

CARDINAL RIVER OPERATIONS CHEVIOT HAUL ROAD CONSTRUCTION, RECLAMATION AND OPERATION

by Marc Symbaluk P.Ag

Cardinal River Operations/ Elk Valley Coal
Bag Service 2570
Hinton, AB, Canada T7V 1V5

ABSTRACT:

The Cheviot Coal Mine Project, operated by Elk Valley Coal Corporation's Cardinal River Operations (CRO), is located approximately 250 km west of Edmonton, Alberta. It is in the Subalpine Natural Subregion of the Front Range of the Rocky Mountains at an elevation of 1650 to 1900 m. At its closest point, the mineral surface lease boundary lies 3 km east of the Jasper National Park border. Following nearly 10 years of environmental assessments and extensive regulatory processes, approvals were issued to begin development of the Cheviot Mining area in late 2003. This new metallurgical coal mine is located approximately 20 km south of the existing CRO processing plant. A key aspect of the mine development, and source of opposition for environmental activist groups, was the need for construction of approximately 13 km of new haul road to access the Cheviot development.

Initiated in early 2004 and largely completed in 2005, this new haul road is located in the McLeod River valley. To address environmental conditions, this development implemented several mitigation programs and strategies, including extensive efforts to avoid in-stream disturbance and water quality impacts. A water management program was initiated to ensure containment and controls for all drainage wastewater. Mitigative measures were employed to reduce both ecological and species specific impacts. Concurrently, traffic/wildlife mitigation programs were developed and implemented to mitigate risk for incidents along the operating haul road.

The construction of the haul road within the river valley required the temporary closure and relocation of an adjacent seasonal public road. Interim measures were required to ensure that stakeholders were permitted periodic passage through the active construction area until CRO could re-establish the public road. Construction occurred through a period of intense litigation and regulatory challenges by determined environmental groups and intense multi-stakeholder interest. Construction activities accomplished two milestones: allowing successful first coal delivery from the Cheviot Pit in October 2004, and successful re-opening of the public road by Victoria Day in May 2005.

In 2005, reclamation activities were initiated. The haul road and county road in the McLeod River Valley, sharing a parallel alignment, have been both extensively and successfully utilized. This presentation will outline and discuss some of the project objectives, field challenges, and key stakeholder and environmental management issues that were encountered and addressed through CRO's adaptive management process in the construction and reclamation of the Cheviot haul road.

1.0 PROJECT AND REGULATORY HISTORY OF CHEVIOT COAL PROJECT

In 1993, Cardinal River Coals Ltd (CRC), then owned by Luscar Limited and Consol Coal, began actively planning to access coal reserves in the Mountain Park area. A series of applications was made to provincial and federal agencies for approval for the proposed CRC Cheviot coal mine and processing plant project. This plan included an access corridor with a rail line and high-speed public road, and processing/maintenance facilities at the new mine site.

The Alberta Energy and Utilities Board (EUB)/Canadian Environmental Assessment Agency (CEAA) Joint Review Panel held hearings on the project in 1997. On June 17, 1997 the Panel released its report approving the construction and operation of CRC's Cheviot mine and associated infrastructure. Under the EUB's mandate, the Panel ruled the Cheviot Coal Project met all regulatory requirements and was in the public interest. With regard to the Federal mandate, the panel found the environmental effects, including socioeconomic effects, were either positive or not significant. The corresponding authorizations were issued as follows:

- EUB Mine Site Permit – Aug 1997
- EUB Coal Processing Plant Approval – Sept 1997
- Department of Fisheries & Oceans (DFO) Access Corridor Authorization – Aug 1998
- DFO Authorization for Facilities- Sept 1998
- AENV Mine and Plant Approval – Sept 1998
- AENV pre-development license – Sept 1998

In October of 1998 a coalition of environmental groups filed the first of a series of applications for a judicial review of the Panel's decision and DFO authorizations. On April 8 1999, Federal Justice Campbell determined that the environmental assessment conducted by the Panel was not in compliance with the Canadian Environmental Assessment Act and the DFO authorization for the access corridor was quashed. The second DFO authorization (for facilities) also faced a legal challenge and CRC made the decision to ask the DFO to withdraw the authorization.

CEAA subsequently requested the Joint Review Panel to reconvene to address issues raised. The hearing was reconvened in Hinton, Alberta in March and April of 2000 and the Panel released its report in August. The Panel determined there was no new evidence presented that would cause it to vary from its original decision and determined the applications 960313 and 960314 meet provincial regulatory requirements and the public interest. The panel upheld the decisions previously made in their 1997 Report, adding a number of additional conditions.

Shortly after this second Panel Decision was released, CRC announced that due to lengthy delays in approvals and deteriorating market conditions for metallurgical coal, the Cheviot Project would be put on hold and their existing Luscar Mine would be closed. In March of 2003 the Fording Coal Partnership was formed and the metallurgical coal assets of Fording Canadian Coal Trust, Teck Cominco and Luscar Ltd. became the Elk Valley Coal Corp. CRC became a wholly owned subsidiary of Elk Valley Coal Corporation, and Cardinal River Operations (CRO) became operator of the Luscar and Cheviot mining

areas. Development plans for the Cheviot Mine were modified to replace the rail line, high-speed road and plant/office complex with a 20-km haul road that would connect the coal land development with the existing Luscar processing plant. In response to CRO's regulatory applications for these refinements, the following correspondences were received and authorizations were issued:

- Fisheries and Oceans advised CEAA the DFO would not be exercising any power in relation to the haul road proposal because "DFO concludes that the haul road will not have significant transboundary environmental effects in Jasper Park related to matters within DFO's jurisdiction"- April 22, 2003;
- EUB issued an amendment to the mine permit to include the haul road area December 2003;
- The Federal Minister of Environment concluded, in response to a petition by environmental lobby groups, that the revised plans would not undergo another review under CEAA, stating "having reviewed the petition and <the Company's>'s project information, the Agency, in consultation with federal authorities, has concluded that the proposed changes to the project do not constitute a stand-alone project"- December 10 2003;
- AENV issued an amendment to the 1998 AEP approval to include the haul road.

In March 2004 Elk Valley Coal made the decision to proceed with developing the haul road and Cheviot Pit due to improvements in market conditions. Additional regulatory challenges occurred:

- In 2005, environmental groups launched a court challenge of the Federal Minister of Environment's 2003 decision on the haul road. The challenge was dismissed.
- EAB held a hearing in the spring 2005
- Following the quashing of the 2005 challenge and the EAB hearing, environmental groups responsible for several of the litigation activities publicly stated they had made the decision to no longer pursue additional legal challenges of project approvals.

2.0 HAUL ROAD DESIGN

The original proposal to access the cheviot pit mining area included a high-speed all-season public road and rail line, versus a private haul road with seasonal public access status quo to what already existed, albeit on a somewhat re-aligned route. The comparisons available to CRO to make the decision to proceed with a haul road rather than the original McLeod Corridor (1996) rail line are summarized in the following table.

The decision was made to construct a haul road to the existing Luscar plant rather than a rail line spur and new plant complex. The rail line option raised several issues, including the need for several crossings and re-alignments of the McLeod River and tributaries, and a high-speed public road. Environmentally, the haul road became the preferred option because of reduced likelihood of direct mortality due to lower traffic speed and volume; less high-quality grizzly habitat affected by limiting the disturbance footprint to one side of the river; and limitation of public access to the Mountain Park and associated recreation areas in winter resulting in less stress on ungulate populations. The private haul road route replaced multiple crossings of fish bearing streams with clear span bridges to ensure no in-stream disturbance. Designing these clear span bridges pushed the bridge technology at the time to meet our requirements.

Table 1. Comparison of McLeod Corridor vs. Private Haul Road

McLeod Corridor (1996) with Rail	Private Haul Road (2003)
526 vehicles/day	405 vehicles/day
Mostly gravel	All gravel
90 km/hour speed	70 km/hour speed
Disturbance & activity on both sides of river	Everything restricted to one side of river
Disturbance footprint same as haul road but split on either side of river	Footprint 60 m – 150 m (mean approximately 70 m)

In general, four primary tenants were adhered to in designing the haul road. They were:

- Minimize the overall disturbance footprint;
- Avoid in-stream disturbance of fish-bearing streams;
- Consider significant wildlife movement corridors in mine and reclamation planning;
- Engage in mine sequencing allowing for rapid reclamation and minimizing timeframes of disturbances.

This paper outlines planning, mitigation, reclamation and communication efforts as follows:

- Water, Fisheries and Riparian Management
- Wildlife Management
- Landform Design and Revegetation
- Stakeholder Activities
- Consultation and Communications

3.0 WATER, FISHERIES AND RIPARIAN MANAGEMENT

An extensive water management program was initiated to ensure containment and controls for all wastewater. (Note: In Alberta drainage from minesites is classed as wastewater and therefore will be referred to as such through out this paper) This program involved clean water surface runoff diversions; settling pond construction and maintenance; and water monitoring.

3.1 Clean Water Diversions

The new haul road crossed approximately 25 ephemeral and intermittent streams and two large permanent water courses. To ensure that the water in these streams would not come into contact with haul road disturbance, each of these streams was either diverted through culverts underneath the haul road, or spanned in their entirety. Almost 2 km of culverting was needed to achieve the diversions, and many of the crossings had unique circumstances that required a case-by-case assessment. A number of these locations involved springs, either flowing from steep, unstable slopes, or flowing infrequently but at high

volumes of several thousand litres/minute. Given the steep, rolling terrain and proximity to the McLeod River, culvert placement was one of the critical aspects of effective water management.

3.2 Waste Water Management

The 13-km section of new haul road runs through terrain characterized by steep incised slopes, rolling terrain, and many ephemeral and intermittent streams. The McLeod River parallels the alignment, and terrain limitations require the haul road to be as close to the river as 30 m at several points. The management of surface runoff and sedimentation were issues that had to be effectively addressed. The minimization of surface disturbance and clean water diversions under-pin the over-all program, but waste water treatment is essential during periods of run-off.

Sumps constructed along the haul road are designed to catch runoff coming from the recently constructed haul road, allowing sediment to settle out before runoff reaches the McLeod River. CRO Environment staff routinely monitor and water sample the haul road sumps according to an approved schedule.

Generally, the haul road sumps are only utilized during periods of precipitation and/or snowmelt. An exception is the PCNW sump, which also receives some inflow from seepage through an exposed wall from a hillside cut created during road construction. This area is planned to be sloped and reclaimed but in the short-term must be treated as wastewater. The sumps are designed to be able to handle runoff produced by melting or precipitation events. Most of the sumps will drain through infiltration into base materials during periods of dry weather.

While there were incidents reported to Alberta Environment regarding drainage wastewater releases in 2005, none were of significant volume, flow, or duration to result in any adverse environmental effects. During the active construction, CRO experienced two 1 in 10 year storm events in 2005, one occurring over June 17 and 18, and the other occurring over September 8 to 10, 2005. Not only were there these two major storm events but record precipitation levels were set for the entire year.

3.3 Water Monitoring

Water monitoring programs for the haul road are specified under the mine's EPEA approval, and are integral to the haul road management program. All settling ponds are inspected regularly and sampled at least weekly or during run-off events. There also 3 sites routinely monitored on the McLeod River: MR-1, MR-2, and MR-4.

- 1) The MR-1 site is a reference site near the headwaters of the McLeod River. It is upstream of all mining influence.
- 2) The next site downstream, MR-2, is several hundred meters downstream of Cheviot Creek (the discharge from the settling pond), and approximately 4 km downstream of MR-1.

3) The MR-4 site is downstream of the Cheviot, Prospect, and Whitehorse Creeks, at km 11.4 of the haul road (on the area referred to by CRO as the Inland Flats, the low-lying area adjacent to Lehigh-Inland Cement).

Monitoring of these sites began in August 2004 and was continuous throughout 2005.

3.4 Fisheries

Historically, there were no natural fisheries in the upper McLeod River watershed for two reasons; a set of falls upstream of the confluence with Whitehorse Creek acts as a permanent barrier to upstream fish migration, and extremely limited over-wintering habitat caused by very low winter water-flow and complete freezing of sections of streambeds. A self-reproducing population of non-native brook trout had become established in a tributary of the upper McLeod as a result of 1940's stocking programs. An old mine and end pit lake developed in the late 1940's had ameliorated the natural extreme flow regime in the watershed enough to provide suitable local conditions for these fish.

The specific decision to go with the 2003 haul road construction option rather than the 1996 rail option allowed the following reductions in in-stream disturbance:

- No channel diversions in McLeod River significantly reduced the construction impact (the original 1996 rail plan included 690 m of channel diversion);
- No rail bridge over McLeod River at the canyon reduced construction and habitat impacts;
- Bank to bank arch structure at Prospect and Whitehorse creeks maintains natural stream bed.

CRO's mitigation program for fisheries began with the avoidance of in-stream disturbance. This was achieved through the construction of full span crossings built over Whitehorse and Prospect creeks. A third span will eventually be built over the upper McLeod River. The second and third parts of the program involved the control of surface runoff from the disturbances during and following construction – as described under Section 3.2, Water Management. The fourth phase involved habitat enhancement work to improve fisheries habitat. Plans for habitat enhancement were originally developed and approved in 1998, but have recently been under review to avoid disturbance to Harlequin duck habitat.

3.5 Harlequin Ducks

The western Harlequin Duck is a small, relatively uncommon sea duck that over-winters on the BC coast and moves inland to breed and nest in low densities in fast-flowing mountain streams. The McLeod River Watershed provides such habitat for these ducks. Due to their sensitivity to changes in stream flow characteristics and disruption to nesting habitat, studying and managing for Harlequin Duck requirements has been an important part of CRO's management plan.

Ten years of monitoring by CRO have determined that 40-70 Harlequin Ducks use the McLeod River watershed during the summer season. The Canadian wintering population along the Pacific Coast is

currently estimated between 200,000 and 300,000 birds according to the Alberta Endangered Species Conservation Committee.

CRO, with input from consultants and government agencies, developed a six-point plan for managing potential impacts on this species. CRO has implemented this plan which includes:

1. Detailed study of duck populations and their use of the Cheviot area – Study objectives are overseen by a Harlequin Duck Workplan Review Team comprised of mine personnel, wildlife biologists and government representatives;
2. Reduce construction impacts in riparian areas – The original plan for the rail line and new plant was replaced with the haul road, which eliminated the need for in-stream disturbance. The original haul road plans for culverted crossings of the Whitehorse, Prospect and McLeod drainages were modified to incorporate full-span crossings. These full-span crossings avoided in-stream work and provided up and downstream passage of ducks during and after construction; fish habitat enhancement features proposed for the upper McLeod were moved downstream to avoid disturbance to important duck habitat. During haul road construction, a biologist was retained full time on site to monitor and provide advice regarding Harlequin Duck health and status. Buffer vegetation between the road corridor and McLeod/Prospect/Whitehorse drainages were maintained as much as possible, and when not, visual breaks were established using rocks. To ensure a minimum of human/duck interaction, the public Grave Flats road was re-aligned to run parallel to the adjacent haul road to reduce opportunity for random camping near duck habitat. Public access was focused to underpasses of the haul road at Cadomin Caves, Whitehorse Creek and Prospect Creek. Additionally, Cardinal River staff worked with Alberta Sustainable Resource Development to help relocate the Mountain Park Staging Area for off-highway vehicles to a new staging area that provided less interaction with the duck habitat;
3. Reduce mining impacts in riparian habitats – the first and second sets of pit developments in the Cheviot project have reduced projected riparian disturbance significantly;
4. Stream restoration of historic mine disturbances in riparian habitat – the first phase of this work was completed prior to the commencement of mining operations;
5. Long-term monitoring - CRO has monitored duck populations and use in the McLeod watershed for 10 uninterrupted years;
6. Participation in regional studies – CRO has been a catalyst in the initiation and completion of several technical papers involving regional Harlequin Duck ecology, habits and habitat under the auspices of the Foothills Model Forest.

4.0 WILDLIFE MANAGEMENT

The mine's EIA and CEA (Cumulative Environmental Assessment) work of 1993 to 1999 thoroughly examined the wildlife resources of the area and identified a number of issues and mitigation opportunities. In addition to the fisheries and Harlequin Duck categories discussed above in relationship to water management, CRO implemented several mitigation programs to address further categories including neotropical birds, carnivores and traffic-wildlife conflicts.

4.1 Migratory/Neotropical Songbirds

The subalpine-alpine zone that runs through the Cheviot project area is important breeding and nesting habitat for a wide range of neo-tropical songbird species. Reclamation of haul road and mine disturbances is expected to mitigate disturbance of this habitat, but a number of actions were determined to be necessary to minimize disturbance during construction. The key action was to avoid disturbing vegetation during the May 1 to July 15 breeding/nesting window. To achieve this, CRO determined well in advance of May 1st the areas that would be needed for construction, and the vegetation was stripped in advance. This minimized the likelihood of active nests being disturbed. Another important action was to develop a monitoring program that will provide further information on species use of the area, habitat preferences, and the effectiveness of the reclamation program in maintaining species. The adaptive management approach will be used to refine reclamation practices as necessary to establish neo-tropical bird habitat.

4.2 Carnivores – Grizzly Bear

During the EIA process, grizzly bears were determined to be a species particularly sensitive to mine disturbance. Part of CRO's compensation/mitigation program was to partner with others to develop and implement a study program, and the outcome of this was a world-class grizzly bear collaring/monitoring program under the Foothills Model Forest. In this program, over 70 grizzly bears were tagged with radio-collars between 1999-2004. One of the outcomes of this program was a greatly improved understanding of grizzly bear ecology in the region. Specifically, it was determined that 30 of these bears had annual home ranges overlapping or bordering the Cheviot project area. Information was also collected on denning activities. No den sites were located in the Cheviot mine permit area, but 10 dens were located in the Foothills Model Forest Grizzly Bear Research Project study area. (For more information, see http://www.fmf.ca/pa_GB.html) food preferences, seasonal movement, individual bear health, and mortality factors.

When planning development of the haul road, CRO implemented several strategies and activities to mitigate potential harm to the carnivore population. Maximum speed limits and wildlife warning signs were posted, a Carnivore Observation Program was created, and a radio communications program was implemented to alert other workers/drivers to the presence of carnivores. A bear awareness program was created and implemented for all haul road operators and CRO employees, and a bear-sensitive waste management program was implemented. Additional activities are noted below in CRO's Traffic and Wildlife Management Plan.

4.3 Traffic and Wildlife Management Plan (TWMP)

Potential conflict between traffic and wildlife was identified as an issue early on in the development of the Cheviot project and design-stage of the haul road.

The TWMP was developed to minimize coal mine traffic related wildlife incidents on the Cheviot haul road through the twenty-year life of the coal project.

The TWMP follows the adaptive management process.

Prevention Management and Science

- Annual winter wildlife track monitoring program is conducted by a wildlife biologist, who provides an updated map of observed key movement corridors. A second tool is utilized to understand wildlife movement: the grizzly bear resource selection function (RSF) modeling, developed by the Foothills Model Forest Grizzly Bear Program to predict grizzly bear movement corridors which may transect the haul road. Annual review of both of these two key tools by the wildlife biologist with senior operations foreman and senior environmental officer is conducted. Further completion of field level risk assessment of sites is undertaken to determine if further mitigation may be warranted;
- Radio communication protocol by all operators to make all other road users aware of real-time wildlife occurrences in proximity to haul road;
- Debottlenecking areas of poor visibility due to obstructions where deemed appropriate, while minimizing road width and land disturbance footprint;
- Traditional wildlife crossing signage is placed in areas where wildlife hazard has been observed and/or modeled;
- Coal heavy haulers are customized with high intensity lighting for greatly improved nighttime visibility;
- Imposed speed limit on the haul road of 70km/h for all equipment;
- No use of salts or other potential wildlife attractants on road surface to control icing or to provide dust control;
- Wildlife awareness and training included in orientation packages for all new hires and contractors accessing the haul road. This is further communicated through informal presentations by CRO's environment team to operations teams at their respective monthly team meetings and through quarterly addresses by the site general manager;
- Implementation of the Carnivore Observation Program (COP). All employees and contractors document carnivore sightings while at the mine site. This data is collected and reviewed periodically by CRO's environment team and reported annually.

Incident Management

- Immediate contact of CRO environment team to either attend the scene or advise operations personnel in the event of a traffic-wildlife mortality;
- Wildlife Incident Mortality Investigation Form is to be completed by the operations senior foreman. This includes a written statement by the implicated operator and/or witnesses documenting all circumstances relating to the incident along with recommended measures which they feel might be employed to prevent recurrence of similar incidents;
- Immediate reporting to regulatory agencies if the incident involves a large carnivore.

5.0 LANDFORM DESIGN AND REVEGETATION

Most of the 87-ha haul road footprint is part of the active operating surface for public and mining equipment, but over 20 ha of this must be reclaimed to meet provincial reclamation criteria and mine objectives. The stages in this reclamation program include timber salvage, soil conservation, landform design, soil placement and revegetation.

The existing subalpine forest communities are dominated by lodgepole pine and hybridized Engelmann-white spruce, with understory vegetation including hairy wild rye, willow, dwarf birch, bearberry, buffaloberry and mosses. At these higher elevations, timber productivity and merchantability are variable. Where timber salvage is not required, trees are cut or knocked down and incorporated into surface soil during the salvage operation. Timber is buried under dump construction only where steep slopes prohibit timber and surface soil salvage operations. Timber salvage is undertaken where trees are deemed merchantable and can be practically salvaged. All timber salvage requirements are determined during consultation with the local Conservation and Reclamation Inspector of Alberta Sustainable Resource Development.

Soils in the area are typically Brunisols and Luvisols with thin LFH layer. Soils tend to be acidic and shallow. Surface soil salvage operations are undertaken to recover all salvageable soil. The salvaged material includes a mix of organic and upper mineral surface horizons. Salvage depth in the Cheviot Creek mining area generally varies from 30 to 60 cm, but some areas have soil depths ranging up to 1 metre.

Surface soil salvage operations are carried out following any timber clearing activities (if necessary). In 2005, the majority of surface soil salvage activity on the haul road utilized a contractor with small equipment, which included D6, D8 dozers, track excavators, and 40-ton articulating trucks. Surface soil is pushed into windrows by dozer, then loaded into trucks by excavator and either hauled to a soil stockpile for future use or to areas available for direct soil placement.

The EPEA Approval requires that salvaged material be placed to a minimum thickness of 0.30 m onto recontoured areas of mine disturbance. The rough mounded placement technique is employed to minimize compaction and to provide additional microsites for enhanced reclamation.

During 2005, approximately 50,400m³ of surface soil was spread on a total of 16.8 ha (41.5 ac) along the Cheviot haul road for a total of just over 20 ha completed to date.

In 2005, a cover crop of annual ryegrass was planted on approximately 19.9 ha (49.2 ac) of recently disturbed areas along the haul road. The cover crop will protect the soil from desiccation as well as from erosion by wind and water. It will also provide protection for the slower-establishing species that are also seeded – alpine bluegrass, slender wheatgrass, northern wheatgrass, hard fescue, fringed brome, Mountain brome, and Rocky Mountain fescue. These are considered to be native cultivars and will help to provide a vegetation layer as locally native species naturally colonize the sites.

Selected agronomic species are utilized in areas with high potential for water erosion, such as on steep slopes and drainage swales. Agronomic seed mixes are applied at a low rate on areas which will be reclaimed into grassland and open coniferous forest lands. A light application of an annual agronomic cover crop maximizes the re-establishment of native species through ingress and propagation from topsoil placement.

In the second or third year of the revegetation program, after the annual ryegrass cover has died, tree and shrub species will be planted. These will include lodgepole pine and Engelmann-white spruce, dwarf birch, shrubby cinquefoil, buffaloberry and green alder.

6.0 STAKEHOLDER ACTIVITIES

Stakeholder relationships are vital to CRO's continued ability to operate. One of CRO's primary tenants of stakeholder relationships is effective communications. To that end, a new format was added to the Elk Valley Coal website to make project information widely available to interested parties. Among other environmental and community issues being publicly shared on the website, information pertaining to the haul road, such as "Traffic and Wildlife" and "Public Access" (http://www.elkvalleycoal.ca/cache/page_1261-1315-1868-1935.html) can be reviewed and commented on by interested stakeholders. Additional communication efforts are outlined in the following section titled "Consultation and Communications".

6.1 Noise and Dust

In response to stakeholder interests specific to the haul road, CRO has implemented the following noise and dust monitoring programs.

The noise and dust monitoring programs were developed and implemented through 2005 to evaluate impacts which may result from the operation of the haul road. Annual reporting of results will be provided to regulators and updates to Cadomin Environmental Protection Association (CEPA) upon request.

The current dust monitoring program along the haul road and Cadomin area includes:

- A high-volume PM10 dust monitoring station is set up at the north end of the hamlet. It samples for a period of 24 hours every 6th day, as scheduled by the National Air Pollution Surveillance Network. A quantifiable volume of air is drawn into the sampler; a glass quartz filter captures particulate matter of diameter 10 microns and greater. Filters are supplied and subsequently analyzed by 3rd party accredited laboratory.
- Dustfall canisters have been set up between km 8.8 of the haul road and the hamlet of Cadomin to measure for dustfall. Five canisters were set up in July 2005 and an additional 3 canisters were placed around the area in November 2005. The canisters are exposed and allowed to passively

collect dust for a period of approximately one month. They were then analyzed for total dustfall and fixed dustfall.

- Dust is also measured at a station set up in the Whitehorse Creek campground during the camping season (Victoria Day long-weekend to Labor Day long-weekend). Two low volume samplers were installed; one measures PM10 and the other PM2.5. These samplers are run for a 24 hour period, every third day (as scheduled by the National Air Pollution Surveillance Network). Filters are supplied and analyzed by 3rd party accredited laboratory.

All canisters and filters are prepared, supplied and analyzed by a 3rd party accredited laboratory.

Noise is measured opportunistically; as climatological conditions permit. There is no set schedule for monitoring, as several meteorological conditions must be within a defined range in order to not adversely impact measurements. Monitoring began in September 2005, with multiple monitoring periods per month since that time.

Noise was not successfully monitored at the Whitehorse Creek campground during the 2005 camping season due to some technical difficulties, including stolen or vandalized equipment. CRO has discussed these issues with Alberta Community Development and is planning to implement a full program in 2006.

6.2 Access

Public access adjacent to, surrounding, or in the vicinity of the Cheviot project area has been an issue in two primary and often opposing ways: recreation and outdoor enthusiasts have a stake in continued access to pursue their pastimes, yet increased activity and easier access through road development can create a potential cumulative negative impact on those wildlife species that are sensitive to human activities.

CRO addressed the requirement to balance access issues in several ways. In the design phase of the haul road the decision was made to align the public county Grave Flats road with the haul road to provide unrestricted access through and beyond the Cheviot project area while reducing random camping along the county road. During construction of the haul road, for safety reasons, the Grave Flats county road was closed to public access. CRO worked to get public access quickly back to the Whitehorse Creek Campground and Whitehorse Wildland Park. Throughout the year-long construction project, an escorted access program was implemented and advertised on long-weekends to the public who wanted to access recreation sites in the McLeod River Valley area. The Grave Flats county road was reopened to unrestricted public access on schedule on the May long-weekend of 2005.

Additionally, throughout the summer of 2005 CRO sponsored "Guardians" to ensure public safety and provide access information along the alignment. A satellite image-based access map was developed to show changes to public access and off-highway vehicle (OHV) trails to circumvent restricted access areas. A series of Designated Access Trails were implemented. These trails permit vehicle, OHV, or foot/equestrian access on or through CRO's surface leases.

7.0 CONSULTATION AND COMMUNICATIONS

As is outlined in the opening History of the Cheviot Coal Project, stakeholder engagement includes a ten year span of public engagement including two EUB/CEAA Review Panel Hearings.

Specific to the haul road construction and its escorted access programs, the stakeholder engagement involved substantial communication efforts. Stakeholder lists were constructed using local knowledge and the previous EUB hearings. Public Road closure notices were posted. Haul Road Construction Updates were written and published on a regular basis and were distributed via e-mail, regular post and fax as well as posted in various community focal points. (Chambers of Commerce and local stores). During the escorted access programs over long-weekends, the program schedule was advertised in local newspapers, radio and cable TV, as well as posted on-line and at the Chambers of Commerce and Jacoby's General Store in Cadomin. In addition to the publicized escort programs, ad-hoc requests were accommodated by staff where possible. A toll-free phone number was set up and manned during this phase, and an e-mail address dedicated to community input was established.

CRO undertook an extensive stakeholder engagement strategy. Stakeholder forums, such as Trail Meetings, were held to discuss public access issues and recommendations.

As a unique and separate stakeholder issue, it should be noted that Cardinal River Coals negotiated and signed an MOU in 1996 with the Alexis Nakota Sioux, the primary aboriginal group in the area by virtue of their Reserve #IR 234 which lies adjacent to the Cheviot mineral lease boundaries. This confidential MOU is actively managed by both CRO and the Alexis and has stood the test of successful implementation over several years. CRO staff members also are in regular and active contact with various aboriginal groups who live near, or assert rights in the area.

Summary

In September 2005, CRO issued an open public invitation to all stakeholders, local communities, regulatory and public officials to tour the completed haul road and the Cheviot mining area. Close to 600 individuals participated in the three hour bus tours to witness first-hand the construction and impacts of the CRO haul road.