

**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. 15048  
ORDER NO. R-13785**

**APPLICATION OF SUNDOWN ENERGY L.P. FOR AUTHORIZATION TO  
INJECT FOR WATERFLOOD PROJECT OPERATIONS, LEA COUNTY, NEW  
MEXICO.**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This case came on for hearing at 8:15 am on October 3, 2013, at Santa Fe, New Mexico, before Examiner Phillip R. Goetze.

NOW, on this 21<sup>st</sup> day of January, 2014, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner,

**FINDS THAT:**

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

(2) The Applicant, Sundown Energy L.P. ("Sundown") seeks approval of a waterflood project for its Reeves-Queen Waterflood Unit ("Unit") for the Queen formation (Reeves-Queen Pool [Pool Code 52070]) underlying the following-described proposed project area situated in Lea County, New Mexico:

**Township 18 South, Range 35 East, NMPM**

Section 21: SE/4 SE/4

Section 22: SW/4

Section 27: NW/4

Section 28: NE/4

Under Case No. 15055, Applicant has sought approval of a Unit Agreement for the State of New Mexico lands described for the Unit.

- (3) The proposed injection wells are the following:

**Arco 28 State No. 1**  
API No. 30-025-29340  
660 FNL & 660 FEL  
Unit A, Section 28-18S-35E

**Arco 28 State No. 2**  
API No. 30-025-29526  
330 FNL & 1650 FEL  
Unit B, Section 28-18S-35E

- (4) Applicant appeared at the hearing through counsel and presented testimony that demonstrates that:
- (a) Production began in the 1950s as single or two well developments. A total of 17 wells was completed in the Reeves-Queen Pool. Cumulative production from the pool is 234,000 barrels of oil and 767 million cubic feet of gas. Primary recovery per well ranges between 35,000 and 55,000 barrels of oil with very low water production. Applicant acquired the state leases and now seeks injection authority.
  - (b) The Queen formation in this area has been totally defined by development. Applicant interprets that the reservoir mechanism is typical solution gas drive with no water drive.
  - (c) Applicant has described target for enhanced recovery as a porosity pinch-out type of reservoir with very little structural variation. Applicant interprets the reservoir as a dolomitic sandstone with secondary porosity. Porosity in the Unit ranges between 10 and 20 percent but decreases significantly in all four cardinal directions sealing the reservoir.
  - (d) Based on comparative studies of two similar fields in the area that have been water flooded, Applicant believes a secondary recovery to primary production ratio of two to one is possible. Applicant has based the economic model for waterflood on secondary recovery to primary production ratio of 0.9. Secondary reserves for the Unit are estimated at 214,000 barrels of oil.
  - (e) Decrease in the porosity to less than one percent above the top of the reservoir forms a barrier that will prevent upward migration of injected fluids out of the injection zone. There are no faults or other geologic structures that would allow migration of the injected fluids out of the injection zone.

- (f) Each of the two injection wells will be properly constructed to prevent migration of the injected fluid upward to any underground source of drinking water or other hydrocarbon producing formation.
  - (g) Applicant proposes a maximum surface injection pressure of 894 psig and an average injection rate of 500 barrels of water per day, with a maximum of 1,000 barrels of water per day. Applicant may subsequently request higher injection pressures, and accordingly requests that the Director approve injection pressure increases by administrative order.
  - (h) Most of the wells in the one-half mile area of review (AOR) surrounding each of the proposed injection wells are currently plugged and abandoned. Excluding the two proposed injector wells, there are four wells in the AOR that are plugged and abandoned and three wells that are currently producing. Each of the wells is properly plugged or cemented so that it will not become a conduit to allow migration of injected fluids out of the injection zone.
  - (i) The water that will be injected is produced water from Devonian wells from a different operator in the vicinity and has a quality of approximately 33,000 parts per million Total Dissolved Solids (ppm TDS). There are no fluid compatibility issues.
  - (j) Applicant identified four fresh water wells within a one-mile radius of the injection wells, all completed in the Ogallala formation. The base of this aquifer is less than 156 feet in this area. There is no known hydrologic connection between the injection interval and any underground source of drinking water.
  - (k) Applicant provided the required notice requirements to affected persons pursuant to Subsection C of Division Rule 19.15.26.8 NMAC.
- (5) No other party appeared at the hearing or otherwise opposed the application.

The Division concludes that:

- (6) All of the plugged and abandoned wells in the AOR appear to be adequately plugged, so that none of them will become a conduit for the escape of injected fluid from the permitted injection formation.

(7) Applicant should be authorized to inject fluids at a surface injection pressure not to exceed 894 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.

(8) The proposed project will, in reasonable probability, result in production of substantially more hydrocarbons from the project area than would otherwise be produced therefrom, will prevent waste, and will not impair correlative rights, and should be approved.

**IT IS THEREFORE ORDERED THAT:**

(1) The application of Sundown Energy L.P. ("Sundown" or "Operator") for authorization to inject produced water in the Reeves-Queen Waterflood Unit (the "Unit") is hereby approved. Sundown is authorized to inject produced water into the Queen formation, the Reeves-Queen Pool (Pool Code 52070) through the following existing wells to be converted to injection wells:

**Arco 28 State No. 1**  
API No. 30-025-29340  
660 FNL & 660 FEL  
Unit A, Section 28-18S-35E

**Arco 28 State No. 2**  
API No. 30-025-29526  
330 FNL & 1650 FEL  
Unit B, Section 28-18S-35E

(2) Injection shall be through perforated intervals from 4,472 feet to 4,488 feet and from 4,480 feet to 4,483 feet.

(3) The project is hereby designated the **Reeves-Queen Waterflood Project** ("Project") and shall comprise the following described lands ("Project Area"):

**Township 18 South, Range 35 East, NMPM**

Section 21: SE/4 SE/4

Section 22: SW/4

Section 27: NW/4

Section 28: NE/4

(4) Sundown Energy L.P. (OGRID 232611) is the designated operator of the Project.

(5) 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) The two injection wells shall be re-entered and completed as presented in the wellbore diagrams on Pages 10 and 15 of the attachments to the Form C-108 admitted in evidence as Exhibit No. 4. This includes the rehabilitation of Arco 28 State No. 1 (API No. 30-025-29340) that includes setting new 4 ½-inch production casing at the top of the current cutoff at approximately 1,375 feet below the surface, then cementing the new casing to the surface.

(7) Injection shall be accomplished through plastic-lined steel tubing installed in a packer set in the casing below the top of the injection formation and 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.

(8) The well shall pass a mechanical integrity test prior to initial commencement of injection and prior to resumption of injection each time the injection packer is unseated. All testing procedures and schedules shall conform to the requirements of Division Rule 19.15.26.11.A NMAC. The Division Director retains the right to require at any time wireline verification of completion and packer setting depths.

(9) The 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 894 psi**.

(10) The Division Director may administratively authorize an increase in the maximum injection pressure upon a showing by the operator that such higher pressure will not result in fracturing of the injection formation or confining strata.

(11) For each injection well, the operator shall give at least 72 hours advance notice to the supervisor of the Division's Hobbs 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.

(12) The operator shall provide written notice of the date of commencement of injection operations into each well to the Hobbs District Office.

(13) The operator shall immediately notify the supervisor of the Division's Hobbs 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 or abandoned well within one-half mile of the injection well, and shall take all steps as may be timely and necessary to correct such failure or leakage.

(14) The Project shall be governed by applicable provisions of Division Rules 19.15.26.8 through 26.15 NMAC. Operator shall submit monthly reports of the injection operations on Division Form C-115, in accordance with Division Rules 19.15.26.13 and 19.15.7.28 NMAC.

(15) The injection authority granted herein shall terminate two years 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 two-year time period, may grant an extension for good cause.

(16) In accordance with Division Rule 19.15.26.12.C NMAC, the injection authority granted herein shall terminate if, after injection commences, any continuous period of one year elapses without reported injection into any authorized injection well in the project area occurring; provided, however, the Division, upon written request by Operator filed prior to the expiration of the one-year period of non-injection, may grant an extension for good cause.

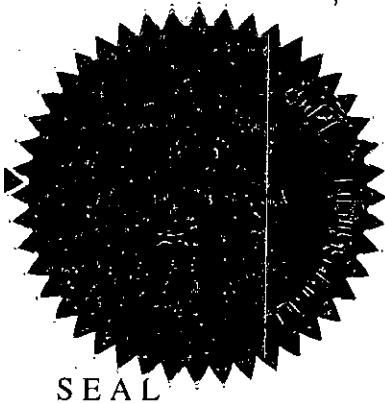
(17) Operator shall provide written notice to the Division upon permanent cessation of injection into the Project.

(18) This order does not relieve Operator of responsibility should its operations cause any actual damage or threat of damage to protectable 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.

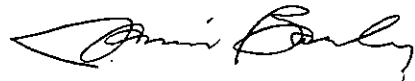
(19) Upon failure of the operator to conduct operations (1) in such manner as will protect fresh water, or (2) in a manner consistent with the requirements in this order, the Division may, after notice and hearing, (or without notice and hearing in event of an emergency), terminate the injection authority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



STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION



JAMI BAILEY  
Director