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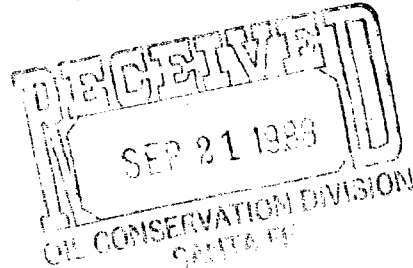
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September 19, 1988

HAND-DELIVERED



Mr. Tom Bahr
Secretary of Energy, Minerals
and Natural Resources
Villagra Building, Room 121
408 Galisteo Street
Santa Fe, New Mexico 87501

Re: Application for Review of Mallon Oil Company,
et al.

Dear Secretary Bahr:

Enclosed for your consideration please find the application of Mallon Oil Company, et al., for review of certain decisions of the Oil Conservation Commission. This application is filed under authority of Section 70-2-26, NMSA, 1978 Compilation.

Should you have any questions or require additional information, please let us know.

Very truly yours,

Ernest L. Padilla

ELP:njp

cc: with enclosures

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Mr. Tom Bahr
September 19, 1988
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STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

IN THE MATTER OF THE APPEAL TO
THE SECRETARY OF THE ENERGY,
MINERALS AND NATURAL RESOURCES
DEPARTMENT FOR THE PURPOSE OF
CONSIDERING:

THE APPEAL OF OIL CONSERVATION
COMMISSION ORDERS R-8712, R-7407-F,
R-6469-F, and R-3401-B, AFFECTING
THE SPECIAL RULES AND REGULATIONS
OF THE GAVILAN-MANCOS OIL POOL AND
THE WEST PUERTO CHIQUITO-MANCOS
OIL POOL

Oil Conservation
Commission Cases
7980, 8946, 8950,
9111, and 9412

APPLICATION FOR REVIEW

Mallon Oil Company, American Penn Energy, Inc., Hooper, Kimbell & Williams, Koch Exploration, Kodiak Petroleum, Inc., Mesa Grande, Ltd., Mesa Grande Resources, Inc., Reading and Bates Petroleum Company, and Amoco Production Company* ("Applicants") file this, their Application for Review of Commission orders in the above-described matters, and state as follow:

I.

SIGNIFICANT ISSUE

The Commission orders in this proceeding cause the waste and ultimate loss of valuable natural resources to the State of New Mexico because of their arbitrary limit on oil production in the Gavilan Mancos Pool. Applicants' Exhibit

*Amoco joins this application in all respects except it requests allowables be set at state-wide rates rather than capacity.

19A shows permanent waste of 370,000 to 441,000 stock tank barrels of oil has already occurred under the Commission's restricted allowable orders for this pool and an additional 606,000 to 720,000 stock tank barrels of waste will occur in the future. The State of New Mexico already has permanently lost \$1,200,000.00 in income, which amount will never be retrieved. Future loss of income to the State under the Commission's previously restricted allowable orders would be \$2,000,000.00. While the Commission's new orders raise allowables in the Gavilan somewhat, they are still artificially restricted to below the normal statewide allowable rates and will further enhance the ultimate loss of reserves in the Gavilan Mancos pool.

II.

BACKGROUND

The above-captioned matters are part of a long series of disputes between operators in the Gavilan Mancos ("Gavilan") and West Puerto Chiquito Mancos ("WPC") Pools, Rio Arriba County, New Mexico, regarding proper field rules and allowables. The Secretary of Energy has in the past been made aware of this ongoing dispute when parties have requested the Secretary review various Commission orders covering the Gavilan pursuant to his authority under Section 70-2-26, NMSA 1978. The Secretary has declined to review any prior orders, referring the parties back to the Commission or on to the courthouse for resolution. However,

because the issues in dispute cut to the core of the entire regulatory process controlling the production of oil and gas in the State of New Mexico and directly impact the established goals of this State to preserve natural resources, produce those resources to their highest potential and to maximize recovery and revenue for the State, Applicants believe review by the Secretary of various orders entered by the Commission in the latest series of hearings on the Gavilan is critical to insure those goals are met in a uniform and consistent manner.

On August 4 and 5, 1988, the Oil Conservation Commission entered a new set of orders relating to the proper pool boundaries and producing rates from the Gavilan and WPC Pools. The orders are attached hereto as Exhibit "A" and incorporated herein by reference. The Commission entered these orders on the vote of only two Commissioners and over the strenuous objection and dissenting opinion of Commissioner Erling Brostuen, which opinion is attached hereto as Exhibit "B" and incorporated herein by reference. (This is the first time in recent history the Commission has failed to act in unison and a dissenting Commissioner has gone to the effort to state specifically his objections and reasons therefore.) These orders, among other things:

1. Recognize a "political" boundary between the Gavilan and WPC Pools when in fact all evidence indicates

communication between sections on either side of that "political" boundary;

2. Fail to establish the true boundary between the Gavilan and WPC Pools as established by the overwhelming weight of evidence presented at hearing;

3. Establish an allowable well below the statewide allowable rates in the Gavilan Pool, at 800 bopd for wells on 640 acres and one-half that amount for wells on 320 acres, with each having a limiting gas/oil ratio of 2000:1;

4. Grant partial expansion of a pressure maintenance project in the WPC to areas not in communication with gas injection wells and allow credit for gas injection when it will serve no useful purpose in the expansion area, all contrary to the great weight and preponderance of the evidence;

5. Order meaningless testing designed to prove communication across the "political" boundary, which the parties do not dispute, and is otherwise useless to determining communication across the true boundary between the pools.

The result of these orders is to continue in place a regulatory scheme for the Gavilan Pool which has caused and will continue to cause severe waste of otherwise recoverable reserves. This waste is immense, immediate and irretrievable and is a true loss to the State of New Mexico.

On August 24, 1988, Applicants filed a Motion for Rehearing with the Commission, pointing out specific objections to the Commissions' majority orders, which motion is attached hereto as Exhibit "C" and incorporated herein by reference. Applicants specifically requested the Commission:

1. Increase allowables in the Gavilan to capacity; or at lease temporarily remove gas limits and set permanent allowables at normal statewide rates. This increase in gas limit is necessary because severe allowable restrictions placed on Gavilan wells by prior orders have caused many wells to load up with gas during the past so-called "low rate test period" which lasted over the protest of Applicants, from mid-November, 1987, until August 4, 1988, (8 1/2 months). Wells are currently capable of making only a fraction of the oil they were making prior to the low rate test period (and may never recover), while producing the same volumes of gas, with gas/oil ratios running as high as 70,000:1;

2. Recognize the Gavilan and WPC as separate reservoirs;

3. Set pool boundaries at the established permeability barrier;

4. Deny pressure maintenance expansion in the WPC; or, alternatively, deny any injection credit for expansion;

5. Defer or withdraw any additional testing requirements; or, alternatively, more clearly define the goals of such testing and order that the testing be designed, implemented and reviewed by senior staff reservoir and petroleum engineers, with input from operators.

The Commission failed to take any action on this motion and it was overruled as a matter of law on September 6, 1988. Applicants once again turn to the Secretary to exercise his discretionary powers to prevent the needless waste of reserves.

III.

STATUTORY AUTHORITY

By statute, the Secretary has the discretion to hold a public hearing to determine whether the orders appealed "contravene the statewide plan or the public interest." (Section 70-2-26, NMSA 1978). Applicants have specifically reviewed the "Policy-Level Plan for the Development and Management of New Mexico's Energy and Mineral Resources" ("Plan") to understand the statewide plan and how it may affect this Application. The Plan sets out two goals which are directly applicable to this controversy: To optimize state revenues from the production of mineral resources; and to stimulate economic development in New Mexico by optimizing the supply of mineral resources. (P. 6 of the Plan). Applicants believe that the current majority orders

of the commission contravene these stated goals by encouraging improper development in the Gavilan and WPC.

For instance, the allowable restrictions in the Gavilan will further enhance the waste of natural resources that is occurring in the pool today. Applicants are prepared to present evidence to the Secretary that the arbitrary allowable restrictions placed upon the Gavilan Pool during the past two years has caused waste and will continue to cause waste. Wells that were once capable of producing in excess of 1000 bopd at normal gas/oil ratios for a field at that stage of depletion, are now producing only about 180-200 bopd and then only with extremely high gas/oil ratios. The Commission has consistently refused to grasp these simple facts and instead has, over the past two years, continued to arbitrarily restrict allowables under the guise of obtaining additional data to determine if higher rates are appropriate. While this data was being compiled, the Gavilan Pool was being destroyed. It has already suffered permanent damage; the Secretary must act to prevent further destruction of the pool. The additional data has always shown the Gavilan should be produced without any allowable restrictions, or at the very least, with statewide rates in effect. (See Commissioner Brostuen's dissent, Ex. B, P. 7.)

Similarly, the Commission's majority order ignores the true boundary between the Gavilan and WPC and instead permits injection credit for gas produced from the Gavilan

and injected into the WPC seven miles away when there is no credible evidence to support any injection credit. The effect of this gratuitous gas injection credit will be to permit the Protestants to produce in excess of their fair share and drain the Applicants' property.

PROCEDURE FOR REVIEW

As the Secretary is aware, the statute granting his discretionary powers to review Commission orders requires that any hearing on review be held within 20 days of the date the Commission overrules Applicant's Motion for Rehearing. The statute further provides that the hearing be a de novo proceeding. Opponents to prior applications for review have argued that any such hearing will necessarily take several days or even weeks to complete because of the complex nature of the problem. Applicants do not believe that is the case.

De novo proceedings do not mean that the entire previous record is ignored or retried. It simply means that the Secretary is free to make new or additional findings of facts based upon the prior record and any additional testimony and evidence entered in the review hearing. (See Section 70-2-25, NMSA 1978 discussion regarding trial de novo in district court). The statute clearly provides that the previous record may be made part of the record of the hearing before the Secretary. (Section 70-2-28, NMSA 1978.) The Secretary can limit additional testimony to specific

issues, including effect of proposed order; waste of natural resources and lost revenues to the State, along with a limited time of presentation: one or two hours per side.

V.

CONCLUSION

Applicants respectfully request that the Secretary exercise its discretionary authority to review the Commission's orders in this case and that, upon hearing and review, the Secretary adopt Commissioner Brostuen's dissenting opinion, and amend the Commission's orders to provide:

1. Capacity allowables in the Gavilan; or at least temporarily removing gas limits to allow wells to flow at capacity in order to stabilize and set permanent allowables at statewide rates;

2. That the Gavilan and West Puerto Chiquito Mancos Pools are separate reservoirs;

3. Pool boundaries be set at the permeability barrier;

4. Denial of Protestant's pressure maintenance expansion request or, alternatively, deny any injection credit for expansion; and

5. Withdrawal of any additional testing requirements until the Commission has more clearly defined the goals of such testing and senior staff reservoir and petroleum engineers have had the opportunity to work with operators in the pool to develop an adequate testing procedure.

Respectfully submitted,

PADILLA & SNYDER

By: 

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Attorneys for Mesa Grande
Resources, Inc.

CERTIFICATE OF SERVICE

I hereby certify that I caused a true and correct copy of the foregoing Application for Review to be mailed to the following persons this 19th day of September, 1988:

W. Perry Pearce
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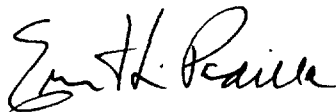
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Post Office Box 2088
Santa Fe, New Mexico 87501



Ernest L. Padilla

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 9412
ORDER NO. R-8712

APPLICATION OF MESA GRANDE RESOURCES,
INC. FOR THE EXTENSION OF THE GAVILAN-
MANCOS OIL POOL AND THE CONTRACTION OF
THE WEST PUERTO CHIQUITO-MANCOS OIL
POOL

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 a.m. on June 13, 1988, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 4th day of August, 1988, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS THAT:

(1) Due public notice having been given as required by law, the Commission has jurisdiction of these causes and the subject matter thereof.

(2) At the time of the hearing, Cases 7980 (reopened), 8946 (reopened), 8950 (reopened), 9111 (reopened) and 9412 were consolidated for purposes of testimony.

(3) Case 9412 involves renewed application of Mesa Grande Resources, Inc. for extension of Gavilan and concomitant contraction of West Puerto Chiquito Mancos ("WPC") identical to the request in Case 9113 which was denied by Order R-7407-E.

(4) There was not substantial evidence presented to show that two separate sources of supply are separated at the boundary proposed in the application.

— EXHIBIT "A" —

g/c

-2-

Case No. 9412
Order No. R-8712

(5) A change in field boundaries would not protect correlative rights or prevent waste and would impose substantial burdens on all parties and, therefore, the application in Case 9412 should be denied.

IT IS THEREFORE ORDERED THAT:

(1) The application in Case 9412 is hereby denied.

(2) Jurisdiction of this cause is retained for entry of such further orders as the Commission deems necessary.

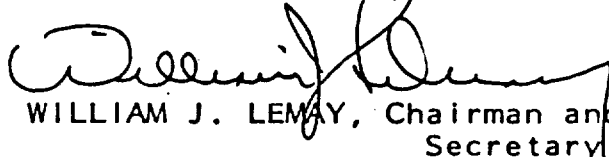
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



WILLIAM R. HUMPHRIES, Member

ERLING A. BROSTUEN, Member


WILLIAM J. LEMAY, Chairman and
Secretary

S E A L

dr/

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

REOPENED CASES NO. 7980, 8946 AND 8950
ORDER NO. R-7407-F-1
ORDER NO. R-6469-F-1

REOPENING CASES 7980, 8946 AND 8950
FOR FURTHER TESTIMONY AS PROVIDED BY
ORDER R-7407-E IN REGARD TO THE
CAVILAN-MANCOS OIL POOL AND ORDER R-6469-D
IN REGARD TO THE WEST PUERTO CHIQUITO-MANCOS
OIL POOL IN RIO ARriba COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Oil Conservation Commission of New Mexico (Commission) that the combined order (Order Nos. R-7407-F and R-6469-F) issued in Reopened Case Nos. 7980, 8946 and 8950 and dated August 5, 1988, does not correctly state the intended order of the Commission;

IT IS THEREFORE ORDERED THAT:

(1) Division Order No. R-7407-F being inadvertently issued twice, the first in Reopened Case 7980 heard before the Commission on March 17, 1988, and the second being erroneously issued in the immediate case as described above; therefore, all references to "Order No. R-7407-F" throughout said order issued in Reopened Case Nos. 7980, 8946 and 8950, dated August 5, 1988, are hereby amended to read "Order No. R-7407-G."

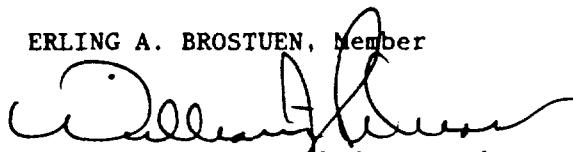
(2) The corrections set forth in this order be entered nunc pro tunc as of August 5, 1988.

DONE at Santa Fe, New Mexico, on this 17th day of August, 1988.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


WILLIAM R. HUMPHRIES, Member

ERLING A. BROSTUEN, Member


WILLIAM J. LEMAY, Chairman and
Secretary

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

REOPENED CASES NOS. 7980,
8946 and 8950
ORDER NO. R-7407-F
ORDER NO. R-6469-F

REOPENING OF CASES 7980, 8946 and 8950 FOR
FURTHER TESTIMONY AS PROVIDED BY ORDER
R-7407-E IN REGARD TO THE GAVILAN-MANCOS OIL
POOL AND ORDER R-6469-D IN REGARD TO THE
WEST PUERTO CHIQUITO-MANCOS OIL POOL IN
RIO ARRIBA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 a.m. on June 13, 1988, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 5th day of August, 1988, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS THAT:

(1) Due public notice having been given as required by law, the Commission has jurisdiction of these causes and the subject matter thereof.

(2) At the time of the hearing, Cases 7980 (reopened), 8946 (reopened), 8950 (reopened), 9111 (reopened) and 9412 were consolidated for purposes of testimony. Separate orders are being entered in Cases 9111 and 9412.

(3) Case 7980 was called and reopened by the Commission to determine appropriate spacing and enter permanent orders establishing spacing and proration units in the Gavilan-Mancos Oil Pool (hereinafter "Gavilan") pursuant to Order R-7407-E (Rule 2a) which rule increased spacing from 320-acre to 640-acre spacing units.

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Case No. 7980
Order No. R-7407-F
Order No. R-6469-F

(4) Case 8946 was re-opened to determine what top oil allowable and limiting gas-oil ratio should be established in the Gavilan-Mancos Oil Pool to provide waste and protect correlative rights.

(5) Case 8950 was re-opened to determine what top oil allowable and limiting gas-oil ratio should be established for the West Puerto Chiquito Mancos Oil Pool (hereinafter "WPC").

(6) Orders R-7407-E and R-6469-C were entered by the Commission to direct operators within Gavilan and WPC, respectively, to conduct tests on wells within the pools to determine the optimal top allowable and limiting gas-oil ratio for each of the pools. Pursuant to those orders, the pools were produced with a top allowable of 1280 barrels of oil per day for a standard 640-acre proration unit with a limiting gas-oil ratio of 2,000 cubic feet of gas per barrel of oil for the period July 1 until November 20, 1987, referred to as the "high rate test period" and were produced with a top oil allowable of 800 barrels of oil per day for a 640-acre proration unit with a limiting gas-oil ratio of 600 cubic feet of gas per barrel of oil from November 20, 1987 until February 20, 1988, referred to as the "low rate test period". Operators were directed to take bottomhole pressure surveys in selected wells within both pools at the start of and end of each test period. Subsequent to the test period, the top oil allowable remained at 800 barrels of oil per day for a 640-acre proration unit with a limiting gas-oil ratio of 600 to 1.

(7) Data collected by the operators during the test period pursuant to Orders R-7407-E and R-6469-C were submitted to the Division's Aztec district office and were available to all parties in this matter. At the request of the Commission, Petroleum Recovery Research Center at Socorro, New Mexico, made an independent evaluation of the data as a disinterested, unbiased expert and its report was entered into evidence by testimony and exhibit.

(8) Mallon Oil Company, Mesa Grande Resources, Inc., Mobil Texas-New Mexico Producing et al, collectively called "proponents", advocate return to special allowable of at least 1280 barrels of oil per day for 640-acre units with limiting gas-oil ratio of 2000 cubic feet per barrel whereas Benson-Montin-Greer Drilling Co., Sun Exploration and Production Company, Dugan Production Corporation et al, collectively called "opponents", advocate allowable and gas limits no higher than the current special allowable of 800 barrels of oil per day for 640-acre units and limiting gas-oil ratio of 600 cubic feet per barrel.

(9) Proponents presented testimony and exhibits intended to demonstrate:

- (a) Gavilan and WPC pools are separate sources of supply separated by a permeability barrier approximately two miles east of the line separating Range 1 West from Range 2 West which is the present common boundary between the two pools.
- (b) Insignificant oil has moved across the alleged barrier.
- (c) Gas-oil ratio limitations are unfair to Gavilan operators.
- (d) Wells were not shut in following the high rate testing period for sufficient time to permit accurate BHP measurement following the high rate testing period.
- (e) The high-rate/low-rate testing program prescribed by Order R-7407-E demonstrated that high producing rates prevented waste as evidenced by lower gas-oil ratios during that phase of the test period.
- (f) Irreversible imbibition of oil into the matrix during shut-in or low-rate production causes waste from reduced recovery of oil.
- (g) Pressure maintenance in Gavilan would recover no additional oil and would actually reduce ultimate recovery.
- (h) The most efficient method of production in Gavilan would be to remove all production restrictions in the pool.

(10) Opponents presented testimony and exhibits intended to demonstrate:

- (a) There is pressure communication throughout the Gavilan-WPC pools which actually comprise a single reservoir.
- (b) Directional permeability trending north-south with limited permeability east-west, together with gas reinjection, has worked to improve oil

Case No. 7980

Order No. R-7407-F

Order No. R-6469-T

recovery in the COU located wholly within the WPC pool.

- (c) Success of the pressure maintenance project is shown by the low gas-oil ratio performance of structurally low wells in the unit.
- (d) Oil has moved across the low permeability area east of the Proposed Pressure Maintenance Expansion Area to the Canada Ojitos Unit as pressure differentials have occurred due to fluid withdrawal or injection.
- (e) Although lower gas-oil ratios were observed during the high-rate production test period, reservoir pressure drop per barrel of oil recovered increased indicating lower efficiency.
- (f) Gravity segregation was responsible for the lower GOR performance during high-rate production.
- (g) The effects of the pressure maintenance project were shown, not only in the expansion area but even into the Gavilan pool.
- (h) The reservoir performance during the test period shows pronounced effects of depletion.
- (i) The higher allowables advocated by proponents would severely violate correlative rights.

(11) Substantial evidence indicated, and all parties agreed, that 640 acres is the appropriate size spacing and proration unit for Gavilan.

(12) Eminent experts on both sides interpreted test data including gas-oil ratios, bottomhole pressures, and pressure build-up tests with widely differing interpretations and conclusions.

(13) The preponderance of the evidence demonstrates the Gavilan and WPC pools constitute a single source of supply which can continue to be regulated effectively as two separate pools with uniform rules for spacing and allowables.

(14) No well produced the top oil allowable during any month of the test period; no well produced the gas limit during the high rate test period; 30 wells produced the gas limit at the beginning of the low rate test period but eight wells produced that limit at the conclusion of the test period.

(15) There is substantial evidence that lower gas-oil ratios observed during the high-rate test period are due to a number of factors including reduced oil re-imbibition, gravity segregation of fluids within the reservoir, and greater pressure differential between fractures and matrix reservoir rock.

(16) A preponderance of evidence shows that both Cavilan and WPC exhibit a very high degree of communication between wells, particularly in north-south directions, and as a result the 72-hour shut in prior to BHP tests may not have been sufficient to permit pressures to completely stabilize. However, such pressure measurements were adequate to provide useful data for reservoir evaluation.

(17) Substantial evidence shows that some wells demonstrated a reduced gas-oil ratio with a high rate of production and that increased production limits should prevent waste.

(18) Substantial evidence also demonstrated that high deliverability wells have intersected a high capacity fracture system and therefore drain distant tracts better than low deliverability wells which have been drilled on those distant tracts. The evidence also indicates that high production rates result in the reduced oil recovery per pound of pressure drop. As a result a top oil allowable and limiting gas-oil ratio is necessary to prevent waste and protect correlative rights.

(19) A top oil allowable of 800 barrels per day per 640 acres with a limiting gas-oil ratio of 2,000 to 1 will enable high productivity wells to produce at more efficient rates without significantly impairing correlative rights.

IT IS THEREFORE ORDERED THAT:

(1) Rule 2 (a) of the temporary special rules and regulations for the Cavilan-Mancos Oil Pool as promulgated by Order R-7407 is hereby amended as follows:

Rule 2 (a). A standard proration unit shall consist of between 632 and 648 acres consisting of a governmental section with at least one and not more than two wells drilled or recompleted thereon; provided that if the second well is drilled or recompleted on a standard unit it shall not be located in the same quarter section, nor closer than 1650 feet to the first well drilled on the unit; and provided further that proration units formed prior to the date of this order are hereby approved as non-standard, provided however, that operators have the option to file Form C-102 to form standard units.

Case No. 7980

Order No. R-7407-F

Order No. R-6469-F

(2) Effective August 1, 1988 the allowable for a standard 640-acre spacing and proration unit in the Gavilan-Mancos Oil Pool shall be 800 barrels of oil per day and the limiting gas-oil ratio shall be 2000 cubic feet of gas per barrel of oil. Non-standard units shall receive allowables in the same proportion of 800 barrels of oil per day that the acreage in the spacing and proration unit bears to 640 acres.

(3) Effective August 1, 1988, the allowable for a standard 640-acre spacing and proration unit in the West Puerto Chiquito-Mancos Oil Pool shall be 800 barrels of oil per day and the limiting gas-oil ratio shall be 2000 cubic feet of gas per barrel of oil. Non-standard units shall receive allowables in the same proportion of 800 barrels of oil per day that the acreage in the spacing and proration unit bears to 640 acres.

(4) Jurisdiction of these causes is retained for entry of such further orders as the Commission deems necessary.

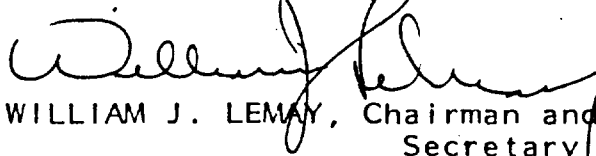
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



WILLIAM R. HUMPHRIES, Member

ERLING A. BROSTUEN, Member



WILLIAM J. LEMAY, Chairman and
Secretary

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STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 9111
Order No. R-3401-B

APPLICATION OF BENSON-MONTIN-GREER
DRILLING CORPORATION FOR EXPANSION OF
THE PROJECT AREA FOR ITS WEST PUERTO
CHIKUITO-MANCOS PRESSURE MAINTENANCE
PROJECT, RIO ARriba COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 a.m. on March 18, 1988, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission." Decision on the case was deferred until possibly related testimony in Cases 7980, 8946, 8950 and 9412 was received at the hearing held June 13, 1988.

NOW, on this 5th day of August, 1988, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS THAT:

(1) Due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) Applicant requests expansion of the West Puerto Chikuito-Mancos Pressure Maintenance Project area to include the below-described area which would make the project area coterminous with the Canada Ojito Unit area and the Mancos Participating Area of the unit:

TOWNSHIP 24 NORTH, RANGE 1 WEST, NMPM
Sections 5 through 8

TOWNSHIP 25 NORTH, RANGE 1 WEST, NMPM
Sections 5 through 8
Sections 17 through 20
Sections 29 through 32

TOWNSHIP 26 NORTH, RANGE 1 WEST, NMPM
w/2 Sections 5, 8, 17, and 20
Sections 6, 7, 18, 19, 29, 30, 31 and 32

All in Rio Arriba County, New Mexico

(3) The expanded project area would abut the Gavilan-Mancos Pool boundary at the West line of Range 1 West.

(4) Applicant was supported in its application by Sun Exploration and Production Company and was opposed by Mallon Oil Company, Mesa Grande Resources, Inc., Mobil Texas-New Mexico Producing, Koch Exploration and others.

(5) Critical to the case is the degree, if any, of pressure communication across a low permeability zone at or near the present western boundary of the project area which is approximately two miles east of the western boundary of the unit.

(6) The two westernmost rows of sections inside the unit area are in effective pressure communication with the Gavilan-Mancos pool as demonstrated by shut in pressure measurements.

(7) The unit area east of the proposed expansion of the area described above exhibits a significantly greater pressure than the proposed expansion area and the adjacent Gavilan area, as a result of gas injection at the structurally higher and more easterly portion of the unit.

(8) The pressure differential across the low-permeability area which resides in the third row of sections east of the western boundary of the unit is in the range of 350-400 psi, and thus indicates limited pressure communication between the injection wells and the proposed expansion area.

(9) Limited transmissibility across the low-permeability zone has been shown by (1) transmission of a pressure pulse from a hydraulically fractured well to wells across the low permeability zone, (2) failure to increase the average pressure east of the zone by overinjection of gas, and (3) the lower gas-oil ratio of wells in the proposed expansion area as compared to adjacent Gavilan-Mancos wells.

(10) The gas credit provided by Rule 7 of Order R-3401, as amended, in the project area provides a reduced COR penalty for wells in the project area because the pressure maintenance process results in a smaller reservoir voidage per barrel of oil produced than would occur if the gas were not reinjected.

(11) The permeability restriction described in Finding No. (5) limits the benefit which the proposed expansion area can receive from the pressure maintenance gas injection.

(12) There is evidence that wells within both the WPC and the Gavilan Pools are in communication with areas outside of those pools, particularly in a north-south direction. As a result there may be gas flow and repressurization from the pressure maintenance project in a northerly and southerly direction and that it may extend beyond the northern and southern boundaries of the pressure maintenance project.

(13) Because of Findings (11) and (12), giving full injection credit to those wells in the proposed expansion area would give those wells an advantage over the adjacent wells in the Gavilan-Mancos Pool and would impair the correlative rights of the owners in the Gavilan-Mancos Pool.

(14) Limited expansion of the project area, and reduced credit to wells in the expansion area for reinjected gas in the project area will encourage continued gas injection, will increase the ultimate recovery of oil in the West Puerto Chiquito-Mancos Oil Pool and will also protect correlative rights in the Gavilan-Mancos Pool wells offsetting the unit.

(15) The project area should be expanded only one tier of sections to the west leaving one tier of sections between the expansion area and Gavilan.

(16) The evidence is not conclusive as to the amount of injection credit which the wells in the expansion area of the project should receive, and pending further data evaluation, a 50% injected gas credit is reasonable.

(17) The gas credit amount in the expansion area granted by this order should be modified upon presentation of evidence that an advantage is gained by either pool over the other.

(18) The Aztec district office of the Division, in consultation with the operators in the two pools should determine the wells and procedures to be employed to obtain accurate, representative BHP's on either side of the common pool boundary on a semi-annual basis for detection and evaluation of any drainage across the said boundary and a basis for adjusting the gas injection credit assigned the wells in the expansion area.

IT IS THEREFORE ORDERED THAT:

(1) The Project Area of the West Puerto Chiquito-Mancos Pressure Maintenance Project is hereby expanded to include the following described area:

TOWNSHIP 24 NORTH, RANGE 1 WEST, NMPM
Sections 5 and 8

TOWNSHIP 25 NORTH, RANGE 1 WEST, NMPM
Sections 5, 8, 17, 20, 29 and 32

TOWNSHIP 26 NORTH, RANGE 1 WEST, NMPM
W/2 Sections 5, 8, 17 and 20 and all of
Sections 29 and 32

All in Rio Arriba County, New Mexico.

(2) Rule 6 and Rule 7 of the Special Rules for the West Puerto Chiquito-Mancos Pressure Maintenance Project established by Order No. R-3401, as amended, are hereby amended to read in their entirety as follows:

"Rule 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3, shall be determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a 72-hour test throughout which the well should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Commission Rule 502 1 (a) and the limiting gas-oil ratio for the West Puerto Chiquito-Mancos Oil Pool shall be waived during such tests. The project operator shall notify all operators offsetting the well, as well as the Commission, of the exact time such tests are to be conducted. Tests may be witnessed by representatives of the offsetting operators and the Commission, if they so desire."

"Rule 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or top unit allowable for the West Puerto Chiquito-Mancos Oil Pool, whichever is less, provided that any producing well in the project area which directly or diagonally offsets a well outside the Canada Ojitos Unit Area producing from the same common source of supply shall not produce in excess of top unit allowable for the pool. Production of such well at a higher rate shall be authorized only after notice and hearing. Each producing well shall be subject to the limiting gas-oil

ratio for the West Puerto Chiquito-Mancos Oil Pool except that any well or wells within the project area producing with a gas-oil ratio in excess of the limiting gas oil ratio may be produced on a "net gas-oil ratio" basis, which shall be determined by applying credit for daily average gas injected, if any, into the West Puerto Chiquito-Mancos Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = TUA \times F_a \times \frac{GOR}{\frac{P_g - I_g}{P_o}}$$

where A_{adj} = the well's daily adjusted allowable.

TUA = top unit allowable for the pool.

F_a = the well's acreage factor (1.0 if one well on a 640 acre proration unit or 1/2 each if two wells on a 640 acre unit, and 1/2 for a well in a section along the Gavilan boundary which lies closer than 2310' from the Gavilan boundary).

P_g = average daily volume of gas produced by the well during the preceding month, cubic feet.

I_g = the well's allocated share of the daily average gas injected during the preceding month, cubic feet.

P_o = average daily volume of oil produced by the well during the preceding month, barrels.

COR = limiting gas-oil ratio for the West Puerto Chiquito-Mancos Oil Pool.

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$ to be less than the limiting gas-oil ratio for the West Puerto Chiquito Mancos Oil Pool.

Provided however, that wells located in the area described as: Sections 5 and 8, Township 24 North, Range 1

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Case No. 9111
Order No. R-3401-B

West; Sections 5, 8, 17, 20, 29 and 32,
Township 25 North, Range 1 West; Sections 29
and 32 and W/2 of Sections 5, 8, 17 and 20,
Township 26 North, Range 1 West

shall be limited to 50% of the allocated share of injection
gas in the l_g term of the formula above.

(3) The Aztec district office of the Division, with due
counselling and advice from pool operators, shall, by October
1, 1988, develop a program for semi-annual bottomhole pressure
surveys of wells in both pools located not less than 3/8 mile
and not more than 1 1/2 miles from the common pool boundary,
designed to measure accurately the pressure differential
across the pool boundary and to be used as a basis for
adjusting the gas injection credit to wells in the expansion
area. The program shall be presented for approval to the
Commission Conference on October 6, 1988.

(5) This order may be modified, after notice and hear-
ing, to offset any advantage gained by wells on either side of
the common boundary of the Gavilan and West Puerto Chiquito
Oil Pools, as a result of this order.

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

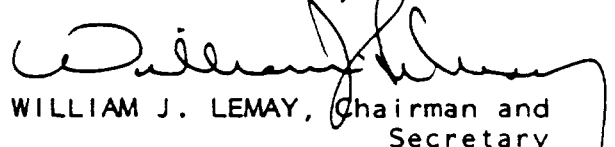
DONE at Santa Fe, New Mexico, on the day and year
hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



WILLIAM R. HUMPHRIES, Member

ERLING A. BROSTUEN, Member



WILLIAM J. LEMAY, Chairman and
Secretary

S E A L

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

DISSENTING OPINION REGARDING FINDINGS AND ORDERS CONTAINED
IN NEW MEXICO OIL AND GAS CONSERVATION COMMISSION CASES AND
ORDERS:

CASE NO. 9412
ORDER NO. R-8712;

CASES NOS. 7890, 8946 and 8950
ORDER NO. R-7407-F
ORDER NO. R-6469-F

CASE NO. 9111
ORDER NO. R-3401-B

AS APPROVED AND SIGNED BY NEW MEXICO OIL CONSERVATION
COMMISSIONERS WILLIAM J. LEMAY, CHAIRMAN, AND WILLIAM R.
HUMPHRIES, MEMBER, DATED AUGUST 4, 1988 AND AUGUST 5, 1988.

The above described cases and orders are all closely related.
They affect the West Puerto Chiquito Mancos Pool and the
Galivan Mancos Pool both located in Rio Arriba County,
New Mexico.

Central to all issues in the above cases and orders is the
determination of the existence of a permeability barrier
or permeability restriction, and the effectiveness thereof,
separating the two pools. By Order No. R-8711 in Case No.
9412, dated August 4, 1988, Commission Members LeMay and
Humphries have determined that there was not substantial
evidence presented to show that two separate sources of
supply exist. As dissenting Commission Member, I take
the position that the preponderance of the evidence
demonstrates that the Gavilan Mancos Pool and the West
Puerto Chiquito Mancos Pools are separate sources of
supply.

In the findings and orders issued in the above cases, there
are areas of concurrence and non-concurrence between
Commission Members LeMay and Humphries and myself. The
cases will be discussed below in the order presented above
with areas of concurrence noted and areas of non-concurrence
indicated with reasons therefore.

EXHIBIT "B"

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Dissenting Opinion
Cases Nos. 9412, 7890,
8946, 8950, 9111

CASE NO. 9412
ORDER NO. R-8712

FINDINGS:

(1), (2), (3). I concur.

(4) I do not concur. The preponderance of evidence demonstrates that the Gavilan Mancos Pool and the West Puerto Chiquito Mancos Pool are two separate sources of supply that are effectively separated by a permeability restriction or barrier approximately two miles east of the line separating Range 1 West from Range 2 West, the present common boundary between the two pools.

Compelling evidence of the presence of the barrier include:

- ° The lack of well interference and frac pulse response between wells on either side of the barrier. Opponents to Mesa Grande Resources request and the consultant to the Commission from the New Mexico Petroleum Recovery Research Center discussed such well interference and frac pulse response evidence, however, the only communication demonstrated between wells was limited to wells on either side of the barrier and communication was not demonstrated between wells across the barrier. The opponents attempted to demonstrate communication by frac pulse response between the COU B-32 and the COU C-34 wells, the COU B-29 and the COU C-34 wells, the COU B-32 and the COU A-16 wells, and the COU A-20 and the COU D-17 wells by Horner Plot analysis. The proponents effectively demonstrated, utilizing accepted petroleum engineering practices, that the opponents were in error and that in fact proper analysis indicated the presence of and distance from the postulated barrier. The calculated distances to the barrier very closely approximated the scaled distances between the wells and the barrier. See proponents exhibits 42 and 43.
- ° The isobaric contouring of pressure gradients presented in proponents exhibits demonstrated the presence of the barrier and two separate sources of supply. See proponents exhibits 48, 49 and 50.

- ° Proponents exhibit 20 consisting of a comparison of Canada Ojitos Unit field pressure history and Gavilan Mancos Pool field pressure history over a 25 year period clearly demonstrates the lack of communication between the two pools. Initial static reservoir pressure in Canada Ojitos Unit was approximately 1900 psi corrected to +370 feet. The initial static reservoir pressure for Gavilan Mancos Pool nearly 20 years following the discovery of production in Canada Ojitos Unit was approximately 1800 psi corrected to +370 feet. Pressure declines for the two pools show no relationship in the five years following discovery of Gavilan Mancos Pool. The 25 year interference test shows no communication between the two pools.
 - ° The presence of non-productive wells along the barrier. In properly developed pools, pool boundaries are commonly delineated by the presence of dry holes. Wells which do not exhibit the presence of economically recoverable reserves are commonly plugged and abandoned as dry holes. Benson, Montin, Greer Drilling Corp. is the operator of the COU F-20 and the COU G-32 wells located in Sections 20 and 32 respectively in Township 26 North Range 1 West, the COU J-8 well in Section 8, Township 25 North, Range 1 West, and the COU D-17 well in Section 17, Township 25 North Range 1 West. These wells are non-productive and do not exhibit the presence of economically recoverable reserves. They are located on or adjacent to the postulated barrier and are further evidence of the barriers existence and effectiveness. The COU K-8 well located in Section 8, Township 24 North, Range 1 West is also located on or adjacent to the barrier and as of April 1988 was capable of producing less than 2 barrels of oil per day.
- (5) I do not concur. Approval of the requested change in field boundaries should be granted. The tracts in question are in communication with the Gavilan Mancos Pool, and are not in communication with the West Puerto Chiquito Mancos Pool. Approval of the requested action would protect the correlative rights of any working interest owner or royalty interest owner that may have been included in the Canada Ojitos Unit through the New Mexico Statutory Unitization Act, 70-7-1 NMSA 1978.

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Dissenting Opinion
Case Nos. 9412, 7890,
8946, 8950, 9111

ORDER:

- (1) I do not concur. The application in Case No. 9412 should be approved.
- (2) I concur. Jurisdiction in this matter should be retained by the Commission.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

A handwritten signature in cursive script, reading "Erling A. Brostuen".

ERLING A. BROSTUEN, Member

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Dissenting Opinion
Case Nos. 9412, 7890
8946, 8950, 9111

CASES NOS. 7890, 8946 and 8950
ORDER NO. R-7405-F
ORDER NO. R-6469-F

FINDINGS:

- (1), (2), (3), (4) I concur. Typographical error in (4), line 3, "provide" should be changed to "prevent".
- (5) I concur. The incorporation of "to prevent waste and protect correlative rights" in the finding would be proper.
- (6), (7), (8), (9), (10), (11), (12) I concur.
- (13) I do not concur. The preponderance of evidence demonstrates that Gavilan Mancos Pool and West Puerto Chiquito Mancos Pool are separate sources of supply and are separate and distinct pools. For reasons for non-concurrence, I refer you to my comments on finding (4), Case No. 9412, Order No. R-8712 above.
- (14), (15) I concur.
- (16) I concur in part. I concur in that wells within the two individual pools exhibit a high degree of communication between wells, particularly in a north-south direction, however, communication between wells is not exhibited across pool boundaries. It is also my position that the two rows of sections immediately to the east of the present common boundary separating the pools are in communication with the Gavilan Mancos pool, are not in communication with the West Puerto Chiquito Mancos Pool and are by definition of a pool, part of the Gavilan Mancos Pool. I concur that 72 hour shut in periods for the purpose of static reservoir pressure testing are insufficient. The dual porosity nature of the pools require a longer shut in period. Pressures taken during the previous testing periods were related essentially to the high capacity fracture system. Longer shut in periods are necessary to stabilize reservoir pressures due to the decreased build up rate of the low capacity matrix system. The lower capacity matrix system

has been attested to by the proponents in testimony and by exhibit. It has also been attested to by Benson, Montin, Greer Drilling Corp. through a paper co-authored by Albert R. Greer. The paper "Fracture Permeability in Cretaceous Rocks of the San Juan Basin" by Frank D. Gorham, Jr, Lee A. Woodward, J. F. Callender, and Albert R. Greer; New Mexico Geol. Soc. Guidebook, 28th Field Conf., San Juan Basin III, 1977, discusses the contribution of the lower capacity matrix system. The paper states that Benson, Montin, Greer Drilling Corp. continued to produce a suitable well (Canada Ojitos Unit C-34) after the high-capacity system was essentially swept (gas to oil ratio increased from an initial ratio of 300 to about 10,000). The paper continues that after reaching the 10,000 to 1 GOR, the well continued to produce at a rate of approximately 100 BOPD for 3 years with no further increase in GOR. The subject well reached a 10,000 to 1 GOR in May, 1974. Cumulative production at that time was 296.0 MBO. Cumulative production to May, 1988 is 609.5 MBO. It follows that the lower capacity matrix porosity system has contributed 313.5 MBO of production to the well. It is also probable that the lower capacity matrix system was contributing to production prior to the well reaching a 10,000 to 1 GOR. It is apparent that the tight blocks or lower capacity matrix system play a major role in production from the Gavilan Mancos Pool and the West Puerto Chiquito Pool. It is also apparent that pressures recorded following a 72 hour shut in period are not representative of reservoir static pressures and that evaluations and calculations based thereon will be erroneous.

(17) I concur.

(18) I concur with the first sentence. I do not concur with the remainder of the finding. Evidence presented by the opponents based upon pressures and production recorded during the testing periods indicate a higher production per pound pressure drop at the lower production allowable rate. The consultant to the Commission also calculated a higher production per pound pressure drop at the lower production allowable rate. Proponents, however, contend that the opponents and the consultant to the Commission erred in their analysis due to invalid reservoir pressure data.

Dissenting Opinion
Case Nos. 9412, 7890,
8946, 8950, 9111


The proponents utilized field wide average pressure differential rather than the 72 hour shut in pressures. Their analysis indicated that higher production per pound pressure drop was achieved during the higher production allowable rate. In view of my discussion of the relative importance of the lower capacity matrix contribution to cumulative production in finding (16) above, it is my opinion that a top oil allowable and limiting gas oil ratio will have little or no effect in the prevention of waste and the protection of correlative rights.

- (19) I concur in part. I concur that a higher top oil allowable and a higher limiting gas oil ratio will enable high productivity wells to produce at more efficient rates without significantly impairing correlative rights. I am concerned that the recommended top oil allowable of 800 barrels per day with a limiting gas oil ratio of 2000 to 1 may be achieved in some better wells without the desired effect of increasing the pressure differential between the high capacity fracture system and the lower capacity matrix system.

ORDERS:

- (1) I concur.
- (2) I concur in part. I am in agreement that the top oil allowable and limiting gas oil ratio must be increased for reasons stated in comments on finding (19) above. No conclusive evidence was presented that would justify a top oil allowable or limiting gas oil ratio.
- (3) I concur in part. Refer to my comments in (2) above.
- (4) I concur.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


ERLING A. BROSTUEN, Member

Dissenting Opinion
Case Nos. 9412, 7890,
8946, 8950, 9111

CASE NO. 9111
ORDER NO. R-3401-B

FINDINGS:

(1), (2), (3), (4), (5), (6) I concur.

(7) I concur in part. I concur that the area east of the proposed expansion area exhibits a significantly greater pressure than the proposed expansion area and the adjacent Gavilan Mancos Pool. While this greater pressure is no doubt related to gas injection in the structurally higher and more easterly part of the unit, it is also related to the presence of a permeability barrier which separates the proposed expansion area and Gavilan Mancos Pool from West Puerto Chiquito Mancos Pool.

(8) I do not concur. The pressure differential discussed here in no way indicates limited pressure communication between the injection wells and the proposed expansion area. This finding is absurd.

(9) I do not concur. (1) Transmission of a pressure pulse from a hydraulically fracture well to wells across the permeability barrier has not been demonstrated. Refer to my comments in Case No. 9412, Order No. R-8712, Finding (4). (2) Failure to increase the average pressure east of the zone by overinjection of gas is not related to transmissibility across the permeability barrier. The Canada Ojitos Unit has been so poorly monitored by the operator as regards pressure measurements. From 1971 until pressure measurements were required by order of the Commission in 1987, no pressure measurements were taken or if taken were not reported to the Commission or Division. I assume that such pressure measurements if taken and if they would be beneficial to the opponents case, would have been furnished to the Division or to the Commission in hearing. (3) The variation in gas oil ratios across Gavilan Mancos Pool has no relationship to proximity to the Canada Ojitos Unit. Structural position is generally the governing factor with higher gas oil ratios in wells that are higher structurally and lower gas oil ratios in wells that are lower structurally. Variations in permeability in different areas of a pool will also affect gas oil ratios. In tighter areas gas oil ratios will generally be higher due to the preferential permeability to gas relative to oil.

Dissenting Opinion
Case Nos. 9412, 7890,
8946, 8950, 9111

(10) I concur.

(11) I do not concur. The permeability restriction is an effective barrier to any significant movement of fluids. In addition, there has been no demonstration that the pressure maintenance project in Canada Ojitos Unit has had any beneficial effect on production. To the contrary, Gavilan Mancos Pool and that area in communication therewith west of the permeability barrier in West Puerto Chiquito Field have performed far better than has the Canada Ojitos Pressure Maintenance Area. In addition, the Canada Ojitos Pressure Maintenance Area has performed more poorly than other fractured Mancos pools in spite of its pressure maintenance program. See proponents exhibits 25 and 26.

(12) I concur in part. Both pools are still being defined. Boundaries are still being delineated. Only Gavilan Mancos Pool is being developed in an orderly manner.

(13) I do not concur. There has been no evidence presented that demonstrates any movement of fluids between the present pressure maintenance unit and the proposed expansion area. There is no justification for any injection credit in the proposed expansion area. There has been no evidence presented that has demonstrated that any gas injection program has been successful in a solution gas drive fractured reservoir. The example presented in opponents exhibit 6 has no relationship to fractured Mancos reservoirs. The reservoir in the cited example consists of a sucrosic limestone with low dip, limited fractures and high porosity and permeability. If communication did exist across the permeability barrier or restriction it is highly questionable whether gas injection should be allowed to continue in Canada Ojitos Unit in view of reimbibition effects. Any gas injection credit as proposed in would seriously adversely affect the correlative rights of owners in the Gavilan Mancos Pool.

(14) I do not concur. No evidence has been presented that demonstrates that gas injection in Canada Ojitos Unit has had any beneficial effect on production, prevention of waste and the protection of correlative rights. Refer to comments under (11) above.

(15) I do not concur. There is no justification for any expansion of the pressure maintenance area or for injection credit in the proposed expansion area recommended in (15).

Dissenting Opinion

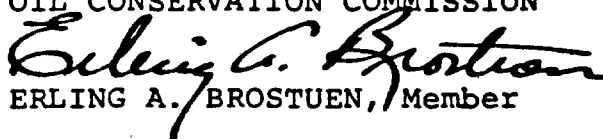
Case Nos. 9412, 7890,
8946, 8950, 9111

- (16) I do not concur. The assigning of a 50% injection gas credit to the proposed expansion area is arbitrary and capricious and has no basis in any evidence demonstrated in Case No. 9111.
- (17) I do not concur. No gas credit should be allowed. Refer to comments on (11), (13) and (14) above.
- (18) I do not concur. The reservoir pressure testing will not provide any indication of movement of fluids across the permeability barrier or restriction the will justify injection gas credit. It has already been established that the two rows of sections immediately to the east of the common boundary of the Gavilan Mancos Pool and the West Puerto Chiquitos Mancos Pool are in communication and are one common source of supply and by definition part of the same pool.

ORDER:

- (1) I do not concur. There has been no evidence presented that determines the movement of fluids across the permeability barrier or restriction into the proposed expansion area. Refer to comments on findings and orders relating to all cases discussed above.
- (2) I do not concur. No evidence has been presented that would demonstrate justification of enlargement of the injection credit area.
- (3) I do not concur. Refer to comments on (1) above.
- (4) Omitted.
- (5) I concur. This order is badly in need of modification.
- (6) I concur.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


ERLING A. BROSTUEN, Member

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

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IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

OIL CONSERVATION DIVISION

CASES NOS. 7980, 8946, 9113,
9114, 8950 and 9412

CASE NO. 7980

IN THE MATTER OF CASE 7980 BEING REOPENED PURSUANT TO THE PROVISIONS OF COMMISSION ORDER NO. R-7407, WHICH ORDER PROMULGATED TEMPORARY SPECIAL RULES AND REGULATIONS FOR THE GAVILAN-MANCOS OIL POOL IN RIO ARriba COUNTY, INCLUDING A PROVISION FOR 320-ACRE SPACING UNITS.

CASE NO. 8946

IN THE MATTER OF CASE 8946 BEING REOPENED PURSUANT TO THE PROVISIONS OF COMMISSION ORDER NO. R-7407-D, WHICH ORDER PROMULGATED A TEMPORARY LIMITING GAS-OIL RATIO AND DEPTH BRACKET ALLOWABLE FOR THE GAVILAN-MANCOS OIL POOL IN RIO ARriba COUNTY.

CASE NO. 9113

APPLICATION OF BENSON-MONTIN-GREER DRILLING CORPORATION, JEROME P. McHUGH & ASSOCIATES, AND SUN EXPLORATION AND PRODUCTION COMPANY TO ABOLISH THE GAVILAN-MANCOS OIL POOL, TO EXTEND THE WEST PUERTO CHIQUITO-MANCOS OIL POOL, AND TO AMEND THE SPECIAL RULES AND REGULATIONS FOR THE WEST PUERTO CHIQUITO-MANCOS OIL POOL, RIO ARriba COUNTY, NEW MEXICO.

CASE NO. 9114

APPLICATION OF MESA GRANDE RESOURCES, INC. FOR THE EXTENSION OF THE GAVILAN-MANCOS OIL POOL AND THE CONTRACTION OF THE WEST PUERTO CHIQUITO-MANCOS OIL POOL, RIO ARriba COUNTY, NEW MEXICO.

CASE NO. 8950

IN THE MATTER OF CASE 8950 BEING REOPENED PURSUANT TO THE PROVISIONS OF COMMISSION ORDERS NOS. R-6469-C AND R-3401-A, AS AMENDED, WHICH ORDER PROMULGATED A TEMPORARY ALLOWABLE AND LIMITING GAS-OIL RATIO FOR THE WEST PUERTO CHIQUITO-MANCOS OIL POOL IN RIO ARriba COUNTY.

— EXHIBIT "C" —

5124

REQUEST FOR REHEARING

Mallon Oil Company, American Penn Energy, Inc., Hooper, Kimbell & Williams, Koch Exploration, Kodiak Petroleum, Inc., Mesa Grande, Ltd., Mesa Grande Resources, Inc., Mobil Production Texas-New Mexico, Inc. Reading and Bates Petroleum Company and Tenneco Oil Company state:

1. Applicants are pleased with the general trend of the Commission's Order No. R-7407-G that recognizes the need to increase the oil allowable and gas limits for the Gavilan-Mancos Oil Pool ("Gavilan") in order to increase the ultimate recovery of reserves from the pool and to protect the correlative rights of the mineral owners. Under order No. R-7407-G, the top oil allowable for the Gavilan is now 800 bopd for a well on 640 acres and one-half that amount for a well on 320 acres, with each having a 2000:1 gas limit. Of course, this allowable is still 37.5% below normal yardstick allowables. While Applicants believe even higher oil allowables are necessary to insure maximum recovery of reserves from the Gavilan, of more immediate concern to them is the need for a temporary removal of any gas limit so that Gavilan wells, which have been severely restricted or even shut-in under the Commission's prior orders, may be returned to their full producing capabilities.

In Order No. R-7407-G the Commissioners have agreed with Applicants that wells in the Gavilan Pool produce at considerably higher gas ratios during periods of low oil production. (Findings of Fact Nos. 15 and 17). Unfortunately, this fact is being repeatedly demonstrated as operators in the Gavilan Pool attempt to bring their wells back on line and up to the full producing capacity permitted by Order No. R-7407-G. The severe allowable restrictions placed on Gavilan wells by prior orders have caused many wells to load up with gas during the past "low rate test period." Gavilan operators have experienced high gas production as they have tried to bring restricted and shut-in wells back on line.

For example, many Mallon wells initially produced nothing but gas when they were returned to production following the Commissioners' approval of Order No. R-7407-G. Mallon has had to place pulling units on its wells, treat them numerous times with hot oil and undertaken other treating and reworking operations (at a cost of \$3000 - \$7000 per well) in order to reestablish normal oil production. In addition, Mallon has experienced numerous problems with compressors that have been virtually out of use during the past reduced rate period. Mallon has currently achieved a production rate of only 200 bopd from its wells, down from the 900 bopd it was making in November, 1987. However, Mallon wells are producing the same volume of gas as in 1987, with gas/oil ratios running as high as 70,000:1. Other Gavilan

operators are experiencing similar problems with high gas production, low oil production and high gas/oil ratios as they return their wells to production.

Therefore, in order to eliminate the build-up of gas that has occurred in the Gavilan and to achieve a stabilized producing rate which is in line with the new pool rules, Applicants respectfully request the Commission to amend their orders to temporarily remove the gas limit in the Gavilan for a 90 day period beginning September 1, 1988. This temporary order will allow operators in the Gavilan to stabilize production from their wells as they are returned to production. Applicants have no objection to an identical temporary removal of the gas limit for the West Puerto Chiquito pool as well.

If after 90 days the gas production in the Gavilan remains high while oil production is at a fraction of its prior rate, it will be clear that Gavilan has suffered permanent reservoir damage from the prior low rate and shut-in periods.

2. Applicants would further state they are parties of record adversely affected by the issuance of Orders Nos. R-8712, R-7407-G, R-6469-F and R-3401-B.

3. The Commission should reconsider its decision in these matters and should grant a rehearing because:

a. The Commission's failure to recognize the true boundary between the Gavilan and West Puerto Chiquito Pools, as defined by pressure differentials of at least 450 psi, is

arbitrary and capricious and not supported by substantial evidence;

b. The Commission's adoption of a top oil allowable of 800 bopd for the Gavilan, with a limiting gas-oil ratio of 2000:1 is arbitrary and capricious, not supported by substantial evidence, and contrary to the Commission's findings regarding the effect of oil rate on gas-oil ratios; and

c. The Commission's expansion of the West Puerto Chiquito Pressure Maintenance Project and the approval of a 1/2 injection credit for the expansion area is arbitrary and capricious, not supported by substantial evidence and detrimental to the correlative rights of the Gavilan owners.

4. Applicants submit that certain findings and orderings are not supported by the evidence presented at the hearing and are arbitrary and capricious and not supported by law. In particular, and without limitation, the following findings are incorrect for the reasons stated below:

As to Order R-8712:

a. Finding (4): Applicants proved by an overwhelming preponderance of the evidence that the Gavilan and West Puerto Chiquito Pools are separated by a permeability barrier located approximately two miles east of the present common boundary between the two pools. All pressure data from the two pools supports the conclusion that a permeability barrier exists between wells which in February 1988 had at least a 450 psi pressure differential. This pressure differential is probably

higher now as more production has occurred in the pools. no effective communication has been shown across this barrier: in fact, pressure history over the past 25 years conclusively proves lack of communication.

b. Finding (5): A change in the pool boundaries is mandated by the preponderance of evidence presented in this hearing and is necessary to protect the correlative rights of the parties, and would not impose substantial burdens on all parties.

As to Orders R-7407-G and R-6469-F:

a. Finding (7): As established by cross-examination, the study conducted by the Petroleum Recovery Research Center was not truly "independent". In fact, the study was built upon critical "facts" that were merely assumed by the researchers to be true and not supported by any objective evidence. For instance, rather than looking for objective data to support a theory of pressure interference between wells, the researchers assumed interference and then attempted to quantify the amount of interference.

b. Finding (8): Proponents advocated adoption of a capacity allowable for the Gavilan in order to prevent waste; or, at the very least, that the normal statewide allowable of 1280 bopd for 640-acre units be approved. Opponents have advocated restrictive special allowables for the Gavilan, which would maintain production below state-wide levels.

c. Finding (9): Proponents also presented testimony and exhibits to demonstrate:

1) The change to higher oil and gas allowables was accompanied by a period of time of several days/weeks in which higher oil rates were achieved. (Proponents' Exhibit 11). Prior to that time, the wells produced primarily gas.

2) Allowable restrictions below the approved statewide top allowables limited production of gas in a manner that severely reduced oil withdrawals. Reduced oil withdrawals in turn resulted in higher gas-oil ratios due to inverse rate sensitivity. The effect of higher gas-oil ratios further curtailed oil allowable. This problem affected the Gavilan Mancos Pool in, which gas production is continuously metered, more severely than the Proposed Expansion Area of the C.O.U., in which outlet gas volumes are not continuously measured. The final result is a disproportionate reduction in oil production from the Gavilan Mancos Pool, drainage to the C.O.U. Proposed Expansion Area and a violation of correlative rights. (Proponents' Exhibits 14 and 15)

3) Use of average trend pressures to describe the pressure drop occurring during the "low rate - high rate - low rate" Commission ordered testing period, rather than the 72 hour well pressures which were clearly not built up, indicates increased incremental oil production per psi pressure drop at the higher withdrawal rates. (Proponents' Exhibits 22 and 23)

4) Per acre oil recovery from the C.O.U. Pressure Maintenance Project has not been noticeably increased by gas injection in comparison to either Gavilan recovery or

recovery from other fractured Niobrara fields in the area (Exhibits 25 and 26). This is not surprising since there is no technical basis on which increased oil recovery in a dual-porosity reservoir can be achieved. The gas injection program in the C.O.U. Pressure Maintenance Area has simply extended dramatically the time to recover hydrocarbons that would otherwise be recoverable by primary depletion.

5) Significant physical and economic waste has occurred and will continue to occur in the future in the event production is restricted to less than capacity rates. This has and will affect revenues to State, Federal, Working Interest and other Royalty Owners. (Proponents' Exhibits 27 and 28)

d. Finding (11): Substantial evidence indicated, and all parties agreed, that 640 acres with the option to drill two wells is the appropriate size spacing and proration unit for Gavilan.

e. Finding (13): The preponderance of the evidence proves the existence of the permeability barrier. Eleven separate types of information provide proof of this barrier:

1. Lack of pressure interference between Gavilan area and C.O.U. Pressure Maintenance Area between 1962 and 1988. Exhibit 20: 25 Year Interference Test.
2. Lack of pressure response to fracture stimulation across the barrier. Exhibit 41.
3. Pressure buildups near the barrier (C.O.U. A-20, B-29, B-32) all indicate barrier at correct location. Exhibit 43.

4. Inconsistent isobaric behavior between Gavilan Area and C.O.U. Pressure Maintenance Area indicates barrier. Weiss exhibits plus Exhibits 48, 49, 50: Isobaric Maps.
5. Lack of performance response on C.O.U. Pressure Maintenance Area due to Gavilan increasing in production to as high as 8,000 BOPD. Exhibit 7.
6. All wells drilled in barrier area have been extremely low productivity even after fracture stimulation. Exhibit 5: Base Map and Exhibit 5 to March 17-18, 1988 hearing.
7. Lack of pressure gradient with distance on either side of barrier indicates discontinuity and presence of barrier. Exhibit 21: Cross-Section of Greer Rainbow Map.
8. Simulation study indicates observed performance can be simulated in Gavilan Mancos area without having any efflux out of or influx into Gavilan.
9. Second derivative of structure map indicates barrier is in "quiet" area where low level of natural fracturing would be expected. Prior Mesa Grande geological testimony.
10. Lack of any verifiable evidence that barrier is not present coupled with above items, indicates that barrier is present and prevents communication between Gavilan and C.O.U. Pressure Maintenance Area.
11. Recognition by BMG and its experts for as long as 20 years that there exists a "boundary" (Mr. Greer), "reduction in permeability" (Dr. Lee), "reduced Kh and damage zone" (Mr. Roe) and "tight streak and fuzzy boundary" (Mr. Greer).

* includes C.O.U. Proposed Expansion Area

As can be seen, pressure differentials; lack of response to interference testing and the presence of nonproductive wells, among other evidence, conclusively proves the existence of a permeability barrier between the Gavilan and the West Puerto Chiquito Pools and prevents them from being a common source of supply.

f. Finding (14): The Commission has misstated the evidence regarding the ability of wells to produce top oil allowables. While it is true that no well produced the top oil allowable during the period of normal rate testing, several wells did produce, and were limited by the gas limit of 1280 mcf/d on 320 acre units during that period. In addition, many wells could have produced the proposed top oil allowable of 800 bopd had they not been limited by the gas limit in effect.

g. Finding (16): The available pressure measurements are conclusive evidence of the existence of a boundary and permeability barrier between the Gavilan and West Puerto Chiquito pools. A preponderance of the evidence shows that wells on each side of the barrier exhibit a very high degree of communication in all directions EXCEPT across the barrier. There is no evidence to show directional permeabilities vary. Use of 72-hour shut-in pressures has not provided adequate information regarding reservoir pressure, most especially following high production rate periods. As a result, erroneous conclusions have been reached such as that stated in the second sentence of Finding 18.

h. Finding (19): Evidence shows that the most efficient rate of production in the Gavilan will be achieved by producing at capacity allowables. There is no justification to establish any top oil allowable or limiting gas-oil ratio other than state-wide allowable levels.

i. Ordering (2): The 800 bopd top oil allowable with a 2000:1 gas limit should be amended to reflect the most efficient producing rate for wells in the Gavilan: capacity allowables; or, at the very least, a return to normal statewide allowables. In the alternative, the Commission should temporarily remove the gas limit for a 90 day period, effective September 1, 1988, in order to achieve stabilized producing rates in the Gavilan.

As to Order R-3401-B

a. Finding (7): The unit area east of the proposed expansion area exhibits a significantly greater pressure than the proposed expansion area and the adjacent Gavilan area because of the existence of a permeability barrier which separates the proposed expansion area and the Gavilan from the West Puerto Chiquito Mancos Pool.

b. Finding (8): The pressure differential of greater than 450 psi in February 1988 (and is even greater today), which exists across the third row of sections east of the western boundary of the unit conclusively proves that there is no effective communication between the injection wells and the proposed expansion area. Over the last 25 years the magnitude

and direction of the pressure differential has not affected the performance of either the COU pressure maintenance area or the Gavilan Mancos Pool (including the COU proposed expansion area). See Gavilan Pool Member Ex. 20.

c. Finding (9): Frac pulse responses have been established only between wells on the same side of the permeability barrier. No pulse response has been established across the permeability barrier. There is insufficient data to support any conclusion that overinjection of gas in the pressure maintenance area has failed to increase average pressures because the operator of the pressure maintenance area has uniformly failed to keep or provide sufficient pressure records for his project. In addition, the operator has stated that even prior to the discovery of Gavilan, overinjection of gas did not maintain pressure in the pressure maintenance area. The lower gas-oil ratio of wells in the proposed expansion area is caused by either lower structural position. None of these facts support the idea of any transmissibility across the low permeability zone.

d. Finding (10): Although the theory behind gas credits for gas injection is admirable, the evidence in this case does not support any gas injection credit for the expansion area because there will be no effective communication between the expansion area and the injection wells, some located more than 7 miles away, all located across a permeability barrier and all in a different pool from the proposed expansion area.

e. Finding (11): The permeability restriction described in Finding No. (5) makes it clear that the proposed expansion area will receive no benefit from the pressure maintenance gas project.

f. Findings (13), (14), (15), (16), and (17): This series of findings must fall to the evidence which establishes a permeability barrier and reservoir boundary between the proposed expansion area and the pressure maintenance area as described in Gavilan Pool Member Exs. 20 and 21. Because no portion of the proposed expansion area is in effective communication with the injection wells in the pressure maintenance area and will receive no benefit from gas injection, there is no justification for extending the pressure maintenance to any part of the proposed expansion area or for granting any injection credit to the proposed expansion area. To do so will destroy the correlative rights of the adjacent Gavilan owners.

g. Finding (18): If additional bottom hole pressure data is necessary to establish gas injection credit, then the proper wells to test are those on either side of the permeability barrier. Evidence of drainage across the current boundary between Gavilan and West Puerto Chiquito Mancos is meaningless for adjusting gas injection credit in the expansion areas as the wells on either side of the current boundary are not in communication with the injection wells and don't produce from the same pool with the injection wells. Furthermore, because of the complexity of the Gavilan and West Puerto Chiquito Pools, the

magnitude of dispute between operators in each and the involvement of the highest levels of the OCC in making decisions regarding the pools, any testing program should be designed (with impute from the operators), monitored and reviewed by the OCC's senior reservoir and petroleum engineers in Santa Fe rather than in the district. Finally, in order to obtain meaningful assistance from the operators and senior staff, the Commission should more clearly define its goals in requesting additional test data so that all operators and staff members can design a testing program to provide meaningful data.

However, if such tests are required, they should be delayed until the Commission rules upon this request for rehearing and until the requested ninety (90) day period of increased production is completed.

h. Ordering (1) and (2): There is no credible evidence in the record to support extending the pressure maintenance area to any part of the proposed expansion area, or to grant any gas injection credit for wells in the expansion area. The Commission is acting arbitrarily and capriciously in granting any portion of this application.

i. Ordering (3): As noted above, the proposed testing is meaningless. If any tests are to be run, they should be designed to conclusively establish communication, or the lack thereof, across the permeability barrier. The testing currently proposed merely assumes communication contrary to the overwhelming preponderance of evidence in this case.

Furthermore, if additional testing is necessary, it should be designed, implemented and reviewed by senior staff reservoir and petroleum engineers in Santa Fe.

In support of this motion, Applicants rely on the record before this Commission and the Dissenting Opinion filed by Commissioner Erling A. Brostuen, a copy of which is attached hereto and incorporated herein as Exhibit "A".

WHEREFORE, Applicants request the Commission grant this motion for rehearing and order the following:

1. Increase allowables in the Gavilan to capacity; or at least temporarily remove gas limits and set permanent allowables at state-wide rates;

2. Recognize the Gavilan and West Puerto Chiquito Mancos Pools as separate reservoirs;

3. Set pool boundaries at the permeability barrier;

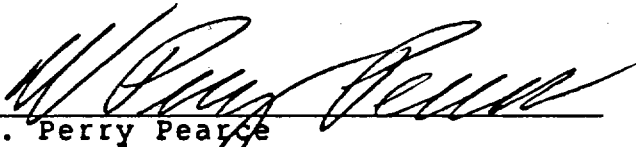
4. Deny Opponents' pressure maintenance expansion request or, alternatively, deny any injection credit for expansion;

5. Defer or withdraw any additional testing requirements, or, alternatively, more clearly define the goals of such testing and order that the testing is to be designed, implemented and reviewed by senior staff reservoir and petroleum engineers, with input from operators.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I caused a true and correct copy of the foregoing Request for Rehearing to be mailed to the following persons this 24th day of August, 1988.

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