MARVIN C. GROSS
P.O. BOX 356 - PHONE 623-3539
ROSWELL, NEW MEXICO 88201

PROPOSED ANTEBELLUM FEDERAL UNIT
LEA COUNTY, NEW MEXICO

TABLE OF CONTENTS

MARVIN C. GROSS
P.O. BOX 356 - PHONE 623-3539
ROSWELL, NEW MEXICO 88201

PROPOSED ANTEBELLUM UNIT
LEA COUNTY, NEW MEXICO

LOCATION:

The proposed Antebellum Unit is located approximately 35 miles southwest of Hobbs, New Mexico, in Twn. 23 S., Rge. 34 E., and is associated with the Bell Lake and Antelope Ridge gas and condensate fields. The area is accessible by roads due to the surrounding production and wildcat test in the area. There is no established production from any formation in the proposed unit area.

UNIT BOUNDARY: (EXHIBITS "A" & "B")

The proposed unit boundary is predicated on the Morrow Clastics subsurface map. All acreage is included that lies within the minus 9400 foot contour line except acreage to the south which is presently committed to the Bell Lake and Antelope Ridge Units. Sections 16-17-20-21-22-29 Twn. 23 S., Rge. 34 E. are proposed to comprise the unit. A depth of 13,800 feet should penetrate the top of the Barnett Shale.

OBJECTIVES AND DEPTHS TO TEST:

The primary objectives of this operation are the Delaware sands, Bone Spring sands and carbonates, Wolfcamp limestone, Strawn-Atoka carbonates, and Morrow sands.

STRATIGRAPHIC SECTION:

The following is a stratigraphic sequence of formations expected in the proposed unit area and the approximate depths below the surface where they should be encountered:

Delaware	5,000 feet
Bone Spring	8,500
Wolfcamp	11,200
Strawn	11,700
Atoka	12,000
Morrow	12,900
Barnett Shale	13,800

GEOLOGY:

The prospect is located in the northern part of the Delaware Basin and 12 miles west of the Central Basin Platform. Production has been established from the Bone Spring (Permian), Strawn-Atoka, Morrow (Pennsylvanian), and Devonian formations in the vicinity of the proposed wellsite. The nearest established production is in the Shell #1 Harris approximately one and one-fourth miles southeast in Section 27.

Structure (Exhibit "B"): Subsurface structure maps have been prepared on tops of the Bone Spring and Morrow Clastics, indicating a structural high over the prospective unit associated with the North Bell Lake, Bell Lake and Antelope Ridge Fields. The structure generally parallels the Central Basin Platform in a slightly northwest-southeast trend. Closure over the prospect is expected to exceed 300 feet, as indicated by the subsurface control. The structure map on top of the Morrow Clastics is submitted with this report. (Exhibit "B")

Cross Sections (Exhibits "C" & "D"): The wells used in the cross section from left to right (south to north) appear to be flanking the structural high on the east side. The section shows the electric log strips from near the base of the Wolfcamp to the top of the Barnett Shale below the producing Morrow pays. The

The correlations made on the tops of the Atoka, Morrow Clastics and Barnett Shale show the apparent low relief of the structure near the apex along the strike of the structure. An East-West cross section reflects approximately 400 feet of west dip from the Shell #1 Harris in Section 27, to the Continental #2 Bell Lake in Section 30, and 925 feet of east dip from the Shell #1 Harris to the Midwest #1 Custer Mountain Unit located seven miles southeast in Section 9, Twn. 24 S., Rge. 35 E. (Exhibits "C" & "D")

Potential Pay Zones: Bone Spring pay is found in the Continental #3 Bell Lake Unit well in Section 6, Twn. 24 S., Rge. 34 E. The productive zone is in the upper 100 feet of the formation. Production to Jan. 1, 1973, is 159,505 barrels. The same zone had 18 feet of neutron porosity in the Shell test in Section 22 that was not tested. Zones producing oil in the Scharb, Mescalero and Lea fields have not been evaluated on the structure. The Strawn-Atoka beds are shown as gas producers on the cross section in Section 4, Twn. 24 S., Rge. 34 E., producing from 12,005-307', with cumulative production of 9,373,219 MCF gas and 177,434 barrels of condensate. This zone flowed 3,000 MCF gas on drill stem test and recorded high shut-in pressures in the Shell #1 North Antelope Ridge Unit well. (Sec. 22) The shut-in pressures tend to indicate very near reservoir conditions to the well bore.

The main prospective pay zone for the prospect is the Morrow zone expected in the test well from 12,800 to 13,600 feet. The Morrow pay zones are sandstone interbedded with thin limestones

and shales. The productive potential depends upon the development of porosity and permeability in the sand and lime beds. At the time the Shell #1 North Antelope (Sec. 22) was drilled, the Shell #1 Harris in Sec. 27 was producing from the Devonian formation only. (Having since been plugged back to the Morrow.) In testing the North Antelope well, long drill stem tests were conducted and bore hole damage from the drilling fluid may have prevented an initial flow of commercial gas. Production tests of the equivalent pay zones were not attempted in the intervals from 12,810-30, 12890-910, 12,990-13,010, and 13,220-260 feet. With retrospect to the re-completion of the Shell #1 Harris in the Morrow, these zones should have been production tested in the North Antelope Ridge well. The Shell #1 Harris has produced 14,859,603 MCFG and 164,320 barrels of condensate in the past six years from the Morrow formation. Patrik Petroleum Company drilled a test 660 feet from the South line and 1830 feet from the West line of Section 22 in 1972. The Shell Harris pay was not tested in this well due to hole problems. Similar production can be expected to be encountered under this prospect.

PRODUCTION DECLINE CURVE: (Exhibit "E")

The production decline curve from the Shell #1 Harris is included to show the strength of the reservoir. Shell engineers have indicated that the well can deliver 10 million cubic feet of gas per day when there is a market for that much production.

RESERVES:

The formation reserves are projected from wells producing

from these formations with gross pay sections, depths, and lithologies similar to the prospect, and are considered to be average figures.

Formation	Spacing	Gross Oil (BSTO)	Gross Gas (MMMCF)
Bone Spring	80	150,000	-
Wolfcamp	640	300,000	5.00
Strawn-Atoka	640	400,000	15.00
Morrow	640	500,000	25.00

CONCLUSION:

Well control in the area suggests that the prospect is situated on a major structure which has multi-pay potential. Production in the area has been very commercial, and the proposed well location is considered semi-proven. All parameters for a successful operation are present, i.e., reservoir rock in the objective formations, structure, and known hydrocarbon generation. In the best interest of sound conservation principles and orderly development, a fully approved Federal Unit is recommended.

Respectfully submitted,

Marvin C. Gross, Geologist
P. O. Box 358
Roswell, New Mexico 88201

R. 34 E.

T. 23 S.

7 8 9 10

18 17 AMERICAN FUELS NM 18304 ⑤ 16 ALLIED CHEM 9-17-78 L-1484 ⑨ ARCO 4-1-82 LG-50 15 ⑮

R.P. FULLER 4-21-80 L-4398 ⑬

CONTINENTAL OIL HBP LC065194 ①

ARCO 4-1-82 LG-50 ⑮

19 20 AMERICAN FUELS NM 18306 ⑥ 21 R.P.F. 10-15-78 L-1592 ⑩ 22 SUPER. OIL 9-17-73 K-3595 ⑧ R.P.F 8-18-80 L-4804 ⑭

R.P.F. 3-17-80 L-4333 ⑫

R.P.F 2-1-83 NM17446 ④

③ SUPERIOR OIL 3-1-75 NM0556297

SUPERIOR OIL 5-1-74 NM0552659-A ②

30 29 ALLIED CH. 9-16-79 L-3573 ⑪ 28 27

AMERICAN FUELS 4-1-78 NM 18307 ⑦

ANTELOPE RIDGE UNIT

31 32 33 34

BELL LAKE UNIT

BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 5028
Submitted by: Applicant
Hearing Date 7-25-73

LEGEND

FEDERAL	2240.00	Acres	58.3333%
STATE	1600.00	Acres	41.6667%
TOTAL	3840.00	Acres	100.0000%

UNIT OUTLINE

⑦ TRACT NO.

ANTEBELLUM UNIT

LEA COUNTY, NEW MEXICO

UNIT OPERATOR: GREAT BASINS PETROLEUM COMPANY

EXHIBIT "A"