



**Cardinal River Coals Ltd.
TransAlta Utilities Corporation
Cheviot Coal Project**

June 1997

ALBERTA ENERGY AND UTILITIES BOARD

Decision 97-08: Cardinal River Coals Ltd. TransAlta Utilities Corporation Cheviot Coal Project

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ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

CARDINAL RIVER COALS LTD.

TRANSALTA UTILITIES CORPORATION

CHEVIOT COAL PROJECT

Decision 97-8

Applications No. 960313, 960314, and 960677

1 INTRODUCTION

In March 1996, Cardinal River Coals Ltd. (CRC) submitted Applications No. 960313 and 960314 to the Alberta Energy and Utilities Board (EUB) for approvals with respect to a proposed coal mine and coal processing plant (Cheviot Coal Project) under Sections 10(1)(b) and 23(1)(a) of the Coal Conservation Act. Included with these applications was an Environmental Impact Assessment (EIA), submitted in accordance with the Alberta Environmental Protection and Enhancement Act (AEPEA). At the same time, the Federal Department of Fisheries and Oceans (DFO) was advised by CRC of its intention to apply for authorization under Section 35(2) of the Fisheries Act.

On 21 August 1996, TransAlta Utilities Corporation (TransAlta) submitted Application No. 960677 to the EUB in respect to the proposed transmission line and associated substation, as per Sections 12, 14, and 17 of the Hydro and Electric Energy Act.

This report constitutes the decisions of the Joint Review Panel (the Panel) on matters that fall under the jurisdiction of the EUB, and the recommendations of the Panel to the Federal Ministers of the Environment and Fisheries and Oceans on matters that fall under the jurisdiction of the federal government and, more specifically, under the jurisdiction of the Canadian Environmental Assessment Act (CEA Act) and the Fisheries Act, with regard to the Cheviot Coal Project.

1.1 Project Summary

The Cheviot Coal Project is a proposal by CRC for the construction, operation, and decommissioning of a coal processing plant; the development, operation, and reclamation of an open pit coal mine; the restoration of the Mountain Park subdivision rail line; the upgrading of the existing access road (the Grave Flats Road) into the Cheviot mine area; and the installation of a new transmission line and substation to supply electrical power to the Cheviot mine.

The Cheviot Coal Project (Figure 1) is located in the Rocky Mountains of west-central Alberta approximately 320 kilometres (km) west of the City of Edmonton and 70 km south of the Town of Hinton. Proposed open pit mining would be centred around the former community of Mountain Park (Figure 2), approximately 20 km south-east of CRC's existing Luscar mine and 12 km south of the Hamlet of Cadomin. A Treaty Land Entitlement has recently been awarded to the Alexis First Nation immediately south and east of the Cheviot mine area, and the Smallboy Camp is located approximately

15 km east of the mine boundary (see Figure 3). The western edge of the proposed mine permit boundary lies 2.8 km east of the Jasper National Park boundary.

The Cheviot mine permit area is approximately 23 km long and 3.5 km wide and located within an east–west trending valley. Terrain within the valley is hilly, with elevations between 1700 and 2000 metres (m). The eastern third of the permit area drains to the south and east along Red Cap Creek into the Cardinal River and ultimately the Saskatchewan River system. The western portions of the proposed permit area are drained to the north by the McLeod River system into the Athabasca River and ultimately the Mackenzie River system. The Cardinal Divide ridge is a dominant topographic feature to the south, while the western edge of the proposed mine permit boundary extends into the front range of the Rocky Mountains to an elevation of 2200 m. The north and east limits of the development are bounded by Cadomin Mountain and Red Cap Mountain (Nikanassin Range).

Mining activity had been carried out within the proposed mine permit boundary from the early 1900s until the 1950s, and was centred around the former townsite of Mountain Park. Mining during this period was primarily underground, although some minor surface mining was also conducted. No reclamation of these mining activities has been carried out.

1.2 Approval Process

In Alberta, the development of a coal mine is based upon a two-stage approval process. The first provincial approval (or permitting) stage deals primarily with the conceptual plans for the mine project as a whole. This stage is carried out under the disclosure requirements of the Coal Development Policy for Alberta, the EIA requirements of Alberta Environmental Protection (AEP), and the permit requirements of the EUB. In the case of the Cheviot Coal Project, a federal approval from the DFO is also required. These various processes are described in greater detail below.

The second stage of the approval process, generally referred to as the licensing stage, is designed to examine, on an individual basis and in much greater detail, the specific components of the project. These include licences from the EUB for individual pits and rock dumps, as well as more detailed approvals from AEP for air and water emissions and reclamation plans.

The two-stage approval process for coal mine projects is designed to first look at, on a broad-scale basis, the full range of likely environmental and technical issues associated with a project, and in so doing, set broad boundaries for acceptable development scenarios. The second stage is intended to allow for site-specific changes to the broader conceptual plans approved during the first stage. The presence of the second stage recognizes the inherent difficulty for a company in predicting the optimal pit, highwall, waste dump, and reclamation program designs prior to accurately establishing the actual extent and distribution of the coal resources. The presence of the licensing stage helps to ensure that both resource conservation and environmental protection are optimized in a manner not possible during the permitting stage.

1.2.1 Coal Development Policy for Alberta (1976)

The Coal Development Policy for Alberta is designed to bring about and maintain the maximum benefits of the province's coal resources for the people of Alberta. A fundamental principle of the Coal Development Policy is that no development will be permitted unless the Alberta Government is satisfied that it may proceed without irreparable harm to the environment and with satisfactory reclamation of any disturbed land.

The Coal Development Policy provides a classification of provincial lands into four categories based on: their relative environmental sensitivity; the range of alternate land uses; the potential coal resources; and the extent of existing development of townsites and transportation facilities.

The Coal Development Policy also provides for a four-step screening and approval process for coal mines which includes:

- (1) preliminary disclosure to government,
- (2) disclosure by the applicant to the public,
- (3) consideration of a formal application through a public hearing, and
- (4) a final decision by the government.

CRC submitted a preliminary disclosure, as required by the Coal Development Policy, to the Government of Alberta and in December 1985 received approval in principle to proceed to the next stage of the approval process.

1.2.2 Alberta Environmental Protection

The Cheviot Coal Project includes both a surface mine producing a projected 3.2 million tonnes of coal per year and a coal processing plant. As a result, it is a mandatory project as set out under the Environmental Assessment Regulations of the AEPEA and so requires the preparation of an EIA.

A draft Terms of Reference for the EIA was developed jointly between both the federal and provincial governments and CRC. These were made available to the public for review in October 1994. After receipt of comments, the Terms of Reference were finalized and published by the Alberta Director of Environmental Assessment on 23 January 1995. The EIA was submitted by CRC in March 1996 to the EUB as one component of its application. Following the review of the EIA, AEP's Director of Environmental Assessment advised the EUB on 18 September 1996 that the EIA now addressed the requirements set out in Section 47 of the AEPEA and in the final Terms of Reference. The Director also advised the EUB that the EIA report was complete pursuant to Section 51 of the AEPEA.

1.2.3 Alberta Energy and Utilities Board

Under Section 10(1)(b) of the Coal Conservation Act, no person shall develop a mine site without first applying for, and obtaining, a permit from the EUB. Similarly, under Section 23(1)(a) of the Coal Conservation Act, no person shall construct or begin operations at a new coal processing plant without applying for, and obtaining, an approval from the EUB. A permit and licence from the EUB are also required under Sections 12, 14, and 17 of the Hydro and Electric Energy Act in order to construct and operate a new transmission line and to operate a new substation.

The processing of applications made by companies to the EUB is guided by the requirements of the Energy Resources Conservation Act (ERCA) and the associated Rules of Practice. Section 29(2) of the ERCA requires that, if it appears to the EUB that its decision on an application may directly and adversely affect the rights of a person, the EUB provide: (1) notice of the application; (2) an opportunity for learning the facts regarding the application; and (3) an opportunity to cross-examine the applicant and to present evidence and argument to the EUB.

The Rules of Practice provide direction on procedures, including the provision of notice, submissions by interveners, and the presentation of submissions. By agreement between the EUB and the Canadian Environmental Assessment Agency (CEAA), the EUB Rules of Practice governed the procedures followed by the Panel in addressing these applications.

1.2.4 Federal Department of Fisheries and Oceans/ Federal Department of the Environment/ Canadian Environmental Assessment Agency

Section 35(2) of the Fisheries Act requires that an authorization be obtained from the Minister of Fisheries and Oceans prior to the alteration, disruption, or destruction of fish habitat. Under the CEA Act, prior to issuing such an authorization, an environmental assessment of the project must be undertaken. Following notification by CRC as to its intention to apply for the above authorization, the DFO, as a Responsible Authority under the CEA Act, initiated a review of the proposed project. In a letter dated 26 August 1996 to the Minister of the Environment, the Minister of Fisheries and Oceans stated that, following a review of CRC's environmental information, the DFO had determined that the project may potentially result in significant adverse environmental effects. In order to expedite the review process, the Minister of Fisheries and Oceans recommended that the Cheviot Coal Project should be referred by the Minister of the Environment for review by a panel and further recommended, in the spirit of the 1993 Canada/Alberta Harmonization Agreement for Environmental Assessment, that the CEAA attempt to integrate this panel review through a Joint Review Panel, with any hearing process required by the EUB.

Sections 40 and 41 of the CEA Act provide for the establishment and appointment of a Joint Review Panel and for the factors to be considered by a Joint Review Panel.

1.3 Public Review Processes

1.3.1 EUB Review Process

On 16 July 1996, a Notice of Filing was published by the EUB, advising the public how and where it could obtain a copy of CRC's application, including the EIA. On 25 September 1996, the EUB published a Notice of Hearing, advising the public that the EUB had scheduled a public hearing of the CRC and TransAlta applications in the Town of Hinton on 25 November 1996. The public were also advised that the scheduled public hearing could, subject to agreement being reached between the EUB and CEAA, be substituted with a hearing held under the auspices of a Joint Review Panel.

In response to questions raised by the public, the EUB scheduled a pre-hearing meeting for 5 November 1996, in Hinton, Alberta. Notice of the pre-hearing meeting was issued on 10 October 1996. At the pre-hearing meeting, the issues addressed included timing of the hearing, the availability of intervener funding, and the Joint Review Panel process. A Memorandum of Decision was issued by the EUB on 27 November 1996 and is included as Appendix A. In the Memorandum of Decision the hearing was rescheduled to 13 January 1997, with written submissions to be made by interested parties on or before 7 January 1997.

1.3.2 Joint Review Panel Process

The EUB's review process for the Cheviot Coal Project was initiated by the EUB prior to the implementation of the Joint Review Panel process. Negotiations on the form and structure of a joint federal-provincial review of the Cheviot Coal Project were formally initiated in July 1996. On 5 September 1996, a draft agreement between CEAA and the EUB was released to the public and public comments were sought on or before 4 October 1996. Comments from the public, as well as government agencies, were incorporated and on 24 October 1996 the EUB executed the agreement with CEAA for the operation of the Joint Review Panel for the Cheviot Coal Project. This agreement covered the constitution of the Joint Review Panel, the factors to be considered by the Joint Review Panel, and the conduct of the hearing. The agreement, together with the Terms of Reference and the factors to be considered by the Joint Review Panel, are included as Appendix B.

In a letter dated 16 September 1996, the Chair of the EUB advised the CEAA that Dr. Brian F. Bietz and Mr. Gordon J. Miller had been selected to sit as the EUB Division (i.e. Panel members) for the public hearings into the Cheviot Coal Project, with Dr. Bietz to chair. By letter dated 22 October 1996, the Federal Minister of the Environment also appointed Dr. Bietz and Mr. Miller as Chair and Member, respectively of the Joint Review Panel. Dr. Tom Beck was subsequently appointed by the Minister of the Environment as the third Member of the Panel. Dr. Beck was then also appointed by a Provincial Order-in-Council as an Acting EUB Board Member and assigned by the Chair of the EUB on 27 November 1996 to the Division of the EUB scheduled to hear the Cheviot Coal Project.

On 28 November 1996, the Joint Review Panel (the Panel) issued a notice confirming its agreement with the 13 January 1997 as the date for public hearings into the Cheviot Coal Project.

1.3.3 Public Hearing

The public hearing of the Cheviot Coal Project was held at the Crestwood Hotel in Hinton, Alberta from 13 January to 20 February 1997 inclusive and re-opened on 10 April 1997 for one day. Organizations and individuals who attended and participated in the hearing are listed in Table 1.

The hearing was re-opened on 10 April 1997 in order to consider a report by Norwest Consultants, who were retained by the Panel to provide advice on certain aspects of the proposed mine plan.

1.3.4 Decision-Making Process

There are significant differences worth noting in the role of the Panel in a combined provincial and federal decision-making process. Under the Alberta provincial statutes, the Panel is charged with determining whether a proposed energy development is in the public interest. In making its determination as to whether a project is in the public interest, the Panel is required to consider a range of factors, including resource conservation, safety, economic and social impacts of the project, and effects on the environment. Its decision, including reasons, is documented in a Decision Report.

Under the CEA Act, the Panel is required to submit to the Minister of the Environment and to the Responsible Authority (in this case DFO) a report which provides its rationale, conclusions, and recommendations relating to the environmental assessment of the project, including any mitigation measures and follow-up programs. No decision on federal issues is made by the Panel. Section 37 of the CEA Act authorizes the Responsible Authority to exercise its power to allow a project to proceed if, taking into account the report submitted by a review panel and any mitigation measures, its adverse environmental effects are deemed to be insignificant or, if they are significant, felt to be justified in the circumstances.

As per the agreement between the EUB and CEAA, the Panel intends to issue a single Decision Report designed to meet the requirements of both levels of government.

1.4 Public Consultation Process

1.4.1 AEP and EUB Requirements

The AEP and EUB expectations for public consultation by CRC and TransAlta were outlined in the EIA Terms of Reference issued on 23 January 1996. It was expected that the proponent's public consultation program would inform members of the public who may be affected by the project of the development plans, provide opportunities to express their concerns with those plans, and allow them to

contribute to the preparation of the EIA. Members of the public were expected to include: Cadomin/Hinton/Edson residents, commercial and recreational land users, and aboriginal peoples.

1.4.2 CEEA Requirements

Through the CEA Act, the Government of Canada has committed to facilitating public participation in the environmental assessment of projects requiring its approval, and to providing access to information on which the assessment is made. These requirements were incorporated by the Government of Canada into the EIA Terms of Reference in order to ensure that the proponent's public consultation program satisfied the requirements of the CEA Act.

1.4.3 Activities of the Applicants

CRC and TransAlta's public consultation program concentrated on the area generally known and identified as the Coal Branch Area in west-central Alberta. A formal press announcement, radio announcements, and a direct mail out to 50 individuals and groups with respect to the Cheviot Coal Project were made on or about 13 October 1994.

Between October 1994 and March 1996, CRC and TransAlta held approximately 160 meetings with various public participants and regulatory officials in an attempt to identify pertinent environmental concerns, as well as means for mitigating environmental effects. Methods of involving the public included: direct contact between CRC/TransAlta staff, their consultants, and the public; open house meetings; direct mailing of information to 928 locations, and field tours.

In April 1996 CRC held a public disclosure meeting, as required by the Coal Development Policy for Alberta.

1.5 Report Framework

1.5.1 Format

For both convenience and clarity, the report will generally follow the format of issues that the Panel must address, as set out by Schedule 1, Appendix 1 of the Terms of Reference (Appendix B of this report). The report is broken into eight sections which address, respectively, the following broad issues:

- (1) Introduction
- (2) Project Purpose, Need, and Alternatives
- (3) Aquatic Environmental Effects

- (4) Terrestrial Environmental Effects
- (5) Atmospheric Environmental Effects
- (6) Land Use Effects
- (7) Community Effects
- (8) Conclusions, Decisions, and Recommendations

Sections 2 through 7 summarize the views of the applicants, the views of the interveners who commented on a particular issue, and the views of the Panel. Sections 3 through 7 also address, as appropriate:

- (1) the study area considered;
- (2) the existing environmental conditions, including socio-economic conditions;
- (3) the expected environmental effects of the various project components or alternatives on the factor being considered, including their temporal and spatial boundaries and significance;
- (4) the need for, and requirements of any follow-up and monitoring programs felt appropriate;
- (5) the effects of accidents or malfunctions;
- (6) the capacity of affected renewable resources to meet future needs; and
- (7) cumulative environmental effects.

It should be noted that, in preparing this report, the Panel has exercised its judgement in determining the extent to which each of the above general subjects applies to a particular component of the Cheviot Coal Project, and has specifically commented in the report on only those issues relevant to its task.

1.5.2 Environmental Assessment Process

The Agreement between the EUB and CEAA (Appendix B) provides a brief outline of the issues which are expected to be considered by the Panel. However, a number of terms (e.g. the spatial and temporal boundaries of environmental effects; cumulative environmental effects; and the significance of environmental effects) are not defined. In its application, CRC set out in some detail the approach it had adopted in assessing the significance of any adverse environmental effects potentially resulting from the Cheviot Coal Project, as well as their temporal and spatial boundaries and the cumulative

environmental effects of their proposed project in conjunction with other activities in the region. Many of CRC's views and assumptions were questioned at the hearing by various interveners. As well, CRC, in its EIA, has made use of the concept of Valued Environmental Components (VECs) in its analysis of environmental effects. In order to ensure that there is a common understanding of the Panel's interpretation of these concepts, a brief discussion of each was felt appropriate.

It is worth noting that the Panel does not believe that the discussion below either can or should be binding on future tribunals tasked with addressing public interest issues. While the Panel believes that the approach taken here is valid to the Cheviot Coal Project, clearly other approaches to assessing the environmental effects of a project may be equally if not more appropriate.

Valued Environmental Components

VECs have been defined by CRC as "those environmental attributes associated with the proposed project development, which have been identified to be of concern by either the public, government, or the professional community". Physical (e.g. groundwater, air quality), biological (e.g. fish, vegetation, ungulates), and social/economic (e.g. forestry, public health, recreation) components of the environment were included by CRC in its selection of VECs, in part in response, CRC noted, to the broad-based definition of environmental effects found in both provincial and federal legislation. The use of VECs was intended to help ensure that the EIA process is focused on relevant issues.

The Panel believes that the use of VECs is appropriate for the Cheviot Coal Project. In particular, the Panel accepts that their use can minimize unnecessary effort to assess issues of likely little relevance, and ensure that the efforts of the applicant, the interested publics, and the government review agencies alike are focused on key questions. Furthermore, the results of analyses of VECs, if properly done, can reasonably be expected to be applicable to a broader range of environmental parameters.

Spatial and Temporal Boundaries

CRC noted that the Cheviot Coal Project has the potential to affect various VECs over a range of distances from the actual sources of disturbance as well as over a number of time periods of various lengths. In preparing the EIA, CRC indicated that it has generally attempted to describe the aerial extent of a predicted impact (i.e. its spatial boundary), as well as the time period over which CRC predicted that such impacts will occur (i.e. its temporal boundary). The Panel notes that while CRC initially attempted to provide some broader definitions of these two terms, it is evident from the EIA that both the spatial and temporal boundaries of environmental effects ultimately tended to be highly specific to: first, the actual components of the Cheviot Coal Project (e.g. the transportation and utilities corridor, the coal processing plant, or the surface mine); second, the project phase (e.g. construction, operation, or decommissioning); and third, the particular VEC under consideration (e.g. water quality, vegetation, or carnivores). The Panel, therefore, has also not attempted to set broad definitions for

either the spatial or temporal boundaries of environmental effects, but rather has considered the evidence as presented for each VEC.

Significance of Environmental Effects

While recognizing that this is somewhat of an over simplification, the Panel believes that the environmental effects arising from the Cheviot Coal Project can be placed, for all practical purposes, into one of three general categories. These are:

- (1) changes to the numbers of organisms, including both flora and fauna, found in the environment and their relative proportions to each other;
- (2) changes to the physical properties, including water, air, and soil, of the environment and their interactions; and
- (3) changes to the human use of the environment, for aesthetic, spiritual, recreational, economic, or any other purpose.

For each of these three categories, the parameters which define when an environmental effect is significant are clearly different. In assessing whether an environmental effect of the Cheviot Coal Project is significant, the Panel has, when appropriate, used the following general criteria:

- (1) For organisms, an environmental effect was generally considered to be significant when the changes induced by the Cheviot Coal Project are beyond the normal range of natural variation in the population size of that organism or group of organisms **and** the effects on population size will continue beyond the life of the Cheviot Coal Project into the foreseeable future. The term population is based on the biological definition of population; that is, a geographically distinct assemblage of members of a species, usually capable of successful reproduction.
- (2) For the physical properties of the environment, an environmental effect of the Cheviot Coal Project would normally be considered to be significant when either the mean value of the physical property or its normal range of variation is altered to the point that this results in either a reduced carrying capacity of the environment for biological VECs, or a risk to human health or safety.
- (3) For human use, an environmental effect resulting from the Cheviot Coal Project would usually be considered to be significant if it results in a permanent loss of an area or region where an activity was historically carried out and where other comparable areas cannot be readily substituted.

Where particular issues did not clearly fall into any of the above categories, the Panel has used its professional judgement in its assessment of the significance of environmental effects. For example, an environmental effect may be deemed significant if it precludes organisms from returning to an area where they previously occurred or alternatively precludes some reasonably likely future human use. Clearly a greater degree of judgement regarding whether these alternative events have a reasonable probability of occurring and their importance, if they did, must be applied. It is worth noting that while all of the environmental effects described above result in negative impacts, the same model can be applied when the environmental effects result in a net positive change.

In its application, CRC stated that it had considered the affects of its mitigation measures prior to determining environmental significance, an approach which was questioned by some parties at the hearing. The Panel, in its assessment of the Cheviot Coal Project, believes that the significance of environmental effects can only be realistically determined after mitigation has been incorporated into the project design. In this case, this would include the mitigation measures required by the Panel and other regulatory agencies in addition to those proposed by CRC.

Cumulative Environmental Effects

Both provincial and federal EIA legislation require a proponent to assess the cumulative environmental effects of its proposed project. In recent years, a considerable amount of debate has occurred regarding how cumulative environmental effects should be defined and assessed, but a number of questions remain. In this case, CRC's approach to addressing cumulative effects was also challenged by some interveners.

For the purposes of this review the Panel believes that, ideally, in order to carry out a cumulative effects assessment (CEA) of the Cheviot Coal Project, it is necessary to first have some knowledge of the historic status of each VEC that may be affected by the project (e.g. what was its past distribution and occurrence? Were these attributes stable or variable?). The second step is to understand its current status (e.g. has its distribution and occurrence changed? Are these attributes more or less variable?). The third step is to ascertain why those changes, if any, have occurred (e.g. are they caused by normal biological, physical, or social processes? Or, are they due to anthropogenic or some other unique forces?)

Based upon this description of existing conditions, the fourth step in the process is to estimate the likely incremental effects of the proposed project on the VEC, both in absolute terms as well as on its degree of variability. The final step is to identify any other reasonable factors, particularly other projects or developments which, if they also occur, will also have an effect on the VEC, and what their incremental effects either alone or combined might be.

In carrying out its review, the Panel has, either explicitly or implicitly, applied the above criteria to the information provided by CRC in its application. In those cases where the data base is incomplete or of

questionable quality, the Panel has used its professional judgement as appropriate. The Panel has then attempted to assess, within the context of the full range of project benefits and costs:

- (1) whether the incremental changes in a VEC created by the Cheviot Coal Project are significant;
- (2) if they are significant, whether they are justified from a public interest perspective; and
- (3) if they are justified, whether the incremental changes in a VEC create a significant risk that other development opportunities may need to be foregone.

1.6 Preliminary Matters

At the outset of the public hearing, a number of preliminary matters were raised. Other procedural matters were raised during the hearing. These are addressed below.

1.6.1 Change of Venue

In a letter dated 18 December 1996, the RMEC stated that a change in venue for the hearing was needed, due to a concern that strong public sentiment in the Hinton region could prevent fair and complete participation in the public hearing process, particularly by those opposed to the Cheviot Coal Project.

The Panel, however, did not agree that such a change was either needed or in the overall public interest. The motion was denied.

1.6.2 Establishment of the Joint Review Panel

The RMEC took the position that certain sections of the CEA Act, notably sections 15(1), 16(3), and 33(b)(2) set out mandatory requirements that the Federal Minister of the Environment must meet before a federal review panel can be properly established. RMEC was of the view that, in the case of the Cheviot Coal Project Joint Review Panel, these requirements had not been met and that the current Panel was improperly constituted.

The Panel, in deciding against the RMEC's motion, noted that the CEA Act had clearly anticipated two forms of panel, that is "panel reviews" (Sections 29 and 33 to 35) and "joint panel reviews" (Sections 40 through 42). The view of the Panel was that, despite the similarity in their names, the legislation clearly contemplated differences in the two processes. Since the Panel had been constituted as a Joint Review Panel, the position taken was that it only needed to assure itself that the requirements set out under Sections 40, 41, and 42 of the CEA Act had been met. The Panel re-examined those requirements and, based on the results of that review, assured itself that to the best of its knowledge, the legislative requirements had been met.

1.6.3 Public Registry

The third issue raised by the RMEC was whether the Public Registry for documents, a requirement under the CEA Act, had been operated in a fashion which in some way prevented public access to information in a manner inconsistent with the requirements of Section 55 of the CEA Act. In particular, it was argued that the presence of a \$6 service fee and the unavailability of certain documents when initially requested produced unacceptable barriers to effective participation in the hearing by the public. As a result, the RMEC argued that the hearing should be adjourned until this problem had been adequately rectified.

In reviewing the various facts provided by the RMEC regarding the operation of the Public Registry, the Panel was not convinced that the RMEC had been treated unfairly nor that it had been denied a reasonable opportunity to review the various pieces of evidence needed to examine the application or that the Panel might use in reaching its conclusions. The motion to adjourn was denied. Judicial review of this decision was sought by RMEC in the Federal Court of Canada. The Federal Court of Canada, on two occasions, dismissed RMEC's application.

1.6.4 Institutional Bias

The RMEC argued that because two of the Joint Review Panel members had originally sat as an EUB Division at the pre-hearing meeting held on 5 November 1996 and had, as members of the Joint Review Panel, subsequently ratified the decisions made by the EUB Division arising from that meeting, such a decision in fact had de facto fettered the authority of the Joint Review Panel and/or raised a suggestion of bias on the part of the members.

The Panel rejected this argument on several grounds. The key issue, however, was the fact that the establishment of the Joint Review Panel in no way diminished either the authority or the obligation of the Panel members to carry out their statutory mandates as set out under both provincial and federal legislation. The Panel found that, at the pre-hearing meeting, the EUB Division had properly carried out its obligations as set out in the EUB's Rules of Practice. With the formation of the Joint Review Panel, the decisions made by the EUB Division were properly reviewed and accepted by the Joint Review Panel and, in doing so, the Panel was in no way fettered by previous decisions.

1.6.5 Adjournment Request

The AWA Coalition requested an adjournment of the hearing in a letter dated 6 January 1997 on the grounds that it had not had adequate time to prepare. CRC responded that the hearing had already been adjourned once and that a further adjournment would be unfair. The Panel rejected the AWA Coalition's request and found that 13 January 1997 was a fair and reasonable date to commence the hearings.

At the opening of the hearing on 13 January 1997, the AWA Coalition repeated its request for an adjournment, in this case noting that there were a number of documents, specifically interventions by various parties to the hearing, that it would not receive until after the hearings had begun, and so it required more time to review these. The AWA Coalition also noted that because it was a volunteer group it had only limited resources available to carry out such a review. CRC stated that its application had already been available for public review for several months and that it had carried out public consultation for over a two-year period.

The Panel again denied the adjournment request. The Panel indicated that it should be possible to seat the first two CRC witness panels without unfairly compromising the AWA Coalition's ability to carry out cross-examination. The Panel did advise, however, that should this not prove to be the case, it was prepared to reconsider the motion. The following day, the AWA Coalition raised the issue again, noting in particular that it had been unable to obtain complete copies of the submissions of the Federal Government of Canada. Based on this, the Panel agreed with the request and provided an adjournment.

On 4 April 1997, in the context of a proposed re-opening of the hearing, the AWA Coalition requested an adjournment to allow for more time to review the Norwest Consultant's report on CRC's conceptual mine plan. The Panel did not accept that additional review time was warranted. The AWA Coalition reiterated its concerns with respect to preparation time at the re-opening of the hearing on 10 April 1997.

1.6.6 Expert Advice

The AWA Coalition suggested on a number of occasions during the hearing that the Panel may need to gain additional independent technical advice on a number of issues, most notably fisheries, conservation biology, and social benefit-cost analysis. The Panel reserved any decision on those suggestions, and ultimately did decide that it required independent expert advice on the subject of mine planning and the proposed extent of CRC's external rock waste dumps. This advice was addressed during the re-opening of the hearing on 10 April 1997.

1.6.7 Site Visit

The AWA Coalition requested that the Panel carry out a site visit during the hearing. The Panel concurred and a helicopter view of the proposed mine site was carried out on 12 February 1997.

1.6.8 Production Of Witnesses

Prior to the testimony of the Government of Alberta, the AWA Coalition requested that the Province provide a witness from the Parks and Natural Heritage Division of AEP with specific expertise in the Cadomin Caves and the Cardinal Divide Natural Areas.

In considering the request, the Panel noted that AEP intended to seat a full panel of expert witnesses. Given that there seemed to be a reasonable opportunity to examine the evidence adduced by AEP at the hearing, the Panel determined that it was not prepared to grant the motion.

1.6.9 Production of Documents

The AWA Coalition requested that the Panel require the Government of Alberta to produce copies of the preliminary disclosure documents, prepared under the requirements of the Coal Development Policy of Alberta, for a number of other surface coal mines which had been proposed in the region. The Government of Alberta advised the Panel that those documents had, in its view, been submitted in confidence and so could not be released, except perhaps under a request under the Freedom of Information and Protection of Privacy Act. The Government also noted that the documents were dated, with some being submitted in the mid-1970s, and that without someone to speak to them, it would not be possible to determine if the various proposals remained relevant.

The Panel determined that, given the expectation of the parties that the documents were submitted in confidence and, more importantly, the inability of anyone, including the applicant, to test the relevance of the documents, it was not prepared to attempt to compel that the documents be submitted to the hearing.

2 PROJECT PURPOSE, NEED, AND ALTERNATIVES

2.1 Proposed Cheviot Coal Project

2.1.1 Views of the Applicant

CRC noted that the Cheviot Coal Project was intended to eventually replace its current mining operations at the existing CRC Luscar mine. CRC advised that the reserves of coal at the Luscar mine will be sufficient to maintain present production levels (i.e. 3 million tonnes per year) only until the year 2000 and will be exhausted by 2001–2003. It proposed developing the Cheviot reserves in order to produce approximately 3.2 million tonnes of clean coal annually for at least 20 years, with production slated to begin in 1999 in order to allow a smooth transition of activities from the Luscar mine to the Cheviot mine. The coal from the Cheviot mine would be destined primarily for the Pacific Rim metallurgical coal market. CRC advised that it had no signed contracts with respect to the proposed production from the Cheviot mine. However, CRC referred to its unique achievement of maintaining an "AA" coal quality rating from the steel mills which purchased its coal as evidence of the company's success in the international coal trade and to support its confidence that existing Luscar mine contracts would be continued with Cheviot mine coal.

The CRC application for a mine permit encompasses approximately 7430 hectares (ha) of land in Townships 45 and 46, Ranges 22, 23, and 24, West of the 5th Meridian (Figure 2). CRC stated that the project was based almost entirely on coal leased to Luscar Ltd., one of its joint venture partners. CRC advised that an additional 101 ha of coal (Sections 35, 36-24-45 W5M) are leased to two private citizens, who currently reside in British Columbia. CRC advised that it currently was in discussion with these lease holders with a view to obtaining their agreement for CRC to include these leases in the development proposal.

CRC advised that it had considered three possible scenarios to address the declining reserves at the Luscar mine. These were: (1) to take no action and allow mining operations to end; (2) to purchase another mine within the region; or (3) to develop another CRC/Luscar property. CRC considered that the first option was not viable due to its reluctance to forego the continued opportunity to meet a market need for high quality metallurgical coal which it had historically been able to fill with a high degree of success. The second scenario was also not a viable option in CRC's view due to the absence of properties available for purchase.

With respect to the last scenario, CRC indicated that it had considered developing the coal resources of Cadomin East, a lease holding that lay immediately east of the Hamlet of Cadomin, or possibly accessing additional reserves at the existing Luscar mine site using underground mining techniques. In CRC's view, the reserves at Cadomin East were too small (less than 6 million tonnes) to sustain a long-term development. CRC also noted that the Hamlet of Cadomin had expressed a number of concerns, none of which had been resolved, regarding the possible development of the Cadomin East

reserves. With respect to the remaining underground reserves at the Luscar mine site, CRC had concluded that the small amount of reserves (9.5 million tonnes), together with CRC's lack of underground mining experience, did not make this a viable development option.

CRC indicated that it had also considered developing other CRC/Luscar lease options at Folding Mountain, Brule, and Muskiki Lake/Race Creek/South Esk, respectively, and that it had concluded that factors such as insufficient drilling information, unfavourable zoning, and a considerable distance from infrastructure rendered these properties as also not being viable options, particularly when compared to the Cheviot mine where approximately 70 million clean tonnes of mineable coal had been confirmed.

CRC said that approval of the Cheviot Coal Project would also allow for the efficient transfer of its workforce from the existing Luscar mine. It pointed to the achievements of the company and the workers' union in the fields of safety and labour relations as evidence of CRC being a responsible company and employer. CRC noted that in 1982 it had received the first reclamation certificate issued in the province and had subsequently been the recipient of government and industry association awards with respect to reclamation and wildlife enhancement. The company stated that approval of the Cheviot Coal Project would help assure the existing economic and social benefits to the surrounding communities, particularly Hinton. CRC also noted that all provincial zoning policies, including the Coal Development Policy for Alberta (1976), the Eastern Slopes Policy (1984), and the Coal Branch Sub-Regional Integrated Resource Plan (1990) recognize the importance of, and make provision for, coal development in the Cheviot area. CRC's position was that the Cheviot Coal Project was clearly its most favourable option with respect to reserves, zoning, and proximity to infrastructure.

2.1.2 Views of the Interveners

At the hearing, a large number of interveners advised the Panel that they supported CRC and TransAlta in their applications. These included: the Town of Hinton; the Alberta Chamber of Commerce; the Hinton and District Chamber of Commerce; the United Mine Workers of America (UMWA); Mr. Van Binsbergen, the Member of the Legislative Assembly (MLA) for West Yellowhead; Mr. Breitkreuz, the Member of Parliament (MP) for Yellowhead; Mr. J. D. Clark; Canadian National Railway; Weldwood Canada; and Inland Cement. Several noted CRC's long history of successful operations in the region and indicated that they were confident that this would continue into the future. The Alexis First Nation indicated that, based on the undertakings made by CRC to the Alexis First Nation, they also supported CRC's application.

A number of other interveners at the hearing took the position that, while they had concerns with specific components of the Cheviot Coal Project and wished to see some changes, they did not, in principle, oppose the application. These included: the Alpine Club of Canada/Alberta Native Plant Council (Alpine Club Coalition), the Mountain Park Environmental Protection and Heritage Association (Mountain Park Association), Alberta Fish and Game Association, and Trout Unlimited.

CEPA took no position with regard to the need for the Cheviot mine. However, CEPA advised the Panel that the Hamlet of Cadomin was the community that would be most directly impacted by the development of Cadomin East. Without a significant degree of further discussion and analysis, the community was not prepared to accept Cadomin East as an alternative to the Cheviot Coal Project.

With regard to underground mining, the UMWA Local 1656 confirmed that their membership had neither expertise nor training in underground mining and furthermore, in their view, underground mining was both very difficult and dangerous. The inherent concerns associated with previous underground mining operations in the Coal Branch were also raised by the Mountain Park Association.

The AWA Coalition argued that CRC had not adequately justified its need to develop the Cheviot mine site, given its potential impacts on the environment. In particular, the AWA Coalition had significant concerns regarding the economic viability of the Cheviot Coal Project and categorized it as being, at best, uncertain. It claimed that CRC had not provided sufficient information for the Panel to be able to assess the risk of project failure. In particular, CRC had not provided a sensitivity analysis related to the effect on the economic viability of the project from any future decrease in demand for metallurgical coal. The AWA Coalition noted that the Japanese use of coking coal had reduced from 65.1 million to 36 million tonnes between 1981 and 1995 and was forecasted to decrease to 27.7 million tonnes by the year 2000. Since the Japanese were a major customer, unforeseen declines in their demand would, in the view of the AWA Coalition, represent a significant risk to the success of the project. The AWA Coalition also noted that CRC had not provided any information related to the effects of variability in the annual production rates from the Cheviot Coal Project on the viability of the project, or its sensitivity to further declines in the price paid for coal. The AWA Coalition noted that the prices used by CRC for planning purposes are among the highest seen in the last decade.

With regard to the project costs and benefits, the AWA Coalition noted that CRC had failed to provide any data, either in its application or at the hearing, on either operating or reclamation costs and the impacts of increases in those costs, nor had it provided any evidence of contracts for the Cheviot coal. The AWA Coalition stated that CRC's economic analysis had also not included any analysis of the risk that public dollars may be needed to maintain its operations or the risk, should the project fail, to the public for clean-up costs. Nor had CRC included various public costs such as costs to the municipality for road maintenance past the life of the project and costs for regulatory services. Finally, the AWA Coalition did not believe that CRC had adequately addressed, in assessing the need for the project, the range of environmental and social costs which the project would impose.

The AWA Coalition noted that CRC's proposal to continue large scale resource extraction in the area did not promote either economic diversification or long-term employment. They noted that the foregone employment in tourism and recreation, while smaller in total economic value in the near term, would continue indefinitely and could grow gradually. A number of other interveners to the hearing, most notably the RMEC, echoed the concerns raised by the AWA Coalition.

The AWA Coalition also noted concerns with CRC's competitive position. The AWA Coalition observed that CRC was proposing strip ratios (i.e. the ratio of overburden moved per tonne of coal mined) at the Cheviot Coal Project which were substantively higher than those used in other coal mines in Western Canada. The AWA Coalition argued that, since the moving of overburden is a significant component of mining costs, this placed the ability of CRC to compete with other North American coal mines into question. The AWA Coalition also suggested that the long-term economic viability of the Cheviot Coal Project was even further eroded by competition from Australian metallurgical coal mines. These mines, they argued, had significant economic advantages due to easier terrain to mine, shorter distances to tidewater, fewer environmental issues, and proximity to the main marketplace for metallurgical coals.

The AWA Coalition, in its intervention, identified a number of provincial, federal, and international government policies focused on both the preservation and conservation of natural resources. These included: Alberta's Vision on Sustainable Development, the Alberta Coal Development Policy, the Alberta Revised Policy for Development of the Eastern Slopes, the Coal Branch Integrated Resource Plan, the Coal Branch Access Management Plan, the World Conservation Strategy, A Wildlife Policy for Canada, Federal Water Policy, Federal Policy on Wetlands Conservation, United Nations Convention on Biological Diversity, the Canadian Biodiversity Strategy, the National Task Force on the Environment and Economy, the National Parks Operational Policies, and the Alberta Fish and Wildlife Policy. As well, several pieces of relevant environmental legislation were referenced. In the view of the AWA Coalition, the Cheviot Coal Project was inconsistent with many of the basic premises and objectives of the above policies and legislation. Nor did the AWA Coalition believe that the Panel could depend on the lack of objection from the government agencies as an indication that a proposed project was consistent with government policy. The AWA Coalition stated that the Panel needed to consider such policies in considering the Cheviot Coal Project since they provided a measure of the public interest, as set out by elected officials, as well as a tool to measure whether environmental effects are adverse.

The AWA Coalition argued that it made more sense for CRC to delay development of the Cheviot Coal Project while it developed the remaining reserves at the Luscar mine which could be accessed through underground or hydraulic mining, and the reserves at Cadomin East. Both of these would be much closer to the existing Luscar mine infrastructure and so should greatly reduce development costs. The AWA Coalition noted that while CRC may not have extensive experience in underground mining, its joint venture partner, Consol Inc., certainly did. The AWA Coalition also believed that CRC had not provided the Panel with sufficient information to test whether the proposed alternatives represented technically, economically, and environmentally feasible alternatives to the proposed project. The AWA Coalition suggested that, based on these factors alone, the Panel could deny the applications.

2.1.3 Views of the Panel

In assessing the need for the proposed Cheviot Coal Project, the Panel notes that no intervener questioned whether CRC had obtained the mineral leases necessary for it to carry out mining activities, as proposed, within the mine permit boundary. The Panel does note, however, that there is a small area of coal leases in the western portion of the project area which are not controlled by CRC. While negotiations have not yet been finalized with the lease holders, the Panel has no reason to doubt that they are in support of their leases being mined by CRC. Therefore, the Panel accepts that CRC has established that, subject to its receiving the necessary provincial and federal approvals, it has the right to carry out extraction of the coal resources within the proposed mine permit boundaries.

The Panel notes that the AWA Coalition raised a number of questions regarding whether the Cheviot Coal Project is consistent with numerous international, national, and provincial policies which deal with integrated land planning and the protection of biological resources, including biodiversity. In reaching its decisions regarding the Cheviot Coal Project, the Panel intends to consider all evidence properly placed before it in determining whether approval of the Cheviot Coal Project is in the overall public interest, including relevant public policy. The Panel does agree with the AWA Coalition that it can and should look to such policies as one measure of the public interest, and has addressed this issue, where appropriate, throughout this report.

With regard to its existing mining operations, the Panel is prepared to accept CRC's contention that the Luscar mine is approaching the end of its economic life and that, for CRC to continue operations in the Hinton region, an alternative source of metallurgical coal will be needed. The Panel also believes that CRC has made a reasonable effort to evaluate and assess feasible alternatives to the proposed project. The Panel notes that no other lease holder came forward during the hearings to advise that it was willing to provide CRC with access to another source of coal or to propose an alternative to the Cheviot Coal Project. The Panel also accepts CRC's reticence and that of its employees to move to underground mining techniques or, given the concerns expressed by the Hamlet of Cadomin, to develop Cadomin East at this time, particularly given the relatively small amount of reserves associated with either option. The Panel also notes that development of the other coal leases currently held by CRC, even if economic, would also have associated environmental and social issues. The Panel does believe, despite the contention of the AWA Coalition, that it was provided with sufficient evidence to test whether the proposed alternatives were technically and environmentally feasible.

With respect to the Cheviot Coal Project itself, the Panel is prepared to accept CRC's estimates of coal reserves and coal quality, particularly given CRC's experience at the Luscar mine, as reasonable. The Panel notes that CRC is unable, through the provision of signed contracts, to provide any direct assurance that it will be able to market the coal it intends to produce. The Panel is also willing to accept the contention that demand for coking coal is very likely to decline in the Japanese market. However, the Panel notes that no party to the hearing contested CRC's contention that, because of the consistently high quality of its product, it would be able to continue to maintain market share. The Panel

accepts CRC's view that, as an experienced and sophisticated entity in the international coal market, it will be able to successfully market the products of the Cheviot Coal Project.

It was claimed by several parties that not only was insufficient information provided by CRC's economic analysis for the Panel to confirm whether the Cheviot Coal Project was viable, but it was also not possible to determine the degree of future public liability for these costs. The Panel does agree that additional economic data would have been of value. However, during the hearing CRC indicated that, due to the highly competitive nature of the metallurgical coal industry, it was not prepared to release a great deal of information.

The Panel is prepared to accept CRC's contention that the Cheviot Coal Project will be, under reasonable price and market scenarios, economically viable. The Panel takes particular note, in reaching this decision, of CRC's ongoing operation of the Luscar mine for over two decades. While the Panel would have preferred to have additional economic data, the Panel is prepared to conclude that it is CRC that will bear the primary economic burden should the Cheviot Coal Project fail, and so approval of the project would not be contrary to the public interest for that reason.

The Panel also believes that the likely risks to the public associated with the project are acceptable. The Panel notes that, with the exception of the longer-term maintenance of the Grave Flats Road beyond the life of the mine, the Cheviot Coal Project does not appear to require any public funds for infrastructure costs. Some risk of public liability does exist should the project fail, but the Panel believes that this risk is minimal. The Panel notes that both partners in CRC are well established corporate entities and furthermore, that AEP requires monies to be set aside during the mining process to ensure that funds are available for reclamation.

The Panel is of the opinion that there may have been some confusion at the hearing with respect to the economic implications of the high strip ratios being proposed by CRC. The Panel is prepared to accept CRC's contention that, based on its existing knowledge of area geology, a strip ratio of 20:1 is feasible. However, the Panel is also of the view that, should mine development be approved, the company will be able to mine at substantially lower strip ratios if necessary. The benefit to the company in such a case would be reduced expenses. The cost to the company would be a corresponding reduction in the ultimately recoverable coal reserves and therefore the life the mine. Since such actions would also have resource conservation implications, the Panel notes that these issues would be closely monitored by the EUB during the mine licensing stage, since it is charged, among other things, with ensuring that resource conservation is optimized.

Based on the above findings, the Panel is prepared to accept that CRC has established a need for the Cheviot Coal Project. The Panel notes, however, that establishment of need does not automatically imply that the project is in the public interest or should ultimately be approved. The degree of environmental, social, and economic impact must also be assessed.

2.2 Proposed Surface Mine

2.2.1 Views of the Applicant

CRC stated that its conceptual mining plan for the Cheviot Coal Project called for the use of the same truck/shovel surface mining technology as presently employed at the Luscar mine. A series of individual open pits would be developed sequentially to meet both its production and reclamation objectives. CRC felt that the techniques and the experience gained in the steep terrain of the Luscar mine would be easily transferable to the primarily valley bottom Cheviot mine terrain. As noted earlier, in view of its lack of expertise in underground mining, CRC did not consider underground mining at the Cheviot mine as a suitable option.

CRC indicated that the waste rock removed to uncover the coal would be disposed of either by backfilling into already mined-out pits or into external waste rock dumps. In a number of instances, existing valley topography would be used for external dumps. Rock drains would be used in those cases, since many of these valleys contain small streams. Rock drains are intended to permit the unobstructed flow of water through the base of the waste rock dump. CRC noted that rock drain technology is currently employed at the Luscar mine and is a common practice in mountainous environments. The remaining rock disposed of externally to the pits would be placed into conventional dry land waste rock dumps.

In designing its conceptual mine plan CRC noted that, in order to satisfy certain customer requirements, it needed to produce on a continuous basis two specific levels of coal quality. In order to do this, it needed to mine two separate areas of the mine simultaneously. CRC said that it had considered mining the property from west to east in order to minimize the spread of disturbance over a broad area and perhaps also enjoy a more rapid return of the land to public use. However, the need to produce two products at the same time dictated the proposed plan of commencing development in two separate areas.

CRC advised that it was proposing that some of the excavated pits would not be backfilled with rock but rather would be allowed to fill with water. Lakes would be developed within the completed pits (commonly referred to as end pit lakes), where the lack of material or mining logistics limited CRC's ability to backfill. CRC predicted that approximately 12 pits would be left in this condition.

Recognizing the historical and sentimental factors related to the former townsite of Mountain Park, CRC said that it had looked at avoiding mining activities within the townsite. However, the reserves of coal still remaining despite the earlier underground mining and the need for external waste rock dumping had resulted in some of the former townsite being impacted. CRC noted it had agreed with the Mountain Park Association that the Mountain Park cemetery should not be disturbed and that any disturbance adjacent to the cemetery should be minimized and reclaimed as soon as possible. In its

proposed mine plan, CRC stated that it had ensured that public access would be maintained to the cemetery.

CRC advised that it had voluntarily relinquished to the government its coal leases at the eastern edge of the mine permit boundary. It had done so, it said, in order to hopefully expedite the settlement of the land claim of the Alexis First Nation.

2.2.2 Views of the Interveners

A number of interveners expressed concerns that CRC had not made sufficient effort to reduce the size of its external dumps. The Alpine Club Coalition requested that CRC be required to keep external waste rock disposal to a minimum and make more use of backfilling of the excavated pits than was currently proposed.

The Alberta Fish and Game Association also saw little justification for the use of external waste rock dumps to the extent proposed in the application. It suggested that CRC use in-pit backfill wherever possible, use dry-land dumps when external dumps cannot be avoided and, in the few cases where rock drains are justified, limit these to the upper reaches of streams where flows are intermittent and impacts on aquatic habitat would be minimal.

In its submission to the Panel, Environment Canada recommended that CRC's waste rock dumping plan be re-evaluated in order to minimize habitat disturbance and that important carnivore travel corridors/critical habitat remain protected on the lease area.

AEP, in its submission, noted that with respect to CRC's material handling plans, CRC would be required in its future applications for approvals under AEPEA to more accurately determine the extent to which surface and riparian disturbance could be further minimized, especially in areas where fisheries and wildlife habitat would be significantly impacted.

The Mountain Park Association expressed a strong concern with the levels of mining activity that were being proposed for the former townsite. They asked that CRC be required to re-examine its mine plans in greater detail in order to ensure that mining disturbance of the former townsite was kept to the minimum level possible

2.2.3 Views of the Panel

The Panel is prepared to accept that CRC's proposal to use surface mining techniques to remove the coal resources from its leases provides for the most economic recovery of these resources. In particular, the Panel notes that the use of surface mining technology will allow CRC to directly transfer both technical expertise and equipment from the Luscar mine as operations there wind down.

Ultimately, the experience gained by CRC in reclamation and wildlife habitat enhancement at the Luscar mine should also be applicable to the Cheviot Coal Project.

Based on the information provided by CRC at the hearing, the Panel was unable to assess whether CRC had taken sufficient steps to balance maximizing coal recovery against minimizing the total area to be disturbed by surface mining activities. For this reason, an independent consultant was retained to evaluate CRC's conceptual mine plan.

Based in part on the advice from the consultant, the Panel is satisfied that the Cheviot Coal Project mine plan is based on sound economic and engineering assumptions and compares favourably to other western Canadian surface coal mine operations. The Panel accepts that, should the project be approved, the footprint of the proposed mine is not likely to be significantly greater than that presently envisaged by CRC. The Panel was encouraged by the efforts of CRC, as reported by the Panel's consultant, to continue to further refine its mine plan. There are indications that the footprint of the external waste rock dumps could be further reduced in a number of areas, thus lessening the effects on both aquatic and terrestrial habitat. Should the project be approved, the Panel would expect that the mine plan would continue to evolve and that further reduction in external waste rock dumps, particularly in the Prospect Creek, Powerhouse Creek, and MacKenzie Creek areas, would be actively explored by CRC.

With respect to the mine plan in the area of the former townsite of Mountain Park, the Panel notes the commitments made by CRC to avoid impacting the cemetery and minimizing, to the extent possible, impacts on the former townsite. The Panel concurs that protection of the cemetery from both disturbance and loss of access is required. The Panel also believes that as there are substantive coal reserves below the former townsite of Mountain Park, only partial protection of that site may be warranted. The issue of appropriate protection of the cemetery and the former townsite are discussed in Section 7.

2.3 Proposed Coal Processing Plant

2.3.1 Views of the Applicant

Coal produced at the Cheviot mine will require cleaning prior to shipment, and CRC proposed to construct a new coal preparation plant within the mine permit boundaries. CRC applied to locate its proposed coal processing plant within the Harris Creek drainage. The Harris Creek location would, in CRC's opinion, lower the visual impact to the public travelling through the McLeod River valley. CRC stated that while the plant was designed to maximize water recirculation, it would require a continuous and reliable source of make-up water. This CRC planned to obtain from a freshwater reservoir to be constructed at a site in Harris Creek.

CRC advised that it had considered dewatering of the fine refuse or tailings which would result from the coal cleaning process, but had found this to be both expensive and environmentally unnecessary. CRC therefore proposed, initially, to dispose of the tailings into a retention pond to be located in the Cheviot Creek valley. After approximately 5–7 years, when excavated pits became available, CRC intended to then utilize such pits to dispose of tailings. For reclamation purposes, consideration would eventually be given to either covering or capping the tailings with waste rock or, alternatively, with water.

With respect to the coal cleaning requirements for the project, CRC stated it had considered two alternatives. These were: (1) construction of a new processing plant in the vicinity of the project; or (2) transporting the raw coal to the existing processing plant at the Luscar mine. CRC concluded that a new plant was preferred given that the continued use of the plant at Luscar would require additional transportation infrastructure, modifications to increase the plant's efficiency and capacity, and would result in a delay with respect to returning the land at the Luscar mine site back to the Province.

CRC stated that it had also considered three potential sites for a new coal preparation plant in the project area. These were: (1) the site of the former town of Mountain Park (which was rejected largely on social grounds); (2) a location in the McLeod River valley between Thornton and Cheviot Creeks (which was rejected because of air and water quality considerations; and (3) the Harris Creek location which, while not as favourable from an engineering perspective as the other sites, was considered preferable on both biophysical and social grounds.

CRC advised that it had also considered two potential sites for its proposed freshwater reservoir. These were sites at the Lower J Creek and the Lower Harris Creek. CRC observed that the Lower J Creek site would be a considerable distance from the plant site and that the reservoir would be located within an undisturbed area. On this basis CRC opted for the Lower Harris Creek location.

In considering a site for the fine refuse tailings pond, CRC advised that it had looked at five potential locations. Three of the sites — Lower Cheviot Creek, Upper Thornton Creek, and Upper Harris Creek — were considered as being capable of handling the required volume of tailings and further would not impact known coal reserves. Of these, CRC considered that the higher operating costs and the need for additional infrastructure effectively eliminated the Upper Harris Creek site from further consideration, while less favourable engineering factors eliminated the Upper Thornton Creek site. The Lower Cheviot Creek was selected as the preferred site.

2.3.2 Views of the Interveners

The Mountain Park Association had a number of concerns with CRC's proposed tailings handling and disposal program. In particular, they believed that CRC should be using dewatering of fine tailings rather than pond and/or pit disposal. In the view of the Mountain Park Association, CRC had demonstrated at the Luscar mine that such technology was technically feasible and since, in its view,

dewatered tailings reduced environmental risks, CRC should be required to use this approach at the Cheviot Coal Project. The Mountain Park Association also questioned the capacity of the thickener proposed by CRC.

The AWA Coalition also took the position that the use of an impoundment to dispose of the fine tailings did not represent best available mining practices.

CEPA, while it did not oppose the concept of the proposed tailings pond, said that the related dam construction for the tailings and fresh water ponds was of concern to it and that the dams should continue to be viewed and designed as high hazard structures. This concern is addressed in Section 3.1 of this report.

Environment Canada recommended that the coal processing and loading facilities be located in a less environmentally sensitive location and further back from the McLeod River.

AEP advised the Panel that, with respect to the CRC proposal to cap tailings with water, if the project was to receive approval from the EUB, AEP would require further evaluations to demonstrate that the tailings ponds will meet the intended reclamation objectives and further documentation to confirm that the tailings will not cause adverse effects in the overlying capping water. AEP said it would also require contingency plans with respect to the two man-made lakes (i.e. Kennedy and Cheviot Lakes) where CRC planned to use the water capping technology, should further research confirm that this process was not feasible.

2.3.3 Views of the Panel

In considering the coal preparation plant, the Panel believes that there are several issues which must be addressed. These are whether a new coal processing plant is required, whether the site selected for both the plant and the associated ponds and reservoirs is appropriate, and whether the fine tailings control technology selected by CRC is appropriate.

With regard to whether a new plant is required, the Panel is prepared to accept the view of CRC that construction of the new plant will provide greater efficiency and reduce costs to the company. Since use of the existing Luscar plant would also require the transportation of raw coal through the Hamlet of Cadomin, which may result in a number of associated environmental issues, and also potentially delay reclamation of the Luscar mine site for a significant length of time, the Panel believes that construction of a new plant is reasonable.

With respect to the location of the various facilities required for coal processing, the Panel believes that CRC has made a reasonable effort to balance environmental, social, and engineering factors in its site selection process.

With regard to coal washing technology, particularly the use of fine tailings disposal versus dewatering of tailings, the Panel is prepared to accept CRC's proposal as technically acceptable. While alternative technologies are clearly available, the Panel is not convinced that they provide sufficient environmental benefits to require them to be adopted by CRC. The Panel's views on the environmental issues associated with water use, water quality, and the risks of accidental release of coal fine tailings from the tailings ponds are addressed in Section 3.2.

2.4 Proposed Transportation and Utilities System

2.4.1 Views of the Applicant

CRC indicated that a transportation corridor, which would provide road access, rail access, and an electrical power transmission line would be required to service the Cheviot Coal Project. Existing road access is limited to a gravel road (the Grave Flats Road) which is unsuited to the traffic needs of the Cheviot Coal Project. Existing railway and power line facilities currently only extend to the Hamlet of Cadomin, approximately 12 km from the proposed site of the coal processing plant.

CRC advised of its preference to locate the transportation corridor within the McLeod River valley. It proposed that the existing derelict railway lines would be replaced on the existing right of way between Cadomin and Mountain Park. It also proposed that the existing Grave Flats Road would be upgraded from its junction with Highway 40 to the location of the proposed coal preparation plant at Mountain Park. The upgrading included, following discussions with the residents of Cadomin, a commitment by CRC to create a bypass around Cadomin.

In addressing alternatives with respect to a transportation corridor into the Cheviot Coal Project, CRC advised that it had also considered the MacKenzie Creek and the Cardinal River corridors in addition to the McLeod River corridor. The main criteria considered were: (1) convenient workforce and supplies access to and from Hinton; (2) access to the existing railway infrastructure; (3) access to existing electrical power sources, and (4) avoiding increased public access and resulting impacts. Of the three options considered, CRC concluded that the McLeod River corridor represented the most acceptable route.

Within the McLeod River corridor, CRC noted that it had initially considered three route options for the upgraded road. These included: (1) upgrading the existing road which would continue to be routed through Cadomin (Option A); (2) creating a bypass road to be located on the west terrace above the community and connecting with existing road north and south of the community (Option B); and (3) a new route through the Luscar mine site from Highway 40 and connecting with the Grave Flats Road south of Cadomin (Option C). CRC advised that, as a result of consultation with the public, it had eliminated Option A since it was unacceptable to the residents of Cadomin. CRC also advised that Option C presented logistical and safety concerns for the company. More detailed plans were then developed for Option B. CRC noted that this option resulted in considerable local concerns with the

initial proposed routing and, following further consultation and consideration of variations to Option B (the bypass proposal) eventually developed a route (Appendix C) which was acceptable to the community.

TransAlta noted that it had applied for approval of a 138 kV transmission line needed to provide electrical power to the mine site to be located within, where possible, the proposed right of way of either the upgraded Grave Flats Road or the railway line (Figure 4). TransAlta felt that inclusion of the transmission line within an existing right of way would minimize land requirements and would reduce the overall impacts of the transmission line. TransAlta also advised it would work with the residents of Cadomin should any electrical interference arise from the power lines.

TransAlta indicated that it had considered a number of routes for the transmission line prior to selecting the proposed route. These included: (1) routes through the MacKenzie and Little MacKenzie Creeks; (2) a route located to the east of Cadomin; (3) a route located to the west of Cadomin; and (4) a route which would pass through the existing Luscar mine. TransAlta noted that higher costs, and the opportunity for increased access into the relatively undisturbed MacKenzie and Little MacKenzie Creeks, made Option 1 both economically and environmentally unacceptable. Increased length (and therefore cost) and interference with current mining activities caused TransAlta to eliminate the Luscar mine route (Option 4). While the route east of Cadomin (Option 2) was considered a reasonable option, it was eventually rejected because it would also open up new access and would not take advantage of the proposed road bypass around Cadomin. TransAlta, following consultation with the public, identified the Cadomin west bypass route (Option 3) as the preferred route.

CNR indicated that it intended to follow, to a large extent, the existing railway right of way for the Cheviot Coal Project rail line. Restoration work would include rebuilding the rail bed, replacing one bridge on the McLeod River, installing new trackage, and constructing a rail loop for the coal loadout facilities. Two bridges used in the original right of way would be avoided by returning the McLeod River to its former channel. Crossings at Prospect Creek, Cheviot Creek, Thornton Creek, and two McLeod River crossings would be accomplished using culverts. CNR, on behalf of CRC, advised that it had considered five alternatives with respect to the location of the railway loadout loop. Only one of these alternatives (Option 5D) fully satisfied all of the operational requirements related to the Harris Creek site for the coal preparation plant.

CRC stated that it intended to temporarily house construction workers in two camp sites located at the south boundary of Cadomin and at the Mountain Park area, but in view of concerns expressed by CEPA, it was now looking at the possibility of replacing the Cadomin site with temporary accommodation in Hinton. No decision had, however, been made, and CRC wished to keep its options open in this regard.

2.4.2 Views of the Interveners

No interveners to the hearing questioned CRC's need for an upgraded road, and a new rail line and power line or argued that CRC should consider other alternatives to the proposed transportation and utilities corridor. Residents of the Hamlet of Cadomin, through CEPA, expressed general acceptance of the proposed road bypass and of the proposed route of the transmission line past the Hamlet, but indicated that there remained some outstanding issues related to noise and dust from the bypass road. With respect to the proposed construction camp at Cadomin, CEPA expressed strong concerns that its proximity to the Hamlet could result in increased rowdiness or crime and so reduce area quality of life. These issues are addressed in Sections 5 and 7, respectively, of this report.

The AWA Coalition was also concerned that the construction camp at Cadomin could impact the Cadomin Caves due to an increase in visits to the Caves, particularly during periods when the bat populations using the Caves were particularly sensitive to disturbance. This issue is addressed in Section 4.5.

2.4.3 Views of the Panel

Provided the environmental and social issues can be addressed, the Panel accepts that CRC has established the need for the proposed transportation and utilities corridor. The Panel also believes that CRC has adequately evaluated the available alternatives for accessing the proposed mine site and that the McLeod River corridor represents a reasonable balance between economic, social, and environmental costs. In particular, the use and upgrading of an existing railroad right of way and road system; the reduction in impacts on the Hamlet of Cadomin through use of a bypass; and the avoidance of creating new access in currently undisturbed valleys are considered by the Panel to be appropriate. The Panel also accepts CRC's and TransAlta's Cadomin west bypass routing of the proposed access road and transmission line as reasonable.

3 AQUATIC ENVIRONMENTAL EFFECTS

The Cheviot Coal Project has the potential to affect both groundwater and surface water discharge patterns (i.e. water quantity), the physical and chemical nature of subsurface and surface waters (i.e. water quality), and the organisms which depend on both water quantity and quality (i.e. aquatic habitats and fisheries). Each issue is treated separately below.

3.1 Water Quantity

3.1.1 Views of the Applicant

Study Area

The areas considered by the applicant with regard to effects on groundwater and surface water quantities differed slightly. With regard to groundwater, CRC stated that it had considered effects within the proposed mine permit boundary, as well as at those locations beyond the permit boundary where concerns were raised during the public consultation process. These areas included the Hamlet of Cadomin, Alexis First Nations land, the Smallboy Camp, Cadomin Caves, Cadomin Springs, Miette Hot Springs, and the Town of Edson. Surface water flows were assessed for both the McLeod River and Cardinal River drainages. Both the immediate effects on surface flow within the project boundaries, as well as downstream effects, were considered.

Existing Conditions

Existing groundwater conditions were established based on sampling results over two years from 27 piezometers and two water wells placed within the mine permit area. These provided data on depth to groundwater, information on flow rates and, to a lesser degree, on the direction of groundwater flows. Surface water flows were measured by CRC at six locations within or proximal to the coal lease and additional historic data were taken from Water Survey of Canada (WSC) gauging stations further downstream. The latter provided an estimate of longer-term, regional flow patterns.

The existing primary groundwater bearing units identified within the mine permit boundary were sandstone bedrock, any other fractured bedrock, and quaternary gravel deposits. The two bedrock zones were noted to have highly variable flow rates (hydraulic conductivities of 1.4×10^{-8} to 1.0×10^{-5} metres per second) but were felt to be comparable to the formations and associated flow rates found at the Luscar mine. Depth to groundwater was found to vary from 0 to 65 m below ground level, and a number of flowing springs and drill holes in the lower valley areas suggested that the bedrock formations provided areas of groundwater discharge. The quaternary gravel deposits, on the other hand, were found generally within the valley bottoms, and acted as areas of groundwater recharge, with high hydraulic conductivity and the potential to store and transmit large volumes of groundwater.

In describing the existing surface water flows, CRC noted that several tributaries to the upper McLeod River would be disturbed. These included Prospect, Powerhouse, Cheviot, Thornton, Harris, and MacKenzie Creeks. Red Cap Creek, a relatively small tributary to the Cardinal River, would also eventually be affected by mine development.

CRC noted that some disturbance of these drainages has already occurred or is occurring. Sources of disturbance included the Grave Flats Road, the existing CN rail line, old coal refuse piles scattered along the valley bottoms, and the presence of abandoned underground and surface mining activity, particularly the open end pit and associated rock dump on Cheviot Creek. As well, more recent disturbance has included coal exploration by CRC and the creation of trails by off-highway vehicles throughout the general area. Disturbance levels in the Cardinal drainage were felt to be somewhat less than in the McLeod River drainage area.

A number of both natural and manmade features were felt to affect existing surface water flow patterns. CRC noted that Prospect Creek exhibited very high runoff rates due to its high gradients, while a high degree of flow attenuation was noted at Cheviot, Thornton, and MacKenzie Creeks due to the presence of the existing abandoned surface pit, groundwater discharge from an abandoned underground mine, and a large wetland complex, respectively.

Expected Effects

The risk of impacts from the development of the rail line, power line, and access road on groundwater flows were predicted to occur primarily in those locations where shallow water supply wells were located in areas proximal to the construction activities. CRC proposed to provide alternative water supplies should disruption occur. No impact on Cadomin Spring was predicted. Negligible impacts on surface water flows were predicted from either rail or road construction.

With regard to the coal processing plant, CRC predicted insignificant changes to groundwater recharge and discharge rates would occur as a result of grading activities during construction. Significant changes to surface flows were predicted, however, from the operation of the coal processing plant. These would occur because water demand for the coal processing plant would require approximately 20 per cent of the average summer flows of Harris Creek, the proposed water supply source, and demand would exceed the average winter flows. As a result, a water storage reservoir was required on Harris Creek which would be used to store sufficient summer flow volumes to meet the plant's water requirements on an annual basis. CRC stated that it was unable to mitigate these impacts and deemed them to be significant.

With regard to surface mine impacts on groundwater, CRC noted that all phases of mine development (e.g. land clearing, top soil stripping, overburden removal, coal removal, backfilling of pits, and the diversion of surface water courses) will have an affect on groundwater flows. In particular, mine pit development will alter recharge patterns and, since the pits will extend below the existing water table,

will alter groundwater flow patterns as well. During the initial phases of mining, CRC noted that it will be necessary to remove groundwater from pits. This was predicted to create a zone of groundwater drawdown extending as far as 1000 m from the pits, depending on pit size. With backfilling of the pits following mining and the creation of external waste rock dumps, some localized changes in groundwater discharge and recharge were also predicted. These are expected to stabilize relatively quickly and, based on observations at the Luscar mine, were not felt to be significant.

CRC stated that some local springs which are likely used by wildlife will be lost as a result of mine development, as will a water well currently supplying the Mountain Park Staging Area. With regard to the former, CRC assumed that other seepage sources and the in-pit lakes would eventually replace these resources. With respect to the well, CRC indicated that it was prepared to consider replacing this well during the reclamation phase, dependent on the results of public consultation at that time. CRC noted that it expected little or no impact on groundwater on the Alexis First Nations lands and no impact on the Hamlet of Cadomin, the Cadomin Caves, Cadomin Springs, Smallboy Camp, Miette Hot Springs, or the Town of Edson.

Those features of the surface mine that will effect groundwater flows will also impact surface flows. CRC noted that the careful handling of surface flows during mining was a key component of their existing Luscar mine and this would also be the case at the Cheviot Coal Project. Over the course of the 20 year mine development, CRC stated that all surface drainages within the coal lease boundary would be affected to some degree (Figure 5). During active mining, streams would be diverted around the open pits and so little or no alteration in flows from this activity was predicted. However, dewatering of the open pits would increase surface flows above normal levels, with a proportionately much greater increase during the winter months. CRC saw these changes as relatively short term and not significant, given the natural variability in the local stream flows.

In addition to stream diversion, CRC proposed to use existing valley bottoms in a number of cases as areas for the dumping of waste rock, and so permanently bury the stream channel. In order to ensure that stream flow could continue at grade through these valleys, CRC planned to construct rock drains. These drains are created by preferentially spilling waste material so that the very large diameter rocks are placed at the base of the waste dump. CRC noted that, given the large interstitial spaces between these rocks, practice has demonstrated that such drains are capable of passing very large flows of water, with little impact on downstream flow rate or water quality.

Following mining, CRC proposed to return at least some surface flows back into their original drainages, although, as noted above, they would now likely flow through end pit lakes and/or rock drains (Figure 5). In other cases, there would likely be complete diversion from some parts of the original drainage (e.g. Cheviot and Thornton Creeks) and into others (e.g. portions of the Upper McLeod River). CRC noted that, while the presence of end pits in the drainages will tend to increase surface flows during the active mining phase, once reclamation is initiated and surface water is allowed to re-enter the end pits (and the other backfilled pits as well since they have a relatively high degree of

voidage), there will be a general decline in surface flows. The filling of the end pit lakes is predicted by CRC to require from several months to three years, and during that period general flow reductions of 12 per cent to 20 per cent of the summer flows of streams within the mine project boundaries, and flow reductions of 1 per cent in the Cardinal River, 4 per cent in the McLeod River at Cadomin, and 4 per cent in the lower reaches of MacKenzie Creek are predicted. In general, CRC viewed these reductions as within the normal range of flow variation for the streams in question and did not consider these impacts as significant. Some mitigation of these effects would also be achieved through the recycling of water at the plant to minimize use and the use of water from the tailing ponds when possible. Once the end pit lakes were filled, CRC predicted that these would result in a degree of flow stabilization in the affected drainages.

Risk of Accidents

Two potential sources of accidental increase in surface flows were considered by CRC. This would occur if there were either a failure in the Harris Creek freshwater impoundment or the Cheviot Creek tailings pond. In the case of a complete failure of the Cheviot Creek tailings pond, CRC concluded that impacts would be limited to some flood damage to mine infrastructure such as the railway loop and to the Graves Flat Road immediately downstream of the pond. If the Harris Creek reservoir were to fail, CRC anticipated somewhat higher levels of damage to the mine infrastructure and to the access road. Furthermore, some risk to random and organized campers was predicted, while it was calculated that the Hamlet of Cadomin would experience a flood event roughly equivalent to a 1:100 year flood.

In order to reduce the risk of an uncontrolled flow from the Harris Creek reservoir, CRC agreed in discussions with CEPA to use Probable Maximum Flood as the design criteria for this dam. For the Cheviot tailings dam, a 1:20 year flood design was used. However, CRC intended to ensure that the pond could contain the 1:20 year flood at all times. Therefore, as the pond filled, the dam would normally be maintained at levels able to withstand much higher levels than the 1:20 year storm event. Furthermore, CRC planned to divert most of the flow upstream of the tailings pond outside of the Cheviot drainage, which would reduce the size of the 1:20 year flood substantially. Furthermore, in an agreement reached with the Hamlet of Cadomin, CRC agreed to monitor the integrity of the dams in such a way as to be able to warn the residents regarding an impending dam breach. CRC also agreed, should the dam fail, to accept full responsibility for any damages and to provide whatever assistance to Cadomin as necessary to deal with the impacts of flooding. CRC advised that it was prepared to construct potential flow channels at the surface of rock drains in order to pass, without unacceptable erosion, any surface flows arising due to a failure of the drain to function properly.

Cumulative Effects

Because the effects on groundwater flows would not extend regionally, CRC did not believe that any cumulative effects on groundwater flows due to the project would occur. Some regional effects on surface flows would occur during pit dewatering and subsequent re-filling and due to water use in the

coal processing plant but CRC also felt that, given the size of these effects relative to the normal variation in flow rates, no cumulative effects would arise. The other notable source of potential effects on surface water flows noted by CRC was logging in the region. However, data collected in the Tri-Creeks Study led CRC to conclude that the effects on surface flows from forestry operations would also be small.

Monitoring

CRC proposed to monitor groundwater levels in all piezometers semi-annually until the start of mining and continue semi-annual monitoring in piezometers beyond the potential effects of pit construction. Monthly sampling in piezometers located closest to the new pits was recommended, with sampling frequency to be reviewed once a sufficient data base had been collected. No specific surface water monitoring program was recommended.

3.1.2 Views of the Interveners

Two concerns were raised by CEPA with regard to changes in regional water quantity. First, CEPA was concerned with the potential impact of surface mine development on the flow rates of groundwater within the Hamlet. This issue was of particular concern since the Hamlet of Cadomin relies on groundwater for its water supply. The second issue of particular concern was the possible impacts of failure of either the Cheviot tailings pond dam or the Harris Creek freshwater dam on the community. CEPA believed that: both dams must be designed to "high hazard" standards; that the Harris Creek dam breach analysis should be re-evaluated once construction of features such as downstream bridges and bank armouring have been completed; that the elevations used in the flood plain analysis be field verified; that the height of the Harris Creek dam be minimized to the extent practical; and that a risk assessment be done to confirm which of the two dams poses the greatest threat to the community.

In its final argument, the RMEC suggested that, in its view, both the groundwater and surface water hydrology reports were sufficiently flawed so as to be unreliable for predictions regarding the impacts of the proposed project.

3.1.3 Views of the Panel

In general, the Panel is of the view that CRC appears to have a good understanding of existing surface flow conditions within the proposed development areas. The company's knowledge of groundwater flow patterns, given the difficulty inherent in measuring these, is understandably less extensive, but given CRC's experience at the Luscar mine, also appears to be sufficient to predict the impacts of development on groundwater flows.

The Panel accepts CRC's contention that the impacts of the road and rail corridor on surface flows will, with good engineering practice, be negligible. The Panel also accepts CRC's undertaking to replace

groundwater supplies within the Hamlet of Cadomin, should these be damaged, as reasonable mitigation of those impacts. The Panel will expect CRC to ensure that it has measured existing flow rates within the community prior to development in order to avoid conflicts.

The Panel notes that CRC's operations will significantly alter surface flow patterns and rates in Harris Creek over the life of the mine (i.e. 20+ years). While these flows will eventually be re-established, there will be a short term loss of aquatic and wildlife habitat in Harris Creek (see Sections 3.3 and 4.1). Given that the flow patterns in the McLeod River below the Harris Creek confluence will be relatively unaffected, the Panel is of the view that this environmental effect is not significant.

With regard to the levels of groundwater disturbance due to mining activities, the Panel accepts that these will be substantive within the mine permit boundary. However, the Panel also believes that CRC's contention that groundwater flow effects are unlikely to extend more than 1000 m beyond the areas of active mining is reasonable and so will not be significant in areas beyond the mine permit. The Panel also believes that groundwater flows will become re-established with the end of mining activities, although the flow patterns will undoubtedly be very different. The Panel also notes CRC's commitment to replace the water well at the Mountain Park Staging Area if required following further public consultation.

The Panel believes that the alteration of existing surface flows during the active mining phase is the potentially greatest source of adverse effects both within and beyond the mine development area. In particular, the Panel believes that CRC may have underestimated the effects of removal of vegetation and other sources of flow attenuation (retention) on surface discharge rates, particularly during storm events. However, the Panel also accepts that ultimately CRC will need to manage these events in order to carry out its mining operations and continue to meet water quality objectives (see Section 3.2) and so will need to include the necessary water management features into its engineering design.

The Panel is prepared to accept that the small surface flow increases due to pit dewatering will not result in any adverse downstream effects. The Panel is also prepared to accept that filling of the end pit lakes can be carried out in a manner which will not negatively affect downstream flows. However, CRC will be required to monitor area flow rates and take whatever steps are necessary to maintain minimum flows, particularly during the winter months. It is strongly recommended that CRC work with AEP prior to initiating significant mining activities to establish these flow levels. Once reclamation is complete, the Panel believes that the presence of the end pit lakes will at worst have a neutral effect and may in fact represent a net benefit to downstream flows, again particularly during the winter, by attenuating the naturally high spring runoff events. While some changes in particle size range due to sediment deposition in the end pit lakes in stream substrates below the mine site may occur as a result, this impact, given the regional topography, is not expected by the Panel to be significant.

The Panel is prepared to accept that the rock drain technology being proposed by CRC is capable of effectively passing a range of flows and is a well understood approach. The Panel does note, however,

that the use of rock drains at the Cheviot mine is much more extensive than that at the Luscar mine, and so the Panel will expect CRC to be prepared to consider alternative approaches if monitoring at the first rock drains constructed fail to meet expectations. Those rock drains where the upstream face of the waste dump is relatively low (and therefore the risks of overtopping the drain may be higher) are of particular concern, since this could result in significant, long term erosion. Should the Cheviot Coal Project receive approval, the Panel will require that CRC continue to re-evaluate the need for individual rock drains and determine if there are reasonable opportunities to carry those flows on the surface of the waste dump, or preferably avoid rock spillage within the drainage altogether.

The Panel notes the concerns raised by CEPA regarding the possible impacts of the failure of either the Cheviot or Harris dams on Cadomin. The Panel believes that the use by CRC of Probable Maximum Flood as the design standard for the Harris Creek dam and a 1:20 year flood design for the Cheviot dam (given its greatly reduced catchment), is adequate to deal with the concerns of the Hamlet. The Panel also notes that CRC has committed to providing compensation to the residents should damage from flooding occur as a result of failure of either structure, and to providing a warning system should a failure occur. The Panel also notes that further approvals for the dams will be required from AEP. In the Panel's view, CRC has undertaken all reasonable steps to avoid and/or mitigate the impacts of accidents in this case. The Panel is not prepared to require CRC to undertake further work to assess downstream risks beyond that already committed to, but does encourage CRC and CEPA to continue to work together to resolve their issues.

With regard to cumulative effects, the Panel does not believe that significant risks to regional flow rates would be created by the development of the Cheviot Coal Project. That said, regional monitoring of flow patterns by CRC, other appropriate companies, and regulatory authorities should continue.

With regard to monitoring programs, the Panel accepts CRC's proposed monitoring program for groundwater quantity as generally adequate. With regard to surface flows, the Panel believes that a formal program, particularly with regard to winter flow rates, is needed, if only to establish required minimum flows. CRC should work with AEP and DFO, as appropriate, to establish this program in conjunction with its monitoring programs for surface water quality and aquatic habitat (see Sections 3.2 and 3.3).

3.2 Water Quality

3.2.1 Views of the Applicant

Study Area

Groundwater samples were collected from several points within the mine permit boundary, including from the Harris Creek and Cheviot–Thornton Creek aquifers, from discharge from an underground mine (the Thornton Creek mine portal,) and from several area springs. Samples were analyzed for

routine potability, major ions, and dissolved metals. Bioassays (96 hr rainbow trout) on some samples were also conducted.

Data on sediment levels in surface waters were collected at stations used to monitor surface flows in the mine permit area. Regional sediment data were obtained from the Tri-Creeks watersheds near Hinton. The potential long term effects of mine development on water quality were assessed through measurements of benthic invertebrate populations (18 sites on eight streams), epilithic algae communities (16 sites on seven streams), and bioconcentratable substances using semi-permeable membrane devices (SPMDs). Existing water chemistry was measured at 35 sites on the McLeod River system and six sites on the Cardinal River system. Sample stations were located both within and downstream of the proposed mine site and included the effects of discharges from the two existing coal mines, the Gregg River mine, and the Luscar mine into the McLeod River.

Existing Conditions

In assessing existing groundwater conditions, CRC noted that relatively high levels of sulphur, barium, and strontium were observed in groundwater samples from a number of sites, but these values were also highly variable between sample sites. The groundwater samples were considered to be non-toxic based on the results of the trout bioassays.

In general, current sediment levels in surface waters were proportional to flows but varied significantly between drainages. For example, maximum values recorded in Prospect Creek exceeded 1000 ppm while maximum concentrations in MacKenzie Creek and the Cardinal River were less than 50 ppm. When compared to regional streams, sediment loads in the mine permit area were considered to be high, due in part to the presence of relatively steep terrain.

The benthic invertebrate communities varied somewhat with flow rates but generally were characteristic of communities occurring in fast flowing water. The algal communities were generally at or slightly above the historic ranges found in the region. Bioassay data from the Luscar mine for the outflow from the Luscar Creek settling pond and for the coal processing plant outflow showed no acute toxicity. Marginal toxicity from tailings leachate was observed but this result could not be repeated. Acute toxicity, as measured using Microtox, was observed from the materials concentrated in the SPMDs but this result was believed to be a sampling artifact.

In assessing existing surface water chemistry, CRC divided the McLeod drainage basin into three reaches. The first reach extended from the proposed mine site to above the confluence with Luscar Creek which drains from the Luscar mine. Water in this reach is influenced primarily by inflow from a number of tributaries, and groundwater flow from the old underground mine (Thornton Creek) and by Cadomin Springs. Flow from the old mine workings resulted in a localized increase in sodium, barium, potassium, and strontium loadings, but these declined to

background below the confluence with Prospect Creek. High sulphur loadings from the Cadomin Springs and from Whitehorse Creek were also observed by CRC.

The second reach extended from the confluence with Luscar Creek to the WSC Station. In this reach, CRC noted that there was a measurable increase in sodium, chloride, total inorganic carbon, and nitrates due to the influence of the Luscar mine. However, all parameters remained within the existing freshwater guidelines and objectives.

Within the third reach, which extended from the WSC Station to upstream of Edson, CRC observed that some parameters influenced by the Luscar Creek discharges decreased or stabilized. However, others increased due to the influence of additional loadings from the Mary Gregg Creek and the Gregg River. Both are heavily influenced by upstream mining activities, both the Luscar mine and the Gregg River mine. Increasing and/or fluctuating levels of organic carbon, iron, silica, TSS, nitrates, and sodium were all attributed to runoff from mining areas.

Within the three reaches on the McLeod River a number of the surface water quality criteria and guidelines were exceeded over the two-year sampling period. These exceedances were attributed by CRC to natural factors. CRC also noted that these values were consistent with historical data collected for the region. A similar pattern was observed on the Cardinal River, where the freshwater objectives for aluminum, copper, iron, phenolics, and dissolved oxygen were exceeded in some samples.

Expected Effects

Construction and operation of the road, rail line, or powerline were predicted by CRC not to have any direct impacts on groundwater quality. The primary source of impacts to surface water quality from the construction and operation of the utility corridor would be sedimentation resulting from construction in or near the McLeod River and other water courses. In general, however, CRC viewed these impacts as insignificant relative to natural levels of sediment loading. Mitigation of the effects of sediment loadings could be achieved through careful construction techniques (e.g. diversions) and timing. Some risk of the runoff of calcium chloride used for de-icing and dust suppression on the access road was noted but the effects were again felt to be insignificant.

Operation of the coal processing plant will produce a refuse (tailings) which will be discharged to the tailings pond. Under normal operations, no tailings effluent will be released and so no impacts will occur. Other sources of potential contaminants include plant discharge (slurry) water, surface runoff from the plant and coal stockpile area, and sewage. Surface runoff would be diverted to settling ponds, treated with surfactants, and released, while sewage would be directed to a sewage treatment plant.

CRC stated that there was little risk to groundwater quality from the coal processing plant due to recharge from either the tailings pond or from other sources of contaminants. With regard to surface water quality, CRC noted that there were risks of increased sedimentation during the construction

phases for the coal processing plant, but because these could be prevented through careful construction techniques, the effects would be insignificant.

CRC indicated that they did not predict any impacts on local or regional groundwater quality from mining operations. The one exception to this was a possible chance of elevated nitrate levels due to blasting residue leached from the overburden. In general, groundwater quality was predicted to not change substantively from current conditions.

A number of the components of mine development were examined by CRC in order to determine their potential effects on surface water quality. The active dewatering of pits and the old underground workings were expected to have some effects due to higher than background levels of a number of compounds (e.g. several metals, salts, and nutrients) in the existing groundwater. These impacts were expected to be localized due to downstream dilution and would only last for a few years, primarily during the mining of the Cheviot Creek area.

During the operation phase of the mine, the risk of sedimentation could best be assessed, in CRC's view, by considering the low sediment release rates from the existing sediment ponds at the Luscar mine. Sediment data over a five-year period from the existing sediment ponds at the Luscar mine indicated a maximum level of 200 parts per million (ppm) and generally less than 50 ppm during periods of moderate to high runoff. CRC noted that these loadings were less than the natural loadings recorded in the Tri-Creek watersheds. Coal slurry water from the Luscar mine was assessed for toxicity and no acute lethality was found, although relatively high levels of sodium, nitrogen, and occasionally high levels of suspended solids and organic carbon were observed.

CRC noted that settling pond discharges were, however, a second major potential source of surface water quality contaminants. All runoff and pit water would be directed to settling ponds for treatment prior to release. Settling pond discharges may on occasion have higher than background levels of a number of compounds, including metals and nutrients, and data taken by CRC from Luscar Creek suggest that the Luscar mine is having measurable impacts downstream.

While most water quality impacts associated with discharges from the proposed mine were predicted by CRC to be localized, nutrient loading and the associated risk of eutrophication was considered to potentially have regional effects, possibly as far downstream as Edson. CRC noted that it had undertaken a number of programs at the Luscar mine to reduce the amount of residue remaining from blasting operations and therefore the levels of nitrogen available to enter the watershed. CRC advised the Panel that it would continue with these practices at the Cheviot mine. During cross examination, CRC also agreed that levels of some metals in the Luscar mine settling pond discharges (e.g. selenium) were above water quality objectives and that further work was needed to ensure that these would not be an issue in the Cheviot Coal Project.

Accidents

CRC noted that there was some risk to both groundwater and surface water quality from accidental release (spills) of compounds. These risks would occur during both the construction phase and the operation phase and could occur within the utility/transportation corridor, the coal processing plant, or within the mine. CRC felt that the primary sources of spills would be: (1) the loss of fuels either from storage during construction and operations or during transportation from transport trucks during operations; (2) the loss of bulk chemicals (e.g. magnetite) during transportation by either rail or truck; and (3) the loss of coal during transportation by rail. While a major spill of either fuel or chemicals into a water course could have significant effects, CRC believed that it had in place adequate emergency measures to ensure that the risk was very small and the likelihood of impacts was not significant.

CRC stated that the accidental release of slurry and/or tailings from the coal processing plant and the tailings pond also has some potential to affect water quality. CRC noted, however, that its chemical analysis of tailings indicated no substantive difference from the Luscar mine settling pond water quality which is routinely discharged to the environment, and that bioassays on concentrated tailings water and on coal slurry water also showed no toxicity. CRC also noted that a number of design features (e.g. incorporation of plant slurry lines within other lines in at-risk locations) had been used to further reduce the risk of accidental release of tailings. Finally, CRC observed that the fine tailings impoundment would only be in operation for five to seven years. As a result, the effects of an accidental release were judged to be insignificant.

Cumulative Effects

CRC noted that there were a number of sources of sediments into the McLeod River and, to a lesser extent, the Cardinal River drainage and that the mine was also a potential source. However, CRC observed that the establishment of end pit lakes would in fact reduce existing sediment loads and, based on data from the Tri-Creeks watershed study, cumulative sediment loadings from sources such as logging were not expected. CRC noted that the upper reaches of the Cardinal River drainage were largely undisturbed and so foresaw no cumulative effects from its proposed operations.

With regard to the McLeod River, CRC observed that water quality was already impacted by timber harvesting, mining and quarrying, exploration for natural gas, recreation, and human use (e.g. at Cadomin). CRC did not predict any cumulative effects on groundwater quality as a result of its proposed new mine development. However, some cumulative effects on surface water quality due to sedimentation and eutrophication were considered to be possible. To some degree, the closure of the Luscar mine shortly after the opening of the Cheviot mine was expected to help to reduce any cumulative effects. CRC noted some difficulty in obtaining cumulative effects information (e.g. forestry) to enable a thorough analysis.

Monitoring and Follow Up

CRC did not propose any specific monitoring programs for water quality in its application but did indicate that routine monitoring of settling ponds and monitoring of benthic organisms and epithilic algae would be recommended. CRC indicated as well that monitoring of discharges of underground mine water, treated sewage, and tailings would be appropriate and that any monitoring program would be carried out in a manner that ensures that the data collected are compatible with regional water quality programs.

A somewhat more specific monitoring program was also set out in CRC's Cheviot Project Water Policy for the Hamlet of Cadomin (Appendix D). The policy includes a commitment to ensure that a water monitoring program is in place at least one year before active mining commences, with baseline data on both surface and groundwater quality, including samples from within and around Cadomin, and ongoing semi-annual sampling from surface sites and both observation and domestic wells.

3.2.2 Views of the Interveners

In its submission, CEPA noted that it was concerned with protecting water quality and particularly groundwater quality since many of its members depended on groundwater sources for their water supply. At the hearing, CEPA requested that the water policy agreed to by CRC and CEPA be made a condition of any approval for the project.

At the hearing, the Mountain Park Association indicated it had strong concerns regarding the use of reservoirs for the storage of tailings. In particular, they were concerned with the possible water quality impacts from failure of the tailings pond dam and the subsequent release of tailings into the downstream watersheds. They indicated a strong preference for mechanical dewatering of tails, water recycle, and the direct disposal of the tails into pits rather than into a tailings pond. The Mountain Park Association did not believe that, given the relatively small volume of tails when compared to waste rock, this would be an unacceptable cost to CRC.

The Smallboy Camp indicated that their concerns regarding water quality were particularly focused on the potential impacts to Red Cap Creek and therefore on the Cardinal River system. However, they also noted that the Cheviot Coal Project was located on a significant divide in the watershed and so believed the mine could have potentially very far reaching effects into several watersheds. At the hearing, the Smallboy Camp reiterated an earlier request to CRC that it consider only mining the western two-thirds of its lease and limiting its development activities to only the McLeod River watershed.

The AWA Coalition identified a number of concerns regarding water quality resulting from the Cheviot Coal Project. One was the possibility that chemicals, including diesel fuel, would migrate from the coal processing plant into the tailings pond, resulting in emissions to the environment. A second concern was

that mining operations would result in unacceptably high levels of metals, nitrates, and pollutants being discharged to area streams. In particular, the AWA Coalition noted that nitrates arising from blasting could result in downstream eutrophication and, if converted to nitrites, could present a potential health hazard. The AWA Coalition noted that CRC had not committed to a waste water treatment system to deal with either nutrient levels or with domestic sewage.

The AWA Coalition also noted that there was little evidence adduced regarding the possibility of high levels of sedimentation if a heavy rainfall occurred prior to the establishment of vegetative cover within the mine site. They observed that CRC had had five or six exceedances per year of its licence limits for sediment discharges at the existing Luscar mine. In the view of the AWA Coalition, CRC had not adequately addressed either the likely sources of sediment from the Cheviot mine or methods to curtail sediments. The AWA Coalition also raised concerns that other compounds, such as selenium, are being discharged from the Luscar mine at levels above the current guidelines and water quality objectives. They also noted that the anoxic conditions likely to develop at the bottom of the proposed end pit lakes could exacerbate this problem by creating conditions suitable for the creation of more toxic forms of these compounds. Furthermore, they believed that CRC's data confirmed that mining activities at Mountain Park continued to contribute contaminants to area waters long after mining had ended.

The RMEC also raised a number of concerns regarding surface water quality. They noted that, in their view, CRC had not adequately addressed the potential risks of acid mine drainage or the potential associated loading of metals. CRC had also not addressed the potential effects of rock dump failures on water quality, particularly the sedimentation effects of such a failure. The RMEC also believed that CRC had greatly underestimated the downstream impacts of its development on area water quality. In particular, they predicted that there were significant risks of chronic sediment loadings, eutrophication from nutrients, and toxicity from metals and other compounds released into the area receiving streams as a result of mining activities. In general, the views of the RMEC were also echoed by the Western Canada Wilderness Committee (WCWC).

AEP stated that its policy was to not allow releases or discharges into the environment that could result in adverse environmental impacts. AEP noted that some metal levels in discharges from the mine were predicted by CRC to exceed current guidelines. AEP indicated that it believed that CRC should undertake control efforts for these metals, as well as carry out further research into the likely extent of such exceedances, as well as the relevance of the guidelines to the existing environment at the Cheviot Coal Project.

AEP commented on potential nutrient loadings from the Cheviot Coal Project and noted that while eventually the Luscar mine loadings would decline, for a least some period of time there would be nutrient discharges from both projects. As a result, AEP believed that CRC would need to consider active control of nutrient loadings into the McLeod River watershed if current levels were to be maintained. AEP also noted concerns regarding the effect of the coal tailings on overlying water quality

and recommended that monitoring of this would be needed. AEP was also concerned with possible water temperature elevation downstream from the mine site.

Trout Unlimited proposed that continuous water quality monitoring could be achieved through the use of caged rainbow trout or some other similar approach. This would assist CRC in dealing with the effects of excess levels of flocculant and accidental spills and releases on the mine site. Trout Unlimited also recommended ongoing monitoring of siltation levels, particularly in regions where upstream construction of end pit lakes and rock drains had reduced the natural flushing capacity of the streams. Both Trout Unlimited and the Alberta Fish and Game Association also suggested that monitoring of nutrients downstream was necessary, in part to address the risks of reduced oxygen levels due to eutrophication and the associated potential for fish kills.

3.2.3 Views of the Panel

The Panel believes that CRC's programs to measure existing groundwater and surface water quality provide sufficient information to assess the potential environmental effects of the Cheviot Coal Project. In general, the Panel is of the view that existing water quality within the areas to be affected by the project is good. The Panel notes, however, that some changes to the water quality of the upper reaches of the McLeod River and its tributaries continues to occur due to past mining activities. At the same time, operations at the existing Luscar and Gregg River mines are having measurable effects on water quality downstream of the proposed project. Furthermore, some exceedances of provincial and/or national water quality objectives are also already occurring due to both anthropogenic and natural causes. As a result, predicting the future environmental effects of new development is somewhat confounded.

Neither construction nor routine operation of the road, rail line, or powerline appear likely to have significant adverse effects on either groundwater or surface water quality. Furthermore, these risks of impact likely can be readily reduced through prudent practices such as runoff control.

Risks to water quality from construction of the coal processing plant also appear to be small, assuming normal construction practices are followed. The Panel also notes that CRC intends to operate the fine tailings pond as a closed loop and so avoid any direct discharge to the environment. There is presumably risk of water from the tailings pond entering the groundwater, but the evidence provided by CRC at the hearing suggests that this material is relatively benign and so any associated environmental effect would not be significant. The Panel does not believe that diesel fuel carryover into the tailings pond will be a significant issue.

The surface mine operations, in the Panel's view, clearly do represent some risk of impacts on both local and regional water quality. At least some nitrate–nitrogen loadings to groundwater from blasting residue appears to be likely. However, these effects appear very likely to be either localized to groundwater within the mine permit area or will join surface flows beyond the mine disturbance. Water

pumped from pits during dewatering may also have chemical characteristics inconsistent with surface flows.

The primary sources of concern for impacts on surface water quality appear to be discharges of sediments, metals, and nutrients. The Panel does not find that there is any evidence of risk of acid mine drainage as suggested by RMEC.

A large surface mine in rugged terrain will create numerous sources of sediments. The Panel believes, however, that sediment control can be achieved through the use of diversions, sedimentation ponds, and the careful addition of flocculants. The Panel notes that CRC's biological monitoring data from Luscar Creek, which drains a settling pond on the Luscar mine site, indicates that recovery of the benthic invertebrate community has occurred within a reasonable distance downstream of the discharge point.

With regard to metals loadings, the Panel notes that CRC's data for the Luscar Creek settling pond do show levels of a number of compounds at or above surface water quality guidelines. It is difficult for the Panel to assess the biological relevance of these levels. The Panel appreciates that Canada's Water Quality Criteria are designed to provide a high level of protection and so are very conservative. The Panel also understands that in many instances, natural sources of various compounds may raise their concentrations in pristine receiving waters above the levels set in the objectives.

In this case, the Panel believes that there is sufficient evidence to confirm that both previous and current mining operations are increasing the concentrations of a number of metals and similar compounds in receiving waters above background levels, and in some instances above water quality objectives. While no evidence was provided which would suggest that these levels are having a significant environmental impact, the Panel concurs with the position taken by AEP that additional effort needs to be made by CRC to assess control technologies for these compounds and to ensure such controls, should the Cheviot Coal Project be approved, are put in place. The Panel also agrees with AEP that further analysis of the relevance of the water quality objectives be carried out and that the results of this analysis be reflected in any effluent discharge permits.

With regard to nutrient loadings, the Panel agrees that there is some risk of regional impacts if these are not carefully monitored and controlled. In this instance, the Panel is prepared to accept CRC's contention that it has been able to greatly reduce avoidable losses of nitrates from the Luscar mine and that these improvements can be readily transferred to the Cheviot mine. The Panel also notes, however, that there will be a period of some unknown length when nutrient loadings from both mines will be occurring. It will be very important that CRC's monitoring programs are adequate to identify if nutrient loadings are creating a risk of downstream eutrophication.

With regard to post-mining impacts on water quality, the Panel notes that some sources of sediments, metals, and nutrients likely will exist for at least a few years following mine closure. However, a

potential indirect benefit of CRC's proposal to leave a number of end pit lakes in place will be the increased attenuation time for area surface runoff. The higher attenuation time, when coupled with the naturally low nutrient and high energy levels of area watersheds, can reasonably be expected to assist in mitigating any long-term effects on water quality.

With regard to cumulative effects, the Panel notes that there are a number of relatively small, but potentially cumulative, impacts to regional water quality occurring from a number of sources, particularly within the McLeod River watershed. The sources of these impacts include a range of industrial, municipal, and recreational activities. Based on the measurements of existing water quality, the Panel does not believe that development of the Cheviot Coal Project, at present levels of activity in the watershed, should result in an unacceptable reduction in regional water quality. However, effective monitoring and potentially increased controls on discharges, particularly nutrients, may be required to avoid curtailment of future development within the watershed.

The Cheviot Coal Project does create some opportunity for the accidental release of materials and associated impacts on water quality. There will be some increased risk of spills within the transportation corridor. However, this risk does not appear to be any larger than the risks associated with the Luscar mine, and CRC appears to have adequate spill response programs.

There is also a risk of accidental release from the Cheviot tailings pond. However, as noted in Section 3.1, the artificially reduced catchment basin above the pond, the relatively low toxicity of the fine tailings; and the measures taken by CRC to further reduce the risk of tailings loss, such as enclosing the tailings pipeline within a culvert, all appear to have adequately reduced the risk to water quality from an accidental release.

With regard to monitoring programs, it appears that programs initiated by CRC to measure existing water quality, both for groundwater and surface water, will provide the basis for an adequate monitoring program. Prior to commencing its operations, CRC should, in discussions with AEP, agree to an appropriate level of long-term monitoring. The Panel believes that such a program should include biomonitoring (e.g. benthic invertebrate and algae communities), water chemistry (both in groundwater and surface water), and measurements of sediment levels. Stations should be located sufficiently far downstream to measure potential impacts from other mines, as well as potential impact on downstream water users (e.g. Edson, Cadomin, Alexis First Nation, and Smallboy Camp). The Panel is not convinced that monitoring of chronic toxicity using flowthrough assays (e.g. with caged rainbow trout or SPMDs) is currently warranted. However, CRC and AEP may wish to consider such approaches further, particularly if they would be of value in assessing the applicability of the various water quality criteria to CRC's licensed discharge levels.

3.3 Aquatic Habitat and Fisheries

3.3.1 Views of the Applicant

Study Area

The area examined by CRC in order to assess the potential effect on fisheries included the streams within the mine permit boundaries; plus investigations of tributaries of MacKenzie Creek and Whitehorse Creek and the main stems of the McLeod River, Cardinal River, MacKenzie Creek, and Whitehorse Creek downstream of the mine permit boundary. Two abandoned mine pits within the mine permit boundary were also investigated.

Existing Conditions

Five species of sport fish (bull trout, rainbow trout, brook trout, cutthroat trout, and mountain whitefish) occur in the study area. Bull trout, rainbow trout, and mountain whitefish are found in both the main stem of the McLeod River and MacKenzie Creek. A series of falls on the McLeod River upstream of the confluence with Whitehorse Creek appear to have prevented their migration upstream into the mine permit area. Brook trout, which are not native to the region and were stocked in the upstream reaches of the McLeod River are found throughout both drainages, but population densities are highest within the mine permit boundary. Bull trout are considered to be at risk in Alberta, while the rainbow trout in the study area may be derived from Athabasca rainbow trout, considered a potentially unique subspecies. Cutthroat trout are only found in the Cardinal River, where they were introduced between 1986–1988. Bull trout were the only other sport species observed by CRC in the Cardinal River.

CRC observed that stream habitat quality for fish in the region is generally directly related to stream energy which, in turn, is a function of gradient and discharge regime. Overall fisheries habitat quality in the lower reaches of the McLeod River was considered moderate, while habitat quality in the upper reaches was considered poor due to extensive periods of low flow and/or steep gradients. The majority of the tributaries to the upper McLeod River are high energy streams with extreme fluctuations in discharge, and habitat quality is generally low for adult fish and moderate to low for juveniles. Habitat quality in the two abandoned pits was also considered to be low, but flow stabilization in the pits appeared to have improved downstream fisheries habitat in Cheviot Creek somewhat.

Habitat quality in the lower reaches of MacKenzie Creek was rated moderate to high due, in part, to the presence of bull trout spawning habitat. Habitat quality in the tributaries to MacKenzie Creek in those tributaries that supported fish was rated by CRC as moderate.

Existing habitat quality for fish in the Cardinal River was generally rated as moderate to low for adult cutthroat trout, while habitat quality in Red Cap Creek was rated as high for both juvenile cutthroat and bull trout.

Expected Effects

CRC noted that impacts on aquatic habitat and the associated fisheries could result from a number of changes in the parameters making up that habitat. These included: direct physical disturbance of banks, riparian vegetation, and substrates, etc; increases in sediment loads; and changes in flow regimes.

With regard to the transportation and utility corridor, CRC stated that its requirements to restore the existing rail line will result in construction work both along and within the McLeod River. This would include: the removal of old debris, the construction of one bridge crossing, the restoration of the river to its historic channel in order to avoid two other crossings, and the installation of five culverts. As well, significant armouring of the stream banks to prevent erosion would be needed along several locations. As a result, some direct physical damage to aquatic habitat and degradation to other habitat types due to siltation may result. Improper placement or design of culverts could also lead to the blockage of fish passage.

CRC noted that these impacts would be mitigated through minimizing the amount of instream work, and the use of other construction techniques designed to minimize sediments and other impacts. Restoration of the original river channel was predicted to eventually result in the replacement of an equivalent amount of habitat, and culvert design and placement would be done so as to ensure no loss of fish habitat.

Impacts from access road construction were expected by CRC to be similar to those from the rail line (e.g. sediment from cuts and fills, stream crossings, culverts, etc) with similar mitigation techniques. The road did appear to represent a potentially greater source of sediments after construction and, while these loadings would be reduced as much as possible, some sedimentation was expected. CRC noted, however, that the high energy of the McLeod River system would likely help to ensure that any impacts were insignificant over the life of the project. No impacts on aquatic habitat or fisheries from the powerline were predicted.

Impacts from the construction of the coal processing plant would be limited primarily to sediments from runoff over disturbed areas and, like other construction sources, CRC believed that these effects could be easily controlled and were insignificant. Operation of the coal processing plant would, however, require the development of a freshwater reservoir on Harris Creek and a tailings pond on Cheviot Creek. The impacts from the freshwater reservoir were considered to be insignificant and temporary, since a self-sustaining fish population could be established in the reservoir over the life of the project and the reservoir would then be removed. However, the impacts of construction of the tailings pond on Cheviot Creek were felt, without compensation, to be significant since this would result in the permanent loss of fisheries habitat.

Several sources of impacts to aquatic habitat from the construction and operation of the surface mine were identified by CRC. Haul roads, during both the construction and operation phases, were identified as one potential source of impacts, particularly as sources of sediment. However, a number of techniques are available to avoid runoff from disturbed areas and CRC believed the effects of haul roads would, in general, be insignificant. Furthermore, culverts used in stream crossings would be designed to minimize habitat loss either directly or through reductions in fish movements.

A second source of sediment was surface runoff from disturbed areas on the mine site and from discharged pit water but, as with haul roads, CRC was confident, based in part on previous experience at the Luscar mine, that these effects could be controlled primarily through the use of settling ponds and flocculants.

A third source of impact identified by CRC was both the temporary and permanent diversion of streams from their existing channels. During temporary diversion downstream flows are maintained, but at least some fish habitat will be temporarily lost due to draining of the particular stream section. Populations upstream from the diversions will also be cut off at least partially from any immigration from downstream populations. In the case of the permanent diversions from Cheviot Creek, Thornton Creek, and two small tributaries of Red Cap Creek, some permanent loss of stream habitat will occur, although downstream habitat will be maintained. In CRC's view, these impacts could also not be mitigated without some form of compensation.

A fourth source of impact on aquatic habitat was changes to discharge regimes. As noted earlier in Section 3.1, stream flows are predicted to increase during periods of pit dewatering and decrease when end pit lakes are being filled. Little or no impact on aquatic habitat quality due to these activities was predicted, however, due to the relatively small changes in flow and CRC's ability to control the timing of these activities.

The final source of impacts from the construction and operation of the mine was the loss of various tributary stream sections due to their excavation and/or burial beneath rock dumps and rock drains. These losses would be permanent and were considered by CRC, in the absence of compensation, to be significant.

Compensation and Mitigation

CRC proposed two methods to compensate for the above loss of fish habitat. The first program was the introduction of native Athabasca rainbow trout into the upper McLeod River system into areas where natural blockages to migration exist. CRC estimated that approximately 11 km of stream habitat not currently used by Athabasca rainbow trout would be available and, because of its natural isolation from downstream populations, would provide a genetic refugium for the native species. CRC also noted the importance of ensuring that only native Athabasca trout be stocked in these waters in order to avoid contamination by other rainbow trout strains. When questioned about the possibility of

extirpating the existing introduced populations of brook trout in the upper McLeod watershed and also introducing bull trout, CRC indicated that it was not convinced that either program would likely be successful and so did not believe that these were appropriate compensation strategies.

The second component of CRC's fisheries compensation program was the establishment of seven mine pit lakes, six within the McLeod basin and one within the Cardinal basin, capable of supporting self-reproducing populations. CRC noted that these lakes would, in its view, not require ongoing stocking programs to maintain fish populations, provided that only catch and release angling was permitted once the lakes were turned over to provincial management authorities. CRC also noted that ongoing management of these lakes would, in its view, be the responsibility of the Alberta Fisheries Management Division.

In order to help address the time delay between the loss of stream habitat and the establishment of lake habitat, CRC advised that very early in the mining process it also intended to establish native Athabasca rainbow trout populations in a number of small overwintering ponds, with adjacent spawning habitat, in the upper McLeod watershed.

CRC noted that it had been able to establish a self-reproducing fish population in a mine pit lake at the Luscar mine site and was confident that it could do the same at the Cheviot Coal Project. CRC indicated that it planned to carry out extensive engineering in the seven end pits expected to be able to support self-reproducing fish population in order to ensure that features such as depth, surface area, and in particular the presence of littoral zones and spawning habitat were optimized for fish, within reasonable limits set by coal mining economics and the realities of pit geometry. In CRC's view, such lakes provided more than adequate compensation for lost stream habitat since both the amount and productivity of the replacement habitat would be greater than the existing habitat. Furthermore, CRC noted that there is a relative paucity of high mountain lake habitat in the region and that the new lakes would likely be attractive to regional anglers.

CRC observed that its conceptual mine plan called for another five lakes that would not, in its view, be able to support self-reproducing populations due to their physical features (e.g. inadequate depth). CRC noted that it did not plan to carry out stocking programs for these lakes, but did feel that these lakes would likely act as sources of food organisms for downstream aquatic habitat.

Accidents

The accidental release of fuels or other toxicants to the watershed (see Section 3.2) could ultimately have an effect on fisheries.

Cumulative Effects

Because the proposed lakes would eventually exceed the current production levels of the lost stream habitat, CRC viewed its fisheries compensation plan as providing a net positive cumulative effect to the region.

3.3.2 Views of the Interveners

The Mountain Park Association noted that it felt that CRC had not made sufficient effort to ensure that as few end pit lakes were constructed as possible. In their view, examples of such lakes (e.g. old quarry pits) were common in the area, were very unattractive, and of questionable value as fisheries habitat.

The AWA Coalition noted that the project as proposed will result in the destruction of up to 10.9 km of valuable stream habitats. In their view, the proponent did not adequately explore other options to avoid the loss or harmful alteration of fish habitat, such as the selection of alternate sites, or the creation of "like for like" habitat, but rather went straight to compensation as the only possible option available to mitigate the effects of its proposal. AWA stated that CRC, even in using compensation to mitigate the effects of the project, had not provided any evidence that the program as proposed met the genetic and biological criteria needed to make such a program successful. Nor did they believe that CRC had adequately described the cumulative effects of their proposal on the area's fisheries resources. They also noted that no evidence of angler preference for such artificial lakes was provided.

The RMEC also took exception to the use of end pit lakes to compensate for lost stream fish habitat. In their view, the habitat to be lost would be defined under DFO policy as critical habitat, and therefore compensation was not an acceptable mitigation strategy. Both RMEC and the AWA Coalition also noted that no surveys had been done with regard to rare species of either fish or invertebrates in the areas of stream to be destroyed by the mining operations.

RMEC also strongly questioned CRC's assertion that the proposed end pit lakes would be at least as, and likely more, productive in terms of fish biomass than the existing area streams. First they noted that, in their view, CRC had not been able to estimate the actual productivity, particularly as sources of downstream food organisms, of the streams which it would be affecting. Second, RMEC stated that they felt that CRC had greatly overstated the likely productivity of the end pit lakes, noting that there were a number of questions regarding water quality and availability of juvenile rearing habitat. Finally, RMEC noted that, in their view, CRC had not adequately indicated how it intended to ensure that the proposed end pit lakes would be accessible to the public.

In its submission, AEP advised the Panel that it believed that while there were a number of uncertainties with regard to CRC's proposed fisheries compensation program, AEP was prepared to accept the replacement of riverine/stream habitat with self sustaining end pit lakes, with several caveats. In order

to adequately compensate for lost fisheries habitat, AEP stated that such lakes must protect the integrity of both Athabasca rainbow trout and bull trout populations, be maintenance free, and have suitable water quality to support fish populations. AEP also suggested a number of features, such as the extent and depth of the littoral zone, that should be incorporated by CRC into the lake design.

AEP advised the Panel that it was also prepared to conditionally accept CRC's assessment that the impacts of the Cheviot Coal Project on bull trout populations would be insignificant. However, AEP did believe that monitoring programs on water flow rates (particularly groundwater discharge), water quality, temperature regimes, aquatic habitat integrity, and fish populations in the streams downstream of the disturbed areas was needed to ensure that CRC's predictions were borne out. AEP also indicated that the construction of additional overwintering ponds downstream of the mine permit boundary in the McLeod River could provide some additional mitigation of the impacts on fisheries.

Although AEP was prepared to accept the CRC proposal for the development of end pit lakes, they did indicate that, in general, CRC would be expected to minimize the impacts of development on existing aquatic habitat. In particular, AEP noted that the protection of existing natural riparian habitat must be given precedence whenever possible. AEP also indicated that, as part of its approval process, CRC would be required to submit a contingency plan designed to address any future deficiencies identified in the current program. AEP also requested that the Panel require CRC, in consultation with AEP, to establish a fund which would cover the cost of stocking both the end pit lakes forecast to have sustainable fisheries populations, as well as those lakes which CRC did not expect to be self-sustaining. Such stocking programs would be designed to compensate, in part, for angling opportunities lost both during and following the closure of the Cheviot Coal Project. Finally, AEP indicated that it strongly supported the concept of establishing a protective corridor along MacKenzie Creek with little or no mine disturbance as a method to protect bull trout spawning and rearing habitat.

DFO also advised the panel of a number of its concerns regarding the potential impacts of the Cheviot Coal Project on fisheries habitat and CRC's proposed mitigation programs. The two general areas of concern were first, whether the loss/degradation of stream habitat due to mine development, in conjunction with the creation of multiple pit lakes, would significantly affect the overall function and integrity of the aquatic ecosystems involved; and second, whether the end pit lakes would provide suitable replacement habitat, particularly in terms of their acceptance by area residents.

More specific concerns raised by DFO included whether the data base gathered from Lac Des Roches was sufficient to justify CRC's confidence that end pit lakes within the Cheviot Coal Project would be able to sufficiently meet the needs of both bull trout and Athabasca rainbow trout populations so as to result in self-sustaining fish populations. DFO noted that the creation of end pit lakes may not provide adequate replacement for lost stream habitat, particularly for bull trout spawning and for juvenile rearing. DFO also indicated remaining concerns with the potential loss of groundwater discharge in area streams, particularly during the winter months, as well as reduced food availability due to the

blockage of downstream movement of organic materials and benthic organisms by rock drains and the end pit lakes within the various stream courses.

DFO also advised the Panel that, in its view, the applicant had not adequately assessed the cumulative impacts of its development on the region with respect to not only other developments within the basin, but also the proposed cumulative effects of introducing a number of lakes into the headwaters of the various drainages. In particular, DFO were concerned with the relative impacts on anglers in the region. However, DFO went on to note that, given that the development will take place over a number of years, monitoring programs could be put in place to establish both the extent of impacts as well as the effectiveness of the proposed programs to mitigate these impacts. DFO stated that a flexible and adaptive approach to project management could allow new information to be incorporated during project development.

To meet the above information needs, DFO suggested that the applicant: identify areas of groundwater upswelling and confirm if used for spawning, assess instream flows, monitor annual spawning success, and measure juvenile production rates in river reaches below the proposed mine. Measurement of sediment generated, other water quality parameters, and benthic invertebrate production was also recommended. DFO also recommended that the applicant monitor areas where the blockage of fish passage may be problematic as well as the productivity of the proposed end pit lakes. DFO believed that in the event such lakes did not adequately compensate for the loss of fish habitat, CRC should identify possible nearby streams for providing "like-for-like" habitat compensation.

At the hearing, DFO advised the Panel that, based on the evidence provided, it had identified some additional recommendations. First, that the mine plan be modified to the extent possible to minimize the use of rock dumps within watercourses. Second, that CRC should undertake an analysis of sediment samples downstream of the area where increased levels of polycyclic aromatic hydrocarbons (PAHs) were identified in surface runoff. Third, that CRC should undertake the analyses needed to demonstrate that fish in the area of mining activity are not accumulating metals, PAHs, or other contaminants that would affect their suitability for human consumption. Fourth, that sediment deposition downstream of the disturbed areas be monitored and fifth, that end pit lakes be designed so as to incorporate physical features which will maximize their productive capacity.

Trout Unlimited indicated that it had several concerns with the habitat compensation program being planned by CRC but did note that, if well planned and managed, unique opportunities did exist to improve existing fish habitat and to provide new habitat. Trout Unlimited, in its evidence, described the changes which had already occurred to the streams and fish populations in the area due to both natural factors (e.g. beaver activity) as well as from mining and increased angling pressure. Trout Unlimited was of the view that the regional fishery had already been degraded and that further losses must be avoided.

Trout Unlimited did not believe that the construction being proposed by CRC to upgrade the access road and rebuild the rail line within the McLeod River valley would, if adequate precautions were

taken, have a significant effect on fish habitat. Trout Unlimited did believe that the mine development, particularly during the active stages, would have a significant effect on the area fishery and was not convinced that CRC had reduced the impacts of mining on the upstream drainages to the fullest extent possible. In particular, Trout Unlimited questioned whether the proposed mine plan had minimized the creation of rock dumps and drains within the affected drainage systems. Trout Unlimited was also very concerned that the proposed end pit lakes would not adequately compensate for the loss of stream habitat and believed that the proposed end pit lakes would not be as productive as CRC hoped.

However, Trout Unlimited also believed that several other opportunities existed for CRC to provide compensation for the impacts of mine development on regional fisheries. In particular, Trout Unlimited believed that CRC could carry out a number of activities in the reaches downstream of its proposed project to enhance fish habitat. These included the construction of pools and other forms of suitable overwintering and holding habitat in the McLeod River, MacKenzie Creek, and Red Cap Creek below the mine lease boundaries prior to commencement of mine operations. Winter flows, to be determined based on further direct measurements, were also proposed to be maintained within the downstream reaches of these streams. An additional step proposed by Trout Unlimited was the extirpation of brook trout populations in the upper reaches of the McLeod River in order to reduce competitive pressure and the risk of hybridization with introduced bull trout. Also recommended was the creation of additional fish habitat below stream diversions in order to compensate for the upstream losses caused by channel blockage, and ensuring that Cheviot Lake is engineered in a manner that will allow a self-sustaining population of fish to develop.

The Alberta Fish and Game Association expressed very similar concerns to those of Trout Unlimited, particularly with regard to the loss of natural stream habitat through excessive rock dumping external to the pits and the potential over-reliance by CRC on the ability of the end pit lakes to provide suitable and equally productive alternative habitat. The Alberta Fish and Game Association also expressed a strong desire that CRC would work to re-establish public access to disturbed lands as soon as possible in the mining process.

3.3.3 Views of the Panel

At the hearing, there was general agreement among all the parties that the Cheviot Coal Project will result in the permanent loss, as well as the short-term alteration, of fish habitat. There were differences of opinion, however, as to whether CRC's proposals first of all adequately minimized the loss or alteration of that habitat, and second, if the proposed mitigation strategy (i.e. compensation through the creation of end pit lakes) was appropriate.

With regard to minimization of habitat disturbance, the Panel believes that CRC's proposed development of both the transportation/utility corridor and the coal processing plant can be accomplished in a manner which adequately mitigates any short-term impacts on fisheries habitat. The primary risks from this would appear to be the restoration of the McLeod River to its former channel in

order to avoid the need for two new bridges and the possible blockage to fish movement due to improper sizing or placement of the five proposed culverts. With regard to the restoration of the McLeod River, the Panel views this activity as in fact relatively consistent with natural stream processes, particularly in higher gradient rivers like the McLeod. Therefore, although the "new" habitat created will very likely not be initially as productive as the existing habitat, these effects should tend to be short lived, and, given the extent of the disturbed habitat relative to the size of the river, are very unlikely to have a measurable impact on fish populations. With regard to the use of culverts, since such activities are carried out on a relatively routine basis, the Panel sees no reason why they cannot be accomplished in this case with little or no impact.

The Cheviot Coal Project, as proposed by CRC, will clearly result in both the temporary and/or permanent diversion of several headwater streams and the permanent burial of others below rock drains. As a basic principle in the design of this project, the Panel believes that, as per the principles established by both AEP and DFO, wherever practical, CRC should attempt to leave existing aquatic habitat undisturbed. Where this is not feasible, the company should attempt to only disturb habitat temporarily (e.g. through diversions), with the goal of ultimately restoring the original habitat to the degree possible. Only if neither option is available should the company look to alternative measures for mitigation, including compensation.

In their submissions, a number of interveners questioned whether CRC had, in preparing its conceptual mine plan, minimized to the degree possible the disturbance of aquatic habitat. In particular, the number of end pit lakes and the interrelated size of the external rock dumps was questioned. However, based in part on the report prepared by Norwest, the Panel is prepared to accept that: (1) the present conceptual mine plan is based on reasonable engineering and economic assumptions, and (2) at least some options likely exist which will allow CRC to further reduce the level of disturbance to aquatic habitat, without unacceptable impacts on other social and environmental factors (e.g. the former Town of Mountain Park or wildlife). The Panel expects CRC, as it continues to expand and refine its mine planning, to use as a key design criteria either avoiding or only temporarily disturbing aquatic habitat, wherever possible.

Notwithstanding CRC's efforts to avoid disturbance of aquatic habitat, the Panel agrees with CRC's view that some impacts cannot be avoided or mitigated, and also agrees that in this case compensation is appropriate. With regard to CRC's proposal to establish Athabasca rainbow trout populations in the upper McLeod River, the Panel believes that this is an appropriate approach and would strongly recommend that DFO accept this as partial compensation for lost habitat. Since the only competing salmonid is an introduced population of brook trout, CRC's proposal to create both an extension of the range as well as a genetic refugia for the native Athabasca rainbow trout seems to be an ecologically sound. The Panel is much less certain regarding the likely success of Trout Unlimited's proposal to attempt to eradicate brook trout from the upper McLeod, but will leave the decision regarding its feasibility and of the concept of stocking bull trout above the falls to the managers of the fisheries resource.

With regard to the use of end pit lakes to provide compensation, the Panel is prepared to accept the concept as having potential, but has a number of concerns regarding the ultimate productivity of these lakes. The Panel believes that CRC's success to date in creating Lac Des Roches, while it does suggest that lake creation is possible, is not yet definitive. The Panel notes that it is well established that productivity in new reservoirs is often much higher during their early stages, due to the influx of nutrients, and productivity can decline substantially with time. The Panel also agrees with DFO's view that CRC's population estimates for Lac Des Roches may be over reported. Other features of the proposed new lakes, such as their mean depth and their relatively high altitude, will also likely serve to further reduce productivity. Finally, a significant amount of engineering appears to be needed in order to produce the full range of habitats (e.g. spawning, juvenile rearing, and adult foraging habitat) required to create self-sustaining fish populations.

Despite the above concerns, the Panel recommends that DFO accept end pit lakes at this time as reasonable compensation for the habitat lost due to mining activities. The Panel agrees with the position taken by DFO at the hearing that there is sufficient time over the course of the development of the Cheviot Coal Project to carry out adaptive management practices. In particular, ongoing work at Lac Des Roches should provide significant direction for the future design of the proposed new lakes, including addressing the issues of public access and how to optimize the value of these lakes for area residents. Since there are no guarantees that CRC's proposed compensation programs will be successful, the Panel believes that it is reasonable for CRC to consider other forms of aquatic habitat improvement, possibly downstream of the mine permit boundary, as one component of its overall reclamation program, should ongoing monitoring and research indicate that CRC's proposed compensation program cannot adequately address impacts to the area's fisheries resources.

The Panel also notes that many of the streams being lost do not currently contain high quality fish habitat, but rather serve as a source of nutrients and food organisms for downstream reaches. The Panel believes that it is reasonable to assume that the presence of the end pit lakes will not have a significant negative effect on downstream flow of food and nutrients, but this assumption needs to be monitored. The Panel also believes that the attenuation of flows by the end pit lakes may in fact result in a net benefit to downstream fish habitat, particularly during the winter months. These effects, whether negative or positive, should be detectable by the requirements for monitoring programs described in Sections 3.1 and 3.2.

At the hearing, there was some discussion regarding the advisability of stocking the five lakes not expected by CRC to be able to support self-sustaining fish populations. Given the large number of unknowns regarding the eventual ecology of the end pit lakes, the acceptability of such lakes to anglers, or even the actual number of lakes that may result from mining, this concept appears to be somewhat premature at this time. The Panel would suggest that it will likely be important that CRC ensure that those lakes which can naturally compensate for lost fish production do so before any efforts are directed at creating a fishery which must be artificially maintained. The Panel also believes that CRC should be required, as the mine evolves, to justify, during the licensing stage, the need for each end pit

lake on an individual basis, and if such justification cannot be provided, to carry out backfilling of the particular end pit.

With regard to accidents or malfunctions which may affect fish or aquatic habitat, the Panel believes that fuel spills, accidental release of unreacted flocculants, and the failure of the Cheviot tailings pond, with the associated large volumes of sediments, are the primary sources of concern. The first two events have some potential to result in short-term toxicity to fish, but the materials would be rapidly rendered non-toxic by natural physical and biological processes. The latter event, particularly if it occurred during a low flow period, would likely result in more chronic downstream effects to food organisms (i.e. invertebrates) and any fish eggs which had been deposited in gravel substrates prior to the release. However, the high energy nature of the area streams, combined with the low toxicity of the coal fines, should eventually result in the flushing and removal of these materials without any undue environmental damage. The Panel also believes, as previously noted in Sections 3.1 and 3.2, that CRC has put in place adequate measures to either prevent or mitigate the effects of these events.

In assessing the cumulative effects of the Cheviot Coal Project, the Panel notes that little or no data were made available at the hearing on the current use of the fish resources of the mine permit area by anglers. This is of some concern since the eventual acceptance of the end pit lakes for lost stream fishing opportunities by area anglers is a component of CRC's compensation program. The Panel also notes the evidence by Trout Unlimited that local angling pressures appear to have increased, particularly as access has improved. Since the Cheviot Coal Project will, on one hand, improve access to the upper McLeod River valley below the mine permit boundary and, on the other, reduce access to traditional fisheries within the mine permit boundary, it seems reasonable to presume that this will also result in some cumulative effects on angling pressure in the region. The Panel agrees with DFO, however, that if the Cheviot Coal Project proceeds, there will be further opportunities to gather these data during the early development stages, and believes that the risk that the Cheviot Coal Project will result in significant cumulative effects on regional angling opportunities is small.

The Panel also notes that CRC, in attempting to carry out an assessment of potential cumulative effects (CEA), stated that it was unable to obtain the necessary information from other industry sources, particularly forestry. The Panel can appreciate the difficulty that this creates for an applicant. Given that a CEA is a requirement of both the provincial and federal EIA process, the Panel believes that the government has a responsibility for ensuring either that needed data can be collected or alternatively, that the current legislation is amended to recognize the limitations that lack of cooperation between industry sectors or companies within a sector can create for a CEA. In this particular case, the Panel notes that CRC was able to use data from the Tri-Creeks watershed as a surrogate measure of the likely effects of modern forestry practices on both discharge rates and water quality, and found little evidence of impact. Therefore, the Panel does not expect the cumulative effects of coal mining and forestry at present/predicted levels to have a significant impact on regional fisheries resources, or reduce their capacity as renewable resources, to meet either present or future needs.

At the hearing a range of monitoring and follow up programs were discussed. After reviewing the various proposals, the Panel believes that, as a minimum, CRC should be required to:

- (1) Establish an ongoing research program into the aquatic ecology of Lac Des Roches. Lac Des Roches provides CRC with an excellent template for the proposed end pit lakes at the Cheviot Coal Project. Data elements which CRC should consider monitoring include: ongoing water chemistry measurements, particularly in the anaerobic zone and at the interface of that zone with areas influenced by turnover; water temperature, nutrient, and biomass differentials between lake inflow and outflow; and fish population dynamics, including both biomass and life history data. Additional data on the use of Lac Des Roches by anglers would also be of value.
- (2) Establish minimum instream flow values in the drainages directly affected by mine development. Flow rates particularly during the late summer and winter months would appear to be among the primary elements controlling habitat quality and the ability of the regional streams to support fish populations. Additional data are needed to establish minimum flow rates that will need to be maintained during the various phases of mining to ensure that fish habitat is protected.

In addition to the above, CRC will also need to establish the water quality and biomonitoring programs described in Section 3.2. CRC will also need to develop a program to monitor the relative success of its proposal to establish native rainbow trout stocks within the mine site prior to the completion of the end pit lakes. Finally, CRC will need to develop a program designed to identify potential sites where other forms of mitigation for the loss of fish habitat (e.g. "like for like") could potentially be undertaken, should its proposed compensation strategies not prove to be as effective as expected. CRC may also wish to consider carrying out some experiments in such habitat enhancement techniques (e.g. creation of overwintering pools) within the area of the McLeod River where the original channel is to be restored. Assuming that there are sites within that reach where such work would be appropriate, the combination of absence of flow and the presence of construction equipment may make such work particularly cost effective.

4 TERRESTRIAL EFFECTS

The Cheviot Coal Project has the potential to affect several components of the terrestrial environment. In a number of cases, CRC selected VECs for its analysis of the terrestrial environmental effects of the Cheviot Coal Project and focused its assessment on these. These have been addressed in this report in the following sections:

- C vegetation (botanical and forest resources),
- C soils and terrain,
- C carnivores,
- C ungulates,
- C small mammals and amphibians,
- C Harlequin ducks, and
- C neotropical and other breeding birds and raptors.

Clearly there are linkages between these components and the Panel has taken these into account in its review and analysis of the environmental effects of the Cheviot Coal Project.

4.1 Vegetation

4.1.1 Views of the Applicant

Study Area

Botanical resources (vegetation and ecosites) were mapped by CRC at a 1:15 000 scale for the entire mine permit boundary area (102 km²). Mapping was based on data collected from 100 sites distributed throughout the study area. Similar mapping was carried out within the proposed transportation and utilities corridor north to the junction with Highway 40. Vegetation resources were measured along the transportation and utilities corridor over a distance of 16 km and a width of 500 to 1000 m, with the area surrounding Cadomin the widest portion. Forest resources were also measured within the mine permit boundary and along the corridor.

Existing Conditions

Three ecoclimatic zones (subalpine, montane, and boreal-cordilleran, with subalpine the most common) were described within the transportation and utilities corridor, while four ecoclimatic communities (upper boreal-cordilleran, subalpine, alpine, and montane, with subalpine the most common) were

found to occur within the mine perimeter. CRC indicated that 16 vegetative community types (6 coniferous forest types, 8 shrub types, and 2 grassland meadow types) were present within this area. Coniferous forests (primarily lodgepole pine) covered approximately 57 per cent of the area. Willows and dwarf birch shrub covered another 29 per cent. Less than 1 per cent was classified as disturbed, another 2 per cent was unvegetated or poorly vegetated, and 7 1/2 per cent was classified as alpine.

Of the 16 plant communities, 2 were considered to have particular ecological significance. These were a potentially old growth Englemann spruce–subalpine fir community and an alpine white dryad-kobresia community. The former was considered important due to its age, successional status, and relative rarity in Alberta. The latter was considered important due to its sensitivity to disturbance, limited areal extent, and the occurrence of numerous provincially and nationally significant plant species within the community.

In its application, CRC stated that a total of 477 plant species, including 74 non-vascular taxa, were found or reported in the Cheviot Coal Project area. CRC noted that further surveys would likely extend the list of non-vascular plants, particularly lichens, since it had focused primarily on vascular species. CRC also noted that because the area had historically been easily accessible and somewhat disturbed, a number of introduced species occurred. CRC observed that approximately 92 per cent of the species that occurred within the mine area were also reported in Banff and Jasper National Parks, while approximately 83 per cent of the species within the study area were also found on the Cardinal Divide.

CRC noted that within the mine permit area and the transportation and utilities corridor there were 35 plant species considered to be provincially significant. Four are classified as critically imperiled, 27 as imperiled, and 4 as rare. Three species are also considered to be of national significance. Many of these plants are associated with alpine/arctic environments and are parts of disjunct populations at the southern extent of their range. The alpine zone of Prospect Mountain was particularly noteworthy for the number of provincially and nationally significant species.

In terms of existing forest resources, CRC reported that 6400 ha (64 per cent) of the mine permit area was forested (i.e. a forest cover of at least 6 per cent). Much of this was lodgepole pine which originated following fires in the 1920s. The model age of stands was 75 years, but some stands of over 300 years in age also occurred. Approximately 25 per cent of the forested areas were classified, using the Alberta Vegetative Inventory, as commercially unproductive, with 72 per cent rated as "fair" productivity. However, using methods developed by Alberta Lands and Forests (now AEP), CRC estimated that only 43 per cent of the forested land would be rated as productive. Average gross volume of merchantable timber was 58 m³/ha and total timber volume is 418 000 m³. Within the area stated for direct mining disturbance, 103 000 m³ total timber volume was estimated to be in place, with 58 500 m³ in commercially productive and recoverable stands.

Expected Effects

CRC considered separately the effects on vegetative resources of development within the mine permit boundary, including the coal processing plant, and of development of the transportation and utilities corridor.

The Cheviot mine is expected to encompass an area of about 3007 ha with, approximately 2739 ha of land directly impacted by the development and with up to 7 per cent of the total mined area retaining its present vegetation cover. Based on its current mine development proposals, CRC believed that the impacts to vegetation resources would include:

- C the destruction of native vegetation, including 31 and 29 ha, respectively of the ecologically significant white dryad-kobresia and Engelmann spruce-subalpine fir communities;
- C the potential loss of individuals from provincially and nationally significant plant species populations;
- C a general reduction in floristic and vegetation diversity;
- C an increase in the abundance of non-native species;
- C the replacement of terrestrial ecosystems with standing water bodies;
- C the conversion of ridged and rolling topography to a terraced landscape; and
- C the creation of non-vegetated highwalls, footwalls, and related rock scarp.

CRC also noted that vegetation within reclaimed areas will require from one to several decades of growth to develop a physiognomy that resembles existing plant communities.

CRC provided an estimate, based on its current planning, of the likely changes in vegetation types pre- and post-mining. CRC predicted a net loss of 355 ha (12 per cent of total vegetation) of coniferous forest, 72 ha (3 per cent) of open forest/shrublands, and 255 ha (9 per cent) of mixed vegetation. The vegetation type showing the greatest increase in occurrence was grasslands (542 ha or 19 per cent). Unvegetated areas (e.g. highwalls) were also predicted to increase in area (22 ha or 1 per cent), as were lakes (122 ha or 4 per cent).

CRC noted that many impacts on vegetation will be major in the local area, but felt that mitigation (i.e. reclamation) would, in most cases, reduce the overall impacts to an insignificant level. In final argument CRC noted that, although concerns regarding mosses and lichens had been raised at the hearing, these had not been identified as VECs in the EIA process, and subsequently had received less attention. In any event, CRC stated that it believed the impacts on these species would also be insignificant. The two exceptions were the loss of old growth Engelmann spruce-subalpine fir communities and the

potential loss of members of provincially and nationally significant plant populations. CRC observed that it expected that at least 5 to 20 years, 20 to 40 years, and 40 to 60 years of plant growth will be required in grassland, shrubland, and forest communities, respectively, to fully mitigate the impact of vegetation losses resulting from mining. After about 80 to 100 years, impacts considered to be amenable to mitigation would be expected to be insignificant.

With regard to the transportation and utilities corridor, CRC believed that restoration of the railway, upgrading of the highway access, and extension of the transmission line would disturb a total of 126 ha, including 85 ha of native vegetation. The only potentially significant impacts were risks to two provincially significant plant species (*Ranunculus occidentalis*, *Schistidium tenerum*), of which the latter is critically imperiled.

CRC stated that, in its view, the loss of vegetation in itself was not necessarily a major ecological problem because of the widespread distribution in the region of most of the plant species and plant communities. Furthermore, natural processes tended to promote the revegetation of disturbed areas through natural succession, although CRC did note that significant amounts of time may be required to complete the process. However, CRC did also note that there are indirect impacts that can occur as a result of the destruction of natural vegetation cover. These include: the loss of wildlife habitat; creation of barriers to wildlife movement; increased surface runoff, erosion, and a corresponding degradation of fluvial environments and fish habitat; and aesthetic concerns.

CRC described a number of steps it proposed to take to help mitigate the adverse effects of the mine. These included:

- (1) taking an ecological and landscape perspective to revegetation;
- (2) integrating the post-mining landscape into the surrounding natural conditions;
- (3) creating a revegetation plan that focuses on the development of plant communities;
- (4) avoiding disturbing vegetation that is considered ecologically significant where possible;
- (5) assessing further significant plant species occurrence and abundance within the disturbance zone on Prospect Mountain prior to development in this area;
- (6) transplanting of selected significant species where avoidance is not possible;
- (7) minimizing the amount of vegetation that will be disturbed;
- (8) salvaging organic debris and the biologically active portion of the mineral soil for use in reclamation;
- (9) creating irregular surfaces for reclamation planting;

- (10) integrating the proposed water-filled mine pits into the surrounding landscape;
- (11) protecting the reclaimed post-mining landscape from human disturbance until the vegetation has become re-established through appropriate land management; and
- (12) conducting reclamation planning and mine rehabilitation using a multi-disciplinary team.

In order to mitigate impacts along the corridor, CRC planned to implement the following mitigation measures:

- (1) Disturbance to vegetation would be minimized.
- (2) Sites scheduled for development would be stripped of both woody debris and the biologically active portion of the soil (upper 10 to 15 cm) for use in revegetation wherever possible.
- (3) Disturbed areas (roadsides, major cuts and fills, and borrow areas) would be reclaimed with plants that would eventually produce vegetation similar to existing native communities.
- (4) Culverts would be installed in wetland drainage areas.
- (5) Abandoned portions of the existing railway and roadway would be revegetated, thereby restoring previously disturbed habitat.
- (6) Transplantation of *Ranunculus occidentalis* would be carried out if encountered and disturbance is unavoidable.
- (7) The road right of way would not be cleared on the west side of the upgraded Grave Flats Road in the vicinity of the *Schistidium tenerum* habitat, and one transmission pole will be relocated.
- (8) The transmission line right of way would not be cleared of native vegetation, except when forest cover occurs or plants exceed 3.5 m in height.
- (9) Chemical and mechanical methods would not be used to control vegetation regrowth on cleared portions of the transmission line right of way unless it directly interferes with power lines.

With regard to residual and cumulative effects, CRC predicted that effects related to the loss of native vegetation, with the exception of ecologically significant communities or species, would be insignificant. With regard to the Englemann spruce–subalpine fir community, CRC noted that the main area threatened by development was a 29 ha area in the Powerhouse Creek vicinity where a rock dump is proposed. CRC advised the Panel that it intended to review the status of this community with AEP since CRC was not at present convinced of its ecological value. Based on the results of this re-evaluation, one option would be to relocate the proposed rock dump.

As for the white dryad-kobresia community, CRC noted that this 31 ha alpine community was located in upper Prospect Creek and, as a result, would not be mined for approximately 10 years, allowing for further planning. Further, this community was, in its view, part of a larger 635 ha community and so its loss would not be significant. CRC proposed to compensate, should the loss of this vegetative community prove to be unavoidable, by assisting in reclamation of nearby alpine areas.

In its application, CRC described its current conceptual plan for reclamation. CRC noted that the fundamental principle that underlies the definition of reclamation success, as set out by AEP, is that land capability remain equivalent to the original (pre-construction) or representative (adjacent) site conditions, with due consideration for construction norms at the time of development. CRC also noted that for its Luscar mine, acceptable post-mining land uses are contained in its approvals from AEP. In that case, acceptable reclamation includes the creation of ungulate wildlife habitat with some recreational and forestry uses where climate permits.

CRC noted that reclamation planning had evolved significantly over the years at its Luscar mine. The original goal at the outset of mining in the mid-1970s was confirming what, if anything, would grow. This evolved, in part because of very high maintenance costs, to attempts to develop self-sustaining cover vegetation, with native species, particularly grasses, preferred, again in part to reduce maintenance costs. More recently, reclamation had focused on the process of plant succession from a community of revegetation species (native or introduced) to indigenous native plant communities. CRC noted that at the Luscar mine a productive, self-sustaining plant cover capable of supporting a large wildlife population has been established. However, plant succession to native vegetation, particularly vascular plants, is occurring slowly. The low invasion rate was felt to be a function of the revegetation strategy used (i.e. forage production rather than establishing native plants); the distance to the forest edge which is a source of native species; and low opportunities for native species to become established in areas with a high cover of introduced species.

CRC stated that its reclamation program would be designed to meet several goals, including establishing wildlife habitat, particularly for elk (e.g. grasses, legumes as food, woody plants as food and cover); enhancement of recreation (e.g. wildlife viewing, aesthetics, hiking opportunities); reforestation; and maximization of diversity through creation of a diverse large and small scale rolling topography and the use of native species with a broad genetic base. However, CRC emphasized in both its application and at the hearing that watershed protection, through the establishment of vegetation that will control erosion and rebuild soil, was its top priority.

To meet the goal of erosion control, CRC proposed, with few exceptions, to reclaim all slopes initially with a grass/legume mix to achieve the needed ground cover (80 per cent). This process is assisted by creating a rough micro-topography (i.e. mounds and hollows of 5–60 cm depth in the topsoil). Hand and helicopter broadcasting of seed, rather than a crawler tracker as is currently used at the Luscar mine, may be used in order to preserve the micro-topographic features. This reseeding approach may also increase the risk of localized areas of bare ground, but CRC did not expect that this would increase the risk of erosion. Transplanting of commercial forest species and shrubs and the direct placement of topsoil and the associated seed bank were also proposed, while further work was felt

necessary to determine if sod transplants would be feasible. The latter was felt to be particularly useful in providing rapid runoff control, watershed protection, rescue of significant plant species, and lakeshore restoration.

The current Luscar mine seed mixture, since it has proven effective under local climatic conditions, was proposed by CRC as a starting point for reclamation at the Cheviot mine. However, further refinements would need to be carried out to remove more aggressive non-native species and replace these with new seed sources. CRC noted its use of native seeds is constrained by both seed availability and by competing revegetation goals such as erosion control. CRC described the results of seed trials at Mountain Park which it believed showed promise. CRC also noted that it had success regenerating willow using fresh topsoil from areas previously containing willow with no reseeded. This method was felt to provide the best opportunity to re-establish woody species. CRC advised the Panel that it estimated high levels of native plant re-establishment, including woody species, within 15–20 years on reclaimed lands.

CRC observed that impacts to the timber resources in the vicinity of the mine development area would be limited to those areas directly disturbed by the mine itself, the plant site, and the transportation and utilities corridor.

Commercial forestry is presently limited to the south-east corner of the mine permit area, which is part of the Weldwood Forestry Management Agreement (FMA). Weldwood has scheduled timber harvest for the area for the year 2020. The forested areas outside of the FMA is part of Forestry Management Unit (FMU) E05, and although considered open to commercial forestry, is unallocated at present.

CRC stated that within the total area of Weldwood's FMA, the overall impact of the disturbance is relatively minor. The amount of timber affected represents 0.7 per cent of the annual allowable cut for one year. CRC anticipated that this loss in volume could be offset by the timber volume originating from the stands harvested by the mine development process. In its application, CRC committed to coordinate timber harvest operations with the FMA holder, and noted it would be revegetating specific areas to commercial forests.

In areas outside the FMA but within the project area, the expected disturbance to commercial forests is about 921 ha. This loss of merchantable timber, particularly given CRC's reclamation programs, was not considered to be significant.

CRC noted that post-mining topography will result in some permanent land base features which will affect future timber operations. For example, highwalls will affect accessibility of stands, recreational lakes may require buffers, and access will be improved. The extent of this type of impact was also expected to be minor and could be mitigated with careful reclamation planning. The disturbance associated with the McLeod River transportation and utilities corridor would, on the other hand, be long term. However, the extent of the impact on forest resources would, in CRC's view, be minimal.

In its application, CRC addressed possible risks to the ecological integrity of the Cardinal Divide Natural Area which could result from the Cheviot Coal Project. Because its native plant communities are a key feature of the Cardinal Divide, CRC noted that the introduction of alien species could have a negative effect. At present, there are only two alien species (common dandelion, red clover) found in the alpine area of the Cardinal Divide, while three clover species have been found in the Prospect Creek alpine areas, possibly resulting from previous reclamation work.

CRC observed that two of the prerequisites for alien plant invasions; that is, heavy ground disturbance, in this case trails created by cars, horses, and hikers, and a nearby source of seed or propagules, have been present at the Cardinal Divide for possibly 20 years. Despite this very little invasion has occurred. CRC believed this was primarily due to the extreme climatic conditions on the Cardinal Divide, which allows only the hardiest native species to survive. Two species, red clover and fodder vetch, which are currently found in the Mountain Park area, were felt to be possible sources of invaders into the Cardinal Divide. The former has been spread extensively by pastured horses and the range of the latter also appears to be increasing.

CRC did see some risk of invasion of the Cardinal Divide Natural Area by the licensed varieties and ecovars of native grass and legume species being considered for use in reclamation at the Cheviot mine. However, because the genetic selection process used in creating these varieties is usually directed at improving the agricultural production of the species, CRC felt it unlikely that these varieties would also have a genetic advantage in the climatically harsh, competitive environment already existing on the Cardinal Divide. Furthermore, genetic segregation would cause the new varieties to return to their original genetic make-up within a few generations.

CRC also believed that some risk of cross-pollination with introduced species and therefore changes in the genetic make-up of the species in the Cardinal Divide exists. This was in part due to the fact that the area to be revegetated at the Cheviot mine (3000 ha) was quite large in relation to the Cardinal Divide (6000 ha). Because distances between the two sites would be as small as 300 m in the Prospect Creek area, this risk appeared to be quite possible. The result could be increased inbreeding and the resulting loss of genetic diversity and inbreeding depression.

In order to mitigate these possible impacts on the Cardinal Divide Natural Area, CRC proposed to:

- (1) avoid creating any additional access for motorized vehicles into the Cardinal Divide Natural Area and therefore sources of ground disturbance and seed spreading;
- (2) maintain a 1000 m buffer zone between revegetated areas and alpine areas of Cardinal Divide;
- (3) avoid the introduction of new alien species;
- (4) consult with government land managers and the stewards of the Cardinal Divide before introducing any new species and introduce such species cautiously; and

- (5) avoid or limit the use of cross-pollinated, native alpine species in revegetation mixes.

4.1.2 Views of the Interveners

The AWA Coalition raised a number of concerns regarding the impacts of the Cheviot Coal Project on the existing vegetation resources and the efficiency of the proposed revegetation program. In general, they did not believe CRC had adequately addressed post-development vegetation in terms of regional ecosystem integrity, habitat diversity, or habitat quantity, as required by the EIA Terms of Reference. Among other issues, they noted that CRC had to depend on natural successional patterns over a century to return the area to a stable ecological condition and that, as a result of mining, significant changes in the post-reclamation landscape and the proportions of various community types would occur.

None of these factors, in its view, allowed CRC to comply with AEP's objective of returning the Cheviot mine site to equivalent land capability. In particular, the AWA Coalition felt that the overall reclamation plan had undue emphasis on returning the land to very specific land uses (e.g. forestry, elk habitat), rather than to equivalent capacity for all ecosystem residents. The AWA Coalition took particular exception to the contention by CRC that reclamation of the Cheviot Coal Project would not be unlike natural succession patterns following a large fire, since, they noted, fire processes normally leave significant amounts of vegetation biomass. Other specific concerns included the large increase (140 ha) of unvegetated areas and the replacement of late succession forests with grasses and forbes. The AWA Coalition also questioned the adequacy of CRC's surveys for rare plant species.

The AWA Coalition noted that, as a result of mine development, there would be a loss of a number of important plant communities. They felt that the loss of the entire 124 ha of potential old growth Englemann spruce community type should be of concern, and not just that proportion which is presently old growth, since without such successional forests there would not be additions to the old growth communities and so a significant risk of future loss in biodiversity. The AWA Coalition also believed that CRC had frequently understated the time frame for reclamation, particularly with regard to habitat structure.

The AWA Coalition also disagreed strongly with CRC's proposal for mitigation for the loss of the white dryad-kobresia community. They also believed that CRC was misinterpreting the intent of the Coal Conservation Act in stating that failing to mine that area would result in a failure to meet EUB requirements to maximize the recovery of coal resources.

The Alpine Club Coalition had a number of suggestions regarding CRC's proposals and particularly with regard to improving the protection of the Cardinal Divide Natural Area. They pointed out that as volunteer stewards of the Natural Area, they had been actively working to reclaim disturbed areas through revegetation with native seed, through the removal of fire pits, and the blocking of vehicle access, and did not wish to see this work lost through impacts from the Cheviot Coal Project.

In the view of the Alpine Club Coalition, a number of conditions on any approval of the Cheviot Coal Project, as well as associated follow-up programs, were warranted. Their suggested conditions and follow-up programs designed to address significant adverse effects on rare plant species and significant plant communities were that:

- (1) the white dryad-kobresia community be excluded from the mine development plan;
- (2) the dumping of waste rock or other mining activities in old growth Engelmann spruce/subalpine fir communities not be permitted;
- (3) additional studies to determine the impacts on rare plant species (including large-scale mapping) and an associated monitoring program be required; and
- (4) an assessment of the impacts on mosses and any required mitigation be carried out.

The suggested conditions and follow-up programs by the Alpine Club Coalition that addressed the reclamation of disturbed vegetation were that:

- (1) reclamation should favour the use of native species, include native non-aggressive, non-persistent legumes; native grass cultivars; native shrubs; and early seral native species;
- (2) CRC place a priority on finding local seed sources with collection beginning prior to disturbance;
- (3) plants used to reclaim wetlands only be from areas to be disturbed by the project or from container-grown stock;
- (4) CRC thoroughly evaluate the ecology and supply potential for native plants; and
- (5) a precise program to measure reclamation success, including an expert advisory committee to advise CRC, be established.

In order to address potential impacts to the Cardinal Divide Natural Area, the Alpine Club Coalition proposed that:

- (1) a 1 km (1000 m) undisturbed buffer zone between the mine and Cardinal Divide be established;
- (2) lands in Sections 27 and 30-45-23 W5M and in Sections 35 and 36-45-24 W5M should be added to the Cardinal Divide Natural Area in order to better protect their rare plant communities;

- (3) the Coal Branch Access Management Plan be revised to take into account the Cheviot Coal Project and steps taken to implement the proposed measures. In particular, Forest Land Use Zones needed to be established; and
- (4) the use of rock dumps external to the pits should be minimized and soil salvage from undisturbed areas should be prevented.

At the hearing, the Alpine Club Coalition noted that while the upper Prospect Creek area contained less than 4 per cent of the coal available to be mined by CRC, it represented a very large proportion of the significant plant communities likely to be affected, and therefore mining in this area was not in the public interest.

AEP noted at the hearing that it had regulatory authority over CRC's proposed reclamation plans, including setting priorities for various end uses of the reclaimed lands (e.g. wildlife, forestry, etc). AEP advised the Panel that CRC's conceptual reclamation plan met its requirements, with the exception of selected aspects of lake reclamation (see Section 3.3) and conservation and replacement of topsoil (see Section 4.3). With regard to vegetative impacts, AEP's position was that CRC's reclamation plan must:

- (1) create vegetative communities capable of evolving naturally to tree cover or open forest scrub;
- (2) use direct placement of topsoil to preserve native seed and enhance native plant recolonization;
- (3) return the area to approximately similar cover patterns, with particular emphasis on watershed protection; and
- (4) minimize impacts on ecologically significant vegetation types where possible.

AEP stated that it believed these issues could be addressed during its approval process.

4.1.3 Views of the Panel

In considering the potential impacts of the Cheviot Coal Project on regional vegetative resources, the Panel believes that the issues it must consider are:

- (1) whether there are any aspects of the area's vegetative resources, including forests, which are so sensitive that they would preclude development;
- (2) whether CRC's proposed conceptual reclamation programs are adequate to ensure a reasonable probability of restoring land use capacity, protecting area watersheds, re-establishing biodiversity, and matching natural vegetation succession patterns; and
- (3) whether there are specific plant communities within the project area that require added protection.

With regard to the first question, the Panel is prepared to accept the evidence from the various parties that, within the Mountain Park/Cardinal Divide region as a whole, there exists an extremely complex and diverse set of vegetative communities, with a number of rare and/or unique species. Furthermore, given the extensive study done by various parties to the hearing, the Panel is also prepared to accept that, while regional plant surveys may not have been carried out in a level of detail satisfactory to everyone, there is sufficient information to determine to an acceptable level the current status of the plant communities within the Cheviot Coal Project area.

The Panel notes that surface mining will, at least in the near term, result in the complete removal of much of the vegetative cover within the areas directly disturbed by either pit development or waste rock dumping. Furthermore, while the Panel believes that CRC's proposal to avoid or relocate rare plant species, while worthwhile, is likely to be marginally successful at best. However, the Panel notes that plant species are capable of re-colonizing heavily disturbed areas through a series of successional steps made up of various community types. In this case, the Panel accepts that, while the final site topography will be changed, most of the general terrain, soils, and certainly the climatic features, will remain. Therefore, it should be possible for CRC to design a reclamation program capable of returning the site to much of its past vegetative diversity.

In coming to the above conclusion, the Panel is prepared to accept that it is likely that the proportions of the various plant communities on the reclaimed Cheviot mine site will certainly, in the short term and possibly over a much longer term, be changed. The Panel does not, however, see such changes as inherently unacceptable. For example, while the loss of certain plant communities will disadvantage some wildlife species, others will benefit. Therefore, the Panel believes that, on a community basis, the development of the Cheviot Coal Project should not result in an unacceptable loss of vegetative resources or, as a result, an unacceptable risk of loss of biodiversity in other terrestrial species.

With regard to the proposed reclamation program, the Panel believes that CRC, given its experience at the Luscar mine and the information gained there, will be able to create a reclaimed environment which, while it will not initially contain late successional species, will be capable of returning eventually to such stages. The Panel notes that AEP, in its evidence, also accepts that successful reclamation of the site is possible and further, re-emphasized its intention to ensure that the ultimate reclamation plan was designed to allow natural plant successional patterns to occur. The Panel is also prepared to accept that for the mine site to ultimately return to a natural vegetative structure will take several decades at least. While such a time frame may be frustrating to some, the Panel notes that this is not significantly different from the time frames associated with either natural successional processes (e.g. following a severe fire) or other man-induced succession (e.g. following clear cutting). The Panel does believe CRC can and should be required to re-establish later successional shrub and tree communities through a proactive planting program rather than through natural succession.

Key to recreating an ecosystem capable of returning to natural successional patterns will be ensuring that the basic requirements for plant growth are in place. To that end, the Panel would strongly recommend that CRC ensure that topsoil is, to the degree possible, directly placed onto disturbed areas; that roughness features are built into reclaimed landscapes as is currently proposed; that native

vegetation is used wherever practical; and that undisturbed areas of vegetation be maintained wherever possible throughout the area to act as colonization sources. With regard to the use of native species, the Panel also notes that neither CRC nor the Alpine Club Coalition view the use of native species as a panacea and would strongly agree that caution and common sense will need to prevail in the selection of appropriate native species in order to ensure conflicting reclamation goals are met. The Panel also agrees with the suggestion that CRC seriously consider establishing an advisory committee to comment on its proposed reclamation programs as well as a system designed to accurately measure its reclamation success.

With regard to forestry, the Panel notes that CRC has predicted that the loss of forestry resources due to mine development, in a regional context, will be minor and can be further alleviated by working with the region's forestry companies. The Panel accepts that contention and notes it was not challenged at the hearing. With regard to longer-term impacts on forestry, AEP, in its testimony, advised the Panel that its first objective regarding reclamation will be protection of the watershed, with longer-term reclamation designed to approximate existing vegetative cover patterns. Presumably this may, to some degree, reduce long-term forestry potential in the area. The Panel, however, believes that in this case, AEP's emphasis on returning features such as wildlife habitat, even if it occurs at a cost to the ultimate amount of merchantable timber that will be available for future harvest, is an appropriate trade-off, and would strongly encourage both AEP and CRC to continue to follow this path. This small amount of lost forest capability would in no way compromise the province's ability to supply the needs of future generations with this renewable resource.

With regard to whether specific plant communities within the area potentially affected by the Cheviot Coal Project require further protection, the Panel believes that there are three areas of particular concern. The first is the presence of old growth and/or late successional Englemann spruce/subalpine fir communities. The Panel finds as reasonable the argument made by the AWA Coalition that even if such communities are not currently old growth, it is necessary to maintain a continuum of forest ages in order to also maintain final climax forests as part of the overall biological community.

The Panel notes that, in particular, a relatively small area of the Englemann spruce/subalpine fir community that exists in the area of Powerhouse Creek was of concern to interveners. The Panel accepts that CRC, in creating the mine plan for this area, had attempted to deal with a number of conflicting issues, and that further protection of the vegetative resources of this area will have impacts on other resources, including coal recovery and the former Town of Mountain Park. The Panel is unable, based on the available evidence, to determine if CRC's current proposal is still the best option. However, the Panel will require, should the Cheviot Coal Project be approved, that CRC, as its mine planning continues to evolve, re-examine its options with regard to Powerhouse Creek in order to reconfirm that the disturbance of this plant community cannot be avoided without unacceptable impacts on other resources. CRC should also be encouraged to examine other areas of the mine containing Englemann spruce/subalpine fir communities in order to determine if impacts on these can also be further reduced.

With respect to the need to exclude upper Prospect Creek from further mining, the Panel agrees that this area contains a disproportionately high percentage of the rare and/or disjunct species within the mine site. The Panel does not expect that CRC's proposals (e.g. removal and transplanting of rare species) likely to be either successful or perhaps even ecologically sound practice. Nor does the Panel anticipate, given the natural harshness of the alpine climate and short growing season, that natural succession patterns can be re-established within the area within decades or perhaps even centuries. As a result, the Panel believes impacts within this area cannot be mitigated and will be significant.

The third area of particular concern to the Panel is the protection of the Cardinal Divide Natural Area. The Panel notes that this area is in fact a valuable resource to CRC, since it provides a refugia for a number of native plant species which will likely eventually become important elements of a truly successful reclamation program. The Panel does believe that the Cheviot Coal Project can be carried out in a manner which also ensures that the ecological integrity of the Cardinal Divide is preserved, but does believe that care will need to be taken to ensure this occurs. To that end, the Panel will expect CRC to:

- (1) maintain a minimum 1000 m buffer between mine development and the Natural Area;
- (2) ensure that its reclamation programs do not have a negative impact on existing plant communities in the Cardinal Divide Natural Area;
- (3) ensure that mine development does not create new access points, particularly for vehicular traffic, into the Natural Area; and
- (4) work closely with the Alpine Club Coalition to continue to map and identify rare plant species, and in the design of its revegetation programs, particularly the selection of and sources for potential reclamation species.

With regard to follow-up and monitoring programs, the Panel notes that AEP has direct regulatory responsibility for reclamation programs at the Cheviot Coal Project. Other than for the suggestions already contained in this report, the Panel believes the experts in AEP are best placed to design any additional needed programs.

4.2 Soils and Terrain

4.2.1 Views of the Applicant

Study Area

CRC stated that its studies of soils and terrain for the Cheviot Coal Project were carried out at several levels of detail. A regional assessment scale (1:50 000) was used to map general features over a 400 km² area extending from Highway 40 in the north, to the boundary with Jasper National Park to the west, to the Cardinal River valley in the south, and to the confluence of Red Cap Creek and the

Cardinal River to the east. More detailed mapping of the mine site and of potential corridors along both the McLeod River and MacKenzie Creek was also carried out.

Existing Conditions

CRC stated that soil landscapes (i.e. the spatial distribution of soil types) within the study area varied considerably. Within the surface mine itself, forest soils dominated the lower elevation subalpine ecoregions and extended into some of the higher elevation areas as well. These soils generally had an upper duff layer; acidic, nutrient deficient, and carbon poor upper soils; and acidic lower soils. In subalpine areas with shrub cover, soils were covered with sod rather than duff, with extensive organic carbon build up in the A horizon. The open forest covered areas of the subalpine generally had either eutric or dystric brunisol soil profiles.

Within the valleys, patterns of wet mineral soils and peat soils, often covered with accumulations of wind deposited sediments, were common. CRC also noted that soil landscapes were strongly influenced by slope aspect. South and south–west facing soils on steep slopes were similar to prairie soils, while soils on north–east exposures were typically frozen until August or even permanently frozen. Soils in the alpine areas were particularly complex.

With regard to the coal processing plant, CRC described the soils there as a mosaic of dry, moist, and wet shrub/grassland and forest soils. Small patches were frozen for much of the year. Along the transportation and utilities corridor, the terrain is dominated by the river flood plain and steep valley walls. Soils are primarily regosols and brunisols, quite thin, and have high quantities of gravel and rock. Almost 36 per cent of lands in this area (39 ha) were classified as previously disturbed by various human activities.

In addition to soil conditions, CRC inventoried terrain features perceived as important due to their rarity, diversity, educational value, or scenic quality. Special terrain features in the region were felt to include the Cadomin Caves, cirque moraines, rock glaciers, landslides and massive slope failures, a talus chute, a glacially scoured valley, the McLeod River canyon, scenic viewpoints, several unique soil landscapes, and possible glacial refugia.

A total of eight scenic viewpoints (i.e. areas of unobstructed view, usually in several directions) were identified. CRC noted that all are accessed by trails and are popular destinations. Unique soils in the area included solifluction soils (i.e. downslope soil movement of saturated soils over a frozen subsurface layer), which were found on a north–west facing slope of Cardinal Divide, permafrost soils (i.e. soils frozen through the summer) which were found in several localized areas, and fragipan soils (i.e. easily fractured soils with a hard layer in the subsoil which prevents downward migration of water) which have not been reported elsewhere in Alberta and were located in two relatively extensive areas to the north and east of the mine permit boundary.

With regard to whether the Cheviot area contained glacial refugia, CRC stated that, based on its considerable field research, it was clear that much, if not all, of the mine permit area had been glaciated

during the last ice age. CRC noted that several small refugia could exist within the region but likely outside the mine permit area. However, even if such refugia did exist, CRC was of the view that the landscape had sufficiently changed in response to natural successional patterns that the ecological values which make such areas important likely no longer existed

Expected Effects

CRC described a number of impacts from mining, plant site development, and road/rail/power line construction on soils and terrain features. CRC identified eight VECs that it felt could be at risk from the development of the Cheviot Coal Project. These were: soil resources; land capability and productivity; scenic viewpoint trails; permafrost, solifluction, and fragipan soils; the McLeod River canyon; and non-glaciated lands.

During mining, CRC noted that there would be a complete disruption of the natural soil landscapes (approximately 2800 ha). Associated with that would be the loss of non-salvageable soils, accelerated soil erosion, and the loss of soil diversity, as well as a possible positive increase in soil quality due to mixing. CRC observed that poorly conducted mining and associated soil salvage operations could result in either the delay in returning to or permanently reduced land capability and future production. Similar impact on soils within the proposed plant site (approximately 108 ha) and the McLeod River valley (approximately 116 ha) were also predicted.

Impacts on unique terrain features were also considered to be possible. These included the loss of scenic viewpoints and access trails; and the destruction of permafrost, solifluction, and fragipan soils at both the mine site and the coal processing plant. Within the transportation and utilities corridor, disturbance of the McLeod River canyon was also noted as a potential risk to a unique terrain feature.

With regard to mitigation of these impacts on soils, CRC stated that a successful reclamation program was the primary approach available to deal with impacts on terrain features, soils, watersheds, and land productivity. CRC provided a summary of its proposed reclamation program for the Cheviot Coal Project. Prior to construction, all merchantable timber will be removed and brush cleared where feasible, and non-salvageable woody debris will be incorporated in to salvaged topsoil or windrowed. CRC stated that topsoil salvage will be carried out wherever feasible. If possible, salvaged topsoil will be immediately replaced on to reclaimed areas and, if not, stockpiled within the mine disturbance limits. Subsoil (regolith) will also be salvaged in volumes necessary for reclamation.

CRC noted that it will recontour the areas disturbed by mining. This will include reducing all dump slopes to an angle less than 27° and backfilling of pits, highwalls, and footwalls where possible. Through "designed dumping" in the final stages, a complex of concave and convex surfaces will also be created. CRC proposed, as is currently the case at the Luscar mine, to cover all resloped lands with at least 10 cm of regolith, unless overburden characteristics are such that this is not required. CRC stated that 70 per cent of the area disturbed by mining will receive an additional 30 cm of topsoil. Finally, revegetation will be initiated, first using grasses and legumes for watershed protection and soil conditioning. Tree and shrub planting will be undertaken two to four years after initial revegetation.

Once reclamation in an area was successfully underway, CRC noted that it was prepared to re-establish viewpoints and access trails, presumably under the Coal Branch Access Management Plan, and anticipated limited access within 5 to 15 years to reclaimed years. Impacts on unique soils could, CRC stated, be minimized by avoidance (e.g. solifluction soils and fragipan soils) or routine handling procedures (e.g. permafrost soils). CRC predicted a net positive impact on terrain features within the McLeod River corridor from the Cheviot Coal Project, due to the reclamation of previously disturbed areas. No impacts on glacial refugia were predicted.

CRC noted that the region contained other mine developments and, as a result, there would be a regional cumulative impact on soils and terrain. CRC stated that, given the extent of these landforms in Alberta, no significant cumulative effect was predicted.

4.2.2 Views of the Interveners

The AWA noted several concerns with CRC's prediction of impacts on soils and terrain features. In their view, CRC had not adequately addressed the impact of mine development and associated landscape changes on regional aesthetics for either Jasper National Park or the Cardinal Divide Natural Area. In their view, the Cheviot mine would have a serious impact on the wilderness values of both areas. They noted that the proposed open pit mine, 22 km in length, would directly and indirectly affect many of the features which gave the areas their high scenic value.

The AWA Coalition noted that topsoil replacement is only intended for 70 per cent of the reclaimed area. This, they stated, was inconsistent with government reclamation policy of re-establishing equivalent land capability. The AWA Coalition believed that provision should have been made for 100 per cent replacement of topsoil, particularly since this would promote the growth of shrubs and trees. They also believed that the direct placement of topsoil onto reclaimed areas should have been given priority in CRC's engineering of its conceptual mine plan.

Furthermore, the AWA Coalition argued that the creation of a "man-made" landscape (i.e. "changes from a ridged and rolling topography to a terraced landscape of highwall and footwall cliffs and headwater stream valleys filled with rock rubble") significantly different from the present natural landscape was also inconsistent with reclamation policy. At the hearing, both the AWA Coalition and the WCWC argued that much of the area was non-glaciated and so mine development would result in the loss of particularly unique soil and terrain conditions and the associated flora and fauna.

The AWA Coalition stated that CRC's reclamation plan had a number of deficiencies, including failure to address:

- C the moisture deficit associated with alpine and subalpine environments;
- C snow deposition patterns;
- C reclamation of vegetation to pre-disturbance structural levels (i.e. forest, shrubland, etc); and

C monitoring programs.

They also stated that CRC had not provided sufficient detail to be able to assess its commitment to reclamation, nor had the company truly committed to any specific mitigation programs.

AEP expressed a significant concern with CRC's proposal to reclaim disturbed areas without topsoil. AEP stated that CRC's proposed reclamation plan would, in its view, result in the wasting of at least 2 000 000 m³ of available topsoil. AEP did not believe that CRC had provided sufficient evidence to justify this approach. AEP stated that while site specific waivers of its requirements to conserve topsoil would be considered, any acceptable reclamation plan for the Cheviot Coal Project would be based on the conservation of salvageable topsoil.

CEPA echoed the concerns raised by AEP and stated that, in its view, all recoverable topsoil must be salvaged and a 30 cm cover provided to areas of grassland (580 ha) now being proposed to only be covered by regolith.

4.2.3 Views of the Panel

The Panel has examined the evidence provided by CRC and believes that the company has adequately described existing soil conditions and terrain features.

With regard to impacts on soils and terrain, the Panel accepts that both existing soil landscapes and terrain features will be heavily disrupted by all aspects of the Cheviot Coal Project development. Furthermore, there appears to be no practical method available for CRC to return either back to their original configurations. If the mine is approved, existing soils will be mixed and redistributed, and virtually all existing terrain features will be changed, some extensively. Therefore, the Panel believes that impacts to soil landscapes and terrain features in general will be significant.

Given CRC's experience at the Luscar mine, the Panel accepts that the re-establishment of the productive capacity of reclaimed soils at Cheviot, with careful management, can be achieved. Provided that AEP's concerns regarding soil salvage are addressed in the final reclamation plan, the Panel also believes that impacts to soil quality and productive capability will not be significant. The Panel also believes that CRC can create microtopographic features able to make the reclaimed landscape appear more "natural", as well as enhance the survival of woody plant species. The Panel is also prepared to accept that impacts to the area's unique soil features can in general be avoided since, with the exception of permafrost areas, most appear to be located beyond the likely mine disturbance boundaries.

The Panel is not convinced the Cheviot Coal Project will significantly affect the wilderness experience within Jasper National Park. However, the changes to terrain features will have an impact on aesthetics and therefore very likely on the wilderness experience, perhaps permanently, for at least some visitors to the Cardinal Divide Natural Area.

The Panel accepts CRC's undertakings to re-establish viewpoints as reasonable. The Panel does note that CRC's success in this area does appear to require that at least to some degree that the Coal Branch Access Management Plan be implemented, and would urge AEP to take any steps necessary. The Panel is also prepared to accept CRC's view that within the proposed mine permit area the risk of disturbing glacial refugia is not significant. The Panel also accepts that CRC's activities within the McLeod River valley are unlikely to result in a significant adverse effect on soils and terrain.

The Panel believes that ongoing monitoring of the success of CRC's reclamation programs is clearly necessary. However, as noted in Section 4.1.3, the Panel also believes that these programs should be designed by AEP as part of its approval function.

4.3 Carnivores

4.3.1 Views of the Applicant

CRC noted that carnivores, especially the larger-bodied ones, can be considered both as indicator and as umbrella species for impact assessment purposes. An indicator species in this context is a species that is particularly sensitive to the effects of development and human activities. Measurements of the effects of development on such species provides a measure of the success of impact mitigation programs. For umbrella species, the presence of declines in population and habitat for such species are taken to indicate not only stresses on the species itself, but also on other species and on the ecosystem to which they belong. Protection of the umbrella species, on the other hand, will generally result in the preservation of adequate ecological conditions for other species. The primary focus of the impact assessment was on two carnivores, grizzly bears and wolves, that are considered to be both indicator and umbrella species.

Study Area

Reflecting the large, but ecologically specific spatial needs of the grizzly bears and wolves, two different but largely overlapping regional study areas were defined. The study areas centred on the Cheviot Coal Project area, but included 878 km² of nearby Jasper National Park. Each study area covered about 3000 km². The study's focal species have large home range sizes, and the large study area size was considered necessary by CRC in order to adequately assess the impacts of development on these species.

Existing Conditions

CRC noted three conditions that need to be present in order to have complete ecological integrity in a region. These are: (1) all indigenous species are present; (2) all species' numbers approximate historical levels; and (3) the ecosystem is still shaped by natural processes such as wildfire. With regard to the first condition, CRC noted that 16 species of mammalian carnivores are present or are assumed to be present in and nearby the proposed Cheviot Coal Project. CRC indicated that none of the carnivore species are known to have become extirpated; however, two of the species, grizzly bear and

wolverine, are listed as vulnerable by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

With regard to the second condition, six species (grizzly bear, bobcat, cougar, lynx, river otter, and wolverine) are considered, at a provincial level, to be at risk, and CRC observed that it was likely that several mammalian carnivore populations in the region had been depleted below historical levels. Four species (coyotes, marten, red fox, and wolf) all appeared, based on trapping records, to have actually increased in numbers over the last two decades. Coyotes and red foxes were noted by CRC to adapt well to human disturbance, while wolves appeared to have increased from a population low induced by predator control programs in the 1950s, despite a significant decrease in regional habitat effectiveness for wolves during the same period.

CRC noted that the third condition of ecological integrity (i.e. the action of natural processes) was also not met in the region. Wildfire, CRC observed, is suppressed and numerous other activities, including forestry, oil and gas development, and motorized recreation had served to fragment habitat and produced a wide range of disturbances to regional carnivore populations. CRC suggested that this could result in significant declines in populations of species such as grizzly bears, wolverines, and fishers which do not do well in fragmented habitat.

In order to describe existing conditions for carnivores, as well as to predict the potential effects of the development of the Cheviot Coal Project, CRC undertook to develop Cumulative Effects Models (CEMs) for the two selected indicator species. For grizzly bears, a model originally developed in Yellowstone Park was selected and modified using local parameters.

The main output product for the grizzly bear CEM was a description of the current status of "habitat quality" and "habitat effectiveness" for the region and for the Cheviot Coal Project area. CRC observed that habitat quality is a measure of the inherent suitability of an area for a species, while habitat effectiveness is a measure of an area's potential usefulness to a species, after factoring in the negative influences of human development and activities. Therefore, it is quite possible for an area to have high habitat quality but still support very few animals due to low habitat effectiveness. The CEM was also used to help predict the effects that implementation of the Cheviot Coal Project would have on grizzly bear habitat quality and habitat effectiveness, both locally and regionally.

For the grizzly bear CEM, the regional study area was divided by CRC into three Bear Management Units (BMU). Each of the three BMUs were further subdivided into several Bear Management Sub-Units (BMSU). The average size of each BMSU (338 km²) was roughly equal to the size of a female grizzly bear's home range in this part of the Rocky Mountains. This scheme of subdivision allowed existing habitat and the effects of development to be assessed on a biologically meaningful scale.

BMU 1, located entirely within Jasper National Park, showed the lowest quality habitat for grizzly bears in the entire study area due in part to a large proportion of mountainous terrain. Habitat effectiveness, however, was very high, averaging 95 per cent, due to few human developments or activities in this portion of the study area.

BMU 2 was located east of, and adjacent to, Jasper National Park and included the entire surface portion of the proposed Cheviot mine within BMSUs 2A and 2B. The inherent habitat quality in BMU 2 was moderate to high, depending upon the season. Current habitat effectiveness values for BMSUs 2A and 2B averaged 68 per cent. CRC stated that this value is slightly below the 70-80 per cent effectiveness threshold assumed to be needed for regular versus occasional use by grizzly bears.

BMU 3 is the north–east portion of the study area and generally east of the mine permit boundary. This unit includes the proposed transportation and utilities corridor for the Cheviot Coal Project, the existing Luscar mine, a concentration of timber harvesting activities, the Hamlets of Cadomin and Mercoal, and a relatively extensive network of high and low speed roads, as well as logging, seismic, and other exploration roads. Although habitat quality was higher in this area for grizzly bears than other portions of the study area, the habitat effectiveness for grizzly bears, due to the cumulative effects of extensive development, was so low (averaging 44 per cent), that only occasional use of this area by grizzly bears was predicted.

Because an existing CEM was not available for gray wolves, an original model was constructed, using available biological information on wolves, their prey (ungulates), and disturbance features from the grizzly bear CEM. The results of the wolf CEM showed many parallels to that of the grizzly bear CEM. The wolf CEM showed that human development and activities have adversely affected habitat effectiveness in the regional study area outside of Jasper National Park. Seventy-three percent of high quality wolf habitat has been degraded to medium or low quality. Wolf populations in the local area of the proposed Cheviot Coal Project are already stressed, largely because of decreased habitat effectiveness. Road densities already exceed or approach known tolerance levels for wolves. Consequently, CRC believed that the area proposed for the mine is currently of low attraction to, and therefore limited importance for, wolves.

Expected Effects

CRC analyzed potential impacts of the Cheviot Coal Project on mammals from a general perspective, using the CEM models for the two indicator species, grizzly bears and gray wolves. As well, more specific assessments of the effects of the project components on various species were carried out.

With regard to the three BMUs, CRC believed that with respect to BMU 1, which was located in Jasper National Park, that the Cheviot Coal Project would not effect either habitat quality or habitat effectiveness. For BMU 2, east of but adjacent to Jasper National Park, with the addition of disturbance due to the proposed Cheviot Project, habitat effectiveness values would drop to an average of 49 per cent, well below the assumed threshold values of 70–80 per cent. At that point, CRC predicted only occasional use of BMSUs 2A and 2B by grizzly bears. The proposed mine was therefore predicted to have an immediate, significant, adverse effect on the grizzly bears that currently include this specific area within their home ranges.

CRC noted that implementation of the Cheviot Coal Project in BMU 2 would also create significant potential for the interruption of grizzly bear movements. This potential interruption of movement would

occur primarily because of the shape, size and location of the mine footprint itself, and also because of the associated human activities (blasting, traffic, etc). Fragmentation of grizzly bear habitat and populations beyond the area actually directly disturbed by the surface mine would be the likely outcome. Mitigation of these impacts through changes to the mine plans was not considered to be feasible.

For BMU 3, located to the north–east of the Cheviot mine, CRC noted that this BMU would be directly affected by development of the road, railway, and powerline. CRC stated that while only a small portion of the habitat would be disturbed, and overall habitat effectiveness in BMU 3 would not be further degraded by the Cheviot Coal Project, the affected habitat was primarily valley bottom, which had very good inherent habitat quality. Also, the upgraded access road could further interrupt grizzly bear movement and so further fragment grizzly bear habitat and populations.

With regard to wolves, CRC noted that the surface mine would degrade 116 ha of high quality wolf habitat to medium quality and 2023 ha of medium quality habitat to low quality, making most of the project area unavailable to wolves. Mitigation was expected to be difficult, and would consist primarily of dispersing human activity spatially and temporally, as much as possible, across the project area.

A number of other project specific impacts were also considered by CRC. One source of impacts was mortalities resulting from collisions with vehicles, particularly in the McLeod River valley, which is very narrow and a natural travel corridor for wildlife. The road (proposed speed limit of 90 km/hr) was seen as a major risk of mortality while the rail line (30 km/hr) was not, provided the speed limit was observed. The use of a high bridge at Whitehorse Creek was predicted to reduce these impacts somewhat, and other possible mitigation suggested included the use of speed limits at areas where crossing of the road by wildlife was common, and fencing.

Increased hunting, trapping, and poaching due to increased access was also seen by CRC as a source of direct mortality for carnivores. Mitigation could be achieved by restricting access in general, the means of access (e.g. motorized vehicles) in particular, or by changing hunting and trapping regulations. The need to control "problem" wildlife, due to increased human interaction, was also seen as a long–term risk of impact, although CRC believed that this could be controlled through proactive management.

Cumulative Effects

The CEM used by CRC also considered the regional effects of the Cheviot Coal Project when combined with other existing and proposed developments within the study area (i.e. cumulative effects). CRC emphasized that it was important to realize that the adverse effects of the Cheviot Coal Project would be part of a regional series of cumulative effects, all of which are already stressing sensitive carnivores. These other sources of cumulative effects included oil and gas activities, quarrying activities, recreational activities, and other mining activities, although some pockets of more secure habitat have been created through access and development control (e.g. designated protected areas).

Overall, the projected regional changes in human developments and activities were predicted to significantly further erode the status of carnivores from an already apparently declining condition, particularly for the more sensitive of the large carnivores species. CRC stated that the long-term persistence of populations of grizzly bears, wolves, cougars, wolverines, and fishers, due to ongoing development and activity in the region, was predicted to be threatened within the entire non-national park portion of the study area, and not just the proposed Cheviot mine site. It was felt unlikely that grizzly bears, wolves, or wolverines would be extirpated from the Jasper National Park portion of the grizzly bear regional study area. However, any individuals dispersing into the provincial portion of the study area likely already experience increased mortality risk. If current development trends continued in the region without incorporating the needs of these sensitive large carnivores, then CRC believed that provincial lands would become an even greater mortality sink for carnivores originating from Jasper National Park. Compromising large carnivore populations to this extent would not, in CRC's view, be consistent with regional wildlife management objectives.

Mitigation Opportunities

In their application CRC recognized that the proposed Cheviot Coal Project, along with other regional developments, would have an adverse effect on carnivores. However, CRC also noted that, even without implementation of the Cheviot Coal Project, the currently declining status of the populations and habitats, particularly for large carnivores, is an early indication of the loss of biological diversity in the region.

The mitigation scenarios for carnivores reviewed by CRC included avoidance of disturbance, minimization of disturbance, and compensation for disturbance. Given the scope of the project it was determined that the first two would be difficult, if not impossible to accomplish. CRC stated that the most effective method to address the predicted impacts to carnivores would be to establish a carnivore compensation program. Such a program would be designed to address the needs of carnivores at the regional scale. CRC proposed that, given project approval, it would compensate for unmitigatable losses to carnivore habitat by creation of a "Cheviot Mine Wildlife Compensation Program". In its application CRC committed to: (1) contributing to funding regional research on carnivore ecology; (2) contributing towards establishing and supporting a Wildlife Management Board (or similar body); and (3) contributing toward regional level education packages aimed at informing the public regarding the various carnivores. CRC noted that a number of similar programs were now underway in both Alberta and other parts of North America.

At the hearing, CRC stated that, in its view, compensation, to be effective, must be applied on a regional basis with a multi-stakeholder involvement. The following highlights the suggested goals of CRC's proposed carnivore compensation program:

Goal 1. To form a Carnivore Compensation Advisory Board and to define its responsibilities and reporting lines.

Goal 2. To require this advisory board to prepare within one year a carnivore management action plan to address stresses on sensitive carnivores within the Cheviot Coal Project cumulative effects areas. As part of this plan, specific criteria for success will be developed. Success criteria would include species specific distribution, population, mortality, habitat, connectivity, and other relevant parameters. Grizzly bears, wolves, and possibly wolverines were recommended as focal species on which to gather research data to test management hypotheses.

Goal 3. To use research in an adaptive management context to test, and validate or revise, the criteria for success. The Carnivore Compensation Advisory Board would continue until the criteria for success are met, and mechanisms are in place to monitor and maintain that criteria.

The suggested objectives of the carnivore compensation program were to:

- (1) monitor and understand sensitive ecosystem elements to facilitate management decisions affecting carnivores;
- (2) monitor and understand human uses and changes to the land base to facilitate management decisions affecting carnivores;
- (3) develop land management options for carnivores and their ecosystems;
- (4) develop education and outreach programs regarding carnivores and their supporting ecosystems;
- (5) monitor people's knowledge, attitudes, opinions, actions, and values regarding carnivores and supporting ecosystems;
- (6) implement a baseline study of the historic ecology of carnivores and their ecosystems in the region; and
- (7) establish an organizational structure for the program.

A tentative administrative structure for the carnivore compensation program was also suggested by CRC. It included representation from provincial and federal government, CRC, and other industrial operators, and should include consultation with other interested stakeholders. Management program implementation would be addressed through a multi-level committee structure with management authority remaining with agencies currently having those responsibilities.

CRC stated that the impacts of the proposed development on carnivores, after considering mitigative measures and the proposed compensation program, would be, in its view, considered to be insignificant.

4.3.2 Views of the Interveners

The AWA Coalition stated that, in its view, CRC's evidence confirmed that the best option for carnivores in the region was implementation of a conservation strategy in the region while at the same time denying the Cheviot Coal Project. If the mine were approved, the AWA Coalition indicated that the proposed compensation program should not be seen as an acceptable mitigative measure because: (1) the evidence provided did not show that there is commitment to the compensation program by all stakeholders; (2) even CRC had not made a full commitment to the program; (3) while the program intended for the carnivores to be accommodated outside the Cheviot Coal Project, there is no habitat of comparable quality elsewhere; (4) there was no legal mandate attached to the program; and (5) the lack of experience with such complex collaborative projects made it difficult to predict the chances of success.

The AWA Coalition submitted that it was particularly concerned about the fragmentation of habitat for all wildlife species which would occur should the application be approved. It was their belief that fragmentation will result in the proposed mine area becoming a filter to species, making it more difficult for them to access and therefore make use of the region. Fragmentation would also reduce the biological diversity in the area. The AWA Coalition also noted Parks Canada's comments with respect to the essential nature of ecological linkages in order to sustain viable wildlife populations and therefore sustain the ecological integrity of Jasper National Park. The AWA Coalition stated that the proposed mine would clearly sever those linkages thus having a devastating impact on biodiversity both within and outside of the park.

The AWA Coalition submitted that substantial evidence was presented showing that wildlife corridors are required across the proposed mine, and further noted that sufficient evidence was provided stating that the appropriate location and design of these corridors is still unknown. Given that the Cheviot coal leases are designated under the Coal Branch Subregional Integrated Resource Plan as critical wildlife habitat, it was their view that more work must be carried out prior to designating specific corridors in order to ensure that they meet the needs of the various affected species. Therefore, the approval of the Cheviot Coal Project was, in their view, premature.

RMEC also stated that there were a number of problems with CRC's proposed Carnivore Compensation Program. RMEC noted that there was no basis upon which to evaluate the program and that all of the other examples of compensation programs provided by CRC involved situations where problems were detected after the fact and that compensation was implemented to account for past "blunders". RMEC stated that the Cheviot Coal Project is still at a conceptual phase and therefore the comparisons which were presented by CRC were not valid.

Another concern of RMEC regarding the compensation program was that there were many areas in Alberta's eastern slopes where grizzly bear habitat has already been lost or is currently being damaged. Given this, and CRC's projected 100 year+ reclamation period, RMEC stated they were concerned that there may no longer be a source of grizzly bears to repopulate the area even if restoration of both habitat quality and effectiveness could be accomplished.

RMEC also indicated that, should the proposed application be approved and the carnivore compensation program be implemented, there will be a significant imposition of constraints on other activities in other areas of the east slopes. This would result in costs being transferred to other companies and members of the public. RMEC noted that, in their view, this fact was not addressed in the draft compensation package even though it is a significant public interest consideration.

It was stated by RMEC that the draft compensation program was a notion concocted by CRC to address unmitigatable impacts to carnivores out to 100 years. RMEC felt that CRC's plans for implementation were vague, without commitment from CRC, and dependent upon participation from a whole range of agencies and groups, all with varying objectives, mandates and legislation. Further, RMEC stated that even CRC's witnesses had conceded that the compensation plan had an extremely low probability of success.

Regarding the cumulative effects assessment presented by CRC, RMEC felt that it was scientifically flawed and certain aspects of the evidence were presented in such a manner that the ability for appropriate cross examination did not exist. Given this, RMEC stated that information on the cumulative effects assessment should not be considered by the Panel. Further, RMEC stated that CRC's view on significance was very narrow and legalistic.

Both RMEC and the Alpine Club Coalition supported the AWA Coalition's concerns with respect to wildlife corridors. RMEC indicated that corridors could be an option; however, CRC had presented no evidence that supported a conclusion as to the effects of wildlife corridors. The Alpine Club Coalition noted that, to be effective, such corridors must also be closed to off highway vehicle traffic.

In its intervention, AEP stated that it has no objection to the application with regard to carnivores, subject to the Panel finding that the proposal is in the public interest, but that it did have a number of recommendations that it believed the Panel should address in its decision. AEP stated that it believed that CRC should be required, in consultation with AEP, to carry out further ongoing scientific monitoring of wildlife movements across the proposed mine site in order, in part, to establish the need for a permanent corridor or corridors. Should a need be shown, AEP requested that the Panel require that the placement and design of any resulting corridor(s) also be done in consultation with AEP. AEP also recommended that the Panel require CRC to act as a catalyst in generating multi-stakeholder support for the implementation of the carnivore compensation plan and that CRC be required to contribute to a fund for the purposes of carnivore habitat mitigation.

At the hearing, AEP noted that it did have concerns regarding wildlife mortality within the access corridor and strongly suggested that speed reduction was likely the major mitigative tool.

Parks Canada stated that while it had no mandate on provincial lands, it did have a legislated mandate to protect the ecological integrity of Jasper National Park, which included its involvement with projects occurring outside of national parks if they had the potential to impact the park's ecological integrity. Parks Canada further noted that Jasper National Park shares many VECs with the project area, and the broader regional ecosystem had been referred to extensively in the EIA. In its view, the Cheviot

Coal Project, as proposed, clearly has the potential to adversely impact the ecological integrity of Jasper National Park. In particular, Parks Canada noted that the EIA had established that significant effects on grizzly bears within the regional ecosystem, which includes portions of Jasper National Park, were possible.

Parks Canada noted that the development proposal by CRC represented a unique opportunity for the creation of a regional ecosystem management authority and Parks Canada concurred that this was desirable. Such an authority could, in the view of Parks Canada, oversee the establishment of landscape level goals within the regional ecosystem and the development of strategies to attain these goals. By outlining a development plan covering the next 20–25 years (the forecasted period of mine disturbance), Parks Canada believed that the applicant had also set the groundwork for assessing the potential cumulative effects of the project. The tools developed by CRC in the EIA (e.g. the CEMs) also provided, in its view, an excellent starting point from which to address cumulative effects of past, existing, planned, and proposed future developments.

Parks Canada offered several recommendations which it believed would help to alleviate its concerns. The recommendations fell into two categories; that is, recommendations which should be implemented by CRC as part of the approval process, and recommendations which should be incorporated into follow-up programs should the project be approved. Parks Canada suggested that:

- (1) A "core area" analysis for BMUs 1–3 should be conducted and the results combined with the cumulative effects area analysis for an overall assessment of habitat capability and security.
- (2) The cumulative effects/core area assessment should be expanded to include other planned or foreseeable human activities (e.g. timber harvesting, mineral and oil and gas exploration and development, recreation, etc) in the larger analysis area (i.e. BMUs 1–3). The cumulative effects of at least one likely scenario should be assessed with such additional activities at five–year intervals over the next 20 years.
- (3) All habitat lost due to the proposed Cheviot Coal Project should eventually be compensated in–kind elsewhere in the same BMU in accordance with applicable provincial and federal policies regarding "no net loss".
- (4) On-site mitigation, such as the delineation of a "landscape linkage" to facilitate movements of grizzly bears east/west and north/south across the Cheviot Coal Project and the cumulative effects analysis area, should be developed.
- (5) On-site mitigation should be developed for the major transportation corridors to reduce the potential for wildlife mortality due to vehicle and/or train collisions.
- (6) A "Road Corridor Wildlife Sanctuary" along the Grave Flats Road from the Cardinal River–Brazeau River junction over the Cardinal River Divide and down along the McLeod

River to Mercoal should be established to reduce human caused mortality (legal and illegal) of large carnivores.

- (7) A moratorium on legal hunting of grizzly bears in all or a significant portion of Grizzly Bear Management Area (GBMA) 4B following any year in which the Total Known Man-Caused Mortality (TKMM), including removals, exceeds two bears or, alternatively, a moratorium on legal hunting of grizzly bears in all or a significant portion of GBMA 4B should be established.
- (8) Solid waste management strategies for making human food and garbage unavailable to bears to reduce the potential for the need for destruction of habituated bears should be developed and implemented.
- (9) CRC should be required to work with Jasper National Park to further identify and mitigate access concerns.
- (10) Regional ecosystem goals (i.e. landscape level goals) should be established at the appropriate scale to allow Parks Canada to meet its objectives for the maintenance of ecological integrity and targets for such things as habitat connectivity and landscape linkages, habitat effectiveness, and potential threshold values for grizzly bears.
- (11) A regional management authority which is both multi-disciplinary and multi-jurisdictional should be created to oversee the development and implementation of strategies to meet landscape level goals for the regional ecosystem.
- (12) An inter-agency science advisory group, reporting to the regional management authority, should be created to address various conservation issues for grizzly bears and other carnivores in the regional ecosystem. The group should establish goals and objectives for habitat capability and security, ceiling levels of total known man-caused mortality (including net removals), and landscape linkages based upon best scientific information available on grizzly bears. Conservation actions for grizzly bears should be enacted and evaluated independently in an adaptive management approach for prudent stewardship of natural resources.
- (13) All development proposals within the region, including the proposed Cheviot Coal Project, should be reviewed on the basis of cumulative effects.
- (14) The long-term protection of critical habitat and the integrity of corridors that connect critical habitats should be ensured in order to prevent isolation of habitat or wildlife species beyond development boundaries.
- (15) The Coal Branch Access Management Plan should be revised and implemented with emphasis on ecological goals, not historical use patterns.

- (16) If approved, implementation of the Cheviot Coal Project should follow an adaptive management framework incorporating a rigorous program of monitoring key ecosystem components and feedback into ongoing mine operation and development. This would be accompanied by a commitment by CRC to alter operations when unanticipated threats to ecological integrity are identified.

In its submission, the Alexis First Nation highlighted potential impacts on wildlife habitat and movement as well as regional land access. They also requested that the Panel order the participation of both the governments of Alberta and Canada in regional wildlife management and planning initiatives and establish a mechanism by which the EUB could monitor the decisions and impacts of the planning process.

4.3.3 Views of the Panel

In assessing the potential effects of the Cheviot Coal Project on mammalian carnivores, the Panel is convinced, from the evidence provided by all parties to the hearing, that a regional perspective must be taken. The Panel notes that there appeared to be general acceptance by all the parties with regard to CRC's contentions that many carnivore populations within the region have already been negatively affected by a range of man-induced factors and that, with or without approval of the Cheviot Coal Project, there is a reasonable likelihood that these impacts will continue. It is within this general context that the Panel believes that it should consider CRC's application.

While CRC has considered some site-specific aspects of the impacts of its proposed mining operations on carnivores (e.g. direct mortality from vehicles on the access road), the bulk of their work has been directed towards looking at regional habitat effects through the use of CEMs. The Panel agrees with this approach and notes the support expressed by Parks Canada. The Panel is also prepared to accept as reasonable CRC's focus on grizzly bears and gray wolves as indicator species of the general quality of regional habitat for mammalian carnivores.

With regard to Jasper National Park, the Panel is prepared to accept that development of the Cheviot Coal Project will not result in the direct loss of either habitat effectiveness or habitat quality for mammalian carnivore populations in general or grizzly bears in particular within BMU 1. The Panel does believe that development will create barriers to the movements of carnivores such as grizzly bears, wolverines, and wolves between the park and provincial lands (BMUs 2 and 3). These barriers will occur primarily due to the relative sensitivity of such species to human activities, and the reduction in cover or escape habitat as the mine develops. By altering the natural movements of these species, many of which tend to be territorial and widely dispersed, it can be anticipated that at least some redistribution of home ranges will occur, and possibly the eventual loss of some animals which currently move between provincial land and the park. For grizzly bears, given that habitat quality is relatively lower within the park than it is beyond the park, these effects may be significant. Perhaps more importantly, the areas outside of the park may also become even more of a mortality sink than currently occurs. Therefore, while habitat quality within Jasper National Park will not be directly affected by the

Cheviot Coal Project, the Panel does accept that some impacts on carnivores which make use of the Park likely will occur.

With regard to BMU 2, the area most directly affected by mine development, the Panel accepts that, based on available data, the area is currently able to sustain intermittent to regular use by grizzly bears, and therefore presumably most of the other mammalian carnivores. The Cheviot Coal Project will result in a significant loss of carnivore habitat, including grizzly bear habitat from the moment construction begins until some period well after mining has ended. While movement barriers (e.g. Grave Flats Road) currently exist, the Panel believes that the development of both the surface mine and the upgraded access road will create significant new barriers to movement over at least the life of the mine. The Panel believes that these barriers will further increase as mine development extends to both the east and west from the Harris Creek and Cheviot Creek drainages. These barriers, plus the loss of cover, the loss of prey animals, the fragmentation of habitat, and ongoing human activity will all significantly reduce the value of the mine site as well as surrounding areas for wildlife for the life of the mine at an absolute minimum, and likely for several years or decades later. The Panel is also of the view that the ultimate value of the Cheviot mine site to carnivores will be at least partially a product of CRC's ability to re-establish appropriate vegetative cover within a reasonable period of time. What that time period is or should be is as yet, also unknown.

Based on the evidence provided at the hearing, the Panel was unable to predict the spatial extent of these impacts on carnivores beyond the general mine permit area. Clearly, this will be a product of several factors, including the biological requirements of the various species and their sensitivity to disturbance. For example, the Panel notes that BMU 3, while it contains relatively high quality habitat for grizzly bears had, due to current levels of human disturbance, such low habitat effectiveness that it was of very little real value to grizzly bears. BMU 1, on the other hand, had little disturbance but also very little high quality habitat. The Panel believes it is reasonable to assume that similar issues exist, particularly for the larger carnivores such as wolves, wolverines, and cougars, in all the areas surrounding the mine site.

It might be argued that, since BMU 3 as well as other smaller areas in BMU 2 currently have little or no value for carnivores, there is no incremental impact from the development of the Cheviot Coal Project. The Panel, however, does not accept this argument. For example, should other management programs be put in place (e.g. greater access control), then habitat effectiveness in the absence of the Cheviot Coal Project would presumably increase. Therefore, approval of the Cheviot Coal Project could further reduce the likelihood that other mitigation strategies will be successful.

The Panel examined the steps proposed by CRC to reduce impacts on carnivores, and provides the following comments:

(1) Mortality Due to Collision

The Panel agrees with CRC that the Grave Flats Road, if upgraded to a 90 km/hr speed limit between Cadomin and the Cheviot mine, will result in a significant increase in the chance of mortality, not only to

carnivores, but ungulates, raptors, and even humans as well. The Panel would strongly suggest that CRC discuss speed limits further with regional authorities and assess whether lower speed limits over the length of the road can and/or should be imposed. While the Panel can see some limited merit in some of the alternatives listed by CRC (e.g. slowing traffic at wildlife crossing points, high bridge crossings), these all seem to be both relatively ineffective and costly when compared to a simple reduction in traffic speeds. Others, such as fencing, have significant risks to wildlife as well as benefits. Given the short distance between Cadomin and the mine (12 km), the additional travel time incurred if speeds were reduced from 90 km/hr to 50 km/hr, for example, would be in the order of 8–10 minutes or less. This does not appear to be an undue impact on either CRC, its employees, or the public.

(2) Increased Hunting, Poaching, and Trapping

If public access, and particularly motorized access, either during or following mining activities is permitted to increase, then the Panel agrees with CRC's assessment that mortality from hunting, poaching, and trapping will also increase. The Panel notes, however, that while CRC can control the amount and type of access to its lands, general changes to land access and hunting regulations are beyond both its and the Panel's jurisdiction. The Panel does expect CRC, however, to work closely with the appropriate land managers in developing access management plans, as well as general management plans for wildlife along the Graves Flat Road. Furthermore, the Panel would strongly recommend that the reduction of impacts on wildlife in general, and carnivores in particular, be a key priority in setting any new regional access plans.

(3) Possible Control Kills of Bears, Wolves, and Cougars

The Panel will expect CRC to ensure that its activities (e.g. garbage control) are carried out in a manner that minimizes the risk of interaction and habituation and the associated need for control. The Panel encourages provincial authorities to continue to take similar proactive measures at public facilities to reduce the need for such controls as much as possible.

(4) Habitat Alteration and Alienation

The Panel will expect CRC to reduce these factors to the degree possible. In particular, CRC should avoid disturbance of any areas not immediately required for mining, waste rock disposal, or roads. Where disturbance is necessary, the extent of disturbance should be minimized, particularly at the outer limits of the mine area. Reclamation on disturbed areas should be initiated as soon as possible. In particular, haul roads, especially those which provide access near to or into adjacent undisturbed habitat, once no longer needed should be closed and reclaimed as quickly as possible.

(5) Movement Corridors and Habitat Fragmentation

At the hearing there was a great deal of general discussion regarding the possibility of maintaining movement corridors across the proposed mine site. In particular, maintaining a north–south corridor along MacKenzie Creek from the Cardinal Divide Natural Area lands in the south, to the relatively

undisturbed lands north of the mine, was raised by several parties. To a lesser extent, maintaining a corridor across the headwaters of Prospect Creek was also raised.

The Panel is prepared to accept CRC's view that, at present, there is only a very poor understanding of the criteria that would need to be met for such a corridor to be useful to various species. A width of 1 km, plus heavy vegetation cover, was considered likely to be a minimum requirement but this appeared to be based primarily on conjecture at this time. The Panel also agrees with CRC that the current mine plan would make creation of such a corridor difficult, and would almost certainly, if nothing else, require a certain amount of economically available coal to remain unmined.

However, the Panel does believe that, conceptually, such a corridor would be of sufficient potential benefit that further consideration is warranted. This is particularly true given the potential uncertainties associated with the success of CRC's proposed Carnivore Compensation Program (see below). Should the mine be approved, the Panel will expect CRC to revisit its proposed mine plan, particularly with regard to MacKenzie Creek and upper Prospect Creek, in order to determine whether such corridors could be accommodated and at what cost. In addition, current levels of use of these areas by wildlife must be better established, as well as an evaluation made of likely minimum widths and cover needed by the various species of importance.

Since active mining in both areas is not expected for up to a decade, the Panel believes that, should the Cheviot Coal Project be approved, adequate time exists for CRC to assess both the feasibility and benefit/cost of providing such an access corridor or corridors across the mine site. The Panel accepts that there is a reasonable probability that the development of movement corridors may be of such minimum value to wildlife that their development cannot be reasonably justified. However, the Panel does believe that further work to address the question is certainly warranted, given the potential benefits.

(6) Carnivore Compensation Program

In general, the Panel agrees that the available site specific mitigation strategies for carnivores, including corridors are, without major and costly changes to CRC's conceptual mine plan, unlikely to be successful in reducing the impacts on carnivore populations significantly. Therefore, the Panel is prepared to consider CRC's proposal to compensate for lost carnivore habitat in areas outside of the Cheviot Coal Project as a reasonable option. The Panel believes that there are now sufficient numbers of models to indicate that such a program would have at least a reasonable probability of success, despite its inherent complexities.

Therefore, should the Cheviot Coal Project be approved, the Panel will require CRC to honour its commitment to act as both a catalyst and a stakeholder in such a process. The Panel will also expect that both the companies and government agencies which advised the Panel at the hearing that they would participate in the program, will also do so. The Panel will require CRC to report to the EUB on an annual basis regarding the status of the program. The Panel accepts that the progress of this process at first may be slow. However, the Panel also believes that it is critical that CRC be able to show

measurable success in establishing the Carnivore Compensation Program before unmitigable impacts have occurred within the Cheviot mine site. Therefore, the Panel will also require that CRC be able to demonstrate either sufficient evidence of program success within three years of receiving government approval of its project or, in the absence of such evidence, what alternative steps it is prepared to take to mitigate/compensate for effects on carnivore populations. One key measure of such success will be the level of commitment by both government and industry, including financial commitment, to the regional process.

Clearly, the ultimate success of such a program will depend on active participation of a range of parties. The Panel notes from the evidence provided at the hearing that the level of proactive participation by companies in such processes tends to be directly tied to the degree that a program may affect either their present operations or future approvals. Government, on the other hand, while wishing very much to participate in a comprehensive manner, often has difficulty in identifying adequate resources. In order to assist CRC in gaining the economic as well as the moral support of other industries in the region, the Panel believes that both the EUB and AEP may need to re-examine the process by which new licences are granted to other regional industry players for developments which may also have a cumulative effect on carnivores. Such changes may be timely, given the fact that both provincial and federal environmental legislation now recognize that it is no longer adequate to examine the environmental impacts of a proposed development in isolation, but rather the cumulative effects must be considered. The Panel also believes that the government agencies will very likely need to identify the specific resources they can make available for their participation in the Carnivore Compensation Program in order for it to be effective.

Monitoring and Follow Up

A number of potential follow-up studies for carnivores were discussed at the hearing. Most of these, however, were tied to the proposed Carnivore Compensation Program. The Panel is satisfied that the need for and the extent of such studies can best be determined by the proposed Carnivore Compensation Advisory Board. At a minimum, however, the Panel does expect CRC, should it receive approval of the Cheviot Coal Project, to:

- C monitor the impacts of increased traffic on the Grave Flats Road and make any adjustments necessary to reduce wildlife mortality to acceptable levels;
- C monitor changes to public access patterns resulting from its development and advise AEP if any of these appear to have unduly increased the risk of legal or illegal carnivore mortality; and
- C carry out any studies needed, in consultation with AEP and Parks Canada, as appropriate, to examine current wildlife movement patterns across the proposed mine site and to establish the likely minimum conditions (e.g. location, width, degree of cover) necessary for such corridors to be effective.

Upper Cardinal River

As noted earlier, the Panel has some concerns regarding whether the Carnivore Compensation Program will adequately address carnivore impacts over the long term. Of particular concern is the potential blockage of carnivore movements from Jasper National Park to provincial lands. At the hearing, the Panel was struck by the high quality of the upper Cardinal River habitat for carnivores and by the relatively low habitat effectiveness of the region based on the CEA models due apparently to road development within the valley. The upper Cardinal River would appear to offer, with only minor changes in current land use zoning, a significant opportunity to provide wildlife with well defined linkages to the Cardinal Divide Natural Area, and ultimately to other areas such as the MacKenzie Creek drainage. The Panel notes that the Coal Branch Access Management Plan is to be evaluated by AEP in the fall of 1997. The Panel would suggest that a re-examination of the current access patterns in the upper Cardinal River watershed could provide a significant opportunity to compensate for carnivore habitat losses. This would be particularly important if CRC is ultimately unable to successfully establish the Carnivore Compensation Program.

4.4 Ungulates

4.4.1 Views of the Applicant

CRC advised that, in its view, the maintenance of ungulate populations in the Cheviot area was particularly important as: (1) ungulates provide a prey base for the larger carnivores; (2) they require diverse vegetation and topography, meeting their habitat needs also fulfils those of a wide assemblage of species; (3) they possess relatively large home ranges, forcing planners to work at a landscape level; (4) their grazing activities can affect the development of grasslands which in turn are related to erosion and runoff control; and (5) their response to reclamation activities can be used as a measure of success as well as to fine tune reclamation planning.

Study Area

Detailed ungulate work was completed in an area encompassing 445 km² which included the Cheviot mine permit area, the lands between the Nikanassin Range and ranges to the west, and the area between Red Cap Creek and the Luscar mine. As well, impacts of the proposed project were put into a temporal and spatial perspective with existing and future demands by conducting a CEA for elk. This assessment was conducted within a regional setting of 900 km².

Existing Conditions

CRC selected five species (elk, moose, mule deer, whitetailed deer, and bighorn sheep) as the appropriate VECs for its assessment. CRC provided data from surveys for ungulates carried out from 1992 to 1995. All five ungulate VECs were observed in both the Luscar and Cheviot mine areas. CRC noted that the majority of the Cheviot project area is zoned as critical wildlife habitat in the Coal Branch Sub-Regional Integrated Resource Plan. CRC also recognized that the Whitehorse and

Prospect Creek areas have been identified in the Integrated Resource Plan as providing regionally significant elk habitat and that the front ranges of the Rocky Mountains provide critical habitat for bighorn sheep. CRC also noted that the wildlife objectives for the Integrated Resource Plan include increasing elk and mountain goat populations while maintaining bighorn sheep populations.

CRC stated that elk populations in the area of the Luscar mine are considered to be distinct from those in the Cheviot mine area, although some level of interchange between the populations appears to occur. Within the vicinity of the Cheviot mine, elk were primarily found on: Drummond, Prospect, and the lower reaches of Cheviot, Thornton, and Harris Creeks; either side of MacKenzie Gap on south facing slopes of the Nikanassin (Red Cap) Range; and upper subalpine drainages on the south side of the peak of Red Cap Mountain. During the winter, CRC observed that elk were usually found in open canopy coniferous habitat with a shrub understory. Elk were observed to make use of a large mineral lick located in the headwaters of Prospect Creek, as well as licks in Thornton and Harris Creeks.

CRC noted that elk populations in the region have been surveyed by AEP since 1983. Total numbers in the Mountain Park area are considered low, in the range of 90–100 animals, and the historic increases seen in other regional herds have not occurred. In general, management efforts to increase elk population size in the area do not appear to have been successful, although CRC did note that elk are currently using reclaimed portions of the Luscar mine site.

Moose densities ($0.34/\text{km}^2$) in the Cheviot area were considered by CRC to be consistent with those found in other mountainous regions and somewhat lower than in boreal habitat. In the winter, moose are generally found at a small area at the mouth of Red Cap Creek; a much larger area encompassing the upper reaches of Red Cap and MacKenzie Creek and all of Harris Creek, the upper reaches of the McLeod River and portions of Cheviot and Thornton Creeks; and the river terraces in Whitehorse Creek at the mouth of Drummond Creek. Moose were most frequently observed in open canopy coniferous forests with a shrub understory in the winter, while in the summer they were observed in a variety of habitats.

CRC stated that mule deer densities ($0.27/\text{km}^2$ in 1994) would generally be considered to lie between poor and moderate on a provincial basis. CRC observed that mule deer do make use of the reclaimed areas of the Luscar mine site and numbers there have increased from 45 in 1990 to 92 in 1994. During the winter, CRC stated that mule deer are generally found in four areas: the McLeod valley north of Inland Cement, including the Luscar mine; north of Cadomin Mountain and west of Watson Creek; an area of Little MacKenzie Creek; and north of the peak of Red Cap Mountain. During the summer, CRC suggested that mule deer appeared to be concentrated along the reaches of the McLeod River between the mine site and Cadomin. Mule deer tended to use open canopy coniferous habitat in early winter, but later shifted to subalpine meadows.

Whitetailed deer were very uncommon within the area, with only five observed during three winter surveys in 1994. CRC observed that provincially optimum habitat for this species is aspen parkland, and that their distribution in grassland and boreal mixed wood ecoregions was often restricted by cover and snow depth, respectively.

Bighorn sheep were the most abundant ungulate observed by CRC. However, most were located outside the Cheviot mine permit boundary with relatively large numbers of sheep resident on reclaimed portions of the Luscar mine site. Bighorn sheep were observed in the headwaters of Prospect Creek, on Cadomin ridge, and in an area of the Nikanassin (Red Cap) Range south–east of MacKenzie Creek. Bighorn sheep were primarily observed in alpine habitat throughout the year. In winter, windswept or sunny grasslands in proximity to cliffs were preferred, while in summer both open grasslands and, to a lesser degree, lower shrubland habitat, was used.

Expected Effects

CRC noted that ungulates in the region may experience both indirect impacts (i.e. habitat loss, barriers to movement, and harassment) and direct impacts (i.e. mortality due to vehicular collisions and increased legal and illegal hunting), as a result of the development of the Cheviot Coal Project.

The development of the Cheviot mine and the office complex were predicted to result in the loss of habitat for all ungulate VECs. For elk, a number of areas will be disturbed, while for moose habitat loss will generally be in the area of Harris and upper MacKenzie Creeks. Mule deer habitat in Cheviot, Thornton, and Prospect Creeks will be lost, while bighorn sheep habitat losses will occur primarily in upper Prospect Creek. As a result, CRC predicted that 10.8 per cent of the core elk winter range south of the Red Cap Range, 26 per cent of the moose core winter range, 13 per cent of the mule deer core winter range, and 1.6 per cent of the bighorn sheep core winter range will be affected. CRC also noted the potential loss of four mineral licks, with the largest also located in upper Prospect Creek. Habitat loss for elk, because it is located in the Harris–Cheviot Creek areas, will occur almost immediately during the earliest stages of mine and processing plant construction.

CRC estimated that, should the mine be approved, hiding cover for elk and moose would require 25–35 years (pine) or 35–45 years (spruce) to become re–established on the reclaimed Cheviot mine. During this time elk would be able to use forage resources located at the edge of the disturbance area where large blocks of undisturbed habitat would exist. Moose use of the reclaimed landscapes would be delayed, however, until significant shrublands were established (16 years minimum). Once shrublands were established, CRC expected that moose, like elk, would forage at the edges of the disturbance area until tree growth was tall enough to provide hiding cover. CRC observed that if the integrity of forested areas beyond the mine boundary are not maintained until tree cover planted on the disturbed sites is usable again by elk and moose, then habitat which could provide forage for these species would presumably be even less available.

In addition to direct habitat loss from construction and operation of the mine and coal processing plant, CRC noted that elk, moose, and mule deer movement patterns will be at least initially disrupted by the creation of large open areas, up to 2.8 km across in the Cheviot Creek area and 1.5 km across in the Red Cap Creek area. Elk movement would be disrupted between Prospect and Cheviot Creek and in the vicinity of the former townsite of Mountain Park, as well as along Harris Creek. Moose and mule deer movement from the high shrublands located below the Cardinal Divide Natural Area to the lower reaches of MacKenzie Creek would also be disrupted by mining and valley fills. The disruptions would

force wildlife to establish new movement corridors; a process which would cause them to expend energy not normally required, and making them more vulnerable to predation. If new movement patterns cannot be established, abandonment of portions of range may result. CRC also noted that the highwalls created by mining, if not appropriately modified, may actually attract bighorn sheep into the area and that this may be inconsistent with area wildlife management objectives.

In the longer term CRC maintained that the Cheviot mine was not expected to be a significant barrier for ungulate movement. CRC noted that the proposed mine will be developed progressively, like the Luscar mine, and that there would be large areas which would either be undisturbed or in the process of reclamation at any point in time. CRC noted that previous experience at the Luscar mine indicated that progressive development of this type facilitates wildlife (especially ungulate) movement through active mining and reclamation areas.

CRC also noted that development of the Cheviot mine will result in the displacement, to a large degree, of existing human use of the area for recreation and hunting. In the absence of careful access management planning, CRC felt that this could create added pressure on regional ungulate populations, particularly along the periphery of the mining operations.

CRC stated that the proposed transportation corridor lies entirely within mule deer winter range, it intersects elk winter range throughout the length of the McLeod River upstream of Whitehorse Creek, and intersects moose winter range between Prospect and Cheviot Creeks. Several areas along Grave Flats Road were identified where a high incidence of wildlife crossing or congregation along the roadway currently occurs. Mule deer and bighorn sheep commonly cross between Cadomin and Whitehorse Creek campground, and mule deer, elk, and moose all cross the road between Whitehorse Creek campground and the end of the transportation corridor at the rail loop. CRC noted that a reduced use of preferred habitats within specified distances from roads and trails had also been shown by a number of researchers and similar effects were likely to occur along the Grave Flats Road. CRC predicted that upgrading of the Grave Flats Road would likely also result in increased ungulate mortality due to collisions, while the risk of direct mortality from trains, due to their low speeds, was felt to be low. Mortality risk from collisions with vehicles would be further increased due to the attraction of ungulates to road salt.

CRC also noted that elk are particularly vulnerable to human disturbance and hunting mortality in the areas immediately adjacent to the former townsite of Mountain Park, and at the junction of the Grave Flats Road and Highway 40. CRC noted that the elk population located south of the Nikanassin (Red Cap) Range will tend to absorb the impacts of mining operations, while elk populations north of the Nikanassin (Red Cap) Range would tend to be more directly affected by the transportation and utilities corridor. CRC believed that moose are particularly susceptible to human disturbances and human caused mortalities on Highway 40 in the vicinity of Luscar and Trapper Creeks, in the Thornton Creek area, the upper McLeod River valley south of the former townsite of Mountain Park, the Cardinal River valley, and, to a lesser degree, along Harris Creek and the headwaters of MacKenzie Creek. Mule deer are susceptible to human disturbance and human caused mortality all along the McLeod River corridor. After mining is completed, no further impacts from either the rail line or the transmission line

would occur. The upgraded highway was expected, however, to be a source of residual impact on ungulates in the McLeod River valley.

Cumulative Effects

CRC carried out a CEA for elk, based on a model developed in western Oregon and using AEP survey data for population trends. The CEA model suggested that regional habitat effectiveness for Class 1 and 2 elk habitat had been reduced, due to existing human disturbance, by 38 per cent for winter forage, 46 per cent for summer forage, 21 per cent for winter cover, and 22 per cent for summer cover. Development of the Cheviot Coal Project, CRC predicted, would result in further reductions in regional winter and summer forage of 3 per cent and 2 per cent respectively, and an 8 per cent reduction in both winter and summer cover. While CRC predicted that for elk, at these levels of habitat reduction, existing habitat should be able to absorb any displaced animals, the ultimate mitigation of habitat loss for all ungulates, including elk, depended primarily on rapid reclamation of disturbed areas. CRC also suggested that current low productivity levels of elk in the region indicated a sensitivity to further stress and that management strategies needed to reflect this.

Mitigation

CRC identified a number of potential mitigation options which it was prepared to consider in reducing the impacts of the surface mine and of the transportation and utilities corridor on ungulates. While no specific commitments were made, CRC did commit at the hearing to work with other interested parties, including public interest groups, to make appropriate changes to its mine plan to deal with these and other issues. In order to mitigate impacts due to the construction and operation of the surface mine and coal processing plant, CRC indicated it would consider the following:

- C Maintaining tree and shrub cover wherever possible, including forested areas adjacent to the mine, and avoiding placing infrastructure through these areas.
- C Reducing the disturbance of riparian and other valley bottom habitat by minimizing the placement of either haul roads or wash rock dumps in these areas.
- C Avoiding the disturbance of mineral licks and, where new licks are created by mining, leaving these areas exposed and unvegetated.
- C Designing revegetation programs to meet the needs of ungulates as soon as possible, including planting trees around the office/coal processing complex in order to reduce sight lines, reclaiming the slopes above upper Cheviot Creek and the east arm of Prospect Creek to forage palatable to elk, developing extensive areas of shrublands for moose, and ensuring the upper Prospect Creek reclamation program meets the needs of bighorn sheep.
- C Avoiding the creation of new access into the east end of the mine permit area from the Grave Flats Road.

CRC stated that requiring permanent undisturbed wildlife corridors were not considered to be an acceptable mitigation strategy since in order to be maintained across the proposed project area, they would substantially limit CRC's ability to maximize recovery of the coal resource. For example, a wildlife corridor or riparian buffer zone through the MacKenzie Creek drainage would result in the loss of some 12 million tonnes of coal.

Potential mitigation options for the transportation corridor suggested by CRC included:

- C Avoiding the creation of new access from the Grave Flats Road into Prospect Creek.
- C Educating workers and others with regard to potential wildlife hazards along the road and marking high hazard areas with signage.
- C Ensuring, wherever possible, that road embankments are designed to avoid trapping animals, that views are unobstructed in areas of high wildlife use, and calcium chloride is substituted for sodium chloride.
- C Following existing disturbance for the new power line wherever possible, and generally maintaining as much shrub and woody vegetation as possible.

In its application, CRC noted that elk have responded positively to reclamation efforts at CRC's Luscar mine and at other mining locations such as Elkview in British Columbia while bighorn sheep have voluntarily colonized the reclaimed landscapes of the CRC Luscar mine, producing an increase in the regional population. Also, reclamation trials for browse in moose habitat had shown positive results in Alaska. CRC believed that ungulates will respond similarly to reclamation at the Cheviot mine.

CRC stated that, while mining was underway, elk and other ungulates would have to re-establish annual movement and foraging patterns in adjacent habitat. CRC felt that the implementation of the Coal Branch Access Management Plan prior to mining would be beneficial to this process by making recreation use somewhat predictable, and thereby reducing human pressure on wildlife. CRC believed that once reclamation is initiated, the impact on the elk would be lessened as quality forage becomes available at the edge of the mining disturbance. Furthermore, as trees become tall enough to provide hiding cover, elk will be able to more effectively use the disturbance area. As a result, CRC felt that renewed growth in the regional elk population should be possible sometime during the reclamation process. The final reclaimed landscape, in conjunction with the undisturbed natural landscape should, in CRC's view, eventually be able to support the Integrated Resource Plan target population for the area of 200 animals. Once canopy closure was achieved, CRC predicted that impacts on the regional elk population could be considered to be insignificant as all the basic elements of their habitat requirements would then be in place. CRC noted that monitoring of the elk population during this period was important since maintaining a viable elk population through the early stages of mining would be needed in order to effectively recolonize the reclaimed habitat.

CRC believed that all the other ungulate species would go through a similar process as elk, but the time frames would vary depending on their habitat requirements.

CRC felt that once ungulate use of the reclaimed areas had been established, then human use of the reclaimed landscape could be introduced in a planned fashion. To ensure that a viable elk population remains in the Cheviot area both during and after the life of the proposed mine, CRC recommended that the following measures be considered by the appropriate regulatory authorities:

- C monitor and manage human recreation in the Cadomin area to minimize disturbance of elk;
- C identify nodes of high quality habitat and restrict human access and other development in these areas;
- C coordinate logging and other future development to prevent additive loss of quality elk habitat; and
- C plan the re-introduction of people onto the reclaimed landscape after mining

CRC recognized that implementation of the above measures would require cooperation between government agencies, the various industries, and other users of the area.

Monitoring and Follow Up

CRC suggested a number of general monitoring programs that it felt should be considered. These included:

- C monitoring of the site during mining activities in order to identify any new mineral licks created by mining operations;
- C monitoring, once the Coal Branch Access Management Plan is implemented, of any designated access routes to determine human use levels, ensure hunting levels are not too liberal, and prevent the development of new access into undisturbed blocks of adjacent forest habitat; and
- C assess the response of the area elk populations to mining activities.

4.4.2 Views of the Interveners

The AWA Coalition had several concerns regarding the potential impacts of the Cheviot Coal Project on ungulates. They noted, for example, that CRC may already have begun to have an impact on ungulates (e.g. as a result of keeping open the Grave Flats Road up to the mine site during the winter), and observed that CRC had made no mention of any monitoring of these effects.

The AWA Coalition noted that two ungulate species, mountain goat and woodland caribou, were identified to have historically used the Cheviot area. In the view of the AWA Coalition, approval of the Cheviot Coal Project would preclude restoration of these two species.

The AWA Coalition also believed that the CRC application was at odds with the Coal Branch Sub-Regional Integrated Resource Plan for other species of ungulates since, in its view, the Cheviot Coal Project would remove existing core habitat for these species as well as place additional stress on the populations. This, they argued, was completely inconsistent with the Integrated Resource Plan's goals of re-establishing ungulate populations and its classification of the area as a critical wildlife zone. Furthermore, there was no evidence that CRC's proposal to restore reclaimed areas to grassland would ultimately be beneficial for elk, as claimed, since there was no evidence that existing grassland was a limiting factor for elk, or that elk populations had increased as a result of their use of the Luscar mine site. The AWA Coalition believed that the Cheviot Coal Project would in fact place further stress on elk populations and make it impossible to restore regional populations.

The AWA Coalition noted that CRC had not made any specific commitments to mitigation of impacts of the transportation and utilities corridor on ungulates despite having identified crossing points and areas where animals congregate. They also noted that CRC had no plan for protecting movement corridors through the mine permit area, but only proposed a general study of the issue. The AWA Coalition noted that CRC had apparently placed social values above wildlife values in its selection of the Harris Creek site over the Mountain Park site for the coal processing plant.

The AWA Coalition expressed concerns with the CEA for elk. In particular, they noted the model, in their view, did not include existing and imminent developments in the region, nor did it distinguish between northern and southern populations. The RMEC also questioned some of the model parameters, particularly the relationship used to assess the impact of roads on habitat effectiveness for ungulates. Finally, the AWA Coalition questioned CRC's interpretation of the likely environmental effects on elk. Given predator pressure, plus loss of corridors and cover, they did not see how elk populations could begin to recover with the initiation of reclamation. They also questioned whether CRC could begin to restore elk populations in less than 100–145 years, particularly since CRC could not be sure any elk would be available for colonization that far into the future. The AWA Coalition also believed human activities were likely to be displaced to lands adjacent to the proposed mine, which would further increase the extent of impacts.

The Smallboy Camp noted that they were very concerned that CRC's reclamation program at the Luscar mine had the potential to significantly disrupt bighorn sheep ecology in the region. They suggested that the unnaturally high quality of forage, high growth rates, the proximity between very large numbers of animals, and the absence of normal predation had created ecological risks for the Luscar population and possibly other bighorn sheep populations as well. These risks included increased chances of disease transmission within the Luscar herd and possible maladaptive shifts in the area gene pools if rams from the Luscar population have a reproductive advantage over resident rams which does not also translate into a selective advantage for any resulting progeny.

The Alpine Club Coalition noted a number of concerns for ungulates in general. In particular, they suggested that, in order to re-introduce human use in an orderly fashion, the Coal Branch Access Management Plan must be implemented and any access routes designated under the Coal Branch Access Management Plan should be closely monitored. As well, no new access routes should be cut in adjacent forest blocks, human use on the mine periphery should be limited, and the east end of the mine area should not be connected to the Grave Flats Road.

The Alpine Club Coalition observed that, while CRC had had good success in re-establishing bighorn sheep at the Luscar mine, elk were only just beginning to come back after 20 years. They noted that while the grasses needed for sheep fodder are relatively quickly established, shrubs for moose browse and trees for sheltering elk take decades. They also noted that off-highway vehicle use is much more limited around the Luscar site. Furthermore, they noted that mine development will displace both off-highway vehicles and ungulates, thereby increasing the risk of conflicts on adjoining lands.

AEP stated that, in its view, CRC's proposed mitigation plans will create suitable elk habitat. However, AEP noted that CRC's mitigation proposals included implementation of the Coal Branch Access Management Plan which was currently being implemented through a system of voluntary compliance for a trial period. AEP also noted that CRC may need to consider, if elk populations for whatever reason are no longer available to re-colonize the Cheviot mine, possible enhancement of other elk ranges or funding elk transplants. However, AEP also noted that the Integrated Resource Plan states that no further elk transplants will be undertaken until access management is implemented.

The Alberta Fish and Game Association also raised concerns regarding the relationships between access and wildlife, particularly ungulates. They noted that reclamation at the Luscar mine had been so successful in re-establishing habitat for bighorn sheep that the populations there now represented serious management difficulties. The Luscar mine had, in their view, become a de facto sanctuary with protection from human hunters and little predation from carnivores due to their sensitivity to humans.

The Alberta Fish and Game Association observed that it was very unclear as to how wildlife populations in the Luscar mine were going to be managed once the mine shut down. Options included: (1) simply returning the land to past, pre-disturbance hunting practices (an option which the Alberta Fish and Game Association described as catastrophic); (2) setting the area off limits to hunting in order to provide watchable wildlife/ecotourism opportunities; or (3) establishing a limited entry hunt until sheep, elk, and deer herds had adjusted to human presence (which was the option favoured by the Alberta Fish and Game Association).

The Alberta Fish and Game Association observed that such problems could be avoided at the Cheviot mine by continuing to allow a full range of human activities at the mine, including hunting, in order to avoid an unnatural build up of wildlife. This, they believed, could be accomplished by: (1) allowing existing management policies to remain in place as long as possible in areas of the mine lease where development will not occur for some years to come; and (2) returning reclaimed lands to public use as soon as possible. With regard to the latter suggestion, the Alberta Fish and Game Association felt that

foot access activities, including hunting, should be possible in most cases within five years of completion of reclamation groundwork.

CEPA stated that, in its view, it was important that CRC not develop one animal habitat type at the expense of another and further, should be encouraged to develop habitat for a range of both small and large mammals. CEPA believed that it was also very important that CRC avoid the development of "domesticated" herds, such as had occurred, in its view, at the Luscar mine site. CEPA noted that the Luscar mine bighorn sheep populations had become very accustomed to human presence and felt that these animals would be very vulnerable once access to the Luscar mine for hunting became available. To prevent this, CEPA suggested CRC needed to encourage animals to follow their traditional migratory routes into and off of the mine site, in part by allowing ongoing access to hunters.

4.4.3 Views of the Panel

In considering the potential environmental effects on ungulates, the Panel believes that CRC has adequately described the historic and existing ungulate populations within the proposed Cheviot Coal Project, and their use of regional habitat. The Panel notes that three species, moose, mule deer, and whitetailed deer, while found within the study area, are generally at relatively low densities. This appears to be more a function of general habitat quality than due to anthropogenic causes. Two other species, mountain goats and woodland caribou, appear to have made historical use of the area, but appear to no longer occur within the region likely directly affected by the Cheviot Coal Project. The Panel notes that bighorn sheep populations in the area are considered by AEP to be healthy and stable and are able to withstand what appears to be a relatively intensive level of hunting. Elk populations, on the other hand, are below what AEP believes is the reasonable carrying capacity of the region and increasing these populations is identified in the Coal Branch Sub-Regional Integrated Resource Plan as an important goal for the area.

Based on the evidence provided, the Panel is prepared to accept CRC's estimates of the expected effects of development and operation of the surface mine and coal processing plant on ungulate populations as reasonable. The Panel accepts that during site clearing, mine and plant construction, and mine and plant operations, habitat will be lost and ungulate populations displaced. Furthermore, normal movement patterns by ungulates across the mine site will be disrupted, possibly extensively. While some impacts can be expected to extend beyond the life of the mine (i.e. 20+ years), the Panel does believe that ungulate populations can be re-established progressively within a reasonable time frame, thus lessening the impact, particularly given CRC's commitment to enhancement. The Panel also believes that ungulates in general will be better able to adapt to human activities within the active mine areas, provided they are not harassed, than some other wildlife species such as wolves or grizzly bears. As a result, during active mine development, the Panel believes that CRC's prediction that ungulates will continue to use undisturbed habitat at the periphery of and within the surface mine is reasonable, provided these areas are properly managed.

The Panel notes that the AWA Coalition on numerous occasions argued that the Cheviot Coal Project was inconsistent with government policy for ungulates in general and with government planning policy,

as set out in the Integrated Resource Plan, in particular. However, the Panel notes that in fact the Coal Branch Sub-Regional Integrated Resource Plan clearly states on page 69 under Guidelines for the Mountain Park–Folding Mountain Resource Management Area that:

"4. Coal exploration and development in the Mountain Park Critical Wildlife Zone and General Recreation Zone will be allowed under existing approval processes and will not be prevented or pre-empted by other interim land uses. In the Critical wildlife Zone, coal exploration will be allowed with a commitment from the developer to ensure maintenance of adequate usable habitat to allow elk population objectives to be met."

The IRP goes on to state (page 70) that the objectives for the Resource Management Area include:

"1. To increase the elk population from 90 to 200 animals, primarily in the Whitehorse Creek, Prospect Creek, Mountain Park area."

Based on the above, the Panel believes that since CRC has provided a commitment to the protection and/or provision of elk habitat at the Cheviot Coal Project which, at a minimum does not reduce the current opportunity of meeting RMA objectives for elk populations, then it is reasonable to assume that the application is consistent with the Integrated Resource Plan.

The Panel also notes that CRC's commitments to mitigate the impacts resulting from its surface mining activities were questioned by interveners. The Panel believes that, with regard to the re-establishment of vegetation suitable for both browse and cover as quickly as possible, which is CRC's primary mitigation strategy for impacts to ungulates, CRC has adequately demonstrated that it is both prepared and able to carry out this program. In particular, the Panel notes CRC's ability to re-establish habitat for bighorn sheep and other ungulates on its Luscar mine property. As noted earlier in this report, the Panel accepts that it is very likely that CRC's reclamation plans will favour some species over others. In the case of the Cheviot Coal Project, this would presumably be for elk populations. However, since specific natural habitats are more suitable for some species than others, the Panel does not view this as intrinsically an adverse effect. Furthermore, the Panel does believe that normal successional patterns will ultimately create a mosaic of habitat types and so eventually increase overall ungulate diversity within the area.

Control of access to both the mine site and to surrounding lands was noted by both CRC and by most interveners, including AEP, as being an important component of the ultimate success of CRC's mitigation strategies for ungulates. The Panel also agrees with this view. During development of the mine, the Panel notes that CRC has committed, provided both worker and public safety can be preserved, to allowing public access to undeveloped portions of the mine to continue. The Panel believes that this is reasonable. However, the Panel also agrees with the common view that without careful control, increased human use of high quality ungulate habitat, either within or immediately adjacent to the Cheviot mine, can potentially jeopardize the ultimate success of CRC's mitigation

programs. This is likely particularly true during periods when mine activity is high and/or when animals are just beginning to re-establish themselves into newly available habitat.

The Panel believes that increased pressure from human activity which could affect CRC's mitigation program for ungulates may come from several sources. One would be the creation of new access into areas previously not readily accessible by the public. For the Cheviot Coal Project, the most likely areas of concern would include: access along either the MacKenzie Creek or Prospect Creek valleys; from the eastern end of the project from Grave Flats Road; or into the Cardinal Divide Natural Area. A second source of pressure on ungulates would be the relocation of off-highway vehicles and hunters, which currently make use of the mine permit area, into adjacent areas. Assuming that the total numbers using the region remain roughly the same, the increase in impacts to ungulate populations from displaced recreational users could easily be disproportionately much higher than the actual increase in the number of users.

The Panel also believes that the process of re-establishing of human use onto the mine site following reclamation will also be critical to the success of CRC's mitigation programs for ungulates. The current situation at the Luscar mine, which contains a very large population of bighorn sheep strongly habituated to human presence, provides an excellent example of this concern. The Panel believes that all programs designed to restore ungulate populations must, at their outset, have a clear view as to the ultimate end use or uses proposed for the area. With that in mind, it will be much easier to ensure that all programs are designed so as to meet those goals.

A fourth source of impacts on the success of CRC's program to mitigate impacts on ungulates would be the cumulative effect from the loss of forest cover in areas surrounding the mine site. The Panel believes that preservation of these areas, until adequate tree cover is established on the mine site itself, will likely be a key component for successful re-establishment of ungulate populations. The Panel notes that all four sources of impacts on ungulates described above (i.e. human use patterns of non-lease areas during mining, the impacts of relocation of human use from the mine lease, the re-establishment of human use of the mine lease following mining, and the loss of ungulate habitat adjacent to the mine lease) are all, to some degree, beyond the direct control of CRC.

With regard to the transportation and utilities corridor, the Panel believes that upgrading of the Grave Flats Road will result in some reductions in habitat effectiveness, particularly during the winter months when the road has traditionally not been opened. Furthermore, the Panel expects that increases in direct mortality due to collisions with vehicles will likely increase. These impacts, which will continue over the life of the mine, may be significant if the proposed mitigation measures are not effective. The Panel does see merit in the changes to the general road design proposed by CRC to mitigate against impacts to ungulates and will expect these to be carried out. However, the Panel continues to be of the view that the most effective mitigation tool remains a general reduction in speed limits along the Grave Flats Road. The Panel also agrees, as noted earlier, that no new access to Prospect Creek from the Grave Flats Road should be created by CRC.

Cumulative Effects

With regard to the impacts on ungulates, the Panel does not believe that the incremental changes in regional ungulate populations will be so great as to require other foreseeable uses of the area for either recreation or industrial development to be foregone. The two exceptions to this could be first, a delay, perhaps for several decades, in forest harvest operations at the periphery of the mine in order to preserve cover for ungulates and second, the need to forego or reduce some recreational activities on or nearby the mine site in order to optimize ungulate re-establishment into the mine site. The Panel also believes that, if effectively managed, the existing Luscar mine site may provide some opportunities to offset the cumulative effects of the Cheviot Coal Project on ungulates.

With regard to the concerns raised by the Smallboy Camp regarding current ungulate management practices at the Luscar mine and their cumulative effects, the Panel agrees that creating large populations of a single species on limited areas and without normal population controls such as predation (by either man or carnivores) is not good long-term management practice and likely does represent some, albeit unknown, increased risk of disease or similar problems. However, the Panel is confident that both CRC and AEP are well aware of such issues and will address these questions in their final design for the Luscar mine site. The Panel does agree with the Smallboy Camp that this issue is a serious one and would expect, as discussed earlier in this section, that CRC and AEP will ensure that end-use goals for the Cheviot Coal Project are more clearly established and so hopefully avoid the problem in the future.

With regard to the second issue raised by the Smallboy Camp regarding the genetic fitness of Luscar mine rams, the Panel does not share their concerns. While it may be true that younger rams from the Luscar mine may, due to their larger size, have a reproductive advantage over resident rams in other regional bighorn sheep herds, the Panel believes that the general demands of the rut will ensure that any successful male, while perhaps not the "fittest" in some senses, will still be very likely to produce healthy offspring. Even assuming that there was a selective disadvantage for those offspring, normal genetic variability plus time would ensure that such effects are temporary.

Monitoring and Follow Up

If the Cheviot Coal Project is approved, the Panel will require that CRC initiate ongoing studies of changes to ungulate use of the Cheviot mine permit area as soon as possible. These data should be very useful in confirming current habitat use patterns by ungulates, including potential corridor locations (as discussed in Section 4.3), as well as determining the minimum size of undisturbed habitat blocks needed to allow either use or travel by ungulates.

The Panel will also require that CRC continue to monitor general human use patterns surrounding the mine site, and be prepared to advise AEP whenever it believed that human use, including new access, was at levels which potentially could reduce area values for ungulates. CRC will also be required to monitor and report on ungulate use of the Grave Flats Road and the relative success of the various

mitigation programs. Ongoing monitoring during mining activities to identify new mineral licks will also be needed.

4.5 Small Mammals and Amphibians

4.5.1 Views of the Applicant

CRC carried out research on the relative numbers of several groups of small mammals and amphibians potentially affected by the Cheviot Coal Project. The mammals examined included: shrews and rodents; bats; and hares and pikas. CRC did not carry out studies on terrestrial invertebrates as these were not raised in the EIA Terms of Reference or during public consultation as VECs. CRC did, however, respond to comments regarding butterflies raised at the public hearing, and this issue is addressed in this report section as well.

Study Area

CRC established 48 traplines within eight habitat types for shrews and rodents. These extended throughout the mine permit boundary and along the Grave Flats Road to the north and to the east of the mine permit boundaries. Data collection on bats focused primarily on the bat hibernaculum in the Cadomin Caves, which is located just south of the Hamlet of Cadomin. Additional summer data for bats were collected from Cadomin to the former townsite of Mountain Park. Evidence of hare distribution was measured during ungulate winter count surveys. Data on pikas, other small mammals, and amphibians were collected incidentally.

Existing Conditions

A total of 175 small mammals representing nine species were captured in CRC's sampling program. Two additional species (bushy-tailed woodrat and muskrat) were not sampled but felt likely to occur within the general study area. A sharp increase in small mammal density was noted between the two sample years; such variability was described by CRC as common in small mammal populations. Of the habitat types within the region, deciduous, riparian, and open coniferous or upland shrub had the highest densities of small mammals. The deer mouse was the most common species in both years, while meadow voles exhibited the largest increase between years.

CRC stated that four species of bats have been found hibernating within the Cadomin Caves, which is one of four known bat hibernacula in Alberta. Land use guidelines for the Caves state that public access will not be promoted during the swarming and hibernation periods (10 August to 30 April). Based on several years of data collected by AEP, the bat population using the Caves appears to be relatively stable at around 400 to 600 bats. No bats were observed by CRC in the general region of the mine area during the summer survey.

Pikas were observed by CRC on five different occasions in the Cheviot area, primarily in alpine terrain to the west of the mine permit boundaries. Snowshoe hares were among the most abundant furbearers

on the Cheviot mine site and found in a range of habitat types. Other mammal species recorded included least chipmunks, hoary marmots, golden-mantled ground squirrels, red squirrels, beavers, and porcupines.

Two species of amphibians (wood frogs and western toads) were observed within the study area. Neither species is considered endangered in Alberta. Toads were observed along the McLeod and Cardinal Rivers; and Luscar, Watson, and Prospect Creeks. Wood frogs were found at a single location in beaver ponds at Watson Creek, which is located downstream of the Hamlet of Cadomin.

Expected Effects

CRC expected that the impact of mine development on small mammals would include direct mortality due to clearing and indirect mortality due to habitat loss. Once reclamation was initiated CRC predicted, at least in the early stages, that existing densities of small mammals will return but that diversity would remain low until the diversity of new vegetation also increased. Therefore, mitigation of impacts on these species would require returning the mined areas to a diverse plant community as quickly as possible.

In the EIA, CRC predicted that no impacts from mine activities (e.g. blasting) on the use of the Cadomin Caves by bats would occur. When questioned at the hearing, CRC did confirm that it was considering locating a construction camp at the trailhead of the relatively steep trail to the Caves, but did not anticipate this would have a negative effect. CRC advised that it felt that AEP's ongoing monitoring of the Caves should continue during the construction and initial operating phases of the project, but that it did not believe it was appropriate for the company to tell either its employees or contractors that the Cadomin Caves was off limits or to try to enforce such a rule.

The primary source of impacts to amphibians was felt to be from the loss of riparian habitat within the mine site and during the construction of the road and rail line. Possible mitigation included maintaining wetland habitats, minimizing the clearing of riparian habitat, and preventing excessive siltation. A second source of impacts was either direct mortality of animals during their movements across areas of high traffic or indirect effects on movement due to avoidance of large open areas associated with the mine. No mitigation for these impacts was suggested. No cumulative effects on either small mammals or amphibians were predicted.

In final argument, CRC advised the Panel that while no butterflies of concern that could be impacted by the Cheviot Coal Project had, in its view, been identified, it was prepared to consider their nutritional requirements in its reclamation program.

4.5.2 Views of the Interveners

No specific concerns were raised either in interventions or at the hearing with regard to either small mammals, with the exception of bats, or amphibians. The Alpine Club Coalition, in describing the

relatively high number of unique species of organisms within the upper reaches of Prospect Creek, did note the presence of several unique species of butterflies in particular.

The AWA had a particular concern regarding disturbance of bat populations at Cadomin Caves. They noted that CRC had only examined the impacts of blasting at the surface mine and not road/railroad construction. They also noted that CRC was seriously considering locating a construction camp immediately adjacent to the trailhead leading to the Caves. In their view, this had the potential of greatly increasing the number of visitors to the Caves and therefore, the associated risk of disturbance, particularly during critical periods in the fall and winter. At the hearing, the AWA Coalition questioned CRC as to why it was not prepared to enforce a closure of the trail to the Caves to use by its employees and contractors or, alternatively, to re-locate the camp. In its application, the AWA Coalition also registered concerns with the cumulative impacts on bats from other sources of blasting (e.g. Inland Cement, the Luscar mine, road construction) and from damage to the springs associated with the Caves (see Section 3.1).

4.5.3 Views of the Panel

The Panel is prepared to accept as reasonable CRC's description of existing conditions for small mammals and amphibians at the Cheviot mine. The Panel also agrees with CRC's view that any small mammals or amphibians using habitat subject to direct disturbance will also be highly vulnerable to either direct mortality or indirect mortality due to habitat loss. Furthermore, there are few opportunities open to CRC to mitigate these effects during the active mining phase other than reducing disturbed areas as much as possible.

The Panel does not believe, however, that in a regional context, either impacts on small mammals or amphibians will be significant. Nor does the Panel believe that there will be significant cumulative effects. The Panel notes that habitat losses will be extended over several years, allowing at least some areas to be reclaimed prior to the disturbance of others. While the populations of small mammals re-invading disturbed areas will very likely initially have different compositions than those presently occupying the site, the Panel is prepared to accept that the carrying capacity for small mammals in reclaimed areas will be reasonably high and further, that as vegetative diversity increases over time, immigration from surrounding areas will eventually allow the original species' diversity to be re-established. For amphibians, the Panel believes it is reasonable to assume that the permanent loss of riparian habitat will at least be partially compensated for by the extensive end pit lake development. The Panel has no specific requirements for monitoring or follow up programs for either small mammals or amphibians.

The primary exception to the above finding is potential impacts on registered traplines (see Section 6.5). There are currently three registered traplines within the area. The Cheviot Coal Project may have indirect effects on these through the disruption of the normal predator/prey relationship within and beyond the mine boundaries. This issue will need to be considered by CRC in its negotiations with the owners of these traplines.

With specific reference to bat populations within the Cadomin Caves, the Panel notes that there was no argument among the parties to the hearing regarding their provincial significance, or their relative sensitivity to disturbance. The Panel does not believe, however, that mining or other activities associated with mine operations will have a significant effect on the populations using the Cadomin Caves. With regard to access to the Caves, while the Panel believes that these animals must be adequately protected, the Panel can also understand CRC's reticence in trying to prevent its employees and contractors from using trails currently open to other members of the public. However, the Panel does not disagree with the position of the AWA Coalition that the location of a camp at the trail base could increase the risk of disturbance to the Caves, although the Panel does not believe that risk is significant.

Should CRC ultimately locate a construction camp south of Cadomin, the company will be required to initiate an education program for all camp users regarding the sensitivity of the Caves to disturbance. As well, CRC will be expected to monitor the use of the trail by its employees and contractors and, in conjunction with AEP, determine if usage levels warrant any further intervention. However, any decisions regarding changes to access to the Cadomin Caves by the public is the responsibility of AEP.

4.6 Harlequin Ducks

4.6.1 Views of the Applicant

In its application, CRC noted that it had included the Harlequin duck in its analysis of potential environmental effects due to concerns raised regarding this species in Jasper National Park. CRC noted that the species was considered by AEP to be a species for which there are "no population concerns, and no specific management efforts required", and that Harlequins had not been identified as a species of concern in either the Terms of Reference for the Cheviot Coal Project EIA or during CRC's public consultation process.

Study Area

Surveys for breeding/nesting pairs of Harlequin ducks were carried out in 1995 and 1996 along the McLeod River from the Watson Creek campground to the bridge on the north side of the Cardinal Divide on the Cardinal River; and on Red Cap, Whitehorse, Drummond, Thornton, Cheviot, Harris, Powerhouse, West Jarvis, and MacKenzie Creeks.

Existing Conditions

Harlequin ducks are sea birds which nest along swiftly flowing mountain streams. Population estimates for the Pacific Northwest presented at the hearing ranged from 160,000 to 200,000 birds. The number of breeding pairs and breeding streams in Canada and Alaska are unknown. CRC reported on several scattered observations of the birds in Alberta and noted that no concerted efforts had been made to accurately determine their general distribution or the population size of breeding pairs in the province. East coast populations (less than 1,000 birds) of Harlequins are considered to be endangered, while

west coast populations have shown significant declines, possibly due to damage of marine habitat (e.g. oil spills) and disturbance to breeding habitat.

Surveys carried out by CRC in 1995 suggested that from 9 to 14 and 5 breeding pairs of Harlequin ducks, respectively, may use the McLeod and Cardinal River drainages. Additional survey and banding work in 1996 indicated that as many as 60 birds may be using the region. Adult birds were noted particularly at the junction of tributaries with the upper McLeod River (e.g. Luscar, Cadomin, and Prospect Creeks), on Whitehorse Creek, and on upper MacKenzie Creek. Broods were observed at Red Cap Creek, MacKenzie Creek, and in the McLeod River downstream of the Mountain Park Staging Area. While no broods were observed in Thornton, Cheviot, or Harris Creeks or the upper McLeod River, CRC considered that these were also possible nesting habitat. CRC observed that Harlequin nesting habitat tends to be quite specific and generally occurred in the upper reaches of streams, and so was subject to high, rapid runoff (and associated risk of mortality to eggs), followed by a rapid return to clear water conditions, which was necessary to allow the birds to feed effectively. Nesting appears to take place in the upper reaches of the various streams, with the female and her brood then moving gradually downstream over the summer. The birds are generally long-lived and females show high fidelity to their natal streams. Because males return to the ocean following breeding, only a single brood per year is possible. All of the above characteristics were felt by CRC to make the Harlequin particularly sensitive to disturbance and relatively good indicators of environmental quality.

Expected Effects

Both mining activities and development of the road, rail, and power line were anticipated to have an effect on Harlequin ducks. Possible sources of impacts were predicted by CRC to include: (1) disruption of flow regimes, particularly increased or multiple flood events and the associated risk of loss of nests; (2) sedimentation of streams and the associated risk of impacts on supplies of benthic food organisms; (3) general negative changes to existing stream morphology and associated habitat effects; (4) loss of riparian vegetation; and (5) increased human activity and associated disturbance of both nesting birds and their broods.

CRC estimated that its mining operations would result in the permanent loss of two probable nesting areas (Cheviot and Thornton Creeks) and portions of MacKenzie Creek and one of its tributaries. As well, Harris Creek, a possible nesting site, would be modified. Construction of the road, rail line, powerline, and coal processing plant were also considered potential sources, at least during construction, of sediment and bank de-stabilization, and so additional habitat loss. At the hearing, CRC also confirmed that it was not known how Harlequin ducks and their broods would respond to culverts when moving along area streams, but CRC did believe its culverts would not act as a barrier to downstream migration of broods.

CRC noted that, in its view, the presence of a probable nesting female on the McLeod River at the site of the former reservoir for the Town of Mountain Park may indicate that Harlequins have the potential to colonize disturbed areas. CRC also noted that since Harlequins were relatively long-lived, this may

allow the birds to better adapt to short-term disturbance during construction. At the hearing, CRC also observed that very few intensive surveys for Harlequins had been undertaken in Alberta. In its view, the relatively high numbers observed at the Cheviot site could be an artifact of this lack of general survey data. All these factors led CRC to conclude that project impacts on Harlequins were likely to be insignificant, and that no cumulative impacts were anticipated. CRC did state that ongoing monitoring of the effectiveness of any mitigative measures should be carried out.

CRC described several mitigation strategies for impacts to Harlequins that it was prepared to consider during future detailed planning. These included:

- (1) placement of temporary access roads, waste disposal sites, borrow pits, staging areas, etc in areas not immediately adjacent to the river;
- (2) planning of construction around sensitive periods in the birds' life history;
- (3) maintenance of a 100 m buffer along the McLeod River where possible;
- (4) avoidance or reduction of stream crossings and the use of bridges rather than culverts;
- (5) timing of flow releases to mimic natural patterns;
- (6) further inventory of area streams to better identify key habitat for Harlequins; and
- (7) ensuring that no new human recreation or access is encouraged on the McLeod River.

4.6.2 Views of the Interveners

In its submission and at the hearings, Environment Canada noted significant concerns with regard to the effects of the Cheviot Coal Project on Harlequin ducks, both within the mine site and by extension, to the birds on winter ranges in the Strait of Georgia. Environment Canada confirmed CRC's view regarding the current population status of the Harlequin as well as its ecology. However, Environment Canada also noted that in the northwest United States and British Columbia, Harlequin populations are generally listed as a species of concern, for a variety of reasons. Environment Canada also observed that in Alberta, Harlequin habitat is limited to the mountains and foothills and that within that range, their distribution is uneven. Sources of disturbance to these birds in Alberta included commercial rafting and tourism along the Elbow and Maligne Rivers, as well as general habitat damage and human disturbance.

Environment Canada noted that, based on the data provided by CRC, the McLeod drainage contained the second largest population of breeding Harlequins observed to date in Alberta. Environment Canada felt that until the McLeod River's relative importance to Harlequin populations in general could be established, significant limits should be placed on the proposed development. Environment Canada recommended that:

- C on tributaries of the upper McLeod River of importance to Harlequins, that a 100 m disturbance free zone on each side of the streams be established;
- C any waste rock dumps be designed so as to preclude the risk of failure into undisturbed streams;
- C no construction activities occur between 1 May and 15 September within 100 m of streams supporting Harlequin ducks;
- C the coal preparation plant and rail loop be relocated to an area of less importance to Harlequin ducks;
- C bridges be used instead of culverts;
- C stream flows be re-established on the surface over rock dumps instead of through rock drains;
- C the rail line be relocated further away from the McLeod River in order to minimize construction disturbance; and
- C measures be taken to discourage recreational use and access across the McLeod River.

Environment Canada also noted the need for both long-term monitoring and further research in the attributes of Harlequin duck breeding and rearing habitat. Environment Canada advised the Panel that, in its view, the current application by CRC did not adequately address the cumulative effects of the proposal with respect to Harlequin ducks and that, without design alterations, Harlequin duck populations would be impacted.

The AWA Coalition indicated that, in its view, CRC had failed to adequately address potential impacts of the Cheviot Coal Project on Harlequin ducks. Relevant issues included missing information on: the appropriateness of the proposed mitigative measures; the size of populations to be affected and the timing of these affects; the loss of biodiversity; and the impacts of habitat fragmentation. The AWA Coalition believed that CRC, rather than providing the above data prior to requesting approval, proposed to collect the information needed to properly design a mitigation and reclamation plan only after it had received approval. This, they stated, was inconsistent with the EIA Terms of Reference.

The AWA Coalition noted that CRC had made no commitment to carry out any of the mitigation strategies described in the EIA. Nor had CRC, in its view, carried out a CEA for Harlequins. They noted that CRC's contention of only relatively short-term impacts was highly unlikely, but rather would be at least between 20 years (the life of the mine) and 35–45 years (the time needed to restore riparian habitat) in duration. Since, in its view, CRC had not made an adequate commitment to restore riparian vegetation, such impacts could in fact be of even longer duration. Furthermore, the AWA Coalition noted that mitigation of the impacts of development would only occur if other breeding birds were available and willing to re-colonize the area, an assumption which they believed could not be supported

by CRC's application. Finally, AWA pointed out that AEP was currently reviewing the status of the Harlequin duck in Alberta and, given recent information, they were relatively sure its status would be changed to a higher risk category.

In its submission, AEP advised the Panel that it was prepared to accept CRC's analysis of the current status of the Harlequin duck and the potential impacts of mine development. AEP also confirmed that it is currently reviewing the status of the Harlequin in Alberta. AEP indicated that, given the species' sensitivity and its apparent density within the region, it was prepared to accept CRC's proposed inventory and mitigation programs. AEP indicated that CRC would, prior to receiving AEP approvals, need to:

- C complete the proposed Harlequin inventory, and identify critical habitat;
- C identify and assess the impacts of the current mine design;
- C identify and assess the effectiveness of mitigation strategies;
- C consider alterations needed in the mine design to protect Harlequin habitat; and
- C in consultation with AEP, design and report the results of monitoring programs on the effectiveness of the mitigation strategies.

During its cross-examination of Environment Canada, the Alpine Club Coalition noted that some nesting of Harlequin ducks had been observed in Prospect Creek and suggested that avoidance of mining in that drainage would be of benefit to the species.

4.6.3 Views of the Panel

The Panel notes that all parties to the hearing agreed that the Harlequin duck, given its relatively unique habitat requirements for nesting and brood rearing, plus its fidelity to specific areas, makes it an excellent indicator of general habitat quality, and presumably, of the ability of a project proponent to mitigate affects on that quality.

In considering the potential impacts on the Harlequin duck, the Panel believes that the research to date by CRC has been adequate to describe the general distribution of these birds in the area as well as provide a reasonable indication of their use, both temporally and spatially, of that habitat. The Panel also believes that the Cheviot Coal Project, as proposed, will have a significant and permanent adverse effect on certain portions of that habitat, namely those creeks which are filled with waste rock. Furthermore, various aspects of the project (e.g. road and rail construction, culverts) will at best temporarily disturb adult birds and their broods and at worst potentially make other stream sections unavailable to the Harlequins for at least the duration of the Cheviot Coal Project.

Unfortunately, there is not a significant amount of information available regarding the relative sensitivity of Harlequins to disturbance. The Panel notes that two Alberta populations, on the Elbow and Maligne Rivers, appear to have been impacted by recreational use of those rivers. However, these effects on flightless broods of very young ducks, who depend on the rivers to provide escape habitat, is not unexpected. The Panel does believe that the sources of disturbance from development of the Cheviot Coal Project would likely be of a quite different nature (i.e. on shore, localized) and so not directly comparable. The Panel also notes that the upper McLeod River was heavily disturbed by mining activity for several decades. The presence of nesting Harlequins there now strongly suggests that either the birds were able to adapt to human presence or alternatively, were able to re-colonize the area once disturbance ended.

The Panel accepts the view of Environment Canada that, in assessing the potential significance of a reduction in the McLeod River Harlequin population, it is necessary to look in a broader context to the population as a whole. In doing so, the Panel believes a number of points need to be considered. First, it was generally accepted by all parties that there are between 160 000 and 200 000 Harlequins located in western North America. Even if only a relatively small proportion of these birds are breeding, then it appears reasonable to assume that several thousand breeding pairs exist. Therefore, while a reduction in the McLeod River population may be of local, regional, or even provincial significance, and while the Panel can understand Environment Canada's desire to avoid any source of incremental loss to the breeding population, the Panel does not believe that it is appropriate to consider such losses to be significant in terms of the species as a whole.

Second, on a regional basis, it was suggested that the McLeod River population was very significant since it represented the second largest concentration of breeding birds found to date in Alberta. The Panel does accept that the McLeod River population is regionally important. What is not yet clear is to what degree the relative size of this population, when compared to other provincial populations, is a function of the level of effort made to carry out surveys. The Panel notes that estimates made in 1995 apparently underestimated the population size by 50 per cent, not a surprising result given the secretive nature of the birds. The Panel is persuaded that other mountain and foothills streams also likely have Harlequin populations, but have simply not been systematically surveyed to anywhere near the degree of intensity that has occurred in the McLeod River system.

Based on the above, the Panel does not believe that the effects on regional Harlequin duck populations during the life of the mine would be sufficiently large as to be unacceptable. The Panel accepts that some reductions in the current size of the breeding population within the area to be disturbed by mine development will occur, and furthermore, there is a significant risk that the population may not recover to its current size due to the permanent loss of some habitat. The Panel also believes, however, that a number of sources of impact during the life of the mine can be reduced or mitigated and that, following mining activity, there is a reasonable probability that re-colonization of at least some area streams by Harlequin ducks will occur. As a result, the Panel does not believe that the adverse environmental effects on Harlequin ducks will be significant.

With regard to mitigation, the Panel believes that the mitigation strategies described by CRC are reasonable and, to the degree practical, will require that they are implemented should the Cheviot Coal Project be approved. These requirements will include:

- (1) avoiding placing any unnecessary construction activities (e.g. staging areas, borrow pits, etc) in proximity to the main stem of the McLeod River and MacKenzie Creek;
- (2) planning of construction activities around sensitive periods;
- (3) maximizing setbacks from the McLeod River, MacKenzie Creek, and the Cardinal River systems wherever possible;
- (4) re-examining the use of culverts and either substituting bridges or providing a detailed rationale for the retention of culverts; and
- (5) timing of flow release patterns to the degree possible to mimic natural patterns and levels.

The Panel is not prepared to require CRC to relocate either the rail loop or the coal processing plant to reduce potential impacts on Harlequin ducks. The Panel notes that the site chosen by CRC represented a complex balance between a number of conflicting environmental, social, and engineering issues, and is not persuaded that the possible reduction in effects on Harlequin ducks is sufficient to require that CRC re-examine the tradeoffs already made.

The Panel also believes that ongoing monitoring of Harlequin duck populations in the McLeod River, MacKenzie Creek, and Cardinal River systems is warranted. As noted earlier, the species appears to be an excellent indicator of general ecosystem health, and so will provide a measure of CRC's success in avoiding disturbance to riparian habitat in general. Further inventories of area streams will also assist CRC in identifying additional key habitats for the species.

Finally, the Panel notes that reducing further human access to the Cardinal River and the McLeod River and avoiding new access to MacKenzie Creek may also reduce impacts to Harlequin ducks. However, such decisions need to be made as components of integrated land planning, and the responsibility of AEP and not CRC. Therefore, the Panel suggests CRC work in conjunction with AEP in assessing any issues associated with access to these drainages.

4.7 Neotropical and Other Breeding Birds and Raptors

4.7.1 Views of the Applicant

Study Area

In assessing potential impacts on neotropical and other smaller birds arising from the Cheviot Coal Project, CRC carried out breeding bird surveys in 1993 and 1994. Eighty plots were sampled in 1993

and 42 sampled in 1994. Plots were primarily located within the mine permit boundary, but also extended down both the McLeod River and MacKenzie Creek drainages. Owl surveys were carried out over 77 kms of trails and roads throughout the general area of the mine, while surveys of diurnal raptors focused on cliffs near the headwaters of Prospect, Cheviot, and Thornton Creeks, and along Cardinal Divide.

Existing Conditions

Neotropical migrants are those birds which breed in Canada and the United States, and generally winter between the Tropics of Cancer and Capricorn. CRC noted that many of these species have been declining within their breeding ranges over a prolonged period. Since western populations breed primarily in limited riparian and montane forests, CRC observed that they may be particularly vulnerable to disturbance. Forty-four of the 76 bird species recorded by CRC within the region of the Cheviot mine were neotropical migrants.

Bird densities at Cheviot were slightly higher than at Coal Valley and significantly higher than the Luscar mine. On the mine site, shrub habitat supported the highest density of birds, while coniferous habitat had the lowest bird density. Density also increased with increases in proportions of shrub and edge in vegetative communities, while diversity was positively correlated with increased structural (i.e. horizontal and vertical) diversity.

Seven diurnal raptor species and two owl species were observed by CRC. A possible siting of either a peregrine or prairie falcon was also noted. Some (e.g. golden eagles, northern harriers, rough-legged hawks) were thought likely to be migrants, while others (e.g. American kestrel, red-tailed hawk, sharp-shinned hawk, osprey) may nest in the area or nearby, although no nests were observed. A single great horned owl and several boreal owls were recorded during winter bird surveys, and boreal owls were common along both the Cardinal River and MacKenzie Creek during the summer months.

Expected Effects

In its assessment of the impacts on neotropical birds, CRC did not specifically distinguish between the various project components. CRC did predict that the primary source of impacts on neotropicals and other breeding birds will result from vegetation removal during both the construction and mining phases of the Cheviot Coal Project. Both direct mortality and indirect impacts from loss of breeding habitat would occur. During the reclamation process, shifts in bird community distribution would also result due to changes in the vegetative community composition.

CRC expected that raptor populations would be affected through both direct mortality of adults (e.g. electrocution or collisions) and direct mortality of eggs or young (e.g. removal of active nest sites). Less direct impacts could include the loss of tree cover, nesting areas, or prey habitat, as well as sensory disturbance from blasting or similar activities.

In order to mitigate these impacts, CRC advised that it would consider a number of options during detailed planning. These included: clearing of vegetation outside of the breeding season; maintaining as much undisturbed vegetation as possible; removal of carrion from roads as soon as possible to avoid scavenging and the associated risk of collisions; and reclaiming the returned mine site to as diverse a vegetative community as practical.

CRC concluded that there were no significant cumulative effects expected on either neotropicals or raptors.

4.7.2 Views of the Interveners

In Environment Canada's view, development of the Cheviot Coal Project would greatly reduce the biodiversity of habitat types within the area. This, in turn, would have an impact on a number of species and particularly bird species. Environment Canada observed that the area had a notably high number of bird species, many of which are showing generally declining numbers and/or which have restricted ranges and special habitat requirements. Environment Canada also noted the relative importance of riparian and shrubland habitats, two relatively common features of the mine area, to bird species. Much of this habitat would, in its view, be lost or damaged under CRC's current mine plan. In order to mitigate some of these effects, Environment Canada recommended that no vegetation clearing in areas where migratory birds are nesting take place between 1 May and at least 21 July. It was also recommended that all mine plans be reconfigured so as to minimize habitat loss, particularly riparian and shrub habitat, and to provide 100 m buffers on both sides of all streams from disturbance.

The AWA Coalition found the treatment of various bird species in the EIA "uneven". For example, colonization by neotropical birds was discussed while colonization by raptors was not. The AWA Coalition also believed that the CRC application had underplayed the significance of riparian habitats, as well as not clearly indicating that the two most common habitat types on the site (i.e. riparian and spruce forest) will be under-represented once final reclamation is complete. Populations dependent on these vegetation types would, therefore, be negatively affected permanently.

4.7.3 Views of the Panel

The Panel notes the research carried out by CRC within the proposed Cheviot mine region and is prepared to accept the company's views with regard to existing populations of neotropical birds and raptors. The Panel is also prepared to accept Environment Canada's view that the diversity of bird species within the Cheviot region is high relative to other regions.

The Panel would agree with CRC that, as vegetation is removed from mine development, habitat will become completely unavailable for nesting birds. Furthermore, human activity and noise will likely extend those effects further than the area immediately disturbed. Such habitat will not become available again until re-vegetation is completed. The Panel also accepts that the original species' diversity in the area will not likely return until vegetative diversity is also re-established. As a result, impacts will begin relatively early in the project and extend several decades beyond the final reclamation of the mine. If

the final reclaimed landscapes, due to the use of rock drains, are significantly drier than what currently occurs within mine areas, then some permanent loss of riparian shrub habitat, and therefore numbers of birds, may also occur.

The Panel notes and accepts that many bird species, and particularly neotropicals, are losing available habitat at a significant rate. Therefore, any further loss of habitat, particularly in cases such as the Cheviot Coal Project where such habitat is of relatively limited distribution, should be avoided to the extent possible. In this particular case, there is little doubt that development of the Cheviot Coal Project will have a significant adverse effect on local bird populations in general and neotropicals in particular. The Panel also believes that, despite CRC's commitment to the reclamation and revegetation of the site, these effects will be relatively long term. The Panel does believe that much, if not all, of the current species diversity within the mine area can ultimately be re-established.

In order to further mitigate these effects, the Panel will require CRC, should the Cheviot Coal Project be approved, to attempt to restrict vegetative clearing to periods outside the breeding season and to make the maximization of habitat diversity a key component of its reclamation plans. Removal of carrion from the roads will also be encouraged to reduce raptor mortality. Such actions should, in the Panel's view, ensure that impacts on song birds and raptors will be reduced and justifiable in the overall circumstance, and that both the risk of longer term and cumulative effects are lowered to acceptable levels.

5 ATMOSPHERIC ENVIRONMENTAL EFFECTS

5.1 Noise and Vibration

5.1.1 Views of the Applicant

Study Area

CRC indicated that it had considered existing levels of noise within the area to be affected by mine development and the coal processing plant, as well as along the access corridor. At the hearing, the possible effects of noise within Jasper National Park was also evaluated.

Existing Conditions

CRC noted that no permanent or temporary residences are present either within or near the proposed surface mine and coal processing plant areas. Existing sources of man-made noise were traffic related, either on the Grave Flats Road or from off-highway vehicles.

The nearest residences are found within the Hamlet of Cadomin. Existing noise sources include the Inland Cement plant, the Luscar mine, and the rail and road traffic associated with both developments. CRC noted that anyone using the Whitehorse Creek Recreational Area would also be exposed, albeit to a lesser degree, to these noise sources plus any general road traffic. No temporary or permanent residences currently exist on the Alexis First Nation lands.

Expected Effects

CRC advised that, because of the distances involved, the noise levels from both the mine and the coal processing plant would meet the EUB requirements of less than 40 dBA Leq at the nearest residence (i.e. Cadomin), and therefore no effects from mine and coal processing operations on either the Hamlet of Cadomin or the Whitehorse Creek Recreational Area were predicted.

CRC said that it expected increased noise levels with respect to the Alexis First Nation lands, which are presently unoccupied, but that these levels would also be no greater than 40 dBA Leq and would occur only when the mining operations approached close to the Alexis First Nation lands.

CRC noted that during development of the 50-A-8 pit at the Luscar mine, it had implemented a number of procedures which had further reduced noise levels associated with mining operations. If conditions warranted, and provided other issues such as worker and public safety could be addressed, CRC indicated that it would be prepared to consider such procedures at the Cheviot Coal Project.

With respect to the transportation and utilities corridor in the McLeod River valley, CRC noted that there was some potential for noise impacts on the community of Cadomin; however, changes in train make-up and the introduction of sight and sound barriers with respect to the Cadomin bypass road

should minimize these impacts. Under cross-examination, CRC advised that a noise evaluation study had not been conducted with respect to the final route of the bypass road, but expected that increases in noise level could be mitigated with berms and/or barriers. CRC said that any elevated noise levels from train traffic through Cadomin would be mitigated by the decrease in traffic to the Luscar mine and by more efficient handling of the Inland Cement rail traffic. With respect to the Whitehorse Creek Recreational Area, CRC advised that the anticipated noise exposure, while elevated above the levels existing at present, would be comparable to other area recreational sites. Vibrations from trains were considered as being virtually undetectable from present background conditions.

During the hearing, and in response to cross-examination, CRC provided an assessment of the anticipated noise levels which could be expected in Jasper National Park. This assessment indicated, in CRC's view, that the EUB goals for sound levels in pristine areas (i.e. less than 40 dBA Leq at 1.5 km from the sound source) would be achieved.

CRC referred to a 1989 study it had conducted with regard to the potential for impacts of blast vibration on the Cadomin Caves. This study was carried out in relation to the Luscar 50-A-8 mining operation. Subsequent monitoring had shown that vibrations due to its operations in the 50-A-8 area are not detectable at the mouth of the Cadomin Caves. Given that the Cheviot Coal Project would be even further from the Caves than the 50-A-8 operations, CRC concluded that impacts on the Cadomin Caves would be negligible.

Following evaluation of the anticipated noise levels associated with the project, CRC concluded that noise and vibration were not significant environmental issues, that long-term monitoring of noise was not considered to be necessary, and that noise levels were expected to comply with the EUB guidelines.

CRC expressed the opinion that there were no cumulative effects resulting from noise and vibration associated with the project.

5.1.2 Views of the Interveners

CEPA said that it had retained its own consultant with respect to the Cadomin road options and that the consultant had concluded the traffic generated by the project could be expected to double if the Cheviot Coal Project goes ahead. It noted that the present posted speed limit through the community was 50 km/hr and that the traffic was reasonably unintrusive on the quality of life of the residents. CEPA felt that all possible steps should be taken to mitigate the impacts of noise on the community, and therefore believed that the bypass road should be paved from the northern to the southern boundary of the Hamlet.

Parks Canada and the AWA Coalition expressed concern for the potential for noise impacts in Jasper National Park. However, in cross-examination, Parks Canada agreed that there were no documented complaints received to date in relation to the existing Luscar mine operations.

Both the AWA Coalition and the Alpine Club Coalition questioned the potential for noise impacts in the Cardinal Divide Natural Area. They noted that the EUB Noise Control Directive (ID 94-4) required companies in remote areas to achieve 40 dBA Leq at a distance of 1.5 km from the facility. In their view, CRC would be unable to achieve this at the Cardinal Divide Natural Area. The Alpine Club Coalition believed that further noise studies by CRC were warranted.

5.1.3 Views of the Panel

The Panel accepts the results of the noise study conducted on behalf of CRC; however, it notes that the requirements of the EUB's ID 94-4 may have received too narrow an interpretation by the company in their application to the various components of the project. Should the project be approved, the Panel will require that, prior to any construction work being started, CRC establish Permissible Noise Levels (as defined by ID 94-4) with respect to residences in the Hamlet of Cadomin and the Whitehorse Creek Recreational Area. Such a step would provide criteria from which any future noise complaints could be assessed.

The Panel does not agree with CRC's view that noise resulting from rail or road traffic generated by the Cheviot Coal Project is beyond the purview of the EUB. These activities are, in fact, integral to CRC's application for approval to the EUB. Therefore, should these activities result in noise levels unacceptable to the residents of Cadomin, CRC will be required to take any steps deemed appropriate by the EUB to reduce these levels.

With respect to noise levels at the Cardinal Divide Natural Area, the Panel notes that CRC's activities will almost undoubtedly be audible. However, just as CRC has placed too narrow an interpretation on the EUB's noise control guidelines, the Panel believes that the interveners' interpretation may be too broad. The Panel notes that the EUB's noise control requirements are designed to ensure that sound levels are minimized in remote areas in order to ensure that, should a residence be established at some future time, conflicts can be minimized. The Directive does not address noise impacts on temporary users of the land and, in fact, does not even guarantee that a permanent resident will not be able to hear the new facility, but rather only that indoor sound levels will not be affected. The Panel believes that, while sounds from the Cheviot Coal Project would not go unnoticed in a wilderness setting, the noise impacts on Jasper National Park and the Cardinal Divide Natural Area will not be significant. However, the Panel will require CRC to consult with both Parks Canada and the Alpine Club Coalition should noise complaints arise and, wherever possible, look for feasible methods to reduce impacts.

The Panel agrees with CRC's conclusions that negligible blasting impacts on the Cadomin Caves from development of the Cheviot Coal Project are likely. However, given the potential sensitivity of the Caves' ecological resources, the Panel will require, if the application is approved, that CRC evaluate with EUB staff whether any additional noise follow up or monitoring prior to start up is appropriate.

5.2 Emissions

5.2.1 Views of the Applicant

Study Area

Local, regional, and global emission issues were addressed by CRC. Local boundaries were felt to extend to the Whitehorse Creek Recreational Area, the residential areas of Cadomin, the Smallboy Camp, and the Alexis First Nation lands. Regional impacts on Jasper National Park (visibility) and on the West Central Airshed, established by AEP, were also addressed by CRC, as were the potential global effects of the project due to greenhouse gas emissions.

Existing Conditions

Meteorological data used by CRC included data from the current Luscar mine monitoring network (from 1991) and a monitoring station established at the former townsite of Mountain Park (from 1993). Particulate data were collected at stations in proximity to Cadomin.

North–west, west, and north winds predominated and wind speeds were less than 5 m/s 89 per cent of the time. Inversions were found to occur 38 per cent of the time. Mean annual total suspended particulate levels were 22 Fg/m³, while 24 hour maximum average values were 109 Fg/m³. While the latter was slightly above AEP guidelines, the levels were not considered indicative of either public health or environmental concerns. Measured levels of annual and maximum fine particulates were 7.5–11 Fg/m³ and 38–49 Fg/m³, respectively and were considered to be low, representing good air quality.

Expected Effects

CRC stated that it planned to have much of the coal preparation plant totally enclosed and that it intended to install dust control systems at various dust–generating locations and totally enclose all external conveyors. The proposed emission limits for the coal dryer, it advised, would be based on a best available control technology (BACT) evaluation and would compare very favourably with other plants in Canada and the United States. CRC expected to reduce particulate emissions to about 30 per cent of the maximum limit permitted by AEP for exhaust gas. CRC said that outside storage of coal, and therefore associated dust, would be reduced by providing four large coal silos (compared with one silo at the existing Luscar mine site). Other emission levels (e.g. oxides of nitrogen) would, in CRC's view, be negligible. With respect to its predictions of the ambient air quality which could be expected as a result of the Cheviot Coal Project, CRC advised that it had used a dispersion model developed by the U.S. Environmental Protection Agency. This model, CRC noted, had been accepted by both AEP and Environment Canada.

CRC indicated that it intended to use surfactants on the gravel surface of the proposed upgraded Grave Flats Road for dust control and continue the practice of applying water to the mine's haul roads currently used at the Luscar mine. CRC noted that local nuisance dusting may occur in the vicinity of

both the cemetery and of the former townsite of Mountain Park, but that no health effects are anticipated because of the relatively short exposure times which would be incurred by visitors to these areas. CRC also noted that dust sources from the existing Luscar mine would decline as that mine reached the end of its economic life, and so reduce regional loadings.

CRC said that, based on its modelling, regional air quality in the West Central Alberta Airshed would not be significantly affected by the project, and that visibility in Jasper National Park would also be unaffected. As the Cheviot Coal Project was a replacement for the Luscar mine, CRC also expressed the opinion that there would be no significant new contributions to global warming. At the hearing, CRC also indicated that it did not expect significant emissions of PAHs from its tailings pond due to diesel fuel carryover, since the vast majority of the material would adhere to the clean coal.

CRC concluded that the results of its studies suggested that the impacts from dust and gaseous emissions during the construction and operation phases would be insignificant, that there would be no significant effects on ambient air quality or public health, and that there would be no cumulative effects in respect of air quality associated with the project.

5.2.2 Views of the Interveners

The Mountain Park Association expressed a concern that fish in the area could ingest coal dust, and questioned whether such fish could be safely eaten. A similar concern was expressed by Health Canada, who speculated whether human exposure to coal dust and subsequently to PAHs could occur directly from the consumption of contaminated vegetation or indirectly from the consumption of wildlife or fish harvested from the area.

CEPA stated that, notwithstanding CRC's proposed use of calcium chloride on the bypass road, it continued to have reservations that this was sufficient to control dust adequately, and felt that paving of the bypass was the answer to its concerns for dust impacts on the community.

The Alpine Club Coalition expressed concern regarding the potential for dust emissions on rare plants within the Cardinal Divide Natural Area and rare plants located in the area along the transportation and utilities corridor.

The AWA Coalition raised several concerns regarding potential emissions from the Cheviot Coal Project. They argued that dust plumes and haze will be visible from some considerable distance, and could impair the natural vista. Further, these effects will increase as mine development expands. They felt that CRC had also not considered the impacts of particulates on alpine vegetation in either the Cardinal Divide Natural Area or Jasper National Park, particularly on lichens which receive a significant portion of their nutrients from atmospheric deposition. The AWA Coalition also believed that CRC had not adequately addressed the impacts of particulates on human health, claiming that CRC's current sampling frequency may be inadequate, that CRC had not considered the cumulative effects of both the Luscar mine and the Cheviot mine, and that CRC should sample for particulates in communities other

than Cadomin. Finally, the AWA Coalition stated that they believed CRC's dispersion models were inaccurate.

The AWA Coalition also raised concerns regarding volatile organic carbon (VOC) and nitrogen oxide (NO_x) emissions from the mine. In particular, either direct impacts from these compounds, or indirect effects due to the formation of ozone, were predicted on sensitive plant and animal communities. PAH and BTEX (benzene, toluene, ethylbenzene, and xylene) were also considered to be compounds of concern in emissions from the Cheviot Coal Project. In their view, CRC failed to adequately quantify NO_x or VOC emissions from the Cheviot Coal Project or to adequately describe the cumulative impact of ground level ozone in the West Central Airshed.

Finally, the AWA Coalition noted that Canada had made an undertaking to reduce its national emissions of greenhouse gases, and particularly CO₂, to 1990 levels by the year 2000. In their view, this commitment was reconfirmed by the government, and that significant steps would need to be implemented to meet this goal. The AWA Coalition argued that approval of a project designed to produce large volumes of hydrocarbon, and therefore CO₂, was inconsistent with federal policy. Alternatively, approval of the Cheviot Coal Project would require foregoing or curtailment of other, potentially more economic, future developments in order to meet the federal commitments.

The AWA Coalition noted that, in their view, CRC had not adequately addressed the impacts of methane emissions from the Cheviot Coal Project on global warming. This was important, they stated, because methane has 21 times the global warming impact of CO₂. Nor did CRC adequately address, in their view, the emissions of global warming gases associated with plant operations (e.g. thermal dryers, space heating, fuel consumption, electrical power, etc). Finally, the AWA Coalition noted that CRC had not yet provided any evidence that CRC was an active participant in Canada's Climate Change Voluntary Challenge and Registry Program.

Health Canada advised the Panel that no data on potential health effects associated with surface coal mining appeared to be available, and indicated it would be prepared to participate in such a study. The Alexis First Nation noted that it had issues similar to those raised by Health Canada, since its community members actively hunt animals in the area for food. They stated that they wished to be assured that airborne emissions were not contaminating area food sources.

5.2.3 Views of the Panel

Despite the concerns raised by some participants to the hearing, the Panel did not find the evidence of risk to plants, animals, or humans from emissions from the Cheviot Coal Project to be compelling. The Panel believes that no evidence was provided which would suggest that impacts on ambient air quality or public health will occur or be significant. The Panel also believes that there will be no cumulative effects, as a result of emissions, from the proposed project. In reaching this conclusion, the Panel notes that, in general, the emission sources of VOC, NO_x, BTEX, and PAH from a surface mine would appear to be significantly smaller than from many other industrial facilities. The Panel also notes that

neither AEP nor Environment Canada expressed any concerns in their submissions with regard to emissions.

The Panel does believe that the concerns raised by CEPA regarding dust within the Hamlet of Cadomin warrant further consideration. The Panel notes that, in a previously considered Cadomin bypass proposal, CRC had indicated that it was prepared to pave the Cadomin bypass section of the upgraded Graves Flats Road. However, the Panel understands that CRC no longer considers it necessary to pave the most recent bypass alternative since it would be located some distance away from the Hamlet. The Panel believes, however, that in view of concerns with respect to dust in relation to the proposed Cadomin bypass, paving of this section (i.e. from the northern boundary of the Hamlet to its southern boundary) is very likely still appropriate. Should the project be approved, the Panel will expect CRC to discuss this issue further with the municipal authorities and with the community and, in the absence of concerns from either party or safety issues, ensure that this road section is paved.

With regard to the emissions of greenhouse gases, the Panel notes that the Cheviot Coal Project would, if approved, within two to three years replace mining activities at the existing Luscar mine. While the new mine will have higher production rates and therefore greater sources of greenhouse gas emissions, this will be offset somewhat by higher energy efficiency at the new mine. Therefore, the Panel does not believe that approval of the Cheviot Coal Project will result in a significant change in regional emissions of greenhouse gases.

The Panel accepts that, if Canada ultimately does determine that specific caps to greenhouse gas emissions from industry sources should be put in place, there will be some, although likely small, level of risk that a decision by this Panel to approve the Cheviot Coal Project may have an affect on the overall implementation of such a program. However, to the Panel's knowledge, no such program currently exists.

6 LAND USE EFFECTS

The proposed Cheviot Coal Project is located on lands owned by the Province of Alberta (i.e. Crown lands) and is subject to government land use policies. A number of other uses are currently made of these and nearby lands, including: provincial natural areas, recreational uses, commercial developments, and federal national parks. (A number of communities are also located near to the Cheviot Coal Project. The expected environmental effects of the Cheviot Coal Project on them are discussed in Section 7 of the report.)

6.1 Land Use Policies

6.1.1 Views of the Applicant

In their application, CRC acknowledged that several provincial zoning policies cover the proposed development areas of the Cheviot mine, including the Coal Development Policy for Alberta, the Eastern Slopes Policy, and the Coal Branch Sub-Regional Integrated Resource Plan.

CRC also noted that the proposed Cheviot Coal Project area is located entirely within the Municipal District (M.D.) of Yellowhead No. 94. The applicant indicated that, should the project be approved by the provincial and federal governments, local development approvals would also be required and would be subject to the development policies of the M.D.

Coal Development Policy

CRC noted that the 1976 Alberta Coal Development Policy identified a variety of categories which set out the extent to which exploration and development of coal resources may be considered in Alberta. The categories are based on factors such as potential coal resources, infrastructure requirements, alternate land uses, environmental sensitivity, and reclamation capability.

At the hearing, CRC advised the Panel that all lands within the mine permit area were classified under the Coal Conservation Act as Category 4 lands; that is, lands:

"in which surface or underground mining or in-situ operations may be considered subject to proper assurances respecting protection of the environment and reclamation of disturbed lands".

CRC stated that the Coal Development Policy zoning for the proposed Cheviot area recognizes the previous mining activity in the area, as well as the high potential for the area to still contain significant coal resources, the proximity of infrastructure, the presence of successful coal operations, and reclamation achievements in the immediate area. In CRC's view, these all confirm the capability of the area to accommodate future coal mining.

Coal Branch Sub-Regional Integrated Resource Plan

CRC stated that the 1995 Coal Branch Sub-Regional Integrated Resource Plan outlined the government's most recent general resource management policy for public lands and resources within the Coal Branch planning area. CRC stated that the Integrated Resource Plan identified eight Resource Management Areas (RMAs) within the Coal Branch Region and that the Cheviot project area is within the Mountain Park–Folding Mountain RMA. CRC observed that the Integrated Resource Plan (page 66) stated that:

"The management intent for the Mountain Park–Folding Mountain RMA is to recognize a varied range of provincially significant resources such as coal, wildlife, extensive recreation, tourism and historical resources. A limited range of other multiple use activities will also be provided, while recognizing the importance of watershed protection."

CRC indicated that four land use zones and their associated objectives have been established for the immediate area within and around the Cheviot Coal Project. These are:

- C *Zone 1 - Prime Protection: "To preserve environmentally sensitive terrain and valuable ecological and aesthetic resources."*
- C *Zone 2 - Critical Wildlife: "To protect specific fish and wildlife populations by protecting aquatic and terrestrial habitat crucial to the maintenance of those populations."*
- C *Zone 4 - General Recreation: "To retain a variety of natural environments within which a wide range of outdoor recreation opportunities may be provided."*
- C *Zone 5 - Multiple Use: "To provide for the management and development of the full range of available resources, while meeting long-term objectives for watershed management and environmental protection."*

Of these, CRC noted that only Zones 2, 4, and 5 are found within the lands to be disturbed by the Cheviot Coal Project. CRC stated that while Zone 1 (Prime Protection) lands border part of the Cheviot Coal Project area, they do not occur within it and that the breakdown of the land use zones within the project is: 83 per cent Critical Wildlife; 8 per cent General Recreation; and 9 per cent Multiple Use.

Coal Branch Access Management Plan

CRC indicated that the Coal Branch Access Management Plan, which was developed in 1995, also had a bearing on the Cheviot Coal Project. CRC stated that the Access Management Plan was intended to manage motorized and non-motorized recreational use on existing access routes on public land. The Plan was created in order to provide opportunities for compatible motorized and

non-motorized recreational use, while meeting the fish and wildlife objectives and maintaining the integrity of the natural environment as outlined in the Integrated Resource Plan. Within the Mountain Park-Folding Mountain RMA, the planning area considered by the Access Management Plan included all Zone 1, 2, and 4 areas. To date, the plan has only been implemented on a voluntary basis, with a public review proposed for the latter half of 1997.

CRC stated that the proposed mine and coal preparation plant operations would disturb portions of designated motorized access corridors from the project area to Drummond/Prospect Ridge and to Cadomin Ridge/Cadomin Mountain. CRC stated that it was prepared to work with provincial land managers and affected stakeholders to review access alternatives and, where appropriate, develop trails outside the disturbance area, and thereby provide linkages to the existing trail system. In addition, CRC stated that it would prepare annual access plans within the project area that would be available for review by interested recreation user groups. As a result, CRC believed that the proposed Cheviot Coal Project would have an insignificant impact on the Coal Branch Access Management Plan.

Special Places 2000

In their application, CRC noted that Special Places 2000 is a 1995 government policy committed to the identification and protection of a network of natural landscapes that represent the environmental diversity of the province's six natural regions and 20 sub-regions. CRC noted at the hearing that the Alberta Minister of Environment had advised the Special Places Coordinating Committee that the Cardinal Divide Natural Area is an effective and adequate commitment to the protected areas program for this portion of the Rocky Mountains. CRC stated that, in its view, approval of the Cheviot Coal Project would have no impact on the Special Places 2000 program.

CRC stated that, while it was aware that there are other land use policies which may have some degree of relevance to the Cheviot Coal Project, it was their belief that the policies noted above were the overriding authority for the area. Furthermore, CRC stated that whatever land use limitations may have previously applied to the Cheviot Coal Project under the 1984 Eastern Slopes Policy, those had now been superseded by the more recent Integrated Resource Plan.

CRC stated that it recognized that zoning policies carry restrictions and/or guidelines for industrial development within the areas of their coverage and hence must be assessed for potential conflicts or development conditions. CRC stated that it had incorporated what it interpreted as being the required components of the aforementioned policies into its EIA.

6.1.2 Views of the Interveners

The AWA Coalition stated that they believed the applicant had not given an appropriate amount of consideration to all of the relevant policies that apply to the proposed Cheviot project area. The AWA Coalition also felt that, due to the possibility of impacts extending beyond the proposed project boundary, the policies which apply to lands adjacent to the proposed project area should also have been considered.

The AWA Coalition stated that, in its view, CRC was prepared to meet only the basic statutory requirements, which included such policies as the Coal Branch Integrated Resource Plan, the Coal Development Policy for Alberta, and the Coal Branch Access Management Plan. It was the contention of the AWA Coalition that CRC had not addressed all of the relevant policies and, of the ones that it had addressed, CRC had not satisfactorily presented evidence that indicated it would be able to meet their intent and/or goals. As an example, the AWA Coalition noted that the Coal Development Policy states that any coal development which will cause irreparable harm to the environment should not be approved. The AWA Coalition stated that there was extensive expert evidence concluding that irreparable harm to the environment, including to such VECs as grizzly bears, Harlequin ducks, migratory song birds, rare plants, and fish will occur if the Cheviot Coal Project were to proceed.

The AWA Coalition also suggested that the Cheviot area had been classified as Zone 2 (i.e. Critical Wildlife) rather than Zone 1 (Prime Protection) during the creation of the Integrated Resource Plan because coal leases already existed for the area, rather than as an accurate measure of the relative environmental sensitivity of the lands. However, since such zoning did not guarantee a company that a proposed development would be approved, the AWA Coalition stated that it had now fallen to the Panel to determine whether the application was compatible with the intent of the Integrated Resource Plan. The AWA Coalition also stated that since, in their view, portions of the Cheviot mine permit area, most notably upper Prospect Creek, were still being considered as potential extensions to the Cardinal Divide Natural Area under the Special Places 2000 program, CRC could not claim that the approval of the Cheviot Coal Project would have no impact on Special Places 2000.

RMEC also stated that, in its view, CRC had considered only those policies which favoured its project and had ignored those which did not, often arguing that policies did not have the force of law. Further, RMEC concurred with the AWA Coalition's position that policies are a key determinant as to the significance of an environmental effect, and therefore go considerably towards establishing what the public interest is in a particular situation. Given this, RMEC felt that the question of significance of impacts must be viewed beyond just legalistic terms and that policy is one of many components which must be considered in the decision-making process.

AEP advised the Panel that, in its view, the proposed Cheviot Coal Project is consistent with the Coal Branch Sub-Regional Integrated Resource Management Plan and that coal mining is a compatible or permitted use within the land use designations for the proposed project area. AEP indicated that it had no objections in principle to a coal mine in this area, subject to public review and approval by the Panel, and subject to CRC meeting all subsequent environmental regulatory requirements.

With respect to the issue of access management, AEP stated that there is a detailed provincial process for the Coal Branch area that already exists which is designed to balance the interests of various stakeholders regarding access management issues. It was indicated by AEP that a determination would be made of the effectiveness of voluntary compliance with the Coal Branch Access Management Plan during the public review in the fall of 1997. At that point, a multi-stakeholder committee, hopefully including CRC, would determine whether the use of legislated forest land use zones (FLUZs) is

required or if access management can continue on a voluntary basis. Given this, AEP requested that the Panel leave the issue of access to the provincial process.

6.1.3 Views of the Panel

As noted earlier in this report, the Panel does believe that the consistency of a project with government policy does provide one of many tests of the public acceptability of a project. In the case where there are inconsistencies between the policies themselves, the Panel believes that it is reasonable, unless it can be demonstrated otherwise, to consider either the most recent and/or the most site specific as paramount. In the case of the Cheviot Coal Project, the Coal Branch Sub-Regional Integrated Resource Plan is clearly both the most recent and site specific. That plan also clearly anticipates potential coal mining in the area, to the extent that it sets out specific criteria for an applicant to meet in its environmental planning. The Panel agrees with the position taken by AEP that the Cheviot Coal Project is conceptually consistent with the Integrated Resource Plan for the region. The Panel also finds that the Cheviot Coal Project is consistent with the Alberta Coal Development Policy. Nor is the Panel convinced that further consideration of the area under the Special Places 2000 program is likely.

With regard to access management, this issue has been addressed to some degree previously (Section 4.4) and will be addressed again in Section 6.4. However, the Panel notes that AEP did not raise concerns with CRC's proposals to ensure that Cheviot Coal Project activities were consistent with the Coal Branch Access Management Plan, and accepts that these issues can be addressed during the mine development process.

6.2 Natural Areas

6.2.1 Views of the Applicant

In their application, CRC indicated that two sites near the proposed mine permit area have been designated as Natural Areas, and that two other sites have been nominated as Candidate Natural Areas. The designated Natural Areas were the Cardinal Divide Natural Area south and west of the proposed mine and the Muskiki Lake Natural Area several kilometres to the east. The two candidate sites identified by CRC were the Cadomin Caves Candidate Natural Area located south of Cadomin, and the Grave Flats Candidate Natural Area located 5 km east of the project area. In its application, CRC only addressed possible environmental effects of the Cheviot Coal Project on the Cardinal Divide Natural Area and the Cadomin Caves Candidate Natural Area, as these were the closest to the proposed developments.

Existing Conditions

CRC indicated that the Cardinal Divide Natural Area was established under the Alberta Special Places 2000 legislation in 1995. Bordering part of both the western and southern boundaries of the proposed Cheviot mine project area, it covers approximately 6500 ha and lies between the proposed mine and Jasper National Park to the west and the Cardinal River to the south (Figure 6). CRC also noted that

several other areas, notably the upper Cardinal River, upper Prospect Creek, and lands on either side of the point where Grave Flats Road traverses the Divide, had originally been considered for inclusion into the Natural Area. These areas are currently zoned with Protective Notations (PNTs) which are intended to restrict public access to varying degrees.

The Cardinal Divide Natural Area contains a rich variety of physical and biological features, some of which are representative of the alpine ecoregion in the northern front ranges and many of which are special. More specifically, the area contains rock glaciers; waterfalls; numerous rare or geographically significant alpine plant species; and a high diversity of birds, mammals, and insects. CRC recognized that the Cardinal Divide Natural Area is a scenic and fragile area valued for scientific and educational research. The area is easily accessible from the Grave Flats Road and each summer it is visited by a variety of users including hikers, mountain bikers, equestrian trail riders, and off-highway vehicle users.

CRC acknowledged that the Alberta Native Plant Council and the Alpine Club of Canada – Alberta Chapter had volunteered as stewards for the Cardinal Divide Natural Area and the access trails leading to and within this area, while the Alberta Off-Highway Vehicle Association had volunteered to be trail steward for the motorized recreation corridor to the upper Cardinal River.

With regard to the Cadomin Caves Candidate Natural Area, CRC submitted that the Coal Branch Integrated Resource Plan refers to the Cadomin Caves as a historical, biological, and ecological resource and that it has been nominated as a Natural Area under Special Places 2000. CRC described this proposed Natural Area as encompassing approximately 520 ha, including a parking area, an access trail, known passages, predicted cave extensions, cold sulphur springs, and a paleontological site. The area is bounded by the Grave Flats Road on the east and the Whitehorse Creek recreation area to the south. It was recognized by the applicant that the Cadomin Caves are a rare and important feature which have recreational, educational, and interpretive value. As such they are well known by the Alberta Speleological Society and other outdoor recreationalists who visit this region.

Expected Effects

CRC noted that, in general, the proposed Cheviot Coal Project would not affect or encroach upon the Cardinal Divide Natural Area. With the exception of the upper Prospect Creek area, a minimum distance of 1000 m of undisturbed area would be maintained between the mine disturbance and the Natural Area. Some potential risks to the Cardinal Divide Natural Area from revegetation programs and new access (see Section 4) were identified by CRC, but these potential environmental affects were considered to be mitigable.

With regard to the Cadomin Caves Candidate Natural Area, CRC noted that the Cadomin Caves parking area is located 2 km south of the Hamlet of Cadomin and approximately 12 km north of the proposed mine. Potential sources of impacts to the Caves included blasting and the presence of a proposed construction camp and are discussed in Section 3 (groundwater), Section 4 (bats), and Section 5 (noise) of this report. CRC indicated that the Cave entrance is 360 m above the valley floor and estimated that it would take one hour to ascend to the Cave entrance from the parking area. Given

this they believed that the potential for the project to have any impact on the Cadomin Caves was insignificant.

6.2.2 Views of the Interveners

The Alpine Club Coalition noted in their intervention that, as stewards of the Cardinal Divide Natural Area, they have a direct interest in the potential impacts of the proposed mine on the Natural Area. The Alpine Club Coalition stated that, unless proper mitigation measures were taken, there was no doubt the proposed mine would have significant and adverse effects on the Cardinal Divide Natural Area.

It was argued by the Alpine Club Coalition that having a relatively undisturbed protected buffer zone between the mine disturbance limits and the Cardinal Divide Natural Area would maintain a valuable core area for wildlife and vegetation. This core area would provide an interim wildlife refuge during mining disturbance, which could ultimately enhance mitigation by allowing for optimal wildlife rehabilitation/re-introduction into the reclaimed areas. Further, the Alpine Club Coalition noted that there were rare and disjunct plant species and plant/animal communities which would be less impacted as a result of such buffers.

The Alpine Club Coalition noted that two parcels of land, section 30-45-23 W5M and the south half of section 27-45-23 W5M had originally been considered for inclusion into the Cardinal Divide Natural Area but, due to the presence of coal leases, had ultimately been excluded. The Alpine Club Coalition observed that CRC no longer intended to mine in these areas and suggested that it would make sense to add these parcels to the Cardinal Divide Natural Area. As noted earlier in this report, the Alpine Club Coalition also suggested that the upper portions of Prospect Creek now also be added into the Natural Area, as had originally been considered. These areas, they noted, contained many plant species of particular concern, as well as provided significant wildlife corridors.

The AWA Coalition also had some concerns regarding both the Cardinal Divide and Cadomin Caves. Due to the proximity of the Cardinal Divide Natural Area to the Cheviot Coal Project surface mine, the AWA Coalition indicated that they were very concerned with CRC's lack of commitment to putting a tree buffer, where possible, between the Natural Area and any vehicle access route. Further, the AWA Coalition did not believe that CRC had provided an adequate commitment that it would not extend the existing buffer zone beyond the boundaries outlined in the proposed mine application.

The AWA Coalition stated that the Cadomin Caves are also provincially significant due to their cultural, biological, and ecological resources. They submitted that the proposed work camp, which may be located in the parking lot at the base of the access trail to the Caves, posed a significant adverse risk to the Natural Area, as did blasting from CRC's construction and mine operations. The AWA Coalition believed that CRC had not adequately committed to any mitigation of impacts to the Cadomin Caves Candidate Natural Area. In particular, they argued that while their preference was to locate the camp elsewhere, at a minimum CRC should implement a security system to prevent access to the Caves during sensitive periods.

AEP, in their final argument, stated that PNTs issued under the Public Lands Act may be revised according to the needs of an area. Specifically, AEP noted that the PNT in the south–west corner of the permit area, within the vicinity of Prospect Creek, could be incorporated into the Cardinal Divide Natural Area. Inclusion would be dependent upon what portion of the PNT area would be required by CRC's mining operations, should the project be approved, as well as having consideration for other interests in the area.

6.2.3 Views of the Panel

During the course of the hearing, there was a considerable amount of discussion regarding the inter–relationships between the Cardinal Divide Natural Area and the Cheviot Coal Project. These included risks to the area's vegetation resources due to invasion by foreign plants; new access points for vehicles; and loss of aesthetic values due to visual, dust, and noise impacts. Also discussed were the relative values of the ecological resources of the Cardinal Divide Natural Area for the Cheviot Coal Project, including acting as a source of native vegetation and undisturbed wildlife habitat. Finally, the inter–relationships between the upper Prospect Creek area, the mine, and the Natural Area were examined in some detail.

Based on the large amount of evidence presented, the Panel has been able to draw a number of conclusions. First, with regard to the Cardinal Divide Natural Area, the Panel does believe that approval of the Cheviot Coal Project, as applied for, will result in increased pressure on the Natural Area's resources and values. These will come not only from CRC activities but also, and possibly more directly, from recreational users displaced from the proposed mine site (see Section 6.4). However, the Panel believes that, to a large degree, the inclusion of a 1000 m buffer between CRC's active sites and the Natural Area boundaries, plus careful access control, will greatly help to reduce the applicant's direct impacts on the Cardinal Divide. The Panel also believes that other direct impacts, such as risks of invasion of non–native species into the Cardinal Divide, can be adequately controlled. With these mitigative measures in place, the environmental effects of the Cheviot Coal Project on the Cardinal Divide Natural Area would not be significant.

Second, the Panel believes that the Cardinal Divide Natural Area, through its preservation of a substantive block of largely undisturbed habitat to the south of the proposed mine development, will be very important in mitigating the impacts of the Cheviot Coal Project. The Cardinal Divide Natural Area appears to be capable of providing a significant refugia for numerous plant, bird, small mammal, and ungulate species which will be disturbed by mining activities. These attributes will be further enhanced if the interdiction against vehicular access into the Cardinal Divide Natural Area is enforced. Furthermore, the Panel believes that the Cardinal Divide, with some relatively minor additions to its boundaries, could also act as a very effective travel corridor for a number of valued wildlife species, particularly carnivores. This could have significant regional benefits since, as noted in Section 4.3 of this report, the Panel is concerned that CRC's Carnivore Compensation Program may not ultimately be adequate to mitigate regional impacts to carnivore populations. Should this prove to be the case, the Panel would require CRC to be able to suggest feasible alternative approaches. The Panel notes that,

should the province decide to include section 30 and the south half of section 27-45-23 W5M into the Natural Area as requested by the Alpine Club Coalition, this would have no negative effect on CRC specifically or on mineral extraction generally.

Third, with regard to the relationship between upper Prospect Creek and the Cardinal Divide Natural Area, the Panel notes that the mining of pits PC7 and PC8, as applied for, will cause the mine to encroach more closely (i.e. within 300 m) to the Cardinal Divide Natural Area than at any other point. As noted earlier, the Panel, should it decide to approve the Cheviot Coal Project, will require that a 1000 m buffer generally be retained between the Cardinal Divide Natural Area and mine developments. Therefore, at a minimum, revisions to CRC's mine plans for this area will be required.

As noted earlier in this report, the Panel does not, subject to some minor conditions, anticipate that the Cheviot Coal Project will have a significant adverse environmental effect on the Cadomin Caves Candidate Natural Areas, but has suggested monitoring of possible impacts from the camp, if located near the access point to the Caves, and of blasting may need to be carried out.

6.3 Jasper National Park

6.3.1 Views of the Applicant

Existing Conditions

Jasper National Park contains 10 878 km² of mountains, valleys, lakes, and Rocky Mountain wilderness. A portion of the eastern boundary of the Park, the Miette Range, serves as the western boundary of the Cheviot study area. At its closest point the boundary of the Park is approximately 2.8 km west of the proposed Cheviot mine permit area and is separated from the Cheviot Coal Project by Prospect Mountain and the Cardinal Divide Natural Area.

Land and resource use activities on lands adjacent to the Park include coal mining, quarrying, big game hunting and outfitting, trapping, ecotourism, commercial and recreational equestrian trail rides, off-highway vehicle use, camping, hiking, fishing, and nature appreciation. Access routes into Jasper National Park from lands within the study area examined by CRC included:

- an equestrian, hiking, and motorized recreation access trail from Highway 40 up Drinnan Creek to Mystery Lake, and non-motorized access beyond Mystery Lake to Miette Hot Springs;
- a hiking/equestrian/mountain biking trail from the Whitehorse Creek Recreation Area up Whitehorse Creek through Fiddle Pass (Whitehorse Pass) to Miette Hot Springs;
- a hiking and equestrian trail, starting below the Cardinal Divide and proceeding up the Cardinal River and into the Park via Cardinal Pass (Rocky Pass); and

- equestrian trails from Cardinal River starting near Grave Flats and Muskiki Lake up Ruby Creek, Flapjack Creek, and Thistle Creek to their headwaters and into the Park at Southesk Meadows.

Expected Effects

CRC stated that it recognized that there were public concerns raised over the proximity of the proposed Cheviot Coal Project to Jasper National Park. CRC noted that in fact the closest point between the permit boundary and Jasper National Park is 2.8 km and that the distance between the Park and the nearest disturbance area is even greater. Further, there exists a number of prominent terrain features, including mountains and high elevation ridges, between the Park and the proposed mine permit area. CRC also noted that, due to the orientation of the proposed mine, only the western-most end of the proposed project is proximate to the Park, with mining scheduled to occur in that area during 2007 to 2013.

CRC stated that its experience with the Luscar mine revealed that the mine had had little if no effect on the integrity of Jasper National Park. CRC noted the observation at the hearing by Parks Canada officials that there had been no documented problems caused by the existing Luscar mine over the past 27 years.

CRC recognized that, although public access will continue to be open during the transportation corridor construction phase, there may be some temporary reduction in the number of visitors to the Park from the back country trails. After this phase, the proponent submitted that there may actually be an increase in back country visitors due to the improved road conditions between Cadomin and Mountain Park. CRC committed to maintaining communication with Jasper National Park staff to ensure that mine development and operations do not unduly affect access to the Park from back country trails.

Based on the information it had gathered, including previous experience with the Luscar mine and the commitment to ongoing communication, CRC did not believe that there would be any significant impacts on Jasper National Park.

6.3.2 Views of the Interveners

Parks Canada noted that their legislated mandate is to protect the integrity of all national parks. Further, their guiding principles and operating policies provide direction for Parks Canada to become involved in projects which have the potential to negatively impact the ecological integrity of any national park.

As Jasper National Park is contiguous with the proposed project area, Parks Canada was concerned with potential impacts on the Park, which is identified as a world heritage site, from the Cheviot Coal Project. Parks Canada indicated that their primary concern with the proposed Cheviot mine project lies in the fact that any deterioration in the regional ecosystem has the potential to impact Parks Canada's ability to meet its mandate for ecological integrity within the Park. They noted that the

ecological integrity of Jasper National Park is dependent on favourable ecosystem conditions in the region; therefore, sustainability and viability must be established as measurable goals within the region and the cumulative impacts of all human activities must be evaluated against these goals.

Parks Canada stated that, in its view, the applicant had insufficiently addressed the issues of cumulative effects. Parks Canada stated that a regional management authority should be established to oversee the development and implementation of strategies to meet the landscape level of goals for the regional ecosystem. Parks Canada stated that this authority should be established by the regulatory agencies of AEP and Parks Canada and should include major disposition holders in the region.

Parks Canada stated that it recognized that no one player could successfully implement regional initiatives and indicated that they would be committed to actively participating in such initiatives. Parks Canada indicated that it is committed to working with others towards a sustainable future and a sustainable landscape and noted that agreement on landscape level goals was, in their opinion, a critical first step. Given this, Parks Canada strongly urged the Panel to establish measurable goals that will form the basis for cooperative actions on the ground. Parks Canada stated that by implementing actions which move towards the realization of ecosystem goals, its concerns would be minimized (see Section 4.3).

The AWA Coalition supported Parks Canada's mandate of "preserving Jasper National Park as a world heritage site dedicated to the preservation of the Park and leaving it unimpaired for the enjoyment of future generations". They noted that one of its members, the Jasper Environmental Association, due to its limited numbers and resources had, as its main focus up until now, almost entirely things that are happening inside the Park. However, because development in the greater ecoregion around the Park could potentially have devastating effects on the Park itself, they had made the decision to become involved in the hearing process.

The AWA Coalition submitted that Jasper National Park is not an island; rather, it is part of a larger ecosystem. Therefore, based on the policy of the National Parks Act whereby protection of the ecological integrity takes precedence over any other use and the evidence presented at the hearing stating that the region's ecological integrity would be compromised, the AWA Coalition felt that the proposed mine should not be approved.

6.3.3 Views of the Panel

In assessing the potential impacts of the Cheviot Coal Project on Jasper National Park, the Panel believes it is necessary to be cognizant of both the general east–west orientation of the project and the regional topography. These are highly relevant since, while the western extent of the mine disturbance will be within 3 km of the Park boundary, the vast amount of the areas with high activity (e.g. the coal processing plant) will be several kilometres further away. Furthermore, the presence of significant topographical features between the mine and the Park will further serve to create a barrier between the two land uses. The Panel believes that, overall, CRC's commitments regarding access to the Park, plus its other programs (e.g. the Carnivore Compensation Program), are adequate to mitigate any

short-term negative impacts and ensure that longer-term environmental effects are addressed. The Panel does not believe that the Cheviot Coal Project, either on its own or cumulatively, compromises the ecological integrity of Jasper National Park.

With regard to Parks Canada's suggestion that a regional management authority be created, while such a concept may have merit, any such decision would clearly need to be made by both the appropriate provincial and federal authorities when and how they saw fit, undoubtedly following considerably more discussion than occurred at the hearing.

6.4 Recreational Users

6.4.1 Views of the Applicant

Existing Conditions

CRC stated that it recognized that the Cheviot Coal Project lies within an area of great natural beauty which is attractive to a large number of recreational users. Popular summer activities include camping, hiking, off-highway vehicle use, horseback riding, caving, fishing, mountain biking, and sightseeing. Other seasonal uses include hunting, snowmobiling, and cross country skiing.

A study conducted by CRC revealed that, within an area bounded by Highway 40 and the Grave Flats Road, an estimated 13 000 user days are spent annually by recreation seekers. A total of 2 600 user days per year were spent just within the proposed mine permit area. A majority of the users (61 per cent) were from Edmonton and area, while local use (Edson, Hinton, and Robb) made up 15 per cent. Some 80 per cent of the visitors had visited the area more than once.

Expected Effects

CRC acknowledged that recreation sites within the local area corridor will undoubtedly be affected, and noted that the development plans for the proposed project would be guided by the resource management objectives and policy guidelines laid out for recreational use of public land in the Coal Branch Sub-Regional Integrated Resource Plan.

CRC stated that public access to trails within the proposed mine development area would be affected, particularly off-highway vehicle access in the Mountain Park area. Elimination of the existing vehicle staging facility at the Mountain Park Recreation Area would also eventually occur. However, since road conditions along the Grave Flats Road would be greatly improved and public road access would be maintained through the mine permit area to the Cardinal River and Grave Flats area, potential increases in the recreational use in these areas was possible.

CRC stated that opportunities for off-highway vehicle recreational use would likely be reduced if the Cheviot Coal Project is approved. During the 1995 summer period, a survey by CRC indicated that there is a wide range of other locations across the province that off-highway vehicle users could access.

CRC believed that it is likely that the off-highway vehicle users would perceive other areas as more desirable once construction and mining began in the Mountain Park area.

CRC stated that there should not be any effect on current commercial recreational outfitters based out of the Whitehorse Creek area for the life of the proposed Cheviot mine, and only minimal effects on general outdoor recreation in this area were predicted. Any effects would include the elimination of random camping and access areas currently used along the local area corridor. CRC noted that traditional access to Jasper National Park through Fiddle, Rocky, and Cardinal passes would be maintained. CRC committed to maintaining recreational access, or providing alternative routes, where feasible.

CRC stated that, in accordance with the Integrated Resource Plan, they would focus on recreational uses in their reclamation plans for the disturbed areas along the McLeod River corridor in the vicinity of the abandoned Mountain Park townsite. The applicant stated that they would also conduct an annual review of its development plans and their implications for access. With input from stakeholders and government land managers, CRC committed to replacing recreational facilities equivalent to those which currently exist. In particular, CRC noted that, with regard to the Mountain Park recreation/off-highway vehicle staging area, it would be necessary to determine the feasibility of replacing the site with equivalent facilities at a nearby location, what optional site locations are available, and what criteria should be used for selecting a preferred location. CRC anticipated that these decisions would be addressed with multi-stakeholder input which could include, but not be limited to, public land managers, off-highway vehicle users, the Cardinal Divide Natural Area stewards, Alexis First Nation, the company, and any others who have a direct interest.

With respect to scenic values, mining activity will be visible from several locations within the local area corridor, including the Mountain Park cemetery and parts of the Cardinal River Divide Natural Area. CRC indicated that visual impacts on recreationalists travelling within the proposed mine development area could be minimized through the design and alignment of roadways and power lines to minimize intrusion on the landscape. Where mine development is obvious from the road, interpretive opportunities at these locations would be considered.

CRC noted that recreation sites within the transportation and utilities corridor, including Whitehorse Creek and Cadomin Caves, will experience short-term effects during construction of Grave Flats Road, but should not be affected during the life of the mine. Jasper National Park was not expected to be significantly affected by the proposed mine development or operation.

Cumulative Effects

In addressing potential cumulative effects on recreation, CRC stated that there are several other activities such as changes in land jurisdiction, future public policy, and program changes that may have implications to recreational use in the local area. CRC noted, for example, that the Treaty Land Entitlement provided to the Alexis First Nation had resulted in the closure of the Cardinal River Recreation Area in 1995. Furthermore, CRC observed that all Alberta public land management for

recreation is currently undergoing significant changes. In the future, all public recreational sites will be considered on an individual basis for privatization, reduced service, or closure and these initiatives may affect the current recreational use and distribution of recreational activities in the region.

CRC noted that timber harvesting in the region may also affect recreational opportunities. Forest harvest plans are currently under preparation by Weldwood of Canada Limited (Hinton Division). The company plans to begin harvesting operations north and east of Cadomin in 1996/97 and continue to harvest within the region over the next 20 years. As part of the company's commitment to the Foothills Model Forest, Weldwood had conducted a detailed assessment of recreational use throughout the region, including the local area which will be influenced by the proposed Cheviot Coal Project.

Monitoring and Follow Up

CRC committed to working with public land managers to monitor the effects of mine development on recreation throughout construction and operation. Outside the mine development area, CRC noted that the Coal Branch Access Management Plan would provide direction to access planning and mitigation. CRC stated it would also work with public land managers to develop a communications plan aimed at area recreation users, encouraging use of Whitehorse Creek, Watson Creek, and other alternative recreation sites within the region.

6.4.2 Views of the Interveners

The Alberta Fish and Game Association stated that it was disappointed and concerned with the lack of recognition given by CRC to hunting as a valued recreational activity. They noted that throughout the application there was little mention of the impact of the loss of hunting opportunities or how the impacts would be mitigated or compensated for.

The Alberta Fish and Game Association believed that CRC's application was ambiguous with respect to timing and availability of access to wildlife resources in the area of the mine. The Alberta Fish and Game Association believed that it would be important to find a balance between restricting the public and allowing controlled access so that a build up of non-streetwise wildlife may be prevented. To accomplish this, the Alberta Fish and Game Association believed that existing access management policies should remain in place as long as possible, until mining would prevent safe access. Further, they requested that CRC open reclaimed land to public access as soon as possible.

AEP suggested that, although there would be a large number of campers displaced, there were other campgrounds in the vicinity which should be able to accommodate these people. They also commented that it could not, at this point, be positive as to where the campers would ultimately choose to relocate, and therefore there was potential of increased pressure at some individual sites. AEP noted at the hearing, in response to questions, that the necessary steps to create FLUZs in the region had been carried out, short of requesting an Order-in-Council from the Alberta Government. AEP also advised the Panel that, since most of the area was already open to off-highway vehicle use, AEP had not, as yet, considered creating an area dedicated to off-highway vehicles, such as the McLean Creek area in

Kananaskis Country.

The Alpine Club Coalition and the AWA Coalition stated that they were concerned that the off-highway vehicle displacement from the proposed mine disturbance area would result in intensive activities in the Cardinal Divide Natural Area and other environmentally sensitive areas. The Alpine Club Coalition submitted that they were particularly concerned about access management plans, specifically as they relate to off-highway vehicle activities. The Alpine Club Coalition noted current off-highway vehicle impacts and felt that inappropriate re-introduction or relocation of off-highway vehicles from CRC's mine permit area to other locations could jeopardize CRC's wildlife mitigation and reclamation plans. It was suggested by the Alpine Club Coalition that an effective access management plan, based on ecological rather than historical criteria and reinforced by a FLUZ, should be established.

The Town of Hinton noted that outdoor recreational opportunities are clearly a valued part of life for town residents. They submitted that indicators such as high utilization of nearby areas by local residents, high ownership rates of recreational vehicles, and license purchases for hunting and fishing are reflective of this value. The Town of Hinton felt confident that CRC would continue to demonstrate the same high level of corporate environmental stewardship at the proposed Cheviot mine as it had at the Luscar mine.

CEPA noted that the residents of Cadomin make significant use of the surrounding environment. Therefore, they noted that they were concerned about how access to various areas would be impacted should the mine proceed. CEPA submitted that access to areas should not be restricted by CRC until absolutely necessary, and that access be returned at the first available opportunity. It was CEPA's request that the Panel, in its decision, make recommendations to the appropriate authorities responsible for addressing these concerns.

CEPA, in its submission, noted that CRC had as yet returned very little of its reclaimed surface lands at the Luscar mine back to the public, apparently due to CRC's concerns with potential damage to young trees and non-regulated hunting impacts to wildlife. Since recreational use of lands in the area had increased dramatically, CEPA stated it wished to see this avoided at the Cheviot Coal Project. CEPA believed that first, surface rights, through Mineral Surface Leases (MSLs), should only be provided by AEP to CRC on an as needed basis, therefore allowing ongoing public access. Second, they suggested that CRC's MSLs should stipulate that public access to lands not being used for mining be permitted wherever safe to do so. Once lands were returned to the province no access restrictions should be imposed or, if necessary, graduated access could be permitted. Finally, CEPA indicated that it strongly supported voluntary access control since legislated control, through FLUZs, was, in its view, insufficiently flexible and/or too difficult to amend at a later date.

The AWA Coalition submitted that a number of policies, including the Coal Branch Integrated Resource Plan, emphasized the importance of maintaining the visual quality of scenic areas. It was felt by the AWA Coalition that CRC had failed to assess the impact of the project on the aesthetic qualities

of the region. They indicated that the mine would directly or indirectly impair many of the features which gave the area a high scenic quality rating.

Trout Unlimited stated that they were appreciative of the communication that CRC had provided to them; however, Trout Unlimited submitted that CRC's application, as proposed, would surely result in deleterious impacts to fish habitat and therefore recreational opportunities. Trout Unlimited felt that implementation of the mitigative measures proposed in its intervention would lessen the impacts of the mine on streams and ultimately reduce impacts on recreational fishing.

6.4.3 Views of the Panel

The Mountain Park area currently provides a diverse number of recreational opportunities to a wide range of groups. The Panel is prepared to accept CRC's commitments to work closely with both recreational users and provincial land managers in order to mitigate to the extent possible the direct impacts of the Cheviot Coal Project on recreation. The Panel is also prepared to accept CRC's commitment to minimize to the degree practical the curtailment of public access for recreation on its leased lands.

However, the Panel believes that it is very likely that much, if not all, of the Cheviot mine site will be unavailable for recreational purposes for much of the life of the mine, and in fact some period following that. The Panel notes that much of the public access to the area currently occurs from the Grave Flats Road at or near to the former townsite of Mountain Park. However, this will also be the area of greatest mining activity and so public access through here, if any can be provided at all, will almost undoubtedly be very limited. Other alternative access points could be developed, but doing so would appear to be inconsistent with protecting other area resources (e.g. wildlife, the Cardinal Divide Natural Area). Therefore, the Panel expects, at least in the near term, that there will be little opportunity to avoid direct impacts on the current recreational uses of the area, particularly for hunting, fishing, off-highway vehicle use, and random camping.

The Panel does accept that, in a regional and provincial context, other areas of equal quality are likely available for recreational purposes and that, to some unknown degree, can likely absorb the demands displaced by the Cheviot Coal Project. The Panel does not expect, however, that these demands will be evenly distributed, but rather that a disproportionate number of recreational users will likely wish to transfer their present recreational activities to areas in the immediate vicinity of the Cheviot Coal Project. This issue may actually be further exacerbated by the increased level of all season access which would be provided by the proposed upgrades to the Grave Flats Road. As a result, the Panel believes that the cumulative effects of the Cheviot Coal Project on current recreational use will also be significant.

The Panel notes that at least some regional recreational activities already potentially conflict with other area land users. For example, allowing indiscriminate use of off-highway vehicles on the sensitive alpine terrain of the Cardinal Divide Natural Area, or open access hunting in areas currently serving as refugia for ungulates on the Luscar mine site, would appear to be inconsistent with each other. The

Panel agrees with the Alpine Club Coalition that it would be unacceptable if significant disturbance of the Cardinal Divide Natural Area was to occur due to improperly managed human activity resulting from the approval of the Cheviot Coal Project. Similarly, the Panel agrees with the Alberta Fish and Game Association that hunting in the area of the Cheviot mine will need to be carefully managed, and in fact believes that the protection and re-establishment of wildlife in the region may need to be placed ahead of the maintenance of hunting opportunities.

The Panel notes that the Integrated Resource Plan, both explicitly and implicitly, recognizes that not all areas can support all land uses at all times. In the case of the Cheviot region, the Panel believes that the area can support a significant mining industry proximate to two significant ecological resources, the Cardinal Divide Natural Area and Jasper National Park. Furthermore, the Panel believes that these two disparate land uses can be accomplished while also still protecting area watersheds and water quality, fish and wildlife populations, and forestry resources.

The Panel is not convinced, however, that all of the above can be accomplished while also maintaining all current recreational activities within proximity to both the mine and the protected areas. For area land managers to attempt to do so, the Panel believes, could, at a minimum, put at risk the two areas being protected for their ecological values. In particular, the Panel is very concerned that off-highway vehicle use currently being carried out within the mine permit area will relocate to the Cardinal Divide, upper Prospect Creek, and the upper Cardinal watershed. Should this occur, then the Panel believes that the value of these area's ecological resources, and therefore their value in mitigating the cumulative effects of the Cheviot Coal Project, will be significantly reduced. Should that occur, then the Panel believes that the public acceptability of the Cheviot Coal Project would also be at risk.

The Panel does believe that, if acceptable alternative recreational opportunities can be established at some distance from the Cheviot Coal Project, this would likely reduce the risk of unacceptable conflicts significantly. One possible alternative that area land managers may wish to consider is the creation of a new off-highway vehicle recreational area akin to the McLean Creek region of Kananaskis Country. The Panel understands that McLean Creek has been successful in reducing similar conflicts in southern Alberta. The level of development in the Coal Branch region, particularly given the likelihood of further commercial and recreational pressures, may now make development of such an area in central Alberta timely.

The Panel notes CEPA's wish that both the government and CRC be required, through the MSL process, to grant ongoing public access to lands either not being actively mined (assuming public safety can be protected) or recently reclaimed (provided reclamation efforts are not compromised). Further, CEPA has argued that voluntary access management be continued. The Panel does not believe that either of these requests is likely to be practical. In particular, it would seem inevitable to the Panel that stronger, not weaker, regulatory control of access will be required by land managers if they are to carry out their obligations of meeting a range of conflicting public needs. However, the Panel also notes that ultimately these decisions clearly lie within the regulatory responsibility of AEP and not the Panel.

6.5 Commercial Users

6.5.1 Views of the Applicant

CRC stated that it had evaluated the potential impacts of the Cheviot Coal Project, should it be approved, on other commercial users.

Coal

CRC noted that throughout the region there are a number of developed and undeveloped metallurgical and thermal coal leases. Only one of these leases would be directly affected by the proposed Cheviot Mine Project. The lease in question is the small (101 ha) privately held Crown lease, located just inside the west boundary of the project area. Development of these coal reserves is subject to further exploration work by CRC but, if these reserves did prove to be economically mineable, they could be incorporated into the Cheviot mine plan. Should this happen, it would generate a significant positive economic impact for the Crown lease holder. CRC advised the Panel that it had initiated discussions with the lease holders, and that they were in support of its application. However, CRC stated that on its own the Crown lease contains insufficient reserves to make coal mining economically viable, given the capital costs necessary for infrastructure and equipment needed to mine and transport the coal to market.

Timber

CRC stated that development and operation of the proposed Cheviot mine could have a negative effect on a small portion (1070 ha) of Weldwood of Canada's Forest Management Area (FMA) which overlaps the east end of the Cheviot Coal Project area. According to Weldwood's long-term plans, this area is not currently scheduled for first pass harvesting until 2020, which would be after the area had been disturbed by mining. If Weldwood's harvesting schedule cannot be moved forward, CRC stated that it would make arrangements to harvest and salvage the merchantable timber for Weldwood. Mining activity would then delay reforestation of the disturbed area of the FMA for up to five years, and this in turn would similarly delay the next harvesting cycle in this portion of the FMA. However, given the size of the area in question relative to the total Weldwood FMA, the overall effect of the Cheviot mine operations on this portion of Weldwood's FMA was expected to be insignificant in duration.

Oil and Gas

CRC noted that there are no oil or gas leases, fields, operating facilities, or exploration activities in the Cheviot mine project area. There is one abandoned natural gas well located next to the Cardinal River that has been turned over to the Crown. With the exception of this abandoned well, the closest gas well is located 8 km east of the Cheviot Coal Project area. One energy company had previously expressed some interest in exploring for natural gas within the project area but has not reconfirmed its

interest in recent years. As a result, it appeared to CRC that it was unlikely that the proposed mine development would affect oil and natural gas activities in the foreseeable future.

Limestone and Other Minerals

CRC acknowledged that there are eight limestone leases in the local area. Only one lease, at Cadomin Mountain, which is owned by Inland Cement, has been developed. None of the limestone leases are located within the proposed Cheviot Coal Project area and CRC stated that these leases would not be affected by any aspect of the mining activities. In addition, CRC noted that there are a number of metallic and industrial mineral exploration permits that overlap a portion of the Cheviot Coal Project area. However, CRC believed that exploration and test results to date have not been promising, and noted that the permits were scheduled to expire. As a result, CRC believed that the proposed Cheviot Coal Project would have no effect on the metallic and industrial mineral exploration permit holder.

CRC noted that Inland Cement owns a small group of residences at the south end of the Hamlet of Cadomin. These residences include several homes which the company rents to employees and a guest house. CRC stated that the proposed Cadomin bypass route would merge with the existing road and power line routes in the vicinity of these homes. Further south, a side entrance off of the upgraded Grave Flats Road would be provided to access Inland Cement's quarrying operations.

The upgraded rail line to the proposed mine would follow the present alignment and bypass the existing rail loading area at Inland Cement. Separate main line trackage is proposed to be provided through this area in order to eliminate conflict with the ongoing loading of rail cars by Inland Cement. Details of the trackage layout in this area are part of ongoing negotiations between CNR and Inland Cement. It was expected by CRC that any changes to trackage would be accommodated within the rail yard area already in place in this area.

Trapping, Hunting, Outfitters, and Ecotours

The proposed Cheviot Coal Project overlaps a portion of three Registered Fur Management Areas (RFMAs). Two, RFMAs 2262 and 1872, would not be directly affected by construction of the transportation and utilities corridor, the preparation plant, or initial mining activities, while the effect on one (RFMA 1728) would be minimal. During mine operations, fur-bearer habitat in all three RFMAs will be lost due to land disturbance. Furthermore, RFMA 1872 would be affected by Weldwood timber harvesting, while RFMA 2262 would be affected by the Alexis First Nation land acquisition. CRC stated that it had provided the three RFMA holders with advance notice of the proposed mine plan and that compensation would be provided if traplines have to be relocated within the RFMAs. In addition, fur-bearer harvests in the RFMAs would be monitored during mine operations, and fair and equitable compensation would be paid to the RFMA holders for long-term loss of fur-bearer habitat and project related decline in fur revenues. After compensation, the residual impact on trapping was expected by CRC to be insignificant.

CRC stated that the proposed Cheviot Coal Project lies within the boundaries of Wildlife Management Units 437 and 438, where two hunting outfitters operate. CRC noted that the proposed Cheviot Coal Project plan would disturb a substantial amount of wildlife habitat and some access trails through the area, which could adversely affect the two outfitters. In addition, there will also be a cumulative loss of wildlife habitat in the two Wildlife Management Units as a result of Weldwood's timber harvesting activities.

For its part, CRC noted it would mitigate the adverse effects on wildlife habitat through sequential pit and dump development; prompt reclamation designed to enhance elk, moose, and deer habitat; protecting wildlife from hunters within the mineral surface lease; and providing hunter access trails through the mine permit boundary to adjacent wildlife habitat. As noted previously, the access trails would be developed in consultation with public land managers responsible for implementing the Coal Branch Access Management Plan.

CRC stated that all of the outfitters who hold wildlife allocations in Wildlife Management Units 437 and 438 have been notified as to the proposed Cheviot plans for development. The only serious concerns expressed were related to access routes through the permit site to the hunting areas. CRC has committed to maintaining ongoing dialogue with these individuals to ensure that their needs are addressed. Given the location of proposed construction activities, the affects on big game hunting and outfitting were predicted by CRC to be insignificant.

CRC noted that there are two equestrian trail riding operators, two Cadomin Caves guided tour operators, and at least two environmental education/ecotourism tour operators working in the region. None, however, operate within the proposed Cheviot Coal Project boundaries. The Grave Flats Road, which provides access to staging areas such as the Cadomin Caves parking lot, Whitehorse Creek Recreation Area, and Cardinal Divide used by these commercial operators would be kept open to the public in the construction period and subsequently upgraded. As a result, CRC stated that the effect of mine related construction and operation on these commercial operators and their tourist clientele is expected to be insignificant.

6.5.2 Views of the Interveners

Mr. Gadd, who intervened as part of the AWA Coalition, indicated that his main interests in the area of Mountain Park and the Cardinal Divide was as an interpretive guide and as a geologist who had a technical interest in the Canadian Rockies generally, and more specifically with an interest in the Cardinal Divide area. Mr. Gadd noted that his commercial tours, which approach the Cardinal Divide from the north, pass the Luscar and Gregg River mines and the Inland Cement quarry. He submitted that, for a client who came to view natural landscapes, this level of development is unattractive and often caused his clients to comment negatively.

Mr. Gadd stated that, in his view, if mining were to proceed his clients' eco-experience would be lost and that they would probably not want to come back. Mr. Gadd acknowledged that, while it was difficult to put the loss of ecovalues into economic terms, he believed that an economic assessment

should have been done by CRC, and that this was a deficiency in the proponent's application. Mr. Gadd was confident that if a comprehensive environmental accounting were done for the area, it would reveal that the long-term economic and social benefits to west-central Alberta of protecting the Cardinal Divide region would far outweigh the short-term infusion of money from mining.

Weldwood noted that the proposed Cheviot mine would abut the Weldwood industrial forest and that there would be issues of common concern such as water yield and quality, management of large mammals, and issues around displaced off-highway vehicle users. Weldwood recognized that these issues would need to be worked on cooperatively and, based on historical working relationships, was confident that its productive relationship with CRC would continue. Weldwood also noted that a multi-stakeholder approach would be necessary for certain issues and stated that it would be willing to participate. Given this, Weldwood submitted that they supported CRC's Cheviot mine application.

6.5.3 Views of the Panel

The Panel notes that the region surrounding the Cheviot Coal Project contains a number of industries. Most, however, appear to be compatible with the Cheviot Coal Project as envisioned.

The Panel does expect that development of the Cheviot Coal Project will have a negative effect on trapping in the area, but whether this impact will be significant cannot be predicted at this time. However, the Panel will expect CRC to honour its commitments to develop a fair and equitable compensation agreement with affected trappers. The Panel does not anticipate that significant negative impacts to commercial hunting operations would occur as a result of the Cheviot Coal Project.

The Panel does believe that development of the Cheviot Coal Project will have a significant impact on the value of the Cardinal Divide Natural Area as a destination for those tourists seeking a wildlands experience due to aesthetic impacts, but does not expect areas further south or north of the proposed mine will be significantly affected. The Panel does not believe that the Cheviot Coal Project will significantly reduce the other ecological (and therefore ecotourism) values of the Cardinal Divide.

7 COMMUNITY EFFECTS

7.1 Mountain Park Townsite

7.1.1 Views of the Applicant

The former Town of Mountain Park (Figure 7) is located just upstream of the confluence of Thornton Creek and the McLeod River and situated along the Grave Flats Road and so is roughly centred within the Cheviot Coal Project. Mountain Park was developed in the early part of the century to serve area coal miners and their families, and was abandoned in the early 1950s when local coal mining ceased. CRC noted that, although the Mountain Park cemetery is intact, no above ground structures exist in the former townsite. However, a number of subsurface structures, including the positively identified Chinese Cafe and the two main town dumps are all well preserved.

At the hearing, CRC advised that from the outset of the Cheviot Coal Project, the company had committed to avoid disturbing the Mountain Park cemetery. In order to do so, the company indicated it planned a minimum 60 m buffer between the cemetery boundary and any mine disturbance. CRC also advised that it had been working diligently to preserve/record the heritage elements of the former townsite, including carrying out an Historical Resources Impact Assessment (HRIA). CRC noted that it had undertaken a number of modifications to its mine planning and site selection process in order to avoid disturbing as much of the former townsite as possible, while still recovering the important coal reserves beneath the former townsite.

CRC stated that it was prepared to minimize external waste dumping within the area of the old townsite, at significant additional cost, and that protecting the heritage values of the townsite and cemetery were also important factors in its selection of the site for the coal preparation plant and offices. CRC stated that it was also prepared to ensure that access to the cemetery was provided, to contribute to the maintenance of the cemetery, and, if deemed appropriate, provide for public interpretation. As a result of these mitigation programs, CRC stated that it believed that the impacts on the former townsite and the cemetery were insignificant.

7.1.2 Views of the Interveners

The Mountain Park Association noted that its membership is made up largely of individuals who had strong family ties to the former town. They advised the Panel that reunions of the various families who once lived in the area still take place every five years on the former townsite. Many of their association also have family members interred in the Mountain Park cemetery. As a result, both the townsite and the cemetery had special historical, cultural, and aesthetic values for them, as well as, they believed, broader public values. While the Mountain Park Association stated that they were not opposed to coal development per se, they did believe that the Cheviot Coal Project, as designed, would result in unacceptable impacts to the values of the former Mountain Park townsite specifically, and the surrounding area generally.

At the hearing, the Mountain Park Association recounted some of the history of coal mining in the region. They noted the low wages and the struggles between the workers and the companies to achieve better salaries and working conditions. They also described the risks associated with early underground coal mining. They told the Panel that it was, to a large degree, due to the efforts of these pioneers that mining could be carried out as safely and economically as it is. As a result, they felt it was very important that an appropriate memorial, through the preservation of the area's history, be left for those people.

With regard to the cemetery, the Mountain Park Association stated that they were not convinced that CRC's plans to protect the Mountain Park cemetery from disturbance were adequate, and proposed that the buffer between the cemetery and mine disturbance be increased. Furthermore, they believed that this buffer should be legislatively protected through the application by the Government of Alberta of a Protective Notation (PNT) to the site. The Mountain Park Association also indicated that they would support the installation by CRC of interpretive signage to inform visitors regarding the history of the cemetery.

With regard to the former townsite, the Mountain Park Association stated that CRC should, at an absolute minimum, be required to leave the entire townsite undisturbed, rather than just a portion. Ideally, the Mountain Park Association stated that it believed that a much greater reduction of surface disturbance in the area around the former townsite was also appropriate. They noted that much of the historical and sentimental value of the site was tied to the surrounding vista and natural beauty of the area. In their view, CRC's plans to create extensive rock drains and external waste rock dumps would destroy these values, as well as destroying irreplaceable habitat for fish and wildlife.

At the hearing, AEP advised the Panel that it was their understanding that a PNT for the cemetery had been established and that it had recently been expanded from an area set at the cemetery fence line to an area approximately 60 m on all sides beyond the cemetery fence. In response to questions from the Panel, AEP advised that if further protection of these resources was warranted, it saw no obvious problem with either increasing the PNT for the cemetery or applying a PNT to the former Mountain Park townsite. Alberta Culture did advise the Panel that, in its view, the area of Mountain Park proposed to be preserved by CRC was adequate from an historical and cultural perspective.

7.1.3 Views of the Panel

The Panel believes it can understand the concerns raised by the Mountain Park Association, and can sympathize with their feeling of loss. However, the Panel also understands CRC's position that very significant coal resources are buried below the former Mountain Park townsite.

In this case, the Panel does not believe that the public interest would be best served by leaving those coal reserves in place in order to preserve the entire former townsite. The Panel notes that from the perspective of Alberta Culture, the area currently proposed to be preserved is adequate. Given that there are no surface structures remaining, the Panel accepts that CRC's proposal will preserve a sufficient portion of the former townsite that its historical value to the general public will still be

preserved, even though its sentimental value to former residents will very likely be compromised. The Panel would urge that the Alberta government place a PNT around the area of the former townsite to be preserved in order to provide some additional assurance to the members of the Mountain Park Association that the former townsite has legislated protection. The Panel expects CRC to keep its commitment to work with both Alberta Culture and the Mountain Park Association in the design and maintenance of appropriate signage, access, and public parking.

With regard to the Mountain Park cemetery, the Panel notes that AEP appears to have already used a PNT to create a legislated protected zone around the cemetery. The Panel is not convinced, however, that a 60 m buffer between the cemetery and mine disturbance is adequate. Therefore, the Panel will require CRC to work with staff from the EUB, AEP, and members of the Mountain Park Association to re-examine the mine plan and establish whether a more substantive buffer can be established. If a larger buffer is feasible, the Panel would urge the Alberta government to expand the PNT appropriately.

7.2 Cheviot Coal Project Workers

7.2.1 Views of the Applicant

CRC stated at the hearing that it concurred with the position of Local 1656 of the United Mine Workers of America (UMWA) that its employees constituted a community of workers. CRC stated that, based on its experience at the Luscar mine site, it had no reason to doubt that the Cheviot Coal Project would provide a safe and secure workplace, characterized by cooperative labour management relationships, progressive work practices, and significant job security. The net result of approval of the Cheviot Coal Project, CRC felt, would be a significant positive impact on the existing Luscar mine workforce as the approval would allow a planned and orderly transition from one facility to the other. Other public benefits such as the minimal wastage of coal resources, a stronger worker commitment to environmental protection, and greater involvement in community activities would also be achieved if the current levels of high worker job satisfaction and feelings of commitment to the region could be maintained in the Cheviot Coal Project workers.

7.2.2 Views of the Interveners

At the hearing, the workers at the existing Luscar mine, through their union, expressed unequivocal support for the Cheviot Coal Project, as well as pride in the current company operations at the Luscar mine, including its environmental practices. In their evidence, they also highlighted the significant negative effects which would occur should the mine not be approved. The UMWA noted that more than 500 jobs would be lost, affecting a population of 1500 people. Most, they believed, would need to relocate from the area with their families, and would also experience a reduction in income and their standard of living. Such losses, they believed, would also weaken the social fabric of the other area communities.

The UMWA also noted that the jobs that would be provided at the Cheviot Coal Project were skilled,

high paying, and non-cyclical. Job stability was very high, they stated, with the average length of employment greater than 12 years. Jobs associated with industries such as tourism, on the other hand, tended, in their view, to be lower paying, seasonal, and providing fewer economic spinoffs to the community.

The AWA Coalition, in its intervention, noted that approval of the CRC application would generate employment for another 20 years, but this would again end unless a new mine could again be developed, while employment from tourism and recreation, while smaller in the near term, could grow and continue indefinitely. The AWA Coalition also argued that the Cheviot Coal Project was a new project, and could not be considered, as CRC claimed, to be an extension of the existing Luscar mine in terms of workforce continuity.

7.2.3 Views of the Panel

The Panel accepts both CRC's and the workers' views that the current Luscar mine provides high quality employment. The Panel also accepts that if the Cheviot Coal Project is not approved, the economic and social impacts on those workers will be adverse and significant. In particular, the Panel notes the relative stability of the workforce at the Luscar mine as both a measure of the workers' satisfaction with their current working environment and a basis for their relative sensitivity to the impacts of a change in job security.

The Panel also believes that it is reasonable to consider the Cheviot Coal Project as an extension, when considering the community of workers, of the Luscar mine. In the Panel's view, the Cheviot Coal Project is in fact quite unique in that it is able to make use of an existing workforce already well established within an existing community infrastructure. As a result, while the Cheviot Coal Project will not create any "new" jobs, its approval would clearly help to ensure regional economic stability for at least two decades, with minimal new infrastructure costs. Furthermore, such jobs would, in a provincial context, tend to be considered skilled, stable, and relatively well paid.

7.3 Alexis First Nation and Smallboy Camp

7.3.1 Views of the Applicant

CRC stated that the Cheviot Mine Project area had been used by aboriginal peoples extending back to well before pre-contact times. In order to better understand the degree to which the area had been used by aboriginal peoples, CRC indicated that it had carried out an assessment of traditional land use in the region. As well, numerous meetings, field tours, and phone conversations had been carried out with representatives of the aboriginal communities. CRC stated that it was committed to maintaining this dialogue throughout the life of the mine. Based on the above communications, CRC advised that, in its view, three native communities, the Alexis First Nation (Stoney), the Smallboy Camp (Cree), and the non-treaty Salteau group appeared to have traditional land use interests in the area. Of these, only the Alexis First Nation and the Smallboy Camp appeared to have land use concerns proximal to or within the Cheviot Coal Project.

CRC noted that in 1993 it became aware of a land claim by the Alexis First Nation to an area south and east of the mine permit boundary (Figure 3). This Treaty Land Entitlement (TLE) also extended

over approximately 45 ha of coal leases held by Luscar Ltd. CRC advised that it voluntarily relinquished its rights to those lands in order that government officials could proceed with the TLE package. In its application, CRC indicated that it was unaware of any other land claims for the area.

Alexis First Nation

CRC stated that it had identified a number of items of concern to the Alexis First Nation and had proposed a number of mitigative strategies to deal with these. CRC noted that it had concluded a memorandum of understanding with Alexis First Nation regarding employment and business opportunities.

With regard to the maintenance of water quality, CRC stated that, while it believed its project would have no significant effects on water quality within the Cardinal River drainage system, it was prepared to undertake a water quality monitoring program in conjunction with the Alexis First Nation. CRC noted that it was not prepared to avoid mining within the Red Cap/Cardinal drainage completely, since the coal reserves were critical to the success of its mine.

With regard to the magnitude of the project, CRC advised that it was prepared, in discussion with Alexis First Nation, to carry out an appropriate show of respect for the land and for the customs of the Alexis First Nation. CRC noted that while there would be a loss of traditional use areas (e.g. for hunting, gathering, burials, etc), it would review access and development plans on an ongoing basis with Alexis First Nation to maximize opportunities for their use of the land. CRC advised it would also consult with the Alexis First Nation regarding the location of possible burial sites and protocols for their relocation if any were discovered.

CRC noted that cumulative effects to Alexis First Nation lands could occur from forestry, oil and gas exploration, and regional recreation. No changes to the seasonal use of the Grave Flats Road, which would be upgraded and maintained as a four season road only to the mine site, was expected in areas proximal to the Alexis First Nation TLE. Given its proposed mitigation plans, CRC stated that it did not believe that the cumulative effects of development on the various VECs contained within the Alexis First Nation lands would be significant.

Smallboy Camp

CRC noted that the Smallboy Camp had identified the preservation of water quality, particularly in the Cardinal River drainage, as its primary concern but felt that the impacts of the Cheviot Coal Project on water quality would not be significant. CRC advised, however, that it was not prepared to avoid mining in the Red Cap drainage as suggested by the Smallboy Camp. CRC advised it was prepared to enter into a joint water monitoring program with the Smallboy Camp.

CRC noted that the Smallboy Camp also had very significant concerns with regard to the loss of traditional land uses, particularly for gathering medicinal plants and hunting opportunities. CRC committed to working with the Smallboy Camp in an attempt to identify unique plants prior to

disturbance and to either allow them to be harvested or possibly even attempt to transplant them. CRC also advised it would continue to work with the Smallboy Camp regarding its wildlife programs and would ensure that its activities were carried out in a manner which respected the people and their culture.

CRC noted that while it did not believe that the Cheviot Coal Project would result in significant cumulative effects on the Smallboy Camp, it would continue to liaise with the community to ensure that its development plans were understood and that any concerns were addressed.

7.3.2 Views of the Interveners

The Alexis First Nation stated that it was their traditional use of the lands in the Mountain Park area which had led them to accepting the TLE in 1994. They also acknowledged CRC's actions in releasing its interest in a portion of the TLE.

The Alexis First Nation stated that they had selected the TLE because of its pristine beauty, clean water, fresh air, and traditional and spiritual significance, as well as because of potential future socio-economic benefits. They advised that they ultimately intended to develop an aboriginal cultural centre and ecotourism operation on the lands and so wished to preserve its environmental values as much as possible. As a result, they were concerned about the potential environmental effects of the Cheviot Coal Project.

The Alexis First Nation noted they had worked cooperatively with CRC for the past 18 months in assessing the project impacts and confirmed that they had entered into a Memorandum of Understanding with CRC regarding socio-economic benefits. They also noted that CRC had agreed to consult with them on all related future applications to the EUB and AEP, and advised the Panel they reserved their right to intervene in such applications if their rights were compromised. The Alexis First Nation also asked that the Panel ensure that future permits and licences be very specific in stipulating requirements for environmental protection, and adopt the highest standards.

As previously noted in this report, in its submission the Alexis First Nation confirmed ongoing concerns with impacts to wildlife, human health, and water quality resulting from mine development, and suggested that CRC be required to address and/or monitor these effects and report regularly to interested parties, including the Alexis First Nation. They also advised the Panel that, due to the fiduciary relationship between both the Federal and Provincial Crowns and First Nations, that if CRC's operations had an effect on their rights that the Crown was required to place their interests before those of other parties. The Alexis First Nation also wished to be assured that they would be part of all future land use and management decisions made for the region.

The Smallboy Camp advised the Panel that they had left their reserve lands at Hobbema, Alberta and travelled first to the Kootenay Plains and eventually settled in their current location approximately 15 kilometres to the east of the proposed Cheviot Coal Project in the late 1950s and early 1960s. They indicated that they had done so in order to enable the re-establishment of a traditional lifestyle based on the practice of what they termed Natural Law. The Smallboy Camp indicated that they had selected the area at least in part because of its isolation and its pristine nature.

The Smallboy Camp stated that they had over the years had other industrial development, such as oil and gas exploration, occur in proximity to their camp and had been able to reach an accommodation

with the developers. They also advised that they were not against the mines or companies per se. However, the Smallboy Camp stated that they too required certain areas of land not only for survival but also as an integral part of their identity. For the Smallboy Camp, the Cheviot area, they stated, was a key element in their attempt to relearn for themselves and to teach their children traditional native values. From that philosophical base, they hoped to be able to eventually also learn to deal more effectively with non-native culture. They stated that much of the area, and particularly Red Cap Mountain and Red Cap Creek, had important spiritual values as well as providing a major source of traditional medicines and their drinking water supply. Any acceptable development process in this region, they stated, had to give equal value to their needs and their viewpoint.

At the hearing the Smallboy Camp stated they were not trying to cause any disturbance for the people who depended on the mine to earn a living. But at the same time, they noted, they also had the right to survive, and that the land they needed was only a small fraction of what was available to the rest of society. Therefore, they were requesting that CRC not be allowed to mine within the Red Cap Creek watershed. This, they stated, represented only one-third of the total mine area, and also represented, in their mind, a reasonable compromise between conflicting needs. They also stated that they were prepared to take whatever legal steps were available to the Smallboy Camp to protect the Red Cap Creek drainage.

On her own behalf Mrs. Misisquis Young Dave, a member of the Smallboy Camp, observed that she and her family had lived for generations in this area and that she currently derived much of her income from the medicinal plants within the Red Cap Creek drainage. This in turn helped support a number of family members. She advised the Panel that she had no idea how she would replace that income once mining started. At a minimum, she believed that some form of compensation for her economic losses would be fair.

7.3.3 Views of the Panel

With regard to the Alexis First Nation, the Panel notes that they and CRC have, after significant discussion, reached a Memorandum of Understanding regarding socio-economic issues. As a result, the Alexis First Nation advised the panel that, assuming CRC continued to meet its commitments, they were in support of the Cheviot Coal Project. From this and from their comments at the hearing, the Panel believes that, in a general sense, their concerns have been addressed by CRC.

With regard to specific concerns raised by the Alexis First Nation (e.g. wildlife, water quality, health), the Panel believes that these have been addressed in the appropriate sections of this report. The Panel therefore concludes that, provided CRC's undertakings to the Alexis First Nation are met, the environmental effects of the Cheviot Coal Project on the Alexis First Nation will not be significant.

With regard to the Smallboy Camp, the Panel is prepared to accept that, although the community itself is some distance from the mine, the lands proposed to be mined by CRC, particularly within the Red Cap Creek drainage, are part of the lands currently used by the members of the community. However, although the Smallboy Camp may ultimately be affected by the approval of the Cheviot Coal Project,

the Panel does not believe that the public interest would be served by precluding the mining of the coal reserves within the Red Cap Creek drainage.

The Panel notes that there seems to be little opportunity for compromise between the positions taken by the Smallboy Camp (i.e. that mining within the Red Cap Creek drainage should not be permitted) and CRC (i.e. that mining within the Red Cap Creek is vital to the economic viability of the project). While recognizing that the circumstances between the two native communities are different, the Panel does note that CRC has demonstrated, through its agreements with the Alexis First Nation, that some accommodation of potentially conflicting land uses may be possible. The Panel also notes that the Smallboy Camp has also previously demonstrated an ability to reach a compromise with industrial development, although again recognizing the large differences in scale between oil and gas and coal development. Given that several years must elapse before CRC will be prepared to mine in the Red Cap Creek area, the Panel believes that a real opportunity still exists for CRC and the Smallboy Camp to explore alternative ways in which both their needs could be met. Should the Cheviot Coal Project be approved, the Panel will expect CRC to make substantive efforts to continue its dialogue with the Smallboy Camp to try to find such alternatives.

With regard to the specific concerns raised by Mrs. Young Dave, the Panel notes the commitments made by CRC to continue to liaise with the Smallboy Camp and all its members and the Panel will require CRC to meet those commitments. The Panel also notes the commitments made by CRC to attempt to minimize its effects on traditional uses of the area, and would suggest that the company consider the retention of expert advice in areas such as medicinal plants to help it meet those commitments.

7.4 Hamlet of Cadomin

7.4.1 Views of the Applicant

Both in its application and at the hearing, CRC advised the Panel that through CEPA it had been working closely with the residents of Cadomin to address issues associated with both the existing Luscar mine and the proposed Cheviot Coal Project. As a result, in its view, a large number of issues had been addressed. These included the design and routing of the access corridor around the Hamlet, the protection of water supplies and the appropriate design features of the dams required by the project. CRC stated that it believed that both positive and negative effects on Cadomin would likely be minimal.

Despite these efforts, CRC did note that some areas continued to exist where, in its view, agreement between CEPA and CRC had not yet been reached. One such issue was the possible location of a construction camp at the southern edge of Cadomin. CRC advised the Panel that it may have misunderstood the extent of the community's objections to such camps, due to perceived negative impacts on quality of life. CRC stated that, had it realized the extent of the issue, it believed that it would have been able, through dialogue, to resolve the community's concerns. CRC stated that, notwithstanding its view that there are no significant negative consequences associated with such camps,

it was prepared, in discussion with CEPA, to re-evaluate its options with regard to such camps and was confident this issue could be resolved.

7.4.2 Views of the Interveners

CEPA noted in its submission that it was formed in 1989, in response to an application by CRC to mine coal proximal to Cadomin, and that its 123 plus members represented 80 per cent of the residents of Cadomin. CEPA noted that over the years the residents of Cadomin have become largely non-permanent, and use the area largely for its diverse recreational opportunities. Cadomin, it stated, would be impacted by the Cheviot Coal Project as a result of effects on waterways, access routes, and land management changes.

CEPA advised the Panel that it had been working cooperatively with CRC and had, as a result, reached a number of agreements (see Appendices C, D). Furthermore, they submitted to the Panel a number of recommendations to which, they believed, CRC had also largely agreed to undertake. Despite CRC's agreement, however, they asked that these also be included as conditions of any approval issued to CRC in order that they could be enforced. A number of these recommendations, specifically on the bypass access road, water policy, dam construction, soil conservation, land management, and wildlife have been addressed elsewhere in this report. Three remaining issues (i.e. the effects of the construction camps, the need for an advisory committee, and community funding) are discussed below.

With regard to the construction camp, CEPA stated that it was unfortunate that a misunderstanding regarding the need for camps had arisen between itself and CRC. CEPA stated that in its view, the proposed camp would be large relative to the size of the community and would operate for a significant amount of time (up to 16 months). CEPA noted that while such camps may have positive economic benefits for a community, they may also have negative effects including increased traffic and crime. Furthermore, even if such impacts do not occur, the perception of risk can reduce quality of life within the community. CEPA stated that, in its view, such effects had not, based on the information provided at the hearing, been adequately addressed by CRC. In its view, no construction camps at either Cadomin or Mountain Park should be permitted, and construction workers should be transported from Hinton.

CEPA stated that, with regard to any Public Advisory Committee for the Cheviot Coal Project, CRC should also be required to form a separate advisory committee, with only CEPA and CRC as members, and that this should be made a condition of any approval. CEPA also set out a number of specific conditions with regard to this committee, including frequency of meetings, that it felt were appropriate. CEPA also requested that the Panel recommend that CRC assist CEPA with retaining the necessary expert advice on future licences and approvals when these will have an impact on the residents of Cadomin.

7.4.3 Views of the Panel

With regard to the potential environmental effects of the Cheviot Coal Project on the residents of Cadomin, the Panel notes that CRC appears to have carried out an extensive and generally effective consultation process. Furthermore, CRC has clearly made a number of significant changes in its application and a number of commitments in order to address the concerns of the residents. Most of these have been addressed earlier in this report and in general, the Panel is satisfied that no significant environmental effects on the Hamlet of Cadomin will occur. However, three remaining issues, that is the use and location of construction camps, the establishment of a specific advisory committee between CRC and CEPA, and funding appear to be outstanding.

With regard to construction camps, the Panel does not agree with CEPA that construction camps in either the vicinity of Mountain Park or Cadomin are unacceptable. Based on the evidence provided at the hearing, the Panel is not prepared to make it a requirement of any approval that CRC cannot establish construction camps at either one or both sites. The Panel believes that the use of construction camps in proximity to communities is a well established practice in Alberta, and was not convinced that CEPA's concerns were sufficient to warrant limiting CRC's options in this regard. That said, the Panel will require that CRC continue in its dialogue with CEPA to determine if this issue can be resolved consensually.

With regard to a CEPA-CRC advisory committee, the Panel would expect CRC to honour any commitments it has made to CEPA, including the possible funding of experts. The Panel is not, however, prepared to make it a condition of any approval, that such a committee must be established or that it be funded by CRC. The Panel believes that CRC has made a very significant effort to communicate with CEPA during the course of preparing its application. The Panel also believes that CRC will continue to communicate extensively and effectively with the various affected publics over the life of the Cheviot Coal Project and will expect it to do so. However, for such a process to be truly effective, the Panel believes it must be based on all parties believing that such dialogue represents a net benefit. The Panel is not convinced if one of the parties believes that it has no choice but to participate that this is conducive to effective communications. Furthermore, the creation of such a "regulated" consultation process would almost by definition have a significant risk of reducing its effectiveness.

7.5 Town of Hinton

7.5.1 Views of the Applicant

CRC noted that the Town of Hinton, with a population of 10 000, is located approximately 50 km north-west of the proposed Cardinal River Coal's Cheviot coal mine. Hinton is primarily resource-based, with coal mining, forestry, and pulp and sawmill operations representing the community's economic engines. CRC observed that more than 80 per cent of the miners at the Luscar mine currently live in Hinton.

CRC believed that approval of the Cheviot Coal Project will have positive economic and social benefits for Hinton. These benefits primarily flow from the continued economic and social stability and predictability resulting from the preservation of approximately 400 full-time jobs directly related to the mining operation, which would occur as CRC transferred its labour force from the Luscar mine to the Cheviot mine.

Should the Cheviot Coal Project not be approved, CRC stated that once the coal resources within the Luscar mine were exhausted over the next 5 to 7 years, that the mine would close down. While other economic factors could reduce this effect somewhat, CRC predicted that up to 300 households (900 people) could be lost from the town of Hinton. Associated with this would be proportionate increases in social and infrastructure costs to the remaining population, including a potential significant drop in real estate values as supply exceeded demand.

7.5.2 Views of the Interveners

The Town of Hinton, the Hinton and District Chamber of Commerce and the Alberta Chamber of Commerce all spoke strongly in favour of allowing the Cheviot Coal Project to proceed, and echoed CRC's descriptions of the economic and social benefits which would occur. Their presentations reiterated the description of the positive benefits of allowing the project to proceed itemized by CRC. These interveners also agreed that a decision to refuse to allow the mine to proceed would have major social and economic costs for Hinton. A number of these groups also suggested that the environmental impacts of the project were mitigable with known technology and that there was therefore a clear public good associated with allowing the project to proceed.

7.5.3 Views of the Panel

During the hearing, very strong support for the Cheviot Coal Project by representatives and citizens of the town of Hinton was evident. The Panel is prepared to accept the evidence, which in general was not challenged, that the failure of the Cheviot Coal Project to proceed will have significant negative social and economic effects on the Town of Hinton, and likely other regional towns such as Edson, as well.

7.6 Regional Community Effects

7.6.1 Views of the Applicant

CRC stated that major economic and related social benefits would accrue to the region, and beyond, if the Cheviot Coal Project were approved. According to CRC, the positive economic effects of the project included job creation during the construction phase; job maintenance for a large number of workers currently employed at the Luscar mine that would otherwise end within several years; spin-off economic benefits for regional businesses and residents; and major revenues for the local, provincial, and federal government. CRC also noted that these benefits would, if the project were denied, become

the opportunity costs of not proceeding. CRC believed that the regional economic benefits clearly outweighed the environmental impacts associated with the project.

CRC indicated that the project entails construction activities during 1997–1999 which will inject more than \$180 million in 1995 dollars into the regional economy. This construction will also create 585 person–years of direct employment and another 1100 person–years of work indirectly. In addition, during the period 2001–2019, the Cheviot Coal Project would directly maintain approximately 450 person–years of employment annually. CRC also stated that the project would indirectly sustain an additional 690 person–years of work for the full 20–year life cycle of the project. CRC stated that the ongoing employment associated with the mine would infuse more than \$54 million (1995 dollars) of household income annually into the regional and provincial economy. CRC estimated that about 57 per cent of this long-term cash flow will go directly to households in the immediate vicinity of the project.

CRC stated that it was prepared to continue to support the Alberta Industrial Benefits Program administered by Alberta Economic Development and Tourism. CRC stressed that it would ensure that Alberta and Canadian engineering firms, contractors, manufacturers, and suppliers receive full and fair opportunity to compete in the supply of goods and services for the Cheviot Mine Project. CRC expected that over 75 per cent of this business would flow to Alberta firms.

CRC predicted that the municipal, provincial, and federal governments would receive about \$0.2 million, \$17.0 million, and \$20 million per year, respectively, in additional revenues from the Cheviot Coal Project. At the hearing, CRC also submitted what it believed was a reasonable estimate of recreational spending in the Mountain Park region which would be foregone, or at least displaced, if the Cheviot Coal Project were to proceed. CRC's analysis suggested that losses would be approximately \$350,000 (\$260,000 for general recreationalists plus \$90,000 for resident and non-resident hunters) and estimated this level of expenditure would generate 10 full time equivalent jobs.

7.6.2 Views of the Interveners

A large number of businesses and groups within the region endorsed the Cheviot Coal Project. As noted in subsection 7.5.2, the Town of Hinton, Hinton and District Chamber of Commerce, and the Alberta Chamber of Commerce stated that they supported the Cheviot Coal Project because they believed that it would yield real net benefits for local municipalities and the region. This group also presented the results of a regional survey signed by 4000+ persons who supported the project.

The pro-project view was shared in the letters of support submitted to the panel by the Regional Municipality of Wood Buffalo and the Towns of Edson, Grande Cache, and Bonnyville. The interveners representing local business groups, municipalities, and the mine workers also voiced concern about the negative economic and social effects of a decision not to proceed with the mine on local communities such as Robb and Cadomin.

Representatives of Weldwood Canada, the largest employer in Hinton, and Inland Cement, which operates near Cadomin, also expressed support for the project and indicated that they foresaw positive

gains to the region from the undertaking. These firms also stated that CRC is a very good corporate citizen who contributes to the wellbeing of local communities in a variety of ways, including training local residents in emergency measures for fires, chemical spills, first aid, and mine safety. Weldwood Canada also stressed that CRC's continued presence would have a major stabilizing effect on the economic and social wellbeing of numerous communities within the region. In the view of both companies, CRC had displayed a leadership role in acting as an environmental steward within the local area. Inland Cement cited as an example of CRC's enlightened treatment of environmental issues the company's decision to suspend operations along its haul roads when heavy snows forced bighorn ewes to lamb along company roadways.

The AWA Coalition stated that, in its view, CRC had failed to show how its economic analysis of the benefits of the project could be of use to the Panel without also conducting a social benefit–cost analysis. The AWA Coalition stressed that without an effort to assess the non–market valued resources — such as the value the public places on undisturbed wilderness — it was not possible to evaluate the true economic and social benefits and costs of the project. In a similar vein, AWA argued that the proponent's failure to properly analyze the economic and social consequences of alternatives to the project deprived the panel of essential information required to determine whether the project is in the public interest.

7.6.3 Views of the Panel

The Panel is prepared to accept in general CRC's estimates of the social and economic benefits of the Cheviot Coal Project as reasonable. The Panel also notes that the Cheviot Coal Project is somewhat unique in so far as, should it be approved, no new social infrastructure costs would be incurred and/or transferred from one portion of the province to another.

The one exception to the above findings was CRC's analysis of the foregone socio–economic benefits associated with not developing the Cheviot Coal Project. The Panel found this analysis to be somewhat superficial. However, the Panel undertook to re–analyse CRC's estimate of foregone benefits (\$350 000) from lost recreation and hunting opportunities. In that analysis, the Panel, using publicly available data calculated an upper value of under \$600 000 per year in foregone economic activity. However, even assuming that this value still underestimates the lost recreational value of the region by 100 per cent, the Panel was not able to demonstrate to its satisfaction that the foregone economic non-consumptive benefits even approximated the economic benefits of mine development.

8 CONCLUSIONS, DECISIONS, AND RECOMMENDATIONS

8.1 Conclusions

The Panel has carefully reviewed the evidence provided by the parties to the public hearing regarding the Cheviot Coal Project and has reached a number of conclusions. In reaching these conclusions, the Panel has been mindful that the approval process for coal mines in Alberta currently has two stages, with the second licensing stage designed to address in much more detail specific aspects of a project in a manner not possible during the permitting stage. Should this two-stage process be abandoned in the future, then the Panel believes its findings should be revisited in order to ensure that they remain valid.

- (1) With regard to the need for and alternatives to the Cheviot Coal Project, the Panel concludes that CRC has established that, subject to receiving the necessary federal and provincial approvals, it has the right to carry out extraction of the coal resources within the applied for mine permit boundary. The Panel believes that CRC has adequately considered other potential sources of metallurgical coal, and that the Cheviot Coal Project provides CRC, from an economic perspective, with an optimal combination of coal reserves, coal quality, and access to infrastructure. The Panel also concludes that, under reasonable economic assumptions, the Cheviot Coal Project is economically viable, and will provide significant economic benefits to both the region and to the province.

With respect to alternative methods of extracting the Cheviot coal reserves, the Panel accepts that surface mining is the optimal method of coal extraction, and that CRC has adequately considered alternative methods. The Panel also concludes that a coal preparation plant and a transportation and utilities corridor are also necessary integral components to the Cheviot Coal Project.

- (2) With regard to aquatic environmental effects, the Panel concludes that the Cheviot Coal Project will have a direct impact on water flow rates and water quality both within and beyond the mine permit boundaries. However, the Panel believes that these changes to flow and to water chemistry will not be beyond the normal range of variability in such parameters and the environmental effects will not be significant. The Panel believes that both the rock drain technology and the dam design standards proposed by CRC are reasonable, and that the risk of accidental loss of contaminants is within acceptable limits.

The Panel also concludes that the Cheviot Coal Project will result in both the short-term disruption and permanent loss of fish habitat. The Panel will require CRC, to the extent possible, to avoid or minimize the loss of such habitat. However, where such loss is unavoidable (e.g. in headwater streams covered by external waste rock dumps) the Panel concludes that CRC's proposals to compensate for lost fish habitat are reasonable. Although there are a number of questions remaining regarding the ultimate productivity of end pit lakes, the Panel believes that there is an acceptable probability that they can maintain self-sustaining fish populations. However, the Panel also concludes that CRC should be required at the

licensing stage to justify the need for each end pit lake, particularly those not expected to be able to sustain fish populations and, if a lake cannot be adequately justified, to refill the pit with waste rock. CRC will also be required to establish alternative methods of compensation for lost aquatic habitat should end pit lakes prove to be inadequate.

- (3) With respect to terrestrial environmental effects, the Panel concludes that the impacts to soil landscapes, general terrain features, and neotropical breeding birds resulting from surface mining will be significant, but can be justified. The Panel also concludes that impacts to vegetation and other wildlife can, with one notable exception, likely be adequately mitigated, and further, that the predicted impacts can likely be further reduced as mine planning continues. To the extent possible, the Panel will require CRC to minimize surface disturbance and maintain existing vegetation, soil, and terrain features. CRC will also be required to evaluate the possibility of providing wildlife corridors and to confirm, within three years, whether it has been able to successfully initiate the Carnivore Compensation Program.

The exception to the above conclusions is with regard to the vegetation and wildlife values found in the upper Prospect Creek drainage. The Panel does not believe that the economic value of the coal resources in this area, particularly given the high reclamation and transportation costs, are sufficient to justify the loss of large numbers of rare alpine plant species, the potential impacts to wildlife, or the risks to the ecological integrity of the Cardinal Divide Natural Area. The Panel, therefore, has concluded that surface coal mining in all of Section 35–45–24 W5M and in the SW 1/4 of Section 36–45–24 W5M would not be in the public interest. In addition, the Panel believes that all mine development along the base of Tripoli, Cheviot, and Prospect Mountains must be carried out in a manner which continues to permit the unimpeded movement of wildlife along this travel route.

The Panel also strongly recommends that the level of protection for wildlife in the upper Cardinal River be increased. The most effective means of doing so would appear to be to amend the existing PNTs to further restrict motorized access. While the Panel recognizes that this will have some adverse effect on motorized recreation, the direct benefits to the Cheviot Coal Project by increasing the likelihood that the various wildlife mitigation programs will be successful would appear to make these changes highly appropriate. Potential indirect benefits would include: increased watershed protection on the Cardinal River, which was a key issue to both the Alexis First Nation and the Smallboy Camp; additional buffering of Jasper National Park; and additional protection for the Cardinal Divide Natural Area. The Panel would suggest that AEP consider the inclusion of these lands, as well as the upper Prospect Creek lands, into the Cardinal Divide Natural Area, if only to reduce any confusion regarding the level of protection from disturbance that is required to protect their ecological values.

- (4) With respect to noise and atmospheric emissions, the Panel concludes that any adverse environmental effects from the Cheviot Coal Project will not be significant.
- (5) With regard to land use effects, the Panel concludes that the Cheviot Coal Project is consistent

with current provincial land use policy. The Panel also concludes that development of the Cheviot Coal Project can be carried out in a fashion which preserves the majority of the existing regional land use objectives, including the maintenance of the ecological integrity of the Cardinal Divide Natural Area and Jasper National Park. However, in order to do so, CRC will be required to work closely with provincial and federal land managers and the stewards of the Cardinal Divide Natural Area.

The Panel believes that the one major exception to the above conclusions would be the impacts on current recreational users of the Mountain Park area. In the Panel's view, much of this activity will be displaced to surrounding areas. Without careful management, particularly of access patterns, the Panel believes that these changes in the distribution of recreational activities will have significant effects on a number of other land use objectives, including the success of CRC's mitigation programs for wildlife and the preservation of the ecological values of the Cardinal Divide Natural Area. In particular, the Panel believes that it is unlikely that the necessary control of access can be accomplished without the imposition of some form of regulatory control such as Forest Land Use Zones.

- (6) Regarding community effects, the Panel concludes that, on a regional basis, the Cheviot Coal Project will provide significant economic and social benefits, particularly to the Town of Hinton. The Panel also concludes that potential impacts on one aboriginal community, the Alexis First Nation, appear to have been effectively addressed. The Panel does expect that some effects on the Smallboy Camp, given their desire to live outside industrialized society as much as possible, may occur. However, the Panel believes that such impacts may not occur for some time and can potentially be somewhat reduced through ongoing dialogue between CRC and the Smallboy Camp. The Panel also concludes that, with some minor modifications, CRC's proposals to reduce the impacts on the former town of Mountain Park and the Mountain Park cemetery are appropriate.

8.2 Decisions

Having regard for its responsibilities for matters which fall under the mandate of the EUB, the Joint Review Panel has considered all of the evidence and views presented at the hearing and is satisfied that, subject to a number of conditions, Applications No. 960313, 960314, and 960677 meet all of the regulatory requirements and are in the public interest. Accordingly the Panel is prepared to approve the applications subject to the commitments made by CRC and TransAlta and to the following conditions:

- (1) All of Section 35-45-24-W5M and the SW 1/4 of Section 36-45-24-W5M are excluded from the mine permit area as proposed by Cardinal River Coals Ltd. in Application No. 960313.
- (2) For the purposes of providing a template for the proposed Cheviot mine end pit lakes, CRC shall establish an ongoing program into the aquatic ecology of Lac Des Roche.

- (3) CRC shall justify the need for each end pit lake and rock drain on an individual basis to the satisfaction of the EUB and AEP.
- (4) CRC shall establish minimum instream flow values in the drainages directly affected by the Cheviot mine. In consultation with AEP, CRC shall carry out long-term monitoring of groundwater and surface water quality, including appropriate biomonitoring.
- (5) CRC will undertake to review available control technologies for metals, nutrients, and other compounds within its settling ponds as well as assess the relevance of current water quality guidelines to its effluent discharges.
- (6) CRC will monitor the success of its programs to re-establish native rainbow trout stocks and identify potential alternative areas for habitat enhancement should end pit lakes not prove to be successful.
- (7) CRC shall re-examine its mine plan options in the vicinity of Powerhouse Creek and any other area if appropriate to determine in consultation with the EUB and AEP if disturbance of the Englemann spruce-subalpine fir community can be avoided.
- (8) CRC will, in consultation with the EUB, continue to refine its mine plan with the goal of maintaining a 1000 m buffer between areas of mine disturbance and the present boundaries of the Cardinal Divide Natural Area wherever practical. In particular, proposed waste rock dumps which currently intrude within this buffer must be re-examined at the appropriate time and their location justified to the EUB. Should the Cardinal Divide Natural Area be expanded, CRC will be required to maximize the distance between mine disturbance and the Cardinal Divide Natural Area to the degree practical, recognizing that the 1000 m buffer likely can no longer be maintained. In consultation with the stewards for the Cardinal Divide Natural Area, CRC will also ensure that no access points are created or that its reclamation programs do not have a negative impact on existing plant communities.
- (9) CRC shall advise the EUB on an annual basis regarding the status of the Carnivore Compensation Program and, within three years of receiving approval for the project and before unmitigable impacts have occurred, shall provide evidence of measurable success in establishing the proposed Carnivore Compensation Program.
- (10) CRC shall monitor the impacts of its increased traffic on wildlife populations along the Graves Flats Road and make any adjustments necessary to reduce wildlife mortality to acceptable levels.
- (11) CRC shall carry out studies needed, in consultation with the EUB, AEP, and Parks Canada, to examine current wildlife movement patterns across the mine site and to establish the likely minimum conditions (e.g. width, degree of cover) necessary for wildlife corridors to be

effective, and to establish how such corridors might be accommodated within the mine plan. Ongoing monitoring to identify new mineral licks is also required.

- (12) CRC shall monitor changes to public access and use patterns resulting from its development and advise AEP if any of these appear to have unduly increased the risk of wildlife habitat displacement or of either legal or illegal wildlife mortality.
- (13) Should CRC locate a construction camp at Cadomin, it shall educate workers regarding the area sensitivity and monitor the Cadomin Caves trail usage by its workers and contractors.
- (14) CRC shall employ all reasonable methods available to reduce impacts on Harlequin duck populations, including reducing disturbance levels in riparian areas of the McLeod River, MacKenzie Creek, and Cardinal River watersheds, and continue to monitor these populations.
- (15) Prior to commencing any construction work, CRC shall establish Permissible Noise Levels (as defined by the EUB's ID 94-4) with respect to residences in the Hamlet of Cadomin and the Whitehorse Creek Recreational Area and, in discussion with EUB staff, determine if noise monitoring at the Cadomin Caves is appropriate.
- (16) CRC shall undertake to pave the west bypass access route provided no significant safety or other concerns are raised by either the regional authorities or the residents of Cadomin.
- (17) CRC shall review its mine plan in consultation with the EUB, the Mountain Park Association, and Alberta Culture to establish appropriate buffers, access, and signage for the Mountain Park cemetery and former townsite.
- (18) CRC will establish a community liaison group or groups in order to provide interested parties with an opportunity to express concerns, learn about proposed company activities, and receive the results of CRC's various monitoring programs. In particular, CRC will continue its dialogue to the best of its ability with CEPA, the Mountain Park Association, the stewards of the Cardinal Divide Natural Area, the Alexis First Nation, and the Smallboy Camp.

8.3 Recommendations

As per the Terms of Reference for the Joint Review Panel, the Panel has prepared the above final report setting out the rationale for its conclusions regarding the environmental effects of the Cheviot Coal Project. The Panel has concluded that sufficient information was provided for it to be able to determine that the majority of the environmental effects, including socio-economic effects, are either positive or where adverse, are not significant. Where the environmental effects were considered to be adverse and significant, they were generally considered to be justified in the context of the project as a whole. In two cases, for the loss of stream (fish) habitat and the loss of carnivore habitat, compensation for non-mitigable effects was found to be acceptable.

In one case, that is in upper Prospect Creek, the impacts of mine development were considered to be adverse, significant, and not justifiable given the circumstances. However, the Panel, under the authority granted by the mandate of the EUB, has required that this area be excluded from the Cheviot Coal Project, and so the risk of potential adverse environmental effects has been addressed.

Based on this, the Panel recommends that the Cheviot Coal Project receive regulatory approval from the Government of Canada. In particular, the Panel recommends that the programs to be required of CRC as mitigation measures under the EUB and AEP approvals be accepted as also adequate to address the requirements under Section 35(2) of the Federal Fisheries Act.

DATED at Calgary, Alberta, on 6 June 1997.

**ALBERTA ENERGY AND UTILITIES BOARD
CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY**

Brian F. Bietz
Chairman

Gordon J. Miller
Member

Tom Beck
Member

TABLE 1 THOSE WHO APPEARED AT THE HEARING

Principals and Representatives
(Abbreviations Used in Report)

Witnesses

Cardinal River Coals Ltd. (CRC)

D. R. Thomas, Q.C.

A. E. Domes

N. A. Maydonik, Q.C.

W. Hume

F. Munn

A. M. Toutant

L. LaFleur

B. Logan

R. Ferster

M. Evans

R. Karst

P. Sagert

W. Veldman

F. Claridge

T. Dabrowski

A. Stewart

M. Thompson

R. Morin

M. LeBlanc

M. Harris

G. Potolicki

C. Brinker

B. MacCallum

S. Herrero

D. Walker

O. Bakowski

W. Strong

J. Gendron

L. Knapik

A. Wolanski

J. Allan

M. Kavanagh

D. Birkholz

D. Davies

U. Klee

B. Ramsey

D. Whicker

K. Hale

D. Davies

G. Fedirchuk

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)	Witnesses
TransAlta Utilities Corporation (TransAlta) C. J. Meagher D. C. Maxwell J. Dixon C. Journault	R. V. Howland D. W. Walters
Canadian National Railway Company (CNR) M. A. King	
Inland Cement T. McDougall	R. Moss
Weldwood Canada T. Whitford	T. Whitford
Hinton and District Chamber of Commerce C. Mork	B. Deal C. Mork
Alberta Chamber of Commerce N. Leach C. Mork	N. Leach
United Mine Workers of America, Local 1656 (UMWA) G. K. Randall, Q.C.	R. Campbell B. Bish S. Whiteley P. Nichols
Town of Hinton Mayor R. Risvold	Mayor R. Risvold P. Nichols B. Kreiner

D. Van Binsbergen, MLA for West Yellowhead (himself)

C. Breitkreuz, MP Yellowhead (himself)

C. Breitkreuz

L. Best

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives
(Abbreviations Used in Report)

Witnesses

Alexis First Nation

J. Slavik

Chief R. Alexis

Councillor B. Alexis

Councillor N. Alexis

Cadomin Environmental Protection Association (CEPA)

R. M. Kruhlak

C. Way

J. Kupper

P. Bell

D. Howery

Alpine Club of Canada/Alberta Native Plant Council
(Alpine Club Coalition)

G. Lewis

A. Dinwoodie

A. Smreciu

E. Beaubien

T. Pike

A. Dinwoodie

Mountain Park Environmental Protection
and Heritage Association (Mountain Park Association)

M. Bracko

M. Bracko

Alberta Wilderness Association, Jasper Environmental Society,
Pembina Institute for Responsible Development, Canadian
Parks and Wilderness Society, and Ben Gadd (AWA Coalition)

J. Klimek

D. Pachal

B. Gadd

C. Wershler

C. Wallis

D. Pachal

R. Notnes

S. Gunsch
 J. Seaton
 C. Baker
 R. Hornung

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives
 (Abbreviations Used in Report)

Witnesses

Alberta Fish and Game Association

A. Boyd

A. Boyd

Trout Unlimited

K. Brewin

N. Rodseth

K. Brewin

W. Mackay

G. Mitchell

Rocky Mountain Ecosystem Coalition (RMEC)

M. Sawyer

M. Sawyer

D. Mayhood

Western Canada Wilderness Committee (WCWC)

G. Jones

G. Jones

Smallboy Camp

M. Nadeau

B. Parry

M. Nadeau

B. Parry

Dave Family

J. Smallboy

Mistisquoi Young Dave

Jessie Smallboy

Eleanor Smallboy

J. D. Clark (himself)

Mrs. B. Higgins (herself)

Government of Canada

P. Hodgkinson
 S. Faulknor
 G. Linsey
 U. Tauscher

G. Linsey

R. Tupper
 J. Shaw
 J. Fleury
 P. Hale
 B. Stewart
 L. Jackson
 R. Newstead

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives
 (Abbreviations Used in Report)

Witnesses

T. Swerdfager
 P. Galbraith
 D. Rosenberg
 D. Bodaly
 F. Schneider-Viera
 I. Goudie
 P. Clarkson
 G. Holroyd
 J. Weaver
 G. Mercer
 W. Bradford
 S. Cardiff
 T. Tremblay

Alberta Environmental Protection (AEP) and
 Alberta Community Development

S. Rutwind
 R. Bodnarek

R. Stone
 L. Hurt
 D. Bratton
 D. Cox
 K. Smith
 T. Mill
 J. Nagendran
 C. Hunt

Alberta Energy and Utilities Board staff

R. Creasey
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R. Girvitz
K. Gladwyn
R. King
T. Walden
R. Marsh
K. Nichol
B. Paterson

Panel Secretariat

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