

# ALBERTA ENVIRONMENTAL APPEALS BOARD

## Report and Recommendations

Date of Hearing – November 24 and 25, 2009  
Date of Report and Recommendations – December 23, 2009

**IN THE MATTER OF** sections 91, 92, 94, and 95 of the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c. E-12, and section 115 of the *Water Act*, R.S.A. 2000, c. W-3;

**-and-**

**IN THE MATTER OF** an appeal filed by the Municipality of Crowsnest Pass with respect to the decision of the Director, Southern Region, Environmental Management, Alberta Environment, to refuse to issue a water licence, from a well located at SW-16-08-05-W5M, under the *Water Act*.

Cite as: *Municipality of Crowsnest Pass v. Director, Southern Region, Environmental Management, Alberta Environment* (23 December 2009), Appeal No. 08-016-R (A.E.A.B.).

**BEFORE:**

Mr. Eric O. McAvity, Q.C., Panel Chair;  
Dr. Alan J. Kennedy, Board Member; and  
Mr. Gordon Thompson, Board Member.

**BOARD STAFF:**

Mr. Gilbert Van Nes, General Counsel and  
Settlement Officer; Ms. Denise Black, Board  
Secretary; and Ms. Marian Fluker, Associate  
Counsel.

**SUBMISSIONS BY:**

**Appellant:** Municipality of Crowsnest Pass, represented by  
Mr. Derek King, Brownlee LLP.

**Director:** Mr. Robert Burland, District Approval Manager,  
Southern Region, Environmental Management,  
Alberta Environment, represented by Ms.  
Michelle Williamson, Alberta Justice.

**Intervenors:** Bridgegate Financial Corporation, represented by  
Mr. William L. Bradley; ClansWest Development  
Ltd., represented by Mr. Shane Stewart; and Mr.  
Terry Kenney.

**WITNESSES:**

**Appellant:** Dr. Grant Nielsen, Hydrogeologist, Stantec  
Consulting Ltd.; Mr. Garry Chan,  
Hydrogeologist, Stantec Consulting Ltd.; Mr.  
Gordon Lundy, Chief Administrative Officer,  
Municipality of Crowsnest Pass; and Mr. Jeff  
Drain, Stantec Consulting Ltd.

**Director:** Mr. Rob Burland, Director, Southern Region,  
Environmental Management, Alberta  
Environment; Mr. Robert George, Hydrogeologist  
and Groundwater Policy Advisor, Alberta  
Environment; Mr. Jeff Gutsell, District  
Hydrologist, Southern Region, Environmental  
Management, Alberta Environment; and Ms.  
Kathleen Murphy, Water Approvals Team  
Leader, Southern Region, Environmental  
Management, Alberta Environment.

**Intervenors:** Mr. William L. Bradley; Mr. Shane Stewart; and  
Mr. Terry Kenney.

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## **Executive Summary**

Alberta Environment refused to issue a water licence under the *Water Act* to the Municipality of Crowsnest Pass for a water well located near the community of Sentinel, Alberta. The reason Alberta Environment refused to issue the licence was a possible connection between the proposed well and Crowsnest Lake or other surface water sources. Alberta Environment has placed a reservation on all surface water and groundwater that naturally flows to and from surface water sources, in most of southern Alberta, the effect of which is to limit the issuance of new water licences from such sources.

Following a hearing, the Board concluded the water being requested under the licence was reserved water and, therefore, the Board recommended to the Minister that the Director's decision be upheld. Based on the evidence and data provided, significant uncertainty remained as to whether the water applied for was hydraulically connected to surface water. The purpose of the reservation in the South Saskatchewan, Oldman, and Bow river basins is to protect and conserve water for downstream water users and future users. Given the absence of compelling site-specific data that could demonstrate with a greater degree of certainty that the aquifer is not connected to a surface water body, the Board applied the precautionary principle. The water applied for was, therefore, reserved water, and the Board recommended no licence should be issued.

## I. INTRODUCTION

[1] This is the Board's Report and Recommendations regarding the appeal of a decision by Alberta Environment to refuse to issue a water licence for a municipal well intended to supply residential and commercial developments.<sup>1</sup> Alberta Environment refused to issue a licence because, in its view, the water being requested is "reserved" under section 35 of the *Water Act*, R.S.A. 2000, c. W-5. This section of the *Water Act* authorizes the Minister to "reserve" unallocated water and restrict the purposes for which the water may be used.<sup>2</sup>

[2] In this case, there is a reservation in place known as the *Bow, Oldman, and South Saskatchewan River Basin Allocation Order*, Alta. Reg. 171/2007 (the "Allocation Order"). The Allocation Order reserves all unallocated water "in the Oldman River and its tributaries and the water below the ground naturally flowing to and from the Oldman River and its tributaries"<sup>3</sup> and

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<sup>1</sup> Alberta Environment expressed concern about how the appeal has been characterized with respect to the nature of the decision under appeal. This concern is discussed under the heading "Jurisdiction" and it should be clear that referring to the decision made by the Director as "refused to issue a licence" should not be construed as the Board having prejudged the matter.

<sup>2</sup> Section 35 of the *Water Act* provides in part:

35(1) The Minister may by order reserve water that is not currently allocated under a licence or registration or specified in a preliminary certificate

- (a) in order to determine how the water should be used, or
- (b) for any other purpose.

(2) When making an order under subsection (1), the Minister may

- (a) include terms and conditions,
- (b) subject to section 29(2)(b), prescribe the priority number of any allocation of water to be made from the reserved water, but the priority number may not be based on a date and time that is earlier than the date and time that the reservation was made, and
- (c) specify
  - (i) the purposes for which,
  - (ii) how,
  - (iii) to whom, and
  - (iv) the time period within which,

an allocation of the reserved water may be made by the Director.

(3) The Director may ...

- (c) if an order under subsection (1) allows, issue a licence for the diversion of the reserved water and in accordance with an order made under subsection (1), and
- (d) refuse to accept an application for a licence for the reserved water unless the refusal is contrary to an order made under subsection (1).

<sup>3</sup> Section 1 of the Allocation Order states:

"1. In this Order ... (e) 'Oldman River Basin' means the Oldman River and its tributaries and the water below the ground naturally flowing to and from the Oldman River and its tributaries, within Alberta ..."

Section 2 of the Allocation Order states:

only authorizes water licences to be issued for certain purposes. These purposes do not include supplying residential and commercial developments.

[3] The issue in this appeal is whether the water from the Well is “reserved water” because it is “water below the ground naturally flowing to and from the Oldman River and its tributaries.” If the water being requested is reserved water, then Alberta Environment may not issue the water licence. If the water is not reserved water then, subject to additional licensing requirements, it may be possible for Alberta Environment to grant the water licence.

## **II. PROCEDURAL BACKGROUND**

[4] On August 18, 2008, the Director, Southern Region, Environmental Management, Alberta Environment (the “Director”), refused to issue a water licence to the Municipality of Crowsnest Pass (the “Appellant”) for the proposed Sentinel Well located at SW-16-08-05-W5M (the “Well”) within the municipality. The Director refused to issue the licence because the water from the Well is reserved water as, in his view, there is a connection between the Well and the Crowsnest Lake, which is a surface water feature of the Oldman River system, and he may not issue a licence for reserved water in these circumstances.

[5] On September 19, 2008, the Environmental Appeals Board (the “Board”) received a Notice of Appeal from the Appellant appealing the Director’s decision.

[6] On September 22, 2008, the Board wrote to the Appellant and the Director (collectively the “Parties”) acknowledging receipt of the Notice of Appeal and notifying the Director of the appeal. The Board also requested the Director provide the Board with a copy of the record (the “Record”) relating to the appeal, and that the Parties provide available dates for a mediation meeting, preliminary motions hearing, or hearing. The Record was received on October 20, 2008.

[7] According to standard practice, the Board wrote to the Natural Resources Conservation Board, the Energy Resources Conservation Board, and the Alberta Utilities

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“All the water in the Bow River Basin, Oldman River Basin and South Saskatchewan River Basin that is not, on the date this Order is filed under the *Regulations Act*, allocated under a licence or registration or specified in a preliminary certificate is reserved.”

Commission asking whether this matter had been the subject of a hearing or review under their respective legislation. The boards all responded in the negative.

[8] In consultation with the Parties, the Board scheduled a mediation meeting for January 14, 2009, in Lethbridge, Alberta. On December 22, 2008, the Appellant notified the Board that the Director and the Appellant were in discussion, and the Parties asked that the mediation meeting be adjourned. The Board granted the adjournment on January 9, 2009. The Board requested monthly status reports be provided, and the Parties were asked to provide available dates for a hearing in August 2009. The Board received monthly updates until June 2009.

[9] On June 26, 2009, the Appellant notified the Board that the appeal needed to proceed to a hearing, because the issue could not be resolved through discussions with the Director. On August 6, 2009, the Board notified the Parties that the Hearing would be held on October 20, 2009.

[10] On August 28, 2009, the Board contacted Alberta Environment requesting it provide any policy documents or any other documents that might affect this appeal and that were not previously provided by the Director. The Director responded on September 10, 2009, providing the three policy documents that affected the Director's decision: (1) the Allocation Order; (2) the *Oldman River Basin Water Allocation Order*, Alta. Reg. 319/2003; and (3) the Groundwater Evaluation Guideline, Appendix B.

[11] The Board published a Notice of Hearing in the Crowsnest Pass Herald, Crowsnest Pass Promoter, Prairie Post West, Lethbridge Herald, Pincher Creek Echo, and Fort Macleod Gazette, and a copy of the Notice of Hearing was provided to the Municipality of Crowsnest Pass to post on its public bulletin board. The Board also issued a news release advising of the Hearing that was distributed to the media across the province.

[12] In response to the notice, the Board received intervenor requests from the Bridgegate Financial Corporation ("Bridgegate"), ClansWest Development Ltd. ("ClansWest"), and Mr. Terry Kenney (collectively, the "Intervenors"). The Board received submissions regarding the intervenor requests from the Parties on September 18, 2009. On September 23, 2009, the Board notified the Parties and the Intervenors that the Intervenors would be allowed to

participate in the Hearing by providing a written submission by October 2, 2009, and allowing each Intervenor five minutes at the Hearing to speak to their submissions.

[13] The Board received submissions from the Parties and the Intervenors on October 2, 2009. On October 7, 2009, the Director requested the Hearing be adjourned in order for him to review new evidence provided by the Appellant in its submission. The Director stated the new evidence was extensive and included technical and scientific data that would require several staff to review. The Appellant agreed to the proposed adjournment.

[14] On October 13, 2009, the Board notified the Parties that it would allow the adjournment and that the Hearing would be held on November 24 and 25, 2009. As requested, the Parties provided their rebuttal submissions on November 10, 2009.

[15] The Hearing was held on November 24 and 25, 2009, in Lethbridge, Alberta.

### **III. SUBMISSIONS**

[16] In the written submissions provided to the Board, and in the testimony presented at the hearing, a wide variety of terms were used to describe the various types of water that were being discussed. While the Board has recorded the submissions of the participants in the terms that they have used, the Board wishes to be clear that the only distinction that is relevant in the consideration of this matter is whether the water is reserved or unreserved. As stated in the Allocation Order, reserved water is water in the Oldman River and its tributaries (frequently referred to by the participants as surface water) and the water below the ground naturally flowing to and from the Oldman River and its tributaries (frequently referred to by the participants as groundwater connected to surface water). Unreserved water is water below the ground that is not naturally flowing to and from the Oldman River and its tributaries (frequently referred to by the participants as groundwater). In reviewing the submissions of the participants, it is important to keep focused on the reserved versus unreserved distinction.

**A. Intervenor**

[17] Mr. Bradley represented the 850 persons who invested in the Bridgegate project on Crowsnest Lake and who support the proposed Well.

[18] Mr. Kenney owns industrial lots in Sentinel Park, and he requires potable water and water for fire suppression for the lots but neither is available. He stated the project he is working on would be a significant contributor to the local economy. Mr. Kenney questioned why his project should be restricted in its usage of water when the rest of Southern Alberta can use existing water, subject to licencing, for continued growth. He argued the water from the Sentinel Well would supplement the current water supply in the area and provide additional water for downstream users. Mr. Kenney argued the Appellant had provided documentation to prove the water in question is groundwater, and there is no reason to prohibit the issuance of the licence.

[19] Mr. Stewart submitted the refusal to issue the licence was in error, and it was not justifiable to remove water access for residents who surround the Well. Mr. Stewart noted the Well is 24 metres deep and 85 metres from Crowsnest Lake, so it is clear the Well is not considered surface water. He stated the data presented by the Appellant demonstrates the Well is not sourced from the surface. Mr. Stewart submitted there is a fundamental human right to have clean, safe drinking water available. He argued the 12 home sites and the industrial park in Sentinel are deprived of this right. He stated it is essential to have a safe, consistent, treated, and monitored water source available for the residents and for a sustainable economy. He stated the Sentinel Well is what the community can afford and the most efficient use of infrastructure. Mr. Stewart argued the amount of water involved in the application is minute compared to the water used for irrigation.

**B. Appellant**

[20] The Appellant submitted the issue for the Board's determination is whether groundwater accessed by the proposed Sentinel Well is connected to surface water in such a manner or degree as to bring that groundwater within the definition of surface water under the Allocation Order.

[21] The Appellant explained it is expecting significant residential, business, and resort development in the Sentinel and Coleman area, and a safe and reliable supply of water is critical. The Appellant explained the proposed Well is also critical for allowing existing residents and businesses to transfer their supply of water from their existing individual water wells to a single, reliable, and safe municipal water system.

[22] The Appellant explained it submitted a hydrogeological report dated October 2007 (“Report No. 1”) in support of its application for the proposed Well. The Appellant stated Report No. 1 concluded there was no connection between the proposed Well and the surrounding surface water sources. The Appellant stated the Director disagreed with the conclusions in Report No. 1 and concluded the Well was hydraulically connected to local surface water because: the pump test data for the Well and Observation Wells No. 2 and 3 indicate a possible boundary condition; the close proximity of the proposed Well to Crowsnest Lake and high transmissivity values for the aquifer sediments indicate recharge to the Sentinel Well from Crowsnest Lake to be virtually instantaneous; the pump test data of Observation Well No. 3 was inconclusive, and it was considered the most important well for determining potential conductivity; static water levels in the production Well and Observation Wells No. 2 and 3 were similar to elevation levels in Crowsnest Lake; the presence of a possible till unit in Observation Well No. 3 without evidence of its lateral extent and evidence of a groundwater and surface water connection; and water quality samples taken from the production Well and Crowsnest Lake only examined pH and electrical conductivity, and the Director noted the values were not markedly different, suggesting a connection.

[23] The Appellant stated Alberta Environment invited it to submit additional information. The Appellant provided a response on February 7, 2008, to assure the Director there was no surface water connection. In response, the Appellant explained: several of the draw-down curves provided evidence of a barrier boundary; there is no instantaneous recharge from Crowsnest Lake because there was a delay time of 10 minutes before Observation Well No. 3 reacted to pumping at the production Well; previous testing on Observation Well No. 3 demonstrated a clear barrier boundary after 1,000 minutes of pumping; similar water levels between the wells and the lake did not prove a hydraulic connection and which can vary with stream flow in and out on a daily or seasonal basis; the water quality samples demonstrated a

significant difference between the groundwater and the surface water and the pH and electrical conductivity diverged with time rather than converged, indicating there cannot be a direct and instantaneous connection between the lake and the wells; and the electrical conductivity for the groundwater was over 50 percent higher than for the surface water and the pH of the lake water was more than 800 percent more basic than the groundwater. With respect to the other water quality parameters, the Appellant stated groundwater temperatures would be virtually constant below a specific zone, but surface temperatures of mountain lakes would change rapidly; total dissolved solids could be derived by conversion from the electrical conductivity; and turbidity would be filtered out by the intervening medium between the lake and the Well.

[24] The Appellant explained it provided results of its chemical testing program of Crowsnest Lake to demonstrate the difference in water chemistry of the lake and the aquifer was significant enough to show there was no connection between the surface water and the groundwater.

[25] The Appellant explained that Alberta Environment contacted the Appellant's consultant on February 14, 2008, requesting the completion of the proper application form that was not received with the initial report.

[26] The Appellant stated it was notified by the Director on March 31, 2008, that the technical information provided indicated a groundwater – surface water connection, and subject to the Allocation Order, the Director would not process the application. The Appellant explained the Director advised it could submit a new application for a groundwater source, providing sufficient technical information showed conclusively there was no connection to surface water or, the Appellant could explore the possibility of transferring an existing surface water licence to the Sentinel Well.

[27] The Appellant stated it submitted a new application on June 16, 2008, and provided a supplementary hydrogeological report ("Report No. 2") and a third party analysis of Report No. 1 prepared by Dr. Laurence Bentley of the University of Calgary (the "Bentley Report"). The Appellant stated Report No. 2 concluded the two water sources were significantly different, including the lack of similarity of pH and electrical conductivity, the lack of evidence of a recharge boundary as a result of examination of time drawdown and recovery curves for the

three wells, and the hydrogeological profile from north to south demonstrated the presence of a low permeability till barrier in the observation well closest to the lake. The Appellant explained the Bentley Report concluded there was no direct communication between Crowsnest Lake and the aquifer.

[28] The Appellant stated the Director notified it in August 2008, that it had reviewed Report No. 2, concluded the report was essentially the same as the original Report No. 1, and stated it would not accept the application or any further applications or analysis regarding the Sentinel Well.

[29] The Appellant explained there are several springs in the Crowsnest Pass due to the karst development in the area. It stated the Crowsnest Spring is located on the north side of Crowsnest Lake, about one kilometer from the Well.

[30] The Appellant explained the Sentinel Well and observation wells were drilled and tested in 2006, and based on the results, further testing of the wells was completed at their maximum capacity. The Appellant also stated pH and electrical conductivity were measured in the pumping Well and Crowsnest Lake as part of the second testing program. The Appellant noted the pH increased slightly in Crowsnest Lake and decreased slightly in the production Well during the test, while the electrical conductivity exhibited the opposite behavior. The Appellant stated there was no evidence the groundwater quality was approaching that of lake water because of induction of lake water. The Appellant argued there was no similarity between the groundwater and the lake water.

[31] The Appellant explained the results from the second test of Observation Well No. 3 did not respond in a normal way to the pumping, and the parameter values did not represent reality. The Appellant stated there was heavy rain during the test and the recharge to the aquifer at Observation Well No. 3 appeared to have been greater than the drawdown. The Appellant explained the completion zone of Observation Well No. 3 was in a shallower zone than in the production Well and Observation Well No. 2.

[32] The Appellant stated that, even with no recharge, the impact of continuous pumping at the projected discharge rate after 20 years would result in less than one metre impact to the nearest wells located over eight kilometers away, assuming the wells are completed in the

same aquifer. The Appellant stated the aquifers in Alberta tend to be discontinuous and heterogeneous in their configuration resulting in inconsistent transmissive capacity in the aquifer and in time. The Appellant stated the lenticular nature of aquifers in Alberta results in often neighbouring wells being completed in different and distinct water-bearing strata.

[33] The Appellant explained the testing completed in September 2007 was organized to evaluate the possibility of a hydraulic connection between the lake and the groundwater at the Sentinel Well location to determine if there was a surface water influence.

[34] The Appellant stated the time-drawdown and time-recovery plots of the production Well and the observation wells provide no evidence of a recharge boundary. The Appellant explained the north-south profile from Observation Well No. 2, through the production Well and Observation Well No. 3, to the lakeshore shows a thick till sequence with very little gravel. According to the Appellant, this till sequence appears to act as a hydraulic barrier between the lake and the production Well.

[35] The Appellant explained the data collected for Reports No. 1 and No. 2 support the thesis that the water produced in the proposed Well is not in communication with any surface water bodies in the area and does not flow naturally to the surface water. The Appellant's consultant concluded: the proposed Well was completed in an unconsolidated sand and gravel aquifer under a thick silty sand sequence within a buried preglacial channel; the aquifer is semi-confined and responds to fluctuations in barometric pressure and responds quickly to recharge events; no positive barrier boundary was evident; the key chemical parameters show the lake water and groundwater are from completely different sources and there is no hydraulic connection; and the soil profile shows a low permeability till barrier between the lake and the production Well.

[36] The Appellant explained supplemental testing carried out in May 2009 addressed the remaining issues identified by Alberta Environment and demonstrated more fully the lack of a groundwater/surface water connection. The Appellant provided this supplementary testing information and analysis as a report attached to the written submission prepared for the Hearing ("Report No. 3"). The Appellant stated another observation well ("Observation Well No. 4")

was drilled beside Observation Well No. 3 to determine the in-situ horizontal hydraulic conductivity of the unconsolidated deposits between the proposed Well and Crowsnest Lake.

[37] The Appellant explained the aquifer pump tests of the proposed Well and Observation Well No. 2 showed no evidence of either recharge or discharge boundaries, and the recovery portion of the test showed no evidence of boundary effects. The Appellant stated the behavior of Observation Wells No. 3 and 4 did not correspond to the type of time-drawdown and time-recovery patterns normally expected. The Appellant explained part of the reason was that these wells were completed in a shallower sand stratum than the proposed Well and Observation Well No. 2. The Appellant stated there appeared to be an indirect hydraulic connection that was capable of transmitting pressure changes from the proposed Well and Observation Well No. 3. The Appellant explained another factor affecting Observation Well No. 3 was that water pumped during the 2007 test could not flow freely to Crowsnest Lake because of the railway grade that resulted in ponding of the water. The Appellant stated there were heavy rainfall events in 2007 and 2009 during testing, resulting in recharge to the aquifer and an increase or stabilization of levels in Observation Wells No. 3 and 4. The Appellant argued this supports the interpretation that there was no recharge of the proposed Well from Crowsnest Lake.

[38] The Appellant's consultant expected that, if there was a recharge boundary, there would be either a flatter limb on the late portion of the time-drawdown curve or it would have stabilized at a constant depth, but it would not have risen again. The Appellant stated Observation Well No. 4 had lower transmissive values than Observation Well No. 3 but similar values to the proposed Well and Observation Well No. 2. The Appellant argued this suggests Observation Well No. 4 had a less direct hydraulic connection with the main aquifer.

[39] The Appellant stated the transmissive capacity and storativity of the aquifer are in the range expected for a semi-confined to confined aquifer.

[40] The Appellant stated the water level in the wells compared to the lake in September 2007 suggest the lake may be a minor source of recharge to the proposed Well and Observation Well No. 2, whereas levels in Observation Well No. 3 suggest a shallow groundwater flow and possible discharge to Crowsnest Lake. The Appellant explained that in May 2009, the groundwater level in the proposed Well was higher than levels in Observation

Well No. 3 and Crowsnest Lake, suggesting natural groundwater movement to the lake. The Appellant's consultant concluded changes in relative water elevations between the wells and the lake suggest there is no direct relationship between groundwater levels and lake levels.

[41] The Appellant stated isotope analysis conducted on the groundwater and Crowsnest Lake found the origin of the groundwater to be upgradient local recharge from precipitation and from karst discharge. The Appellant noted there was no evidence of Crowsnest Lake being a source.

[42] The Appellant explained a microscopic particulate analysis of the groundwater showed a total absence of *Giardia*, *Cryptosporidium*, diatoms, insects, rotifers, plant debris, nematodes, amoebae, ciliates, and flagellates indicated a low risk of surface water contamination. It stated the miniscule quantities of pollen, iron, organic matter, and silica chips present were likely introduced while collecting the sample. The Appellant stated a number of differences in water quality aspects indicate a lack of groundwater/surface water connectivity.

[43] The Appellant stated the water levels in the pond south of Observation Well No. 3 and in Crowsnest Lake showed no response to pumping, and therefore there was no evidence of a shallow hydraulic connection with the aquifer tested.

[44] The Appellant explained Observation Wells No. 3 and 4 were the closest wells to Crowsnest Lake and most critical to determining any potential hydraulic connection between the aquifer and the lake.

[45] The Appellant explained five core samples from the drilling of the borehole were subjected to grain-size analysis, and hydraulic conductivities were calculated for each sample and an average was taken. The Appellant explained the soils at Observation Wells No. 3 and No. 4 have low permeability and travel time between the lake and the proposed Well under natural conditions would be about 118 to 331 years, and under pumping conditions it decreases to 4.3 to 12 years. The Appellant argued that, given these projected travel times, the aquifer is not groundwater that readily flows naturally under the ground to a surface water body.

[46] The Appellant stated photographs of Crowsnest Lake in winter show the lake surface is frozen except that portion of the lake where lake-bottom springs discharge to the

surface, but that portion is distant from the proposed Well. Therefore, according to the Appellant, no significant discharge to the lake takes place near the proposed Well.

[47] The Appellant recognized that, in order to receive a water licence, it must show the proposed Well is not groundwater naturally flowing to and from the South Saskatchewan River system and its tributaries. The Appellant stated the Allocation Order does not define groundwater naturally flowing to and from the South Saskatchewan River system and its tributaries. The Appellant explained the circumstances in which groundwater will be considered part of the surface water reservation is found in Alberta Environment's Approved Water Management Plan for the South Saskatchewan River Basin ("Water Management Plan").<sup>4</sup>

[48] The Appellant noted the Water Management Plan defines surface water to include "...sub-surface or groundwater with a direct and immediate hydrological connection to surface water...." The Appellant argued the Allocation Order is intended only to apply to surface water and not all groundwater is to be subject to the Allocation Order. The Appellant noted that in order to ensure water conservation goals, groundwater with a strong interconnectedness with surface water is also captured by the reservation in the Allocation Order. The Appellant stated the interconnectivity is measured by determining whether the groundwater is readily flowing to a surface body or has a direct and immediate connection.

[49] The Appellant argued the interconnectivity of groundwater and surface water is an issue of time. It submitted that if the various parameters demonstrate a lack of interconnectivity and influence, or establish there is interconnectivity but with a significant time delay, then the groundwater is not captured by the Allocation Order.

[50] The Appellant argued the data demonstrate there is no evidence of a direct or immediate hydrological connection between the Sentinel Well and the surface water, and the aquifer is not "readily flowing" to the surface water. The Appellant noted the water from the proposed Well is high quality groundwater, supporting the establishment that no direct and immediate hydrological connection exists.

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<sup>4</sup> The Board notes that the Oldman River Basin is part of the South Saskatchewan River system. The Appellant referred to page 1 of the Water Management Plan for clarification, quoting:

[51] The Appellant submitted that, although no definitive statement has been provided as to what measure of time would be considered to demonstrate readily flowing groundwater, if the flow time between the surface water body and the aquifer is measured in hundreds of years, as in this case, it is reasonable to conclude the subject water is not readily flowing to the surface water body.

[52] With respect to the Board's jurisdiction to hear the appeal, the Appellant argued the determination of whether the water applied for is reserved water, is a pre-condition to the exercise of the Director's authority under section 35(3)(d) of the *Water Act*.<sup>5</sup> The Appellant stated the Director cannot refuse an application with respect to water that is not reserved water. The Appellant submitted that, until it was established the Director had the authority to refuse the application under section 35(3)(d) of the *Water Act*, the Sentinel Well application decision was effectively a refusal to issue a licence, which is appealable.

[53] The Appellant argued there is no direct connection between the groundwater and surrounding surface water. It stated the groundwater is demonstrably different in its chemistry and other measurable parameters and cannot be said to be readily flowing naturally to surface water bodies in the basin.

[54] The Appellant submitted the Director erred in concluding water in the Well was captured by the definition of surface water for the purpose of the Allocation Order, and, therefore, he erred in refusing to process the application for a licence for the Well.

[55] In its rebuttal submission, the Appellant argued the Director erred: by applying the incorrect test in determining whether the proposed licence is for water which is reserved under the Allocation Order; considering only select evidence submitted in support of the application and misinterpreting the results of the evidence considered; and proposing there is no right of appeal where the Director determined the water applied for is reserved.

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"The plan applies to all of the named rivers, their tributaries and all natural surface water with hydrological connection to the named rivers and tributaries. Groundwater that readily flows naturally under the ground to these surface water bodies is also considered surface water."

<sup>5</sup> Section 35(3)(d) of the *Water Act* states:

"The Director may refuse to accept an application for a licence for the reserved water unless the refusal is contrary to an order made under subsection (1)."

[56] The Appellant stated the Director referred to the test to determine what constitutes groundwater as requiring the Appellant to prove the absence of any hydraulic connection. The Appellant argued this was a mischaracterization of the requirements of the Allocation Order and the Water Management Plan and is not the test required to be met.

[57] The Appellant argued it does not have the onus of proving beyond a reasonable doubt that no hydraulic connection of any kind exists. It stated that it was doubtful any such absolute requirement could be scientifically determined. The Appellant argued that it must demonstrate on the preponderance of the technical evidence submitted that the well water is not naturally flowing to and from surface water. The Appellant argued “naturally flowing to and from surface water” should not be equated with any hydrological connection, however remote or indirect.

[58] The Appellant argued the scientific data demonstrated there is no evidence of a direct or immediate hydrological connection. The Appellant stated the flow time between the aquifer and surface water bodies is measured on a scale of hundreds of years and the water quality parameters are different. The Appellant argued it is reasonable and obvious to conclude the water from the proposed Well is not naturally or readily flowing to and from surface water.

[59] The Appellant argued the Director’s technical findings were either incorrect at the time of his decision or were subsequently demonstrated to be incorrect as a result of the Appellant’s 2009 supplemental report.

[60] The Appellant explained the pump test conducted in 2009 demonstrated virtually straight line graphs, indicating it is a classic aquifer without boundaries for the duration of the test. The previous testing in 2006 indicated there might be a barrier boundary as evidenced by the steep slope at the end of the semi-log plot of Observation Well No. 3 and a slightly steeper slope at the end of the plots for Observation Well No. 2 in 2007.

[61] The Appellant stated static water levels have no relevance to the determination of a possible direct and immediate connection to surface water. The Appellant explained water levels are never truly static because they rise or fall in response to external conditions. The Appellant noted the non-pumping levels documented in 2009 showed the level to be higher in the lake than the aquifer at certain times and at other times, the opposite occurred.

[62] The Appellant explained an additional observation well, Observation Well No. 4, was drilled close to Observation Well No. 3 to carry out specialized permeability testing and additional testing. The Appellant stated the results provide additional supportive evidence of the lack of a direct and immediate connection to surface water.

[63] The Appellant explained parameters were taken on identical days on two separate occasions and during the same month on a third occasion. The Appellant stated the water quality parameters provide further evidence of lack of a direct and immediate hydrological connection.

[64] The Appellant acknowledged Dr. Bentley was unwilling to come to a more definitive conclusion based on his review of information provided by the Appellant's consultant, Stantec Consulting Ltd. ("Stantec") in Report No. 1. The Appellant noted Dr. Bentley stated the hydraulic data does not definitely demonstrate a connection or lack of hydraulic connection of Observation Well No. 3 and the lake. The Appellant stated further data were collected in 2009 and presented in Report No. 3, where they also addressed Dr. Bentley's concerns as to uncertainties and supports the Appellant's position that there is a lack of evidence of any direct connectivity.

[65] The Appellant noted the Director relied on the McElhaney Consulting Services Ltd. – EBA Engineering Consultants Ltd. Report dated October 2006 to suggest there is an extensive alluvial aquifer running the entire length of the Crowsnest Valley. The Appellant argued the report is of little value to determining the hydrogeology of the region in which the Sentinel Well is located. The Appellant stated the information in the report, which was prepared in relation to the proposed relocation of Highway 3, is generalized, regional information addressing surface and groundwater in addition to surveying the flora and fauna of the entire region. The Appellant argued the report is too outdated and general to be of any relevance.

[66] The Appellant stated Reports No. 1, 2, and 3 prepared by Stantec were drawn principally on specific investigations conducted within the vicinity of the proposed Sentinel Well. The Appellant argued Reports No. 1, 2, and 3 are based on more detailed, reliable information.

[67] The Appellant requested the Board recommend to the Minister that the Director's decision be overturned on the basis the Sentinel Well is not reserved water under the Allocation Order, and that the Minister direct the Director to process the application for the Sentinel Well.

**C. Director**

[68] The Director explained that when the Appellant applied for a licence to divert water, the internal review focused on whether the application was for the diversion of groundwater or surface water. The Director stated the significance of determining the source water was highlighted to the Appellant prior to the application being submitted. The Director noted the application recognized the need to demonstrate the absence of any hydraulic connection because of the moratorium on surface water licences in the area.

[69] The Director explained the review by Alberta Environment staff was extensive and included staff at the Alberta Geological Survey of Alberta. The Director stated he reviewed and approved the conclusions.

[70] The Director stated he advised the Appellant that the application suggested the source of water in the proposed Well was connected to Crowsnest Lake and was considered a surface water application prohibited by the South Saskatchewan River Basin closure. The Director stated he advised the Appellant the determination of non-connection to surface water had to be conclusive. He stated he invited the Appellant to provide additional information to explain or conclusively prove non-connectivity.

[71] The Director explained the technical review found: pump test data did not establish a barrier boundary was evident; pump test data from Observation Well No. 3 was unreliable but was important in the determination of potential connectivity; static water levels in the Well and observation wells were similar enough to that of the Crowsnest Lake that a connection was suggested; borehole log data did not establish the lateral extent of the till unit found at depth in Observation Well No. 3 so the confinement and isolation of the aquifer could not be concluded from the data; the full suite of water quality parameters was not reported making the findings on pH and electrical conductivity inconclusive; and water chemistry samples

comparing Crowsnest Lake and the production Well were from different time periods, making comparisons futile for determining whether a connection exists.

[72] The Director stated the Appellant responded to his findings on February 8, 2008, but no new technical data was provided until February 12, 2008. The Director explained the new data consisted of the results from a chemical testing program at Crowsnest Lake conducted in 2007 by Alberta Environment, and the Appellant submitted it confirmed the water in Crowsnest Lake is different from the water in the aquifer. The Director stated that, on February 14, 2008, he asked the Appellant to complete the proper form of application, and the internal review of the application resumed.

[73] The Director confirmed in a letter dated March 31, 2008, that he considered all of the information provided by the Appellant and concluded there was evidence of a groundwater/surface water connection between the proposed Well and the surface water source. The Director returned the application to the Appellant because the river basin was closed to further surface water allocations.

[74] The Director stated the Appellant submitted an application in April 2008. The Director explained the Appellant provided the same report with some new information, including the Bentley Report. The Director stated an internal review of the application was done.

[75] The Director argued the Bentley Report corroborates a number of the technical findings of Alberta Environment, particularly that the data are inconclusive. The Director stated the Bentley Report found that, based on the data, the aquifer was weakly confined vertically by the silty sand layer. The Director quoted the Bentley Report:

“...the basal gravel aquifer is part of a shallow groundwater system. Shallow groundwater systems generally discharge into a surface water body ... if that body is not Crowsnest Lake, it [i]s likely an unidentified stream, river, lake or wetland.”<sup>6</sup>

[76] The Director stated he notified the Appellant in August 2008, that the revised application did not contain any new or additional information to refute the existence of a groundwater/surface water connection, and he advised that no further applications would be

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<sup>6</sup> Director's submission, dated October 2, 2009, at paragraph 16, quoting page 3 of the Bentley Report.

accepted that use the proposed Well as a water source. The Director offered to discuss alternatives for obtaining water.

[77] The Director explained the Minister reserved all water that was not allocated in the Bow River Basin, Oldman River Basin, and South Saskatchewan River Basin. The Director stated reserved water is any water from the Oldman River, its tributaries, and any water below the ground naturally flowing to and from the Oldman River and its tributaries. The Director stated he must refuse to accept an application for a licence for reserved water that is not allowed under the Allocation Order. The Director stated that he cannot consider the merits of the licence application until a determination is made as to whether the application is reserved water. The Director stated the Water Management Plan recommends that Alberta Environment not accept applications for new water allocations except as specified by the Minister through a Crown reservation. He noted the Water Management Plan applies to named rivers and their tributaries and all natural water with hydraulic connection to the named rivers and tributaries. He explained the Water Management Plan includes groundwater that readily flows naturally under the ground to the surface water bodies as surface water. The Director noted the Water Management Plan defines surface water as including sub-surface and groundwater with a direct and immediate hydrological connection.

[78] The Director noted the Groundwater Evaluation Guideline clearly states it is not applicable unless the applicant proves no hydraulic connection between the sand and gravel deposits and the water body.

[79] The Director explained the proposed Well, located 80 metres north of the northern most extension of Crowsnest Lake, is 23.5 metres deep with a non-pumping water level 7.83 metres below ground level. The Director stated the proposed Well is completed in alluvial gravel and is alleged to be a small pre-glacial tributary channel.

[80] The Director explained Crowsnest Lake is not separate from Crowsnest River, a river in the Oldman River sub-basin. He stated the lake is a local and temporary widening of the river valley and is expected to be underlain with postglacial alluvial sediments.

[81] The Director argued the Appellant is required to prove there is no hydraulic connection between the aquifer accessed by the Well and a surface water body. The Director

explained the Appellant must prove it is a confined aquifer, isolated from surface hydraulic systems. The Director stated the Appellant's own reports acknowledged it only submitted evidence that supported the argument that the Well is not connected to surface water bodies and, at best, the report concluded the aquifer is semi-confined.

[82] The Director explained that in order for the aquifer to be confined, the subsurface stratigraphy of the lithographic units would have to indicate conclusively that there is a confining layer above the gravel layer in which the proposed Well is completed. The Director stated the layer must be non-permeable and isolating the confined aquifer from the alluvial aquifer that underlies the lake or any other surface water connection.

[83] The Director stated lithographic descriptions of the three borehole logs included in the application showed a unit of gravel sediment at surface and extending across all the wells and into Crowsnest Lake. The Director noted the borehole from the proposed Well indicated a clayey silty and sand unit separating the upper gravel aquifer from the lower gravel aquifer in which the proposed Well is completed. The Director argued this is not consistent with what is expected to suggest a confining or semi-confining layer.

[84] The Director stated that only one of the three borehole logs was taken in an area between the Well and the lake. The Director explained the limited number of boreholes makes it impossible to determine whether the aquifer is confined and isolated from the lake. The Director noted the Appellant's independent reviewer recognized there was some uncertainty in making a geologic interpretation based on three logs. The Director argued a 2006 study completed by McElhaney Consulting Services Ltd. was more extensive and showed no evidence of a confining layer.

[85] The Director explained the static water levels measured in the aquifer and the lake should be significantly different if the aquifer is confined and isolated from the lake. The Director stated that, in a mountainous environment, the static level in aquifers would be expected to be under pressure and much higher than when a hydraulic connection existed between Crowsnest Lake and the proposed Well. The Director stated the application did not report on static levels, but based on the figures provided, the static water levels in the proposed Well and observation wells and that of the Crowsnest Lake are within one metre or less from each other.

[86] The Director explained pump tests are conducted to assess hydraulic properties of the aquifer to determine groundwater movement and the extent and sustainable yield of the aquifer. He stated assessment of the pump test results determine aquifer boundaries, aquifer type, hydraulic conductivity, transmissivity, and storativity. The Director explained a trend line drawn through pump test data of a confined aquifer would show a gentle slope with no upward change or break in slope. The Director stated the pump test information submitted with the application was unreliable and inconclusive. He stated the pump tests showed small variations compared to what would be expected of proof of a barrier or connection. The Director noted that Dr. Bentley indicated the pump tests were of insufficient time for water from Crowsnest Lake to arrive at the pumping well. The Director stated a 7-day pump test should have been conducted in order to determine the significance of potential recharge boundaries. The Director noted the Appellant recognized the data from Observation Well No. 3 were unreliable, and the lack of reliable data is important because Observation Well No. 3 was the only well directly between the proposed Well and the lake.

[87] The Director explained a confined aquifer would have elevated concentrations of total dissolved solids, chloride, fluoride, sodium, and potassium ions due to slow water movement and increased residence time. He stated these parameters should be distinctly different from those found in the surface water body. The Director explained the most reliable data are collected over an extended period of time, such as a year.

[88] The Director stated the Appellant first compared the chemistry of the lake as sampled in 1976 with the chemistry of the proposed Well in 2007. He stated the difference in time made the data unreliable. The Director noted the revised application compared samples taken from the lake and the proposed Well in 2007. The Director stated the data show similar water chemistry between the lake and the Well. He stated the low chloride and fluoride concentrations are consistent with what would be expected when an aquifer is hydraulically connected to the Crowsnest surface water system.

[89] The Director stated the comparison of pH and electrical conductivity, presence or absence of coliforms or fecal coliforms, and comparing water temperature to the ambient air are of little assistance in determining whether an aquifer is confined. The Director stated pH and electrical conductivity data need to be assessed over a period of time rather than single data

points. He stated the presence or absence of coliforms is not relevant to determining whether an aquifer is connected to a surface water body. The Director stated temperature readings are significant in mountainous regions in Canada.

[90] The Director submitted the Appellant did not prove there is no hydraulic connection between the proposed Well and the surface water body. The Director argued most of the evidence was unreliable or ambiguous. In addition, the Director stated that, given the depth of completion and location of the proposed Well, he was required to conclude the application was for groundwater that is naturally connected to the hydrologic surface water system and is, therefore, reserved water under the Allocation Order.

[91] The Director explained the Allocation Order enables the Director to consider licensing reserved water in certain circumstances as specified in the Allocation Order, but the application for the proposed Well was not of the type specified in the Allocation Order. The Director stated that, under section 35(3)(d) of the *Water Act*, he was required to reject the application without considering it. The Director submitted there is no right of appeal from a decision of the Director under section 35(3)(d) of the *Water Act*.

[92] The Director stated the Appellant applied for a licence for water that is reserved by the Allocation Order and which he has no jurisdiction or authority to allocate. He argued he correctly rejected the application, and the Board should recommend the appeal be dismissed.

[93] In his rebuttal submission, the Director argued the purpose of the Appellant's application for a licence is not relevant because he did not consider it once the application was refused. The Director noted the Appellant did not establish the purpose or justification for the amount of water applied for since the water use information provided by the Appellant to Alberta Environment shows the Appellant uses only 50 percent or less of its current allocations. The Director stated the Appellant uses, on a per capita basis, 1,200 litres of water per day, compared to the use in an average community in the South Saskatchewan River Basin of 350 to 400 litres per capita per day.

[94] The Director admitted he was unclear whether the Appellant's June 2008 application was a new application or a supplementary version of the November 2007 application.

The Director stated it was clear the application was not accepted pursuant to section 35(3)(d) of the *Water Act* and the Allocation Order.

[95] The Director noted the Allocation Order does not refer to water below the surface being directly, readily, instantaneously, or immediately flowing to or from the Oldman River or any of its tributaries. The Director submitted it is an error to read in any modifying adverbs to the phrase “naturally occurring.” The Director argued it is also an error to consider only whether surface water flows to and discharges to the water accessed by the proposed Well (the aquifer), because the Allocation Order encompasses all water below the ground that discharges into the Oldman River or any of its tributaries, including Crowsnest Lake.

[96] The Director explained the Water Management Plan specified the need for emphasis to be placed on ensuring environmental considerations are taken into account when considering applications, the need for improved cooperation between stakeholders, and the need for conservation, efficiency, and effectiveness in the way water is managed in the basin.

[97] The Director acknowledged the intent of the Allocation Order is not to reject all applications for allocations of water even though all groundwater is connected to surface water. The Director stated a balance is needed between water consumption and environmental protection. The Director submitted this balance is met in the Allocation Order by considering the impact an allocation would have on downstream water users in a drought cycle. The Director stated he should err on the side of protecting the environment when an allocation of water below ground is likely to have a negative impact on water supply to downstream users in a drought cycle. The Director stated that drought years have lasted 3 to 4 years in the Oldman River Basin, so if a diversion of groundwater could affect downstream users within a four-year period, then the water should be considered reserved water in order to protect the environment.

[98] The Director stated that, based on the definition of surface water in the Water Management Plan, then any water below the ground that readily flows naturally and where the cone of depression intersects a surface water body, is surface water.

[99] The Director explained the assessment criteria for Groundwater Under the Direct Influence of Surface Water is used to determine the level of potable water treatment required for a drinking water system to assure public health and environmental protection under the

*Environmental Protection and Enhancement Act*, R.S.A. 2000, c. E-12 (“EPEA”). The Director stated the guide has application in some situations to determine whether there is a hydraulic connection between a surface water source and a well, but it is not determinative of any question regarding supply of water under the *Water Act*.

[100] The Director argued that, even using the guide, it is not possible to conclude water in the Well is not connected to a surface water source. He stated the proposed Well fails two of the four criteria set out in the guide, specifically the source of water should not be located within 100 metres of any permanent, intermittent, or seasonal surface water body, and the source of water shall not be a well in an unconfined aquifer.

[101] The Director stated the Phase 2 hydrogeological investigation completed by the Appellant is deficient, because the calculation to determine the time of travel between a surface water body and the source Well was not completed until 2009. The Director also noted the hydrograph analysis of water quality parameters is recommended to be monitored once a week for a minimum of one year, but this was not done by the Appellant.

[102] The Director argued that, because the Appellant conducted a microscopic particulate analysis, it can be inferred the Appellant found a hydraulic connection between the proposed Well and a nearby surface water body. The Director stated this analysis also was incomplete.

[103] The Director submitted the evidence supported the conclusion that the aquifer is shallow, post glacial, alluvial, unconfined, and semi-confined that receives recharge from surface precipitation and discharges groundwater to a surface water body.

[104] The Director rejected the Appellant’s assertion there is evidence from the wellbore lithology that a regional “layer cake” stratigraphy creates an impermeable barrier above the aquifer in which the Sentinel Well lies. The Director argued the Appellant did not prove a regional extension of the clayey sand and clayey silt layer on a local east-west cross section, and the Appellant did not demonstrate the layer is substantially impermeable to infiltration from the surface or to upwards flow from the deeper aquifer layer and therefore preventing a connection from a surface water source.

[105] The Director rejected the Appellant's assertion that there is a complete and substantially impermeable barrier to lateral flow with the Sentinel Well aquifer that prevents natural flow to or from all surface water sources such as Crowsnest Lake or Crowsnest River.

[106] The Director referred to additional information to support his position, including the Surficial Geology Alberta Foothills and Rocky Mountains, Atlas of Alberta Lakes, Springs of Alberta, and map cross sections prepared by Alberta Environment.<sup>7</sup>

[107] The Director noted the Appellant added Observation Well No. 4 in 2009. The Director stated the additional borehole did not provide stratigraphic support for the Appellant's assertion the aquifer is isolated and confined. He argued the data collected from Observation Well No. 4 did not conclusively demonstrate the existence of a till layer and noted that aquifer units vary widely in thickness. The Director stated the data provided from Observation Well No. 4 contributes to the conclusion the lithology of the area is heterogeneous. The Director argued the "... data may support the concept that a local groundwater barrier exists between the Sentinel [W]ell aquifer and the immediately adjacent margin of Crowsnest Lake but this is not enough to refute the conclusion that the aquifer is a tributary of the Crowsnest Lake and River."<sup>8</sup>

[108] The Director reaffirmed the static water levels in the production Well and the lake are similar, indicating a persuasive argument that the water in the two water sources is hydraulically connected or the same. The Director argued the Appellant attempted to differentiate the water levels by comparing values that are not significantly different. The Director stated there would be a significant difference in water levels if there was a barrier between the Well and the lake. The Director argued the Appellant's 2009 hydrological investigations confirms the water in the aquifer flows to the Crowsnest Lake, something that could not happen unless the two sources are hydraulically connected.

[109] The Director established that, based on the Appellant's pump test data, the travel time of the water between the lake and the aquifer is between 2 and 57 days. The Director rejected the Appellant's approach to calculating the hydraulic conductivity of the aquifer, because its calculation was based on a selected, averaged, hydraulic conductivity value of a less

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<sup>7</sup> Surficial Geology Alberta Foothills and Rocky Mountains, 1974/1975, Alberta Environment.

<sup>8</sup> Director's submission, dated November 10, 2009, at paragraph 23.

permeable unit instead of the actual measured values of the unit the well is screened in. The Director explained standard practice is to use the most permeable layer in order to be assured of being protective of the environment.

[110] The Director submitted that the Appellant's data establishes the cone of depression from pumping water from the aquifer extends beyond the margin of Crowsnest Lake within 7 to 10 minutes of pumping. The Director stated that over one month of continuous pumping, the cone of depression would extend over five kilometers.

[111] The Director argued the 2009 pump test data are inconclusive regarding the presence or absence of a barrier boundary condition. The Director stated the relatively short period of pumping during a rain event may have contributed to the lack of a conclusive barrier response.

[112] The Director stated the addition of the well point piezometer data was of little assistance, because the piezometers were not completed in the same depth as the aquifer, and the piezometers appear to be too close to the lake to be distinguishable from the lake.

[113] The Director stated the additional water chemistry data collected in 2009 are consistent with previous results and confirms the chemistry in the aquifer is similar to the water in Crowsnest Lake. The Director explained the isotope sampling confirmed the aquifer is recharged by water from the deeper karst formation and from local precipitation, thereby establishing there is no barrier to vertical movement of water to or from the aquifer. The Director stated these data have no bearing on whether the aquifer discharges to Crowsnest Lake, but it shows the aquifer receives surface water from precipitation.

[114] The Director concluded that, based on the evidence, the shallow aquifer accessed by the Sentinel Well is a hydraulically connected tributary to the Crowsnest River, not a separate and confined groundwater source. He submitted it is therefore reserved water and he cannot accept an application for allocation of this water. He stated there is no evidence of a high yielding confined aquifer beneath the Sentinel site.

[115] The Board notes that Alberta Environment offered repeatedly to discuss other options for obtaining water for the Sentinel area that may be available to the Municipality of Crowsnest Pass.

#### IV. JURISDICTION

[116] The Director expressed concern with the way in which the Appellant and the Board characterized this appeal. The Appellant and the Board, for the purpose of processing the appeal, characterized the appeal as being from the Director's decision to refuse to issue a licence. The Director stated that the decision that he made was to refuse to accept the application for the licence, and he argued the Board does not have jurisdiction to hear this appeal because there is no right of appeal from the Director's decision to refuse to accept an application. The Director and Appellant referred to the Board's previous decision of *Westridge*,<sup>9</sup> where the Board found *Westridge* did not have a right of appeal. In *Westridge*, the Board found the Director did not make any decision regarding the water licence application because Alberta Environment staff found the application was incomplete and the application was not given to the Director to review. In the present case, the Director stated he did review the application and his staff did an extensive review. These facts distinguish *Westridge* from this case.

[117] It is clear from the Director's record that he accepted the Appellant's application, reviewed the information provided, and based on this review, determined the water in the Well was hydraulically connected to surface water and was therefore reserved water. The application was submitted by the Appellant and the Director replied, asking for additional information and later asking for and receiving a proper application form. This is not behaviour indicative of a refusal to accept the application. The Board understands the Director asked for additional information because it was not obvious to the Director in the application whether the water source was reserved or unreserved water. The Director reviewed all of the information and data provided by the Appellant and based on his review, he determined the water applied for was reserved water subject to the Allocation Order. Since the Director considered the application to be for reserved water, he refused to issue the licence. The Board accepts this as a reasonable approach in these circumstances even though it resulted in a right of appeal when the licence was refused.

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<sup>9</sup> See: Preliminary Motions: *Westridge Utilities Inc. v. Regional Director, Southern Region, Environmental Management, Alberta Environment* (22 October 2008), Appeal No. 07-146-D (A.E.A.B.) ("*Westridge*").

[118] In the Board's view, the Director refused to issue the licence. In these circumstances, the refusal of a licence is appealable under section 115(1)(d) of the *Water Act*, and the Board has jurisdiction to determine the substance of the appeal.

## **V. MOTIONS**

[119] During the Hearing, the Appellant's technical witness testified that the proposed Well may not be drilled at the location specified in the application because an easement for access to the Well had not yet been secured from the landowner. When questioned by counsel for the Director, the Appellant's technical witness agreed that a new application would have to be made if the site of the Well was changed. Based on this evidence, Counsel for the Director made a motion that the appeal was moot. The Director also made a motion to have a representative of the Municipality of Crowsnest Pass sworn in as a witness to explain its intention regarding the Well and to have the current landowner subpoenaed as a witness. The Appellant did not object to a municipal representative being called as a witness, and consequently, the Board heard the evidence of the municipal witness, but waited until after hearing the witness before considering the motion to call the landowner as a witness. The Director argued that the mootness issue was still an issue after the municipal representative presented his evidence and was cross-examined by the Director.

[120] After hearing the evidence of the Appellant's municipal witness, and considering the submissions of the Parties, the Board denied the motion to dismiss the appeal for being moot. The Board found the Appellant intended to drill and use the proposed Well located at the site as specified in the application. The Board also denied the Director's motion to call the landowner as a witness. The Board indicated in its oral reasons that if the Appellant was successful in this appeal, the Director would have to continue processing the application for the licence, and one of the licencing requirements would be for the Appellant to ensure it had a written agreement for access to the site from the landowner.

[121] As both motions were dismissed, the Board continued with the Hearing.

## VI. ANALYSIS

[122] The issue in this appeal is whether the water in the proposed Sentinel Well is connected to Crowsnest Lake or some other surface water body and is, therefore, reserved water. The determination of whether it is reserved water is important because the basin in which the proposed Well is located is subject to the Allocation Order, which limits new water licences for the reserved water from being issued.

[123] There are three river basins that are subject to the Allocation Order and the order reserves all water in these rivers and their tributaries, including “the water below the ground naturally flowing to and from” these rivers and their tributaries.<sup>10</sup> There are specified exceptions which allow the Director to issue new licences for reserved water from within these basins.<sup>11</sup> However, all of the Parties agreed that the exceptions in section 6 of the Allocation Order do not apply in the appeal before the Board. The application is for a licence from a Well in close proximity to Crowsnest Lake, and the purpose of the Well is to provide water for residential and commercial purposes in the surrounding area. Residential and commercial purposes are not included in the exceptions in section 6 of the Allocation Order.

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<sup>10</sup> Section 1 of the Allocation Order states:

“1. In this Order ... (e) ‘Oldman River Basin’ means the Oldman River and its tributaries and the water below the ground naturally flowing to and from the Oldman River and its tributaries, within Alberta ...”

Section 2 of the Allocation Order states:

“All the water in the Bow River Basin, Oldman River Basin and South Saskatchewan River Basin that is not, on the date this Order is filed under the *Regulations Act*, allocated under a licence or registration or specified in a preliminary certificate is reserved.”

<sup>11</sup> Section 6 of the Allocation Order provides in part:

“6(1) The Director may issue licences with respect to the Oldman River Basin in accordance with the following:

- (a) for use by a First Nation...;
- (b) for a water conservation objective;
- (c) for storage, if it is for the protection of the aquatic environment and for improving the availability of water to existing licence holders and registrants;
- (d) for any purpose, if, on or before the date this Order is filed under the *Regulations Act*, an application for the licence that is complete and complies with the Act has been filed with the Director;
- (e) if an application for a licence is made that relates to the Little Bow Project/Highwood Diversion Plan...;
- (f) if an application for a licence is made that relates to the Pine Coulee Water Management Project...”

[124] The effective closure of the river basins was a policy decision made by Alberta Government. It is not a policy decision that can be altered by the Board. What is at issue in this appeal is solely the question of whether the water in the Sentinel Well is reserved water. If it is reserved water, then the issuance of a new licence for residential or commercial purposes is not permitted. If the application was for unreserved water, then the Board could recommend to the Minister that the Director continue processing the application submitted by the Appellant for a licence.

[125] In this appeal, the Board heard evidence from two senior hydrogeologists who reached different conclusions from the data. The Board realizes that in science this can occur, especially in a field such as hydrogeology, where there are many unknowns. In the circumstances of this appeal, what the Board was faced with was a great deal of uncertainty. The data provided in support of the Appellant's application could be interpreted in differing ways, as was evident in the arguments presented at the Hearing.

[126] The Appellant is attempting to obtain a licence for a new water source, which it believes will provide potable water in a cost effective manner. The Board appreciates the Appellant's desire to secure additional potable water sources for its residents and to stimulate economic development in the area. However, the Appellant is located in an area where water is a scarce and precious resource. The legislators confirmed the value of water, and in particular surface water, in the southern region by enacting legislation that limits the Director's ability to issue a new water licence. It is important to note that the legislation is permissive, not mandatory; the Director has the discretion to issue a licence because of the inclusion of the word "may," contrary to the Director's submission that the Director had no discretion in this matter and had to deny the application. What the Board needed in this case was evidence that would have demonstrated with a greater level of certainty, on the preponderance of the evidence, that there was a barrier that would prevent the water in the proposed Well from being hydraulically connected to surface water sources such as Crowsnest Lake. This is important because the Allocation Order clearly states that such water is reserved, except under specific enumerated circumstances. A clear reading of the Allocation Order indicates to the Board that the intent of the legislators is to protect reserved water in the basin, and if any person wants a licence in the area, they must provide compelling evidence to show there will not be any impact to reserved

water. In other words, more data collection would need to be undertaken to demonstrate there is no hydrological connection between the water in the Well and the reserved water. Standard data collection is not sufficient in the circumstance of this case. Additional testing would need to be completed, analyzed, and provided in order to create a clear delineation of the aquifer and the barrier the Appellant argued was present.

[127] The Appellant raised the issue of what level of data analysis would be required to prove beyond a doubt there was a barrier. It is the Board's position that there needs to be a sufficient level of detail to allow the Board to conclude, on the preponderance of the evidence, that there is a barrier between the water in the Well and the reserved water. In other words, the data presented should be substantive, complete, and provide an obvious conclusion on the issue of a barrier between reserved water and water at the Sentinel Well.

[128] The Appellant retained the services of Dr. Bentley from the University of Calgary to review the data collected by Stantec. Dr. Bentley concluded there was insufficient information to say with any degree of certainty that there is, or is not, any direct connection to the reserved water. The Board understands some additional testing was undertaken by Stantec to address, in part, Dr. Bentley's concerns. (See: Report No. 2 and Report No. 3.) In reviewing the data gathered and hearing the arguments presented at the Hearing, the Board does not find it has compelling or definitive evidence of either a connection or a barrier between the aquifer and surface water bodies.

[129] The Appellant explained there were topographic and physical reasons why additional drilling testing was not completed. It stated the terrain limited access to the site for drilling equipment and it did not want to destroy trees. The Board appreciates the limitations placed on the Appellant and its consultants in obtaining the required data. However, the intent of the data collection was to determine whether there was a surface water connection to the aquifer. The Appellant was basing the lack of connection on the presumption that a barrier exists between the proposed Well and the lake. If this barrier exists, the Appellant might have made additional boreholes to test the presumption more thoroughly and to show the exact location, size, and physical properties of the barrier. Only Observation Well No. 3 and subsequently, in 2009, Observation Well No. 4 was drilled between the proposed Well and the lake. The close

proximity of the two observation wells (approximately one metre apart) did not provide compelling additional information on the extent of the barrier to support the Appellant's position.

[130] The Board found the evidence relating to the composition of the lithography from Observation Well No. 4 to suggest varying degrees of permeability relating to the substrata materials suggestive of, in part, a possible connection between the aquifer and Crowsnest Lake.

[131] Throughout the Hearing, the Appellant noted specific parameters that, when considered collectively, it argued, conclusively proved the aquifer was not hydraulically connected to a surface water body. These included: isotope analysis; water quality chemical analyses; microscopic particulate analysis; non-pumping water levels; Crowsnest Lake in winter; in-situ permeability test, gradient and grain-size analyses, and theoretical travel time; observation wells dry when drilled; aquifer pinches out between the proposed Well and Observation Wells No. 3 and No. 4; and no evidence of recharge boundaries.

[132] According to the Appellant, isotope analyses of water from the aquifer and the lake show the sources of water vary. The analyses indicated the aquifer is derived from an up-gradient karst formation and infiltration from land surface whereas the lake water is derived from the karst formation, precipitation, and surface runoff. The Appellant stated the lake is not a source of water for the aquifer. It is important to note that the definition of groundwater in the Approved Water Management Plan for the South Saskatchewan River Basin states, "...an aquifer that readily (drawdown cone for a well intersects a surface water body) flows naturally under the ground to surface water bodies is considered surface water for licencing purposes in Alberta."<sup>12</sup> The definition does not require an aquifer to be derived from the surface water body to be considered surface water. The aquifer and lake water are both derived from the karst formation and have inputs from precipitation events. This information does not either confirm or rebut the presence of a barrier between the proposed Well and the lake.

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<sup>12</sup> Alberta Environment, Approved Water Management Plan for the South Saskatchewan River Basin (August 2006) at page 22.

[133] The water quality analysis conducted by the Appellant included a full suite of substances. Testing for many of these substances is particularly relevant when determining whether the water is suitable for potable water. The Appellant explained sulfates and the microbial analyses were of particular interest in determining if the sample is surface water or groundwater. The tests were also conducted during pumping to determine if there was any chemical evidence of surface water entering the aquifer during pumping. The results indicated, and the Director agreed, that no connection was evident during the time the pump tests were conducted. The Director did add that longer periods of pumping may result in recharge from the lake occurring. The Director is not certain of this occurring, and based on the information, nor is the Board. The differences seen in the chemical analyses could be attributed to other sources recharging the lake, higher degree of mixing in the lake, amount of mixing of other sources of water, the length of time water is in the aquifer, and the substrate water flows through to reach the aquifer affecting specific chemical properties. All of these factors can change the chemical composition of the water tested and therefore would not be definitive in either proving or rejecting the existence of a barrier. The chemical analyses data do not provide any information that clearly demonstrates the aquifer is not hydraulically connected to the lake.

[134] The microscopic particulate analysis is useful to determine if there is a risk of contamination of the aquifer from surface water. This analysis is useful in assessing whether the water is suitable as a potable water source. The analysis may assist when the well water is recharged by a surface water body. It does not assist in assessing if there is a hydraulic connection between the aquifer and the lake because the aquifer can recharge the lake. The hydraulic connection would exist but would not be detected in a microscopic particulate analysis. Therefore, the Board considers the microscopic particulate analysis of little value in this circumstance in determining if the aquifer is hydraulically connected to Crowsnest Lake.

[135] The results of the microscopic particulate analysis showed small quantities of pollen, iron, organic matter, and silica chips. The Appellant believed these particulates were introduced in the water collection process. To provide a higher level of certainty to the results, further testing could have been taken to determine the actual source of the particulates.

[136] The Appellant referred to the non-pumping water levels as an indicator there was no connection between the aquifer and lake. The Director expected a more significant difference

in non-pumping water levels if the aquifer was confined. The water levels vary in both the lake and aquifer and the Appellant's consultant concluded there was no direct relationship between groundwater levels and lake levels. This does not mean that a connection does not exist because other comments made by the consultant suggest groundwater movement to the lake.<sup>13</sup> This does not support the Appellant's argument of an existing barrier. The Appellant argued movement may exist because barriers in hydrogeology are not absolute, and that the travel time for water to flow from the aquifer to the lake would be decades to centuries. The Board believes there is not enough information that would provide a level of certainty to the Appellant's argument that the aquifer and lake are not connected.

[137] The Appellant argued the fact Crowsnest Lake freezes in winter at the area closest to the proposed Well indicates a lack of hydraulic connectivity. It referred to a different area of the lake that does not freeze in winter because a spring opens into the lake at that point. Whether or not the lake freezes at the closest point to the proposed Well is not conclusive in determining if there is a hydraulic connection with the Sentinel Well. The observation only points out that there is a spring feeding into the lake.

[138] The particulate size of material affects the rate of water movement through the geologic unit. If there are large amounts of coarse textured material, such as sand and gravel, water transmissivity increases. In calculating the transmissivity of the aquifer, the Appellant took an average of the various transmissivity values for the different strata in the borehole of Observation Well No. 4. In determining the possible effects a proposed Well may have on the environment, the Board accepts that a "worst case" scenario is preferred. In this case, the "worst case" scenario would be using the highest transmissivity rate to calculate the potential impacts on surrounding water sources, not the mid range. The Appellant calculated a theoretical travel time between the proposed Well and Crowsnest Lake of 188 years. However, the Director used the conservative value of the highest transmissivity rate and found the travel time to be between 2 and 57 days. This difference is substantive. The Board considers the conservative approach (worst-case scenario) more appropriate in this circumstance due to the importance of protecting the water sources in the area. This approach is consistent with the Province's policy documentation leading to the closure of the Old Man River Basin.

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<sup>13</sup> See: Appellant's submission, dated October 2, 2009, at Tab 21, Report No. 3, at pages 6.4 and 6.5.

[139] The Appellant argued the aquifer pinches out between the proposed Well and Observation Wells No. 3 and 4. This argument is based on speculation. The Appellant did not conduct sufficient testing and drilling to determine if the aquifer is pinched out or if some other geological anomaly exists that restricts the amount of water in the aquifer or its flow. Observation Well No. 4 was drilled just over one metre from Observation Well No. 3. This short distance between the two wells may have provided information that Observation Well No. 3 did not provide, but the wells are too close together to provide a better understanding of the subsurface topography including the extent of any potential pinching out of the aquifer. Without a better delineation of the extent of any pinching out or barrier, it is difficult to either accept or reject the argument the aquifer is a true closed aquifer.

[140] The Appellant argued a confining layer exists that prevents water from leaving the aquifer and flowing into Crowsnest Lake. It was explained the aquifer is recharged from the karst formation and from infiltration. If water continually comes into the aquifer from these sources, it should, without some intervening factor, eventually reach capacity and discharge to some area. No evidence was provided that this occurs. When questioned by the Board as to what happens to the water in the aquifer if it is a truly confined aquifer, the Appellant explained that vegetation, specifically poplar trees, absorb the water from the aquifer. The Board is not in a position to accept or reject this explanation, because no data were provided to support the explanation.

[141] The Appellant did not provide any explanation as to why the Sentinel Well should vary significantly from other wells in the area with respect to its geology other than to refer to the heterogeneity of the area. Other wells in the area have shown not to be confined aquifers or to have impermeable barriers. The subsurface geology of the region should not be overlooked. If site-specific data are limited in space and time, which is the case in the present appeal, data from the region can provide useful indicators of what can be expected to be found at the site. When looking at the data from Observation Wells No. 3 and 4, the Board cannot conclude that there is an impermeable barrier to the extent possible to interrupt the hydraulic connectivity between the aquifer and Crowsnest Lake.

[142] Of particular value to the Board in determining the issue before it was the evidence provided regarding the pump tests taken at the proposed Well and the effects on the

three observation wells. The definition of surface water includes groundwater in which the cone of influence intersects with a surface water body. The Director calculated the cone of depression to reach Observation Well No. 3 with 10 minutes of pumping. This suggests the lake is well within the cone of depression of the proposed Well.

[143] The data collected during the pump tests to support the Appellant's position is of questionable value. There were significant rain events at the time the data were collected, affecting the results because of surface infiltration reaching the wells. Additional data might have been useful in order to provide a clearer picture of the actual influence of the pumping Well on the observation wells.

[144] The Appellant argued that it is unreasonable to conclude that a connection between the aquifer and the lake is apparent based on the length of time it takes for the water to reach the Well from the lake. The determination of surface water is, however, not necessarily time dependent. It is measured by the cone of influence of the pumping well. In this case, the cone of influence may over time include Crowsnest Lake, making the water in the aquifer reserved water subject to the Allocation Order.

[145] The Appellant stated the totality of the evidence presented in support of the Appellant's application demonstrated the presence of a barrier between the proposed Well and Crowsnest Lake. The Board found the groundwater data insufficient, inconclusive, or irrelevant to determine a hydraulic barrier exists between the groundwater and the reserved water in this circumstance.

[146] In this particular case, the precautionary principle needs to apply. There is a significant amount of uncertainty regarding the aquifer and the barrier that might exist. Water is a valuable resource that needs to be protected and preserved, which is the reason the legislators enacted the Allocation Order. Since a great deal of uncertainty still exists regarding the aquifer and its properties, the Board considers it appropriate to recommend to the Minister that he confirm the Director's decision that the application is denied.

[147] The Parties responded to the Board's questions regarding the appropriate onus to be placed upon the Appellant in satisfying its obligation to establish a lack of connectivity between the aquifer and Crowsnest Lake or any other surface water. The Appellant argued the

onus it was obligated to meet should be one of a preponderance of evidence, a standard of proof that the Board considers prudent in this case. The Director argued, however, that the standard of proof necessary in these types of applications is more definite; that an applicant for a groundwater licence would need to establish with certainty that the applied for licence was clearly in relation to groundwater, thereby requiring definitive evidence to refute any possibility of a groundwater to surface water connection. The evidence of the two hydrogeologists made it clear to the Board that absolute certainty in matters of understanding groundwater properties and movement is not always possible. In any event, the Board finds that the obligation resting upon the Appellant in this matter is to establish on a preponderance of evidence that there is no such hydrologic connection. For the reasons set out herein, and particularly the inconclusive nature of the evidence taken as a whole, the Board finds the Appellant has failed to meet this test.

[148] Finally, the Board finds that, in these circumstances, the Director's decision to refuse to issue the licence in the manner that he did, a decision based upon a thorough review of the site-specific data and information submitted for review as well as regional hydrogeology, was reasonable.

## **VII. RECOMMENDATIONS**

[149] The Board recommends that the decision of the Director to refuse to issue a licence under the *Water Act* to the Municipality of Crowsnest Pass be upheld.

[150] With respect to sections 100(2) and 103 of EPEA, the Board recommends that copies of this Report and Recommendations, and of any decision by the Minister, be sent to the following:

1. Mr. Derek King, Brownlee LLP, on behalf of the Municipality of Crowsnest Pass;
2. Ms. Michelle Williamson, Alberta Justice, on behalf of the Director, Southern Region, Environmental Management, Alberta Environment;
3. Mr. Shane Stewart on behalf of ClansWest Development Ltd.;
4. Mr. William Bradley on behalf of Bridgegate Financial Corporation; and
5. Mr. Terry Kenney.

## **VIII. COSTS**

[151] The Appellant reserved its right to apply for costs. The Board requests the Appellant provide its application for costs to the Board within two weeks of the date of the Minister's Order with respect to this Report and Recommendations. The Board will then provide the Director with an opportunity to respond to the application before making its decision.

Dated on December 23, 2009, at Edmonton, Alberta.

*- original signed by -*

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Eric O. McAvity, Q.C.  
Board Member and Panel Chair

*- original signed by -*

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Alan J. Kennedy  
Board Member

*- original signed by -*

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Gordon Thompson  
Board Member



ALBERTA  
ENVIRONMENT

*Office of the Minister  
MLA, Medicine Hat*

## **Ministerial Order 01/2010**

*Environmental Protection and Enhancement Act*  
R.S.A. 2000, c. E-12

*Water Act*  
R.S.A. 2000, c. W-3

### **Order Respecting Environmental Appeals Board Appeal No. 08-016**

I, Rob Renner, Minister of Environment, pursuant to section 100 of the *Environmental Protection and Enhancement Act*, make the order in the attached Appendix, being an Order Respecting Environmental Appeals Board Appeal No. 08-016.

Dated at the City of Edmonton, in the Province of Alberta, this 4 day of January, 2010.

Rob Renner  
Minister

## **Appendix**

### **Order Respecting Environmental Appeals Board Appeal No. 08-016**

With respect to the August 18, 2008 decision of the Director, Southern Region, Environmental Management, Alberta Environment (the "Director"), to refuse to issue a water licence to the Municipality of Crowsnest Pass for a well located at SW-16-08-05-W5M under the *Water Act*, R.S.A. 2000, c. W-3, I, Rob Renner, Minister of Environment, order:

1. That the August 18, 2008 decision of the Director is confirmed.