Coal Valley Resources Inc. - Coal Valley Mine

Robb Trend Project
Environmental Impact Assessment and Mine Permit Application
EPEA - 028-00011066; ERCB - 1725257

Supplemental Information Request Responses

Submitted to
Alberta Environment and Sustainable Resource Development and the Energy Resources and Conservation Board

December 2012

Coal Valley Resources Inc. Robb Trend Project

Supplemental Information Request
EPEA Application No. 028-00011066
ERCB Application No.1725257
Received: July 26, 2012; September 18, 2012

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1. ACRONYMS USED IN THIS SUPPLEMENTAL INFORMATION REQUEST

The following acronyms are used in this Supplemental Information Request.

AAAQO	Alberta Ambient Air Quality Objectives
AAAQG	Alberta Ambient Air Quality Objectives and Guidelines
ADT	Average daily traffic volume
AENV	Alberta Environment
AEPEA	Alberta Environmental Protection and Enhancement Act
AESCC	Alberta Endangered Species Conservation Committee
AESRD	Alberta Environment and Sustainable Resource Development
AEW	Alberta Environment and Water
ANFO	Ammonium Nitrate and Fuel Oil
AQRSA	Air Quality Regional Study Area
ASTM	American Society for Testing and Materials
AT	Alberta Transportation
ARBO	Arbour Seam
AVI	Alberta Vegetation Inventory
BCM/RMT	Bank Cubic meter/raw metric tonne
BESR	Breakeven Strip Ratio
BIBP	Benthic invertebrate biomonitoring program
CACs	Criteria Air Contaminant Species
CASA	Clean Air Strategic Alliance
CCR	Coal Conservation Regulation
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Act
CF	Capture Factors
CNC	Consultative Notation - Company
COPC	Chemical of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CR	Consultant Report
CRB	Conservation and Reclamation Business Plan
CRO	Cardinal River Operations
CVM	Coal Valley Mine
CVRI	Coal Valley Resources Inc.
D	Drop height
DFO	Department of Fisheries and Oceans Canada
E	Suspended particulate emission factor (kg/day/ha)
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPEA	Environmental Protection and Enhancement Act
EPL	End pit lakes
ERCB	Energy Resources Conservation Board

ESRD	Environment and Sustainable Resource and Development
EUB	Energy and Utilities Board
EZE	Easement
F	Percentage of time that the unobstructed wind speed exceeds 5.14 m/s
FMA	Forest Management Area
FOB	Freight on Board
FOFN	Foothills Ojibway First Nation
FRI	Foothills Research Institute
FTOR	Final Terms of Reference
FWMIS	Fish and Wildlife Information System
GHG	Greenhouse Gas
HHRA	Human Health Risk Assessment
HLSA	Hydrogeology Local Study Area
HRIA	Historic Resources Impact Assessment
HIS	Habitat Suitability Modeling
HU	habitat supply
HWP	Hinton Wood Products
ILCR	Incremental lifetime cancer risk
IRIS	Integrated Risk Information System
ISP	Industrial Sample Plot
KAI	Key Aquatic Indicators
km	kilometre
LFN	Low Frequency Noise
LG	Lerchs-Grossman
LOC	Licence of Occupation
LTSA	long-toed salamander
LSA	Local Study Area
M	moisture content
m	metre
MDH	MDH Engineered Solutions
MLL	Miscellaneous Lease
MPOI	Maximum Point of Impingement
MSL	Mineral Surface Lease
NIA	Noise Impact Assessment
NNL	No Net Loss
NNLP	No Net Loss Habitat Compensation Plan
NRCAN	Natural Resources Canada
NPI	National Pollution Inventory
NPRI	National Pollutant Release Inventory
NRCB	Natural Resources Conservation Board
OLM	Ozone Limiting Method
PAH	polycyclic aromatic hydrocarbons
PAI	Potential Acid Input
PASZA	Peace River Airshed Zone
PDC	Planned Development Case
PIL	Pipeline Installation Lease

PLA	Pipeline Agreement
Plant	Coal Valley Coal Processing Plant
PM	Particulate Matter
PNG	Petroleum and Natural Gas
Project	Robb Trend Project
RM	Robb Main Trend
RNTR	native Athabasca Rainbow Trout
ROM	Right of Mind
RQ	Risk Quotient
RSA	Regional Study Area
RT	Robb Trend
RW	Robb West
S	silt content of aggregate (%)
SAAB	SREM Aboriginal Affairs Branch
SARA	Species at Risk Act
SG	Specific Gravity
SIL	Sampling Intensity Level
SIR	Supplemental Information Request
SKM	Sinclair Knight Merz
SML	Surface Mineral Lease
SP&P	Standard Practices and Procedures Manual
SR	Surface Runoff
SRCL	Smoky River Coal Mine
SRD	Sustainable Resource Development
TC	Transport Canada
TCH	Trans-Canada Highway
TCL	Teck Coal Ltd.
TEK	Traditional Environmental Knowledge
TERRAD	distance CALMET considers in computing terrain effects
TLU	Traditional Land Use
TOR	Terms of Reference
TPA	Trapping Area
TRVs	Toxicological Reference Values
TSP	Total Suspended Particulate
TSS	total suspended solids
TU	Trout Unlimited Canada
U	wind speed (m/s)
USEPA	United States Environmental Protection Agency
VEC	Valued Environmental Components
VOC	Volatile Organic Compound
WCAS	West Central Airshed Society
WHO	World Health Organization

2. BOARD

The responses to questions in this Board section will not be considered as part of the EIA completeness decision made by Alberta Environment.

3. GENERAL

1. Provide an update on any Project changes, and their impacts, which have occurred since the filing of the Application.

Response:

No changes to the scope of the Project have occurred since filing of the application. Various alternatives to further reduce the Project environmental footprint and impact will be considered in future planning (See ESRD SIR #3b) and #122b)).

2. Provide an update on any public consultation activities which have occurred since the filing of the Application. Specifically, provide an update on CVRI's efforts to address concerns raised by the Foothills Ojibway, Tourmaline OilCorp., and Trout Unlimited Canada.

a) What activities have been undertaken?

Response:

The 'consultation program' for the Project has continued. A compilation report is maintained by CVRI for all stakeholder consultation. Bi-monthly reports regarding First Nation consultation are provided to SAAB. The most current was forwarded in October, 2012.

Foothills Ojibway First Nation[1]

CVRI is continuing an engagement process with FOFN. The most recent meeting was held in Hinton on October 26, 2012 between Jimmy O'Chiese and the Robb Trend Project Manager. A 'negotiation meeting' was planned for mid-November for continued discussion regarding a revised 'agreement' related to land use by CVRI in the FOFN area. The existing agreement which provides funding to FOFN for consultation capacity continues to be implemented.

Tourmaline Oil Corp

CVRI and Tourmaline are currently drafting an agreement covering future developments in the region.

Trout Unlimited Canada

[1] Federal Corporation #7936257, January 1, 2012

CVRI staff have meet with Trout Unlimited (TU) to discuss the TU concerns. A response to the questions raised in the TU correspondence is being prepared.

b) What issues have been raised?

Response:

Foothills Ojibway First Nation

FOFN is seeking recognition of 'status' within the region and has raised concerns regarding mining impacts within their traditional land areas. FOFN is seeking a 'benefit agreement' from CVRI in recognition of their traditional land use of the area. Discussion leading toward a revised working agreement is in progress.

Tourmaline Oil Corp.

Tourmaline has raised concerns regarding potential future development conflicts due to mine activity. CVRI and Tourmaline are actively developing a mutual agreement covering future developments by the companies in the Project area.

Trout Unlimited Canada

TU has raised concerns about potential Project effects on fisheries resources in the region. Particular concern was raised concerning the potential loss of fisheries habitat and population in the Erith River system. CVRI is responding to the questions and concerns raised by TU.

c) What issues have been resolved and how?

Response:

Foothills Ojibway First Nation

CVRI and FOFN continue to negotiate to establish an appropriate development agreement covering current and future mining activities. FOFN has stated that they do not wish to block or object to the proposed Project but are seeking recognition of their presence and traditional use of the land base.

Tourmaline Oil Corp.

CVRI and Tourmaline are working to complete a development agreement covering future mining activities. The agreement is focused toward cooperative development in the Project area.

Trout Unlimited Canada

CVRI is preparing a written response to questions raised by TU and will continue to work with TU in support of maintaining current fisheries resources in the region. TU has noted[2] they do not

[2] Trout Unlimited Canada, "therefore we are not looking to stop or delay this project in any manner", undated.

desire to stop or delay the Project but are seeking possible concessions to protect 'native waters and native fish species'.

d) What issues remain outstanding and how will they be resolved?

Response:

CVRI is continuing co-operative discussions with all three parties to conclude agreements or plans that will support proposed future mining activities.

3. Provide a statement with respect to all applicable surface and mineral rights ownership in the permit area.

Response:

Surface Dispositions

An updated 'public land standing' report has been obtained for the proposed Mine Permit and surrounding area. A digital copy of this report has been provided to ERCB separately. A summary of the *surface rights holders* is provided (see ERCB Table 3-1).

Table 3-1 Robb Trend - Surface Dispositions in Project Area

Public Land Standing Report - Sept. 21, 2012						
Company (Non Sherritt)	Land Surface Disposition (Non-Government)					
	ISP	LOC	MSL	PIL	PLA	Other
Mancal Coal Inc.						CNC 990002
West Fraser Mills Ltd.	ISP 020719	LOC 628				FMA8800025
	ISP 020721	LOC 1315				CRB 080002
	ISP 020742	LOC 2489				SML 810025
	ISP 020745	LOC 3966				
	ISP 020757	LOC 3980				
	ISP 020758	LOC 5354				
	ISP 020759	LOC 012313				
	ISP 020760	LOC 013639				
	ISP 020779	LOC 013640				
	ISP 020782	LOC 020934				
	ISP 020783	LOC 041632				
	ISP 020808	LOC 810792				
	ISP 020817	LOC 920489				
	ISP 020845	LOC 951411				
	ISP 020846	LOC 961414				
	ISP 020848	LOC 961593				
	ISP 070036	LOC 961594				
	ISP 070116	LOC 961595				
	ISP 070135	LOC 961596				
	ISP 070139	LOC 961597				
	ISP 070140	LOC 961598				
		LOC 961599				
		LOC 961601				

Table 3-1 Robb Trend - Surface Dispositions in Project Area						
Public Land Standing Report - Sept. 21, 2012						
Company (Non Sherritt)	**Land Surface Disposition (Non-Government)**					
	ISP	**LOC**	**MSL**	**PIL**	**PLA**	**Other**
		LOC 971995 LOC 971999 LOC 972002 LOC 972003 LOC 990999 LOC 991020				
Altalink Management Ltd.						EZE 2186 EZE 810213 EZE 830170 EZE 870165 EZE 870181
Fortis Alberta Inc.						EZE 100215 EZE 870152
Sundance Forest Industries Ltd		LOC 5787				FMA 9700032
Suncor Energy Inc.		LOC 5204 LOC 000160 LOC 820762 LOC 940945 LOC 951205 LOC 970548 LOC 971461	MSL 9986 MSL 021816 MSL 970709	PIL 970098	PLA 000580 PLA 001930 PLA 010346 PLA013599 PLA 032047 PLA 042034 PLA 042099 PLA 051640	

Table 3-1 Robb Trend - Surface Dispositions in Project Area						
Public Land Standing Report - Sept. 21, 2012						
Company (Non Sherritt)	**Land Surface Disposition (Non-Government)**					
	ISP	**LOC**	**MSL**	**PIL**	**PLA**	**Other**
					PLA 810452 PLA 810453 PLA 890456 PLA 970722 PLA 992238	
Sabre Energy Ltd		LOC 000994	MSL 001346 MSL 961454	PIL 980007	PLA 972461	
Harvest Operations Corp.		LOC 040439	MSL 040660			
Husky Oil Operations Limited		LOC 081798				
Persta Resources Inc.		LOC 090317 LOC 100238 LOC 111792	MSL 082289 MSL 111901 MSL 111966 MSL 111969	PIL 080407 PIL 090160 PIL 090161	PLA 080934 PLA 090467 PLA 100359 PLA 110993 PLA 111469 PLA 111505	MLL 120202
Tourmaline Oil Corp.		LOC 100631 LOC 110794 LOC 111741 LOC 120481 LOC 810792	MSL 090382 MSL 090511 MSL 091443 MSL 100931 MSL 110825 MSL 111908	PIL 110371	PLA 070866 PLA 110214 PLA 110219 PLA 110897 PLA 111998 PLA 112002	MLL 090099

Table 3-1 Robb Trend - Surface Dispositions in Project Area						
Public Land Standing Report - Sept. 21, 2012						
Company (Non Sherritt)	**Land Surface Disposition (Non-Government)**					
	ISP	**LOC**	**MSL**	**PIL**	**PLA**	**Other**
			MSL 120495			
			MSL 121424			
			MSL 951585			
Manitok Energy Ltd.		LOC 910755	MSL 910846		PLA 001544	
		LOC 920698	MSL 930805		PLA 001780	
		LOC 930271	MSL 931537		PLA 930586	
		LOC 930954	MSL 941921		PLA 961511	
		LOC 941322	MSL 952726		PLA 961512	
		LOC 961070	MSL 981752		PLA 961513	
		LOC 961071	MSL 981772		PLA 981698	
		LOC 981301			PLA 990008	
		LOC 981318				
ConocoPhillips Canada Resources Corp.		LOC 920369	MSL 941016		PLA 930250	
		LOC 940711	MSL 941879		PLA 930412	
					PLA 971518	
Trident Exploration (Alberta) Corp			MSL 023210			
Richards Oil & Gas Limited			MSL 060815			
ExxonMobil Canada Energy			MSL 973118			

Table 3-1 Robb Trend - Surface Dispositions in Project Area						
Public Land Standing Report - Sept. 21, 2012						
Company (Non Sherritt)	Land Surface Disposition (Non-Government)					
	ISP	LOC	MSL	PIL	PLA	Other
Yellowhead Gas Co-op Ltd.					PLA 820393 PLA 961184	
Britlan Road Maintenance and Repair Ltd.						MLL 120155
Larry Chapman						MLP 860092 TPA 2619
Norman Rooke						MLP 950101 TPA 2256
Ronald Cowles						TPA 1516
Sidney Tizzard						TPA 1527
Bill Fehr						TPA 2046
Mike Naef						TPA 2064

LEGEND

- Agreement with Hinton Wood Products
- Agreement with ConocoPhillips
- Agreement with Suncor
- Agreement with Tourmaline
- Compensation Agreement

All surface rights in the area are in the name of the Crown. The Hamlet of Robb is managed by Yellowhead County.

Forestry (FMA, ISP, LOC, CRB, SML)

West Fraser Mills Ltd, Hinton Wood Products (HWP) is the only company with holdings within the proposed project area. CVRI and HWP have an established agreement covering mining operations in the existing CVM area. CVRI anticipates this agreement will be extended to include the Project.

Oil & Gas (PLA, PIL, LOC, MSL)

CVRI will continue to co-operate with established oil and gas companies in the area to development resources (see ERCB SIR #6). CVRI has established existing agreements for several individual wells and pipelines in the area giving precedent to mine development. Additional regional agreements with Suncor and Tourmaline are being developed with respect to future gas facilities in the area. CVRI will continue to establish appropriate agreements and operating procedures for working with such facilities.

Trappers (TPA, MLL)

CVRI is currently developing operations within existing fur management areas. Some 'compensation agreements' within the existing CVM area and the Project are already established. A well-established compensation process is available for additional future agreements.

Mineral Rights

A 'Land Index Search' report has been obtained for the proposed Mine Permit and surrounding area. A digital copy of this report has been provided to ERCB separately. A summary of the *mineral rights holders* is provided (see ERCB Table 3-2).

Table 3-2 Robb Trend Project Area - Mineral Agreements

Land Index Search - Sept 29, 2012

Mineral Agreements

Type of Agreement	Number
Petroleum And Natural Gas Lease	5
5 Year Northern Petroleum and Natural Gas Lease	1
4 Year Northern Petroleum and Natural Gas Lease	2
5 Year Foothills Petroleum and Natural Gas Lease	39
Coal Lease	28
Coal Lease - Application	4
Metallic and Industrial Minerals Permit	2

Table 3-2 Robb Trend Project Area - Mineral Agreements		
Land Index Search - Sept 29, 2012		
Mineral Agreements		
Agreements (Non Coal)		
Company	**Agreement Number**	**Area (ha)**
Petroleum and Natural Gas		
Husky Oil Operations Limited	26296	256
	26297	256
	006 0698010421	256
	055 5504050810	3328
	055 5598010117	512
Suncor Energy Ltd.	36082	256
	122027	128
	122028	1408
	006 0603060624	256
	055 5505060328	768
	055 5505060329	1536
Rockford Land Ltd.	005 0510120380	256
Sabre Energy Ltd.	006 0600010375	128
Ranger Land Services Ltd.	006 0607060326	256
	006 0607060330	256
	055 55110400277	3072
Persta Resources Inc.	006 0607060327	256
	006 0607060328	256
	006 0607060329	256
	006 0607060332	256
	006 0608090142	256
	006 0608090143	256
	055 5507010513	1024
	055 5507010514	1536
	055 5508030753	256
	055 5508030754	256
Manitok Energy Ltd.	006 0695110470	1024
	006 0696050691	1024
	006 0697050966	512
	006 0697050967	512
	006 0697070615	512
	006 0697120362	1280
	055 55940020081	256

Table 3-2 Robb Trend Project Area - Mineral Agreements		
Land Index Search - Sept 29, 2012		
Mineral Agreements		
Scott Land & Lease Ltd.	054 5409100373 054 5409100552 055 5506050797 055 5508040368 055 5508070373	1536 1280 1792 768 256
Windfall Resources Ltd.	055 5505060330 055 5511100258	256 768
Tourmaline Oil Corp.	055 5506050798 055 5598080082	2816 1280
Meridian Land Services (90) Ltd.	055 5507010515 055 5507010517	1024 768
Coles Bay Resources Ltd.	055 5511040276	3072
Standard Land Company Inc.	055 5511110504	2816
Metallic and Industrial Minerals		
Athabasca Minerals Inc.	093 9312030695 093 9312030696	9216 8261

All mineral rights in the region are in the name of the Crown.

Coal (Permit, Lease)

CVRI will co-operate with Mancal in developing an 'end wall development agreement' prior to mining in the Robb West area (see ERCB SIR #7).

A small lease area (W, SEL3-31-49-21-5) remains open, but is reported to have restrictions (see ERCB Appendix 3). (This lease was previously identified as privately held). CVRI believes that the lease would be assigned to CVRI once the proposed Mine Permit is approved.

PNG

CVRI will continue to co-operate with PNG owners in resource development in the Project area.

Minerals

CVRI is not aware of any planned 'mineral development' within the Project area.

4. Cover Letter to CEAA dated April 11, 2012.

CVRI references a July 18, 2011, Project Agreement with the Government of Canada outlining the regulatory process regarding the Project.

a. Provide a copy of this document.

Response:

A copy of the agreement and recent correspondence is provided (see ERCB Appendix 4).

5. Section A.4.3.4, Page A-10.

CVRI lists the additional approvals required for the project, including requirements under the Water Act.

b. Provide a detailed schedule for all permits, licences and approvals associated with the Project, beyond that shown in Table A.6-1.

Response:

Exploration

CVRI is continuing exploration work in the Project area. This will include additional drilling and coal quality sampling. Bulk samples are planned and applications will be submitted in due course.

During 2013 efforts are expected toward geotechnical drilling including coreholes. 'Coal Exploration Permits' will be required for such programs.

Mine Permit

CVRI continues to seek Mine Permit approval as a priority. This is the focus of the application submitted.

Critical Construction

During early 2013 CVRI will move toward final design and submissions for various regulatory approvals associated with the initial 'critical construction' activity. The first activity will involve construction of haulroads and powerlines into the Project area thus connecting the existing operation to the new mining areas.

Construction will involve timber harvest, soil salvage, cut/fill for roads, a crossing of the Erith River, establishment of several ponds and establishment of a powerline for future dragline operation. Applications for EPEA amendment, *Water Act, Fisheries Act,* Navigable *Waters Protection Act* and Public Lands will be prepared and submitted.

Initial Mining

During late 2013/early 2014 CVRI will move toward final design and submissions for various regulatory approvals associated with the 'initial mining' activity. Early pits are expected to be located in Robb Main/Robb Center near the Erith River in order to provide the start of production. Applications for EPEA amendment, *Water Act, Fisheries Act,* Navigable *Waters Protection Act* and Public Lands will be prepared and submitted.

Schedule

A preliminary schedule for additional permits, licences and approvals is provided (See ERCB Table 5-1).

Table 5-1 Project Approvals Required

	Estimated Timing	Regulators			
		ERCB	AESRD	Other	Federal
Exploration Stage					
Coal Exploration	2013		X		
Bulk Sample Test Pits	2012/2013	X			
Dump Foundation Test Pits	2012/2013		X		
Permit Stage					
Mine Permit Amendment	2013	X			
Critical Construction Stage					
EPEA Amendment	2013		X		
Water Act	2013		X		
Public Lands	2013		X		
Navigable Waters	2013				X
Fisheries Act	2013				X
Pipeline Crossing Agreement	2013			X	
HRIA Clearance	2013			X	
Initial Mining Stage					
Mine Licence	2013	X			
Dump Licence	2013	X			
EPEA Amendment	2013		X		
Water Act	2013		X		X
Public Lands	2013		X		
Navigable Water	2013				X
Fisheries Act	2013				X
Pipeline Crossing Agreement	2013			X	
HRIA Clearance	2013			X	
Future Construction					
Explosives Act					X
Pipeline Crossing Agreement				X	
HRIA Clearance				X	
Future Mining Stage(s)					
Mine Permit Amendment		X			
Mine Licence		X			
Dump Licence		X			
EPEA Amendment			X		

Table 5-1 Project Approvals Required					
	Estimated Timing	Regulators			
		ERCB	AESRD	Other	Federal
Water Act			X		
Public Lands			X		
Navigable Water					X
Fisheries Act					X
Pipeline Crossing Agreements				X	
HRIA Clearance				X	

6. Section A.8.16, Page A-56.

CVRI states it has identified other surface and subsurface land and resource users located within the Project mine permit boundary.

a. Provide a detailed map of all existing facilities/infrastructure in or affecting the permit area, and a discussion on their impacts to mining and vise versa.

Response:

Figure E.16-5 and E.16-6 had been provided previously in the application to provide detail of existing 'infrastructure' in and adjacent to the Project area. The following discussion outlines the limited infrastructure in the area and the potential impact from the Project. Since the submission of the Application, no new projects/facilities/infrastructure have been built and or documented.

Forestry

Hinton Wood Products (West Fraser) has established numerous logging roads and tree plots throughout the Project area. CVRI has a long standing relationship with West Fraser in dealing with cooperative development of mining areas. This relationship includes establishment of formal agreements for road usage and replacement in addition to compensation for disruption to forestry business. CVRI will continue in like fashion for the Project.

CVRI will continue to accommodate timber harvest in the Project area and will fulfill compensation requirements expected in the amended agreement with West Fraser. No limitations to mining are anticipated.

Trapping

Three traplines are impacted by the Project. Cabins and traplines have been established within these areas. CVRI will conclude compensation agreements with any of the RFMA holders which seek accommodation when mining reaches their specific trapping areas. No limitations to mining are anticipated.

Commercial Gas

Yellowhead Gas Co-op has a single use gas line through the Project area to service the CVM. CVRI anticipates that minor relocation of the line will be sufficient to accommodate future mining. No limitations to mining are anticipated.

Resource Gas Development

A variety of gas wells with associated access roads and pipelines are located within and adjacent to the Project. The presence of gas wells and pipelines will require mining accommodations unless the facilities are removed, relocated or 'shut-in' during mining. Several agreements have been established for some individual wells and pipelines which require the operator to move the facility in favor of coal mining activity. Only two major pipeline routes remain which require relocation or 'work arounds'. Plans for these will be established at the time of pit licence applications. CVRI has previous experience accommodating such infrastructure.

Hamlet of Robb

CVRI has a long standing history of consultation with the Hamlet of Robb. Over the history of the CVM, many employees and their families have resided in Robb. As the Hamlet is located adjacent to the proposed Project, CVRI has provided for a buffer zone between development and the residential area of Robb. Various mitigation efforts have also been included in the proposed development plan to reduce the effect on the community. CVRI continues to consult with Robb residents regarding the progress of the Project, current and potential future mitigation efforts and the overall community understanding of the Project.

Public Highways

Highway 47 is located outside of the Project area running in between Robb West and Robb Main. The highway corridor is not directly impacted by the Project. No additional crossings of the highway will be required. Similar to current operations at the CVM, specific blasting procedures in proximity to Highway 47 will be implemented.

b) Provide an update on CVRI's discussions with the owner(s) of other facilities/infrastructure and confirmation if proximity agreements have been reached.

Response:

See response to ERCB SIR #6a).

4. GEOLOGY

7. Section A.4.3.1, Table A.4-2 and Section B.6.1, Table B.6-1.

CVRI lists the sections under application for the proposed permit. In Section B.6.1 CVRI states "*Mancal holds a Mine Permit that overlaps a portion of the west edge of the Project.*" and "*CVRI will negotiate with the lease holder for rights to mine the area.*"

a. Provide justification for overlapping the requested permit area over coal leases owned by others.

Response:

Robb West 'End Wall'

The lease configuration at the west end of Robb West forms a 'jagged' shape. Mining is proposed to end with a pit wall perpendicular to the seam strike direction. A 'negotiated agreement' between CVRI and Mancal will be required to cover this circumstance. Such discussions with Mancal have not yet been started.

The 'end wall' which will occur at the extreme western end of Robb West could extend into the adjacent Mancal mine permit. In order to include all surface disturbance the proposed CVRI mine limit would have to be extended into this same area. Hence the 'overlap' occurs.

In calling attention to this 'overlap' CVRI has identified a potential conflict with mine permit boundaries. CVRI concern is focused on future 'licence' boundaries should the Mancal side remain as only a permit without operating licences.

Past practice in such circumstances has involved the two 'licenced operators' establishing a 'boundary agreement' covering the 'end wall' development. This arrangement remains as an alternative to 'overlapping' two mine permits.

Should ERCB be able to confirm that no complications in licencing would occur then CVRI would withdraw the overlap area (NE3, 5, 6 -6-49-21-5, 1-36-49-21-5) from the requested Mine Permit area.

b. Provide a revised Figure B.6-1 with all existing and proposed permits in the area and highlight the overlapping areas.

Response:

ERCB Figure 7-1 is provided to illustrate all existing and proposed mine permits in the Project area including the Robb West area. The 'overlap' area is highlighted.

c. Describe the specific consultation completed with those third party lease/permit holders and plans for further communication.

Response:

Communication between CVRI and Mancal are occurring. An agreement with respect to this boundary will be negotiated and communicated to the ERCB.

CVRI previously identified a small lease area (W, SE 3-31-49-21-5) as a 'private lease'. It has been determined that this small 30 acre block remains as an open lease but is subject to Alberta Energy restrictions. CVRI believes that the lease will be assigned to CVRI once the proposed Mine Permit amendment is approved (see response to ERCB SIR #3).

d. Provide a timeline for approval of the areas on Figure B.6-1 shown as "Lease Requested" and "Lease Applications Pending".

Response:

CVRI will progress rapidly to complete acquisition of the additional leases once the Mine Permit is approved. Alberta Energy is aware of the ongoing application and is currently withholding any action on these leases.

e. Confirm that the "Lease Requested" areas marked on Figure B.6-1 are not listed in Table B.6-1.

Response:

Leases which have already been assigned to CVRI are listed in Table B.6-1 with a 'lease number'. These are shown in Figure B.6-1 and colour coded in a green shade.

Leases which are 'pending' to be assigned to CVRI are listed in Table B.6-1 with an "A" code as the first letter of the lease number. These are shown in Figure B.6-1 and colour coded in a blue shade.

Areas not yet leased to CVRI are tabulated in Table B.6-1 and shown in Figure B.6-1. These include both areas for which CVRI has submitted applications and areas for which Alberta Energy has withheld lease assignment pending CVRI Mine Permit amendment approval.

Table B.6-1 does not include coal leases assigned to Mancal nor a small lease area identified in Figure B.6-1 with a dark blue shade as being an application by others. CVRI has now learned that this 'other application' has no application but is restricted pending decision on the requested Mine Permit amendment approval.

Alberta Energy has indicated to CVRI that coal leases within or adjacent to an approved Mine Permit would be granted to the Mine Permit holder.

8. Section A.8.3 and Section E.3.1.

CVRI states, "*Information regarding the characteristics of groundwater in the area has been available since 1975.*"

a. Provide justification that the Coal Valley Mine (CVM) hydro-geological experience is applicable given that the proposed permit extension is on a different geological trend of "*the western limb of the Alberta Syncline*" mentioned in Section B.2 with the CVM on the Entrance syncline.

Response:

The Project is not in a different geological trend.

CR #3 provides substantial justification for the working assumption that is the same hydrogeological regime. CR #3 subsequently presents the monitoring data which support that conclusion. Reference is specifically made to Section 1, and Section 3 of CR #3.

b. Provide a discussion on the distance and geological changes between the hydro-geological regime in the Robb trend and the water well near the office of the CVM.

Response:

The distance from the water well near the office of CVM to the Project is approximately 5 km.

The only geological change is that the strata in the Project dip westward and at the office site they dip eastward. This reflects the now-eroded anticline that formerly existed between these locations. Other than this, the geological sequence is the same in both of the locations requested to be compared.

c. Provide discussion on the relevance of data from water wells near Robb to the hydro-geological regime in the Robb trend and how that data was used.

Response:

CR #3 provides discussion in this regard. Specifically, Section 2.3.10 and Section 4.2 can be noted.

Briefly, the following points can be made from the above sections:

- The Hamlet generally lies on, or slightly northeast, of the alignment of the Project. This means that water wells in the hamlet may intersect coal seams that are the focus of mining in the Project to the southeast and/or northwest. The point is made that Robb

wells may largely be completed in the same hydrogeological regime as that of the Project in general.

- The chemistry data for the water wells in Robb is similar in characteristics to that of the Project, in general. Table 2.3.8 and Table 2.3.9 of CR #3 provide comparisons in Section 2.3.10.

9. Section B.3.1.2, Page B-3.

CVRI states, "*Denison completed exploration and feasibility evaluations for the area...*"

a. Provide a summary (names, locations, size, sampling conducted) of test pits and adits done by Denison in addition to the drillholes already mentioned.

Response:

Denison Sample Locations

The ERCB website provides maps of 'coal mines' in the province. These locations include registered 'test pits' or 'bulk sample' locations. The Denison 'test pits' are referenced as 1790/E/01, 1790/E/02, 1790/E/03, 1790/E/04, 1790/E/07, 1790/E/08 and 1790/E/09.

Bulk Samples

In reviewing old Denison reports CVRI has found data related to various bulk sample tests. A 1980 bulk sample (66 drums) was obtained from the Val d'Or/Arbour seam. Three additional bulk samples were obtained in 1981 along with a 10 tonne channel sample. ERCB Table 9-1 details these large samples.

The 1980 bulk sample was washed as an individual sample.

The 1981 samples provided individual size analysis and attrition test data. These samples where then composited for pilot plant wash tests. Fouling and slagging characteristics were also calculated from this blend.

Table 9-1 Coal Quality Summary										
Dentherm Resources Limited - Coalspur Project Feasibility Study - Geology - August 1982										
	1980 Val d'Or/Arbour	1981 Bulk Blend	Drill Core							
			V	A	McL	McP	US	M1	M/LM	Wt'd Ave
Raw Coal										
Moisture (adb) %	24.7									
Equilibrium Moisture %			9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Proximate Analysis (db) %										
Ash	35.1	34.8								
Volatile Matter	30.4	25.6								
Fixed Carbon	34.5	39.6								
Sulphur (db) 5	0.19									
Gross Cal. Value (db) kcal/kg	3776	4355								
Clean Coal										
Proximate Analysis (db) %										
Ash	12.3	10.0	9.4	9.9	10.9	9.5	8.2	7.7	11.7	10.0
Volatile Matter	41.1	38.3	33.7	34.0	33.9	33.7	33.3	34.0	33.4	33.7
Fixed Carbon	46.6	51.7	56.9	56.1	55.2	56.8	58.5	58.3	54.9	56.3
Gross Cal. Value (db) kcal/kg	5289	6800	6522	6611	6657	6716	6845	6912	6590	6619
Ultimate Analysis (db) %										
Carbon	71.8	65.0	70.6	68.3	67.6	69.3	69.8	70.3	68.2	69.3
Hydrogen	3.6	4.1	4.9	4.8	4.7	4.7	4.7	4.8	4.8	4.8
Sulphur	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.3
Nitrogen	0.8	0.7	0.9	0.8	0.9	1.0	1.1	1.1	1.0	1.0
Ash	12.3	10.0	9.1	9.9	9.9	9.2	8.1	7.5	11.6	9.7
Oxygen (by difference)	22.9	14.8	14.4	15.8	16.6	15.5	15.9	15.9	14.1	14.9
Hardgrove Grindability Index			41	42	40	42	43	43	41	41.0

Table 9-1 Coal Quality Summary										
Dentherm Resources Limited - Coalspur Project Feasibility Study - Geology - August 1982										
	1980 Val d'Or/Arbour	1981 Bulk Blend	Drill Core							
			V	A	McL	McP	US	M1	M/LM	Wt'd Ave
Ash Analysis (db) %										
SiO2		61.6	57.1	61.6	59.9	60.0	56.4	54.8	63.9	59.9
Al2O3		18.8	18.1	18.2	20.7	20.2	19.1	18.4	19.2	18.9
Fe2O3		4.2	4.7	3.2	2.8	3.0	4.7	5.6	2.8	3.6
TiO2		1.0	0.4	0.6	0.5	0.4	0.5	0.4	0.6	0.5
P2O5		0.4	1.0	0.4	0.2	0.2	0.5	31.0	0.4	0.4
CaO		6.6	9.0	5.9	4.5	5.0	6.6	5.7	5.6	6.7
MgO		1.0	1.8	1.1	1.9	2.0	2.2	1.8	1.2	1.8
SO3		3.8	4.2	4.3	4.2	4.2	4.9	6.0	3.4	4.2
Na2O		0.5	0.8	3.1	3.0	2.8	2.5	2.7	1.5	2.4
K2O		0.5	1.7	1.2	0.7	0.6	0.7	1.1	0.4	0.7
Fusibility of Ash C										
Initial Deformation Temp.	1322	1275	1189	1202	1239	1241	1204	1226	1257	1218
Softening Temp. Spherical	1340	1315	1242	1292	1290	1291	1248	1276	1314	1277
Softening Temp. Hemispherical	1348	1350	1303	1350	1373	1340	1302	1318	1392	1340
Fluid Temp.	1357	1425	1378	1415	1426	1404	1272	1133	1328	1401

b. Provide a summary of any coal quality testing done on samples from those test pits or adits.

Response:

See ERCB SIR #9a) for the coal quality analysis from the Dension 1982 feasibility study.

10. Section B.4.3, Page B-8.

CVRI states, with respect to areas of previous underground mining, "*CVRI has worked through such areas previously and maintains 'codes of practice' for operating in such area.*"

a. Provide the codes of practice for coal exploration drilling in areas of previous underground mines.

Response:

The discussion in this section is referring to mine operations with areas with underground workings. The codes of practice noted refer to 'mining' not exploration. (See ERCB SIR #31).

11. Section B.6.2.1, Page B-11.

CVRI states, "*The report translates this price to a 'breakeven strip ratio' of 6:1 (BCM/RMT) as the relationship for determining the maximum mining depth and pit configuration.*"

a. Clarify if this strip ratio is an Incremental Cut-off Strip Ratio or an Overall Pit Strip Ratio.

Response:

The 6:1 BCM/RMT Breakeven Strip Ratio is an 'incremental cut-off strip ratio'.

12. Table B.6-2 and Table B.6-3.

CVRI provides reserves by strip ratio and reserves by seam separately.

a. Provide a matrix of coal reserves by different strip ratio by mining area with separation into the various coal seams in one table.

Response:

Table B.6-2a, B.6-2b, B.6.2c and B.6-2d are provided below as ERCB Table 12-1, 12-2, 12-3, and 12-4, indicating the 'reserves' within the four main development areas for each of the 'cut-off ratios' evaluated by Norwest. The higher 'BESR' results in deeper and larger pits which would result in greater coal recovery.

Table 12-1 (Revised B.6-2a) Robb West - Reserves by Seam by BESR						
	BESR					
SEAM	**4**	**6**	**8**	**10**	**12**	**14**
VLDU	2.917	4.705	6.389	8.754	10.996	11.891
VLD	7.329	11.721	15.887	21.782	27.512	29.706
ARBO	11.614	17.921	24.139	32.957	41.258	44.432
MCLD	0.149	0.497	0.629	0.819	1.185	1.251
MCPU	0.521	2.919	3.330	3.835	3.938	3.950
MCPM	2.246	14.191	18.598	24.285	29.477	31.322
MCPL						
WEE					0.083	0.362
BOUR						
MYNU	1.963	3.548	5.619	7.658	14.683	21.659
MYNL						
Total	26.739	55.502	74.591	100.090	129.132	144.573
Waste (kBCM)	56.433	201.692	340.221	581.052	939.527	1,187.410
Ratio (BCM:RMT)	2.11	3.63	4.56	5.81	7.28	8.21

Table 12-2 (Revised B.6-2b) Robb Main - Reserves by Seam by BESR						
	BESR					
SEAM	**4**	**6**	**8**	**10**	**12**	**14**
VLDU	4.812	7.555	10.634	14.105	17.712	19.679
VLD	18.089	27.910	38.797	51.016	63.633	70.605
ARBO	23.217	34.819	47.597	61.997	76.900	85.079
MCLD	0.208	2.321	6.494	9.788	13.168	14.355
MCPU	0.200	1.429	4.510	6.669	8.952	9.831
MCPM	0.615	3.323	9.854	14.443	19.096	20.904
MCPL	0.413	2.832	6.992	9.646	11.852	12.512
WEE	0.173	0.518	1.776	5.411	12.734	14.737
BOUR						
MYNU	4.215	7.348	13.445	24.405	46.425	52.995
MYNL	0.455	0.778	1.673	3.331	4.389	4.996
Total	52.397	88.833	141.772	200.811	274.861	305.693
Waste (kBCM)	113.140	291.087	655.416	1,171.229	1,949.299	2,304.351
Ratio (BCM:RMT)	2.16	3.28	4.62	5.83	7.09	7.54

Table 12-3 (Revised B.6-2c) Robb Center - Reserves by Seam by BESR						
	BESR					
SEAM	4	6	8	10	12	14
VLDU	0.418	0.803	1.249	1.704	2.216	2.741
VLD	3.297	5.872	8.446	11.085	14.140	17.154
ARBO	3.655	6.289	8.839	11.321	14.340	17.288
MCLD						
MCPU						
MCPM		0.015	0.042	0.065	0.105	0.549
MCPL	0.013	0.053	0.085	0.131	0.212	0.497
WEE	0.108	0.185	0.356	0.837	1.591	3.341
BOUR						
MYNU	0.853	1.788	3.117	5.552	7.557	11.041
MYNL						
Total	8.344	15.005	22.134	30.695	40.161	52.611
Waste (kBCM)	22.339	55.708	107.522	187.944	294.400	464.751
Ratio (BCM:RMT)	2.68	3.71	4.86	6.12	7.33	8.83

Table 12-4 (Revised B.6-2d) SIR Robb East - Reserves by Seam by BESR						
	BESR					
SEAM	4	6	8	10	12	14
VLDU	2.285	3.823	5.251	6.738	8.195	9.606
VLD	12.153	18.812	24.938	31.606	37.257	42.550
ARBO	1.096	2.566	3.583	4.588	5.667	6.451
MCLD						
MCPU						
MCPM	0.272	0.689	1.161	1.720	2.567	4.518
MCPL	0.002	0.026	0.042	0.058	0.072	0.085
WEE	0.403	0.977	1.847	2.721	4.177	6.769
BOUR	0.018	0.060	0.107	0.134	0.184	0.223
MYNU	1.529	3.305	5.599	7.601	10.016	13.098
MYNL	0.216	0.451	0.792	1.116	1.528	2.150
Total	17.974	30.709	43.320	56.282	69.663	85.450
Waste (kBCM)	38.024	98.847	186.470	299.752	444.163	653.179
Ratio (BCM:RMT)	2.12	3.22	4.30	5.33	6.38	7.64

b. Provide Table B.6-2 with an additional column of Overall Pit Strip Ratio for each "BESR".

Response:

A revised Table B.6-2 is provided as ERCB Figure 12-1.

13. Section B.

CVRI has not provided a plan showing drillhole locations within the application. However, MDH has submitted plans in Appendix 9, Figures A1 to A5 showing drillholes with additional geological information for parts of the proposed mine permit amendment.

a. Re-submit figures with all geological features marked and annotated including drillhole locations, cross section locations, projected subcrops, faults, bedding angles, fold axis, to and beyond the proposed permit amendment. Ensure that all drillholes are annotated and the proposed permit amendment boundaries are clearly shown.

Response:

CVRI has previously provided ERCB with a then current drillhole plan and a copy of the drillhole database to assist in development of their geology model.

A 'revised drillhole plan' is provided with the detail requested (See ERCB Figure 13-1 and ERCB Figure 13-2). These figures include the completed drillholes and the proposed upcoming drillhole plan which is currently underway in the Project and will continue through 2013.

14. Section C, Figures C.2-3 to C.2-15.

a. Resubmit these figures with coal holes shown and all geological features marked and annotated including but not limited to geological formations, folds, and faults. Ensure that all drillholes are annotated and the proposed permit amendment limits are clearly shown.

Response:

Section C was provided to describe the scope of the proposed Project**.** These cross-sections illustrate the general layout of the mine area and include an indication of the reclamation profile. "Geology' sections were provided in Appendix 9 of the application.

b. Provide cross-sections for a permit application at approximately 800m to 1000m spacing. All coal seams must be shown on each cross section, even if they are projected from geological interpretation.

Response:

A current and revised set of 'geology' cross-sections have been provided as requested (See ERCB Appendix 14). Elements provided by the sections include:

- sections spaced throughout the extent of the Project;
- annotated drillholes and drillhole 'trace';
- defined and interpreted seam locations;
- seams are labeled;
- permit boundary are provided (if within the section limit); and
- known and interpreted faults and folds are illustrated.

Please note that the 'permit boundary' may fall outside of the boundaries of the various cross-sections which are focused on the proposed mining limits. The 'mine permit' is defined to include all the mine areas such as dumps and haulroads so that 'geology' will not be defined for the entire 'permit boundary'.

c. Provide a discussion on what further geological information is needed to complete the modeling and project the coal seams beyond proposed pit limits.

Response:

Additional exploration drilling is ongoing to complete structural definition and refine geological interpretation. Drilling will include 'deep drilling' of the Val d'Or/Arbour Seams to confirm deeper seam definition. Please note that CVRI has submitted and received approvals for the proposed Coal Exploration Permit in place for 2012 and 2013.

A revised 'geology model' is proposed for development in spring 2013 to include then current drilling information. This model will be utilized to re-evaluate reserves and initiate detailed mine planning.

Pit limits are established by an economic evaluation of a breakeven strip ratio limit on the dipping coal seams. The 'pit shells' currently established have been utilized to guide the drilling programs to cover the proposed pits. These 'pit limits' have been included on the cross-sections provided in ERCB Appendix 14.

d. Submit longitudinal sections with the extents of previous underground mines, drillhole locations and all geological features marked and annotated. Clearly show annotated drillholes and the proposed permit amendment limits.

Response:

CVRI believes that 'longitudinal cross-sections' would not be useful in illustrating the position or extent of underground workings. Reference to the cross-sections provided (see ERCB Appendix 14) will adequately illustrate the relative position of the mine limits. Underground recovery was limited to a 'core' coal horizon within the Val d'Or Seam. It should be noted that

mine operators did not have a 'cleaning plant' so relied on mining only of the cleanest portion of the coal seam.

Robb West

The Bryan Coal Co. Ltd. operated an underground mine which falls within a portion of the Robb West area. Appendix 9, Figure A-1 illustrates the approximate extent of this mine. The underground workings are found between approximately -100E to 3000E. Cross-sections Figure B3 and B4 indicate the relative position of the underground workings within the Val d'Or Seam. It should be noted that the underground mine attempted recovery of only a portion of the Val d'Or Seam by developing only the cleaner 'core' of the seam.

Mine plans indicate that the main drivage for the Bryan Mine was located at approximately 1080m level with a slight incline toward the west. Therefore all room and pillar development was above that level.

Robb Main

Lakeside Coals Ltd. operated an underground mine on the eastern side of the River. Appendix 9, Figure A1 illustrates the approximate extent of this mine. The underground workings are found between approximately 3000E to 6000E. Cross-section Figure B5 indicates the relative position of the underground workings within the Val d'Or Seam. Again, only the central 'core' of the seam was developed to gain access to 'clean' coal.

Proposed mining in Robb Main will end at approximately 5750E. Therefore the underground workings will be encountered only between 5750E to 6000E, a strike length of 250 m. Mine plans show that the main drivage for underground mining in this area was at the 1080 m level. Therefore room and pillar development was limited to elevations above 1080 m.

15. Section C, Figures C.2-3 to C.2-15.

These cross sections show construction of external dumps above coal resources.

a. Provide justification for sterilizing the coal resources, including evaluation of alternative dump locations.

Response:

Conceptual Plan

Open pit mining requires the removal of overburden from the coal seam with discard of the material to some adjacent location. Cost of removal is minimized if the discard location is nearby and conveniently located, typically downslope of the excavation bench. Therefore, dump locations beside and downslope of the pits have been anticipated as probable dump sites. In-pit backfill has also been anticipated where possible. The various plans provided in the application are illustrative of the mining sequence and dumping arrangements resulting in the conceptual

development plan presented. Future detailed design work for the pit and dump plans will result in further refinements of the overburden discard sequence and dump locations and volumes.

Sterilized Resources

The dumps shown in the proposed plan do cover deep coal resources beyond the economic limits of the proposed mining. This occurs with both internal and some external dumps.

Internal dumps (in-pit backfill) result in overburden discarded within previously excavated and completed pits. The dumped material 're-fills' the pit to some degree thus 're-burying' the remaining coal. The alternative is to place all waste material into external dumps which would significantly increase the disturbance footprint and result in larger, deeper end pit lakes. CVRI has attempted to 'balance' such increased disturbance with utilizing backfill where feasible.

External dumps result in overburden being discarded adjacent to the excavated pits. The plans provided by CVRI accommodate waste from the upper elevation benches of the various pits within dumps developed near the upper 'pit rim'. This results in shorter haul distances and minimizes the elevation differences for the truck haulage. Mining in the 'mid-elevation' benches are expected to be located in lowest elevations of the external dumps. Again, this avoids hauling overburden to higher elevations which significantly increases haul costs. (The lower benches of the pits are often accommodated in the internal or backfill dumps to avoid long distance haulage out of the pit boundary.)

This scheme results in external dumps located on the 'hanging wall' side of the pit which adds extra material over the deeper coal seams. This would further hinder any future mining to deeper depth.

Therefore, the mine plan presented anticipates mining to a pre-planned depth. The dumping arrangements associated with the plan would likely preclude any future mining of any deeper resources by open pit methods.

Alternatives

An alternative to the internal (backfill) dumps would be to place all overburden material as external dumps. This would increase waste haulage costs which would result in smaller and shallower pits to maintain mine economics. In addition the disturbance areas needed for larger external dumps would increase thus impacting reclamation efforts. This would further increase operating costs thus requiring a reduced stripping ratio to balance the increased costs.

Alternatives to nearby external dumps on the hanging wall location of the pits would include relocation of the dumps to a greater distance. This would increase haulage costs and likely

increase the overall project disturbance footprint. In balancing these increased costs the strip ratio of the pit would need to be reduced thus reducing coal recovery.

Long term practice at CVM has shown that strategic planning of dumping can provide significant operating savings and help maximize coal recovery. These plans often target maximizing in-pit backfill and backfill over adjacent pits of dumps. The conceptual plan presented in the Project application has anticipated such dump planning. The plans presented already accommodate dumps from the Val d'Or/Arbour Pits being placed over top of the McPherson and some of the Mynheer dumps and pits. This sequencing reduces the volume of external dump space required on the hanging wall side of the Val d'Or pit. CVRI is confident that continued design refinements can further reduce the external dump footprint.

Justification

No dumps are located on coal resources identified as below the proposed breakeven strip ratio.

The development plan presented results in the pits mined to a pre-planned depth only. This depth is dependent upon mining economics during the period of mining. Therefore, mining depth could vary over the life of the Project as mining economics vary. Each individual licenced pit would be operated under the conditions prevailing at the time of the pit approval.

The position chosen for the pit mining depth would be justified by relevant mining economics at the time of mining.

16. Appendix 10, Section 1.0.

Norwest states, "*...the surface mineable portion of the coal seams that underlie the Robb Main Trend (RM) and the Robb West (RW) coal blocks...*" It appears not all proposed mining blocks have been modeled.

a. Confirm that the material in this appendix deals with all the proposed permit amendment of Robb West, Robb Main, Robb Center, Robb West.

Response:

A single, continuous geologic model was developed by Norwest for the Project. The extents of the model are: -4,150E to 46,150E; 12,900N to 18408N; 850 to 1,495 elevation.

b. Confirm that the geological models used for analysis in this appendix deal with all the proposed permit amendment of Robb West, Robb Main, Robb Center, Robb West.

Response:

See the response to ERCB SIR #16a). CVRI confirms that the geologic models provide full coverage for the proposed permit amendment of Robb West, Robb Main, Robb Center and Robb East.

17. Appendix 10, Section 1.0.

Norwest states, "*The first report, prepared in accordance with the requirements of National Instrument 43-101....*" In Appendix 10, Section 2.0 Norwest states, "*The Technical Report provides a detailed description of the history, tenure and geology of the Robb Trend and surrounding area. The reader is directed to "Technical Report – Robb Trend Coal Property" dated November 5, 2010 for these details.*"

CVRI Comments

As there appears to be confusion regarding references to Norwest reports comments are provided to place these reports into the proper context of the application. ERCB Figure 17-1 is provided to illustrate the logic flow of these reports with respect to the mine plans and reserves stated within the application.

Geology Model

CVRI contracted Norwest to develop a 'geology model' of the Robb Trend Project area. Geology data available at the time were utilized with topographic data obtained by CVRI. Sections and plans from the model were compared to available reports to confirm the acceptance of the model.

NI 43-101

CVRI requested Norwest to provide an updated report meeting NI 43-101 standards for internal corporate use. Norwest utilized the current geology model to revised and updated earlier 'reserve' reports. This report is provided (see response to ERCB SIR #17a).

Mine Plan Evaluations

CVRI requested Norwest to undertake an evaluation of the project to investigate potential mineable reserves for various truck/shovel and dragline options. Several variations in the mining case were investigated.

A range of selling prices from $50 to $80 was to be used to help understand the 'sensitivity' of the reserves to depth of mining. LG pit shells and reserve estimate where produced for these cases.

Additional cases were developed to model the difference between truck/shovel and dragline mining methods. Certain portions of the project would be more applicable to dragline mining while the majority of the project would require deep truck/shovel methods. Differences in mining cost between the two methods where considered. Various pit shells and reserves were produced for these variations in the approach.

As a concluding evaluation a LG pit shell was developed for a $60 price. Reserves were generated for this case. In an effort to understand the relative value of the Arbour seam this

scenario was modified to simply 'deepen' the pit shell to include the Arbour Seam. This provided an 'incremental' evaluation of the change due to inclusion of the seam.

Results of many of these options was reported by Norwest in their report which CVRI provided in Appendix 10 of the application.

Project Application

Subsequently, CVRI requested Norwest to provide LG pit shells for a range of 'cut-off' ratios with the inclusion of Arbour Seam as a mineable seam. A range of ratios from 4 to 12 were provided. Reserve estimates for these various cases have been provided.

CVRI has chosen the 6:1 case as the 'base case' for development of the Project application.

Future Evaluations

As drilling continues throughout the Project, CVRI will continue to refine both geological models and mine plans over the life of the Project. A revised and updated geology model is expected to be developed in spring 2013 to include all drilling data available. This model will then be utilized to provide a revised and updated NI 43-101 estimate for the entire Project.

The Norwest reports have been provided to explain the assumptions utilized and progression of reserve estimates and mine plans. Such work has led to the proposed mine plan which is developed from the Norwest geology model, utilizes LG pit shells developed for a 6:1 cut-off ratio and incorporates the Arbour Seam as a viable, recoverable seam.

Norwest Comments

CVRI requested Norwest to review the various SIR questions related to their reports and assist in preparing responses to specific questions. Norwest has supplied the following explanation of the technical reports they prepared in order to clarify the applicability of the reports and the evaluation processes involved:

> ***CLARIFICATION***
>
> *Appendix 10 Section 1.0 states that: The Robb Trend Conceptual Mining Study (Conceptual Study) "… was commissioned by CVRI to examine at a conceptual level the surface mining potential of the resources identified in the Technical Report. The conceptual study was founded on current CVRI cost experience and was designed to examine the relationship between the size of the mineable resource and FOB Mine price where mineable resource is defined as the total tonnes of product coal that can be profitably produced on an incremental basis at a given FOB Mine price."*
>
> *The report "Technical Report - Robb Trend Coal Property Alberta; November 5, 2010; Norwest Corporation" is companion to the Conceptual Study and was prepared to satisfy the requirements of NI 43-101 and not the requirements of the Permit Application. It was*

never CVRI's intention to include the Technical Report in the application nor should it be considered relevant to the application process now. The report "Robb Trend Conceptual Mining Study, November 5, 2010; Norwest Corporation" is the reference document for the application on all matters concerning geologic modeling and/or pit design.

The pit shells described in the Conceptual Study are not the final pit shells that were submitted by CVRI in the Permit Application. Nonetheless, the methods and procedures that were used to develop these pit designs are based the same methods and procedures that were used to develop the final pit designs described in the Application. CVRI elected to use the descriptions contained in the Conceptual Study as the reference on all matters concerning pit design for the purposes of the Application.

The Conceptual Study developed two separate but related series of pit designs given the following criteria.

I. The first series of pit shells were developed to a BESR of six assuming that the Arbour Seam had no value. Consequently this series of designs bottomed out at the footwall of the Val d'OR Seam.

II. The second series of pit shells were developed under the assumption that the Arbour Seam did offer value. The incremental value associated with the Arbour Seam was developed by extending the first series of pit shells downward along the existing BESR cut-off line to the Arbour footwall while remaining within the confines of the first series pit shells.

The Conceptual Study concluded.

The findings of the Conceptual Study showed that the Arbour Seam could contribute considerable value to the project given the assumptions regarding value as discussed herein. Based on these findings CVRI decided to pursue that potential through the development of the "final" pit shells where the Arbour Seam was assigned full value and new LG's were run at an unconstrained BESR value of six. Development of the final pit shells is described in Section B of the Application, Section B.6.2.1 through Section B.6.2.4. CVRI recognizes that the actual value of the Arbour Seam must be proven. Toward that end CVRI has designed and is presently undertaking a Robb Trend drillhole based coal quality assessment program. The program is designed to improve the companies understanding of Robb Trend coal quality in general but with particular emphasis on that of the Arbour Seam. The results of that work will be used to further evolve the ultimate pit designs particularly for those designs where the Arbour is present.

a. Provide the first report (Technical Report).

Response:

A copy of the November 5, 2010 Norwest report "Technical Report – Robb Trend Coal Property Alberta" is provided in ERCB Appendix 17.

b. Confirm that the first report describes the evaluation process or that the sub-Appendix "A" describes the evaluation process.

Response:

Two Norwest reports are being referenced:

* Technical Report, Robb Trend Coal Property, Alberta; November 5, 2010

This report was prepared for Sherritt International Corporation by Norwest as a 43-101 compliant document. The report discusses 'coal reserves' in context of GSC 88-21 guidelines.

* Robb Trend, Conceptual Mining Study; November 5, 2010

This report provides a mining evaluation of the Project with focus on definition of a realistic 'break-even' strip ratio. A reserve estimate was calculated assuming that Arbour was not recoverable. An option was then calculated to extend the same highwall downward to reach the Arbour. These two estimates indicated the relative 'value' of the Arbour.

Subsequently, Norwest provided LG pit shells for the Project, including the Arbour Seam. These estimates are provided in response to ERCB SIR #12.

18. Appendix 10, Section 1.0.

The text between Tables 8.2 and 8.3 says, *"At present the economic potential of the Arbour Seam in the Robb Trend area is unknown. The Technical Report offers some guidance in terms of what information would be required to better assess the potential of the Arbour Seam."*

a. Discuss the additional information that is necessary to assess the potential of the Arbour seam and how and when CVRI will obtain this information.

Response:

CVRI has included recovery of the Arbour seam in the proposed mine plan. Section B.6.2.4 indicates that CVRI has included the Arbour Seam within 'mineable reserves'. Table B.6-4 provides the material characteristics utilized in calculation of reserves for this seam. Table B.6-3 indicates the calculated reserves for the Arbour Seam (ARBO).

On behalf of CVRI, Norwest developed a geology model of the Project from available drillhole and quality information. Initial evaluations and resources estimates had excluded the Arbour Seam based on past experience at CVM. Subsequent evaluations (including Denison coal quality results) have concluded that the Arbour Seam should be included into the mine plan. These subsequent evaluations included additional 'pit shells' for various strip ratio scenarios from which CVRI has developed the proposed mine plan presented.

Ongoing and future exploration will be utilized to further refine definition of all the coal seams present including the Arbour Seam. CVRI has completed several core holes in the Robb Main area which have intersected and sampled the Val d'Or and Arbour seams. Laboratory results of composited samples are being evaluated. Additional rotary chip sampling will be undertaken during 2012/2013 and additional core holes are proposed for 2013. A bulk sample pit in the Val d'Or/Arbour seam is being proposed.

19. Appendix 10, Section 3.0.

Norwest states, "*Footwall surfaces were created and then sliced onto a 100 m spaced North-South grid set. Seam polygons were drawn on a section by section basis.*" and Appendix 9, Section 2.3.1-2 MDH states, "*Interpretation of drilling data and geophysical logs indicated that faulting exists at Robb East from 36800E to 43000E. The faulting displaces the Val D'Or and Arbour coal seams as well as the lower seams of the coal zone. Through this region the Val D'Or Seam is notably thicker, likely due to the faulting.*"

a. Discuss how the partially known faulting, mentioned in Appendix 9, is being incorporated in the resource modeling being done as a simple monocline apparent in Appendix 10 text and cross-section.

Response:

The Val d'Or Seam between Section 36800E and 43000E is interpreted to occur as a steeply dipping monocline (>45 degrees). Throughout this zone, the Val d'Or sequence of coal plies is over thickened with true thickness exceeding 20m in some places. The thickening appears to be the result of thrust faulting within the Val d'Or package. This thickening is represented in the model having been preserved through the application of sectional polygons that honor the increased thickness of the drillhole sequence within this area.

20. Appendix 10, Section 3.0.

Norwest states, "*To account for the rock partings that are included in the seam solids, an ore-waste composite ash value was calculated for the drill holes, where the interval thickness for each material type within the coal package contributed to the overall raw ash value. The composited raw ash values for each seam were interpolated into the model blocks using the composited drill hole data." and "Quality data were then incorporated into the model where ash was assigned to each lithology from the limited drillhole quality data that was available for each seam.*"

a. Provide discussion as to whether the ash values were determined from only the few coal quality analysis available or interpreted from other drillhole data.

Response:

Due to the limited size of the available coal quality data set global ash values were assigned to all coal, dirty coal and non-coal drillhole intervals based primarily on coal quality information within that area. These assignments were lithology code dependent and specific to each seam

being modeled. All coal, dirty coal and non-coal ply's identified within a particular sequence of coal, within each drill hole, were then composited to estimate a unique length weighted ash value for the composited mineable interval. The resultant ash value was dependent on the specific proportion of lithology types contained within the total identified interval.

b. Confirm that, as it appears in the cross-sections, the process of seam composites appear to have assigned uniform ash values to each block in thicker seams.

Response:

Each seam composite will have its own unique ash value within each drill hole. Please see the response to ERCB SIR #20a) above.

c. Provide discussion on how the "Quality data" re-estimated the previously modeled ash values.

Response:

Here "Quality data" refers to the composite ash values that were interpolated into the model blocks. The term was not introduced to suggest that an additional re-estimation procedure had been applied. Ash values were assigned on a by seam basis using the compositing and interpolation methods described in Appendix 10, Section 3.0.

d. Discuss if there was a distance limit to extrapolation of that data.

Response:

As discussed above in response to ERCB SIR #20a) all seams identified for modeling had ash assigned to their respective lithology intervals on a 'by drillhole basis'. Interpolation distance limits for the composited ash samples were set at 6,000m. This was to ensure that ash values were assigned to all model blocks containing seams with limited drillhole intersections. The average distance, for all seams, to the nearest composite sample point was approximately 800m.

e. Describe what the process was for blocks beyond the distance limit.

Response:

All model blocks were populated with an ash and Specific Gravity (S.G.) value, regardless of their distance to the closest composite sample (see response to ERCB SIR #20d)).

21. Appendix 10, Section 3.0.

Norwest states, "*Once the in-place composited ash was determined, contact dilution was introduced to simulate the raw coal recovery process. This was accomplished by replacing 0.2 m of in-place coal with 0.2 m of rock at each external rock/coal contact.*"

a. Provide discussion on whether it is an industry standard to have the concepts of top-loss and bottom dilution modeled in this fashion.

Response:

Experience shows that top loss and bottom dilution will occur when in-place coal is recovered. The impact of dilution and loss on ROM tonnes, SG, ROM Ash and Yield can be significant and therefore must be part of the estimating process. The average thickness of the top loss and bottom dilution zones, in this case 0.2m has been developed in consideration of actual CVRI experience under similar conditions. CVRI understands that others in the industry model these processes using similar methods.

b. Provide discussion if the thicknesses of top-loss and bottom dilution are appropriate for this style of mining and proposed mine equipment.

Response:

The Project mine plan has used a 0.2m swap zone to simulate the coal loss and dilution that will occur when rock/coal contacts are cleaned. For the Project it has been assumed that 0.2m of in-place coal will be lost at each rock/coal contact. It has also been assumed that a like thickness, 0.2m of external dilution will be replace the lost coal resulting in a transaction that is volume neutral.

There are a number of factors which influence the thickness of the swap zone. These factors could include but may not necessarily be limited to: the size and selectivity characteristic of the equipment cleaning the contact, the skill of the equipment operator, the cohesion on the rock/coal contact and the dip of the coal. Failure to provide for coal loss and dilution at external contacts will result in the systematic underestimation of run of mine tonnes, SG, and feed ash. Plant hours and production cost will also be underestimated. Plant yield will be overestimated. As the number of discreet seams and rock/coal contacts increase and/or where the contact to coal thickness ratio increases, so too will the impact of contact dilution on the quantity and quality of the ROM coal; the impact of contact dilution can be significant.

CVRI is satisfied that the thicknesses of top-loss and bottom dilution are appropriate for this style of mining and proposed mine equipment.

22. Appendix 10, Section 3.0.
Norwest states, "*ROM SG = 0.98* ROM Ash% + 1.209*".

a. Provide discussion on how SG would be calculated when there are two seams in one block.

Response:

In the event that more than one seam is contained within a model block a secondary, but seam specific, set of attributes would be developed for the additional seam using the SG formula.

b. Errata. The Ash % is more properly represented as Ash decimal.

Response:

CVRI agrees with the above statement.

23. Appendix 10, Figures 6-2 to 6-5.

The figures provided are diagrams showing the LG results in cross-section.

a. Provide similar cross-sections to those requested in SIR #14 or confirm that the lines on the MDH cross-sections (Appendix 9, Figures in sub-Appendix B) are the results of the LG shells.

Response:

Please see the cross-sections provided for ERCB Appendix 14. The LG shell outline utilized by CVRI for the conceptual mine plan is provided on these sections.

b. Confirm the LG shells represent the geological faulting mentioned in Appendix 9, Section 2.3.1-2.

Response:

The LG shells accommodate the faulting noted. This can be seen where the LG pit shells go much deeper in the fault zone where a thickened Val D'Or seam is modeled. Val D'Or seam LG pit shell depths of 80 to 100m are encountered in the fault zone whereas shell depths only reach 35 to 50 m depths outside of the fault thickened zone.

24. Appendix 10, Table 6.1 and 6.2.

Norwest titles these tables as "*...Resource Summaries*"

a. Errata - Norwest titles as "Robb Trend Resource Summary" with headers including "in-place Coal/Kbcm", "ROM/Kcmt", "clean/Kcmt". It is understood that, as the volume changes for different "coal price", the "in-place Coal" is only the coal resource within the respective LG shells and is not the total resource of the coal deposit. "in-place Coal/Kbcm" should be "recoverable resource", "ROM/Kcmt" should be "ROM reserves", "clean/Kcmt" should be "clean reserves", and the table header "Robb Trend Resource Summary" should be "Robb Trend Reserves Summary".

Response:

As indicated in the response to ERCB SIR #17, the Norwest report provided in Appendix 10 of the application provided results of various evaluation of the mining potential for the project under various assumptions. The report was provided to illustrate the 'sensitivity' of the project to price and cut-off constraints. The report is not intended to define 'reserves' nor 'resources'.

b. Provide the initial in-place coal resources including all categories of coal (not limited to the resource within the LG shells) and listing each seam individually.

Response:

CVRI has provided results of LG shells ranging from a cut-off ratio of 4 to 14 (see response to ERCB SIR #12).

The 'in-place' values for the 14:1 shell is provided in ERCB Table 24-1. As this represents an estimate to an extreme depth it is suggested that it might be utilized for the estimate requested.

CVRI has no estimate for coal volumes beyond this depth.

Table 24-1 Reserves Based on BESR = 14:1 RMT (Million)
Robb Trend Project

Seam	West	Main	Center	East	Total
VLDU	11.891	19.679	2.741	9.606	43.917
VLDU	29.706	70.605	17.154	42.550	160.015
ARBO	44.432	85.079	17.288	6.451	153.250
MCLD	1.251	14.355			15.606
MCPU	3.950	9.831			13.781
MCPM	31.322	20.904	0.549	4.518	57.293
MCPL		12.512	0.497	0.085	13.094
WEE	0.362	14.737	3.341	6.769	25.209
BOUR				0.223	0.223
MYNU	21.659	52.995	11.041	13.098	98.793
MYNL		4.996		2.150	7.146
Total	144.573	305.693	52.611	85.450	588.327

25. Appendix 10, Section 8.0.

Norwest states, "*...was modified to include the Arbour seam. The adjusted pit shell was used to estimate the in-place tonnage of this seam and the incremental strip ratio required to recover it. The adjusted ROM resource including the Arbour seam is reported on a by seam/package basis in Table 8.2.*"

a. Confirm that the inclusion of the Arbour was based on re-calculating the LG shells to also include this large resource.

Response:

As stated "The adjusted pit shell was used to estimate the in-place tonnage of this seam and the incremental strip ratio required to recover it." This LG shell was generated without the inclusion of the Arbour seam in the BESR calculation economics. The LG shell BESR cut-off line was extended to the Arbour footwall in order to quantify the potential resource and the incremental strip ratio associated with the Arbour seam "within" the economic LG shell.

Please note that in this report the evaluation was undertaken to identify the 'incremental contribution' should the Arbour Seam be recovered. The Project mine plans were developed on different LG shells.

b. Provide discussion on the resulting strip ratios if the original LG shells from non-Arbour LG modeling were used.

Response:

Within this report the base case LG pit shell was generated from non-Arbour LG modeling and the resulting strip ratio was 2.64 bcm/rmt. The incremental ratio to recover the Arbour seam from within this shell was 1.73:1 bcm/rmt. The overall strip ratio (including the Arbour seam) within the base case LG shell was 2.44:1 bcm/rmt.

Please note that the mine plan presented in the application was generated from new LG shells which did include the Arbour Seam as a recoverable seam.

26. Appendix 10, Section 8.0.

Norwest states, "*The operating history at the Coal Valley Mine shows that the Arbour seam is not generally recovered due to high ash and the presence of inseparable and difficult to process bentonitic layers, therefore the Arbour seam has not been included in the resource evaluation.*"

a. Clarify that the coal resource is the estimated value for recoverable resources or in-place resources even if there is no recovery.

Response:

The term "resources" as used by Norwest in its reports refers to quantities expressed in units of volumes or tonnes and not to "dollar value". In the statement from Norwest's report referred to

above "resources" refers to coal that has sufficient economic merit to be considered a resource in accordance with NI 43-101 definitions, regardless of whether it is in place and/or potentially recoverable.

27. Appendix 10, Figures 8-1 to 8-4.

Why do the proposed base-of-pit lines for the 'Base Arbour Excluded' scenario not have the Val D'Or as the footwall?

Response:

The 'seam trace' on these sections are representations of interpretations by the mine geologist. There may not be sufficient drilling on these sections to accurately position the coal seams.

The 'shells' are the result of the computer model which is based on calculated interpretations of the seam position.

The two 'interpreted' seam locations would be expected to have divergence where drilling data is sparse.

The 'revised' series of sections provided (see response to ERCB SIR #14) will exhibit similar 'divergence' in locations where drill data is sparse.

28. Appendix 10, sub-Appendix "A" Figure 3.

Norwest shows plan views of the various pit shells.

a. Provide similar figures that show all BESR outlines for each pit location within the proposed permit amendment.

Response:

ERCB Figure 28-1 is provided to illustrate the outlines of LG shells developed for the Project application. These shells are based on the inclusion of the Arbour Seam. Shells for 'cut-off' ratios of 4, 6 and 8 are illustrated.

5. MINING

29. Section A.1, Page A-1.

CVRI states, "*This additional tonnage would provide CVRI with the necessary resources to operate at projected rates of production until 2038.*"

Addition of the Project will allow CVRI to continue coal production into the future. The Project is projected to extend production life to 2038.

a. Provide a list of other satellite pits, in addition to those shown in Table C.1-2, with corresponding reserves by pit.

Response:

Remaining coal resources within the existing Mine Permit are limited. Table C.1-2 indicates the only remaining production areas available at CVM. Current production at CVM is quickly reducing this remaining reserve.

No other production areas have been identified at CVM although further engineering efforts are ongoing to review potential production alternatives. Little further economical feasible reserve is expected to be identified (see below).

b. Provide a plan for investigating the feasibility of mining in other locations concurrent with Robb Trend.

Response:

Existing Mine Permit

The Project represents an opportunity for the long term continuation of CVM production as existing surface coal reserves in the mine permit are nearly depleted. No other large-scale and long-term surface mining development is available in the vicinity of the existing Plant. However, CVRI is investigating additional "short term" production opportunities within the existing CVM mine permit area. These options include re-entering old mine areas and potentially mining "marginal" resource areas within the existing mine permit. At best, such options may provide small incremental production value, but at a high cost. Short term production options include reconfiguration of Pits 21 and 26, mining in wetland between Pit 122 and 123, and potential pushback in Pit 143. None of these options would add significant production life to CVM.

Outside the Existing Mine Permit

CVRI is also actively investigating additional mining potential in the vicinity of CVM to increase future "long term" production opportunities in the area. CVRI currently holds a significant amount of coal leases that surround the Coal Valley and Project areas, which have been explored to various degrees over the past 30 years. As part of CVRI's long term exploration strategy, recent field investigations have occurred within these coal leases such as the Brazeau, Brazeau East and Oppelt prospects. These investigations include geological mapping and exploratory drilling to further define potentially mineable coal seams. Future exploration programs will also focus on leases to the southeast of the CVM. However, all of these areas are distant from the existing Plant, and are considered "greenfield prospects" at this stage, with little short term capacity for production at CVM. Over the next 5-10 years, as confidence increases in these greenfield prospects it may become feasible to mine in some of these areas concurrently with the Project, but this would be highly dependent on the results from drilling, modelling and economic factors at the time.

30. Section A.3, Page A-3.

CVRI identifies project alternatives for the development of its coal reserves; however, no mention is made of investigating the applicability of highwall mining.

a. Provide an assessment of employing highwall mining at the Robb Trend mine site.

Response:

Highwall Mining

Highwall mining is often also referenced as 'auger mining'. The method utilizes 'augers' or 'mechanized cutters' to excavate deep holes into the coal seam. A series of 'holes' can be made with a 'pillar' of coal left in between. The coal seam must first be exposed by an open pit so that the highwall miner can access the seam and place holes perpendicular to the open pit highwall face.

Typically such methods are utilized as ancillary to other production methods or to 'extend' mine life by recovering coal 'beyond' the open pit mining breakeven wall position. CVRI has investigated 'highwall mining' options at other locations concluding that the methods have various constraints to successful operation, historically low coal recovery and high operating costs. Characteristics of the 'seam roof', seam thickness and partings are critical to successful operation of highwall miners. The condition and strength of the roof leading to potential roof collapse is a significant element to consider. Coal seam characteristics and strength determine pillar width which controls degree of coal recovery.

Highwall mining operations requires a unique set of conditions to be successful.

Project Alternative

A 'highwall mining method' was not considered as an alternative' to the proposed open pit plan presented. Open pit mining offers the greatest degree of coal recovery.

Supplemental Application

The most common application of highwall mining is to 'extend' recovery beyond the final highwall. This does not change the overall open pit mining plan but permits extra coal recovery.

This option was not considered for the Project. The coal seams are steeply dipping. Any attempt to highwall mine the coal seams from the toe of the highwall would require coal to be extracted on a steep incline. The 'dip' could be modified by utilizing an 'apparent angle' for extraction. In either case the equipment would not be able to extract the coal against 'gravity'. A further variation would be to attempt highwall mining in a 'end wall' configuration. This would result in low recover from areas that could be economically mined by open pit.

CVRI does not consider highwall mining as a feasible alternative for the Project. At best, the method could be applied in small local situations over the life of the Project but would not provide significant production capability.

31. Section B.4.3, Page B-8.

CVRI states, with respect to areas of previous underground mining, "*CVRI has worked through such areas previously and maintains 'codes of practice' for operating in such area.*"

a. Provide the codes of practice for surface mining operations in areas of previous underground mines.

Response:

ERCB Appendix 31 contains the CVM Standard Practices and Procedures Manual (SP&P) D.07.17 Old Underground Mining Areas. This document explains the policies that need to be followed and designates responsibilities.

32. Section C.1.1, Page C-2, Table C.1-1.

a. Update and resubmit table to include overall ratio in BCM/RMT.

Response:

A revised Table C.1-1 is provided below as ERCB Table 32-1.

Table 32-1 (Revised Table C.1-1) Annual Production Statistics

Year	Waste Production (BCM)	Coal Production		Ratio	
		(RMT)	(CMT)	(BCM/RMT)	(BCM/CMT)
1978	2,960,703	1,156,208	663,729	2.56	4.46
1979	5,982,276	3,277,530	1,953,190	1.83	3.06
1980	10,415,544	4,247,827	2,401,317	2.45	4.34
1981	12,417,449	4,989,255	2,760,573	2.49	4.50
1982	13,818,532	5,095,664	2,685,169	2.71	5.15
1983	12,820,596	3,761,080	2,040,498	3.41	6.28
1984	12,906,920	3,710,717	2,102,337	3.48	6.14
1985	8,414,767	3,062,404	1,702,414	2.75	4.94
1986	7,632,468	2,984,816	1,569,500	2.56	4.86
1987	9,334,255	3,156,607	1,724,480	2.96	5.41
1988	11,738,338	3,654,633	2,014,392	3.21	5.83
1989	11,502,506	3,623,819	1,982,187	3.17	5.80
1990	11,008,098	3,549,789	1,950,057	3.10	5.65
1991	9,114,498	3,415,280	1,854,344	2.67	4.92
1992	10,344,270	3,457,539	1,902,017	2.99	5.44
1993	8,688,332	2,844,945	1,528,480	3.05	5.68
1994	8,860,741	2,878,140	1,475,285	3.08	6.01
1995	10,356,123	3,383,113	1,711,611	3.06	6.05

Table 32-1 (Revised Table C.1-1) Annual Production Statistics					
Year	Waste Production (BCM)	Coal Production		Ratio	
		(RMT)	(CMT)	(BCM/RMT)	(BCM/CMT)
1996	11,881,603	3,528,643	1,779,430	3.37	6.68
1997	11,626,084	3,545,301	1,677,430	3.28	6.93
1998	12,315,681	3,829,913	1,876,478	3.22	6.56
1999	11,185,751	3,341,494	1,604,404	3.35	6.97
2000	6,375,780	2,390,052	1,088,389	2.67	5.86
2001	7,192,559	3,056,304	1,514,412	2.35	4.75
2002	8,261,889	3,607,475	1,788,800	2.29	4.62
2003	10,113,802	2,421,648	1,233,535	4.18	8.20
2004	9,862,884	3,397,283	1,650,749	2.90	5.97
2005	8,761,002	3,252,444	1,418,120	2.69	6.18
2006	9,474,273	7,190,220	3,596,261	1.32	2.63
2007	12,570,973	7,162,640	3,431,620	1.76	3.66
2008	15,938,759	6,798,630	3,448,890	2.34	4.62
2009	18,806,093	8,484,565	3,639,280	2.22	5.17
2010	20,403,089	7,624,005	3,408,555	2.68	5.99
2011	21,522,987	7,169,285	3,357,885	3.00	6.41
2012 Sep 30	15,905,286	5,288,965	2,534,137	3.01	6.28
TOTAL	374,609,625	144,338,233	73,069,955	2.60	5.13

33. Section C1.4.2, Page C-12.

CVRI states, with respect to tailings storage, "*Long term storage capacity in the pond is available.*"

a. What is the life and capacity remaining in the pond?

Response:

Table C.5-1 provides information regarding tailings and reject disposal. The completed Mynheer A pits are currently being utilized for tailings disposal. Tailings are pumped from the Plant to the old pits and water recirculated for process makeup water. Table C.5-1 indicates that tailings can be accommodated in this same area until 2024. At that time an alternative tailings disposal opportunity will be available in the mined out Pit 26 area.

Plant reject will continue to be placed in dumps in the Mynheer A area including over the older tailings disposal areas. The Mynheer A location has sufficient space to accommodate the volumes of material indicated in Table C-5.1.

34. Section C, Table C.3-1, Page C-35 and Figures C.3-1 to C.3-11.

CVRI provides a table summarizing the nine stages of the proposed mine development. Figures C.3-1 to C.3-11 show the stages at a low level of detail.

a. Resubmit the figures to show each of the stages in more detail that includes pit locations and names, dump locations and names, haul roads, mining methods, and creek/river diversions.

Response:

Pit and Dump Naming Convention

CVRI has established a metric co-ordinate grid system specific to the Coal Valley area (see Figure C.2-1). A 'baseline' has been established roughly corresponding to the 'strike' direction of the geologic strata. Northing grids are generally between 12,000 and 18,000 N. The extreme western end of the Project ends at approximately -4,000 E while the eastern limit extends to approximately 46,000 E.

CVRI has divided the Project into four broad zones; Robb West, Robb Main, Robb Center and Robb East (see Figure C.2-1). These zones are divided according to the easterly grid position within the Project area.

CVRI is proposing a pit and naming convention which utilizes the 'easterly grid position' and the 'seam name' being recovered. This system is expected to provide both a lateral (easterly) position and a cross-section (northerly) position.

The proposed mining plan will recover multiple coal seams which can be grouped into the following broad groupings; Val d'Or/Arbour, McPherson, and Mynheer zones. Variations may include mining of the McLeod Seam with the Val d'Or/Arbour pits and small isolated Silkstone Seam pits. Therefore pits are to be named corresponding to the coal seams recovered within the individual pit.

Examples of pit names are:

Name	Seam	Grid East
Val d'Or 11	Val d'Or/Arbour	11,000 E
Val d'Or 12-15	Val d'Or/Arbour	12,000 to 15,000 E
McPherson 34	McPherson	34,000 E
Mynheer 22-25	Mynheer	22,000 to 25,000 E

Dumps are often developed in sequence with individual pits hence named in concert with the pit development. Waste is hauled from various pit benches to develop specific 'lifts' on dumps. For example; Bench 1150 (elevation) is hauled to the pit's NW dump, lift 1210 (elevation).

This 'naming convention' is likely to develop and be refined over time. At this early, conceptual level, a pattern utilizing the seam name and eastern grid position is being utilized.

Haul Roads

Three main haulroads are presented as 'connections' between the Project and the current Plant. The three corridors are Bryan, Erith and Halpenny corresponding generally with the major watercourse in the respective route. These corridors will form the 'trunk' routes for coal haul and access to the Project development area over the life of the Project.

Within the Project area numerous haulage routes can be expected to be developed over the life of the Project. During mining each pit will need to be connected to each of the corresponding dump areas often involving multiple ramps between pit benches and dump lift platforms. As coal seams are encountered coal haulage routes will be established between the various pot benches leading from the pit to interconnect with the nearest main coal haul corridor. Additionally, access between multiple pits will be required to accommodate equipment movements including drills and interchange of excavators and trucks. The haulage patterns change throughout the life of each pit.

Haulage roads for each of the individual benches and dumps and coal access routes from each coal benches have not been defined throughout the life of the proposed Project. Main routes interconnecting major portions of the Project area have been identified in Figure C.3-1 to Figure C.3-11. The main routes are identified with a bold red dashed line. ERCB Figure 34-1 is provided to consolidate all the main interconnecting haul roads and associated watercourse crossing locations over the life of the Project.

Mining Methods

CVRI is proposing two mining methods within the Project area; truck/shovel and dragline methods.

Common practice for the dragline is to excavate shallow, linear pits defined by the steeply dipping monocline seam structure. Since such pits limited on depth by economic limits the dragline is particularly suited to the 'single pass' stripping. The dragline will be limited to mining in Robb Main, Center and East. As a result the dragline mining method is focused on the Mynheer Seam and some portions of the McPherson and Silkstone seams. Shallow Val d'Or Pits in Robb Center and Robb East may also be mined with the dragline.

The remainder of the Project will be mined with a truck/shovel open pit method. Large hydraulic excavators, both backhoe and front shovel models, are currently utilized at CVM. This method is suited to deeper pits which are developed with multiple benches.

ERCB Figure 34-2 is provided to illustrate the mining methods associated with each specific pit.

Watercourse Diversions

Locations of watercourse diversions have been previously provided on Figure C.4-1.

b. Provide representative cross sections showing accurate depictions of each stage. All the coal seams and other lithologic layers must be identified and shown to the maximum extent of the exploration drilling conducted to date.

Response:

Representative cross-sections showing pit and dump areas have been provided in response to previous questions (ERCB Appendix 14).

35. Section C.2.2, Page C-31.

CVRI states, "*pit limits are determined by applying a BESR on each of the cross-sections*." and Appendix 10, Section 6, Page 6-1 states that Lerchs-Grossman pit optimization was used to develop ultimate LG pits.

a. Provide clarification on how the two methodologies correlate.

Response:

The Lerchs-Grossman method of pit optimization was used to develop the pit shells. Pit limits were not determined by applying BESR on each cross-section as suggested in Section 2.2, Page C-31.

36. Section C.3, Page C-35.

CVRI states that backfill of the pits should be maximized yet backfilling is not apparent in figures C.3-1 to C.3-11.

a. Provide the proposed waste allocation plans for the Project.

Response:

ERCB Figure 36-1 has been provided to illustrate the proposed locations of the waste dumps. External and internal (backfill) dumps have been marked. Dragline spoils have also been marked.

The conceptualized plan presented identifies likely dump locations and approximate dumping limits. The extent, limits and sequence of dumps, both external and internal, can be expected to vary as refinement of the licence designs occur over the life of the Project. As always, the refining design phase will focus on balancing minimizing land disturbance, lowest haulage costs and maximizing internal backfill.

ERCB Figure 36-1 is provided to further illustrate the conceptual dumping areas included in the Project concept. This plan illustrates the dump areas as shaded areas overlying the pit areas. The external dumps have been shaded a darker shade. The dumps which are primarily internal

or backfill dumps have been shaded with a lighter shade. These internal (or backfill) dumps have been located within the pit bottoms or have would be hauled to completely cover adjacent mined areas. The topmost elevations of the dumps have been labeled to illustrate the relative height and position of the dumps.

Dump volumes for individual dumps have not been calculated for the conceptual layout. However, the plan provided illustrates the relative balance between external and backfill dumps. The surface area occupied by the two types of dumps is:

External Dumps	933 ha
Backfill Dumps	834 ha

37. Appendix 9, Section 3.2, Page 25.

MDH states, "*As indicated by Norwest's preliminary pit shell layouts for the RT project, the deepest pit will be up to 190 m. The results of the slope stability analysis by Piteau (1982) did address designs for pits up to 280 m deep*."

a. Application Section C, Figures C.2-3 to C.2-15 appears to show the deepest pit at 180 m. Provide a contour map showing CVRI's proposed conceptual mine plan.

Response:

ERCB Figure 37-1 is provided to illustrate the 'pit contours'. The contours provided are generated from the LG pit shell. The cross-sections provided in ERCB Appendix 14 also illustrate this 'pit shell'. Pit depth varies substantially throughout the Project with the deepest pits found in the Val d'Or/Arbour development. The deepest pits are found in Robb West and Robb Main with one large deep pit at the extreme eastern end of Robb East where the Val d'Or Seam is overthickened by faulting.

b. Provide the economic assessment that showed Piteau analysis of mining to a depth of 280 m.

Response:

The Piteau work referenced by MDH refers to preliminary design work undertaken for Denison in 1982. This work is not reflective of the proposed plan for the Project presented by CVRI. However, the MDH reference does support the contention that 'open pit mining' to depths as much as 280 m could be accomplished while maintaining stable slopes. A 'Piteau' cross-section taken from Denison report is provided in ERCB Appendix 37 to illustrate the deep pit scenarios that were investigated at that time.

The MDH report notes that significant geotechnical data and evaluations were undertaken for the Denison project which can be utilized in the Project pit and dump stability evaluations. CVRI will supplement this base data with additional geotechnical investigations and evaluation.

38. Appendix 10, Page 3-1.

Norwest states, "*The geologic model (the model) was primarily concerned with the Val d'Or and Mynheer Seams…*"

a. Describe how the other seams were evaluated for mining, and confirm if resources and reserves were modeled for all seams.

Response:

The other coal seams present in the Project area were also included in the geology model. Tables provided in response to ERCB SIR #12 provide estimates of coal tonnage from these seams.

39. Appendix 10, Page 3-1.

Norwest states that it "*did not develop a base of oxidation surface; it was decided that the introduction of an oxidation provision would not materially alter the conclusions of the current study. It is recommended that CVRI introduce an oxidation surface at the next level of study.*"

a. Describe how CVRI will address this in the detailed mine plan.

Response:

CVRI does not normally establish an 'oxidation surface'. 'Near surface' coal is inspected once uncovered to determine its condition and 'feedback' from the coal processing plant guides field recovery. Material not suitable for 'plant feed' is discarded as waste material.

Norwest often models an oxidation surface for their work in order to not overestimate the recoverable coal tonnage.

CVRI has noted previous Denison comments regarding oxidation:

"David E. Pearson and Associates, Ltd., of Vitoria, performed petrographic analysis on selected samples from Robb Block drill holes and Val d'Or bulk sample pit. The samples drawn from the test pit were studied primarily to determine the depth of penetration of the surface oxidation effects. The studies indicate that surface oxidation effects are negligible after 2 m, and represent no hazard to coal cleaning operations (Pearson, 1981c)."

In addition, CVRI normal practice is to haul all 'near surface' or 'subcrop' coal to the Plant for processing as long as it can be properly segregated from overlying till or weathered bedrock.

40. Appendix 10, Section 3, Page 3-3.

Norwest states that their study applied SG and Yield equations consistently to all seams and recommended CVRI introduce seam specific equations for the next level of study when more detailed coal quality information is available. The ERCB requires analysis of the coal as per Clause 4(1)(f) of the Coal Conservation Regulation (CCR).

a. Provide seam specific coal quality information.

Response:

Table 2.2 of the MDH report (Appendix 9) provides a tabulation of the drillhole samples obtained within the Project area. The quality information is divided for each seam. The report also provides a comparison of this data to similar information from existing CVM pits recently or currently in production. The intent of the comparison is to illustrate that the Project coal quality between the two regions is equivalent.

Information provided in response to ERCB SIR #9 also references coal quality results from bulk samples. These values also illustrate that the coal quality is within a similar range.

This data also supports the assumption that the Arbour Seam can be considered suitable for recovery if it can be economically mined.

41. Appendix 10, Section 3, Page 3-4.

Norwest states, "*In Section 16.7 of the Technical Report the author concludes that the Robb Trend coal quality dataset is not presently strong enough to support reserve designation.*" The ERCB requires a statement on established recoverable reserves to issue a mine permit.

a. Clarify this statement in the context of Clause 4(1)(e) of the CCR.

Response:

CVRI has provided a Norwest report in response to ERCB SIR #17 which provides a reserves statement with regard to NI 43-101. This report limits the reserve estimate due to limited quality information for the Arbour Seam. Please note that the evaluation had not taken into account the Denison coal quality information related to the bulk sample pits.

CVRI has provided reserve estimates, based on LG modeling, based on the current geology model. These estimates are described in the application as Project 'base case' determined from a BESR of 6:1.

b. Discuss CVRI plans to mitigate deficiencies in the dataset.

Response:

CVRI has established 'recoverable reserves' based on an extensive drilling dataset.

CVRI will continue drilling and coal quality evaluations over the life of the project to provide refinement of geology interpretation and increase accuracy of reserve estimates.

Proposed Drilling

CVRI is planning additional exploration in the Project to further definition of the reserve and to focus on detailed design for the initial mining area. This drilling will include multiple 'chip samples' for the various coal seams. A revised geologic model is expected to be undertaken in Spring, 2013 to re-evaluate the Project area including data available up to that time.

Future Exploration

CVRI intends to complete exploration work to complete 400m spaced drilling sections on the whole of the Project by Dec. 2014. This work will include adding drilling sections in Robb Center, 'deep drilling' to define hanging wall conditions in the Val d'Or/Arbour Seam, and additional coal quality sampling throughout the property.

Initial Mining Area

CVRI intends to undertake additional 'infill' drilling in the initial mining area in support of pit design and licence applications. Drilling programs through 2012 and 2013 will complete 200 m spaced drilling sections through all seams in the proposed mining areas. Core holes for geotechnical investigation will be included in the program. Additional coal sampling will be undertaken in conjunction with the drilling. Additional 'overburden quality' sampling will be undertaken in conjunction with the drilling and coring programs.

CVRI is considering 'bulk sample' test pits within the start-up area to obtain additional data for yield predictions. Test pits in the Val d'Or/Arbour and Mcpherson Seams are expected to be completed by Spring 2013.

Future Mining Area

Additional 'infill' drilling will advance over time as mining progresses to additional mining areas.

NI 43-101

CVRI anticipates a revised NI 43-101 evaluation to be complete by mid – 2013.

42. Appendix 10, Section 6.0 page 6-6.

Norwest states, "*The ratios are somewhat skewed by the depth restriction imposed on the dragline mining scenarios and the thicker till pockets seen in the Robb Center area.*"

a. Provide discussion how the constraint affected the LG process.

Response:

The unit cost of removing waste with a dragline is notably less than the cost of moving waste with a truck & shovel fleet. This lower waste cost has significant impact on the BESR, allowing the LG model to mine to greater depths. The Base Case Robb Trend BESR calculations indicate

that dragline waste removal costs support a BESR of 7.8: 1 whereas the BESR for truck shovel methods is 3.4:1. However, the dragline is limited by machine geometry resulting in a maximum digging depth for this machine of approximately 45m. Even though the LG Model for a base case cut-off ratio in a given dragline pit may go deeper than 45m the LG model must be restricted to the machines geometric limitations otherwise an over estimation of pit reserves would be incurred.

43. The ERCB notes that the nearby proposed Coalspur Vista Project is currently under regulatory review. This proposed project has an overall average clean coal strip ratio of 9:1 based on a C$80 coal price. Justify why CVRI's proposed project shows lower recovery.

Response:

Coalspur – Vista Project

CVRI is uncertain of the source of the reference to 9:1 strip ratio.

Page C-20 of the Coalspur application notes that "the incremental in-situ strip ratio along the north wall is 7.2 bcm/raw metric tonne".

Table C.1.4.1 indicates that the overall stripping ratio for the first five years of production would be 3.5 bcm/raw metric tonne.

CVRI also notes from recent Coalspur news releases that a revised startup plan for the project is currently being proposed.

CVRI Comments

CVRI has based the proposed Project mine plan on extensive operational experience in both mining and coal processing. The proposal involves 'continuation' of an existing operation with a long and successful history of production and sales of a high quality coal product meeting international market requirements.

The CVRI current application is focused on a "Mine Permit" application which will require subsequent multiple "Mine Licence" applications which will occur throughout the life of the project. Each of these licence applications will reflect the market and mine costing situation relevant at that period of time. Fluctuations in mine cut-off strip ratios can be expected to occur with future market and economic variations.

6. GEOTECHNICAL

44. Section B.3.1, Page B-3 and Appendix 9, Section 2.3.1, Page 8.

CVRI states that over 730 drill holes have been drilled in the Project during different exploration programs and that additional drilling is currently being conducted.

The MDH report notes that 730 drill holes had been drilled in the project area with 118 drill holes located in Robb West and the remaining 612 drill holes spread throughout the eastern portion of the Project. Additional drilling has been completed in Robb Main since this submission.

a. How many of these drill holes were geotechnical holes used to investigate subsurface conditions and obtain samples for testing?

Response:

Historic Drilling

CVRI has reviewed drilling results from previous lease holders. North Canadian Oil (NCO) drilled in the Robb West area including 2 diamond drill holes. Dension drilled 16 diamond drill holes in the Robb Main area for a total of 3,929 m. The Denison holes provided a variety of test data that was utilized by Piteau in geotechnical evaluations for the proposed mining plans for Denison. The MDH report presented in Appendix 9 summarizes much of this information.

Core Program – Coal Quality

The CVRI exploration program completed 18 core holes in Robb Main area during early 2012. The objective of the program was to focus on coal quality by obtaining details of the seam structure, coal samples and strength parameters for the partings and footwall materials.

MDH was contracted to record the core hole information and obtain appropriate samples. The MDH report reporting the core program results is provided as ERCB Appendix 44-1. This report describes 17 of the 18 core holes. A single core hole was managed directly by CVRI drilling staff and not included in the MDH work. Features of the report include:

- map of the core holes locations, all concentrated in the Robb Main area;
- geological and geotechnical core logging data including RQD and RMR values;
- core photos; and
- 24 rock samples in the seam structure where subject to UCS testing.

Composite coal samples were obtained by CVRI from the resulting core produced by the drilling program. These samples were delivered to a coal lab for analysis of size distribution, coal quality and washability. Laboratory results are provided in ERCB Appendix 44-2. A summary

of these results is underway and not yet available. Coal quality testing was completed as follows:

- 7 samples of the Val d'Or/Arbour seams where obtained. The samples were maintained as separate samples between the two seams;
- 2 samples were obtained for the McPherson Seam;
- A single sample was available for the McLeod Seam;
- 2 samples were provided for the Silkstone Seam; and
- A total of 11 samples were taken for various portions of the Mynheer Seam.

b. How many of these holes were cored holes?

Response:

See the response to ERCB SIR #44 a).

c. Provide a site plan showing the geotechnical drill or core hole locations.

Response:

See response to ERCB SIR #13. Core holes are designated with the letter 'C'.

d. Discuss CVRI's plans to conduct geotechnical drilling to gather additional site-specific geotechnical information.

Response:

CVRI has drilled 17 core holes during early 2012 in the Robb Main area (see ERCB Appendix 44-1). This initial coring was focused on coal measures rather than overburden. A total of 32 rock core samples were tested for UCS. These samples represented rock parting and footwall materials.

CVRI has planned additional coring to characterize strata positioned in proposed pit highwalls and footwalls. The proposed 2012/2013 drilling campaign (see ERCB SIR #49) will focus on the initial mining areas in order to obtain additional data for pit designs leading to licence applications. Sampling for rock strength testing is included in the proposed work.

45. Section B.4.3, Page B-8 and Appendix 9, Section 2.5, Page 16.

CVRI states, with respect to areas of previous underground mining, "*CVRI has worked through such areas previously and maintains 'codes of practice' for operating in such area*." CVRI also indicate that the *approximate* extents of the underground mines are known.

The existing underground mines around Robb will affect only a minor portion of the Project. These mines occurred only in the Val d'Or Seam. Workings were limited to the central portion

of the seam leaving the upper and lower parts of the seam untouched. Room and pillar methods resulted in large pillars being left in place.

The Lakeside Mine will impact proposed mining between 5750E and 6000 E, a strike length of approximately 250 m. Workings in this area are above the 1080 m level.

The Bryan Mine (underground) will impact mining between -100E and 3000E, a strike length of approximately 3100 m. Workings in this area are above the 1080 m level.

a. Discuss CVRI's plans to conduct detailed review and reconnaissance to accurately delineate the extents of underground mine workings relative to pits, dumps and other proposed mine infrastructure.

Response:

CVRI is not planning any further work to delineate the extent of these underground workings.

The portions of underground workings which will be intercepted by mining will be within pits developed in the Val d'Or Seam only. No dumps or infrastructure are proposed over or near the underground areas to be incorporated into these pits.

Similar circumstances have occurred in previous CVM pits such as Pit 27, 28 and 123. These pits were successfully mined with no difficulty.

b. Discuss the potential impacts old underground mines could have on the pit floor, external dump and pit wall stability.

Response:

No underground workings will remain beneath the pit floor.

No underground workings will be in the pit wall expect the 'end wall'.

No dumps will be located above underground workings.

The portions of the underground workings which will be intersected by mining will be fully within the proposed mining. No portions will be left below the proposed mining. The 'end walls' of the proposed pits will contain a contact zone with the underground. End walls will be reclaimed to 26 degrees after mining.

CVRI anticipates that the presence of the underground workings will have little impact on mining in these areas. However, mining can be expected to 'dewater' the underground workings to the level of which proposed mining reaches.

c. Discuss CVRI's plans to conduct detailed assessments of these potential impacts prior to at the licencing stage.

Response:

CVRI will expect to address an assessment of the 'consequence' of the presence of underground workings on the mining, operation and reclamation of these pits at the time of licence applications. These impacts are expected to be limited to end wall stability and groundwater 'dewatering'. The subject of dewatering of flooded workings has been addressed in the EIA documentation.

46. Section B.5, Page B-8.

CVRI provides a section related to the geotechnical assessment and references Appendix 9 as the source of the assessment for the Project.

CVRI contracted MDH to provide a generalized report to identify geotechnical experience gained at CVM, summarize information known about the Project, provides a comparison of the two areas and include an assessment of the applicability of such experience to the proposed Project area. The report was provided as Appendix 9.

a. Provide CVRI's summary of the information provided in Appendix 9, including a list of all recommendations provided by MDH and CVRI's intent to adopt these.

Response:

The MDH report offers several suggestions and recommendations:

- Page 12; *"this bentonite seam will need to be taken into account for design of the footwall where the Arbour Seam is mined*"
  Past performance at CVM has shown the importance of identifying and assessing the presence of bentonite bedding in stability analysis and coal recovery plans. Such material is identified in e-logs and highlighted in stability assessments.
- Page 21; "*footwall geophysical information should be compiled on more closely spaced sections and used with local footwall dip to define locations of footwall bench faces and bench widths once at the detailed pit design stage*"
  CVRI is continuing with exploration drilling to 'in-fill' to approximately 200 m spaced sections. This additional 'definition' will be utilized for final pit design.
- Page 29; "*the following preliminary slope design criteria are recommended…*"
  CVRI will address slope design criteria in detail at the licence stage.
- Page 32; *"the following slope operating criteria are recommended…*"
  CVRI will address slope design criteria in detail at the licence stage.

- Section 4.4 Additional Recommendations for External Dump Design
  CVRI will utilize the MDH recommendations and suggestions provided in future external dump design. Future licence applications will address foundation preparation, rock fall protection, dump hydrology, monitoring and safety.
- Section 5.1 Recommendations for Internal Waste Dump Design
  CVRI will utilize the MDH recommendations and suggestions provided in future internal dump design. Future licence applications will address dumping methodology, configuration and slope stability.
- Section 7.0 Summary and Conclusions
  CVRI will utilize the MDH recommendations provided regarding external and internal waste dump design. Future licence applications will provide details of design and stability analysis.

47. Appendix 9, Section 2.1, Page 3.

MDH states that faults may be present in the Project area but are relatively uncommon and generally have displacements of less than 10 metres. Appendix 9, Section 2.3.1-2 MDH states, "Interpretation of drilling data and geophysical logs indicated that faulting exists at Robb East from 36800E to 43000E. The chart provided in Appendix 9, Figure 3.1 shows footwall (coal seam) as high as 70 degrees and cross joint dips as low as 20 degrees coincide with this area.

Abnormal conditions have been identified in the eastern end of the Project. These include steeper dips, over thickened Val d'Or and interpreted faulting. The interpretation of the over thickening is 'open ended' to the east. This has resulted in a probable larger and deeper pit which has been truncated due to the location of the Pembina River.

Further future exploration drilling is planned for the area to further define the geology structure.

a. Describe the impact of this faulting on the pit wall design.

Response:

The 'faulting' identified is located within the coal seam and appears responsible for 'over thickening' of the coal measure. CVRI believes that this represents a regional 'thrust fault' similar to others in the overall regional structure fabric.

CVRI does not anticipate that this faulting will significantly impact pit wall design. Further 'in-fill drilling' prior to final pit design in this area is expected to provide further definition for assessment at the time of licencing.

b. How will CVRI mitigate these impacts during operations?

Response:

See response to ERCB SIR #47a).

c. Describe how CVRI plans to conduct site-specific verification of faulting and structural geology in general.

Response:

Additional, future drilling is planned for this area of the project in advance of final design and licence applications. Drilling to date has identified 'over thickened coal measures' which may extend east of the Pembina River. Regional thrust faulting has been currently interpreted as being present.

Similarly, additional 'in-fill' drilling will occur throughout the project in advance of final pit design. On-going geological interpretation of drilling results are expected to identify any further faulting.

48. Appendix 9, Section 3.0 and 4.0, Pages 16 and 33.

MDH provided geotechnical assessments for the pit and external dump designs.

a. Provide site plans showing the proposed locations of the pits and external dumps. These plans must show proposed haul roads and creek/river diversions and topographic contours.

Response:

The plans presented in the application are provided in support of a 'mine permit' application, hence are conceptual in nature. Final details of roads, creek crossings, creek diversions and pit or dump configurations will be provided in due course over the life of the Project as licencing applications are submitted for approval.

The MDH report provides general statements regarding available geotechnical data and expectations for pit or dump stability based on long term experience in similar circumstances. The mining and dumping plans presented can be achieved within known and practiced methodology.

The responses to several previous questions (ERCB SIR #34) provide additional details regarding pit contours, road locations, and diversions.

49. Appendix 9, Section 3.1, Page 17 to 24.

MDH provided preliminary geotechnical parameters for pit design including rock type, rock strength and structure, which are based on previous studies and/or CVRI experience.

a. Describe CVRI's planned detailed site specific investigations to determine local parameters.

Response:

Mine Permit

CSA 4(1) requires general statements regarding mining methods and plans. Detailed geotechnical information is normally deferred for licence applications.

The MDH report was provided with the following objectives:

- To illustrate that CVRI has had a long, successful history of mine operations in the foothills region. The geology and mining conditions in these past and current pits were described as were the design principles which have been successfully employed.
- To summarize the existing geology and geotechnical information gathered thus far for the Project area and to show that these characteristics and conditions are similar to those found at CVM.
- To draw the conclusion that CVRI will be able to carry this past experience, operating and design principles to the Project. This conclusion is intended to support the request for a Mine Permit for the proposed Project area.

Initial Mining

CVRI is currently developing mine licence applications for the initial mining areas including several pits and dumps. These applications will be submitted after approval of the mine permit as required by CSA(8).

Proposed Dumps

It is normal practice for CVRI to provide detailed geotechnical reports regarding foundation assessment and dump stability analysis for proposed waste dumps. This work often starts with a field program within the proposed dump footprint to characterize the foundation materials and conditions. A series of 'test pits' are frequently completed to determine material conditions, obtain samples for testing and determine depth to bedrock. Information gained from this work would be utilized in stability analysis for the proposed dump layout and design.

CVRI has already completed 'soils' mapping in the entire project area including the proposed dump areas. The soils work helps identify surface soils and conditions such as subsoil conditions and wetland conditions. This information helps target potential dump areas to avoid steep slopes and poor ground conditions.

CVRI is currently undertaking a 'first pass' field program including test pits within the initial dump areas. The field portion of this program has recently been completed. ERCB Appendix 49 provides a sketch plan of the pit locations.

Proposed Pits

It is normal practice for CVRI to provide detailed geotechnical reports regarding stability assessments for proposed pit walls. This work is carried out in conjunction with pit layout and design to provide a workable operating area with suitable access and dumping sequences including in-pit backfill where possible.

CVRI continues to undertake 'in-fill' drilling in the proposed initial pit areas. This drilling work will continue from fall 2012 to winter 2013. The objective is to close to a drill section spacing of 200 m where necessary to adequately define geology structure. Drilling will include additional coal quality sampling and core holes to obtain rock samples for geotechnical testing. Such information will be utilized in stability analysis and provided in licence documents. A plan for this additional drilling, including coring, is provided as ERCB Appendix 49.

50. Appendix 9, Section 3.2, Pages 24 to 32.

MDH identifies that maintaining pit wall stability is highly dependent on drained conditions in the pit wall. The Application shows a significant portion of the Robb Main area between 11000E and 17000E will include mine pits that are in very close proximity to the Erith River or the Erith River diversion.

a. Discuss if this represents the worst case scenario of pit wall/surface water interaction in the Project.

Response:

Proximity of River Flow

In this instance the proposed pits will run parallel to the river channel over a long distance. CVRI understands this question to raise concerns about the proximity of the river flow to the active excavation in the adjacent pit. This would pose two risks:

- Would the river flow be able to enter the open pit?
- Would the river flow 'charge' the groundwater so as to create flow through bedrock strata into the excavated pit?

Step 1 = McPherson Pit

CVRI proposes mining the McPherson Seam first on the northern side of the Erith River. This pit is expected to reach a maximum depth of approximately 50 m.

The majority of the proposed pit will be separated by a suitable buffer from the river. Throughout the length of the McPherson Pit there are five short segments which will fall within >30 and <40 m of the river flow. The majority of the pit will maintain a wider buffer which in many cases will include a constructed waste dump on the footwall side of the pit separating the pit from the river.

The 'hydraulic' difference between the river flow and the pit floor will be limited. In the majority of the pit length the pit floor will be less than 25 m below the river flow elevation.

The dip of the McPherson Seam, hence pit footwall, is approximately 30 degrees in this region.

The river will be located in the footwall strata 'below' the McPherson Seam. Groundwater would need to enter this strata through the silty river bottom, downward along the bedding of the strata, and exit through jointing in the multiple strata >30 m in thickness to reach the excavated pit. CVRI anticipates that flow through such conditions would be minimal.

The McPherson Pit is expected to require <24 months to complete. The pit will be broken into various segments each of which can be mined independently of the other.

The pit will be reclaimed immediately behind mining and allowed to fill with water from surface and groundwater flows. Pumping from Erith River may be used to quicken the lake filling.

Step 2 = Temporary Diversion of River

The River will be temporarily diverted through the completed McPherson Pit. The river elevations are expected to be approximately the same as the current river elevation. Flow is expected to be through a series of small pools interconnected with constructed channels. The 'southern' channel edge will be the bedrock of the McPherson Seam footwall.

Step 3 = Mynheer Pit

CVRI is proposing mining the Mynheer Pit as the next stage of development within this valley corridor. The seam is located to the south, downdip of the McPherson Seam. The Mynheer Pit is expected to have a depth of approximately 50 m with a footwall angle following the seam dip and a highwall angle of approximately 45 degrees.

Separation of the northern 'pit rim' and the river flow within the old McPherson Pit will be approximately 225 to 250 m.

The river flow will be 'contained' in the McPherson Pit excavation with the intact footwall bedrock limiting risk of flow leaving this temporary channel. Likewise any groundwater flow induced by the river flow would have to route downward through intact bedrock to reach the Mynheer Pit excavation. CVRI would expect this flow to be minimal.

Step 4 = Redirected River Flow

After completion of Mynheer Pit the pit will be reclaimed and the river redirected through the Mynheer Lake. A long linear lake is anticipated allowing the river to continue in much of its original route.

Step 5 = Val d'Or/Arbour Pit

The final pit in the corridor will involve the Val d'Or/Arbour Seam recovery to the north of the new river channel. Separation of the southern pit rim will be approximately 325 to 350 m from the river channel.

Although the Val/Or/Arbour pit will have considerable depth the pit will be widely separated from the Erith River channel. Waste from the pit will be placed in a constructed dump between the pit and the river thus backfilling over the older McPherson Pit.

Conclusion

As a result of the various stages of mining CVRI is confident that the river flow will be well contained within the various channels so that risk of flooding or movement of the river will not cause any direct flows into any pit development.

Potential 'groundwater seepage' from the river into the pit is expected to be minimal due to the long intervening distance separating the various pits from the river flow. Such seepage would be 'across' strata rather than following bedding planes. Impact on footwall or highwall due to increased pore pressures are expected to be minimal. Monitoring of groundwater levels 'in between' the river and active pits could be considered to confirm this assessment.

b. Discuss CVRI's plans to control groundwater levels and thereby maintain pit wall stability in such areas.

Response:

Underground Workings

CVRI anticipates 'dewatering' only with respect to the underground workings. It is anticipated that the room and drivage developments remain largely 'open' and are flooded to natural 'drainage' elevation. CVRI will pump the flooded volume from the workings in advance of any open pit development intersecting the respective underground development. Large water volumes are expected so that advance pumping will be required. Water quality will be confirmed but is expected to be discharged into Embarras River.

General Project Area

CVRI has no current plans to 'control groundwater levels' around any pits. In past practice such efforts have not been necessary. 'In pit' water make has been minimal and easily handled by local pumping from the pit floor. Pit wall stability has not been adversely impacted by groundwater levels in the past.

c. Discuss how CVRI's dewatering plan will address the potential water management of extremely large volumes.

Response:

CVRI has no current plans to 'dewater' pit areas in advance of mining.

Water accumulation within an active pit can occur due to groundwater inflow or surface runoff during rain events. Some short term storage is normally available at the pit floor and sumps are kept to accommodate pump installation. Water is routinely pumped from the pit floor to nearby waste water management ponds.

Pumping capacity can be established as circumstances require. Multiple pumps and hose lines can be accommodated to meet high demands.

d. Discuss how detailed pit wall design will address the worst case pit wall portions of the mine and if more stringent stability requirements will be required in such areas.

Response:

Proposed pit wall design, both footwall and hanging wall, will evaluate and address likely pore pressure impacts. Groundwater monitoring within the Project is ongoing. Results of this monitoring program will be utilized and addressed in proposed pit designs which will be submitted at the licence stage.

e. Describe CVRI's plans for groundwater and stability monitoring plans for pit walls.

Response:

Licence applications for proposed future pits will address groundwater and wall stability monitoring plans. Continuation of the groundwater monitoring is often a regulatory requirement. Monitoring pit wall stability is a routine operating practice often involving visual or survey inspections.

51. Appendix 9, Section 4.2.2, Page 36.

MDH states, with respect to external dump design and geotechnical parameters, *"...site specific geotechnical field investigations will be carried out at the pit licensing stage to assess foundation conditions of the proposed overburden dumps at RT.*"

a. Confirm that CVRI will conduct the required detailed site specific assessment to determine foundation conditions and discuss how CVRI will improve on the quality and quantity of the information required during the dump licencing stages of the Project.

Response:

CVRI will conduct further detailed site assessments for all dumps to be developed in the Project area. These assessments will include 'test pit' and/or drilling programs to further characterize dump foundation materials and conditions. Such information is utilized to complete 'stability

analysis' of dump designs. This process is routine practice in finalizing and supporting dump designs for licencing.

See response to ERCB SIR #49.

b. Describe CVRI's plans for groundwater and stability monitoring plans for external dump.

Response:

Groundwater Monitoring

CVRI does not anticipate any 'groundwater monitoring' for external dumps. There has been no routine practice for such monitoring.

Water monitoring at CVM has been limited to two locations where water quality of 'toe seepage' has been monitored to determine if 'overburden leaching' occurs. Long term results indicate that this is not occurring.

Stability Monitoring

CVRI monitors dump behavior during construction through visual inspections. CVRI proposes continuation of this practice for the Project. Additional monitoring methods can be implemented should slope movements be observed. Proposed monitoring plans will be described in future licence applications.

Reclamation

Dumps are inspected post-reclamation to assess long term stability. Such reports form part of the reclamation certification' process.

7. SOCIO-ECONOMICS

52. Section E.9.2.6, Page E-143.

CVRI states "*In total 460, or 92% of the CVM direct workforce is resident to the RSA." In Section A.8.9 CVRI states that the mine will continue to ensure "Provision of employing 490 RSA residents in well-paying jobs*." The application is unclear in the number of workers employed during operations that reside in the RSA. CVRI provided two different numbers.

a. Clarify how many people will be directly employed during the operation phase.

Response:

The different numbers presented represent distinctions between full-time and total employment (including part-time or full-time equivalent (FTE) contract). Table 3.1 in Section 3.1.1 refers to 460 full-time employees in the RSA, and notes this does not include FTE contract (18) and

summer/temporary (10) positions. The reference to "*490 RSA residents in well-paying jobs*" stated in Section A.8.9 includes the temporary, summer and contract workforce, which when rounded, totals 490 FTE positions.

b. Provide an estimate of how many employees will be from the RSA.

Response:

As stated in Section 3.1.1, "[…] 460, or 92% of the CVM direct workforce is resident to the RSA […] The majority of summer and temporary employees also live within the RSA."

53. Consultant Report # 9, Section 1.3.1, Page 2.

"*Workforce requirements for the Project, including a description of when peak activity periods will occur*" is identified in TOR 7.1 [B] c) but was not addressed by CVRI or the consultants. The TOR states requirements that need to be covered by the applicant.

a. Provide a description and timeline of when peak activity periods will occur.

Response:

In Section 3.2.1.1, the SEIA states that *"The Project extends mining operations at current production levels until the year 2038. The fulltime operations workforce at the CVM is not expected to change due to the Project".*

Subsequently, in Section 3.2.1.2, the report states: "*A number of activities are required in preparing the site and support infrastructure required for mining the new area* […] *These "start-up" activities are expected to occur over six years beginning in 2012, with the majority of activities taking place between 2014 and 2016* […] *The majority of onsite construction activities will be handled by the CVM's existing workforce. Some limited contract workforce will be required for some activities. The Project will create approximately 250 PY of employment over the construction period, predominantly for equipment operators, surveyors, carpenters and welders. The onsite workforce is estimated to range between 20 to 30 persons from 2014 to 2016.*"

54. Consultant Report # 9, Section 3.1.2, Page 28.

CVRI has provided a breakdown of current operating costs. The company states, "*The CVM's total annual operating budget is in the order of $226 million per year*."

a. Clarify if CVRI assume operating costs will remain at approximately the same level?

Response:

CVRI does estimate that its annual operating expenditures will remain approximately at current levels, with the exception of some limited expenditures in preparing the new mining area. As stated in Section 3.2.1.2, "start-up" activities are expected to occur over six years, between 2012

and 2018, with an average cost of $14 million per year. This represents an additional 5-6% increase above current average annual operations spending, for a limited time.

Also noted further in Section 3.2.1.2, labour and procurement of goods and services are expected to remain roughly at current levels until 2030, after which they are expected to decline until the Project is complete.

55. Consultant Report # 9, Section 3.2.1.2, Page 32.

CVRI states, "*The Project will create approximately 250 PY of employment over the construction period, predominantly for equipment operators, surveyors, carpenters and welders. The onsite workforce is estimated to range between 20 to 30 persons from 2014 to 2016.*" The company's consultant states construction employment in person years and then in employee numbers. Since there are four phases of the project, it is unclear how many people, or person years, are required for each phase.

a. Clarify if the 250 PY for all phases or for the construction period 2014 to 2016?

Response:

The estimated 250 PY of employment relates to the total 2012-18 construction period.

b. Clarify if the 20-30 persons represent the construction workforce?

Response:

The majority of onsite construction activities will be handled by CVM's existing workforce. The limited additional contractor workforce required, is estimated to be between 20 to 30 persons during the period of 2014 to 2016, and less during the other years of the construction period. This represents roughly 4% to 6% of the CVM full-time operations workforce.

c. What is the estimated construction workforce for each of the four stages; Robb Centre, Robb Main, Robb East and Robb West.

Response:

As stated the contract construction workforce is expected to be between 20 - 30 persons during the period of 2014 to 2016 which is the startup of the Project. The workforce will be less during construction of other phases of the Project.

8. WATER

56. Consultant Report #6.

Numerous watercourses will be diverted during mine construction, operation, and following closure. This will require approvals from both ESRD (Water Act) and DFO.

a. Provide an update on discussions and consultation with DFO and ESRD regarding timing and requirements for these approvals.

Response:

Navigable Waters

Transport Canada is represented in the ongoing CEAA review of the Project.

CVRI intends to seek early determinations of navigable waters throughout the entire Project area. Appropriate applications would then be made over the life of the Project to accommodate timely approvals for any construction or mining activity involving Transport Canada. The first phase is expected to include haulroad and crossing construction for the Erith haulroad.

A representative of Transport Canada has toured the Project area and identified information requirements regarding 'navigability determination'. CVR is preparing base information with a submission expected in spring, 2013.

Fisheries and Oceans

Department of Fisheries and Oceans is represented in the ongoing CEAA review of the Project.

CVRI will submit various applications over the life of the Project for activities involving DFO areas of responsibility. The first phase is expected to involve haulroad and crossing construction in the Erith River valley and diversion of portions of the Eirth River.

CVRI maintains dialogue with DFO representatives with respect to ongoing and proposed mining activity including Mercoal West, Yellowhead Tower and Robb Trend.

ESRD

The first phase of activity for the Project will involve haulroad construction in the Erith corridor. This will require applications for an EPEA Amendment, Water Act and Public Lands. Applications are expected to be submitted in 2013.

57. Consultant Report #6.

Numerous mountain mines have resulted in increases in Selenium loading to watercourses and water bodies.

a. Provide baseline data and describe the risk that there will be increased Se in receiving water bodies.

Response:

While it is correct to say that mountain mines have demonstrated increased impacts from selenium it is not correct to imply that CVM is also a similar situation. The stratigraphic sequence in which the coal lies is entirely different between, CVM and Cardinal River Mine for instance. It is not the mining process that causes the selenium to be present and subsequently

release – rather it is the nature of the spoil associated with the coal. In the cases cited above, the coal at:

- CVM is:
  - upper Cretaceous to Tertiary sediments of the Paskapoo Formation; and
  - these strata may be generally characterized a "soft" – hence the coal is suitable for thermal purposes.
- Cardinal River Mine is:
  - lower Cretaceous sediments of the Gates Formation; and
  - these starta may generally characterized as "hard" – hence the coal is suitable for steel production.

The deposition in these two areas took place 50 to 80 million years apart and there is no apparent reason to assume similar selenium responses to mining.

CR #3, Appendix B provides the historical record of selenium concentration from an extensive and expansive groundwater monitoring program. CR #3, Section 2.3.6 provides data analysis that demonstrates that selenium releases are generally within the range of background conditions in this geological setting.

Measured concentrations of total selenium in watercourses are summarized below; these data are taken from environmental assessments conducted in support of the Mercoal West/Yellowhead Tower Mine Extensions and the Project and are aggregated across seasons for the LSA's used in the assessments:

	Watercourses Upstream of Active Mines	Watercourses Downstream of Active Mines
No. Observations	95	53
% Observations with Selenium Concentrations Above Alberta Environment for Protection of Aquatic Life	0	2

These results indicate a slightly elevated risk of selenium concentrations exceeding guidelines for the protection of aquatic life downstream of existing mines in the CVRI area. In addition, the analyses presented in CR #11, Section 4.3.1.3, Page 38, predict there will be a low risk of increasing selenium concentrations in receiving waterbodies as a result of the Project.

Reference:

Hatfield (Hatfield Consultants). 2008. Surface Water Quality EIA: Mercoal West and Yellowhead Tower Project.

b. Describe monitoring and finding for Se concentrations in water and fish tissue from existing CVRI mines in the region.

Response:

Measured concentrations of total selenium in watercourses are summarized in the table above; these data are taken from environmental assessments conducted in support of the Mercoal West/Yellowhead Tower Mine Extensions and the Project and are aggregated across seasons.

CR #3, Appendix B provides the description of the ongoing groundwater monitoring program mandated by the existing Approval.

c. Describe CVRI's plans to monitor Se concentrations in water or fish tissues at the Robb Trend mine.

Response:

CR #3, Appendix B provides the description of the ongoing groundwater monitoring program mandated by the existing Approval.

With respect to surface water, CR #11, Section 4.3.1.2, Page 37 states that CVRI will continue effective water quality monitoring programs including a focus on selenium concentrations. The objective will be to observe water quality relative to baseline values to identify any changes over time. Should a significant increase in selenium levels be noted an investigation will be undertaken to identify possible sources and mitigation plans will be implemented. CVRI will undertake all surface water quality monitoring programs required in all Project approvals.

d. Discuss how mine and reclamation plans incorporate mitigations to minimize the risk of Se loading to local water courses.

Response:

There is no documented risk of increased selenium loading in spite of decades of surface and groundwater monitoring. In addition groundwater springs from reclaimed dumps have been monitored since 2000. It is therefore highly unlikely that such an event would take place given that the geological units being mined are not changing in the Project area.

A mitigation plan is unnecessary.

58. Consultant Report #3.

CVRI provided 2009 Annual Report entitled "*Groundwater Monitoring Coal Valley Mine*" prepared by Millennium EMS Solutions Ltd.

a. Submit the most up to date groundwater monitoring report and provide a discussion on any changes that occurred in 2010-2011 in the condition of subsurface soils and groundwater in the Coal Valley Mine.

Response:

This is an incorrect statement. CR #3 contains Appendix B which is the annual report for 2011 for the groundwater monitoring. Discussion on any changes is provided in that appendix.

59. Section E, Page E-44.

CVRI states, "*A synthesis of 74 hydraulic conductivities determined in the historical information has noted that the maximum value observed was 3.7 x 10 -3 m/s while the minimum was 3.4 x 10 –9 m/s with a median value of 2.9 x 10–6 m/s. The million-fold range of hydraulic conductivity is not unusual given the fact that the nature of the rock can range from solid, intact strata to collapsed coal seams in abandoned underground workings.*"

a. Provide a site plan showing the testing locations and a summary table with the monitoring wells' completion details including the completed interval's depth and lithology and the measured hydraulic conductivity.

Response:

This statement cited is a quote from Luscar (1999), specifically Part G, Section 2.2.3.1. That report did not provide details of the type requested. CVM is therefore unable to respond to this request.

60. Section E, Page E-44.

CVRI states, "*Generally, groundwater in the Project will have TDS less than 800 mg/L, will be sodium bicarbonate in nature and pH may be expected to be approximately 9.*"

a. Provide a site plan showing the sampling locations and a description of the major hydrostratigraphic units in the project area and identify from which the water samples were collected, including lithostratigraphic description and the depth range.

Response:

CR #3, Figure 1.4-1 provides the locations.

CVRI believes that consideration of hydrostratigraphic units is not a useful concept in this context where impacts are confined to a distance of several hundred metres from the disturbance area. If the area of potential impact were larger, such a concept might be appropriate. CR #3 provides descriptions of:

- the geological framework in Section 2.2;
- the concept of "aquifers" in Section 2.3.1;
- the groundwater chemistry in Section 2.3.2; and
- the groundwater flow in Section 2.3.3.

Table 3.4-1 and Appendix B – Table 3 provide the information requested with respect the provenance of the water samples.

61. Section E, Page E-45.

CVRI states, "*Section 2.3.3 of the CR#3 (Hydrogeological Report by Millennium EMS Solutions) contains the details of the hydrogeological regime comparable for that of the project.*"

a. Section 2.3.3.1 and Section 2.3.3.2 of the Section 2.3.3 of the CR#3 describes two different hydrogeological regimes. Outline the major hydrostratigraphic units, the depth to the water table, the principle directions of the lateral and vertical shallow groundwater flow direction in each of the defined units specifically in the proposed expansion area based on the available site-specific data.

Response:

Section 2.3.3.1 and 2.3.3.2 are discussions of the existing hydrogeological regime where mining has, or is, taking place. The regime has the variation of topographic relief as the only distinguishing feature between the two areas.

CVRI believes that consideration of hydrostratigraphic units is not a useful concept in this context where impacts are confined to a distance of several hundred metres from the disturbance area. If the area of potential impact were larger, such a concept might be appropriate. Section 3 of CR #3 discusses the hydrogeological regime of the Project. Section 3.4.2 discusses groundwater flow and the associated figures illustrate depth to water.

b. The Erith River and a number of Creeks flow through the proposed expansion area. Describe how mining activities will impact groundwater-surface water interaction in the proposed development area.

Response:

CR #3 has established that drawdown of the water table is not anticipated at distances of more than several hundred metres from the mine pit.

At those locations where a surface water body lies within approximately several hundred metres of a mine pit there will be some diversion of groundwater that was destined to discharge into that water body. This water will end up in the mine pit. This impact has been identified in CR #3.

The practice of CVM is to treat all water (groundwater and precipitation) accumulating in the mine pit and to release it to the adjacent surface water body. This practice mitigates the impact of decreased groundwater discharge and the impact therefore is not significant.

62. Section E, Page E-46.

CVRI states, "*Because of the steep dip of the geological structure of the area drawdown of groundwater levels take place in a cross-formational direction. Declines in water levels will be transmitted across formations rather than along the formations*." Further, CVRI states, "*The operating procedure for pit dewatering is to return the water to the local drainage course. This will have the net effect of an insignificant change in the volume of flow in the water course.*"

a. Provide a conceptual drawing illustrating the dewatering technique.

Response:

See ERCB Figure 62-1 for a conceptual layout drawing illustrating the dewatering technique.

b. Demonstrate quantitatively that the impact of dewatering is environmentally insignificant for the major water courses in the project area such as the Erith River. Include the model inputs such as pumping rates and schedules.

Response:

Pit dewatering will be from sumps in the pit collecting both surface and seepage runoff, as shown in ERCB Figure 62-1. Typically, sumps with a 1500 igpm (0.113 m^3/s) pump capacity will be used that will run intermittently, as required, according runoff and seepage rates. Runoff in the pit due to storm events is typically a magnitude or more greater than seepage amounts. Total pit runoff and seepage volumes may be 3 times greater than natural runoff rates but peak outflows are delayed and highly regulated by the sumps and various settling control cells before discharging to receiving streams. As an extreme case scenario for the Erith River, assuming a maximum 2 km^2 of pit area is active and being dewatered and pit runoff is 3 times natural, than the increase in runoff based upon the Erith River drainage area of 74.28 km^2 below the mine is = (2 km^2 of pit area X 3 times runoff rate + 72.28 km^2 assumed natural area)/ (74.28 km^2) = 1.04 or a 4% increase. This does not account for expected reduced runoff from dump areas or other pond/sump controls in the basin. In other smaller basins pit sizes are proportionally smaller resulting in similar net effects.

Many flow condition scenarios could be assumed based upon the intermittent addition of pumped pit water (typically operating through the spring to late summer period) at 1500 igpm amounts and its regulated release. For illustration purposes, assuming a fall average release rate to the river is one third of the maximum pump rate (500 igpm or 0.037 m^3/s) with the Erith River mean October flow rate at 5 $L/s/km^2$ or 0.37 m^3/s, the increase in flow is 10%.

63. Section E, Page E-49.

CVRI states, "*Hackbarth Environmental (1999) presented an assessment of the behaviour of nitrate in mine spoil. Hackbarth determined that nitrate may be elevated above background in mines (or portions of mines) where significant amounts of explosives were used. He further determined that the nitrate was leached out after several years. Thus, the occurrence of nitrate is self-mitigating. The impact of nitrate on groundwater chemistry is insignificant.*"

a. Provide updated monitoring data from 2000-2011, analyze these results and show that the new monitoring data supports the findings of the 1999 report.

Response:

CR #3 provides a complete set of responses to these questions. Examination of the report will explain that:

- updated monitoring data is presented in Appendix B:
  - notably, Appendix B, Section 5.1 which deals with toe springs emanating from mine spoil;
  - it is noted that trend charts for nitrate are not presented because the concentrations at the toe springs have been undetectable for three years; and
  - the conclusions of Hackbarth (1999) remain valid;
- analysis is also provided in Section 2.3.7 of CR #3.

64. Section E, Pages E-49 to E-50.

CVRI stated, "*Unacceptable drawdown of water levels in wells is likely to occur when mining operations are active in the areas of the Lakeside and Bryan Mines. This impact will be highest for shallow wells located close to these areas and much less for wells which are deeper and/or located farther away from the former underground mines," and "CVRI will inventory water wells in all three residential areas of Robb as mining approaches the Lakeside Mine in approximately 2029.*"

a. Provide a summary of the domestic water use in the impacted area, including a map showing the locations of all the water wells in the 3 km radius and a table summarizing completion and use details for all the water wells using the publicly available sources.

Response:

CR #3, Section 4.2 provides extensive detail on these matters. ESRD SIR #72 requests similar information and that response should also be consulted.

The message of these sections is that it is premature to conduct a detailed domestic well inventory in 2012 seventeen years before the impact may begin. Such an inventory would have no functional use in the 2020's and would have to be repeated.

CVRI has recognized that the situation presents a potential major issue and has committed to the recommendations provided in CR #3. CVRI maintains that the proposed timing is appropriate and that a survey of the current situation provides no useful information to advance the current review process. CVRI anticipates that any ensuing approval will contain a clause to undertake the recommended program.

b. Provide information on any existing and expired water diversion licenses in the LSA/RSA.

Response:

CR #3, Section 1.2.2 defines that the Study Area is the mine permit described in the application. The mine permit includes portions of:

- Twp 49 R 20, 21;
- Twp 48 R 19, 20;
- Twp 47 R 18,19; and
- Twp 46 R 19.

Information on existing and expired water diversion licenses from the Alberta Environment Authorization Viewer is provided in ERCB Appendix 64.

c. Define the time lapse between the surveys and anticipated adverse impacts on the groundwater supply.

Response:

CVRI accepts the recommendation of CR #3 to begin the review process approximately 5 years before the dewatering of the Lakeside Mine is to occur. That would mean that the well survey would take place in the early 2020's if the anticipated schedule is maintained. This would mean approximately five years between the survey and the potential impact.

d. Describe the components of the survey (i.e. the groundwater levels, yields and the chemistry) and the selection criteria for the water wells that will be accessed for the baseline water well testing;

Response:

The complete well survey would include all of the following:

- owner information;
- efforts to correlate the well to existing water well driller's reports;
- GPS location of well;

- number of persons using the well;
- estimate of volume of use;
- water treatment equipment and use of "bottled" water for drinking;
- discussions with the owner regarding problems with the well;
- depth to water;
- collection of a water sample for analysis for major ion chemistry; and
- possibly other analyses depending on problems identified by the owner.

e. Specify the number and frequency of the monitoring and sampling events that will be conducted prior to the development in order to establish the background groundwater quality and quantity.

Response:

Quantity

CR #3, Section 3.4.3 describes the initial stages of this monitoring program. Two wells have been installed at each of two sites in upper and lower Robb. These wells are equipped with level loggers that record water levels each hour.

Multiple wells have been established on both sides of the hamlet located between the proposed mining areas and the community wells. Water levels and water quality for these wells are being monitored as a baseline.

Additional monitoring wells are anticipated to be installed after project approval. Level Loggers would also be installed in these wells. It is also anticipated that pumping tests will be conducted on these wells to estimate hydraulic conductivity.

Quality

CR #3 documents background water quality in Robb based on Geological Institution of Canada (GIC) information. Once Project approval is obtained, CVRI anticipates beginning to collect water samples from the observation wells. CVRI will also consider initiating a sampling program from selected domestic wells at that same time. Annual sampling is anticipated as that is the accepted periodicity of the current approval.

f. Provide a list of components that the background water samples will be analyzed for, specifying the indicator parameters that will be monitored and the guidelines that each parameter will be compared against.

Response:

Due to the annual sampling interval it is anticipated that a full major ion analysis would be undertaken to include the following parameters:

- Calcium;
- Magnesium;
- Sodium;
- Potassium;
- Carbonate;
- Bicarbonate;
- Sulphate;
- Chloride;
- TDS;
- pH; and
- Nitrate.

In selected circumstances petroleum hydrocarbons, metals and bacteria may be selectively considered.

9. TERRESTRIAL

65. Section F.3.4, Page F-27.

CVRI states, "*Where reclamation stock is available suitable understory species would be inter-planted with the tree seedlings*."

a. Discuss what species will be selected and how CVRI will secure stock for use in reclamation.

Response:

Table F.4-6 was provided in the application (listed below as ERCB Table 65-1) and provides a list of the species that are currently being considered for the reforestation program.

Table 65-1 (Revised Table F.4-6) Native Woody Plant Species for the Project's Reclamation Program	
Coniferous	**Deciduous**
White spruce (Picea glauca)	Trembling aspen (Populus tremuloides)
Lodgepole pine (Pinus contorta var. latifolia)	Balsam poplar (Populus balsamifera)
	Dwarf birch (Betula glandulosa)
	Green alder (Alnus crispa)
	Prickly rose (Rosa acicularis)
	Arnica (Arnica cordifolia)
	Greyleaf willow (Salix glauca)
	Dogwood (Cornus stolonifera)
	Beaked willow (S. bebbiana)
	Flat-leaved willow (S. planifolia)
	Pussy willow (S. discolor)
	Barclay's willow (S. barclayi)
	Buffalo-berry (Shepherdia canadensis)
	Huckleberry (Tall Billberry) (Vaccinium membranaceum)
	Other blueberry species (Vaccinium spp.)

The following factors will be considered when undertaking the site specific species selection:

- Wildlife considerations; if browsing is causing damage to the plantations the selection of less palatable species will be considered;
- Propagule availability; the collection of propagules from some species may be difficult;
- Propagation of stock; some species may be difficult to propagate at the greenhouse; and
- TEK; species of value for the aboriginal communities will be included in the species selection.

Species selection may be changed under the CVRI adaptive management program. Observations of factors such as survivability and growth will determine if a species is not performing to the needs of the revegetation program and if be changes should be made. In addition, as previously stated the consultation programs could identify species of value which should be included in the revegetation program.

CVRI will collect plant propagules (seed and cuttings) from the local area for the propagation of the reclamation stock. CVRI will have the seedlings grown by a reputable forest greenhouse to ensure good quality planting stock.

b. Describe CVRI's experience with this approach, and provide examples of where it has led to certified reclamation.

Response:

Certification of reclaimed land requires that the lands are in compliance with the EPEA Approval conditions.

CVRI has been collecting plant propagules for the propagation of reclamation stock since the early 1980's. The inclusion of understory species in the revegetation program was completed during the period of 1979 to 1989 and a limited program occurred during the period of 1990-1996. Since that time only conifer species were planted. There are currently 111.1 ha of lands that have been certified at the mine and they were certified under past regulatory requirements. The inclusion of understory species was not a significant factor in the certification criteria.

In 2008, CVRI assessed approximately 462 ha of reclaimed lands for potential certification. The lands were assessed for compliance with requirements of the EPEA approval. It was determined that lands met the requirements of the EPEA Approval and an application for certification was submitted to the government. To date there has not been any action on the application.

c. If shrub stock is not available for reclamation, what will the effect be on capability for target wildlife species?

Response:

There are areas of the CVM have been reclaimed without the inclusion of shrub species and through natural succession native species are slowly becoming established in the reclamation areas. These reclaimed areas now host an assemblage of wildlife species.

The planting of understory species will accelerate a process that would naturally occur over time. Wildlife species that require deciduous vegetation will not be attracted to the reclamation areas until natural succession occurs and the vegetation species that form part of the habitat requirements of these species establish in the reclaimed areas. As demonstrated on the existing reclamation areas of the mine wildlife will colonize the reclamation area but the full benefit of the understory species will not be realized until natural succession occurs and these species establish.

66. Section F.4.2.4, Page F-48.

CVRI states, "*Traditional value plants will be identified in respect to their possible use as revegetation species.*"

a. Discuss CVRI's commitment to use Traditional Use species as presented in The Aboriginal Consultation, Traditional Ecological Knowledge and Land Use report, March 1, 2012, Section 4.1, Important Plant and Fungi Species Identified in the Project Area, Table 11, Page 53/54.

Response:

CVRI is committed to the inclusion of traditional value species in the revegetation program.

Table 11 of the TLU report provides a list of species of value to aboriginal groups. Some of the species listed are already included in the revegetation program. CVRI is also introducing a native seed mix that will be utilized in the Project revegetation program.

As stated in Section F.4.2.4 of the application CVRI will be evaluating the utilization of traditional use species for inclusion in the revegetation program.

In order to be successful the selected species must have the following attributes:

- ability to efficiently collect plant propagules (seed or cuttings);
- ability to be propagated in a forest greenhouse; and
- be able to survive in a reclamation situation as some of the species identified require various degrees of shade to thrive.

The revegetation program is designed to increase the biodiversity of the reclamation areas. Efforts will be made to establish diversity through the establishment of deciduous species of trees and shrubs. Many of the trees and shrubs are of traditional use value.

67. Section 5.6.4, Page 145.

CVRI states, "*Long term impacts on community and landscape level biodiversity in the LSA and the RSA, following mitigation, are negligible given that ecosites will be reclaimed following mining.*

- *Aim at the establishment of equivalent levels of biodiversity areas common to predistubed conditions (AEP 1998:27)*
- *Immediate direct placement of soil salvaged (with propagules) in areas of high and very high biodiversity*
- *Reestablishing deciduous trees, native shrubs (willow, berry species), and forbs to provide structural diversity, and wildlife habitat to the coniferous dominant ecosystem.*"

a. Discuss the CVRI strategy to establish a range of ecosite phases that would provide an equivalent area and quality of habitat for listed species found in the LSA.

Response:

Different reclamation strategies will be developed for reclaiming each area. CVRI is planning to reclaim to the ecosite level which can be defined as an ecological unit that develops under similar environmental influences such as climate, moisture and nutrient regimes (Beckingham, 1996).

CVRI does not believe that reclamation to the ecosite phase level is a viable option in a mine setting. Soil handling procedures, mine scheduling and mine economics will limit the ability to salvage and replace soil at the ecosite phase level. CVRI's reclamation planning will provide the soils, slope position and aspect that will set the capability for the reclaimed areas to develop ecosites. The developing moisture regime will influence the ecosites and ultimately the ecosite phase that will develop over time.

Ecosite development is dependent on the following factors:

- Climate;
- Slope position;
- Aspect;
- Moisture regime; and
- Soils.

The climate of the CVM will be the same as existed prior to disturbance. Through the reclamation process CVRI will construct the slope position and aspect of the reclamation areas. The moisture regimes will develop over time but will be determined, in part, by the slope position and aspect. The soil salvage operations will produce two soil types; an upland soil and an organic soil. The salvaged upland soils will consist of a mixture of the different soil types from the salvage area. There may be instances where the direct placement of salvaged soil will allow the replacement of soil onto slope positions and aspects similar to the conditions of the salvage area. Revegetation programs will aim at establishing structural diversity in the reclamation areas with planting of deciduous trees, native shrubs and forbs. The revegetation program will initially establish a native plant cover and then the dominant tree species will be planted; either a conifer or deciduous species. Suitable understory species will be inter-planted with the tree seedlings. CVRI will be continuing the huckleberry transplanting program currently underway at the CVM. CVRI will be expanding the program to include other suitable species.

The assignment of reclamation strategies including soil replacement and initial vegetation prescriptions will set the capability of the lands to develop to the ecosite level. This in turn will facilitate natural succession for the development of ecosite phases over time.

b. Provide local empirical reclamation information to demonstrate that ingress has been an effective reclamation strategy for the establishment of ecosystems and wildlife habitat that could support the documented pre-disturbance Listed Species at closure.

Response:

In 2010, Ms. P. Longman produced a report titled; *Vegetation Development and Native Species on Reclaimed Coal Mine Lands, Edson AB: Direction for Reclamation Planning*. The report documented research that was completed on the CVM. The purpose of the research was to assess the vegetation on reclamation areas at the CVM, to provide a summary of the vegetation communities and characteristics, compare the observed patterns with desired patterns of vegetation change, and develop recommendations to improve the success of the reclamation program at the CVM.

Specific objectives were to:

1. Assess the reclamation vegetation using quantitative methods with respect to differences over a 25 year period.
2. Compare the observed vegetation patterns with the expected patterns using statistical Methods.
3. Summarize the vegetation characteristics, structure, communities and patterns using statistical methods and examine successional pathways.
4. Evaluate possible factors involved in the observed patterns.
5. Develop recommendations for reclamation at the CVM to address issues identified in the literature review and subsequent analysis.

Ms. Longmans report detailed the lack of understory species in some reclamation areas and that natural ingress on its own will not provide the desired forest structure. The report highlighted the need to include understory species in the revegetation program.

Ms. Longman made the recommendation to reintroduce the establishment of the herb and shrub planting program. CVRI is in the early stages of re-establishing this component of the revegetation program. CVRI is planning to continue the program at the Project.

68. Table F.3-4, Page F-28.

This table indicates that an objective of the upper ridge BRU is to establish plant cover to control surface erosion.

a. Describe other methods that have been considered to control erosion (e.g. soil mounding), and why those have not been incorporated or considered acceptable by CVRI.

Response:

There are many methods in use to control erosion. The rapid establishment of a vegetative cover is the primary method used by CVRI to control erosion on the reclamation areas. Other techniques that will used to control erosion include:

- minimizing disturbance;
  - minimizing the disturbance area reduces the amount of land that could potentially be eroded;
- cover crops;
  - The use of a cover crop allows seeded vegetation to become established while minimizing erosion;
- recontouring to minimize erosion;
  - the establishment of topographical relief slows water movement across the reclamation areas. The inclusion of depressions traps silt before it entering the receiving environment;
- rough soil surface;
  - as stated in Section F.4.2.2 of the application the recommended method of soil replacement is to provide a rough soil surface. A rough soil surface is equivalent to soil mounding as it increases the retention of water in soil reducing surface runoff;
- fertilization;
  - an application of fertilizer with the initial seeding ensures the rapid establishment of a vegetation cover;
- inclusion of slash;
  - the inclusion of woody debris in the salvaged soil provides a level of erosion control in the replaced soil. The timber slash and debris provides a mechanical strengthens the replaced soil;
- erosion control products;
  - turf reinforcement mats that can used to reinforce replaced soils thus reducing erosion;
  - bale ditch checks installed in a drainage way will slow water and trap sediment; and
  - silt fences can be installed to intercepting surface flows;
- progressive reclamation;
  - timely reclamation will reduce the overall areas that are susceptible to erosion. The quicker the disturbed lands are vegetated will minimize the areas that can be eroded.

69. Consultants Reports #14, and Section E.

Although maps are provided showing habitat values at various stages of mining for elk and moose, no similar maps are provided for species of management concern (Listed species) except for mammalian carnivores (CR #7).

a. Provide maps at the local and regional scales showing the location and describe the amount of habitats of various quality for species of management concern at baseline and during mining.

Response:

For this question, CVRI requested clarification from the ERCB regarding the definition of 'management species'. ERCB indicated that:

"*The species referred to are really the listed species (SARA, COSEWIC, SRD general status). The concern is understanding effects on these species through the mining cycle, including operations and reclamation*." (pers. comm. Bruce Greenfield, ERCB to Kevin Peters, Millennium EMS, September 24, 2012, Excerpt).

The application includes a list of all wildlife species (other than carnivores) that were identified with federal and provincial status on the CVM, on the LSA and on the RSA (CR #14, Table 9.1). A new table containing the 32 species identified on the LSA with federal and provincial status was extracted from Table 9.1 and presented here as ERCB Table 69-1.

To address ERCB SIR 69a) and 69b), a series of maps were prepared for each of the 32 listed species using the same time steps identified for cumulative effects assessment for elk, moose and 27 birds in the application (CR #14, page 107). Description and details of activities during these time steps is found in CR #14, page 107 and CR #13, page 88, 89). Time steps are:

- Year 0 Baseline;
- Year 10 Maximum Disturbance by the Project;
- Year 25 Maximum Disturbance within the RSA; and
- Year 50 Regional Closure – 50 years after mining starts in 2014.

Habitat requirements for each species were identified from:

- peer-reviewed literature;
- models prepared by FRI for use in the West Fraser FMA if available; and
- the wildlife inventory of the LSA (CR #14, Section13.4.1, pages 125-139; Appendix IV, pages 210 and 211).

Maps (ERCB Appendix 69) were prepared using the 17 Land Cover types developed for cumulative effects assessment (CR #14, Section 13.1.1, page 108). Species with similar habitat

types were grouped into 14 habitat categories (ERCB Table 69-2) and a time series of 8 maps were prepared for each habitat category resulting 112 maps and ERCB Table 69-3. Time series are:

- Year 0, 10, 25 and 50 for the RSA (including the LSA); and
- Year 0, 10, 25 and 50 for the LSA.

Table 69-1 Federal and Provincial Status for 1 Amphibian, 27 Bird, and 4 Mammal Species on the Robb Trend LSA.

No.	Common Name	Alberta Status 2010	Alberta Wildlife Act	COSEWIC	SARA	CVM	LSA	RSA (A,B,M)
1	Western Toad	Sensitive		Special Concern	Schedule 1, Special Concern	P	P	P
2	Green-winged Teal	Sensitive				O	B	PrB
3	Lesser Scaup	Sensitive				PrB	PoB	PrB
4	Great Blue Heron	Sensitive				O	O	O
5	Osprey	Sensitive				O	O	B
6	Bald Eagle	Sensitive		Not At Risk		O	O	PoB
7	Northern Harrier	Sensitive		Not At Risk		PoB	PoB	PoB
8	Northern Goshawk	Sensitive		Not At Risk		O	PoB	B
9	Broad-winged Hawk	Sensitive					B	O(3)
10	Golden Eagle	Sensitive		Not At Risk		O	O	O
11	American Kestrel	Sensitive				PoB	B	B
12	Sora	Sensitive				O	PoB	PoB
13	Sandhill Crane	Sensitive		Not At Risk			O	PrB
14	Upland Sandpiper	Sensitive				O	O	PrB
15	Northern Pygmy-Owl	Sensitive					PoB	PoB
16	Barred Owl	Sensitive					B	B
17	Great Gray Owl	Sensitive		Not At Risk			B	B
18	Black-backed Woodpecker	Sensitive				PoB	PoB	B
19	Pileated Woodpecker	Sensitive				PoB	PoB	B
20	Olive-sided Flycatcher	May Be At Risk		Threatened	Schedule 1, Threatened	O	B	PrB
21	Western Wood-Pewee	Sensitive				O	B	PrB
22	Least Flycatcher	Sensitive				B	B	B
23	Barn Swallow	Sensitive		Threatened	No Schedule, No Status	B	B	B
24	Brown Creeper	Sensitive				O[1]	B	B
25	Black-throated Green Warbler	Sensitive	Special Concern			O[1]	PoB	
26	Common Yellowthroat	Sensitive				PrB	B	B
27	Western Tanager	Sensitive				O	B	PrB

Table 69-1 Federal and Provincial Status for 1 Amphibian, 27 Bird, and 4 Mammal Species on the Robb Trend LSA.

No.	Common Name	Alberta Status 2010	Alberta Wildlife Act	COSEWIC	SARA	CVM	LSA	RSA (A,B,M)
28	Rusty Blackbird	Sensitive		Special Concern	Schedule 1, Special Concern	O	O	B
29	Little Brown Myotis	Secure		Endangered		*	*	P
30	Northern Myotis	May Be At Risk		Endangered		*	*	P
31	Silver-haired Bat	Sensitive					P	P
32	Hoary Bat	Sensitive					P	P

A = Amphibians - RSA distribution based on Russell & Bauer (1993): P = present
B = Birds - RSA distribution based on FAN (2007): Breeding status codes are: O = Observed (Migrant & Accidental) PoB = Possible Breeding PrB = Probable Breeding B= Confirmed Breeding
M = Mammals - RSA distribution based on Smith (1993): P = present A = accidental

1 Record from Cottonwood and Sweetgrass (1978), Cottonwood (1981)
2 Record from FWMIS
3 Record from Yellowhead Fire Tower Hawk Watch
4 Record from Yellowhead Tower LSA
5 Record from Robb Trend RSA this study

Table 69-2 Habitats and Associated Wildlife Species with Federal and Provincial Status, Robb Trend LSA.

Habitat	Wildlife Species
1. Water	• Green-winged Teal (Nesting Habitat - Breeding Not Confirmed in LSA) • Lesser Scaup (Nesting Habitat - Breeding Not Confirmed in LSA • Great Blue Heron (Foraging during Migration) • Osprey (Foraging) • Sora (Nesting) • Barn Swallow (Foraging) • Western Toad (Breeding) • Little Brown Myotis (Summer Foraging)
2. Treed Wetland	• Sandhill Crane (Nesting Habitat - Observed as Migrant only in LSA) • Rusty Blackbird (Nesting Habitat - Observed as Migrant only in LSA)
3. Open Wetland / Open Mixedwood / Open Regen	• Olive-sided Flycatcher (Nesting)
4. Shrubs / Open Mixedwood / Open Regen	• Western Wood Peewee (Nesting)
5. Shrubs / Upland Herbaceous / Open Wetland / Open Regen	• Northern Harrier (Nesting, Foraging during Migration) • Bald Eagle (Foraging during Migration) • Golden Eagle (Foraging during Migration)
6. Shrubs / Treed Wetland	• Common Yellowthroat (Nesting)
7. Upland Herbaceous	• American Kestrel (Foraging) • Upland Sandpiper (Nesting - Accidental Occurrence in LSA)

Table 69-2 Habitats and Associated Wildlife Species with Federal and Provincial Status, Robb Trend LSA.	
Habitat	**Wildlife Species**
8. Dense Mixedwood	• Northern Pygmy Owl (Nesting) • Broad-winged Hawk (Nesting) • Western Tanager (Nesting)
9. Dense Mixedwood / Moderate Mixedwood / Open Mixedwood	• Least Flycatcher (Nesting)
10. Dense Broadleaf / Dense Mixedwood	• Northern Goshawk (Nesting) • Barred Owl (Nesting) • Pileated Woodpecker (Nesting)
11. Dense Conifer / Dense Broadleaf / Dense Mixedwood	• Great Gray Owl (Nesting)
12. Dense Conifer	• Black-backed Woodpecker (Nesting) • Brown Creeper (Nesting) • Black-throated Green Warbler (Nesting, Breeding Not Confirmed in LSA)
13. Moderate Conifer / Open Conifer / Moderate Mixedwood / Open Mixedwood / Closed Regen	• Silver-haired Bat (Obligate Tree Rooster) • Hoary Bat (Obligate Tree Rooster)
14. Moderate Conifer / Open Conifer / Open Wetland / Closed Regen	• Northern Myotis (Roosting, Foraging)

Table 69-3 Habitat Change for Federal and Provincial Listed Species in the Robb Trend RSA and LSA, Year 0 through Year 50.

Habitat		RSA Habitat Area (Ha)				RSA Habitat Area (Ha) Without LSA				LSA Habitat Area (Ha)			
		Year 0	Year 10	Year 25	Year 50	Year0	Year 10	Year 25	Year 50	Year0	Year 10	Year 25	Year 50
1	Water	720	921	1546	1546	705	906	908	908	15	15	639	639
2	Treed Wetland	8253	8181	8144	8144	8108	8097	8095	8095	146	84	49	49
3	Open Wetland/Open Mixedwood/Open Regen	28463	56666	48526	2392	26980	54610	44097	2306	1483	2056	4429	86
4	Shrubs/Open Mixedwood/Open Regen	36586	65064	56734	10060	34802	62820	52286	9956	1784	2244	4448	105
5	Shrubs/Upland Herbaceous/Open Wetland/Open Regen	45176	71766	64951	16797	43171	69357	58835	16505	2004	2409	6116	293
6	Shrubs/Treed Wetland	18459	18757	18599	18060	17996	18469	18446	17907	463	288	153	153
7	Upland Herbaceous	6692	4679	6114	4633	6487	4529	4531	4531	204	150	1583	103
8	Dense Mixedwood	7938	5710	3743	3743	7112	5503	3682	3682	826	206	61	61
9	Dense Mixedwood/Moderate Mixedwood/Open Mixedwood	28454	20755	15305	15305	25852	20018	15042	15042	2602	737	263	263
10	Dense Broadleaf/Dense Mixedwood	8618	6298	4322	4322	7792	6092	4261	4261	826	206	61	61
11	Dense Conifer/Dense Broadleaf/Dense Mixedwood	65203	54367	65914	97861	63009	53302	65092	92597	2195	1066	822	5265
12	Dense Conifer	56585	48069	61592	93540	55217	47210	60832	88336	1368	859	761	5204
13	Moderate Conifer/Open Conifer/ Moderate Mixedwood/Open Mixedwood/Closed Regen	127250	111379	110779	126986	123636	109424	108982	123808	3614	1955	1797	3177
14	Moderate Conifer/Open Conifer/Open Wetland/Closed Regen	108817	98512	101465	117671	106962	97071	99785	114611	1855	1441	1680	3061

b. Provide maps at the local and regional scales showing the location and describe the amount of habitats of various quality for species of management concern following closure.

Response:

Please refer to the response to SIR #69 a).

c. Discuss how CVRI will demonstrate that equivalent capability for species of management concern has been achieved.

Response:

A number of measures to mitigate the potential impacts of the Project on wildlife which include the listed species are discussed in CR #14, Section 12.2, pages 92–98. A cumulative effects assessment was also conducted for elk, moose and the 27 listed bird species. An account for each of the 27 listed bird species including habitat change through the mining process is found in CR #14 pages 125-139.

A discussion of factors that will reduce the impact of the Project on these species, as well as steps taken to ensure the predicted event will occur during the Project are found in CR #14 Section 13.2.2, page 113 and 114 (elk), Section 13.3.1 page 119 and 120 (moose) and Section 13.5.1, page 140 and 141 (birds).

Primary factors that will reduce the impact of the Project on wildlife are:

a) identification of wildlife as a primary end land use especially in the Zone 2 (Critical Wildlife) area of the Project;
b) use of wildlife habitat requirements to guide reclamation activities; and
c) coordination and cooperation of the major land users and use of best practices to ensure long term viable populations in the region.

Recommendations from CR #14 that are especially relevant to the listed species are listed below with an expanded discussion regarding habitat, management and monitoring requirements for the 32 listed species.

Identify Wildlife as a Primary End Land Use in the Project Zone 2 area

1. Identification of wildlife as a primary end land use will encourage reclamation activities that specifically enhance wildlife use of the reclaimed area. The LSA supports ungulates, their predators and a diverse bird community all of which require diverse vegetation communities and complex arrangements of vegetation and landscape features. Reclamation will ensure that diverse vegetation community and complex topography is

established that will benefit wildlife. This is particularly important in the Zone 2 (Critical Wildlife) areas.

Approximately 50% of the Project falls within lands zoned as Class C – Key wildlife and watercourse (CR #14, page 10 and Figure 1.4). Reclamation is the primary tool to ensure specified land is returned to an equivalent capability. The Conceptual End Land Use Map from the Application (Section F, F.4-2) identifies broad land use types. Ecological conditions and resource objectives change along the length of the Project. More detailed reclamation plans to be developed at the operations stage will incorporate specific wildlife habitat requirements.

Establish Ecosystem Function

2. Reclamation should focus on establishing ecosystem function and initiating soil microbial activity. Wherever possible, direct haul placement techniques should be used, and the reclaimed vegetation should be similar to the existing vegetation, *e.g.*, a mosaic of upland and wetland vegetation types. The reclamation seed mix should generally be composed of several species of grasses and several species of legumes and forbs to provide foraging diversity for small mammals, ungulates, and various bird species. Reclamation activities will initially establish a cover vegetation of grasses, legumes and forbs to prevent erosion and initiate soil development. Trees and shrubs will additionally be planted at the appropriate time in areas planned for wildlife habitat function.

   Habitats #8, 9, and 10 containing mixedwood forests will decrease both in the RSA and in the LSA by Year 50 (ERCB Table 69-3). CVRI's proposed reclamation plan (Table F.4-4) indicates that mixed wood forest types will increase from 21.4% of the Project Area pre mine to 25.2% of the Project Area post mine. This will benefit species like Northern Pygmy Owl, Broad-winged Hawk, Western Tanager, Least Flycatcher, Northern Goshawk, Barred Owl, and Pileated Woodpecker.

   By Year 50 habitats containing dense conifer (Habitat 12 and 13) will increase in the RSA and LSA. CVRI's proposed reclamation plan will reduce the amount of coniferous habitat on the Project Area from 62.3% to 47.2%. These habitats will increase 47% and 60% in the RSA by Year 50 without the contribution of the LSA thereby providing increased regional habitat for Black-backed Woodpecker, Brown Creeper, Black-throated Green Warbler, Silver-haired Bat and Hoary Bat.

   By Year 50 the amount of habitat #13 will decrease negligibly in the RSA by 12% in the LSA. The CVRI proposed reclamation program will increase the mixed wood component of this habitat but decrease the coniferous components. Dense coniferous habitats in the RSA (without the LSA) will be increasing by 62.5% by Year 50 thereby providing increased regional habitat for Northern Myotis.

Promote Structural Complexity of Regenerated Forests

3. Tree planting at the CVM has resulted in successful forest regeneration. This has produced growth tall enough to provide hiding cover for ungulates but lacks understorey development. Establishing high densities of willow, and other deciduous shrubs in selected areas will provide additional hiding cover and browsing opportunities for ungulates and small mammals, and nesting opportunities for birds. Hiding cover for elk and moose is defined as forest cover 3 m tall; for mule deer and white-tailed deer 1.8 m tall. Browse is assumed to be generally available when shrubs are at least 1 m tall. Understory cover benefits species like the Northern Myotis which forage above shrubs growing beneath the forest canopy.

Establish a Variety of Vegetation Communities

4. Establish deciduous shrubs to provide forage for ungulates, especially moose, hiding cover for small mammals, and nests sites and food for various bird species. Shrub species like *Abies lasiocarpa, Alnus viridis, Betula glandulosa, Lonicera involucrata, Populus tremuloides, P. balsamifera, Ribes spp., Rosa acicularis, Rubus idaeus, Salix spp., Shepherdia canadensis, Vaccinium spp., and Viburnum edule* are present in the upland vegetation of the LSA. Deciduous shrubs can be established as part of a forest understorey or as a shrubby meadow type.
   By Year 50 habitats #4, 5 and 6 which incorporate large amounts of shrubland will decrease in the RSA as well as the LSA (ERCB Table 69-3). CVRI's proposed revegetation program (Section F.4.2.3, page F-44) indicates that grassland/shrubland habitat will increase in the Project Area from 1.4% pre reclamation to 2.9% post reclamation. Areas to be reclaimed specifically to shrublands will be identified at the operation stage.

5. Use reclamation techniques appropriate to birds and mimic the natural disturbance regime where possible. This includes designing complexity into the landscape by establishing forests with structural diversity and variety in vegetation communities and topography. Lake, pond and wetland development also promotes bird diversity. Reclaiming wetlands to include islands, irregular shoreline features, and a variety of aquatic and upland vegetation will promote nesting by waterfowl. The margins of lakes and ponds should be planted with a diversity of vegetation, *e.g.,* shrubs, trees, open meadows. Maintenance of a shallow mudflat margin in certain areas is important for migrating shorebirds.
   By Year 50, water will increase in both the RSA and LSA (ERCB Table 69-3). CVRI (Section F, Page F-44, Table F4-4) indicates that the amount of lakes/water in the Project area will increase from 0.2% pre mining to 13.6% post mining. These water features will likely contain fish. Larger bodies of water will provide opportunities for foraging for

Great Blue Heron, Osprey, Barn Swallow, Myotis species and other bats. The amount of foraging by bats will likely depend on the nearness of summer roost sites. A variety of waterfowl will use these lakes during migration including Green-winged Teal and Lesser Scaup both of which have been observed on Lovett Lake at the CVM during migration.

6. Opportunities to develop a number of fishless ponds with shallow edges (<1 m) and emergent vegetation suitable for amphibian breeding and waterfowl nesting should be identified for the reclamation phase of development. The development of shallow lakes also provides this habitat function.
   CVRI (Section F, Page F-44, Table F4-4) indicates that the amount of Riparian/Wetland will be similar pre and post mining. A variety of ponds with differing emergent and shoreline vegetation and water depths will be established on the Project during the revegetation program.
   Small temporary and permanent fishless ponds are used by the Western Toad as breeding ponds. Reclamation activities will establish wetlands featuring shallow, open water on the Project Area, characteristics that are suitable for breeding ponds.
   Other wetlands with open water and dense shoreline shrub and grass vegetation will provide nesting habitat for Green-winged Teal and Lesser Scaup. Ponds with moderately shallow to deep water with emergent vegetation will provide nesting habitat for Sora.

Establish Specialized Habitat Features

7. Important habitat features, such as snags, rock outcrops, cliffs and mineral licks add diversity to the landscape. Stumps and other irregularities on the grassland surface will be used by kestrels and harriers for perching. Mature forests left adjacent to the mining footprint provide perches for Red-tailed Hawk which frequent the area. Logging residual placed on the reclaimed surface will function as downed wood in the future forest and will provide habitat for small mammalian predators, *i.e.,* weasels. The debris will also attract them into the reclaimed landscape which supports high densities of small mammals. Cliff Swallows have made nests in pit walls that remain after mining on the CVM, *e.g.,* south wall of the west end of Pit 20.
   Barn Swallows will nest in artificial structures around human activity but also use crevices in cliffs. An inventory of cliffs associated with mining should be completed prior to sloping to identify which cliffs are used by swallows followed by an assessment whether these cliffs could be incorporated into the final reclaimed landscape. "Planting" snags in reclaimed landscapes and leaving large stumps in early succession open environments will offer perches for hunting raptors like the American Kestrel and the Northern Harrier and when the forest stand grows higher, snags will provide habitat for species like the Olive-sided Flycatcher.

Management and Monitoring

8. Ungulates will be dependent on hiding cover provided by forest immediately adjacent to mine disturbance in the early years of reclamation. As well, part of the high bird diversity recorded on the CVM is dependent on the proximity of undisturbed habitat. Undisturbed forest is required adjacent to the reclaimed areas until the regenerated forest begins to provide hiding cover for ungulates and habitat for forest-dwelling birds. Use of lakes for foraging by bats like the Little Brown Myotis and other bats will depend on the nearness of undisturbed forest until planted forests are established. Considerable bat activity was detected over Lovett Lake on the CVM. Removal of timber immediately adjacent to the mine footprint should be coordinated with West Fraser Mills, Hinton Division so that mining and forest harvesting do not result in simultaneous removal of mature tree cover and the creation of overly large open disturbances.

9. The Lovett Ridge and the CVM MSL provide important habitat for ungulates, birds and other wildlife in the RSA. Moose numbers are reduced in the RSA, and there has been an apparent change in elk distribution in the RSA. It is therefore recommended that a monitoring program be developed to track response of ungulates, birds and amphibians to reclamation of the Project and other CVM projects.
   Monitoring will include repeating the CVM air survey at appropriate intervals during the life of the Project and conducting systematic ground surveys as well as periodic amphibian and bird surveys. Results will provide information about ungulate, bird and amphibian response to reclamation on the existing CVM. Information on species, rate of colonization, and habitat use will be used to help design upland and wetland reclamation within the Project disturbance area and to develop appropriate habitat management plans if required.

70. Consultant Report #7, Section 5.3.5.3, Page 78/79.

CVRI states, "*Upon closure and decommissioning, reclaimed mined lands once again revert to the Province of Alberta. Symbaluk (2008) and Kansas and Symbaluk (2011) noted that it is after mine closure that grizzly bears are most vulnerable to potential increases in mortality associated with public access. Without careful land planning and management, an attractive source for grizzly bears has potential to quickly become a mortality sink.*"

a. Discuss the CVRI management strategy to design the closure landscape and vegetation to separate people from the places that would attract grizzly bears post closure.

Response:

This reference alludes to the potential for increased killing of grizzly bears assuming that heightened human access could occur after the management of reclaimed and certified mined

lands reverts to the Crown. The most likely sources of such mortalities are self-defense kills by ungulate hunters, illegal killing, and the killing or relocation of aggressive bears interacting with the recreational public. Such sources of grizzly bear mortality are very rare during active mining and reclamation because of human use and fire-arm restrictions imposed by the Mineral Surface Lease. No such incidents have occurred on the CVM lease since its inception 35 years ago.

As noted in Section F 4.3 the CVRI is required to "maintain and manage the reclaimed land until a reclamation certificate is issued". It is predicted that this will occur 10 to 16 years following initial mine activities. Reclaimed forests at certification will meet minimum height and density requirements and will provide sufficient hiding cover for grizzly bears. Notwithstanding the occurrence of widespread hiding cover, grizzly bear interactions with humans could occur anywhere on the post-closure landscape (*i.e.,* forests, shrublands, lakes, riparian grasslands *etc.*). This is because of the generalist foraging strategy of grizzly bears and their wide-ranging movements. Limiting lethal interactions between bears and humans is less a matter of designing the closure landscape than it is managing human use levels and activity types on the landscape. This will be done through multi-stakeholder post-closure land planning as described below.

b. Describe the process the CVRI will use to determine final land uses and landscape design to support these uses.

Response:

CVRI will utilize a very similar process to that of the Luscar and Gregg River Mines Land Management Plan (Karmacharya *et al.* 2011) of which Sherritt is an active member. This on-going process engaged 18 stakeholders representing a variety of community of interests such as conservation, stewardship, non-motorized recreation, motorized recreation, commercial outfitting, hunting and eco-tourism. The process established a vision for the area that would see the continued conservation of the habitats and populations of wildlife supported by the post-mining reclamation. The plan accommodates a wide range of land uses including: hiking, wildlife viewing, photography, off-highway vehicle use, cross country skiing, mountain biking, equestrian, ecotourism, hunting, trapping, angling, and research/interpretive activities. All of these land uses are restricted in a manner that minimizes impacts on focal wildlife species such as grizzly bear. Examples of cooperative land planning/management practices that would reduce grizzly bear mortality risk include:

- locate and site trails in a manner that minimizes line of sight and known areas of concentrated grizzly bear occurrence;
- late season (post-denning for females) ungulate hunting regulations;
- bear safety programs;
- bear deterrent programs if necessary; and

- closure of fishing in selected lakes to reduce interactions.

71. Consultant Report #7, Figure 19.

a. Discuss how the CVRI management strategy and reclamation will comply with ESRD's Grizzly Bear Recovery Plan.

Response:

The Alberta Grizzly Bear Recovery Plan (2008-2013) is part of a larger recovery program to fulfill Alberta's commitment to the *Accord for the Protection of Species at Risk* and to the *National Framework for the Conservation of Species at Risk*, combined with requirements established under Alberta's *Wildlife Act* and the federal *Species at Risk Act.* The overall goal of the recovery program is to restore species identified as *Threatened* or *Endangered* to viable, naturally self-sustaining populations within Alberta. The grizzly recovery plan was prepared by recovery teams composed of a variety of stakeholders including conservation organizations, industry, landowners, resource users, universities, government agencies and others. The goals and strategies of the plan are provincial in scope, although regional implementation teams are developing specific management approaches. The recovery plan is not designed to demand and monitor compliance by individual companies or land users, although the recovery principles, goals/objectives and strategies can serve as a broad guide for individual land users.

The seven strategies of the Alberta grizzly bear recovery plan are listed below along with aspects of the CVRI management strategy and reclamation approach.

- Reduce Human-caused Mortality of Grizzly Bears

The CVM lease restricts firearm use on the mine and hence reduces mortality risk. CVRI will work with other stakeholders post closure to reduce mortality risks to bears (see ERCB SIR #70). Section 5.3.5.1 (pages 75 and 76) of CR #7 provide specific management strategies to limit sources of project-specific grizzly bear mortality during mining. Section 6.6.5 (pages 94 and 95) list a number of measures for reducing regionally-exerted and cumulative mortality effects.

- Improve Knowledge of Grizzly Bears

CVRI has and will continue, along with other stakeholders, to fund focused studies that provide knowledge of grizzly bear response to surface coal mining and reclaimed mine lands. CVRI will also work with other stakeholders to more fully understand cumulative land use impacts on grizzly bears.

- Reduce Human/Bear Conflicts

See response to ERCB SIR #70.

- Improve and Deliver Education and Outreach Programs to Enhance Grizzly Bear Conservation

CVRI considers this to be primarily a provincial government responsibility but will provide information on grizzly bear/mining interactions (see Section 4.5.4 of CR #7) to assist these programs.

- Identify, Track, and Maintain Habitat for Grizzly Bears

This is done by the Foothills Research Institute provincially and regionally (see Figures 15, 16 and 17 of CR #7)

- Improve Inter-jurisdictional Cooperation

CVRI will cooperate with a wide range of stakeholders in post-closure land use planning and will continue to provide information on grizzly bear/mining interactions to ESRD.

- Improve and Apply *R*egulations and/or Legislation for Recovery Implementation

This is clearly a provincial government responsibility. CVRI will abide by any and all regulations and legislation pertaining to grizzly bear conservation.

b. Provide a tabular representation of pre-disturbance habitat units, (hectares of H, M, L suitability) of the LSA for grizzly bears based on an analysis of predisturbance habitat suitability figures provided with in the Mammalian Carnivore Report.

Response:

ERCB Table 71-1 provides a tabular representation of the pre-disturbance habitat units both in an area (hectares) and suitability (very low, low, moderate, high and very high) context of the LSA for grizzly bears.

Table 71-1 Pre-Disturbance Habitat Units of the LSA for Grizzly Bears

Spring Season			
Suitability		**Hectares**	**Percent of LSA**
	Very Low	861.6	8.6%
	Low	1639.6	16.3%
	Moderate	3348.6	33.3%
	High	2866.6	28.5%
	Very High	1343.9	13.4%

Table 71-1 Pre-Disturbance Habitat Units of the LSA for Grizzly Bears			
Summer Season			
Suitability		**Hectares**	**Percent of LSA**
	Very Low	617.1	6.1%
	Low	1820.6	18.1%
	Moderate	2915.5	29.0%
	High	2714.5	27.0%
	Very High	1992.6	19.8%
Fall Season			
Suitability		**Hectares**	**Percent of LSA**
	Very Low	555.8	5.5%
	Low	1850.6	18.4%
	Moderate	3114.6	31.0%
	High	2626.3	26.1%
	Very High	1906.6	19.0%

72. Consultant Report #7, Section 6.6.5, Page 94.

CVRI states, "*The causes and pathways of cumulative effects on grizzly bear mortality are both compounding and synergistic. Increasing open motorized road access is being used by humans leading to increasing probability of contact with grizzly bears. Such contacts are resulting in death of bears as indicated by the high percentage of radio collared bears being killed. Probability of contact between humans and bears is highest in areas where attractive, high quality habitat overlaps with high road densities and potential for human occurrence (Nielsen et al. 2006). Examples of such areas include regenerating clear cut complexes and riparian vegetation along river valleys (Roever 2007) and surface coal mine permit areas (Stevens and Duval 2005, Kansas 2005).*"

a. In Volume 1, Section 16.2.2, Table E.16-3, pg. E-264-268 and Table E.16-4, pg. E-268-271 CVRI lists oil and gas surface rights dispositions and other surface dispositions issued to Forestry companies within the area covered by the Project. Discuss CVRI's intent to partner with regulatory agencies and other resource development companies to develop and implement local and regional integrated land management strategies to minimize the effects of roads, their locations, resource development and reclamation to grizzly bear populations of the LSA and RSA.

Response:

In Section 6.6.5 (pages 92 to 95) of CR #7 CVRI provides a detailed discussion on regional cumulative effects vectors and pathways as they influence grizzly bear mortality and populations. CVRI clearly states that.....

"The greatest threat to regional grizzly bear populations is human-caused mortality caused by illegal hunting, self defense kills by ungulate hunters, and vehicle/train collisions (Table 35; Section 5.3.5). Any land use that results in increased access or use of access by individuals

carrying firearms is a threat to grizzly bear population persistence. Any roads with vehicle speeds greater than 70 kph also have potential to result in increased grizzly bear mortality."

One of the main factors leading to increased grizzly mortality are roads that are open to public access (Alberta Grizzly Bear Recovery Team 2008). Industrial road dispositions are a primary source of such potential mortality. Although some roads are gated, many are not and those that are gated are often easily breached. Grizzly bear mortality has been correlated with road density with more roads usually equating to more human use (Alberta Grizzly Bear Recovery Team 2008). Existing open road densities in the RSA (0.73 km/km^2) and in the BMUs that surround the Project area (Embarras - 0.85 km/km^2 and Lendrum - 0.88 km/km^2) are approaching or exceed published thresholds for grizzly bear mortality risk in high quality habitat areas (*i.e.,* 0.6 km/km^2).

In recognition of the regional access/mortality issue CVRI lists a number of mitigation measures that could be implemented and monitored to minimize grizzly bear mortality (Section 6.6.5 and 7.0, pages 94 to 96). Below we list the measures pertaining to roads and mortality risk:

- establish full-time 'bear warden' positions in the RSA and greater region. Purpose would be to provide a presence in the field to deter poaching and educate the public about measures to reduce grizzly mortality. Bear wardens could implement road closure measures and study their effectiveness. Funding for these should be cost-shared between government and companies (oil and gas, logging and mining) active in the region;
- establish a 'no-firearm/no hunting' land use buffer or zone along major primary road corridors that support high quality grizzly bear habitat;
- reduce traffic speeds on major primary roads in the RSA and greater Yellowhead region to <70 kph in areas of known high quality habitat;
- conduct detailed human use inventory studies to better understand actual human use of landscapes and hence better predict and manage mortality risk; and
- identify road decommissioning and closure (*i.e.,* gating) opportunities and use 'bear wardens' to enforce and monitor success.

CVRI is ready and willing to cooperate/partner with regulatory agencies and other resource development companies to develop and implement local and regional integrated land management strategies to minimize the effects of roads, their locations, resource development and reclamation to grizzly bear populations. This should be done in conjunction with the evolving land use planning framework for the Upper Athabasca Region.

b. Provide an assessment of the cumulative effect that all existing, approved and planned development within the RSA would have on the sustainability of grizzly bear populations of the RSA. Include the effect the developments would have on grizzly bears populations during development and post closure. Include the effect of displacement of grizzly bears from development areas.

Response:

Section 6.0 of CR #7 assesses the project-specific and regional cumulative effects of the Project on mammalian carnivores, including grizzly bears (Section 6.6.5). The assessment followed approaches recommended by the Cumulative Effects Practitioners Guide (Hegman *et al.* 1999) and the EUB/AENV/Natural Resources Conservation Board Information Letter "*Cumulative Effects Assessment in Environmental Impact Assessment Reports Required under the Alberta Environmental Protection and Enhancement Act*" (EUB/AENV/NRCB 2000). The latter source states that a Cumulative Effects Assessment (CEA) ".....should include a discussion of historical developments and activities that have created the current "baseline" conditions. It should clearly:

1. Describe the state of the environment that will be affected by the proposed Project;
2. Predict the incremental consequences of developing the Project;
3. Identify potential interactions of stresses created by the Project with other stresses and, if possible;
4. Predict the cumulative consequences of those combined effects.

All of the above tasks were completed as part of the Project CEA for grizzly bears. Section 4.5 of CR #7 describes the local and regional grizzly bear habitat and population status using empirical regional information from the Foothills Research Institute (*i.e.,* Point #1 above). Section 5.3.5 predicts the project-specific effects on grizzly bears in local and regional contexts (*i.e.,* Point #2 above). Section 6.4 identifies past, present and reasonably foreseeable future land actions and Sections 6.5 and 6.6.5 describe how these land uses could interact with the Project to affect grizzly bear habitat and populations regionally and cumulatively. Section 6.6.5 also concludes that regional land uses have combined to result in a grizzly bear population that is in all likelihood declining. Mortality likely exceeds recruitment and cumulative effects thresholds have been breached and are significant. Given the additional reasonably foreseeable land uses in the region, the cumulative effects on grizzly bears will likely continue to be significant unless aggressive and cooperative measures that control access are implemented successfully.

Section 4.5 also concludes that project-specific effects of the Project are not likely to contribute to increased mortality because of the nature of coal mining land use (*i.e.,* mine lease closed to the public carrying firearms and probable increases in high quality grizzly bear habitat at closure).

The Project-specific conclusions are based on ungulate and grizzly bear response to the nearby CVM operations.

Section 5.3.5.3 (Sensory Disturbance/Movement Obstruction) provides detailed discussion of the effects of regional developments on the potential displacement of grizzly bears. This discussion is based on empirical data from the Foothills Research Institute.

c. Provide a discussion of development and reclamation strategies that would be implemented to ensure sustainable grizzly bears populations in the LSA, and RSA due to the cumulative regional development effect to grizzly bears populations.

Response:

As previously stated and stressed, the number one threat to grizzly bear populations in the RSA is human-caused mortality caused by illegal hunting, self defense kills by ungulate hunters, and vehicle/train collisions. This threat is caused in large part by open motorized route access proliferation resulting from existing and proposed from cumulative regional development. Although this same threat is negligible in the LSA during mining and reclamation the conversion of land tenure to the Crown has potential to result in grizzly bear mortality.

In our response to ERCB SIR #72a we reiterate the kinds of regional measures that are required to minimize regional and cumulative grizzly bear mortality threat. A serious and cooperative effort will need to be conducted to close roads to the firearm carrying public, especially those in high suitability grizzly bear habitat. New roads in such settings should be gated and success of gates monitored and enforced. Older, existing roads should be reviewed and closed/gated as required. Opportunities to "put roads to bed" should be sought in a cooperative fashion using existing grizzly bear habitat mapping. On-going DNA census should be conducted to determine if current grizzly bear populations are below those calculated in 2002. Additional DNA population estimates should be conducted after 5 to 10 years of road closure implementation. All this work needs to be done cooperatively in a multi-participant framework.

10. ERRATA

73. Appendix 9, Section 2.0.

CVRI states the faults and folds are 70 to 150 million years old. However, it is the sediments that are that age.

Response:

CVRI acknowledges and confirms the correction.

74. Section C, Table C.2-5.

The units in the title should be in “million tonnes”.

Response:

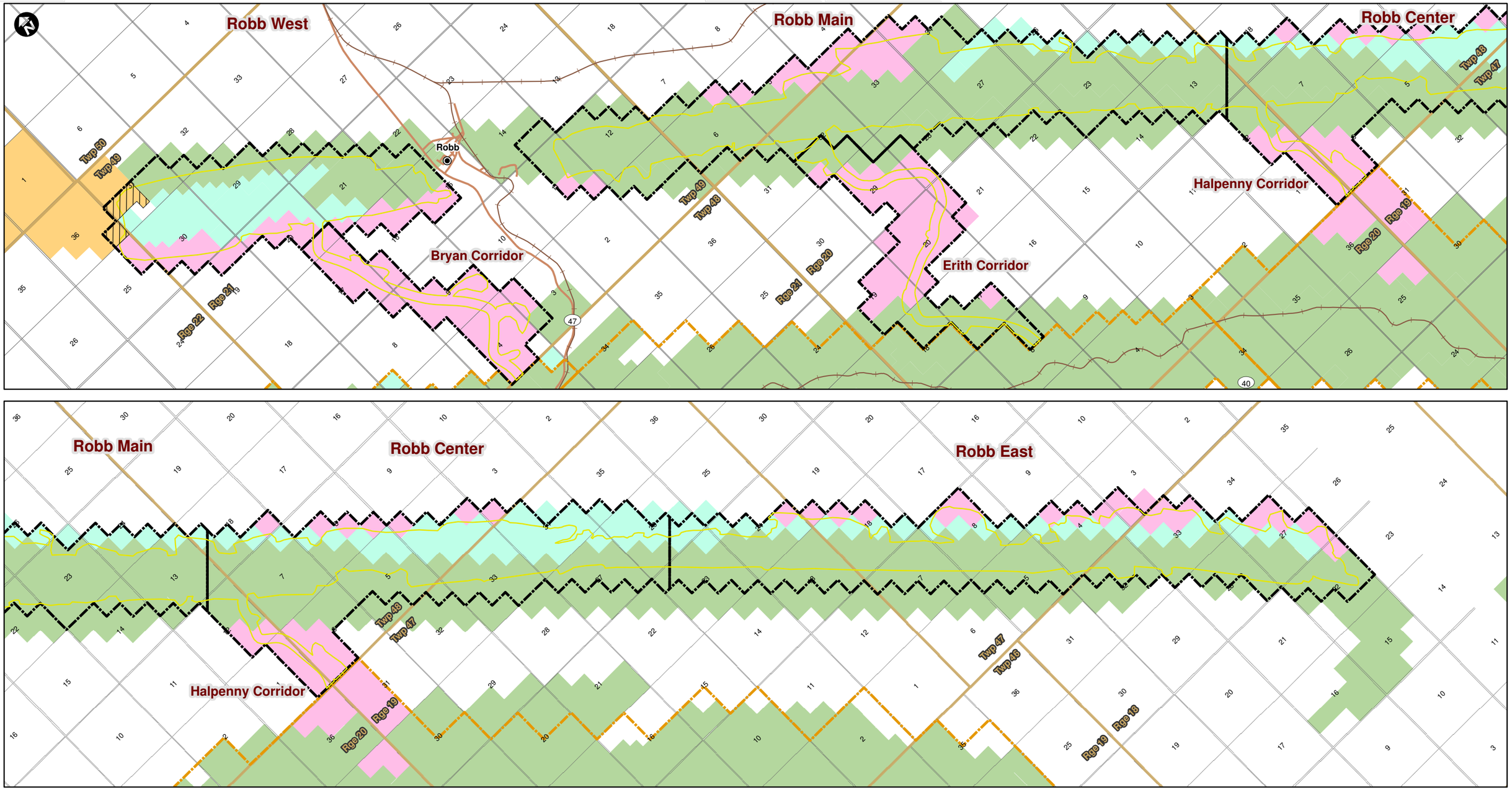
CVRI acknowledges and confirms the correction.

75. Section B, Table B.6-2.
The units in the title should be in million RMT.

Response:

CVRI acknowledges and confirms the correction.

FIGURES



Legend

- Lease Applications Pending - CVRI
- Lease Requested - CVRI
- Lease Applications - Others
- Lease - CVRI
- Lease - Mancal Coal Ltd.*
- Overlap Area
- Proposed Robb Trend Mine Permit Boundary
- Proposed Footprint
- Existing Mine Permit Boundary

0 0.75 1.5 3
Kilometres

* McLeod River Mine (South Mine) Permit C82-60

REF: CVRI, Robb Trend Project Extents 2B.dwg, Feb 7, 2011.

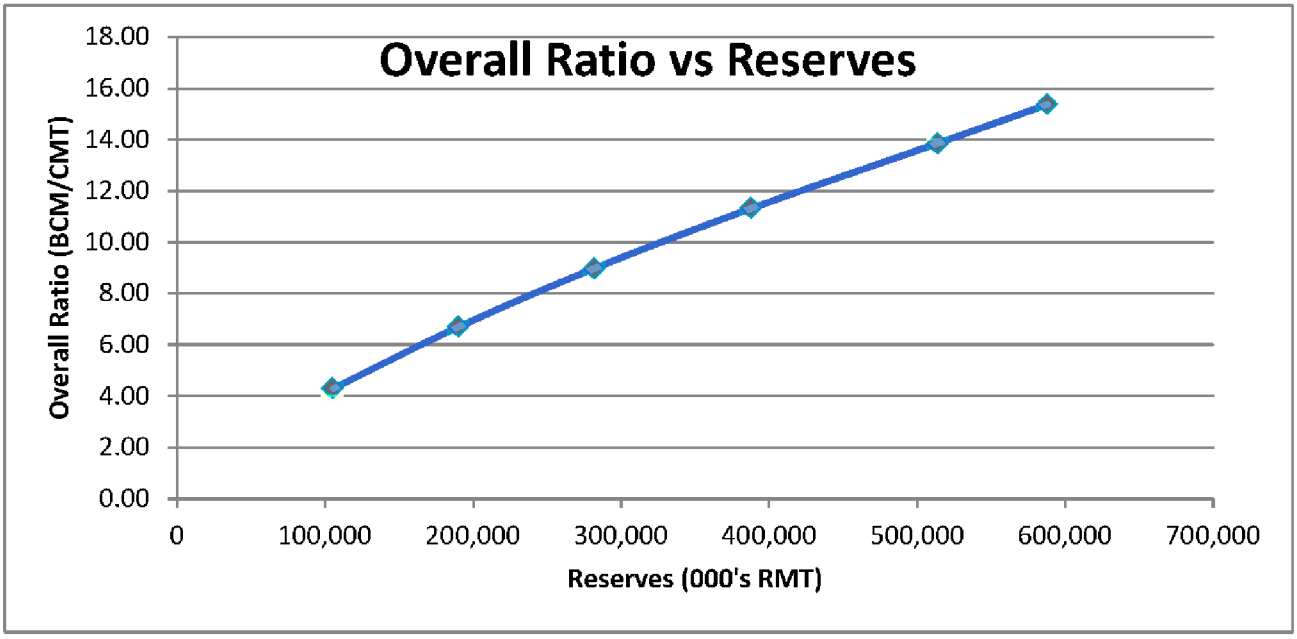
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Coal Leases

DRAWN: PS
CHECKED: KY
DATE: Nov 26/12
PROJECT: 08-041

FIGURE:
7-1

BESR	West	Main	Center	East	Total	Overall Ratio	
	(000's RMT)					BCM/RMT	BCM/CMT
4	26,739	52,397	8,344	17,974	105,454	2.15	4.30
6	**55,502**	**88,833**	**15,005**	**30,709**	**190,049**	**3.35**	**6.70**
8	74,591	141,772	22,134	43,320	281,817	4.49	8.98
10	100,090	200,811	30,695	56,282	387,878	5.66	11.32
12	129,132	274,861	40,161	69,663	513,817	6.93	13.86
14	144,573	305,693	52,611	85,450	588,327	7.69	15.38



REF: CVRI, 2012.

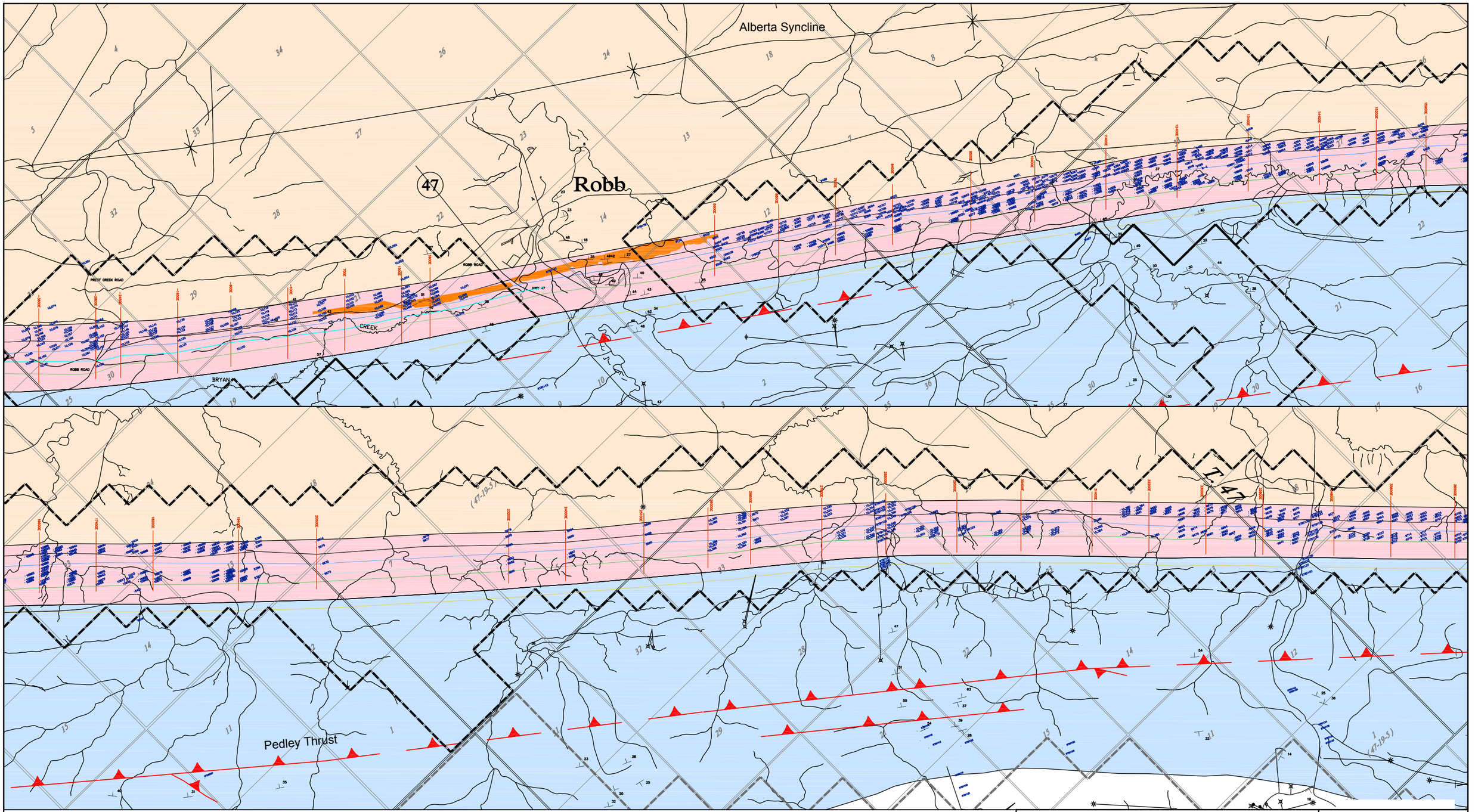
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Project Reserves (Table B.6-2 Revised)

FILE: ...Final Docs\SIR\ERCB\SIR Drawings.dwg

DRAWN: RS/JG
CHECKED: KP
DATE: Dec 4/12
PROJECT: 08-041

FIGURE:
12-1



Legend

- Drillhole
- Thrust Fault
- Cross-Section Trace
- Bedding Dip (44)
- Fold Axis
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary
- Underground Mining Area

STRATIGRAPHY

- Paskapoo Fm.
- Coalspur Fm.
- Val D'Or Seam
- McPherson Seam
- Silkstone Seam
- Mynheer Seam
- Brazeau Fm.
- Brazeau Seam

0 0.5 1 2km

Scale 1 : 50 000

Source: CVRI, 2012.

PROJECT:

Coal Valley Mine
Robb Trend Project

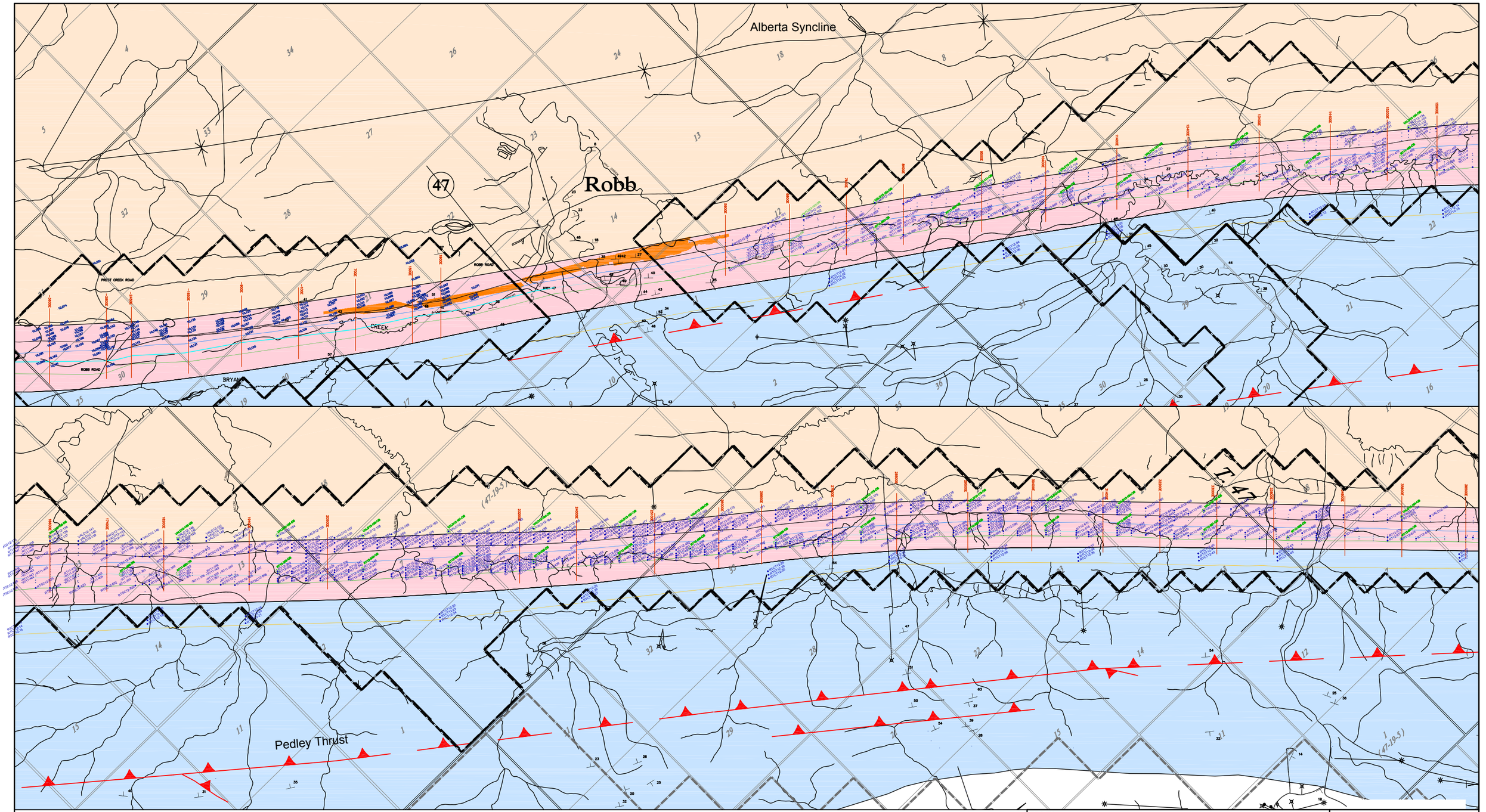
TITLE:

Completed Drilling

cvri

Docs\SIR\ERCB\Fig 13-1 Completed Drilling.dwg

DRAWN: JG	FIGURE:
CHECKED: KP	**13-1**
DATE: Dec 5/12	
PROJECT: 08-041	



Legend

- Existing Drillhole
- Planned Drillhole
- Overburden Sample
- Thrust Fault
- Cross-Section Trace
- Bedding Dip
- Fold Axis
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary
- Underground Mining Area

STRATIGRAPHY

- Paskapoo Fm.
- Coalspur Fm.
- Val D'Or Seam
- McPherson Seam
- Silkstone Seam
- Mynheer Seam
- Brazeau Fm.
- Brazeau Seam

0 0.5 1 2km

Scale 1 : 50 000

Source: CVRI, 2012.

PROJECT:
Coal Valley Mine
Robb Trend Project

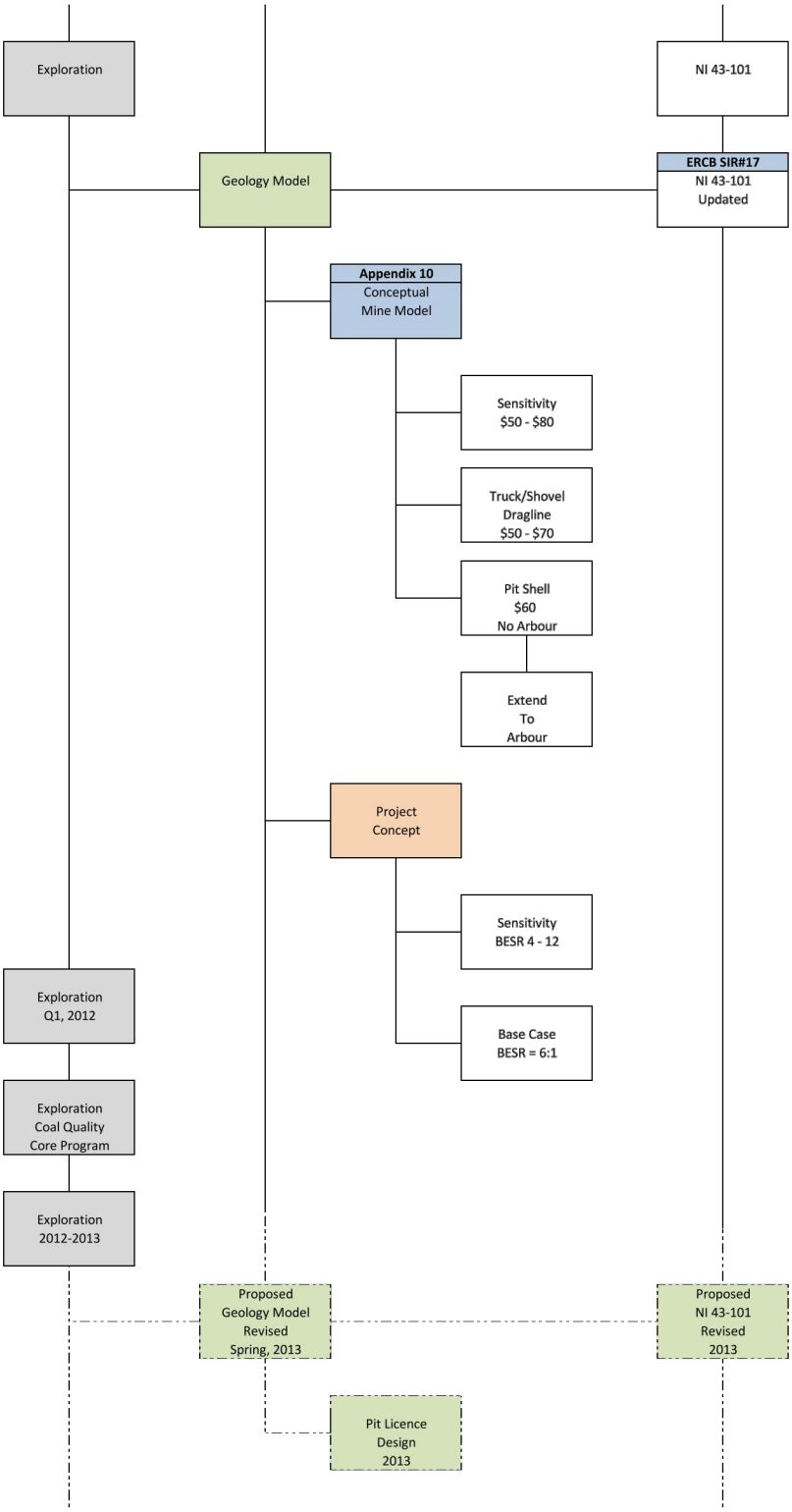
TITLE:
Proposed Drilling

cvri

Docs\SIR\ERCB\Fig 13-2 Proposed Drilling.dwg

DRAWN: JG	FIGURE: 13-2
CHECKED: KP	
DATE: Dec 5/12	
PROJECT: 08-041	

ROBB TREND PROJECT
CONTEXT OF NORWEST REPORTS



REF: CVRI, 2012.

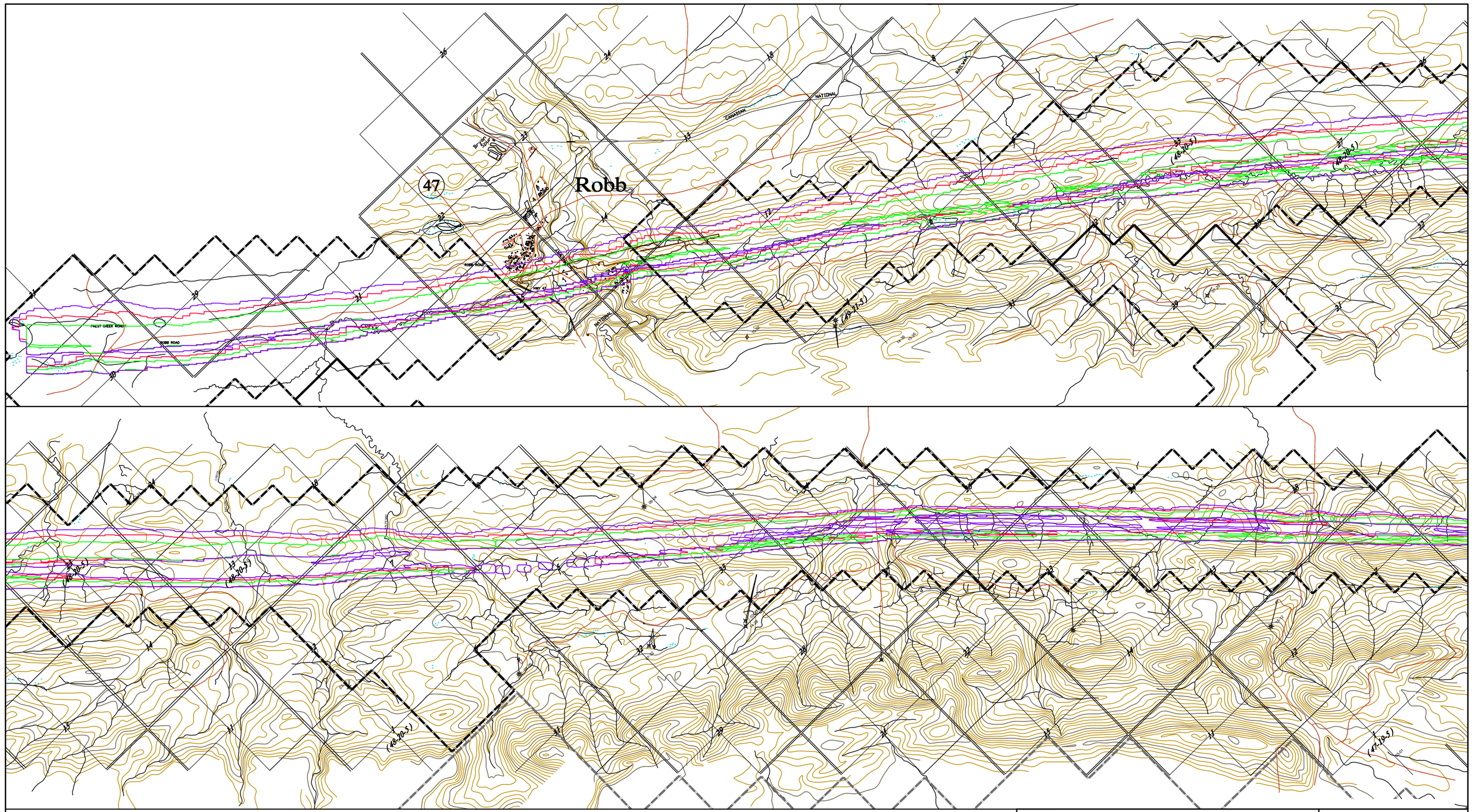
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Context of Norwest Reports

FILE: ...Final Docs\SIR\ERCB\SIR Drawings.dwg

DRAWN:	RS/JG
CHECKED:	KP
DATE:	Dec 4/12
PROJECT:	08-041

FIGURE: **17-1**



Legend

- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary
- Strip Ratio 4
- Strip Ratio 6
- Strip Ratio 8

Source: CVRI, 2012.

0 0.5 1 2km

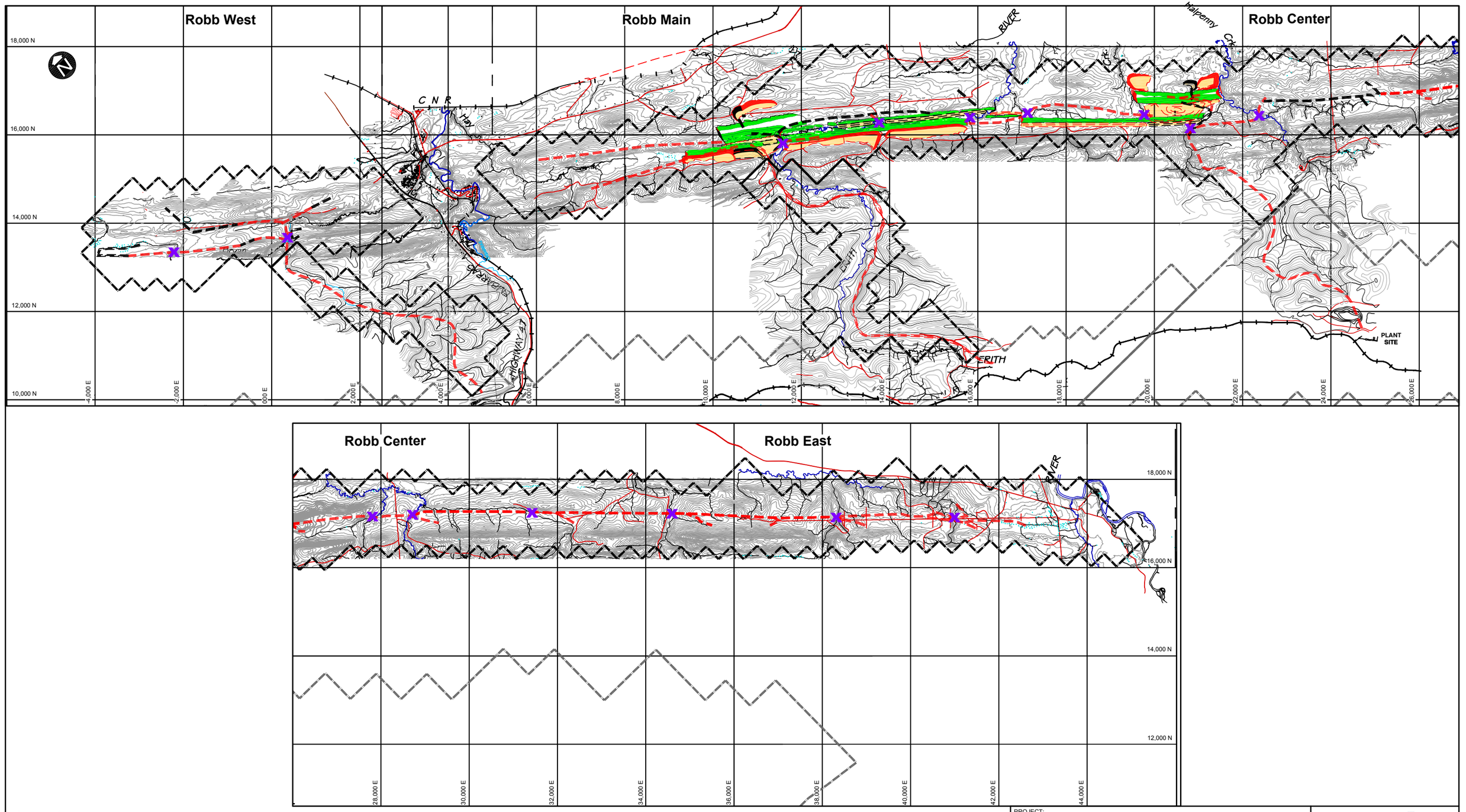
Scale 1 : 50 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Outlines of LG Shells

FILE: ... Final Docs\SIR\ERCB\Fig 28-1 Outlines.dwg

DRAWN: JG	FIGURE:
CHECKED: KP	**28-1**
DATE: Dec 3/12	
PROJECT: 08-041	



Legend

- Road Crossing
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, 2012.

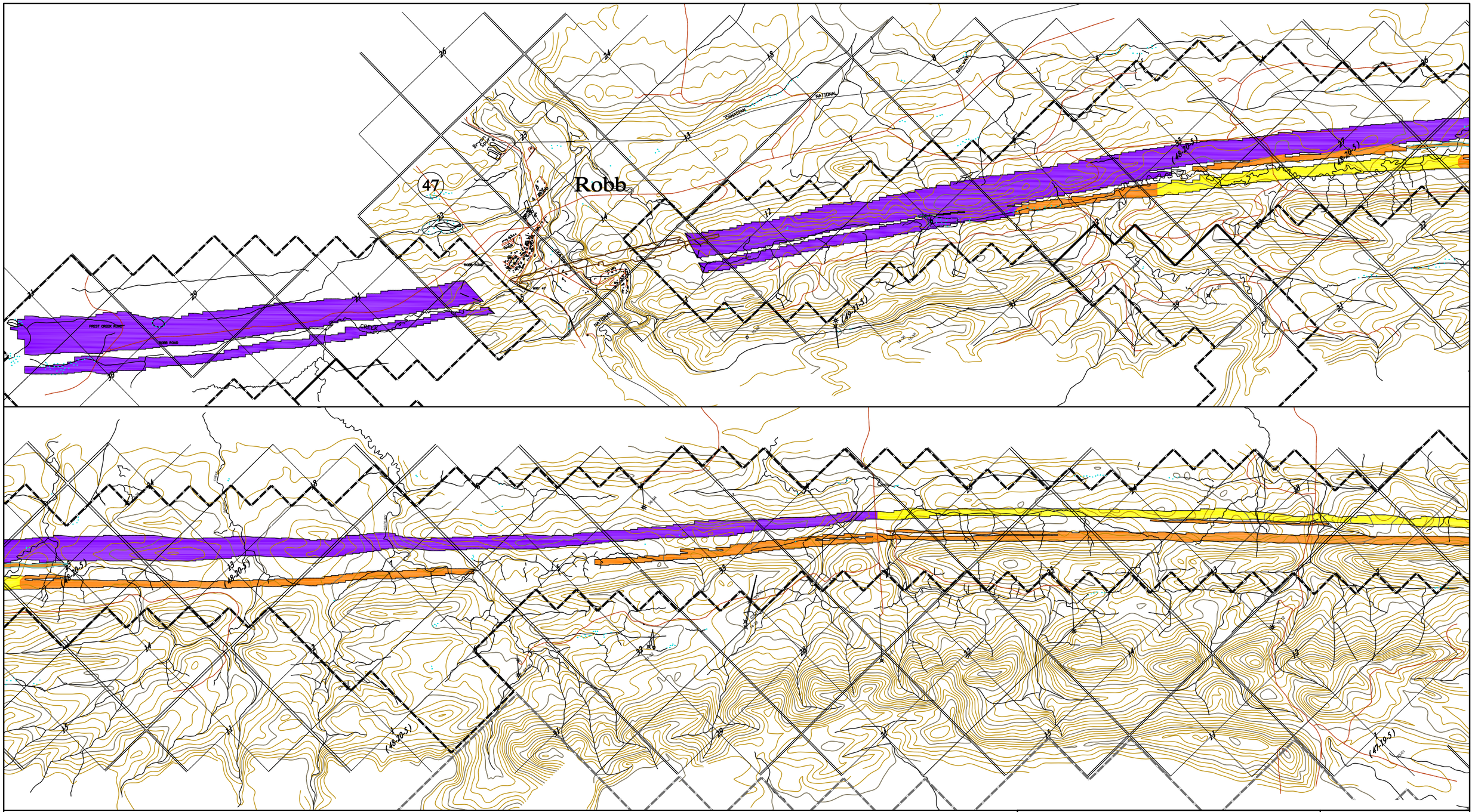
0 1 2 3 4 km

SCALE 1 : 80 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Main Haulroads and Watercourse Crossings

FILE: ..Final Docs/SIR/ERCB\Fig 34-1 Haulroads.dwg
DRAWN: JG
CHECKED: KP
DATE: Dec 5/12
PROJECT: 08-041
FIGURE: **34-1**



Legend

- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary
- Dragline
- Dragline or Excavator
- Excavator

Source: CVRI, 2012.

0 0.5 1 2km

Scale 1 : 50 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Pit Mining Methods

... Final Docs\SIR\ERCB\Fig 34-2 Pit Mining.dwg

DRAWN: JG	FIGURE:
CHECKED: KP	**34-2**
DATE: Dec 5/12	
PROJECT: 08-041	