Scott

STATEMENT OF POSITION OF BROOKHAVEN OIL COMPANY
GALLEGOS CANYON UNIT SPACING, NEW MEXICO OIL
CONSERVATION COMMISSION HEARING SEPTEMBER 17, 1953.

CASE NO. 377
ORDER NO. R-172

The West Kutz Canyon Pool is a common source of gas supply in the Pictured Cliffs formation and covers an area of approximately 42,000 acres, of which approximately the north half is operated in the Gallegos Canyon Unit by Benson-Montin, and the south half in smaller tracts by a number of individual operators. There are no known underground barriers which would question the common source of supply throughout the entire pool or which would stop drainage from one end of the pool to the other. We understand that the pipe line of El Paso Natural Gas Company is the outlet for the gas produced from the northern half wells (Gallegos Canyon Unit) and the pipe line of the Southern Union Gas Company is the outlet for the gas produced from the southern half wells.

The conservation laws of this and other States recognize uniform spacing as the primary requisite for conservation and the protection of correlative rights. Uniform spacing promotes conservation because it results in the best drainage. Uniform spacing protects correlative rights of the individual owners because it gives each owner mutual and similar conditions for production. Additionally, State Conservation Commissions (including New Mexico), where there is an excess of supply over demand, add to the uniform spacing orders, an engineering formula so as to compensate for the varying capacities of the wells. Despite the necessity and requirement of uniform spacing, there are a few isolated cases where exceptions are made so that a lease owner may drill and produce on an odd size piece of land. Ordinarily a well is permitted to be drilled on an odd size piece of land but its capacity to produce is prorated in accordance with the size of that particular piece of land to the uniform pattern and the capacity to produce.

EXHIBIT I - (Continued)

(b) There are approximately four and a half times as many wells in the South Half of the West Kutz Canyon Pool as there are in the North Half (Gallegos Canyon Unit) June 30, 1953.

(c) The number of acres per producing well is approximately 200 acres per well in the South Half of the Pool and 1100 acres in the North Half of the Pool (Gallegos Canyon Unit) June 30, 1953.

EXHIBIT II - CHART SHOWING THE DECLINE IN PRESSURE OF INDIVIDUAL WELLS FROM INITIAL BOTTOM HOLE PRESSURE TO SHUT-IN PRESSURE SEPTEMBER 1953.

This is a chart showing decline in pressures during period of production from beginning to September 1953. It will be noted that the average rate of decline in pressures (due to the greater length of time of production) is generally less for the wells outside the Unit than for the wells inside the Unit.

EXHIBIT III - TABULATION SHOWING THE DECLINE IN PRESSURE PER MILLION CUBIC FEET OF PRODUCTION FROM INITIAL BOTTOM HOLE PRESSURE TO SHUT-IN PRESSURE SEPTEMBER 1953

This shows that generally speaking, the decline in pressures per million feet of gas produced is greater for the Unit than for the south half of the Pool. This means that gas is escaping to the south half of the Pool or that the wells are being produced so hard that it is waste. I am inclined to believe that both escape of gas to the south end of the Pool and also waste is taking place.

EXHIBIT IV - TWO MAPS SHOWING

(a) Contours on the top of the Pictured Cliffs subsurface sea-level basis.

(b) Contours of initial potentials. Please note the lack of Unit protection on the south border where the potentials are the highest.

(c) Contours present day shut-in pressures, showing high pressure areas to be within the Unit and the extreme southeast end of the Pool.

You will see from these exhibits that the individual operations in the south half of the pool could not fail to drain gas from the north end and I believe the operators of the Unit, having drilled a line of wells on 160 acre spacing within the Unit on the south border, evidence this contention. We also note that adjoining the Unit on the south border, the operators on their own properties have drilled their wells on 160 acre spacing. In other words, 160 acre spacing is needed in the north half

of the Kutz Canyon Pictured Cliffs Pool to equalize the drainage from the south end. It is true that in the most recent wells so far the productivity per well in the Unit drilled on 320 acre spacing and in virgin territory is somewhat higher than the productivity of the older wells outside the Unit drilled on 160 acre spacing. Nevertheless, this productivity per well will equalize if all wells in the pool are produced to capacity.

As we understand it, the interference tests that have been made by Benson-Montin consist of blowing down a well and shutting it in over a period of time while the surrounding or nearby wells are producing. We fail to see what, if anything, this proves.

As to the engineering features of common sources of gas supply, we mention the following:

1. A common source of gas supply at the beginning of production has a certain volume of gas content and a certain bottom hole pressure. The decline of each, as gas is produced, is directly proportional to the other. In other words, if a certain pool starts with reserves of 1,000,000 MCF and a bottom hole pressure of 1000# per square inch, and 500,000 MCF, or one-half of the gas, is produced, the bottom hole pressure will also decline one-half to 500# per square inch. Therefore, if one portion of a pool has produced and/or is producing greater volumes of gas than another portion, the bottom hole pressure of the area of greater production declines more than the area of lesser production. Therefore, the bottom hole pressures in the south half of the West Kutz Pool are generally lower and have generally declined

more than those in the north half (Gallegos Canyon Unit), thus drainage of gas is taking place from the north half to the south half. The pressures in the common source of gas supply must inevitably equalize. What the differential in pressures is may be determined at any time by the Commission or the Operators. The evidence of equalization of pressure is exemplifield in the East Kutz Canyon Pool and any other common source pool that might be chosen as an example. Until such time as there is equalization of pressure throughout the pool, there will be drainage from the higher pressure area to the lower pressure area.

The West Kutz Canyon Pool, and as a matter of fact all other Pictured Cliffs pools as far as we know in the San Juan Basin - New Mexico, have subnormal pressures. The Pictured Cliffs formation in the West Kutz Canyon Pool has low permeability, good porosity (approximately 20%) and excellent thickness from approximately 20 to 100 feet. As mentioned above, there is no known barrier to drainage within the common source of supply. It is a fact that gas as compared with oil, flows more easily through a formation, thus it drains more easily than oil from the high pressure area to the low pressure area.

As to the economics of the situation, the recovery or commercial reserves of gas from the West Kutz Canyon Pool is estimated by competent engineers and geologists from 4,000 to 7,000 MCF per acre. In the following example we have used the conservative figure of 5,000 MCF per acre net (7/8ths) to the operator:

Recovery 5,000 MCF per Acre x 320 Acres	1,600,000 MCF
Gas sold @ 10¢ per MCF	$ 160,000
Cost First Well (320 acre spacing)	19,000
	$ 141,000
Cost to produce @ 1/4¢ per MCF	4,000
Net Dollar Recovery After All Charges	$ 137,000
Cost of Second Well (160 acre spacing)	20,000
NET	$ 117,000

From the computation you will see that if an additional well is drilled on a 320 acre lease to make 160 acre spacing, the net income after all charges will be $117,000. The total charges to drill and produce the second location will be approximately $20,000. Therefore, to pay for this $20,000, additional recovery of the net 7/8ths gas to an amount of 200,000 MCF is necessary. In other words, an additional recovery of 12½% would pay for the second well. Certainly, two wells, if drilled on 160 acre spacing, will recover at least 12½% additional gas to one well drilled on 320 acre spacing. From our experience, it is our belief that the increase in recovery from two wells being drilled may be as high as 20 to 40%.

In other words, there is no doubt that there is an increase in gas recoveries when the number of wells drilled is increased. The more wells that are drilled, the more will be the increase in recovery. Therefore, the restriction of the number of wells to be drilled is an economic factor only. It restricts the ultimate recovery. From the above you will see that the drilling of wells on 160 acre spacing allows the operator sufficient profit and therefore there is no economic restriction to such 160 acre spacing.

Brookhaven Oil Company owns 1.03% interest in the Gallegos Canyon Unit, that is, they own 240 acres of New Mexico State Leases within the producing area. As a matter of fact, Brookhaven's ownership is in the only State sections that produce from the West Kutz Canyon Pool. Basing the total recovery from this acreage at 5,000 MCF per acre, a loss by drainage to the south end of the pool of 10% means a loss of $12,000. A loss by drainage of 20% to the south end of the pool means a loss of

$24,000 over the life of the production.

It is recommended that Order No. R-172 of Case No. 377, dated June 1952, be rescinded, because

SUMMARY

1. The West Kutz Canyon Pool is a common source of supply and initially had the same bottom hole pressure.
2. The decline in pressure per million of gas produced is directly proportioned.
3. A great many more wells and a great deal more of gas has been produced from the south end of the Pool than from the north end.
4. The present pressures in the south end of the Pool are less than in the north end of the Pool, therefore there is drainage of gas from the north end of the Pool to the south end of the Pool.
5. Drilling wells on 160 acre spacing is economical.
6. The gathering systems of the El Paso Natural taking gas, generally speaking, from the north end of the Pool and the Southern Union gathering system taking gas from the south end of the Pool are, as I understand it, in the future going to coordinate their takings. Whether or not this will be on a well basis or pressure basis remains to be seen.
7. The primary requisite of proration and conservation and the protection of correlative rights is that one common source of supply must be drilled on the same spacing pattern. If in addition to that the Commission sees fit to prorate the wells by formula based on capacity, that is an additional matter but the spacing of wells must remain the same in a common source of supply.

Brookhaven Exhibits
Case 377
9-17-53

EXHIBIT I MEMORANDUM (See attached tabulations)

INFORMAL STUDY WEST KUTZ CANYON PICTURED CLIFFS POOL
MAY 1, 1952 to OCTOBER 31, 1952 and JANUARY 1, 1953 to MAY 31, 1953

(The figures for the Gallegos Canyon Unit for the months of November and December 1952 are listed but remain uncomputed in the summaries.)

1. EXPLANATION OF COLUMNAR FIGURES

COLUMN A - is the month in which the production took place.

COLUMN B - is the number of wells producing during that month. There is no guarantee that the wells were producing during the entire month.

COLUMN C - Average production per well is computed by taking the total production and dividing it by the number of wells shown in Column "B".

COLUMN D - Average production per acre is Column "C" (Average Production Per Well) divided by the number of acres in the spacing unit, for instance, for the Gallegos Canyon Unit it is Column "C" divided by 320 acres. For the area outside, it is Column "C" divided by 160 acres.

COLUMN E - is the total production respectively for the Gallegos Canyon Unit and for the total area outside the Unit as received from the statistical reports named.

SUMMARIES on the bottom of each sheet and for the whole pool are computed in the same manner as the columns just mentioned.

2. TOTAL PRODUCTION

Year	Gallegos Canyon Unit North Half of Pool	South Half of Pool
1952 (May thru October)	430,035 MCF	2,921,723 MCF
1953 (January thru May)	1,112,815 MCF	2,209,266 MCF

3. AVERAGE NUMBER OF PRODUCING WELLS PER MONTH

1952 (May thru October)	4.67	72.67
1953 (January thru May)	16.2	85.80*

*(This figure is actually higher but has been reduced in the computation by approximately 40 wells not being reported in for production during the month of May.)

4. NUMBER OF ACRES PER WELL OF PRODUCING AREA

May 31, 1952	7667	288
December 31, 1952	2555	226
April 30, 1953	1100*	200

*(Assuming that the drainage area of each of the 21 wells in the Unit is 320 acres, the total acreage drained is 7,187 acres out of a total of 23,000.)

EXHIBIT I - TABULATION SHOWING PRODUCTION

(a) To date the production from the South Half of the West Kutz Canyon Pool is more than three times the production from the North Half of the Pool (Gallegos Canyon Unit) from beginning through June 1953.

(b) There are approximately four and a half times as many wells in the South Half of the West Kutz Canyon Pool as there are in the North Half (Gallegos Canyon Unit) June 30, 1953.

(c) The number of acres per producing well is approximately 200 acres per well in the South Half of the Pool and 1100 acres in the North Half of the Pool (Gallegos Canyon Unit) June 30, 1953.