

**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. 12112 (Reopened)  
ORDER NO. R-11435-A**

**APPLICATION OF VANCO OIL & GAS CORPORATION AND ITS  
AFFILIATE, CBS OPERATING CORP., FOR AMENDMENT OF DIVISION  
ORDER NO. R-11435 TO AUTHORIZE A PRESSURE MAINTENANCE  
(WATER FLOOD) PROJECT IN THE NORTH SQUARE LAKE UNIT AREA,  
ESTABLISH PROCEDURES FOR APPROVAL OF ADDITIONAL INJECTION  
WELLS, AND QUALIFY THE PROJECT AREA FOR THE RECOVERED OIL  
TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, EDDY  
COUNTY, NEW MEXICO.**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This case came on for hearing at 8:15 a.m. on March 7, 2002 at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 30th day of May, 2002, 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) By Order No. R-11207, issued in Case No. 12113 on June 17, 1999, the Division, upon application of GP II Energy, Inc., statutorily unitized the North Square Lake Unit pursuant to the "Statutory Unitization Act," Sections 70-7-1 through 70-7-21 NMSA 1978, for the purpose of establishing a secondary recovery project. The unit area comprises 6,155.96 acres, more or less, of state and federal lands and encompasses the following-described acreage in Eddy County, New Mexico:

**TOWNSHIP 16 SOUTH, RANGE 30 EAST, NMPM**

Section 25:	E/2
Section 36:	N/2

TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM

Section 19: S/2  
Section 20: S/2  
Section 27: SW/4, W/2 SE/4, SE/4 SE/4, SW/4 NE/4,  
S/2 NW/4, NW/4 NW/4  
Section 28 through 34: All

(3) By Order No. R-11435 issued in Case No. 12112 on August 10, 2000, the Division determined that the existing wells located within the Unit Area had reached the advance stage of depletion and authorized GP II Energy, Inc., to institute a waterflood project within Phases 1A East and 1B West of the North Square Lake Unit ("Unit Area") by the injection of water into the Grayburg and San Andres formations, Square Lake Grayburg-San Andres Pool, Eddy County, New Mexico, through twenty-three (23) initial injection wells. This order further stipulated that prior to commencing injection operations into any of the twenty-three injection wells, GP II Energy Inc. was required to: (i) re-enter and re-plug four wells located within the "area of review"; and (ii) re-enter and either re-plug or recompleat as inactive injection wells thirteen wells located within the "area of review."

(4) Vanco Oil & Gas Corporation ("Vanco") and its affiliate, CBS Operating Corporation ("CBS"), seek the amendment of Division Order No. R-11435 to authorize:

- (a) the implementation of a limited pressure maintenance project within the North Square Lake Unit, in lieu of a full-scale waterflood project, to be commenced with water injection into seven existing injection wells within the project area;
- (b) the administrative expansion of the pressure maintenance project by the addition of injection wells pursuant to the procedure set forth by Division Rule No. 701.G(6) or (7); and
- (c) the commencement of injection operations into any new injection well once all remedial work, if any, has been completed within the one-half mile area of review for that well.

(5) Pursuant to Section 70-7-8 NMSA 1978, sufficient ratifications of the Division's statutory unitization order were obtained from the interest owners in the Unit Area, and the unit became effective on January 1, 2000.

(6) Vanco was formed in early 2000 and purchased approximately 11% of the working interest in the Unit Area.

(7) CBS and Square Lake Partners, L.L.C. own approximately 5% and 80%, respectively, of the working interest ownership within the Unit Area. The remaining 4% working interest in the Unit Area is owned by several additional parties in small proportions.

(8) GP II Energy, Inc. currently serves as the contract operator of the Unit Area, but owns no interest in the unit.

(9) Vanco's witnesses testified that it has the authority to represent the interest of CBS and Square Lake Partners, L.L.C. in all matters pertaining to the operation of the Unit Area.

(10) As part of its efforts to acquire interests in the Unit Area, Vanco conducted studies on the Grayburg and San Andres formations within the Unit Area and within several secondary recovery projects that offset the Unit Area.

(11) Vanco has determined, through its technical study, that there are several factors that prohibit the successful implementation of a full-scale waterflood project within the Unit Area, described as follows:

- (a) full-scale waterflood projects in this area, generally those in which the ratio of producing wells to injection wells is 1:1, have proven to less effective than anticipated. This is especially true of the Keel West and Skelly Unit Waterflood Projects, located directly south of the Unit Area;
- (b) area of review well remediation requirements contained within Division Order No. R-11435 will preclude the commencement of injection operations until such time as considerable work has been performed and considerable expenses incurred

repairing the problem wells identified in that order;  
and

- (c) there are outstanding compliance issues with regards to approximately twenty wells within the Unit Area. These compliance issues are related to the Division's current effort to identify inactive wells and cause action to be taken by operators to bring these wells into compliance with Rule 201.

(12) Vanco presented engineering evidence that demonstrates that:

- (a) the pay zones in the Grayburg and San Andres formations are generally continuous within the Unit Area and within various secondary recovery projects adjacent to the Unit Area. It is therefore anticipated that full-scale waterflood operations conducted within the Unit Area will perform similarly to waterflood projects located adjacent to the Unit Area;
- (b) although initially thought to be the most effective type of enhanced oil recovery technique in this area, full-scale waterflood operations, those in which the ratio of producing wells to injection wells is 1:1 and which utilize a set pattern such as a 40-acre five spot, have not performed as well as projected; and
- (c) a pressure maintenance project that is designed to meet the technical characteristics of the reservoir and provide the flexibility to inject water where it will provide the maximum recovery benefit should result in the recovery of more hydrocarbons from the Unit Area than would be recovered utilizing full-scale waterflood operations.

(13) The Unit Area currently contains 91 wells, of which 48 are producers, 33 are inactive and 10 are approved injection wells. Current production from the Unit Area is approximately 109 barrels of oil and 400 barrels of water per day. There is currently no gas produced within the Unit Area.

(14) Vanco's witnesses testified that if the Division approves its plan to implement pressure maintenance operations within the Unit Area, and if the Division approves Vanco's schedule for bringing certain wells within the Unit Area into compliance with Rule 201, GP II Energy, Inc. will resign as unit operator and Vanco or CBS will become unit operator and post additional bonds to assure performance of the well compliance schedule.

(15) Vanco proposes to implement pressure maintenance operations within the Unit Area in accordance with the following plan:

- (a) The designated operator will drill twelve (12) new infill producing wells in 2002 and twelve (12) additional infill producing wells in 2003. Modern logs will be run on each of these wells in order to obtain reliable geologic and reservoir data. These wells will be located in close proximity to existing injection wells and possibly at other locations based upon new reservoir information obtained from the development of the unit. Additional infill producing wells will be drilled subsequent to 2003, the number and location of which will be determined by subsequently obtained reservoir data and response to pressure maintenance operations;
- (b) Seven existing injection wells will be utilized in 2002. Four were permitted by Division Order No. R-11435 and three were approved prior to the issuance of Order No. R-11435. An additional four injection wells will be added in 2003, either by drilling new injection wells or converting existing wells to injection. Subsequently, additional wells will be converted to injection or new injection wells drilled as deemed necessary by the operator in order to ultimately obtain a ratio of approximately one injection well per three producing wells within the Unit Area;
- (c) The existing injection facilities will be upgraded to handle required rates for pressure maintenance operations. Surface facilities within the Unit Area

will be upgraded, including the installation of three central tank batteries with LACT units and crude oil pipeline connections. Existing pipelines will be rerouted to move necessary volumes of water to the injection wells in the project area;

- (d) Once an agreement is reached with the Division on a schedule for performing remedial work on wells to bring them into compliance with Division rules, Vanco or CBS will post additional plugging bonds and remediate non-compliant wells; and
  - (e) Vanco will conduct an engineering study to determine its development plans for 2004 and thereafter. Vanco currently anticipates that eventually fifty (50) additional infill producing wells will be drilled and an appropriate number of injection wells will be drilled or converted.
- (16) The evidence presented by Vanco in this case demonstrates that:
- (a) infill drilling and pressure maintenance operations conducted within the Unit Area should be at least as effective in recovering additional secondary reserves as a full-scale waterflood project;
  - (b) the implementation of infill drilling and pressure maintenance operations within the Unit Area should result in the recovery of additional hydrocarbons that would otherwise not be recovered, thereby preventing waste;
  - (c) Vanco's initial plan of operation for 2002-03, which concentrates injection operations and infill drilling in the southwestern and north-central portion of the Unit Area appears to be reasonable and should be adopted; and
  - (d) project costs are estimated to be approximately \$18.5 million dollars. The ultimate recovery resulting from pressure maintenance operations

within the Unit Area are estimated to be approximately 6.74 million barrels of oil valued at \$144 million dollars.

(17) Vanco notified all interest owners within the Unit Area of its application in this case. None of the interest owners that represent the outstanding 4% interest in the Unit Area appeared at the hearing.

(18) The application of Vanco to amend Division Order No. R-11435 should be approved.

(19) Vanco further seeks to qualify the subject pressure maintenance project as an "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5.)

(20) The evidence presented indicates that:

- (a) the proposed pressure maintenance project should result in an increase in the amount of crude oil that may be ultimately recovered from the project area;
- (b) the project area has been so depleted that it is prudent to apply enhanced recovery techniques to maximize the ultimate recovery of crude oil; and
- (c) the proposed pressure maintenance project is economically and technically feasible, and the application has not been prematurely filed.

Accordingly, the proposed pressure maintenance project meets all criteria for approval under the Enhanced Oil Recovery Act and Rule 30.

(21) The project area should be approved in two phases described as follows:

**Phase I, North Square Lake Unit, West Area**

**TOWNSHIP 16 SOUTH, RANGE 30 EAST, NMPM**

Section 25: E/2

Section 36: N/2

**TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM**

Section 19: S/2  
Section 20: S/2  
Sections 29 through 32: All

**Phase II, North Square Lake Unit, East Area**

**TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM**

Section 27: SW/4, W/2 SE/4, SE/4 SE/4, SW/4 NE/4,  
S/2 NW/4, NW/4 NW/4  
Section 28: All  
Sections 33 through 34: All

(22) To be eligible for the EOR tax rate, the operator should advise the Division of the date and time water injection commences within the pressure maintenance project. At that time the Division will certify the project to the New Mexico Taxation and Revenue Department.

(23) At such time as a positive production response occurs and within five years from the date the project was certified to the New Mexico Taxation and Revenue Department, the applicant must apply to the Division for certification of a positive production response. This application shall identify the area benefiting from enhanced recovery operations and the specific wells eligible for the EOR tax rate. The Division may review the application administratively or set it for hearing. Based upon evidence presented, the Division will certify to the New Mexico Taxation and Revenue Department those wells that are eligible for the EOR tax rate.

**IT IS THEREFORE ORDERED THAT:**

(1) The application of Vanco Oil & Gas Corporation and its affiliate, CBS Operating Corporation, to amend Division Order No. R-11435, dated August 10, 2000, is hereby granted.

(2) The Ordering Paragraphs of Division Order No. R-11435 are hereby superseded by this order. The Exhibits attached to Order No. R-11435 are hereby deleted and superseded by the Exhibits attached to this Order.

(3) In lieu of implementing a full scale waterflood project within the North Square Lake Unit, the operator of the North Square Lake Unit is hereby authorized to



institute a pressure maintenance project within the Unit Area by the injection of water into the Grayburg and San Andres formations, Square Lake Grayburg-San Andres Pool, Eddy County, New Mexico, through seven initial injection wells shown on Exhibit "A" attached hereto.

(4) Prior to commencing injection operations into the NSLU Well No. 101 located in Unit B of Section 31, the applicant shall re-enter and either re-plug or recompleate as inactive injection wells to be approved for injection at a later time the following-described wells:

<u>Well Name</u>	<u>Well Location</u>
NSLU No. 76	Unit N, Section 30, T-16S, R-31E
NSLU No. 77	Unit O, Section 30, T-16S, R-31E
NSLU No. 103	Unit A, Section 31, T-16S, R-31E
NSLU No. 104	Unit D, Section 32, T-16S, R-31E

04931? ✓  
04940? ✓  
NA

(5) Prior to commencing injection operations into the NSLU Well No. 102 (Grier Well No. 17) located in Unit A of Section 31, the applicant shall re-enter and either re-plug or recompleate as inactive injection wells to be approved for injection at a later time the aforesaid NSLU Wells No. 77, 103 and 104.

(6) Prior to commencing injection operations into the NSLU Well No. 127 (Grier Well No. 7X) located in Unit H of Section 31, the applicant shall re-enter and either re-plug or recompleate as inactive injection wells to be approved for injection at a later time the aforesaid NSLU Wells No. 103 and 104, and the NSLU Well No. 146 located in Unit L of Section 32, T-16S, R-31E.

X NA

(7) Prior to commencing injection operations into the NSLU Well No. 145 (Grier Well No. 6) located in Unit J of Section 31, the applicant shall re-enter and either re-plug or recompleate as inactive injection wells to be approved for injection at a later time the aforesaid NSLU Well No. 146 and the NSLU Well No. 161 located in Unit N of Section 31, T-16S, R-31E.

04951? ✓

(8) The operator may place additional wells on injection within the Unit Area after obtaining an administratively issued injection permit in accordance with the procedure set forth by Division Rule 701.G(7).

(9) The operator shall conduct bradenhead tests on each of the wells shown on Exhibit "B" annually in accordance with a schedule obtained from the Artesia District

Office of the Division in order to ensure that fresh water aquifers are not being adversely affected by injection operations.

(10) The project is hereby designated the North Square Lake Unit Pressure Maintenance Project, and the operator shall conduct injection operations in accordance with Division Rules No. 701 through 708, and shall submit monthly progress reports in accordance with Division Rules No. 706 and 1115.

(11) The operator shall take all steps necessary to ensure that the injected fluid 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.

(12) The injection of water into each of the wells shown on Exhibit "A" shall be accomplished through 2 3/8 inch internally plastic-lined 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.

(13) Prior to commencing injection operations into the wells shown on Exhibit "A," the casing in each well shall be pressure tested throughout the interval from the surface down to the proposed packer setting depth to ensure the integrity of the casing.

(14) Each of the wells in Exhibit "A" shall be equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to that shown in Exhibit "A."

(15) 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.

(16) The operator shall give advance notice to the supervisor of the Division's Artesia District Office of the date and time: (i) injection equipment will be installed on each of the proposed injection wells; (ii) the mechanical integrity pressure tests will be conducted on each of the proposed injection wells; and (iii) the remedial work will be performed on the NSLU Wells No. 76, 77, 103, 104, 146, and 161, so that these operations may be witnessed.

(17) The injection authority granted herein for the NSLU Wells No. 101, 102, 127 and 145 shall terminate one year after the effective date of this order if the applicant

has not commenced injection operations into the well; provided however, the Division upon written request by the operator, may grant an extension for good cause shown.

(18) The subject pressure maintenance project, though described as a "pressure maintenance project" by the operator, is a "water flood project" as defined by Rule 701.G, and the allowables of the producing wells in the Project Area shall be determined in accordance with Rule 701.G(4).

(19) The operator shall immediately notify the supervisor of the Division's Artesia District Office of any failure of the tubing, casing or packer in any of the injection wells or the leakage of water or oil from or around any producing or plugged and abandoned well within the project area, and shall take such steps as may be necessary and timely to correct the failure or leakage.

(20) The subject pressure maintenance project is hereby qualified as an "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5.)

(21) The certified project area shall initially comprise the area approved for statutory unitization by Division Order No. R-11207, and described as follows, provided however, the Phase I West Area and Phase II East Area within the project may be independently certified by the Division to the New Mexico Taxation and Revenue Department:

**Phase I, North Square Lake Unit, West Area**

**TOWNSHIP 16 SOUTH, RANGE 30 EAST, NMPM**

Section 25: E/2  
Section 36: N/2

**TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM**

Section 19: S/2  
Section 20: S/2  
Sections 29 through 32: All

**Phase II, North Square Lake Unit, East Area**

**TOWNSHIP 16 SOUTH, RANGE 31 EAST, NMPM**

Section 27: SW/4, W/2 SE/4, SE/4 SE/4, SW/4 NE/4,  
S/2 NW/4, NW/4 NW/4

Section 28: All  
Sections 33 through 34: All

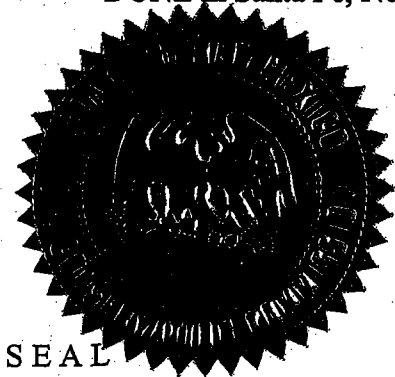
(22) To be eligible for the EOR tax rate, the operator shall advise the Division of the date and time water injection commences within the pressure maintenance project. At that time the Division will certify the project to the New Mexico Taxation and Revenue Department.

(23) At such time as a positive production response occurs and within five years from the date the project was certified to the New Mexico Taxation and Revenue Department, the operator must apply to the Division for certification of a positive production response. This application shall identify the area benefiting from enhanced recovery operations and the specific wells eligible for the EOR tax rate. The Division may review the application administratively or set it for hearing. Based upon evidence presented, the Division will certify to the New Mexico Taxation and Revenue Department those wells that are eligible for the EOR tax rate.

(24) The operator shall submit an annual report to the Division, due January 1<sup>st</sup>, that details the work accomplished within the Unit Area during the previous year. Such report shall include, but not necessarily be limited to, the number of wells drilled, the number of active producing and injection wells, a summary of Unit Area production, the remedial well work performed, facility work, etc. This report shall further detail the work that is planned for the current year within the Unit Area.

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

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



STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

*Lori Wrotenbery*  
LORI WROTENBERY,  
Director

**EXHIBIT "A"**  
**CASE NO. 12112 (REOPENED)**  
**ORDER NO. R-11435-A**

**Vanco Oil & Gas Corporation**  
**Approved Injection Wells**  
**North Square Lake Unit Pressure Maintenance Project**

<u>Well Name</u>		<u>Location</u>	<u>Section</u>	<u>Injection Interval</u>	<u>Pressure Limit (psig)</u>
NSLU No. 4	I	1650' FSL & 990' FEL	19	3,286-3,304	657 X
NSLU No. 8	I	1980' FSL & 660' FEL	20	3,404-3,575	681 — 04025
NSLU No. 59	K	1880' FSL & 1980' FWL	29	3,215-3,451	643 04919
Grier Well No. 11 (NSLU No. 101)	B	660' FNL & 1980' FEL	31	2,988-3,336	598 04946
Grier Well No. 17 (NSLU No. 102)	✓ A	330' FNL & 660' FEL	31	3,132-3,338	626 20185
Grier Well No. 7X (NSLU No. 127)	A	1980' FNL & 660' FEL	31	3,055-3,367	611 04948
Grier Well No. 6 (NSLU No. 145)	✓ J	1980' FSL & 1980' FEL	31	2,980-3,338 OH	596 04948

**EXHIBIT "B"**  
**CASE NO. 12112 (REOPENED)**  
**ORDER NO. R-11435-A**

**Vanco Oil & Gas Corporation**  
**Wells to be Bradenhead Tested Annually**  
**North Square Lake Unit Pressure Maintenance Project**

<u>Well Name</u>	<u>Location</u>	<u>Status</u>
Grier Well No. 12 (NSLU No. 56)	1980' FSL & 1980' FEL (Unit J) Section 30, Township 16 South, Range 31 East	Active Producer
Texas Trading "A" Well No. 3 (NSLU No. 58)	1980' FSL & 660' FWL (Unit L) Section 29, Township 16 South, Range 31 East	Active Producer
J.N. Fidel Well No. 1 (NSLU No. 79)	660' FSL & 660' FEL (Unit P) Section 30, Township 16 South, Range 31 East	Inactive Producer
Grier Well No. 1 (NSLU No. 97)	660' FNL & 660' FWL (Unit D) Section 31, Township 16 South, Range 31 East	Active Producer
Desa Well No. 1 (NSLU No. 120)	1650' FNL & 1650' FEL (Unit G) Section 32, Township 16 South, Range 31 East	Active Producer
HJ Loe Well No. 1 (NSLU No. 160)	330' FSL & 1980' FWL (Unit N) Section 31, Township 16 South, Range 31 East	Active Producer
WSLU Well No. 10	660' FSL & 660' FEL (Unit P) Section 36, Township 16 South, Range 30 East	Active Producer