APPLICATION FOR WATER FLOOD

NORTH MALJAMAR - ROBINSON POOLS
LEA COUNTY, NEW MEXICO

TO THE

NEW MEXICO OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

BY

WATER FLOOD ASSOCIATES, INC.
301 BOOKER BLDG.
ARTESIA, NEW MEXICO

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 2441

WATER FLOOD ASSOCIATES, INC.
APPLICATION FOR WATER - FLOOD
NORTH MALJAMAR AND ROBINSON POOLS

LOCATION

THE APPLICATION IS MADE FOR THE WATER-FLOOD ASSOCIATES, INC. LEASES IN THE NORTH MALJAMAR AND ROBINSON POOLS, LEA COUNTY, NEW MEXICO. THE LOCATION BY LEASES IS SHOWN ON AREA MAP, APPENDIX X, AS FOLLOWS:

MITCHELL 1 & 2 LEASE SW/4 SW/4 SECTION 5; SE/4 SE/4 SECTION 6; AND NE/4 NE/4 SECTION 7, T17S, R32E.

MITCHELL 3 & 4 LEASE NW/4 SW/4 SECTION 5 AND NE/4 SE/4 SECTION 6, T17S, R32E.

MITCHELL 5 & 6 LEASE W/2 NW/4 SECTION 5, T17S, R32E.

THE PROJECT AREA INCLUDES 280 ACRES ON WHICH THERE ARE FIVE PRODUCING OIL WELLS, TWO PLUGGED AND ABANDONED WELLS, AND ONE DRY HOLE.

GEOLOGY

OIL PRODUCTION IS FROM ZONES 5 AND 6 OF THE GRAYBURG FORMATION AND ZONES 7 AND 8 OF THE SAN ANDRES FORMATION, GUADALUPE SERIES OF THE PERMIAN SYSTEM. THE RESERVOIR IS AN ELONGATED STRATIGRAPHIC TRAP CONTROLLED BY PERMEABILITY PINCH-OUTS AND DEFINED BY DRY HOLES AND PLUGGED WELLS. LIMITS OF PRODUCTION ARE SHOWN AS APPENDIX VI. ZONES OF COMPLETION ON EACH INDIVIDUAL WELL ARE SHOWN AS APPENDIX XI.

WELL COMPLETION DATA

DETAILS OF WELL COMPLETION ARE SHOWN AS APPENDIX III. THE WELLS WERE DRILLED BY CABLE TOOLS. SURFACE CASING WAS SET INTO THE SALT SECTION (OCHOA SERIES) AND CEMENTED WITH 50 SACKS. THE LONG STRING WAS SET ABOVE THE PAY SECTIONS AND CEMENTED WITH 100 SACKS OF CEMENT. GENERAL PRACTICE WAS TO DRILL THE PAY ZONES AND STIMULATE PRODUCTION BY MEANS OF A NITRO-GLYCERIN SHOT. DETAILS OF WELL STIMULATIONS ARE SHOWN IN APPENDIX IV.

ANY SHALLOW WATER WHICH MIGHT BE PRESENT IN THE AREA ARE PROTECTED BY TWO STRINGS OF CASING AND TWO CEMENT JOBS. CALCULATED TOPS OF CEMENT ARE SHOWN AS APPENDIX V.

PRIMARY PRODUCTION HISTORY

MITCHELL NO. 1 WAS DRILLED IN MARCH, 1927, AND WAS THE DISCOVERY WELL. THE WELL POTENTIALED FOR ONE HUNDRED BARRELS OF OIL PER DAY. THIS WELL HAS PRODUCED 160,000 BARRELS OF OIL. RECOVERY BY WELL IS SHOWN IN APPENDIX IV. ADDITIONAL DEVELOPMENT DID NOT OCCUR UNTIL 1940 WHEN WELL NO. 2 WAS DRILLED. ADDITIONAL WELLS WERE DRILLED THROUGH 1953. COMPLETION DATES ARE SHOWN IN APPENDIX III. THERE ARE PRESENTLY FIVE PRODUCING WELLS WHICH HAVE PRODUCED 311596 BARRELS OF OIL.

PRESENT PRODUCTION IS LESS THAN 2 BARRELS PER WELL PER DAY. THE WELLS PRODUCE NO SIGNIFICANT AMOUNTS OF WATER. THE PRODUCING GAS-OIL RATIO IS LESS THAN 50 CUBIC FEET PER BARREL. THE WELLS ARE IN A DEPLETED STATE AND NEAR THEIR PRIMARY ECONOMIC LIMIT.

GRAPHIC PRODUCTION DATA IS SHOWN AS APPENDIX I.

WATER FLOOD PATTERN

APPLICATION IS MADE TO CONVERT WELL NO. 2, P SECTION 6, AND WELL NO. 5, E SECTION 5 TO WATER INJECTION. THIS WILL PROVIDE AN EFFICIENT SWEEP OF THE RESERVOIR CONSIDERING THE PERMEABILITY BARRIERS AS SHOWN IN APPENDIX VI. THE CONVERSION OF THESE WELLS WILL PREVENT WASTE OF A NATURAL RESOURCE BY THE RECOVERY OF OIL BY SECONDARY METHODS WHICH COULD NEVER BE RECOVERED BY PRIMARY PRODUCING METHODS. ADDITIONAL WELLS MAY BE REQUESTED AS INPUT WELLS IN FUTURE. APPLICATION IS MADE FOR APPROVAL FOR ADMINISTRATIVE PROCEDURE FOR EXPANDING THE PROGRAM UNDER RULE 701.

RESERVOIR DATA

VERY LITTLE RESERVOIR DATA IS AVAILABLE. NO ELECTRICAL OR RADIOACTIVE TYPE LOGS HAVE BEEN RUN. CABLE TOOL SAMPLE ANALYSES HAVE SHOWN THE PRODUCTIVE ZONES TO BE ZONES 5, 6, 7 AND 8 OF THE GRAYBURG-SAN ANDRES FORMATIONS. NO DATA IS AVAILABLE TO DETERMINE NET PAY THICKNESS, POROSITY OR PERMEABILITIES. THE PRODUCED OIL IS ABOUT 35° API GRAVITY. NONE OF THE WELLS PRODUCE SIGNIFICANT QUANTITIES OF WATER AND THERE ARE NO HIGH GAS-OIL RATIOS; THEREFORE IT MUST BE CONCLUDED THAT THE RESERVOIR IS THE TYPICAL VOLUMETRIC TYPE AND THAT THE PRODUCING MECHANISM WAS THE EXPANSION OF SOLUTION GAS. NO SECONDARY GAS CAP IS IN EVIDENCE.

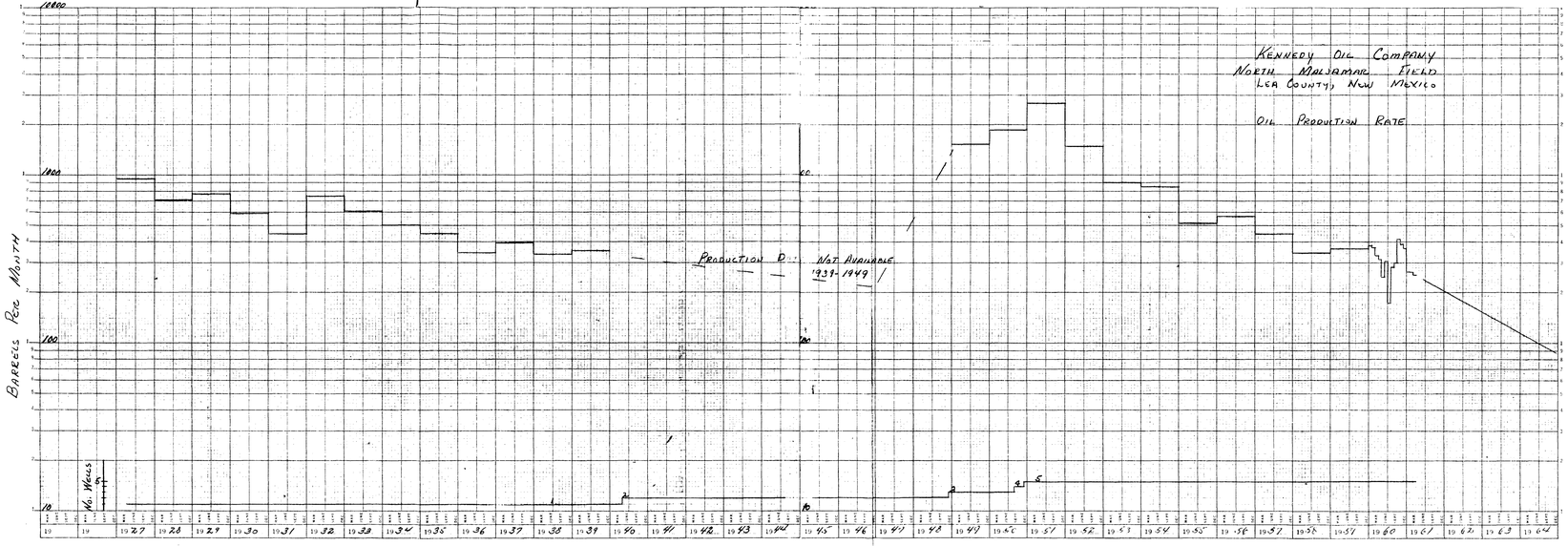
COMPARING THE RESERVOIR TO SIMILAR ONES IN THE SAME FORMATIONS IN THE AREA, IT IS REASONABLE TO ESTIMATE THAT LESS THAN 17% OF THE OIL ORIGINALLY IN PLACE HAS BEEN RECOVERED BY PRIMARY MEANS.

WATER-FLOOD PERFORMANCE

ANTICIPATED WATER INJECTION RATES ARE 500 BARRELS PER WELL PER DAY AT A WELL HEAD PRESSURE OF 2000 PSI. IT IS ESTIMATED THAT 3,000,000 BARRELS OF WATER WILL BE INJECTED DURING THE LIFE OF THE PROJECT. THE PROJECT LIFE IS ESTIMATED TO BE 10 YEARS. IT IS ESTIMATED THAT THE WATER FLOOD OIL RECOVERABLE IS 480,000 BARRELS, OR 1.5 TIMES THE PRIMARY RECOVERY.

WATER SOURCE

WATER IS AVAILABLE FOR WATER-FLOODING FROM TWO COMMERCIAL PIPELINE COMPANIES. BOTH THESE PIPELINES ARE NEAR THE PROPERTY. BOTH COMPANIES HAVE AGREED TO SELL WATER FOR THE PROJECT. COPIES OF THESE LETTERS ARE SHOWN AS APPENDIX V-A AND VI.-A


KENNEDY OIL COMPANY
NORTH MALJAMAR FIELD
LEA COUNTY, NEW MEXICO
OIL PRODUCTION RATE
BARRELS PER MONTH
10000
1000
100
10
PRODUCTION DATA NOT AVAILABLE 1939-1949
NO. WELLS
1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964