Injection Authority for Beach Exploration Inc's
Red Lake Unit No. 2

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:

See Also Order
No. R-9453-A

CASE NO. 10192
ORDER NO. R-9453

APPLICATION OF BEACH EXPLORATION INC.
FOR A WATERFLOOD PROJECT, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

This cause came on for hearing at 8:15 a.m. on January 10, 1991 at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 12th day of March, 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) Division Case Nos. 10192 and 10193 were consolidated at the time of the hearing for the purpose of testimony.

(3) The applicant, Beach Exploration Inc., seeks authority to institute a waterflood project in its Red Lake Unit (being the subject of Division Case No. 10193) by the injection of water into the Penrose Sand member of the Queen formation, East Red Lake-Queen-Grayburg Pool, through the gross perforated interval from approximately 1537 feet to 1838 feet in fourteen existing wells located in Sections 24, 25, 35 and 36, Township 16 South, Range 28 East, NMPM, and in Section 30, Township 16 South, Range 29 East, NMPM, Eddy County, New Mexico, all as shown on Exhibit "A" attached hereto.

(4) The wells located within applicant's Red Lake Unit Area are in an advanced state of depletion and should properly be classified as "stripper wells".

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

(6) The applicant 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 from injection, production, or plugged and abandoned wells.

(7) The injection of water into each of the wells shown on Exhibit "A" should be accomplished through internally plastic-lined tubing installed in a packer set within 100 feet of the uppermost injection perforation; the casing-tubing annulus 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.

(8) Prior to commencing injection operations into the wells shown on Exhibit "A", 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.

(9) There are 4 wells, shown on Exhibit "B" attached hereto, which are located within the "area of review" which may not be completed or plugged in such a manner which will assure that their wellbores will not serve as a conduit for movement of injected fluid out of the injection interval.

(10) Prior to initiating injection operations within one-half mile of any of the wells shown on Exhibit "B", the applicant should be required to complete or re-plug said wells in a manner which will assure that these wellbores will not serve as a conduit for migration of injected fluid and to the satisfaction of the supervisor of the Artesia district office of the Division.

(11) The applicant requested that it be allowed to inject fluid into each of the wells shown on Exhibit "A" at a surface pressure not to exceed 1500 psi, as an exception to the standard injection pressure limitation of 0.2 psi per foot of depth to the top perforation.

(12) According to applicant's testimony, approximately half of the proposed injection wells are located in "tight" areas or areas of decreased permeability within the Penrose Sand member, and injection into these wells at the proposed rates of 150-250 barrels of water per day cannot be accomplished at the standard injection pressure limitation normally imposed by the Division.

(13) Prior to authorizing injection at the proposed surface injection pressure of 1500 psi. the applicant should be required to conduct a minimum of four step rate injection tests in order to properly determine the current fracture pressure of the Penrose Sand member, and in order to allow the Division the opportunity to assess the potential for fracturing and/or migration of injected fluid out of zone as a result of injection at the proposed pressure.

(14) 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 0.2 psi per foot of depth to the top injection perforation, or in the case of open hole completions, the casing shoe, all as shown on Exhibit "A".

(15) The Division Director should 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 fracturing of the injection formation or confining strata.

(16) 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, of the mechanical integrity pressure tests, and of the conductance of any remedial cement or plugging operations in order that the same may be witnessed.

(17) The application should be approved and the project should be governed by the provisions of Rule Nos. 701 through 708 of the Oil Conservation Division Rules and Regulations.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Beach Exploration Inc., is hereby authorized to institute a waterflood project in its Red Lake Unit (being the subject of Division Case No. 10193) by the injection of water into the Penrose Sand member of the Queen formation, East Red Lake-Queen-Grayburg Pool, through the gross perforated interval from approximately 153[illegible] feet to 1838 feet in fourteen existing wells located in Sections 24, 25, 35 and 36, Township 16 South, Range 28 East, NMPM, and in Section 30, Township 16 South, Range 29 East, NMPM, Eddy County, New Mexico, all as shown on Exhibit "A" attached hereto.

(2) Prior to initiating injection operations within one-half mile of any of the wells shown on Exhibit "B", the applicant shall complete or re-plug said wells in a manner which will assure that these wellbores will not serve as a conduit for migration of injected fluid and to the satisfaction of the supervisor of the Artesia district office of the Division.

(3) The applicant 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 from injection, production, or plugged and abandoned wells.

(4) Injection into the proposed injection wells shall be accomplished through 2 3/8-inch plastic-lined tubing installed in a packer set approximately within 100 feet of the uppermost injection perforation or casing shoe; the casing-tubing annulus in each well shall be filled with an inert fluid and equipped with an approved pressure gauge or attention-attracting leak detection device.

(5) The injection wells or pressurization system shall be initially equipped with a pressure control device or acceptable substitute which will limit the surface injection pressure to no more than 0.2 psi per foot of depth to the top injection perforation, or in the case of open hole completions, the casing shoe, all as shown on Exhibit "A".

(6) 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 fracturing of the injection formation or confining strata.

(7) Prior to commencing injection operations into the proposed injection wells, 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.

(8) 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, of the mechanical integrity pressure tests, and of the conductance of any remedial cement or plugging operations in order that the same may be witnessed.

(9) The applicant shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in any of the injection wells, the leakage of water or oil from or around any producing well, or the leakage of water or oil 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.

(10) The subject waterflood project is hereby designated the Red Lake Unit Penrose Waterflood Project, and the applicant shall conduct injection operations in accordance with Division Rule Nos. 701 through 708 and shall submit monthly progress reports in accordance with Division Rule Nos. 706 and 1115.

(11) 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

EXHIBIT "A"
RED LAKE UNIT
APPROVED INJECTION WELLS
CASE NO. 10192
ORDER NO. R-9453

Well Name	*Location*	*Unit*	*S T R*	*Injection Perforations*	*Packer Depth*	*Tubing Size*	*Maximum Surface Injection Pressure*
Amoco State No. 1	2310' FSL & 2287' FWL	K	25-16S-28E	1609' - 1634'	1559'	2 3/8	322
Bogle Farms No. 1	660' FSL & 990' FWL	M	25-16S-28E	1575' - 1599'	1525'	2 3/8	315
Hinkle State "A" No. 1	2310' FSL & 2310' FEL	J	36-16S-28E	1762' - 1809'	1712'	2 3/8	352
N.M. State "35" No. 1	660' FNL & 660' FEL	A	35-16S-28E	1560' - 1585'	1510'	2 3/8	312
N.M. State "36" No. 3	1980' FNL & 990' FWL	L	36-16S-28E	1618' - 1672'	1568'	2 3/8	324
N.M. State "36" No. 4	660' FNL & 1980' FWL	C	36-16S-28E	1656' - 1675'	1606'	2 3/8	331
N.M. State "36" No. 5	1986' FNL & 1983' FEL	G	36-16S-28E	1778' - 1824'	1728'	2 3/8	356
N.M. State "36" No. 6	330' FNL & 981' FEL	A	36-16S-28E	1814' - 1825'	1764'	2 3/8	363
Government No. 1	660' FSL & 1980' FEL	O	25-16S-28E	1779' - 1804'	1729'	2 3/8	356
Government No. 4	2310' FNL & 1980' FEL	G	25-16S-28E	1642' - 1660'	1592'	2 3/8	328
Government No. 5	1650' FSL & 990' FEL	I	25-16S-28E	1816' - 1838'	1766'	2 3/8	363
Allen Federal No. 1	860' FNL & 660' FEL	A	25-16S-28E	1687' - 1807'	1637'	2 3/8	337
Max Federal No. 3	2310' FNL & 330' FWL	E	30-16S-29E	1828' - 1838'	1778'	2 3/8	366
State "24" No. 1	660' FSL & 1980' FEL	O	24-16S-28E	1537' - 1599'	1487'	2 3/8	307

EXHIBIT "B"
RED LAKE UNIT
INADEQUATELY COMPLETED, PLUGGED OR ABANDONED WELLS
CASE NO. 10192
ORDER NO. R-9453

Well Name	*Location*	*Unit*	*S-T-R*
Meridian Federal No. 1	2310' FNL - 990' FWL	E	25-16S-28E
State "24" No. 1	2310' FNL - 2310' FEL	G	24-16S-28E
Kemper State No. 2	660' FNL - 660' FEL	A	36-16S-28E
Southern Union Federal No. 1	660' FSL - 1980' FEL	O	26-16S-28E

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. 10495
Order No. R-9453-A

APPLICATION OF BEACH EXPLORATION INC. FOR AMENDMENT OF DIVISION ORDER NO. R-9453 TO INCREASE THE INJECTION PRESSURE LIMITATION IN ITS RED LAKE UNIT PENROSE WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO.

See Also Order No. R-9453

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on June 25, 1992, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 13th day of July, 1992, 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-9453 issued in Case No. 10192 on March 12, 1991, the Division, upon application of Beach Exploration Inc., authorized the institution of a waterflood project within the Red Lake Unit located in portions of Township 16 South, Ranges 28 and 29 East, NMPM, East Red Lake Queen-Grayburg Pool, Eddy County, New Mexico, by the injection of water into the Penrose member of the Queen formation through fourteen existing injection wells located in Sections 24, 25, 35 and 36, Township 16 South, Range 28 East, NMPM, and Section 30, Township 16 South, Range 29 East, NMPM.

(3) Said Order No. R-9453 further limited the surface injection pressure on the subject injection wells to no more than 0.2 psi per foot of depth to the uppermost injection perforation or an average of approximately 338 psi.

(4) The applicant, Beach Exploration Inc., seeks an order increasing the surface injection pressure on the fourteen subject injection wells within the Red Lake Unit Penrose Waterflood Project to 1500 psi.

(5) Injection into the subject waterflood project commenced in June, 1991. As of the date of the hearing, the unit has not experienced a response to waterflood operations.

(6) On September 4, 1991, the Division authorized the applicant to inject water into the subject wells at a surface pressure of 900 psi based upon the results of step rate tests conducted on certain wells within the unit.

(7) Applicant's evidence in this case indicates that injection volumes at the current pressure limitation have steadily declined to the point that waterflood operations will be uneconomic within a relatively short period of time.

(8) Applicant testified that effective waterflood operations within the Red Lake Unit should result in the recovery of 550,000 barrels of oil which would otherwise not be recovered.

(9) There are several Queen (Penrose) waterflood projects in the area of the Red Lake Unit which have historically utilized injection pressures ranging from 1360 to 1800 psi to effectively and efficiently carry out secondary recovery operations.

(10) Such projects were approved prior to the Division initiating its policy of limiting surface injection pressures.

(11) Evidence and testimony by the applicant indicates that there have been no occurrences of water out of zone in the general vicinity of the Red Lake Unit as a result of injection into the aforesaid waterflood projects at the injection pressures described above.

(12) The applicant presented engineering evidence and testimony which indicates that:

a) the Penrose member of the Queen formation is located at a depth of approximately 1660 feet to 1680 feet as shown on the Density/Neutron Log run on the Red Lake Unit Well No. 23 located in Unit F of Section 36; the Queen formation, as shown on the same log, occurs from a depth of approximately 1420 feet to 2110 feet;

b) the Penrose member of the Queen formation appears to contain horizontal fractures, either natural or previously induced;

c) injection into the Penrose at a surface injection pressure of 1500 psi will likely cause additional horizontal fracturing in the Penrose formation, however, any vertical fracturing which may occur at such pressure should be limited to an area of approximately 30 feet above and below the Penrose member;

d) the thickness and rock properties of the Queen interval above the injection zone are sufficient to ensure that the injected fluid will not migrate from the Queen formation at the proposed injection pressure.

(13) The applicant further demonstrated through the conductance of injection profile logs that the construction of the injection wells is sufficient such that migration of fluids should not occur at the proposed injection pressure through the casing annulus.

(14) Fresh water occurs sporadically in this area at a depth of approximately 80 feet.

(15) The applicant, through its engineering evidence and testimony, has satisfactorily demonstrated that injection through the fourteen subject wells at a surface injection pressure of 1500 psi is necessary in order to efficiently and effectively waterflood the Red Lake Unit and will allow the applicant to recover the additional oil reserves underlying said area, thereby preventing waste.

(16) The applicant has further satisfactorily demonstrated that injection into the fourteen subject wells at a surface injection pressure of 1500 psi will not result in the migration of fluid from the Queen formation and will not pose a threat to underground sources of drinking water in this area.

(17) The Division Director should have the authority to reduce or rescind the surface injection pressure approved herein should it become apparent that the injected fluid is not being adequately confined to the East Red Lake Queen-Grayburg Pool.

IT IS THEREFORE ORDERED THAT:

(1) Division Order No. R-9453 is hereby amended to authorize Beach Exploration Inc. to inject water into fourteen previously approved injection wells (as more fully described on Exhibit "A" of Order No. R-9453) located within the Red Lake Unit Penrose Waterflood Project in Sections 24, 25, 35 and 36, Township 16 South, Range 28 East, NMPM, and Section 30, Township 16 South, Range 29 East, NMPM, East Red Lake Queen-Grayburg Pool, Eddy County, New Mexico, at a surface injection pressure of 1500 psi.

(2) The Division Director shall have the authority to reduce or rescind the surface injection pressure approved herein should it become apparent that the injected fluid is not being adequately confined to the East Red Lake Queen-Grayburg Pool.

(3) 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