State of New Mexico
Commissioner of Public Lands

RAY POWELL, M.S., D.V.M.
COMMISSIONER

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September 25, 1995

Santa Fe Energy Resources, Inc.
550 W. Texas
Suite 1330
Midland, Texas 79701

RECEIVED
SEP 28 1995
LAND DEPT.
MIDLAND, TX

Attention: Ms. Danita R. Walker

Re: Preliminary Approval
Proposed Kemosabe Unit
Lea County, New Mexico

Santa Fe 8
11383

Dear Ms. Walker:

This office has reviewed the unexecuted copy of the unit agreement which you have submitted for the proposed Kemosabe Unit area, Lea County, New Mexico. This agreement meets the general requirements of the Commissioner of Public Lands, who has this date granted you preliminary approval as to form and content.

Preliminary approval shall not be construed to mean final approval of this agreement in any way and will not extend any short term leases, until final approval and an effective date have been given. Also, any well commenced prior to the effective date of this agreement which penetrates its objective horizon prior to said effective date shall not be construed as the initial test well.

When submitting your agreement for final approval, please submit the following:

1. Application for final approval by the Commissioner setting forth the tracts that have been committed and the tracts that have not been committed.

2. All ratifications from the Lessees of Record and Working Interest Owners. All signatures should be acknowledged by a notary and one set must contain original signatures.

3. Order of the New Mexico Oil Conservation Division. Our approval will be conditioned upon subsequent favorable approval by the New Mexico Oil Conservation Division.

4. Please submit two copies of the unit agreement and one copy of the unit operating agreement.

5. The filing fee for a unit agreement is thirty ($30.00) dollars for every section or partial section thereof. Please submit a filing fee in the amount of $60.00 dollars.

6. Please follow the changes we have made to Exhibit "B".

If you have any questions, or if we may be of further help, please contact Pete Martinez at (505) 827-5791.

Very truly yours,

RAY POWELL, M.S., D.V.M.
COMMISSIONER OF PUBLIC LANDS

BY:
LARRY KEHOE, DIRECTOR
Oil, Gas and Minerals Division
(505) 827-5744

RP/LK/pm
Enclosure
cc: Reader File
OCD-Santa Fe -- Attention: Mr. Roy Johnson
Commissioners File

SANTA FE ENERGY RESOURCES, INC.
PROPOSED KEMOSABE UNIT
Lea County, New Mexico

Santa Fe 8

11383

Introduction:

The proposed Kemosabe State Unit is located approximately 20 miles west of Hobbs, New Mexico in the northeastern portion of the Delaware Basin. The Unit consists of 795.093 acres in Section 18, T18S-R35E and Section 13, T18S-R34E, Lea County, New Mexico. The proposed Unit well will be drilled in Section 13, T18S-R34E to a total depth of 10,500 feet or deep enough to test the entire Bone Spring . and the Upper Wolfcamp Formations.

Geology:

The Permian age Bone Spring Formation can be divided into six intervals for mapping purposes. The Bone Spring Formation is a series of alternating carbonate and siliclastic detrital and slump sediments that were deposited basinward of the adjacent Abo Reef. These deposits can be divided into six units: the First Bone Spring Carbonate, the First Bone Spring Sandstone, the Second Bone Spring Carbonate, the Second Bone Spring Sandstone, the Third Bone Spring Carbonate, and the Third Bone Spring Sandstone. Each of these units, except the First Bone Spring Carbonate, are productive in the Delaware Basin.

The primary objective of the proposed Kemosabe Unit is the 3rd Bone Spring Carbonate. Deposition of the 3rd Bone Spring Carbonate Interval in this area is as a series of carbonate detritals shed into the basin off of the main Abo Reef located approximately 1 mile north of the proposed unit. Carbonates in the 3rd Bone Spring Formation are found productive in the immediate vicinity of the proposed Unit at North Airstrip Field. This field is located 1 mile west of the proposed unit and has produced 1.2 MMBO from five wells. Production at the field is had from of 4 to 5 separate carbonate detrital flows which have been dolomitized.

The 3rd Bone Spring Carbonate interval is also found productive in several wells in the Vacuum Field approximately 1 mile northeast of the proposed Kemosabe State Unit. This field produces from several zones including the 3rd Bone Spring Carbonate which is more massive and thicker than in Airstrip North Field. A Net Carbonate Isopach with neutron porosity > 6% (Map 1) of all dolomitized carbonates in the 3rd Bone Spring interval in the proposed Kemosabe State Unit area shows the relationship between the massive 3rd Bone Spring interval at Vacuum Field and the detrital flow at Airstrip North Field. A deep seated basement fault separates the Unit area and Vacuum Field. This fault is believed to be responsible for the differences in thickness of the detrital carbonates between the two areas. The fault is shown as a strong nose on the Structure Map (Map 2) which is drawn on the top of the Upper Wolfcamp Marker.

Drilling History:

There have been four wells drilled in the proposed Kemosabe Unit area, all of which were completed as dry holes. The first key well is the Mesa *Yeso State #1* well, SENW Sec.13,

T18S-R34E. This well was drilled in March, 1983 and encountered six feet of dolomitized 3rd Bone Spring Carbonate interval. This zone was drill-stem tested and recovered 8,270' of gas, 875' of oil and 150 of gas cut drilling fluid. This zone was perforated, acidized and fracture stimulated but was to tight to produce and was plugged and abandoned. The presence of dolomitized carbonate material with a show and porosity suggests the possible accumulation of detrital sediments in the proposed unit area similar to the North Airstrip Field. A second key well is the Manzano *#1 Tonto State*, SESE Sec.13, T18S-R34E. This well encountered the 3rd Bone Spring carbonate but only had 2' of neutron porosity > 6%. A drill stem test of this interval recovered 1' of free oil and 124' of mud which confirms the E-Log evaluation that the interval was to tight to produce. A third well, the Terra Resources *Enron State #1* well in the NENE Sec. 13, T18S-R34E encountered little carbonate material in the 3rd Bone Spring Interval. This well is interpreted as being in the depositional "by-pass zone" where a lack of carbonate material would be expected. The Anadarko Petroleum. #1 *NM "AH" State* well in the NESW Sec. 18, T18S-R35E encountered a thin 3rd Bone Spring Carbonate interval with only 2" of Net Carbonate, which shows the eastern extent of deposition of the 3rd Bone Spring Carbonate in this area.

Unit Boundaries:

The proposed boundaries of the proposed Kemosabe Unit are based on geologic considerations of the primary objective, the 3rd Bone Spring Carbonate interval of the Bone Spring Formation. The Isopach Map is a Net Dolomitized Carbonate Isopach Map of the 3rd Bone Spring Carbonate Interval with a 6% neutron porosity cutoff. The 10 foot contour line was used as the cutoff for the unit boundary. This cutoff was used as all wells in the analogous Airstrip North Field that have over 10 feet of net dolomitized carbonate with >6% porosity are productive. The Mesa *Yeso State* well in the proposed unit had 6 feet of Net Interval, had an excellent show of hydrocarbons but was to tight to produce. The northern Unit boundary is based on the lack of carbonate interval in the Terra Resources *Enron State* well which is interpreted as being in the sediment "by-pass zone". The southern and eastern boundary of the Unit is based on two wells, the Manzano *Tonto State* well and the Anandarko *NM "AH" State*, well that each only had 2' of Net Dolomitized Carbonate interval.

Summary:

The proposed Kemosabe Unit is a stratigraphic exploration prospect located on depositional strike with Airstrip North Field one mile west of the Unit. This field is productive from detrital sediments of the 3rd Bone Spring Carbonate interval and serves as the geologic analogue to the Kemosabe Unit. The proposed unit is located in a depositional fairway of dolomitized detrital carbonates and should encounter porous and permeable carbonate sediments of the 3rd Bone Spring Carbonate. The initial well will be drilled deep enough to test the entire Bone Spring Formation and the upper portion of the Wolfcamp Formation, since several wells in the area have found production in the Wolfcamp.