

CASE 2803: Application of J. R.  
CONE for a waterflood project,  
Las County New Mexico

CASE No.  
2803

Application,  
TRANSCRIPTS,  
SMALL Exhibits  
ETC.

BEFORE THE OIL CONSERVATION COMMISSION  
OF NEW MEXICO

IN THE MATTER OF THE APPLICATION  
OF J. R. CONE FOR APPROVAL OF  
A WATER FLOOD PROJECT IN THE CONE  
JALMAT YATES POOL UNIT, LEA COUNTY  
NEW MEXICO.

2803

A P P L I C A T I O N

Comes now J. R. Cone, as unit operator of the Cone Jalmat Yates Pool Unit, Lea County, New Mexico, and applies to the Oil Conservation Commission of New Mexico for approval of a secondary recovery project in the said unit by water injection and in support thereof would show:

1. Attached hereto is the Cone Jalmat Yates Pool Unit Water Flood Development proposal, setting forth the proposed waterflood pilot program, and development plan, together with plat showing injection wells, location of offsetting wells, lease ownership, log of the Nix State No. 3 well, and other information.
2. Water supply is anticipated from the Santa Rosa Sand from the British American well No. 1, located in Section 14, Township 22 South, Range 36 East. It is anticipated that not to exceed 9,000 bbls. of water per day will be required for the project at maximum injection rates.
3. Description of the casing program of injection wells will be supplied prior to date of hearing of this application.
4. Copy of this application is submitted simultaneously to the office of the State Engineer.
5. This secondary recovery project will operate under the provisions of Rule 701 of the Commission's Rules and Regulations.

DOCKET NO. 1120

Date 5/16/3  
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WHEREFORE, applicant prays that this application be set for hearing and that after notice and hearing as required by law, the Commission enter its order approving the water flood project for the Cone Jalmat Yates Pool Unit, Lea County, New Mexico, as applied for.

Respectfully submitted,

J. R. CONE

BY Jesse W. Kellahin  
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P. O. Box 1713  
Santa Fe, New Mexico

ATTORNEYS FOR APPLICANT

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CONE JALMAT YATES POOL UNIT  
WATER FLOOD DEVELOPMENT PROPOSAL

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CONE JALMAT YATES POOL UNIT  
Water Flood Development Proposal

I

INTRODUCTION

The Cone Jalmat Yates Pool Unit under consideration here is composed of all or a portion of Sections 13, 23, 24, 25 and 36 in Township 22 South, Range 35 East NMPM, Lea County, New Mexico. The area expected to be occupied by the unit is set out in more specific detail in Figure I, which is included as an appendix to this report.

The Purpose of the subject unit is to facilitate the development of a Water Flood project through which additional oil and gas may be recovered from the Yates Sand formation.

The Intent of the unit effort is to effect the maximum recovery of oil and gas from the Yates sand formation, as it exist under the unit area, through the use of fluid injection practices. It is realized that these practices are not at this time proven to be effective in the area of interest. It is further realized that the unit area contains a significant reserve of oil and gas that can be recovered through continuation of production practices now in use in the wells to be affected by the proposed secondary recovery development. It therefore is the intent of the unit participants to fully evaluate the process of water flood operations in the area of interest and at the same time jepordize a minimum volume of known remaining primary oil

and gas reserve toward the end that the unit will recover the maximum reserve at a minimum cost.

In order that this end may be accomplished; a pilot water flood project is planned. This pilot project will affect a total 200 acre area of which 160 acres will be inside the pilot project and 40 acres will be adjacent.

The pilot water flood project will require the conversion of four existing unit producing wells to water injection service. In addition British American Oil Producing Company will supply two water injection wells to fully inclose the 160 acre pilot flood area. This project will contain two inside oil and gas producing wells and two external but adjacent producing wells. All other unit wells will remain in their present producing status until such time that the pilot project has proven the adviseability of expanding the water injection program to include the entire unit area.

## II

### DEFINITION AND HISTORY

The Jalmat Yates Pool Reservoir is composed of a series of sand members in the upper portion of the Permian aged Gualdalupe series of sediments. The sand members are seperated by anhydritic dolomite members. The total sand section has a thickness of some 150' in the area of interest although an average of only 32' of sand with characteristics adequate to support commercial rates of oil production is present in the total section. The sand is calcareous, light to moderately cemented and friable. It is composed of fine to medium grains of rounded quartz exhibiting a color ranging from tan to red.

The Jalmat Yates Pool occupies the greater portion of an area some 30 miles north and south by 6 miles east and west which is centered some 10 miles northwest from Eunice, Lea County, New Mexico. The area under consideration here is located in the south central portion of the west flank of the greater Pool area.

Production was extended into the unit area with the completion of the J. R. Cone No. 1 Nix State well in May 1954. This well was initially completed as a gas well from the upper portion of the Yates sand section. It was later completed lower in the Yates section as a high GOR oil well. The last well completed in the unit area was the Delhi-Taylor Oil Corp. No. 3 Amerada State "B" in November 1957.

The production history of the Yates sand in the unit area is typical of that expected for a reservoir whose energy is supplied by solution gas. Although the reservoir has available a large gas cap, energy from that source has evidently had little, if any, influence on oil production from the reservoir.

Through August 1962 the 37 wells included in the unit area have produced a total 1,501,908 bbl of stock tank oil. These wells averaged 6-8 bbl per well per day during the first 6 months of 1962. Individual well production ranged from an average 1 to 10 bbl per day during this time. Production rate from wells in the unit area is declining at a rate of approximately 2% per month.

Primary production of commercial quality from the reservoir was established in the wells thus far completed only through the use of well stimulation processes in the form of acid or hydraulic fracturing practices.

### III

#### RESERVOIR DATA AND RESERVES

The Jalmar Yates Reservoir in the area of the unit may be subdivided into 4 distinct members. Each of these members may in turn be subdivided to some degree, however, these secondary subdivisions do not exhibit an area wide continuity that is equal in any respect to that of the 4 major subdivisions. The members identified as subdivisions of the reservoir are set out in Figure 11 in the appendix to this report which is a typical log from the Yates sand section in the unit area.

The Gas/Oil Contact in this reservoir appears to occur, within rather narrow limits, at approximately the same level in all sand members of the reservoir. Production and well test data has been used to establish the gas/oil contact datum at between -75' and -100' sub sea level.

The Fluids produced from the Yates sand reservoir are sour. The oil has a gravity of 36° API and the gas has an estimated specific gravity of 0.87. Water production from the reservoir is practically negligible in volume leading to the conclusion that the reservoir water saturation under original conditions was at or very near irreducible.

Although specific data is lacking regarding the true nature of the oils produced from the reservoir estimates indicate that the oil was originally saturated with solution gas and that its saturation pressure was in the vicinity of 1000 psi. The original oil formation volume factor was 1.35 and the original solution GOR was 250/1. Indicated reservoir oil viscosity is 1.50 cp.

The Reservoir Rock characteristics have been determined from core analysis data, electrical well surveys and well test data. These average characteristics are set out as follows:

Reservoir Zone

	I	II	III	IV
Net Pay thickness ft.	6.0	10.4	9.8	5.8
Porosity %	19.3	19.0	19.9	18.9
Interstitual Water %	43.0	39.0	39.0	42.0
Air Permiability md.	8.6	23.0	23.0	16.0
%Total Reservoir Storage	18.7	31.9	31.6	17.8
%Total Reservoir Flow Capacity	8.5	39.3	37.0	15.2

The physical nature of the reservoir along with the production history of the wells completed therein suggest an ultimate yield of some 73.4 bbl stock tank oil per acre foot through primary depletion of solution gas energy. Primary reservoir performance suggest that only some 50% of the indicated net reservoir volume has been effective in primary production. Energy from the entire section must have contributed to this recovery in order to supply the gas necessary for the high GOR production. This limitation of effectiveness is the result of low permiability supplying inadequate flow capacity to materially effect commercial rates of production and a slight limitation to the drainage radius for the individual wells.

Primary Production from the Yates sand reservoir underlying the unit area has accounted for the recovery of 1,510,908 bbl of stock tank oil through August 31, 1962. It is expected that an additional 230,092 bbl will be recovered from these wells to yield an ultimate primary recovery of 1,741,000 bbl of stock tank oil.

Primary depletion of the reservoir is expected to yield

an average 73.4 bbl stock tank oil per acre foot of effective pay. This recovery will amount to 15% of the movable stock tank oil originally contained in that effective pay section. Primary production will reduce original reservoir oil saturation from 61% of pore space to 44.6%.

Secondary Recovery Reserves that are expected to be recovered from the Yates sand reservoir as it exists under the unit area amount to a total 3,952,000 bbl after January 1, 1963. This assumes that water injection will commence in a pilot water flood project on or about January 1, 1963. This reserve amounts to 3,748,308 bbl over and above estimated ultimate primary production for a ratio of 2.16 bbl of water flood recovery oil per bbl of ultimate primary recoverable oil.

Secondary recovery by water injection into this reservoir will reduce reservoir oil saturation from the 44.6% of pore space expected after primary depletion to 27.4% of pore space.

The recovery of this secondary oil is expected to require a total 16 years of operation. This time consist of 1.5 years pilot flood operation, 1.5 years water flood expansion to full scale operation and 13 years full scale operation. This prediction is based on producing wells of maximum rate within allowable limits of 42 bbl per gross well per day. The rate at which this reserve is expected to accrue is shown in graphic form through Figure III, attached hereto as a part of the Appendix to this report. (Figure IV attached hereto is a graphic representation of the performance expected from the proposed 160 acre pilot flood area which will contain two internal producing wells and 6 water injection wells. Pro-

duction that will result from influence on producing wells external to the 160 acre pilot area has not been taken into consideration in this figure although it does influence the planning of expansion rate for the project beyond the pilot flood test period.)

#### IV

#### WATER FLOOD OPERATIONS

Water Injection into the reservoir is a direct function of the reservoir rock and its contained fluid characteristic.

Injection Pressure for the proposed project should be limited to a maximum 1000 psi at the injection well head. Well treatment history indicates that the sand section may be expected to break down above this pressure.

Injection Capacity into the Yates sand reservoir under reasonable pressure limitation is expected to range from 16.3 bbl water per foot of sand per day during early fill up period to 8.3 bbl per foot per day after initial fill up. These volumes are based on an injection well head pressure of 1000 psi.

Water Requirement for the recovery of the predicted water flood reserve from the unit area is estimated to be 5.7 bbl water per bbl of oil produced. Fill up requirement for the pilot flood area is estimated to be 600,000 bbl. These volumes are exclusive of excess water break through which is expected in some areas of the anticipated project, yet unpredictable at this time. It is further estimated that some 1,500,000 bbl water will be required to control the movement of

reservoir liquids from migration into the gas cap area. It may therefore be estimated that total make-up water requirement for the project will approximate 22,000,000 bbl. The average daily requirement is then estimated to be 3800 bbl per day and range from 8800 maximum to a minimum of some 2000 bbl per day.

Water Supply for the injection program into the subject area may be derived from either of two primary sources. These being the Santa Rosa sand section in the interval 900' to 1200' beneath the surface and the Capitan Reef section encountered at approximately 4100' beneath the surface.

British American Oil Producing Co. has tested both supply sources set out above. These test suggest that a Santa Rosa well should be expected to yield a stable supply of good water at the rate of 3,000 bbl per well per day. Their test of the Reef section suggest a stable capacity of some 10,000 bbl per well per day of water that chemically is much less attractive than that of the Santa Rosa. These test indicate that 3 Santa Rosa wells or 1 Reef well would supply the total water requirements for the proposed project.

The cost requirement to drill and complete a Reef water supply well for the subject unit is estimated at \$92,600.00. The cost requirement to drill and complete a Santa Rosa water supply well for the unit is estimated at \$23,000.00. Three Santa Rosa water supply wells will satisfy the estimated requirements for the subject unit project. These three wells with an estimated productivity of 3,000 bbl each will cost

\$7.67 per daily barrel of water as compared to \$9.26 per daily barrel of water from the Capitan Reef. In addition the three Santa Rosa well program will lend flexibility to the project and become more adoptable to the plans for growth of the project from a pilot flood area into a full scale operation.

Water Injection Plant facilities for the proposed project in the unit area will require the ultimate injection into 18 wells to be drilled in the future. The shape of the unit area being some 2 1/4 times longer in a north-south direction than east-west and the evidence that multiple water supply wells will be required leads naturally to the plan of multiple water injection plant facilities. A companion water injection plant for each of three supply wells has therefore been determined the most practical approach to plant facility planning.

Each such plant with its companion water supply well will be required to handle a maximum 3,000 bbl water per day at 1,300 psi. For purposes of flexibility each plant facility will be connected to the other such that low pressure water may be transferred from one plant to the other.

Water Treatment necessary to furnish clean, chemically compatible water to the injection well head is expected to be minor. The Santa Rosa water supply is indicated to be totally compatible with that from the Yates sand reservoir. The presence of minor concentrations of carbon dioxide in the Santa Rosa water will require mechanical as well as chemical attention.

V

DEVELOPMENT PLAN

Initial Development will be constituted by the pilot water flood consisting of 4 injection wells as outlined above. Expansion of the pilot flood project to include 2 additional injection wells is expected after 6 to 9 months of operation. This expansion will complete development in the Plant I area.

After approximately 6 months operation of the expanded Plant I the second plant is expected to be justified and approximately 12 months later the third plant will be justified. Total Development of the unit area is expected to extend over a period of some 27 total months from the date the first plant is started to the date of full unit development.

Water Injection Plant facilities will consist of three identical systems each consisting of a water supply well, water injection pressure pumps and injection measurement and treating equipment.

VI

WATER INJECTION PLANT DESIGN

The Requirement for each plant will be the injection of a maximum 2900 bbl water per day of 1000 psi well head pressure. This volume will reduce as the project moves toward completion to approximately 1600 bbl per day. It is also anticipated that some of the injection wells may require a maximum 1300 psi well head pressure during the later life of the project.

Water Supply Well Completion will require the lifting of 3000 bbl water per day from a depth of 950'. 85/8" casing is recommended for the handling of a submersible pump of this capacity.

In the completion of the water supply well 85/8" casing will be run and cemented back to the surface from a TD of approximately 910' or the top of the Santa Rosa sand section. 75/8" hole will be drilled below the 85/8" casing seat to the base of the Santa Rosa sand section (Estimate 225') for a TD of 1135'. 7" shop cut slotted liner will be run to TD and set without cement. Liner slots will be of 0.05" or less.

A submersible pump will be run on 27/8" EUE tubing to approximately 900'. The pumping cycle for the well will be controlled by demand determined from the water level in the plant clear water tank.

The water well location will be as near as practical to the water injection plant location and will be connected to the plant water tanks with 3" linepipe that is to be internally plastic coated.

The Injection Plant will consist of water storage facilities, triplex injection pumps, pressure and volume meters and controls as well as injection lines and filtration equipment for the individual water injection wells.

Water storage will consist of two 500 bbl, 16' tanks plastic coated internally. Raw water will be produced into one of these tanks and plant suction from the other with provisions for taking plant water supply from either tank.

The suction line leading from tanks to pumps will be 6" line pipe, plastic coated and buried from tank outlet to plant suction header

The Suction Header will be fabricated from 12' of 85/8" casing. Individual well suction lines will be 4" set at a 45° angle to the header axis. A 2" inlet into the suction header will serve as high pressure water return to the suction line.

The Injection Pump facilities should consist of 2 triplex pumps with electrical prime movers. These pumps should be of a 3" stroke and adoptable to plunger diameters ranging from 1 1/2" to 2 1/2" and safe operating speed range from 250 to 400 cycles per minute. The fluid end should be of aluminum bronze with a pressure rating of 1500 psi with 1 1/2" plungers and 1000 psi with 2" plungers.

The Pressure Header into which the pumps will deliver their high pressure water should consist of 12" of 85/8" J casing equipped for 2-2" inlets and 10-2" outlets.

Individual Well Injection Lines will take off from the injection pressure header through a stop valve, volume meter, check valve and throttle valve. These lines will be of 2" tubing or equivalent without internal protection. The injection lines will terminate at the injection well through an individual cartridge type filter and master gate valve. Dual injection lines will be placed in operation in the case of the Cone-Nix State No. 4, one serving the oil column and the other the gas cap. Similar dual injection treatment will

be given later injection wells along the east boundry of the Unit which will serve to control pressure in the gas cap area.

Injection Well Treatment will consist of pulling tubing from the selected producing wells, cleaning the exposed formation face and re-running 2" tubing with packer to be set approximately 100' above the highest perforations. Dual service injection wells will require the pack be set at or as near as practical to a 100' sub sea level datum. In these cases water will be injected into the gas cap through the annular space between tubing and casing.

## VII

### ECONOMICS

Pilot Flood Development Cost is expected to amount to \$61,639.00. The pilot flood development is expected to yield a gross 409,415 bbl of stock tank oil. Expansion of the pilot flood into full plant operation will require an additional expenditure of \$11,500.00 for a total cost for Plant I of \$73,139.00.

Total Unit Development for full scale operation will require the construction of 3 plants identical to the expanded Plant I at a cost of \$73,139.00 each and a minimum of 1 additional producing well completed in the Yates sand at an estimated cost of \$39,500.00. This full development is therefore estimated to require an expenditure of \$258,917.00, and result in the development of 3,748,308 gross bbl of stock tank oil for an average development cost of \$0.069 per gross bbl. Operation of the project is expected to cost \$1,604,400.00

or an average \$0.482 per gross bbl. Royalty interest and production tax is expected to cost \$0.83 per gross bbl for a total ultimate cost of \$1.381 per gross bbl of estimated recovery. When based on an average current price of crude oil of \$2.83 per bbl the working interest owners should expect to realize an ultimate net \$1.449 per gross bbl of estimated reserve for an ultimate net return \$21.00 per dollar invested in development.

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WATERFLOOD DATA  
Cone Jalmat Yates Pool Unit  
Lea County, New Mexico

OPERATOR J. R. Cone DATE April 1963  
FIELD Jalmat COUNTY Lea  
RESERVOIR Yates Sand  
Date of completion of first well in reservoir May 13, 1954  
Other operators injecting into this reservoir in this field British-  
American Oil Prod. Co. into their Jalmat Yates Sand Unit

I. Reservoir and fluid characteristics

A. Information on entire reservoir

1. Name of reservoir Yates Sand
2. Rock composition of reservoir Sand
3. Structural nature of reservoir Monocline
4. Reservoir energy source during primary production Solution Gas
5. Original reservoir pressure 1400 psi
6. Average well density 40 acres per well

B. Information on proposed project area

7. Number of productive acres in project area 1760
8. Average depth to top of pay 3700'
9. Estimated average effective pay thickness 32'
10. Average Porosity (% of bulk volume) 19.3%
11. Average Permiability (md) 19 md Range 0.1md-150md.
12. Interstitial Water Content (%pore space) 40.3% (Log data)
13. Gravity of oil (API) 36°
14. Viscosity of oil (centipoise) 1.5 cp.
15. Solution GOR @ bubble point 250 cf per Bbl.

II. Primary production history and present status

1. Date of first well completion in project area May 13, 1954  
J. R. Cone #1 Nix State
2. Stage of depletion of project area Stripper with 89% of ultimate primary recovered
3. Number of wells in project area 36
4. Average present oil production 5.3 bbl per well per day
5. Cumulative oil produced to 4/1/63 from project area 1,555,458 Bbl
6. Estimated oil saturation in reservoir at present time  
(% pore space) 46.4%
7. Estimated ultimate primary recovery from project area  
1,741,000 bbl of oil
8. Estimated remaining primary reserve 186,000 bbl oil

III. Fluid Injection plan

1. Source of injection water Santa Rosa sand at 1000'
2. Nature of water Brackish (see analysis attached)
3. Type of Injection System Fully closed
4. Water treatment Chemical as required
5. Injection pattern and spacing 5-spot pattern, 80 acres per like well
6. Injection pressures at well head Maximum estimated 1000 psi
7. Estimated initial injection rate bbl per well 400 bbl per day

IV. Results expected

1. Estimated oil saturation in reservoir at abandonment (%pore space)  
27.4%
2. Estimated increase in ultimate oil recovery resulting from project  
3,748,000 bbl oil
3. Estimated original oil in place 17,960,000 bbl oil
4. Estimated total water requirements 22,000,000 bbl of water

# WATER ANALYSIS

Water Source: Santa Rosa Sand

Location of Source: Section 14 T22S R35E Lea County, New Mexico  
from British American WSN #1

Depth of Source: 1000' to 1240'

Temperature	°F	78
pH		7.6
Carbon Dioxide	ppm	13
Dissolved Oxygen	ppm	None
Residual Chlorine	ppm	None
Turbidity	ppm	3.6
Manganese	ppm	None
Iron	ppm	0.7
Total Alkalinity	ppm	250
Sulfates	ppm	360
Chlorides	ppm	225
Total Hardness Ca CO <sub>3</sub>	ppm	200
Silica	ppm	None
Calcium	ppm	26
Magnesium	ppm	33
Total Solids	ppm	1,350

*Case 2803*

DOCKET: REGULAR HEARING - WEDNESDAY - MAY 15, 1963

OIL CONSERVATION COMMISSION - 9 A.M., ELKS CLUB, 200 NORTH RICHARDSON  
AVENUE, ROSWELL, NEW MEXICO

- ALLOWABLE: (1) Consideration of the oil allowable for June, 1963.
- (2) Consideration of the allowable production of gas for June, 1963, from ten prorated pools in Lea and Eddy Counties, New Mexico, and also presentation of purchasers' nominations for said pools for the six-month period beginning July 1, 1963; consideration of the allowable production of gas from nine prorated pools in San Juan, Rio Arriba and Sandoval Counties, New Mexico for June, 1963.

CASE 2802: Application of J. R. Cone for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Cone Jalmat Yates Pool Unit Area comprising 1,760 acres of State land in Township 22 South, Range 35 East, Lea County, New Mexico.

CASE 2803: Application of J. R. Cone for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Yates formation, Jalmat Pool, through 4 wells located in Units J, L and N of Section 13, and Unit D of Section 24, Township 22 South, Range 35 East, Lea County, New Mexico.

CASE 2804: Application of John W. Gates for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order for pooling all mineral interests in the White City-Pennsylvanian Gas Pool underlying all of Section 29, Township 24 South, Range 26 East, Eddy County, New Mexico.

CASE 2805: Application of Newmont Oil Company for an amendment of Order No. R-2178-B. Applicant, in the above-styled cause, seeks an amendment of Order No. R-2178-B, which order established an administrative procedure for expansion by stages of the Loco Hills Sand Unit Waterflood Project, Eddy County, New Mexico. Said amendment is necessitated by unexpected delay in commencing initial injection in the unit area.

CASE 2806: Application of Sun Oil Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause,

Docket No. 14-63

seeks an order force pooling all mineral interests in the Oil-Center Blinbry Pool underlying the W/2 SW/4 of Section 3, Township 21 South, Range 36 East, Lea County, New Mexico.

CASE 2807:

In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider a revision of Rule 1301 of the Commission Rules and Regulations to include Grant, Sierra, Hidalgo, and Luna Counties in Oil Conservation Commission District No. 2, headquarters Artesia, New Mexico.

CASE 2808:

In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider a revision of Rule 112 of the Commission Rules and Regulations to permit the administrative approval by the Secretary-Director of the Commission of triple completions (conventional).

CASE 2809:

In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider a revision of Rule 701-B, 701-C, and 701-E of the Commission Rules and Regulations insofar as said rules relate to the method of making application for hearings or administrative approval for injection or disposal wells.

CASE 2810:

In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider the revision of Rule 401 of the Commission Rules and Regulations to require open flow potential tests of natural gas wells upon completion and after workovers only rather than annually as now required.

CASE 2811:

In the matter of the hearing called by the Oil Conservation Commission on its own motion to consider the revision of Rule 402 of the Commission Rules and Regulations to require shut-in pressures of natural gas wells annually only rather than semi-annually as now required.

CASE 2812:

Southeastern New Mexico nomenclature case calling for an order for the creation, contraction, abolishment, and extension of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico.

(a) Create a new gas pool for Strawn production, designated as the Antelope Sink-Strawn Gas Pool, and described as:

TOWNSHIP 18 SOUTH, RANGE 23 EAST, NMPM  
Section 30: All

- (b) Create a new oil pool for Abo production, designated as the Midway-Abo Pool, and described as:

TOWNSHIP 17 SOUTH, RANGE 37 EAST, NMPM

Section 9: S/2  
Section 16: NW/4  
Section 17: NE/4

- (c) Create a new oil pool for San Andres production, designated as the Penasco-San Andres Pool, and described as:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM

Section 25: NW/4

- (d) Contract the Robinson (Grayburg-San Andres) Pool in Eddy and Lea Counties, New Mexico, by deletion of the following-described acreage in Eddy County:

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM

Section 25: S/2 and S/2 NE/4  
Section 35: All  
Section 36: All

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 1: S/2 and E/2 NW/4  
Section 2: All  
Section 11: E/2 and N/2 NW/4

- (e) Abolish the North Robinson-Queen-Grayburg-San Andres Pool in Eddy County, described as:

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM

Section 24: NE/4

- (f) Extend the Grayburg-Jackson Pool to include:

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM

Section 24: W/2 SE/4 and SW/4 NE/4  
Section 25: S/2 and NE/4  
Section 35: All  
Section 36: All

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 1: N/2 and E/2 SE/4  
Section 2: All  
Section 11: All

- (g) Extend the Artesia Pool to include:

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM  
Section 24: SE/4

- (h) Extend the Corral Canyon-Delaware Pool to include:

TOWNSHIP 25 SOUTH, RANGE 30 EAST, NMPM  
Section 17: W/2 SW/4  
Section 20: NW/4 NW/4

- (i) Extend the Henshaw-Wolfcamp Pool to include:

TOWNSHIP 16 SOUTH, RANGE 30 EAST, NMPM  
Section 23: SE/4

- (j) Extend the High Lonesome Pool to include:

TOWNSHIP 16 SOUTH, RANGE 29 EAST, NMPM  
Section 20: E/2 E/2

- (k) Extend the Inbe-Pennsylvanian Pool to include:

TOWNSHIP 11 SOUTH, RANGE 34 EAST, NMPM  
Section 18: W/2 NE/4 and NW/4

- (l) Extend the North Justis-Blinebry Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM  
Section 2: S/2 NE/4 and SE/4

- (m) Extend the North Justis-Devonian Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM  
Section 2: SW/4

- (n) Extend the North Justis-Tubb Drinkard Pool to include:

TOWNSHIP 25 SOUTH, RANGE 37 EAST, NMPM  
Section 2: SW/4

- (o) Extend the Pearl-Queen Pool to include:

TOWNSHIP 19 SOUTH, RANGE 34 EAST, NMPM  
Section 36: SE/4

TOWNSHIP 20 SOUTH, RANGE 34 EAST, NMPM  
Section 1: N/2 NE/4

- (p) Extend the Sawyer-San Andres Gas Pool to include:

TOWNSHIP 9 SOUTH, RANGE 38 EAST, NMPM  
Section 31: SE/4

- (q) Extend the Vacuum-Devonian Pool to include:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM  
Section 35: NE/4  
Section 36: NW/4

- (r) Extend the Vacuum-Glorieta Pool to include:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM  
Section 36: SW/4

- (s) Extend the Wantz-Abo Pool to include:

TOWNSHIP 21 SOUTH, RANGE 37 EAST, NMPM  
Section 26: SW/4  
Section 35: W/2

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM  
Section 2: All

- (t) Extend the West Henshaw-Grayburg Pool to include:

TOWNSHIP 15 SOUTH, RANGE 30 EAST, NMPM  
Section 33: S/2 SE/4  
Section 34: SW/4 SW/4

- (u) Extend the Diablo-San Andres Pool to include:

TOWNSHIP 10 SOUTH, RANGE 27 EAST, NMPM  
Section 21: NE/4 NE/4  
Section 22: NW/4 NW/4

- (v) Extend the Windmill-San Andres Pool to include:

TOWNSHIP 15 SOUTH, RANGE 28 EAST, NMPM  
Section 10: W/2 SW/4  
Section 15: NW/4 NW/4

- (w) Extend the West Allison-Pennsylvanian Pool to include:

TOWNSHIP 8 SOUTH, RANGE 35 EAST, NMPM  
Section 36: NE/4

- (x) Extend the Milnesand-San Andres Pool to include:

TOWNSHIP 8 SOUTH, RANGE 34 EAST, NMPM

Section 1: S/2 SE/4

Section 12: NE/4

Section 24: SW/4

TOWNSHIP 8 SOUTH, RANGE 35 EAST, NMPM

Section 5: N/2 SE/4

- (y) Extend the South Prairie-Pennsylvanian Pool to include:

TOWNSHIP 8 SOUTH, RANGE 36 EAST, NMPM

Section 15: SE/4

CASE 2813:

Northwestern New Mexico nomenclature case calling for an order extending certain existing pools in Rio Arriba, San Juan, and Sandoval Counties, New Mexico.

- (a) Extend the Aztec-Pictured Cliffs Pool to include:

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM

Section 14: SW/4

Section 23: N/2

Section 24: NW/4

- (b) Extend the Blanco-Pictured Cliffs Pool to include:

TOWNSHIP 30 NORTH, RANGE 9 WEST, NMPM

Section 20: S/2

- (c) Extend the South Blanco-Pictured Cliffs Pool to include:

TOWNSHIP 23 NORTH, RANGE 2 WEST, NMPM

Section 2: All

Section 3: E/2

Section 11: All

Section 12: W/2

TOWNSHIP 27 NORTH, RANGE 5 WEST, NMPM

Section 34: SW/4

- (d) Extend the Blanco-Mesaverde Pool to include:

TOWNSHIP 32 NORTH, RANGE 5 WEST, NMPM

Partial Section 18: All

Partial Section 19: All

-7-

Docket No. 14-63

- (e) Extend the Puerto Chiquito-Gallup Oil Pool to include:

TOWNSHIP 27 NORTH, RANGE 1 EAST, NMPM  
Section 20: SE/4 SW/4

- (f) Extend the Verde-Gallup Oil Pool to include:

TOWNSHIP 31 NORTH, RANGE 15 WEST, NMPM  
Section 10: SE/4 SW/4

iqg/



*Case 2802*

1963 MAY 13 PM 3  
**STATE OF NEW MEXICO**  
**STATE ENGINEER OFFICE**  
**SANTA FE**

S. E. REYNOLDS  
STATE ENGINEER

May 13, 1963

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

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

Dear Mr. Porter:

Reference is made to the application of J. R. Cone for approval of the waterflood project in the Cone Jalmat Yates Pool Unit, Lea County, New Mexico and to my letter of May 7, 1963 on that subject.

I have discussed this application and a previously approved application in this pool with your Chief Engineer, Daniel Nutter and reached the conclusion that if the J. R. Cone application is approved with Restriction 3 of the British-American Order, it will be satisfactory with this office. Restriction 3 is quoted herewith:

"That water injection shall be accomplished either by injecting into all sands through one string of tubing under a packer or by injecting selectively through two strings of tubing under a packer; provided, however, that in the case of selective injection wells which are equipped with less than 5 1/2-inch pipe, selective injection may be made through one string of tubing under a packer and through the casing-tubing annulus in which case the casing must have been perforated and squeeze-cemented from total depth to the shoe of the surface string of casing."

Yours truly,

S. E. Reynolds  
State Engineer

FEI/ma  
cc-Kellahin & Fox  
F. H. Hennighausen

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

May 13, 1963

C  
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Y

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

Dear Mr. Porter:

Reference is made to the application of J. R. Cone for approval of the waterflood project in the Cone Jalmat Yates Pool Unit, Lea County, New Mexico and to my letter of May 7, 1963 on that subject.

I have discussed this application and a previously approved application in this pool with your Chief Engineer, Daniel Nutter and reached the conclusion that if the J. R. Cone application is approved with Restriction 3 of the British-American Order, it will be satisfactory with this office. Restriction 3 is quoted herewith:

"That water injection shall be accomplished either by injecting into all sands through one string of tubing under a packer or by injecting selectively through two strings of tubing under a packer; provided, however, that in the case of selective injection wells which are equipped with less than 5 1/2-inch pipe, selective injections may be made through one string of tubing under a packer and through the casing-tubing annulus in which case the casing must have been perforated and squeeze-cemented from total depth to the shoe of the surface string of casing."

Yours truly,

S. E. Reynolds  
State Engineer

FEI/ma  
cc-Kellahin & Fox  
F. H. Hennighauson

By:  
Frank E. Irby  
Chief  
Water Rights Division



113 MAY 6 11 11 AM '63  
STATE OF NEW MEXICO  
STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS  
STATE ENGINEER

May 7, 1963

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

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

Dear Mr. Porter:

Reference is made to the application of J. R. Cone for approval of the waterflood project in the Cone Jalmat Yates Pool Unit, Lea County, New Mexico. This proposed project is in the SE portion of Township 22 South, Range 35 East in southern Lea County.

Exhibits recently received from Mr. Kellahin, who represents J. R. Cone, include a schematic drawing of the water supply well, injection well and production well. It is noted on this exhibit that no cement exists in the annulus outside the  $5\frac{1}{2}$  inch casing, in the injection well at the interval 350 feet depth to approximately 1700 feet depth. Mr. Cone proposes to inject through tubing under packer into the lower zone and down this  $5\frac{1}{2}$  inch casing to an upper zone.

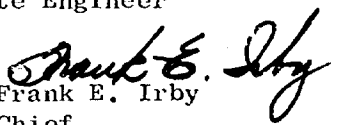
All of these wells are from 6 to 9 years old and nothing is said about the present condition of the casing or to what extent it may have deteriorated since being installed. Furthermore, there is no statement as to the condition of the casing at the time it was installed. You can readily see that there is nothing but the casing wall of the  $5\frac{1}{2}$  inch casing between the Santa Rosa formation and the injection fluid. It is the opinion of this office that this is insufficient protection for the waters which occur in the Santa Rosa formation. Therefore, we cannot approve this plan of injection.

There are two possibilities that I might suggest: (1) that two strings of tubing be run and (2) that cement be placed in the annulus surrounding the  $5\frac{1}{2}$  inch casing from the top of the present cement, at approximately 1700' depth, up into the 8 5/8 inch casing. I do not intend to be

presumptious by these suggestions, but they occurred to me and I thought they might be helpful to the applicant.

Yours very truly,

S. E. Reynolds  
State Engineer

By:   
Frank E. Irby  
Chief  
Water Rights Division

FEI/ma  
cc-Kellahin & Fox (2 copies)  
F. H. Hennighausen

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

Mr. Jason Kellahin  
Kellahin & Fox  
Attorneys at Law  
Box 1713  
Santa Fe, New Mexico

Gentlemen:

Enclosed herewith is Commission Order No. R- 2495, entered in Case No. 2803, approving the Case 2803 of the Water Flood Project.

According to our calculations, when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 25 barrels per day.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate District proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.  
Secretary-Director

OCC Hobbs

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

June 11, 1963

C  
O  
P  
Y  
Mr. Jason Kellahin  
Kellahin & Fox  
Attorneys at Law  
Post Office Box 1713  
Santa Fe, New Mexico

Dear Mr. Kellahin:

Enclosed herewith is Commission Order No. R-2495, entered in Case No. 2803, approving the Cone Jalrat Unit Waterflood Project.

According to our calculations, when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 504 barrels per day.

Please report any error in this calculated maximum allowable immediately both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.  
Secretary-Director

ALP/ir  
cc: Oil Conservation Commission - Hobbs, New Mexico

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. 2803  
Order No. R-2495

APPLICATION OF J. R. CONE  
FOR A WATERFLOOD PROJECT,  
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 15, 1963, at Roswell, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 11th day of June, 1963, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, 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 Cone Jalmat Yates Pool Unit Agreement has been approved by the Commission by Order No. R-2494; that the Cone Jalmat Yates Pool Unit Area comprises 1,760 acres, more or less, of State land in Township 22 South, Range 35 East, NMPM, Lea County, New Mexico, as more fully described in said order.

(3) That the applicant, J. R. Cone, seeks permission to institute a waterflood project in the Jalmat Pool in the Cone Jalmat Yates Pool Unit Area by the injection of water into the Yates formation through four wells located within said unit area.

(4) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(5) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, thereby preventing waste.

-2-

CASE No. 2803

Order No. R-2495

(6) That the subject application should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

(7) That all water injection should be through tubing under a packer; provided however, that selective water injection into more than one sand in wells which are equipped with less than 5 1/2-inch pipe may be through one string of tubing under a packer and through the casing-tubing annulus if the casing is perforated and squeeze-cemented from total depth to the surface casing shoe.

IT IS THEREFORE ORDERED:

(1) That the applicant, J. R. Cone, is hereby authorized to institute a waterflood project in the Jalmat Pool in the Cone Jalmat Yates Pool Unit Area by the injection of water into the Yates formation through the following-described four wells in Township 22 South, Range 35 East, NMPM, Lea County, New Mexico:

J. R. Cone Nix State Well No. 4, Unit J, Section 13  
J. R. Cone Nix State Well No. 5, Unit L, Section 13  
J. R. Cone Nix State Well No. 9, Unit N, Section 13  
J. R. Cone Nix State Well No. 7, Unit D, Section 24

(2) That all water injection shall be through tubing under a packer; provided however, that selective water injection into more than one sand in wells which are equipped with less than 5 1/2-inch pipe may be through one string of tubing under a packer and through the casing-tubing annulus if the casing is perforated and squeeze-cemented from total depth to the surface casing shoe.

(3) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(4) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

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

-3-

CASE No. 2803  
Order No. R-2495

DONE at Santa Fe, New Mexico, on the day and year herein-  
above designated.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

*Jack M. Campbell*

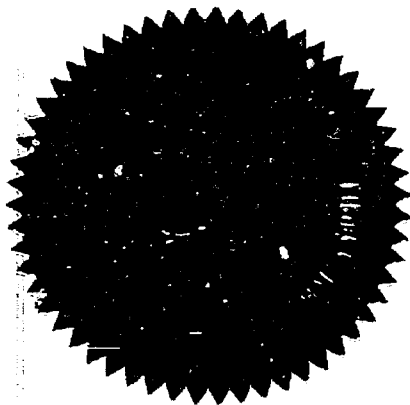
JACK M. CAMPBELL, Chairman

*E. S. Walker*

E. S. WALKER, Member

*A. L. Porter, Jr.*

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



esr/

1. Reservoir and Fluid Characteristics:  
2. Primary Production History and Present Status:  
3. Fluid Injection Plan

1602 2802  
9203

Operator J. K. Long Date April 1, 1954

Field Jabat County Jeff State La.

Reservoir Yates Sand

Date of completion of first well in reservoir May 15, 1934

Other operators injecting into this reservoir in this state:

British-American Oil Prod. Co.

I. RESERVOIR and FLUID CHARACTERISTICS:

A. Information on entire reservoir

1. Name of reservoir Yates Sand
2. Rock composition sand
3. Structural nature of reservoir anticline
4. Reservoir energy source during primary production sol. gas
5. Original reservoir pressure 1400 psi.
6. Average well density 40 acres per well

B. Information on proposed project area

7. Number of productive acres in project area 17.00
8. Average depth to top of pay 5700'
9. Estimated average effective pay thickness 52'
10. Average porosity (% of bulk volume) 15.3%
11. Average permeability (md) 10 md range 3.1 - 150.0 md
12. Interstitial water content (% pore space) 40.5% (log data)
13. Gravity of oil (API) 36°
14. Viscosity of oil (centipoise) 1.5 cp.
15. Solution GOR & bubble point 250 cu. ft. gas/ bbl. oil

II. PRIMARY PRODUCTION HISTORY and PRESENT STATUS:

1. Date of first well completion in project area May 15, 1934  
This well was the J. K. Long #1 six-state
2. Stage of depletion of project area cracked with 50% of ultimate primary recovered
3. Number of wells in project area 34
4. Average present oil production 3.3 bbl per well per day
5. Cumulative oil produced to 4/1/53 from project area 1,555,458 bbl
6. Estimated oil saturation in reservoir at present time 40.4% of pore space
7. Estimated ultimate primary recovery from project area 1,741,000 bbl of oil
8. Estimated remaining primary reserve 100,000 bbl oil

III. FLUID INJECTION PLAN

1. Source of injection water Acata Boss Sand at 1,000'
2. Nature of water brackish
3. Type of injection system fully closed
4. Water treatment chemical as required
5. Injection pattern and spacing 5-spot, 50 acres per line well
6. Injection pressure at well head maximum 1,000 psi
7. Estimated initial injection rate bbl per well 100 bbl/day

IV. RESULTS EXPECTED

1. Estimated oil saturation in reservoir at abandonment 27.4% of pore space
2. Estimated increase in ultimate oil recovery resulting from this project 3,741,000 bbl oil
3. Estimated original oil in place 17,000,000 bbl oil
4. Estimated total water requirement 22,000,000 bbl water

DRAFT

JMD/esr  
May \_\_, 1963

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. 2803

Order No. R- 2495

*[Signature]*  
APPLICATION OF J. R. CONE  
FOR A WATERFLOOD PROJECT,  
LEA COUNTY, NEW MEXICO.

*[Signature]*  
6/6/63

*Give Cone  
2802 as number  
first & enter it  
here also*

ORDER OF THE COMMISSION

BY THE COMMISSION:

Roswell,

This cause came on for hearing at 9 o'clock a.m. on  
May 15, 1963, at ~~Santa Fe~~ New Mexico, before the Oil Conser-  
vation Commission of New Mexico, hereinafter referred to as the  
"Commission."

NOW, on this June 6 day of May, 1963, the Commission,  
a quorum being present, having considered the testimony presented  
and the exhibits received at said hearing, 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 Cone Jalmat Yates Pool Unit Agreement has  
been approved by the Commission by Order No. R- ~~2492~~ <sup>R-2494</sup> that the  
Cone Jalmat Yates Pool Unit Area comprises 1,760 acres, more or  
less, of State land in Township 22 South, Range 35 East, NMPM,  
Lea County, New Mexico, as more fully described in said order.

(3) That the applicant, J. R. Cone, seeks permission to  
institute a waterflood project in the Jalmat Pool in the Cone  
Jalmat Yates Pool Unit Area by the injection of water into the  
Yates formation through four wells located within said unit area.

(4) That the wells in the project area are in an advanced  
state of depletion and should properly be classified as "stripper"  
wells.

### Insert

- (7) That all water injection should be through tubing under a packer; provided however, that selective water injection into more than one sand in wells which are equipped with less than 5 1/2 inch pipe may be through one string of tubing under a packer and through the casing - tubing annulus if the casing is perforated and squeeze-cemented from total depth to the surface casing shoe.

(5) That the proposed waterflood project is in the interest of conservation and should result in recovery of otherwise unrecoverable oil, *thereby preventing waste.*

(6) That the subject application should be approved and the project should be governed by the provisions of Rule 701 of the Commission Rules and Regulations.

*(7) see insert*

IT IS THEREFORE ORDERED:

(1) That the applicant, J. R. Cone, is hereby authorized to institute a waterflood project in the Jalmat Pool in the Cone Jalmat Yates Pool Unit Area by the injection of water into the Yates formation through the following-described four wells in Township 22 South, Range 35 East, NMPM, Lea County, New Mexico:

~~Section 13~~

*J R Cone* Nix State well no 4, located in Unit J, Section 13  
*J R Cone* Nix State well no 5, located in Unit L, Section 13  
*J R Cone* Nix State well no 9, located in Unit N, Section 13

~~Section 24~~

*J R Cone* Nix State well no 7, located in Unit D, Section 24

*(2) That all water injection shall be through ...  
(Same as finding no. 7)*

(3) That the subject waterflood project shall be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(4) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1119 of the Commission Rules and Regulations.

(5) 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.

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

SANTA FE, N. M.  
PHONE 983-3971

ALBUQUERQUE, N. M.  
PHONE 243-6691

BEFORE THE  
OIL CONSERVATION COMMISSION  
Roswell, New Mexico  
May 15, 1963

IN THE MATTER OF:

Application of J. R. Cone for a unit  
agreement, Lea County, New Mexico.  
Applicant, in the above-styled cause,  
seeks approval of the Cone Jalmat  
Yates Pool Unit Area comprising 1,760  
acres of State land in Township 22  
South, Range 35 East, Lea County, New  
Mexico.

Case 2802

Application of J. R. Cone for a water-  
flood project, Lea County, New Mexico.  
Applicant, in the above-styled cause,  
seeks authority to institute a water-  
flood project by the injection of water  
into the Yates formation, Jalmat Pool,  
through 4 wells located in Units J, L  
and N of Section 13, and Unit D of  
Section 24, Township 22 South, Range 35  
East, Lea County, New Mexico.

Case 2803

BEFORE: Honorable Jack M. Campbell  
Mr. A. L. "Pete" Porter  
Mr. E. S. "Johnny" Walker

TRANSCRIPT OF HEARING

MR. PORTER: We will take up next Case 2802.

MR. DURRETT: Application of J. R. Cone for a unit  
agreement, Lea County, New Mexico.

MR. KELLAHIN: If the Commission please, Jason Kellahin,  
Kellahin & Fox, Santa Fe, appearing for the applicant. I believe



that in the interest of time this case could well be consolidated with Case 2803, these two cases consisting of an application for a unit agreement and the waterflood project on the same unit and the testimony will overlap.

MR. PORTER: Is there any objection to the consolidation of Cases 2802 and 2803? For purposes of testimony, the cases will be consolidated.

MR. KELLAHIN: If the Commission please, we have one witness I would like to have sworn.

(Whereupon, Applicant's Exhibits Nos. 1 through 7 were marked for identification.)

(Witness sworn.)

JOHN C. BYERS

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please?

A John C. Byers.

Q What business are you engaged in, Mr. Byers?

A I am a consulting engineer.

Q In your capacity as a consulting petroleum engineer have you been employed by J. R. Cone in connection with the two

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PHONE 983-3971

FARMINGTON, N. M.  
PHONE 325-1182



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PHONE 325-1182

SANTA FE, N. M.  
PHONE 983-3971

ALBUQUERQUE, N. M.  
PHONE 243-6691

cases before the Commission at this time?

A Yes, I have.

Q Mr. Byers, have you ever testified before the Oil Conservation Commission before?

A It has been a number of years, I would like to be qualified.

Q Would you, for the benefit of the Commission, state briefly your education and experience as a petroleum engineer?

A I was educated at Texas Tech, graduated in 1947, I have been a practicing petroleum engineer in Texas. Since that time I have been practicing as a consultant since 1957 in Lubbock.

Q In connection with your practice as a consulting engineer since 1957, have you done work in New Mexico?

A Yes, I have.

Q Have you done work in the area involved in this application?

A Yes, I have.

MR. KELLAMIN: We submit the witness is a qualified petroleum engineer.

MR. PORTER: The Commission considers the witness qualified.

Q Mr. Byers, referring to what has been marked as Exhibit No. 1, would you identify that exhibit, please?



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PHONE 243-6691

A That is a unit agreement.

Q Are you familiar with the contents of that agreement?

A Yes, I am.

Q How did you become familiar with that agreement?

A I was working in the preparation of that agreement.

Q Are you familiar with the land that is covered by the unit agreement?

A I am.

Q What does it consist of?

A It consists of 1760 acres, including all or parts of Sections 13, 24, 23, 25 and 26, Township 22 South, Range 35 East, Lea County. This is a sector of the Jalmat Yates Pool.

Q What is the basic ownership of this land?

A The basic ownership is all State land.

Q Does the unit agreement contain a plat showing the area?

A It does. It is an exhibit thereto, Exhibit B, I believe it is.

Q Is this unit agreement in a form which has heretofore been approved by the Oil Conservation Commission?

A It is. It is an adaption of the State Land recommended form.

Q Has it been submitted to the Commissioner of Public



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PHONE 243-6691

Lands?

A Yes, it has.

Q Has it been approved as to form and content by the Commissioner of Public Lands?

A It has been so approved.

Q There is no federal or fee land involved here?

A There is none involved in this unit.

Q Now, referring to what has been marked as Exhibit No. 2, would you identify that exhibit?

A Exhibit 2 is a unit operating agreement providing for the conduct of operations among the joint ownership of the proposed unit.

Q What is proposed to be done under the terms of this operating agreement, assuming it's approved by the Commission?

A It is proposed that a pilot waterflood program be instituted in the Yates Pool at the northern end of this unit, and upon execution thereof that waterflood expanded to include the entire unit.

Q Initially you only propose a pilot program?

A That is correct.

Q Mr. Byers, what is the status of this unit agreement as to the participation of the working and royalty interest?

A The royalty interests that, other than the State, is



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PHONE 325-1182SANTA FE, N. M.  
PHONE 983-3971ALBUQUERQUE, N. M.  
PHONE 243-6691

100% signed up. The working interest ownership is approximately 90% signed up. The remaining 10% are in agreement and waiting the circulation of appropriate agreements.

Q Have they tentatively agreed to the program?

A They have.

Q Do you anticipate, then, that you would have 100% of both working and overriding royalty interest committed to the unit?

A We do.

Q Referring to what has been marked as Exhibit No. 3, would you identify that exhibit, please?

A Exhibit No. 3, I believe, is the plat covering the area. It includes all or parts of Township 22 South.

Q Would you continue your testimony with regard to Exhibit No. 3?

A Exhibit No. 3 is a map covering all or parts of four townships with the proposed unit area in the center of that outlined as the unit itself, it's position with respect to the Yates sand production in the area, and also its position with the British American operated Jalmat Yates Sand Unit.

Q What is the situation with regard to the British American Unit?

A Our pilot flood will actually be a completion or a



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continuation of British American's existing project.

Q Do you have a line agreement with the British American Petroleum Company?

A Yes, we do.

Q Do you know whether the British American is injecting at the present time in the wells shown as injection wells on your exhibit along the northern boundary?

A Along the northern unit boundary, they are not. They are waiting to complete their injection program. At the time of their hearing we asked that they not inject along the proposed line until after this unit is formed. As soon as the unit is completed and approved they will commence injection adjacent to the line.

Q Then the injection will be in direct cooperation?

A In direct cooperation.

Q The exhibit also shows two lines through a series of wells North, South, East, West.

A Those are lines through which the cross section has been prepared expressing the continuity of the Yates sand reservoirs that exist in this area and showing the relationship which exists of the extremes of the unit area.

Q The contours would indicate that this is a continuous reservoir across the unit?



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A Those contours are at the top of the Yates sand section and indicate it is continuous.

Q Referring to what has been marked as Exhibit No. 4, will you identify that? Will you discuss that, please?

A Exhibit No. 4, I believe, is a cross section, is that correct?

Q Yes, that is correct.

A That cross section extends, the two cross sections on that exhibit, one extending north-south through the extent of this unit, one extending east-west beyond the limits of this proposed unit. The entire Yates sand reservoir interval is set out on that and correlation from well to well is shown.

Q Does that indicate that this is a continuous reservoir across the unit both north-south and east-west?

A It would.

Q In your opinion, Mr. Byers, as a petroleum engineer, based on your examination of available information, do you believe that this reservoir is acceptable to a successful water-flood?

A We believe so. However, we are making reservations in our own mind there, and that's the reason for the pilot program. We are convinced that there is something in the vicinity of 200,000 barrels of primary reserves left in this reservoir, and



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it is our desire to endanger a minimum volume of that in an effort to prove up the validity of the reservoir.

Q And that is the reason you are now proposing the pilot program?

A The pilot program and the expansion to the full program.

Q Have you prepared a data sheet showing information on the waterflood program?

A Yes, I have.

Q Would you refer to Exhibit No. 5 and discuss the information shown on that exhibit?

A Exhibit No. 5 is a data sheet in which is set out the basic data relative to this proposed project. That data sheet includes information regarding the general nature of the reservoir with which we are dealing. Specific information with respect to the individual project, our expectations and a summary of the past history of this project.

Q Any other information on the exhibit which you wish to call attention to?

A There is a lot of specific data.

It indicates that this reservoir has the dissector of the reservoir shown within this proposed unit as of the first of the year, produced some million and a half barrels of crude oil. There's approximately just under 200,000 barrels of remaining



reserves produceable by primary methods, and that we expect to improve recovery by something in excess of 3,000,000 barrels.

Q On primary, what is the producing mechanism?

A It is solution gas.

Q Have you found any indication of an active water drive?

A None.

Q Referring to what has been marked as Exhibit No. 6, would you identify that exhibit and discuss the information shown on it, please?

A Exhibit No. 6, I believe, is a data sheet covering all the wells, tabulation of each well within the proposed unit area, the date upon which the well was completed, specific completion data as to the portions of the reservoir that have been opened, the initial productivity of the well and the present productivity of the well.

Q Now, your exhibit indicates, does it not, that all of the wells have been perforated, no open hole completions exist in this?

A That is correct. There are no open hole completions within this reservoir.

Q Are those selected perforations as to the different zones?

A Yes, they are. This reservoir has provided four

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overall members altogether, the total thickness of the four members is in excess of 150 feet, only 30 odd feet are considered effective pay. These perforations are defined in the effective pay section within the reservoir.

Q Do you anticipate that the injectivity of each of these zones will be similar or the same?

A Yes.

Q How will you handle the waterflood project if that be not true?

A There will be continuous surveillance, periodic surveillance of injectivity of individual zones and if unsatisfactory injectivities are found that will be adjusted by selective plugging.

Q Is it your goal to flood all of the four zones at approximately the same rate?

A It is our anticipation that we will flood all of them simultaneously.

Q Do you think that you will have to set a packer in any further zone?

A No, we do not anticipate the use of packers with the exception along the eastern boundary as shown in the map, which I believe is Exhibit 3, there is a tendency toward a gas cap. Selective injection into the section that is above our indicated



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gas-oil contact will be conducted separately through the use of packers in an attempt at isolating migration of hydrocarbon oils.

Q And you will again keep careful watch on the program as it is expanded to determine whether you are emptying the reservoir by migration of oil into the gas cap?

A Yes. It is certainly very important to us to keep a continuous watch on that simply because we lose oil if we move it into the gas cap.

Q Referring to what has been marked as Exhibit No. 7, will you discuss that information on that exhibit?

A I believe that is our diagrammatic sketch of the average condition of wells existing in the proposed unit as well as a diagrammatic sketch of our proposed completion control of injection wells and water supply wells.

Q In connection with your completions, are you familiar with the letters written by the New Mexico State Engineer as to the protection of the Santa Rosa formation?

A Yes, I am.

Q Mr. Frank Irby, by letter, advised that he would approve a completion provided that water injection shall be accomplished either by injecting into all sands through one string of tubing or by injecting selectively through two strings of tubing under a packer; provided, however, that in the case of selective



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injection wells which are equipped with less than 5½" pipe, selective injections may be made through one string of tubing under a packer and into a tubing casing annulus, in which case the tubing must total depth to the shoe of the surface end of the casing.

A Yes, I am aware of that, and we would expect to conform to those requirements.

Q Now, your Exhibit No. 7 also shows your production of oil as having a rod actuated bottom hole pump?

A That's right.

Q Do you plan to operate your producing wells on a pump?

A They will be operated continuously on a pump.

Q Is it your opinion that the casing program, as shown on your Exhibit No. 7, adequately protects all producing formations?

A Yes, it does. None of the wells involved in this project have been drilled into a producing reservoir below that. There is no present production in the known reservoirs above this. Our cementing practices throughout this field have covered the entire interval with adequate cement to give protection to isolation within the reservoir.

Q Let me ask you, first, were any fresh water zones encountered in the drilling of these wells?



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A None that we know of.

Q You know that the Santa Rosa formation in some areas is considered a fresh water zone?

A Yes, I am aware of this, and this area is considered brackish.

Q Will these completions protect that zone?

A Yes, they will.

Q What is your source of water for this waterflood project?

A We expect to use Santa Rosa water for the water supply.

Q Where will you secure it?

A We will secure that through wells; we anticipate three wells uniformly spaced through the area, the first of which will be in the immediate pilot area.

Q Is this unit area located within the Lea County underground water basin?

A No, it is not.

Q What volumes of water will you require?

A We are expected to produce to require a maximum of around 8500 to 9000 barrels per day after peak.

Q When do you anticipate it would reach its peak?

A Probably not for two years after the effective date of the unit.



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Q Will this waterflood be operated entirely under the provisions of Rule 701 of the Commission rules?

A Yes.

Q Do you ask that there be an administrative procedure for expansion of the pilot program?

A We would like to have permission to expand this program upon selection by the operators without additional hearing.

Q By administrative procedure?

A That's right.

Q Were Exhibits 2 through 7 prepared by you or under your supervision?

A They were.

Q Were Exhibits 1 and 2, or the unit operating agreement in which you participated in the preparation, is that correct?

A Yes, that's right.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits 1 through 7, inclusive.

MR. PORTER: Are there any objections to the admission of these exhibits? They will be admitted to the record.

(Whereupon, Applicant's Exhibits 1 through 7 were offered and admitted in evidence.)

MR. KELLAHIN: That completes our examination of the



witness.

MR. PORTER: Any questions of the witness?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Byers, I believe that you stated that you had 90% of the working interest signed as far as this unit is concerned?

A Yes.

Q And you expect the other 10% of the working interest will sign?

A Yes, they will sign.

Q And they have agreed to go into the unit?

A Yes.

Q Referring to your plat, will the completion of the unit here and putting this portion of the Jalmat Pool on waterflood, will that complete the waterflood program as far as this oil-productive arm of the pool is concerned?

A It will complete it with the exception of that row of wells immediately east of this operated by Cities Service, which is federal land.

Q That's one row of 40-acre tracts?

A That is right.

Q And those are oil wells in the Jalmat?

A Those are oil wells as far as the classification is

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concerned. There are one or two that are classified as gas wells.

Q Do you know whether Cities Service has been approached as far as determining whether they're willing to go into any unit?

A Yes.

Q Or whether they are planning to put their wells on waterflood?

A Yes, we discussed it with Cities Service, and Cities Service indicated that they would prefer cooperation along that line since their acreage is federal land, this being all state, we can cooperate very nicely.

Q There has been no effort to unitize this acreage in with the proposed state acreage?

A No, there has not.

Q Has the flood in the British American property been successful or is it too early to know?

A I think it's too early. They are getting some response. The evaluation of that response is a very nebulous response.

Q So the response to date is what you might say insignificant?

A That is right.

Q Now, on your data sheet for these wells in your unit you've indicated the four zones. Does that mean that each of



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these wells is perforated in this interval under each of the four zones?

A That is correct. In some cases there will have to be some additional openings made.

Q Is it the intent of the applicant, J. R. Cone, to flood all four zones?

A Yes.

Q And all the injection zones?

A All four zones will be flooded simultaneously.

Q But there won't be any effort made to selectively inject into any of them under a differential pressure or anything like that?

A No, our intent is to flood each zone volumetrically with respect to its representation of total volume in the reservoir as best we can control it through selective flooding.

Q But without separation of the zones by packer?

A We do not believe that effective separation can be accomplished.

Q How much did you estimate was the primary oil remaining?

A About a hundred, two hundred thousand barrels, about 186,000 barrels.

Q What is the area producing at the present time, in the neighborhood of 95 barrels a day?



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A That's about right.

Q Now, Mr. Byers, you mentioned the gas cap to the east. Would you detail a little further the method that you planned to treat this gas cap?

A We will handle that gas cap through selective injection the best we can accomplish it. By injecting water separately isolated by packer into the injection wells that encounter the gas cap or effective pay section, well, say above a level of about 75 to 100 feet, which is the approximate gas-oil contact level, and if we raise the pressure in that area to a level high enough to preclude migration of oil from the oil column into that area.

Q Are you going to say that you are going to saturate the gas cap with water?

A That is correct.

Q To prevent the migration of oil?

A That is correct.

Q That would be a migration beyond Cities Service tracts?

A The total extent of that reservoir beyond Cities Service is some problem. It extends into the Cities Service area. However, the productivity of it is extremely--

Q To saturate the gas cap won't you have to saturate Cities Service?



A No, that will be locally.

Q On the upper perforations only?

A That is right.

Q Mr. Byers, you made reference to a letter from the State Engineer's office in which he prescribed certain means of injection which would be acceptable to that office?

A That's right.

Q Would this letter, which the Oil Conservation Commission received from the State Engineer pretty much outline what you mentioned in your letter?

A Yes, it does. It covers the same material.

Q And you would expect to comply with these provisions?

A Yes, we would.

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

MR. PORTER: Does anyone else have a question of the witness? He may be excused.

(Witness excused.)

MR. PORTER: Does that conclude the applicant's testimony in this case?

MR. KELLAHIN: That concludes our case, if the Commission please.

MR. PORTER: Does anyone else have anything to offer in either one of these cases? The Commission will take the

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cases under advisement.

MR. BAKER: Baker, with Atlantic Refining Company, and we would like to concur with J. R. Cone in their request for the approval of Cases 2802 and 2803.

MR. PORTER: Atlantic concurs in both cases?

MR. BAKER: Yes.

MR. BAKER: Glenn Raker, British American Oil Producing Company. We concur in support of J. R. Cone's two applications.

MR. PORTER: Anyone else have anything to say in this case? Any further statements? The case will be taken under advisement.



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I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Roswell, 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 3rd day of June, 1963.

*Ada Dearnley*  
Notary Public-Court Reporter

My commission expires:  
June 19, 1963.

