

# KEEL-WEST WATERFLOOD PROJECT

## DIVISION ORDERS

R-2268  
R-2268-A  
R-2268-B  
R-2268-C  
R-10663  
R-10663-A  
WFX-585  
WFX-587  
WFX-687  
WFX-690

NEW MEXICO  
OIL CONSERVATION DIVISION

Devon EXHIBIT 2A

CASE NO. 11696

GRAYBURG-JACKSON POOL  
(Sinclair Oil & Gas Waterflood)  
Eddy County, New Mexico

Order No. R-2268, Authorizing Sinclair Oil & Gas Company to Institute a Waterflood Project in the Grayburg-Jackson Pool, Eddy County, New Mexico, June 21, 1962.

Application of Sinclair Oil & Gas Company for Approval of a Waterflood Project, Eddy County, New Mexico.

CASE NO. 2576  
Order No. ~~R-2268~~

ORDER OF THE COMMISSION

BY THE COMMISSION: This cause came on for hearing at 9 o'clock a.m. on June 7, 1962, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 21st day of June, 1962, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Sinclair Oil & Gas Company, seeks approval of a waterflood project in the Grayburg-Jackson Pool with the injection of water to be through seven wells located in Section 3 and 4, Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico.

(3) That the wells in the proposed project area are in an advanced stage of depletion and should be classified as "stripper" wells.

(4) That approval of the subject application will neither cause waste nor impair correlative rights; provided, however, that unless agreed to by all parties, the transfer of allowables across lease lines where royalty ownership is diverse should not be authorized.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sinclair Oil & Gas Company, is hereby authorized to institute a waterflood project in the Grayburg-Jackson Pool with the injection of water through the following-described wells in Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico:

- West "A" Well No. 8, Unit E, Section 3;
- West "A" Well No. 4, Unit G, Section 4;
- West "A" Well No. 7, Unit A, Section 4;
- West "A" Well No. 9, Unit I, Section 4;
- West "B" Well No. 3, Unit C, Section 4;
- West "B" Well No. 6, Unit E, Section 4; and
- West "B" Well No. 11, Unit K, Section 4.

(2) That the waterflood project shall be governed by Rule 701, including the allowable provisions thereof.

PROVIDED HOWEVER, That unless otherwise agreed to by all parties and evidence thereof furnished the Commission, the transfer of allowables within the project area of this waterflood shall be authorized only insofar as the transfer is made between wells having common royalty ownership.

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

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

STATE OF NEW MEXICO  
(Secondary Recovery Projects Amendment -  
Order No. R-3375)

Order No. R-3375, Amending Statewide Rule 701, Secondary Recovery and Salt Water Disposal Orders, February 14, 1968

In the Matter of the Hearing Called by the Oil Conservation Commission Upon its Own Motion to Consider the Amendment of Rule 701 of the Commission Rules and Regulations and Secondary Recovery Orders Nos. R-1244, R-1311, R-1456, R-1470, R-1505, R-2064, R-2178-B, R-2268-A, R-2269, R-2403, R-2541, R-2622, R-2664, R-2700, and R-2795, to Delete Therefrom All References to the State Engineer or the State Engineer Office.

CASE NO. 371  
Order No. R-337

ORDER OF THE COMMISSION

BY THE COMMISSION: This cause came on for hearing at 9 a.m. on January 24, 1968, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 14th day of February, 1968, the Commission, quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, 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 in order to ease the administrative burden upon operators and Commission, thereby preventing economic waste, Rule 701 of the Commission Rules and Regulations and secondary

**GRAYBURG-JACKSON POOL**  
(Sinclair Oil and Gas Waterflood Expansion)  
Eddy County, New Mexico

Order No. R-2268-A, Authorizing Sinclair Oil and Gas Company to Expand the Keel-West Waterflood Project in the Grayburg-Jackson Pool, Eddy County, New Mexico, October 17, 1963, as Amended by Order No. R-3375, March 1, 1968.

See separate Order No R-3375, March 1, 1968, deleting references to State Engineer or State Engineer Office.

Application of Sinclair Oil & Gas Company  
for the Extension of a Waterflood Project,  
Eddy County, New Mexico.

CASE NO. 2909  
Order No. R-2268-A

**ORDER OF THE COMMISSION**

BY THE COMMISSION: This cause came on for hearing at 9 o'clock a.m. on September 25, 1963, 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 17th day of October, 1963, 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 by Order No. R-2268 dated June 21, 1962, the Commission authorized Sinclair Oil & Gas Company to institute a waterflood project in the Grayburg-Jackson Pool with the injection of water through seven wells in Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico.

(3) That the applicant, Sinclair Oil & Gas Company, seeks authority to expand its Keel-West Waterflood Project in the Grayburg-Jackson Pool in four separate stages.

(4) That an administrative procedure should be established whereby wells may be converted to injection by stages rather than after experiencing substantial response to water injection as required by Rule 701-E (5).

(5) That approval of the subject application will not alter the manner in which allowable will be assigned to the waterflood project area under the provisions of Rule 701.

(6) That approval of the subject application will afford the applicant greater operating conveniences; that expansion of the waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(7) That the applicant should not be authorized to utilize any casing and tubing program in expansion of the waterflood project unless approval has been obtained or is obtained from the Commission and the State Engineer.

**IT IS THEREFORE ORDERED:**

(1) That the applicant, Sinclair Oil & Gas Company, is hereby authorized to expand its Keel-West Waterflood Project in the Grayburg-Jackson Pool in Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, in four stages as follows:

**STAGE I-TO BE COMMENCED PRIOR TO DECEMBER 31, 1963**

Convert the following wells to injection wells;

West "B" Well No. 9, Unit M, Section 4  
West "B" Well No. 19, Unit C, Section 10  
West "B" Well No. 23, Unit K, Section 3  
Keel "B" Well No. 16, Unit I, Section 5  
Keel "B" Well No. 12, Unit A, Section 8  
Keel "B" Well No. 13, Unit O, Section 5

Drill 1 injection well located on the West "B" lease in Unit A of Section 9.

**STAGE II-TO BE COMMENCED SUBSEQUENT TO COMPLETION OF STAGE I BUT NOT PRIOR TO JANUARY 1, 1964**

Convert the following wells to injection wells;

West "B" Well No. 10, Unit E, Section 9  
Keel "B" Well No. 7, Unit C, Section 8  
Keel "B" Well No. 8, Unit G, Section 8

Drill 1 injection well located on the West "B" lease in Unit C of Section 9.

**STAGE III - TO BE COMMENCED SUBSEQUENT TO COMPLETION OF STAGE II BUT NOT PRIOR TO JULY 1, 1964**

Convert the following wells to injection wells;

West "B" Well No. 14, Unit K, Section 10  
West "B" Well No. 17, Unit I, Section 9  
Keel "B" Well No. 2, Unit M, Section 8  
Keel "B" Well No. 4, Unit O, Section 8  
Keel "B" Well No. 17, Unit E, Section 8  
Keel "A" Well No. 5, Unit O, Section 7  
Keel "A" Well No. 7, Unit L, Section 7  
Keel "A" Well No. 9, Unit G, Section 7  
Keel "A" Well No. 10, Unit I, Section 7  
Keel "A" Well No. 12, Unit A, Section 7  
Keel "A" Well No. 14, Unit D, Section 7  
West "A" Well No. 1, Unit C, Section 3

Drill 2 injection wells located on the Keel "B" lease in Units I and K of Section 8; drill 1 injection well located on the West "B" lease in Unit K of Section 9.

## (GRAYBURG-JACKSON (SINCLAIR OIL AND GAS WATER-FLOOD EXPANSION) POOL - Cont'd.)

## STAGE IV-TO BE COMMENCED SUBSEQUENT TO COMPLETION OF STAGE III BUT NOT PRIOR TO JANUARY 1, 1965

Convert the following wells to injection wells;  
 West "A" Well No. 3, Unit A, Section 3  
 West "B" Well No. 24, Unit A, Section 10  
 West "B" Well No. 26, Unit I, Section 3  
 Keel "B" Well No. 1, Unit D, Section 6  
 Keel "B" Well No. 19, Unit J, Section 5  
 Keel "B" Well No. 21, Unit J, Section 6  
 Keel "B" Well No. 22, Unit L, Section 5  
 Keel "B" Well No. 25, Unit L, Section 6

Drill 3 injection wells located on the West "B" lease in Unit P of Section 9 and in units I and N of Section 10.

(2) That the applicant is hereby authorized to drill and substitute injection wells for the injection wells authorized above provided the substitute well will be drilled at a standard location in the same 40-acre tract as the well it is to replace, the usual forms to obtain approval to drill a well are filed with the Commission, and the applicant notifies the Commission in writing of the proposed substitution.

(3) (As Amended by Order No. R-3375, March 1, 1968.) That the applicant shall not utilize any casing or tubing program in expansion of the waterflood project as approved by this order unless the Commission shall have approved said casing or tubing program.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.  
 DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

SQUARE LAKE POOL  
 (Premier Sand Waterflood)  
 Eddy County, New Mexico

Order No. R-2609, Authorizing Texaco, Inc. to Institute a Waterflood Project in the Premier Sand, Square Lake Pool, Eddy County, New Mexico, December 6, 1963.

Application of Texaco, Inc. for a Waterflood Project, Eddy County, New Mexico.

CASE NO. 2940  
 Order No. R-2609

## ORDER OF THE COMMISSION

BY THE COMMISSION: This cause came on for hearing at 9 o'clock a.m. on November 20, 1963, 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 6th day of December, 1963, 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 Square Lake 31 Unit Agreement has been approved by the Commission by Order No. R-2608; that the Square Lake 31 Unit Area comprises 480 acres, more or less, of Federal land in Section 31, Township 16 South, Range 30 East, NMPPM, Eddy County, New Mexico, as more fully described in said order.

(3) That the applicant, Texaco, Inc., seeks permission to institute a waterflood project in the Square Lake Pool in the Square Lake 31 Unit Area by the injection of water into the Premier Sand of the Grayburg formation through six 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.

(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.

## IT IS THEREFORE ORDERED:

(1) That the applicant, Texaco, Inc., is hereby authorized to institute a waterflood project in the Square Lake Pool in the Square Lake 31 Unit Area by the injection of water into the Premier Sand of the Grayburg formation through the following-described six wells:

SECTION 31, TOWNSHIP 16 SOUTH, RANGE 30 EAST,  
 NMPPM, EDDY COUNTY, NEW MEXICO

Texaco, Inc. Etz Federal NCT-1 Well No. 1, Unit L  
 Texaco, Inc. Etz Federal NCT-2 Well No. 4, Unit H  
 John H. Trigg Federal E-31 Well No. 2, Unit N  
 John H. Trigg Federal E-31 Well No. 3, Unit F  
 A. C. Holder et al DeKalb Federal Well No. 1, Unit P  
 A. C. Holder et al DeKalb Federal Well No. 3, Unit J

(2) 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.

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

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

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

**(LOCO HILLS (GRAYBURG WATERFLOOD PROJECT-DIXON & YATES) POOL - Cont'd.)**

through its Boulter Well No. 3, located 660 feet from the North line and 660 feet from the West line of Section 14, Township 18 South, Range 29 East, NMPM, Eddy County, New Mexico.

(3) That the applicant also seeks designation of the N/2 NW/4 of said Section 14 as a capacity-type waterflood project.

(4) That the project area is offset to the North and West by a prorated waterflood project wherein transfer of allowables is permitted.

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

(6) That the institution of a waterflood project in the project area should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(7) That the applicant and the operator of the waterflood project to the North and West have entered into an agreement for cooperative waterflooding across lease lines.

(8) That the applicant has not established that the wells in the project area would be capable of producing more than the allowable that they would receive under a prorated waterflood project.

(9) That the applicant has not established that designation of the N/2 NW/4 of said Section 14 as a capacity-type waterflood project is necessary in order to prevent waste or protect correlative rights.

(10) That the applicant should be authorized to institute a waterflood project in the proposed area and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(11) That the applicant's request that the N/2 NW/4 of said Section 14 be designated a capacity-type waterflood project should be denied.

**IT IS THEREFORE ORDERED:**

(1) That the applicant, Dixon & Yates Oil Company, is hereby authorized to institute a waterflood project in the Loco Hills Pool by the injection of water into the Grayburg formation through its Boulter Well No. 3, located 660 feet from the North line and 660 feet from the West line of Section 14, Township 18 South, Range 29 East, NMPM, Eddy County, New Mexico.

(2) That the applicant's request that the N/2 NW/4 of said Section 14 be designated a capacity-type waterflood project is hereby denied.

(3) That the waterflood project herein authorized shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(4) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 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.

**GRAYBURG-JACKSON POOL**  
(Sinclair Oil and Gas Waterflood Amendment)  
Eddy County, New Mexico

Order No. R-2268-B, Authorizing Amendment of the Sinclair Oil and Gas Company Keel-West Waterflood Project in the Grayburg-Jackson Pool, Eddy County, New Mexico, September 13, 1965.

Application of Sinclair Oil & Gas Company  
for a Waterflood Expansion, Eddy County,  
New Mexico.

CASE NO. 3299  
Order No. ~~R-2268-B~~

**ORDER OF THE COMMISSION**

BY THE COMMISSION: This cause came on for hearing at 9 o'clock a. m. on August 25, 1965, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 13th day of September, 1965, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, 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 by Order No. R-2268-A, the Commission authorized the applicant, Sinclair Oil & Gas Company, to expand its Keel-West Waterflood Project in the Grayburg-Jackson Pool in Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, in four stages, specifying a period of time to commence each stage of the project.

(3) That Order No. R-2268-A provided that Stage IV of the project was to be commenced subsequent to completion of Stage III but not prior to January 1, 1965.

(4) That the applicant seeks amendment of Order No. R-2268-A to authorize the commencement of Stage IV of the project prior to the completion of Stage III.

(5) That approval of the subject application should result in a more efficient waterflood project, thereby preventing waste.

**IT IS THEREFORE ORDERED:**

(1) That Order No. R-2268-A is hereby amended to authorize the applicant, Sinclair Oil & Gas Company, to commence Stage IV of its Keel-West Waterflood Project in the Grayburg-Jackson Pool in Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, prior to the completion of Stage III of the project.

(2) 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.

(SHUGART YATES-SEVEN RIVERS QUEEN-GRAYBURG  
(SIETE SHUGART COOPERATIVE WATERFLOOD PROJECT)  
POOL - Cont'd.)

(9) The subject waterflood project is hereby designated the Siete Shugart Cooperative Waterflood Project and shall be governed by the provisions of Rules 701 through 708 of the Division Rules and Regulations.

(10) Monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 704 and 1120 of the Division Rules and Regulations.

(11) Prior to commencing injection operations, the applicant shall be required to obtain any applicable approval from the appropriate agency of the United States Department of the Interior.

(12) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

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

EXHIBIT "A"  
CASE NO. 9925  
DIVISION ORDER NO. R-9184

<u>WELL NAME &amp; LOCATION</u>	<u>MAXIMUM SURFACE INJECTION PRESSURE</u>
Geronimo Federal Well No. 2 950' FNL & 2310' FEL, Unit B, Section 24, Township 18 South, Range 31 East, NMFM.	754 PSIG
Geronimo Federal Well No. 7 1750' FNL & 990' FEL, Unit H, Section 24, Township 18 South, Range 31 East, NMFM.	750 PSIG
Inca Federal Well No. 4 760' FNL & 420' FWL, Unit D, Section 19, Township 18 South, Range 32 East, NMFM.	754 PSIG

GRAYBURG-JACKSON POOL  
(Keel-West Waterflood Project)  
Eddy County, New Mexico

Order No. R-2268-C, Authorizing Socorro Petroleum Company to Expand its Keel-West Waterflood Project in the Grayburg-Jackson Pool, Eddy County, New Mexico, June 14, 1990.

Application of Socorro Petroleum Company for Waterflood Expansion And to Amend Division Order No. R-2268 And Administrative Orders WFX-585 And WFX-587, Eddy County, New Mexico.

CASE NO. 9929  
Order No. R-2268-C

ORDER OF THE DIVISION

BY THE DIVISION: This cause came on for hearing at 8:15 a.m. on May 2, 1990, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 14th day of June, 1990, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) The applicant, Socorro Petroleum Company, is the current operator of the Keel-West Waterflood Project which was originally approved by Division Order Nos. R-2268, R-2268-A and R-2268-B, and which encompasses, in part, Sections 3, 4, 9 and 10, Township 17 South, Range 31 East, NMFM, Grayburg-Jackson Pool, Eddy County, New Mexico.

(3) The applicant seeks authority to expand said Keel-West Waterflood Project by converting its H. E. West "B" Well No. 24, located 660 feet from the North and East lines (Unit A) of Section 10, Township 17 South, Range 31 East, NMFM, Eddy County, New Mexico, from a producing oil well to a water injection well.

(4) By Order Nos. R-2268 (supplemental), WFX-585 and WFX-587, entered, respectively, October 7, 1989, August 31, 1989, and September 26, 1989, the Division authorized the expansion of said Keel-West Waterflood Project by the conversion of fifteen wells located in said Sections 3, 4, 9 and 10 to water injection wells. These orders further limited the surface injection pressure on said wells to 0.2 psi per foot of depth to the uppermost perforations or approximately 670 psi.

(5) The applicant also seeks authority, in the immediate case, to increase the surface injection pressure on said fifteen injection wells to approximately 450 psi above formation parting pressure as determined from step rate tests conducted on certain injection wells located within the project area. The applicant further seeks to increase the surface injection pressure on its proposed H. E. West "B" Well No. 24, as described above, to 450 psi above formation parting pressure.

## GRAYBURG-JACKSON (KEEL-WEST WATERFLOOD-PROJECT) POOL - Cont'd.)

6) At the time of the hearing, the applicant requested that the action of this case requesting the authority to convert its H. E. West "B" Well No. 24 to an injection well be dismissed inasmuch as a formal application to convert said well has been filed with the Division for administrative approval.

7) The subject waterflood project was initiated in June, 1962, at which time the Division did not restrict the surface injection pressure on injection wells.

8) From inception to August, 1986, the former operator of the Keel-West Waterflood Project utilized some ten injection wells previously approved by said Order Nos. R-2268, R-2268-A, and R-2268-B, and located within said Sections 3, 4, 9 and 10, to inject water into the Grayburg and San Andres formations at surface injection pressures as high as 2500 psi.

9) Decline curve analysis indicates that if sufficient volumes of water are injected into the Grayburg-Jackson Pool in this area, an estimated additional 1.48 million barrels of oil will be recovered.

10) The evidence presented by the applicant indicates that sufficient volumes of water cannot be injected into the Grayburg-Jackson Pool by those fifteen subsequently approved injection wells at their presently authorized injection pressures.

11) The applicant presented test data obtained from step rate injection tests conducted on nine of the fifteen subject injection wells which indicates that the average fracture pressure is approximately 1711 psi.

12) The evidence presented further indicates that injection volumes limited to the formation fracture pressure as established by step rate tests are not sufficient to recover the additional 1.48 million barrels of oil.

13) The applicant, through its engineering evidence and testimony, has satisfactorily demonstrated that injection through the fifteen subject injection wells at a pressure of approximately 450 psi above formation fracture pressure is necessary in order to efficiently and effectively waterflood the area and will enable the applicant to recover the additional oil reserves within the Grayburg-Jackson Pool, thereby preventing waste.

14) The applicant has further demonstrated that injection into the Grayburg and San Andres formations at said injection pressures would not result in the migration of injected water from the Grayburg-Jackson Pool.

15) According to the evidence presented, there are no fresh water aquifers located above or below the Grayburg-Jackson Pool in this area.

16) Injection into the fifteen subject injection wells at a surface injection pressure of approximately 450 psi above formation fracture pressure will allow the recovery of additional oil reserves within

the Grayburg-Jackson Pool, thereby preventing waste, will not endanger any fresh water aquifers, and should therefore be approved.

(17) The Division Director should have the authority to reduce or rescind said injection pressures should it become apparent that the injected fluid is not being adequately confined to the Grayburg-Jackson Pool.

(18) Inasmuch as the injection pressures authorized by this order are based upon the current formation fracture pressure, which, through continued injection, may increase, the Division Director should also have the authority to administratively increase the surface injection pressures on the fifteen subject injection wells, provided, however, that current step rate tests are accompanied by such request.

(19) Prior to authorizing the requested surface injection pressure for the proposed H. E. West "B" Well No. 24, the applicant should be required to demonstrate that said well has been approved for injection, and should further be required to conduct and submit a step rate test on said well.

IT IS THEREFORE ORDERED THAT:

(1) Division Order Nos. R-2268 (supplemental), WFX-585 and WFX-587 are hereby amended authorizing Socorro Petroleum Company to inject water into fifteen previously approved injection wells located within the Keel-West Waterflood Project in Sections 3, 4, 9 and 10, Township 17 South, Range 31 East, NMPM, Grayburg-Jackson Pool, Eddy County, New Mexico, at a surface injection pressure of approximately 450 psi above formation fracture pressure as shown on Exhibit "A" attached hereto.

(2) The Division Director shall have the authority to administratively approve subsequent pressure increases on said wells provided, however, that current step rate tests are accompanied by such requests.

(3) The Division Director shall also have the authority to reduce or rescind said injection pressures should it become apparent that the injected fluid is not being adequately confined to the Grayburg-Jackson Pool.

(4) The portion of this case requesting the expansion of the Keel-West Waterflood Project by the conversion of the H. E. West "B" Well No. 24 located 660 feet from the North and East lines (Unit A) of Section 10, Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, to a water injection well is hereby dismissed.

(5) Prior to authorizing the requested surface injection pressure for said H. E. West "B" Well No. 24, the applicant shall be required to demonstrate that said well has been approved for injection, and shall further be required to conduct and submit a step rate injection test on said well.

(6) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

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

## (GRAYBURG-JACKSON (KEEL-WEST WATERFLOOD-PROJECT) POOL - Cont'd.)

EXHIBIT "A"  
DIVISION ORDER NO. R-2268-C

<u>WELL &amp; LOCATION</u>	<u>MAXIMUM SURFACE INJECTION PRESSURE</u>
H.E. West "A" No. 8 Unit E, Section 3, T-17S, R-31E	2407 PSIG
H.E. West "A" No. 9 Unit I, Section 4, T-17S, R-31E	2250 PSIG
H.E. West "A" No. 11 Unit G, Section 3, T-17S, R-31E	2160 PSIG
H.E. West "A" No. 14 Unit O, Section 4, T-17S, R-31E	2160 PSIG
H.E. West "A" No. 15 Unit A, Section 3, T-17S, R-31E	2160 PSIG
H.E. West "B" No. 12 Unit G, Section 9, T-17S, R-31E	1872 PSIG
H.E. West "B" No. 13 Unit E, Section 10, T-17S, R-31E	2027 PSIG
H.E. West "B" No. 15 Unit G, Section 10, T-17S, R-31E	2236 PSIG
H.E. West "B" No. 16 Unit M, Section 3, T-17S, R-31E	2160 PSIG
H.E. West "B" No. 18 Unit O, Section 3, T-17S, R-31E	2000 PSIG

<u>WELL &amp; LOCATION</u>	<u>MAXIMUM SURFACE INJECTION PRESSURE</u>
H.E. West "B" No. 20 Unit O, Section 10, T-17S, R-31E	2160 PSIG
H.E. West "B" No. 21 Unit M, Section 10, T-17S, R-31E	2075 PSIG
H.E. West "B" No. 22Y Unit O, Section 9, T-17S, R-31E	2118 PSIG
H.E. West "B" No. 34 Unit I, Section 10, T-17S, R-31E	2160 PSIG
H.E. West "B" No. 43 Unit M, Section 9, T-17S, R-31E	2470 PSIG

QUEREOCHO PLAINS-QUEEN ASSOCIATED POOL  
(Cavalcade Federal "21" Lease)  
Lea County, New Mexico

Order No. R-9240, Authorizing Gary L. Bennett to Institute a Pressure Maintenance Project on its Cavalcade Federal "21" Lease, in the Querecho Plains-Queen Associated Pool, Lea County, New Mexico, July 31, 1990.

Application of Gary L. Bennett for a Pressure Maintenance Project, Lea County, New Mexico.

CASE NO. 9972  
Order No. R-9240

## ORDER OF THE DIVISION

BY THE DIVISION: This cause came on for hearing at 8:15 a.m. on June 27, 1990, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 31st day of July, 1990, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

## FINDS THAT:

(1) Due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof

(2) The applicant, Gary L. Bennett, seeks authority to institute a pressure maintenance project on its Cavalcade Federal "21" Lease comprising the E/2 SW/4 and SE/4 of Section 21, Township 18 South, Range 32 East, NMPM, Lea County, New Mexico, by the injection of water into the Querecho Plains-Queen Associated Pool through the perforated interval from approximately 4088 feet to 4130 feet in its Cavalcade Federal "21" Well No. 4 located 400 feet from the South line and 660 feet from the East line (Unit P) of said Section 21.

(3) The applicant proposes to maintain reservoir pressure in the Querecho Plains-Queen Associated Pool by the injection of water into the Penrose member of the Queen formation within the wellbore of its Cavalcade Federal "21" Well No. 4 as described above.

(4) The proposed pressure maintenance project should result in the recovery of otherwise unrecoverable oil from the Querecho Plains-Queen Associated Pool, thereby preventing waste.

(5) The operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

(6) The evidence presented indicates that within the proposed injection well's area of review, there are two wells which may not be adequately cemented or plugged back in a manner adequate to confine the injected fluid to the proposed injection zone, these being the Cavalcade Federal "21" Well Nos. 1 and 3 located, respectively, 660 feet from the South line and 1650 feet from the East line (Unit O), and 1980 feet from the South line and 660 feet from the East line (Unit I), both in said Section 21.

(7) Prior to commencing injection operations, the applicant should be required to perform remedial cement operations and remedial plug back operations on the wells described in Finding No. (6) above in a manner satisfactory to the supervisor of the Division's Hobbs district office.

(8) In addition, the evidence presented indicates that within the SW/4 SW/4 of Section 22, Township 18 South, Range 32 East, NMPM, there apparently exists a plugged and abandoned well of which the Division has no records, and it is unknown whether such well has been plugged in a manner which will prevent the migration of fluid from the injection formation.



**STATE OF NEW MEXICO  
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION**

**IN THE MATTER OF THE HEARING  
CALLED BY THE OIL CONSERVATION  
DIVISION FOR THE PURPOSE OF  
CONSIDERING:**

**CASE NO. 11580  
Order No. R-10663**

**APPLICATION OF DEVON ENERGY  
OPERATING CORPORATION FOR  
WATERFLOOD EXPANSION, EDDY  
COUNTY, NEW MEXICO.**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This cause came on for hearing at 8:15 a.m. on July 25, 1996, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 9th day of September, 1996, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

**FINDS THAT:**

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

(2) The applicant, Devon Energy Operating Corporation, is the current operator of the Keel-West Waterflood Project which was originally approved by Division Order No. R-2268, as amended, and which encompasses, in part, Sections 3 through 10, Township 17 South, Range 31 East, NMPM, Grayburg-Jackson Pool, Eddy County, New Mexico.

(3) The applicant seeks authority to expand the Keel-West Waterflood Project by converting seven existing producing wells, described as follows, to injection wells:

<u>WELL NUMBER</u>	<u>WELL LOCATION</u>	<u>INJECTION INTERVAL</u>	<u>PACKER DEPTH</u>
J.L. Keel "B" No. 12	660' FNL & 660' FEL A-8-17S-31E	2,950'-3,730'	3,000'
J.L. Keel "B" No. 27	1980' FSL & 1980' FEL J-8-17S-31E	2,900'-3,728'	2,900'
J.L. Keel "B" No. 29	1980' FSL & 1980' FWL K-8-17S-31E	2,800'-3,697'	2,800'
J.L. Keel "B" No. 46	660' FSL & 660' FEL P-8-17S-31E	2,900'-3,751'	3,000'
J.L. Keel "B" No. 76	2030' FNL & 1980' FEL G-8-17S-31E	2,900'-3,820'	3,000'
J.L. Keel "B" No. 77	1930' FNL & 714' FEL H-8-17S-31E	3,000'-3,850'	3,050'
H.E. West "B" No. 35	1980' FSL & 860' FWL L-9-17S-31E	3,050'-3,950'	3,050'

(4) Applicant proposes to inject into the Grayburg-San Andres formation through the gross interval from approximately 2,800 feet to 3,950 feet.

(5) Applicant further proposes to inject into the subject wells through 2 3/8-inch or 2 7/8-inch tubing set in a packer located within 100 feet of the uppermost injection perforations at a rate of approximately 500 barrels of water per day.

(6) Applicant requests that the subject wells be allowed to inject at a maximum surface injection pressure of 2,500 psi. Applicant further testified that it is currently injecting into this waterflood project at an average pressure of approximately 2,000-2,100 psi under authority previously granted by the Division.

(7) Applicant testified that it has been unable to identify any fresh water wells or sources within one mile of the proposed injection wells.

(8) The applicant submitted data on the proposed injection wells and all other wells which penetrate the zone of interest within 1/2 mile thereof.

(9) This evidence indicates that there is a plugged and abandoned well located within ½ mile of the proposed injection wells which is not adequately plugged and abandoned so as to confine injected fluid to the proposed injection interval, this being the Keel "B" Well No. 28 located 1980 feet from the South line and 660 feet from the East line (Unit D) of Section 8, Township 17 South, Range 31 East, NMPM.

(10) It is the current policy of the Division not to allow injection within ½ mile of any well which is not adequately cased, cemented or plugged and abandoned so as to confine injection fluid to the injection interval.

(11) Applicant testified that due to the current condition of the wellbore, re-entry of the Keel "B" Well No. 28 for the purpose of re-plugging is not feasible.

(12) In lieu of a requirement to re-enter and re-plug the Keel "B" Well No. 28, applicant proposed that it be allowed to implement a phased injection and monitor program described as follows:

#### **PHASE I**

- a) immediately convert the J.L. Keel "B" Well Nos. 12, 29 and 76 to injection;
- b) utilize the J.L. Keel "B" Well Nos. 27, 46, 57, 77, 92 and 94 and the West "B" Well Nos. 35, 80 and 89 as monitor wells to evaluate reservoir performance around the Keel "B" Well No. 28. Parameters to be monitored include fluid levels and waterflood response. As response is experienced in any monitor well the rates in the adjacent injection wells will be adjusted as necessary to maintain the producing wells in a pumped off condition;

#### **PHASE II**

- c) after sufficient data is gathered to show that low fluid levels can be maintained in the producing wells by adjusting offset injection rates, the J.L. Keel "B" Well Nos. 27, 46 and 77 and the West "B" Well No. 35 will be converted to injection;

- d) utilize the J.L. Keel "B" Well Nos. 57, 92 and 94 and the West "B" Well Nos. 80 and 89 as monitor wells to evaluate reservoir performance around the Keel "B" Well No. 28. Parameters to be monitored include fluid levels and waterflood response. As response is experienced in any monitor well the rates in the adjacent injection wells will be adjusted as necessary to maintain the producing wells in a pumped off condition;
- e) continue to utilize the J.L. Keel "B" Well No. 57, which is located 80 feet east of the Keel "B" Well No. 28 at a location 1980 feet from the South line and 580 feet from the East line (Unit I) of Section 8, as a monitor well throughout the life of the project.

(13) Applicant contends that the proposed monitoring program will provide sufficient data necessary to control the reservoir pressure and therefore prevent fluid migration within the Keel "B" Well No. 28.

(14) The evidence and testimony presented in this case indicates that:

- a) the Keel "B" Well No. 28 contains Grayburg/San Andres perforations open in the tubing/casing annulus from a depth of 3,118 feet to 3,347 feet, and perforations open below the packer at a depth of 3,613 feet to 3,800 feet;
- b) there are no cement plugs in the wellbore between the depths of 1,230 feet and 3,800 feet (T.D.);
- c) attempted plugging operations by ARCO Oil & Gas Company on the Keel "B" Well No. 28 revealed the presence of a "void" or "cavern" in the salt section at a depth of 1,134 feet to 1,224 feet which may reportedly extend horizontally away from the wellbore a distance of approximately 4,400 feet;

- d) by authority of Division Order No. R-2268-C, applicant is currently injecting within the project at a surface injection pressure which exceeds the fracture pressure of the Grayburg-San Andres formation. Applicant further testified that it cannot conduct effective waterflood operations in this portion of the field at a reduced injection pressure;
- e) applicant testified that it has encountered waterflows in the salt section within the southern portion of Section 7, approximately one mile away from the proposed injection wells;
- f) the proposed monitoring program will not allow the applicant to detect fluid entry into the Keel "B" Well No. 28; and,
- g) the absence of fresh water wells in this area does not definitively indicate the absence of fresh water sources;

(15) Applicant's proposed Phase I injection and monitoring program is sufficient to ensure that injected fluid will not reach the Keel "B" Well No. 28 provided that the applicant utilize the J.L. Keel "B" Well Nos. 15, 27 and 92 as producing wells throughout the life of the project.

(16) Applicant's proposed Phase II injection and monitoring program does not adequately protect against the possibility of injected fluid reaching the Keel "B" Well No. 28 and migrating up-hole to other formations.

(17) Applicant should be authorized to convert the J.L. Keel "B" Well Nos. 12, 29 and 76 to injection wells within the Keel-West Waterflood Project as proposed, provided however, continued use of these wells as injection wells should be contingent upon continued utilization of the J.L. Keel "B" Well Nos. 15, 27 and 92 as producing wells.

(18) Applicant's proposed conversion of the J.L. Keel "B" Well Nos. 27, 46 and 77 and the West "B" Well No. 35 to injection wells (Phase II) should be denied.

(19) The operator should take all steps necessary to ensure that the injected fluid enters only the proposed injection interval and is not permitted to escape into other formations or onto the surface from injection, production or plugged and abandoned wells.

(20) The casing-tubing annulus within the J.L. Keel "B" Well Nos. 12, 29 and 76 should be filled with an inert fluid and a gauge or approved leak-detection device should be attached to the annulus in order to determine leakage in the casing, tubing or packer.

(21) Prior to commencing injection operations into the J.L. Keel "B" Well Nos. 12, 29 and 76, the casing in each well should be pressure tested throughout the interval from the surface down to the proposed packer setting depth, to assure the integrity of such casing.

(22) The injection wells or pressurization system should be initially equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to no more than 2,100 psi.

(23) The Division Director should have the authority to administratively authorize a pressure limitation in excess of the pressure limitation described above upon a showing by the operator that such higher pressure will not result in the migration of fluid from the injection formation.

(24) The operator should give advance notification to the supervisor of the Artesia District Office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity pressure tests in order that the same may be witnessed.

(25) The injection authority granted herein for the subject injection wells should terminate one year after the effective date of this order if the operator has not commenced injection operations into the wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

**IT IS THEREFORE ORDERED THAT:**

(1) The applicant, Devon Energy Corporation, is hereby authorized to convert the following described wells to injection wells within its Keel-West Waterflood Project in Section 8, Township 17 South, Range 31 East, NMPM, Grayburg-Jackson Pool, Eddy County, New Mexico:

<u>WELL NUMBER</u>	<u>WELL LOCATION</u>	<u>INJECTION INTERVAL</u>	<u>PACKER DEPTH</u>
J.L. Keel "B" No. 12	660' FNL & 660' FEL A-8-17S-31E	2,950' -3,730'	3,000'
J.L. Keel "B" No. 29	1980' FSL & 1980' FWL K-8-17S-31E	2,800' -3,697'	2,800'
J.L. Keel "B" No. 76	2030' FNL & 1980' FEL G-8-17S-31E	2,900' -3,820'	3,000'

PROVIDED HOWEVER THAT, injection into the aforesaid wells shall occur only at such time as the J.L. Keel "B" Well Nos. 15, 27 and 92 are utilized as producing wells. If production operations within the J.L. Keel "B" Well Nos. 15, 27 and 92 are discontinued for any reason, injection into the subject injection wells shall cease as well.

(2) The applicant's proposed conversion of the J.L. Keel "B" Well Nos. 27, 46 and 77 and the West "B" Well No. 35 to injection within the Keel-West Waterflood Project is hereby denied.

(3) The operator shall take all steps necessary to ensure that the injected fluid enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(3) Injection shall be accomplished through 2 3/8 or 2 7/8 inch tubing installed in a packer set within 100 feet of the uppermost injection perforations; the casing-tubing annulus shall be filled with an inert fluid and equipped with an approved pressure gauge or attention-attracting leak detection device.

(4) The injection wells or pressurization system shall be equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to no more than 2,100 psi.

(5) The Division Director shall have the authority to administratively authorize a pressure limitation in excess of the above upon a showing by the operator that such higher pressure will not result in the migration of injection fluid from the injection formation.

(6) Prior to commencing injection operations, the casing in each well shall be pressure-tested throughout the interval from the surface down to the proposed packer setting depth, to assure the integrity of such casing.

(7) The operator shall give advance notification to the supervisor of the Artesia District Office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity pressure tests in order that the same may be witnessed.


(8) The operator shall immediately notify the supervisor of the Artesia District Office of the Division of the failure of the tubing, casing or packer in the injection wells, the leakage of water, oil or gas from or around any producing well, or the leakage of water, oil or gas from any plugged and abandoned well within the project area, and shall take such steps as may be timely and necessary to correct such failure or leakage.

(9) The injection authority granted herein for the subject injection wells shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

(10) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

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

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LeMAY  
Director

S E A L



STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION

Case No. 11580  
Order No. R-10663-A

APPLICATION OF DEVON ENERGY OPERATING  
CORPORATION FOR WATERFLOOD EXPANSION,  
EDDY COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE DIVISION:

It appearing to the Division that Order No. R-10663 dated September 9, 1996, does not correctly state the intended order of the Division,

IT IS THEREFORE ORDERED THAT:

(1) Decretory Paragraph No. (15) on page 5 of said Order No. R-10663 is hereby amended to read in its entirety as follows:

“(15) Applicant’s proposed Phase I injection and monitoring program is sufficient to ensure that injected fluid will not reach the Keel “B” Well No. 28 provided that the applicant utilizes the J.L. Keel “B” Well Nos. 77, 27 and 92 as producing wells throughout the life of the project.”

(2) Decretory Paragraph No. (17) on page 5 of said Order No. R-10663 is hereby amended to read in its entirety as follows:

“(17) Applicant should be authorized to convert the J.L. Keel “B” Well Nos. 12, 29 and 76 to injection wells within the Keel-West Waterflood Project as proposed, provided however, continued use of these wells as injection wells should be contingent upon continued utilization of the J.L. Keel “B” Well Nos. 77, 27 and 92 as producing wells.”

(3) Ordering Paragraph No. (1) on pages 6 and 7 of said Order No. R-10663 is hereby amended to read in its entirety as follows:

“(1) The applicant, Devon Energy Corporation, is hereby authorized to convert the following described wells to injection wells within its Keel-West Waterflood Project in Section 8, Township 17 South, Range 31 East, NMPM, Grayburg-Jackson Pool, Eddy County, New Mexico:

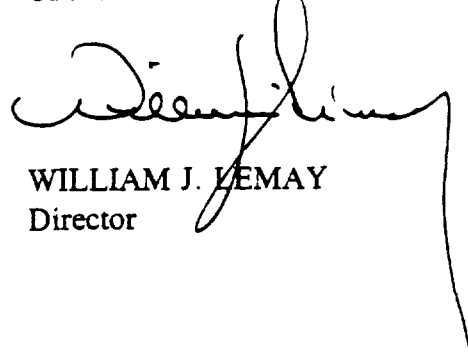
<u>WELL NUMBER</u>	<u>WELL LOCATION</u>	<u>INJECTION INTERVAL</u>	<u>PACKER DEPTH</u>
J.L. Keel "B"	660' FNL & 660' FEL	2,950'-3,730'	3,000'
No. 12	A-8-17S-31E		
J.L. Keel "B"	1980' FSL & 1980' FWL	2,800'-3,697'	2,800'
No. 29	K-8-17S-31E		
J.L. Keel "B"	2030' FNL & 1980' FEL	2,900'-3,820'	3,000'
No. 76	G-8-17S-31E		

PROVIDED HOWEVER THAT, injection into the aforesaid wells shall occur only at such time as the J.L. Keel "B" Well Nos. 77, 27 and 92 are utilized as producing wells. If production operations within the J.L. Keel "B" Well Nos. 77, 27 and 92 are discontinued for any reason, injection into the subject injection wells shall cease as well."

(4) The corrections set forth in this order be entered nunc pro tunc as of September 9, 1996.

DONE at Santa Fe, New Mexico, on this 2nd day of October, 1996.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LEMAY  
Director

S E A L

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION



GARREY CARRUTHERS  
GOVERNOR

POST OFFICE BOX 2088  
STATE LAND OFFICE BUILDING  
SANTA FE, NEW MEXICO 87504  
(505) 827-5800

ORDER NO. WFX-585

APPLICATION OF HONDO OIL AND GAS COMPANY TO EXPAND ITS WATERFLOOD PROJECT IN THE GRAYBURG JACKSON SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES POOL IN EDDY COUNTY, NEW MEXICO

ADMINISTRATIVE ORDER  
OF THE OIL CONSERVATION DIVISION

Under the provisions of Division Order No. R-2268, as amended, Hondo Oil and Gas Company has made application to the Division on July 25-August 3, 1989 for permission to expand its Keel West Waterflood Project in the Grayburg Jackson Seven Rivers Queen Grayburg San Andres Pool in Eddy County, New Mexico.

NOW, on this 31st day of August, 1989, the Division Director finds that:

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection wells are eligible for conversion to water injection under the terms of Rule 701.
- (5) The proposed expansion of the above-referenced waterflood project will not cause waste nor impair correlative rights.
- (6) The application should be approved.

IT IS THEREFORE ORDERED THAT:

The applicant, Hondo Oil and Gas Company, be and the same is hereby authorized to inject water into the Grayburg San Andres formation through 2 or 2 3/8-inch plastic lined tubing set in a packer located as near as practical to the injection perforations in the wells shown on Exhibit "A" attached to this order for purposes of secondary recovery.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the wells, the casing in each well shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus in each well shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection wells or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection wells to no more than 0.2 psi/ft. of depth to the uppermost perforation, as shown on Exhibit "A".

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said wells that such higher pressure will not result in migration of the injected fluid from the Grayburg San Andres formation. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity test so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said wells and shall take such steps as may be timely and necessary to correct such failure or leakage.

The subject wells shall be governed by all provisions of Division Order No. R-2268 and Rules 701-708 of the Division Rules and Regulations not inconsistent herewith.

PROVIDED FURTHER THAT, jurisdiction of this cause is hereby retained by the Division for the entry of such further order or orders as may be deemed necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of the operator to conduct operations in a manner which will ensure the protection of fresh water or in a manner inconsistent with the requirements set forth in this order, the Division may, after notice and hearing, terminate the injection authority granted herein.

Administrative Order WFX-585  
Hondo Oil and Gas Company  
September 25, 1989  
Page 3

The operator shall submit monthly progress reports of the project in accordance with Rule 706 and 1115 of the Division Rules and Regulations.

Approved at Santa Fe, New Mexico, on this 31st day of August, 1989.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY  
Director

S E A L

Exhibit "A"  
Hondo Oil and Gas Company  
WFX-585

Well Name and Location	Footage Location	U-S-T-R	Injection Interval (Feet)	Maximum Surface Injection Pressure
H. E. West "B" Well No. 12	1980' FNL - 1980' FEL	G-09-17S-31E	3260 - 3628	652 PSIG
H. E. West "B" Well No. 13	1980' FNL - 660' FWL	E-10-17S-31E	3312 - 3696	662 PSIG
H. E. West "A" Well No. 14	720' FSL - 1980' FEL	O-04-17S-31E	3214 - 3826	643 PSIG
H. E. West "B" Well No. 15	1980' FNL - 1980' FEL	G-10-17S-31E	3368 - 3916	674 PSIG
H. E. West "B" Well No. 16	660' FSL - 660' FWL	M-03-17S-31E	3333 - 3742	667 PSIG
H. E. West "B" Well No. 18	660' FSL - 1980' FEL	O-03-17S-31E	3386 - 3994	677 PSIG
H. E. West "B" Well No. 21	660' FSL - 660' FWL	M-10-17S-31E	3294 - 3917	659 PSIG
H. E. West "B" Well No. 22Y	660' FSL - 1990' FEL	O-09-17S-31E	3239 - 3856	648 PSIG
H. E. West "B" Well No. 43	660' FSL - 760' FWL	M-09-17S-31E	3141 - 3673	628 PSIG



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS  
GOVERNOR

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SANTA FE, NEW MEXICO 87501  
(505) 827-5800

ORDER NO. WFX-587

APPLICATION OF HONDO OIL AND GAS COMPANY TO EXPAND ITS WATERFLOOD PROJECT IN THE GRAYBURG JACKSON SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES POOL IN EDDY COUNTY, NEW MEXICO

ADMINISTRATIVE ORDER  
OF THE OIL CONSERVATION DIVISION

Under the provisions of Division Order No. R-2268 as amended, Hondo Oil and Gas Company has made application to the Division on July 26-August 2, 1989 for permission to expand its Keel West Waterflood Project in the Grayburg Jackson Seven Rivers Queen Grayburg San Andres Pool in Eddy County, New Mexico.

NOW, on this 26th day of September, 1989, the Division Director finds that:

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection wells are eligible for conversion to water injection under the terms of Rule 701.
- (5) The proposed expansion of the above-referenced waterflood project will not cause waste nor impair correlative rights.
- (6) The application should be approved.

IT IS THEREFORE ORDERED THAT:

The applicant, Hondo Oil and Gas Company, be and the same is hereby authorized to inject water into the Grayburg San Andres formation through 2 or 2 3/8-inch plastic lined tubing set in a packer located as near as practical to the injection perforations in the wells shown on Exhibit "A" attached to this order for purposes of secondary recovery.

IT IS FURTHER ORDERED THAT:

Administrative Order WFX-587  
Hondo Oil and Gas Company  
September 26, 1989  
Page 2

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the wells, the casing in each well shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus in each well shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection wells or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection wells to no more than 0.2 psi/ft. of depth to the uppermost perforation, as shown on Exhibit "A".

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said wells that such higher pressure will not result in migration of the injected fluid from the Grayburg San Andres formation. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity test so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said wells and shall take such steps as may be timely and necessary to correct such failure or leakage.

The subject wells shall be governed by all provisions of Division Order No. R-2268 and Rules 701-708 of the Division Rules and Regulations not inconsistent herewith.

PROVIDED FURTHER THAT, jurisdiction of this cause is hereby retained by the Division for the entry of such further order or orders as may be deemed necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of the operator to conduct operations in a manner which will ensure the protection of fresh water or in a manner inconsistent with the requirements set forth in this order, the Division may, after notice and hearing, terminate the injection authority granted herein.

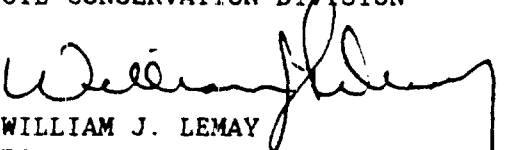


Administrative Order WFX-587  
Hondo Oil and Gas Company  
September 26, 1989  
Page 3

The operator shall submit monthly progress reports of the project in accordance with Rule 706 and 1115 of the Division Rules and Regulations.

Approved at Santa Fe, New Mexico, on this 26th day of September, 1989.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LEMAY  
Director

S E A L

Exhibit "A"  
Hondo Oil and Gas Company  
WFX-587

Well Name and Location	Footage Location	U-S-T-R	Injection Interval (Feet)	Maximum Surface Injection Pressure
H.E. West "A" Well No. 11	1980' FNL - 1980' FEL	G-03-17S-31E	3439-3973	688 PSIG
H.E. West "A" Well No. 15	660' FNL - 330' FEL	A-03-17S-31E	3479-4046	696 PSIG
H.E. West "B" Well No. 20	660' FSL - 1980' FEL	O-10-17S-31E	3353-3937	671 PSIG
H.E. West "B" Well No. 34	1980' FSL - 660' FEL	I-10-17s-31E	3341-3802	668 PSIG



**NEW MEXICO ENERGY, MINERALS  
& NATURAL RESOURCES DEPARTMENT**

OIL CONSERVATION DIVISION  
2840 South Pacheco Street  
Santa Fe, New Mexico 87505  
(505) 827-7131

**AMENDED ADMINISTRATIVE ORDER NO. WFX-687**

**APPLICATION OF DEVON ENERGY CORPORATION TO EXPAND ITS WATERFLOOD  
PROJECT IN THE GRAYBURG JACKSON POOL IN EDDY COUNTY, NEW MEXICO**

**ADMINISTRATIVE ORDER  
OF THE OIL CONSERVATION DIVISION**

Under the provisions of Division Order No. R-2268 as amended, Devon Energy Corporation has made application to the Division on March 26, 1996 for permission to expand its Keel-West Unit Waterflood Project in the Grayburg Jackson Pool in Eddy County, New Mexico.

**THE DIVISION DIRECTOR FINDS THAT:**

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection wells are eligible for conversion to injection under the terms of Rule 701.
- (5) The proposed expansion of the above referenced waterflood project will not cause waste nor impair correlative rights.
- (6) The application should be approved.

**IT IS THEREFORE ORDERED THAT:**

The applicant, Devon Energy Corporation, be and the same is hereby authorized to inject water into the Grayburg and San Andres formations at approximately 2570 feet to approximately 3950 feet through 2 3/8-inch plastic lined tubing set in a packer located within 100 feet of the uppermost injection perforations in the wells described on Exhibit "A" attached hereto, for purposes of secondary recovery.

**IT IS FURTHER ORDERED THAT:**

Prior to commencing injection operations into the J.L. Keel 'B' No.34 and the J.L. Keel 'B' No.37, the operator shall re-enter the Everts (Grier) Well No.1, located 330' FSL & 330' FEL in Section 31, Township 16 South, Range 31 East, NMPM, Eddy County, New Mexico, and plug and abandon the well in a manner satisfactory to the supervisor of the Artesia District Office of the Division.

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the wells, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection wells to no more than between .5 and .6 psi per foot of depth to the uppermost injection perforations or open hole interval *as indicated on Exhibit "A"*.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said wells that such higher pressure will not result in migration of the injected fluid from the Grayburg or San Andres formations. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity tests so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said wells and shall take such steps as may be timely and necessary to correct such failure or leakage.

The subject wells shall be governed by all provisions of Division Order No. R-2268, as amended and Rules 702-706 of the Division Rules and Regulations not inconsistent herewith.

*Amended Administrative Order WFX-687*

*Devon Energy Corporation*

*July 30, 1996*

*Page 3*

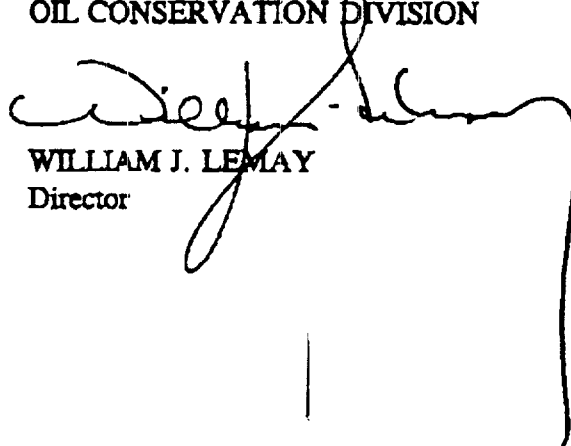
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**PROVIDED FURTHER THAT**, jurisdiction of this cause is hereby retained by the Division for the entry of such further order or orders as may be deemed necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of the operator to conduct operations in a manner which will ensure the protection of fresh water or in a manner inconsistent with the requirements set forth in this order, the Division may, after notice and hearing, terminate the injection authority granted herein.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

DONE at Santa Fe, New Mexico, on this 30th day of July, 1996.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LEMAY  
Director

SEAL

cc: Oil Conservation Division - Artesia

**EXHIBIT "A" (AMENDED)**  
**DIVISION ORDER NO. WFX-687**  
**KEEL-WEST UNIT WATERFLOOD PROJECT**  
**APPROVED INJECTION WELLS**

\* Conditions apply to these wells prior to injection.

Well Name	Well No.	Location	Unit	S-T-R	Injection Interval	Packer Depth	Tubing Size	Injection Pressure
J.L. Keel "A"	3	330' FNL & 1650' FWL	C	7-17S-31E	2700'-3567'	2600'	2 3/8"	1350
J.L. Keel "A"	6	660' FSL & 660' FEL	P	7-17S-31E	2710'-3485'	2610'	2 3/8"	1355
J.L. Keel "A"	10	1980' FSL & 660' FEL	I	7-17S-31E	2750'-3580'	2650'	2 3/8"	1375
J.L. Keel "A"	28	1989' FSL & 2001' FEL	J	7-17S-31E	2700'-3650'	2600'	2 3/8"	1350
J.L. Keel "A"	30	430' FSL & 2013' FEL	O	7-17S-31E	2700'-3680'	2600'	2 3/8"	1350
J.L. Keel "B"	5	1980' FSL & 660' FEL	I	8-17S-31E	2750'-3651'	2650'	2 3/8"	1650
J.L. Keel "B"	9	1980' FNL & 660' FEL	H	5-17S-31E	3000'-3950'	2900'	2 3/8"	1800
J.L. Keel "B"	10	660' FNL & 1980' FEL	B	8-17S-31E	2950'-3800'	2850'	2 3/8"	1770
J.L. Keel "B"	13	660' FSL & 1980' FEL	O	5-17S-31E	2950'-3737'	2850'	2 3/8"	1770
J.L. Keel "B"	14	660' FSL & 660' FEL	P	5-17S-31E	3000'-3728'	2900'	2 3/8"	1800
J.L. Keel "B"	19	1980' FSL & 1980' FEL	J	5-17S-31E	2950'-3950'	2850'	2 3/8"	1770
J.L. Keel "B"	31	1980' FNL & 1980' FEL	G	6-17S-31E	2800'-3700'	2700'	2 3/8"	1680
J.L. Keel "B"	34*	1880' FNL & 660' FEL	H	6-17S-31E	2800'-3664'	2700'	2 3/8"	1680
J.L. Keel "B"	36	1980' FNL & 1980' FWL	F	5-17S-31E	2900'-3760'	2800'	2 3/8"	1740
J.L. Keel "B"	37*	1780' FNL & 660' FWL	H	5-17S-31E	2850'-3707'	2750'	2 3/8"	1710
J.L. Keel "B"	45	1930' FNL & 1830' FEL	G	5-17S-31E	3000'-3900'	2900'	2 3/8"	1800
J.L. Keel "B"	72	2230' FSL & 760' FEL	I	5-17S-31E	3000'-3900'	2900'	2 3/8"	1800
Hudson Federal	1	660' FNL & 660' FEL	A	18-17S-31E	2700'-3500'	2600'	2 3/8"	1485
Hudson Federal	6	2310' FNL & 990' FEL	H	18-17S-31E	2670'-3500'	2570'	2 3/8"	1485

Well Name	Well No.	Location	Unit	S-T-R	Injection Interval	Packer Depth	Tubing Size	Injection Pressure
C.A. Russell	6	990' FNL & 1384' FWL	C	18-17S-31E	2710'-3650'	2610'	2 3/8"	1490
C.A. Russell	7	1650' FNL & 1384' FWL	F	18-17S-31E	2700'-3535'	2600'	2 3/8"	1485
C.A. Russell	8	1650' FNL & 1650' FEL	G	18-17S-31E	2700'-3497'	2600'	2 3/8"	1485
C.A. Russell	9	660' FNL & 1980' FEL	B	18-17S-31E	2665'-3520'	2565'	2 3/8"	1465
C.A. Russell	10	2200' FNL & 2665' FEL	G	18-17S-31E	2700'-3506'	2600'	2 3/8"	1485
C.A. Russell	11	1000' FNL & 2350' FWL	C	18-17S-31E	2700'-3511'	2600'	2 3/8"	1485
Turner "A"	3	2220' FSL & 1760' FWL	K	18-17S-31E	2705'-3511'	2605'	2 3/8"	1487
Turner "A"	9	330' FNL & 1980' FEL	B	19-17S-31E	2650'-3530'	2550'	2 3/8"	1457
Turner "A"	10	1980' FSL & 1830' FEL	J	18-17S-31E	2650'-3465'	2550'	2 3/8"	1457
Turner "A"	11	660' FSL & 660' FEL	P	18-17S-31E	2650'-3451'	2550'	2 3/8"	1457
Turner "A"	12	330' FNL & 660' FEL	A	19-17S-31E	2610'-3381'	2510'	2 3/8"	1435
Turner "A"	13	1980' FSL & 660' FEL	I	19-17S-31E	2700'-3600'	2600'	2 3/8"	1485
Turner "A"	15	1650' FNL & 1980' FWL	P	19-17S-31E	2600'-3433'	2500'	2 3/8"	1430
Turner "A"	35	1800' FNL & 660' FEL	H	19-17S-31E	2570'-3635'	2470'	2 3/8"	1413
Turner "A"	36	1800' FNL & 1980' FEL	G	19-17S-31E	2580'-3450'	2480'	2 3/8"	1419
Turner "A"	56	585' FSL & 1800' FWL	N	18-17S-31E	2700'-3770'	2600'	2 3/8"	1485
Turner "A"	57	580' FNL & 1905' FWL	B	19-17S-31E	2650'-3700'	2550'	2 3/8"	1457
Turner "A"	58	560' FSL & 1880' FEL	O	18-17S-31E	2650'-3600'	2550'	2 3/8"	1457

All wells in Eddy County, New Mexico



**NEW MEXICO ENERGY, MINERALS  
& NATURAL RESOURCES DEPARTMENT**

OIL CONSERVATION DIVISION  
2040 South Pacheco Street  
Santa Fe, New Mexico 87505  
(505) 827-7131

**ADMINISTRATIVE ORDER NO. WFX-690**

***APPLICATION OF DEVON ENERGY CORPORATION TO EXPAND ITS WATERFLOOD  
PROJECT IN THE GRAYBURG JACKSON POOL IN EDDY COUNTY, NEW MEXICO***

**ADMINISTRATIVE ORDER  
OF THE OIL CONSERVATION DIVISION**

Under the provisions of Division Order No. R-2258 as amended, Devon Energy Corporation has made application to the Division on July 22, 1996 for permission to expand its Keel-West Unit Waterflood Project in the Grayburg Jackson Pool in Eddy County, New Mexico.

**THE DIVISION DIRECTOR FINDS THAT:**

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection wells are eligible for conversion to injection under the terms of Rule 701.
- (5) The proposed expansion of the above referenced waterflood project will not cause waste nor impair correlative rights.
- (6) The application should be approved.

**IT IS THEREFORE ORDERED THAT:**

The applicant, Devon Energy Corporation, be and the same is hereby authorized to inject water into the Grayburg and San Andres formations at approximately 2700 feet to approximately 4100 feet through 2 3/8-inch plastic lined tubing set in a packer located within 100 feet of the uppermost injection perforations in the wells described on Exhibit "A" attached hereto, for purposes of secondary recovery.



**IT IS FURTHER ORDERED THAT:**

Prior to commencing injection operations into the H.E. West 'B' No.48, the operator shall re-enter the well identified as Repollo Well No.1, located approximately 330' FSL & 330' FEL in Section 10, Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, and plug and abandon the well in a manner satisfactory to the supervisor of the Artesia District Office of the Division.

Prior to commencing injection operations into the H.E. West 'B' No.A-11, the operator shall re-enter the well identified as H.E. West (Repollo) Well No.A-3, located approximately 330' FNL & 330' FEL in Section 3, Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, and plug and abandon the well in a manner satisfactory to the supervisor of the Artesia District Office of the Division.

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the wells, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection wells to no more than between .6 and .65 psi per foot of depth to the uppermost injection perforations or open hole interval as indicated on Exhibit "A".

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said wells that such higher pressure will not result in migration of the injected fluid from the Grayburg or San Andres formations. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity tests so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said wells and shall take such steps as may be timely and necessary to correct such failure or leakage.

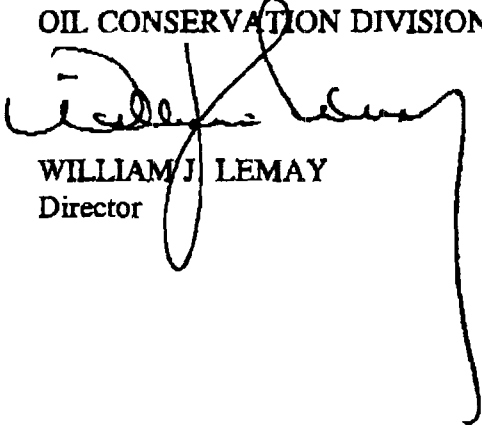
The subject wells shall be governed by all provisions of Division Order No. R-2268, as amended and Rules 702-706 of the Division Rules and Regulations not inconsistent herewith.

**PROVIDED FURTHER THAT**, jurisdiction of this cause is hereby retained by the Division for the entry of such further order or orders as may be deemed necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of the operator to conduct operations in a manner which will ensure the protection of fresh water or in a manner inconsistent with the requirements set forth in this order, the Division may, after notice and hearing, terminate the injection authority granted herein.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

DONE at Santa Fe, New Mexico, on this 23rd day of August, 1996.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LEMAY  
Director

S E A L

cc: Oil Conservation Division - Artesia

## EXHIBIT "A"

DIVISION ORDER NO. WFX-690  
**KEEL-WEST UNIT WATERFLOOD PROJECT**  
 APPROVED INJECTION WELLS

Well Name	Well No.	Location	Unit	S-T-R	Injection Interval	Packer Depth	Tubing Size	Injection Pressure
J.L. Keel "A"	4	1650' FSL & 2310' FWL	K	7-17S-31E	2700'-3586'	2600'	2 3/8"	1620**
J.L. Keel "A"	16	2080' FNL & 1700' FWL	F	7-17S-31E	2710'-3600'	2610'	2 3/8"	1626**
J.L. Keel "A"	17	640' FNL & 2050' FWL	C	7-17S-31E	2750'-3785'	2650'	2 3/8"	1650**
J.L. Keel "B"	23	660' FSL & 1700' FWL	N	6-17S-31E	2720'-3720'	2620'	2 3/8"	1632**
J.L. Keel "B"	24	1980' FNL & 1694' FWL	E	6-17S-31E	2770'-3519'	2670'	2 3/8"	1662**
J.L. Keel "B"	42	1980' FSL & 1780' FWL	K	6-17S-31E	2750'-3550'	2650'	2 3/8"	1650**
H.E. West "A"	11*	1980' FNL & 1980' FEL	G	3-17S-31E	3220'-3986'	3120'	2 3/8"	2093
H.E. West "B"	15	1980' FNL & 1980' FEL	G	10-17S-31E	3180'-3952'	3080'	2 3/8"	2067
H.E. West "B"	18	660' FSL & 1980' FEL	O	3-17S-31E	3200'-4100'	3100'	2 3/8"	2080
H.E. West "B"	48*	2130' FSL & 1980' FEL	J	10-17S-31E	3170'-4150'	3070'	2 3/8"	2061

All wells in Eddy County, New Mexico

\* Conditions apply to these wells prior to injection.

\*\*Permitted Pressure at .6 psi per foot of depth; others calculated at .65 psi per foot. Both pressure gradients derived from data submitted previously.

# C.A. RUSSELL WATERFLOOD PROJECT

## DIVISION ORDERS

R-3185  
R-3185-A  
R-3528-A  
WFX-687

NEW MEXICO  
OIL CONSERVATION DIVISION

Devon EXHIBIT 2B

CASE NO. 11696

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

Cas #3880  
RECEIVED

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

FEB 3 1967

O. C. C.  
ARTESIA OFFICE

CASE No. 3521  
Order No. R-3185

APPLICATION OF SINCLAIR OIL & GAS  
COMPANY FOR THREE WATERFLOOD PROJ-  
ECTS, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on January 25, 1967,  
at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 1st day of February, 1967, the Commission, a  
quorum being present, having considered the testimony, the record,  
and the recommendations of the Examiner, 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, Sinclair Oil & Gas Company, seeks  
authority to institute three waterflood projects in the Grayburg-  
Jackson Pool by the injection of water into the Grayburg-San  
Andres formations through two wells on its C. A. Russell Lease,  
eight wells on its Turner "A" Lease, and nine wells on its Turner  
"B" Lease, in Sections 17, 18, 19, and 20, Township 17 South, Range  
31 East, NMPM, Eddy County, New Mexico.

(3) That the applicant also seeks an administrative proce-  
dure whereby said projects could be expanded to include additional  
lands and injection wells in the area of said projects as may be  
necessary in order to complete an efficient injection pattern.

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

(5) That the proposed waterflood projects should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the subject application should be approved and the projects should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sinclair Oil & Gas Company, is hereby authorized to institute three waterflood projects in the Grayburg-Jackson Pool by the injection of water into the Grayburg-San Andres formations through the following-described 19 wells in Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico:

Sinclair Russell Grayburg-Jackson Waterflood Project

Injection wells:

C. A. Russell Well No. 6	979' FNL & 1400' FWL	Section 18 ✓
C. A. Russell Well No. 10	2147' FNL & 2374' FWL	Section 18 ✓

Sinclair Turner "A" Grayburg-Jackson Waterflood Project

Injection wells:

Turner "A" SP Well No. 2	2220' FSL & 427' FWL	Section 18 ✓
Turner "A" SP Well No. 5 ✓	332' FNL & 670' FWL	Section 19 ✓
Turner "A" SP Well No. 6 ✓	568' FSL & 1707' FWL	Section 12 ✓
Turner "A" SP Well No. 9 ✓	408' FNL & 1994' FEL	Section 19 ✓
Turner "A" SP Well No. 10 ✓	1940' FSL & 1839' FEL	Section 18 ✓
Turner "A" SP Well No. 11 ✓	589' FSL & 655' FEL	Section 18 ✓
Turner "A" SP Well No. 15 ✓	1635' FNL & 1698' FWL	Section 19 ✓
Turner "A" SP Well No. (35)	700' FEL & 1840' FNL	Section 19

Sinclair Turner "B" Grayburg-Jackson Waterflood Project

Injection wells:

Turner "B" SP Well No. 3	309' FNL & 666' FWL	Section 20 ✓
Turner "B" SP Well No. 4	700' FSL & 1751' FWL	Section 17 ✓
Turner "B" SP Well No. 5	1989' FSL & 625' FWL	Section 17 ✓
Turner "B" SP Well No. 8 ✓	504' FNL & 2064' FEL	Section 20 ✓
Turner "B" SP Well No. 11 ✓	1785' FNL & 725' FEL	Section 20 ✓
Turner "B" SP Well No. 30	680' FSL & 632' FEL	Section 17 ✓
Turner "B" SP Well No. 41	1635' FNL & 1665' FWL	Section 20 ✓
Turner "B" SP Well No. 67	1650' FSL & 660' FWL	Section 20 ✓
Turner "B" SP Well No. 78	2130' FSL & 1980' FEL	Section 20 ✓

(2) That the subject waterflood projects shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations;

PROVIDED HOWEVER, that the Secretary-Director of the Commission may approve expansion of said projects to include such additional lands and injection wells in the area of said projects as may be necessary to complete an efficient water injection pattern.

(3) That monthly progress reports of the waterflood projects herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

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

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

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

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

S E A L

esr/

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

CASE No. 3521  
Order No. R-3185-A

IN THE MATTER OF THE APPLICATION OF  
SINCLAIR OIL & GAS COMPANY FOR THREE  
WATERFLOOD PROJECTS, EDDY COUNTY,  
NEW MEXICO.

*See Also Order No. R-3185*

*R-3185*

*R-3528*

*R-3528-A*

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Commission that through inadvertence, Order No. R-3185, dated February 1, 1967, does not reflect the true and correct locations of certain existing wells which were authorized for conversion to water injection by said order,

IT IS THEREFORE ORDERED:

(1) That the following well locations are hereby substituted in lieu of those shown in Order No. R-3185 to correctly reflect the locations of water injection wells authorized by said Order No. R-3185:

Sinclair Russell Grayburg-Jackson Waterflood Project

Injection wells:

C. A. Russell Well No. 6	990' FNL & 1384' FWL	Section 18
C. A. Russell Well No. 10	2200' FNL & 2665' FEL	Section 18

Sinclair Turner "A" Grayburg-Jackson Waterflood Project

Injection wells:

Turner "A" SP Well No. 2	2200' FSL & 440' FWL	Section 18
Turner "A" SP Well No. 5	330' FNL & 660' FWL	Section 19
Turner "A" SP Well No. 6	660' FSL & 1980' FWL	Section 18
Turner "A" SP Well No. 9	330' FNL & 1980' FEL	Section 19
Turner "A" SP Well No. 10	1980' FSL & 1830' FEL	Section 18
Turner "A" SP Well No. 11	660' FSL & 660' FEL	Section 18
Turner "A" SP Well No. 15	1650' FNL & 1980' FWL	Section 19
Turner "A" SP Well No. 35	1800' FNL & 660' FEL	Section 19



-2-

CASE No. 3521

Order No. R-3185-A

Sinclair Turner "B" Grayburg-Jackson Waterflood Project

Injection wells:

Turner "B" SP Well No. 3	330' FNL & 660' FWL	Section 20
Turner "B" SP Well No. 4	660' FSL & 1980' FWL	Section 17
Turner "B" SP Well No. 5	1980' FSL & 660' FWL	Section 17
Turner "B" SP Well No. 8	660' FNL & 1980' FEL	Section 20
Turner "B" SP Well No. 11	1980' FNL & 660' FEL	Section 20
Turner "B" SP Well No. 30	660' FSL & 660' FEL	Section 17
Turner "B" SP Well No. 41	1650' FNL & 1650' FWL	Section 20
Turner "B" SP Well No. 67	1650' FSL & 660' FWL	Section 20
Turner "B" SP Well No. 78	2080' FSL & 1980' FEL	Section 20

(2) That this order shall be effective nunc pro tunc as of February 1, 1967.

DONE at Santa Fe, New Mexico, on this 19th day of February, 1968.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

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

S E A L

esr/

STATE OF NEW MEXICO  
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING  
CALLED BY THE OIL CONSERVATION  
DIVISION FOR THE PURPOSE OF  
CONSIDERING:

CASE NO. 10290  
Order No. R-3528-A

APPLICATION OF AVON ENERGY CORPORATION  
FOR AMENDMENT OF DIVISION ORDER NOS.  
R-3185, R-3185-A AND R-3528 TO EXPAND  
THE VERTICAL LIMITS AND TO ESTABLISH  
AN INJECTION PRESSURE LIMITATION FOR  
THE TURNER "B" LEASE WATERFLOOD PROJECT,  
EDDY COUNTY, NEW MEXICO.

*See Also Cause No.*

*R-3185*

*R-3185-A*

*R-3528*

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on August 8, 1991, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 23rd day of September, 1991, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) By Order No. R-3185, dated February 1, 1967, the Division authorized Sinclair Oil & Gas Company to institute three waterflood projects, the Russel Grayburg-Jackson Waterflood Project, Turner "A" Grayburg-Jackson Waterflood Project, and the Turner "B" Grayburg-Jackson Waterflood Project, said projects comprising all or portions of Sections 17, 18, 19, 20, 29 and 30, Township 17 South, Range 31 East, NMPM, Grayburg-Jackson Pool, Eddy County, New Mexico, by the injection of water into the Grayburg-San Andres formation through two, eight and nine injection wells located within said projects, respectively.

(3) By Nunc Pro Tunc Order No. R-3185-A, dated February 19, 1968, the Division corrected certain injection well locations authorized by said Order No. R-3185.

(4) By Order No. R-3528, dated October 9, 1968, the Division authorized Sinclair Oil Corporation to expand its Turner "B" Grayburg-Jackson Waterflood Project by the injection of water into the Premier Sand member of the Grayburg formation through twelve injection wells located in Sections 20, 29 and 30, Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico, hereinafter referred to as the "Expansion Area".

(5) The current boundaries of the Russel Grayburg-Jackson Waterflood Project, Turner "A" Grayburg-Jackson Waterflood Project, Turner "B" Grayburg-Jackson Waterflood Project (including the "Expansion Area"), and the Grayburg-Jackson Friess-Fren Waterflood Project (also located in said Sections 19 and 30 and approved by Division Order No. R-4306) are as follows:

Russel Grayburg-Jackson Waterflood Project  
TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 18: NW/4, W/2 NE/4

Turner "A" Grayburg-Jackson Waterflood Project  
TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 18: S/2  
Section 19: N/2

Turner "B" Grayburg-Jackson Waterflood Project  
TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 17: NW/4 SW/4, S/2 S/2  
Section 20: All  
Section 29: All  
Section 30: SE/4

Grayburg-Jackson Friess-Fren Waterflood Project  
TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 19: E/2 SW/4, SE/4  
Section 30: NE/4

(6) The Russel Grayburg-Jackson, Turner "A" Grayburg-Jackson, Grayburg-Jackson Friess-Fren and portions of the Turner "B" Grayburg-Jackson Waterflood Projects are currently owned and operated by Socorro Petroleum Company.

(7) The applicant, Avon Energy Corporation, a 50% owner of Socorro Petroleum Company, currently operates a portion of the Turner "B" Grayburg-Jackson Waterflood Project comprising the following described acreage:

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM

Section 20: S/2 N/2, S/2

Section 29: All

Section 30: E/2 SE/4

(8) The applicant in this case, Avon Energy Corporation, seeks the following:

- 1) The amendment of Division Order No. R-3528 by expanding the injection interval in the twelve injection wells approved by said order to include the entire Grayburg-San Andres formation;
- 2) The establishment of an injection pressure limitation of 450 psi above the formation fracture pressure as determined from step rate tests for those twelve injection wells located within the "Expansion Area".
- 3) The establishment of an administrative procedure whereby acreage currently contained within the Russel Grayburg-Jackson, Turner "A" Grayburg-Jackson, Turner "B" Grayburg-Jackson, and Grayburg-Jackson Friess-Fren Waterflood Projects may be transferred to Avon Energy Corporation and operated as a single waterflood project.

(9) According to applicant's evidence, Avon Energy Corporation currently has a farmout agreement with Socorro Petroleum Company whereby Avon earns acreage from Socorro as said acreage is drilled or otherwise further developed.

(10) Further evidence presented indicates that all of the acreage within the subject waterflood projects is Federal lands.

(11) The transfer and operation of such acreage should result in a more efficient operation, will result in the recovery of additional oil within the projects, and will not violate correlative rights.

(12) According to applicant's evidence and testimony, expansion of the injection interval within those wells located in the "Expansion Area" will result in the recovery of an additional 2.3 million barrels of oil which would not otherwise be recovered, thereby preventing waste.

(13) The proposed expansion of the injection interval within those wells located in the "Expansion Area" should be approved.

(14) The Division has determined, after consultation with the applicant prior to the hearing, that certain "Area of Review" wells located within the "Expansion Area" are not completed in such a manner which will assure that their wellbores will not serve as a conduit for migration of the injected fluid from the proposed injection zone.

(15) Prior to commencing injection operations within one-half mile of any of the following described wells, or prior to injecting into the Turner "B" Well No. 56 located in Unit J of said Section 30, the applicant should be required to perform remedial cement operations or take other action as may be necessary in order to assure that these wellbores will not serve as a conduit for migration of injected fluid to the satisfaction of the supervisor of the Artesia district office of the Division:

Turner "B" No. 55	Unit H, Section 29, T-17S, R-31E
Turner "B" No. 60	Unit K, Section 29, T-17S, R-31E
Turner "B" No. 68	Unit P, Section 29, T-17S, R-31E
Turner "B" No. 71	Unit M, Section 29, T-17S, R-31E

(16) No injection pressure limitation currently exists on any of the injection wells in the subject waterflood projects, however, by virtue of amending the injection interval in those injection wells located within the "Expansion Area", the Division would normally impose a surface injection pressure limitation on those wells equal to 0.2 psi per foot of depth to the uppermost perforations.

(17) The applicant presented the results of step-rate tests conducted on three injection wells within the "Expansion Area". The results of these step rate tests show an average formation fracture pressure of 1208 psi. ;

(18) The applicant's engineering study of pressure limits based upon Frac Hite, Frac Migration, and After Frac Logs (submitted as evidence in this case ) provides substantial evidence to demonstrate that injection at 1650 psi (450 psi above the formation parting pressure) will not propagate fractures outside of the vertical limits of the Grayburg-Jackson Pool.

(19) The requested increase in surface pressure limitations for the "Expansion Area" will approximate the surface injection pressure for the original injection wells for which no pressure limit was imposed.

(20) Engineering studies conducted on behalf of the applicant have demonstrated that the water injected into the original injection wells at pressures up to an average of 1870 psi remained confined to the Grayburg-Jackson Pool.

(21) There is no indication that water injected into the original injection wells at pressures higher than those sought by the applicant in this case has moved water outside of the vertical limits of the Grayburg-Jackson Pool.

(22) Applicant's request is similar to the request previously approved by the Division Order R-2268-C for Socorro Petroleum Company and for which no adverse effects have been reported.

(23) Injection into the twelve subject injection wells at a surface injection pressure of approximately 450 psi above formation fracture pressure will allow the recovery of additional oil reserves within the Grayburg-Jackson Pool, thereby preventing waste, will not endanger any fresh water aquifers, and should therefore be approved.

(24) As the reservoir pressure in the "Expansion Area" increases as a result of the injection of water, it will be necessary to periodically increase the surface pressure limitation for the project which should be authorized administratively.

(25) The applicant should be required to submit a request to the Santa Fe and Artesia offices of the Division and to the United States Bureau of Land Management (BLM) for transfer of acreage from the Socorro Petroleum Company operated Turner "A" Grayburg-Jackson, Turner "B" Grayburg-Jackson, Grayburg-Jackson Friess-Fren and Russel Grayburg-Jackson Waterflood Projects into the Avon operated Turner "B" Grayburg-Jackson Waterflood Project. Such request should be in general letter form along with a plat of the projects showing the requested acreage to be transferred.

IT IS THEREFORE ORDERED THAT:

(1) Division Order Nos. R-3185, R-3185-A and R-3528 are hereby amended authorizing Avon Energy Corporation to inject water into the Grayburg-San Andres formation, Grayburg-Jackson Pool, through the twelve injection wells (previously approved for injection by Order No. R-3528) shown on Exhibit "A" attached hereto located within the "Expansion Area" of the Turner "B" Grayburg-Jackson Waterflood Project comprising all or portions of Sections 20, 29 and 30, Township 17 South, Range 31 East, NMPM, Eddy County, New Mexico.

(2) The twelve subject injection wells or pressurization system shall be equipped with a pressure limiting device which will limit the surface injection pressure on said wells to no more than 1650 psi.

(3) The Division Director shall have the authority to administratively approve subsequent pressure increases on said wells to 450 psi above fracture pressure, provided, however, that step-rate tests, temperature surveys, tracer surveys or other supporting data the Division may deem necessary accompany such requests.

(4) The Division Director shall also have the authority to reduce or rescind said injection pressures should it become apparent that the injected fluid is not being adequately confined to the Grayburg-Jackson Pool.

(5) Prior to commencing injection operations within one-half mile of any of the following described wells, or prior to injecting into the Turner "B" Well No. 56 located in Unit J of said Section 30, the applicant shall perform remedial cement operations or take other action as may be necessary in order to assure that these wellbores will not serve as a conduit for migration of injected fluid to the satisfaction of the supervisor of the Artesia district office of the Division:

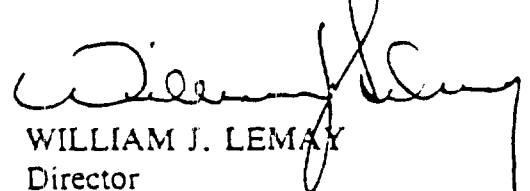
Turner "B" No. 55	Unit H, Section 29, T-17S, R-31E
Turner "B" No. 60	Unit K, Section 29, T-17S, R-31E
Turner "B" No. 68	Unit P, Section 29, T-17S, R-31E
Turner "B" No. 71	Unit M, Section 29, T-17S, R-31E

(6) The Division Director ~~may~~ authorize the transfer of acreage currently contained within the Socorro Petroleum Company operated Turner "A" Grayburg-Jackson, Turner "B" Grayburg-Jackson, Grayburg-Jackson Friess-Fren and Russel Grayburg-Jackson Waterflood Projects into the Avon operated Turner "B" Grayburg-Jackson Waterflood Project provided a request for such transfer of acreage is submitted to the Santa Fe and Artesia offices of the Division and to the United States Bureau of Land Management (BLM). Such request shall be in general letter form along with a plat of the projects showing the requested acreage to be transferred.

(7) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

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

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LEMAY  
Director

S E A L



**EXHIBIT "A"**  
**CASE NO. 10290**  
**DIVISION ORDER NO R-3528-A**  
**TURNER "B" GRAYBURG-JACKSON WATERFLOOD PROJECT**

Well Number	Location	Unit	S-T-R	Injection Perforations	Packer Depth	Tubing Size	Injection Pressure
Turner "B" No. 44	660' FSL & 2055' FWL	N	20-17S-31E	TBD*	TBD*	2 3/8	1650
Turner "B" No. 46	660' FSL & 760' FEL	P	20-17S-31E	TBD*	TBD*	2 3/8	1650
Turner "B" No. 47	560' FNL & 1980' FEL	B	29-17S-31E	3045' - 3412'	2945'	2 3/8	1650
Turner "B" No. 50	660' FNL & 660' FWL	D	29-17S-31E	2978' - 3330'	2878'	2 3/8	1650
Turner "B" No. 54	1980' FNL & 1980' FWL	F	29-17S-31E	3108' - 3404'	3008'	2 3/8	1650
Turner "B" No. 55	1980' FNL & 660' FEL	II	29-17S-31E	TBD*	TBD*	2 3/8	1650
Turner "B" No. 56	1980' FSL & 1980' FEL	J	30-17S-31E	TBD*	TBD*	2 3/8	1650
Turner "B" No. 61	1980' FSL & 1980' FEL	J	29-17S-31E	3254' - 3646'	3154'	2 3/8	1650
Turner "B" No. 64	1980' FSL & 660' FWL	L	29-17S-31E	3146' - 3557'	3046'	2 3/8	1650
Turner "B" No. 66	660' FSL & 1980' FWL	N	29-17S-31E	3281' - 3678'	3181'	2 3/8	1650
Turner "B" No. 68	660' FSL & 660' FEL	P	29-17S-31E	TBD*	TBD*	2 3/8	1650
Turner "B" No. 76	660' FSL & 660' FEL	P	30-17S-31E	TBD*	TBD*	2 3/8	1650

\*TBD - To Be Determined



**NEW MEXICO ENERGY, MINERALS  
& NATURAL RESOURCES DEPARTMENT**

OIL CONSERVATION DIVISION  
2040 South Pacheco Street  
Santa Fe, New Mexico 87505  
(505) 827-7131

**AMENDED ADMINISTRATIVE ORDER NO. WFX-687**

**APPLICATION OF DEVON ENERGY CORPORATION TO EXPAND ITS WATERFLOOD  
PROJECT IN THE GRAYBURG JACKSON POOL IN EDDY COUNTY, NEW MEXICO**

**ADMINISTRATIVE ORDER  
OF THE OIL CONSERVATION DIVISION**

Under the provisions of Division Order No. R-2268 as amended, Devon Energy Corporation has made application to the Division on March 26, 1996 for permission to expand its Keel-West Unit Waterflood Project in the Grayburg Jackson Pool in Eddy County, New Mexico.

**THE DIVISION DIRECTOR FINDS THAT:**

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection wells are eligible for conversion to injection under the terms of Rule 701.
- (5) The proposed expansion of the above referenced waterflood project will not cause waste nor impair correlative rights.
- (6) The application should be approved.

**IT IS THEREFORE ORDERED THAT:**

The applicant, Devon Energy Corporation, be and the same is hereby authorized to inject water into the Grayburg and San Andres formations at approximately *2570 feet to approximately 3950 feet* through 2 3/8-inch plastic lined tubing set in a packer located within 100 feet of the uppermost injection perforations in the wells described on Exhibit "A" attached hereto, for purposes of secondary recovery.

**IT IS FURTHER ORDERED THAT:**

Prior to commencing injection operations into the J.L. Keel 'B' No.34 and the J.L. Keel 'B' No.37, the operator shall re-enter the Everts (Grier) Well No.1, located 330' FSL & 330' FEL in Section 31, Township 16 South, Range 31 East, NMPM, Eddy County, New Mexico, and plug and abandon the well in a manner satisfactory to the supervisor of the Artesia District Office of the Division.

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the wells, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection wells to no more than between .5 and .6 psi per foot of depth to the uppermost injection perforations or open hole interval *as indicated on Exhibit "A"*.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said wells that such higher pressure will not result in migration of the injected fluid from the Grayburg or San Andres formations. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity tests so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said wells and shall take such steps as may be timely and necessary to correct such failure or leakage.

The subject wells shall be governed by all provisions of Division Order No. R-2268, as amended and Rules 702-706 of the Division Rules and Regulations not inconsistent herewith.

*Amended Administrative Order WFX-687*

*Devon Energy Corporation*

*July 30, 1996*

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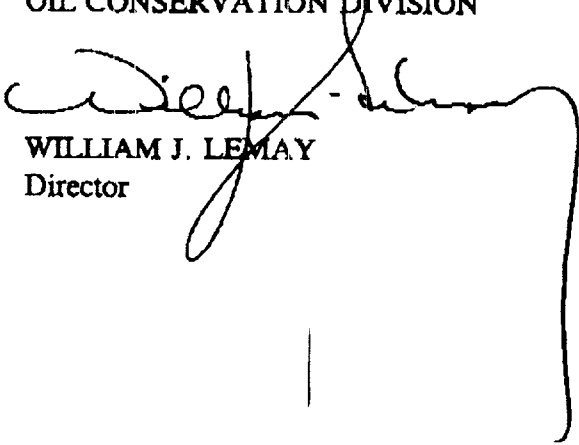
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**PROVIDED FURTHER THAT**, jurisdiction of this cause is hereby retained by the Division for the entry of such further order or orders as may be deemed necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of the operator to conduct operations in a manner which will ensure the protection of fresh water or in a manner inconsistent with the requirements set forth in this order, the Division may, after notice and hearing, terminate the injection authority granted herein.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

DONE at Santa Fe, New Mexico, on this 30th day of July, 1996.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

  
WILLIAM J. LEMAY  
Director

S E A L

cc: Oil Conservation Division - Artesia

**EXHIBIT "A" (AMENDED)**  
**DIVISION ORDER NO. WFX-687**  
**KEEL-WEST UNIT WATERFLOOD PROJECT**  
**APPROVED INJECTION WELLS**

\* Conditions apply to these wells prior to injection.

Well Name	Well No.	Location	Unit	S-T-R	Injection Interval	Packer Depth	Tubing Size	Injection Pressure
J.L. Keel "A"	3	330' FNL & 1650' FWL	C	7-17S-31E	2700'-3567'	2600'	2 3/8"	1350
J.L. Keel "A"	6	660' FSL & 660' FEL	P	7-17S-31E	2710'-3485'	2610'	2 3/8"	1355
J.L. Keel "A"	10	1980' FSL & 660' FEL	I	7-17S-31E	2750'-3580'	2650'	2 3/8"	1375
J.L. Keel "A"	28	1989' FSL & 2001' FEL	J	7-17S-31E	2700'-3650'	2600'	2 3/8"	1350
J.L. Keel "A"	30	430' FSL & 2013' FEL	O	7-17S-31E	2700'-3680'	2600'	2 3/8"	1350
J.L. Keel "B"	5	1980' FSL & 660' FEL	I	8-17S-31E	2750'-3651'	2650'	2 3/8"	1650
J.L. Keel "B"	9	1980' FNL & 660' FEL	H	5-17S-31E	3000'-3950'	2900'	2 3/8"	1800
J.L. Keel "B"	10	660' FNL & 1980' FEL	B	8-17S-31E	2950'-3800'	2850'	2 3/8"	1770
J.L. Keel "B"	13	660' FSL & 1980' FEL	O	5-17S-31E	2950'-3737'	2850'	2 3/8"	1770
J.L. Keel "B"	14	660' FSL & 660' FEL	P	5-17S-31E	3000'-3728'	2900'	2 3/8"	1800
J.L. Keel "B"	19	1980' FSL & 1980' FEL	J	5-17S-31E	2950'-3950'	2850'	2 3/8"	1770
J.L. Keel "B"	31	1980' FNL & 1980' FEL	G	6-17S-31E	2800'-3700'	2700'	2 3/8"	1680
J.L. Keel "B"	34*	1880' FNL & 660' FEL	H	6-17S-31E	2800'-3664'	2700'	2 3/8"	1680
J.L. Keel "B"	36	1980' FNL & 1980' FWL	F	5-17S-31E	2900'-3760'	2800'	2 3/8"	1740
J.L. Keel "B"	37*	1780' FNL & 660' FWL	H	5-17S-31E	2850'-3707'	2750'	2 3/8"	1710
J.L. Keel "B"	45	1930' FNL & 1830' FEL	G	5-17S-31E	3000'-3900'	2900'	2 3/8"	1800
J.L. Keel "B"	72	2230' FSL & 760' FEL	I	5-17S-31E	3000'-3900'	2900'	2 3/8"	1800
Hudson Federal	1	660' FNL & 660' FEL	A	18-17S-31E	2700'-3500'	2600'	2 3/8"	1485
Hudson Federal	6	2310' FNL & 990' FEL	H	18-17S-31E	2670'-3500'	2570'	2 3/8"	1485