

ALBERTA
ENVIRONMENTAL APPEAL BOARD

Report and Recommendations

Date of Hearing: April 24 and 25, 2002

Date of Report: May 27, 2002

IN THE MATTER OF sections 91, 94, and 99 of the
Environmental Protection and Enhancement Act, R.S.A. 2000, c.
E-12;

-and-

IN THE MATTER OF Notices of Appeal filed by James Kievit,
Paul Adams, and Jeff Eamon, with respect to Approval No. 1702-
01-02 issued by the Director, Approvals, Southern Region,
Regional Services, Alberta Environment to Lafarge Canada Inc.

Cite as: *Kievit et al. v. Director, Approvals, Southern Region, Regional Services, Alberta Environment re: Lafarge Canada Inc.*

**HEARING
BEFORE:**

William A. Tilleman, Q.C., Chair;
Dr. Steve Hrudehy; and
Dr. Curt Vos.

APPEARANCES:

- Appellants: Mr. James Kievit, Dr. Paul Adams, and Mr. Jeff Eamon, represented by Ms. Jennifer Klimek.
- Approval Holder: Lafarge Canada Inc., represented by Mr. Ronald Kruhlak and Mr. Corbin Devlin, McLennan Ross.
- Director: Ms. May Mah-Paulson, Director, Approvals, Southern Region, Regional Services, Alberta Environment, represented by Mr. William McDonald and Ms. Charlene Graham, Alberta Justice.
- Intervenors: Stoney Nakoda First Nation (Stoney Tribal Council), represented by Mr. Tibor Osvath, Rae and Company.
- Municipal District of Bighorn, represented by Mr. Dene Cooper.
- Other Parties: Bow Valley Citizens for Clean Air, represented by Ms. Jennifer Klimek.
- Board Staff: Mr. Gilbert Van Nes, General Counsel and Settlement Officer, Ms. Denise Black, Board Secretary, and Ms. Valerie Higgins, Registrar of Appeals.

WITNESSES:

- Appellants: Mr. James Kievit, Dr. Paul Adams, Mr. Jeff Eamon, Mr. Chris Severson-Baker, Mr. Hal Retzer, and Dr. Tracey Henderson.
- Approval Holder: Mr. Christian Gagnon, Mr. Andre Auger, Mr. Gordie Miskow, Mr. Niko Zorkin, Mr. Alex Schutte, and Mr. Allan Legge.
- Director: Ms. May Mah-Paulson, Mr. Joseph Feehan, Mr. Alexander MacKenzie, and Dr. Ahmed Idriss.

EXECUTIVE SUMMARY

Alberta Environment issued an Amending Approval to Lafarge Canada Inc. for its cement manufacturing plant near Exshaw, Alberta. The Amending Approval permits Lafarge to change the fuel supply for part of the plant from natural gas to coal. The Environmental Appeal Board received ten appeals challenging this Amending Approval, but based on a joint recommendation of the parties, the Board accepted only three of the appeals.

Following a Preliminary Meeting, the Board decided that eight issues would be included in the hearing, but that greenhouse gases was not an appropriate issue to be included.

The Board undertook an extensive hearing and received volumes of legal, technical, and scientific information regarding the appeal from Lafarge, Alberta Environment, the three individuals who filed the Notices of Appeal (Mr. James Kievit, Dr. Paul Adams, and Mr. Jeff Eamon), the Bow Valley Citizens for Clean Air, and the M.D. of Bighorn. (The Stoney Nakoda First Nation withdrew their intervention request.) Taking all of this information into account, including some of the recommendations that Lafarge submitted to the Board at the close of the hearing, which the Board accepted, we recommend that the Minister uphold the Amending Approval, subject to the following changes:

1. the SO₂ emission reduction plan should be submitted by August 1, 2003, (instead of by June 1, 2005, as originally planned) and a 25% reduction in SO₂ should be implemented by June 1, 2005, (no date was originally specified);
2. prior to the application for the renewal of the approval, Lafarge should provide Alberta Environment with information regarding the Best Available Demonstrated Technology for the control of emissions of SO₂, fine particulate, mercury, and heavy metals;
3. a continuous SO₂ monitor should be placed at the Barrier Lookout for one complete operational season (as suggested by Lafarge), the results of this monitoring program should analyze the validity of the ambient air quality modeling, this analysis should be provided to Alberta Environment to allow an independent review of the modeling, and all the parties to these Appeals should be encouraged to form and participate in an Air Quality Management Zone;
4. Lafarge should submit the terms of reference for the proposed bioaccumulation study to Alberta Environment for approval and Lafarge should be encouraged to involve the local government and the other parties to this appeal in the review of the terms of reference and, if possible, in the study itself;
5. if the monitoring program reveals that emission levels of mercury and heavy metals are higher than predicted, then Lafarge should develop a program to reduce these emissions;

6. the vegetation study should include an additional vegetation sampling site to the west of Exshaw (agreed to by Lafarge);
7. if blue haze remains an issue, Lafarge should undertake studies on the causes of any portion of the blue haze that they might be responsible for and develop a plan to reduce this problem, and this plan should be provided to Alberta Environment before the application for renewal of this approval is submitted;
8. Lafarge (as they suggested) should have a complaint line for addressing noise complaints from affected neighbours; and
9. the Human Health Impact Assessment that Lafarge is required to undertake should involve consultation with all of the Parties to these Appeals and evaluate the impact of air emissions from the Plant using the emerging source, ambient and other available monitoring results;
10. the proposal for the Human Health Impact Assessment should be provided for approval to Alberta Environment by December 31, 2002, (instead of by June 1, 2003, as originally planned) and it should be completed by December 31, 2003, (instead of by March 1, 2004 as originally planned).

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I. BACKGROUND

[1] This Report and Recommendations deals with Amending Approval No. 1702-01-02 (the “Approval”) under the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c. E-12 (“EPEA” or the “Act”)¹ issued by the Director, Approvals, Southern Region, Regional Services, Alberta Environment (the “Director”) on October 22, 2001, to Lafarge Canada Inc. (the “Approval Holder” or “Lafarge”) with respect to its cement manufacturing plant (the “Plant”) at Exshaw, Alberta near the entrance to Banff National Park.

[2] The Plant was originally constructed 96 years ago, in 1906. In May 1997, the Plant was granted an approval (the “Original Approval”)² under EPEA. The Plant is currently fueled by natural gas. But, in the last few years the price of natural gas has been unstable. This has resulted in economic difficulties at the Plant such that during one period in the last few years, two-thirds of the Plant had to be shut down and cement had to be imported from outside the province.³ Apparently, in response to these unstable natural gas prices, the Approval Holder applied to the Director for an amendment (the Approval) to the Original Approval to allow the burning of coal as part of what is referred to as the “Fuel Flexibility Project.”

[3] Lafarge had expected increased public concerns with the switch to coal. On May 8, 1998, in a letter to the Alberta Energy and Utility Board (“AEUB”), Lafarge requested a renewal of the Industrial Development Permit that permitted it to use natural gas as a fuel source. As justification for using natural gas as a fuel source, instead of other fuel sources such as coal, Lafarge stated:

“There are two main reasons [(economics and the environment)] why gas is the fuel choice for [the] Lafarge Canada Inc. – Exshaw Plant, and why renewal of Industrial Development Permit IDP 90-5 is in the public interest: ...

¹ The *Environmental Protection and Enhancement Act*, R.S.A. 2000, c. E-12 replaced the *Environmental Protection and Enhancement Act*, S.A. 1992, c. E-13.3 on January 1, 2002.

² The Amending Approval amends the Original Approval (Approval No.1702-01-00), which was issued on May 29, 1997, and which expired on May 1, 2007. The Board notes that it did not receive any Appeals in relation to the Original Approval. There was a previous amendment (Amending Approval 1702-01-001) to the Original Approval, which related to a “Crusher Modernization Project.”

³ Oral Submission of the Approval Holder, presented March 25, 2002.

Environment

The plant is located in the environmentally sensitive Bow Valley, near Canmore, Alberta. This area has seen a tremendous increase in recreational visitors over the last several years, and has been nominated under the Provincial Special Places 2000 process.

Lafarge has worked very hard to make sure our operations are in accordance with all environmental legislation, and further, acceptable to our neighbours in the Bow Valley. Using an alternate fuel to gas, such as coal, would dramatically affect our ability to do this. ...

Obviously, any decision to move to an alternate fuel source would require an extensive consultation process with the stakeholders in the Bow Valley.”

[4] The Board notes that the Lafarge Fuel Flexibility Project is not before the AEUB for a new Industrial Development Permit pursuant to the *Coal Conservation Act*,⁴ because the Approval Holder only proposes to use 175,000 tonnes of coal per year.⁵

A. Procedural Background

[5] On November 21 and 22, 2001, the Environmental Appeal Board (the “Board”) received ten Notices of Appeal expressing concerns with the Fuel Flexibility Project.⁶ The Board acknowledged these Appeals on November 21 and 23, 2001, and requested a copy of the records (the “Record”) from the Director.

[6] The Board subsequently determined, based on an agreement reached by the Parties to these appeals, that it would accept the Notices of Appeal filed by Mr. James Kievit, Dr. Paul Adams, and Mr. Jeff Eamon (collectively the “Appellants”).⁷

⁴ *Coal Conservation Act*, R.S.A. 2000, c. C-17.

⁵ Section 28(1)(2) of the *Coal Conservation Act* only requires an Industrial Development Permit if 230,000 tonnes per year or more of coal is going to be used as fuel. The *Coal Conservation Act* has a similar Industrial Development Permit process and public hearing process (section 29) for the use of coal as a fuel, as that used by the Alberta Energy and Utilities Board for the use of natural gas as a fuel. Section 5-1 of Lafarge’s Application of the Approval states that Lafarge plans to use approximately 175,000 tonnes per year of coal as fuel. Director’s Record, part 42.

⁶ The Notices of Appeal were received from Mr. James Kievit, Dr. Paul Adams, Mr. Marlo Reynolds, Ms. Nadine Reynolds, Mr. Jeff Eamon and Ms. Anne Wilson, Mr. Hal Retzer, the Bow Valley Citizens for Clean Air and the Pembina Institute for Appropriate Development, Dr. Tracey Henderson, Ms. Amy Taylor, and Mr. Gary Parkstrom.

⁷ The Board’s decision to accept the Notices of Appeals of Mr. Kievit, Dr. Adams, and Mr. Eamon is the subject of a separate decision.

[7] According to standard practice, the Board wrote to the Natural Resources Conservation Board (the “NRCB”) and the AEUB asking whether this matter had been the subject of a hearing or review under their respective legislation. The NRCB responded in the negative. The AEUB advised that it had issued an Industrial Development Permit to the Approval Holder.⁸

[8] On December 10, 2001, the Board received a copy of the Record, which was distributed to those involved in the Appeals on December 11, 2001.

[9] On December 21, 2001, the Director notified the Board that the Municipal District of Bighorn and the Stoney Nakoda First Nation⁹ might have an interest in the Appeals. On January 9, 2002, the Board wrote to the Municipal District of Bighorn (the “Municipal District”) and the Stoney Nakoda First Nation, advising them of the Appeals.

[10] On January 3, 2002, the Board was advised that the Parties were close to an agreement with respect to a number of preliminary matters, including the issues to be considered in these Appeals.¹⁰ The Board subsequently requested a written status report respecting this agreement by January 31, 2002. On January 31, 2002, the Board received a letter from the Appellants advising that they were close to an agreement with the Director and Approval Holder on the preliminary matters.

[11] On February 11, 2002, the Board received a letter from the Approval Holder stating that the Parties had reached an agreement with respect to a number of preliminary matters, including which Notices of Appeal should be accepted by the Board. However, this agreement did not appear to include the issues that should be considered by the Board at the hearing of these Appeals.

[12] On February 15, 2002, the Board wrote the Parties and asked them to provide a letter outlining their agreement. On February 20, 2002, the Appellants wrote to the Board stating that the Bow Valley Citizens for Clean Air’s “... Notice of Appeal succinctly summarizes

⁸ The Board has considered the effect of the AEUB’s Industrial Development Permit on these Appeals and determined that the AEUB has not held a hearing or review of this matter. The Board’s consideration of the AEUB’s involvement in this matter is in a separate decision.

⁹ The Stoney Nakoda First Nation have also identified themselves in other correspondence with the Board as the Stoney Tribal Council and the Stoney First Nation.

¹⁰ Letter from the Approval Holder, dated January 3, 2002.

the issues in this appeal and should be the reference point for this appeal. If that is not acceptable, I would appreciate an opportunity to address the above issue.” It was not clear to the Board at that time whether the Parties had reached an agreement on the issues to be considered in these Appeals.

[13] On March 4, 2002, the Board advised the Parties that the Hearing was scheduled for April 24 and 25, 2002, and provided a copy of the Board’s Notice of Public Hearing.¹¹ The Notice of Public Hearing advised that if any person wished to make representations before the Board, they should submit a request in writing by March 20, 2002. On March 4, 2002, the Board provided a copy of the Board’s Notice of Public Hearing to the Municipal District of Bighorn and the Stoney Nakoda First Nation.

[14] On March 5, 2002, the Board wrote to the Parties on several outstanding issues.¹²

[15] The Parties subsequently provided the submissions requested by the Board. A key matter addressed by the Parties was the fact that the Approval before the Board was in fact an amendment of the Original Approval issued in May 1997. The Appellants’ response submission, dated March 13, 2002, stated that “...there appears to be a disagreement on the Director’s jurisdiction, it is an issue before the Board and full argument should be heard on it.”¹³ The Board reviewed the written submissions respecting the issues and, in a letter dated March 18, 2002, noted that the Appellants presented “...the view that an appeal of an amendment to an approval can include a review of the ‘...entire scope of the approved operation....’” The Board went on to note that the Approval Holder and the Director argued that there is no “...jurisdiction to ‘open up’ the entire approval.” As a result, the Board requested comments from the Parties on

¹¹ The Board’s Notice of Public Hearing was published in the *Okotoks Western Wheel* and the *Canmore Leader*.

¹² The Board stated:
“Section 95 of the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c. E-12 provides:

‘(2) Prior to conducting a hearing of an appeal, the Board may, in accordance with the regulations, determine which matters included in notices of appeal properly before it will be included in the hearing of the appeal....’

Therefore, in order to ensure that we are able to proceed to a hearing as planned for April 24 and 25, 2002 the Board is requesting submissions from the parties with respect to which matters included in notices of appeal properly before it (Adams, Eamon, and Kievit) will be included in the hearing of the appeals. The Board would like to receive submissions on this question....” (Emphasis omitted.)

¹³ This disagreement related to the degree to which an appeal of an amending approval (the Approval)

the Appellants' request to have full arguments heard on the degree to which the Original Approval can be considered.

B. Interventions

[16] On March 19, 2002, the Board received an intervenor request from the Municipal District of Bighorn. The Municipal District indicated that the Plant is located in the municipality and that its residents are affected by the Approval. The Municipal District identified the "...efforts and process implemented by the Exshaw Community Environment Committee ... in monitoring of air quality and other related environmental issues...." The Municipal District indicated that they wished to present evidence regarding the Exshaw Community Environmental Committee (the "ECEC".)

[17] On March 19, 2002, the Board also received an intervenor request from the Stoney Nakoda First Nation. The Stoney Nakoda First Nation indicated that in their view "...neither Alberta Environment nor the Alberta Environmental Appeal Board (the 'Board') had or have the jurisdiction to issue, amend or approve ... [the Approval] in so far as the ... Approval may impact upon the Stoney Nakoda [First] Nation, without, at a minimum, the approval of the Stoney Nakoda [First] Nation." However, the Stoney Nakoda First Nation went on to say that since "... their interests are directly affected and impacted by the ... Approval and the appeal of the said ... Approval that is before the Board, please be advised that ... [they wish] to intervene and present both written and oral submissions, as well as reserving the right to cross-examine any witnesses...."¹⁴

could consider the Original Approval.

¹⁴ The Stoney Nakoda First Nation stated that they wished to address the following issues:

1. Failure of the Approval Holder, Lafarge Canada Inc., to consult, or adequately consult with the Stoney Nakoda [First] Nation and ... [the Federal Crown in regard to the Approval].
2. Failure of the Approval Holder and Environment Alberta to obtain the consent and approval for the ... Approval from the Stoney Nakoda [First] Nation and ... [the Federal Crown].
3. Failure of the Approval Holder and Environment Alberta to properly consider, study and assess health and environmental impacts of the ... Approval on the members of Stoney Nakoda [First] Nation.
4. Failure of the Approval Holder and Environment Alberta to properly consider, study and assess the impact of the ... Approval on vegetation and wildlife located on both Reserve

[18] On March 20, 2002, the Board wrote to the Parties and requested comments on the participation of the Stoney Nakoda First Nation and the Municipal District of Bighorn prior to the Board making a decision regarding their interventions. (These comments were subsequently received on March 26, 2002.)

C. Preliminary Meeting

[19] In response to the concern of the Parties, regarding the scope of the issues before the Board,¹⁵ the Board decided to call a Preliminary Meeting "...to hear submissions on the issues to be dealt with at the Hearing, the timing of the Affidavits and written submissions, and any other preliminary matters." The Board said that it "...would principally like to hear arguments from the parties with respect to the inclusion of greenhouse gases as an issue and to what extent the original approval can be considered at the hearing of these Appeals."¹⁶ Following consultation with the Parties, in the Board's letter of March 22, 2002, the Board scheduled the Preliminary Meeting for March 25, 2002, in the Board's offices in Edmonton. The letter detailed the procedure for the Preliminary Meeting and indicated that the Municipal District of Bighorn and the Stoney Nakoda First Nation were invited to attend if they chose.¹⁷

D. The Hearing

[20] Following the Preliminary Meeting, the Board issued its Decision,¹⁸ which included directions on the status of intervenors,¹⁹ scheduling of written submissions and

Lands and Traditional Lands, including Stoney Nakoda [First] Nation's agriculture and livestock.

5. Failure of the Approval Holder and Environment Alberta to properly consider, study and assess the impact of the ... Approval on Stoney Nakoda [First] Nation's traditional land use on both Reserve Lands and Traditional Lands.
6. Failure of Environment Alberta to ensure that a copy of the Approval Holder's annual summary and report be provided to Stoney Nakoda [First] Nation ... [and the Federal Crown.]"

¹⁵ See: Paragraph 15.

¹⁶ Board's Letter, dated March 22, 2002.

¹⁷ On March 25, 2002, the Board convened the Preliminary Meeting. In attendance were the Appellants, the Approval Holder, the Director, and the Stoney Nakoda First Nation.

¹⁸ Preliminary Motions: *Kievit et al. v. Director, Approvals, Southern Region, Regional Services, Alberta Environment re: Lafarge Canada Inc.* (April 16, 2002), EAB 01-097, 098 and 101-D.

¹⁹ The Board decided that the Stoney Nakoda Nation and the Municipal District of Bighorn would be given full intervenor status for the Hearing on April 24 and 25, 2002.

Affidavits for the Hearing on April 24 and 25, 2002, the issues to be dealt with at the Hearing, and requested that if any of the Parties became aware of any steps being taken under the *Canadian Environmental Assessment Act* to undertake a review, they were to advise the Board immediately.²⁰

[21] At the outset of the Hearing, the Stoney Nakoda First Nation informed the Board that based on negotiations with the Approval Holder and the Stoney Nakoda First Nation, the consultation issues in respect to the Approval Holder had been dealt with and that no further arguments or representations regarding the consultation issue would be made at this time.²¹ The Stoney Nakoda First Nation also told the Board that they had reviewed the Board's position on the Stoney Nakoda First Nation's jurisdictional arguments²² and decided to withdraw their intervention.²³

II. ANALYSIS

[22] The eight issues to be decided were set out by the Board in its letter of April 2, 2002, as follows:

- SO₂ emissions – Approval Conditions 4.1.13 and 4.1.35;
- mercury and heavy metals;
- particulates;
- monitoring and reporting – Approval Conditions 4.1.24 and 4.1.28;
- human health impact assessment/vegetation assessment study – Approval Condition 4.1.30 and 4.1.37;
- any potential antagonistic environmental effects of burning tires and coal;
- the environmental effects of burning coal on the viewscape; and
- the environmental effects of burning coal on the natural surrounding.

The Board also decided that greenhouse gases was not an appropriate issue to be included in the hearing of these Appeals. The Board will address each of these eight issues. However, prior to moving to these eight specific issues the Board has some general comments.

²⁰ *Canadian Environmental Assessment Act*, S.C. 1992, c. 37 (“CEAA”). No formal steps taken under CEAA was brought to the Board's attention. See: Board's Letters, dated April 18 and 19, 2002.

²¹ Transcript, April 24 and 25, 2002, at page 13.

²² Board's Letter, dated April 23, 2002.

²³ Transcript, April 24 and 25, 2002, at page 13.

A. General Comments

[23] Concerns were raised by the Appellants about adverse human health effects from sulphur dioxide (“SO₂”), but no evidence suggesting that adverse health effects had occurred was presented by any of the Parties at the hearing. While it is true that absence of evidence does not constitute evidence of evidence, the burden of proof for any issue raised by an appellant resides with that appellant. No case was made that human health impacts attributable to ambient SO₂ arising from emissions originating with the Plant were likely to occur. However, there was considerable evidence provided in the Record and at the Hearing to indicate that existing and proposed SO₂ emission levels would, on occasion, exceed Alberta’s Ambient Air Quality Guidelines’ (the “Guidelines”) 1-hour maximum according to the Approval Holder’s air dispersion modeling.

[24] The Board believes that Albertans rightly expect that the air quality Guidelines that have been established for all locations in Alberta will be enforced with vigour, particularly in locations such as the Bow Valley corridor where such high intrinsic values, in terms of Provincially protected recreational areas, and aesthetic and ecological values are evident. In this context, the air quality Guidelines, set by Alberta Environment with all of the expertise that it has marshaled for this purpose, provide the appropriate reference point that must be considered by this Board.

[25] The Board also recognizes the importance that Alberta Environment has attached to the concept of enforcing the best available demonstrated technology (“BADT”) for controlling pollutant emissions as an approach to assuring Albertans, in accordance with the stated goals of the Act,²⁴ that environmental quality will not be sacrificed to economic activity. The policy of requiring BADT has been pursued in cases where ambient environmental quality guidelines are not being exceeded. There is, in our judgment, a clear imperative for vigorous implementation of the BADT policy when the exceedance of ambient environmental quality guidelines is predicted.

²⁴ Section 2 (b) of the Act provides:

“The purpose of this Act is to support and promote the protection, enhancement and wise use of the environment while recognizing the following: ... (b) the need for Alberta’s economic growth and prosperity in an environmentally responsible manner and the need to integrate environmental protection and economic decisions in the earliest stages of planning....”

B. Sulphur Dioxide Emissions

[26] It is clear to the Board that SO₂ emissions associated with the Approval Holder's project were a major concern for the Appellants, and probably for all of the Parties before the Board. The Board acknowledges that the Approval for the Fuel Flexibility Project involved no increase in SO₂ emissions over what the approved emissions for this Plant were, based on natural gas operations. However, the air quality modeling conducted for this Approval application indicated that at the emission limits for SO₂ permitted pursuant to Condition 4.1.13 of the Approval,²⁵ there may be exceedances by more than 33% of Alberta's Ambient Air Quality Guidelines' 1-hour maximum for SO₂ on a small number of occasions. The exceedances are predicted during unfavourable meteorological conditions in winter at higher elevations in the region to the east of the Plant.²⁶ Exceedances were predicted even when lower SO₂ input values were utilized for the Graymont plant (another industrial facility in the area).²⁷

[27] The Board recognizes that these modeled exceedances may not occur in reality. Furthermore, because the emitted mass of SO₂ has not changed for the modeled scenario, if the modeled exceedances are accurate, then logically they should have also been occurring in the past. However, the Board finds that the evaluation done by Dr. Legge for SO₂ damage to Lodgepole Pine, while helpful on the question of whether there is any evidence of chronic air pollution damage to sensitive vegetation, did not answer the question of whether 1-hour maximum SO₂ exceedances have occurred in the past.²⁸

²⁵ Condition 4.1.13 of the Approval provides:

"4.1.13 Releases of air contaminants shall not exceed the limits specified in TABLE 4.1-1 unless authorized by the Director in writing."

Pursuant to TABLE 4.1-1 STACK EMISSION LIMITS, the Approval Holder is permitted to emit 665 tonnes per quarter of SO₂ or 2660 tonnes per year.

²⁶ Written Submission of the Director, dated April 15, 2002, at page 7, paragraphs 48 to 51. These areas include Heart Mountain and Exshaw Mountain.

²⁷ Written Submission of the Director, dated April 15, 2002, at page 7, paragraph 51. "...The new modeling still predicts that the areas near the summits of Heart Mountain and Exshaw Mountain may have 1-hour concentrations of SO₂ which will exceed the ambient guideline value of 450 µg/m³."

²⁸ Exhibit B to the Affidavit of Dr. Allan H. Legge. *Evaluation and Assessment of the Impact of Current SO₂ Emissions from the Lafarge Canada Inc. Exshaw Cement Plant on Vegetation in the Bow Valley Corridor*, dated March 27, 2002 (the "Vegetation Study").

Transcript, April 24 and 25, 2002, at page 236, questioning of Dr. Legge by Dr. Hrudey:

"Q. (Dr. Hrudey) To what extent can I rely upon an inference from your observations of apparent acute injury of pine trees to validate or fail to validate the short-term peak exposures estimated by the model? Does it tell us anything useful on that front at all? My

[28] The Director proposed to address these model predicted exceedances of SO₂ by verifying the accuracy of the modeled exceedances through a passive monitoring program set out in the Approval.²⁹ The evidence before the Board was that the proposed passive monitoring program would also not be able to substantially confirm or refute the predicted exceedances.³⁰ The Board is of the view, therefore, that the Director cannot confidently rely on the passive monitoring program set out in the Approval to determine the accuracy of the modeled results or to determine whether or not SO₂ exceedances are actually occurring.³¹

[29] The continuous monitoring program involving the ambient monitoring trailer will have clear value for determining ground level exposure to air pollutants in the nearby communities.³² However, this monitoring location, while valuable for that purpose, does not offer much value for validating or otherwise, the predicted 1-hour SO₂ exceedances at high elevations to the east of Exshaw.

[30] During the Hearing, the Approval Holder and the Director both argued that the CALPUFF dispersion model utilized by the Approval Holder in predicting SO₂ dispersion is inherently conservative.³³ The Board accepts this characterization and acknowledges the substantial uncertainty in such modeling and the likelihood that any bias in the model is likely towards overprediction. However, at the end of the day, the Board is left with the reality that the only scientific means currently available for judging the likelihood of such exceedances occurring in reality are the estimates from the model predictions. The intent of the Act³⁴ is to

inclination from everything that I have heard is no, it doesn't.

A. (Dr. Legge) Probably not. It would depend how they occurred, but probably not."

²⁹ Written Submission of the Director, dated April 15, 2002, at page 8, paragraphs 54 and 55. See: Approval conditions 4.1.28 and 4.1.29. (Note: there is a clerical error; 4.1.28 should refer to Table 4.1-5 not Table 4.1-4.)

³⁰ Transcript, April 24 and 25, 2002, at page 296. Under cross-examination by Ms. Klimek, the Director's expert panelist on air quality, Dr. Idriss, stated: "Definitely, as we indicated, the passive models wouldn't catch the one-hour exceedances or the actual exceedances."

³¹ The Board notes that the presence at the Hearing of an Alberta Environment air quality monitoring specialist would have greatly assisted all parties in addressing the issue of air monitoring options for the high-mountain areas predicted to have SO₂ exceedances.

³² Written Submission of the Director, April 15, 2002, at page 8, paragraphs 54 and 55. See: Approval conditions 4.1.24 and TABLE 4.1-5 (Ambient Trailer – SO₂ and other parameters – continuous monitoring and monthly reporting from February 1, 2002 to June 30, 2004).

³³ Written Submission of the Director, April 15, 2002, at page 8, paragraphs 52 and 53. The Director submitted that the model has a tendency to "...overstate the worse case scenario rather than underestimating." See: Submission of the Approval Holder, dated April 12, 2002, at page 5. Lafarge argued that the modeled results are "conservative."

³⁴ Section 2(d) of the Act provides:

prevent or mitigate impacts to the environment, which in this case should include seeking compliance with the Alberta Ambient Air Quality Guidelines for the 1-hour maximum SO₂. The Approval Holder acknowledged the need to treat these Guidelines as a regulatory requirement that should be satisfied.³⁵

[31] All parties acknowledged the sensitivity of the location of the Plant, surrounded by highly valued and regulated Alberta Parks and recreation land.³⁶ The Director recognized the need to reduce SO₂ emissions from this facility by including Condition 4.1.35 in the Approval³⁷ obliging the Approval Holder to develop a plan and a schedule for reducing emissions by 25% - a reduction that will move the highest predicted 1-hour SO₂ levels towards compliance with the Guidelines.

[32] The Appellants questioned whether there was any scientific information before the Director to indicate what level of SO₂ emissions would be necessary to avoid the modeled exceedances. Accordingly, the Appellants questioned where the 25% figure for the SO₂ reduction plan was derived and whether this amount will be adequate to avoid the exceedances.³⁸

“The purpose of this Act is to support and promote the protection, enhancement and wise use of the environment while recognizing the following: ... (d) the importance of preventing and mitigating the environmental impact of development and of government policies, programs and decisions....”

³⁵ Transcript, April 24 and 25, 2002, at page 388.

³⁶ The Board notes that these highly valued parks, also located in or near the Bow Valley corridor, include not only Banff National Park, Canada’s oldest National Park and a designated World Heritage Site, but also Bow Valley Wildland Park, Bow Valley Provincial Park, and Kananaskis Country. Recent amalgamation of Natural Areas (and other protected area designations) in forming the Bow Valley Wildland Park, indicates the provincial ecological significance of the surrounding region. Indeed, the Banff National Park gates were located east of Exshaw until 1930. (Transcript, April 24 and 25, 2002, at page 127.)

³⁷ Condition 4.1.35 of the Approval provides:

“4.1.35 The approval holder shall submit to the Director a written SO₂ Emission Reduction Plan by June 1, 2005 which shall include the following:

- (a) a detailed description of measures on how to achieve a 25% reduction in SO₂ emissions from the plant; and
- (b) an implementation schedule for the measures to achieve a 25% reduction in SO₂ emissions.”

³⁸ Transcript, April 24 and 25, 2002, at pages 302-303. Ms. Klimek cross-examined the Director, Ms. Mah-Paulson. In response to Ms. Klimek’s question on whether 25% SO₂ reduction was achievable, the following exchange took place:

“A. [Ms. Mah-Paulson] ... based on the information that was provided [by Lafarge], we selected 25 percent as what seems to be a reasonably and achievable target for Lafarge.

Q. [Ms. Klimek] You chose that number then because it was achievable, not because it would lead to some – or would reduce or eliminate the modeled exceedances; is that a fair statement?

In her written submission, the Director admitted that no modeling was done to determine if the 25% reduction would have any impact on the modeled exceedances.³⁹ Under cross-examination, the Director indicated that the 25% figure was an achievable target for the Approval Holder, and it would have an overall effect of reducing SO₂ levels.⁴⁰ The Board finds that the Director has not answered the question of what level of SO₂ emissions would prevent the modeled exceedances. The Board acknowledges that a linear decrease in emissions, used as a direct input to the model, if all other parameters (e.g. stack exit temperature, etc.) are held constant, will reduce predicted ambient concentrations proportionately, although it is also acknowledged that holding all other relevant parameters constant for a hypothetical reduced emissions scenario may not be realistic.⁴¹

[33] The Director also included Condition 4.1.36 in the Approval⁴² indicating that the Approval Holder shall implement the reduction, but the initiation of this reduction plan would

A. Obviously reducing by 25 percent will have an overall effect on reducing SO₂ levels.

Q. But that was a number picked because it was achievable, if I understand you?

A. We knew that they were committed to no net increase in SO₂; they were also undertaking – looking at some things that they could do to further reduce SO₂ emissions.”

³⁹ Written Submission of the Director, April 15, 2002, at page 15, paragraph 111. The Director stated: “It is acknowledged that no modeling was done to determine if the 25% reduction figure would have any impact on the modeled exceedances. It was determined that with Lafarge obtaining more monitoring data and completing a Human Health Impact Assessment, that this information would allow AENV to assess the sulphur dioxide issue. It was determined that such modeling was not required at this time, but may be something that needs to be completed in the future.”

⁴⁰ Written Submission of the Director, April 15, 2002, at page 15, paragraph 111.

⁴¹ Transcript, April 24 and 25, 2002, at page 208, Ms. Klimek cross-examines Mr. Schutte.

“Q. [Ms. Klimek] Now wouldn’t that be put into your original model that 2,660 tonnes, that they produced that amount? You would know your stack temperature and your stack height for that model did you not?

A. [Mr. Schutte] If you’re referring to that if all stack characteristics were to remain the same, what level of reduction would be required?

Q. Yes.

A. That first of all, is probably not a realistic scenario because when you reduce sulphur, you probably change the characteristics of your stack, like exit velocity or temperature. But if that were to occur, a 25-percent reduction would eliminate all levels above the guideline at the Heart Mountain area. Straightforward math, the maximum predicted concentration at Heart Mountain was under 600, so it would be that way. And at Exshaw Mountain, it would reduce it. There would still probably be a predicted exceedance there, but 25 percent of 700 and something is still above the guideline. There would be less predicted exceedances at that point.”

⁴² Condition 4.1.36 of the Approval provides:

“4.1.36 The approval holder shall implement the SO₂ Emission Reduction Plan as authorized in writing by the Director.”

not be considered by the Director until June 1, 2005, let alone be implemented by that date. The evidence before the Board justified the need for some operating experience with the modified operation using coal as a primary fuel in order to develop a realistic proposal for achieving the SO₂ emission reduction.⁴³ However, no evidence was presented to justify the need for almost 3 years of operation before a plan could be submitted for the 25% SO₂ emission reduction. The Board thus concludes that 1 full year of operation with the new system should be adequate to provide the necessary operating experience for developing the emission reduction plan, and a further 6 months should be sufficient to prepare a realistic implementation plan with the objective of fully implementing the 25% reduction in SO₂ emissions by no later than June 1, 2005.

[34] The Appellants argued that the Approval does not require the Approval Holder to use BADT in addressing SO₂ emissions from the Plant.⁴⁴ They relied on Alberta Environment's own document that sets forth the purpose of the Guidelines to argue that these Guidelines should have been used by the Director in Lafarge's approval process to ensure that emissions were minimized and the Guidelines met through the use of BADT.⁴⁵ They argued that given:

- a. the unique ecological and protected recreational setting of the Plant,⁴⁶
- b. the predicted exceedances for SO₂ in all modeling put forth by the Approval Holder,
- c. the potential risks posed by these exceedances for humans and the natural surroundings,
- d. that the predicted exceedances cannot be validated or invalidated by the proposed monitoring system, and
- e. that the SO₂ exceedances modeled to occur are contrary to Alberta Environment's own Guidelines,

⁴³ Transcript, April 24 and 25, 2002, at pages 176, 178, and 212 to 214.

⁴⁴ Written Submission of Appellants, April 5, 2002, at page 3, paragraph 7(f)(i).

⁴⁵ Written Submission of Appellants, April 5, 2002, at page 5, paragraph 15. See: Affidavit of Paul Retzer, dated April 1, 2002, at page 6, paragraph 33 where Mr. Retzer quotes the Guidelines, which are attached as Exhibit B to his Affidavit: "The Guidelines ... are part of the Alberta air quality management system. [This system was] designed to ensure emissions are minimized through the use of best available demonstrated technology ('BADT'), and that residual emissions are dispersed to ensure that the Guidelines are met."

⁴⁶ Written Submission of Appellants, April 5, 2002, at page 4. The Appellants urged the Board, in its assessment of the merits of this appeal, to understand and appreciate the nature of the area where the Plant is located. This is an area surrounded by protected areas that were established because of their ecological and recreational importance.

that the Director should have employed her power to require the Approval Holder to use BADT to reduce SO₂ emissions to levels that would not cause exceedances of the Guidelines.⁴⁷

[35] The Director's main response to predicted SO₂ exceedances, in this case, was to require further monitoring, including a continuous emissions monitoring ("CEM") system of the kiln stacks.⁴⁸ The Director pointed to the Canadian Council of Ministers of the Environment ("CCME") *National Emission Guideline for Cement Kilns*⁴⁹ (the "CCME Guideline") for nitrogen oxide (not SO₂) to demonstrate that there are no cement sector-specific SO₂ emission guidelines and to show that the Director acted in a manner consistent with the CCME Guideline in requiring a CEM system in the Approval. The Director also pointed to the CCME Guideline to indicate that the use of electrostatic precipitator/baghouse is the acceptable pollution abatement equipment in the cement manufacturing industry.⁵⁰

[36] The Board finds consensus among the Parties at the hearing that the use of a fabric filter baghouse may be the BADT for controlling fine particulate dust in the cement manufacturing industry. The question remains, however, whether BADT has effectively been applied to address the SO₂ exceedance issue. Specifically, should the Director have required the Approval Holder to use flue gas desulphurization technology or the equivalent? At the Hearing, the Board heard that the Director declined to require the installation of this or equivalent technology at the Plant for the following reason:

"We are aware of a very few cement plants which are using additional technology such as flue gas desulphurization. Flue gas desulphurization is not a standard across the cement industry. It is typically used to control emissions from the coal-fired electric utility power industry."⁵¹

⁴⁷ In his Affidavit (at paragraphs 37 to 41) and direct evidence (Transcript, April 24 and 25, 2002, at pages 62-63), Mr. Retzer indicated that in meetings with Lafarge, Lafarge indicated that the cost was in the \$500,000 to \$1 million range to install some of the technology to reduce SO₂ emissions. Mr. Retzer charged that such a small increase in capital cost for SO₂ removal equipment would not be an economic burden. Lafarge, in its direct evidence (Transcript, April 24 and 25, 2002, at pages 177 to 178), stated that if there was any technology it could "...pull off the shelf for say half a million dollars that will *eliminate* the SO₂ problem at the Exshaw plant..." it would "...do it right now..." (Emphasis added.)

⁴⁸ Written Submission of the Director, April 15, 2002, at pages 16 to 17, paragraphs 115 to 124.

⁴⁹ Canadian Council of Ministers of the Environment, *National Emission Guideline for Cement Kilns*; Initiative N306 (Winnipeg: Canadian Council of Ministers of the Environment Secretariat, 1998).

⁵⁰ Written Submission of the Director, April 15, 2002, at pages 16 to 17, paragraphs 115 to 124.

⁵¹ Transcript, April 24 and 25, 2002, at pages 273 to 275.

[37] The Board notes that the coal-fired electric utility power industry and the amended operations at the Lafarge Exshaw Plant both use thermal coal as their primary energy source.

[38] Under cross-examination by the Appellants, the Director reiterated that in considering what would be BADT in this case, she considered BADT to be what is the standard recognized technology for the cement industry.⁵² She said that a literature search was conducted and that this search identified that flue gas desulphurization was being used in some cement plants. She stated:

“We looked at what facilities were using flue gas desulphurization. We saw that there were very few cement plants that used this technology, and as I indicated before, best available technology is what we consider to be commercially available and standard for the industry.”⁵³

[39] Understandably, the Appellants then asked the Director:

“How does a new piece of technology then that’s been proven become best available technology if industry doesn’t voluntarily bring it into its standards?”⁵⁴

And the Director responded:

“The Department [(Alberta Environment)] does review and expect our industrial approval holders to look at things like continuous improvement at the time of – whether it’s at the time of a first application or at renewal time. If there is a technology out there that looks like this is the way we might want to consider going, then certainly it requires field testing and extensive, more extensive literature research.”⁵⁵

[40] Ultimately, the Appellants asked that the Approval be amended such that:

“Lafarge shall reduce SO₂ emissions using BADT to a level that prevents modeled exceedances of the Alberta Ambient Air Quality Guideline. All equipment or changes to plant feedstock required to meet the requirement shall be fully functional within 18 months of coal conversion.”⁵⁶

[41] On the other hand, the Director and the Approval Holder asked that the Approval, as it relates to SO₂ emissions, remain unchanged.

⁵² Transcript, April 24 and 25, 2002, at pages 303 to 306.

⁵³ Transcript, April 24 and 25, 2002, at pages 303 to 306.

⁵⁴ Transcript, April 24 and 25, 2002, at pages 303 to 306.

⁵⁵ Transcript, April 24 and 25, 2002, at page 305.

⁵⁶ Exhibit No. 12, Appellants’ Proposed Changes, dated April 26, 2002, at page 1.

[42] Significantly, the Board notes that the regulatory precedent of Alberta Environment has been to require the implementation of BADT for issuing approvals, even in cases where the ambient air quality Guidelines are not being exceeded. Both the Board and the Minister have, in the past, upheld a specific challenge by an approval holder to this policy.⁵⁷ In the case of the Lafarge Exshaw Plant, the Board is not convinced that Alberta Environment has been provided with an adequate basis to determine the nature of BADT for this industry sector, particularly for SO₂ emissions. Evidence was provided about the Approval Holder's state-of-the-art cement manufacturing facility in Richmond, British Columbia, but it was acknowledged that the Richmond facility has not experienced a serious SO₂ emission problem,⁵⁸ so it remains unlikely that the Richmond facility provides an appropriate BADT reference point for the matter of SO₂ emissions at Exshaw.

[43] During the course of the Hearing, the Board heard that the Exshaw Plant is anomalous for a number of reasons. First, because it is located in an ecologically and recreationally significant part of the world; second, because it is one of the few cement plants that is currently fueled by natural gas; and third, because the larger proportion of the sulphur input into its cement manufacturing process is from the raw materials (shale – Seebe shale at 2.5% sulphur) used and not from the coal (maximum of 0.6% sulphur).⁵⁹

[44] In the Board's view, all three of these anomalous qualities substantiate the need for ongoing consideration of BADT for the Exshaw Plant. Faced with only a small number of industrial plants for comparison in total, as appears to be the case for cement kilns, there is clearly a need for a more rigorous consideration of technology that may only be used at a small number of facilities.

[45] The Director and this Board are both required to take their responsibilities for the protection of the environment under the Act seriously. With regard to the anomalous circumstances of the Exshaw Plant for its current use of natural gas, the Board points out that the use of natural gas for cement plants is currently the norm for the province of Alberta. Both

⁵⁷ *Ainsworth Lumber Co. Ltd. and Footner Forest Products Ltd. v. Director, Northwest Boreal Region, Alberta Environment* (June 26, 2000), E.A.B. Appeal Nos. 00-004 and 00-005.

⁵⁸ Transcript, April 24 and 25, 2002, at pages 222 to 223.

⁵⁹ Written Submission of the Director, April 15, 2002, at page 15, paragraph 106.

cement plants in the province, Inland Cement Ltd. and Lafarge, currently use natural gas.⁶⁰ The Board is aware, however, that both are in the process of switching to coal.⁶¹ Finally, in regard to the anomalous contribution of sulphur from the raw materials used at the Exshaw Plant, the Board notes that this fact weighs in favour of a closer look at BADT that mainly address the issue of SO₂.

[46] In conclusion, the Board believes that the Approval Holder should, in the future, be required to submit verifiable evidence to Alberta Environment to assist in defining BADT for this industry, particularly with reference to SO₂ emissions, as a condition of this Approval prior to submitting an application for renewal of their approval in 2007.

C. Mercury and Heavy Metals

[47] In the process of manufacturing cement, mercury⁶² from both the coal fuel and the raw materials is emitted from the kiln stacks. The Approval Holder predicted that with its switch from natural gas to coal fuel, there will be a 12% increase in the one-hour average ambient mercury concentrations, and a 8.7% increase in stack emissions of mercury (simulated results based on testing).⁶³

[48] The Approval requires the Approval Holder to monitor for heavy metals in the ambient air (based on the heavy metal content of PM 2.5 fraction) for 2 consecutive months prior to the use of coal and 4 consecutive months after the commencement of the use of coal.⁶⁴ The Approval also requires the Approval Holder to carry out a variety of stack tests for heavy metals, raw material and coal analysis, and mercury speciation.⁶⁵ The Director defended her decision not to place specific mercury emission limits in the Approval on the basis that there are no mercury

⁶⁰ Transcript, April 24 and 25, 2002, at page 274.

⁶¹ The Board understands that Inland Cement Ltd. was issued an approval to use coal as a fuel source on May 24, 2002.

⁶² Mercury is a heavy metal that transforms easily between liquid and gaseous form. It is transformed through biological processes to methyl-mercury, a persistent substance that bioaccumulates in the food chain and is particularly toxic. It leads to deformities and reproduction problems in wildlife and is a neuro-toxin. Elevated environmental levels and concern for the toxic properties of mercury have led to commercial fisheries advisories and fish consumption restrictions in numerous locations in Canada. See CCME, *Canada-Wide Standard for Mercury – Update*. Exhibit A to Affidavit of Jim Kievit, dated April 1, 2002.

⁶³ Written Submission of the Director, April 15, 2002, at page 22, paragraph 169.

⁶⁴ Written Submission of the Director, April 15, 2002, at page 21, paragraph 156. See: TABLE 4.1-5 of the Approval.

emission standards for cement manufacturing plants, and there is no guideline for mercury in the Alberta Ambient Air Quality Guidelines.⁶⁶ She chose instead to follow the trend in recent approvals for the coal-fired electricity generation sector by requiring increased monitoring.⁶⁷ The mercury data gathered through the monitoring, stack tests, material analysis, and mercury speciation will be used in the Human Health Impact Assessment as well as to provide data to assess emission estimates.⁶⁸

[49] The Director was also aware at the time the Approval was issued, that the Approval Holder was committed to funding an independent study on metal bioaccumulation in the Bow Valley to be directed by the ECEC.⁶⁹ During her evidence, the Director indicated that this study would

“...include sampling and analysis for heavy metals of soils in the general geographic area surrounding the plant, sediment and low-level analysis of the water in the Bow River and Lac Des Arcs and bio-accumulation in fish species. The study will include monitoring in 2002 and 2006 with the report published no later than February 15, 2003 and 2007. It is intended that the study will provide some base information... This study is not intended to be a comprehensive, long-term assessment.”

[50] During the Hearing, the Board heard from the Mr. Dene Cooper, a local government volunteer with the ECEC, that the ECEC is prepared to assume the leadership role in organizing a collaborative research program on metal bioaccumulation.⁷⁰ At the close of the Hearing, the Approval Holder recommended to the Board that the terms of reference for the bioaccumulation study be submitted to the Director for approval, as this would address the concerns raised by the Appellants regarding the appropriateness of the ECEC in organizing this study.⁷¹ The Board also believes that there would be a benefit to allowing the Appellants to participate in the review of the terms of reference, and if consensus can be reached, to participate

⁶⁵ Written Submission of the Director, April 15, 2002, at page 21, paragraph 158.

⁶⁶ Written Submission of the Director, April 15, 2002, at page 22, paragraph 160.

⁶⁷ Written Submission of the Director, April 15, 2002, at page 22, paragraphs 161 to 162.

⁶⁸ Written Submission of the Director, April 15, 2002, at page 22, paragraph 167.

⁶⁹ Written Submission of the Director, April 15, 2002, at page 23, paragraph 172.

⁷⁰ Transcript, April 24 and 25, 2002, at page 132.

⁷¹ Exhibit No. 14, Recommendations on Changes to the Amending Approval by Lafarge.

with ECEC in this study. Mr. Cooper indicated a willingness on the part of the ECEC to welcome such broader participation.⁷²

[51] The Appellants argued that the flue-gas desulphurization technology that would reduce SO₂ emissions would also operate to reduce mercury emissions by approximately 20% at the Exshaw Plant.⁷³ At the close of the Hearing, the Appellants proposed that the Approval be amended to require the Approval Holder to develop and implement a plan to reduce emissions of mercury, heavy metals, and PAHs within 18 months of coal conversion.⁷⁴

[52] The Board believes that the BADT plan that the Approval Holder must develop for SO₂ must also address the issue of mercury and heavy metals emissions. Because these emissions create a cumulative burden on the environment, there is a more compelling case for pursuing BADT to reduce such emissions than may be the case for emissions of transient pollutants. Provided that the mercury and heavy metals emissions monitoring programs verify that emissions are not increasing more than predicted in the Approval Holder proposal (e.g. <12% increase for mercury), the matter of reducing mercury and heavy metal emissions may be dealt with as part of the required BADT plan. However, the Approval should include a provision for addressing the need for developing a more aggressive reduction of mercury or heavy metals emissions if the monitoring program reveals emission level increases that are higher than those predicted.

[53] The Board therefore concludes that if the monitoring program reveals emission level increases for mercury and heavy metal emissions that are higher than those predicted by the Approval Holder, then the Approval Holder should be required to submit a plan to the Director for the implementation of a mercury and heavy metal emission reduction program, and once the plan has been approved as being satisfactory by the Director, the Approval Holder should be required to implement it. The Approval Holder should be required to submit such a reduction plan within 6 months of revealing the need for emission reduction by means of the monitoring program, and the plan should be implemented in accordance with a schedule approved by the Director.

⁷² Transcript, April 24 and 25, 2002, at page 374.

⁷³ Exhibit B to Affidavit of Jim Kievit, *Mercury Falling: An analysis of Mercury Pollution from Coal-Burning Power Plants*, at pages 33 to 34.

⁷⁴ Exhibit No. 12, Appellants' Proposed Changes. A "PAH" is a polycyclic aromatic hydrocarbon.

D. Particulates

[54] The Director placed a number of new requirements on the Approval Holder⁷⁵ to address particulate issues associated with the Plant. All parties agreed that the issue of ambient particulate levels in the region of the Plant was a historical one, and that the particulate sources are both natural and industrial in origin. The Appellants argued that the level of fine particulate matter in the area is over the level that causes human health problems, that the Approval Holder is one of the main industrial contributors, and that technology exists that would dramatically reduce the particulate matter emissions from the Plant.⁷⁶ Specifically, the Appellants argued that Kiln #4 is a major source of fine particulate emissions during both routine and upset conditions, and that its electrostatic precipitator should be replaced with a baghouse to reduce emissions as was done with Kiln #5.⁷⁷

[55] The Board accepts that the implementation of the baghouse controls on Kiln #5 main stack constitutes BADT for particulate emission control on this important emission source. The Board acknowledges that upgrades to the electrostatic precipitator for Kiln #4 main stack were also required in the Approval. The Board concludes that further evaluation of what reasonably constitutes BADT for particulate emissions from the Kiln #4 main stack should be included in the provision of evidence for defining the BADT that the Board is recommending be provided to the Director prior to submission of the application for the renewal of their approval in 2007.

E. Monitoring and Reporting

[56] As the Board discussed in the section on SO₂ emissions, the major issue with the monitoring program currently set out in the Approval is the difficulty of validating or otherwise calibrating the predictions of the modeling with regard to exceedances of the Guidelines for SO₂. In closing argument, the Approval Holder offered to address this challenge by adding a continuous SO₂ monitor at the Barrier Lookout, while it is manned, for one season. This innovative proposal is a welcome commitment by the Approval Holder, to its credit, and it will

⁷⁵ Exhibit No. 12, Appellants' Proposed Changes, at pages 18 to 21.

⁷⁶ Written Submission of the Appellants, April 5, 2002, at page 7, paragraphs 29 to 31.

⁷⁷ Affidavit of Chris Severson-Baker, at page 6, paragraph 28.

partly address the problem by allowing peak levels of SO₂ to be measured at an elevated location. According to the evidence, SO₂ exceedances would not be expected to occur at the times of the year that the Barrier Lookout is manned, but the highest actual hourly SO₂ levels that are measured can be compared with what the model would predict for that specific location for those actual, meteorological conditions. This comparison would provide a much better basis for calibrating the model and judging the extent of any model over-prediction at this and other locations. In order for this approach to have value for resolving the current uncertainty, such comparisons between monitoring data and corresponding model predictions must be made available to the Director in a form that will allow for a meaningful, independent evaluation.

[57] The Appellants expressed concern over the time-limited terms of some of the other monitoring requirements imposed on the Approval Holder.⁷⁸ The Director has the discretion to require that these monitoring requirements continue if the evidence from the monitoring program warrants. The Board is prepared to rely on the Director's discretion in this regard, particularly given the high level of public attention that the Plant, at this high visibility location, will continue to attract.

[58] The Appellants expressed a willingness to forego their concerns about the time-limited nature of the monitoring program if the Approval Holder agreed to participate in an Air Quality Management Zone under the Clean Air Strategic Alliance.⁷⁹ Given the sensitive location of the Plant and the stake that many Albertans hold in assuring the air quality of this region, the Director should encourage all major air pollutant emitters in this region to work cooperatively towards the common goal of excellent air quality. The review that the Director undertakes of the air quality monitoring results provided under this Approval and any subsequent requirement for

⁷⁸ Exhibit No. 12, Appellants' Proposed Changes. The Appellants propose the monitoring conditions be amended as follows:

"Lafarge shall continue to monitor ambient air quality for the life of the plant:

- continuous monitoring should not cease on June 30, 2004,
- sampling for heavy metals and PM_{2.5} should continue to be collected beyond 4 consecutive months after using coal,
- passive monitoring program should not cease on May 1, 2003.

This condition may be superseded by Lafarge's participation in an Air Quality Management Zone which conducts monitoring at least as stringent as the revised Amended Approval.

Lafarge shall continue to collect stack samples and conduct speciation analysis for mercury periodically for the life of the plant."

⁷⁹ Exhibit No. 12, Appellants' Proposed Changes.

additional monitoring should be guided by the comparative benefits of implementing an Air Quality Management Zone with the full participation of the Approval Holder.

[59] The Board therefore agrees with the Approval Holder that the Approval should be amended to add a continuous SO₂ monitor at the Barrier Lookout, while it is manned, for one season. The results of this monitoring should be reported to the Director. Further, the Board concludes that the Director should encourage all parties in the region to form and participate in an Air Quality Management Zone.

F. Human Health Impact Assessment/Vegetation Assessment Study

[60] With regard to the Human Health Impact Assessment, the major point of contention among the parties is with the *timing* of that assessment. Condition 4.1.30 of the Approval requires the submission of a proposal for the study by June 1, 2003. Condition 4.1.32 of the Approval requires that the study be completed by March 1, 2004. The Appellants argued that this study should have been completed before the submission of an application for the Approval. The rationale presented by the Appellants, that impact assessments should be completed before a project is implemented, has undeniable merit. Notwithstanding these merits, the Appellants' closing argument⁸⁰ proposed allowing the Approval Holder to complete the study within 12 months of the fuel conversion to coal.

[61] The Approval Holder and the Director maintain that the impact assessment will be done better if it is based on monitoring data that will better document the pollutant emissions and ambient concentrations.⁸¹ The Board recognizes merit in that rationale, provided that the monitoring does not reveal evidence of emission levels capable of causing clear damage to human health. However, the premise of waiting to do such a study to retroactively document the degree of measurable harm that has been done to human health is clearly contrary to the preventive rationale underlying health risk assessment. An impact assessment should be a study to document the range of pollutant exposures that may conceivably occur, thereby allowing predictions of the potential for harm under the most unfavourable conditions so that preventive actions can be taken if necessary.

⁸⁰ Exhibit No. 12, Appellants' Proposed Changes, Issue 5.

⁸¹ Written Submission of the Director, April 15, 2002, at page 24, paragraphs 179 to 186. See: Written

[62] The Board concludes that an appropriate resolution for this disagreement is to begin authentic and meaningful consultation with interested parties immediately to plan what can realistically be accomplished in a Human Health Impact Assessment, given the nature of emissions under consideration and the type of data that can be collected. If these planning activities are conducted in parallel with the data collection, any extreme values that might be found in the monitoring program can be evaluated more quickly in relation to the proposed study design. By starting the planning and Director's approval process earlier, the completion of this health impact study before the end of December 2003 (three months earlier than originally planned) appears entirely realistic.

[63] In regard to the vegetation assessment study, the Approval Holder in closing argument⁸² offered to include a vegetation sampling site to the west of Exshaw to provide an assured control site. The Board agrees that this would be a useful addition to the vegetation assessment study and welcomes this proposal from Lafarge.

G. Potential Antagonistic Environmental Effects of Burning Tires and Coal

[64] The Appellants requested a prohibition of the burning of coal and tires together.⁸³ The Approval Holder has collected information on the combination of burning tires and coal and offered in closing arguments to assemble this information and to submit it to the Director prior to using the combination of tires plus coal as a fuel source.⁸⁴ The ECEC proposed that if tires are not likely to be used as a fuel, then the provision for tires should be removed from the Approval.⁸⁵ The Board finds that there is currently *no* evidence upon which to judge whether the combination of burning tires and coal poses a problem. If the Director finds any evidence in the supplementary information submitted by the Approval Holder, the Director will be obliged to adjust the Approval accordingly to either modify the operating conditions to mitigate the problems or to remove the option of burning the combination of tires and coal altogether. The Board recognizes that the burning of tires in cement kilns has been pursued to resolve, in an

Submission of the Approval Holder, April 12, 2002, at page 11, paragraph 45.

⁸² Exhibit No. 14, Recommendations on Changes to the Amending Approval by Lafarge, Issue 5.

⁸³ Exhibit No. 12, Appellants' Proposed Changes.

⁸⁴ Exhibit No. 14, Recommendations on Changes to the Amending Approval by Lafarge, Issue 6.

⁸⁵ Exhibit No. 13, Concluding Statement of Dene Cooper on behalf of the ECEC and the Municipal District of Bighorn, dated April 25, 2002.

environmentally acceptable manner, the challenges posed by tire disposal. In conclusion, the Board is reluctant to see inadequately justified limits imposed on the Director's discretion to balance the merits of dealing with this issue for the maximum environmental benefit.

H. Environmental Effects of Burning Coal on the Viewscape

[65] The issue of viewscape is not explicitly addressed in the Approval beyond the opacity requirements on the plume. The problem of "blue haze" was acknowledged to be a concern by Lafarge, but the reduced particulate emissions under the Approval are expected to reduce the frequency and intensity of blue haze. Unfortunately, there does not appear to be any objective basis for judging whether an improvement will actually have been achieved. The Board views this lack of any plan for addressing this issue as unfortunate, because the visual impact of industrial operations in this region, where the scenery is highly valued and the land use strongly regulated, will continue to be a concern.

[66] The Board believes the Approval Holder and the Director recognize the validity of these ongoing concerns. The Board concludes that the application for renewal of the approval in 2007 should be accompanied by documented evidence and explicit proposals about what can be done to reduce this problem if it remains a substantive unresolved issue after the current round of reductions to particulate emissions.

I. Environmental Effects of Burning Coal on the Natural Setting

[67] The Parties at the Hearing appeared to be in agreement that this issue was largely addressed in the evidence and discussions surrounding the previous issues and no separate evidence on this issue was heard. The possible exception might be the matter of noise that did not clearly fit within the other categories. The Approval Holder noted that the switch to coal as a fuel would not have any effect on noise levels and, in any case, noise levels are regulated by the Municipal District of Bighorn development permit.⁸⁶ The Appellants argued that the noise from

⁸⁶ Exhibit No. 14, Recommendations on Changes to the Amending Approval by Lafarge, Issue 7. See: Written Submission of the Director, April 15, 2002, at Tab 11 (Development Permit 41/01). With regard to noise, the permit provides: "...the developer shall monitor noise levels from the cement plant once the new fuel flexibility equipment is in operation. If noise levels exceed current conditions, the developer shall implement a noise mitigation and suppression plan to reduce those noise levels so that they are at or below current levels."

this operation should be governed by the [A]EUB noise abatement guidelines⁸⁷ and that there should be a complaint line maintained by the Approval Holder so that affected neighbours can find out what may be contributing to noise impacts.⁸⁸ The Board concludes that a complaint line for noise concerns provides a reasonable response to this problem. Again, we congratulate Lafarge for its commitment to resolve as many issues as it can locally.

III. RECOMMENDATIONS

[68] In accordance with section 99 of the Act, the Board recommends that the Minister of Environment:

1. vary the Approval to require the Approval Holder to submit to the Director a written SO₂ emission reduction plan by August 1, 2003 (instead of by June 1, 2005 as originally planned) and fully implement the 25% reduction in SO₂ by no later than June 1, 2005 (no date was originally specified);
2. vary the Approval to require the Approval Holder to submit to the Director, no later than 6 months prior to any application for a renewal of the current approval and in any event no later than May 1, 2007, documented evidence that can be used by Alberta Environment to determine what constitutes Best Available Demonstrated Technology for control of emissions of SO₂, fine particulate, mercury, and heavy metals;
3. vary the Approval to (a) provide for the placement of a continuous SO₂ monitor at the Barrier Lookout, while it is manned, for one complete operational season, (b) collect the results of this monitoring program and conduct analysis of these results to provide an assessment of the validity of the ambient air quality modeling that has been performed, and (c) report the monitoring results and modeling assessment to the Director, with sufficient documentation to allow the Director to form an independent judgment of the validity of the model predictions;
4. encourage all parties in the region to form and participate in an Air Quality Management Zone;
5. vary the Approval to require the Approval Holder to submit to the Director, for approval, the terms of reference for the proposed bioaccumulation study;

⁸⁷ Exhibit No. 12, Appellants' Proposed Changes, No. 9. See: Affidavit of Paul R. Adams, dated April 1, 2002, at paragraph 8, where Mr. Adams states: "... Noise levels, as presented by Lafarge in its noise map, indicate noise in the range of 50-55 dB at Lac Des Arcs. These noise levels would not meet the [A]EUB Guideline ID 99-8."

⁸⁸ Transcript, April 24 and 25, 2002, at page 74. Mr. Paul Adams, in his direct evidence on noise, provided: "...Noise control directives should be implemented for the Lafarge plant and better mechanisms for submitting and resolving complaints should be provided; in other words, if somebody does have a concern, how do they register it? Who do they phone? How do they submit it?"

6. encourage the Approval Holder to involve the local government and the Appellants in the review of these terms of reference for the proposed bioaccumulation study and, if possible, in the bioaccumulation study itself;
7. vary the Approval to require the Approval Holder to develop a more aggressive reduction of mercury and heavy metals emissions if the monitoring program reveals emission level increases that are higher than predicted;
8. vary the Approval to require the Approval Holder include in its vegetation study, an additional vegetation sampling site to the west of Exshaw to provide an assured control site;
9. vary the Approval to require the Approval Holder, if blue haze remains an issue, to undertake studies on the causes and control of any portion of the blue haze that they might be responsible for and develop an explicit plan to reduce, substantially, this problem and this plan should be provided to the Director at the time an application is submitted for renewal of the Approval and in any event no later than May 1, 2007;
10. vary the approval to require the Approval Holder to establish and maintain a complaint line for addressing noise complaints from affected neighbours; and
11. vary the Approval to require the Approval Holder to (a) undertake a consultation process inviting participation from all Parties before the Board to design a Human Health Impact Assessment to evaluate the impact of air emissions from the Plant using the emerging source, ambient, and other available results, (b) develop a proposal for the study based on the foregoing consultations, (c) submit the proposal for approval by the Director by December 31, 2002, (d) complete the Human Health Impact Assessment as authorized by the Director, and (e) submit the written Human Health Impact Assessment by December 31, 2003.

[69] Attached for the Minister's consideration is a draft Ministerial Order implementing these recommendations.

[70] Finally, with respect to sections 100(2) and 103 of the Act, the Board recommends that copies of this Report and Recommendations and of any decision by the Minister be sent to the following parties:

1. Ms. Jennifer Klimek on behalf of Mr. James Kievit, Dr. Paul Adams, Mr. Jeff Eamon, and the Bow Valley Citizens for Clean Air;
2. Mr. Ron Kruhlak and Mr. Corbin Devlin, McLennan Ross on behalf of Lafarge Canada Ltd;
3. Mr. William McDonald and Ms. Charlene Graham, Alberta Justice on behalf of Ms. May Mah-Paulson, Director, Approvals, Southern Region, Regional Services, Alberta Environment;
4. Mr. Tibor Osvath, Rae and Company on behalf of Stoney Tribal Council

(Stoney Nakoda First Nation); and

5. Mr. Dene Cooper on behalf of M.D. of Bighorn.

IV. COSTS

[71] Prior to the close of the Hearing, the Board received notice from the Appellants that, depending on the outcome of the Hearing, they may wish to make an application for costs.

[72] The Board is prepared to receive an application for costs from the Appellants. The Board requests that the applications for costs, if any, be provided to the Board within two weeks from the date of the Minister's Order with respect to this Report and Recommendations. The Board will then provide the Approval Holder and the Director with an opportunity to respond to any such costs application.

Dated on May 27, 2002, at Edmonton, Alberta.

“original signed by”

William A. Tilleman, Q.C.
Chair

“original signed by”

Dr. Steve E. Hrudehy
Member

“original signed by”

Dr. Curt Vos
Member

V. EXHIBIT LIST

HEARING

April 24 & 25, 2002, Calgary, Alberta

Lafarge Canada Inc.
Approval No. 1702-01-02
Appeal Nos.: EAB 01-097, 098, 101

EXHIBIT LIST

Exhibit No.	Description
1	Notice of Public Hearing Advertisement was placed in the local newspapers on March 13, 2002. A news release was forwarded to the Public Affairs Bureau regarding the hearing and placed on the Alberta Government website on March 6, 2002. A further advertisement was placed in the local newspapers on March 26, and 27, 2002, advising that the venue for the hearing was changed to Calgary.
2	Notices of Appeal filed by Mr. Kames Kievit (01-097), Dr. Paul Adams (01-098), and Mr. Jeff Eamon (01-101).
3	Map – The Bow Valley With Features For The Lafarge Fuel Flexibility Project. Submitted by Alberta Environment.
4	Letter dated April 23, 2002, from W. Tibor Osvath, Rae and Company on behalf of the Stoney Nakoda Nation. Submitted by Mr. Osvath.
5	Presentation of the M.D. of Bighorn No. 8 titled “Submission of Dene Cooper on Behalf of Exshaw Community Environmental Committee.” Submitted by the M.D. of Bighorn No. 8.
6	Slides from the Appellants for their presentation. Submitted by the Appellants.
7	Letter dated April 24, 2002 from Maria Dunki, Reeve, Municipal District of Bighorn No. 8. Submitted by the M.D. of Bighorn No. 8.
8	Lafarge Canada Inc. Exshaw Plant, Disclosure Document Exshaw Fuel Flexibility Project. Submitted by Lafarge.
9	Report “Recognition of Air Pollution Injury to Vegetation: A Pictorial Atlas”, Air & Waste Management Association. Submitted by Lafarge.
10	Report “Diagnosis of Air Pollutant and Natural Stress Symptoms on Forest Vegetation in Western Canada,” Northern Forest Research Centre. Submitted by Lafarge.
11	Approval 227-01-00 issued by Peter Watson, Alberta Environment, on June 30, 1998, to Continental Lime Ltd. Submitted by Alberta Environment.
12	The Appellant’s Proposed Changes to the Approval. Submitted by the Appellants.

Exhibit No.	Description
13	Concluding Statement of Dene Cooper, Exshaw Community Environmental Committee and the Municipal District of Bighorn. Submitted by the M.D. of Bighorn No. 8.
14	Recommendations on Changes to the Amending Approval by Lafarge. Submitted by Lafarge.

VI. DRAFT ORDER

Ministerial Order

/2002

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

**Order Respecting Environmental Appeal Board
Appeal No. 01-097, 098 and 101**

I, Dr. Lorne Taylor, 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 Appeal Board Appeal No. 01-097, 098 and 101.

Dated at the City of Edmonton, in the Province of Alberta this ____ day of _____, 2002.

Honorable Dr. Lorne Taylor
Minister of Environment

Draft Appendix

With respect to the decision of Ms. May Mah-Paulson, Director, Approvals, Southern Region, Regional Services, Alberta Environment (the "Director"), to issue Approval No. 1702-01-02 (the "Approval") dated October 22, 2001, under the *Environmental Protection and Enhancement Act*, to Lafarge Canada Inc., I, Dr. Lorne Taylor, Minister of Environment:

1. Order that the decision of the Director to issue the Approval is confirmed, subject to the following provisions.
2. Order the Approval be varied by deleting conditions 4.1.30, 4.1.31 and 4.1.32 and replacing them as follows:
 - (a) "4.1.30 The approval holder shall, to the Director's satisfaction, undertake a consultation process inviting participation from
 - (a) Mr. James Kievit,
 - (b) Dr. Paul Adams,
 - (c) Mr. Jeff Eamon,
 - (d) the Bow Valley Citizens for Clean Air,
 - (e) the Municipal District of Big Horn,
 - (f) the Exshaw Community Environmental Committee, and
 - (g) the Stoney Nakoda First Nationto design a Human Health Impact Assessment to evaluate the impact of air emissions from the plant using the emerging source, ambient and other available monitoring results.";
 - (b) "4.1.31 The approval holder shall develop a proposal for the study based on the consultations per 4.1.30 and obtain the Director's approval for the proposed study by December 31, 2002.";
 - (c) "4.1.32 The approval holder shall complete the Human Health Impact Assessment as authorized in writing by the Director."; and
 - (d) "4.1.32.1 The approval holder shall submit a written Human Health Impact Assessment to the Director by December 31, 2003 as per 4.1.30, 4.1.31 and 4.1.32.".
3. Order that the Approval is varied by deleting condition 4.1.35 and replacing it as follows:

"4.1.35 The approval holder shall submit to the Director, for approval, a written SO₂ Emission Reduction Plan by August 1, 2003 that shall include the following:

 - (a) a detailed description of measures on how to achieve a 25% reduction in SO₂ emissions from the plant; and
 - (b) an implementation schedule for the measures to achieve a 25% reduction in SO₂ by June 1, 2005.".

4. Order that the Approval is varied by deleting condition 4.1.36 and replacing it as follows:

“4.1.36 The approval holder shall fully implement the SO₂ Emission Reduction Plan by no later than June 1, 2005 as authorized in writing by the Director.”.

5. Order that the Approval is varied by adding the following:

(a) “2.1.12 The approval holder shall establish and maintain a complaint line for addressing noise complaints from affected neighbours.”;

(b) “4.1.25.1 The approval holder shall summarize the results of the monitoring for heavy metals and mercury emissions as per 4.1.25 and TABLE 4.1-5.”;

(c) “4.1.25.2 If these results reveal emission increases greater than predicted in application 010-1702, then within 6 months of the date of the summary, the approval holder shall submit for approval to the Director a plan and schedule of implementation for reduction of the emissions of heavy metals and mercury, and implement the plan as authorized by the Director.”;

(d) “4.1.27.1 The approval holder shall submit to the Director, no later than 6 months prior to any application for a renewal of the approval and in any event no later than May 1, 2007, documented evidence that can be used to determine what constitutes Best Available Demonstrated Technology for the control of emissions of SO₂, fine particulate, mercury and heavy metals.”;

(e) “4.1.27.2 If the blue haze remains an issue, the approval holder shall undertake studies on the causes and control of any portion of the blue haze that it might be responsible for and develop an explicit plan to reduce, substantially, this problem.”;

(f) “4.1.27.3 Where the approval holder is required to submit a plan to reduce blue haze per 4.1.40 it shall be submitted at the time that an application for the renewal of this approval is submitted and in any event no later than May 1, 2007.”;

(g) “4.1.27.4 The approval holder shall submit for approval to the Director the terms of reference for the proposed mercury and heavy metals bioaccumulation study.”;

(h) “4.1.29.1 The approval holder shall:

(a) provide for the placement of a continuous SO₂ monitor at the Barrier Lookout, while it is manned, for one complete operational season;

(b) collect the results of this monitoring program and conduct analysis of these results to provide an assessment of the validity of the ambient air quality modeling that has been performed; and

(c) report the monitoring results and modeling assessment to the Director, with sufficient documentation to allow the Director to form an independent judgment of the validity of the model predictions.”; and

- (i) “4.1.38 The approval holder shall include in its Vegetation Assessment study, an additional vegetation sampling site to the west of Exshaw to provide an assured control site.”.

**Ministerial Order
17/2002**

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

**Order Respecting Environmental Appeal Board
Appeal No. 01-097, 098 and 101**

I, Dr. Lorne Taylor, 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 Appeal Board Appeal No. 01-097, 098 and 101.

Dated at the City of Calgary, in the Province of Alberta this 8th day of July, 2002.

“original signed by”
Honorable Dr. Lorne Taylor
Minister of Environment

Appendix

With respect to the decision of Ms. May Mah-Paulson, Director, Approvals, Southern Region, Regional Services, Alberta Environment (the "Director"), to issue Approval No. 1702-01-02 (the "Approval") dated October 22, 2001, under the *Environmental Protection and Enhancement Act*, to Lafarge Canada Inc., I, Dr. Lorne Taylor, Minister of Environment:

1. Order that the decision of the Director to issue the Approval is confirmed, subject to the following provisions.

2. Order the Approval be varied by amending condition 4 as follows:
 - (a) deleting the proposed wording of sections 4.1.30, 4.1.31 and 4.1.32 and replacing them as follows:

“4.1.30 The approval holder shall, to the Director’s satisfaction, undertake a consultation process inviting participation from

 - (h) Mr. James Kievit,
 - (i) Dr. Paul Adams,
 - (j) Mr. Jeff Eamon,
 - (k) the Bow Valley Citizens for Clean Air,
 - (l) the Municipal District of Big Horn,
 - (m) the Exshaw Community Environmental Committee, and
 - (n) the Stoney Nakoda First Nation

to design a Human Health Impact Assessment to evaluate the impact of air emissions from the plant using the emerging source, ambient and other available monitoring results.

4.1.31 The approval holder shall develop a proposal for the study based on the consultations per 4.1.30 and obtain the Director’s approval for the proposed study by December 31, 2002.

4.1.32 The approval holder shall complete the Human Health Impact Assessment as authorized in writing by the Director.

4.1.32.1 The approval holder shall submit a written Human Health Impact Assessment to the Director by December 31, 2003 as per 4.1.30, 4.1.31 and 4.1.32.”;
 - (b) deleting the proposed wording of sections 4.1.35 and replacing it as follows:

“4.1.35 The approval holder shall submit to the Director, for approval, a written SO₂ Emission Reduction Plan by August 1, 2003 that shall include the following:

- (a) a detailed description of measures on how to achieve a 25% reduction in SO₂ emissions from the plant; and
 - (b) an implementation schedule for the measures to achieve a 25% reduction in SO₂ by June 1, 2005.”;
- (c) deleting the proposed wording of section 4.1.36 and replacing it as follows:
“4.1.36 The approval holder shall fully implement the SO₂ Emission Reduction Plan by no later than June 1, 2005 as authorized in writing by the Director.”.
- (d) adding the following:
- (i) “4.1.25.1 The approval holder shall summarize the results of the monitoring for heavy metals and mercury emissions as per 4.1.25 and TABLE 4.1-5.
4.1.25.2 If these results reveal emission increases greater than predicted in application 010-1702, then within 6 months of the date of the summary, the approval holder shall submit for approval to the Director a plan and schedule of implementation for reduction of the emissions of heavy metals and mercury, and implement the plan as authorized by the Director.”;
 - (ii) “4.1.27.1 The approval holder shall submit to the Director, no later than 6 months prior to any application for a renewal of the approval and in any event no later than May 1, 2007, documented evidence that can be used to determine what constitutes Best Available Demonstrated Technology for the control of emissions of SO₂, fine particulate, mercury and heavy metals.
4.1.27.2 If the blue haze remains an issue, the approval holder shall undertake studies on the causes and control of any portion of the blue haze that it might be responsible for and develop an explicit plan to reduce, substantially, this problem.
4.1.27.3 Where the approval holder is required to submit a plan to reduce blue haze per 4.1.40 it shall be submitted at the time that an application for the renewal of this approval is submitted and in any event no later than May 1, 2007.
4.1.27.4 The approval holder shall submit for approval to the Director the terms of reference for the proposed mercury and heavy metals bioaccumulation study.”;

- (iii) “4.1.29.1 The approval holder shall:
 - (a) provide for the placement of a continuous SO₂ monitor at the Barrier Lookout, while it is manned, for one complete operational season;
 - (b) collect the results of this monitoring program and conduct analysis of these results to provide an assessment of the validity of the ambient air quality modeling that has been performed; and
 - (c) report the monitoring results and modeling assessment to the Director, with sufficient documentation to allow the Director to form an independent judgment of the validity of the model predictions.”; and

- (iv) “4.1.38 The approval holder shall include in its Vegetation Assessment study, an additional vegetation sampling site to the west of Exshaw to provide an assured control site.”.

3. Order the Approval be varied by adding the following condition:

“7. PART 2 is amended by adding the following:

2.1.12 The approval holder shall establish and maintain a complaint line for addressing noise complaints from affected neighbours.”.