STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

April 28, 1980

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STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

El Paso Exploration Company
P. O. Box 289
Farmington, New Mexico 87401

Attention: Mr. D. R. Read

Administrative Order NSL-1186

Gentlemen:

Reference is made to your application for approval of a non-standard location for your San Juan 28-7 Unit Well No. 256E to be located 1960 feet from the South line and 1390 feet from the East line of Section 17, Township 28 North, Range 7 West, NMPM, Basin-Dakota Gas Pool, Rio Arriba County, New Mexico.

By authority granted me under the provisions of Rule 3 of Order No. R-1670, the above-described unorthodox location is hereby approved.

Sincerely,

JOE D. RAMEY
Director

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DIST. 3

JDR/RLS/dr

cc: Oil Conservation Division - Aztec
Oil & Gas Engineering Committee - Hobbs
U. S. Geological Survey - Farmington

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FARMINGTON, N. M.

drill string. Also, the high velocity forces the cuttings to collide with each other, the tool joints, and the wall of the hole. These actions reduce the drill cutting sizes to the small dust-like particles seen at the surface.

Routine drill-off tests can be run to obtain the optimum penetration rate. It is suggested, because of the faster penetration rates with air, that a drill-off test be conducted over at least 60 ft. That is, apply the same weight on the bit and rotary speed over 60 ft and average the penetration rate. Then change either weight on bit or rpm and repeat the process. This procedure averages out thin formation changes and will provide the optimum penetration rate.

Bit selection. Bit performance is an important factor in any drilling operation. In air drilling, select the bit with the best gauge protection. This will, in some cases, require counting and comparing the outer row of inserts or teeth. The bit with the most outer-row inserts, or teeth, will give the best performance by holding its gauge longer.

One of the detriments in air drilling is bits going out of gauge. This problem is most prevalent when hard, abrasive quartzite sands are drilled.

Reaming behind an out-of-gauge bit causes premature bearing failure of the bit being used to ream. This is caused by a pinched bit when the bit reaches bottom after reaming. Premature bearing failure shortens bit life and requires the use of more bits per well.

Hard-formation insert-type bits are used in most air-drilling operations. Today's market offers bits made for air drilling. Some of these bits, however, are manufactured for mining operations. These mining bits have OD overages which range from zero to ¼-in. (i.e., a 7⅞ in. bit could be no smaller than 7⅞ in. but could be as large as 8⅛ in.)

Also, some bits are manufactured for oil-field air drilling. These bits have OD specifications which are the same as bits normally used to drill with mud.

When an air bit is used, experience has shown that bit life and penetration rate can be improved by blanking one jet nozzle. When a blank is used in a jet nozzle, the blank should go between the cones with the most gauge inserts (Fig. 2). The reason for this is that the cones on each side of the blank will bear most of the cutting load while drilling. Therefore, these cones should have the most inserts and best gauge protection. Under normal conditions, the other two open jets should be left open or jetted with 20/32-in. or 24/32-in. jets.

The blank jet in an air bit improves bit life because the blank restricts air flow through the jet nozzles. This increases the back pressure at the bit and forces more air through the air tubes and across the bearings. This keeps the bearings cooler and cleaner and will extend bit life. The pressure increase, due to blanking one bit jet, is about 10-15 psig.

The second advantage to a blank jet is better hole cleaning, noted in most cases by faster penetration. The blank jet forces the air to flow across the bit face, thereby removing cuttings from the center of the bit and preventing any regrinding of cuttings which would be trapped under the bit.

Symmetrical jetting can, under certain conditions, build up cuttings in the bit center. Effects vary with various formations and possible advantages have to be weighed against negatives, such as reduced bit-bearing cooling.

Equipment required. Conversion of a conventional rotary rig to an air-drilling operation is a simple matter. Most of the liquid and solids-handling equipment, normally used for mud drilling, can be removed. For air drilling, the liquid-handling equipment should consist of one mud pump, a centrifugal transfer pump, and about 1,500 bbl of water storage (steel mud pits can be used).

A valve manifold is welded to the standpipe on the rig floor (Fig. 3). The hardware, valves, and lines in this manifold should be sized and pressure rated to provide minimum friction losses and maximum operatings pressures.

A rotating drilling head (rotating blowout preventer) is essential (Fig. 4). The rotating head maintains a constant seal around all rotating elements in the drill string except large-diameter pieces such as large drill collars, reamers, and drill bit. The rubber seal unit will seal around any shape (kelly or drill pipe).

The packing element rotates with the drill string and provides a pack-off across the annulus and around the drill string. This allows the drill cuttings or dust to be directed out the flanged outlet and away from the rig via the blooie line.

Proper alignment of the rotating head is essential to save time on connections and prevent undue wear on the rubber element and bearing structure. A method for proper alignment of the rotating head is to set a drill collar on the slips in the rotary table and center the drill collar in the rotating head.

Fig. 7

Jet arrangement

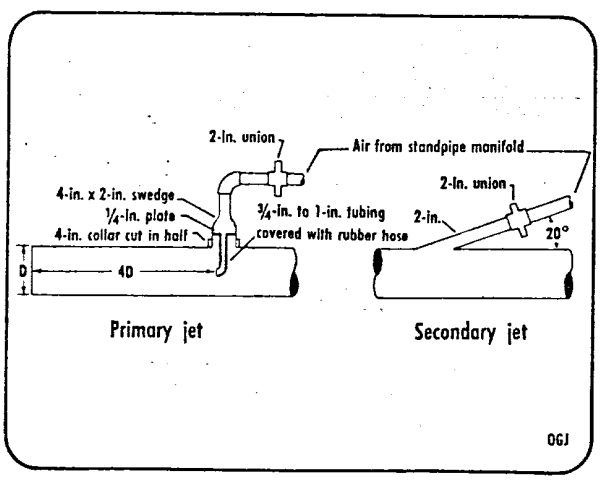

Fig. 8

De-duster