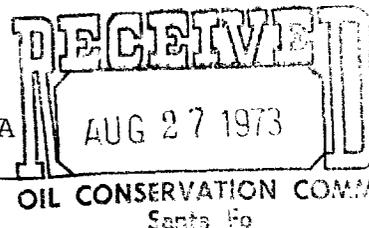


UNIT AGREEMENT
FOR THE OPERATION OF THE
GRAMA RIDGE MORROW UNIT AREA
LEA COUNTY, NEW MEXICO



THIS AGREEMENT entered into as of the 25th day of April, 1973 by and between the parties subscribing, ratifying or consenting hereto, and herein referred to as the "parties hereto".

WITNESSETH:

WHEREAS, the parties hereto are the owners of working, royalty or other oil or gas interests in the unit area subject to this agreement; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico (hereinafter referred to as "Commissioner") is authorized by law to consent to and approve the operation of state lands under agreements made by lessees of state lands jointly or severally with other lessees where such agreements provide for the unit operation of part of or all of any oil or gas pool, field or area (Section 7-11-39, 7-11-40 N.M.S.A. 1953 Comp.); and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by law to amend with the approval of lessee, evidenced by lessee's execution of such agreement or otherwise, any oil and gas lease embracing state lands so that the length of the term of said lease may coincide with the term of such agreement for the unit operation of part or all of any oil or gas pool, field or area (Section 7-11-41 N.M.S.A. 1953 Comp.); and

WHEREAS, the Oil Conservation Commission of the State of New Mexico (hereinafter referred to as "Commission") is authorized by law to approve this agreement and the conservation provisions thereof (Art. 3, Chap. 65, Vol. 9, Part 2 N.M.S.A. 1953 Comp.); and

WHEREAS, the parties hereto hold sufficient interest in the Grama Ridge Morrow Unit Area covering the lands hereinafter described

to give reasonably effective control of operations therein; and

WHEREAS, it is the purpose of the parties hereto to conserve natural resources, prevent waste, store gas and secure other benefits obtainable through development and operation of the area subject to this agreement under the terms and conditions and limitations herein set forth.

NOW, THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this agreement their respective interests in the below defined unit area, and agree severally among themselves as follows:

1. UNIT AREA: The following described land is hereby designated and recognized as constituting the unit area:

Township 21 South, Range 34 East, N.M.P.M.

Section 34 - All

Township 22 South, Range 34 East, N.M.P.M.

Section 3 - All

containing 1287.16 acres, more or less.

Exhibit "A" attached hereto is a map showing the unit area and the boundaries and identity of tracts and leases in said area to the extent known to the unit operator. Exhibit "B" attached hereto is a schedule showing to the extent known to the unit operator the acreage, percentage and kind of ownership of oil and gas interests in all lands in the unit area. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest or interests as are shown on said map or schedule as owned by such party. Exhibits "A" and "B" shall be revised by the unit operator whenever changes in ownership in the unit area render such revisions necessary or when requested by the Commissioner.

All land committed to this agreement shall constitute land referred to herein as "unitized land" or "land subject to this agreement".

2. UNITIZED SUBSTANCES: All oil, gas, natural gasoline and associated fluid hydrocarbons in the unitized formation as hereinafter defined are unitized under the terms of this agreement and herein are called unitized substances.

3. UNITIZED FORMATION: That subsurface portion of the unit area commonly known as the Morrow sands which is the same zone as the top and bottom of which were encountered at log depths of 12,722 feet and 13,208 feet in the Shell Oil Company State GRA Well No. 1 as shown on the Schlumberger Sonic Log - Gamma Ray Log of said well dated July 5, 1965, which said well is located 1980 feet from the North line and 660 feet from the west line of Section 3, Township 22 South, Range 34 East, is unitized under this agreement and is hereinafter referred to as the "unitized formation".

4. UNIT OPERATOR: Llano, Inc. with offices at Hobbs, New Mexico (P.O. Drawer 1320) is hereby designated as unit operator and by signature hereto commits to this agreement all interest in unitized substances vested in it as set forth on Exhibit "B" and agrees and consents to accept the duties and obligations of unit operator for the operation of the Grama Ridge Morrow Unit Area. Whenever reference is made herein to the unit operator, such reference means the unit operator acting in that capacity and not as an owner of interests in unitized substances, and the term "working interest owner" when used herein shall include or refer to unit operator as the owner of a working interest when such interest is owned by it.

5. RESIGNATION OR REMOVAL OF UNIT OPERATOR: Unit operator shall have the right to resign at any time, but such resignation shall not become effective until a successor unit operator has been selected and approved in the manner provided for in Section 6 of this agreement. The resignation of the unit operator shall not release the unit operator from any liability or any default by it hereunder occurring prior to the effective date of its resignation.

Unit operator may, upon default or failure in the performance of its duties or obligations hereunder, be subject to removal by the same percentage vote of the owners of working interests determined in like manner as herein provided for the selection of a new unit operator. Such removal shall be effective upon notice thereof to the Commissioner.

The resignation or removal of the unit operator under this agreement shall not terminate his right, title or interest as the owner of a working interest or other interest in unitized substances, but upon the resignation or removal of unit operator becoming effective, such unit operator shall deliver possession of all equipment, materials and appurtenances used in conducting the unit operations and owned by the working interest owners to the new duly qualified successor unit operator, or to the owners thereof if no such new unit operator is elected, to be used for the purpose of conducting unit operations hereunder. Nothing herein shall be construed as authorizing removal of any material, equipment and appurtenances needed for the preservation of any wells.

6. SUCCESSOR UNIT OPERATOR: Whenever the unit operator shall resign as unit operator or shall be removed as hereinabove provided, the owners of the working interests according to their respective acreage interests in all unitized land shall by a majority vote select a successor unit operator; provided that, if a majority but less than seventy-five percent (75%) of the working interests qualified to vote is owned by one party to this agreement, a concurring vote of sufficient additional parties, so as to constitute in the aggregate not less than seventy-five percent (75%) of the total working interests, shall be required to select a new operator. Such selection shall not become effective until (a) a unit operator so selected shall accept in writing the duties and responsibilities of

unit operator, and (b) the selection shall have been approved by the Commissioner. If no successor unit operator is selected and qualified as herein provided, the Commissioner at his election may declare this unit agreement terminated.

7. ACCOUNTING PROVISIONS: The unit operator shall pay all costs and expenses incurred in conducting unit operations hereunder. In the event the ownership of the unitized formation should hereafter be divided or owned in whole or in part by parties other than unit operator, from and after such time unit operator shall pay in the first instance all costs and expenses incurred in conducting unit operations hereunder, and such costs and expenses and the working interest benefits accruing hereunder shall be apportioned among the owners of the unitized working interests in accordance with an operating agreement entered into by and between the unit operator and the owners of such interests, whether one or more, separately or collectively. Any agreement or agreements entered into between the working interest owners and the unit operator as provided in this section, whether one or more, are herein referred to as the "Operating Agreement". No such agreement shall be deemed either to modify any of the terms and conditions of this unit agreement or to relieve the unit operator of any right of obligation established under this unit agreement and in case of any inconsistencies or conflict between this unit agreement and the operating agreement, this unit agreement shall prevail.

8. RIGHTS AND OBLIGATIONS OF UNIT OPERATOR: Except as otherwise specifically provided herein, the exclusive right, privilege and duty of exercising any and all rights of the parties hereto which are necessary or convenient for producing, storing, allocating and distributing the unitized substances are hereby delegated to and shall be exercised by the unit operator as herein provided.

Acceptable evidence of title to said rights shall be deposited with said unit operator and, together with this agreement, shall constitute and define the rights, privileges and obligations of unit operator. Nothing herein, however, shall be construed to transfer title to any land or to any lease or operating agreement, it being understood that under this agreement the unit operator, in its capacity as unit operator, shall exercise the rights of possession and use vested in the parties hereto only for the purposes herein specified.

9. PURPOSE OF UNIT AND PLAN OF OPERATION: It is recognized and agreed by the parties hereto that the unitized formation as to all of the lands subject to this agreement is reasonably proven to be productive of unitized substances or necessary for unit operations and that the object and purpose of this agreement is to formulate and put into effect a secondary recovery and gas storage project in order to effect the greatest economic recovery of unitized substances, prevent waste and conserve natural resources consistent with good engineering practices expected of a prudent operator. The parties hereto agree that the unit operator may, subject to the approval of a plan of operation by the Commissioner, inject gas produced from lands other than the unit area into the unitized formation through the Shell Oil Company State GRA Well No. 1 located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 3, Township 22 South, Range 34 East and the Shell State GRB Well No. 1 located in the NW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 34, Township 21 South, Range 34 East for secondary recovery and storage purposes. Unit operator shall furnish the Commissioner, between the first and twentieth of each month, reports showing the amount of gas produced and injected into the unitized formation for the preceding month.

A plan of operation shall be filed with the Commissioner concurrently with the filing of this unit agreement for final approval. Said plan of operation and all revisions thereof shall be as complete

and adequate as the Commissioner may determine to be necessary in connection with operations hereunder. Upon approval of this agreement and the aforementioned plan of operation by the Commissioner, said plan and all subsequently approved plans shall constitute the operating obligations of the unit operator under this agreement for the period specified in the plan. Thereafter, from time to time before the expiration of any existing plan, the unit operator shall submit for approval a plan for an additional specified period of operation. Reasonable diligence shall be exercised in complying with the obligations of the approved plan of operation. The unit operator shall furnish to the Commissioner, within 30 days from the expiration of each 6 month period, a report giving full factual information as to the manner in which the plan in effect for such period has been carried out.

If the unit operator should fail to comply with any approved plan of operation or supplement to or modification thereof, this agreement may be terminated by the Commissioner; provided, however, the Commissioner shall give notice to the unit operator and the lessees of record in the manner prescribed by Section 7-11-14 N.M.S.A. 1953 of intention to cancel because of any alleged breach of said plan of operation and any decision entered therein shall be subject to appeal in the manner prescribed by Section 7-11-17 N.M.S.A. 1953; and provided further in any event unit operator shall be given a reasonable opportunity after a final determination within which to remedy said default, failing in which this agreement shall be terminated.

10. TRACT PARTICIPATION: Exhibit "B" attached hereto shows the percentage of participation of each of the tracts embraced by leasehold interests which are committed to this agreement. These participation factors have been obtained by dividing the number of acres contained in each tract by the total number of acres contained in the unit area.

The unitized substances produced from the unit area shall be allocated to the respective tracts as hereinafter set forth in accordance with said percentages of participation and such unitized substances shall be deemed to have been produced from the respective tracts to which allocated.

11. ALLOCATION OF PRODUCTION:

A. PHASE I: It is recognized that there is still some primary gas and liquid hydrocarbons left in the unitized formation underlying the unit area which would otherwise be produced in the normal producing life of the existing wells before they reach their economic limit upon which the state would be entitled to royalty. It is contemplated that gas produced from lands outside the unit area will be injected into the unitized formation for a considerable length of time before any appreciable amounts of gas are withdrawn. The primary production which would normally have been produced from May 1, 1975 to its economic limit has been determined by B.H.P/Z method based upon prior production, and Exhibit "C" attached hereto shows the royalty gas to which the state is entitled. In order that the State of New Mexico will continue to receive royalties on the same basis as if the existing wells had continued normal production until they reached their economic limits, the amount of gas shown for the respective months on Exhibit "C" shall be allocated to the tracts in accordance with the percentages set forth on Exhibit "B" and unit operator shall pay to the state royalties on the gas allocated to the respective tracts on the basis provided in the leases covering said tracts exactly the same as if the gas had actually been produced therefrom. Such payments based upon the gas for each of the months shown on Exhibit "C" shall be considered as full payment to the state for all remaining primary gas reserves. The period from May 1, 1973 through the months shown on Exhibit "C" shall constitute Phase I.

B. PHASE II: It is contemplated that after the unitized formation has been reasonably repressured by the injection of gas produced from lands outside the unit area, there will be withdrawals from time to time. Unit operator shall install and at all times operate and maintain metering equipment and other facilities approved by the Commissioner so that an accurate cumulative account can be kept of the quantity of gas gas as well as the total number of British Thermal Units in the gas injected into the unitized formation through the existing wells. Operator shall also keep an accurate cumulative account of the total number of British Thermal Units in all gas withdrawn from the unitized formation.

Operator shall also install, operate and maintain at all times the necessary separation equipment to separate the gas from the liquid hydrocarbons produced in connection with the withdrawal of gas from the respective wells, as well as all other related equipment which may be required to transfer all liquids so separated.

Operator shall cause monthly analyses by chromatograph or other mutually acceptable method of all the gas injected into or withdrawn from the reservoir in order to compute the net change in British Thermal Unit content.

Operator shall pay royalties to the state at the rates provided in the respective leases on all liquid hydrocarbons which are separated from the gas withdrawn and allocated to the respective tracts in accordance with the percentages of participation set forth on Exhibit "B" regardless of the time said gas is withdrawn. In addition, should the total cumulative British Thermal Units in the gas withdrawn exceed the total British Thermal Units in the gas

injected plus the pre-determined number of British Thermal Units in the remaining primary gas reserves and for which the state has been or will be paid during Phase I, then operator shall pay royalties on said increase in British Thermal Units at the prevailing market price in Lea County, New Mexico as set by the Federal Power Commission for gas of like quality. Payment for British Thermal Unit enrichment as set forth herein shall be made on a monthly basis as the result of the chromatograph analyses.

In addition to the rental and royalty provided in the leases covering the respective tracts beginning with the first of the month following the end of Phase I as shown on Exhibit "C" unit operator shall pay an annual storage fee or rental of \$1.00 per acre plus 1/2¢ per thousand cubic fee of gas withdrawn from the reservoir, which shall be allocated to the respective leasehold interests on the basis of the percentage of participation set forth on Exhibit "B". Said storage fee or additional rental of \$1.00 per acre shall be paid during the month of February of each year and the 1/2¢ per thousand cubic feet for gas withdrawn shall be based on the monthly withdrawals, payments to be made in the month following the month in which withdrawals are made.

All gas produced from the lands outside the unit area and injected into the unitized formation, as well as all primary gas if, as and when produced, except for the payments to be made to the state in accordance with Phase I, may be withdrawn from the unitized formation from time to time royalty free except as to any enhancement in value through an increase in British Thermal Units. Notwithstanding the above, royalty shall be paid on all liquid hydrocarbons separated from gas withdrawn.

12. LEASES AND CONTRACTS CONFORMED AND EXTENDED. The terms, conditions and provisions of all leases, subleases, operating agreements and other contracts relating to the exploration, drilling,

development or operation for oil or gas of the lands committed to this agreement shall, as of the effective date hereof, be and the same are hereby expressly modified and amended insofar as they apply to lands within the unitized area to the extent necessary to make the same conform to the provisions hereof and so that the respective terms of said leases and agreements will be extended insofar as necessary to coincide with the term of this agreement and the approval of this agreement by the Commissioner and the respective lessees shall be effective to conform the provisions and extend the term of each such lease as to lands within the unitized area to the provisions and term of this agreement; but otherwise to remain in full force and effect. Each lease committed to this agreement, insofar as it applies to lands within the unitized area, shall continue in force beyond the term provided therein so long as this agreement remains in effect. Termination of this agreement shall not affect any lease which pursuant to the terms thereof or any applicable laws would continue in full force and effect thereafter. The continued operation or production of a well or wells for unitized substances on the unit area or for gas storage purposes shall be construed and considered as the continued operation or production on each of the leasehold interests committed to this agreement and operations or production or gas storage pursuant to this agreement shall be deemed to be operations upon and production from each leasehold interest committed hereto and there shall be no obligation on the part of the unit operator or any of the owners of the respective leasehold interests committed hereto to drill offsets to wells as between the leasehold interests committed to this agreement.

Any lease embracing lands of the State of New Mexico having only a portion of its lands committed hereto shall be segregated as to the portion committed and the portion not committed and the terms of such leases shall apply separately as to such segregated portions

commencing as of the effective date hereof. Notwithstanding any of the provisions of this agreement to the contrary, any lease embracing lands of the State of New Mexico having only a portion of its lands committed hereto shall continue in full force and effect beyond the term provided therein as to all lands embraced in such lease if oil and gas, or either of them, are capable of being produced from or gas is being stored within some part of the unitized formation covered by the leases committed to this agreement at the expiration of the secondary term thereof.

13. CONSERVATION: Operations hereunder and production of unitized substances shall be conducted to provide for the most economical and efficient recovery and storage of said substances without waste, as defined by or pursuant to state laws or regulations.

14. DRAINAGE: In the event a well or wells producing oil or gas in paying quantities should be brought in on land adjacent to the unit area draining unitized substances from the lands embraced therein, unit operator shall drill such offset well or wells as a reasonably prudent operator would drill under the same or similar circumstances.

15. COVENANTS RUN WITH LAND: The covenants herein shall be construed to be covenants running with the land with respect to the interests of the parties hereto and their successors in interest until this agreement terminates, and any grant, transfer or conveyance of interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by the grantee, transferee or other successor in interest. No assignment or transfer of any working, royalty or other interest subject hereto shall be binding upon unit operator until the first day of the calendar month after the unit operator is furnished with the original, photostatic or certified copy of the instrument of transfer.

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16. EFFECTIVE DATE AND TERM: This agreement shall become effective as of April 25, 1973 upon approval by the Commissioner and shall remain in effect so long as unitized substances are being produced from or stored within the unitized formation. This agreement may be terminated at any time by not less than seventy-five per cent (75%) on an acreage basis of the owners of working interests signatory hereto with the approval of the Commissioner.

17. RATE OF PRODUCTION: All production and the disposal thereof shall be in conformity with allocations, allotments and quotas made or fixed by the Commission and in conformity with all applicable laws and lawful regulations.

18. APPEARANCES: Unit operator shall, after notice to other parties affected, have the right to appear for and on behalf of any and all interests affected hereby before the Commissioner of Public Lands and the New Mexico Oil Conservation Commission, and to appeal from orders issued under the regulations of the Commissioner or Commission or to apply for relief from any of said regulations or in any proceedings on its own behalf relative to operations pending before the Commissioner or Commission; provided, however, that any other interested party shall also have the right at his own expense to appear and to participate in any such proceeding.

19. NOTICES: All notices, demands or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if given in writing and sent by postpaid certified mail, addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party may have furnished in writing to party sending the notice, demand or statement.

20. UNAVOIDABLE DELAY: All obligations under this agreement requiring the unit operator to produce unitized substances from or

store gas within the unitized formation covered by this agreement shall be suspended while, but only so long as, the unit operator, despite the exercise of due care and diligence, is prevented from complying with such obligations, in whole or in part, by strikes, war, acts of God, federal, state or municipal law or agencies, unavoidable accidents, uncontrollable delays in transportation, inability to obtain necessary materials in open market, or other matters beyond the reasonable control of the unit operator, whether similar to matters herein enumerated or not.

21. LOSS OF TITLE: In the event title to any tract of unitized land or substantial interest therein shall fail and the true owner cannot be induced to join the unit agreement so that such tract is not committed to this agreement or the operation thereof hereunder becomes impracticable as a result thereof, such tract may be eliminated from the unitized area, and the interest of the parties readjusted as a result of such tract being eliminated from the unitized area. In the event of a dispute as to the title to any royalty, working or other interest subject hereto, the unit operator may withhold payment or delivery of the allocated portion of the unitized substances involved on account thereof without liability for interest until the dispute is finally settled, provided that no payment of funds due the State of New Mexico shall be withheld. Unit operator as such is relieved from any responsibility for any defect or failure of any title hereunder.

22. RE-NEGOTIATION OF STORAGE OR RENTAL FEE: The gas storage fee paid on gas withdrawn under Section 11B shall be valid for a period of three (3) years from the effective date of this agreement. During the final year of the first three (3) year period that this agreement is in force the fee set out in Section 11B shall be re-negotiated between the parties hereto, each such re-negotiated rate to be in effect for the succeeding five (5) year period. If the parties hereto are unable to agree to re-negotiated new fees sixty (60) days prior to the

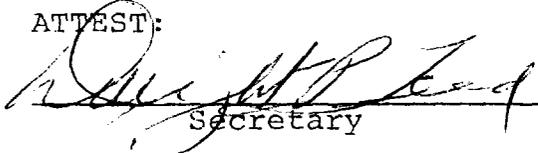
expiration of the first three (3) year period and at least sixty (60) days prior to the first day of any such succeeding five (5) year period, payment of the fees on the basis of prior rates shall continue and this agreement shall terminate upon expiration of not more than two (2) years from said first day (during which time the parties hereto may remove the metered and injected gas not previously withdrawn and equipment and facilities installed under this agreement) unless during such two (2) year period the parties hereto agree upon a re-negotiated rate to be effective retroactively to said first day. Any gas or facilities not then removed by the termination date shall become the property of the State of New Mexico if it so elects.

23. HOLD HARMLESS CLAUSE: Notwithstanding any of the provisions contained herein, unit operator shall save, hold and protect the Commissioner of Public Lands and the State of New Mexico harmless from all claims and liabilities of whatsoever kind, nature or description arising from or growing out of operations carried on by unit operator pursuant to this agreement.

24. COUNTERPARTS: This agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties, or may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all such parties had signed the same document and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the above described unit area.

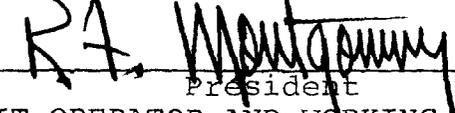
IN WITNESS WHEREOF, the undersigned parties have caused this agreement to be executed as of the respective dates set forth opposite their signatures.

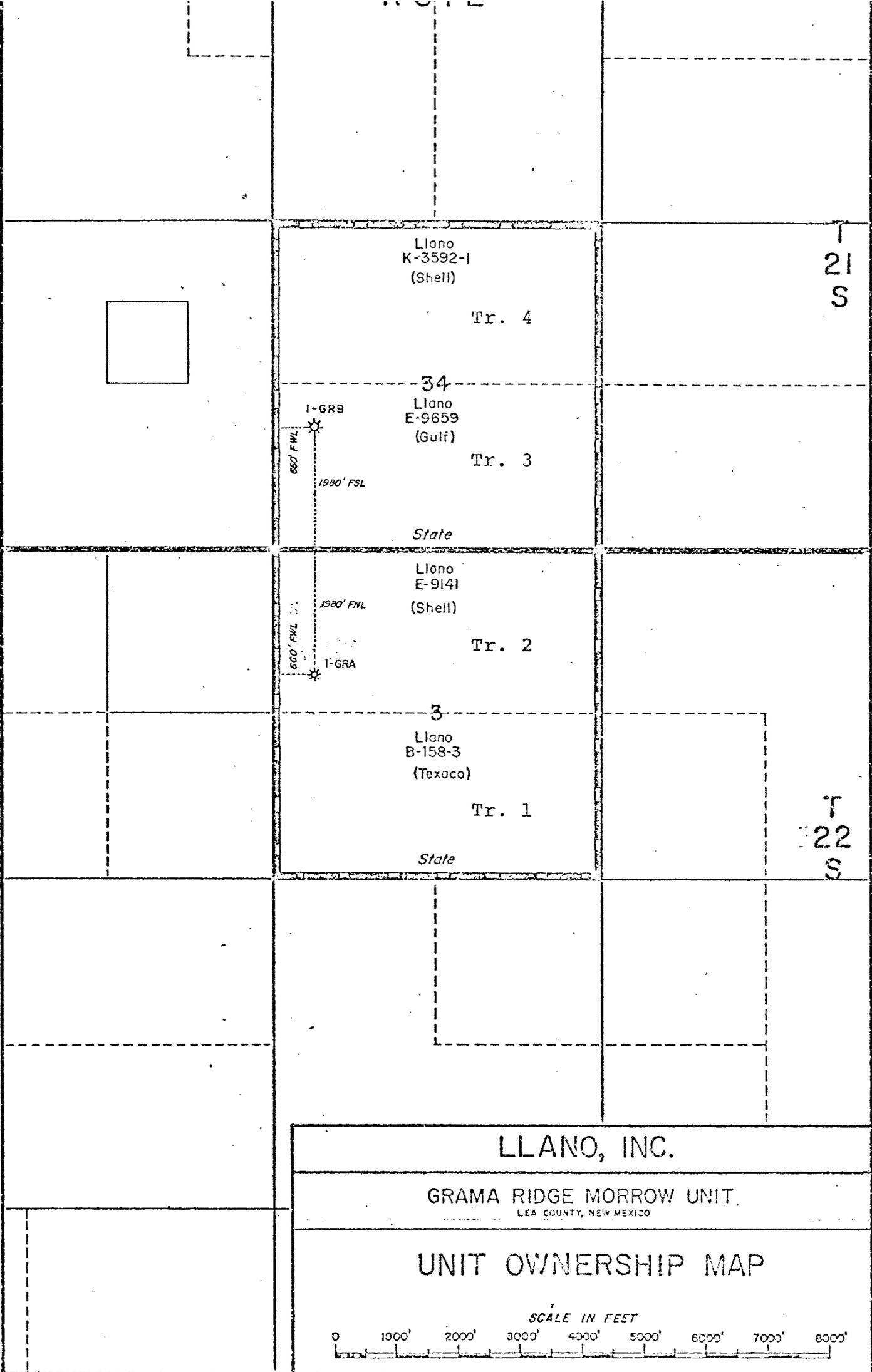
ATTEST:


Secretary

Date: June 7, 1973

LLANO, INC.

By  President
UNIT OPERATOR AND WORKING INTEREST OWNER
Address: P. O. Box 1320
Hobbs, New Mexico 88240



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LLANO, INC.

GRAMA RIDGE MORROW UNIT,
LEA COUNTY, NEW MEXICO

UNIT OWNERSHIP MAP

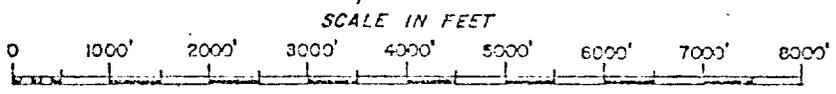


EXHIBIT "B"
GRAMA RIDGE MORROW UNIT AGREEMENT

tract	Description	No. Surface Acres	Lease No.	Basic Royalty	Lessees of Record	Overriding Royalty or Prod. Pymt.	Working Int. Owner and Percentage	Percentage Tract Participation
	S $\frac{1}{2}$ Sec. 3, T. 22 S., R. 34 E.	320.00	B-158-3	12 $\frac{1}{2}$ %	Texaco Inc.	None	Llano, Inc. 100%	24.861
	N $\frac{1}{2}$ Sec. 3, T. 22 S., R. 34 E.	327.16	E-9141	12 $\frac{1}{2}$ %	Shell Oil Company	None	Llano, Inc. 100%	25.417
	S $\frac{1}{2}$ Sec. 34, T. 21 S., R. 34 E.	320.00	E-9659	12 $\frac{1}{2}$ %	Gulf Oil Corporation	None	Llano, Inc. 100%	24.861
	N $\frac{1}{2}$ Sec. 34, T. 21 S., R. 34 E.	320.00	K-3592-1	12 $\frac{1}{2}$ %	Shell Oil Company	None	Llano, Inc. 100%	24.861
Total		1287.16						100.000

EXHIBIT "C"

Composite Royalty Production - BHP/Z Method - Grama Ridge Morrow Unit Area, Lea County, New Mexico

1973		1974		1975		1976		1977	
Month	Equivalent Gas Production MCF								
May	1,860	Jan.	1,060	Jan.	810	Jan.	610	Jan.	460
June	1,770	Feb.	1,040	Feb.	790	Feb.	600	Feb.	450
July	1,660	Mar.	1,010	Mar.	775	Mar.	590	Mar.	445
Aug.	1,590	April	990	April	750	April	575	April	430
Sept.	1,510	May	960	May	740	May	550	May	425
Oct.	1,450	June	950	June	710	June	540	June	410
Nov.	1,380	July	925	July	700	July	525	July	400
Dec.	1,090	Aug.	900	Aug.	690	Aug.	510	Aug.	395
Total	12,310	Sept.	890	Sept.	675	Sept.	500	Sept.	390
Cum.	12,310	Oct.	860	Oct.	650	Oct.	495	Oct.	375
		Nov.	840	Nov.	640	Nov.	490	Nov.	370
		Dec.	825	Dec.	625	Dec.	475	Dec.	360
		Total	11,250	Total	8,555	Total	6,460	Total	4,910
		Cum.	23,560	Cum.	32,115	Cum.	38,575	Cum.	43,485

1978		1979	
Month	Equivalent Gas Production MCF	Month	Equivalent Gas Production MCF
Jan.	350	Jan.	270
Feb.	345	Feb.	270
Mar.	340		
April	330		
May	325		
June	310		
July	305		
Aug.	300		
Sept.	295		
Oct.	290		
Nov.	280		
Dec.	275		
Total	3,745	Total	540
Cum.	47,230	Cum.	47,770

Unit Name GRAMA RIDGE MORROW UNIT (SECONDARY RECOVERY AND GAS STORAGE)
 Operator Llano, Inc.
 County Lea

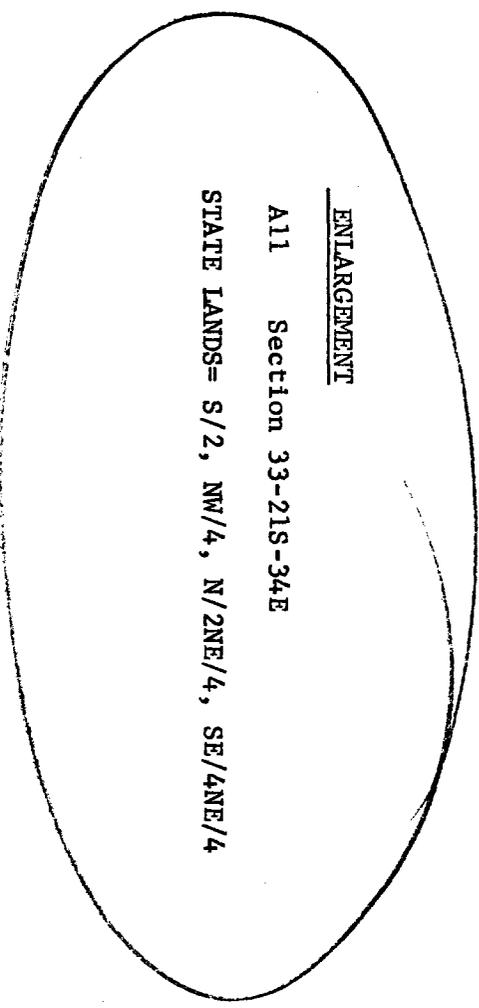
4895 &

DATE	OCC CASE NO.	4896	EFFECTIVE DATE	TOTAL ACREAGE	STATE	FEDERAL	INDIAN-FEE	SEGREGATION CLAUSE	TERM
APPROVED	OCC ORDER NO.	R-4473 &							
Commissioner	1-29-73 &	R-4491	4-25-73	1,287.16	1,287.16	-0-	-0-	Yes	5 yrs.
8-27-73	3-16-73								

UNIT AREA

TOWNSHIP 22 SOUTH, RANGE 34 EAST NMPM
 Section 3: All

TOWNSHIP 21 South, Range 34 EAST NMPM
 Section 34: All
 Section 33: All (ENLARGEMENT)



Unit Name GRAMA RIDGE MORROW UNIT (Secondary Recovery and Gas Storage)
 Operator Llano, Inc.
 County Lea

STATE TRACT NO.	LEASE NO.	INSTI-TUTION	SEC.	TWP.	RGE.	SUBSECTION	RATIFIED		ACRES	ACREAGE		LESSEE
							DATE	ACRES		NOT RATIFIED	RATIFIED	
1	B-158-3	C.S.	3	22S	34E	S/2	7-18-73	320.00				Texaco Inc.
2	E-9141	C.S.	3	22S	34E	N/2	6-7-73	327.16				Llano, Inc.
3	E-9659	C.S.	34	21S	34E	S/2	7-20-73	320.00				Gulf Oil Corporation
4	K-3592-2	C.S.	34	21S	34E	N/2	6-7-73	320.00				Llano, Inc.
5	E-7574-1	C.S.	33	21S	34E	S/2, NW/4, N/2NE/4, SE/4NE/4 (ENLARGEMENT)	11-29-76	600.00				Wilson Oil Company and Frances P. Bolton, dba Wyoming Oil Company

A REVIEW

FOR THE

UNDERGROUND STORAGE OF GAS
IN THE GRAMA RIDGE MORROW UNIT
LEA COUNTY, NEW MEXICO



December, 1972

RECEIVED BY	MINER, UTZ
OIL COMPANY	LEA COUNTY COMMISSION
DATE	1
ACCOUNT NO.	4895 - 4896
BY	Hono Inc
DATE	1/27/73

I. INTRODUCTION

Llano, Inc., a New Mexico Corporation with offices in Hobbs, New Mexico, desires to form an underground gas storage facility to include the State GRA No. 1 and State GRB No. 1 wells in the Morrow Sand Formation of the Grama Ridge Field. The object of this review is to determine the feasibility of storage in the two-well area.

II. SUMMARY

The Grama Ridge Field is located in Southeastern New Mexico approximately 18 miles west of the Eunice townsite (as shown in Fig. 1). The field was discovered in June, 1965 by the Shell Oil Company - Federal "GR" No. 4-1. The reservoir is the Morrow Sand Formation at approximately 13,000 feet and consists of numerous sandstone members that are irregularly interbedded with impermeable shales. Cross-sections indicate that any individual sand is not continuous throughout the field and, therefore, communication between wells is not thought to be prevalent. The proration spacing is 640 acres per well.

Areal extent of the proposed storage unit is 1280 acres. The effective reservoir volume under this surface area is estimated to be 13,220 acre-feet. Original gas-in-place was established from rate-time extrapolations. The reservoir was considered to be 85 percent depleted of original gas-in-place at abandonment.

Cumulative equivalent gas volumes within the proposed storage unit are as follows:

15.65 billion cubic feet originally-in-place

13.32 billion cubic feet of recoverable gas

13.05 billion cubic feet cumulative (est.) to 1/1/73

The storage system can be pressure monitored in offset well and enlarged if communication is evident.

III. CONCLUSIONS

1. The producing mechanism is by gas expansion.
2. Ultimate primary recovery on the State GRA No. 1 and State GRB No. 1 is estimated at 13.32 billion standard cubic feet of equivalent gas which is 85 percent of the 15.65 billion standard cubic feet of equivalent gas-in-place.
3. Remaining estimated primary production as of 1/1/73 will be 0.276 billion standard cubic feet of equivalent gas which is approximately 2.1% of the recoverable 13.32 billion standard cubic feet.
4. The reservoir does not have sufficient hydrocarbons to support economical secondary operations.
5. No production anomalies exist to justify future development.
6. Volumetric calculations show a limited reservoir.
7. The geological interpretation shows a limited stratigraphic trap.

8. The reservoir is useable for the storage of gas in view of the limited volume, depletion state and geologic nature.

9. Pressure monitoring in offset wells will determine if expansion is needed due to communication.

IV. RECOMMENDATIONS

1. Contract with the Commissioner of Public Lands for underground gas storage under the state area as shown outlined by Map 1(attached).

2. Utilize the interval to extend from the top of the Morrow Clastics to the base of the Morrow Marker Zone as shown on type log (Fig. 2).

V. DISCUSSION

Storage Area

The proposed storage area is as shown on Map 5.

Vertical Limits of Storage

The vertical interval proposed for storage utilization is from the top of the Morrow Clastics to the base of the bottom Marker Zone as shown on type log (Fig. 2).

Performance Data

Table No. 1 is a summary of the data from the State GRA No. 1

and State GRB No. 1 wells. Completion and production data was obtained from the Oil Conservation Commission files in the Hobbs, New Mexico office. Other data is as follows:

- (a) Completion Sands
- (b) Equivalent Cumulative Gas Production
- (c) Equivalent Ultimate Gas Production
- (d) Calculated Flow Capacity From 4-Point Test

Geology

(a) Structure - As contoured on top of the Morrow Clastics, the area is reflecting structural relief with southwest nosing (see Map 2).

(b) Morrow Sands - The sand development indicates five correlable zones between wells that vary from 0 to 60 feet in gross thickness with up-structure thinning. The sands are extremely irregular and non-continuous in nature and are embedded in a shale matrix. Permeability pinch-outs occur with increased shaliness toward the sand/shale facies. Cross-section No. 1 shows the five correlable zones as A, B, C, D and E. The sands in these zones are perforated for the most part where test data indicated permeability. The sand irregularity is apparent in the cross-section and it is thought that communication between wells is not prevalent. Fig. No. 2 is a typical gamma-ray sonic log of the Morrow Formation.

Original Gas-In-Place

The original gas-in-place under the State GRA and GRB leases was calculated to be 15.65 billion standard cubic feet by considering the summation of the individual well rate-time production extrapolations to

be 85 percent of the original gas-in-place.

Volumetric calculations based on this original gas-in-place of 15.65 billion cubic feet indicates an average effective pay thickness of 10.32 feet with the parameters as shown below.

Average Porosity	10%
Water Saturation	20%
Ultimate Equivalent Primary Gas Production	13.21 BCF
Initial Reservoir Pressure	7500 PSI
Reservoir Temperature	182°F
Spacing (2 wells)	1280 Acres

Primary Recovery

Cumulative production to January 1, 1972 from the State GRA No. 1 was 6,830,087 MCF of gas and 20,315 barrels of condensate and from the State GRB No. 1 it was 5,777,279 MCF of gas and 23,412 barrels of condensate. Using an estimate of 3500 SCF/STBO the condensate production when converted to equivalent gas production is 0.153 BCF. Ultimate primary equivalent gas production has been estimated at 13.32 billion cubic feet of gas by extrapolating the individual lease rate-time decline curve to an economic limit of \$300 per well per month. This ultimate primary gas production represents an empirical recovery of 85 percent of the original 15.65 billion standard cubic feet of gas-in-place estimated under the State GRA and State GRB leases.

Plan of Operation

The day to day operation of the storage facility will depend on market demand and wellhead obligations. The availability of underground storage facility will enable Llano to operate its pipeline system near 100 percent annual capacity. During low demand periods, gas in excess of market requirements will be injected into storage. This "stored gas" would then be available for use in periods of peak demand with controlled deliverability.

Gas will be injected into the State GRA No. 1 and State GRB No. 1 wells after they have been converted for injection purposes. When there is a demand for the stored gas the injection wells will become withdrawal wells until the demand is met.

It is anticipated that 13 billion cubic feet will be the maximum storage capacity at a shut-in wellhead pressure of 6000 psi. This facility will enable Llano's pipeline system to operate at or approaching a 100 percent load factor which will enable Llano to maintain a more efficient operation.

Llano, Inc

GRAMA RIDGE FIELD
LEA COUNTY, NEW MEXICO

1/15/73

GRA No 1 & GRB No 1

Mcf's

COMPOSITE ROYALTY PRODUCTION

- BHP/2 METHOD

1973			1974			1975			
Month	GRA	GRB	TOTAL	Month	GRB	TOTAL	Month	GRB	Total
Jan	990	1400	2390	Jan	1060	1060	Jan	810	810
Feb	880	1360	2240	Feb	1040	1040	Feb	790	790
Mar	760	1340	2100	Mar	1010	1010	Mar	775	775
Apr	680	1290	1970	Apr	990	990	Apr	750	750
May	600	1260	1860	May	960	960	May	740	740
Jun	520	1250	1770	Jun	950	950	Jun	710	710
Jul	450	1210	1660	Jul	925	925	Jul	700	700
Aug	400	1190	1590	Aug	900	900	Aug	690	690
Sep	350	1160	1510	Sep	890	890	Sep	675	675
Oct	310	1140	1450	Oct	860	860	Oct	650	650
Nov	290	1110	1380	Nov	840	840	Nov	640	640
Dec	-	1090	1090	Dec	825	825	Dec	625	625
Tot	6210	14,800	21,010	Tot	11,250	11,250	Tot	8555	8555
Cum	6210	14,800	21,010	Cum	26,050	32,260	Cum	34,605	40,915

1976		1977		1978				
Month	GRB	TOTAL	Month	GRB	TOTAL			
Jan	610	610	Jan	460	460	Jan	350	350
Feb	600	600	Feb	450	450	Feb	345	345
Mar	590	590	Mar	445	445	Mar	340	340
Apr	575	575	Apr	430	430	Apr	330	330
May	550	550	May	425	425	May	325	325
Jun	540	540	Jun	410	410	Jun	310	310
Jul	525	525	Jul	400	400	Jul	305	305
Aug	510	510	Aug	395	395	Aug	300	300
Sep	500	500	Sep	390	390	Sep	295	295
Oct	495	495	Oct	375	375	Oct	290	290
Nov	490	490	Nov	370	370	Nov	280	280
Dec	475	475	Dec	360	360	Dec	275	275
TOT	6460	6460	TOT	4910	4910	TOT	3745	3745
CUM	41,065	47,275	CUM	45,975	52,185	CUM	49720	55,930

1979		
Month	GRB	TOTAL
Jan	270	270
Feb	270	270
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		
TOT	540	540
CUM	50,260	56,470

3500/1

LLANO, INC.
 P.O. BOX 1320
 HOBBS, NEW MEXICO 88240

To: New Mexico State Land Office
 P.O. Box 1148
 Santa Fe, New Mexico 87501
 Attn: Oil & Gas Department
 Mr. Alex Armijo

New Mexico Oil Conservation Commission
 P.O. Box 2088
 Santa Fe, New Mexico 87501
 Attn: Mr. Joe Ramey

New Mexico Oil Conservation Commission
 P.O. Box 1980
 Hobbs, New Mexico 88240
 Attn: Mr. Jerry Sexton

Gentlemen:

In accordance with New Mexico Oil Conservation Commission Order No. R-4491 and Unit Agreement for the Operation of the Grama Ridge Morrow Unit Area, Lea County, New Mexico, Llano, Inc. hereby submits the following Report:

FOR THE MONTH OF July 1976

GRAMA RIDGE MORROW UNIT

MCF VOLUMES @ 15.025# pb.

Gas Injected	Accumulated Gas Injected		Gas Withdrawn		Accumulated Gas Withdrawn		Gas Balance (Inj.-Withdrawn)		Accumulated Gas Balance (Inj.-Withdrawn)		
	MCF	MMBTU	MCF	MMBTU	MCF	MMBTU	MCF	MMBTU	MCF	MMBTU	
<u>GRA</u>											
150,083	160,698	4,545,850	4,783,337	24,593	26,333	186,352	196,643	125,490	134,365	4,359,543	4,586,694
<u>GRB</u>											
103,216	110,516	2,472,232	2,614,767	36,821	38,406	198,774	209,124	66,395	72,110	2,273,458	2,405,721
<u>Totals</u>											
253,299	271,214	7,018,082	7,398,104	61,414	64,739	385,126	405,767	191,885	206,475	6,633,001	6,992,415

Dist: JFM
 CCM
 TUCO-JC
 File
 JM(x)WLS(x)GWE(x)DLG(x)TJJ

Remarks: Initial Injection 4/26/73

Prepared By [Signature] 5-19-76
 Verified By [Signature] 8-20-76

QCE

Unit Name GRAMA RIDGE MORROW UNIT (SECONDARY RECOVERY AND GAS STORAGE)
Operator Llano, Inc.
County Lea

4895 &

600 4570

DATE	OCC CASE NO.	OCC ORDER NO.	EFFECTIVE DATE	TOTAL ACREAGE	STATE	FEDERAL	INDIAN-FEE	SEGREGATION CLAUSE	TERM
APPROVED	4896	R-4473 &	4-25-73	1,287.16	1,287.16	-0-	-0-	Yes	5 yrs.
Commissioner	1-29-73 &	R-4491							
	8-27-73	3-16-73							

UNIT AREA

TOWNSHIP 22 SOUTH, RANGE 34 EAST NMPM
Section 3: A11

TOWNSHIP 21 South, Range 34 EAST NMPM
Section 34: A11

Unit Name GRAMA RIDGE MORROW UNIT (Secondary Recovery and Gas Storage)
 Operator Llano, Inc.
 County Lea

STATE TRACT NO.	LEASE NO.	INSTI-TUTION	SEC.	TWP.	RGE.	SUBSECTION	RATIFIED		LESSEE
							DATE	ACRES	
1	B-158-3	C.S.	3	22S	34E	S/2	7-18-73	320.00	Texaco Inc.
2	E-9141	C.S.	3	22S	34E	N/2	6-7-73	327.16	Llano, Inc.
3	E-9659	C.S.	34	21S	34E	S/2	7-20-73	320.00	Gulf Oil Corporation
4	K-3592-2	C.S.	34	21S	34E	N/2	6-7-73	320.00	Llano, Inc.

CERTIFICATE OF APPROVAL

BY COMMISSIONER OF PUBLIC LANDS, STATE OF NEW MEXICO

AMENDMENT OF UNIT AGREEMENT

GRAMA RIDGE-MORROW UNIT

LEA COUNTY, NEW MEXICO

There having been presented to the undersigned Commissioner of Public Lands of the State of New Mexico for examination, the attached Amendment of Unit Agreement for the development and operation of the Grama Ridge-Morrow Unit Area, Lea County, New Mexico for the purpose of expanding the Unit Area.

The attached Amendment of Unit Agreement was entered into as of September 1, 1976 by and between the parties to the original Unit Agreement for the purpose of expanding the unit area to include all of Section 33, Township 21 South, Range 34 East, N.M.P.M. The Amendment also ratifies and confirms the Original Unit Agreement as amended and upon examination of said Amendment, the Commissioner finds:

- (a) That such Amendment to this Agreement will tend to promote the conservation of oil and gas and the better utilization of reservoir energy in said area.
- (b) That under the proposed amended Agreement the State of New Mexico will receive its fair share of the recoverable oil or gas in place under its lands in the area.
- (c) That each beneficiary Institution of the State of New Mexico will receive its fair and equitable share of the recoverable oil and gas under its lands within the area.
- (d) That such Agreement is in other respects for the best interests of the State, with respect to State lands.

NOW, THEREFORE, by virtue of the authority conferred upon me under Sections 7-11-39, 7-11-40, 7-11-41, 7-11-47, and 7-11-48, New Mexico Statutes Annotated, 1953 Compilation, I, the undersigned, Commissioner of Public Lands of the State of New Mexico, for the purpose of more properly conserving the oil and gas resources of the State, do hereby consent to and approve the said Amendment, and any leases embracing lands of the State of New Mexico within the area shall be and the same are hereby amended to conform with the terms and conditions of said Agreement. This approval is subject to all of the provisions of the aforesaid statutes.

IN WITNESS WHEREOF, this Certificate of Approval is executed, with seal affixed, this 26th. day of January, 1977.


COMMISSIONER OF PUBLIC LANDS
Of the State of New Mexico

AMENDMENT TO UNIT AGREEMENT
FOR OPERATION OF THE GRAMA
RIDGE-MORROW UNIT AREA
LEA COUNTY, NEW MEXICO

THIS AMENDMENT entered into as of the first day of September, 1976, by and between the parties subscribing, ratifying or consenting hereto and herein referred to as the "parties hereto".

WHEREAS, as of April 25, 1973 the Unit Agreement for the Operation of the Grama Ridge-Morrow Unit Area was entered into by and between Llano, Inc. as unit operator and as a working interest owner and by Gulf Oil Corporation and Texaco Inc. as record title owners of oil and gas leases embracing lands in the unit area, which said agreement was approved by the Commissioner of Public Lands of the State of New Mexico, herein referred to as "Commissioner", on August 27, 1973, and

WHEREAS, the original unit agreement covered all of Section 34, Township 21 South, Range 34 East and all of Section 3, Township 22 South, Range 34 East and was entered into for the purpose of formulating and putting into effect a secondary recovery and gas storage project as to the Morrow formation which was unitized under said agreement and which is specifically defined in Section 3 thereof, and

WHEREAS, the unit operator has injected gas into wells located on the unit area which has resulted in a pressure increase in the South Wilson Deep Unit No. 1 gas well producing from the unitized formation located in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 33, Township 21 South, Range 34 East and has likewise resulted in an increase in pressure in the Llano Federal GR-4 No. 1 Morrow gas well located in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 4, Township 22 South, Range 34 East and such communication indicates that said wells are located in the same reservoir as the two gas wells within the unit area, which wells

have been used for the injection and withdrawal of gas pursuant to the terms of said unit agreement, and

WHEREAS, it now appears that the Morrow gas reservoir underlies Sections 33 and 34, Township 21 South, Range 34 East and Sections 3 and 4, Township 22 South, Range 34 East, and

WHEREAS, all of Section 33 is owned by the State of New Mexico except the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of said section which is fee land and the minerals underlying said 40 acres, subject to the existing lease, are owned 32.37% by Don E. Gridley and wife, Alice F. Gridley, John E. Bosserman and wife, Carol Jean Bosserman and 67.63% by The Merchant Livestock Company, and

WHEREAS, all of Section 4, Township 22 South, Range 34 East is federal land and Llano, Inc. has entered into an agreement with the United States, acting by and through the Secretary of the Interior, effective as of November 1, 1975 for the storage of gas in the Morrow formation which is unitized under the terms of said unit agreement. Said gas storage agreement with the United States recognizes that the gas reservoir underlies the 4 sections hereinabove referred to and also provides that all injection and withdrawal fees payable to the United States shall be based upon 1/4 of all gas injected or withdrawn from the reservoir through any wells located on the 4 sections above referred to, and

WHEREAS, it is the purpose of this amendment to expand the unit area to include all of Section 33, Township 21 South, Range 34 East so that the unit agreement, taken into consideration with the gas storage agreement with the United States covering Section 4, will cover the entire reservoir, and

WHEREAS, the unit agreement recognized that there was still some primary gas and liquid hydrocarbons left in the unitized formation when the unit agreement was entered into and said agreement provided for the payment of royalty thereon on a monthly basis beginning in May, 1974 through February, 1979 and the unit operator has agreed to pay in full all royalty payments provided for in Exhibit "C"

attached to the unit agreement, as well as the royalty for the remaining 318,519 MCF of primary gas and the liquid hydrocarbons attributable thereto underlying said Section 33 (15/16 of which is to be allocated to Tract 5 and 1/16 to Tract 6 shown on Exhibit "B") so that Phase I provided for in Section 11(a) of the original agreement will no longer be applicable; and

WHEREAS, the parties are desirous of amending said unit agreement to provide for the same gas injection and withdrawal fees (on an average basis) as are provided under the terms of the gas storage agreement with the United States covering Section 4 as to 1/4 of the gas injected and withdrawn from said reservoir; subject, however, to the right of the unit operator to withdraw gas previously injected from extraneous sources up to and including August 31, 1976 amounting to 6,727,987 MCF at a pressure base of 15.025 psia without payment of withdrawal fees as to any portion thereof withdrawn prior to March 1, 1979.

NOW, THEREFORE, in consideration of the premises, the parties hereby mutually agree that the Unit Agreement for the Operation of the Grama Ridge-Morrow Unit Area shall be and is hereby amended as hereinafter set forth:

1. Section 1 of the unit agreement is amended as follows:

1. UNIT AREA: The following described land is hereby designated and recognized as constituting the unit area:

Township 21 South, Range 34 East, N.M.P.M.
Section 33 - All
Section 34 - All
Township 22 South, Range 34 East, N.M.P.M.
Section 3 - All
containing 1,927.16 acres, more or less

Exhibit "A" attached hereto is a map showing the unit area and the boundaries and identity of tracts and leases in said area to the extent known to the unit operator. Exhibit "B" attached hereto is a schedule showing to the extent known to the unit operator the acreage, percentage and kind of ownership of oil and gas interests

in all lands in the unit area. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest or interests as are shown on said map or schedule as owned by such party. Exhibits "A" and "B" shall be revised by the unit operator whenever changes in ownership in the unit area render such revisions necessary or when requested by the Commissioner.

All land committed to this agreement shall constitute land referred to herein as "unitized land" or "land subject to this agreement".

2. Section 9 of the unit agreement is amended as follows:

9. PURPOSE OF UNIT AND PLAN OF OPERATION: It is recognized and agreed by the parties hereto that the unitized formation as to all of the lands subject to this agreement is reasonably proven to be productive of unitized substances or necessary for unit operations and that the object and purpose of this agreement is to formulate and put into effect a secondary recovery and gas storage project in order to effect the greatest economic recovery of unitized substances, prevent waste and conserve natural resources consistent with good engineering practices expected of a prudent operator. The parties hereto agree that the unit operator may, subject to the approval of a plan of operation by the Commissioner, inject gas produced from lands other than the unit area into the unitized formation through the following wells for secondary recovery and storage purposes:

Shell Oil Company State GRA Well No. 1 - SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 3
Township 22 South, Range 34 East (Llano, Inc. operator)

Shell State GRB Well No. - NW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 34, Township 21
South, Range 34 East (Llano, Inc. operator)

South Wilson Deep Unit No. 1 well - NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 33,
Township 21 South, Range 34 East (Llano, Inc. operator)

Llano Federal GR-4 No. 1 Morrow - SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 4,
Township 22 South, Range 34 East (Llano, Inc. operator)

Unit operator shall furnish the Commissioner, between the first and twenty-fifth of each month, reports showing the amount of gas produced and injected into the unitized formation for the preceding month.

Unit operator shall have the right to rework or recondition the wells now located on the unit area or to drill additional wells to inject gas into or produce gas from the gas storage reservoir area to the extent that such work shall be approved by the Commissioner as necessary or incident to the rights granted to unit operator pursuant to this agreement. Unit operator shall conduct all operations hereunder in accordance with all applicable laws and regulations and shall comply with all the terms and conditions of the respective leases.

A plan of operation shall be filed with the Commissioner concurrently with the filing of this unit agreement for final approval. Said plan of operation and all revisions thereof shall be as complete and adequate as the Commissioner may determine to be necessary in connection with operations hereunder. Upon approval of this agreement and the aforementioned plan of operation by the Commissioner, said plan and all subsequently approved plans shall constitute the operating obligations of the unit operator under this agreement for the period specified in the plan. Thereafter, from time to time before the expiration of any existing plan, the unit operator shall submit for approval a plan for an additional specified period of operation. Reasonable diligence shall be exercised in complying with the obligations of the approved plan of operation. The unit operator shall furnish to the Commissioner, within 30 days from the expiration of each 6 month period, a report giving full factual information as to the manner in which the plan in effect for such period has been carried out.

If the unit operator should fail to comply with any approved plan of operation or supplement to or modification thereof, this

agreement may be terminated by the Commissioner; provided, however, the Commissioner shall give notice to the unit operator and the lessees of record in the manner prescribed by Section 7-11-14 N.M.S.A. 1953 of intention to cancel because of any alleged breach of said plan of operation and any decision entered therein shall be subject to appeal in the manner prescribed by Section 7-11-17 N.M.S.A. 1953; and provided, further, in any event unit operator shall be given a reasonable opportunity after a final determination within which to remedy said default, failing in which this agreement shall be terminated.

3. Section 10 of the unit agreement is amended as follows:

10. TRACT PARTICIPATION: For the purposes of this agreement "extraneous gas" shall mean the total amount of gas from other sources injected into the reservoir less the amount which has been withdrawn. Any gas produced in excess of the extraneous gas injected prior to or after the effective date hereof shall be considered as "indigenous gas". All such indigenous gas shall be apportioned to the tracts within the unit area in the proportions set forth on Exhibit "B" attached hereto, which is based on the percentage that the acreage covered by each tract bears to the total acreage within the unit area. Royalties shall be paid to the State of New Mexico at the rates provided in the respective leases on all indigenous gas allocated to such tracts.

4. Section 11 of the unit agreement shall be amended as follows:

11. GAS STORAGE -- STORAGE, INJECTION AND WITHDRAWAL FEES:

A. Gas Storage: It is contemplated that the extraneous gas which has been injected will be withdrawn from time to time. Unit operator shall be under no obligation to inject or withdraw any particular quantity of gas other than such as it in its sole discretion deems advisable. Unit operator shall install

and at all times operate and maintain metering equipment and other facilities approved by the Commissioner so that an accurate cumulative account can be kept of the quantity of gas, as well as the total number of British Thermal Units in the gas, injected into the unitized formation through the existing wells. Operator shall also keep an accurate cumulative account of the total number of British Thermal Units in all gas withdrawn from the unitized formation.

Operator shall also install, operate and maintain at all times the necessary separation equipment to separate the gas from the liquid hydrocarbons produced in connection with the withdrawal of gas from the respective wells, as well as all other related equipment which may be required to transfer all liquids so separated.

Operator shall cause monthly analyses by chromatograph or other mutually acceptable method of all gas injected into or withdrawn from the reservoir in order to compute the net change in British Thermal Unit content.

Operator shall pay royalties at the rates provided in the respective leases on 3/4 of all liquid hydrocarbons which are separated from the gas withdrawn and allocated to the respective tracts in accordance with the percentages of participation set forth on Exhibit "B"; provided, however, operator shall not be required to pay royalties on that portion of all liquid hydrocarbons which are separated from the first 318,519 MCF of gas withdrawn subsequent to the effective date of this amendment as payment for such liquid hydrocarbons has been included in the payment for the remaining primary gas underlying said Section 33 referred to in the preamble to this amendment. In addition, should the total cumulative British Thermal Units in the gas withdrawn exceed the total British Thermal Units in the gas injected, then operator shall pay royalties on said increase

in British Thermal Units at the prevailing market price in Lea County, New Mexico for gas of like quality. Payment for British Thermal Unit enrichment as set forth herein shall be made on an annual basis as determined by the cumulative chromatograph analyses.

B. Storage, Injection and Withdrawal Fees: In addition to the rental provided in the leases covering the respective tracts, for each year after the effective date of this amendment, unit operator shall pay an annual storage fee of \$1.00 per acre for the number of surface acres owned by the respective surface owners as shown on Exhibit "C" attached hereto. Said storage fee shall be paid in advance during the month of September of each year.

As to all gas injected or withdrawn subsequent to the effective date of this amendment, unit operator shall pay to the State of New Mexico an injection fee equal to $\frac{47}{64}$ of \$.00625 per MCF and a withdrawal fee equal to $\frac{47}{64}$ of \$.00625 per MCF on all gas injected or withdrawn from the reservoir through any wells located on the unit area or on Section 4, Township 22 South, Range 34 East during each calendar month; provided, however, no withdrawal fees shall be required on 6,727,987 MCF at 15.025 psia for gas injected prior to the effective date of this amendment if said gas is withdrawn prior to March 1, 1979. $\frac{1}{64}$ of said injection and withdrawal fees on all of the gas shall be paid to Don E. Gridley and wife, Alice F. Gridley, John E. Bosserman and wife, Carol Jean Bosserman, and The Merchant Livestock Company in the proportions owned by said parties. All injection and withdrawal fees shall be paid during the month following the month in which injection or withdrawals are made.

5. Section 16 of the unit agreement is amended as follows:

16. EFFECTIVE DATE AND TERM: This amendment shall become effective as of September 1, 1976 upon approval by the Commissioner

and shall remain in effect so long as unitized substances are being produced from or stored within the unitized formation. The unit agreement may be terminated at any time by not less than seventy-five (75%) percent on an acreage basis of the owners of working interests signatory hereto with the approval of the Commissioner.

6. Section 22 of the unit agreement is amended as follows:

22. RE-NEGOTIATION OF INJECTION AND WITHDRAWAL FEES:

The injection and withdrawal fees provided for in Section 11 hereof shall be effective for a period of 5 years from the effective date of this amendment; provided, however, that during the 4th year of the first 5 year period and during the 4th year of each successive 5 year period this agreement is in force and effect said fees shall be subject to re-negotiation between the parties hereto so that said fees will be commensurate with fees being paid on similar projects, such re-negotiated rate to be in effect for the succeeding 5 year period. If the parties hereto are unable to agree to re-negotiate new fees 60 days prior to the expiration of the 4th year of any 5 year period, payment of the fees on the basis of prior rates shall continue and this agreement shall terminate upon expiration of not more than 3 years from the expiration of the preceding 5 year period. During said 3 year period the parties hereto may remove the metered and injected gas not previously withdrawn and equipment and facilities installed under this agreement, unless during such 3 year period the parties hereto agree upon a re-negotiated rate to be effective retroactively. Any gas or facilities not then removed by the termination date shall become the property of the State of New Mexico if it so elects.

7. COMMITMENT OF INTERESTS TO UNIT AND RATIFICATION OF

OTHER UNIT PROVISIONS: By the execution of this amendment, the parties hereto commit to the unit agreement their respective interests of whatsoever kind, nature or description in and to the unitized forma-

tion underlying the unit area. Except as amended herein, all of the other terms and conditions of the original Unit Agreement for the Operation of the Grama Ridge-Morrow Unit Area shall remain in full force and effect and are ratified and confirmed by the parties or by those consenting hereto by separate instrument.

8. COUNTERPARTS: This amendment may be executed in any number of counterparts, no one of which needs to be executed by all parties, or may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all such parties had signed the same document and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the above described unit area.

IN WITNESS WHEREOF, the undersigned parties have caused this agreement to be executed as of the respective dates set opposite their signatures.

ATTEST:

Spring D. Greig
Assistant Secretary-Treasurer
Date: 12-16-76

WJ LLANO, INC.
By *Donald L. Darcy*
President
Address: P. O. Box 1320
Hobbs, New Mexico 88240

ATTEST:

Secretary
Date: _____

GULF OIL CORPORATION

By _____
President
Address: _____

ATTEST:

Secretary
Date: _____

TEXACO INC.

By _____
President
Address: _____

ATTEST:

Secretary
Date: _____

WILSON OIL COMPANY

By _____
President
Address: _____

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8. COUNTERPARTS: This amendment may be executed in any number of counterparts, no one of which needs to be executed by all parties, or may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all such parties had signed the same document and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the above described unit area.

IN WITNESS WHEREOF, the undersigned parties have caused this agreement to be executed as of the respective dates set opposite their signatures.

ATTEST:

Secretary

Date: _____

LLANO, INC.

By _____
President

Address: _____

ATTEST:

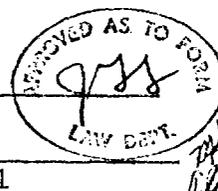

Asst. Secretary

Date: _____

GULF OIL CORPORATION

By  _____

Address: Attorney-in-fact
P. O. Box 1150
Midland, Texas 79701



ATTEST:

Secretary

Date: _____

TEXACO INC.

By _____
President

Address: _____

ATTEST:

Secretary

Date: _____

WILSON OIL COMPANY

By _____
President

Address: _____

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8. COUNTERPARTS: This amendment may be executed in any number of counterparts, no one of which needs to be executed by all parties, or may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all such parties had signed the same document and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the above described unit area.

IN WITNESS WHEREOF, the undersigned parties have caused this agreement to be executed as of the respective dates set opposite their signatures.

ATTEST:

Secretary
Date: _____

LLANO, INC.
By _____
President
Address: _____

ATTEST:

Secretary
Date: _____

GULF OIL CORPORATION
By _____
President
Address: _____

APPROVED:
Terms: OK
Form: SP
Date: NOVEMBER 5, 1976

TEXACO INC.
By [Signature]
Attorney-in-Fact
Address: Box 3109
Midland, Texas 79701

ATTEST:

Secretary
Date: _____

WILSON OIL COMPANY
By _____
President
Address: _____

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8. COUNTERPARTS: This amendment may be executed in any number of counterparts, no one of which needs to be executed by all parties, or may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all such parties had signed the same document and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the above described unit area.

IN WITNESS WHEREOF, the undersigned parties have caused this agreement to be executed as of the respective dates set opposite their signatures.

ATTEST:

Secretary
Date: _____

LLANO, INC.
By _____
President
Address: _____

ATTEST:

Secretary
Date: _____

GULF OIL CORPORATION
By _____
President
Address: _____

ATTEST:

Secretary
Date: _____

TEXACO INC.
By _____
President
Address: _____

ATTEST:
Francis Wilson
Secretary
Date: 29 Nov 76

WILSON OIL COMPANY
By Francis Wilson
President
Address: P.O. Box 1297
Santa Fe, New Mexico 87501

Date: December 2, 1976

FRANCES P. BOLTON, dba WYOMING OIL COMPANY ✓

Address: Frances P Bolton
810 Hanna Building
Cleveland, Ohio 44115

NEW MEXICO ELECTRIC SERVICE COMPANY

ATTEST:

Secretary

By _____
President

Address: _____

ATTEST:

Secretary

TUCO, INC.

By _____
President

Address: _____

STATE OF NEW MEXICO)
 : ss
COUNTY OF LEA)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ President of Llano, Inc., a New Mexico corporation, on behalf of said corporation.

My Commission Expires: _____

Notary Public

STATE OF _____)
 : ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of Gulf Oil Corporation, a Pennsylvania corporation, on behalf of said corporation.

My Commission Expires: _____

Notary Public

STATE OF _____)
 : ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of Texaco Inc. a Delaware corporation, on behalf of said corporation.

My Commission Expires: _____

Notary Public

Date: _____

FRANCES P. BOLTON, dba WYOMING OIL COMPANY
Address: _____

ATTEST:

NEW MEXICO ELECTRIC SERVICE COMPANY

Secretary

By _____
President

Address: _____

ATTEST:

TUCO, INC.

Secretary

By _____
President

Address: _____

STATE OF NEW MEXICO)
 : ss
COUNTY OF LEA)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ President of Llano, Inc., a New Mexico corporation, on behalf of said corporation.

My Commission Expires: _____

Notary Public

STATE OF _____)
 : ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of Gulf Oil Corporation, a Pennsylvania corporation, on behalf of said corporation.

My Commission Expires: _____

Notary Public

STATE OF TEXAS)
 : ss
COUNTY OF MIDLAND)

The foregoing instrument was acknowledged before me this 5th day of November 1976 by G. F. CLARK Attorney-in-Fact of Texaco Inc. a Delaware corporation, on behalf of said corporation.

My Commission Expires: _____

June 1, 1977

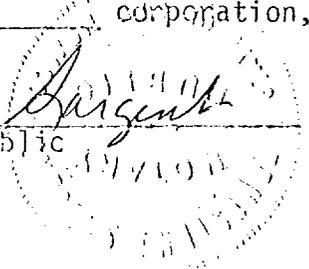
Martha Fincher Notary Public in and for Midland County, Texas

STATE OF NEW MEXICO)
 : SS
COUNTY OF Santa Fe)

The foregoing instrument was acknowledged before me this 29th
day of November 1976 by PARKER WILSON
President of Wilson Oil Company, a New Mexico corporation,
on behalf of said corporation.

My Commission Expires:
July 12, 1980

Ernestine Argenta
Notary Public



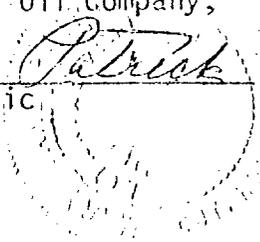
✓

STATE OF Ohio)
 : SS
COUNTY OF Cuyahoga)

The foregoing instrument was acknowledged before me this 3rd
day of December 1976 by Frances P. Bolton, dba Wyoming Oil Company,

My Commission Expires:
May 8, 1978

Mary Jane Patrick
Notary Public
For Cuyahoga County, Ohio
My commission expires May 8, 1978



STATE OF NEW MEXICO)
 : SS
COUNTY OF LEA)

The foregoing instrument was acknowledged before me this _____
day of _____ 1976 by _____
of New Mexico Electric Service Company, a New Mexico cor-
poration, on behalf of said corporation.

My Commission Expires:

Notary Public

STATE OF NEW MEXICO)
 : SS
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____
day of _____ 1976 by _____
of TUCO, INC., a New Mexico corporation, on behalf of
said corporation.

My Commission Expires:

Notary Public

STATE OF _____)
COUNTY OF _____) : ss

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of Wilson Oil Company, a _____ corporation, on behalf of said corporation.

My Commission Expires: _____
Notary Public

STATE OF _____)
COUNTY OF _____) : ss

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by Frances P. Bolton, dba Wyoming Oil Company,

My Commission Expires: _____
Notary Public

STATE OF NEW MEXICO)
COUNTY OF LEA) : ss

The foregoing instrument was acknowledged before me this 19th day of October 1976 by J. F Maddox, President of New Mexico Electric Service Company, a New Mexico corporation, on behalf of said corporation.

My Commission Expires: December 6, 1979
Sanaline Legg
Notary Public

STATE OF NEW MEXICO)
COUNTY OF _____) : ss

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of TUCO, Inc., a New Mexico corporation, on behalf of said corporation.

My Commission Expires: _____
Notary Public

STATE OF _____)
: ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of Wilson Oil Company, a _____ corporation, on behalf of said corporation.

My Commission Expires: _____
Notary Public

STATE OF _____)
: ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by Frances P. Bolton, dba Wyoming Oil Company,

My Commission Expires: _____
Notary Public

STATE OF NEW MEXICO)
: ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 1976 by _____ of New Mexico Electric Service Company, a New Mexico corporation, on behalf of said corporation.

My Commission Expires: _____
Notary Public

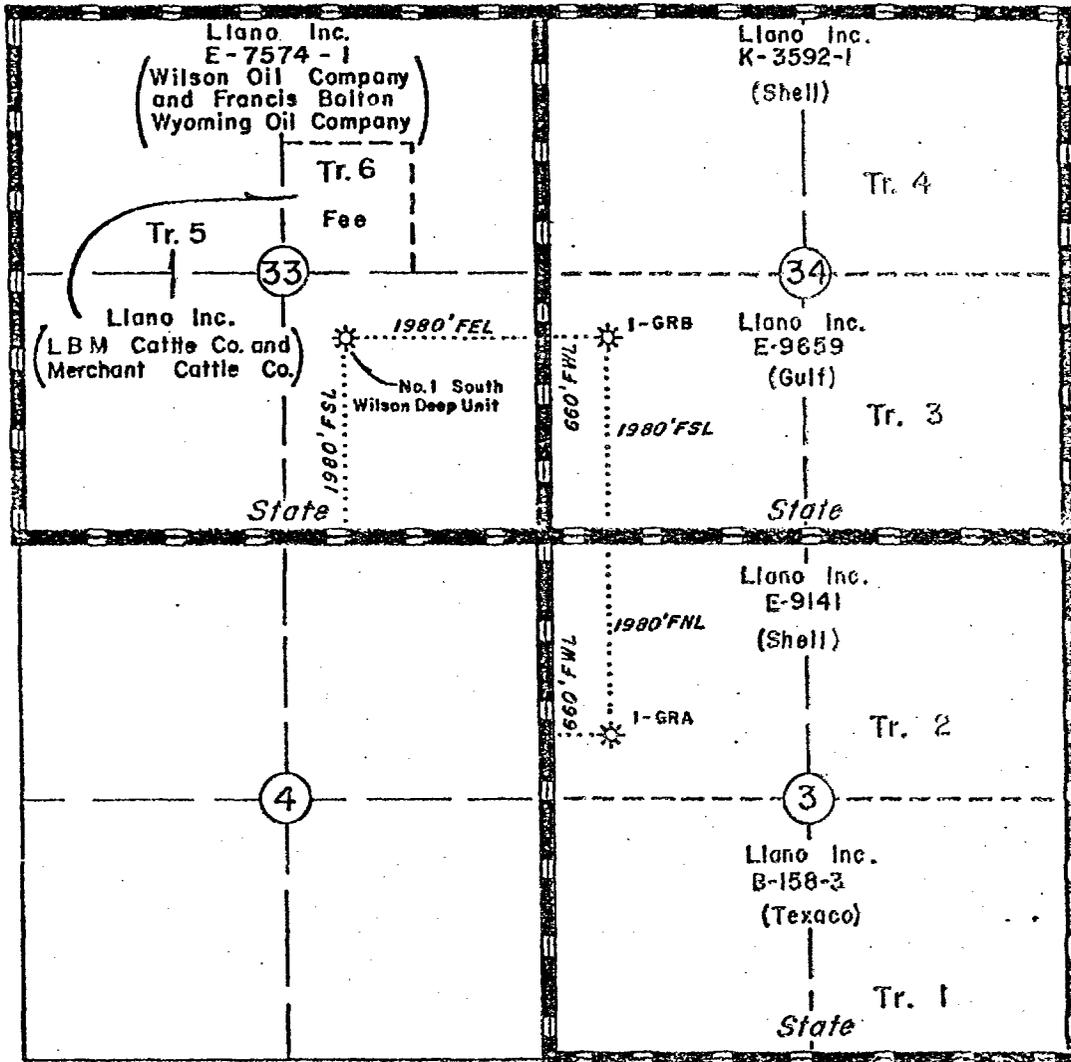
STATE OF ^{Sussex} ~~NEW MEXICO~~)
: ss
COUNTY OF Potter)

The foregoing instrument was acknowledged before me this 8th day of December 1976 by Carroll A. Pearson, President of TUCO, Inc., a New Mexico corporation, on behalf of said corporation.

My Commission Expires: June 1, 1977
Gulen Bertel
Notary Public



R 34 E



T21S

T22S

EXHIBIT "A"

LLANO, INC.

GRAMA RIDGE MORROW UNIT
Lea County, New Mexico

UNIT OWNERSHIP MAP

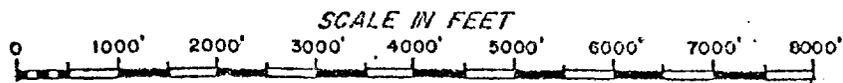


EXHIBIT "B"
GRAMA RIDGE-MORROW UNIT AGREEMENT

Tract No.	Description	No. Acres	Surface Lease No.	Basic Royalty	Lessee of Record	Overriding Royalty	Working Int. Owner and Percentage	Percentage Tract Participation
1	S½ Sec. 3, T. 22 S., R. 34 E.	320.00	B-158-3	12½%	Texaco Inc.	None	*New Mexico Electric Service Co. 40% TUCO INC. 40% Llano, Inc. 20%	16,60475
2	N½ Sec. 3, T. 22 S., R. 34 E.	327.16	E-9141	12½%	Llano, Inc.	None	New Mexico Electric Service Co. 40% TUCO INC. 40% Llano, Inc. 20	16,97627
3	S½ Sec. 34, T. 21 S., R. 34 E.	320.00	E-9659	12½%	Gulf Oil Corp.	None	**New Mexico Electric Service Co. 40% TUCO INC. 40% Llano, Inc. 20%	16,60475
4	N½ Sec. 34, T. 21 S., R. 34 E.	320.00	K-3592-1	12½%	Llano, Inc.	None	New Mexico Electric Service Co. 40% TUCO INC. 40% Llano, Inc. 20%	16,60475

EXHIBIT "B"
GRAMA RIDGE-MORROW UNIT AGREEMENT

Tract No.	Description	No. Surface Acres	Lease No.	Basic Royalty	Lessee of Record	Overriding Royalty	Working Int. Owner and Percentage	Percentage Tract Participation
5	S $\frac{1}{2}$, NW $\frac{1}{4}$, N $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 33, T. 21 S., R. 34 E.	600.00	E-7574-1	12 $\frac{1}{2}$ %	Wilson Oil Co. and Frances P. Bolton, dba Wyoming Oil Co.	Amoco Production Co. - .0102041 Myles A. Colligan .0005102 Estelle L. Lake .0004081 F. W. Lake .0002041 Mary E. Lake .0002041 M. A. Machris .0032653 C. L. Milburn .0005102 Wilson Oil Co. .0081314 Frances P. Bolton dba Wyoming Oil Co. .0081314 Llano, Inc. .0280611	**New Mexico Electric Service Co. 40% TUCO INC. 40% Llano, Inc. 20%	31.13389
6	SW $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 33, T. 21 S., R. 34 E.	40.00	Fee	The Merchant Livestock Company - 67.63% of 12 $\frac{1}{2}$ % Don E. Gridley and wife and John E. Bosserman and wife - 32.37% of 12 $\frac{1}{2}$ %	Wilson Oil Co. and Frances P. Bolton, dba Wyoming Oil Co.	Amoco Production Co. - .0102041. Myles A. Colligan .0005102 Estelle L. Lake .0004081 F. W. Lake .0002041 Mary E. Lake .0002041 M. A. Machris .0032653 C. L. Milburn .0005102	New Mexico Electric Service Co. 40% TUCO INC. 40% Llano, Inc. 20%	2.07559

EXHIBIT "B"
GRAMA RIDGE-MORROW UNIT AGREEMENT

Tract No.	Description	No. Surface Acres	Lease No.	Basic Royalty	Lessee of Record	Overriding Royalty	Working Int. Owner and Percentage	Percentage Tract Participation
					Wilson Oil Co. .0081314 Frances P. Bolton dba Wyoming Oil Co. .0081314 Llano, Inc. .0280611			
	Total	1,927.16						100.0000

* Rights within vertical limits of the Morrow sand formation between 12,720 and 13,257 feet.
 ** From the surface to the top of the Silurian.
 ***From 5,200 to 13,503 feet.

EXHIBIT "C"

Description	Surface Ownership	Acreage	Rental
W $\frac{1}{2}$ E $\frac{1}{2}$ Section 33, S $\frac{1}{2}$ S $\frac{1}{2}$ Section 34, Township 21 South, Range 34 East	The Merchant Livestock Company	320.00	\$ 320.00
W $\frac{1}{2}$, E $\frac{1}{2}$ E $\frac{1}{2}$ Section 33, N $\frac{1}{2}$, N $\frac{1}{2}$ S $\frac{1}{2}$ Section 34, Township 21 South, Range 34 East	State of New Mexico	960.00	960.00
All Section 3, Township 22 South, Range 34 East	State of New Mexico	647.16	<u>647.16</u>
			\$1927.16

CONSENT AND RATIFICATION OF
GRAMA RIDGE-MORROW UNIT AGREEMENT
AND AMENDMENT THERETO
LEA COUNTY, NEW MEXICO.

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the undersigned, Don E. Gridley and wife, Alice F. Gridley, John E. Bosserman and wife, Carol Jean Bosserman, and The Merchant Livestock Company (hereinafter referred to as "parties hereto") are the owners of all the oil, gas and other minerals in and under and that may be produced from the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 33, Township 21 South, Range 34 East, N.M.P.M. Lea County, New Mexico, subject to an oil and gas lease dated April 3, 1959 made by The Merchant Livestock Company to Wilson Oil Company, which lease was recorded in Book 175 at page 7 of the records in the office of the County Clerk of Lea County, and

WHEREAS, as of April 25, 1973 a unit agreement was made and entered into for the operation of the Grama Ridge-Morrow Unit Area Lea County, New Mexico covering all of Section 34, Township 21 South, Range 34 East and all of Section 3, Township 22 South, Range 34 East, which are lands of the State of New Mexico, by and between the owners of the oil and gas leases covering said lands, which unit agreement was approved by the Commissioner of Public Lands of the State of New Mexico on August 27, 1973, and

WHEREAS, said unit agreement covers only the Morrow formation as defined in said unit agreement, and

WHEREAS, the owners of the oil and gas leases covering the unitized formation covered by the above unit agreement and the owners of oil and gas leases covering Section 33, Township 21 South, Range 34 East as of September 1, 1976 entered into an amendment to said unit agreement so as to include within the unit area and make subject to all of the terms and conditions of said unit agreement all of

