Form OGC - 3

MISSOURI OIL AND GAS COUNCIL

APPLICATION FOR PERMIT TO DRILL, DEEPEN OR PLUG BACK

APPLICATION TO DRILL ☒ DEEPEN ☐ PLUG BACK ☐

NAME OF COMPANY OR OPERATOR DNR - GEOL SURVEY DATE 1 MARCH 77

PO BOX 250 (Address) ROLLA (City) MO (State)

DESCRIPTION OF WELL AND LEASE

Name of lease	Well number	Elevation (ground)
ERDA TS	17	943

WELL LOCATION (give footage from section lines)
280 ft. from (N) (S) sec. line 2580 ft. from (E) (W) sec. line

WELL LOCATION Section 2 Township 33N Range 31W County BARTON

Nearest distance from proposed location to property or lease line: NA feet

Distance from proposed location to nearest drilling, completed or applied – for well on the same lease: NA feet

Proposed depth:	Rotary or Cable tools	Approx. date work will start
200	Rotary	8 march

Number of acres in lease: NA

Number of wells on lease, including this well, completed in or drilling to this reservoir: NA

Number of abandoned wells on lease: _____

If lease, purchased with one or more wells drilled, from whom purchased: Name _____ Address NA

No. of Wells: producing _____ inactive _____ abandoned _____

Status of Bond

Single Well ☐ Amt. _____ Blanket Bond ☐ Amt. _____ ☐ ON FILE ☐ ATTACHED

Remarks: (If this is an application to deepen or plug back, briefly describe work to be done, giving present producing zone and expected new producing zone) use back of form if needed.

Proposed casing program:

amt.	size	wt./ft.	cem.
	NONE		

Approved casing – To be filled in by State Geologist

amt.	size	wt./ft.	cem.

I, the undersigned, state that I am the _____ of the _____ (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

Signature _____

Permit Number: 20019

Approval Date: 1 march 1977

Approved By: Wallace B. Howe

☒ SAMPLES REQUIRED

☐ SAMPLES NOT REQUIRED

Note: This Permit not transferable to any other person or to any other location.

WATER SAMPLES REQUIRED @:

Remit two copies to: Missouri Oil and Gas Council P.O. Box 250 Rolla, Mo. 65401

One will be returned.

Approval of this permit by the Oil and Gas Council does not constitute endorsement of the geologic merits of the proposed well nor endorsement of the qualifications of the permittee.

MISSOURI OIL AND GAS COUNCIL

WELL LOCATION PLAT

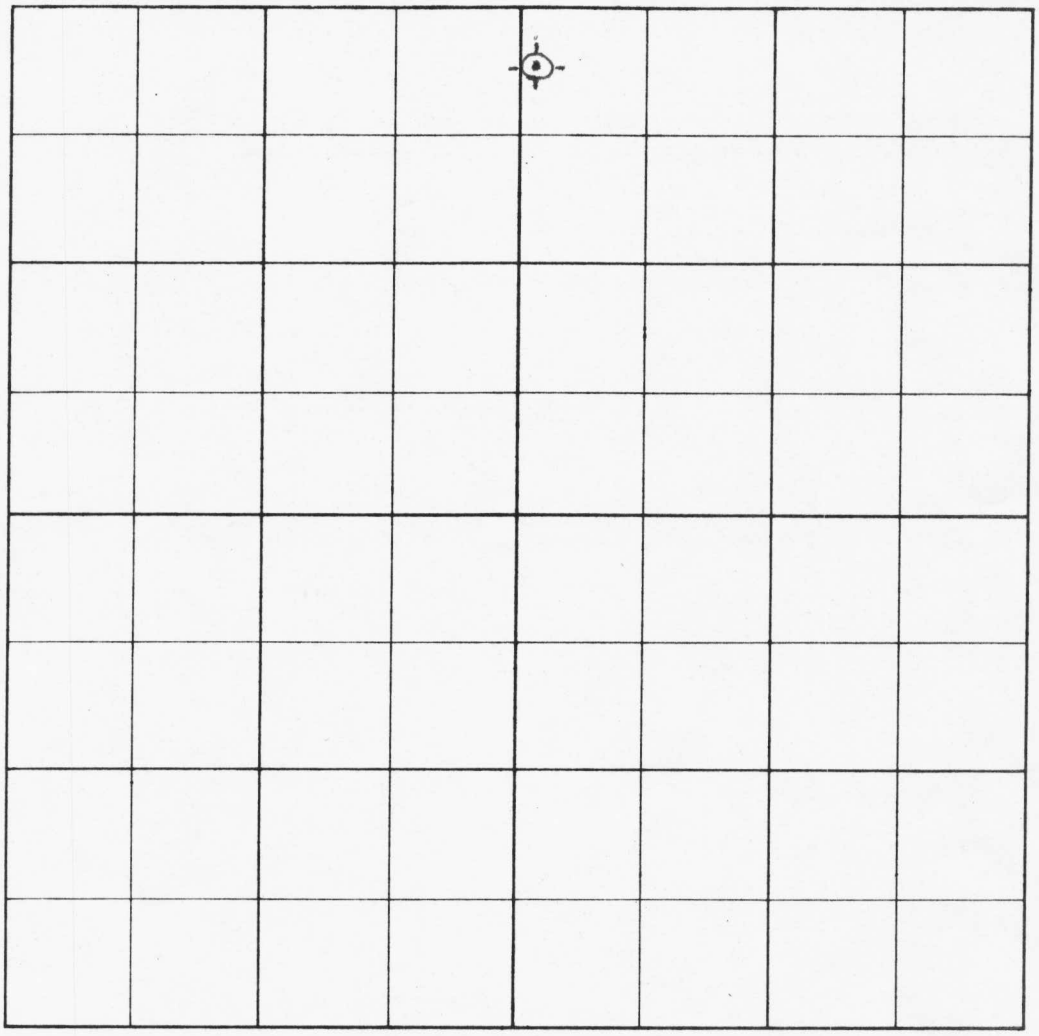
Form OGC - 4

Owner: DNR - GEOL SURVEY

Lease Name: ERDA TS NO 17 County, BARTON

280 feet from (N) - (S) line and 2580 feet from (E) - (W) line of Sec. 2 Twp. 33N Range 31W

SCALE
1" = 1000'



REMARKS: _____

INSTRUCTIONS

On the above plat, show distance of the proposed well from the two nearest lease and section lines, and from the nearest well on the same lease completed in or drilling to the same reservoir. If the location requested is not in conformance with the applicable well-spacing rules, show all off-setting wells to the proposed well. Do not confuse survey lines with lease lines. See rule 7 - 3 (b) for survey requirements.

(SEAL)

Remit two copies to: Missouri Oil and Gas Council
P.O. Box 250 Rolla, Mo. 65401

One will be returned.

_____

Registered Land Surveyor

TEST BORING LOG

Project: State of Missouri
Boring No.: 17 C
Sheet 1 of 2

E.R.D.A.
Surface Elevation:
Offset:

Address: ~~Vernon~~ Barton County
Date Started: 3/8/77
Completed: 3/10/77

City & State: Nevada, Missouri
Driller: J. Wright
Rig: CME 750

Abbreviations:
A.O. – Auger Only
H.A. – Hollow Auger
W.B. – Wash Bore
R.B. – Rock Bit
S.S. – Split Spoon
S.T. – Shelby Tube
C.W. – Core Water
C.A. – Core Air
F.B. – Finger Bit

Sec. 2, T. 33N., R. 31W.

DEPTH FROM	DEPTH TO	METHOD	PENETRATION RECORD: POCKET PENETRO-METER	PENETRATION RECORD: NO. OF BLOWS	CORE RECOVERY	SAMPLE DESCRIPTION: COLOR–MATERIAL–MOISTURE–CLAY CONSISTENCY SAND DENSITY
0.0'	10.0'	WB				Soil, sandy clay, brown
10.0'	20.0'	CW1			10.0'	Sandstone, gray
20.0'	30.0'	CW2			10.0'	Same
30.0'	40.0'	CW3			10.0'	Same
40.0'	50.0'	CW4			10.0'	Same
50.0'	60.0'	CW5			10.0'	Same
60.0'	70.0'	CW6			10.0'	Same
70.0'	80.0'	CW7			10.0'	Sandstone, gray, black shale streaks
80.0'	90.0'	CW8			10.0'	Same
90.0'	100.0'	CW9			10.0'	Same
100.0'	110.0'	CW10			8.5'	Same
110.0'	120.0'	CW11			10.0'	Shale, dark gray, sandy
120.0'	130.0'	CW12			10.0'	Sandstone, gray
130.0'	140.0'	CW13			10.0'	Same
140.0'	150.0'	CW14			9.0'	Shale, dark gray, sandy
150.0'	160.0'	CW15			8.0'	Shale, dark gray, sandy

REMARKS: (Casing, Water Loss, Etc.)

	Water Level	Time	Date	
				(Completion)

Layne-Western Company, Inc.

LW-59A

TEST BORING LOG

Project State of Missouri

Boring No. 17 C

Sheet 2 of 2

Surface Elevation

Offset

Address

Date Started

Completed

City & State

Driller

Rig

Abbreviations:

A.O.	– Auger Only	R.B.	– Rock Bit	C.W.	– Core Water
H.A.	– Hollow Auger	S.S.	– Split Spoon	C.A.	– Core Air
W.B.	– Wash Bore	S.T.	– Shelby Tube	F.B.	– Finger Bit

DEPTH		METHOD	PENETRATION RECORD		CORE RECOVERY	SAMPLE DESCRIPTION
FROM	TO		POCKET PENETRO-METER	NO. OF BLOWS		COLOR–MATERIAL–MOISTURE–CLAY CONSISTENCY SAND DENSITY
160.0'	170.0'	CW16			8.0'	Shale, dark gray, sandy
170.0'	180.0'	CW17			10.0'	Same
180.0'	190.0'	CW18			10.0'	Same
190.0	195.0'	CW19			4.5'	Shale, black w/tan chert nodules
195.0'	Total Depth					

REMARKS: (Casing, Water Loss, Etc.)

Water Level Time Date

(Completion)

Layne-Western Company, Inc.

LW-59A

QUADRANGLE: Sheldon

ERDA-TS core hole 17
COUNTY: Barton

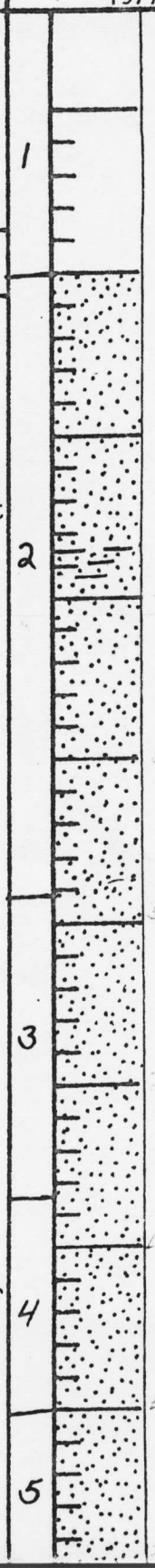
LOCATION: NW1/4 NE1/4 SEC. 2 T. 33N R. 31W

DATE: March 8, 1977

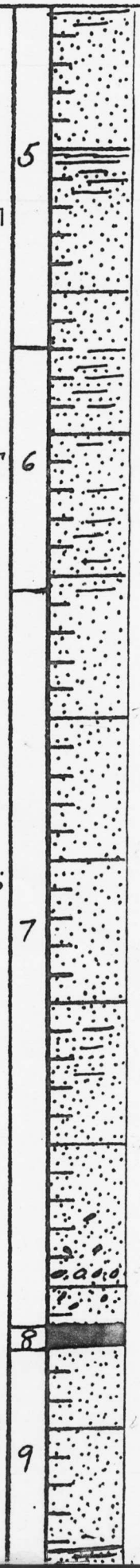
LOCATION DESCRIPTION: 280' FNL and 2580' FEL;
1/2 mile south of Sheldon on east side of old U.S. Hwy 71

surface elev. 943.0; T.D. 195.±

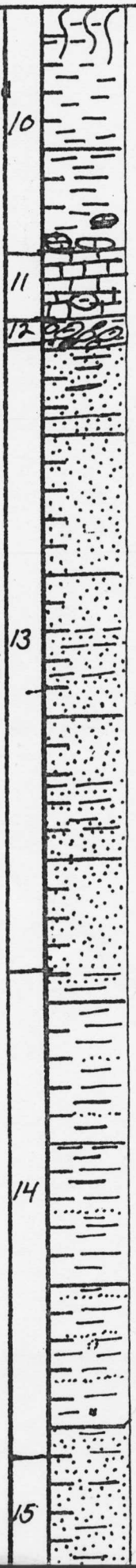
DEPTH (FEET)		BED NO.	LITHOLOGY
0.0	10.0	1	no core
10.0	29.4	2	ss., brown, fine-grained (1/16 to 1/8 mm), compact; dk. gray shale lens 18.6 to 19.4; very slight oil stained zone 1 ft thick at 19.0 ft.; fairly heavy brown asphalt stained from 22.0 to 29.0 ft
29.4	38.4	3	ss., fine-grained, lt. gray, non calc., argillaceous; brown, asphalt stained 30.6 to 31.1, 33.6 to 36.0, heavy black asphalt staining 36.2 to 36.6 ft; possible cross-bedding obscured by drill
38.4	45.0	4	ss., brown, asphalt stained, micaceous, becoming coarser grained (1/4 mm. dia.) at bottom



45.0	62.0	5	ss., lt. gray (grain size 1/8 mm. dia); speckled black with carbonaceous plant material, mica along bedding planes, possibly some asphalt but pieces of charcoal with plant structure visible; med. dk. gray shale bed 55.8 to 56.4 ft; discontinuous lenses of coaly material at 51.0 to 51.5 ft, 55.0 to 55.5 ft.
62.0	70.5	6	ss., lt gray, fine-grained, cross-laminated ripples intercalated with dk. gray shale which "climb" up ripples; approx. 10% of unit dk. gray shale laminae FROM 64.0 to 68.0 ft, 30% of unit dk. gray shale and coaly laminae below 68.0 ft.
70.5	96.4	7	ss., lt. gray, massive appearing, slightly friable; 25% of unit is interbedded shale laminae from 86.0 to 88.0 ft.; pieces of fossilized wood in bottom 5 ft.; conglomerate from 94.6 to 94.7 ft; consists of clasts round to flattened, tan shale and clay ironstone, coal; some pyrite nodules
96.4	97.3	8	coal, bands of vitrain
97.3	105.0	9	ss., and coal; thin coal beds 104.2 – 104.45 ft; 3 coal beds or lenses .05 to .1 ft thick interbedded with ss. from 104.45 to 105.0 ft.

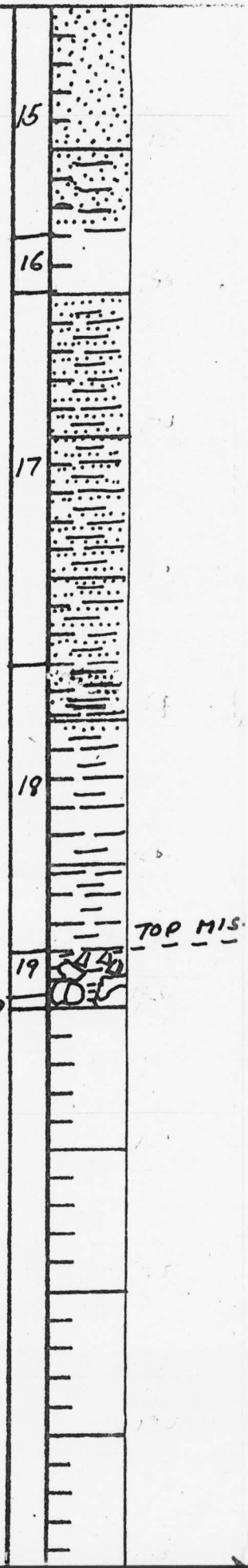


105.0	113.7	10	clay, lt. gray, sandy, slickensided, abundant carbonized root impressions; bottom 4 ft. ss. greenish-gray with sand-sized siderite concretions; bottom 1 ft. contains ls. nodules
113.7	116.0	11	ls., lt. gray, finely crystalline, compact; pyrite and green clay filling vugs; poorly developed stylolites
116.0	116.9	12	congl., calc.; clasts are rounded, flat, ranging in size ~~from~~ to .1 ft dia. but some angular pieces of coal, clasts consist of tan clay ironstone; lt. to dk. gray shale; some tan clasts appear to be clay that filled in pith of <u>Calamites</u> stems; some pyrite
116.9	139.0	13	ss., lt. gray, grain size 1/8 mm. dia.; few parallel laminae "bundles" of carbonaceous ~~rich~~ material or coal laminae in upper 3 ft.; micaceous, pyritiferous; lt. gray ss. and dk. gray shale interbedded in .05 ft thick beds at 127.0-127.5 ft., 128.5 to 129.0, 132.4 to 134.0 few inclined coaly laminae throughout unit; ss. below 134.0 ft is slightly coarser than 1/8 mm dia. of grains and contains bits of charcoal.
139.0	156.0	14	shale, black with lt. gray lenticular cross-laminated ss. ripples and pods from 142.0 ft. and increase to comprise about 10% of unit below 150.0 ft.; lost core 149.0-150.0 ft



156.0	168.0	15	ss., lt. gray; about 20% of unit from 156.0 → 161.0 and 165.0 → 168.0 ft. is dk. gray wavy shale laminae
168.0	170.0	16	lost core
170.0	183.0	17	shale, black; interlaminated, lt. gray ss. (ripples) and dk. gray shale
183.0	193.0	18	shale, black, very few ss ripples in top half
193.0	194.5	19	chert, lt. gray; only a few clasts in black shale at top but increases downsection to massive chert with some clay filled cavities at bottom; fragmented brachiopod molds in the chert.
194.5	195.0	20	lost core

T.D. 195.0 ft.



WILDCAT

FR & COMP

STATE MISSOURI 9-2-105 MAP NO. S-T-R 2-33N-31W S

OPER MISSOURI GEOL SURVEY SPOT APP N/2 N/2 N/2 INIT

P O BOX 250, ROLLA, MISSOURI CO BARTON S

WELL 17 ERDA-TS ELEV 943 GR FIN

CONTR LAYNE WESTERN 280' fnl, 2580' fel, Sec

FIELD WC

IP D&A

API 24-011-20019

SPUD 3-8-77, no surf csg

RTD 195, log

D&A FIRST REPORTED & COMPLETED 3-10-77

GR SPL TOPS:

RIVERTON	145 + 798
MISS CHERT	190 + 753
RTD	195 + 748

TD IN MISS

COMP ISSUED 9-12-77

Petroleum Information CORPORATION

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Amoco Production Company
4502 East 41st Street
P.O. Box 591
Tulsa, Oklahoma 74102
Research Center

RECEIVED
MAY 12 1977
MO. GEOL. SURV.

May 9, 1977

Mr. Jack S. Wells
Division of Geology and Land Survey
P.O. Box 250
Rolla, MO 65401

Dear Jack:

As previously promised, we are furnishing herewith source rock evaluation information concerning pieces of core from your ERDA Test Wells # 17 and #20.

We appreciate your cooperation and the opportunity to sample the core. Please let me know when you resume your coring program.

Sincerely,

Red

Warren S. Spaulding

WSP:jg
0037

Enclosures

cc: w/out attachment
J. L. Severson/D. L. Boyne
H. M. Cotton

AMOCO PRODUCTION COMPANY
RESEARCH CENTER

SOURCE ROCK EVALUATION

ERDA Test Well No. 17 Barton Co., Missouri
Test Well No. 20 Vernon Co., Missouri

Petroservices Group

L. M. Ross

Distribution: H. M. Cotten
W. S. Spaulding
D. L. Boyne/J. L. Severson

Project 508
Job Subproject 468
Requested by H. M. Cotten
RESEARCH CENTER
Roger L. Amer (5-4-77)

W. S. Spaulding

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LMR:jg
1913

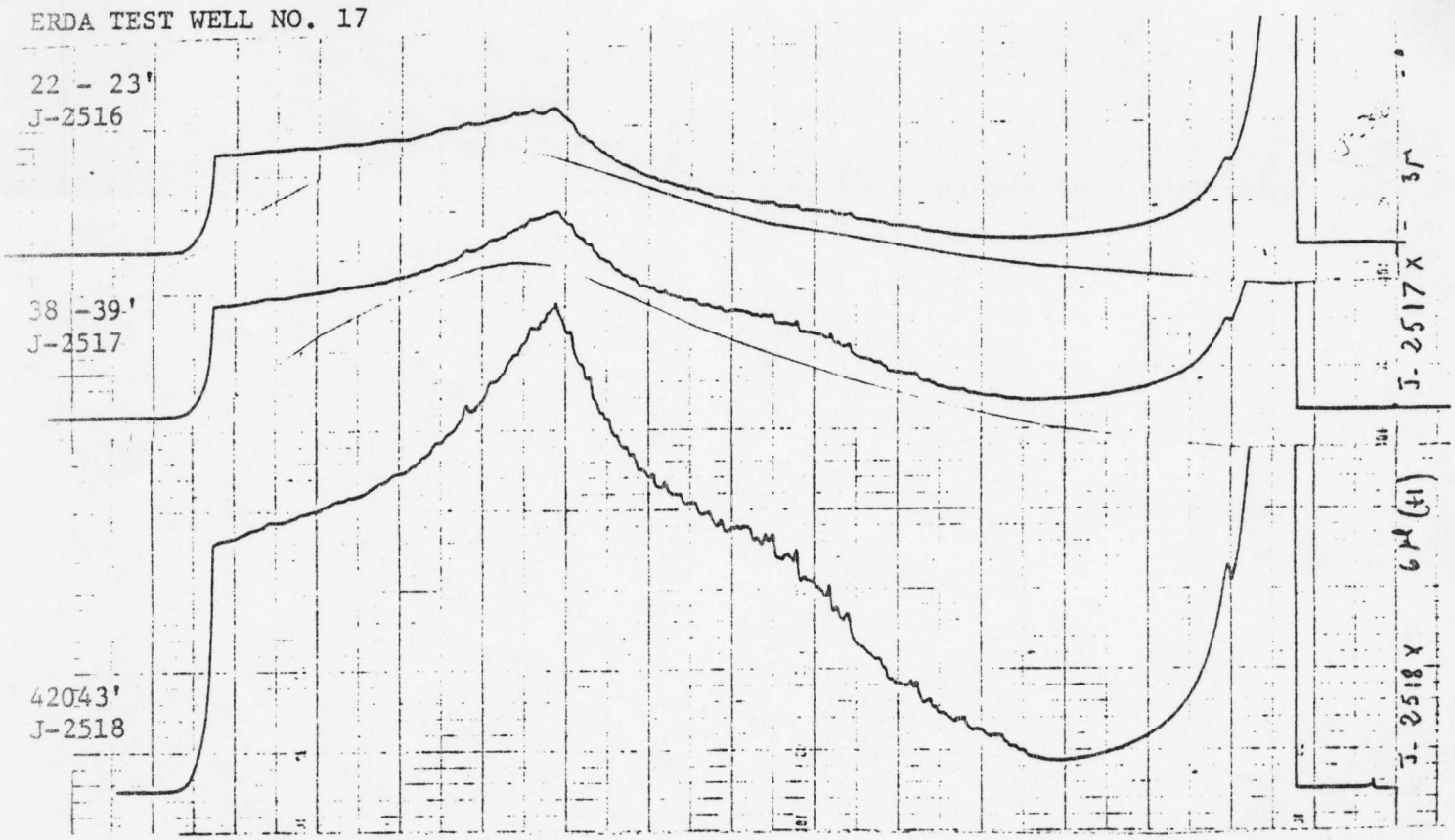
A M O C O P R O D U C T I O N C O M P A N Y
R E S E A R C H C E N T E R

OFFICE GEOL. RESEARCH DISTRICT
TECHNICAL SERVICE NUMBER 468

SOURCE ROCK DATA
TABLE 2.
DATE 04/26/77

SAMPLE NUMBER	DEPTH FEET TOP**	BOTTOM	GEOL. AGE	INSOL RESID%	BIT-FREE ORG C WT%	BITUMEN BBL/AF	BITUMEN PPM	SAT HC BBL/AF	SAT HC PPM	SAT HC/ BITUMEN	BITUMEN/ TL ORG C	REMARKS WT. % BITUMEN
STATE MISSOURI COUNTY BARTON					WELL LOCATION SEC.2-33N-31W							
WELL NAME					LEASE ERDA TEST WELL NO. 17							
J-2516	22.0--	23.0	93	.3	379	17693	200	9359	.53	.84		1.8
J-2517	38.0--	39.0	93	.3	679	32322	237	11283	.35	.51		3.2
J-2518	42.0--	43.0	91	.3	572	26811	320	14914	.56	.90		2.7
STATE MISSOURI COUNTY VERNON					WELL LOCATION SEC.5-34N-32W							
WELL NAME					LEASE ERDA TEST WELL NO. 20							
J-2519	79.0--	80.0	95	.2	855.0	39462	359	16667	.42	.96		3.9
J-2520	85.0--	86.0	89	.2	1115.0	53252	558	26570	.50	.97		5.3

WHOLE EXTRACT CHROMATOGRAMS



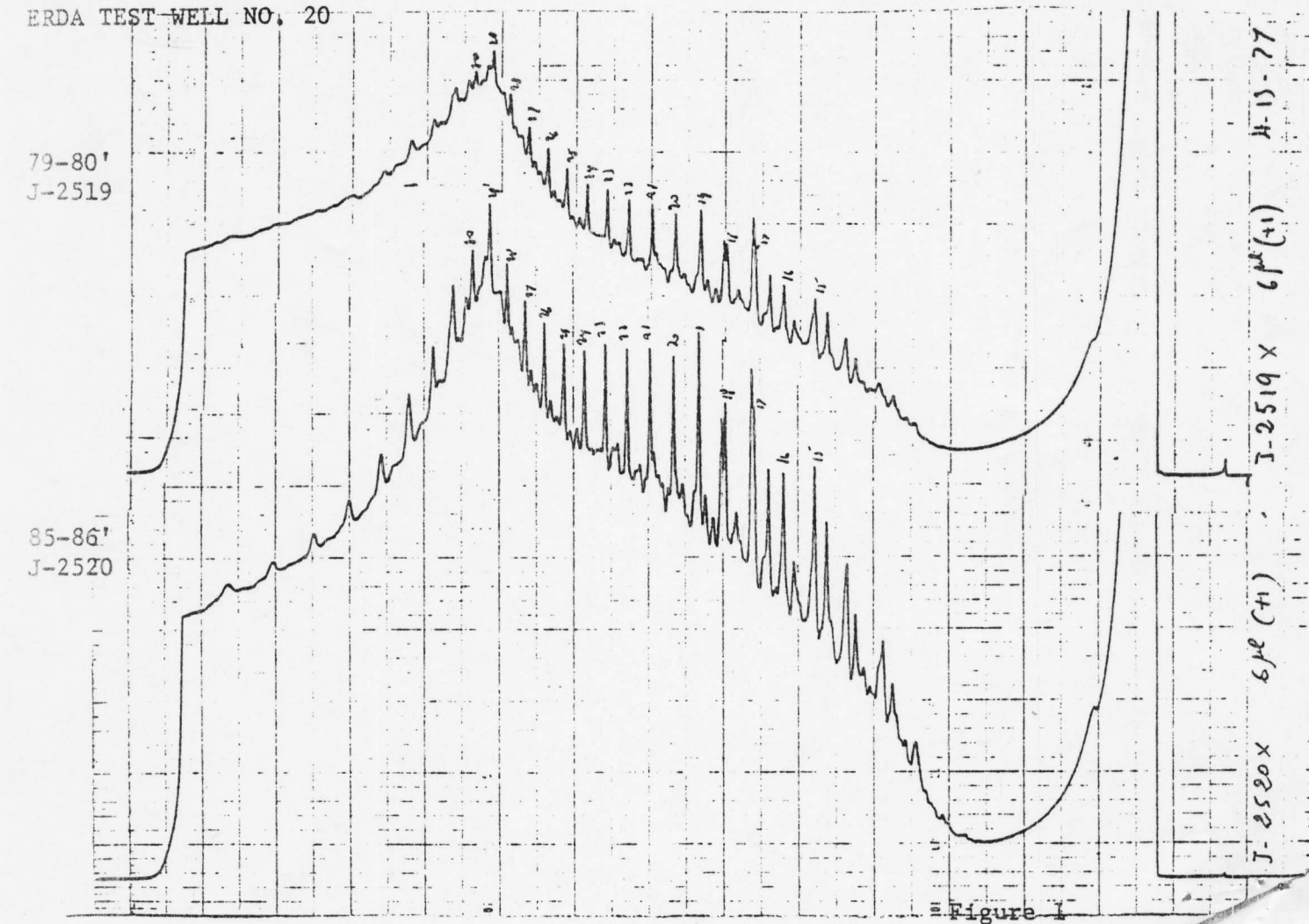


Figure I

Proj. 508 #468

OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

April 7, 1977

State of Missouri Department
of Natural Resources
Geological Survey
Buehler Park
Rolla, Missouri 65401

Gentlemen:

Enclosed herewith are the results of tests run on the Rotary core samples taken from the ERDA TS Lease, Well No. 17, Barton County, Missouri, and submitted to our laboratory on March 31, 1977.

This core was sampled by a representative of the client.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

James E. Russell

James E. Russell

by Perry S. Brigham

Geologist

JER:gb
5 c to Rolla, Missouri

RECEIVED
APR 11 1977
MO. OIL & GAS COUNCIL

Oilfield Research Laboratories

State of Missouri
Department of Natural Resources

GENERAL INFORMATION & SUMMARY

Company Geological Survey Lease ERDA TS Well No. 17

Location 280'FNL & 2580'FEL

Section 2 Twp. 33N Rge. 31W County Barton State Missouri

Name of Sand	Cherokee
Top of Core (Received)	22.5
Bottom of Core (Received)	47.5
Top of Sand (Received)	22.5
Bottom of Sand (Received)	47.5
Total Feet of Permeable Sand	10.0
Total Feet of Floodable Sand	

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	2.0	2.0
10 - 100	3.0	5.0
100 - 200	2.0	7.0
200 - 300	2.0	9.0
300 & above	1.0	10.0

Average Permeability Millidarcys	111.6
Average Percent Porosity	21.1
Average Percent Oil Saturation	30.6
Average Percent Water Saturation	58.5
Average Oil Content, Bbls./A. Ft.	501.
Total Oil Content, Bbls./Acre	5,014.
Average Percent Oil Recovery by Laboratory Flooding Tests	
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	
Total Calculated Oil Recovery, Bbls./Acre	
Packer Setting, Feet	
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	
Elevation, Feet (Ground Level)	943.

OILFIELD RESEARCH LABORATORIES

- LOG -

Company State of Missouri Department of Natural Resources Geological Survey

Lease ERDA TS Well No. 17

Depth Interval, Feet	Description
22.5 - 35.0	Light brown very fine grained shaly sandstone.
35.0 - 41.5	Dark brown slightly laminated fine grained sandstone.
41.5 - 43.5	Speckled brown fine grained sandstone.
43.5 - 47.5	Brownish gray slightly laminated slightly carbonaceous fine grained sandstone.

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company State of Missouri Department of Natural Resources Geological Survey **Lease** ERDA TS **Well No.** 17

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	23.0	19.6	30	63	93	456	10.	1.0	1.0	456	10.00
2	25.0	18.6	38	56	94	548	4.5	1.0	2.0	548	4.50
3	27.0	20.5	35	51	86	557	11.	1.0	3.0	557	11.00
4	29.0	20.4	22	64	86	348	8.7	1.0	4.0	348	8.70
5	34.5	21.8	23	61	84	389	11.	1.0	5.0	389	11.00
6	39.5	22.4	41	47	88	713	236.	1.0	6.0	713	236.00
7	41.0	23.0	44	47	91	785	231.	1.0	7.0	785	231.00
8	43.0	21.8	31	58	89	524	346.	1.0	8.0	524	346.00
9	45.0	21.0	22	71	93	359	113.	1.0	9.0	359	113.00
10	47.0	21.6	20	67	87	335	145.	1.0	10.0	335	145.00

Oilfield Research Laboratories

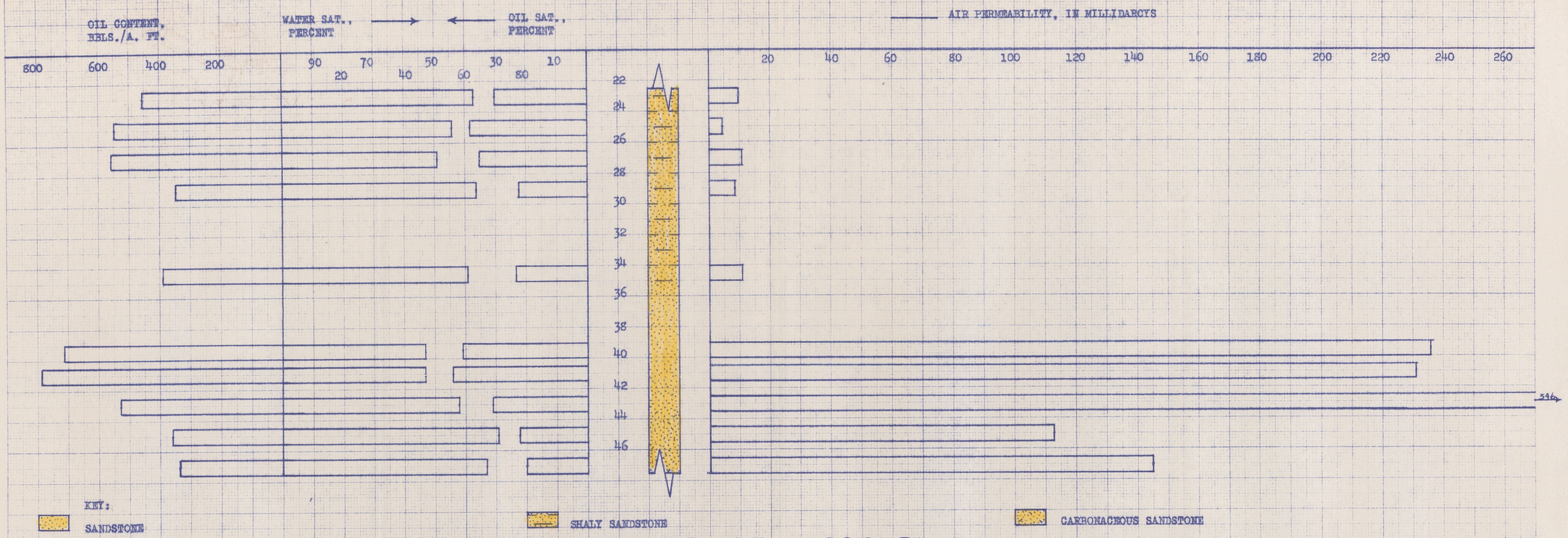
SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company State of Missouri Department of Natural Resources Geological Survey Lease ERDA TS Well No. 17

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.
22.5 - 35.0	5.0	9.0	45.20
39.0 - 47.5	5.0	214.2	1071.00
22.5 - 47.5	10.0	111.6	1116.20

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
22.5 - 35.0	5.0	20.2	29.6	59.0	460	2,298
39.0 - 47.5	5.0	22.0	31.6	58.0	543	2,716
22.5 - 47.5	10.0	21.1	30.6	58.5	501	5,014



STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY

ERDA TS LEASE WELL NO. 17

BARTON COUNTY, MISSOURI

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION, PERCENT	AVG. WATER SATURATION, PERCENT	AVG. OIL CONTENT, BBLS./A.FT.	TOTAL OIL CONTENT, BBLS./ACRE	AVG. AIR PERMEABILITY, MILLIDARCYS
22.5 - 35.0	5.0	20.2	29.6	59.0	460	2,298	9.0
39.0 - 47.5	5.0	22.0	31.6	58.0	543	2,716	214.2
22.5 - 47.5	10.0	21.1	30.6	58.5	501	5,014	111.6

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
APRIL, 1977