

"EXHIBIT B"

Rosa Unit
Rio Arriba and San Juan Counties
New Mexico

Geologic Report
Mesaverde Producing Interval

PROPOSED ELEVENTH, TWELFTH, THIRTEENTH,
AND FOURTEENTH EXPANSIONS OF THE
MESAVERDE PARTICIPATING AREA

NORTHWEST PIPELINE CORPORATION

APPROVED BY:



Kenneth J. Stracke
Director
Production Division

"EXHIBIT B"

Rosa Unit
Rio Arriba and San Juan Counties
New Mexico

Geologic Report
Mesaverde Producing Interval

Proposed Eleventh, Twelfth, Thirteenth,
and Fourteenth Expansions of the
Mesaverde Participating Area

INTRODUCTION

The Rosa Unit is located in the northeast quadrant of the New Mexico portion of the San Juan Basin, including parts of Township 31 North, Ranges 4, 5, and 6 West and Township 32 North, Range 6 West. 54,211.01 acres comprise the Rosa Unit.

Within the unit area, the "Mesaverde Producing Interval" (NMOCC Order No. R-5459) has been tested in 40 wells resulting in 30 commercial wells, one non-commercial well, five wells plugged and abandoned, and four wells awaiting evaluation and pipeline connection.

The "Mesaverde Producing Interval" consists of the Cliff House Formation (top), the Menefee Formation, and the Point Lookout Formation (base). The Cliff House Formation, composed of transgressive marine sandstones and siltstones, is very thin throughout most of the Rosa Unit and contributes little (if any) to gas production. The Menefee Formation consists of sandstones, siltstones, shales, and coals deposited in nonmarine environments (swamp and fluvial). Although the sandstones within the Menefee are lenticular with limited areal extent, they contribute to gas production. The Point Lookout Formation is composed of regressive marine sandstones and thin shales. The major producing horizon within the Mesaverde interval in the Rosa Unit is the Point Lookout Formation.

Included in this report as Exhibit "C" are two maps (Figures 1 and 2). Figure 1 is a structure map contoured on the "C" marker bed (probably a bentonite bed) of the Lewis Shale. The map reflects the structural configuration of the underlying Mesaverde Group. Mean sea level is the datum plane, and the contour interval is 20 feet. The synclinal axis of the San Juan Basin extends across the Rosa Unit, plunging to the east throughout the mapped area.

Mesaverde Expansion
October, 1982
Page Two

Figure 2 is an isopachous map contoured on the net productive Point Lookout Formation as determined from radioactive and electric logs of wells drilled within the unit and the surrounding area; the contour interval is 20 feet.

Exhibit "D" (Table 1) is a tabulation of the Mesaverde gas production from the unit. The table shows monthly gas production of each well for September 1981 through August 1982. Cumulative production through August 1982 is also shown. The Rosa Unit has produced 15,318,739 Mcf of gas from the "Mesaverde Producing Interval" as of September 1, 1982.

PROPOSED ELEVENTH EXPANSION OF THE MESAVERDE PARTICIPATING AREA

Effective Date: April 1, 1981

Proposed Acreage: Township 31 North, Range 6 West, N.M.P.M.
Section 22: West Half (320 Acres)
Township 31 North, Range 5 West, N.M.P.M.
Section 8: South Half (320 Acres)
Total Acres: 640

The Eleventh Expansion of the "Mesaverde Participating Area" is based on log interpretation, initial test results, and ten month of production of the Northwest Pipeline Corporation Rosa Unit Wells #79 and #80. Production histories and log data from surrounding wells were also used in determining the extent of this expansion. From this data, the proposed acreage is believed to be capable of producing unitized substances in commercial quantities from the "Mesaverde Producing Interval". The wells are described as follows:

The Rosa Unit #79 well is located 1800 feet from the south line and 1780 feet from the west line, Section 22, Township 31 North, Range 6 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on December 5, 1981 and completed on March 6, 1981. The Mesaverde Formation was perforated with 30 holes between the following depths:

5282' and 5712'

These perforations were sand/water fractured. This well has two tubing strings. The well was shut-in with a SIPT of 1070 psig and SIPC of 1071 psig. On March 6, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 1949 Mcf/D with a calculated AOF of 5680 Mcf/D.

On the basis of the above well, the west half of Section 22, Township 31 North, Range 6 West (320 acres) is recommended for inclusion in the Eleventh Expansion of the "Mesaverde Participating Area."

Mesaverde Expansion
October, 1982
Page Three

The Rosa Unit #80 well is located 1660 feet from the south line and 1789 feet from the west line, Section 8, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on November 22, 1980 and completed on March 19, 1981. The Mesaverde Formation was perforated with 30 holes between the following depths:

5376' and 5724'

These perforations were treated with 500 gallons of HCl followed by sand/water fracturing. This well has two tubing strings. The well was shut-in with a SIPT of 1183 psig and SIPC of 1184 psig. On March 19, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 2155 Mcf/D with a calculated AOF of 5645 Mcf/D.

On the basis of the above well and the surrounding geology, the south half of Section 8, Township 31 North, Range 5 West (320 acres) is recommended for inclusion in the Eleventh Expansion of the "Mesaverde Participating Area."

PROPOSED TWELFTH EXPANSION OF THE MESAVERDE PARTICIPATING AREA

Effective Date: June 1, 1981

Proposed Acreage: Township 31 North, Range 5 West, N.M.P.M.
Section 33: South Half (320 acres)
Total acres: 320

The Twelfth Expansion of the "Mesaverde Participating Area" is based on log interpretation, initial test results and five months of production of the Northwest Pipeline Corporation Rosa Unit well #77. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the "Mesaverde Producing Interval." The well is described as follows:

The Rosa Unit #77 well is located 1820 feet from the south line and 810 feet from the west line, Section 33, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on November 5, 1980 and completed on May 5, 1981 in the Mesaverde Formation at a plug back depth of 8125'. The Mesaverde Formation was perforated with 27 holes between the following depths:

5562' - 5938'

Mesaverde Expansion
October, 1982
Page Four

These perforations were treated with 1000 gallons 7 1/2% HCl followed by a sand/water fracturing. The well was shut-in on April 20, 1981 for fifteen days with a SIPT of 1089 psig and SIPC of 1094 psig. On May 5, 1981, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/4 inch tubing, the well gauged 1719 Mcf/D with a calculated AOF of 4777 Mcf/D.

On The basis of the above well, the south half of Section 33, Township 31 North, Range 5 West (320 acres) is recommended as the Twelfth Expansion of the "Mesaverde Participating Area."

PROPOSED THIRTEENTH EXPANSION OF THE MESAVERDE PARTICIPATING AREA

Effective Date: October 1, 1981

Proposed Acreage: Township 32 North, Range 6 West, N.M.P.M.
Section 34: All (640 acres)
Section 35: All (640 acres)
Total Acres: 1280

The Thirteenth Expansion of the "Mesaverde Participating Area" is based on log interpretation, initial test results, and at least four months of production of the Northwest Pipeline Corporation Rosa Unit Wells #89 and #91. The isopach map and production histories from surrounding wells were also used in determining the extent of this expansion. From this data, the proposed acreage is believed to be capable of producing unitized substances in commercial quantities from the "Mesaverde Producing Interval." The wells are described as follows:

The Rosa Unit #89 well is located 565 feet from the north line and 625 feet from the east line, Section 34, Township 32 North, Range 6 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on August 1, 1981 and completed on September 1, 1981 in the Mesaverde Formation at a plug back depth of 6058'. The Mesaverde Formation was perforated with 22 holes between the depths:

5762' - 6042'

These perforations were treated with 1000 gallons of 7 1/2 HCl followed by a sand/water fracturing. The well was shut-in on August 25, 1981 for eight days with SIPT of 911 psig and SIPC of 915 psig. On September 1, 1981, the well was tested and after flowing for three hours through a 2 x .750 inch variable choke on the 2 3/8 inch tubing, the well gauged 3266 Mcf/D with a calculated AOF of 5401 Mcf/D.

Mesaverde Expansion
October, 1982
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On the basis of the above well and the surrounding geology, Section 34, Township 32 North, Range 6 West (640 acres) is recommended for inclusion in the Thirteenth Expansion of the "Mesaverde Participating Area."

The Rosa Unit #91 well is located 1630 feet from the north line and 970 from the east line, Section 35, Township 32 North, Range 6 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on July 15, 1981 and completed on September 4, 1981 in the Mesaverde Formation at a plug back depth of 6040'. The Mesaverde Formation was perforated with 23 holes between the depths:

5630' - 5989'

These perforations were treated with 1750 gallons of 7 1/2% HCl followed by a sand/water fracturing. The well was shut-in on August 29, 1981 for nine days with a SIPT of 1018 psig and SIPC of 1018 psig. On September 4, 1981,

the well was tested and after flowing for three hours through a 2 x .750 inch variable choke on the 2 3/8 inch tubing, the well gauged 3050 Mcf/D with a calculated AOF of 4115 Mcf/D.

On the basis of the above well and the surrounding geology, Section 35, Township 32 North, Range 6 West (640 acres) is recommended for inclusion in the Thirteenth Expansion of the "Mesaverde Participating Area."

PROPOSED FOURTEENTH EXPANSION OF THE MESAVERDE PARTICIPATING AREA

Effective Date: December 1, 1981

Proposed Acreage: Township 31 North, Range 6 West, N.M.P.M.
Section 8: Southwest Quarter (160 acres)
Township 31 North, Range 5 West, N.M.P.M.
Section 20: North Half (320 acres)
Total acreage: 480

The Fourteenth Expansion of the "Mesaverde Participating Area" is based on log interpretation, initial test results, and three months of production of the Northwest Pipeline Corporation Rosa Unit Wells #85 and #88. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the "Mesaverde Producing Interval." The wells are described as follows:

Mesaverde Expansion
October, 1982
Page Six

The Rosa Unit #85 well is located 800 feet from the north line and 990 feet from the east line, Section 20, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on July 2, 1981 and completed on November 3, 1981. The Mesaverde Formation was perforated with 37 holes between the following depths:

5545' - 5892"

These perforations were treated with 10,000 gallons of pad water followed by sand/water fracturing. This well has one tubing string. The well was shut-in with a SIPT of 1112 psig and SIPC of 1113 psig. On November 30, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 tubing, the well gauged 2024 Mcf/D with a calculated AOF of 5589 Mcf/D.

On the basis of the above well, the north half of Section 20, Township 31 North, Range 5 West (320 acres) is recommended for inclusion in the Fourteenth Expansion of the "Mesaverde Participating Area."

The Rosa Unit #88 well is located 1610 feet from the north line and 1100 feet from the west line of Section 8, Township 31 North, Range 6 West, N.M.P.M., San Juan County, New Mexico.

This well was spudded on August 9, 1981 and completed on November 3, 1981. The Mesaverde Formation was perforated with 20 holes between the following depths:

5321' - 5676'

These perforations were treated with 73,100 gallons of slick water followed by sand/water fracturing. This well has one tubing string. The well was shut-in with SIPT of 1169 psig. On November 13, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing, the well gauged 2920 Mcf/D with a calculated AOF of 3306 Mcf/D.

On the basis of the above well, the southwest quarter of Section 8, Township 31 North, Range 6 West (160 acres) is recommended for inclusion in the Fourteenth Expansion of the "Mesaverde Participating Area."

EXHIBIT "D"
TABLE NO. 1

ROSA UNIT: MESAVERDE GAS PRODUCTION
RIO ARRIBA AND SAN JUAN COUNTIES, NEW MEXICO
GAS VOLUMES IN MCF @ 14.73 PSIA & 60°F

UNIT WELL NO.	LOCATION	I. D. DATE	MONTHLY PRODUCTION												CUMULATIVE PRODUCTION TO 9-1-82
			SEP 81	OCT 81	NOV 81	DEC 81	JAN 82	FEB 82	MAR 82	APR 82	MAY 82	JUN 82	JUL 82	AUG 82	
41	5-31N-5W	5/62	1291	239	0	1284	1389	1650	1202	922	152	3	1130	287	568193
80	8-31N-5W	11/81	---	---	19631	18866	12112	10576	7232	3969	3627	3310	4338	3376	87537
22	18-31N-5W	10/57	0	1162	914	779	732	659	615	697	420	707	1002	420	415258
85	20-31N-5W	6/82	---	---	---	---	---	---	---	---	---	14062	21467	42227	42227
17	20-31N-5W	10/57	0	661	1298	1424	1024	706	647	906	2189	26	531	226	398275
15	29-31N-5W	10/57	0	677	978	734	919	1644	779	1058	1550	2	635	785	502727
23	29-31N-5W	10/57	0	0	0	0	0	0	0	487	282	26	446	68	297769
13	31-31N-5W	10/57	0	785	5284	2417	3274	2348	4766	3330	3251	8	819	1937	1021919
26	32-31N-5W	6/58	1121	991	946	866	932	432	173	1752	900	4	1332	942	640635
24	32-31N-5W	11/57	0	357	1387	1746	2460	1052	0	2100	1886	518	548	1676	893120
77	33-31N-5W	4/82	---	---	---	---	---	---	---	17297	12350	15879	8101	4065	57692
35X	5-31N-6W	5/60	1081	1276	1308	1189	1170	1042	1169	1016	835	10	266	909	359524
83	8-31N-6W	5/82	---	---	---	---	---	---	---	---	9	22330	11784	10079	44202
36	11-31N-6W	5/60	2275	2293	2823	2713	2808	2511	2683	2474	1828	23	1746	1037	1016378
9	11-31N-6W	10/57	929	477	880	378	903	677	638	361	327	2	142	316	410800
10	13-31N-6W	10/57	681	1020	1335	963	2357	0	0	0	0	1495	654	339	475677
20	14-31N-6W	10/57	1647	1515	1554	1690	1703	1646	2053	1940	766	4	1927	740	746204
16	14-31N-6W	10/57	0	2116	2232	1678	1409	259	0	2610	733	6	1099	974	695057
12	15-31N-6W	10/57	0	3095	2341	4307	3830	1574	1539	1546	916	4	1396	1087	1053904
25	15-31N-6W	11/57	0	1167	1800	923	1031	776	788	252	233	2	454	327	640431
18	22-31N-6W	10/57	0	1247	2142	1641	1525	1387	1486	990	608	4	890	381	494915
79	22-31N-6W	11/81	---	---	3088	20713	11003	15936	11013	7048	5928	8386	5901	3866	92892
14	23-31N-6W	10/57	---	1796	1591	1239	2263	1364	1277	1244	612	2	669	394	549457
21	23-31N-6W	10/57	0	0	0	0	0	0	0	918	159	0	653	523	731059
19	24-31N-6W	10/57	0	1955	1781	1190	1495	1304	1190	813	467	4	456	345	518686
8	26-31N-6W	11/57	0	167	1208	697	771	693	671	457	785	1	364	259	241677
5	26-31N-6W	*	0	0	0	0	0	0	0	0	0	0	0	0	0
29	32-32N-6W	10/58	2155	2740	2934	2564	2445	2110	2807	2138	1550	2015	929	2307	842600
89	34-32N-6W	1/82	---	---	---	---	18248	13210	0	11920	10845	0	1263	11084	66571
91	35-32N-6W	4/82	---	---	---	---	---	---	---	---	1576	6907	9728	10634	42845
34	36-32N-6W	5/60	3837	3714	3723	2170	1573	759	3648	3273	3638	6	1739	773	1349978

* - non-commercial

50 YEARS



TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION



1935 - 1985

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

April 9, 1985

133

Northwest Pipeline Corporation
P.O. Box 1526
Salt Lake City, Utah 84110-1526

Attention: Darrell L. Gillen

Re: Rosa Unit I Sec. No. 587
San Juan and Rio Arriba
Counties, New Mexico
1985 Drilling Program

Dear Mr. Gillen:

Enclosed please find an approved copy of the material referenced above. Such approval is contingent upon like approval by the Commissioner of Public Lands and the Bureau of Land Management.

Sincerely,

A handwritten signature in black ink, appearing to read "Roy E. Johnson".

ROY E. JOHNSON
Senior Petroleum Geologist

REJ/dp

cc: Commissioner of Public Lands - Santa Fe
Bureau of Land Management - Albuquerque
OCD District Office - Aztec

Bureau of Land Management
Albuquerque District Office
Minerals Division
P.O. Box 6770
Albuquerque, NM 87197-6770

3100 (015)
Rosa Unit

MAY 01 1985

Northwest Pipeline Corporation
Attention: Mr. Darrell L. Gillen
P.O. Box 1526
Salt Lake City, Utah 84110-1526

RECEIVED
MAY 1 1985
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
MINERALS DIVISION

Gentlemen:

Two approved copies of your 1985 Plan of Development for the Rosa Unit area, San Juan and Rio Arriba Counties, are enclosed. Such plan, proposing to carry over seven wells from the 1984 drilling program and drill an additional ten Gallup/Dakota wells, was approved on this date subject to like approval by the appropriate officials of the State of New Mexico.

The possibility might exist of drainage by wells outside of the unit boundary. You will be contacted at a later date about this possibility.

If you have any questions, please contact Gary Stephens at the above address or telephone (505) 766-2841.

Sincerely yours,

(Orig. Signed) - Sid Vogelpohl

For District Manager

Enclosure(s)

cc:

AMOCB, Santa Fe
Comm. of Pub. Lands, Santa Fe
Micrographics 943B-1
Fluids Section FRAH
File: Rosa Unit POD
O&G Chron

015:RKent:tt:5/1/85:0664M

NORTHWEST PIPELINE CORPORATION
ONE OF THE WILLIAMS COMPANIES 

LAND DEPARTMENT

P.O. BOX 1526
SALT LAKE CITY, UTAH 84110-1526
801-584-7215

241-85

March 29, 1985

133

Assistant Area Oil and Gas Supervisor
Bureau of Land Management
Western National Bank Building
505 Marquette NW, Suite 815
Albuquerque, NM 87102

State of New Mexico
Commissioner of Public Lands
Attn: Mr. Ray D. Graham
P. O. Box 1148
Santa Fe, NM 87501

State of New Mexico
Oil Conservation Commission
Attn: Richard L. Stamets
P. O. Box 2088
Santa Fe, NM 87501

Re: Rosa Unit I Sec. No. 587
San Juan and Rio Arriba
Counties, New Mexico
1985 Drilling Program

Gentlemen:

By letter dated April 12, 1984, Northwest Pipeline Corporation, as Unit Operator, filed a Drilling Program for the captioned unit providing for the drilling of Eighteen (18) Gallup/Dakota wells. By letter dated June 13, 1984, Northwest filed a Supplemental Drilling Program to recomplete three (3) Gallup wells. Well #112 per letter dated March 14, 1985 will be redrilled as well #112Y at the same location and be carried over to the 1985 Drilling Program along with wells #110, #113 and #114. The three recomplete Gallup wells will be carried over to the 1985 Drilling Program which are wells #82, #83 and #84. If well #84 is unsuccessful, it will be completed in the Pictured Cliffs Formation. Well #49 was drilled in 1971 with mechanical problems, it will be recompleted in the Gallup, if unsuccessful it will be recompleted in the Mesaverde. Well #81 was completed and shut-in in 1982 it will be recompleted in the Dakota. There were thirteen (13) Gallup/Dakota wells and one (1) Dakota well timely drilled.

Assistant Area Oil and Gas Supervisor
 Commissioner of Public Lands
 Oil Conservation Commission
 Rosa Unit
 March 29, 1985
 Page -2-

As of this date, the total number of wells drilled in the Rosa Unit on acreage committed to the unit is as follows:

Pictured Cliffs/ Mesaverde, Pictured Cliffs, non-commercial	1
Pictured Cliffs/ Mesaverde, Mesaverde commerciality not determined	1
Mesaverde, commerciality not determined	1
Mesaverde, commercial	25
Mesaverde, non-commercial	4
Mesaverde, Plugged and abandoned	6
Dakota, commercial	16
Dakota, Non-commercial	7
Dakota, Not completed	1
Mesaverde/Commingled Gallup-Dakota Commerciality not determined	1
Commingled Gallup-Dakota, commerciality not determined	1
Dakota, Plugged and abandoned	3
Mesaverde-Dakota, Not completed	5
Gallup-Dakota, Not completed	15
Mesaverde/Commingled Gallup-Dakota Not completed	<u>1</u>
Total	88

Pursuant to Section 9 of the Rosa Unit Agreement, Northwest Pipeline Corporation, as Unit Operator, has contacted all of the Working Interest Owners and has received the necessary concurrence to propose the drilling of the following additional wells during the calendar year of 1985:

<u>Well Number</u>	<u>Location</u>	<u>Formation</u>
Rosa Unit #119	S/2 Sec. 18-31N-5W	Gallup/Dakota
Rosa Unit #120	S/2 Sec. 19-31N-5W	Gallup/Dakota
Rosa Unit #121	S/2 Sec. 20-31N-5W	Gallup/Dakota
Rosa Unit #122	W/2 Sec. 28-31N-5W	Gallup/Dakota
Rosa Unit #123	E/2 Sec. 28-31N-5W	Gallup/Dakota
Rosa Unit #124	S/2 Sec. 29-31N-5W	Gallup/Dakota
Rosa Unit #125	N/2 Sec. 13-31N-6W	Gallup/Dakota
Rosa Unit #126	S/2 Sec. 14-31N-6W	Gallup/Dakota
Rosa Unit #127	E/2 Sec. 25-31N-6W	Gallup/Dakota
Rosa Unit #128	N/2 Sec. 26-31N-6W	Gallup/Dakota

Northwest Pipeline Corporation, as Unit Operator, will drill any offset wells that may be required to prevent drainage of unitized substances and any other wells deemed necessary or which are requested by the Unit Operator or the Working Interest Owners.

Assistant Area Oil and Gas Supervisor
Commissioner of Public Lands
Oil Conservation Commission
Rosa Unit
March 29, 1985
Page -3-

If this Drilling Program is acceptable, please signify your approval as required under Section 10 of the Unit Agreement in the space provided on the attached sheet and return an approved copy to Northwest Pipeline Corporation.

Copies of this Drilling Program are being sent to the Working Interest Owners as shown on the attached sheet.

Very truly yours,

NORTHWEST PIPELINE CORPORATION


Darrell L. Gillen
Land Coordinator

DLG:js

Attachment

cc: Working Interest Owners

Assistant Area Oil and Gas Supervisor
Commissioner of Public Lands
Oil Conservation Commission
Rosa Unit
March 29, 1985
Page -4-

APPROVED: _____ Date _____
Assistant Area Oil and Gas Supervisor
Minerals Management Service
Subject to like approval by the
Commissioner of Public Lands and
the Oil Conservation Commission

APPROVED: _____ Date _____
Commissioner of Public Lands
Subject to like approval by the
Minerals Management Service and
the Oil Conservation Commission

APPROVED:  _____ Date 4-9-85
Oil Conservation Commission
Subject to like approval by the
Minerals Management Service and
the Commissioner of Public Lands

The foregoing is for the approval of the Rosa Unit 1985 Drilling Program.

NORTHWEST PIPELINE CORPORATION
ONE OF THE WILLIAMS COMPANIES

P.O. BOX 1526
SALT LAKE CITY, UTAH 84110-1526
801-583-8800

RECEIVED
FEBRUARY 14 1985
OIL CONSERVATION DIVISION
SANTA FE

December 31, 1984

#133

1041-84

Assistant Area Oil and Gas Supervisor
Bureau of Land Management
Western National Bank Building
505 Marquette NW, Suite 815
Albuquerque, New Mexico 87102

JAN 14 1985

State of New Mexico
Commissioner of Public Lands
Attention: Mr. Ray D. Graham
P. O. Box 1148
Santa Fe, New Mexico 87501

State of New Mexico
Oil Conservation Commission
Attention: Mr. Richard L. Stamets
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Rosa Unit I Sec. 587
San Juan & Rio Arriba Counties, New Mexico
APPLICATION FOR APPROVAL OF INITIAL DAKOTA PARTICIPATING AREA
Effective January 10, 1966

APPLICATION FOR APPROVAL OF INITIAL DAKOTA "A" PARTICIPATING AREA
Effective August 11, 1978

APPLICATION FOR APPROVAL OF INITIAL DAKOTA "B" PARTICIPATING AREA
Effective August 25, 1978

APPLICATION FOR APPROVAL OF INITIAL DAKOTA "C" PARTICIPATING AREA
Effective October 30, 1978

APPLICATION FOR APPROVAL OF INITIAL DAKOTA "D" PARTICIPATING AREA
Effective February 27, 1981

APPLICATION FOR APPROVAL OF INITIAL DAKOTA "E" PARTICIPATING AREA
Effective April 29, 1981

Bureau of Land Management
Commissioner of Public Lands
Oil Conservation Commission
Page 2
December 31, 1984

APPLICATION FOR APPROVAL OF FIRST EXPANSION OF THE DAKOTA "B"
PARTICIPATING AREA
Effective June 1, 1980

APPLICATION FOR APPROVAL OF SECOND EXPANSION OF THE DAKOTA "B"
PARTICIPATING AREA
Effective April 1, 1981

Gentlemen:

Pursuant to the provisions of Section 10 of the Rosa Unit Agreement I Sec. No. 587, approved January 24, 1948, NORTHWEST PIPELINE CORPORATION, as Unit Operator, hereby respectfully requests approval of the captioned Participating Areas for the Dakota Formation, to wit:

INITIAL DAKOTA PARTICIPATING AREA - Effective January 10, 1966

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
N/2 Sec. 10-T31N-R5W	320.00	Rosa Unit No. 70

The proposed Initial Dakota Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 70 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit No. 70 Well is located 575 feet from the North line and 1300 feet from the West line, Section 10, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on October 24, 1965 and completed on January 10, 1966, in the Dakota Formation at a plug back depth of 8189 feet.

The Dakota Formation was sand-water fractured below the casing from 8195 feet to 8330 feet, and later perforated from 8166 feet to 8178 feet with four shots per foot. This zone was treated with 500 gallons of mud acid. Prior to acidizing and setting tubing, the well was shut-in with a SIPC of 2280 psig. On January 10, 1966, five hours after perforating, the well flowed at a rate of 1450 Mcf/D.

INITIAL DAKOTA "A" PARTICIPATING AREA - Effective August 11, 1978

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
W/2 Sec. 13-T31N-R6W	320.00	Rosa Unit No. 66

The proposed Initial Dakota "A" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 66 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit No. 66 Well is located 1960 feet from the South line and 815 feet from the West line, Section 13, Township 31 North, Range 6 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on June 4, 1978 and completed on August 11, 1978 in the Dakota Formation at a plug back depth of 8070 feet. The Dakota Formation was perforated at the following depths with two shots per foot:

7913-28', 7960-84', 8032-38', and 8050-58'.

These perforations were fractured with sand and frac fluid. The well was shut-in with a SIPT of 2968 and a SIPC of 2958 psig. On August 11, 1978, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 4427 Mcf/D with a calculated AOF of 5039 Mcf/D.

INITIAL DAKOTA "B" PARTICIPATING AREA - Effective August 25, 1978

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
E/2 Sec. 17-T31N-R5W	320.00	Rosa Unit No. 65

The proposed Initial Dakota "B" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 65 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit No. 65 Well is located 1140 feet from the North line and 860 feet from the East line, Section 17, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on July 14, 1978, and completed on August 25, 1978, in the Dakota Formation at a plug back depth of 8030 feet. The Dakota Formation was perforated at the following depths:

7874-92', 7920-45' and 7999-8017'.

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These perforations were fractured with sand and frac fluid. The well was shut-in with a SIPT of 2624 and a SIPC of 2625 psig. On August 25, 1978, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 3095 Mcf/D with a calculated AOF of 3585 Mcf/D.

INITIAL DAKOTA "C" PARTICIPATING AREA - Effective October 30, 1978

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
E/2 Sec. 29-T31N-R5W	320.00	Rosa Unit No. 64

The proposed Initial Dakota "C" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 64 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit No. 64 Well is located 790 feet from the North line and 790 feet from the East line, Section 29, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on August 7, 1978, and completed on October 5, 1978, in the Dakota Formation at a plug back depth of 8070 feet. The Dakota Formation was perforated at the following depths with two shots per foot:

7950-68' and 8001-14'.

These perforations were fractured with sand and frac fluid. The well was shut-in October 5, 1978, for 25 days with a SIPT of 2280 and a SIPC of 2280 psig. On October 30, 1978, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 1321 Mcf/D with a calculated AOF of 1843 Mcf/D.

INITIAL DAKOTA "D" PARTICIPATING AREA - Effective February 27, 1981

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
W/2 Sec. 22-T31N-R6W	320.00	Rosa Unit No. 79

The proposed Initial Dakota "D" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the

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Rosa Unit No. 79 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit No. 79 Well is located 1800 feet from the South line and 1780 feet from the West line, Section 22, Township 31 North, Range 6 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on December 5, 1980, and completed on February 27, 1981. The Dakota Formation was perforated with 64 holes between the following depths:

7772-7788' and 7817-7831'.

These perforations were sand/water fractured. This well has two tubing strings. The well was shut-in with a SIPT of 2901 psig. On February 27, 1981, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 1858 Mcf/D with a calculated AOF of 1960 Mcf/D.

INITIAL DAKOTA "E" PARTICIPATING AREA - Effective April 29, 1981

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
S/2 Sec. 33-T31N-R5W	320.00	Rosa Unit No. 77

The proposed Initial Dakota "E" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 77 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit #77 Well is located 1820 feet from the South line and 810 feet from the West line, Section 33, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on November 5, 1980, and completed on April 27, 1981. The Dakota Formation was perforated with 132 holes between the following depths:

7989' and 8091'.

The perforations were sand/water fractured. This well has one tubing string. The well was shut-in with a SIPT of 2561 psig. On April 29, 1981, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 2544 Mcf/D with a calculated AOF of 2714 Mcf/D.

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FIRST EXPANSION OF THE DAKOTA "B" PARTICIPATING AREA - Effective June 1, 1980

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
W/2 Sec. 17-T31N-R5W	320.00	Rosa Unit No. 68

The proposed First Expansion of the Dakota "B" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 68 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit No. 68 Well is located 1850 feet from the South line and 790 feet from the West line, Section 17, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on August 12, 1979, and completed on October 2, 1979, in the Dakota Formation at a plug back depth of 8094 feet. The Dakota Formation was perforated with two shots per foot at the following depths:

7864-80', 7910-26', 7998-8016' and 8042-57'.

These perforations were fractured with sand and frac fluid. The well was shut-in and a SIPC of 2460 psig and a SIPT of 2460 psig were measured. On May 16, 1980, the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 5757 Mcf/D with a calculated AOF of 6938 Mcf/D.

SECOND EXPANSION OF THE DAKOTA "B" PARTICIPATING AREA - Effective April 1, 1981

<u>Description of Lands</u>	<u>No. of Acres</u>	<u>Well Name</u>
W/2 Sec. 8-T31N-R5W	320.00	Rosa Unit No. 80

The proposed Second Expansion of the Dakota "B" Participating Area is predicated upon the determination by NORTHWEST PIPELINE CORPORATION, as Unit Operator, that the Rosa Unit No. 80 Well is capable of producing unitized substances in paying quantities from the Dakota Formation. The well data is as follows:

The Rosa Unit #80 Well is located 1660 feet from the South line and 1789 feet from the West line, Section 8, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on November 22, 1980, and completed on March 12, 1981. The Dakota Formation was perforated with 56 holes between the following depths.

7845-57' and 7897-7909'.

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These perforations were treated with 500 gallons of HCL followed by sand/water fracturing. This well has two tubing strings. The well was shut-in with a SIPT of 2553 psig. On March 12, 1981, the well was tested and after flowing for three hours through 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 1176 Mcf/D with a calculated AOF of 1177 Mcf/D.

In support of this application, the following listed exhibits are made a part hereof:

EXHIBIT "A"

Ownership map reflecting the boundaries of the Unit and the proposed Dakota Participating Areas with the Rosa Unit.

EXHIBIT "B"

Geologic Report on the proposed Participating Areas within the Rosa Unit.

EXHIBIT "C"

- Figure No. 1: Structure Map
- Figure No. 2: Net Sand Thickness Map Upper Dakota Sand
- Figure No. 3: Gross Sand Thickness Map
- Figure No. 4: Typical Well Log
- Figure No. 5: Stratigraphic Cross Section A-A'
- Figure No. 6: Stratigraphic Cross Section B-B'

EXHIBIT "D"

Rosa Unit Production Schedule

Attached hereto are Schedules I, I-A, I-B, I-C, I-D, I-E, II-B and III-B showing the proposed Dakota Participating Areas. The schedules described the Participating Areas, show the percentage of unitized substances allocated to each unitized tract, and the percentage of ownership in the tracts.

If the proposed Participating Areas set forth herein meet with your approval, please indicate such approval in the space provided on the attached sheet and return an approved copy for our files.

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December 31, 1984

Copies of this letter, exhibits and schedules are being sent to the Working Interest Owners shown on the attached sheet.

Very truly yours,

Darrell L. Gillen
Darrell L. Gillen
Land Coordinator

APPROVED

Ray E. Johnson

Oil Conservation Division

1-16-85

jawc
Attachments

cc: Working Interest Owners

ROSA UNIT
WORKING INTEREST OWNERS

The Wiser Oil Company
905 Oil and Gas Building
Wichita Falls, Texas 76301

Mr. William G. Webb
1700 Mercantile Bank Building
Dallas, Texas 75201

El Paso Exploration Co.
Attn: Land Department
P. O. Box 4289
Farmington, NM 87499-4289

Phillips Petroleum Co.
Attn: T. C. Doughty
8055 E. Tufts Avenue Parkway
Denver, Colorado 80237

Elizabeth T. Calloway
4801 St. Johns Drive
Dallas, Texas 75205

John L. Turner
800 Diamond Shamrock Tower
Dallas, Texas 75201

Mercantile National Bank of Dallas
Trustee, Mary Frances Turner, Jr.
Personal Trust Department
P. O. Box 225415
Dallas, Texas 75265

Gas Producing Enterprises, Inc.
Attn: North Region-Land Department
2100 Prudential Plaza
P. O. Box 749
Denver, Colorado 80201

Ms. Lois J. Willard
P. O. Box 5205
Santa Fe, New Mexico 87501

Mitchell Energy Corporation
Attn: Mr. Jerry Taylor
1670 Broadway - Suite 3200
Amoco Building
Denver, Colorado 80202

Amoco Production Company
Attn: J. C. Burnside
1670 Broadway - Suite 1914
Amoco Building
Denver, Colorado 80202

J. Glenn Turner, Jr.
1700 Mercantile Bank Building
Dallas, Texas 75201

Fred E. Turner
One Energy Square - Suite 852
4925 Greenville Avenue
Dallas, Texas 75206

Mr. Frank A. Schultz
730 Fidelity Union Tower
Dallas, Texas 75201

Winifred K. Ponder
1800 North Stanton Street
El Paso, Texas 79902

Coastal Oil & Gas Corporation
Attn: Mgr., Joint Interest Oper
P. O. Box 749
600 - 17th St., Suite 800 S.
Denver, CO 80201

UNIT AREA EXPANSION SCHEDULE

SCHEDULE I
 INITIAL DAKOTA PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
			<u>TRACT 13</u>			
USA SF-078763	<u>T-31-N, R-5-W</u> Sec. 10: N/2	320.00	Royalty	12.500%	12.500%	100.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	

Effective January 10, 1966

UNIT AREA EXPANSION SCHEDULE

SCHEDULE I-A
 INITIAL DAKOTA "A" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
			<u>TRACT 14</u>			
USA SF-078767	<u>T-31-N, R-6-W</u> Sec. 13: W/2	320.00	Royalty	12.500%	12.500%	100.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	

Effective August 11, 1978

UNIT AREA EXPANSION SCHEDULE

SCHEDULE I-B
 INITIAL DAKOTA "B" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
			<u>TRACT 15</u>			
USA SF-078769	<u>T-31-N, R-5-W</u> Sec. 17: E/2	320.00	Royalty	12.500%	12.500%	100.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	

Effective August 25, 1978

UNIT AREA EXPANSION SCHEDULE

SCHEDULE I-C
 INITIAL DAKOTA "C" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
<u>TRACT 18</u>						
USA SF-078764	T-31-N, R-5-W Sec. 29: N/2NE/4, W/2SE/4	160.00	Royalty	12.500%	12.500%	50.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	0.000%	0.000%	
			Total	<u>100.000%</u>	<u>100.000%</u>	
<u>TRACT 21</u>						
USA SF-079165	T-31-N, R-5-W Sec. 29: S/2NE/4, E/2SE/4	160.00	Royalty	12.500%	12.500%	50.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	0.000%	0.000%	
			Total	<u>100.000%</u>	<u>100.000%</u>	

RECAPITULATION
DESCRIPTION OF LANDS IN PARTICIPATING AREA

Township 31 North, Range 5 West
Section 29: E/2

Total Number of Acres in Participating Area	320.00
Total Number of Acres Committed to Participating Area	320.00

Effective October 30, 1978

UNIT AREA EXPANSION SCHEDULE

SCHEDULE I-D
 INITIAL DAKOTA "D" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
<u>TRACT 39</u>						
USA SF-078766	T-31-N, R-6-W Sec. 22: E/2NW/4, SW/4, Lot 1	248.50	Royalty	12.500%	12.500%	77.65625%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	0.000%	0.000%	
			Total	<u>100.000%</u>	<u>100.000%</u>	
<u>TRACT 43</u>						
E-289-43	T-31-N, R-6-W Sec. 22: Approx. W/2NW/4	71.50	Royalty	12.500%	12.500%	22.34375%
			Working Interest			
			Phillips Petroleum Co.	82.500%	82.500%	
			ORRI	5.000%	5.000%	
			Total	<u>100.000%</u>	<u>100.000%</u>	

RECAPITULATION
DESCRIPTION OF LANDS IN PARTICIPATING AREA

Township 31 North, Range 6 West
 Section 22: W/2

Total Number of Acres in Participating Area	320.00
Total Number of Acres Committed to Participating Area	320.00

Effective February 27, 1981

UNIT AREA EXPANSION SCHEDULE

SCHEDULE I-E
 INITIAL DAKOTA "E" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
			<u>TRACT 28</u>			
USA SF-078773	<u>T-31-N, R-5-W</u> Sec. 33: S/2	320.00	Royalty	12.500%	12.500%	100.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	

Effective: April 29, 1981

UNIT AREA EXPANSION SCHEDULE

SCHEDULE II-B
 FIRST EXPANSION OF THE DAKOTA "B" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
			<u>TRACT 17</u>			
USA SF-078769	<u>T-31-N, R-5-W</u> Sec. 17: W/2	320.00	Royalty	12.500%	12.500%	100.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	

Effective: June 1, 1980

UNIT AREA EXPANSION SCHEDULE

SCHEDULE III-B
 SECOND EXPANSION OF THE DAKOTA "B" PARTICIPATING AREA
 ROSA UNIT

<u>SERIAL NUMBER</u>	<u>DESCRIPTION</u>	<u>NUMBER OF ACRES</u>	<u>DRILLING BLOCK OWNERSHIP</u>	<u>PERCENTAGE</u>	<u>PERCENTAGE COMMITTED</u>	<u>PRESENT ACTUAL PARTICIPATION</u>
<u>TRACT 13</u>						
USA SF-078763	<u>T-31-N, R-5-W</u> Sec. 8: SW/4	160.00	Royalty	12.500%	12.500%	50.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	
<u>TRACT 14</u>						
USA SF-078767	<u>T-31-N, R-5-W</u> Sec. 8: NW/4	160.00	Royalty	12.500%	12.500%	50.00000%
			Working Interest			
			Amoco Production Co.	87.500%	87.500%	
			ORRI	<u>0.000%</u>	<u>0.000%</u>	
			Total	<u>100.000%</u>	<u>100.000%</u>	

RECAPITULATION
DESCRIPTION OF LANDS IN PARTICIPATING AREA

Township 31 North, Range 5 West
Section 8: W/2

Total Number of Acres in Participating Area	320.00
Total Number of Acres Committed to Participating Area	320.00

Effective: April 1, 1981

EXHIBIT "B"

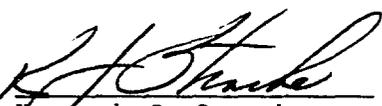
ROSA UNIT
RIO ARRIBA AND SAN JUAN COUNTIES, NEW MEXICO

GEOLOGIC REPORT
DAKOTA PRODUCING INTERVAL

PROPOSED INITIAL DAKOTA PARTICIPATING AREAS AND
FIRST AND SECOND EXPANSIONS OF THE DAKOTA "B"
PARTICIPATING AREA

NORTHWEST PIPELINE CORPORATION

APPROVED BY:



Kenneth J. Stracke
Director

Production Division

EXHIBIT "B"

ROSA UNIT
RIO ARRIBA AND SAN JUAN COUNTIES, NEW MEXICO

GEOLOGIC REPORT
DAKOTA PRODUCING INTERVAL

PROPOSED INITIAL DAKOTA PARTICIPATING AREAS
AND FIRST AND SECOND EXPANSIONS OF THE
DAKOTA "B" PARTICIPATING AREA

GENERAL INFORMATION

The Rosa Unit is located in the Northeast quadrant of the New Mexico portion of the San Juan Basin along the synclinal axis of the Basin. It is composed of 54,211.01 acres within the unit outline of which 53,733.30 acres are committed to the unit.

Within the Rosa Unit, the Dakota Producing Interval (NMOCC Order No. R 1670-C Rule 25) has been tested in 27 wells resulting in 12 non-commercial wells, seven plugged and abandoned wells, and eight commercial wells.

To date the producing sands within the Dakota Producing Interval are restricted to the Upper (Marine) and Middle (Fluviatile) Dakota Sands. There are no sands developed within the Graneros Shale interval above, and the Lower or Basal Dakota Sands below are apparently water-wet.

As to the producing Dakota Sands, the Upper Dakota Sand is littoral marine sand with depositional characteristics that range from deltaic to off-shore bar in the immediate vicinity of the Rosa Unit. Porosity, grain size and sorting generally increase upward in the Upper Dakota Sand. The sand interval is generally correlatable across the extent of the unit. The Middle Dakota sands are interpreted to be a network of localized fluvial channel deposits. These sands are generally tight, often siliceous, with low porosity in the 0 to 6% range. Local porosity development of greater than 6% and the presence, in some instances, of hi-angle natural fractures permit these sands to be productive. These Middle Dakota Sands are not individually correlatable across the unit.

Well testing information gathered to date does not differentiate the productive capabilities between the Upper and Middle Dakota producing sands. Experience dictates that evaluation of the mechanical logs on these wells can be misleading. The actual drainage pattern for any given well in the Rosa Unit is probably quite irregular and not possible, at this time, to map.

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July 1983
Page Two

Included in the report are three maps, a type log and two cross-sections entitled Exhibit "C", Figures 1 through 6.

Exhibit "C", Figure No. 1 shows the configuration of the subsurface structure of the Dakota interval using sea level as the datum plane, the top of the Graneros as the mapping horizon and a contour interval of 50 feet.

The structure map indicates a structural trough extending generally east-west across the Rosa Unit and rising toward the west. This trough is one limb of the synclinal axis of the San Juan Basin. It is apparent that here, as in much of the San Juan Basin, stratigraphy rather than structure controls the accumulation of hydrocarbons within the Dakota producing interval.

Exhibit "C", Figure No. 2 is a contour map of the thickness in feet of net reservoir sand which is interpreted from well logs to be present at each drilling site within the Upper Dakota Sand. Sand thickness trends in the San Juan 30-5 and 31-6 Units were extrapolated into the Rosa Unit, but because of limited data the contours should be considered as somewhat speculative.

Exhibit "C", Figure No. 3 indicates the gross sand development within the Middle Dakota interval at each drilling site as interpreted from well logs. No attempt has been made to contour the isopachous thickness of these gross sands.

Exhibit "C", Figure No. 4 is offered as a type log for the Rosa Unit. Completed intervals for this well, the Amoco Production Company's Rosa No. 68, SW/4 Section 17, Township 31 North, Range 5 West, Rio Arriba County, New Mexico, are indicated on the log track. Nomenclature, as used in this report, is indicated between the induction and porosity logs.

Exhibit "C", Figure Nos. 5 and 6 are stratigraphic cross sections of Rosa Unit wells in the area under consideration for participation. The stratigraphic datum for these wells is the base of the Greenhorn.

Exhibit "D", Table 1 is a tabulation of the Dakota gas production from the unit. The cumulative production through May 31, 1983 is shown. The Rosa Unit has produced a total of 8,606,782 Mcf from the Dakota as of June 1, 1983.

It is apparent from these exhibits that continuity of reservoir sands across the unit is questionable in the case of the Upper Dakota Sand and apparently not possible in the case of the Middle Dakota Sands. However, we believe that a 320-acre spacing pattern can be used to effectively produce the Dakota reservoir system. Because of the practical limitations in mapping and predicting a drainage area, it is recommended that each 320-acre tract be designated as a drilling and producing area for the Dakota Formation in this unit at this time.

Rosa Expansion
July 1983
Page Three

INITIAL DAKOTA PARTICIPATING AREA

Effective Date: January 10, 1966
Proposed Acreage: Township 31 North, Range 5 West, N.M.P.M.
Section 10: N/2 (320 Acres)

The Initial Dakota Participating Area is based on interpretation of the well logs, the initial test results, and production history of the Rosa Unit No. 70 (formerly Carson #1) Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

The Rosa Unit No. 70 Well is located 575 feet from the North line and 1300 feet from the West line, Section 10, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on October 24, 1965 and completed on January 10, 1966, in the Dakota Formation at a plug back depth of 8189 feet.

The Dakota Formation was sand-water fractured below the casing from 8195 feet to 8330 feet, and later perforated from 8166 feet to 8178 feet with four shots per foot. This zone was treated with 500 gallons of mud acid. Prior to acidizing and setting tubing, the well was shut-in with a SIPC of 2280 psig. On January 10, 1966, five hours after perforating, the well flowed at a rate of 1450 Mcf/D.

On the basis of this well, the N/2 of Section 10 (320.00 acres) is recommended as the Initial Dakota Participating Area.

INITIAL DAKOTA "A" PARTICIPATING AREA

Effective Date: August 11, 1978
Proposed Acreage: Township 31 North, Range 6 West, N.M.P.M.
Section 13, W/2 (320 Acres)

The Initial Dakota "A" Participating Area is based on interpretation of the well logs, the initial test results, and production history of the Rosa Unit No. 66 Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

The Rosa Unit No. 66 Well is located 1960 feet from the South line and 815 feet from the West line, Section 13, Township 31 North, Range 6 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on June 4, 1978 and completed on August 11, 1978 in the Dakota Formation at a plug back depth of 8070 feet. The Dakota Formation was perforated at the following depths with two shots per foot:

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7913-28', 7960-84', 8032-38', and 8050-58'.

These perforations were fractured with sand and frac fluid. The well was shut-in with a SIPT of 2968 and a SIPC of 2958 psig. On August 11, 1978 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 4427 Mcf/D with a calculated AOF of 5039 Mcf/D.

On the basis of this well, the W/2 of Section 13 (320.00 acres) is recommended as the Initial Dakota "A" Participating Area.

INITIAL DAKOTA "B" PARTICIPATING AREA

Effective Date: August 25, 1978
Proposed Acreage: Township 31 North, Range 5 West, N.M.P.M.
Section 17: E/2 (320 Acres)

The Initial Dakota "B" Participating Area is based on interpretation of the well logs, initial test results, and production history of the Rosa Unit No. 65 Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

The Rosa Unit No. 65 Well is located 1140 feet from the North line and 860 feet from the East line, Section 17, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on July 14, 1978 and completed on August 25, 1978 in the Dakota Formation at a plug back depth of 8030 feet. The Dakota Formation was perforated at the following depths:

7874-92', 7920-45' and 7999-8017'.

These perforations were fractured with sand and frac fluid. The well was shut-in with a SIPT of 2624 and a SIPC of 2625 psig. On August 25, 1978 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 3095 Mcf/D with a calculated AOF of 3585 Mcf/D.

On the basis of this well, the E/2 of Section 17 (320.00 acres) is recommended as the Initial Dakota "B" Participating Area.

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INITIAL DAKOTA "C" PARTICIPATING AREA

Effective Date: October 30, 1978
Proposed Acreage: Township 31 North, Range 5 West
Section 29: E/2 (320 Acres)

The Initial Dakota "C" Participating Area is based on interpretation of the well logs, initial test results, and production history of the Rosa Unit No. 64 Well. From this data it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

The Rosa Unit No. 64 Well is located 790 feet from the North line and 790 feet from the East line, Section 29, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on August 7, 1978 and completed on October 5, 1978 in the Dakota Formation at a plug back depth of 8070 feet. The Dakota Formation was perforated at the following depths with two shots per foot:

7950-68' and 8001-14'

These perforations were fractured with sand and frac fluid. The well was shut-in October 5, 1978 for 25 days with a SIPT of 2280 and a SIPC of 2280 psig. On October 30, 1978 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 1321 Mcf/D with a calculated AOF of 1843 Mcf/D.

On the basis of this well, the E/2 of Section 29 (320.00 acres) is recommended as the Initial Dakota "C" Participating Area.

INITIAL DAKOTA "D" PARTICIPATING AREA

Effective Date: February 27, 1981
Proposed Acreage: Township 31 North, Range 6 West, N.M.P.M.
Section 22: W/2 (320 Acres)

The Initial Dakota "D" Participating Area is based on interpretation of the well logs, initial test results, and production history of the Rosa Unit No. 79 Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

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The Rosa Unit #79 Well is located 1800 feet from the South line and 1780 feet from the West line, Section 22, Township 31 North, Range 6 West, M.M.P.M., Rio Arriba County, New Mexico. This well was spudded on December 5, 1980 and completed on February 27, 1981. The Dakota Formation was perforated with 64 holes between the following depths:

7772-7788' and 7817-7831'.

These perforations were sand/water fractured. This well has two tubing strings. The well was shut-in with a SIPT of 2901 psig. On February 27, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 1858 Mcf/D with a calculated AOF of 1960 Mcf/D.

On the basis of this well, the W/2 of Section 22 (320.00 acres) is recommended as the Initial Dakota "D" Participating Area.

INITIAL DAKOTA "E" PARTICIPATING AREA

Effective Date: April 29, 1981
Proposed Acreage: Township 31 North, Range 5 West
Section 33: S/2 (320 Acres)

The Initial Dakota "E" Participating Area is based on interpretation of the well logs, initial test results, and production history of the Rosa Unit No. 77 Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

The Rosa Unit #77 Well is located 1820 feet from the South line and 810 feet from the West line, Section 33, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on November 5, 1980 and completed on April 27, 1981. The Dakota Formation was perforated with 132 holes between the following depths:

7989' and 8091'

These perforations were sand/water fractured. This well has one tubing string. The well was shut-in with a SIPT of 2561 psig. On April 29, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 2544 Mcf/D with a calculated AOF of 2714 Mcf/D.

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FIRST EXPANSION OF THE DAKOTA "B" PARTICIPATING AREA

Effective Date: June 1, 1980
Proposed Acreage: Township 31 North, Range 5 West, N.M.P.M.
Section 17: W/2 (320 Acres)

The First Expansion of the Dakota "B" Participating Area is based on interpretation of the well logs, initial test results, and production history of the Rosa Unit No. 68 Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

The Rosa Unit No. 68 Well is located 1850 feet from the South line and 790 feet from the West line, Section 17, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on August 12, 1979 and completed on October 2, 1979 in the Dakota Formation at a plug back depth of 8094 feet. The Dakota Formation was perforated with two shots per foot at the following depths:

7864-80', 7910-26', 7998-8016' and 8042-57'.

These perforations were fractured with sand and frac fluid. The well was shut-in and a SIPC of 2460 psig and a SIPT of 2460 psig were measured. On May 16, 1980 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 2 3/8 inch tubing the well gauged 5757 Mcf/D with a calculated AOF of 6938 Mcf/D.

On the basis of this well, the W/2 of Section 17 (320.00 acres) is recommended as the First Expansion of the Dakota "B" Participating Area.

SECOND EXPANSION OF THE DAKOTA "B" PARTICIPATING AREA

Effective Date: April 1, 1981
Proposed Acreage: Township 31 North, Range 5 West, N.M.P.M.
Section 8: W/2 (320 Acres)

The Second Expansion of the Dakota "B" Participating Area is based on interpretation of the well logs, initial tests results, and production history of the Rosa Unit No. 80 Well. From this data, it is inferred that the proposed acreage is capable of producing unitized substances in commercial quantities from the Dakota Producing Interval.

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The Rosa Unit #80 Well is located 1660 feet from the South line and 1789 feet from the West line, Section 8, Township 31 North, Range 5 West, N.M.P.M., Rio Arriba County, New Mexico. This well was spudded on November 22, 1980 and completed on March 12, 1981. The Dakota Formation was perforated with 56 holes between the following depths:

7845-57' and 7897-7909'.

These perforations were treated with 500 gallons of HCL followed by sand/water fracturing. This well has two tubing strings. The well was shut-in with a SIPT of 2553 psig. On March 12, 1981 the well was tested and after flowing for three hours through a 3/4 inch variable choke on the 1 1/2 inch tubing, the well gauged 1176 Mcf/D with a calculated AOF Of 1177 Mcf/D.

On the basis of this well, the W/2 of Section 8 (320.00 acres) is recommended as the Second Expansion of the Daota "B" Participating Area.

EXHIBIT "D"
TABLE NO. 1

ROSA UNIT: DAKOTA GAS PRODUCTION
RIO ARRIBA COUNTY, NEW MEXICO
GAS VOLUMES IN MCF @ 14.73 PSIA & 60° F

UNIT WELL NO.	LOCATION	I. D. DATE	MONTHS												CUMULATIVE PRODUCTION TO 6-1-83
			JUN 82	JUL 82	AUG 82	SEP 82	OCT 82	NOV 82	DEC 82	JAN 83	FEB 83	MAR 83	APR 83	MAY 83	
43*	19-31N-4M	5/79	830	4713	3419	3268	620	4250	3404	3688	2323	1827	2300	0	138805
63*	30-31N-4M	9/78	0	0	0	0	0	0	0	0	0	0	0	0	9257
53*	8-31N-5M	7/70	1810	2791	1245	0	2354	5826	3349	3724	2048	0	3652	0	765013
80	8-31N-5M	11/81	4646	4098	4093	7412	11714	9677	9243	8097	7351	6617	4822	4708	149752
70	10-31N-5M	11/78	2573	2177	1783	9037	9066	6815	5062	8683	5012	5900	0	1159	406309
40*	11-31N-5M	3/79	5201	4834	4928	2597	1832	3786	3751	3660	3114	3107	2699	0	312913
48*	11-31N-5M	3/79	4505	3148	0	4002	6865	9751	8034	7220	6160	7461	5038	0	414334
61*	13-31N-5M	9/78	1424	1063	1511	1089	1424	1416	857	142	156	0	125	0	108718
65	17-31N-5M	4/79	2195	3279	4378	1041	0	7742	4916	5655	8	0	7776	5606	209640
68	17-31N-5M	8/80	4585	15017	10183	20923	8362	15902	6188	22244	13739	0	11670	5829	309506
85*	20-31N-5M	---	---	---	---	---	---	---	---	---	---	---	---	---	---
62*	25-31N-5M	9/78	2209	558	2447	1597	1422	2076	570	662	1358	893	0	0	150479
64	29-31N-5M	4/79	2585	3168	2882	2898	0	2467	7053	4712	3996	3856	908	0	226924
52*	33-31N-5M	7/70	3726	5893	5283	4857	0	3746	9845	7304	0	0	3369	0	1253460
77	33-31N-5M	4/82	5579	13931	10132	7432	6668	5704	5258	7021	4574	6198	3665	4913	101980
55*	34-31N-5M	5/75	3513	4784	3739	0	1863	6723	6491	5052	1327	2606	5455	708	526660
56*	35-31N-5M	10/75	788	1177	684	0	547	2205	1527	453	289	182	212	0	281544
66	13-31N-6M	4/79	0	14297	13638	43985	0	0	21376	49935	51035	53218	28428	0	1736188
79	22-31N-6M	11/81	36252	26040	45545	38258	40172	22577	34998	39938	34171	35856	23823	0	608979
51*	23-31N-6M	7/70	2218	5168	4483	758	620	9510	3753	0	7142	5953	3234	0	863432

WELLS PLUGGED AND ABANDONED

49	27-31N-4M															
54	36-31N-5M	5/75														32889
35-X	5-31N-6M															
36	11-31N-6M															
1	11-31N-6M															
69	16-31N-6M															
67	14-31N-6M															
* Non-commercial																