Sou. Calif Pet Corp.
Exhibit

CASE 1326

Application for this hearing was made to the New Mexico Oil Conservation Commission on September 26 by wire and copies of the formal application subsequently sent by certified mail to:

New Mexico Oil Conservation Commission, Santa Fe and Hobbs, New Mexico.
United States Geological Survey, Artesia, New Mexico.
Potash Company of America, Carlsbad, New Mexico.
Anderson-Prichard Oil Corporation, Midland, Texas.
W. H. Black, Operator, Midland, Texas.

The purpose of this application is for an order to establish special pool rules for the Teas Pool in the Potash-Oil Area in Lea County, New Mexico, to provide a casing program for wells to be drilled in said pool involving exceptions to the shallow-zone casing requirements of Commission Order R-111-A. Applicant has no intention of attempting to disprove the validity of Order R-111-A but proposes a casing program that will adequately protect potash deposits at considerably less expense to the oil operator than that required by Order R-111-A. Applicant's proposal is made as an optional casing program that an operator may follow in lieu of the shallow-zone casing requirements of Order R-111-A, which is similar to the casing program allowed in Case 1277 by Order R-1039 dated August 26, 1957, in the newly created Middle Lynch-Yates Pool.

We wish to submit a map of the Teas Pool and surrounding area as Exhibit A. This map shows the boundary of the Teas Pool outlined in red, the boundary of the Potash-Oil Area in green, the names of those holding oil and gas leases in the area under consideration, and the location of productive and non-productive wells drilled in the area. The date of completion or abandonment, the depths to which casing was set or cemented, and the total depth of each well are listed beside each well location. The Potash Company of America holds all the potash permits in this area and all the acreage is owned by the Federal Government.

Exhibit B is a structural contour map of the same area as Exhibit A contoured on top of the frosted quartz grain zone near the top of the Yates formation.

Exhibit C is a composite sample log showing a typical section of formations as found in this pool and range of casing-setting depths.

The Teas Pool is located in west Central Lea County, New Mexico, about 30 miles southwest of Hobbs, just south of the Hobbs-Carlsbad highway. It contains 15 wells producing oil and a negligible amount of gas from the Yates formation at a depth of 3300 feet. Oil is produced from a total section of about 250 feet from several sand intervals

and a porous dolomite interval within the Yates formation, each separated by impermeable strata. Completion is generally from about 35-85 feet of open hole. The occurrence of oil is apparently controlled by an anticlinal structural trap and varying lithology. The interval that is productive in one well is not necessarily productive in the adjacent well which makes it very risky for an operator to run the oil string without first having seen a show of oil.

The Paul C. Teas "Dinnin No. 1-I", drilled to a depth of 3420 feet in Section 24, T20S, R33E, in March 1951 is credited with discovery of the pool. However, this well produced only about 3 months and was plugged and abandoned. Offset wells were drilled south and west of this well and were both dry. The present productive area of the pool lies principally in Sections 13 and 14, T20S, R33E -- over a mile north and west from the discovery well, and this is the area now under consideration since the southern portion within the pool boundary has been proven non-productive. The first well completed in the productive area was the Spartan "Federal-Turner No. 1-13-E", drilled to a depth of 3338 feet in June 1951. It was plagued by mechanical difficulties and was finally plugged and abandoned in May 1956.

The pool was developed principally during the period 1952 through February 1955, prior to the issuance of Commission Order R-111-A, at which time 20 wells had been drilled in and around the present productive area. Fourteen were pumping producers and 6 were non-productive. Since then, 3 more wells have been drilled, bringing the total wells drilled to 23, of which 15 produce oil by pumping, 1 producer is abandoned and 7 were non-productive. Oil production is averaging about 225 barrels per day for all 15 wells, or an average barrels per day per well of 15. Daily production per well ranges from 3 to 37, only 2 wells being capable of producing more than the present top allowable of 37 barrels per day. Most of the wells produce a small amount of water with the oil and gas production is generally too small to measure. There is no gas sales outlet from the pool. Gas production has always been only little more than sufficient for lease use to run pumping unit engines and heater-treaters. Available gas for fuel has often been insufficient and earlier this year operators found it necessary to go to the additional expense of installing electric power for pumping unit operation. Seven wells are operated by W. H. Black; 7 by Southern California Petroleum

Corporation; and 1 by Anderson-Prichard Oil Corporation.

Present cost for a completed well is about $37,000; $42,000, with tank battery, road and location. Pay out on well cost alone based on present allowable is about 1½ years; since only 4 or 5 wells have produced top allowable this long, pay out period is generally much longer.

Commission Order R-111-A became effective October 13, 1955 and sets forth certain strict casing requirements for these shallow-zone wells which applicant considers an economic hardship on operators in this shallow pool. The productive area of the Teas Pool lies wholly within the horizontal and vertical limits of the shallow-zone Potash-Oil Area, as set forth by Order R-111-A.

Twenty-two of the 23 wells in this area have been drilled with cable tools due to the low pressures in the zones penetrated. Drilling with rotary tools causes a high hydrostatic pressure to be exerted on the pay zone by the column of circulating mud and often causes low-pressure zones to be damaged to the extent that they cannot be made to produce. This may have been the reason for the non-productivity of the only well drilled in this pool by rotary tools - Western Drilling Co. "Anderson-Prichard No. 1-P" in Section 10, T20S, R33E. Apparently good pay sand was cored in this well, as operator ran oil string to bottom, cemented to the surface, perforated, fractured and attempted to produce it. Production was non-commercial and it was plugged and abandoned, although it is offset to the south and east by producing wells.

The cable tool drilling and casing program generally followed during the principal development of this pool has been as follows:

1. Set 13-3/8" casing at 60-110 feet in the top of the "Red Beds" to shut off possible fresh water in surface sands and gravels; since no water is present at this depth, this casing serves to prevent caving.
2. Set 10-3/4" casing at 550-670 feet in the "Red Beds" to prevent caving.
3. Set 8-5/8" casing at 900-1000 feet into the Dewey Lake formation immediately below the Santa Rosa water sands to shut off water. Water is found from about 625-900 feet in small quantity.

   Each of these strings of casings have been set in the hole with 5-10 sacks of heavy mud around the shoe to obtain a temporary shut-off, the hole bailed dry and allowed

to stand at least one hour, then the hole is checked with the bailer for entry of water or cavings to ascertain that a shut-off has been effected before drilling is resumed.

4. Drill ahead through the Salado, or salt section, the Tansill dolomite, and into the Yates until an oil show is encountered. At this point, the size of the hole was reduced from 8" to 5" and the pay section drilled. Most wells reduced hole, although several did not, and the pay section was drilled with 8" hole. The amount of oil entering the hole while drilling the pay section would then determine whether or not an oil string would be run. Estimates of natural production were based on how much oil per hour could be bailed from the hole. Most productive wells had only from about 100 to 600 feet of oil enter the hole at this stage, with two having as much as 1500 feet. Non-productive wells have had similar amounts of salt water enter the hole or have been almost completely dry.

5. If the operator chose to run an oil string, then 5½" or 7" casing was run to the shoulder where hole was reduced at or near the top of the pay section (or hung at this point if hole was not reduced), and the casing either tacked with a small volume of cement for further testing or treating, or if the operator was confident of obtaining commercial production, cemented for final completion. Also, before the oil string was run, a plug of cal-seal or hydromite was usually set in the hole above the pay section to protect the pay from the hydrostatic pressure of the heavy column of cement. Most oil strings were cemented with 300-500 sacks with 4-10% gel in an attempt to circulate the cement to the surface. Four of the wells were cemented with 100-200 sacks at the shoe of the oil string and then with 150-300 sacks through a stage collar in the string at a depth opposite the anhydrite just above the salt section. If cement did not circulate to the surface small pipe would be run as far as possible in the hole outside the oil string and the hole filled to the surface with cement.

If the oil string had been tacked with a small volume of cement for testing purposes, the casing would then be perforated just above the top of the cement as determined by a temperature survey and the oil string recemented to the surface.

Casing centralizers were used on the oil string in wells drilled by applicant and placed in the anhydrite above the salt and in the Tansill dolomite section below the salt.

In all except one of the productive wells in which an oil string was cemented, the upper strings of casing that were set or mudded in for protection were pulled prior to cementing the oil string.

All wells have been completed on the pump due to the low presure of the oil zones, all except one are completed from open hole, all except two have required stimulation treatment on initial completion -- the exceptions being wells producing from the porous dolomite in the NW¼ of Section 14, no blow-outs or water flows have occurred; in fact, the only fluids encountered in this pool are the Santa Rosa salt water, oil and/or salt water in the Yates.

The differences in lithology between pay zones in the same well require different types of stimulation treatment -- acid for the dolomite and sand-fracing for the sands. If more than one sand interval in the same well is productive, it has been demonstrated that one sand will treat at a different pressure than another, thereby causing waste by ineffective treatment of all pay intervals in an open hole completion as well as possibly allowing one interval to thief oil from another. Applicant is now faced with the problem of how to economically and effectively work over the wells completed in open hole in an attempt to increase oil recovery. Applicant, therefore, holds that pool rules that will allow oil strings to be set in a practical manner through pay zones for selective perforating and treating will allow more efficient and complete recovery of oil.

Section IV (2) a of Order R-111-A requires surface casing to be set and cemented solid in the basal Rustler formation immediately above the salt section which occurs at a depth of 1400-1700 feet in this pool. Applicant requests an exception to this requirement by maintaining that mudding in of 3 strings of casing down to approximately 1000 feet as

was allowed by Order R-1021 dated July 17, 1957, in Case 1274 and pertaining to the drilling of Applicant's "Federal-Bobb C No. 1-G", will give the necessary protection to the potash from shallow water. $6,000-7,000 would be saved by the operator by exception to this requirement.

Section IV (3) a and b (1) of Order R-111-A requires a salt protection string to be set between 100 and 600 feet below the base of the salt section but in any event, above the highest known oil or gas zone and cemented with a nominal volume of cement for testing or circulated to the surface. Since the oil zone, if present, generally occurs in this pool about 200 feet below the base of the salt, this requirement practically forces an open-hole completion and makes the salt-protection string and the oil string one and the same. Due to the low reservoir pressure and low fluid levels encountered throughout this pool during its development and the fact that the hole is open at the surface while the pay section is drilled, Applicant holds that an exception to this requirement would not damage the potash reserves. Applicant's interpretation of this requirement is that it protects the salt section principally from being saturated with gas under pressure. Cementing of the oil strings to the surface according to Section IV (5) a then would give the necessary protection and satisfy the requirements pertaining to the setting and cementing of the salt protection string and, further, would allow an operator to set pipe through pay zones if desired, without undue additional expense.

Applicant, therefore, proposes that the Commission write Special Pool Rules pertaining to the drilling of wells in the Teas Pool in Sections 13 and 14, T20S, R33E, within the Potash-Oil Area, as defined by Order R-111-A, to provide an optional casing program that an operator may follow in lieu of the shallow-zone casing program set forth by Order R-111-A, as follows:

ROTARY TOOLS CASING PROGRAM

Surface casing to the top of the "Red Beds" and cemented to the surface.

Production casing to be set below the base of the Tansill dolomite if a show of oil in the Yates is to be evaluated; this casing to be tacked with cement or cemented to the surface. If it is determined that commercial production has been obtained, said production string shall be cemented to the surface.

CABLE TOOLS CASING PROGRAM

Surface casing to be set into the top of the "Red Beds" and mudded in or cemented to the surface.

Cave casing string to be set in the "Red Beds" Chinle section if necessary and mudded in.

Water shut-off casing to be set through the Santa Rosa formation and into the Dewey Lake formation and mudded in.

Production casing to be set below the base of the Tansill dolomite if a show of oil in the Yates is to be evaluated; this casing to be tacked with cement or cemented to the surface. If it is determined that commercial production has been obtained, all upper strings of casing mudded in may be pulled and said production casing shall be cemented to the surface.

All requirements of Order R-111-A such as, well location, cement waiting time, casing tests, water shut-off tests, location of of top of cement that fails to circulate, use of saturated brine to mix cement, and to drill the salt section, plugging and abandonment of wells, inspection of operations by the potash operator, etc. not specifically excepted shall be strictly followed for subsequent wells drilled in this pool.

An oil operator may be required to notify the potash operator holding rights on his lease in sufficient time that he may have a representative present for witnessing drilling operations, cementing of casing or plugging of wells drilled within this pool.

Applicant holds that the proposed drilling and casing programs will permit more economic recovery of oil and potash minerals in the Teas Pool within the Potash-Oil Area and prevent waste, protect correlative rights and assure a maximum conservation of the oil and potash resources in the Teas Pool area.

SOUTHERN CALIFORNIA PETROLEUM CORP.

By _____
Division Engineer

October 17, 1957