Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: Federal U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

7. UNIT AGREEMENT NAME: N/A

8. FARM OR LEASE NAME: Federal - Bullfrog Creek

9. WELL NO.: 1

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 21 T36S R10E

12. COUNTY OR PARISH: Garfield | 13. STATE: Utah

1a. TYPE OF WORK: DRILL [XX] DEEPEN [ ] PLUG BACK [ ]

b. TYPE OF WELL: OIL WELL [XX] GAS WELL [ ] OTHER — SINGLE ZONE [ ] MULTIPLE ZONE [ ]

2. NAME OF OPERATOR: ROMEX CORPORATION

3. ADDRESS OF OPERATOR: Suite 1214 - 1700 Broadway Denver, Colo. 80202

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 1626.7 West Line and 1574.6 from North Line
At proposed prod. zone: (SE of NW) of Section 21
Twp. 36 South, Range 10 East NWSENW

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 45 miles Southeast of Escalante

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any)	16. NO. OF ACRES IN LEASE	17. NO. OF ACRES ASSIGNED TO THIS WELL
1574.6 feet	1280 ac.	160
18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.	**19. PROPOSED DEPTH**	**20. ROTARY OR CABLE TOOLS**
None	4000 feet	Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 4190 Ground Level

22. APPROX. DATE WORK WILL START*: July 15, 1969

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12¼	9 5/8"	36#	200'	200 sks
8 3/4	7"	17#	3100'	100 sks

Double ram Hydraulic 10" Blowout preventer API 900 will be used while drilling. Our prognosis is to drill a 12¼" hole to approximately 200', where 9 5/8" surface casing will be cemented from casing shoe to ground level. Well will be drilled with rotary tools using air and air mist drilling hole size to be 8 3/4". If water from Navajo Sandstone make it impossible to mist drill, conversion to fresh water jelled mud will be used to drill to approximately 3000'. Seven inch casing will be run and cemented at 3000'. The White Rim Sandstone will then be air drilled to total depth. Est. Tops, Navajo 700' - Windgate 1940' - Chinle 2180' - Shinarump 2840' - Moencopi 2890' - White Rim 3100' - Cedar Mesa 3820'

NOTE; 1. Previous designated operator, Cleary Funds, Inc.; new designation of Romex Corporation as operator attached.

2. Well being drilled under Bond #1540008. Consent of Surety for all principals of lease attached.

OGCC-1a, C-3a

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED A. A. Schoenfeld TITLE President DATE 7-8-69

(This space for Federal or State office use)

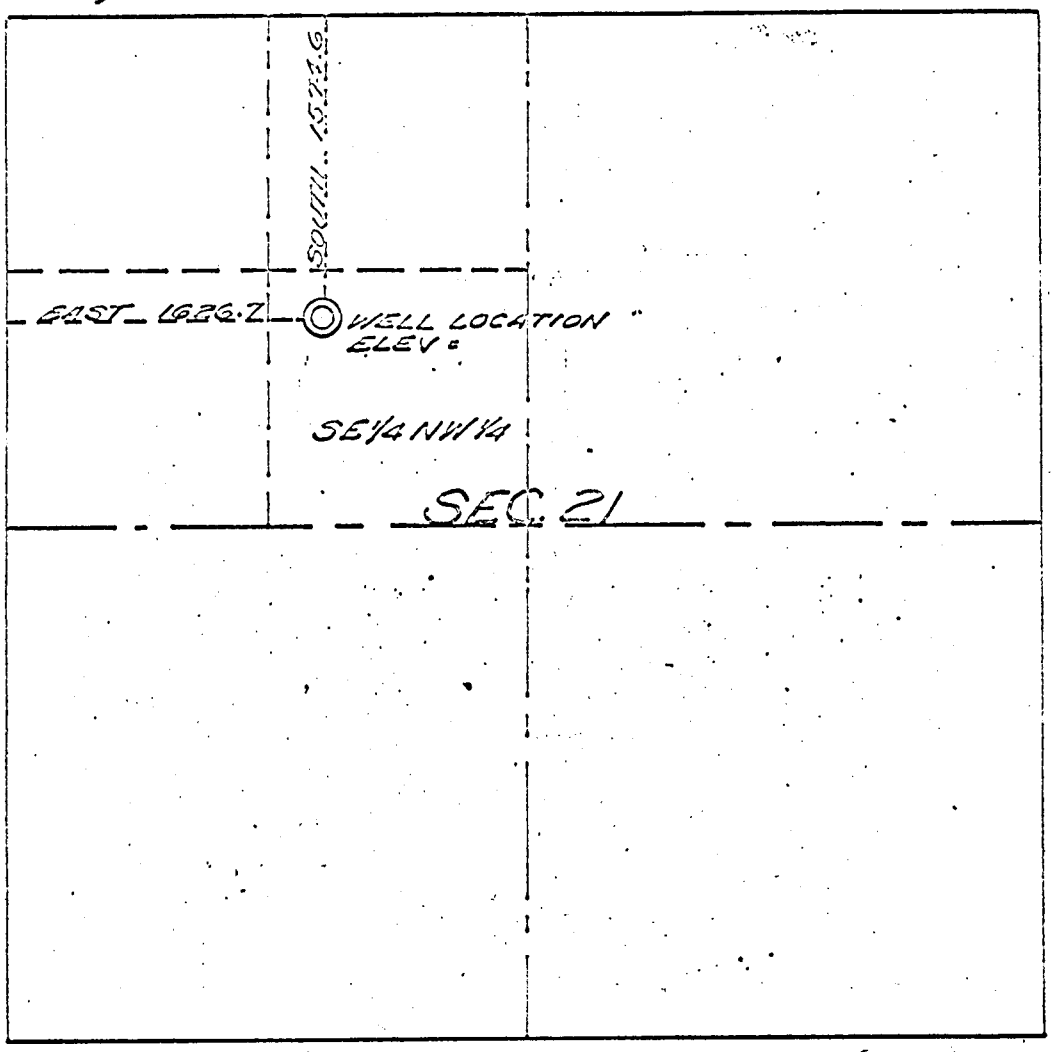
PERMIT NO. 43-017-30019 APPROVAL DATE

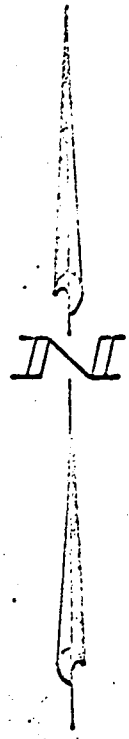
APPROVED BY TITLE DATE

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side

T. 36 S., R. 10 E. OF THE SALT LAKE MERIDIAN





WELL LOCATION

ROMEX CORP.

DENVER, COLORADO

BULLFROG CREEK NO. 1

SITUATED IN

SE¼NW¼ SECTION 21

T. 36 S., R. 10 E. OF THE SALT LAKE MERIDIAN

GARFIELD COUNTY, UTAH

REF. POINT 150 FEET NORTH ELEV:

REF. POINT 150 FEET EAST ELEV:

THIS IS TO CERTIFY THAT THE WELL LOCATION SHOWN ON THIS PLAT WAS PLOTTED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.
DATE SURVEYED 7/3/69

SCARROW AND WALKER
REGISTERED LAND SURVEYORS
BY
ROBERT D. SCARROW
CERTIFICATE NO. 3317

ROMEX CORPORATION

1700 BROADWAY
SUITE 1214
DENVER, COLORADO 80202
AREA CODE 303 255-0265

This location does not fall within the State Regulations as far as distance from the nearest 40 acre tract; however, the location is spaced this way because of topographic reasons being in the Bullfrog Creek drainage system.

It should be noted, however, that we own all of the acreage within the section that we are drilling in.

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SUITE 1214
DENVER, COLORADO 80202
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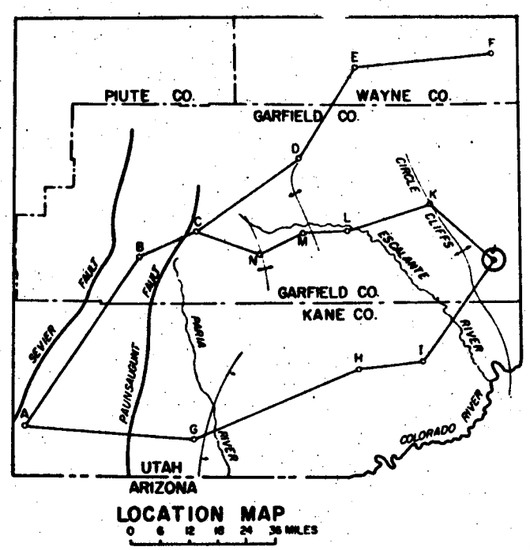
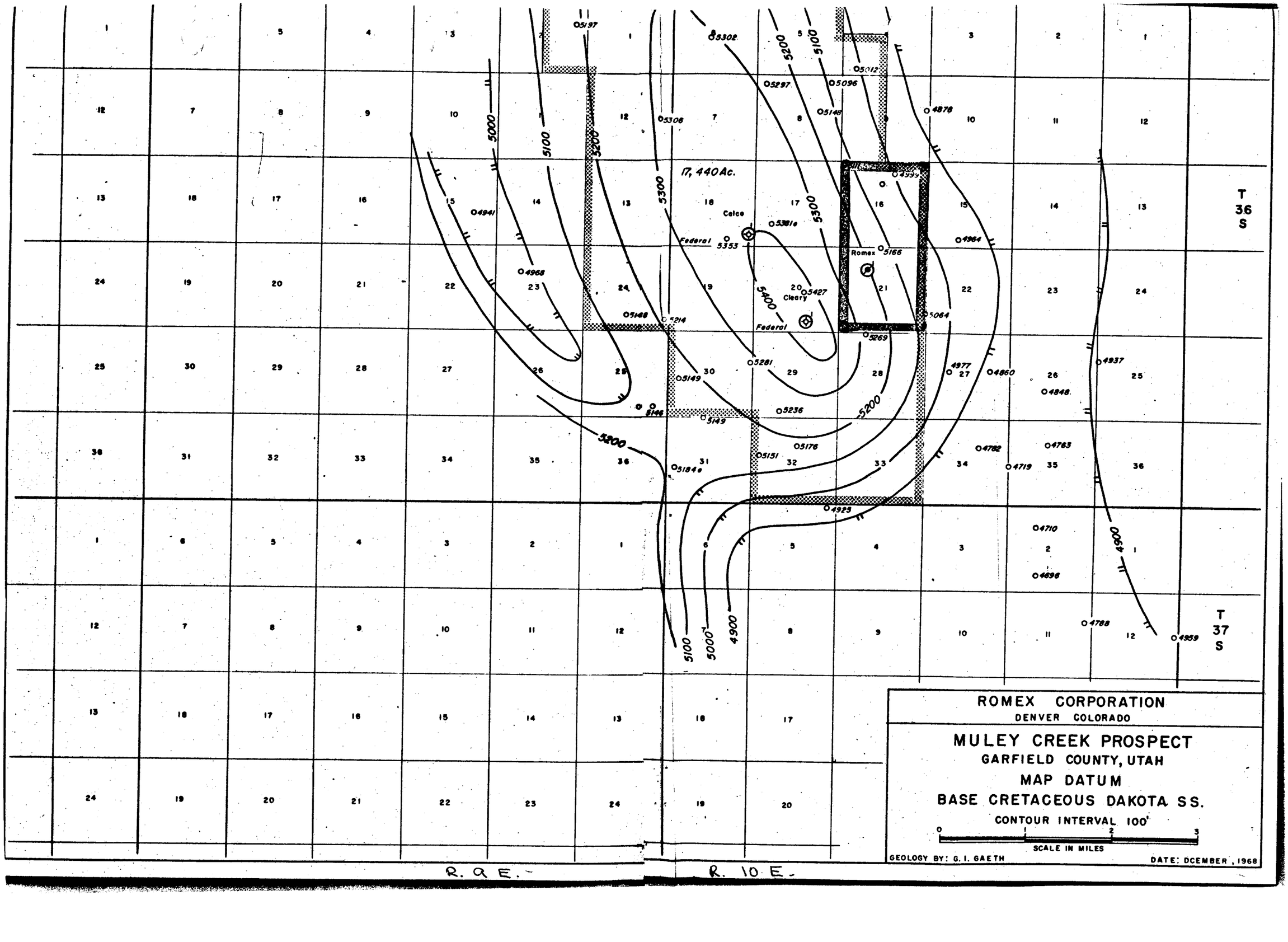


BASE OF QUEANTOWEAP-CEDAR MESA SANDSTONE

FENCE DIAGRAM OF POST WOLFCAMPIAN PERMIAN ROCKS KAIPAROWITS BASIN, UTAH



ROMEX CORPORATION
DENVER COLORADO

MULEY CREEK PROSPECT
GARFIELD COUNTY, UTAH
MAP DATUM
BASE CRETACEOUS DAKOTA SS.
CONTOUR INTERVAL 100'

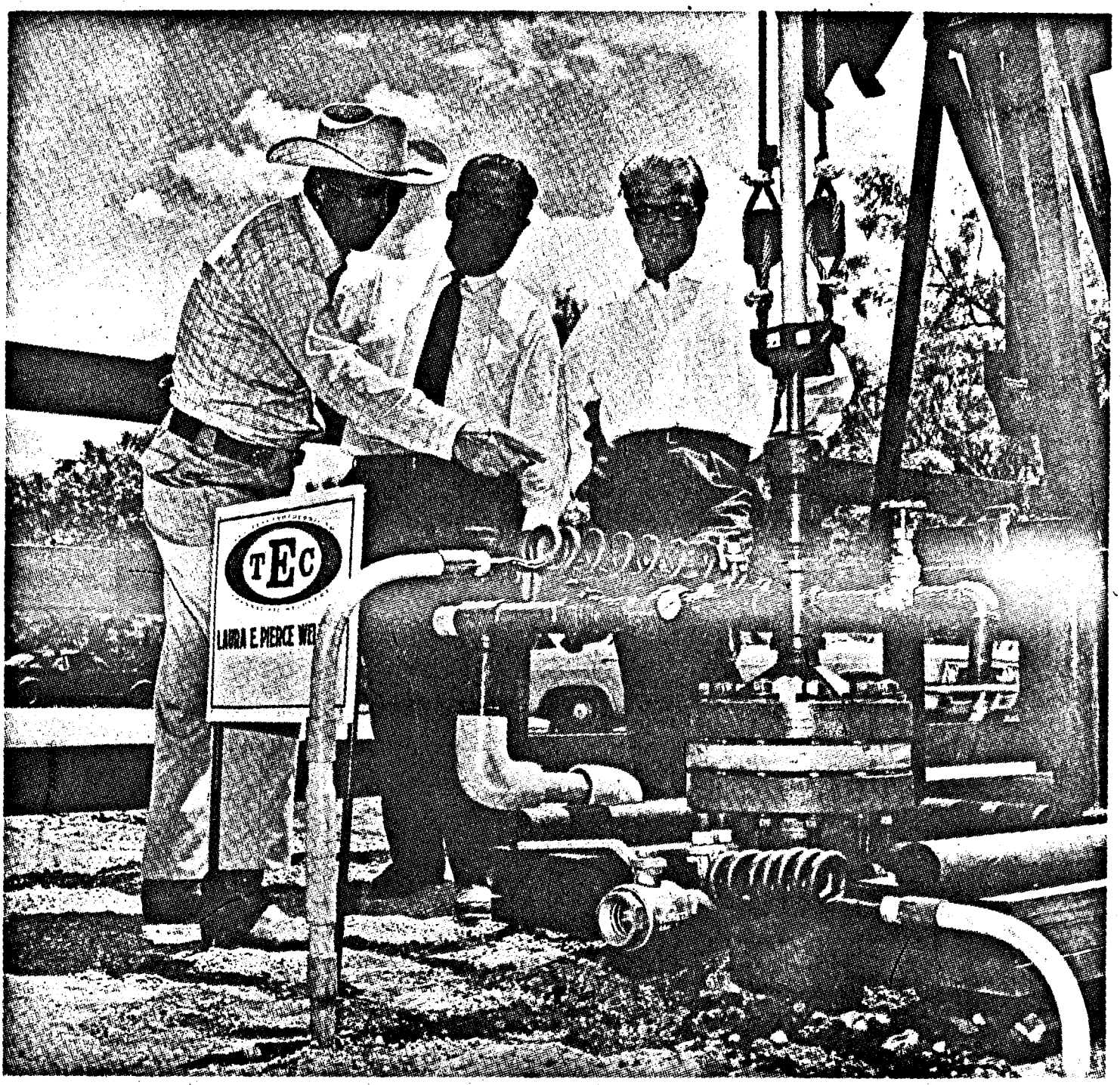
0 1 2 3
SCALE IN MILES

GEOLOGY BY: G. I. GAETH
DATE: DCEMBER, 1968

THE ELECTROTHERMIC CO.
WILSON BLDG. • CORPUS CHRISTI, TEXAS 78401

PRELIMINARY COPY

TECHNICAL BULLETIN #1



H. J. GRUY DUDLEY T. DOUGHERTY

DR. R. L. WHITING

SUMMARY

The addition of heat to an oil reservoir in the vicinity of a producing well bore can be very beneficial. It can decrease the oil viscosity, increase the effective permeability to oil, increase the apparent effective well bore radius, and decrease the amount of pressure drop (ΔP) necessary to move the oil production through the heated zone adjacent to the producing well. All of these effects can serve to increase the oil production rate up to many thousand percent, and the magnitude of the expected increase can be calculated by use of the Darcy radial flow formula.

It is possible to furnish large amounts of heat to an oil reservoir around a producing well bore, to a considerable distance from the well (up to a 50 foot radius under proper conditions) by using the Electrothermic Process. Operating temperature is in the range of 200 to 250 degrees Farenheit.

This system, on which the Electrothermic Co. has 47 patent claims allowed and pending, plus additional patent claims applied for, consists of the application of an electric current directly into an oil reservoir, through a specially designed electrode.

The connate water in the oil reservoir is the carrier of the current, and also the resistance heating element. Heat is then exchanged with the oil in intimate contact with the connate water. This heat exchange is continous during production, as unheated oil flows into the heating area to replace produced oil. It can be seen that the flow of electricity, hence the flow of heat, is counter to the direction of the flow of oil, with no interference between the two. The Process is thus one of continous heating and production. No wires are used down hole in this Process. A string of steel casing or tubing, which is an excellent carrier of AC current, is electrically insulated into the electrode, which is placed in the producing formation. The circuit then flows from the electrode through the formation, and returns through an infinite conductor, the earth. Thus the resistance is confined around the electrode, where the heating takes place.

In summary, it can be shown that the addition of heat to an oil reservoir can have many beneficial effects; that heat can be effecientently added to an oil reservoir by use of the Electrothermic Process, and it is possible, by using the Darcy radial flow equation, to calculate the magnitude of the probable effect of Electrothermic heating on oil production in barrels per day of increased production.

INTRODUCTION

Those engaged in petroleum reservoir engineering studies have long recognized the importance of rock, fluid and reservoir geometry factors on petroleum productivity and recovery. For a given well density in an isotropic reservoir, the parameters that hold the greatest promise for increasing fluid productivity and recovery are control of the fluid viscosity and/or effective radius of the well bore, and the effective permeability to oil.

OIL PRODUCTION RATE

The rate at which oil production can be obtained from a petroleum reservoir may be estimated through use of Darcy's radial flow equation as follows:

$$Q_o = \frac{7.08 K_o h(\Delta P)}{B_o \mu_o \ln r_e/r_w} = \frac{7.08 K_o h(P_e - P_w)}{B_o \mu_o \ln r_e/r_w}$$

where

Q_o = oil production rate, stock tank barrels per day

K_o = effective permeability to oil, darcies

h = thickness of formation, feet

$\Delta P = P_e - P_w$ = pressure gradient in the formation between the internal and external radii, pounds per square inch.

B_o = oil formation volume factor, reservoir barrels per stock tank barrel.

μ_o = viscosity of the fluid flowing, centipoise

r_e = external radius of drainage, feet

r_w = internal (effective well bore) radius, feet

Quite obviously, it is desired to increase the oil production rate to a maximum. Let us consider how this may be accomplished by examining the equation. It is evident that the formation thickness and the radii define the geometry of the reservoir system. The formation thickness is fixed, but some control can be exerted on the magnitude of the radii. The external radius is defined by the well spacing, smaller well spacing yielding proportionally smaller values of external well radius, r_e. The internal (effective well bore) radius may be controlled by varying the size of the well bore, through the use of larger bits, underreaming or other methods. Any method which causes the pressure gradient in the vicinity of the well bore to be decreased relative to the pressure gradient that exists in the main body of the reservoir has the effect of increasing the well bore radius. If a fracture is produced, the average pore size increased, the oil saturation increased or the oil viscosity decreased in the vicinity of the well bore, the effect will be to increase the effective well bore radius. For a given well spacing and formation thickness an increase in the effective well bore radius will produce a proportional increase in the oil production rate.

The pressure gradient $\Delta P = P_e - P_w$ that is generally practical is defined by the depth and geological factors that governed the accumulation of the oil in the reservoir. However, supplementary energy in the form of fluid injection may be used to increase the pressure at the external boundary and artificial fluid lifts may be used to decrease the pressure at the effective well bore radius. It is also seen that if the effective well bore radius is increased the reservoir energy in the form of pressure gradient is applicable over a shorter distance. An increase in pressure gradient $\Delta P = P_e - P_w$ will produce a corresponding increase in oil production rate.

The fluid properties of formation volume factor and viscosity for a given oil are dependent upon the composition of the oil, the amount of gas dissolved in the oil and the reservoir pressure and temperature. At reservoir temperature the oil formation volume factor is influenced primarily by the solution gas which normally exhibits a linear relationship to pressure. Although the oil viscosity is influenced somewhat by pressure and solution gas, oil viscosity is primarily dependent upon the temperature. Usually, oil viscosity exhibits a semi-logarithmic relationship to temperature. Hence, the product of the oil properties $(B_o \mu_o)$ can be significantly reduced by increasing the temperature, thereby increasing the oil production rate.

The effective permeability to oil, K_o, is dependent upon the saturations of oil, water and gas in the formation. Not too much control can be

exerted on these saturations in the main body of the reservoir. However, quite often water and gas may accumulate in the vicinity of the well bore, thereby increasing the production rate of these two and decreasing the oil production rate. If by some method the saturation of water and gas can be decreased the oil saturation and the oil production rate will be increased. An increase in effective well bore radius, reservoir temperature and pressure gradient can produce the desired effect. An increase in effective permeability to oil in the vicinity of the well bore will increase the oil production rate.

In summary, it is seen that for a chosen well density in a reservoir of a given thickness, containing naturally occurring oil, water and gas at elevated pressure and temperature, the variables which lend themselves to control for the purpose of increasing the oil production rate are the equivalent well bore radius, oil viscosity and effective permeability to oil. The electrical energy process is directed to control these variables.

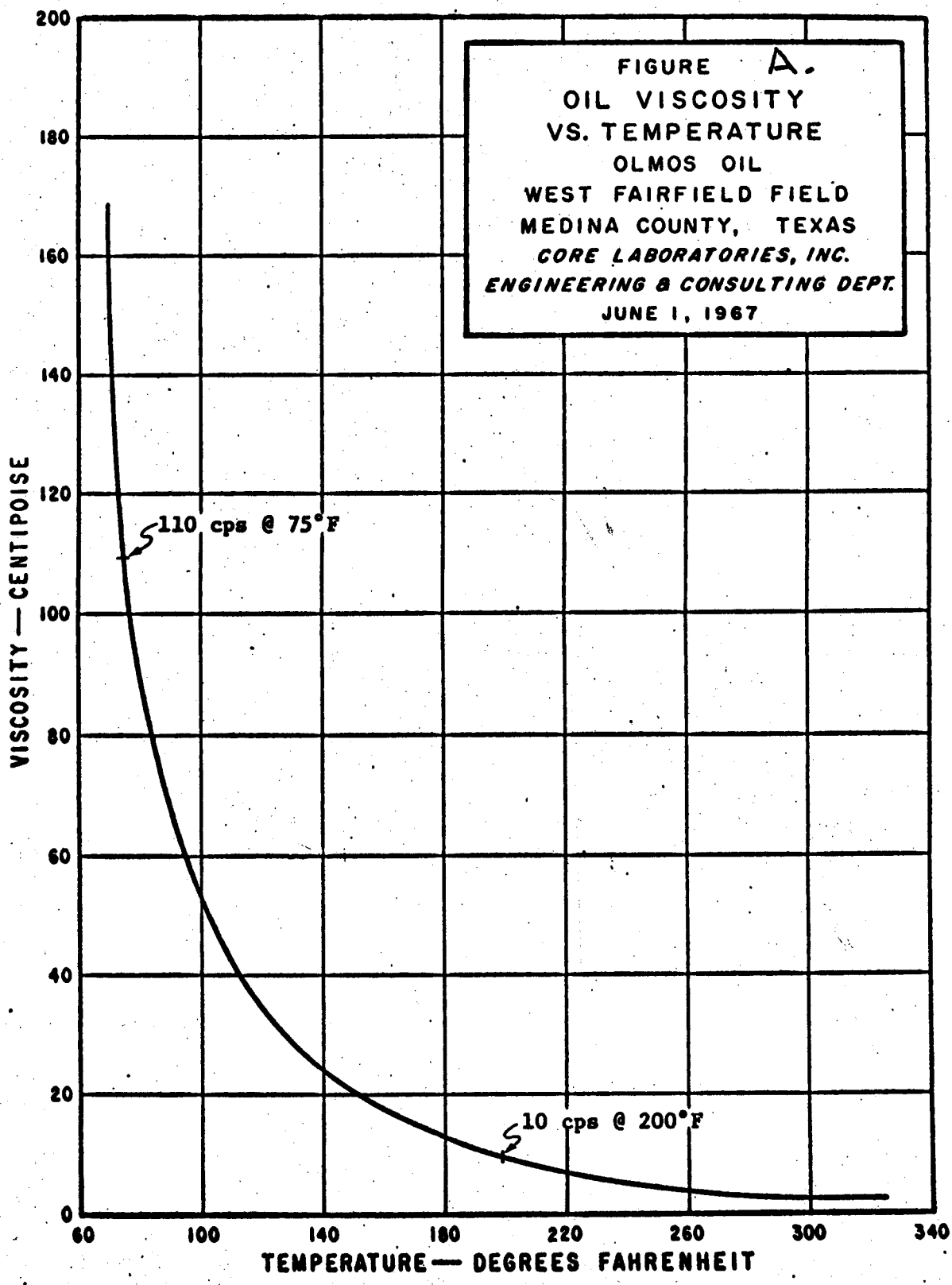


FIGURE A.
OIL VISCOSITY
VS. TEMPERATURE
OLMOS OIL
WEST FAIRFIELD FIELD
MEDINA COUNTY, TEXAS
CORE LABORATORIES, INC.
ENGINEERING & CONSULTING DEPT.
JUNE 1, 1967
VISCOSITY — CENTIPOISE
200
180
160
140
120
100
80
60
40
20
0
110 cps @ 75°F
10 cps @ 200°F
60
100
140
180
220
260
300
340
TEMPERATURE — DEGREES FAHRENHEIT

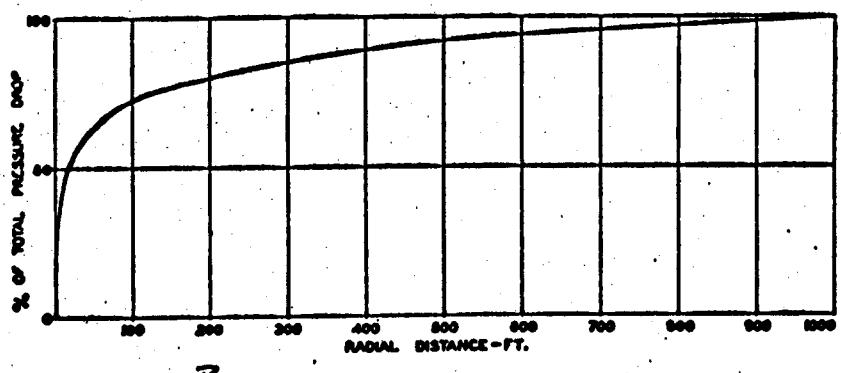


FIG. B Ideal pressure drop through a radial system.

For the purpose of this example, a well bore radius of 1/4 foot was selected with a radius of drainage of 1000 feet. By referring to the curve in Figure (B) above, we can see that over 50 percent of the pressure drop (ΔP) occurs within a 16 foot radius of the well. It is possible to heat a 16 foot radius quite easily with the Electrothermic System, so that we can drastically rearrange the pressure drop (ΔP) within a producing reservoir.

In order to calculate the effect of the Electrothermic heating on the rate of oil production, it is necessary to draw up two Darcy equations; one for the region from the radius of drainage to the radius of effective heating, and one from the radius of effective heating to the radius of the well bore. There will be two unknowns in each equations; Q_o, barrels per day, and ΔP, pressure drop. It is apparent, however, that the production (Q_o) in barrels per day must be the same for each equation, since the amount of oil that flows into the heated area must be the same as the amount of oil that flows into the well bore. Thus the two equations must be equal, and solution can be made for simultaneous equations.

THE EFFECT OF RESERVOIR TEMPERATURE ON OIL PRODUCTION

In order to see the effect of a reservoir temperature on oil production rate, let us take the results of an analysis of an actual 20 degree API gravity crude oil, as shown in Figure (A).

The temperature in the reservoir from which this crude sample was taken is 75 degrees Farenheit, and the planned heating of this well will be to a temperature of 200 degrees Farenheit. An examination of the tempature-viscosity curve will show that the viscosity of this crude sample at reservoir temperature of 75 degrees is 110 centipoise,while the viscosity at the heated temperature of 200 degrees is only 10 centipoise. It is apparent that a substitution of the 10 centipoise figure for the 110 centipoise figure in the Darcy radial flow equation will cause the oil production rate in barrels per day to increase by a factor of 11. In the Electrothermic Process all of the reservoir is not heated to the elevated temperature, only the part around the producing well. However, the heating of this portion of the producing reservoir does have a dramatic effect on the oil production rate, as we shall see shortly.

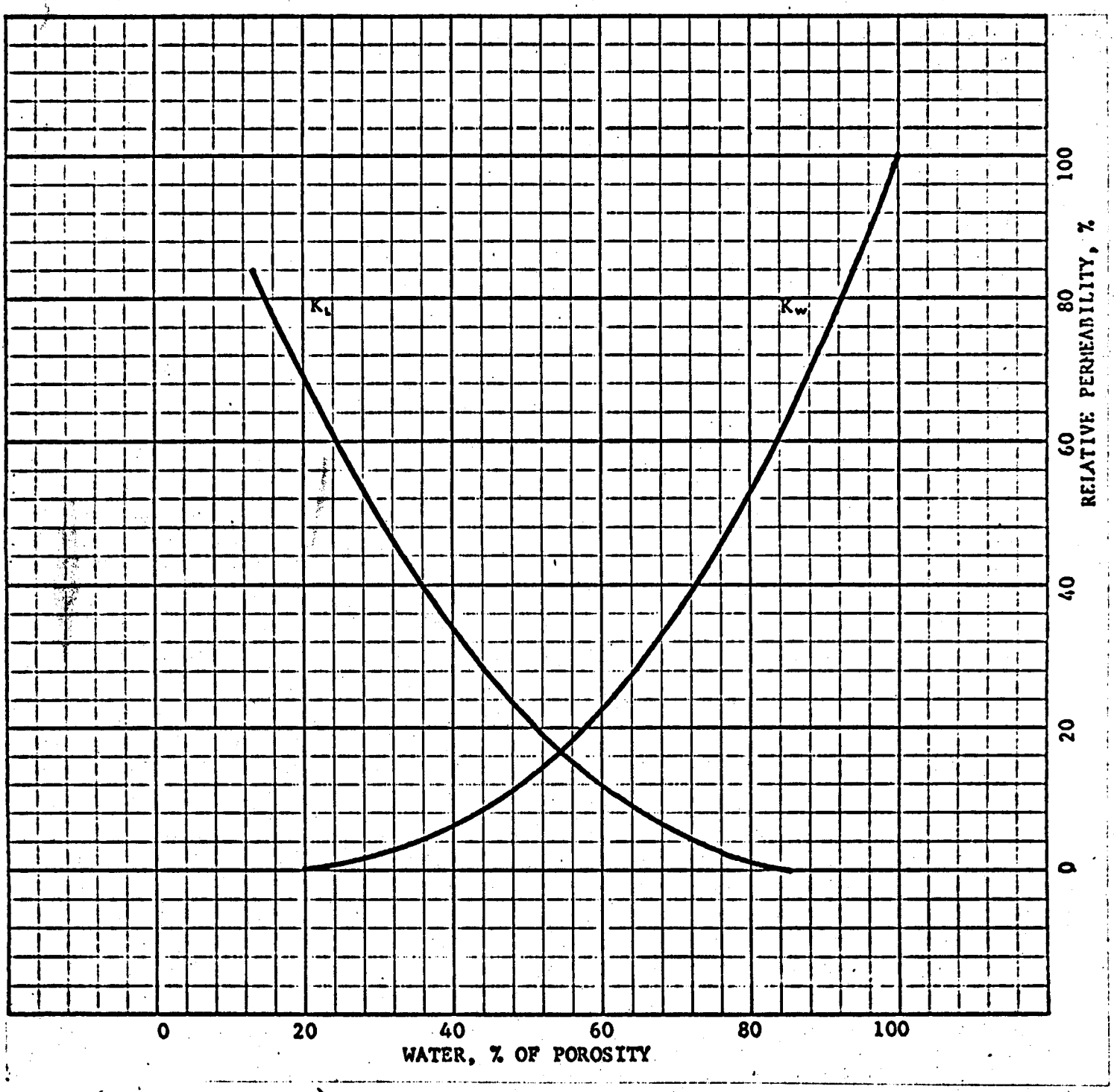
THE EFFECT OF ELECTROTHERMIC HEATING ON PRESSURE DIFFERENTIAL IN A FLOWING WELL.

The variation of pressure with distance from a flowing well is shown in Figure (B) on the next page.

THE EFFECT OF ELECTROTHERMIC HEATING ON EFFECTIVE PERMEABILITY TO OIL.

Examination of the actual producing rate versus the theoretical (calculated) producing rate for most oil wells will show an actual producing rate much lower than the theoretical producing rate. Assuming that information concerning the physical reservoir and well conditions are reasonably accurate, then this discrepancy is usually due to the fact that the actual K_o (effective permeability to oil) has been reduced by certain physical conditions around the well bore (sand face damage), either from deposition of heavy asphaltic hydrocarbons or paraffin, or possibly water or gas accumulation around the well bore. It is not possible to calculate the increase in K_o, effective permeability to oil, that can be brought about by the use of Electrothermic heating, since the amount of damage is difficult to determine in the first place, but this can be very significant factor in increasing oil production. Examination of numerous producing reservoirs has shown that sand face damage causes reduction in the producing rate by as much as 200 times, especially in viscous oil reservoirs, but this can often be largely remedied by Electrothermic heating.

The permeability of reservoir rock to any fluid at less than 100 percent saturation is called effective permeability. The ratio of effective permeability to the permeability at 100 percent saturation is called relative permeability.



Relative permeability Kl to reservoir liquid and Kw to water for sandstone. (After Park Jones)

ELECTRICAL ENERGY AS A THERMAL SOURCE.

The dissipation of electrical energy in a resistance produces heat, the thermal equivalent of which is 3412 BTU per kilowatt-hour. The cost of power varies widely, but in most areas a cost for a pilot project of 1.0 cent per kilowatt-hour can be established. For medium size producing areas (10 wells or more), this cost can be lowered to approximately 0.7 cents per kilowatt-hour.

USING THE EARTH'S RESISTANCE AS A HEATING ELEMENT

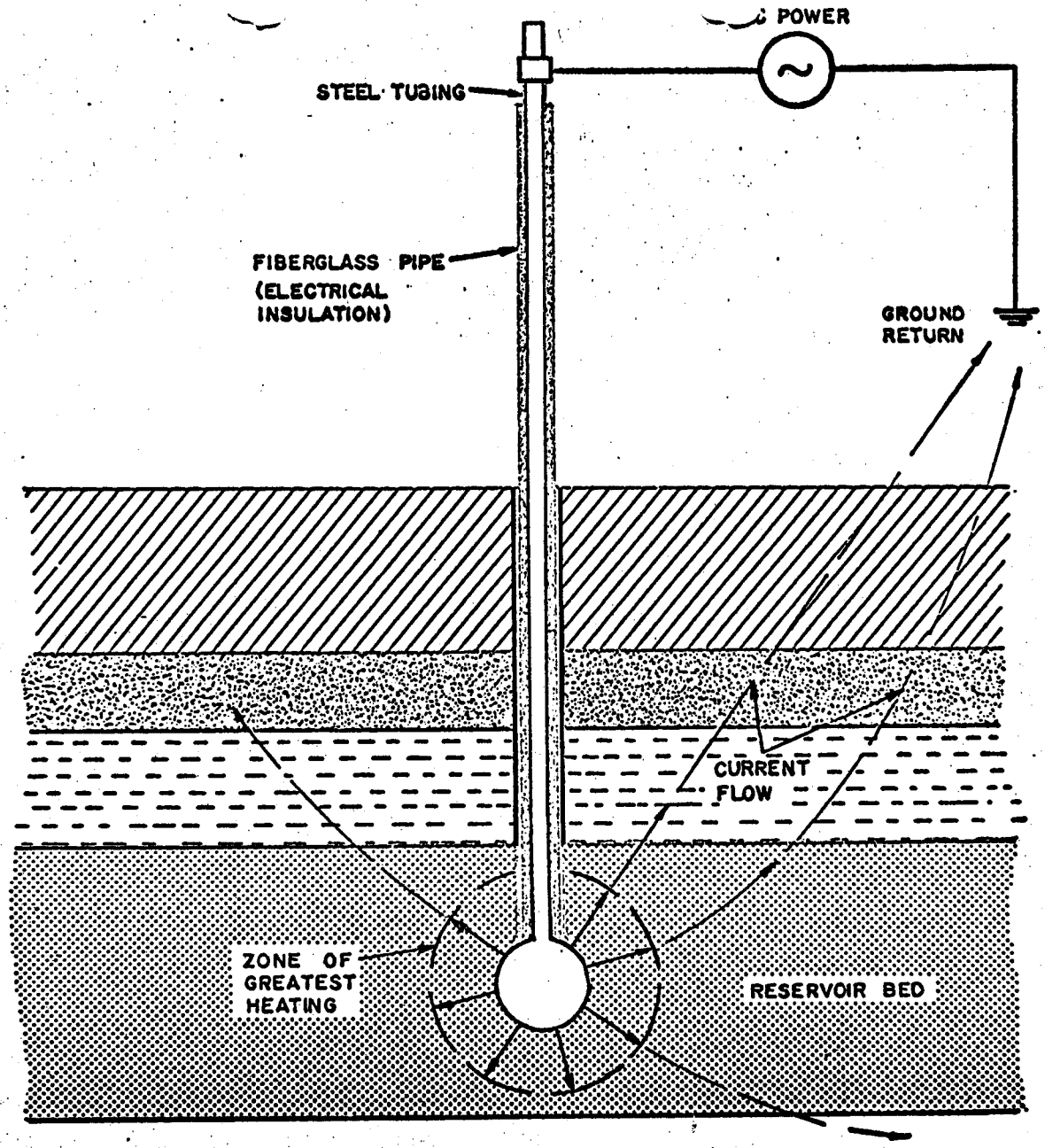
Because of the concentration of the resistance of an earth current path to the volume near the electrode, current impressed on a formation in the proper way can serve as a powerful down-hole heating element.

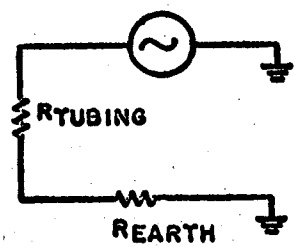
Figure (B) shows a representative system consisting of a string of insulated tubing connected to an exposed metal electrode inserted into an oil bearing formation. A source of electrical power is connected between the tubing and an infinite remote ground return electrode. Current will flow through the circuit, consisting of the resistance of the tubing and the resistance of the earth path.

A. Resistance of Tubing

Measured resistance to AC current of 1000 feet of J-55 non-upset 2-3/8" tubing, using special conducting thread compound, has been found to be

$R = 0.1166 \text{ ohms}/1000 \text{ ft.}$





EQUIVALENT CIRCUIT

FIGURE B

SCHEMATIC REPRESENTATION OF
ELECTRICAL RESERVOIR HEATING

This tubing is satisfactory for shallow wells, but it is possible to decrease the resistance in the tubular conductor to almost any desired figure by using heavier wall tubing, by using both tubing and casing as the insulated conductor or even by using aluminum tubing. It is usually desirable to have some heat generated in the tubular string, since this serves to keep the oil warm as it is brought to the surface.

B. The Earth's Resistance

The resistance of the earth to current flow is not difficult to calculate. For example, if the configuration of the electrode is considered to be spherical, the resistance of this circuit is given by

$$R = \rho \int_{r_o}^{\infty} \frac{dr}{4\pi r^2}$$

where r_o is the radius of the electrode. This intergration yields

$$R = \frac{\rho}{4\pi r_o}$$

This simply states that the resistance of an earth path to current flow depends only upon the resistivity of the earth material and the size of the electrode.

Actual experience has shown that resistivity of many oil reservoirs in salt water wet sand formation is on the order of

$$\rho = 10.0 \text{ ohm } m^2/m$$

If the spherical electrode is one (1) meter in diameter, then the resistance of the circuit through the earth to a perfect ground would be

$$R = \frac{10.0}{4\pi \times 1/2} = 1.6 \text{ ohm}$$

It is interesting to note that further calculations will show that, with the spherical electrode one (1) meter in diameter, about 85% of the total heating takes place in the first ten feet around the electrode. Other electrode configurations will give deeper heat penetration into the reservoir, if desired.

C. The Heating Circuit

If an electrical current is impressed on this circuit, using 480 volts and zero power factor on a well 3000 feet deep, then the resultant heating would take place as follows:

$$I = \frac{E}{R} = \frac{480}{1.95} = 246 \text{ Amps}$$

The power dissipated in the tubing would be

$$P = I^2 R_t = (246)^2 (.3498) = 21.17 \text{ KW}$$

and the power dissipated in the earth path (within a few electrode diameters of the bore hole) would amount to

$$P = I^2 R_e = (246)^2 (1.6) = 96.83 KW$$

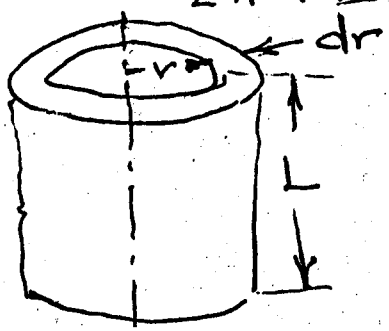
The thermal equivalent of these two figures is 72,232 BTU per hour and 330,384 BTU per hour, respectively.

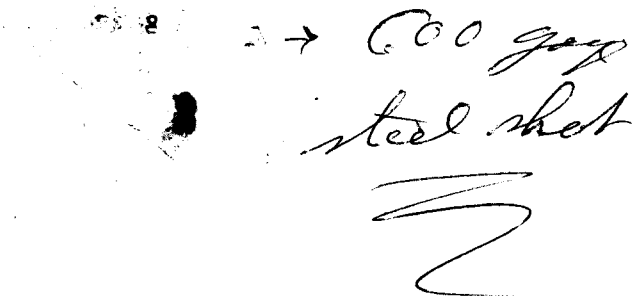
It is obvious that there are no elements to burn out, and no problems of insulating a high temperature heater associated with this method.

For purposes of calculation of heat distribution around an electrode, and rate of change of heating pattern, let us consider an actual case. The field in which this well was drilled had a paraffin problem, which tests indicated was in the sand face at the well bore. It was anticipated that heat penetration of 24" radius would be sufficient, so a cylindrical electrode design with several notches, was used (See Figure C). The electrode of the well to be considered consisted primarily of a cylinder 9.5 to 10 inches in diameter of 10-18 gauge steel shot packed around a special stainless steel welded 20 gauge screen. It should be noted that the cylindrical electrode configuration gives the least heat penetration into the reservoir, and is used only where deep penetration of heat is not important. The annulus of this screen was packed off with an asbestos packer. It can be seen that the steel shot is in intimate contact with the formation, and serves to direct the current into the formation.

Assuming radial current distribution from the electrode, a reasonable assumption at distances close to the electrode compared to its length, and sufficiently remote from boundaries, the effect of initial formation resistivity can be computed. In Figure I, the thin cylindrical shell at distance dr from the axis will have a resistance given by

$$dR = \frac{\rho dr}{2\pi r L}$$




→ 600 gm
steel shot

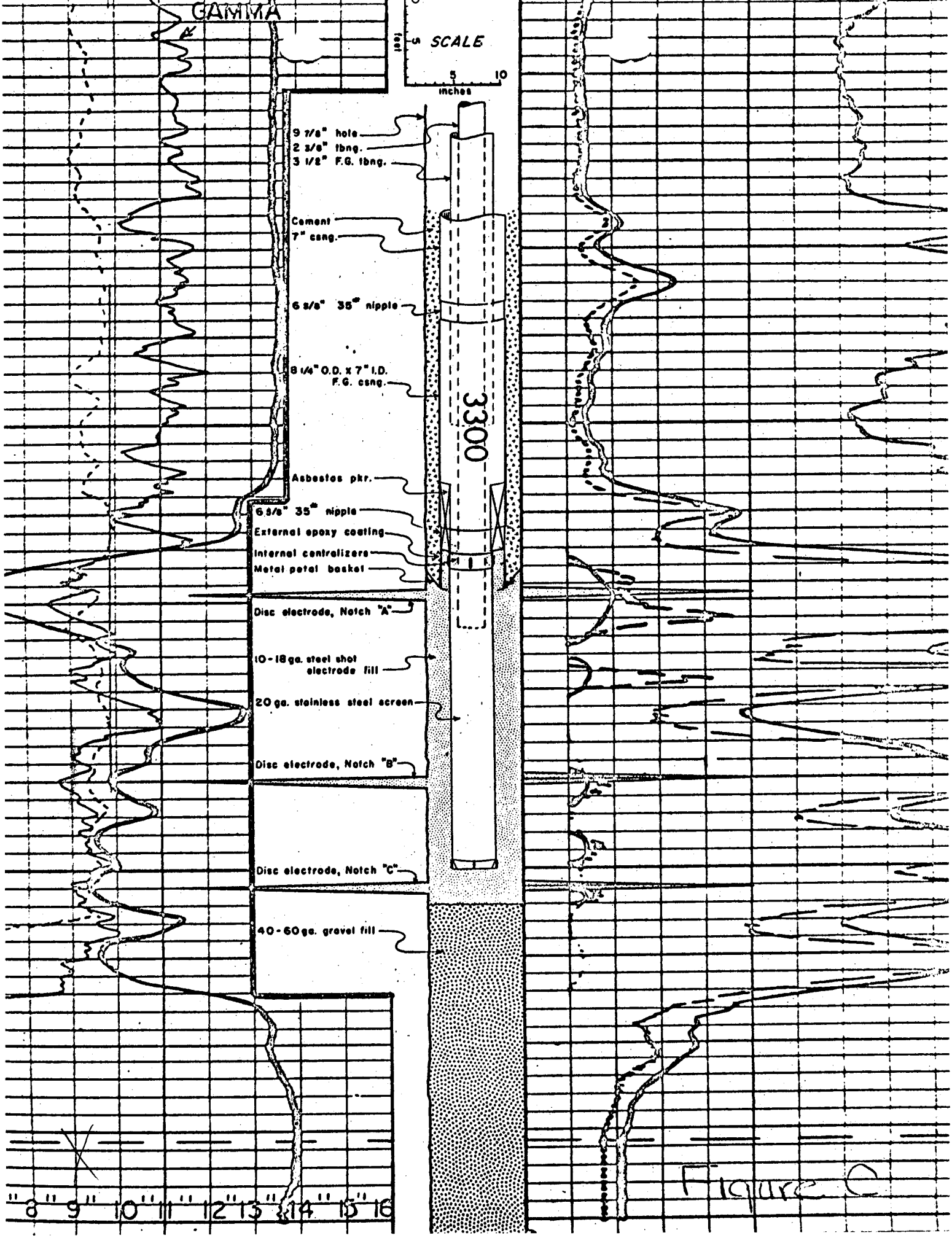

GAMMA
SCALE
5
10
inches
9 7/8" hole
2 3/8" tbng.
3 1/8" F.G. tbng.
Cement
7" csng.
6 3/8" 35° nipple
8 1/4" O.D. x 7" I.D.
F.G. csng.
3300
Asbestos pkr.
6 3/8" 35° nipple
External epoxy coating
Internal centrolizers
Metal petal basket
Disc electrode, Notch "A"
10-18 ga. steel shot
electrode fill
20 ga. stainless steel screen
Disc electrode, Notch "B"
Disc electrode, Notch "C"
40-60 ga. gravel fill
8" 9" 10" 11" 12" 13" 14" 15" 16"

Figure 2

Intergrating between limits r_1, and r_2 (where r_2 is small compared to L)

$$R = \frac{\rho}{2\pi L} \int_{r_1}^{r_2} \frac{dr}{r}$$

$$R = \frac{\rho}{2\pi L} \ln \frac{r_2}{r_1}$$

where ρ true formation resistivity

The first cylindrical shell of formation to be examined, consisting of formation from the electrode boundary, r_1 = 5 inches to r_2 = 10 inches. Electric log measurements indicate formation resistivity (ρ) equal to 70 ohm - m, but other experimental results indicates 50 ohm - m to be a more realistic figure for the overall section. On this basis

$$R_{r_1-r_2} = \frac{\rho}{2\pi L} \ln 2$$

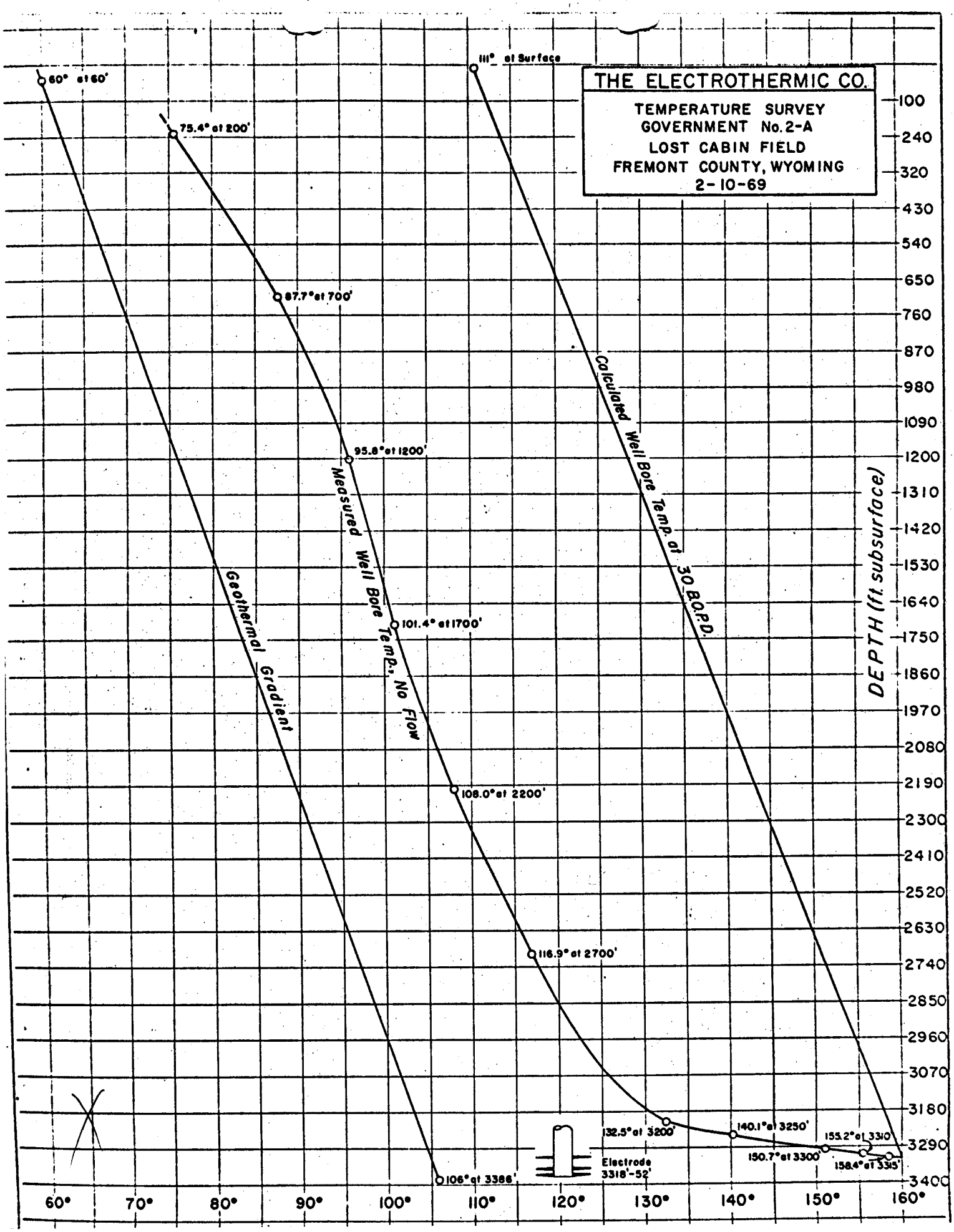
$$= \frac{50}{2\pi\, 11.5818} (.693)$$

$$= .6870 \text{ ohms}$$

Obviously, each time a new shell having twice the radius of the last is encountered, an equal series resistance is added. Thus the shell from r = 5 inches to r = 10 inches, the shell from r = 10 inches to r =

20 inches, the shell from $\sqrt{}$ = 20 inches to $\sqrt{}$ = 40 inches each contribute approximately .687 ohm to the total initial circuit. It should here be noted that these conditions prevail only for the initial circuit, because the resistance in the earth path immediately begins to drop as the heat begins to increase. For every increase of 100 degree F in the area around the electrode the resistance decreases by half, so that a high initial heat rate immediately around the electrode gives way to a slower rate of heating as the resistance drops, and the additional current thus allowed to pass thru then causes deeper and deeper heat penetration around the well, on to the point of equilibrium.

The bottom hole temperature curve (Figure D) on the following page illustrates the high efficiency of this system. The fact that the temperature of the well bore is only 20 degrees above the geothermal gradient, even after heating for a seven (7) day period with no flow, as this well was, shows that the uphole losses are at a minimum. The probable maximum tempature in the electrode of this well, which was below the deepest reading, was calculated to be 200 degrees F at equilibrium. This well replaced a well making four barrels of oil per day.


THE ELECTROTHERMIC CO.
TEMPERATURE SURVEY
GOVERNMENT No. 2-A
LOST CABIN FIELD
FREMONT COUNTY, WYOMING
2-10-69
60° at 60'
75.4° at 200'
87.7° at 700'
95.8° at 1200'
101.4° at 1700'
108.0° at 2200'
116.9° at 2700'
132.5° at 3200'
140.1° at 3250'
150.7° at 3300'
155.2° at 3310
158.4° at 3315'
106° at 3386'
111° at Surface
Geothermal Gradient
Measured Well Bore Temp., No Flow
Calculated Well Bore Temp. at 30 B.O.P.D.
Electrode 3318'-52'
DEPTH (ft. subsurface)
100
240
320
430
540
650
760
870
980
1090
1200
1310
1420
1530
1640
1750
1860
1970
2080
2190
2300
2410
2520
2630
2740
2850
2960
3070
3180
3290
3400
60°
70°
80°
90°
100°
110°
120°
130°
140°
150°
160°

APPENDIX A

The first question asked after a person has read the foregoing report is usually, "What does the calculation discussed show for an increase in production using the Electrothermic Process?"

To show the production to be expected, a copy of a letter from H. J. Gruy and Associates, giving the results of such a calculation, is attached beginning on the following page. The well in question was not capable of commercial production, although it had been swabbed at a rate of 6 - 7 barrels per day. The calculation indicates that the Electrothermic Process will increase this production to a minimum of 324 barrels per day. A contract has been signed covering the land on which this well was drilled, and a project will be started here during the month of February, 1970 to test actual results.

The second question usually asked about the Electrothermic Process is, "How much is the heating cost per barrel of oil produced?"

The cost per barrel for heat varies from area to area, but the cost on projects considered most successful varies from ten cents (10¢) per barrel for paraffin oil to thirty cents (30¢) per barrel for heavier oils.

H. J. GRUY AND ASSOCIATES, INC.
PETROLEUM CONSULTANTS
2501 CEDAR SPRINGS ROAD
DALLAS, TEXAS 75201

October 3, 1969

Mr. William G. Gill
The Electrothermic Co.
430 Wilson Building
Corpus Christi, Texas 78401

Dear Bill:

We have reviewed the data that you have forwarded to us on the Bullfrog Federal No. 1 well, Garfield County, Utah, to determine the feasibility for installing the Electrothermic thermal oil recovery process.

Our calculations are for a 30-foot zone located at a depth of 2970 to 3000 feet. Sufficient data were furnished to construct the attached oil viscosity versus temperature curve. The data furnished indicated an average core analysis permeability for the section from 2972 to 2992 of 503 millidarcies. We assume this value to be absolute permeability. No relative permeability data were furnished, and we have reported calculated producing capacities in a graphical form for a range of effective permeabilities to oil. Because no bottom-hole pressure data were available, we have prepared this graph assuming a maximum drawdown of 300 pounds per square inch to be possible with the lifting equipment.

Radial flow calculations indicate that if a 25-foot radius for the heated zone is assumed, the pressure drop within the heated zone will be approximately 4.13 percent of the total pressure drawdown. Based on an assumed 300-pound total pressure drop and a permeability effective to oil of 40 millidarcies, calculations indicate the producing rate to be about 324 barrels per day. Higher effective permeability assumptions will increase this producing capacity as indicated on Graph No. 2 attached.

The above calculations assume radial flow conditions and assume that satisfactory heating to an average temperature of 200 degrees and a radius of 25 feet can be accomplished. No heat balance-cost of power calculations have been performed in association with the above calculations.

Yours very truly,

Forrest A. Garb

Forrest A. Garb
Executive Vice President

FAG/mlm
Attachments

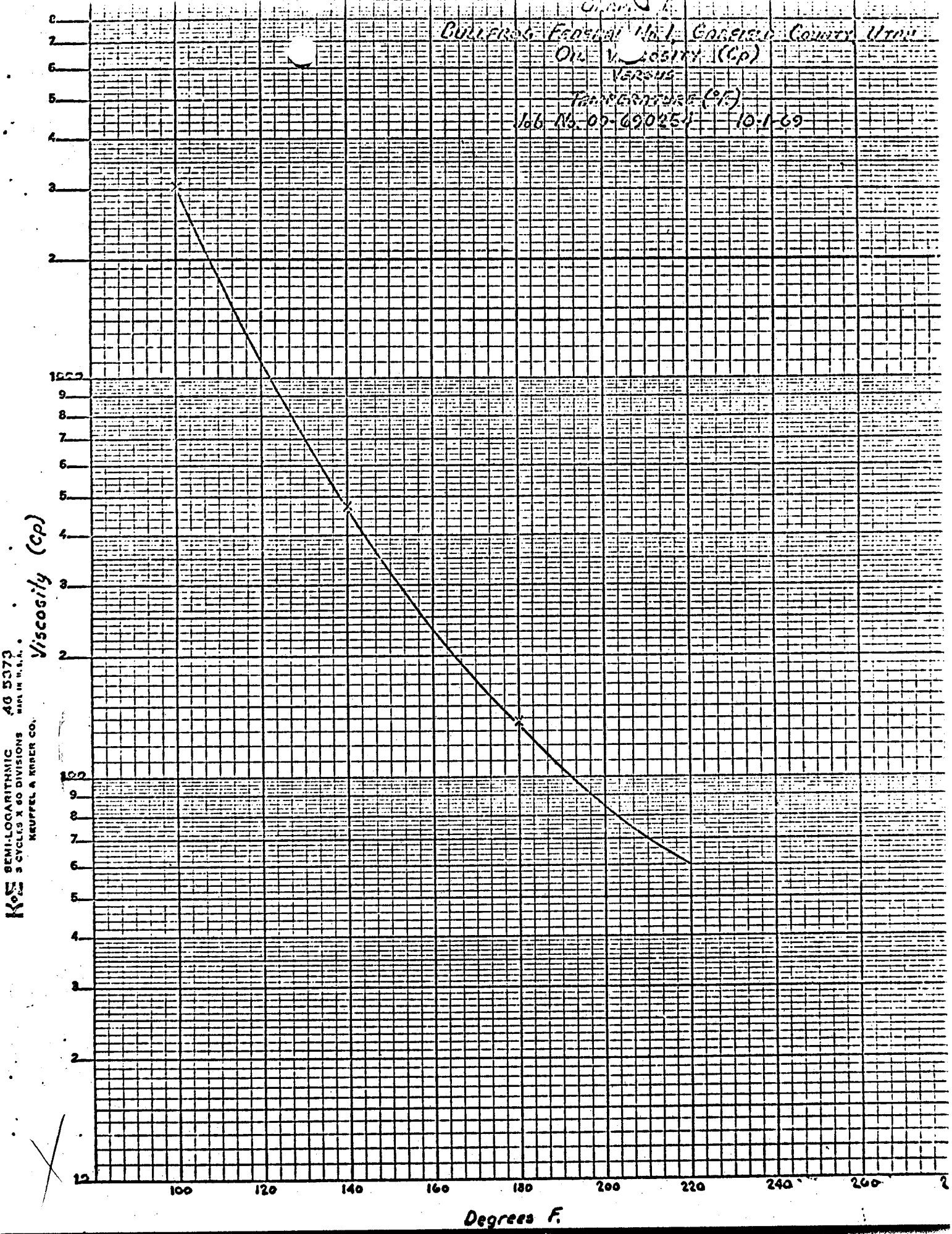
Cullinan Federal No. 1, Garfield County, Utah

Oil Viscosity (Cp)

Versus

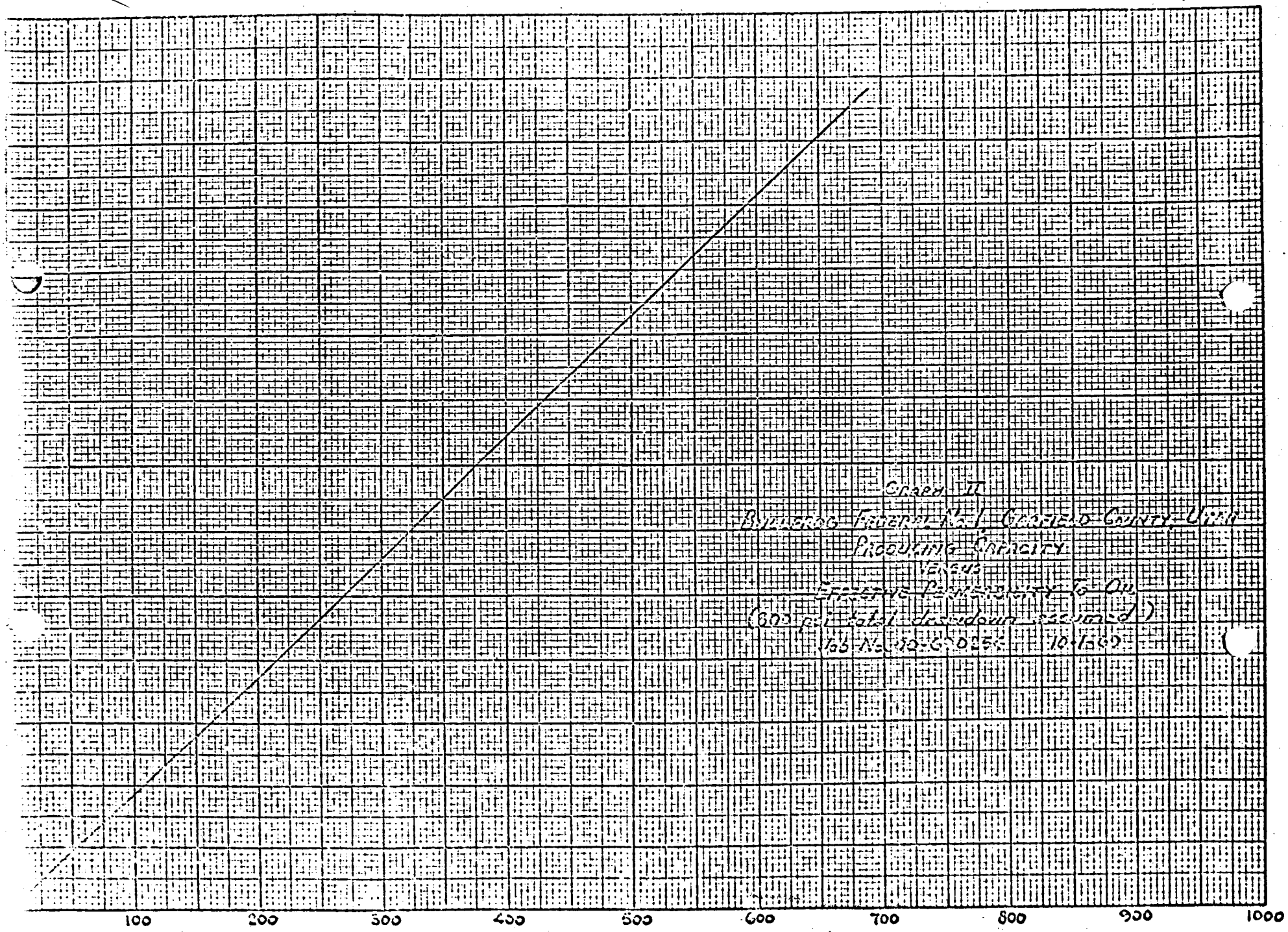
Temperature (°F)

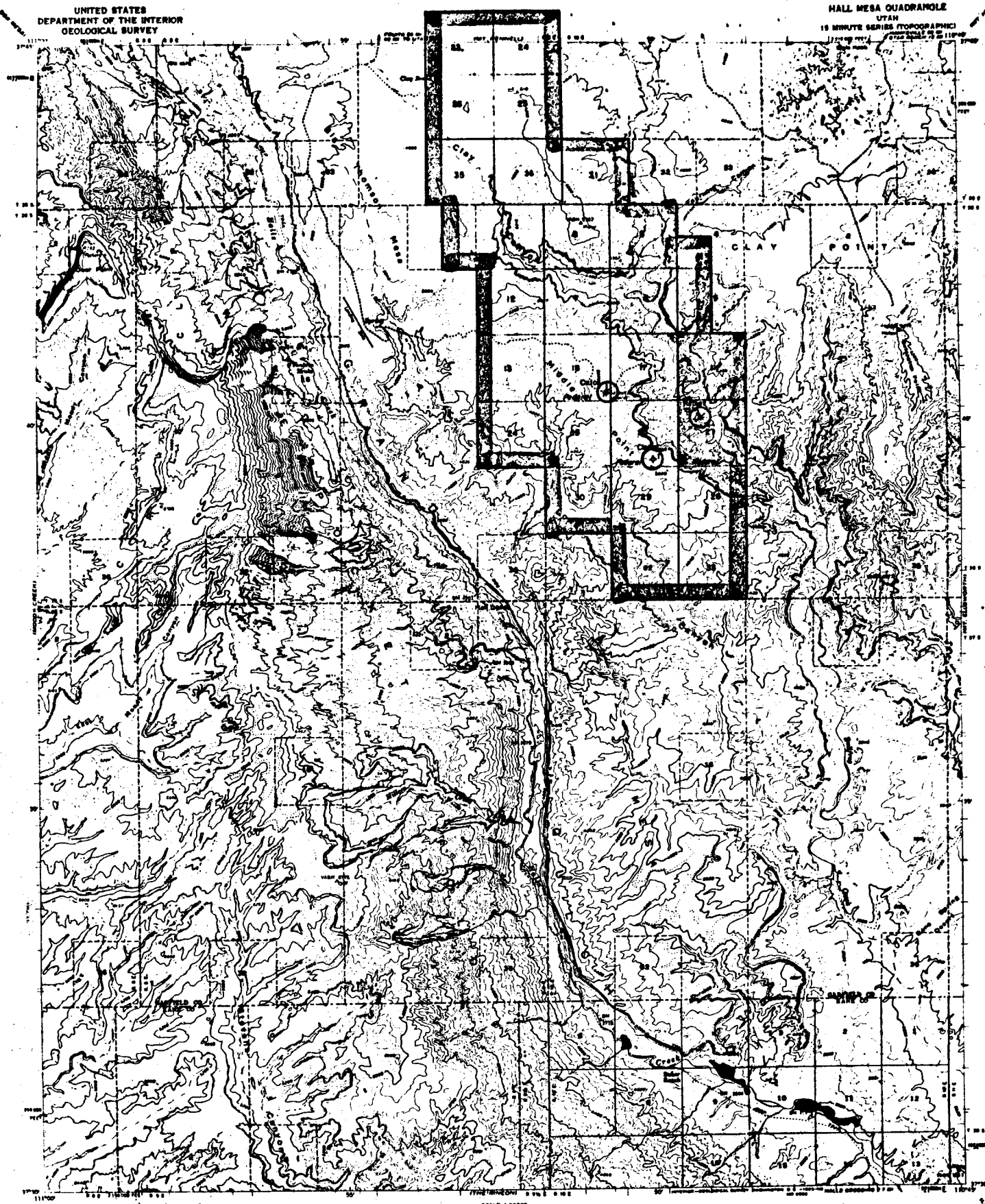
166 43-05-60025 10-1-69



KEUFFEL & ESSER CO. MADE IN U.S.A. 46 5373

SEMI-LOGARITHMIC
3 CYCLES X 60 DIVISIONS


Graph II
Producing Capacity
Versus
Reserve Pressure to Ou
100
200
300
400
500
600
700
800
900
1000
Producing Capacity (310)


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
HALL MESA QUADRANGLE
UTAH
15 MINUTE SERIES (TOPOGRAPHIC)
CLAY POINT
SCALE 1:62500
CONTOUR INTERVAL 80 FEET
HALL MESA, UTAH
1953

H. J. GRUY AND ASSOCIATES, INC.
PETROLEUM CONSULTANTS
2501 CEDAR SPRINGS ROAD
DALLAS, TEXAS 75201

October 3, 1969

Mr. William G. Gill
The Electrothermic Co.
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Yours very truly,

Forrest A. Garb

Forrest A. Garb
Executive Vice President

FAG/mlm
Attachments

THE ELECTROTHERMIC CO.
WILSON BLDG. • CORPUS CHRISTI, TEXAS 78401

BULLFROG MARINA PROSPECT

MULEY CREEK ANTICLINE

GARFIELD COUNTY, UTAH

GRAPH I

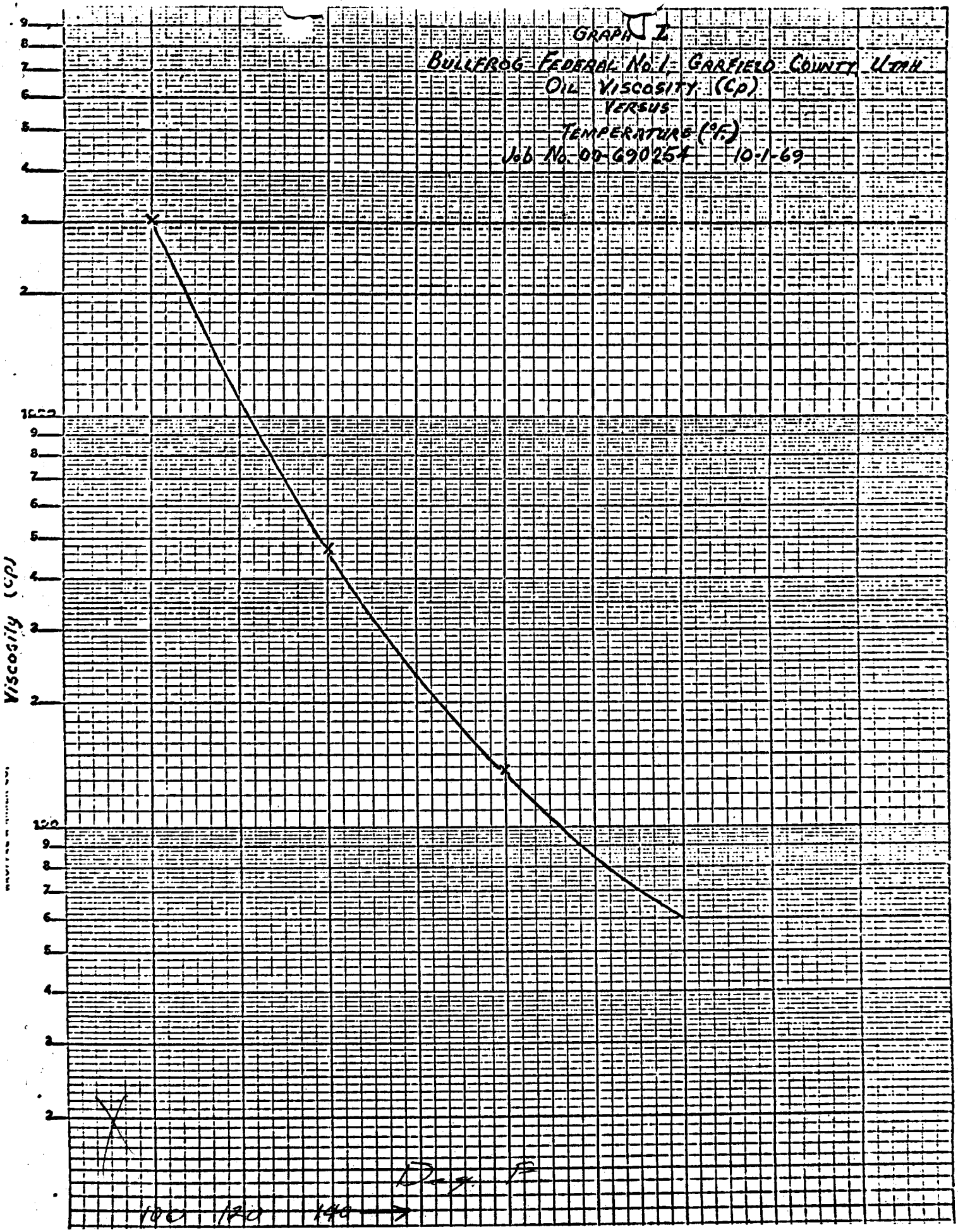
BULLFROG FEDERAL No. 1 - GARFIELD COUNTY UTAH

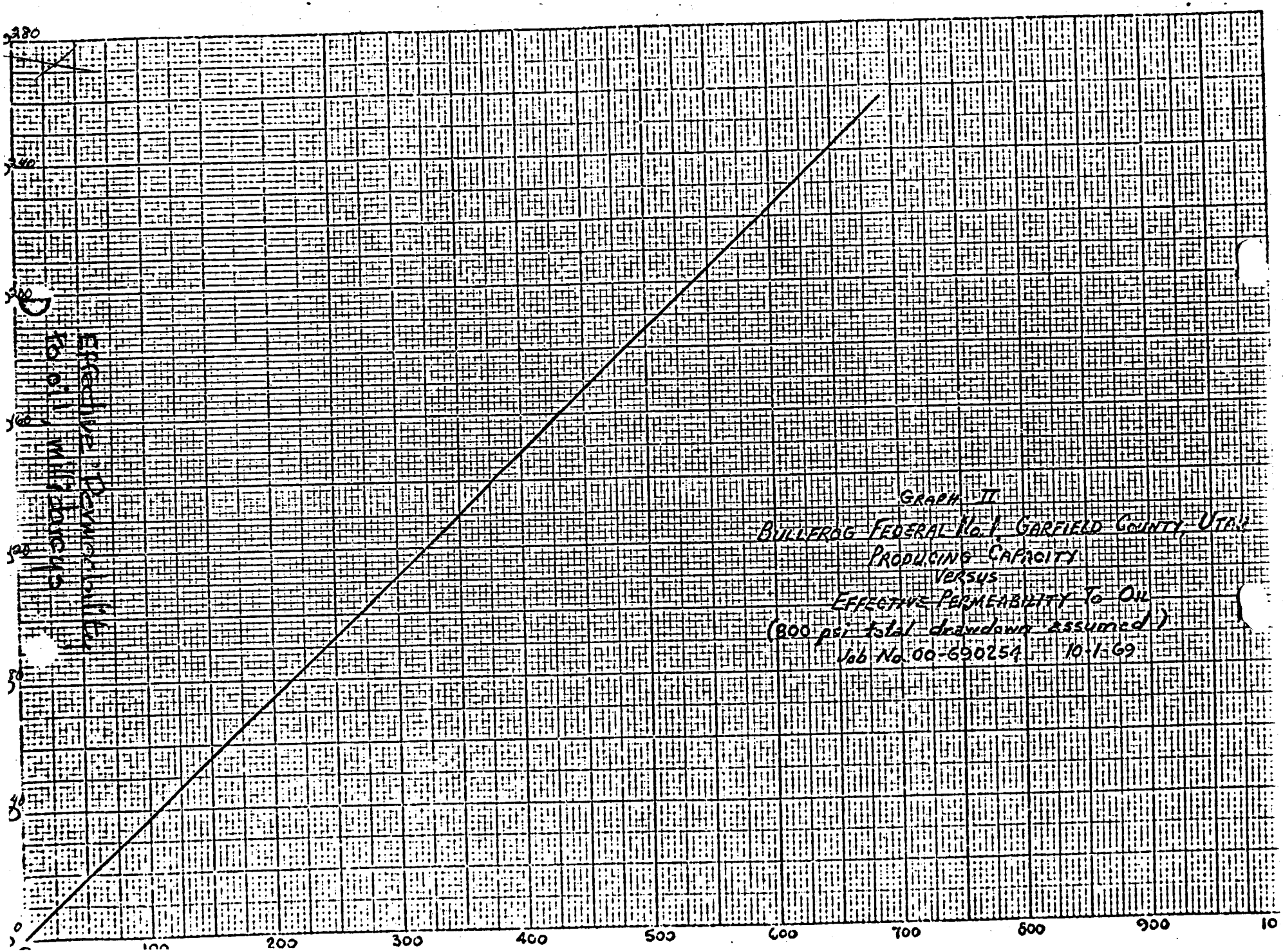
OIL VISCOSITY (Cp)

VERSUS

TEMPERATURE (°F.)

Job No. 00-690254 10-1-69





GRAPH II

BULLFROG FEDERAL No. 1 GARFIELD COUNTY, UTAH

PRODUCING CAPACITY

VERSUS

EFFECTIVE PERMEABILITY TO OIL

(800 psi total drawdown assumed)

Job No. 00-690254 10-1-69

Exploration Memo #9

To: Romex Executive Committee

From: Grant I. Gaeth

Subject: Muley Creek Prospect

Date: November 25, 1968

The enclosed logs, core analyses, DST Report and Muley Creek structure map support this brief memorandum outlining the Muley Creek Prospect.

The Muley Creek Prospect consists of a doubly plunging semetrical fold with closure in excess of 300 feet. This feature is approximately 50 miles due east of Tenneco's Upper Valley Field and 60 miles south, southwest of Hanksville in Garfield County, Utah. Specifically in Townships 35 through 37 South and Ranges 9 & 10 East.

Access to the Prospect is via the newly paved Utah State Highway 95, south of Hanksville, to approximately 5 miles north of the Bull Frog Basin Marina. Here, a newly graded County road heads northwest approximately 10 miles to the Muley Creek Dry Holes.

The initial Muley Creek test was drilled by the California Company in 1951 to a total depth of 8,362' and located in the NE SE of Section 18-T36S-R10E. After recovering sidewall cores of saturated sand in the White Rim sandstone, the hole was plugged back from total depth to 3770 and side-tracked at 3841'. Five cores were taken in the interval 3920-4024 and a copy of the core lab report is included with this memorandum. In summary, the core analysis was as follows:

1. Porosity: 9.6-23.9%
2. Permeability: 0-1,035 millidarcys
3. Oil Saturation: 0-59.7%
4. Water Saturation: 21.6-90.3%

The Cleary Petroleum Federal 1-20 in the SW SE of Section 20-T36S-R10E was completed as a dry hole November 19, 1968 at a total depth of 4004' in the Permian White Rim sandstone. Summary of the attached core analysis report covering 119' of White Rim Sandstone is as follows:

1. Porosity: 8-25.9%
2. Permeability: .6-2550 Millidarcys
3. Oil Saturation: 0-40.1%
4. Water Saturation: 22.8-78.5%

A comparison of core analyses in the two Muley Creek tests delineates a thicker saturated section with better overall porsity and permeability in the Cleary well; however there are thin streaks of higher oil saturation in the Calco well. Of note, is the fact that although the Cleary well is 43' structurally high to

CA-30

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company CLEARY FUNDS — Formation WHITE RIM — File RP-3-2329
Well FEDERAL NO. 1-20 — Core Type DIAMOND 2.625" — Date Report 11-15-68
Field WILDCAT — Drilling Fluid WATER BASE MUD — Analyst GALLOP
County GARFIELD — State UTAH — Elev. 4990'GL — Location SEC 2-T36S-R10E

Lithological Abbreviations

SAND-SD SHALE-SH LIME-LM	DOLOMITE-DOL CHERT-CH GYPSUM-GYP	ANHYDRITE-ANHY CONGLOMERATE-CONG FOSSILIFEROUS-FOSS	SANDY-SDY SHALY-SHY LIMY-LMY	FINE-FN MEDIUM-MED COARSE-CSE	CRYSTALLINE-XLN GRAIN-GRN GRANULAR-GRNL	BROWN-BRN GRAY-GY VUGGY-VGY	FRACTURED-FRAC LAMINATION-LAM STYLOLITIC-STY	SLIGHTLY-SL/ TEST-V/ WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS KA	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	RESIDUAL SATURATION PER CENT PORE TOTAL WATER	GRAIN DENS.	SAMPLE DESCRIPTION AND REMARKS
	(CONVENTIONAL ANALYSIS)						
1	3809.0-10.0	340	20.5	22.9	50.7	2.71	Sd, Tn, Fn Grn
2	10.0-11.0	120	20.5	12.7	65.9		Sd, Tn, Fn Grn
3	11.0-12.0	140	16.6	11.5	56.1		Sd, Tn, Fn Grn
4	12.0-13.0	100	15.9	16.4	57.2	2.69	Sd, Tn, Fn Grn
5	13.0-14.0	51	18.1	14.4	50.8		Sd, Tn, Fn Grn
6	14.0-15.0	77	19.6	13.2	56.5		Sd, Tn, Fn Grn
7	15.0-16.0	140	18.6	12.4	61.8		Sd, Tn, Fn Grn
8	16.0-17.0	135	17.7	10.4	65.3		Sd, Tn, Fn Grn
9	17.0-18.0	80	16.2	7.4	67.9		Sd, Tn, Fn Grn
10	18.0-19.0	90	17.6	17.6	48.3	2.69	Sd, Tn, Fn Grn
11	19.0-20.0	63	15.7	14.7	49.7		Sd, Tn, Fn Grn
12	20.0-21.0	190	16.2	11.7	59.2		Sd, Tn, Fn Grn
13	21.0-22.0	150	11.9	10.1	73.2		Sd, Tn, Fn Grn
14	22.0-23.0	54	14.7	20.4	55.7		Sd, Tn, Fn Grn
15	23.0-24.0	16	13.5	22.2	50.3	2.68	Sd, Tn, Fn Grn
16	24.0-25.0	3.3	12.3	4.1	65.0		Sd, Gy, V/Fn Grn, Dolomitic
17	25.0-26.0	2.1	12.7	0.0	67.8		Sd, Gy, V/Fn Grn
18	26.0-27.0	7.8	15.7	21.0	46.5		Sd, Tn, Fn Grn
19	27.0-28.0	1.7	9.6	10.0	40.6		Sd, Gy, Fn Grn
20	28.0-29.0	3.5	11.5	1.7	44.3	2.72	Sd, Tn, Fn Grn
21	29.0-30.0	54	12.5	30.4	36.0		Sd, Tn, Fn Grn
22	30.0-31.0	34	15.5	18.1	24.5		Sd, Tn, Fn Grn
23	31.0-32.0	98	12.3	24.4	22.8		Sd, Tn, Fn Grn
24	32.0-33.0	165	14.7	13.6	51.7		Sd, Tn, Fn Grn
25	33.0-34.0	110	18.6	14.0	51.1	2.69	Sd, Tn, Fn Grn
26	34.0-35.0	1.2	8.4	0.0	47.6		Sd, Gy, V/Fn Grn, Sl/Dolomitic
27	35.0-36.0	2.1	10.9	0.0	36.7		Sd, Gy, V/Fn Grn, Sl/Dolomitic
28	36.0-37.0	1150	25.9	35.9	25.5		Sd, Gy, Fn Grn, Sl/Dolomitic
29	37.0-38.0	725	23.5	36.2	28.5		Sd, Tn, Fn Grn, Sl/Dolomitic
30	38.0-39.0	715	20.8	35.1	37.0	2.69	Sd, Tn, Fn Grn, Sl/Dolomitic
31	39.0-40.0	705	22.0	28.6	27.7		Sd, Tn, Fn Grn
32	40.0-41.0	735	14.2	40.1	25.3		Sd, Tn, Fn Grn
33	41.0-42.0	430	15.6	28.2	33.3		Sd, Tn, Fn Grn
34	42.0-43.0	1360	17.6	15.3	44.9		Sd, Tn, Fn Grn
35	43.0-44.0	300	14.2	18.3	55.5	2.69	Sd, Tn, Fn Grn
36	44.0-45.0	1980	18.7	17.6	48.6		Sd, Tn, Fn Grn
37	45.0-46.0	2550	17.2	18.6	54.1		Sd, Tn, Fn Grn
38	46.0-47.0	1540	19.5	16.4	42.1		Sd, Tn, Fn Grn

the Calco well, the apparent oil-water contact is 9' low to that in the Calco well.

A DST in the interval 3799-3869 recovered 3060' of black sulphur water with a measured Rw of 4 ohms. The final flow and shut in pressures were 1228 and 1272 lbs. respectively, indicating a very permeable reservoir. As of this date there is no information regarding the sulphide content of this fluid.

Preliminary analysis of the electrical logs run in the Cleary well could not substantiate the 4 ohm water recovered in the DST. Subsequent communication and log analysis by and with Schlumberger representatives have concluded that the measured Rw is in error.. Furthermore, several other Rocky Mountain areas have also produced highly resistive waters on tests that have been incompatible with log evaluations and actual oil production. The following log evaluation utilizes Rw's that were computed by a Schlumberger representative from the SP curve and from the dual induction log assuming an interval as 100% water saturated.

1.	Interval	3771-3778	Dolomite Rw = .5, Rt =275, porosity 20.5%, Sw = 19% Rw = 1.3, Rt and porosity as above, Sw = 33%
2.	Interval	3779-3785	Dolomite Rw = .5, Rt = 210, porosity 23%, Sw = 20% Rw = 1.3, Rt and porosity as above, Sw 34%
3.	Interval	3786-3798	Sandy Dolomite Rw = .5, Rt = 200 porosity 20%, Sw = 23% Rw = 1.3, Rt and porosity as above, Sw = 39%
4.	Interval	3800-3820	Sandstone Rw = .5, Rt = 105, porosity 17.5, Sw = 37% Rw = 1.3, Rt and porosity as above, Sw = 62%
5.	Interval	3841-3848	Sandstone Rw = 1.3, Rt = 120, porosity 24%, Sw = 42%

As you will note, the lower two intervals were cored and tested; however, the intervals from 3771-3798 were neither cored nor tested and are indicated oil productive by log analysis. Interval from 3841-3848 is a border-line case and should have been tested separately from other zones with lower oil saturations.

Since the Cleary well did not achieve either of its two primary objectives; that is, to drill the Permian section with air from hydrodynamically oriented location and since Cleary has no intention of drilling the third well, it is ocncluded that Romex should investigate all aspects of this Prospect and determine whether or not a third test should be drilled. Our first recommendation is to obtain an accurate surface map of the anticline so that we may evaluate the anomalous structural relationship between the Cleary and Calco wells.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company CLEARY FUNDS | Formation WHITE RIM | File RP-3-2329
Well FEDERAL NO. 1-20 | Core Type DIAMOND 2.625" | Date Report 11-15-68
Field WILDCAT | Drilling Fluid WATER BASE MUD | Analysts GALLOP
County GARFIELD State UTAH Elev. 4290'GL Location SEC 2-T36S-R10E

Lithological Abbreviations

SDSO.-SD SHALE-SH LIME-LM	DOLOMITE-DOL CHERT-CH GYPSUM-GYP	ANHYDRITE-ANHY CONGLOMERATE-CONG FOSSILIFEROUS-FOSS	SANDY-SDY SHALY-SHY LIMY-LMY	FINE-FN MEDIUM-MED COARSE-CSE	CRYSTALLINE-XLN GRAIN-GRN GRANULAR-GRNL	BROWN-BRN GRAY-GY VUGGY-VGY	FRACTURED-FRAC LAMINATION-LAM STYLOLITIC-STY	SLIGHTLY-SL/ VERY-V/ WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS Kᴀ	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	RESIDUAL SATURATION PER CENT PORE TOTAL WATER	GRAIN DENS.	SAMPLE DESCRIPTION AND REMARKS
39	3847.0-48.0	1590	16.2	20.4	46.9		Sd, Tn, Fn Grn
40	48.0-49.0	1160	15.3	22.8	45.1	2.67	Sd, Tn, Fn Grn
41	49.0-50.0	2220	17.4	16.7	44.8		Sd, Tn, Fn Grn
42	50.0-51.0	72	14.3	14.0	39.8		Sd, Tn, Fn Grn
43	51.0-52.0	0.6	8.9	0.0	40.5		Sd, Gy, V/Fn Grn, Sl/Dolomitic
44	52.0-53.0	0.6	8.0	0.0	48.7		Sd, Gy, V/Fn Grn, Sl/Dolomitic
45	53.0-54.0	20	11.8	1.7	50.8	2.68	Sd, Lt Tn, Fn Grn, Sl/Dolomitic
46	54.0-55.0	69	15.7	16.6	48.4		Sd, Tn, Fn Grn
47	55.0-56.0	160	12.9	24.0	37.2		Sd, Tn, Fn Grn, Sl/Dolomitic
48	56.0-56.5	34	12.4	27.4	30.6		Sd, Tn, Fn Grn, Dolomitic
49	3869.0-70.0	110	15.3	39.2	35.2		Sd, Tn, Fn Grn
50	70.0-71.0	110	15.0	30.0	32.7		Sd, Tn Fn Grn
51	71.0-72.0	120	15.3	20.9	48.4		Sd, Tn, Fn Grn
52	72.0-73.0	255	15.8	29.7	44.3		Sd, Tn, Fn Grn
53	73.0-74.0	2.7	13.7	7.3	51.8		Sd, Lt Tn, Fn Grn
54	74.0-75.0	17	14.8	1.4	58.0		Sd, Lt Tn, Fn Grn
55	75.0-76.0	60	15.3	1.3	47.7		Sd, Lt Tn, Fn Grn
56	76.0-77.0	77	13.3	1.5	66.1		Sd, Tn, Fn Grn
57	77.0-78.0	12	13.7	3.6	68.5		Sd, Lt Tn, Fn Grn
58	78.0-79.0	31	17.5	15.4	54.8		Sd, Lt Tn, Fn Grn
59	79.0-80.0	8.2	11.4	1.8	64.7		Sd, Gy, V/Fn Grn
60	80.0-81.0	43	17.9	1.1	68.7		Sd, Tn, Fn Grn
61	81.0-82.0	74	17.4	1.1	57.4		Sd, Tn, Fn Grn
62	82.0-83.0	115	17.6	1.1	65.3		Sd, Tn, Fn Grn
63	83.0-84.0	43	11.5	1.7	57.2		Sd, Tn, Fn Grn
64	84.0-85.0	3.3	11.7	0.0	61.6		Sd, Lt Gy, V/Fn Grn
65	85.0-86.0	1.7	11.5	0.0	58.2		Sd, Lt Gy, V/Fn Grn
66	86.0-87.0	0.8	13.1	0.0	55.8		Sd, Lt Gy, V/Fn Grn
67	87.0-88.0	6.2	10.9	0.0	37.6		Sd, Lt Gy, V/Fn Grn, Dolomitic
68	88.0-89.0	51	16.9	1.2	55.1		Sd, Tn, Fn Grn
69	89.0-90.0	43	16.3	1.2	63.9		Sd, Tn, Fn Grn
70	90.0-91.0	31	17.0	1.2	45.9		Sd, Tn, Fn Grn
71	91.0-92.0	37	19.2	0.0	59.8		Sd, Tn, Fn Grn
72	92.0-93.0	14	14.6	1.4	56.8		Sd, Tn, Fn Grn
73	93.0-94.0	46	18.8	0.0	64.9		Sd, Tn, Fn Grn
74	94.0-95.0	63	18.9	0.0	74.5		Sd, Tn, Fn Grn
75	95.0-96.0	17	14.4	0.0	51.3		Sd, Gy, V/Fn Grn

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company CLEARY FUNDS — Formation WHITE RIM — File RP-3-2329
Well FEDERAL NO. 1-20 — Core Type DIAMOND 2.625" — Date Report 11-15-68
Field WILDCAT — Drilling Fluid WATER BASE MUD — Analysts GALLOP
County GARFIELD — State UTAH — Elev. 4990 'GL — Location SEC 2-T36S-R10E

Lithological Abbreviations

SDSTN-SS SHALE-SH LIME-LM	DOLOMITE-DOL CHERT-CH GYPSUM-GYP	ANHYDRITE-ANHY CONGLOMERATE-CONG FOSSILIFEROUS-FOSS	SANDY-SDY SHALY-SHY LIMY-LMY	FINE-FN MEDIUM-MED COARSE-CSE	CRYSTALLINE-XLN GRAIN-GRN GRANULAR-GRNL	BROWN-BRN GRAY-GY VUGGY-VGY	FRACTURED-FRAC LAMINATION-LAM STYLOLITIC-STY	SLIGHTLY-SL/ VERY-V/ WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS KA	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	RESIDUAL SATURATION PER CENT PORE TOTAL WATER	SAMPLE DESCRIPTION AND REMARKS
76	3896.0-97.0	9.7	15.1	1.3	55.6	Sd, Gy, V/Fn Grn
77	97.0-98.0	34	16.9	0.0	60.3	Sd, Lt Tn, Fn Grn
78	98.0-99.0	8.6	15.2	0.0	61.2	Sd, Lt Tn, Fn Grn
79	3899.0-00.0	51	17.8	0.0	58.5	Sd, Lt Tn, Fn Grn
80	3900.0-01.0	34	17.3	0.0	61.2	Sd, Lt Tn, Fn Grn
81	01.0-02.0	12	12.9	0.0	56.6	Sd, Lt Tn, Fn Grn
82	02.0-03.0	14	13.3	0.0	51.8	Sd, Lt Tn, Fn Grn
83	03.0-04.0	31	14.3	0.0	55.3	Sd, Lt Tn, Fn Grn
84	04.0-05.0	288	14.8	0.0	68.9	Sd, Lt Tn, Fn Grn
85	05.0-06.0	37	14.3	1.4	62.2	Sd, Lt Tn, Fn Grn
86	06.0-07.0	12	13.3	0.0	61.0	Sd, Lt Tn, Fn Grn
87	07.0-08.0	36	16.7	0.0	59.9	Sd, Lt Tn, Fn Grn
88	08.0-09.0	15	11.2	0.0	78.5	Sd, Lt Tn, Fn Grn
89	09.0-10.0	98	16.0	0.0	65.1	Sd, Lt Tn, Fn Grn
90	10.0-11.0	57	15.5	0.0	64.5	Sd, Lt Tn, Fn Grn
91	11.0-12.0	37	12.4	0.0	55.6	Sd, Gy, V/Fn Grn
92	12.0-13.0	54	15.1	0.0	57.6	Sd, Gy, V/Fn Grn
93	13.0-14.0	31	12.5	0.0	60.0	Sd, Gy, V/Fn Grn
94	14.0-15.0	200	16.3	1.2	54.6	Sd, Gy, V/Fn Grn
95	15.0-16.0	23	12.5	0.0	56.8	Sd, Gy, V/Fn Grn
96	16.0-17.0	46	14.6	0.0	55.5	Sd, Gy, V/Fn Grn
97	17.0-18.0	92	13.1	1.5	70.2	Sd, Gy, V/Fn Grn
98	18.0-19.0	14	13.0	0.0	48.5	Sd, Gy, V/Fn Grn
99	19.0-20.0	13	12.3	0.0	52.9	Sd, Gy, V/Fn Grn
100	20.0-21.0	34	14.8	0.0	64.8	Sd, Tn, Fn Grn
101	21.0-22.0	80	13.9	0.0	61.1	Sd, Tn, Fn Grn
102	22.0-23.0	105	14.0	0.0	68.6	Sd, Tn, Fn Grn
103	23.0-24.0	16	11.0	1.8	60.9	Sd, Lt Tn, Fn Grn
104	24.0-25.0	16	11.0	0.0	40.8	Sd, Lt Tn, Fn Grn
105	25.0-26.0	27	11.8	0.0	43.2	Sd, Lt Tn, Fn Grn
106	26.0-27.0	150	14.5	1.4	71.7	Sd, Tn, Fn Grn
107	27.0-28.0	145	14.9	0.0	58.3	Sd, Tn, Fn Grn

Exploration Memo No. 9-A

To: Romex Executive Committee

From: Grant I. Gaeth

Subject: Addendum to Exploration Memo #9 Muley Creek Prospect

Date: December 23, 1968

Jack Mayfield of Goldston Oil and I spent four field days in December mapping the Muley Creek structure. Jurassic Entrada and Salt Wash points were converted to the basal Cretaceous Dakota datum by means of several trigonometrically computed three-point sections. The resultant structural interpretation substantiated the subsurface structural relationships between the Calco and Cleary Muley Creek wells. Conversely, this interpretation is significantly different than either the Calco or Cleary Muley Creek structural interpretations in that the structure does not plunge southeast of the Calco well nor does the syncline separating the Muley Creek and Waterpocket folds plunge in this direction. A strong northeast trending nose radiates from the Waterpocket fold, closes the Big Thompson Mesa syncline to the southeast and probably affects the hydrodynamic conditions along the southeast plunge of the Muley Creek fold.

Limited Permian pressure data in the Muley Creek - Waterpocket fold area defines an easterly dipping potentiometric surface of sufficient magnitude to displace 22°- 29°API gravity oils off the crest of the Muley Creek fold. The following geological and mechanical relationships were noted while drilling and evaluating the Muley Creek prospect:

1. The apparant paleo oil-water contact in the Cleary well is 9' low to that in the Calco well.
2. Measured API gravity of the oil in the Calso well is 31° in the zone above 3960' and 26° below 3970' while that in the Cleary well is 23° at an unknown depth.
3. The Cleary well is 43' structural high to the Calco test and located nearer the east plunging nose off the waterpocket fold.

4. Although the overall resevoir conditions are similar in both wells; specifically, the permeabilities are better in the Cleary well while the oil saturations are higher in the structurally lower Calco test.
5. The White Rim oil was probably sourced by the same marine Moenkopi unit that sourced the rich tar sands exposed near the Hunt Circle Cliffs well, Sec. 24-T34S-R7E, on the crest of the Waterpocket fold. These tar sands strike northeasterly and wedge out to the southeast in the direction of the Muley Creek test.
6. The upper dolomite porosity zone, indicated productive by log analysis, was not tested in the Cleary well and made black sulphur water in the formation damaged Calco test.

In summary, data obtained from the Cleary and Calco tests defines a low temperature, multi-gravity, water channeled, structurally controlled oil reservoir that has not been adequately tested in light of recent reservoir evaluation @ Upper Valley and in the Big Horn Basin of north central Wyoming. Several low temperature, low gravity, structurally controlled reservoirs in the Big Horn Basin are produced by high volume pumping without a defineable oil-water contact. Many of these fields have high water-cut wells off-set along strike and in a downdip direction by relatively water-free economic producers. Detailed reservoir evaluation including attempts to reduce oil viscosity by heat injection has proven beneficial in producing the Permo-Pennsylvanian Tensleep (dolomitic sandstone) reservoirs in Wyoming. In addition reservoir data at Upper Valley (approx. 50 miles west of Muley Creek) supports an undefineable oil-water contact, excellent downdip production and the necessity for a carefully programmed completion of the Cedar Mesa sandstone reservoir.

Recommendation: It is recommended that Romex investigate the cost and feasibility of drilling a 3000' White Rim test within the 5200' structural contour in the SE SE of sec. 17-T36S-R10E Garfield County, Utah.

WALLACE E. GRAHAM
Geology of Petroleum
808 WILSON TOWER
CORPUS CHRISTI, TEXAS 78401

December 30, 1969

The Electrothermic Co.
430 Wilson Building
Corpus Christi, Texas

In Re: Bullfrog Marina Prospect
Muley Creek Anticline
Garfield County, Utah

Gentlemen:

Attached is a comprehensive geological study of the subject area prepared by Grant I. Gaeth, Geologist and Secretary-Treasurer for Romex Corporation, Denver, Colorado. Also attached and preceding the Romex study is a feasibility report prepared by H. J. Gruy & Associates, Inc., Dallas, Texas wherein there are calculated estimates of the effectiveness of the Electrothermic Process in recovering crude oil from Romex #1 Bullfrog Federal.

The Muley Creek Anticline is a well-known structure in Garfield County, Utah over which there is draped a hydrodynamically oriented accumulation of heavy (12 degree API) crude oil in the White Rim (Permian) Sandstone. Although most deposits of heavy oil in southeastern Utah occur above all water tables and are without any bottom hole pressure; the Muley Creek accumulation occurs in the White Rim formation which is also an aquifer that provides normal reservoir pressures.

Romex #1 Bullfrog Federal in Section 21, drilled and cored approximately 105' of oil saturated White Rim Sandstone with porosities that averaged about 17% and with permeabilities that ranged up to 2000 millidarcies. Engineers calculate from these data approximately 950 barrels of oil in place per acrefoot. Based on the above figures, Section 21, which you have acquired from Romex Corporation (along with Section 16 to the north) might well be harboring in excess of 60,000,000 barrels of oil. There could be that much more under Section 16. Noting the saturation thicknesses in Cleary #1 Federal 20, and Calco #1 Muley Creek Federal, the Romex Corporation leases on the Muley Creek Anticline may be underlain by 680,000,000 barrels of oil.

The next control well north of the Muley Creek Anticline (see Gaeth's Isopachous Map of the White Rim Sandstone) is Superior #1 Swap Mesa Federal, which encountered 50' of heavy oil saturation in the top of the White Rim

Sandstone. The closest south control to the Muley Creek Anticline is where Clyde Kissinger et al #1 Rincon Dome Federal was drilled on an oil seep near the bank of the Colorado River and also encountered 50' of heavy oil saturation in the top of the White Rim Sandstone. The Swap Mesa well and the Rincon Dome well are 38 miles apart. In between lies the Muley Creek Anticline. It staggers the imagination to realize that one oil field could stretch that far. There is no evidence that it does not.

The Electrothermic Co. has been offered the opportunity to evaluate the Bullfrog Marina Prospect with a minimal entrance fee by installing its process in Romex #1 Bullfrog Federal, which was completed in a manner ideally suited for such an installation.

This is the type project which The Electrothermic Co. should be seeking and is one that should be undertaken at the earliest opportunity.

Yours very truly,

Wallace E. Graham

Wallace E. Graham

WEG/phd

July 14, 1969

Romex Corporation
Suite 1214
1700 Broadway
Denver, Colorado 80202

Re: Well No. Bullfrog Creek Federal #1
Sec. 21, T. 36 S, R. 10 E,
Garfield County, Utah

Gentlemen:

Insofar as this office is concerned, approval to drill the above mentioned well on said unorthodox location is hereby granted in accordance with Rule C-3(c).

Should you determine that it will be necessary to plug and abandon this well, you are hereby requested to immediately notify the following:

PAUL W. BURCHELL - Chief Petroleum Engineer
HOME: 277-2890 - Salt Lake City
OFFICE: 328-5771

This approval terminates within 90 days if the well has not been spudded-in within said period.

Enclosed please find Form OGC-8-X, which is to be completed whether or not water sands (aquifers) are encountered while drilling. Your co-operation with respect to completing this form will be greatly appreciated.

The API number assigned to this well is 43-017-30019 (see Bulletin D-12 published by the American Petroleum Institute).

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

CLEON B. FEIGHT
DIRECTOR

CBF:sd
Enclosures

cc: U.S. Geological Survey
Rod Smith
8416 Federal Building
Salt Lake City, Utah 84111

P I

ROMEX CORPORATION

1700 BROADWAY
SUITE 1214
DENVER, COLORADO 80202
AREA CODE 303 255-0265

August 27, 1969

To: Drilling Participants

re: Romex-Federal Bullfrog #1
1575' from North Line 1627'
from West Line Sec. 21
T36S-R10E Garfield County, Utah
Elevation: 3965' Derrick Floor

Gentlemen:

The following outline presents a summary of the drilling history, formation tops, logging evaluation and testing of the captioned well:

1. The Bullfrog #1 spudded 9:30 a.m. on July 27, 1969 and drilled to a total depth of 3043' in the Permian White Rim Sandstone on August 18, 1969. The well was temporarily abondoned on August 19, 1969, after setting a 25 sack plug in the base of the 7" casing at 2900'; squeezing 90 sacks of cement between the 9 5/8" surface casing and the 7" long string and welding a tubing hanger, flange and 3" orbed valve fitted to a dry hole marker.

2. After setting six joints of 9 5/8" 8 round, 32 lb. casing at 172.44' KB with 100 sks, the hole was mist drilled to 2096' on July 31, 1969. It took approximately 30 hours to mix mud and heal the Navajo water zone. Drilling operations resumed 3:00 a.m. on August 2nd, and the 2900' casing point was reached at 9:00 a.m. on August 5th. A total of 90 joints of 7" 8 round, 20 lb. casing was set at 2900' with 75 sacks regular cement plus 2% CACL (plug down @ 8:45 p.m.).

3. At 2:30 p.m. on August 6th, after unsuccessfully trying to dry up the hole the well was drilled out from under 7" casing in increments of 10 and 20' allowing sufficient time for the hole to charge with fluid before drilling ahead. The following is a resume by interval of the lithology, drilling time, shut in time and oil shows to 2972':

	Interval	Lithology	Drlg Time Min/ft	Shut In Time	Oil Show
1.	2900 - 2908	Ss, fn-crs, dol to very dol.	.75	32"	Sli. Oil stn in small sand clusters, v sli dull fluor.
2.	2908 - 2920	Ss, m-crs, well sntd sub round to rounded qtz grs.	.9	57"	Oil stn on surface of grns no oil stn inside grain clusters, dull fluor. sli. odor, fair cut fluor.
3.	2920 - 2932	Ss, m-crs, rounded frosted qtz grs.	.9	67"	Most Ss had sli oil stn with v dull fluor, sli. odor & fair cut; air stream dry & contng. hvy. blk. residue with appearance of oil - very little sample w/air stream; oil stn aa
4.	2932 - 2942	Ss, m-crs, rounded, frosted qtz grs.	1.5	15"	Oil stnd. aa
	NOTE: Hole is dusting intermittantly and slower drilling rate attributed to limited fluid entry.				
5.	2942 - 2952	Ss, as above	2.2	40"	Returned globs of mud, sand, dust & oil residue mixture. More black residue in air stream
	NOTE: Unable to clean hole and started mist drilling with detergent @ 2952'.				
6.	2952 - 2960	Ss, as above	2	None	Making some formation water w/oil stn sample as above.
7.	2960 - 2972	Ss, brown f-m, well sorted, rounded qtz grs, v sli. calc.	1		Mkg hvy blk oil w/mist, detergent & fm water while drlg; sample saturated w/dark brn oil, dull fluor. gd odor, excellent cut fluor.

After shuting down for a three hour fluid entry test following the oil show in the interval 2960 - 72', the crew was unable to break circulation with 1300 lb. air pressure. A trip was made to free drill pipe of heavy oil and sand emulsion block. A column of fluid consisting of approximately 20% black oil, 80% formation water and equal to a pressure differential of 300 psi was then displaced with a total pressure of 500 psi. A second S.I. period of 6 hours was initiated @ 3:00 a.m. on August 7th. Recovery consisted of approximately 75% black free oil, approximately 25% black sulphur water.

4. A complete suite of Schlumberger logs necessary for a synergetic log systems analysis was run in the open hole below 2900' and a gamma ray neutron log was run from total depth 2973' to the surface. Logging operations commenced 9:00 a.m. August 8, 1969. The following sample and electric log tops are:

Formation	Sample Top	E. Log Top	Sea Level Datum
Jurassic			
Navajo	483	487	+3478
Triassic			
Keyenta	1390		
Wingate	1718	1711	+2254
Chinle	1968	1968	+1997
Shinarump	2625	2627	+1338
Moenkopi	2675	2683	+1282
Permian	2880?	2872?	+1093?
White Rim	2920	2916	+1049

5. Electric log Formation Evaluation

2932 Sandstone
Rw= 1, Rt + 300, porosity = 13 - 15%
Sw= 37 - 46%

2956-60 Sandstone
Rw=1, Rt= 600, porosity = 11%
Sw= 39%

2960-71 Sandstone
Rw= 1, Rt = 170, porosity = 18%
Sw = 37%

A complete synergetic Schulumberger analysis compliments the above field evaluation, copies of which have already been forwarded to the Bullfrog partners. Logging operations were completed 8:30 p.m., August 8, 1969.

6. Formation testing in the interval 2900' to 2972': Swabbing operations were begun through 2 3/8" tubing set at 2958 with a conventional Halliburton packer and a 15' perforated anchor at 8:00 a.m. August 9, 1969. The tubing was swabbed dry with 8 runs and yielded black sulphur water with a light show of oil. The packer was released and continuous swabbing at the rate of 4 - 5 runs/hour could not reduce the fluid level below 408' from the bottom. Fluid recovery consisted of water with approximately 5% oil. The packer was reset at 2958' and the tubing swabbed dry in two runs. It was concluded that the sand below the packer seat at 2958' has an emulsion block prohibiting fluid entry. A total of 37 runs were made with the swabbing unit using 4 type MV and 2 type J swabbing cups.

A full string of heavily oil coated tubing was pulled and mist drilling operations resumed at 10:00 p.m. August 9, 1969. Mist and detergent were injected for 2 hours with a recovery of sulphur water having a slight show of oil and one slug of 90% black oil 20 minutes after injecting the mist. Testing to 11:00 a.m. August 10, 1969 consisted of intermittently displacing fluid after 3 hour shut in periods. Fluid recovery consisted of sulphur water with approximately 5% oil cut.

Swabbing operations were resumed at 1:30 p.m. August 10, 1969. The packer was set 16' from the bottom at 2957' and the tubing remained dry with a very slight show of heavy oil and sulphur water after 20 swabbing runs.

100 gallons of diesel fuel were spotted at 9:00 p.m. on August 10, with packer set at 2957'. The diesel was on formation below packer for 1½ hours. The swab was worked on several short pulls for each of 5 runs. Recovery consisted of diesel fuel cut approximately 20% with black oil and no water. Twenty-nine additional runs were made with fluid level averaging 100' off bottom and consisting predominately of black sulphur water, with less than 10% oil. It is not known whether the diesel swab brought in formation water from the emulsion blocked interval below 2957', from the new open interval 2957-58' or around the packer set at 2957'.

7. Coring operations commenced at 10:00 p.m. on August 11, 1969 and consisted of two 10' cores in the interval 2972 - 2992'. Recovery consisted of 19½' of Sandstone; generally dark brown, f-m, sub-rounded, quartz grains heavily saturated with dark brown oil and moderately cross bedded throughout the recovered interval. Tight streaks consisted of up to 40% anhydrite and dolomite cement. Coring time averaged 4"/ft. with 2' less than 2"/ft. Fifteen feet had porosities greater than 18% and ranging to 26%; permeabilities averaging in excess of ½ darcy and ranging to 2.1 darcies; oil saturations averaging in excess of 40% and ranging to 53.6%.

8. Formation testing in the interval 2900 to 2992': testing operations resumed at 3:00 a.m. on August 13, 1969 with a Hook-Wall packer set a 2930'. The first four swab runs managed to lower the fluid level from 800' to 1275'. During a ½ hour shut down to repair the swabbing unit, the fluid level rose to 500'. An additional ½ hour shut down found the fluid level at 150' from the surface. 20 additional swab runs pulling from 700 to 1000' of fluid could not lower the fluid level below 1700' from the surface. Fluid recoveries consisted of black sulphur water, fresh sulphur water and in all cases less than 5% heavy black oil. Several of the last swab runs yielded less than 1% oil.

The Hook-Wall packer was reset at 2986' at 1:00 p.m. on August 13, and 9 swabbing runs could not lower the fluid level below 1500' from the surface. Fluid recoveries were as above with no oil cut exceeding 2%. Swabbing operations were discontinued at 3:00 p.m. August 13th, due to insufficient butane for the swabbing unit. The fluid level was checked at 8:00 p.m. and found to be 30' from the surface. By 1:00 a.m. August 14, 1969, the well was flowing approximately 12 barrels of water a day cut with 1% heavy black oil. The bottom hole pressure was estimated at 1300 $\pm$ 25#'s.

Bob Evans, Leclair Engineer, arrived at the Bullfrog Marina landing strip at 7:45 a.m. August 14, 1969. The review of all previous well history yielded the following possible procedures in order of preference:

(1) Set liner and selectively test through perforations

(2) Run inflatable straddle packers and selectively treat and test

(3) Test both above and below a single packer seat

(4) Set an RTTS packer in the casing and treat and test the entire interval

NOTE: All treatments to consist of diesel oil or reformate followed by Alco 202 acid containing proper emulsion breakers. Also note: setting a liner precluded any additional drilling or coring of the White Rim section.

An RTTS packer was run on 2 3/8" tubing at 7:00 p.m. August 15, 1969 and set at 2893' with bottom of the tail pipe at 2969'. The open hole from 2900 to 2992' was treated with 4,000 gallons of #2 diesel, 1½% AS-5, 1½% N-3, and 1,000 gallons Halco mud #202 acid, 1½% AS-5, 1½% N-3. The treatment was then displaced with 12 barrels of fresh water having a maximum injection rate of 2½ BPM at 1300 psi. The initial shut in pressure was 600 psi. Job completed at 12:00 midnight.

The well head pressure was down to 100 psi at 3:00 a.m. on August 16, 1969. The well started flowing to pit at 3:10 a.m. at the rate of approximately 8 barrels of fresh water per hour. The diesel fuel started flowing back at 5:30 a.m. and declined to a very slow intermittent flow by 7:00 a.m. Commencing at 8:00 a.m. 49 swabbing runs were made pulling approximately 800 feet of fluid per run through 2 3/8" tubing with the RTTS packer set at 2893'. Approximately 130 barrels of fluid consisting of mostly sulphur water with a light scum of oil were recovered during the above swabbing operations which terminated due to mechanical failure at 5:00 p.m. August 16, 1969.

9. Coring operations resumed at 3:25 a.m. August 17, 1969. After successfully unloading the hole with air at 1300', 2000' and 2600'. Core No. 3 in the interval 2992 to 3017' recovered 25' of very fine to fine, sub-angular, to sub-rounded quartz sandstone cemented with dolomite and anhydrite as above and containing two heavily oil saturated zones

in the top 5 and lower 7'. The porosity, permeabilities and oil saturation of the upper and lower reservoir zones were slightly lower than in cores #1 and #2. Coring time averaged 7 minutes per foot but a damaged core head precluded any reliable comparison of drilling times, at least as far as the upper 5' zone was concerned.

After reaming the hole to total depth with a bit and junk-sub, drilling one foot of new hole and tripping with a 6" magnet, Core #4 was pulled at 2:00 a.m. August 18, with a recovery of 23.5' consisting of 3½' saturated, fine to medium, slightly calcareous sandstone and 20' of white, fine to medium, quartz sandstone with abundant dolomite and anhydrite cement. A very definite oil water contact at 3021½' was observed in the core and coincided with a marked decrease in permeability at the same depth.

10. Tabulated below are Permian structural elevations and oil-water contacts in three Muley Creek wells converted to a sea-level datum:

	KB Elev.	Top Permian	Top White Rim	Oil-Water Contact
Romex #1 Bullfrog SE NW 21-36S-10E	3966'	+1093?	+1050	+ 945
Cleary Fed #1-20 SW SE 20-36S-10E	5000'	+1230	+1203	+1116
Calco #1 Muley Creek SE SE 18-36S-10E	5117'	+1187	+1170?	+1130

Structurally, the Permian was topped at 2872? or 137' low to the Cleary well in Sec. 20 T36S-R10E and 96' low to the Calco well in Sec. 18 T36S-R10E. Since the #1 Bullfrog was 155' and 177' low respectively to the same wells on top of the Jurrassic Navajo Sandstone, there was some cause for questioning our Permian top.

It appears that most of the interval variation occurs within the Triassic Moenkopi formation and probably results from the erosional surface developed on the Kaibab formation and White Rim Sandstone prior to Moenkopi time. It is impossible to tell whether the chert and glauconitic dolomite fragments observed in the Bullfrog samples were part of a basal Triassic conglomerate or part of a Kaibab dolomite and solution breccia. The lack of differentiation below 2872' on the gamma ray log of the Bullfrog well would preclude a broken conglomeratic section and favor a remnant Kaibab dolomite and solution breccia interpretation.

The resultant Moenkopi thin as defined in the Bullfrog well probably borders a late Paleozoic positive sedimentary area in the vicinity of the Henry Mountains. This could explain a sharp change in the depositional enviornment as defined by a total lack of oil staining in 168' of interbedded dolomitic sands and glauconitic sandy Kaibab dolomites, measured in sections 34, 35 and 25 T34S-R7E, that grade in less than 15 miles to the saturated shore face sands penetrated by the above tests.

Samples of the various fluids recovered during the above drilling and testing operations have been forwarded to Chemical and Geological Laboratories Casper, Wyoming, with instructions for analysis as dictated by Bill Mitchell of Coronado Petroleum, a leading Rocky Mountain heavy oil producer. We are awaiting the results of these analyses, evaluation by Coronado Petroleum, and other forthcoming engineering reports before submitting our recommendations regarding the disposition of the captioned well and the Muley Creek Prospect.

Sincerely,

Grant I. Gaeth

GIG/j

1588 West North Temple
Salt Lake City, Utah 84116

328-5771
September 9, 1969

Romex Corporation
Suite 1214-1700 Broadway
Denver, Colorado 80202

Re: Well No. Bullfrog Creek Fed. #1
Sec. 21, T. 36 S, R. 10 E,
Garfield County, Utah

Month of: August, 1969

Gentlemen:

Our records indicate that you have not filed a Monthly Report of Operations for the months mentioned above for the subject well. Rule C-22 (1), General Rules and Regulations and Rules of Practice and Procedure, Utah State Division of Oil and Gas Conservation requires that said reports be filed on or before the sixteenth (16) day of the succeeding month. This report may be filed on Form OGC-1b, (U. S. Geological Survey Form 9-331, "Sundry Notices and Reports on Wells"), or on company forms containing substantially the sam information. We are enclosing forms for your convenience.

Your immediate attention is required in this matter.

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

SHARON CAMERON
RECORDS CLERK

sc

Enclosures: Forms OGC-1b

Form OGCC-1

THE STATE OF UTAH
DIVISION OF OIL AND GAS CONSERVATION

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

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.)

5. LEASE DESIGNATION AND SERIAL NO.: Federal U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

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

7. UNIT AGREEMENT NAME: N/A

2. NAME OF OPERATOR: ROMEX CORPORATION

8. FARM OR LEASE NAME: Federal - Bullfrog Creek

3. ADDRESS OF OPERATOR: Suite 1214 - 1700 Broadway Denver, Colorado 80202

9. WELL NO.: 1

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: Twp. 36 South, Range 10 East, 1626.7 West Line and 1574.6 from North Line (SE of NW) of Section 21

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 21 T36S-R10E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 3955 Ground Level

12. COUNTY OR PARISH: Garfield

13. STATE: Utah

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) Temporary Abandonment			[ ]	(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.)*

Spotted 25 Sacks cement plug in base of casing set @ 2900'. Squeezed 90 sacks cement between 9 5/8" surface casing and 7" long string. Spotted 10 sacks cement plug @ top of 7" casing. Welded in tubing hanger flange and 3" orbed valve fitted to a dry hole marker.

APPROVED BY DIVISION OF
OIL & GAS CONSERVATION

DATE 9-16-69

BY [illegible]

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

SIGNED A. A. Schoenfeld TITLE President DATE 9/12/69

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

1588 West North Temple
Salt Lake City, Utah 84116

328-5771
January 12, 1970

Romex Corporation
Suite 1214 - 1700 Broadway
Denver, Colorado 80202

Re: Well No. Federal Bullfrog Creek #1
Sec. 21, T. 36 S, R. 10 E,
Garfield County, Utah

Gentlemen:

This letter is to advise you that the "Well Completion or Recompletion Report and Log" and electric and/or radioactivity logs for the above mentioned well are due and have not been filed with this office as required by our rules and regulations.

Please complete the enclosed Forms OGC-3, "Well Completion or Recompletion Report and Log", in duplicate and forward them to this office as soon as possible. If electric and/or radioactivity logs were not run, please make a statement to this effect in order for us to keep our records accurate and complete.

Your cooperation in this matter will be greatly appreciated.

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

SHARON CAMERON
RECORDS CLERK

sc

Enclosure: Forms OGC-3

ROMEX CORPORATION

1700 BROADWAY
SUITE 1214
DENVER, COLORADO 80202
AREA CODE 303 255-0265

January 26, 1970

State of Utah
Division of Oil & Gas Conservation
1588 West North Temple
Salt Lake City, Utah 84116

Re: #1 Federal-Bullfrog Creek
Garfield County, Utah

Gentlemen:

Enclosed please find a xerox copy of the Sundry Notice which was approved by you on 9-16-69 and a set of logs on this well. Contracts with Electrothermic Company are being finalized and a completion attempt programmed for February 1970. LeClair Operating Company will make the necessary arrangements.

Sincerely,

Grant I. Gaeth

GIG/j

Enc.

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.

RECEIVED
MAR 4 1970
U.S. GEOLOGICAL SURVEY
SALT LAKE CITY, UTAH

BR. OF OIL & GAS OPERATIONS

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 [X] GAS WELL [ ] OTHER

2. NAME OF OPERATOR
*Romex Oil Corporation

3. ADDRESS OF OPERATOR
c/o LeClair Operating Co., Inc.
152 No. Durbin, Casper, Wyo. 82601

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1575' FNL & 1623' FWL
(Actual footage unknown by this office)
SE NW Sec. 21, T36S, R10E

5. LEASE DESIGNATION AND SERIAL NO.
Utah 0282175

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
Federal-Bullfrog Crk.

9. WELL NO.
#1

10. FIELD AND POOL, OR WILDCAT
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 21, T36S, R10E

12. COUNTY OR PARISH
Garfield

13. STATE
Utah

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
3966 RT; 3956 GL

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	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other) Put on Production	[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.) *

* (Electrothermic Corp., 430 Wilson Building, Corpus Christi, Texas will operate for Romex and perform the required work).

Electrothermic proposes to install in subject well their "thermal" process for the purpose of increasing bottomhole temperature and thereby making it possible to commercially produce oil from well.

Current Conditions:
(1) 7", 20#, J-55 casing set at 2900' and cemented with 10 sacks regular cement.
(2) TD 3043' K.B., open hole 2900' to 3043'.

Note: Electrothermic Corporation will present to U.S.G.S. prognosis for above work.

APPROVED BY DIVISION OF
OIL & GAS CONSERVATION
DATE 3-6-70
BY Cleon B. Feight

18. I hereby certify that the foregoing is true and correct
SIGNED E. W. McILNAY, P.E. TITLE Agent Div. Mgr.-LeClair Opr. Co. DATE 2-3-70

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Hugh Zeil (The Electrothermic Co.)
Chuck Adams (LoClair Co.)
Reed Spaty - (Shyline)
Bob Rumble - (Crest Oil)

THE ELECTROTHERMIC CO.
WILSON BLDG. • CORPUS CHRISTI, TEXAS 78401

In Re: Romex #1 Bullfrog Federal, Located
1575' from North line; 1627' from
West line of Section 21, T36S-R10E,
Garfield County, Utah
Elevation: 3965' D. F.

PROGNOSIS

I. Select area between 2970' and 3020' depth for electrode placement from core analysis and logs.

II. Under-ream about 3'. Exact gauge to be determined later.

III. Place calculated volume of 660 C.I. shot electrode.

IV. Run approx. 30' of 4-1/2" Layne-Bowler stainless steel welded screen below asbestos packer. Screen to be centered across main electrode section.

V. Run 3-1/2" or 4-1/2" KT-15 Koch fiberglass tubing to about 12' above top of packer.

VI. Run 2-3/8" NUE, J-55 tubing to approx. 3' below internal electrode contacts.

VII. Nipple up insulated wellhead.

VIII. Conduct S.P. and Resistance test and analysis.

IX. Tie in electrical leads from 62.5 KVA generator.

X. Heat.

ROMEX CORPORATION

OFFICERS
PRESIDENT
A. A. SCHOENFELD
VICE PRESIDENTS
JACK H. MAYFIELD
EDWARD G. KADANE
J. D. KENNEDY
SECRETARY-TREASURER
GRANT I. GAETH

1776 LINCOLN
SUITE 420
DENVER, COLORADO 80203
AREA CODE 303 255-0265

DIRECTORS
C. J. DAVIDSON
JACK Q. FRIZZELL
IRIS GOLDSTON
CLAUD B. HAMILL
JOE A. HUMPHREY
WILLIAM S. KILROY
J. C. MAXWELL

March 4, 1970

United States Geological Survey
8416 Federal Building
Salt Lake City, Utah 84111

ATTEN: Mr. Rodney Smith

re: Romex #1 Bullfrog Creek Well
Garfield County, Utah

Dear Mr. Smith:

As you are aware, we are planning a re-entry and completion attempt on the above captioned well in the very near future and this letter is to advise you that LeClair Operating Company and the Electrothermic Corporation will be acting as agents in our behalf on this completion attempt.

If there are any further forms or information that we can provide you, please feel free to contact us.

Very truly yours,

A. A. Schoenfeld

A. A. Schoenfeld

AAS/j

cc: LeClair Operating Co.
The Electrothermic Corporation

attended Meeting at U.S.G.S.
3/6/70

July 31, 1970

Electrothermic Corporation
430 Wilson Building
Corpus Christi, Texas

Re: Well No. Bullfrog Creek Federal #1
Sec. 21, T. 36 S, R. 10 E,
Garfield County, Utah

Gentlemen:

Approval to re-enter the above mentioned well, which was granted to you on March 6, 1970, is hereby terminated for failure to commence work within the prescribed time.

If and when you should decide to complete work on this well, it will be necessary to again obtain the approval of this Division.

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

CLEON B. FEIGHT
DIRECTOR

CBF:sd
cc: Romex Corporation, 1700 Broadway, Denver, Colorado

ROMEX CORPORATION

1776 LINCOLN
SUITE 420
DENVER, COLORADO 80203
AREA CODE 303 255-0265

September 30, 1970

State of Utah
Oil & Gas Conservation Commission
State Capitol Building
Salt Lake City, Utah 84110

re: Utah 0142173
Well No. 1 (Bullfrog Creek)
Garfield County, Utah

Gentlemen:

We are transmitting, herewith: two copies each of Romex well completion report, E logs, core analyses, crude analysis, drill time log and USGS form 9-330.

Sincerely,

Grant I. Gaeth

GIG/j

Enc.

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: Federal U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

7. UNIT AGREEMENT NAME: N/A

8. FARM OR LEASE NAME: Federal - Bullfrog Creek

9. WELL NO.: 1

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 21 T36S-R10E

12. COUNTY OR PARISH: Garfield

13. STATE: Utah

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] DRY [ ] Other

b. TYPE OF COMPLETION: NEW WELL [ ] WORK OVER [ ] DEEP-EN [ ] PLUG BACK [X] DIFF. RESVR. [ ] Other

2. NAME OF OPERATOR: Romex Corporation

3. ADDRESS OF OPERATOR: Suite 420 - 1776 Lincoln Denver, Colorado 80203

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 1626.7 West Line and 1574.6 from North Line (SE of NW) of Section 21
At top prod. interval reported below
At total depth

14. PERMIT NO.: | DATE ISSUED: 9-16-69

15. DATE SPUDDED | 16. DATE T.D. REACHED | 17. DATE COMPL. (*Ready to prod.*) | 18. ELEVATIONS (DF, RKB, RT, GR, ETC.)* | 19. ELEV. CASINGHEAD

20. TOTAL DEPTH, MD & TVD | 21. PLUG, BACK T.D., MD & TVD | 22. IF MULTIPLE COMPL., HOW MANY* | 23. INTERVALS DRILLED BY → | ROTARY TOOLS | CABLE TOOLS

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)* | 25. WAS DIRECTIONAL SURVEY MADE

26. TYPE ELECTRIC AND OTHER LOGS RUN | 27. WAS WELL CORED

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*) | TEST WITNESSED BY

35. LIST OF ATTACHMENTS NOTE: Two copies of Romex Completion report delivered to USGS as addendum to well completion report, also two each : E logs, core analysis, crude analysis, drill time log

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED A. L. Schoenfeld TITLE President DATE 9-28-70

*(See Instructions and Spaces for Additional Data on Reverse Side)

Branch of Oil and Gas Operations
8416 Federal Building
Salt Lake City, Utah, 84111

October 2, 1970

Romex Oil Corporation
1776 Lincoln, Suite 420
Denver, Colorado 80203

Re: Utah 0142173
Well No. 1 (Bullfrog Creek)
SE¼NW¼ sec. 21, T 36 S, R 10 E,
Garfield County, Utah

Gentlemen:

Thank you for the completion report you sent for the referenced well. As we advised in our letter of September 18, we already had copies of the logs that were run in the well when it was completed and therefore we are returning the additional two sets you sent.

The Sundry Notice dated March 6, 1970, which outlined workover operations you proposed for the referenced well was approved by this office on March 6, 1970. Due to the elapsed time with no work having been performed, please be advised that approval of the workover operations is hereby revoked without prejudice. If you should desire to perform the work at some future date, please obtain the approval of this office, via another sundry notice, at that time.

Sincerely yours,

Gerald R. Daniels,
District Engineer

Attachments

cc: Mountain Fuel Supply Co.
Cleary Funds, Inc.
Maxwell Oil Co.
Skyline Oil Co.
State Div. of Oil & Gas Con.
Casper

STATE OF UTAH

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL & GAS CONSERVATION

1588 WEST NORTH TEMPLE
SALT LAKE CITY, UTAH 84116
328-5771

October 13, 1970

Romex Corporation
1776 Lincoln
Suite 420
Denver, Colorado 80203

Re: Well No. Bullfrog Creek #1
Sec. 21, T. 36 S, R. 10 E,
Garfield County, Utah

Gentlemen:

We are in receipt of your "Well Completion or Recompletion Report and Log", as well as the Electric Logs run on the above mentioned well.

However, upon checking the electric logs received against the Well Completion Report, it was noted that this office did not receive a copy of the synergetic analysis run by Schulumberger. It would be appreciated if you could forward a copy of this analysis to our office as soon as possible.

Thank you for your cooperation with regard to this request.

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

SCHEREE DeRose
SUPERVISING STENOGRAPHER

:sd

Received

SKYLINE OIL COMPANY
ATLAS BUILDING
SALT LAKE CITY 1, UTAH

April 7, 1971

State of Utah
Oil and Gas Conservation Commission
1588 West North Temple
Salt Lake City, Utah

Re Skyline Federal #1 Bull Frog Creek Well
SENW, Sec. 21, T. 36 S., R. 10 E., S.L.M., Garfield County, Utah

Gentlemen:

Enclosed herewith are two copies of Application for Permit to re-enter for completion attempt in the subject well.

Since this is a re-entry, we have not enclosed survey plats, as you undoubtedly have such plats in your file from the original Application for Permit to drill the well.

Thank you for your consideration.

Very truly yours,

Reed G. Spjut

Reed G. Spjut
Vice President

Enclosures

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1a. TYPE OF WORK: ~~DRILL~~ ☒ Re-enter DEEPEN ☐ PLUG BACK ☐

7. UNIT AGREEMENT NAME:

b. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ OTHER Re-entry SINGLE ZONE ☐ MULTIPLE ZONE ☐

8. FARM OR LEASE NAME:

2. NAME OF OPERATOR: SKYLINE OIL COMPANY

9. WELL NO.: 1

3. ADDRESS OF OPERATOR: 418 Atlas Building, Salt Lake City, Utah 84101

10. FIELD AND POOL, OR WILDCAT: Wildcat

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 1626.7 from West Line and 1574.6 from North Line (SENW) Sec. 21, T.36 S., R. 10 E., S.L.M.
At proposed prod. zone:

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 21, T. 36 S., R. 10 E

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 45 miles southeast of Escalante

12. COUNTY OR PARISH: Garfield 13. STATE: Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any)	16. NO. OF ACRES IN LEASE	17. NO. OF ACRES ASSIGNED TO THIS WELL
1574.6	1280 acres	160
18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.	**19. PROPOSED DEPTH**	**20. ROTARY OR CABLE TOOLS**
None	P.T.D. 3042 ft.	Workover Rig

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 4190 G.L.

22. APPROX. DATE WORK WILL START*: 4-15-71

23. ~~PROPOSED~~ CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12-1/2"	9-5/8"	32#	172'	100 sx
8-3/4"	7"	20#	2900'	75 sx 2% CaCl
6-1/4"	Open hole to P.T.D. 3042'			

We plan to:

1. Re-enter and clean out well to P.T.D. of 3042'.
2. Run and cement 4½" liner from approx. 2800' to T.D.
3. Selectively perforate and treat most promising oil zones in the interval 2928' to 3020' in the White Rim formation.
4. Install rod pump and associated surface equipment to test productive potential of well.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED [signature] TITLE Vice President DATE 4/7/71

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

5. LEASE DESIGNATION AND SERIAL NO.: U-0142173

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1a. TYPE OF WORK: ~~DRILL~~ ☒ Re-enter DEEPEN ☐ PLUG BACK ☐

7. UNIT AGREEMENT NAME:

b. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ OTHER Re-entry SINGLE ZONE ☐ MULTIPLE ZONE ☐

8. FARM OR LEASE NAME:

2. NAME OF OPERATOR: SKYLINE OIL COMPANY

9. WELL NO.: 1

3. ADDRESS OF OPERATOR: 418 Atlas Building, Salt Lake City, Utah 84101

10. FIELD AND POOL, OR WILDCAT: Wildcat

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 1626.7 from West Line and 1574.6 from North Line (SENW) Sec. 21, T.36 S., R. 10 E., S.L.M.
At proposed prod. zone:

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 21, T. 36 S., R. 10 E

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 45 miles southeast of Escalante

12. COUNTY OR PARISH: Garfield 13. STATE: Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any)	16. NO. OF ACRES IN LEASE	17. NO. OF ACRES ASSIGNED TO THIS WELL
1574.6	1280 acres	160
18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.	**19. PROPOSED DEPTH**	**20. ROTARY OR CABLE TOOLS**
None	P.T.D. 3042 ft.	Workover Rig

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 4190 G.L.

22. APPROX. DATE WORK WILL START*: 4-15-71

23. ~~PROPOSED~~ CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12-1/2"	9-5/8"	32#	172'	100 sx
8-3/4"	7"	20#	2900'	75 sx 2% CaCl
6-1/4"	Open hole to P.T.D. 3042'			

We plan to:

1. Re-enter and clean out well to P.T.D. of 3042'.
2. Run and cement 4½" liner from approx. 2800' to T.D.
3. Selectively perforate and treat most promising oil zones in the interval 2928' to 3020' in the White Rim formation.
4. Install rod pump and associated surface equipment to test productive potential of well.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED Ronald G. Lynch TITLE Vice President DATE 4/7/71

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side

April 9, 1971

Skyline Oil Company
418 Atlas Building
Salt Lake City, Utah

API No. 43-017-30019
Re: Bullfrog Creek Federal 1
Sec. 21, T. 36 S, R. 10 E,
Garfield County, Utah

Dear Mr. Spjut:

Insofar as this office is concerned, approval to re-enter the above referred to well is hereby granted.

However, should it become necessary to again plug and abandon this well, you are hereby requested to immediately notify the following:

PAUL W. BURCHELL - Chief Petroleum Engineer
HOME: 277-2890
OFFICE: 328-5771

This approval terminates within 90 days if re-entry operations have not commenced within said period of time.

Enclosed please find Form OGC-8-X, which is to be completed whether or not water sands (aquifers) are encountered during drilling. Thank you for your cooperation with regard to the above.

Very truly yours,

DIVISION OF OIL & GAS CONSERVATION

CLEON B. FEIGHT
DIRECTOR

CBF:sd
cc: U.S. Geological Survey

CL1-12A (REV. 1964)

CHEMICAL & GEOLOGICAL LABORATORIES

P. O. Box 2794
Casper, Wyoming

WATER ANALYSIS REPORT

OPERATOR Skyline Oil Company
WELL NO. Bullfrog No. 1
FIELD
COUNTY Garfield
STATE Utah

DATE 4-15-71 LAB NO. 5404-2
LOCATION SENW 21-36S-10E
FORMATION White ~~River~~ RIM
INTERVAL
SAMPLE FROM Production (4-1-71)

REMARKS & CONCLUSIONS:
Oil and water, clear filtrate.
Suitable for use with mud or cement.

Cations	mg/l	meq/l	Anions	mg/l	meq/l
Sodium	94	4.08	Sulfate	545	11.34
Potassium	34	0.87	Chloride	36	1.02
Lithium	-	-	Carbonate	24	0.80
Calcium	28	1.40	Bicarbonate	61	1.00
Magnesium	95	7.81	Hydroxide	-	-
Iron	absent	-	Hydrogen sulfide	absent	-
Total Cations		14.16	Total Anions		14.16

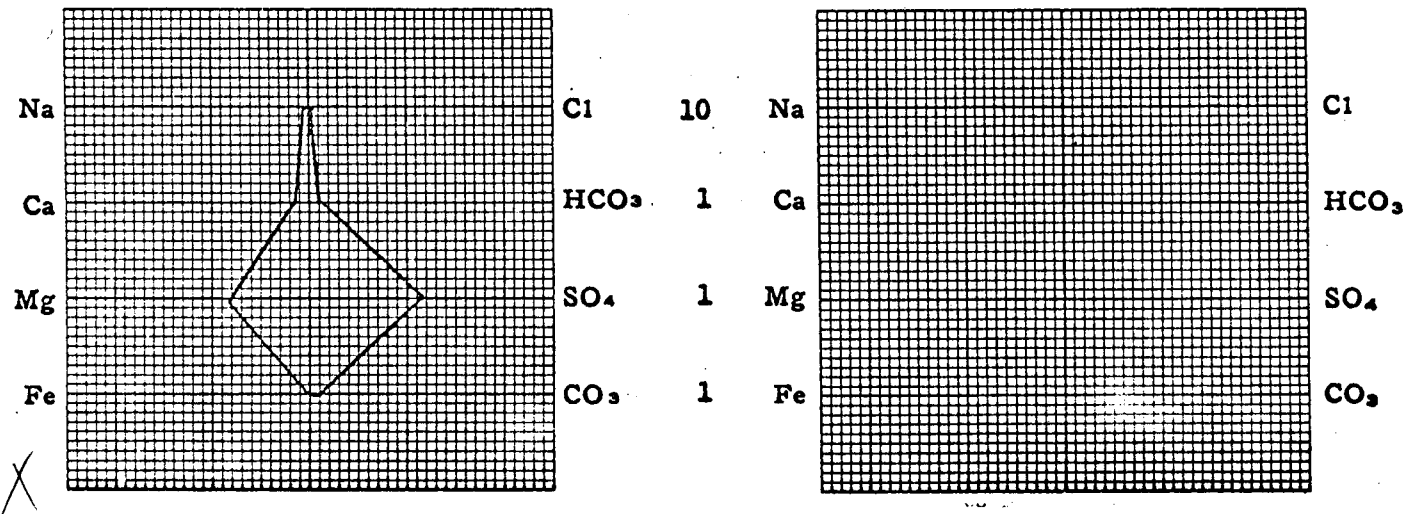
Total dissolved solids, mg/l - - - - - 886
NaCl equivalent, mg/l - - - - - - - 700
Observed pH - - - - - - - - - - - 8.6

Specific resistance @ 68°F.:
Observed - - - - 8.80 ohm-meters
Calculated - - - - 8.30 ohm-meters

WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit



(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

CHEMICAL & GEOLOGICAL LABORATORIES

P. O. Box 2794
Casper, Wyoming 82601

CRUDE OIL ANALYSIS REPORT

Company Skyline Oil Company
Well No. Bullfrog #1
Field
County Garfield
State Utah

Date 4-15-71 Lab. No. 5403
Location SE-NW 21-36S-10E
Formation White Rim
Depth
Analyzed by D. E. Sevier

Production Sample 4-1-71

GENERAL CHARACTERISTICS

Specific gravity @ 60/60 °F.	0.9338
A.P.I. gravity @ 60 °F.	20.0
Saybolt Universal Viscosity @ 70°F., seconds	641
Saybolt Universal Viscosity @ 100°F., seconds	258
B. s. and water, % by volume	0.1
Pour point, °F.	Below Zero
Total sulphur, % by weight	1.92

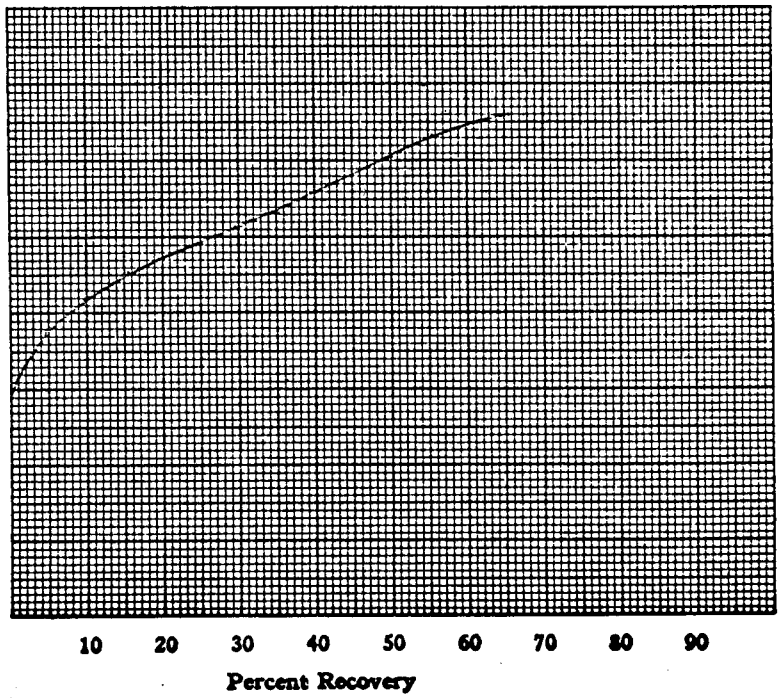
REMARKS:

ENGLER DISTILLATION

Recovery, %	Temperature, °F.
IBP	287
5	378
10	420
15	450
20	472
25	490
30	514
35	534
40	562
45	590
50	604
55	630
60	645
65	660
70	
75	
80	
85	
90	
95	
E.P.	

Recovery, % 67.0
Residue, % 33.0
Loss, % 0

DISTILLATION GRAPH



Approximate Recovery

300 EP gasoline, %	-
392 EP gasoline, %	7.5
500 EP distillate, %	19.5

SKYLINE OIL COMPANY
418 ATLAS BUILDING
SALT LAKE CITY, UTAH 84101

BULLFROG CREEK #1
GARFIELD COUNTY, UTAH

4-19-71 R & R well service rig arrived at location in the P.M. for recompletion.

4-20-71 Rig up R & R well service unit and pump. Picked up 2 - 3-1/2" DC's with 6-1/4" Hughes bit and 85 joints 2-7/8" EUE tubing. Tag plugs at 2745' and circulate and clean out with power swivel to 3042' T.D. Pull up in casing at 2870'. Shut down for P.M. at 8:30.

4-21-71 Circulate and mix and condition mud to log, pull tubing and log with Schlumberger - D.I.L., S.N. BCSC, Density Synergetic and Proximity logs. Shut down at 8:00 P.M.

4-22-71 Ran tubing with seat nipple and 1 joint tail pipe. Landed tubing at 3032'. Displaced drilling mud with water and rigged up to swab. Swabbed 7 hours and recovered approximately 288 barrels water. Fluid level remained at 800'. Swabbed from 3000'.

4-23-71 Swabbed 2 hours. Recovered 46 barrels fluid. Fluid level at 600'. Pulled tubing and rerun with D.C.'s and bit. Mixed mud and conditioned hole to run 4-1/2" liner. Pulled up into casing and shut in for P.M.

4-24-71 Circulated 1/2 hour, pulled tubing and D.C. with bit. Picked up and ran 8 joints 4-1/2" J-55 9.5# new 8 Rd casing equipped with Howco float shoe and Larkin float collar and 4 centralizers hung with Burns Liner Hangar, 7" X 4-1/2. Landed casing at 3041' with hangar at 2780'. Cemented with 35 sacks Ideal class "A" cement with 18% salt and 1/4 of 1% CFR-2. Preceded cement with 500 gallons Mud Flush and 3 barrels water. Displaced with 17 barrels water and shear wiper plug at 4500# bump bottom plug with 1500#. Floats held O.K. Set casing hangar and reversed out excess cement. Pulled tubing and W.O.C.

4-25-71 Trip in with tubing and bit. Tag P.B.T.D. at 3018'. Displace hole with water. Trip out with tubing and bit.

4-26-71 Rig up Schlumberger and ran G.R. Correlation Log and Cement Bond Logs. Trip in with tubing and seat nipple. Swab well down to perforate, pull tubing and rig up to perforate. Schlumberger perforated with 4 H.P.F. 2996' to 3002'. Trip in with tubing and seat nipple. Landed

at 3010'. Swabbed 6 hours. Recovered 130.5 barrels water with very slight trace crude. Fluid level at 2800'.

4-27-71 Swab test 2 hours. Fluid level at 200'. Recovered 86 barrels brackish water with trace oil. Swabbed down fluid level to 2500'. Trip out with tubing. Set Baker CIBP at 2990'. Perforate with 4 H.P.F. - 2969' to 2975'. Trip in with tubing. Landed at 2968'. Swab test 7 hours. Recovered 30.5 barrels. Fluid level at 2960'.

4-28-71 Swabbed 1/2 hour. Recovered 1/4 barrel. Fluid level at 2900'. Second run dry. Pull tubing and rigged up Schlumberger. Set Baker CIBP at 2965'. Perforated with 3 H.P.F. from 2938' to 2955'. Trip in with tubing and landed at 2943'. Swab test 7 hours. Recovered 4.5 barrels brackish water with very slight trace oil. Recovered 2.2 barrels from formation.

4-29-71 Swab 5 runs. Recovered 6 barrels. Trip out tubing. Pick up and run Baker model C. Rt. cementer. Set at 2905'. With T.D. at 2940' acidize with 300 gallons 15% HCl 1-1/2% HS-5 and 1-1/2% N-3. Breakdown pressure 1800# back to 1300#. Drop to 900# with acid on formation. Displace at rate of 1 BPM. Initial shut in 750# and swab back 26.5 barrels fluid. Swab down to 2900'.

4-30-71 Swab 8 barrels, fluid level at 2209', brackish water with trace of oil. Swab down to packer. Release packer and pull and lay down tubing and model "C". Install wellhead and rig down R & R well service. Well temporarily abandoned.

PMB

PF

DIVISION OF OIL & GAS CONSERVATION
DEPARTMENT OF NATURAL RESOURCES

PLUGGING PROGRAMS

NAME OF COMPANY: Skyline Oil Co.

WELL NAME: Bullfrog Creek #1

Sec. 21 Township 36S Range 10E County Garfield

Verbal Approval Was Given to ~~Plug~~ T.A. the Above Mentioned Well in the Following Manner:

4½" liner, top at 2780' - 35 sacks, bottom at 3042'
perforated - 2996-3002, swabbed oil & water
bridge plug at 2990
perforated - 2969-2975 swabbed no recovery
bridge plug at 2964
perforated - 2938-2955, swabbed 30-58 barrels of fluid per day, 30° API gravity,
install well head & clean for possible water disposal.

X

Date Approved: 5-3-71 Signed: Scheu

(USGS received 5-3-71)

SKYLINE OIL COMPANY

418 ATLAS BUILDING
SALT LAKE CITY, UTAH 84101
TELEPHONE (801) 521-3500

REED G. SPJUT
VICE PRESIDENT

June 3, 1971

State of Utah
Division of Oil and Gas Conservation
1588 West North Temple
Salt Lake City, Utah

Re Well No. 1 Federal, Bull Frog Creek, $SE\frac{1}{4}NW\frac{1}{4}$, Sec. 21, T. 36 S., R. 10 E., S. L. M., Garfield County, Utah, Lease No. U-0142173

Gentlemen:

Enclosed herewith is one copy of each of the following-listed materials relating to the recent recompletion work which we performed on the subject well:

1. Well Completion or Recompletion Report and Log
2. Summary of work done on the well
3. Crude Oil Analysis Report of the White Rim oil
4. Water Analysis Report of the White Rim water
5. Copies of the respective electrical logs run on the well

We believe the enclosed materials will bring you up to date on our work with the subject well. Should you require additional information or reports, please let us know and we will be happy to prepare them for you.

Very truly yours,

Reed G. Spjut

Reed G. Spjut
Vice President

Enclosures

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME:

9. WELL NO.:

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 21, T. 36 S., R. 10 E., S.L.M.

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☐ Other

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☒ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: SKYLINE OIL COMPANY

3. ADDRESS OF OPERATOR: 418 Atlas Building, Salt Lake City, Utah 84101

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface 1626.7'/W Line, 1574.6'/N Line (SE NW) Sec. 21, T. 36 S., R. 10 E., S.L.M.
At top prod. interval reported below
At total depth

14. PERMIT NO. | DATE ISSUED

12. COUNTY OR PARISH: Garfield | 13. STATE: Utah

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
			3956 GL 3965 KB	

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
3042'	2965'		→	All	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*

25. WAS DIRECTIONAL SURVEY MADE

26. TYPE ELECTRIC AND OTHER LOGS RUN: DIL, PROX, SN, DC, GRN

27. WAS WELL CORED

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
9-5/8"	32#	172'	12½"	100 sc	
7"	20#	2900'	8-3/4"	75 sx 2% CaCl	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
4½"	2780'	3041'	35 sx	

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)
3996'-3002' 4 jets/ft. CIBP at 2990'
2969'-2975' 4 jets/ft. CIBP at 2965'
2938'-2955' 3 jets/ft.

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
2938-2955	300 Gal. 15% HCL

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)
		Shut In

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)

TEST WITNESSED BY

35. LIST OF ATTACHMENTS
Logs: DIL, PROX, SN, DC, GRN; Resume of Re-entry Operations; Oil Analysis, Water Analysis.

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED Jack B. Wright TITLE Vice President DATE 6/1/71

*(See Instructions and Spaces for Additional Data on Reverse Side)

CHEMICAL & GEOLOGICAL LABORATORIES

P. O. Box 279

Casper, Wyoming

WATER ANALYSIS REPORT

OPERATOR Romex Corporation
WELL NO. No. 1 Federal-Bullfrog Creek
FIELD Wildcat
COUNTY Garfield
STATE Utah

DATE August 28, 1969 LAB NO. 2420-1
LOCATION SE NW 21-36S-10E
FORMATION White Rim
INTERVAL
SAMPLE FROM

REMARKS & CONCLUSIONS: Clear water.

Cations	mg/l	meq/l	Anions	mg/l	meq/l
Sodium	192	8.36	Sulfate	560	11.65
Potassium	35	0.90	Chloride	46	1.30
Lithium	-	-	Carbonate	-	-
Calcium	185	9.23	Bicarbonate	769	12.61
Magnesium	86	7.07	Hydroxide	-	-
Iron	present	-	Hydrogen sulfide	absent	-
Total Cations		25.56	Total Anions		25.56

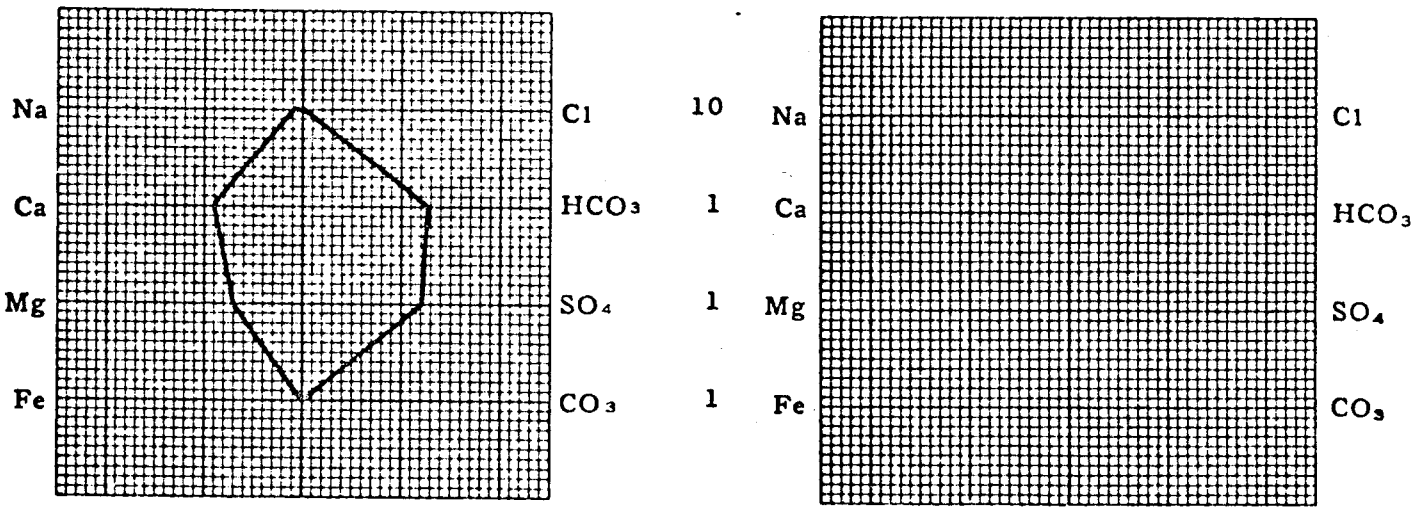
Total dissolved solids, mg/l	1,483
NaCl equivalent, mg/l	1,108
Observed pH	7.9

Specific resistance @ 68°F.:
Observed 6.58 ohm-meters
Calculated 5.32 ohm-meters

WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit



(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

CL1-12A (REV. 1964)

CHEMICAL & GEOLOGICAL LABORATORIES

P. O. Box 279

Casper, Wyoming

WATER ANALYSIS REPORT

OPERATOR Romex Corporation — DATE August 28,1969 — LAB NO. 2420-2

WELL NO. No. 1 Federal-Bullfrog Creek — LOCATION SE NW 21-36S-10E

FIELD Wildcat — FORMATION

COUNTY Garfield — INTERVAL

STATE Utah — SAMPLE FROM

REMARKS & CONCLUSIONS: Clear water.

Cations	mg/l	meq/l	Anions	mg/l	meq/l
Sodium	184	8.00	Sulfate	556	11.56
Potassium	39	1.00	Chloride	34	0.96
Lithium	-	-	Carbonate	-	-
Calcium	104	5.19	Bicarbonate	488	8.00
Magnesium	77	6.33	Hydroxide	-	-
Iron	present	-	Hydrogen sulfide	absent	-
Total Cations		20.52	Total Anions		20.52

Total dissolved solids, mg/l — 1,234

NaCl equivalent, mg/l — 920

Observed pH — 7.4

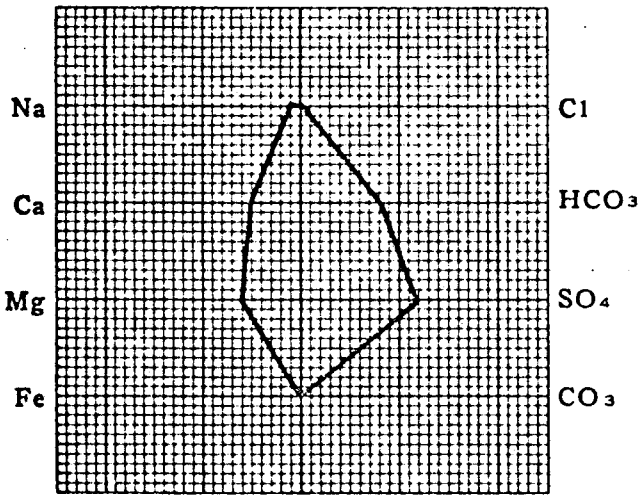
Specific resistance @ 68°F.:

Observed — 7.29 ohm-meters

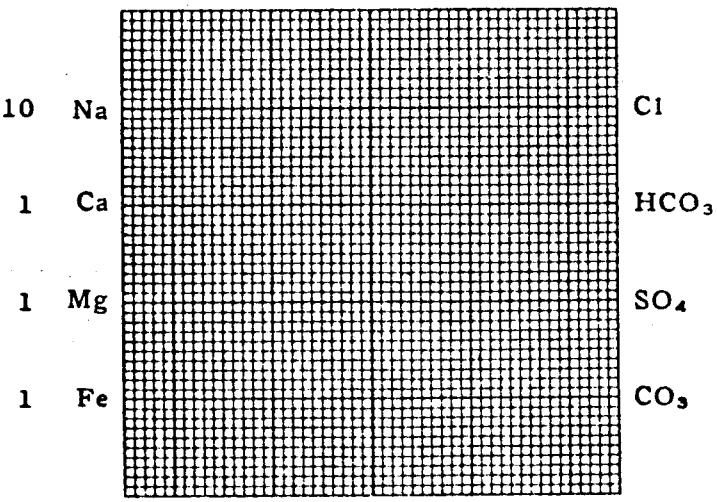
Calculated — 6.40 ohm-meters

WATER ANALYSIS PATTERN

Sample above described



Scale
MEQ per Unit



(Na value in above graphs includes Na, K, and Li)

NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter

Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

CHEMICAL & GEOLOGICAL LABORATORIES
P. O. Box 279
Casper, Wyoming

ANALYTICAL REPORT

From Romex Corporation Product Crude Oil
Address Denver, Colorado Date August 22, 1969
Other Pertinent Data

Analyzed by C. E. Davis Date August 30, 1969 Lab No. 2420-3

CRUDE OIL ANALYSIS

Garfield County, Utah
No. 1 Federal-Bullfrog Creek
SE NW 21-36S-10E
White Rim

Specific Gravity, @60/60°F	0.983
API Gravity @60/60°F	12.4
Saybolt Universal Viscosity @100°F, seconds	14,500; 3043 cp.
Saybolt Universal Viscosity @140°F, seconds	2,200; 470 cp.
Saybolt Universal Viscosity @180°F, seconds	660; 137 cp.
Bs and water, % by volume	45
Pour point, °F	40
Total Sulfur, % by weight	2.58

Remarks: Specific pour point is impossible to determine due to extreme viscosity of this oil. Insufficient water-free sample for distillation.

CA-20

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company Romex Corporation | Formation White Rim | File RP-3-2373
Well # 1 Federal-Bullfrog Creek | Core Type Dia. Conv. 2 5/8" | Date Report 8-13-69
Field Wildcat | Drilling Fluid Air w/soap mist | Analysts Mohl
County Garfield State Utah Elev. 4190 GL Location SE NW Sec 21 - T 36S - R 10E

Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM | DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP | ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS | SANDY-SDY, SHALY-SHY, LIMY-LMY | FINE-FN, MEDIUM-MED, COARSE-CSE | CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL | BROWN-BRN, GRAY-GY, VUGGY-VGY | FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY | SLIGHTLY-SL/, VERY-V/, WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS K_A	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	RESIDUAL SATURATION PER CENT PORE TOTAL WATER	SAMPLE DESCRIPTION AND REMARKS
1	2972-73	54.	12.9	43.4	41.8	Ss, gry, vfn
2	2973-74	161.	18.1	46.9	32.6	Ss, gry, vfn
3	2974-75	259.	18.1	50.8	34.8	Ss, gry, vfn
4	2975-76	14.	19.3	35.7	35.7	Ss, gry, vfn, dolo lam
5	2976-77	262.	19.2	44.2	40.6	Ss, gry, vfn, dolo lam
6	2977-78	51.	18.0	27.2	50.6	Ss, gry, vfn, dolo lam
7	2978-79	981.	23.2	43.1	38.4	Ss, gry, vfn
8	2979-80	346.	26.0	29.6	40.4	Ss, gry, vfn
9	2980-81	673.	21.1	21.8	37.4	Ss, gry, vfn
10	2981-81.5	149.	18.6	23.6	33.3	Ss, gry, vfn, w/ white cse well-cem ss la
11	2982-83	576.	15.1	32.4	37.8	Ss, gry, vfn, w/wh cse well-cem ss lam
12	2983-84	731.	17.4	27.6	32.2	Ss, gry, vfn, w/wh cse well-cem ss lam
13	2984-85	496.	13.3	24.0	51.1	Ss, gry, vfn, w/wh cse well-cem ss lam
14	2985-86	28.	15.1	19.2	58.2	Ss, gry, vfn, w/wh cse well-cem ss lam
15	2986-87	981.	20.7	53.6	21.2	Ss, gry, vfn, w/wh cse well-cem ss lam
16	2987-88	1115.	20.6	50.5	28.6	Ss, gry, vfn
17	2988-89	654.	20.5	50.2	17.6	Ss, gry, vfn
18	2989-90	673.	18.3	53.5	25.6	Ss, gry, vfn
19	2990-91	731.	15.4	37.0	24.6	Ss, gry, vfn
20	2991-91.5	2115.	18.8	27.2	21.2	Ss, gry, vfn
	8-15-69	White Rim Formation				
21	2992-93	542.	18.1	32.0	26.0	Ss, gry, fn, sl calc
22	2993-94	788.	14.5	37.2	18.6	Ss, gry, fn
23	2994-95	167.	16.0	32.4	13.7	Ss, gry, fn-med
24	2995-96	357.	15.8	38.0	14.6	Ss, gry, fn-med
25	2996-97	1192.	17.2	21.0	14.5	Ss, gry, med
26	2997-98	15.	14.0	10.7	30.0	Ss, wh, vfn
27	2998-99	2.6	8.7	0.0	54.0	Ss, wh, vfn
28	2999-00	16.	9.8	15.3	31.6	Ss, wh, vfn
29	3000-01	21.	11.4	0.0	54.4	Ss, wh, vfn
30	3001-02	21.	13.3	9.0	48.9	Ss, wh, vfn
31	3002-03	44.	14.4	8.3	40.3	Ss, wh, fn-med
32	3003-04	57.	14.6	13.7	41.0	Ss, wh, fn-med
33	3004-05	43.	16.7	15.6	34.2	Ss, wh, vfn
34	3005-06	141.	17.0	7.1	40.6	Ss, wh, vfn
35	3006-07	37.	15.8	4.4	50.0	Ss, wh, vfn
36	3007-08	72.	17.4	14.9	27.6	Ss, wh, vfn
37	3008-09	90.	14.7	7.5	38.1	Ss, wh, vfn
38	3009-10	49.	14.9	6.0	51.6	Ss, wh, vfn
39	3010-11	155.	16.9	32.0	18.9	Ss, wh, vfn
40	3011-12	101.	16.2	16.1	28.4	Ss, wh, vfn

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS RESULTS

Company Romex Corporation — Formation White Rim — File RP-3-2373
Well # 1 Federal-Bullfrog Creek — Core Type Dia. Conv. 2 5/8" — Date Report 8-17-69
Field Wildcat — Drilling Fluid Air w/soap mist — Analysts Mohl
County Garfield — State Utah — Elev. 4190 GL — Location SE NW Sec 21 - T 36S - R 10E

Lithological Abbreviations

SAND-SD, SHALE-SH, LIME-LM, DOLOMITE-DOL, CHERT-CH, GYPSUM-GYP, ANHYDRITE-ANHY, CONGLOMERATE-CONG, FOSSILIFEROUS-FOSS, SANDY-SDY, SHALY-SHY, LIMY-LMY, FINE-FN, MEDIUM-MED, COARSE-CSE, CRYSTALLINE-XLN, GRAIN-GRN, GRANULAR-GRNL, BROWN-BRN, GRAY-GY, VUGGY-VGY, FRACTURED-FRAC, LAMINATION-LAM, STYLOLITIC-STY, SLIGHTLY-SL/, VERY-V/, WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS K_A	POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE OIL	RESIDUAL SATURATION PER CENT PORE TOTAL WATER	SAMPLE DESCRIPTION AND REMARKS
41	3012-13	152.	13.4	36.6	19.4	Ss, wh, fn
42	3013-14	224.	18.7	16.6	32.6	Ss, wh, fn
43	3014-15	109.	16.3	20.2	34.4	Ss, wh, fn
44	3015-16	60.	12.8	14.1	39.0	Ss, wh, med
45	3016-17	271.	14.6	35.6	27.4	Ss, wh, fn-med
		8-18-69	White Rim Formation			
46	3017-18	1346.	18.7	26.8	11.2	Ss, gry, med-cse
47	3018-19	473.	14.6	22.6	12.3	Ss, gry, fn-med
48	3019-20	1000.	15.0	13.3	27.3	Ss, gry, fn-med
49	3020-21	2.5	9.5	0.0	46.3	Ss, wh, fn-med
50	3021-22	0.17	8.2	0.0	43.9	Ss, wh, fn-med
51	3022-23	4.2	10.5	0.0	33.3	Ss, wh, fn-med
52	3023-24	10.	10.3	0.0	49.5	Ss, wh, fn-med
53	3024-25	35.	12.0	0.0	38.4	Ss, wh, fn-med
54	3025-26	5.8	8.4	0.0	52.4	Ss, wh, fn-med
55	3026-27	1.1	9.7	0.0	45.3	Ss, wh, fn-med
56	3027-28	3.2	8.5	0.0	37.7	Ss, wh, fn-med
57	3028-29	2.6	8.9	0.0	40.4	Ss, wh, fn-med
58	3029-30	0.80	9.6	0.0	38.6	Ss, wh, fn-med
59	3030-31	4.5	7.9	0.0	39.2	Ss, wh, fn-med
60	3031-32	12.	14.0	0.0	35.7	Ss, wh, fn-med
61	3032-33	32.	16.0	0.0	49.3	Ss, wh, fn
62	3033-34	28.	16.5	0.0	38.2	Ss, wh, fn
63	3034-35	6.4	14.0	0.0	54.2	Ss, wh, fn
64	3035-36	22.	10.7	0.0	25.2	Ss, wh, fn-med, sl calc
65	3036-37	6.9	7.1	0.0	57.7	Ss, wh, fn-med, sl calc
66	3037-38	60.	16.9	0.0	33.2	Ss, wh, fn-med
67	3038-39	46.	13.5	0.0	43.0	Ss, wh, fn-med
68	3039-40	115.	14.3	0.0	36.4	Ss, wh, fn-med
69	3040-41	6.4	16.2	8.0	23.4	Ss, wh, fn-med
70	3041-42	175.	13.6	0.0	18.4	Ss, wh, fn-med

This core had been exposed for some time before analysis was run and seemed to indicate that a certain amount of drying out had taken place before analysis.

CORE LABORATORIES, INC. WORKLAB *Petroleum Reservoir Engineering*

COMPANY Romex Corporation FIELD Wildcat FILE RP-3-2373

WELL # 1 Federal-Bullfrog Creek COUNTY Garfield DATE 8-19-69

LOCATION SE NW Sec 21-T 36S- R 10E STATE Utah ELEV. 4190 GL

CORE-GAMMA CORRELATION

VERTICAL SCALE: 5" = 100'

CORE-GAMMA SURFACE LOG
(PATENT APPLIED FOR)

GAMMA RAY
RADIATION INCREASE →

COREGRAPH

TOTAL WATER
PERCENT TOTAL WATER
80 60 40 20 0

PERMEABILITY
2000 500 100 MILLIDARCYS
1000 50 10

POROSITY
PERCENT
20 10

OIL SATURATION
PERCENT PORE SPACE
0 20 40 60 80

2972
2980
2990
3000
3010
3020
3030
3042

CL-939 CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: WHITE RIM [illegible] FEET

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	26.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	31.6
FEET OF CORE INCLUDED IN AVERAGES	26.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	25(c)
AVERAGE PERMEABILITY: MILLIDARCYS	543	OIL GRAVITY: °API	25(c)
PRODUCTVE CAPACITY: MILLIDARCY-FEET	14,111	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	17.9	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05(e)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	35.1	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	990

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

FORMATION NAME AND DEPTH INTERVAL: WHITE RIM 3010 to 3020 FEET

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	10	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	27.1
FEET OF CORE INCLUDED IN AVERAGES	10	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	20(c)
AVERAGE PERMEABILITY: MILLIDARCYS	389	OIL GRAVITY: °API	25(c)
PRODUCTVE CAPACITY: MILLIDARCY-FEET	3891	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT	15.7	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	1.05(e)
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	23.4	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	937

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

INTERPRETATION OF DATA

2972 - 2998 Feet - Characteristics are within the range of oil productive sands. However, core was exposed sometime before analysis indicating some alteration of fluid content.
2998 - 3010 Feet - Believed to be a transitional zone. Produce primarily water.
3010 - 3020 Feet - Oil productive characteristics but may be continuation of transitional zone above.
3020 - 3042 Feet - Primarily water productive.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

CRUDE OIL ANALYSIS EXHIBIT

Company: Mountain Fuel Supply Company
Well No.: Bullfrog Creek Well No. 1
Field: Wildcat
County: Garfield
State: Utah

Date: August 11, 1969 Lab. No. 2344
Location: SE NW, Sec. 21, T. 36 S., R. 10 E.
Formation: White Rim
Depth: 2958'-2971'
Analyzed by: DES

Sample No. 777

GENERAL CHARACTERISTICS

Specific gravity @ 60/60 °F.	.9785
A.P.I. gravity @ 60 °F.	13.1
Saybolt Universal Viscosity @ 70°F., seconds	
Saybolt Universal Viscosity @ 100°F., seconds	
B. s. and water, % by volume	32%
Pour point, °F.	
Total sulphur, % by weight	

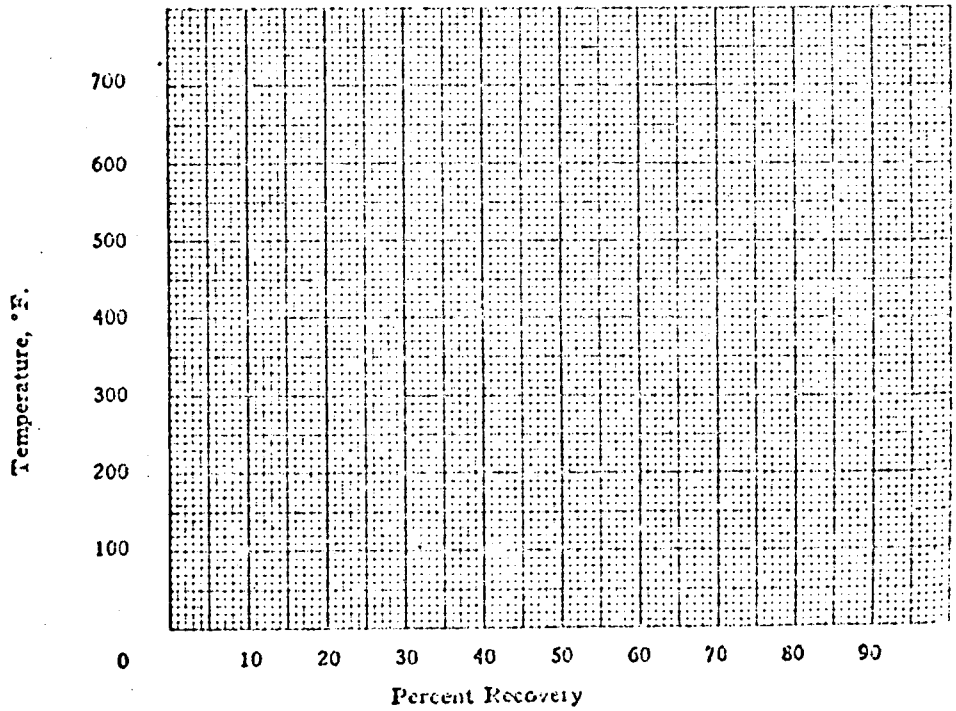
REMARKS: Insufficient sample for other tests.

ENGLER DISTILLATION

Recovery, %	Temperature, °F.
IBP	
5	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	
60	
65	
70	
75	
80	
85	
90	
95	
E.P.	

Recovery, % _____
Residue, % _____
Loss, % _____

DISTILLATION GRAPH



Approximate Recovery

300 EP gasoline, % _____
392 EP gasoline, % _____
500 EP distillate, % _____

SKYLINE OIL COMPANY

418 ATLAS BUILDING

SALT LAKE CITY, UTAH 84101

TELEPHONE (801) 521-3500

REED G. SPJUT
VICE PRESIDENT

August 23, 1971

State of Utah
Division of Oil & Gas Conservation
1588 West North Temple
Salt Lake City, Utah

Re Well No. 1-Federal, Bullfrog Creek, SW¼NW¼, Sec. 21, T. 36 S., R. 10 E., S.L.M., Garfield County, Utah. Lease No. U-0142173

Gentlemen:

Enclosed herewith are two copies each of the following-listed materials relating to the recent plugging and abandoning of the subject well:

1. Sundry Notices and Reports on Wells.

2. Well Completion Report and Log.

The well was plugged and abandoned on August 2, 1971; Because of heavy rains and flood conditions in Bullfrog Creek, we have not been able to grade the location and prepare it for inspection. When the rainy season is past and we are able to finish the location, we will notify you so that you may inspect it.

Very truly yours,

Reed G. Spjut

Reed G. Spjut
Vice President

Enclosures

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME:

9. WELL NO.: Bullfrog #1

10. FIELD AND POOL, OR WILDCAT: Wildcat

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 21, T. 36 S., R. 10 E., S. L. M.

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☒ Other

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: SKYLINE OIL COMPANY

3. ADDRESS OF OPERATOR: 418 Atlas Building, Salt Lake City, Utah 84101

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 1626.7'/W Line, 1574.6'/N Line (SENW), Sec. 21,
At top prod. interval reported below: T. 36 S., R. 10 E., S.L.M.
At total depth

14. PERMIT NO. | DATE ISSUED

12. COUNTY OR PARISH: Garfield | 13. STATE: Utah

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
			3956 GL 3965 KB	

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
3042'	2965'		→	All	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*

25. WAS DIRECTIONAL SURVEY MADE

26. TYPE ELECTRIC AND OTHER LOGS RUN: DIL, PROX, SN, DC, GRN

27. WAS WELL CORED

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
9-5/8"	32#	172'	12 1/2"	100 sc	None
7"	20#	2900'	8-3/4"	75 sx 2% CaCl	None

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
4 1/2"	2780'	3041'	35 sx	

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)
3996'-3002' 4 jets/ft. CIBP at 2990'
2969'-2975' 4 jets/ft. CIBP at 2965'
2938'-2955' 3 jets/ft. CIBP at 2930'
2883'-2889' W 13 jets CIBP at 2840'

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
2938-2955	300 gal. 15% HCl
2883'-2889'	1000 gal. 28% HCl

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)

TEST WITNESSED BY

35. LIST OF ATTACHMENTS
Logs: DIL, PROX, SN, DC, GRN; Resume of Re-entry Operations; Oil Analysis, Water Analysis

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED Leslie L. Squires TITLE Vice President DATE 8/19/71

*(See Instructions and Spaces for Additional Data on Reverse Side)

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.)

1. OIL WELL ☐ GAS WELL ☐ OTHER P. & A.

2. NAME OF OPERATOR
Skyline Oil Company

3. ADDRESS OF OPERATOR
418 Atlas Building, Salt Lake City, Utah 84101

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1626.7'/WL, 1574.6'/N Line (SENW) Sec. 21, T. 36 S., R. 10 E., S.L.M.

5. LEASE DESIGNATION AND SERIAL NO.
U-0142173

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME

9. WELL NO.
Bullfrog #1

10. FIELD AND POOL, OR WILDCAT
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 21, T. 36 S., R. 10 E., SLM

12. COUNTY OR PARISH
Garfield

13. STATE
Utah

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
3956 GL

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*	X
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.) *

7/30/71 Ran Baker Mod. P-1 W.L.C.I.B.P. @2930' to shut off perfs. between 2938'-2955'.

7/31/71 Perfed 2883-89 w 13 shots, acidized with 1000 gals. 28% HCl

8/1/71 Swabbed back acid and load water--swabbed dry

8/2/71 Swabbed 6 bbls. slightly brackish, sulfurous water with trace of oil. Obtained plugging instructions from Utah State Oil & Gas Conservation Engineer (U.S.G.S. Engineer on vacation). Set Baker Mod. P-1 W.L.C.I.B.P. @ 2840'--filled cased hole with water--capped casing with pumping head, flanged bonnet and dry-hole marker.

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

SIGNED [signature] TITLE Vice President DATE 8/19/71

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side