

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. 11485
ORDER NO. R-10594

**APPLICATION OF ROBERT N. ENFIELD FOR SALT WATER DISPOSAL, LEA
COUNTY, NEW MEXICO.**

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on March 7, 1996, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this 10th day of May, 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) Robert N. Enfield ("Enfield") owns and operators the Hudson "31" Federal Well No. 1 (**API No. 30-025-31652**), located at a standard oil well location 2310 feet from the North line and 330 feet from the East line (Unit H) of Section 31, Township 18 South, Range 33 East, NMPM, Lea County, New Mexico. Said well was drilled in October 1992 to a total depth of 4,550 feet. On November 6, 1992 this well was completed as a producing oil well in the Buffalo-Queen Pool with perforations in the Penrose from 4,423 feet to 4,432 feet.

(3) Robert N. Enfield as the applicant in this case testified that the well is currently producing from the Buffalo-Queen Pool at a rate of two barrels per day or less, its cumulative production from this interval is approximately 6,200 barrels, and the well has reached its economic limit; therefore, the applicant proposes to convert said well into a disposal well and is requesting authority to inject produced salt water into said perforated

interval.

(4) Harvey E. Yates Company ("HEYCO"), operator of the following three producing Penrose oil wells within the NE/4 of adjacent Section 32, Township 18 South, Range 33 East, NMPM, Buffalo-Queen Pool, Lea County, New Mexico, appeared at the hearing in opposition to the application and presented testimony supporting its position:

- (a) the Atlantic "32" State Well No. 1 (**API No. 30-025-23388**), located 660 feet from the North line and 1980 feet from the West line (Unit C) of said Section 32, or approximately 2,834 feet from the proposed disposal well, is perforated from 4,438 feet to 4,446 feet;
- (b) the Atlantic "32" State Well No. 2 (**API No. 30-025-31222**), located 1980 feet from the North line and 990 feet from the West line (Unit E) of said Section 32, or approximately 1,351 feet from the proposed disposal well, is perforated from 4,428 feet to 4,434 feet; and,
- (c) the Atlantic "32" State Well No. 3 (**API No. 30-025-31378**), located 1650 feet from the North and West lines (Unit F) of said Section 32, or approximately 2,087 feet from the proposed disposal well, is perforated from 4,428 feet to 4,434 feet.

(5) HEYCO owns an overriding royalty interest in two other producing Penrose oil wells in said Section 32, both operated by Chi Operating, Inc., who neither appeared at the hearing nor filed an objection to this application:

- (a) the Bison State Well No. 1 (**API No. 30-025-31583**), located 2310 feet from the South line and 990 feet from the West line (Unit L) of said Section 32, or approximately 1,476 feet from the proposed disposal well, is perforated from 4,448 feet to 4,456 feet; and,
- (b) the Bison State Well No. 2 (**API No. 30-025-31697**), located 2310 feet from the South line and 2100 feet from the West line (Unit K) of said Section 32, or approximately 2,518 feet from the proposed disposal well, is perforated from 4,458 feet to 4,465 feet.

(6) Engineering and geologic evidence presented at the hearing indicates this thin producing interval to be from a solution gas drive reservoir with approximately 30% water cut, the proposed disposal well is up-dip of the Chi Operating, Inc. wells, slightly up-dip of the Atlantic "32" Well No. 4, slightly down-dip of the Atlantic "32" Well No. 1, and that both porosity and permeability increase in the reservoir east of the Hudson "31" Federal Well No. 1.

(7) It was HEYCO's position that any water injected up-dip of the Chi wells would naturally gravitate down-dip and would eventually be produced from the two "Bison State" wells. Also, channeling of produced water could cause increased water production and the eventual premature watering out of the three "Atlantic 32 State" wells.

(8) Enfield's position in this matter was: (i) the injected volume, approximately 250 barrels of water per day, would be insignificant to affect the offset producing wells; (ii) the two closest producing wells, the Bison State Well No. 1 and Atlantic "32" State Well No. 2 are too far away to be adversely effected; and, (iii) any effect would be a positive one due to the introduction of additional reservoir energy.

(9) While the injection of water into this still actively producing reservoir could possibly have a positive effect, it still is considered a disposal well, that is pressure is not controlled, water quality is not regulated, and the volumes are not held constant; therefore, while the likelihood of disposed water interfering with the offset producing wells appears to be small, it is nonetheless present and there exists a potential of water encroachment into a producing reservoir.

(10) HEYCO's concerns for the utilization by the applicant of the Hudson "31" Federal Well No. 1 for disposal of produced salt water into the Penrose formation of the Buffalo-Queen Pool through the perforated interval from 4,423 feet to 4,432 feet is warranted under Section 70-2-12.B(4) N.M.S.A. Laws of 1978, which requires the Division to prevent the drowning by water of any stratum or part thereof capable of producing oil in paying quantities and to prevent the premature and irregular encroachment of water or any other kind of water encroachment which reduces or tends to reduce the total ultimate recovery of oil from any pool.

(11) This application should therefore be denied.

IT IS THEREFORE ORDERED THAT:

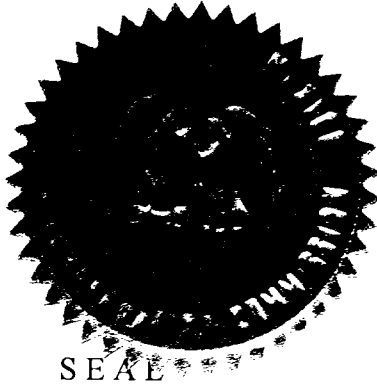
(1) The application of Robert N. Enfield ("Enfield"), to utilize its Hudson "31" Federal Well No. 1 (**API No. 30-025-31652**), located at a standard oil well location 2310 feet from the North line and 330 feet from the East line (Unit H) of Section 31, Township 18

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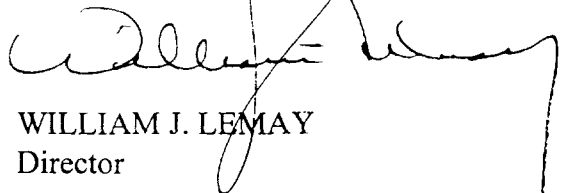
South, Range 33 East, NMPM, Lea County, New Mexico, to dispose of produced salt water into the Penrose formation within the Buffalo-Queen Pool through the perforated interval from 4,423 feet to 4,432 feet, is hereby *denied*.

(2) 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

Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

May 14, 1996

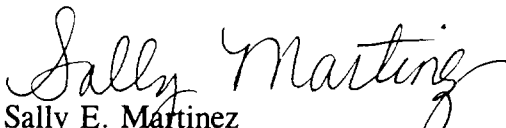
HINKLE, COX, EATON, COFFIELD & HENSLEY
Attorneys At Law
P. O. Box 2068
Santa Fe, New Mexico 87501

RE: CASE NO. 11485
ORDER NO. R-10594

Dear Sir:

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

Sincerely,


Sally E. Martinez
Administrative Secretary

cc: BLM - Carlsbad
Tom Kellahin

HINKLE, COX, EATON, COFFIELD & HENSLEY,
L.L.P.

ATTORNEYS AT LAW

218 MONTEZUMA POST OFFICE BOX 2068
SANTA FE, NEW MEXICO 87504-2068
(505) 982-4554 FAX (505) 982-8623

LEWIS C. COX, JR. (1924-1993)
CLARENCE E. HINKLE (1901-1985)

OF COUNSEL
O. M. CALHOUN* JOE W. WOOD
RICHARD L. CAZZELL* RAY W. RICHARDS*

AUSTIN AFFILIATION
HOFFMAN & STEPHENS, P.C.
KENNETH R. HOFFMAN*
TOM D. STEPHENS*
RONALD C. SCHULTZ, JR.*
JOSE CANO*

RECEIVED
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REBECCA NICHOLS JOHNSON
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KAROLYN KING NELSON
ELLEN T. LOUDERBOUGH
JAMES H. WOOD*
NANCY L. STRATTON
TIMOTHY R. BROWN
JAMES C. MARTIN

*NOT LICENSED IN NEW MEXICO

PAUL W. EATON
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.
STUART D. SHANOR
ERIC D. LANPHERE
C. D. MARTIN
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MARSHALL G. MARTIN
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DOUGLAS L. LUNSFORD
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JAMES M. HUDSON
JEFFREY S. BAIRD*

May 13, 1996

Via Hand Delivery

Michael E. Stogner
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico

Dear Mr. Stogner:

Enclosed is the proposed order of Robert N. Enfield regarding Case No. 11,485, the application of Mr. Enfield for salt water disposal. Please call me if you need anything else in this matter.

Very truly yours,

HINKLE, COX, EATON, COFFIELD
& HENSLEY, L.L.P.

James Bruce

cc: W. Thomas Kellahin (w/encl.)
P.O. Box 2265
Santa Fe, NM 87504

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. 11485
ORDER NO. R- _____

APPLICATION OF ROBERT N. ENFIELD
FOR SALT WATER DISPOSAL,
LEA COUNTY, NEW MEXICO

ORDER OF THE DIVISION
PROPOSED BY ROBERT N. ENFIELD

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on March 7, 1996, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this _____ day of May, 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, Robert N. Enfield ("Enfield"), seeks authority to convert his Hudson "31" Federal Well No. 1, located 2310 feet from the North line and 330 feet from the East line (Unit H) of Section 31, Township 18 South, Range 33 East, NMPM, Lea County, New Mexico, for the purpose of disposing produced salt water into the Penrose interval of the Buffalo-Queen Pool through

perforations from approximately 4423 feet to 4432 feet.

(3) At the hearing, Harvey E. Yates Company ("HEYCO") appeared and objected to the application.

(4) The evidence presented shows that:

(a) The proposed injection well was drilled as a Queen producer in December 1992, and currently produces at a marginal rate of 2-3 bopd.

(b) Enfield proposes to inject approximately 200-250 bwpd into the subject well. The injection water is produced from other wells in the area operated by Enfield. The producing wells, their current approximate producing rates, and the producing formation, are as follows:

<u>Well Name and Location</u>	<u>Monthly Water Produced</u>	<u>Monthly Oil Produced</u>	<u>Producing Formation</u>
Hudson Fed. #5 (Unit N § 29)			Queen
Hudson Fed. #6 (Unit O § 29)			Queen
Hudson Fed. #7 (Unit K § 29)	940	350 ¹	Queen
Hudson Fed. #3 (Unit O § 19)	125	370	Bone Spring
Hudson Fed. #2 (Unit C § 30)	2350	1600	Wolfcamp

¹ Combined production from the Hudson Fed. Well Nos. 5, 6, and 7.

In addition, Enfield plans to dispose of water produced from the proposed Federal Well No. 1, located in the NW¼ of Section 29. Said well is a Wolfcamp test which will produce approximately 100 bwpd. All of the produced salt water is from the same lease.

(c) There are no compatibility problems between injection and formation water.

(d) The Buffalo-Queen Pool covers the S½ of Section 29, the NE¼ of Section 31, and the W½ of Section 32 in Township 18 South, Range 33 East. However, HEYCO's geologist testified that the Queen reservoir in Sections 31 and 32 only covers approximately 200 acres comprising the SE¼NE¼ of Section 31 and the NW¼ and N½SW¼ of Section 32. The Queen reservoir in Sections 31 and 32 contains the following wells:

<u>Operator</u>	<u>Well Name and Location</u>	<u>Producing Status</u>
HEYCO	Atlantic 32 St. #1 (Unit C § 32)	12-13 bopd
HEYCO	Atlantic 32 St. #2 (Unit E § 32)	Shut-in
HEYCO	Atlantic 32 St. #3 (Unit D § 32)	P & A'd
HEYCO	Atlantic 32 St. #4 (Unit F § 32)	8-9 bopd
Chi Operating	Bison St. #1 (Unit L § 32)	5-6 bopd
Chi Operating	Bison St. #2 (Unit K § 32)	1-2 bopd

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Enfield	Hudson "31" Fed. #1	2-3 bopd
	(Unit H § 31)	

In addition, the Enfield Hudson Fed. Well Nos. 5, 6, and 7 in Section 29 are in the Buffalo-Queen Pool.

(e) No wells have been drilled in the Buffalo-Queen Pool in the last 3-1/2 years. HEYCO's engineer testified that the Buffalo-Queen Pool is fully developed, and no further drilling will occur.

(f) The Queen formation throughout the Permian Basin has scattered porosity, and porosity stringers do not correlate from well to well. As a result, infill drilling is often necessary to adequately produce the Queen. Because of the stringers, channeling does not occur.

(g) The Queen is susceptible of waterflooding, and the injection of produced water as proposed by Enfield will have a beneficial pressure maintenance or waterflood effect on offsetting wells.

(h) There are a number of successful Queen waterfloods in New Mexico, including the Querecho Plains-Queen Associated Waterflood Project, located approximately two miles to the west of the proposed injection well.

(i) The nearest producing well to the proposed injection well is the Chi Operating Bison St. Well No. 1, located

approximately 1400 feet east-southeast of the proposed injector. The nearest HEYCO producer, the Atlantic 32 St. Well No. 4, is 2200 feet northeast of the proposed injector. The Chi Operating well will act as a pressure sink for injected water, minimizing any effect on HEYCO's acreage. Moreover, the proposed injection well is downdip from HEYCO's wells.

(j) Water hauling costs in this area are approximately \$1.25 - \$1.35/barrel. The injection well will substantially lower operating costs and allow Enfield to recover additional reserves from wells on his lease.

(k) There are no fresh water wells within a mile of the proposed injection well.

(l) All wells in the area of review are properly cased and cemented, or plugged and abandoned.

(5) Injection into the Hudson "31" Federal Well No. 1 should be accomplished through 2-3/8" plastic lined tubing installed in a packer set at approximately 4400 feet; the casing-tubing annulus should be filled with an inert fluid; and a pressure gauge or approved leak detection device should be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(6) Prior to commencing injection operations, the casing in the subject 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.

(7) The injection well or system should be equipped with a pressure limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 885 psi.

(8) The Director of the Division should be authorized to administratively approve an increase in the injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected waters from the Queen formation.

(9) The operator should notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of disposal equipment and of the mechanical integrity pressure test in order that the same may be witnessed.

(10) 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.

(11) Approval of the subject application will prevent the drilling of unnecessary wells and otherwise prevent waste and

protect correlative rights.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Robert N. Enfield, is hereby authorized to convert his Hudson "31" Federal Well No. 1, located 2310 feet from the North line and 330 feet from the East line (Unit H) of Section 31, Township 18 South, Range 33 East, NMPM, Lea County, New Mexico, to dispose of produced salt water into the Queen formation, with injection to be accomplished through 2-3/8" tubing installed in a packer set at approximately 4400 feet, with injection into the perforated interval from approximately 4432 feet to 4432 feet.

PROVIDED, HOWEVER, THAT, the tubing shall be internally plastic-lined; the casing-tubing annulus shall be filled with an inert fluid; and a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak detection device in order to determine leakage in the casing, tubing, or packer.

AND PROVIDED FURTHER THAT, prior to commencing injection operations, the casing in the subject well shall be pressure-tested to assure the integrity of such casing in a manner that is satisfactory to the supervisor of the Division's district office at

Hobbs.

(2) The injection well or system shall be equipped with a pressure limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 885 psi.

(3) The Director of the Division may authorize an increase in the injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected waters from the Queen formation.

(4) The operator shall notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of disposal equipment and of the mechanical integrity pressure test in order that the same may be witnessed.

(5) The operator shall immediately notify the supervisor of the Division's Hobbs district office of the failure of the tubing, casing, or packer in said well or the leakage of water from or around said well, and shall take such steps as may be timely and necessary to correct such failure or leakage.

(6) The applicant shall conduct disposal operations and submit monthly reports in accordance with Rules 702, 703, 704, 705, 706, 708, and 1120 of the Division Rules and Regulations.

(7) The injection authority granted herein shall terminate

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

(8) 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