

SOURCE PETROLEUM CO.

IBLA 88-245

Decided December 13, 1989

Appeal from a decision of the Utah State Office, Bureau of Land Management, increasing annual rental for noncompetitive oil and gas lease U-58526.

Affirmed.

1. Oil and Gas Leases: Burden of Proof--Oil and Gas Leases: Known Geologic Structure

Delineation of a KGS recognizes the existence of a continuous entrapping structure, on some part of which there is production, or of numerous related, but nevertheless independent, stratigraphic or structural traps. A party challenging a determination that lands are within a KGS must either show that the producing structure does not underlie the land or affirmatively establish that the land is not productive from the structure in question. A determination by a Departmental technical expert that lands qualify for inclusion in a KGS will be upheld when it is not arbitrary and capricious and is supported by competent evidence.

2. Oil and Gas Leases: Known Geologic Structure

When a KGS determination is challenged, the relevant questions concern the reasonableness of the inferences which have been made based upon well data and the extent to which BLM's conclusions concerning the geologic structure are supported or contradicted by the available information.

3. Oil and Gas Leases: Known Geologic Structure

Land is included in a KGS on the basis of geologic evidence indicating that the structure underlies the land, not on the basis of evidence that oil and gas is contained in that portion of the structure which underlies the land. Consequently, the fact that land within the KGS is later found not to be productive does not mean that it was improperly included or that the criteria for its inclusion were deficient.

APPEARANCES: Robert W. Adkins, Esq., Coalville, Utah, for appellant; David K. Grayson, Esq., Assistant Regional Solicitor, U. S. Department of the Interior, Salt Lake City, Utah, for the Bureau of the Land Management.

OPINION BY ADMINISTRATIVE JUDGE HARRIS

Source Petroleum Company has appealed a decision dated January 11, 1988, by the Utah State Office, Bureau of Land Management (BLM), increasing the annual rental for oil and gas lease U-58526 to \$2 per acre because a portion of the lands embraced by the lease was within the Greater Blanding Basin Known Geologic Structure (KGS), effective April 27, 1987.

Lease U-58526 was issued April 1, 1987, for 2,090.64 acres in San Juan County, Utah, described as secs. 7, 8, and 18, the SW $\frac{1}{4}$ sec. 12, and the SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 17, T. 37 S., R. 25 E., Salt Lake Meridian (SLM).

By memorandum dated December 23, 1987, the Moab District Manager notified the Utah State Director, BLM, that based upon a recent geologic study certain lands, including lands within U-58526 were included in the Greater Blanding KGS effective April 27, 1987.

BLM's decision, based on a Geologic Report For Greater Blanding Basin Known Geologic Structure, dated April 27, 1987 (Geologic Report), advised appellant that "the following lands in oil and gas lease U-58526 are, effective April 27, 1987, within the known geologic structure of the greater Blanding Basin Field: T. 37 S., R. 25 E., SLM, Utah, Sec. 18, lots 2-4, SE $\frac{1}{4}$ SW $\frac{1}{4}$." BLM also notified appellant that the new rental rate of \$2 per acre or fraction thereof would be effective April 1, 1988, and apply to all the acreage in the lease.

Appellant asserts initially that BLM unreasonably delayed issuing the lease pending completion of the KGS study. BLM concedes that U-58526 was withheld from issuance for this reason. BLM explains that in March 1987 sufficient work had been completed on the KGS study to allow clearlisting of some parcels clearly not within the KGS. Lease U-58526 embraces two noncontiguous parcels, one straddling the KGS boundary and the other clearly out of the presumptively productive acreage. BLM states that the parcel straddling the KGS boundary was erroneously clearlisted and included in appellant's lease.

The record shows, however, that the lease, dated March 24, 1987, and effective April 1, 1987, actually issued prior to the effective date of the KGS determination. Whether BLM should have waited until after establishment of the Greater Blanding Basin KGS before issuing appellant's lease is another question. It did not; and at the time of lease issuance the record shows the lands in sec. 18 open to noncompetitive leasing.

However, any complaint appellant may have regarding delay in issuance of its lease must be rejected. As the court stated in Angelina Holly Corp. v. Clark, 587 F. Supp. 1152, 1156 (D.D.C. 1984), "the Secretary is under no duty to issue or reject leases within a certain period of time and failure to process leases for several years is not unlawful." See Eugen Dumitru Georgescu, 109 IBLA 317 (1989); Marc W. Richman, 86 IBLA 143, 145 (1985).

Appellant generally challenges BLM's KGS action as overbroad and based on administrative convenience rather than geologic information. Prior to considering appellant's specific challenges to BLM's KGS action, salient portions of BLM's geologic analysis, including those to which appellant takes exception, will be set out.

BLM identifies the Upper Ismay Member of the Paradox Formation as the principal producing horizon. Describing reservoir characteristics, BLM's Geologic Report states that all Upper Ismay production comes from zones of high porosity and permeability formed of bioclastic mounds composed of fragments of marine organisms. In general, the mounds appear to be convex upward lenses varying in thickness from 20 to 180 feet, in length from a few hundred to 15,000 feet, and in width from 500 to 3,000 feet. Algal remains and other marine organisms are present between productive mounds suggesting that thinner algal "meadows" grew between the larger "reef-like" mounds resulting in zones of intermediate porosity 10 to 50 feet in thickness. Wells in these areas commonly have shows of oil and/or gas (Geologic Report at 5).

The trap limits are described as follows:

The Upper Ismay trap consists of a group of algal mound bioherms which are areally contiguous as a result of their accumulation in a common depositional environment, identified as a build-up facies. This facies contains several high porosity productive mounds, interconnected by a somewhat lower porosity biogenic carbonate horizon. This intermound porosity was sufficient to allow hydrocarbon movement, and frequently contains hydrocarbon shows when encountered. However, permeability within the facies exhibits very erratic patterns which cannot be predicted with any reliability, and the complex diagenetic history in the build-up facies has resulted in some areas where intermound permeability has been reduced and the reservoir is not fully developed. These areas are believed to be small in extent, and known areas with no reservoir development are shown on Map No. 5. These areas are excluded from the reservoir.

Therefore, the presumptively productive limits of the Upper Ismay trap can be defined by the areal extent of the build-up facies (Map No. 4), and a facies controlled 4 per cent isoporosity contour (Map No. 3). These maps show excellent correlation when overlain. The KGS boundary was drawn on the 4 per cent isoporosity contour and includes all 40-acre tracts cut by this 4 per cent contour. This provides a quantitative boundary definition, and presents a more accurate portrayal of the actual extent of the reservoir, as build-up facies data shows that the reservoir can lack porosity and permeability near its boundaries with adjoining facies.

(Geologic Report at 6).

In a "Staff Report" filed as a response to appellant's statement of reasons (SOR), BLM defines a facies at page 2 as "a common assemblage of

lithostratigraphic rock types formed under similar environmental or depositional conditions." BLM states that four separate facies were identified within the Upper Ismay from well logs, core and sample data. BLM states that this data, combined with production and test data, showed the porosity and permeability throughout the build-up facies to be sufficient to allow movement of oil and gas within the facies. The Staff Report continues:

Analysis showed further that laterally adjacent facies did not contain sufficient porosity or permeability to trap hydrocarbons. Combined with sealing shales on top and bottom, the build-up facies thereby effectively traps any hydrocarbons within. Log and core calculated porosity were also mapped for all wells within the study area, where available, and the resultant isoporosity map shows close correlation with the mapped extent of the build-up facies.

Based on this geologic data BLM defined the trap as all lands cut by the 4 per cent isoporosity contour falling within the build-up facies of the Upper Ismay formation. We believe all lands within this boundary meet the definition of presumptively productive, even though drilling has shown that not all wells within are capable of commercial production, which tends to occur within the actual mound (bioherm) buildups.

(Staff Report at 2).

At page 6 of the Geologic Report and at page 3 of the Staff Report, BLM summarized the drilling activity within the build-up facies as of April 1987. As of that time, 48 wells had been completed as producers within the Upper Ismay. Of 102 wells drilled and abandoned, 33 had shows of oil and/ or gas, 39 did not conduct tests within the Upper Ismay, 11 had inconclu-sive Upper Ismay test data, and 7 wells were tested with no data available. Where tests were not conducted, were inconclusive, or data was not available, analysis of the well logs indicated the presence of reservoir within the build-up facies, in that log profiles showed similar characteristics to logs run through the Upper Ismay porosity zone in producing wells within the KGS. Of the 102 wells drilled and abandoned, 12 were determined to be dry and the 40 acres surrounding each well were geologically excluded from the KGS. These exclusions were based on well spacing within the Greater Blanding Basin, but "[t]hese areas were deemed to be of small enough extent however that they were added 'administratively' to the KGS in accordance with guidelines in KGS Handbook 3022.1" (Staff Report at 3).

With respect to porosity analysis, the Geologic Report states in part at pages 7-8:

Log porosity was calculated for 155 wells within the entire study area. This includes 114 wells within the build-up facies, and 25 wells with the basin/evaporite facies, 10 wells within the shelf facies, and 6 wells within the basin/evaporite - build up transition facies.

The results of these porosity calculations were used to prepare a porosity isopleth map, shown as Map No. 3, which shows well status at completion, and lists the API code and weighted porosity as attributes next to the well symbol. An attribute value of .999 indicates no porosity data available.

Comparison of the porosity map with data on productive characteristics of the Upper Ismay reservoir, indicates a porosity threshold of 4 percent limits hydrocarbon movement and entrapment within the reservoir. The following factors support this conclusion:

1. Of the 115 wells with porosity data within the build-up facies, all but 3 have a weighted porosity of 4% or higher with an average of 6.9 percent. The 3 exceptions are the Bullpup Unit 1-8 in T36S, R23E, Sec. 8 (30904) at 3.3 percent, the Alkali Creek Unit Federal D-1 in T38S, R23E, Sec. 23 (31087) at 2.9 percent, and the Alkali Canyon Unit 17-21 in T39S, R24E, Sec. 17 (30592) at 1.4 percent porosity. All three of these wells fall on the boundary between the shelf facies and the build-up facies. It can be assumed that porosity and permeability development were infilled with evaporites as a result of this position. These three wells are not included within the presumptively productive limits of the trap.

2. Calculated porosity within the shelf facies showed a high value of 3.6 percent with an average of 2.3 percent. Calculated porosity within the basin/evaporite facies showed one anomalously high value of 6.5 percent, of the remaining basin/evaporite wells the high range is 3.6 percent with an average of 2.2 percent.

3. With only minor exceptions, the boundary delineated by the 4 percent porosity isopleth, overlies almost identically the map of the areal distribution of the build-up facies.

4. There are 3 wells within the build-up facies that have been completed for production in Upper Ismay carbonates calculated at 5 percent weighted porosity, indicating that the trap limits are at a value of less than 5 percent.

Appellant has submitted no geologic information of his own, basing his appeal on a critique of BLM's geologic analysis. First, appellant asserts that the Upper Ismay is not a trap, but simply a formation. Although appellant appears to concede that many productive wells are located on the KGS lands (SOR at 3), it argues (Reply at 3), that the "meadows" within the build-up facies cannot be construed as presumptively productive "because of the significant number of wells that have been drilled in them and not one has been productive." Appellant asserts that the only presumptively productive reservoir "has to be the algal mounds." Thus, appellant suggests that BLM has unduly broadened the definition of trap to include "a group of traps that are generally vertically overlapping, aerially [sic] contiguous, and/or represent the same environment of

deposition and accumulation." Appellant urges that the KGS boundary should have been drawn around the algal mounds rather than enlarging the KGS by 97,670.39 acres, as a matter of administrative convenience (Reply at 3).

[1] A KGS is defined as "technically the trap in which an accumulation of oil and gas is discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive" 43 CFR 3100.0-5(l). Delineation of a KGS recognizes the existence of a continuous entrapping structure, on some part of which there is production, or of numerous related, but nevertheless independent, stratigraphic as well as structural traps. Thunderbird Oil Corp., 91 IBLA 195, 202 (1986), aff'd sub nom., Planet Corp. v. Hodel, No. 86-679 HB (D.N.M. May 6, 1987). While there must be a determination that a structural and/or stratigraphic trap contains oil or gas, usually by completion of a producing well, the limits of a KGS are not simply the immediate area around that well or land itself determined to be productive, but all land where geologic or other evidence indicates that there is a reasonable probability that the land is underlain by the trap or a series of related traps in the same formation(s). Beard Oil Co., 99 IBLA 40, 44 (1987). Such additional land is considered to be "presumptively productive" and is properly included in the KGS. Id.

Appellant concedes the existence of traps but disputes BLM's delineation of those traps for purposes of KGS classification. However, BLM is not required to designate discrete KGS's where, as here, the geologic data shows that an area is underlain by related but independent traps, rather than by a single stratigraphic trap. Carol Ann Hoffman, 100 IBLA 139, 141 (1987).

Appellant has termed BLM's KGS designation as one of administrative convenience. As we observed in Beard, supra at 48, designation of land within a KGS always has an administrative component. In order to make a KGS administratively manageable, KGS boundaries will be drawn along recognized survey boundaries to encompass land determined by drilling and geologic evidence to be presumptively productive.

An appellant challenging a KGS determination must either show that the producing structure does not underlie the land or affirmatively establish that the land involved is not productive from the structure in question. Thunderbird, supra at 202. The law is settled that a party challenging a BLM determination that lands are within a KGS has the burden of establishing by a preponderance of the evidence that inclusion of the land in a KGS is erroneous. Bender v. Clark, 744 F.2d 1424, 1429-30 (10th Cir. 1984); Paul E. Pendergrass, 108 IBLA 125, 127 (1989), and cases there cited.

The Secretary of the Interior has delegated responsibility for determining the existence and extent of KGS's to his technical experts in the field. When these experts make a determination that lands qualify for inclusion in a KGS, the Secretary is entitled to rely on their reasoned opinion. A determination by a Departmental technical expert will be upheld when it is not arbitrary and capricious and is supported by competent evidence. Pendergrass, supra; Thunderbird, supra.

[2] BLM's information indicates that its conclusions were based on a large number of wells drilled into the Upper Ismay formation, and, as indicated earlier, appellant appears to acknowledge the existence of productive wells. Regardless of the number of wells and the amount of well data evaluated, when a KGS determination is challenged, the relevant inquiries are to the reasonableness of the inferences which have been made based upon the data and the extent to which BLM's conclusions concerning the geologic structure are supported or contradicted by the available data. Joy Goldschmidt, 107 IBLA 237, 241 (1989). Appellant's disagreements with, and contradictions of, certain of BLM's findings are unaccompanied by technical support data. Moreover, appellant has failed to show that BLM's conclusions and inferences are unsupported by the available data. While appellant's disagreements and opinions may be reasonable, they fall short of the quantum of proof necessary to overturn a BLM KGS action. See Patricia A. Laudon, 107 IBLA 26, 30-31 (1989).

Appellant asserts that the history of the Santa Fe Energy Company, Bradford Canyon Unit No. 1-13 well drilled within one-half mile of the lands in its lease establishes that BLM erroneously classified a portion of the lands in his lease as KGS lands. Appellant states that this well was plugged and abandoned and "did not contain a reservoir" (SOR at 3). 1/

BLM states, however, that it examined well logs and drill stem test data submitted by Santa Fe Energy and that these data "conclusively show that the well did encounter the Upper Ismay build-up facies reservoir which upon testing indicated the presence of free gas within this zone" (Staff Report at 3).

[3] Appellant's critique assumes that BLM's purpose in selecting criteria to define a KGS is accurate to predict the areas where oil or gas will be found. Because appellant regards the KGS designation as essentially predictive, it construes the fact that dry holes have been drilled within KGS lands as indicating that those lands were erroneously classified KGS. Appellant is mistaken. Criteria employed for KGS designation are selected to describe the structure in which oil or gas has been found, not to predict where it will be found. Land is included in a KGS on the basis of geologic evidence indicating that the structure described

1/ The pleadings reflect some confusion as to the location of this well. In its statement of reasons, appellant initially placed this well in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of sec. 13, T. 34 S., R. 24 E., SLM. BLM's staff report asserts that the well is in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of sec. 13, T. 37 S., R. 25 E., SLM, "approximately 1/2 mile west of appellant's lease tract." Appellant states in its reply that both descriptions are in error and that the well "is actually in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ of sec. 13, T. 37 S., R. 24 E., SLM, "approximately one-half mile west of the east boundary of the KGS designation" (Reply at 5). BLM's maps indicate no well in either sec. 13, T. 37 S., R. 24 E., or in sec. 13, T. 37 S., R. 25 E. However, in order to be located approximately one-half mile west of appellant's lease acreage the well would have to be located in sec. 13, T. 37 S., R. 24 E., rather than sec. 13, T. 37 S., R. 25 E., SLM.

by the criteria underlies the land, not on the basis that oil or gas is contained in that portion of the structure which underlies the land. Consequently, the fact that land within the KGS is later found not to be productive does not mean that it was improperly included or that the criteria were deficient. Joy Goldschmidt, supra at 244.

Moreover, the fact that dry holes are found within the area included in a KGS does not, ipso facto, establish that it was error to include the area within the KGS. As we noted in Beard Oil Co., supra at 46, dry holes may simply establish the existence of small, localized areas lacking in production. Error may be shown, however, if data from the well establishes that the presumptively productive structure does not underlie the land, that the structure underlying the land does not meet the criteria based on which the land was included in the KGS, or that the structure underlying the land does not contain and cannot produce oil or gas. Thunderbird Oil Corp., supra at 202.

Appellant alleges that the portion of his lease lands KGS'd by BLM cannot be presumptively productive because they are on the edge of a facies change, where, as BLM concedes, there can be a lack of "porosity and permeability" (Geologic Report at 6). Appellant asserts:

Since the BLM concludes that there can be a lack of porosity and permeability near the boundaries of a facies change, and since the BLM 4% isoporosity contour line includes all forty acre tracts cut by this 4% contour, it is obvious that the contour does not extend to the east line of Lots 2, 3, and 4 and the SE $\frac{1}{4}$ SW $\frac{1}{4}$.

(Reply at 5-6). Appellant contends that since BLM excluded from the presumptively productive limits of the trap three wells drilled in the boundary between shelf facies and build-up facies (wells whose porosity values were below 4 percent), it should also have excluded appellant's lease acreage, which overlies a facies boundary. In this connection, appellant also challenges BLM's 4-percent porosity figure as arbitrary and too low (Reply at 5-6).

Doubt rather than certainty regarding porosity and permeability near the facies boundary does not of itself indicate that BLM's trap limits were improperly drawn so as to include appellant's lease lands. Nor does it, in combination with BLM's isoporosity value of 4 percent, demonstrate that the trap limits do not cut, and hence, properly embrace those lands. As we have noted in previous appeals, KGS designations cannot be based on geologic cer-tainty. Patricia Laudon, supra at 31. Moreover, BLM's derivation of its 4-percent porosity value is explained in technical detail at pages 7-8 of its Geologic Report (quoted in part, supra). BLM's analysis is logically based on correlation of distinct well log data from numerous wells. Appellant's objections to the conclusions BLM drew from its data are based on assumption and speculation. While BLM's evaluation may admit of more than one interpretation, a different interpretation is not tantamount to a showing of error. Appellant's disagreements do not support a conclusion that BLM improperly defined the limits of the KGS; that improper criteria were

used to postulate its existence in that location; or that the lands would not be productive from that structure.

Regarding BLM's administrative action with respect to the 40-acre parcels surrounding the 12 dry holes (Staff Report at 3), appellant "assumes" that these parcels were excluded because they lacked a trap containing hydrocarbons. Appellant charges that BLM's inclusion of these parcels within the KGS was arbitrary, unreasonable, and lacking factual geologic basis (Reply at 4).

Assuming for the sake of argument that BLM erred in administratively including the 40-acre parcels within the KGS, appellant has shown no link between this action and BLM's inclusion of a portion of appellant's lease lands in the KGS. In addition, since neither the file nor the pleadings disclose the identity or location of these wells, any further discussion of the matter would be hypothetical and could serve no dispositive purpose. 2/

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed.

Bruce R. Harris
Administrative Judge

I concur:

Wm. Philip Horton
Chief Administrative Judge

2/ We note, however, that BLM's Draft KGS Handbook (Feb. 26, 1988), states that the administrative boundary of a KGS must be described in units no smaller than the smallest legal subdivision (quarter quarter section) "which is cut by the limit of the trap" (Draft Handbook at 39). This criterion accords with the Board's rulings. In Pamela S. Crocker-Davis, 94 IBLA 328, 332 (1986), the Board concluded that, absent some justification to show the relationship between the state-established spacing units and the concept of a KGS, BLM should include in a KGS only the smallest legal subdivision (quarter quarter section) traversed by the boundary of the structural or stratigraphic trap. Accord Charles J. Rydzewski, 105 IBLA 9 (1988); Ecological Engineering Systems, 104 IBLA 117, 121 (1988).