Alberta Energy Regulator

Bearspaw Petroleum Ltd.

Proceeding 336
Application 1820596
Pool Delineation, Crossfield Basal Quartz C & V Pools

June 2, 2016

Alberta Energy Regulator
Decision 2016 ABAER 007: Bearspaw Petroleum; Proceeding 336, Application 1820596, Pool Delineation, Crossfield Basal Quartz C & V Pools

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Application No. 1820596

Decision

[1] The Alberta Energy Regulator (AER) approves Bearspaw Petroleum Ltd.'s Application No. 1820596.

[2] In reaching its decision, the AER considered all relevant materials constituting the record of this proceeding, including the evidence and argument provided by each party. Accordingly, references in this decision to specific parts of the record are intended to assist the reader in understanding the AER's reasoning on a particular matter and do not mean that the AER did not consider all relevant portions of the record with respect to that matter.

Introduction

[3] Bearspaw filed application no. 1820596 pursuant to subsection 33(1)(d) of the *Oil and Gas Conservation Act* (*OGCA*) asking the AER to include Bearspaw's 102/11-24-24-28W4M (102/11-24) well in the Crossfield Basal Quartz (BQ) C pool. That well is the only well in the BQ V pool (see figure 1). Harvest Operations Corp., Nexen Crossfield Partnership, and Exxon Mobil Canada Energy are working interest owners in the producing C pool wells and are co-owners of a gathering and processing system that services C pool wells. Harvest and Nexen filed statements of concern regarding Bearspaw's application. Harvest participated in the hearing on behalf of itself, Nexen, and Exxon Mobil Canada. Harvest opposed the inclusion of the 102/11-24 well in the C pool.

[4] Bearspaw based its application largely on pressure data, which it said supported its argument that the C and V pools are not separate. Harvest's opposition was also focused on the pressure data. Harvest argued that, properly understood, the pressure data supported its argument that the C and V pools are separate or, if they are not actually separate, that the communication between them is not "effective" enough to find that they appear to be the same pool.

[5] Throughout the process, both Bearspaw and Harvest referred to the impacts of the C pool delineation on a potential common carrier application that Bearspaw might bring to gain access to the gathering and processing system currently serving C pool wells. At the prehearing, the panel specifically

asked the parties if there were any additional applications that should be considered in conjunction with Bearspaw's application. Bearspaw and Harvest advised the panel that it would be most efficient to proceed with Bearspaw's application as filed.

Procedural Background

Notice of Hearing

[6] The AER issued an initial notice of hearing on November 5, 2015, setting a deadline for requests to participate of November 20, 2015 and an applicant response deadline of November 27, 2015. Harvest filed its request to participate on November 20, 2015. Bearspaw requested, and the panel granted, an extension to its response deadline date to December 4, 2015. The panel granted full hearing participation rights to Harvest in a letter to parties dated December 11, 2015.

Prehearing

[7] A notice of prehearing meeting was issued on December 17, 2015, setting a prehearing meeting date of January 12, 2016. The panel held a prehearing meeting in Govier Hall on January 12, 2016, to consider the following:

- scheduling of the hearing,
- submission deadlines,
- the need for a formal information request process,
- time limits for the presentation of evidence and cross-examination,
- the specific issues to be addressed at the hearing, including common carrier issues, and
- any other matters that may aid in the simplification or the fair and most expeditious disposition of the proceeding.

[8] The panel issued a letter with its decisions from the prehearing meeting to the participants on January 13, 2016. In its letter, the panel agreed with parties that we would only hear the application as filed without the addition of a common carrier or any other application. The panel confirmed that the hearing would be scheduled for two days and would begin on April 20, 2016. The panel also confirmed that a formal information request process would not be scheduled but provided a final date for responses to information requests along with other submission filing dates. The panel decided that given the amount of evidence yet to be filed, they would establish time limits closer to the hearing date.

[9] A notice of hearing was issued on January 21, 2016, announcing that the oral hearing would begin on April 20, 2016, in Govier Hall.

[10] Section 19.1 of the *Alberta Energy Regulator Rules of Practice* requires the panel to establish time limits for evidence, cross-examination, and argument. After requesting time estimates from the parties, the panel set those time limits in a letter dated April 19, 2015.

Hearing

[11] The oral hearing took place over two days beginning April 20, 2016, before hearing commissioners C. Low (presiding), H. Kennedy, and J. Lawson. Those who appeared at the hearing are listed in appendix 1.

Issues

[12] Section 33 (1) of the *OGCA* gives the AER the authority to "designate a pool" by describing the pool boundary at surface and naming or otherwise identifying the subsurface reservoir in which the pool occurs. Pool boundaries may be redelineated following the initial assignment of wells to a pool when additional information becomes available. The AER may delineate and redelineate pool boundaries on its own motion or on application.

[13] As noted in section 2.5.1 of *Directive 065: Resources Applications for Oil and Gas Reservoirs*, "The interpretation of pool reserves and delineation can affect regulatory requirements related to the operation and development of oil and gas pools in Alberta, as well as equity-based issues between operators." As a result, well licensees are encouraged by the AER to apply to have a pool redelineated when new information is available that would substantially change existing pool boundaries.

[14] In this case, Bearspaw has asked the AER to redelineate the BQ C pool so that it includes its 102/11-24 well on the basis of additional pressure data collected over a series of extended pressure tests.

[15] The *OGCA* defines a pool to mean:

> "(i) a natural underground reservoir containing or appearing to contain an accumulation of oil or gas, or both, separated or appearing to be separated from any other such accumulation…"

[16] What we have to decide is whether the accumulation of gas in the BQ encountered by the 102/11-24 well is separate or appears to be separate from the accumulation of gas being produced by the C pool wells. There are no prescribed factors that the AER must take into account when considering an application made under section 33(1) of the *OGCA*. Previous pool delineation decisions made by the AER's predecessors have taken into account a variety of factors including geology, geochemistry, gas composition, pressure data, and other matters that may be broadly described as reservoir characteristics.

[17] As the applicant, the burden of proof rests with Bearspaw to establish on a balance of probabilities that the 102/11-24 well ought to be included in the C pool. The evidence does not need to be conclusive.

[18] In this case, the parties provided evidence and submissions relating to geology, depositional environment in particular; gas composition; pressure data; and reservoir characteristics. These factors are discussed below.

Geology

[19] The parties each provided an interpretation of the geology that was broadly similar but different in detail. For example, Bearspaw submitted that the BQ in the area of the C and V pools was deposited in a braided fluvial system. Harvest's interpretation is that the BQ in this area was deposited in a meandering system. An academic paper cited by Bearspaw in its rebuttal evidence suggests that the most appropriate interpretation is that the BQ in the region was deposited in several cycles, including both braided and meandering systems.[1]

[20] Bearspaw described the BQ in the area as a large (in aerial extent) heterogeneous reservoir with highly variable porosity and permeability. Bearspaw's interpretation is that its 102/11-24 well is in a less depleted area of a large pool that includes the BQ C wells. It also said that the highly variable porosity and permeability and overall heterogeneity of the depositional environment results in differences in the behavior of the wells in the pool as reflected by pressure data.

[21] Harvest's geological interpretation is that the BQ reservoir comprises up to four depositional cycles of deeply incised fluvial channel system sands and that the BQ C and V pools were formed in a complex fluvial environment where several different mechanisms exist that could result in the separation of pools in the reservoir. Specifically, Harvest submitted that specific characteristics of the BQ in the area, such as the presence of silica cement and the presence of clay in core samples taken from wells in the area, contribute to pool separation within the reservoir. Harvest also pointed to well logs from wells in the C pool that its geologist, Mr. Howard, said are consistent with the presence of mudstone drapes. Mudstone drapes would contribute to the separation of the accumulation of petroleum in different pools in a reservoir.

[22] Mr. Howard also said that while the characteristics of well logs recorded at various C pool wells are similar to the 102/11-24 well logs, suggesting a similar depositional environment, that similarity does not establish that the C pool and V pool are connected.

[1] B.R. Spence, "Sedimentology and Diagenesis of the Basal Quartz Formation, Calgary, Alberta," (master's thesis, University of Calgary, 1997).

[23] Bearspaw submitted that the porosity and permeability of the BQ in the 102/11-24 well as interpreted from well log data is within a reasonable range of the porosity and permeability found in the C pool wells. Harvest did not challenge this point. The panel finds that the well log evidence provided by both parties clearly establishes that the porosity and permeability of the BQ varies throughout the C pool.

[24] We agree with the broad interpretation of both Bearspaw and Harvest that the BQ in the region of the current C and V pools is sands deposited in a complex fluvial system. The panel's interpretation of the geological evidence provided by the parties, including the well logs and cross-sections, is that the BQ in the area was deposited in a complex depositional environment that includes both meandering and braided depositional facies. Such an environment could result in separate pools within the same reservoir and also in larger pools that are highly heterogeneous.

[25] Finally, both Bearspaw and Harvest submitted net pay maps of the BQ in the relevant area. Bearspaw's map was very optimistic. It outlined a C pool that was many times larger than the current pool delineation, extending a significant distance to the south beyond the southern-most well control. Harvest's net pay map for the C pool was very conservative and did not include wells at 15-23-28-24W4M and 100-102/11-24, notwithstanding the fact that they encountered relatively significant BQ sands. Harvest's geologist, Mr. Howard, explained that he excluded the 15-23 and 100/11-24 wells from the net pay map because in his opinion they had negligible net pay. His opinion was based on the fact that the company that had drilled both wells was unable to complete either and bring them on production.

[26] The panel finds that it is most probable that neither the Bearspaw nor the Harvest net pay maps accurately reflect the C pool; the reality is somewhere in between. Neither party argued that net pay mapping provided conclusive evidence, and in this case, the panel finds that the net pay maps are not helpful in determining whether the 102/11-24 well appears to be in a separate pool from the C pool wells.

[27] In our view, the key point arising from the geological evidence is that the BQ reservoir is heterogeneous and appears to be highly so. We find that the geological evidence on its own does not establish on a balance of probabilities that the boundaries of the C pool should be redrawn to include the 102/11-24 well.

Gas Composition

[28] Bearspaw submitted evidence of the composition of the gas produced from two C pool wells and its 102/11-24 well. Harvest provided no gas chemistry evidence of its own and did not challenge Bearspaw's evidence on this point.

[29] The gas composition evidence shows a marked similarity between the two C pool wells and the 102/11-24 well for all but four specific components: iC5, nC5, C6, and C7. For those four components there is a small but noticeable difference.

[30] In the course of questioning at the hearing, Bearspaw provided its explanation of the difference. Bearspaw's witness Mr. Kaplan said it was most likely the result of the fact that the C pool well samples and the V pool sample at the 102/11-24 well were taken at a different points: the latter at the separator, the former at the wellhead. According to Mr. Kaplan, the effect of taking samples at the separator is that any liquids produced with the gas would have dropped out. That would be reflected in the difference in the values of the liquids components represented by the iC5, nC5, C6, and C7 numbers. Bearspaw provided no evidence in support of its explanation.

[31] While Bearspaw's explanation is reasonable, we find that the gas composition evidence, whether considered alone or with the geological evidence, is not sufficient to establish whether, on balance of probabilities, the gas accumulation in the V pool is separate or appears to be separate from the C pool.

Observed Pressures and Reservoir Characteristics

[32] Bearspaw filed a significant amount of pressure data for the 102/11-24 well. When compared to the pressure data for the wells in the BQ C pool, the static gradient pressure data for the 102/11-24 well appears to set it apart. For example, static gradient pressure readings for wells in the C pool taken in October 2011 after those wells had been shut in for six months reflect stabilized pressures and range from 3300 kPa to 3900 kPa for all but the 6-26-24-28W4 well, which had a pressure of 6800 kPa. The closest pressure data in time for the 102/11-24 well is from September 2013 after the well had been shut in for two and a half years. The observed pressure was 12 296 kPa. In a homogeneous pool or a pool that was more homogeneous than heterogeneous, we would expect the pressure in the 102/11-24 well to be much closer to that of the pressures in the C pool wells if the wells were in the same pool. However, we find that the BQ reservoir is more heterogeneous than homogeneous and so the fact that the initial static gradient pressure of the 102/11-24 well differs by more than we would expect in a homogeneous pool is not conclusive evidence of 102/11-24 being in the same or a separate pool.

[33] Similarly, as noted by Harvest, when plotted in a pressure vs. time graph or a pressure vs. cumulative production graph, the 102/11-24 well does not appear to behave like the wells in the C pool. The 102/11-24 pressures are noticeably higher and, when plotted over time or production, result in a curve that is different from that of the majority of the C pool wells. The 6-26 well, however, which was initially designated to a single-section pool on its own, was redesignated to the BQ C pool in April 2002. Its pressures and pressure trends also appear to be somewhat different than the rest of the C pool wells. In addition, it was the evidence of Harvest's witness Dr. Pooladi-Darvish that the stabilized pressures in 6-26 are higher relative to the earlier C pool wells because that well has not been able to produce a corresponding amount from its drainage area. He said it was likely that 6-26 is in "limited communication" with the rest of the pool. It is also important to note that Dr. Pooladi-Darvish indicated that in some instances, such as where communication within a pool is limited, the pressure vs. production (p/Z) calculation may not be applicable. He said that in cases closer to "what we have here" in the C pool, more than one interpretation of the p/Z data is possible.

[34] The panel's interpretation of the 6-26 pressure data is that it reflects a change or changes in the C pool that are significant enough to affect the pressure data in a way that makes it distinctive when compared to the other wells currently in the C pool and more like the 102/11-24 well, which has also had a limited opportunity to produce from its drainage area. We believe that the 6-26 well is evidence of changes in the C pool that establish an intermediate step or link to the pressure data from the 102/11-24 well.

[35] When plotted with the pressure data from the C pool wells and the 102/11-24 well (see, for example, the written evidence of Benoit Regulatory Compliance Inc. dated February 26, 2016, which will be referred to as the Benoit evidence, figures 1 and 2) the panel finds that the 6-26 well pressure data support Bearspaw's interpretation of a highly heterogeneous pool with observable differences in depletion and pressure characteristics trending to the south and south-southeast towards the 102/11-24 well, which it says is in the least depleted area of the pool. Harvest expressed no concern with the 6-26 well being included in the C pool. Indeed, Harvest's reservoir engineering expert, Dr. Pooladi-Darvish, said that he would have difficulty excluding the 6-26 well from the C pool.

[36] Dr. Pooladi-Darvish sorted pressure data from the BQ C and V pools into categories (good, mediocre, and bad) reflecting his professional opinion about the quality of the particular data point in terms of whether it reflected a stabilized pressure or not and whether it was problematic or questionable from some other perspective. The exercise demonstrates attention to detail and quality control and for that reason the panel has referred to the data as set out in the tables included in Dr. Pooladi-Darvish's written submissions in the discussion below.

[37] The initial pressure of the first well drilled and included in the C pool, 11-02-25-28W4M, was 17 000 kPa. The initial pressure of the first well drilled into a new, separate pool in the same BQ reservoir would be expected to have an initial pressure similar or at least close to that of the C pool. Both Bearspaw and Harvest agree on this point. The initial pressure of the 102/11-24 well was 13 837 kPa, which is 3163 kPa less than the initial pressure of the 11-02 well. The panel finds that the pressure difference is significantly greater than would be expected for a well drilled into a new, separate pool in the same homogeneous reservoir.

[38] Wells drilled after the 11-02 well but before 102/11-24 and included in the C pool had initial pressures of 11 800 kPa, 12 100 kPa (the 6-26 well), 7600, and 5100 kPa. The decreasing pressures reflect depletion of the C pool resulting from production of earlier wells. Although the 6-26 well appears anomalous, the oral evidence of Harvest's expert, Dr. Pooladi-Darvish, was that the initial pressure of the 6-26 well, which bears the greatest similarity to the 102/11-24 well in terms of pressure, net pay thickness, and location in the reservoir, indicates that that the reserves within reach of that well had been depleted by C pool production by approximately five-eighths or roughly 60%.

[39] In questioning by the panel, Dr. Pooladi-Darvish referred to figure 1 in the Benoit evidence to estimate initial depletion of the 6-26 well, other C pool wells, and the 102/11-24 well. His estimates were based on the ratio of the difference between the initial pool pressure of 17 000 kPa and the initial pressure of the well in question, and the difference between 17 000 kPa and the estimated pool pressure at the relevant time taken from the average trend line shown on figure 1.

[40] Using Dr. Pooladi-Darvish's method of estimation, other wells in the C pool, specifically 6-11 and 11-35, showed greater depletion on initial pressure testing of about 83% (five-sixths). Dr. Pooladi-Darvish's oral evidence at the hearing was that the 102/11-24 well reserves had been depleted by approximately 25% by the time the well was drilled. Using figure 1 of the Benoit evidence and Dr. Pooladi-Darvish's approximation method as described above, the panel finds that the 102/11-24 well appears to have experienced approximately 30% drainage by the time it was first pressure tested by Bearspaw.

[41] Bearspaw explained that the difference in initial pressures and the lower apparent drainage at the 102/11-24 was the result of (1) the fact that the C pool is heterogeneous with highly variable porosity and permeability throughout and (2) that the 102/11-24 well is in an as yet undepleted portion of the pool.

[42] Harvest submitted that the initial pressure of the 102/11-24 well is so different from the initial pressures of the C pool wells that it would not be reasonable to include it in the C pool.

[43] As part of its written rebuttal evidence dated March 29, 2016, Bearspaw submitted the static gradient test data for the 100/11-23-24-28W4M well (100/11-23). That well has not been producing and is not designated to a pool. The 100/11-23 well was drilled and completed seven years after the 6-26 well. The recorded downhole pressure at that time was 11 695 kPa, reflecting, according to Bearspaw, an approximately 32% decline from initial reservoir pressure as a result of depletion. Harvest did not challenge Bearspaw on this point. The panel finds that it is more likely than not that the 100/11-23 well reserves have been depleted as a result of production of C pool wells (6-26 in particular) and that the bottomhole location of the 100/11-23 well appears to have penetrated an area of the BQ reservoir that is more like the 102/11-24 than wells in the C pool north of the 6/26 well.

[44] In addition to the static pressure data, Bearspaw acquired pressure data from the 102/11-24 well over five separate "extended gradient" tests. Bearspaw describes an "extended gradient" test as when pressure readings are taken at the landing point of the pressure recorders over an extended period of time—in this case weeks and months—before the instruments are retrieved. The pressure data from each of the extended gradient tests clearly show a slowly falling pressure in the 102/11-24 well. According to the corrected data provided by Bearspaw in table 3 of its supplemental evidence submission dated March 14, 2016, the pressure falls between each test period: for example 1447 kPa between the end of pressure gradient one and the first pressure recorded for pressure gradient two (over a period of some eight years, including two and a half years of production) and 53 kPa between the end of pressure gradient two and

the first stabilized pressures for pressure gradient three (over a period of eight months). The stabilized pressures also decline over the course of each of the extended gradient tests. For example, during each of extended pressure gradient tests one, two, and three, the pressure declined 21 kPa over a period of 6.7 weeks, 17 kPa over a period of 11.1 weeks, and 36 kPa over a period of 14.1 weeks, respectively. The corresponding pressure depletions, as calculated by Bearspaw, are 13.7 kPa/month, 6.6 kPa/month, and 11.0 kPa/month. The lower decline rate over the course of extended pressure gradient test two corresponds to the period after the C pool wells had been shut in for approximately sixteen months.

[45] Bearspaw submitted that the only reasonable explanation for the falling pressures is that the BQ penetrated by the 102/11-24 well is being depleted as a result of production from the C pool wells. As a consequence, Bearspaw said the 102/11-24 well does not appear to be separate from the C pool.

[46] Harvest raised a number of arguments against Bearspaw's submissions. First and foremost Harvest argued that Bearspaw's pressure data were unreliable for a variety of reasons. Harvest pointed to changes in fluid levels, the potential presence of fluid levels above the pressure gauges, and disparities in pressures measured at the wellhead vs. calculated wellhead pressure, arguing that the relatively small decrease in bottomhole pressures measured over the extended static gradient tests was not reliable because it was many times smaller than the unexplained discrepancy in the calculated vs. measured wellhead pressure.

[47] Harvest also argued that there were wellbore effects resulting from changing fluid levels that affected Bearspaw's data and, given the relatively small pressure decline, the data could not be relied on to show that on a balance of probabilities the 102/11-24 well was not separate or does not appear to be separate from the C pool. Harvest's witness Dr. Pooladi-Darvish also expressed the view that an ongoing gas–liquid exchange could explain the observed pressure declines, but he did not provide or point to any evidence to support his view.

[48] We agree that the pressure data reflect changing fluid levels, other wellbore effects, or both at the beginning of each Bearspaw extended gradient test. However, if that data is excluded and the stable pressures are examined (for example see attachments 21 and 23 of Bearspaw's rebuttal), the panel concludes that the bottomhole pressures observed in the 102/11-24 well consistently ("repeatably" in Bearspaw's submissions) show a decline in pressure over a period of weeks and months that is more probably than not real and is not explained by the evidence filed in this proceeding if the 102/11-24 BQ gas reserves are not being depleted by production from other wells.

[49] Although Harvest also raised packer integrity and thief zones as possible contributors to pressure decline, AER staff asked a series of questions in regards to the possibilities as well as the possibility of wellhead seals, and the panel is satisfied that there is no evidence of any additional leak paths or mechanical leakage. In addition, Bearspaw provided evidence that the gauges used to record the pressure

data it submitted were calibrated. For that reason, and because of the repeatability of the observed pressure decline, the panel is also satisfied that the reliability of the gauges themselves is not an issue.

[50] Harvest's response to the slow, ongoing measurable decline in pressure observed at the 102/11-24 well was to take the position that if the C and V pools are in pressure communication, that communication was not "effective" and therefore should not form the basis for a redelineation of the C pool.

[51] In support of its alternative submission, Harvest used data provided by Bearspaw in three different reservoir engineering calculations used in standard industry practice. The purpose was to show that including the 102/11-24 well in the C pool gave unreasonable results. For example, Harvest's expert Dr. Pooladi-Darvish calculated original gas in place assuming that if it was part of the C pool the 102/11-24 well initial pressure would have to be the most representative pressure of the pool.

[52] Bearspaw argued, and the panel agrees, that assumption does not accurately reflect reality in a heterogeneous pool. Indeed, Dr. Pooladi-Darvish acknowledged that the calculations he presented all necessarily assumed a reservoir that was homogeneous. For that reason we find that those three calculations are not sufficiently compelling to outweigh the slow but steady decline in pressure of the BQ reservoir observed at the 102/11-24 well and the apparent depletion of its reserves.

[53] Harvest also argued that if there is communication between wells, effective communication would lead to 80–90% depletion over a twenty-year period. However, Harvest was unable to provide any evidence of industry or regulatory standards or criteria in support of its submissions on "effective communication." Harvest did submit that because the apparent depletion observed at 102/11-24 is not comparable to the depletion observed over the same period of time at wells currently in the C pool, communication between them must not be effective.

[54] Harvest also argued that unconventional shale reservoirs are an example of a situation where even though there may be pressure communication it would not make sense to delineate a pool simply on that basis. Harvest's argument on this point is not relevant since we are not dealing with an unconventional shale reservoir here.

[55] Bearspaw took the position that "effective communication" should be considered to be a significant loss in reserves over the life of the reservoir and that what is "significant" should be defined on a reservoir-by-reservoir basis. Bearspaw provided evidence of the monetary value of reserves it says it has lost in support of its argument that if the effectiveness of communication is a factor, then it has satisfied that requirement.

[56] In the panel's view, the monetary value of any reserves that may have been drained from around the 102/11-24 well is not relevant to this application. Similarly, any possible decrease in value of C pool production to Harvest with the 102/11-24 included in that pool is not relevant to our consideration of whether or not to redelineate the pool boundary. We must assess the evidence against subsection 33(1)(d)

of the *OGCA* and the definition of "pool." More particularly, as noted above, we must determine whether the accumulation of gas in the BQ encountered by the 102/11-24 well appears to be separate from the accumulation of gas in the BQ encountered by wells in the C pool. The monetary value of potential or lost production does not assist in that determination.

[57] Neither party made arguments based on statutory interpretation, case law, or previous decisions of the regulator or its predecessors on this point. The *OGCA* does not require or establish thresholds of communication for the purposes of determining whether pools which are in fact physically connected can appear to be separate for the purposes of pool delineation. In light of the overall purposes of the *OGCA* set out in section 4, especially preventing waste and providing for efficient development of oil and gas resources of Alberta, the panel finds that for the purposes of determining whether an accumulation of oil or gas appears to be separate, communication is the ability of production from one or more wells in a reservoir to affect production by depleting reserves that might otherwise be produced from another well in the same reservoir.

[58] For the purposes of this application, our interpretation of the BQ reservoir pressure evidence is that the 102/11-24 well is and has been experiencing drainage. Whether the initial drainage is the 25% in Dr. Pooladi-Darvish's oral evidence or the 30% found by this panel using Dr. Pooladi-Darvish's method of estimation or in fact some other number, the fact that pressures that reflect drainage are repeatedly measurable and ongoing is sufficient. The only producing wells in evidence before us that could affect production from the 102/11-24 well are the C pool wells. As a result, we conclude that on a balance of probabilities, the accumulation of gas in the BQ at the 102/11-24 well does not appear separate from that in the C pool.

Conclusion

[59] As a result, Bearspaw's application is granted. The 102/11-24 well will be designated to the BQ C pool, and the C pool boundary will be redelineated to include the current BQ V pool which contains only the 102/11-24 well.

Dated in Calgary, Alberta, on June 2, 2016.

Alberta Energy Regulator

<original signed by>

C. Low
Presiding Hearing Commissioner

<original signed by>

H. Kennedy
Hearing Commissioner

<original signed by>

J. Lawson
Hearing Commissioner

Appendix 1 Hearing Participants

Principals and Representatives (Abbreviations used in report)	Witnesses
Bearspaw Petroleum Limited (Bearspaw) J. Gruber	J. Kaplan P. Wright
Harvest Operations Corp. (Harvest) on behalf of itself, Nexen Crossfield Canada Energy by its managing partner Nexen Energy ULC (Nexen), and ExxonMobil Canada Energy (ExxonMobil Canada) D. Wood	R. Swanson J. Glenn M. Pooladi-Darvish G. Howard
Alberta Energy Regulator staff B. Kapel Holden, AER Counsel D. Burns, AER Counsel G. McLean K. Li J. Chmilar D. Carson A. Shukalkina M. Arguello	

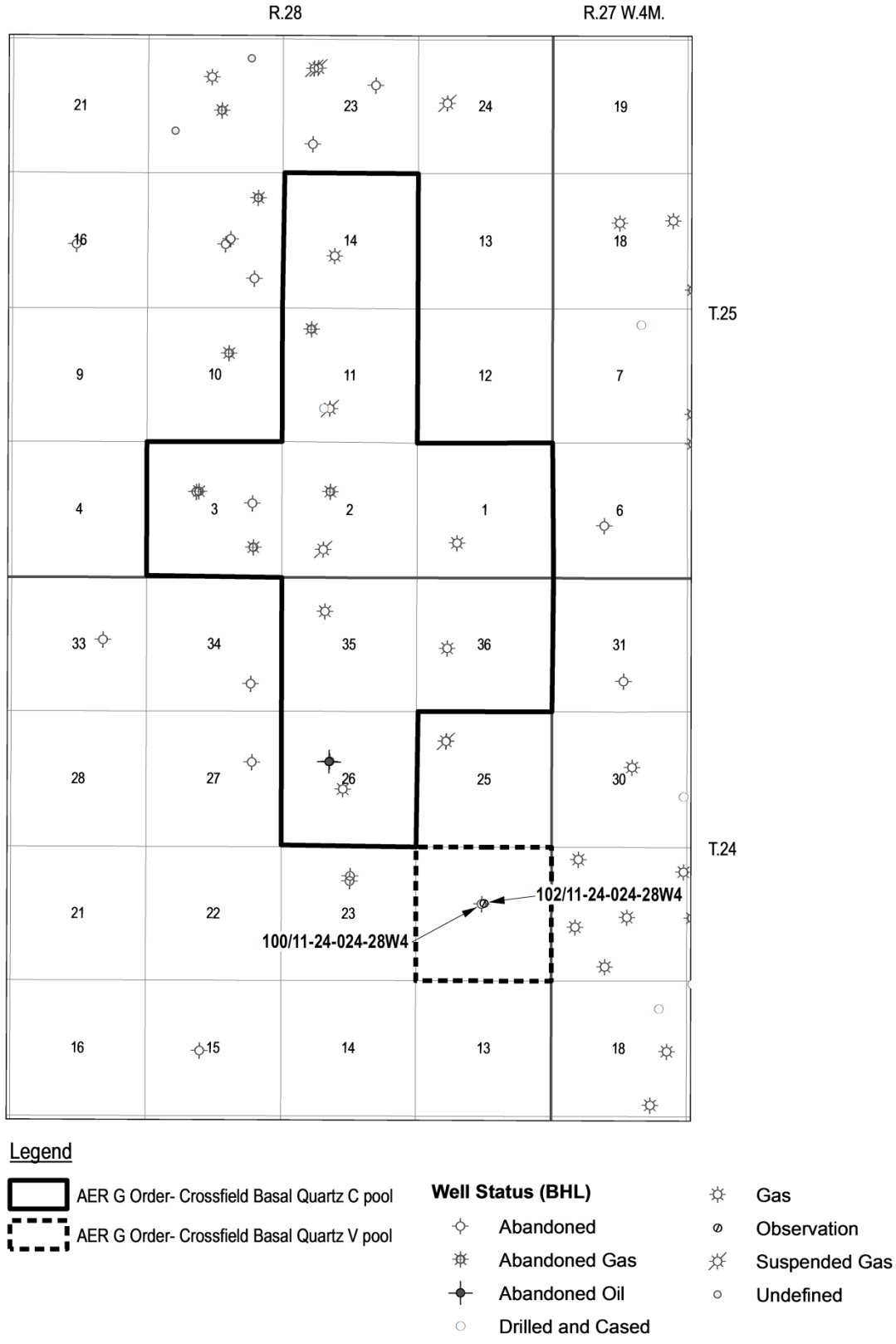

Figure 1. Pre-decision AER pool order outlines for the C and V pools