

DATE 1965, Application of ...  
to ... its ...  
proj. in ...

$P_g$  = 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 10. 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 Gas Injection 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.

RULE 11. The Commission shall, upon review of the report and after any adjustments deemed necessary, assign allowables to each well in the Project for the next succeeding month in accordance with these rules.

RULE 12. The Special Rules and Regulations for the operation of the subject Project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith.

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

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

*John Burroughs*  
~~EDWIN L. MECHEM~~, Chairman

MURRAY E. MORGAN, Member

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

S E A L

ir/

In no event shall a well receive an allowance greater than its ability to produce during such test, or greater than top unit allowance <sup>for the pool</sup> at the time of such test multiplied by the well's acreage factor, or greater than the current top unit allowance for the pool during the month of transfer, multiplied by the well's acreage factor, whichever of the three is less. The project operator shall notify all operators affecting the Project, as

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

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

The Secretary-Director may approve the proposed ~~new~~ 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 ~~interested parties~~ *offset operators*.

RULE 6. The allowable assigned to any well which is shut-in or is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event exceed the producing capacity of the well prior to such shut-in or curtailment as determined by the testing procedure prescribed by Rule 7.

RULE 7. The allowable assigned to any well which is used for the purpose of ~~new~~ injection, or which is shut-in or curtailed in accordance with Rule 3, shall be determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a ~~72-hour test~~ throughout which the well shall be ~~produced in the same manner as a well at a constant rate~~ *produced in the same manner as a well at a constant rate*. ~~shall a well receive an allowable greater than its ability to produce, or greater than top unit allowable for the pool multiplied by the well's acreage factor, whichever is applicable.~~ The project operator shall notify all operators offsetting the Project, as

*less.*

Case No. 1559  
Order No. R-1315

(3) That special rules and regulations governing the operation of the above-described gas injection project on applicants Federal "C" Lease be and the same are hereby promulgated as follows, effective February 1, 1959:

SPECIAL RULES AND REGULATIONS FOR THE  
SUNRAY MID-CONTINENT OIL COMPANY FEDERAL "C" GAS  
INJECTION PROJECT

RULE 1. The project area of the Sunray Mid-Continent Oil Company Federal "C" Gas Injection Project, hereinafter referred to as the "Project," shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 6: NE/4, NW/4, S/2 NW/4,  
NE/4, and S/2

Section 7: N/2 and SE/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31: N/2, SW/4, SE/4 SW/4, and SE/4

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

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 shut-in for pressure regulation, control of pattern or sweep efficiencies, to observe changes in pressures or changes in characteristics of reservoir liquids, or progress of sweep.

RULE 4. The project allowable may be produced from any well or wells in the project area in any proportion, subject to the limitations set forth in Rule 8, provided that the rate of production is consistent with the efficient operation of the Project and provided further that no well shall produce in excess of two times the top unit allowable for the Bisti-Lower Gallup Oil Pool, or 200 barrels per day, whichever is greater.

RULE 5. The allowable assigned to any  injection well, which allowable is to be transferred to any well or wells in the project area for production, shall in no event exceed the producing capacity of the well prior to conversion to  injection, as determined by the testing procedure prescribed by Rule 7.

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(6) That special rules and regulations governing the operation of the Central Bisti Injection Project, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, be and the same are hereby promulgated as follows, effective

June 1, 1959.

SPECIAL RULES AND REGULATIONS FOR THE  
SUNRAY MID-CONTINENT OIL COMPANY CENTRAL  
BISTI LPG-GAS-WATER INJECTION PROJECT

RULE 1. The project area of the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water Injection Project shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3:	SW/4
Sections 4 and 5:	All
Section 6:	E/2, SW/4, S/2 NW/4, and NE/4 NW/4
Sections 7, 8, and 9:	All
Section 10:	NW/4
Section 16:	All
Section 17:	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18:	NE/4, N/2 NW/4, and N/2 SE/4
Section 20:	NE/4 and NE/4 NW/4
Section 21:	N/2, N/2 SE/4, and NE/4 SW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31:	S/2 N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 33:	S/2 SW/4

(2) That the applicant, Sunray Mid-Continent Oil Company, be and the same is hereby authorized to operate a liquefied petroleum gas-gas-water injection project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, subject to the special rules and regulations for said injection project as hereinafter set forth.

(3) That the applicant be and the same is hereby authorized to convert, for the purpose of injecting liquefied petroleum gas followed by gas, the following-described wells:

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 4  
SW 4 NE 4, Section 6, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 13  
SW 4 NW 4, Section 5, Township 25 North, Range 12 West, NMPM

Amerada Petroleum Corporation  
Gle-Na-Nup-Pah Well No. 1  
SW 4 SE 4, Section 5, Township 25 North, Range 12 West, NMPM

Phillips Petroleum Company  
Benally Well No. 1  
SW 4 SW 4, Section 5, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 10  
SW 4 SE 4, Section 6, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 14  
SW 4 NE 4, Section 8, Township 25, North, Range 12 West, NMPM

(4) That the applicant be and the same is hereby <sup>AUTHORIZED</sup> ~~authorized~~ to convert, for the purpose of injecting gas, the following-described wells:

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 7  
SW 4 SE 4, Section 31, Township 26 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 16  
SW 4 NW 4, Section 8, Township 25 North, Range 12 West, NMPM

El Paso Natural Gas Products Company  
Benally Well No. 1  
SW 4 NE 4, Section 5, Township 25 North, Range 12 West, NMPM

Amerada Petroleum Corporation  
Salina White Well No. 1  
SE 4 SW 4, Section 8, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 18  
SW 4 NE 4, Section 7, Township 25 North, Range 12 West, NMPM

(5) That the interval of injection for the above-described LPG-gas and gas injection wells shall include the three main sands of the Lower Gallup formation.

Case No. 1665

Order No. R-\_\_\_\_\_

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 16  
SW/4 NW/4, Section 8, Township 25 North, Range 12 West

El Paso Natural Gas Products Company  
Benally Well No. 1  
SW/4 NE/4, Section 5, Township 25 North, Range 12 West

Amerada Petroleum Corporation  
Salina White Well No. 1  
SE/4 SW/4, Section 8, Township 25 North, Range 12 West

(6) That the applicant further proposes that special rules and regulations be promulgated to govern the operation of said project, which rules would provide for:

(a) The conversion of additional ~~injection~~ <sup>to injection wells</sup> wells without notice and hearing, subject to administrative approval by the Commission.

(b) The transfer for allowables from injection wells to producing wells within the project area.

(c) The transfer of allowables from wells which have been shut-in for observation, or to increase the efficiency of the project, to other wells within the project area.

(d) Operation of the wells in the project on a net gas-oil ratio basis giving allowance for gas injected.

(e) Such other rules and regulations as are deemed appropriate by the Commission.

(7) That the applicant has established by a preponderance of the evidence that approval of the subject application will prevent waste and result in greater ultimate recovery of oil from the Bisti-Lower Gallup Oil Pool.

(8) That the applicant's proposal to convert the several wells described in Finding No. 5 to LPG-Gas Injection and Gas Injection should be approved.

(9) That special rules and regulations governing the proposed LPG-Gas-Water injection project area in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, should be promulgated.

(10) That Order No. R-1315, establishing the Sunray Mid-Continent Oil Company Federal "C" Gas Injection Project and promulgating special rules and regulations therefor should be superseded.

IT IS THEREFORE ORDERED:

(1) That Commission Order No. R-1315, dated December 31, 1958, be and the same is hereby superseded.



Case No. 1665

Order No. R-

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 6: NE/4 NW/4, S/2 NW/4, NE/4 and the S/2  
Section 7: N/2 and the SE/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31: N/2 SW/4, SE/4 SW/4 and the SE/4

Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

(4) That said Order No. R-1315 authorized the injection of gas into one well, namely the Sunray Mid-Continent Federal "C" Well No. 18, located in the SW/4 NE/4 of Section 7, Township 25 North, Range 12 West, NMPM, and promulgated special rules and regulations governing the operation of said project.

(5) That the applicant, Sunray Mid-Continent Oil Company, seeks an order amending said Order No. R-1315, to enlarge the area governed by the special rules and regulations for the project to include all of that area described in Finding No. 2 of this order and further, to authorize, in addition to the above-described gas injection well and the two water injection wells authorized by Commission Order No. R-1413, ~~the conversion for injection purposes of the following~~ wells:

LIQUEFIED PETROLEUM GAS (LPG) INJECTION  
FOLLOWED BY GAS INJECTION

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 4  
SW/4 NE/4, Section 6, Township 25 North, Range 12 West

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 13  
SW/4 NW/4, Section 5, Township 25 North, Range 12 West

Amerada Petroleum Corporation  
Gle-Na-Nup-Pah Well No. 1  
SW/4 SE/4, Section 5, Township 25 North, Range 12 West

Phillips Petroleum Company  
Benally Well No. 1  
SW/4 SW/4, Section 5, Township 25 North, Range 12 West

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 10  
SW/4 SE/4, Section 6, Township 25 North, Range 12 West

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 14  
SW/4 NE/4, Section 8, Township 25 North, Range 12 West

GAS INJECTION ONLY

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 7  
SW/4 SE/4, Section 31, Township 26 North, Range 12 West

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. 1665  
Order No. R- 1414

APPLICATION OF SUNRAY MID-CONTINENT  
OIL COMPANY FOR AN ORDER AUTHORIZING  
AN LPG-GAS-WATER INJECTION PROJECT  
IN THE BISTI-LOWER GALLUP OIL POOL IN  
SAN JUAN COUNTY, NEW MEXICO, AND FOR  
THE PROMULGATION OF SPECIAL RULES  
AND REGULATIONS GOVERNING SAID  
PROJECT

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 12, 1959, 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 June day of 1959, 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, Sunray Mid-Continent Oil Company, is the operator, under an underwriting agreement pending unitization, of the following described acreage in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3:	SW/4
Sections 4 and 5:	All
Section 6:	E/2, SW/4, S/2 NW/4, and NE/4 NW/4
Sections 7, 8, and 9:	All
Section 10:	NW/4
Section 16:	All
Section 17:	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18:	NE/4, N/2 NW/4, and N/2 SE/4
Section 20:	NE/4 and NE/4 NW/4
Section 21:	N/2, N/2 SE/4, and NE/4 SW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31:	S/2 N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 33:	S/2 SW/4

- (3) That the applicant is the operator of the Sunray Mid-Continent Oil Company Federal "C" Gas Injection Project, which project was authorized by Commission Order No. R-1315 and comprises the following described acreage:

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. 1665  
Order No. R-1414

APPLICATION OF SUNRAY MID-CONTINENT  
OIL COMPANY FOR AN ORDER AUTHORIZING  
AN LPG-GAS-WATER INJECTION PROJECT  
IN THE BISTI-LOWER GALLUP OIL POOL IN  
SAN JUAN COUNTY, NEW MEXICO, AND FOR  
THE PROMULGATION OF SPECIAL RULES  
AND REGULATIONS GOVERNING SAID  
PROJECT

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 12, 1959, 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 5<sup>th</sup> day of June, 1959, 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, Sunray Mid-Continent Oil Company, is the operator, under an underwriting agreement pending unitization, of the following-described acreage in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 3:	SW/4
Sections 4 and 5:	All
Section 6:	E/2, SW/4, S/2 NW/4, and NE/4 NW/4
Sections 7, 8, and 9:	All
Section 10:	NW/4
Section 16:	All
Section 17:	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18:	NE/4, N/2 NW/4, and N/2 SE/4
Section 20:	NE/4 and NE/4 NW/4
Section 21:	N/2, N/2 SE/4, and NE/4 SW/4

Case No. 1665  
Order No. R-1414

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31: S/2 N/2, SE/4, N/2 SW/4, and SE/4 SW/4  
Section 33: S/2 SW/4

(3) That the applicant is the operator of the Sunray Mid-Continent Oil Company Federal "C" Gas Injection Project, which project was authorized by Commission Order No. R-1315 and comprises the following-described acreage:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 6: NE/4 NW/4, S/2 NW/4, NE/4 and the S/2  
Section 7: N/2 and the SE/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31: N/2 SW/4, SE/4 SW/4 and the SE/4

Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

(4) That said Order No. R-1315 authorized the injection of gas into one well, namely the Sunray Mid-Continent Federal "C" Well No. 18, located in the SW/4 NE/4 of Section 7, Township 25 North, Range 12 West, NMPM, and promulgated special rules and regulations governing the operation of said project.

(5) That the applicant, Sunray Mid-Continent Oil Company, seeks an order amending said Order No. R-1315, to enlarge the area governed by the special rules and regulations for the project to include all of that area described in Finding No. 2 of this order and further, to authorize, in addition to the above-described gas injection well and the two water injection wells authorized by Commission Order No. R-1413, the conversion for injection purposes of the following wells:

LIQUEFIED PETROLEUM GAS (LPG) INJECTION  
FOLLOWED BY GAS INJECTION

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 4  
SW/4 NE/4, Section 6, Township 25 North, Range 12 West

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 13  
SW/4 NW/4, Section 5, Township 25 North, Range 12 West

Amerada Petroleum Corporation  
Gle-Na-Nup-Pah Well No. 1  
SW/4 SE/4, Section 5, Township 25 North, Range 12 West

Phillips Petroleum Company  
Benally Well No. 1  
SW/4 SW/4, Section 5, Township 25 North, Range 12 West

Case No. 1665  
Order No. R-1414

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 10  
SW/4 SE/4, Section 6, Township 25 North, Range 12 West

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 14  
SW/4 NE/4, Section 8, Township 25 North, Range 12 West

GAS INJECTION ONLY

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 7  
SW/4 SE/4, Section 31, Township 26 North, Range 12 West

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 16  
SW/4 NW/4, Section 8, Township 25 North, Range 12 West

El Paso Natural Gas Products Company  
Benally Well No. 1  
SW/4 NE/4, Section 5, Township 25 North, Range 12 West

Amerada Petroleum Corporation  
Salina White Well No. 1  
SE/4 SW/4, Section 8, Township 25 North, Range 12 West

(6) That the applicant further proposes that special rules and regulations be promulgated to govern the operation of said project, which rules would provide for:

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

(b) The transfer for allowables from injection wells to producing wells within the project area.

(c) The transfer of allowables from wells which have been shut-in for observation, or to increase the efficiency of the project, to other wells within the project area.

(d) Operation of the wells in the project on a net gas-oil ratio basis giving allowance for gas injected.

(e) Such other rules and regulations as are deemed appropriate by the Commission.

(7) That the applicant has established by a preponderance of the evidence that approval of the subject application will prevent waste and result in greater ultimate recovery of oil from the Bisti-Lower Gallup Oil Pool.

-4-

Case No. 1665  
Order No. R-1414

(8) That the applicant's proposal to convert the several wells described in Finding No. 5 to LPG-Gas Injection and Gas Injection should be approved.

(9) That special rules and regulations governing the proposed LPG-Gas-Water injection project area in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, should be promulgated.

(10) That Order No. R-1315, establishing the Sunray Mid-Continent Oil Company Federal "C" Gas Injection Project and promulgating special rules and regulations therefor should be superseded.

**IT IS THEREFORE ORDERED:**

(1) That Commission Order No. R-1315, dated December 31, 1958, be and the same is hereby superseded.

(2) That the applicant, Sunray Mid-Continent Oil Company, be and the same is hereby authorized to operate a liquefied petroleum gas-gas-water injection project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, subject to the special rules and regulations for said injection project as hereinafter set forth.

(3) That the applicant be and the same is hereby authorized to convert, for the purpose of injecting liquefied petroleum gas followed by gas, the following-described wells:

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 4  
SW/4 NE/4, Section 6, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 13  
SW/4 NW/4, Section 5, Township 25 North, Range 12 West, NMPM

Amerada Petroleum Corporation  
Gle-Na-Nup-Pah Well No. 1  
SW/4 SE/4, Section 5, Township 25 North, Range 12 West, NMPM

Phillips Petroleum Company  
Benally Well No. 1  
SW/4 SW/4, Section 5, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 10  
SW/4 SE/4, Section 6, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 14  
SW/4 NE/4, Section 8, Township 25 North, Range 12 West, NMPM

-5-

Case No. 1665

Order No. R-1414

(4) That the applicant be and the same is hereby authorized to convert, for the purpose of injecting gas, the following-described wells:

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 7  
SW/4 SE/4, Section 31, Township 26 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 16  
SW/4 NW/4, Section 8, Township 25 North, Range 12 West, NMPM

El Paso Natural Gas Products Company  
Benally Well No. 1  
SW/4 NE/4, Section 5, Township 25 North, Range 12 West, NMPM

Amerada Petroleum Corporation  
Sallaa White Well No. 1  
SE/4 SW/4, Section 8, Township 25 North, Range 12 West, NMPM

Sunray Mid-Continent Oil Company  
Federal "C" Well No. 18  
SW/4 NE/4, Section 7, Township 25 North, Range 12 West, NMPM

(5) That the interval of injection for the above-described LPG-gas and gas injection wells shall include the three main sands of the Lower Gallup formation.

(6) That special rules and regulations governing the operation of the Central Bisti Injection Project, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, be and the same are hereby promulgated as follows, effective June 1, 1959.

**SPECIAL RULES AND REGULATIONS FOR THE  
SUNRAY MID-CONTINENT OIL COMPANY CENTRAL  
BISTI LPG-GAS-WATER INJECTION PROJECT**

**RULE 1.** The project area of the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water Injection Project shall comprise that area described as follows:

**TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM**

Section 3:	SW/4
Sections 4 and 5:	All
Section 6:	E/2, SW/4, S/2 NW/4, and NE/4 NW/4
Sections 7, 8, and 9:	All
Section 10:	NW/4
Section 16:	All
Section 17:	N/2, SE/4, N/2 SW/4, and SE/4 SW/4
Section 18:	NE/4, N/2 NW/4, and N/2 SE/4
Section 20:	NE/4 and NE/4 NW/4
Section 21:	N/2, N/2 SE/4, and NE/4 SW/4

Case No. 1665  
Order No. R-1414

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31: S/2 N/2, SE/4, N/2 SW/4, and SE/4 SW/4  
Section 33: S/2 SW/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 or are used as injection wells.

**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 shut-in for pressure regulation, control of pattern or sweep efficiencies, to observe changes in pressures or changes in characteristics of reservoir liquids, or progress of sweep.

**RULE 4.** The project allowable may be produced from any well or wells in the project area in any proportion, subject to the limitations set forth in Rule 8, provided that the rate of production is consistent with the efficient operation of the Project and provided further that no well shall produce in excess of two times the top unit allowable for the Bisti-Lower Gallup Oil Pool, or 200 barrels per day, whichever is greater.

**RULE 5.** The allowable assigned to any injection well, which allowable is to be transferred to any well or wells in the project area for production, shall in no event exceed the producing capacity of the well prior to conversion to injection, as determined by the testing procedure prescribed by Rule 7. Conversion of producing wells to injection, or the drilling of additional wells for injection, shall be done only after approval of same by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application with the Commission, which application shall include the following:

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

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



**RULE 6.** The allowable assigned to any well which is shut-in or is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event exceed the producing capacity of the well prior to such shut-in or curtailment as determined by the testing procedure prescribed by Rule 7.

**RULE 7.** The allowable assigned to any well which is used for the purpose of injection, or which is shut-in or curtailed in accordance with Rule 3, shall be determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a 72-hour test throughout which the well shall be produced in the same manner and at a constant rate. In no event shall a well receive an allowable greater than its ability to produce during such test, or greater than top unit allowable for the pool at the time of such test multiplied by the well's acreage factor, or greater than the current top unit allowable for the pool during the month of transfer, multiplied by the well's acreage factor, whichever of the three is less. The project operator shall notify all operators offsetting the Project, 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 8.** No well in the project area shall be assigned any allowable transferred from any other well or wells in the project area unless and until said well has been approved by the Commission as a duly authorized "Transfer Well." To receive approval for any such Transfer Well, the Project operator shall file application with the Secretary-Director of the Commission for permission to transfer allowable to the well, setting forth therein the well's current allowable and the maximum allowable which will be assigned to the well. Copies of the application shall be provided to the operator of each well offsetting the proration unit on which the transfer well is located. The Secretary-Director may designate the well as a Transfer Well subject to the maximum expected allowable for the well if, within 20 days after receiving the application, no objection to the designation is received. The Secretary-Director may grant immediate designation as a Transfer Well provided waivers of objection are received from all such offset operators.

**RULE 9.** The allowable assigned to any well in the Project shall be based upon the ability of the well to produce and shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Bisti-Lower Gallup Oil Pool, except that any well or wells within the project area producing with a gas-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 into the Bisti-Lower Gallup Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any such well receiving gas injection credit shall be determined in accordance with the following formula:

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

-8-

Case No. 1665

Order No. R-1414

where:

$A_{adj}$  = the well's daily adjusted allowable  
 $TUA$  = top unit allowable for 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 10.** 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 Gas Injection 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.

**RULE 11.** The Commission shall, upon review of the report and after any adjustments deemed necessary, assign allowables to each well in the Project for the next succeeding month in accordance with these rules.

**RULE 12.** The Special Rules and Regulations for the operation of the subject Project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith.

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

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

S E A L

*John Burroughs*  
JOHN BURROUGHS, Chairman

*Murray E. Morgan*  
MURRAY E. MORGAN, Member

vem/

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

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF SUNRAY  
MID-CONTINENT OIL COMPANY FOR AN ORDER  
AUTHORIZING A LIQUEFIED PETROLEUM GAS-GAS  
INJECTION PROJECT IN THE BISTI-LOWER GALLUP  
OIL POOL IN SAN JUAN COUNTY, NEW MEXICO,  
PURSUANT TO RULE 701 OF THE COMMISSION'S  
RULES AND REGULATIONS, AND FOR AN ORDER  
ESTABLISHING RULES AND REGULATIONS IN THE  
AREA OF SAID PROJECT.

CASE NO. \_\_\_\_\_

A P P L I C A T I O N

TO THE HONORABLE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO:

COMES NOW THE APPLICANT, SUNRAY MID-CONTINENT OIL COMPANY, AND  
RESPECTFULLY ALLEGES AND STATES AS FOLLOWS:

1. THAT IT IS THE OWNER AND OPERATOR OF LEASES AND WELLS WITHIN THE  
LIMITS OF THE BISTI-LOWER GALLUP OIL POOL, SAN JUAN COUNTY, NEW MEXICO.

2. THAT BY NEW MEXICO OIL CONSERVATION COMMISSION ORDER NO. R-1315,  
CASE NO. 1559, DATED DECEMBER 31, 1958 SUNRAY MID-CONTINENT OIL COMPANY WAS  
AUTHORIZED TO COMMENCE GAS INJECTION INTO THE BISTI-LOWER GALLUP FORMATION BY THE  
USE OF ITS FEDERAL "C" WELL NO. 18, LOCATED IN THE SW/4 NE/4 SECTION 7, TOWNSHIP  
25 NORTH, RANGE 12 WEST NMPM, SAN JUAN COUNTY, NEW MEXICO, AND BY THIS SAME ORDER  
RULES AND REGULATIONS GOVERNING THE OPERATION OF THE GAS INJECTION PROJECT WERE  
ADOPTED FOR A PORTION OF THE BISTI-LOWER GALLUP OIL POOL; THAT THE COMMISSION BY  
ITS ORDER NO. R-1027, DATED AUGUST 7, 1957, GRANTED SUNRAY MID-CONTINENT OIL  
COMPANY PERMISSION TO INJECT LIQUEFIED PETROLEUM GAS FOLLOWED BY GAS INTO THE  
BISTI-LOWER GALLUP OIL POOL FOR THE PURPOSE OF SECONDARY RECOVERY.

3. THAT IT IS DESIRED TO INJECT LIQUEFIED PETROLEUM GAS AND GAS PURSUANT  
TO RULE NO. 701 OF THE NEW MEXICO OIL CONSERVATION COMMISSION RULES AND REGULATIONS  
INTO THE BISTI-LOWER GALLUP FORMATION UNDERLYING THE FOLLOWING DESCRIBED ACREAGE:

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

SECTION 31: S/2 AND S/2 N/2  
SECTION 32: S/2 AND S/2 N/2  
SECTION 33: S/2 SW/4

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

SECTION 3: SW/4  
SECTION 4: ALL  
SECTION 5: ALL  
SECTION 6: ALL  
SECTION 7: ALL  
SECTION 8: ALL  
SECTION 9: ALL  
SECTION 10: NW/4  
SECTION 16: ALL  
SECTION 17: N/2 AND SE/4 AND E/2 SW/4 AND NW/4 SW/4  
SECTION 18: NE/4 AND N/2 NW/4 AND N/2 SE/4  
SECTION 20: NE/4 AND NE/4 NW/4  
SECTION 21: N/2 AND N/2 SE/4 AND NE/4 SW/4

ALL IN SAN JUAN COUNTY, NEW MEXICO.

4. THAT THE WELLS IN THE BISTI-LOWER GALLUP OIL POOL ARE PRODUCED FROM  
THE LOWER-GALLUP OIL SAND WHICH IS FOUND AT THE APPROXIMATE DEPTH OF 4829 FEET IN  
SUNRAY MID-CONTINENT OIL COMPANY'S FEDERAL "C" WELL NO. 1 LOCATED IN THE NORTHWEST  
QUARTER OF THE NORTHWEST QUARTER (NW/4 NW/4) OF SECTION 6, TOWNSHIP 25 NORTH,  
RANGE 12 WEST, NMPM. SAN JUAN COUNTY, NEW MEXICO.

5. THAT IT IS PROPOSED TO INJECT GAS INTO THE FOLLOWING WELLS IN  
ADDITION TO SUNRAY MID-CONTINENT'S FEDERAL "C" WELL NO. 18, LOCATED IN THE SW/4 NE/4  
SECTION 7, TOWNSHIP 25 NORTH, RANGE 12 WEST, WHICH WAS AUTHORIZED AS A GAS INJECTION  
WELL BY NEW MEXICO OIL CONSERVATION COMMISSION NO. R-1315:

SUNRAY MID-CONTINENT OIL COMPANY  
FEDERAL "C" WELL No. 7  
SW/4 SE/4 SECTION 31, TOWNSHIP 26 NORTH,  
RANGE 12 WEST

EL PASO NATURAL GAS PRODUCTS COMPANY  
BENALLY WELL No. 1  
SW/4 NE/4 SECTION 5, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

AMERADA PETROLEUM CORPORATION  
SALINA WHITE WELL No. 1  
SE/4 SW/4 SECTION 8, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

ALL IN SAN JUAN COUNTY, NEW MEXICO

6. THAT IT IS PROPOSED TO INJECT LIQUEFIED PETROLEUM GAS FOLLOWED BY GAS INTO THE FOLLOWING WELLS:

SUNRAY MID-CONTINENT OIL COMPANY  
FEDERAL "C" WELL No. 4  
SW/4 NE/4 SECTION 6, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

SUNRAY MID-CONTINENT OIL COMPANY  
FEDERAL "C" WELL No. 13  
SW/4 NW/4, SECTION 5, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

AMERADA PETROLEUM CORPORATION  
GLE-NA-NUP-PAH WELL No. 1  
SW/4 SE/4 SECTION 5, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

PHILLIPS PETROLEUM COMPANY  
BENALLY WELL No. 1  
SW/4 SW/4 SECTION 5, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

SUNRAY MID-CONTINENT OIL COMPANY  
FEDERAL "C" WELL No. 10  
SW/4 SE/4 SECTION 6, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

SUNRAY MID-CONTINENT OIL COMPANY  
FEDERAL "C" WELL No. 16  
SW/4 NW/4 SECTION 8, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

SUNRAY MID-CONTINENT OIL COMPANY  
FEDERAL "C" WELL No. 14  
SW/4 NE/4 SECTION 8, TOWNSHIP 25 NORTH,  
RANGE 12 WEST

ALL IN SAN JUAN COUNTY, NEW MEXICO

7. THAT THE CASING PROGRAM IN SUNRAY MID-CONTINENT'S FEDERAL "C" WELL No. 18 IS AS FOLLOWS AND IS TYPICAL OF THE CASING PROGRAM FOR THE WELLS PROPOSED TO BE CONVERTED INTO INJECTION WELLS:

8-5/8" CASING SET AT 352' WITH 225 SACKS OF CEMENT.  
5-1/2" CASING SET AT 4989' WITH 200 SACKS OF CEMENT.

THE CASING IN EACH INJECTION WELL WILL BE TESTED IN ACCORDANCE WITH SUCH RULES AND METHODS HERETOFORE APPROVED BY THE COMMISSION OR AS MAY BE PRESCRIBED BY IT PRIOR TO USE AS AN INJECTION WELL.

8. THAT IT IS ESTIMATED THAT BETWEEN 3,000,000 AND 4,000,000 CUBIC FEET OF GAS PER DAY WILL BE INJECTED INTO THE INJECTION WELLS AND 6,000 TO 7,000 BARRELS OF LIQUEFIED PETROLEUM GAS PER DAY WILL BE INJECTED INTO THE INJECTION WELLS; AT A LATER DATE IT IS ESTIMATED THAT THE VOLUME OF GAS INJECTED MAY INCREASE, THAT THE GAS WILL CONSIST OF PRODUCED CASINGHEAD GAS FROM THE LOWER GALLUP OIL FORMATION WITH NEEDED MAKE-UP GAS TO BE PURCHASED FROM OUTSIDE SOURCES; THAT THE LIQUEFIED PETROLEUM GAS WILL BE PURCHASED FROM AVAILABLE PLANTS IN THE GENERAL VICINITY OF THE PROJECT.

9. THAT ATTACHED HERETO, MARKED EXHIBIT "A", AND MADE A PART HEREOF BY THIS REFERENCE, IS A PLAT SHOWING THE LOCATION OF THE PROPOSED INJECTION WELLS; THE LOCATION OF ALL OIL AND GAS WELLS, INCLUDING DRILLING WELLS AND DRY HOLES, AND THE NAMES OF LESSEES WITHIN ONE-HALF MILE OF THE PROPOSED INJECTION WELLS; AND THE NAME OF EACH OFFSET OPERATOR.

10. THAT THE OPERATOR OF THIS PROJECT IS SUNRAY MID-CONTINENT OIL COMPANY, P. O. Box 2039, TULSA 2, OKLAHOMA.

11. THAT IN THE INTEREST OF CONSERVATION, THE PREVENTION OF WASTE AND TO MORE EFFECTIVELY AND EFFICIENTLY OPERATE THE LIQUEFIED PETROLEUM GAS-GAS INJECTION PROJECT IT IS RECOMMENDED TO THE COMMISSION THAT RULES AND REGULATIONS AS PROVIDED FOR BY NEW MEXICO OIL CONSERVATION COMMISSION ORDER NO. R-1315 BE AMENDED TO PROVIDE FOR LIQUEFIED PETROLEUM GAS-GAS INJECTION AS WELL AS GAS INJECTION AND APPLY TO THAT PORTION OF THE BISTI-LOWER GALLUP OIL POOL DESCRIBED ABOVE.

WHEREFORE APPLICANT PRAYS THAT THIS APPLICATION BE SET FOR HEARING, THAT NOTICE BE GIVEN AS REQUIRED BY LAW AND THAT UPON THE EVIDENCE ADDUCED AT SUCH HEARING, THE COMMISSION ISSUE AN ORDER GRANTING TO APPLICANT PERMISSION TO INJECT GAS AND LIQUEFIED PETROLEUM GAS INTO THE BISTI-LOWER GALLUP OIL POOL, AND ESTABLISHING RULES AND REGULATIONS IN THAT PORTION OF THE BISTI-LOWER GALLUP OIL POOL, SAN JUAN COUNTY, NEW MEXICO, DESCRIBED IN THIS APPLICATION, AS MORE FULLY SET FORTH IN THIS APPLICATION.

DATED THIS 17<sup>th</sup> DAY OF APRIL, 1959.

SUNRAY MID-CONTINENT OIL COMPANY

BY

William R. Loar

WILLIAM R. LOAR, ATTORNEY  
P. O. Box 2039  
TULSA 2, OKLAHOMA

BY

L. C. White

L. C. WHITE, ATTORNEY  
P. O. Box 787  
SANTA FE, NEW MEXICO

BEFORE THE  
OIL CONSERVATION COMMISSION  
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1665

TRANSCRIPT OF HEARING

AUGUST 5, 1959

DEARNLEY - MEIER & ASSOCIATES  
INCORPORATED  
GENERAL LAW REPORTERS  
ALBUQUERQUE, NEW MEXICO  
3-6691 5-9546

BEFORE THE  
OIL CONSERVATION COMMISSION  
SANTA FE, NEW MEXICO  
AUGUST 5, 1959

-----  
IN THE MATTER OF:

CASE 1665 Application of Sunray Mid-Continent Oil Com- :  
pany for an amendment of Order No. R-1414. :  
Applicant, in the above-styled cause, seeks :  
an order amending Order No. R-1414 to include :  
additional acreage in its Central Bisti LPG- :  
Gas-Water Injection project in the Bisti- :  
Lower Gallup Oil Pool in San Juan County, New :  
Mexico, and for permission to drill four ad- :  
ditional water injection wells in said pro- :  
ject and for permission to convert one addi- :  
tional well to gas injection in said project.:  
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BEFORE:

Elvis A. Utz, Examiner.

T R A N S C R I P T    O F    P R O C E E D I N G S

MR. UTZ: Next case on the docket will be Case 1665.

MR. PAYNE: Case 1665. Application of Sunray Mid-  
Continent Oil Company for an amendment of Order No. R-1414.

MR. WHITE: If the Examiner please, Charles White of  
Gilbert, White & Gilbert, Santa Fe, New Mexico, appearing on be-  
half of the applicant, Sunray Mid-Continent. I have associated  
with me Mr. Bill Lear, attorney from Tulsa, Oklahoma.

MR. UTZ: Any other appearances to be made? If not,  
you may proceed.

MR. LOAR: Mr. Brooks will be our one witness, Mr.

Examiner.

(Witness sworn)

MR. UTZ: You want to mark one set of these Exhibits?

MR. LOAR: Yes, sir.

ROBERT E. BROOKS,

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

DIRECT EXAMINATION

BY MR. LOAR:

Q Will you please state your name and occupation?

A I am Robert E. Brooks, Division Reservoir Engineer with Sunray Mid-Continent, Midland, Texas.

Q Have you testified before this Commission as a reservoir engineer previously?

A Yes, sir.

MR. LOAR: If the Examiner please, are his qualifications acceptable?

MR. UTZ: Yes, sir, they are.

Q (By Mr. Loar) Mr. Brooks, this is the application of Sunray Mid-Continent Oil Company requesting that the field rules that apply to the Central Bisti Unit be extended to include the S/2 of the N/2 and the S/2 of Section 32, Township 25 North, Range 12 West -- I am sorry, 26 North, Range 12 West, and the W/2 of the SW/4 of Section 10, and the W/2 of the NW/4 of Section 15 in



1  
Township 25 North, Range 12 West, and for conversion, or for permission to drill four water injection wells in the Section 10 and 15 area, and for permission to convert the, what is labeled on the -- what has been labeled Val R. Reese Hickman No. 1 to gas injection.

Q Are you familiar with this application in this area involved?

A Yes, sir.

Q Did you testify in the previous Commission hearings in Cases 1664, 1665 and 1706, which were all dealing with the Central Bisti Unit and the field rules that apply thereto?

A Yes, sir, I did.

(Thereupon, Sunray Mid-Continent's Exhibit No. 1 was marked for identification.)

Q Will you please now refer to Exhibit No. 1 and state briefly what that shows?

A Exhibit No. 1 is a map of a portion of the northwest part of the Bisti-Lower Gallup Oil Pool. This map also shows the Central Bisti Unit with the heavy dashed lines. It shows the proposed extension for the field rules which we are requesting here today, shaded in light blue. It also shows the location of the various types of injection wells. The description of the proposed area is the S/2 and the S/2 of the N/2 of Section 32, Township 26 North, Range 12 West.

Q Now, Mr. Brooks, may I interrupt at that point? That

portion of Section 32 has been approved, has been included by the Commission within the area approved for the Central Bisti Unit, is that correct? I believe it has.

A I'm not sure of that.

Q All right. However, that portion of Section 32, shaded in yellow, shaded in blue, was not included in the field rule hearing because at the time of the field rules Sunray Mid-Continent and the Unit did not have control of Section 32?

A That is correct.

Q All right. Now, would you proceed?

A The other areas, or the W/2 of the SW/4 of Section 10, Township 25 North, Range 12 West, and the W/2 of the NW/4 of Section 15, Township 25 North, Range 12 West. Now, in this area in Section 10 and Section 15 we propose to drill four water injection wells. The wells are set out on the application and may be described from north to south with Well No. 1 to be located 1315 feet East and 2635 feet North of the Southwest corner of Section 10. This will be known in the future as the CBU water injection or WI No. 4. Well No. 2 to be located 1315 feet East and 1320 feet north of the southwest corner of Section 10. This well will be known as CBU WI No. 5. Well No. 3 on the application is to be located 1315 feet East and zero feet North of the southwest corner of Section 10. This will be known as CBU WI No. 6. I have given the wrong numbers here on these wells for the CBU numbers, I see. I was going down the line. I will renumber those

later.

Q Let's straighten it up now, Mr. Brooks, since you brought it up.

A Going from North to South for the new terminology, the most northerly well will be the CBU No. 4. The next Well South will be the CBU No. 5. The Well on the common boundary of Sections 10 and 15 will be the CBU WI No. 6, and the most southerly Well will be the CBU WI No. 7.

Q Now, I believe you have given the location of all the Wells except the CBU WI No. 7. Will you give that location?

A This was described as Well No. 4 in the application, to be located 1315 feet East and 1320 feet South of the northwest corner of Section 15.

Q Mr. Brooks, how do you propose to complete these wells as water injection wells?

A These wells will be completed in the following manner, and I will read from the drilling program of the CBU WI No. 5. The surface casing of 8 5/8 inches will be set at approximately 315 feet and circulated with cement to the surface. The production casing they have here, or the casing string, will be set at approximately 4920 feet. It will be 4 1/2 inch casing, and adequate cement will be displaced to put the top above 4,000 feet. The tubing in this well, there will be approximately 4920 feet of 2 3/8 inches of plastic coated tubing. We will set a Model "D" packer, Baker Model "D" packer above the top of the perfora-

tions, which will be in the Bisti-Lower Gallup section.

Q Now, then, Mr. Brooks, as I understand it, you'll run 8 5/8 surface pipe and cement it to surface. You will run 4 1/2 inch long string to the Lower Gallup formation and cement it sufficiently to complete the Gallup formation. You'll perforate, you will run plastic lined 2 3/8 inch tubing and set it on a permanent type packer, is that correct?

A That's correct.

Q Will this method of completion keep the water that is to be injected into this well in the Lower Gallup formation?

A Yes, sir.

Q What is to be the source of the water to be used in these four wells?

A The source of the water in these four wells will be from a water supply well which is located 1,000 feet from the West line and 660 feet from the South line of Section 10, Township 25 North, Range 12 West. The sundry description of the sand, which will supply the water, is known as the Menefee. This well is presently being tested.

Q All right. Now, is this the same water that is being used over on the West line of the Central Bisti Unit?

A Yes, sir.

Q What are the injection rates and pressures that you anticipate using for these four wells?

A The injection rate will be dependent upon the volumes

that the wells will take. Of course, we anticipate injecting a total of approximately 1,000 barrels per day into the four wells at a pressure not greater than 1200 pounds per square inch at surface in any one well.

Q Now, Mr. Brooks, the Commission has previously approved the use of two water injection wells on the West side of the Bisti Unit, and have given us the administrative procedure for converting additional wells to water injection. Do these four wells, and the injection rates that you are requesting, and the completion method, are they all compatible with the method approved by the Commission in the -- referring to the two wells on the West side?

A Yes, sir, I believe they are.

Q The application, which is the subject of this hearing, also requests permission to convert the Val R. Reese & Associates Hickman Well located in the southwest, southwest of 32, 26 North, 12 West, to injection purposes, is that correct?

A Yes, sir.

Q Will you then run 2-inch non-upset tubing on the packer and inject down the tubing?

A Yes, sir.

Q Is this compatible with the completion procedures authorized in the previous hearings on this unit?

A Yes, sir, it is.

(Thereupon, Sunray Mic-Continent's Exhibit No. 2 was marked for identification.)

Q Would you please refer to Exhibit No. 2 and state very briefly what that is?

A Exhibit No. 2 is an isopach of the Bisti-Lower Gallup sand, or what has been termed as Zone 1, and calculated from microlog separation.

Q Does this show that the acreage in Sections 10 and 15 and the acreage in Section 32, which we are seeking to include within the field rules, are underlain by the Bisti-Lower Gallup formation?

A Yes, sir.

Q Does it indicate that this is the same reservoir and that the sand is continuous and connected throughout?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 3 was marked for identification.)

Q Exhibit No. 3, I believe, is an isopach showing microlog separation for the Zone No. 2, is that correct?

A Yes, sir.

Q Does it indicate a similar picture?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 4 was marked for identification.)

Q Exhibit No. 4 is an isopach showing microlog separation

for Zone No. 3. Does it also indicate a similar picture?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 5 was marked for identification.)

Q Exhibit No. 5, would you explain what Exhibit No. 5 is?

A Exhibit No. 5 is an isopachous map on the Bisti-Lower Gallup sand as constructed from the pay determined from the SP curve of the electric log.

Q And it also shows the portions in Sections 10 and 15 and portions in Section 32 which we are seeking to include by the field rules are underlain by the Bisti-Lower Gallup formation?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 6 was marked for identification.)

Q Exhibit No. 6 is an isopach based on Zone No. 2. Does that indicate a similar picture?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 7 was marked for identification.)

Q Exhibit No. 7 is an isopach based on the SP for Zone No. 3. Does it also indicate a similar picture?

A Yes, sir.

Q Do you recommend to the Oil Conservation Commission that the S/2 of the N/2 and the S/2 of Section 32, Township 26 North, Range 12 West, and the E/2 of the -- I'm sorry -- the W/2

of the Southwest of Section 10, and the W/2 of the Northwest of Section 15, in Township 25 North, Range 12 West, be included within the field rules for the Central Bisti Unit?

A Yes, sir.

Q Is it your understanding that after certain procedural requirements are met, that we will seek to include these areas within the Central Bisti Unit upon administrative procedure to the Commission?

A Yes, sir.

MR. LOAR: I believe that's all we have.

Q (By Mr. Loar) Were Exhibits 1 through 7 prepared by you or under your supervision?

A Yes, sir.

MR. LOAR: We request they be received.

MR. UTZ: Without objection, they will be received.

(Whereupon, Sunray Mid-Continent's Exhibits Nos. 1 through 7 were received in evidence.)

#### CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Brooks, is the CBU Unit communitized only for the three Zones mentioned in your Exhibits here?

A Yes, sir.

Q Are there other producing zones below these three zones in the Mancos?

A Yes, sir.



Q And can you say why those zones are not communitized?

A The engineers which worked on the reservoir interpretations which led to unitization of the Central Bisti-Lower Gallup sand Unit did not feel that this zone which was completed, I believe, in Amerada's Ka-Da-Pah No. 1, and previously in Amerada's Ka-Da-Pah No. 2 were the same reservoir, as I recall. This zone is approximately a hundred feet below the lowest sand stringer that we find in the Bisti-Lower Gallup reservoir.

Q You feel that is a separate reservoir from the Lower Gallup.

A Yes, sir, we believe that it is. It appears to be a localized sand stringer. The Ka-Da-Pah No. 2 produced very shortly and was eventually squeezed off due to its inability to produce. As far as the actual details on the nature of the crude and bottom hole pressures, I do not have that with me today.

Q Well, do you know of any other wells in -- producing wells, that are completed in that zone in the Unit?

A Pan American perforated, I believe it was the Ka-Da-Pah No. 1 in this zone. It was one of the wells in the Ka-Da-Pah, but it could have been the In-Na-Da-Pah No. 1. I don't have that with me either.

Q That was the only well that you know of that was completed in the zone below the communitized area?

A The three that I have mentioned are the only three, yes, sir. And the Pan American Well is a very poor looking thing.

I don't know what the nature of that completion is, but it would be my opinion that it would yield very little, if any, oil at all.

Q Do you know whether it is the intention of Sunray, as unit operator, to convert the Amerada Ka-Da-Pah No. 1 as an LPG injection well?

A Yes, sir, it is the intention of Sunray to convert the Amerada Ka-Da-Pah No. 1 to an LPG injection well.

Q The production strings, 4 1/2 inch producing strings which you will set in the four water injection wells, I don't believe you stated how that would be tested.

A That will be tested with 2,000 pounds for thirty minutes after the casing has been set for twelve hours under pressure. We will run temperature surveys in the well to determine tops.

Q Your hydrostatic head on the casing shoe will be in the neighborhood of 2200 pounds?

A Yes, sir.

Q And you intend to put a maximum of a thousand pounds surface pressure?

A Two thousand.

Q Two thousand pounds?

A Yes, sir, two thousand pounds for thirty minutes. You asked on the 4 1/2 inch.

Q No, I mean in the injection pressure, water injection pressure at the surface?

A Yes, sir, 1200 pounds.

Q If you do that, then the pressure casing shoe would be somewhere around 3200 pounds?

A That's right.

Q And you would have tested it only to 2,000. Do you think that is a sufficient test to assure no leakage in the testing?

A We could easily test it to the higher pressure if the Commission desires.

Q Do you think it would be a good practice to do so?

A Yes, sir.

MR. UTZ: Any other questions of the witness?

MR. PAYNE: Yes, sir.

QUESTIONS BY MR. PAYNE:

Q Mr. Brooks, as I understand it, the unit agreement has not yet been amended to take in the acreage in Sections 10 and 15?

A That's correct, as I understand it.

Q Now, I don't quite understand how you propose to convert these wells until such time as they are in the unit.

A An underwriter's agreement between the operators in the Central Bisti Unit and Phillips Petroleum Company and Shell Oil Company has been written and approved which will permit this work to proceed.

Q The underwriting agreement does cover this acreage?

A Yes, sir.

Q Now, in this Val R. Reese Well that you propose to con-

vert to gas injection, you are not proposing that that be a dual completion injection producing well, simply an injection well?

A Yes, sir.

MR. PAYNE: That's all. Thank you.

MR. UTZ: Any other questions?

MR. LOAR: I would like to ask one or two more.

MR. UTZ: Mr. Loar.

REDIRECT EXAMINATION

BY MR. LOAR:

Q Mr. Brooks, isn't it Sunray's intention to not convert the Val R. Reese Well until it is made a part of the Unit, is that correct; --

A That's correct.

Q -- since that is the only well in the lease?

A Yes, sir.

MR. LOAR: That's all.

MR. UTZ: Any other questions? If not, the witness may be excused.

(Witness excused)

MR. UTZ: Any other statements to be made in this case? If there are none, the case will be taken under advisement, and take a ten-minute recess.

STATE OF NEW MEXICO )  
 ) ss  
 COUNTY OF BERNALILLO )

I, J. A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 14<sup>th</sup> day of August, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. Trujillo  
 NOTARY PUBLIC

My Commission Expires:

October 5, 1960

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1665, heard by me on August 5, 1959.

Frank M. [Signature], Examiner  
 New Mexico Oil Conservation Commission

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. 1665  
Order No. R-1414-B

APPLICATION OF SUNRAY MID-  
CONTINENT OIL COMPANY FOR AN  
ORDER AMENDING ORDER NO. R-1414  
TO INCLUDE ADDITIONAL ACREAGE  
IN ITS CENTRAL BISTI LPG-GAS-  
WATER INJECTION PROJECT IN THE  
BISTI-LOWER GALLUP OIL POOL IN  
SAN JUAN COUNTY, NEW MEXICO,  
AND FOR PERMISSION TO DRILL  
FOUR ADDITIONAL WATER INJECTION  
WELLS AND TO CONVERT ONE ADDI-  
TIONAL WELL TO GAS INJECTION

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on August 5, 1939, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 20<sup>th</sup> day of August, 1959, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

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

(2) That Order No. R-1414 authorized the applicant to initiate a liquefied petroleum gas-gas-water injection project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

(3) That the applicant seeks an amendment of Rule 1 of the Special Rules and Regulations for the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water Injection Project, as promulgated by Order No. 1414 and amended by Order No. 1414-A, to include the following acreage in the said project area:

-2-

Case No. 1665

Order No. R-1414-B

S/2 and S/2 N/2 of Section 32, Township 26  
North, Range 12 West, NMPM  
W/2 SW/4 of Section 10, Township 25 North,  
Range 12 West, NMPM  
W/2 NW/4 of Section 15, Township 25 North,  
Range 12 West, NMPM

all in San Juan County, New Mexico, and within the defined limits  
of the Bisti-Lower Gallup Oil Pool.

(4) That in connection with the aforesaid Injection Project, the applicant further seeks permission to drill and complete the following-described water injection wells:

CBU-WI Well No. 4, located 2635 feet from  
the South line and 1315 feet from the West  
line of Section 10, Township 25 North,  
Range 12 West, NMPM

CBU-WI Well No. 5, located 1319 feet from  
the South line and 1315 feet from the West  
line of Section 10, Township 25 North,  
Range 12 West, NMPM

CBU-WI Well No. 6, located five feet from  
the North line and 1315 feet from the West  
line of Section 15, Township 25 North,  
Range 12 West, NMPM

CBU-WI Well No. 7, located 1315 feet from  
the North line and 1315 feet from the West  
line of Section 15, Township 25 North,  
Range 12 West, NMPM

(5) That the applicant further seeks permission to convert  
to dry gas injection the Val R. Reese Hickman Well No. 1, located  
in the SW/4 SW/4 of Section 32, Township 26 North, Range 12 West,  
NMPM, San Juan County, New Mexico.

(6) That approval of the subject application will neither  
cause waste nor impair correlative rights.

IT IS THEREFORE ORDERED:

(1) That Rule 1 of the Special Rules and Regulations for  
the Sunray Mid-Continent Oil Company Central Bisti LPG-Gas-Water  
Injection Project, as promulgated by Order No. R-1414 and amended  
by Order No. R-1414-A, be and the same is hereby further amended  
to include the following additional acreage within the defined project  
area, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico:

-3-

Case No. 1665

Order No. R-1414-B

S/2 and S/2 N/2 of Section 32, Township 26 North, Range 12 West, NMPM  
W/2 SW/4 of Section 10, Township 25 North, Range 12 West, NMPM  
W/2 NW/4 of Section 15, Township 25 North, Range 12 West, NMPM

(2) That the applicant be and the same is hereby authorized to drill and complete the following-described water injection wells:

CBU-WI Well No. 4, located 2635 feet from the South line and 1315 feet from the West line of Section 10, Township 25 North, Range 12 West, NMPM

CBU-WI Well No. 5, located 1319 feet from the South line and 1315 feet from the West line of Section 10, Township 25 North, Range 12 West, NMPM

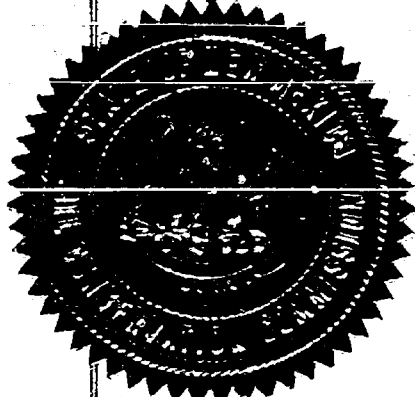
CBU-WI Well No. 6, located five feet from the North line and 1315 feet from the West line of Section 15, Township 25 North, Range 12 West, NMPM

CBU-WI Well No. 7, located 1315 feet from the North line and 1315 feet from the West line of Section 15, Township 25 North, Range 12 West, NMPM

(3) That the applicant be and the same is hereby authorized to convert to dry gas injection the Val R. Reese Hickman Well No. 1, located in the SW/4 SW/4 of Section 32, Township 26 North, Range 12 West, NMPM, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

PROVIDED HOWEVER, That prior to utilizing the above-described wells as injection wells, the casing in each such well shall be tested at a pressure equal to the hydrostatic head plus the maximum surface pressure of the injection fluid.

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



ven/

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

*John Burroughs*  
JOHN BURROUGHS, Chairman

*Murray E. Morgan*  
MURRAY E. MORGAN, Member

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



OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

August 20, 1959

Mr. Charlie White  
P. O. Box 787  
Bishop Building  
Santa Fe, New Mexico

Dear Mr. White:

On behalf of your client, Sunray Mid-Continent Oil Company, we enclose two copies of Order No. E-1414-B issued August 20, 1959, by the Oil Conservation Commission in Case No. 1665, which was heard on August 5, 1959 at Santa Fe before an examiner.

Very truly yours,

A. L. PORTER, Jr.  
Secretary-Director

lr/

Enclosures

*Copy sent to  
Carter & Hobbs*

OIL CONSERVATION COMMISSION  
SANTA FE, NEW MEXICO

Date 8-6-59

CASE NO. 1665

HEARING DATE 8-5-59

My recommendations for an order in the above numbered case(s) are as follows:

1. Grant Sunray's request for an amendment to the R-1414 to expand the Central Bisti-Unit by adding ~~S/2~~ ~~SW/4~~, ~~5/2 N/2~~ sec 32 - 26 N-12W, and the W/2 SW/4 sec. 10 and W/2 NW/4 sec. 15, 25 N-12W.
2. approve one additional LPH injection well ~~to be known as~~ known as the Reese-Nickman #1 SW/4 32-26 N-12W.
3. approve 4 injection water injection wells as follows:  
CBU-WI #4 - ~~1315~~ 26 35/N, 1315/W 10-26 N-12W  
CBU-WI #5 1320/N, 1315/W - 10-26 N-12W.  
CBU-WI #6 on S. line and 1315/W sec. 10-26 N-12W.  
CBU-WI #7 1320/S, 1315/E sec. 15-26 N-12W.
4. Casing shall be tested on the injection wells to a pressure equal to the hydrostatic head plus the maximum surface pressure of the injection fluid.

Staff Member

*[Signature]*

DOCKET: EXAMINER HEARING AUGUST 5, 1959

Oil Conservation Commission - 9 a.m., Mabry Hall, State Capitol, Santa Fe, New Mexico

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

Continued Case

CASE 1695: Application of Texaco, Inc. for a triple completion, for permission to commingle the production from three separate pools, and for the establishment of two non-standard gas proration units. Applicant, in the above-styled cause, seeks an order authorizing it to triple complete its A. H. Blinebry NCT-4 Well No. 1, located in the SE/4 SE/4 of Section 31, Township 22 South, Range 38 East, Lea County, New Mexico, in such a manner as to permit production from the Blinebry formation, production of gas from the Tubb Gas Pool, and production of oil from the Drinkard Pool through tubing, the annulus via cross-over, and tubing respectively. Applicant further seeks the establishment of a 160-acre non-standard gas proration unit in both the Tubb Gas Pool and Blinebry Gas Pool each consisting of the S/2 S/2 of said Section 31. Applicant further seeks permission to commingle the liquid production from the Blinebry, Tubb and Drinkard formations underlying said acreage.

NEW CASES

CASE 1665: Application of Sunray Mid-Continent Oil Company for an amendment of Order No. R-1414. Applicant, in the above-styled cause, seeks an order amending Order No. R-1414 to include additional acreage in its Central Bisti LPG-Gas-Water Injection project in the Bisti-Lower Gallup Oil Pool in San Juan County, New Mexico, and for permission to drill four additional water injection wells in said project and for permission to convert one additional well to gas injection in said project.

CASE 1731: Application of Sunray Mid-Continent Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its D. Hardy Well No. 2, located 1980 feet from the North and East lines of Section 29, Township 21 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Paddock Pool and the production of oil from the Drinkard Pool through parallel strings of tubing.

CASE 1732: Application of Continental Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Lockhart B-11 Well No. 8-1B, located in the SW/4 SE/4 of Section 11, Township 21 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Terry-Blinebry Oil Pool and the production of oil from the Drinkard Pool through parallel strings of tubing.

CASE 1733: Application of Kersey and Company for a pilot water flood project, for several unorthodox locations for wells in said project, for administrative procedure for conversion of additional wells to water injection, and for a project allowable. Applicant, in the above-styled cause, seeks an order authorizing a pilot water flood project in the 2000-foot sand zone of the Grayburg formation underlying its Twin Lakes Lease comprising the SW/4 of Section 28, Township 18 South, Range 28 East, Eddy County, New Mexico.

Docket No. 28-59

Applicant further seeks the approval of unorthodox locations for three wells which would be placed on water injection immediately and the approval of an administrative procedure whereby several other wells on said lease may be converted to water injection without notice and hearing. Applicant further requests a project allowable for the acreage involved.

CASE 1734:

Application of Kersey and Company for a water injection-oil production dual completion on an unorthodox location, and for an additional injection well. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Featherstone Well No. 2, located on an unorthodox location, 1060 feet from the North line and 250 feet from the East line of Section 29, Township 18 South, Range 28 East, Eddy County, New Mexico, in such a manner as to permit the injection of water into the Grayburg sand at approximately 2000 feet and the production of oil from the Premier zone of the Grayburg sand at approximately 2230 feet. Applicant further seeks authority to inject water into a new well to be drilled 330 feet from the North line and 990 feet from the East line of said Section 29. Applicant states that Graridge Corporation is presently injecting water offsetting this tract.

Aug 5  
MAIN OFFICE CCC

REC JUL 14 AM 9:41

BEFORE THE OIL CONSERVATION COMMISSION OF THE

STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF  
SUNRAY MID-CONTINENT OIL COMPANY FOR  
PERMISSION TO EXTEND ITS LPG-GAS-WATER  
INJECTION PROGRAM TO INCLUDE ADDITIONAL  
ACREAGE AND PERMISSION TO DRILL FOUR WATER  
INJECTION WELLS WITHIN THE CENTRAL BISTI-  
LOWER SAND UNIT AREA, TO USE ITS VAL R. REESE  
HICKMAN WELL No. 1 WITHIN SAID UNIT AREA AS  
A GAS INJECTION WELL AND TO EXTEND THE SPECIAL  
RULES AND REGULATIONS PERTAINING TO SAID UNIT  
AREA.

Case No. 1665

APPLICATION

TO: THE HONORABLE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO.

Comes now the Applicant, Sunray Mid-Continent Oil Company and respectfully alleges and states:

1. That it is the owner and operator of the S $\frac{1}{2}$  and the S $\frac{1}{2}$ N $\frac{1}{2}$  of Section 32, Township 26 North, Range 12 West all within the exterior limits of the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

2. That in the interests of conservation, the prevention of waste and to more effectively and efficiently operate the LPG-Gas-Water Injection Program, heretofore authorized by Order R-1414 in Case No. 1665, the aforementioned Acreage should be included in said program, and the order amended accordingly.

3. That in further interests of the prevention of waste and for the more successful operation of said injection program, petitioner seeks approval of and permission to drill and complete four water injection wells within the Central Bisti-Lower Gallup Sand Unit Area, said wells to be situate in Township 25 North, Range 12 West, as follows:

Well No. 1 to be located 1315 feet East and 2635 feet North of the Southwest corner of Section 10.

Well No. 2 to be located 1315 feet East and 1320 feet North of the Southwest corner of Section 10.

GILBERT, WHITE AND GILBERT  
ATTORNEYS AT LAW  
SANTA FE, NEW MEXICO

Doyle  
7-23-59

GILBERT, WHITE AND GILBERT  
ATTORNEYS AT LAW  
SANTA FE, NEW MEXICO

Well No. 3 to be located 1315 feet East and Zero feet  
North of Southwest corner of Section 10.

Well No. 4 to be located 1315 feet East and 1320 feet  
South of the northwest corner of Section 15;

and for permission to use petitioner's Val R. Reese Hickman Well No. 1  
situate in the SW $\frac{1}{4}$ SW $\frac{1}{4}$  of Section 32 T. 26 N. Range 12 W. San Juan County,  
as a gas injection well.

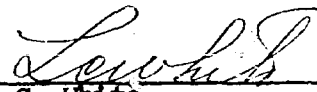
4. Petitioner further requests that the limits of the Central Bisti LPG-  
Gas-Water Injection Program be enlarged to include the W $\frac{1}{2}$ SW $\frac{1}{4}$  of Section 10  
and the W $\frac{1}{2}$ NW $\frac{1}{4}$  of Section 15 T. 25 N. Range 12 W., San Juan County, New Mexico,  
and that the special rules and regulations for said project be extended to  
include the matters and things herein sought to be obtained from the Commission.

WHEREFORE applicant prays that this application be set for hearing;  
that notice be given as required by law and that upon the evidence adduced  
at such hearing the Commission issue its order granting all matters requested  
in this application.

SUNRAY MID-CONTINENT OIL COMPANY

By: W. R. Loar  
P.O. Box 2039  
Tulsa 2, Oklahoma

By

  
L.C. White  
P.O. Box 787  
Santa Fe, New Mexico

BEFORE THE  
OIL CONSERVATION COMMISSION  
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1665

TRANSCRIPT OF HEARING

AUGUST 5, 1959

DEARNLEY - MEIER & ASSOCIATES  
INCORPORATED  
GENERAL LAW REPORTERS  
ALBUQUERQUE, NEW MEXICO  
3-6691 5-9546

2

BEFORE THE  
OIL CONSERVATION COMMISSION  
SANTA FE, NEW MEXICO  
AUGUST 5, 1959

-----  
IN THE MATTER OF:

CASE 1665 Application of Sunray Mid-Continent Oil Com-  
pany for an amendment of Order No. R-1414.  
Applicant, in the above-styled cause, seeks  
an order amending Order No. R-1414 to include  
additional acreage in its Central Bisti LPG-  
Gas-Water Injection project in the Bisti-  
Lower Gallup Oil Pool in San Juan County, New  
Mexico, and for permission to drill four ad-  
ditional water injection wells in said pro-  
ject and for permission to convert one addi-  
tional well to gas injection in said project.

-----  
BEFORE:

Elvis A. Utz, Examiner.

TRANSCRIPT OF PROCEEDINGS

MR. UTZ: Next case on the docket will be Case 1665.

MR. PAYNE: Case 1665. Application of Sunray Mid-  
Continent Oil Company for an amendment of Order No. R-1414.

MR. WHITE: If the Examiner please, Charles White of  
Gilbert, White & Gilbert, Santa Fe, New Mexico, appearing on be-  
half of the applicant, Sunray Mid-Continent. I have associated  
with me Mr. Bill Loar, attorney from Tulsa, Oklahoma.

MR. UTZ: Any other appearances to be made? If not,  
you may proceed.



MR. LOAR: Mr. Brooks will be our one witness, Mr.  
Examiner.

(Witness sworn)

MR. UTZ: You want to mark one set of these Exhibits?

MR. LOAR: Yes, sir.

ROBERT E. BROOKS,  
called as a witness, having been first duly sworn, testified as  
follows:

DIRECT EXAMINATION

BY MR. LOAR:

Q Will you please state your name and occupation?

A I am Robert E. Brooks, Division Reservoir Engineer  
with Sunray Mid-Continent, Midland, Texas.

Q Have you testified before this Commission as a reser-  
voir engineer previously?

A Yes, sir.

MR. LOAR: If the Examiner please, are his qualifica-  
tions acceptable?

MR. UTZ: Yes, sir, they are.

Q (By Mr. Loar) Mr. Brooks, this is the application of  
Sunray Mid-Continent Oil Company requesting that the field rules  
that apply to the Central Bisti Unit be extended to include the  
S/2 of the N/2 and the S/2 of Section 32, Township 25 North, Range  
12 West -- I am sorry, 26 North, Range 12 West, and the W/2 of  
the SW/4 of Section 10, and the W/2 of the NW/4 of Section 15 in

Township 25 North, Range 12 West, and for conversion, or for permission to drill four water injection wells in the Section 10 and 15 area, and for permission to convert the, what is labeled on the -- what has been labeled Val R. Reese Hickman No. 1 to gas injection.

Q Are you familiar with this application in this area involved?

A Yes, sir.

Q Did you testify in the previous Commission hearings in Cases 1664, 1665 and 1706, which were all dealing with the Central Bisti Unit and the field rules that apply thereto?

A Yes, sir, I did.

(Thereupon, Sunray Mid-Continent's Exhibit No. 1 was marked for identification.)

Q Will you please now refer to Exhibit No. 1 and state briefly what that shows?

A Exhibit No. 1 is a map of a portion of the northwest part of the Bisti-Lower Gallup Oil Pool. This map also shows the Central Bisti Unit with the heavy dashed lines. It shows the proposed extension for the field rules which we are requesting here today, shaded in light blue. It also shows the location of the various types of injection wells. The description of the proposed area is the S/2 and the S/2 of the N/2 of Section 32, Township 26 North, Range 12 West.

Q Now, Mr. Brooks, may I interrupt at that point? That

portion of Section 32 has been approved, has been included by the Commission within the area approved for the Central Bisti Unit, is that correct? I believe it has.

A I'm not sure of that.

Q All right. However, that portion of Section 32, shaded in yellow, shaded in blue, was not included in the field rule hearing because at the time of the field rules Sunray Mid-Continent and the Unit did not have control of Section 32?

A That is correct.

Q All right. Now, would you proceed?

A The other areas, or the W/2 of the SW/4 of Section 10, Township 25 North, Range 12 West, and the W/2 of the NW/4 of Section 15, Township 25 North, Range 12 West. Now, in this area in Section 10 and Section 15 we propose to drill four water injection wells. The wells are set out on the application and may be described from north to south with Well No. 1 to be located 1315 feet East and 2635 feet North of the Southwest corner of Section 10. This will be known in the future as the CBU water injection or WI No. 4. Well No. 2 to be located 1315 feet East and 1320 feet north of the southwest corner of Section 10. This well will be known as CBU WI No. 5. Well No. 3 on the application is to be located 1315 feet East and zero feet North of the southwest corner of Section 10. This will be known as CBU WI No. 6. I have given the wrong numbers here on these wells for the CBU numbers, I see. I was going down the line. I will renumber those

later.

Q Let's straighten it up now, Mr. Brooks, since you brought it up.

A Going from North to South for the new terminology, the most northerly well will be the CBU No. 4. The next Well South will be the CBU No. 5. The Well on the common boundary of Sections 10 and 15 will be the CBU WI No. 6, and the most southerly Well will be the CBU WI No. 7.

Q Now, I believe you have given the location of all the Wells except the CBU WI No. 7. Will you give that location?

A This was described as Well No. 4 in the application, to be located 1315 feet East and 1320 feet South of the northwest corner of Section 15.

Q Mr. Brooks, how do you propose to complete these wells as water injection wells?

A These wells will be completed in the following manner, and I will read from the drilling program of the CBU WI No. 5. The surface casing of 8 5/8 inches will be set at approximately 315 feet and circulated with cement to the surface. The production casing they have here, or the casing string, will be set at approximately 4920 feet. It will be 4 1/2 inch casing, and adequate cement will be displaced to put the top above 4,000 feet. The tubing in this well, there will be approximately 4920 feet of 2 3/8 inches of plastic coated tubing. We will set a Model "D" packer, Baker Model "D" packer above the top of the perfora-

tions, which will be in the Bisti-Lower Gallup section.

Q Now, then, Mr. Brooks, as I understand it, you'll run 8 5/8 surface pipe and cement it to surface. You will run 4 1/2 inch long string to the Lower Gallup formation and cement it sufficiently to complete the Gallup formation. You'll perforate, you will run plastic lined 2 3/8 inch tubing and set it on a permanent type packer, is that correct?

A That's correct.

Q Will this method of completion keep the water that is to be injected into this well in the Lower Gallup formation?

A Yes, sir.

Q What is to be the source of the water to be used in these four wells?

A The source of the water in these four wells will be from a water supply well which is located 1,000 feet from the West line and 660 feet from the South line of Section 10, Township 25 North, Range 12 West. The sundry description of the sand, which will supply the water, is known as the Menefee. This well is presently being tested.

Q All right. Now, is this the same water that is being used over on the West line of the Central Bisti Unit?

A Yes, sir.

Q What are the injection rates and pressures that you anticipate using for these four wells?

A The injection rate will be dependent upon the volumes

that the wells will take. Of course, we anticipate injecting a total of approximately 1,000 barrels per day into the four wells at a pressure not greater than 1200 pounds per square inch at surface in any one well.

Q Now, Mr. Brooks, the Commission has previously approved the use of two water injection wells on the West side of the Bisti Unit, and have given us the administrative procedure for converting additional wells to water injection. Do these four wells, and the injection rates that you are requesting, and the completion method, are they all compatible with the method approved by the Commission in the -- referring to the two wells on the West side?

A Yes, sir, I believe they are.

Q The application, which is the subject of this hearing, also requests permission to convert the Val R. Reese & Associates Hickman Well located in the southwest, southwest of 32, 26 North, 12 West, to injection purposes, is that correct?

A Yes, sir.

Q Will you then run 2-inch non-upset tubing on the packer and inject down the tubing?

A Yes, sir.

Q Is this compatible with the completion procedures authorized in the previous hearings on this unit?

A Yes, sir, it is.

2

(Thereupon, Sunray Mid-Continent's Exhibit No. 2 was marked for identification.)

Q Would you please refer to Exhibit No. 2 and state very briefly what that is?

A Exhibit No. 2 is an isopach of the Bisti-Lower Gallup sand, or what has been termed as Zone 1, and calculated from microlog separation.

Q Does this show that the acreage in Sections 10 and 15 and the acreage in Section 32, which we are seeking to include within the field rules, are underlain by the Bisti-Lower Gallup formation?

A Yes, sir.

Q Does it indicate that this is the same reservoir and that the sand is continuous and connected throughout?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 3 was marked for identification.)

Q Exhibit No. 3, I believe, is an isopach showing microlog separation for the Zone No. 2, is that correct?

A Yes, sir.

Q Does it indicate a similar picture?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's Exhibit No. 4 was marked for identification.)

Q Exhibit No. 4 is an isopach showing microlog separation

for Zone No. 3. Does it also indicate a similar picture?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's  
Exhibit No. 5 was marked for  
identification.)

Q Exhibit No. 5, would you explain what Exhibit No. 5 is?

A Exhibit No. 5 is an isopachous map on the Bisti-Lower  
Gallup sand as constructed from the pay determined from the SP  
curve of the electric log.

Q And it also shows the portions in Sections 10 and 15  
and portions in Section 32 which we are seeking to include by the  
field rules are underlain by the Bisti-Lower Gallup formation?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's  
Exhibit No. 6 was marked for  
identification.)

Q Exhibit No. 6 is an isopach based on Zone No. 2. Does  
that indicate a similar picture?

A Yes, sir.

(Thereupon, Sunray Mid-Continent's  
Exhibit No. 7 was marked for  
identification.)

Q Exhibit No. 7 is an isopach based on the SP for Zone  
No. 3. Does it also indicate a similar picture?

A Yes, sir.

Q Do you recommend to the Oil Conservation Commission  
that the S/2 of the N/2 and the S/2 of Section 32, Township 26  
North, Range 12 West, and the E/2 of the -- I'm sorry -- the W/2



of the Southwest of Section 10, and the W/2 of the Northwest of Section 15, in Township 25 North, Range 12 West, be included within the field rules for the Central Bisti Unit?

A Yes, sir.

Q Is it your understanding that after certain procedural requirements are met, that we will seek to include these areas within the Central Bisti Unit upon administrative procedure to the Commission?

A Yes, sir.

MR. LOAR: I believe that's all we have.

Q (By Mr. Loar) Were Exhibits 1 through 7 prepared by you or under your supervision?

A Yes, sir.

MR. LOAR: We request they be received.

MR. UTZ: Without objection, they will be received.

(Whereupon, Sunny Mid-Continent's Exhibits Nos. 1 through 7 were received in evidence.)

#### CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Brooks, is the CBU Unit communitized only for the three Zones mentioned in your Exhibits here?

A Yes, sir.

Q Are there other producing zones below these three zones in the Mancos?

A Yes, sir.

Q And can you say why those zones are not communitized?

A The engineers which worked on the reservoir interpretations which led to unitization of the Central Bisti-Lower Gallup sand Unit did not feel that this zone which was completed, I believe, in Amerada's Ka-Da-Pah No. 1, and previously in Amerada's Ka-Da-Pah No. 2 were the same reservoir, as I recall. This zone is approximately a hundred feet below the lowest sand stringer that we find in the Bisti-Lower Gallup reservoir.

Q You feel that is a separate reservoir from the Lower Gallup.

A Yes, sir, we believe that it is. It appears to be a localized sand stringer. The Ka-Da-Pah No. 2 produced very shortly and was eventually squeezed off due to its inability to produce. As far as the actual details on the nature of the crude and bottom hole pressures, I do not have that with me today.

Q Well, do you know of any other wells in -- producing wells, that are completed in that zone in the Unit?

A Pan American perforated, I believe it was the Ka-Da-Pah No. 1 in this zone. It was one of the wells in the Ka-Da-Pah, but it could have been the In-Na-Da-Pah No. 1. I don't have that with me either.

Q That was the only well that you know of that was completed in the zone below the communitized area?

A The three that I have mentioned are the only three, yes, sir. And the Pan American Well is a very poor looking thing.

I don't know what the nature of that completion is, but it would be my opinion that it would yield very little, if any, oil at all.

Q Do you know whether it is the intention of Sunray, as unit operator, to convert the Amerada Ka-Da-Pah No. 1 as an LPG injection well?

A Yes, sir, it is the intention of Sunray to convert the Amerada Ka-Da-Pah No. 1 to an LPG injection well.

Q The production strings, 4 1/2 inch producing strings which you will set in the four water injection wells, I don't believe you stated how that would be tested.

A That will be tested with 2,000 pounds for thirty minutes after the casing has been set for twelve hours under pressure. We will run temperature surveys in the well to determine tops.

Q Your hydrostatic head on the casing shoe will be in the neighborhood of 2200 pounds?

A Yes, sir.

Q And you intend to put a maximum of a thousand pounds surface pressure?

A Two thousand.

Q Two thousand pounds?

A Yes, sir, two thousand pounds for thirty minutes. You asked on the 4 1/2 inch.

Q No, I mean in the injection pressure, water injection pressure at the surface?

A Yes, sir, 1200 pounds.

Q If you do that, then the pressure casing shoe would be somewhere around 3200 pounds?

A That's right.

Q And you would have tested it only to 2,000. Do you think that is a sufficient test to assure no leakage in the testing?

A We could easily test it to the higher pressure if the Commission desires.

Q Do you think it would be a good practice to do so?

A Yes, sir.

MR. UTZ: Any other questions of the witness?

MR. PAYNE: Yes, sir.

QUESTIONS BY MR. PAYNE:

Q Mr. Brooks, as I understand it, the unit agreement has not yet been amended to take in the acreage in Sections 10 and 15?

A That's correct, as I understand it.

Q Now, I don't quite understand how you propose to convert these wells until such time as they are in the unit.

A An underwriter's agreement between the operators in the Central Dist Unit and Phillips Petroleum Company and Shell Oil Company has been written and approved which will permit this work to proceed.

Q The underwriting agreement does cover this acreage?

A Yes, sir.

Q Now, in this Val R. Reese Well that you propose to con-

vert to gas injection, you are not proposing that that be a dual completion injection producing well, simply an injection well?

A Yes, sir.

MR. PAYNE: That's all. Thank you.

MR. UTZ: Any other questions?

MR. LOAR: I would like to ask one or two more.

MR. UTZ: Mr. Loar.

REDIRECT EXAMINATION

BY MR. LOAR:

Q Mr. Brooks, isn't it Sunray's intention to not convert the Val R. Reese Well until it is made a part of the Unit, is that correct, --

A That's correct.

Q -- since that is the only well in the lease?

A Yes, sir.

MR. LOAR: That's all.

MR. UTZ: Any other questions? If not, the witness may be excused.

(Witness excused)

MR. UTZ: Any other statements to be made in this case? If there are none, the case will be taken under advisement, and take a ten-minute recess.

STATE OF NEW MEXICO )  
COUNTY OF BERNALILLO ) 55

I, J. A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 14<sup>th</sup> day of August, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. Trujillo  
NOTARY PUBLIC

My Commission Expires:

October 5, 1960

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1665, heard by me on August 5, 1959.

Frank H. [Signature] Examiner  
New Mexico Oil Conservation Commission