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. 13935
ORDER NO. R-12887

APPLICATION OF APOLLO ENERGY, L.P. FOR APPROVAL OF A WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on June 21, 2007, at Santa Fe, New Mexico, before Examiners David K. Brooks and Richard Ezeanyim.

NOW, on this 18th day of January, 2008, the Division Director, having considered the testimony, the record and the recommendations of the Examiners,

FINDS THAT:

(1) Due notice has been given, and the Division has jurisdiction of the subject matter of this case.

(2) By this application, Apollo Energy, L.P. (Applicant) seeks authority to institute a waterflood project in the Yates formation, within a project area consisting of the following described lands in Township 20 South, Range 28 East, NMPM, in Eddy County, New Mexico:

Section 12: SW/4 SE/4
Section 13: N/2, SW/4, N/2 SE/4 and SW/4 SE/4
Section 14: SE/4 SE/4

comprising 680 acres, included within a single federal oil and gas lease.

(3) Applicant proposes to drill and utilize five injection wells, in addition to two existing, permitted disposal wells, at locations identified on Exhibit A to this Order, for injection of produced water into the Yates formation in the Russell-Yates Pool

(52820), through an injection interval at a depth between 700 feet to 900 feet below the surface. Applicant anticipates adding additional injection wells and will seek authorization for such additional injection wells by administrative application pursuant to Division rules.

(4) Applicant proposes to construct the injection wells with 8 5/8" surface casing set at 302 feet and cemented to surface, and 5 1/2" casing set in the vicinity of total depth, estimated to be approximately 1200 feet, and cemented to surface. Applicant may drill into and test the Seven Rivers formation, below the Yates, and then shall set a cast-iron bridge plug in the casing above the base of the Yates formation, at approximately 975 feet. Injection will be accomplished through 2 3/8" tubing, installed in a 5 1/2" tension packer, set in the casing at approximately 775 feet.

(5) At the hearing, Applicant appeared through counsel and presented testimony and exhibits to the effect that:

(a) The proposed project area is part of an area that was authorized for waterflood by Order R-263, issued in Case No. 469 on February 10, 1953. Substantial injection activity occurred pursuant to that order, but injection ceased several years ago, and all producing wells in the area have been shut in by order of the United States Bureau of Land Management for at least two years.

(b) The entire project area consists of a single federal oil and gas lease, and Applicant is the owner of 100% of the working interest in the Yates formation throughout the project area. Overriding royalty ownership in the Yates formation is uniform throughout the project area.

(c) Two wells within the project area have been recently permitted as injection wells for purposes for disposal of produced water. These are USA Well No. 60 and the USA Well No. 65, more specifically described in Exhibit A, which were permitted for injection by Administrative Orders SWD-1079 and SWD-1080, respectively. The USA Well No. 60 is currently injecting into the Yates formation. The USA Well No. 65 failed mechanical integrity test, and is not active at this time.

(d) The Yates formation in this area is encountered at depths from approximately 700 feet to approximately 1000 feet beneath the surface, and is correlated, and continuous, across the project area. It consists of a collection of alternating sands and shales. It is basically a stratigraphic trap. There is no particular, identified closing structure. However, the Yates reservoir quality diminishes to the north, west, south and southeast of the project area. The sands either lose their reservoir quality or they become limy and anhydritic. The Yates and Seven Rivers formations overlie the Capitan Reef. There is a salt section 100 to 150 feet in thickness approximately 100 feet above the Yates.

(e) The only fresh water-bearing formation Applicant has identified in the project area is the Rustler formation, which lies at a depth of 70 to 85 feet below the surface. There are no operable water wells in the project area or the Area of Review. Applicant has contacted the Office of the State Engineer (OSE) regarding fresh water sources that might be affected. The OSE advised that there are no known sources of fresh water in this area.

(f) To applicant's knowledge, there is no faulting that would connect the proposed injection formation with any fresh water bearing zone.

(g) Based on available data, the reservoir probably has on the order of 16% porosity and had original water saturation on the order of 35%. Original oil in place was estimated at 6 million barrels. The reservoir has produced (cumulative primary and secondary) approximately 2.4 million barrels of oil and 8.5 million barrels of water, including water that was re-injected in earlier waterflood operations.

(h) The existing wells within the project area are "stripper wells" in the sense that they have reached an advanced state of depletion.

(i) From a geologic standpoint, the project area is susceptible to further waterflooding; previous waterflood operations were apparently abandoned due to neglect, not because those operations had exhausted their potential. Estimates of incremental oil recovery by further water injection range from 88,900 barrels to 919,500 barrels. Applicant believes that it can recover at least 100,000 to 150,000 barrels of additional oil from the proposed waterflood.

(j) Applicant proposes initially to inject into the two permitted disposal wells and the five new wells described in Exhibit A. The injection medium will be produced water from the formation. Subsequently, Applicant may seek to add as many as 20 to 30 more injectors, and Applicant plans to study the feasibility of converting the project to tertiary, surfactant injection.

(k) There are 75 wells in the Area of Review. Ten of these have been plugged and abandoned. Based on Division records, these wells have been properly plugged to prevent movement of fluids to other zones. There are several producing wells that penetrate the Yates formation and are completed in much deeper formations. However, these wells are cased through the Yates formation, and accordingly will not serve as a conduit for movement of injected fluids out of the formation. The remaining wells in the Area of Review are operated by Applicant and completed in the Yates formation. These wells have surface casing set and cemented below the base of the Rustler, fresh water bearing formation.

(l) Division records indicate that previous operators have injected approximately 14.5 million barrels of water into this formation. There have been no reported surface leaks.

(m) Applicant has conducted a step rate test on the USA Well No. 60 (the existing, active injector), and has determined, based on the results of that test, that the pressure that will initiate a fracture in the formation is between 450 and 500 psi. Applicant is requesting a maximum surface injection pressure of 400 psi.

(6) No other party appeared at the hearing or otherwise opposed the application prior to the hearing. After the hearing, Nordstrand Engineering, Inc, an operator of a deeper producing well within the project area not completed in the Yates formation, filed a protest. The Division advised Nordstrand that it should file a motion to re-open the hearing not later than December 10, 2007, if it wished to present evidence in support of its protest. However, it did not file such a motion.

The Division concludes that:

(7) The design of the injection wells is appropriate and should be approved. The testimony is somewhat unclear about the presence of freshwater. However, the proposed casing plan should adequately protect freshwater sources that may exist.

(8) The plugged and abandoned wells in the Area of Review identified in Applicant's C-108 are properly plugged to prevent the movement of fluids from the injection zone.

(9) There is an additional plugged and abandoned well in the Area of Review, Pre-Ongard Well No. 1 (API No. 30-015-02424), located 660 feet from the North Line and 660 feet from the West Line (Unit D) of Section 24-20S-28E. However, Division records indicate that this well, also, has been properly plugged.

(10) The wells in the Area of Review having open completions appear to be adequately cased and cemented, so that none of them will become a conduit for the escape of fluid from the permitted injection formation. Accordingly no remedial work on wells in the Area of Review is required.

(11) Based on the step-rate test that Applicant conducted on the USA Well No. 60, which Applicant presented to the examiners following the hearing, Applicant should be authorized initially to inject fluids at a surface injection pressure not to exceed 300 psi; provided that Applicant may apply to the Division for a higher injection pressure upon satisfactorily demonstrating that an increase in injection pressure will not result in fracturing of the injection formation or confining strata.

(12) The proposed project will, in reasonable probability, prevent waste by making possible the production of oil that would not otherwise be produced, and will not impair correlative rights.

(13) Accordingly, the application should be approved.

IT IS THEREFORE ORDERED THAT:

(1) Apollo Energy, L.P. [OGRID 248192] ("Applicant" or "Operator") is hereby authorized to institute a waterflood injection project in the Yates sand member of the Yates formation [Russell-Yates Pool (52820)], within a project area consisting of the following described lands in Township 20 South, Range 28 East, NMPM, in Eddy County, New Mexico:

Section 12: SW/4 SE/4
Section 13: N/2, SW/4, SW/4 SE/4
Section 14: SE/4 SE/4

comprising 680 acres, included within a single federal oil and gas lease.

(2) This project is hereby designated the Russell Yates Waterflood Project ("the Project"). Applicant is designated operator of the project.

(3) Operator is authorized to re-inject produced water into the Yates formation within an appropriate injection interval between approximately 700 feet and 900 feet below the surface, through the Russell USA Well No. 60 (API No. 30-015-10420), previously permitted as a disposal well, and the five new injection wells to be drilled as described in Exhibit A hereto.

(4) Inasmuch as the evidence indicates that the Russell USA Well No. 65, also previously permitted as a disposal well, does not have mechanical integrity, and Operator has not made a decision regarding future use of that well, permission to inject into the Russell USA Well No. 65 at this time is denied. If Operator decides to restore the Russell USA Well No. 65 as an injection well, Operator shall first file a separate administrative application to reinstate injection authority for that well.

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

(6) Injection into each proposed injection well shall be accomplished through 2-3/8 inch, plastic coated, steel 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 a gauge or approved leak-detection device shall be attached to the annulus in order to detect leakage in the casing, tubing or packer. The Operator shall set a cast iron bridge plug below the lowest perforations, to isolate the injection formation.

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

(8) Each injection well shall be initially equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to no more than 300 psi.

(9) The Division Director shall have the authority to administratively authorize an increase in injection pressure upon a showing by the operator that such higher pressure will not result in fracturing of the injection formation or confining strata.

(10) For each injection well, the operator shall give at least 72 hours advance notice to the supervisor of the Division's Artesia District Office of the date and time (i) injection equipment will be installed, and (ii) the mechanical integrity pressure tests will be conducted, so that these operations may be witnessed.

(11) The operator shall provide written notice of the date of commencement of injection into each well to the Artesia District Office of the Division.

(12) The operator shall immediately notify the supervisor of the Division's Artesia District Office of the failure of the tubing, casing or packer in any of the injection wells, or the leakage of water, oil, gas or other fluid from or around any producing, abandoned or inactive well within ½ mile of any injection well, and shall take all steps as may be timely and necessary to correct such failure or leakage.

(13) The Project shall be governed by Division Rules No. 701 through 708. The operator shall submit monthly reports of the injection operations on Division Form C-115, in accordance with Division Rules 706 and 1120.

(14) In accordance with Rule 705.C, the injection authority granted herein shall terminate one year after the effective date of this order if the Operator has not commenced injection operations; provided, however, the Division, upon written request by the Operator, filed prior to the expiration of the one-year period, may grant an extension for good cause.

(15) Operator shall provide written notice to the Division upon permanent cessation of injection into the Project and upon final completion of the Project.

(16) Operator may, from time to time, seek Division approval to add additional injection wells within the project area, or to change the authorized injection interval of any well, within the Yates formation, by administrative application, in accordance with Division rules.

(17) In the event that Operator determines to convert the project area to a tertiary, surfactant injection project, as suggested in the testimony, Operator shall first file an application pursuant to Division Rule 701, and obtain Division approval after appropriate notice and hearing.

(18) This order does not relieve Operator of responsibility should its operations cause any actual damage or threat of damage to protectible fresh water, human health or the environment; nor does it relieve the operator of responsibility for complying with applicable Division rules or other state, federal or local laws or regulations.

(19) Upon failure of the operator to conduct operations (1) in such manner as will protect fresh water, or (2) in a manner consistent with the requirements in this order, the Division may, after notice and hearing, (or without notice and hearing in event of an emergency, subject to the provisions of NMSA 1978 Section 70-2-23), terminate the injection authority granted herein.

(20) Jurisdiction of this case 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.

SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MARK E. FESMIRE, P.E.
Director

Case No. 13935
Exhibit A to
Order No. R-12887

Authorized Injection Wells

Existing, Permitted Disposal Well

Russell USA Well No. 60
API No. 30-015-10420
2630 FNL, 1980 FWL
F-13-20S-28E

New Injection Wells to Be Drilled

Russell USA Well No. 70
1980 FSL, 2310 FWL
K-13-20S-28E

Russell USA Well No. 71
1110 FSL, 1980 FWL
N-13-20S-28E

Russell USA Well No. 72
2480 FSL, 680 FWL
L-13-20S-28E

Russell USA Well No. 73
1550 FSL, 2580 FWL
K-13-20S-28E

Russell USA Well No. 74
1485 FSL, 1155 FWL
L-13-20S-28E