

**ALBERTA ENERGY AND UTILITIES BOARD**

**Calgary Alberta**

**IRONWOOD PETROLEUM LTD.  
BEARSPAW PETROLEUM LTD.  
COMPULSORY POOLING  
DRUMHELLER FIELD**

**Examiner Report E 96-12  
Applications No. 960222 & 960491**

**1 INTRODUCTION**

**1.1 Applications, Interventions, and Hearing**

Two competing applications for a compulsory pooling order were submitted under section 72 of the Oil and Gas Conservation Act (the Act):

- Application No. 960222, by Ironwood Petroleum Ltd., for an order prescribing that all tracts within the drilling spacing unit comprising Section 18 of Township 29, Range 19, West of the 4th Meridian (Section 18) be operated as a unit for the production of gas from
  - the Belly River Group through the well with the unique identifier of 00/11-18-029-19W4 (the 11-18 well), and
  - the Basal Quartz Formation through the well with the unique identifier of 03/02-18-029-19W4 (the 2-18 well); and
- Application No. 960491, by Bearspaw Petroleum Ltd., for an order prescribing that all tracts within the drilling spacing unit comprising Section 18 be operated as a unit for the production of gas from the Belly River Group and the Basal Quartz Formation through the well with the unique identifier of 00/14-18-029-19W4 (the 14-18 well).

Each applicant submitted an intervention opposing the other party's application.

The applications were considered at a public hearing on 30 and 31 October 1996, in Calgary, Alberta, by Board-appointed examiners G. C. Dunn, P.Eng., T. M. Hurst, and T. A. Dibus, P.Geol.

The participants who appeared at the hearing and abbreviations used in the report are shown on Table 1.

## **1.2 Background and Preliminary Matters**

According to the applicants, the natural gas rights for the Belly River Group and the Basal Quartz Formation in Section 18 are held as shown on Table 2.

The shut-in 14-18 well was drilled in 1982 by Dome Petroleum Limited as a prospective Nisku oil well; however, no oil was encountered. Bearspaw acquired the well in 1994. It submitted that the well is capable of gas production from the Belly River Group and Basal Quartz Formation (see discussion in Section 3.2 of the report).

The 2-18 well was drilled in 1994 by Mannville Oil & Gas Ltd. as a prospective Nisku oil well, but did not encounter economic reserves in that zone. The well was subsequently acquired by Ironwood and its partners. It was completed and tested in 1995, and found to be productive in the Basal Quartz Formation (see discussion in section 3.1 of the report).

Ironwood drilled the 11-18 well in November 1995, encountering a productive Belly River pool (see discussion in Section 3.1 of the report). In December 1995, Bearspaw requested, under sections 42 and 43 of the Energy Resources Conservation Act, that the Board review the well licence and order the abandonment of the well. Bearspaw submitted that it did not recognize Ironwood as having any interest in the Northwest quarter of Section 18. Bearspaw further submitted that it has a 50 per cent (%) working interest in that quarter section and is the operator of the 14-18 well which is capable of production from the Belly River Group. Bearspaw maintained that on this basis, the 11-18 well should never have been allowed to be drilled, and it requested a hearing before the Board to allow it to put forth arguments as to why the well should be abandoned. The Board reviewed the matter during April 1996 and was satisfied from the submissions filed that Ironwood held an interest in Belly River gas in the Northwest quarter of Section 18 as well as in the remaining portion of the section, and that it has the right to hold the licence for the 11-18 well. Bearspaw was advised of this decision on 22 April 1996.

Bearspaw initially objected to the Ironwood pooling application partly on the basis that Ironwood has not provided any documentary proof of its ownership in the Northwest quarter of Section 18. However, it subsequently submitted a written statement, which it confirmed at the hearing, withdrawing its dispute as to Ironwood's interest in the Northwest quarter of the section. Bearspaw also submitted that operations on Lsd 11 and 14 of the section are governed by a contract dating back to 1951. According to Bearspaw, under the provisions of this contract, it had earned certain rights as operator of these lands and it claimed Ironwood to be in trespass by drilling the 11-18 well. It was also Bearspaw's position that a penalty provision in the 1951 contract ascribed Bearspaw's right to claim penalty benefits to itself from successors in interest, in this case, Ironwood.

Ironwood responded to the Bearspaw position regarding the 1951 contract in part by arguing that it was not for the Board to resolve the contract issues. It suggested that Bearspaw should seek a remedy for its concerns on these matters under the contract itself or through the courts.

The examiners note that the Board has previously considered the matter of whether Ironwood has an interest in Belly River gas in the Northwest quarter of Section 18. The Board was satisfied that it has such an interest, and that it could properly hold the licence for the 11-18 well. The examiners note that no evidence was submitted to demonstrate that the interests as represented by Ironwood were incorrect. They accept that Belly River gas ownership is as set out in the Ironwood application and shown on Table 2. For the purposes of any compulsory pooling order, the examiners therefore see two tracts in Section 18: one tract comprising the Northwest quarter, and one tract comprising the South half and Northeast quarter. With respect to the contractual matters raised by Bears paw, the examiners agree with Ironwood that these matters are not relevant to the pooling application, and that the Board does not have the jurisdiction to resolve contractual disputes. The examiners also note that under section 9 of the Act, any pooling order issued by the Board would override the provisions of any contract or other arrangement conflicting with the order. This would apply to all aspects of the order, including the appointment of an operator under the pooling order and any penalty provisions which may be set out in the order.

## **2 ISSUES**

The examiners consider the issues respecting the applications to be

- the need for pooling orders, and
- the provisions of any pooling orders if issued, including
  - whether pooling should be on a tract area or reserves basis,
  - what wells should be subject to any pooling orders issued,
  - the costs and penalties that should be assessed in any pooling orders issued, and
  - the operator(s) to be named in any pooling orders issued.

## **3 CONSIDERATION OF THE APPLICATIONS**

### **3.1 Views of Ironwood**

Ironwood said that it has been unsuccessful in numerous efforts to obtain a voluntary pooling agreement with Bears paw, and that a pooling order is therefore needed to allow production from Section 18. It said that the filing of two competing compulsory pooling applications also shows that there is a need for a pooling order.

Ironwood proposed that the allocation of costs and revenues for both Belly River and Basal Quartz gas production under the pooling order be on a reserves basis. Using its net gas pay maps of the Belly River and Basal Quartz pools underlying Section 18, and assuming constant porosity and water saturation, Ironwood calculated a Belly River allocation of 11.7% for the Northwest quarter of Section 18, and 88.3% for the remainder of the section. For the Basal Quartz, it calculated an allocation of 21.4% for the Northwest quarter of the section, and 78.6% for the remainder of the section.

Ironwood justified using its mapping for the allocation for Belly River production on the basis that there was good well control over Section 18, with log data for some 12 wells, 11 of which had been drilled as prospective Nisku oil wells. Ironwood indicated that there were a number of Belly River intervals within the gross sand unit. It considered the intervals to be in communication and mapped them as a common pool; however, it acknowledged that the intervals could represent separate pools. Ironwood also acknowledged that it was interpretive as to how far to extend the pool to the South and the North. Ironwood disagreed with Bearspaw's argument that available log data for the Belly River Group are highly interpretive because there are different log suites for the various wells which were taken over more than 30 years, and further, that the practice of drilling through the Belly River Group with water when drilling for Nisku oil had damaged the zone and resulted in additional uncertainty in interpreting the logs. Ironwood acknowledged that by applying a 21% density porosity cutoff, an 8-ohm resistivity cutoff, and an associated spontaneous potential development on the logs, its method of analysis tended to produce optimistic results. It maintained however, that this method of analysis was justified for the application because it had resulted in the drilling of successful Belly River wells in this area.

Ironwood said that it had used its cutoff parameters consistently, and on this basis had not assigned any Belly River gas pay to Bearspaw's 14-18 well. Ironwood maintained that Bearspaw's flow test of less than 2 hours on the Belly River Group at the 14-18 well resulted in an uneconomic estimated gas flow rate of 4.1 thousand cubic metres per day ( $10^3 \text{ m}^3/\text{d}$ ). In Ironwood's opinion, the flow test had not substantiated the 14-18 well as being capable of commercial production from the Belly River Group, and seemed to lend support for the cutoffs used in its analysis.

With respect to the Basal Quartz Formation, Ironwood submitted that allocation under a pooling order should be on a reserves basis because of the variable nature of sand distribution over Section 18. However, in particular reference to a well with the unique identifier of 00/10-07-029-19W4, Ironwood acknowledged that other contouring alternatives were possible. It also said that the Basal Quartz Formation in the area has low permeability and requires fracture-stimulation, rendering drill stem tests to be very misleading. Because of this circumstance, Ironwood preferred to refer to log signatures and offset core data in evaluating the Basal Quartz Formation. It reviewed log data for 11 wells in Section 18 which it said provided good well control for mapping the pool. Ironwood used a 12% density porosity cutoff derived

from core data, a 10-ohm resistivity cutoff, and a 32-API (American Petroleum Institute) cutoff on the gamma ray log to obtain net gas pay values for mapping the Basal Quartz pool involved.

Ironwood included both the 2-18 and 14-18 wells within the same Basal Quartz pool underlying Section 18. It disagreed with the Bears paw assertion that pressure data indicates that the Basal Quartz pool encountered by the 14-18 well is separate from that encountered by the 2-18 well. Ironwood said that the surface pressure measurement of 8.1 megapascals (MPa) for the Basal Quartz Formation at the 14-18 well taken by Bears paw in July 1996 indicated some depletion from the initial Basal Quartz pool pressure of approximately 10 MPa. In its opinion, there is a pressure transient in this pool, and the pressure of the pool would be expected to be higher with increasing distance from the two producing wells located South of Section 18. In any event, Ironwood had no confidence in the surface pressure measured on the Basal Quartz in the 14-18 well. It noted that the pressure was measured at surface and since the pressure gradient in the well was unknown, the bottom hole pressure is therefore uncertain.

Ironwood submitted that the respective best wells in each of the pools in question, the 11-18 well for the Belly River pool and the 2-18 well for the Basal Quartz pool, should be allowed to produce from Section 18. It noted that a deliverability test completed in January 1996 by Ironwood showed the absolute open flow potential of the Belly River pool at the 11-18 well to be  $63.2 \times 10^3 \text{ m}^3/\text{d}$ . In contrast, it viewed the short flow test conducted on the 14-18 well to have resulted in an uneconomic flow rate of  $4.1 \times 10^3 \text{ m}^3/\text{d}$  from the Belly River Group. Ironwood also questioned the value of the test performed. It maintained that the test results were questionable and the flow rate was only an estimate. With respect to the Basal Quartz Formation, Ironwood noted that a test conducted over a 40-hour period on the 2-18 well resulted in a flow rate of  $57 \times 10^3 \text{ m}^3/\text{d}$ . It pointed out that on the other hand, a short test of about 2 hours duration on the Basal Quartz zone at the 14-18 well resulted in an estimated flow rate of  $10.48 \times 10^3 \text{ m}^3/\text{d}$ . Ironwood also argued that the 2-18 well should produce from the Basal Quartz pool because it is more optimally located in the pool than the 14-18 well, and has encountered a thicker portion of the pool.

Ironwood proposed that the pooling order provide for the sharing of the costs of drilling and completing the 11-18 well, and for the cost of completing the 2-18 well in the Basal Quartz Formation. It did not request that the drilling costs of the 2-18 well be shared under a pooling order, because none of the parties now involved in the section incurred such costs. Ironwood also requested that if the 14-18 well is allowed to produce, drilling costs should not be recoverable because none of the current tract holders in Section 18 incurred the costs of drilling the well.

Ironwood requested that the maximum penalty allowed under the Act be imposed against a tract owner's share of drilling and/or completion costs, with the penalty coming into effect 30 days after the later of the pooling order being issued, the well being placed on production, and each tract owner being notified in writing of its share of costs. Ironwood considered that the

maximum penalty is justified on the basis that Bearspaw has not been cooperative in responding to Ironwood's attempts to obtain a voluntary pooling arrangement.

Finally, Ironwood requested that it be named operator of both the 2-18 and 11-18 wells under the proposed pooling order.

### **3.2 Views of Bearspaw**

Bearspaw said that it had been unsuccessful in its attempts to resolve the matters in question on a voluntary basis, and it agreed that there is a need for a pooling order.

Bearspaw submitted that allocation of costs and revenues under a pooling order for Belly River production be on a tract area basis, and it initially proposed the allocation for Basal Quartz production be on a reserves basis. Using its net gas pay isopach map of the Basal Quartz pool, and assuming constant porosity and water saturation, it had calculated an allocation for Basal Quartz production of 16.3% for Tract 1 (Lsd 12 and 13), 14.7% for Tract 2 (Lsd 11 and 14), and 69.0% for the South half and Northeast quarter of the section.

Bearspaw submitted a gross sand isopach map showing Belly River sand deposition throughout Section 18. However, it was not comfortable constructing a net gas pay isopach map because of the interpretive nature of the Belly River log data for wells in the section. It contended that interpretation of the log data was rendered uncertain by the differences in the log suites which were obtained over more than 30 years, and by formation damage to the Belly River Group in most of the wells caused by the practice of drilling through the zone with water to reach the deeper Nisku Formation. Bearspaw disagreed with Ironwood's mapping of the Belly River pool which excluded the 14-18 well from the pool. In Bearspaw's opinion, the flow test conducted on the 14-18 well in July 1996 shows the well to be productive in the Belly River Group. It also noted that a surface pressure taken on the Belly River pool at the 14-18 well in July 1996 indicated that the well has encountered the same Belly River pool as the 11-18 well. On the basis of the foregoing, Bearspaw concluded that the allocation of costs and revenues for Belly River production under a pooling order should be on a tract area basis.

Bearspaw constructed a net gas pay isopach map of the Basal Quartz pool underlying Section 18 using a 10% density porosity cutoff, and a clean sand cutoff on the gamma ray log. Its mapping shows the 2-18 and 14-18 wells to be in the same Basal Quartz pool. However, at the hearing, it argued that both its own and Ironwood's maps of the Basal Quartz pool were wrong in view of the surface pressure of 8.1 MPa it measured on the Basal Quartz Formation at the 14-18 well in July 1996. Bearspaw assumed that there were no liquids in the wellbore at the time, and used a gas gradient to calculate a bottom hole pressure for the zone of 8.970 MPa. It considered this to be essentially the same as the initial pressure of the pool which it estimated at 9.490 MPa. It concluded that the Basal Quartz pool encountered by the 14-18 well is different from the one

encountered by the 2-18 well, where the pressure in February 1995 was measured to be 4.667 MPa. Although Bearspaw could not provide a geological explanation, it considered the pressure differences in the Basal Quartz Formation between the wells to be indicative of a permeability barrier between the wells. Consequently, it considered the allocation it initially calculated from its mapping to be invalid, but it did not propose any other allocation to address the circumstances.

Bearspaw argued that the well that should be the designated producer from Section 18 is the first well to be drilled that has the ability to drain each pool. On this basis, it argued that the 14-18 well should produce from both the Belly River Group and the Basal Quartz Formation.

Bearspaw noted that a test of less than two hours conducted in July 1996 resulted in an estimated flow rate for the Belly River Group of  $4.1 \times 10^3$  m<sup>3</sup>/d. It considered this to be an economic rate for what it judged to be a damaged zone which would be fracture-stimulated to increase the flow rate if the well were to be placed on production. Bearspaw also contended that the 14-18 well would drain the Belly River reserves underlying Section 18 as efficiently as the 11-18 well, and that the 11-18 well represents an unnecessary duplication of wellbores.

Bearspaw submitted that its test of approximately two hours in duration, conducted in July 1996, which resulted in an estimated flow rate from the Basal Quartz Formation of  $10.48 \times 10^3$  m<sup>3</sup>/d, shows that the 14-18 well is also capable of producing from that zone. It indicated that it would also fracture-stimulate this zone to increase productivity. Bearspaw further argued that the 14-18 well should be allowed to produce from the Basal Quartz Formation because the 2-18 well would not drain the pool encountered by the 14-18 well. In response to questioning, Bearspaw agreed that it would be reasonable to provide the mineral holders of the South half of the section with an opportunity to have a drainage point for the effective recovery of reserves, provided that Bearspaw is not prevented from draining Basal Quartz reserves in the Northwest quarter of Section 18 through the 14-18 well. It requested that if the 2-18 well is allowed to produce under a pooling order, the order should be drafted in such a way as to allow Bearspaw to apply for reduced drilling spacing units to allow the 14-18 well to also produce Basal Quartz reserves.

Bearspaw proposed that the costs of drilling and completing the 14-18 well should be equalized under the pooling order. It acknowledged that it did not incur the drilling costs directly, but maintained that it did so indirectly at the time it purchased the lands.

Bearspaw requested that the maximum penalty allowed under the Act be imposed against a tract owner's share of drilling and completion costs, with the penalty to be in effect 30 days after the later of the pooling order being issued, the well being placed on production, and each tract owner being notified in writing of its share of costs. It said that the maximum penalty was justified because of the lack of cooperation it encountered in attempting to resolve the issues relating to Section 18.

Finally, Bears paw requested that it be named operator of the 14-18 well under any pooling order issued. It said further that, based on its contractual agreements, it should also be named operator of the 11-18 well should that well be allowed to produce under a pooling order. It did not propose an operator for the 2-18 well, but did not have an objection to allowing production from the 2-18 well so long as it could produce Basal Quartz gas from the Northwest quarter of the section through the 14-18 well.

### **3.3 Views of the Examiners**

The examiners note that the parties involved have been unsuccessful in reaching a mutually satisfactory pooling arrangement for Section 18, and conclude that there is a need for a pooling order.

With respect to the basis for allocation of costs and revenues under a pooling order, the examiners note that section 72(4)(b) states that such allocation "...shall be on an area basis unless it can be shown to the Board that that basis is inequitable".

The examiners agree that there is good well control in the Belly River Group in Section 18. However, the examiners concur with Bears paw that the Belly River log data for the majority of wells in the section are highly interpretive because of the differences in log suites obtained for the various wells over some 30 years, and the probable damage to the Belly River Group caused by drilling through the zone with water. The examiners note that Ironwood acknowledged that there are uncertainties in mapping the areal extent of the pool. In addition, mapping the pool in the vertical sense is also uncertain, because there is no evidence as to whether the various Belly River intervals within the gross sand unit are in communication. Where such uncertainties exist, the examiners consider that log data should be supplemented by deliverability data for mapping. However, no evidence was presented respecting such data for Section 18 except for the 11-18 and 14-18 wells. Consequently, the examiners conclude that the distribution of reserves underlying each tract cannot be determined, and therefore, pooling of tracts on an area basis would be appropriate for Belly River production.

With respect to the Basal Quartz Formation, the examiners observe that the log data is somewhat better than for the Belly River Group. However, the age of the logs, the variation on types of logs run from one well to another, and the heterogeneity of the sand itself make the log analysis very interpretive. The examiners also note that the two parties were unable to agree on the cutoffs to use in log analysis and they both acknowledged that other contouring alternatives are possible in mapping the pool. Further, no Basal Quartz deliverability test data were submitted for Section 18 wells, except for the 2-18 and 14-18 wells, as evidence to supplement the log data. The examiners note the Bears paw argument that pressure data show that the 2-18 and 14-18 wells are in separate Basal Quartz pools. However, the examiners agree with Ironwood that the test may not be reliable. Even if the test had provided more reliable data, the examiners would be cautious in making a pooling decision on the basis of a single measurement. In the examiners'



view, the reservoir pressure would need to be confirmed with a proper bottom hole pressure test conducted in accordance with the Board's Guide G-40. On the basis of the foregoing, the examiners conclude that there is insufficient evidence to warrant using mapping as a basis for allocating costs and revenues for Basal Quartz production under a pooling order.

In determining which well should produce from each zone in Section 18 under a pooling order, the examiners believe they should give primary consideration to the Board's mandate, set out in section 4(a) of the Act, to effect conservation of gas resources.

The examiners do not consider the short flow tests as performed on the Belly River Group and the Basal Quartz Formation at the 14-18 well to be sufficient to substantiate that the well is capable of sustained production from these zones. They acknowledge that the deliverability of the zones may increase with fracture-stimulation; however, there is no assurance that this would occur. The examiners note that Bears paw has not tried to estimate the formation damage or put forward some experience to substantiate that the formation damage could be overcome by fracture-stimulation. On the other hand, a proper deliverability and pressure buildup test has been conducted on the 11-18 well indicating sustainable deliverability from the Belly River Group at the well. A flow test of reasonable duration has also been conducted on the 2-18 well, showing the Basal Quartz Formation to be productive. The examiners conclude that the pooling order should specify the 11-18 and 2-18 wells, respectively, as the wells from which Belly River and Basal Quartz gas should be produced in Section 18.

Although the examiners are not prepared to use the surface pressure measurement taken on the Basal Quartz Formation at the 14-18 well, they acknowledge that it is possible that proper testing in the future could confirm the well to be in a Basal Quartz pool that is either in limited communication with, or isolated from, the pool encountered by the 2-18 well. If this occurs and Bears paw wishes to produce the 14-18 well from the Basal Quartz Formation, it has the option of applying for a holding allowing two producing wells for the section, or for reduced drilling spacing units. In either case, an application would also need to be filed to amend the pooling order issued as a result of these applications, to ensure that the special spacing and pooling orders do not conflict.

The examiners consider it appropriate that the pooling order provide for the sharing of the actual drilling and completion costs of the 11-18 well, and the actual costs of completing the 2-18 well in the Basal Quartz Formation. They agree with Ironwood that it would be inappropriate for the pooling order to specify the sharing of the cost of drilling the 2-18 well, because none of the existing tracts owners incurred these costs.

The examiners note that both parties requested that the maximum penalty allowed under the Act be imposed against a tract owner's share of drilling and completion costs. This penalty would be consistent with the Board's common practice in this type of case. Further, the examiners believe that it would be appropriate, and also consistent with the Board's common practice, for the

penalty to come into effect if the tract owner fails to pay those costs within 30 days of the later of the pooling order being issued, the well being placed on production, and each tract owner being notified in writing of its share of costs. Accordingly, the examiners are prepared to recommend that above-noted penalty provisions be approved.

Finally, the examiners believe that it would be appropriate to name Ironwood as operator of the 2-18 and 11-18 wells under the pooling order.

#### **4 RECOMMENDATION**

The examiners recommend that

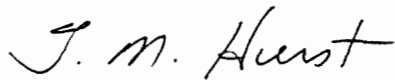
- the Board, with the approval of the Lieutenant Governor in Council, approve Application No. 960222, subject to certain terms set out below, by issuing orders under section 72 of the Oil and Gas Conservation Act, designating that all tracts within Section 18 of Township 29, Range 19, West of the 4th Meridian, be operated as a unit for the production of gas from
  - the Belly River Group, through the well with the unique identifier of 00/11-18-029-19W4, and
  - the Basal Quartz Formation, through the well with the unique identifier of 03/02-18-029-19W4;
- the orders allocate the costs and revenues associated with the subject wells on an area basis, with each tract's share being in the same proportion as the area of each tract is to the total area of the drilling spacing unit;
- the orders provide for the payment of the actual cost of drilling and completing the well with the unique identifier of 00/11-18-029-19W4, for the payment of the actual costs of completing the well with the unique identifier of 03/02-18-029-19W4 in the Basal Quartz Formation, and for the payment of the actual costs of operation and abandonment of the wells;
- the orders specify that a penalty equal to two times the unpaid amount be applied against a tract owner's share of the actual costs of drilling and completing the well with the unique identifier of 00/11-18-029-19W4, and the actual costs of completing the well with the unique identifier of 03/02-18-029-19W4 in the Basal Quartz Formation, if the tract owner does not pay such costs within 30 days of the later of the pooling order being issued, the well being placed on production, and each tract owner being notified in writing of its share of costs;

- the orders designate Ironwood Petroleum Ltd. as the operator of the wells with the unique identifiers of 03/02-18-029-18W4 and 00/11-18-029-19W4; and
- Application No. 960491 be denied.

DATED at Calgary, Alberta on 10 December 1996.



G. C. Dunn, P.Eng.



T. M. Hurst



T. A. Dibus, P.Geol.

**TABLE 1    THOSE WHO APPEARED AT THE HEARING**

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**Principals and Representatives  
(Abbreviations Used in Report)**

**Witnesses**

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Ironwood Petroleum Ltd. (Ironwood)  
H. R. Hansford

J. Carriere  
Consulting Landman  
R. D. Holt, P.Geol.  
R. B. Lowry, P.Eng.  
L. Strong, P.Geol.  
of NCE Resources Group  
Inc. (NCE)

Bearspaw Petroleum Ltd. (Bearspaw)  
T. J. Taylor

R. Lake  
Consulting Geologist  
D. Ostermann  
P. Wright

Alberta Energy and Utilities Board staff  
M. E. Connelly, P.Geol.  
K. Fisher

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**TABLE 2 BELLY RIVER AND BASAL QUARTZ GAS RIGHTS IN SECTION 18**

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**Gas Rights As Submitted By Ironwood**

**Belly River**

South half & Northeast quarter	Ironwood	28.8750%
	NCE	28.8750%
	Pointer Exploration Corp. (Pointer)	42.2500%
Northwest quarter	Ironwood	14.4375%
	NCE	14.4375%
	Pointer	21.1250%
	Bearspaw	50.0000%

**Basal Quartz:**

Northwest quarter	NCE	28.8750%
	Pointer	21.1250%
	Bearspaw	50.0000%
South half & Northeast quarter	Drumheller Basal Quartz Gas Unit No. 1 (the Unit) (Ironwood, NCE, and Pointer hold some 96% of the interests in the Unit; Bearspaw and a number of other parties also have a small interest in the Unit.)	100.0000%

**Gas Rights As Submitted By Bearspaw**

Bearspaw did not dispute Ironwood's submission of ownership for Belly River gas in the South half and Northeast quarter of Section 18, or for Basal Quartz gas for the entire section. However, it submitted that the gas rights for the Belly River for the Northwest quarter of the section are as follows:

Legal Subdivision (Lsd) 12 and 13 (Tract 1)	Bearspaw	50.00%
	NCE	17.50%
	Pointer	21.13%
	Choya Petroleum Ltd.	8.22%
	Llano Resources Ltd.	3.15%
Lsd 11 and 14 (Tract 2)	Before Payout, Bearspaw	100.00%
	After Payout, same as for Lsd 12 and 13	