



OXY USA INC.

EXPLORATION AND PRODUCTION GROUP

**Geological & Engineering Report
Central Corbin Queen Field
Lea County, New Mexico**

Midland, Texas

July, 1990

ENGINEERING AND GEOLOGICAL REPORT

CENTRAL CORBIN QUEEN FIELD

LEA COUNTY, NEW MEXICO

MARCH, 1990

BEFORE EXAMINER STOGNER
Oil Conservation Division
Oxy Exhibit No. <u>1</u>
Case No. <u>10062,63,64</u>

FIRST REPORT: SEPTEMBER 1987

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SUMMARY

1. The Central Corbin Queen Field was discovered in March, 1985, and currently includes twenty-four producers, one temporarily abandoned well, and four plugged and abandoned wells. The most productive areas of the field have been developed.
2. The Queen reservoir is found at an average depth of 4200 feet and consists of very fine-grained sandstone deposited in a tidal channel environment. Net pay thickness averages 21 feet and porosity averages about 10%. The trap is stratigraphic; productive limits are controlled by porosity distribution. The oil-water contact exists at about -300 ft subsea and defines the southern productive limit of the field.
3. The producing rate decline has been severe. The field's cumulative oil production to May 1, 1989 is 502 MBO, and the remaining primary reserves are estimated at 70 MBO. The ultimate primary production is thus expected to reach 572 MBO, or 5.4% of the original oil-in-place.
4. Based on the performance of analogous fields, a secondary-to-primary ratio of 0.98:1 is anticipated for the Central Corbin Queen Field. Secondary reserves are estimated at 559 MBO, or 5.3% of the original oil-in-place.

5. The investment required to implement a fieldwide waterflood totals \$888,000.
6. A Central Corbin Queen waterflood can be expected to generate undiscounted net cash of 3,727 M\$ (2,613 M\$ when discounted at 15%) for a 100% Working Interest and 87.5% Net Revenue Interest. The Discounted Cash Flow Return on Investment is 227.7% and the payback period is 1.4 years.

RECOMMENDATIONS

1. It is recommended that plans for a Central Corbin Queen waterflood be approved.
2. Unitization proceedings should be initiated. Operators with productive wells in the Central Corbin Queen Field should be contacted and informed.
3. Unitization plans should be presented to the Bureau of Land Management and the New Mexico Oil Conservation Division for approval. The field will necessarily be unitized under the rules for federal units.
4. It is recommended that a fieldwide waterflood using 80-acre, five spot patterns be implemented.

INTRODUCTION

The Central Corbin Queen Field is located in Sections 3, 4 and 9 of Township 18 south, Range 33 east, Lea County, New Mexico approximately 35 miles west of Hobbs, New Mexico (Attachment 1). The field's main producing zone is the upper member of the Guadalupian-age Queen sandstone. Primarily because of the success of other Queen waterfloods in the Delaware Basin, it has been recognized that waterflooding may be the optimal means of producing this field.

Development

The Central Corbin Queen Field was discovered in March, 1985, with the completion of the Federal "AA" No. 1 in the Queen. The wildcat was known as the Cardinal Prospect. After unsuccessful tests in the Morrow, Wolfcamp, Bone Spring and Premier, the Queen completion flowed 482 BOPD on its initial potential test.

The development began in July, 1985 as two offsets to the discovery, the Federal "AA" No. 2 and the Federal "AD" No. 1, were completed pumping 52 BOPD and flowing 589 BOPD, respectively. The drilling of eight additional wells from October through January completed the second group of wells. The Federal "AE" No.3, the field's first unsuccessful well, was part of this group. The new wells increased OXY's field producing rate to roughly 680

BOPD.

Drilling was resumed in September, 1986. Nine wells were drilled in 1986. Portions of the western and northern boundaries of the field were established from this drilling. These wells also extended the field to the south and east. OXY has drilled twenty wells in the Central Corbin Queen Field to date. The producing rate for the OXY wells was 61 BOPD in April 1989.

The Federal "AI" Nos. 3 and 4 wells were completed in August and November 1986 respectively. The Federal "AH" No. 1 well was completed in June 1987.

Offset operators drilled a total of six Queen producers subsequent to the field's discovery. Leases containing four (4) of these six (6) wells were purchased by OXY in 1988. Current offset operators include Conoco in Section 10 and Santa Fe Exploration in Section 3.

The royalties for the federal leases are determined using a "sliding scale" formula, and vary with producing rate. Lease ownership and well locations are shown on Attachment 2. The Corbin Queen Field, located in Township 17 South, lies north of the Central Corbin Queen Field. Reservoir rock properties, fluid properties, and reserves are summarized in Table 1.

Completions

Generally, the wells in the Central Corbin Queen Field typically have 8-5/8" 24# K55 casing set below 350' and 5-1/2" 14# K55 casing set at total depth. Cement is circulated behind both strings. Most wells are pumped using 3/4" steel rods and Lufkin Mark 160D pumping units. The pumping units are somewhat oversized for current needs to allow sufficient lifting capacity for the increased fluid producing rates which will accompany the waterflood.

The overall performance of the wells drilled in October and November, 1986, was better than that of the typical well of the first eleven wells, although it is unclear whether this was due to treatments or the reservoir quality. The most recent five wells have been more disappointing, but these wells were also drilled on the margins of the field.

The Queen wells usually must be fracture stimulated before there is any show of oil and gas. These stimulations range in size from 20,000 gallons to 34,000 gallons and 41,200 pounds to 105,000 pounds of sand. Table 2 summarizes well data for Central Corbin Queen wells.

Production Characteristics

High production rates on the initial potential tests are common at the Central Corbin Queen Field. The highest test was

recorded on the Federal "AE" No. 2, which flowed 611 BOPD at 100 PSI tubing pressure on a 3/4" choke. The initial potential tests on OXY wells have averaged 160 BOPD. The 80 BOPD field allowable prevented some wells from being produced daily early during their first months of production.

After eighteen months of production, some specific problems associated with production from the Central Corbin Queen Field have been recognized. The characteristics include a rapid decline in producing rate, the accumulation of paraffin in the tubulars, and the precipitation of salt both downhole and in surface vessels.

(*) Several factors may contribute to the steep initial decline common to all Central Corbin Queen wells. First, the reservoir drive mechanism appears to be solution gas drive. In a field where GOR's are as low as they are in the Central Corbin, this energy is quickly depleted. This produces a severe pressure decline in the vicinity of the wells, reducing the pressure drop which drives the flow of hydrocarbons. The producing rates of wells in areas of low permeability will be particularly affected by this energy depletion.

A second factor which may steepen the production decline is the possible downhole precipitation of scale. Both paraffin and salt precipitation may also be accelerating the field's producing rate decline if this precipitation is occurring downhole where it is difficult to remove. The blocking of the perforations by these materials would act as skin damage in a well, reducing the

flow rate into a wellbore for any particular pressure drop. Since early in 1986, Xylene treatments have been used on producing wells to remove paraffin. Surface lines and vessels can be cleaned out by the circulation of hot oil and fresh water.

RESERVOIR DESCRIPTION

The Central Corbin (Queen) Field is located on the north basin platform structural province, near the northern edge of the Delaware Basin. The Queen Formation is part of the Guadalupian age Artesia Group, which includes the Goat Seep and Capitan carbonate reef systems (Attachment 3). Central Corbin, along with several other Queen fields in the area (Corbin, E-K, and North E-K) produces from the upper part of the Queen, locally referred to as the Shattuck member, or Queen sandstone (Attachment 4). The Central Corbin Field is primarily a stratigraphic trap, with a structural influence at its southern edge.

Queen core is available on three wells in Central Corbin: the Federal "AA" No. 2 (4236-4291), Federal "AD" No. 1 (4198-4245) and the Federal "AE" No. 1 (4194-4242). Open hole logs are available on most of the wells. The gamma ray-neutron/density log has proven to be the most useful correlation tool. Regional subsurface mapping has provided valuable analogies from more mature Queen fields.

In Central Corbin, the Queen sandstone is 48-60 feet thick, with gradational contacts with the underlying and overlying anhydrite. The reservoir consists of very fine grained (62.5-125 microns) well sorted, sub-angular quartzarenite. Corrensite clay (a mixed layer chlorite-smectite clay) lines the pore throats. X-ray analysis indicates clay volumes (1,2,3,4) ranging from 4.2-

8.6% ($\pm 2\%$). Authigenic potassium feldspar, dolomite and gilsonite occur in small quantities. The better reservoir rocks exhibit low-angle planar cross-bedding, and the grain size is on the coarse end of the range (88-125 microns). Oil-bearing rocks are buff-gray, whereas non-oil-bearing rocks are red. Visible oil within red sandstones are surrounded by buff-gray rings, indicating that the color change is due to reduction of iron oxides in the rock by the presence of hydrocarbons.

Porosity is interparticle, ranging up to 14%, and averaging 10.4%. Pay thickness (porosity $\geq 8\%$) ranges up to 34 feet, and averages 21 feet. Anhydrite is the dominant cement type in the reservoir. The degree of anhydrite plugging is a function of grain size. Sandstone on the coarse end of the range is less affected by anhydrite cementation. Permeability ranges up to 207 md, and averages 3.8 md. Porosity-permeability plots derived from core data cluster along a fairly linear trend (Figure 1). Oriented core, recovered from the Federal "AD" No. 1 indicates no preferred permeability direction. Oil staining and reduction spots on core surfaces show preferred fluid flow parallel to the low-angle cross-bedding, which probably dips to the south. Anhydrite cement distribution in the cross-bedded sandstones suggest tortuous permeability paths. Natural fractures probably influence permeability paths, however, the core does not reveal an extensive fracture system. Random distribution of anhydrite cement appears to have the greatest impact on permeability paths, therefore, near-wellbore permeability paths should be radial.

Non-reservoir rock within the Queen sandstone consists of coarse-grained (31.2-62.5 microns), sub-angular, well-sorted quartz siltstone. It is mostly red, with some red-buff wavy laminae, and wisps, or nodules of anhydrite. Porosity is completely plugged with anhydrite.

Structural strike at Central Corbin is east-west, dipping southerly 100-150 feet/mile (Attachment 5). An east-west trending monoclinial fold occurs north of Central Corbin, in the Corbin (Queen) Field. The monoclinial fold appears to have influenced pay development in Corbin. An oil-water contact occurs at -300 feet.

Calculated water saturations in the field are quite erratic, ranging from 33-82%, with no difference in water cut. The presence of corrensite clay appears to have affected resistivity measurements. In addition, porosity calculations from CNL-FDC logs sometimes bear little relationship to well performance, which in turn would distort water saturation calculations. Due to the unreliable water saturation calculations from well logs, hydrocarbon pore volume maps ($S_{o\phi h}$) were not constructed. A water saturation of 41% was used based on relative-permeability data and fractional flow equation.

The most significant porosity zone in the Queen occurs in the lower half of the section. Three other thin zones are correlatable throughout the field.

Core measured porosities do not consistently correlate with porosities calculated from CNL-FDC logs. Therefore the litho-

density and CNL logs were used from the Federal AE #1 and AE #5 wells to determine the two predominate minerals were anhydrite and sandstone. On this basis the matrix density was calculated on a point by point basis to arrive at the net sand and porosity-thickness values for each well with an open hole density and neutron log and porosity was then calculated from this new matrix density. These data were then used with the water-oil contact to construct the net sand, net pay and net porosity-thickness isopach maps of the Queen interval (Attachments 6, 7 and 8).

The net pay isopach of the Queen sandstone, using an 8% porosity cut-off helps define the limits of the reservoir (Attachment 7). The reservoir is bounded on the north, east and west by a pinchout of the porosity, and to the south by the oil-water contact.

The Queen sandstone is a widespread deposit of probable eolian origin. A trend of Queen sandstone production occurs along the northern edge of the underlying Goat Seep Reef lagoon (Attachment 9). The digitate lagoon-sabkha boundary is defined by lithologic logs; dolomite underlies the Queen sandstone in the lagoon, and anhydrite underlies the Queen in the sabkha. Along this boundary, the eolian transported sands were re-worked by marginal marine processes, creating the reservoir. Central Corbin Field is located within a narrow embayment in the lagoon, where tidal currents re-worked the sands. Depositional strike is north-south, perpendicular to the shoreline. The Corbin Field, to the north, is located along the shoreline, where shoreline currents re-

worked the sands. Depositional strike is therefore east-west, parallel to the shoreline.

Dry holes separate the north-south trending Central Corbin (Queen) Field from the east-west trending Corbin (Queen) Field (Attachments 10 and 11). The proposed unit area includes all the active wells in the Central Corbin (Queen) Field, as well as the Oxy Federal "AI" No. 1, an old completion in the Corbin (Queen) Field (NE/4 NE/4, section 4). Current mapping indicates that this well is in communication with Central Corbin, and separate from Corbin.

Fluid Characteristics

The fluids produced at the Central Corbin Queen Field have some unique characteristics. The effect of these characteristics on waterflood performance is unknown but probably not detrimental. Queen waterfloods located near the Central Corbin Queen Field have been successful, although it is not certain whether similar fluids were originally present. Discussions of the PVT analysis, gas composition, and water properties follow.

Samples of oil and gas were collected from the Federal "AA" No. 1 on July 17, 1986 for the purpose of performing a recombination pressure-volume-temperature (PVT) analysis. The samples were collected at the heater treater. An original reservoir pressure of 1850 PSI, an initial GOR of 115 SCF/BBL, and a reservoir temperature of 96° F were used to perform the analysis at

approximate reservoir conditions. The bubble point pressure of the recombined fluid was found to be 895 PSIG (5). The entire PVT analysis is included as Tables 3-6 and Figures 2-8. The compositional analysis of the recombined fluids revealed the first unusual characteristic of the fluids produced from the Central Corbin Queen Field.

The compositional analysis revealed an unusually high percentage of nitrogen in the gas samples, showing that nitrogen made up almost 25 mol% of the total gas volume. The periodic gas analyses performed by Conoco Pipeline on the gas they gather from the Oxy's leases confirmed this high concentration of nitrogen in the gas. Additionally, the Conoco gas analyses show that the concentration of nitrogen appears to fluctuate with time over a wide range of values, specifically from a low of 15.7 mol% to a high of 25.4 mol%. The most recent tests indicate a nitrogen concentration of 22.0 mol%. No satisfactory explanation has been offered for this fluctuation in nitrogen concentration. Nitrogen has been encountered in this area in the past. The geologic origin of these nitrogen pockets is uncertain, but it is possible that at some time in the past, nitrogen migrated through the Queen reservoir and isolated pockets of gas were trapped. The cumulative effect of this gas on those fluid characteristics which have a bearing on waterflood performance should be reflected in the PVT data.

The second unusual characteristic of the Central Corbin Queen reservoir fluids is the behavior of the produced water. The pH

tends to drop significantly with time. pH's as low as 4.1 were measured after produced water sat undisturbed and exposed to air for 24 hours. Because of the high concentration of iron ions in the water, it will be necessary to prevent the exposure of produced water to air if iron precipitation is to be avoided prior to injection. This should also help to maintain the pH of the water at its starting value of 6.0. Another unusual characteristic of the produced water at the Central Corbin Queen Field is its high salt concentration. The chlorides content of the brine averages 182,000 ppm. A typical water analysis performed on a sample soon after its collection is included as Table 7. It should be noted that the produced brine may be precipitating calcium carbonate and possibly gypsum.

Reservoir Pressure

The initial reservoir pressure of the Central Corbin Queen Field has been approximated at 1850 PSI, based on fluid levels and shut-in tubing pressures measured during completion and on flowing tubing pressures. No accurate direct pressure measurements have been made. Although a pressure of 1296 PSI was measured in the Federal "AA" No. 1 following a 144-hour shut-in period, a higher bottom hole pressure would be necessary to induce flow with the measured flowing tubing pressure. Table 8 tabulates various pressure data for several wells. An attempt was made in 1986 to determine reservoir pressure using fluid levels in producing

wells. Unfortunately, this method provided contradictory estimates, and the investigation was abandoned. Direct measurements of current reservoir pressure have not been attempted, and historical data does not exist. A regular testing schedule will be needed once the waterflood is initiated to monitor its progress and maximize its efficiency.

RESERVE ANALYSIS

Original Oil-In-Place

The original-oil-in-place (OOIP) for the Central Corbin Queen Field was determined using both the volumetric and material balance methods. The volumetric OOIP estimate for the Central Corbin Queen Field is based on the porosity-thickness isopach map given as Attachment 8. A discussion of this isopach map is presented in the "Reservoir Description" section.

Log interpretation is not always indicative of the productive potential of a given well. There is good production performance from wells with poor log appearance and poor production performance from wells with good log appearance. That is, primary production is more dependent on drainage area pressure and the effect of offset production than the variation in reservoir rock character.

The pore volume of the Queen reservoir was calculated using the following method. The areas within the contour lines on the isopach maps were determined by use of a planimeter. The volume of the reservoir rock was then calculated by applying the pyramidal technique to the areas digitized. A pore volume of 18,877,541 barrels was calculated.

Most completions in the field were initially water-free, and yet conventional analysis of the dual laterologs indicated water saturation as high as 92%. Samples of core were analyzed and the clay corrensite was identified. Based on available evidence it is

believed that the presence of corrensite is largely responsible for the high (log) water saturations. Therefore, relative-permeability data and the fractional flow equation were used to determine initial water saturation. A water saturation of 41% was determined at fractional flow of water equal to zero (Figure 9). The sample taken from the Federal "AE" No. 1 at 4216.4' provides relative permeability data (Table 9).

At the original reservoir pressure of 1850 PSI, all gas is in solution and B_o , the formation volume factor is 1.048 RB/STB. Using calculated pore volume, water saturation and formation volume factor, OOIP of 10,627,624 STB was calculated. This calculation is included as Table 10.

Primary Recovery

Hyperbolic decline analysis was used to determine the primary reserves for the Central Corbin Queen Field. The ultimate primary recovery was estimated at 572 MSTB, or 5.4% of OOIP and cumulative production thru April 30, 1989 totals 502 MSTB.

Hyperbolic decline analysis was applied to each well at Central Corbin Queen until it reached an abandonment rate (Q_a) of 10 BOPM. The production history and extrapolated production are given for each active producing well in Appendix A. It should be noted that twenty six (26) decline curves are given. Production from the Federal "AG" No. 1 well is included but this well is not included in the current active producing well count. Also production from the Federal "AE" No. 3 well is shown but the well

is temporarily abandoned and is not included in the active producing well count (24 wells). The production data used in these figures were obtained from a commercial data source (Dwight's) which receives data from the New Mexico Oil Conservation Commission. These figures (Dwight's) were compared with data submitted to the Bureau of Land Management and are in agreement.

Well-by-well cumulative production, remaining primary reserves and ultimate primary recovery are presented in Table 11.

Secondary Recovery

The ultimate secondary recovery at Central Corbin Queen is expected to reach 559 MSTB (5.3% OOIP). The estimate of ultimate secondary recovery from the Central Corbin Queen Field is based on the results of the E-K Queen Unit, which was waterflooded from 1966 until 1978. The E-K Queen Unit was flooded using eighty-acre 5-spot patterns. The E-K Queen Unit would have produced 1925 MSTB of ultimate primary recovery and 1877 MSTB were produced under secondary recovery for a secondary-to-primary ratio of 0.98:1.

The comparable depositional setting, confirmed by the log characteristics, proximity, and overall field size, also supports the analogy. These factors as well as a comparison of the producing intervals of the field are presented in Attachment 12. The 559 MSTB (5.3% OOIP) secondary recovery prediction is simply the product of 0.98 and the expected ultimate primary recovery of 572 MSTB (5.4% OOIP) for the Central Corbin Queen.

A secondary recovery schedule was obtained from a peak daily production of 925 BOPD in 1991, daily production will average 540 BOPD for over two years, then decline at 45% per year thereafter. This estimate is based on the unit being developed on 80-acre five spot patterns. Primary and secondary figures for the Central Corbin Queen Field are given in Table 12. These data are plotted on Figure 10.

Laboratory flow tests in cores from the Federal "AA" No. 2 and Federal "AE" No. 1 wells indicate an average residual oil saturation after waterflooding of about 25 percent pore volume (6). The relatively high volumetric sweep efficiency was justified by a detailed examination of the core data. Correlative intervals in the cores were identified using the gamma traces. The permeabilities in Zone 2 range from 82 md to 1.0 md. The Dykstra-Parsons permeability variation is 0.82 (Figure 11). Still, neither the high nor low permeability stringers were found to extend from well to well; any stringers with exceptional reservoir properties appear to be areally limited. Thus, no highly permeable flow channels will directly connect producer and injector. Likewise, no barriers which might restrict vertical flow across a large area are anticipated. Although the variation in the measured permeabilities is high, this variation should not significantly reduce the overall sweep efficiency.

Pattern-size Selection

A review of several Queen waterfloods in Lea and Eddy Counties

has shown that an 80-acre 5-spot pattern is generally believed to adequately drain Queen reservoirs. A map illustrating the locations of these waterfloods is included as Attachment 13. Twenty-acre infill producers have been drilled as pilots in seven of these Units, and 40-acre 5-spot patterns have been developed in one Unit. Although some wells drilled in six of the eight Units could be considered economically viable, the infill projects in only two of the eight Units appear to be overall successes.

Both the Seven Rivers Queen Unit and the Langlie Jal Unit produce from several zones in addition to the Shattuck Member of the Queen. Still, these Units are examples of successful infill programs in Queen waterfloods, and should, therefore, be reviewed.

First, Arco has drilled nine 20-acre producers in the Seven Rivers Queen Unit located in T-22-S, R-36-E in the South Eunice Seven Rivers Queen Field. Five of these wells appear to be recovering incremental oil, although it is not clear that their ultimate cumulative production will approach that of older offset producers. Arco is continuing this development. Second, Union Texas has had success in converting from 80-acre to 40-acre 5-spot pattern in the Langlie Jal Unit located in T-24-S and 25-S, R-37-E, in the Langlie Mattix Seven Rivers Queen Grayburg Field. Ten out of the fifteen 20-acre producers drilled appear to be economically viable and contributing incremental oil. The infill program appears to have been the product of an effort to extend the life of this Unit, as many of the old 40-acre producers had reached their economic limits.

The one 20-acre producer drilled at Yates Petroleum's Young

Queen Unit located in T-18-S, R-32-E in the Young Queen Field recovered only 3 MBO before temporarily abandoned in 1985. This field is located only 7 miles west of the Central Corbin and is in the same geologic trend. Apparently, the 80-acre 5-spot patterns have effectively recovered secondary reserves in this Unit. Accordingly it is recommended that 80-acre 5-spot patterns be utilized for waterflooding the Central Corbin Queen Field.

PLAN OF OPERATION

Fieldwide Waterflood

As indicated in the previous section it is planned to waterflood the Central Corbin Queen Field using 80-acre 5-spot patterns. Water will be from three sources: (1) Central Corbin Queen produced brine, (2) produced brine from two nearby leases and (3) fresh water from an Ogalalla supply well. Other nearby Queen waterfloods have successfully used fresh water for make-up water. Laboratory flow tests using Central Corbin Queen Field core plugs were performed using a synthetic brine mixed with increasing proportions of fresh water(7). In one case a permeability reduction was observed and in the other flow test an increase in (brine) permeability was observed. Fresh water has been injected in the E-K Queen Unit and the East E-K Queen Unit without any adverse affects. The compatibility of Corbin Queen produced brine with the nearby lease produced brine has not been determined as of this writing. However, compatibility of Central Corbin Queen produced brine with fresh water was investigated (8). An initial rate of roughly 200 BWPD per well at 1500 PSI is expected for the Central Corbin Queen.

The Bureau of Land Management must grant approval for water injection in the Central Corbin Queen before the waterflood can be initiated. Since water injection will likely push oil from one lease to another, it is recommended that the field be unitized

prior to the start of water injection. A discussion of unitization is included in a later portion of this section. Permission to use fresh water as part of the make-up water will also be required.

Water Requirements and Sources

The maximum daily water requirement for the proposed flood is estimated to be 2400 BWPD for the first year (Table 13). All the produced water in the Central Corbin Queen Field will be reinjected. However, make-up water will be required throughout the life of the field to maintain pressure. Reinjecting produced water is shown in Table 13. Wells on the State DW and Federal AB leases located approximately 3 miles East of the Central Corbin Queen will provide approximately 1000 BWPD during the first three years of the project. The (total) cost to purchase pipe, lay a pipeline, and purchase pumping equipment in order to deliver produced water from the State DW and Federal AB leases is estimated at \$65,000. To achieve the maximum daily water injection rate, the required make-up water for the Central Corbin is shown in Table 13. This supply will be obtained by purchasing fresh water from one of the Ogallala supply wells in the area. The cost of fresh water is \$0.21/BBL.

Well Conversions

Attachment 14 shows those wells selected for conversion to water injection for the Central Corbin Queen Field. The conversion wells were selected by choosing the pattern which would position

most low rate or abandoned edge wells as injectors. The 80-acre pattern size requires the conversion of eleven (11) producers and one temporarily abandoned well to injection, leaving thirteen (13) active producers in the Unit. Limited transfers of pumping units among the producers may also be needed to insure that sufficient lift capability is available as the produced water volume increases. There are already thirteen (13) M160D pumping units on OXY leases and new units will not be needed.

The cost estimate for converting an existing producer and activating a TA'd well is \$30,000/well (Table 14). The total cost for converting twelve (12) wells is \$360,000 (Table 14).

Facilities

The facilities investment required for implementation of a fieldwide waterflood total \$528,400 and is itemized in Table 15. Attachments 15 and 16 show the gathering and injection systems respectively. The facilities plan consists of consolidating the several existing batteries to two (2) production and test facilities with a single sales facility, and one (1) injection facility. In order to conserve capital, it is intended to make use of as much of the materials on hand as possible. The production facilities will take advantage of existing production headers and well test equipment. Converting wells to injection will allow sufficient flowline materials to be reclaimed to provide flowlines for the additional wells which will need to be tied to the two production batteries. The elimination of existing

batteries will provide tankage for the new waterflood plant. Transfer pumps will be standardized as much as possible for ease of maintenance and repair. Oxygen scavenging, gas blankets and filtering will be provided for the injection water to minimize corrosion and injection well plugging. Whenever practical, components will be shop rather than field fabricated to save on field labor charges.

Economic Analysis

The economic analysis of the proposed waterflood project involves three economic cases. Case 1 is the project under continued operations while case 2 is the expected value of the project if the waterflood is implemented during January 1990. Case 3 is the difference between case 1 and 2, and shows the incremental economics associated with the proposed waterflood. Table 16 is a summary of the three economic analyses.

A capital investment of 888 M\$ will generate discounted net cash production of 2,613 M\$ (discounted at 15%) and add lease gross incremental oil reserves of 524 MSTB. The project will generate a rate-of-return on investment of 227.7% with payout occurring in 1.4 years. A Working Interest of 100% and Net Revenue Interest of 87.5% were assumed for these economic analyses. The current oil and gas prices of \$18.00/Bbl and \$1.50/MCF were used, respectively. Operating expenses were based on \$1,500/month/well plus the cost of make-up water at \$0.21/Bbl. Constant-dollar economics were applied for all cases.

Unitization

Unit Area

The Proposed Unit is comprised of twelve (10) tracts (Tracts 1A,1B,2A,2B,3,4A,4B,5,6 and 7) with different working interest, royalties, and overriding royalties. The legal description, size, royalty owner, overriding royalty owner, and working interest ownership for each tract are given on Attachment 17. The proposed secondary recovery unit area (boundary) of Central Corbin Queen Field is shown on Attachment 18.

Equity Parameters

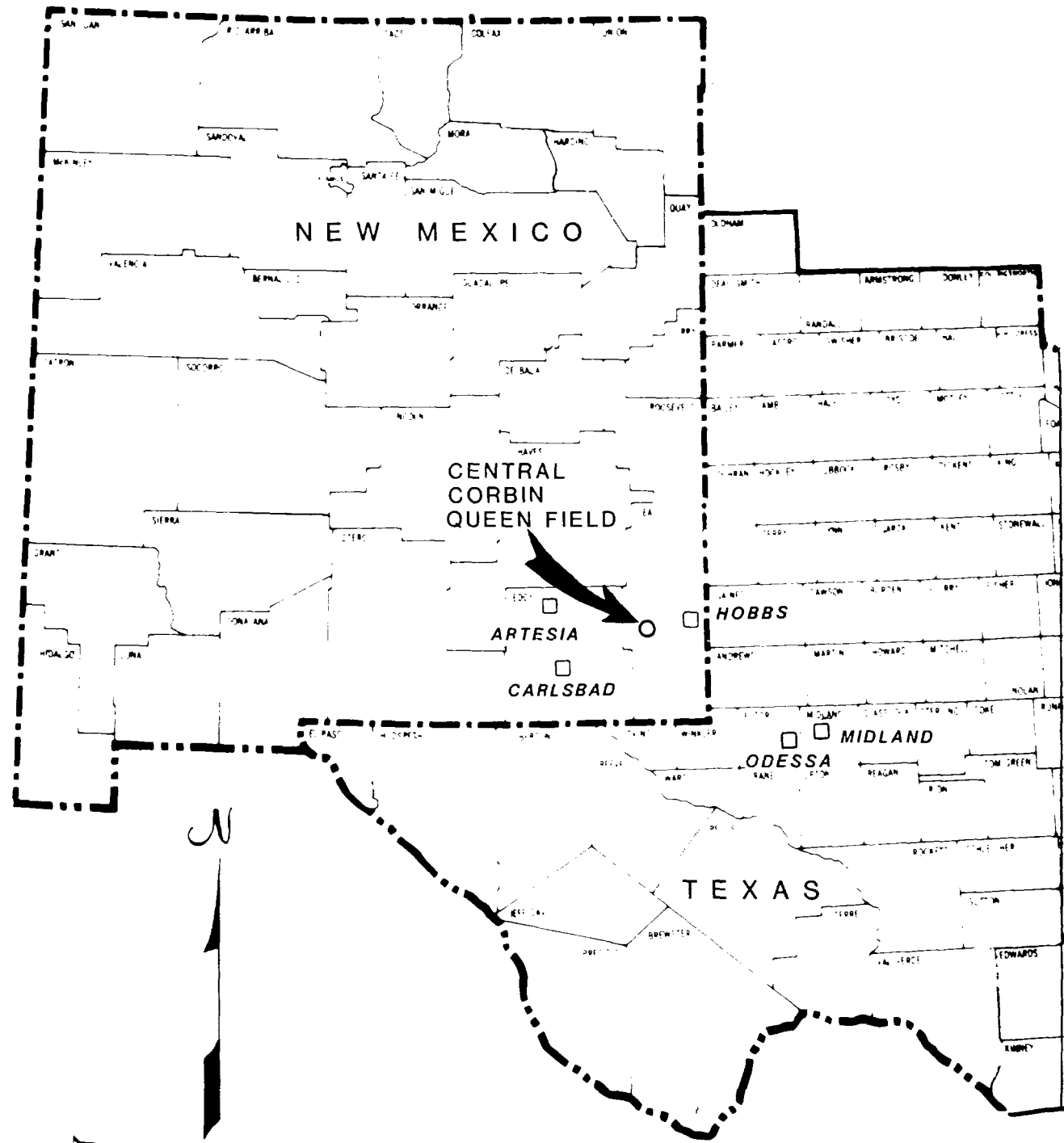
The following list of parameters was considered in determining equity for the proposed secondary recovery unit:

- 1) Surface acreage
- 2) Net well count
- 3) Cumulative production to 4/30/89
- 4) Remaining primary reserves
- 5) Ultimate primary production
- 6) Average production rates (As of 4/89)
- 7) Net pay isopach
- 8) Net pay porosity-thickness isopach

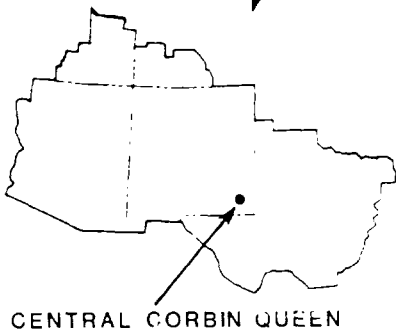
A summary of the values of each parameter on a tract-by-tract basis appears in Table 17. Table 18 gives the working interest participations for each operator in the field based on the parameter values in Table 17.

REFERENCES

1. Interoffice letter dated August 26, 1986, from Wade Waddell to Rebecca Egg entitled, "Corrensite Clay".
2. Interoffice letter dated August 26, 1986, from Eric Eslinger to Rebecca Egg entitled "Completion Procedures in Corbin Queen Wells".
3. Study by Wade Waddell, Geology and Reservoir Description of the Queen Sand, Central Corbin Queen Field, Lea County, New Mexico, (RMG86-10). October, 1986.
4. Interoffice letter dated September 11, 1986, from Wade Waddell to Jim McCarthy entitled, "Percent Clay in Queen Sand".
5. Interoffice letter dated November 6, 1986, from James Berryman to Jim McCarthy entitled, "Reservoir Fluid Analysis-Federal "AA-1", Corbin Queen Field, Lea County, New Mexico".
6. Interoffice letter dated June 5, 1987, from Joe Mundis to Rebecca Egg entitled, "Residual Oil Saturation Determination, Corbin Queen Field, Lea County, New Mexico".
7. Memo dated October 23, 1986, from Joe Mundis to Rebecca Egg entitled, "Water Sensitivity Test Nos. 1 and 2".
8. Interoffice letter dated September 9, 1986, from Loyd Nixon to Rebecca Egg entitled, Federal "AA", "AD", "AE" Brines Mixed with Fresh Water for Waterflood".



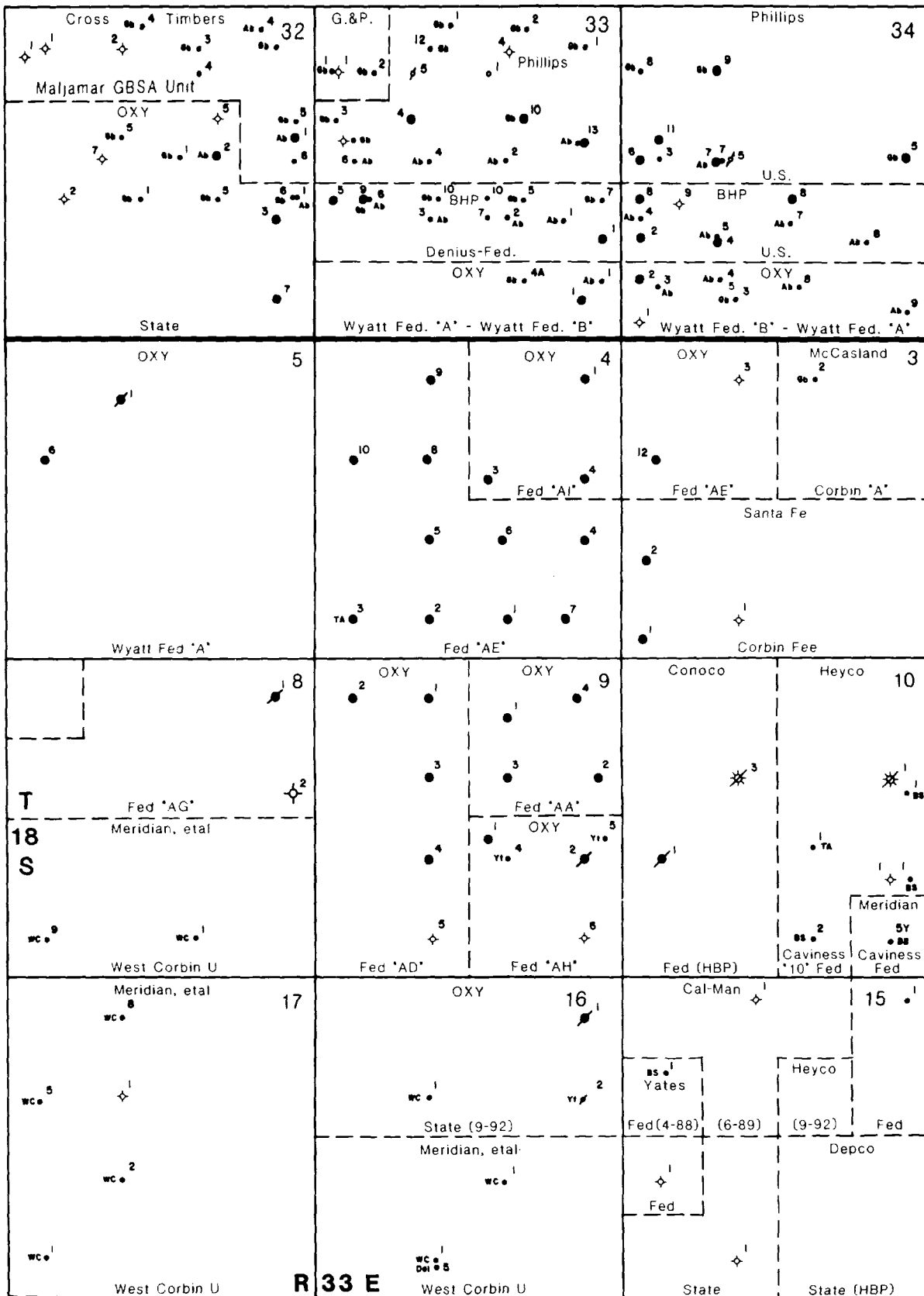
CENTRAL CORBIN (QUEEN) FIELD
LEA COUNTY, NEW MEXICO
LOCATOR MAP



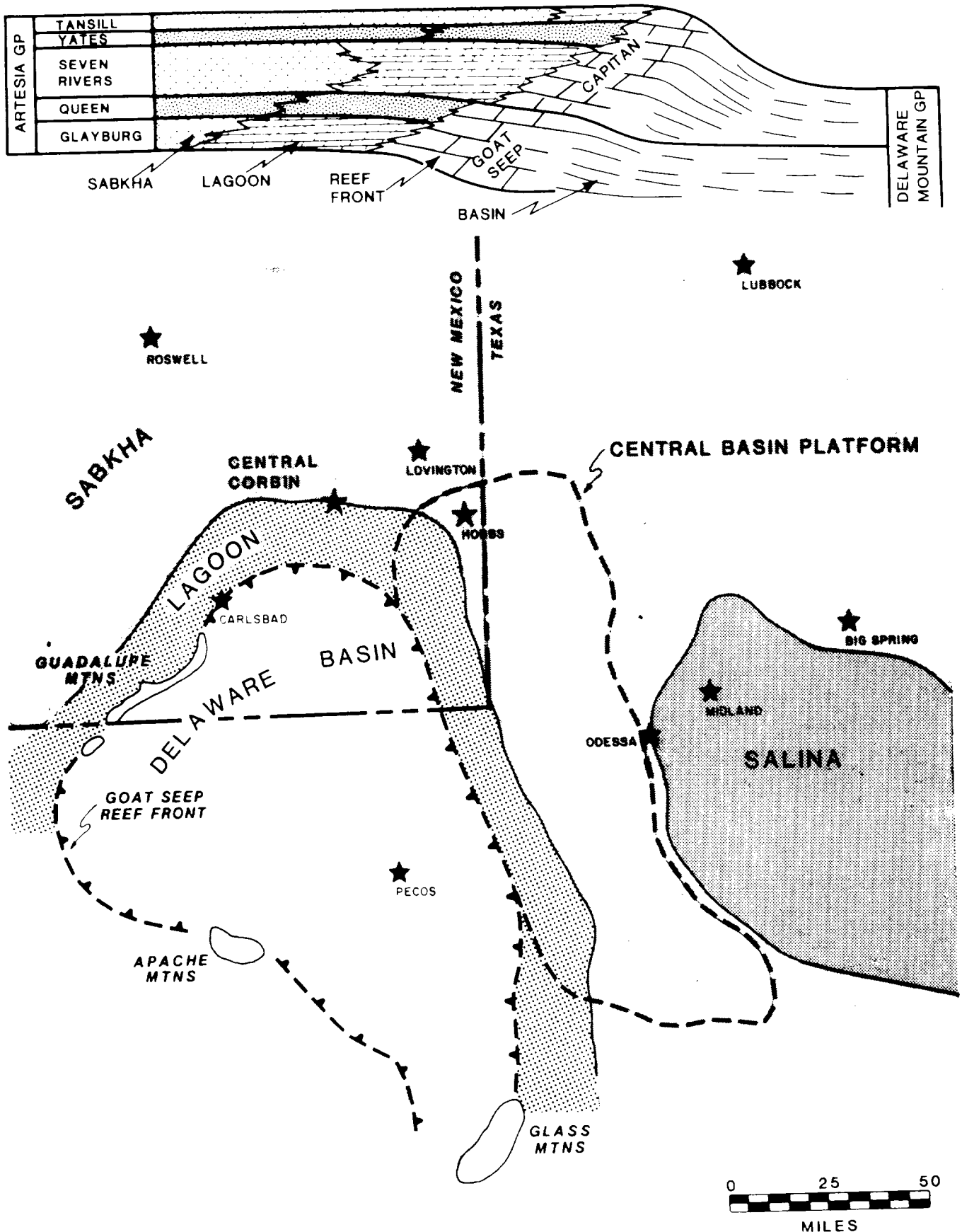
0 40
MILES

MARCH, 1990

ATTACHMENT 2



CORBIN (QUEEN) AND
CENTRAL CORBIN (QUEEN) FIELDS
LEA COUNTY, NEW MEXICO
LEASE OWNERSHIP AND
WELL LOCATIONS



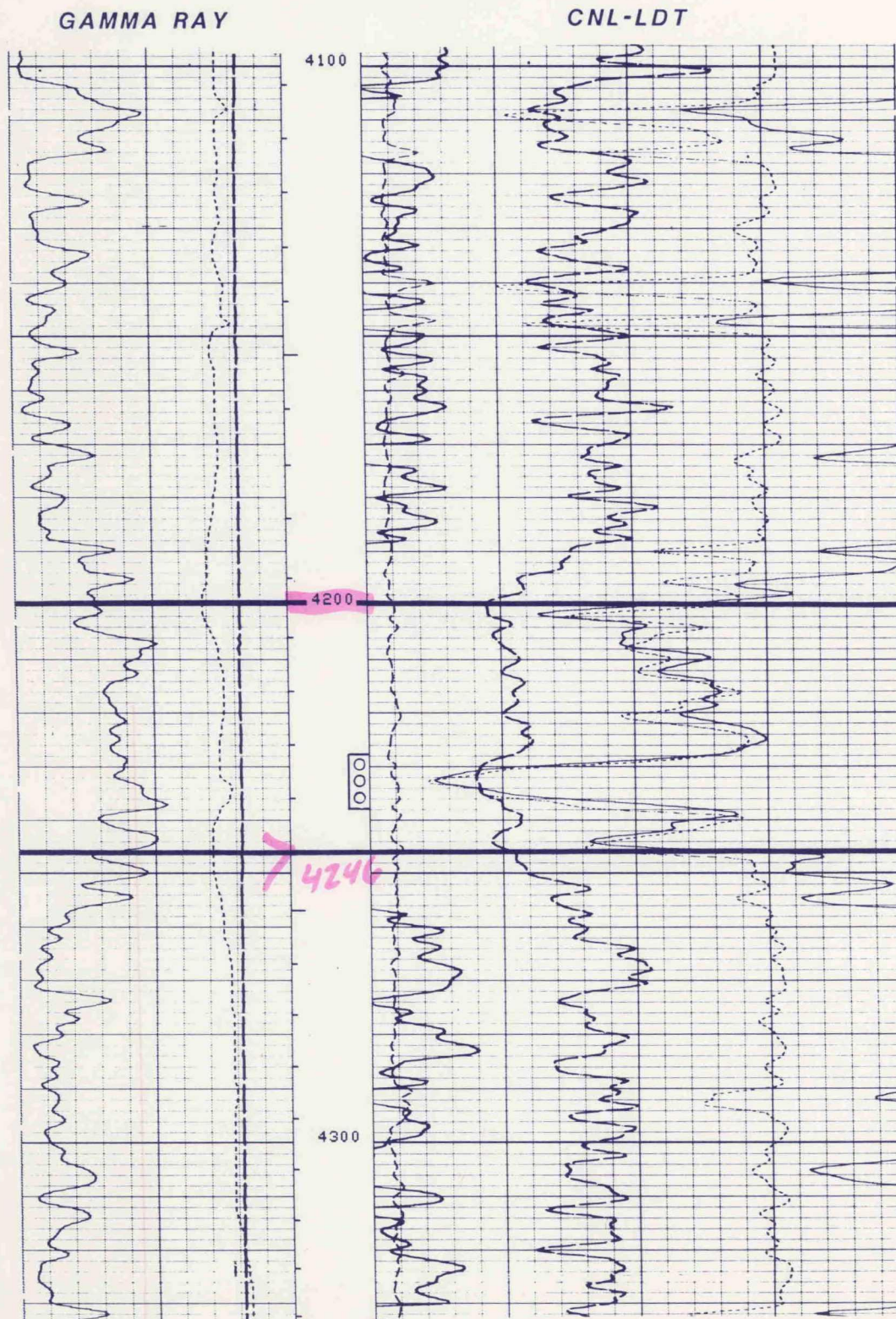
GEOL: R.L. DOTY

MARCH, 1990

Type Log

OXY USA INC.
FEDERAL "AA" #1

990' FNL & 1980' FEL
Sec. 9, T-18-S, R-33-E
Lea County, New Mexico
KB 3985'



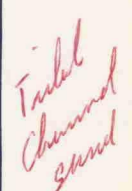
TYPE LOG
CENTRAL CORBIN
(QUEEN) FIELD

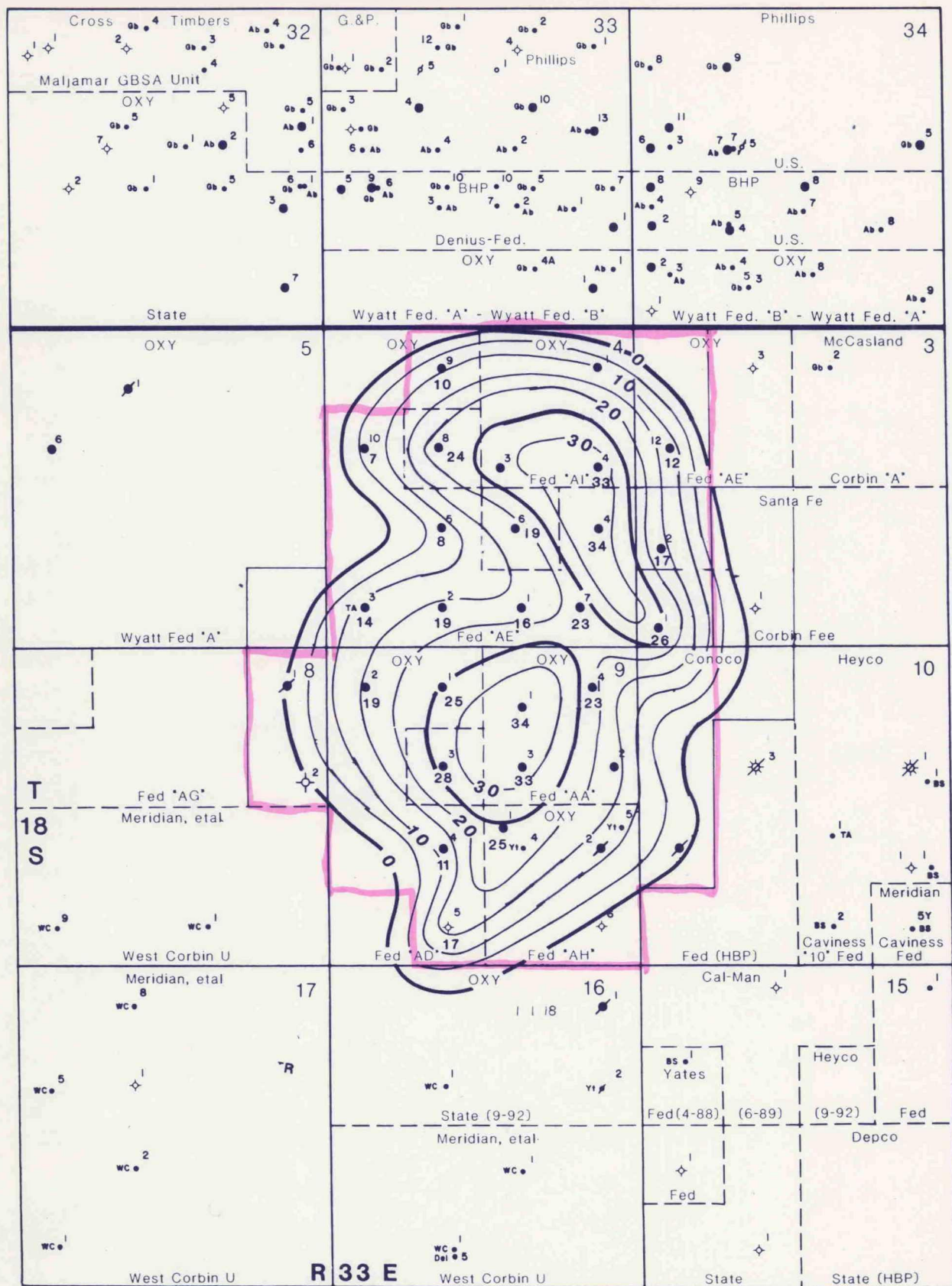
4200
.2
84 0.0

QUEEN
SANDSTONE

PF 4228-38' IPF 482 BOPD

34





● QUEEN PRODUCER

• OTHER ZONES

Yates
Grayburg
Delaware
Aba
Bone Spring
Wolfcamp

X WELL NUMBER

X NET SAND, FT

CENTRAL CORBIN (QUEEN) FIELD LEA COUNTY, NEW MEXICO

NET SAND ISOPACH ($\phi \geq 8\%$)

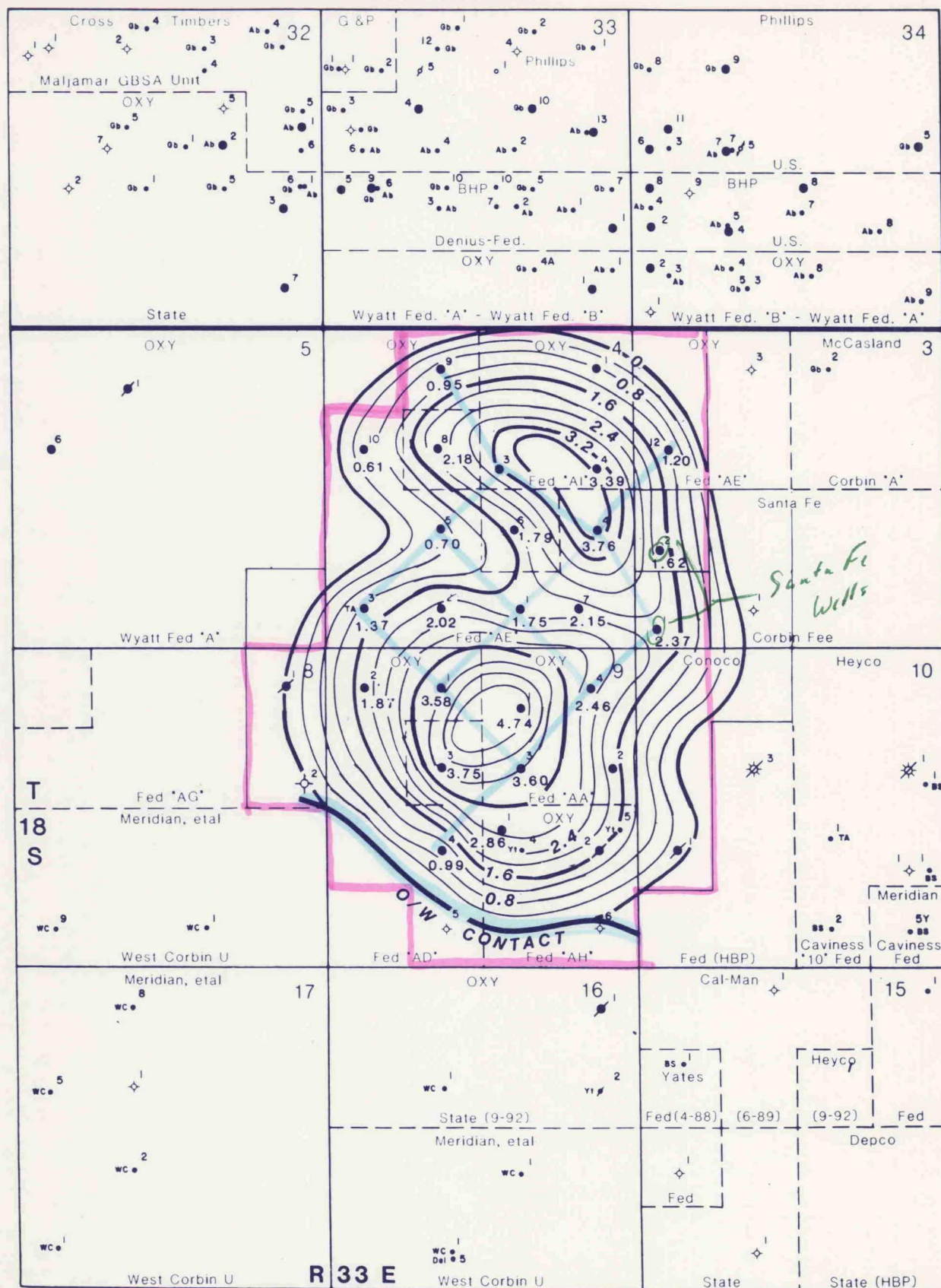
ENG.: V. PHAM

0 1/2
MILE

MARCH, 1990

37

ATTACHMENT 8



Pore Volume Map.

CENTRAL CORBIN (QUEEN) FIELD
LEA COUNTY, NEW MEXICO

QUEEN SANDSTONE POROSITY-THICKNESS ISOPACH ($\phi \geq 8\%$)

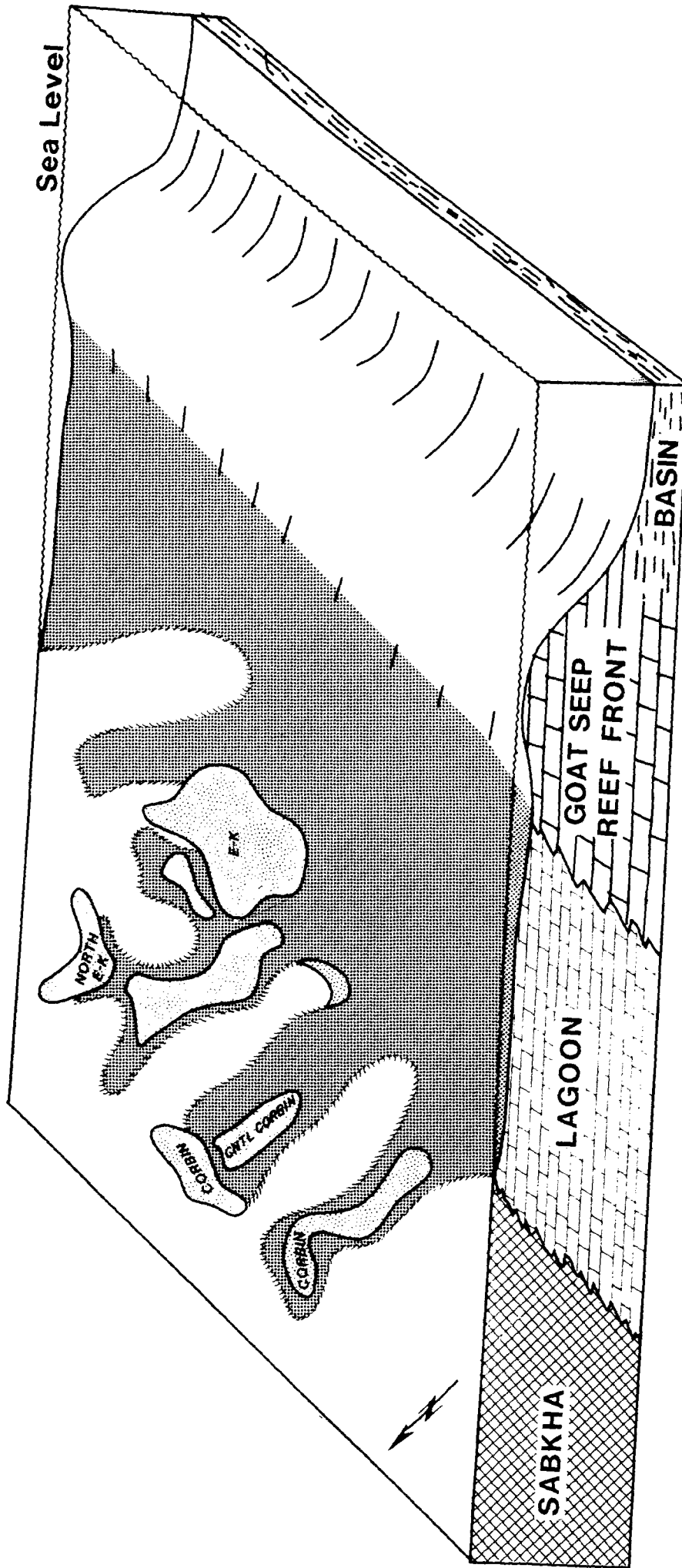
C.I. = 0.40 h'

ENG. V. PHAM

0 1/2
MILE

MARCH, 1990

38



CENTRAL CORBIN (QUEEN) AREA
BLOCK DIAGRAM OF QUEEN DEPOSITION

GEOLOGICAL R.L. DOTY

JUNE, 1989

ATTACHMENT 10

A

3300'



3400'

A'

Phillips Wyatt A Fed. #4
1650 FNL & 1650 FWL
Sec. 33, T-17-S, R-33-E

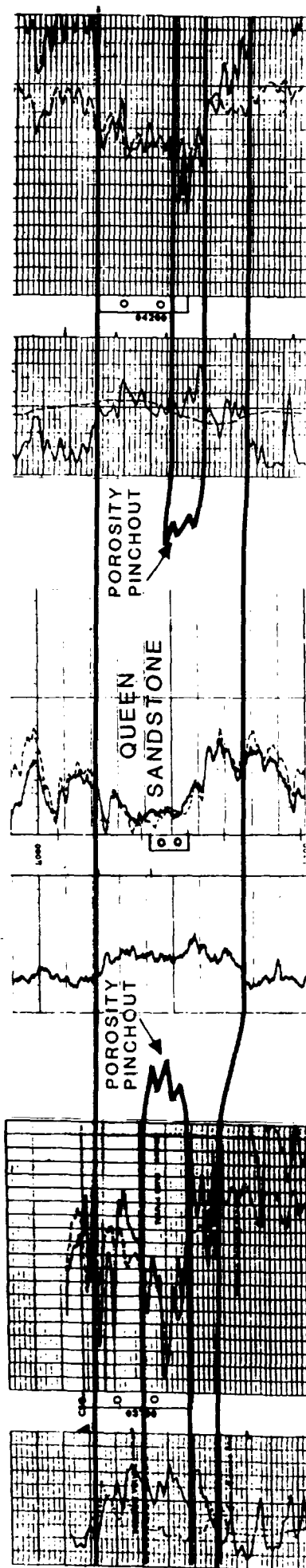
Oxy Wyatt Fed. A#4
990 FSL & 1650 FEL
Sec. 33, T-17-S, R-33-E

Oxy Fed. AI #4
2310 FNL & 660 FEL
Sec. 4, T-18-S, R-33-E

GL 4084
CNL-FDC

DF 4065
Cased Hole Neutron

KB 4036
CNL-FDC

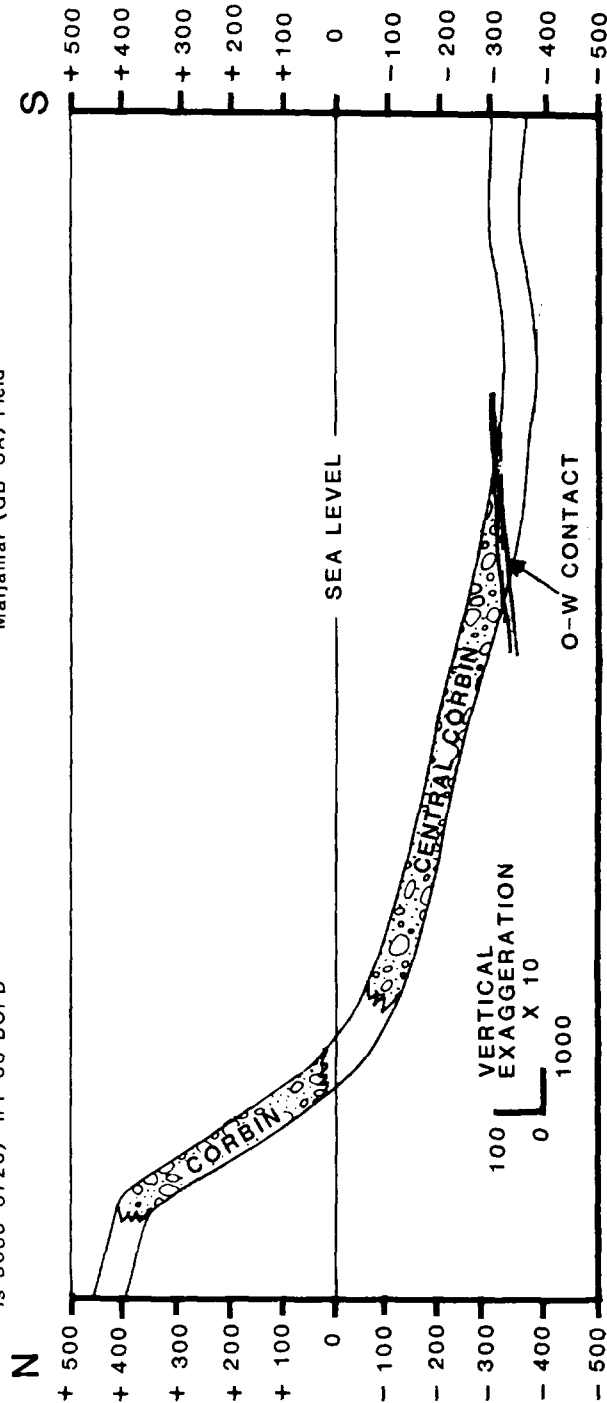


Completed in Corbin (Queen) Field
OH 3675-3715 (Corrected to New Log
is 3680-3720) IPF 35 BOPD

Queen Reservoir Tested Dry PF 4042-56:
Acid, Frac, Swab Dry, Sqzd Completed in
Maljamar (GB-SA) Field

Completed in Central Corbin (Queen) Field
PF 4180-4442: IPP 80 BOPD

N



CENTRAL CORBIN (QUEEN) FIELD

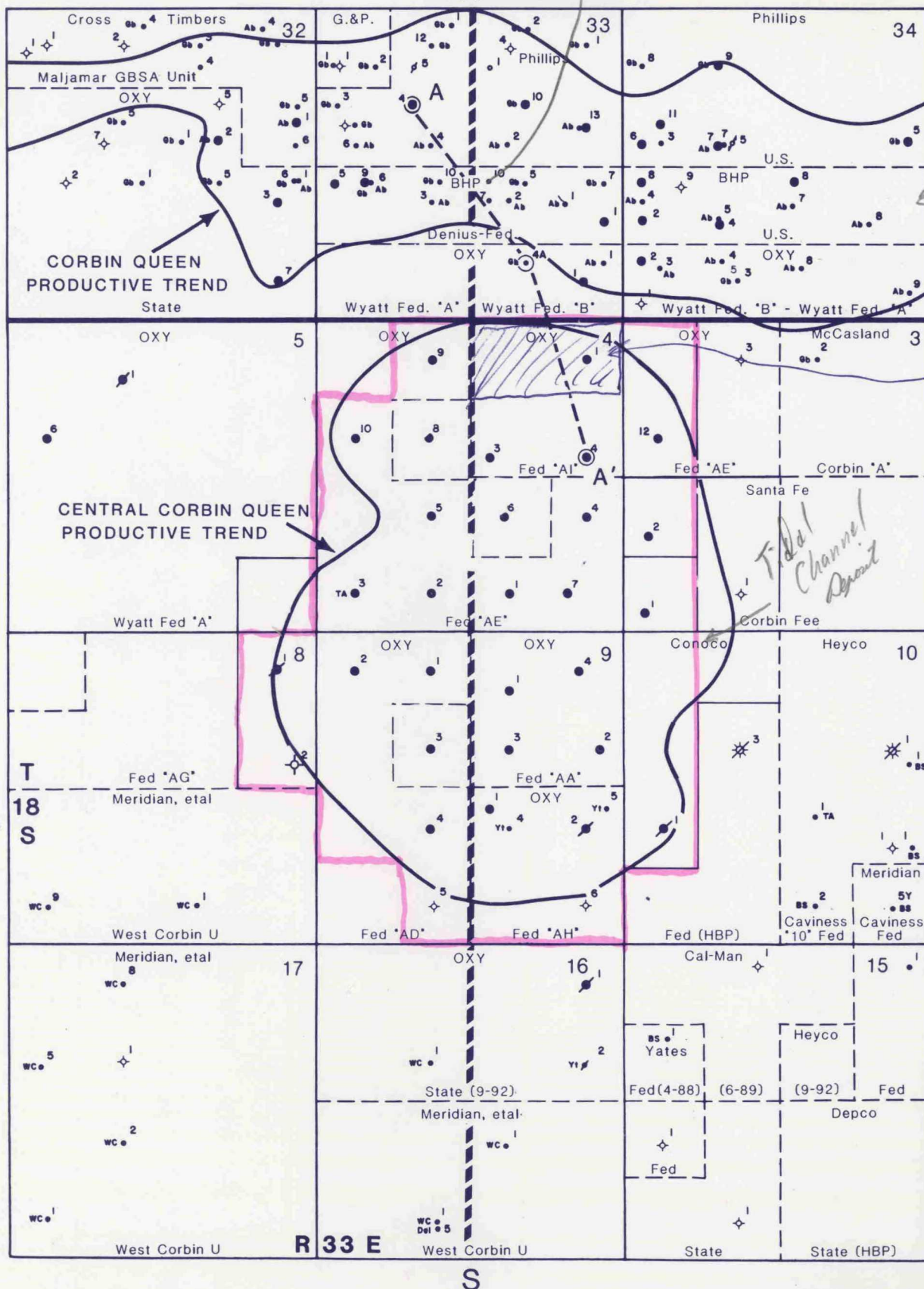
LEA COUNTY, NEW MEXICO

STRATIGRAPHIC SECTION A-A' AND STRUCTURAL SECTION N-S

STRAT. SECTION DATUM:
TOP OF QUEEN SANDSTONE

GEOL.: R. L. DOTY

MARCH, 1990



● QUEEN PRODUCER

● OTHER ZONES

Yates
Grayburg
Delaware
Abo
Bone Spring
Wolfcamp

CENTRAL CORBIN (QUEEN) FIELD LEA COUNTY, NEW MEXICO

PRODUCTIVE TREND

0 1/2
MILE

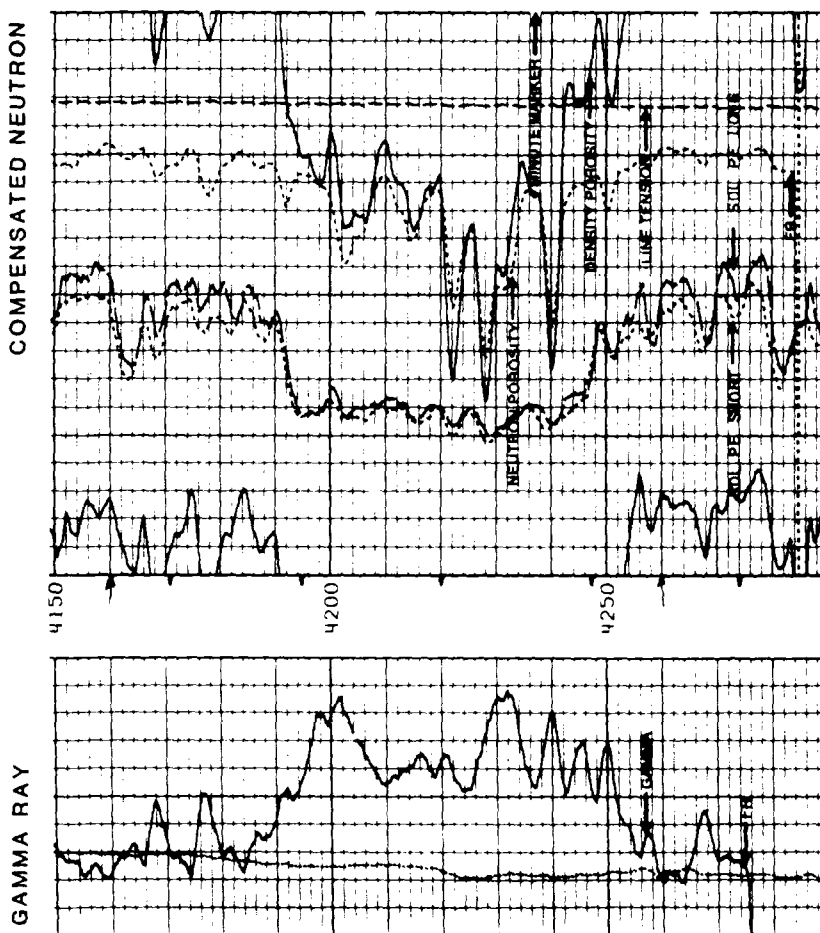
GEOL.: R. L. DOTY

MARCH, 1990

COMPARISON OF QUEEN INTERVALS

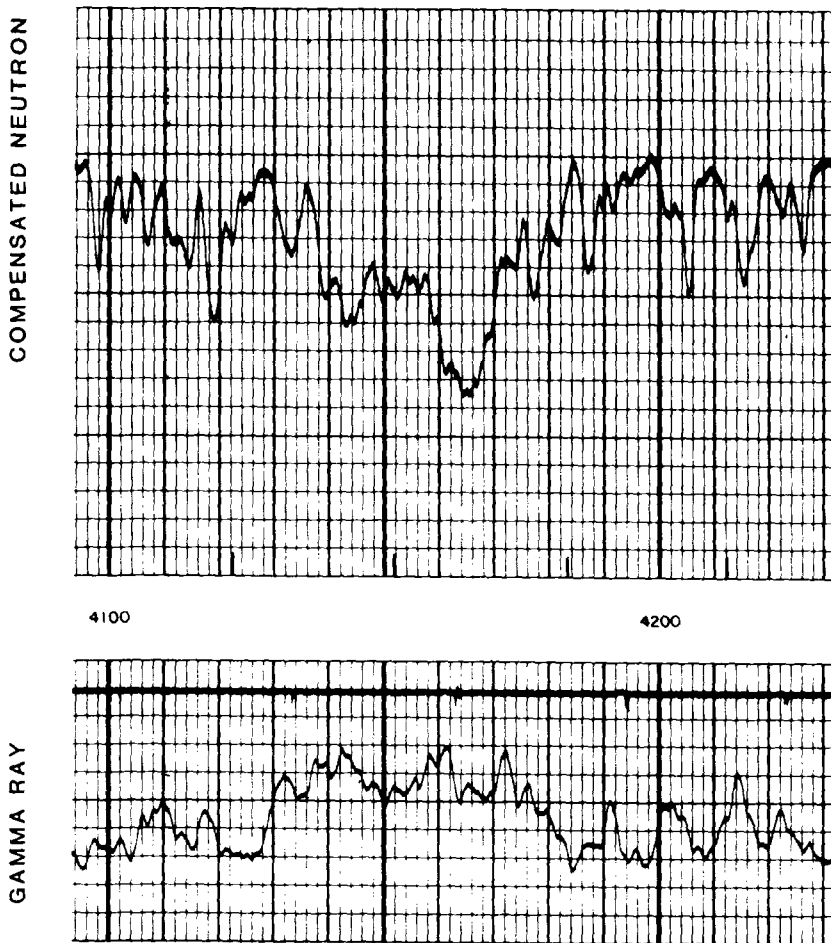
Central Corbin Queen Field

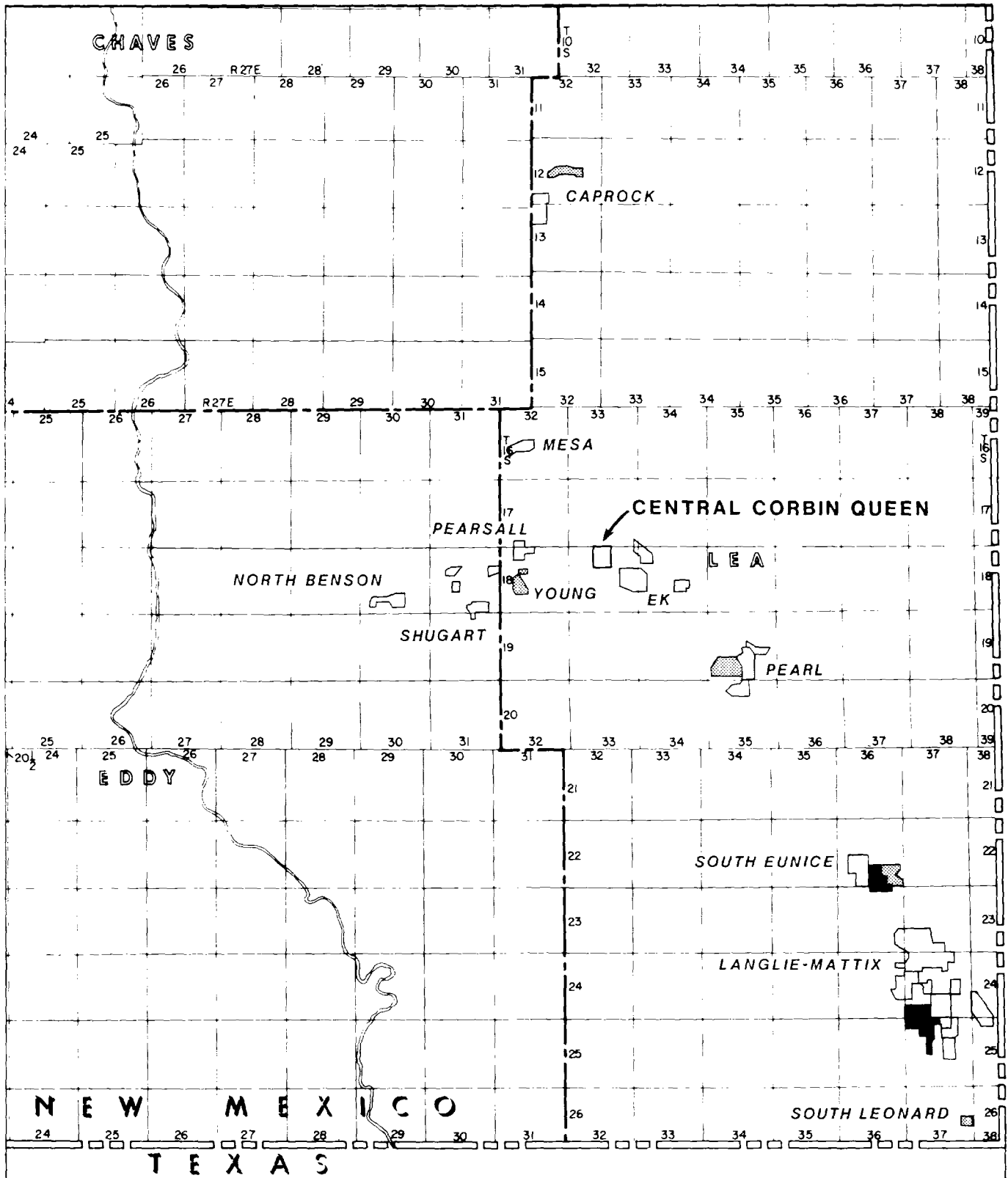
OXY USA
Federal "AE" No. 1
Section 4, T-18-S, R-33-E
Lea County, New Mexico
Welex Density/Neutron Log Run 10-3-85



North E-K Queen Field

Murphy H. Baxter
North E-K Queen Unit No. 2-5
Section 1, T-18-S, R-33-E
Lea County, New Mexico
Dresser Atlas Neutron Log Run 8-13-75





- ☐ QUEEN WATERFLOOD/80-ACRE
5-SPOT PATTERN
- ☒ QUEEN UNIT WITH 20-ACRE
PRODUCERS
- ☒ QUEEN UNIT WITH SUCCESSFUL
20-ACRE PRODUCERS

QUEEN WATERFLOODS IN LEA & EDDY COUNTIES

0 6
MILES

MARCH, 1990

- **QUEEN PRODUCER**
- **OTHER ZONES**
- Yates
Grayburg
Delaware
Abo
Bone Spring
Wolfcamp
- ▲ **PROPOSED INJECTOR**

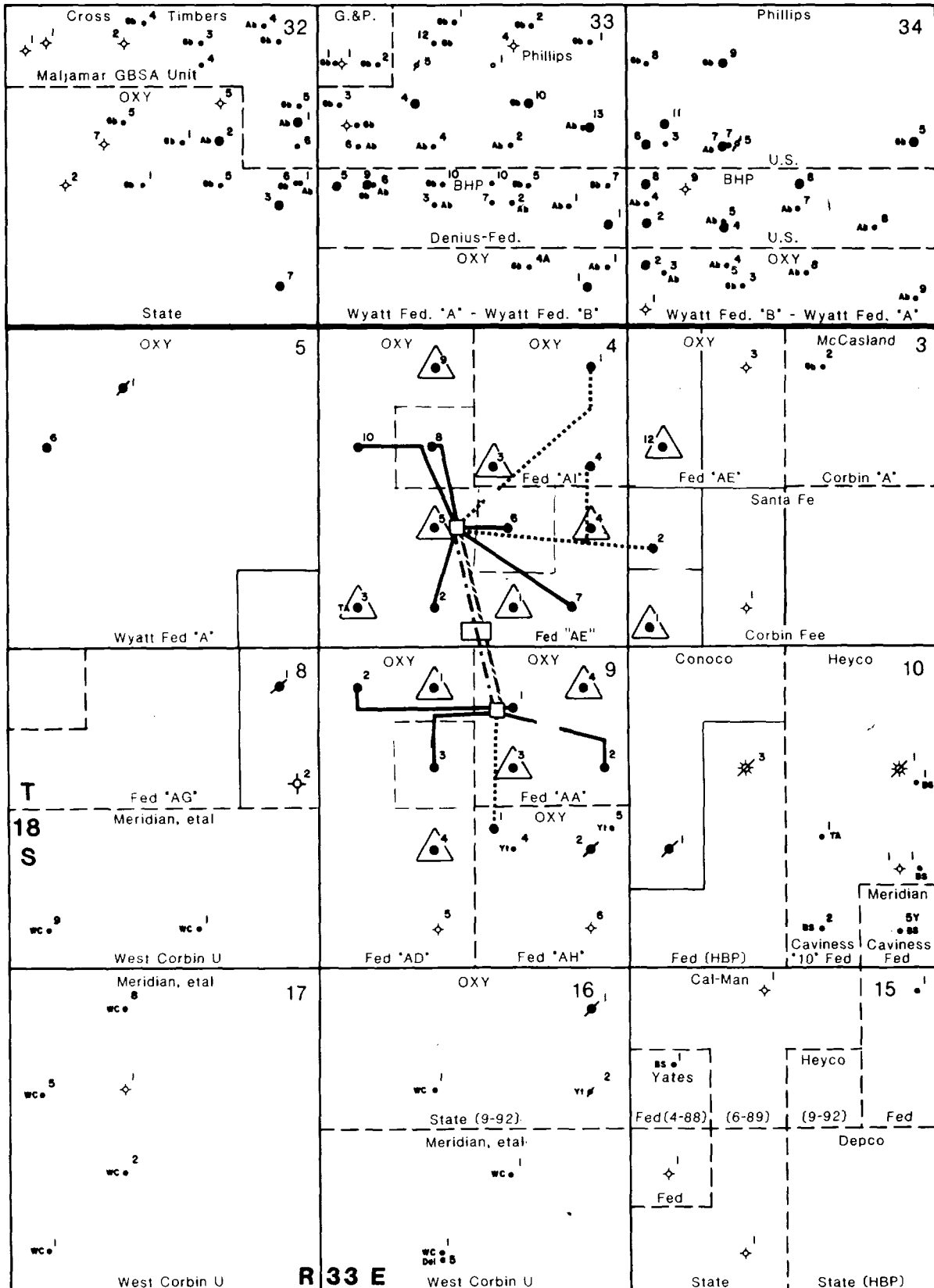
PROPOSED CONVERSION TO INJECTOR



MARCH, 1990

44

ATTACHMENT 15



• QUEEN PRODUCER

• OTHER ZONES

Yates
Grayburg
Delaware
Abo
Bone Spring
Wolfcamp

— EXISTING LINES

..... NEW LINES

- - - OIL TRANSFER LINE

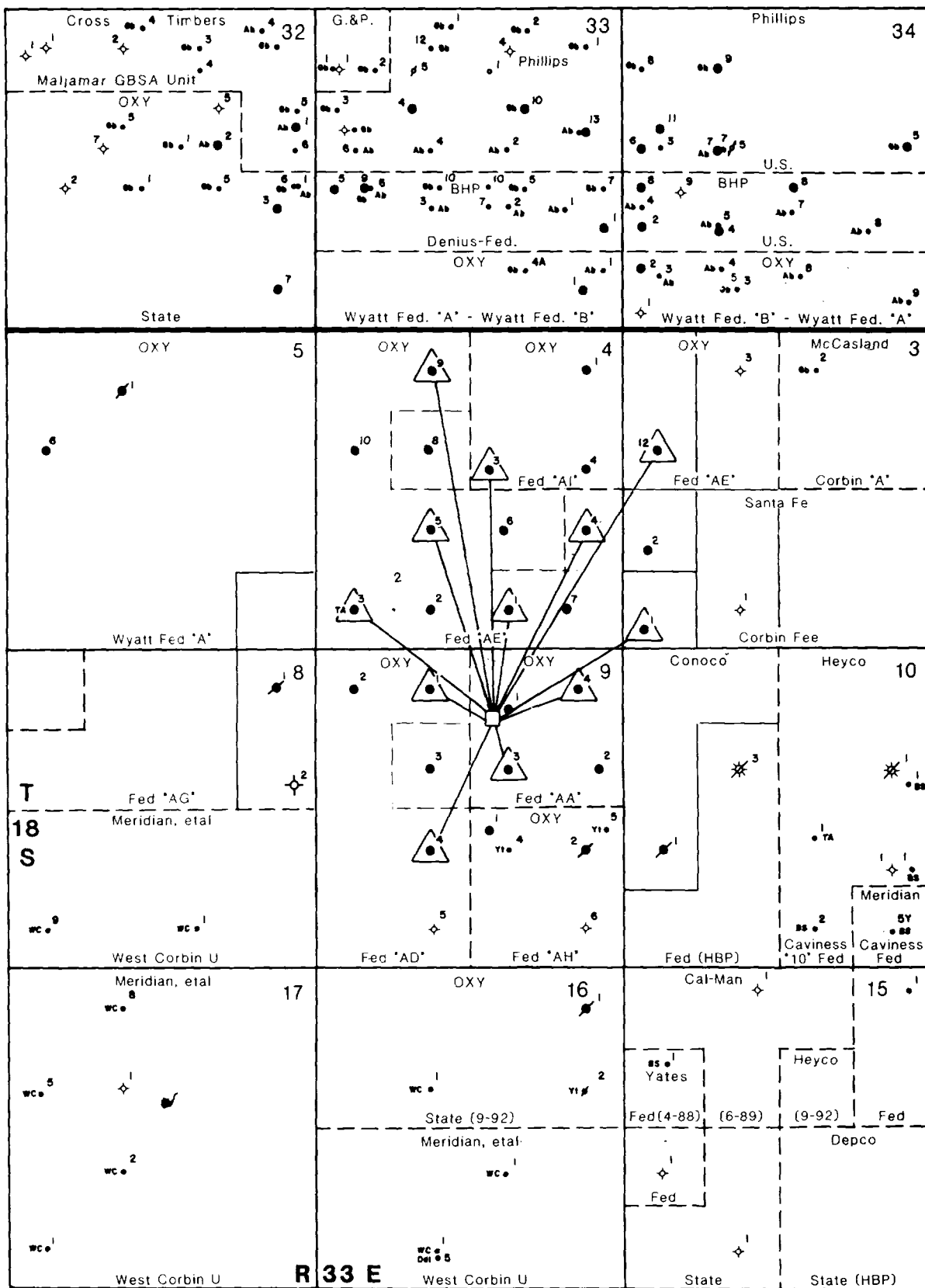
CENTRAL CORBIN (QUEEN) FIELD
LEA COUNTY, NEW MEXICO

GATHERING SYSTEM

0 1 1/2
MILE

MARCH, 1990

45



ATTACHMENT 17

PROPOSED SECONDARY RECOVERY UNIT DESCRIPTION OF LANDS

Tract 1a

Description of Lands:	T-18S, R-33E, NMPM Sec. 9: NE/4	
No. of Acres:	160.00	
Serial Number:	LC 029 489(A)	
Basic Royalty and %:	US Bureau of Land Management	12.5%*
Current Record Title and %:	OXY USA, Inc. 100%	
Overriding Royalty and %:	Selma E. Andrews	1.07410%
	John W. Boone	.50000%
	Braille of America Inc.,	
	c/o Republic Bank of Dallas	.92590%
	Harriet Justice Cochran	.12500%
	Daisy I. Corbin	1.50000%
	Homer R. Denius, et al	2.50000%
	Higgins Trust Inc.	.50000%
	James Virgil Linam Estate	.43750%
	Allene D. Rowan	.87500%
	Sabine Royalty Trust	.50000%
	H. Dillard Schenck Estate	.06250%
	Kirby D. Schenck	.06250%
	Estate of Floyd E. Sherrell	.08333%
	Wilbur L. Sherrell	.08333%
	William M. Siegenthaler	.50000%
	Estate of Joseph Wallingford	.25000%
	Rufus Wallingford	.12500%
	J. S. Ward	.25000%
	Marideth Watkins	.08334%
	Thelma A. Webber	.43750%
	William J. Wright	.50000%
Working Interest and %:	OXY USA, Inc. 100%	

Tract 1b

Description of Lands:	T-18S, R-33E, NMPM, Sec. 9: SE/4	
No. of Acres:	160.0	
Serial Number:	71-029 489(A)	
Basic Royalty and %:	US Bureau of Land Management	12.5%*
Current Record Title and %:	OXY USA, Inc. 100%	
Overriding Royalty and %:	Selma E. Andrews	1.07410%
	Braille of America Inc.,	
	c/o Republic Bank of Dallas	.92590%
	Harriet Justice Cochran	.12500%
	Daisy I. Corbin	1.50000%
	Higgins Trust Inc.	.50000%
	James Virgil Linam Estate	.87500%
	Allene D. Rowan	.87500%
	Sabine Royalty Trust	.50000%

H. Dillard Schenck Estate	.06250%
Kirby D. Schenck	.06250%
Estate of Floyd E. Sherrell	.08333%
Wilbur L. Sherrell	.08333%
Leo R. Sutton, et us	.50000%
Estate of Joseph Wallingford	.25000%
Rufus Wallingford	.12500%
J. S. Ward	.25000%
Marideth Watkins	.08334%
Martha W. West	.12500%
Working Interest and %:	OXY USA, Inc. 100%

Tract 2a

Description of Lands:	T-18S, R-33E, Sec. 3: Lot 4 (40.18), SW/4 NW/4, Sec. 4: Lot 3 (40.40), S/2 NW/4, S/2
No. of Acres:	520.58
Serial Number:	LC-029489(B)
Basic Royalty and %:	US Bureau of Land Management 12.5%
Current Record Title and %:	OXY USA, Inc. 100%
Overriding Royalty and %:	0%
Working Interest and %:	OXY USA, Inc. 100%

Tract 2b

Description of Lands:	T-18S, R-33E, Sec. 4: Lot 1 (40.27), Lot 2 (40.34), S/2 NE/4
No. of Acres:	160.61
Serial Number:	LC-029489(B)
Basic Royalty and %:	US Bureau of Land Management 12.5%
Current Record Title and %:	OXY USA, Inc. 100%
Overriding Royalty and %:	0%
Working Interest and %:	OXY USA, Inc. 100%

Tract 3

Description of Lands:	T-18S, R-33E, Sec. 10: W/2 NW/4, NE/4 NW/4, NW/4 NW/4
No. of Acres:	160.00
Serial Number:	LC-029489(C)
Basic Royalty and %:	US Bureau of Land Management 12.5%*
Current Record Title and %:	Conoco, Inc. 100%
Overriding Royalty and %:	11 Companies 7.50000%
Working Interest and %:	Conoco, Inc. 100%

Tract 4

Description of Lands: T-18S, R-33E, Sec. 9: NW/4, N/2 SW/4, SE/4 SW/4
 No. of Acres: 280.00
 Serial Number: NM-55149 HBP
 Basic Royalty and %: US Bureau of Land Management 12.5%
 Current Record Title and %: OXY USA, Inc. 100%
 Overriding Royalty and %: 0%
 Working Interest and %: OXY USA, Inc. 100%

Tract 5

Description of Lands: T-18S, R-33E, Sec. 8: E/2 NE/4
 No. of Acres: 80.00
 Serial Number: NM-26884(A)
 Basic Royalty and %: US Bureau of Land Management 12.5%
 Current Record Title and %: Unleased
 Overriding Royalty and %: NA
 Working Interest and %: NA

Tract 6

Description of Lands: T-18S, R-33E, Sec. 3: SW/4 SW/4
 No. of Acres: 40.00
 Serial Number: Fee
 Basic Royalty and %: Three individuals 19.375%
 Current Record Title and %: Santa Fe Exploration et. al. 100%
 Overriding Royalty and %: Three entities 0.6503125%
 Working Interest and %: Santa Fe Exploration Co. 25.000000%
 Dr. Dennis Alsofrom &
 Linda Ann Anderson 1.000000%
 Homer Bankhead 1.000000%
 Jeff Bowman .500000%
 C. E LaRue and B. N.
 Muncy, Jr. 22.500000%
 Marbob Energy Corp. 15.000000%
 Dr. Roger Moore 3.750000%
 Maurice Mordka 1.000000%
 Richard Olson .500000%
 Dale M. Sanders 1.000000%
 Sipes Properties Inc. 3.000000%
 David Spoede .500000%
 C. W. and Frieda T.
 Stumhoffer 3.750000%
 James H. Bozarth 1.000000%
 Frances Buckler 3.750000%
 Pat Carlisle 1.000000%
 Binion H. Carr 3.750000%
 Bart Colwell 2.000000%
 V. Randolph Delk 3.000000%
 Dr. Fred Hadley

Hamilton III	1.00000%
Dr. Robert W. King	2.00000%
Jack S. Kitchen	3.00000%
Jack S. Kitchen, Jr.	1.00000%

Tract 7

Description of Lands:	T-18S, R-33E, Sec. 3: NW/4 SW/4	
No. of Acres:	40.00	
Serial Number:		
Basic Royalty and %:	Twenty entities	18.75%
Current Record Title and %:	Santa Fe. Expl. Co. et al	100%
Overriding Royalty and %:	Four entities	1.372462%
Working Interest and %:	Santa Fe Expl. Co.	28.75000%
	Dr. Dennis Alsofrom &	
	Linda Ann Anderson	1.00000%
	Homer Bankhead	1.00000%
	Phillip R. Bishop	3.75000%
	James H. Bozarth	1.00000%
	Frances Buckler	3.75000%
	Pat Carlisle	2.00000%
	Binion H. Carr	3.75000%
	Bart Colwell	2.00000%
	V. Randolph Delk	3.00000%
	Dr. Fred Hadley Hamilton	
	III	1.00000%
	Jack S. Kitchen	3.00000%
	C. E. LaRue &	
	B. N. Muncy, Jr.	22.50000%
	Marbob Energy Corp.	15.00000%
	Dr. Roger Moore	3.75000%
	Maurice Mordka	1.00000%
	C. W. & Frieda T.	
	Stumhoffer	3.75000%

* Royalty is 12.5-25% on sliding scale.9+

Cross 4 Timbers 32 G.&P. Phillips 34
 Maljamar GBSA Unit
 OXY
 State
 Wyatt Fed. 'A' - Wyatt Fed. 'B'
 OXY
 Wyatt Fed. 'B' - Wyatt Fed. 'A'
 OXY
 Wyatt Fed 'A'
 T
 18
 S
 Meridian, etal
 West Corbin U
 Meridian, etal
 West Corbin U
 R 33 E
 West Corbin U
 State (9-92)
 Meridian, etal
 West Corbin U
 State
 State (HBP)
 Phillips
 BHP
 U.S.
 OXY
 BHP
 U.S.
 OXY
 Corbin 'A'
 Santa Fe
 Santa Fe
 Santa Fe
 Corbin Fee
 Coroco
 Heyco
 10
 Meridian
 Caviness
 10" Fed
 Caviness
 Fed
 Cal-Man
 Yates
 Heyco
 Depco
 State
 State (HBP)

- OTHER ZONES

MARCH, 1990

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TABLE 1

CENTRAL CORBIN QUEEN FIELD

FIELD AND RESERVOIR DATA

FIELD DATA

DATE OF DISCOVERY	April, 1985
TYPE OF TRAP	Stratigraphic
PRODUCING FORMATION	Queen Sand

RESERVOIR CHARACTERISTICS

AVERAGE DEPTH, FT	4200
AVERAGE GROSS THICKNESS, FT	63
AVERAGE NET THICKNESS (8% CUTOFF), FT	21
AVERAGE POROSITY (8% CUTOFF), %	10.4
AVERAGE AIR PERMEABILITY, MD	3.83
AVERAGE WATER SATURATION, %	41

FLUID CHARACTERISTICS

OIL API GRAVITY AT 60 DEG F	35.1
INITIAL PRESSURE (EST.), PSIG	1850
RESERVOIR TEMPERATURE, DEG F	96
BUBBLE POINT PRESSURE, PSIG	895
ORIGINAL SOLUTION GOR, SCF/STB	115
SOLUTION GOR AT BUBBLE POINT, SCF/BBL	103
FVF AT BUBBLE POINT, RB/STB	1.056
OIL VISCOSITY AT BUBBLE POINT, CP	2.75

RESERVES

OOIP, MSTB (VOLUMETRIC)	10628
PRIMARY RECOVERY TO 5/89, MSTB	502
ESTIMATED REMAINING PRIMARY RECOVERY FROM 5/1/89, MSTB	70
ULTIMATE PRIMARY RECOVERY, MSTB	572
ESTIMATED SECONDARY RECOVERY, MSTB	559

TABLE 2

WELL DATA SUMMARY

TRACT	OPERATOR	LEASE NAME AND WELL NUMBER	TD, FEET	PBTD, FEET	PRODUCTION CASING	PERFORATION INTERVAL, FEET	FORMATION	STATUS	INITIAL POTENTIAL
5	UNLEASED	FEDERAL AG #1	9,000	4277	5-1/2"	4218-4225	QUEEN	PA	P 5 BOPD, 146 BWPD
5	UNLEASED	FEDERAL AG #2	11,500	4310	5-1/2"	4270-4279	QUEEN	PA	NONE
4	OXY	FEDERAL AD #1	4,310	4256	5-1/2"	4206-4232	QUEEN	ACTIVE	F 589 BOPD, 83 BLW
4	OXY	FEDERAL AD #2	4,320	4276	5-1/2"	4220-4255	QUEEN	ACTIVE	P 28 BOPD, 12 BLW
4	OXY	FEDERAL AD #3	4,320	4277	5-1/2"	4245-4253	QUEEN	ACTIVE	P 98 BOPD, 12 BLW
4	OXY	FEDERAL AD #4	4,350	4288	5-1/2"	4258-4271	QUEEN	ACTIVE	P 91 BOPD, 23 BWPD
1A	OXY	FEDERAL AA #1	13,835	4850	5-1/2"	4228-4238	QUEEN	ACTIVE	F 482 BOPD, 0 BWPD
1A	OXY	FEDERAL AA #2	4,375	4339	5-1/2"	4270-4282	QUEEN	ACTIVE	P 52 BOPD, 130 BLW
1A	OXY	FEDERAL AA #3	4,350	4314	5-1/2"	4236-4262	QUEEN	ACTIVE	F 322 BOPD, 55 BLW
1A	OXY	FEDERAL AA #4	4,325	4312	5-1/2"	4213-4242	QUEEN	ACTIVE	P 81 BOPD, 408 BLW
1B	OXY	FEDERAL AH #1	4,400	4400	5-1/2"	4274-4294	QUEEN	ACTIVE	P 105 BOPD, 70 BWPD
1B	OXY	FEDERAL AH #2	4,350		5-1/2"	OH	QUEEN	PA	70 BOPD, 4 BWPD
2A	OXY	FEDERAL AE #1	4,320	4256	5-1/2"	4221-4241	QUEEN	ACTIVE	P 176 BOPD, 0 BWPD
2A	OXY	FEDERAL AE #2	4,300	4256	5-1/2"	4207-4226	QUEEN	ACTIVE	F 611 BOPD, 39 BLW
2A	OXY	FEDERAL AE #3*	4,325	4279	5-1/2"	4243-4247	QUEEN	TA	P 8 BOPD, 42 BLW
2A	OXY	FEDERAL AE #4	4,350	4314	5-1/2"	4200-4217	QUEEN	ACTIVE	P 117 BOPD, 7 BLW
2A	OXY	FEDERAL AE #5	4,280	4240	5-1/2"	4174-4180	QUEEN	ACTIVE	F 155 BOPD, 15 BLW
2A	OXY	FEDERAL AE #6	4,300	4253	5-1/2"	4184-4215	QUEEN	ACTIVE	P 49 BOPD, 18 BLW
2A	OXY	FEDERAL AE #7	4,530	4478	5-1/2"	4203-4227	QUEEN	ACTIVE	P 84 BOPD, 13 BLW
2A	OXY	FEDERAL AE #8	4,275	4225	5-1/2"	4151-4177	QUEEN	ACTIVE	P 81 BOPD, 26 BLW
2A	OXY	FEDERAL AE #9	4,452	4398	5-1/2"	4152-4166	QUEEN	ACTIVE	P 19 BOPD, 12 BLW
2A	OXY	FEDERAL AE #10	4,275	4226	5-1/2"	4134-4138	QUEEN	ACTIVE	P 4 BOPD, 0 BLW
2A	OXY	FEDERAL AE #12	4,300	4255	5-1/2"	4211-4215	QUEEN	ACTIVE	P 10 BOPD, 9 BLW
2B	OXY	FEDERAL AI #1	5,257		5-1/2"	OH	QUEEN	ACTIVE	P 50 BOPD
2B	OXY	FEDERAL AI #3	5,000	4983	5-1/2"	4163-4440	QUEEN	ACTIVE	P 80 BOPD, 26 BWPD
2B	OXY	FEDERAL AI #4	5,000	4983	5-1/2"	4180-4442	QUEEN	ACTIVE	P 80 BOPD, 20 BWPD
3	CONOCO	FEDERAL (BHP) #1	4319		7"	OH	QUEEN	PA	P 43 BOPD
6	SANTA FE	CORBIN FEE #1	5050	5050	5-1/2"	4219-4266	QUEEN	ACTIVE	P 10 BOPD, 10 BWPD
7	SANTA FE	CORBIN FEE #2	5200	5200	5-1/2"	4224-4234	QUEEN	ACTIVE	P 81 BOPD, 20 BWPD
						4898-5128	GRAYBURG	ACTIVE	NA

* YATES TESTED DRY

TABLE 3

PRESSURE - VOLUME RELATIONS AT 96 F

FEDERAL "AA" No. 1

RECOMBINED FLUIDS SAMPLE

<u>PRESSURE,</u> <u>PSIG</u>	<u>RELATIVE VOLUME OF</u> <u>OIL AND GAS @ 96 F</u> <u>VOL./SAT. VOL.</u>	<u>OIL</u> <u>COMPRESSIBILITY</u> <u>1/PSI X 10-6</u>
5000	0.97897	4.24
4000	0.98365	4.64
3000	0.98834	5.09
2000	0.99365	5.61
1600	0.99547	5.84
1400	0.99701	5.96
1200	0.99842	6.09
1000	0.99952	6.22
895 (BUBBLE POINT PRESSURE)	1.00000	6.29
866	1.00539	
833	1.01066	
773	1.02163	
717	1.03336	
617	1.06470	
494	1.12606	
383	1.22310	
240	1.50192	
199	1.68700	
118		

$$\text{RELATIVE VOLUME} = A + B/(\text{PRESSURE} + C)$$

$$\text{COMPRESSIBILITY} = B/(\text{PRESSURE} + C)^2 / \text{RELATIVE VOLUME}$$

$$A = 0.88819$$

$$B = 1994.05$$

$$C = 16899$$

TABLE 4

DIFFERENTIAL VAPORIZATION AT 96 F

FEDERAL "AA" No. 1

RECOMBINED FLUID SAMPLE

<u>PRESSURE,</u> <u>PSIG</u>	<u>OIL VOLUME</u> <u>RELATIVE TO</u> <u>RESIDUAL</u> <u>OIL @ 60 F</u>	<u>OIL VOLUME</u> <u>RELATIVE TO</u> <u>RESIDUAL</u> <u>OIL @ 96 F</u>	<u>SOLUTION GOR</u> <u>SCF GAS PER</u> <u>BBL RESIDUAL</u> <u>OIL @ 60 F</u>	<u>SOLUTION GOR</u> <u>SCF GAS PER</u> <u>BBL RESIDUAL</u> <u>OIL @ 96 F</u>	<u>GAS</u> <u>GRAVITY</u> <u>@ 96 F</u> <u>(AIR=1)</u>
5000	1.03079	1.01458			
4000	1.03608	1.01979			
3000	1.04105	1.02468			
2000	1.04734	1.03087			
1600	1.05024	1.03373			
1400	1.05163	1.03510			
1200	1.05340	1.03684			
1000	1.05532	1.03873			
895	1.05643	1.03982	104.3	102.6	
610	1.05141	1.03488	77.9	76.7	0.844
370	1.03754	1.02122	55.8	54.9	0.780
175	1.02846	1.01229	29.3	28.8	0.757
82	1.02230	1.00623	14.9	14.7	0.769
0	1.01597	1.00000	0.0	0.0	0.863

API GRAVITY OF RESIDUAL OIL @ 60 F = 35.8

TABLE 5

DIFFERENTIAL VAPORIZATION AT 96 F

FEDERAL "AA" No. 1

RECOMBINED FLUIDS SAMPLE

<u>PRESSURE</u> <u>PSIG</u>	<u>OIL</u> <u>DENSITY</u> <u>@ 96 F</u> <u>G/CC</u>	<u>OIL</u> <u>VISCOSITY</u> <u>@ 96 F</u> <u>CENTIPOISE</u>	<u>GAS</u> <u>VISCOSITY</u> <u>@ 96 F</u> <u>CENTIPOISE</u>	<u>OIL/GAS</u> <u>VISCOSITY</u> <u>RATIO</u>
5000	0.8384	3.86		
4000	0.8341	3.57		
3000	0.8301	3.28		
2000	0.8251	3.01		
1600	0.8228	2.91		
1400	0.8218	2.86		
1200	0.8304	2.82		
1000	0.8189	2.76		
895	0.8180	2.74		
610	0.8173	2.92	0.0116	252
370	0.8246	3.06	0.0113	271
175	0.8276	3.25	0.0111	293
92	0.8303	3.40	0.0109	312
0	0.8327	3.58	0.0105	341

TABLE 6

FEDERAL "AA" No. 1

FLUID COMPOSITIONS

<u>COMPONENTS</u>	<u>SEP. GAS</u> <u>MOL %</u>	<u>SEP. OIL</u> <u>MOL %</u>	<u>RECOMBINED SAMPLE, MOL %</u>	
			<u>EXPERIMENTAL</u>	<u>THEORETICAL</u>
OXYGEN	0.02	0.00	0.00	0.00
NITROGEN	24.72	0.13	4.16	4.02
METHANE	54.63	0.99	9.70	9.48
CARBON DIOXIDE	0.01	0.01	0.01	0.01
ETHANE	8.77	0.81	2.10	2.07
PROPANE	6.34	1.62	2.43	2.37
ISOBUTANE	0.96	0.56	0.64	0.62
N-BUTANE	2.25	2.13	2.23	2.15
ISOPENTANE	0.65	1.68	1.60	1.52
N-PENTANE	0.58	2.18	2.01	1.92
HEXANES	0.64	6.43	6.02	5.51
HEPTANES PLUS	0.43	83.46	69.10	70.33

C7+ MOL WT.	205
C7+ DENSITY, G/CC @ 60 F	0.8896
SPECIFIC GRAVITY OF GAS (AIR = 1.0)	0.8609
BTU CONTENT OF GAS, DRY GROSS	1078
SEPARATOR PRESSURE, PSIG	33
SEPARATOR TEMPERATURE, F	108
SEPARATOR OIL SHRINKAGE FACTOR	1.012
API GRAVITY OF STOCK TANK OIL @ 60 F	35.1

TABLE 7

WATER ANALYSIS BY
CHAMPION CHEMICALS, INC.
6/26/86

CHEMICAL
COMPONENTS

PARTS PER MILLION
LEASE

	<u>FEDERAL AE</u>	<u>FEDERAL AD</u>	<u>FEDERAL AA</u>
CHLORIDE	180,000	199,000	208,000
IRON	105	102	48
TOTAL HARDNESS	60,200	72,400	79,400
CALCIUM	7,378	8,541	6,295
MAGNESIUM	10,157	12,417	15,479
BICARBONATE	244	170	305
CARBONATE	0	0	0
SULFATE	1,100	737	1,200
HYDROGEN SULFIDE	18	30	18
SPECIFIC GRAVITY	1.190	1.200	1.210
DENSITY LB/GAL	9.917	10.000	10.084
pH	6.20	5.80	5.80
SODIUM (CALC)	90,179	96,797	99,832
TDS	289,058	317,664	331,112
CaSO ₄ PRESENT	1,558	1,045	1,700
CaCO ₃ SI @ 86 F	+1.37	+1.31	+1.69
104 F	+1.60	+1.54	+1.92
122 F	+1.86	+1.80	+2.18
140 F	+2.15	+2.09	+2.47
158 F	+2.47	+2.41	+2.79

TABLE 8
PRESSURE DATA

<u>LEASE/WELL</u>	<u>MID-PERFS, FEET</u>	<u>SITP, PSI</u>	<u>FLUID LEVEL, FEET</u>	<u>BHP 1, PSI</u>	<u>FTP, PSI</u>	<u>BHP 2, PSI</u>
FEDERAL AA #1	4228	-	-	-	40	1625
#2	4270	175	2300	1106	-	-
#3	4249	50	2100	896	20	1693
#4	4228	525	3300	902	-	-
FEDERAL AD #1	4206	150	500	1504	25	1602
#2	4220	100	1900	1188	-	-
#3	4245	175	1300	1511	-	-
#4	4264	700	3000	1224	-	1770
FEDERAL AE #1	4221	275	900	1632	-	-
#2	4207	200	1100	1388	100	1709
#4	4208	400	1800	1303	-	-
#5	4174	450	800	1778	70	1714
#6	4184	1200	-	1200	40	1803
#7	4215	475	1800	1637	-	-
#8	4151	35	1440	1136	40	1726
#9	4159	700	3000	597	-	-
#10	4136	0	3100	502	-	-
#12	4213	0	2400	902	-	-

BHP 1 - Pressure estimate based on SITP and fluid level measured during completion.

BHP 2 - Pressure estimate based on FTP.

TABLE 9

WATER-OIL RELATIVE PERMEABILITY DATA
UNSTEADY STATE

4216.4 FT FEDERAL "AE" No. 1

VISCOSITY OF SYN FORMATION WATER, CP	1.58
VISCOSITY OF TEST OIL, CP	3.65
DENSITY OF SYN FORMATION WATER, G/CC	1.160
DENSITY OF TEST OIL, G/CC	0.788
PORE VOLUME, CC	6.49
POROSITY, %	12.9
AIR PERMEABILITY, MD	39.970
IRREDUCIBLE WATER SATURATION, %PV	41.0
OIL PERMEABILITY @ IRREDUCIBLE WATER, MD	32.180
RESIDUAL OIL SATURATION, %PV	21.3
WATER PERMEABILITY @ RESIDUAL OIL. MD	11.370

<u>WTRSAT, %</u>	<u>KWATER (MD)</u>	<u>KOIL (MD)</u>	<u>KW/KO</u>	<u>KRW</u>	<u>KRO</u>
63.8	---	---	3.117	---	---
64.2	3.9873	1.1337	3.517	0.12391	0.03523
66.8	4.2246	0.5362	7.878	0.13128	0.01666
68.3	4.5369	0.3547	12.790	0.14098	0.01102
70.0	4.8468	0.2195	22.077	0.15062	0.00682
72.3	5.5329	0.1072	51.630	0.17194	0.00333
74.2	6.0649	0.0543	111.722	0.18847	0.00169
77.0	6.9996	0.0098	712.087	0.21751	0.00031
77.5	7.2695	0.0050	1463.674	0.22590	0.00015
78.2	9.1755	0.0018	5180.316	0.28513	0.00006
71.5	0.2621	0.0000	8300.941	0.43330	0.00005

TABLE 10
ORIGINAL OIL-IN-PLACE

POROSITY-THICKNESS ISOPACH

PROPERTY	PYRAMID METHOD <u>(AC-FT)</u>
TRACT 5	13.46
TRACT 4	573.45
TRACT 1A	472.62
TRACT 1B	183.36
TRACT 2A	679.61
TRACT 2B	307.13
TRACT 3	78.50
TRACT 6	59.92
TRACT 7	<u>57.98</u>
TOTAL (UNIT AREA)	2426.03

TOTAL PORE VOLUME FROM PHI-H MAP - 2433.30

VOLUMETRIC EQUATION

$$\begin{aligned}
 \text{OOIP} &= 7758 * A * h * \phi * (1 - s_w) / B_o \\
 &= 7758 * 2433.30 * (1 - 0.41) / 1.048 \\
 &= 10,627,624 \text{ STB}
 \end{aligned}$$

WHERE:

$A * h * \phi$ is average of porosity-thickness isopach = 2433.30 ac-ft

s_w is initial water saturation = 0.41

B_o is initial oil formation volume factor = 1.048 RB/STB

TABLE 11
SUMMARY OF PRIMARY PRODUCTION
AS OF 4/30/89

TRACT NUMBER	LEASE	WELL NUMBER	CUMMULATIVE PRODUCTION, BBLs	REMAINING RESERVES, BBLs	ULTIMATE PRIMARY RECOVERY, BBLs
1A	FEDERAL "AA"	1	69751	2599	72350
1A	FEDERAL "AA"	2	21288	463	21751
1A	FEDERAL "AA"	3	15384	251	15635
1A	FEDERAL "AA"	4	18020	1173	19193
1B	FEDERAL "AH"	1	9509	4775	14284
1B	FEDERAL "AH"	2	41087	0	41087
2A	FEDERAL "AE"	1	30724	1890	32614
2A	FEDERAL "AE"	2	25719	3374	29093
2A	FEDERAL "AE"	3	2641	0	2641
2A	FEDERAL "AE"	4	10980	4056	15036
2A	FEDERAL "AE"	5	25069	2460	27529
2A	FEDERAL "AE"	6	8339	363	8702
2A	FEDERAL "AE"	7	11539	9501	21040
2A	FEDERAL "AE"	8	20221	7649	27870
2A	FEDERAL "AE"	9	2633	2677	5310
2A	FEDERAL "AE"	10	586	999	1585
2A	FEDERAL "AE"	12	5588	6425	12013
2B	FEDERAL "AI"	1	37833	1058	38891
2B	FEDERAL "AI"	3	9429	3305	12734
2B	FEDERAL "AI"	4	8377	1169	9546
3	FEDERAL (BHP)	1	23590	0	23590
4A	FEDERAL "AD"	1	42275	4965	47240
4A	FEDERAL "AD"	2	10854	2029	12883
4A	FEDERAL "AD"	3	10733	568	11301
4A	FEDERAL "AD"	4	13322	251	13573
5	FEDERAL "AG"	1	19	0	19
5	FEDERAL "AG"	2	0	0	0
6	CORBIN FEE	1	3070	208	3278
7	CORBIN FEE	2	23114	8412	31526
	TOTALS	29	501694	70620	572314

TABLE 12

Primary and Secondary Recovery Production Schedules

Actuals Thru 4/30/89
(BBL)

	Tract 1A	Tract 1B	Tract 2A	Tract 2B	Tract 3	Tract 4	Tract 5	Tract 6	Tract 7	Totals
1938-1978					23590					95542
1979		41087		30865						1019
1980				1019						965
1981				965						843
1982				843						792
1983				792						805
1984				805						677
1985				677						76398
1986				715				649	4502	12464
1987				6710				1229	12464	173393
Jan 88	37218		15853	7808				700	3300	99786
Feb 88	47388	4824	2063	404			8	55	231	5348
Mar 88	29138	555	1933	362			5	43	190	4909
Apr 88	1263	848	1663	389			1	35	218	4300
May 88	982	405	1610	285			0	30	182	3784
Jun 88	774	310	1341	303			0	48	206	3708
Jul 88	846	313	1172	299			5	33	181	3678
Aug 88	1313	381	1291	43			0	35	183	3712
Sep 88	1098	300	1282	310			0	19	189	3387
Oct 88	1005	212	1253	312			0	41	171	3308
Nov 88	837	238	1239	324			0	20	164	3149
Dec 88	824	142	1290	268			0	26	160	2428
Jan 89	603	187	945	321			0	24	169	2935
Feb 89	526	219	860	286			0	28	165	2548
Mar 89	486	154	694	169			0	18	139	1786
Apr 89	182	47	1078	201			0	20	154	2002
May 89	323	199		164			0	17	146	1988
Jun 89	161	175								
Jul 89										
Aug 89										
Sep 89										
Oct 89										
Nov 89										
Dec 89										
1990										
Jan 90	1130	1144	7646	1235	0	1701	0	118	1059	14033
Feb 90	4452	1912	6334	2112	815	2935	0	113	1089	19760
Mar 90	55801	23965	79391	26475	10210	36787	0	1419	13645	247692
Apr 90	34049	14623	48443	16155	6230	22447	0	866	8326	151138
May 90	16699	7172	23759	7923	3055	11009	0	425	4083	74125
Jun 90	10450	4488	14867	4958	1912	6889	0	266	2555	46384
Jul 90	6870	2951	9775	3260	1257	4529	0	175	1680	30497
Aug 90	4377	1880	6228	2077	801	2886	0	111	1070	19429
Sep 90	3325	1428	4731	1578	608	2192	0	85	813	14760
Oct 90	2418	1038	3440	1147	442	1594	0	61	591	10732
Nov 90										
Dec 90										
Tot. Pri.+Sec.	265510	111196	348651	122558	48921	170153	19	6708	58025	1131740

CCQ primary prediction was based on hyperbolic decline

CCQ total secondary recovery was based on secondary/primary ratio of 0.98 from the E.K. Queen Unit

Annual secondary production by tract was calculated using the ratio of ultimate primary tract / ultimate primary total

TABLE 13
INJECTION AND SUPPLY WATER SCHEDULES

<u>YEAR</u>	<u>INJECTED*</u> <u>WATER, BBL</u>	<u>PRODUCED</u> <u>WATER, BBL</u>	<u>WATER FROM</u> <u>STATE DW &</u> <u>FEDERAL AB, BBL</u>	<u>FRESH WATER</u> <u>MAKE-UP, BBL</u>
1990	876000	11000	365000	500000
1991	810300	142000	365000	303300
1992	700800	283000	365000	52800
1993	591300	348000	243300	0
1994	481800	436000	45800	0
1995	394200	355000	39200	0
1996	350400	315000	35400	0
1997	306600	275000	31600	0
1998	262800	240000	22800	0

* CONSTANT PRESSURE AT 1500 PSI

TABLE 14

TYPICAL CONVERSION COST*

(DOLLARS)

<u>ITEM</u>	<u>TANGIBLE</u>	<u>INTANGIBLE</u>	<u>TOTAL</u>
4300' 2-3/8" 4.7# J55 PC TUBING	15,050		15,050
INJECTION PACKER	3,000		3,000
INJECTION WELLHEAD	3,000		3,000
3 DAYS PULLING UNIT		2,700	2,700
ACID TREATMENT		5,000	5,000
MISCELLANEOUS	<u> </u>	<u>1,250</u>	<u>1,250</u>
TOTAL	21,050	8,950	30,000

TOTAL CONVERSION COST (12 WELLS)	<u>360,000</u>
----------------------------------	----------------

* ESTIMATE PROVIDED BY THE HOBBS PRODUCTION GROUP

TABLE 15

FACILITIES INVESTMENT FOR FIELDWIDE WATERFLOOD*

<u>ITEM</u>	<u>COST, \$</u>
BATTERY	
BATTERY PAD (INCLUDES DAMAGES AND ROAD)	7,300
INJECTION PUMP SKID AND FILTER	77,000
CHEMICAL PUMPS	1,600
REFURBISH, MOVE, SET AND COAT TANKS	16,000
CEMENT FOUNDATION WORK	500
TRANSFORMERS	2,500
LEVEL CONTROLS	1,600
ELECTRICAL MATERIALS AND LABOR	8,000
INJECTION HEADER, CHOKES AND METERS	25,000
ALARM SYSTEM REPLACEMENT	10,000
WELL TEST EQUIPMENT	2,500
PLANT PIPING AND VALVING	15,000
WATER SUPPLY WELL (OPTIONAL, MAY PURCHASE @ 5¢/BBL)	7,000
LABOR	15,000
PLANT TOTAL	189,000
INJECTION AND TRANSFER LINES	
PRODUCED WATER LINE FROM STATE DW	65,000
INJECTION LINES AND INSTALLATION	230,000
FLOWLINES FOR OFFSET PRODUCERS	13,000
OIL TRANSFER LINE	9,500
WATER TRANSFER LINES	17,500
GAS LINE	4,400
LINE TOTAL	339,400
TOTAL FACILITY INVESTMENT	528,400

* BASED ON WORK BY ROB MC ALPINE

Table 16

Economic Summary

	Primary Depletion	Primary + Waterflood Project	Incremental Waterflood Project
Total Investment (M\$)	0	888	888
Operating Expenses (M\$)	191	2430	2239
Lease Gross Reserves			
Oil (MSTB)	15	539	524
Gas (MMCF)	44	81	37
Profitability Indicators			
Disc. Net Cash Prod. @ 10% (M\$)	55	2982	2927
@ 15% (M\$)	54	2667	2613
DCF Return On Inv. (%)	NMV	246.5	227.7
Payout (Years)	0	1.4	1.4
Project Life (Years)	1	5	5

TABLE 17
EQUITY PARAMETERS

PARAMETER(UNIT)	TRACT 1A VALUE	TRACT 1B VALUE	TRACT 2A VALUE	TRACT 2B VALUE	TRACT 3 VALUE	TRACT 4 VALUE	TRACT 5 VALUE	TRACT 6 VALUE	TRACT 7 VALUE	TOTAL
SURFACE ACRES(ACRES)	160.00	160.00	520.58	160.61	120.00	280	80.00	40.00	40.00	1561.19
NET WELL COUNT PRODUCIBLE USABLE*	4 0	1 0	10 1	3 0	0 1	4 0	0 0	0 0	1 0	24 2
CUMULATIVE PRODUCTION THRU 4/30/89 (BBL)	124443	50596	144039	55639	23590	77184	19	3070	23114	501694
REMAINING PRIMARY RESERVES FROM 5/1/89 (BBL)	4485	4775	39394	5533	0	7813	0	208	8412	70620
ULTIMATE PRIMARY RECOVERY (BBL)	128928	55371	183433	61172	23590	84997	19	3278	31526	572314
AVERAGE CURRENT PRODUCING RATES AS OF APRIL, 1989 (BBL/MON)	161	175	1078	164	0	247	0	17	146	1988
NET PAY ISOPACH-PYRAMID METHOD (ACRE-FT)**	3853.28	1494.24	6369.2075	3087.51	657.51	3883.07	121.18	675.94	473.67	20615.606
NET PHIMH - PYRAMID METHOD (ACRE-O-FT)***	472.62	183.36	675.34205	307.13	75.40	573.45	13.46	59.92	57.98	2418.68305
PARAMETER(UNIT)	TRACT 1A VALUE	TRACT 1B VALUE	TRACT 2A VALUE	TRACT 2B VALUE	TRACT 3 VALUE	TRACT 4 VALUE	TRACT 5 VALUE	TRACT 6 VALUE	TRACT 7 VALUE	TOTAL
SURFACE ACRES(ACRES)	0.10248592	0.10248592	0.33345077	0.10287665	0.07686444	0.17935037	0.05124296	0.02562148	0.02562148	1.000000
NET WELL COUNT PRODUCIBLE USABLE*	0.16666667	0.04166667	0.41666667	0.12500000	0.00000000	0.16666667	0.00000000	0.04166667	0.04166667	1.000000
CUMULATIVE PRODUCTION THRU 4/30/89 (BBL)	0.00000000	0.00000000	0.50000000	0.00000000	0.50000000	0.00000000	0.00000000	0.00000000	0.00000000	1.000000
REMAINING PRIMARY RESERVES FROM 5/1/89 (BBL)	0.24804562	0.10085032	0.28710529	0.11090226	0.04702069	0.15384677	0.00003787	0.00611927	0.04607191	1.000000
ULTIMATE PRIMARY RECOVERY (BBL)	0.06350892	0.06761541	0.55783064	0.07834891	0.00000000	0.11063438	0.00000000	0.00294534	0.11911640	1.000000
AVERAGE CURRENT PRODUCING RATES AS OF APRIL, 1989 (BBL/MON)	0.22527494	0.09674934	0.32051112	0.10688538	0.04121863	0.14851463	0.00003320	0.00572763	0.05508515	1.000000
NET PAY ISOPACH-PYRAMID METHOD (ACRE-FT)**	0.08098592	0.08802817	0.54225352	0.08249497	0.00000000	0.12424547	0.00000000	0.00855131	0.07344064	1.000000
NET PHIMH - PYRAMID METHOD (ACRE-O-FT)***	0.18691083	0.07248101	0.30895078	0.14976567	0.03189373	0.18835585	0.00587807	0.03278778	0.02297628	1.000000
	0.19540547	0.07581048	0.27922122	0.12698338	0.03117466	0.23709379	0.00556506	0.02477402	0.02397192	1.000000

* INCLUDES TRAP'D AND P&A'D WELLS.

** POROSITY CUTOFF OF 82 WAS USED--SEE ATTACHMENT 6.

*** POROSITY CUTOFF OF 82 WAS USED--SEE ATTACHMENT 9.
** ASSUME THIS WELL IS USABLE

TABLE 18

**EQUITY PARAMETERS AND WORKING INTEREST PARTICIPATION
DERIVED FROM TABLE 17 FIGURES**

<u>PARAMETER</u>	<u>OXY</u> <u>%</u>	<u>CONOCO</u> <u>%</u>	<u>SANTA FE*</u> <u>%</u>	<u>SANTA FE</u> <u>ENERGY</u> <u>%</u>	<u>TOTAL</u>
SURFACE ACRES	82.0650	7.6864	5.1243	5.1243	100
NET WELL COUNT					
PRODUCIBLE	91.6667	0.0000	8.3333	0.0000	100
USABLE	50.0000	50.0000	0.0000	0.0000	100
CUMULATIVE PRODUCTION TO 5/1/89	90.0750	4.7021	5.2191	0.0038	100
REMAINING PRIMARY RESERVES FROM 5/1/89	87.7938	0.0000	12.2062	0.0000	100
ULTIMATE PRIMARY RESERVES	89.7935	4.1219	6.0813	0.0033	100
AVERAGE CURRENT PRODUCING RATES AS OF 4/89	91.8008	0.0000	8.1992	0.0000	100
NET PAY ISOPACH PYRAMID METHOD	90.6464	3.1894	5.5764	0.5878	100
NET POROSITY-THICKNESS PYRAMID METHOD	91.4514	3.1175	4.8746	0.5565	100

OXY USA:

TRACTS 1A, 1B, 2A, 2B, 4A AND 4B

CONOCO:

TRACT 3

*SANTA FE AND APPROXIMATELY 26 OTHERS: TRACTS 6 AND 7

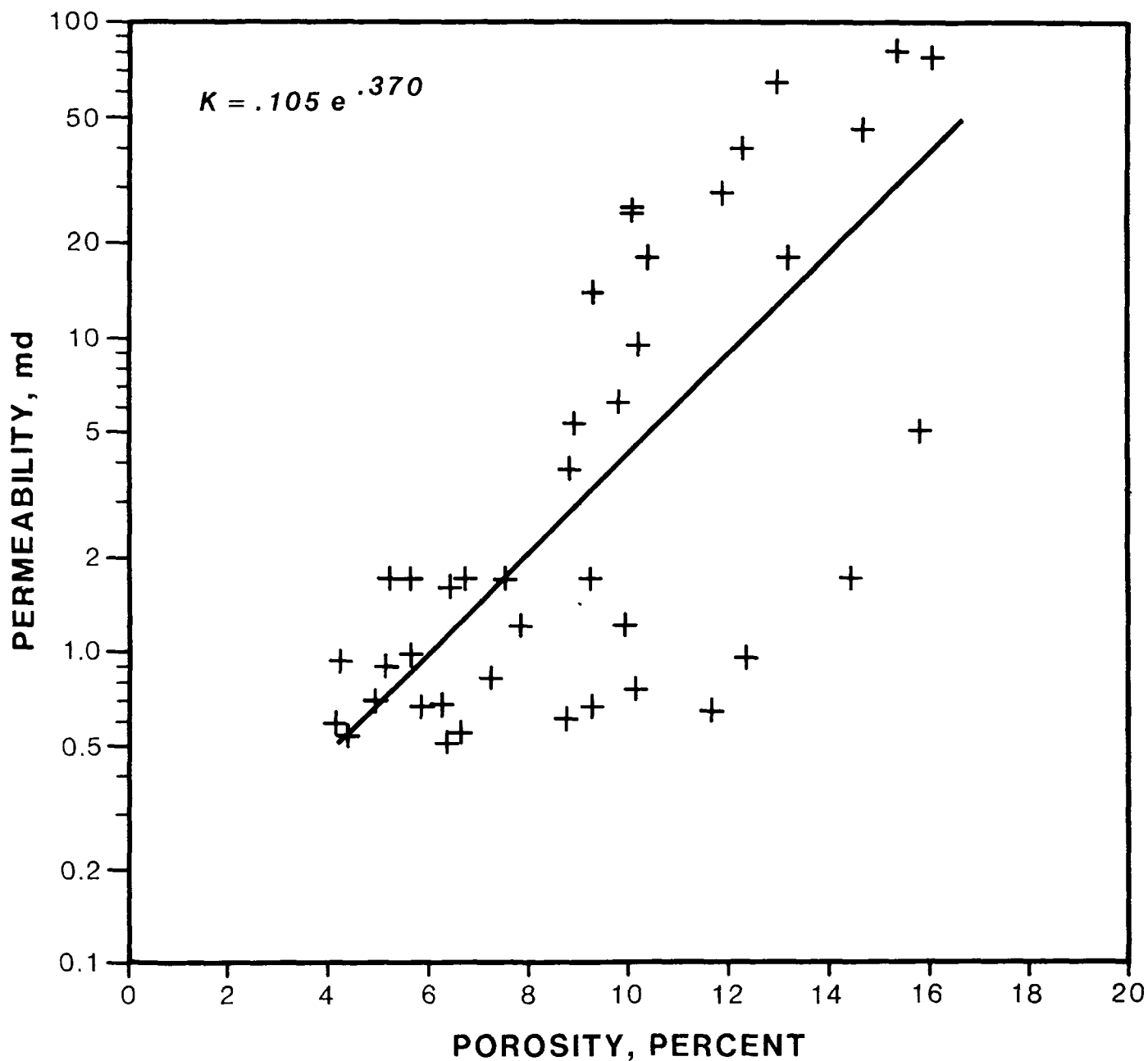
SANTA FE ENERGY:

TRACT 5

COMPLETE TRACT DESCRIPTIONS ARE GIVEN IN ATTACHMENT 17.

FIGURE 1

POROSITY-PERMEABILITY CROSSPLOT FROM CORE DATA



USING CORE ANALYSIS FROM: FEDERAL "AA" No.2
FEDERAL "AD" No.1
FEDERAL "AE" No.1

FIGURE 2
Pressure and Volume Relations

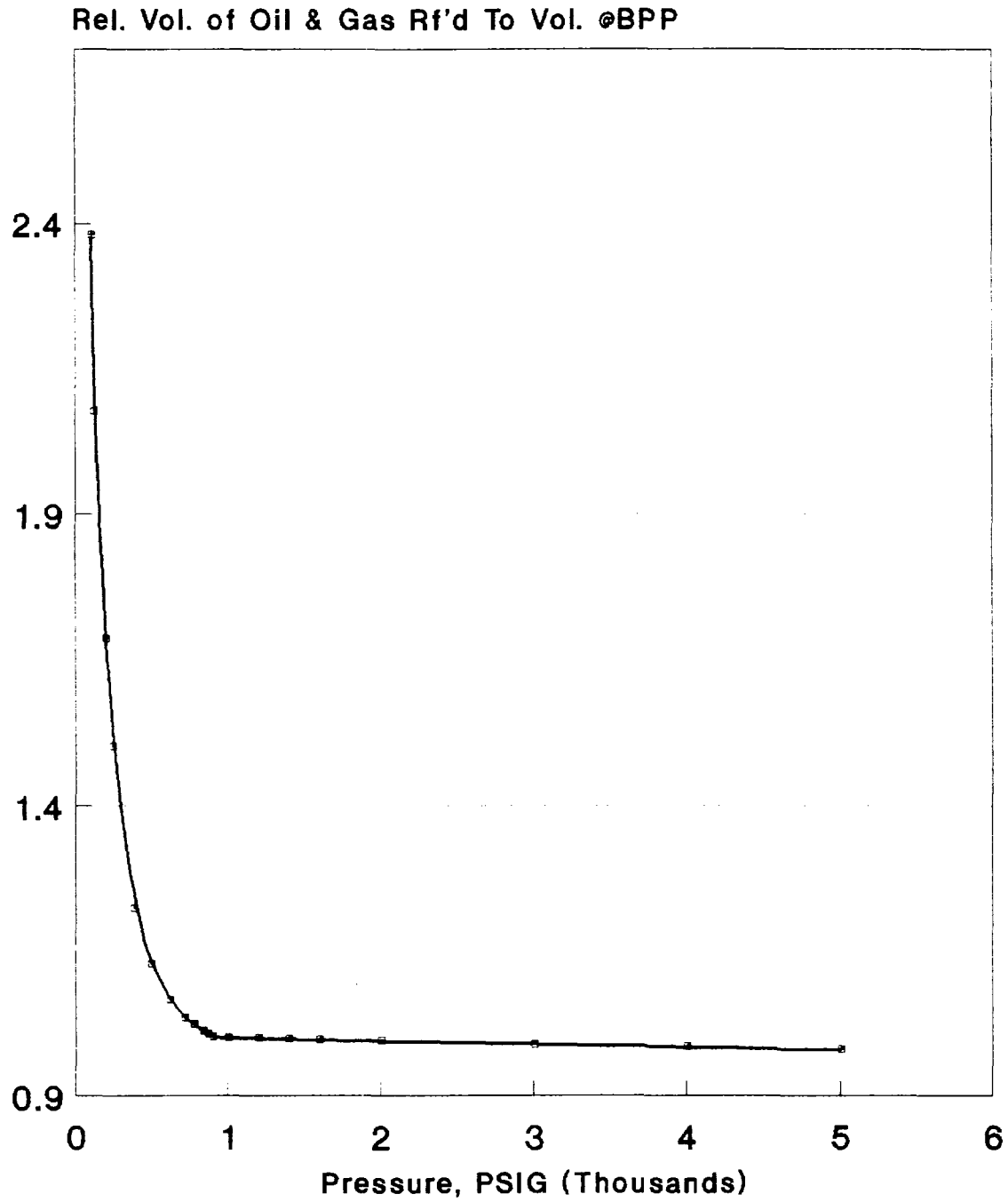


FIGURE 3
Liquid Compressibility vs. Pressure

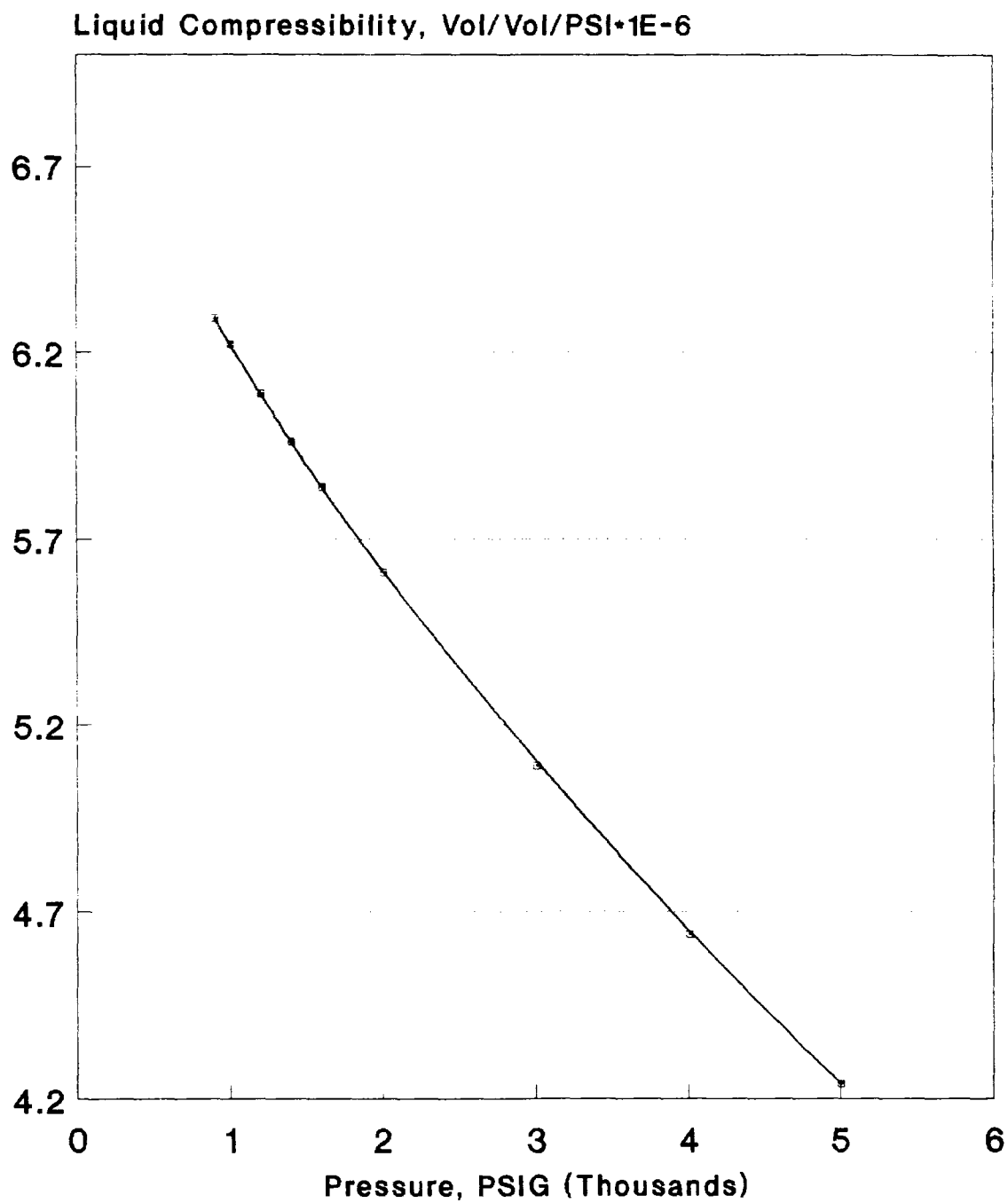


FIGURE 4
Reservoir Volume Factor vs. Pressure

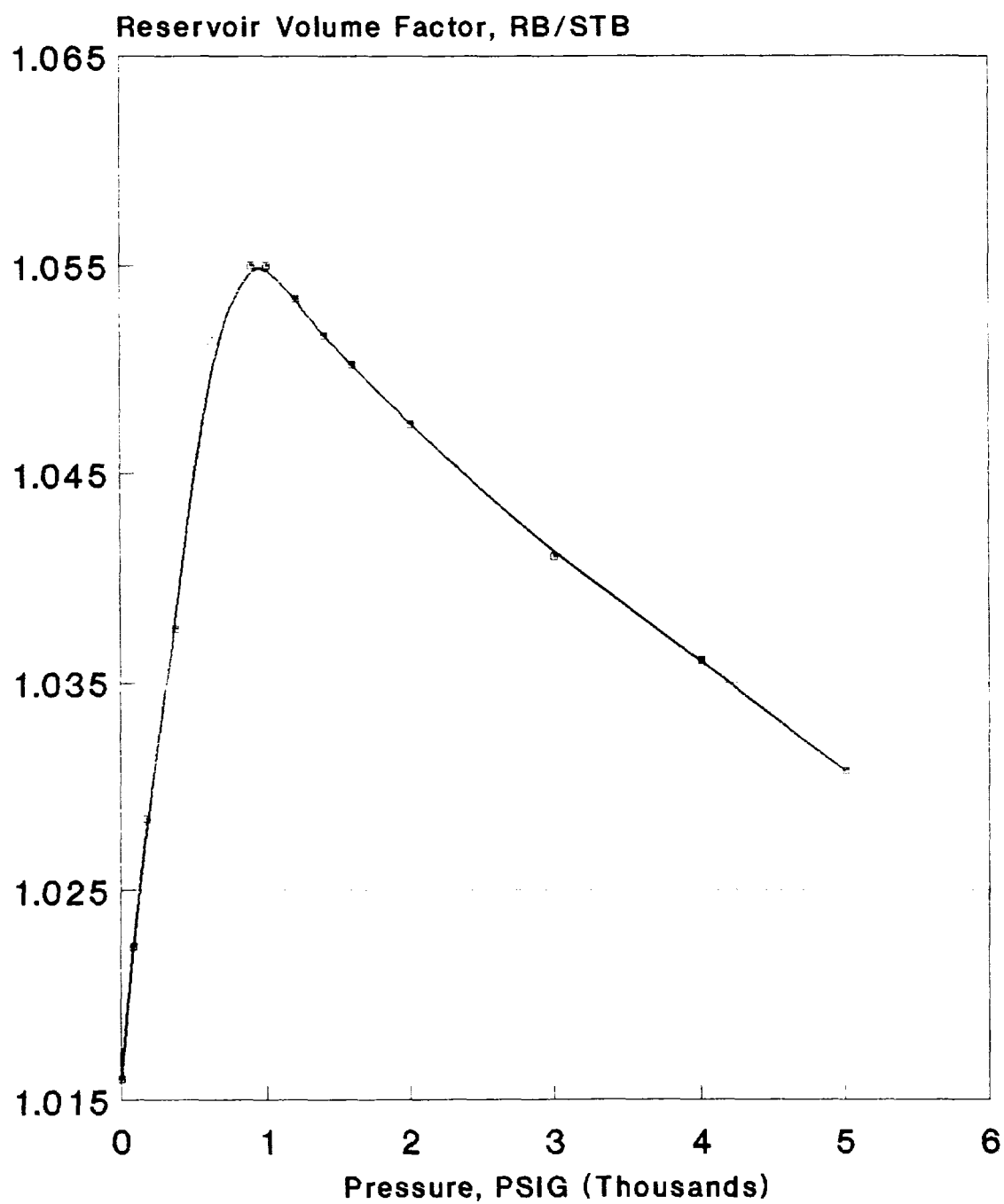


FIGURE 5
Solution Gas-Oil-Ratio vs. Pressure

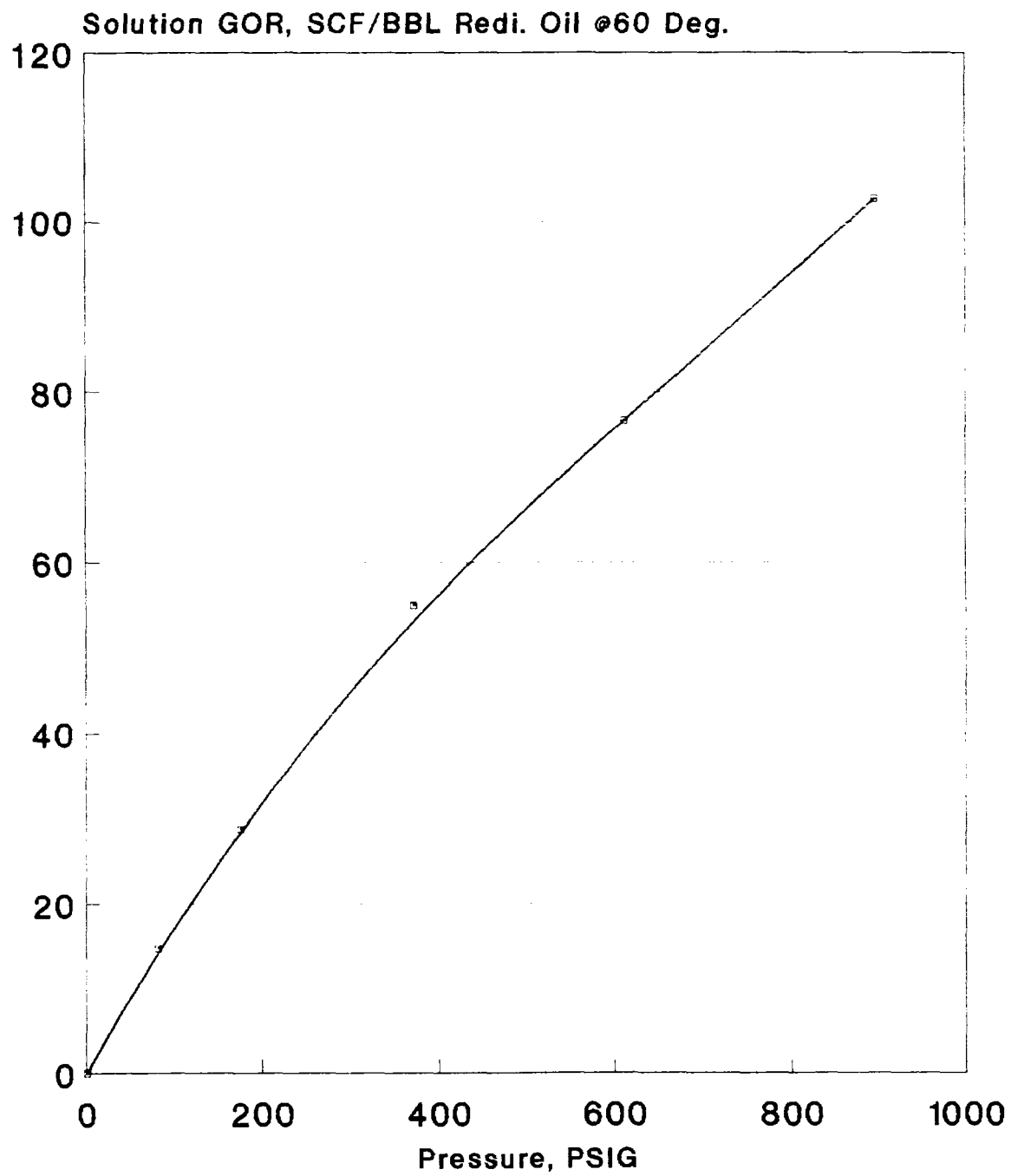


FIGURE 6
Liquid Density vs. Pressure

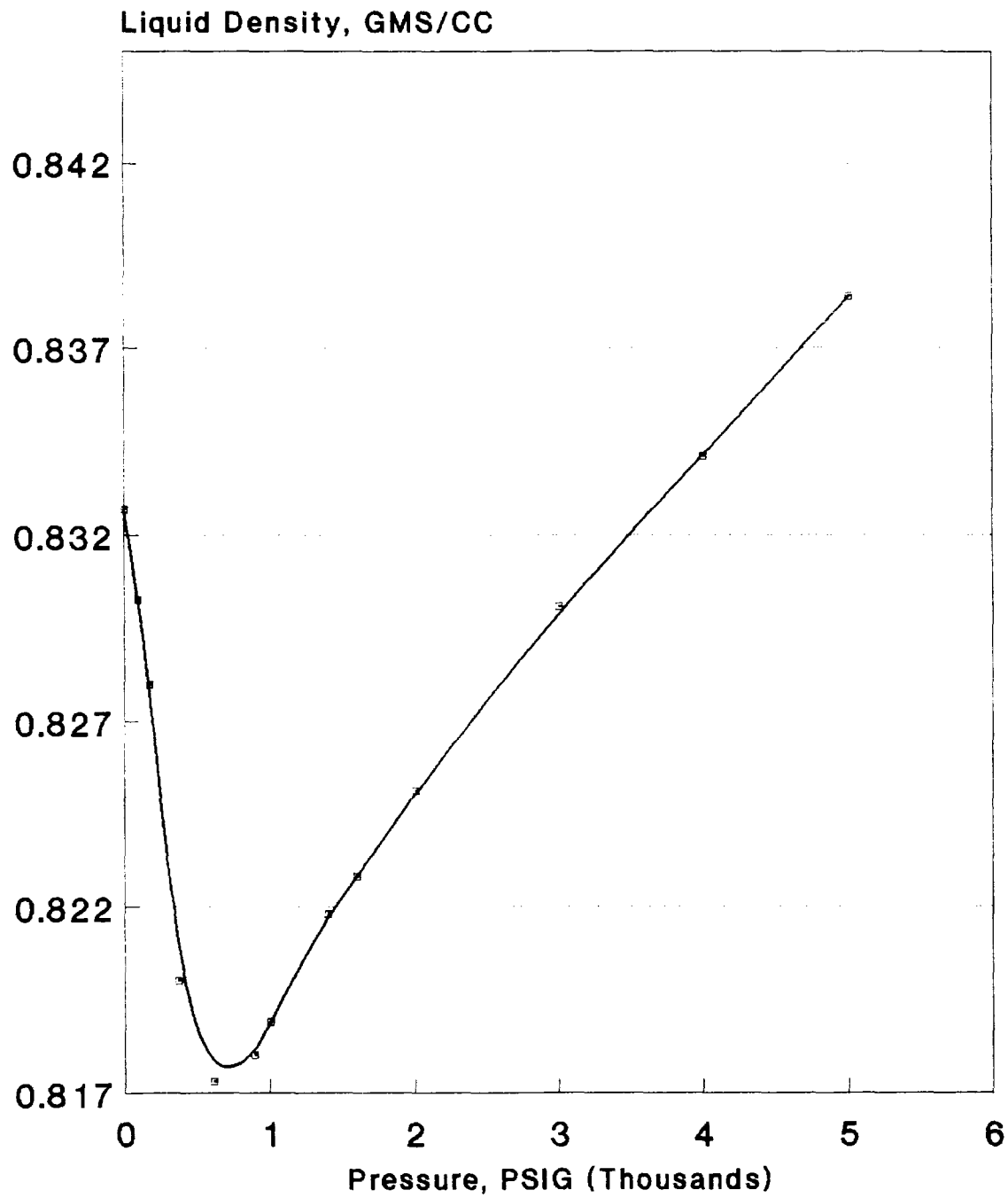


FIGURE 7
Viscosity vs. Pressure @ Reservoir Temp.

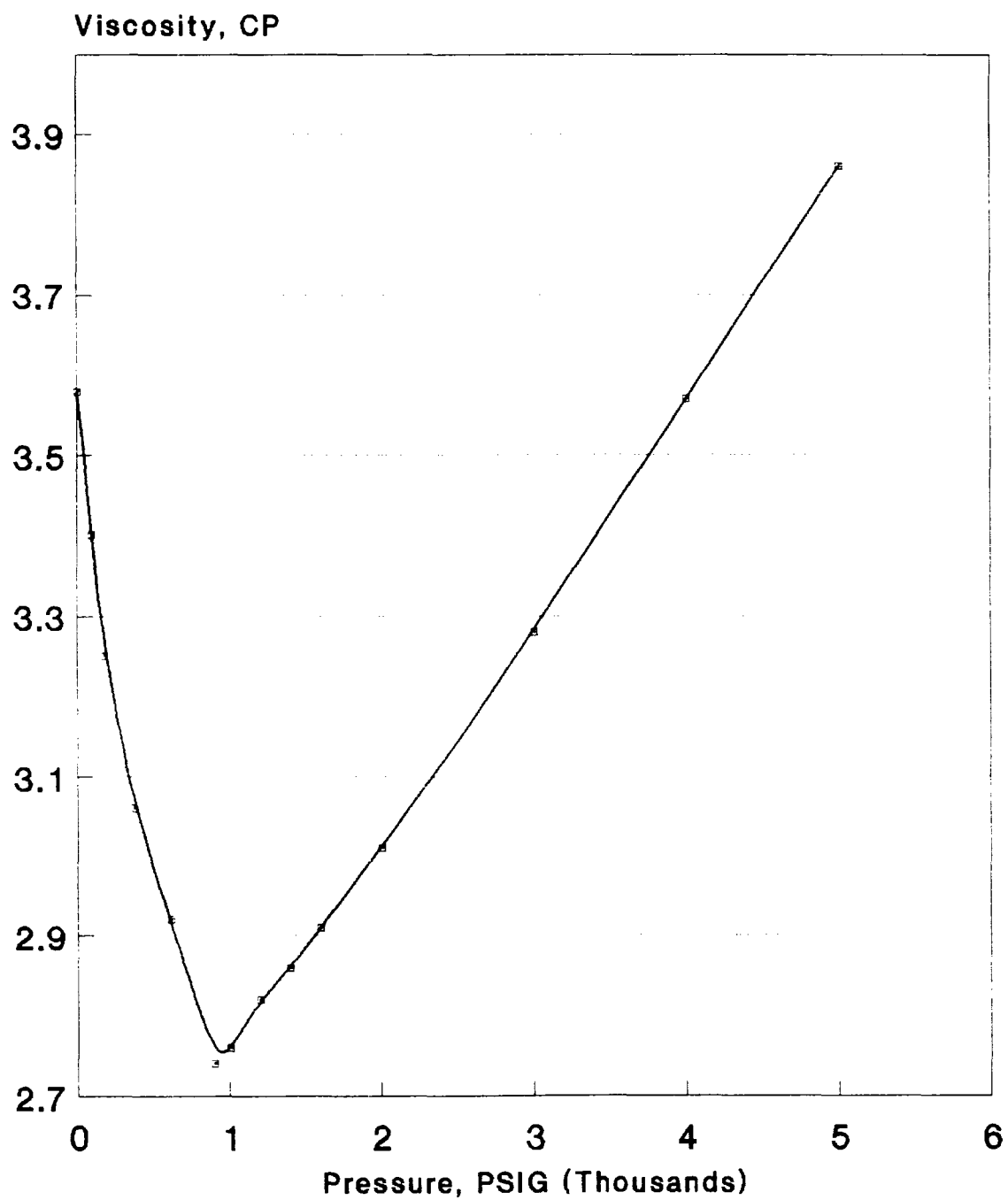


FIGURE 8
Specific Gravity of Liberated Gas

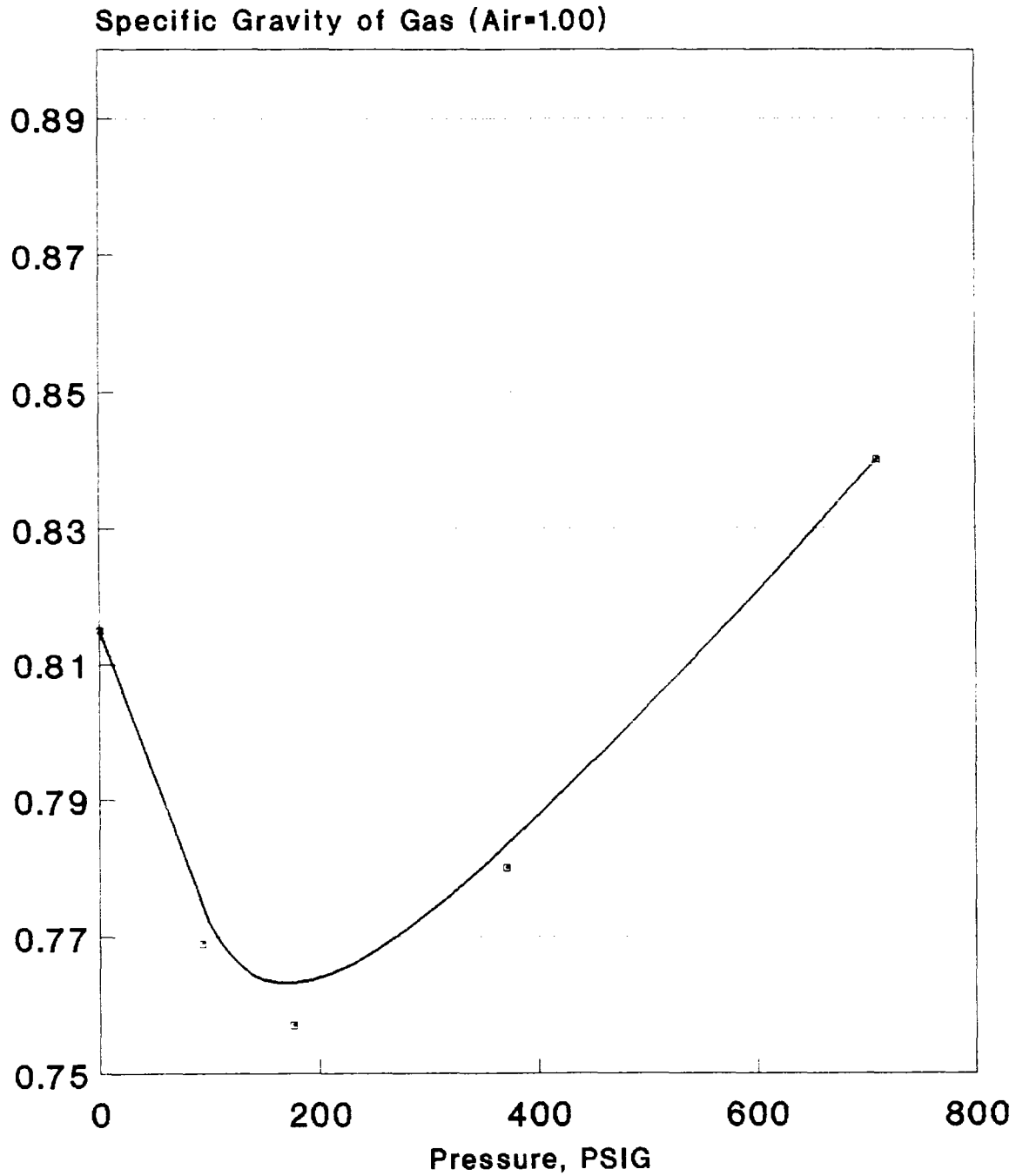


FIGURE 9
Fractional Flow Curve

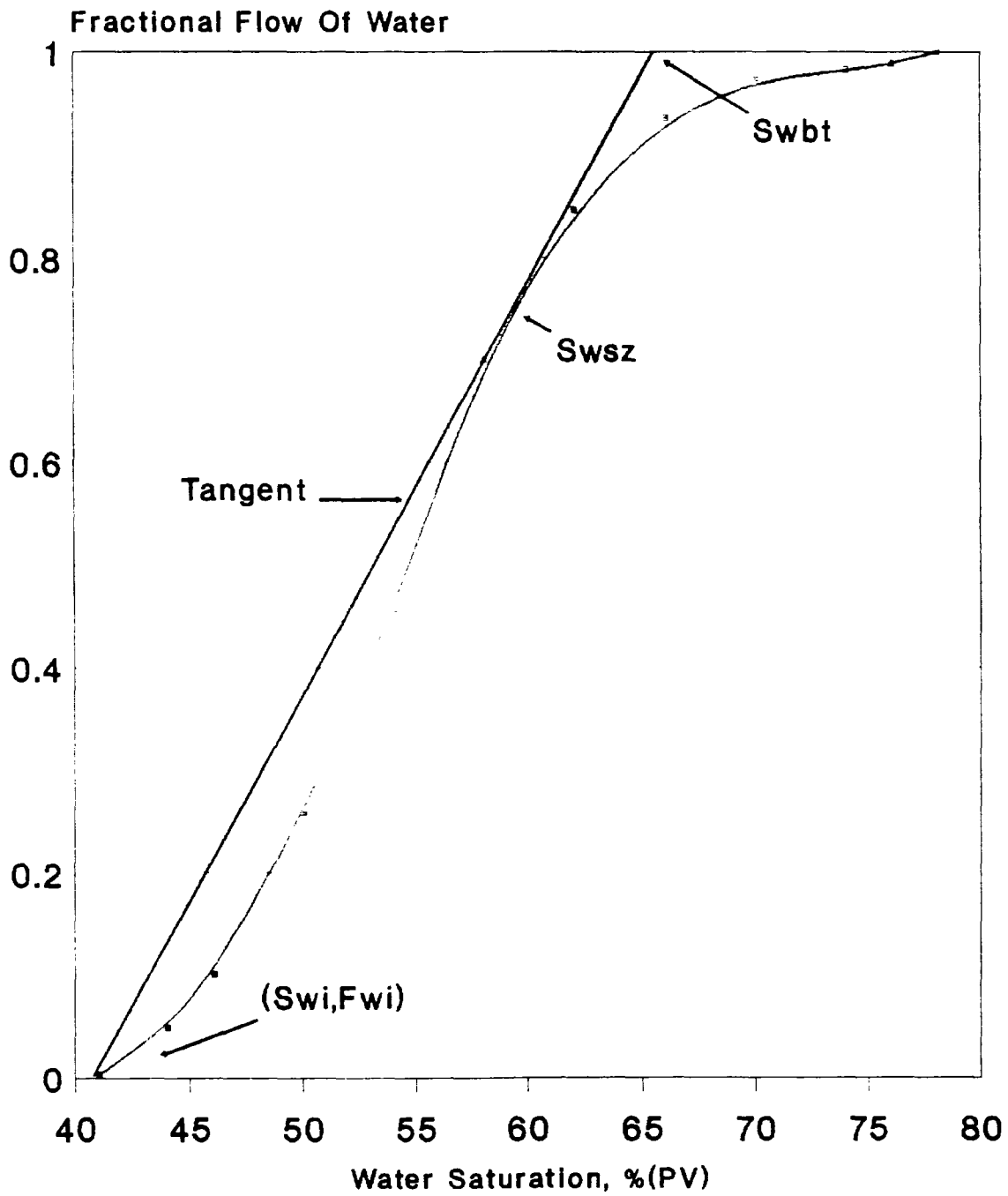


FIGURE 10
Central Corbin Queen
Waterflood Start 1 / 1990

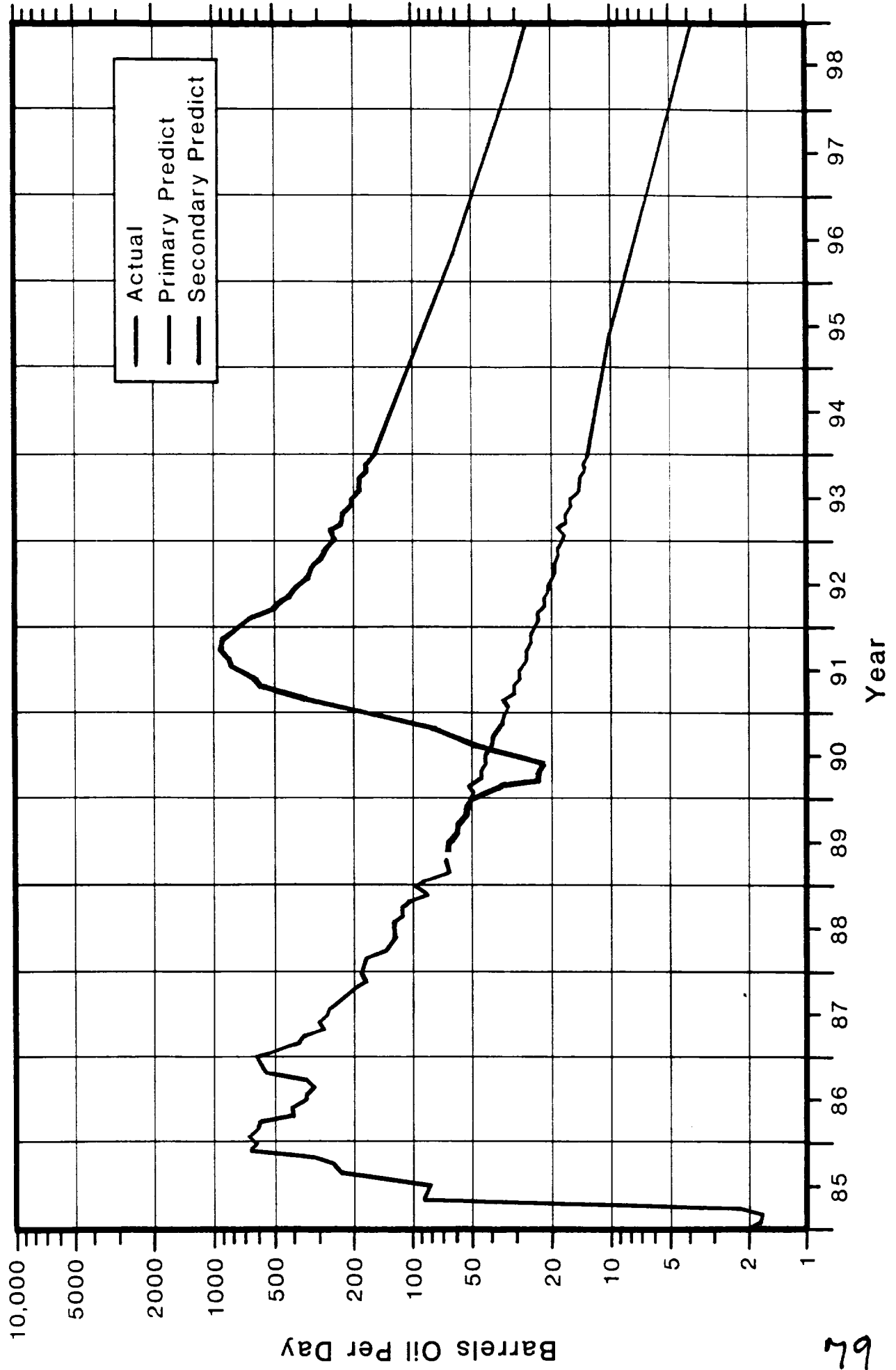
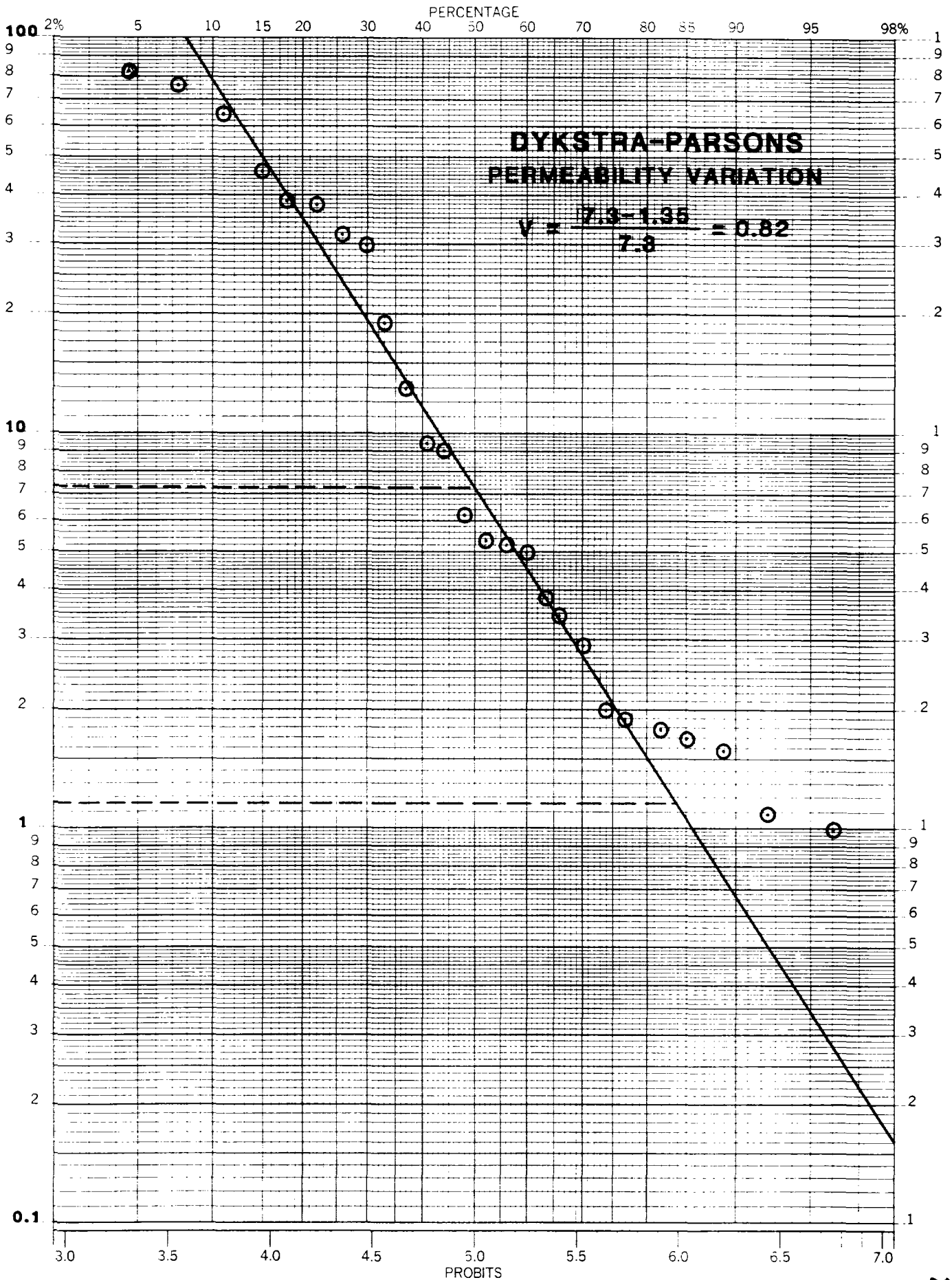


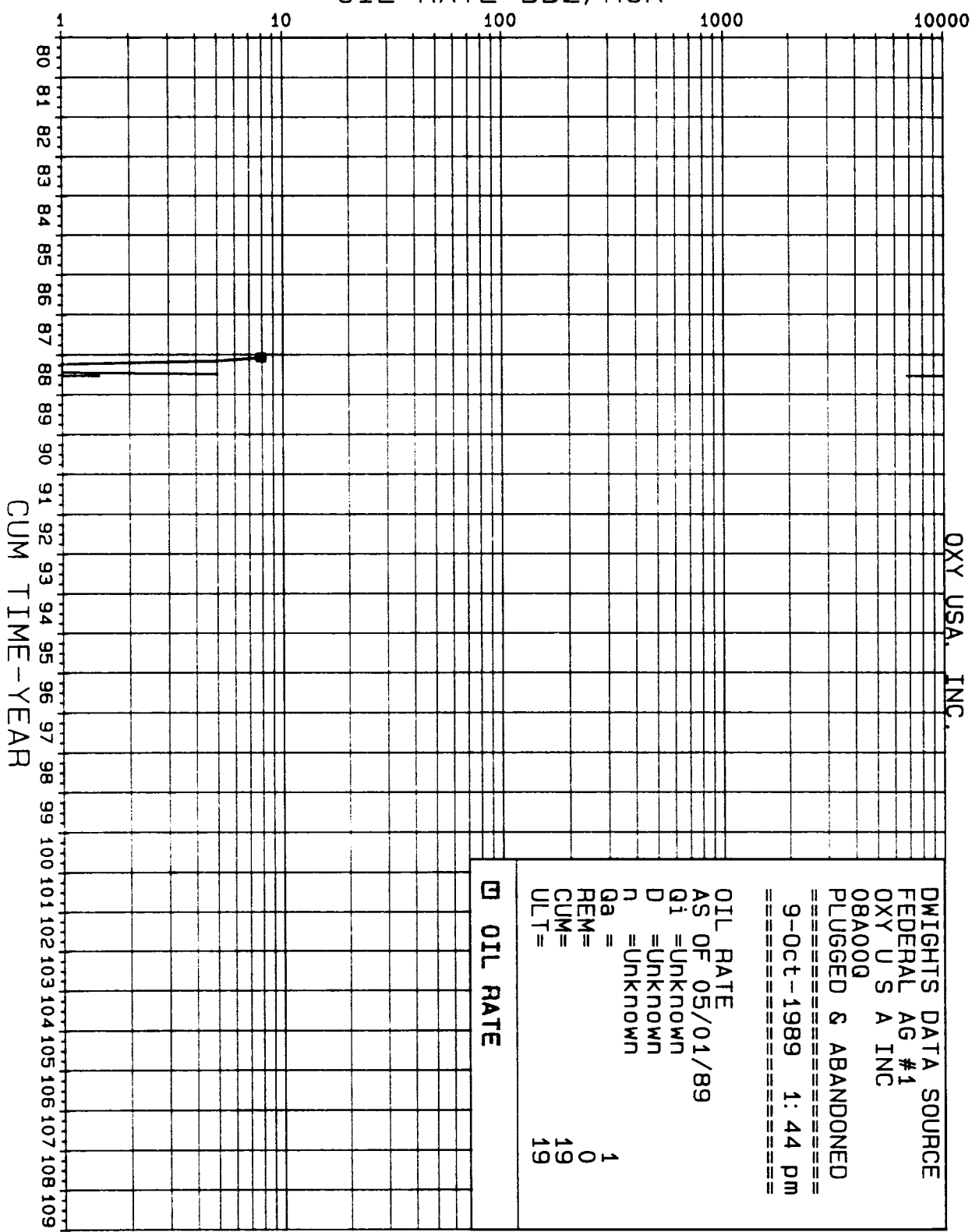
FIGURE 11



4b 8082

KEUFFEL & ESSER CO. NEW YORK, N.Y.

OIL RATE-BBL/MON



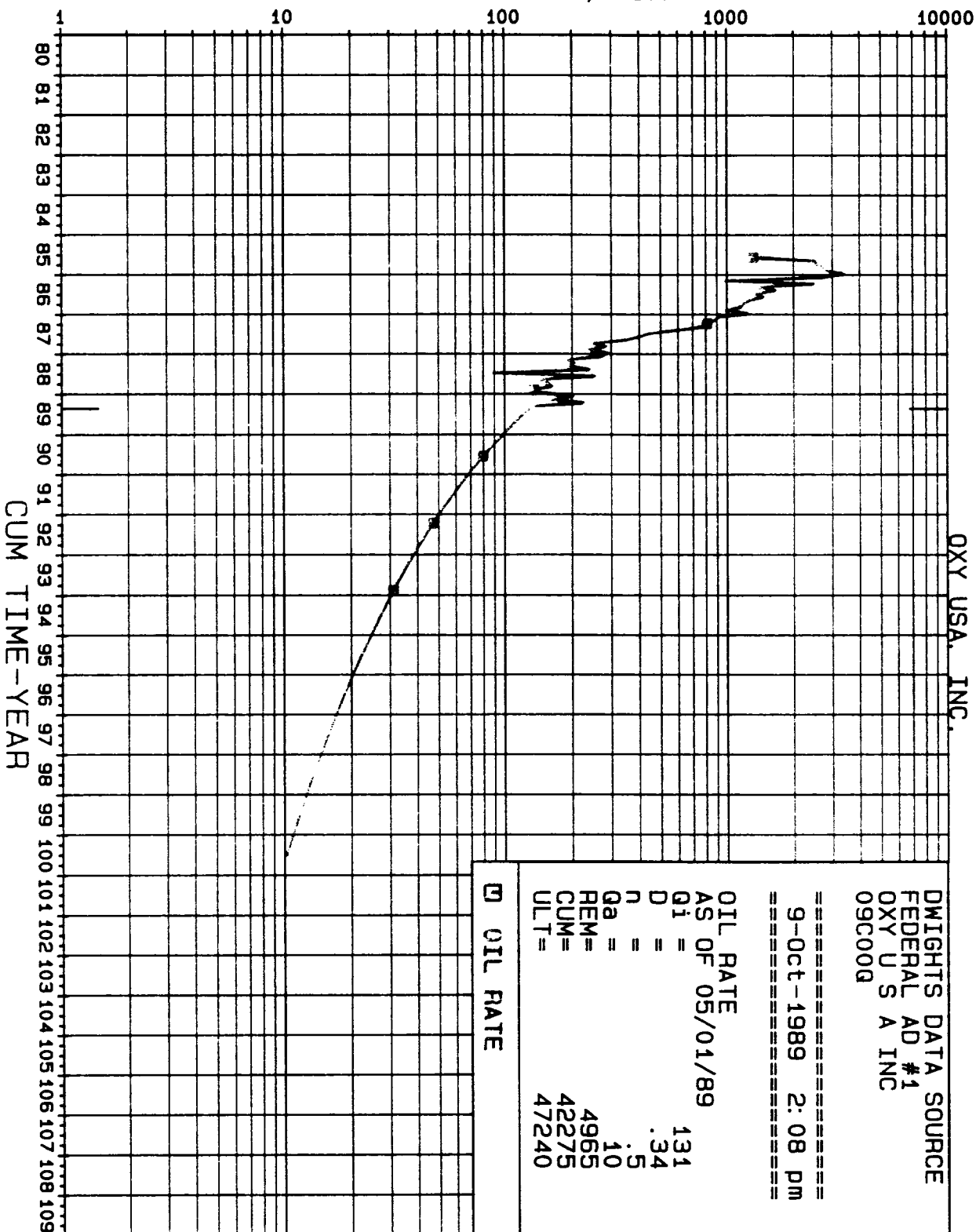
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FEDERAL AG #1
OXY U S A INC
08A00G
PLUGGED & ABANDONED
=====

9-Oct-1989 1:44 pm
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AS OF 05/01/89
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D =Unknown
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REM= 0
CUM= 19
ULT= 19

OIL RATE

OIL RATE-BBL/MON



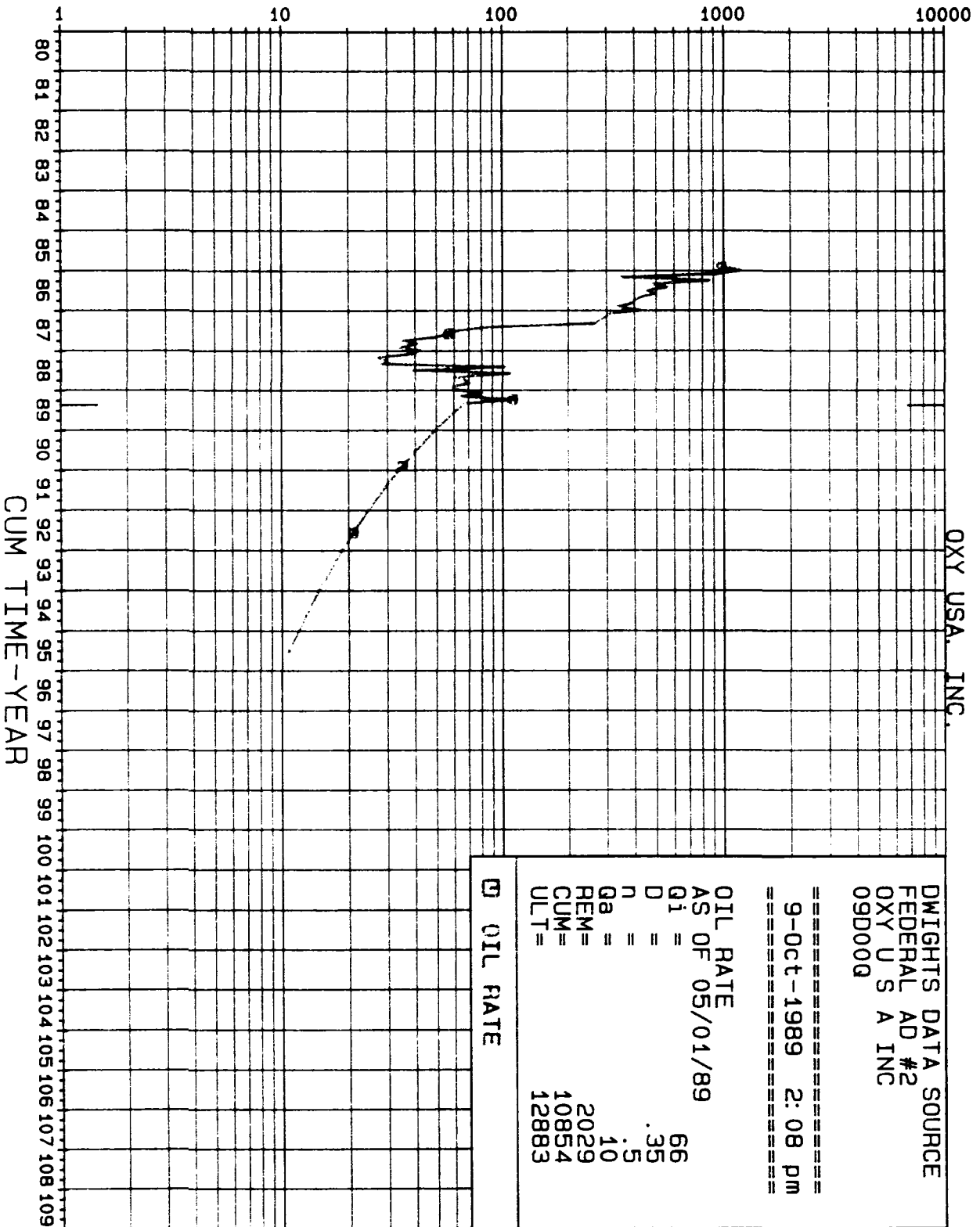
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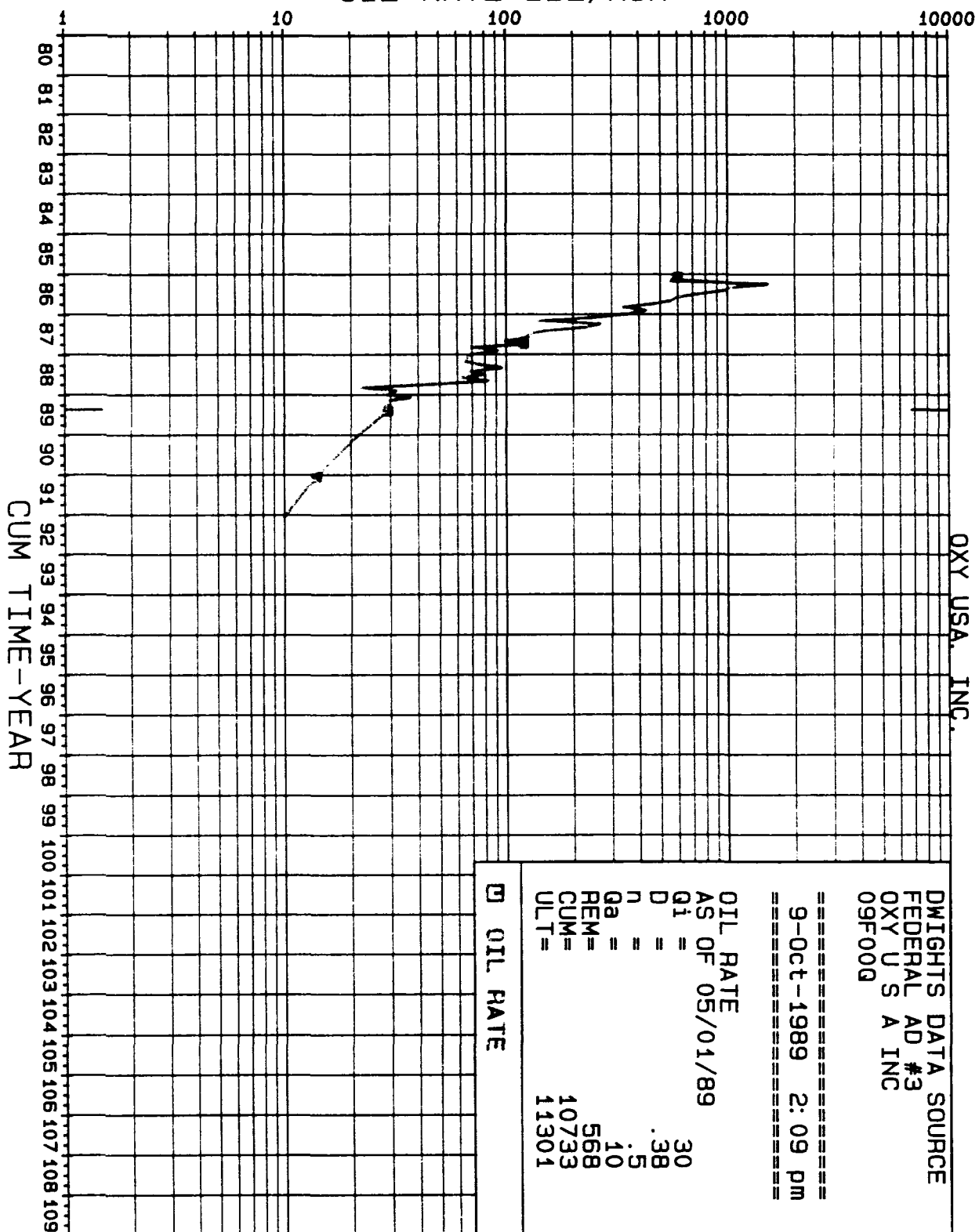
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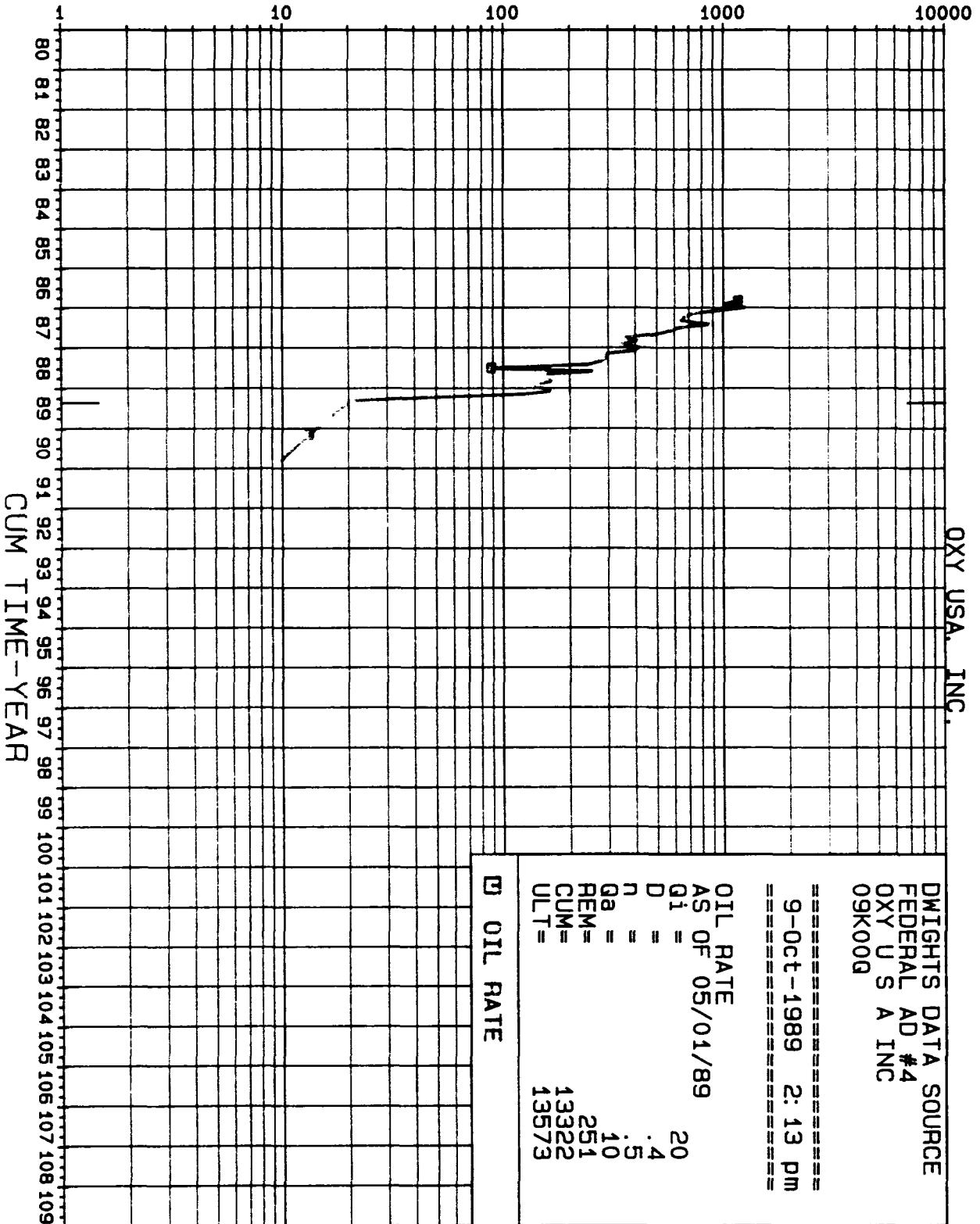
OIL RATE-BBL/MON



OIL RATE-BBL/MON



OIL RATE-BBL/MON



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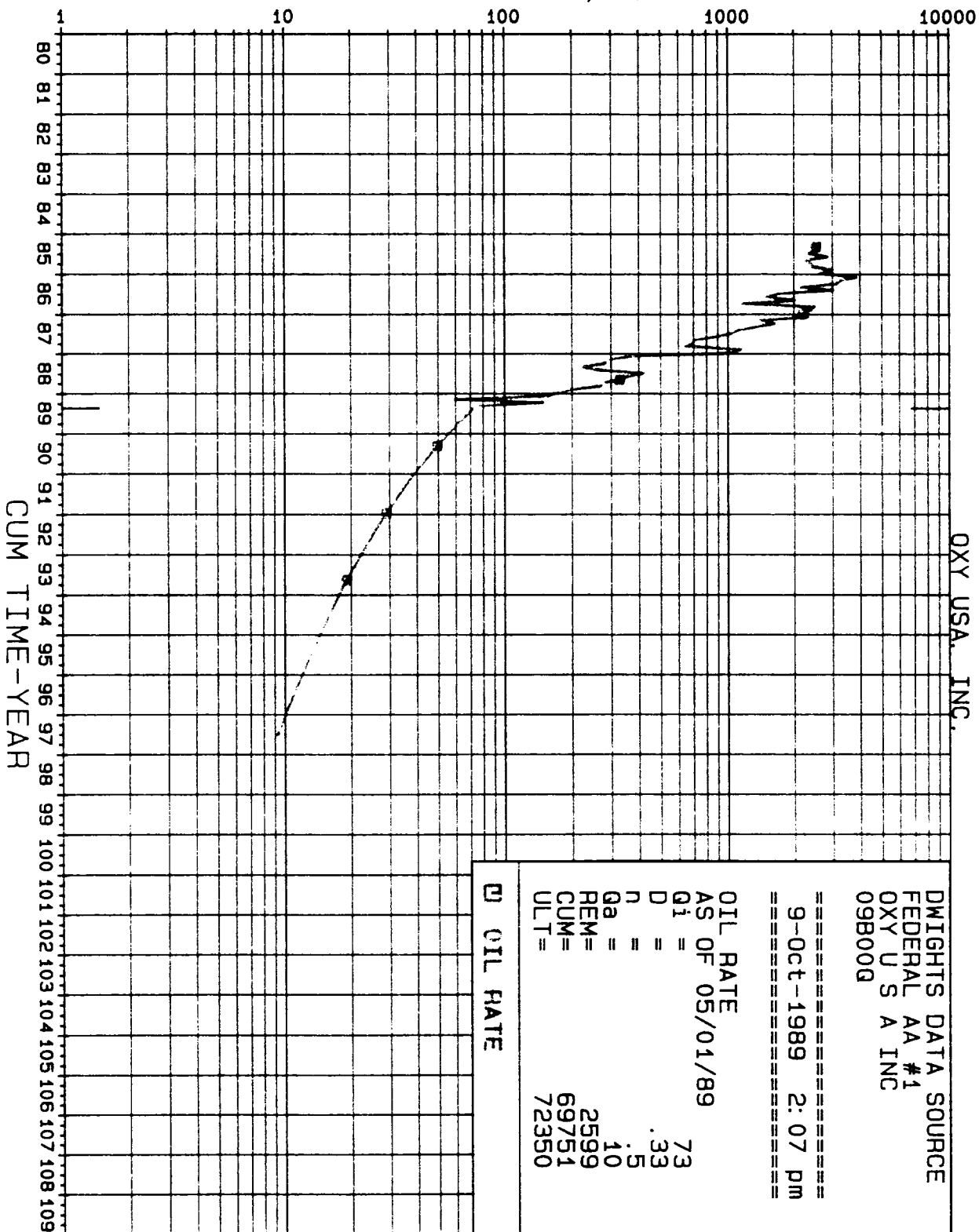
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OIL RATE

OIL RATE-BBL/MON



OXY USA, INC.

DWIGHTS DATA SOURCE
FEDERAL AA #1
OXY U S A INC
09B000G

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9-Oct-1989 2:07 pm

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AS OF 05/01/89

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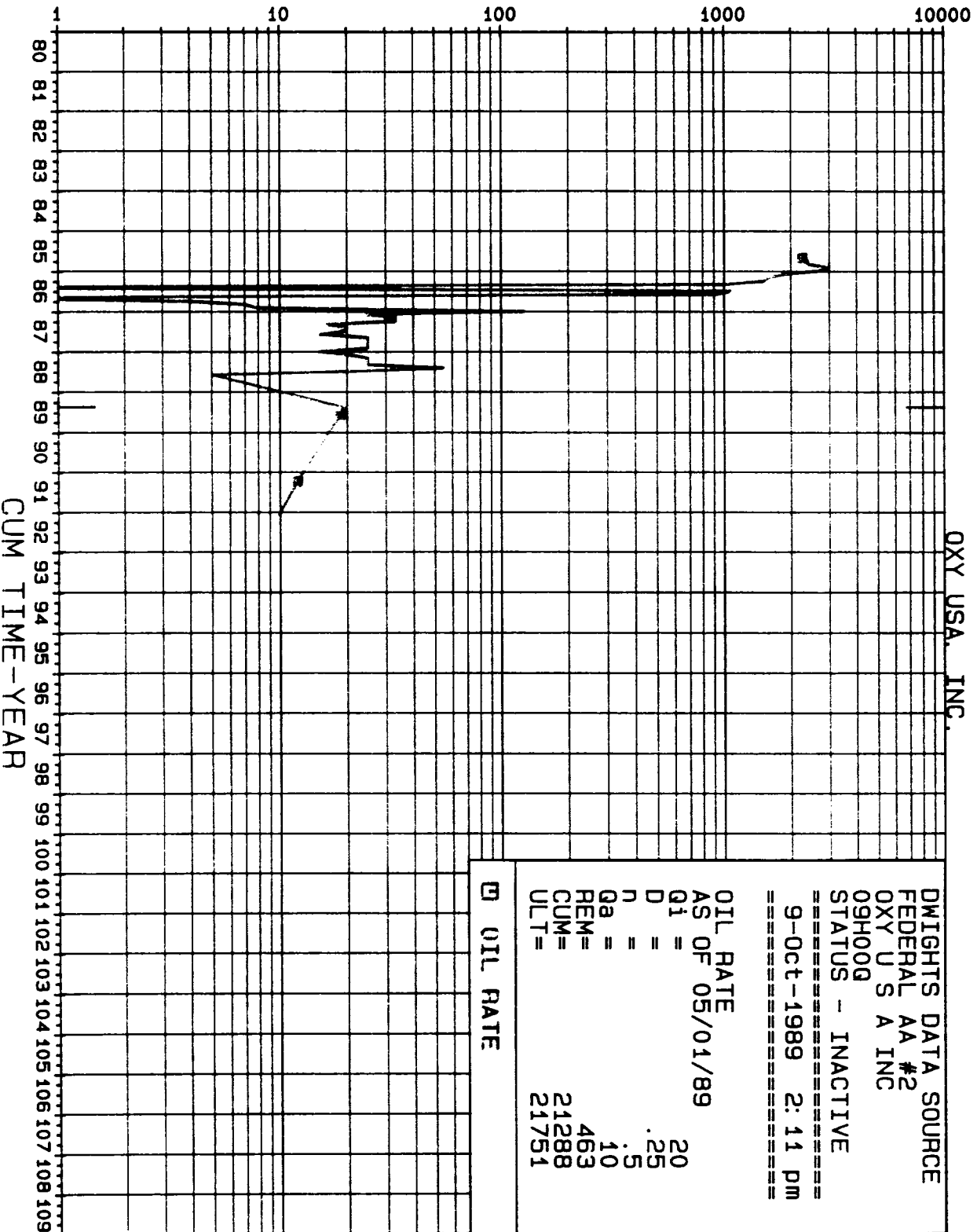
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ULT = 72350

Q OIL RATE

OIL RATE-BBL/MON



OXY USA, INC.

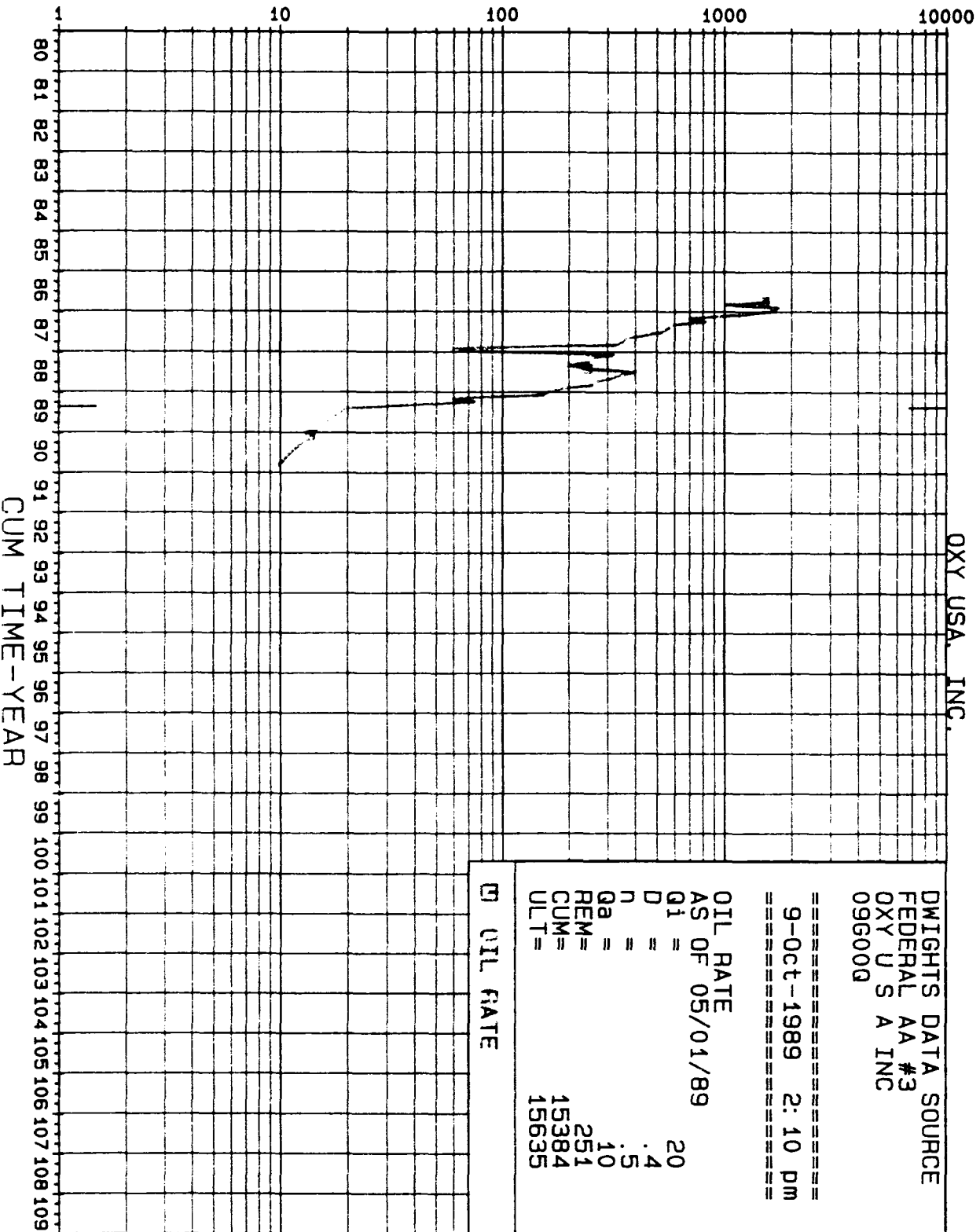
CUM TIME-YEAR

DWIGHTS DATA SOURCE
 FEDERAL AA #2
 OXY U S A INC
 09H00G
 STATUS - INACTIVE
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 9-Oct-1989 2:11 pm
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OIL RATE

OIL RATE
 AS OF 05/01/89
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OIL RATE-BBL/MON



OXY USA, INC.

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OXY U S A INC
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9-Oct-1989 2:10 pm

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AS OF 05/01/89

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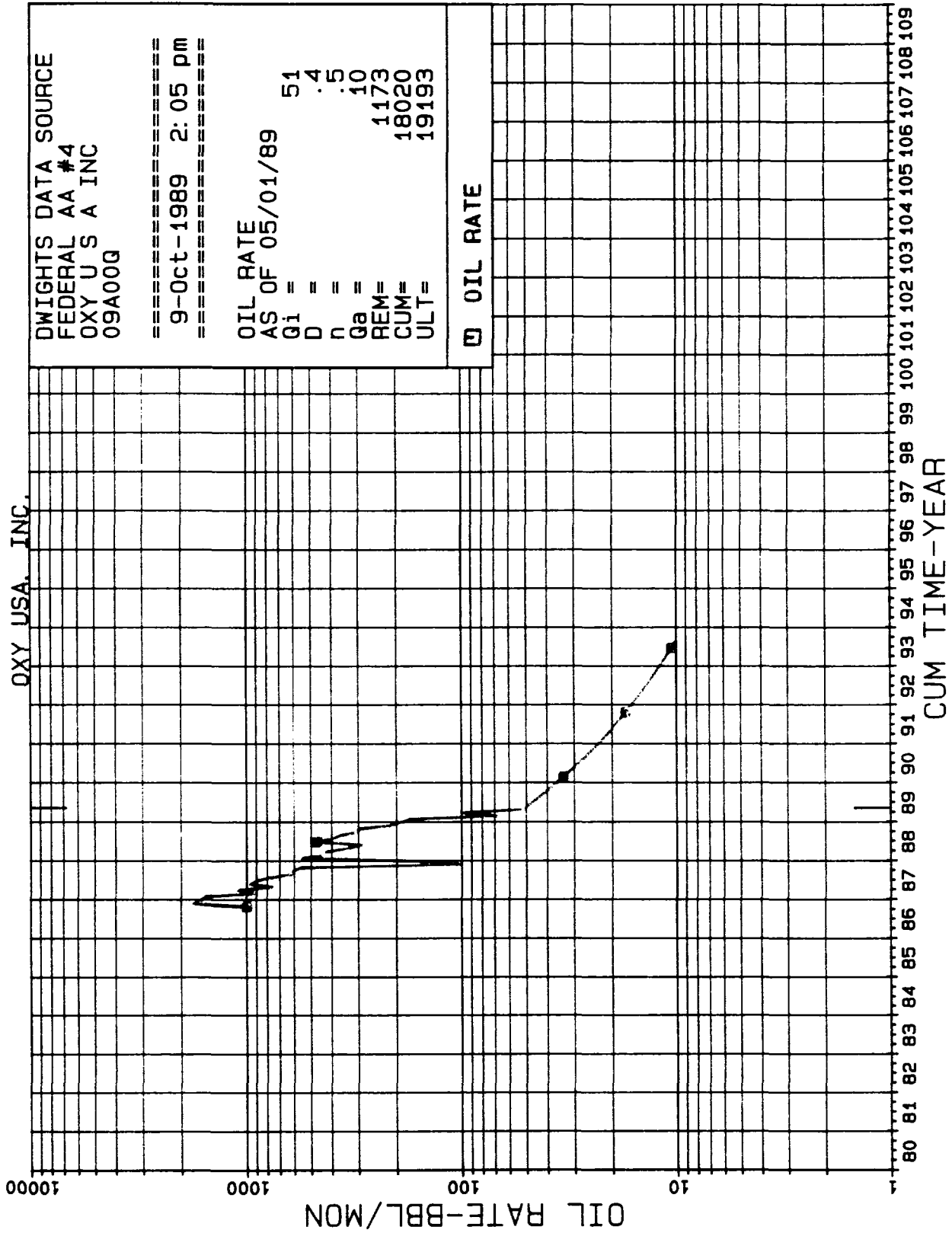
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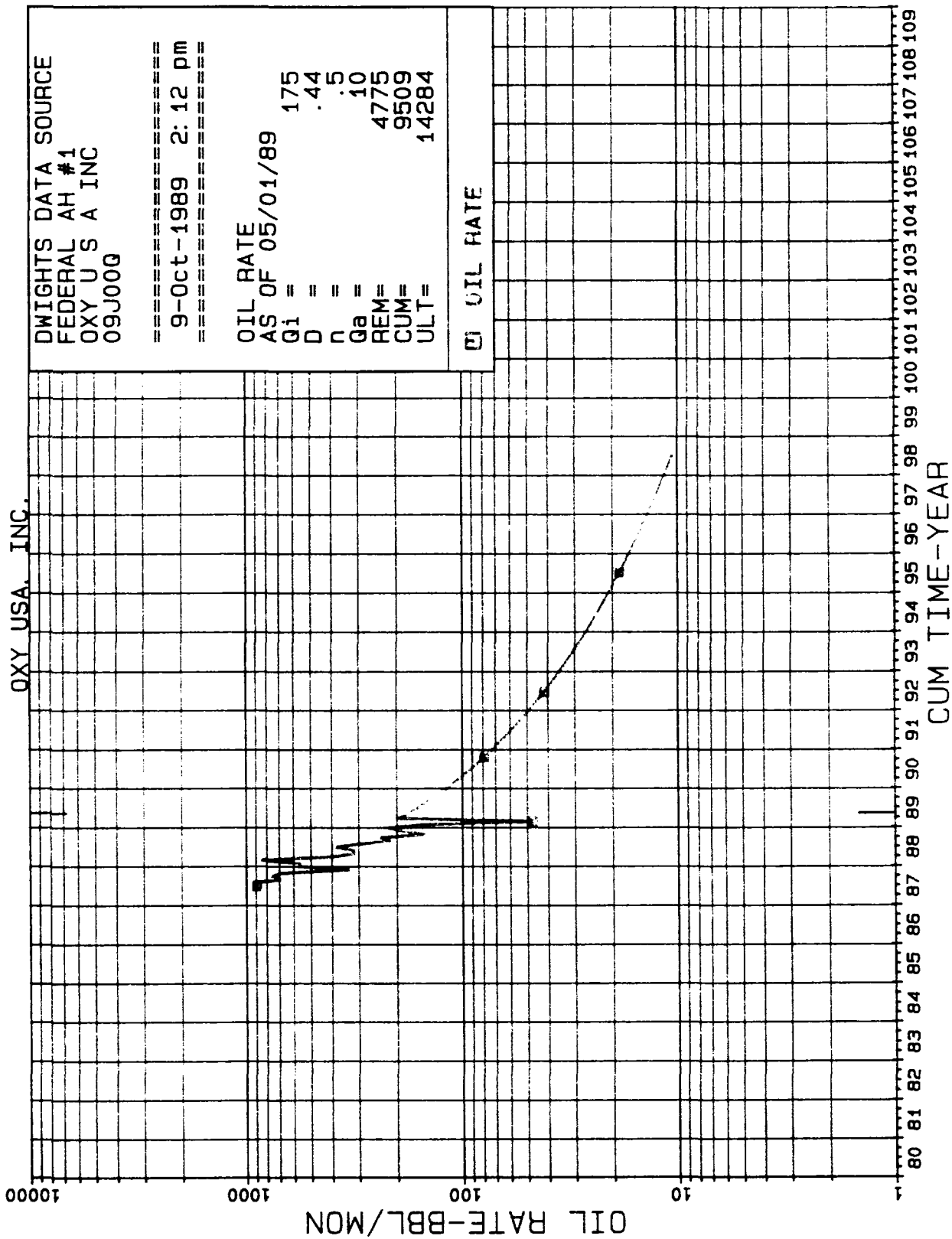
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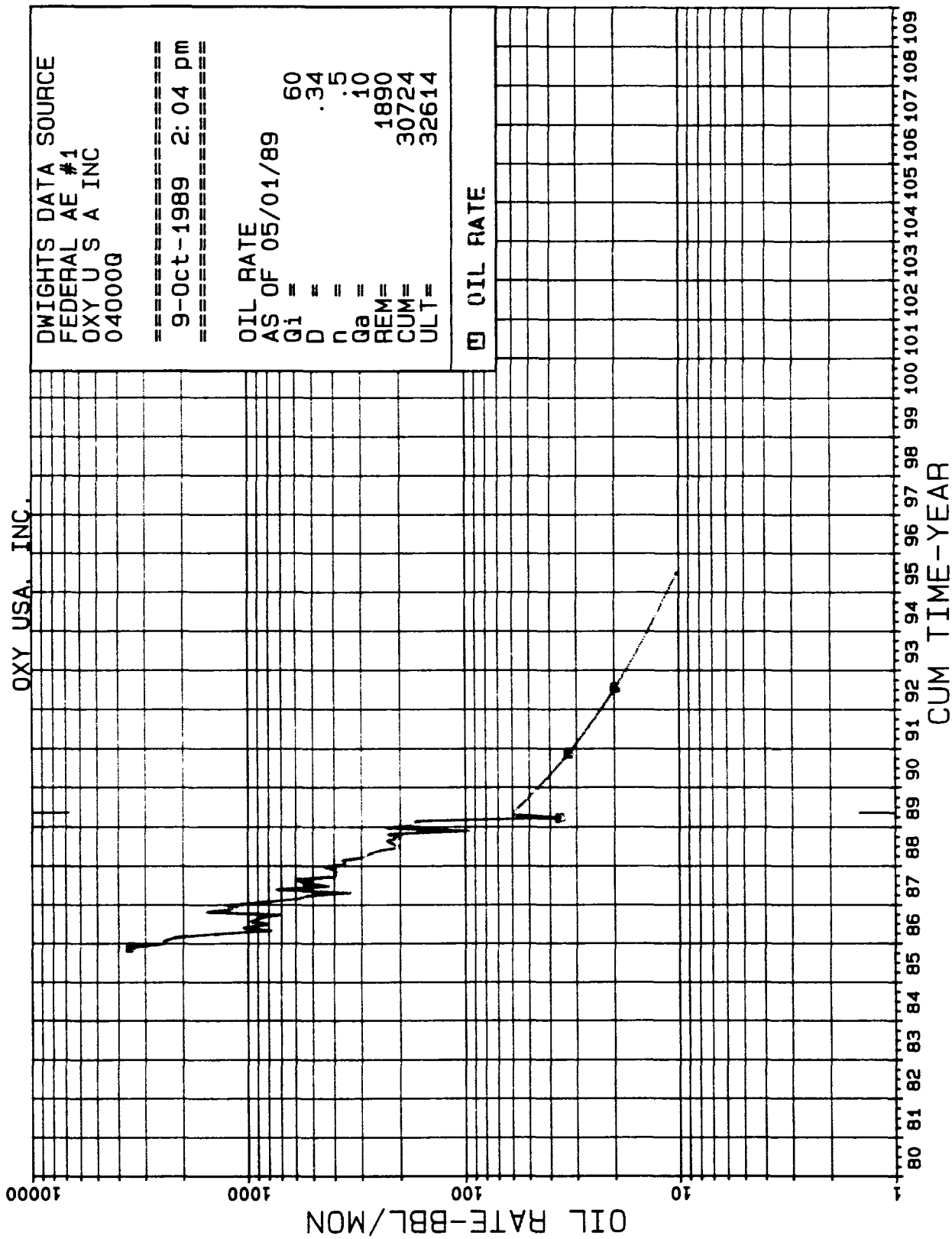
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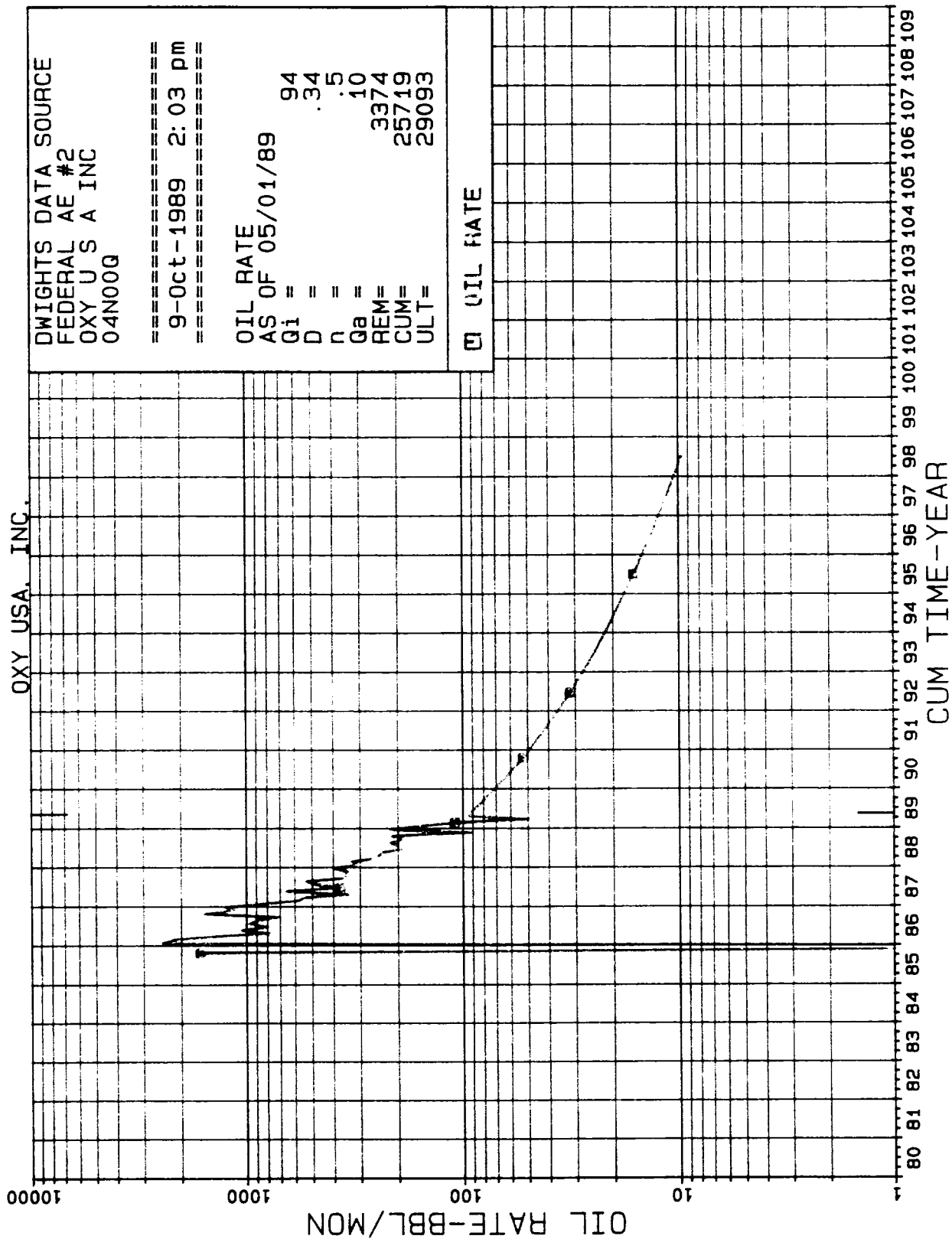
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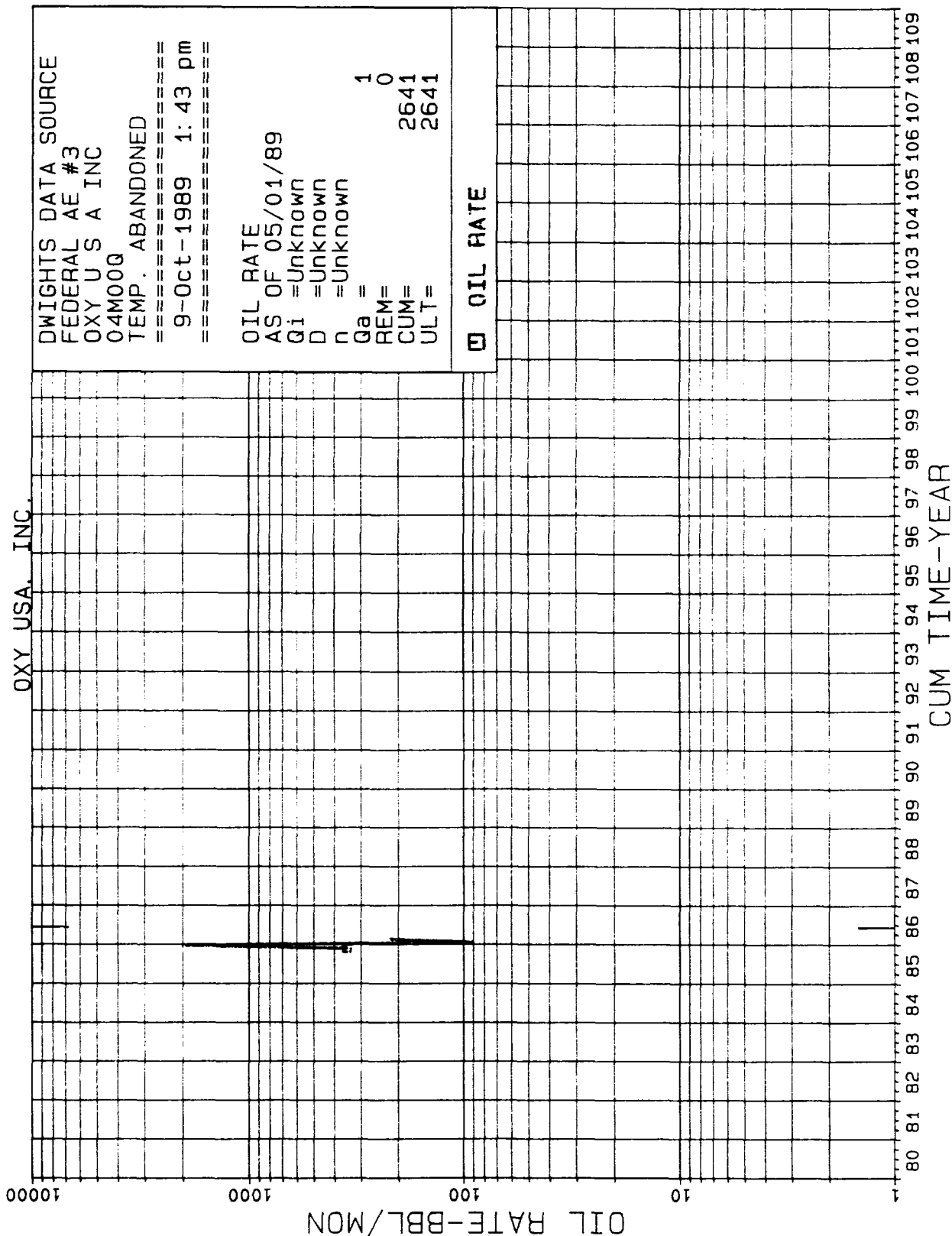
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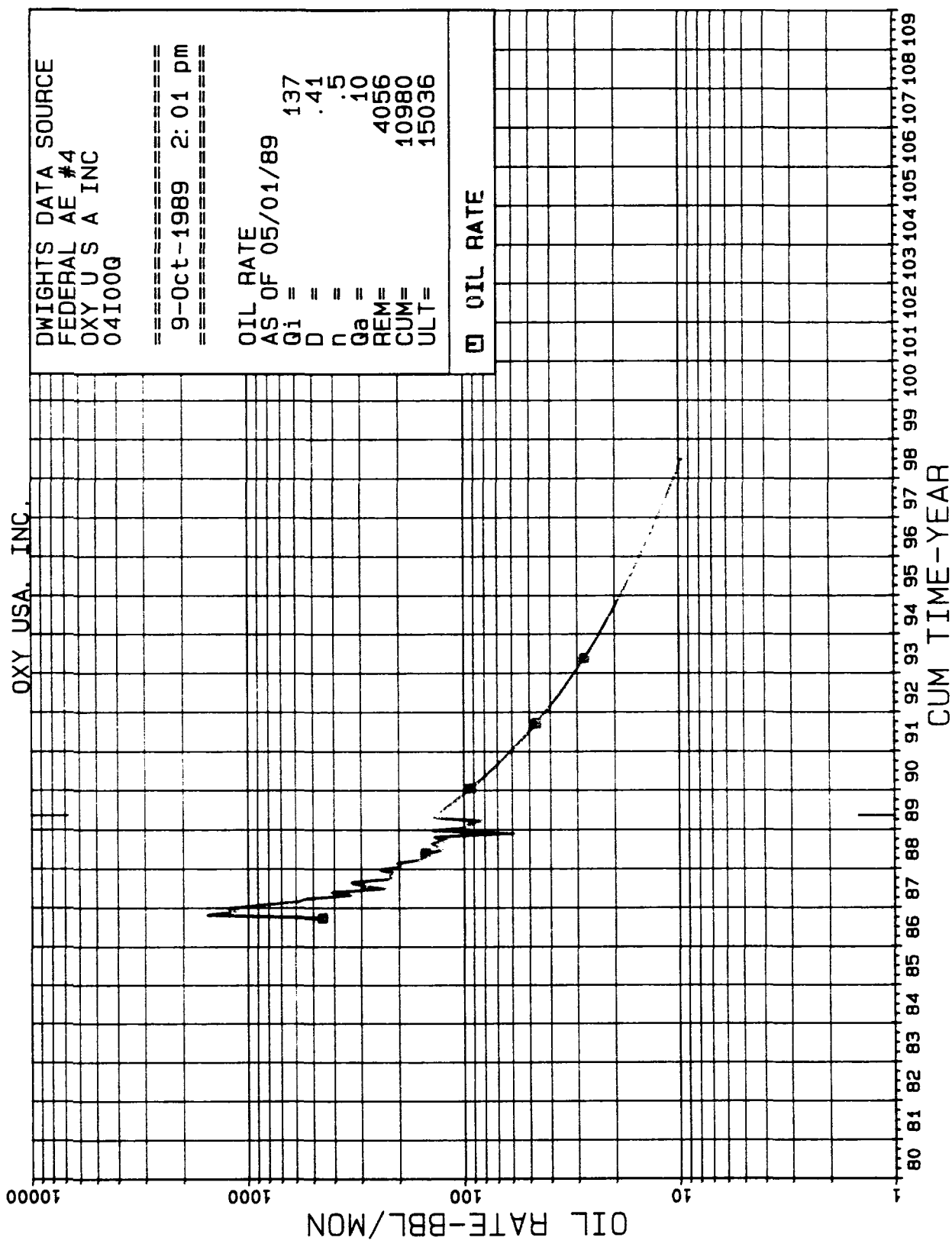


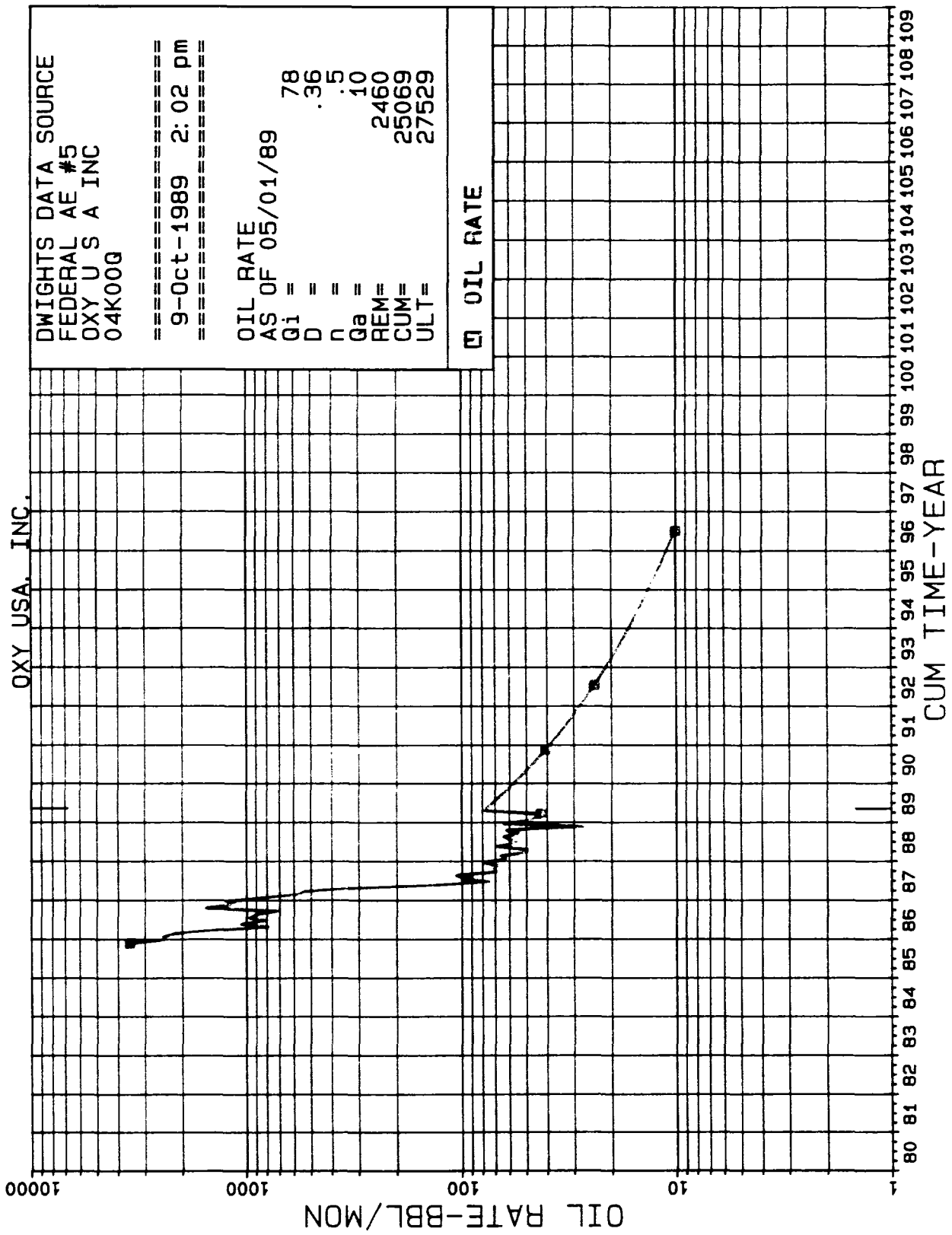


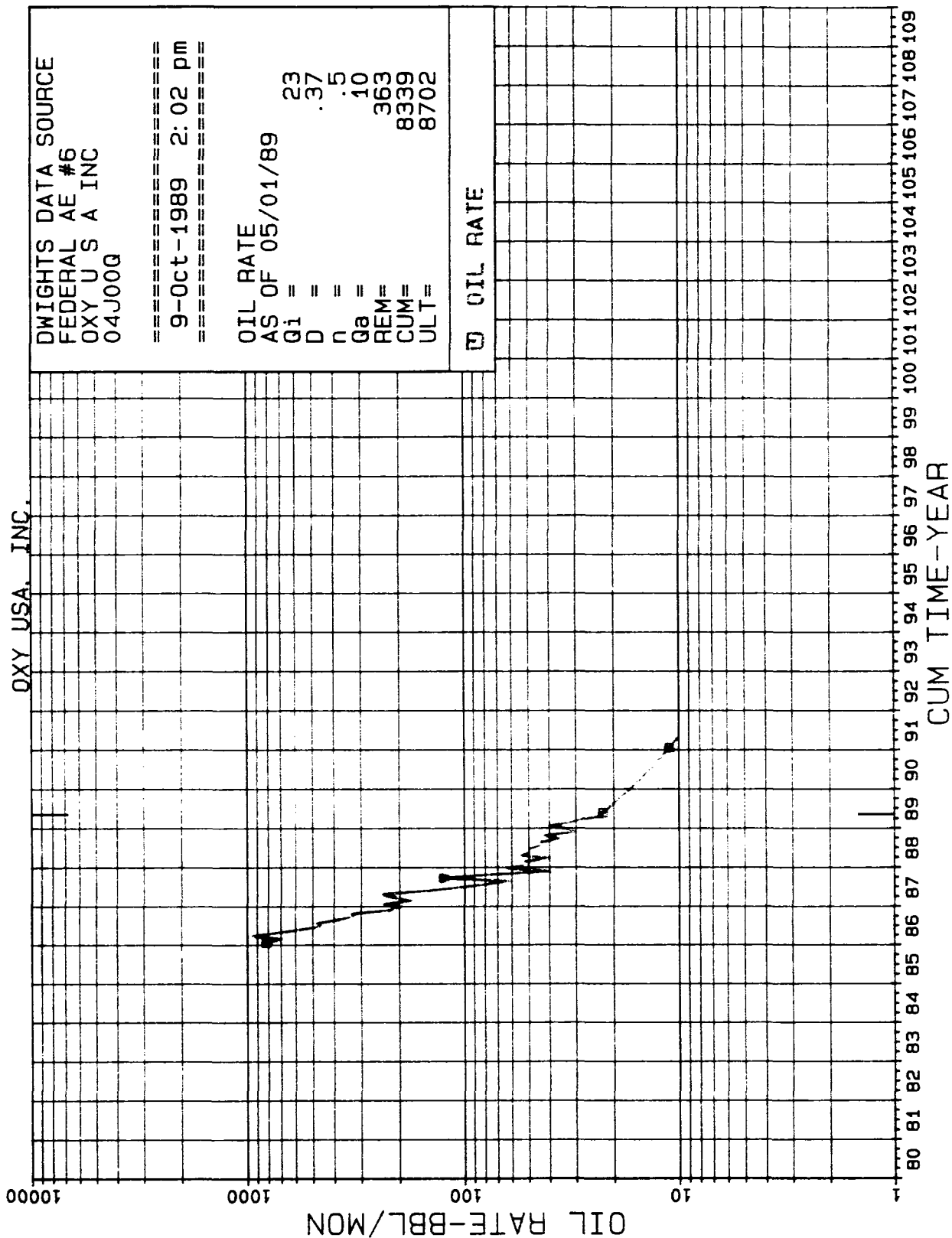


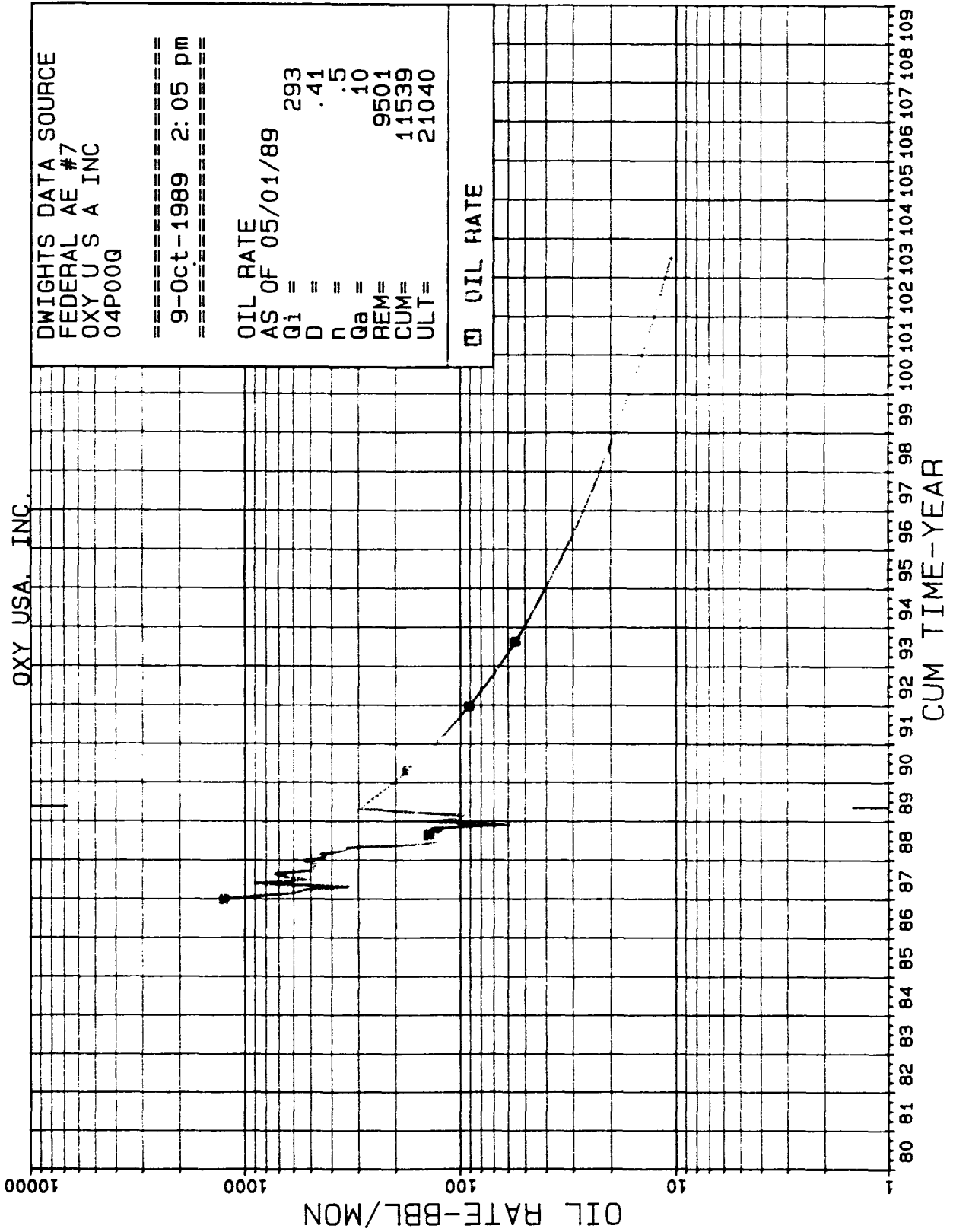


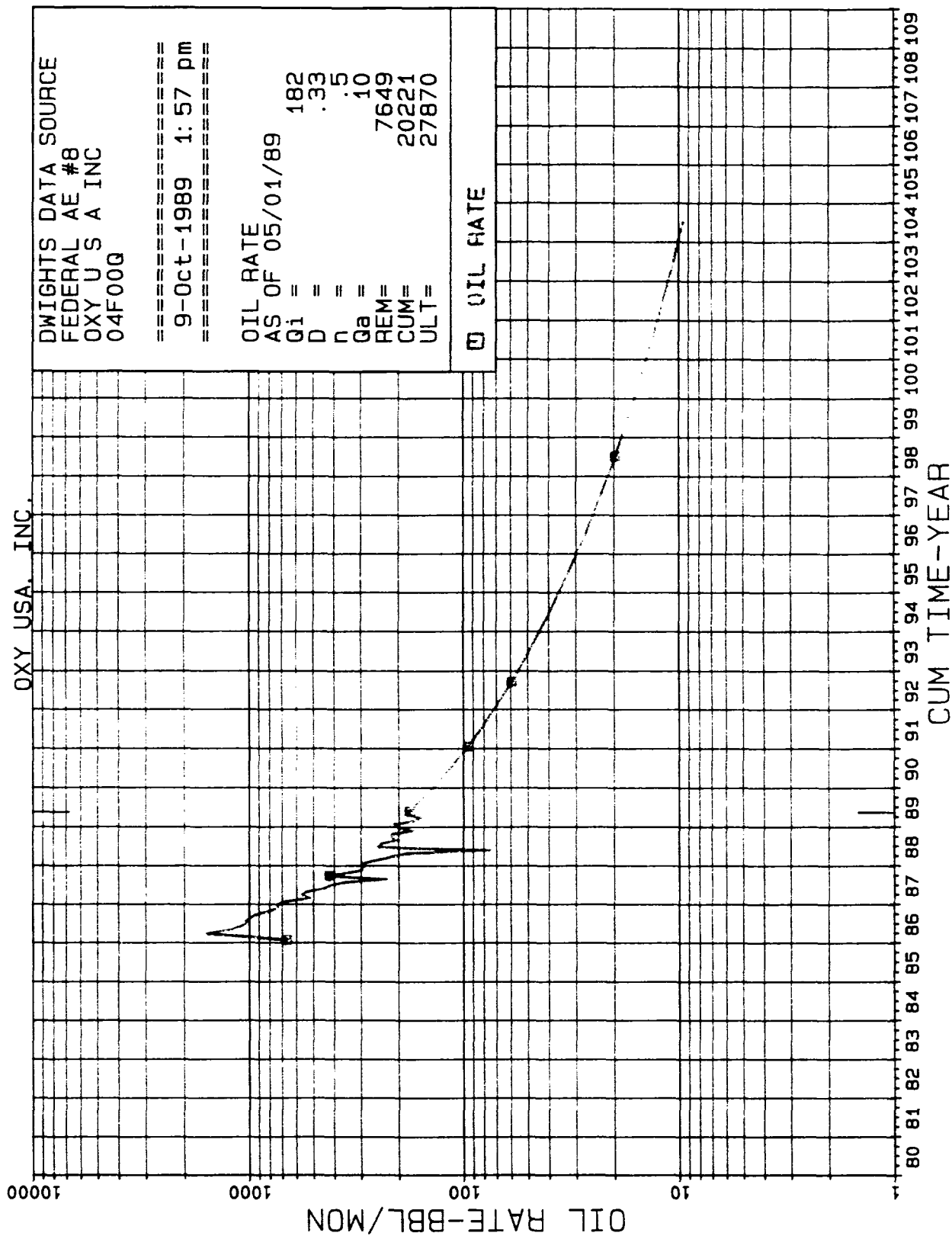


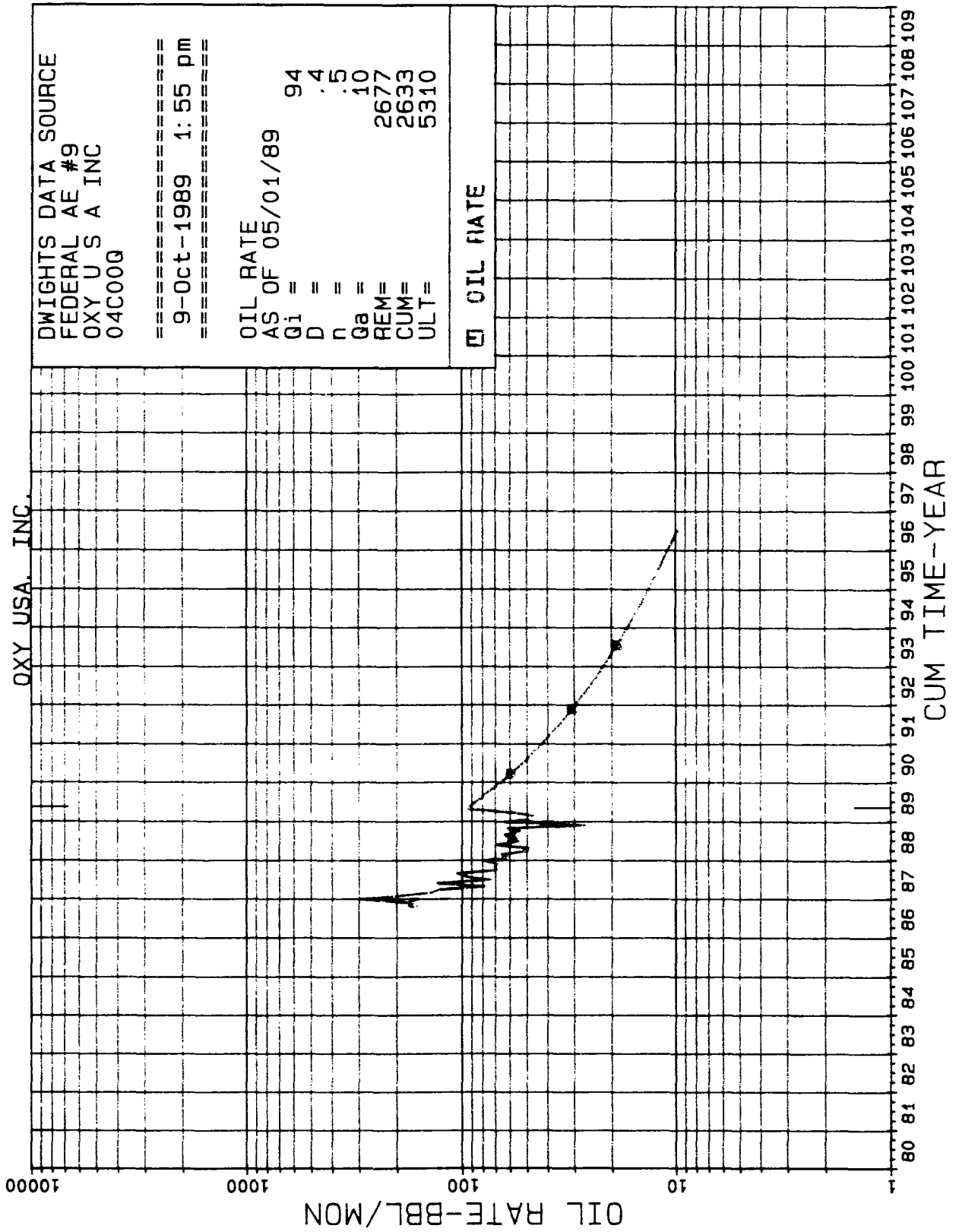


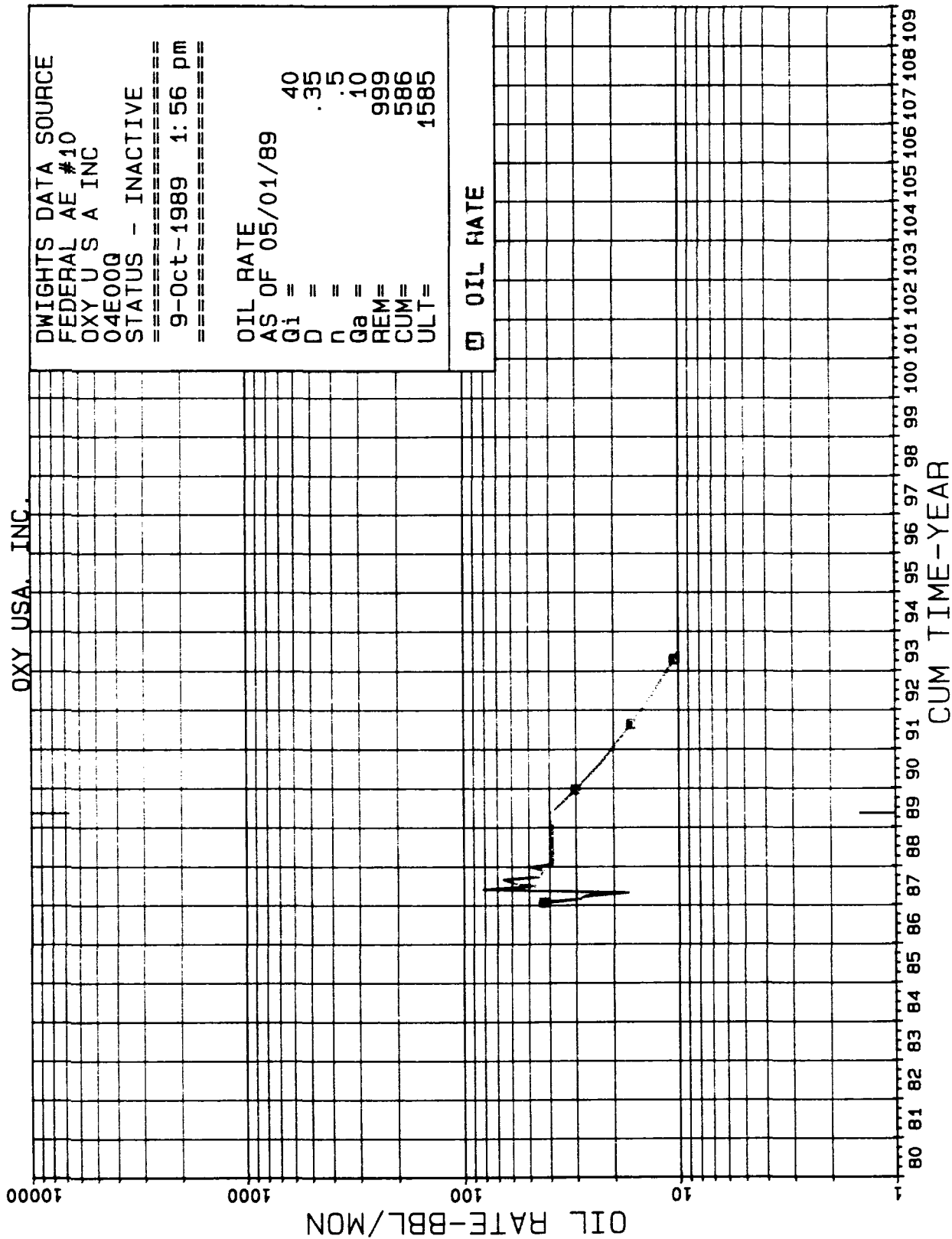


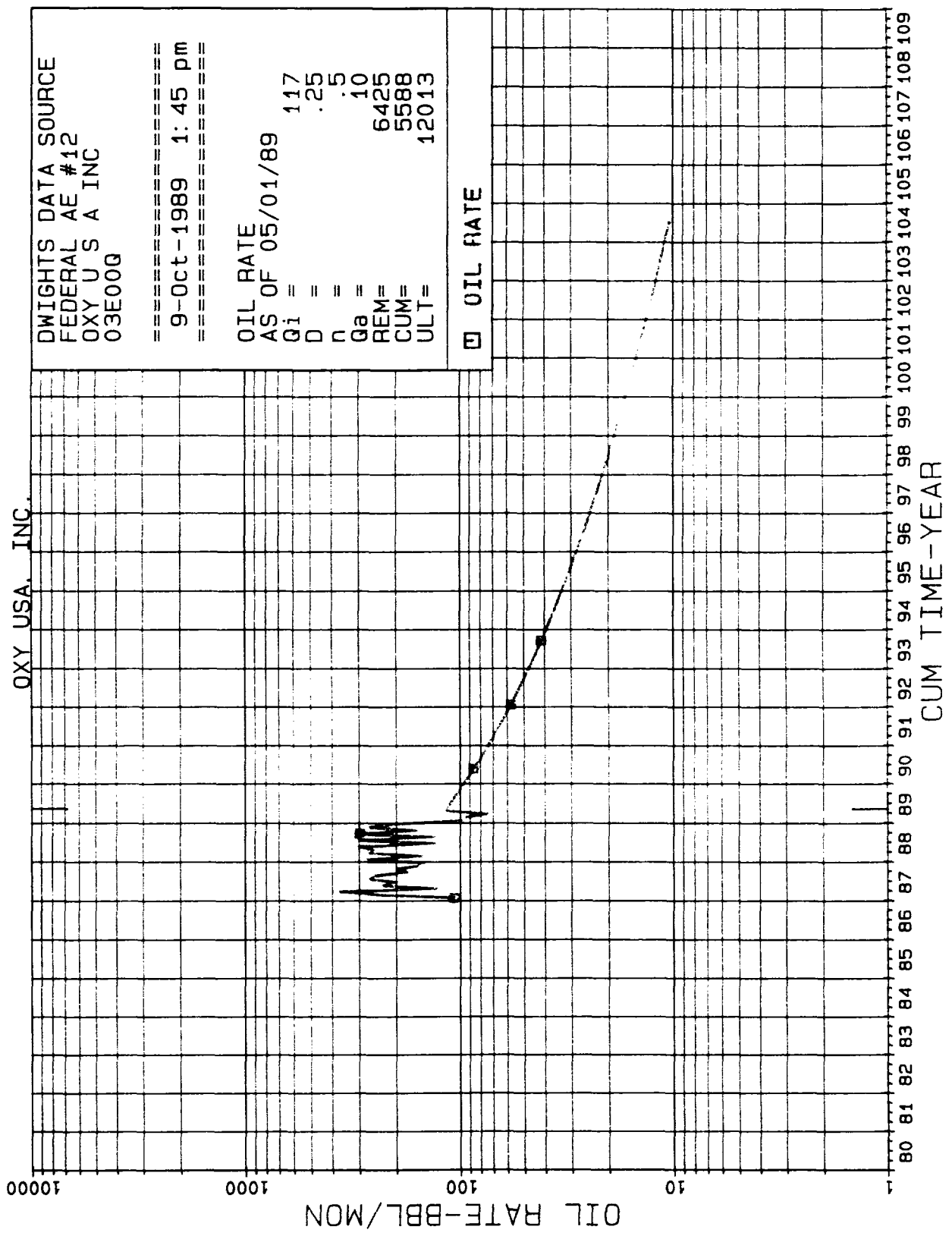


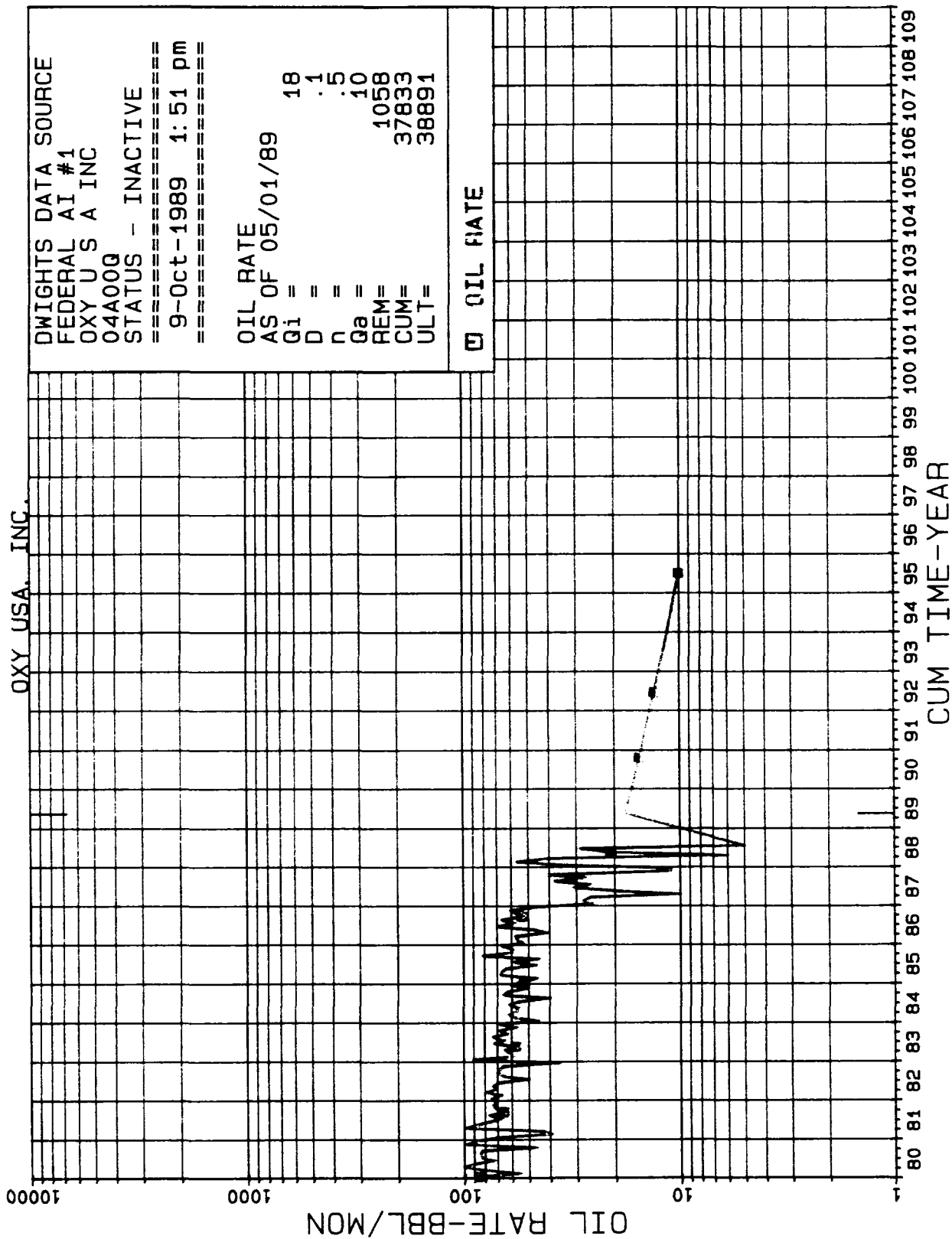


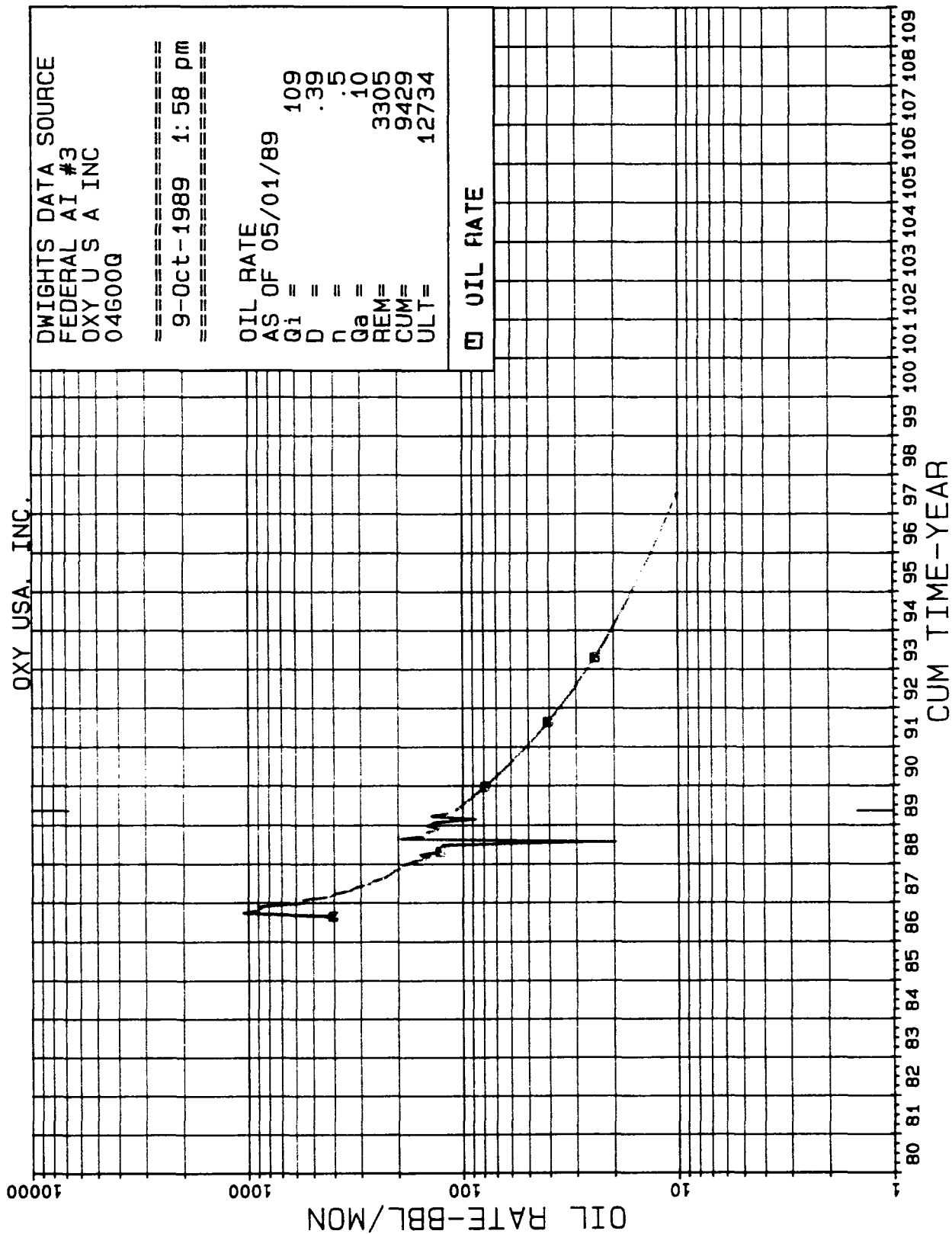


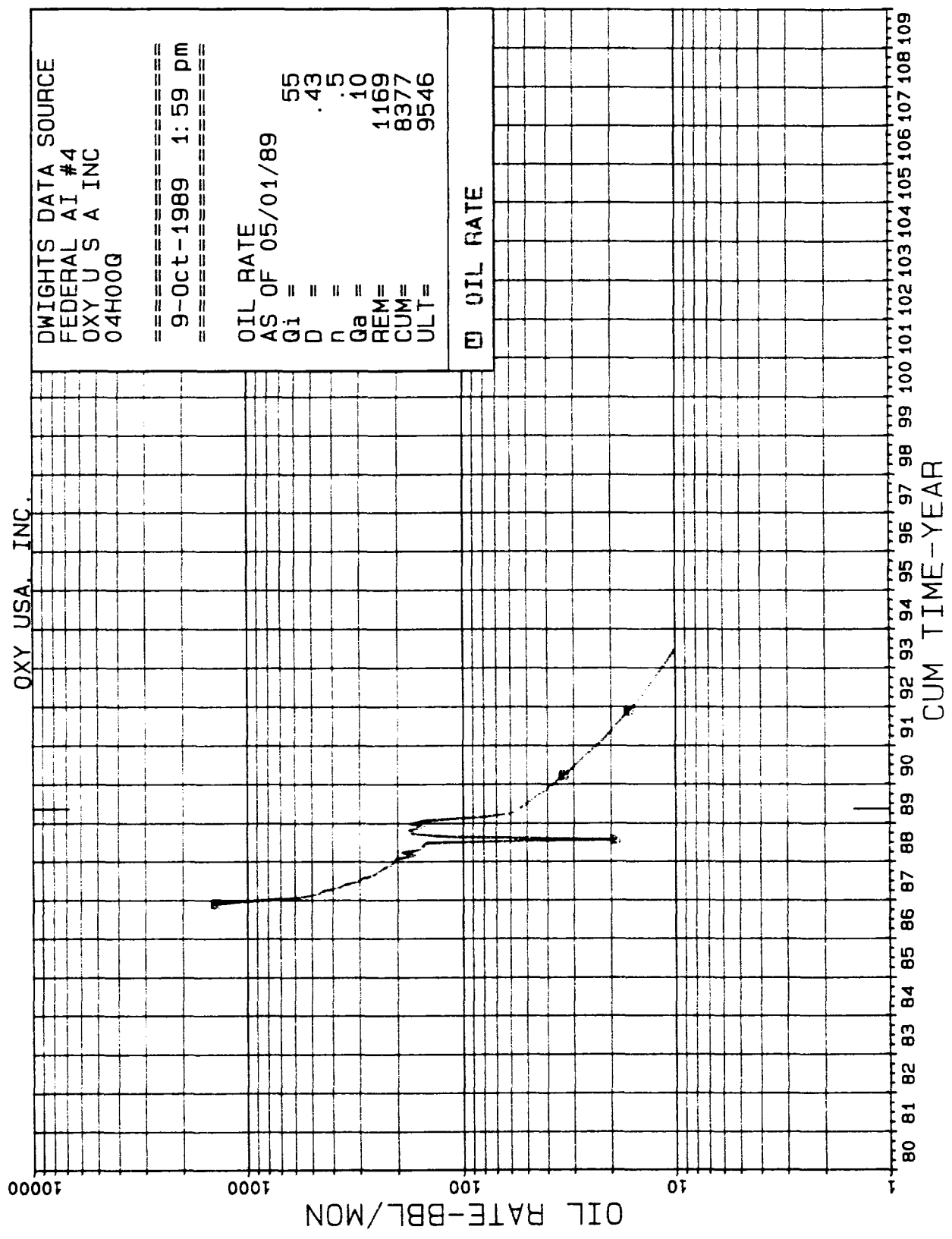




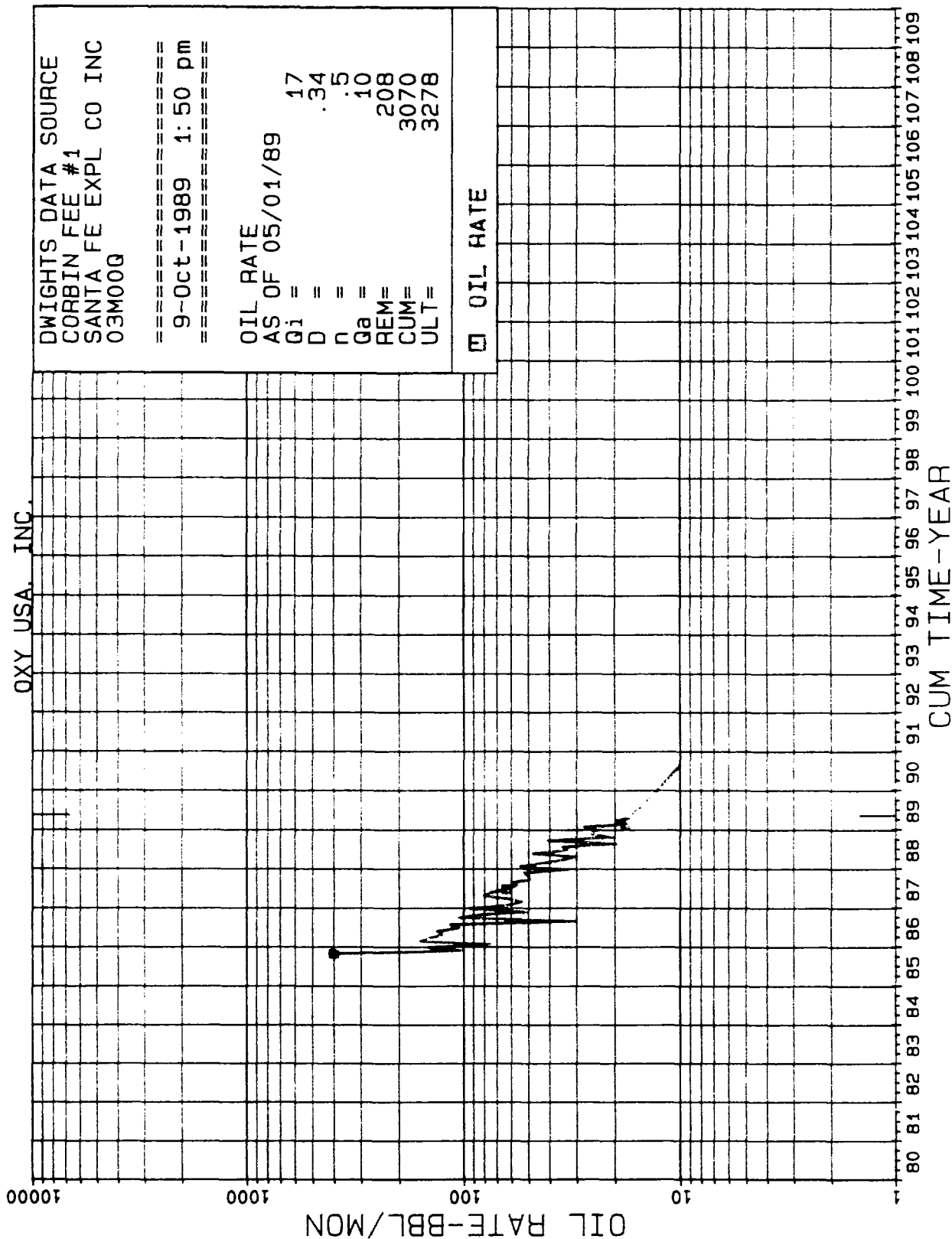


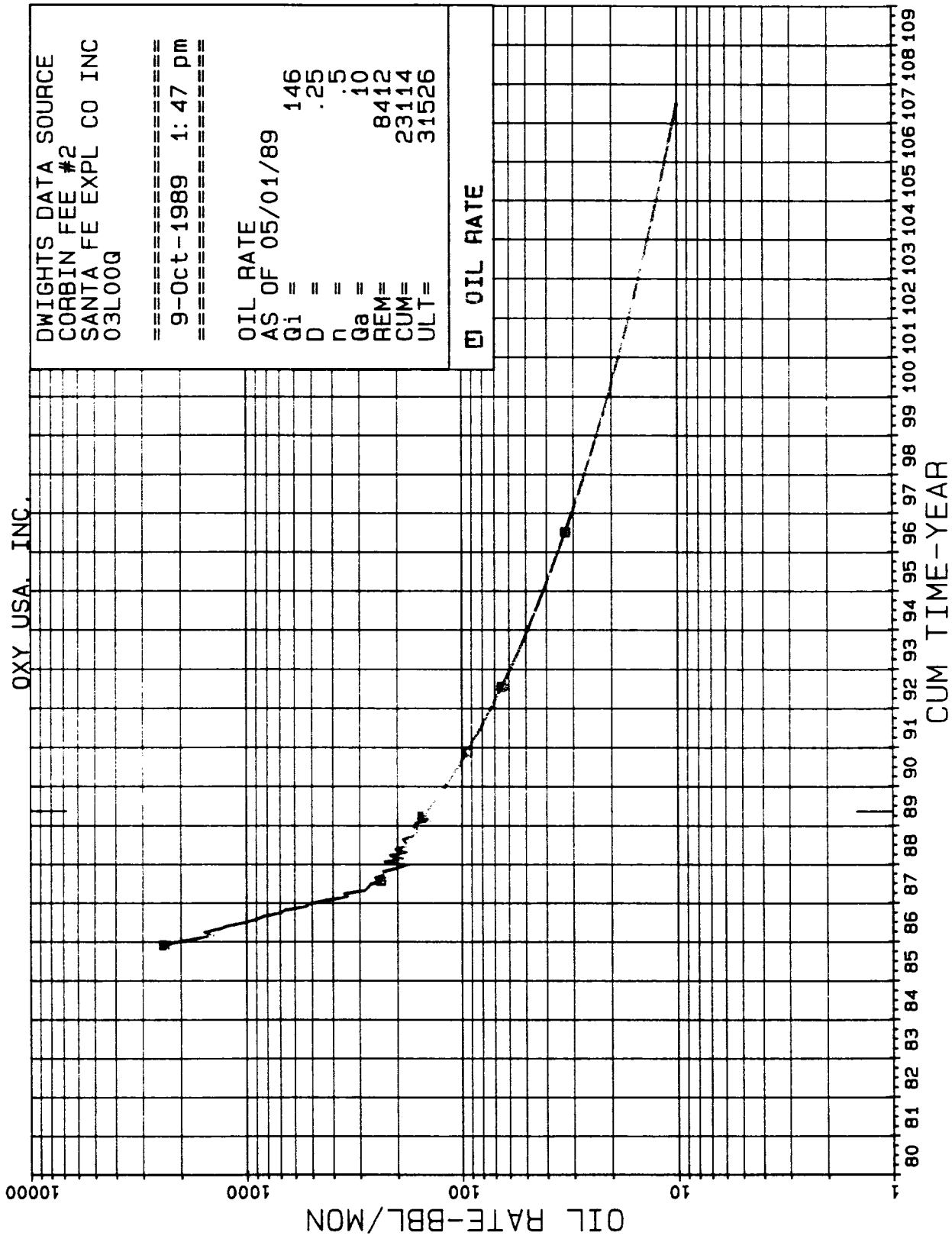






OXY USA, INC.





UNIT AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

UNIT AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

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Exhibit "A" (Map of Unit Area)

Exhibit "B-1" (Schedule of Ownership)

Exhibit "B-2" (Schedule of Tract Participation)

UNIT AGREEMENT
FOR THE DEVELOPMENT AND OPERATION
OF THE
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of July, 1990, 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 and gas interests in the Unit Area subject to this Agreement; and

WHEREAS, the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Secs. 181 et seq., authorizes Federal lessees and their representatives to unit with each other, or jointly or separately with others, in collectively adopting and operating a cooperative or unit plan of development or operation of any oil or gas pool, field, or like area, or any part thereof for the purpose of more properly conserving the natural resources thereof whenever determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest; and

WHEREAS, the Oil Conservation Division of the State of New Mexico (hereinafter referred to as the "Division") is authorized by an Act of the Legislature (Chapter 72, Laws of 1935 as amended) (Chapter 70, Article 2, Section 2 et seq., New Mexico Statutes 1978 Annotated) to approve this Agreement and the conservation provisions hereof; and

WHEREAS, the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico is authorized by law (Chapter 65, Article 3

and Article 14, N.M.S. 1953 Annotated) to approve this Agreement and the conservation provisions hereof; and

WHEREAS, the parties hereto hold sufficient interest in the Unit Area covering the land 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, and secure other benefits obtainable through development and operation of the area subject to this Agreement under the terms, 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 interest in the below-defined Unit Area, and agree severally among themselves as follows:

SECTION 1. ENABLING ACT AND REGULATIONS. The Mineral Leasing Act of February 25, 1920, as amended, supra, and all valid pertinent regulations, including operating and unit plan regulations, heretofore issued thereunder or valid, pertinent, and reasonable regulations hereafter issued thereunder are accepted and made a part of this Agreement as to Federal lands, provided such regulations are not inconsistent with the terms of this Agreement; and as to non-federal lands, the oil and gas operating regulations in effect as of the Effective Date hereof governing drilling and producing operations, not inconsistent with the terms hereof or the laws of the state in which the non-federal

land is located, area hereby accepted and made a part of this Agreement.

SECTION 2. UNIT AREA AND DEFINITIONS. For the purpose of this Agreement, the following terms and expressions as used herein shall mean:

(a) "Unit Area" is defined as those lands described in Exhibit "B-1" and depicted on Exhibit "A" hereof, and such land is hereby designated and recognized as constituting the Unit Area, containing 1561.19 acres, more or less, in Lea County, New Mexico.

(b) "Division" is defined as the Oil Conservation Division of the Department of Energy and Minerals of the State of New Mexico.

(c) "Authorized Officer" or "A.O." is any employee of the Bureau of Land Management who has been delegated the required authority to act on behalf of the BLM.

(d) "Secretary" is defined as the Secretary of the Interior of the United States of America, or his duly authorized delegate.

(e) "Department" is defined as the Department of the Interior of the United States of America.

(f) "Proper BLM Office" is defined as the Bureau of Land Management office having jurisdiction over the federal lands included in the Unit Area.

(g) "Unitized Formation" shall mean that interval underlying the Unit Area, the vertical limits of which extend from an upper limit described as 215 feet below mean sea level or at the top of the Queen formation, whichever is higher, to a lower limit at the base of the Queen formation; the geologic markers having been previously found to occur at 4200 feet and 4246 feet, respectively, in OXY USA Inc.'s Federal AA #1 well (located at 990 feet FNL

and 1980 feet FEL of Section 9, T-18-S, R-33-E, Lea County, New Mexico) as recorded on the Schlumberger CNL-LDT log taken on November 10, 1984, said log being measured from a kelly drive bushing elevation of 3985 feet above sea level.

(h) "Unitized Substances" are all oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate and all associated and constituent liquid or liquefiable hydrocarbons, other than outside substances, within and produced from the Unitized Formation.

(i) "Tract" is each parcel of land described as such and given a Tract number in Exhibit "B-1".

(j) "Tract Participation" is defined as the percentage of participation shown on Exhibit "B-2" for allocating Unitized Substances to a Tract under this Agreement. Percentages of participation are shown on Exhibit "B-2" separately for Tract Oil Participation and Tract Gas Participation.

(k) "Unit Participation" is the sum of the percentages obtained by multiplying the Working Interest of a Working Interest Owner in each Tract by the Tract Participation of such Tract. A separate Unit Oil Participation and Unit Gas Participation are defined by such calculation.

(l) "Working Interest" is the right to search for, produce and acquire Unitized Substances whether held as an incident of ownership of mineral fee simple title, under an oil and gas lease, operating agreement, or otherwise held, which interest is chargeable with and obligated to pay or bear, either in cash or out of production, or otherwise, all or a portion of the cost of drilling, developing and producing the Unitized Substances from the Unitized Formation and operations thereof hereunder. Provided that any Royalty Interest created out of a Working Interest subsequent to the execution of this Agreement

by the owner of the Working Interest shall continue to be subject to such Working Interest burdens and obligations.

(m) "Working Interest Owners" is any party hereto owning a Working Interest, including a carried Working Interest Owner, holding an interest in Unitized Substances by virtue of a lease, operating agreement, fee title or otherwise. The owner of Oil and Gas Rights that are free of lease or other instrument creating a Working Interest in another shall be regarded as a Working Interest Owner to the extent of seven-eighths ($7/8$) of his interest in Unitized Substances, and as a Royalty Owner with respect to his remaining one-eighth ($1/8$) interest therein.

(n) "Royalty Interest" or "Royalty" is an interest other than a Working Interest in or right to receive a portion of the Unitized Substances or the proceeds thereof and includes the Royalty Interest reserved by the lessor or by an oil and gas lease and any overriding Royalty Interest, oil payment interest, net profit contracts, or any other payment or burden which does not carry with it the right to search for a produce Unitized Substances.

(o) "Royalty Owner" is the owner of a Royalty Interest.

(p) "Unit Operating Agreement" is the Agreement entered into by and between the Unit Operator and the Working Interest Owners as provided in Section 9, *infra*, and shall be styled "Unit Operating Agreement, Central Corbin Queen Unit, Lea County, New Mexico".

(q) "Oil and Gas Rights" is the right to explore, develop and operate lands within the Unit Area for the production of Unitized Substances, or to share in the production so obtained or the proceeds thereof.

(r) "Outside Substances" is any substance obtained from any source other than the Unitized Formation and injected into the Unitized Formation.

(s) "Unit Manager" is any person or corporation appointed by Working Interest Owners to perform the duties of Unit Operator until the selection and qualification of a successor Unit Operator as provided for in Section 7 hereof.

(t) "Unit Operator" is the party designated by Working Interest Owners under the Unit Operating Agreement to conduct Unit Operations.

(u) "Unit Operations" is any operation conducted pursuant to this Agreement and the Unit Operating Agreement.

(v) "Unit Equipment" is all personal property, lease and well equipment, plants, and other facilities and equipment taken over or otherwise acquired for the joint account for use in Unit Operations.

(w) "Unit Expense" is all cost, expense, or indebtedness incurred by Working Interest Owners or Unit Operator pursuant to this Agreement and the Unit Operating Agreement for or on account of Unit Operations.

(x) "Effective Date" is the date determined in accordance with Section 24, or as redetermined in accordance with Section 39.

SECTION 3. EXHIBITS. The following exhibits are incorporated herein by reference: Exhibit "A" attached hereto is a map showing the Unit Area and the boundaries and identity of Tracts and leases in said Unit Area to the extent known to the Unit Operator. Exhibit "B-1" attached hereto is a schedule showing, to the extent known to the Unit Operator, the acreage comprising each Tract, percentages and kind of ownership of Oil and Gas Interests in all land in the Unit Area. Exhibit "B"-2" attached hereto is a schedule showing the Tract Participation of each Tract. However, nothing herein or in said schedules 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

in said map or schedules as owned by such party. The shapes and descriptions of the respective Tracts have been established by using the best information available. Each Working Interest Owner is responsible for supplying Unit Operator with accurate information relating to each Working Interest Owner's interest. If it subsequently appears that any Tract, because of diverse Royalty or Working Interest ownership on the Effective Date hereof, should be divided into more than one Tract, or when any revision is requested by the A.O., or any correction of any error other than mechanical miscalculations or clerical is needed, then the Unit Operator, with the approval of the Working Interest Owners, may correct the mistake by revising the Exhibits to conform to the facts. The revision shall not include any reevaluation of engineering or geological interpretations used in determining Tract Participation. Each such revision of an Exhibit made prior to thirty (3) days after the Effective Date shall be effective as of the Effective Date. Each other such revision of an Exhibit shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised Exhibit or on such other date as may be determined by Working Interest Owners and set forth in the revised Exhibit. Not less than four copies of such revision shall be filed with the A.O. In any such revision, there shall be no retroactive allocation or adjustment of Unit Expense or of interests in the Unitized Substances produced, or proceeds thereof.

SECTION 4. EXPANSION. The above described Unit Area may, with the approval of the A.O., when practicable be expanded to include therein any additional Tract or Tracts regarded as reasonably necessary or advisable for the purposes of this Agreement provided however, in such expansion there shall

be no retroactive allocation or adjustment of Unit Expense or of interests in the Unitized Substances produced, or proceeds thereof. Pursuant to Subsection (b), the Working Interest Owners may agree upon an adjustment of investment by reason of the expansion. Such expansion shall be effected in the following manner:

(a) The Working Interest Owner or Owners of a Tract or Tracts desiring to bring such Tract or Tracts into this unit, shall file an application therefor with Unit Operator requesting such admission.

(b) Unit Operator shall circulate a notice of the proposed expansion to each Working Interest Owners in the Unit Area and in the Tract proposed to be included in the unit, setting out the basis for admission, the Tract Participation to be assigned to each Tract in the enlarged Unit Area and other pertinent data. After negotiation (at Working Interest Owners' meeting or otherwise) if at least three Working Interest Owners having in the aggregate seventy-five percent (75%) of the Unit Oil Participation then in effect have agreed to inclusion of such Tract or Tracts in the Unit Area, then Unit Operator shall:

(1) After obtaining preliminary concurrence by the A.O., prepare a notice of proposed expansion describing the contemplated changes in the boundaries of the Unit Area, the reason therefor, the basis for admission of the additional Tract or Tracts, the Tract Participation to be assigned thereto and the proposed effective date thereof; and

(2) Deliver copies of said notice to the A.O. at the Proper BLM Office, each Working Interest Owner and to the last known address of each lessee and lessor whose interests are affected, advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objection to such proposed expansion; and

(3) File, upon the expiration of said thirty (30) day period as set out in (2) immediately above with the A.O. the following: (a) evidence of mailing or delivering copies of said notice of expansion; (b) an application for approval of such expansion; (c) an instrument containing the appropriate joinders in compliance with the participation requirements of Section 14, and Section 34, infra; and (d) a copy of all objections received along with the Unit Operator's response thereto.

The expansion shall, after due consideration of all pertinent information and approval by the and the A.O., become effective as of the date prescribed in the notice thereof, preferably the first day of the month subsequent to the date of notice. The revised Tract Participation of the respective Tracts included within the Unit Area prior to such enlargement shall remain the same ratio one to another.

SECTION 5. UNITIZED LAND. All land committed to this Agreement as to the Unitized Formation shall constitute land referred to herein as "Unitized Land" or "Land subject to this Agreement". Nothing herein shall be construed to unitize, pool, or in any way affect the oil, gas and other minerals contained in or that may be produced from any formation other than the Unitized Formation as defined in Section 2(g) of this Agreement.

SECTION 6. UNIT OPERATOR. OXY USA INC. is hereby designated the Unit Operator, and by signing this instrument as Unit Operator, agrees and consents to accept the duties and obligations of Unit Operator for the Operation, development, and production of Unitized Substances as herein provided. Whenever reference is made herein to the Unit Operator, such references means the Unit Operator acting in that capacity and not as an owner of interests in Unitized Substances, when such interests are owned by it and the term "Working Interest Owner" when used herein shall include or refer to the Unit Operator as the owner of a Working Interest when such an interest is owned by it.

Unit Operator shall have a lien upon interests of Working Interest Owners in the Unit Area to the extent provided in the Unit Operating Agreement.

SECTION 7. RESIGNATION OR REMOVAL OF UNIT OPERATOR. Unit Operator shall have the right to resign at any time, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights a such for a period of six (6) months after written notice of intention to resign has been given by Unit Operator to all Working Interest Owners and the A.O. unless a new Unit Operator shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

The Unit Operator shall, upon default or failure in the performance of its duties and obligations hereunder, be subject to removal by the affirmative vote of three (3) or more Working Interest Owners having in the aggregate seventy-five percent (75%) or more or the Unit Participation then in effect

exclusive of the Working Interest Owners who is the Unit Operator. Such removal shall be effective upon notice thereof to the A.O.

In all such instances of effective resignation or removal, until a successor to Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for the performance of the duties of the Unit Operator and shall, not later than thirty (30) days before such resignation or removal becomes effective, appoint a Unit Manager to represent them in any action to be taken hereunder.

The resignation or removal of Unit Operator under this Agreement shall not terminate its 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 wells, equipment, books and records, materials, appurtenances and any other assets used in connection with the Unit Operations to the new duly qualified successor Unit Operator or to the Unit Manager if no such new Unit Operator is elected. Nothing herein shall be construed to relieve or discharge any Unit Operator or Unit Manager who resigns or is removed hereunder from any liability or duties accruing or performable by it prior to the effective date of such resignation or removal.

SECTION 8. SUCCESSOR UNIT OPERATOR. Whenever the Unit Operator shall tender its resignation as Unit Operator or shall be removed as hereinabove provided, the Working Interest Owners shall select a successor Unit Operator as herein provided. 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 A.O. If no successor Unit Operator or Unit Manager is selected and qualified as herein provided, the A.O., at its election, may declare this Agreement terminated.

In selecting a successor Unit Operator, the affirmative vote of three or more Working Interest Owners having a total of sixty-five percent (65%) or more of the total Unit Participation shall prevail; provided that if any one Working Interest Owner has a Unit Participation of more than thirty-five percent (35%), its negative vote or failure to vote shall not be regarded as sufficient unless supported by the vote of two or more other Working Interest Owners having a total Unit Participation of at least five percent (5%). If the Unit Operator who is removed votes only to succeed itself or fails to vote, the successor Unit Operator may be selected by the affirmative vote of the owner of at least seventy-five percent (75%) of the Unit Participation remaining after excluding the Unit Participation of Unit Operator so removed.

SECTION 9. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT. Costs and expenses incurred by Unit Operator in conducting Unit Operations hereunder shall be paid, apportioned among and borne by the Working Interest Owners in accordance with the Unit Operating Agreement. Such Unit Operating Agreement shall also provide the manner in which the Working Interest Owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereto in conformity with their underlying operating agreements, leases or other contracts and such other rights and obligations as

between Unit Operator and the Working Interest Owners as may be agreed upon by the Unit Operator and the Working Interest Owners; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Agreement or to relieve the Unit Operator of any right or obligation established under this Agreement, and in case of any inconsistency or conflict between this Agreement and the Unit Operating Agreement, this Agreement shall prevail. Copies of any Unit Operating Agreement executed pursuant to this Section shall be filed with and with the A.O. at the Proper BLM Office as required prior to approval of this Agreement.

SECTION 10. 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 including surface rights which are necessary or convenient for prospecting for, producing, storing, allocating and distributing the Unitized Substances are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Upon request, acceptable evidence of title to said rights shall be deposited with said 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.

SECTION 11. PLAN OF OPERATIONS. It is recognized and agreed by the parties hereto that all of the land subject to this Agreement is reasonably

proved to be productive of Unitized Substances and that the object and purpose of this Agreement is to formulate and to put into effect an improved recovery project in order to effect additional recovery of Unitized Substances, prevent waste and conserve natural resources. Unit Operator shall have the right to inject into the Unitized Formation any substances for secondary recovery or enhanced recovery purposes in accordance with a plan of operation approved by the Working Interest Owners, the A.O. and the Division, including the right to drill and maintain injection wells within the Unit Area and completed in the Unitized Formation, and to use abandoned well or wells producing from the Unitized Formation for said purpose. Subject to like approval, the Plan of Operation may be revised as conditions may warrant.

The initial Plan of Operation shall be filed with the A.O. and the Division concurrently with the filing of this Unit Agreement for final approval. Said initial Plan of Operation and all revisions thereof shall be as complete and adequate as the A.O., and the Division may determine to be necessary for timely operation consistent herewith. Upon approval of this Agreement and the initial plan by the A.O., said plan, and all subsequently approved plans, shall constitute the operating obligations of the Unit Operator under this Agreement for the period specified therein. Thereafter, from time to time before the expiration of any existing plan, the Unit Operator shall submit for like approval a plan for an additional specified period of operations. After such operations are commenced, reasonable diligence shall be exercised by the Unit Operator in complying with the obligations of the approved Plan of Operation.

Notwithstanding anything to the contrary herein contained, should the Unit Operator fail to commence Unit Operations for the secondary recovery of Unitized Substances from the Unit Area within eighteen (18) months after the effective date of this Agreement, or any extension thereof approved by the A.O., this Agreement shall terminate automatically as of the date of default.

SECTION 12. USE OF SURFACE AND USE OF WATER. The parties to the extent of their rights and interests, hereby grant to Unit Operator the right to use as much of the surface, including the water thereunder, of the Unitized Land as may reasonably be necessary for Unit Operations.

Unit Operator's free use of water or brine or both for Unit Operations, shall not include any water from any well, lake, pond, or irrigation ditch or a surface owner, unless approval for such use is granted by the surface owner.

Unit Operator shall pay the surface owner for damages to growing crops, fences, improvements and structures on the Unitized Land that result from Unit Operations, and such payments shall be considered as items of Unit Expense to be borne by all the Working Interest Owners of lands subject hereto.

SECTION 13. TRACT PARTICIPATION. IN Exhibit "B-2" attached hereto there are listed and numbered the various Tracts within the Unit Area, and set forth opposite each Tract are figures which represent the Tract Participation, during Unit Operations if all Tracts in the Unit Area qualify as provided herein. The Tract Participation of each Tract as shown in Exhibit "B-2" has been determined in accordance with the following formula:

Tract Participation = 35% A/B + 30% C/D + 25% E/F + 10% G/H

A = The Tract total net porosity acre feet from the Unitized Formation

B = The Unit total net porosity acre feet from the Unitized Formation

C = The Tract Cumulative Oil Production from the Unitized Formation
through April 30, 1989

D = The Unit total Cumulative Oil Production from the Unitized Formation
through April 30, 1989

E = The Remaining Primary Oil Reserves from the Unitized Formation for
for the Tract, after April 30, 1989

F = The Remaining Primary Oil Reserves from the Unitized Formation for
all Unit Tracts, after April 30, 1989

G = The amount of oil produced from the Unitized Formation by the Tract
from April 1, 1989 through April 30, 1989

H = The amount of oil produced from the Unitized Formation by all Unit
Tracts from April 1, 1989 through April 30, 1989

In the event less than all Tracts are qualified on the Effective Date hereof, the Tract Participation shall be calculated on the basis of all such qualified Tracts rather than all Tracts in the Unit Area.

SECTION 14. TRACTS QUALIFIED FOR PARTICIPATION. On an after the Effective Date hereof, the Tracts within the Unit Area which shall be entitled to participation in the production of Unitized Substances shall be those Tracts more particularly described in Exhibit "B-1" that corner or have a common boundary (Tracts separated only by a public road or a railroad right-of-way shall be considered to have a common boundary), and that otherwise qualify as follows:

(a) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest have become parties to this Agreement and as to which Royalty Owners owning seventy-five percent (75%) or more of the Royalty Interest have become parties to this Agreement.

(b) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest have become parties to this Agreement, and as to which Royalty Owners owning less than seventy-five percent (75%) of the Royalty Interest have become parties to this Agreement, and as to which (1) the Working Interest Owner who operates the Tract and Working Interest Owners owning at least seventy-five percent (75%) of the remaining Working Interest in such Tract have joined in a request for the inclusion of such Tract, and as to which (2) Working Interest Owners owning at least seventy-five percent (75%) of the combined Unit Participation in all Tracts that meet the requirements of Section 14(a) above have voted in favor of the inclusion of such Tract.

(c) Each Tract as to which Working Interest Owners owning less than one hundred percent (100%) of the Working Interest have become parties to this Agreement, regardless of the percentage of Royalty Interest therein that is committed hereto; and as to which (1) the Working Interest Owner who operates the Tract and Working Interest Owners owning at least seventy-five percent (75%) of the remaining Working Interest in such Tract who have become parties to this Agreement have joined in a request for inclusion of such Tract, and have executed and delivered, or obligated themselves to execute and deliver an

indemnity agreement indemnifying and agreeing to hold harmless the other owners of committed Working Interests, their successors and assigns, against all claims and demands that may be made by the owners of Working Interest in such Tract who are not parties to this Agreement, and which arise out of the inclusion of the Tract; and as to which (2) Working Interest Owners owning at least seventy-five percent (75%) of the Unit Participation in all Tracts that meet the requirements of Section 14(a) and 14(b) have voted in favor of the inclusion of such Tract and to accept the indemnity agreement. Upon the inclusion of such a Tract, the Tract Participations which would have been attributed to the nonsubscribing owners of Working Interest in such Tract, had they become parties to this Agreement and the Unit Operating Agreement, shall be attributed to the Working Interest Owners in such Tract who have become parties to such agreements, and joined in the indemnity agreement, in proportion to their respective Working Interests in the Tract.

If on the Effective Date of this Agreement there is any Tract or Tracts which have not been effectively committed to or made subject to this Agreement by qualifying as above provided, then such Tract or Tracts shall not be entitled to participate hereunder. Unit Operator shall, when submitting this Agreement for final approval by the A.O., file therewith schedules of those Tracts which have been committed and made subject to this Agreement and are entitled to participate in Unitized Substances. Said schedules shall set forth opposite each such committed Tract the lease number or assignment number, the owner of record of the lease, and the percentage participation of such Tract which shall be computed according to the participation formulas set forth in Section 13 (Tract Participation) above. These schedules shall be

revised Exhibit "B-1" and "B-2" and upon approval thereof by the A.O., shall become a part of this Agreement and shall govern the allocation of production of Unitized Substances until new schedules are approved by the A.O.

SECTION 15.A. ALLOCATION OF UNITIZED SUBSTANCES. All Unitized Substances produced and saved (less, save and except any part of such Unitized Substances used in conformity with good operating practices on unitized land for drilling, operating, camp and other production or development purposes and for injection or unavoidable loss in accordance with a Plan of Operation approved by the A.O.) shall be apportioned among and allocated to the qualified Tracts in accordance with the respective Tract Participations effective hereunder during the respective periods such Unitized Substances were produced, as set forth in the schedule of participation in Exhibit "B-2". The amount of Unitized Substances so allocated to each Tract, and only that amount (regardless of whether it be more or less than the amount of the actual production of Unitized Substances from the well or wells, if any, on such Tract) shall, for all intents, uses and purposes, be deemed to have been produced from such Tract.

The Unitized Substances allocated to each Tract shall be distributed among, or accounted for, to the parties entitled to share in the production from such Tract in the same manner, in the same proportions, and upon the same conditions, as they would have participated and shared in the production from such Tracts, or in the proceeds thereof, had this Agreement not been entered into; and with the same legal force and effect.

No Tract committed to this Agreement and qualified for participation as

above provided shall be subsequently excluded from participation hereunder on account of depletion of Unitized Substances.

If the Working Interest and/or the Royalty Interest in any Tract are divided with respect to separate parcels or portions of such Tract and owned now or hereafter in severalty by different persons, the Tract Participation shall in the absence of a recordable instrument executed by all owners in such Tract and furnished to Unit Operator fixing the divisions of ownership, be divided among such parcels or portions in proportion to the number of surface acres in each.

SECTION 15.B. TAKING UNITIZED SUBSTANCES IN KIND. The Unitized Substances allocated to each Tract shall be delivered in kind to the respective parties entitled thereto by virtue of the ownership of Oil and Gas Rights therein. Each such party shall have the right to construct, maintain and operate all necessary facilities for that purpose within the Unitized Area, provided the same are so constructed, maintained and operated as not to interfere with Unit Operations. Subject to Section 17 hereof, any extra expenditure incurred by Unit Operator by reason of the delivery in kind of any portion of the Unitized Substances shall be borne by the party taking delivery. In the event any Working Interest Owner shall fail to take or otherwise adequately dispose of its proportionate share of the production from the Unitized Formation, then so long as such condition continues, Unit Operator, for the account and at the expense of the Working Interest Owner of the Tract or Tracts concerned, and in order to avoid curtailing the operation of the Unit Area, may, but shall not be required to, sell or otherwise dispose of such production to itself or to

others, provided that all contracts of sale by Unit Operator of any other party's share of Unitized Substances shall be only for such reasonable periods of time as are consistent with the minimum needs of the industry under the circumstances, but in no event shall any such contract be for a period in excess of one year, and at not less than the prevailing market price in the area for like production, and the account of such Working Interest Owner shall be charged therewith as having received such production. The net proceeds, if any, of the Unitized Substances so disposed of by Unit Operator shall be paid to the Working Interest Owner of the Tract or Tracts concerned. Notwithstanding the foregoing, Unit Operator shall not make a sale into interstate commerce of any Working Interest Owner's share of gas production without first giving such Working Interest Owner sixty (60) days' notice of such intended sale.

Any Working Interest Owner receiving in kind or separately disposing of all or any part of the Unitized Substances allocated to any Tract, or receiving the proceeds therefrom if the same is sold or purchased by Unit Operator, shall be responsible for the payment of all Royalty, overriding Royalty and production payments due thereon, and each such party shall hold each other Working Interest Owner harmless against all claims, demands and causes of action by owners of such Royalty, overriding Royalty and production payments.

If, after the Effective Date of this Agreement, there is any Tract or Tracts that are subsequently committed hereto, as provided in Section 4 (Expansion) hereof, or any Tract or Tracts within the Unit Area not committed hereto as of the Effective Date hereof but which are subsequently committed hereto under the provisions of Section 14 (Tracts Qualified for Participation)

and Section 32 (Nonjoinder and Subsequent Joinder); or if any Tract is excluded from this Agreement as provided for in Section 21 (Loss of Title), the schedules as shown in Exhibits "B-1" and "B-2" shall be revised by the Unit Operator; and the revised Exhibits "B-1" and "B-2", upon approval by the A.O., shall govern the allocation of production on and after the effective date thereof until revised schedules are approved as hereinabove provided.

SECTION 16. OUTSIDE SUBSTANCES. If gas obtained from formations not subject to this Agreement is introduced into the Unitized Formation for use in repressuring, stimulating of production or increasing ultimate recovery which shall be in conformity with a Plan of Operation first approved by the A.O., a like amount of gas with appropriate deduction for loss or depletion from any cause may be withdrawn from unit wells completed in the Unitized Formation royalty free as to dry gas, but not royalty free as to the products extracted therefrom; provided that such withdrawal shall be at such time as may be provided in the approved Plan of Operation or as otherwise may be consented to or prescribed by the A.O. as conforming to good petroleum engineering practices and provided further that such right of withdrawal shall terminate on the termination date of this Agreement.

SECTION 17. ROYALTY SETTLEMENT. The United States of America and all Royalty Owners who, under an existing contract, are entitled to take in kind a share of the Unitized Substances produced from any Tract unitized hereunder, shall continue to be entitled to such right to take in kind their share of the Unitized Substances allocated to such Tract, and Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable

contracts, laws and regulations. Settlement for Royalty not taken in kind shall be made by Working Interest Owners responsible therefor under existing contracts, laws and regulations on or before the last day of each month for Unitized Substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any Royalty due under the leases, except that such Royalty shall be computed on Unitized Substances as allocated to each Tract in accordance with the terms of this Agreement. With respect to Federal leases committed hereto on which the royalty rate depends upon the daily average production per well, such average production shall be determined in accordance with the operating regulations pertaining to Federal leases as though the committed Tracts were included in a single consolidated lease.

If the amount of production or the proceeds thereof accruing to any Royalty Owner (except the United States of America) in a Tract depends upon the average production per well or the average pipeline runs per well from such Tract during any period of time, then such production shall be determined from and after the Effective Date hereof by dividing the quantity of Unitized Substances allocated hereunder to such Tract during such period of time by the number of wells located thereon capable of producing Unitized Substances as of the Effective Date hereof, provided that any Tract not having any well so capable of producing Unitized Substances on the Effective Date hereof shall be considered as having one such well for the purpose of this provision.

All Royalty due the United States of America and the other Royalty Owners

hereunder shall be computed and paid on the basis of all Unitized Substances allocated to the respective Tract or Tracts committed hereto, in lieu of actual production from such Tract or Tracts.

With the exception of Federal and State requirements to the contrary, Working Interest Owners may use or consume Unitized Substances for Unit Operations and no Royalty, overriding Royalty, production or other payments shall be payable on account of Unitized Substances used, lost, or consumed in Unit Operations.

Each Royalty Owner (other than the United States of America) that executes this Agreement represents and warrants that it is the owner of a Royalty Interest in a Tract or Tracts within the Unit Area as its interest appears in Exhibit "B-2" attached hereto. If any Royalty Interest in a Tract or Tracts should be lost by title failure or otherwise in whole or in part, during the term of this Agreement, then the Royalty Interest of the party representing himself to be the owner thereof shall be reduced proportionately and the interests of all parties shall be adjusted accordingly.

SECTION 18. RENTAL SETTLEMENT. Rentals or minimum Royalties due on the leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws and regulations provided that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental or minimum Royalty in lieu thereof, due under their leases. Rental or minimum Royalty for lands of the United States of America subject to this Agreement shall be paid at the

rate specified in the respective leases from the United States of America, unless such rental or minimum Royalty is waived, suspended or reduced by law or by approval of the Secretary or his duly authorized representative.

SECTION 19. CONSERVATION. Operations hereunder and production of Unitized Substances shall be conducted to provide for the most economical and efficient recovery of said substances without waste, as defined by or pursuant to Federal and State laws and regulations.

SECTION 20. DRAINAGE. The Unit Operator shall take all reasonable and prudent measures to prevent drainage of Unitized Substances from unitized land by wells on land not subject to this Agreement.

The Unit Operator, upon approval by the Working Interest Owners and the A.O. is hereby empowered to enter into a borderline agreement or agreements with working interest owners of adjoining lands not subject to this Agreement with respect to operation in the border area for the maximum economic recovery, conservation purposes and proper protection of the parties and interest affected.

SECTION 21. LOSS OF TITLE. In the event title to any Tract of unitized land shall fail and the true owner cannot be induced to join in this Agreement, such Tract shall be automatically regarded as not committed hereto, and there shall be such readjustment of future costs and benefits as may be required on account of the loss of such title. In the event of a dispute as to title to any Royalty, Working Interest, or other interests subject thereto, payment or

delivery on account thereof may be withheld without liability for interest until the dispute is finally settled; provided that, as to Federal lands or leases, no payments of fund due the United States shall be withheld, but such funds shall be deposited as directed by the A.O. to be held as unearned money pending final settlement of the title dispute, and then applied as earned or returned in accordance with such final settlement.

If the title or right of any party claiming the right to receive in kind all or any portion of the Unitized Substances allocated to as Tract is in dispute, Unit Operator at the direction of Working Interest Owners shall either:

(a) require that the party to whom such Unitized Substances are delivered or to whom the proceeds thereof are paid furnish security for the proper accounting therefor to the rightful owner if the title or right of such party fails in whole or in part, or

(b) withhold and market the portion of Unitized Substances with respect to which title or right is in dispute, and impound the proceeds thereof until such time as the title or right thereto is established by a final judgement of a court of competent jurisdiction or otherwise to the satisfaction of Working Interest Owners, whereupon the proceeds so impounded shall be paid to the party rightfully entitled thereto.

Each Working Interest Owner shall indemnify, hold harmless, and defend all other Working Interest Owners against any and all claims by any party against the interest attributed to such Working Interest Owner on Exhibits

"B-1" and "B-2".

Unit Operator as such is relieved from any responsibility for any defect or failure of any title hereunder.

SECTION 22. LEASES AND CONTRACTS CONFORMED AND EXTENDED. The terms, conditions and provisions of all leases, subleases and other contracts relating to exploration, drilling development or operation for oil or gas on lands committed to this Agreement are hereby expressly modified and amended to the extent necessary to make the same conform to the provisions hereof, but otherwise to remain in full force and effect, and the parties hereto hereby consent that the Secretary shall and by his approval hereof, or by the approval hereof by his duly authorized representative, do hereby establish, alter, change or revoke the drilling, producing, rental, minimum Royalty and Royalty requirements of Federal leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this Agreement.

Without limiting the generality of the foregoing, all leases, subleases and contracts are particularly modified in accordance with the following:

(a) The development and operation of lands subject to this Agreement under the terms hereof shall be deemed full performance of all obligations for development and operation with respect to each Tract subject to this Agreement, regardless of whether there is any development of any Tract of the Unit Area, notwithstanding anything to the contrary in any lease, operating agreement or

other contract by and between the parties hereto, or their respective predecessors in interest, or any of them.

(b) Drilling, producing or improved recovery operations performed hereunder shall be deemed to be performed upon and for the benefit of each Tract, and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on the land therein embraced.

(c) Suspension of drilling or producing operations within the Unit Area pursuant to direction or consent of the A.O., or their duly authorized representatives, shall be deemed to constitute such suspension pursuant to such direction or consent as to each Tract within the Unitized Area.

(d) Each lease, sublease, or contract relating to the exploration, drilling, development, or operation for oil and gas which by its terms might expire prior to the termination of this Agreement, is hereby extended beyond any such term so provided therein, so that it shall be continued in full force and effect for and during the term of this Agreement.

(e) The segregation of any Federal lease committed to this Agreement is governed by the following provision in the fourth paragraph of Section 17(j) of the Mineral Leasing Act, as amended by the Act of September 2, 1960 (74 Stat. 781-784): "Any (Federal) lease heretofore or hereafter committed to any such (unit) plan embracing lands that are in part within and in part outside of the area covered by any such plan shall be segregated into separate leases as to the lands committed and the lands not committed as of the effective date

of unitization; provided, however, that any such lease as to the nonunitized portion shall continue in force and effect for the term thereof but for not less than two years from the date of such segregation and so long thereafter as oil or gas is produced in paying quantities."

SECTION 23. COVENANTS RUN WITH LAND. The covenants herein shall be construed to be covenants running with the land with respect to the interest 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 Interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument or transfer; and no assignment or transfer of any Royalty Interest subject hereto shall be binding upon the Working Interest Owner responsible therefor until the first day of the calendar month after said Working Interest Owner is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument or transfer.

SECTION 24. EFFECTIVE DATE AND TERM. This Agreement shall become binding upon each party who executes or ratifies it as of the date of execution or ratification by such party and shall become effective on the first day of the calendar month next following the approval of this Agreement by the A.O. and the Commission.

If this Agreement does not become effective on or before January 1, 1992, it shall ipso facto expire on said date (hereinafter called "Expiration Date") and thereafter be of no further force or effect, unless prior thereto this Agreement has been executed or ratified by Working Interest Owners owning a combined Unit Participation of at least seventy-five percent (75%); and at least seventy-five percent (75%) of such working Interest Owners committed to this Agreement have decided to extend Expiration Date for a period not to exceed one (1) year (hereinafter called "Extended Expiration Date"). If Expiration Date is so extended and this Agreement does not become effective on or before Extended Expiration Date, it shall ipso facto expire on Extended Expiration Date and thereafter be of no further force and effect.

Unit Operator shall file for record within thirty (30) days after the Effective Date of this Agreement, in the office of the County Clerk of Lea County, New Mexico, where a counterpart of this Agreement has become effective according to its terms and stating further the Effective Date.

The terms of this Agreement shall be for and during the time that Unitized Substances are produced from the unitized land and so long thereafter as drilling, reworking or other operations (including improved recovery operations) are prosecuted thereon without cessation of more than ninety (90) consecutive days unless sooner terminated as herein provided.

This Agreement may be terminated with the approval of the A.O. by Working Interest Owners owning seventy-five percent (75%) of the Unit Participation

then in effect whenever such Working Interest Owners determine that Unit Operations are no longer profitable, or in the interest of conservation. Upon approval, such termination shall be effective as of the first day of the month after said Working Interest Owners' determination. Notice of any such termination shall be filed by Unit Operator in the office of the County Clerk of Lea County, New Mexico, within thirty (30) days of the effective date of termination.

Upon termination of this Agreement, the parties hereto shall be governed by the terms and provisions of the leases and contracts affecting the separate Tracts just as if this Agreement had never been entered into.

Notwithstanding any other provision in the leases unitized under this Agreement, Royalty Owners hereby grant Working Interest Owners a period of six months after termination of this Agreement in which to salvage, sell, distribute or otherwise dispose of the personal property and facilities used in connection with Unit Operations.

SECTION 25. RATE OF PROSPECTING, DEVELOPMENT AND PRODUCTION. All production and the disposal thereof shall be in conformity with allocations and quotas made or fixed by and duly authorized person or regulatory body under any Federal or State statute. The A.O. is hereby vested with authority to alter or modify from time to time, in his discretion, the rate of prospecting and development and within the limits made or fixed by the Division to alter or modify the quantity and rate of production under this Agreement, such authority being hereby limited to alteration or modification in the public

interest, the purpose thereof and the public interest to be served thereby to be stated in the order of alternation or modification; provided, further, that no such alteration or modification shall be effective as to any lands in the State of New Mexico or privately-owned lands subject to this Agreement or to the quantity and rate of production from such lands in the absence of specific written approval thereof by the Division.

Powers in this Section vested in the A.O. shall only be exercised after notice to Unit Operator and opportunity for hearing to be held not less than fifteen (15) days from notice, and thereafter subject to administrative appeal before becoming final.

SECTION 26. NONDISCRIMINATION. Unit Operator in connection with the performance of work under this Agreement relating to leases of the United States, agrees to comply with all of the provisions of Section 202(1) to (7) inclusive of Executive Order 11246, (30 F.R. 12319), which are hereby incorporated by reference in this Agreement.

SECTION 27. APPEARANCES. Unit Operator shall have the right to appear for or on behalf of any interests affected hereby before the Department, and the Division, and to appeal from any order issued under the rules and regulations of the Department or the Division, or to apply for relief from any of said rules and regulations or in any proceedings relative to operations before the Department or the Division or any other legally constituted authority; provided, however, that any other interested party shall also have the right at his or its own expense to be heard in any such proceeding.

SECTION 28. NOTICES. All notices, demands, objections or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if made in writing and personally delivered to the party or parties or sent by postpaid certified or registered mail, addressed to such party or parties at their last known address set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other addresses as any such party or parties may have furnished in writing to the party sending the notice, demand or statement.

SECTION 29. NO WAIVER OF CERTAIN RIGHTS. Nothing in this Agreement contained shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense as to the validity or invalidity of any law of the State wherein said Unitized Lands are located, or regulations issued thereunder in any way affecting such party, or as a waiver by any such party of any right beyond his or its authority to waiver; provided, however, each party hereto covenants that it will not resort to any action to partition the unitized land or the Unit Equipment.

SECTION 30. EQUIPMENT AND FACILITIES NOT FIXTURES ATTACHED TO REALTY. Each Working Interest Owner has heretofore placed and used on its Tract or Tracts committed to this Agreement various well and lease equipment and other property, equipment and facilities. It is also recognized that additional equipment and facilities may hereafter be placed and used upon the unitized land as now or hereafter constituted. Therefore, for all purposes of this Agreement, any such equipment shall be considered to be personal property and not fixtures

attached to realty. Accordingly, said well and lease equipment and personal property is hereby severed from the mineral estates affected by this Agreement, and it is agreed that any such equipment and personal property shall be and remain personal property of the Working Interest Owners for all purposes.

SECTION 31. UNAVOIDABLE DELAY. All obligations under this Agreement requiring the Unit Operator to commence or continue improved recovery operations or to operate on or produce Unitized Substances from any of the lands 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, acts of God, Federal, State or municipal law or agency, unavoidable accident, uncontrollable delays in transportation, inability to obtain necessary materials or equipment in open market, or other matters beyond the reasonable control of the Unit Operator whether similar to matters herein enumerated or not.

SECTION 32. NONJOINDER AND SUBSEQUENT JOINDER. Joinder by any Royalty Owner, at any time, must be accompanied by appropriate joinder of the corresponding Working Interest Owner in order for the interest of such Royalty Owner to be regarded as effectively committed. Joinder to this Agreement by a Working Interest Owner, at any time, must be accompanied by appropriate joinder to the Unit Operating Agreement in order for such interest to be regarded as effectively committed to this Agreement.

Any oil or gas interest in the Unitized Formation not committed hereto prior to submission of this Agreement to the A.O. for final approval may

thereafter be committed hereto upon compliance with the applicable provisions of this Section and of Section 14 (Tracts Qualified for Participation) hereof, at any time up to the Effective Date hereof on the same basis of Tract Participation as provided in Section 13, by the owner or owners thereof subscribing, ratifying, or consenting in writing to this Agreement and, if the interest is a Working Interest, by the owner of such interest subscribing also to the Unit Operating Agreement.

It is understood and agreed, however, that from and after the Effective Date hereof the right of subsequent joinder as provided in this Section shall be subject to such requirements or approvals and on such basis as may be agreed upon by Working Interest Owners owning not less than sixty-five percent (65%) of the Unit Participation then in effect, and approved by the A.O. Such subsequent joinder by a proposed Working Interest Owner must be evidenced by his execution or ratification of this Agreement and the Unit Operating Agreement and, where Federal land is involved, such joinder must be approved by the A.O. Such joinder by a proposed Royalty Owner must be evidenced by his execution, ratification or consent of this Agreement and must be consented to in writing by the Working Interest Owner responsible for the payment of any benefits that may accrue hereunder in behalf of such proposed Royalty Owner. Except as may be otherwise herein provided, subsequent joinder to this Agreement shall be effective as of the first day of the month following the filing with the A.O. of duly executed counterparts of any and all documents necessary to establish effective commitment of any Tract or interest to this Agreement, unless objection to such joinder by the A.O., is duly made sixty (60) days after such filing.

SECTION 33. COUNTERPARTS. This Agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties and 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 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 land within the described Unit Area. Furthermore, this Agreement shall extend to and be binding on the parties hereto, their successors, heirs and assigns.

SECTION 34. JOINDER IN DUAL CAPACITY. Execution as herein provided by any party as either a Working Interest Owner or a Royalty Owner shall commit all interests owned or controlled by such party; provided, that if the party is the owner of a Working Interest, he must also execute the Unit Operating Agreement.

SECTION 35. TAXES. Each party hereto shall, for its own account, render and pay its share of any taxes levied against or measured by the amount or value of the Unitized Substances produced from the unitized land; provided, however, that if it is required or if it be determined that the Unit Operator or the several Working Interest Owners must pay or advance said taxes for the account of the parties hereto, it is hereby expressly agreed that the parties so paying or advancing said taxes shall be reimbursed therefor by the parties hereto, including Royalty Owners, who may be responsible for the taxes on

their respective allocated share of said Unitized Substances. No taxes shall be charged to the United States nor to any lessor who has a contact with a lessee which requires his lessee to pay such taxes.

SECTION 36. NO PARTNERSHIP. The duties, obligations and liabilities of the parties hereto are intended to be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the parties hereto. Each party hereto shall be individually responsible for its own obligation as herein provided.

SECTION 37. PRODUCTION AS OF THE EFFECTIVE DATE. Unit Operator shall make a proper and timely gauge of all leases and other tanks within the Unit Area in order to ascertain the amount of merchantable oil above the pipeline connection, in such tanks as of 7:00 a.m. on the Effective Date hereof. All such oil which has then been produced in accordance with established allowables shall be and remain the property of the Working Interest Owner entitled thereto, the same as if the unit had not been formed; and the responsible Working Interest Owner shall promptly remove said oil from the unitized land. Any such oil not so removed shall be sold by Unit Operator for the account of such Working Interest Owners, subject to the payment of all Royalty to Royalty Owners under the terms hereof. The oil that is in excess of the prior allowable of the wells from which it was produced shall be regarded as Unitized Substances produced after Effective Date hereof.

If, as of the Effective Date hereof, any Tract is overproduced with respect to the allowable of the wells on that Tract and the amount of overproduction shall be regarded as a part of the Unitized Substances produced after the Effective Date hereof and shall be charged to such Tract as having been delivered to the parties entitled to Unitized Substances allocated to such Tract.

SECTION 38. NO SHARING OF MARKET. This Agreement is not intended to provide and shall not be construed to provide, directly or indirectly, for any cooperative refining, joint sale or marketing of Unitized Substances.

SECTION 39. STATUTORY UNITIZATION. If and when Working Interest Owners owning at least seventy-five percent (75%) Unit Participation and Royalty Owners owning at least seventy-five percent (75%) Royalty Interest have become parties to this Agreement or have approved this Agreement in writing and such Working Interest Owners have also become parties to the Unit Operating Agreement, Unit Operator may make application to the Division for statutory unitization of the uncommitted interests pursuant to the Statutory Unitization Act (Chapter 65, Article 14, N.M.S. 1953 Annotated). If such application is made and statutory unitization is approved by the Division, then effective as of the date of the Division's order approving statutory unitization, this Agreement and/or the Unit Operating Agreement shall automatically be revised and/or amended in accordance with the following:

(1) Section 14 of this Agreement shall be revised by substituting for the entire said Section the following:

"SECTION 14. TRACTS QUALIFIED FOR PARTICIPATION. On and after the Effective Date hereof, all Tracts within the Unit Area shall be entitled to participation in the production of Unitized Substances."

(2) Section 24 of this Agreement shall be revised by substituting for the first three paragraphs of said Section the following:

"SECTION 24. EFFECTIVE DATE AND TERM. This Agreement shall become effective on the first day of the calendar month next following the effective date of the Division's order approving statutory unitization upon the terms and conditions of this Agreement, as amended (if any amendment is necessary) to conform to the Division's order; approval of this Agreement, as so amended, by the A.O. and the filing by Unit Operator of this Agreement or notice thereof for record in the office of the County Clerk of Lea County, New Mexico. Unit Operator shall not file this Agreement or notice thereof for record, and hence this Agreement shall not become effective, unless within ninety (90) days after the date all other prerequisites for effectiveness of this Agreement have been satisfied, such filing is approved by Working Interest Owners owning a combined Unit Participation of at least sixty-five percent (65%) as to all Tracts within the Unit Area.

"Unit Operator shall, within thirty (30) days after the Effective Date of this Agreement, file for record in the office of the County Clerk of Lea County, New Mexico, a certificate to the effect that this Agreement has become effective in accordance with its terms, therein identifying

the Division's order approving statutory unitization and stating the Effective Date."

(3) This Agreement and/or the Unit Operating Agreement shall be amended in any and all respects necessary to conform to the Division's order approving statutory unitization.

Any and all amendments of this Agreement and/or the Unit Operating Agreement that are necessary to conform said agreements to the Division's order approving statutory unitization shall be deemed to be hereby approved in writing by the parties hereto without any necessity for further approval by said parties, except as follows:

(a) If any amendment of this Agreement has the effect of reducing any Royalty Owner's participation in the production of Unitized Substances, such Royalty Owner shall not be deemed to have hereby approved the amended agreement without the necessity of further approval in writing by said Royalty Owner; and

(b) If any amendment of this Agreement and/or the Unit Operating Agreement has the effect of reducing any Working Interest Owner's participation in the production of Unitized Substances or increasing such Working Interest Owner's share of Unit Expense, such Working Interest Owner shall not be deemed to have hereby approved the amended agreements without the necessity of further approval in writing by said Working Interest Owner.

IN WITNESS WHEREOF, the undersigned have executed this agreement on the
dates evidenced by their respective certificates of acknowledgement hereof.

UNIT OPERATOR AND WORKING INTEREST OWNER
OXY USA Inc.

By: _____

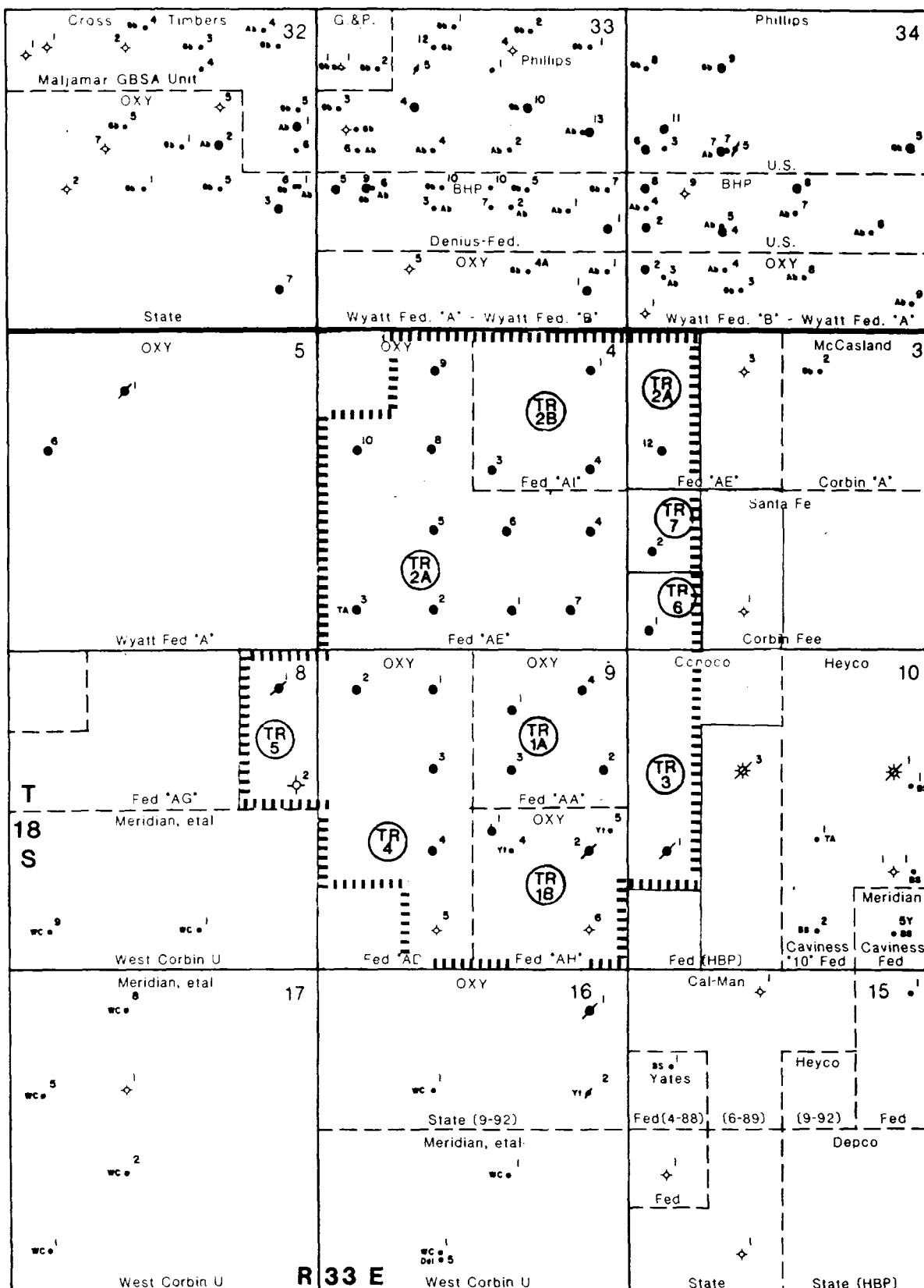
STATE OF

COUNTY OF

This instrument was acknowledged before me on _____
_____, by _____, Attorney-in-Fact of OXY USA Inc.
_____, a Delaware corporation, on behalf of said
corporation.

My Commission Expires:

Notary Public in and for said County
and State



• QUEEN PRODUCER

• OTHER ZONES

Yates
Grayburg
Delaware
Abo
Bone Spring
Wolfcamp

CENTRAL CORBIN (QUEEN) FIELD LEA COUNTY, NEW MEXICO

PROPOSED UNIT

0 1/2
MILE

MARCH, 1990

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS
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[illegible]

* Royalty is 12.5% on sliding scale

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS
1b	T-18S, R-33E, NMPM Sec. 9; SE/4	160	LC-029489(A)	United States Bureau of Land Management 12.5%*	OPY USA Inc. 100%	Selma E. Andrews Trust Braille Institute of America Inc., c/o Republic National Bank of Dallas Harriett Justice Cochran Daisy I. Corbin Higgins Trust Inc. James Virgil Linam Trust Allene D. Roman Sabine Royalty Trust H. Dillard Schenck Estate Kirby D. Schenck Estate of Floyd E. Sherrell Wilbur L. Sherrell Leo R. Sutton, et ux Joseph K. Wallingford Trust Rufus Wallingford J. S. Ward Marideth Watkins Thelma A. Webber Martha W. West	1.07410%

* Royalty is 12.5% on sliding scale

* Royalty is 12.5% on Sliding Scale

Selma E. Andrews Trust	1.07410%
Braile Institute of America Inc., c/o Republic National Bank of Dallas	.92590%
Harriett Justice Cochran	.12500%
Daisy I. Corbin	1.50000%
Higgins Trust Inc.	.50000%
James Virgil Linam Trust	.43750%
Allene D. Roman	.87500%
Sabine Royalty Trust	.50000%
H. Dillard Schenck Estate	.06250%
Kirby D. Schenck Estate of Floyd E. Sherrill	.06250%
Wilbur L. Sherrill	.08333%
Joseph K. Wallingford	.08333%
Trust	.25000%
J. S. Ward	.25000%
Marideth Watkins	.08334%
Thelma A. Webber	.43750%
Martha W. West	<u>.12500%</u>
	7.50000%
	5.00000%
Texaco Inc. **	12.50000%
**Production Payment	

EXHIBIT "g-1"
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS
5	T-18S, R-33E Sec. 8: E/2 NE/4	80	NM-84731	United States Bureau of Land Management 12.5%	Santa Fe Energy 100%	-0-	Santa Fe Energy H.E. Yates Company 50.00% <u>50.00%</u> 100.00%
6	T-18S, R-33E, Sec. 3: SW/4 SW/4	40	Fee	Floyd Graham 9.375% Doyle M. Sanders 5% Jeanne Cina 5%	Santa Fe Exp. Co. et al 100%	James B. Eubank Larry Schultz Kerr-McGee .<6503125%	Santa Fe Exploration Company 25.00% Dr. Dennis Alsofrom & Linda Ann Anderson 1.00% Homer Bankhead 1.00% C. W. & Frieda T. Stumhofer 3.75% James H. Bozarth 1.00% Frances Buckler 3.75% Pat Carlisle 1.00% Binton H. Carr 3.75% Bart Colwell 2.00% V. Randolph Delk 3.00% Dr. Fred Hadley Hamilton III 1.00% Dr. Robert W. King 2.00% Jack S. Kitchen 3.00% Jack S. Kitchen, Jr. 1.00% Jeff Bowman 1.00% C. E. Larue and B. N. Muncy, Jr. 22.50% Marbob Energy Corp. 15.00% Dr. Roger Moore 3.75% Maurice Mordka 1.00% Richard Olson .50% Dale M. Sanders 1.00% Stipes Properties Inc. 3.00% David Spodee .50% <u>100.00%</u>

EXHIBIT "B-1"
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS	
7	T-18S, R-33E Sec. 3: NW/4 SW/4	40		Pardue Farms Kathleen C. Robbins Stephenie Aldemir Ronald Robbins Earl J. Walters Anne D. O'Byrne Christine Campos Leona Stanger Merland Inc. Carmex Inc. Kugeler Brothers 1st Nat Bk Birmingham Tr.J.M. Phillips, Dec. James M. Winfield John F. Joyce II Melton Winfield Daisy S. Winfield Robert Phillips Handley Nell Arnold Handley Jerry Phillips Winfield Pamela Gage Winfield Penny Leigh Winfield comprising 18.75%	Santa Fe Exp. Co. et al 100%	Larry Schultz Siete Oil & Gas Corp Kerr-McGee Corp William C. Anderson	1.372462%	Santa Fe Exploration Company 28.75% Dr. Dennis Alsofrom & Linda Ann Anderson Homer Bankhead Phillip R. Bishop James H. Bozarth Frances Buckler Pat Carlisle Binton H. Carr Bart Colwell V. Randolph Delk Dr. Fred Hadley Hamilton III Jack S. Kitchen C. E. Larue & B. N. Muncy, Jr. Marbob Energy Corp. Dr. Roger Moore Maurice Mordka C. W. & Frieda T. Stumthoffer 100.00%

TOTAL ACRES

Federal	1481.19	acres
Fee	<u>80.00</u>	acres
9 Tracts	1561.19	acres

EXHIBIT "B-2"

SCHEDULE SHOWING TRACT PARTICIPATION
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

<u>TRACT NO.</u>	<u>TRACT PARTICIPATION PERCENTAGE</u>
1a	16.67814
1b	8.24954
2a	37.75420
2b	10.55516
3	2.50173
4	16.92200
5	.19592
6	1.20982
7	<u>5.93349</u>
TOTAL	100.00000%

UNIT OPERATING AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

EXHIBIT E

UNIT OPERATING AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

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**UNIT OPERATING AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO**

THIS AGREEMENT, entered into as of the 1st day of July, 1990

W I T N E S S E T H:

WHEREAS, an agreement entitled "UNIT AGREEMENT, CENTRAL CORBIN QUEEN UNIT, Lea County, New Mexico", herein referred to as "Unit Agreement", has been made which, among other things, provides for a separate agreement to provide for Unit Operations as therein defined.

NOW, THEREFORE, it is provided as follows:

ARTICLE 1.

CONFIRMATION OF UNIT AGREEMENT

1.1 Confirmation of Unit Agreement. The Unit Agreement is hereby confirmed and by reference made a part of this Agreement. The definitions in the Unit Agreement are adopted for all purposes of this Agreement. If there is any conflict between the Unit Agreement and this Agreement, the Unit Agreement shall govern.

ARTICLE 2

EXHIBITS

2.1 Exhibits. The following exhibits are incorporated herein by reference:

2.1.1 Exhibit A, attached hereto, is a plat of the Unit Area.

2.1.2 Exhibit B-1, attached hereto, is a listing of the separate tracts of the Unit Area.

2.1.3 Exhibit B-2, attached hereto, is a listing of the tract participations of each tract in the Unit Area.

2.1.4 Exhibit B-3, attached hereto, is a listing of the Working Interest Owners, their addresses, and their interest in the respective tracts and the Unit Area.

2.1.5 Exhibit C , attached hereto, is the Accounting Procedure applicable to Unit Operations. If there is any conflict between this Agreement and Exhibit C, this Agreement shall govern.

2.1.6 Exhibit D, attached hereto, contains insurance provisions applicable to Unit Operations.

2.1.7 Exhibit E, attached hereto, contains provisions applicable in the event any party does not take its share of gas production from the Unit Area.

2.2 Reference to Exhibits. When reference is made herein to an Exhibit, it is to the original exhibit or, if revised, to the last revision.

ARTICLE 3

SUPERVISION OF OPERATIONS BY WORKING INTEREST OWNERS

3.1 Overall Supervision. Working Interest Owners shall exercise overall supervision and control of all matters pertaining

to Unit Operations. In the exercise of such authority, each Working Interest Owner shall act solely in its own behalf in the capacity of an individual owner and not on behalf of the owners as an entirety.

3.2 Specific Authority and Duties. The matters with respect to which Working Interest Owners shall decide and take action shall include, but not be limited to, the following:

3.2.1 Method of Operation. The method of operation, including the type of recovery program to be employed.

3.2.2 Drilling of Wells. The drilling of any well whether for production of Unitized Substances, for use as an injection well, or for other purposes.

3.2.3 Well Recompletions and Change of Status. The recompletion, abandonment, or change of status of any well, or the use of any well for injection or other purposes.

3.2.4 Unit Operator's Tools and Equipment. The use by operator of its own tools and equipment in the drilling of a well or in any other operations in which drilling equipment is required.

3.2.5 Expenditures. The making of any single expenditure in excess of Fifty Thousand Dollars (\$50,000.00); however, approval by Working Interest Owners of the drilling, reworking, deepening, or plugging back of any well shall include approval of all necessary expenditures required therefor, and for completing, testing, and

equipping the well, including necessary flow lines, separators, and lease tankage.

3.2.6 Disposition of Unit Equipment. The selling or otherwise disposing of any item of surplus Unit Equipment, if the current price of new equipment similar thereto is in excess of Fifty Thousand Dollars (\$50,000.00).

3.2.7 Appearance Before a Court or Regulatory Agency. The designating of a representative to appear before any court or regulatory agency in matters pertaining to Unit Operations; however, such designation shall not prevent any Working Interest Owner from appearing in person or from designating another representative in its own behalf.

3.2.8 Audit Exceptions. The settlement of unresolved audit exceptions.

3.2.9 Inventories. The taking of periodic inventories as provided by Exhibit C.

3.2.10 Technical Services. The authorizing of charges to the joint account for services by consultant Operator's technical personnel not covered by the charges provided by Exhibit C.

3.2.11 Assignments to Committees. The appointment of committees to study any problems in connection with Unit Operations.

3.2.12 Successor of Operator. The selection of a successor Unit Operator upon resignation of the Unit Operator.

3.2.13 Changes and Amendments. The changing of the Unit Area or the amending of this Agreement or the Unit Agreement as provided by Article 11 of the Unit Agreement.

3.2.14 Investment Adjustment. The adjustment and readjustment of investments.

3.2.15 Termination of Unit Agreement. The termination of the Unit Agreement as provided therein.

ARTICLE 4

MANNER OF EXERCISING SUPERVISION

4.1 Designation of Representatives. Each Working Interest Owner shall inform Unit Operator of the names and addresses of the representative and alternate who are authorized to represent and bind such Working Interest Owners with respect to Unit Operations. The representative or alternate may be changed from time to time by written notice to Unit Operator.

4.2 Meetings. All meetings of Working Interest Owners shall be called by Unit Operator upon its own motion or at the request of one or more Working Interest Owners having a total Unit Participation of not less than five percent (5%). No meeting shall be called on less than fourteen (14) days advance written notice, with agenda for the meeting attached. Working Interest Owners who attend the meeting may amend items included in the agenda and may act upon an amended item or other items presented at the meeting. The representative of Unit Operator shall be chairman of each meeting.

4.3 Voting Procedure. Working Interest Owners shall determine all matters coming before them as follows:

4.3.1 Voting Interest. Each Working Interest Owner shall have a voting interest equal to its Unit Participation.

4.3.2 Vote Required. Unless otherwise provided herein or in the Unit Agreement, Working Interest Owners shall determine all matters by the affirmative vote of two (2) or more Working Interest Owners having a combined voting interest of at least seventy percent (70%); however, should any one Working Interest Owner have more than thirty percent (30%) voting interest, its negative vote or failure to vote shall not defeat a motion, such motion shall pass if approved by Working Interest Owners having a majority voting interest, unless one (1) or more Working Interest Owners having a combined voting interest of at least twenty percent (20%) likewise vote against the motion or fail to vote.

4.3.3 Vote at Meeting by Nonattending Working Interest Owner. Any Working Interest Owner who is not represented at a meeting may vote on any agenda item by letter or telegram addressed to the representative of Unit Operator if its vote is received prior to the vote at the meeting.

4.3.4 Poll Votes. Working Interest Owners may vote by letter or telegram on any matter submitted in writing to all Working Interest Owners. If a meeting is not requested, as provided in Section 4.2, within seven (7) days after a

written proposal is sent to Working Interest Owners, the vote taken letter or telegram shall control. Unit Operator shall give prompt notice of the results of such voting to each Working Interest Owner.

ARTICLE 5

INDIVIDUAL RIGHTS OF WORKING INTEREST OWNERS

5.1 **Reservation of Rights.** Working Interest Owners retain all their rights, except as otherwise provided in this Agreement or the Unit Agreement.

5.2 **Specific Rights.** Each Working Interest Owner shall have, among others, the following specific rights:

5.2.1 **Access to Unit Area.** Access to the Unit Area at all reasonable times to inspect Unit Operations, all wells, and the records and data pertaining thereto.

5.2.2 **Reports.** The right to receive from Unit Operator, upon written request, copies of all reports to any governmental agency, reports of crude oil runs and stocks, inventory reports, and all other information pertaining to Unit Operations. The cost of gathering and furnishing information not ordinarily furnished by Unit operator to all Working Interest Owners shall be charged to the Working Interest Owner that requests the information.

5.2.3 **Audits.** The right to audit the accounts of Unit Operator pertaining to Unit Operations according to the provisions of Exhibit C.

ARTICLE 6

UNIT OPERATOR

6.1 Unit Operator. OXY USA Inc. is designated as the initial Unit Operator.

6.2 Resignation. Unit Operator may resign at any time. Such resignation shall not become effective for a period of three (3) months after the resignation unless a successor Unit Operator has taken over Unit Operations prior to the expiration of such period.

6.3 Selection of Successor. Upon the resignation of Unit Operator, a successor Unit Operator shall be selected by Working Interest Owners. If the former Unit Operator fails to vote the successor Unit Operator shall be selected by the affirmative vote of Working Interest Owners having a majority of the voting interest remaining after excluding the voting interest of the former Unit Operator.

ARTICLE 7

AUTHORITY AND DUTIES OF UNIT OPERATOR

7.1 Exclusive Right to Operate Unit. Subject to the provisions of this Agreement and to instructions from Working Interest Owners. Unit Operator shall have the exclusive right and be obligated to conduct Unit Operations.

7.2 Workmanlike Conduct. Unit Operator shall conduct Unit Operations in a good and workmanlike manner as would a prudent operator under the same or similar circumstances. Unit Operator shall freely consult with Working Interest Owners and keep them

informed of all matters which Unit Operator, in the exercise of its best judgment, considers important. Unit Operator shall not be liable to Working Interest Owners for damages, unless such damages result from its gross negligence or willful misconduct.

7.3 Liens and Encumbrances. Unit Operator shall endeavor to keep the lands and leases in the Unit Area and Unit Equipment free from all liens and encumbrances occasioned by Unit Operations, except those provided for in Article 11.

7.4 Employees. The number of employees used by Unit Operator in conducting Unit Operations, their selection, hours of labor, and compensation shall be determined by Unit Operator. Such employees shall be the employees of Unit Operator.

7.5 Records. Unit Operator shall keep correct books, accounts, and records of Unit Operations.

7.6 Reports to Working Interest Owners. Unit Operator shall furnish Working Interest Owners periodic reports of Unit Operations.

7.7 Reports to Governmental Authorities. Unit Operator shall make reports to governmental authorities that it has the duty to make as Unit Operator.

7.8 Engineering and Geological Information. Unit Operator shall furnish to a Working Interest Owner, upon written request, a copy of all logs and other engineering and geological data pertaining to wells drilled for Unit Operations.

7.9 Expenditures. Unit Operator is authorized to make single expenditures not in excess of Fifty Thousand Dollars

(\$50,000.00) without prior approval of Working Interest Owners. In the event of an emergency, Unit Operator may immediately make or incur such expenditures as in its opinion are required to deal with the emergency. Unit Operator shall report to Working Interest Owners, as promptly as possible, the nature of the emergency and the action taken.

7.10 Wells Drilled by Unit Operator. All wells drilled by Unit Operator shall be at the rates prevailing in the area.

ARTICLE 8

TAXES

8.1 Property Taxes. Beginning with the first calendar year after the Effective Date hereof, Unit Operator shall make and file all necessary property tax renditions and returns with the proper taxing authorities with respect to all property of each Working Interest Owner used or held by Unit Operator for Unit Operations. Unit Operator shall settle assessments arising therefrom. All such property taxes shall be paid by Unit Operator and charged to the joint account; however, if the interest of a Working Interest Owner is subject to a separately assessed overriding royalty interest, production payment, or other interest in excess of one-eighth (1/8) royalty, such Working Interest Owner shall be given credit for the reduction in taxes paid resulting therefrom.

8.2 Other Taxes. Each Working Interest Owner shall pay or cause to be paid all production, severance, gathering, and other taxes imposed upon or with respect to the production or handling

of its share of Unitized Substances.

8.3 Income Tax Election. Notwithstanding any provisions herein that the rights and liabilities hereunder are several and not joint or collective, or that this Agreement and operations hereunder shall not constitute a partnership, if for Federal income tax purposes this Agreement and the operations hereunder are regarded as a partnership, then each Person hereby affected elects to be excluded from the application of all the provisions of Subchapter K, Chapter 1, Subtitle A, of the Internal Revenue Code of 1954, as permitted and authorized by Section 761 of the Code and the regulations promulgated thereunder. Unit Operator is authorized and directed to execute on behalf of each Person hereby affected such evidence of this election as may be required by the Secretary of the Treasury of the United States or the Federal Internal Revenue Service, including specifically, but not by way of limitation, all of the returns, statements, and the data required by Federal Regulations 1.761-1(a). Should there be any requirement that each Person hereby affected give further evidence of this election, each such Person shall execute such documents and furnish such other evidence as may be required by the Federal Internal Revenue Service or as may be necessary to evidence this election. No such Person shall give any notices or take any other action inconsistent with the election made hereby. If any present or future income tax laws of the state or states in which the Unit Area is located or any future income tax law of the United States contain provisions similar to those in Subchapter

K, Chapter 1, Subtitle A, of the Internal Revenue Code of 1954, under which an election similar to that provided by Section 761 of the Code is permitted, each Person hereby affected shall make such elections as may be permitted or required by such laws. In making the foregoing election, each such Person states that the income derived by such Person from Unit Operations can be adequately determined without the computation of partnership taxable income.

ARTICLE 9

INSURANCE

9.1 Insurance. Unit Operator, with respect to Unit Operations, shall:

- (a) comply with the Workmen's Compensation Laws of the state,
- (b) comply with Employer's Liability and other insurance requirements of the laws of the state, and
- (c) provide insurance or other protection as set forth in Exhibit D.

ARTICLE 10

ADJUSTMENT OF INVESTMENTS

10.1 Property Taken Over. Upon the Effective Date, Working Interest Owners shall deliver to Unit Operator the following:

10.1.1 Wells. All wells completed in the Unitized Formation, within the Unit Area.

10.1.2 Equipment. The casing and tubing in each such

well, the wellhead connections thereon, and all other lease and operating equipment that is used in the operation of such wells which Working Interest Owners determine is necessary or desirable for conducting Unit Operations.

10.1.3 Records. A copy of all production and well records for such wells.

10.2 Inventory and Evaluation. Working Interest Owners shall at Unit Expense inventory and evaluate the wells and equipment taken over. The inventory of equipment shall be limited to those items considered controllable under Exhibit C except, upon determination of Working Interest Owners, items considered noncontrollable may be included in the inventory in order to insure a more equitable adjustment of investment. The method of evaluating wells and equipment shall be determined by Working Interest Owners.

10.3 Investment Adjustment. Upon approval by Working Interest Owners of the inventory and evaluation, each Working Interest Owner shall be credited with the value of its interest in all wells and equipment taken over under Section 10.1, and shall be charged with an amount equal to that obtained by multiplying the total value of all wells and equipment taken over under Section 10.1 by such Working Interest Owner's Unit Participation. If the charge against any Working Interest Owner is greater than the amount credited to such Working Interest Owner, the resulting net charge shall be an item of Unit Expense, chargeable against such Working Interest Owner. If the credit to any Working

Interest Owner is greater than the amount charged against such Working Interest Owner, the resulting net credit shall be paid to such Working Interest Owner by Unit Operator out of funds received by it in settlement of the net charges described above.

10.4 General Facilities. The acquisition of warehouses, warehouse stocks, lease houses, camps, facility systems, and office buildings necessary for Unit Operations shall be by negotiation by the owners thereof and Unit Operator, subject to the approval of Working Interest Owners.

10.5 Ownership of Property and Facilities. Each Working Interest Owner, individually, shall by virtue hereof own an undivided interest, equal to its Unit Participation in all wells, equipment, and facilities taken over or otherwise acquired by Unit Operator pursuant to this Agreement.

ARTICLE 11

UNIT EXPENSE

11.1 Basis of Charge to Working Interest Owners. Unit Operator initially shall pay all Unit Expense. Each Working Interest Owner shall reimburse Unit Operator for its share of Unit Expense. Each Working Interest Owner's share shall be the same as its Unit Participation. All charges, credits, and accounting for Unit Expense shall be in accordance with Exhibit C.

11.2 Budgets. Before or as soon as practical after the Effective Date, Unit Operator shall prepare a budget of estimated Unit Expense for the remainder of the calendar year, and thereafter shall prepare budgets as determined by Working Interest Owners.

Budgets shall be estimates only, and shall be adjusted or corrected by Working Interest Owners and Unit Operator whenever an adjustment or correction is proper. A copy of each budget and adjusted budget shall be furnished promptly to each Working Interest Owner.

11.3 Advance Billings. Unit Operator shall have the right to require Working Interest Owners to advance their respective shares of estimated Unit Expense as provided by Exhibit C.

11.4 Commingling of Funds. Funds received by Unit Operator under this Agreement need not be segregated or maintained by it as a separate fund, but may be commingled with its own funds.

11.5 Unpaid Unit Expense. If any Working Interest Owner fails or is unable to pay its share of Unit Expense within sixty (60) days after rendition of a statement therefor by Unit Operator, the non-defaulting Working Interest Owners shall, upon request by Unit Operator, pay the unpaid amount as if it were Unit Expense in the proportion that the Unit Participation of each such Working Interest Owner bears to the Unit Participation of all such Working Interest Owners. Each Working Interest so paying its share of the unpaid amount shall, to obtain reimbursement thereof, be subrogated to the security rights described in Section 11.6 of this Agreement.

11.6 Security Rights. In addition to any other security rights and remedies provided for by the laws of this State with respect to services rendered or materials and equipment furnished under this Agreement, Unit Operator shall have a first and prior lien upon each Working Interest, including the Unitized Substances

and Unit Equipment credited thereto, in order to secure payment of the Unit Expense charged against such Working Interest, together with interest thereon at the rate set forth in Exhibit C or the maximum rate allowed by law, whichever is less. If any Working Interest Owner does not pay its share of Unit Expense when due, Unit Operator shall have the right to collect from the purchaser the proceeds from the sale of such Working Interest Owner's share of Unitized Substances until the amount owed, plus interest at the rate herein provided, has been paid. Each purchaser shall be entitled to rely on Unit Operator's statement concerning the amount owed and the interest payable thereon.

11.7 Carved-out Interests. Any overriding royalty, production payment, net proceeds interest, carried interest or any other interest carved out of a Working Interest shall be subject to this Agreement. If a Working Interest Owner does not pay its share of Unit Expense and the proceeds from the sale of Unitized Substances under Section 11.6 are insufficient for that purpose, the security rights provided for therein may be applied against the carved-out interests with which such Working Interest is burdened. In such event, the owner of such carved-out interest shall be subrogated to the security rights granted by Section 11.6.

ARTICLE 12

NONUNITIZED FORMATIONS

12.1 Right to Operate. Any Working Interest Owner that now has or hereafter acquires the right to drill for and produce oil, gas, or other minerals, from a formation underlying the Unit Are

other than the Unitized Formation, shall have the right to do so notwithstanding this Agreement or the Unit Agreement. In exercising the right, however, such Working Interest Owner shall exercise care to prevent unreasonable interference with Unit Operations. No Working Interest Owner other than Unit Operator shall produce Unitized Substances. If any Working Interest Owner drills any well into or through the Unitized Formation, the Unitized Formation shall be protected in a manner satisfactory to Working Interest Owners so that the production of Unitized Substances will not be affected adversely.

ARTICLE 13

LIABILITY, CLAIMS, AND SUITS

13.1 **Individual Liability.** The duties, obligations, and liabilities of Working Interest Owners shall be several and not joint or collective; and nothing therein shall ever be construed as creating a partnership of any kind, joint venture, association, or trust among Working Interest Owners.

13.2 **Settlements.** Unit Operator may settle any single damage claim or suit involving Unit Operations if the expenditure does not exceed Ten Thousand Dollars (\$10,000.00) and if the payment is in complete settlement of such claim or suit. If the amount required for settlement exceeds the above amount, Working Interest Owners shall determine the further handling of the claim or suit. All costs and expense of handling, settling, or otherwise discharging such claim or suit shall be an item of Unit Expense, subject to such limitation as is set forth in Exhibit C. If a

claim is made against any Working Interest Owner or if any Working Interest Owner is sued on account of any matter arising from Unit Operations over which such Working Interest Owner individually has no control because of the rights given Working Interest Owners and Unit Operator by this Agreement and the Unit Agreement, the Working Interest Owner shall immediately notify Unit Operator, and the claim or suit shall be treated as any other claim or suit involving Unit Operations.

13.3 Notice of Loss. Unit Operator shall report to Working Interest Owners as soon as practicable after each occurrence, damage or loss to Unit Equipment, and each accident, occurrence, claim, or suit involving third party bodily injury or property damage not covered by insurance carried for the benefit of Working Interest Owners.

ARTICLE 14

NONDISCRIMINATION

14.1 Nondiscrimination. During the performance of work under this Agreement, Unit Operator agrees to comply with all the provisions of subsections (1) through (7) of Section 202, Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and as subsequently amended, which are hereby incorporated by reference in this Agreement.

ARTICLE 15

NOTICES

15.1 Notices. All notices required hereunder shall be in

writing and shall be deemed to have been properly served when sent by mail or telegram to the address of the representative of each Working Interest Owner as furnished to Unit Operator in accordance with Article 4.

ARTICLE 16

WITHDRAWAL OF WORKING INTEREST OWNER

16.1 Withdrawal. A Working Interest Owner may withdraw from this agreement by transferring, without warranty of title either express or implied, to the Working Interest Owners who do not desire to withdraw all its Oil and Gas Rights, exclusive of Royalty Interests, together with its interest in all Unit Equipment and in all wells used in Unit Operations, provided that such transfer shall not relieve such Working Interest Owner from any obligation or liability incurred prior to the first day of the month following receipt by Unit Operator of such transfer. The delivery of the transfer shall be made to Unit Operator for the transferees. The transferred interest shall be owned by the transferees in proportion to their respective interests so acquired, shall pay the transferor for its interest in Unit Equipment, the salvage value thereof less its share of the estimated cost of salvaging same and of plugging and abandoning all wells then being used or held for Unit Operations, as determined by Working Interest Owners. In the event such withdrawing owner's interest in the aforesaid salvage value is less than such owner's share of such estimated costs, the withdrawing owner, as a condition precedent to withdrawal, shall pay the Unit Operator,

for the benefit of Working Interest Owners succeeding to its interest, a sum equal to the deficiency. Within sixty (60) days after receiving delivery of the transfer, Unit Operator shall render a final statement to the withdrawing owner for its share of Unit Expense, including any deficiency in salvage value, as determined by Working Interest Owners, incurred as of the first day of the month following the date of receipt of the transfer. Provided all Unit Expense, including any deficiency hereunder, due from the withdrawing owner has been paid in full within thirty (30) days after the rendering of such final statement by the Unit Operator, the transfer shall be effective the first day of the month following its receipt by Unit Operator and, as of such effective date, withdrawing owner shall be relieved from all further obligations and liabilities hereunder and under the Unit Agreement, and the rights of the withdrawing Working Interest Owner hereunder and under the Unit Agreement shall cease insofar as they existed by virtue of the interest transferred.

16.2 Limitation on Withdrawal. Notwithstanding anything set forth in Section 16.1, Working Interest Owners may refuse to permit the withdrawal of a Working Interest Owner if its Working Interest is burdened by any royalties, overriding royalties, production payments, net proceeds interest, carried interest, or any other interest created out of the Working Interest in excess of one-eighth (1/8) lessor's royalty, unless the other Working Interest Owners willing to accept the assignment agree to accept the Working Interest subject to such burdens.

ARTICLE 17

ABANDONMENT OF WELLS

17.1 **Rights of Former Owners.** If Working Interest Owners determine to permanently abandon any well within the Unit Area prior to termination of the Unit Agreement, Unit Operator shall give written notice thereof to the Working Interest Owners of the Tract on which the well is located, and they shall have the option for a period of sixty (60) days after the sending of such notice to notify Unit Operator in writing of their election to take over and own the well. Within ten (10) days after the Working Interest Owners of the Tract have notified Unit Operator of their election to take over the well, they shall pay Unit Operator, for credit to the joint account, the amount determined by Working Interest Owners to be the net salvage value of the casing and equipment, through the wellhead, in and on the well. The Working Interest Owners of the Tract, by taking over the well, agree to seal off the Unitized Formation, and upon abandonment to plug the well in compliance with applicable laws and regulations.

17.2 **Plugging.** If the Working Interest Owners of a Tract do not elect to take over a well within the Unit Area that is proposed for abandonment, Unit Operator shall plug and abandon the well in compliance with applicable laws and regulations.

ARTICLE 18

EFFECTIVE DATE AND TERM

18.1 Effective Date. This Agreement shall become effective when the Unit Agreement becomes effective.

18.2 Term. This Agreement shall continue in effect so long as the Unit Agreement remains in effect, and thereafter until (a) all Unit wells have been plugged and abandoned or turned over to Working Interest Owners in accordance with Article 19; (b) all Unit Equipment and real property acquired for the joint account have been disposed of by Unit Operator in accordance with instructions of Working Interest Owners; and (c) there has been a final accounting.

ARTICLE 19

ABANDONMENT OF OPERATIONS

19.1 Termination. Upon termination of the Unit Agreement, the following will occur:

19.1.1 Oil and Gas Rights. Oil and Gas Rights in and to each separate Tract shall no longer be affected by this Agreement, and thereafter the parties shall be governed by the terms and provisions of the leases, contracts, and other instruments affecting the separate Tracts.

19.1.2 Right to Operate. Working Interest Owners of any Tract that desire to take over and continue to operate wells located thereon may do so by paying Unit Operator, for credit to the joint account, the net salvage value, as determined by Working Interest Owners, of the casing and

equipment, through the wellhead, in and on the wells taken over and by agreeing upon abandonment to plug each well in compliance with applicable laws and regulations.

19.1.3 Salvaging Wells. Unit Operator shall salvage as much of the casing and equipment in or on wells not taken over by Working Interest Owners of separate Tracts as can economically and reasonably be salvaged, and shall cause the wells to be plugged and abandoned in compliance with applicable laws and regulations.

19.1.4 Cost of Abandonment. The cost of abandonment of Unit Operations shall be Unit Expense.

19.1.5 Distribution of Assets. Working Interest Owners shall share in the distribution of Unit Equipment, or the proceeds thereof, in proportion to their Unit Participations.

ARTICLE 20

APPROVAL

20.1 Original, Counterpart, or Other Instrument. An owner of a Working Interest may approve this Agreement by signing the original, a counterpart thereof, or other instrument approving this Agreement. The signing of any such instrument shall have the same effect as if all Persons had signed the same instrument.

ARTICLE 21

SUCCESSORS AND ASSIGNS

21.1 Successors and Assigns. This Agreement shall extend to, be binding upon, and inure to the benefit of the Persons hereto and their respective heirs, devisees, legal representatives,

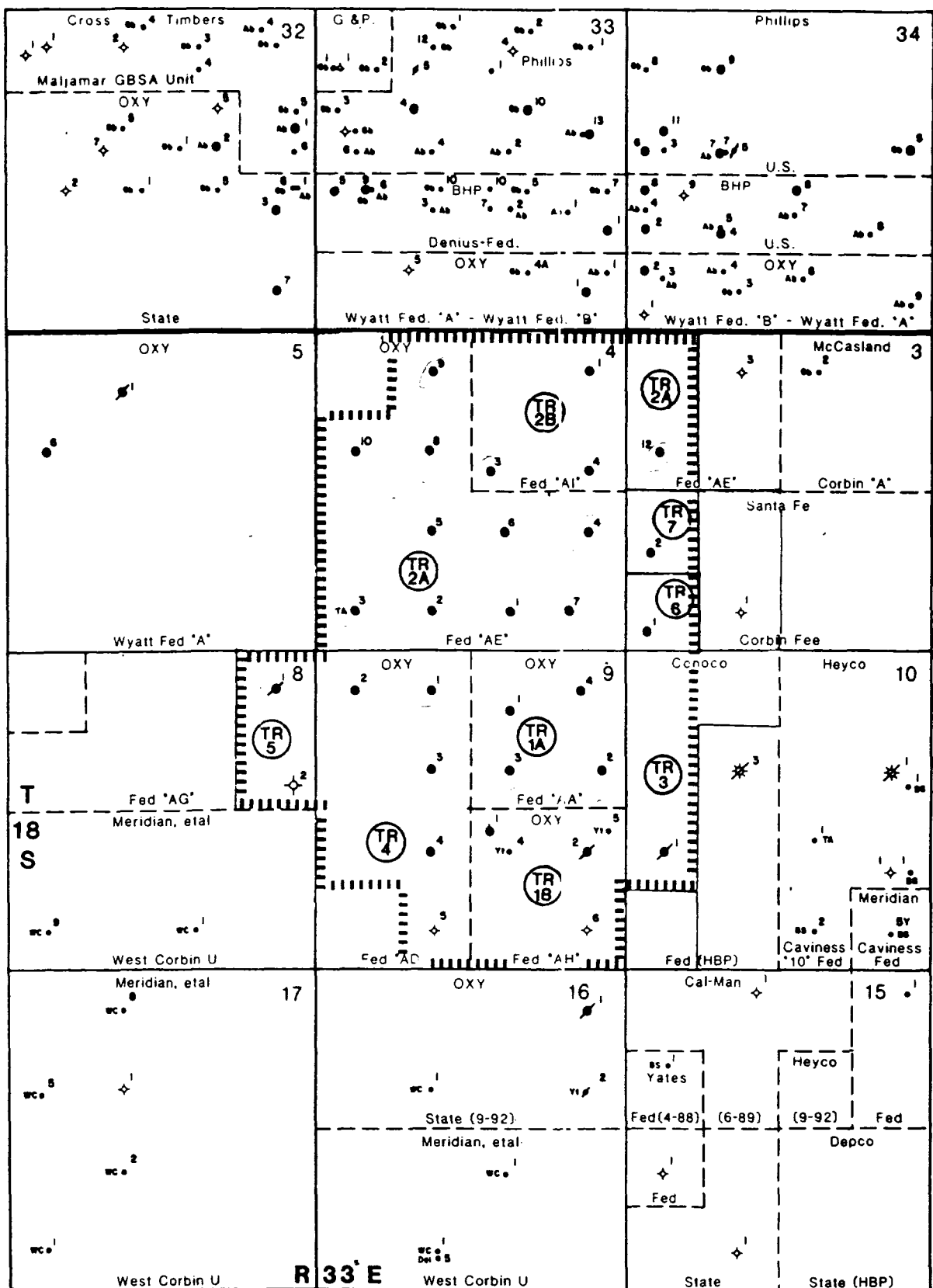
successors, and assigns, and shall constitute a covenant running with the lands, leases, and interests covered hereby.

IN WITNESS WHEREOF, this Agreement is approved on the dates opposite the respective signatures.

WORKING INTEREST OWNERS:

OXY USA Inc.

By_____



• QUEEN PRODUCER

• OTHER ZONES

Yates
Grayberg
Delaware
Alco
Bone Spring
Wolfcamp

CENTRAL CORBIN (QUEEN) FIELD LEA COUNTY, NEW MEXICO

PROPOSED UNIT

0 1/2
MILE

MARCH, 1990

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS
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[illegible]

Royalty is 12.5% on Sliding Scale

EXHIBIT "B-1"
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

ACT O.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS
b	T-18S, R-33E, N4PM Sec. 9: SE/4	160	LC-029489(A)	United States Bureau of Land Management 12.5%*	OXY USA Inc. 100%	Selma E. Andrews Trust Braille Institute of America Inc., c/o Republic National Bank of Dallas Harriett Justice Cochran Daisy I. Corbin Higgins Trust Inc. James Virgil Linam Trust Allene D. Roman Sabine Royalty Trust H. Dillard Schenck Estate Kirby D. Schenck Estate of Floyd E. Sherrell Wilbur L. Sherrell Leo R. Sutton, et ux Joseph K. Wallingford Trust Rufus Wallingford J. S. Ward Marideth Watkins Thelma A. Webber Martha W. West	1.07410% <

Royalty is 12.5% on Sliding Scale

Royalty is 12.5% on Sliding Scale

EXHIBIT "B-1"
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

Page 4

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS
5	T-18S, R-33E Sec. 8: E/2 NE/4	80	NM-84/731	United States Bureau of Land Management 12.5%	Santa Fe Energy 100%	-0-	Santa Fe Energy H.E. Yates Company 50.00% <u>50.00%</u> 100.00%
6	T-18S, R-33E, Sec. 3: SW/4, SW/4	40	Fee	Floyd Graham 9.3/75% Doyle M. Sanders 5% Jeanne Cina 5%	Santa Fe Exp. Co. et al 100%	James B. Eubank Larry Schultz Kerr-McGee	Santa Fe Exploration Company 25.00% Dr. Dennis Alsofrom & Linda Ann Anderson 1.00% Homer Bankhead 1.00% C. W. & Frieda T. Stumhofer 3.75% James H. Rozarth 1.00% Frances Buckler 3.75% Pat Carlisle 1.00% Binion H. Carr 3.75% Bart Colwell 2.00% V. Randolph Delk 3.00% Dr. Fred Hadley Hamilton III 1.00% Dr. Robert W. King 2.00% Jack S. Kitchen 3.00% Jack S. Kitchen, Jr. 1.00% Jeff Bowman 1.00% C. E. LaRue and B. N. Muncy, Jr. 22.50% Marbob Energy Corp. 15.00% Dr. Roger Moore 3.75% Maurice Mordka 1.00% Richard Olson 1.00% Dale M. Sanders .50% Stipes Properties Inc. 1.00% 3.00% David Spode .50% <u>100.00%</u>

EXHIBIT "B-1"
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

TRACT NO.	DESCRIPTION OF LAND	ACRES	SERIAL NO.	BASIC ROYALTY	CURRENT RECORD TITLE	OVERRIDING ROYALTY	WORKING INTEREST OWNERS	
7	T-18S, R-33E Sec. 3: NW/4 SW/4	40		Pardue Farms Kathleen C. Robbins Stephenie Aldemir Ronald Robbins Earl J. Walters Anne D. O'Byrne Christine Campos Leona Stanger Merland Inc. Carmex Inc. Kugeler Brothers 1st Nat Bk Birmingham Tr-J.M. Phillips, Dec. James M. Winfield John F. Joyce II Melton Winfield Daisy S. Winfield Robert Phillips Handley Nell Arnold Handley Jerry Phillips Winfield Pamela Gage Winfield Perry Leigh Winfield comprising 18.75%	Santa Fe Exp. 100%	Larry Schultz Sierte Oil & Gas Corp Kerr-McGee Corp William C. Anderson	1.372462%	Santa Fe Exploration Company 28.75% Dr. Dennis Alsoprom & Linda Ann Anderson Homer Bankhead Phillip R. Bishop James H. Bozarth Frances Buckler Pat Carlisle Binion H. Carr Bart Colwell V Randolph Hall Dr. Fred Hadley Hamilton III Jack S. Kitchen C. E. LaRue & B. N. Murncy, Jr. Marbob Energy Corp. Dr. Roger Moore Maurice Mordka C. W. & Frieda T. Stumthoffer 100.00%

TOTAL ACRES

Federal	1481.19	acres
Fee	<u>80.00</u>	acres
9 Tracts	1561.19	acres

EXHIBIT "B-2"

SCHEDULE SHOWING TRACT PARTICIPATION
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

<u>TRACT NO.</u>	<u>TRACT PARTICIPATION PERCENTAGE</u>
1a	16.67814
1b	8.24954
2a	37.75420
2b	10.55516
3	2.50173
4	16.92200
5	.19592
6	1.20982
7	<u>5.93349</u>
TOTAL	100.00000%

EXHIBIT B-3
SCHEDULE SHOWING WORKING INTEREST OWNERSHIP
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

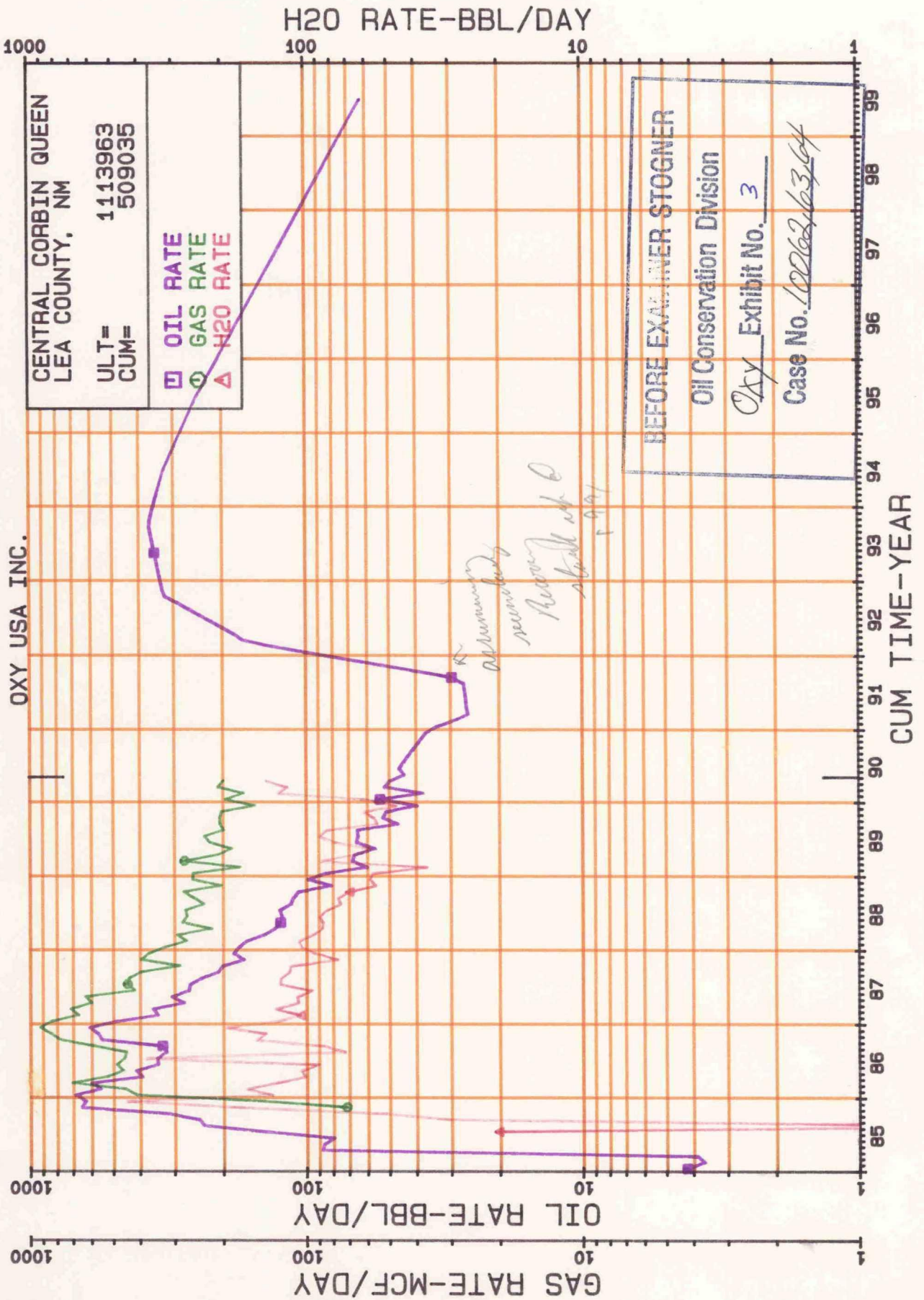
	<u>Tract</u>	<u>Tract</u> <u>Ownership</u>	<u>Unit</u> <u>Percentage</u>
OXY USA INC. P. O. Box 50250 Midland, TX 79710	1a	100.0%	16.67814
	1b	100.0%	8.24954
	2a	100.0%	37.75420
	2b	100.0%	10.55516
	4a	100.0%	<u>16.92200</u>
			90.15904
Conoco, Inc. 726 E. Michigan Hobbs, New Mexico 88240	3	100.0%	2.50173
Santa Fe Energy Operating Partners, L.P. 500 West Illinois, Suite 500 Midland, Texas 79701	5	50.0%	.09796
H. E. Yates Company P. O. Box 1933 Roswell, New Mexico 88202	5	50.0%	.09796
Santa Fe Exploration Company P.O. Box 1136 Roswell, New Mexico 88202	6	25.0%	.30245
	7	28.75%	<u>1.70588</u>
			2.00833
Dr. Dennis Alsofrom & Linda Ann Anderson 809 W. Alameda Roswell, NM 88201	6	1.0%	.01210
	7	1.0%	<u>.05933</u>
			.07143
Homer Bankhead c/o Development Dept. Castle Memorial Hospital 640 Ulukahiki Street Kailua, Hawaii 96734	6	1.0%	.01210
	7	1.0%	<u>.05933</u>
			.07143
Phillip R. Bishop 1800 Interfirst Bldg. Fort Worth, TX 76102	7	3.75%	.22251
Jeff Bowman Box 569 Giddings, TX 78942	6	.5%	.00605
James H. Bozarth Box 2382 Roswell, NM 88202	6	1.0%	.01210
	7	1.0%	<u>.05933</u>
			.07143

Exhibit B-3
Central Corbin Queen Unit
Page 2

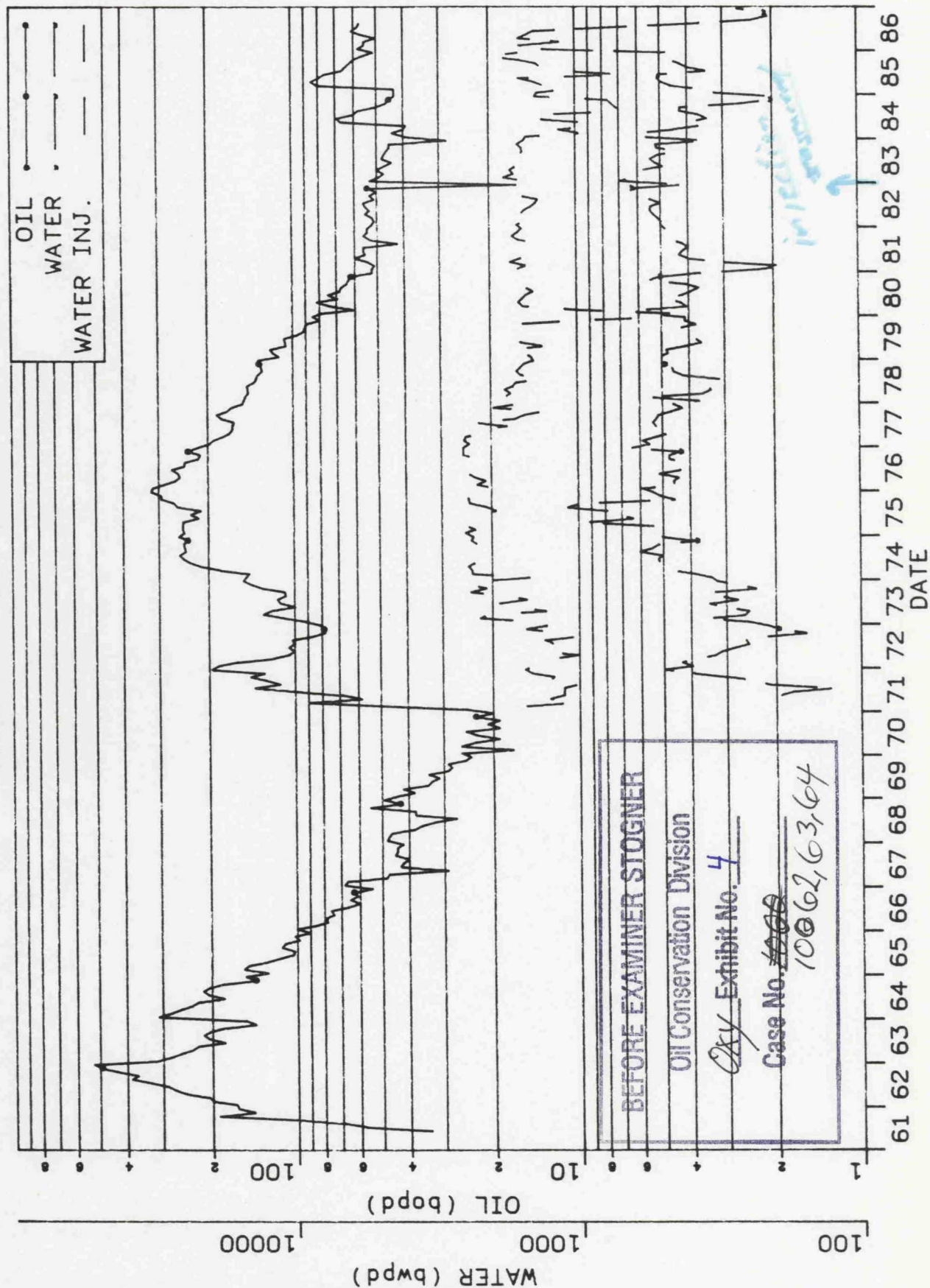
Frances Buckler	6	3.75%	.04537
104 Hazelwood Drive	7	3.75%	<u>.22251</u>
Fort Worth, TX 76107.			.26788
Pat Carlisle	6	1.0%	.01210
Box 83-0654	7	2.0%	<u>.11867</u>
Richardson, TX 75083			.13077
Binion H. Carr	6	3.75%	.04537
Box 877	7	3.75%	<u>.22251</u>
Wichita Falls, TX 76307			.26788
Bart Colwell	6	2.0%	.02420
3024 Park North Dr.	7	2.0%	<u>.11867</u>
El Paso, TX 79904			.14287
V. Randolph Delk	6	3.0%	.03629
1620 Texas Commerce Bank Bldg.	7	3.0%	<u>.17800</u>
201 East Main Drive			.21429
El Paso, Texas 79901			
Dr. Fred Hadley Hamilton III	6	1.0%	.01210
809 W. Alameda	7	1.0%	<u>.05933</u>
Roswell, NM 88201			.07143
Dr. Robert W. King	6	1.0%	.02420
912 NW 39th Street			
Oklahoma City, OK 73118			
Jack S. Kitchen	6	3.0%	.03629
1800 N. Stanton #1007	7	3.0%	<u>.17800</u>
El Paso, TX 79902			.21429
Jack S. Kitchen, Jr.	6	1.0%	.01210
1720 Milburn Drive			
Pleasant Hill, CA 94523			
C. E. LaRue and B. N. Muncy, Jr.	6	22.5%	.27220
Box 470	7	22.5%	<u>1.33505</u>
Artesia, NM 88210			1.60725
Marbob Energy Corp.	6	15.0%	.18147
Box 304	7	15.0%	<u>.89002</u>
Artesia, NM 88210			1.07149
Dr. Roger Moore	6	3.75%	.04537
8504 Fairway Drive	7	3.75%	<u>.22251</u>
Fort Worth, TX 76179			.26788

Exhibit B-3
Central Corbin Queen Unit
Page 3

Maurice Mordka	6	3.75%	.01210
1800 N. Grady	7	3.75%	<u>.05933</u>
Tucson, AR 85715			.07143
Richard Olson	6	.5%	.00605
Box 10			
Roswell, NM 88201			
Dale M. Sanders	6	1.0%	.01210
Box 83			
Law Cruces, NM 88004			
Sipes Properties Inc.	6	3.0%	.03629
Box 10849			
Midland, TX 79702			
David Spoede	6	.5%	.00605
Box 1276			
Albuquerque, NM 87103			
C. W. & Frieda T. Stumhoffer	6	3.75%	.04537
Ridglea Bank Bldg. #1007	7	3.75%	<u>.22251</u>
Fort Worth, TX 76116			.26788



NORTH E-K QUEEN FIELD PRODUCTION HISTORY



COMPARISON TO NORTH E-K FIELD

	Central Corbin	North E-K
Unit 2 Log Analysis		
Net Pay	7'	8'
Porosity	14%	16%
Number of wells	24	23
# of Frac sand	60,000	35,000
Performance:		
Average IP, BOPD	160	130
Initial decline rate	92%	92%
Primary recovery, MBO	572	524
Ultimate recovery, MBO	1131	1181
Secondary to primary ratio	0.98	1.25

BEFORE EXAMINER STOBNER

Oil Conservation Division

Oxy Exhibit No. 5

Case No. 10062, 163, 164

CENTRAL CORBIN QUEEN PROPOSED UNIT
EQUITY PARAMETERS AND TRACT PARTICIPATION

UNIT PARAMETER	REMAINING PRIMARY RESERVES				AS OF APRIL, 1989				NET PH1*H - PYRAMID METHOD				TRACT PARTICIPATION PERCENTAGE
	BBLs	FRACTION	FORMULA %	BBLs	FRACTION	FORMULA %	BBL/MON	FRACTION	FORMULA %	AC.FT.	FRACTION	FORMULA %	
% OF FORMULA	25				25				35				%
TRACT 1A	124443	0.24805	7.44137	4485	0.06351	1.58772	161	0.08099	0.80986	472.62	0.19541	6.83919	16.6781424
TRACT 1B	50596	0.10085	3.02551	4775	0.06762	1.69039	175	0.08803	0.88028	183.36	0.07581	2.65337	8.2495431
TRACT 2A	144039	0.28711	8.61316	39394	0.55783	13.94577	1078	0.54225	5.42254	675.34	0.27922	9.77274	37.7542026
TRACT 2B	55639	0.11090	3.32707	5533	0.07835	1.95872	164	0.08249	0.82495	307.13	0.12698	4.44442	10.5551585
TRACT 3	23590	0.04702	1.41062	0	0.00000	0.00000	0	0.00000	0.00000	75.40	0.03117	1.09111	2.5017339
TRACT 4	77184	0.15385	4.61540	7813	0.11063	2.76586	247	0.12425	1.24245	573.45	0.23709	8.29828	16.9220001
TRACT 5	19	0.00004	0.00114	0	0.00000	0.00000	0	0.00000	0.00000	13.46	0.00557	0.19478	0.1959132
TRACT (Santa Fe)	3070	0.00612	0.18358	208	0.00295	0.07363	17	0.00855	0.08551	59.92	0.02477	0.86709	1.2098152
TRACT (Santa Fe)	23114	0.04607	1.38216	8412	0.11912	2.97791	146	0.07344	0.73441	57.98	0.02397	0.83902	5.9334909
TOTAL	501694	1.00000	30.00000	70620	1.00000	25.00000	1988	1.00000	10.00000	2418.66	1.00000	35.00000	100.0000000

OFFICE EXAMINER STOGNER

Oil Conservation Division

Exhibit No. 6

Case No. 100626364

*\$1500 =
operating
cost for well
over the life of
the project.*

CENTRAL CORBIN QUEEN PROPOSED UNIT

TRACT PRIMARY AND SECONDARY COMPARISON

TRACT NUMBER	LEASE	WELL NUMBER	REMAINING RESERVES, BBLs 3/90	SECONDARY BASED ON TRACT PARTICIPATION, BBLs	REMAINING PRIMARY ECONOMICS DNC@10% M\$	SECONDARY ECONOMICS DNC@10% M\$	INCREMENTAL SECONDARY ECONOMICS DNC@10% M\$
1A	FEDERAL "AA"	1	1596		11.6		
1A	FEDERAL "AA"	2	0		0.0		
1A	FEDERAL "AA"	3	391		1.5		
1A	FEDERAL "AA"	4	839		5.1		
1A TOTAL			2826	97112	18.2	487.00	468.8
1B	FEDERAL "AH"	1	3996		32.0		
1B	FEDERAL "AH"	2	0		0.0		
1B TOTAL			3996	48035	32.0	240.91	208.91
2A	FEDERAL "AE"	1	111		0.0		
2A	FEDERAL "AE"	2	2660				
2A	FEDERAL "AE"	3	0				
2A	FEDERAL "AE"	4	1757		13.3		
2A	FEDERAL "AE"	5	5436		38.2		
2A	FEDERAL "AE"	6	0		0.0		
2A	FEDERAL "AE"	7	12151		99.0		
2A	FEDERAL "AE"	8	13392		128.1		
2A	FEDERAL "AE"	9	4373		34.7		
2A	FEDERAL "AE"	10	0				
2A	FEDERAL "AE"	12	3958		31.6		
2A TOTAL			43838	219832	344.9	1102.53	757.63
2B	FEDERAL "AI"	1	0		0.0		
2B	FEDERAL "AI"	3	5840		44.5		
2B	FEDERAL "AI"	4	3318		26.0		
2B TOTAL			9158	61460	70.5	308.24	237.74
3	FEDERAL (BHP)	1	0	14567	0.0	73.00	73
4	FEDERAL "AD"	1	4157		33.5		
4	FEDERAL "AD"	2	3722		28.4		
4	FEDERAL "AD"	3	0		0.0		
4	FEDERAL "AD"	4	861		5.3		
4 TOTAL			8740	98532	67.2	494.17	426.97
5	FEDERAL "AG"	1	0				
5	FEDERAL "AG"	2	0				
5 TOTAL			0	1141	0.0	5.72	5.72
6	CORBIN FEE	1	80	7044	0.0	30.07	30.07
7	CORBIN FEE	2	7817	34549	68.1	147.50	79.4
TOTALS			29	76455	582272	600.9	2889.14
							2288.24

BEFORE EXAMINER STOGNER

Oil Conservation Division

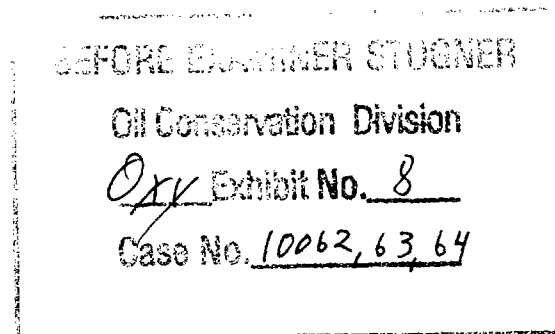
Oxy Exhibit No. 7

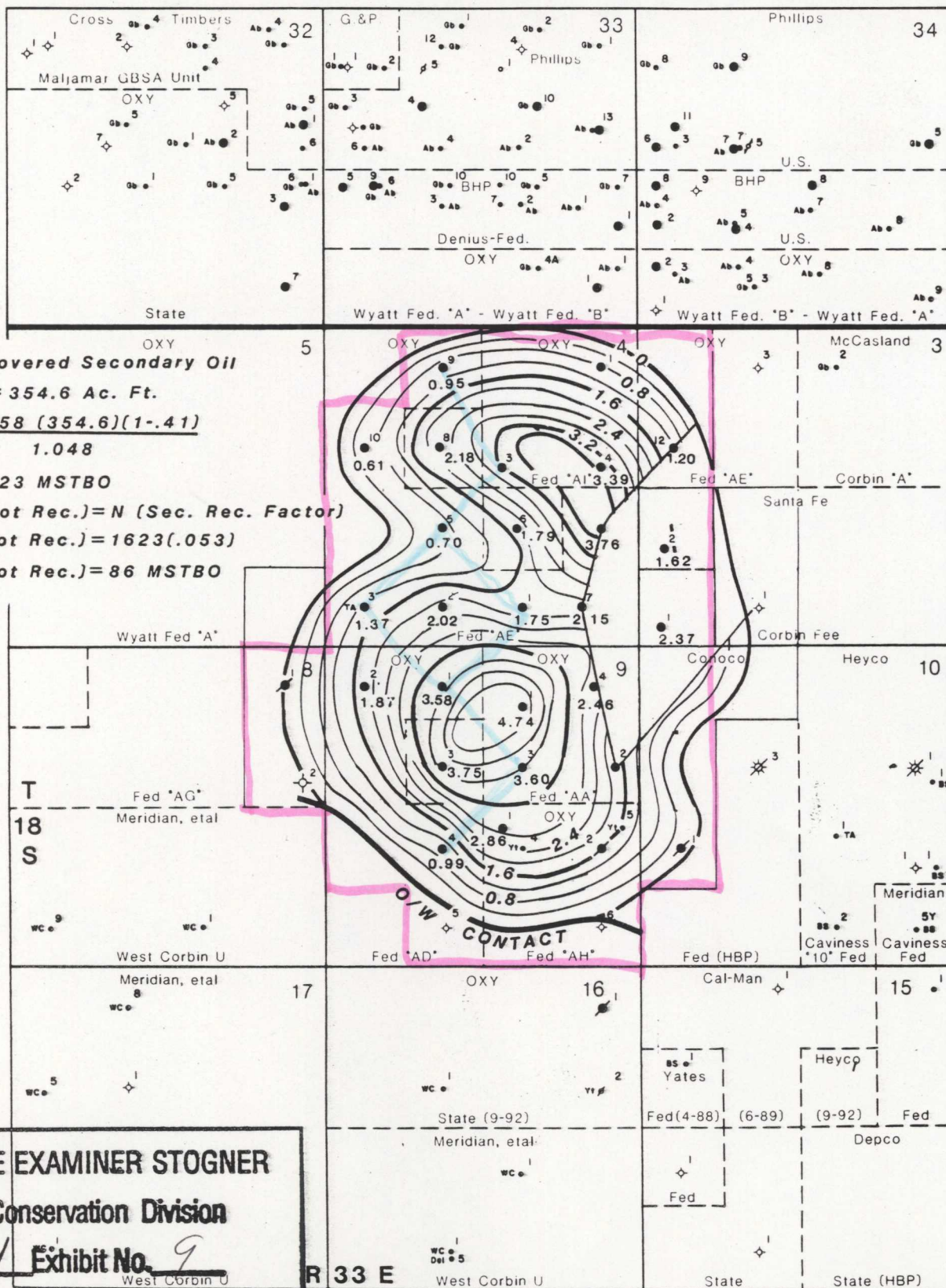
Case No. 10062, 63, 64

CENTRAL CORBIN QUEEN PROPOSED UNIT

FIELD STUDY CHRONOLOGY

1985	DEVELOPMENT BEGAN
1987	INITIAL WATERFLOOD FEASIBILITY COMPLETED
1989	NEW FEASIBILITY STUDY DONE
1990	FINAL GEOLOGIC AND ENGINEERING REPORT MAILED TO WIO FOR COMMENTS





Unrecovered Secondary Oil

ϕ HA = 354.6 Ac. Ft.

$N = 7758 (354.6)(1-.41)$

1.048

$N = 1623$ MSTBO

N_p (Not Rec.) = N (Sec. Rec. Factor)

N_p (Not Rec.) = 1623(.053)

N_p (Not Rec.) = 86 MSTBO

BEFORE EXAMINER STOGNER

Oil Conservation Division

OXY Exhibit No. 9

Case No. 10062, 63, 64

• QUEEN PRODUCER

• OTHER ZONES

Grayburg
Delaware
Abo
Bone Spring
Wolfcamp

X WELL NUMBER

X POROSITY-FEET

CENTRAL CORBIN (QUEEN) FIELD
LEA COUNTY, NEW MEXICO

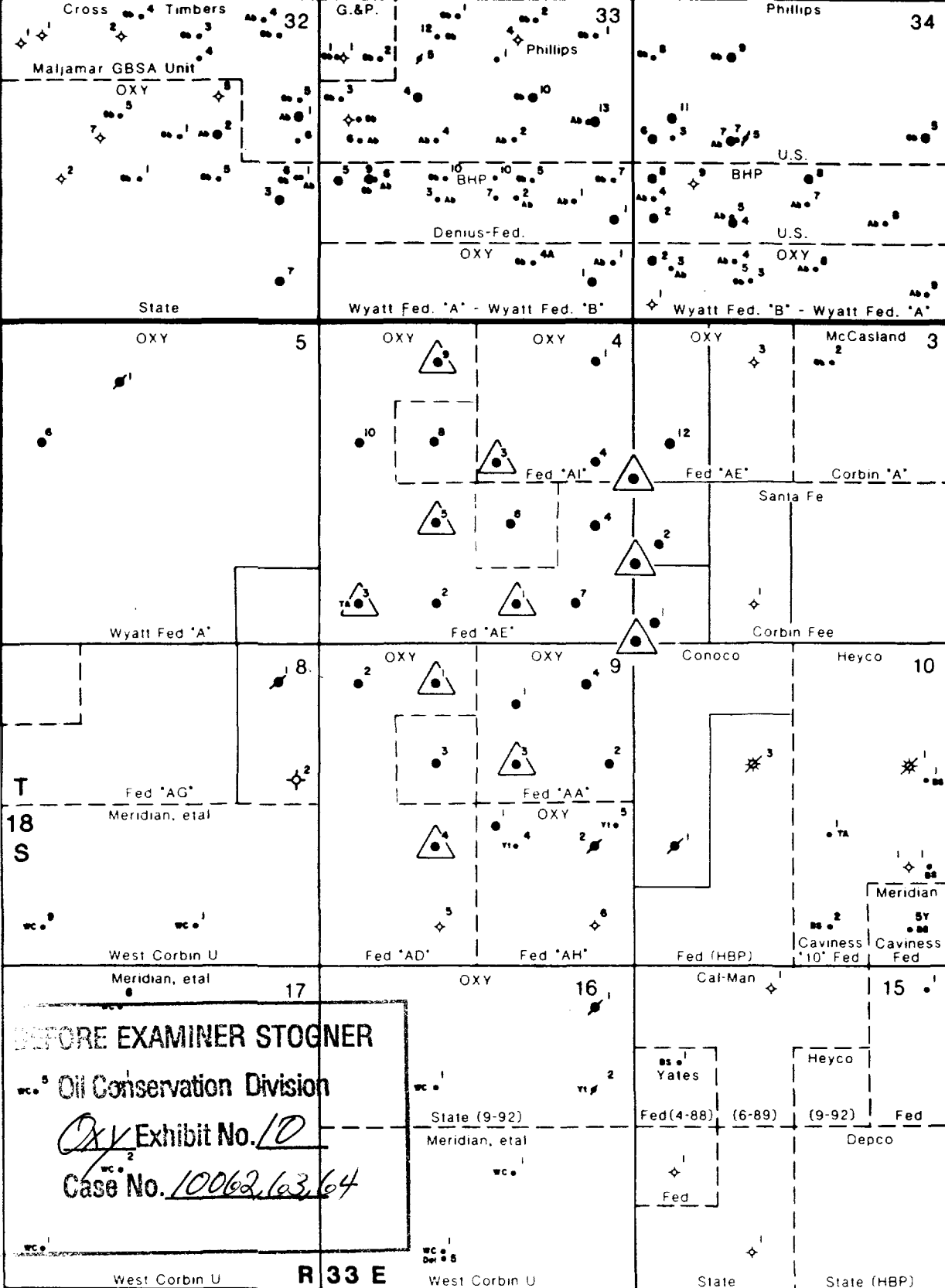
QUEEN SANDSTONE POROSITY-THICKNESS
ISOPACH ($\phi \geq 8\%$)

C.I. = 0.40 h'

ENG. V. PHAM

0 1/2
MILE

MARCH, 1990



• QUEEN PRODUCER

• OTHER ZONES { Yates
Grayburg
Delaware
Alco
Bone Spring
Wolfcamp

△ PROPOSED INJECTOR

CENTRAL CORBIN (QUEEN) FIELD LEA COUNTY, NEW MEXICO

PROPOSED INJECTION WELLS

0 1/2
MILE

MARCH, 1990

CENTRAL CORBIN QUEEN PROPOSED UNIT

TYPICAL CONVERSION COST

<u>ITEM</u>	<u>TANGIBLE</u>	<u>INTANGIBLE</u>	<u>TOTAL</u>
4300' 2-3/8" 4.7# J55 PC TUBING	15,050		15,050
INJECTION PACKER	3,000		3,000
INJECTION WELLHEAD	3,000		3,000
3 DAYS PULLING UNIT		2,700	2,700
ACID TREATMENT		5,000	5,000
MISCELLANEOUS	_____	<u>1,250</u>	<u>1,250</u>
TOTAL	21,050	8,950	30,000
TOTAL CONVERSION COST (12 WELLS)			<u>360,000</u>

FACILITIES INVESTMENT FOR FIELDWIDE WATERFLOOD

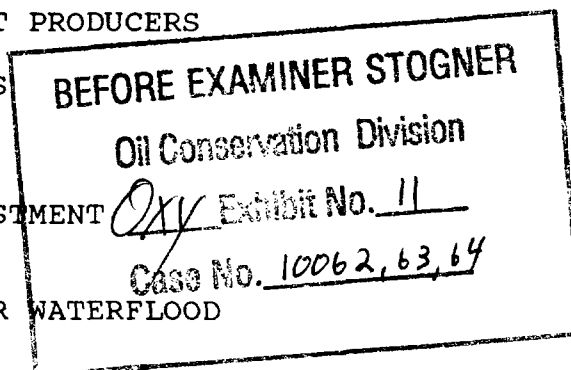
<u>ITEM</u>	<u>COST, \$</u>
BATTERY	
BATTERY PAD (INCLUDES DAMAGES AND ROAD)	7,300
INJECTION PUMP SKID AND FILTER	77,000
CHEMICAL PUMPS	1,600
REFURBISH, MOVE, SET AND COAT TANKS	16,000
CEMENT FOUNDATION WORK	500
TRANSFORMERS	2,500
LEVEL CONTROLS	1,600
ELECTRICAL MATERIALS AND LABOR	8,000
INJECTION HEADER, CHOKES AND METERS	25,000
ALARM SYSTEM REPLACEMENT	10,000
WELL TEST EQUIPMENT	2,500
PLANT PIPING AND VALVING	15,000
WATER SUPPLY WELL (OPTIONAL, MAY PURCHASE @ 5¢/BBL)	7,000
LABOR	15,000
PLANT TOTAL	189,000

INJECTION AND TRANSFER LINES

PRODUCED WATER LINE FROM STATE DW	65,000
INJECTION LINES AND INSTALLATION	230,000
FLOWLINES FOR OFFSET PRODUCERS	13,000
OIL TRANSFER LINE	9,500
WATER TRANSFER LINES	17,500
GAS LINE	4,400
LINE TOTAL	339,400

TOTAL FACILITY INVESTMENT 528,400

TOTAL INVESTMENT FOR WATERFLOOD \$ 888,400



CENTRAL CORBIN QUEEN PROPOSED UNIT

OPERATIONAL DATA

PRODUCING WELLS	13
INJECTION WELLS	12
PATTERN	80-ACRE 5-SPOT
CONVERSION COSTS	\$30,000 / WELL
INJECTION WATER SOURCE	
OGALLALA	1370 BWPD
BONE SPRINGS	1000 BWPD
PRODUCED QUEEN	30 BWPD
TOTAL	2400 BWPD
INJECTION AND PLANT FACILITIES	\$530,000
MAXIMUM INJECTION PRESSURE	840 PSI*
TOTAL INVESTMENT	\$890,000
FIELD PRODUCTION	
PEAK RATE	900 BOPD
CURRENT RATE	45 BOPD
PRODUCING LIFE - PRIMARY	14 YEARS
- SECONDARY	7 YEARS
RESERVES - PRIMARY	60 MSTBO
- SECONDARY	559 MSTBO

From Type
Log
4200'
2 psi/ft.
840

SCORE EXAMINER STOGNER

Oil Conservation Division

Exhibit No. 12

Case No. 10062, 63, 64

C-108

BEFORE EXAMINATION

OIL CONSERVATION DIVISION

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☒ Secondary Recovery ☐ Pressure Maintenance ☐ Disposal ☐ Storage
Application qualifies for administrative approval? ☐ Yes ☐ No 10062,63,64

II. Operator: OXY USA INC.

Address: P.O. BOX 50250, Midland, Texas 79710

Contact party: Richard E. Foppiano Phone: 915/685-5913

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? ☐ Yes ☒ No
If yes, give the Division order number authorizing the project _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Richard E. Foppiano Title: Regulatory Affairs Engr.

Signature: Richard E. Foppiano Date: 7-25-90

If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal.

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

- (1) Lease name; Well No.; location by Section, Township, and Range; and footage location within the section.
- (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (3) A description of the tubing to be used including its size, lining material, and setting depth.
- (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

- (1) The name of the injection formation and, if applicable, the field or pool name.
- (2) The injection interval and whether it is perforated or open-hole.
- (3) State if the well was drilled for injection or, if not, the original purpose of the well.
- (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
- (5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

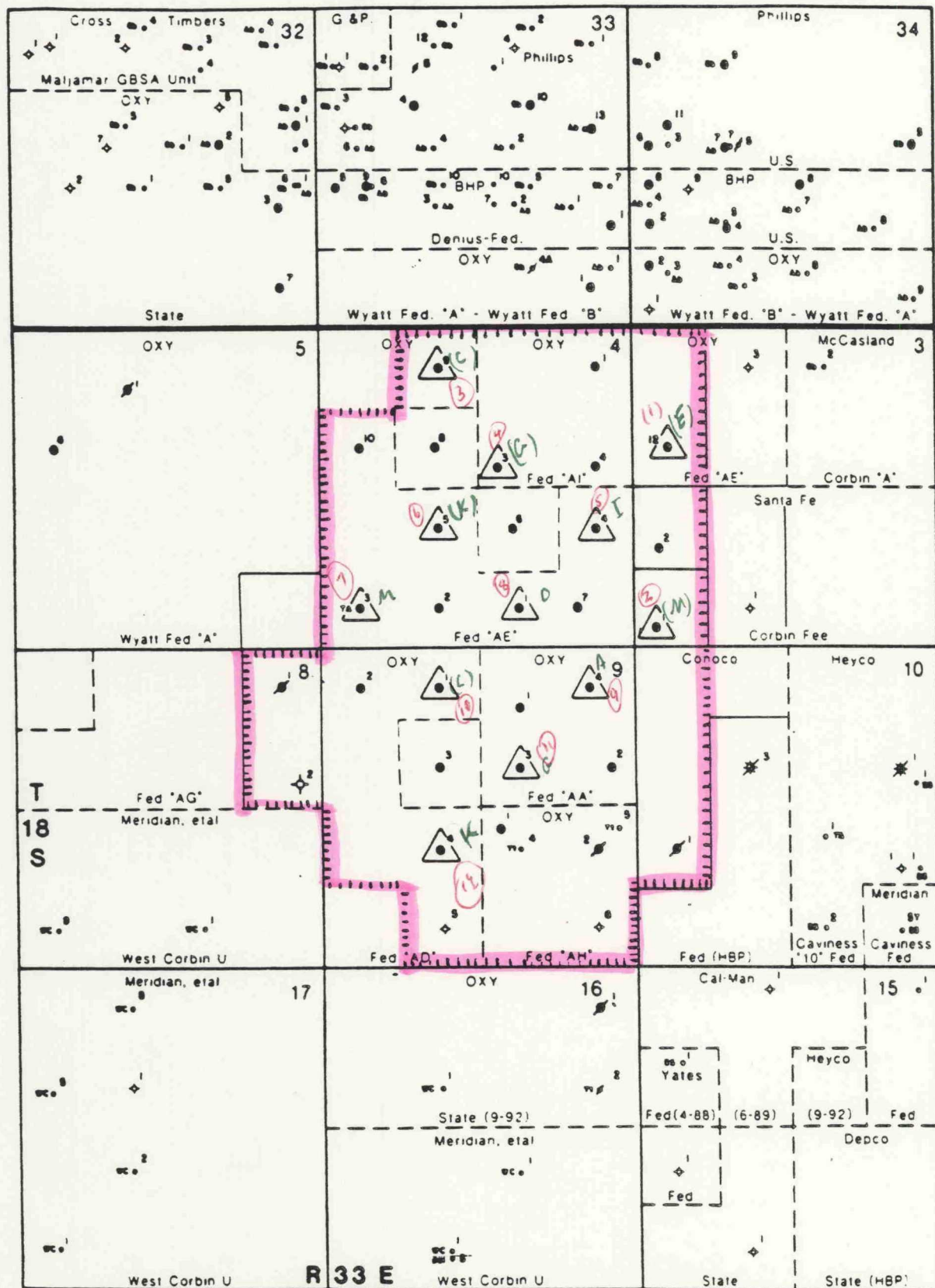
- (1) The name, address, phone number, and contact party for the applicant;
- (2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;
- (3) the formation name and depth with expected maximum injection rates and pressures; and
- (4) a notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

ILLEGIBLE

ATTACHMENT 14



• QUEEN PRODUCER

• OTHER ZONES

Yates
Greyburg
Delaware
Also
Bene Spring
Wetmore



PROPOSED INJECTOR

EXHIBIT 4

CENTRAL CORBIN (QUEEN) FIELD
LEA COUNTY, NEW MEXICO

PROPOSED CONVERSION TO INJECTOR

0 1/2
MILE

MARCH, 1990

PROPOSED TYPICAL WATER INJECTION WELL

FEDERAL AE #1
660' FSL & 1980' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4003'
GL: 3992'

TYPICAL PROPOSED WATER INJECTION WELL
IN THE CENTRAL CORBIN QUEEN FIELD
OTHER PROPOSED CONVERSIONS INCLUDE:

FEDERAL AA # 3
FEDERAL AA # 4
FEDERAL AD # 1
FEDERAL AD # 4
FEDERAL AE # 3
FEDERAL AE # 4
FEDERAL AE # 5
FEDERAL AE # 9
FEDERAL AE # 12
FEDERAL AI # 3

8 5/8" SURFACE CASING @ 388'
CMTD W/ 350 SX CMT CIRC
12 1/4" HOLE SIZE

2 3/8" 4.7# J-55 PLASTIC COATED TBG

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EVE
DEPTH	388'	4300'	4170'

BAKER MODEL AD-1 PKR @ 4170'

QUEEN PERFS (4221' - 4241')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4256'
5 1/2" CSG @ 4300' CMTD W/ 1250 SX
CMT CIRC 7 7/8" HOLE SIZE
TD @ 4300'

EXHIBIT 7
Wellbore Schematics for
proposed injection wells

PROPOSED TYPICAL WATER INJECTION WELL

SANTA FE - CORBIN FEE #1
330' FSL & 330' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4009'
GL: 4001'

8 5/8" SURFACE CASING @ 1528'
CMTD W/ 710 SX CMT CIRC
12 1/4" HOLE SIZE

2 3/8" 4.7# J-55 PLASTIC COATED TBG

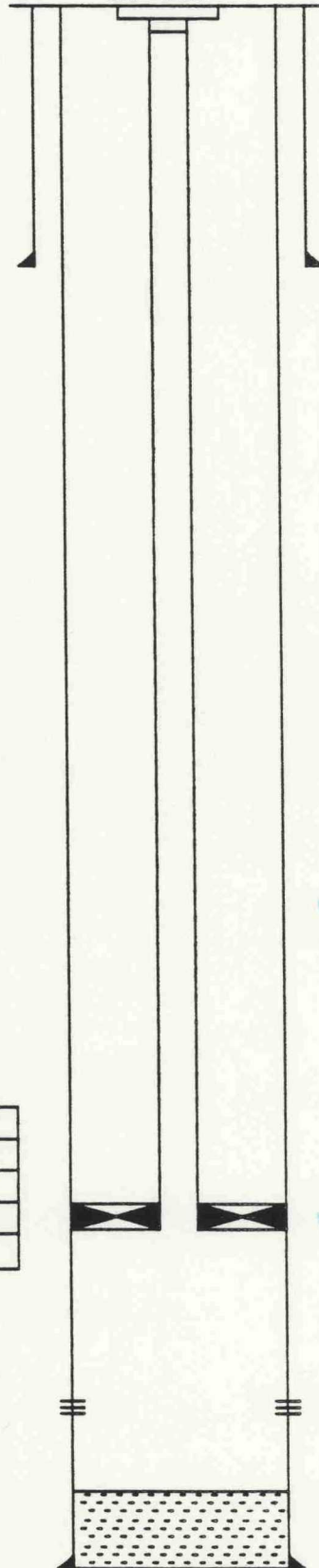
	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	17 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd. EUE
DEPTH	1528'	5052'	4170'

BAKER MODEL AD-1 PKR @ 4170'

QUEEN PERFS (4219' - 4266')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 13, 1990

5 1/2" CSG @ 5052' CMTD W/ 800 SX
7 7/8" HOLE SIZE TOC - N.A.
TD @ 5052'



⑪

(G)

OXY USA Inc.

Queen

Central Corbin Queen

4236' - 4262' Open Hole Perforated X

No

Producer

No

Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3024'

EXHIBIT 6

Well data sheets

WELL Federal AA # 4

LOCATION 660' FNL & 790' FEL, Sec. 9, T-18-S, R-33-E, Lea County, NM (A)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4213' - 4242' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3020'

WELL Federal AD # 1

LOCATION 660' FNL & 1980' FWL, Sec. 9, T-18-S, R-33-E, Lea County, NM (C)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4206' - 4232' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail.

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 2992'

WELL Federal AD # 4

LOCATION 1980' FSL & FWL, Sec. 9, T-18-S, R-33-E, Lea County, NM (K)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4258' - 4271' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3016'

(1)

CURRENT OPERATOR OXY USA Inc.

2. Name of Field or Pool Central Corbin Queen

4. Was this well drilled for injection No

WELL Federal AE # 3

LOCATION 660' FSL & FWL, Sec. 4, T-18-S, R-33-E, Lea County, NM (M)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4243' - 4247' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? Yes

List all such perforated intervals and give plugging detail. Yates (3029' - 4120')

Squeezed with 500 sacks cement

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3014'

15

(I)

OXY USA Inc.

Queen

Central Corbin Queen

4200' - 4217'	Open Hole	Perforated	X
---------------	-----------	------------	---

No

Producer

No

ve the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates – 3013'

WELL Federal AE # 5

LOCATION 1980' FSL & FWL, Sec. 4, T-18-S, R-33-E, Lea County, NM (K)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4174' - 4180' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3012'

WELL Federal AE # 9

LOCATION 660' FNL & 1980' FWL, Sec. 4, T-18-S, R-33-E, Lea County, NM (C)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4152' - 4166' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 2963'

WELL Federal AE # 12

LOCATION 1980' FNL & 560' FWL, Sec. 3, T-18-S, R-33-E, Lea County, NM (F)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4211' - 4215' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3022'

WELL Federal AI # 3

LOCATION 2310' FNL & 2310' FEL, Sec. 4, T-18-S, R-33-E, Lea County, NM (6)

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4163' - 4440' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 2975'

WELL Corbin Fee # 1 M

LOCATION 330' FSL & 330' FWL, Sec. 3, T-18-S, R-33-E, Lea County, NM (M)

CURRENT OPERATOR Santa Fe

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4219' - 4266' Open Hole Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. _____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - N.A.

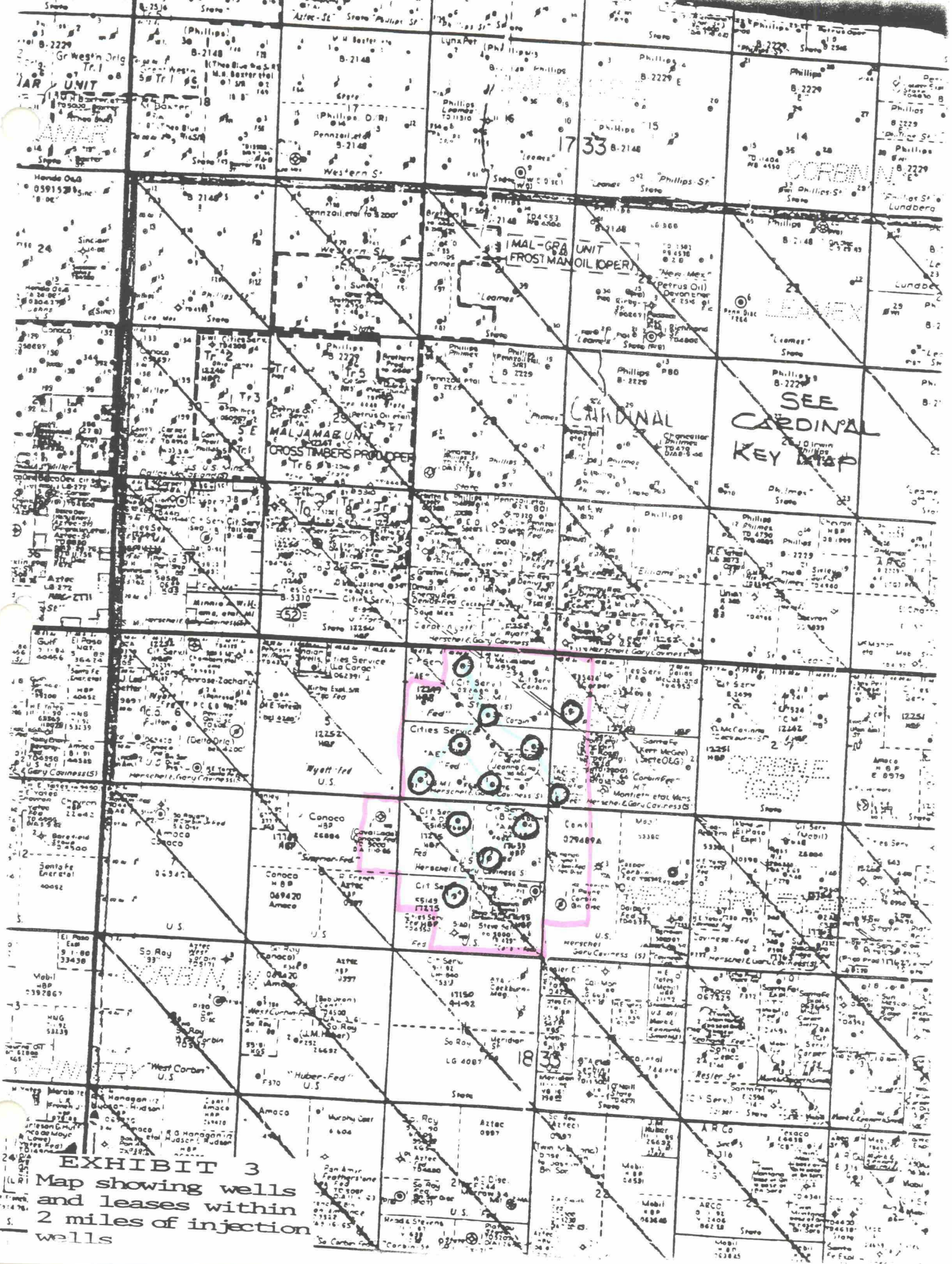
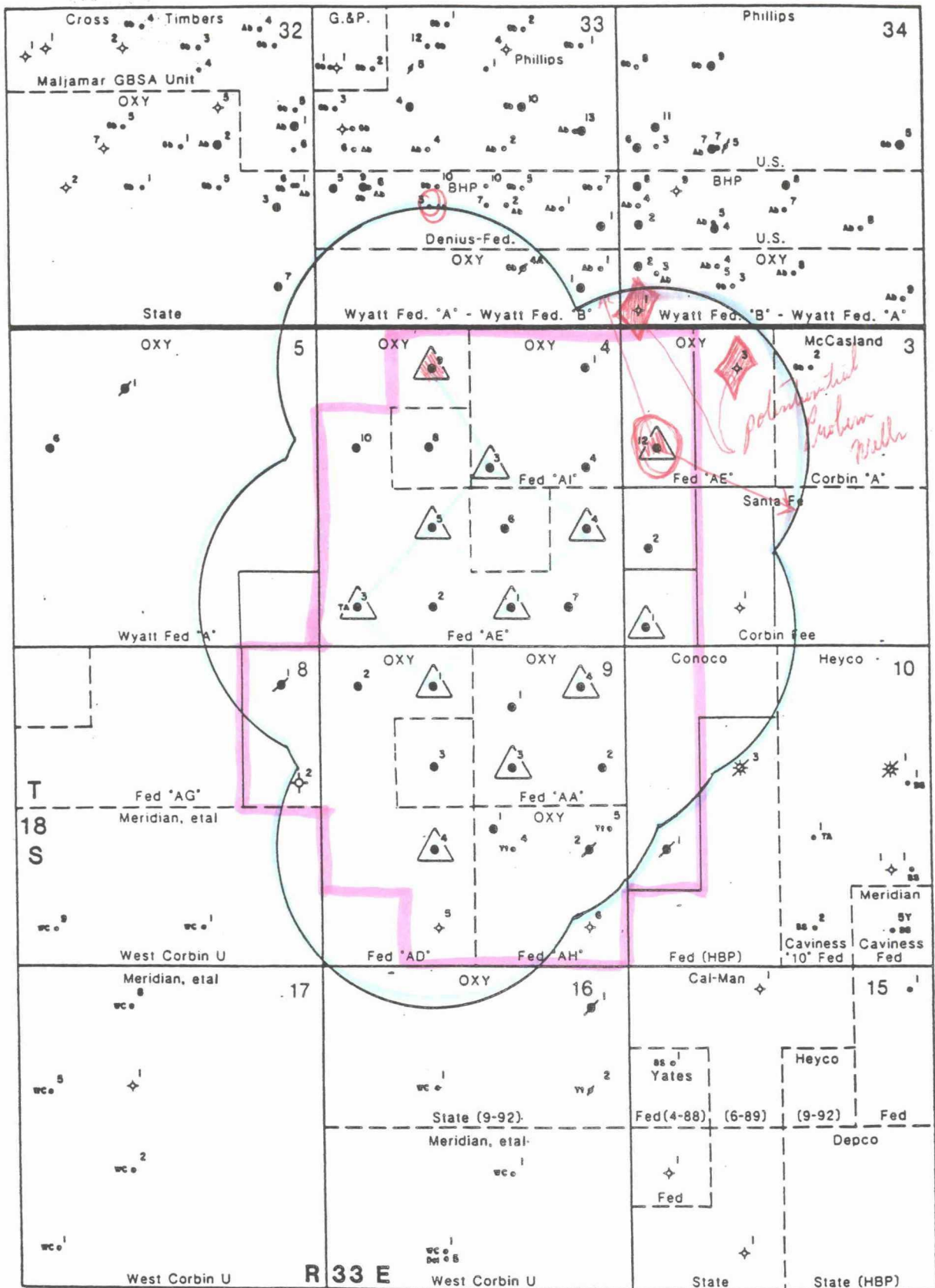


EXHIBIT 3

Map showing wells
and leases within
2 miles of injection
wells



● QUEEN PRODUCER

● OTHER ZONES

Yates
Grayburg
Delaware
Abe
Bone Spring
Wolfcamp

△ PROPOSED INJECTOR

CENTRAL CORBIN (QUEEN) FIELD LEA COUNTY, NEW MEXICO

MAP IDENTIFYING ALL WELLS AND LEASES WITHIN 1/2 MILE
OF EACH PROPOSED INJECTION WELL (AREA OF REVIEW)

0 1/2
MILE

JULY, 1990

SANTA FE - CORBIN FEE #1
 330' FSL & 330' FNL SEC 3 T18S R33E
 LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4009'
 GL: 4001'

DATE DRILLED : 2/85

TOP OF QUEEN : 4219'

8 5/8" SURFACE CASING @ 1528'
 CMTD W/ 710 SX CNT CIRC

NO TUBING DATA AVAILABLE

SURFACE PRODUCTION

SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	17 #	
GRADE	K-55	K-55	
THREAD	ST&C	ST&C	
DEPTH	1528'	5052'	

QUEEN PERFS (4219' - 4266')

PREPARED BY: SCOTT E. GENGLER
 DATE : JULY 13, 1990

5 1/2" CS @ 5052' CMTD W/ 800 SX
 TD @ 5052'

EXHIBIT 8

28

SANTA FE - CORBIN FEE #2
 1650' FSL & 330' FML SEC 3 T18S R33E
 LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4021'
 GL: 4012'

DATE DRILLED : 11/85

TOP OF QUEEN : 4194'

8 5/8" SURFACE CASING @ 1554'
 CMTD W/ 710 SX CMT CIRC

2 3/8" 4.7# J-55 TBG @ 4240'

SURFACE PRODUCTION

SIZE	8 5/8"	5 1/2"	
WEIGHT	N.A.	N.A.	
GRADE	N.A.	N.A.	
THREAD	N.A.	N.A.	
DEPTH	1528'	5200'	

QUEEN PERFS (4224' - 4234')

PREPARED BY: SCOTT E. GENGLER
 DATE : JULY 13, 1990

5 1/2" CSG @ 5200' CMTD W/ 350 SX
 TD @ 5200'

EXHIBIT 8

FEDERAL AE #12
1980' FML & 560' FML SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4036'
GL: 4025'

DATE DRILLED : 1/87

TOP OF YATES : 3022'

TOP OF QUEEN : 4180'

8 5/8" SURFACE CASING @ 372'
CMTD W/ 300 SX CNT CIRC

1 JT 2 3/8" TBG W/ NOTCHED COLLAR	31.60
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4174.92
TOTAL	4207.62
KB	11.00
SET AT	4218.62

RODS : 164 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	372'	4300'	4219'

2 3/8" SN @ 4156'

2 3/8" TBG W/ NOTCHED COLLAR @ 4219'

QUEEN PERFS (4211' - 4215')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4260'
5 1/2" CSG @ 4300' CMTD W/ 1500 SX
TD @ 4300' CNT CIRC

ELEVATION: KB: 4003'
GL: 3992'

DATE DRILLED : 11/85

TOP OF YATES : 3005'

TOP OF QUEEN : 4193'

8 5/8" SURFACE CASING @ 388'
CMTD W/ 350 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	30.83
1 - 2 3/8" PERF SUB	4.12
1 - 2 3/8" SN	1.10
4 JTS 2 3/8" 4.7# J-55 TB6	124.48
1 - 5 1/2" TRICO TAC	3.60
130 JTS 2 3/8" 4.7# J55 TB6	4036.87
TOTAL	4201.00
KB	11.00
SET AT	4212.00

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd ELE
DEPTH	388'	4300'	4212'

TAC @ 4045'

2 3/8" SN @ 4176'

2 3/8" MUD ANCHOR @ 4212'

QUEEN PERFS (4221' - 4241')

PSTD @ 4256'

5 1/2" CS6 @ 4300' CMTD W/ 1250 SX
TD @ 4300' CMT CIRC

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

ELEVATION: KB: 3991'
GL: 3979'

DATE DRILLED : 10/85

TOP OF YATES : 2982'

TOP OF QUEEN : 4178'

8 5/8" SURFACE CASING @ 394'
CMTD W/ 350 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	31.11
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4160.42
TOTAL	4192.63
KB	10.00
SET AT	4102.63

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-11 EUE
DEPTH	394'	4300'	4212'

2 3/8" SN @ 4171'

2 3/8" TBG W/ NOTCHED COLLAR @ 4103'

QUEEN PERFS (4207' - 4226')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4256'
5 1/2" CS6 @ 4300' CMTD W/ 1250 SX
TD @ 4300' CMT CIRC

FEDERAL AE #3
660' FSL & 660' FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4006'
GL: 3994'

DATE DRILLED : 11/85

TOP OF YATES : 3014'

TOP OF QUEEN : 4216'

8 5/8" SURFACE CASING @ 378'
CMTD W/ 250 SX CMT CIRC

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	14 #	
GRADE	K-55	K-55	
THREAD	ST&C	ST&C	
DEPTH	378'	4325'	

YATES PERFS (3029' - 4120') SQZD

CIBP & PBTD @ 4200'

QUEEN PERFS (4243' - 4247')

ORIGINAL PBTD @ 4279'

5 1/2" CS6 @ 4325' CMTD W/ 1300 SX
TD @ 4325' CMT CIRC

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

FEDERAL AE #4
1980' FSL & 660' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4022'

GL: 4010'

DATE DRILLED : 9/86

TOP OF YATES : 3013'

TOP OF QUEEN : 4178'

8 5/8" SURFACE CASING @ 350'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR 0.43
1 JT 2 3/8" 4.7# J-55 TBG 31.10
1 - 2 3/8" SN 1.10
2 JTS 2 3/8" 4.7# J-55 TBG 61.56
1 - 5 1/2" TRICO TAC 2.90
131 JTS 2 3/8" 4.7# J55 TBG 4083.92

TOTAL 4180.51

KB 10.00

SET AT 4190.51

RODS : 163 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20'

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	350'	4350'	4191'

TAC @ 4093'

2 3/8" SN @ 4158'

2 3/8" MUD ANCHOR @ 4191'

QUEEN PERFS (4200' - 4217')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4314'
5 1/2" CSG @ 4350' CMTD W/ 1400 SX
TD @ 4350' CMT CIRC

EXHIBIT 8

FEDERAL AE #5
1980' FSL & FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4012'
GL: 4000'

DATE DRILLED : 11/85

TOP OF YATES : 3012'

TOP OF QUEEN : 4218'

8 5/8" SURFACE CASING @ 383'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	31.93
1 - 2 3/8" PERF SUB	3.80
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	58.18
1 - 5 1/2" GUIS TAC	3.60
130 JTS 2 3/8" 4.7# J55 TBG	4101.42
TOTAL	4200.03
KB	11.00
SET AT	4211.03

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STGC	STGC	8rd EUE
DEPTH	383'	4280'	4211'

TAC @ 4112'

2 3/8" SN @ 4174'

2 3/8" MUD ANCHOR @ 4211'

QUEEN PERFS (4174' - 4180')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4240'
5 1/2" CS6 @ 4280' CMTD W/ 1150 SX
TD @ 4280' CMT CIRC

EXHIBIT 8

FEDERAL AE #6
 1980' FSL & 2067' FEL SEC 4 T18S R33E
 LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4014'
 GL: 4002'

DATE DRILLED : 1/86

TOP OF YATES : 2992'

TOP OF QUEEN : 4170'

8 5/8" SURFACE CASING @ 350'
 CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.40
1 JT 2 3/8" 4.7# J-55 TBG	30.42
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	65.73
1 - 5 1/2" GUISB TAC	2.80
131 JTS 2 3/8" 4.7# J55 TBG	4119.84
TOTAL	4220.29
KB	12.00
SET AT	4232.29

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STGC	STGC	8-1 EUE
DEPTH	350'	4300'	4232'

TAC @ 4128'

2 3/8" SN @ 4197'

2 3/8" MUD ANCHOR @ 4232'

QUEEN PERFS (4184' - 4215')

PREPARED BY: SCOTT E. GENGLER
 DATE : JULY 12, 1990

PBTD @ 4252'
 5 1/2" CS6 @ 4300' CMTD W/ 1650 SX
 TD @ 4300' CMT CIRC

EXHIBIT 8

FEDERAL AE #7
660' FSL & 990' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4014'
GL: 4003'

DATE DRILLED : 12/86

TOP OF YATES : 3016'

TOP OF QUEEN : 4192'

8 5/8" SURFACE CASING @ 396'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.30
1 JT 2 3/8" 4.7# J-55 TBG	31.54
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4276.73
TOTAL	4309.67
KB	11.00
SET AT	4320.67

RODS : 170 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20'

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STGC	STGC	8-6 EUE
DEPTH	396'	4523'	4321'

2 3/8" SN @ 4277'

2 3/8" TBG W/ NOTCHED COLLAR @ 4321'

QUEEN PERFS (4203' - 4227')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4478'
5 1/2" CS6 @ 4523' CMTD W/ 1400 SX
TD @ 4530' CMT CIRC

EXHIBIT 8

ELEVATION: KB: 4025'

GL: 4013'

DATE DRILLED : 1/86

TOP OF YATES : 2966'

TOP OF QUEEN : 4140'

8 5/8" SURFACE CASING @ 350'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	32.90
1 - 2 3/8" PERF SUB	4.10
1 - 2 3/8" SN	1.10
3 JTS 2 3/8" 4.7# J-55 TB6	93.92
1 - 5 1/2" GUID TAC	2.84
129 JTS 2 3/8" 4.7# J55 TB6	4015.62
TOTAL	4150.48
KB	10.00
SET AT	4160.48

RODS : 163 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-6 EUE
DEPTH	350'	4286'	4180'

TAC @ 4026'

2 3/8" SN @ 4122'

2 3/8" MUD ANCHOR @ 4160'

QUEEN PERFS (4151' - 4177')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4222'
5 1/2" CS6 @ 4266' CMTD W/ 1350 SX
TD @ 4275' CMT CIRC

ELEVATION: KB: 4040'

GL: 4029'

DATE DRILLED : 11/86

TOP OF YATES : 2963'

TOP OF QUEEN : 4120'

8 5/8" SURFACE CASING @ 391'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.43
1 JT 2 3/8" 4.7# J-55 TBG	31.15
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4188.55
TOTAL	4221.23
KB	10.00
SET AT	4231.23

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STGC	STGC	8rd EUE
DEPTH	391'	4452'	4231'

2 3/8" SN @ 4198'

2 3/8" TBG W/ NOTCHED COLLAR @ 4231'

QUEEN PERFS (4152' - 4166')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4398'
5 1/2" CS6 @ 4452' CMTD W/ 1400 SX
TD @ 4452' CMT CIRC

ELEVATION: KB: 4024'
GL: 4013'

DATE DRILLED : 12/86

TOP OF YATES : 2952'

TOP OF QUEEN : 4122'

8 5/8" SURFACE CASING @ 394'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.43
1 JT 2 3/8" 4.7# J-55 TB6	31.17
1 - 2 3/8" SN	1.10
132 JTS 2 3/8" 4.7# J55 TB6	4070.35
TOTAL	4103.05
KB	11.00
SET AT	4114.05

RODS : 162 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-6 EUE
DEPTH	394'	4275'	4114'

2 3/8" SN @ 4081'

2 3/8" TB6 W/ NOTCHED COLLAR @ 4114'

QUEEN PERFS (4134' - 4138')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4173'
5 1/2" CS6 @ 4273' CMTD W/ 1400 SX
TD @ 4275' CMT CIRC

FEDERAL AI #1
660' FNL & FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 4046'

DATE DRILLED : 12/46

10 3/4" SURFACE CASING @ 346'
CMTD W/ 150 SX CMT CIRC

8 5/8" INTERMEDIATE CASING @ 1587'
CMTD W/ 50 SX

NO TUBING DATA AVAILABLE

SURFACE INTERMED PRODUCTION

SIZE	10 3/4"	8 5/8"	7 "
WEIGHT	34 #	28 #	20 #
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	346'	1587'	3921'

7 " CASING @ 3921' CMTD W/ 100 SX

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

PBTD @ 4927'

TD @ 5257'

EXHIBIT 8

FEDERAL AI #3
2310' FNL & FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4025'
GL: 4014'

DATE DRILLED : 7/86

TOP OF YATES : 2975'

TOP OF QUEEN : 4154'

8 5/8" SURFACE CASING @ 352'
CMTD W/ 350 SX CMT CIRC

RODS : 177 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 18" X 20'

2 3/8" 4.7# J-55 TBG @ 4412'

SURFACE PRODUCTION

SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	17 #	
GRADE	J-55	K-55	
THREAD	ST&C	ST&C	
DEPTH	352'	4983'	

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

QUEEN PERFS (4163' - 4440')

PBTD @ 4928'
5 1/2" CS @ 4983' CMTD W/ 1500 SX
TD @ 5000' CMT CIRC

EXHIBIT 8

FEDERAL AI #4
2310' FNL & 660' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4036'
GL: 4025'

DATE DRILLED : 11/86

TOP OF YATES : 2980'

TOP OF QUEEN : 4180'

8 5/8" SURFACE CASING @ 1511'
CMTD W/ 700 SX CMT CIRC

2 3/8" 4.7# J-55 TBG @ 4460'

SURFACE PRODUCTION

SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	17 #	
GRADE	N.A.	N.A.	
THREAD	STBC	STBC	
DEPTH	1511'	4984'	

QUEEN PERFS (4180' - 4442')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

PBTD @ 4864'
5 1/2" CSG @ 4994' CMTD W/ 1625 SX
TD @ 5000' CMT CIRC

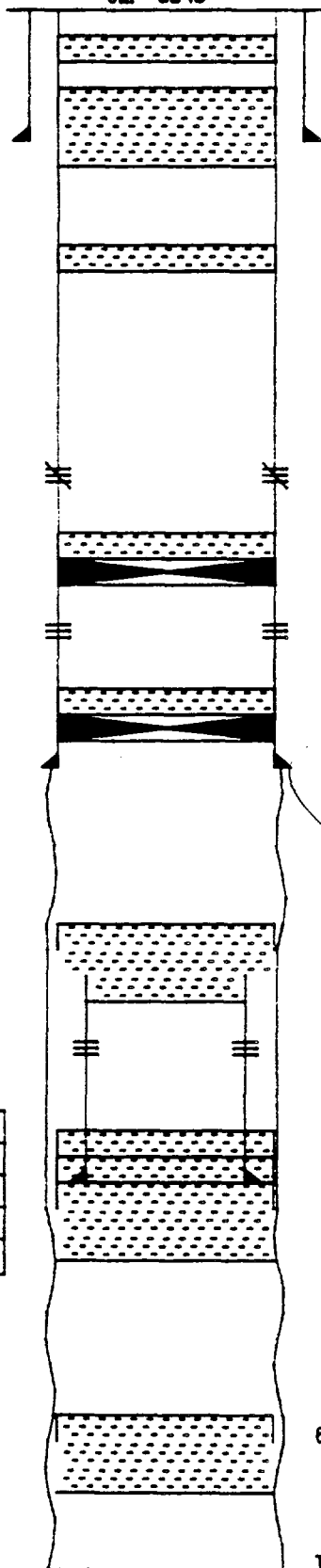
FEDERAL AG #1
660' FNL & FEL SEC 8 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3959'
GL: 3948'

DATE DRILLED : 11/87

TOP OF YATES : 2964'

TOP OF QUEEN : 4213'



14 SX PLUG (52' - 0')

30 SX PLUG (495' - 385')

13 3/8" SURFACE CASING @ 433'
CMTD W/ 400 SX CNT CIRC

30 SX PLUG (1609' - 1499')

YATES PERFS (3394' - 3405') SQZD

6 SX PLUG (4180' - 4158')
CIBP @ 4180'

QUEEN PERFS (4218' - 4248')

PBTD @ 4277'

CIBP @ 4297'

8 5/8" INTERMEDIATE CASING @ 4330'
CMTD W/ 1400 SX CNT CMT CIRC

150' PLUG (6175' - 6025')
5 1/2" CASING STUB @ 6100'

DELAWARE PERFS (6570' - 6590')

PBTD @ 6690'

5 1/2" CASING @ 6750' CMTD W/ 250 SX

70 SX PLUG (6750' - 6900')

60 SX CNT PLUG (8550' - 8700')

TD @ 9000'

SURFACE INTERMED

SIZE	13 3/8"	8 5/8"	
WEIGHT	54.56	24 & 32	
GRADE	K-55	K-55	
THREAD	ST&C	ST&C	
DEPTH	433'	4330'	

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

EXHIBIT 8

DL
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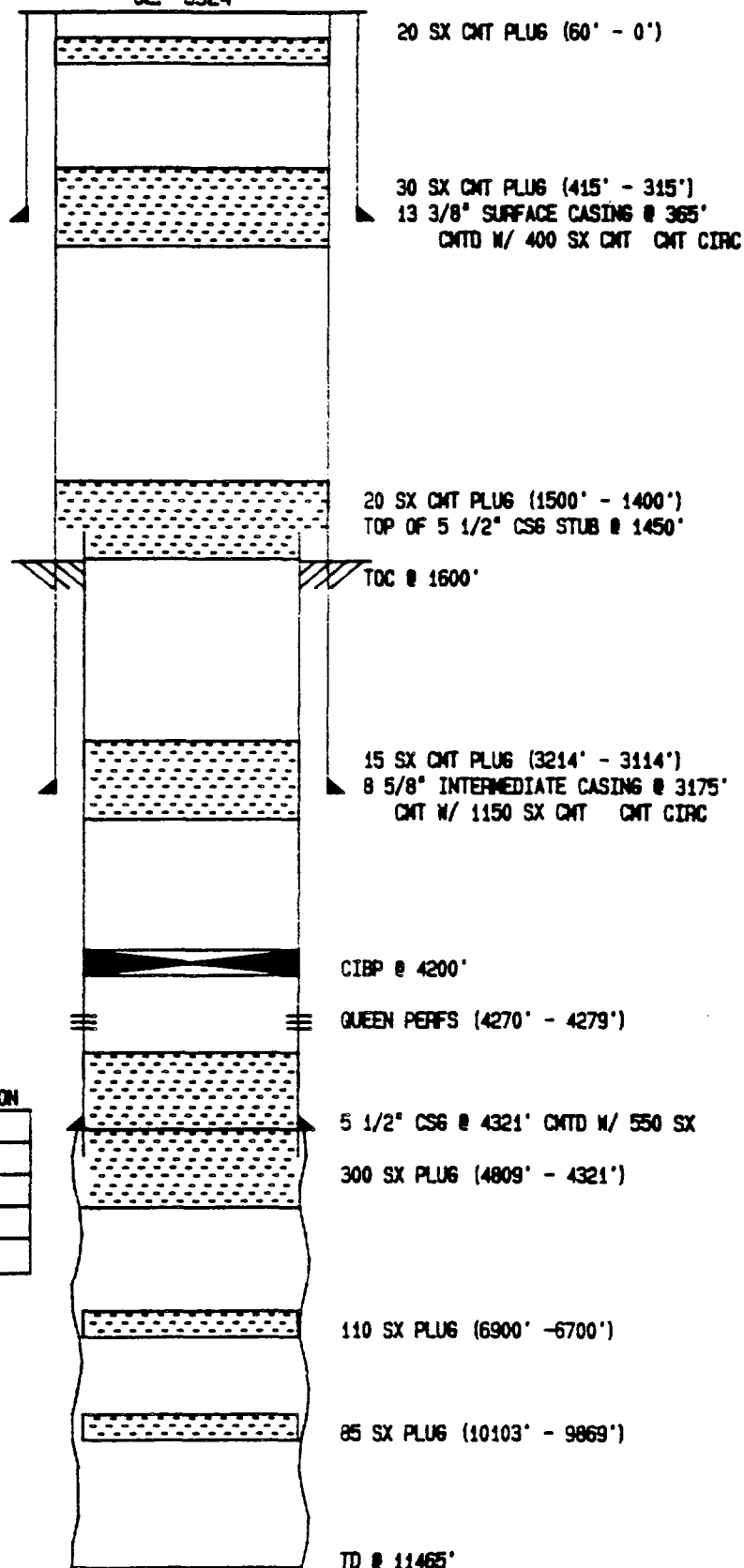
FEDERAL AG #2
2310' FNL & 330' FEL SEC 8 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION KB: 3942'
GL: 3924'

DATE DRILLED : 10/88

TOP OF YATES : 2982'

TOP OF QUEEN : 4139'



SURFACE INTERMED PRODUCTION

SIZE	13 3/8"	8 5/8"	5 1/2"
WEIGHT	48 #	24 & 32#	15.5 #
GRADE	H-40	K-35	K-35
THREAD	ST&C	ST&C	LT&C
DEPTH	365'	3175'	4321'

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

EXHIBIT 8

OK

ELEVATION: KB: 3984'
GL: 3966'

DATE DRILLED: 3/85

TOP OF YATES: 2960'

TOP OF QUEEN: 4189'

1 - 2 7/8" MUD ANCHOR W/ BP	30.75
1 - 2 7/8" PERF SUB	4.10
1 - 2 7/8" SN	1.10
2 JTS 2 7/8" 6.5# N-80 TBG	60.23
1 - 5 1/2" TAC	3.54
136 JTS 2 7/8" 6.5# N80 TBG	4185.87
TOTAL	4285.59
KB	18.50
SET AT	4304.05

RODS: 165 3/4" CLASS D STEEL

PUMP: 2" X 1 1/4" X 16" X 20"

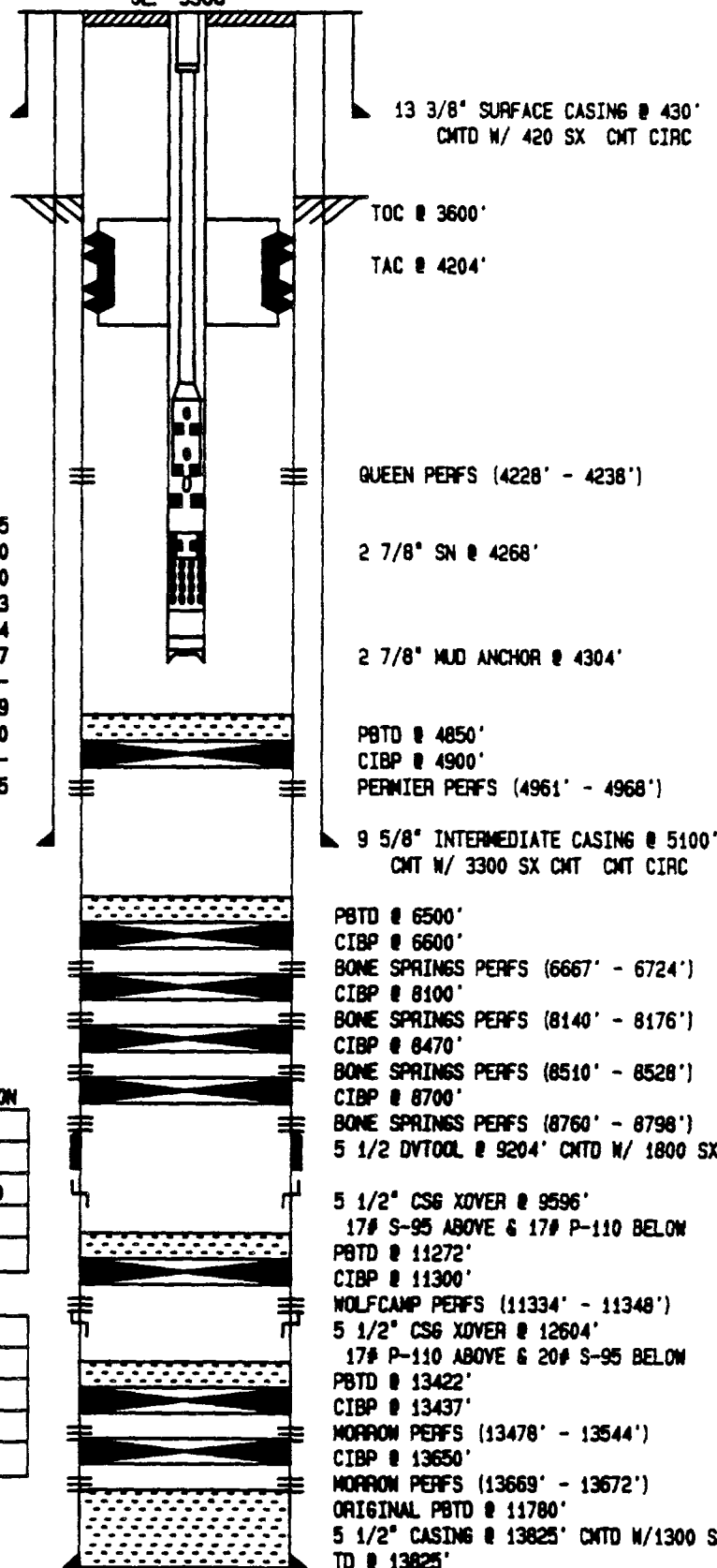
SURFACE INTERMED PRODUCTION

SIZE	13 3/8"	9 5/8"	5 1/2"
WEIGHT	48 #	36 #	17.20#
GRADE	H-40	S-80	S-95#-110
THREAD	ST&C	ST&C	LT&C
DEPTH	430'	5100'	13825'

TUBING

SIZE	2 7/8"
WEIGHT	6.5#
GRADE	N-80
THREAD	8RD EUE
DEPTH	4304'

PREP'D BY: SCOTT E. GENGLER
DATE: JULY 20, 1990



FEDERAL AA #2
 1980' FNL & 430' FEL SEC 9 T18S R33E
 LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3992'
 GL: 3979'

DATE DRILLED : 7/85

TOP OF YATES : 3050'

TOP OF QUEEN : 4242'

8 5/8" SURFACE CASING @ 380'
 CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	30.16
1 - 2 3/8" PERF SUB	3.87
1 - 2 3/8" SN	1.10
3 JTS 2 3/8" 4.7# J-55 TBG	91.09
1 - 5 1/2" TAC	3.60
133 JTS 2 3/8" 4.7# J55 TBG	4112.78
TOTAL	4242.60
KB	13.00
SET AT	4255.60

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-6 EUE
DEPTH	380'	4366'	4256'

TAC @ 4126'

2 3/8" SN @ 4220'

2 3/8" MUD ANCHOR @ 4256'

QUEEN PERFS (4270' - 4282')

PREP'D BY: SCOTT E. GENGLER
 DATE : JULY 20, 1990

PBTD @ 4339'
 5 1/2" CSG @ 4366' CMTD W/ 1550 SX
 TD @ 4375' CMT CIRC

EXHIBIT 8

ELEVATION: KB: 3976'
GL: 3966'

DATE DRILLED : 9/86

TOP OF YATES : 3024'

TOP OF QUEEN : 4222'

8 5/8" SURFACE CASING @ 360'
CMTD W/ 400 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	31.30
1 - 2 3/8" PERF SUB	3.80
1 - 2 3/8" SN	1.10
1 JTS 2 3/8" 4.7# J-55 TB6	30.86
1 - 5 1/2" BAKER TAC	2.75
135 JTS 2 3/8" 4.7# J55 TB6	4160.34
TOTAL	4230.15
KB	10.00
SET AT	4240.15

RODS : 168 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-11 EUE
DEPTH	360'	4350'	4240'

TAC @ 4170'

2 3/8" SN @ 4204'

2 3/8" MUD ANCHOR @ 4240'

QUEEN PERFS (4236' - 4262')

P8TD @ 4314'

5 1/2" CS6 @ 4350' CMTD W/ 1400 SX
TD @ 4350' CMT CIRC

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 20, 1990

FEDERAL AA #4
660' FNL & 790' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3997'

GL: 3985'

DATE DRILLED : 10/86

TOP OF YATES : 3020'

TOP OF QUEEN : 4204'

8 5/8" SURFACE CASING @ 375'
CMTD W/ 300 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	30.50
1 - 2 3/8" SN	1.10
137 JTS 2 3/8" 4.7# J55 TBG	4211.57
TOTAL	4243.17
KB	10.00
SET AT	4253.17

RODS : 167 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	6-6 EUE
DEPTH	375'	4325'	4253'

2 3/8" SN @ 4221'

2 3/8" TBG W/ NOTCHED COLLAR @ 4253'

QUEEN PERFS (4213' - 4242')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 20, 1990

PBTD @ 4312'
5 1/2" CS6 @ 4325' CMTD W/ 1400 SX
TD @ 4325' CMT CIRC

EXHIBIT 8

FEDERAL AD #1
660' FNL & 1980' FNL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3977'
GL: 3965'

DATE DRILLED : 7/85

TOP OF YATES : 2992'

TOP OF QUEEN : 4198'

8 5/8" SURFACE CASING @ 369'
CMTD W/ 350 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	31.73
1 - 2 3/8" SN	1.10
136 JTS 2 3/8" 4.7# J55 TBG	4178.70
TOTAL	4211.53
KB	12.00
SET AT	4223.53

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

SURFACE PRODUCTION TUBING

SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8-11 EUE
DEPTH	369'	4310'	4223'

2 3/8" SN @ 4191'

2 3/8" TBG W/ NOTCHED COLLAR @ 4223'

QUEEN PERFS (4206' - 4232')

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4256'
5 1/2" CSG @ 4310' CMTD W/ 1350 SX
TD @ 4310' CMT CIRC

ELEVATION: KB: 3970'
GL: 3958'

DATE DRILLED : 11/85

TOP OF YATES : 2982'

TOP OF QUEEN : 4165'

8 5/8" SURFACE CASING @ 363'
CMTD W/ 350 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	32.09
1 - 2 3/8" PERF SUB	3.90
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	64.51
1 - 5 1/2" GUITB TAC	3.60
131 JTS 2 3/8" 4.7# J55 TBG	4139.75
TOTAL	4244.95
KB	11.00
SET AT	4255.95

RODS : 167 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-6 EUE
DEPTH	363'	4320'	4256'

TAC @ 4151'

2 3/8" SN @ 4219'

2 3/8" MUD ANCHOR @ 4256'

QUEEN PERFS (4220' - 4255')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4264'
5 1/2" CS6 @ 4320' CMTD W/ 1250 SX
TD @ 4320' CMT CIRC

ELEVATION: KB: 3957'
GL: 3947'

DATE DRILLED : 1/86

TOP OF YATES : 3002'

TOP OF QUEEN : 4222'

8 5/8" SURFACE CASING @ 362'
CMTD W/ 300 SX CNT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.53
1 JT 2 3/8" 4.7# J-55 TBG	31.10
1 - 2 3/8" SN	1.10
3 JTS 2 3/8" 4.7# J-55 TBG	94.92
1 - 5 1/2" GUTB TAC	2.75
132 JTS 2 3/8" 4.7# J55 TBG	4087.32
TOTAL	4217.72
KB	11.00
SET AT	4227.72

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20"

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8-4 EUE
DEPTH	362'	4319'	4228'

TAC @ 4097'

2 3/8" SN @ 4195'

2 3/8" MUD ANCHOR @ 4228'

QUEEN PERFS (4245' - 4253')

PREP'D BY: SCOTT E. GENSLER
DATE : JULY 16, 1990

P8TD @ 4277'
5 1/2" CS6 @ 4319' CMTD W/ 1450 SX
TD @ 4320' CNT CIRC

ELEVATION: KB: 3950'
GL: 3938'

DATE DRILLED : 10/86

TOP OF YATES : 3016'

TOP OF QUEEN : 4236'

8 5/8" SURFACE CASING @ 351'
CMTD W/ 300 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	31.75
1 - 2 3/8" SN	1.10
134 JTS 2 3/8" 4.7# J55 TBG	4200.44
TOTAL	4233.29
KB	10.00
SET AT	4243.29

RODS : 167 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	6-d EUE
DEPTH	351'	4350'	4243'

2 3/8" SN @ 4210'

2 3/8" TBG W/ NOTCHED COLLAR @ 4243'

QUEEN PERFS (4258' - 4271')

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4288'
5 1/2" CSG @ 4350' CMTD W/ 1400 SX
TD @ 4350' CMT CIRC

FEDERAL AD #5
660' FSL & 2055' FWL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3951'
GL: 3940'

DATE DRILLED : 12/87

TOP OF YATES : 3026'
TOP OF QUEEN : 4252'

8 5/8" SURFACE CASING @ 373'
CMTD W/ 300 SX CMT CIRC

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	14 #	
GRADE	K-55	K-55	
THREAD	ST&C	ST&C	
DEPTH	373'	4352'	

CIBP & PBTD @ 4200'

QUEEN PERFS (4275' - 4291')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 23, 1990

ORIGINAL PBTD @ 4307'
5 1/2" CS6 @ 4352' CMTD W/ 1525 SX
TD @ 4352' CMT CIRC

FEDERAL AH #1
2310' FSL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3983'
GL: 3967'

DATE DRILLED : 6/87

TOP OF YATES : 3000'

TOP OF QUEEN : 4160'

8 5/8" SURFACE CASING @ 380'
CMTD W/ 250 SX CMT CIRC

1 - 3 1/2" MUD ANCHOR W/ BP
1 - 2 7/8" SN
2 JTS 2 7/8" 6.5# J-55 TBG
1 - 5 1/2" WATSON TAC
134 JTS 2 7/8" 6.5# J55 TBG

TOTAL	4177.00
KB	16.00
SET AT	4193.00

RODS : 100 3/4" CLASS D STEEL
68 7/8" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16" X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8-11 EUE
DEPTH	383'	4320'	4298'

5 1/2" CS6 XOVER @ 3640'
14# J55 ABOVE & 15.5# K55 BELOW

5 1/2" CS6 XOVER @ 3961'
15.5# K55 ABOVE & 17# K55 BELOW

TAC @ 4111'

2 3/8" SN @ 4172'

3 1/2" MUD ANCHOR @ 4193'

QUEEN PERFS (4274' - 4294')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

PBTD @ 4352'
5 1/2" CS6 @ 4400' CMTD W/ 850 SX
TD @ 4400'
TOC - N.A.

FEDERAL AH #5
2310' FSL & 330' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3997'

DATE DRILLED : 4/52

TOP OF YATES : 3443'

TOP OF QUEEN : 4271'

7" SURFACE CASING @ 1530'
CMTD W/ 50 SX CMT CIRC

RODS : 47 3/4" CLASS D STEEL
73 5/8" CLASS D STEEL

2 3/8" 4.7# J-55 TBG @ 3000'

	SURFACE	PRODUCTION	
SIZE	7"	5 1/2"	
WEIGHT	17 #	14 #	
GRADE	N.A.	N.A.	
THREAD	N.A.	N.A.	
DEPTH	1530'	3417'	

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

QUEEN PERFS (4219' - 4266')

5 1/2" CS6 @ 3417' CMTD W/ 50 SX
TD @ 4305'

FEDERAL AH #4
1980' FSL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3982'

DATE DRILLED : 11/53

1 - 2 3/8" MUD ANCHOR
1 - 2 3/8" PERF SUB
1 - 2 3/8" SN
2 3/8" 4.7# J55 T86

SET AT

3400.00

12 3/4" SURFACE CASING @ 275'
CMTD W/ 150 SX CMT CIRC

8 5/8" INTERMEDIATE CASING @ 1539'
CMTD W/ 625 SX

RODS : 133 5/8" CLASS D STEEL

PUMP : 2" X 1 1/2" X 12'

	SURFACE	INTERMED	PRODUCTION
SIZE	12 3/4"	8 5/8"	5 1/2"
WEIGHT	N.A.	N.A.	N.A.
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	275'	1539'	4324'

TUBING	
SIZE	2 3/8"
WEIGHT	4.7#
GRADE	J-55
THREAD	8610 RD
DEPTH	3400'

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

2 3/8" SN @ 3365'

2 3/8" MUD ANCHOR @ 3400'

YATES PERFS (3435' - 3488')

CIBP @ 3520'

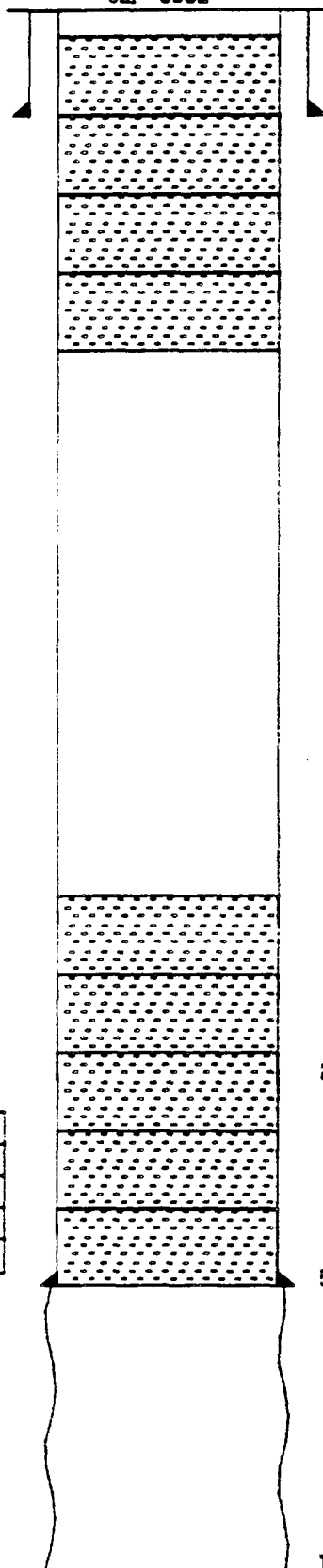
QUEEN PERFS

PBTD @ 4927'
5 1/2" CASING @ 4324' CMTD W/ 215 SX
TD @ 5257'

H&P - CORBIN FEDERAL #2
 1980' FSL & 660' FEL SEC 9 T18S R33E
 LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
 GL: 3982'

DATE DRILLED : 10/40



10 3/4" SURFACE CASING @ 264'
 CMTD W/ 150 SX CMT CIRC

500 SX PLUG (825' - 0')

200 SX PLUG (4228' - 2278')

5 1/2" CS6 @ 4228' CMTD W/ 528 SX

TO @ 4350'

	SURFACE	PRODUCTION	
SIZE	10 3/4"	5 1/2"	
WEIGHT	N.A.	N.A.	
GRADE	N.A.	N.A.	
THREAD	N.A.	N.A.	
DEPTH	264'	4228'	

PREP'D BY: SCOTT E. GENGLER
 DATE : JULY 24, 1990

OK

CHEVRON - COCKBURN FEDERAL G #1
1650' FSL & 940' FML SEC 10 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3957'

DATE DRILLED : 1/90
TOP OF QUEEN : 4244'

13 3/8" SURFACE CASING @ 405'
CMTD W/ 500 SX CMT CIRC

8 5/8" INTERMEDIATE CASING @ 3189'
CMTD W/ 1100 SX

2 7/8" 6.5# J-55 TBG @ 9070'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	5 1/2"
WEIGHT	40#	32 #	15.5 & 17#
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	405'	3189'	9000'

TUBING	
SIZE	2 7/8"
WEIGHT	6.5#
GRADE	J-55
THREAD	8PD EUE
DEPTH	9070'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

BONE SPRINGS PERFS (9069' - 9336')

PSTD @ 9481'
5 1/2" CASING @ 9589' CMTD W/ 1850 SX
TD @ 9589'

1
2

Exhibit 9

"Based on Tom's Research"

WYATT FEDERAL A #4
 990' FSL & 1650' FEL SEC 33 T17S R33E
 LEA COUNTY, NEW MEXICO

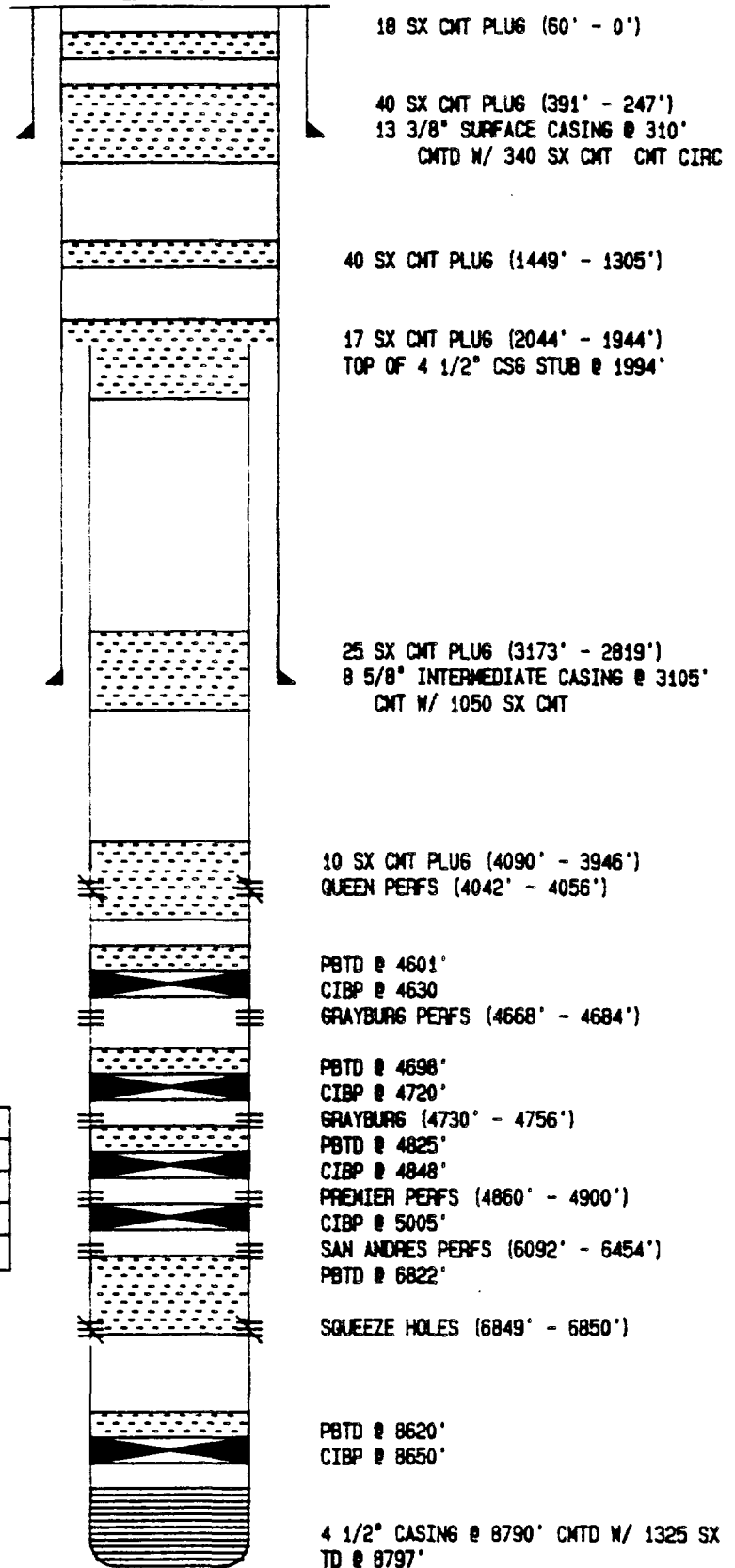
ELEVATION: KB: 4065'
 GL: 4053'

DATE DRILLED : 2/62

TOP OF YATES : 2895'
 TOP OF QUEEN : 4039'
 TOP OF GLORIETA : 6660'
 TOP OF ABO : 8792'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	4 1/2"
WEIGHT	40 #	24 & 32#	9.5611.68#
GRADE	NA	NA	NA
THREAD	NA	NA	NA
DEPTH	310'	3105'	8790'

PREPRD BY: SCOTT E. GENGLER
 DATE : JULY 23, 1990



WYATT FEDERAL B #1
990' FSL & 330' FEL SEC 33 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4071'
GL: 4060'

DATE DRILLED : 1/61

TOP OF YATES : 2876'

TOP OF QUEEN : 4008'

1 - SEAL ASSY W/O SEALS	0.40
1 - 2 3/8" PERF SUB	4.10
1 - 2 3/8" SN	1.10
211 JTS 2 3/8" 4.7# J-55 TB6	6429.57
68 JTS 2 7/8" 6.5# J-55 TB6	2107.93
4 JTS 2 7/8" 6.5# J-55 TB6 SUBS	27.90
TOTAL	8571.00
KB	11.00
SET AT	8582.00

13 3/8" SURFACE CASING @ 309'
CMTD W/ 340 SX CNT CIRC

8 5/8" INTERMEDIATE CASING @ 4213'
CMTD W/ 1900 SX TOC @ 250'

RODS : 176 3/4" CLASS D STEEL
84 7/8" CLASS D STEEL
80 1" CLASS D STEEL

PUMP : 2" X 1 1/4" X 20" X 24"

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	4 1/2"
WEIGHT	489	24, 28, 32#	9.5811.8#
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	309'	4213'	8850'

2 3/8" SN @ 8578'

BAKER MODEL D PKR @ 8582'

A80 PERFS (8617' - 8764')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

P8TD @ 8810'
4 1/2" CASING @ 8850' CMTD W/ 200 SX
TD @ 8850'

BHP - DENIUS FEDERAL #3
1980' FSL & FNL SEC 33 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 4111'

DATE DRILLED : 9/60

TOP OF YATES : 2800'

TOP OF QUEEN : 3910'

13 3/8" SURFACE CASING @ 309'
CMTD W/ 340 SX CMT CIRC

8 5/8" INTERMEDIATE CASING @ 2920'
CMTD W/ 850 SX

NO TUBING DATA AVAILABLE

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	4 1/2"
HEIGHT	480	24 & 320	11.6 #
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	309'	2920'	9068'

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

ABO PERFS (8576' - 8740')

5 1/2" CASING @ 9068' CMTD W/ 250 SX
TD @ 9071'

HENDERSON, DEXTER, BLACK - WYATT #1
330' FSL & FNL SEC 34 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: N.A.

DATE DRILLED : 8/20

10 SX PLUG (110' - 0')

15 1/2" SURFACE CASING @ 300'

12 1/2" INTERMEDIATE CSG @ 600'

TOP OF 10" CASING STUB @ 925'

10" INTERMEDIATE CASING @ 1500'

TOP OF 6 5/8" CASING STUB @ 1647'

	SURFACE	INTERMED	INTERMED
SIZE	15 1/2"	12 1/2"	10 "
WEIGHT	N.A.	N.A.	N.A.
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	300'	600'	1500'

	PRODUCTION
SIZE	6 5/8"
WEIGHT	N.A.
GRADE	N.A.
THREAD	N.A.
DEPTH	4500'

6 5/8" CASING @ 4508'

23 SX PLUG (4775' - 4750')

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

TD @ 5370'

CARPER - CORBIN #3 B
660' FNL & 1980' FNL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 4041'

DATE DRILLED : 10/57

TOP OF QUEEN : 4119'

8 5/8" SURFACE CASING @ 1567'
CMTD W/ 50 SX

10 SX PLUG (1675' - 1635')

10 SX PLUG (2775' - 2735')

SURFACE

SIZE	8 5/8"		
WEIGHT	24 #		
GRADE	N.A.		
THREAD	N.A.		
DEPTH	1567'		

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

TD @ 5424'

113

STOLTZ, WAGNER & BROWN #1
660' FSL & 1980' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4035'
GL: 4018'

DATE DRILLED : 11/74

TOP OF YATES : 2994'

TOP OF QUEEN : 4215'

15 SX PLUG (40' - 0')

13 3/8" SURFACE CASING @ 300'
CMTD W/ 300 SX CMT CIRC

40 SX CMT PLUG (3450' - 3350')
9 5/8" INTERMEDIATE CASING @ 3402'
CMT W/ 300 SX CMT

40 SX CMT PLUG (5250' - 5150')

40 SX CMT PLUG (6900' - 6800')

40 SX CMT PLUG (8200' - 8100')

40 SX CMT PLUG (9500' - 9400')

40 SX CMT PLUG (9700' - 9600')

40 SX CMT PLUG (10520' - 10420')

40 SX CMT PLUG (11000' - 10900')

40 SX CMT PLUG (12900' - 12800')

40 SX CMT PLUG (13700' - 13600')
TD @ 13700'

	SURFACE	INTERMED	
SIZE	13 3/8"	9 5/8"	
WEIGHT	NA	NA	
GRADE	NA	NA	
THREAD	NA	NA	
DEPTH	300'	3402'	

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

B. COCKBURN - CORBIN #6
660' FSL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: N.A.

DATE DRILLED : 5/55

8 5/8" SURFACE CASING @ 1525'
CMTD W/ 100 SX

PLUGGING DATA NOT AVAILABLE AT
THIS TIME

	SURFACE	PRODUCTION	
SIZE	8 5/8"		
WEIGHT	N.A.		
GRADE	N.A.		
THREAD	N.A.		
DEPTH	1525'		

PREPARED BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

TD @ 4927'

✓
HSP - CORBIN FEDERAL #1
1980' FSL & 660' FML SEC 10 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3984'

DATE DRILLED : 8/38

13" SURFACE CASING @ 303'
CMTD W/ 275 SX CMT CIRC

PLUGGING DATA NOT AVAILABLE AT
AT THIS TIME

9 5/8" INTERMEDIATE CASING @ 1618'
CMTD W/ 350 SX

	SURFACE	INTERMED	PRODUCTION
SIZE	13 "	9 5/8"	7 "
WEIGHT	N.A.	N.A.	N.A.
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	303'	1618'	4021'

7 " CASING @ 4021' CMTD W/ 100 SX

PREP'D BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

PBTD @ 4320'

TD @ 5118'

ITEM VII

Proposed Average Injection Rate (per well, per day): 200 BPD

Proposed Maximum Injection Rate (per well, per day): 1000 BPD

Proposed Average Injection Pressure: 1500 PSI

Proposed Maximum Injection Pressure: 2000 PSI

Type of System: Open, make-up water will come from Ogallala formation, and off-lease wells producing from the Bone Spring formation.



Home Office 707 N. Leech, P.O. Box 1499 / Hobbs, NM 88240 / Ph. 505/393-7751, TWX 910/986-0010

July 24, 1990

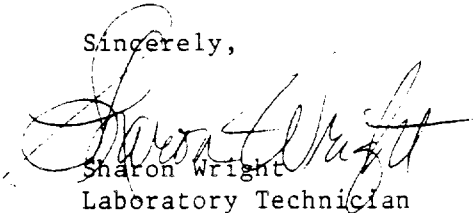
Mr. Sid Nichols
Oxy USA, Inc.
Box 69
Hobbs, NM 88241

Dear Mr. Nichols:

Enclosed please find our water analysis and compatability report on the samples submitted July 20, 1990, from the **State DW #4** and **Federal AH**.

If you have any questions or require further information, please contact us.

Sincerely,



Sharon Wright
Laboratory Technician

SW/sr

Enclosures

cc: John Offutt
Joe Gibson
Scott Gengler
Joe Hay

Unichem International

707 North Leech

P.O.Box 1499

Hobbs, New Mexico 88240

Company : OXY USA, INC.

Date : 07-24-1990

Location: BONESPRINGS-STATE DW #4 (on 07-20-1990)

	<u>Sample 1</u>
Specific Gravity:	1.136
Total Dissolved Solids:	190561
pH:	7.00
IONIC STRENGTH:	3.474

<u>CATIONS:</u>		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺²)	240	4800
Magnesium	(Mg ⁺²)	100	1220
Sodium	(Na ⁺¹)	2940	67600
Iron (total)	(Fe ⁺²)	0.355	9.90
Barium	(Ba ⁺²)	0.004	0.300
Manganese	(Mn ⁺²)	0.029	0.800

<u>ANIONS:</u>			
Bicarbonate	(HCO ₃ ⁻¹)	4.60	281
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	33.8	1630
Chloride	(Cl ⁻¹)	3240	115000

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium</u>	<u>Calcium</u>
86°F	30°C	<u>Carbonate</u>	<u>Sulfate</u>
		0.98	-14

Unichem International

707 North Leech

P.O.Box 1499

Hobbs, New Mexico 88240

Company : OXY USA, INC.

Date : 07-24-1990

Location: STATE DW #4 & FEDERAL AH - COMPATABILITY (on 07-20-1990)

	<u>Sample 1</u>
Specific Gravity:	1.109
Total Dissolved Solids:	152201
pH:	6.90
IONIC STRENGTH:	2.867

<u>CATIONS:</u>		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺²)	194	3880
Magnesium	(Mg ⁺²)	212	2580
Sodium	(Na ⁺¹)	2240	51500
Iron (total)	(Fe ⁺²)	1.23	34.5
Barium	(Ba ⁺²)	0.004	0.250
Manganese	(Mn ⁺²)	0.110	3.02

<u>ANIONS:</u>			
Bicarbonate	(HCO ₃ ⁻¹)	4.30	262
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	31.5	1510
Chloride	(Cl ⁻¹)	2610	92500

<u>DISSOLVED GASES</u>		
Carbon Dioxide	(CO ₂)	0
Hydrogen Sulfide	(H ₂ S)	0
Oxygen	(O ₂)	0

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium</u>	<u>Calcium</u>
86°F	30°C	<u>Carbonate</u>	<u>Sulfate</u>
		0.52	-25

Comments:

STATE DW #4= 50% & FEDERAL AH= 50%

Unichem International

707 North Leech

P.O.Box 1499

Hobbs, New Mexico 88240

Company : OXY USA, INC.

Date : 07-24-1990

Location: QUEEN-FEDERAL AH (on 07-20-1990)

	<u>Sample 1</u>
Specific Gravity:	1.081
Total Dissolved Solids:	113841
pH:	6.80
IONIC STRENGTH:	2.259

<u>CATIONS:</u>		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺²)	148	2950
Magnesium	(Mg ⁺²)	324	3940
Sodium	(Na ⁺¹)	1540	35300
Iron (total)	(Fe ⁺²)	2.11	59.0
Barium	(Ba ⁺²)	0.003	0.200
Manganese	(Mn ⁺²)	0.191	5.24

<u>ANIONS:</u>			
Bicarbonate	(HCO ₃ ⁻¹)	4.00	244
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	29.1	1400
Chloride	(Cl ⁻¹)	1970	70000

SCALING INDEX (positive value indicates scale)

		<u>Calcium</u>	<u>Calcium</u>
	<u>Temperature</u>	<u>Carbonate</u>	<u>Sulfate</u>
86°F	30°C	0.06	-35

CITIES SERVICE OIL AND GAS CORPORATION

INTEROFFICE LETTER

September 9, 1986

TO: Ms. Rebecca Egg
FROM: Loyd A. Nixon *LAN*
SUBJECT: Federal AA, AD, AE Brines Mixed with
Fresh Water for Waterflood

Conclusions

1. The produced brine itself is very likely to be scaling CaCO_3 , and possible gypsum (Table I).
2. Blending fresh water with this brine lessens the tendency to deposit CaCO_3 , CaSO_4 , BaSO_4 and SrSO_4 (Figure 1-4).
3. Due to the high iron content of the produced water and the amount of oxygen in the fresh water (~7ppm) formation of iron oxide (red water) is certain.

Recommendations

1. The above waters are essentially compatible and will not cause precipitation of any of the four major scales. Therefore, it should be used as a source water (Tables I, II, - Figures 1, 2, 3 and 4).
2. Scavenge the oxygen from the fresh water using either NH_4HSO_3 (ammonium bisulfite 50% liquid solution) or SO_2 (sulphur dioxide). Ammonium bisulfite is usually effective in fresh water at a rate of 10 ppm per 1 ppm oxygen.
3. Provide tankage on the lease to give the fresh water at least two hours retention time. This will provide ample time for the scavenger to work before contacting produced water.

Discussion

The calcium magnesium ratio of the produced brines, as well as the calcite stability index values, leads to the conclusion that calcium scales may already be or will become a problem in these wells. Inhibition may be a necessary part of operation if it is not already.

Interoffice Letter
Ms. Rebecca Egg
September 9, 1986
Page 2

Oxygen in the fresh water must be removed before it is mixed with the produced brine or red water (Fe_2O_3) will form. The cost of NH_4HSO_3 for use for this purpose would be ~\$11.32/1000 bbl. fresh water /day. This assumes a cost of \$3.50/gal. for 50% NH_4HSO_3 solution. SO_2 should be somewhat cheaper if bought on a no service basis from a jobber other than Kemex.

LAN/cb

cc: Messrs. G. L. Davis
C. L. Oney
E. Pittinger

<u>Fresh Water (%)</u>	<u>Produced Brine %</u>	<u>Calcium as CaCO₃ At Start (ppm)</u>	<u>Calcium as CaCO₃ At End¹ (ppm)</u>	<u>Calcium Deposited As CaCO₃ (ppm)</u>	<u>pH In</u>	<u>pH Out</u>
0	100	12000	12000	0	6.0	5.1
20	80	10200	10200	80	6.2	5.3
40	60	7000	7300	-300	6.1	5.8
60	40	5100	5100	0	6.0	6.3
80	20	2700	2800	100	6.4	7.1
100	0	136	136	0	7.6	8.4

Table II Calcium scale deposition values when Fed. AA, AD, AE brine is mixed with fresh water from water well on lease.

¹Test length 24 hours, temperature 90°F

<u>Fresh Water %</u>	<u>Produced Brine (ppm)</u>	<u>Iron (Fe⁺⁺) At Start (ppm)</u>	<u>Iron (Fe⁺⁺) At Finish¹ (ppm)</u>	<u>Iron (Fe⁺⁺) Deposited As Fe₂O₂ (%) (ppm)</u>	<u>Deposition (%)</u>
0	100	90	10	76.3	88.9
20	80	40	2	36.2	95.0
40	60	30	0.1	28.5	99.7
60	40	20	0.0	19.0	100.0
80	20	10	0.0	9.5	100.0
100	0	0.5	0.5	0.0	0

Table III Iron oxide deposition when Federal AA, AD, AE brine is mixed with fresh water from well on lease.

¹Test length 24 hours, temperature 90°F

CENTRAL CORBIN QUEEN FIELD

RESERVOIR DESCRIPTION

The Central Corbin (Queen) Field is located on the north basin platform structural province, near the northern edge of the Delaware Basin. The Queen Formation is part of the Guadalupian age Artesia Group, which includes the Goat Seep and Capitan carbonate reef systems. Central Corbin, along with several other Queen fields in the area (Corbin, E-K, and North E-K) produces from the upper part of the Queen, locally referred to as the Shattuck member, or Queen sandstone. The Central Corbin Field is primarily a stratigraphic trap, with a structural influence at its southern edge.

Queen core is available on three wells in Central Corbin: the Federal "AA" No. 2 (4236-4291), Federal "AD" No. 1 (4198-4245) and the Federal "AE" No. 1 (4194-4242). Open hole logs are available on most of the wells. The gamma ray-neutron/density log has proven to be the most useful correlation tool. Regional subsurface mapping has provided valuable analogies from more mature Queen fields.

In Central Corbin, the Queen sandstone is 48-60 feet thick, with gradational contacts with the underlying and overlying anhydrite. The reservoir consists of very fine grained (62.5-125 microns) well sorted, sub-angular quartzarenite. Corrensite clay (a mixed layer chlorite-smectite clay) lines the pore throats. X-ray analysis indicates clay volumes ranging from 4.2-8.6% ($\pm 2\%$).

Authigenic potassium feldspar, dolomite and gilsonite occur in small quantities. The better reservoir rocks exhibit low-angle planar cross-bedding, and the grain size is on the coarse end of the range (88-125 microns). Oil-bearing rocks are buff-gray, whereas non-oil-bearing rocks are red. Visible oil within red sandstones are surrounded by buff-gray rings, indicating that the color change is due to reduction of iron oxides in the rock by the presence of hydrocarbons.

Porosity is interparticle, ranging up to 14%, and averaging 10.4%. Pay thickness (porosity $\geq$ 8%) ranges up to 34 feet, and averages 21 feet. Anhydrite is the dominant cement type in the reservoir. The degree of anhydrite plugging is a function of grain size. Sandstone on the coarse end of the range is less affected by anhydrite cementation. Permeability ranges up to 207 md, and averages 3.8 md. Porosity-permeability plots derived from core data cluster along a fairly linear trend. Oriented core, recovered from the Federal "AD" No. 1 indicates no preferred permeability direction. Oil staining and reduction spots on core surfaces show preferred fluid flow parallel to the low-angle cross-bedding, which probably dips to the south. Anhydrite cement distribution in the cross-bedded sandstones suggest tortuous permeability paths. Natural fractures probably influence permeability paths, however, the core does not reveal an extensive fracture system. Random distribution of anhydrite cement appears to have the greatest impact on permeability paths, therefore, near-wellbore permeability paths should be radial.

Non-reservoir rock within the Queen sandstone consists of coarse-grained (31.2-62.5 microns), sub-angular, well-sorted quartz siltstone. It is mostly red, with some red-buff wavy laminae, and wisps, or nodules of anhydrite. Porosity is completely plugged with anhydrite.

Structural strike at Central Corbin is east-west, dipping southerly 100-150 feet/mile. An east-west trending monoclinial fold occurs north of Central Corbin, in the Corbin (Queen) Field. The monoclinial fold appears to have influenced pay development in Corbin. An oil-water contact occurs at -300 feet based on the recovery of the Federal AD #5 and the Federal AG wells.

The most significant porosity zone in the Queen occurs in the lower half of the section with three other thin zones correlatable throughout the field.

The net pay isopach of the Queen sandstone, using an 8% porosity cut-off helps define the limits of the reservoir. The reservoir is bounded on the north, east and west by a pinchout of the porosity, and to the south by the oil-water contact.

The Queen sandstone is a widespread deposit of probable eolian origin. A trend of Queen sandstone production occurs along the northern edge of the underlying Goat Seep Reef lagoon. The digitate lagoon-sabkha boundary is defined by lithologic logs; dolomite underlies the Queen sandstone in the lagoon, and anhydrite underlies the Queen in the sabkha. Along this boundary, the eolian transported sands were re-worked by marginal marine processes, creating the reservoir. Central Corbin Field is located within a narrow embayment in the lagoon, where tidal

currents re-worked the sands. Depositional strike is north-south, perpendicular to the shoreline. The Corbin Field, to the north, is located along the shoreline, where shoreline currents re-worked the sands. Depositional strike is therefore east-west, parallel to the shoreline.

Dry holes separate the north-south trending Central Corbin (Queen) Field from the east-west trending Corbin (Queen) Field. The proposed unit area includes all the active wells in the Central Corbin (Queen) Field, as well as the Oxy Federal "AI" No. 1, an old completion in the Corbin (Queen) Field (NE/4 NE/4, section 4). Current mapping indicates that this well is in communication with Central Corbin, and separate from Corbin.

KELLAHIN, KELLAHIN AND AUBREY

ATTORNEYS AT LAW

EL PATIO BUILDING

117 NORTH GUADALUPE

POST OFFICE BOX 2265

SANTA FE, NEW MEXICO 87504-2265

TELEPHONE (505) 982-4285
TELEFAX (505) 982-2047

W. THOMAS KELLAHIN
KAREN AUBREY

CANDACE HAMANN CALLAHAN

JASON KELLAHIN
OF COUNSEL

July 31, 1990

HAND DELIVERED

RECEIVED

Mr. William J. LeMay
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

JUL 31 1990

OIL CONSERVATION DIV.
SANTA FE

- Re: (1) Application of OXY USA Inc. for
Statutory Unitization for the Central
Corbin Queen Unit, Lea County,
New Mexico
- (2) Application of OXY USA for Authority
to Institute a waterflood project for
the Central Corbin Queen Unit, Lea County,
New Mexico.

Dear Mr. LeMay:

On behalf of OXY USA Inc, we would appreciate your setting the enclosed two Applications for a public hearing on the Division's Examiner docket now scheduled for August 22, 1990.

By copy of this letter to all parties to be subject to any orders issued in these cases, we are notifying them by certified mail-return receipt, that they have the right to appear at the hearing, to make a statement to the Division, to present evidence and cross-examine witnesses either in support of or in opposition to the Application. Those parties are directed to contact the Division or the Applicant's attorney to determine what additional rights they may have. In addition, they are advised that the entry of a statutory unitization order will affect their rights to share in the production from the subject unit.

Any party desiring to participate in the hearing should file a prehearing statement with the Division and the applicant's attorney by 4:00 P.M. on August 17, 1990.

Sincerely,

W. Thomas Kellahin

WTK/tic
Encl.

STATE OF NEW MEXICO
DEPARTMENT OF ENERGY AND MINERALS
OIL CONSERVATION DIVISION

RECEIVED

JUL 31 1990

OIL CONSERVATION DIV.
SANTA FE

APPLICATION OF OXY USA, INC. FOR
AUTHORITY TO INSTITUTE A WATERFLOOD
PROJECT FOR THE CENTRAL CORBIN QUEEN
UNIT, LEA COUNTY, NEW MEXICO

NO.

A P P L I C A T I O N

OXY USA INC. ("OXY") hereby applies to the New Mexico Oil Conservation Commission for an order authorizing OXY to institute a waterflood project for the Central Corbin Queen Unit, Lea County, New Mexico, and in support of its application states:

1. OXY USA Inc. ("OXY") is a Delaware corporation authorized to transact business in the State of New Mexico, and is engaged in the business of, among other things, producing and selling oil and gas.

2. The proposed area (the "Project Area") for which application is made is known as the Central Corbin Queen Unit and consists of 1560 acres, more or less, in Lea County, New Mexico, and is more particularly shown in Exhibit No. 1 attached hereto and incorporated herein by reference. OXY proposes to seek an order pursuant to the New Mexico Statutory Unitization Act providing for the unitized management, operation and further development of the Project Area.

3. By converting certain presently producing wells to water injection wells and by drilling new water injection wells, OXY proposes to inject fluids into the producing interval which shall include the formations which extend from an upper limit described as 215 feet below mean sea level or at the top of the Queen formation, whichever is higher, to a lower limit at the base of the Queen formation. The geologic markers have been previously found by the Oil Conservation Division to occur at 4200 feet and 4246 feet, respectively, in OXY USA Inc.'s Federal "AA" No. 1 Well (located at 990 feet from the North line and 1980 feet from the East line of Section 9, Township 18 South, Range 33 East, Lea County, New Mexico) and as recorded on the Schlumberger CNL-LDT Log taken on November 10, 1984, said Log being measured from a kelly drive bushing elevation of 3985 feet above sea level. A copy of the Welex Log for said well on said date is attached hereto and incorporated herein by reference as Exhibit No. 2. Also attached hereto and incorporated herein by reference as Exhibit No. 3 is a Well Status Map of the Central Corbin Queen Unit Area showing the location and current status of all wells and leases located within the project area as well as those that are located within a two mile radius of the proposed injection wells. Also attached hereto and incorporated herein by reference is Exhibit No. 4 which is a Well Status Map of the Central Corbin Queen Unit which also shows the proposed Unit

injection wells. Exhibit No. 5, in conjunction with Exhibit No. 1, is the proposed well numbering system within the unit. Regarding both Exhibit No. 4 and Exhibit No. 5 and attached hereto and incorporated herein by reference as Exhibit No. 6 are well data sheets relating current and proposed well data on each proposed injection well within the Unit Area. Diagrammatic sketches illustrating the wellbore configurations typical of the majority of the proposed injection wells and showing the manner in which the wells will be equipped for injection are attached hereto and incorporated herein by reference as Exhibit No. 7. Schematic diagrams for other wells in the units are attached and incorporated herein by reference as Exhibit No. 8. All the available well logs of the proposed injection wells are currently on file with the Oil Conservation Division. Attached hereto and incorporated herein by reference as Exhibit No. 9 is a list of those injection wells for which well logs are not available.

4. Schematic diagrams on all other wells located within one-half mile radius of the proposed injection wells showing all casing strings, setting depths, sacks of cement used, cement tops, total depth, producing intervals, well identification, and location are attached hereto and incorporated herein by reference as Exhibit No. 10.

Included in this attachment are schematics of all plugged and abandoned wells located within a one-half mile radius of the proposed injection wells.

5. Initially, water to be used for injection for the waterflood project will come from the Ogallala and the Bone Spring formations. As production increases, and the number of injection wells increase, it is expected that produced water will become the primary source of injected water supplemented by water from the Ogallala formation.

6. Water is to be injected at a surface pressure not to exceed 0.2 psi per foot of depth to the top of the injection zone provided that surface pressure in excess of 0.2 psi per foot of depth to injection zone may be applied upon administrative approval of the Director of the Oil Conservation Division after showing that such higher pressure will not result in fracturing of the confining strata.

7. Furthermore, filed with this application is Division Form C-108 with remaining attachments, which is incorporated herein by reference as Exhibit No. 11.

8. Approval of this application for the Central Corbin Queen Unit waterflood project will substantially increase recoverable reserves thereby preventing waste.

9. In accordance with Division Notice Rules, a copy of this application has been sent certified mail return receipt to those offset operators and surface owners as set forth on Exhibit 12 and they are hereby notified of the hearing set for August 22, 1990.

WHEREFORE, OXY respectfully requests that this application be set for hearing before the Oil Conservation Division on August 22, 1990 and that the Division enter its order approving the waterflood project for the Central Corbin Queen Unit.

KELLAHIN, KELLAHIN & AUBREY

By: 

W. Thomas Kellahin
Post Office Box 2265
Santa Fe, New Mexico 87504
(505) 982-4285

ATTORNEYS FOR OXY USA, INC.

EXHIBIT 12

List of Offset Operators
and Surface Owners

BHP Petroleum Inc.
5847 San Felipe St. 3600
Houston, Texas 77057

Dallas McCasland
Box 206
Eunice, N.M. 88231

Meridian Oil Inc.
21 Desta Drive
Midland, Texas 79705
Attn: Tom Ollie

Conoco Inc.
10 Desta Drive West
Midland, Texas 79705
Attn: Jerry Hoover

Harvey E. Yates Company (Heyco)
P. O. Box 1933
Roswell, New Mexico 08202
Attn: Rosemary Avery

Santa Fe Energy Operating Partners
500 W. Illinois
Midland, Texas 79701

Santa Fe Exploration Company
P. O. Box 1136
Roswell, New Mexico 88201

Surface Owner

Bureau of Land Management
P. O. Box 17789
Carlsbad, New Mexico 88220



OXY USA INC.
Box 50250, Midland, TX 79710

August 13, 1990

STATE LAND OFFICE
P. O. Box 2088
Santa Fe, New Mexico 87504

** CERTIFIED MAIL **

Re: Application for OXY USA Inc. for
Authority to Institute a Waterflood
Project for the Central Corbin Queen
Unit, Lea County, New Mexico.

Dear Sir:

Please find attached copies of the referenced application. I apologize because you were inadvertently left out of the original mailing.

Sorry for the inconvenience.

Yours Truly,

A handwritten signature in cursive script, reading "Richard E. Foppiano".

Richard E. Foppiano

Regulatory Affairs Engineering Advisor

REF/Ref
attachments



OXY USA INC.
Box 50250, Midland, TX 79710

August 13, 1990

Herschel Caviness
Gary Caviness
East Star Route
Maljamar, New Mexico 88264

** CERTIFIED MAIL **

Re: Application for OXY USA Inc. for
Authority to Institute a Waterflood
Project for the Central Corbin Queen
Unit, Lea County, New Mexico.

Dear Sir:

Please find attached copies of the referenced application. I apologize because you were inadvertently left out of the original mailing.

Sorry for the inconvenience.

Yours Truly,

A handwritten signature in dark ink, reading "Richard E. Foppiano", written in a cursive style.

Richard E. Foppiano

Regulatory Affairs Engineering Advisor

REF/Ref
attachments

CENTRAL CORBIN QUEEN UNIT

WELL CROSS REFERENCE

<u>TRACT</u>	<u>PREVIOUS OPERATOR</u>	<u>LEASE NAME AND WELL NUMBER</u>	<u>UNIT DESIGNATION</u>
5	SANTE FE	FEDERAL AG #1	NOT USED
5	SANTE FE	FEDERAL AG #2	NOT USED
4	OXY	FEDERAL AD #1	401W
4	OXY	FEDERAL AD #2	402
4	OXY	FEDERAL AD #3	403
4	OXY	FEDERAL AD #4	404W
4	OXY	FEDERAL AD #5	405
1A	OXY	FEDERAL AA #1	101
1A	OXY	FEDERAL AA #2	102
1A	OXY	FEDERAL AA #3	103W
1A	OXY	FEDERAL AA #4	104W
1B	OXY	FEDERAL AH #1	105
1B	OXY	FEDERAL AH #2	NOT USED
2A	OXY	FEDERAL AE #1	201W
2A	OXY	FEDERAL AE #2	202
2A	OXY	FEDERAL AE #3	203W
2A	OXY	FEDERAL AE #4	204W
2A	OXY	FEDERAL AE #5	205W
2A	OXY	FEDERAL AE #6	206
2A	OXY	FEDERAL AE #7	207
2A	OXY	FEDERAL AE #8	208
2A	OXY	FEDERAL AE #9	209W
2A	OXY	FEDERAL AE #10	210
2A	OXY	FEDERAL AE #12	212W
2B	OXY	FEDERAL AI #1	215
2B	OXY	FEDERAL AI #3	214
2B	OXY	FEDERAL AI #4	213W
3	CONOCO	FEDERAL (BHP) #1	NOT USED
6	SANTA FE	CORBIN FEE #1	601W
7	SANTA FE	CORBIN FEE #2	602

NOTE: FEDERAL AG #1 and #2 will be #501 and #502 if used.

EXHIBIT 5

Proposed well
numbering system

Unit Agreement

UNIT AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

*Copy 14.
from unit*

UNIT AGREEMENT
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

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Exhibit "A" (Map of Unit Area)

Exhibit "B-1" (Schedule of Ownership)

Exhibit "B-2" (Schedule of Tract Participation)

UNIT AGREEMENT
FOR THE DEVELOPMENT AND OPERATION
OF THE
CENTRAL CORBIN QUEEN UNIT
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of July, 1990, 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 and gas interests in the Unit Area subject to this Agreement; and

WHEREAS, the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Secs. 181 et seq., authorizes Federal lessees and their representatives to unit with each other, or jointly or separately with others, in collectively adopting and operating a cooperative or unit plan of development or operation of any oil or gas pool, field, or like area, or any part thereof for the purpose of more properly conserving the natural resources thereof whenever determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest; and

WHEREAS, the Oil Conservation Division of the State of New Mexico (hereinafter referred to as the "Division") is authorized by an Act of the Legislature (Chapter 72, Laws of 1935 as amended) (Chapter 70, Article 2, Section 2 et seq., New Mexico Statutes 1978 Annotated) to approve this Agreement and the conservation provisions hereof; and

WHEREAS, the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico is authorized by law (Chapter 65, Article 3

and Article 14, N.M.S. 1953 Annotated) to approve this Agreement and the conservation provisions hereof; and

WHEREAS, the parties hereto hold sufficient interest in the Unit Area covering the land 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, and secure other benefits obtainable through development and operation of the area subject to this Agreement under the terms, 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 interest in the below-defined Unit Area, and agree severally among themselves as follows:

SECTION 1. ENABLING ACT AND REGULATIONS. The Mineral Leasing Act of February 25, 1920, as amended, supra, and all valid pertinent regulations, including operating and unit plan regulations, heretofore issued thereunder or valid, pertinent, and reasonable regulations hereafter issued thereunder are accepted and made a part of this Agreement as to Federal lands, provided such regulations are not inconsistent with the terms of this Agreement; and as to non-federal lands, the oil and gas operating regulations in effect as of the Effective Date hereof governing drilling and producing operations, not inconsistent with the terms hereof or the laws of the state in which the non-federal

land is located, area hereby accepted and made a part of this Agreement.

SECTION 2. UNIT AREA AND DEFINITIONS. For the purpose of this Agreement, the following terms and expressions as used herein shall mean:

(a) "Unit Area" is defined as those lands described in Exhibit "B-1" and depicted on Exhibit "A" hereof, and such land is hereby designated and recognized as constituting the Unit Area, containing 1561.19 acres, more or less, in Lea County, New Mexico.

(b) "Division" is defined as the Oil Conservation Division of the Department of Energy and Minerals of the State of New Mexico.

(c) "Authorized Officer" or "A.O." is any employee of the Bureau of Land Management who has been delegated the required authority to act on behalf of the BLM.

(d) "Secretary" is defined as the Secretary of the Interior of the United States of America, or his duly authorized delegate.

(e) "Department" is defined as the Department of the Interior of the United States of America.

(f) "Proper BLM Office" is defined as the Bureau of Land Management office having jurisdiction over the federal lands included in the Unit Area.

(g) "Unitized Formation" shall mean that interval underlying the Unit Area, the vertical limits of which extend from an upper limit described as 215 feet below mean sea level or at the top of the Queen formation, whichever is higher, to a lower limit at the base of the Queen formation; the geologic markers having been previously found to occur at 4200 feet and 4246 feet, respectively, in OXY USA Inc.'s Federal AA #1 well (located at 990 feet FNL

and 1980 feet FEL of Section 9, T-18-S, R-33-E, Lea County, New Mexico) as recorded on the Schlumberger CNL-LDT log taken on November 10, 1984, said log being measured from a kelly drive bushing elevation of 3985 feet above sea level.

(h) "Unitized Substances" are all oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate and all associated and constituent liquid or liquefiable hydrocarbons, other than outside substances, within and produced from the Unitized Formation.

(i) "Tract" is each parcel of land described as such and given a Tract number in Exhibit "B-1".

(j) "Tract Participation" is defined as the percentage of participation shown on Exhibit "B-2" for allocating Unitized Substances to a Tract under this Agreement. Percentages of participation are shown on Exhibit "B-2" separately for Tract Oil Participation and Tract Gas Participation.

(k) "Unit Participation" is the sum of the percentages obtained by multiplying the Working Interest of a Working Interest Owner in each Tract by the Tract Participation of such Tract. A separate Unit Oil Participation and Unit Gas Participation are defined by such calculation.

(l) "Working Interest" is the right to search for, produce and acquire Unitized Substances whether held as an incident of ownership of mineral fee simple title, under an oil and gas lease, operating agreement, or otherwise held, which interest is chargeable with and obligated to pay or bear, either in cash or out of production, or otherwise, all or a portion of the cost of drilling, developing and producing the Unitized Substances from the Unitized Formation and operations thereof hereunder. Provided that any Royalty Interest created out of a Working Interest subsequent to the execution of this Agreement

by the owner of the Working Interest shall continue to be subject to such Working Interest burdens and obligations.

(m) "Working Interest Owners" is any party hereto owning a Working Interest, including a carried Working Interest Owner, holding an interest in Unitized Substances by virtue of a lease, operating agreement, fee title or otherwise. The owner of Oil and Gas Rights that are free of lease or other instrument creating a Working Interest in another shall be regarded as a Working Interest Owner to the extent of seven-eighths (7/8) of his interest in Unitized Substances, and as a Royalty Owner with respect to his remaining one-eighth (1/8) interest therein.

(n) "Royalty Interest" or "Royalty" is an interest other than a Working Interest in or right to receive a portion of the Unitized Substances or the proceeds thereof and includes the Royalty Interest reserved by the lessor or by an oil and gas lease and any overriding Royalty Interest, oil payment interest, net profit contracts, or any other payment or burden which does not carry with it the right to search for a produce Unitized Substances.

(o) "Royalty Owner" is the owner of a Royalty Interest.

(p) "Unit Operating Agreement" is the Agreement entered into by and between the Unit Operator and the Working Interest Owners as provided in Section 9, infra, and shall be styled "Unit Operating Agreement, Central Corbin Queen Unit, Lea County, New Mexico".

(q) "Oil and Gas Rights" is the right to explore, develop and operate lands within the Unit Area for the production of Unitized Substances, or to share int the production so obtained or the proceeds thereof.

(r) "Outside Substances" is any substance obtained from any source other than the Unitized Formation and injected into the Unitized Formation.

(s) "Unit Manager" is any person or corporation appointed by Working Interest Owners to perform the duties of Unit Operator until the selection and qualification of a successor Unit Operator as provided for in Section 7 hereof.

(t) "Unit Operator" is the party designated by Working Interest Owners under the Unit Operating Agreement to conduct Unit Operations.

(u) "Unit Operations" is any operation conducted pursuant to this Agreement and the Unit Operating Agreement.

(v) "Unit Equipment" is all personal property, lease and well equipment, plants, and other facilities and equipment taken over or otherwise acquired for the joint account for use in Unit Operations.

(w) "Unit Expense" is all cost, expense, or indebtedness incurred by Working Interest Owners or Unit Operator pursuant to this Agreement and the Unit Operating Agreement for or on account of Unit Operations.

(x) "Effective Date" is the date determined in accordance with Section 24, or as redetermined in accordance with Section 39.

SECTION 3. EXHIBITS. The following exhibits are incorporated herein by reference: Exhibit "A" attached hereto is a map showing the Unit Area and the boundaries and identity of Tracts and leases in said Unit Area to the extent known to the Unit Operator. Exhibit "B-1" attached hereto is a schedule showing, to the extent known to the Unit Operator, the acreage comprising each Tract, percentages and kind of ownership of Oil and Gas Interests in all land in the Unit Area. Exhibit "B"-2" attached hereto is a schedule showing the Tract Participation of each Tract. However, nothing herein or in said schedules 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

in said map or schedules as owned by such party. The shapes and descriptions of the respective Tracts have been established by using the best information available. Each Working Interest Owner is responsible for supplying Unit Operator with accurate information relating to each Working Interest Owner's interest. If it subsequently appears that any Tract, because of diverse Royalty or Working Interest ownership on the Effective Date hereof, should be divided into more than one Tract, or when any revision is requested by the A.O., or any correction of any error other than mechanical miscalculations or clerical is needed, then the Unit Operator, with the approval of the Working Interest Owners, may correct the mistake by revising the Exhibits to conform to the facts. The revision shall not include any reevaluation of engineering or geological interpretations used in determining Tract Participation. Each such revision of an Exhibit made prior to thirty (3) days after the Effective Date shall be effective as of the Effective Date. Each other such revision of an Exhibit shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised Exhibit or on such other date as may be determined by Working Interest Owners and set forth in the revised Exhibit. Not less than four copies of such revision shall be filed with the A.O. In any such revision, there shall be no retroactive allocation or adjustment of Unit Expense or of interests in the Unitized Substances produced, or proceeds thereof.

SECTION 4. EXPANSION. The above described Unit Area may, with the approval of the A.O., when practicable be expanded to include therein any additional Tract or Tracts regarded as reasonably necessary or advisable for the purposes of this Agreement provided however, in such expansion there shall

be no retroactive allocation or adjustment of Unit Expense or of interests in the Unitized Substances produced, or proceeds thereof. Pursuant to Subsection (b), the Working Interest Owners may agree upon an adjustment of investment by reason of the expansion. Such expansion shall be effected in the following manner:

(a) The Working Interest Owner or Owners of a Tract or Tracts desiring to bring such Tract or Tracts into this unit, shall file an application therefor with Unit Operator requesting such admission.

(b) Unit Operator shall circulate a notice of the proposed expansion to each Working Interest Owners in the Unit Area and in the Tract proposed to be included in the unit, setting out the basis for admission, the Tract Participation to be assigned to each Tract in the enlarged Unit Area and other pertinent data. After negotiation (at Working Interest Owners' meeting or otherwise) if at least three Working Interest Owners having in the aggregate seventy-five percent (75%) of the Unit Oil Participation then in effect have agreed to inclusion of such Tract or Tracts in the Unit Area, then Unit Operator shall:

(1) After obtaining preliminary concurrence by the A.O., prepare a notice of proposed expansion describing the contemplated changes in the boundaries of the Unit Area, the reason therefor, the basis for admission of the additional Tract or Tracts, the Tract Participation to be assigned thereto and the proposed effective date thereof; and

(2) Deliver copies of said notice to the A.O. at the Proper BLM Office, each Working Interest Owner and to the last known address of each lessee and lessor whose interests are affected, advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objection to such proposed expansion; and

(3) File, upon the expiration of said thirty (30) day period as set out in (2) immediately above with the A.O. the following: (a) evidence of mailing or delivering copies of said notice of expansion; (b) an application for approval of such expansion; (c) an instrument containing the appropriate joinders in compliance with the participation requirements of Section 14, and Section 34, infra; and (d) a copy of all objections received along with the Unit Operator's response thereto.

The expansion shall, after due consideration of all pertinent information and approval by the and the A.O., become effective as of the date prescribed in the notice thereof, preferably the first day of the month subsequent to the date of notice. The revised Tract Participation of the respective Tracts included within the Unit Area prior to such enlargement shall remain the same ratio one to another.

SECTION 5. UNITIZED LAND. All land committed to this Agreement as to the Unitized Formation shall constitute land referred to herein as "Unitized Land" or "Land subject to this Agreement". Nothing herein shall be construed to unitize, pool, or in any way affect the oil, gas and other minerals contained in or that may be produced from any formation other than the Unitized Formation as defined in Section 2(g) of this Agreement.

SECTION 6. UNIT OPERATOR. OXY USA INC. is hereby designated the Unit Operator, and by signing this instrument as Unit Operator, agrees and consents to accept the duties and obligations of Unit Operator for the Operation, development, and production of Unitized Substances as herein provided. Whenever reference is made herein to the Unit Operator, such references means the Unit Operator acting in that capacity and not as an owner of interests in Unitized Substances, when such interests are owned by it and the term "Working Interest Owner" when used herein shall include or refer to the Unit Operator as the owner of a Working Interest when such an interest is owned by it.

Unit Operator shall have a lien upon interests of Working Interest Owners in the Unit Area to the extent provided in the Unit Operating Agreement.

SECTION 7. RESIGNATION OR REMOVAL OF UNIT OPERATOR. Unit Operator shall have the right to resign at any time, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights a such for a period of six (6) months after written notice of intention to resign has been given by Unit Operator to all Working Interest Owners and the A.O. unless a new Unit Operator shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

The Unit Operator shall, upon default or failure in the performance of its duties and obligations hereunder, be subject to removal by the affirmative vote of three (3) or more Working Interest Owners having in the aggregate seventy-five percent (75%) or more or the Unit Participation then in effect

exclusive of the Working Interest Owners who is the Unit Operator. Such removal shall be effective upon notice thereof to the A.O.

In all such instances of effective resignation or removal, until a successor to Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for the performance of the duties of the Unit Operator and shall, not later than thirty (30) days before such resignation or removal becomes effective, appoint a Unit Manager to represent them in any action to be taken hereunder.

The resignation or removal of Unit Operator under this Agreement shall not terminate its 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 wells, equipment, books and records, materials, appurtenances and any other assets used in connection with the Unit Operations to the new duly qualified successor Unit Operator or to the Unit Manager if no such new Unit Operator is elected. Nothing herein shall be construed to relieve or discharge any Unit Operator or Unit Manager who resigns or is removed hereunder from any liability or duties accruing or performable by it prior to the effective date of such resignation or removal.

SECTION 8. SUCCESSOR UNIT OPERATOR. Whenever the Unit Operator shall tender its resignation as Unit Operator or shall be removed as hereinabove provided, the Working Interest Owners shall select a successor Unit Operator as herein provided. 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 A.O. If no successor Unit Operator or Unit Manager is selected and qualified as herein provided, the A.O., at its election, may declare this Agreement terminated.

In selecting a successor Unit Operator, the affirmative vote of three or more Working Interest Owners having a total of sixty-five percent (65%) or more of the total Unit Participation shall prevail; provided that if any one Working Interest Owner has a Unit Participation of more than thirty-five percent (35%), its negative vote or failure to vote shall not be regarded as sufficient unless supported by the vote of two or more other Working Interest Owners having a total Unit Participation of at least five percent (5%). If the Unit Operator who is removed votes only to succeed itself or fails to vote, the successor Unit Operator may be selected by the affirmative vote of the owner of at least seventy-five percent (75%) of the Unit Participation remaining after excluding the Unit Participation of Unit Operator so removed.

SECTION 9. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT. Costs and expenses incurred by Unit Operator in conducting Unit Operations hereunder shall be paid, apportioned among and borne by the Working Interest Owners in accordance with the Unit Operating Agreement. Such Unit Operating Agreement shall also provide the manner in which the Working Interest Owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereto in conformity with their underlying operating agreements, leases or other contracts and such other rights and obligations as

between Unit Operator and the Working Interest Owners as may be agreed upon by the Unit Operator and the Working Interest Owners; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Agreement or to relieve the Unit Operator of any right or obligation established under this Agreement, and in case of any inconsistency or conflict between this Agreement and the Unit Operating Agreement, this Agreement shall prevail. Copies of any Unit Operating Agreement executed pursuant to this Section shall be filed with and with the A.O. at the Proper BLM Office as required prior to approval of this Agreement.

SECTION 10. 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 including surface rights which are necessary or convenient for prospecting for, producing, storing, allocating and distributing the Unitized Substances are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Upon request, acceptable evidence of title to said rights shall be deposited with said 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.

SECTION 11. PLAN OF OPERATIONS. It is recognized and agreed by the parties hereto that all of the land subject to this Agreement is reasonably

proved to be productive of Unitized Substances and that the object and purpose of this Agreement is to formulate and to put into effect an improved recovery project in order to effect additional recovery of Unitized Substances, prevent waste and conserve natural resources. Unit Operator shall have the right to inject into the Unitized Formation any substances for secondary recovery or enhanced recovery purposes in accordance with a plan of operation approved by the Working Interest Owners, the A.O. and the Division, including the right to drill and maintain injection wells within the Unit Area and completed in the Unitized Formation, and to use abandoned well or wells producing from the Unitized Formation for said purpose. Subject to like approval, the Plan of Operation may be revised as conditions may warrant.

The initial Plan of Operation shall be filed with the A.O. and the Division concurrently with the filing of this Unit Agreement for final approval. Said initial Plan of Operation and all revisions thereof shall be as complete and adequate as the A.O., and the Division may determine to be necessary for timely operation consistent herewith. Upon approval of this Agreement and the initial plan by the A.O., said plan, and all subsequently approved plans, shall constitute the operating obligations of the Unit Operator under this Agreement for the period specified therein. Thereafter, from time to time before the expiration of any existing plan, the Unit Operator shall submit for like approval a plan for an additional specified period of operations. After such operations are commenced, reasonable diligence shall be exercised by the Unit Operator in complying with the obligations of the approved Plan of Operation.

Notwithstanding anything to the contrary herein contained, should the Unit Operator fail to commence Unit Operations for the secondary recovery of Unitized Substances from the Unit Area within eighteen (18) months after the effective date of this Agreement, or any extension thereof approved by the A.O., this Agreement shall terminate automatically as of the date of default.

SECTION 12. USE OF SURFACE AND USE OF WATER. The parties to the extent of their rights and interests, hereby grant to Unit Operator the right to use as much of the surface, including the water thereunder, of the Unitized Land as may reasonably be necessary for Unit Operations.

Unit Operator's free use of water or brine or both for Unit Operations, shall not include any water from any well, lake, pond, or irrigation ditch or a surface owner, unless approval for such use is granted by the surface owner.

Unit Operator shall pay the surface owner for damages to growing crops, fences, improvements and structures on the Unitized Land that result from Unit Operations, and such payments shall be considered as items of Unit Expense to be borne by all the Working Interest Owners of lands subject hereto.

SECTION 13. TRACT PARTICIPATION. IN Exhibit "B-2" attached hereto there are listed and numbered the various Tracts within the Unit Area, and set forth opposite each Tract are figures which represent the Tract Participation, during Unit Operations if all Tracts in the Unit Area qualify as provided herein. The Tract Participation of each Tract as shown in Exhibit "B-2" has been determined in accordance with the following formula:

Tract Participation = 35% A/B + 30% C/D + 25% E/F + 10% G/H

A = The Tract total net porosity acre feet from the Unitized Formation

B = The Unit total net porosity acre feet from the Unitized Formation

C = The Tract Cumulative Oil Production from the Unitized Formation
through April 30, 1989

D = The Unit total Cumulative Oil Production from the Unitized Formation
through April 30, 1989

E = The Remaining Primary Oil Reserves from the Unitized Formation for
for the Tract, after April 30, 1989

F = The Remaining Primary Oil Reserves from the Unitized Formation for
all Unit Tracts, after April 30, 1989

G = The amount of oil produced from the Unitized Formation by the Tract
from April 1, 1989 through April 30, 1989

H = The amount of oil produced from the Unitized Formation by all Unit
Tracts from April 1, 1989 through April 30, 1989

35%

30%

25%

10%

In the event less than all Tracts are qualified on the Effective Date hereof, the Tract Participation shall be calculated on the basis of all such qualified Tracts rather than all Tracts in the Unit Area.

SECTION 14. TRACTS QUALIFIED FOR PARTICIPATION. On and after the Effective Date hereof, the Tracts within the Unit Area which shall be entitled to participation in the production of Unitized Substances shall be those Tracts more particularly described in Exhibit "B-1" that corner or have a common boundary (Tracts separated only by a public road or a railroad right-of-way shall be considered to have a common boundary), and that otherwise qualify as follows:

(a) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest have become parties to this Agreement and as to which Royalty Owners owning seventy-five percent (75%) or more of the Royalty Interest have become parties to this Agreement.

(b) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest have become parties to this Agreement, and as to which Royalty Owners owning less than seventy-five percent (75%) of the Royalty Interest have become parties to this Agreement, and as to which (1) the Working Interest Owner who operates the Tract and Working Interest Owners owning at least seventy-five percent (75%) of the remaining Working Interest in such Tract have joined in a request for the inclusion of such Tract, and as to which (2) Working Interest Owners owning at least seventy-five percent (75%) of the combined Unit Participation in all Tracts that meet the requirements of Section 14(a) above have voted in favor of the inclusion of such Tract.

(c) Each Tract as to which Working Interest Owners owning less than one hundred percent (100%) of the Working Interest have become parties to this Agreement, regardless of the percentage of Royalty Interest therein that is committed hereto; and as to which (1) the Working Interest Owner who operates the Tract and Working Interest Owners owning at least seventy-five percent (75%) of the remaining Working Interest in such Tract who have become parties to this Agreement have joined in a request for inclusion of such Tract, and have executed and delivered, or obligated themselves to execute and deliver an

indemnity agreement indemnifying and agreeing to hold harmless the other owners of committed Working Interests, their successors and assigns, against all claims and demands that may be made by the owners of Working Interest in such Tract who are not parties to this Agreement, and which arise out of the inclusion of the Tract; and as to which (2) Working Interest Owners owning at least seventy-five percent (75%) of the Unit Participation in all Tracts that meet the requirements of Section 14(a) and 14(b) have voted in favor of the inclusion of such Tract and to accept the indemnity agreement. Upon the inclusion of such a Tract, the Tract Participations which would have been attributed to the nonsubscribing owners of Working Interest in such Tract, had they become parties to this Agreement and the Unit Operating Agreement, shall be attributed to the Working Interest Owners in such Tract who have become parties to such agreements, and joined in the indemnity agreement, in proportion to their respective Working Interests in the Tract.

If on the Effective Date of this Agreement there is any Tract or Tracts which have not been effectively committed to or made subject to this Agreement by qualifying as above provided, then such Tract or Tracts shall not be entitled to participate hereunder. Unit Operator shall, when submitting this Agreement for final approval by the A.O., file therewith schedules of those Tracts which have been committed and made subject to this Agreement and are entitled to participate in Unitized Substances. Said schedules shall set forth opposite each such committed Tract the lease number or assignment number, the owner of record of the lease, and the percentage participation of such Tract which shall be computed according to the participation formulas set forth in Section 13 (Tract Participation) above. These schedules shall be

revised Exhibit "B-1" and "B-2" and upon approval thereof by the A.O., shall become a part of this Agreement and shall govern the allocation of production of Unitized Substances until new schedules are approved by the A.O.

SECTION 15.A. ALLOCATION OF UNITIZED SUBSTANCES. All Unitized Substances produced and saved (less, save and except any part of such Unitized Substances used in conformity with good operating practices on unitized land for drilling, operating, camp and other production or development purposes and for injection or unavoidable loss in accordance with a Plan of Operation approved by the A.O.) shall be apportioned among and allocated to the qualified Tracts in accordance with the respective Tract Participations effective hereunder during the respective periods such Unitized Substances were produced, as set forth in the schedule of participation in Exhibit "B-2". The amount of Unitized Substances so allocated to each Tract, and only that amount (regardless of whether it be more or less than the amount of the actual production of Unitized Substances from the well or wells, if any, on such Tract) shall, for all intents, uses and purposes, be deemed to have been produced from such Tract.

The Unitized Substances allocated to each Tract shall be distributed among, or accounted for, to the parties entitled to share in the production from such Tract in the same manner, in the same proportions, and upon the same conditions, as they would have participated and shared in the production from such Tracts, or in the proceeds thereof, had this Agreement not been entered into; and with the same legal force and effect.

No Tract committed to this Agreement and qualified for participation as

above provided shall be subsequently excluded from participation hereunder on account of depletion of Unitized Substances.

If the Working Interest and/or the Royalty Interest in any Tract are divided with respect to separate parcels or portions of such Tract and owned now or hereafter in severalty by different persons, the Tract Participation shall in the absence of a recordable instrument executed by all owners in such Tract and furnished to Unit Operator fixing the divisions of ownership, be divided among such parcels or portions in proportion to the number of surface acres in each.

SECTION 15.B. TAKING UNITIZED SUBSTANCES IN KIND. The Unitized Substances allocated to each Tract shall be delivered in kind to the respective parties entitled thereto by virtue of the ownership of Oil and Gas Rights therein. Each such party shall have the right to construct, maintain and operate all necessary facilities for that purpose within the Unitized Area, provided the same are so constructed, maintained and operated as not to interfere with Unit Operations. Subject to Section 17 hereof, any extra expenditure incurred by Unit Operator by reason of the delivery in kind of any portion of the Unitized Substances shall be borne by the party taking delivery. In the event any Working Interest Owner shall fail to take or otherwise adequately dispose of its proportionate share of the production from the Unitized Formation, then so long as such condition continues, Unit Operator, for the account and at the expense of the Working Interest Owner of the Tract or Tracts concerned, and in order to avoid curtailing the operation of the Unit Area, may, but shall not be required to, sell or otherwise dispose of such production to itself or to

others, provided that all contracts of sale by Unit Operator of any other party's share of Unitized Substances shall be only for such reasonable periods of time as are consistent with the minimum needs of the industry under the circumstances, but in no event shall any such contract be for a period in excess of one year, and at not less than the prevailing market price in the area for like production, and the account of such Working Interest Owner shall be charged therewith as having received such production. The net proceeds, if any, of the Unitized Substances so disposed of by Unit Operator shall be paid to the Working Interest Owner of the Tract or Tracts concerned. Notwithstanding the foregoing, Unit Operator shall not make a sale into interstate commerce of any Working Interest Owner's share of gas production without first giving such Working Interest Owner sixty (60) days' notice of such intended sale.

Any Working Interest Owner receiving in kind or separately disposing of all or any part of the Unitized Substances allocated to any Tract, or receiving the proceeds therefrom if the same is sold or purchased by Unit Operator, shall be responsible for the payment of all Royalty, overriding Royalty and production payments due thereon, and each such party shall hold each other Working Interest Owner harmless against all claims, demands and causes of action by owners of such Royalty, overriding Royalty and production payments.

If, after the Effective Date of this Agreement, there is any Tract or Tracts that are subsequently committed hereto, as provided in Section 4 (Expansion) hereof, or any Tract or Tracts within the Unit Area not committed hereto as of the Effective Date hereof but which are subsequently committed hereto under the provisions of Section 14 (Tracts Qualified for Participation)

and Section 32 (Nonjoinder and Subsequent Joinder); or if any Tract is excluded from this Agreement as provided for in Section 21 (Loss of Title), the schedules as shown in Exhibits "B-1" and "B-2" shall be revised by the Unit Operator; and the revised Exhibits "B-1" and "B-2", upon approval by the A.O., shall govern the allocation of production on and after the effective date thereof until revised schedules are approved as hereinabove provided.

SECTION 16. OUTSIDE SUBSTANCES. If gas obtained from formations not subject to this Agreement is introduced into the Unitized Formation for use in repressuring, stimulating of production or increasing ultimate recovery which shall be in conformity with a Plan of Operation first approved by the A.O., a like amount of gas with appropriate deduction for loss or depletion from any cause may be withdrawn from unit wells completed in the Unitized Formation royalty free as to dry gas, but not royalty free as to the products extracted therefrom; provided that such withdrawal shall be at such time as may be provided in the approved Plan of Operation or as otherwise may be consented to or prescribed by the A.O. as conforming to good petroleum engineering practices and provided further that such right of withdrawal shall terminate on the termination date of this Agreement.

SECTION 17. ROYALTY SETTLEMENT. The United States of America and all Royalty Owners who, under an existing contract, are entitled to take in kind a share of the Unitized Substances produced from any Tract unitized hereunder, shall continue to be entitled to such right to take in kind their share of the Unitized Substances allocated to such Tract, and Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable

contracts, laws and regulations. Settlement for Royalty not taken in kind shall be made by Working Interest Owners responsible therefor under existing contracts, laws and regulations on or before the last day of each month for Unitized Substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any Royalty due under the leases, except that such Royalty shall be computed on Unitized Substances as allocated to each Tract in accordance with the terms of this Agreement. With respect to Federal leases committed hereto on which the royalty rate depends upon the daily average production per well, such average production shall be determined in accordance with the operating regulations pertaining to Federal leases as though the committed Tracts were included in a single consolidated lease.

If the amount of production or the proceeds thereof accruing to any Royalty Owner (except the United States of America) in a Tract depends upon the average production per well or the average pipeline runs per well from such Tract during any period of time, then such production shall be determined from and after the Effective Date hereof by dividing the quantity of Unitized Substances allocated hereunder to such Tract during such period of time by the number of wells located thereon capable of producing Unitized Substances as of the Effective Date hereof, provided that any Tract not having any well so capable of producing Unitized Substances on the Effective Date hereof shall be considered as having one such well for the purpose of this provision.

All Royalty due the United States of America and the other Royalty Owners

hereunder shall be computed and paid on the basis of all Unitized Substances allocated to the respective Tract or Tracts committed hereto, in lieu of actual production from such Tract or Tracts.

With the exception of Federal and State requirements to the contrary, Working Interest Owners may use or consume Unitized Substances for Unit Operations and no Royalty, overriding Royalty, production or other payments shall be payable on account of Unitized Substances used, lost, or consumed in Unit Operations.

Each Royalty Owner (other than the United States of America) that executes this Agreement represents and warrants that it is the owner of a Royalty Interest in a Tract or Tracts within the Unit Area as its interest appears in Exhibit "B-2" attached hereto. If any Royalty Interest in a Tract or Tracts should be lost by title failure or otherwise in whole or in part, during the term of this Agreement, then the Royalty Interest of the party representing himself to be the owner thereof shall be reduced proportionately and the interests of all parties shall be adjusted accordingly.

SECTION 18. RENTAL SETTLEMENT. Rentals or minimum Royalties due on the leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws and regulations provided that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental or minimum Royalty in lieu thereof, due under their leases. Rental or minimum Royalty for lands of the United States of America subject to this Agreement shall be paid at the