAST POPLAR UNIT #3

LOCATION:	Center of southwest ¼ of the southwest ¼ of Section 1, Township 28 North, Range 51 East, Roosevelt County, Montana.
ELEVATION:	2204 K.B.
SPUDDED:	April 13, 1952.
COMPLETED:	June 7, 1952.
TOTAL DEPTH:	5968' Driller.

HISTORY

April 13-15:	Spudded and drilled to 1035' with 12¼" bit.
April 16:	Set 1023.03' of 9 5/8" casing at 1037' with 400 sacks of cement.
April 17:	Perforated casing at 750' with 8 shots and squeezed cemented casing w/ 200 sacks of common cement because of gas breaking th through the annulus between the pipe and the hold; gas blow was killed.
April 18:	Drilled out squeeze plug. Tested casing with 1000# pressure, did not hold. Re-cemented with 96 sacks common cement.
April 19:	Waiting on cement; held o.k.; nippling up to drill out cement and re-test.
April 20:	Drilled squeeze plug and tested casing with 1000# pressure; failed to hold again. Set Baker Model K Retainer at 714'.
April 21:	Cemented with 50 sacks and waited on cement.
April 22:	Squeezed out 50 more sacks, waited 8 hours; pumped in 30 sacks gel, mixed with Diesel oil. Drilled out squeeze plug and tested casing with 600#; held o.k. Drilled retainer, plugs and shoe.
April 23-24:	Drilled from 1039' to 2955' with 8 3/4" bit.
April 25:	Cut and pulled Core No. 1, 2955-78. Started cutting Core No. 2.
April 26:	Pulled Core No. 2, 2978-3015; drilled 3015-3335.

April 27-29: Drilled from 3335' to 4410'.

April 30: Cut and pulled Core No. 3, 4410-60.

May 1-7: Drilled from 4460-5355', fishing on May 5, 1952.

May 8: Cut and pulled Core No. 4, 5355'-85'; drilled to 5420'.

May 9: Drilled from 5420 to 5478'.

May 10: Drilled from 5478 to 5500'; started cutting Core No. 5.

May 11: Pulled Core No. 5, 5500-39. Cut and pulled Core No. 6, 5539-96.

May 12: Cut and pulled Core No. 7, 5596-5655'.

May 13: Ran Drill Stem Test No. 1, 5600-5626; started cutting Core No. 8.

May 14: Pulled Core No. 8, 5655-5714', and started cutting Core No. 9.

May 15: Pulled Core No. 9, 5714-31'; cut and pulled Core No. 10, 5731-5760'.

May 16: Ran Drill Stem Test No. 2, 5740-60, and Drill Stem Test No. 3, 5740-51; started cutting Core No. 11.

May 17: Pulled Core No. 11, 5760-5819'.

May 18: Ran Drill Stem Test No. 4, 5760-75½', and Drill Stem Test No. 5, 5758-5766'. Drilled to 5821'.

May 19: Started cutting Core No. 12.

May 20: Pulled Core No. 12, 5821-5880. Cut and pulled Core No. 13, 5880-5918.

May 21: Ran Drill Stem Test No. 6, 5896-5918. Cut and pulled Core No. 14, 5918-5928.

May 22: Ran Schlumberger ES and Microlog. Cut and pulled Core No. 15, 5928-5938. Cut and pulled Core No. 16, 5938-5948.

May 23: Cut and pulled Core No. 17, 5948-5958. Cut and pulled Core No. 18, 5958-5968.

May 24: Ran Drill Stem Test No. 7, 5938-5968.

May 25-June 7: Well undergoing completion operations.

EAST POPLAR UNIT NO. 3

	Top of cement 4650'
5-25-52	Perforate 5907-5912' Squeezed 50 sacks Perforate 5892-5904' Acidize 500 gallons Flowed 3 BPH 60% water Set bridge plug at 5850' Perforate 5599-5616' A-Zone
11-3-54	Acidize A Zone 500 gallons acid.
8-21-58	300# pressure on surface casing. Flowed 3 barrels black crude.
8-22-58	Squeeze A-Zone
8-28-58	Perforate B-3 Zone 5780-5785'
8-29-58	Acidize B-3 Perforation 500 gallons 85% Water
8-31-58	Squeeze B-3
9-1-58	Perforate B-2 Swab 302 BOPD 130 BWPD
5-20-63	Casing leak 3657' Squeezed
11-19-63	Casing Collapsed Set 4-1/2", 16.6# liner up to 3137'
3-20-68	Set bridge plug at 5636'. Perforate A-4 5599-5603' Pumped 19 BOPD 216 BWPD
4-25-68	Squeezed bridge plug at 5635'
5-1-68	Acidize A-4 500 gallons
7-6-68	Acidize A-4 1000 gallons
	There are tight spots in liner at 3657' and 4940'
	# 3 is 6' low to # 7 and 10' low to # 101

MURPHY
OIL CORPORATION

INTER-OFFICE CORRESPONDENCE

M.T.J.
Bill
Gerald
Tommy
Floyd

FROM: W. J. Thornton LOC.: P & E - ElD DATE: September 26, 1967

TO: M. T. James LOC.: P & E - Poplar CARBONS TO:

SUBJECT: East Poplar Unit No. 3 File

We are returning unsigned your Authority for Expenditure No. 7-1528 covering the proposed workover #5 East Poplar Unit #3 Well.

Slim, the proposal for this workover has been closely looked at by Production and Engineering and since this well has bad pipe we are not approving the workover at this time.

It is suggested that as soon as you have downhole problems you can then place this well on temporarily abandoned status. We are not permanently closing the door on possibility of future workover but suggest at this time that you cancel the AFE number and take another look at some future date.

W. J. Thornton

BPD:djj
Attachments

ENVIRONMENTAL
PROTECTION AGENCY
NOV 5 1998
MONTANA OFFICE

MURPHY
OIL USA, INC.

POST OFFICE BOX 547
POPLAR, MONTANA 59255

February 18, 1993

Arnold Dougan
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301

FEB 1993
Bureau of Land Management
Miles City, Montana

Dear Mr. Dougan:

This is in response to your letter dated January 20, 1993 concerning the actual condition of the following wells:

EPU No. 3 Well bore open with perforations 5599'-5603' Last production 7-87

EPU No. 17 Well bore open with perforations 5628'-5632' Last production 10-89

EPU No. 30 Well bore open with perforations 5738'-5746' & 5756'-5766' Last production 7-87

EPU No. 34 Well bore open with perforations 5664'-5668' Last production 6-74

EPU No. 40 Well bore open with perforations 5699'-5703' & 5715'-5719' Last production 9-68

EPU No. 43 Well bore open with perforations 5772'-5778' & 5790'-5798' Last production 8-64

EPU No. 45 Well bore open with perforations 5626'-5634' Last production 6-87

EPU No. 68 Well bore open with perforations 5758'-5762' Last production 3-69

EPU No. 71 Well bore open with perforations 5892'-5901' & 5932'-5940' Last production 8-76

EPU No. 79 Well bore open with perforations 5718'-5726' Last production 3-88

EPU No. 103 Well bore open with perforations 5499'-5501' Last production 8-62

Sincerely,

SPUR

Raymond Reede
District Manager

11 P

A.F.E. No. _____

AUTHORITY FOR EXPENDITURE

MURPHY CORPORATION -

East Poplar Unit # 3 for 5850 feet

WELL DRILLING & CONSTRUCTION EXPENSE:	TO CSG. PT.	COMP. & EQUIP.	TOTAL COST
Drilling: Rig up and down	$ 9800.00	$	$ 9800.00
Day Work Based on 55 days and 7 days	49500.00		49500.00
Loc. survey, permit & prep.	1500.00		1500.00
Roads, fences, cattleguards, etc.		400.00	400.00
Mud mat. & chem., incl. oil & gas	6000.00		6000.00
Fuel	8500.00	700.00	9200.00
Water	540.00	60.00	600.00
Drilling bits, baskets, etc.	3960.00	210.00	4170.00
Drill pipe rental	4015.00		4015.00
Move rig in & out	5000.00		5000.00
Derrick rent, erect & dismantle	3400.00		3400.00
Winterize rig			
Cementing casing	1033.25	696.25	1729.50
Coring materials & services	3435.00		3435.00
Testing services, incl. swabbing	2939.00	606.00	3545.00
Core analyses	1500.00		1500.00
Other logs, surveys & analyses	1005.50	535.00	1540.50
Hydrafrac, acidize, etc. incl. oil			
Float equip., centralizers, etc.	109.80	332.80	442.60
Perf. & set packer		1732.00	1732.00
Trucking, welding & other labor	700.00	1000.00	1700.00
Supervision & Miscellaneous	4000.00	500.00	4500.00
Total est. well drlg. & const. exp.	$ 106,937.55	$ 13,072.05	$ 120,009.60
WELL EQUIPMENT COSTS:			
Casing 1010 feet 9 5/8 40# J-55	3898.60		3898.60
Casing 5850 feet 5 1/2 15.50 J-55		8014.15	8014.15
Casing			
Casing			
Tubing 58.50 feet 2 3/8 EUE J-55		2900.00	2900.00
Packers, etc.		533.38	533.38
Casing head & connections	564.03	230.83	794.86
Xmas tree & connections		1799.33	1799.33
Pumping unit & engine			
Rods, pump, etc.			
Derrick & crown block			
Miscellaneous			
Total est. well equip. costs	$ 4,462.63	$ 13,478.07	$ 17,940.67
Total Est. cost of well	$ 111,400.18	$ 26,550.09	$ 137,950.27
LEASE EQUIPMENT:			
Tanks, erected		9723.86	9723.86
Separators		819.17	819.17
Heater-treaters		4519.80	4519.80
Gunbarrels			
Flow lines		1593.25	1593.25
Other line pipe, valves & fittings		1200.00	1200.00
Trucking, welding & other labor		1237.50	1237.50
Miscellaneous			
Total est. cost of lease equip.	$	$ 19,093.58	$ 19,093.58
Total Est. Cost of well & Lease Equip.	$ 111,400.18	$ 45,643.67	$ 157,043.85

APPORTIONMENT OF TOTAL ESTIMATED COSTS

% Participation			
Total Estimated Cost	$	$	$

APPROVED _____

By _____

Date _____

Prepared by:	Requested by:	Approved by:	Approved by:	Approved by:
Date	Date	Date	Date	Date

Distribution:

A.F.E. #56-4-67

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 3
(Workover to Dual Complete the "A" and "B-2" Zones)
SW NW Section 1-T28N-R51E, Roosevelt County, Montana

Pulling machine - 6 (12 hour) days @ $300	$1,800
Packer and setting charge	1,050
Perforate	600
1000 gallons acid and service	750
Trucking and miscellaneous	750
Total Workover Cost	$4,950
Pumping unit complete with engine	$5,650
Labor and materials setting unit	750
Trucking, small fittings & incidentals	150
Rods, pump & well head equipment	3,000
Total Pumping Equipment Cost	$9,550
GRAND TOTAL	$14,500

APPORTIONMENT OF TOTAL ESTIMATED COST

	%	
Murphy Corporation - Unit Operator	31.448470	$4,560
Sunoco Company	2.096565	304
Placid Oil Company	33.545035	4,864
Carter Oil Company	16.335860	2,369
Phillips Petroleum Company	16.335860	2,369
C. F. Lundgren	.238210	35

APPROVAL OF EXPENDITURE

Requested by:

Harold Milam APR 26 1956
Division Production Supt. Date

Recommend Approval:

Gordon Kirby APR 26 1956
Division Manager Date

Approved:

By Date

Recommend Approval:

Staff Production Man Date

Recommend Approval:

Budget Supervisor Date

Approved:

Vice President-Operations Date

HH:eg
4-26-56

File EPO # 2

A.F.E. # 8-5002
(Cancels A.F.E. # 56-4-67)

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 3
SW NW SECTION 1, T28N, R51E, ROOSEVELT COUNTY, MONTANA
Workover #2

I. Dual Complete the "A-3" and "B-3" Zones

Pulling Machine - 6 (12 hour) days @ $300	$ 1,800
Packer, Setting Charge and Otis Choke Nipple	1,500
G-N Logs and Perforate	1,100
1,000 Gallons of Acid and Service	800
Trucking and Miscellaneous	800
Total Workover Cost.	$ 6,000
Pumping Unit with Electric Motor	$ 5,650
Labor and Materials Setting Unit (Foundations Set)	950
Trucking, Small Fittings and Incidentals	200
Rods, Pump, Change Tubing and Equipment	3,800
Total Pumping Equipment Cost	$10,600
Grand Total	$16,600

Workover Recommendation

Present Status: Flowing 196 BFPD 80% water, (39 BOPD, 148 BWPD), 12/64" choke, TFP-125#, CP-750#. From "A" - Zone, total cumulative production 84,700 net barrels of oil and 99,508 barrels of water through March 1957, through "A" - Zone perforations 5599' to 5616'.

History: Completed June 7, 1952, for an initial potential 108 barrels fluid 1% BS&W (perforations above). Workover No. 1 - to increase oil production and fluid flow rate, to combat parrafin and increased fluid flow rate from 75 BOPD + 8 to 30% water to 120 BOPD + 10 to 36% water.

Proposed Workover No. 2: Load hole with 10# per gallon salt water to kill "A" Zone, pull tubing, run bit-casing scraper, run G-N Logs, perforate "B-3" Zone 5781' to 5786' (5 ft.). Set Baker Model "D" Production Packer, change 3,500' of 2 3/8" tubing to 2 1/2". Run Otis Choke Nipple, acidize "B-3" zone, swab test, blank off "B-3", swab "A" zone in through tubing, re-run Otis side door, pump "B-3" zone through tubing and flow "A" zone through casing.

Structural Position: "B-3" zone - 3577' (4' high) to No. 88 -3581'. No. 88 has produced 41,600 net barrels of oil through March 1957, flowing.

Pay out 200 BOPD - "B-3" zone - 42 days.

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470 %	$ 5,220
Munoco Company	2.096565 %	348
Placid Oil Company	33.545035 %	5,568
Carter Oil Company	16.335860 %	2,712
Phillips Petroleum Company	16.335860 %	2,712
C. F. Lundgren	.238210 %	40

APPROVAL OF EXPENDITURE

Requested by: [signature] 5-21-57 Date

Recommend Approval:

[signature] MAY 27 1957
Division Production Supt. Date

Staff Prod. Engineer Date

Recommend Approval:

[signature] MAY 27 1957
Division Manager Date

Recommend Approval:

Budget Supervisor Date

Approved:

Vice President-Operations Date

MTJ:mm
5-21-57

Poplar

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 3
SW NW Section 1, T28N, R51E, Roosevelt County, Montana
(Workover #2)

Pulling Unit 5 (12 hr.) days at $300 per day	$1,500
Mud material to kill "A" Zone	900
Packers and service	1,000
Pump truck and cement (squeeze "A" Zone)	700
Power swivel and bit	400
Perforate "B-3" Zone (5') and 500 gal. acid job	900
Miscellaneous labor and trucking	400
Total Estimated Cost of Re-completion in the "B-3" Zone	$5,800
Pumping Unit complete with motor and controls	$5,650
Pumping unit foundation (complete)	950
Rods, well head equipment and pump	3,000
Miscellaneous labor, trucking and small fittings	300
Total Estimated Pumping Unit Cost	$9,900
GRAND TOTAL	$15,700

Pumping Unit foundation purchased on old A.F.E. No. 56-4-67.

Present Status: Flowing from "A-3 & 4" Zones. Perforations 5599'-5616' (17'). Production June 1 through June 15, 1958 — 360 barrels oil; 2,040 barrels water. Average for 15 days — 24 BOPD, 136 BWPD. Tested June 3, 1958, open flow, 211 BFPD, 87% water (27 BOPD, 184 BWPD), BHP May 16, 1958, datum 3600' at 2824 psi.

History: Completed May 23, 1952, flowing from "A" Zone. Perforations 5599' to 5616' (lower 5' of perforation open in "A-4" Zone oolitic). Total accumulated production through May 31, 1958 — 97,930 BO; 175,059 BW.

Workover No. 1 production had decreased to 75 BOPD with 8 to 30% water on open flow and tubing was plugging with paraffin, treated with 500 gallons of Howco MCA, increased production to 120 BOPD, 10 to 36% water on 1/8" choke.

Justification for Zone Change: The "A" Zone water cut has increased to 87% and oil production has dropped to 24 BOPD and the "A" Zone requires squeezing to shut off the perforations that are open in "A-4" Zone (oolitic) to lower water cut. To economically deplete the "B-3, 2 & 1" Zones, perforate and deplete each zone individually starting with the "B-3" Zone before re-completing at a higher interval in the "A" Zones.

Proposed Zone Change: Kill "A" Zone with mud, squeeze "A" Zone perforations 5599' to 5616' with 75 sacks cement with retrievable packer, drill out and pressure test "A" Zone squeeze, perforate "B-3" Zone 5780'-5785' (5') G & N Log. Set production packer at 5705', acidize with 500 gallons, swab test, set pumping unit on existing foundation, run rods and put on beam.

Structurally: E.P.U. No. 3, "B-3" Zone -3577', +4' to No. 88 with 8/10 of 1% BS&W, +12' to No. 99 dry hole (the best oil test behind casing in No. 99 was in the "B-3" Zone).

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	$4,937
Munoco Company	2.096565%	329
Placid Oil Company	33.545035%	5,267
Carter Oil Company	16.335860%	2,565
Phillips Petroleum Company	16.335860%	2,565
C. F. Lundgren	.238210%	37

Rec 7-18-58

APPROVAL OF EXPENDITURE

Requested by: [signature] 6-17-58 Date

Harold Milan JUN 19 1958
Division Production Supt. Date

Gordon Kirby JUN 19 1958
Division Manager Date

Recommend Approval:
/s/ L. L. Duncan by RJS 6-30-58
Staff Production Man Date

Recommend Approval:
/s/ Harold Robirds 6-24-58
Budget Supervisor Date

Approved:
/s/ Paul C. McDonald 6-30-58
Vice President - Operations Date

MTJ:mm
6-17-58

A.F.E. #60-5029

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 3
C SW SW Section 1, T28N, R51E, Roosevelt County, Montana
(Lower Pump to Perforations)

Pulling Unit -- 12 hours	$ 325
2" Stroke Through Pump	500
Additional 3/4" and 5/8" rods to lower pump	845
Trucking rods	100
Total Estimated Cost	$1,770

Present Status: Tested July 1, 1959, pumping from the "B-2" Zone, 109 BOPD, 128 BWPD, 54% water cut.

Justification for Expenditure: to lower tubing and increase production.

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	$ 557
Munoco Company	2.096565%	37
Placid Oil Company	33.545035%	594
Carter Oil Company	16.335860%	289
Phillips Petroleum Company	16.335860%	289
C. F. Lundgren	.238210%	4

APPROVAL OF EXPENDITURE

Requested by: M. T. James 7-9-59 Date
By J.G.D.

Recommend Approval:

Division Production Supt. Date

Staff Production Man Date

Recommend Approval:

Recommend Approval:

Division Manager Date

Budget Supervisor Date

Approved:

Vice President-Operations Date

Do not need E. L. Morris's approval as estimated cost is less than $2,500

MTJ:mm
7-9-59

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 3
SW NW Section 1, T28N, R51E, Roosevelt County, Montana

(To Change Out Tbg. and Lower Pump to 4,000')

Pulling Unit (10 Hrs. @ $28.00 per hr.)	$ 300
4,050' - 2 7/8" (Cond. 2) tubing @ $0.60 per foot	2,430
575' - 3/4" plain rods (Cond. 2) @ $0.42 per foot	250
1600' - 7/8" plain rods (Cond. 2) @ $0.53 per foot	850
2 1/2" x 2 1/4" x 8' tubing liner pump	725
Miscellaneous labor, material and trucking	200
Less 4,050' - 2 3/8" (Cond. 2) tubing @ $0.42 per foot	(1,700)
Less 3,800' - 5/8" (Cond. 2) plain rods @ $0.35 per foot	(1,230)
TOTAL ESTIMATED COST	$1,745

Present Status: Pumping from the B2 Zone. 249 BFPD, 71% water (72 BOPD 177 BWPD).

Justification: To increase production.

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	$549
Sunoco Company	2.096565%	37
Placid Oil Company	33.545035%	585
Humble Oil & Refining	16.335860%	285
Phillips Petroleum	16.335860%	285
C. F. Lundgren	.238210%	4

APPROVAL OF EXPENDITURE

Requested by: [signature] 4-21-61
J. J. Field Production Superintendent — Date

RECOMMEND APPROVAL:

Division Production Supt. — Date

RECOMMEND APPROVAL:

Staff Production Man — Date

RECOMMEND APPROVAL:

Division Manager — Date

RECOMMEND APPROVAL:

Budget Supervisor — Date

APPROVED:

Vice President - Operations — Date

MTJ:pm
4-21-61

File E.P.U. #3

M.T. James Copy

A.F.E. NO. 3-1514

AUTHORITY FOR EXPENDITURE

MURPHY CORPORATION **EAST POPLAR UNIT NO. 3**

SW/NW Section 1, T28N, R51E, Roosevelt County, Montana

(Workover No. 3 Repair Casing Leak)

Well Status E.P.U. No. 3 pumping from B2 zone at rate of 279 BFPD, 89% water. (31 BOPD, 248 BWPD)

Justification for Expenditure: To locate and repair indicated casing leak. Well is pumping drilling mud.

ESTIMATED COST

Pulling unit 75 hours @ $30 per hr.	$	2,250
Halliburton squeeze job and retarder		2,000
Baker tool rental and service		1,200
Dia-log service		400
1500' (estimated) of 2-7/8" 6.50# EUE Cond. 1 TBG. @ .90 p.f.		1,350
Miscellaneous labor, material and trucking		300
TOTAL ESTIMATED COST		7,500

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	2,359
Monoco Company	157
Placid Oil Company	2,516
Humble Oil & Refining Company	1,225
Phillips Petroleum Company	1,225
C. F. Lundgren	18

APPROVAL OF EXPENDITURE

Requested By: M. T. James 5-18-63
M. T. James Date

Recommend Approval:

L. L. Duncan 5-27-63
L. L. Duncan Date

W. J. Thornton Date

APPROVED:

P. J. Sweeney 5/31/63
Manager - P.& E. Date

MTJ/rlt
5-18-63

File #3

M.T. James
all approvals received

A.F.E. NO. 3-1514-S1

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION-EAST POPLAR UNIT NO. 3
SW/NW SECTION 1, T28N, R51E, ROOSEVELT COUNTY, MONTANA

(Supplement #1)

JUSTIFICATION:

Supplement #1 to AFE No. 3-1514 is to confirm the additional cost of swedging out collasped casing and adjust over spent in one category and under spent in others. (The 2-7/8" tubing was not used.)

CONFIRMING AND ESTIMATED COST

Total estimated cost of swedging out collasped casing and squeezing casing leak.	$8,850
Less total estimated cost AFE No. 3-1514	$7,150
TOTAL ESTIMATED COST SUPPLEMENT #1	$1,700

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	$ 534
Manoco Company	2.096565%	$ 36
Placid Oil Company	33.545035%	$ 570
Humble Oil & Refining Company	16.335860%	$ 278
Phillips Petroleum Company	16.335860%	$ 278
C. F. Lundgren	.238210%	$ 4

APPROVAL OF EXPENDITURE

Requested By: M. T. James — Date

Recommend Approval:

L. L. Duncan — Date

W. J. Thornton — Date 6-18-63

APPROVED:

R. J. Sweeney — Date 6/20/63
Manager - P. & E.

MTJ/bab
June 3, 1963

Mail to M. T. James

A.F.E. No. 8-1505

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 3
SW NW Section 1, T28N, R51E, Roosevelt County, Montana
(Workover No. 5 - Recomplete A-4 Zone)

Present Status: The well is temporarily abandoned with the B-2 perforations (5761-5765') open. A 4-1/2", 16.60# Buttress thread liner is cemented from 3137' to 5932' with tight places at 3657' and 5047'. The rods and tubing have been layed down.

Proposal: Run junk basket and gauge ring, with gin poles, to see if tools will go into 4-1/2" liner. If tools will not go abandon well, but if tools do go continue with workover. Set Bridge Plug at 5630' with 1/2 sack of cement on top. Perforate the A-4 Zone from 5599' to 5604' (4') with a casing gun. Run rods and tubing to pump test. An acid job may be necessary as this formation is tight.

ESTIMATED COST

Pulling Unit 15 hrs. at $33.00	$ 500.00
Wireline, Bridge Plug and Perforating	$ 1,400.00
5600' of 2-3/8" Cond. 3 Tubing at .36¢/ft. (Stock)	$ 2,025.00
5600' of 3/4" and 5/8" Cond. 2 Rods (Stock)	$ 1,750.00
500 Gallon Acid Job (if needed)	$ 600.00
Hydro Test Tubing	$ 250.00
Misc. Labor, Material & Trucking	$ 400.00
Total Estimated Cost	$ 6,925.00

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	$ 2,178.00
Munoco Company	2.096565%	$ 145.00
Placid Oil Company	33.545035%	$ 2,323.00
Humble Oil and Refining Company	16.335860%	$ 1,131.00
Drilling Specialties	16.335860%	$ 1,131.00
G. F. Lundgren	.238210%	$ 17.00

APPROVAL OF EXPENDITURE

Requested by: M. T. James — Date 2-6-68

Approved: W. J. Thornton — Date 2-8-68

MTJ/sb
February 5, 1968

Partners approval received 3-15-68

A.F.E. No. 8-1505 S1

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 3
SW NW Section 1, T28N, R51E, Roosevelt County, Montana
(Workover No. 5 - Supplement No. 1)

Supplement No. 1 to A.F.E. No. 8-1505 is to cover the estimated additional expense to determine the source of the B-Zone water through A-Zone perforations(from chlorides 90,000 PPM. The average chlorides of A-Zone produced water is 133,000 PPM) and cement squeeze for water shut off and recomplete in the same A-Zone interval.

ESTIMATED COST

Pulling unit, 30 hrs. at $33.50 perhr.	$ 1,000.00
Pump truck and cement to squeeze	$ 1,100.00
Special tools to squeeze and drill out packer, bit and power swivel, ect.	$ 1,000.00
Perforate and acid job if needed	$ 1,100.00
Misc. trucking, labor and material	$ 600.00
Under spent on A.F.E. 8-1505	($ 1,000.00)
Total Estimated Cost Of Supplement	$ 3,800.00

APPROTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	$ 1,195.00
Munoco Company	2.096565%	$ 79.00
Placid Oil Company	33.545035%	$ 1,275.00
Humble Oil & Refining Company	16.335860%	$ 621.00
Drilling Specialties	16.335860%	$ 621.00
C. F. Lundgren	.238210%	$ 9.00

APPROVAL OF EXPENDITURE

Requested by: Approved:

M. L. James — 3-27-68 Date — W. J. Thornton — 4-2-68 Date

MTJ/sb
March 27, 1968

(A.F.E. NO. 8-1515

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 3
SW NW Section 1, T20N, R51E, Roosevelt County, Montana
(Reacidize)

Workover No. 3: May 2, 1968 Blanked of the B-2 Zone with bridge plug and recompleted in the A-4 Zone 5599-5603'. Washed perforations with 500 gallons HCL 15% Acid. Maximum pressure 1800 PSI. Soaked 190 gallons out into A-4 Zone formation. Workover Potential 139 BOPD 52 BWPD , 27% Water Cut.

PRESENT STATUS: Pumping from the A-4 Zone. Tested June 4, 1968 11 BOPD 44 BWPD 80% Water Cut.

From the above the fluid production decline is not normal and formation is probably blocked.

PROPOSAL: Pull rods and tubing. Run 4-1/2" packer. Acidize with 1000 gallons 15% HCL acid. Swab spent acid, trip tubing and pump test.

Expected production 30 BOPD 120 BWPD Pay out at 30 BOPD 50 days.

ESTIMATED COST

Pulling Unit, 26 hrs. at $33.00 per hr.	$ 850.00
1000 gallons acid and service	$ 850.00
Packer Rental	$ 400.00
Misc labor, trucking and material	$ 100.00
Total Estimated Cost	$ 2,200.00

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	$ 692.00
Munoco Company	2.096565%	$ 46.00
Placid Oil Company	33.545035%	$ 738.00
Humble Oil & Refining Company	16.335860%	$ 359.00
Drilling Specialties Company	16.335860%	$ 359.00
C. F. Lundgren	.238210%	$ 6.00

APPROVAL OF EXPENDITURE

Requested by: Approved:

M. T. Jones — 6-6-68 Date — W. J. Thornton — 7-2-68 Date

MTJ/sb
June 6, 1968

PERMIT
APPLICATIONS

EPU #3
24 p
1952-1968

RECEIVED MAR 28 1952 OIL CONSERVATION BOARD

cC O P Y

Form 331b—10M—4-7 UNITED STATES DEPT. OF THE INTERIOR - GEOLOGICAL SURVEY

24 P

OIL AND GAS WELL DIVISION

Lease Billings ~~Fee Land~~ - Frerich East Poplar Unit

SUNDRY NOTICES AND REPORT OF WELLS

(Indicate Nature of Data by Checking)

Notice of intention to drill	xx	Subsequent record of shooting	
Notice of intention to change plans		Record of perforating casing	
Notice of date for test of water shut-off		Notice of intention to pull or otherwise alter casing	
Report on result of test of water shut-off		Notice of intention to abandon well	
Notice of intention of redrill or repair well		Subsequent report of abandonment	
Notice of intention to shoot		Supplementary well history	

RECEIVED MAR 25 1952 OIL CONSERVATION BOARD AND BOARD OF RAILROAD COMMISSIONERS BILLINGS

March 24, 19 52

Following is a { notice of intention to do work / report of work done } on land { owned / leased } described as follows:

MONTANA (State) Roosevelt (County) E. Poplar Unit (Field)

Well No. 1 C SW NW 1 (m. sec.) 28 N (Township) 51 E (Range) M. Prin. (Meridian)

The well is located 1993 ft. { S. / xx } of North line and 660 ft. { E. / xx } of West line of Sec. 1

The elevation of the ~~derrick~~ ground floor above the sea level is 2193

DETAILS OF PLAN OF WORK

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work.)

Will set approximately 1000' of 9 5/8" OD casing with sufficient cement to get return to surface. Then will drill to approximately 6000' so as to test the Madison. But if conditions are favorable, then will drill deeper.

Will install and inspect blowout preventer daily.

Approved 3-24-52 (Date)

s/ H. H. Perrigo

Title District Engineer

Oil and Gas Well Division

Company C. H. Murphy, Jr., et al

By s/ Harold Milam

Title Dist. Prod. Supt.

Address Box 76, Poplar, Montana

NOTE:—Reports on this Form to be submitted to the Superviser for Approval.

7 Form 331b—10M—4-44

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF MONTANA

OIL AND GAS WELL DIVISION

Lease East Poplar Unit (Frerich)

SUNDRY NOTICES AND REPORT OF WELLS

(Indicate Nature of Data by Checking)

Notice of intention to drill		Subsequent record of shooting	
Notice of intention to change plans		Record of perforating casing	X
Notice of date for test of water shut-off		Notice of intention to pull or otherwise alter casing	
Report on result of test of water shut-off		Notice of intention to abandon well	
Notice of intention of redrill or repair well		Subsequent report of abandonment	
Notice of intention to shoot		Supplementary well history	X

4 / 21, 1952

Following is a ~~notice of intention to do work~~ / report of work done on land ~~owned~~ / leased described as follows:

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 C SW/4 NW/4 Sec 1 (m. sec.) 28N (Township) 51E (Range) (Meridian)

The well is located 1993 ft. S. of North line and ft. E. of West line of Sec. 1

The elevation of the derrick floor above the sea level is 2204

DETAILS OF PLAN OF WORK

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work.)

The above well spudded 12 1/4" hole at 1:00 AM 4-13-52. Drilled to 1039' using 11.4 mud weight to hold the flow of gas and water in the Judith River formation found at approximately 800'. Ran 9 5/8" 40 lb. J-55 to 1037' and cemented with 400 sax common cement with 1% CaCl2 added. Received clean cement returns to surface. Plug down at 1:45 PM 4-16-52. Eight hours later, gas began to break thru the annulus between the pipe and the hole indicating that the cement had channeled. Perforated eight holes at 750' and recemented with 200 sax common cement. This killed the flow of gas in the annulus. Drilled out squeeze plug 4-18-52. Tested casing with 1000 lbs. Pressure did not hold. Recemented with 96 sax common. Drilled squeeze plug out 4-20-52. Tested casing with 1000 lbs. and pressure failed to hold again. Set Baker model K retainer at 714' and squeezed out 50 sax. Waited eight hours and squeezed out 50 more sax. Waited eight more hours and squeezed out 75 sax with 4% Calsium Choride and 1 % Jelflake. Pressure built up to 1500 lbs. Job complete at 4:00 PM 4-21-52.

RECEIVED

APR 23 1952

OIL CONSERVATION BOARD AND BOARD OF RAILROAD COMMISSIONERS BILLINGS

Approved April 23, 1952 (Date)

Title Chief Oil & Gas Field Supervisor

Oil and Gas Well Division

Company Murphy Corporation

By Harold O. Milan

Title District Production Supt.

Address Box 76 Poplar, Montana

NOTE:—Reports on this Form to be submitted to the Superviser for Approval.

7 Form 3-1b—10M—

RECEIVED
JUN 16 1952
CONSERVATION BOARD
OF THE STATE OF MONTANA

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF MONTANA

OIL AND GAS WELL DIVISION

Lease

SUNDRY NOTICES AND REPORT OF WELLS

Unit

(Indicate Nature of Data by Checking)

Notice of intention to drill		Subsequent record of shooting	
Notice of intention to change plans		Record of perforating casing	
Notice of date for test of water shut-off		Notice of intention to pull or otherwise alter casing	
Report on result of test of water shut-off		Notice of intention to abandon well	
Notice of intention of redrill or repair well		Subsequent report of abandonment	
Notice of intention to shoot		Supplementary well history	
		Drill Stem Test	x

May 29, 1952, 19

Following is a {notice of intention to do work / report of work done} on land {owned / leased} described as follows:

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 3 C SW NW Sec. 1 (m. sec.) 28N (Township) 51E (Range) (Meridian)

The well is located 1993 ft. {S. / N.} of North line and ft. {E. / W.} of West line of Sec. 1

The elevation of the derrick floor above the sea level is 2204 ft.

DETAILS OF PLAN OF WORK

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work.)

D.S.T.#7 5938-5968 ft. 1/2" bottom choke. No W.C. Tool open 1 hr. Closed 15 min. Rec. 1000' mud cut w/ salt water and gas, 2094' salt water w/ show of gas. IBHFP-400# FBHFP-1775# BHSIP-3100# Hydrostatic-3500#

Production Casing- Ran 5 1/2"OD, 15.50#, J-55, smls. csg. to 5957'. Cemented w/250 sx. common cement and 5 sx. aquagel. Plug down @10:25 A.M. 5-25-52. Temperature survey showed top cement @ 4650'. Tested csg. for leaks w/ 1000# pressure.

Perforated from 5907-5912 w/ 6 bullets per ft.

D.S.T.#8 Perfs. 5907-5912. 1/2" bottom choke, no W.C. Tool open 17 hrs. 38 min. Weak blow gas to surface in 10 hrs. 13 min., oil to surface 14 hrs. 47 min. Rate of flow calculated @ 38 bbls. oil/day. Tool closed in 20 min. Rec. 4010' 35.2 gravity dirty oil, 610' mud cut w/ oil, gas, and salt water, 1281' salty sulfur water.
IBHFP-0, FBHFP-2300#, BHSIP-3100#, Hydrostatic 3500#.

Approved June 14, 1952 (Date)

Title Chief Oil & Gas Field Superviser

Oil and Gas Well Division

Company

By Murphy Corporation

Title Harold Milam

Address District production Supt. Box 76, Poplar, Mont.

NOTE:—Reports on this Form to be submitted to the Superviser for Approval.

RECEIVED
JUN 10 1952
CONSERVATION BOARD

Form 331b—10M—4

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF MONTANA

OIL AND GAS WELL DIVISION

Lease Frerich

SUNDRY NOTICES AND REPORT OF WELLS

(Indicate Nature of Data by Checking)

Notice of intention to drill		Subsequent record of shooting	
Notice of intention to change plans		Record of perforating casing	
Notice of date for test of water shut-off		Notice of intention to pull or otherwise alter casing	
Report on result of test of water shut-off		Notice of intention to abandon well	
Notice of intention of redrill or repair well		Subsequent report of abandonment	
Notice of intention to shoot		Supplementary well history	X

RECEIVED
JUN 9 1952
OIL CONSERVATION BOARD
OF RAILROAD COMMISSIONERS
BILLINGS

Following is a {notice of intention to do work / report of work done} on land {owned / leased} described as follows: June 7, 1952

MONTANA (State) Roosevelt Field East Poplar Unit

Well No. 3 (m. sec.) 28N (Township) 51E (Range) (Meridian)

The well is located 1993 ft. {S. / N.} of South line and 660 ft. {E. / W.} of East line of Sec. 1

The elevation of the derrick floor above the sea level is 2204

DETAILS OF PLAN OF WORK

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work.)

Plugged Madison Zone off with bridge plug
Set at 5850 and 10 ft. cement 5840 to 5850
Perforated 4 jets per foot 5599-5616
Ran D.S.T. #9 to test plug for leaks. Dry test.
D.S.T. #10. Testing perforations 5597-5616
Packer set @ 5584. Tool open 7:15 P.M. 6-5-52
Gas to surface in 25 min. Fluid to surface in 54 min. Well flowed at the rate of 450 BBL per day on ¾" top choke. Tool open 7 hrs. 45 min. closed 30 min.
1. BHFP-110 FBRFP-2220 BHSIP-3125 HYDRO-3250

Approved 6/9/52 (Date) J. E. Platt

Title Oil and Gas Well Division

Company C.H.Murphy, Jr. et al

By M Y James

Title Production Foreman

Address Box 76 Poplar, Montana

NOTE:—Reports on this Form to be submitted to the Superviser for Approval.

Form No. 2
GENERAL RULES
201, 202, 213,
216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)
TO
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE!
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION

SEP 2 - 1958

OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement	XX	Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

August 25, 1958

Following is a {notice of intention to do work / ~~report of work done~~} on land {~~fee~~ / leased} described as follows:

LEASE Fee Land (Frerich)

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 3 C SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) M.P.M. (Meridian)

The well is located 1993 ft. from {N / ~~S~~} line and 660 ft. from {E / ~~W~~} line of Sec. 1

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

The elevation of the derrick floor above the sea level is 2204'

READ CAREFULLY — DETAILS OF PLAN OF WORK — READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Will kill "A" Zone with mud, squeeze "A" Zone perforations 5599'-5616' with 75 sacks cement with retrievable packer, drill out and pressure test "A" Zone squeeze, perforate "B" Zone 5780'-5785' (5') G & N Log. Set production packer at 5775', acidize with 500 gallons, swab test, set pumping unit on existing foundation, run rods and put on beam.

RECEIVED
AUG 29 1958
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA
BILLINGS

Approved subject to conditions on reverse of form — G.S.G.S approved 8-28-58

Date 8-29-58

By [signature] Title District Office Agent

Company Murphy Corporation

By [signature]

Title Field Production Superintendent

Address Poplar, Montana

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

10M

OVER

Form No. 2
GENERAL RULES
201, 202, 213,
216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)

TO-

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE!
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION

RECEIVED
SEP 10 1958
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	
		Workover History	XX

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

September 9, 1958

Following is a {~~notice of intention to do work~~ / report of work done} on land {~~owned~~ / leased} described as follows:

LEASE Fee Land (Frerich)

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 3 C SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) M.P.M. (Meridian)

The well is located 1993 ft. from {N / ~~XXX~~} line and 660 ft. from {E / ~~XXX~~} line of Sec. 1

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

The elevation of the derrick floor above the sea level is 2204'

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

SEE ATTACHED SHEETS

RECEIVED
SEP 8 1958
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA - BILLINGS

U.S.G.S. approved 9-11-58
Approved subject to conditions on reverse of form

Date 9-15-58

By [signature] Title District Office Agent

Company Murphy Corporation

By [signature]

Title Field Production Superintendent

Address Poplar, Montana

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

10M

OVER

Form No. 2
GENERAL RULES
201, 202, 213,
216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)
TO
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE: THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED
JUN 4 - 1963
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement	XX	Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

May 28, 1963

Following is a {notice of intention to do work / [redacted]} on land {[redacted] / leased} described as follows:

LEASE Frerich

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 3 SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) (Meridian)

The well is located 1993 ft. from {N / S} line and 660 ft. from {E / W} line of Sec. 1

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

The elevation of the derrick floor above the sea level is 2192

RECEIVED
MAY 31 1963
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA - BILLINGS

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Pumping at the rate of 279 BFPD, 89% water cut, (31 BO, 248 BW).
To locate and repair indicated casing leak.

Approved subject to conditions on reverse of form

Date June 3, 1963

By R M Watkins
Title
District Office Agent

Company Murphy Corporation

By M J Jones

Title Field Production Superintendent

Address Bos 547, Poplar, Montana

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL

OVER

Form No. 2
GENERAL RULES
201, 202, 213,
216, 219, 233.1

RECEIVED

(SUBMIT IN QUADRUPLICATE)
TO
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

JUN 6 - 1963
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA

NOTICE!
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	XX
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

June 4, 1963

Following is a { ~~Notice of Intention to do work~~ report of work done } on land { ~~owned~~ leased } described as follows:

LEASE Frerich

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 3 SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) (Meridian)

The well is located 1993 ft. from { N } line and 660 ft. from { W } line of Sec. 1

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

RECEIVED
JUN 5 - 1963
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA - BILLINGS

The elevation of the derrick floor above the sea level is 2192

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Workover #3 was to swedge out and repair casing leak at 3657". Five squeeze jobs were required to repair leak. Pressure tested final squeeze #5 with 1300 PSI for 30 minutes, held. Started pumping May 31, 1963. Tested June 3, 1963, pumping at the rate of 16 BOPD, 258 BWPD, water cut 96%. (Water cut not leveled off).

Approved subject to conditions on reverse of form

Date June 5, 1963

By R M Watkins
Title
District Office Agent

Company Murphy Corporation

By M H Jones

Title Field Production Superintendent

Address Box 547, Poplar, Montana

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL

OVER

Form No. 2

GENERAL RULES
201, 202, 213,
216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE: THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED
JAN 7 - 1964
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	
		Report of Workover done	xx

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

December 31, 1963

Following is a {~~notice of intention to do work~~ / report of work done} on land {~~owned~~ / leased} described as follows:

LEASE Frerich

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 3 SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) (Meridian)

The well is located 1993 ft. from {N / S} line and 660 ft. from {E / W} line of Sec. 1

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

The elevation of the derrick floor above the sea level is 2192

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK RESULT

RECEIVED
JAN 3 - 1964
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA - BILLINGS

See Attached Sheet

Approved subject to conditions on reverse of form

Date 1-6-64

By [signature] Title

District Office Agent

Company Murphy Corporation

By [signature]

Title Field Production Superintendent

Address Box 547, Poplar, Montana 59255

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL

Form 9-331
(May 1963)

U"'TED STATES
DEPARTM..T OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TR' 'CATE* (Other instructi on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

U. S. GEOLOGICAL SURVEY
RECEIVED
JAN 3 1964
BILLINGS, MONTANA

1. OIL WELL [■] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Murphy Corporation

3. ADDRESS OF OPERATOR: Poplar, Montana

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface

1993' from N line and 660' from W line of Section 1

5. LEASE DESIGNATION AND SERIAL NO.: Frerich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME: East Poplar

8. FARM OR LEASE NAME:

9. WELL NO.: EPU #3

10. FIELD AND POOL, OR WILDCAT: East Poplar Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SW NW Section 1, T28N, R51E

12. COUNTY OR PARISH: Roosevelt

13. STATE: Montana

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 2192

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) Report of Workover			[x]
(Other)			[ ]				

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

See Attached Sheet (see addendum #4)

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE Field Production Superintendent DATE December 31, 1963

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) HILLARY A. ODEN TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES 201, 202, 213, 216, 219, 233.1

OCT 1967 RECEIVED OIL & GAS CONS. COMM. STATE OF MONT. HELENA

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED
OCT 6 - 1967
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA BILLINGS

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	XX
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

October 5, 1967

Following is a {XXXXXXXXXXXXXXXXXXXXXXXX / report of work done} on land {XXXXXX / leased} described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 SW NW Section 1 (m. sec.) T28N (Township) R51E (Range) MPM (Meridian)

The well is located 1993 ft. from {N / XXX} line and 660 ft. from {XXX / W} line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

East Poplar Unit No. 3

September, 1967 Well Test 171 BFPD 164 BWPD 96% W.C. 7 BOPD Uneconomical. This well was shut down 10-4-67 with parted rods. Tubing and rods well be pulled. Casing will be left intact. Temporarily Abandoned October 4, 1967.

(LOCATION INSPECTED & APPROVED)

Approved subject to conditions on reverse of form

Date 10-17-67

By District Office Agent Title

Company Murphy Oil Corporation

By M. L. Gonzales

Title District Superintendent

Address P.O. Box 547, Poplar, Montana 59255

COMMISSION USE ONLY
API WELL NUMBER
2 5
STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

Form 9-331
(May 1963)

File

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR
Murphy Oil Corporation

3. ADDRESS OF OPERATOR
P.O. Box 547, Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1993' from North line and 660' from West line of Section 1

5. LEASE DESIGNATION AND SERIAL NO.
Frerich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Fort Peck

7. UNIT AGREEMENT NAME
East Poplar Unit

8. FARM OR LEASE NAME

9. WELL NO.
No. 3

10. FIELD AND POOL, OR WILDCAT
East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SW NW Section 1
T28N, R51E

12. COUNTY OR PARISH
Roosevelt

13. STATE
Montana

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
2192' G.L.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	Temp. ABANDONMENT*	[XX]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)							

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

East Poplar Unit No. 3

September, 1967 Well Test 171 BFPD 164 BWPD 96% W.C. 7 BOPD Uneconomical
This well was shut down 10-4-67 with parted rods. Tubing and rods will be pulled. Casing will be left intact. Temporarily Abandoned October 4, 1967.

U. S. GEOLOGICAL SURVEY
RECEIVED
OCT 6 1967
BILLINGS, MONTANA

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE District Superintendent DATE October 5, 1967

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) HILLARY A. ODEN TITLE DISTRICT ENGINEER DATE OCT 6 1967
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES 201, 202, 213, 216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED
MAR 20 1968
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA - BILLINGS

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change ~~XXX~~ Zones	XX	Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	
Workover No. 5	XX		

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

March 19, 19 68

Following is a {notice of intention to do work} on land {~~XXXXX~~ leased} described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) MPM (Meridian)

The well is located 1993 ft. from {N / ~~XXX~~} line and 660 ft. from {~~XXX~~ / W} line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Temporarily Abandoned October 4, 1967 - Uneconomical.
Run junk basket and gauge ring, with gin poles, to see if tools will go into 4-1/2" liner. If tools will not go abandon well, but if tools do go continue with workover. Set Bridge Plug at 5630' with 1/2 sack of cement on top. Perforate the A-4 Zone from 5599' to 5603' (4') with a casing gun. Run rods and tubing to pump test. An acid job may be necessary as this formation is tight.

Approved subject to conditions on reverse of form

Date March 20, 1968

By G. Lamnett Pet. Engr.
District Office Agent Title

Company Murphy Oil Corporation

By M. H. [illegible]

Title District Superintendent

Address P.O. Box 547, Poplar, Montana 59255

COMMISSION USE ONLY
API WELL NUMBER
2 5
STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

U. S. Geological Survey
RECEIVED
MAR 20 1968
Billings, Montana

1. OIL WELL [X] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Murphy Oil Corporation

3. ADDRESS OF OPERATOR: P.O. Box 547, Poplar, Montana

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1993' from North line and 660' from West line of Section 1

5. LEASE DESIGNATION AND SERIAL NO.: Fraerich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Fort Peck

7. UNIT AGREEMENT NAME: East Poplar Unit

8. FARM OR LEASE NAME:

9. WELL NO.: No. 3

10. FIELD AND POOL, OR WILDCAT: East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SW NW Section 1 T28N R51E

12. COUNTY OR PARISH: Roosevelt 13. STATE: Montana

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 2192' G.L.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)		W.O. No. 5		(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Temporarily Abandoned October 4, 1967 - Uneconomical.
Run junk basket and gauge ring, with gin poles, to see if tools will go into 4-1/2" liner. If tools will not go abandon well, but if tools do go continue with workover. Set Bridge Plug at 5630' with 1/2 sack of cement on top. Perforate the A-4 Zone from 5599' to 5602' (4') with a casing gun. Run rods and tubing to pump test. An acid job may be necessary as this formation is tight.

18. I hereby certify that the foregoing is true and correct

SIGNED (ORIGINAL SIGNED BY H. R. JAMES) TITLE District Superintendent DATE March 19, 1968

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) GEORGE F. REITZ TITLE ACTING DISTRICT ENGINEER DATE MAR 20 1968

CONDITIONS OF APPROVAL, IF ANY:

SUBMIT A PLUGGING PROGRAM FOR OUR APPROVAL IF IT IS NECESSARY TO ABANDON THE WELL.

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES 201, 202, 213, 216, 219, 233

RECEIVED APR 1968 OIL & GAS CONS. COMM. STATE OF MONT. HELENA

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	
		Zone Change	XX

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

April 8, 1968

Following is a {~~notice of intention to do work~~ / report of work done} on land {~~XXXXXX~~ / leased} described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) MPM (Meridian)

The well is located 1993 ft. from {N / ~~XXX~~} line and 660 ft. from {~~XXX~~ / W} line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Workover No. 5 - Zone Change
Set Baker Model "N" Bridge Plug at 5635'. Pressure tested bridge plug to 1500#, Held OK.
Perforated the A-4 Zone at 5599-5603' with 2 SPF using 50 gram Aluminum jet charges.
Started pumping at 6:00 P.M. 3/20/68.

Workover Potential 24 Hr. Test 233 BFPD 96% W.C. 9 BOPD 224 BWPD

RECEIVED
APR 9 - 1968
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA - BILLINGS

Approved subject to conditions on reverse of form

Date April 9, 1968

By [signature] District Office Agent Pet. Engr. Title

Company Murphy Oil Corporation

By [signature]

Title District Superintendent

Address P.O. Box 547, Poplar, Montana

COMMISSION USE ONLY
API WELL NUMBER
25 STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR
Murphy Oil Corporation

3. ADDRESS OF OPERATOR
P.O. Box 547, Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1993' from North line and 660' from West line

Billings, Montana

5. LEASE DESIGNATION AND SERIAL NO.
Frerich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Fort Peck

7. UNIT AGREEMENT NAME
East Poplar Unit

8. FARM OR LEASE NAME

9. WELL NO.
No. 3

10. FIELD AND POOL, OR WILDCAT
East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SW NW Section 1
T28N, R51E

12. COUNTY OR PARISH
Roosevelt

13. STATE
Montana

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
2192' G.L.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) Zone Change			[XX]
(Other)			[ ]				

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Workover No. 5 - Zone Change
Set Baker Model "N" Bridge Plug at 5635'. Pressure tested bridge plug to 1500#, Held OK. Perforated the A-4 Zone at 5599-5603' with 2 SPF using 50 gram Aluminum jet charges. Started pumping at 6:00 P.M. 3/20/68

Workover Potential 24 Hr. Test 233 BFPD 96% W.C. 9 BOPD 224 BWPD

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE District Superintendent DATE April 8, 1968

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) HILLARY A. OLSEN TITLE DISTRICT ENGINEER DATE APR 12 1968

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES 201, 202, 213, 216, 219, 233.1

RECEIVED OIL & GAS CONS. COMM. STATE OF MONT. HELENA

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED MAY 3 - 1968 OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA BILLINGS

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of ~~XXXXXX~~ Acidizing, Cementing	XX
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

May 2, 19 68

Following is a {~~XXXXXXXXXXXXXXXXXXXXXXXX~~ / report of work done} on land {~~XXXXXX~~ / leased} described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State)	Roosevelt (County)	East Poplar Unit (Field)

Well No. 3	SW NW Section 1 (m. sec.)	28N (Township)	51E (Range)	MPM (Meridian)

The well is located 1993 ft. from {N / ~~XX~~} line and 660 ft. from {~~XX~~ / W} line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY — **DETAILS OF PLAN OF WORK** — READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Squeezed retainer leak with 90 sacks Pozmix Cement with 2% gel added. Maximum pressure 3600#. Acidized the A-4 Zone perforations, 5599-5603, using 500 gallons HCL 15% acid. Formation took 190 gallons acid. Maximum pressure 1800#. Reversed out spent and partialy spent acid water.

Workover Potential:

18 hr. Test 143 BF = 191 BFPD 27% W.C. 139 BOPD. 52 BWPD.

Approved subject to conditions on reverse of form

Date May 3 1968

By [signature] District Office Agent — Pet Engr Title

Company Murphy Oil Corporation

By [signature]

Title District Superintendent

Address P.O. Box 547, Poplar, Montana 59255

COMMISSION USE ONLY
API WELL NUMBER
2 5
STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

File

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

U. S. Geological Survey
RECEIVED
MAY 3 1968
Billings, Montana

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Murphy Oil Corporation

3. ADDRESS OF OPERATOR: P.O. Box 547, Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1993' from North line and 660' from West line

5. LEASE DESIGNATION AND SERIAL NO.: Frerich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Fort Peck

7. UNIT AGREEMENT NAME: East Poplar Unit

8. FARM OR LEASE NAME:

9. WELL NO.: No. 3

10. FIELD AND POOL, OR WILDCAT: East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SW SW Section 1 T28N, R51E

12. COUNTY OR PARISH: Roosevelt

13. STATE: Montana

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 2192' G.L.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	~~XXXXXX~~ OR ACIDIZING	[XX]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) Squeezed			[XX]
(Other)			[ ]				

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Squeezed retainer leak with 90 sacks Pozmix Cement with 2% gel added. Maximum pressure 3600#. Acidized the A-4 Zone perforations 5599-5603 using 500 gallons HCL 15% acid. Formation took 190 gallons Acid. Maximum pressure 1800#. Reversed out spent and partialy spent acid water.

Workover Potential:

18 hr. Test 143 BF = 191 BFPD 27% W.C. 139 BOPD 52 BWPD.

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE District Superintendent DATE May 2, 1968

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) MICHAEL P. RETZ TITLE DATE MAY 6 1968

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES 201, 202, 213, 216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED JUL 9 - 1968 OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA BILLINGS

RECEIVED JUL 1968 OIL & GAS CONS. COMM. STATE OF MONT. HELENA

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to ~~Shoot~~ Acidize, ~~Cement~~	XX	Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

July 8, 19 68

Following is a {notice of intention to do work / ~~report of work done~~} on land {~~patented~~ / leased} described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 SW ~~NW~~ Section 1 (m. sec.) 28N (Township) 51E (Range) MPM (Meridian)

The well is located 1993 ft. from {N / ~~S~~} line and 660 ft. from {~~E~~ / W} line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Producing from the A-4 Zone perforations 5599-5603'. Production has decreased from 139 BOPD 52 BWPD 27% W.C., Workover Potential, to 11 BOPD 44 BWPD 80% W.C.. The fluid production decline is not normal and formation is probably blocked. Acidize the well with 1000 gallons 15% HCL acid. Swab spent acid, trip tubing and pump test.

Approved subject to conditions on reverse of form

Date 7-9-68

By [signature] District Office Agent Title

Company MURPHY OIL CORPORATION

By [signature]

Title District Superintendent

Address P.O. Box 547, Poplar, Montana 59255

COMMISSION USE ONLY
API WELL NUMBER
25 STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

Form 9-331
(May 1963)

U. S. Geological Survey
RECEIVED
JUL 9 1968
Billings, Montana

'ITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN T ICATE*
(Other instruc. on re-
verse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR
Murphy Oil Corporation

3. ADDRESS OF OPERATOR
P.O. Box 547, Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1993' from North line and 660' from West line

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
2192' G.L.

5. LEASE DESIGNATION AND SERIAL NO.
Frarich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
East Poplar Unit

8. FARM OR LEASE NAME
East Poplar Unit

9. WELL NO.
No. 3

10. FIELD AND POOL, OR WILDCAT
East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SW SW Section1, T28N, R51E

12. COUNTY OR PARISH
Roosevelt

13. STATE
Montana

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
~~SHOOT OR~~ ACIDIZE	[X]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			[ ]
(Other)							

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Producing from the A-4 Zone perforations 5599-5603'. Production has decreased from 139 BOPD 52 BWPD 27% W.C., Workover Potential, to 11 BOPD 44 BWPD 80% W.C.. The fluid production decline is not normal and formation is probably blocked. Acidize the well with 1000 gallons 15% HCL acid. Swab spent acid, trip tubing and pump test.

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE District Superintendent DATE July 8, 1968

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) MICHAEL F. REITZ TITLE ACTING DISTRICT ENGINEER DATE JUL 9 1968

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES 201, 202, 213, 216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)

TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED
JUL 19 1968
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA - BILLINGS

RECEIVED JUL 1968 OIL & GAS CONS. COMM. STATE OF MONT. HELENA

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	XX
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

July 18, 1968

Following is a {report of work done} on land {leased} described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 SW NW Section 1 (m. sec.) 28N (Township) 51E (Range) MPM (Meridian)

The well is located 1993 ft. from {N} line and 660 ft. from {W} line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Acidized the A-4 perforations at 5599-5603' using 1000 gallons of Dowell 15% HCL. Maximum pressure 2600#. Gradually decreased pressure to 1300#. I.SIP 1300#, 5 min. SIP 300#.

Workover Potential: 7-17-68 24 Hr. Water Draw Test
Pumped 279 BFPD 99% Water 4 BOPD 275 BWPD.

Approved subject to conditions on reverse of form

Date 7/22/1968

By [signature] District Office Agent Title [signature]

Company MURPHY OIL CORPORATION

By [signature]

Title District Superintendent

Address P.O. Box 547, Poplar, Montana 59255

COMMISSION USE ONLY
API WELL NUMBER
25
STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

U. S. Geological Survey
Billings, Montana
JUL 19 1968

SUBMIT IN TRIPLICATE (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR
Murphy Oil Corporation

3. ADDRESS OF OPERATOR
P.O. Box 547, Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1993' from North line and 660' from West line

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
2192' G.L.

5. LEASE DESIGNATION AND SERIAL NO.
Frerich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
East Poplar Unit

8. FARM OR LEASE NAME
East Poplar Unit

9. WELL NO.
No. 3

10. FIELD AND POOL, OR WILDCAT
East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SW SW Section 1, T28N, R51E

12. COUNTY OR PARISH
Roosevelt

13. STATE
Montana

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	~~XXXXXXXX~~ ACIDIZING	[XX]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)			[ ]				

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Acidized the A-4 perforations at 5599-5603' using 1000 gallons of Dowell 15% HCL. Maximum pressure 2600#. Gradually decreased pressure to 1300#. ISIP 1300#, 5 min. SIP 300#.

Workover Potential: 7-17-68 24 Hr. Water Draw Test
Pumped 279 BFPD 99% Water 4 BOPD 275 BWPD.

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE ~~District Superintendent~~ DATE ~~July 18, 1968~~

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) MICHAEL F. REITZ TITLE ACTING DISTRICT ENGINEER DATE JUL 19 1968

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form No. 2
GENERAL RULES
201, 202, 213,
216, 219, 233

(SUBMIT IN QUADRUPLICATE)
TO
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

RECEIVED
AUG 8 - 1968
OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF MONTANA - BILLINGS

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of ~~Shooting~~ Acidizing ~~Cementing~~	XX
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	XX
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

August 7, 19 68

Following is a ~~XXXXXXXXXXXXXXXXXXXXXXXXXX~~ (report of work done) on land { ~~XXXXX~~ leased } described as follows:

LEASE Frerich - East Poplar Unit

MONTANA (State) Roosevelt (County) East Poplar Unit (Field)

Well No. 3 C- SW NW Section 1 (m. sec.) T28N (Township) R51E (Range) MPM (Meridian)

The well is located 1993 ft. from { N / ~~XXX~~ } line and 660 ft. from { ~~XXX~~ / W } line of Sec. 1

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2192' G.L.

READ CAREFULLY **DETAILS OF PLAN OF WORK** READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Acidized the A-4 Zone 5599-5603' with 1000 gallons of Dowell 15% HCL. Maximum pressure 2600#. Gradually decreased pressure to 1300# at end of job. Flowed spent acid to pit.

Pump Tested. 24 Hour Water Draw Test 268 BFPD 264 BWPD 4 BOPD 98% W.E.
Uneconomical

This well was temporarily abandoned August 5, 1968. Tubing and rods are to be pulled. Casing will be left intact.

Approved subject to conditions on reverse of form

Date 3-8-68

By [signature] District Office Agent [signature] Title

Company Murphy Oil Corporation

By [signature]

Title District Superintendent

Address P.O. Box 547, Poplar, Montana 59255

COMMISSION USE ONLY
API WELL NUMBER
2 5
STATE COUNTY WELL

NOTE:—Reports on this form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL.

OVER

3 REPORTER PRTG. & SUPPLY CO.

Form 9-331
(May 1963)

U. S. Geological Survey
RECEIVED
AUG 8 1968
Billings, Montana

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL [XX] GAS WELL [ ] OTHER

2. NAME OF OPERATOR
Murphy Oil Corporation

3. ADDRESS OF OPERATOR
P.O. Box 547, Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1993' from North line and 660' from West line

5. LEASE DESIGNATION AND SERIAL NO.
Fraich

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Fort Peck

7. UNIT AGREEMENT NAME
East Poplar Unit

8. FARM OR LEASE NAME
East Poplar Unit

9. WELL NO.
No. 3

10. FIELD AND POOL, OR WILDCAT
East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SW NW Section 1, T28N, R51E

12. COUNTY OR PARISH
Roosevelt

13. STATE
Montana

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
2192' G.L.

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	~~XXXXXXXX~~ ACIDIZING	[XX]	ABANDONMENT*	[XX]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Acidized the A-4 Zone 5599-5603' with 1000 gallons of Dowell 15% HCL. Maximum pressure 2600#. Gradually decreased pressure to 1300# at end of job. Flowed spent acid to pit.

Pump Tested. 24 Hour Water Draw Test 268 BFPD 264 BWPD 4 BOPD 98% W.C. Uneconomical.

This well was temporarily abandoned August 5, 1968. Tubing and rods are to be pulled. Casing will be left intact.

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY W. E. [illegible] TITLE District Superintendent DATE August 7, 1968

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) MICHAEL F. REITZ TITLE ACTING DISTRICT ENGINEER DATE AUG 8 1968

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

EPK #3
41 pages
Geol. Data
1952

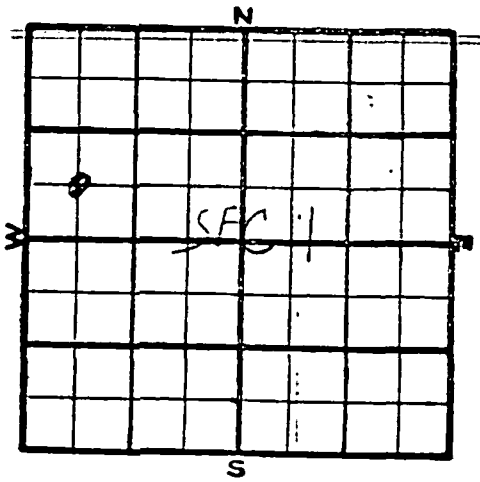
Geological Data

LOCATE WELL CORRECTLY

This Log to Be Rendered in Four Copies

BEST COPYS AVAILABLE

5M—2-



Lease ~~Fee Land (Frerich)~~

RECEIVED JUN 25 1952 OIL CONSERVATION BOARD

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF MONTANA

RECEIVED JUN 21 1952 OIL CONSERVATION BOARD AND BOARD OF RAILROAD COMMISSIONERS BILLINGS

Paul T. Smith, Chairman

Austin B. Middleton, Commissioner Leonard C. Young, Commissioner

OIL AND GAS WELL DIVISION

5

LOG OF OIL OR GAS WELL

Company C. H. Murphy, Jr. Et Al Address Box 76 Poplar, Montana

Lessor or Tract East Poplar Unit (Frerich) Field East Poplar Unit State MONTANA

Well No. 3 Sec. 1 T. 28N R. 51E Meridian M.P.M. County Roosevelt

Location 1993 ft. { N. } of North Line and 660 ft. { W. } West Line of Sec 1 Elevation 2204 (Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed Harold Mulan

Title District Production Superintendent

Date June 16, 1952 Address Box 76 Poplar, Montana

The summary on this page is for the condition of the well at above date.

Commenced drilling 4-13, 19 52 Finished drilling 5-23, 19 52

Oil or Gass Sands or Zones (Denote Gas by G)				Important Water Sands		
No. 1, from 740	to 760	Gas		No. 1, from	to	
No. 2, from 5599	to 5616	Oil		No. 2, from	to	
No. 3, from	to			No. 3, from	to	
No. 4, from	to			No. 4, from	to	
No. 5, from	to			No. 5, from	to	

CASING RECORD

Size Casing	Weight per Foot	Threads Per Inch	Make	Amount	Kind of Shoe	Cut & Pulled From	Perforated From	Perforated To	Purpose
9 5/8	36	8	J&L	1037	Howco		750	760	Surface
5½	15.50	8	Mtl.	5957	Howco		5907	5912	oil string
							5892	5904	
							5599	5616	

CASING OR TOOLS LOST OR SIDETRACKED

From to Description

FOLD MA

MUDDING AND CEMENTING RECORD

Casing Size	Where Set	Number Sacks of Cement	Methods Used	Mud Gravity	Amount of Mud Used
9 5/8	1037	400	Plug & Pump		
5½	5957	250	Plug & Pump		
			50 squeezed in perforations @ 5907-5912		

PLUGS AND ADAPTERS

Heaving plug—Material Baker Model K Length 30' Depth Set

Adapters—Material Size

SHOOTING RECORD

Size	Shell Used	Explosive Used	Quantity	Date	Depth Shot	Depth Cleaned Out

TOOLS USED

Rotary tools were used from 0 feet to 5968 feet, and from feet to feet

Cable tools were used from feet to feet, and from feet to feet

DATES

19 Put to producing 19

The production for the first 24 hours was 108 barrels of fluid of which 99 % was oil; 1 % emulsion; % water, and % sediment.

If gas well, cu. ft. per 24 hours Rock pressure, lbs. per sq. in.

Gallons gasoline per 1,000 cu. ft. of gas

EMPLOYEES

S. H. Williams, Driller T. F. Manion, Driller

Eddie Collins, Driller

HISTORY OF OIL OR GAS WELL

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reasons for the work, and its results. If there were any changes made in the casing, state fully, and if any casing was "side-tracked" or left in the well, give size and location. If the well has been dynamited, give date, size, position, and number of shots. If plug or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

FORMATION RECORD

From	To	Total Feet	Formation
top			
1230			Eagle
2093			Niobrara
2443			Greenhorn
2993			Muddy
3207			Dakota
3607			Morrison
4425			Piper Lm.

FORMATION RECORD

From	To	Total Feet	Formation
3502			
3503			
4806			Amsden
5290			Kibbey
5489			Charles
5896			Mission Canyon

The East Poplar Unit #3 Well spudded 12¼" hole at 1:00 AM 4-13-52. Drilled to 1039' using 11.4 lb mud to hold the flow of gas and water in the Judith River formation found it approximately 800'. Ran 9 5/8" 40# J-55 to 1037' and cemented with 400 sax common cement with 1% $CaCl_2$ added. Received clean cement returns to surface. Plug down at 1:45 PM 4-16-52. Eight hours later, gas began to break thru the annulus between the pipe and the hole indicating that the cement had channeled. Perforated with eight shots at 750' and cemented with 200 sax common cement. This killed the flow of gas in the annulus. Drilled out squeeze plug 4-18-52 and tested casing with 1000 lbs. pressure did not hold. Recemented with 96 sax. Drilled out 4-20-52 and tested with 1000 lbs. and pressure failed to hold again. Set Baker model K retainer 714' and squeezed with 50 sax. Waited eight hours and squeezed with 50 more sax. Waited eight more hours and squeezed with 75 sax and 4% $CaCl_2$. Pressure built to 1500 lbs. Job complete at 4:00 PM 4-21-52. 8 3/4" hole drilled to 5500'. Cores were cut from there to total depth and following Drill Stem Tests were run:

DST#1-5600'-5621' Straddle packers (TD 5655) ½" bot. ch. ¼" top ch. no WC Tool open 30 min. Closed 10 min. Tool open W/ strong blow 2# top pressure on ¼" choke. Recovered 2222' Fluid in the following order 281' clean 41 gravity oil 496' mud cut w/ oil and gas 825' clean oil 279' oil cut with mud 341' muddy salt water. Bottom hole pressures: IBHFP-350#, FBHFP-900#, BHSIP-2975#, Hydro-3425#.

DST#2-5740'-5760' 5/8" bot. ch. no W.C. Tool open 45 min., fair blow Closed 10 min. Recovered 91' of mud, cut with oil, gas, and salt water. IBHFP-465, FBHFP-465, BHSIP-2320, Hydro-3170.

DST#3-5740-5751' ½" bot. chl, no W.C. Tool open one hour, strong blow closed 10 min. Rec. 91' mud, cut with s.w. and trace of oil and gas. IBHFP-50, FBHFP-100, BHSIP-2800, Hydro-3675.

DST#4-5760-5775, ½" bot. ch., no W.C. Tool open 3:15 AM for 30 min. strong blow, closed 10 min. Rec. 455' oil, heavily cut with mud and 122' of muddy s.w. IBHFP-190, FBHFP-250, BHSIP-2850, Hydro-3300.

DST#5-5758'-5766', ½" bot. ch., no W.C. Tool open 1 hr. strong blow closed 20 min. Rec. 716' clean oil and 165' of mud and s.w. IBHFP-o, FBHFP-275, BHSIP-2900, Hydro-3400.

DST#6-5896'-5918', ½" bot. ch., no W.C. Tool open 1 hr. closed 20 min. weak blow thru out test (Reset tool twice no increase in blow) Rec. 182' mud cut w/ gas & oil. IBHFP-50#, FBHFP-60#, BHSIP-3050#, Hydro-3425#.

DST#7-5938'-5968', ½" bot. ch. No W.C. Tool open 1 hr. Closed 15 min. Rec. 1000' mud cut w/ s.w. and gas, 2094" s.w. w/ show of gas. IBHFP-400#, FBHFP-1775#, BHSIP-3100#, Hydro-3500#.

Production casing ran 5½" OD, 15.50#, J-55, smls. csg. to 5957'. Cemented 250 sx. common cement and 5 sx. aquagel. Plug down @ 10:25 AM 5-25-52. Temperature survey showed top cement @ 4650'. Tested csg. for leaks w/ 1000# pressure. Perforated from 5907-5912 w/ 6 bullets per foot.

DST#8-Perfs. 5907-5912 w/ 6 bullet ½" bot. ch., no W.C. Tool open 17 hrs 38 min. Weak blow, gas to surface in 10 hrs. 13 min., oil to surface 14 hrs. 47 min. Rate of flow calculated @ 38 bbls. oil/day Tool closed in 20 min. Rec. 4010' 35.2 gravity dirty oil, IBHFP-o, FBHFP-2300#, BHSIP-3100#, Hydro-3500#.

Squeezed perforations 5907 to 5912 with 50 sax with Model K Baker Retainer Set @ 5904. Open tool 8:49 AM 5-13-52 for one hour. Dry test. Acidized with 500 gals. Break down pressure 3000 lbs. Well flowed 22 hours at the rate of 3 BPH, 60% s.w. and 40% oil. Plugged Madison Zone off with bridge plug. Set at 5850 and 10 ft. cement 5840 to 5850

top cement @ 4650'. Tested csg. for leaks w/ 1000# pressure. Perforated from 5907-5912 w/ 6 bullets per foot.

DST#8-Perfs. 5907-5912 w/ 6 bullet ½" bot. ch., no W.C. Tool open 17 hrs 38 min. Weak blow, gas to surface in 10 hrs. 13 min., oil to surface 14 hrs. 47 min. Rate of flow calculated @ 38 bbls. oil/day. Tool closed in 20 min. Rec. 4010' 35.2 gravity dirty oil, IBHFP-o, FBHFP-2300#, BHSIP-3100#, Hydro-3500#.

Squeezed perforations 5907-to-5912 with 50 sax with Model K Baker Retainer Set @ 5904. Open tool 8:49 AM 5-13-52 for one hour. Dry test. Acidized with 500 gals. Break down pressure 3000 lbs. Well flowed 22 hours at the rate of 3 BPH, 60% s.w. and 40% oil. Plugged Madison Zone off with bridge plug. Set at 5850 and 10 ft. cement 5840 to 5850. Perforated 4 jets per foot 5599-5616. Packer set @ 5584. Tool open 7:15 PM 6-5-52. Ran DST#9 to test plug for leaks. Dry test.

DST#10-Testing perforations 5597-5616. Packer set @ 5584. Tool open 7:15 PM 6-5-52. Gas to surface in 25 min. Fluid to surface in 54 min. Well flowed at the rate of 450 BBL per day on ¼" top choke. Tool open 7 hrs. 45 min. closed 30 min. IBHFP-110, FBHFP-2220, BHSIP-3125, Hydro-3250.

Ran 2 3/8" tubing with 3 foot perforated nipple @ 5615. Installed Xmas tree and circulated hole with water 6-5-52. Flowed well into burning pits until 3:15 P.M. 6-7-52.

Tank Gauges as follows:

Prod. ¼"	choke	80.67 BBLS in 11 hours	TBG. pressure 30#. CSG. pressure 200#.
Prod. 12/64"	choke	27.20 BBLS in 4 hours	TBG. pressure 100#. CSG. pressure 250#.
Prod. 12/64"	choke	108.28 BBLS in 16 hours	TBG. pressure 100#. CSG. pressure 390#.

2

RECEIVED

JUN 5 2 1952

RECEIVED

Well No. 1-A

Well Name C.H.Murphy Jr et al- Frerich #3

Twp. 28 N

Rge. 51 E

Structure: Poplar Dome

Sec. 1

County: Roosevelt

Location: C SW NW 1993 S/N 660 E/W

State: Montana

Surface Elevation and Formation: 2193 Gr 2204

Landowner: Frerich

API #25-085-05057

Lessee: C.H.Murphy Jr.et al

Drilling Company: C.H.Murphy Jr et al

Representative in Charge: Harold Milam, Dist. Supt. Poplar

Contractor or Driller: Williams, Collins, Manion

Date Location: 3-24-52 App 3-24-52 HHP)

Date Spudded: 4-13-52

3-29-52 MORT (FCP) LOG IN FILE

4-18-52 Drilling 750 (FCP)

4-26-52 Drilling 2955; 1037' of 9-5/8" w/ 400 sx; cem surface pipe several times against gas and water at 800' (FCP)

5-3-52 Drilling 4327; (FCP)

5-8-52 Drilling 5145; Cem sur pipe several times against gas and water at 800' (FCP)

5-31-52 Coring 5990, Sch Tops: Niobrara 2100; Greenhorn 2435; Muddy 2939; Ellis 3987; Piper limestone 4468; Amsden 4785; Kibbey 5215; Charles 5500?; DST 5600-26 open 30 min, SI 10 min; rec. 2222' fluid in following order; 281' clean 41 Gr oil; 496' oil cut mud; 825' clean oil; 279' mud cut w/ oil and gas; 341' muddy salt water; FP 900#; SI 2975#; DST #5, 5758-5766, ½" choke, open 1 hr. SI 20 min; strong blow, Rec 716' clean oil, 165' mud and salt water; FP 275#, SI 2900# (FCP)

6-2-52 Coring 5990 (FCP)

6-12-52 Comp 5-25-52, 1037' of 9-5/8" w/ 400 sx. Sch Tops: Charles 5500?; DST #5, 5758-5766 TD 5968, PB to 5903, perf 48 shots 5892-5904; Treated w/ 500 gals, flowed 22 hrs at rate of 3PH, 60% salt water, 40% oil, testing (FCP)

9-13-52 5957' of 5½" w/ 350 sx. Sch Tops: Charles 5485, Mission Canyon 5896? TD 5968; PB 5840, perf Charles 5599-5616, 4 shots per ft. Packer at 5584' open 7 hrs 45 min; fluid to surface in 45 min; flowed at rate of 450 BOPD thr ¼" choke; FP 2220p SI 3125;

Completed: 5-25-52

Total Depth: 5968 PB 5840

Formation: Mod. Mission

Oil: I.P. 200 BOPD

Gas

Water

Final Result: Flowed 450 BOPD thru ¼" choke

flowed 80.67 bbls in 11 hrs. ¼" choke, TP 30#; flowed 27.4 BO in 4 hrs, 12/64" choke; TP 100, CP 250#; flowed 105.66 BO in 16 hrs, TP 100#, CP 390#, SI 910#; .6 of 1% BS&W (FCP)

6-20-52 I.P. 200 BOPD (FCP)

Sands: 740-760 Gas. 5599-5616 Oil

Casing Record:
1037' of 9-5/8" w/ 400 sx.
5957' of 5½" w/ 250 sx.

E L E C T R O L O G D A T A

TYPE LOG	INTERVAL LOGGED
ES	1039-5928
Microlog	5430-5928

Electro Log Tops

	Depth	Datum	Thickness
Eagle	1228	+ 976	
Niobrara	2092	+ 112	
Carlisle	2242	- 38	
Greenhorn	2442	- 238	
Graneros	2643	- 439	
U. Muddy	2770	- 566	
Muddy	2992	- 788	
Skull Crk.	3038	- 834	
Dakota Silt	3206	-1002	
Morrison	3603	-1399	
Vanguard	3990	-1786	
Rierdon	4173	-1969	
Piper Sh.	4347	-2143	
Piper Ls.	4426	-2222	
Gyp Sprgs.	4482	-2278	
Spearfish	4672	-2468	
Amsden	4805	-2601	
Heath	4934	-2730	
Otter	5100	-2896	
Kibbey	5238	-3034	
Kibbey Ls.	5396	-3192	
Madison	5487	-3283	
A-1	5583	-3379	3
A-2	5593	-3389	2
A-3	5600	-3396	14
A-4	5614	-3410	20
B-1	5742	-3538	8
B-2	5760	-3556	16
B-3	5782	-3578	7
B-4	5815	-3611	5
B-5	5854	-3650	?
C-1	5887	-3683	?
C-2	5907	-3703	9

CORE DESCRIPTIONS

Core No. 1

2955-78 Rec. 20'

20' Shale, dark gray, slightly micaceous, slightly rotten with prominent ring-tail cleavage, very few streaks of light gray bentonite.

C. T. 30, 31, 39, 45, 42/ 36, 20, 22, 22, 26/ 25, 27, 25, 30, 30/ 35, 30, 30, 2 25, 30/ 80, 65, 40, 35, 28/

- - - - - - - - - - -

Core No. 2

2978-3015 Rec. 36'

C. T. 35, 28/ 22, 22, 22, 26, 24/ 25, 24, 25, 25 15/ 7, 9, 13, 14, 12/ 16, 18, 16, 20, 20,/ 17, 13, 16, 16, 15/ 17, 18, 20, 14, 5/ 4, 3, 3, 4, 3/

4' Interlaminated and included very dark gray shale, and very light gray, fine grained, fairly hard, tight sand with a predominance of sand toward base. No Show.

7' Shale, very dark gray, slightly rotten, ring-tail cleavage, few small sand inclusions throughout.

3'9" Sand, steel gray, with slight greenish cast, fine-medium grained, well assorted, porous and permeable, spotted brown oil stain, fair oil odor on fresh break, faint oil taste; trace of tight fracturing in top, well developed fracture in basal 1', entire unit looks wet. Muddy

12'3" Interlaminated dark gray shale and light gray silt to very fine grained sand, becoming fairly pure shale in streaks. No Show.

2' Sand, very dark gray, ring-tail cleavage.

6" Conglomerate, very dark gray, sub-rounded; pebbles cemented in a very light gray, sandy matrix, hard, tight. No Show.

6'6" Sand, white to very light gray in top, slightly banded, becoming light gray at base, few scattered tan and green grains, slightly porous and permeable, looks wet. No Show.

- - - - - - - - - - -

Core No. 3

4410-60 Rec. 48'

C. T. 28, 23, 22, 30, 29/ 24, 21, 19, 19, 25/ 23, 15, 14, 12, 12/ 12, 11, 11, 11, 12/ 16, 17, 23, 18, 11/ 14, 17, 30, 20, 15/ 10, 8, 12, 8, 7/ 10, 15, 15, 15, 12/ 13, 13, 11, 11, 29/ 28, 17, 17, 18, 20/

8' (44') Shale, limey, very dark slightly brownish-gray, hackly fractured, fossiliferous. No Show.

20' (38') Limestone, brown and brownish-gray, banded, massive to microcrystalline, hard, dense, argillaceous; numerous incipient fractures throughout, not apparent until core is struck with hammer. Calcite crystals clustered and few irregular shale partings near base. Numerous hairline quartz veinlets or fracture fillings, very fossiliferous; some oil stain on one fracture plane, second foot from top of unit has fair oil odor; fairly even golden fluorescence.

Piper Ls.

7'6" Limestone, tan to light brown, massive to microcrystalline, very hard, dense, except for numerous incipient and extremely tight fractures, very fossiliferous throughout (gastropods), faint oil odor on fresh break which is believed from dead oil associated with fossil which appears to have slight amount of oil stain.

12'6" Limestone, brownish black, massive, very hard, dense; trace of incipient fracturing, sparingly fossiliferous. No Show.

- - - - - - - - - - - -

Core No. 4

5355-85 Rec. 30'

C. T. 20, 12, 12, 12, 14/ 18, 17, 20, 23, 22/ 22, 16, 23, 17, 15/ 10, 10, 11, 12, 12/ 14, 13, 13, 14, 14/ 14, 14, 14, 15, 15/

1' Argillaceous silt, very fine grained sand, rust-red, slightly banded, very hard and tight. No Show.

5' Sand, lavender-red, fine to medium grained, poorly assorted, few irregular streaks, porous and permeable, otherwise tight, selenite cementing throughout. No Show.

8' Silt, very fine grained sand, rust-red, numerous very small red shale lenses throughout, few thin streaks of medium grained sand, very hard, tight. No Show.

4' Sand, lavender red, medium to coarse grained, very slightly porous, questionable permeability, poorly assorted, good selenite cementing. No Show.

7' Silt, very fine grained sand, same as the above 8'.

5' Argillaceous silt in top, becoming silty shale toward base, rust red, becoming lavender in very few streaks, few white anhydrite inclusions near top of unit, some fracturing in upper 2' of unit. No Show.

Core No. 5

5500-39 Rec. 36'

C. T. 14, 12, 26, 20, 20/ 20, 25, 21, 22, 18/ 20, 13, 9, 8, 10/ 9, 8, 10, 13, 17/ 19, 18, 15, 11, 13/ 17, 16, 15, 15, 17/ 17, 14, 14, 15, 13/ 11, 17, 18, 24,

5'6" Argillaceous dolomite, brick red, numerous inclusions and fragments of white to pin anhydrite; numerous dolomite fragments throughout, fragments angular; unit hard, dense. No Show.

2' Anhydrite, brownish-gray, numerous thin very dark gray shale partings becoming slightly contorted near base, hard, dense. No Show.

9" Interlaminated brownish-gray anhydrite and very dark gray shale, few thin streaks of dark gray dolomite, appears cross-bedded and slightly contorted, hard, dense. No Show.

2'6" Dolomite, light gray, massive, very hard, dense. No Show.

2'6" Anhydrite, dark brownish-gray, numerous thin black shale partings, displaying some apparent dip or cross-bedding near base. No Show.

3' Dolomite, same as above 2'6" dolomite.

4" Very argillaceous dolomite, brick red, massive, very hard, dense, becoming red and gray varigated toward base. No Show.

5' Anhydrite, brownish-gray, massive, fairly hard, dense, few black shale partings.throughout. No Show.

1'6" Dolomite, same as above 2'6" dolomite. No Show.

1' Anhydrite, light brown, massive, very hard, dense, few very thin anhydritic shale partings. No Show.

- - - - - - - - - - - -

Core No. 6

5539-96 Rec. 57'

C. T. 17, 16, 17, 20, 22/ 20, 20, 20, 18, 20/ 18, 20, 24, 20, 20/ 18, 16, 16, 18, 16,/ 20, 19, 20, 20, 20/ 20, 20, 20, 15, 12/ 10, 13, 11, 11, 10/ 10, 5, 6, 17, 18/ 17, 15, 15, 15, 15/ 7, 11, 14, 15, 14/ 14, 16, 19, 23, 17/ 23, 32.

2'6" Interlaminated black shale and gray anhydritic dolomite; prominent shale cleavage, wavy or contorted, fairly hard and dense. No Show.

1'6" Dolomite, argillaceous, greenish gray, with very numerous white to pink anhydritic inclusions, very hard, dense. No Show.

(Core No. 6 continued)

3'6" Dolomite, argillaceous, brick red, in top, becoming more pure; buff gray dolomite toward base with few anhydritic veinlets, entire unit hard and dense. No Show.

5' Anhydrite, very light gray, massive, dense, with few dark greenish-gray limestone inclusions. No Show.

8' Limestone, very dark brownish-gray, massive to microcrystalline, interlaminated with black shale partings, few anhydrite inclusions, prominent shale partings, fairly hard, dense. No Show.

5'6" Anhydrite, brownish-gray, massive to finely crystalline, hard, dense. No Show.

1' Limestone, dark brownish-gray, massive to microcrystalline, very hard, dense, fairly numerous hairline veinlets or fracture fillings of white crystalline anhydrite. No Show.

1'6" Anhydrite, brownish-gray, massive to microcrystalline, hard, dense, with few irregular lenses of gray limestone near base. No Show.

1'6" Anhydrite, brownish-gray, finely crystalline, hard, dense, limy in a few spots, No Show.

1'6" Limestone, brown, very finely oolitic, with fair oolitic development, few calcite veinlets throughout, hard, dense, some porosity, questionable permeability. No Show.

3'6" Limestone, light gray, microcrystalline, hard, dense, fairly numerous black shale partings, few anhydrite veinlets. No Show.

1' Limestone, brown, very finely oolitic, poor oolitic development, slight porosity, very slightly permeable, few massive limestone inclusions throughout, water odor, few anhydrite filled fractures. No Show.

1' Limestone, earthy to microcrystalline, medium gray, fairly hard and dense, very numerous irregular wavy black shale partings. No Show.

1' Dolomite, very fine to microcrystalline, medium gray, slightly banded, fairly hard, slightly porous, very slightly permeable, few hairline veinlets of anhydrite, looks wet. No Show.

8 Limestone, dark brown, massive to finely crystalline, hard, dense, except for few very thin streaks, very slightly porous and permeable. No Show.

2' Dolomite, very light gray, earthy, firm, very slightly porous, questionable permeability, looks wet. No Show.

7'6" Dolomite, slate gray, massive, hard, dense, fairly numerous light gray anhydrite inclusions, few black shale partings, slightly contorted near base. No Show.

1'6" Anhydrite, white to light gray, composed of numerous anhydrite inclusions or fragments cemented together with dolomite. No Show.

Core No. 7

5596-5655 Rec. 55'

C. T. 32, 15, 15, 17, 20/ 23, 30, 25, 20, 25/ 25, 25, 25, 25, 25/ 20, 22, 23, 15, 15/ 20, 19, 18, 18, 17/ 17, 17, 21, 20, 23,/ 22, 26, 20, 18, 16/ 14, 14, 18, 20, 26/ 21, 20, 30, 21, 24/ 16, 8, 12, 10, 8,/ 19, 19, 38, 27, 25/ 24, 24, 28, 27, 25/

3'6" Anhydrite, light gray, dense.

16'6" Limestone, dark brownish-gray, hard fine to very finely crystalline, good porosity in upper 3'6" of unit, occasional very slight streaked porosity in remainder of unit, porosity is very tight, irregular fractures with trace of vuggy porosity, questionable permeability, considerable oil bleeding from porous zones, good stain, oil odor and fluorescence where porous.

11' Limestone, oolitic to earthy and medium crystalline, brownish-gray, hard, oolites poorly developed, very porous and permeable, good oil odor and stain, spotted to fairly even fluorescence, well preserved corals approaching coralline limestone in upper 4'.

4' Limestone, dark brownish-gray, earthy to fine crystalline, spotted to streaked porosity, moderate amount of pencil-point vugs, permeable, good oil odor, spotted stain, fairly good spotted fluorescence (silvery green)

2'6" Limestone, fine to medium oolitic, dark brownish gray, hard, well developed oolites, very porous and permeable, good oil odor, tastes wet, good even yellow-gold fluorescnece.

1'6" Limestone, dark brownish-gray, medium hard, finely crystalline, very porous and permeable in lower 1', good oil odor and stain, bottom 1' appears wet, spotted yellow-golden fluorescence.

6'6" Anhydrite, dense, dark brownish gray, fine crystalline, massive. N/S.

3'6" Dolomite, dense, except for numerous tight fractures. No Show.
4'6" Dolomite, hard, dense. No Show.
1'6" Anhydrite, hard, dense. No Show.

- - - - - - - - - - -

Core No. 8

5655-5714 Rec. 46'

C. T. 28, 22, 23, 21, 21/ 20, 23, 22, 25, 23/ 24, 25, 25, 25, 22/ 18, 19, 24, 24, 23/ 25, 30, 28, 30, 30/ 30, 24, 25, 18, 10/ 12, 10, 23, 25, 20/ 20, 20, 20, 15, 15/ 12, 13, 8, 8, 8/ 8, 8, 15, 18, 20/ 22, 22, 20, 20, 20/ 21, 20, 19, 20,

23' Anhydrite, dolomitic in upper 3'6", medium brownish-gray to very light gray and white toward base; numerous irregular brown anhydritic shale partings, amorphous, dense. No Show.

1'6" Dolomite, medium dark gray, amorphous to very finely crystalline,

(Core No. 8 continued)

with numerous veinlets and specks clear salt, few very tight hairline fractures with salt along fracture planes, slight amount of intercrystalline porosity, No Show.

6'6" Dolomite, dark gray in top, becoming medium gray toward base, anhydritic in numerous very thin lenses, with irregular shaly partings, amorphous, dense. No Show.

2'6" Salt, white to amber, coarsely crystalline in top to granular at base. No Show.

9'6" Anhydrite, white to very light gray, amorphous, dense, except for some vugular porosity caused by solution of inclusions and veinlets of salt; occasional very thin brown limestone streaks. No Show.

3' Anhydrite, white to very light gray, amorphous, dense, numerous irregular brown limy partings. No Show.

- - - - - - - - - - -

Core No. 9

5714-31 Rec. 16'

C. T. 20, 20, 18, 20, 22/ 20, 20, 25, 32, 28/ 35, 27, 25, 30, 28/ 20, 33,

7' Anhydrite, light gray to white, amorphous, dense, few thin brown dolomitic partings. No Show.

3' Dolomite, light to medium gray, amorphous to very finely crystalline, with numerous fairly well developed fractures covered with clear salt on fracture planes, some intercrystalline porosity. No Show.

6" Dolomite, anhydritic, medium gray, amorphous, dense, with few very thin white anhydrite parings. No Show.

1' Dolomite, medium gray, amorphous, breaks with slight conchoidal fracture, few fairly well developed fractures, with salt along fracture planes. No Show.

3'6" Dolomite, very anhydritic, becoming almost pure anhydrite in thin streaks, light to medium brownish-gray, very fine to microcrystalline, fair amount of fracturing in more dolomitic parts, fracture planes covered with clear salt, no porosity, no permeability. No Show.

1' Anhydrite, very dolomitic, light to medium gray, amorphous, dense, with numerous large inclusions of dark gray dolomite, no porosity, no permeability. No Show.

- - - - - - - - - - -

Core No. 10

5731-60 Rec. 29'

C. T. 34, 26, 22, 18, 17/ 17, 18, 18, 20, 20/ 18, 18, 16, 10, 8/ 17, 17, 12, 10, 8/16, 16, 16, 16, 17/ 16, 16, 15, 20,

2' Dolomite, medium brownish-gray, amorphous to microcrystalline, few very thin streaks of white anhydrite; trace of vugular porosity, probably caused by solution of salt, otherwise hard and dense, few tight hairline fractures. No Show.

3' Anhydrite, light brownish-gray, finely crystalline, very good vugular porosity, probably caused by solution of salt, core has salty taste, some vugs size of pencil-point, medium hard. No Show.

7' Anhydrite, light to medium brownish-gray, finely crystalline, hard, massive, no porosity, no permeability. No Show.

3' Limestone, medium brownish-gray, finely crystalline, with numerous dark, medium to coarse calcite crystals scattered throughout, fairly good oolitic structure in 3" streak at bottom of unit, good porosity and permeability, medium hard, good oil odor, weak spotted to even yellow golden fluorescence, good taste.

2' Limestone, dark brownish-gray, amorphous to microcrystalline, some tight hairline fractures, very few small pin-point vugs, otherwise dense, fairly hard, fair oil odor and taste, weak yellow fluorescence along fracture planes.

3' Limestone, dark brownish-gray, fine-medium crystalline, with numerous medium crystals, of clear calcite, fairly good porosity and permeability, few very large inclusions of white to clar calcite in bottom 3" of unit; good oil odor and taste, good stain, good greenish-yellow even fluorescence.

9' Anhydrite, white to light gray, microcrystalline, few very thin streaks of brown limestone, massive, hard, dense. No Show.

- - - - - - - - - - - - -

Core No. 11

5760-5819 Rec. 59'

C. T. 25, 18, 12, 10, 18/ 15, 15, 17, 20, 15/ 15, 15, 15, 15, 18/ 17, 25, 25, 30, 30/ 25, 18, 10, 10, 10/ 12, 13, 10, 13, 22/ 20, 10, 10, 20, 30/ 23, 22, 24, 21, 17/ 14, 16, 18, 20, 17/ 18, 16, 20, 22, 23/ 21, 23, 22, 21, 22/ 17, 17, 22, 24.

1' Limestone, very anhydritic, medium brownish-gray, finely crystalline, with numerous large inclusions of white anhydrite, fairly hard, dense, very slight oil odor, trace of spotted weak yellow fluorescence. No Taste.

(Core No. 11 continued)

1' Limestone, dark to medium brownish-gray, pseudo-oolitic, with few thin streaks amorphous, dense, dark gray limestone, good porosity and permeability, good oil odor on fresh break, good stain in zones having porosity, slight oil taste, weak even dull yellow fluorescence on porous parts.

3' Limestone, medium brownish gray, medium hard, fine to medium crystalline, with few large crystals of clear calcite, fairly good porosity, few small pin-point vugs, questionable permeability, good oil odor on fresh break, fair taste, fairly even dull yellow fluorescence, fossiliferous.

2'6" Limestone, dark brownish gray, medium hard, amorphous to finely crystalline, slight amount of vugular porosity, few fairly well developed 1/8" fractures, some fractures filled with calcite, fair oil odor and taste, fairly even dull yellow fluorescence.

8'. Limestone, medium brownish-gray, fine to coarsely crystalline, medium hard, good vuggy porosity, with numerous small pin-point vugs and few large thumb size vugs, filled with calcite crystals; numerous 1/8" fractures with calcite crystals along fracture planes; slight oil stain on calcite crystals, both in vugs and along fractures; good oil odor, slight taste, fairly even dull yellow fluorescence, fossiliferous.

2'6" Limestone, medium dark brownish-gray, very fine to microcrystalline, very hard, except for few thin streaks of crystalline limestone with vuggy porosity, few fairly well developed 1/8" fractures throughout unit, slight oil odor; no taste, dull, yellow, even fluorescence along some fractures.

1' Limestone, light brownish-gray, medium crystalline, with few coarse crystals of white calcite, slight amount of pin-point vuggy porosity, questionable permeability, slight oil odor, some stain, fairly even, dull yellow fluorescence.

2'6" Limestone, same as above 2'6" unit, except fewer fractures and no streaks of coarsely crystalline limestone.

6'6" Dolomite, slightly sandy, very light gray, very finely crystalline, slightly banded, fairly porous and permeable, fairly hard, dense, except for single vertical fracture; looks and tastes wet, no fluorescence.

1'6" Dolomite, dark brownish-gray, microcrystalline, very hard, dense, no porosity, no permeability. No Show.

2'6" Dolomite, very sandy, light gray, finely crystalline, hard and dense, except for single vertical hairline fracture, slight amount of porosity, questionable permeability; sand grains fairly well sorted, angular, fine grained.

(Core No. 11 continued)

7'6" Dolomite, medium brownish-gray, microcrystalline, very hard, dense, except for unit becoming anhydritic in lower 1'. No Show.

8'6" Anhydrite, light gray, white, very finely crystalline, fairly hard, dense, massive. No Show.

7' Limestone, dark brownish-black, amorphous to microcrystalline, recemented vertical fractures, otherwise dense, few thin black shale laminae, few calcite inclusions, becoming medium crystalline in streaks. No Show.

4' Dolomite, light gray, finely crystalline, hard, few fairly medium developed fractures in top 2'; numerous white anhydrite inclusions in lower 2'; mass of core very hard and dense. No Show.

- - - - - - - - - - - -

Core No. 12

5821-80 Rec. 59'

C. T. 20, 18, 20, 22, 20/ 28, 27, 28, 22, 22/ 23, 22, 25, 28, 25/ 25, 28, 22, 23, 20/ 22, 26, 24, 25, 23/ 21, 22, 24, 27, 21/ 22, 20, 19, 18, 20/ 25, 27, 31, 25, 20/ 25, 28, 25, 27, 25/ 23, 27, 28, 27, 27/ 25, 26, 29, 33, 28/ 28, 28, 32, 35

9' Dolomite, medium gray, finely crystalline, few thin partings of light gray anhydrite, few thin black shale partings, hard and dense. No Show.

2'6" Anhydrite, light gray, finely crystalline, few thin streaks and inclusions of dark gray dolomite, few thin shale partings, medium hard. No Show.

6' Dolomite, dark gray, amorphous to microcrystalline, few thin streaks of light gray anhydrite in upper part of unit, few inclusions of white selenite in upper part, becoming numerous toward base, basal 1' of unit is limy, fairly hard, and dense throughout. No Show.

13'6" Limestone, light brownish-gray, very finely crystalline, numerous white selenite inclusions, in upper 6', very hard, dense, few small cubes of pyrite. No Show.

6" Dolomite, medium gray, microcrystalline, very hard, dense. No Show.

14'6" Limestone, dark brownish-gray, microcrystalline, numerous streaks and inclusions of white, finely crystalline anhydrite, fairly hard, dense, one 2" streak of medium gray dolomite 4½' from top of unit, slightly pyritic. No Show.

1' Dolomite, medium gray, microcrystalline, singular tight vertical hairline fracture through unit, otherwise hard and dense. No Show.

(Core No. 12 continued)

7'6" Limestone, dark brownish-gray, microcrystalline, few very thin shale partings in top 1' of unit, otherwise very hard and dense, becoming very dolomitic in bottom of unit.

2'6" Dolomite, dark brownish-gray, microcrystalline, very hard, dense. No Show.

2' Limestone, slightly dolomitic in top 1', dark brownish-gray, finely crystalline, few thin streaks and inclusions of white to light gray anhydrite, few fairly well developed vertical fractures, otherwise very hard, dense. No Show.

- - - - - - - - - - - -

Core No. 13

5880-5918 Rec. 35'

C. T. 25, 20, 25, 25, 20/ 25, 27, 26, 26, 23/ 22, 26, 21, 20, 19/ 16, 19, 25, 17, 19/ 22, 20, 20, 17, 17/ 21, 18, 12, 7, 9/ 14, 14, 12, 32, 26/ 38, 29, 36.

6' Limestone, dark brownish-gray, fine to medium crystalline, numerous small soft black crystals of slaty material, few fairly well developed fractures filled with white crystalline anhydrite, few thin streaks dark gray, hard, dense dolomite, no porosity or permeability in mass of unit. No Show.

6'6" Dolomite, dark gray-black, microcrystalline, few thin streaks of light gray anhydrite in top of unit, numerous very fine specks of pyrite, few black shale partings, otherwise very hard and dense. No Show.

16'6" Limestone, medium brownish-gray, fine to medium crystalline, few black shale partings, medium hard, fractured throughout with well developed fractures (1/8") from 5896-98 and from 5903 to 5909, few black stylolites, some fractures filled with white calcite, few tight fractures in basal 2' of unit bleeding slight amount of oil which has fair odor and good golden yellow fluorescence; good oil taste, no show in mass of unit (fractures extend into unit below).

6' Top 5909 Limestone, dark brownish-gray, finely crystalline, slightly porous, questionable permeability, very highly fractured throughout, some fractures filled with white calcite, all fractures vertical; good oil odor on fresh break, good stain along fracture planes, weak spotted dull yellow-fluorescence in mass of core, slightly fossiliferous; good, even bright yellow golden fluorescence along fracture planes.
5915

- - - - - - - - - - - -

Core No. 14

5918-28 Rec. 9'

C. T. 20, 16, 12, 19, 20/ 19, 22, 20, 17, 15/

(Core No. 14)continued)

4'6" Limestone, medium brownish-gray, finely crystalline, massive, very hard, massive, except for few stylolitic partings, slight amount of intercrystalline porosity, faint oil odor, no stain, very weak spotted dull yellow fluorescence; no taste, slightly fossiliferous.

4'6" Limestone, light to medium brownish gray, finely crystalline, massive, hard, dense; trace of pyrite, fossiliferous. No Show.

- - - - - - - - - - -

Core No. 15

5928-38 Rec. 10'

C. T. 18, 15, 15, 17, 20/ 15, 14, 12, 15, 20/

10' Limestone, medium to dark brownish-gray, very fine to finely crystalline, with few thin streaks of medium crystalline, few thin, black shale partings, few black stylolitic partings, very hard, dense. No Show.

- - - - - - - - - - -

Core No. 16

5939-48 Rec. 10'

C. T. 19, 18, 18k 25, 22/ 23, 25, 25, 21, 21/

3' Limestone, dark brown-brownish gray, microcrystalline, with few scattered coarse crystals, few recemented fractures, very fossiliferous, entire unit very hard, dense, slight odor on fresh break. No Show.

1'6" Limestone, dark brownish-gray, amorphous to microcrystalline, very hard and dense, except for very few, tight fractures which are bleeding slight amount of oil, few black stylolites, no show in mass of unit.

5'6" Limestone, very dark brownish-gray, microcrystalline, with few scattered coarse crystals, few black stylolites, very slightly porous, no permeability, questionable oil odor on fresh break, slightly argillaceous in basal 6".

- - - - - - - - - - -

Core No. 17

5948-58 Rec. 10'

C. T. 15, 20, 25, 20, 25/ 25, 20, 23, 22, 25/

2' Limestone, very dark brown, amorphous to microcrystalline, scattered coarse crystals, hard and dense, except for few tight fractures, which have slight sulphur oil odor on fresh break, otherwise no show, fossiliferous.

(Core No. 17 continued)

1' Limestone, very dark brown, microcrystalline, scattered coarse crystals, hard, dense, except for singular, vertical fracture, sulphur odor on fresh break. No Show.

6'6" Limestone, very dark gray-black, amorphous, shaley, hard, dense, slightly pyritic, No Show.

6" Limestone, very dark gray-black, amorphous, dense, except for single vertical fracture covered with calcite crystals and having spotted brown stain and bright golden fluorescence on fracture plane, no show in mass of unit, extremely fossiliferous.

- - - - - - - - - - -

Core No. 18

5959-68 Rec. 10'

C. T. 20, 23, 19, 20, 20/ 18, 16, 20, 24, 16/

1'6" Limestone, very dark brownish gray, amorphous to microcrystalline, few thin black shale partings, one small fracture 6" long (No Show on fracture), fracture covered with calcite crystals, fossiliferous. No Show.

6'6" Limestone, medium brownish-gray, fine to medium crystalline, very hard, few thin tight fractures recemented with calcite, numerous crinoid stem fragments, fossiliferous. No Show.

2' Limestone, medium brownish-gray, fine to medium crystalline, very highly fractured to small fragments in bottom of unit, very fossiliferous with crinoid stem fragments. No Show.

- - - - - - - - - - -

CORE ANALYSIS REPORTS

Field East Poplar County Roosevelt State Montana

Well No. #3 Unit Location C SW NW 1-28N-51E

Formation Given Below Depths 2989'-5967'

Operator C. H. Murphy Corporation Date 6-16-52

WELL AND CORE DATA

Elevation, ft. 2204' KB Total Depth, ft. 5968'

Drilling Mud Gypsum Base Completion Depth, ft. 5616'

Formations Analyzed	Intervals, ft.
Muddy, 10¼ ft.	2989-3015
Piper, 7½ ft.	4438-4445½
Charles, 60 ft.	5600-5896
Madison, 31 ft.	5896-5967

Cores Analyzed:

Footages: as given above.
Number of Samples: 105

Sampling Data

Sampled by: C. H. Murphy Corporation
Duplicate Samples Retained: by Billings CORE-LAB

Type of Laboratory Analysis:

Oil & Water Saturation: X
Porosity: X
Permeability to Air: X
Connate Water
Liquid Permeability:
15% Acid Solubilites: X (11 samples from 5904'-5915')
Mud Acid Solubilites:
Vertical Permeabilities to Air:
Large Core Analysis: X (14 samples in Charles section, 5761'-5789')

SUMMARY OF DATA

Depths Feet	Interval Feet	Porosity Percent	Permeability Millidarcies	Saturation, % Pore Space Residual Oil	Water
		MUDDY			
2989-3015	10¼	17.2	36	0.6	72.3
		Probable Production-Water			
		PIPER			
4438-4445½	7½	4.3	-0.1	4.3	78.8
		Probable Production-None			
		UPPER CHARLES	A-4		
*5616½-5634	14	111.6	86	8.0	51.5
**Ommitted 5619½, 5620½, 5628½, 5629½. Hard tight limestone.					
		Probable Production-Oil & Water.			
		LOWER CHARLES			
*5742½-5775	17	8.6	3.7	12.6	46.4
*No samples from 5749½ to 5761 ft. Omitted 5743½, 5745½, 5747½, 5766-67 and 5773-74. Hard tight limestone. Omitted samples from 5775 through 5790 and 5895-96. Samples are hard and tight with no oil saturation.					
		Probable Production-Oil & Water?			
		MADISON			
*5909-5922	8	9.6	-0.1	27.2	47.0
*No samples from 5915-5918. Omitted samples 5918-19, 5919-20, and 5922-23 and samples from 5942 through 5967. Dense barren limestone. Although matrix permeability is less than 0.1 md. this section may pproduce oil by virtue of fracturing that is present. However, if fractures lead into water, water would be produced rather than oil. If fractures as indicated by laboratory samples are not present in the reservoir then probably no fluid would be produced in this section.					
		Probable Production-?			

ESTIMATED OIL RECOVERY

Summary of Core Data

Average Porosity, %	11.6
Average Permeability, millidarcies	86
Average Residual Oil Saturation, %Pore Space	8.0
Average Water Saturation, % Pore Space	51.5
Average Connate Water, % Pore Space	Estimated 35.0
Total Footage	14

Well and Crude Oil Data

Formation Volume Factor	
Shrinkage	Estimated 0.85
Gas-Oil Ratio, Cu. Ft. per bbl. stock tank oil	
Degrees API Gravity @ 60°F	
Bottom Hole Pressure @ ____ ft., lbs.	
Bottom Hole Temperature @ ____ ft., °F	
Elevation, ft.	2204' KB
Foratmion	Upper Charles

Volumetric Data

Pore Space per acre-foot, barrels	900
Connate Water per acre-foot, barrels	315
Reservoir Oil per acre-foot, barrels	585
Stock Tank Oil per acre-foot, barrels	497

Estimated Oil Recovery

Barrels per acre-foot	227
Barrels per acre	3178

Remarks:

The estimated oil recovery figure is based on the assumption that there is an active water drive in addition to a solution gas drive. This section has good permeabilities and should flow naturally. Water saturations are high and water will probably be produced.

ESTIMATED OIL RECOVERY

Summary of Core Data

Average Porosity, %	8.6
Average Permeability, millidarcies	3.7
Average Residual Oil Saturation, % Pore Space	12.6
Average Water Saturation, % Pore Space	46.4
Average Connate Water, % Pore Space	Estimated 35.0
Total Footage	17

Well and Crude Oil Data

Formation Volume Factor	
Shrinkage	Estimated 0.85
Gas-Oil Ration, Cu. Ft. per bbl. stock tank oil	
Degrees API Gravity @ 60°F	
Bottom Hole Pressure @ ___ ft., lbs.	
Bottom Hole Temperature @ ___ ft., °F	
Elevation, Ft.	2204' KB
Formation	Lower Charles

Volumetric Data

Pore Space per acre-foot, barrels	667
Connate Water per acre-foot, barrels	233
Reservoir Oil per acre-foot, barrels	434
Stock tank oil per acre-foot, barrels	369

Estimated Oil Recovery

Barrels per acre-foot	170
Barrels per acre	2890

Remarks:

The estimated oil recovery figure is based on the assumption that there is an active water drive in addition to a solution gas drive. This section is fairly tight and probably will require acidization to make commercial production. Water production is questionable.

CORE ANALYSIS REPORT

Field East Poplar County Roosevelt State Montana

Well No. 3 Unit Location C SW SW 1-28N-51E

Formation Muddy, Piper, Charles Depths 2989-5634

Operator C. H. Murphy Corporation Date 5-31-52

LABORATORY DATA

Sample Number	Depth Feet	Porosity Per Cent	Permeability Millidarcies	Saturation, % Pore Space Residual oil	Water	Remarks
1				MUDDY		
1	2989-90	13.8	41	Trace	68.3	
2	2990-91	16.0	120	6.4	58.6	
3	2991-91'9"	15.8	71	0	72.0	Vertical Fract.
4	2991-92	16.3	113	0	86.6	" "
5	3008½-10½	17.6	1.0	Trace	72.3	
6	3010½-12½	18.3	6.3	Trace	76.9	
7	3012½-15	18.7	11	0	70.0	
				PIPER		
8	4438-39	2.9	-0.1	6.6	86.2	Closed Vertical Fract.
9	4439-40	3.9	-0.1	2.8	87.2	Vert. Fract.
10	4440-41	6.0	-0.1	Trace	95.7	Closed Vert. Fract.
11	4441-42	2.3	-0.1	0	85.2	Closed Vert. Fract.
12	4442-43	6.8	-0.1	Trace	47.1	Vert. Fr.
13	4443-44	6.6	-0.1	Trace	78.8	Vert. Fr.
14	4444-45'6"	1.9	-0.1	20.5	71.1	" "
				CHARLES		
15	5600	5.5	-0.1	4.0	29.1	
16	5601	2.8	-0.1	7.9	35.7	
17	5602	4.0	-0.1	6.0	55.5	
18	5603	2.6	-0.1	8.1	37.7	
19	5616½	7.7	1.1	14.8	82.1	
20	5617½	11.4	22	12.7	40.0	
21	5618½	10.3	13	11.6	37.1	
22	5619½	13.7	-0.1	8.7	77.6	
23	5620½	9.6	-0.1	10.6	43.5	
24	5621½	10.0	12	4.8	33.3	
25	5622½	14.2	22	6.5	85.4	
26	5623½	13.8	12	3.2	48.8	
27	5624½	13.5	15	3.6	46.1	
28	5625½	12.7	22	5.2	55.1	
29	5626½	12.0	98	5.9	83.3	
30	5627½	9.3	57	7.1	20.4	
31	5628½	1.4	-0.1	15.0	68.6	
32	5629½	5.0	-0.1	9.4	52.0	
33	5630½	9.1	5.0	4.8	19.8	
34	5631½	15.0	544	9.5	52.5	
35	5632½	12.9	366	15.8	55.3	
36	5634	10.5	19	6.3	61.0	

CORE ANALYSIS REPORT

Field East Poplar County Roosevelt State Montana

Well No. 3 Unit Location C SW SW 1-28N-51E

Formation Charles Depths 5742½'-5790'

Operator C. H. Murphy Corporation Date 5-31-52

Sample Number	Depth Feet	Porosity Per Cent	Permeability Millidarcies	Saturation, % Pore Space Residual Oil	Water	Remarks
37	5742½	12.0	4.4	20.2	42.4	Top B-1
38	5743½	12.0	-0.1	9.0	67.3	
39	5744½	8.9	0.7	22.0	37.4	
40	5745½	1.0	-0.1	0	96.0	
41	5746½	3.9	2.5	5.9	85.4	
42	5747½	6.7	0.1	15.8	19.7	
43	5748½	11.7	4.1	9.1	24.2	= 36.1
44	5749½	12.0 = 10.55	2.5 = 1.98	21.3 = 16.2	25.7	
* 45	5761-62	7.8	1.17	8.1	36.9	Top-B-2
* 46	5762-63	14.9	2.79	14.0	49.4	
* 47	5763-64	12.2	4.14	20.2	27.3	
48	5764-65	9.5	6.6	11.1	81.5	
* 49	5765-66	3.2	4.56	20.3	76.1	Total B-2 Column 128.433 oil 35.7 Lost
50	5766-67	2.2	-0.1	19.1	77.3	
* 51	5767-68	8.7 = 7.6	0.30	3.8	29.3	
* 52	5768-69	6.5	2.45	11.5	48.9	
* 53	5769-70	3.4	1.06 = 2.57	6.2 = 12.7	66.5	= 54.8
* 54	5770-71	6.8	10	6.2	42.4	
55	5771-72	6.7	1.2	13.0	63.1	
56	5772-73	11.4	3.1	17.5	26.3	
57	5773-74	5.3	-0.1	13.0	82.3	
* 58	5774-75	7.1	1.14	3.1	25.9	
* 59	5775-76	2.0	0.23	Trace	91.0	
* 60	5776-77	0.3	-0.01	Trace	96.0	
61	5777-78	1.9	-0.1	Trace	94.7	Vert. Fr.
62	5778-79	9.8	0.2	4.5	26.5	
63	5779-80	9.3	-0.1	Trace	8.9	
* 64	5780-81	0.4	50	Trace	94.5	B-3 Produced 61 BOPD + 347 BWPD. did not produce
* 65	5781-82	0.5	38	0	91.2	
66	5782-83	15.5	-0.1	0	90.3	Broken Sample
67	5783-84	17.1	0.2	0	83.0	" "
68	5784-85	17.1	-0.1	Trace	86.4	" "
69	5785-86	15.6	-0.1	0	88.7	Open Vert. Fr.
70	5786-87	13.5	-0.1	0	87.1	" " "
71	5787-88	14.0	-0.1	0	80.9	" " "
* 72	5788-89	8.0	688	0	87.0	" " "
73	5789-90	0.8	-0.1	0	75.0	

* Samples analyzed by the large core method.

CORE ANALYSIS REPORT

Field East Poplar County Roosevelt State Montana

Well No. 3 Unit Location C SW SW 1-28N-51E

Formation Charles and Madison Depths 5895'-5967'

Operator C. H. Murphy Corporation Date 5-31-52

LABORATORY DATA

Sample Number	Depth Feet	Porosity Per Cent	Permeability Millidarcies	Saturation, % pore space Residual Oil	Water	Remarks
74	5895-96	3.5	-0.1	0	46.6	
				MADISON?		
75	5896-97	0.7	-0.1	0	54.3	
76	5897-98	0.8	-0.1	0	46.3	Open vert. fr.
77	5898-99	2.2	-0.1	0	64.5	
78	5899-5900	1.2	-0.1	0	83.3	
				MADISON		
79	5900-01	1.4	-0.1	0	39.9	Closed vert. fr.
80	5901-02	1.0	-0.1	0	65.0	" " "
81	5902-03	3.8	-0.1	0	95.0	" " "
82	5903-04	4.1	-0.1	0	97.6	" " "
83	5904-05	2.6	-0.1	Trace	92.3	2 Open " "
84	5905-06	1.3	-0.1	Trace	50.0	2 Open " "
85	5906-07	1.7	-0.1	25.9	58.8	4 Open " "
86	5907-08	1.0	-0.1	Trace	88.0	4 Open " "
87	5908-09	0.9	-0.1	0	97.8	2 Open " "
88	5909-10	8.7	-0.1	38.4	57.5	2 Open " "
89	5910-11	10.9	-0.1	43.9	39.5	
90	5911-12	11.0	-0.1	31.7	51.6	
91	5912-13	8.7	-0.1	36.2	41.1	Open " "
92	5913-14	10.4	-0.1	9.9	30.2	Open " "
93	5914-15	11.0	-0.1	28.4	34.1	2 Open " "
94	5918-19	6.6	-0.1	Trace	18.2	
95	5919-20	9.7	-0.1	Trace	40.0	
96	5920-21	8.5	-0.1	20.0	43.4	
97	5921-22	7.7	-0.1	8.8	78.4	
98	5922-23	8.1	-0.1	0	55.6	
99	5942	1.1	-0.1	0	70.0	
100	5945	2.8	-0.1	7.5	30.4	
101	5949	1.7	-0.1	0	94.1	
102	5947½	1.2	-0.1	0	83.3	
103	5958½	1.3	-0.1	0	33.1	
104	5963½	1.3	-0.1	Trace	38.5	
105	5967	1.1	-0.1	0	34.5	

NOTE: Cores described as received in laboratory.

CORE ANALYSIS REPORT

Field East Poplar County Roosevelt State Montana

Well No. 3 Unit Location C SW NW 1-28N-51E

Formation Charles Depths 5761-89'

Operator C. H. Murphy Corporation Date 7-9-52

LABORATORY DATA

Sample Number	Depth Feet	Porosity Per Cent	Permeability Millidarcies	Saturation, %pore space Residual Oil	Water	Remarks

COMPARISON OF ROUTINE AND FULL DIAMETER CORE ANALYSIS

		Permeabilities Routine	Permeabilities F.D.	Porosities Routine	Porosities F.D.
45	5761-62	-0.1	1.2	8.2	7.8
46	5762-63	5.3	2.8	15.3	14.9
47	5763-64	2.8	4.1	13.6	12.2
49	5765-66	-0.1	4.5*	2.5	3.2
51	5767-68	-0.1	0.3*	9.7	8.7
52	5768-69	1.8	2.5	6.6	6.5
53	5769-70	-0.1	1.1	6.1	3.4
54	5770-71	-0.1	10	4.2	6.8
58	5774-75	0.6	1.4	7.5	7.1
59	5775-76	-0.1	0.2	2.5	2.0
60	5776-77	-0.1	-0.1*	0.6	0.3
64	5780-81	-0.1	50*	0.6	0.4
65	5781-82	-0.1	38*	0.8	0.5
72	5788-89	286	688**	15.0	8.0

* Note: Full diameter samples broken while preparing samples for analysis. These samples were broken so that there was an open vertical fracture throughout the sample. In the case of samples No. 64 and 65, the fractures were close enough to the center hole drilled in it to give it some permeability. These samples did not have any fractures when sent in for analysis.

**Sample No. 72 had an open vertical fracture near the center of core when sent in for full diameter analysis. Routine plug was cut with fracture in center of it and the lower permeability obtained is due to the fact that the small plug can be squeezed together in the core holder tightly whereas in full diameter analysis the pieces are wired together.

Remarks: After accounting for the broken samples the full diameter results check the routine results fairly well.

CORE ANALYSIS REPORT

Well No. Unit #3 Formation Charles Depths 5761-5772' Date June 10, 1952

FULL DIAMETER CORESTUDY

Sample Number	Representative of Feet	Footage	Permeability Radial	Effective Porosity	Density Bulk	Density Matrix	Description
1	5761-62	1	1.17	7.8	2.56	2.77	NF
2	5762-63	1	2.79	14.9	2.32	2.71	NF
3	5763.64	1	4.14	12.2	2.41	2.74	VF - ali. vuggy
4	5765-66	1	4.56	3.2	2.62	2.70	VF-tight
5	5767-68	1	0.30	8.7	2.48	2.71	VF-tight
6	5768-69	1	2.45	6.5	2.52	2.70	SVF-tight
7	5769-70	1	1.06	3.4	2.63	2.72	SVF-tight
8	5770-71	1	10	6.8	2.51	2.69	VF-tight
9	5774-75	1	1.44	7.1	2.50	2.70	SVF-vuggy
10	5775-76	1	0.23	2.0	2.64	2.69	SVF-tight vuggy
11	5776-77	1	-0.01	0.3	2.73	2.74	VF-tight
12	5780-81	1	50	0.4	2.72	2.73	VF-tight cracked
13	5781-82	1	38	0.5	2.79	2.80	SVF-tight
14	5788-89	1	688	8.0	2.46	2.67	OVF-tight

CORE ANALYSIS REPORT

Well No. 3 Formation Madison Depths 5904-15 Date 5-26-52

LABORATORY DATA

Sample Number	Depth Feet	Porosity Per Cent	Permeability Millidarcies	Saturation, % Pore Space Residual Oil	Water	Remarks
		% Solubility 15% HCl Acid				
83	5904-05	90.3				
84	5905-06	87.6				
85	5906-07	93.4				
86	5907-08	86.7				
87	5908-09	94.4				
88	5909-10	92.8				
89	5910-11	92.7				
90	5911-12	90.7				
91	5912-13	94.0				
92	5913-14	38.8				
93	5914-15	87.3				

Average Solubility 86.2%

DRILL STEM TESTS

DST #1, 5600-5626, straddle packers, ½" bottom choke, ¼" top choke; no water cushion; Tool open 30 minutes with strong blow, 2# TFP ¼" choke; closed 10 minutes. Recovered: 2222' total fluid in the following order: 281' clean 41° gravity oil, 496' mud, cut with oil and gas, 825' clean oil, 279' oil, cut with mud, 341' muddy salt water. IBHFP: 350# FBHFP: 900# SIP: 2975# Hydro: 3425#. A-ST4 produced

---

DST #2, 5740-60, 5/8" bottom choke; no water cushion; Halliburton Tool; Tool open 15 minutes with fair blow, then to strong blow for 30 minutes; closed 10 minutes. Recovered gas 8 stands off bottom. Pipe dripped oil from 6 stands off bottom. Recovered 1 stand fluid-91' mud cut with salt water, gas and very little oil. IBHFP: 465# FBHFP: 465# SIP: 2370# Hydro: 3170#.

DST #3, 5740-51, straddle packers, Johnston Tool, ½" bottom choke; no water cushion; tool open with weak blow for 23 minutes, then strong blow for 37 minutes; closed 10 minutes. Recovered 426' gas, 91' mud, cut with salt water, gas and trace of oil. IBHFP: 75# FBHFP: 100# SIP: 2800# Hydro: 3675#. B-1

DST #4, 5760-75, ½" bottom choke, no water cushion; tool opened with weak blow for 3 minutes, increasing to strong blow for 27 minutes; tool open 30 minutes, closed 10 minutes. Recovered 455' oil cut with mud, 122' dark muddy salt water. IBHFP: 190# FBHFP: 250# SIP: 2850# Hydro: 3300#. (Recovered gas 1274' off bottom). B-2

DST #5, 5758-66, ½" bottom choke, no top choke; no water cushion; tool open 1 hour, open with strong blow decreasing to good blow at end of hour. Closed 20 minutes. Recovered 716' oil, 165' mud and brackish water, and gas 37 stands from bottom. IBHFP: 0 FBHFP: 275# SIP: 2900# Hydro: 3400#. B-2

DST #6, 5896-5918, ½" bottom choke; no water cushion; open 1 hour, weak blow throughout; reset tool twice; closed 20 minutes. Recovered 182' mud, slightly cut with oil, fairly gassy. IBHFP: 50# FBHFP: 60# SIP: 3050# Hydro: 3425#. C-1

DST #7, 5938-5968, ½" bottom choke; no water cushion. Tool open 1 hour, strong blow throughout; closed 15 minutes. Recovered 1000' mud, cut with water and gas, 2094' salt water with show of gas. IBHFP: 400# FBHFP: 1775# SIP: 3100# Hydro: 3500# Chlorides: 31,500 PPM, Total Salts: 51,975 PPM. C-3

(DRILL STEM TESTS continued)

DST #8, 5907-12, (through perforations), packer set at 5901, ¼" bottom choke; no water cushion; tool open 11:07 AM, 5-8-52, open 17 hours, 38 min. weak blow; gas to surface 10 hours, 32 minutes; oil to surface 14 hours, 47 minutes; oil flowed stream approximately the size of lead pencil with no top choke; rate of flow 1.6 barrels per hour; closed 20 minutes. Recovered: 4010' 35.2° gravity dirty oil, 610' mud, cut with oil, gas and salt water, 1281' salty sulphur water, chlorides 20,000 PPM. IBHFP: 0 FBHFP: 2300# SIP: 3100# Hydro: 3550#. C-2

DST #9, Perforations 5892-5904, tool open 8:49 AM, 5-31-52, good blow 3 min., weak blow 2 minutes, no blow for 10 minutes. Reset tool twice, with approximately the same results. Dry Tested. Acidized with 500 gals. under Baker sq. tool, flowed load wt. at rate of 4½ barrels per hour, almost stopped flowing and started making little oil at 8 AM, flowed at rate of 3½barrels per hour. Total fluid 60% sulphur water, 40% oil. Well flowed at average rate of 3 barrels fluid per hour overnight, average 60% water (30,000 ppm chloride) and 40% oil. C-1

DST #10, Tested bridge plug at 5850' with 10' of cement on top, for leaks-- dry test.

DST #11, Tested perforations 5599-5616; packer set at 5584'. Tool open 7:15 PM, 6-5-52, open for 7 hours, 45 minutes. Gas to surface in 25 min., fluid to surface in 54 minutes; flowed at rate of 450 BOPD on ¼" choke. Closed 30 minutes. IBHFP: 110# FBHFP: 2220# BHSIP: 3125# Hydro: 3250#. A-3

WATER ANALYSIS REPORT

Well No. 3 Formation Upper Charles Depths 5600'-5626' DST No. 1

Date Analyzed 5-17-52 Other Data Muddy sample. Disagreeable odor. Filtrate clear and colorless. No hydrogen sulfide present. Organic matter present.

Constituents	PPM	MEQ.	MEQ. %
Sodium	73,313	3188.92	48.03
Calcium	2,265	113.02	1.70
Magnesium	218	17.92	0.27
Sulfate	4,610	95.89	1.44
Chloride	114,160	3219.31	48.49
Carbonate	0	0	0
Bicarbonate	284	4.66	0.07
Hydroxide	0	0	0

Total Solids in Parts per Million

By Evaporation 198,068
After ignition 195,348
Calculated 194,706

pH 5.8
Specific gravity @ 60°F 1.136
Resistivity @ 68°F
ohm/meter^3 Actual 0.062
Calc. 0.068

Well No. 3 Formation Lower Charles Depths 5760-5775 DST No. 4

Date Analyzed 5-27-52 Other Data Clear water sample. Some organic matter present.

Constituents	PPM	MEQ.	MEQ. %
Sodium	43,510	1892.57	47.37
Calcium	1,736	86.63	2.17
Magnesium	225	18.50	0.46
Sulfate	3,735	77.69	1.94
Chloride	67,840	1913.09	47.89
Carbonate	0	c 0	0
Bicarbonate	422	6.92	0.17
Hydroxide	0	0	0

Total Solids in Parts per Million

By evaporation 119,520
After ignition 118,350
Calculated 117,255

pH 6.2
Specific gravity @ 60°F 1.086
Resistivity @ 68°F
ohms/meter^3 0.085

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

C O M P L E T I O N D A T A

Production casing: ran 5½" OD, 15.50#, J-55, seamless casing to 5957'; cemented 250 sacks common cement and 5 sacks aquagel. Plug down at 10:25 A.M., 5-25-52. Temperature survey showed top cement at 4650'. Tested casing for leaks with 1000# pressure. Perforated from 5907-5912 with 6 bullets per foot; ran Drill-Stem Test No. 8 on perforations 5907-5912; squeezed perforations 5907-5912 with 50 sacks, and with Model K Baker Retainer, set at 5904'. Perforated with 48 jet shots from 5892 to 5904'; ran Drill Stem Test No. 9 on perforations 5892 to 5904' with packer set at 5886', dry test; acidized with 500 gallons, break-down pressure 3000#. Well flowed 22 hours at the rate of 3 BPH, 60% S.W. and 40% oil. Plugged Madison Zone off with bridge plug, set at 5850, and 10 feet of cement, 5840 to 5850, and ran Drill Stem Test No. 10 to test plug for leaks, dry test. Perforated 4 jet shots per foot, 5599-5616, and ran Drill Stem Test No. 11 to test perforations 5599-5616, packer set at 5584'. Well flowed at the rate of 450 barrels per day on ¼" top choke. Ran 2 3/8" tubing with 3 ft. perforated nipple at 5615; installed Xmas tree and circulated hole with water, 6-5-52. Flowed well into burning pits until 3:15 P.M., 6-7-52.

Tank gauges as follows:

Prod. ¼" choke:	80.67 bbls in 11 hrs,	Tbg. Press:	30#
		Csg. Press:	200#
Prod. 12/64" chbke:	271.20 bbls in 4 hrs,	Tbg. Press:	100#
		Csg. Press:	250#
Prod. 12/64" choke:	108.28 bbls in 16 hrs,	Tbg. Press:	100#
		Csg. Press:	390#

SUMMARY OF COMPLETION DATA

Casing: 5945' of 5½", set @ 5957' w/ 250 sacks cement.

Tubing: 183 joints 2 3/8" J-55 E.U.E. w/3 ft. perforated nipple at 5615'.

Packers: Set Baker Model "K" Retainer at 5904'

Perforations: 5906-11 Lane-Wells = 5907-12 Schlumberger, w/30 bullets; 5892-5904 Schlumberger w/48 jet shots per foot; 5599-5616 Schlumberger w/4 jet shots per foot.

Acid: 500 gallons in "C" Zone.

Type Completion: Single; "A" Zone through tubing.

P R O D U C T I O N T E S T D A T A

Note: See completion data page for initial production figures.

- - - - - - -

DAILY PRODUCTION RECORD

East Poplar Unit #3

August, 1952

Tubing Production, "A" Zone

Date	Choke	BS&W	Fluid	Water	Oil	Tbg. Press.	Csg. Press.
1	12/64	14.0	64.07	8.97	55.10	25#	375#
2	12/64	14.0	57.42	8.04	49.38	25#	400#
3	20/64	18.0	85.66	15.42	70.23	50#	400#
4	20/64	18.0	85.66	15.42	70.24	50#	400#
5	20/64	4.0	73.17	2.93	70.24	50#	375#
6	20/64	2.0	71.67	1.43	70.24	50#	375#
7	20/64	14.0	94.24	13.19	81.05	50#	375#
8	20/64	14.0	257.99	36.12	221.87	50#	375# Test Oil
9	20/64	13.0	59.28	7.71	51.57	50#	375#
10	20/64	20.0	93.90	18.78	75.12	50#	375#
11	20/64	11.0	90.46	9.95	80.51	50#	375#
12	20/64	4.0	115.99	4.64	111.35	50#	400#
13	20/64	12.0	89.46	10.73	78.73	50#	400#
14	20/64	18.0	115.47	20.78	94.69	75#	400#
15	20/64	14.0	110.11	15.41	94.70	75#	400#
16	20/64	14.0	109.55	15.34	94.21	75#	425#
17	20/64	16.0	113.22	18.11	95.11	75#	425#
18	20/64	15.0	84.98	12.75	72.23	75#	425#
19	20/64	12.0	106.73	12.81	93.92	50#	400#
20	20/64	18.0	127.51	22.95	104.56	50#	400#
21	20/64	18.0	68.22	12.28	55.94	50#	400#
22	20/64	14.0	67.02	9.38	57.64	50#	400#
23	20/64	12.0	75.61	9.07	66.54	50#	400#
24	20/64	12.0	106.43	12.77	93.66	50#	400#
25	20/64	14.0	108.16	15.14	93.02	40#	400#
26	20/64	-	5.14	- -	5.14	900#SI	900# SI
27	20/64	40.0	35.78	14.31	21.47	50#	375#
28	20/64	14.0	140.13	20.21	20.11	50#	375#
29	20/64	-	44.25	- -	44.25	900#SI	925# SI BHP
30	-	-	-	- -	- -	900#SI	925# SI BHP
31	20/64	8.0	14.17	1.13	13.04	50#	500#
			2671.45	365.58	2305.87		
Tank Table Adjust.			1.28-		1.28-		
			2670.17	365.58	2304.59		
Average:	19/64	17.0	95.36	13.06	82.31	52#	397#

SAMPLE DESCRIPTION

1500-1600	Shale, gray, slightly silty, slightly calcareous.
1600-1620	Silt, gray.
1620-1640	Shale, gray, slightly silty, slightly calcareous.
1640-1660	Shale, gray, slightly silty, slightly calcareous; trace of very fine grained sandstone.
1660-1740	Shale, gray, slightly silty, slightly calcareous.
1740-1760	Shale, gray, silty to sandy, slightly calcareous.
1760-1780	Shale, gray, silty to sandy, slightly calcareous; trace of white, very fine grained sandstone.
1780-1800	Shale, gray, silty to sandy, slightly calcareous.
1800-1820	No Sample.
1820-1840	Siltstone, gray-brown; some gray shale.
1840-1860	Shale, gray, very silty; trace of brown shale.
1860-1900	Silt, gray; very fine grained sandstone; some gray shale; trace of brown shale; slight trace of bentonite.
1900-1940	Silt, gray; and silty shale; trace of bentonite; trace of brown shale.
1940-1980	Silt, gray; and silty shale; some bentonite.
1980-2080	Silt, gray; and silty shale; some bentonite; slight trace of brown shale.
2080-2160	Shale, gray, silty; some calcareous speckled(white on brown) shale; Trace of white bentonite; trace of white calcite.
2160-2180	Shale, gray, silty; trace of white calcite.
2180-2200	Shale, gray, silty-sandy; trace of white bentonite.
2200-2280	Shale, gray, silty; trace of white bentonite.
2280-2360	Shale, gray, silty, some sandy; trace of white bentonite.
2360-2430	Shale, dark gray to black; some loose silt; trace of bentonite.
2430	Sample Top Greenhorn.
2430-2450	Shale, very dark gray to black, very calcareous;and, light tan, fine to medium crystalline, slightly porous limestone.

SAMPLE DESCRIPTION

2450-2470 Shale, dark gray; trace of some black, very calcareous shale; slight trace of buff, dense limestone.

2470-2560 Shale, black, very calcareous, with trace of white specks; some dark gray, shale.

2560-2600 Shale, brownish-black, very calcareous.

2600-2620 Shale, black, slightly calcareous.

2620-2660 Shale, dark gray to black, some trace of calcareous shale.

2660-2700 Shale, very dark gray.

2700-2710 Shale, very dark gray; slight trace of pyrite.

2710-2770 Shale, very dark gray.

2770-2810 Shale, very dark gray, slightly calcareous.

2810-2830 Shale, very dark gray, hard; slight trace of white, fine grained, glauconitic sand.

2830-2870 Shale, very dark gray, hard, trace of slightly calcareous shale.

2870-2910 Shale, very dark gray to black, hard.

2910-2955 Shale, very dark gray to black, hard; few pieces of tan glauconitic silt and very fine grained sand.

2955 = 2945 S.L.M.

2955-2978 Core No. 1.

2978-3015 Core No. 2.

2988 Sample Top Muddy.

3015-3020 Sand, very light gray, fine grained, slightly porous, slight glauconitic; some gray shale.

3020-3060 Shale, dark gray; trace of very light gray, fine grained, slightly porous, slightly glauconitic sand.

3060-3090 Shale, dark gray.

3090-3140 Sand, very light gray, to gray, slightly porous to porous, slightly glauconitic to glauconitic.

3140-3150 Shale, dark gray.

3150-3180 Shale, dark gray; some dark gray silt.

3180-3190 Shale, dark gray; and white to gray silt; very fine grained sandstone.

SAMPLE DESCRIPTION:

3190-3200	Shale, dark gray; some white, fine grained, tight sand; some gray, brown silt.
3200-3210	Silt, light brownish-gray; very fine graind sand; some black shale.
3210-3220	Shale, light to dark gray and silty shale; some silt.
3220-3230	Silt, very light gray; some dark gray shale.
3230-3240	Silt, white to gray.
3240-3250	Silt, white to gray;some dark gray shale.
3250-3270	Silt, white; very fine grained, micaceous sand.
3270-3280	Sand, white, very fine to fine grained, porous, micaceous.
3280-3290	Silt, white; very fine grained sand.
3290-3310	Sand, white, very fine to fine grained, porous, micaceous.
3310-3330	Sand, white, very fine to fine grained, porous, micaceous; and gray shale.
3330-3340	Silt, gray, and silty shale; trace of white sand.
3340-3470	Shale, dark gray, pyritic; trace of white, fine to medium grained porosity, friable sand.
3470-3510	Shale, dark gray, pyritic; some loose, fine to coarse grained sand.
3510-3520	Shale, gray.
3520-3530	Shale, gray; trace of loose, medium to coarse grained sand.
3530-3540	Sand, loose, medium grained, sub-angular to sub-rounded.
3540-3560	Shale, gray; some white to light gray silt to very fine grained sand; trace of loose, medium grained sand.
3560-3610	Shale, dark gray; some white, fine to medium grained, porous sand.
3610-3650	Shale, dark gray; trace of dark gray silt.
3650-3680	Sand, white to very light gray, fine grained, slightly porous, slightly calcareous, glauconitic, micaceous.
3680-3700	Shale, very dark gray; slight trace of white, glauconitic, slightly calcareous sand.
3700-3710	Shale, very dark gray; trace of light gray, very fine grained, tight, slightly calcareous, glauconitic sand.

SAMPLE DESCRIPTION

3710-3730	Sand, white to very light gray, very fine to fine grained, slightly calcareous, glauconitic, slightly porous.
3730-3740	Sand, as above and gray to dark gray shale.
3740-3780	Shale, gray and very dark gray shale; trace of very light gray, glauconitic sand.
3780-3800	Shale, gray and very dark gray shale.
3800-3820	Shale, as above; trace to some white, fine grained, glauconitic sand.
3820-3840	Shale, as above.
3840-3850	Shale, very dark gray, slightly splintery.
3850-3880	Shale, as above; trace of white, very fine grained, glauconitic sand; trace of light gray siltstone.
3880-3930	Shale, very dark gray; trace of light gray siltstone, slight trade of white, very fine grained, glauconitic sand.
3930-3980	Shale, medium to dark gray.
3980	Sample Top Ellie.
3980-4000	Shale, as above; trace to some light buff, very fine grained, slightly calcareous, glauconitic, slightly porous sand.
4000-4010	Shale, as above, and white slightly calcareous, silt to very fine grained sand.
4010-4040	Sand, white, very fine to fine grained; some dark gray shale.
4040-4060	Shale, medium to very dark gray; trace to some white to light gray, silt to fine grained, glauconitic sand.
4060-4090	Shale, medium gray, sub-waxy.
4090-4130	Shale, medium to dark gray, sub-waxy, slightly calcareous; trace of light gray to tan, silt to very fine grained sand.
4130-4160	Shale, light to medium gray, waxy.
4160-4190	Shale, slightly greenish-gray, waxy, slightly calcareous; trace of gray, silty sand.
4190-4200	Shale, as above; trace of tan to light gray, silty to very fine grained sand.
4200-4210	Shale, as above; trace to some tan to light gray, silty to very fine grained, calcareous sand; few pieces of tan limestone.

SAMPLE DESCRIPTION

4210-4220	Shale, as above; trace of white to tan, very fine grained sand.
4220-4230	Shale, as above; sand as above; trace of brown dense limestone.
4230-4340	Shale, as above; some to trace of light brownish-gray, calcareous, siltstone.
4340	Sample Top Piper Shale.
4340-4390	Shale, as above; some to slight trace of brick red shale; few pieces crystalline anhydrite.
4390-4410	No Sample.
4410-4460	Core No. 3.
4460-4470	Shale, slight greenish-gray, waxy; slight trace of red shale; trace of limestone.
4470-4480	Limestone, tan, argillaceous, dense, massive, some greenish-gray shale.
4480-4560	Shale, slightly greenish-gray, waxy, splintery, slightly calcareous; slight trace of brick-red shale.
4560-4580	Shale, as above; trace to some white to very light gray, dense limestone.
4580-4620	Shale, dark greenish-gray, slightly calcareous; some red silt and shale; some white to tan, massive, dense limestone.
4620-4670	Shale, as above; slight trace of greenish-white, very fine grained sand.
4670-4740	Shale, greenish-gray, waxy, slightly calcareous; some brick-red silt to very fine grained sand and shale.
4740-4770	Shale, greenish-gray, waxy, slightly calcareous; some brick-red, anhydritic silt to very fine grained sand.
4770-4840	Shale, as above; some dark purple shale; few pieces of light gray-to-pink dolomite; trace of brick-red anhydritic silt to very fine grained sand.
4840-4880	Limestone, tan-brown, dense, massive; some greenish-gray shale; trace of purple shale.
4880-4890	Shale, as above; trace to some dense limestone.
4890-4900	Shale, brick-red and purple; some greenish-gray shale; trace to some tan to purple dolomite.
4900-4930	Limestone, tan microcrystalline, dense; some greenish-gray shale; some purple shale.
4930-4940	Shale, red and purple; some greenish-gray shale; trace of limestone.

SAMPLE DESCRIPTION

4940-4970 Shale, as above; some to trace of dark-red, fine-grained, tight sand.

4970-4990 Shale, as above; sand as above; trace of tan limestone.

4990-5000 Shale, purple, red, brown, and lavender; some greenish-gray shale.

5000-5010 Same as above; slight trace of red, fine-grained sand.

5010-5050 Sandstone, red, fine to medium grained, sub-angular to sub-rounded, porous; some red-purple and greenish-gray shale.

5050-5060 Shale, rust-red, purple, lavender, brown, greenish-gray; slight trace of tan, dense limestone.

5060-5070 No Sample.

5070-5080 Shale, greenish-gray, purple, reddish-brown; trace of tan shale.

5080-5090 Shale, as above; and bright green shale.

5090-5130 Shale, as above; some light tan, dense, massive, fossiliferous limestone.

5130-5150 Limestone, light gray-brownish-gray, dense, massive; trace-to-some white to buff, medium-oolitic, dense limestone with few loose oolites; some greenish-gray shale; trace of purple and reddish-brown shale.

5150-5155 Shale, greenish-gray, purple and reddish-brown; some dull gray, dense, limestone; some tan to brown, pseudo-oolitic limestone; trace of oolitic limestone.

5155-5195 Shale, greenish-gray, very calcareous; purple and reddish-brown shale; slight trace of tan, dense, fossiliferous limestone.

5195-5200 Shale, greenish-gray, splintery; some reddish-brown, purple and lavender shale; some light gray, dense dolomite.

5200-5205 Dolomite, very light gray to medium gray, dense, massive, calcareous; some greenish-gray shale; some reddish shale.

5205-5225 Same as above with slight trace of rust-red, argillaceous sand and sandy shale.

5225-5245 Silt to very fine grained, bright, rust-red, tight; trace-to-some greenish-gray shale; trace of red shale.

5245-5255 Some silt to very fine grained, bright rust-red, tight; and white, dense, hard, slightly sandy limestone; some greenish-gray shale.

5255-5260 No Sample.

5260-5350 Sand, white to pink, fine to medium grained, sub-rounded, porous; some greenish-gray, red and purple shale.

5350-5355 No Sample.

SAMPLE DESCRIPTION

5355-5385	Core No. 4.
5385-5410	Limestone, very light gray, dense, massive, fossiliferous; some rust-red and purple shale; some greenish-gray shale; some very light grayish lavender, very fine to fine grained, tight sand.
5410-5455	Silt, to very fine grained sand, white-red, slightly anhydritic, some greenish-gray and brick-red shale.
5455-5470	Same as above with slight trace of limestone.
5470-5495	Shale, greenish-gray, brick-red, and purple; some light red, very anhydritic silt.
5495-5500	No Sample.
5500-5539	Core No. 5.
5539-5596	Core No. 6.
5596-5655	Core No. 7.
5655-5714	Core No. 8.
5714-5731	Core No. 9.
5731-5760	Core No. 10.
5760-5819	Core No. 11.
5819-5821	No Recovery.
5821-5880	Core No. 12.
5880-5918	Core No. 13.
5918-5928	Core No. 14.
5928-5938	Core No. 15.
5938-5948	Core No. 16.
5948-5758	Core No. 17.
5958-5968	Core No. 18.

Total Depth: 5968' Driller.

S+T
EPU #3
37 pages
1952-1968

Service & Testing

WORKOVER HISTORY NO. 1

Date February 17, 1957

Lease and Well No. East Poplar Unit Well No. 3

Field East Poplar Unit County Roosevelt State Montana

Well Location C SW SW Section 1, T28N, R51E.

Status prior to present job:

Date Completed: June 7, 1952 Date Last Workover None Total Depth 5968' PBTD 5840' Producing Zone "A" Zone of Madison formation

Perforations 5599-5616' with 4 j.s.p.f. Cumulative Production 23,654 bbls oil; 7,311 bbls water Latest Test: 75 BOPD with 8-30% water

Justification for Workover:

1. Increase oil production.
2. Oil production increase will help reduce paraffin accumulations in tubing and flow line.
3. Additional information for evaluating the potentialities of the A zone.

Summary of Workover:

11-3-54: PBTD 5840'. Treated "A"-3 zone through perforations 5599-5616' with 500 gallons Howco MCA. Broke formation with 2800#, washed formation with 6 stages. Over-flushed 27 barrels. Bleed down pressure 900#. Spent acid to surface in 20 minutes, well cleaned up in 45 more minutes. Tested in tank battery on 1/8" choke. Well made 140 barrels of oil and 79 barrels of water in 24 hours. TFP-600#. CFP-775#.

Re-cap of Workover:

1. Perforations 5599-5616 (unchanged)
2. Total Depth - 5968' (unchanged) PBTD 5840' (unchanged).
3. Initial Potential after workover - 120 BOPD w/10 to 36% water.
4. Name of Producing zone - A Zone of Madison Formation (unchanged).
5. Downhole equipment - 1023.03' of 9 5/8" casing; 5945' of 5 1/2" casing; 5615' of 2 3/8" tubing. Bridge plug set at 5850'. Baker Model K cast iron retainer at 5904'.

Results of Workover:

Oil production was increased from 75 BOPD w/ 8-30% water to 120 BOPD w/ 10 to 36% water. Workover successful.

WORKOVER HISTORY NO. 2

September 9, 1958

Well Lease and Number: East Poplar Unit Well No. 3

Field: East Poplar County: Roosevelt State: Montana

Well Location: SW NW Section 1, T28N, R51E

Status Prior to Present Job:

Date Completed: June 7, 1952 Date of Last Workover: November 3, 1954 Sept. 9 1958

T.D.: 5968' PBTD: 5840' 5774' Producing Zone: "A" Zone of Madison Formation B Zone

Perforations: 5599'-5616' 5760-5770' Cumulative Production of Present Zone: 97,930 124,410

BO: 175,059 BW: 317,133 Latest Test: Flowing 211 BFPD, 87% water (27 BOPD, 184 BWPD) May 3, 1963 269 89 30 239

Justification for Workover: The "A" Zone water cut had increased to 87% and oil production had dropped to 24 BOPD and the "A" Zone required squeezing to shut off the perforations that were open in "A-4" Zone (oolitic) to lower water cut. To economically deplete the "B-3, 2 & 1" Zones, perforated and depleted each zone individually starting with the "B-3" Zone before recompleting at a higher interval in the "A" Zone.

Summary of Workover:

8-21-58 PBTD 5840' - Workover to squeeze "A-3 & 4" Zone and recomplete in "B-3" Zone. Hauled mud from EPU 18, killed "A" Zone with 10.2# mud. Surface casing had 300# pressure, bleed off gas and very black crude oil -- approximately 3 barrels. Saved sample to check source of crude. Moved in pulling unit.

8-22-58 PBTD 5840' - Ran full bore packer and set at 5632', tested bridge plug at 5850' with 3500#, held ok. Reset tool at 5581', tested casing and head to 2500#, held ok. Broke formation with 2700#, squeezed "A" Zone perforations 5599'-5616' with 75 sacks regular cement with HR-4 retarder with 2 barrels water ahead. Squeezed 2 barrels cement into formation, casing and tubing began communicating slowly. Squeezed 28 sacks cement into formation, maximum pressure 4200#, reversed out 47 sacks cement and water flag. Reset tool and tested squeeze to 3500#, held ok. Reverse circulated 40 more barrels mud by tool. Pulled 19 stands and packer hung up at 4435'.

8-23-58 PBTD 5840' - Attempted to release stuck packer. Ran Wireline string shot, found tight place in tubing at 3294', spotted 10 barrels water flag in tubing, displacement indicated hole in tubing at 3294', spotted 5 barrels acid and let set overnight.

8-24-58 PBTD 5840' - Ran Wireline string shot, backed tubing off at 3260', pulled 53 stands tubing. Ran washover pipe with outside cutter, cut tubing off at 3855'. Recovered 19 singles

Summary of Workover continued

tubing full of cement (583').

8-25-58 PBTD 5840' - Went in hole with 21 jts. (588') of washover pipe and outside cutting tool. Cut and retrieved 17 jts. (525.57') of tubing. Ran clusterite washover shoe and 4 jts. (102') of washover pipe. Drilled 5' cement to tool and 2.6' of tool. Making trip to change clusterite washover shoe.

8-26-58 PBTD 5840' - Going in hole with new grapples in overshot. Drilled full bore packer free and followed to bottom, recovered upper part of full bore packer (unloader) in wash pipe, run overshot and caught fish, pulled to first casing collar approximately 15'. Fish hung. Lost fish while jarring.

8-27-58 PBTD 5840' - Recovered full bore packer, ran bit and scraper. Spotted water in casing (5563'-4434') and tested casing above squeeze to 3000#, held ok. Drilled hard cement 5568'-5616' and fell through at bottom of perforation. Checked bottom at 5838'. Spotted water in casing (5838'-5550') and tested squeeze to 2500#, held ok. Circulated 1 hour, displaced mud with water. Coming out of hole.

8-28-58 PBTD 5827' - Perforated "B-3" Zone (5780'-85') with Lane Wells karat free casing gun, 4 shot per foot. Set Model "D" production packer on wireline at 5775'. Ran tubing with seal assembly, swabbed dry and let set overnight. Fillup 700' oil, 400' water, total fillup 1100'.

8-29-58 PBTD 5827' - Swabbed tubing dry and acidized "B-3" Zone (5780'-5785') with 500 gallons Howco HV retarded acid. Broke formation with 2600#, maximum pressure 2600#. Injection rate 3 BPM, 30 minute bleed down vacuum on tubing. Swabbed 6 hours, last hour swab rate 16 BFPH, 80-90% water, average 85% water. Chlorides 84,000 PPM (384 BFPD, 327 BWPD, 57 BOPD). Fluid level 2800', shut in overnight.

8-30-58 PBTD 5827' - Overnight fillup 200' oil, 600' water, fluid level 2000'. Swabbed 5 hours, last hour, swabbed at the rate of 17 BFPH, 80-90% water, average 85% water (408 BFPD, 347 BWPD, 61 BOPD). Shut In overnight.

8-31-58 PBTD 5770' - Squeezed "B-3" Zone perforations (5780'-85') with 75 sacks regular cement with HR-4 retarder. Breakdown pressure 1000#. Squeezed 60 sacks cement into formation, maximum pressure 3800#, reverse circulated 15 sacks cement out. Pulled tubing, put on BOP with blind rams.

9-1-58 PBTD 5774' - Perforated "B-2" Zone (5760'-70') with Wireline Service, Inc. casing gun, 4 shots per foot. Ran wireline junk basket, set Model "D" production packer on wireline at 5753'. Acidized with 1000 gallons Howco HV retarded acid. Broke formation with 2400#, maximum pressure 2900#. Injected 2.7 BPM at 2900#. 1 hour bleed down vacuum on tubing. Swabbed 4 hours, last hour swab rate 18 BFPH, 30% water (432 BFPD, 302 BOPD, 130 BWPD). Shut in overnight.

Summary of Workover continued

9-2-58	PBTD 5774' - Ran rods and 2" x 1½" x 1½" x12' x 24' double volume pump spaced at 4017'. Will test when well levels off.
9-3-58	PBTD 5774' - On 4 hour test, pumped at rate of 190 BFPD, 81% water (154 BWPD, 36 BOPD). Shake out 9 a.m. --10% water, 1 p.m. 81% water, 6 p.m. -- 75% water. Chlorides 89,000 PPM.
9-4-58	PBTD 5774' - On 17 hour test, pumped at rate of 200 BFPD, 81% water (38 BOPD, 162 BWPD).
9-5-58	PBTD 5774' - Pumped at the rate of 252 BFPD, 53% water (134 BWPD, 118 BOPD).
9-6-58	PBTD 5774' - Pulled rods, changed pump. Ran new Harbison Fisher double volume.
9-7-58	PBTD 5774' - Pumping 30 to 60% water, average 45%. Will test today.
9-8-58	PBTD 5774' - On 18 hour test, pumped at the rate of 303 BFPD, 45% water (137 BWPD, 166 BOPD). This is the "B-2" Zone initial potential test, to drop from report.

Recap of Workover:

1. Final ~~New~~ Perforations: 5760'-5770' Unchanged

2. Final PBTD: 5774' TD (Unchanged)

3. Initial Potential Test ~~of New Producing Zone~~: Pumping 272 303 BFPD, 45% water (137 BWPD, 166 BOPD).
   93 253 19

4. Geologic Name of ~~New~~ Producing Zone: "B-2" Zone of Madison Formation

5. Downhole Equipment:

Tubing Record

Landed below RKB	8.50'	
Top joint	29.65'	
Subs	10.08'	
129 jts. 2-3/8" tubing	3987.35'	
Seating nipple	1.10'	
56 jts. tubing	1719.00'	
Perforating nipple	3.20'	
Latch-on Locator sub	.86'	
	5759.74'	= 5753' Wireline
Tail Pipe	5.08'	
Bottom of Tubing	5764.82'	

Recap of Workover continued

Rod Record

39 - 3/4" scraper rods
24 - 3/4" plain rods
95 - 5/8" plain rods
8' - 3/4" scraper subs

Pump: ~~Harbison Fisher double volume 2" x 1½" x 1-1/16' x 12' x 24'~~
Oil Well " 8½"X 8" insert

Results of Workover:
Oil production increased from 27 BPD to 166 BPD and water production decreased from 87% to 45% or 184 BPD to 137 BPD. Workover Successful.

Csg leak was successfully sq. off w/ 4 Sq. jobs. Well Test - June 5, 1963 ——— Prod. sh. level off at approx. the same rate as before Csg. leak ocurred

File

WORKOVER HISTORY NO. 3

May 30, 1963

Well Lease and Number: East Poplar Unit Well No. 3

Field: East Poplar County: Roosevelt State: Montana

Well Location: SW NW Section 1, T28N, R51E

Status Prior to Present Job:

Date Completed: June 7, 1952 Date of Last Workover: September 9, 1958

T.D.: 5968' PBTD: 5774' Producing Zone: "B" Zone of Madison Formation Perforations: 5760' - 5770' Cumulative Production of Present Zone: 124,410 BO 317,133 BW Latest Test: May 3, 1963, Pumping 269 BFPD, 89% water, (30 BOPD, 239 BWPD)

Justification for Workover: To locate, swedge out collasped casing at 3657' - 3661' and repair casing leak at 3657'.

SUMMARY OF WORKOVER:

5-20-63 PBTD 5774' - Moved in pulling unit. Pulled rods. Ran Dia-Log Caliper survey in 2-7/8" tubing. Pulled tbg. out of hole. Ran Howco Bridge Plug and R.T.T.S. Packer on 2-3/8" tubing. Found tight place in casing at 3657'. Unable to get packer through tight place. Pulling out of hole.

5-21-63 PBTD 5774' - Ran Howco 4-3/4" O.D. swedge with bumper jars and oil jars. Swedged casing out from 3657' to 3661'. Pulled out of hole, ran Howco bridge plug and R.T.T.S. Packer. Set B.P. at 3750'. Pin pointed hole in casing at 3657'. Tested bridge plug and casing from 3668' to 3750' with 2500#. Held ok. Reset packer at 3652', tested casing to 2000#, held ok. Released packer, picked tubing up 20', closed B.O.P. Shut down overnite.

5-22-63 PBTD 5774' - Spotted 1-sack of salt jel on bridge plug at 3750'. Set packer at 3678', tested B.P. and pipe to 2500#. Held ok. Reset packer at 3565', pressured casing to 1000#. Pumped in formation at 3657' with S.W. at rate of 5 BPM with 2000#. Shut pump down, well on vacuum. Mixed 100 sacks cement with Howco Halid 9 added. Pumped down tubing with 10 bbls. of fresh water ahead of cmt. Displaced cmt. with 14.5 bbls. of fresh water. Cleared tbg., shut down pump. Staged 30 minutes, pumped 1/4 bbl., press. increased to 200# and bled to zero.

SUMMARY OF WORKOVER CONTINUED

Staged 1 hour, pumped 1/4 bbl. with no press. Shut down 3 hours. Pumped 1/4 bbl., press. increased to 150# and bled to zero in 3 minutes. Staged 1-1/2 hours, press. up to 200#, bled to zero in 5 minutes. Shut down 2 hours, press. up to 1000#, bled to 400# in 5 minutes. Repress. to 1000#, broke back to 400# with all cement away. Press. to 3000#, attempting to overflush. Shut down pump, bled down at rate of 100# per minute. Released press. to pump truck, would not hold. Repress. to 2700#, bled to 100# in 55 minutes. Repress. to 1500#, shut in overnight.

5-23-63 PBTD 5774' - Tested squeeze job with packer at 3565' to 3000#. Would not hold. Reset packer at 3614', press. to 2800#, bled to 2400#, held ok. Reset packer at 3565', press. to 2800#. Held ok. Pulled packer out of hole. Ran 4-5/8" Hughes bit. Drilled hard cmt. from 3622' to 3699'. Circ. and washed to top of bridge plug at 3750'. Reversed, circ. 1 hour. Tested squeeze with 1500#, would not hold. Bled from 1500# to 600# in 10 minutes, bled from 600# to 300# in 18 minutes and held 300#. Shut down overnight.

5-24-63 PBTD 5774' - Pulled bit out of hole. Ran baker Model "R" Packer. Set at 3715'. Tested bridge plug and casing to 2000#. Held ok. Reset packer at 3560' and swab tested squeeze job. Swab tbg. down 1st. hour. Swab test as follows.
1 hour swabbed at rate of 9 B.P.H. 216 BPD
2 hour swabbed at rate of 7 B.P.H. 168 BPD
Filled tbg., released packer, pin pointed leak at 3657' with hot oil truck. Pulled Baker Model "R" Packer out of hole. Ran Howco R.T.T.S. Packer in hole. Shut down overnight.

5-25-63 PBTD 5774' - Test bridge plug with 2000#. Held. Set packer at 3642' and test BOP and casing with 1500#. Held. Squeeze #2 with 25 sacks regular cement with HR-4 retarder added. Broke formation with 2600#. Squeezed 25 sacks cmt. out in formation. Max. press. 2600#. Would not hold. Cleared tool with 4 bbls. water. Reversed out with water. Bridge at 3667'. Squeeze #3 with 25 sacks reg. HR-4 retarder added. Broke formation with 2800#. Squeezed 25 sacks cmt. out in formation. Max. Press. 3000#. Would not hold. Cleared tool with 4 bbls. water. Reversed out with water. Let set 4 hours. Squeeze #4 with 40 sacks D.O.C. cement. Broke formation with 3000#. Squeezed 25 sacks cmt. out in formation. Max. press. 3500#. Released press., would not hold. Press. back to 3100#. Let set 5 minutes, then reversed out 14 sacks cement under 1500# press. Left one sack cement in casing. Press. to 1500# and let set overnight.

5-26-63 PBTD 5774' - Released 500# press. on tbg. after setting overnight. Tagged bridge at 3667'. Cement left in casing thiefed overnight. Test squeeze with 1500#. Held ok. Pulled packer out of hole. Ran tbg. with 4-5/8" bit. Drilled 5 feet cmt. from 3667' to 3672'.

SUMMARY OF WORKOVER CONTINUED

Tagged bridge plug, then reversed out gel. Test squeeze with 1500#. Bleed 500# in 7 minutes. Made trip with tbg. to pick up Model "R" Packer and retreiving head. Set packer at 3607' and swab test squeeze. First hour rec. 14.82 bbls. fluid. Second hour rec. 2BF. Third hour rec. 1/2 BF. Left packer set overnite.

5-27-63 PBTD 5774' - Overnite fillup 5.13 bbls. Swab tested squeeze job. Swabbed at rate of 1.71 B.P.H. 41 BFPD. Filled tubing, pulled Model "R" Packer out of hole. Ran Howco R.T.T.S. Packer set at 3730'. Tested Bridge Plug and tbg. to 3000#. Held ok. Spotted 1 sack of gel on B.P. Reset packer at 3560'. Press. csg. to 1500#, broke formation with 2 bbls. water at rate of 1/4 BPM at 1000#. Squeezed with 30 sacks of latex cement with 2 bbls. of fresh water ahead. Displaced with fresh water. Max. squeeze press. 2400# with 25 sacks of cmt. in formation. Bled csg. press. to 1000#. Closed tbg. in with 2300#. Pressure holding. Shut well in overnite.

5-28-63 PBTD 5774' - Worked packer loose, pulled out of hole. Found 109' of cement in tubing. Ran 4-5/8" Hughes bit. Drilled hard cement from 3561' to 3658'. Drilled strangers of cement from 3658' to 3674'. Circ. and wash to top of bridge plug at 3750'. Tested squeeze job to 1300# with hot oil truck. Held ok. Pulled bit out of hole, ran Howco retreiving tool. Washing and working tbg. Trying to get over fishing neck on bridge plug.

5-29-63 PBTD 5774' - Attempted to wash and rotate over fishing neck on bridge plug. Unable to get over same. Pulled out of hole, shoe indicated junk around fishing neck. Ran retreiving tool without shoe. Washed and circ. over fishing neck and pulled B.P. out of hole. Ran tbg. in hole with Baker Latch on Assembly for Model "D" Packer at 5753; no seal assembly. Ran 2-1/2" seating nipple at 5000'. Started reverse circulating shale out of hole, tubing plugged.

5-30-63 PBTD 5774' - Made trip out with plugged tubing, 4 jts. of 2-7/8" tubing plugged above swage to 2-3/8 tubing. Ran tubing circulated to bottom. Shale 3/4" in diameter circ. out of csg. Ran 2" insert pump spaced at 4975'. Started pumping. To drop from report.

RECAP OF WORKOVER:

1. Final Perforations: 5760' - 5770' (unchanged)

2. Final PBTD: 5774' (unchanged)

3. Initial Potential Test: Pumping 272 BFPD, 93% water, (253 BWPD, 19 BOPD).

4. Geologic Name of Producing Zone: "B-2" Zone of Madison Formation

5. Downhole Equipment:

Tubing Record

Below RKB	10.00	
Top jt.	31.10	
Subs	6.15	
162 jts. 2-7/8"	4997.39	
Seating Nipple	1.10	
Swage	.67	
23 jts. 2-3/8"	703.11	
Loc Sub	.64	
Top Packer	5750.16	= 5753 Wireline

Rod Record

80 - 7/8" pl.	2000
119 - 3/4 pl.	2975
	4975'

Pump: Oilwell $2\frac{1}{2}$" x 2" insert

RESULTS OF WORKOVER:

Casing leak was successfully squeezed off with 5 squeeze jobs. Well test June 5, 1963, 272 BFPD, 93% water, 253 BWPD, 19 BOPD. Production should level off at approximately the same rate as before casing leak occurred.

WORKOVER HISTORY NO. 4

November 19, 1963

Well Lease and Number: East Poplar Unit Well No. 3

Field: East Poplar Unit County: Roosevelt State: Montana

Well Location: SW NW Section 1, T28N, R51E

STATUS PRIOR TO PRESENT JOB:

Date Completed: June 7, 1952 Date of Last Workover: May 30, 1963

T.D. : 5968' PBTD: 5774' Producing Zone: "B-2" Zone of the Madison Formation Perforations: 5760'-5770' Cumulative Production of Present Zone: 128,433 BO, 356,760 BW

Latest Test: November 6, 1963 - Pumping 270 BFPD, 89% water, 30 BOPD, 240 BWPD

JUSTIFICATION FOR WORKOVER: To repair collasped casing.

SUMMARY OF WORKOVER:

11-19-63 PBTD 5774' - Moved in pulling unit to fish rods. Caught fish and pulled pump. Pump was rain bowed indicating collasped casing and bent tubing. Pulled and worked tubing, unable to pull same. Torqued on tubing 2 turns to right and twisted off at 3655'. Ran 4-3/4" impression block on sand line. Ran tubing with Bowen Overshot and 8' wash pipe. Caught fish. Rigged up Dia-Log and attempted to run free point indicator. Unable to get through bad place in tubing at 3670'. Ran collar locator and 2-1/4" dummy jet shot. Unable to get past 3670'. Ran collar locator alone and worked through bad place in tubing. Picked collars and flagged line. Ran 2-1/4" jet cutter without collar locator. Worked same through bad pipe and cut tubing off at 3704'. Pulled fish out of hole. Hole worn in tubing from outside in at 3670', indicating 5-1/2" casing collasped in against tubing causing same to wear while pumping. Shut in overnite.

11-20-63 PBTD 5774' - Picked up 4-5/8" swedge, six 4-1/4" drill collars, bumper jars, oil jars and 2-3/8" tubing. Swedged from 3657' to 3687'. Tightest place at 3657'. Unable to go lower than 3687' due to drill collars dragging in bent casing. Could not hit with bumper jars. Pulled out of hole. Ran 4-3/4" swedge, six 4-1/4" drill collars, bumper jars and oil jars. Swedged on tight place at 3657' for 2½ hours. Made 1½' of hole, which was made first 30 minutes. Shut in overnite.

SUMMARY OF WORKOVER CONTINUED:

11-21-63 PBTD 5774' - Pulled tubing, lay down 4-1/4" drill collars and 4-3/4" swedge. Picked up 4-1/2" swedge, six 3-1/2" drill collars, bumper jars and oil jars. Ran same to top of fish at 3708'. Swedge only drag was at 3670'. Did not require any jaring to push through. Made trip and picked up 4-5/8" swedge. Ran swedge to 3670' without touching anything. Bumped swedge 5 times with jars to 3674'. Swedge free down to fish at 3708'. Pulled back through tight place with 20,000# overweight of tubing. Ran through bad place for 30 minutes with no improvement. Pull swedge above bad pipe and shut in overnite. Swedge did hang coming up at 3657', required 25,000# overweight of tubing to pull through. No indication going down. Repeated operation with same results.

11-22-63 PBTD 5774' - Running 4-1/2" impression block. Pulled tubing and removed 4-5/8" swedge. Ran tubing with 3-1/2" drill collars, oil jars, bumper jars and 4-1/8" overshot dressed for 2-7/8" tubing with Klustrite trimmer skirt. Located top of fish at 3798'. Attempted to trim top of fish for 3 hours with no success. Pulled overshot and checked bottom of skirt. Indicated not getting over fish. Looked as if a grove was cut in top of fish about 1/2" deep. Shut well in overnite.

11-23-63 PBTD 5774' - Ran impression block on tubing. Pulled same out of of hole. Ran tubing with Bowen spear, drill collars (6), bumper jars, oil jars and safety jt. Caught fish and pulled same out of hole. Bottom jt. of tubing plugged with shale. Six jts. 2-3/8" tubing bent. Shut in overnite.

11-24-63 PBTD 5774' - Ran tubing with drill collars, jars, and 4-11/16" swedge. Swedged through bad pipe 3657' to 3675'. Made trip with tubing and picked up 4-3/4" swedge. Swedged on bad casing at 3657' for 3½ hours. Unable to get through. Shut in overnite.

11-25-63 PBTD 5774' - Pulled 4-3/4" swedge out of hole. Ran tubing with 3-1/2" drill collars (6), oil jars and 4-5/8" bit. Washed shale for 155'. Drilled on packer 5753' 2 hours, then bit plugged. Rods went out on pump motor while attempting to unplug bit. Pulled 40 stands tubing and shut in overnite.

11-26-63 PBTD 5832' - Tubing Measurements. Pulled tubing and unplugged drill collars. Ran tubing with drill collars, jars and 4-5/8" bit. Drilled Model "D" Production Packers at 5753' and 5774'. Pushed packer to 5832' tubing measurements. Circ. 1 hour, then pulled 40 stands tubing. Shut in overnite.

11-27-63 PBTD 5832' - Pulled 4-5/8" bit. Ran tubing with tool string and 4-3/4" swedge. Swedged through bad casing several times, required jars to pull 4-3/4" swedge through bad place in casing. Pulled swedge out of hole. Ran tubing with tool string and 2 jts. (55.11') of 4-1/2" liner. Attempted to run same through bad casing with no success. Pulled same out of hole. Started in hole with tubing open ended. Shut in overnite.

SUMMARY OF WORKOVER CONTINUED:

11-28-63 PBTD 5832' - Ran 2-3/8" tubing to 5750'. Spot 20 bbls. salt gel and lost circ. material above B-2 perf. (5760' - 70') to plug off same. Made trip with tubing and picked up six 3-1/2" drill collars, jars, and 4-3/4" tapered mill. Milled 4 hours on bad 5-1/2" casing from 3656' to 61'. Pulled up above bad pipe and shut in for Thanksgiving.

11-29-63 PBTD 5832' - Tubing Measurements. Shut down for Thanksgiving.

11-30-63 PBTD 5832' - Tubing Measurements. Shut down for Thanksgiving.

12-01-63 PBTD 5832' - Started milling on casing at 3661'. Milled to 3665' all of which milled very slow. Freed up at 3665' then started torquing up again at 3670'. Milled hard to 3676', then freed up. Pulled tapered mill through bad casing and then reamed through all tight place several times. Pulled mill out of hole, stablizer worn off top of mill. Also groves cut in jars. Picked up 2 jts. 4-1/2" linner and made dummy run. Would not go through bad pipe. Pulled same out of hole. Shut down to redress tapered mill.

12-02-63 PBTD 5832' - Ran tubing with six 3-1/2" collars, jars, one 4-1/4" drill collar and tapered 4-3/4" mill. Started milling on casing at 3656'. Cut very slow and hard down to 3665', then freed up to 3668'. As mill started into second bad place at 3670' tubing would torque up and quit turning, indicating 4-1/4" collar binding in bands. Pulled out of hole. Marks and groves cut in 4-1/4" drill collar. Shut down to redress 4-3/4" tapered mill.

12-03-63 PBTD 5832' - Running redressed tapered 4-13/16" to 4" mill. Ran tubing with six 3-1/2" collars, jars, two 4-1/4" collars and 4-13/16" to 4" tapered mill. Milled from 3656' to 3675'. Pulled mill to redress. Shut in overnite.

12-04-63 PBTD 5832' - Milling on casing at 3671'. Ran tubing with six 3-1/2" drill collars, jars, two 4-1/4" drill collars and 4" to 4-13/16" tapered mill. Did not have to drill through upper bad casing 3655' to 67'. Started milling in 2nd bad place at 3670'. Made one foot and rig broke down. Shut down to repair same.

12-05-63 PBTD 5832' - Milled from 3674' to 3681', then mill dropped through. Ran mill through bad casing until same was completely free. Made trip to pick up 2 jts. 4-1/2" linner. Ran same through bad casing. Required 5,000 to 8,000# weight to push through. Pulled above bad casing and shut in overnite.

12-06-63 PBTD 5832' - Ran 2 jts. 4-1/2" linner to 5230' and found bridge. Reverse circ. down to 5290', then tubing plugged. Pulled same out of hole. Started to run 4-3/4" bit and dropped 1 stand tbg. in hole. Went in hole with 4-1/8" Bowen overshot. Pulled same out of hole. Failed to rec. fish. Ran tbg. to attempted to screw into fish. Circ. and chased fish to TD. Screwed into fish and pulled out of hole. Shut in overnite.

SUMMARY OF WORKOVER CONTINUED:

12-7-63 PBTD 5832' - Ran tubing with 4-3/4" bit to 5832'. Circ. with clean salt water. Pulled tubing out of hole. Picked up 97 jts. (2694.95') of 4-1/2", 16.6#, Buttress thd, R-2, Class 7 liner. Ran same on 2½" tbg. & Bowen spear with pack off. Set liner from PBTD (5832) back to (3137.05'). Baker float shoe on bottom at 5832'. Broke circ. around liner, then released spear and pulled 2 jts. 2-7/8" tbg. Shut down overnite.

12-08-63 PBTD 5832' - Pulled 2-7/8" tbg. & layed down drill collars, jars, and etc. Ran 2-3/8" tbg. with Baker Model "E" expansion jt. & seating nipple. Dropped drop valve and test tbg. to 2000#. Held ok. Attempted to fish drop valve with sandline. Unable to get through tbg. at 2500'. Attempted to screw in Baker float shoe with no success. Reverse circ. & attempted again to screw into float shoe. No success. Pulled tbg. Tubing backed off 87 stands down. Left 8 stands in hole. Shut down overnite.

12-09-63 PBTD 5826' - Ran tbg. dropping rabbit through each stand and screwed into fish. Test tbg. with 2000#, held ok. Attempted to fish drop valve with sandline. No success. Pulled tbg. and removed drop valve & Baker tool. Ran tbg. with Halb. RTTS Packer. Reversed down to 5832'. Set packer at 5826'. Press. up to 500# on csg. Packer held ok. Broke circ. around liner, circ. good. Cmt. 4½" liner with 43 sks. pozmix with 6% gel and 15 sks. Latex. Ran 5 bbls. fresh wtr. ahead & behind cmt. Good circ. throughout job. Left 1 bbl. cmt. in tbg. Released press. float, held ok. Reversed out cmt. Second flag cmt. colored water flag, indicating cmt. job on top of liner doubtful. Job complete at 5 PM December 8, 1963. Pulled tbg. above top of liner. Filled hole with salt water. Let cmt. set overnite. Tested cmt. job at 7:00 AM December 9, 1963, would not hold pump in at 1200#.

12-10-63 PBTD 5786' - Press. up on csg. to test cmt. job on 4½" liner. Would not hold. Pumped into formation at 1200# at the rate of 5 bbls. per min. Ran packer to 3200' and set same in top of liner. Press. up to 2000# on tbg. Would not hold. Bleed off slow down to 1200# with small circulating stream. Dropped ball & test tbg. with 2000#, held ok. Reversed out ball. Ran packer to 5824'. Set same & test to 2000#. Held ok. Pulled packer to 5810'. Set same and press. to 2000#. Would not hold. Press. bleed down to 1200# with small stream from csg. (Locate leak at 5815'). Mixed 10 sks. reg. cmt. & spot same down tbg. Pulled tbg. to 5786' & reversed out cmt. Left 40' of cmt. in liner. Pulled six stands of tbg., then set packer. Press. up to 400# on tbg. Shut well in. Waiting on cmt. plug.

12-11-63 PBTD 5786' - Test plug in bottom of liner with 2000#. Held ok. Pulled tbg. Ran tbg. with Halb. RTTS Packer dressed for 5½" csg. Set packer at 3011' & test packer, BOP & csg. to 1500#, held ok. Squeeze around top of 4½" liner & B-2 Zone with 25 sks. reg. cmt. & 75 sks. Pozmix with Halad 9 added. Broke formation at 2000#, 5 BPM. Ran 5 bbls. fresh wtr. ahead & behind cmt.. Pumped 64 sks. cmt. out in formation, then shut down. Max. press. 1600#. Waited 12 min., press. at 900#, then pumped in 2½ sks.. Max. press. 1250#. Waited 1 hr. & 15 min., press. at 550#, then pumped in 2½ sks. Max. press. 1400#. Waited 1 hr. & 28 min. press. at 600#, then pmpd. 1½ sks. max. press. 1100#. Shut in & let set overnite. Total cmt. in formation = 97 sks. Three sks. cmt. left in casing.

SUMMARY OF WORKOVER CONTINUED:

12-12-63 PBTD 5786' - Three hours thawing out well head, BOP, tbg, and etc. Test sq. with 2500#. Held good. Unable to tag cmt. due to trouble with packer. Made trip with tbg., removed packer and picked up 4-3/4" bit. Tagged cmt. at 3101'. Drilled 36' of hard cmt. to top of liner at 3137'. Circ. 30 min.. Test squeeze with 2000#, held ok. Shut in overnite.

12-13-63 PBTD 5786' - Pulled tbg. & removed 4-3/4" bit. Ran tbg. with 3¾" bit. Drilled 17' hard cmt. from top liner 3137' to 3154'. Ran bit to bottom and circ. 45 min.. Shut in overnite.

12-14-63 PBTD 5804' - Pulled tbg. Ran Lane Wells Neutron & collar locator. Unable to get through liner at 3657'. Probably bend in bad csg.
No go → Instrument was 3½" OD x 15' long. Ran 1-3/4" Neutron & collar locator. Correlated with old Gamma Ray-Neutron log, then logged to top of liner. Perf. B-2 Zone (5761'-65') with Lane Wells 3-1/8" NCF II Zone shot, 8 hole per ft. (Note) 3-1/8" gun drug slightly through liner at 3657'. Started in hole with tbg. and packer.

12-15-63 PBTD 5804' - Finished running tbg. Set Halb. R-3 Packer at 5750'. Swabbed tbg. dry. Let set 30 min., made dry run with swab. Press. up on csg., BOP, & packer with 500#. Packer gave way. Pulled packer & removed BOP. Shut in overnite.

12-16-63 PBTD 5804' - Ran tbg. with Halb. RTTS Packer. Set packer at 5750' & test csg., well head & packer with 1500#. Held ok. Acidized B-2 Zone (5761'-65') with 200 gals. Halb. 15% HCA. Spot acid down tbg. & press. up to 2000# & acid started feeding. Injected 4 bbls. acid at the rate of 1/4 BPM at 2000#. Injected last bbl. acid at rate of 1/2 BPM with press. breaking back to 1100#. Bleed down press. 0# in six minutes. Open to pit, well on vacuum.

12-17-63 PBTD 5804' - Finished laying down workover tbg. Ran 2-7/8" & 2-3/8" tbg. with 2" x 1-3/4" x 8' tbg. liner pump, perf. nipple, mud anchor & Halb. R-3 Packer. Ran rods & started well pumping.

12-18-63 PBTD 5804' - Water cut 97%, chlorides- 75,000 PPM. Testing today.

12-19-63 PBTD 5804' - Pumping at the rate of 317 BFPD, 98% water cut, 311 BWPD, 6 BOPD.

12-20-63 PBTD 5804' - Pumping at the rate of 310 BFPD, 97% water, 9 BOPD, 301 BWPD

12-21-63 PBTD 5804' - Pumping at the rate of 311 BFPD, 97% water, 9 BOPD, 301 BWPD.

12-22-63 PBTD 5804' - Pumping at the rate of 314 BFPD, 98% water, 6 BOPD, 308 BWPD

12-23-63 PBTD 5804' - Pumping at the rate of 311 BFPD, 98% water, 6 BOPD, 305 BWPD
To pump 30 days to attempt to exhaust invaded water. and re-evaluate.
To drop from report.

NOTE: TO RELEASE ANCHOR, LET TUBING DOWN AND TURN TO LEFT.

RECAP OF WORKOVER:

1. Final Perforations: 5761' - 5765'

2. Final PBTD: 5804'

3. Test after Workover: 311 BFPD, 98% water, (6 BOPD, 305 BWPD)

4. Geologic Name of Producing Zone: B-2 Zone of the Madison Formation

TUBING RECORD:

RKB	10.00'
99 Jts. 2-7/8" tbg.	3073.00'
Swedge 2-3/8" to 2-7/8"	.80'
58 Jts. 2-3/8" tbg.	1841.35'
2" x 1-3/4" x 8' Tbg. liner pump	17.50'
Perf. Nipple 2-3/8"	3.69'
1 Jt. 2-3/8" tbg.	30.28'
Anchor & Bull Plug	2.25'
BOTTOM OF TUBING	4978.87'

ROD RECORD:

118 3/4" plain	2950'
79 7/8" plain	1975'
2-2' x 7/8" Subs.	4'
	4929'

PUMP DATA:

2" x 1-3/4" x 8' x 17' Oilwell Tubing Liner Pump

EAST POPLAR UNIT NO. 3

SUPPLEMENT TO WORKOVER HISTORY NO. 5

4-25-68 5618' PBTD Running tubing and rods to pump test.
Ran 2-3/8" tubing with HOWCO RTTS (4-1/2") packer, hydrotested tubing to 4000#, tagged cement retainer at 5635'. Set packer at 5610'. Attempted to pressure test retainer but it took fluid. Pumped through retainer at the rate of 3 BPM at 3500#. Reset packer at 5618'. Squeezed retainer leak with 90 sacks of Pozmix cement with 2% gel as follows: Pumped 5 bbls. fresh water ahead. Mixed cement. Started pumping cement through retainer leak at 1 BPM at 2000#. After 65 sacks cement through retainer pressure increased to 3100#. Short staged. Squeezed off with maximum pressure of 3600#. Bled back and repressured. Held OK. 70 sacks out. Reversed out 20 sacks slurry. Removed BOP's. Pulled tubing to remove RTTS packer. Started running production tubing. Shut down for night.

Note: A Zone pressure would bleed very slow 1200# to 600# 5 mins. at start of testing and squeezing. Was holding 1500# at end of squeeze job.

4-26-68 5618' PBTD Pumped Off
Ran tubing with 3.75" O.D. Tubing. Anchor hung at approximately 5000'. Tight place in liner. Pulled out. No indication of damage to tubing anchor. No makrs. Ran tubing with tubing anchor spaced above tight place. Spaced tubing at 5603', bottom of perforations. Ran rods with 1-1/2" bore pump. Pumped 16 Hrs.. Pumped 80 BF (load) Capacity of annulus. Pumped off.

To shut down overnight and restart tomorrow.

4-27-68 5618' PBTD Shut in 22 hrs. Pumped 2 hrs.. Pumped 14 BF 100% Water Pumped Off.

4-28-68 5618' PBTD Shut in 22 hrs.. Pumped 2 hrs.. Pumped 8 BF 100% Oil Pumped Off

Total Fluid Recovered	102 bbls.
Capacity of Casing Annulus	80 bbls.
Total Formation Fluid Recovered	22 bbls.

4-29-68 5618' PBTD Shut in 22 hrs.. Pumped 2 hrs.. Pumped 3 BF 100% Oil.

4-30-68 5618' PBTD Prep. to acidize A-4 Zone perforations.
Moved in and rigged up pulling unit. Pulled rods and pump. Released anchor. Tagged PBTD at 5618'. Respaced bottom of tubing at 5612'. Set anchor. Installed well head. Shut in for night.

5-1-68 5618' PBTD Pump Testing

Rigged up Dowell. Acidized A-4 Zone perforations at 5599-5603'. Used 500 gallons of HCL 15% acid as follows: Loaded hole with water, tested lines and wellhead to 2500#, Held OK. Spotted acid over perforations with 800# pressure. No bleed down. Bled by and increased pressure in 1/2 bbl. and 200# intervals to 1800#. Letting acid soak 5 mins. each interval. Formation began taking slight amount of acid at 1800#. Formation would take from 1/4 to 1/2 bbl. acid with pressure decreasing from 1800 to 1400# in 3 min. intervals.. Soaked and by-passed 310 gallons acid. Formation took 190 gallons acid. Acid on formation a total of 2-1/2 hours. Maximum pressure 1800#. Reversed out spent and partially spent acid water. Heads of gas with water while reversing. Well died 2 mins. after shutting down pump. Ran rods with 1-1/2" bore pump. Started pumping at 2:15 P.M. 4-30-68.

Pumped 17 hrs. Pumped 153 BF - 216 BFPD All load fluid recovered + 51 bbls. formation fluid. Water cut this A.M. 28% with a slight fluid pound.

5-2-68 5618' PBTD Pump Testing.

6 hr. Test Pumped 48 BF - 192 BFPD 46% water 104 BOPD 88 BWPD.

18 hr. Test Pumped 143 BF - 191 BFPD 27% Water 139 BOPD 52 BWPD

WORKOVER POTENTIAL - To Drop From Report.

RECAP OF WORKOVER:

Final Perforations:	5599 - 5603'
Final PBTD:	~~5634'~~ 5618'
Producing Formation:	A-4 Zone
Workover Potential:	191 BFPD 27% Water Cut 139 BOPD 52 BWPD

Workover Successful. Oil production was increased from 7 BOPD to 139 BOPD.

Tubing Record:

1	Cond 3	2-3/8", 4.70#, J-55, 8rd. Range 2 EUE	30.80
	Cond 2	2-3/8" X 8' Tubing Subs	16.40'
155	Cond 3	2-3/8" Tubing as above	4777.22
	Cond 2	Baker 4-1/2" X 2-3/8" Model B-3 Anchor Catcher	3.20 . 1824'
24	Cond 3	2-3/8" Tubing as above	744.46
	Cond 2	Top Mechanical Pump Hold-Down Shoe	.60
1	Cond 3	2-3/8" Tubing as above with bottom orange-peeled to 1-1/4"	29.45
			5602.13
	Landed Below RKB.		9.00
	Landed At		5611.13

Seating Nipple - 2-3/8" Top Mechanical Shoe at 5581'.

Baker Anchor set at 4833' with 24,000# up-Strain. To release find free point an rotate to right.

Anchor will not go below tight place in 4-1/2" liner at approximately 4940'.

East Poplar

EAST POPLAR UNIT NO. 3

WORKOVER HISTORY NO. 5

March, 1968

Well Number and Lease: East Poplar Unit No. 3

Field: East Poplar Unit County: Roosevelt State: Montana

Well Location: SW NW Section 1, T28N, R51E

STATUS PRIOR TO PRESENT JOB:

Date Completed: June 7, 1952 Date Last Workover: November, 1963

Producing Zone: B-2 Zone Perforations: 5761-5765'

T.D.: 5968' PBTD: 5804' Cumulative Production: A-3 & 4 Zones

100,247 BO 191,521 BW. B-2 Zone 146,054 BO 727,312 BW.

Latest Test: 171 BFPD 164 BWPD 7 BOPD 96% W.C. T.A. Uneconomical

JUSTIFICATION FOR WORKOVER:

This well was temporarily abandoned October 4, 1967 with the B-2 perforations (5761-5765') open. Run junk basket and gauge ring, with gin poles, to see if tools will go into 4-1/2" liner. If tools will not go abandon well, but if tools do go continue with workover. Set Bridge Plug at 5630' with 1/2 sack of cement on top. Perforate the A-4 Zone from 5599' to 5602' (4') with a casing gun. Run rods and tubing to pump test. An acid job may be necessary as this formation is tight.

SUMMARY OF WORKOVER:

3-20-68 5635' PBTD Workover No. 5 A.F.E. No. 8-1505
Hydrotesting and running tubing.
Rigged up McCullough Tool Company wireline on portable mast. Ran gauge ring and junk basket for 4-1/2" 16.60# liner to 5650'. Set Baker Model "N" Bridge Plug at 5635' (attempted to dum 1/2 sack of cement on top of B P but cement bailer would not go through tight spot in liner at 3657'). Pressure tested B P to 1500#, Held OK. Perforated A-3 Zone at 5599-5603' with 2 SPF using 50 gram jet charges. Rigged down McCullough. Moved tubing and rods to location. Moved in and rigged up pulling unit.

3-21-68 5635' PBTD Pump Testing 1-1/2" bore X 64" X 15 SPM
Ran tuboscoped 2-3/8", J-55, EUE, Class No. 3 tubing. Landed bottom of tubing at 5625' with Mechanical holddown shoe at 5595' and Baker Anchor at 5530' (did not hydrotest due to operator being hurt). Ran rods with 1-1/2" bore pump. Started pumping at 6:00 P.M. 3-20-68.

3-21-68 Pumped 13-1/2 Hrs. Made 148 BF = 263 BFPD this A.M, water cut 80% equals 263 BFPD 80% Water 53 BOPD 210 BWPD. All load fluid recovered plus 47 bbls. formation fluid.

Capacity of annulus 79 bbls.
Capacity of tubing 22 bbls.
Total 101 bbls.

3-22-68 24 Hr. Test Pumped 235 BFPD 92% W.C. 19 BOPD 216 BWPD

3-22-68 24 Hr. Test Pumped 244 BFPD 95% W.C. 12 BOPD 232 BWPD

3-24-68 No Test Pumping Out of room.

3-25-68 19 Hr. Test Pumped 170 BF 96% W.C. = 215 BFPD 9 BOPD 206 BWPD

Chloride Comparison

	EPU No. 3	90,000 PPM	
	EPU No. 24	113,000 PPM	A-Zone
	EPU No. 68	120,000 PPM	A-Zone
	EPU No. 41	165,000 PPM	A-Zone
EPU N	EPU No. 88	90,000 PPM	B-3 Zone

Well Took some fluid after perforating. Not normal for the A-4 Zone. Possible communication B-Zone.

3-27-68 4 Hr. Test Pumped 41 BF 96% W.C. = 244 BFPD 10 BOPD 234 BWPD

4-5-68 24 Hr. Test Pumped 233 BFPD 96% W.C. 9 BOPD 224 BWPD.
Workover Potential - To Drop From Report.

18 P

CLI-16

File
E.P.U #3

BOTTOM HOLE PRESSURE SURVEY

Date July 27, 1952

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 3 Unit

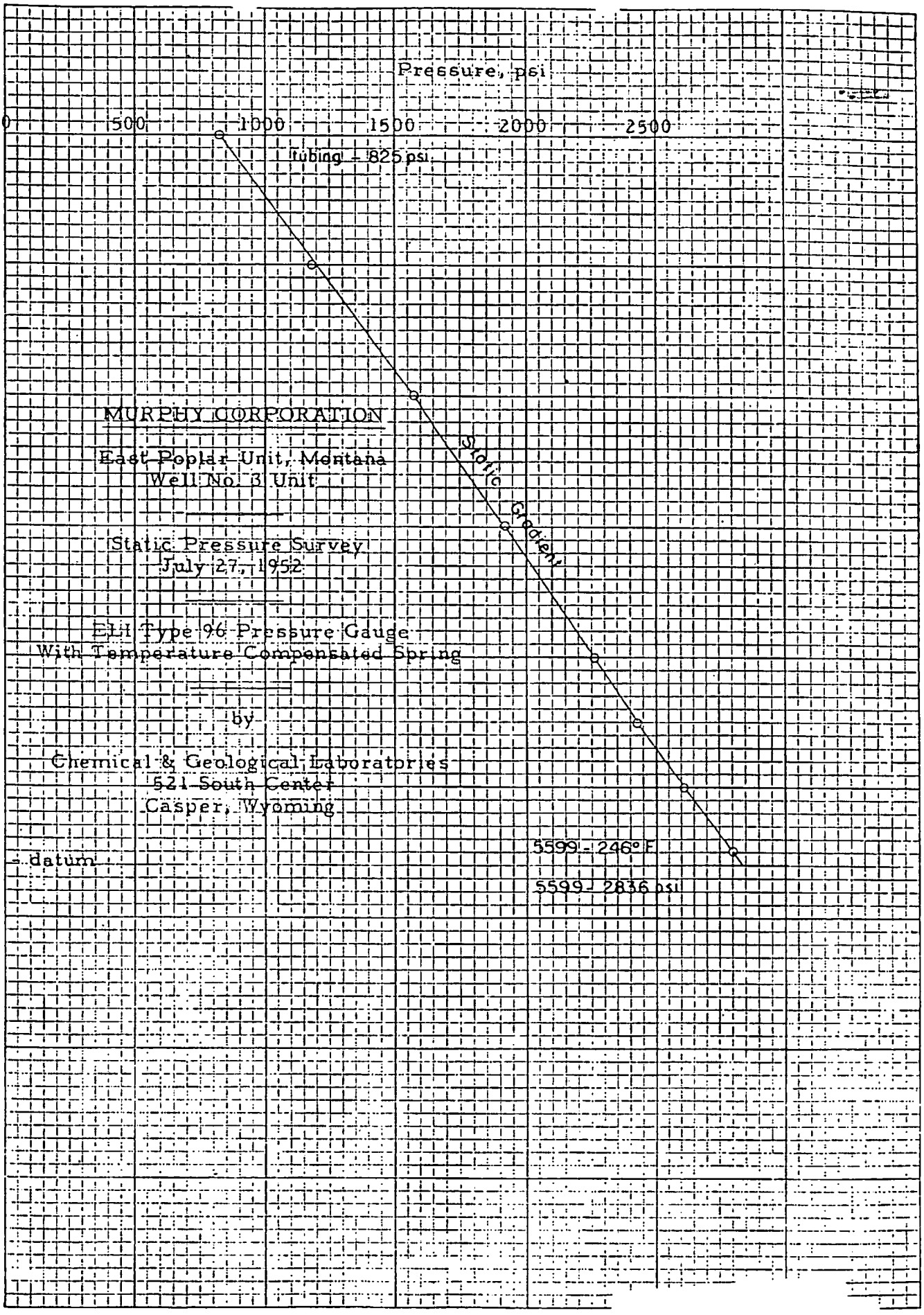
Location C SW NW 1-28N-51E County Roosevelt State Montana

WELL DATA:

	Elevation:	2204 KB	Datum Point:	5599
TD - 5968	Formation:	Mississippian	Perforation:	5599-5616
	P. T. D.:	5840	Tubing Press:	825 psi
	Casing:	$5\frac{1}{2}$" OD @ 5957	Casing Press:	- - - -
	Tubing:	2" EUE @ 5615		

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole	1.010	825 psi		
			35.0	
1000	1.480	1175		
			38.8	
2000	2.005	1563		
			35.1	
3000	2.475	1914		
			34.6	
4000	2.940	2260		
			33.6	
4500	3.165	2428		
			35.8	
5000	3.405	2607		
			38.0	
5500	3.660	2797		
			39.1	
5599	3.730	2836		

Remarks: Temperature @ 5599 - 246°F.



CHARLES BRUNING COMPANY, INC. NO. 100-10 DATA SHEETS
10 x 10 to the inch.

CLI-16
PRAIRIE PUBLISHING CO.—42085

BOTTOM HOLE PRESSURE SURVEY
(Static)

Date August 27, 1952

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 3

Location C SW NW 1-28N-51E County Roosevelt State Montana

WELL DATA:

T.D. - 5968

Elevation:	2204 KB	Datum Point:	5599
Formation:	Mississippian	Perforation:	5599-5616
T.D.:	5840	Tubing Press:	- - - - -
Casing:	$5\frac{1}{2}$" OD @ 5957	Casing Press:	- - - - -
Tubing:	2" EUE @ 5615		

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole				

Note: Bomb stopped at 135 ft. Unable to get to bottom of hole.

Remarks:

CLI-16

BOTTOM HOLE PRESSURE SURVEY
(Static)

Date March 27, 1953

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 3

Location C SW NW 1-28N-51E County Roosevelt State Montana

WELL DATA:

Elevation:	2204 K.B.	Datum Point:	5957
Formation:	Mississippian	Perforation:	open hole (C zone)
T. D.:	5968	Tubing Press:	
Casing:	5½" OD @ 5957	Casing Press:	
Tubing:	2" EUE @ 5615		

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole				

Note: Bomb stopped at 110 ft. Unable to get down.

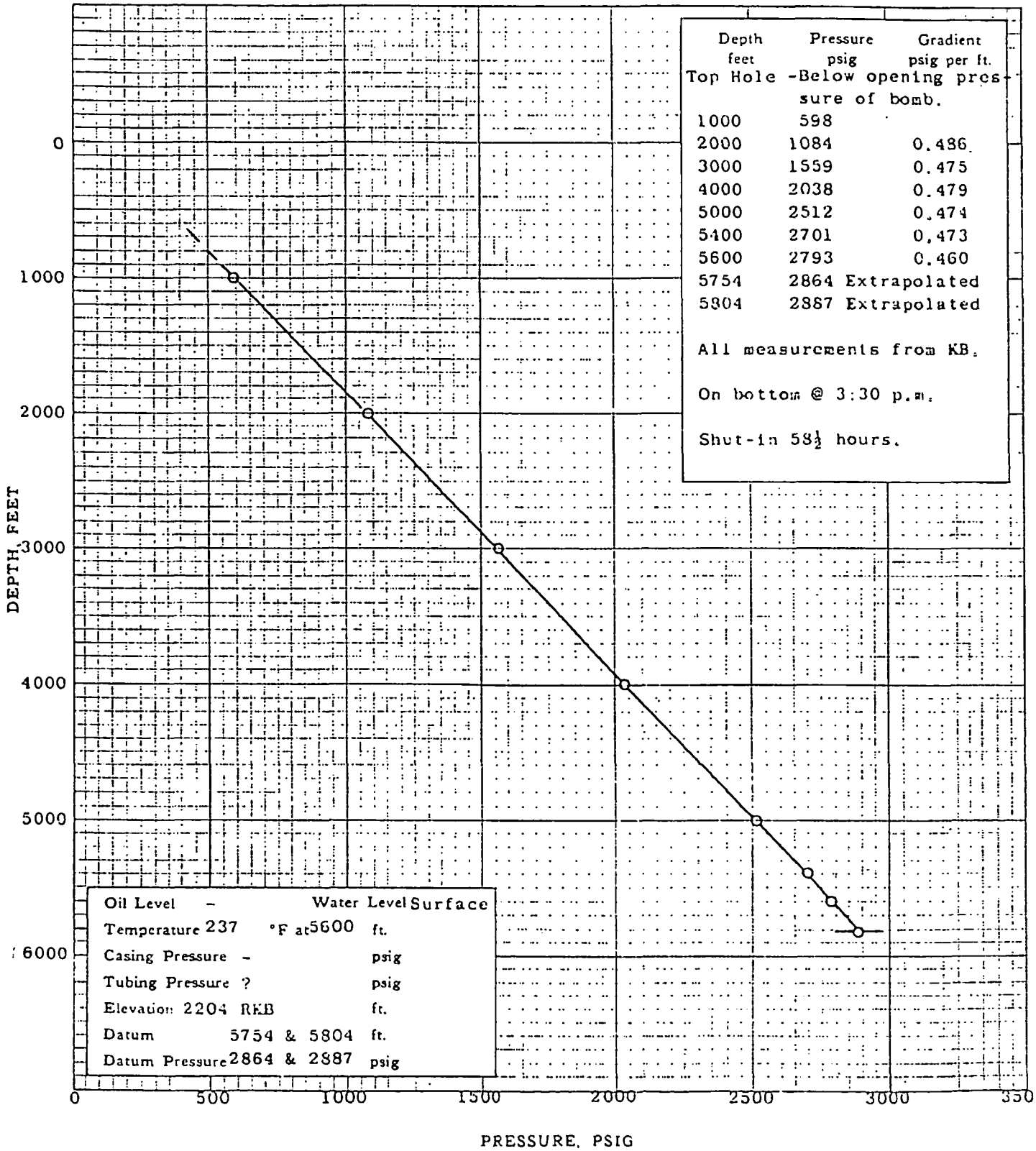
Remarks:

IEMICAL & GEOLOGICAL LABC \TORIES

Casper, Glendive, Edmonton

PRESSURE SURVEY

Company	Murphy Corporation	County	Roosevelt
Field	East Poplar	State	Montana
Lease and Well No.	E. P. U. No. 3	Formation	A Zone
Type of Test	Static	Date Tested	May 16, 1956



Depth feet	Pressure psig	Gradient psig per ft.
Top Hole -Below opening pressure of bomb.		
1000	598	
2000	1084	0.486
3000	1559	0.475
4000	2038	0.479
5000	2512	0.474
5400	2701	0.473
5600	2793	0.460
5754	2864	Extrapolated
5804	2887	Extrapolated

All measurements from KB.

On bottom @ 3:30 p.m.

Shut-in 58½ hours.

Oil Level	–	Water Level	Surface
Temperature	237 °F at	5600	ft.
Casing Pressure	–		psig
Tubing Pressure	?		psig
Elevation	2204 RKB		ft.
Datum	5754 & 5804		ft.
Datum Pressure	2864 & 2887		psig

FPU #3

Billings CORE-LAB

5 NORTH 25TH ST.
BILLINGS, MONTANA

Lab. No. 1029

WATER ANALYSIS REPORT

Field: East Poplar Unit — County: Roosevelt — State: Montana
Well No. 3 — Location: C SW SW 1-28N-51E
Formation: Upper Charles — Depths: 5600'-5626'
Operator: C. H. Murphy Corporation — Date Sampled:
DST No. 1 — Sample No. — Date Analyzed: 5-17-52
Other Data: Muddy sample. Disagreeable odor. Filtrate clear and colorless. No hydrogen sulfide present. Organic matter present.

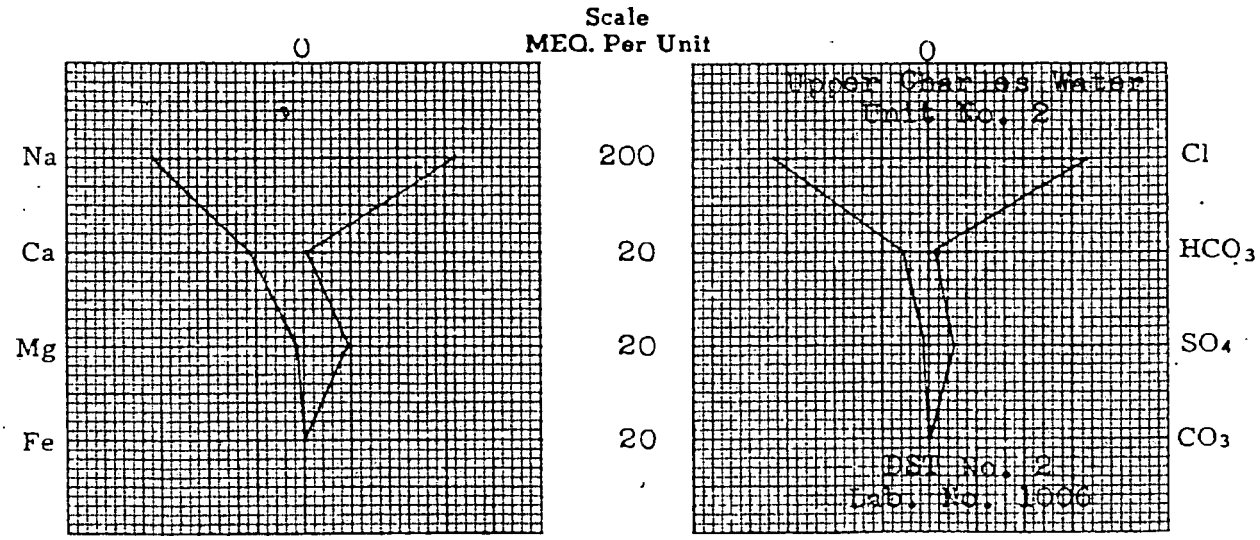
Constituents	PPM	MEQ.	MEQ. %
Sodium	73,313	3188.92	48.03
Calcium	2265	113.02	1.70
Magnesium	218	17.92	0.27
Sulfate	4610	95.89	1.44
Chloride	114,160	3219.31	48.49
Carbonate	0	0	0
Bicarbonate	284	4.66	0.07
Hydroxide	0	0	0

Total Solids in Parts per Million
By evaporation 193,068
After ignition 195,348
Calculated 194,706

pH 5.8
Specific gravity @ 60°F 1.136
Resistivity @ 68°F ohms/meter³ Actual 0.062
Calc. 0.068

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



Correlation: Upper Charles Water

SPECIALIZING IN CORE, WATER, GAS AND CRUDE OIL ANALYSES

WESTERN LITHO-PRINT, INC., BILLINGS, MONT.

EPW #3

Billings CORE-LAB

5 NORTH 25TH ST.
BILLINGS, MONTANA

Lab. No. 1037

WATER ANALYSIS REPORT

Field: East Poplar — County: Roosevelt — State: Montana
Well No.: Unit #3 — Location: C SW SW 1-28N-51E
Formation: Lower Charles B-2 ZONE — Depths: 5760-5775
Operator: C. H. Murphy Corporation — Date Sampled:
DST No.: 4 — Sample No.: — Date Analyzed: 5-27-52
Other Data: Clear water sample. Some organic matter present.

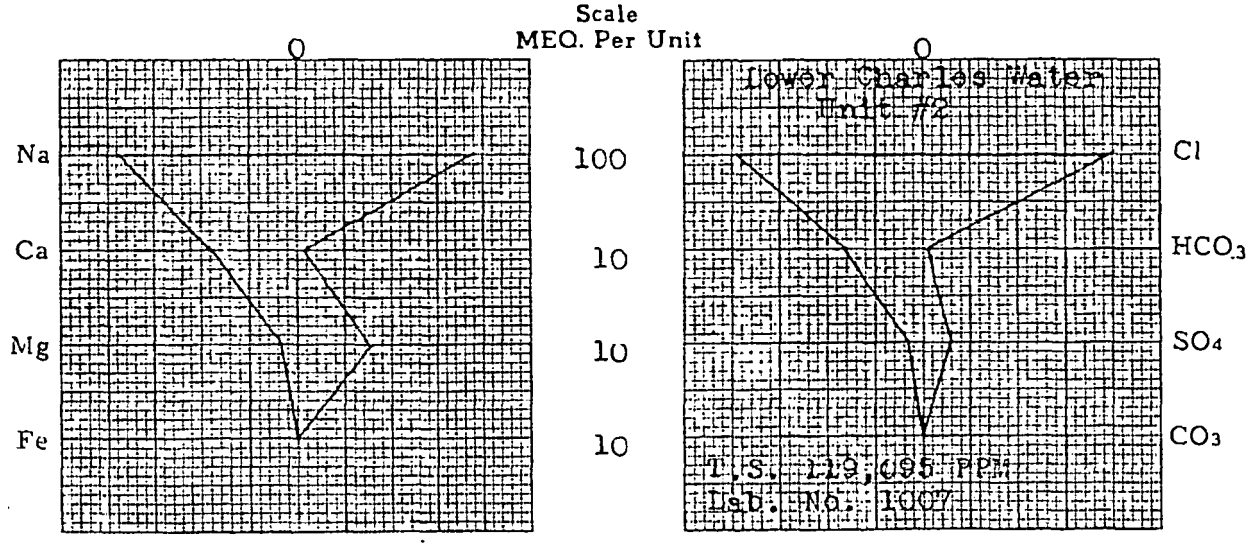
Constituents	PPM	MEQ.	MEQ. %
Sodium	43,510	1892.57	47.37
Calcium	1736	86.63	2.17
Magnesium	225	18.50	0.46
Sulfate	3735	77.69	1.94
Chloride	67,840	1913.09	47.89
Carbonate	0	0	0
Bicarbonate	422	6.92	0.17
Hydroxide	0	0	0

Total Solids in Parts per Million
By evaporation: 119,520
After ignition: 118,350
Calculated: 117,255

pH: 6.2
Specific gravity @ 60°F: 1.086
Resistivity @ 68°F ohms/meter³: 0.085

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



Correlation: Lower Charles Water.

SPECIALIZING IN CORE, WATER, GAS AND CRUDE OIL ANALYSES

WESTERN LITHO-PRINT, INC., BILLINGS, MONT

YAPUNCICH-SANDERSON LABORATORIES

P. O. BOX 593 — BILLINGS, MONTANA — 5 & 9½ N. 25TH ST.

Lab. No. EXTRA (41)

WATER ANALYSIS REPORT

Field: East Poplar — County: Roosevelt — State: Montana
Well No.: Unit #3 — Location: C SW SW 1-28N-51E
Formation: Lower Charles — Depths: 5760-5775'
Operator: C. H. Murphy Corporation — Date Sampled:
DST No.: 4 — Sample No.: — Date Analyzed: 5-27-52
Other Data: Clear water sample. Some organic matter present.

Constituents	PPM	MEQ.	MEQ. %
Sodium	43,510	1892.57	47.37
Calcium	1736	86.63	2.17
Magnesium	225	18.50	0.46
Sulfate	3735	77.69	1.94
Chloride	67,840	1913.09	47.89
Carbonate	0	0	0
Bicarbonate	422	6.92	0.17

Total Solids in Parts per Million

By evaporation: 119,520
After ignition: 118,350
Calculated: 117,255

pH: 6.2

Specific gravity @ 60°F: 1.086

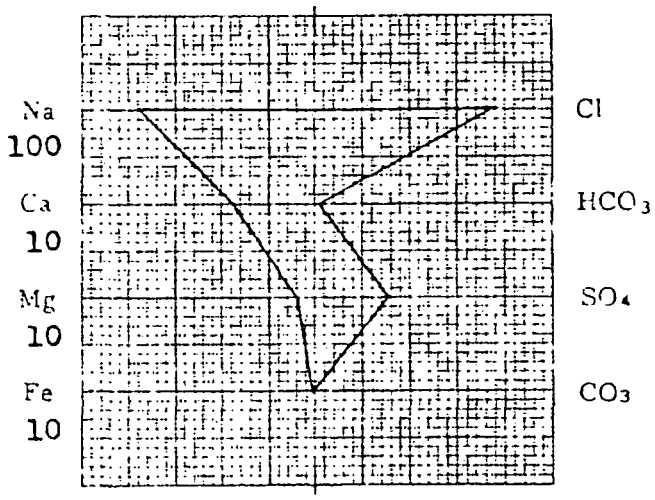
Resistivity @ 68°F ohms/meter³: 0.085

Chloride as NaCl: 111,868 PPM. Total Solids From Resistivity as NaCl: 115,431 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



Billings CORE-LAB

5 NORTH 25TH ST.
BILLINGS, MONTANA

Lab. No. 1037

WATER ANALYSIS REPORT

Field: East Poplar — County: Roosevelt — State: Montana
Well No.: Unit #3 — Location: C SW SW 1-28N-51E
Formation: Lower Charles — Depths: 5760-5775
Operator: C. H. Murphy Corporation — Date Sampled:
DST No.: 4 — Sample No.: — Date Analyzed: 5-27-52
Other Data: Clear water sample. Some organic matter present.

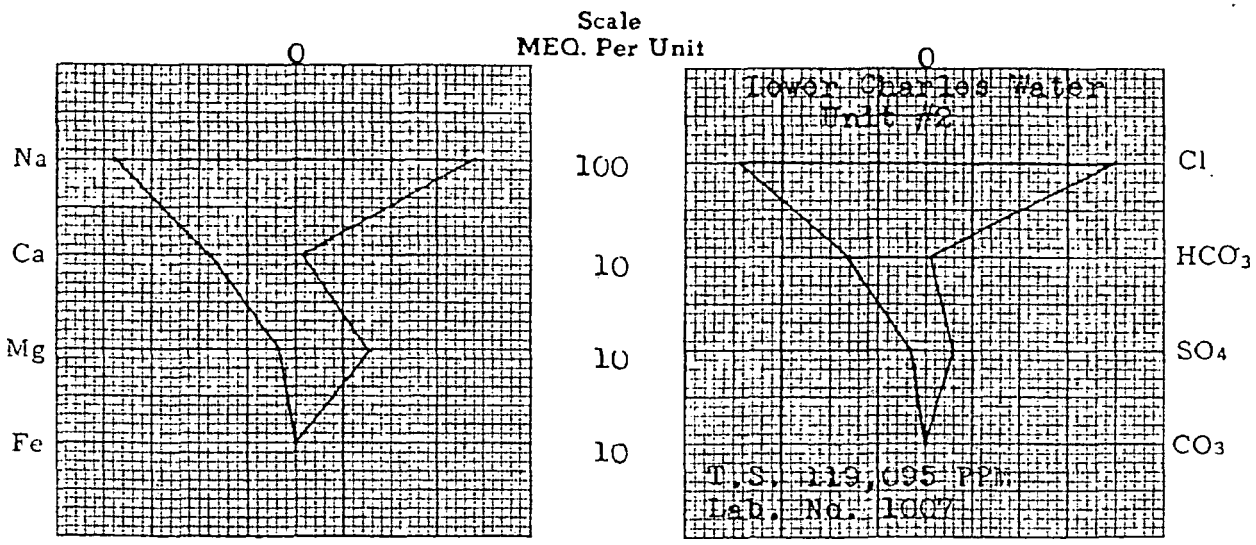
Constituents	PPM	MEQ.	MEQ. %
Sodium	43,510	1892.57	47.37
Calcium	1736	86.63	2.17
Magnesium	225	18.50	0.46
Sulfate	3735	77.69	1.94
Chloride	67,840	1913.09	47.89
Carbonate	0	0	0
Bicarbonate	422	6.92	0.17
Hydroxide	0	0	0

Total Solids in Parts per Million
By evaporation: 119,520
After ignition: 118,350
Calculated: 117,255

pH: 6.2
Specific gravity @ 60°F: 1.086
Resistivity @ 68°F ohms/meter³: 0.085

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



Correlation: Lower Charles Water.

SPECIALIZING IN CORE, WATER, GAS AND CRUDE OIL ANALYSES

WESTERN LITHO-PRINT, INC., BILLINGS, MONT.

YAPUNCICH-SANDERSON LABORATORIES
P. O. BOX 593 BILLINGS, MONTANA 5 & 9 N. 25TH ST.

Lab. No. EXTRA (38)

WATER ANALYSIS REPORT

Field East Poplar County Roosevelt State Montana
Well No 3 Unit Location C SW SW 1-28N-51E
Formation Lower Charles Depth 5740-5760'
Operator C. H. Murphy Corporation Date Sampled
DST No 2 Sample No Date Analyzed 6-14-52
Other Data Mud in sample. Oil on top. Filtrate clear and colorless. Organic matter present.

Constituents	PPM	MEQ.	MEQ. %
Sodium	33,463	1455.53	45.09
Calcium	2808	140.12	4.34
Magnesium	222	18.25	0.57
Sulfate	5584	116.15	3.60
Chloride	53,000	1494.60	46.30
Carbonate	0	0	0
Bicarbonate	192	3.15	0.10

Total Solids in Parts per Million
By evaporation 108,660
After ignition 103,360
Calculated 95,172

pH 5.6

Specific gravity @ 60°F 1.081

Resistivity @ 68°F ohms/meter³ 0.085

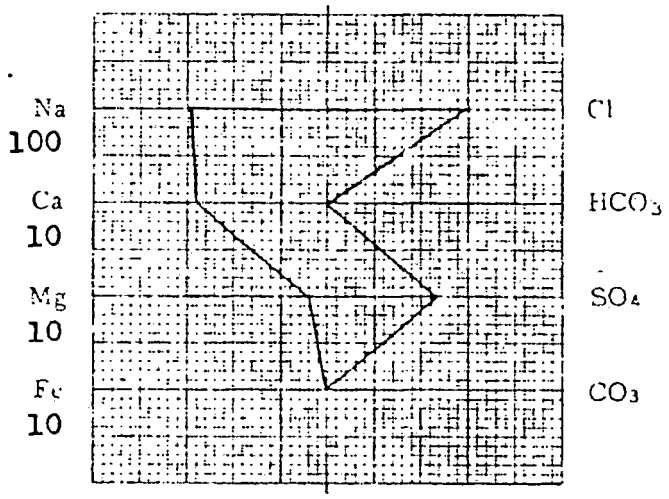
Chloride as NaCl 87,397 PPM

Total Solids From Resistivity as NaCl 92,419 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



YAPUNCICH-SANDERSON LABORATORIES

P. O BOX 593 — BILLINGS, MONTANA — 5 & 914 N. 25TH ST.

Lab. No. EXTRA (40)

WATER ANALYSIS REPORT

Field: East Poplar — County: Roosevelt — State: Montana
Well No.: 3 Unit — Location: C SW SW 1-28N-51E
Formation: Madison — Depths: 5892-5904'
Operator: C.H. Murphy Corporation — Date Sampled:
DST No.: — Sample No.: — Date Analyzed: 6-14-52
Other Data: Clear amber colored water. Organic mattar present.

Constituents	PPM	MEQ.	MEQ. %
Sodium	16,303	709.15	38.28
Calcium	3752	187.22	10.10
Magnesium	360	29.99	1.62
Sulfate	1122	23.34	1.26
Chloride	31,800	896.76	48.40
Carbonate	0	0	0
Bicarbonate	382	6.26	0.34

Total Solids in Parts per Million

By evaporation 56,736
After ignition 55,688
Calculated 53,525

pH 5.8

Specific gravity @ 60°F 1.046

Resistivity @ 68°F ohms/meter³ 0.144

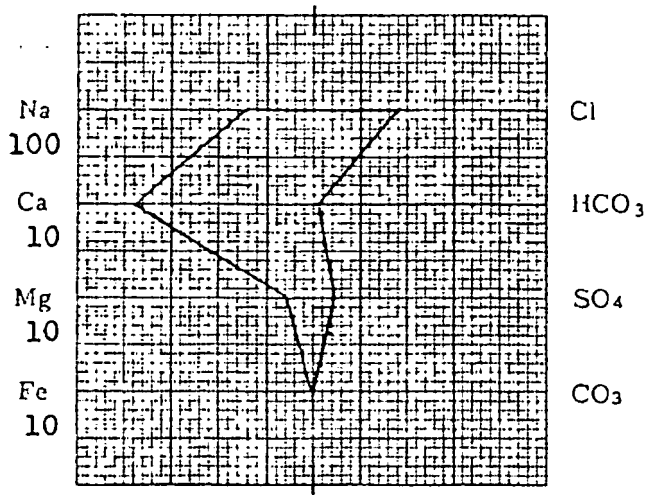
Chloride as NaCl 52,438 PPM.

Total Solids From Resistivity as NaCl 5,3051 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



Billings CORE-LAB

5 NORTH 25TH ST.
BILLINGS, MONTANA

Lab. No. 1056-2

WATER ANALYSIS REPORT

Field: East Poplar
County: Roosevelt
State: Montana
Well No.: 3 Unit
Location: C SW SW 1-28N-51E
Formation: Madison
Depths: 5892'-5904'
Operator: C. H. Murphy Corporation
Date Sampled:
DST No.: Sample No.: Date Analyzed: 6-14-52
Other Data: Clear amber colored water. Organic matter present.

Constituents	PPM	MEQ.	MEQ. %
Sodium	16,303	709.15	38.28
Calcium	3752	187.22	10.10
Magnesium	360	29.99	1.62
Sulfate	1122	23.34	1.26
Chloride	31,800	896.76	48.40
Carbonate	0	0	0
Bicarbonate	382	6.26	0.34
Hydroxide	0	0	0

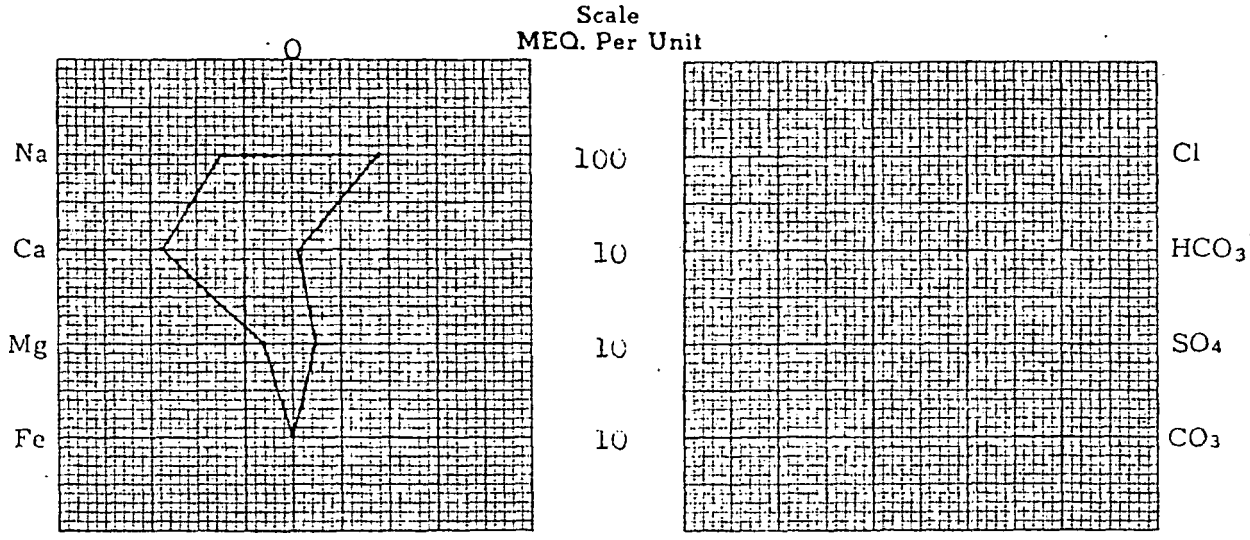
Total Solids in Parts per Million

By evaporation: 56,736
After ignition: 55,688
Calculated: 53,525

pH: 5.8
Specific gravity @ 60°F: 1.046
Resistivity @ 68°F ohms/meter³: 0.144

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



Correlation: Madison water.

SPECIALIZING IN CORE, WATER, GAS AND CRUDE OIL ANALYSES

WESTERN LITHO-PRINT, INC., BILLINGS, MONT.

Billings CORE-LAB

5 NORTH 25TH ST.
BILLINGS, MONTANA

Lab. No. 1056-1

WATER ANALYSIS REPORT

Field: East Poplar — County: Roosevelt — State: Montana
Well No.: 3 Unit — Location: C SW SW 1-23N-51E
Formation: Lower Charles B-2 — Depths: 5740'-5760'
Operator: C. H. Murphy Corporation — Date Sampled:
DST No.: 2 — Sample No.: — Date Analyzed: 6-14-52
Other Data: Mud in sample. Oil on top. Filtrate clear and colorless. Organic matter present.

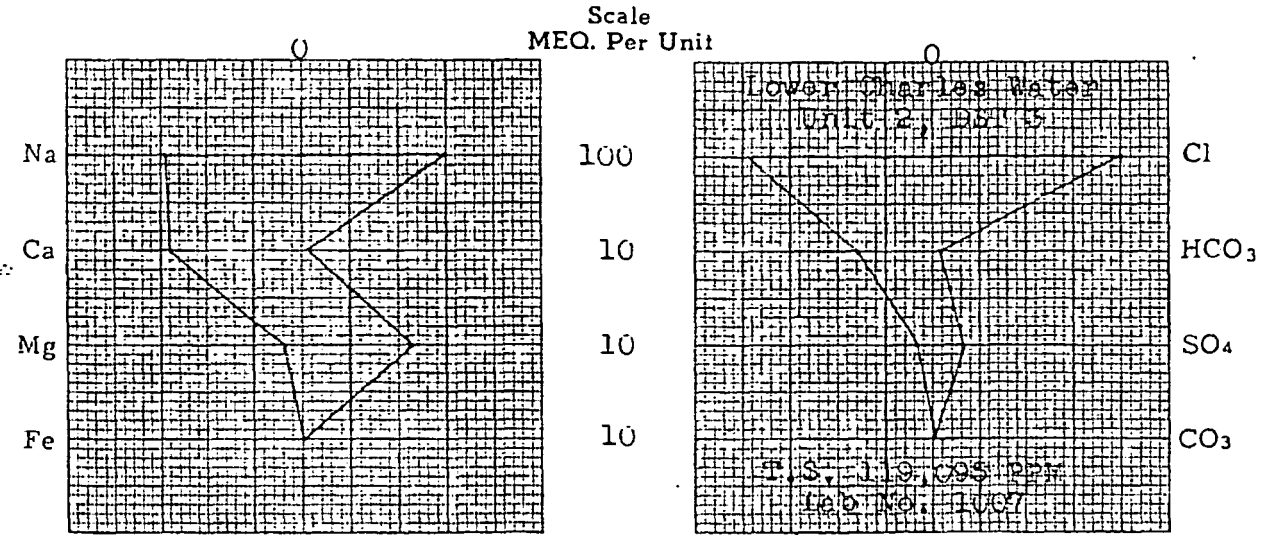
Constituents	PPM	MEQ.	MEQ. %
Sodium	33,463	1455.53	45.09
Calcium	2808	140.12	4.34
Magnesium	222	18.25	0.57
Sulfate	5584	116.15	3.60
Chloride	53,000	1494.60	46.30
Carbonate	0	0	0
Bicarbonate	192	3.15	0.10
Hydroxide	0	0	0

Total Solids in Parts per Million

By evaporation	108,660
After ignition	103,360
Calculated	95,172
pH	5.6
Specific gravity @ 60°F	1.081
Resistivity @ 68°F ohms/meter³	0.085

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



Correlation: Lower Charles water contaminated with drilling water. (Gypsum mud)

SPECIALIZING IN CORE, WATER, GAS AND CRUDE OIL ANALYSES

WESTERN LITHO-PRINT, INC., BILLINGS, MONT.

EAST POPLAR UNIT NO. 3

ACID JOB

Lease and Well Number: East Poplar Unit No. 3

Field: East Poplar Unit County: Roosevelt State: Montana

Well Location: SW NW Section 1, T28N, R51E

Status Prior To Present Job:

Date Completed: June 7, 1952 Date Last Workover: April, 1968

Producing Zone: A-4 Zone Perforations: 5599-5603'

T.D.: 5968' PBTD: 5618' Cumulative Production: 102,420 BO 201,229 B

Latest Test: 11 BOPD 44 BWPD 80% W.C.

Justification For Workover:

Production has decreased from 139 BOPD 52 BWPD 27% W.C., Workover Potential, to 11 BOPD 44 BWPD 80% W.C.. The fluid production decline is not normal and the formation is probably blocked. Acidize the well with 1000 gallons 15% HCL acid. Swab spent acid, trip tubing and pump test.

Summary Of Workover:

7-8-68 Reacidize 5618' PBTD
Pulled rods and tubing. Removed anchor catcher and seating shoe.

7-9-68 5618' PBTD
Ran 2-3/8" tubing with Baker Retievamatic packer. Filled hole with water. Tested lines and well head to 2500#. Set packer at 4862' with bottom of tubing at 5606'. Acidized A-4 perforations at 5599-5603' using 1000 gallons of Dowell 15% HCL as follows: Spotted acid on perforations. Pressured annulus to 1500#, formation started taking acid at 900#. Injected 3 bbls. acid at 1/2 BPM with a maximum pressure of 2600#. Gradually decreasing pressure to 1300# at end of job. Left 1 bbl. acid in tubing. ISIP 1300#, 5 min. SIP 300#. Flowed spent acid to pit. Packer failed to release. Turned well to tank battery for overnight test.

Well flowing 75 to 85% water to pit. Turned to tank battery at 3:00 P.M.

15 Hr. Test Flowed 87 BF. This A.M. water cut 99%.

7-10-68 5618' PBTD Pump Testing
Circulated hole with salt water to kill flow. Pressured annulus with hot oil truck. Released Baker packer. Tripped tubing to remove packer. Landed bottom of tubing at 5612' with anchor at 4833'. Ran rods with 1-1/2" bore pump. Started pumping at 5:00 P.M. 7-9-68.

15 Hr. Test Pumped 184 BF = 294 BFPD 98% Water 6 BOPD 288 BWPD.

7-11-68 5618' PBTD Pump Testing
6 Hr. Test Pumped 71.72 BF 98% Water Cut = 287 BFPD 6 BOPD 281 BWPD.

7-12-68 5618' PBTD Pumping No Test Water Cut 99%

7-13-68 5618' PBTD Pumping 99% Water Cut

7-14-68 5618' PBTD Pumping 99% Water Cut

7-15-68 5618' PBTD Pumping 99% Water Cut

7-16-68 5618' PBTD Pumping 99% Water Cut

7-17-68 5618' PBTD Pumping at the rate of 279 BFPD 99% Water Cut 4 BOPD 275 BWPD
Water Draw Test.
Workover Potential. To Drop From Report.
(No pump 30 days before abandoning)

Recap Of Workover:

Final Perforations:	5599-5603'
Final PBTD:	5618'
Producing Formation:	A-4 Zone
Workover Potential:	279 BFPD 99% W.C. 4 BOPD 275 BWPD

Workover Unsuccessful. Oil Production decreased from 11 BOPD to 4 BOPD and the water increased from 44 BWPD to 275 BWPD.

Tubing Record:

1 Cond. @ 2-3/8", 4.70#, J-55, 8rd., Range 2, EUE Tbg.	30.80
2 Cond. @ 2-3/8", EUE X 8' Tubing Subs	16.40
153 Cond. @ 2-3/8", Tubing as above	4,777.22
1 Cond. @ Baker Model B-3 Anchor Catcher	3.20
24 Cond. @ 2-3/8" Tubing as above	744.46
1 Cond. @ 2-3/8" X 1-25/32" Seating Nipple	1.10
1 Cond. @ 2-3/8" Tubing as above w/btm. orange-peeled to 1-1/4" opening	29.45
TOTAL	5,602.63
Landed Below RKB	9.00
Landed At	5,611.63

Baker 2-3/8" X 4-1/2" Model B-3 Anchor Catcher @ 4833'. To release find free-point and turn 5 rotations to right.

Top of 4-1/2". 16.60# Liner at 3137'. Tight Spots in Liner at 3657' and 4940'.

Ran new 2" X 1-1/2" X 16' THD Pump.
Rod Count 63 3/4" and 133 5/8"

TREATMENT REPORT
DWL-494-1 PRINTED IN U.S.A.

DOWELL

DOWELL DIVISION OF THE DOW CHEMICAL COMPA

DATE: 4-30-68

WELL NAME AND NUMBER: E.P.U #3	LOCATION:	CUSTOMER REPRESENTATIVE: Kinard + James	TREATMENT NUMBER: 15-02-5420
POOL: E.P.U.	FORMATION: "A" Zone	JOB DONE DOWN: TUBING A ☑ CASING B ☐ ANNULUS C ☐	ALLOWABLE PRESSURE: TBG: 1800 CSG:
COUNTY: Roosevelt	STATE: Montana	TYPE OF WELL: OIL A ☑ GAS B ☐ WATER C ☐ INJ. D ☐	
TYPE OF SERVICE: Acid		AGE OF WELL: NEW WELL A ☐ REWORK B ☐	TOTAL DEPTH: 5680 / CIRC. BHT.

CASING SIZE	CASING DEPTH	TUBING SIZE	TUBING DEPTH
5 1/2"	5700	2"	5612
LINER SIZE	LINER DEPTH	PACKER TYPE	PACKER DEPTH
		—	—
OPEN HOLE	CSG. OR ANRL. VOL.	TBG VOLUME	STATIC BHT.
	78	21.8	

CUST. NAME: Murphy Oil Corporation

ADDRESS: Murphy Building
El Dorado, Arkansas

CITY, STATE & ZIP CODE:

REMARKS: Acidize "A" Zone

FOR CONVERSION PURPOSES 24 BBLS EQUALS 1000 GALLONS

ARRIVED ON LOCATION: 8:00

PERFORATED INTERVALS

DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES
5599 to 5603					

TIME	INJECTION RATE	INJECTION BBLS IN	PRESSURE CSG.	PRESSURE TBG.	SERVICE REMARKS
8:10	AM				Test Line, O.K.
8:11					Start ~~500 Gal XFW to~~ Water Spot Down Tubing to Fill
8:30		76			Hole Full - Prepare to Spot Acid
8:31					Start 500 XFW To Spot Down Tub
8:40					Acid on Spot - Close Csg Valve - over Spotted 1 Bbl
9:00		1		1400	1 Bbl Pumped - 1 3/4 Bled Bg
9:30				1800	Pumping + Bleeding Acid By Intermittently
10:00				1800	Pumping + Bleeding By
11:00		4.6		1800	4.6 Bbl Displaced, Job Complete Reverse Acid
					out of Annulus To Pit
12:00					Acid Reversed out - Job Complete

Thanks

TIME LEFT LOCATION	AVG. LIQUID INJ. RATE	ADJ. INJ. RATE (SOLIDS INC.)	TOTAL FLUID PUMPED: OIL / WATER
1:00 P.M.			
MAX. PRESSURE	AVG. PRESSURE	FINAL PUMP IN PRESSURE	SHUT IN PRESSURE: IMMEDIATE / 15 MINUTE

PROPS AND LIQUIDS INJECTED

TYPE	SIZE OR PURPOSE	AMOUNT
XFW	Acid	500

DOWELL LOCATION: Glendive 02

DOWELL ENGINEER: Lewis Correll

DATE	CUSTOMER REP. CONTACTED	CUSTOMER CONSIDERED SERVICE	PROD. BEFORE TREATMENT	PROD. AFTER TREATMENT
		☐ SATISFACTORY ☐ UNSATISFACTORY ☐ UNKNOWN	☐ TEST ☐ ALLOWABLE	DAYS ☐ TEST ☐ ALLOWABLE

TREATMENT REPORT

DOWL-494-I PRINTED IN U.S.A.

DOWELL WELL DIVISION OF THE DOW CHEMICAL COMPANY

DATE: 7-8-68

WELL NAME AND NUMBER: EPU #3	LOCATION:	CUSTOMER REPRESENTATIVE: MR James & Kinard	TREATMENT NUMBER: 15-02-5499
POOL: Poplar Unit	FORMATION: Charles	JOB DONE DOWN: TUBING A ☒ CASING B ☐ ANNULUS C ☐	ALLOWABLE PRESSURE: TBG: 3000 CSG: 1500
COUNTY: Roosevelt	STATE: Montana	TYPE OF WELL: OIL A ☒ GAS B ☐ WATER C ☐ INJ. D ☐	
TYPE OF SERVICE: Acid		AGE OF WELL: NEW WELL A ☑ REWORK B ☐	TOTAL DEPTH: CIRC. BHT.

CASING SIZE	CASING DEPTH	TUBING SIZE	TUBING DEPTH
5½		2⅜	5606
LINER SIZE	**LINER DEPTH**	**PACKER TYPE**	**PACKER DEPTH**
		Baker	4862
OPEN HOLE	**CSG. OR ANRL. VOL.**	**TBG VOLUME**	**STATIC BHT.**
	~~22~~	22	—

CUST. NAME: Murphy oil Corporation

ADDRESS: murphy Building

CITY: El Dorado

STATE & ZIP CODE: Arkansas

REMARKS:

acidize Charles with 1000 gal XFW

FOR CONVERSION PURPOSES 24 BBLS EQUALS 1000 GALLONS

ARRIVED ON LOCATION:

PERFORATED INTERVALS

DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES
5599					
5603	4 per ft				

TIME	INJECTION RATE	INJECTION BBLS IN	PRESSURE CSG.	PRESSURE TBG.	SERVICE REMARKS
9.30					Start water to Fill hole
10.02		55	300	150	Hole circulated 55 BBLs
1003	1.35				Start acid to spot packer open
1020	1.35	23			Acid on perforations 23 BBLs in hole set packer
1030					Pressure check lines
1033	.25				start flush
1041	½	4	1000	2000	shut down to put 1500 PSI on csg.
1042					Resume pumping
1044	1	5	1500	2500	Pressure Break
1046	1	6	1500	2500	
1053	1	13	1500	2000	13 BBl acid displaced shut down to pick up fluid
1057	1				Resume pumping 1 BPM
1103	1	17	1500	1600	
1107		22	1500	1300	Shut down acid displaced
					ISDP. 1000 PSI
					MAX Pressure - 2500 PSI
					min Pressure - 700 PSI
					MAX rate - 1 BPM
					Avg rate - ¾ BPM
					min rate - ¼ BPM

TIME LEFT LOCATION	AVG. LIQUID INJ. RATE	ADJ. INJ. RATE (SOLIDS INC.)	TOTAL FLUID PUMPED: OIL / WATER
	¾ BPM		
MAX. PRESSURE	**AVG. PRESSURE**	**FINAL PUMP IN PRESSURE**	**SHUT IN PRESSURE: IMMEDIATE / 15 MINUTE**
2500		1300	1000 / 0

PROPS AND LIQUIDS INJECTED

TYPE	SIZE OR PURPOSE	AMOUNT
XFW	Acidize	1000

DOWELL LOCATION: Glendive 02

DOWELL ENGINEER: J. D. Kennedy, Lewis Correll

CALL BACK	DATE	CUSTOMER REP. CONTACTED	CUSTOMER CONSIDERED SERVICE ☐ SATISFACTORY ☐ UNSATISFACTORY ☐ UNKNOWN	PROD. BEFORE TREATMENT: TEST / ALLOWABLE	PROD. AFTER TREATMENT: DAYS / TEST / ALLOWABLE

Files

DOWELL

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

CUSTOMER

SERVICE AND INVOICE NUMBER _____

TERMS: NET 30. ADD LEGAL INTEREST THEREAFTER.

Please indicate on all remittances and send to: **1579 EAST 21 STREET TULSA, OKLAHOMA 74114**

SERVICE ORDER RECEIPT AND INVOICE

DATE	CUSTOMER ORDER NO.	SHIPPED VIA	SERVICE FROM DOWELL STATION	OUTPOST
[illegible]		[illegible]		

WELL NAME AND NUMBER	LOCATION AND POOL
[illegible]	
COUNTY, CITY (IF WITHIN CITY LIMITS) & STATE	TYPE OF SERVICE

CUSTOMER'S NAME _____

ADDRESS _____

CITY, STATE AND ZIP CODE _____ ZIP CODE _____

SERVICE INSTRUCTIONS: _____

FRACTURING LICENSE FEE STATEMENT: Must be signed ONLY if the fracturing license fee does not apply because the fracturing fluid used in this treatment was either:

1 - Unthickened water or acid.
2 - Crude oil produced from the same formation in the same field as the well being treated.

EXEMPT-GAL.

CUSTOMER BY _____ AUTHORIZED AGENT

SERVICE ORDER

IMPORTANT: SEE OTHER SIDE FOR TERMS & CONDITIONS

I have read, understood and agreed to the terms and conditions printed on the reverse side hereof and represent that I have full authority to accept same and sign this order.

CUSTOMER BY _____ AUTHORIZED AGENT

ITEM NO.	QUANTITY	UNIT	MATERIAL, EQUIPMENT AND SERVICES USED	UNIT PRICE	AMOUNT
			Chg. To [illegible]		
			Used For		
			Acid Job - AFE		
			AFE No 8-1515		
			Service Rec'd		
			Dist. Approval		
			SUB TOTAL		
			Gallons License Fee		
			Gallons License Fee		
	%		Tax on $		
	%		Tax on $		
				TOTAL	$

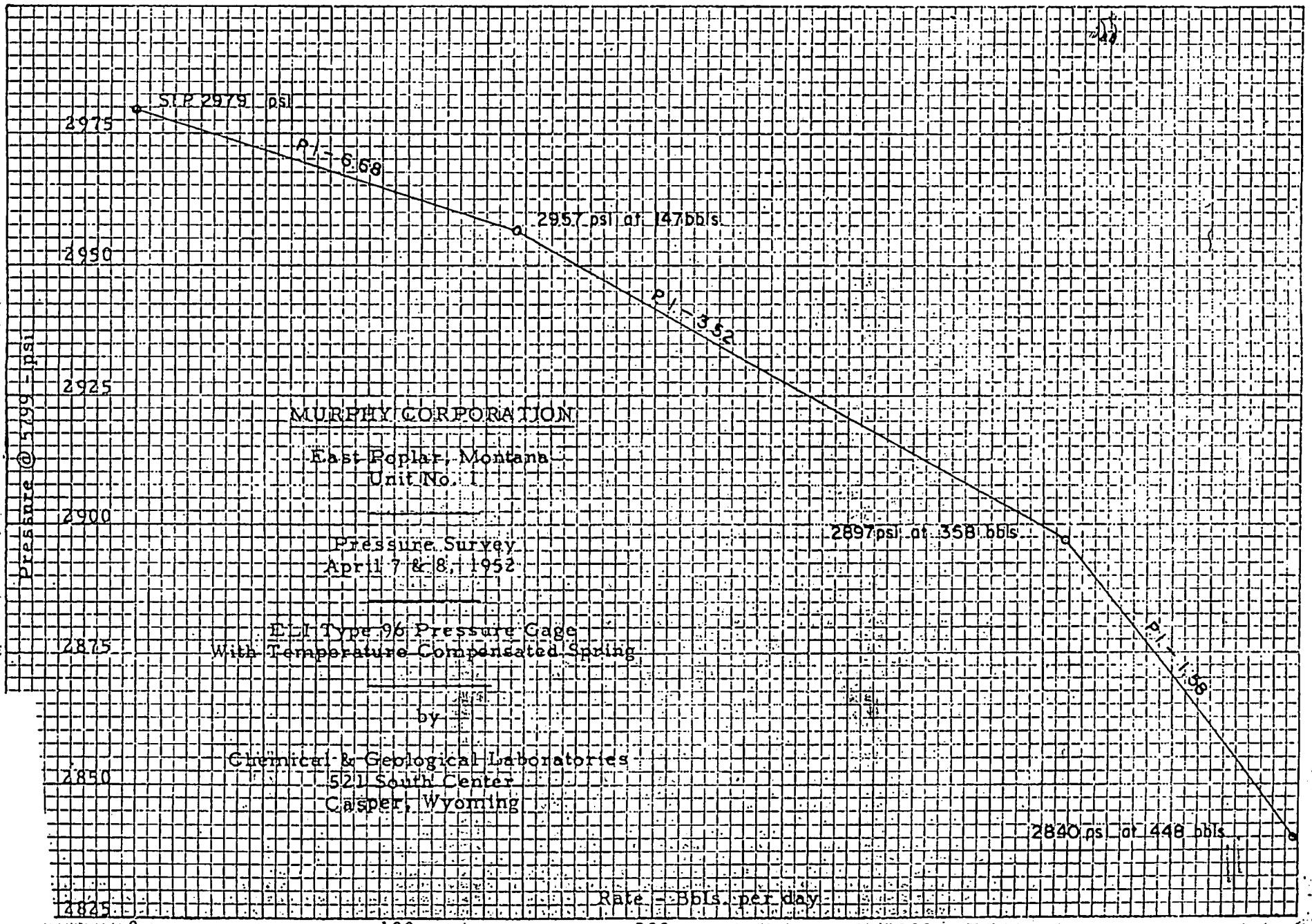
DOWELL ENGINEER _____ PAYROLL INITIALS _____

RECEIPT: The undersigned hereby certifies that the materials and equipment listed above were received and the services were performed in a workmanlike manner.

CUSTOMER BY _____ AUTHORIZED AGENT

DWL 260-G Printed in U.S.A.

PLUGGING &
ABANDONMENT


S.I.P. 2979 psi
P/T 6.68
2957 psi at 147 bbls
P/T 3.52
2897 psi at 358 bbls
P/T 1.58
2840 ps at 448 bbls
2975
2950
2925
2900
2875
2850
2825
Pressure @ 5799 - psi
0
100
200
300
400
Rate - Bbls. per day
MURPHY CORPORATION
East Poplar, Montana
Unit No. 1
Pressure Survey
April 7 & 8, 1952
ELI Type 96 Pressure Gage
With Temperature Compensated Spring
by
Chemical & Geological Laboratories
521 South Center
Casper, Wyoming

SUMMARY OF FIELD NOTES - MADISON LIME TEST

Date	Time	Tank Gage	Bbls. Prod.	Gas Vol. Cu. Ft.	Tubing Pressure	Remarks
4/7/52	11:45 AM				870 psi	Open well - 10/64" choke
4/7/52	12:00 Noon	10"-3-1/4"			775 psi	
4/7/52	2:00 PM	10-10-1/8	37.33	4550	775 psi	
4/7/52	3:00 PM	11-1-3/4	19.68	5950	775 psi	
4/7/52	4:00 PM	11-5	17.65	6380	775 psi	
4/7/52	4:10 PM					Change choke to 9 8/64"
4/7/52	5:00 PM	11-7½	13.57	4440	835 psi	
4/7/52	6:00 PM	11-10	13.57	4440	835 psi	
4/7/52	7:00 PM	12-1	16.29	4150	835 psi	
4/8/52	9:15 AM					Open well - 6/64" choke.
4/8/52	9:30 AM	12-1			910 psi	
4/8/52	10:30 AM	12-2	5.43	2720	910 psi	
4/8/52	11:30 AM	12-3½	8.15	2530	910 psi	
4/8/52	12:30 PM	12-4½	5.43	2810	910 psi	
4/8/52	1:30 PM	12-5-3/4	6.79	2720	910 psi	Shut In @ 1:30 PM

CLI-16

BOTTOM HOLE PRESSURE SURVEY

Date April 9, 1952

Company Murphy Corporation Field East Poplar Lease and Well No. 1

Location C SW NE 2-28N-51E County Roosevelt State Montana

WELL DATA:

Elevation: 2135 DF / 2123 Ground Datum Point: 5650 Top Charles

Formation: Charles Perforation: 5648-80

N.T.D.: 5827 Tubing Press: 815 psi S.I.

Casing: 7" @ 5814 Casing Press: 815 psi S.I.

Tubing: 2½" EUE @ 5750

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole				

FLOW DATA

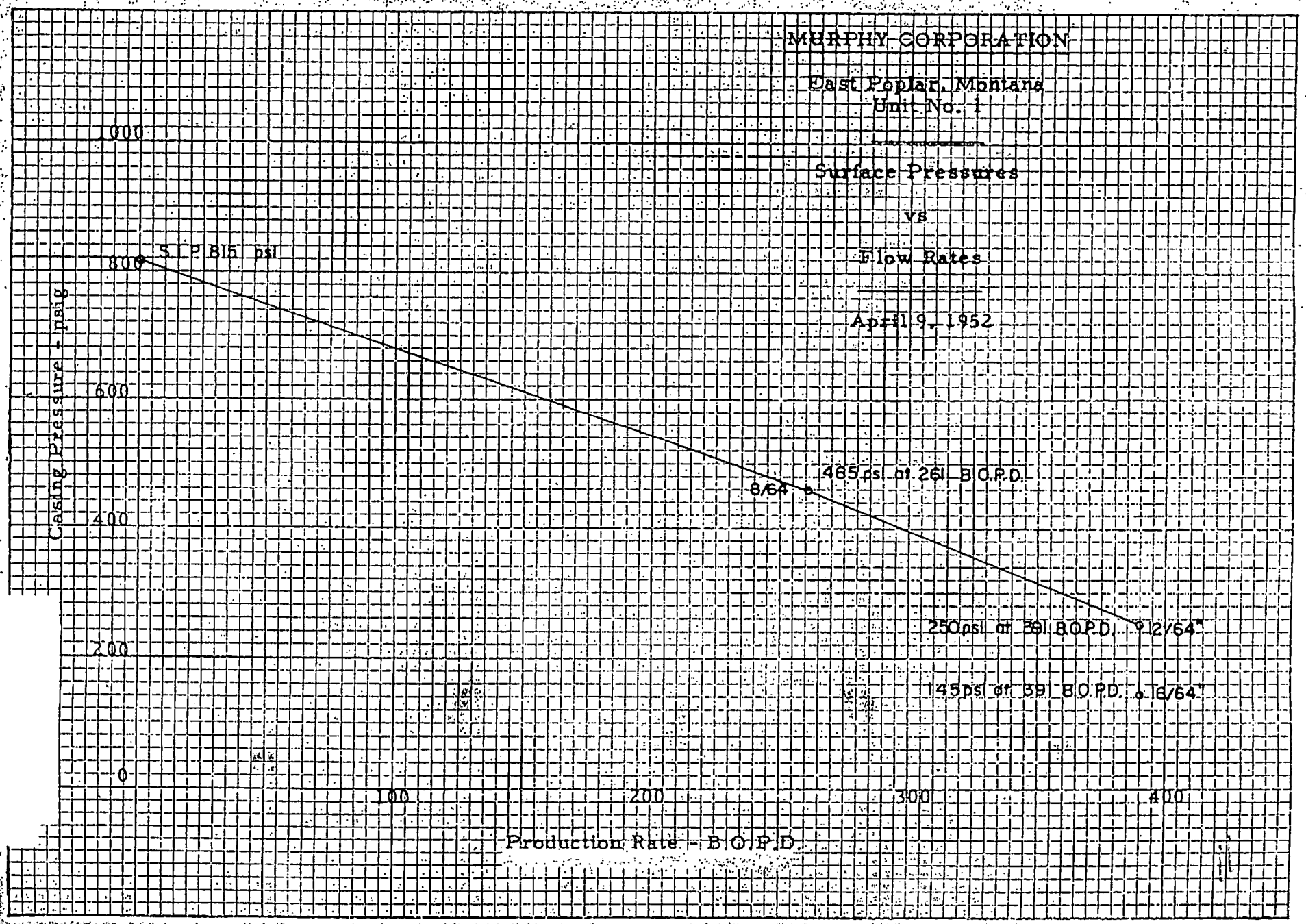
Prod. Rate Bbls./Day	Casing Press. psig	Gas Volume Cu. Ft. Daily (uncorrected)	G/OR	Choke Size
391	145	9150	23/1	16/64"
391	250	7150	18/1	12/64"
261	465	5600	21/1	8/64"
S.I.	815	- -		- - -

Calculated Bottom Hole Pressure @ 5650 - 2900 psig.

Bottom Hole Temperature @ 5650 - 242°F.

Remarks:

CHARLES BRUNING COMPANY, INC. NO. 700-10
10 x 10 to the inch.
DATA SHEETS



SUMMARY OF FIELD NOTES - CHARLES TEST

Tubing Pressure - 910 psi Casing Pressure - 750 psi

Date	Time	Tank Gage	Bbls. Prod.	Gas Vol. Cu. Ft.	Casing Pressure	Remarks
4/9/52	7:10 AM				750 psi	Open well - 16/64" choke
	7:20 AM	13'-9"			210 psi	
	8:20 AM	14-0½	19.01	5970	145 psi	6/10% B.S.&W.
	9:20 AM	14-3½	16.29	8520	150 psi	40.4 °API
	10:20 AM	14-6½	16.29	9150	145 psi	
	10:30 AM					Install - 12/64" choke
	11:30 AM	14-9	13.58	6850	250 psi	
	12:30 PM	15-0	16.29	7150	250 psi	
		13-10-3/4				
	1:30 PM	14-1-3/4	16.29	7100	250 psi	
	1:40 PM					Install - 8/64" choke
	2:40 PM	14-4	12.22	5590	465 psi	
	3:40 PM	14-6	10.86	6160	465 psi	
	4:40 PM	14-8	10.86	5180	465 psi	Shut In

CHEMICAL & GEOLOGICAL LABORATORIES

CHEMISTS GEOLOGISTS ENGINEERS

P.O. BOX 279
CASPER, WYOMING

April 28, 1952

Murphy Corporation
Murphy Building
El Dorado, Arkansas

Attn: Mr. Sweeny

Dear Sir:

Inclosed are 10 copies of reports on the pressure and subsurface studies of the Charles and Madison formations of your Unit No. 1, East Poplar, Montana.

The bottom hole pressure recorded at the top of the Madison lime was 2979 psig, and a temperature of 247°F. was measured. By using the same gradient, the bottom hole pressure of the Charles formation was computed to be 2900 psig at a datum of 5650', and a temperature of 242°F. was calculated. The pressures are normal for this area, but the temperatures are higher than generally found in the Rocky Mountain area.

Both the subsurface samples have similar characteristics and probably can be treated as a single reservoir. However, it is to be noted that the permeabilities of the two formations are vastly different. The oils are low viscosity with very little gas in solution, indicating that production control is entirely water drive. The activity of the water drive can only be determined by future tests.

Bottom hole flowing pressure tests were taken on the Madison, and surface pressure flowing tests were taken on the Charles. Results of these tests are given in tabular and graphic form. It should be noted that the surface pressures of the Charles formation dropped well below the shut-in pressure on the flow tests, while the drop in surface pressure during the Madison tests was not large. This would indicate that the Madison potential is greater.

It should also be noted that the production rate from the Charles formation was the same on the two largest chokes, indicating that 390 BOPD is the capacity of the well.

It is our recommendation that the Charles be produced at 300 BOPD, or less. The Madison can be produced at higher rates without

injury to the well, but water cut should be closely watched and at the first indication of water rates should be reduced.

We trust that this work has been completed to your satisfaction, and hope we may be of service to you in the future.

Yours very truly,

CHEMICAL & GEOLOGICAL LABORATORIES

F. Raymond Wheeler

F. Raymond Wheeler
Petroleum Engineer

FRW:gmz

CL-1—1M
PRAIRIE PUBLISHING CO — 34810

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

REPORT ON SUB-SURFACE OIL SAMPLE

WELL RECORD

Field East Poplar County Roosevelt State Montana

Well No. 1 Unit Location C SW NE 2-28N-51E Formation Madison

Company The C. H. Murphy, Jr., Corp. Date sampled 4/9/52 Lab No. E-386

WELL CHARACTERISTICS

Elevation 2135 (DF) Total depth 9163 Completion depth 5827

Tubing size 2½" Depth 5750

Well flowing 362 B/D through 8/64" Choke

Well making water None % Cut

Remarks 7" OD casing set at 5814'. Packer set at 5750'. Madison produced through tubing. Madison formation. 5799-5827'

SAMPLING CONDITIONS

Sampled at surface by FRW & BEE Date 4/9/52

Flowing hrs. @ B/D hrs. before sampling.

Shut in 24 hrs. before sampling.

Tubing pressure 870 psi after well shut in 12 hrs.

Casing pressure 815 psi after well shut in 12 hrs.

Choke

Remarks

BOTTOM HOLE TEMPERATURE AND PRESSURE DATA

Information by FRW & BEE

Bottom hole static pressure @ 5799 feet: 2979 psi.

Bottom hole temperature @ 5799 feet: 247 °F.

CLI-2-1M
PRAIRIE PUBLISHING CO.—34864

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Madison

Company C. H. Murphy, Jr., Corporation Analysts BEE

REPORT ON SUB-SURFACE OIL SAMPLE

Volumetric Data of Bottom Hole Sample

1. Saturation Pressure (bubble point) 125 PSI @ 247 °F.

2. Thermal expansion of saturated oil @ 3000 PSI:

$$\frac{V \text{ @ } 160 \text{ °F}}{V \text{ @ } 73 \text{ °F}} = 1.0380$$

$$\frac{V \text{ @ } 247 \text{ °F}}{V \text{ @ } 73 \text{ °F}} = 1.0761$$

2. Compressibility of saturated oil @ 247 °F:

From 2980 PSI to 125 PSI = $.96 \times 10^{-7}$

From _____ PSI to _____ PSI = _____

From _____ PSI to _____ PSI = _____

4. Specific volume at saturation pressure: Cu. ft/lb 0.0214 @ 247 °F.

CLI-4-1M
PRAIRIE PUBLISHING CO.—34064

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Madison

Company The C. H. Murphy, Jr., Corporation Analysts BEE

REPORT ON SUB-SURFACE OIL SAMPLE

Flash Liberation

Separator pressure PSI gauge	Separator Gas-Oil Ratio	Stock Tank Gas-Oil Ratio	Stock Tank Gravity °API	Shrinkage Factor Vr/Vs	Formation Volume Factor Vs/Vr	Sp. G. flashed gas
0	11.9	---	40.0	0.908	1.101	1.191
10	9.0	0.15	40.2	0.932	1.072	
20	6.0	3.5	40.4	0.930	1.075	

Calculated shrinkage from 2980 to 0 lbs.
separator pressure - - - - - - - 9.0%

V = Volume at indicated pressure
Vs = Volume of saturated oil at saturation pressure
Vr = Volume of residual oil at 60°F. and 14.7 psia

CLI-3-1M
PRAIRIE PRINTING CO.—34864

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Madison

Company The C. H. Murphy, Jr., Corporation Analysts BEE

REPORT ON SUB-SURFACE OIL SAMPLE

Bottom Hole Sample Tabular Data

Pressure PSI Gauge	Pressure-Volume Relation @ 247 °F. Vol. Factor V/Vs	Viscosity of Oil @ 247 °F. Centipoises	Differential Liberation @ ____ °F. Gas-Oil Ratio Liberated	Gas-Oil Ratio In Solution	Vol. Factor Vs /Vr
3000	0.972	1.06			
* 2980	0.973	1.05	Low saturation pressure makes		
2500	0.976	1.02	differential liberation impractical.		
2000	0.980	0.98			
1500	0.985	0.96			
1000	0.989	0.93			
750	0.992	0.92			
500	0.995	0.91			
250	0.998				
225		0.89			
** 125	1.000	0.88			
110		0.89			
90	1.101				
60		0.90			
40	1.630				
20	2.352				
12	3.029				
0		0.94			

* Reservoir Pressure

** Saturation Pressure

V = Volume at indicated pressure
Vs = Volume of saturated oil at saturation pressure
Vr = Volume of residual oil at 60°F. and 14.7 psia

CHEMICAL & GEOLOGICAL LABORATORIES

521 South Center St. P. O. Box 279
Casper, Wyoming

GAS ANALYSIS REPORT

Field East Poplar, Montana Well No. 1 Unit
Operator C. H. Murphy, Jr., Corporation Location C. SW NE 2-28N-51E
Formation Madison Depths 5799-5827 Lab. No. E-386
Analyzed by CED & BEE Date
Remarks

ORSAT ANALYSIS

	% by Volume
Oxygen	0
Nitrogen	27.57
Carbon dioxide	13.18
Hydrogen sulfide	1.39
~~Methane~~	
~~Ethane and higher~~	
Total Hydrocarbons	57.86
Specific Gravity (calculated)	
Specific Gravity (observed)	
Gross B.t.u. per cu. ft. at 60° F. and 14.7 psia	

PODBIELNIAK
Low Temperature Fractionation

	% by Volume	G. P. M.
Oxygen		
Nitrogen		
Carbon dioxide		
Hydrogen sulfide		
Methane		
Ethane		
Propane		
Isobutane		
N-butane		
Isopentane		
N-pentane		
Hexanes & higher		
TOTAL		

Gross B.t.u. at 60° F. and 14.7 psia by Pod.
Specific Gravity by Pod.
Specific Gravity by Weight

G. P. M.

Actual pentanes
Calculated at 12 lbs.
Calculated at 15 lbs.
Calculated at 22 lbs.
Calculated at 26 lbs.

Vapor pressure (calculated) of actual pentanes

HYDROGEN SULFIDE
(by Tutwiler Method)

Grains of hydrogen sulfide per 100 cu. ft. of gas at 60° F. and 14.7 psia 873

Percentage of hydrogen sulfide 1.39

Remarks and Conclusions: Sample air contaminated - Analysis reported on an air free basis.

CHEMICAL & GEOLOGICAL LABORATORIES

Specializing in Petroleum Production Chemistry

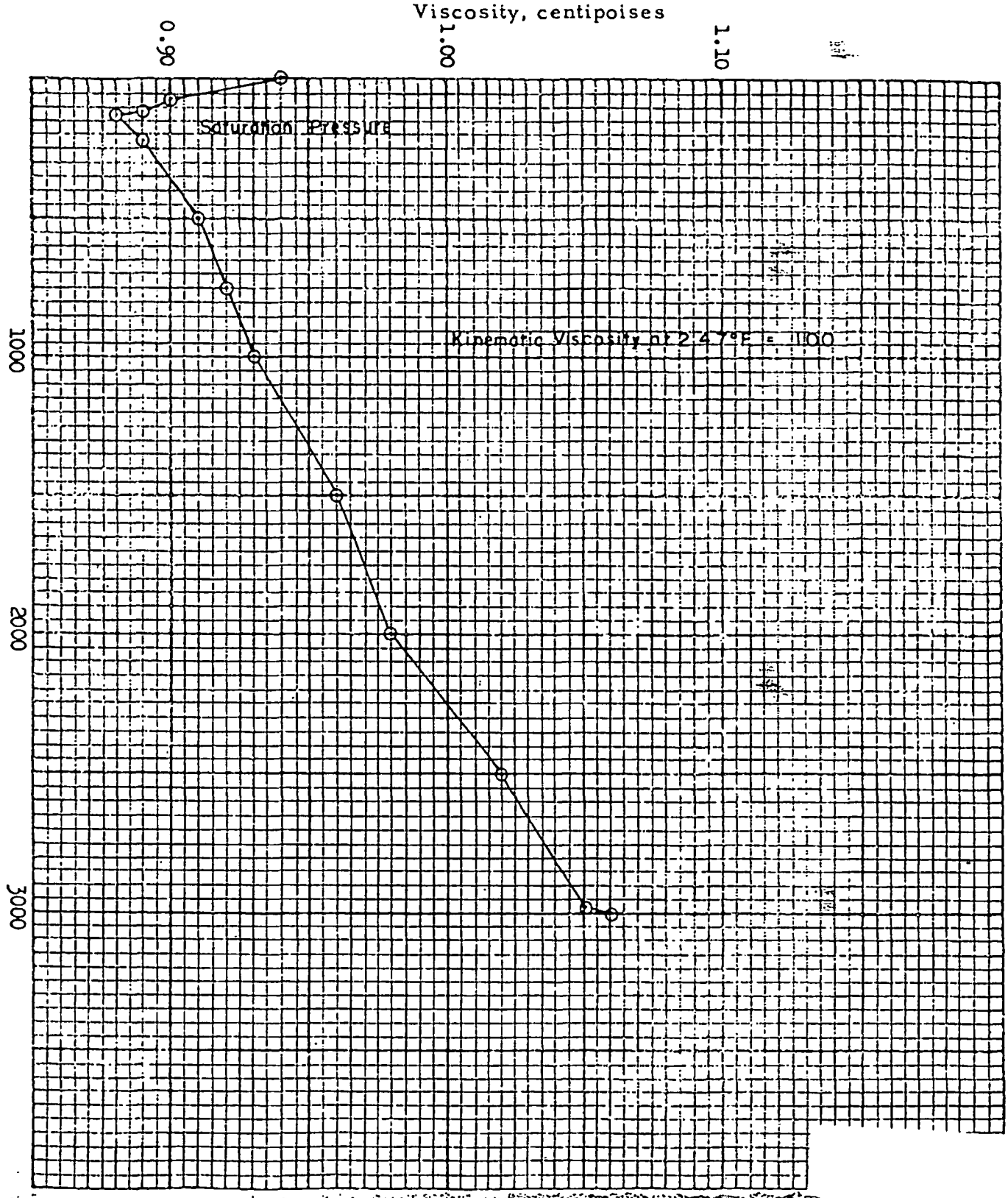
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Madison

Company The C. H. Murphy, Jr. Corp. Analysts BEE

Viscosity of Subsurface Sample @ 247°F.



CHEMICAL & GEOLOGICAL LABORATORIES

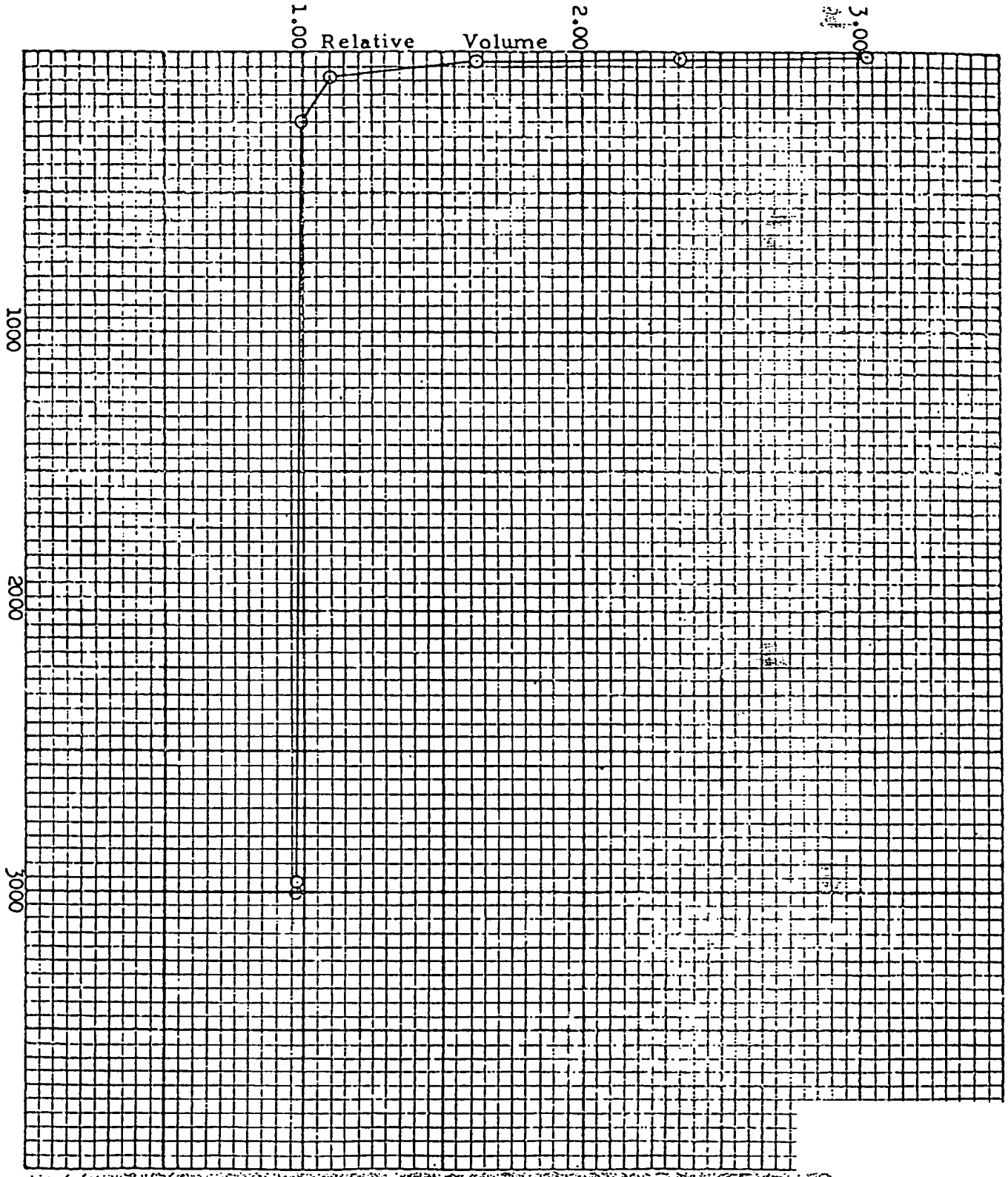
Specializing in Petroleum Production Chemistry

Casper, Wyoming

Field	East Poplar	County	Roosevelt	State	Montana
Well	1 Unit	Location	C SW NE 2-28N-51E	Formation	Madison
Company	The C. H. Murphy, Jr., Corp.	Analysts	BEE		

Pressure Volume Relations @ 247°F.

Volume at indicated pressure referred to volume at saturation.



CLI-1—1M
PRAIRIE PUBLISHING CO.—234310

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

REPORT ON SUB-SURFACE OIL SAMPLE

WELL RECORD

Field East Poplar County Roosevelt State Montana

Well No. 1 Unit Location C SW NE 2-28N-51E Formation Charles Sand

Company The C. H. Murphy Jr., Corp. Date sampled 4/9/52 Lab No. E-386

WELL CHARACTERISTICS

Elevation 2135 (DF) Total depth 9163 Completion depth 5827

Tubing size 2½" Depth 5750

Well flowing 261 B/D through 8/64" Choke

Well making water None % Cut

Remarks 7" OD casing set at 5814. Charles sand produced through annulus of casing and tubing. Charles formation, 5648-80.

SAMPLING CONDITIONS

Sampled at surface by FRW & BEE Date 4/9/52

Flowing 9 hrs. @ 300 B/D for 9 hrs. before sampling.

Started sampling as soon as well was shut-in.

Tubing pressure 870 psi after well shut in 12 hrs.

Casing pressure 815 psi after well shut in 12 hrs.

Choke

Remarks Sampled at surface. GOR approximately 20.

BOTTOM HOLE TEMPERATURE AND PRESSURE DATA

Information by FRW and BEE

Bottom hole static pressure @ 5648 feet: 2900 psi.

Bottom hole temperature @ 5648 feet: 242 °F.

CLI-2-1M
PRAIRIE PUBLISHING CO.—34064

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Charles Sar

Company The C. H. Murphy, Jr., Corp. Analysts BEE

REPORT ON SUB-SURFACE OIL SAMPLE

Volumetric Data of Bottom Hole Sample

1. Saturation Pressure (bubble point) 138 PSI @ 242 °F.

2. Thermal expansion of saturated oil @ 3000 PSI:

$$\frac{V \text{ @ } 157 \text{ °F}}{V \text{ @ } 72 \text{ °F}} = 1.0379$$

$$\frac{V \text{ @ } 242 \text{ °F}}{V \text{ @ } 72 \text{ °F}} = 1.0757$$

2. Compressibility of saturated oil @ 242 °F:

From 2884 PSI to 138 PSI = 95×10^{-7}

From _____ PSI to _____ PSI = _____

From _____ PSI to _____ PSI = _____

4. Specific volume at saturation pressure: Cu. ft/lb. 0.0212 @ 242 °F.

CL1-4-1M
PRAIRIE PUBLISHING CO.—34864

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Charles Sand

Company The C. H. Murphy Jr., Corp. Analysts BEE

REPORT ON SUB-SURFACE OIL SAMPLE

Flash Liberation

Separator pressure PSI gauge	Separator Gas-Oil Ratio	Stock Tank Gas-Oil Ratio	Stock Tank Gravity °API	Shrinkage Factor Vr/Vs	Formation Volume Factor Vs/Vr	Sp. G flashe gas
0	19.4	---	39.7	0.902	1.109	1.184
10	9.9	0.24	40.3	0.905	1.104	
20	5.7	5.1	40.4	0.906	1.104	

Calculated shrinkage from 2885 to 0 lbs.
separator pressure - - - - - - - - 9.5%

V = Volume at indicated pressure
Vs = Volume of saturated oil at saturation pressure
Vr = Volume of residual oil at 60°F. and 14.7 psia

CLI-3-1M
PRAIRIE PUBLISHING CO.—34864

CHEMICAL LABORATORIES, INC.

Specializing in Petroleum Production Chemistry
Casper, Wyoming

Field East Poplar County Roosevelt State Montana

Well 1 Unit Location C SW NE 2-28N-51E Formation Charles Sand

Company The C. H. Murphy, Jr., Corp. Analysts BEE

REPORT ON SUB-SURFACE OIL SAMPLE

Bottom Hole Sample Tabular Data

Pressure PSI Gauge	Pressure-Volume Relation @ 242 °F. Vol. Factor V/Vs	Viscosity of Oil @ 242 °F. Centipoises	Differential Liberation @ ____ °F. Gas-Oil Ratio Liberated	Gas-Oil Ratio In Solution	Vol. Factor Vs /Vr
3000	0.973				
* 2885	0.974	1.19			
2500	0.976	1.17			
2000	0.981	1.11			
1500	0.985	1.06			
1000	0.990	1.02			
800	0.992				
700		1.00			
600	0.994				
500		0.98			
400	0.997				
250		0.96			
200	0.999				
** 138	1.000	0.95			
105	1.091				
90		0.98			
75	1.162				
60		0.99			
55	1.549				
40		1.00			
30	2.144				
20	2.665				
0		1.11			

Low saturation pressure, differential liberation impractical.

* Reservoir Pressure

** Saturation Pressure

V = Volume at indicated pressure
Vs = Volume of saturated oil at saturation pressure
Vr = Volume of residual oil at 60°F. and 14.7 psia

C.L.I.-18
PRAIRIE PUBLISHING CO.—46507

CHEMICAL & GEOLOGICAL LABORATORIES

521 South Center St. P. O. Box 279
Casper, Wyoming

GAS ANALYSIS REPORT

Field East Poplar, Montana Well No. 1 Unit
Operator C. H. Murphy, Jr., Corporation Location C SW NE 2-28N-51E
Formation Charles Sand Depths 5648-5680 Lab. No. E-386
Analyzed by BEE & CED Date
Remarks

ORSAT ANALYSIS

	% by Volume
Oxygen	0
Nitrogen	39.19
Carbon dioxide	6.55
Hydrogen sulfide	0.65
~~Methane~~	
~~Ethane and higher~~	
Total Hydrocarbons	53.61
Specific Gravity (calculated)	--
Specific Gravity (observed)	--
Gross B.t.u. per cu. ft. at 60° F. and 14.7 psia	--

PODBIELNIAK
Low Temperature Fractionation

	% by Volume	G. P. M.
Oxygen		
Nitrogen		
Carbon dioxide		
Hydrogen sulfide		
Methane		
Ethane		
Propane		
Isobutane		
N-butane		
Isopentane		
N-pentane		
Hexanes & higher		
TOTAL		

Gross B.t.u. at 60°F. and 14.7 psia by Pod.
Specific Gravity by Pod.
Specific Gravity by Weight

G. P. M.

Actual pentanes +
Calculated at 12 lbs.
Calculated at 15 lbs.
Calculated at 22 lbs.
Calculated at 26 lbs.

Vapor pressure (calculated) of actual pentanes +

HYDROGEN SULFIDE
(by Tutwiler Method)

Grains of hydrogen sulfide per 100 cu. ft. of gas at 60° F. and 14.7 psia 408

Percentage of hydrogen sulfide 0.65

Remarks and Conclusions:

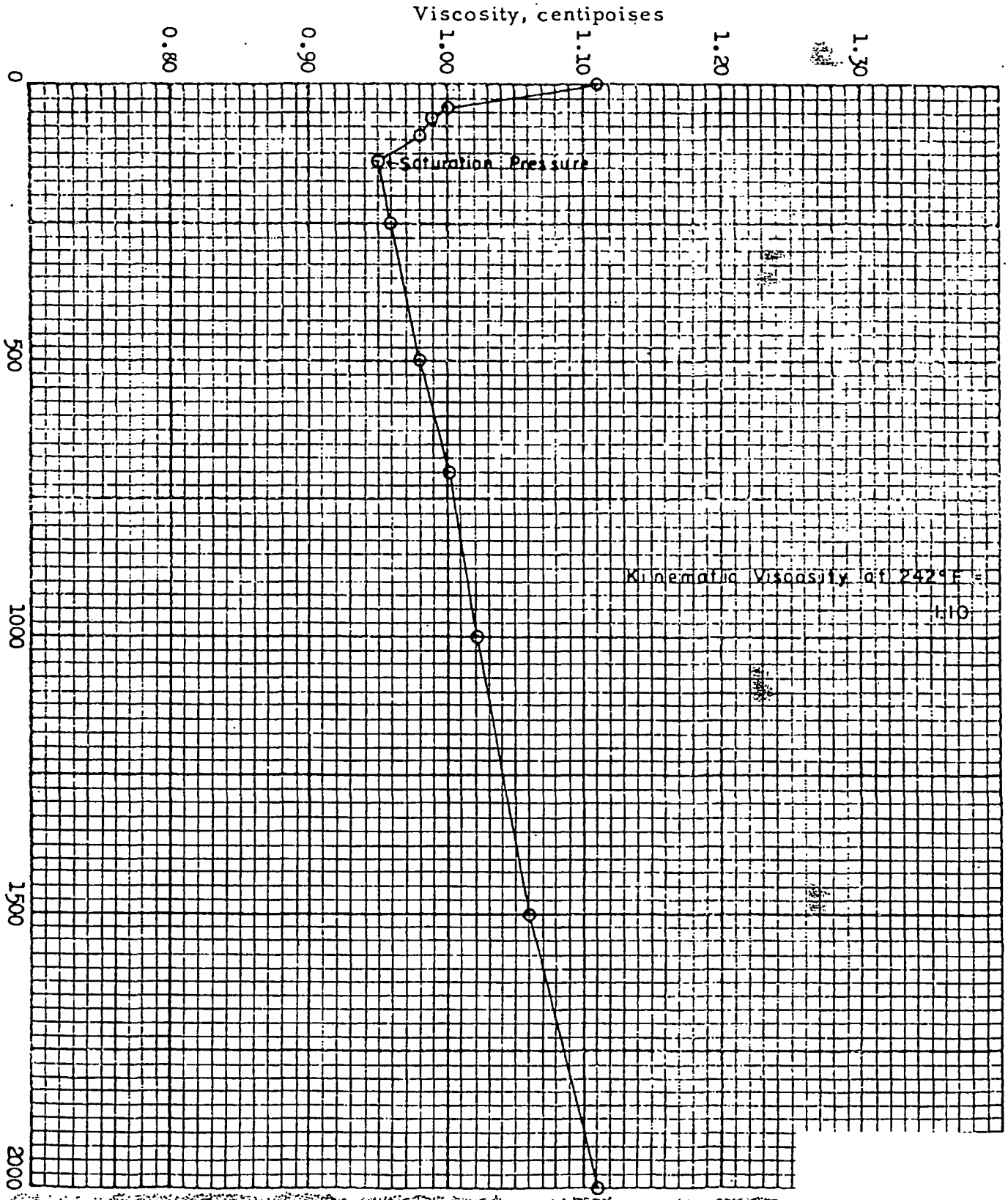
CHEMICAL & GEOLOGICAL LABORATORIES

Specializing in Petroleum Production Chemistry

Casper, Wyoming

Field	East Poplar	County	Roosevelt	State	Montana
Well	1 Unit	Location	C SW NE 2-28N-51E	Formation	Charles Sand
Company	The C. H. Murphy, Jr. Corp.	Analysts		BEE	

Viscosity of Subsurface Sample @ 242°F.



CHEMICAL & GEOLOGICAL LABORATORIES

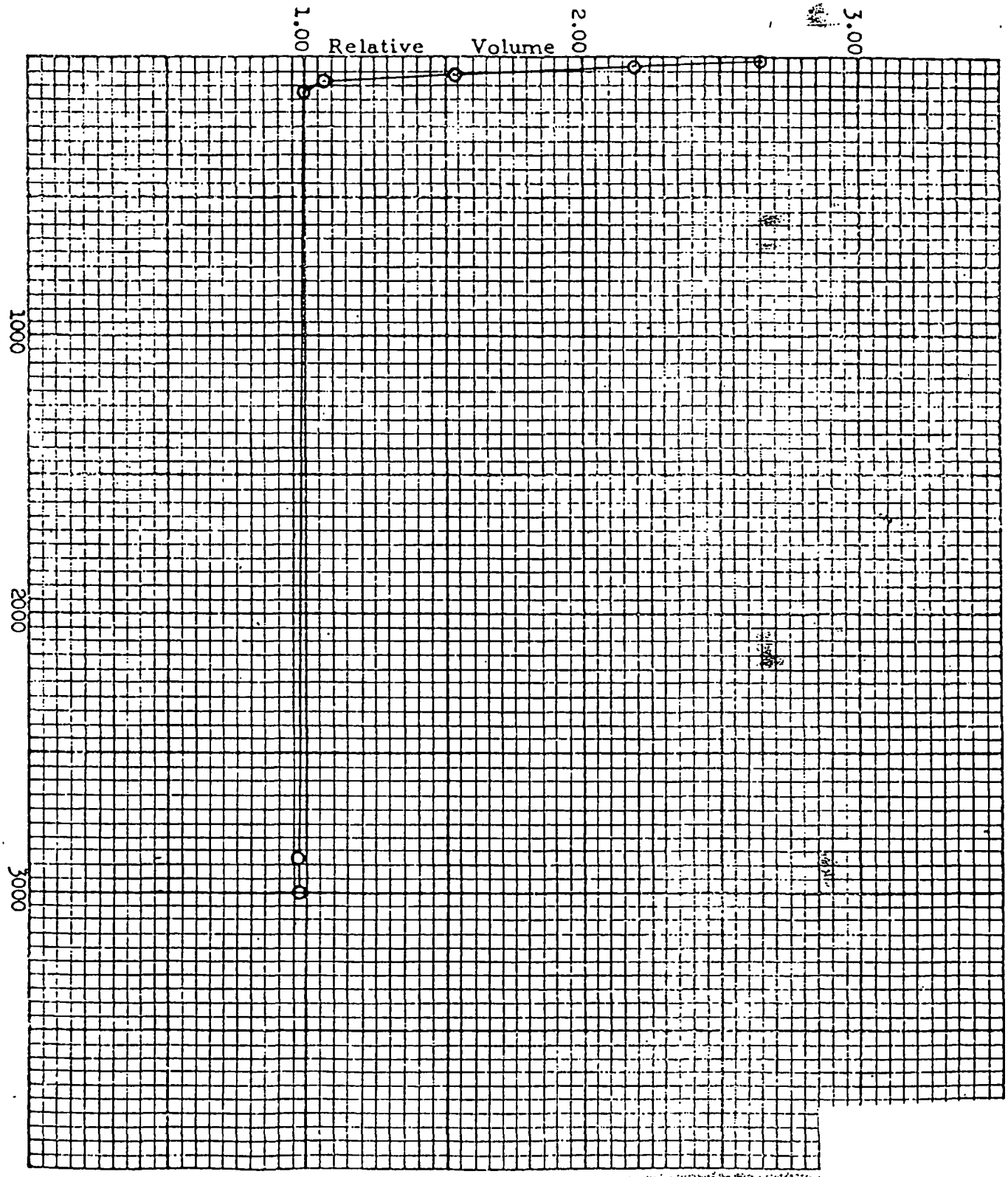
Specializing in Petroleum Production Chemistry

Casper, Wyoming

Field	East Poplar	County	Roosevelt	State	Montana
Well	1 Unit	Location	C SW NE 2-28N-51E	Formation	Charles Sand
Company	The C. H. Murphy, Jr., Corp.	Analysts	BEE		

Pressure Volume Relations @ 242°F.

Volume at indicated pressure referred to volume at saturation.



BOTTOM HOLE PRESSURE SURVEY

Date July 27, 1952

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 1 Unit

Location C SW NE 2-28N-51E County Roosevelt State Montana

WELL DATA:

Elevation: 2123 Datum Point: 5799

Formation: Mississippian Perforation: 5799-5827

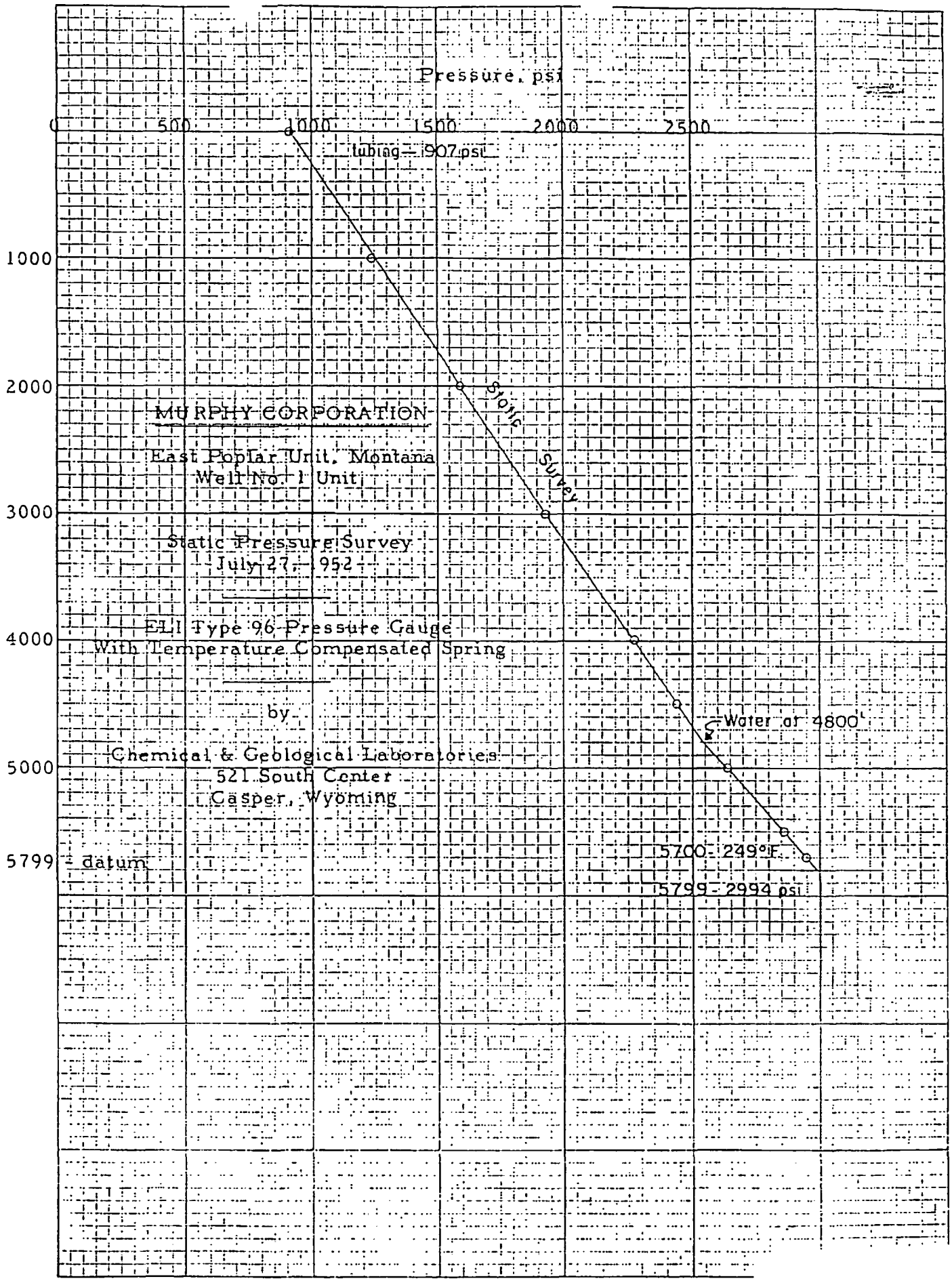
P.T.D.: 5827 Tubing Press: 900 psi

Casing: 7" OD @ 5814 Casing Press:

Tubing: 2½" EUE @ 5750 on packer

Depth	Extension Inches	Pressure	Gradient #/100	Additional Information
Top Hole	1.120	907 psi	33.5	
1000	1.570	1242	34.0	
2000	2.030	1582	34.3	
3000	2.490	1925	34.3	
4000	2.950	2268	34.2	
4500	3.180	2439	40.4	
5000	3.450	2641	44.2	
5500	3.745	2861	44.5	
5700	3.865	2950		
5799		2994 (extrapolated to datum)		

Remarks: Temperature @ 5700 - 249°F.


Pressure, psi
0
500
1000
1500
2000
2500
tubing — 907 psi
1000
2000
3000
4000
5000
5799 - datum
Depth - feet
Static Survey
MURPHY CORPORATION
East Poplar Unit, Montana
Well No. 1 Unit
Static Pressure Survey
July 27, 1952
ELI Type 96 Pressure Gauge
With Temperature Compensated Spring
by
Chemical & Geological Laboratories
521 South Center
Casper, Wyoming
Water at 4800'
5700 - 249°F
5799 - 2994 psi
DATA SHEETS
CHARLES BRUNING COMPANY, INC
10 x 10 to the inch.

CLI-18

BOTTOM HOLE PRESSURE SURVEY

(Static)

Date August 27, 1952

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 1

Location C SW NE 2-28N-51E County Roosevelt State Montana

WELL DATA:

Elevation: 2123 Datum Point: 5799

Formation: Mississippian Perforation: 5799-5827

P. T. D.: 5827 Tubing Press: 950 psi

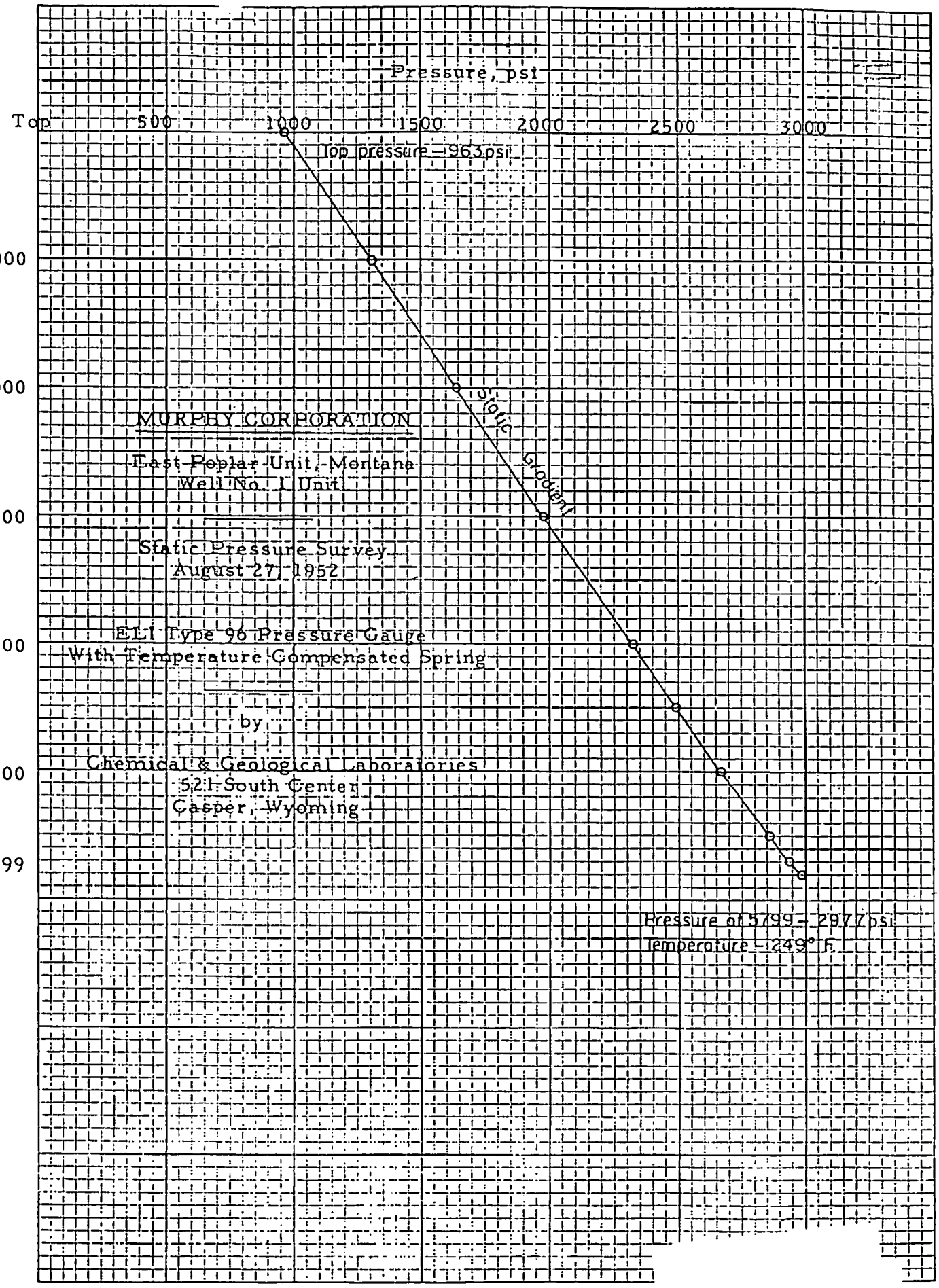
Casing: 7" OD @ 5814 Casing Press: - - -

Tubing: 2½" EUE @ 5750 on packer.

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole	1.195	963 psi		
			34.1	
1000	1.653	1304		
			34.1	
2000	2.110	1645		
			33.8	
3000	2.565	1983		
			34.3	
4000	3.025	2326		
			33.4	
4500	3.250	2493		
			32.8	
5000	3.470	2657		
			39.2	
5500	3.735	2853		
			41.2	
5700	3.845	2936		
5799		2977 (extrapolated)		

Remarks:

Water found in diaphragm of bomb.
Temperature @ 5700 - 249°F.
All measurements from D. F.


Pressure, psi
Top
500
1000
1500
2000
2500
3000
Top pressure = 963 psi
1000
2000
3000
4000
5000
5799
Depth, feet
Static Gradient
MURPHY CORPORATION
East Poplar Unit, Montana
Well No. 1 Unit
Static Pressure Survey
August 27, 1952
ELI Type 96 Pressure Gauge
With Temperature Compensated Spring
by
Chemical & Geological Laboratories
521 South Center
Casper, Wyoming
Pressure at 5799 = 2977 psi
Temperature = 249° F.
DATA SHEETS
NO. 700-10
CHARLES DRUHING COMPANY, INC.
10 x 10 to the inch.

CLI-16

BOTTOM HOLE PRESSURE SURVEY
(Static)

Date: October 1, 1952

Company: Murphy Corporation Field: East Poplar Unit Lease and Well No.: 1

Location: C SW NE 2-28N-51E County: Roosevelt State: Montana

WELL DATA:

Elevation: 2123 KB Datum Point: 5799

Formation: Mississippian Perforation: 5799-5827

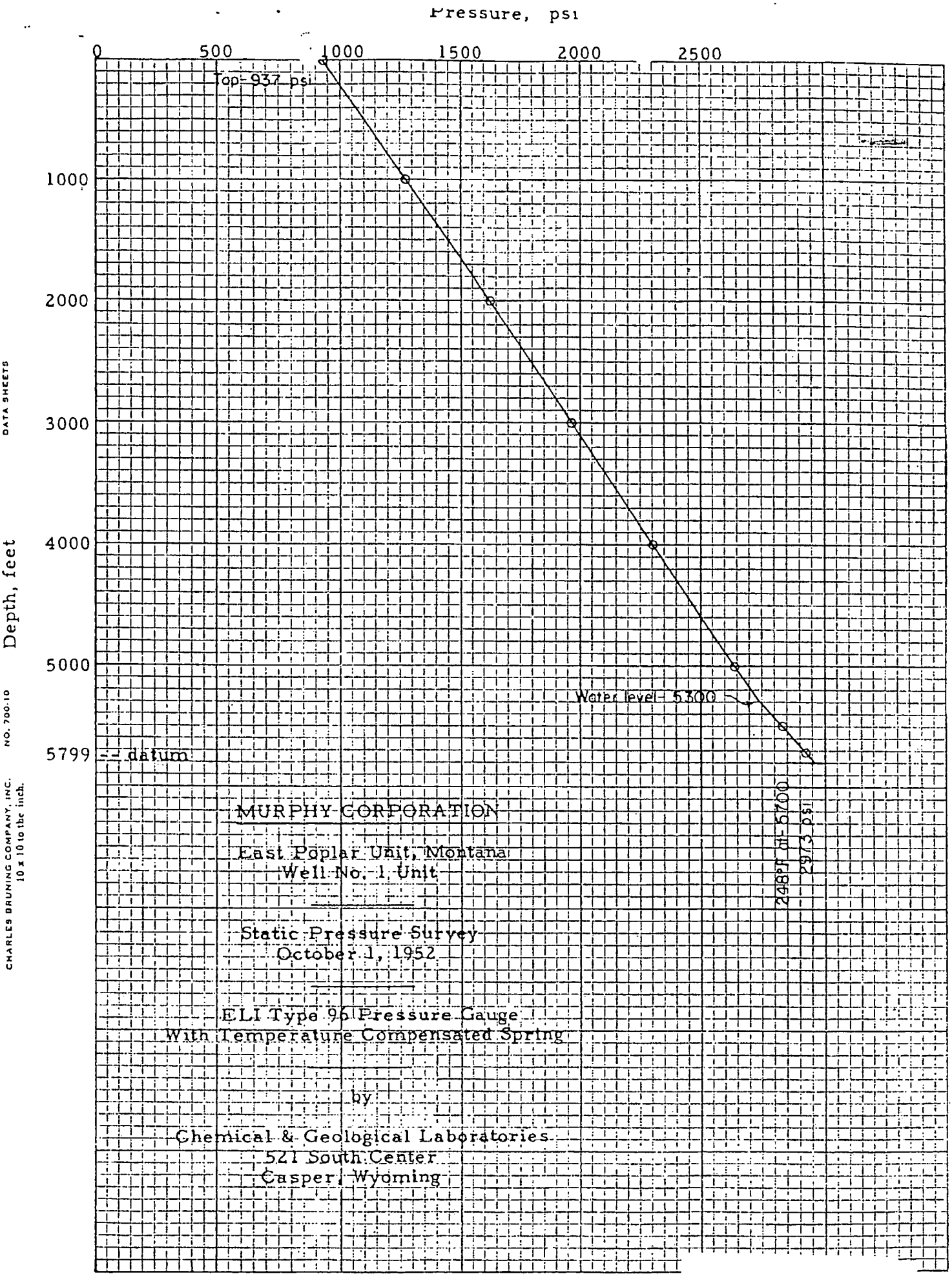
P.T.D.: 5827 Tubing Press: 937 S.I. (Dead Weight Gauge)

Casing: 7" OD @ 5814 Casing Press: 168 Flowing (Dead Weight Gauge

Tubing: 2½" EUE @ 5750 on packer.

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole		937 psi		
			34.2	
1000	1.630	1279		
			34.3	
2000	2.090	1622		
			34.3	
3000	2.550	1965		
			33.9	
4000	3.005	2304		
			33.9	
5000	3.460	2643		
			38.6	
5500	3.720	2836		
			44.3	
5700	3.845	2929		
5799		2973	(extrapolated)	

Remarks: Water found in diaphragm of bomb.
Temperature @ 5700 - 248°F.
All measurements from D. F.


Pressure, psi
0
500
1000
1500
2000
2500
Depth, feet
1000
2000
3000
4000
5000
5799 -- datum
Top-937 psi
Water level-5300
248°F at 5700
2973 psi
MURPHY CORPORATION
East Poplar Unit, Montana
Well No. 1 Unit
Static Pressure Survey
October 1, 1952
ELI Type 96 Pressure Gauge
With Temperature Compensated Spring
by
Chemical & Geological Laboratories
521 South Center
Casper, Wyoming
DATA SHEETS
NO. 700-10
CHARLES BRUNING COMPANY, INC.
10 x 10 to the inch.

CL1-18

BOTTOM HOLE PRESSURE SURVEY

(Static)

Date October 1, 1952

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 4

Location C SW NE 33-29N-51E County Roosevelt State Montana

WELL DATA:

Elevation:	2171 KB	Datum Point:	5724
Formation:	Mississippian	Perforation:	5724-34
P. T. D.:	5800	Tubing Press:	903 S.I. (Dead Weight Gauge)
Casing:	5½" OD @ 5873	Casing Press:	913 S.I. (Dead Weight Gauge)
Tubing:	2" EUE @ 5729		

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole				

Note: Bomb stopped at 38 ft. Unable to get to bottom of hole.

Remarks:

CLI-16
PRAIRIE PUBLISHING CO.—42095

BOTTOM HOLE PRESSURE SURVEY
(Static)

Date March 28, 1953

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 1

Location C SW NE 2-28N-51E County Roosevelt State Montana

WELL DATA:

Elevation: 2123 KB Datum Point: 5814

Formation: Mississippian Perforation: open hole (C zone)

T. D.: 5827 Tubing Press: 982

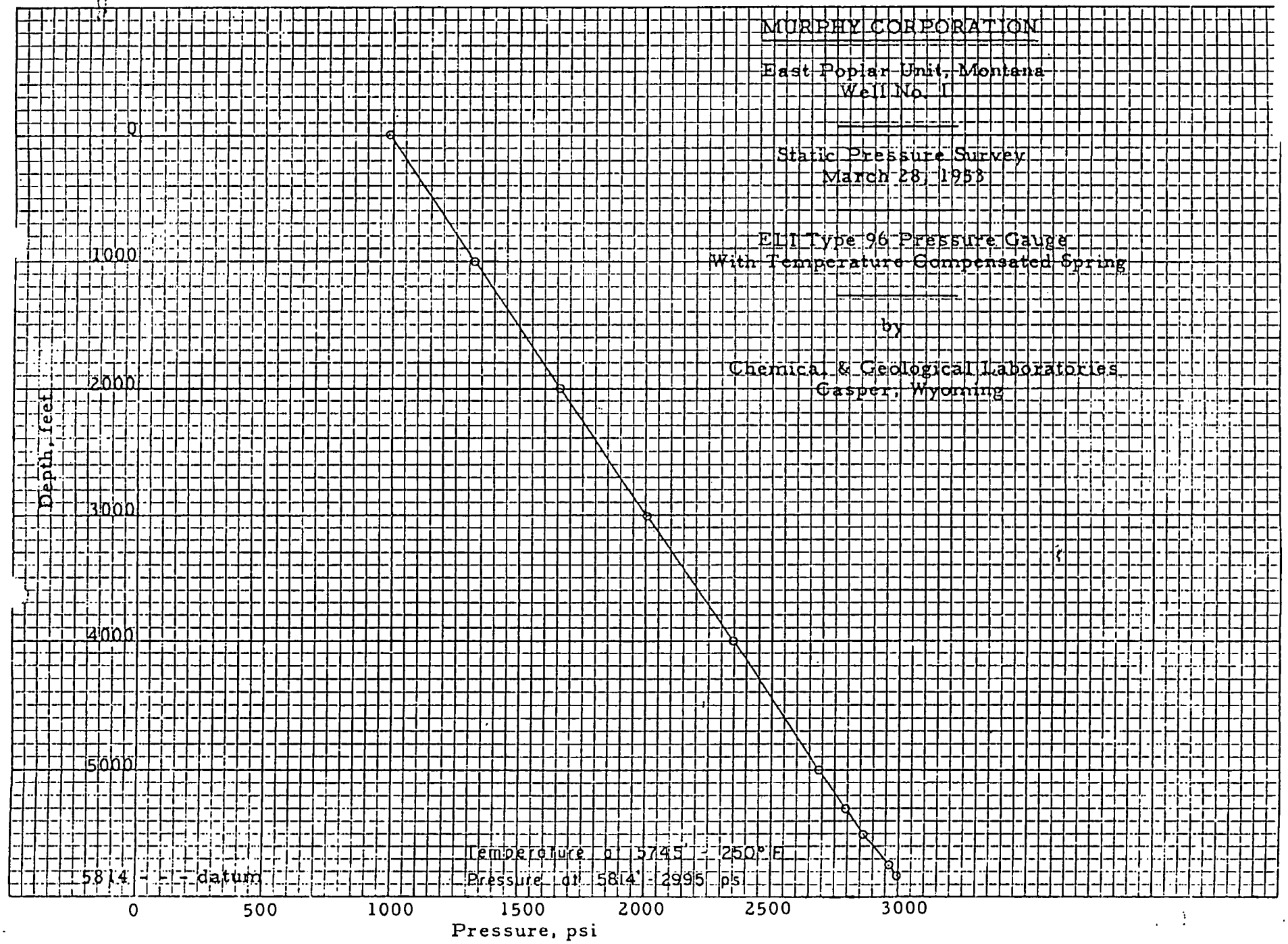
Casing: 7" OD @ 5814 Casing Press:

Tubing: 2½" EUE @ 5750 on packer.

Depths	Extension Inches	Pressure	Gradient #/100'	Additional Information
Top Hole	1.272	982 psi		
			33.9	
1000	1.730	1321		
			34.2	
2000	2.192	1663		
			34.0	
3000	2.651	2003		
			34.3	
4000	3.115	2346		
			34.3	
5000	3.579	2689		
			34.3	
5300	3.717	2792		
			38.0	
5500	3.820	2868		
			40.4	
5745	3.954	2967		
5814		2995	extrapolated	

Remarks: All measurements from KB.
Temperature @ 5745 - 250°F.
Water in diaphragm of bomb.
Well shut in for 86 days.

10 x 10 to the inch.



PRODUCTION &
INJECTION DATA

EPu #1
Surf
4 pages

SURFACE EQUIPMENT RECORD

EAST POPLAR UNIT WELL NO. 1

SURFACE EQUIPMENT RECORD

1. Well Head Equipment:
Head - 13 3/8" O.D. x 12" Ser 900 type C-18 OCT casing with 2-2" outlets.
Hanger - 13 3/8" O.D. x 7" O.D. C-18 casing
Valve - 2" 6000# test WKM SE Gate

Head - 12" Ser 900 x 6" Ser 900 6000# test Type T-16 OV OCT tubing, Ser #10309
Hanger - 7" O.D. x 2 1/2" WA-4 tubing
Adaptor - 6" Ser 900 x 2 1/2" Ser 1500 x 2 1/2" EUE 8rd 6000# test OCT tubing head
Valve - 2 1/2" 6000# test FE Model "L" WKM Gate
Valve - 2" 6000# test FE Model "L" WKM Gate
Flow Control - 2 1/2" Type JE-1-A OCT 6000# flow control with 2" positive choke. Ser #25059
Flow Control - 2" Type JE-2-P OCT 6000# flow control with 2" positive choke. Ser #26742.

2. Lifting Equipment: - Flowing

3. Other Installation:
2 - 2 3/8" 3.7# TWC flow line from Well No. 1 to tank Battery "A". Total of 1687'.

4. Storage Facilities:
Treater - 1 - 8' x 27'6" Type YCF National. Ser #81329
Tanks - 4 - 22' diameter x 16' high black bolted steel National
Circulating Pump - 1 - 2" Type 25 Roper Rotary
Motor - 1 - 5 H.P. Robins-Meyers electric

SUB-SURFACE EQUIPMENT RECORD

EAST POPLAR UNIT WELL NO. "1"

SUB-SURFACE EQUIPMENT RECORD

1. Packers: 7" x 2 3/8" Baker Model "D" production cast iron.
2. Depth Installed: Set at 5750'.
3. Rods: Flowing
4. Pump: Flowing
5. Gas Valve: Flowing

PLUGGING &
ABANDONMENT