

Editor's note: Reconsideration denied by Order dated Feb. 12, 1988

VERA KOCHERGAN

IBLA 85-661

Decided October 13, 1987

Appeal from a decision of the New Mexico State Office, Bureau of Land Management, rejecting offer to lease for oil and gas. NM 57252.

Affirmed.

1. Oil and Gas Leases: Known Geologic Structure

Where a party challenges BLM's designation of certain lands as being within a known geologic structure on the basis that BLM erred in calculating net pay values on a well log, that determination will not be disturbed on appeal when the party fails to show by a preponderance of evidence that BLM, in fact, erred.

APPEARANCES: Roger K. Stewart, Esq., Fresno, California, for appellant; Gayle E. Manges, Esq., Field Solicitor, Santa Fe, New Mexico, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE KELLY

Vera Kochergan has appealed from a decision of the New Mexico State Office, Bureau of Land Management (BLM), dated May 9, 1985, rejecting her offer to lease lands in Eddy County, New Mexico, for oil and gas. BLM rejected appellant's offer, NM 57252, because the lands described therein were within an undefined known geological structure (KGS) and, as such, were available for leasing only by competitive bidding. ^{1/}

BLM's May 9 decision is the second decision informing appellant of the rejection of offer NM 57252. In an order dated January 2, 1985, this Board set aside and remanded an earlier BLM decision, dated March 1, 1984, because the record contained a "conclusory determination" that the lands at issue were within a KGS, but did not affirmatively substantiate the basis for the KGS determination.

^{1/} Appellant submitted a noncompetitive offer to lease pursuant to section 17 of the Mineral Leasing Act of 1920, 30 U.S.C. § 226(c) (1982). Her application to lease parcel NM 225 was selected with first priority in BLM's June 1983 drawing of simultaneously filed applications.

The lands described in offer NM 57252 are the following:

T. 24 S., R. 28 E., New Mexico Principal Meridian
 Sec. 23: SE 1/4 SW 1/4
 Sec. 26: SE 1/4
 Sec. 27: W 1/2 NW 1/4 (totalling 280 acres)

In her statement of reasons, which consists largely of geologic reports by Jack Ahlen, a consulting geologist, appellant concedes that the W 1/2 NW 1/4 sec. 27 is properly included within a KGS. 2/ Our attention is, accordingly, directed to the parcels in secs. 23 and 26.

The record reveals that by memorandum of November 29, 1983, the BLM District Manager, Roswell, informed the State Director that the E 1/2 SW 1/4 sec. 23 and E 1/2 sec. 26, T. 24 S., E. 28 E., New Mexico Principal Meridian, were within an undefined addition to the Malaga KGS, effective November 3, 1983. This determination was based on a study of "production wells" in Tps. 23-25 S., Rs. 28-29 E. Id. A subsequent memorandum of March 13, 1985, 3/ reveals that BLM included within this undefined addition all 40-acre subdivisions cut 50 percent or greater by a 15-foot isopach line showing net pay in the Upper Morrow clastics sand.

Appellant does not dispute this 15-foot standard, but does contend that BLM erred in relying on data from a well in sec. 34, T. 24 S., R. 28 E., in drawing its isopach map of the Upper Morrow. An isopach map, in conjunction with a map of the Morrow subsurface structure, should lead to an accurate projection of oil and gas fields, appellant states. Appellant notes, however, that the structural attitude of the beds is not critical to hydrocarbon entrapment (Ahlen Geologic Report of Sept. 3, 1985 (Ahlen report) at 3). Appellant states:

Primary consideration for entrapment of oil and gas in the Atoka-Morrow section depends on the location of permeable [4/] sand lenses. Since individual sand lenses have limited geographic extent, they form unique traps within an oil or gas producing interval. Gravity segregation allows oil or gas to move structurally up dip, while water moves down dip. * * * To date, little water has been found in the Atoka and Morrow sand interval as mapped in this project. Therefore, most frequently when a sand is present and of sufficient porosity, it will produce gas. The most important map to construct in such a province is the sand thickness or isopach map.

Id.

2/ By memorandum of Sept. 12, 1983, BLM determined that all of sec. 27 was within an undefined addition to an undefined KGS, based upon development drilling in sec. 32.

3/ This memorandum was written by the Roswell District Manager to the Field Solicitor, Southwest Region.

4/ The "permeability" of rock is its capacity for transmitting a fluid. Dictionary of Mining, Mineral, and Related Terms (1968).

Appellant and BLM have relied on compensated neutron-formation density logs to obtain the data necessary for preparation of a net pay isopach. These logs, appellant explains, record the radioactivity and porosity, 5/ inter alia, of rock as a tool is lowered down the borehole of a well. Two different methods to measure porosity are recorded on the logs (Ahlen report at 4). One method, shown on a compensated neutron log, is sensitive to hydrogen atoms in a formation. A deflection of this curve, appellant explains, reflects an increase or decrease of hydrogen, which is the primary constituent of water, oil, or methane. The other method, shown on a formation density log, is sensitive to the electron density of the formation. Id. BLM has defined net pay as the "cross-over on Neutron-Density logs." 6/ Appellant does not dispute this definition, but she would add the further requirement that net pay sands have a porosity of 4 to 5 percent.

Focusing on the cross-over area of neutron-density logs for Amoco's Federal "AI" Com #1 well in sec. 34, T. 24 S., R. 28 E., appellant contends that BLM cannot justify a value of 6 to 7 feet on its net pay isopach. In support, appellant states:

The Compensated Neutron-Density log shows 4 to 4.5 feet of sandstone at 12998 to 13002. Cross plot porosity values from 12998 to 13000 are 4%, which is borderline net pay. The two feet from 13000 to 13002 is good net pay. The repeat section resistivity log suggests no net pay because there is no resistivity shift through the zone of porosity or above it. The repeat section log is chosen over the final log as the final appears to have encountered an obstruction as it passed through the zone at 13002 thereby distorting the values.

Appellant maintains that BLM's error in evaluating these logs caused it to improperly locate a 5-foot contour line south of Amoco's well. Additional error occurred in BLM's location of 20- and 15-foot contour lines which, appellant claims, are extended southward significantly past any well control that might verify or suggest such interpretation (Ahlen report at 6).

In response to these arguments, BLM states that there exists no requirement for 4 to 5 percent porosity in the definition of a KGS. It does acknowledge, however, that a porous and permeable medium must be established and that this medium must contain a hydrocarbon interval with a porosity value greater than zero, as well as some type of trapping mechanism. Responding to appellant's statement that the resistivity log for Amoco's well shows no net pay, BLM points to its compensated neutron-formation density log showing 5 feet of cross-over from 12997 to 13002 feet. Another foot of cross-over is present at 12970 to 12971 for a total of 6 feet, BLM maintains. Examination

5/ The "porosity" of rock is the relative volume of the pore spaces between mineral grains as compared to the total rock volume. 8 Williams and Meyers, Oil and Gas Law 654 (1984).

6/ Cross-over occurs when the relative position of the curves traced by the compensated neutron log and the formation density log changes.

of this log, BLM states, does not reveal any problem mentioned by appellant to justify use of a repeat section resistivity log.

Appellant next contends that BLM well logs do not demonstrate the "porous and permeable medium" that BLM acknowledges should exist for a KGS. Each reservoir has a minimum limit of porosity that is required before a fluid will pass through it, appellant states. In the Upper Guadalupian series, for example, appellant notes that the Queen, Penrose, Yates, and Premier sand sections all require porosities of 12 to 18 percent before they might be considered permeable. Appellant states that the Delaware sand requires a porosity greater than 20 percent, and geologists working the Morrow interval agree that a minimum porosity of 5 to 8 percent is necessary before a sand may be considered permeable. In appellant's view, maps based on data which do not consider permeability and porosity are not geologically sound or technically correct.

BLM responds to appellant's contention that permeability is lacking in Amoco's sec. 34 well by introducing a Micro-Spherically Focused Log (MSFL), showing a higher resistivity than the Laterolog Deep (LLD) and Laterolog Shallow (LLS). Separation between the MSFL and LLS is present, BLM contends, and such separation is indicative of invasion. Invasion of an interval is not possible unless the interval is permeable, BLM maintains.

[1] Section 17(b) of the Mineral Leasing Act, as amended, 30 U.S.C. § 226(b) (1982), provides that public domain lands within the KGS of a producing oil or gas field shall be leased by competitive bidding. A KGS is "technically the trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive." 43 CFR 3100.0-5(1). No discretion exists in the Department to issue a noncompetitive lease, as appellant seeks, for lands properly determined to be within a KGS. McDonald v. Clark, 771 F.2d 460, 464 (10th Cir. 1985); McDade v. Morton, 353 F. Supp. 1006 (D.D.C. 1973), aff'd, 494 F.2d 1156 (D.C. Cir. 1974). Where lands described in a noncompetitive oil and gas lease offer are determined to be within a KGS of a producing oil or gas field at any time prior to lease issuance, 7/ the noncompetitive lease offer must be rejected. 43 CFR 3112.5-2. The burden of showing by a preponderance of the evidence that BLM's determination is in error rests with appellant. Bender v. Clark, 744 F.2d 1424 (10th Cir. 1984).

In Thunderbird Oil Corp., 91 IBLA 195 (1986), affirmed sub nom., Planet Corp. v. Hodel, No. 86-679 HB (D.N.M. May 6, 1987), the Board recognized that the Morrow sands in nearby T. 22 S., R. 32 E., New Mexico Principal Meridian, could serve as a stratigraphic trap 8/ for gas. The lateral extent of this trap was controlled by variations in the permeability and porosity of the sandstone. Therein at page 202, the Board emphasized that BLM was not

7/ Lease issuance occurs upon the signing of the lease by the authorized officer. 43 CFR 3112.6-2.

8/ "'Stratigraphic trap' is a general term for traps that are chiefly the result of a lateral variation in the lithology of the reservoir rock, or a break in its continuity." Levorsen, Geology of Petroleum, 286 (2d ed. 1967).

required to show that land within a KGS was presumptively productive, but rather that a producing structure exists that extends to the land in question.

Appellant acknowledges that a number of wells produce from the mapped Morrow sand interval. An unnumbered exhibit to appellant's statement of reasons 9/ shows 13 such wells, one of which is located in sec. 23, T. 24 S., R. 28 E., one-half mile from lands in NM 57252. Figure 1 of appellant's statement of reasons depicts this mapped interval in a series of well logs for 11 wells, drilled both north and south of NM 57252. Three of these 11 wells produce from the mapped interval. A similar depiction of the mapped interval in a series of seven well logs is offered by BLM in response. BLM states that its depiction reveals the continuity of the mapped interval in its seven wells 10/ and is supported by appellant's data tables, Morrow isopach, and cross-section. Our review of this data and the pleadings reveals that no dispute exists as to the continuity of the mapped Morrow sand interval in wells deemed relevant by the parties or the fact that wells are producing from this interval.

As the pleadings above indicate, the parties disagree as to the thickness of net pay revealed by the compensated neutron-formation density well log for Amoco's well in sec. 34. In figure 9 of the Ahlen report, appellant indicates that 3 feet of net pay is shown by the well log. The report itself, however, appears to contradict figure 9 by first concluding that 4 feet of net pay is revealed by the log, and then stating that no net pay is revealed by a repeat section resistivity log for this well. Geologists consulted by appellant estimate net pay at zero to 3 feet. 11/ BLM, however, finds 6 feet of net pay disclosed by the log for Amoco's well.

9/ This map is entitled "Wells Producing from Mapped Morrow Sand Interval" and is dated August 1985.

10/ These wells are located both north and south of the lands at issue. See figure 2 accompanying the Roswell District Manager's memorandum of Nov. 25, 1986, incorporated in BLM's Response on Remand, filed Dec. 3, 1985. Logs for some of these wells also appear on appellant's figure 1.

11/ Attached to appellant's Rebuttal to Response, filed Dec. 23, 1985, are five letters addressed to professional geologists. In these letters, Ahlen asked each geologist to state how much net pay was shown by the compensated neutron-density formation log for Amoco's well. Appellant states that "[f]ive of the seven geologists responding" assign 3 feet or less. No indication is made as to what answer the remaining two geologists gave. Geologist number one found no net pay. Geologist number two stated that less than 2 feet of net pay was shown. "[N]o more than 5% x-plot porosity" was revealed in the relevant interval. Geologist number three found that the log might show 2 feet of pay. This geologist defined net pay in a Morrow sand to require greater than 8 percent porosity and a resistivity log showing a good invasion profile. Greater than six units of cross-over (density greater than neutron) were desirable on the porosity log. Geologist number four found 3 feet of net pay and defined net pay to require at least 5 or 6 percent porosity. Geologist number five found 3 feet of net pay.

Appellant and BLM also disagree as to the definition of net pay. ^{12/} Appellant initially defined this term to include a Morrow sandstone whose porosity was in excess of 4 to 5 percent. Later, citing the experience of geologists working the Morrow interval, appellant stated that a minimum porosity of 5 to 8 percent was necessary before a sand may be considered permeable. ^{13/} BLM maintains that net pay is found in a porous and permeable medium containing a hydrocarbon interval with a porosity value greater than zero.

Our review of the record reveals that appellant has alternatively claimed that zero, 3, and 4 feet of net pay is shown by the relevant well logs for Amoco's well in sec. 34. The record further reveals that appellant offered no response to BLM's statement that the MSFL showed evidence of permeable sands where appellant claimed net pay to be zero. On the basis of the record evidence, we are unpersuaded that appellant has shown by a preponderance of the evidence that zero net pay is revealed by the relevant logs. If, as appellant alternatively contends, only 3 or 4 feet of net pay is shown on the relevant logs (BLM finds 6 feet), appellant has nevertheless failed to demonstrate by a preponderance of evidence that such finding would materially alter BLM's net pay isopach.

As set forth above, the statutory term "known geological structure" is defined by regulation 43 CFR 3100.0-5(1) to mean a trap in which oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive. This definition has been recently construed by the Board in Beard Oil Co., 99 IBLA 40 (1987), to remove any notion that the term "productive" implies production in paying quantities or the capability of production in paying quantities. Therein, the Board quoted with approval the BLM manual at 3022.1.11A.3 which states: "For KGS determination, it is not necessary that a well be capable of producing in paying quantities, but it must be capable of production." Id. at 47. Profitability is a variable that is dependent upon the market place; a KGS designation, however, is based instead on geologic evidence. Id.

BLM's action in the instant appeal is consistent with its position in Beard Oil Co. If KGS standards are concerned with the existence, rather than the commerciality, of hydrocarbons, then BLM may properly define terms used to delimit a KGS, such as net pay, with these same concepts in mind. Thus, BLM may properly define "net pay" as it has in the instant case, emphasizing the existence of hydrocarbons and removing the need that hydrocarbons occur in commercial or paying quantities.

^{12/} "Pay" is reservoir rock containing oil or gas. "Reservoir rock" is any porous and permeable rock that yields oil or gas. Bates and Jackson, Glossary of Geology (2d ed. 1980).

^{13/} See note 11.

We therefore conclude that appellant has failed to show by a preponderance of evidence that BLM's May 9, 1985, decision was in error, and that BLM properly rejected appellant's lease offer. 14/

Accordingly, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision of the New Mexico State Office is affirmed.

John H. Kelly
Administrative Judge

We concur:

Bruce R. Harris
Administrative Judge

Will A. Irwin
Administrative Judge

14/ In view of our disposition of this case, appellant's request for a hearing is denied.

