

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. 10476
ORDER NO. R-2178-D

APPLICATION OF YATES PETROLEUM CORPORATION FOR AMENDMENT TO
DIVISION ORDER NO. R-2178, AS AMENDED, TO INCLUDE A CARBON DIOXIDE
INJECTION PILOT PROJECT, TWO UNORTHODOX INJECTION WELL
LOCATIONS, AND TO RESCIND DIVISION ORDER NO. R-7821, EDDY COUNTY,
NEW MEXICO

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on May 14, 1992, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this _____ 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) ^{tertiary} The applicant, Yates Petroleum Corporation, seeks authority to initiate and conduct a pilot carbon dioxide/water injection project to be known as the Yates Petroleum Corporation Loco Hills CO₂/Water Injection Pilot Project, hereinafter referred to as "pilot project", for ~~testimony~~ recovery purposes and to test the CO₂ miscible process ~~in process~~ in the Fourth Sand Member of the Grayburg formation (as indicated on the Acoustilog run on September 4, 1964, Newmont Oil Company West Loco Hills Unit 6 Well No. 3 located 660 feet from the South line and 1980 feet from the East line (Unit O) of Section 12, Township 18 South, Range 29 East, NMPM, Eddy County, New Mexico) underlying portions of the SE/4 NE/4 and NE/4 SE/4 of said Section 12 and Lots 2 and 3 (SW/4 NW/4 and NW/4 ^{SW/4}

in the

brackets

~~SE/4 NE/4 and NE/4 SE/4 of said Section 12 and Lots 2 and 3 (SW/4 NW/4 and NW/4 SW/4 equivalents) of Section 7, Township 18 South, Range 30 East, NMPM, Eddy County, New Mexico, all in the Loco Hills Queen-Grayburg-San Andres Pool, West Loco Hills Grayburg No. 4 Sand Unit, West Loco Hills Grayburg No. 4 Sand Unit Waterflood Project (authorized by Division Order No. R-2178, as amended).~~

(3) Applicant further seeks the rescission of Division Order No. R-7821, dated February 21, 1985, which authorized a similar project in the area but was never initiated by the operator and the other working interest owners due to poor economics and technical concerns.

(4) The applicant proposes to initially develop its proposed pilot project utilizing one twenty-two and one-half-acre inverted five-spot pattern and one ten-acre inverted five-spot pattern which requires the drilling of two carbon dioxide/water injection wells at the following unorthodox locations in said Section 7:

- West Loco Hills G4S Unit ^{Tract 1} Well No. 9
1980' FNL - 40' FWL (Unit E); and,
- West Loco Hills G4S Unit ^{Tract 1} Well No. 10
2455' FSL - 50' FWL (Unit L).

(5) The following existing wells will be the producing wells which complete the two aforementioned patterns and will be directly affected by the proposed pilot project:

- West Loco Hills G4S Tract 13A Well No. 4
1650' FNL - 330' FEL (Unit H) of Section 12;
- West Loco Hills G4S Tract ⁶ Well No. 1
1980' FSL - 660' FEL (Unit I) of Section 12;
- West Loco Hills G4S Tract 1 Well No. 2
1650' FNL - 330' FWL (Unit E) of Section 7;
- West Loco Hills G4S Tract 1 Well No. 3
1980' FSL - 660' FWL (Unit L) of Section 7; and,
- West Loco Hills G4S Tract 1 Well No. 8
2310' FNL - 330' FWL (Unit E) of Section 7.

A sixth producing well, to be located approximately 2310 feet from the North line and 330 feet from the East line (Unit H) of Section 12, will be drilled if the project is successful.

(6) The area within the periphery of the five producing wells and the proposed producing well is the area of the pilot project for which this order will hereinafter be concerned.

(7) The pilot project is in an area where extensive primary and secondary recovery operations have been conducted, (see Division Order No. R-2178, as amended), and is of an experimental nature in order to evaluate the effectiveness of carbon dioxide into the subject reservoir and to provide a study of zone isolation, vertical heterogeneity, reservoir directional variation and the carbon dioxide displacement process.

(8) The applicant proposes to inject 60 tons of CO₂ per well per day over a two-month period alternating with 400 barrels of water per well per day for a one-month period.

(9) There are sufficient differences between the proposed pilot project and the project approved by Order No. R-7821 which made it necessary for the applicant to seek authorization through the Division's hearing process. Therefore, Division Order No. R-7821 should be rescinded at this time and ~~that~~ a separate order be issued granting authorization for the proposed pilot project.

(10) The operator of the proposed pilot project should take all steps necessary to ensure that the injected fluids enter only the proposed injection interval and are not permitted to escape to other formations or onto the surface via surrounding injection, production and/or plugged and abandoned wells.

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

(12) The injection into each of the injection wells, as described in Finding Paragraph No. (4) above, should be accomplished through 2 7/8-inch plastic lined tubing installed in a packer set not more than 100 feet above the uppermost perforation; the casing-tubing annulus of each injection well 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.

560 psi
(13) Said injection wells herein authorized and/or the injection authorization system should be so equipped as to limit injection pressure at the wellhead to no more than ~~0.2 psi per foot of depth to the uppermost perforations~~, provided however, the Division Director may authorize a higher surface injection pressure upon satisfactory showing that such pressure will not result in fracturing of the confining strata.

(14) 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 pressure test on each of the proposed injection wells so that the same may be inspected.

(15) The evidence presently available indicates that there is not fresh water within the area of interest.

(16) In the event the pilot project is successful and indicates the desirability and economic feasibility of the process, the pilot project could be expanded to include additional lands and wells, and could result in the production of otherwise unrecoverable oil, thereby preventing waste.

(17) The pilot project is to be conducted within the boundaries of the West Loco Hills Grayburg No. 4 Sand Unit Area, a unitized area, and will therefore not impair correlative rights.

(18) The proposed pilot project should be approved, as well as the requested unorthodox injection well locations as described in Finding Paragraph No. (4) above.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Yates Petroleum Corporation, is hereby authorized to initiate and conduct a pilot carbon dioxide/water injection project known as the Yates Petroleum Corporation Loco Hills CO₂/Water Injection Pilot Project, hereinafter referred to as the "pilot project" in the Fourth Sand Member of the Grayburg formation underlying portions of the SE/4 NE/4 and NE/4 SE/4 (Units H and I, respectively) of Section 12, Township 18 South, Range 29 East, NMPM, and ~~the~~ SW/4 NW/4 and NW/4 SW/4 (Units E and L, respectively) of Section 7, Township 18 South, Range 30 East, NMPM; both portions of said sections located in the Loco Hills Queen-Grayburg-San Andres Pool, West Loco Hills Grayburg No. 4 Sand Unit, Eddy County, New Mexico.

(2) The applicant is hereby authorized to initially develop the above-described pilot project on a 22 1/2-acre and a 10-acre (approximate) inverted five-spot injection pattern utilizing the following wells to be drilled as carbon dioxide/water injection wells hereby approved in Section 7:

- West Loco Hills G4S Unit Well No. 9
1980' FNL - 40' FWL (Unit E); and,
- West Loco Hills G4S Unit Well No. 10
2455' FSL - 50' FWL (Unit L).

(3) Injection into each of the above-described injection wells shall be accomplished through 2 7/8-inch tubing installed in a packer set not more than 100 feet above the uppermost perforation;

PROVIDED HOWEVER THAT, the tubing shall be internally plastic lined; the casing-tubing annulus of each injection well 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.

PROVIDED FURTHER THAT, prior to commencing injection operations, the casing in the subject wells shall be pressure-tested to assure the integrity of such casing in a manner that is satisfactory to the supervisor of the Division's Artesia District Office.

(4) The injection wells herein authorized and/or the injection pressurization equipment shall be so equipped as to limit injection pressure at the wellhead to no more than ~~0.2 psi per foot of depth to the uppermost perforations therein~~, provided however, the Division Director may authorize a higher surface injection pressure upon satisfactory showing that such pressure will not result in fracturing of the confining strata.

(5) The operator shall notify the supervisor of the Artesia District Office of the Division in advance of the date and time of the installation of injection equipment and of the mechanical integrity pressure-test in order that the same may be witnessed.

(6) To further develop the above-described inverted five-spot injection pattern, the applicant is hereby authorized to drill an additional producing well at an undetermined and possible unorthodox location in the SE/4 NE/4 (Unit H) of said Section 12, Township 18 South, Range 29 East, NMPM, provided said well shall be located no closer than 10 feet to any boundary of said quarter-quarter section.

(7) The following existing wells are hereby approved as production wells with the pilot project to fully develop and complete the aforesaid inverted five-spot injection pattern:

- West Loco Hills G4S Tract 13A Well No. 4
1650' FNL - 330' FEL (Unit H) of Section 12;
- West Loco Hills G4S Tract ⁶ Well No. 1
1980' FSL - 660' FEL (Unit I) of Section 12;

both wells being located in said Section 12, Township 18 South, Range 29 East, NMPM;

- West Loco Hills G4S Tract 1 Well No. 2
1650' FNL - 330' FWL (Unit E) of Section 7;

- West Loco Hills G4S Tract 1 Well No. 3
1980' FSL - 660' FWL (Unit L) of Section 7; and,
- West Loco Hills G4S Tract 1 Well No. 8
2310' FNL - 330' FWL (Unit E) of Section 7,

the three above-described wells being located in said Section 7, Township 18 South, Range 30 East, NMPM.

(8) A sixth producing well, if said project is successful, is to be drilled to complete the two injection patterns at a standard oil well location approximately 2310 feet from the North line and 330 feet from the East line (Unit H) of said Section 12.

(9) The area within the periphery of the five existing wells and the proposed producing well as described above shall be the area of the pilot project.

(10) The operator shall immediately notify the supervisor of the Division's Artesia 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.

(11) Any time that any of the producing wells in the pilot project are shut-in for over ninety consecutive days, the Supervisor of the Artesia District Office shall be notified, at which time it shall be demonstrated that any wells that lie between the outside of the aforesaid five-spot injection pattern and a half-mile radius of the aforesaid injection wells will not be adversely affected by the carbon dioxide/water injection operations.

(12) The Yates Petroleum Corporation Loco Hills CO₂/Water Injection Pilot Project shall be governed by this order and the rules contained herein and by the provisions of Rules 701 through 708 of the Division rules which are not in conflict with this order.

(13) Monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 706 and 1115 of the Division Rules and Regulations.

(14) Division Order No. R-7821, issued in Case No. 8324 and dated February 21, 1985, is hereby rescinded.

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

Case No. 10476
Order No. R-2178-D
Page No. 7

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