

**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. 13923  
ORDER NO. R-12821**

**APPLICATION OF SDX RESOURCES, INC. 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 May 24 and on July 26, 2007, at Santa Fe, New Mexico, before Examiners William V. Jones and David K. Brooks.

NOW, on this 22<sup>nd</sup> day of October 2007, the Division Director, having considered the testimony, the record and the recommendations of the Examiners,

**FINDS THAT:**

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

(2) The applicant, SDX Resources, Inc. ("SDX" or "Applicant"), seeks authority to institute a waterflood project, injecting water into the San Andres formation within the Artesia-Queen-Grayburg-San Andres Pool (3230) on its leasehold consisting of the following 520.17 acres, more or less, of State of New Mexico lands in Eddy County, New Mexico:

**Township 17 South, Range 28 East, NMPM**

Section 29: SE/4 SE/4  
Section 31: E/2 E/2  
Section 32: NE/4, SW/4

**Township 18 South, Range 28 East, NMPM**

Section 6: NE/4 NE/4

(3) SDX seeks approval to inject water into oil producing carbonates within the middle and lower San Andres formation in two wells within this proposed waterflood:

(a) The NW State Well No. 8 (API No. 30-015-30815) located 1090 feet from the South line and 2126 feet from the West line, Unit N of Section 32, Township 17 South, Range 28 East, in perforations from 2523 to 2859 feet. This well is proposed as the initial injection well in this project. All supporting information including the C-108 form was submitted at the hearing.

(b) The NW State Well No. 5 (API No. 30-015-30781) located 1900 feet from the South line and 2146 feet from the West line, Unit K of Section 32, Township 17 South, Range 28 East, in perforations from 2464 to 2856 feet. This well was proposed as a future injection candidate in exhibits presented at the hearing. The required C-108 for this well was submitted subsequent to the hearings.

(4) SDX presented testimony from a geologist and an engineer at the May 24<sup>th</sup> hearing. The case was heard, then continued until July 26<sup>th</sup> in order to present proof of notice to any affected parties within the NW/4 of Section 32 and within Section 5 of Township 18 South, Range 28 East. No party appeared at either hearing in opposition to this application.

(5) SDX operates another injection project, the Northwest Artesia Unit, at shallower depths, directly above this proposed waterflood, within the Premier Sands of the lower Grayburg formation. The Northwest Artesia Unit was approved by the State Land Office and by the Oil Conservation Commission in Order No. R-4724 (21 February 1974) and consists of 640 acres of State of New Mexico lands as follows:

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Section 29: SE/4 SE/4  
 Section 31: E/2 SE/4, SE/4 NE/4  
 Section 32: NE/4, SW/4, E/2 SE/4, SW/4 SE/4

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This Unit is very similar [but not identical] in configuration to this proposed San Andres formation waterflood. Within the Unit area, the Northwest Artesia Unit Waterflood Project was approved by the Commission in Order No. R-4727. The Commission in its order approving the waterflood project, also approved 7 wells, located throughout the interior of the unit area, as water injection wells into the "Grayburg-San Andres formation."

(6) The following geological and engineering related testimony was presented by the applicant at the May 24<sup>th</sup> hearing:

(a) Within this general area, oil and gas development began first with the lower Grayburg "Premier sand" and with the Empire Abo formation.

Subsequently, the San Andres formation has been targeted for drilling development.

(b) This proposed injection project is to be vertically contained in the oil producing interval in the middle and lower San Andres formation, Artesia-Queen-Grayburg-San Andres Pool. This interval is approximately 500 feet in gross thickness with 5 to 8 percent porosity and 40 percent water saturation. It is bounded with relatively thick and impervious rocks both above and below. Laterally this interval can be traced for several townships and easily across the proposed waterflood area.

(c) The ultimate primary recovery is predicted to be 53,000 barrels of oil per well [total lease equals approximately 1 million barrels] and 10 percent of original oil in place. SDX is predicting an equal amount of secondary oil recovery.

(d) The best analogous waterflood in this interval is the Atoka-San Andres Unit located approximately 10 miles to the west-southwest. That waterflood was successful in that oil decline rates lessened to approximately 3 percent when the project was under injection.

(e) SDX plans to re-inject produced water and has no plans to utilize fresh water as a supplement to these volumes. SDX expects to inject up to 500 barrels per day into each injection well with the rate declining as the reservoir reaches fillup.

(f) This producing interval is developed on 40-acre well spacing. The northeastern portion of this proposed waterflood area is considered to be the best reservoir development. In that area, 20-acre wells have been drilled, but with mixed results.

(g) The typical well starts out at about 40 barrels of oil per day and declines hyperbolically for about four years. Currently production is declining at 12 to 14 percent annually and averages about 3.5 barrels of oil per day per well – so the wells could be considered as “stripper”.

(h) SDX has notified the surface owner in this area, John R. Gray, LLC, of its plans and has reached an agreement. SDX reported in the hearing that it did not notify the State Land Office of its application in this case.

(i) SDX did not attempt a statutory unitization of its leasehold with contiguous lands due to the numerous owners and the expected delay involved with reaching an agreement.

(j) Water sands in this area reach potentially to 200 feet, but no fresh water wells are reported within this area. There are no geologic faults in this area which would connect the injection zone with any source of drinking water.

(k) The submitted data on all plugged or active wells within the ½ mile area(s) of review (AOR) of the two proposed injection wells, indicates that these wells are cased and plugged so as to protect fresh water and prevent fluid migration from the injection zone.

(7) In November of 2006, in Case No. 13750, Order No. R-12658, BP America Production Company's ("BP") Washington "33" State Lease Waterflood Project was approved as a secondary recovery project within the Queen, Grayburg, and San Andres formations. BP's 600-acre project is wholly contained within Section 33, directly east of SDX's proposed San Andres injection project. BP's project was initially approved with seven (7) internally located injection wells.

(8) SDX did not report the initial or current reservoir pressure within this reservoir, nor did it indicate whether mobility ratios would be favorable for waterflooding. From examination of production plots, it seems this San Andres reservoir is depleted. It has relatively poor porosity and very low primary oil recovery on 40-acre oil spacing. However, this project is expected to be analogous to Devon Energy Production Company LP's successful Atoka San Andres Unit approved in Order No. R-3476, and therefore should be a candidate for secondary oil recovery.

(9) The piecemeal shape of this proposed lease waterflood project is not consistent with successful secondary recovery operations and would always inhibit the ability to design and implement injection patterns necessary for the project's success – see exhibit 4.

(10) SDX is proposing only two initial injection wells, located near each other within only one portion of the lease. SDX's application calls for a waterflood project to be approved, but SDX's witnesses testified at the hearing that this is most likely a pilot project with requested option to add future injection wells. SDX did not present a plan at the hearing as to how injection patterns could be designed within this odd shaped lease in order to best implement "sweep" and recover a maximum amount of oil in place.

(11) This project is proposed as internal to a lease held by SDX and does not involve either an established Unit or statutory unitization. SDX is the operator of record for the lands proposed for waterflooding, but the actual extent of the NW State lease and its breakdown of ownership were never presented, nor was testimony provided from a landman. The ONGARD database available to the Division shows the base lease from the State of New Mexico actually extends into lands beyond the boundaries proposed for this proposed waterflood.

(12) The Northwest Artesia Unit Waterflood Project located almost directly

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above this proposed project was placed within a Unit obtained from the State Land Office and approved by the Commission. In addition, that waterflood was initially implemented with internally located injection wells placed throughout the Unit area so as to immediately affect the entire area.

(13) Division Rule 701G(3) for waterflood projects states:

“The project area of a water flood project shall comprise the proration units a given operator owns or operates upon which injection wells are located plus all proration units the same operator owns or operates that directly or diagonally offset the injection tracts and have producing wells completed on them in the same formation; provided however, that the division may include in the project area additional proration units not directly or diagonally offsetting an injection tract if, after notice and hearing, the operator has established that such additional units have wells completed thereon that have experienced a substantial response to water injection.”

(14) Significantly, the proposed waterflood project omits two spacing units (the SE/4 NW/4 and the SW/4 NW/4 of Section 32), which are, respectively, directly adjacent and diagonally adjacent to the spacing unit on which one of the proposed injectors is located. Although these tracts are not required to be included by Rule 701.G(3), because they are not owned by SDX and do not have producing wells in the San Andres, SDX did not demonstrate that the correlative rights of the owners of these tracts would be protected.

(15) In fact, according to the testimony of SDX's engineering witness, Mr. Morgan, the injected water would most likely move updip from the injection wells. The structure map that SDX presented in evidence indicates that the omitted, adjacent tracts in the S/2 NW/4 of Section 32 are updip from the proposed injection wells. Mr. Morgan conceded that it was at least possible that, if the injected water moved into these tracts, it could adversely affect the correlative rights of the owners of those tracts.

(16) The reluctance of the owners of the San Andres in this area to pool lands for purposes of waterflooding or even to form a cooperative waterflood is unfortunate and will likely lead to waste of oil and gas resources. The positive or negative effect of this “lease” injection on any un-drilled tracts or on offset owners is impossible to determine – but cannot be as favorable as combining contiguous areas and designing patterns based on reservoir characteristics rather than constrained by lease boundaries. This proposal as presented by SDX is an attempt to recover additional oil but is not in the best interests of the owners of this oil reservoir and does not prevent waste or protect correlative rights.

(17) The two proposed injection wells in this case have been submitted by SDX to the Division for administrative approval as saltwater disposal wells – and should each

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be evaluated administratively based on their merits as disposal wells.

(18) This application should be denied.

**IT IS THEREFORE ORDERED THAT:**

(1) The application of SDX Resources, Inc. ("SDX") to institute a waterflood project within the San Andres formation, Artesia-Queen-Grayburg-San Andres Pool (3230) on its leasehold acreage in Eddy County, New Mexico specifically described below is hereby denied.

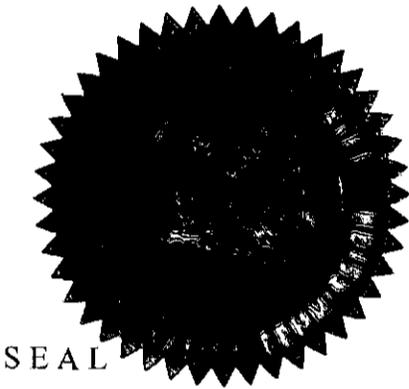
**Township 17 South, Range 28 East, NMPM**

Section 29: SE/4 SE/4  
Section 31: E/2 E/2  
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**Township 18 South, Range 28 East, NMPM**

Section 6: NE/4 NE/4

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated



STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

MARK E. FESMIRE, P.E.  
Director