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JASON KELLAHIN (RETIRED 1991)

September 21, 2001

**HAND DELIVERED**

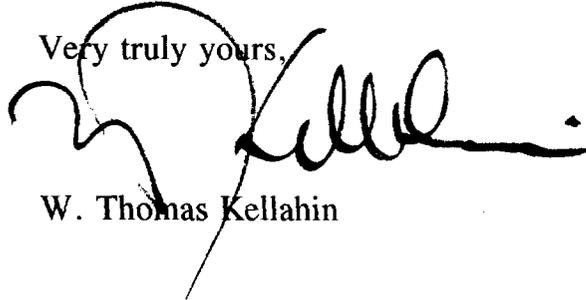
Mr. David R. Catanach  
Oil Conservation Division  
1220 South St. Francis Drive  
Santa Fe, New Mexico 87505

Re: NMOCD Case 12722  
Application of OXY concerning  
a tertiary recovery project  
North Hobbs Unit,  
Lea County, New Mexico

Dear Mr. Catanach:

On behalf of Occidental Permian Limited Partnership ("OXY"), please find enclosed a proposed order for consideration in this case. I also have enclosed a wordperfect 5.1 diskette containing this draft order.

Very truly yours,



W. Thomas Kellahin

cc: Occidental Permian Limited Partnership  
Attn: Richard Foppiano

**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 PURPOSES OF  
CONSIDERING:**

**CASE NO. 12722  
ORDER NO. R-**

**APPLICATION OF OCCIDENTAL PERMIAN LIMITED  
PARTNERSHIP ("OXY") TO AUTHORIZE THE EXPANSION  
OF ITS NORTH HOBBS GRAYBURG-SAN ANDRES UNIT  
PRESSURE MAINTENANCE PROJECT, AMEND DIVISION  
ORDER R-6199-A, AN INCREASED INJECTION PRESSURE,  
INCREASED GAS OIL RATIO, EXCEPTION FROM ONE  
YEAR COMMENCEMENT OF INJECTION, AND TO QUALIFY  
THIS EXPANSION FOR THE RECOVERED OIL TAX RATE  
PURSUANT TO THE "NEW MEXICO ENHANCED OIL  
RECOVERY ACT," LEA COUNTY, NEW MEXICO**

**DRAFT DATED 9/21/01(pm)  
OXY'S PROPOSED  
ORDER OF THE DIVISION**

**BY THE DIVISION:**

This cause came on for hearing at 8:15 a.m. on September 6, 2001, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this \_\_\_ day of September, 2001, 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) The applicant, Occidental Permian Limited Partnership ("OXY") seeks to amend Division Order R-6199 concerning the expansion of its North Hobbs Grayburg-San Andres Unit Pressure Maintenance Project as follows: (i) to convert a portion of this project (Phase I CO2 Project Area) from water injection to a tertiary recovery project by the injection of carbon dioxide (CO2) and produced water and the reinjection of CO2, produced water, and produced gases including methane, natural gas liquids and hydrogen sulfide (H2S) including existing and new wellbores; (ii) an increase in the authorized surface injection pressure; (iii) an increase in the gas oil ratios; (iv) an exception from the one year commencement of injection; and (v) to qualify Phase I CO2 Project Area of the Unit for the recovered oil tax rate pursuant to the "New Mexico Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5. This project is identified as "Phase One CO2 Project Area" and consists of the following acreage in Lea County, New Mexico;

T18S, R37E NMPM

Sec 13: SE/4 and W/2  
Sec 14: All  
Sec 23-25: All  
Sec 26: E/2NE/4 and NW/4NE/4  
Sec 36: NE/4, E/2NW/4 and N/2SE/4

T18S, R38E NMPM

Sec 17: S/2NW/4 and SW/4  
Sec 18: NE/4 and S/2  
Sec 19: All  
Sec 20: S/2 and NW/4  
Sec 21: SW/4  
Sec 28: W/2  
Sec 29-30: All  
Sec 31: N/2 and N/2S/2  
Sec 32: N/2 and N/2S/2  
Sec 33: NW/4

(3) OXY intends to utilize wellbores as follows: to convert existing water injection wells to CO2/water injectors; convert existing producers to injectors; reactivate temporarily abandoned wellbores for injection and/or production; re-enter previously plugged wells and convert to injection; and to drill new producers and/or injectors.

(4) The Phase I CO<sub>2</sub> Project Area involves the approval of injection wells for injection into the North Hobbs Grayburg-San Andres Pool ("injection interval") whose description, location, current status and proposed status is set forth on Exhibit "A" incorporated herein.

(5) Upon the application of Shell Oil Company, the North Hobbs Grayburg San Andres Unit ("North Hobbs Unit") was statutorily unitized on October 3, 1979 by the New Mexico Oil Conservation Commission Order R-6198 entered in Case 6652.

(6) Oxy is the current operator of the North Hobbs Unit Pressure Maintenance Project which was approved by Commission Order R-6199 (Case 6653) issued effective November 30, 1979.

(7) At the time of unitization, the Unit consisted of 10,649.53 acres, more or less, being a portion of the Hobbs Grayburg-San Andres Pool and the pressure maintenance project consisted of some 70 injection wells for the injection of water into the Grayburg-San Andres formation.

(8) Order R-6199 authorized Shell to operate the pressure maintenance project "by the injection of water."

(9) Pre-unitization primary oil recovery from the Unit has been 168 million barrels of oil. Under waterflood recovery an additional 110 million barrels of oil will have been recovered

(10) 76 million barrels of additional oil are estimated to be recoverable by the proposed CO<sub>2</sub> project at an estimated cost of \$510,000,000.

(11) The Unit is currently producing at 6100 BOPD and 226,000 BWPD from 144 active producers. 83 injectors are currently active.

(12) Within a portion of the North Hobbs Unit identified as Phase I CO<sub>2</sub> Project Area, OXY seeks to convert this secondary recovery project to a tertiary recovery project by means of a significant change in the process used for the displacement and recovery of crude oil as follows:

- (a) within that portion of Phase I CO<sub>2</sub> Project Area identified as the Gas Injection Area, by injection of carbon dioxide ("CO<sub>2</sub>") and produced water; and

(b) within that portion of Phase I CO<sub>2</sub> Project Area identified as the Gas Re-injection Area, by the re-injection of produced water and gases produced within the unit including CO<sub>2</sub>, natural gas liquids, methane and H<sub>2</sub>S.

### **Recovered oil tax credit**

(13) An estimated 76 million barrels of additional oil is recoverable oil attributable to a Positive Production Response from CO<sub>2</sub> injection within the Phase I CO<sub>2</sub> Project Area of the North Hobbs Unit.

(14) This Phase I CO<sub>2</sub> Project is a miscible carbon dioxide flood superseding a waterflood. The process will involve a tapered WAG (water alternating with gas), injection of a CO<sub>2</sub> slug size equal to 60% hydrocarbon pore volume (HPCV) on a 160-acre 9 spot pattern (for San Andres zone 1 and 2); and a tapered WAG with an injection of a CO<sub>2</sub> slug size equal to 80% of the HPCV on a 40-acre 5 spot pattern for San Andres zone 3.

(15) This Phase I CO<sub>2</sub> Project represents a substantial change and meets all the criteria for certification by the Division as a qualified "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5).

(16) The applicant presented both engineering and geologic evidence which demonstrated a comprehensive method for tertiary oil recovery at this point in time.

(17) The certified "project area" should initially comprise the area within the North Hobbs Unit described as the "Phase I CO<sub>2</sub> Project" and identified in Finding No. (2) above, provided, however, that the "Phase I CO<sub>2</sub> Project Area" eligible for the recovered oil tax rate may be contracted and reduced dependent upon the evidence presented by the applicant in its demonstration of the occurrence of a positive production response.

(18) To be eligible for the EOR credit, the operator should advise the Division when tertiary injection commences in the project area and request the Division certify such phases or area to the New Mexico Taxation and Revenue Department.

(19) At such time as a positive production response occurs and within five years from the date of the Certificate of Qualification, the applicant must apply to the Division for certification of positive production response, which application shall identify the area actually benefitting from enhanced recovery operations. The Division may review the application administratively or set it for hearing. Based upon evidence presented, the Division will certify to The Department of Taxation and Revenue those lands with are eligible for the credit.

(20) The proposed Phase I CO<sub>2</sub> Project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

### **Safety Plan**

(21) Oxy demonstrated that its proposal to re-inject all produced gases containing hydrogen sulfide within a portion of Phase I is essential in order to have an economically viable project and produced gas re-injection can be accomplished in a safe manner.

(22) OXY has presented a safety plan which has been reviewed by the Bureau Chief of the Environmental Bureau of the Division and determined to be acceptable to the Division

(23) In support of the safety plan, OXY has also submitted technical supporting data including a "unified dispersion model" which the Division finds to be an appropriate model and which meets the API guidelines for determining the radius of exposure for such a project.

### **Surface injection pressure limitations**

(24) Results of some 52 step rate tests performed in the past demonstrate a minimum bottom hole parting pressure of 2600 psi for this formation. OXY proposes to operate at three different maximum **surface injection pressures** based upon substances injected that result in **bottom** hole pressures not greater than 2400 psi.

(25) Oxy's proposed surface pressure limitations will be higher than the Division's standard and are necessary because of the lighter density (as compared to water) of the gaseous injectants caused by their composition and temperature, and because of the friction pressure losses down the tubing resulting from the injection rates necessary to make this project economically viable.

(26) Compliance with this proposed bottom hole pressure limitation of 2400 psi can best be achieved by allowing OXY to inject up to the following maximum surface injection pressures for the following substances:

CO2 only injection:	1250 psi
Water injection:	1100 psi
Produced gas injection:	1770 psi

### **Increase in GOR**

(27) In order to make the injection of CO2 economically practicable, it is necessary to increase in the current total gas to total oil ratio limitation from 3500 mcf/bbl to 6,000 mcf/bbl.

### **extension of period for commencement of injection**

(28) Because the commencement of tertiary injection into the Phase I Area of the North Hobbs Unit may not occur until the end of 2002, Oxy seeks an exception from the Division practice of requiring that actual tertiary injection commence within one (1) year of the date of the order approving injection to eighteen (18) months, plus an administrative procedure that allows for additional extensions of time.

### **Area of Review**

(29) In accordance with Division Rule 701, OXY submitted satisfactory evidence on Division Form C-108 in compliance with Division Rule 701.

(30) In accordance with Division Order R-9708, OXY submitted appropriate evidence to qualify Phase I for the recovered oil tax rate pursuant to the Enhanced Oil Recovery Act.

(31) Within the one-half mile "Area of Review" there are approximately 400 wells which have penetrated to or through the North Hobbs Grayburg-San Andres Pool including 63 plugged and abandoned wells, 36 open hole completion wells, 160 wells with production casing, 108 wells with intermediate casing and liner, 4 wells with deep producing casing and 37 wells with deep production liner with intermediate casing

(32) OXY has submitted schematic diagrams of the 63 plugged and abandoned wellbores within the Area of Review and testified that 62 were cased, cemented and plugged in such a manner to preclude the migration of fluid from the proposed injection interval into fresh water strata or potentially productive zones above or below the injection zone. OXY also testified that these wells have been plugged and abandoned in a manner acceptable to the Division at the time they were plugged.

(33) OXY identified two potential problem wells from this group:

(a) the NM State A Well No. 4 (API 3002505495), Unit I, Section 25, T18S, R37E. It was believed that the total depth of this well was 4270 feet and therefore had a cement plug set at approximately 4240 feet which is not sufficient to isolate the proposed injection interval in the Hobbs Grayburg San Andres Pool from the Byers (Queen) formation. Subsequent to the hearing, OXY has submitted submittal data which demonstrates that the total depth of this well is 3270 feet which means its total depth was too shallow to penetrate the Hobbs Grayburg San Andres Pool and therefore this well is not a "problem" well and no remedial action is required; and

(b) the Moran SM 20 Well No 1 (API #3002507374) Unit G, Section 20, T18S, R38E which did not have sufficient plugs to isolate the proposed injection interval from the Queen or the Glorieta formations. Oxy demonstrated that neither interval is currently productive nor is it expected to be productive within one mile of this wellbore.

(34) No corrective or remedial action should be required on the Moran SM 20 Well No 1 (API #3002507374) Unit I, Section 20, T18S, R38E because of the absence of potentially productive zones within one mile of this wellbore.

(35) OXY also submitted well construction and cementing data for 345 unplugged wells within the Area of Review and testified that all such wells were constructed in such a manner to preclude the migration of fluid from the proposed injection interval in the Hobbs Grayburg San Andres Pool into freshwater strata or potentially productive zones above or below the proposed injection zone.

(36) OXY submitted additional data on 103 proposed injection wells. One proposed injection well, the NHGSU Well No. 311 (API #3002507369), Unit B, Section 19, T18S, R38E, was found to be inadequately cemented behind the production liner.

(37) Prior to commencing tertiary injection into any well within one-half mile of the NHGSU Well No. 311 (API #3002507369) OXY should be required to demonstrate to the supervisor of the Division's Hobbs District Office that OXY has performed remedial cement operations in a manner acceptable to the Division.

(38) The injection of water, carbon dioxide and/or produced gas into each of the injection wells shown on Exhibit "A" should be accomplished through internally fiberglass-lined tubing installed in a packer set within 100 feet of the uppermost injection perforation or casing shoe; the casing-tubing annulus should be filled with an inert fluid and a gauge or approved leak-detection device should be attached to the annulus in order to determine leakage in the casing, tubing or packer.

(39) The operator should give advance notification to the supervisor of the Hobbs District Office of the Division of the date and time of the installation of injection equipment, the conductance of any remedial cement operations and the mechanical integrity pressure tests in order that the same may be witnessed.

(40) The application should be approved and the project should be governed by the provisions of Rule Nos 701 through 708 of the Oil Conservation Division Rules and Regulations.

(41) That approval of this application will prevent waste, result in the recovery of hydrocarbons which might not otherwise be recovered, protect corrective rights and promote the interests of conservation.

**IT IS THEREFORE ORDERED THAT:**

(1) The applicant, Occidental Permian Limited Partnership ("OXY"), is hereby authorized to institute a tertiary recovery project within Phase I Area of its North Hobbs Unit by converting a portion of this project (Phase I) from water injection to a tertiary recovery project by the injection of carbon dioxide (CO<sub>2</sub>) and produced water and the reinjection of CO<sub>2</sub>, produced water, and produced gases including methane, natural gas liquids and hydrogen sulfide (H<sub>2</sub>S) utilizing existing and new wellbores all as shown on Exhibit "A" incorporated herein.

(2) The injection wells or pressure system shall be equipped such that a bottom hole pressure limitation of 2400 psi can be maintained by limiting surface injection pressures for the following substances:

CO2 only injection:	1250 psi
Water injection:	1100 psi
produced gas injection:	1770 psi

(3) The Division Director may administratively authorize a pressure limitation in excess of the above upon a showing by the operator that such higher pressure will not result in the fracturing of the injection formation or confining strata.

(4) The GOR for the North Hobbs Grayburg-San Andres Pool is increased from a GOR ratio of 3500 cubic feet of total gas produced to 1 barrel of oil to 6000 cubic feet of total gas produced to 1 barrel of oil.

(5) The applicant shall take all steps necessary to ensure that the injected fluids entered only the proposed injection interval and are not permitted to escape to other formations or onto the surface from injection, production or plugged or abandoned wells.

(6) Injection into the wells shown on Exhibit "A" shall be accomplished through fiberglass lined tubing installed in a packer set approximately 100 feet from the uppermost injection perforation or casing shoe; 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 determine leakage in the casing, tubing or packer.

(7) Prior to commencing injection operations into the wells identified 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 assure the integrity of such casing.

(8) The injection authority granted herein shall terminate eighteen months after the date of this order if the operator has not commence tertiary injection operation; provided, however, the Division, upon written request of the operator, may grant an extension for good cause.

(9) Prior to commencing injection operations within one-half mile of the OXY's NHGSU Well No. 311 (API #3002507369) Unit B, Section 19, T18S, R38E each shall be re-entered and cemented across the injection interval in a manner acceptable to the Division.

(10) The operator shall give advance notification to the supervisor of the Hobbs District Office of the Division of the date and time of the installation of injection equipment, the conductance of remedial cement operations, and of the mechanical

integrity pressure tests, in order that the same may be witnessed.

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

(12) The tertiary recovery project is hereby designed "Phase I" of the North Hobbs Unit Pressure Maintenance Project and shall be governed by the provisions of Rules Nos. 701 through 708 of the Oil Conservation Division Rules and Regulations.

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

(14) Phase I CO<sub>2</sub> Project of the North Hobbs Unit is hereby certified as a qualified "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (Laws 1992, Chapter 38, Sections 1 through 5).

(15) The certified "project area" shall initially coincide with Phase I CO<sub>2</sub> Project Area of the North Hobbs Unit, described in Finding (2) above, provided however, the "project area" eligible for the recovered oil tax rate may be contracted and reduced dependent upon the evidence presented by the applicant in its demonstration of the occurrence of a positive production response.

(16) To be eligible for the EOR credit, the operator shall advise the Division when tertiary injection commences within the project area, and at such time, request that Division certify such area to the New Mexico Taxation and Revenue Department.

(17) At such time as a positive production response occurs and within five years from the date of the Certificate of Qualification, the applicant must apply to the Division for certification of positive production response, and shall identify the area actually benefitting from enhanced recovery operations. The Division may review the application administratively or set it for hearing. Based upon evidence presented, the Division will certify to The Department of Taxation and Revenue those lands which are eligible for the credit.

(18) 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 designated above.

STATE OF NEW MEXICO  
OIL CONSERVATION DIVISION

LORI WROTENBERY  
Director

S E A L