

CASE 1887: Application of BRITISH-AM.
for a pressure maintenance project in
the Bisti-Lower Gallup Oil Pool.

Case No.

1867

Application, Transcript,
Small Exhibits, Etc.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 1867
Order No. R-1638

APPLICATION OF THE BRITISH-AMERICAN
OIL PRODUCING COMPANY FOR A PRESSURE
MAINTENANCE PROJECT IN ITS WEST BISTI-
LOWER GALLUP SAND UNIT, BISTI-LOWER
GALLUP OIL POOL, SAN JUAN COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on January 27, 1960, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 24th day of March, 1960, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the British-American Oil Producing Company is the operator of the West Bisti Lower Gallup Sand Unit, the initial participation area of which comprises the proposed West Bisti Pressure Maintenance Project Area, described as follows:

TOWNSHIP 25 NORTH, RANGE 13 WEST, NMPM

Section 1: E/2, N/2 NW/4
Section 12: E/2 NE/4

TOWNSHIP 26 NORTH, RANGE 13 WEST, NMPM

Section 18: SW/4, S/2 SE/4
Section 19: N/2, N/2 SE/4, SE SE/4
Section 20: W/2, S/2 SE/4, SE/4
Section 21: SW/4
Section 26: SW/4, S/2 SE/4

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Section 27:	S/2, S/2 N/2
Section 28:	All
Section 29:	N/2 N/2
Section 30:	N/2 NE/4
Section 33:	N/2 NE/4
Section 34:	N/2 NW/4, NE/4
Section 35:	N/2, E/2 SW/4, SE/4
Section 36:	W/2, SE/4

TOWNSHIP 26 NORTH, RANGE 14 WEST, NMPM

Section 13: S/2 NE/4, SE/4

(3) That the applicant proposes to institute a pressure maintenance project in the above-described area by the injection of water into the Gallup formation through seventeen wells.

(4) That the applicant proposes that each month an allowable be established for the West Bisti Pressure Maintenance Project, said allowable to be determined by multiplying the current Northwest New Mexico normal unit allowable for an 80-acre proration unit times the number of 80-acre proration units in the pressure maintenance project, including in such computation those proration units having wells which are shut-in or wells which are used as injection wells, and further including those proration units or portions thereof which have no well located on them.

(5) That only acreage which has been developed and proven productive by the drilling of a well should receive allowable credit.

(6) That the allowable assigned to any well in the project area should be no greater than the demonstrated ability of such well to produce, subject to top unit allowable for the pool. In the case of injection wells or curtailed or shut-in producing wells, the allowable should be no greater than the demonstrated capacity of the well to produce, as reflected by a 24-hour test at a stabilized rate of production immediately prior to such conversion or shut-in or curtailment. In no event should such allowable be greater than the current normal unit allowable for the Bisti-Lower Gallup Oil Pool during the month of transfer multiplied by the well's acreage factor.

(7) That special rules and regulations for the operation of the West Bisti Pressure Maintenance Project should be promulgated and for operational convenience, such rules should provide certain flexibility in authorizing the production of the project allowable from any well or wells in the Project. Such flexibility will not, in this case, impair correlative rights.

(8) That Order Nos. R-1316 and R-1416 shall be superseded.

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IT IS THEREFORE ORDERED:

(1) That Commission Order Nos. R-1316 and R-1416 be and the same are hereby superseded.

(2) That the applicant, The British-American Oil Producing Company, be and the same is hereby authorized to institute a pressure maintenance project by the injection of water into the Gallup formation through the following-described wells:

British-American Marye Well No. 2, NE/4 NE/4 of Section 12, T-25-N, R-13-W.

British-American Marye Well No. 5, NE/4 SE/4 of Section 1, T-25-N, R-13-W.

Honolulu State "D" Well No. 1, NW/4 NW/4 of Section 36, T-26-N, R-13-W.

British-American Marye "B" Well No. 1, SW/4 NE/4 of Section 35, T-26-N, R-13-W.

British-American Marye "B" Well No. 4, NE/4 SW/4 of Section 35, T-26-N, R-13-W.

British-American Douthit "B" Well No. 4, SW/4 NE/4 of Section 27, T-26-N, R-13-W.

British-American Douthit "B" Well No. 8, NE/4 SW/4 of Section 27, T-26-N, R-13-W.

British-American Douthit "B" Well No. 12, SW/4 SW/4 of Section 27, T-26-N, R-13-W.

British-American Salge "B" Well No. 5, NE/4 NE/4 of Section 33, T-26-N, R-13-W.

BMG-Foster Well No. 1, NE/4 SW/4 of Section 21, T-26-N, R-13-W.

BMG-Foster Well No. 5, SW/4 SW/4 of Section 21, T-26-N, R-13-W.

British-American Douthit "B" Well No. 11, NE/4 NE/4 of Section 29, T-26-N, R-13-W.

Skelly Duff Well No. 9, NW/4 NW/4 of Section 20, T-26-N, R-13-W.

Skelly Duff Well No. 8, SE/4 NE/4 of Section 19, T-26-N, R-13-W.

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Skelly Duff Well No. 11, NW/4 SE/4 of Section 19,
T-26-N, R-13-W.

British-American Navajo Well No. 2, SW/4 SE/4 of
Section 13, T-26-N, R-14-W.

British-American Navajo Well No. 3, NE/4 SE/4 of
Section 13, T-26-N, R-14-W.

(3) That special rules and regulations governing the operation of the West Bisti Pressure Maintenance project, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, be and the same are hereby promulgated as follows, effective April 1, 1960.

**SPECIAL RULES AND REGULATIONS FOR THE
BRITISH-AMERICAN OIL PRODUCING COMPANY'S
WEST BISTI PRESSURE MAINTENANCE PROJECT**

RULE 1. That the project area of The British-American Oil Producing Company's West Bisti Pressure Maintenance Project shall comprise the following-described acreage:

TOWNSHIP 25 NORTH, RANGE 13 WEST, NMPM

Section 1: E/2, N/2 NW/4
Section 12: E/2 NE/4

TOWNSHIP 26 NORTH, RANGE 13 WEST, NMPM

Section 18: SW/4, S/2 SE/4
Section 19: N/2, N/2 SE/4, SE SE/4
Section 20: W/2, S/2 NE/4, SE/4
Section 21: SW/4
Section 26: SW/4, S/2 SE/4
Section 27: S/2, S/2 N/2
Section 28: All
Section 29: N/2 N/2
Section 30: N/2 NE/4
Section 33: N/2 NE/4
Section 34: N/2 NW/4, NE/4
Section 35: N/2, N/2 SW/4, SE/4
Section 36: W/2, SE/4

TOWNSHIP 26 NORTH, RANGE 14 WEST, NMPM

Section 13: S/2 NE/4, SE/4

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as

injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

RULE 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio or are shut-in for any of the following reasons: Pressure regulation, control of pattern or sweep efficiencies, or to observe changes in pressures or changes in characteristics of reservoir liquids or progress of sweep.

RULE 4. The allowable assigned to any injection well or any well which is shut-in or is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production shall in no event be greater than its ability to produce during the test prescribed by Rule 5, below, or greater than the current top unit allowable for the pool during the month of transfer, multiplied by the well's acreage factor, whichever is less.

RULE 5. The allowable assigned to any well which is used for the purpose of injection, or which is shut-in or curtailed in accordance with Rule 3, shall be determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a 72-hour test throughout which the well shall be produced in the same manner and at constant rate. The daily tolerance limitation set forth in Commission Rule 502 I (a) and the limiting gas-oil ratio (2000 to 1) for the Bisti-Lower Gallup Oil Pool shall be waived during such tests. The project operator shall notify all operators offsetting the proposed injection well, as well as the Commission, of the exact time such tests are to be conducted. Tests may be witnessed by representatives of the offsetting operators and the Commission, if they so desire. In the event a well is drilled and placed on injection prior to establishing its ability to produce, the allowable for said well shall be determined by the arithmetic average for the producing abilities of the offsetting producing wells at the time said well is placed on injection.

RULE 6. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the Bisti-Lower Gallup Oil Pool, whichever is less. Each such producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Bisti-Lower Gallup Oil Pool, except that any well or wells within the project area producing with a gas-ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected into the Bisti-Lower Gallup Oil Pool within the project area

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to such high gas-oil ratio well. The daily adjusted oil allowable for any such well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - I_g}{P_o}}$$

where:

- A_{adj} = the well's daily adjusted allowable
- TUA = top unit allowable for the pool
- F_a = the well's acreage factor
- P_g = average daily volume of gas produced by the well during the preceding month, cubic feet
- I_g = the well's allocated share of the daily average gas injected during the preceding month, cubic feet
- P_o = average daily volume of oil produced by the well during the preceding month, barrels

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$, to

be less than 2,000 cubic feet of gas per barrel of oil produced.

RULE 7. Credit for daily average net water injected into the Bisti-Lower Gallup Oil Pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

$$E_g = (V_{w \text{ inj}} - V_{w \text{ prod}}) \times 5.61 \times \frac{P}{15.025} \times \frac{520^\circ}{T_s} \times \frac{1}{E}$$

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet

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- $V_w \text{ inj}$ = Average daily volume of water injected, barrels
 $V_w \text{ prod}$ = Average daily volume of water produced, barrels
5.61 = Cubic foot equivalent of one barrel of water
 P_a = Average reservoir pressure at mid-point of upper pay-zone of Bisti-Lower Gallup Oil Pool in project area, psig + 11.8, as determined from most recent survey
15.025 = Pressure base, psi
 520° = Temperature base of 60°F expressed as absolute temperature
 T_s = Reservoir temperature of 145°F expressed as absolute temperature
 Z = Compressibility factor from analysis of Bisti-Lower Gallup gas at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9950	800	.9000
100	.9900	850	.8958
150	.9825	900	.8875
200	.9775	950	.8825
250	.9725	1000	.8775
300	.9625	1050	.8713
350	.9563	1100	.8663
400	.9500	1150	.8600
450	.9425	1200	.8550
500	.9363	1250	.8500
550	.9300	1300	.8450
600	.9238	1350	.8400
650	.9175	1400	.8350
700	.9115	1450	.8325
750	.9050		

RULE 8. Each month the project operator shall, within three days after the normal unit allowable for Northwest New Mexico has been established, submit to the Commission a Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several

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wells in the Project as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be in lieu of Form C-120 for the Project.

RULE 9. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the project and may be produced from the wells in the Project in any proportion.

RULE 10. The conversion of producing wells to injection, or the drilling of additional wells for injection, shall be done only after approval of same by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application with the Commission, which application shall include the following:

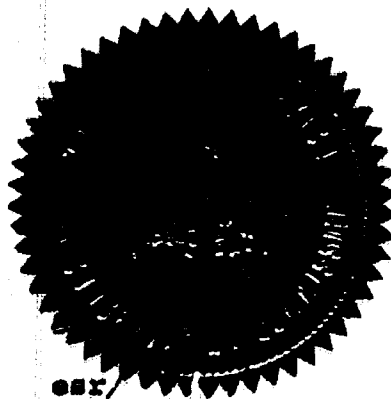
(1) A plat showing location of proposed injection well, all wells within the project area, and offset operators, locating wells which offset the project area.

(2) A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depths and showing that injection of gas will be confined into the Bisti-Lower Gallup formation.

(3) A letter stating that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

John Burroughs
JOHN BURROUGHS, Chairman

Murray E. Morgan
MURRAY E. MORGAN, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 1420
Order No. R-1191-B

APPLICATION OF CAULKINS OIL
COMPANY AND EL PASO NATURAL GAS
PRODUCTS COMPANY FOR AN ORDER
AMENDING IN CERTAIN PARTICULARS
THE SPECIAL RULES GOVERNING THE
SOUTH BLANCO-TOCITO WATER
INJECTION PROJECT IN RIO ARriba
COUNTY, NEW MEXICO, AS SET FORTH
IN ORDER R-1191, FOR PERMISSION
TO CONVERT TWO WELLS IN SAID
PROJECT TO WATER INJECTION, FOR
PERMISSION TO DUALY COMPLETE A
WELL IN SAID PROJECT AS A
PRODUCING-INJECTION WELL AND
FOR APPROVAL OF AN UNORTHODOX LOCA-
TION FOR SAID WELL

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 8, 1959, at Santa Fe, New Mexico, before E. J. Fischer, Examiner duly appointed by the New Mexico Oil Conservation Commission in accordance with Rule 1214 of the Commission Rules and Regulations, and Order No. R-1191-A was entered denying the application in one respect, whereupon this case came on for hearing de novo at 9 o'clock a.m. on July 15, 1959.

NOW, on this 3rd day of August, 1959, the Commission, a quorum being present, having considered the application and the evidence adduced, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant in the subject hearing de novo, Caulkins Oil Company, is the operator of Well No. T-123 located in the NW/4 NE/4 of Section 7, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico.

(3) That the applicant in the subject hearing de novo, Caulkins Oil Company, has requested that only that portion of Order No. R-1191-A dealing with the proposed dual completion of its said Caulkins Well No. T-123 be considered at this hearing.

(4) That the applicant seeks permission to deepen the said Caulkins Well No. T-123 and to dually complete it in such a manner as to permit water injection into the Tocito formation and the production of gas from the Dakota Producing Interval through parallel strings of 2-3/8 inch EUE tubing.

(5) That the maximum expected surface pressure which will be required for water injection into the Tocito formation, plus the hydrostatic head of the water column, is such as to constitute a hazard to the known gas reserves in the Dakota Producing Interval.

(6) That in order to ensure that the Dakota Producing Interval is not damaged, permission to dually complete the aforesaid Caulkins Well No. T-123 in such a manner as to permit the injection of water into the Tocito formation and the production of gas from the Dakota Producing Interval should, under the Commission's obligation to prevent the waste of oil or gas, be denied.

(7) That permission should be granted, at the operator's option, to dually complete the said Caulkins Well No. T-123 in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota Producing Interval through parallel strings of tubing, or to utilize said well as a water injection well in the Tocito formation without deepening it to produce from the Dakota Producing Interval, or to singly complete the well to produce gas from the Dakota Producing Interval and neither produce from nor inject into the Tocito formation.

(8) That the unorthodox gas well location of the said Caulkins Well No. T-123 should be approved inasmuch as the operator may choose one of the above options to produce the well from the Dakota Producing Interval.

IT IS THEREFORE ORDERED:

(1) That the application of Caulkins Oil Company for permission to deepen its Well No. T-123, located in the NW/4 NE/4 of Section 7, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, and to complete said well in such a manner as to permit the injection of water into the Tocito formation and the production of gas from the Dakota Producing Interval through parallel strings of tubing be and the same is hereby denied.

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Order No. R-1191-B

(2) That the applicant be and the same is hereby authorized to complete the said Caulkins Well No. T-123 in accordance with any one of the following procedures:

(a) Complete the well as a single completion in the Tocito formation, utilizing it as a water injection well in said Tocito formation or as a producing well in said formation.

(b) Complete the well as a single completion in the Dakota Producing Interval, utilizing said well for the production of gas from the Dakota Producing Interval.

(c) Complete the well as a dual completion, utilizing said well to produce oil from the Tocito formation and to produce gas from the Dakota Producing Interval.

(3) That an unorthodox gas well location for said Caulkins Well No. T-123 in the Dakota Producing Interval be and the same is hereby approved.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

**STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION**

JOHN BURROUGHS, Chairman

MURRAY E. MORGAN, Member

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A. L. PORTER, Jr., Member & Secretary

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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 1420
Order No. R-1191-A

APPLICATION OF CAULKINS OIL
COMPANY AND EL PASO NATURAL GAS
PRODUCTS COMPANY FOR AN ORDER
AMENDING IN CERTAIN PARTICULARS
THE SPECIAL RULES GOVERNING THE
SOUTH BLANCO-TOCITO WATER
INJECTION PROJECT IN RIO ARriba
COUNTY, NEW MEXICO, AS SET FORTH
IN ORDER R-1191; FOR PERMISSION TO
CONVERT TWO WELLS IN SAID PROJECT
TO WATER INJECTION; FOR PERMISSION
TO DUALY COMPLETE A WELL IN SAID
PROJECT AS A PRODUCING-INJECTION
WELL AND FOR APPROVAL OF AN
UNORTHODOX LOCATION FOR SAID WELL

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 8, 1959, at Santa Fe, New Mexico, before E. J. Fischer, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 21st day of May, 1959, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, E. J. Fischer, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That Rule 11 of Order No. R-1191 established Special Rules and Regulations governing the operation of the South Blanco-Tocito Water Injection Project in the South Blanco-Tocito Oil Pool in Rio Arriba County, New Mexico, and described the acreage encompassed in said South Blanco-Tocito Water Injection Project, hereinafter referred to as the "Project,"

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Case No. 1420

Order No. R-1191-A

(3) That the applicants, operators in said Project, seek an amendment of Order No. R-1191 to provide for the inclusion of the following-described acreage in the Project:

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM

Section 3: All

Section 7: NE/4

Section 8: S/2 NE/4; NW/4

Rio Arriba County, New Mexico.

(4) That the applicants propose that Order No. R-1191 be amended to establish an administrative procedure whereby the Project area may be extended and new wells included in the Project without notice and hearing.

(5) That the applicants also seek authorization to convert the following-described wells to water injection:

El Paso Rincon Unit Well No. 11, located in the
SE/4 SW/4 of Section 6,

Caulkins Well No. T-123, located in the NW/4
NE/4 of Section 7,

both in Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico.

(6) That applicants further seek permission to deepen the said Caulkins Well No. T-123, and to dually complete it in such a manner as to permit water injection into the Tocito formation through the casing-tubing annulus and gas production from the Dakota formation through tubing.

(7) That the location of the said Caulkins Well No. T-123 at a point 700 feet from the North line and 1800 feet from the East line of said Section 7 is unorthodox for a gas well in the Dakota Producing Interval and applicants seek approval for said unorthodox location.

(8) That permission should be granted for the conversion of the aforesaid El Paso Rincon Unit Well No. 11 to water injection.

(9) That in order to ensure the Dakota reservoir is not damaged, permission to dually complete the aforesaid Caulkins Well No. T-123 in such a manner as to permit the injection of water into the Tocito formation through the casing-tubing annulus and the production of gas from the Dakota formation through the tubing should be denied.

(10) That permission should be granted, at the operator's option, to either dually complete the said Caulkins Well No. T-123 in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota formation through parallel strings of tubing, or to utilize said well as a water injection well in the Tocito formation without deepening it to produce from the Dakota formation.

(11) That the unorthodox gas well location of the said Caulkins Well No. T-123 should be approved inasmuch as the operator may choose to dually complete said well in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota formation.

(12) That the inclusion of the additional acreage in the water injection project, as described in Finding No. 3, and the establishment of an administrative system for future expansion, as described in Finding No. 4, should be provided by an amendment to Rule 11(a) of the South Blanco-Tocito Water Injection Project Area Rules, as set forth in Order No. R-1191.

IT IS THEREFORE ORDERED:

(1) That the applicants be and the same are hereby authorized to convert the El Paso Rincon Unit Well No. 11, located in the SE/4 SW/4 of Section 6, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, to water injection.

(2) That permission to deepen the Caulkins Well No. T-123, located 700 feet from the North line and 1800 feet from the East line of Section 7, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, in such a manner as to permit the injection of water into the Tocito formation through the casing-tubing annulus and the production of gas from the Dakota formation through tubing be and the same is hereby denied.

(3) That the operator be and the same is hereby authorized to either utilize said Caulkins Well No. T-123 as a water injection well in the Tocito formation without deepening it so as to produce from the Dakota formation or to dually complete said well in such a manner as to permit the production of oil from the Tocito formation and the production of gas from the Dakota formation through parallel strings of tubing.

(4) That an unorthodox gas well location for said Caulkins Well No. T-123 in the Dakota formation be and the same is hereby approved.

IT IS FURTHER ORDERED:

That Rule 11(a) of the South Blanco-Tocito Water Injection Project Rules as set forth in Order No. R-1191, be and the same is hereby amended to read in its entirety as follows:

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Case No. 1420

Order No. R-1191-A

(a)-1. The project Area shall comprise that area described as follows:

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM

Section 3: S/2 SW/4
Section 4: S/2
Section 6: All
Section 7: NE/4
Section 8: N/2
Section 9: N/2 and N/2 S/2
Section 10: NW/4, N/2 SW/4, and SE/4
Section 11: W/2 SW/4

(a)-2. Expansion of the project area to include additional acreage may be approved administratively by the Secretary-Director of the Commission for good cause shown. To obtain such approval, the project operator shall file proper application with the Commission, furnishing copies of said application to all interested parties. "Interested parties" are defined as being working interest owners and royalty owners within the project area and immediately offsetting it. The Secretary-Director may approve the expansion of the project area if, within 20 days after receiving the application, no objection is received from any interested party. The Secretary-Director may grant immediate approval provided waivers of objection are received from all interested parties.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOHN BURROUGHS, Chairman

MURRAY E. MORGAN, Member

A. L. PORTER, Jr., Member & Secretary

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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 27, 1960
EXAMINER HEARING

IN THE MATTER OF:)

Application of British-American Oil)
Producing Company for a pressure main-)
tenance project in the Bisti-Lower)
Gallup Oil Pool and promulgation of)
special rules in connection therewith.)

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DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
Phone CHapel 3-6691

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 27, 1960
EXAMINER HEARING

IN THE MATTER OF:)

Application of British-American Oil)
Producing Company for a pressure main-)
tenance project in the Bisti-Lower)
Gallup Oil Pool and promulgation of)
special rules in connection therewith.)
Applicant, in the above-styled cause,)
seeks an order authorizing a pressure)
maintenance project in the Bisti-Lower)
Gallup Oil Pool, San Juan County, New)
Mexico, by the injection of water into)
the Lower Gallup formation through 17)
wells. Applicant further proposes)
that special rules be adopted govern-)
ing said project including the transfer)
of allowables from injection and shut-)
in wells to producing wells in the pro-)
ject and for establishment of an ad-)
ministrative procedure to convert addi-)
tional wells to injection.)

Case 1867

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: We will proceed to Case 1867.

MR. PAYNE: Application of British-American Oil Pro-
ducing Company for a pressure maintenance project in the Bisti-
Lower Gallup Oil Pool and promulgation of special rules in con-
nection therewith.

MR. ERREBO: Burns Errebo, Modrall, Seymour, Sperling,
Roehl and Harris of Albuquerque, appearing on behalf of the

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applicant, British-American Oil Producing Company. We will have two witnesses, possibly three. I would like to have the three witnesses, if you desire, sworn at this time.

MR. UTZ: One moment please, let me call for appearances. Any other appearances to be made in this case? You may proceed with swearing the witnesses.

(Witnesses sworn.)

MR. ERREBO: We would like to call as our first witness Mr. Nelson Williamson.

NELSON H. WILLIAMSON

called as a witness, having previously been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. ERREBO:

Q Will you please state your name, occupation, by whom you are employed and where?

A Nelson H. Williamson, British-American Oil Producing Company, Division Exploitation Geologist, Denver, Colorado.

Q Mr. Williamson, how long have you practiced as a geologist?

A Approximately eleven and a half years.

Q Are you familiar with the geology of this oil pool?

A Yes, I am.

Q How long have you been working in the area of this pool?

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A Approximately ever since the pool was discovered.

Q Have you previously testified before this Commission as a geologist?

A Yes, I have.

Q I will ask you to first refer to the structure map which has been marked Applicant's Exhibit No. 1, the copy that's on the board, and briefly state what it shows.

A Exhibit 1, which is the structure map contoured on top of the Lower Gallup pay zone in the Bisti-Gallup Field, is contoured on ten foot interval, and it shows a regional dip of about 50 feet to the mile. This is approximately a regional dip in the whole area. It shows the dip to be to the north generally, striking east-west and trending more or less northwest, southeast on the western limits of the field.

This exhibit and map shows the continuous uninterrupted dip of this particular pool and does not show any major or even minor interruptions in this dip due to structural closure or to reversal or to any strong nosing in the area. So it does show a pool here which is not interrupted in any way by any structure.

Q Mr. Williamson, are you familiar with the unit area of the proposed West Bisti-Lower Gallup unit?

A Yes, I am.

Q Does this map cover the area of that unit?

A Yes, it does.

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Q Mr. Williamson, will you refer to Exhibit No. 2 and explain what it shows?

A Well, Exhibit No. 2 is this map over here, and this is an index map of the cross sections which you see appearing over here. It's a map which shows relationship of the cross sections to the field area.

Q Will you refer to Exhibits 3, 4, 5 and 6 and state what they show?

A Exhibit 3 is the cross section which is shown as AA¹ on the index map and is a cross section along the main axis of the Bisti-Gallup Field. This cross section is placed, the logs are placed on a plus 1300 datum and the correlation lines are on the top and base of the Lower Gallup pay zone.

The purpose of this, using this pay zone or the upper zone is due to the fact that it is the most continuous through this part of the field and it's easier to see the correlation, and there is practically no difference in the structure as far as the other two zones are concerned.

Now, as you can see on the north end of the cross section which is actually outside the limits of the unit area, the sand is pretty well gone and then as you go along the main axis of the field you see that there is no stratigraphic or structural reason for the pool to be separated in any way. The sand is continuous throughout this main part of the field there.

Then on the western end, a transverse cross section which is BB¹ shows the shaling out of the Lower Gallup sand zone to the north. Then going, I might add at this point the sand is continuous and there's no interruption of the sand across the western end until you reach the northern limits of the area. Then, coming down southeast into about the central portion of the field is the north-south cross section CC¹, which goes across that portion of the field, and again you see there is no interruption of the sand until you get to the northern edge of the field where it is still present but very, but in very minor quantities, and if we correlate that or if we approach that we could see that the same thing is happening there that happened here where eventually your sand is gone.

Going farther southeast we come to the cross section DD¹, which is on the eastern limits there of the area, and again we see that the same is continuous there, but as is present all along the northern edge, there's a tendency towards shaling out and eventually if we carried the cross section far enough north we would see there is a shaling out completely of the sand.

MR. UTZ: Is the left-hand log on that a dry hole?

A Yes. Are you speaking of this one right here or this one here?

MR. UTZ: No, sir, the DD¹, the last one over here.

A No.

Q The left-hand one.

A Oh, this one.

MR. UTZ: The left hand.

A El Paso, yes, I believe that is a dry hole, El Paso Kelly State No. 10. Isn't it shown as a dry hole there?

MR. UTZ: Yes, it is.

Q Mr. Williamson, I notice that you have shown the first bench or bench No. 1 on your cross sections. Have you shown that bench for a purpose? And I notice that you don't show the other two benches.

A Well, primarily since the zone one is continuous throughout this portion of the field, whereas zones two and three are not as continuous, and it's much easier to correlate the top zone.

Q Actually you've seen the engineering exhibits which will be presented by a subsequent witness, have you not?

A Yes, that is true.

Q And those included, isopacks which do clearly show the present and location of the other two benches as well as the first bench?

A That's right.

Q From a geological point of view, Mr. Williamson, do you feel that this reservoir is subject to pressure maintenance by the injection of water?

A Yes,,as a geologist I would say that this has excellent possibilities for pressure maintenance by injecting water, since

it is a closed reservoir and we have evidence of shaling out to the north, to the south and to the west. And structurally, there's very little that enters into it structurally.

Q By that you mean there's no structural discontinuity?

A True, that's right.

Q This is, is it not, an offshore sand bar?

A Yes.

Q Do you have anything further you care to state at this time?

A I believe that's all I have.

MR. ERREBO: That's all we have from this witness.

MR. UTZ: Are there questions of the witness? Mr.

Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Williamson, I note on your cross sections BB¹, CC¹ and DD¹ that you show a closing or shaling out on the north side. However, the exhibits seem to indicate an open structure on the upstructure side or south side. Has this shaled out on the upper section also?

A Did you say a closure of structure?

Q I say your exhibits seem to indicate an open structure on the south side.

A Yes.

Q Has this shaled out?

A Yes, it has shaled out to the south. I didn't carry the cross section far enough south to show that. We have evidence of that to the south.

Q You carried your cross section DD¹ through two dry holes. How much farther do you have to go on the south side? El Paso No. 9 and 10 wells.

A Until it shales out?

Q Yes, until you show the shaling out.

A It would have to go farther south than that, because sand is still present there. It would have to go as far south as let me see here. Well, it would have to go as far south as this well in Section 11, and possibly even farther south than that. Now we have exhibits which will show the net sand, will show the net microlog pay which was determined by the Engineering Committee, and I think those questions will all be answered when those exhibits are shown.

Q I see.

A I'm not attempting at this time to define the limits of the pay area. That has been determined by the Engineering Committee. At this point I'm only trying to show the continuity of the sand and structure.

Q I was wondering if there was any possibility of any additional acreage not included in the participating area possibly

being productive.

A I can't answer that because that has been determined by the Engineering Committee.

Q Now, the zone that you have depicted on your exhibits and called zone one is the same zone that Mr. Taylor referred to in the participation formula as bench one?

A That's right. These tops, the top and the base of this sand was taken from the Engineering Committee report as the tops they used, top and base they used.

MR. NUTTER: Thank you.

MR. UTZ: Any other questions?

BY MR. UTZ:

Q Mr. Williamson, can you give a geological analysis why the wells in Section 2 were dry?

A The El Paso Kelly State wells you mean?

Q Yes, sir, wells 9 and 10 I believe.

A I understand that there's possibility of mechanical difficulties in completion. There may be water problems. I am not fully aware of the problems which they had in these wells. I would hesitate to give an opinion on that.

Q You have nothing to show the permeability in this zone that you've cross sectioned?

A No, this, as I stated before, these things were determined by the Engineering Committee. I would prefer to let them

answer those questions.

Q The cross section on Well No. 9 looks like a pretty good section, doesn't it?

A On cross section No. 9?

Q I mean Well No. 9, the log I mean.

A Yes, it looks like a very good sand.

MR. UTZ: Are there other questions of the witness?
If not, the witness may be excused.

(Witness excused.)

WAYNE ROGERS

called as a witness, having previously been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. ERREBO:

Q Will you state your name and by whom you are employed, please?

A Wayne Rogers, employed by British-American Oil Producing Company.

Q In what capacity and where are you located?

A I am located in Denver Colorado as District Engineer of the Northwest District.

Q Have you previously testified as an engineer before this Commission?

A Yes, sir.

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Q You have had approximately how many years' experience as an engineer?

A Ten and a half years.

Q Does that cover field and reservoir experience?

A Yes, sir.

Q Does that also include experience in various forms of fluid injection?

A Yes, sir.

Q You are familiar with the proposed pressure maintenance project in the West Bisti-Lower Gallup Oil Pool?

A Yes, sir.

Q Has an Engineer's Committee been formed and functioning to determine and develop a plan of pressure maintenance for this area?

A Yes, sir, they have.

Q What is your connection with that Engineer's Committee?

A For the past year I have been Chairman of that committee.

Q When was the committee formed, and can you state what has been the nature of their work?

A Originally the committee was made up of members of each one of the companies in what we call the Sunray Central Bisti Unit and the proposed West Bisti Unit. Work was done by that committee approximately, it was started by that committee approximately a year and a half ago.

In approximately October or November of 1958 the committee was formed to separately study what we call the West Bisti Unit, and as of that time British-American was designated to be the operator and British-American representative is the Chairman of that Engineering Committee.

Q Actually all the operators are entitled to representation on the Engineering Committee, are they not?

A Yes, sir.

Q Which of all of those operators have been the most active on the committee?

A The most active committee members have been representatives of Phillips, Skelly, El Paso Natural Gas Products Company and British-American.

Q Does the plan which you will propose this morning represent the combined thinking of some of these companies on the Engineering Committee?

A Yes, sir, it does.

Q Have they approved what you will present here this morning?

A Yes, sir.

Q How many meetings would you estimate that this committee has had to work on this matter?

A I would say approximately ten or twelve.

Q Will you first refer to your Exhibit No. 7 which appears

on the board and explain to the Staff and the Examiner the designation of the wells and the other things which are shown on the map? I notice in the upper right-hand corner that that is labeled West Bisti Water Flood. Now, does that refer to the general meaning of that term rather than the meaning which has been given it by order of the Commission?

A That is a general term that we used, actually indicating that we propose to inject water. It does not strictly adhere to the present thinking of the Commission as to what a water flood and pressure maintenance project is.

Q Later on in your testimony you plan to present evidence and your opinion that this is a pressure maintenance project as defined by the Commission and also according to your thinking and that of the other operators?

A Yes, sir.

Q Will you proceed to explain what is shown on that plat?

A Exhibit 7 is a plat which shows the entire West Bisti area, including all leases that are within two miles of that area. It indicates the proposed participating, and the proposed or recommended unit boundary. The unit boundary was arrived at in attempting to get a buffer zone between the participating area and the outer limits of the unit boundary. It also includes recommendations made by U.S.G.S. and the State as a boundary that

has been recommended by the Engineering Subcommittee.

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The plat also indicates all of the wells within the participating area, indicating that those wells are producing from the Lower Gallup sand. It also shows the proposed facilities for injecting water into the Lower Gallup sand, indicating the injection lines, the water supply lines, indicating the 17 initially--

Q Excuse me, Mr. Rogers. You might refer to how those various facilities are indicated on the exhibit.

A The blue or black dots indicate producing wells throughout the West Bisti area. The ones that have a series of three arrows pointing into the dot with solid lines to those wells are the initial 17 wells that we propose to convert to water injection.

I also, on this exhibit, have outlined those in red pencil to make it a little easier to see. The map indicates the possible 15 wells that we later may come back in and request administrative approval to convert to water injection wells. Each one of those 15 wells are indicated by a circle around the well, or around the blue dot also having a series of three arrows pointed into the well, and are connected by a broken line that means, according to the legend in the lower left-hand corner of the exhibit, possible additional water injection wells.

The map also indicates the location of what we call a satellite water injection plant. It's a plant that was put in to take care of the barrier system that was set up between the

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proposed West Bisti Unit and the Sunray Central Bisti Unit.

This was in Case No. 1663, when I referred to the wells on the west side of the barrier line, being the B. A. Mayre No. 2 and the B. A. Marye No. 5 wells. If I refer to the three wells on the east side of the line they were heard in Case No. 1664.

Q Those are wells which are presently injection wells, are they not?

A Yes, sir, we have been injecting water into the five wells on the barrier since last, either July or August.

Q You say "we", you mean British-American, Sunray in cooperation with each other?

A Yes, sir.

Q Proceed.

A Is it necessary to specify the exact location of those wells?

Q No, sir, I think they show on the exhibit.

A The plat also indicates that we have water supply well No. 2 that is shown here just to the east of the center of Section 28. It is indicated by a black dot with three arrows pointing out and labeled W. S. W. No. 2. That well has been drilled. It also shows the water supply well No. 3 that is immediately northeast of the center, Section 35, Township 26 North, Range 13 West in both cases. That water supply well is indicated similarly to No. 2 and has also been drilled.

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The plans that we have, we propose to drill water supply well No. 4 in the approximate location shown, which is southeast of the center of Section 27, Township 26 North, Range 13 West. That's about all I have from that exhibit.

Q Mr. Rogers, can you state to the Commission the reasons underlying the decision of the Engineering Committee and the Operators Committee to pick this particular pattern of water injection?

A The Engineering Subcommittee made what we felt like were exhaustive studies regarding the type of water injection pattern to set up. The five spot pattern would require too many injection wells, and we didn't feel like it would have the highest efficiency. The peripheral type and semi-peripheral, peripheral wells that would have to be converted to injection wells along the outside boundary of the participating area completely encircling it, would also require a great number of injection wells.

The semi-peripheral would be a type drive where you would have wells possibly along the north edge of the participating area or possibly along the south edge. The next method looked at was the alternating rows of wells to be converted to injection wells which we would call a line type drive. By doing this we have looked at approximately 32 wells that might be converted to water injection. Engineering studies show that we should be able to, or would be able to efficiently flush the Lower Gallup sand by

using every fifth row of wells, using a line type drive, and that is what we have here shown on the exhibit. For example, at the north end we have two water injection wells in Section 13, being the British-American Navajo No. 2 and Navajo No. 3. That is in Township 26 North, Range 14 West, and then coming down to the fifth row, southeast of that we propose to convert those three wells into water injection wells, and that was carried on throughout the field from the northwest end to the southeast end. It is our opinion that that will effectively and efficiently flush the Lower Gallup sand.

Q Actually then, this pattern of injection is best suited to this long shape that the field has, is that correct?

A Well believe it is, yes, sir.

Q You feel like that is the most efficient pattern that can be used in this instance?

A Yes, sir.

Q Is there anything further that you desire to discuss at this time with regard to this particular exhibit?

A Later on another exhibit I will substantiate it. The participating area was chosen to include all productive tracts that are known to be productive either by having producing wells upon them or in two cases we have, for example, a 40-acre tract in the southeast, southeast of Section 19, 26 North, 13 West that was included because it has producing wells on three sides of the

well with a dry hole immediately west. Of course that was the reason for leaving out the southwest of the southeast of 19 because it had a dry hole on it.

Q That will actually be shown more thoroughly in the subsequent exhibit?

A Yes, sir. While I'm at it, the other one I probably should mention is the 80-acre tract in the North Half of the Northeast Quarter of Section 35, 26 North, 13 West. The British-American Mayre "B" tract has no well on that 80 acres. However, it is surrounded by producing wells on all four sides. Consequently it was included within the participating area. The participating area then does not include any tracts that does not either have a producing well on it known to be productive, and certainly does not include any that has dry holes on them.

Q Will you then refer to your next six exhibits and discuss them as you desire? They are all quite similar to each other. Exhibits 8, 8-A, 9, 9-A, 10 and 10-A.

A Exhibit 8 is an electric log of the British-American Oil Producing Company Marye No. 2. It is located in the northeast, northeast of Section 12, 23 North, 13 West, was previously mentioned as a water injection well in the barrier system. This electric log indicates that the top of the Lower Gallup sand is at 4853 feet KB. That is also the top of Zone 1. It indicates the base of Zone 1 is 4880, also being for simplifying it, the top

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of Zone 2. It also indicates the base of Zone 2 at 4897. Which simplified is the top of Zone 3 and indicates the base of Zone 3 at 4966 feet. This was one of the logs studied on one of the 63 wells within the unit.

Q That actually is located in the southeast portion of the pool, is it not?

A Yes, sir, it is at the southeast end of the West Bisti Unit along the barrier. Exhibit 8-A is a microlog survey of the same well, and on it we have indicated the Zone 1, Zone 2 and Zone 3. Exhibit 9 is an electric log of the British-American Oil Producing Company Salge B #5.

Q What part of the project area is it located in?

A The Salge B #5 is located in the central part of the proposed West Bisti Unit. More specifically, it is located in the northeast, northeast of Section 33, 26 North, Range 13 West. It, again, indicates, or we have indicated on it by red pencil the Zone 1, Zone 2 and Zone 3 as discussed a moment ago on the Exhibit 8.

Exhibit 9-A is the microlog survey on Salge B #5, again indicating Zones 1, 2 and 3. Exhibit No. 10 is an electric log of the British-American Oil Company Navajo No. 3 that is located at the extreme northwest end of the participating area, its location being the northeast, southeast of Section 13, Township 26 North, Range 14 West.

~~Exhibit 10 is the electric log survey on that well and~~

indicates the presence of Zone 1, also indicates that Zone 2 and Zone 3 are either absent or of inferior quality.

Q Do you feel that these three logs taken together are typical of the logs of the various injection wells which you will use?

A Yes, we do, since we have chosen one from the three portions of the field.

Q I don't know if you have stated it previously or not, but you might now, how many producing wells are there in the project area?

A There are --

Q Presently producing wells.

A There are 63 wells in the project area. One is shut in, being what we show here on Exhibit 7 as the C. M. and W. No. 1, Elliott No. 1, located in the northwest, northeast of Section 30, 26 North, 13 West, the British-American Oil Company's Douthit B #5 which has been used by approval of the Commission as a gas injection well to conserve gas. It is presently shut in and it is located in the southwest, northeast of Section 28, 26 North, 13 West. Then, the two previously mentioned British-American wells, the Marye No. 2 and Marye No. 5 which are water injection wells that are currently being used in the barrier system.

Q Do you have any further observation as to this series of six exhibits which you have just discussed?

A I probably should make a comment, which I haven't done, that Exhibit 10-A is a microlog survey on Navajo No. 3 on which we have indicated Zone 1, and it is in the northwest end of the field.

Q Will you then proceed to discuss and explain Exhibits 11, 12 and 13?

A Exhibit 11 is entitled the British-American Oil Producing Company Bisti-Gallup Field, should be shown as West Bisti or qualified that way. It is an isopach map drawn on the microlog separation of the Lower Gallup sand Zone 1. This map was drawn after the Engineering Committee had studied all logs within the immediate area, being the participating area or unit area, and their logs.

The positive separation that was shown on the microlog was analyzed in this Zone 1 and the appropriate figures are shown underneath each well. For example, taking a well, for an example the British-American Douthit No. 18, which is located in the northeast, northwest of Section 29, 26 North, 13 West, had 7 feet of microlog separation or pay as indicated on the microlog for Zone 1.

Similar to that the map indicates the amount of net pay under each well in Zone 1. The contour interval of the isopach map is a two-foot interval, and it also, of course, shows the continuity of the Zone 1 throughout the proposed West Bisti Unit.

Exhibit No. 12 is an isopach map drawn on a two-foot contour interval using the corrected S.P. pick on all of the wells within the West Bisti Unit, and it also is on the Lower Gallup sand bench No. 1, or Zone 1, as we show it on the map. Zone 1 and bench 1, being synonymous. The purpose of drawing the isopach map using the S.P. is to evaluate each well in the West Bisti Unit insofar as the S.P. log is concerned. It also is used to try to calculate the oil in place by using the S.P. curve.

In the participating formula one of the parameters being that one-third credit is given to Zones 1, 2 and 3 by S.P. pick or S.P. isopach map. I believe that's all I have on that one, Mr. Errebo.

Q Proceed to the next exhibit, please.

A Exhibit 13 is an isopach map that is drawn on a two-foot contour interval, after analyzing the S.P. curve, or S.P. logs on all the logs in the West Bisti Unit, and it is drawn on the Zone 2 or bench 2 of the Lower Gallup sand. The same explanation that I gave for the Zone 1 S.P. would hold true for the Zone 2 S.P.

I believe one of the important things, of course, to show on this isopach map is that it does not as fully cover the West Bisti area as the Zone 1 microlog or S.P. isopach Zone 1.

Exhibit No. 14 is an isopach map drawn on a two-foot contour of the West Bisti Unit area drawn on the data that was accumulated

by engineering study of the S.P. curve on the electrologs for the Zone 3 of the Lower Gallup sand. Again, it does not show as full a coverage within the area as the Zone 1 maps.

Q These isopachs then were used in determining the boundaries of what you designated the initial participating area, were they not?

A Yes, sir. However, back to the first exhibit that I had, I think that was Exhibit 7, we have included all productive acreage within the zero isopach line on Zone 1. Now, by that, if there are no wells on a tract that are still within the zero isopach line but have no producing wells on the tract, certainly they were excluded from the participating area. They are generally in the buffer zone, but all of them were jointly used, yes, in determining the participating area.

Q Do you have any further comments in connection with this series of exhibits?

A No, sir.

Q Will you then proceed to Exhibit No. 15 and explain that exhibit? Actually I believe Nos. 15, 16 and 17 are of the same nature and you might explain all three of those.

A Separately?

Q However you desire.

A Exhibit No. 15 is a schematic drawing of the downhole condition of British-American Marye No. 2. It is located in the

northeast, northeast, Section 12, 25N, 13 West. This well is presently a water injection well that we are using in the previously mentioned barrier system. It is also to be used as a water injection well in the West Bisti Unit as a whole. The schematic drawing indicates that the well was drilled to a total depth of 4982 feet, a string of 5 1/2" casing was set on approximately bottom and cemented from there up to 4375 feet, which is well above the top of the Lower Gallup sand.

The drawing indicates that the Lower Gallup sand Zones 1, 2 and 3 have been perforated and are taking water at the present time, or at least water is being injected into this well in all three zones. It indicates the proposed method of completing a water injection well being to use plastic coated tubing that will be set on a packer, the packer being immediately above the top of the Lower Gallup sand. Water will then be controlled through the tubing string and will be injected into the Lower Gallup sand below a packer.

It also indicates that a string of 9 5/8" casing is set at 230 feet KB and the drawing does not show this but that is cemented from 230 feet to the surface. A 12 foot cement plug is in the bottom of the casing to prevent any migration of the water from below the casing shoe that is down through the casing.

Q Are 16, 17 and 18--

A Yes, the 16 is the Salge B #5 in the southeast part

of the field, showing the condition of the well. Exhibit 17 is of a Navajo No. 3 which is in the northwest end of the field, previously described.

Q These are the same three wells scattered throughout the field that you showed electrologs on previously?

A Yes, sir.

Q They were picked in order to try to present a representative picture to the Commission of the injection wells, is that correct?

A Yes, sir. I may have made a wrong statement a moment ago, Salge B #5 has not been converted to a water injection well. The drawing shows how we propose to convert it to a water injection well if the unit is formed. The same thing is true of Navajo 3.

MR. UTZ: What size tubing was that?

A This is two-inch tubing.

Q Do you have anything further in connection with those three exhibits?

A No, sir.

Q Will you proceed then to explain Exhibit No. 18?

A Exhibit 18 is a drawing showing the equipment that we propose to put on to each one of the water injection wells.

I don't think it's necessary to go into too much detail on it.

However, if you will note, No. 5 on the drawing is a Floco Meter.

We propose to put a water meter on each one of the injection wells in order to determine how much water we are putting into each well separately rather than trying to spread it out by calculating it. We also propose to put a pressure gauge to indicate the injection pressure each day and a recording of that will be made.

Q Do you have any further pertinent points relating to that exhibit that you care to discuss?

A No, sir, I don't think so.

Q Will you then proceed to Exhibit No. 19 and explain what that shows?

A Exhibit 19 is a schematic sketch of the British-American Douthit water supply well No. 2. It was previously pointed out on Exhibit No. 7. This well was drilled to a total depth of 2600 feet, a string of 7" casing was set at 2590 feet and cemented from 2,027 feet up to the surface. It indicates that the 7" casing is slotted throughout the Cliff House and Menefee, and we do not indicate it on here, but the water supply zones are from the lower Allison, Cliff House and Menefee zones.

The water supply well No. 3 that has been drilled and was previously mentioned and pointed out on Exhibit No. 7 is different to this one only in that it has a string of 9½" casing in it instead of a string of 7".. Water supply well No. 4 previously mentioned, we propose to drill it and equip it with 9 5/8" casing, but producing both of the other wells from the same zones that

we have indicated here on this drawing.

Q How do you propose to lift the water out of the wells?

A Since we have 7" casing in the No. 2 well we propose to lift it with a Reda pump. Water supply well No. 3, even though it has 9 5/8" casing, we propose to use a water, I want to back up and correct that. Water supply well No. 3 is the well that is producing water from these zones and is being furnished to the barrier system, and it is being pumped by a Fairbanks Morris turbine pump. We propose to use the Reda pump also in water supply well No. 4 when we drill and equip it.

Q What is the basic difference between these two types of pumps?

A The pump used on water supply well No. 3 is a turbine pump, it's set approximately 1200 feet deep and has numerous bores in it that work in a turbine or centrifugal action and is powered by gas engine, whereas the Reda pump works from electricity and has the electric motor. It generates surface and electric motor in the pump itself. It can be set at deeper depths and certainly can produce more water than we're able to produce from this other one.

Q Now, refer to Exhibit No. 20 and explain what that exhibit shows.

A Exhibit 20 is a drawdown curve. It's entitled "British-American Oil Producing Company. Bisti Water Supply Well No. 2, Douthit Lease". We ran capability or drawdown tests on this well

to determine how much water we could produce and how much of a drawdown, fluid level drawdown we would actually experience. The curve indicates that the static fluid level was standing 858 feet, that is from the bottom of the hole. This was tested by gas lifting or putting gas down the tubing through perforations in the tubing and lifting water through the annulus.

A pressure bomb was isolated below these perforations and pressure recordings were made. It indicates, for example, that we can produce 8,000 barrels of water per day as shown on the curve by a point with a bottomhole pressure exerted on the bomb of some 550 pounds approximately. The static pressure was some 750 pounds plus a minus 5 pounds. So it indicates that the well is certainly capable of putting out a greater amount than 8,000 barrels of water per day without pulling the fluid level too low.

Q Is it your opinion then, based on this information, that these wells will supply an adequate amount of water for the project as you now foresee its needs?

A Yes, sir. The three water supply wells we propose to have will supply, will actually supply a greater amount than we need at the time.

Q I believe your next exhibit, is it not, is Exhibit No. 21, which is a chemical analysis of the water?

A Yes, sir.

Q Will you explain that exhibit?

A Exhibit 21 is entitled "Chemical Analysis of British-American's Douthit Water Supply Well #2". It shows the various components in the water. This analysis was run by a consulting engineering firm from Dallas, Texas. Without taking too much time on the exhibit, the one thing that we do have is 13.6 parts per million hydrogen sulphide. Therefore, we feel like we have a corrosive water, it is not corrosive to an extreme limit, but it is corrosive.

Consequently, we have designed our facilities, including our injection pumps and our lines and so forth, to combat any type of corrosion. The injection lines will be cement lined, the pumps will have anti-corrosing materials in those to prevent corrosion. That is the reason we propose to inject the water into plastic-coated tubing in the water injection wells, which will prevent corrosion of the tubing and isolate the casing from any corrosive action, because it will not come into contact with water that is above the production packer we propose to use.

The chemical analysis also indicates, and we have this from the consulting engineering firm, that it is compatible with the produced water that is found in the Lower Gallup sand. The waters are compatible. There will be no detrimental effect to the formation or to the reservoir.

Q Has the presence of calcium carbonate presented any problem?

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A Yes, sir. We ran what we call a quality control study of the entire barrier system checking the lines, checking the water supply well, the injection wells and so forth, and we found that we had a calcium carbonate deposition in our lines and in our equipment. At the injection wells primarily because it was a way down the line from the water supply line, I mean from the water supply well had very little calcium carbonates to these points, but it did present a problem that we could eventually have some plugging action if we didn't try to counteract it. So we used a chemical, injected it down the annulus of the water supply well and then made an additional quality controlled study some thirty or forty days later and found that we had eliminated the precipitation of calcium carbonate which would eliminate this danger to possible plugging of the formation, and we feel that that will effectively control it in the other supply, in the other water supply wells.

Q Is that all you have as to that exhibit?

A Yes, sir.

Q Will you then proceed to Exhibit 22?

A Exhibit 22 is entitled "West Bisti-Gallup Field, Arithmetic Average BHP". It indicates that the Mayre No. 1, which is a British-American well, had a bottomhole pressure of 1516 pounds on March 18, 1956. Tests were run every few months since that time and the bottomhole pressure has declined what

we feel like rather rapidly; the last survey we had in June indicated that the West Bisti Field average was down to 887 pounds average. The bubble point pressure in the Lower Gallup sand is 1140 PSIG. Therefore, this curve indicates the drop in pressure that has been experienced in the Lower Gallup sand and points out the importance of instituting a secondary recovery project in order to recover more ultimate oil.

Q Do you have anything further in connection with that exhibit?

A No, sir.

Q Will you proceed then to the next exhibit, which is No. 23?

A Exhibit 23 is a summary sheet entitled "Pertinent Data, West Bisti-Lower Gallup Sand". I don't think it's necessary to go into each one of these items that I have listed here. However, I'll be glad to discuss any of them if necessary.

Q Would you point up what that exhibit shows as to the original primary recoverable oil as compared to the remaining primary recoverable oil?

A The original recoverable primary oil is 6,320,000 barrels. The cumulative production to October 1st, 1959 was 2,723,111 barrels from the West Bisti Field.

MR. NUTTER: Are you referring to the 5,141 acres that are participating?

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A Would you ask that again?

MR. NUTTER: Are you talking about the reserves, are you referring to the 5,141 acres that are participating?

A Yes, sir.

MR. NUTTER: Thank you.

A I should mention that the participating acreage is 5,141.24, but I didn't show that fraction. The original recoverable primary oil that I have previously mentioned is for the participating area.

Q What percentage then of the oil which was originally recoverable has been recovered?

A 14.45%. In trying to bring this up-to-date, the estimated cumulative production to February 1st, 1960 is estimated to be 3,250,000 barrels, which leaves an estimated remaining primary recovery on 2-1-60 of 3,070,000 barrels.

Q Actually, Mr. Rogers, I believe that you intended to give me, actually what I asked you for was the percentage of remaining primary. You gave me a figure of approximately 14%. Actually isn't that closer to 50%?

A Yes, sir. I didn't understand your question completely. Approximately 51.4% of the recoverable primary reserves has been produced, or will be produced, by February 1st, 1960.

Q Now, then, based upon that information and the information shown by your Exhibit No. 22, would you classify this as a

pressure maintenance project or a water flood project as defined under Rule 701?

A This will be a pressure maintenance project by water injection.

Q Actually you are familiar with the provisions of Rule 701 as presently in effect, which among other things defines a pressure maintenance project as one which has not reached the advanced or stripper stage of depletion?

A Yes, sir.

Q It's your opinion that this project is not so qualified?

A That's right.

Q Do you have any further information that you care to call the Staff's attention to and the Examiner's attention to in connection with this?

A Yes, sir, we estimate a commencement date of water injection of June 1st, 1960. We have calculated and estimate a secondary recovery of 6,800,000 barrels from the pressure maintenance project, which would give us a total primary and secondary recovery to depletion of the project of 13,120,000 barrels of oil. This being 30% of the original oil in place that we felt like was recoverable.

We estimate that we will use eighty-seven and a half million barrels of water. We propose to inject the water between 12,000 and 16,000 barrels per day, using the initially proposed 17

injection wells asking for administrative approval to possibly convert an additional 15 at a later time if engineering study and experience from the operation of the project indicates that we need additional injection wells.

We estimate the maximum injection pressure will be 1200 pounds per square inch at the surface of the injection wells. We propose to maintain our pressure certainly below the critical pressure and we think the critical pressure would be 2800 pounds at the surface. We propose, however, to not inject over 1200 pounds of pressure at the surface.

Q Do you have anything further in connection with this exhibit?

A No, sir.

MR. UTZ: : We'll take a ten-minute recess.

(Whereupon a recess was taken.)

MR. UTZ: The hearing will come to order. Will you proceed?

Q (By Mr. Errebo) Mr. Rogers, have you given consideration to pool rules and regulations for this project?

A Yes, sir.

Q And have you prepared such proposed rules?

A Yes, sir.

Q Are they set forth as Exhibit No. 24?

A Yes, sir.

Q Will you proceed to discuss each of the provisions of those rules and regulations to the extent that you may see fit?

A On Exhibit 24, Rule 1 reads: "The project area (initial participation area) of the British-American Oil Producing Company, West Bisti Water Injection Pressure Maintenance Project shall comprise that area described as follows:".

Q That is the area that has been set forth in your Exhibit No. 7, I believe?

A That is right. If it isn't necessary to go through each one of these, that is the exact participating area that we did describe in Exhibit 7.

Q Will you proceed now to the next rule, please.

A "Rule 2: The allowable for the West Bisti Gallup Sand Project shall be equal to the then current normal unit allowable for an 80 acre proration unit of comparable depth in Northwest New Mexico times the number of 80 acre proration units in the project area of the West Bisti Unit including those units having wells which are shut in or are used as injection wells, and those units or portions thereof having no wells.

Q Now, 80-acre spacing is in effect, is it not?

A Yes, sir.

Q In this pool, and this portion of it. Will you refer to your Exhibit No. 7 and explain the particular situations which you might say are not fully apparent by this rule which would be

covered by it?

A We propose that each 80-acre unit on which a well is located would be granted, as stated a minute ago, "the then current normal unit allowable for an 80 acre proration unit of comparable depth in Northwest New Mexico".

We also propose that fractional units get a proportional allowable according to their acreage, in this particular case a part of Section 18 and Section 19 within the participating area, Township 26 North, Range 13 West, on which we have the Riddle No. 1 well that was drilled on a hiatus or acreage within those sections on some 62.24 acres, that is that amount of acreage is within the unit.

Q By that you mean that is a correction all along a township line there, is that correct?

A I think that is correct, I think probably along a range line.

Q Or range line?

A Yes, sir. The rule proposes then that that particular well would be granted an allowable to be used in the aggregate or project allowable that would be equivalent to this fractional part of the 80 acres. For example, 62.24 over 80 times whatever the current 80-acre normal allowable is at any given month.

Q Do you contemplate that you would also assign the same allowable to the wells in the buffer zone?

A Yes, sir.

Q What information do you have that this buffer zone barrier has been effective to separate the Central Bisti Unit and the area now under consideration?

A Since approximately July 1st or August 1st, 1958 we have been injecting water into the previously mentioned barrier wells, two of them being on the west side of the barrier line, B. A. wells, three being on the east side which are Sunray wells. We have injected approximately 500,000 barrels of water combined injection into the five wells. We are satisfied and Sunray is satisfied that it is an effective barrier between the two projects.

A buffer zone being described as the zone, a buffer zone is that zone that coincides where two projects butt up against each other, so we would propose the same allowable for the buffer zone that we have previously mentioned.

Q Now, are there any other tracts or portions of units or full units which do not have a well on them at the present time within the project area?

A Yes, sir. The Southeast, Southeast of Section 19, 26 North, 13 West, a 40-acre tract does not have a producing well upon it. It's the one that I mentioned earlier having producing wells on three sides. However, the Southwest of the Southeast of that Section 19 has the dry hole on it. We would propose that ~~this 40-acre tract be given a project allowable based upon the~~

acreage.

Q Does the information which you have indicate that that tract would be productive of oil under this proposed injection project?

A We believe, since it is outlined on three sides by producing wells, that because of the other engineering data, that it should have oil in place under it, yes.

Q Is there a full 80-acre unit within the interior of the unit, you might say of the project, which is undrilled at the present time?

A Yes, sir, the North Half of the Northeast Quarter, Section 35, 26 North, 13 West, the Marye "B", a British-American Lease, has no well drilled on that 80 acres. However, it is completely surrounded by producing wells on all four sides. From all information, certainly it should be productive and has oil in place under it. We would propose that it be given the top normal unit allowable, as a part of the project allowable.

Q Is there any other, you might say peculiar situation, in here which would be covered by these rules?

A Yes, sir, the British-American Douthit "B" #5 which has been used as a gas injection well under authority given to us by the Commission. That well is located in the Southwest, Northeast of Section 28, 13 West and 26 North. We have injected, in conserving gas from our properties in West Bisti Field, we have

injected some, oh, approximately a quarter of a million feet of gas.

It is presently shut in because all gas is being sold and transmitted into El Paso's line. The well is shut in, however we request that it be given a current normal top allowable, at the time it was converted it was a top allowable well.

Q That well was a good well, I presume, before it was converted?

A Yes, sir, it was one of the top allowable wells.

Q And the injection of gas has now made that well incapable of producing oil at the present time?

A That's right.

Q And you would ask the Commission not to penalize British-American by having to conserve gas by injecting it into the well?

A That is right.

Q Do you believe that the rule which you propose for the assignment of allowable, Rule No. 2, is a fair and equitable rule?

A Yes, sir, I do.

Q Does it ask for the same treatment allowablewise that is being given to wells which are designated or classified as primary producers elsewhere in the San Juan Basin?

A Yes, sir.

Q Then it makes the allowable for this project subject to market demand, does it not?

A It does.

Q You aren't asking for special treatment?

A No, sir.

Q You aren't asking for a bonus?

A No, sir.

Q You are simply asking that this project be treated equally?

A That is correct.

Q Were the allowables assigned to other wells in the area?

A Yes, sir.

Q Now, do you feel that the transferred allowables should be the full unit allowable?

A Yes, sir.

Q And why do you feel that it should be the full unit allowable?

A Well, for one thing, it certainly would make it easier to administer in not being required to make monthly production tests on all the wells and not having to file lengthy detailed reports. We certainly propose to file reports that are required by the Commission to keep them up-to-date on it, but by being able to transfer top allowable, it would be much easier to administer.

Q You feel that the rule that you proposed here as to allowable and the rest of the rules which you will propose are

workable and relatively simple of administration?

A Yes, sir.

Q If new injection wells were to be drilled rather than converting old wells, that would, of course, involve considerable additional expense, wouldn't it?

A Yes, sir.

Q If these injection wells were stimulated so that their production was increased to say the top allowable, then they would be given that amount, wouldn't they, under the present rules of the Commission?

A They would.

Q Now, if they're stimulated instead by the injection of water, do you feel then that is a reasonable justification for asking for a full allowable for the wells which you transfer allowables from in order to convert them to injection wells?

A Yes, sir, I do.

Q Do you have any other observations on the allowable formula which you are presenting to the Commission here today?

A Not right at this moment.

Q I might ask you this, with the exception of say five or six 80-acre units, does each of the proration units within the project area either directly or diagonally offset an injection tract?

A Yes, sir.

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Q Will you proceed to discuss Rule 3?

A "Rule 3: The project allowable may be produced from any well or wells in the project area in any proportion."

Q Excuse me, I might ask you at that point, do you feel that that is likely to cause waste?

A That this rule --

Q This rule could cause waste.

A I don't think it will, no, sir.

Q In other words, there is no bottom water here, is there?

A No, sir.

Q You see no reason why the operator who is conducting a pressure maintenance operation, should not be afforded full latitude in withdrawing production from the unit any place or at any rate that he may see fit in the exercise of his best judgment?

A I think we should be allowed that, yes, sir.

Q Proceed to Rule 4.

A "Rule 4: Conversion of producing wells to injection, or the drilling of additional wells for injection, shall be done only after approval of same by the Secretary Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application shall include the following:

- (1) A plat showing location of proposed injection well,
all wells within the project area and offset

operators, locating their offsetting wells to the project area."

Q Actually, is not this rule, Mr. Rogers, almost identified with a similar provision in Rule 701 of the Commission?

A Yes, sir, it is.

Q I believe you might just omit a further discussion of that then.

A All right. "Rule 5: Each month the project operator shall submit to the Commission a Water Injection Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required."

Q Actually you aren't prepared at this time to go into the details of such a report, are you?

A No, sir, I am not.

Q You would be willing to sit down with the Commission at any time and attempt to work out some form of report which would be satisfactory?

A Yes, sir, we would. "Rule 6: The commission shall, upon review of the report assign a project allowable for the next succeeding month in accordance with these rules."

Q Now, you feel there that the timing of the submission of the report should be such that it would fit in with the Commission's studies made each month of the information submitted by the operators and other consideration to determine the next

month's allowable, is that correct?

A Yes, sir. "Rule 7: The Special Rules and Regulations for the operation of the subject project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith."

Q Is it also your proposal that the rule presently in effect covering the buffer area which was adopted in Case 1663, I believe Order R-1416, superceded to the extent that it may be in conflict with the project as now proposed?

A Yes, sir.

Q Actually it would appear that these rules will cover the operations of the buffer zone, will it not?

A Yes, sir.

Q Do you have anything further which you care to offer at this time?

A Yes, sir, the proposed rules would set a definite ceiling for month to month in that it allocates current allowable each month.

Q Do you feel that a pressure maintenance project may be restricted from time to time as may be indicated by market demand without causing a loss in ultimate recovery and, in particular, I'm referring to this pressure maintenance project as you propose it?

A I think it can be, yes, sir. You might qualify that within reasonable limits. Reasonable limits being present time

40-acre allocation to 63 barrels per day, or that is it will be in February rather. And I would answer your question in the affirmative there unless it were restricted down to some 20 or 30 or 40 barrels, in other words quite an adverse restriction.

Q British-American is willing to produce from this project whatever the allowable may be from month to month?

A That is right.

Q Actually do you know how low the allowable has gotten in any recent year in New Mexico?

A In Northwest New Mexico?

Q Yes.

A Well, since pipeline outlets were available in Northwest New Mexico, I think the average is 52 barrels per day per 40-acre tract.

Q It has been considerably lower than that?

A I think it has been lower than that in three other months, or has been lower than that, yes, sir.

Q Actually then, from what you said, you don't feel that it's necessary to pick some arbitrary figure or some figure otherwise determined as a fixed figure which would represent the allowable for this project here on out, is that correct?

A That is right.

Q And is your reason for making that statement that the operator can fluctuate his production each month in accordance

with market demand?

A You said can fluctuate?

Q Yes.

A That is right.

Q So therefore as compared say to water floods there is no need to give the operator a fixed allowable so that he may design his project in such a manner that it will not exceed in production the amount of that allowable?

A That's right. It is not necessary to do that in this pressure maintenance project we are talking about here.

Q Do you have anything further?

A No, sir.

Q These exhibits, were they prepared by you, under your supervision or by the Bisti Engineering Committee?

A They mostly were prepared by the Engineering Subcommittee under my supervision.

MR. ERREBO: That's all we have of this witness.

MR. UTZ: Any questions of the witness?

MR. PAYNE: Yes, sir.

MR. UTZ: Mr. Payne.

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Rogers, prior to initiating this pressure maintenance project, do you propose to install an ACT system to handle the production?

A The Engineering Subcommittee made a lengthy study of that and at the present time the recommendations are not to put one in. However, we might in the future change our opinion on that. At the present time we do not propose that.

Q Do you propose to produce any wells outside the participating area into a tank battery with the wells in the participating area?

A No, sir.

Q So you wouldn't have to worry about a separate metering problem there?

A That is right.

Q Is your zone of injection to be the entire Lower Gallup perforated interval in each of the wells prior to the time they were converted?

A Yes, sir.

Q Now, referring to this El Paso State Well No. 9 in Section 2, 25 North, 13 West, did the Engineering Committee or Subcommittee draw any conclusion as to why that well was a dry hole?

A Yes, sir, that well was studied by the Engineering Subcommittee and it was our opinion that El Paso being a prudent operator had done everything in their power to make a well out of the well and it would not or is not a commercial well.

Q Now, on your Exhibit 1, the structure map, it would

appear that the structure is almost identified with your Marye Well No. 3 in Section 1, would it not?

A That is probably correct. However, structure is not the controlling factor in the Lower Gallup sand, it is more permeability and porosity development, not structure.

Q As I understand it, this El Paso State well was just temporarily abandoned, it hasn't been permanently plugged and abandoned?

A I'm sorry, but I can not answer that, I'm not sure.

Q Let me ask you this, do you know of any proposal to go back to reenter that well and try to make a producer out of it?

A To my knowledge, I don't know.

Q Now, I take it by your testimony that you are going to inject under pressure, is that right?

A We believe that we will have pressure, yes, sir, and that has been proven by the barrier system.

Q The water that you are going to inject is corrosive and you propose to use a plastic-lined tubing to take care of the corrosion problem?

A The water is corrosive, not to an extreme degree. We do propose to use the plastic-lined tubing to isolate any water action on the casing that is above the production packer.

Q You don't have any proposal at this time to run sweet oil in the annular space between the casing and the tubing?

A By injecting the water in the tubing and having the production packer in there we don't think it is necessary.

Q These wells are all relatively new, are they not?

A I think most of them have been drilled since '55.

Q So there's no problem in regard to the casing?

A No, sir, there should not be.

Q This is going to be a closed system, is it not?

A Yes, sir.

Q Do you have a log of the Marye No. 1 well?

A Yes, sir, I do, I have it with me.

Q In view of the fact, Mr. Rogers, that the unitized area depthwise is pinned on your Marye No. 1 well, it would appear that that's the crucial log, and if you wouldn't mind, we would like to have that as an exhibit.

A I would be glad to leave it with you. I think that was kind of a missight on our part. Would you like for me to describe this log?

Q Please, yes, sir.

A The British-American Marye No. 1 located in the Northeast, Northeast, Section 1, 25 North, 13 West, is a proposed recovery well. It is presently producing from the Lower Gallup sand. As part of the record we will give you a copy of the electrical log run on the Marye No. 1. This also was used as an exhibit in the barrier case which was 1663. It indicates the top

of the Lower Gallup sand at some 4833 feet KB. It indicates the base and also indicates the second zone and the third zone.

Q Now, you proposed under your rules that each injection well will get a normal unit allowable which it can transfer to the producing well, is that right?

A Yes, sir.

Q Why do you feel that the well is entitled to that amount rather than the amount which it was producing immediately prior to conversion?

A Considering the moneys that will be spent in putting the water injection program into effect, and not wanting to have that type of project penalized, we have proposed to use the top unit allowable on, that is for all 80-acre tracts within the West Bisti participating area.

I might point out that we aren't asking for any bonus at the present time because after 17 wells are converted to water injection wells, leaving some 46 producing wells, that will actually sustain a loss in production from what we are currently producing and would be considerably less than this ceiling that we were talking about. However, as the project responds to the water injection as we go in and make studies and do necessary changes to change the pumping equipment which may be too small, as long as we are in, within what we believe is our MER, most efficient rate of production we would like to have this ceiling to give

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us something to be shooting at all the time rather than having the fixed allowable or just what the well is capable of producing right now. If the water injection wells were not converted to producing wells, we could go in and frack treat it, put larger equipment on and try to stimulate it. Those wells also would be stimulated by water injection and we would be allowed to produce greater and greater amounts from those up to this top unit allowable rather than curtailed to something that maybe we have been producing in the last three months or last month. We think it would be in accordance with the statutes, would create waste if we had to go in and drill additional wells in order to keep these wells as producing wells to get the largest allowable that we could.

Q Now, when it reaches the maximum point, that is top unit allowable for each well, you don't feel that the Bisti Pool would be getting an unfair share of the total allowable for Northwest New Mexico based on market demand from that area?

A As long as it is tied in with market demand, I don't think we would be getting an unfair share of it, no, sir.

Q Your project allowable will be tied to normal unit allowables?

A That is correct.

Q So that you don't have to inject at a constant rate or at any specific rate in order to prevent the physical waste of oil?

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A I think that insofar as injection rates go, now you mentioned injection rates that we would probably try to make some study and recommend to the operator. I think that maybe is within the operator's discretion to determine how much water that is within the limits approved by the Commission; we might make a study and try to determine the net acre feet that we feel each acre might flush and try to vary the injection rates into the wells. Again, it may be advisable to inject a constant rate in each one within pressure limitations.

Q If you injected a constant amount into each one, then you wouldn't have your production rate tied to the allowable, would you, assuming the allowable dipped from 63 to 53, you couldn't keep injecting the same amount of water in your injection wells, could you?

A I think we could because on one of the exhibits showing the pressure decline in the field we have indicated that the pressure is some 700 or 750 pounds less than originally, and whereas we propose to inject quantities of water to maintain the pressure, which would be putting in water voidage equal to your reservoir voidage from current production. I don't think that would affect how much water we put in the reservoir if the production rate were decreased to 53 barrels a day, that is the allowable.

Q You have a leeway?

A Yes, we have such a leeway.

Q You control production rather than injection?

A Yes, because we would be glad to have the pressure go up 10 or 15 pounds.

Q Under your proposed rule you propose to give the units or portions thereof having no wells on them an allowable? Isn't this rather unorthodox procedure? You haven't spent any money drilling a well on that unit, and furthermore you can't be assured that it's productive, can you?

A We are as sure that it would be productive as possible without actually having drilled a well. Now, the 80-acre tract that I mentioned earlier on a British-American Lease is surrounded by production on all sides, the continuity of the reservoir and everything would certainly indicate that that particular 80 would be productive and has oil in place that will be produced. We don't feel like under secondary operations only that it would be to the benefit of the operators to spend the money to go drill a well.

Q Of course the El Paso State No. 9 was offset on two sides by producing wells too, was it not?

A Yes, sir. However, again, it is getting off to the Southwest where the permeability and porosity development just disappears.

Q I believe you testified that you felt that if new injection wells are drilled they should also get a normal unit allowable?

A Yes, sir.

Q Now, is that if they're drilled on an 80-acre tract or if you drill a second well on an 80-acre tract, one being the producer and one being the injection well, you wouldn't expect a full 80-acre allowable for each of them, would you?

A My personal opinion would be that if we drilled another well to be an injection well to an 80-acre tract, it should come in under the proportional acreage factor.

MR. PAYNE: In other words, you are saying, if you have two wells on an 80 it certainly should be prorated there.

MR. ERREBO: Mr. Payne, I don't believe that was his testimony. If it was --

MR. PAYNE: I am trying to straighten out what his testimony was.

A I beg your pardon. Let me dig back here.

Q All I'm getting at, if you drill a new injection well on an 80-acre tract and you have a well dedicated, you have that 80-acre tract dedicated to a producing well, you wouldn't want anything for that additional injection well, would you?

A May I take one moment?

Q Yes, sir.

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A If I am understanding your question correctly, we are in Rule 2 talking about 80-acre proration units, and I don't believe that I testified that if on any given 80 acres where we have a producing well at the present time and we went in and twinned it or drilled an injection well on any part of that 80, I don't believe I intended to ask for a full top 80-acre allowable to that well when we have already a well on the 80 acres.

MR. PAYNE: That's what I was trying to bring out.
Thank you, that's all.

MR. UTZ: Any further questions? Mr. Nutter.

BY MR. NUTTER:

Q Mr. Rogers, how many wells in this area currently are being used for injection?

A In the West Bisti, or west of the barrier line, there are presently two wells being used as water injection wells. Then on up in the field, the Douthit "B" #5 was used as a gas injection well to conserve gas.

Q The only other two water injection wells that you have are the Marye "B" #2 and the Marye "B" #5 in the water barrier?

A That is Marye No. 2 and Marye No. 3, Dan, instead of "B".

Q Thank you. Then you have the one gas injection well?

A Yes, sir.

Q Well now, have any of the producing wells in the neighborhood of the barrier received any response from water

injection into the barrier?

A Yes, sir, we have seen some response. I'm speaking purely on the west side.

Q Possibly your Marye 6 or your Marye 8 indicated response to the water injection?

A I don't remember exactly which well, but I have it where I can tell you specifically. You want me to specify which ones, Dan?

Q Yes, sir, and the amount of the response, if you please.

A The British-American Oil Producing Company's Marye No. 8 in the Southwest of the Southeast, Section 1, 25 North, 13 West, over the last three months of 1959, and I presume the first month of 1960, the decline has been arrested. There has been no response insofar as an increase from that well, and it is currently producing 26 barrels per day.

The Marye No. 6, located in the Southwest, Northeast of Section 1, 25 North, 13 West has also experienced an arresting of the decline over the past two to three months' time. It is presently producing 120 barrels of oil per day.

Q Do you think that the response of these two wells is such that you'd be able to say that this has been a pilot so-to-speak to indicate the success of a water injection project for the rest of the year?

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A I think the data from the barrier can be used as a criterion of how the rest of the field might respond to it. We have not considered it to be a pilot, it was a cooperative project that had to be done between the two units to form the barrier. It could be used as one part of a pilot project.

Q Well now, is the British-American plan to put the 17 injection wells on almost simultaneously?

A Yes, sir.

Q So that you'll have the 17-well pilot in effect covering the whole project?

A Yes, sir, I think we would convert them and be ready within, oh, just a very few days of putting water into the 17 at one time, yes, sir.

Q And then, if experience dictates, then you could add another 15 wells?

A Yes, sir. Which certainly would be on down the line some, I don't know, two or three or four years, whatever time it takes to where we can make our study and evaluation and determine whether we need any more.

Q Do any of these wells have any perforations either above or below the point on the log that would be the equivalent of 4826 feet and 5,000 feet on the log of the Marye No. 1 well?

A What was your deepest depth that you mentioned?

Q It's the 5,000 foot point on the Marye No. 1.

A In other words, your question is, are any of the wells perforated above or below the three benches of the Gallup sand?

Q Above or below the unitized vertical limits.

A To my immediate knowledge there are none.

Q So all injection or all production would be in the unitized area or from the unitized area?

A Yes, sir.

Q Now, in the exhibits that depicted your two or three wells there that showed the casing seat and the amount of cement used, you indicated that the 5½ pipe had been cemented with some sacks. Were temperature surveys run, did you find that the temperatures were above?

A To the best of my knowledge the temperature surveys were run.

Q And in all cases the perforations are cemented off then?

A Yes.

Q Will your injection system be a closed system, Mr. Rogers?

A Yes, sir.

Q Will your water distribution system be buried?

A Yes, sir, it will have to be below the frost line.

Q Will that distribution system be plastic coated or in some manner treated that will be resistant to the corrosion of the water?

A It will be treated where it will be resistant to the corrosion, yes, sir.

Q Your Exhibit No. 11 indicates that the El Paso State No. 9 well had 7 feet of microlog separation and the CM and W well in the Northwest of the Northeast of Section 30 had 9 feet of separation. Your Exhibit No. 12 indicates that the El Paso well on the S.P. had 12.7 feet of pay and the CM and W well, 7.8 feet of pay. Exhibit 13 indicates that the Zone 2 of the El Paso well had 10.7 feet of pay while the CM and W had 4.1 feet of pay. And Exhibit 14 shows that Zone 3 of the El Paso well had 11.2 feet of pay and the CM and W well had 11.1 feet of pay. You mentioned that the El Paso well had not been included in the participating area here was the fact that it wasn't commercial. Was the CM and W well considered a commercial well?

A At the time they completed it they evidently thought it was commercial because they ran casing perforated, whether they fracked or not I'm not sure, but put pump equipment on it, that well, as another criterion to tell; production may not have been commercial, but it was completed as an oil producer and was commercial at that time.

Q How long did it produce, or is it still producing?

A It is shut in at the present time. I don't know exactly how long it produced.

Q Do you have any idea how much it's produced?

A I think it produced three to four thousand barrels, something in that magnitude. I don't know exactly.

Q The well probably never has paid out, has it?

A No, sir.

Q Well, now, it appears that from several of the criterions that you have gone by that perhaps this El Paso well is at least as good as or maybe better than the CM and W well. Do you know whether any mechanical difficulties occurred in the completion of the No. 9 El Paso well that precluded it from becoming a producer?

A I personally have not studied any of those possibilities, Mr. Nutter. I did feel like that the operator of the tract did everything in their power to make a commercial well out of it since that certainly is, I mean is their primary business. I think they were prudent in trying to make a well out of it.

Q Well now, if the well were a commercial well it would be on line and in the pattern to be included in this row of injection wells being the Hospah No. 2 and the Hospah No. 3, would it not?

A I think that's right, but let me check. If it were a commercial well it would be included and would be in line with those wells, yes, sir.

Q Do you think the injection of the water in the No. 9 would enhance the production of oil from your Marye "B" #6?

A It could possibly enhance it to a small degree, that being on the edge like that we don't think it would be of any great magnitude, if any. We do feel like that the proposed injection wells we have at the present time will effectively flush the zones in there anyhow. I think in getting over to the agreements between the operators, certainly at a later date if deemed advisable or necessary, they can expand the participating area, but the way it stands now the tracts cannot be brought into it that do not have producing wells on it with the exception of the one and a half tracts that I have previously mentioned.

Q You don't think that the fact that the dry hole was drilled on the tract up there on Skelly's Duff Lease indicates that the entire tract would be non-productive, do you?

A Meaning the east 40 of that particular tract?

Q Yes, sir.

A No, sir, we feel like that that tract will have oil in place that can be recovered again, since it's bracketed on three sides by wells that have produced.

Q How many orders are presently in effect in this area, Mr. Rogers, that have special rules for the operation and producing of the wells?

A West Bisti Unit. West Bisti Field.

Q Yes, sir, in this area.

A Two are the only rules that I know of, one being on the

barrier and then one on the Douthit "B" #5.

Q Do you propose that the rules that you have submitted here today would supercede those rules that are presently --

A Yes, sir, we do.

Q Now, your rules as proposed, don't provide for the shutting in of any high gas-oil ratio wells or transferring the allowable of any wells that are shut in for any reasons whatsoever if you superceded, those provisions would be lost, wouldn't they?

A Yes, sir.

Q I believe one or possibly both of the existing rules make that provision?

A Yes, sir, what we would propose would be to give just a straight top unit allowable, or normal unit allowable, for the Douthit "B" #5 80 acres. Consequently we would see no reason or need for the rules that you just mentioned.

Q So, in other words, you would have this top unit allowable assigned to every 80-acre tract in there whether the well was drilled or whether it was producing or shut in or regardless of its status?

A That is true.

Q You are asking for this even though you did not state that you weren't asking for any special treatment or bonus?

A We don't feel that we're asking for any special treatment or bonus.

Q You stated that you felt that one reason why the injection well should receive top unit allowable was that if they were stimulated that perhaps they could make top unit allowable prior to the time they were converted?

A Yes, sir. We don't subscribe to the theory that you should transfer only that from a well what it is capable of making, because we feel that in so many cases you might go out and stimulate your well and frack your well and do this and that and the other to the well to try to get that particular production up just to be able to get that much allowable transferred. We feel like that the project allowable should be tied to proration in the way we have proposed here and that each tract within that unit area be granted the top unit allowable.

Q Now, for instance, Mr. Rogers, your Douthit No. 2 in the Southwest Quarter of the Southwest Quarter of Section 28 is an injection well, on your ultimate injection pattern, what amount of oil is that well currently making?

A That was Douthit No. 2?

Q Yes, sir.

A In November it produced 20.1 barrels per day average.

Q You think any amount of stimulation could be given that well to make a top unit allowable well out of it today?

A I doubt that we could increase it to a top unit allowable by stimulating it.

Q But you would ask a top unit allowable for that well in the over-all project allowable?

A In the over-all project, yes, sir.

Q Mr. Rogers, you also stated in response to questions by Mr. Errebo that with the possible exception of five or six tracts in this proposed project that all of these producing wells either diagonally or directly offset injection wells. Did you mean directly or diagonally offset the injection wells as the entire 32 injection wells may be placed on injection, or the 17?

A The proposed 17.

Q I see. Mr. Rogers, would it be your interpretation of Rule 3, as you proposed it, that any well or that the project allowable could be produced from any well or wells in the project in any proportion and also your Rule 2 there where you have assigned top unit allowable to a well whether it was capable of making it or not, would the combined effect of these two wells amount to capacity production for the wells that you desire to produce at capacity?

A Not necessarily, because we don't know that we would have to produce any one well or wells at its capacity production.

Q It seems you would have ample allowable that you could produce the wells at their capacity, however?

A Would you repeat that, please?

Q It would seem that under your proposal you are going

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to have adequate allowable to enable you to produce the wells at capacity, wouldn't you imagine?

A Of course, as long as that is within the MER and would not cause any physical waste there might be cases where we might be producing them at capacity.

Q Do you have a projected MER for this project after it gets under way?

A No, sir, we do not.

Q Now, you stated that you didn't anticipate any difficulty as long as the allowable stayed at 63 barrels, but I got the impression that maybe you had some doubts if the allowable should drop to 20, 30 or 40 barrels. What difficulties would you anticipate there?

A I think most of the difficulties would be strictly mechanical more than reservoir conditions. Of course, that's one thing that we're intimating here or asking for is to have our project allowable geared to market demand, taking the possible chance that the market demand will decrease and allowables will go down.

Q What would happen if they went down to 20, 30 or 40 barrels here today?

A I would suppose we would have to shut in certain producing wells throughout the field rather than trying to slow down larger purchasing units and pumping engines below there, pump

efficiency. I think it would be more mechanical then.

MR. NUTTER: I believe that's all, thank you.

BY MR. PAYNE:

Q Do you feel, Mr. Rogers, that the barrier completely isolates the British-American project from the Sunray-Mid-Continent project?

A British-American and Sunray, as operator of the Central Bisti, we are jointly in agreement that it does. We believe it does, yes, sir.

Q So that you wouldn't necessarily have to have the same system of proration in the two units?

A I don't think we would have to because even though the fields butt up against each other, we're talking about two completely different mechanisms of secondary recovery. I don't think they have to be geared to each other at all.

Q It would seem that the method to determine the project allowable for one should probably be the same one utilized in the other, wouldn't you think, as a matter of equity?

A With the barrier in there and being effective, we don't think equities are going to be involved insofar as migration of oil across that barrier in either direction. I don't think that we subscribe or agree with the requested allowable the way it was requested in the other unit to where we could say, yes, we would like to be geared to them. We think our method is the fairest and

best method.

MR. UTZ: Do you have another witness, Mr. Errebo?

MR. ERREBO: Yes, I do. He'll be very brief.

MR. UTZ: Do you have any objection to coming back after lunch?

MR. ERREBO: No, sir.

MR. UTZ: We will adjourn to one-thirty.

AFTERNOON SESSION

MR. UTZ: The hearing will come to order, please.

CROSS EXAMINATION (Continued)
of Mr. Rogers

BY MR. UTZ:

Q Mr. Rogers, do you have a record of how many marginal wells is in this proposed unit at the present time?

A Yes, sir, I have a record of what the wells produced, daily average in November, 1959.

Q Could you count them and give us a figure of those wells that didn't produce less than 53 barrels?

A Fifty-three per 40 or per 80.

Q Well, the normal unit allowable would be 106 barrels?

A Yes, sir.

Q Give me an idea how many marginal wells you had.

A 37 wells of the 63 in the West Bisti Unit.

Q I wonder if you would point out the undedicated

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acreage in this unit. That is the acreage of the units which have no wells in the participating area.

A On Exhibit No. 7, the North Half of the Northeast Quarter of Section 35, 26 North, 13 West, has an 80-acre tract that does not have a well on it. Then, the Southeast, Southeast, Section 19, 26 North, 13 West, is a 40-acre tract within the participating area that does not have a well on it.

Q That's all?

A Yes, sir.

Q Are both your No. 2 and No. 4 water wells drilled at the present time?

A Let's see, water supply well No. 2 is drilled. It is not equipped. Water supply well 3 is drilled and equipped. Water supply well No. 4 has not been drilled.

Q Again, how much water was it that you proposed to inject initially?

A From 12 to 16 barrels of water per day.

Q You feel that the No. 2, No. 3 will furnish you that much water?

A Actually No. 2 and No. 2 will not furnish as much water as we need, that's the reason for proposing the additional water supply well.

Q Which was the gas injection well that you spoke of this morning --

A That's the Douthitt "B" #5, which is located in the

Southwest, Northeast of Section 28, 26 North, 13 West.

Q When you made an injection well out of that one, do you recall what the producing capacity was?

A I don't know what the producing capacity was. It was a top allowable well.

Q Top allowable at that time was what, around 52 barrels?

A It may have been, which would have been 104. It appears that we may have had a test on record at that time of 126 barrels per day, if I'm not misinterpreting my notes here, but it was a top unit allowable well.

Q But you really don't know how much it is capable of producing?

A Now?

Q At the time you converted it.

A No, sir, I have no record of what its capacity production would have been at that time.

Q But do you think it was capable of producing 126 barrels?

A Yes, sir, I do.

Q With reference to your Exhibit No. 24, I believe it was, 23, is it your estimate that you will recover by both secondary and primary methods 30% of the oil in place?

A Yes, sir, that particular figure is based on oil in place, Zone 1. It would be something less than 30% if you were

adding the Zone 2 and 3 into this particular calculation.

Q What percent oil would you feel that you would recover by just primary methods?

A The 6,320,000 barrels is the estimated recovery that we think we'll get with primary methods.

Q So that you have almost, you feel that you will almost double the recovery of oil by using pressure maintenance?

A Yes, sir.

Q Now, the total percentage figure of original oil in place, isn't 30% a little bit low?

A It may be a little low in relationship or comparing with all old fields, but in a field of this type right here I don't think it's too low, no, sir.

Q It's lower than what we would like to have because that's what we think the recovery would be.

Q Do you feel that there are other methods that would give you a better percentage of recovery?

A No, sir, we do not.

MR. UTZ: Are there other questions of the witness? If no other questions of the witness --

MR. ERREBO: I have further questions if the Staff doesn't have any more.

MR. UTZ: Apparently they don't.

REDIRECT EXAMINATION

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BY MR. ERREBO:

Q Mr. Rogers, are you familiar with the allowable provisions of Statewide Rule 701?

A Yes, sir.

Q Those are the rules which govern secondary recovery projects, are they not?

A Yes, sir.

Q They cover both pressure maintenance and water flood?

A Yes, sir.

Q The productive capacity of wells converted to injection are not considered in the assignment of allowables to water floods under those rules, are they?

A That is right.

Q Do you know what consideration is given to well status under the water flood rules? Actually there's no consideration given, is there?

A That is right.

Q Transfer of allowables provided for?

A Yes, sir.

Q Under the water flood rules?

A Well, each tract gets the set allocation regardless whether it's in East New Mexico or Southwest.

Q So actually there is no mechanism set up for transfer of allowables?

A No.

Q Any transfer of allowables from high gas-oil ratio wells?

A Not that I know of.

Q No consideration is given to the actual productive capacity of the well within the unit in assigning the allowable, is it?

A That's right.

Q I think in response to a question from Mr. Nutter this morning with regard to whether the assignment of allowable in this case would result in capacity allowable, actually whether or not an allowable is a capacity allowable depends on several factors, doesn't it?

A Yes, sir.

Q Could you state what those factors might be?

A At the present time, of course, capacity production will be directly related to the type pumping equipment you have in subsurface and surface.

Q Whether or not it was capacity would also depend on market demand?

A Yes.

Q What the allowable was? A Yes.

Q It would also depend, would it not, on the stage of the life the project was in at the particular time?

A Yes, sir, I think it would.

Q It would also have a particular bearing upon the coincidence of a low allowable and high production, or the converse of that?

A Yes.

Q Now, you expressed the opinion that difficulties might result from a lowering of production from 63 barrels per day, as is the case for February, to some lower figure. Those difficulties that you referred to, did they by chance refer to the changes that would be necessary in the mechanical operation of the unit?

A Yes, sir.

Q Did you intend to imply that those difficulties would be the type of difficulty that would cause underground waste, for instance?

A I don't think it would cause underground waste, no.

Q In other words, you are saying then that underground waste would not be caused by a, for instance a reduction in the production from the unit by reducing the production from the unit?

A That's right.

MR. ERREBO: That's all I have.

MR. UTZ: Are there other questions?

RECROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Rogers, do you have high gas-oil ratio wells in a

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stripper pool that initially had a solution gas drive mechanism?

A If it's a stripper pool I don't think you would have high gas-oil ratios, no, sir.

Q So you really couldn't compare a pressure maintenance project with a water flood project in the terms that we define water flood project with secondary recovery project, at least insofar as gas-oil ratios are concerned?

A I think that's probably right, I might make one other comment, if I may, of course in this particular type reservoir we don't expect high gas-oil ratios in the West Bisti Field.

MR. PAYNE: Thank you.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

MR. ERREBO: I have one further witness for brief testimony. I would like to call Mr. Taylor.

E. L. TAYLOR

called as a witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. ERREBO:

Q State your name, please. A E. L. Taylor.

Q You are the same Mr. E. L. Taylor that testified in Case 1866?

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A Yes, sir.

Q Mr. Taylor, I would like to ask you concerning what contact you have had with regard to the other operators, particularly those operators who have been most active in this project with regard to the proposals which have been made here today by the British-American Oil Producing Company.

A I have been in contact with the operators who have been most active in this operation and those are, besides ourselves, Skelly, Phillips, El Paso Natural Gas Products, Honolulu Oil Corporation and Benson-Montin-Greer Drilling Corporation. At an operators' meeting on December 1, 1959, the operators voted upon the initial plan of development and operation for the proposed West Bisti Unit and approved that plan which we have here but have not introduced into evidence because we understand it's going to be introduced as an administrative act following the hearing, but before the effective date of the unit. That plan was as it has been presented here in this case.

Q Have those other operators also been informed of the essential details of the rules which we have proposed here today?

A Yes. At the December 1 meeting in which the plan of development and operation was approved we had not yet developed the field rules section that we propose to incorporate in our application. But since that time we have developed these rules and have been in contact with the same operators. They were

apprized of the contents of these proposed field rules which have been placed in the record here and they approved those orally to me by telephone and advised me that they would substantiate that oral concurrence by communications to the Commission, which Mr. Payne, I believe, read some this morning in connection with the prior case here.

Q Will you please identify those operators that you contacted as to the rules?

A Skelly Oil Company, Phillips Petroleum Company, El Paso Natural Gas Products Company, Honolulu Oil Corporation, Benson, Montin, Greer Drilling Corporation.

MR. ERREBO: Mr. Examiner, the reservoirs which have been received I think may not be too clear as to which of these two hearings they refer to. I think the intent of all these operators that he has named has been to concur in both applications. I don't know whether they realized that there were separate applications, one for the Unit Agreement and the other as contained in this hearing, or not. I think there's one which spells out and names the prior hearing, and if counsel desires, we can leave that out, but I would like to move that the wires received be admitted in evidence and made a part of the record in this case.

MR. UTZ: They'll be admitted.

Q Did you have anything further?

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A That's all.

MR. ERREBO: That's all.

MR. UTZ: You may be excused.

"Honolulu Oil Corporation supports the application of British-American Oil Producing Company in regard to their application for unitization agreement and pressure maintenance project for the proposed Bisti Unit, San Juan County, New Mexico. F. D. Edwards, Division Manager of Development and Production, Honolulu Oil Corporation, Midland, Texas."

"Regarding number Case 1867, British-American application for approval of pressure maintenance project in the Bisti-Lower Gallup formation and corporation of field rules Benson Montin Greer Drilling Corp. concurs in this application stop we believe establishment of allowables and transfer of allowables as herein requested are in accord with the principals and benefits to be derived from unitization stop we therefore urge the Commission to approve British-American application. Benson Montin Greer Drilling Corp., Albert R. Greer."

"Regarding Case No. 1866, British-American application for approval of unit agreement covering the Bisti-Lower Gallup formation Benson Montin Greer Drilling Corp. urges that the Commission approve this application. Benson Montin Greer Drilling Corp., Albert R. Greer."

"Attention Mr. A. L. Porter: El Paso Natural Gas

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Products Co. is in agreement with the British-American Oil Company's application for the approval of West Bisti Unit Agreement. We also concur with their application for approval of their pressure maintenance project establishing field rules, and a project allowable. The El Paso Natural Gas Products Co., W. T. Hollis."

"The Commission has scheduled for hearing on January 27, the application of British-American for approval of the West Bisti-Lower Gallup sand unit. Phillips Petroleum Company is in full support of the applications of British-American and urges your approval of the formation of the unit and of the proposed program for pressure maintenance by water flood operations. We believe the unit and plan of operation is fair and equitable to all concerned and will result in substantially increasing the recovery of oil from this pool. Phillips also urges your approval of establishing a unit allowable which would be determined by multiplying the full basic allowable for an 80-acre proration unit by the total number of 80-acre proration units in the unit. L. E. Fitzjarrald, Phillips Petroleum Co."

MR. UTZ: Do you want to enter your exhibits?

MR. ERREBO: Yes, I move the admission of Exhibits 1 through 25.

MR. UTZ: Without objection they'll be admitted in the record.

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Are there any statements to be made in this case?

MR. SELINGER: If the Commission please, for the record, Skelly Oil Company owns approximately 23% in this unit. We would like to have a few comments with respect to the Applicant's proposed Rule 2 and 3 regarding a project allowable.

If the Examiner please, the statute both in 65-3-13 and 65-3-14 does not prohibit the Commission from issuing a project allowable. We further wish to point out to the Examiner that the criteria used for primary production which rightly concerns the Staff is, of course, the capacity of the well to produce at that time. You can't have well use that same criteria for secondary recovery because, and this is in answer to a question which Mr. Payne made regarding the oil in the reservoir, when you start putting water under pressure you immediately displace in the reservoir the natural criterias of primary production and you begin to move oil and gas and reservoir energy from one end of the area to the other end, from one 80-acre unit to another 80-acre unit.

Hence, you can't use a productive capacity of a particular well at that time, because after a series of secondary recovery for a period of time, a well which may ordinarily be under primary capable of only producing five barrels may very well be capable of producing 75 barrels because you have already moved and caused displacement in the reservoir.

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The best brains of the oil industry have indicated that the ideal objective of conservation is to have as early as possible secondary recovery in the development of a field. We have been handicapped in the past by the fact that regulatory bodies have insisted that the oil industry first define a field in which a unit is to be formed for the purpose of determining what is in the reservoir. Consequently, we have had to wait until fields have been actually depleted and placed in the stripper stage before we could even attempt to make secondary recovery moves.

Now, this Applicant is coming forth with a plan which is becoming quite common throughout the oil industry, particularly in other states, in that they attempt to initiate secondary recovery methods as quickly as possible, and in line with one question that you, Mr. Examiner, asked, I'll ask you here is a 40-acre tract which is a part of a standard unit, we all know that there is recoverable hydrocarbons under that tract because although there's a dry hole immediately west, there's a producing well to the northwest, and to the southwest of this 40-acres. It has 10 to 12 feet of reservoir there under that 40-acre tract. How is the industry going to benefit by the reserves, the recoverable reserves under that particular tract?

Likewise on the 80-acre are you going to require the oil industry to needlessly spend money to drill up the entire productive limits of a unit knowing beforehand that they're going to

recover, as in this case, 6,000,000 barrels from primary to a total of 13,000,000 plus for both primary and secondary? I think this Commission should encourage the earliest possible moment in the development of a field in secondary recovery because it means additional oil, and as an illustration of how the criteria of primary cannot work under the criteria of secondary recovery here, we are recovering additional 7,000,000 barrels of oil. That doesn't necessarily come from only the tracts which have a producing well on it, it comes from any tract that has any portion of productiveness in that reservoir that contributes to a part of the 7,000,000 additional barrels.

Other states have been quick to utilize this method of encouraging the oil industry for early secondary recovery. In Oklahoma it's becoming quite fashionable, I might say, to permit early utilization of a field, and in that regard I might point out the largest unit in Oklahoma which results in additional 313,000,000 barrels of oil as a result of gas secondary recovery pressure maintenance, the common rule there is to take the total number of proration units, which happen to be ten acres there, and multiply it by the top allowable and commensurate with the amount of productive acreage, which is, after all, what the Applicant is asking for now.

He is asking for credit for the 1500 plus productive acreage that lies in the unit. He's not asking for a per well. He's

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asking for all of that productive acreage in the unit as determined by these schedules and the exhibits to be given credit for secondary recovery on pressure maintenance, and we think that even Kansas, for example, on the water floods is beginning to turn to per acre rather than a per well or each unit having a producing well on it. We think that the Commission should firmly consider the encouragement of the oil business in the light that the Applicant here proposes.

MR. UTZ: Are there other statements?

MR. PAYNE: Mr. Selinger, do I understand a portion of your statement correctly, do you feel that any of the oil that will be produced from the participating area is being flushed from any areas outside the participating area?

MR. SELINGER: I think when you start and you look at the unitization agreement, all the interested parties have fixed the amount of recoverable reserves under each of their respective tracts. It is designated there as to the amount of recoverable reserves under each tract, and that is considering both the primary and secondary, so that the parties themselves, both royalty owners and working interest, have already designated what their participation is. I think the Commission can do no less than honor the agreement that all the parties, after complete study, has indicated what the recoverable reserves are under each of the respective tracts.

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MR. PAYNE: You are not saying there's a hundred percent signed up in this unit, are you?

MR. SELINGER: No, but what I am saying is that everything within the productive limits of the unit contributes to the secondary recovery the additional 7,000,000 barrels of oil considering the fact there's a time element which is determined by your productive limits of your producing area as it may be enlarged from time to time. But everything in the unit outlined contributes to that additional 7,000,000 barrels of oil.

MR. PAYNE: If it is all contributing, why isn't it all participating?

MR. SELINGER: Because it is commensurate with the time element, the participating area is the factor which weighs equally to offset the time element. Incidentally, I might add in that regard, whether a purely pressure maintenance project which we have, for example in this unit I have referred to in Oklahoma, 275 wells drilled and about 50 of them are high gas-oil ratio, the operator immediately shut in the high gas-oil ratio wells. There were 40 or 50 different wells and the unit of the 276 wells now produce on the basis of only 140 wells. They got a project allowable and they produce the entire project allowable from the 140 wells, which points out the fact that the difference between the 140 and 276 wells were unnecessary wells to recover the recoverable reserves there, but they had to do it because they had

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
Phone CHapel 3-6691

84
to determine the outline, the perimeter of the producing unit, they had to do it under the best tools we had in the last ten or fifteen years. But we no longer have to be saddled with those things and I think the Commissions of the various states should go along in the additional development of the production of oil and gas. It's a progress movement. I think the states should join along with the industry.

MR. NUTTER: May I ask you one question?

MR. SELINGER: Yes, sir.

MR. NUTTER: If Skelly, after drilling the dry hole in the section, had gone into the Southeast of Southeast and drilled a producing well, would they have asked for and expected to have received a full allowable for that well that they would have drilled, the second well?

MR. SELINGER: Under primary development, no. Under secondary recovery development, if we have the sand there we feel pretty sure that the injection of water would have been, driven oil in that dry 40 acres from somewhere in the field.

MR. NUTTER: You wouldn't have asked for full allowable?

MR. SELINGER: Not under primary, we couldn't.

MR. UTZ: Maybe you ought to unplug the well.

MR. SELINGER: That isn't too farfetched. In these units where you have dry holes drilled in the injection program ~~there are many instances where the operators have gone back~~

into the well bores and made producable wells out of it. Yes, sir,
we have done that ourselves in Texas at the edge of units.

MR. PAYNE: That may be done with El Paso State No. 9?

MR. SELINGER: Yes, sir.

MR. UTZ: Any other statements? If no further state-
ments the case will be taken under advisement.

STATE OF NEW MEXICO)
 : SS
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the
foregoing and attached transcript of proceedings before the New
Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a
true and correct record to the best of my knowledge, skill and
ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal
this 15th day of February, 1960.

Ada Dearnley
Notary Public-Court Reporter

My commission expires:
June 19, 1963.

I do hereby certify that the foregoing is
a complete record of the proceedings in
the hearing of Case No. 1762
heard by me on January 7, 1960.
[Signature], Examiner
New Mexico Oil Conservation Commission

DOCKET: EXAMINER HEARING JANUARY 27, 1960OIL CONSERVATION COMMISSION - 9 a.m., MADRY HALL, STATE CAPITOL, SANTA FE

The following cases will be heard before Elvis A. Utz, Examiner, or A. L. Porter, Jr., Secretary-Director:

CASE 1866: Application of British-American Oil Producing Company for approval of a unit agreement. Applicant, in the above-styled cause, seeks an order approving its West Bisti-Lower Gallup Sand Unit Agreement, which Unit is to comprise 14,331 acres, more or less, in Townships 25 and 26 North, Ranges 13 and 14 West, San Juan County, New Mexico.

CASE 1867: Application of British-American Oil Producing Company for a pressure maintenance project in the Bisti-Lower Gallup Oil Pool and promulgation of special rules in connection therewith. Applicant, in the above-styled cause, seeks an order authorizing a pressure maintenance project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Lower Gallup formation through 17 wells. Applicant further proposes that special rules be adopted governing said project including the transfer of allowables from injection and shut-in wells to producing wells in the project and for establishment of an administrative procedure to convert additional wells to injection.

CASE 1868: Application of Hamilton Dome Oil Company, Ltd. for permission to commingle the production from three separate pools. Applicant, in the above-styled cause, seeks an order authorizing it to commingle the production from the Justis-Drinkard Pool, the Justis-Fusselman Pool and an undesignated Tubb pool from wells on a lease consisting of the S/2 SE/4 of Section 25, Township 25 South, Range 37 East, Lea County, New Mexico.

CASE 1869: Application of Newmont Oil Company for approval to convert five additional wells in the Loco Hills Pool to water injection. Applicant, in the above-styled cause, seeks an order authorizing it to convert to water injection five additional wells in its water flood project in the Loco Hills Pool, Eddy County, New Mexico. Said wells are the Brigham Well No. 1-A, Yates Well No. 4, Yates A Well No. 10, Yates A Well No. 12, and Coppedge Well No. 2, located respectively in the SE/4 SE/4 of Section 31, Township 17 South, Range 30 East, NE/4 SW/4 of Section 6, SW/4 SW/4 of Section 6, NE/4 NE/4 of Section 6, and NW/4 NW/4 of Section 5, all in Township 18 South, Range 30 East.

CASE 1870:

Application of Newmont Oil Company for permission to install four separate automatic custody transfer systems. Applicant, in the above-styled cause, seeks an order authorizing it to install a separate automatic custody transfer system on each of four leases in applicant's water flood project in the Loco Hills Pool, Eddy County, New Mexico.

CASE 1871:

Application of Union Oil Company of California for approval of a unit agreement. Applicant, in the above-styled cause, seeks an order approving its North Anderson Ranch Unit Agreement, which Unit is to comprise 360 acres, more or less, consisting of portions of Sections 32 and 33, Township 15 South, Range 32 East, Lea County, New Mexico.

CASE 1872:

Application of Gulf Oil Corporation for authority to commingle the production from four separate leases and for approval of an automatic custody transfer system to handle said commingled production. Applicant, in the above-styled cause, seeks permission to commingle the production from the following four separate leases and to install an automatic custody transfer system to handle the Pearl-Queen Pool production from all wells located thereon:

Lea-State "AP" lease, E/2 of Section 30;
Lea-State "AQ" lease, N/2 of Section 32;
Lea-State "BG" lease, N/2 of Section 33;
Lea-State "IH" lease, W/2 SW/4 and W/2 SE/4
of Section 29,

all in Township 19 South, Range 35 East, Lea County, New Mexico.

CASE 1873:

Application of The Atlantic Refining Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Langlie Federal "A" Well No. 1, located in Unit H, Section 14, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Justis-Blinbry Pool and the production of oil from an undesignated Tubb pool through parallel strings of tubing.

CASE 1874:

Application of Val R. Reese & Associates, Inc., for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Lybrook Well No. 1-19, located in Unit C, Section 19, Township 24 North, Range 6 West, Rio Arriba County, New Mexico, in such a manner

as to permit the production of gas from an undesignated Gallup pool and the production of gas from an undesignated Dakota pool through parallel strings of tubing.

CASE 1875:

Application of Continental Oil Company for a non-standard gas proration unit and for an order force-pooling the interests therein. Applicant, in the above-styled cause, seeks the establishment of a 160-acre non-standard gas proration unit in the Blinebry Gas Pool consisting of lots 6, 10, 11, and 12 of Section 3, Township 21 South, Range 37 East, Lea County, New Mexico, to be dedicated to Shell Oil Company's Taylor-Glenn Well No. 1, located 3226 feet from the North line and 1980 feet from the West line of said Section 3. Applicant further seeks an order force-pooling the interests of those in said non-standard gas proration unit who have gas rights within the vertical limits of the Blinebry Gas Pool, including M. F. Taylor, P. O. Box 574, Amarillo, Texas, and R. B. Glenn, P. O. Box 461, Amarillo, Texas.

CASE 1876:

Application of Continental Oil Company for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks an order authorizing it to commingle the production from the Weir (Drinkard) Oil Pool and Weir-Tubb Gas Pool from all wells on its Britt B-15 lease consisting of the W/2 and the W/2 E/2 of Section 15, Township 20 South, Range 37 East, Lea County, New Mexico.

CASE 1877:

Application of Continental Oil Company for permission to install an automatic custody transfer system and for permission to produce more than 16 wells in a common tank battery. Applicant, in the above-styled cause, seeks an order authorizing it to install an automatic custody transfer system to handle the production from all Skaggs Pool oil wells on its Southeast Monument Unit comprising lands located in Township 20 South, Ranges 37 and 38 East, Lea County, New Mexico.

CASE 1878:

Application of Continental Oil Company for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks an order authorizing it to commingle the production from the Weir (Drinkard) Oil Pool and the Weir-Tubb Gas Pool from all wells on that portion of the Southeast Monument Unit consisting of the W/2 W/2 of Section 14 and the E/2 E/2 of Section 15, Township 20 South, Range 37 East, Lea County, New Mexico.

CASE 1879:

Application of Amerada Petroleum Corporation for a gas-oil dual completion and for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its State EM "A" Well No. 2, located 660 feet from the South and West lines of Section 22, Township 19 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of gas from the Eumont Gas Pool and the production of oil from the Eumont Gas Pool through the casing-tubing annulus and the tubing respectively. Applicant further seeks the establishment of a 160-acre non-standard gas proration unit in the Eumont Gas Pool consisting of the SW/4 of said Section 22 to be dedicated to the said State EM "A" Well No. 2.

CASE 1880:

Application of Texaco Inc. for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks permission to commingle the production from the Blinebry Oil Pool and the Drinkard Pool from all wells on its V. M. Henderson lease consisting of the N/2 of Section 30, Township 21 South, Range 37 East, Lea County, New Mexico.

CASE 1881:

Application of Texaco Inc. for approval of an automatic custody transfer system. Applicant, in the above-styled cause, seeks an order authorizing the installation of automatic custody transfer facilities to handle the Crossroads-Devonian Pool production from the U. D. Sawyer lease comprising the E/2 of Section 34, Township 9 South, Range 36 East, Lea County, New Mexico.

CASE 1882:

Application of Texaco Inc. for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks permission to commingle the production from the Tubb Pool and the Blinebry Oil Pool from all wells located on its Mittie Weatherly lease comprising the NW/4 of Section 17, Township 21 South, Range 37 East, Lea County, New Mexico.

CASE 1883:

Application of Texaco Inc. for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks permission to commingle the production from the Culwin (Queen) Pool and the Culwin-Yates Pool from all wells located on its Federal Lease comprising the NE/4, E/2 NW/4, N/2 SE/4 and the NE/4 SW/4 of Section 6, Township 19 South, Range 31 East, Eddy County, New Mexico.

CASE 1842:

(Continued)

Application of Skelly Oil Company for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks permission to commingle the production from the Langlie-Mattix Pool and the Drinkard Pool from all wells on its Baker "A" lease comprising the NW/4 of Section 26, Township 22 South, Range 37 East, Lea County, New Mexico.

CASE 1884:

Application of Skelly Oil Company for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks permission to commingle the production from the Langlie-Mattix Pool and the Drinkard Pool from all wells on that portion of the J. V. Baker lease comprising the SE/4 SW/4 of Section 22, Township 22 South, Range 37 East, Lea County, New Mexico.

CASE 1885:

Application of Skelly Oil Company for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks permission to commingle the production from the Drinkard Pool and the Tubb Gas Pool from all wells on its State "K" lease comprising the N/2 NW/4 of Section 32, Township 21 South, Range 37 East, Lea County, New Mexico.

CASE 1886:

Application of E. P. Campbell for an exception to Rule 107 (e) of the Commission Rules and Regulations. Applicant, in the above-styled cause, seeks an exception to Rule 107 (e) in order to recomplete his No. 1 Cleveland Well, located in NW/4 NE/4 of Section 33, Township 18 South, Range 26 East, Eddy County, New Mexico, as a "slim-hole" completion in the Pennsylvanian formation at a depth greater than 5000 feet.

CASE 1887:

Application of Monsanto Chemical Company for an exception to the "no-flare" provision of Order R-1427. Applicant, in the above-styled cause, seeks an exception to February 15, 1960, to the "no-flare" provision of Order R-1427 for five wells in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

CASE 1888:

Application of C. W. Trainer for off-lease storage of oil production. Applicant, in the above-styled cause, seeks permission to store the Pearl-Queen Oil Pool production from his Rushing lease, consisting of the W/2 NE/4 of Section 22, Township 19 South, Range 35 East, Lea County, New Mexico, in a tank battery located on his Signal State lease, consisting of the E/2 NW/4 of said Section 22.

ig/

THE BRITISH-AMERICAN OIL PRODUCING COMPANY

DENVER CLUB BUILDING

DENVER 1, COLORADO

PRODUCTION & ENGINEERING DEPT.

March 5, 1960

ADDRESS ALL CORRESPONDENCE TO
POST OFFICE BOX 180

New Mexico Oil And Gas Conservation Commission
State Capital Building
Santa Fe, New Mexico

Attn: Mr. Elvis Uts

Gentlemen:

Re: Requested Data
British-American's Proposed W. Bisti Unit

In compliance with your request, we are sending you the following information:

1. The bottom hole pressure subsea datum in the lower Gallup Sand is +1300 feet. BHP surveys are normally run once per year.
2. The average bottom hole temperature of the lower Gallup Sand is 145° F.
3. We have no record of any laboratory or calculated Z factor.

If there is any other information you desire, please let us know.

Very truly yours,

THE BRITISH-AMERICAN OIL PRODUCING COMPANY

Thomas M. Hogan
Thomas M. Hogan
District Superintendent

EWR:bk
cc: E. L. Taylor

DOMESTIC SERVICE	
Check the class of service desired; otherwise this message will be sent as a fast telegram	
TELEGRAM	
DAY LETTER	
NIGHT LETTER	

WESTERN UNION

TELEGRAM

1213 (7-58)

W. P. MARSHALL, PRESIDENT

INTERNATIONAL SERVICE	
Check the class of service desired; otherwise the message will be sent at the full rate	
FULL RATE	
LETTER TELEGRAM	
SHORE-SHIP	

NO. WDS.-CL. OF SVC.	PD. OR COLL.	CASH NO.	CHARGE TO THE ACCOUNT OF	TIME FILED
			BENSON-MONTIN-GREER DRILLING CORP.	

Send the following message, subject to the terms on back hereof, which are hereby agreed to

To **A. L. PORTER JR.**

1 - 26 - 19 60

Street and No. **NEW MEXICO OIL CONSERVATION COMMISSION**

Care of or

Apt. No.

Destination

SANTA FE, NEW MEXICO

REGARDING CASE NO. 1866 BRITISH-AMERICAN'S APPLICATION FOR APPROVAL
OF UNIT AGREEMENT COVERING THE BISTI LOWER GALLUP FORMATION,
BENSON-MONTIN-GREER DRILLING CORP. URGES THAT THE COMMISSION APPROVE
THIS APPLICATION.

BENSON-MONTIN-GREER DRILLING CORP.
ALBERT R. GREER

Longfellow

Senders's name and address (For reference)

Sender's telephone number

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

1201

SYMBOLS	
DL	Day Letter
NL	Night Letter
LT	International Letter Telegram

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

LA085 SSJ313

1960 JAN 26 AM 11:45

L FRA039 PD=FARMINGTON NMEX 26 1130AMM=

A L PORTER JR=

NEW MEXICO OIL CONSERVATION CO SANIA FE NMEX=

REGARDING NUMBER CASE 1867 BRITISH AMERICAN APPLICATION
FOR APPROVAL OF PRESSURE MAINTAINENCE PROJECT IN THE
BISTI LOWER GALLUP FORMATION AND CORPORATION OF FIELD
RULES BENSTON MONTIN GREER DRILLING CORP CONCURS IN
THIS APPLICATION STOP WE BELIEVE ESTABLISHMENT OF
ALLOWABLES AND TRANSFER OF ALLOWABLES AS HERE IN
REQUESTED ARE IN ACCORD WITH THE PRINCIPALS AND BENEFITS
TO BE DERIVED FROM UTILIZATION STOP WE THERE FORE URGE
THE COMMISSION TO APPROVE BRITISH AMERICAN APPLICATION

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION TELEGRAM

W. P. MARSHALL, PRESIDENT

1201

SYMBOLS

DL = Day Letter
NL = Night Letter
LT = International Letter Telegram

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

IN THIS CASE=

BENSON MONTIN GREER DRILLING CORP ALBERT R GREER=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

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WESTERN UNION TELEGRAM

W. P. MARSHALL, PRESIDENT

1201

SYMBOLS

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LT = International Letter Telegram

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LA086 SSD136

MAIN OFFICE 00

L FRA041 PD=FARMINGTON NMEX 26 1960 JAN 26 1130AMM=

A L PORTER JR=

NEW MEXICO OIL CONSERVATION COMM SANTA FE NMEX=

REGARDING CASE NUMBER 1866 BRITISH AMERICAN APPLICATION
FOR APPROVAL OF UNIT AGREEMENT COVERING THE BITT LOWER
GALLUP FORMATION BENSON MONTIN GREER DRILLING CORP
URGES THAT THE COMMISSION APPROVE THIS APPLICATION=

BENSON MONTIN GREER DRILLING CORP ALBERT R GREER=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

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WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

SYMBOLS

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1201

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LA200 KA519

K CYA183 NL PD=CHEYENNE WYO 25=

1960 JAN 25 PM 10

THE NEW MEXICO OIL CONSERVATION COMMISSION=

SANTA FE NMEX=

ATTENTION MR. A. L. PORTER: EL PASO NATURAL GAS PRODUCTS CO. IS IN AGREEMENT WITH THE BRITISH-AMERICAN OIL COMPANY'S APPLICATION FOR THE APPROVAL OF WEST DISTI UNIT AGREEMENT. WE ALSO CONCUR WITH THEIR APPLICATION FOR APPROVAL OF THEIR PRESSURE MAINTENANCE PROJECT ESTABLISHING FIELD RULES, AND A PROJECT ALLOWABLE=

THE EL PASO NATURAL GAS PRODUCTS CO W I
HOLLIS

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

SYMBOLS

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NL = Night Letter

LT = International Letter Telegram

1201

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

LA 52

K BRA058 PD=WUX BARTLESVILLE OKLA 26 1103 AMC=

NEW MEXICO OIL CONSERVATION COMMISSION=

SANTA FE NMEX=

THE COMMISSION HAS SCHEDULED FOR HEARING ON JANUARY 27, THE APPLICATION OF BRITISH-AMERICAN FOR APPROVAL OF THE WEST DISTI LOWER GALLOP SAND UNIT. PHILLIPS PETROLEUM COMPANY IS IN FULL SUPPORT OF THE APPLICATIONS OF BRITISH-AMERICAN AND URGES YOUR APPROVAL OF THE FORMATION OF THE UNIT AND OF THE PROPOSED PROGRAM FOR PRESSURE MAINTENANCE BY WATERFLOOD OPERATIONS. WE BELIEVE THE UNIT AND PLAN OF OPERATION IS FAIR AND EQUITABLE TO ALL

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

SYMBOLS

DL=Day Letter

NL=Night Letter

LT=International Letter Telegram

1201

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

CONCERNED AND WILL RESULT IN SUBSTANTIALLY INCREASING THE RECOVERY OF OIL FROM THIS POOL. PHILLIPS ALSO URGES YOUR APPROVAL OF ESTABLISHING A UNIT ALLOWABLE WHICH WOULD BE DETERMINED BY MULTIPLYING THE FULL BASIC ALLOWABLE FOR AN 80-ACRE PRORATION UNIT BY THE TOTAL NUMBER OF 80-ACRE PRORATION UNITS IN THE UNIT=

L E FITZJARRALD PHILLIPS PETROLEUM CO...

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

SYMBOLS

DL=Day Letter

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LT=International Letter Telegram

1201

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

LA159 DB350

1960 JAN 27 AM 8:44

D MDA208 NL PD=MIDLAND TEX 26:

=SECRETARY, NEW MEXICO OIL CONSERVATION COMMISSION=
SANIA FE NMEX=

HONOLULU OIL CORPORATION SUPPORTS THE APPLICATION OF
BRITISH AMERICAN OIL PRODUCING COMPANY IN REGARD TO
THEIR APPLICATION FOR UTILIZATION AGREEMENT AND PRESSURE
MAINTENANCE PROJECT FOR THE PROPOSED BISTIT UNIT,
SAN JUAN COUNTY, NEW MEXICO=

F C EDWARDS DIVISION MANAGER OF DEVELOPMENT
AND PRODUCTION HONOLULU OIL CORP MIDLAND TEXAS.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

OIL AND GAS PRODUCTION AND DISPOSITION

SUNRAY MID-CONTINENT LEASES SE BISTI AND GALLEGOS-GALLUP OIL POOLS

SAN JUAN COUNTY, NEW MEXICO

use for
well 710-1111

<u>Lease</u>	<u>Well No.</u>	<u>Oil Prod. Bbls/day November</u>	<u>Gas Prod. MCF/day November</u>	<u>Lease Use CF/day</u>	<u>Gas * Sales MCF/day</u>	<u>Gas * Flared MCF/day</u>
Bittoney-Nez 23-25-11	1	69	99	0	99	0
Es-Kee-Ba-Ey 25-25-11	1	98	39	0		2.8
	2	49	72	0	83	
Es-Ka-Nel-E-Wood 22-25-11	1	112	214	224	106.8	107
	2	S.I.	S.I.	-		
H. Platero 15-25-11	1	56	224	0	47 ** 177	0
Ka-Des-Pah 25-25-11	1	112	27			
	2	112	120	0	108	39
Ki-Yah-De-Tah 24-25-11	1	2	5	200	4.8	0
Mar-Ga-Le-Tah 23-25-11	1	75	114	0		
	2	37	83	0	197	0
N. Eaton 30-25-10	1	57	23	180		
	2	100	141	206	81.6	82
Federal J 35-27-13	1	3	44	300	0	43.7
TOTALS		882	1,205	1,100	904.2	299.7

* Estimates based on January 12, 1960 takes by El Paso.

** Sale for pipeline pump use.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

GAS

R 14 W

R 13 W R 12 W

9.0

THE BRITISH-AMERICAN OIL PRODUCING COMPANY
BISTI-GALLUP FIELD
SAN JUAN COUNTY, NEW MEXICO
ISOPACH - (MICROLOG SEPARATION)
LOWER GALLUP ZONE 1
SCALE - 1" = 2000'
WICKBULT ENGINEERING CORP.
25 SUMMIT AVE., NEW YORK 17, N.Y.
DRAWN BY: S. A.

7.0

EX. #11

R 14 W

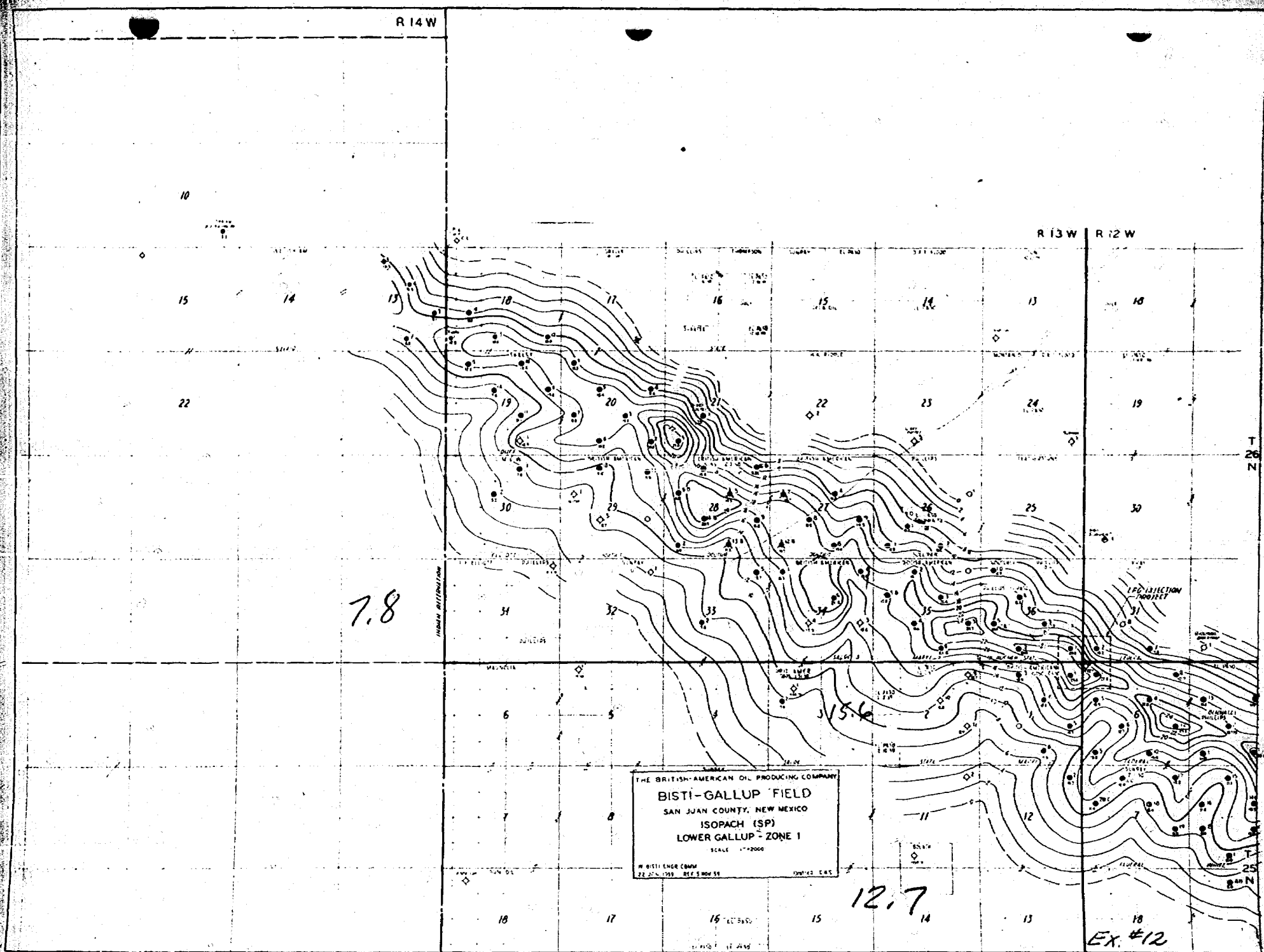
R 13 W R 12 W

7.8

12.7

EX. #12

THE BRITISH-AMERICAN OIL PRODUCING COMPANY
BISTI-GALLUP FIELD
SAN JUAN COUNTY, NEW MEXICO
ISOPACH (SP)
LOWER GALLUP - ZONE I
SCALE 1"=2000
W. BISTI-ENGR CORP.
22 JUN 1959 REF 5 NOV 58
DRAFT C.S.



R 14 W

R 13 W R 12 W

T 26 N

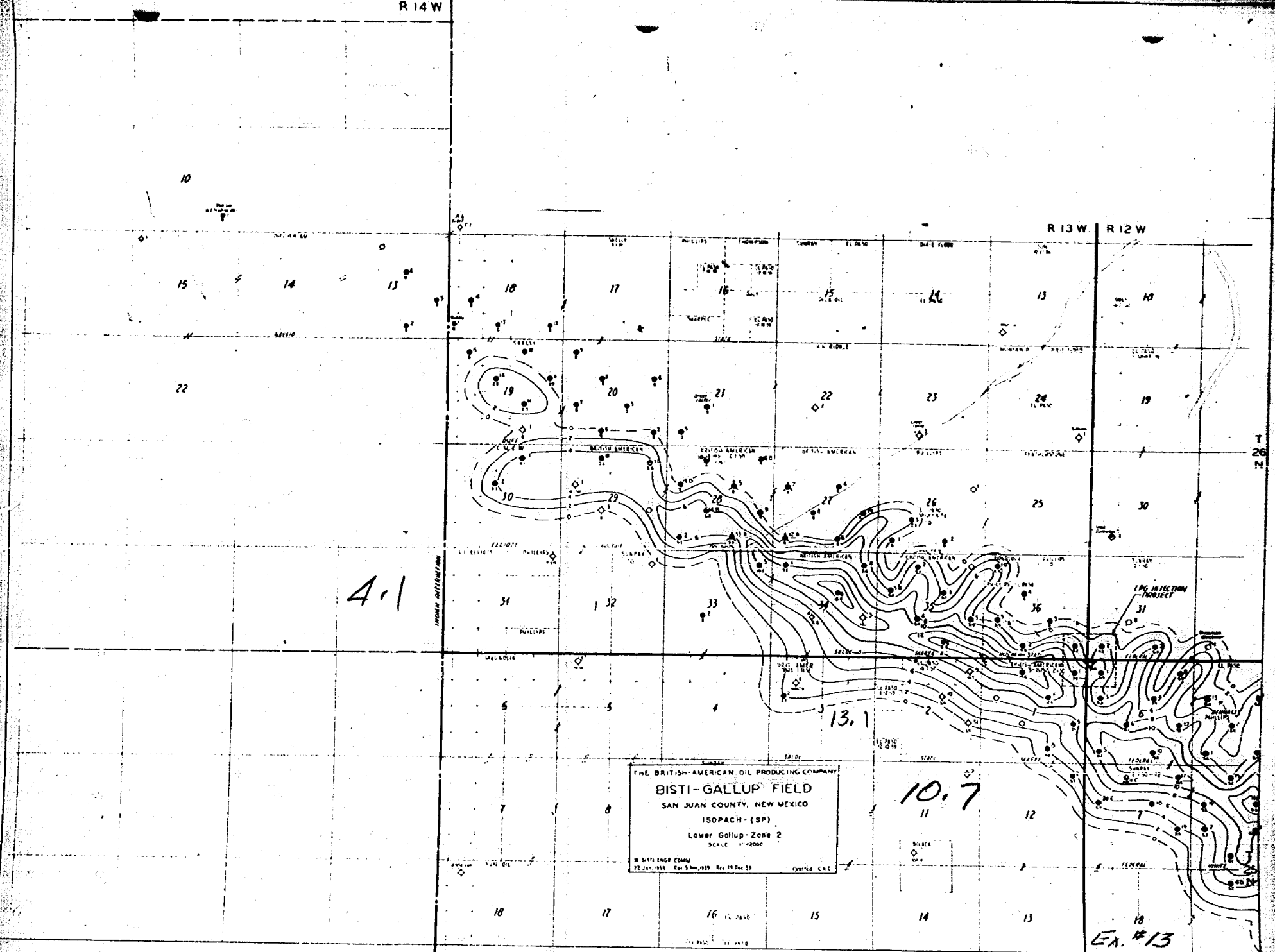
4.1

13.1

10.7

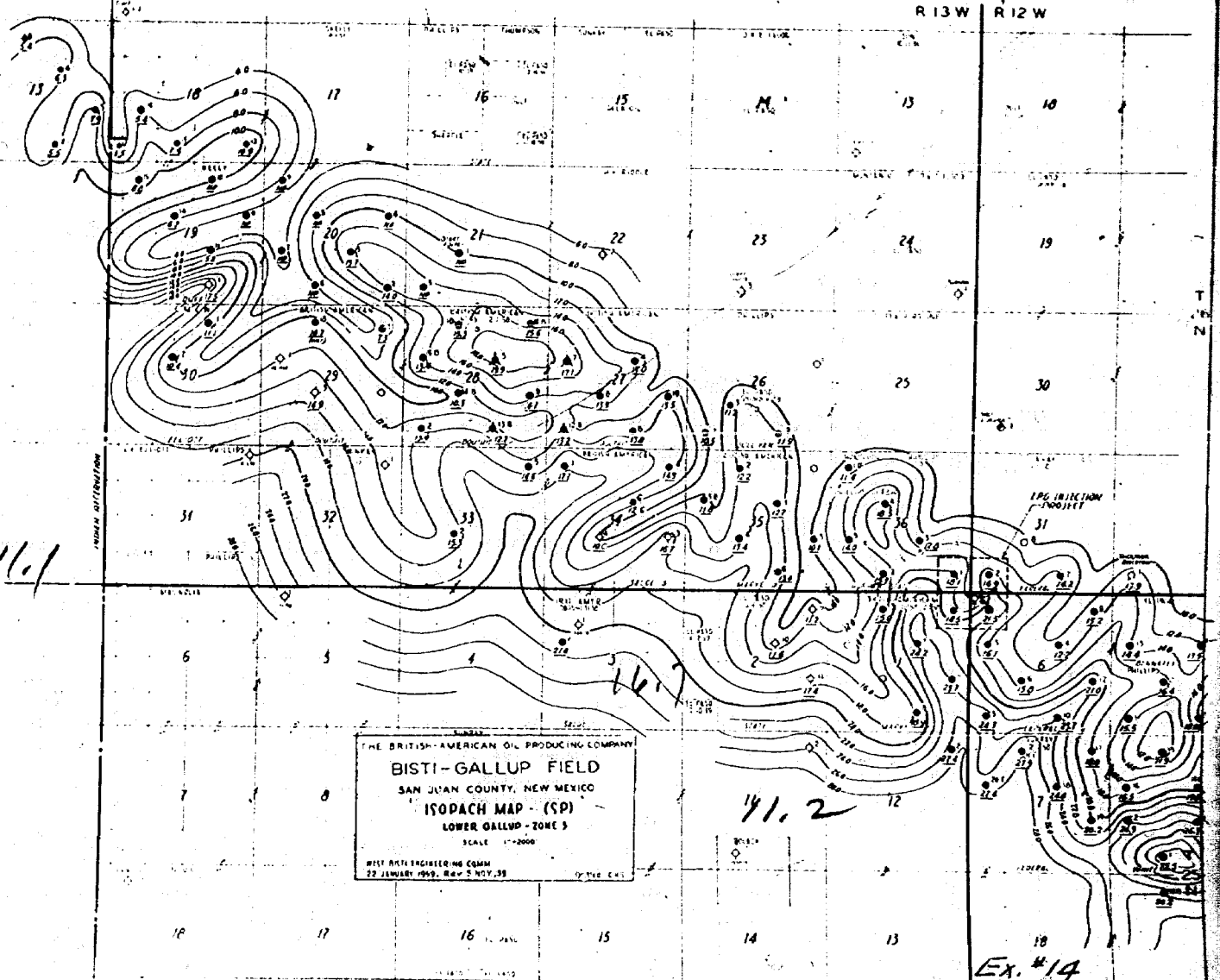
EX. #13

THE BRITISH-AMERICAN OIL PRODUCING COMPANY
BISTI-GALLUP FIELD
 SAN JUAN COUNTY, NEW MEXICO
 ISOPACH - (SP)
 Lower Gallup-Zone 2
 SCALE 1"=2000'



R 14 W

R 13 W R 12 W

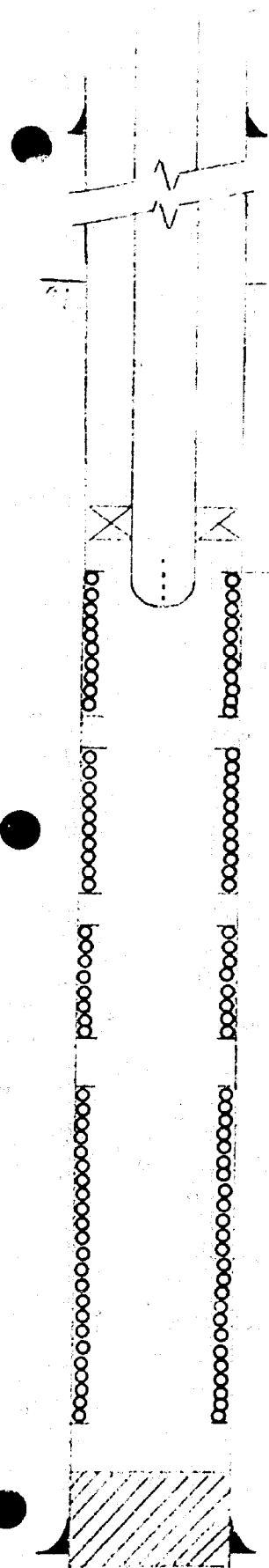


THE BRITISH-AMERICAN OIL PRODUCING COMPANY
BISTI-GALLUP FIELD
 SAN JUAN COUNTY, NEW MEXICO
ISOPACH MAP - (SP)
 LOWER GALLUP - ZONE 5
 SCALE 1"=2000'
 WEST ARIZ ENGINEERING CO. INC.
 22 JANUARY 1959, REV. 5 NOV. 58

BRITISH-AMERICAN
MARYE N°2
 T. 6256' 6L
 NE NE S20. 12-25N-13W
 SAN JUAN CO., N.M.



GCR 3-1-59 TEST
 22-B0 C-BW 1718/1



9 1/4" Csg @ 230' KB
 cont to surface

TOC @ 4375'

T. GALLUP SD. @ 4855'

Perf. 4856'-4876'
 5 1/2" IA-L ZONE #1.
 FRAC'D w/30,000# & 50,000 GAL.
 12-5-58

Perf. 4880'-4895'

Perf. 4902'-4916'
 FRAC'D w/30,000# & 30,000 GAL.
 5-15-56

Perf. 4922'-4964'
 4.80 g/lt. 4.30-56.
 FRAC'D. w/20,000# & 20,000 GAL.

PBD. @ 4970'

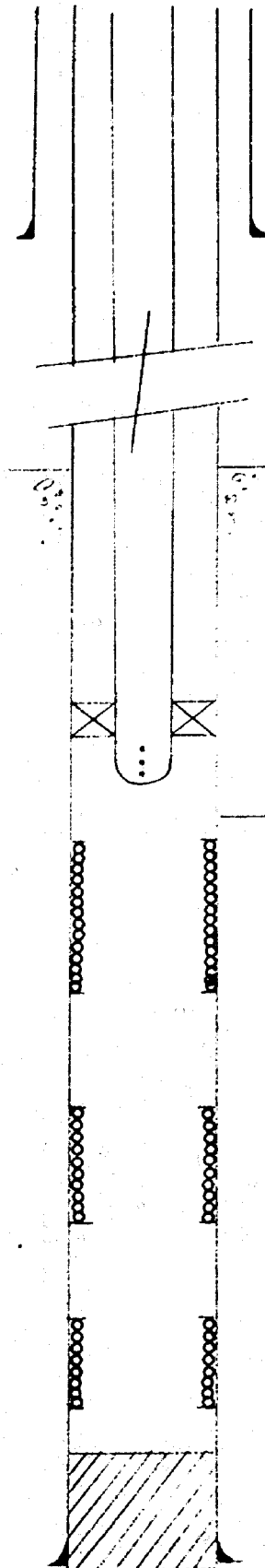
5 1/2" Csg, 800' 15.5#, 4183' 14# 1.55 W/100 SK.
 T.D. @ 4982'

Ex. #15

BRITISH-AMERICAN
SALGE N°B-5
 EL. 6288' GL
 NE NE SEC. 33-26N-13W
 SAN JUAN CO, N.M.



GOR 3-5-59.
 880. GBW, 819/1



9 1/8" CSB. @ 214' KB
 W/ 200 SXX.

TOC @ 4200'

T. GALLUP SAND @ 4900'

PERF. 4994-5016'
 FRAC'D W/ 30,000 # 8
 30,000 GAL. 10-20-58.

PERF. 5028-5040'.

PERF. 5054-5068'

PED @ 5100'

5 1/2" CSB, 14" J-55 @ 5132' W/ 100 SX, 3% GEL.
 TD @ 5133'

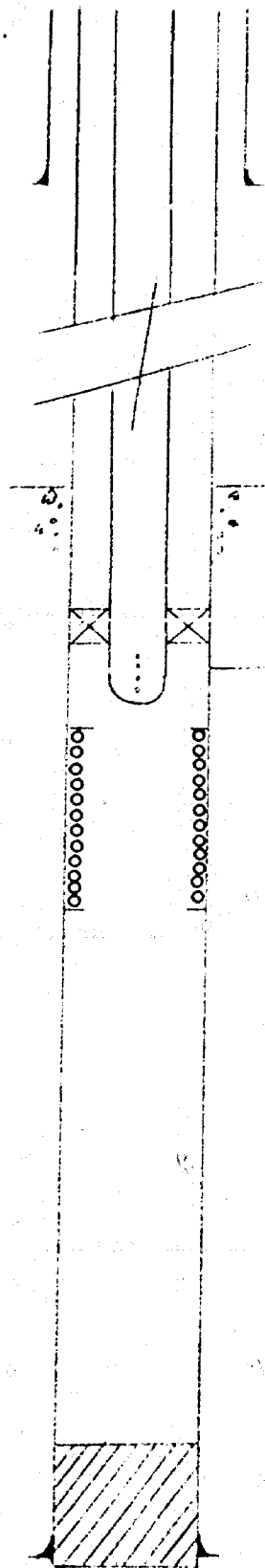
FRAC'D W/ 30,000 # 8
 30,000 GAL. FIVE
 STAGES W/ 32 NYLON
 BALLS INJ. AFTER
 EACH STAGE

Ex. #16

BRITISH AMERICAN
 NAVAJO No 3
 EL. 6420' KB
 NE SE SEC. 13- 2GN-14W
 SAN JUAN CO., N.M.



GOR 3-7-59 TEST
 57 BO, G.P.W. 196/1



9 5/8" CSG @ 212' KB
 W/175 SAX.

T.O.C. @ 4650'

T. GALLUP SAND @ 5230'

PERF 5238'-5250'
 FRAC'D W/30,000 # & 20,000 GAL. 1-10-59

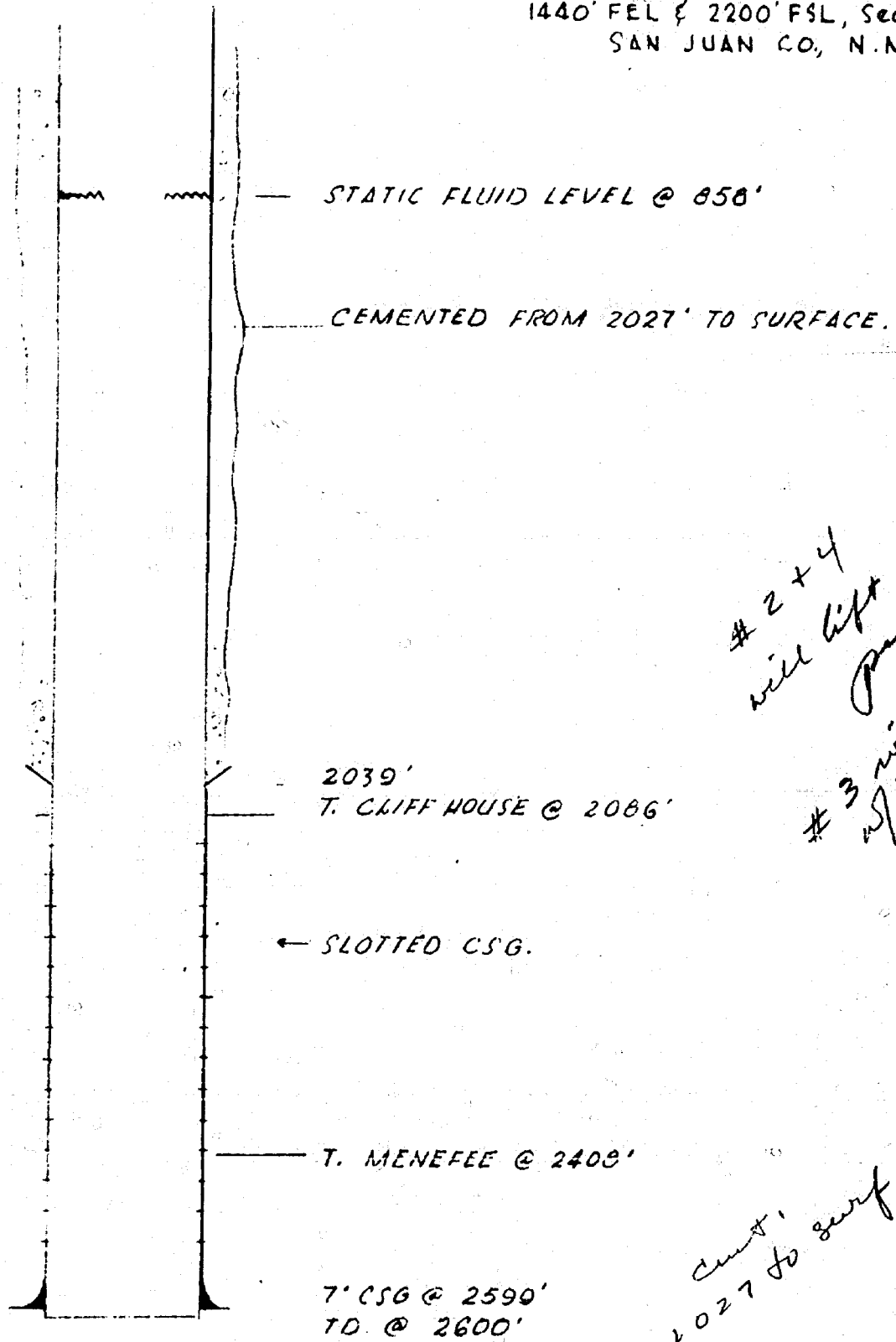
PBD. @ 5312'

5 1/2" CSG, 14 # J. 55 @ 5363' w/100 SX. 50-50 POZMIX "S"
 TD. 5365' KB

Ex. #17

BRITISH-AMERICAN
DOUTHIT WATER SUPPLY WELL
NO. 2

1440' FEL & 2200' FSL, Sec. 28-26N-15W
SAN JUAN CO., N.M.



2 + 4
will lift w/ Pella
pumps.
3 will be lifted
w/ Fairbanks more

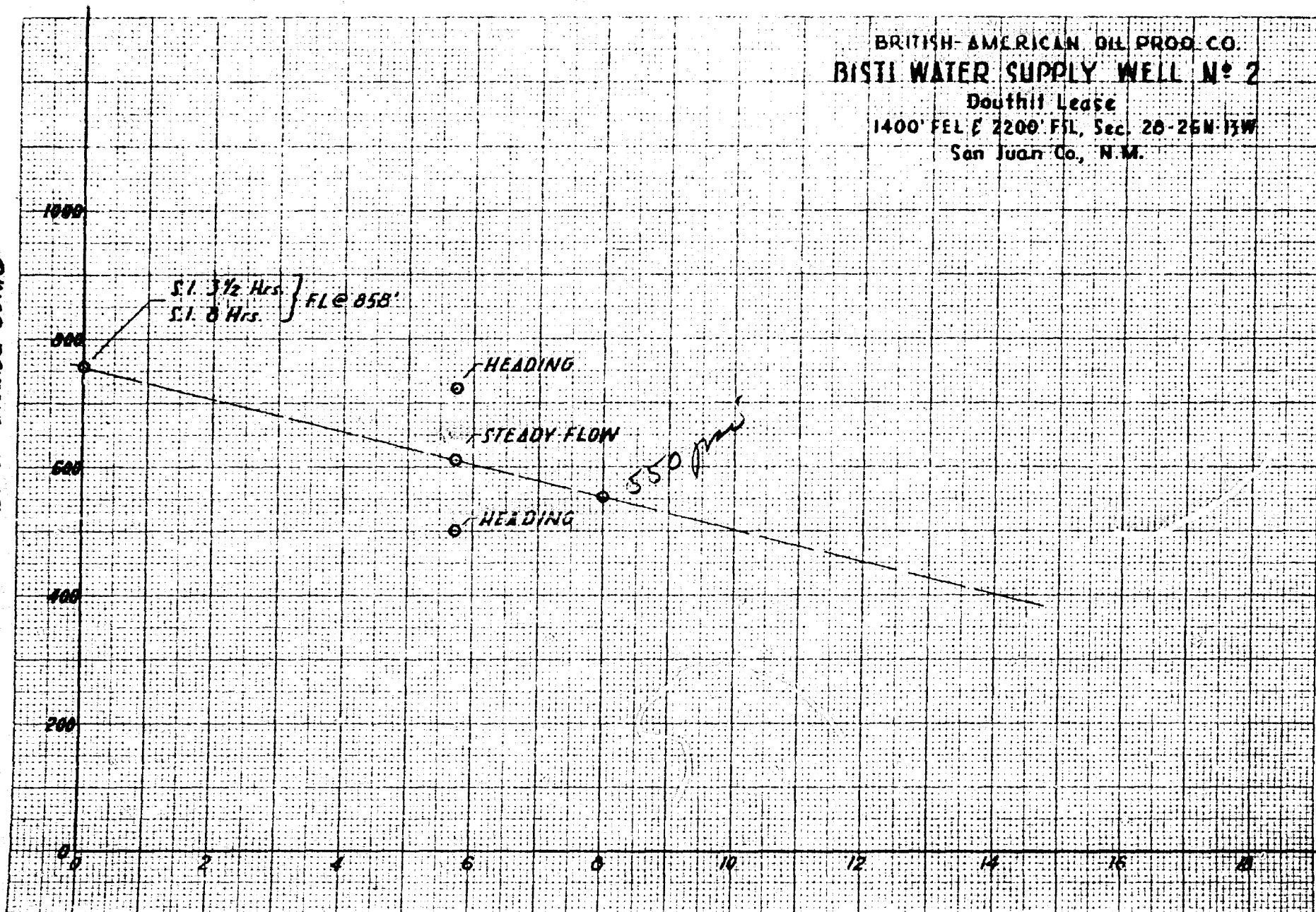
cont.
1027 to surf.

Ex. #19.



BRITISH-AMERICAN OIL PROD. CO.
BISTI WATER SUPPLY WELL NO. 2
Douthitt Lease
1400' FEL & 2200' FIL, Sec. 28-26N-13W
San Juan Co., N.M.

BWD PSIG BY AMERADA BOMB



BW X 10³

Ex. #20

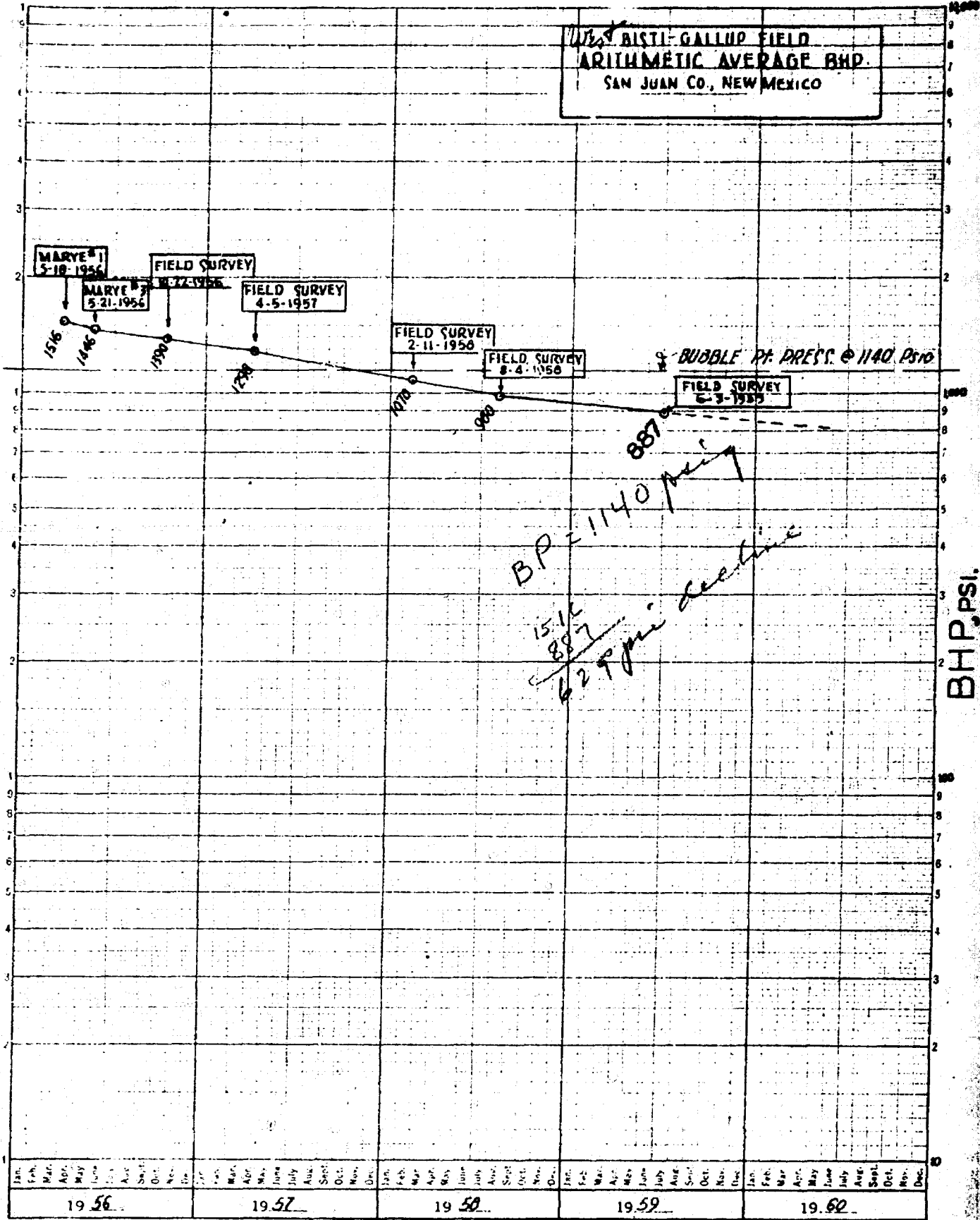
CHEMICAL ANALYSIS OF
BRITISH-AMERICAN'S DOUTHIT WATER SUPPLY WELL #2
1440' FEL, 2200' FSL, Section 28-26N-13W
San Juan County, New Mexico

Total dissolved solids	3240 ppm
Sodium	937
Iron	11
Barium	0
Calcium	31
Magnesium	6
Chlorides	150
Bicarbonates	1165
Sulphates	940
Hydrogen Sulphides	13.6
Carbon Dioxide	12
Oxygen	0
Precipitated solids	217
Ferrous Sulphides	24.7
Calcium Carbonates	12.4
Silica	163.5
Organic	16.5
SG	1.004
pH	8.1

In a closed system this supply water from the Cliff House-Menefee sands would be compatible with Gallup sand produced water and would have no detrimental effect upon the formation.

Ex. #21

K&E 5 YEARS BY MONTHS 359-195
 X 3 CYCLES
 KRAFT & ESSER CO. MADE IN U.S.A.



EX. #22

PERTINENT DATA

WEST BISTI-LOWER GALLUP SAND

I. General Information

Date of Discovery
Structure
Participating Acreage
Total Wells Drilled
Depth to Top of Pay, Ft.
Producing Zones

October, 1955
stratigraphic trap (sand bar deposits)
5,142 ✓
63.
4,900' Approx.
1st, 2nd, and 3rd Benches of Lower Gallup Sd.

II. Reservoir Information

Producing Mechanism
Arithmetic Avg. BHP, psi, (March, 1956)
Arithmetic Avg. BHP, psi, (June, 1959)
Bubble Point Pressure, psi.
Original Solution GOR, CF/S.T.B.O.
Original RVF, RBO/S.T.B.O.
Bottom Hole Temperature, °F.
Gravity of Oil, °API

Solution Gas Drive
1,516
887
1,140
379
1,249
145
38

	ZONES		
	1	2	3
Average Porosity, %	14.9	9.3	9.6
Permeability, md.	31	2	2
Avg. Water Sat., %	28.1	31.7	35.8

III. Production and Reserves

Original Oil in Place, BSTO
Based On M-L Pay

43,750,000 (#1)
900,000 (#2)
1,100,000 (#3)

TOTAL
Original Recoverable Primary Reserves, Bbls.
Est. Recovery Factor, % of Zone #1 Original Oil in Place by M-L
Cumulative Production to 10-1-59, Bbls.
Est. Cumulative Production to 2-1-60, Bbls.
Est. Remaining Primary Reserves on 2-1-60, Bbls.
% Primary Depletion on 2-1-60
Est. Remaining Primary Life Without Pressure Maintenance, Years

45,750,000
6,320,000 ✓ S.A.
14.45
2,723,111 ✓
3,250,000
3,070,000
51.4
7

Ex. #23

IV. Secondary Recovery by Pressure Maintenance

Estimated Commencement Date of Water Injection	6-1-60
Estimated Secondary Recovery, Bbls.	6,800,000
Estimated Total Primary & Secondary Recovery to Depletion, Bbls.	13,120,000
% Recovery of Original Oil In Place	30
Estimated Total Water Requirements, Bbls.	87,500,000
Estimated Daily Avg. Injection, BWPD	12,000 - 16,000
Estimated Duration of Program, Years	20 - 15
Initial Number of Injection Wells	17
Possible Additional Injection Wells	15
Initial Number of Recovery Wells	46
Estimated Number of Water Supply Wells	3
Flood Pattern	Line Drive
Maximum Injection Pressure, psig. (at surf)	1,200

Est. critical press
would be
2800# at surf

17
46
63
32
31

PROPOSED FIELD RULES AND REGULATIONS FOR
THE BRITISH-AMERICAN OIL PRODUCING COMPANY
WEST BISTI WATER INJECTION PRESSURE MAINTENANCE PROJECT

RULE 1: The project area (initial participation area) of the British-American Oil Producing Company, West Bisti Water Injection Pressure Maintenance Project shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 13 WEST, NMPM

Section 1	E/2, N/2 NW/4
Section 12	E/2 NE/4

TOWNSHIP 26 NORTH, RANGE 13 WEST, NMPM

Section 18	SW/4, S/2 SE/4
Section 19	N/2, N/2 SE/4, SE SE/4
Section 20	W/2, S/2 NE/4, SE/4
Section 21	SW/4
Section 26	SW/4, S/2 SE/4
Section 27	S/2, S/2 N/2
Section 28	All
Section 29	N/2 N/2
Section 30	N/2 NE/4
Section 33	N/2 NE/4
Section 34	N/2 NW/4, NE/4
Section 35	N/2, N/2 SW/4, SE/4
Section 36	W/2, SE/4

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. <u>24</u>
CASE NO. <u>1867</u>

Ex. 24

RULE 2: The allowable for the West Bisti Gallup Sand Project shall be equal to the then current normal unit allowable for an 80 acre proration unit of comparable depth in Northwest New Mexico times the number of 80 acre proration units in the project area of the West Bisti Unit including those units having wells which are shut in or are used as injection wells, and those units or portions thereof having no wells.

RULE 3: The project allowable may be produced from any well or wells in the project area in any proportion.

RULE 4: Conversion of producing wells to injection, or the drilling of additional wells for injection, shall be done only after approval of same by the Secretary Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application shall include the following:

- (1) A plat showing location of proposed injection well, all wells within the project area and offset operators, locating their offsetting wells to the project area.
- (2) A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depths and showing that injection of water will be confined into the West Bisti-Lower Gallup formation.
- (3) A letter stating that all offset operators to the project area have been furnished a complete copy of the application and the date of the notification.

The Secretary-Director may approve the proposed injection well if, within

20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval provided waivers of objection are received from all offset operators.

RULE 5: Each month the project operator shall submit to the Commission a Water Injection Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required.

RULE 6: The commission shall, upon review of the report assign a project allowable for the next succeeding month in accordance with these rules.

RULE 7: The Special Rules and Regulations for the operation of the subject project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith.

7 concurred
[Signature]

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 2-5-60

CASE 1867

Hearing Date 1-27-60

My recommendations for an order in the above numbered cases are as follows:

1. Grant approval of the West Bisti Lower Gallup secondary recovery project in Bisti-Lower Gallup oil pool.
2. Denie the assignment of allowable to non-developed units.
3. Denie the assignment of allowable in excess of a well's ability to produce at the time of conversion or drilling.
4. We should assign allowables on the individual well basis as we do in the normal routine of proration with the option to transfer allowables to other wells in the unit. ~~up to a maximum of 200 bbls/day or 6 times the NVA which ever is greater E.O.W.~~
5. This transfer allowable could come from two sources:
 - (a) The conversion of a producing oil well (new or old) to a water injector well.

Staff Number

2

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 2-3-60

CASE

1867

Hearing Date

My recommendations for an order in the above numbered cases are as follows:

- (H) Curtailment or complete shut-in of a high GOR well.
6. The amount of transference allowable from a high GOR well should be determined by converting the difference between the average ^{per well} injected water and the average per well produced water to an equivalent volume of Gas. Such volume of gas to be that volume in excess of the wells GOR limit. In no case can ^{these} be transferred more than a N.V.A. for the well.
7. If more flexibility is desired in changing a well's allowable within a proration month we could allow them to calculate the unit allowable ~~by~~ ^{for} by adding the sum of the individual well allowables, including transferences, but ~~regulating~~ ^{Staff Member} ~~them~~ ^{only} to produce no more than the unit allowable. ~~and no~~

3

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 2-3-60

CASE 1867

Hearing Date _____

My recommendations for an order in the above numbered cases are as follows:

~~not more than 200 bbls or twice the~~
~~N.A. for any well. I do not believe~~
~~we should grant more flexibility than~~
~~this.~~

- Fred D. J. P.

If this recommendation is approved by
the commission then a detailed order
can be written with specific ~~part~~ project
rules. Proposed Project Rules are
attached.

- J. B. D.

① As to paragraph 7, pipeline may be very hesitant to
run oil from a battery which is in excess of ^{total} allowable
assigned to the wells producing into that battery. And
B.A. does not have an ACT system for this unit. Something
would have to appear in the operation schedule to effect
that operator not bound by per well allowable which
appears in schedule.

(2) How is well's ability to produce just prior to conversion
to be determined. JEP (I agree generally with
the proposals by Elvis)

But not on record

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

APPLICATION OF THE BRITISH-AMERICAN
OIL PRODUCING COMPANY FOR AN ORDER
AUTHORIZING A PRESSURE MAINTENANCE
PROJECT IN THE BISTI-LOWER GALLUP
OIL POOL, SAN JUAN COUNTY, NEW MEXICO,
AND FOR THE PROMULGATION OF SPECIAL
RULES AND REGULATIONS COVERING SAID
PROJECT

CASE NO. 1867

APPLICATION

COMES NOW The British-American Oil Producing Company and
respectfully alleges and states as follows:

1. That applicant and certain other parties are the owners
and operators of certain leases which are productive of oil and gas
from the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico,
as shown on Exhibit "A," upon which leases said parties propose to
institute a pressure maintenance program by injection of water into
the Lower Gallup formation found at a depth of approximately 4,800 feet.
2. Attached hereto and made a part hereof is Exhibit "A,"
which is a plat showing the location of the proposed injection wells
and the location of all other wells within a radius of two miles from
said proposed injection wells and the formation from which said wells
are producing or have produced and further indicating the lessees
within said two mile radius.
3. Attached hereto and made a part hereof are the logs of
three of the proposed injection wells, which are representative of
the logs of the injection wells which applicant proposes to use in said
project, consisting of Exhibit "B-1," which is a log of The British-
American Oil Producing Company Marye No. 2, Exhibit "B-2," which is a
log of The British-American Oil Producing Company Salge B No. 5, and

*Docket
mailed
1-18-60
JH*

Exhibit "B-3," which is a log of The British-American Oil Producing Company Navajo No. 3. Attached hereto and made a part hereof are Exhibits "C-1," "C-2," and "C-3," which are the casing program descriptions of the aforementioned Marye No. 2, Salge B No. 5 and Navajo No. 3, respectively.

4. That applicant proposes to inject water into the Lower Gallup formation underlying the lands included within the boundaries of the "initial participation area," consisting of approximately 5000 acres, as shown on Exhibit "A" using 17 wells as designated thereon. Water for injection will be obtained from the Lower Allison-Menefee formation found at approximately a depth of 2,600 feet using three or four water supply wells, two of which wells have been drilled and are designated on said Exhibit "A" as W.S.W. No. 2 and W.S.W. No. 3. Applicant proposes to inject a minimum of 12,000 and a maximum of 16,000 barrels of water per day into said Lower Gallup formation.

5. That the aforesaid parties have entered into an operating agreement for said pressure maintenance project wherein The British-American Oil Producing Company is named Unit Operator.

6. That applicant will request the establishment of an allowable for said project and that rules and regulations be adopted including but not limited to provision for:

(a) the conversion of additional wells to injection wells without notice and hearing, subject to administrative approval by the Commission;

(b) the transfer of allowables from injection wells to producing wells within the project area;

(c) the transfer of allowables from wells which have been shut in for observation or to increase

the efficiency of the project to other wells within the project area;

(d) such other rules and regulations as are appropriate under the circumstances.

6. That by order No. R-1416 dated June 5, 1959, this Commission authorized applicant to institute a pressure maintenance project including all of sections 1 and 12, Township 25 North, Range 13 West, and all of section 35, Township 26 North, Range 13 West, and prescribed rules and regulations governing the same. Applicant will request that said order No. R-1416 be amended or superseded by such order as the Commission may issue herein in accordance with the plan of unit operation and pressure maintenance which applicant will propose.

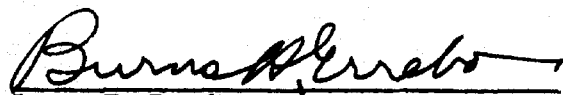
7. That the granting of this application will prevent waste and will not impair the correlative rights of any party.

WHEREFORE, applicant prays that this matter be set for hearing, that notice be given as required by law and that upon said hearing applicant be granted the relief herein requested and such other relief as may be appropriate under the circumstances.

THE BRITISH-AMERICAN OIL PRODUCING COMPANY

By MODRALL, SEYMOUR, SPERLING, ROEHL & HARRIS
Its Attorneys,

By



Burns H. Errebo
1200 Simms Building, P. O. Box 466
Albuquerque, New Mexico