STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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Mr. John West
John West Engineering Company
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Dear John:

Enclosed is the information that you sent me concerning Case No. 9883 which the Commission heard on June 21, 1990. This case has been taken under advisement and the record has been closed. We are, therefore, unable to accept new evidence or evidence which has been disallowed by the June 21, 1990 ruling from the bench.

Sincerely,

WILLIAM J. LEMAY
Director

WJL/fd

enc.

cc: William F. Carr
Karen Aubrey

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To: Bill LeMay
Bill Humphries

From: Bill Weiss

Date: June 29, 1990

Subject: Case #9883 East Loving Delaware, BTA vs. Bird Creek, Heard June 21, 1990

Gentlemen:

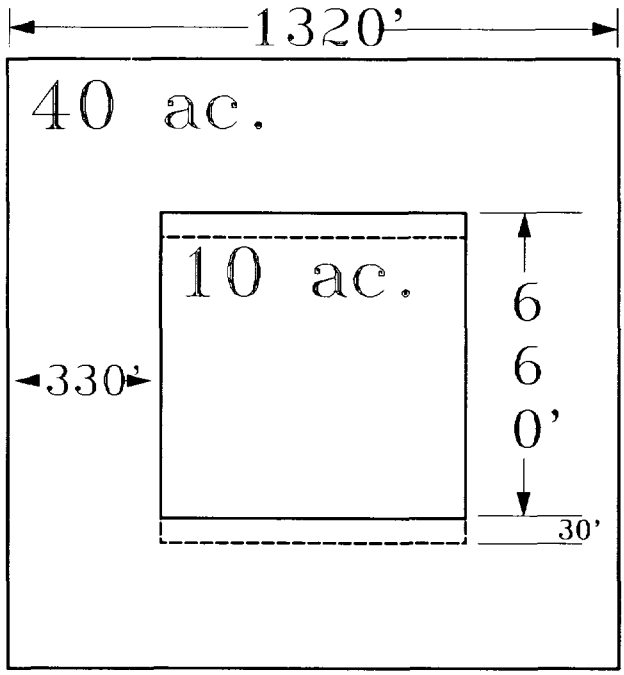
This memo presents my rather random thoughts concerning the subject. A penalty should be levied on BTA for drilling the Pardue "C"1 176 ft from the lease line rather then the 330 ft allowed. Arguments were presented based on a no-flow barrier and 20-ac drainage. Both arguments were based primarily on rhetoric with little definitive data provided.

The only meaningful engineering data provided was Bird Creek's Exhibit No. 9, which was a reservoir fluid study. The laboratory measurements included in Exhibit No. 9 confirm Bird Creek's contention, based on decline curve analyses, that these Delaware wells with 50 ft of net pay on 40-ac spacing will produce 200,000 BO as reservoir pressure decreases from 2858 psi to 150 psi. Thus, the recovery factor on 20 ac spacing would be 29% rather than the 22% presented by BTA. A 29% recovery factor for a solution-gas-drive reservoir is not feasible. A typical recovery factor might be 12%.

The use of a no-flow barrier to establish drainage area for adjacent wells is a good idea if it is substantiated with precise measurements of permeability thickness, average reservoir pressure, and production rate. Given the proper information, a simple analytical calculation can be made for a two-well field. If there are more than two wells producing in the field, computer simulation is required. Thus, Bird Creek's reserve calculations based on drainage area are weak because they

had no precise measurements to support the no-flow boundary concept.

There is no doubt that BTA's "C"1 well is draining oil from Bird Creek's lease; however, the exact amount and the rate are not known. Similarly, Bird Creek's Teledyne #1 well probably drained oil from BTA's Pardue lease prior to production from the "C"1 well. Since the exact volumes and rates of oil moving across the lease line can not be determined, a penalty based on the distance of the well from the lease line, but less than the allowed 330-ft set back, seems appropriate. Rather than using the radius-of-a-circle approach, perhaps we should contemplate the size of the producing unit itself as the basis for determining the penalty. Consider the 40-ac unit depicted below:



Currently the OCD permits a well anywhere within 330 ft of a 40-ac unit boundary, thus the square in the center of the unit has 330 ft per side (10 ac). If the 10-ac square is displaced 30 ft to the south, the encroached area is 30 ft X 330 ft or 0.227 ac, which is 2.27% of the 10-ac square. If the entire 40 ac is considered, a similar calculation is 30 ft X 1320 ft or .909 ac, which is 2.27% of the 40-ac unit. It is evident that 2.27% of the reserves in a 40-ac offset unit to the south of the subject unit have been encroached upon.

If a well lies 176 ft from the south line, the displacement is (330 ft -176 ft) X 330 ft or

1.17 ac. which is 11.7% of a similar unit. It is interesting to note that the ratio of the displacement distance, 154 ft in the second case or 30 ft in the first example, to the side 1320 ft of the 40-ac unit is 11.7% or 2.27%, respectively.

The BTA well encroaches 154 ft on the Bird Creek lease to the south, and since evidence substantiates that the Bird Creek well will produce 200,000 BO, the penalty should be 23,400 BO (11.7% X 200,000 BO) during the BTA well's productive life. The fact that oil produced in the future has less value than oil produced today complicates the penalty assessment.

If the penalty is assessed up-front, ignoring the time value of the rate at which the oil is produced, the well could be shut-in for 165 days (23,400 BO/142 BOPD) or 5.5 months. The S. Culebra Bluff 23 production history presented in Bird Creek Exhibit No. 9 suggests that the well produced at allowable for a period of three months out of its projected 20-year life. A three-month shut-in penalty period imposed on the Pardue "C"1 would be a 12,950 BO penalty, which might be appropriate considering the time value of the oil. Indian Draw, a nearby 10-well Delaware Pool, has produced near the allowable rate for 4 months out of its 16-year history, supporting the S. Culebra Bluff 23 production history observation.

A penalty consisting of shut-in of the well for a specified period has advantages from an administrative viewpoint. Another technique of accessing the 23,400 BO penalty would be to reduce the well's production rate by 11.7% during its productive life. The OCD could be saddled with an administrative problem associated with enforcement of this penalty technique. However, putting the burden of enforcement on the offset operator (Bird Creek) should solve this problem.

I think either penalty technique is appropriate.

Bill Weiss