CASE 2656: Application of WESTERN DEVELOPMENT FOR secondary recovery project, East Millman-Queen Grayburg.

2656

Entries, Transcript,

Ill Exhibits, etc.

Western Development Company of Delaware

69 SENA PLAZA, SANTA FE, NEW MEXICO
TELEPHONE YUKON 2-5000
P. O BOX 427 ARTESIA, NEW MEXICO

December 28, 1962

File

Mr. Daniel S. Nutter, Chief Engineer
New Mexico Oil Conservation Commission
P.O. Box 871
Santa Fe, New Mexico

Re: Case No. 2656; Application of Western Development Company of Delaware for Secondary Recovery Project, East Millman Queen-Grayburg Pool, Eddy County, New Mexico.

Dear Dan:

In reference to the subject application, listed below are the data necessary to calculate the daily average gas equivalent of net water injected as per the proposed Rule No. 8.

$$Eg - (Vw\ inj - Vw\ prod) \times 5.61 \times Pa/15.025 \times 520^{o}/Tr \times 1/Z$$

where:

Eg	-	Average daily gas equivalent of net water injected, cubic feet.
Vw inj	-	Average daily volume of water injected, barrels.
Vw prod	-	Average daily volume of water produced, barrels.
5.61	-	Cubic foot equivalent of one barrel of water.
Pa	-	Average reservoir pressure at a datus of + 1700 feet above sea level, psig + 13.20, as determined from most recent survey.
15.025	-	Pressure base, psi.
520°	-	Temperature base of 60°F expressed as absolute temperature.
Tr	-	Reservoir temperature of 85°F expressed as absolute temperature (545°R).
Z	-	Compressibility factor from analysis of East Millman Queen-Grayburg Pool gas at average reservoir pressure, Pa' interpolated from compressibility

tabulation below:

Pressure Psig	Z	Pressure Psig	Z
0	.998	550	.863
50	.986	600	.851
100	.973	650	.838
150	.961	700	.826
200	.949	750	.816
250	.936	800	.802
300	.924	850	.790
350	.912	900	.777
400	.900	950	.765
450	.887	1000	.753
500	.875	1050	.741
		1100	.729

In the event further data or information is required, please notify this office by mail or telephone collect.

Very truly yours,

WESTERN DEVELOPMENT COMPANY
of Delaware

Jack C. Bendler

J. C. Bendler
Assistant Production Superintendent

JCB:cm

P.S. Current estimated reservoir pressure - 275 psig at datum (+ 1700') above sea level. Current estimated reservoir temperature - 85° F.

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. B. Hopkins
~~W. A. Shelton~~
DISTRICT MANAGER
F. O. Mortlock
DISTRICT EXPLORATION MANAGER
M. I. Taylor
DISTRICT PRODUCTION MANAGER
H. C. Vivian
DISTRICT SERVICES MANAGER

October 3, 1962

P. O. Drawer 1938
Roswell, New Mexico

Case 2656

Oil Conservation Commission
State of New Mexico
Post Office Box 871
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

Reference is made to the application of Western Development Company in Case No. 2656 scheduled for Examiner Hearing on October 10, 1962, for approval of a secondary recovery project, East Millman Queen-Grayburg Pool, Eddy County, New Mexico.

The application as advertised provides for water to be injected initially through 16 injection wells in Sections 11, 14, 15, 22 and 23, Township 19 South, Range 28 East. We have been informed verbally by Western Development Company that they propose to initially inject only into Wells No. 143, 145 and 147 in Section 14, and Well No. 151 in Section 15. It is assumed that the project area will comprise these wells and the direct and diagonal offset wells. If this is the case, Gulf has no objections provided that the provisions of Rule 701 are complied with insofar as notification to offset operators for expansion of the project area is concerned. If approval is requested by Western for all 16 injections wells without further need for expansion approval, then we object to placing the wells on injection at this time that offset our top allowable Eddy State "BN" and "AN" leases located in Sections 11 and 13 respectively.

Yours very truly,

W. B. Hopkins

JHH:dch

cc: Western Development Company
Post Office Box 427
Artesia, New Mexico

GULF

DRAFT

JMD/esr
1-21-63

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE No. 2656
Order No. R-2405-A

APPLICATION OF WESTERN DEVELOPMENT COMPANY FOR A SECONDARY RECOVERY PROJECT, EAST MILLMAN QUEEN-GRAYBURG FIELD, EDDY COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Commission that due to clerical error and mistake, Order No. R-2405, dated December 31, 1962, does not correctly state the intended order of the Commission,

IT IS THEREFORE ORDERED:

(1) That the phrase "80-acre" is hereby stricken from Rule 5 of the Special Rules and Regulations for the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project, and the phrase "40-acre" is hereby interlineated in lieu thereof.

(2) That this order shall be effective nunc pro tunc as of December 31, 1962.

DONE at Santa Fe, New Mexico, on this_____day of January, 1963.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

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

DRAFT

DSN/esr
December 21, 1962

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. 2656

Order No. R-2405

APPLICATION OF WESTERN DEVELOPMENT
COMPANY FOR A SECONDARY RECOVERY
PROJECT, EAST MILLMAN QUEEN-GRAYBURG
FIELD, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on October 10, 1962, at Santa Fe, New Mexico, before Daniel S. Nutter, 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 _____ day of December, 1962, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, 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, Western Development Company of Delaware, hereinafter referred to as Western Development Company, proposes to institute a secondary recovery project in the East Millman Queen-Grayburg Pool by the injection of water into the Queen and Grayburg formations through 13 injection wells located in Sections 14, 15, 22, and 23, Township 19 South, Range 28 East, NMPM, Eddy County, New Mexico.

(3) That the applicant proposes that said project be classified as a pressure maintenance project and further that the Secretary-Director of the Commission be authorized to reclassify said project as a bonafide waterflood project at such time as the extrapolated production decline curve ~~would~~ indicates that the producing capacity of the wells in the project area ~~would be~~ are in an advanced state of depletion and ~~could~~ can properly

be classified as "stripper" wells were it not for the water injection occurring during the pressure maintenance phase of the secondary recovery program.

(4) That special rules and regulations for the operation of the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project should be promulgated and, for operational convenience, such rules should include certain flexibility in authorizing the production of the project allowable from any well or wells in the project in any proportion, provided that no well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply, and belonging to any other operator should be allowed to produce in excess of top unit allowable for the East Millman Queen-Grayburg Pool until such time as the well has experienced a substantial response from water injection. When such response has occurred, the well should be permitted to produce up to two times top unit allowable for the East Millman Queen-Grayburg Pool. Production of such well at a higher rate should be authorized only after notice and hearing.

(5) That the productivity of wells in the subject area has declined to the point where reasonable accuracy may be expected in extrapolation of the production decline curve; that said extrapolation indicates that the subject area, without benefit of pressure maintenance, will reach an advanced state of depletion on or about September 1, 1963.

(6) That approval of said project will neither cause waste nor impair correlative rights, but will result in the recovery of oil which otherwise might not be recovered.

(7) That the proposed pressure maintenance project and the proposed procedure for reclassification of said project to a waterflood should be approved.

IT IS THEREFORE ORDERED:

(1) That the applicant, Western Development Company, is hereby authorized to institute a pressure maintenance project in the East Millman Queen-Grayburg Pool, Eddy County, New Mexico, by

the injection of water into the Queen and Grayburg formations through the following-described wells:

Western Yates State 648 Well No. 143, Unit K, Section 14;
Western Yates State 648 Well No. 145, Unit M, Section 14;
Western Yates State 648 Well No. 147, Unit E, Section 14;
Western Yates State 648 Well No. 151, Unit I, Section 15;
Western Yates State 648 Well No. 152, Unit A, Section 22;
Western Yates State 648 Well No. 153, Unit C, Section 14;
Western Yates State 648 Well No. 156, Unit O, Section 15;
Western Yates State 648 Well No. 158, Unit G, Section 22;
Western Yates State 648 Well No. 182, Unit O, Section 14;
Western Yates State 648 Well No. 184, Unit G, Section 14;
Western Yates Malco-State Well No. 2, Unit C, Section 23;
Western Yates Malco-State Well No. 3, Unit E, Section 23;
Western Yates State E-5003 Well No. 1, Unit A, Section 15;

all in Township 19 South, Range 28 East, NMPM.

(2) That Special Rules and Regulations governing the operation of the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project, Eddy County, New Mexico, are hereby promulgated as follows, effective January 1, 1963.

SPECIAL RULES AND REGULATIONS
FOR THE WESTERN DEVELOPMENT COMPANY
EAST MILLMAN QUEEN-GRAYBURG PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of ~~Western~~ The Western Development Company ~~of Delaware~~ East Millman Queen-Grayburg Pressure Maintenance Project, hereinafter referred to as the project, Eddy County, New Mexico, shall comprise that area described as follows:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 14: SW/4 NE/4, NW/4, SW/4, W/2 SE/4
Section 15: E/2 NE/4, SE/4 SW/4, SE/4
Section 22: NE/4
Section 23: N/2 NW/4, SW/4 NW/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 well which is shut-in or which 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 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on an 80-acre proration unit shall be top unit allowable for the ~~Cha-Cha-Gallup Oil Pool~~.

RULE 6. The allowable assigned to any well 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Commission Rule 502 I (a) and the limiting gas-oil ratio (2,000 to 1) for the ~~Cha-Cha-Gallup Oil~~ Pool shall be waived during such tests. The project operator shall notify all operators offsetting the 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.

RULE 7. 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 ~~Cha-Cha-Gallup Oil~~ Pool, whichever is less, provided that any producing well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until such time as the well receives a substantial response to water injection. When such a response has occurred, the well shall be permitted to produce up to two times top unit allowable for the pool. Production of such well at a higher rate shall be authorized only after notice and hearing. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the ~~Cha-Cha-Gallup Oil Pool~~, except that any well or wells within the project area producing with a gas-oil 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, if any, into the ~~Cha-Cha-Gallup Oil~~ Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

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

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 8. Credit for daily average net water injected into the ~~Cha-Cha-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:

$$E_g = (V_{w\ inj} - V_{w\ prod}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^{\circ}}{T_r} \times \frac{1}{Z}$$

where:

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

$V_{w\ inj}$ = Average daily volume of water injected, barrels

$V_{w\ prod}$ = Average daily volume of water produced, barrels

~~5~~
CASE No. 2616
~~Order~~ No. R-2305

5.61 = Cubic foot equivalent of one barrel of water

P_a = Average reservoir pressure at a datum of + 1700 ~~+ 418~~ feet above sea level, psig + 12.00, as determined from most recent survey

15.025 = Pressure base, psi

520° = Temperature base of 60° F expressed as absolute temperature

T_r = Reservoir temperature of ~~158~~ 85° F expressed as absolute temperature (~~618~~° R) (545° R)

Z = Compressibility factor from analysis of ~~Cha Cha Gallup~~ Four Mile Draw gas at average reservoir pressure, P_a, interpolated from compressibility tabulation below:

Pressure Psig	Z	Pressure Psig	Z	Pressure Psig	Z
0	.998 ~~.986~~	500	.875 .912	1000	.753 ~~.869~~
50	.986 ~~.976~~	550	.863 .906	1050	.741 ~~.865~~
100	.973 ~~.963~~	600	.851 .902	1100	.729 ~~.860~~
150	.961 ~~.952~~	650	.838 .899	~~1150~~	~~.857~~
200	.949 ~~.943~~	700	.826 .895	~~1200~~	~~.853~~
250	.936 ~~.935~~	750	.816 .891	~~1250~~	~~.849~~
300	.924 ~~.930~~	800	.803 .886	~~1300~~	~~.845~~
350	.912 ~~.927~~	850	.790 ~~.882~~	~~1350~~	~~.842~~
400	.900 ~~.923~~	900	.777 ~~.877~~	~~1400~~	~~.838~~
450	.887 ~~.918~~	950	.765 ~~.873~~		

Southeast

RULE 9. 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 wells in the Project as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. 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 except that no well in the Project which directly or diagonally offsets a well outside the Project producing from the same common source of supply shall produce in excess of two times top unit allowable for the pool.

~~-6-~~
~~CASE No. 2656~~
~~Order No. R-2305~~

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells, shall include the following:

(1) A plat showing the 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 depth showing that the injection of gas or water will be confined to the ~~Gallup~~ Queen and/or Grayburg 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.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

(~~3~~) That the Secretary-Director of the Commission is hereby authorized to reclassify the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project as a waterflood project, effective September 1, 1963, upon receipt of written request for such reclassification from Western Development Company. Upon reclassification, the above rules governing the pressure maintenance project shall ~~be~~ terminate ipso facto and the waterflood project shall in all ways be governed by Commission Rule 701-E, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 10, 1962

EXAMINER HEARING

IN THE MATTER OF:

Application of Western Development Company for a secondary recovery project, East Millman Queen-Grayburg Field, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a secondary recovery project in the East Millman Queen-Grayburg Field, with the injection of water into the Queen and Grayburg formations initially to be through 16 wells, located in Sections 11, 14, 15, 22 and 23, Township 19 South, Range 28 East, Eddy County, New Mexico, said project to be governed by the provisions of Rule 701.

Case 2656

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case 2656.

MR. DURRETT: Application of Western Development Company for a secondary recovery project, East Millman Queen-Grayburg Field, Eddy County, New Mexico.

(Whereupon, Western Development Company's Exhibits Nos. 1 through 8 were marked for identification.)

MR. LOSEE: A. J. Losee, Losee and Stewart, representing Western Development Company.

(Witness sworn.)

MR. LOSEE: With the Commission's permission, I would like to make a statement with respect to this case. This is an application by Western Development Company of Delaware as operator of what is now twenty-five producing wells in the East Millman Queen-Grayburg Pool, Eddy County, New Mexico to institute at this time a pressure maintenance project by the injection of water through approximately twelve wells.

It is our intention in connection with this application to show to the Commission that except for pressure maintenance that we request permission to institute at this time these wells would be in an advanced state of depletion on or about June 1 of 1963.

In connection with the application, and in the hopes that we will be permitted to conserve some of our reservoir energy and institute a pressure maintenance project at this time we request that we be granted an allowable for a pressure maintenance project up until the time our wells would have otherwise reached an advanced state of depletion, to wit, June 1 of '63, at which time and in this request the Commission would authorize a water flood project with a water flood allowable under Rule 701.

With that preliminary statement, our first witness has been

sworn, would you state your name, please?

MR. NUTTER: Just a moment, please, Mr. Losee, as I understand it, you would request authorization for a pressure maintenance project at this time, and that your testimony will purport to show that this project area would without the pressure maintenance project reach an advanced stage of depletion on or about June 1st of 1963, at which time you would request that the order would automatically cause this project to be reclassified from a pressure maintenance project to a water flood project, and the allowable provisions follow along with the reclassification?

MR. LOSEE: Yes, sir.

MR. NUTTER: Please proceed.

JACK V. BENDLER

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

DIRECT EXAMINATION

BY MR. LOSEE:

Q State your name, please.

A Jack V. Bendler.

Q Where do you live, Mr. Bendler?

A I live in Artesia, New Mexico.

Q What is your occupation?

A I work for the Western Development Company, Delaware, and with that company I have the position of Assistant Production Superintendent.

Q You have not previously testified before this Commission?

A No.

Q Where did you obtain your public education?

A Mason City High School, Mason City, Nebraska.

Q You graduated? A Yes, sir.

Q What higher education did you obtain?

A I graduated with a Bachelor of Science degree in petroleum engineering, University of Tulsa, Tulsa, Oklahoma.

Q In what year, Mr. Bendler?

A 1951.

Q Since that time what has been your occupation?

A Upon graduating from college I went to work with Phillips Petroleum Company. I spent four and a half years with Phillips and I was a reservoir engineer and a production engineer in the district office when I resigned to go to work for Honolulu Oil Corporation. I worked for Honolulu Oil Corporation for five and a half years, which I was district petroleum engineer. After working for Honolulu Oil I went to work at Western Development where I have worked for approximately

fourteen months now. My current position there is as Production Superintendent.

Q Since your graduation from college have you attended any schools in connection with your work?

A Yes, sir. I attended an industry reservoir school in Texas A. and M. in 1957 and had a four-week duration. It was sponsored by the Texas A. and M. Petroleum School.

Q Would you give us a brief history of this East Millman Queen-Grayburg Pool, please?

A Yes, sir. The discovery well was drilled and completed by Miller Brothers and it was called the Western Development State No. 1. This well was located in Section 14 of 19, 28, Eddy County, New Mexico. This particular well was completed April 11, 1958 for flowing potential of 250 barrels of oil in twenty-four hours. This discovery well was later acquired by Western Development Company of Delaware and Yates Petroleum Corporation, and it is currently known as the State 648 Well No. 181. The majority of the development in this pool was during the latter part of 1958 and 1959. As of June 1st, 1962 there were 60 producing wells listed on the New Mexico Oil Conservation Commission proration schedule.

The field produces from a series of zones in the Queen and the Grayburg sections and they range from 1750 feet to about

2300 feet. The Queen production occurs in sand zones whereas the Grayburg formation is principally from dolomites. In those wells in this project that are presently producing from the Queen and Grayburg zone are open to a common well bore and are commingled down hole. I believe that the Oil Conservation Commission considers this one common reservoir in that respect with regard to proration.

Q Please refer to what has been marked as Exhibit 1 and state what that is.

A Exhibit No. 1 is a plat which we indicate the proposed water flood project, also there is the location of the proposed injection wells and a location of all other wells and leases within a two-mile radius from this said proposed project, and also the formations from which these said wells are being produced.

Q Now, Mr. Bendler, does it portray a smaller project area than the area covered in your application, and if so, what acreage has been deleted?

A Yes, sir, we have deleted from our original application Wells No., and each one of these wells have a 40-acre proration allocation, and the wells are, starting in Section 11, 160 and 155 on State lease 648 in Section 14 on the same lease, State lease 648, wells at the north of the lease or the north of the section, 149, 148, 185, 161 and 178. Those have been deleted

from the project as well as in the original application.

Q That actually, then, the deletion of that area with the exception of the W. C. well, which well is in the southeast corner, isolates your project from any of the other wells in the East Millman Queen-Grayburg Pool?

A That is correct.

Q Please refer to what has been marked Exhibit 2 and state what that is.

A Western Development Company Exhibit No. 2, we included copies of radioactivity logs on all the proposed injection wells. Western Development Company proposes to inject water into the porous producing zones of the Queen and Grayburg formations through casing perforations, and which are so indicated on the logs. I think there is an exception in a well or two where we have an open hole completion.

The formation tops are marked, that is the formation tops for the Queen and the Grayburg and also the production casing points are so indicated on each one of these logs submitted.

Q Some of your wells are producing only from one, only from the Queen and not from the Grayburg?

A Yes, sir.

Q That information is shown on your Exhibit 1, is it not, as to which formation?

A No, sir. The Queen-Grayburg wells are the solid circle and some of those are Queen and some are Grayburg. They are not specifically designated which wells are Queen and which are Grayburg, but the injection wells listed on one of the coming exhibits will indicate those zones.

Q That information is also, of course, shown on these logs?

A Yes, sir.

Q Please refer to your Exhibit No. 3.

A Western Development Company Exhibit No. 3 is a graphic description of the proposed injection well casing program. This casing program, rather the exhibit portrays a typical well, injection well, and it is the State 648 Well No. 147, and as I said, this particular well we consider is a typical example of our injection wells.

With reference to this particular exhibit, the Queen formation topped there is 1681 and the Grayburg is 2026. We, as Western Development Company, propose to equip each dual injection well with tubing and a packer. This will facilitate simultaneous water injection into both the Queen and Grayburg reservoirs. As an example, it will be down tubing below the packer into the Grayburg and down the casing tubing annulus above the packer into the Queen. However, those injection wells where injection

will be into only one producing formation. It is proposed that the water be injected down casing. We propose to inject water into each of these injection wells at an approximate pressure of 1200 psi and at a rate of 300 barrels per day.

Q What is your proposed water source for this project?

A Our proposed water supply for this project, we will hope to develop by drilling shallow fresh water wells within this project area, and they are so marked on the Exhibit No. 1 where we will probably locate these particular shallow wells. We have considerable amount of cable tool information in this area and they indicate the occurrence of a substantial supply of fresh water along the south and southeast portion of the project area. However, in the event that this source is inadequate, why we propose to obtain additional injection water from one of the several water companies.

Q Mr. Bendler, are you not operating, is Western Development Company not operating a water flood project in Section 10 immediately to the north of this proposed project?

A Yes, sir, we sure are.

Q What is your source of water for that Section 10 project?

A It is a fresh water well, shallow fresh water well drilled in the northern part of Section 14, and it's just west, I believe, of Well No. 149 in State Lease 648.

Q Up to this point has that well been adequate for your water supply for that other project?

A Yes, sir, it has.

Q Please refer to your Exhibit No. 4, state what that is.

A Western Development Company's Exhibit No. 4 is a tabulation of statistical data for each proposed injection well. Now, this exhibit lists in part the casing size, the depth set, the volume of cement used in the two strings of casing which is run in each well. I would like to call your attention that each string of casing has been cemented with an adequate amount of cement to isolate and protect both the fresh water sand behind the spacing string and the oil-bearing zones behind the production string. There's one exception to this and that is State Lease 648 Well No. 151 which does not have a cemented surface string. However, in this particular case we propose to inject water into the Queen formation only inasmuch as this will not be a dual injection well. It does produce only from the Queen formation. We propose to inject down tubing below a packer in this particular injection well.

Q Does this exhibit, with your calculation are you able to state how many feet above your shallowest perforation is your cement carried?

A Yes, sir, I can. In all but two of these injection

wells we propose calculated top of cement would be at least 200 feet above top perforations. The two exceptions will be State E-5003 Well No. 1 and Malco State Well No. 3, and both of these wells calculated cement top will be in excess of 100 feet above the perforations. That is in the production string.

Q Please refer to what has been marked Exhibit No. 5 and state what that portrays.

A Western Development Company Exhibit No. 5 is a graph of the oil production rate in barrels per month versus cumulative oil production in barrels. Curve No. 1 on this exhibit is a plot of the actual production rate through September, 1962. The dashed line portion, which is Curve No. 2, is a projection of the current established production decline.

Q Does this graph also include the seven wells that have been deleted from our application as to the project area?

A Yes, sir, they do. These seven wells, as you remember, were in the State Lease 648, and in view of any accurate way of determining the production for these seven wells, it was not attempted to delete it from the curve.

Q Is there any distinction as to the production history on those seven wells from the production history on the other wells in your project area?

A Well, there is some distinction, yes, sir, possibly

being on that side of the project they would be much better than the wells, the productivity would be much better than those say on the southeast side or the east side.

Q Are they somewhat similar, the production history of both of them?

A Yes. The production history of those wells will be similar to those wells in the project, yes, sir.

Q So that actually the only thing that would occur to this graph from your knowledge, if you were to take it, if it were possible to take out those seven wells is it would reduce the amount of production history, it would not change the curve?

A No, sir. It's my opinion that the slope of the curve would be the same.

Q Please refer to what has been marked Exhibit 6. State what that is.

A Western Development Company Exhibit No. 6 is a plot of production rate in barrels per month versus time. Now, Curve No. 1 represents the actual production rates through September, 1962; dashed line portion of the Curve No. 2 is a projection of future rates based on an integration of Curve No. 2 and Exhibit No. 5 with respect to time. In other words, that particular curve on this Exhibit No. 6 is directly related to the curve in Exhibit No. 5.

Q Are your same statements with respect to the seven wells that you have deleted from the project area, your statements with respect to Exhibit 5 the same with respect to Exhibit 6?

A Yes, sir.

Q In your opinion, then, if those wells were included from this curve, would there be any material change in the curve?

A No, sir.

Q At what date on this curve, in your opinion, would you state these wells would be in an advanced state of depletion?

A June 1st, 1963.

Q What is the approximate present average production of the wells in your project area?

A Currently our average production will be around 15 barrels per day per well.

Q Now, in your recent form that you reported to the Commission from that information, can you state whether or not any wells are materially over 15.5, 15½ barrels?

A Yes, sir, the form to which you refer is the Oil Commission Form C-116, gas-oil ratio form which was sent to the Oil Commission about October 10th, and the highest production on a per well basis on any one of the wells was around 17 barrels per day.

Q It's due in the Commission today, then, actually?

A Yes, sir, but we took the tests in September.

Q From your tests there were no wells making over 17 barrels?

A No, sir. That was the maximum recorded.

Q What has Western Development Company done to maintain the production of its wells in this project area?

A As soon as the wells in the beginning failed to make their top allowable we endeavored to put them on the pump as soon as possible. I believe that currently there are only three wells within the project area that are not on the pump.

I would like to refer to the Exhibit No. 1. State Lease E-503, that particular well, and also State Lease 648 163, we do not consider that it would be economically feasible to put a unit on it at this time due to the low productivity of the wells. The only other well that I could truthfully say is not on the pump is the 144 in Section 14 of 648, State Lease 648. We are currently putting it on the pump. Just as soon as we can get out pulling unit available to put it on. We have had it on our list of jobs to do in the last few weeks.

Q It's probably on the pump then, actually now, is that right?

A Well, sir, I couldn't say today that it's actually on,

but it certainly is reasonably possible.

Q From the characteristics of the other wells in the project area that you placed on pump, what will happen to this Well 144 that you are just putting on the pump now?

A We anticipate that this well probably will make top allowable, top unit allowable.

Q For how long?

A For probably thirty-day period, the maximum, and then start declining. That has been the history of the other wells. Incidentally, we have endeavored to pump these wells and we do have them on the pump. We try to maintain as much casinghead pressure as we can and still efficiently pump these wells in the method of conservation of our reservoir pressure.

Q Now, looking back at your Exhibit No. 6, and referring to the sharp lines that occurred, the upsweeps in production from December of 1960 down to the last one in about March of this year, can you state what has made those sharp breaks in the increase in the production?

A Yes, specifically the one that occurred in March of 1962. That particular peak in the curve is due to placing several wells on the pump. As you can see, the production after a little bit of flush period there, which I tried to describe what happened in the Well 144, the same thing occurred here, your

decline rate assumed it's same slope thereafter.

Q Actually, with the exception of these three wells you mentioned that are not on pump, or are just now being placed on pump, when was the last well placed on pump in this project area?

A Well, I believe probably, oh, let's see, the last one, inside the project area it was probably in about April, I would say, maybe May. I can't say for sure.

Q Is there anything else, in your opinion, that your company might do or might have done to maintain the primary production from these wells?

A No, sir. Mechanically, I do not believe that there is anything else we could have done. We do believe that early installation of pressure maintenance would be the only answer to production rate and also recovery.

Q Have you had an opportunity to compare the production, a similar curving in this pool to other Queen-Grayburg Pools in southeastern New Mexico?

A Well, to further qualify that, I would rather say that the reservoir characteristics of the East Millman Queen formations are similar to the Caprock Queen and the Grayburg is similar to the Artesia Field, of which there are floods currently in progress as well as the Caprock Queen. I believe they are similar, yes, sir.

Q Well, the question really is, is the production decline curve that you portrayed on Exhibit 6 similar to the production decline curves in these other fields of Queen and Grayburg formations? Are they similar?

A Yes, sir, I'm sure you can say they are similar, yes, sir.

Q Why do you request the permission for authority at this time to institute a pressure maintenance project rather than waiting until next year when the wells are in an advanced state of depletion?

A Well, in our opinion, and it is also our intent to inject water into the above mentioned producing formations in sufficient quantities and with a sufficient pressure to arrest bottom hole pressure decline, and effectively control the gas-oil ratios, and also stimulate production from each of the producing wells within the project area.

Q In your opinion would it be in the interest of conservation to commence the injection of water at this time?

A Yes, sir, it would. The current rate of decline that is exhibited or shown by Exhibits No. 5 and 6, I do believe that early initiation of pressure maintenance will increase our ultimate recovery, and the earliest date possible would be the best, yes, sir.

Q From your history up here in this Section 10 flood that you earlier referred to, in your opinion will this Queen and Grayburg formations, are they floodable?

A Yes, sir, I would rather refer to the Grayburg formation, however, in Section 10. We are currently injecting water in those wells at about 350 to 400 barrels a day at about 650 to 700 pounds pressure.

Q Please refer to what has been marked as Exhibit 7 and state what that is.

A Western Development Exhibit No. 7 is a monthly GOR versus cummulative oil production curve. If you will note the limitations on the curve there, September, 1960 was when Phillips started gathering gas, casinghead gas in the field, and we have an accurate record of gas takes in the area as of that date. Therefore, anything prior to that I wouldn't consider would be accurate information, so from that date on to the current date of September, 1962, it can be seen by this exhibit that gas-oil ratios are on the incline currently, inasmuch as we consider this reservoir to be a solution gas drive reservoir, this is in keeping with certain stages of depletion.

Q Would it be an aid to control this gas-oil ratio by injection of water at this time?

A Yes, sir. We would hope to arrest the pressure, bottom

hole pressure decline, also with the flexibility of closing certain high ratio wells in as part of the proposed rules of a pressure maintenance project that we could effectively control the high gas-oil ratios, which would certainly be in the interest of conservation.

Q Have you made a calculation or estimate as to the amount of oil that you might recover from this combination pressure maintenance and water flood project, or the amount of oil compared to your primary recovery?

A Yes, sir. A conservative estimate on primary recovery with the combined reservoirs we anticipate probably around 15½% primary. Due to any reservoir information which would certainly aid in a further accurate determination of secondary recovery by benefit of other floods that we've studied, I think that somewhere between one and two times primary would be probably what we will least expect on secondary recovery.

Q How much primary oil have you recovered, or do you anticipate will be recovered from this reservoir if you don't have the present figure?

A Well, our current cummulative production I believe is right at 900, around 900, almost a million barrels, and we anticipate ultimate recovery of probably around 1,580,000 barrels of primary oil.

MR. NUTTER: 580,000?

A Yes, sir, 1,580,000.

Q Then it's your testimony that by this secondary recovery program of pressure maintenance now and water flood next year, you will recover one and two times that amount of oil?

A Yes, sir, one to two times.

Q One to two times? A Yes.

Q I hand you what has been marked Exhibit 8 and ask you to state what that is.

A Western Development Company's Exhibit 8 are the recommended rules and regulations for the East Millman Queen-Grayburg Oil Pool pressure maintenance project.

Q These rules then, you propose to remain in effect until June 1 of next year, at which time it would be a water flood project?

A Yes, sir.

Q Have you compared other pressure maintenance project field rules issued by the Commission or entered by the Commission in the last few years, and if so, how do they compare with these proposed field rules?

A Yes, sir. I have studied numerous recent projects and these rules I feel are certainly comparable. Some may be, perhaps the only difference that I can state with regard to some

of the recent ones, we do propose perhaps that the word response be deleted from direct or diagonally offset wells to wells outside the project that are producing from the same producing interval inasmuch as we consider our wells inside, I mean the project line as inside our own property or our own lease line, why we consider possibly it wouldn't be necessary to have the word response included in the rules.

Q That is under what you have proposed as Rule 7 and Rule 10?

A Yes, sir.

Q And the reason you feel like your project area is different than others, if I understand your statement, is that your project area is all within your lease lines and there are no direct offsets to your project area except the Welch wells to the southeast?

A Yes, sir, I'm sure that we can state that we're in the same stage of depletion that our wells are in that area.

Q The Welch wells in the southeast?

A Yes, sir.

Q Do you have anything further that you would like to offer in this case, Mr. Bendler?

A No, sir.

MR. LOSEE: The applicant will move for the introduction

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Q The Welch wells in the southeast?

A Yes, sir.

Q Do you have anything further that you would like to offer in this case, Mr. Bendler?

A No, sir.

MR. LOSEE: The applicant will move for the introduction

of Exhibits 1 through 8.

MR. NUTTER: Applicant's Exhibits 1 through 8 will be admitted in evidence.

(Whereupon, Western Development Company's Exhibits Nos. 1 through 8 were admitted in evidence.)

MR. LOSEE: That's the applicant's case.

MR. NUTTER: Prior to calling for cross examination of the witness we will take a two-inning recess.

(Whereupon, a recess was taken.)

MR. NUTTER: The hearing will come to order, please. Are there any questions of Mr. Bendler?

CROSS EXAMINATION

BY MR. NUTTER:

Q I realize, Mr. Bendler, that a man can probably tell which are the Queen wells and which are the Grayburg wells from examination of the casing, cementing and perforation exhibit here.

A Yes, sir.

Q I don't know what number that is.

MR. LOSEE: Five.

MR. NUTTER: One of the curves is five, I believe.

A No. 4.

Q I wonder if you would read into the record the ones that are completed in both zones and the ones that are completed

in just a single zone and which zone that would be?

A Yes, sir. Just one moment please. May I ask a question, you mean of the injection wells or all of the wells in the project.

Q All of the wells.

A Okay. If it would be all right with you I would like to go over them numerically in State Lease 648.

Q All right.

A Now, 143 is Queen only, 144 is a dual Queen and Grayburg, 145 is Queen and Grayburg, 146 is Queen only, 147 is Queen and Grayburg, we'll skip 148, that's outside and 149 is outside, 150 is in both zones, Queen and Grayburg, 151 we had casing set deeper but we were only producing casing perforations in the Queen formation. 152 is in the Queen-Grayburg.

MR. IRBY: Which well is 152?

A That's in Section 22 in the Northeast of the Northeast.

MR. IRBY: Thank you.

A 153 is both zones, Queen and Grayburg, 154 is in both zones, 155, that's not in the project, though, 156 is Queen only, wait a minute, I'm sorry to take your time this way, but I have to skip back and forth. Some of the casings, if you will bear with me, are set in both zones.

Q But not perforated in both?

A Yes. Sorry I didn't have that information. I want to check 156. 156 is both zones, 157 is both zones, 159 is both zones, 160 is outside the project, 161 is outside the project, 162 is in both zones, 163 is in the Queen only, 165 is in the Queen only, 178 is outside the project, 181 is Queen only, that's Queen and Grayburg, 181, 182 is a Queen only, 183 is a Queen only, I'm sorry, that's a Queen-Grayburg, there were three workovers and a last one we completed in the Queen-Grayburg, 184 is Queen only, 185 is outside the project.

Now, go to the Malco State, Malco State No. 1 is Queen only, No. 2 is Grayburg only, and State Lease E-5003 Well No. 1 is Queen and Grayburg both. I believe that is it in the entirety.

Q Well, now, Mr. Bendler, an examination of the plat without reference to the formations that they're completed in would indicate that you had a perfect five spot 80-acre water flood pattern here. But then with reference to the formations that the wells are completed in, this perfect five spot pattern disappears, is that not true, when you compare Queen and Grayburg or just Queen?

A I'm sure that's quite possible.

Q Is it the intention of Western, Yates to recomplete the wells in the Queen only? The injection wells in the Queen only and open up additional perforations in the Grayburg on any of them?

A Well, if we were to do that there is certain portions of the reservoir there, the Grayburg isn't present, and there may be some workovers with regard to what we may not want commercially as an oil well, but it may be good to inject into the producing formation as an injection.

Q That's what I had reference to, take 181 Queen-Grayburg, 184 directly north of it is a Queen, 143 directly west is a Queen well and the 182 directly south is a Queen well, so you wouldn't be able to flood the Grayburg in the No. 181 at all then?

A Well, wherever it doesn't fit, we may have to adjust our, let's see, the 181 is the one you are referring to?

Q Yes, sir, you said it was Queen-Grayburg, yet none of the offsetting wells have a Grayburg opening.

A Well, the 143, we do not consider it has a Grayburg section, and the 144 and the 151 and the 165. Now, you take 184 and 146, they're right on the line in the Grayburg with regard, when I say right on the line I mean that it's quite possible we might want to, let's see, 184 was an injection well.

Q I was just referring to the wells on the injection pattern and the formations that they were completed in.

A Yes, sir. That particular well through, after we obtain a little injection and pressure data it may be necessary

to maybe open the Grayburg, say, in the 184, and inject water in it. That's as an exam..., and 146, of course, is not an injection well. All the other wells we'd consider having a Grayburg section we'd probably attempt to evaluate secondary prospects.

Q Then the opposite is true down here on the Western Yates Malco lease where the No. 1 well is a Queen well but two of the offsetting wells, the No. 2 and the 3 are Grayburg only?

A Yes, sir.

Q So there wouldn't be any water injection into the Queen formation through those two wells? There is the possibility that as time goes on you may want to open an additional section in some of the wells, is that correct?

A Yes, that is a possibility, yes, sir.

Q Did I understand you, Mr. Bendler, to say that the calculated cement tops on all of the wells are at least 200 feet above the perforations with two exceptions?

A Yes, sir.

Q That was the 503 No. 1 and what was the other well?

A Malco State No. 3, I would say that they are in excess of 100 feet, though.

Q You think it's in excess of 100 feet in those two wells?

A Yes, sir.

Q The one well that does not have the surface pipe cemented in will be used as a single zone injection well with the injection down tubing and under a packer?

A Yes, sir.

Q Another thing you said you were going to inject 300 barrels per day at what expected pressure?

A Probably overall, looking at both zones, it could be 1200 pounds. That's based on analogies of their related reservoirs that are under flood right now.

Q Do you anticipate this is a solution gas drive in both of these pays?

A I would consider 100% on the Queen that it is a solution gas drive. There is insufficient data with regard to the Grayburg to say that it does not have an active water drive. I don't believe that we do. The Grayburg and Queen reflect structurally and the Grayburg dips to the southeast, and that is one of the barriers limit on the production limit is water occurrence downdip on the Grayburg.

Q To the southeast?

A Yes, sir. If there is a water drive, how much it contributes to the reservoir mechanism we couldn't say. My personal opinion, and I believe I will say it for our company,

is that it is not significant.

Q So you do feel that the majority of the reservoir drive would come from solution gas in the Grayburg also?

A Yes, sir.

Q The 15½% primary recovery that you estimated would be for the two zones?

A It's combination, yes, sir.

Q Would it be approximately the same for each of the two zones?

A No, sir. If you would bear with me here, I'd say that the Queen would probably be maybe 17 or 18% and the Grayburg would be, I don't want to give you any misinformation here with regard to my opinion, approximately 14% in the Grayburg.

Q You mentioned that the new tests had been turned in on the wells. Did that include all of the wells in the project area?

A Yes, sir.

Q Would you happen to have a tabulation of the amount of oil that the wells made on the most recent test?

A On a by well basis, per well basis?

Q Yes.

A Not with me, no, sir.

Q Do you have a tabulation of the production by well for

the last month that that figure is available?

A For instance like on the C-115?

Q Yes, sir, for September, or whatever the last one was.

A No, sir, I don't have that with me either.

Q I wonder if you could, when you get home, send us a tabulation of the per well production for the month of September?

A Yes, sir.

Q That would be the most recent complete month?

A Yes, up to date.

Q And your production decline curve Exhibit No. 6, takes the production down through September, but that's for the entire 32-well area, including the acreage which was deleted, is that right?

A Yes, sir.

Q That figure is approximately what for the month of September there?

A Let's see, that would be about 14,250, just roughly.

Q That's the total production for the 32 wells for the entire month of September, then?

A Yes, sir. I believe on a daily basis that figure is about 458 or 490, something like that per day.

Q Referring to your Exhibit 7 which represents the monthly GOR versus cummulative oil production since the wells

had a casinghead gas connection, this curve appears to be a series of high peaks and low dips. Would you explain that, please?

A I will attempt to. In June, if you notice on the Exhibit No. 6, Curve No. 1, we have a high about March, or a peak on the rate curve, that's when we put some pumps on, and I believe that the GOR at the same time, or shortly after that time, had another peak right in there. The basis of that, probably after a flush period you see, why the oil rate dropped and the gas volume stayed about the same, which would make a little higher ratio and then it kind of started leveling off again on the decline.

Q This is a composite GOR for all of the wells in the area?

A Yes, sir, of all 32 wells, yes.

Q Is there any significant difference between the gas-oil ratio on the Queen and on the Grayburg?

A Well, those wells that, I can't make a positive statement there. I believe in my opinion there's some examples of both cases probably. For instance, you take that 163 well which is Section 15, it has a high, fairly high ratio, but it has a real low oil volume, it's an edge well, of course; and then of course, another example would be the E-5003 up there. It produces from both zones and it has a high ratio and low oil

volume also.

Q There are two wells that are Grayburg only, the Malco 2 and 3. How did the ratios run on those wells?

A I can tell you the lease ratio is running around, oh, twenty-one and twenty-two hundred.

Q That would be one Queen well and two Grayburg wells?

A Yes, sir. We do have some water production down there too. You see, the Queen is on the edge of the reservoir there. The one well may contribute a little more gas than the two Grayburgs. I don't think it's appreciably different in that particular case there as regard to edge wells and infield wells too.

Q Now, the new C-116's that you have just filed, do they show the amount of gas produced from each well as well as the oil production?

A Yes, sir.

Q Are those twenty-four hour tests, do you know?

A In the majority of the cases they probably are, yes, sir.

MR. NUTTER: I believe that's all, Mr. Bendler. Does anyone else have a question of Mr. Bendler?

MR. DURRETT: Yes, sir, I have one question.

MR. NUTTER: Mr. Durrett.

BY MR. DURRETT:

Q There seems to be some confusion as to the actual number of wells that are to be injection wells, the case was advertised as sixteen wells to be injection wells?

A Yes, sir.

Q I count specifically thirteen on your Exhibit 1, and I think I heard you mention twelve on direct. Would you clarify that?

A I believe in the statement that Mr. Losee made he said twelve wells or approximately twelve. He should have said thirteen.

Q But it will be thirteen injection wells, is that correct?

A Yes, sir, I believe that's correct.

BY MR. NUTTER:

Q One other question, Mr. Bendler, you were mentioning that as far as Rule 7 which you were proposing in your project rules, that you would delete something that had reference to response. Has that been deleted from the Rule No. 7 as you have proposed it here? Has that been deleted from the previous Rule 7's that the Commission has entered, and is this Rule 7 the one that you propose?

A I believe that Rule 7 is the one that that response

was deleted from. I think Rule 10 in other projects did not have that statement. I believe that's correct.

Q In other words, these are the rules that you propose? You don't propose a further amendment to these which you have presented here in Exhibit 8?

A No, sir. As far as the pressure maintenance is concerned for that duration, these are the proposed rules.

MR. NUTTER: Any further questions of Mr. Bendler? Mr. Irby.

MR. IRBY: Frank Irby, State Engineer's office.

BY MR. IRBY:

Q Mr. Bendler, for the record would you state the depth of your shallow water well, that is your source of supply for this flood and the formation in which it's bottomed?

A If I understand your question correctly, you asked for this particular project, I think perhaps you mean for the water well for this Section 10 project, is that what you mean? We do not have a current water well drilled for this project.

Q I'm referring to the water well in Section 14 which you stated is now being used.

A Yes, sir, that well is the source of water for the flood in Section 10, Northeast there. The depth of that water well is about 235 feet to total depth.

Q What formation is it bottomed in?

A Well, I believe it's a Rustler. I could verify that, I believe, by counsel with my geologist.

Q I'm interested in where it's bottomed and whether or not it penetrates the entire aquifer.

A In my opinion, I believe that it penetrates the entire aquifer present at that point.

Q That's an opinion rather than a fact?

A Well, yes, I would say that's a fact. I'm sorry I misstated it, it would be a fact.

Q Then completely penetrates the Rustler formation. What formation is it bottomed in?

A When you say aquifer, maybe you included all the Rustler anhydrite as the aquifer. What I meant, we have penetrated the water zones in the Rustler anhydrite, if there is anhydrite below it, it is water free. There still is an anhydrite section before you get to salt.

Q You mean that the well is, I am not sure I understand you, that's the reason I keep after you. You mean that the well is bottomed in a impervious strata of anhydrite, is that correct?

A Yes, sir.

MR. IRBY: I don't want to build up a lot of record here, but I would like to state for the Examiner's benefit why I'm going

into these questions and that is that in a recent hearing that consumed nine long days, entirely expert testimony from eight expert witnesses indicates water zones of useable water below this known aquifer, which we have just discussed in Rustler. I'm apprehensive as to what may happen in these wells with regard to that section between the bottom of the surface casing which is indicated on his Exhibit 4 as 336 feet and the top of the cement in the annulus behind the production string which is indicated on the same exhibit as being at 1073 below the surface. I don't want to put a heavy burden on the applicant in this case, and I don't want to be argumentative about this, but I want to be assured that the construction program of these wells is adequate to prevent the escape of any injected water into any zone of porosity or permeability which may exist between these two depths indicated on Exhibit 3.

I don't know whether this can be done or not. If the Examiner can write an order which would permit this subject to proof of adequate casing program and allow a brief but reasonable time for me to go into this with the technical staff of my office and the Western Development Corporation, I think that this can be worked out. I'm not sure whether you can enter such an order, but with no more assurance than I have today I would find it necessary to object to the construction program on these

injection wells. It may be that this can be worked out without any additional cost whatever if we can come to a meeting of the minds as to the geology between these two points or as to some other method of determining from time to time whether there is a means of determining whether or not leakage has occurred.

MR. NUTTER: Mr. Irby, do the sand stringers, or whatever they are, these porous and permeable zones that contain additional water supplies which were indicated by this nine-day hearing, do those zones appear on the logs of wells which are drilling and logged?

MR. IRBY: Yes, sir, I'm not sure that they do in this field, but they do at adjacent periods.

MR. NUTTER: At the points where they have been found they show on the logs?

MR. IRBY: Yes, sir.

BY MR. NUTTER:

Q Do you have available logs for all of the twelve injection wells, or thirteen, whatever it is here in this Exhibit No. 2? Are they all here?

A Yes, sir, they are all there, but they do not necessarily go to the surface.

Q These are just lower section logs?

A Say 150 feet above the Queen, but these logs that we

injection wells. It may be that this can be worked out without any additional cost whatever if we can come to a meeting of the minds as to the geology between these two points or as to some other method of determining from time to time whether there is a means of determining whether or not leakage has occurred.

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A Yes, sir, they are all there, but they do not necessarily go to the surface.

Q These are just lower section logs?

A Say 150 feet above the Queen, but these logs that we

have presented as testimony are a part in almost all cases of logs to the surface.

Q And you do have the logs to the surface on all of these wells?

A I think that we do, but if we do not, I'm sure, in other words, if all the logs don't go to the surface, which I'm sure they do, but if they do not I am sure that fresh water zone is collatable to where it would be positive.

Q Were temperature surveys run on any of the wells to determine where the top of the cement was?

A To my knowledge, no, sir.

Q So these are all calculated tops?

A Yes, sir, based on the description on Exhibit No. 3.

Q Is there any technique that is available today which can be run in the wells that would determine top of the cement? Would a bond log show that?

A Yes, sir. I believe in the majority of the cases that it does.

Q Then a bond log can be run on a ~~log~~ well long after the cement has dried?

A Yes, sir. Of course, I think in industry there's some difference of opinion as to the validity of the bond logs, but probably in the majority of the cases you probably could pick

out a top. At least the logging companies, I'm sure, will say that you could.

MR. NUTTER: Off the record.

(Whereupon, a discussion was held off the record.)

MR. NUTTER: We'll go back on the record and you can make a motion to continue the case until the tail of the docket if you want to.

MR. LOSEE: I'll move that this case be continued to what I hope is not the end of the docket, but at least later on in the day.

MR. NUTTER: Case No. 2656 will be continued till later on in the day.

***

MR. NUTTER: We will reopen 2656. Mr. Losee.

MR. LOSEE: Mr. Examiner, I have a stipulation which I understand has been agreed to by my client Western Development Company and Mr. Irby with the State Engineer's Office which will result in a withdrawal of his protest. The stipulation is that my client agrees to take the thirteen injection wells, proposed injection wells in this project and fill the spacing annulus with water shortly after this hearing, sometime within the next few days, and fill it to the surface, leave the water in there for one week, at which time they will observe the drawdown or

absorption by adding water back into the annulus, and in the absence of any material drop in the water, or leakage showing up by reason of this test, the casing program through the injection wells will be satisfactory to the State Engineer.

In addition we will agree and it can be made a part of the order that we will furnish each month to the State Engineer's Office with a copy of the Conservation Commission form which reflects the pressure on each of the injection wells. Is that substantially correct, Mr. Irby?

MR. IRBY: That is correct, and I so stipulate for the State Engineer and as a result thereof withdraw the objection earlier entered in this matter.

MR. NUTTER: Is the purpose of filling this annular space to determine if there is any porosity or permeability down there that would take the water and possibly also could be producing water?

MR. LOSEE: Yes.

MR. NUTTER: To determine the presence of porous zones in the uncemented interval?

MR. IRBY: Yes, sir.

MR. NUTTER: Mr. Losee, I would like to recall Mr. Bendler since this case is reopened and ask him one more question, if you like.

MR. LOSEE: All right.

CROSS EXAMINATION
(Continued)

BY MR. NUTTER:

Q Mr. Bendler, examination of the plat which you furnished us as Exhibit No. 1 in this case would indicate that there are probably three leases involved in this project, is that correct?

A Yes, sir.

Q It would be the 5003, the 648 and the Malco State lease?

A Yes, sir.

Q Can you tell me if the beneficiaries of these three state leases are identical in each case?

A Yes, sir.

Q They are? That's all I wanted to know.

MR. NUTTER: You are excused.

(Witness excused.)

MR. NUTTER: Does anyone have anything further they wish to offer in Case 2656?

MR. DURRETT: Yes, sir.

MR. NUTTER: Mr. Durrett.

MR. DURRETT: The Commission has a letter in the file ~~of~~ Gulf Oil Corporation, and with your permission I would like

to read a rather lengthy paragraph from this letter, reading as follows. This letter was received October the 5th, the letter reads as follows, the pertinent paragraph:

"The application as advertised provides for water to be injected initially through the 16 injection wells in Sections 11, 14, 15, 22 and 23, Township 19 South, Range 28 East. We have been informed verbally by Western Development Company that they propose to initially inject only into Wells No. 143, 145 and 147 in Section 14 and Well No. 151 in Section 15. It is assumed that the project area will comprise these wells and the direct and diagonal offset well. If this is the case Gulf has no objections provided that the provisions of Rule 701 are complied with insofar as notification to offset operators for expansion of the project area is concerned. If approval is requested by Western for all 16 injection wells without further need for expansion approval, then we object to placing the wells on injection at this time that offset or top allowable Eddy State BN and AN Leases located in Sections 11 and 13. Respectfully", signed W. B. Hopkins for Gulf Oil Corporation.

MR. LOSEE: I would like to make a statement with respect to the letter.

MR. NUTTER: Yes, sir, Mr. Losee.

MR. LOSEE: After our client received a copy of this

letter from Gulf Corporation I discussed the matter with Mr. Kastler, their attorney in Roswell, explained to him that it was our intention, by reason of this application, to request authority at this hearing to place all of the wells on injection, that in view of his letter we would agree and did back our line up so that we do not directly, our project area does not directly offset Gulf's leases.

We discussed the necessity of a further letter from Gulf Oil Corporation and they felt like that none further was needed in view of the way they'd worded the last sentence of this. We object to placing the wells on injection at this time that offset our top allowable and, actually, by our drawing the line back in the project area one location we do not directly offset Gulf in any case.

Now, there is a diagonal offset injection well. I do not have the map in front of me, which we intend to, and request authority to place it on injection at this time. It's included within our project area.

MR. NUTTER: You are certainly not asking for just the four wells that they mentioned in this letter, however?

MR. LOSEE: No, sir, I wanted to make that clear, and by the same token we tried to save their protest by drawing our project area line back one location.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2656? We'll take the case 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 5th day of November, 1962.

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 Examiner hearing of Case No. 2656, heard by me on 10/10, 1962.

, Examiner
New Mexico Oil Conservation Commission

Case 965

September 26, 1962

Losee & Stewart
Attorneys at Law
P. O. Drawer 239
Artesia, New Mexico

Attn. Mr. A. J. Losee

Dear Mr. Losee:

Reference is made to the application of Western Development Company of Delaware dated September 18, 1962 which seeks permission to initiate a secondary recovery project in the East Millman Queen-Grayburg Field in Eddy County, New Mexico. The graphic illustration of the typical casing program employed in the wells does not give any information with regard to tops of cement used in setting the casing. It appears to me that there is considerable 4½ inch casing which has no cement between it and the hole bore and that you propose to inject water through this casing by using the annulus outside the tubing. It would be very helpful to me if you could inform me as to the cementing program employed in the construction of these proposed injection wells. Without this information, I am unable to reach a conclusion as to whether the fresh water which may occur in the area would be protected.

Very truly yours,

S. E. Reynolds
State Engineer

By:
Frank E. Irby
Chief
Water Rights Division

FEI/ma
cc-Mr. A. L. Porter, Jr.
Western Development Co. of Delaware
F. H. Hennighausen

Case 2656

LAW OFFICES
LOSEE AND STEWART
CARPER BUILDING - P. O. DRAWER 239
ARTESIA, NEW MEXICO

A. J. LOSEE
EDWARD B. STEWART

18 September 1962

Mr. A. L. Porter, Jr., Secretary
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

Enclosed herewith you will please find triplicate executed copies of application of Western Development Company of Delaware for a secondary recovery project in the East Millman Queen-Grayburg Field in Eddy County, New Mexico. Please set this application down for hearing before an examiner and advise me of the date of this hearing.

We do not have a log on Well No. 182. Please consider this letter as an amendment to the application which will now show that no log is available on this well.

With a carbon of this letter we are furnishing the State Engineer's office and State Land office with a copy of this application and the attached exhibits.

Very truly yours,

A. J. Losee

AJL:jat
Enclosures

cc: Mr. Frank Irby
State Engineer's Office

Mr. E. S. Johnny Walker
Commissioner of Public Lands

Western Development Company of Delaware
(Artesia and Denver offices)

DOCKET MAILED

Date 9/28/62

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. 2656
Order No. R-2405

APPLICATION OF WESTERN DEVELOPMENT
COMPANY FOR A SECONDARY RECOVERY
PROJECT, EAST MILLMAN QUEEN-GRAYBURG
FIELD, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on October 10, 1962, at Santa Fe, New Mexico, before Daniel S. Nutter, 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 31st day of December, 1962, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, 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, Western Development Company of Delaware, hereinafter referred to as Western Development Company, proposes to institute a secondary recovery project in the East Millman Queen-Grayburg Pool by the injection of water into the Queen and Grayburg formations through 13 injection wells located in Sections 14, 15, 22, and 23, Township 19 South, Range 28 East, NMPM, Eddy County, New Mexico.

(3) That the applicant proposes that said project be classified as a pressure maintenance project and further that the Secretary-Director of the Commission be authorized to re-classify said project as a bona fide waterflood project at such time as the extrapolated production decline curve indicates that the producing capacity of the wells in the project area are in an advanced state of depletion and can properly be classified as "stripper" wells were it not for the water injection occurring during the pressure maintenance phase of the secondary recovery program.

(4) That special rules and regulations for the operation of the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project should be promulgated and, for operational convenience, such rules should include certain flexibility in authorizing the production of the project allowable from any well or wells in the project in any proportion, provided that no well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply and belonging to any other operator should be allowed to produce in excess of top unit allowable for the East Millman Queen-Grayburg Pool until such time as the well has experienced a substantial response from water injection. When such response has occurred, the well should be permitted to produce up to two times top unit allowable for the East Millman Queen-Grayburg Pool. Production of such well at a higher rate should be authorized only after notice and hearing.

(5) That the productivity of wells in the subject area has declined to the point where reasonable accuracy may be expected in extrapolation of the production decline curve; that said extrapolation indicates that the subject area, without benefit of pressure maintenance, will reach an advanced state of depletion on or about September 1, 1963.

(6) That approval of said project will neither cause waste nor impair correlative rights, but will result in the recovery of oil which otherwise might not be recovered.

(7) That the proposed pressure maintenance project and the proposed procedure for reclassification of said project to a waterflood should be approved.

IT IS THEREFORE ORDERED:

(I) That the applicant, Western Development Company, is hereby authorized to institute a pressure maintenance project in the East Millman Queen-Grayburg Pool, Eddy County, New Mexico, by the injection of water into the Queen and Grayburg formations through the following-described wells.

Western Yates State 648 Well No. 143, Unit K, Section 14;
Western Yates State 648 Well No. 145, Unit M, Section 14;
Western Yates State 648 Well No. 147, Unit E, Section 14;
Western Yates State 648 Well No. 151, Unit I, Section 15;
Western Yates State 648 Well No. 152, Unit A, Section 22;
Western Yates State 648 Well No. 153, Unit C, Section 14;
Western Yates State 648 Well No. 156, Unit O, Section 15;
Western Yates State 648 Well No. 158, Unit G, Section 22;
Western Yates State 648 Well No. 182, Unit O, Section 14;
Western Yates State 648 Well No. 184, Unit G, Section 14;

Western Yates Malco-State Well No. 2, Unit C, Section 23;
Western Yates Malco-State Well No. 3, Unit E, Section 23;
Western Yates State E-5003 Well No. 1, Unit A, Section 15;

all in Township 19 South, Range 28 East, NMPM.

(II) That Special Rules and Regulations governing the operation of the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project, Eddy County, New Mexico, are hereby promulgated as follows, effective January 1, 1963.

SPECIAL RULES AND REGULATIONS
FOR THE WESTERN DEVELOPMENT COMPANY
EAST MILLMAN QUEEN-GRAYBURG PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project, hereinafter referred to as the project, Eddy County, New Mexico, shall comprise that area described as follows:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 14: SW/4 NE/4, NW/4, SW/4, W/2 SE/4
Section 15: E/2 NE/4, SE/4 SW/4, SE/4
Section 22: NE/4
Section 23: N/2 NW/4, SW/4 NW/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 well which is shut-in or which 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 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on an 80-acre proration unit shall be top unit allowable for the East Millman Queen-Grayburg Pool.

RULE 6. The allowable assigned to any well 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Commission Rule 502 I (a) and the limiting gas-oil ratio (2,000 to 1) for the East Millman Queen-Grayburg Pool shall be waived during such tests. The project operator shall notify all operators offsetting the 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.

RULE 7. 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 East Millman Queen-Grayburg Pool, whichever is less, provided that any producing well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool until such time as the well receives a substantial response to water injection. When such a response has occurred, the well shall be permitted to produce up to two times top unit allowable for the pool. Production of such well at a higher rate shall be authorized only after notice and hearing. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the East Millman Queen-Grayburg Pool, except that any well or wells within the project area producing with a gas-oil 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, if any, into the East Millman Queen-Grayburg Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any 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 8. Credit for daily average net water injected into the East Millman Queen-Grayburg 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:

$$E_g = (V_{w\ inj} - V_{w\ prod}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^\circ}{T_r} \times \frac{1}{2}$$

where:

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

$V_{w\ inj}$ = Average daily volume of water injected, barrels

$V_{w\ prod}$ = Average daily volume of water produced, barrels

5.61 = Cubic foot equivalent of one barrel of water

P_a = Average reservoir pressure at a datum of + 1700 feet above sea level, psig + 12.00, as determined from most recent survey

15.025 = Pressure base, psi

520° = Temperature base of 60° F expressed as absolute temperature

T_r = Reservoir temperature of 85° F expressed as absolute temperature (545° R)

Z = Compressibility factor from analysis of East Millman Queen-Grayburg gas at average reservoir pressure, P_a, interpolated from compressibility tabulation below:

Pressure Psig	Z	Pressure Psig	Z	Pressure Psig	Z
0	.998	400	.900	800	.802
50	.986	450	.887	850	.790
100	.973	500	.875	900	.777
150	.961	550	.863	950	.765
200	.949	600	.851	1000	.753
250	.936	650	.838	1050	.741
300	.924	700	.826	1100	.729
350	.912	750	.816		

RULE 9. Each month the project operator shall, within three days after the normal unit allowable for Southeast 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 wells in the project as well as the total project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the project.

RULE 10. 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 except that no well in the project which directly or diagonally offsets a well outside the project producing from the same common source of supply shall produce in excess of two times top unit allowable for the pool.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file propor application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells, shall include the following:

(1) A plat showing the 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 depth showing that the injection of gas or water will be confined to the Queen and/or Grayburg formations.

(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.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

(III) That the Secretary-Director of the Commission is hereby authorized to reclassify the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project as a waterflood project, effective September 1, 1963, upon receipt of written request for such reclassification from Western Development Company. Upon reclassification, the above rules governing the pressure maintenance project shall terminate ipso facto and the waterflood project shall in all ways be governed by Commission Rule 701-E, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(IV) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

TOM BOLACK, Chairman

E. S. WALKER, Member

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

esr/

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF WESTERN DEVELOPMENT COMPANY OF DELAWARE FOR A SECONDARY RECOVERY PROJECT, EAST MILLMAN QUEEN-GRAYBURG FIELD, EDDY COUNTY, NEW MEXICO

No. 2656

APPLICATION

COMES WESTERN DEVELOPMENT COMPANY OF DELAWARE by its attorneys, Losee and Stewart, and states:

1. That it is the operator and, with Yates Petroleum Corporation, the working interest owner of 32 producing oil wells located within the East Millman Queen-Grayburg Field, Eddy County, New Mexico, and within the proposed project area covered by this Application; said project area is described as follows:

Township 19 South, Range 28 East, N.M.P.M.

Section 11: E/2 SW/4
Section 14: All
Section 15: E/2 NE/4, SE/4 SW/4, SE/4
Section 22: NE/4
Section 23: N/2 NW/4, SW/4 NW/4

containing 1,280 acres, more or less.

2. There is attached hereto and by reference made a part hereof, a plat showing the location of the proposed injection wells and the location of all other wells and Lessees within a radius of two miles from said proposed injection wells, and the formations from which said wells are producing.

3. That said wells will not reach the advanced or "stripper" state of depletion until on or about June 1, 1963;

that Applicant proposes to inject water into the producing Queen and Grayburg formations in an effort to build and/or maintain the reservoir pressure in the project area until the simulated date on which the wells would have reached the advanced state of depletion, except for said pressure maintenance, at which time the Applicant proposes to continue injecting water into said producing formations in sufficient quantities and under sufficient pressure to stimulate the production of oil from the producing wells in the project area.

4. That Applicant proposes to inject water into the producing Grayburg and Queen formations through the following described wells in Township 19 South, Range 28 East, N.M.P.M., Eddy County, New Mexico, to-wit:

WESTERN-YATES, STATE LEASE 648

Well No. 160, NE/4 SW/4, Section 11,

Well No. 148, NE/4 NE/4, Section 14,

Well No. 153, NE/4 NW/4, Section 14,

Well No. 184, SW/4 NE/4, Section 14,

Well No. 147, SW/4 NW/4, Section 14,

Well No. 161, NE/4 SE/4, Section 14,

Well No. 143, NE/4 SW/4, Section 14,

Well No. 182, SW/4 SE/4, Section 14,

Well No. 145, SW/4 SW/4, Section 14,

Well No. 151, NE/4 SE/4, Section 15

Well No. 156, SW/4 SE/4, Section 15

Well No. 152, NE/4 NE/4, Section 22

Well No. 158, SW/4 NE/4, Section 22

WESTERN-YATES, STATE LEASE E-5003

Well No. 1, NE/4 NE/4, Section 15,

WESTERN-YATES, MALCO STATE LEASE

Well No. 2, NE/4 NW/4, Section 23,

Well No. 3, SW/4 NW/4, Section 23.

5. There is attached hereto, and by reference made a part hereof, copies of logs on all of the proposed injection wells.

6. There is attached hereto, and by reference made a part hereof, a graphic description of the proposed injection well casing program on Western-Yates State 648 Well No. 147. The casing program for this well is typical of the casing program for the other proposed injection wells covered by this Application. The Gamma Ray Neutron Log on this well reflects that the top of the Queen formation is 1,681 feet below the surface and the top of the Grayburg formation is 2,026 feet below the surface.

7. The source of water for this project is water wells to be drilled by the Applicant within the project area. If these wells will not produce sufficient quantities of water then the Applicant proposes to contract for the purchase of supplemental water from Caprock Water Company or other similar company.

8. The Applicant proposes to inject water into each of the injection wells at a pressure of 1,200 p.s.i. and at the rate of 300 barrels per day.

9. The Applicant proposes to conduct said secondary recovery project in accordance with the allowable provisions of Rule 701 of the New Mexico Oil Conservation Commission.

10. The approval of this secondary recovery project will be in the interest of conservation, will prevent waste and correlative rights will be protected.

WHEREFORE, Applicant prays the orders of the Commission as follows:

1. That this matter be set for hearing before an examiner duly appointed by the Commission and that due notice be given thereof as required by law.

2. That after hearing, an order be entered authorizing the Applicant to institute the aforesaid secondary recovery project by the injection of water into the producing Grayburg and Queen formations through the injection wells hereinabove described and that allowables be established for the project equivalent to a pressure maintenance allowable until June 1, 1963, and equivalent to a waterflood allowable after June 1, 1963.

3. And for such other relief as may be just in the premises.

WESTERN DEVELOPMENT COMPANY OF DELAWARE

By _____

A. J. Losee of
LOSEE AND STEWART
Attorneys at Law
Post Office Drawer 239
Artesia, New Mexico

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

January 2, 1963

COPY

Mr. A. J. Losee
Losee & Stewart
Attorneys at Law
Post Office Box 239
Artesia, New Mexico

Dear Sir:

Enclosed herewith are two copies of Order No. R-2405 recently entered in Case No. 2656, application of Western Development Company for a Secondary Recovery Project, East Millman Queen-Grayburg Pool, Eddy County, New Mexico.

Although the order does not specifically say so, approval of the Western Yates State 648 Lease Well No. 147, located in Unit E of Section 14, Township 19 South, Range 28 East, as a water injection well is contingent upon satisfactory repair of an apparent casing leak in the well. In a recent telephone conversation between myself and Dick Davenport of Western Development, it was agreed to cover this repair in the letter of transmittal rather than in the order itself.

It is requested that you advise the Oil Conservation Commission's Artesia Office as well as James I. Wright of the State Engineer's Roswell Office of the method and time that the casing in the No. 147 will be repaired.

Very truly yours,

DANIEL S. NUTTER
Chief Engineer

DSN/ir

cc: Frank E. Irby
State Engineer Office
Santa Fe, New Mexico

James I. Wright
State Engineer Office
Roswell, New Mexico

Oil Conservation Commission - Artesia, New Mexico

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

December 12, 1962

ADDRESS CORRESPONDENCE TO:
STATE CAPITOL
SANTA FE, N. M.

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Attn. Mr. Dan Nutter

Dear Mr. Nutter:

Enclosed are Jim Wright's memorandum to me (11-30-62), his curves on lowering of fluid in 7 selected wells, his tabulation of measurements to water in the 16 wells and his memorandum to me dated 12-8-62 which was a result of my telephonic request for a clear explanation of his method of plotting the curves. I will elaborate some on the curves.

The dashed line departing from the solid line on each curve represents the maximum rate of lowering for the specified well. This was plotted by arbitrarily picking two points that represented the most rapid rate of lowering.

On the right side of the graph "Fluid transmitted in gallons" is arrived at by multiplying the lowering of "Depth to fluid in feet below datum" by the number of gallons of fluid per linear foot of annular space in the specific well.

I think the computation formula can best be explained by the illustration below.

Depth to fluid at top point on curve representing most extreme condition.

Depth to fluid at lower point on curve representing most extreme condition.

Gallons of fluid required to fill one linear foot of annular space of the selected well.

$$\frac{(46-0)\ (3.3)}{16\ -\ 8} = \text{Maximum loss of fluid } 18.97 \text{ gallons per day}$$

Relative measuring date of lower point on curve representing most extreme conditions.

Relative measuring date of top point on curve representing most extreme conditions.

Although the values with respect to days, feet and gallons vary, the same

formula is used except for well 147 where hours are used instead of days.

The sharp break in the curve for well 147 indicates a leak at about 41 feet, in my opinion. If the fluid level in the annulus is above this point an escape of approximately 90 barrels per day could occur. I recommend that measures be takn to correct this situation.

I find no objection to the granting of the application provided Western Development Company is agreeable to my recommendation in the preceding paragraph, which I believe they will find to be to their interest.

If further discussion of this matter is desired please call on me at your convenience.

Very truly yours,

S. E. Reynolds
State Engineer

By: Frank E. Irby
Frank E. Irby
Chief
Water Rights Division

FEI/ma
cc-Mr. Jack Bendler
James I. Wright

MEMORANDUM

State Engineer Office
Roswell, New Mexico
December 8, 1962

TO Frank E. Irby, Chief, Water Rights Division

FROM James I. Wright

SUBJECT

I am submitting three copies of the report with the exhibits revised as per our telephone conversation December 7, 1962.

The computed maximum infiltration rates which are shown on the attached curves were arrived at by multiplying the slope of the curve times a conversion factor. The maximum slope of the curve was found by arbitrarily picking two values from the curve, subtracting these values, and dividing by the time interval. The conversion factor is introduced for the purpose of converting feet of fluid in the annulus to volume of fluid expressed in gallons.

The maximum slope was used since the maximum slope must be exceeded by the leakage rate before fluid can appear at the surface. In reality, the actual time required for this fluid to surface will be considerably less than the calculated amount due to the decrease in the infiltration rate with decreasing head.

James I. Wright
Field Engineer

JIW:jlc
cc:

1962 DEC 10 AM 9:46

STATE ENGINEER OFFICE
SANTA FE, N. M.

November 30, 1962

Frank E. Irby, Chief, Water Rights Division

James I. Wright

Application of Western Development Company of Delaware for Secondary Recovery Project, East Millman-Queen Grayburg Field, Eddy County, New Mexico, before the Oil Conservation Commission

In accordance with your memo of October 10, 1962, the annular space between the surface casing and the production casing of the proposed injection wells of the subject flood were filled with water on October 29, 1962. On November 7, 1962, I visited these wells and measured the depth to fluid below the opening on the outside casing and calculated the volume of water lost by infiltration from October 29, 1962 to November 7, 1962. I was not satisifed with the results obtained by this test and decided to run a second infiltration rate-test on six of these wells. The results of the latter tests, covering the period of November 7, 1962 to November 16, 1962 were plotted and the infiltration rates determined by graphic methods. The infiltration rates for these wells varied from 0.32 gal/day to 161 gal/day and further indicated that these wells had been filled with fluid on November 6, 1962. Copies of these graphs are attached as well as a tabulation of all of the information which was collected.

The Yates and Seven Rivers formations are probably open in most of the wells and do not appear to have much permeability in this area. The static fluid level in the area of the proposed flood will probably be in excess of 300 feet, but less than 600 feet, below the surface. Although there is very little factual data to support this figure, I believe that it is on the correct order of magnitude based upon my general knowledge of the area. The elevation of the land surface at each well and the density of the fluid in the annulus will effect the depth to water but will not be of significance.

It should be pointed out that the infiltration rates which were computed indicate the amount of water which the formation will take at maximum head. If a leak develops in the production casing it would be necessary to fill the annular space with fluid in addition to exceeding the infiltration rate at maximum head before fluid would appear at the surface.

With the exception of well #147, a leak of 1 GPM would show up at the surface in less than two days after the leak commenced, assuming that the hole condition remains unchanged. The sharp break in the infiltration rate curve for well #147 indicates the possibility of a leak in the surface casing. This well could have a leak exceeding 2 GPM without any fluid appearing at the surface, however, a leak of 3 GPM would be indicated at the surface in less than two days.

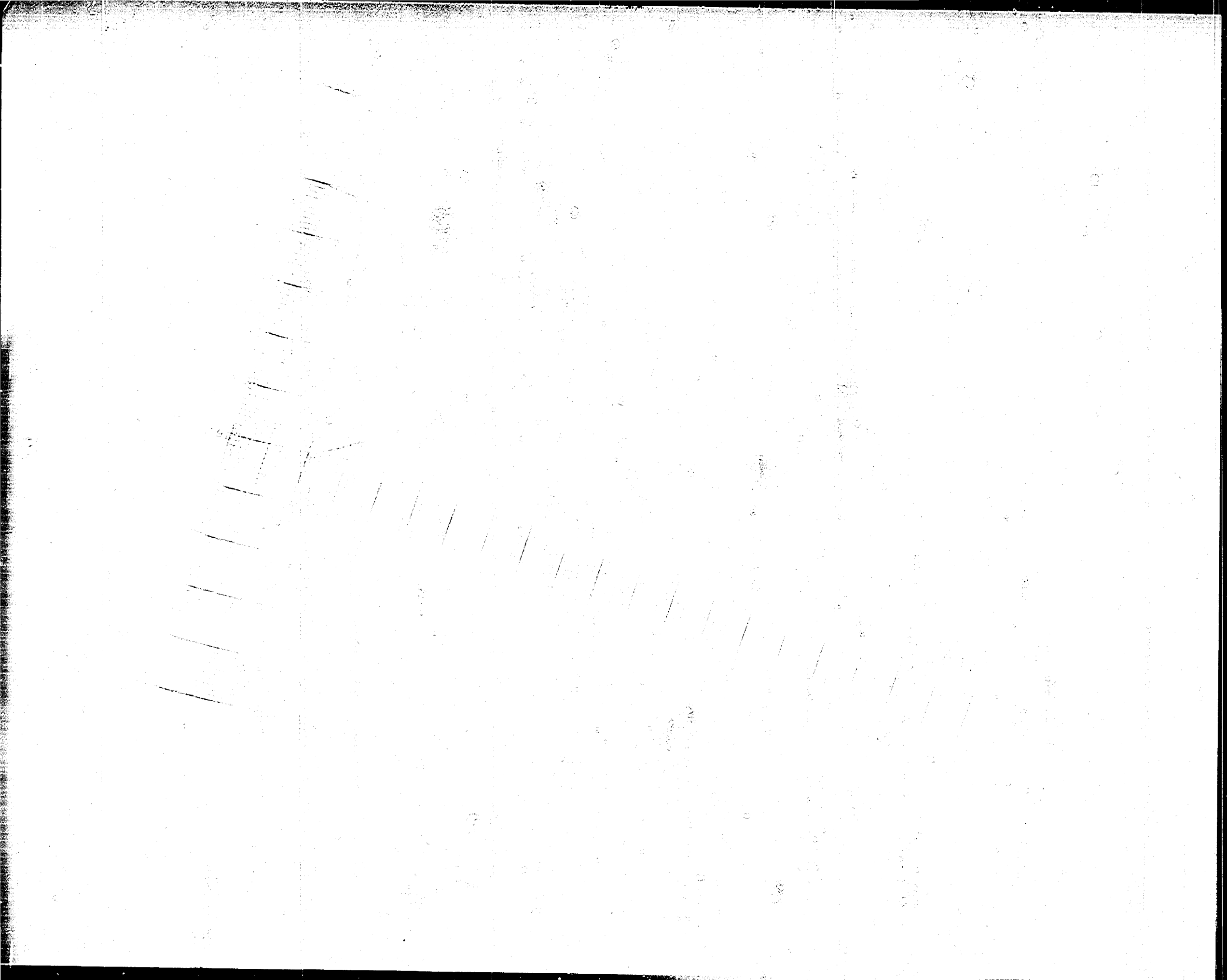
It appears that any leak of significance in the production casing of any of the wells in this proposed flood will be apparent at the surface if the annulus is left open to the atmosphere, and it is my understanding that this will be the case

during the operation of the proposed flood. I feel that the injection of water through the production casing is fairly safe in this area since any leak of significance can be easily detected by the operator, and any increase in the specific injection rate will be reflected on O.C.C. Form C-120 which you indicated you had requested be filed monthly with the State Engineer.

Very truly yours,

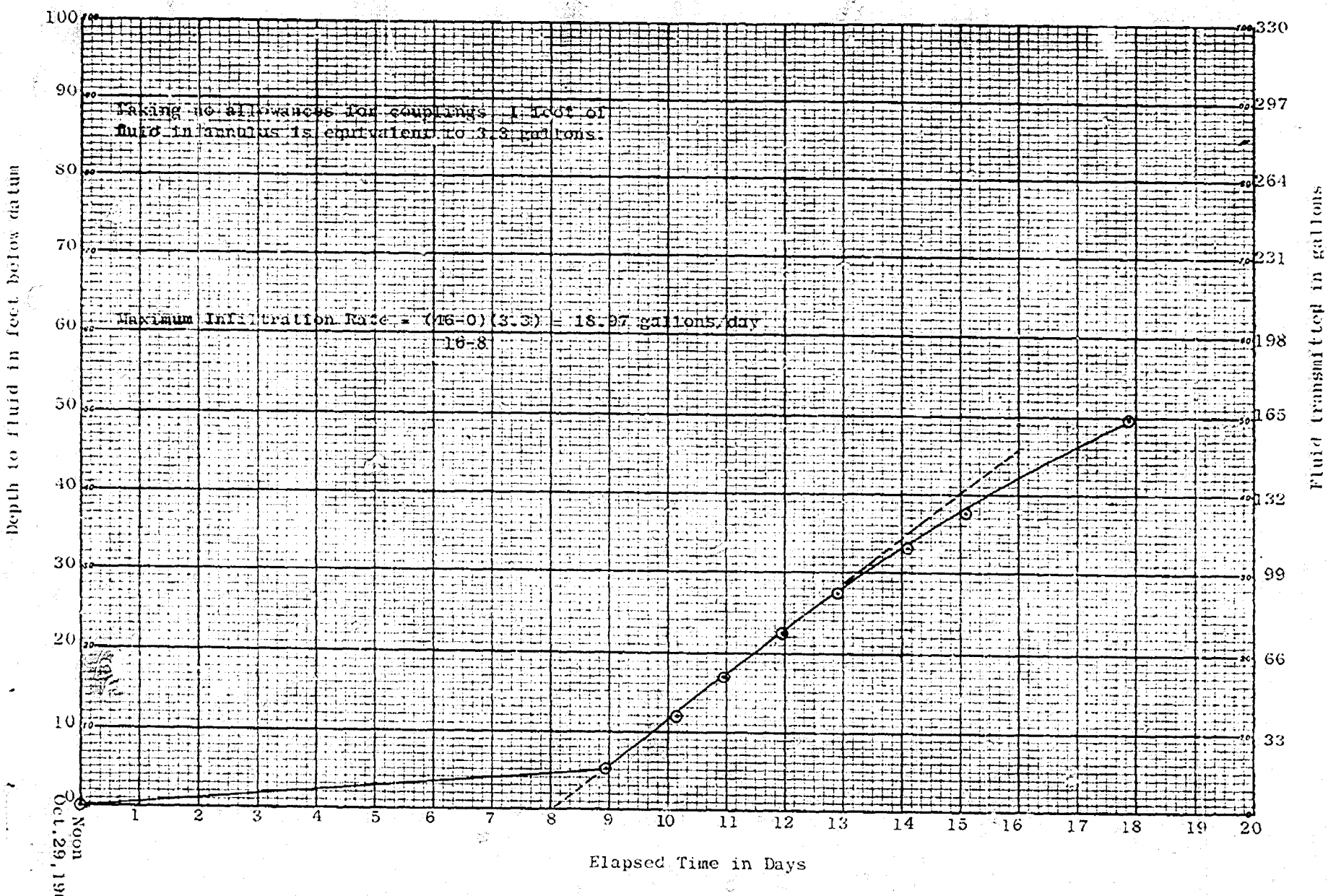
James I. Wright
Field Engineer
Water Rights Division

JIW:ffc
cc: Fred H. Hennighausen

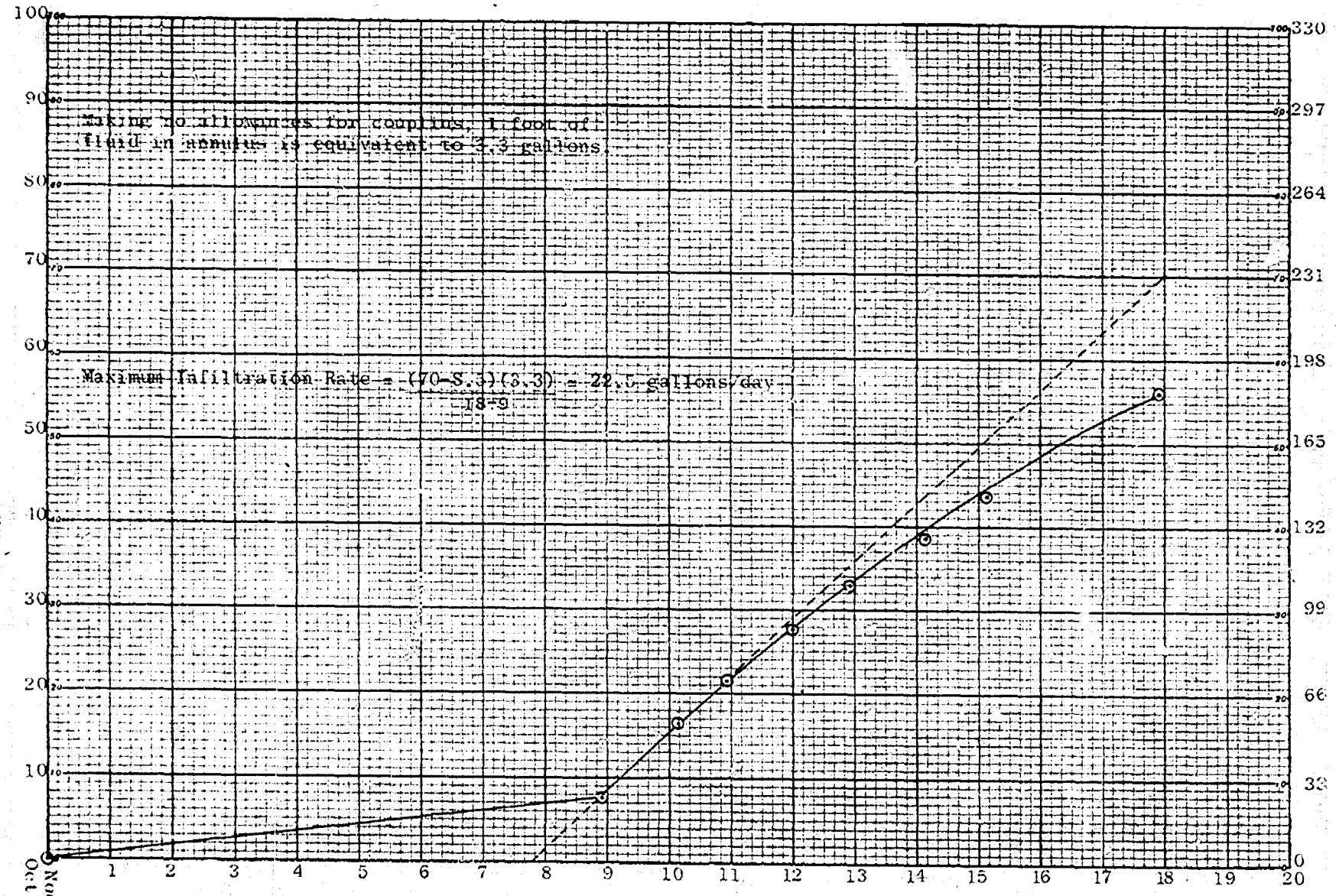


WESTERN YATES MALCO STATE NO. 3

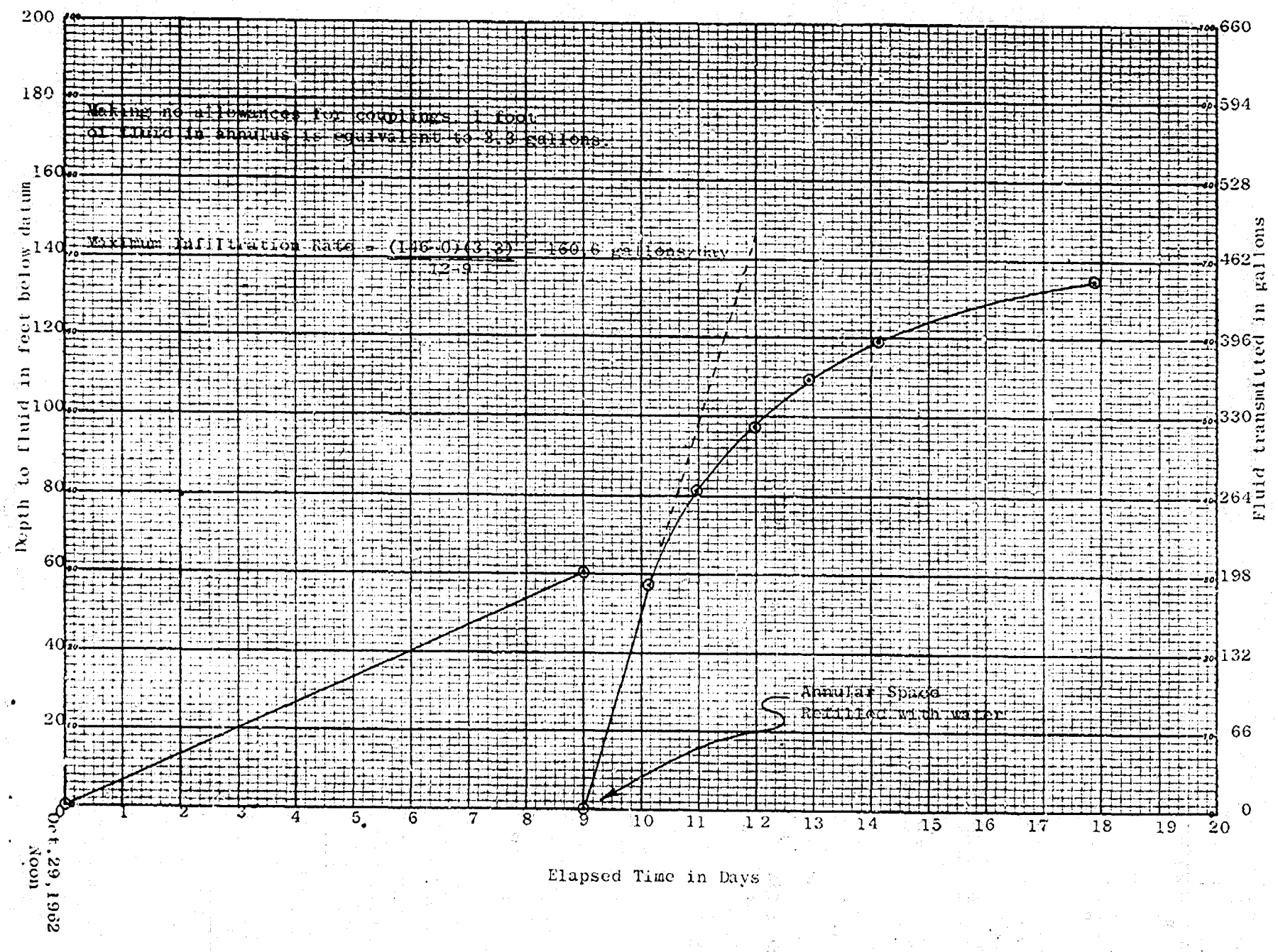
SW¼NW¼ Section 23, Township 19 South, Range 28 East



WESTERN YATES STATE 648 No. 184
SW¼NE¼ Section 14, Township 19 South, Range 28 East



WESTERN YATES MALCO STATE NO. 2
NE¼NW¼ Section 23, Township 19 South, Range 28 East



WESTERN YATES STATE 648 No. 160

NE¼SW¼ Section 11, Township 19 South, Range 28 East

Making no allowances for couplings, 1 foot of fluid in anulus is equivalent to 1.85 gallons.

Maximum Inflitration Rate = $\frac{(22.8-0.7)(1.33)}{11-8}$ = 6.3 gallons/day

Depth to fluid in feet below datum

50 45 40 35 30 25 20 15 10 5

Fluid transmitted in gallons

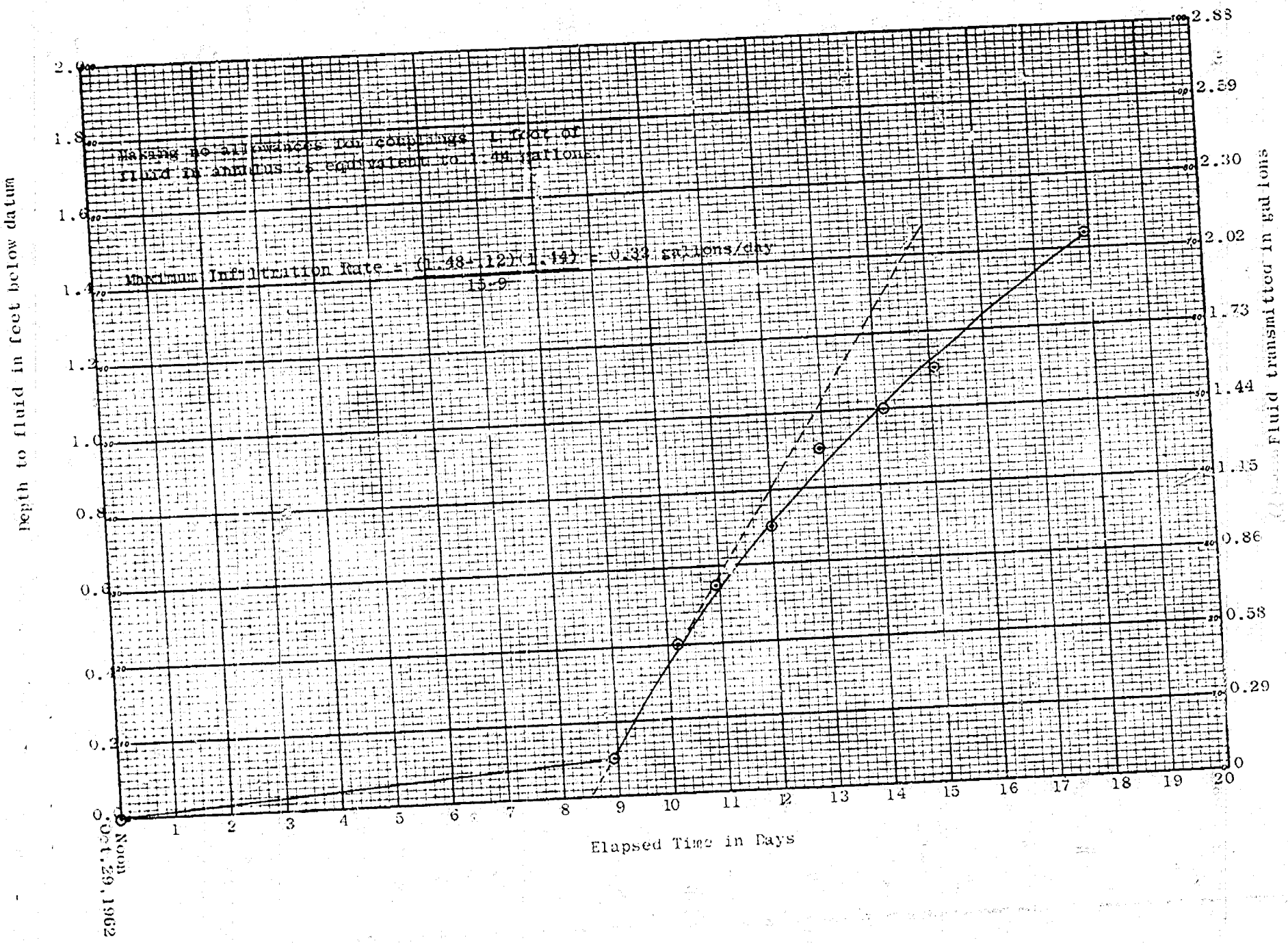
92.50 83.25 74.00 64.75 55.50 46.25 37.00 27.75 18.50 9.25 0

Noon Oct. 29, 1962

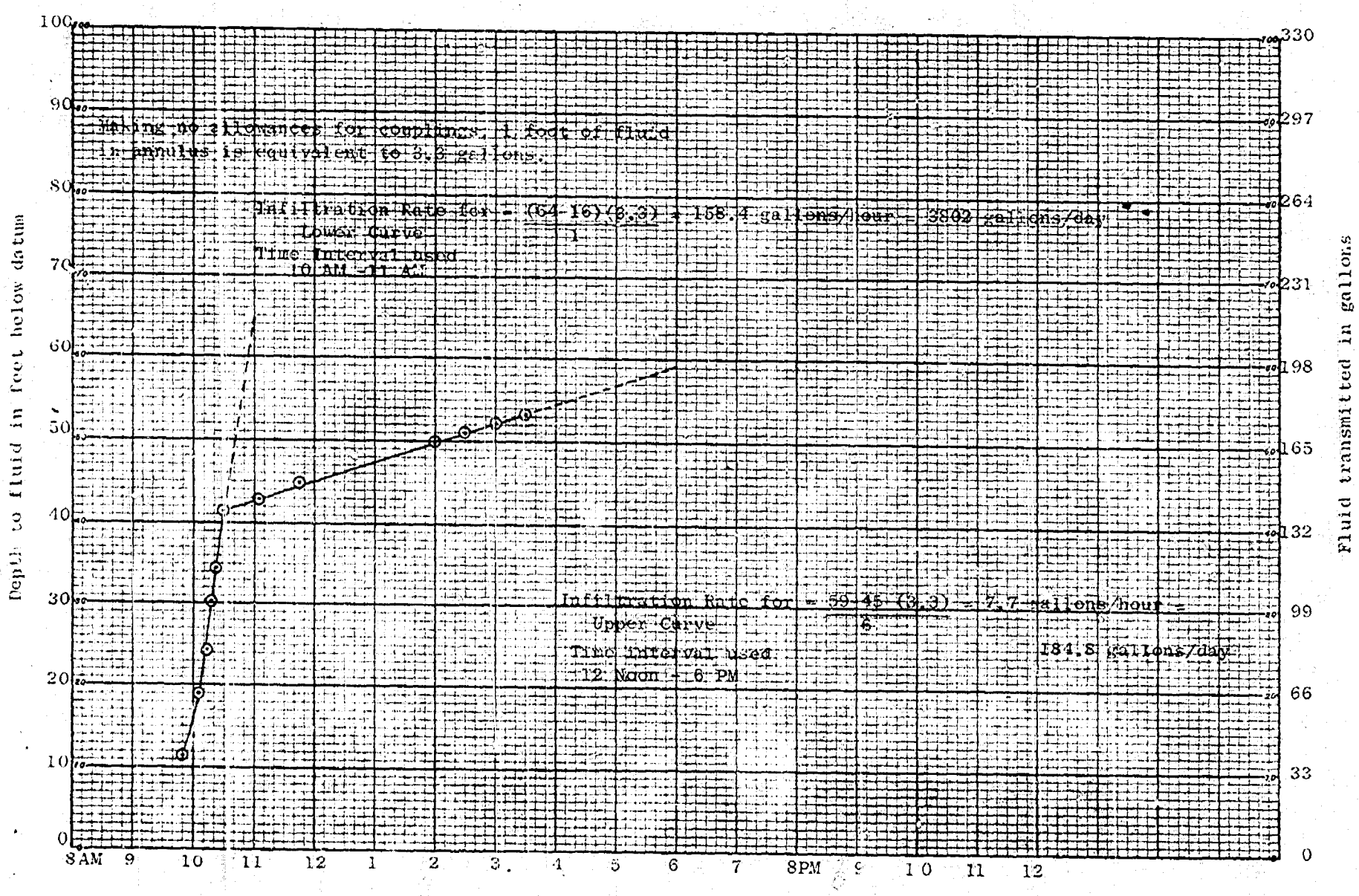
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Elapsed Time in Days

WESTERN YATES STATE 648 No. 182
SW¼SE¼ Section 14, Township 19 South, Range 28 East

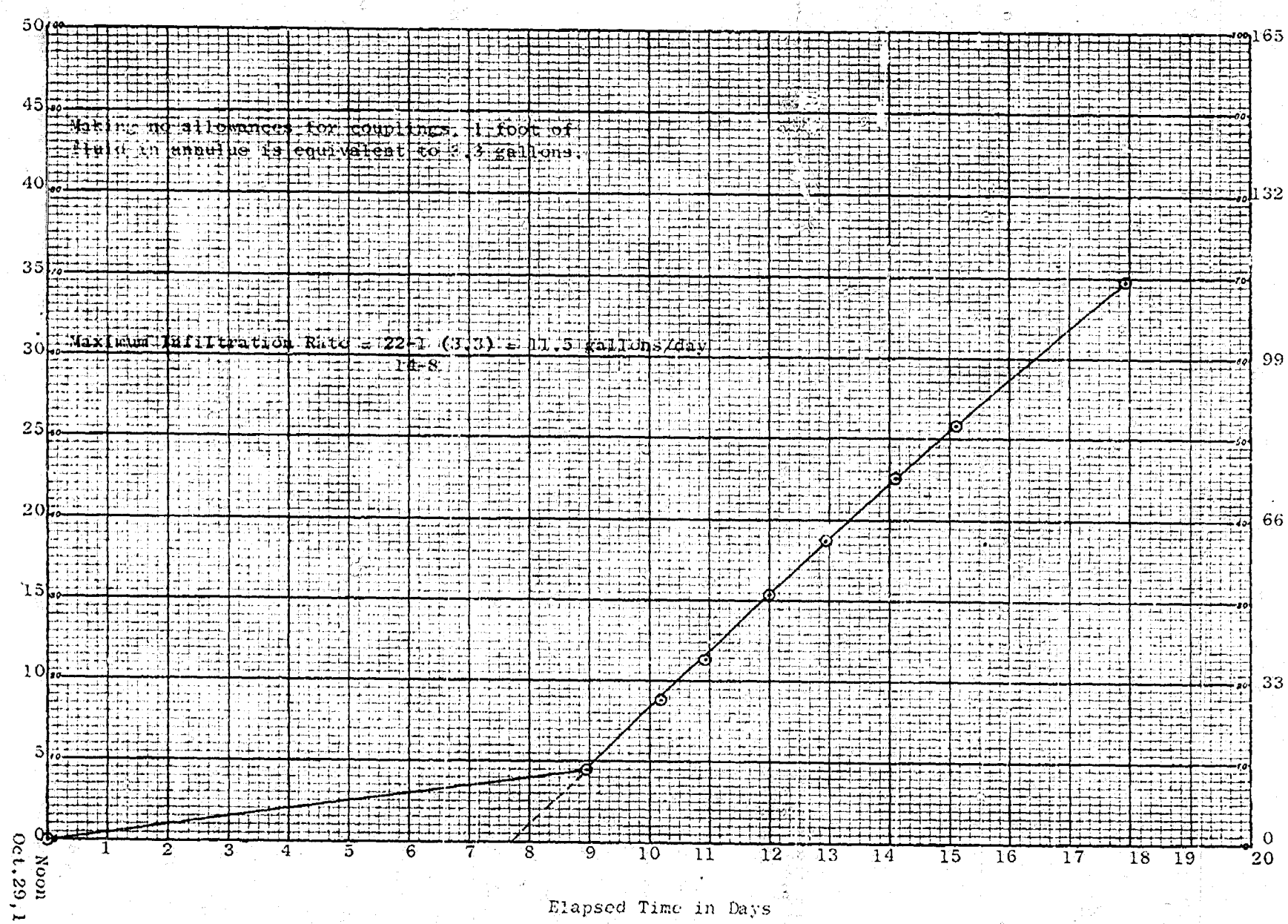


WESTERN YATES STATE 648 No. 147
SW¼NW¼ Section 14, Township 19 South, Range 28 East



Time in hours
November 27, 1962

WESTERN YATES STATE 648 No. 148
$NE\frac{1}{4}NE\frac{1}{4}$ Section 14, Township 19 South, Range 28 East



WESTERN DEVELOPMENT COMPANY OF DELAWARE
SECONDARY RECOVERY PROJECT INJECTION WELLS

Well No.	Depth to Fluid Below Datum in Feet											Volume of Annular Space Above Estimated Water Table in Gallons	Maximum Infiltration Rate in Gallons/day
	10/29/62 Computed Prior to Filling	10/29/62 After Filling	11/7/62	11/8/62	11/9/62	11/10/62	11/11/62	11/12/62	11/13/62	11/16/62	11/20/62		
Malco #3	20	0	5.1	12.0	17.0	22.5	27.45	33.20	37.84	49.72	64.15	1980	19.0
Malco #2	65	0	60.2	59.5	81.40	97.6	109.60	119.60		134.33	138.00	1980	160.6
#182	0		.1	.40	.55	.70	.90	1.00	1.10	1.44	1.90	864	0.3
#184	13	0	7.7	16.4	21.6	27.8	33.0	38.85	43.8	56.29	71.05	1980	22.5
#148	26	0	4.2	8.7	11.45	15.4	18.7	22.6	25.82	34.88	47.05	1980	11.5
#160	33	0	4.1		11.65	15.4	19.0	23.4	29.1	36.18	47.55	1110	6.8
#152		0	0.6	0.8					3.75	5.26		1980	1.7
#158		0	0.7	0.9					4.74	6.61		1980	2.2
#145	7.0	0	0.6	0.6					.80	.89		1980	0.1
#156	0	0	0.1						7.2	3.40		1980	1.1
#151	13	0	0.1						1.65	1.95		1980	0.8
#143	0	0	.05						0.6	.71		1110	1.8
#161	11.0	0	2.5	4.3					11.27	14.26		1110	2.6
#147	129	0	17.0						144.5	146.20	147.50	1980	3802.0
#5000=1	25	0	2.5	5.7					17.1	33.42		524	2.2
#153	7	0	0.1						2.96	3.95		1980	1.5

RECOMMENDED RULES AND REGULATIONS
FOR THE EAST MILLMAN QUEEN-GRAYBURG OIL POOL
PRESSURE MAINTENANCE PROJECT

RULE NO. 1

The project area of Western Development Company of Delaware East Millman Queen-Grayburg Pressure Maintenance Project, hereinafter referred to as the Project, Eddy County, New Mexico shall comprise that area described as follows:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, N. M. P. M

Section 14: SW/4 of the NE/4, NW/4, SW/4, W/2 of the SE/4

Section 15: E/2 of the NE/4, SE/4 of the SW/4, SE/4

Section 22: NE/4

Section 23: N/2 of the NW/4, SW/4 of the NW/4

RULE NO. 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 NO. 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 NO. 4

The allowable assigned to any well which is shut-in or which 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 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE NO. 5

The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the East Millman Queen-Grayburg Oil Pool.

RULE NO. 6

The allowable assigned to any well 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 should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Commission Rule 502 I (a) and the limiting gas-oil ratio (2,000 to 1) for the East Millman Queen-Grayburg Oil Pool shall be waived during such tests. The project operator shall notify all operators offsetting the 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.

RULE NO. 7

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 East Millman Queen-Grayburg Oil Pool, whichever is less, provided that any producing well in the project area which directly or diagonally offsets a well outside the project area producing from the same common source of supply shall not produce in excess of two times top unit allowable for the pool. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the East Millman Queen-Grayburg Oil Pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cu.ft.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, if any, into the East Millman Queen-Grayburg Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

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

RULE NO. 8

Credit for daily average net water injected into the East Millman Queen-Grayburg 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:

$$E_g = (V_{w\,inj} - V_{w\,prod}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^\circ}{T_r} \times \frac{1}{Z}$$

RULE NO. 9

Each month the project operator shall, within three days after the normal unit allowable for Southeast 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 wells in the Project as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE NO. 10

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 except that no well in the Project which directly or diagonally offsets a well outside the Project producing from the same common source of supply shall produce in excess of two times top unit allowable for the Pool.

RULE NO. 11

The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall include the following:

(1) A plat showing the 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 depth showing that the injection of gas or water will be confined to the Queen-Grayburg 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.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 871
SANTA FE

December 31, 1962

Mr. A. J. Losee
Losee & Stewart
Attorneys at Law
Box 239
Artesia, New Mexico

Re: Case No. 2656
Order No. R-2405
Applicant:
Western Development Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC
OTHER

WESTERN-YATES

EAST MILLMAN POOL
EDDY CO., N. MEX.

STATE 648 WELL NO. 147
Sec. 14, T-19-S, R-28-E

Typical Casing Program

Proposed Injection Program

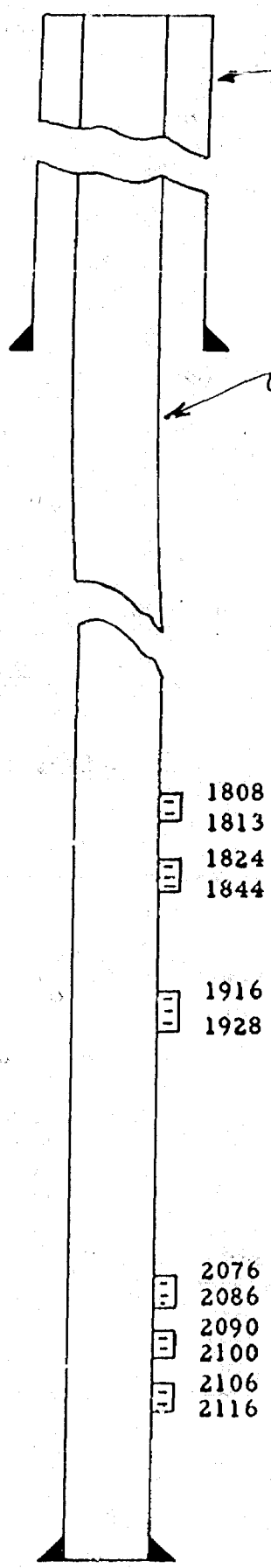
10 3/4" OD casing set at 336' cemented with 75 sx. cement.

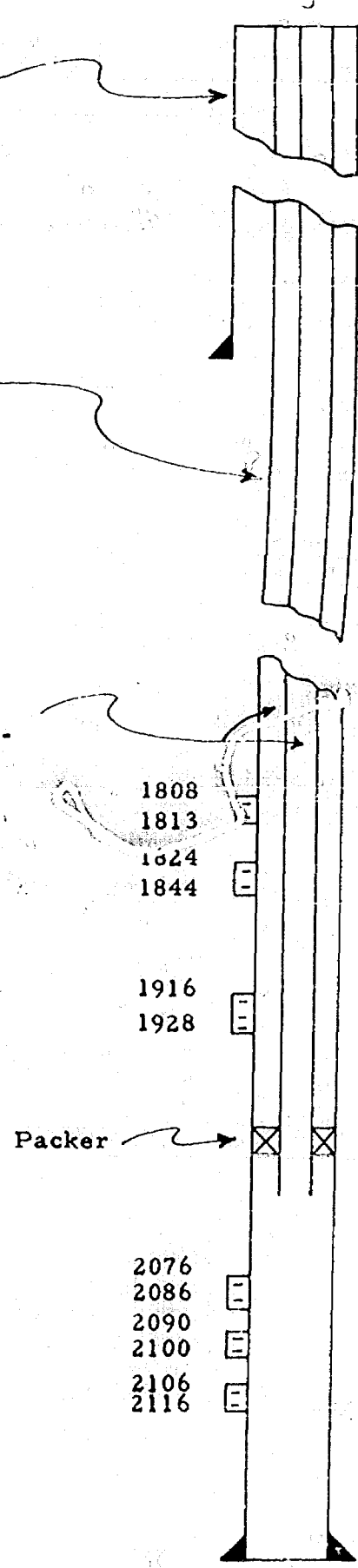
Calculated top of cement is 32' from surface based on average open hole size of 13" in diameter.

4 1/2" OD 11.60 lb. casing set at 2255' cemented with 250 sx. cement.

Calculated top of cement is 1073' from surface based on average open hole size of 8 1/8" in diameter.

2 3/8" OD 4.7 lb. tubing for injection into the Grayburg Formation. Injection into the Queen Formation will be through tubing-casing annulus.





BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Gyrol EXHIBIT NO. 3
CASE NO. 2656

	Completion Date	Elevation G.L.	Total Depth	Plug Back Depth	Casing Sizes	Casing Depth	Cement	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Company, Lease and Well Number	Completion Date	Elevation G.L.	Total Depth	Plug Back Depth	Casing Sizes	Casing Depth	Cement	Perforated Intervals
Western Yates Maico State								
Well No. 2	8-8-59	3407'	2566'	2360'	10 3/4"	390'	75 sx.	2126-46'; 2262-8'
					4 1/2"	2362'	250 sx.	
Well No. 3	11-12-60	3410'	2620'	2460'	10 3/4"	353'	75 sx.	2138-50'; 2263-72';
					4 1/2"	2475'	120 sx.	2280-86'
Western Yates State E-5003								
Well No. 1	2-9-61	3454'	2295'	2293'	7"	526'	125 sx.	1796-1808'; 1824-30';
					4 1/2"	2294'	175 sx.	2068-74'; 2192-9[illegible];
								2204-10'; 2248-52'
Western Yates State 648								
Well No. 143	6-18-58	3427'	1892'	1891'	8 5/8"	606'	150 sx.	1744-62'; 1798-1[illegible];
					4 1/2"	1892'	100 sx.	1960-70'
Well No. 145	1-29-59	3443'	2500'	2498'	10 3/4"	300'	75 sx.	1830-45'; 1863-7[illegible];
					4 1/2"	2500'	325 sx.	2032-80'
Well No. 147	3-4-59	3444'	2255'	2253'	10 3/4"	336'	75 sx.	1808-1[illegible]; 1824-4[illegible];
					4 1/2"	2255'	250 sx.	1916-28'; 2076-8[illegible];
								2090-2100'; 2106-1[illegible]
~~Well No. 148~~	~~3-23-59~~	~~3404'~~	~~2175'~~	~~2172'~~	~~10 3/4"~~	~~327'~~	~~75 sx.~~	~~1740-60'; 1787-9[illegible];~~
					~~4 1/2"~~	~~2175'~~	~~250 sx.~~	~~1896-1[illegible]; 2086-9[illegible];~~
Well No. 151	7-8-59	3471'	2141'	2114'	10 3/4"	287'	Mudded	1880-48'
					4 1/2"	2115'	300 sx.	
Well No. 153	7-29-59	3421'	2663'	2188'	10 3/4"	465'	75 sx.	1778-88'; 1808-2[illegible];
					4 1/2"	2542'	400 sx.	1961-72'; 1972-8[illegible];
								2126-32'; 2172-7[illegible]
Well No. 156	10-26-59	3428'	2296'	2294'	10 3/4"	320'	75 sx.	1816-34'; 2000-6[illegible];
					4 1/2"	2296'	300 sx.	2068-73'; 2086-9[illegible];
								2098-2106'; 2130-4[illegible]
Well No. 158	12-12-59	3433'	2273'	2245'	10 3/4"	357'	75 sx.	1788-1802'; 2058-63'
					4 1/2"	2270'	450 sx.	
Well No. 160	2-10-60	3398'	2597'	2050'	10 3/4"	440'	75 sx.	1878-82'; 2020-24';
					4 1/2"	2594'	328 sx.	2036-40'
~~Well No. 160~~	~~3-7-60~~	~~3446'~~	~~2245'~~	~~2243'~~	~~8 5/8"~~	~~342'~~	~~100 sx.~~	~~2038-45'; 2077-85';~~
					~~4 1/2"~~	~~2245'~~	~~100 sx.~~	~~2092-96'; 2150-54';~~
								~~2185-94'~~

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 4
CASE NO. 2656

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE No. 2656
Order No. R-2405-A

APPLICATION OF WESTERN DEVELOPMENT COMPANY FOR A SECONDARY RECOVERY PROJECT, EAST MILLMAN QUEEN-GRAYBURG FIELD, EDDY COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Commission that due to clerical error and mistake, Order No. R-2405, dated December 31, 1962, does not correctly state the intended order of the Commission,

IT IS THEREFORE ORDERED:

(1) That the phrase "80-acre" is hereby stricken from Rule 5 of the Special Rules and Regulations for the Western Development Company East Millman Queen-Grayburg Pressure Maintenance Project, and the phrase "40-acre" is hereby interlineated in lieu thereof.

(2) That this order shall be effective nunc pro tunc as of December 31, 1962.

DONE at Santa Fe, New Mexico, on this 24th day of January, 1963.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell

JACK M. CAMPBELL, Chairman

E. S. Walker

E. S. WALKER, Member

A. L. Porter Jr.

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

esr/

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 871
SANTA FE

January 24, 1963

Mr. A. J. Losee
Losee & Stewart
Post Office Box 239
Artesia, New Mexico

Re: Case No. 2656
Order No. R-2405-A
Applicant:
Western Development Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC _____
OTHER _____

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

August 22, 1963

COPY

International Oil & Gas Corporation
P. O. Box 427
Artesia, New Mexico

Attention: Mr. R. J. Davenport

Gentlemen:

Reference is made to your letter dated August 12, 1963, wherein you request that the Secretary-Director of the Commission reclassify your East Millman Queen Grayburg Pressure Maintenance Project to a waterflood project effective September 1, 1963, pursuant to Section III of Order No. R-2405.

By the authority vested in me by said Order No. R-2405, the aforesaid pressure maintenance project is hereby reclassified. This water injection project will henceforth be governed by Rule 701-E of the Commission Rules and Regulations, and the special rules relating to the pressure maintenance project as set forth in said Order No. R-2405 shall be of no further force or effect.

When all of the wells authorized for water injection have been placed on active injection, this project will be eligible to receive a maximum water flood allowable of 1050 barrels of oil per day.

Very truly yours,

A. L. PORTER, Jr.,
Secretary-Director

ALP/DSN/og
cc: Oil Conservation Commission - Artesia
Oil & Gas Engineering Committee - Hobbs
State Land Office - Santa Fe

INTERNATIONAL OIL & GAS CORPORATION

825 PETROLEUM CLUB BUILDING
DENVER 2, COLORADO

ADDRESS REPLY TO:
P. O. Box 427
Artesia, New Mexico
August 12, 1963

State of New Mexico
Oil Conservation Commission
P.O. Box 871
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr., Secretary-Director

Dear Sir:

International Oil & Gas Corporation, formerly Western Development Company of Delaware, hereby requests the Secretary-Director of the Commission to reclassify our East Millman Queen Grayburg Pressure Maintenance Project to a water flood project effective September 1, 1963 as per Section (111), Order No. R-2405 dated October 10, 1962. Reclassification of this project will convert to a water flood proration as per Commission Rule No. 701.

Thank you for your cooperation in this matter.

Very truly yours,

INTERNATIONAL OIL & GAS CORPORATION

R. J. Davenport
R. J. Davenport
District Superintendent

RJD:cm

cc: New Mexico Oil Conservation Commission
P.O. Drawer DD
Artesia, New Mexico
Attn: Mr. M. L. Armstrong

Map Allow
1050

R-2405: (10/31/62) Can be reclassified effective 9/1/63
Press Maint Project
Terminate Spec Rules upon Reclassification to WF Proj by Secy Dir upon written request for reclass by oper. Proj then governed in all ways by Rule 701-E incl gas provisions thereof and not previous

P. O. Box 427
Artesia, New Mexico
August 12, 1963

State of New Mexico
Oil Conservation Commission
P.O. Box 871
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr., Secretary-Director

Dear Sir:

International Oil & Gas Corporation, formerly Western Development Company of Delaware, hereby requests the Secretary-Director of the Commission to reclassify our East Millman Queen Grayburg Pressure Maintenance Project to a water flood project effective September 1, 1963 as per Section (111), Order No. R-2405 dated October 10, 1962. Reclassification of this project will convert to a water flood proration as per Commission Rule No. 701.

Thank you for your cooperation in this matter.

Very truly yours,

INTERNATIONAL OIL & GAS CORPORATION

R. J. Davenport
District Superintendent

RJD:cm

cc: New Mexico Oil Conservation Commission
P.O. Drawer DD
Artesia, New Mexico
Attn: Mr. M. L. Armstrong

Western Development Company of Delaware

69 SENA PLAZA, SANTA FE, NEW MEXICO
TELEPHONE YUcca 2-5508
P. O BOX 427 ARTESIA, NEW MEXICO

October 11, 1962

Mr. Daniel S. Nutter, Chief Engineer
New Mexico Oil Conservation Commission
P.O. Box 871
Santa Fe, New Mexico

Re: Case No. 2656; Application of Western Development Company Of Delaware for Secondary Recovery Project, East Millman Queen-Grayburg Pool, Eddy County, New Mexico

Dear Dan:

In keeping with your request I am enclosing herewith the Oil Conservation Commission forms C-115 and C-116 for your disposition.

Please note on the C-116 that there were numerous errors in the producing method column. I have written a letter to your District II office correcting each of the errors. Our production clerk failed to note the changes in producing status this past year.

We as yet have not received gas sales volumes from the various purchasers, therefore, am unable to send you the completed copy of the C-115 for September, 1962. The well status column on the form C-115 for September, 1962 is current and correct.

Also, enclosed herewith, is a list of the wells within the proposed project area indicating the producing formations presently open to the well bore. I thought perhaps in my haste to supply this information during the hearing, I might have failed to note correctly a set of perforations in one of the two producing formations.

If you should desire any further data regarding the subject proposed Pressure Maintainence Project, please feel free to call our Artesia office telephone collect.

Very truly yours,

Jack C. Bendler

JCB:cm

encl.

cc: Western Development Company
Denver, Colorado

WESTERN-YATES
EAST MILLMAN QUEEN-GRAYBURG POOL
EDDY COUNTY, NEW MEXICO
PROPOSED PRESSURE MAINTENANCE PROJECT

Lease & Well No.	Producing Zones Open
State Lease 648 Well No. 143	Queen
State Lease 648 Well No. 144	Queen
State Lease 648 Well No. 145	Queen-Grayburg
State Lease 648 Well No. 146	Queen
State Lease 648 Well No. 147	Queen-Grayburg
State Lease 648 Well No. 150	Queen
State Lease 648 Well No. 151	Queen
State Lease 648 Well No. 152	Queen-Grayburg
State Lease 648 Well No. 153	Queen-Grayburg
State Lease 648 Well No. 154	Queen-Grayburg
State Lease 648 Well No. 156	Queen-Grayburg
State Lease 648 Well No. 157	Queen-Grayburg
State Lease 648 Well No. 158	Queen-Grayburg
State Lease 648 Well No. 159	Queen-Grayburg
State Lease 648 Well No. 162	Queen-Grayburg
State Lease 648 Well No. 163	Queen
State Lease 648 Well No. 165	Queen
State Lease 648 Well No. 181	Queen-Grayburg
State Lease 648 Well No. 182	Queen
State Lease 648 Well No. 183	Queen-Grayburg
State Lease 648 Well No. 184	Queen
State Lease E-5003 Well No. 1	Queen-Grayburg
Malco State Lease Well No. 1	Queen
Malco State Lease Well No. 2	Grayburg
Malco State Lease Well No. 3	Grayburg

STATEWIDE FORM C-115 REV. 10-1-61
SUBMIT: ORIGINAL TO OCC SANTA FE
ONE COPY TO OCC DIST. OFFICE
ONE COPY TO TRANSPORTER

NEW MEXICO OIL CONSERVATION COMMISSION
BOX 871 SANTA FE, NEW MEXICO

OPERATOR'S MONTHLY REPORT

Company or Operator: Western-Yates (Address) P.O. Box 427, Artesia, New Mex. FOR MONTH OF September, 1962 Page 1 of 2

WELL NO. UNIT SEC. TWP. RNG. / POOL NAME (UNDERLINE) / LEASE NAME AND STATE LAND LEASE NUMBER OR FEDERAL LEASE NUMBER	WELL STATUS	TOTAL LIQUIDS PRODUCED: MONTHLY OIL ALLOWABLE	TOTAL LIQUIDS PRODUCED: ACTUAL BARRELS PRODUCED	TOTAL LIQUIDS PRODUCED: BARRELS OF WATER PRODUCED	GAS PRODUCED MCF	DAYS PROD.	DISPOSITION OF GAS: VENTED	DISPOSITION OF GAS: USED ON LEASE	DISPOSITION OF GAS: SOLD	DISPOSITION OF GAS: PURCH.	DISPOSITION OF GAS: OTHER	DISPOSITION OF GAS: CODE	DISPOSITION OF OIL: OIL ON HAND BEG. OF MONTH	DISPOSITION OF OIL: BARRELS TO TRANSPORTER	DISPOSITION OF OIL: OTHER	DISPOSITION OF OIL: CODE	DISPOSITION OF OIL: TRANSPORTER	DISPOSITION OF OIL: OIL ON HAND END OF MONTH
Millman Queen Grayburg East																			
Malco State (E-5136)																			
1 D 23-19-28	P	570	326																
2 C 23-19-28	P	750	432																
3 E 23-19-28	P	630	365																
Lease Total		1950	1123																
State 648																			
143 K 14-19-28	P	1020	482																
144 L 14-19-28	P	1050	482																
145 M 14-19-28	P	1050	470																
146 F 14-19-28	P	1050	444																
147 E 14-19-28	P	1050	470																
148 A 14-19-28	F	1050	520																
149 B 14-19-28	P	1050	482																
150 P 15-19-28	P	1050	432																
151 I 15-19-28	P	1050	470																
152 A 22-19-28	F	1050	444																
153 C 14-19-28	P	1050	482																
154 B 22-19-28	P	1050	457																
155 N 11-19-28	P	1050	495																
156 O 15-19-28	P	1050	457																
157 H 15-19-28	P	1050	458																
158 G 22-19-28	P	1050	470																
159 O 14-19-28	P	1020	508																
160 K 11-19-28	P	SI	SI																
161 I 14-19-28	P	1050	508																
162 H 22-19-28	P	1050	483																
163 N 15-19-28	F	300	290																

Wells underlined in Red are not within the proposed project area.

STATUS CODE
F- - - - FLOWING
P- - - - PUMPING
G- - - - GAS LIFT
S- - - - SHUT IN
T- - - - TEMP. ABANDONED
I- - - - INJECTION

"OTHER" GAS DISPOSITION CODE
X - - - - USED OFF LEASE } (DESTINATION MUST BE SHOWN ON FORM C-111)
D - - - - USED FOR DRILLING }
G - - - - GAS LIFT
L - - - - LOST (MCF ESTIMATED)
E - - - - EXPLANATION ATTACHED
R - - - - REPRESSURING Ok PRESSURE MAINTENANCE

"OTHER" OIL DISPOSITION CODE
C - - - - CIRCULATING OIL
L - - - - LOST
S - - - - SEDIMENTATION (BS&W)
E - - - - EXPLANATION ATTACHED

I HEREBY CERTIFY THAT THE INFORMATION GIVEN IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

(SIGNATURE) (DATE)

(POSITION)

STATEWIDE FORM C-115 REV. 10-1-61
SUBMIT: ORIGINAL TO OCC SANTA FE
ONE COPY TO OCC DIST. OFFICE
ONE COPY TO TRANSPORTER

NEW MEXICO OIL CONSERVATION COMMISSION

BOX 871 SANTA FE, NEW MEXICO

OPERATOR'S MONTHLY REPORT

(Company or Operator) Western-Yates (Address) P.O. Box 427, Artesia, New Mexic (FOR MONTH OF) September, 1962

WELL NO. UNIT SEC. TWP. RNG. / POOL NAME (UNDERLINE) / LEASE NAME AND STATE LAND LEASE NUMBER OR FEDERAL LEASE NUMBER	WELL STATUS	TOTAL LIQUIDS PRODUCED: MONTHLY OIL ALLOWABLE	TOTAL LIQUIDS PRODUCED: ACTUAL BARRELS PRODUCED	TOTAL LIQUIDS PRODUCED: BARRELS OF WATER PRODUCED	GAS PRODUCED MCF	DAYS PROD.	DISPOSITION OF GAS: VENTED	DISPOSITION OF GAS: USED ON LEASE	DISPOSITION OF GAS: SOLD	DISPOSITION OF GAS: PURCH.	DISPOSITION OF GAS: OTHER	DISPOSITION OF GAS: CODE	DISPOSITION OF OIL: OIL ON HAND BEG. OF MONTH	DISPOSITION OF OIL: BARRELS TO TRANSPORTER	DISPOSITION OF OIL: OTHER	DISPOSITION OF OIL: CODE	DISPOSITION OF OIL: TRANSPORTER	DISPOSITION OF OIL: OIL ON HAND END OF MONTH
165 J 15-19-28	P	1050	495																
178 P 14-19-28	P	1050	711																
181 J 14-19-28	P	1050	520																
182 O 14-19-28	P	810	457																
183 N 14-19-28	P	1050	520																
184 G 14-19-28	P	1050	295																
185 N 14-19-28	P	1050	483																
Lease Total		27300	12985																
State E-5003 1 A 15-19-28	F	300	157																

STATUS CODE
F------FLOWING
P------PUMPING
G------GAS LIFT
S------SHUT IN
T------TEMP ABANDONED
I------INJECTION

"OTHER" GAS DISPOSITION CODE
A - - - - USED OFF LEASE } (DESTINATION MUST BE SHOWN ON FORM C-111)
D - - - - USED FOR DRILLING }
G - - - - GAS LIFT
L - - - - LOST (MCF ESTIMATED)
E - - - - EXPLANATION ATTACHED
R - - - - REPRESSURING OR PRESSURE MAINTENANCE

"OTHER" OIL DISPOSITION CODE
C - - - - CIRCULATING OIL
L - - - - LOST
S - - - - SEDIMENTATION (BS&W)
E - - - - EXPLANATION ATTACHED

I HEREBY CERTIFY THAT THE INFORMATION GIVEN IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

(SIGNATURE) (DATE)

(POSITION)

STATEWIDE FORM C-115 REV. 10-1-61
SUBMIT: ORIGINAL TO OCC SANTA FE
ONE COPY TO OCC DIST. OFFICE
ONE COPY TO TRANSPORTER

NEW MEXICO OIL CONSERVATION COMMISSION
BOX 871 SANTA FE, NEW MEXICO

OPERATOR'S MONTHLY REPORT

COMPANY OR OPERATOR: Western - Yates (ADDRESS) P. O. Box 427, Artesia, New Mexico FOR MONTH OF August, 1962 PAGE 6 OF 7

UNIT SEC. TWP. RNG. / POOL NAME (CONDENSATE)	WELL STATUS	TOTAL LIQUIDS PRODUCED: MONTHLY OIL ALLOWABLE	ACTUAL BARRELS PRODUCED	BARRELS OF WATER PRODUCED	GAS PRODUCED MCF	DAYS PROD.	DISPOSITION OF GAS: VENTED	USED ON LEASE	SOLD	PURCH	OTHER	CODE	DISPOSITION OF OIL: OIL ON HAND BEG. OF MONTH	BARRELS TO TRANSPORTER	OTHER	CODE	TRANSPORTER	OIL ON HAND END OF MONTH
LEASE NAME AND STATE LAND LEASE NUMBER OR FEDERAL LEASE NUMBER																		
[illegible] F 14-19-28	F	1054	459	None	1212	31			1212									
[illegible] E 14-19-28	F	1054	485	62	1281	31			1281									
[illegible] A 14-19-28	F	1054	538	None	1420	31			1420									
[illegible] B 14-19-28	F	1054	498	124	1316	31			1316									
[illegible] P 15-19-28	F	1054	446	None	1177	31			1177									
[illegible] 15-19-28	F	1054	485	93	1281	31			1281									
[illegible] A 22-19-28	F	1054	459	None	1212	30			1212									
[illegible] C 14-19-28	F	1054	498	93	1316	31			1316									
[illegible] 22-19-28	F	1054	472	None	1247	30			1247									
[illegible] M 11-19-28	F	1054	510	None	1351	31			1351									
[illegible] O 15-19-28	F	1054	472	62	1247	31			1247									
[illegible] M 15-19-28	F	1054	472	93	1247	31			1247									
[illegible] G 22-19-28	F	1054	485	930	1281	30			1281									
[illegible] D 14-19-28	F	1023	524	248	1385	31			1385									
[illegible] K 11-19-28	F	1054	SI	SI	SI	-			-									
[illegible] 14-19-28	F	1054	524	310	1385	31			1385									
[illegible] B 22-19-28	F	1054	498	60	1316	30			1316									
[illegible] K 15-19-28	F	310	300	None	1380	31			1380									
[illegible] 15-19-28	F	1054	511	None	1351	31			1351									
[illegible] P 14-19-28	F	1054	735	620	1939	31			1939									
[illegible] 14-19-28	F	1054	538	248	1420	31			1420									
[illegible] O 14-19-28	F	837	472	186	1247	31			1247									
[illegible] M 14-19-28	F	1054	538	None	1420	31			1420									
[illegible] O 14-19-28	F	1054	511	62	1351	31			1351									
[illegible] N 14-19-28	F	1054	498	341	1316	31			1316									
Lease Total		28520	13409	4152	36011				36011	PP			1730	13351			CON	1788
State E-5003		-				-												
[illegible] A 15-19-28	F	310	188	93	1668	31			1668	PP			71	-0-			CON	259

[illegible] CODE
F—FLOWING
[illegible]—PUMPING
G—GAS LIFT
S—SHUT IN
[illegible]—TEMP ABANDONED
[illegible]—INJECTION

"OTHER" GAS DISPOSITION CODE
X—USED OFF LEASE
D—USED FOR DRILLING
(DESTINATION MUST BE SHOWN ON FORM C-111)
G—GAS LIFT
L—LOST (MCF ESTIMATED)
E—EXPLANATION ATTACHED
R—REPRESSURING OR PRESSURE MAINTENANCE

"OTHER" OIL DISPOSITION CODE
C—CIRCULATING OIL
L—LOST
S—SEDIMENTATION (BS&W)
E—EXPLANATION ATTACHED

I HEREBY CERTIFY THAT THE INFORMATION GIVEN IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

Joy Patton
(SIGNATURE)

9/24/62
(DATE)

Production Clerk
(POSITION)

Form C- 116
Revised (12/1/55

NEW MEXICO OIL CONSERVATION COMMISSION

GAS-OIL RATIO REPORT

GOR Fit

OPERATOR Western - Yates POOL East Millman (Queen-Grayburg)

ADDRESS P.O.Box 427, Artesia, New Mexico MONTH OF September , 19 62

SCHEDULED TEST X COMPLETION TEST SPECIAL TEST (Check One

(See Instructions on Reverse Side)

Lease	Well No.	Date of Test	Producing Method	Choke Size	Test Hours	Daily Allowable Bbls.	Production During Test			GOR Cu. Ft. Per Bbl.
							Water Bbls.	Oil Bbls.	Gas MCF	
State 648	143	9-13	Flow	~~1/2"~~	24	34	8	18	48	2660
State 648	144	9-12	Flow	~~1/2"~~	24	35	0	17	46	2700
State 648	145	9-9	Pump	---	24	35	9	18	47	2610
State 648	146	9-21	Flow	~~1/2"~~	24	35	0	17	45	2650
State 648	147	9-22	Pump	---	24	35	2	19	48	2520
State 648	148	9-27	Flow	1/2"	24	35	0	18	47	2610
State 648	149	9-26	Pump	---	24	35	3	17	47	2760
State 648	150	9-7	Pump	---	24	35	0	15	40	2660
State 648	151	9-11	Pump	---	24	35	3	18	48	2660
State 648	152	9-4	Flow	1/2"	24	35	0	17	44	2580
State 648	153	9-25	Pump	---	24	35	3	18	49	2720
State 648	154	9-3	Flow	~~1/2"~~	24	35	0	17	45	2650
State 648	155	9-28	Pump	---	24	35	0	18	48	2660
State 648	156	9-6	Flow	~~1/2"~~	24	35	2	16	45	2820
State 648	157	9-23	Pump	---	24	35	3	17	45	2650
State 648	158	9-1	Pump	---	24	35	31	17	48	2820
State 648	159	9-24	Pump	---	24	34	7	18	46	2560
State 648	160	9-14	[illegible]	---	--	[illegible]	-	--	--	----
State 648	161	9-17	Pump	---	24	35	10	18	47	2610

Form C-116
Revised (12/1/58

NEW MEXICO OIL CONSERVATION COMMISSION

GAS-OIL RATIO REPORT

OPERATOR Western - Yates POOL East Millman (Queen-Grayburg)

ADDRESS P.O.Box 427, Artesia, New Mexico MONTH OF September, 19 62

SCHEDULED TEST X COMPLETION TEST SPECIAL TEST (Check One)

(See Instructions on Reverse Side)

Lease	Well No.	Date of Test	Producing Method	Choke Size	Test Hours	Daily Allowable Bbls.	Production During Test			GOR Cu. Ft. Per Bbl.
							Water Bbls.	Oil Bbls.	Gas MCF	
State 648	162	9-2	Pump	---	24	35	3	18	48	2660
State 648	163	9-5	Flow	1/2"	24	10	0	10	46	4600
State 648	165	9-8	Pump	---	24	35	0	17	48	2820
State 648	178	9-15	Pump	---	24	35	20	26	69	2660
State 648	181	9-18	Pump	---	24	35	8	18	46	2560
State 648	182	9-14	Pump	---	24	27	6	16	45	2810
State 648	183	9-10	Flow P	1/2"	24	35	0	18	48	2660
State 648	184	9-20	Pump	---	24	35	2	17	48	2820
State 648	185	9-19	Flow P	1/2"	24	35	11	17	47	2760

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Commission.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60 degrees F. Specific gravity base will be 0.60.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Commission. In accordance with Rule 301 and Appropriate Pool Rules.

(I certify that the information given is true and complete to the best of my knowledge.)

Date October 5, 1962

WESTERN - YATES
Company

By R. Davenport

Production Superintendent
Title

Form C-116
Revised (12/1/55

NEW MEXICO OIL CONSERVATION COMMISSION

GAS-OIL RATIO REPORT

OPERATOR Western - Yates POOL East Millman (Queen-Grayburg)

ADDRESS P.O. Box 427, Artesia, New Mexico MONTH OF September, 19 62

SCHEDULED TEST X COMPLETION TEST ..... SPECIAL TEST ..... (Check One)

(See Instructions on Reverse Side)

Lease	Well No.	Date of Test	Producing Method	Choke Size	Test Hours	Daily Allowable Bbls.	Production During Test			GOR Cu. Ft. Per Bbl.
							Water Bbls.	Oil Bbls.	Gas MCF	
State E-5003	1	9-1	Flow	1/2"	24	10	1/2	7	62	8850

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Commission.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60 degrees F. Specific gravity base will be 0.60.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Commission, in accordance with Rule 301 and Appropriate Pool Rules.

(I certify that the information given is true and complete to the best of my knowledge.)

Date October 5, 1962

WESTERN - YATES
Company

By R. W. Davenport

Production Superintendent
Title

Form C- 116
Revised (12/1/55

NEW MEXICO OIL CONSERVATION COMMISSION

GAS-OIL RATIO REPORT

GOR
Pool

OPERATOR Western - Yates POOL East Millman (Queen-Grayburg)

ADDRESS P. O. Box 427, Artesia, New Mexico MONTH OF September, 19 62

SCHEDULED TEST X COMPLETION TEST SPECIAL TEST (Check One)

(See Instructions on Reverse Side)

Lease	Well No.	Date of Test	Producing Method	Choke Size	Test Hours	Daily Allowable Bbls.	Production During Test			GOR Cu. Ft. Per Bbl.
							Water Bbls.	Oil Bbls.	Gas MCF	
Malco State	1	9-1	Pump	---	24	19	8	12	27	2250
Malco State	2	9-2	Pump	---	24	25	9	16	34	2120
Malco State	3	9-3	Pump	---	24	21	4	14	33	2360

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Commission.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60 degrees F. Specific gravity base will be 0.60.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Commission, in accordance with Rule 301 and Appropriate Pool Rules.

(I certify that the information given is true and complete to the best of my knowledge.)

Date October 5, 1962

WESTERN - YATES
Company

By K. W. Davenport

Production Superintendent
Title

CASE 2657: Application of Odessa Natural Gasoline Company for a non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks establishment of a 320-acre non-standard gas proration unit comprising the SE/4 of Section 23 and the NE/4 of Section 26, Township 25 South, Range 37 East, Justis Gas Pool, Lea County, New Mexico, to be dedicated to its Carlson "A" Well No. 1 located in Unit P of said Section 23.

CASE 2658: Application of Cabot Corporation for temporary special rules and regulations, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order promulgating temporary special rules and regulations for the North Bagley-Pennsylvanian Pool, Lea County, New Mexico, including provisions for 80-acre proration units.

CASE 2659: Application of Cabot Corporation for the creation of a new oil pool and the establishment of temporary rules and regulations, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool to be designated the North Bagley-Wolfcamp Pool for its Humble State Well No. 1, located in the NW/4 NW/4 of Section 23, Township 11 South, Range 33 East, Lea County, New Mexico. Applicant further seeks establishment of temporary rules and regulations governing said pool including provisions for 80-acre proration units.

CASE 2660: Application of Midwest Oil Corporation for the creation of a new oil pool and for the establishment of temporary special rules and regulations, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Pennsylvanian production in the vicinity of its LLE State Wel No. 1, located in the NW/4 SW/4 of Section 14, Township 10 South, Range 33 East, Lea County, New Mexico. Applicant further seeks the promulgation of temporary special rules and regulations governing said pool to include provisions for 80-acre proration units and fixed well location requirements.

CASE 2661: Application of Pan American Petroleum Corporation for a triple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order authorizing the triple completion (conventional) of its Southland Royalty "A" Well No. 2, located in Unit B of Section 9, Township 21 South, Range 37 East, Lea County, New Mexico, in such a manner as to produce

oil from the Drinkard and Blinebry formations and gas from the Tubb formation through parallel strings of tubing.

CASE 2662: Application of Pan American Petroleum Corporation for a triple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order authorizing the triple completion (conventional) of its South Mattix Unit Well No. 14, located in Unit K of Section 15, Township 24 South, Range 37 East, Lea County, New Mexico, in such a manner as to produce gas from the Fowler Paddock and an undesignated Tubb pool, and oil from an undesignated Blinebry pool through parallel strings of tubing.

CASE 2663: Application of Arnold H. Bruner for permission to directionally drill, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to directionally drill his Federal Intex Well No. 1, the surface location of which is in the center of the NW/4 SE/4 of Section 8, Township 9 South, Range 37 East, Allison Pennsylvanian Pool (extension), Lea County, New Mexico. Target for said directionally drilled well would be 100 feet from the North and West lines of the NW/4 SE/4 of said Section 8.

CASE 2664: Application of Southwest Production Company for a dual completion, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to complete its Davis Federal Well No. 1, located in Unit L of Section 24, Township 26 North, Range 11 West, San Juan County, New Mexico, as a dual completion with production of oil from the Gallup zone and production of gas from the Dakota zone to be through parallel strings of 1 ½-inch tubing.

iqg/

No. 29-62

DOCKET: EXAMINER HEARING - WEDNESDAY - OCTOBER 10, 1962

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner or Elvis A. Utz, alternate examiner:

CASE 2647: (Continued)
Application of Carper Drilling Company for a tubingless completion, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to complete its Baetz Well No. 1, located in the SE/4 SW/4 of Section 35, Township 14 South, Range 27 East, Chaves County, New Mexico, as a tubingless gas well completion producing through perforations from 8182-8270' in 2 7/8 inch casing.

CASE 2654: Application of Carper Drilling Company for the creation of a new gas pool and for temporary special rules and regulations, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool to be designated the Buffalo Valley-Pennsylvanian Gas Pool for its Baetz Well No. 1, located in the SE/4 SW/4 of Section 35, Township 14 South, Range 27 East, Chaves County, New Mexico. Applicant, further seeks the establishment of temporary special rules and regulations governing said pool, including provisions for 320-acre gas units.

CASE 2655: Application of Martin Yates III and S. P. Yates for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order force pooling all mineral interests in the Lusk-Strawn Pool to form a 160-acre oil proration unit comprising the NE/4 of Section 30, Township 19 South, Range 32 East, Lea County, New Mexico, to be dedicated to a well to be drilled in the NE/4 NE/4 of said Section 30.

CASE 2656: Application of Western Development Company for a secondary recovery project, East Millman Queen-Grayburg Field, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a secondary recovery project in the East Millman Queen-Grayburg Field, with the injection of water into the Queen and Grayburg formations initially to be through 16 wells, located in Sections 11, 14, 15, 22 and 23, Township 19 South, Range 28 East, Eddy County, New Mexico, said project to be governed by the provisions of Rule 701.