#890

TECHNICAL REPORT

RESOURCES AND RESERVES OF THE LODGEPOLE COAL PROPERTY

FORT STEELE MINING DIVISION

SOUTHEAST BRITISH COLUMBIA

For:

cline mining corporation

Author: J.H. Gray, P.Eng.
GR Technical Services Ltd.

Dated: February 22, 2006

cline
mining corporation

TITLES DIVISION, MINERAL TITLES
VICTORIA, BC

APR 2 8 2006

FILE NO. 13755-04-118
LOG IN NO. 600033

April 10, 2006

Attn: Kim Stone
Ministry of Energy and Mines
Titles Division
6th Floor-1810 Blanshard Street
Victoria, B.C. V8W 9N3

Re: Assessment Reports for Cline Mining Corporation's Lossan and Lodgepole Coal Projects

Dear Kim,

I have enclosed copies of Technical Reports and Technical Appendix data taken from our recent Feasibility Studies on both our coal projects. We trust this data will meet the Government's Assessment requirements for our work programs and will be filed accordingly. Please do not hesitate to call should you have any questions.

Yours truly,

Gordon Gormley
Executive V.P. & C.O.O.
Cline Mining Corporation

cc: Mr. Barry Ryan (no encl.)
K. Bates (no encl.)

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2.0 Table Of Contents

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3.0 Summary

3.1 Project Highlights

Cline Mining Corporation's Lodgepole Property is planned to produce 2.0 million tonnes of product PCI coal over a 20-year mine life from a conventional Open Pit mine, wash plant, and rail coal loadout. Alternative mine layouts have been considered in the design process to minimize environmental impacts, optimize the resource extraction, and to provide most attractive economics over the mine life. Planning has taken advantage where possible of the compact nature of the deposit by keeping the waste dumps within the same valley as the mine excavations, and will utilize backfilling of mined out pits where possible.

The processing plant has been located one kilometer south of the mine in the adjoining valley and will keep the plant refuse within the same valley as the plant. This location is on the existing access road to the deposit providing for a haul route to the Canadian Pacific Railway line by upgrading 33 km of existing road.

At full production the mine is expected to employ up to 320 people with the nearest community being Fernie B.C. a distance of 48.3 km from the plant site.

The mine plan provides for a clean coal strip ratio of 5.8:1 (BCMW to MTCC) for the first 5 years of operation and a life of mine strip ratio of 8.0:1. These comparatively low stripping ratios are expected to support the project's competitiveness in the future.

Table 3-1 Project Highlights

Clean Coal Production per year	2.0 million tonnes
Life of Mine Clean Coal Strip ratio	8.0:1 BCMW:MTCC
Project life	20 years
Total Project Revenues	$4.1 Billion
Direct Employment	320 persons
Project Footprint	1050 hectares
Clean Coal Yield @ 8% moisture	65%
Product Utilization	PCI
Product Quality	
Ash	10%
Volatile Content	19.1%
Heat Value	7,720 K cal/kg
Distance to Fernie B.C.	48.3 km.
Clean Coal Haul Distance to Loadout (east of Elko B.C.)	33 km.
Pretax Economics	
Base Coal Price	$102.40 ($85 US)
Exchange Rate	$1.00 = $0.83 US
Project Capital	$153.1 Million
Financial Results	
Internal Rate of Return	29.58%
Net Present Value (@ 10% discount)	$274.5 Million
Payback	Year 3

3.2 Introduction

This report was prepared by GR Technical Services Ltd. (GR Tech) for Cline Mining Corporation. The report assesses the coal geology, resources and reserves, geotechnical parameters, coal processing and handling, mine planning, site layout, environmental considerations, potential markets and financial factors for the Lodgepole coal property located in southeastern British Columbia. The study has been executed by several specialty consultants with the results compiled by GR Technical Services Ltd. The specific technical areas of the work have been covered by:

- GR Technical Services - Geology Resource Modeling and Mine Planning and Design
- BGC Engineering Inc. - Geotechnical Technical and Hydro-geology
- AD Walters and Associates - Coal Metallurgy and Infrastructure and Plant Design
- EBA Engineering Consultants Ltd.– Environmental and Regulatory

Canadian Pacific Railway - British Columbia, Canada

Figure 3-1 Lodgepole Project, British Columbia, Canada

3.3 Capability and Independence

GR Tech was commissioned to compile the work and complete the study. Specific work areas by responsibility include:

- GR Technical Services Ltd.
- Review the existing exploration data.
- Compile a drill hole database.
- Prepare a computer generated geological model.
- Provide an estimate of coal resources that conforms to NI 43-101 current reporting standards and procedures.
- Economic pit limits and detailed pit and waste dump designs
- Production scheduling
- Detailed Capital and operating Costs for mine development and mine operations
- Develop Financial Analysis
- Prepare Final Report.

AD Walters and Associates Ltd.

- Coal Testing and Process Design
- Process Plant design
- Infrastructure Design

BGC Engineering Inc.

- Geotechnical and Hydro-geology field work
- Development of Slope design parameters for Open Pits and waste fill structures
- Hydro-geological flow rate estimates.

EBA Engineering Consultants Ltd.

- Environmental field investigations and baseline studies
- Air and water quality studies
- Permit application
- Community Relations and Socio Impact Studies
- Regulatory Affairs

The purpose of this report is to present full economic assessment of the development and operation of the Lodgepole Property. This includes an estimate of resources, prepared in accordance with current reporting standards including the geology of the property, the exploration history, and the modeling techniques that formed the basis for resource estimation and the technical and economic basis for a viable and sustainable operating and financial plan.

3.4 Scope of Work/Limitations and Exclusions/Materiality

GR Tech's work in preparing this Feasibility Study is based on information provided by Cline Mining Corporation, public domain documents, budgetary service and supply costs and work carried out by others. Included in the work by others are evaluations and predictions of future coal prices. GR Tech used information from these parties where it was reasonable. Further information or evaluation of other documents should be sought directly from the parties involved. Because of the forward looking nature of the project economics, GR Tech does not warrant any implied or inferred accuracy to future cost and price information or assumptions used in this study.

3.5 Description of Project and Assets

The Lodgepole Coal Operations is planned as an open pit mining operation with an onsite coal washing plant, coal fired dryer, and rail loadout facility near Elko BC. The site facilities include the access road, power line, wash plant, dry refuse disposal, water management structures, and offices and warehouse. A contract mining company will provide the mining equipment and facilities.

The project will mine 325,914 kBCM of waste and 62,435 kMTRC to produce 40,599 kMTCC over the 20-year operating life of the property. Potential for future expansion of the reserve base exists.

3.6 Geological Setting

The Jurassic-Cretaceous Kootenay Group occupies part of a northwest trending belt of predominantly non-marine rocks comprising part of the Rocky Mountain Foothills and Front Ranges of southwestern Alberta and southeastern British Columbia. The Kootenay Group extends from just north of the United States border in the south to the North Saskatchewan River in the north (Gibson, 1985). All five of the operating mines in the Elk Valley extract coal from the Kootenay Group.

The Lodgepole property represents a dip slope of Mist Mountain sediments. The main portion of the proposed mine area has been interpreted as a uniform dip slope with a 1.5km strike length and 1.0km dip length. Several rolls or undulations are apparent in the interpretation of the footwall of the bottom coal Zone.

The property hosts at least 285m of Mist Mountain sediments with at least 34 coal layers, of which at least 19 seams have thicknesses of greater than 0.75m. Because of the individual seam complexity, Zones were developed which represent all of the coal and interseam rock partings within a Zone.

The lowest two coal Zones on the property host the majority of the resource, at least 79% of the total resource model. The proportion of Zones 1 & 2 is even greater within the various economic pit limit options. The bottom coal Zone is up to 17.0m thick, coal Zone 2 is up to 9.5m thick, and coal Zone 3 is up to 7.1m thick.

3.7 Mineral Resources and Reserves

The resource and reserve estimates were completed using MineSight, a widely used and proven geology and mine planning computer software program that is employed at all of the coal mines in the Elk Valley for use on complex, multi-seam coal deposits.

The Lodgepole coal deposit is classified as a 'moderate' geology type in accordance with GSC Paper 88-21. The structure of the deposit is interpreted as a simple dip slope with few folds or faults. There are eight coal Zones within the modeled area, which represent sequences of coal and rock layers. Minimum mineable thickness for coal seams is 0.3m and for rock partings is 0.6m.

The coal quality database includes raw ash values, and out of seam dilution and coal loss has been estimated to predict run of mine coal quality. A specific gravity vs. ash relationship has been used to estimate model and plant feed tonnage.

The drill hole information has been composited into mineable units and interpolated into a 3d Block Model. The interpolation distances from each block to the closest composite (see Dist. To Comp. in Table 3-2 below) has been used to designate the Resource Class within the 3d Block Model according to the GSC 88-21 guidelines for moderate geology type. The results of the interpolated coal volumes in the 3d Block Model are summarized below.

Table 3-2 Coal Resources by Resource Class – Total Model (no mining limits applied)

Resource Class	Model Code	Dist. To Comp. (m)	Coal Volume (kBCM)	Proportion of Coal Modeled
Measured	1	0-300	49,599	48%
	2	301-450	19,602	19%
Indicated	3	451-600	14,505	14%
	4	601-900	17,321	17%
Inferred	5	901-1200	2,110	2%
	6	1201-2400	0	0%
Speculative	9	> 2400	0	0%

Table 3-3 Total Model Coal Volumes by Coal Zone (All Classes)

Coal Zone	Avg. Coal Thickness (m)	Coal Volume (kBCM)	Proportion of Coal Modeled
1	14.3	64,651	62.7%
2	4.3	16,722	16.2%
3	3.0	10,556	10.2%
4	1.8	5,130	5.0%
5	1.5	2,525	2.5%
6	2.2	3,555	3.4%
7	<0.6	0	0%
8	<0.6	0	0%

In-place coal resources are estimated in Table 3-4.

Table 3-4 In-place Coal Resources

ASTM Group	Measured	Indicated	Inferred
Low Volatile Bituminous	105.878	48.694	3.228
Total	154.572		

The updated resource estimate for the Lodgepole property is presented below for 3 different strip ratio delineated pit limits. Two cross-sections are included to indicate the extent of these mining limits on East/West sections 5466000N and 5466700N respectively.

Table 3-5 Measured and Indicated Pit Delineated Resources for the Lodgepole property

Delineation Description	Raw Coal (1)	Clean Coal (10% Ash) (1)	Waste
	(kMTRC)	(kMTCC)	(kBCMW)
Cum Ratio 3 : 1 BCMW : MTRC	22,940	14,895	73,094
Cum Ratio 5 : 1 BCMW: MTRC	72,220	47,255	383,028
Cum Ratio 7.5 : 1 BCMW: MTRC	130,184	87,097	1,005,674

Note: (1) Coal tonnes include 8% moisture raw and clean.

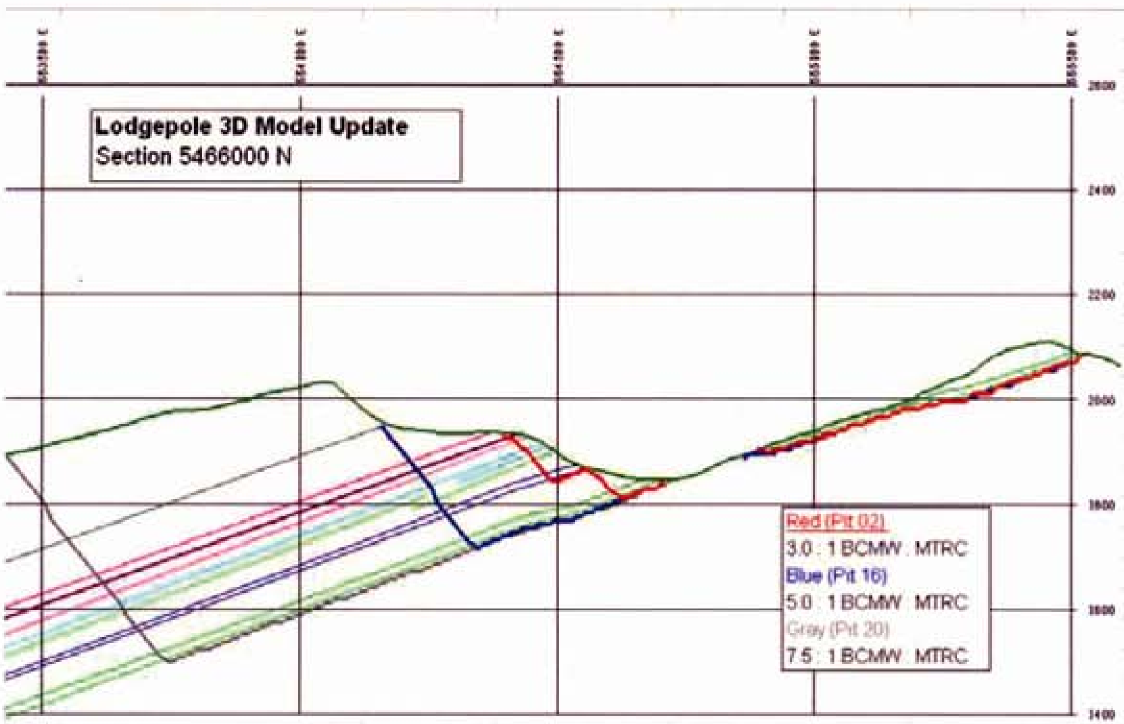

Figure 3-2 Section 546000N with mining limits

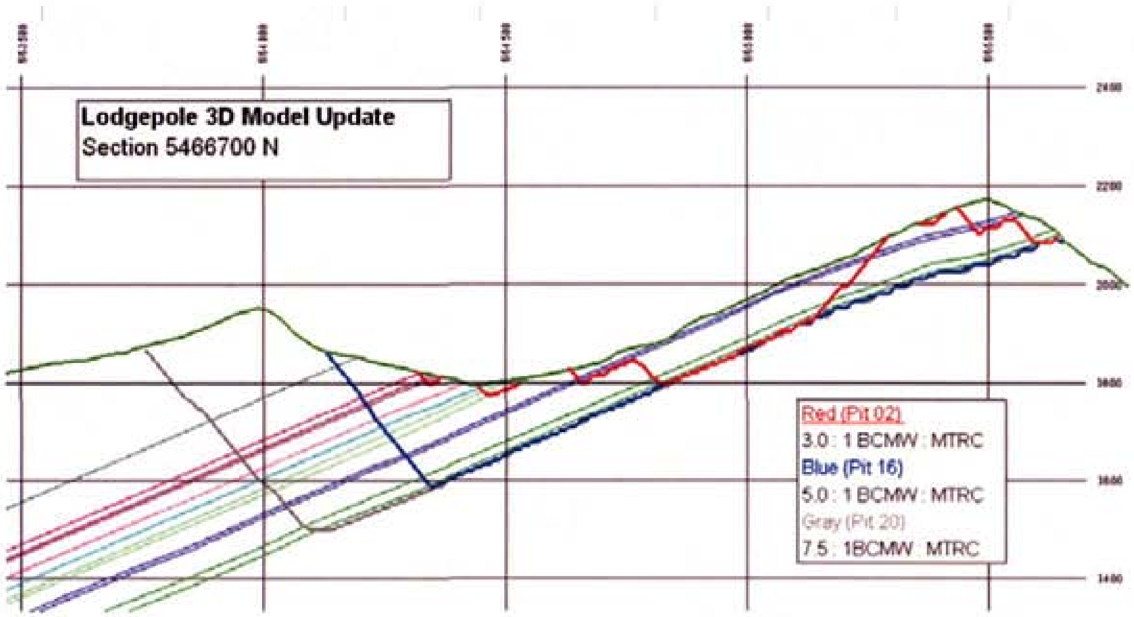

Figure 3-3 Section 546700N with mining limits

The Reserves for the Ultimate pit limit are shown in the Table 3-6 and summarized in Table 3-7. This indicates that 85% of the mineable reserves are made up of Zone 1 & 2 coal. An even higher proportion of 1 and 2 Seam is mined in the early years of the project. The details of the development of the ultimate pit are described in Section 19.8– Mine Planning.

Table 3-6 Reserves for Ultimate Pit (P654) Measured and Indicated

Coal Zone	In-situ Coal (kBCM)	ROM Coal (kMTRC)	Clean Coal (MTCC)	Ash	Proportion Coal Of Modeled (Clean)
1	28,718.3	43,077.5	28,253.4	24.9	70%
2	6,473.6	9,730.8	6,093.7	27.8	15%
3	3,367.7	5,241.4	2,773.2	34.1	7%
4	1,391.1	2,139.4	1,708.0	33.6	4%
5	849.9	1,311.8	921.8	37.1	2%
6	544.1	933.9	849.3	33.8	2%
Total	**41,344.8**	**62,434.8**	**40,599.4**	**26.8**	

Table 3-7Clean saleable surface mineable coal reserves

ASTM Group	Clean Saleable Surface Mineable Coal Reserves (Million Tonnes)	
	Proven	Probable
Low Volatile Bituminous	35.532	5.067
TOTAL	40.599	

3.8 Mine Plan

The ultimate mine pit limit and mining area are shown schematically in Figure 3-4.

The mine plan is made up of 5 phases which mine from lower strip ratio areas in Zone 1 and Zone 2 to high strip ratio areas toward the later years of the schedule. Mined coal is hauled to directly to the raw coal dump at the plant, and waste is hauled to the designated dump sites.

Mine operations will be carried out by a mining contractor. The mining costs have been derived from known operating costs for the specified equipment fleet. A contractors fee has been added to include profit and overhead for the contractor, plus capital financing costs for the contractors onsite facilities and ancillary equipment. Equipment ownership costs has been added to the direct mining costs for the large mining equipment including shovels, large trucks, and mining drills.

The nominal major equipment fleet is:

- Drills: Terex SKF Reedrill (9 ⅞")

- Primary Shovels: O&K RH200
  - Rated Bucket Capacity: 26 LCM

- Haul Trucks: CAT 785
  - Coal Capacity (under loaded): 99.5 MTRC
  - Waste Capacity: 68.2 BCMW

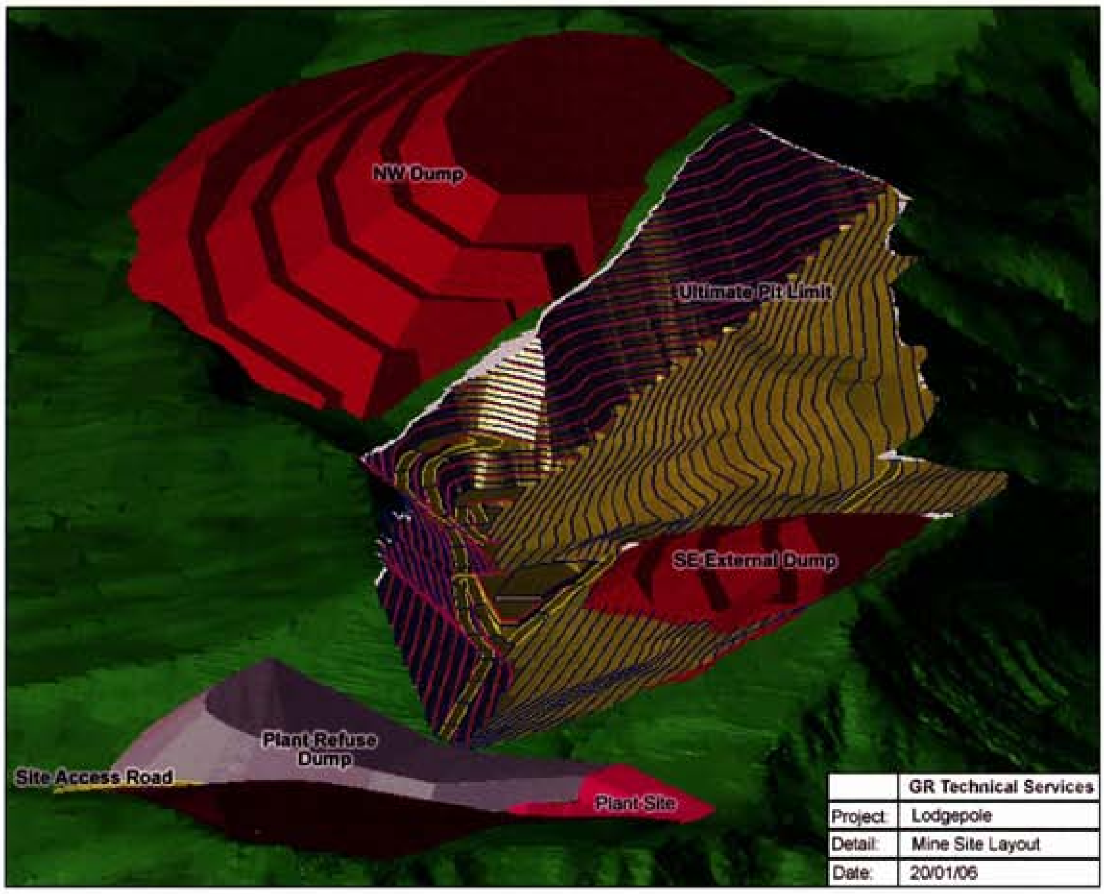

Figure 3-4 Mine Layout

3.9 Coal Processing and Handling

The proposed Coal Process for the Lodgepole Coal Project will employ a Dense Medium Cyclone separations circuit, a fines cleaning Water-Only Cyclone / Spirals circuit, and a Classifying Cyclone / Froth Flotation circuit. Tailings will be filtered and formed into a dewatered cake, blended with the Coarse Refuse and trucked to a Stacked Tailings storage area. Clean Coal will be dried in a Coal Fired Thermal Dryer Plant then transferred to the Railcar Loadout Facility.

The coal processing facilities for the Lodgepole Coal Project have included in the design a Coal Preparation Plant, Clean Coal Thermal Dryer and associated ancillary facilities capable of producing 2.0 million tonne/year of clean coal at 10% ash and 8.0 % moisture.

The clean coal will be trucked on an upgraded road from the proposed Coal Processing Plant site to the Clean Coal Railcar Loadout facility the location of which is proposed to be at or near Elko, B.C.

The available drill core analytical data indicates that the Coal Processing Plant will produce an overall yield of 65.0 % (adb) at 10% ash (adb) after accounting for all processes between the resource model and the final market tonnes. The available drill core analytical data indicates that the Coal Processing Plant will produce an overall life of mine yield of 65.0 % (adb) at 10% ash (adb) after accounting for all processes between the resource model and the final market tonnes. This yield has been used in the production schedule to forecast coal tonnes for market which has then been used for financial calculations. The coal preparation plant yield as quoted in Section 18.4 has only been used for plant design.

The proposed Coal Processing Plant feed rate will be 485 tonne/h (arb) of incoming Raw Coal and 312 tonne/h (arb) of Clean Coal product. These figures take into account the portion of the Clean Coal that is used to fire the Clean Coal Thermal Dryer.

The plant would employ some 77 trained personnel. A further 40 contract drivers will be employed on the Clean Coal haul to the rail loadout and the Plant Rejects haul to the proposed Stacked Tailings area.

The capital cost estimate for the Coal Processing Facilities is $122,879,433.00 (Can) including all ancillary facilities. This figure excludes costs for Plantsite Access Roads, Construction earthworks and all mine related requirements.

3.10 Environmental and Regulatory Requirements

Two primary tributaries of Foisey Creek fall within the mining area. Foisey Creek flows over 2.3 km to its confluence with the Flathead River. This confluence point is 50 km upstream of the Flathead River crossing of the US border. The headwaters of Foisey Creek cover only a very small area of the Flathead Valley and are located well away from the special management area of the Flathead River corridor. The mine project is located on the west slope of McLatchie ridge, which is to the west of the Flathead valley. It is positioned to take advantage of the terrain to utilize water management facilities to control all contact water and contact runoff and treat, if required, all contact water to meet the Federal and Provincial Government water discharge guidelines. Collection will be done utilizing diversion ditches, collection ditches and sedimentation ponds followed by a polishing pond.

Acceptable air quality will be achieved by extensive mitigative measures, including watering of mine haul roads, in potential high dust emission periods.

The dumps, pits, access roads and the plant site area will be reclaimed to meet the requirements of the British Columbia Ministry of Energy and Mines. The waste rock and mill rejects will be reclaimed utilizing the best available management techniques that have been developed over the years in British Columbia on existing mine sites. The end land use is anticipated to be wildlife habitat, likely grizzly bear and goats.

The plant will be constructed south of the mining area just over the "saddle" (ridge) from the mine site in the Jack Creek catchment area, which drains into the Elk Valley drainage system. The dry tailings and coarse coal reject deposal site is presently planned in the same valley, west of the plant area.

Preliminary water quality data collected at on the Flathead and Lodgepole watersheds indicate that both watersheds are characteristic of drainages in mountainous areas of southeastern B.C. The dissolved oxygen at all five locations sampled is near or at saturation; conductivity (TDS) is very low (<20) in the spring during runoff and raises gradually over the summer; and the pH is in the neutral to alkaline range.

Total metals were measured at expected concentrations with none exceeding the CCME guidelines for the protection of Aquatic Life and in most cases below detection.

Nutrients were generally low and well below levels of concern for flowing water. Turbidity and Suspended solids are below the levels of concern used by DFO.

The land use in the area is mainly forestry, hiking, and hunting. Baldy Mountain Outfitters of Wardner British Columbia has a guiding tenure for this area. The area is fairly remote with limited access to the general public.

Open-pit mining of the Lodgepole deposit is expected to provide an economically stable source of revenue as well as a stable source of direct and indirect jobs throughout nearby communities. Several unique attributes of the deposit contribute to its operational stability: large resource contained in a very small area and low strip ratio at present and in future.

Mine operations at Lodgepole are expected to provide the following levels of employment and benefits:

Manpower			
Department	**Staff**	**Hourly**	**Total**
Mine Operations	6	123	129
Mine Maintenance	7	80	87
GME	13	-	13
Plant & Loadout	4	73	77
Local Overhead	15	-	15
Total Manpower	**45**	**276**	**321**

Note: The Mine Operations and Mine Maintenance numbers are averages over the life of the mine.

3.10.1.1 Marketing

The Lodgepole coal is extremely "friable" due to post deposition stress / strain. The fineness of this coal has been accounted for in the plant design and coal recovery.

The general coal characteristics are:

- At 19.1 % VM and reflectance of 1.45%, this coal is ranked as "Borderline" low volatile (LV) as per ASTM / ISO.
- Inherently this product has very low FSI (2.0) and the thermal rheological properties are non-existent, in this area. The main reason this coal is non-coking is the unusually high inerts (40-45 %), preventing the coal macerals from agglomeration during carbonization.
- There are no sign of in-situ or surface oxidation in the fresh coal, yet the agglomerating characteristics are missing due to the high inert levels.
- Due to higher rank (LV), this coal will be attractive for PCI, providing relatively higher coke replacement ratio in blast furnace.

The present market trend has high demand for Metallurgical and PCI Coal demands. There is currently a projected in-use dollar value of "Hard", "Semi-Soft" and PCI coals in the export market .The price of the Lodgepole PCI product is forecasted at $US80 to $US90 per MTCC.

3.10.1.2 Project Schedule

The overall project schedule (see Figure 3-5) is summarized as:

- Development of full Mine Permit application and submission by mid March.
- Project Approval period is 9 ½ months.
- Detailed design, procurement and award of contracts will be under taken during approval period.
- In order to meet a 2008 startup, construction and early ordering of critical path items need to being before permit approvals. This would require certain cost obligations by Cline should permits be delayed or not be granted. Construction and reclamation costs incurred in the case of permit denial will be the risk of Cline.
- Concurrent Mine Pre-Production and Plant Construction periods are 14 months
- First 3 months of Plant production is at half rate for Commissioning
- Coal Produced by Year end of 2007 is 0.2598 Million MTCC
- Full production of 2.0 Million tpa MTCC starts January 2008

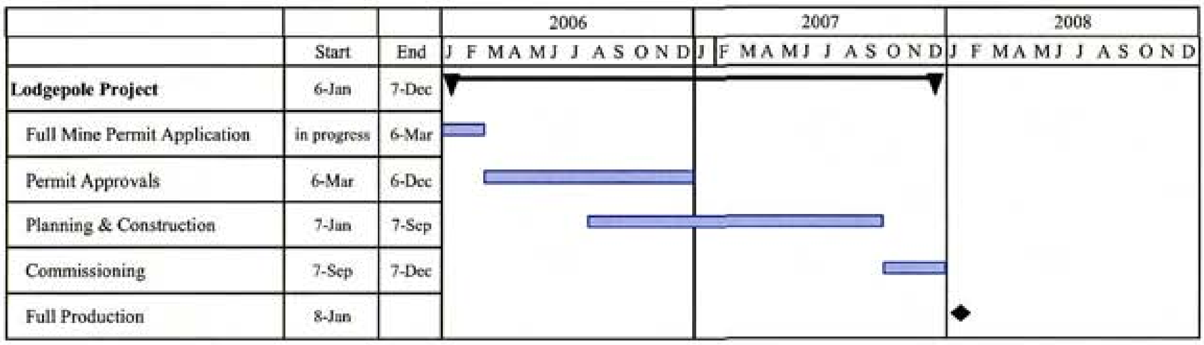

Figure 3-5 Project Schedule

3.11 Economic Analysis

3.11.1 Capital Costs

Initial capital costs for the project total $153,554,621.

At this time, the only sustaining capital identified is $2 million for an extension to the stock tailings in Year 6. Mine sustaining capital will be the responsibility of the mining contractor.

3.11.2 Operating Costs

Operating costs were calculated assuming contractor mining. No inflation has been applied to the base case.

Direct mining costs include equipment and mining costs for mining activities, a contractors fee of 20% to include profit, shops, ancillary equipment and contractors. Mining costs consist of direct operating costs of $1.146 billion and contractor financing costs of $84 million.

Processing costs are based on the raw and clean coal schedule which assumes a three-month initial commissioning period in which some 259,763 metric tonnes of clean coal are produced, followed by nineteen years of clean production in excess of 2,000,000 tonnes per year. Process plant and loadout operating costs total some $266.7 million over the life of the project.

Both Local Overhead and General Mine Expense are assumed to be fixed costs for the life of the project, subject to inflation. Local Overhead includes the costs of accounting, employee relations, safety & first aid, purchasing & warehousing and insurance.

Property Taxes, which would be assessed by the Regional District, are estimated at $10.7 million over the life of the mine. An allocation of corporate overhead is included at $500,000 per year. Reclamation costs accrued over the life of the mine is expended in the last two years of the project life, at a total of $6.1 million. British Columbia mineral taxes are estimated at $100.7 million over the mine life.

3.11.3 Cash Flow and Project Economics

Assuming a minimum acceptable rate of return of 10%, the base case generates an Internal Rate of Return of 29.58% over the life of the project, and the present value of cash flows is $274.5 million. Sensitivities run on the base case are summarized in Table 3-8.

Table 3-8 Lodgpole Cashflow Sensitivities

Case Number	Sensitivity	Pre-Tax IRR	NPV at 10%Millions $
Base Case 13		29.58%	$274.50
Case 13a	10% increase in mining costs	27.19%	$230.40
Case 13b	10% increase in rail costs	27.70%	$243.20
Case 13c	10% increase in plant yield	35.47%	$377.70
Case 13d	10% decrease in plant yield	23.14%	$173.20
Case 13e	10% increase in selling price	38.38%	$433.10
Case 13f	10% decrease in selling price	19.11%	$117.50
Case 13g	10% increase in plant capital	27.65%	$265.00
Case 13h	Exchange rate at $0.87US	25.15%	$203.10
Case 13i	Rail costs at $26.52/MTCC	23.49%	$178.30
Case 13j	Exchange rate at $0.79US	34.24%	$355.50
Case 13k	10% decrease in mining costs	32.00%	$320.80
Case 13l	10% decrease in rail costs	31.56%	$308.00
Case 13m	10% decrease in plant capital	31.97%	$286.20

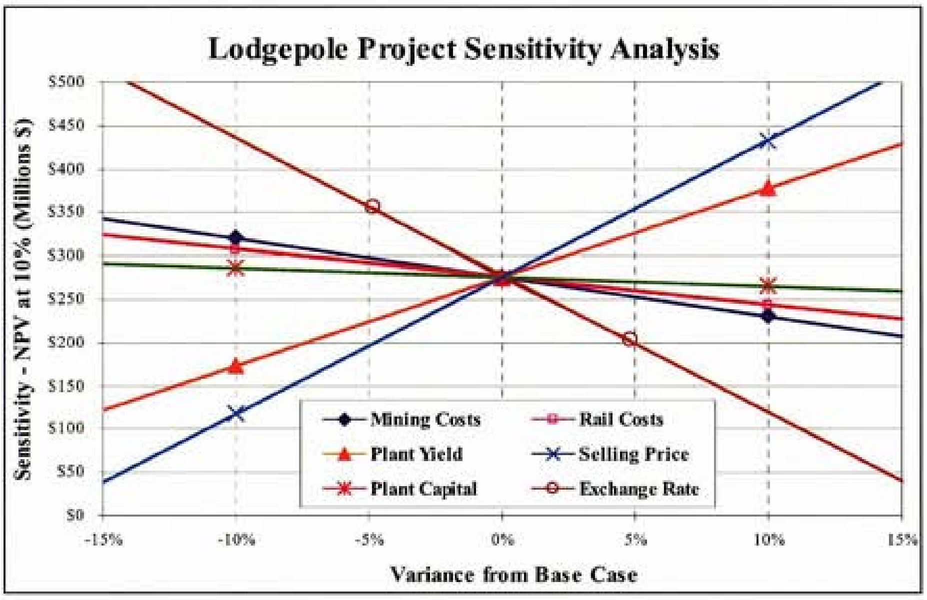

Figure 3-6 Lodgepole Cashflow Sensitivities

Figure 3-6 shows the most sensitive items are selling price, exchange rate and plant

3.12 Conclusions

The Feasibility Study describes the technical and economic aspects of the Lodgepole Project based on historical information, the field data collected, and the Feasibility level planning of the technical evaluation of the consultants involved. The conclusion of the study can be summarized as:

- A Large Coal Resource lies within a compact project area which reduces environmental impact
- There are a minimum number of waste dumps required with the opportunity for backfill.
- There is only one mining area with associated infrastructure which impacts only 2 localized drainage areas.
- The coal is of consistent market quality
- Markets are available
- There is existing infrastructure within an established export coal mining area.
- Local expertise and support enterprises are available to the operation
- The project is located in an active mining region with known regulatory process
- A Dry Tailings system is being used in the design
- The mining Strip ratio is Low in the near and long term
- Certain areas of the study rely on reasonable allowance and contingencies to ensure the project can proceed within the costs estimates of the study. Particularly these areas are in the Coal Load out land position and the location and operating conditions of the waste dumps. The load out land position is in application. The planned and alternate waste dump areas are viable within the cost allowances made but further environmental and geotechnical evaluations are required before the detailed operating design is finalized.
- The project construction schedule is aggressive and the impact of a delay needs to be considered. Alternately certain preparation activities such as access upgrades and establishment of initial construction facilities and sites can be started in advance of final project permits and approvals. This may require the start up to be delayed or corporate commitments by Cline Mining if the permits are delayed or not granted.
- The project has a suitable ROI on a pre-tax basis.

The Lodgepole property is suitable for further investment and justifies proceeding to more advanced levels of design and permitting.

3.13 Recommendations

The level of evaluation and engineering design in this study supports the costs estimates and allowances used in the economic assessment. Additional and ongoing work is required to advance the project to a EPC level and to develop detailed operating plans. More design work will also be required as the EIA and permitting process is advanced. The following work areas are recommended.

- More detail is required on the geotechnical and environmental aspects of the Dry Plant rejects. The dump is contained within the Jack Creek dump but further work will allow this dump to be operated more efficiently.
- More drilling is required to define the coal quality of the upper seams and for ARD/Environmental testing. This information is needed for the later years of the production Schedule.
- Coal Rail Load-out site is not finalized. The contingency for several viable sites has been included and application for crown land has been made. The most suitable location needs to be finalized.
- The Base plan waste dumps and alternatives need to be evaluated in light of the EIA work and ongoing Geotechnical analysis. The dump alternatives used in this plan are economic so the selection of the dump alternatives will need to include these other aspects of design.
- The use of backfill dumps should be considered in the detailed design stage which will further reduce the land disturbance, reduce the reclamation efforts, and could reduce mining costs with shorter haul distances.
- Work to date has been within the general limits of the slope design parameters provided by BGC. These limits are within the well established experience in the Elk Valley but final Geo-technical evaluation of the final detailed pit and dump designs will be required before mining operations begin.
- Project Schedule is aggressive. Areas where construction can start with preliminary approvals should be investigated.

4.0 Introduction and Terms of Reference

4.1 Introduction

This report was prepared by GR Technical Services Ltd. (GR Tech) for Cline Mining Corporation (Cline). The report assesses the coal geology, resources and reserves, geotechnical parameters, coal processing and handling, mine planning, site layout, environmental considerations, potential markets and financial factors for the Lodgepole coal property located in southeastern British Columbia (See Figure 4-1). The study has been executed by several experienced independent consultants with the results compiled by GR Technical Services Ltd. The specific technical areas of the work have been covered by:

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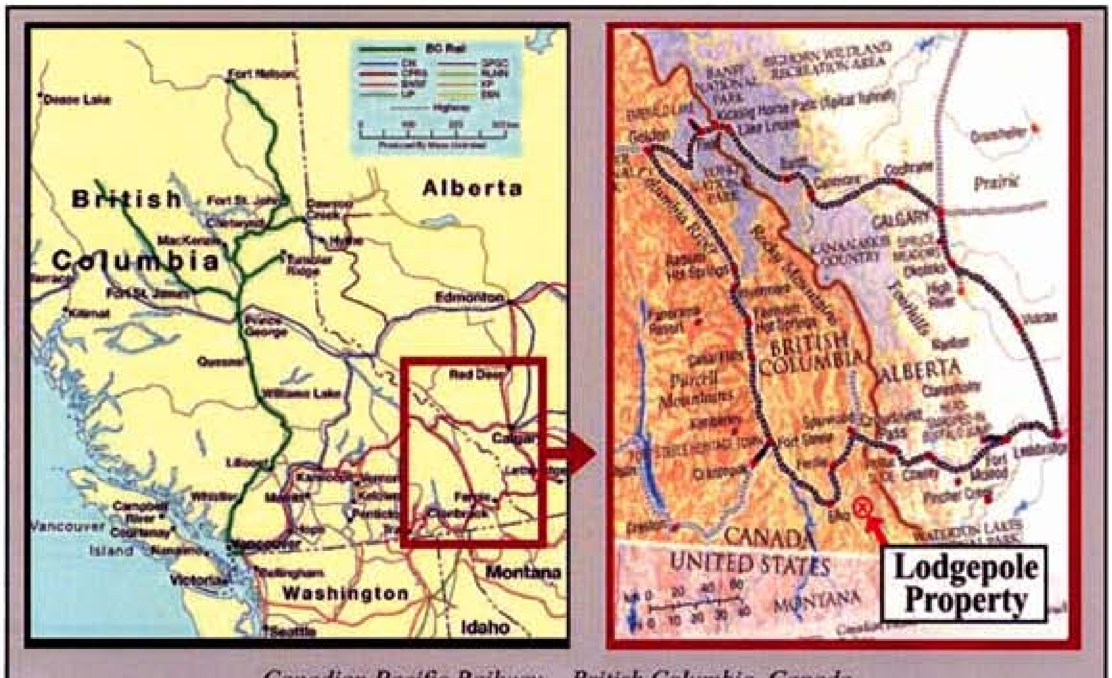


Canadian Pacific Railway - British Columbia, Canada

Figure 4-1 Lodgepole Project, Southeast British Columbia, Canada

4.2 Terms of Reference

4.2.1 Units

Unless otherwise stated all units within this report are "International System of Units" or SI the modern metric system adopted by the Canadian Standards Association (CSA). A glossary and a list of abbreviations and acronyms are included in Sections 26.0 and 27.0.

4.2.2 Purpose

GR Tech was commissioned to compile the work and complete the report for the study. Specific work areas by responsibility include:

GR Technical Services Ltd.

- Review the existing exploration data.
- Compile a drill hole database.
- Prepare a computer generated geological model.
- Provide an estimate of coal resources that conforms to NI 43-101 current reporting standards and procedures.
- Economic pit limits and detailed pit and waste dump designs
- Production scheduling
- Detailed Capital and operating Costs for mine development and mine operations
- Develop Financial Analysis
- To Prepare a Feasibility report.

AD Walters and Associates Ltd.

- Coal Testing and Process Design
- Process Plant design
- Infrastructure Design
- Detailed capital and operating costs for Process Plant and other ancillary facilities, exclusive of mine facilities and operation

BGC Engineering Inc.

- Geotechnical and Hydro-geology field work
- Development of Slope design parameters for Open Pits and waste fill structures
- Hydro-geological flow rate estimates.

EBA Engineering Consultants Ltd.

- Environmental field investigations and baseline studies
- Air and water quality studies
- Permit application
- Community Relations and Socio Impact Studies
- Regulatory Affairs

The purpose of this report is to present full economic assessment of the development and operation of the Lodgepole Property. This includes an estimate of resources, prepared in accordance with current reporting standards including the geology of the property, the exploration history, and the modeling techniques that formed the basis for resource estimation and the technical and economic basis for a viable and sustainable operating and financial plan.

4.2.3 Sources of Information

Assessment reports, from previous exploration programs, have provided the details on the geology of the property. As well, various government publications have been used to gain regional information. In 2005 Cline completed an exploration program which included drilling fifteen diamond drill holes, building approximately 2.3km of new road, and collecting coal samples from drilling for coal quality studies. To assist with the geotechnical analysis numerous trenches were dug to assess the foundation area for the proposed coal cleaning plant, and two holes were drilled to assess the foundation area of the plant refuse dump. A complete list of references is listed in Section 23.0.

Addition technical and costing information has been gathered from regional and local sources for supply of construction and services for the operations. Where possible, local Elk Valley contractor, operating supplies, labor rates, and services have been provided through budgetary quotes.

5.0 Disclaimer

GR Tech's work in preparing this Feasibility Study is based on information provided by Cline Mining Corporation, public domain documents, budgetary costs for services and supplies, and work carried out by others. A list of data and information sources is listed in Section 23.0. References included in the work by others are evaluations and predictions of future coal prices. GR Tech used these marketing predictions as provided. Further information or evaluation of these other documents should be sought directly from the parties involved.

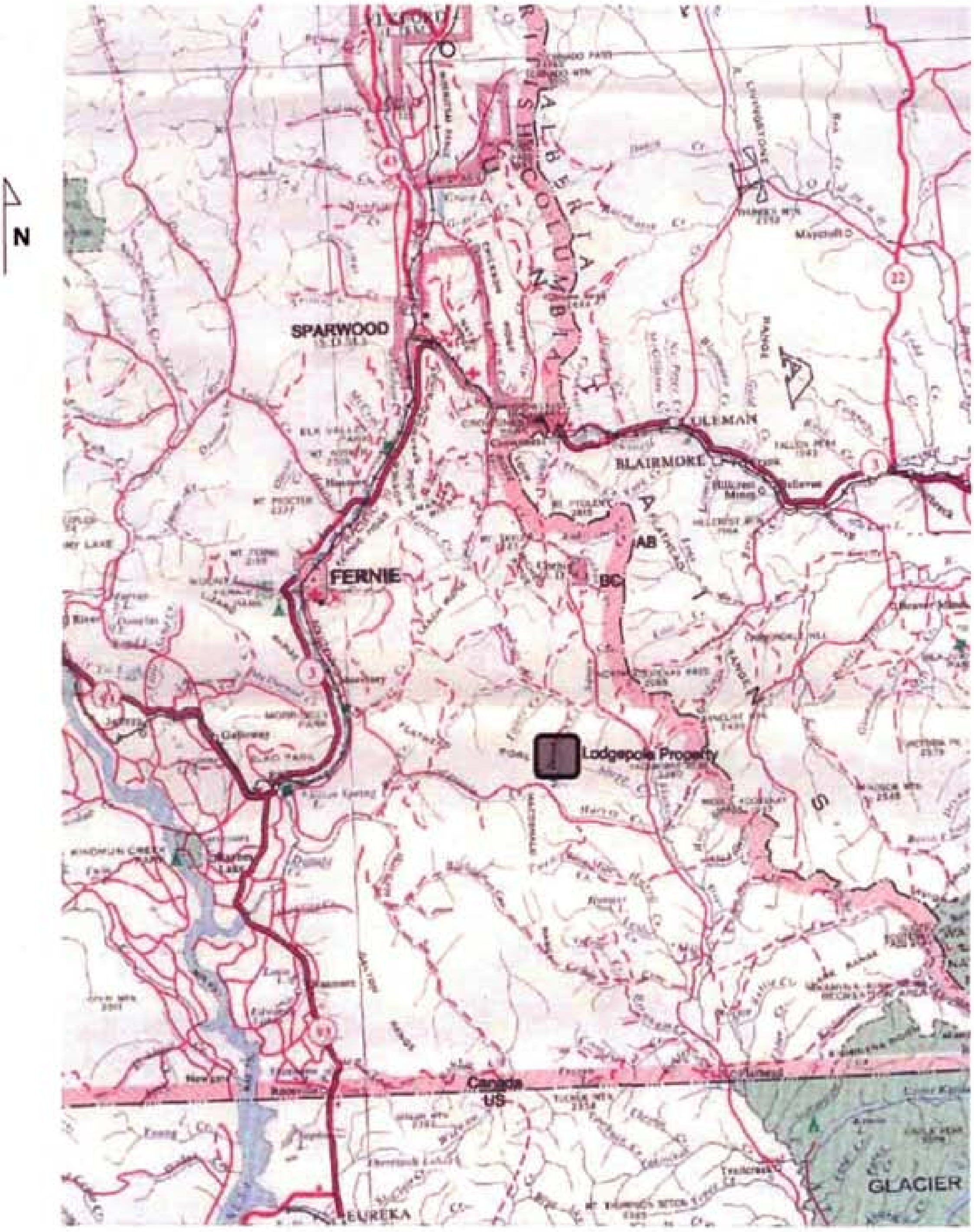
Because of the forward looking nature of the project economics, GR Tech does not warrant any implied or inferred accuracy to future cost and price information and assumptions used in this study.

6.0 Property Description and Location

The Lodgepole property is within the Fort Steele Mining Division, southeastern British Columbia, on NTS map sheet 82G/07, centered at 5 466 000N, 664 450E (NAD 83, Zone 11). The B.C. TRIM map area is 82G.037.

Figure 6-1 is a general site location map, which shows the property relative to the City of Fernie, the village of Sparwood, the British Columbia/Alberta boundary, and the Canada/USA border. The property is 31 air kilometers southeast of Fernie.

Figure 6-2 is the project location map showing road access in the area. Two operating coal mines are also indicated, Elkview in the north and Coal Mountain on the east side of the coalfield.



1:600 000

Figure 6-1 General Site Location

(From Ministry of Environment, Lands and Parks, South Eastern BC, 1992)

CLINE MINING CORPORATION
-LODGEPOLE PROPERTY-
LOCATION MAP

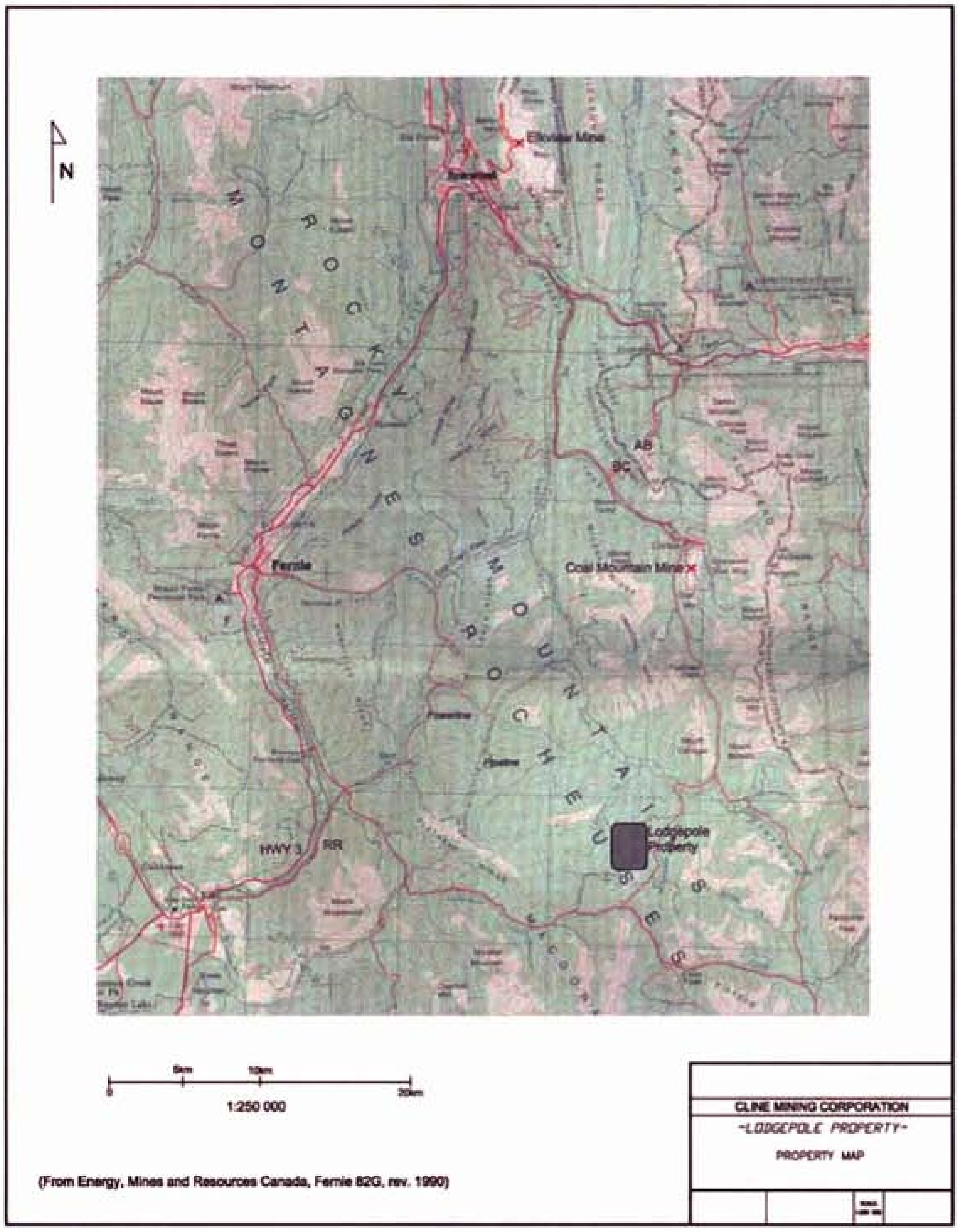


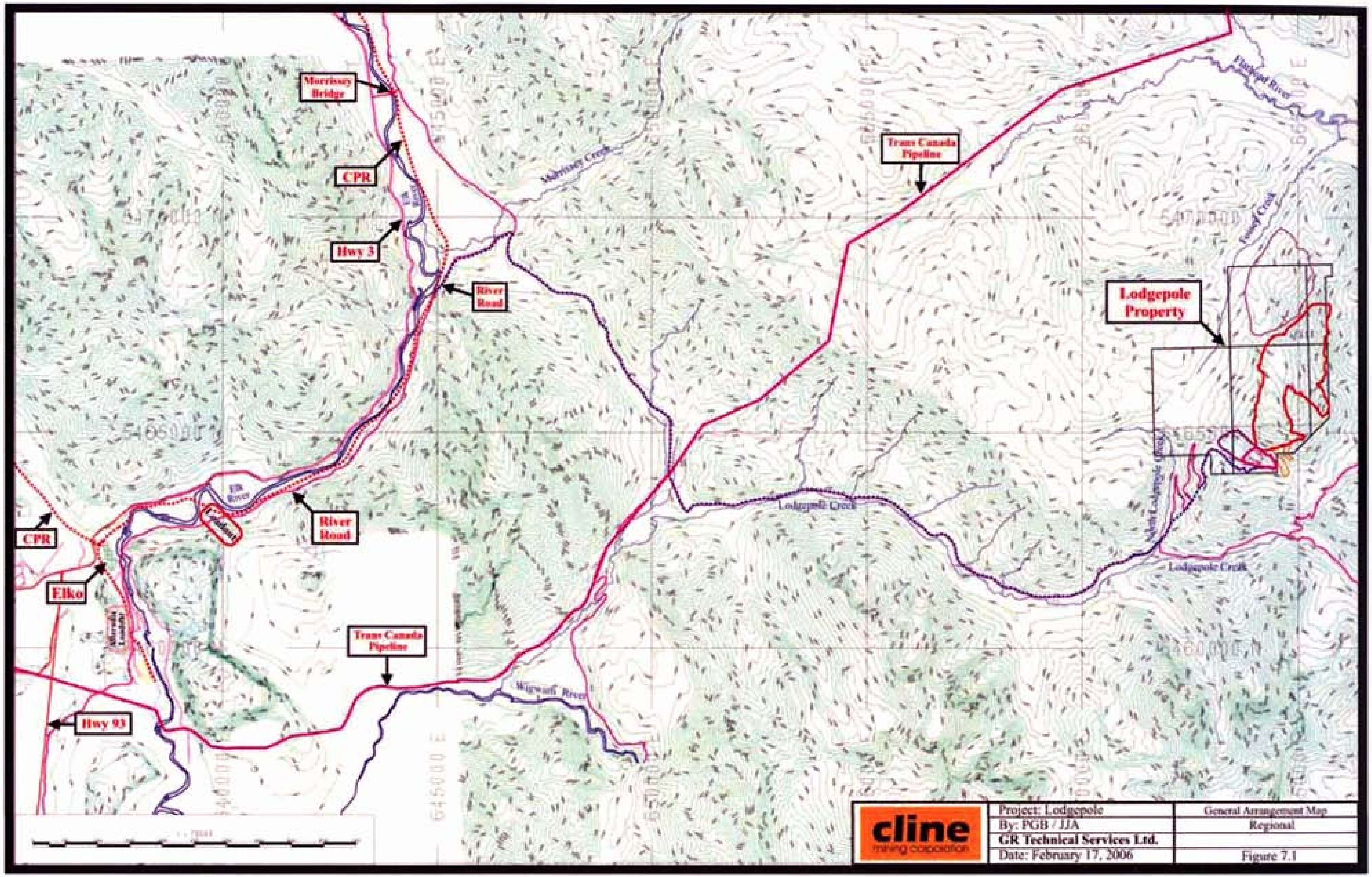
Figure 6-2 Project Location Map

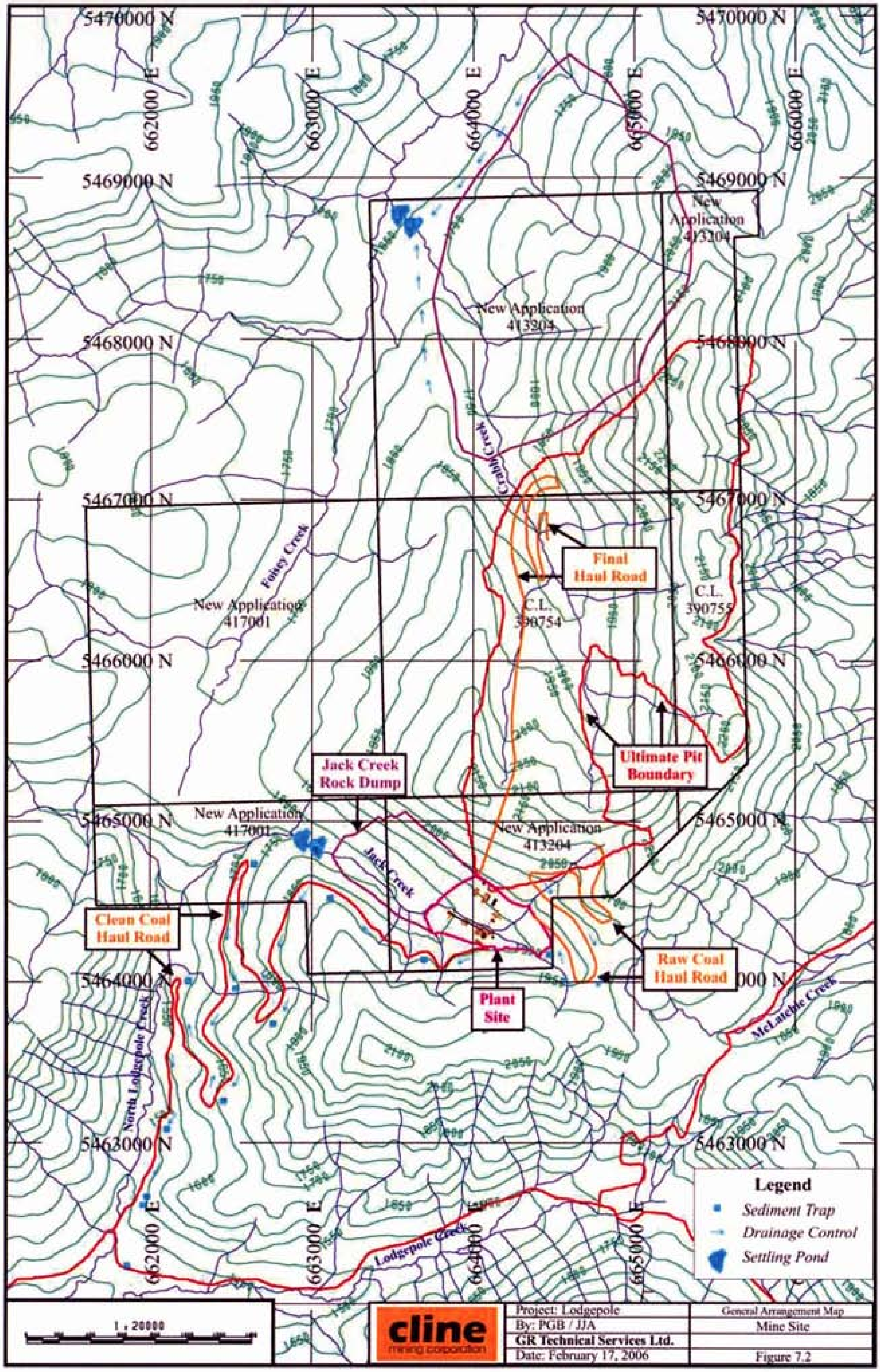
7.0 Accessibility, Climate, Local Resources, Infrastructure, and Physiography

Access is best gained by the Lodgepole road which leaves Highway 3 approximately 14km south of Fernie. After approximately 26.6km following the Lodgepole road, the access to the property follows North Lodgepole Creek and its east tributary for some 6km. An alternative route to the property is from the Coal Mountain mine along Michel Creek, over the Flathead Pass, down Squaw Creek, across the Flathead River, up McLatchie Creek, down the pass into the upper Lodgepole Creek valley, and back to North Lodgepole Creek. Figure 7-1 is the regional, general arrangement map, showing the mine area relative to the rail loadout. Highway 3 and a branch of the Canadian Pacific Railroad (CPR) follow the Elk Valley just west of the property. Crossing the central portion of the Crowsnest Coalfield is a major natural gas pipeline and power line. There are several old exploration and logging roads on the east slope of McLatchie Ridge but these roads have been de-activated for decades.

The property straddles the headwaters of both North Lodgepole Creek and the Flathead River in southeastern British Columbia. Lodgepole Creek and North Lodgepole Creek drain to the west, into the Elk River system, while the Flathead River and two of its upper tributaries, Foisey Creek and McLatchie Creek drain to the east and south. Figure 7-2 is the mine site, general arrangement map, showing the proposed facilities and access in the mine area. Figure 7-3 is the property map, showing the coal licenses and application area.

McLatchie Ridge has a maximum elevation of 2255 m, while the valley to the west has an elevation of 1645 m where it joins Foisey Creek. The upper slopes of McLatchie Ridge are sub-Alpine with widely spaced, stunted fir trees, while the lower slopes to the west are thickly forested with spruce, pine and fir.


Morrissey Bridge
CPR
Hwy 3
River Road
Trans Canada Pipeline
Lodgepole Property
Elko
CPR
River Road
Trans Canada Pipeline
Hwy 93
Lodgepole Creek
Wigwam River
Flathead River
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: February 17, 2006
General Arrangement Map
Regional
Figure 7.1
cline
mining corporation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New Application 413204
New Application 417001
C.L. 390754
C.L. 390755
Fossey Creek
Crabb Creek
Jack Creek
North Lodgepole Creek
Lodgepole Creek
McLatchie Creek
Final Haul Road
Ultimate Pit Boundary
Jack Creek Rock Dump
Clean Coal Haul Road
Raw Coal Haul Road
Plant Site
Legend
Sediment Trap
Drainage Control
Settling Pond
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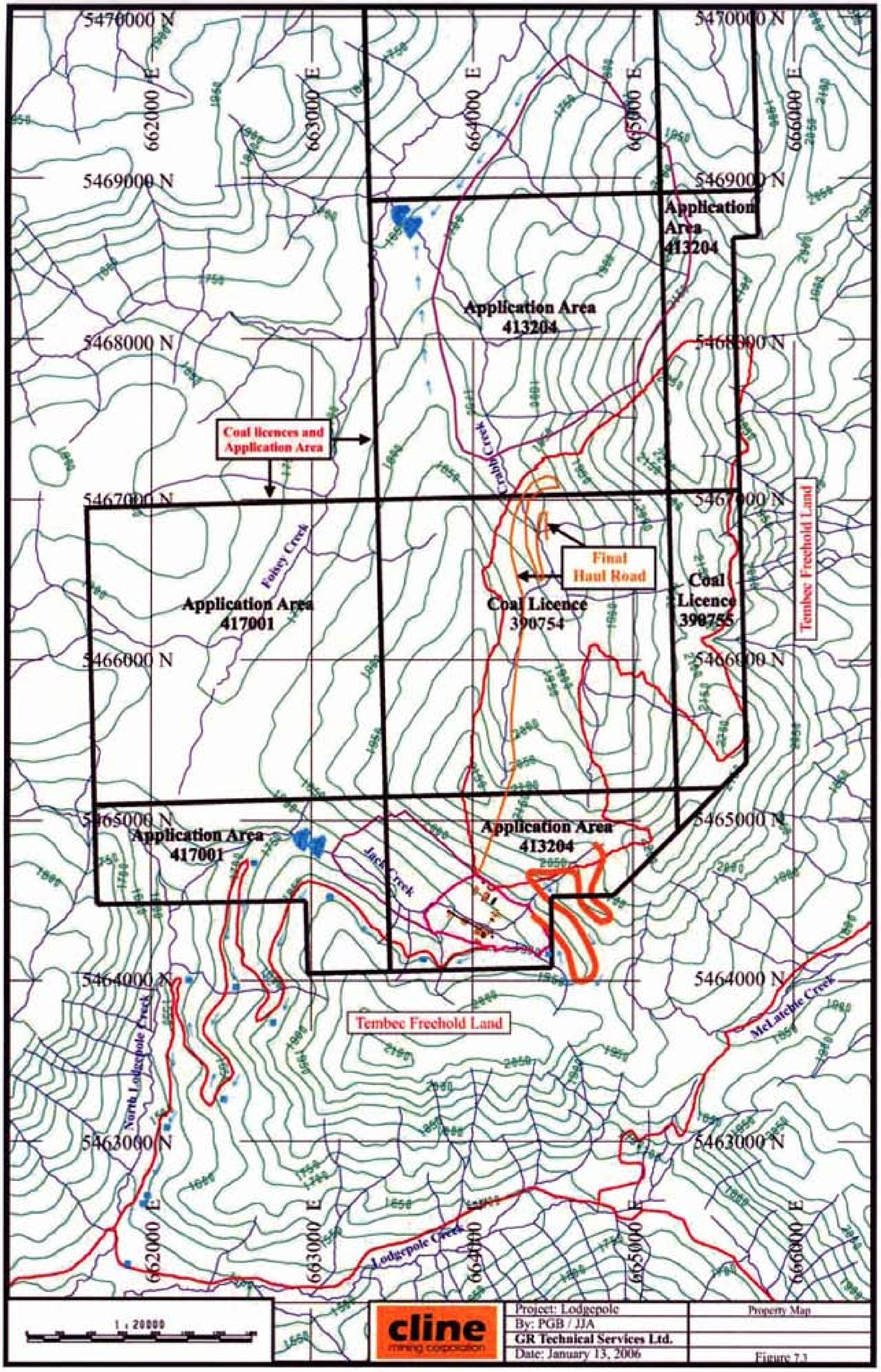
mining corporation
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: February 17, 2006
General Arrangement Map
Mine Site
Figure 7.2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Application Area
413204
Application Area
413204
Coal licences and Application Area
Fossey Creek
Application Area
417001
Final Haul Road
Coal Licence
390754
Coal Licence
390755
Tembec Freehold Land
Application Area
417001
Application Area
413204
Jack Creek
Tembec Freehold Land
North Lodgepole Creek
McLatchie Creek
Lodgepole Creek
1 : 20000
cline
mining corporation
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: January 13, 2006
Property Map
Figure 7.3

Records from a weather station near Fernie show total average yearly precipitation is 105 cm with winter snowfall averaging 368 cm. The highest and lowest temperatures recorded at Fernie were 36°C and –40°C respectively. Snow depths at higher elevations exceed 4 m most winters. The property can be accessed with heavy equipment in mid-summer or after freeze-up.

The coal licenses and application area cover, the mine area, waste rock dump areas, and plant and refuse areas. Mine related infrastructure, preparation plant and maintenance facilities, will be constructed in the upper parts of North Lodgepole Creek. The nearest source of power and natural gas is the Elk Valley, approximately 30 km to the north.

7.1 Permits and Regulatory Status

The Lodgepole property will require coal licenses to cover the coal mining and waste dump areas as well as the surface facilities. The project will be covered by existing and new license applications below.

7.1.1 Coal License Description

The Lodgepole Property comprises two coal licenses and an application for four additional licenses. The existing coal licenses are 390754 and 390755, while the application numbers include 413204, 417001, 413204 and 417175. Table 7-1 lists the legal description of the licenses and application (See Figure 7-3).

7.1.2 Ownership and Tenure

Table 7-1 Property Summary

License No.	Land District	Map No.	Block	Units
390754	East Kootenay	082G037	B	89, 90, 99, 100
390755	East Kootenay	082G037	B	Portions of 88, and 98
Applic. No. 413204	East Kootenay	082G037	B	69(partial), 70(partial), 79, 80
Applic. No. 413204	East Kootenay	082G037	G	09, 10, 19, 20
Applic. No. 417001	East Kootenay	082G037	C	81, 82, 91, 92
Applic. No. 417001	East Kootenay	082G037	C	71(partial), 72(partial)
Applic. No. 413204	East Kootenay	082G037	G	09, 10, 19, 20
Applic. No. 417175	East Kootenay	082G037	G	029, 030, 039, 040,
Applic. No. 417175	East Kootenay	082G037	G	18 (partial), 28 (partial),
Applic. No. 417175	East Kootenay	082G037	G	08 (partial), 18 (partial)

The coal property is held by Cline Mining Corporation and is subject to a private royalty and British Columbia mineral taxes.

There has been no legal survey for the property, although the east and south side of the property adjoins a portion of Freehold Land, Parcel 81 (Plan D.D. 4126-A), District Lot 4589, Kootenay District (certificate of title R-2712), held by Tembec Industries Inc., which has a legal description.

8.0 History

The Lodgepole property has been the subject of the following Government and industry studies.

8.1.1 Government Studies

The first geological map of the area was by McEvoy and Leach (1902), who completed a preliminary survey of the Crowsnest Coalfields. More recent geological surveys, which include the Lodgepole property, have been completed by Price (1962 and 1965), Pearson and Grieve (1981), and Gibson (1985). Dawson, et al. (1998) and Monahan (2000) have compiled the most recent geological maps for the area, though no new fieldwork was included with these publications.

8.1.2 Industry Studies

Crows Nest Pass Oil and Gas Company (a subsidiary of Crows Nest Industries) acquired the original coal licenses for the Lodgepole property in 1969. The Lodgepole Property was largely unexplored until 1975 when Crows Nest Industries built the access road from North Lodgepole Creek and completed a preliminary mapping program. Crows Nest Industries explored the property for two summers then transferred the property to Crows Nest Resources Ltd., a subsidiary of Shell Canada, in 1977. In 1979 Shell Canada acquired a further seven coal licenses, covering land to the west of the original licenses.

Between 1975 and 1977 exploration work consisted of mapping, trenching, and sampling. The first drill holes were completed in 1978 and the property was drilled every year until 1980. After a mapping program in 1981, the property was unexplored until 1997 when Fording Coal Ltd. drilled an additional nine holes. Fording Coal Ltd. forfeited the coal licenses, which were then acquired by Morris Geological Co. Ltd. in 2001. In 2005 Cline Mining Corp. completed 15 diamond drill holes for a total of 1,204.97m. Table 8-1summarizes the exploration work completed on the property to date, while Table 8-2 lists the work in more detail.

Table 8-1 Summary of Exploration History

Year	Assessment Report No.	Operator	Work Completed
1975	423	Crows Nest Ind.	Mapping
1976	424	Crows Nest Ind.	Mapping
1977	425	Shell Canada	Mapping
1978	426	Shell Canada	2 DDH, 495.3m
1979	427	Shell Canada	7 DDH, 1,403.1m
1980	428	Shell Canada	13 DDH (2,353.5m), 5 RCH (279.0m), 4 adits and bulk samples
1981	429	Shell Canada	Mapping
1997	865	Fording Coal	9 RCH, 796.0m
2005	-	Cline Mining Corp.	15 DDH, 1,204.97m

Note: *1) DDH is Diamond drill hole.*
2) RCH is Rotary, reverse circulation hole.
3) The geology database has only 13 DDH's from the 2005 program as the last two holes were drilled late in the season to provide coal for more testing.

Table 8-2 Detail of Previous Exploration Activity

Year	Owner	Operator	Mapping	Trenching	Road Building	Core Drilling	RC Drilling	Bulk Samples
1969-1974	Crows Nest Pass Oil and Gas Co.	Crows Nest Industries	-	-	-	-	-	-
1975	Crows Nest Pass Oil and Gas Co.	Crows Nest Industries	168m measured sections	7 hand trenches, 38.4m	-	-	-	-
1976	Crows Nest Pass Oil and Gas Co.	Crows Nest Industries	610m measured sections	23 hand trenches, 229.8m	-	-	-	-
1977	Crows Nest Pass Oil and Gas Co.	Crows Nest Industries	760m measured sections	19 hand trenches, 353.3m	-	-	-	-
1978	Crows Nest Pass Oil and Gas Co.	Crows Nest Industries	-	-	4.5km new 7.2km upgraded	2 DDH, 495.3m	-	-
1979	Shell Canada Resources Ltd.	Crows Nest Resources	-	29 backhoe, 255m	6.9km new 4.8km upgraded	1 DDH, 156.0m	6 RC, 1,247.1m	-
1980	Shell Canada Resources Ltd.	Crows Nest Resources	-	24 backhoe, 620m	4.4km new 11.6km upgraded	13 DDH, 2,353.5m	5 RC 279.0m	4 Adits
1981	Shell Canada Resources Ltd.	Crows Nest Resources	Along road cuts	-	-	-	-	-
1997	Fording Coal	Fording Coal	-	-	-	-	9 RC, 796.0m	-
2005	Cline Mining Corp.	Cline Mining	-	3 backhoe, 40m	2.3km new	15 DDH, 1,204.97m	-	-
Total			**1,538m of measured section**	**49 hand trenches,621m**	**18.1km new road**	**31 DDH**	**20 RC**	**4 Adits**
				56 machine dug trenches, 915m	**23.6km existing road**	**4,209.8m**	**2,322.1m**	**6,531.9m total drilling**

There has been no commercial coal production from the property though small tonnages have been procured for laboratory test work. The only development on the property has been road construction and pads for drill holes and adits.

Both Shell Canada and Fording Coal made estimates of resources for the property, as shown in Table 8-3. Both of these estimates are considered "historical" as they were completed prior to the reporting standards of GSC Paper 88-21 and NI 43-101.

Cline's resource estimate was completed in February 2005, and is in compliance with NI 43-101 standards. The mineable pit is not an economic limit, but keeps surface mining contained within the valley.

Cline completed a Property of Merit Technical Report in February 2005.

Table 8-3 Historic Resource Estimates

Year, Company	**Source of Estimate**	**Coal (m^3)**	**Waste (m^3)**	**Ratio (m^3/m^3)**
1981, Shell	Cross-section[1]	54,000,000	184,000,000	3.4:1
1997, Fording	8:1 gross ratio pit[2]	62,890,000	599,360,000	9.5:1
1997, Fording	4:1 gross ratio pit	32,540,000	208,210,000	6.4:1
2005, Cline	3D block model	53,964,000	323,784,000	6:1

Note: 1) The cross-sections were at 1:5,000 scale, spaced every 200 m along strike. A 45° pit slope was assumed; coal seam thickness was a weighted average of true thickness as indicated from drill holes.
2) Fording notes that their resource estimate is a "quick calculation with very few parameters set".

9.0 Geological Setting

9.1 Regional Geology

The Jurassic-Cretaceous Kootenay Group occupies part of a northwest trending belt of predominantly non-marine rocks comprising part of the Rocky Mountain Foothills and Front Ranges of southwestern Alberta and southeastern British Columbia. The Kootenay Group extends from just north of the United States border in the south to the North Saskatchewan River in the north, Figure 9-1 (Gibson, 1985). All five of the operating mines in the Elk Valley produce coal from the Kootenay Group.

9.1.1 Stratigraphy

The coal-bearing Kootenay Group of the Rocky Mountain Foothills and Front Ranges encompasses the stratigraphic interval between the Jurassic Fernie Formation below and the Lower Cretaceous Blairmore Group above (Gibson, 1985). Three formations are recognized within the Kootenay Group, the Morrissey Formation (the basal sandstone section), the coal-bearing Mist Mountain Formation, and the upper Elk Formation, Figure 9-2.

The stratigraphic column of interest for a regional mapping program consists of the Fernie Formation, Kootenay Group, and Blairmore Group. The Fernie Formation is comprised of fine-grained marine sediments that represent a marine depositional environment. Near the close of the Jurassic Period uplift in the west created a sediment source that began to "in-fill" the Fernie Sea. The Passage Beds, of the uppermost Fernie Formation, and the Weary Ridge Member of the Morrissey Formation represent this basin fill material. The Moose Mountain Member of the Morrissey Formation represents a beach like depositional environment. Deltas, inter-deltas, and coastal plains saw the development of swamps where coal seams were deposited. The continued progradation of the sedimentary package caused the deltaic environment to be covered by alluvial fans which are represented by the Elk Formation. Figure 9-3 is a sketch showing the depositional environments from marine (Fernie Sea), beach (Moose Mountain), coastal plains and deltas (Mist Mountain), to alluvial plains and fans (Elk and Cadomin).

The higher energy environment of the Blairmore Group eroded older sediments such that the thickness of the Mist Mountain Formation is dramatically different from west to east. In the Coleman area to the east there is a maximum of 168m (and a minimum of 40m) of coal-bearing strata (Norris, 1994), while on the Lodgepole property, the Mist Mountain Formation appears to be in the order of 300 m thick.

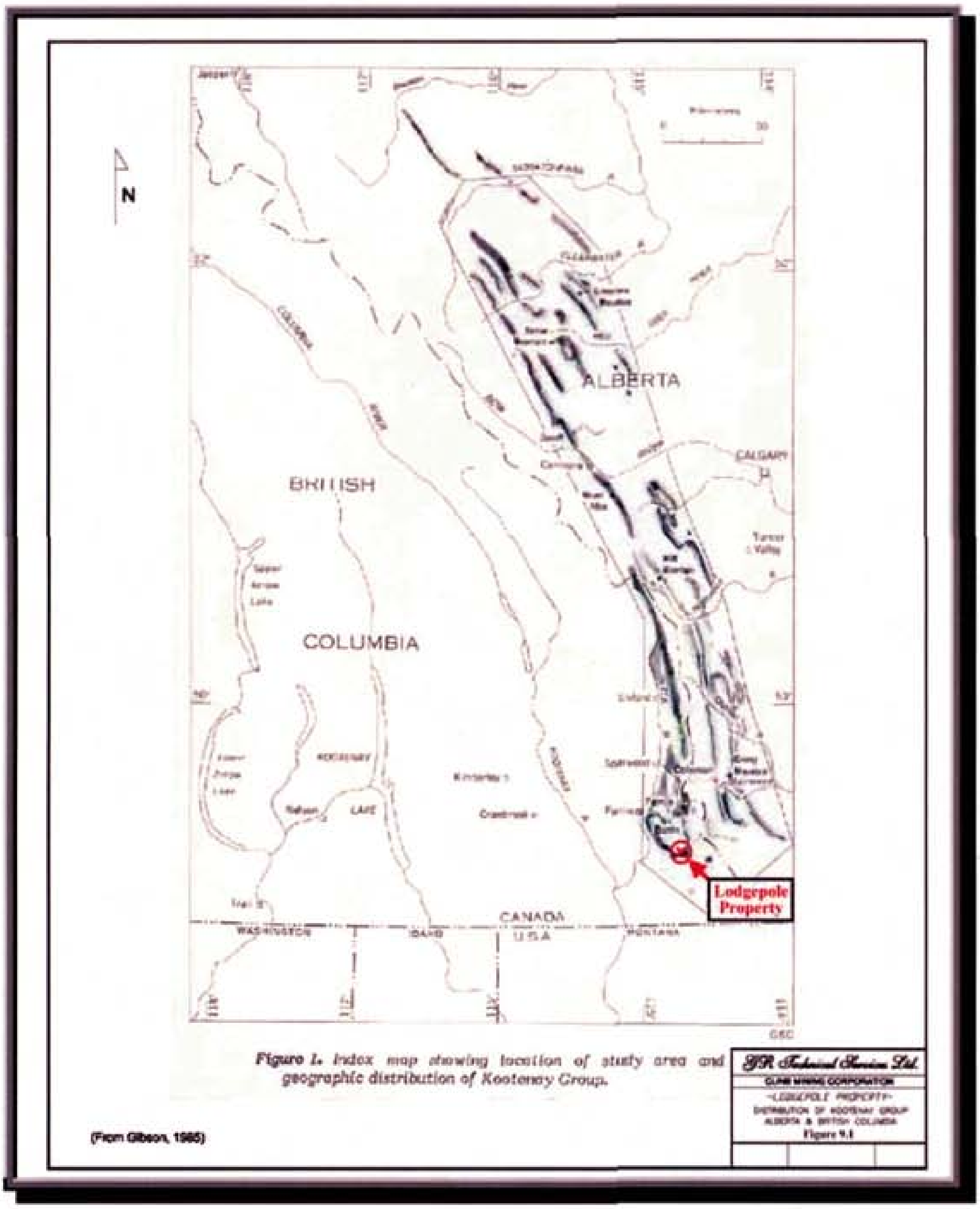


Figure 9-1 Coal Bearing Kootenay Group

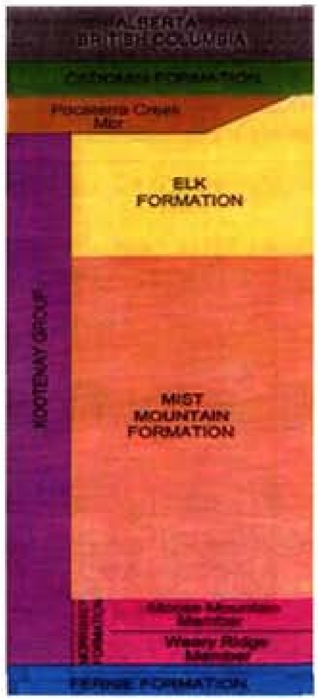


Figure 9-2 Table of Formations

Figure 9-3 Depositional Environments of the Kootenay Group (Gibson and Hughes, 1981).

9.1.2 Structure

The East Kootenay coalfields lie in the front ranges of the Rocky Mountains, which are characterized by north to northwest trending concentric folds and west dipping thrust faults. Tertiary normal faults, some of which are listric (curvilinear, usually concave-upward) and probably occupy earlier thrust surfaces, are also a major feature (Grieve and Kilby, 1989).

The Crowsnest coalfield is a complex synclinorium (a composite synclinal structure of regional extent) in the Lewis thrust sheet. The major compression features of the basin are the synclines linked en echelon by low-amplitude anticlines. The two main fold features include the McEvoy syncline through the main portion of the coalfield, and the Barnes anticline on the east edge. A series of west dipping thrust faults dominate the structure of the north half of the basin. The major extensional feature in the area is the Flathead fault system, which includes the Loop and Erickson normal faults (Grieve and Kilby, 1989). The Harvey fault in the southeast portion of the coalfield is another major normal fault.

Figure 9-4 shows a portion of GSC Map 1154A, which shows the geology of the Lodgepole property area. Figure 9-5 is a portion of a regional cross-section, from GSC Map 1154A, through the Lodgepole property.

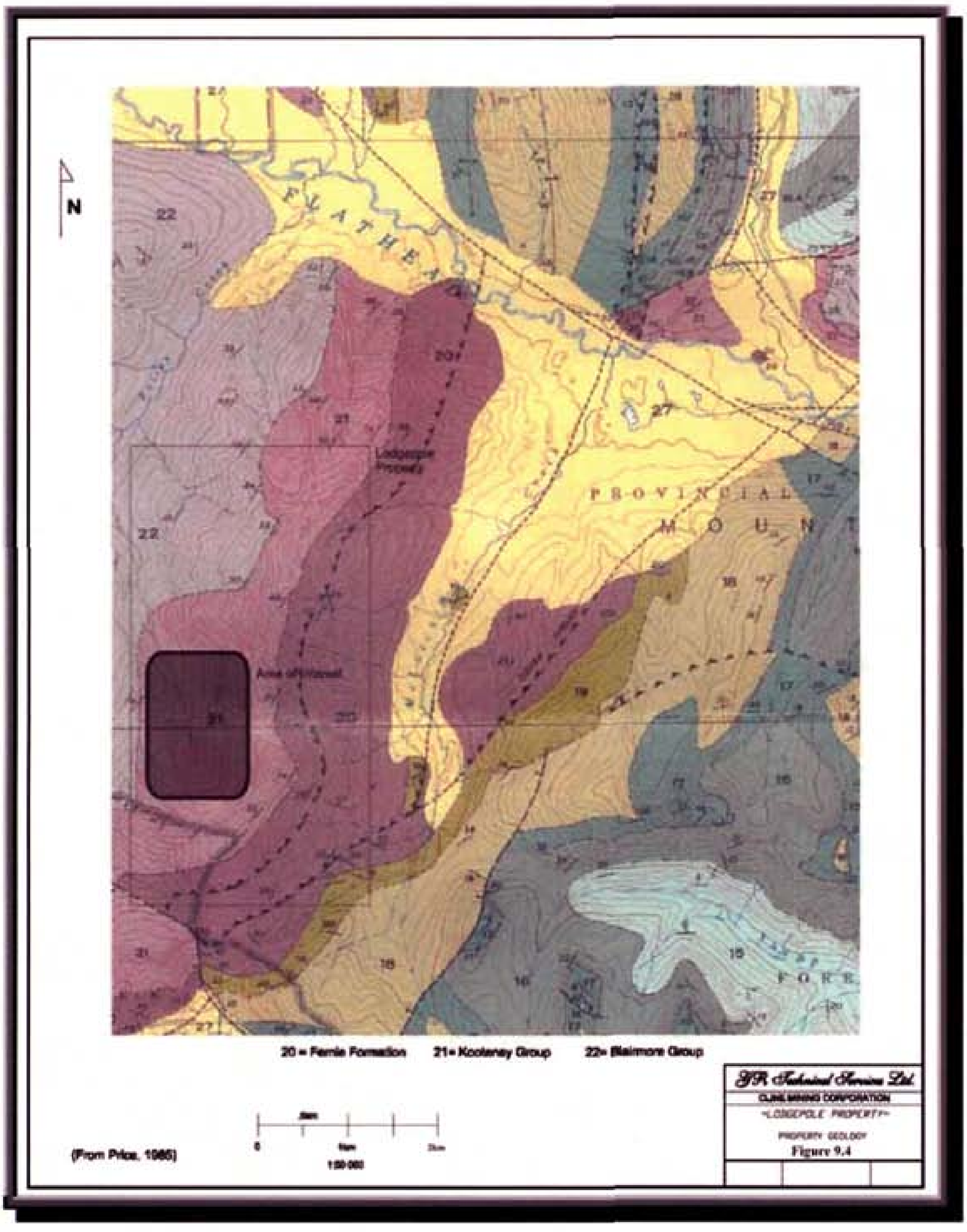


Figure 9-4 Regional Geology, Lodgepole Property

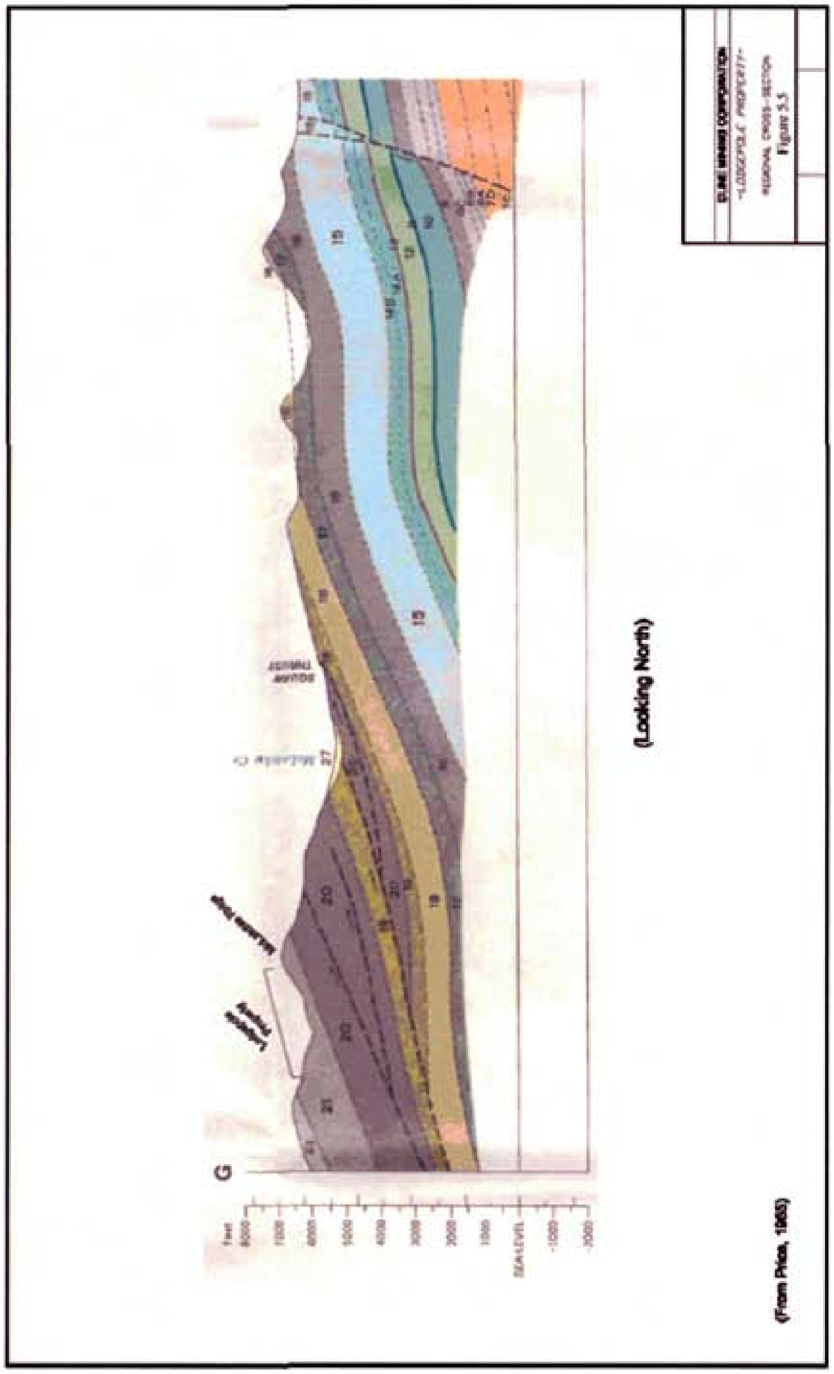
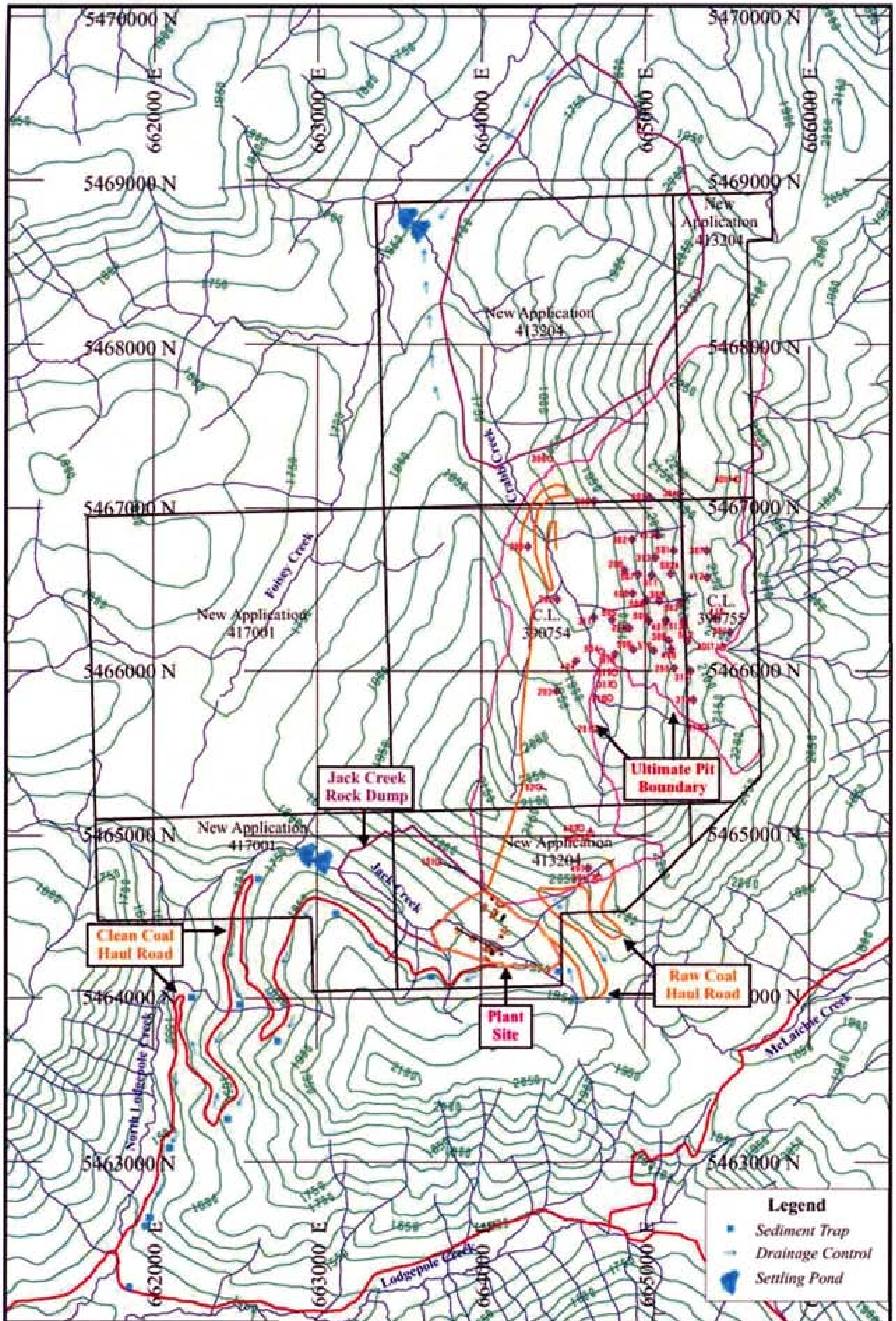


Figure 9-5 Regional Cross-Section, Lodgepole Property

9.2 Property Geology

The Lodgepole property represents a dip slope of Mist Mountain sediments. The main portion of the proposed mine area has been interpreted as a uniform dip slope with a 1.5km strike length and 1.0km dip length. No faults have been interpreted, though there are several rolls or undulations noted in the footwall of Zone 1. Figure 9-6 shows the distribution of drill holes on the property, while Figure 9-7 to Figure 9-9 are cross-sections showing the geological interpretation. Figure 11-1 is the interpolated surface for the base of coal Zone 1.



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New Application 413204
New Application 417001
C.L. 390754
C.L. 390755
Folsey Creek
Crabb Creek
Jack Creek
North Lodgepole Creek
Lodgepole Creek
McLatchie Creek
Jack Creek Rock Dump
Ultimate Pit Boundary
Clean Coal Haul Road
Raw Coal Haul Road
Plant Site
Legend
Sediment Trap
Drainage Control
Settling Pond
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mining corporation
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: February 18, 2006
General Arrangement Map
Drill Hole Map
Figure 9.6

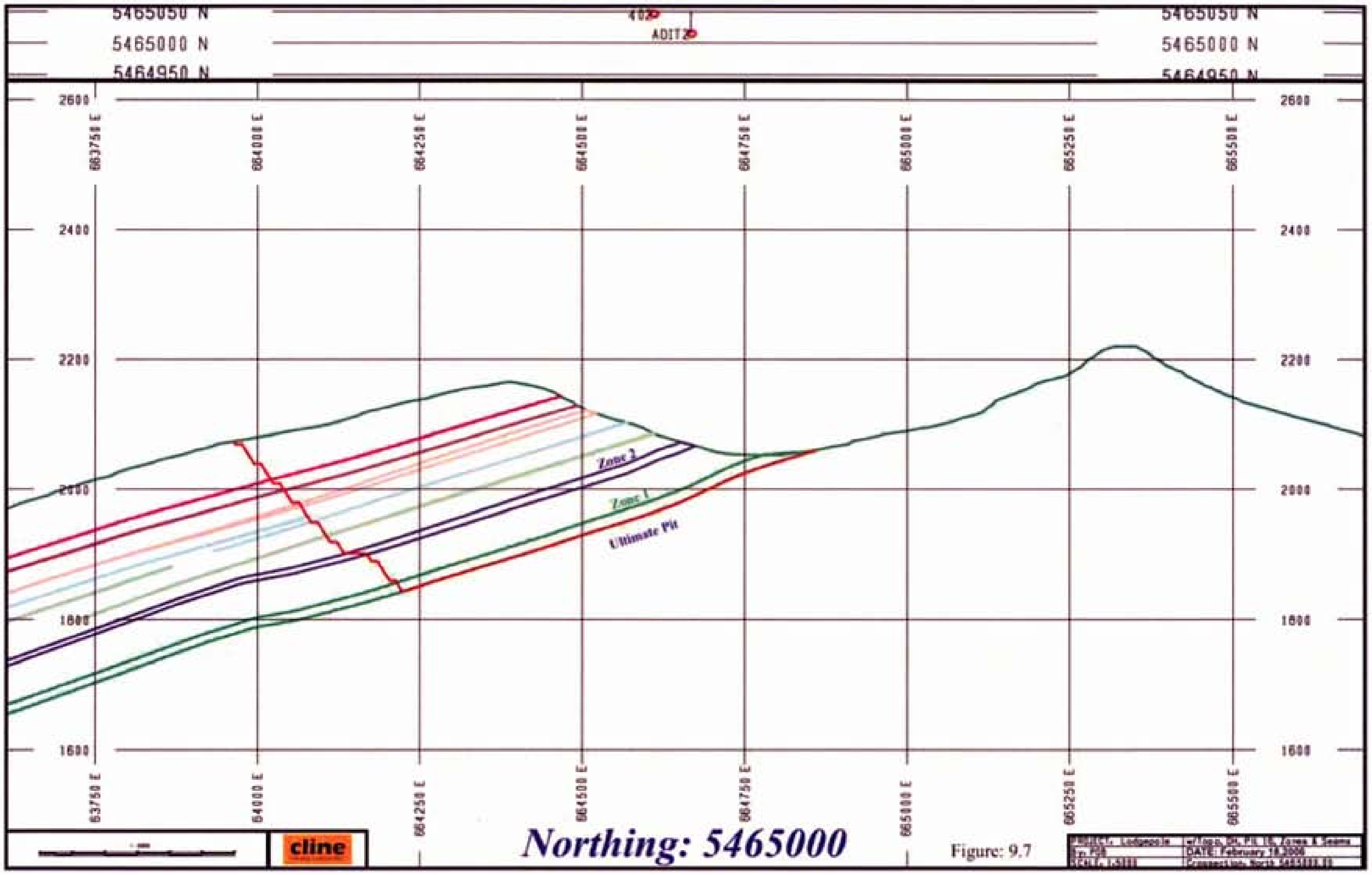
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Figure: 9.7

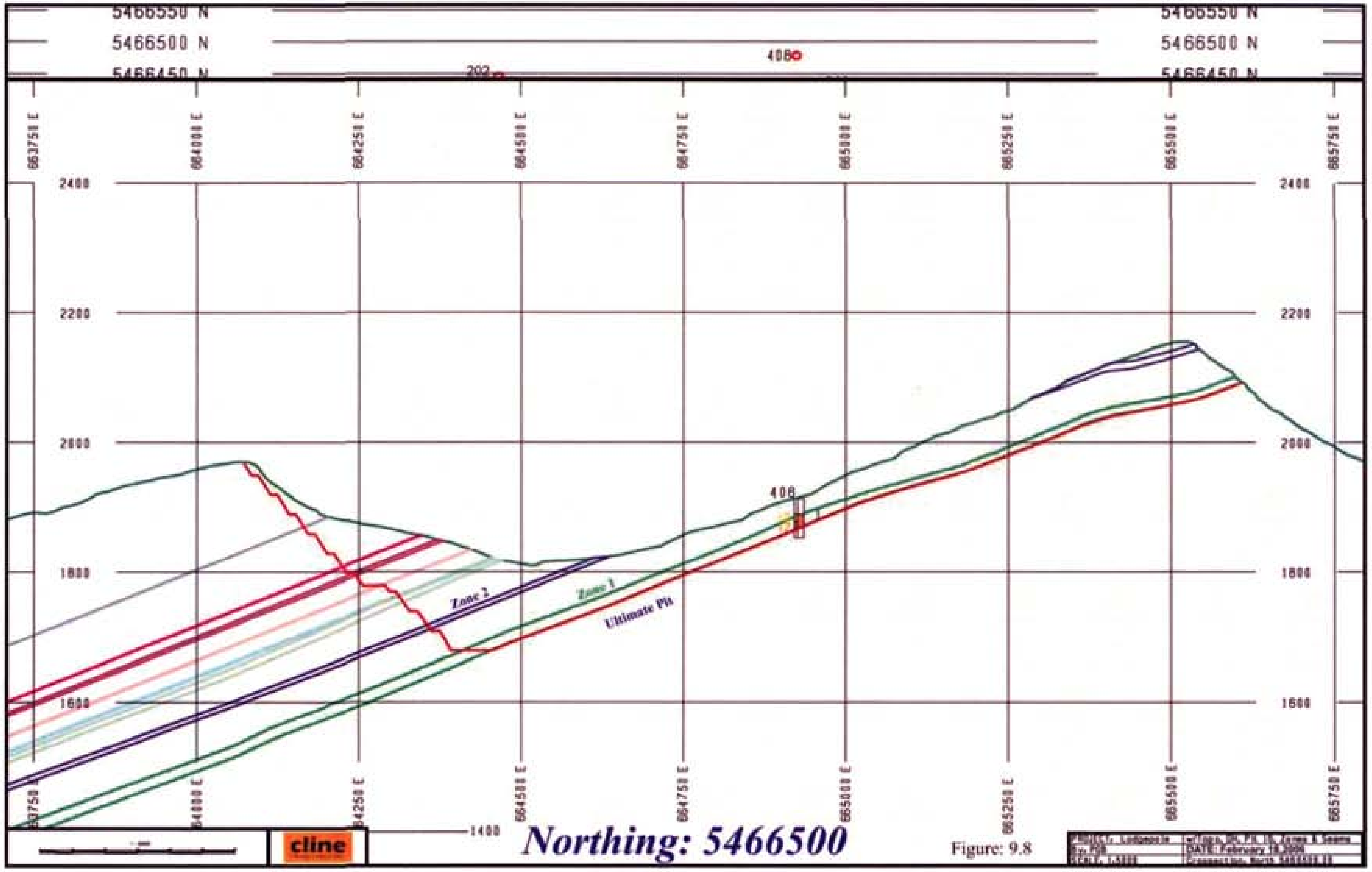
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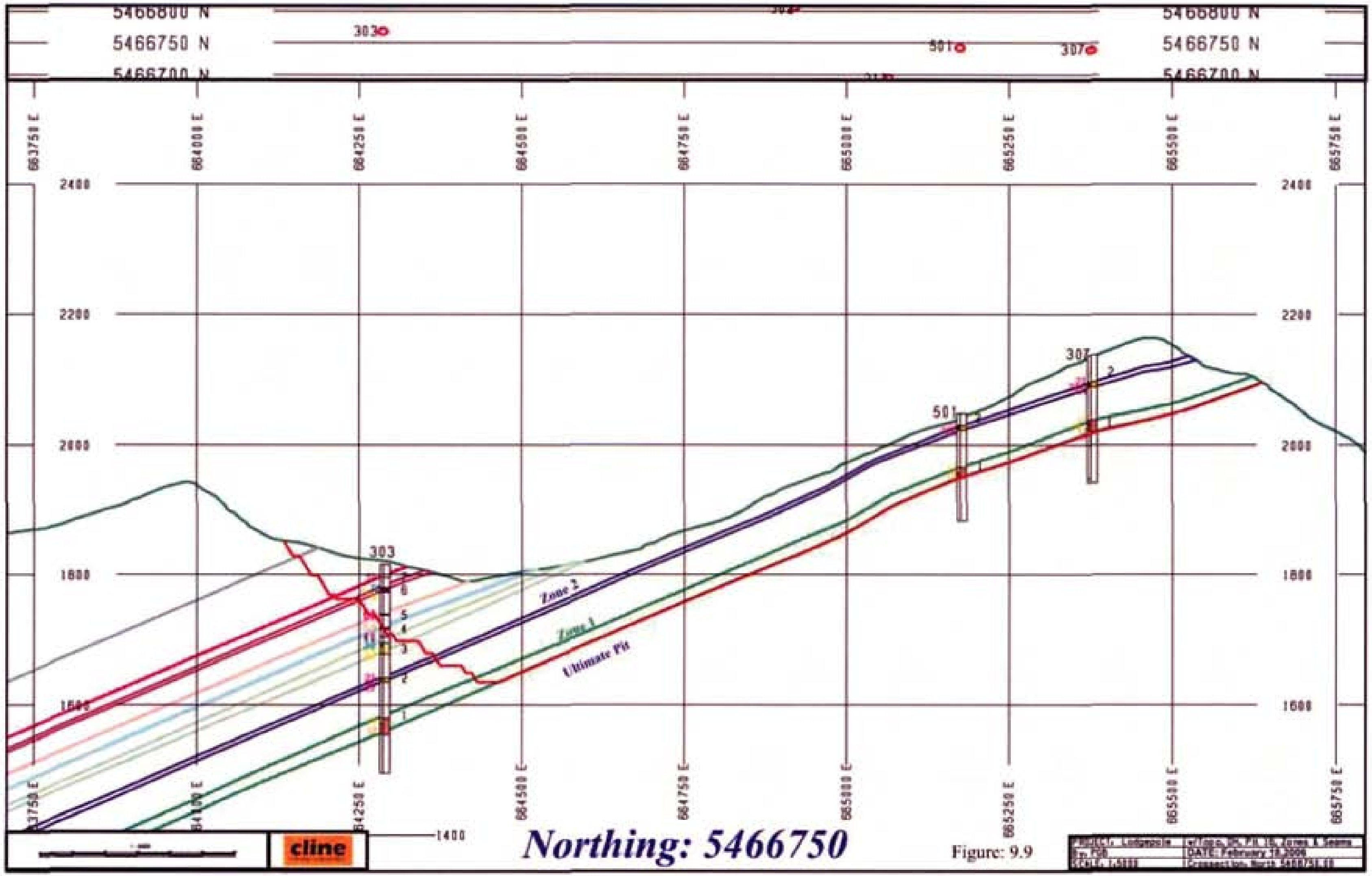
Figure: 9.8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Zone 2
Zone 1
Ultimate Pit
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Northing: 5466750

Figure: 9.9

10.0 Deposit Type

The definition of "Deposit Type" for coal properties includes both "Geology Type" and "Deposit Type".

"Geology Type" is defined in GSC Paper 88-21 by the complexity of the area. The geology type for a particular property defines the confidence that can be placed in the extrapolation of data values. The classification scheme proposed by GSC Paper 88-21 has four classes that range from number one, low tectonic disturbance, like the Plains of Alberta and northeastern British Columbia, to number four, severe, as at the Coal Mountain mine. The third class is referred to as complex, while the second class is moderate. For the purposes of this report, the Lodgepole Property is considered moderate in that there is no reported folding (the property is on the east limb of the McEvoy Syncline), faulting is minimal, and bedding dips are generally less than 30. The results of the planned exploration program will be used confirm the Moderate designation.

"Deposit Type" is defined in GSC Paper 88-21 by the potential mining method most suited to the property. There are four categories, including:

- Surface
- Underground
- Non-conventional, and
- Sterilized

The Lodgepole Property is considered to be a potentially surface mineable deposit.

11.0 Mineralization

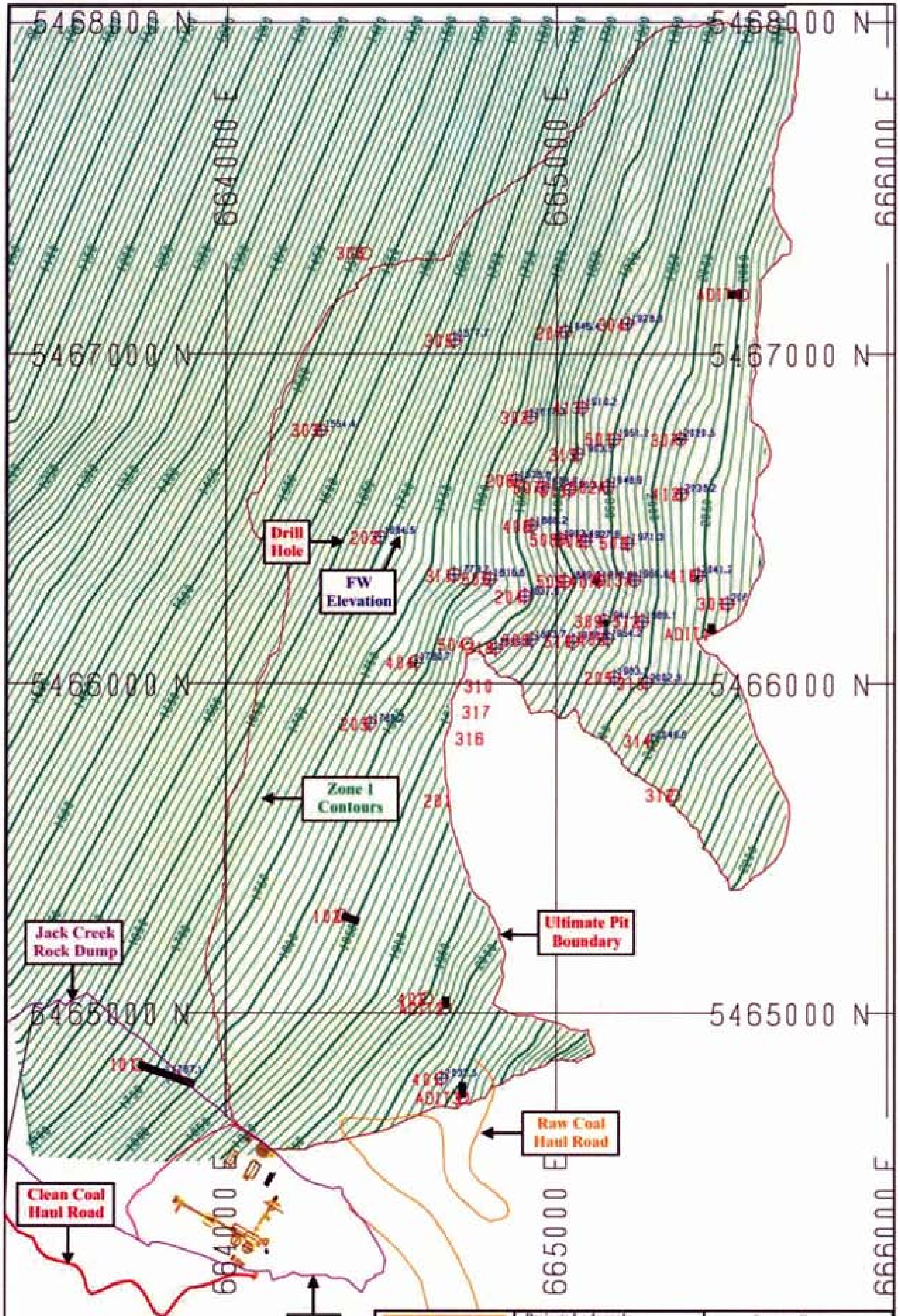
"Mineralization" for coal deposits refers to the accumulation of coal and coal seam stratigraphy.

The Lodgepole Property hosts at least 285m of Mist Mountain sediments with at least 34 coal layers, of which at least 19 seams have thicknesses of greater than 0.75m. Because of the individual seam complexity, Zones were developed which represent all of the coal and interseam rock partings within a Zone. As an example, Zone 1 could be a combination of up to five coal plys (Seams 10, 11, 12, and 13) and four rock partings, or it could be a single thick coal ply (Seam 10). The compositing is discussed in Section 19.0, Mineral Resource and Mineral Reserve Estimates. Figure 11-2 shows the Type Section for the Lodgepole Property.

It is proposed that a minimum seam thickness of 0.6m could be mined, while interseam rock partings of greater than 0.3m could also be mined separately. Based on these mining parameters, a description of the coal seams is included in Table 11-1.

Seam M has been intersected in several drill holes. This seam is interpreted to be within the Moose Mountain Member (Basal Sandstone) of the Morrissey Formation. Without more detailed definition, the seam is considered highly discontinuous as it is within a high-energy depositional environment and is not included in any resource coal quantification.

Seam 299 is a general name applied to coal layers that do not appear to conform to the type section. These seams are considered highly discontinuous without further definition and have not been modeled or included in the resource estimation.



Project: Lodgepole	Structure Contours	
By: PGB / JJA	Zone 1 FW	
GR Technical Services Ltd.		
Date: February 18, 2006	Figure 11.1	

Table 11-1 Coal Seam Development

Zone	Thickness to Seam Below (m)	Average No. Of Coal Plys	Average Coal Thickness (m)	Total Zone Thickness (m)	Rock Parting Thickness (m)	Notes
8	72	1	0.6	0.6	-	Non mineable zone
7	17	1	0.2	0.2	-	Non mineable zone
6	25	3	2.2	4.3	2.1	Two removable partings
5	26	3	1.6	5.3	3.7	Two removable partings
4	18	2	1.9	2.0	0.1	Non-removable parting
3	33	2	3.2	7.1	3.9	Two removable partings
2	48	4	4.6	9.5	4.9	Three removable partings
1	Lowest Seam	4	14.3	17.0	2.7	Three removable partings

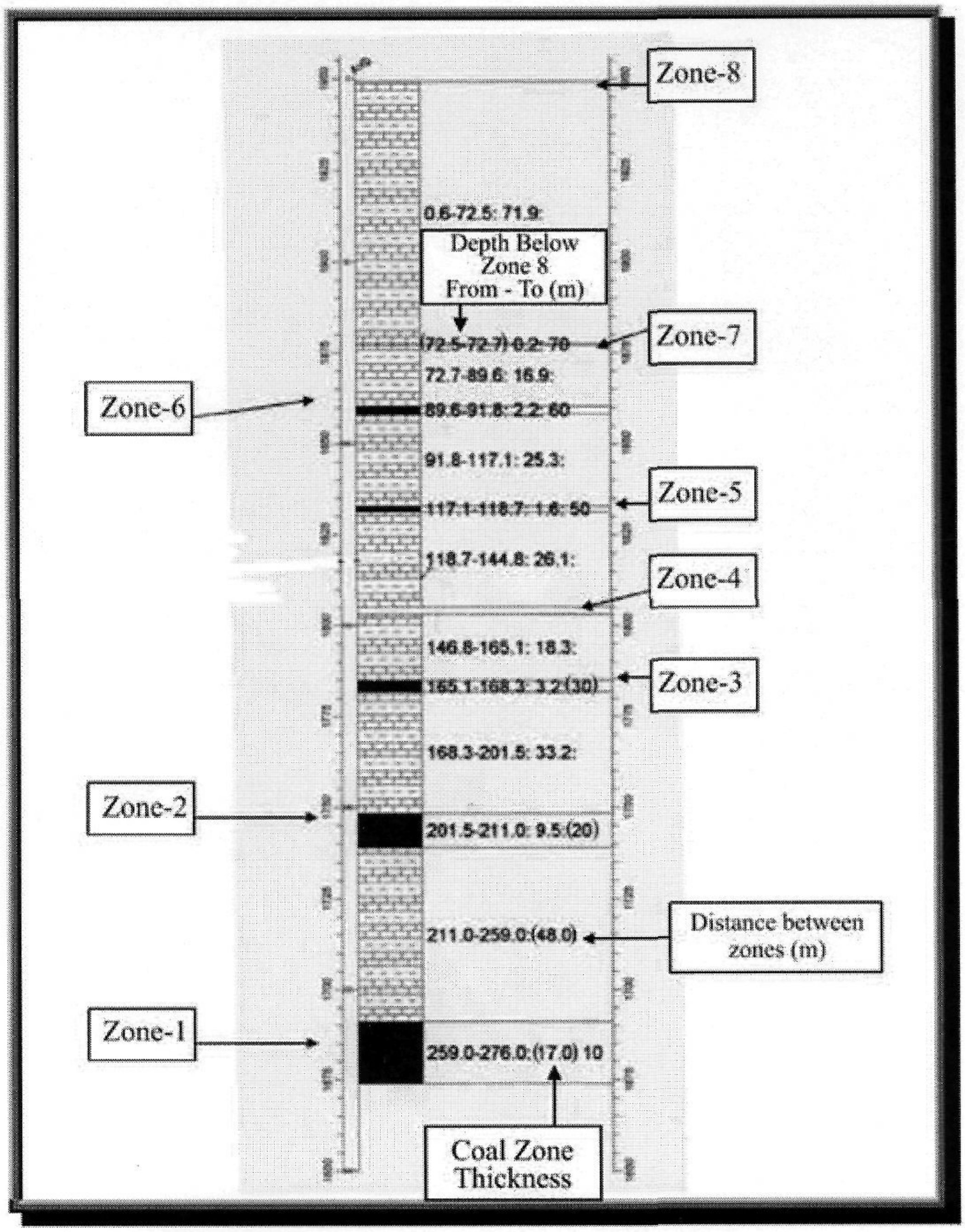


Figure 11-2 Type Section, Lodgepole Property

Seams are identified (tagged) and correlated by their signature in the geophysical logs. The seam correlations and the position in the type section are then the basis of modeling the coal Zones. Zone and seam correlations are illustrated in Figure 11-3to Figure 11-7. After the 2005 drilling, seam correlation has become much simpler and much greater confidence has been gained.

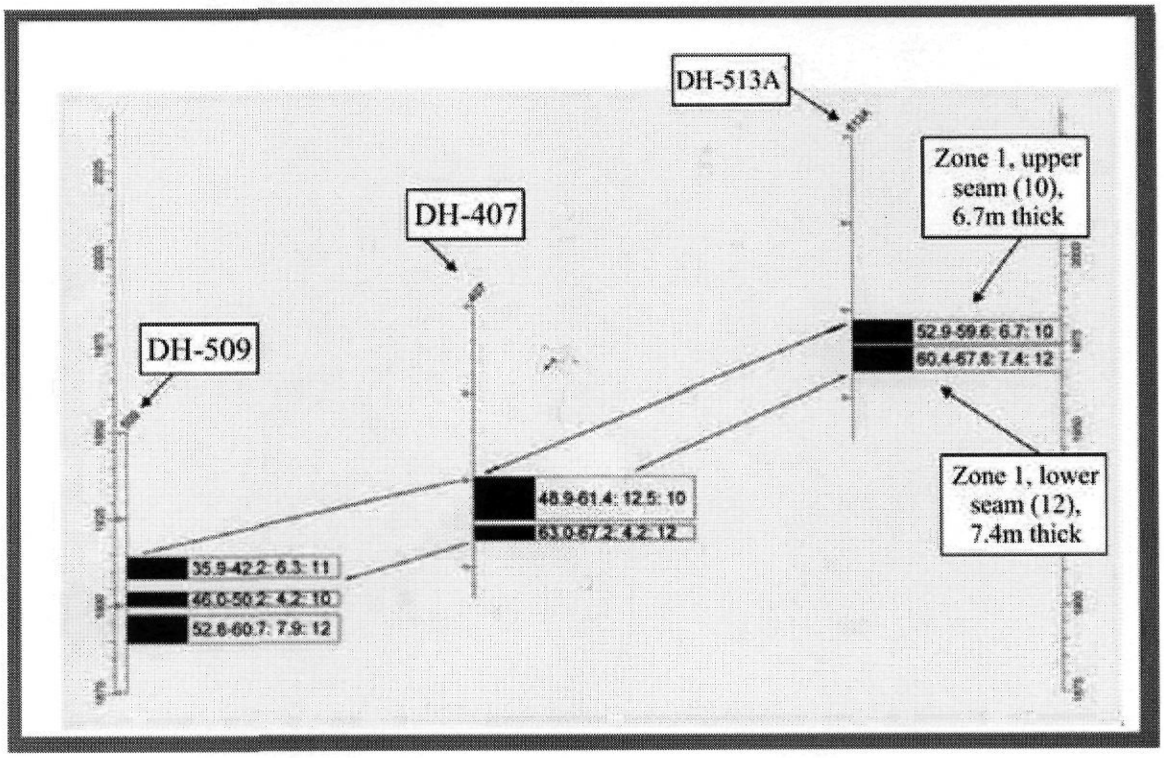


Figure 11-3 Zone 1 Correlation, East/West

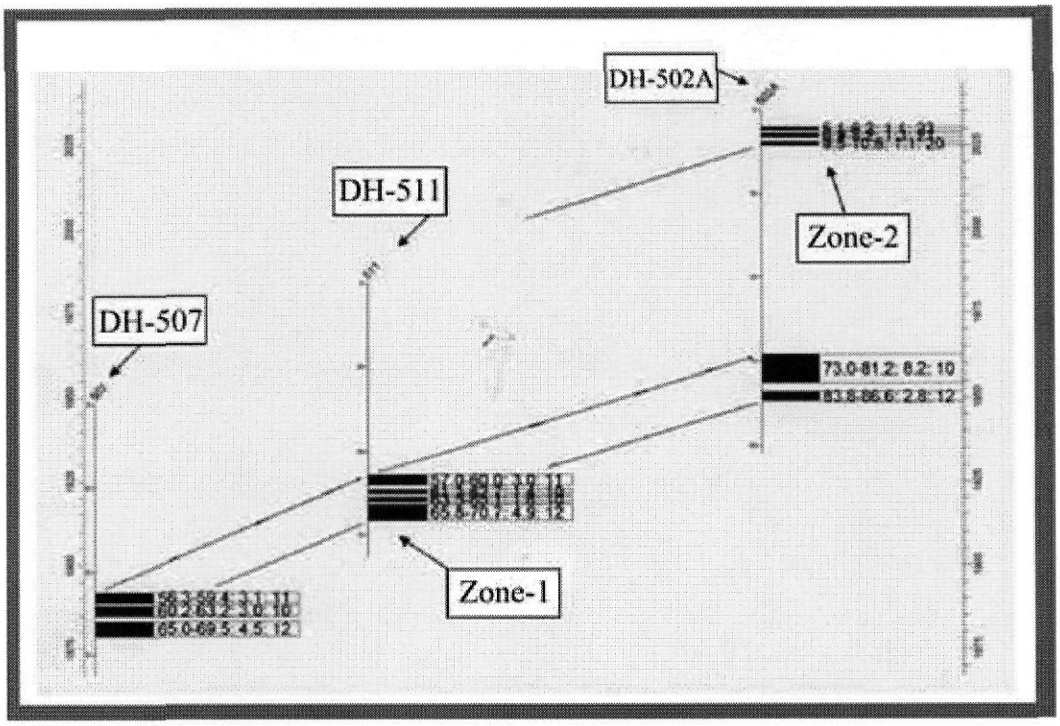


Figure 11-4 Zones 1 and 2 Correlation, East/West

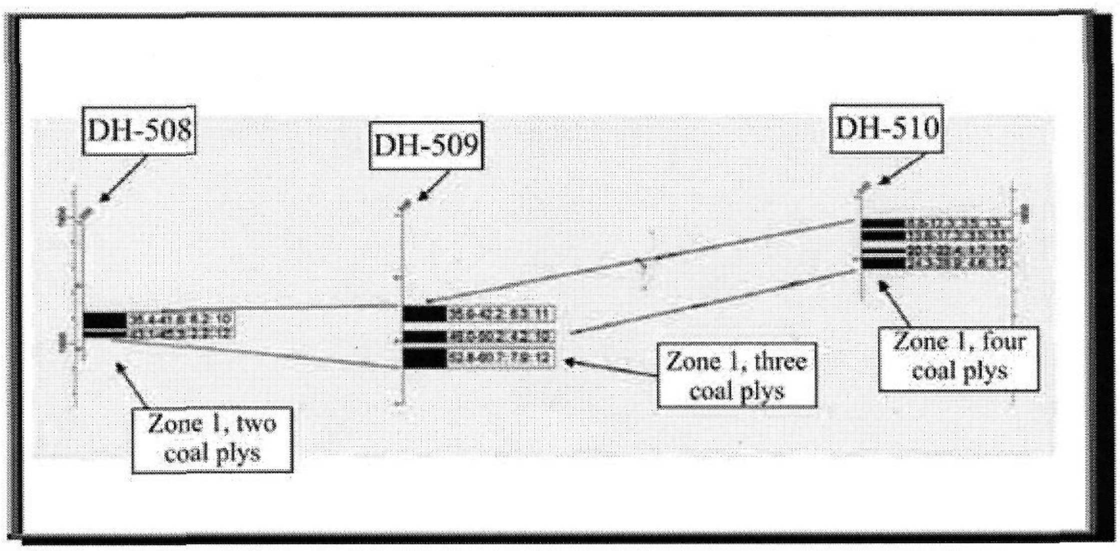


Figure 11-5 Zone 1 Correlation, North/South

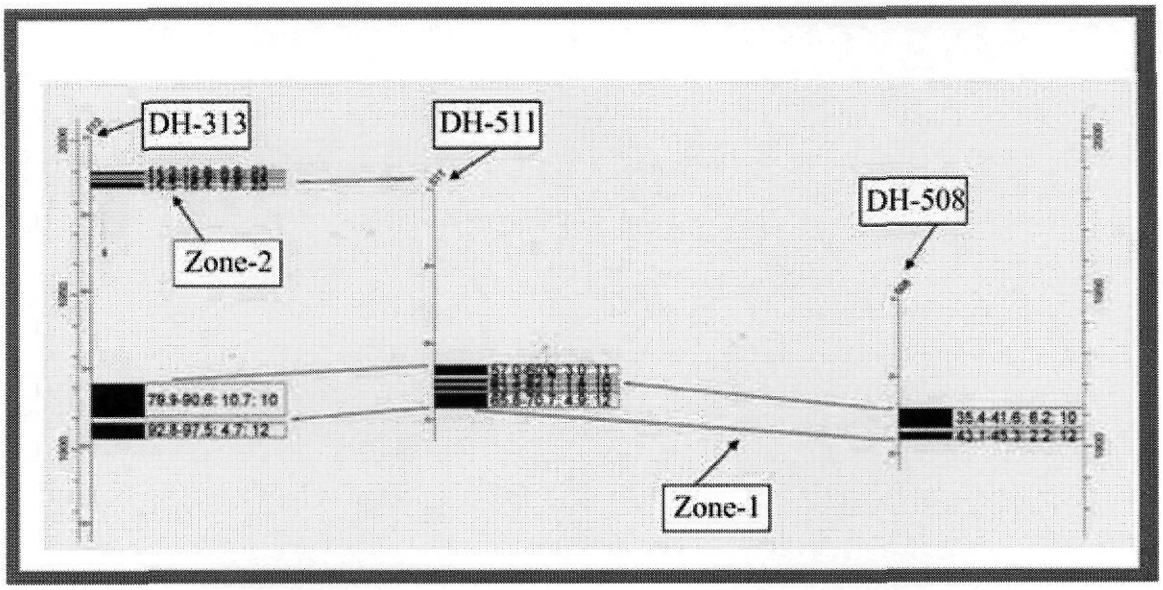


Figure 11-6 Zones 1 and 2 Correlation, North/South

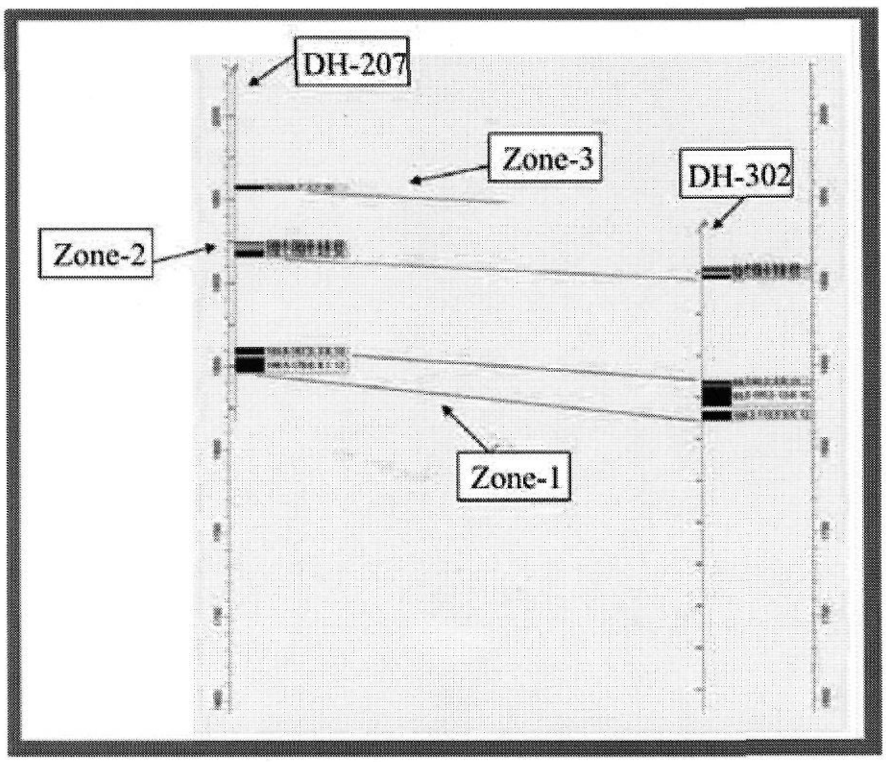


Figure 11-7 Zones 1, 2 and 3 Correlation, North/South

12.0 Exploration

Cline Mining Corporation completed an exploration program on the Lodgepole Property during 2005. The BC Ministry of Energy and Mines have granted exploration permit CX-5-003 for this work. The work included 15-diamond drill holes totaling 1,205m, three backhoe trenches totaling 40m, and 2.3km of new road construction.

Crows Nest Industries Ltd. was the first company to conduct detailed exploration on the Lodgepole Property, between 1975 and 1978. During this period, work included mapping and measuring stratigraphic sections, see Table 12.1. Between 1979 and 1981 Shell Canada Resources Ltd. held the property and evaluated the mining potential of the property by completing 4,530.9m of drilling in 27 holes and collecting 4 bulk samples for coal quality testing. In 1980, 10 piezometers were installed, and a geotechnical engineer logged all of the drill core. More recently, Fording Coal Ltd. evaluated the property by drilling nine rotary, reverse circulation holes totaling 796m.

All of the coal exploration techniques used in the 1980's and 1990's are very similar to those used today, and should be considered reliable. The preliminary field mapping was used to identify the coal-bearing sequence and locate this member within the map area. The road building and drilling was used to locate, in more detail, individual coal seams. The adit program was used to obtain bulk coal samples for testing of the coal quality. All of the exploration work, including road building, drilling, and bulk sampling would have been completed using contract companies.

With the exception of four of the holes, the focus of attention with the previous drilling has been a dip-slope on the west side of McLatchie Ridge. The thirty-two drill holes along the dip-slope cover an area approximately 1.8km long, north/south, by 1.4km wide, east/west. The holes indicate a near surface resource, which has economic potential.

13.0 Drilling

All of the drill holes have been logged geophysically. General practices include logging the completed drill hole through the drill steel with a gamma-neutron tool, then removing the drill steel and attempting to complete an open hole log using a gamma-density tool where possible. Deep, open holes are also surveyed to determine the location of the hole with depth.

The geophysical logs are used to determine the depths to the top and bottom of the coal seams. In this study, all of the logs were re-picked and the seam intercepts are listed in Table 13-1.

Table 13-1 Lodgepole Property Drill Hole Intercepts

Drill Hole	From	To	Thick (m)	Seam	Seam Name
LP101	42.5	42.9	0.4	299	299
	56.3	58.3	2.0	30	Three seam main
	58.9	59.9	1.0	32	Three seam lower
	84.9	85.4	0.5	299	299
	96.9	97.7	0.8	299	299
	115.3	119.1	3.8	20	Two seam main
	121.9	123.1	1.2	22	Two seam lower
	180.9	187.4	6.5	10	One seam main
	187.8	194.3	6.5	12	One seam lower
	325.7	327.1	1.4	M	Moose Seam
	327.5	327.7	0.2	M	Moose Seam
	328.2	328.7	0.5	M	Moose Seam
LP102	34.6	35.4	0.8	31	Three seam upper
	44.2	46.5	2.3	30	Three seam main
	49.4	50.2	0.8	32	Three seam lower
	90.4	91.0	0.6	299	299
	109.3	112.8	3.5	20	Two seam main
LP201	118.0	118.2	0.2	299	299
	231.8	231.9	0.1	299	299
LP202	48.5	49.8	1.3	23	Two seam upper 3
	51.1	52.1	1.0	21	Two seam upper
	52.8	53.0	0.2	20	Two seam main
	54.2	56.6	2.4	22	Two seam lower
	109.8	114.4	4.6	11	One seam upper
	115.3	123.3	8.0	10	One seam main
	124.4	128.5	4.1	12	One seam lower
LP203	23.2	25.4	2.2	50	Five seam main
	37.0	37.3	0.3	41	Four seam upper
	38.6	41.0	2.4	40	Four seam main

Drill Hole	From	To	Thick (m)	Seam	Seam Name
	57.5	59.4	1.9	30	Three seam main
	84.2	85.2	1.0	23	Two seam upper 3
	86.0	86.9	0.9	21	Two seam upper
	87.5	88.9	1.4	20	Two seam main
	98.3	100.4	2.1	22	Two seam lower
	149.4	163.8	14.4	10	One seam main
	166.1	169.8	3.7	12	One seam lower
LP204	50.4	54.5	4.1	11	One seam upper
	55.7	59.0	3.3	10	One seam main
	59.8	68.4	8.6	12	One seam lower
	64.1	64.7	0.6	M	Moose Seam
	65.4	65.9	0.5	M	Moose Seam
	106.0	106.3	0.3	M	Moose Seam
	128.1	129.2	1.1	M	Moose Seam
	130.5	132.4	1.9	M	Moose Seam
	133.8	134.1	0.3	M	Moose Seam
LP205	7.1	10.9	3.8	12	One seam lower
LP206	50.0	53.5	3.5	11	One seam upper
	54.7	58.0	3.3	10	One seam main
	60.7	63.2	2.5	12	One seam lower
LP207	38.6	41.0	2.4	40	Four seam main
	66.0	68.7	2.7	30	Three seam main
	100.3	101.5	1.2	23	Two seam upper 3
	103.1	103.6	0.5	21	Two seam upper
	105.1	109.1	4.0	20	Two seam main
	163.6	167.5	3.9	10	One seam main
	169.5	178.6	9.1	12	One seam lower
LP301	31.0	33.2	2.2	10	One seam main
	34.0	35.9	1.9	12	One seam lower
LP302	21.8	22.7	0.9	23	Two seam upper 3
	23.7	24.6	0.9	21	Two seam upper 1
	26.1	28.7	2.6	20	Two seam main
	89.7	92.2	2.5	11	One seam upper
	93.2	105.2	12.0	10	One seam main
	108.2	113.7	5.5	12	One seam lower
	198.0	201.3	3.3	M	Moose seam
LP303	20.4	20.7	0.3	80	Eight seam
	35.9	37.1	1.2	71	Seven seam upper
	38.2	39.4	1.2	70	Seven seam main
	42.1	42.7	0.6	72	Seven seam lower
	76.6	77.6	1.0	60	Six seam
	97.1	99.9	2.8	50	Five seam main

Drill Hole	From	To	Thick (m)	Seam	Seam Name
	110.7	111.3	0.6	40	Four seam main
	120.8	126.8	6.0	30	Three seam main
	137.9	138.4	0.5	32	Three seam lower
	174.2	176.6	2.4	20	Two seam main
	180.4	180.8	0.4	22	Two seam lower
	236.6	246.3	9.7	10	One seam main
	250.7	261.6	10.9	12	One seam lower
LP304	41.5	42.4	0.9	50	Five seam main
	64.1	64.9	0.8	40	Four seam main
	86.5	90.2	3.7	30	Three seam main
	99.0	99.3	0.3	32	Three seam lower
	121.0	122.0	1.0	23	Two seam upper 3
	123.2	124.3	1.1	21	Two seam upper
	125.4	127.9	2.5	20	Two seam main
	184.9	189.0	4.1	10	One seam main
	190.7	195.2	4.5	12	One seam lower
LP305	65.5	66.5	1.0	40	Four seam main
	85.1	86.7	1.6	30	Three seam main
	120.9	121.1	0.2	23	Two seam upper 3
	123.6	124.0	0.4	21	Two seam upper
	125.6	126.9	1.3	20	Two seam main
	181.5	185.5	4.0	13	One seam upper 3
	186.8	188.3	1.5	11	One seam upper
	189.5	194.6	5.1	10	One seam main
	198.8	204.3	5.5	12	One seam lower
LP306	29.6	30.2	0.6	70	Seven seam
	131.4	133.2	1.8	61	Six seam upper
	135.8	137.9	2.1	60	Six seam main
	168.6	169.4	0.8	50	Five seam main
	197.3	199.1	1.8	40	Four seam main
	212.6	213.5	0.9	31	Three seam upper
	225.1	226.9	1.8	30	Three seam main
	235.6	236.2	0.6	32	Three seam lower
	247.2	247.4	0.2	299	299
	254.8	255.3	0.5	23	Two seam upper 3
	262.6	262.7	0.1	21	Two seam upper
	264.8	268.0	3.2	20	Two seam main
	282.5	283.0	0.5	299	299
LP307	40.9	42.0	1.1	23	Two seam upper 3
	43.9	45.2	1.3	21	Two seam upper
	46.2	48.9	2.7	20	Two seam main
	99.0	104.5	5.5	11	One seam upper

Drill Hole	From	To	Thick (m)	Seam	Seam Name
	106.0	109.5	3.5	10	One seam main
	112.5	116.5	4.0	12	One seam lower
LP308	36.6	41.7	5.1	10	One seam main
	42.4	45.4	3.0	12	One seam lower
LP309	41.7	55.1	13.4	10	One seam main
	56.0	57.9	1.9	12	One seam lower
	136.5	138.0	1.5	M1	Moose seam upper
	138.8	141.2	2.4	M	Moose seam
LP310	72.8	72.9	0.1	299	299
LP311	45.0	55.4	10.4	11	One seam upper
	56.3	58.7	2.4	10	One seam main
	59.7	62.8	3.1	12	One seam lower
	82.0	82.2	0.2	M	Moose seam
LP312	18.8	18.9	0.1	299	299
LP313	11.2	12.0	0.8	23	Two seam upper 3
	13.0	13.5	0.5	21	Two seam upper
	14.5	16.4	1.9	20	Two seam main
	79.9	90.6	10.7	10	One seam main
	92.8	97.5	4.7	12	One seam lower
LP314	10.0	11.2	1.2	10	One seam main
	17.1	18.4	1.3	12	One seam lower
LP315	20.2	24.2	4.0	11	One seam upper
	25.5	26.9	1.4	10	One seam main
	31.0	36.7	5.7	12	One seam lower
LP316	23.8	23.9	0.1	299	299
LP317	22.0	22.5	0.5	M	Moose seam
LP318	17.4	19.1	1.7	10	One seam main
	20.4	24.1	3.7	12	One seam lower
LP401	26.2	40.3	14.1	10	One seam main
	43.5	46.5	3.0	12	One seam lower
LP402	20.3	20.9	0.6	21	Two seam upper
	28.7	32.0	3.3	20	Two seam main
	34.0	35.7	1.7	22	Two seam lower
LP404	61.0	71.3	10.3	10	One seam main
	72.9	76.3	3.4	12	One seam lower
LP406	36.8	45.7	8.9	10	One seam main
	46.5	51.8	5.3	12	One seam lower
LP407	48.9	61.4	12.5	10	One seam main
	63.0	67.2	4.2	12	One seam lower
LP408	23.7	34.7	11.0	10	One seam main
	35.8	44.8	9.0	12	One seam lower
LP410	54.5	61.0	6.5	10	One seam main

Drill Hole	From	To	Thick (m)	Seam	Seam Name
	61.4	66.8	5.4	12	One seam lower
LP412	8.1	9.8	1.7	25	Two seam upper 5
	16.0	16.5	0.5	23	Two seam upper 3
	18.2	19.7	1.5	21	Two seam upper
	20.3	21.6	1.3	20	Two seam main
	47.0	47.5	0.5	299	299
	74.9	75.8	0.9	13	One seam upper 3
	76.8	77.6	0.8	11	One seam upper
	78.6	82.8	4.2	10	One seam main
	83.5	88.4	4.9	12	One seam lower
LP413	15.6	17.1	1.5	23	Two seam upper 3
	18.0	19.1	1.1	21	Two seam upper
	20.7	22.8	2.1	20	Two seam main
	76.0	82.1	6.1	11	One seam upper
	84.0	88.0	4.0	10	One seam main
	90.0	94.5	4.5	12	One seam lower
LP501	18.4	19.4	1.0	23	Two seam upper 3
	20.5	21.9	1.4	21	Two seam upper
	23.1	25.3	2.2	20	Two seam main
	81.8	90.8	9.0	10	One seam main
	92.3	96.8	4.5	12	One seam lower
LP502A	5.1	6.2	1.1	23	Two seam upper 3
	6.9	8.2	1.3	21	Two seam upper
	9.5	10.6	1.1	20	Two seam main
	73.0	81.2	8.2	10	One seam main
	83.8	86.6	2.8	12	One seam lower
LP503	50.2	59.2	9.0	10	One seam main
LP504	30.0	30.1	0.1	299	299
LP505	36.4	46.5	10.1	11	One seam upper
	47.4	49.1	1.7	10	One seam main
	21.1	25.1	4.0	12	One seam lower
LP506	7.8	23.5	15.7	10	One seam main
	28.6	31.7	3.1	12	One seam lower
LP507	56.3	59.4	3.1	11	One seam upper
	60.2	63.2	3.0	10	One seam main
	65.0	69.5	4.5	12	One seam lower
LP508	35.4	41.6	6.2	10	One seam main
	43.1	45.3	2.2	12	One seam lower
LP509	35.9	42.2	6.3	11	One seam upper
	46.0	50.2	4.2	10	One seam main
	52.8	60.7	7.9	12	One seam lower
LP510	8.8	12.3	3.5	13	One seam upper 3

Drill Hole	From	To	Thick (m)	Seam	Seam Name
	13.8	17.3	3.5	11	One seam upper
	20.7	22.4	1.7	10	One seam main
	24.3	28.9	4.6	12	One seam lower
LP511	57.0	60.0	3.0	11	One seam upper
	61.3	62.7	1.4	10	One seam main
	63.5	65.1	1.6	10	One seam main
	65.8	70.7	4.9	12	One seam lower
LP512	28.0	30.0	2.0	11	One seam upper
	30.8	34.5	3.7	10	One seam main
	37.8	44.2	6.4	12	One seam lower
LP513A	52.9	59.6	6.7	10	One seam main
	60.4	67.8	7.4	12	One seam lower

Notes: Coal tags of 10 to 19 are within the Zone 1 package. Similar nomenclature is used for the other zones as well. Seams M and 299 have not been modeled.

14.0 Sampling Method and Approach

Cline Mining completed a sampling program on the Lodgepole Property during 2005.

There are fifty-one drill holes on the property; forty-seven of these are within the main area of interest, while four holes tested the southern portion of the property. In the target surface mine area the drill holes are spaced approximately 150m apart (from 100-350m) along strike (north/south), and approximately 150m apart (from 100-300m) down dip (east/west).

In total there were 183 increment drill hole samples taken from the property during the previous exploration. In 2005 Cline Mining collected a further 447 increment drill hole samples from thirteen holes and two bulk samples from a further two holes. The increment samples represent portions of coal seams, which were then composited to make representative samples of the entire seam.

There is no formal record of how the samples were taken or handled by Crows Nest Resources, though RJ Morris was involved in coal exploration programs with Crows Nest during this era and is familiar with techniques used.

14.1 Crows Nest Resources Sampling (1978-1980)

It is believed that all of the drill hole and bulk samples were collected and handled according to standard coal industry procedures. A description of the various sample-gathering procedures includes:

- Drill Core: as the hole is drilled, core is placed in boxes and transported to a facility for description by a geologist. The coal intervals are marked and divided into sample lengths, generally one meter in length. Rock partings greater than 0.15m would be sampled separately. Hole number and depth would identify each of the samples. For the interval sampled, the entire core was removed as the sample (the reason for sampling the entire core was to provide sufficient quantity of material in the sample).
- Rotary, RC: as the hole is drilled, representative rock cuttings are collected every 1.5-2m for description by a geologist. When a coal seam is encountered, all of the coal from a 1.5m interval is collected and bagged. Hole number and depth would identify each of the samples. Cuttings from the entire interval drilled were included in the sample, to provide sufficient material.
- Bulk Samples: four adits were completed on the Lodgepole Property. As the adit was driven, face samples would be collected at least every 3m along the entry. The face samples are used as an indicator of the degree of oxidation of the coal. The intent of the adit is to obtain an unoxidized coal sample. When the adit intersects unoxidized coal a crosscut is driven to gain access to the entire thickness of the seam, from roof to floor. A bulk sample is then cut across the entire thickness of the seam so that each portion of the seam is equally represented in the sample. Each sample would be identified by adit name and interval across the seam.

14.2 Fording Coal Sampling (1997)

The sampling by Fording Coal in 1997 is documented by Griffiths (2000).

In 1997 Fording Coal Ltd. used their own procedures for drill hole sampling. All of the holes were RC. The rock intervals were not sampled or examined. The coal intercepts were drilled and sampled on 0.5m increments. These increment samples were sent to Elk Valley Environmental Services, a commercial laboratory in Sparwood, B.C. Each sample was analyzed for moisture, ash, and FSI. The results from the half metre samples were compared against the geophysical logs and, seam composites were determined by combining the appropriate sequence of half metre samples. The composite samples underwent analysis for proximate analysis, sulphur, heating value, FSI, and light transmittance. Each composite was floated at 1.60 SG with the float component undergoing the same suite of tests as the unwashed composite. The sink component was analyzed for ash and moisture. Some selected wash samples were sent to the Fording Coal, Greenhills Operations laboratory for dilation and fluidity tests (Griffiths, 2000).

14.3 Cline Mining Sampling (2005)

Drill core was placed in boxes; the boxes were covered and transported to a storage shed in Fernie. The core was examined and coal intervals identified. Coal samples approximately 0.5m in length were marked. Rock intervals greater than 0.3m thick were sampled separately. Samples for a single drill hole were kept together and delivered to the laboratory in Sparwood. Elk Valley Environmental Services completed all of the analyses.

14.4 Sample Recovery

One of the concerns with coal quality estimates for the Lodgepole Property has been the sample recovery from drill programs. With diamond drilling it is possible to determine the recovery through a coal seam by measuring the amount of coal recovered compared to the coal seam thickness as determined by down-hole geophysical logs. Core recovery through the coal seams is often poor and the coal quality data should be considered suspect.

With rotary drilling it is very difficult to estimate the recovery of samples collected through a coal seam. Fording Coal uses a technique that can give an idea of the recovery, which includes, sampling 0.5m increments through a coal seam, and weighing the sample recovered. As the diameter of the drill hole is known, and the length drilled is known, the sample weight should be a function of the bulk density of the coal.

A preliminary assessment indicates that the 1997 drilling recovered +85% of the coal intercepted. The work by Crows Nest did not include sample weights, so sample recovery cannot be estimated.

During the 2005 program, core recovery was a priority. Recovery in coal ranged from 50% to 93%, averaging 74%. It is believed that with higher recovery and more detailed sampling, the coal quality of the deposit has been defined much more accurately.

14.5 Adit Samples

In total there are four adit samples from the property. Coal quality data for three of the adits was located in the assessment reports. The data used in this report represents complete channel samples from the floor to the roof of the coal seam.

15.0 Sample Preparation, Analyses and Security

There is no formal record of sample preparation, analyses and security from the previous exploration programs, though because the work was completed by major mining companies with operating mines in the area it is felt that the procedures would have been very similar to those employed by the coal industry today.

Preparation of drill hole samples is described in Section 14.0.

Bulk Samples: four adits were completed on the Lodgepole Property. As the adit was driven, face samples would be collected at least every 3m along the entry. The face samples are used as an indicator of the degree of oxidation of the coal. The intent of the adit is to obtain an unoxidized coal sample. When the adit intersects unoxidized coal a crosscut is driven to gain access to the entire thickness of the seam, from roof to floor. A bulk sample is then cut across the entire thickness of the seam so that each portion of the seam is equally represented in the sample. Each sample would be identified by adit name and interval across the seam.

15.1 Laboratories Used

The samples would be delivered to the laboratory where they would be handled and tested according to procedures developed for the program.

In the case of many of the Crows Nest samples, for the period 1978-1980, an internal laboratory was used. Crows Nest was developing the Line Creek coal mine, which is still operating, during this same period and had their laboratory in Fernie handle samples from the mine as well as outside exploration projects.

Crows Nest also used two commercial laboratories, Loring Laboratories Ltd., and Birtley Coal & Minerals Testing, both of Calgary AB, and both still in operation.

Fording used the services of Elk Valley Environmental Services, a commercial laboratory in Sparwood, B.C. for testing during their 1997 program; this lab is still in operation today. Some specialized tests were conducted at Fording Coal, Greenhills Operations laboratory. Again, this lab is part of an operating mine, which tests coal for international market sales.

Cline Mining used the services of Elk Valley Environmental Services, a commercial laboratory in Sparwood, B.C. for testing during their 2005 program.

15.2 Analytical Procedures

Since all the data is historical and the sampling and analysis was not observed, the following is a description from RJ Morris of the process that was typically being used at the time. It is reasonable to assume this process was used on the Lodgepole samples.

At the laboratory, samples are placed on metal trays for drying. A sub-sample is removed prior to drying, which is used to determine the following:

- Moisture content, on an as-received basis, air-dried basis, and dry-basis
- Ash content
- FSI (free swelling index), which is a measure of the coking characteristics of the coal

This preliminary data is then used to determine composite samples. Typically samples with less than 35-40% ash are included in a composite if they represent thin parting, less than one metre. The top and bottom of a coal seam is determined with the down hole geophysical logs, as well as important rock partings. Once a coal seam is picked, the individual increment samples are mixed on a thickness-weighted basis to create the composite sample. The composite sample is then subjected to the following tests:

- Proximate analysis, where the moisture, ash, volatile matter, and fixed carbon is determined
- Sulphur
- Calorific value, the heating value of the sample
- FSI
- Light transmittance, an estimation of the humic acid content in the sample, which is a measure of the oxidation of the coal
- Float/sink testing, where the float portion is subject to the above five tests, while the sink component is tested for moisture and ash.

During the 2005 program a very similar laboratory flow chart, as described above, was used.

15.3 Quality Control

A typical coal exploration program includes round robin testing, and does not employ duplicate sampling, insertion of standards, or blank samples, this is the still procedure in use today.

The laboratories rely on good procedures and emphasize cleaning of the equipment, testing temperatures in ovens and furnaces, and checking scales with standard weights.

It is the author's opinion that the analytical work completed on the property is adequate and that it followed accepted coal industry standards.

16.0 Data Verification

All of the original down hole geophysical logs were collected and verified. Verification included reviewing all of the drill holes completed on the property and "picking" the top and bottom of all coal intercepts from down hole geophysical logs. The "picks" were collected in a spreadsheet to represent the drill hole database. As well as the seam tops and bottoms, a file was created for drill hole collar coordinates and elevation, total depth of hole, and down hole survey where completed. Plotting and comparing the locations to copies of original drawings further verified drill hole locations.

To verify coal "picks" from the geophysical logs, the core and cuttings logs were reviewed to confirm that coal had been intercepted at the approximate depth. One question that appeared several times occurred when coal seams were intercepted in the top portion of drill holes that later were cased. In most instances there was confirmation of coal by a note on logging sheets or the fact that samples had been collected.

The coal quality data was captured in various spreadsheets such that the data could be sorted and reviewed. Very few errors, if any, were noted with this data transfer process.

During the 2005 program numerous geologists throughout the year examined the drill core and geophysical logs. Coal zones, which include coal seams and thin rock partings, have been used in the new interpretation to simplify the coal seam stratigraphy (see Section 11.0 and 19.0 for details).

All of the exploration data is deemed to be of high quality.

17.0 Adjacent Properties

The Lodgepole Property represents the only coal licenses in the immediate area. The property is bound on the east and south by Freehold land held by Tembec Industries Inc. (Parcel 81, Plan D.D. 4126-A, District Lot 4589, Kootenay District, certificate of title R-2712). To the west and north of the Lodgepole Property is Crown Land. Approximately eight kilometers to the northeast of the property are the Lillyburt coal licenses, held by Western Canadian Coal, and Elk Valley Coal.

No exploration has been conducted on land immediately to the west of Lodgepole because of the depth of the coal-bearing formation. To the east and south, there has been limited coal exploration, in the form of road building and seam tracing. The Lillyburt property is similar to Lodgepole in that most of the exploration work was completed by Crows Nest Resources Ltd. in the 1980's.

18.0 Coal Processing and Testing

The coal in the Lodgepole project is a typical Rock Mountain multi-seam deposit, which has undergone significant tectonic deformation and as a result is very fine in nature. Previous studies have examined the metallurgical aspects of various seams and Zones in the deposit but have included samples from a variety of drilling and sampling techniques. The primary coal in this study, especially in the early production years, will predominately be seams in Zone 1. The metallurgical test work has been done on Zone 1 samples taken from the 2005 diamond-drilling program only. This is because the results of the previous studies are difficult to use since the effect of the inclusion of partings in the samples is difficult to model.

18.1 Source of Data

The available data was obtained from the following sources:

- Crows Nest Resources (Shell) – 1981 No.1 and No.2 Seam Adit channel samples and drill core samples.
- Fording Coal Drilling Program – 1997
- Cline Mining Drilling Program – 2005 No.1 and No.2 Seam Drill Core Samples

Upon reviewing the data, it has been concluded that the Shell and Fording data indicated variable results that were not readily identified by location. The data used for the designing of the Coal preparation Plant was therefore based upon the Cline Mining Drilling 2005 Program, with the exception that the raw coal predicted size analysis was based on an Adit sample size analysis from the Crows Nest Resource (Shell) 1981 report.

18.2 Coal Seams and Zones

The mine plan, when executed will initially mine Zone 1. All calculations regarding the coal processing section are based on the Seam data from Zone 1. It should be noted however that the plant design has allowed for treatment of both Zones 1 & 2 separately or in any combination. Zones 1 and 2 constitute 85% of the raw coal feed from the design pits. The remaining 15% consists of seams from the upper coal Zones.

18.3 Size Analysis

The predicted size analysis of the raw coal was obtained from channel sample data and from drill core size analysis that had been subjected to Rossin Rammler size interpretation. The graphical data is shown in the charts below.

Table 18-1 Original Feed Distribution

Original Feed Distribution				
Size (in)	**Size (mm)**	**%Passing**	**% Retained**	**Weight %**
1 x 3/4	19.05	97.0%	3.0%	3.0%
3/4 x 1/2	12.7	96.2%	3.8%	0.8%
1/2 x 1/4	6.35	93.3%	6.7%	2.9%
1/4 x 6M	3.35	88.0%	12.0%	5.3%
6M x 28M	0.6	50.2%	49.8%	37.8%
28M x 65M	0.21	29.2%	70.8%	21.0%
65M x 100M	0.15	22.7%	77.3%	6.5%
		0.0%	100.0%	22.7%

Table 18-2 Rosin – Rammler Calculations

Rosin Rammler Calculations				
% Retained	**size (mm)**	**ln wr**	**ln (-ln wr)**	**ln x**
3.0%	19.05	-3.5066	1.2546	9.8548
3.8%	12.7	-3.2702	1.1848	9.4494
6.7%	6.35	-2.7031	0.9944	8.7562
12.0%	3.35	-2.1203	0.7515	8.1167
49.8%	0.6	-0.6972	-0.3607	6.3969
70.8%	0.21	-0.3453	-1.0633	5.3471
77.3%	0.15	-0.2575	-1.3568	5.0106
b=	0.5554	slope of trendline		
y-intercept=	3.9991	y-intercept of trendline		
a=	1339.961433			

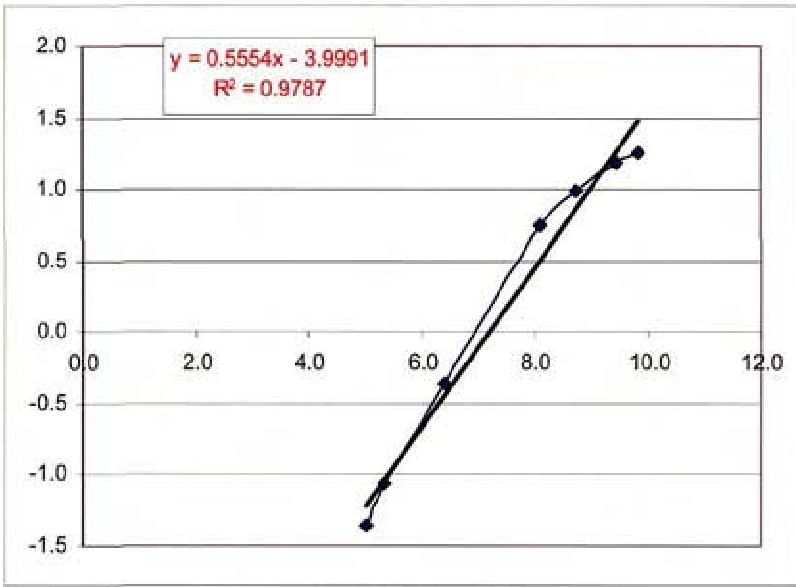


Figure 18-1 Rosin – Rammler Graph

Table 18-3 Rosin – Rammler Revised Distribution

Rosin Rammler Revised Dist.			
Size (mm)	**%Passing**	**% Retained**	**Weight %**
19.05	98.7%	1.3%	1.3%
12.7	96.9%	3.1%	1.8%
6.35	90.7%	9.3%	6.3%
3.35	81.1%	18.9%	9.6%
0.6	47.3%	52.7%	33.8%
0.5	43.9%	56.1%	3.4%
0.21	30.0%	70.0%	13.9%
0.15	25.6%	74.4%	4.4%
0	0.0%	100.0%	25.6%
		Total	100.0%

The predicted size analysis is as follows:

Table 18-4 Lodgepole Clean Coal Predicted Size Analysis

Size Fraction (mm)	Inches/Mesh	Weight %	% Retained
Plus 19 mm	¾"	1.3	1.3
19 mm x 12.7mm	¾" x ½"	1.8	3.1
12.7 mm x 6.35mm	½" x ¼"	6.3	9.3
6.35mm x 3.35mm	¼" x 2.5"	9.6	18.9
3.35mm x 0.60mm	2.5" x 30#	33.8	52.7
0.60mm x 0.5mm	30# x 35#	3.4	56.1
0.50mm x 0.21mm	35# x70#	13.9	70.0
0.21mm x 0.15mm	70# x100#	4.4	74.4
- 0.15mm	-100#	25.6	100.0

It is noted that the coal is considerably finer than the typical coal feed to the coal preparation plants in the Elk Valley. As a result the fines circuit is considerably larger which will reflect in the capital cost.

18.4 Clean Coal Yields

The assessment of the yield to produce a 10.0 % ash coal (adb) was based on the analytical data provided from Elk Valley Environmental Services Laboratories (EVES) in Sparwood, B.C. Zone 1 data has been used for this assessment. A limited amount of information was available on froth flotation and some extrapolation has been applied for the yield calculation. A reasonable assumption has been made that the froth flotation data on the minus 0.25mm fraction provided by EVES will apply to the 0.15mm fraction.

The yields are based on a selection of raw coal data from Zone1, (Seams 10, 11 and 12). The overall calculated yield was adjusted to reflect 2% out-of-seam dilution in the plant feed and 1% for normal plant inefficiencies. The yields obtained from the laboratory data have therefore all been discounted by a factor of 0.99. The plant feed moisture is estimated to be 8%. In this instance, where the plant feed moisture is the same as the plant clean coal moisture, it should be noted that yields quoted on both an air dry basis and an as received basis are the same.

It should be noted that 3 tonne/h of clean coal dryer product is used to fuel the dryer furnace.

The clean coal product loaded into rail cars is at 10% ash (adb) and 6% moisture. The clean coal production rate will be 311 tonne/h (arb). The yield of the clean coal is 57.9% (arb).

It is estimated that the yield on a day-to-day basis can typically vary between 60% and 70%. An overall yield based on coal loaded into vessels at 8% moisture at the coal terminal is estimated at 59.2% (arb).

A regression analysis of Head Ash vs. Yield for Zone1, Seams #10, #11, and #12 are shown in the following tables below.

Table 18-5 Seam #10 Yield / Ash Relationship

Seam	Number	Yield % @ 10% Ash	Head Ash
10	LP502A	86	17.23
10	LP503	68	26.54
10	LP505	72	21.25
10	LP506	79	21.67
10	LP507	62	23.08
10	LP508	71	26.88
10	LP509	60	23.44
10	LP510	57	26.54
10	LP511	47	34.52

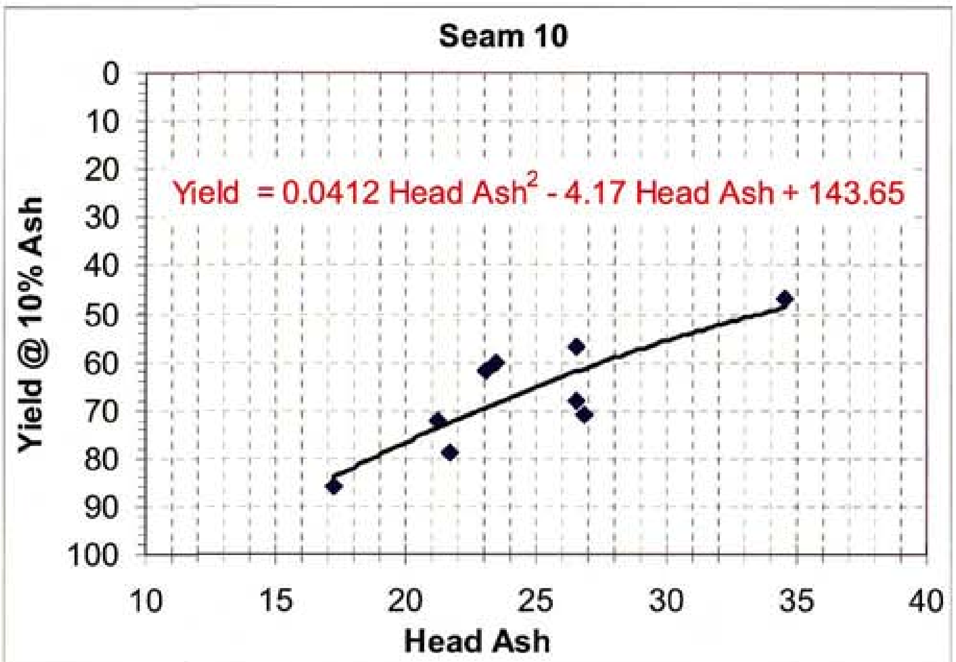


Figure 18-2 Seam #10 Regression Graph

Table 18-6 Seam #11 Yield / Ash Relationship

Seam	Number	Yield % @ 10% Ash	Head Ash
11	LP509	64	27.42
11	LP510	62	30.56

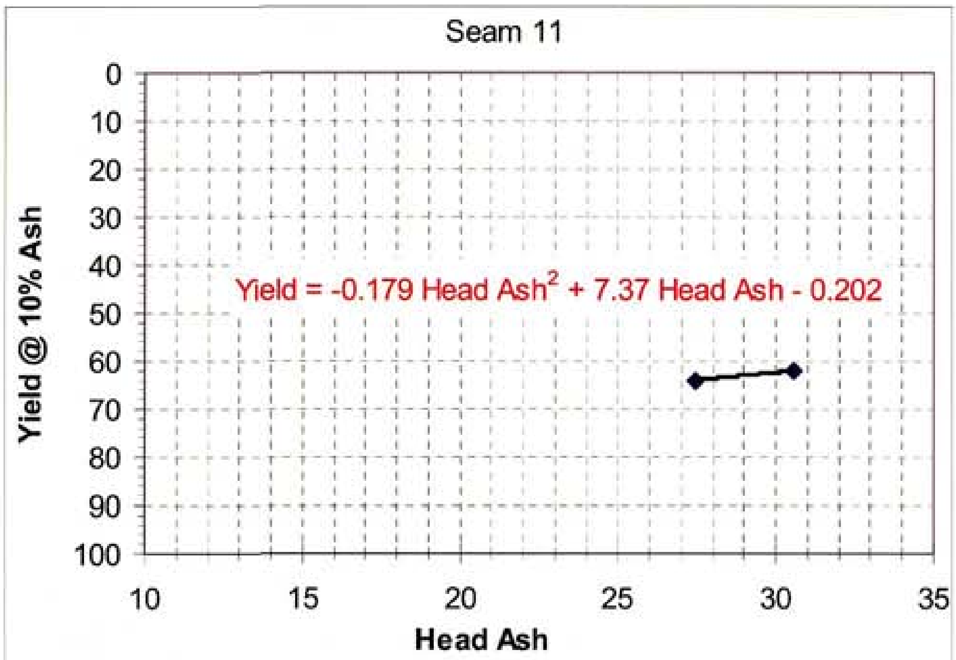


Figure 18-3 Seam #11 Regression Graph

Table 18-7 Seam #12 Yield / Ash Relationship

Seam	Number	Yield % @ 10% Ash	Head Ash
12	LP502A	51	34.12
12	LP505	83	18.73
12	LP506	89	16.24
12	LP507	64	24.51
12	LP508	59	30.32
12	LP509	58	30.89
12	LP510	56	23.72
12	LP511	61	26.81

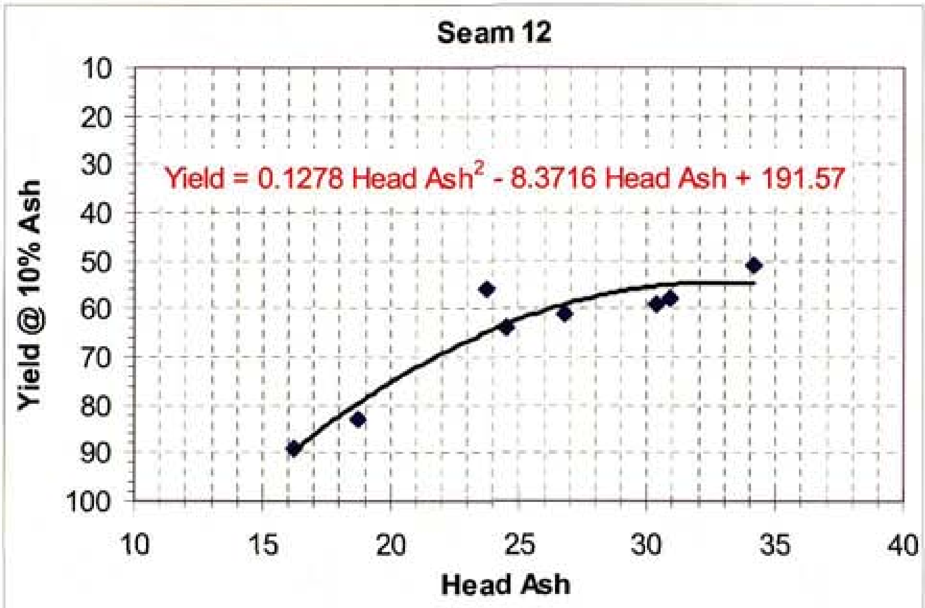


Figure 18-4 Seam #12 Regression Graph

From the available data it is estimated that the theoretical yield of Clean Coal will be 60.3% on an air-dry basis (adb). After applying the 0.97 factor the yield will be 58.5%.

Following an adjustment for the 3 tonne/h clean coal diverted to the dryer furnace, the yield drops to 57.9%. The belt scale yield, which includes moisture on an as received basis for both plant feed and for clean coal loaded into the rail cars is therefore 57.9%

The data indicates that the yield for the different processing streams including a 0.97% adjustment are as shown.

Table 18-8 Individual Process Yields

Yield on Dense Medium Cyclones	53.4%
Yield on Water Only Cyclones/Spirals	67.9%
Yield on Froth Flotation	63.0%

These "adb" yield values are used as the basis of plant through put and costing. The same base values have been used in the Resource model for forecasting Clean Coal tonnages in the production schedule. The yield used in the resource model is adjusted for the water content of the various material streams (see Section 19.0).

19.0 Mineral Resource and Mineral Reserve Estimates

The Lodgepole Coal deposit has been modeled as 3d solids and as a 3d Block model for coal quantification and mine planning purposes using MneSight© Mining Software. The following section describes the modeling process from drillhole and geology inputs through interpolation and coal quality modeling. The final resources and reserves are summarized in Table 19-13 to Table 19-17

19.1 Drill Hole Data Base

Prior to 2005, a total of thirty-six holes have been completed on the property, sixteen diamond drill holes, and twenty reverse circulation rotary holes as well as four adits.

Cline Mining Corporation drilled an additional 13 holes on the Lodgepole Property in 2005. Previous drill hole intercepts have been re-examined to identify new drill hole seam intercepts, and to confirm the intercepts used in the report "Geology and Resources of the Lodgepole Property" -Technical Report Feb 14, 2005. The 2005 work includes the addition of the 2005 exploration data plus the rationalization of previous collar locations and elevations to a single survey datum and review and re-interpretation of previous geophysical logs to assure all seam tops and bottoms have been determined on a consistent and similar basis.

Table 19-1 lists the Lodgepole drill holes completed on the Lodgepole property, their UTM coordinates, elevation and total depth.

Table 19-1 List of drill holes for the Lodgepole property

DH-ID	Northing	Easting	Elevation	Total Depth
101	5464843.30	663738.06	1937.00	368.80
102	5465295.86	664352.91	2075.00	126.50
201	5465645.53	664689.31	1887.00	232.00
202	5466446.01	664466.02	1823.00	156.00
203	5465877.81	664434.65	1950.00	232.00
204	5466264.36	664903.08	1906.00	173.00
205	5466018.89	665174.33	1994.00	201.10
206	5466617.43	664876.47	1902.00	201.00
207	5467064.38	665025.42	2025.00	208.00
301	5466243.52	665518.10	2102.00	93.00
302	5466807.07	664920.48	1931.00	288.58
303	5466768.73	664286.86	1816.00	320.52
304	5467090.18	665213.15	2124.00	250.00
305	5467042.36	664689.80	1882.00	304.50
306	5467303.80	664421.13	1833.00	293.93
307	5466739.36	665375.70	2137.00	195.00

DH-ID	Northing	Easting	Elevation	Total Depth
308	5466433.37	665086.14	1973.00	69.70
309	5466190.59	665143.58	2002.00	222.00
310	5465992.37	664812.83	1876.00	73.00
311	5466330.21	664690.85	1836.00	93.77
312	5465660.56	665359.49	2090.00	19.00
313	5466695.97	665064.67	2001.00	130.50
314	5465826.52	665291.59	2065.00	69.00
315	5466001.20	665273.80	2039.00	77.00
316	5465833.89	664782.80	1871.00	24.00
317	5465916.35	664805.93	1872.00	49.00
318	5466107.64	664815.25	1880.00	60.00
401	5464802.16	664654.34	2079.00	66.00
402	5465045.32	664610.03	2062.00	96.00
404	5466064.58	664574.57	1857.00	102.00
406	5466136.79	665154.74	2006.00	70.00
407	5466313.16	665126.52	1986.00	84.00
408	5466478.75	664925.84	1913.00	60.00
410	5466328.21	665427.12	2108.00	102.00
412	5466576.12	665377.42	2123.60	108.00
413	5466836.58	665077.46	2004.70	108.00
501	5466741.70	665174.90	2048.00	164.90
502A	5466598.70	665155.70	2035.50	102.11
503	5466426.70	665217.40	2030.50	76.81
504	5466120.30	664729.70	1855.70	39.32
505	5466318.40	664799.70	1871.70	81.38
506	5466133.50	664923.00	1915.40	58.52
507	5466596.40	664957.40	1948.20	81.38
508	5466437.91	665007.99	1947.70	55.47
509	5466311.70	665027.60	1950.20	75.29
510	5466128.50	665050.60	1957.20	41.76
511	5466587.20	665038.80	1983.80	81.38
512	5466189.20	665259.60	2033.30	75.29
513A	5466315.10	665235.10	2034.40	87.48
Adit1	5466152.00	665470.00	2060.00	30.00
Adit2	5465013.82	664667.27	2060.00	36.00
Adit3	5464743.00	664716.50	2065.00	47.00
Adit4	5467178.81	665563.34	2105.00	47.00

Note: *UTM, NAD 83*

19.2 Resource Classification

The Lodgepole property is categorized as a 'moderate' geology type, and in accordance with GSC Paper 88-21 the criteria to define assurance of existence are listed in Table 19-2.

Table 19-2 Criteria Used to Define Assurance of Existence For Coals in Moderate Geology Type

	Assurance of Existence Category		
Criteria	**Measured**	**Indicated**	**Inferred**
Distance from nearest point (m)	0-450	450 - 900	900-2400

From: GSC Paper 88-21

19.3 3D Solids Modeling

A 3-D block model has been setup in MineSight© to cover the deposit area. The limits and dimensions are listed in Table 19-3.

Table 19-3 Resource Model Limits and Dimensions

	Minimum	Maximum	Block Size (m)	No. Of Blocks
East	663000	666000	12.5	240
North	5464000	5468000	25	160
Elevation	1500	2700	15	80

19.3.1 Seam Tagging

All of the drill holes have been logged geophysically. General practices include logging the completed drill hole through the drill steel with a gamma-neutron tool, then removing the drill steel and attempting to complete an open hole log using a gamma-density tool. Down hole surveys are run where possible on deep, open holes. Seven holes have down hole survey information.

Coal Seam (ply) identification and thickness estimates are based on geophysical log interpretation, core logging (where applicable), and driller's logs. In this study, all of the logs have been re-picked by the same geologist to minimize discrepancies in evaluation techniques. Seams are designated a code based on their general position in the stratigraphic column and the seam's individual identifier (e.g. Seams 11, 12 represent the #1 and #2 seams in the 1st depositional zone). The seam/ply from-to depths and their designated codes are loaded to the MineSight © drill hole database (file name Lpl311.raw).

19.3.2 Geological Interpretation of Zone Bottoms

The multiple coal seam intervals and their associated partings have been consolidated into depositional packages or 'Zones' for the purpose of modeling. Each seam in the Zone has been assigned the same Zone code. For example it was typical that all picked seam codes '1x' (i.e. 11 to 19) were tagged with a Zone code of 1. The lowermost seam bottom in each depositional zone in each drill hole was utilized in MineSight© 3D to generate an initial base of Zone surface for each Zone. The surface was then extrapolated by creating contact polylines along approximately 50m east-west and north-south cross-sections. The sections were then linked to create 3-d surfaces representing the bottom of each mineable coal Zone over the model area.

19.3.3 Compositing for Zone Thickness

Zone thickness is calculated for each depositional zone based on the difference between the top of the uppermost seam and the bottom of the lowermost seam in the Zone package.

The minimum mineable thickness thresholds have been set at 0.3 meters for coal seams and 0.6 meters minimum separable partings thickness based on the seam interpretations from the geophysical logs. The estimate of minimum mineable coal thickness and minimum removable parting is based on the complexity rating of the coal as defined by GSC paper 88-21 but also by the type of mining equipment, experience of the operators and other operating conditions. Recommendations for surface coal deposits of moderate complexity in GSC paper 88-21 (Table 2., p. 10) are 0.6 meters for coal and 0.3 meters for partings. The high level of experience in the Elk Valley coals can justify the use of a thinner minimum mineable removable coal thickness. Using a thicker removable parting makes the model conservative with respect to plant feed ash. The impact of the differences in these assumptions from the GC 88-21 recommendations has been assessed at less than 1% for the total modeled resource and less than 0.5% (about 170,000 raw tonnes) within the current ultimate pit. The difference between the thickness parameter used in this model and the GSC Paper 88-21 recommendations does not create a significant difference in resource tonnage. The impact on clean coal reserves is even smaller since thin seams are heavily discounted by mining losses and dilution.

Total mineable coal thickness (MC-Thick) for each Zone is the sum of seam intercepts in the Zone with thickness greater than 0.3 meters. Total mineable parting (removable) thickness (MW-thick) for each Zone is the sum of parting intercepts in the Zone with thicknesses greater than 0.6 meters.

The Zone from-to depths, mineable thicknesses and their designated codes are loaded to the MineSight© drill hole database (see MineSight© project files Lpl311.zon and Lpl309.zon). (see Table 19-4)

Note: Anomalous coal intercepts were considered too discontinuous to model and were tagged with a composite code comprised of the nearest lower Zone code with a '9' suffix (un-modelled, discontinuous footwall seams were arbitrarily labeled Zones 99 and 98).

Table 19-4 Drill Hole Zone intercepts for the Lodgepole property

DH	From	To	Thickness	Zone No.	MC-thick	MW-thick
101	22.0	22.1	0.1	5	0	0
101	42.5	42.9	0.4	4	0.4	0
101	56.3	59.9	3.6	3	3	0.6
101	96.9	97.7	0.8	3	0.8	0
101	115.3	123.1	7.8	2	5	2.8
101	180.9	194.3	13.4	1	13	0
101	325.7	328.7	3.0	99	1.9	0
102	4.5	4.6	0.1	7	0.0	0.0
102	23.0	23.1	0.1	6	0.0	0.0
102	34.6	50.2	15.6	5	3.9	11.7
102	90.4	91.0	0.6	4	0.6	0
102	109.3	112.8	3.5	3	3.5	0.0
201	118.0	118.2	0.2	99	0	0
201	231.8	231.9	0.1	98	0	0
202	48.5	56.6	8.1	2	4.7	3.2
202	109.8	128.5	18.7	1	16.7	2.0
203	3.5	3.6	0.1	5	0.0	0.0
203	23.2	25.4	2.2	4	2.2	0.0
203	37.0	41.0	4.0	4	2.4	1.3
203	57.5	59.4	1.9	3	1.9	0.0
203	84.2	100.4	16.2	2	5.4	10.2
203	149.4	169.8	20.4	1	18.1	2.3
204	50.4	68.4	18.0	1	16.0	2.0
204	106.0	106.3	0.3	99	0.0	0.0
204	128.1	134.1	6.0	98	3.0	2.7
205	7.1	10.9	3.8	1	3.8	0.0
206	50.0	63.2	13.2	1	9.3	3.9
207	19.0	19.1	0.1	5	0.0	0.0
207	38.6	41.0	2.4	4	2.4	0.0
207	66.0	68.7	2.7	3	2.7	0.0
207	100.3	109.1	8.8	2	5.7	3.1
207	163.6	178.6	15.0	1	13.0	2.0
301	31.0	35.9	4.9	1	4.1	0.8
302	21.8	28.7	6.9	2	4.4	2.5
302	89.7	113.7	24.0	1	20.0	4.0
302	198.0	201.3	3.3	99	3.3	0.0
303	20.4	20.7	0.3	7	0.3	0.0
303	35.9	42.7	6.8	6	3.0	3.8

DH	From	To	Thickness	Zone No.	MC-thick	MW-thick
303	76.6	77.6	1.0	5	1.0	0.0
303	97.1	99.9	2.8	4	2.8	0.0
303	110.7	111.3	0.6	39	0.6	0.0
303	120.8	138.4	17.6	3	6.5	11.1
303	174.2	180.8	6.6	2	2.8	3.8
303	236.6	261.6	25.0	1	20.6	4.4
304	11.7	11.8	0.1	6	0.0	0.0
304	41.5	42.4	0.9	5	0.9	0.0
304	64.1	64.9	0.8	4	0.8	0.0
304	86.5	99.3	12.8	3	3.7	8.8
304	121.0	127.9	6.9	2	4.6	2.3
304	184.9	195.2	10.3	1	8.6	1.7
305	11.0	11.1	0.1	6	0.0	0.0
305	46.0	46.1	0.1	5	0.0	0.0
305	65.5	66.5	1.0	4	1.0	0.0
305	85.1	86.7	1.6	3	1.6	0.0
305	120.9	126.9	6.0	2	1.7	4.1
305	181.5	204.3	22.8	1	16.1	6.7
306	29.6	30.2	0.6	8	0.6	0.0
306	112.0	112.1	0.1	7	0.0	0.0
306	131.4	137.9	6.5	6	3.9	2.6
306	168.6	169.4	0.8	5	0.8	0.0
306	197.3	199.1	1.8	4	1.8	0.0
306	212.6	225.1	12.5	39	0.9	11.6
306	225.1	236.2	11.1	3	2.4	8.7
306	247.2	247.4	0.2	29	0.0	0.0
306	254.8	268.0	13.2	2	3.7	9.4
306	282.5	283.0	0.5	19	0.5	0.0
307	40.9	48.9	8.0	2	5.1	2.9
307	99.0	116.5	17.5	1	13.0	4.5
308	36.6	45.4	8.8	1	8.1	0.7
309	41.7	57.9	16.2	1	15.3	0.9
309	136.5	141.2	4.7	99	3.9	0.8
310	72.8	72.9	0.1	19	0.0	0.0
311	45.0	62.8	17.8	1	15.9	1.9
311	82.0	82.2	0.2	99	0.0	0.0
312	18.8	18.9	0.1	98	0.0	0.0
313	11.2	16.4	5.2	2	3.2	2.0
313	79.9	97.5	17.6	1	15.4	2.2
314	10.0	18.4	8.4	1	2.5	5.9
315	20.2	36.7	16.5	1	11.1	5.4
316	23.8	23.9	0.1	99	0.0	0.0
317	22.0	22.5	0.5	98	0.5	0.0

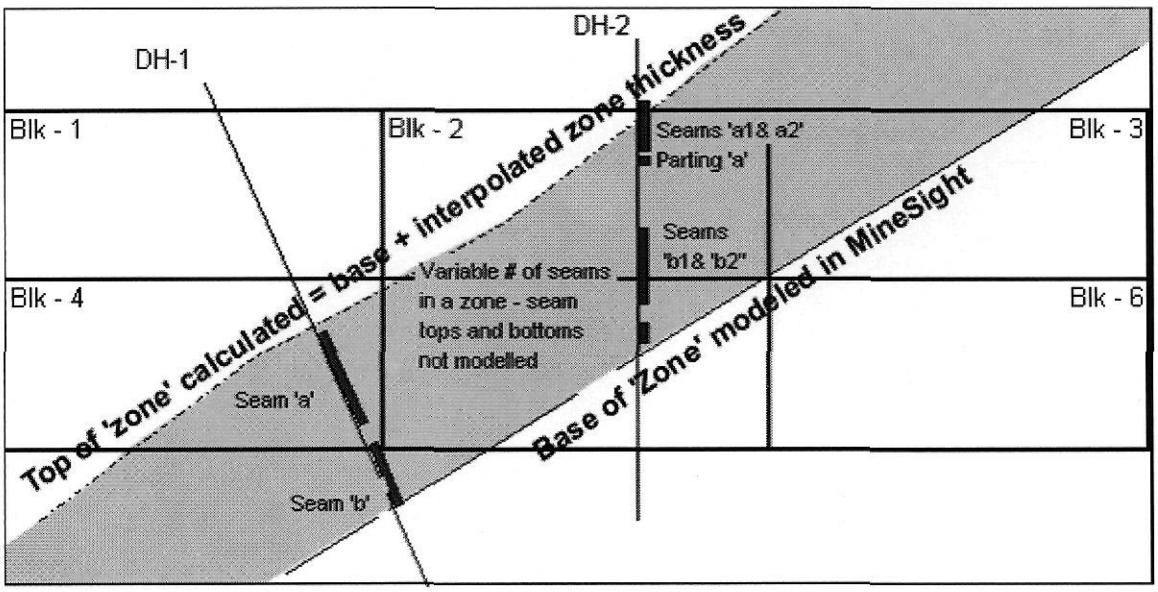
DH	From	To	Thickness	Zone No.	MC-thick	MW-thick
318	17.4	24.1	6.7	1	5.4	1.3
401	26.2	46.5	20.3	1	17.1	3.2
402	20.3	35.7	15.4	2	5.6	9.8
404	61.0	76.3	15.3	1	13.7	1.6
406	36.8	51.8	15.0	1	14.2	0.8
407	48.9	67.2	18.3	1	16.7	1.6
408	23.7	44.8	21.1	1	20.0	1.1
410	54.5	66.8	12.3	1	11.9	0.0
412	8.1	21.6	13.5	2	5.0	8.5
412	47.0	47.5	0.5	19	0.5	0.0
412	74.9	88.4	13.5	1	10.8	2.7
413	15.6	22.8	7.2	2	4.7	2.5
413	76.0	94.5	18.5	1	14.6	3.9
501	18.4	25.3	6.9	2	4.6	2.3
501	81.8	96.8	15.0	1	13.5	1.5
502A	5.1	10.6	5.5	2	3.5	2.0
502A	73.0	86.6	13.6	1	11.0	2.6
503	50.2	59.2	9.0	1	9.0	0.0
504	0.0	0.1	0.1	19	0.0	0.0
505	36.4	55.1	18.7	1	15.8	2.9
506	7.8	31.7	23.9	1	18.8	5.1
507	56.3	69.5	13.2	1	10.6	2.6
508	35.4	45.3	9.9	1	8.4	1.5
509	35.9	60.7	24.8	1	18.4	6.4
510	8.8	28.9	20.1	1	13.3	6.8
511	57.0	70.7	13.7	1	10.9	2.8
512	28.0	44.2	16.2	1	12.1	4.1
513A	52.9	67.8	14.9	1	14.1	0.8

19.3.4 Creation of Coal Zone Solids

Each interpreted Zone bottom surface is gridded to a MineSight© gridded surface file (GSF) which generates average Zone bottom elevations for each grid cell (in plan view) in the 3d model which is being built. Thickness values for mineable coal and partings (removable) are interpolated in the GSF to each grid for each Zone using the Zone thickness composite data (see MineSight© project file Lpl309.zon) described above and MineSight's inverse distance squared routines. Values for distance to nearest composite and number of composites used are stored for each block to allow future resource classification. Zone top elevations are calculated in the GSF (Zone bottom elev. + Zone thickness = Zone top elev.) and converted from the GSF to a 3d surface file. The Zone bottom and top surfaces are then utilized to create 3D solids of each depositional zone.

The Zone solids are then used to code the 3D Block Model (3DBM named Lpl315.zon in this MineSight© project) with appropriate ZONE% and CODEZ values where ZONE% is equal to the percentage of each block in the 3DBM that lays within the Zone solid and CODEZ is equal to the appropriate depositional zone code. In the case where two Zones intersect the same model block, all coal will be coded to the Zone with the greatest volume in the block. (i.e. the Zone is identified by the majority "owner") To complete the estimate of coal volume for each Zone, coal thickness is converted to a Zone coal partial (MCL %) by dividing the interpolated mineable coal thickness (MCTHK) by the Zone thickness (ZNTHK). In-situ mineable coal volume (RCOAL) for each model block then becomes the product of ZONE % and MCL %.

The following generic section depicts the volume logic utilized in creating the Lodgepole 3d block model.



MCL%	= MCTHK / ZNTHK * 100
ZONE%	= % of block within a Zone
RCOAL	= MCL% * ZONE%
CODEZ	= Zone ID of the major Zone in a block if there is more than 1.

19.4 Raw Coal Quality

19.4.1 Drill Hole Files

In-place coal quality data is stored in the MineSight© drill hole files on a seam-by-seam basis. Work completed in 2005 includes the rationalization of pre-2005 sample results to interpreted coal intervals, reconciliation of all reported coal quality to the same basis, and a comparison of pre-2005 quality assessment with 2005 drilling results. Three sets of drill hole files contain drilling and modeling base data.

- "zon" files contain from-to and thickness data utilized to interpolate Zone thickness data (MCTHK, MWTHK, ZNTHK, etc.) and resource classification limits (DIST, NUSED). (See MineSight© assay files lpl311.zon and composite file lpl308.zon & lpl309.zon)
- "raw" files contain all individual seam data (See MineSight© file lpl311.raw) and Zone composite quality data (see MineSight© file lpl308.raw & lpl309.raw).
- "wsh" contain all available clean coal data on individual seams (Note: clean coal quality has not been modeled at this point) See MineSight© files lpl311.wsh, lpl308.wsh, & lpl309.wsh).

Table 19-5 summarizes the coal intersections for each Zone identified in the drill holes and the number of assays available for model interpolation. The current model utilizes all available data for in-place ash estimates for all but Zone 1. Only 2005 quality data was used for Zone 1 (45 assays) See discussion in Section 19.4.2.

Table 19-5 Coal intersections and available quality data (all years).

	Number of Intersections			
Zone	Intersections Identified	Raw Assays	Float Assays	Floated at Standard SG
Discontinuous Upper Zones (not modeled)	8	2	2	2
Zone 8	1	1	1	1
Zone 7	3	0	1	1
Zone 6	8	4	4	4
Zone 5	9	4	4	4
Zone 4	10	4	4	3
Zone 3	13	9	9	9
Zone 2	49	36	36	25
Zone 1	99	85	85	69
Discontinuous Lower Zones (not modeled)	16	0	0	0

Drilling in 2005 has been completed by core methods with a high core recovery. Sample selection with this type of drilling is very discreet as it allows the geologist the opportunity to objectively review the coal horizon drilled so separable partings are not included in the sample. Drilling in past programs included some (16 holes) diamond drilling and reverse circulation drilling (20 holes). Unfortunately, core recovery in prior diamond drill programs was poor and consequently the sample quality data is not considered reliable. In rotary drill programs, samples are collected as drilling advances, increasing the possibility of including partings in samples, and diluting samples with material caving down the hole.

Quality results from these different type of programs with their variable levels of reliability, must be rationalized with geophysical log interpretation and cannot always be accepted on an absolute basis. The model design for the Lodgepole project recognizes the need to treat anomalous quality data in order to *'normalize'* results gained from various drilling and sampling methods.

Before the final coal quality modeling was completed, interim resource estimates were run to compare the amount of coal resource by Zone per coal assay. The results are given in Table 19-6. Quality sample frequency by Zone has been estimated using and the number of assays available in the quality drill hole file.

Table 19-6 Zone Resource Quality saturation (kbcm modeled resource per available sample)

	Sample Saturation (bcm x1000/sample)		
Zone	**Resources**	**Per Raw Assay**	**Per Float assay at Standard SG**
Zone 8	0	0	0
Zone 7	0	na	0
Zone 6	3,555	889	Na
Zone 5	2,525	631	Na
Zone 4	5,130	1,283	Na
Zone 3	10,556	1,173	Na
Zone 2	16,722	465	Na
Zone 1	64,651	1,674	3,079

Table 19-6 above indicates future drilling for quality purposes may best be targeted for Zones 1, 3 & 4.

The effect of the assay results from various drill campaigns has been evaluated to determine the best data to include in the resource model. A comparison of pre-2005 quality results are with the 2005 results presented in Table 19-7.

Table 19-7 Zone 1 Quality results comparison – 2005 and previous

	Raw Coal Ash%				Float Coal Ash%		
	Max	**Min**	**Avg**		**Max**	**Min**	**Avg**
Zone 1							
2005 results	39.3	15.8	26.4		14.6	8.2	10.8
Pre 2005	63.1	17.5	34.4		20.7	7.8	11.9
Zone 2							
2005 results	23.5	12.6	19.5		14.3	9.6	10.5
Pre 2005	66.0	13.2	31.7		14.8	8.2	11.6

Coal intersections from previous programs (and consequently model coal volumes) have been rationalized by the same geologist to ensure log interpretation techniques are consistent. Consequently, partings have been properly identified but the raw coal assays reflect the lab reported results with partings included. For example in a Zone 2 intersection where a prior sample interval has included partings that can be identified on the geophysical log (see hole 302-interval 21.8 to 28.7) two partings of 1.0 and 1.5 meter thickness respectively were identified on the e-logs and the entire interval was reported at 27.5% ash. If the parting is assumed to be 50% ash and removed from the assay on a length weighted basis, the raw ash of the coal is reduced to 17.5%).

By estimating the parting length and ash in these 'diluted' samples, the reported assay results can be normalized to reflect the sampling technique used in the 2005 program. The risk to this approach is that it is not known how much of the parting was sampled relative to the seam but it does make a reasonable adjustment for a systemic problem. To eliminate any risk from assumed partings thickness, only 2005 data has been used for Zone 1.

For Zones 2 through 8, the treated assay values were utilized for compositing quality. Of all the Lodgepole raw coal assays, 43 or 30% have been identified as having potential for this type of sample dilution (all from pre 2005). Partings in the 2005 program were sampled and assayed for ash values. Average values for hanging-wall, footwall, and parting ash were calculated using these samples then applied to 'correct' previous assay results for the coal Zones above Zone 1.

Both the treated and untreated raw ash are stored in the model so further analysis can be done in the future.

19.4.2 In-place Coal Quality

For the purposes of estimating raw coal quality in this study, the seam data has been combined for each coal Zone to create Zone composites. These composites are then used to interpolate raw quality data to the block model by the same multi-pass, inverse distance method used for estimating seam and Zone thickness characteristics. The result is an estimation of in-place coal quality by coal Zone.

As explained above, Zone 1 raw ash has been interpolated to the 3D Block Model (see MineSight© project file lpl315.qlt) using 2005 drilling data only. It is believed the exclusion of pre-2005 holes for Zone 1 is justifiable on the basis of variable and indeterminable sampling methods. (Pre-2005 geo-physical log picks were used for the purpose of volumetric estimations.) Upper zone quality was interpolated using all available drill holes and the 'treated' raw ash (SRASH) value in the composite file.

19.4.3 Plant Feed Quality

The coal quality parameters in the 3d Block Model enables the resource model to predict, report, and optimize plant feed quality. The moderate geological complexity of Lodgepole supports a consistent and repeatable mining recovery process for the various coal seams that will ultimately make up the plant feed. In future operations seam tops will be delineated by blast hole drilling information. Dozers and backhoes will be used to prepare the seam for mining. Seam preparation has a significant effect on plant feed quality and overall mining recovery. Poor mining preparation of the in-place coal will dilute the raw coal quality characteristics with partings and consequently reduce the plant yield and clean coal output. Over-prepared coal in the pit ensures the best-delivered ash and plant yield but increase mining losses in the pit.

The effect of mining loss and dilution on plant feed quality can be varied using standard MineSight© reserve routines on the 3d Block Model and analyzed for its impact on project economics. By assigning a fixed thickness of mining loss and dilution for each coal Zone, mining recovery is dynamically adjusted for the seam or Zone being mined (i.e. A 10 cm mining loss from cleaning the top of an 8m seam represents a 1.25% loss while the same loss due to preparation on a 1m seam will generate a 10 % loss). By further assigning quality estimates to the parting diluting the seam, delivered ash to the raw coal stockpile can be estimated. Table 19-8 shows the effect on feed quality of loss and dilution on the preceding hypothetical seams:

Table 19-8 Effect of mining loss and dilution on seams of varying thickness

	Assume both seams have an in-situ quality estimated at 25% ash						
	Assume parting ash to be 50% in each case (SG=1.7)						
	Assume coal cleaning loss to be 10cm and partings included to be 20cm						
In-situ	**8m thick seam**				**1m thick seam**		
Quality	**In-situ**	**Loss**	**Dilution**		**In-situ**	**Loss**	**Dilution**
Volume (BCM)	100	1%	2.5%	**Volume**	100	10%	20%
Tonnage	150	1.5	5.1	**Tonnage**	150.0	15.0	34.0
Ash	25.0%	25.0%	50.0%	**Ash**	25.0%	25.0%	50.0%
Delivered							
Quality	**8m thick seam**				**1m thick seam**		
	Volume	101.25	bcm		**Volume**	110.00	bcm
	Tonnage	153.6	tonnes		**Tonnage**	169.0	tonnes
	Feed Ash	25.8%			**Feed Ash**	30.0%	

In Table 19-8, net mining recovery is actually above 100% in both cases. The higher delivered feed ash for the thin seam is based on the same in-pit seam mining preparation as the thick seam.

Analysis of the hanging wall, footwall and parting zones was completed for the 2005 drilling program. Average ash for each was completed for Zones 1 and 2. Using these values and the number of contacts estimated in each Zone, an average dilution ash was estimated for each Zone and loaded into the model. Table 19-9 shows loss and dilution thickness assumptions used for each Zone in the current model build. (Note: The typical Loss, Dilution, and Net Recovery values are based on average coal thicknesses for each Zone. Actual % loss and dilution in a given model block will vary with the interpolated coal thickness.)

Table 19-9 Mining Recovery and Dilution assumptions by Zone

	Typical # of Seams	Contacts	Loss Thickness (m)	Dilution Thickness (m)	Typical % Loss	Typical % Dilution	Typical Net Recovery
Zone 8	1	2	0.200	0.100	33.3%	16.7%	83.3%
Zone 7	1	2	0.200	0.100	100.0%	50.0%	50.0%
Zone 6	2	4	0.400	0.200	18.2%	9.1%	90.9%
Zone 5	2	4	0.400	0.200	25.0%	12.5%	87.5%
Zone 4	2	4	0.400	0.200	21.1%	10.5%	89.5%
Zone 3	2	4	0.400	0.200	12.5%	6.3%	93.8%
Zone 2	3	6	0.600	0.300	13.0%	6.5%	93.5%
Zone 1	3	6	0.600	0.300	4.2%	2.1%	97.9%

Applying mining loss and dilution assumptions is an expected process in the conversion of resources to reported reserves and accentuates the need to ensure that seam quality reflects 'coal only'.

19.4.4 Historical Sample Data and Product Quality Modeling

In addition to in-place raw coal quality, the assay results from the 2005 drilling program include estimates of clean ash at varying specific gravities, screening results for hole 501 seam 1 and 2 intervals and a comparison of washability results for screened and unscreened samples for Zone 1 in hole 501. To estimate clean coal quality and yield, all 2005 holes have had float sink analysis done at SGs of 1.4, 1.6, and 1.76. An SG range was selected over an arbitrary single separation (as was done in past years) to allow a preliminary evaluation of the washing characteristics of the lower 2 Zones, which make up 79% of modeled the Lodgepole resource.

The ash of the floated coal at an SG of 1.6 was selected as the standard float results to be analyzed. Although most pre-2005 samples include flotation results, not all previous samples were treated at the same SG separation. The 200 series holes were floated at an SG of 1.5 and the 300 series holes were floated at 1.62 and 1.65 gravities. The variability of the data has precluded the use of the previous clean coal quality data from the pre-2005 work programs, in the current resource model due to the inconsistencies resulting from poor core recoveries or diluted assays from rotary drilling.

For the purposes of the feasibility study, clean coal quality was based on the targeted market coal quality and 2005 washability data. (See Section 18.0)

19.5 Specific Gravity

The specific gravity (SG) of coal deposits are known to be site specific and vary with coal and ash composition, degree of voids, and level of ground water saturation. For the purpose of this study, SG values were set using ranges based on similar values employed at other Elk Valley operations.

The estimated Ash - SG relationship in Table 19-10 has been used to generate SG's for composite weighting in the model and for estimating plant feed tonnage. Additional sampling and lab work for Zone-by-Zone SG algorithms should be considered for future programs.

Table 19-10 Lodgepole Estimated Ash - SG relationship (Raw Coal)

Lower Ash Limit %	Upper Ash Limit %	SG (adb)
0	13	1.33
13	22	1.35
22	28	1.38
28	35	1.41
35	45	1.46
45	60	1.54
60	70	1.61
70	85	1.75
85	100	1.88
100		2.02

Modeled SG (adb) was then multiplied by 1.08 to create a 'wet' SG in the model for 8% arb in Run-of Mine (ROM or delivered) coal calculations.

19.6 Clean Coal Yield in the 3D Block Model

The project Life of Mine production schedule is used to quantify the annual clean coal tonnages for delivery to the market and thus generates the project revenues. The Geology model is the source of the raw coal quantities and the clean coal reserves generated from the model are used in the production schedule. As such the coal yield used in the geology model must include all mining, plant, and transportation processes from the model to the final market product. The following description includes the plant processing yield and accounts for the mining and other issues to include all the yield aspects from the Geology model to final market clean coal tonnage.

19.6.1 Net Clean Coal Yield

Results from the 2005 washability tests were examined to determine a suitable relationship between raw ash and plant yield using the market specification clean coal ash content of 10%. As discussed above, the analysis is based on seams from Zone 1 data from the 2005 program since this coal is the predominate source of coal during the first 5 years of the project. Wash curves were developed for each seam intercepted in Zone 1 using gravity separations of 1.4, 1.6, and

1.76. Utilizing these curves, various potential clean ash products can be assessed for yield. In consideration of the wash data for Zone 1 and market coal quality target, a clean ash target of 10% was selected for the purpose of generating a feed ash versus plant yield algorithm. Table 19-11 shows air-dried basis yield values normalized to a 10% clean ash for each of the Zone 1 seam intersections in the 2005 program. (see Section 18.0 for more detail)

Table 19-11 Zone 1 seam washability data - 2005 assay data

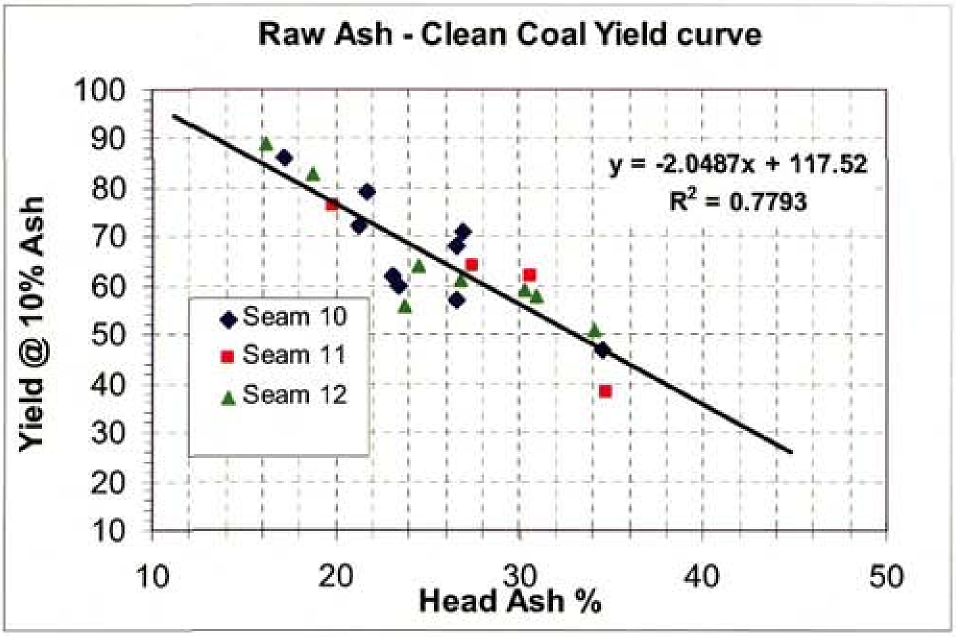
Seam	Yield % @ 10% Ash	Feed Ash (adb)
12	51.0	34.12
12	83.0	18.73
12	89.0	16.24
12	64.0	24.51
12	59.0	30.32
12	58.0	30.89
12	56.0	23.72
12	61.0	26.81
11	64.0	27.42
11	62.0	30.56
11	38.4	34.76
11	76.1	19.8
10	86.0	17.23
10	68.0	26.54
10	72.0	21.25
10	79.0	21.67
10	62.0	23.08
10	71.0	26.88
10	60.0	23.44
10	57.0	26.54
10	47.0	34.52

The linear regression shown in Figure 19-1 has an R^2 of 0.78 and is represented by the equation:

$$\text{Yield} = -2.0487 \times \text{Head Ash} + 117.52$$

The above yield equation is used to calculate process yield based on plant feed ash values (adb). It is necessary to account for change in coal moisture before and after processing when estimating overall plant yield. Drilling methods make acquiring accurate raw coal moisture difficult. Consequently, an assumption of 8% typical raw coal moisture (drained) has been made based on field and core observations and samples. Since the expected product moisture is also 8% at the port, no adjustment to production yield estimates need to be made at this time for change in moisture.

Figure 19-1 Graph of Raw Ash and Clean Coal Yield



In addition to the plant yield correlation above, a reduction of 1% yield is required to account for equipment efficiency when processing coal. The above yield equation has therefore been changed to:

$$\text{Yield} = -2.0487 \times \text{Head Ash} + 117.52 - 1$$

In the mine design process, the mining loss and dilution includes logic to estimate the ash of the coal delivered to the raw coal grizzly (see above Section 19.4.3 – Plant Feed Quality). A Warbler Feeder in included in the plant design situated between the grizzly and the plant which is used to eliminate oversize, normally high-ash, material which generally comes from non-removable partings and mine footwall and hanging wall dilution. The impact of the warbler is to slightly reduce (typically 2-8%) the tonnage of coal available for processing and improve plant feed quality by eliminating some of the higher ash material. The net effect of the grizzly and warbler will be a reduction in feed ash to the plant and an improvement in overall yield (dryer output/grizzly feed). This improvement is not accounted for in the metallurgical test results and has been estimated to be a 1% increase in yield.

Any extra coal resulting from the above under-estimation of yield can be considered as part of the coal used as dryer feed. Energy required for fuelling the dryer will come predominantly from the clean coal stream and will reduce the coal tonnes available for sale. An estimated 1% of product tonnes (3 tph) will be required for dryer fuel. This value is comparable with other mines in the valley using coal fired dryers. The model yield used for scheduling reserves did not account directly for dryer fuel requirements but is more than offset by yield improvements generated by the pre-cleaning of the Warbler feeder. The combined effects of both the warbler and dryer feed are small enough to be within the order of accuracy of this estimate and the net effect is considered negligible.

19.6.2 Relevance of the metallurgical sample distribution.

As mentioned above, the metallurgical samples are taken from Zone 1 seams intersected in the 2005 exploration program. Samples and metallurgical test work from previous years have not been used because of poor core recovery, inconsistent logging techniques, and the difficulty in evaluating the effect of sample dilution from rotary drilling. Other Zones will be sampled in future work before the final detailed plant design. Table 19-12 shows the proportion of feed coming from Zone 1 over the first 5 years of production. It is not expected that there will be significant differences in yield caused by minor additions of the other coal Zones encountered in the production schedule. The proportion of the Zones within the ultimate pit limit is given in Table 19-12.

Table 19-12 Proportion of 1 Zone coal in Production Schedule

	Zone 1 Proportion	
Period	**Period**	**Cumulative**
2	82.5%	82.5%
3	92.7%	90.1%
4	77.3%	84.2%
5	85.9%	84.8%
6	75.3%	82.5%

Note: Plant starts in Production Period 3

The high proportion 1 Zone coal within the payback period mitigates the risk associated with the absence of washability data on upper seams.

19.7 Indicative Clean Coal Quality

As described above, Coal Zones have been modeled as 3d Solids in MineSight© and then interpolated into a 3D Block Model for pit design work and Resource/Reserve calculations. The modeled Resources are quantified in the next section followed by a section for the Pit Reserves based on the economic pit limits and detailed pit design of the ultimate pit. The Pit reserves are presented in this section to summarize the results. A more detailed description of the pit designs and phases is given in Section 1.019.8– Mine Planning.

19.7.1 Coal Resources

The results of the interpolated coal volumes into the 3d Block Model are summarized in Table 19-13 to Table 19-15 for the whole modeled area with no mining limits applied.

Table 19-13 Total Model Coal Volumes by Resource Class

Resource Class *	Model Code	Dist. To Comp. (m)	Coal Volume (kBCM)	Proportion of Coal Modeled
Measured	1	0-300	49,599	48%
	2	301-450	19,602	19%
Indicated	3	451-600	14,505	14%
	4	601-900	17,321	17%
Inferred	5	901-1200	2,110	2%
	6	1201-2400	0	0%
Speculative	9	> 2400	0	0%

Note: The resource class definitions are as specified in the GSC Paper 88-21.

Table 19-14 In-place Coal Resources

ASTM Group	Measured	Indicated	Inferred
Low Volatile Bituminous	105.878	48.694	3.228
Total	154.572		

Table 19-15 Total Model Coal Volumes by Coal Zone (All Classes)

Coal Zone	Avg. Coal Thickness (m)	Coal Volume (kBCM)	Proportion of Coal Modeled
1	14.3	64,651	63%
2	4.3	16,722	16%
3	3.0	10,556	10%
4	1.8	5,130	5%
5	1.5	2,525	2%
6	2.2	3,555	3%
7	<0.6	0	0%
8	<0.6	0	0%

The updated resource estimate for the Lodgepole property is presented in Table 19-16 for 3 different strip ratio delineated pit limits. Figure 19-2 and Figure 19-3 indicate the extent of these mining limits on East/West sections 5466000N and 5466700N respectively.

Table 19-16 Measured and Indicated Pit Delineated Resources for the Lodgepole property

Delineation	Description	Pit # (1)	Raw Coal (2)	Clean Coal (10% Ash) (2)	Waste	Strip Ratio
			(kTonne)	(kTonne)	(kBcm)	BCMW:MTCC
Cum Ratio 3 : 1 Wbcm : Rmt		02	22,940	14,895	73,094	4.9:1
Cum Ratio 5 : 1 Wbcm : Rmt		16	72,220	47,255	383,028	8.0:1
Cum Ratio 7.5 : 1 Wbcm : Rmt		20	130,184	87,097	1,005,674	11.5:1

Note: (1) Pit # refers to the item number in the MineSight© gridded surface file lpl313.pit.
(2) Coal tonnes include 8% moisture raw and clean.

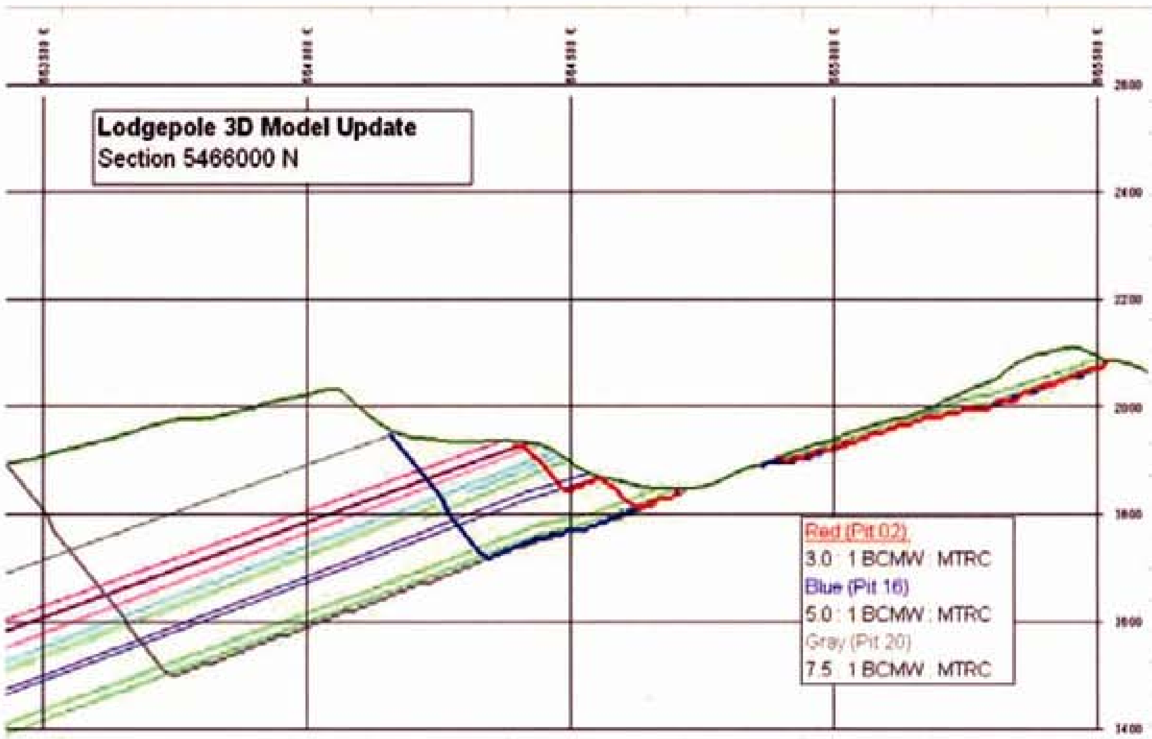


Figure 19-2 Section 546000N with Mining limits

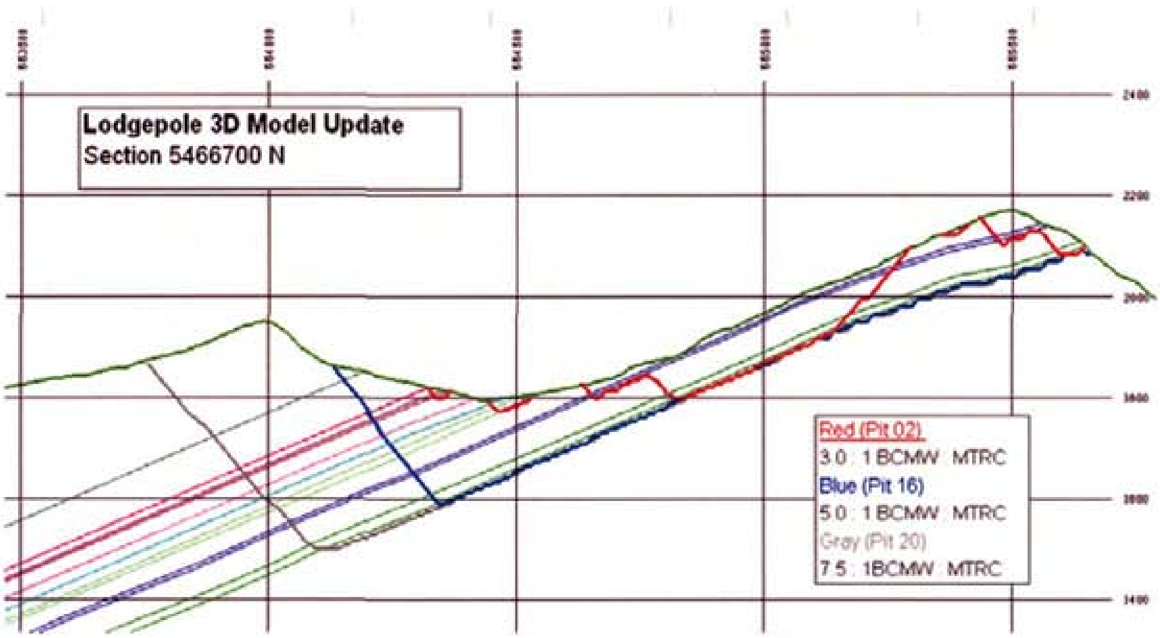


Figure 19-3 Section 546700N with Mining limits

19.7.2 Coal Reserves

The Reserves for the Ultimate pit limit are given in Table 19-17 and Table 19-18. The details of the development of the ultimate pit are described in Section 19.8– Mine Planning. Figure 19-4 shows the extent of the ultimate pit. (see MineSight© project pit design P654)

Table 19-17 Reserves for Ultimate Pit (P654) Measured and Indicated

Coal Zone	In-situ Coal (kBCM)	ROM Coal (kMTRC)	Clean Coal (MTCC)	Ash	Proportion Coal of Modeled (Clean)
1	28,718.3	43,077.5	28,253.4	24.9	70%
2	6,473.6	9,730.8	6,093.7	27.8	15%
3	3,367.7	5,241.4	2,773.2	34.1	7%
4	1,391.1	2,139.4	1,708.0	33.6	4%
5	849.9	1,311.8	921.8	37.1	2%
6	544.1	933.9	849.3	33.8	2%
Total	**41,344.8**	**62,434.8**	**40,599.4**	**26.8**	

Table 19-18Clean saleable surface mineable coal reserves

ASTM Group	Clean Saleable Surface Mineable Coal Reserves (Million Tonnes)	
	Proven	**Probable**
Low Volatile Bituminous	35.532	5.067
TOTAL	40.599	

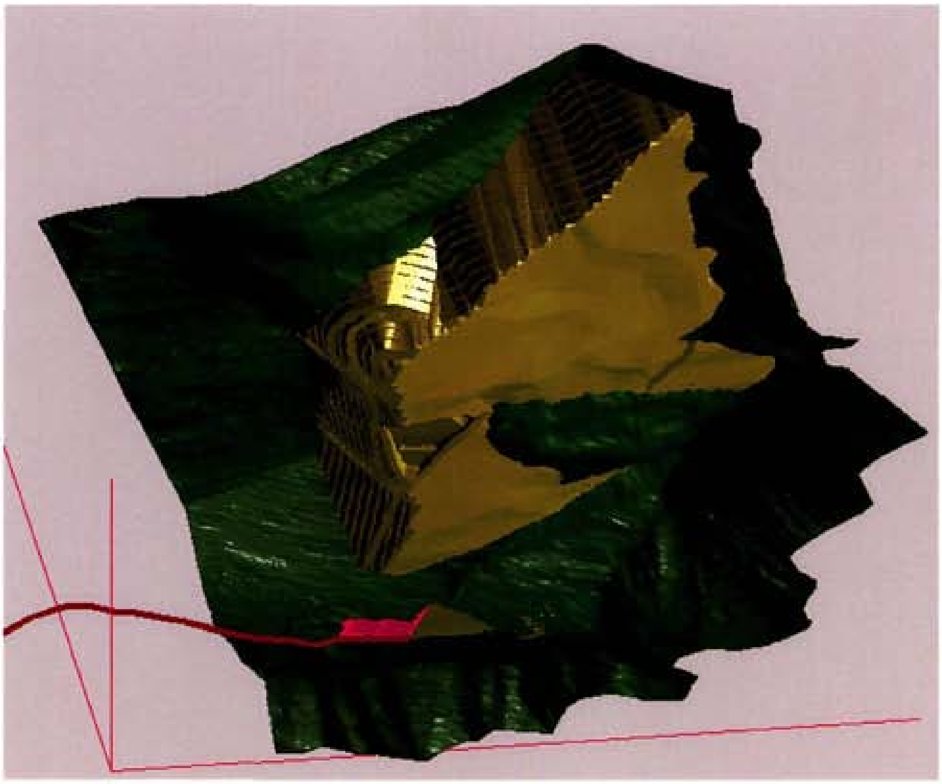


Figure 19-4 Extent of Ultimate Pit (P654)

19.8 Mine Planning

Mine planning includes work utilizing the Geology Resource model, predicted slope angles, and operating costs to determine economic pit limits and detailed pit phase designs. This work is used to define the Reserves and as a basis for the production scheduling.

19.8.1 Overview

The mine planning for the Lodgepole coal property is based on work done with MineSight© a suite of software used extensively on the Rocky Mountain coal properties and almost exclusively in the Elk Valley. It is well proven in the Industry. This includes the geology resource model, pit optimization, detailed pit design, and optimized production scheduling.

In addition to the geological information used for the block model, other data used for the mine planning includes the base economic parameters, mining cost data derived from supplier estimates and historical data, geotechnical slope design parameters, hydrology and geo-hydrology flow rates, metallurgical recoveries, and project design plant costs and throughput rates.

19.8.2 Mineability

The Lodgepole property is categorized as a moderate geology type, in that it is a simple dip slope with dips of approximately 25° with minor faulting and folding. Coal occurs in mineable seam ply's referred to as Zones in this report. The coal Zones occur at vertical strip ratios ranging from 1:1 to > 8:1 with thicknesses up to 17.0 m (See Section 19.3).

The property terrain, seam thicknesses, seam continuity of the Lodgepole coal project make it suitable for a conventional truck/shovel operation.

19.8.2.1 Mining Alternatives

The mining fleet alternatives relate to the scale of operation and whether the pit will have an electrical distribution system. The size of the equipment is discussed in more detail in the next section but for simplicity in the infrastructure and management of the mining area, a diesel-powered fleet is assumed. At this time in the planning process, it is assumed mining will be done by a mining contractor to reduce initial capital costs. A non-electric equipment fleet will be more suitable for a medium sized contractor to supply the equipment. The mine production details and costs are developed for the equipment fleet from first principles and a contractor's fee added. This includes a 20% fee to cover the contractor's overhead, profit and incidental capital for small equipment and field shops plus additional costs for amortization and financing of the major mining equipment fleet.

19.8.2.2 Scale of Operation

A number of factors are considered in establishing an appropriate mining and processing rate, the key ones are discussed below in relation to the Lodgepole project:

- Throughput: The Resource base should be mined in 15 to 20 years since time value discounting beyond this gives little value to resources mined beyond this. Also a "reserve tail" of at least 50% is preferred i.e. the mine is projected to continue for 50% beyond the projected payback period. Generally Rocky Mountain coal mines have large resource bases but require significant pre-stripping and infrastructure with high capital expenditures. If coal washing is required another significant capital expenses is needed (for the plant). With these high costs a payback of 5 to 7 years can be expected. These general guidelines set the annual operating capacity as the mineable resource base divided by 15 to 20 years. The clean coal throughput is then determined by suitable wash plant sizes in this range.

- Equipment Size: Generally, unit-operating costs are lower using the largest possible equipment in the pits. A shovel fleet size of no less than 3 units is preferred to allow for the effect of equipment availability and the need to continuously feed the plant without excessive raw coal stockpiling. The shovels sizes set the bench height (in waste) and blast hole drills and trucks are sized to match the shovels.

- Operational Constraints: Practical considerations with respect to the number of operating mining faces required to achieve a production rate in relation to the pit geometry and provide the best utilization of equipment while achieving production targets.
- Project Financial Performance: Generally, economies of scale can be realized at higher production rates that lead to reduced unit operating costs. These are tempered to the above-mentioned physical constraints and generally higher capital requirements for higher tonnages throughputs.

- Production will be ramped up in 2 phases:

  - Pre-production and Commissioning - The mining fleet will be started while the plant is under construction to pre-strip the future coal production areas and to provide fill for various construction requirements including fill for the plant site and the pit access and raw coal haul road. Coal encountered in the early part of this period will be stockpiled so that waste mining can continue, and will be mined for plant feed. It is also targeted that 250,000 MTCC will be processed in the last 3 months of this period to commission the wash plant.

  - Phase 2 - Clean coal production rate of 2.0 Mtpa for the rest of the life of mine.

19.8.3 Design Parameters

A summary of the slope parameters used to characterize the Lodgepole property are illustrated in Figure 19-5 below.

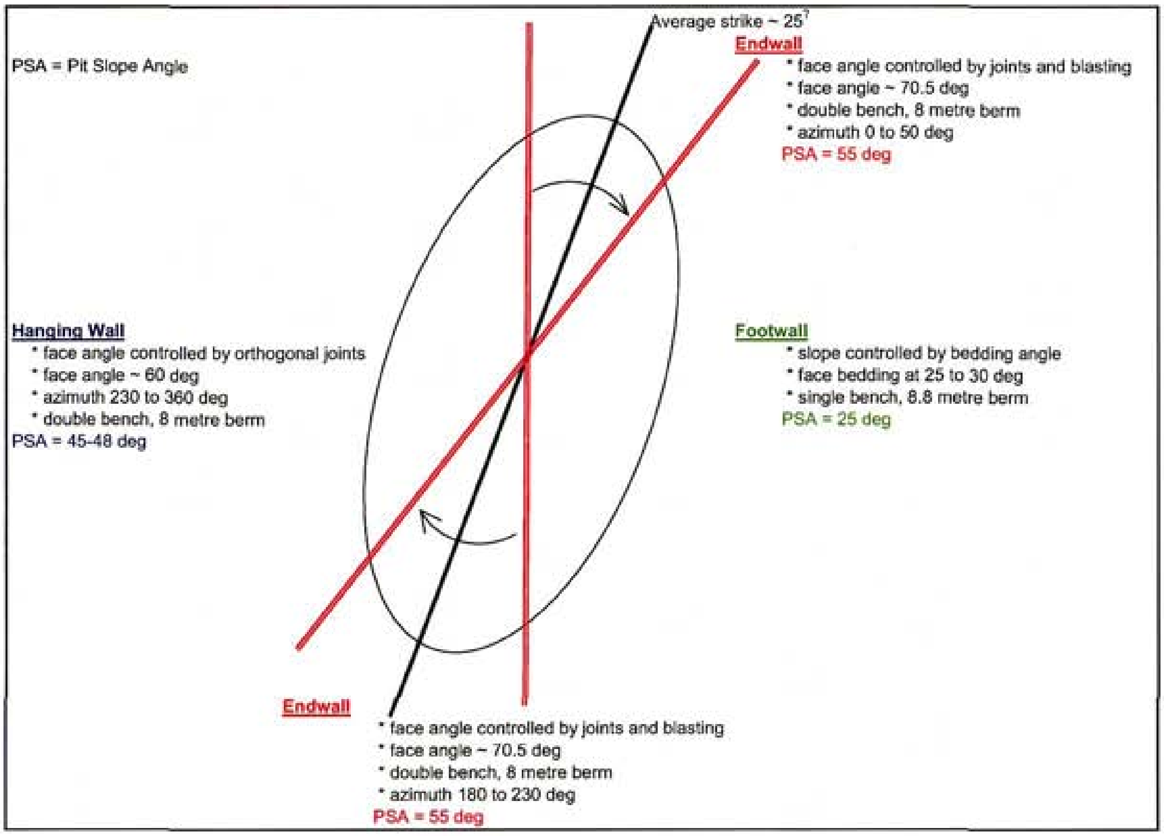


Figure 19-5 Pit Slope Design

The material characteristics for mining reserve estimates and production scheduling are given below.

Densities:

- Coal
  - Bulk Density — 1.35 to 1.54 (tonnes per BCM) - see Section 19.5
  - Swell Factor — 1.20 (tonnes per BCM)
  - Loose Density — 1.28 (tonnes per BCM)

- Waste
  - Bulk Density — 2.70 (tonnes per BCM)
  - Swell Factor — 1.30 (tonnes per BCM)
  - Loose Density — 2.08 (tonnes per BCM)

19.8.4 Economic Pit Limits

It was decided not to run full pit economic limits based on pit optimization routines such as Lerchs-Grossman. Results from the previous Technical Report (Geology and Resources of the Lodgepole Coal Property – Feb 14, 2005) and from preliminary pit limit work on this study show that large scale economics, and optimistic coal prices can push the economic pit limits to the edge of the drilled off coal resource area. The targeted mining area for this project is focused to keep the mining within the Crabb Creek drainage. Mining within these boundaries does not inhibit exploitation of future coal resources expanding through the ridgeline to the west.

With this approach, pit limits have been determined using the more simplistic floating cone (FC) optimization routines in MineSight©. The FC runs against the 3D Block model evaluating the costs and revenues of the blocks within potential pit shells. The routine uses input costs, coal price, plant recoveries, and overall slope angles, and expands downwards and outwards from previous interim economic 3d surfaces, until the last increment is at break-even economics at the in-pit costs, prices, and recoveries. By using constant recoveries and mining costs and by varying the coal price, pit shells are produced which represent 'best to worst' mining options. This approach produces a series of pit shells. Significant Cases have been established at strip ratios (SR) 3,4,5, 6 and 7.5 (BCMW:MTRC) using only measured and indicated resources for comparison with respect to potential mineable resource, area of disturbance for the mining activities, and potential for phased development.

The FC pits at SR 3, 5 and 7.5 are illustrated in Figure 19-6 and Figure 19-7 along with the general plant site location and site access road.

For this study an ultimate pit limit has been chosen which mines to the 5:1 limit. The 7.5:1 limit is not followed to the west since this would break through the ridgeline to the west of Crabb Creek valley. Conceptually this would add incrementally higher strip ratio coal to the project and this higher ratio material would have to be mined early in the project if a backfill plan is to be implemented, progressing from the shallower mining areas in the south to the deeper areas in the north. Mining this material as part of future project expansion could have the potential to backfill the mined out area in the project area proposed in this report.

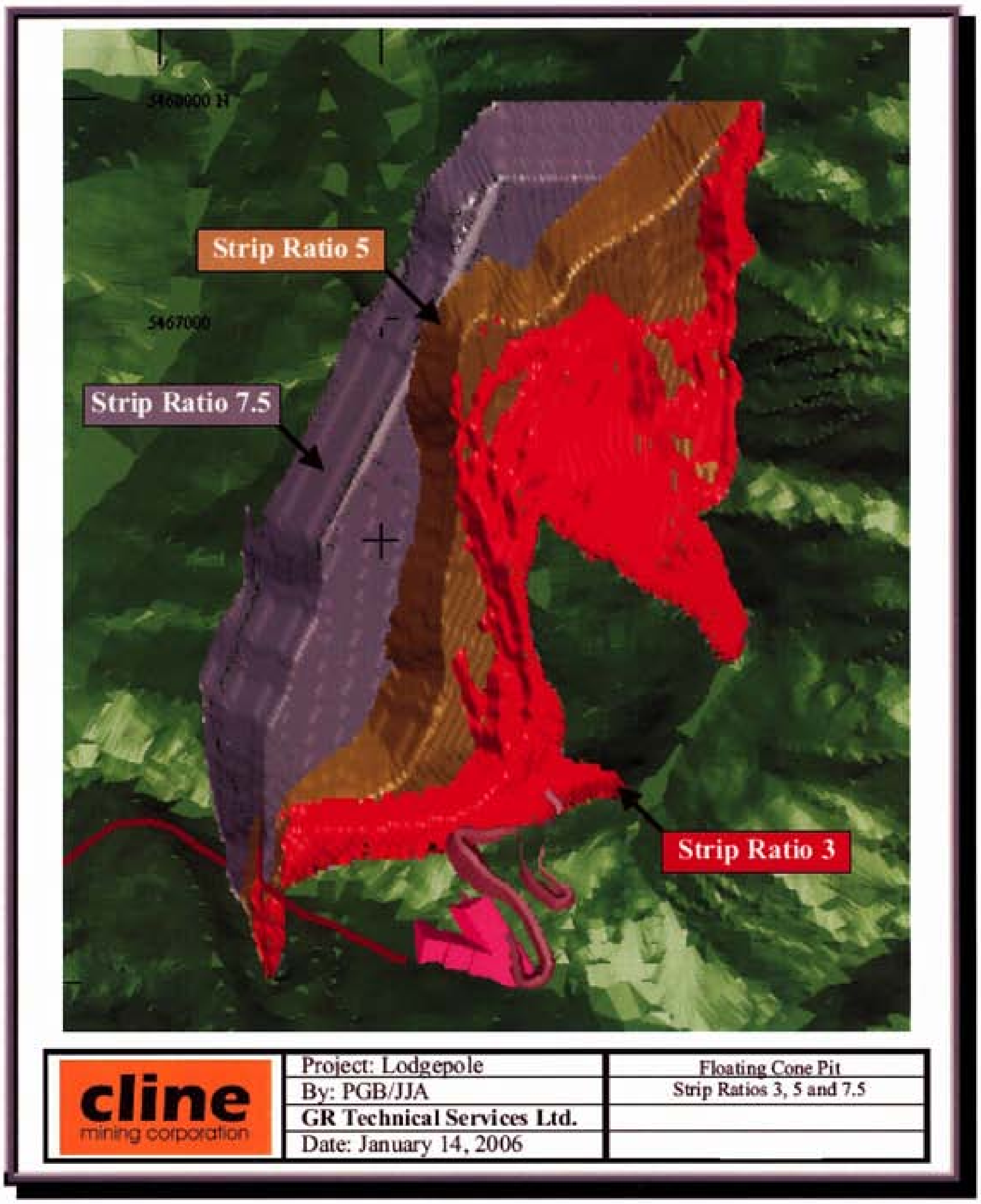


Figure 19-6 Plan view of floating cone pit limits for strip ratios 3, 5 and 7.5

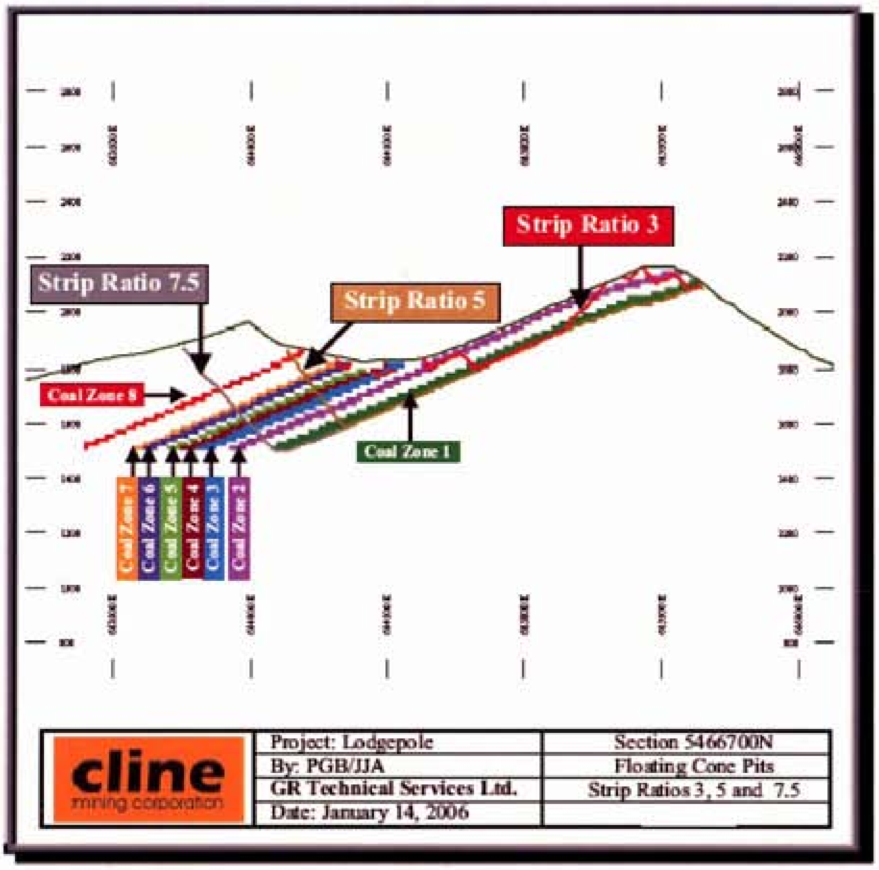


Figure 19-7 EW Section (at North 5466700) of floating cone pit limits for strip ratios 3, 5 and 7.5

19.8.5 Pit Phases and Push Backs

The objective of the phases is to enable a more favorable (even) material flow during the production scheduling of the mine and to minimize the pre-stripping required to release the raw coal feed at start-up. Properly sized and sequenced phases will improve the project cash flow while meeting the clean coal targets and keeping the mine loading and hauling fleet at a consistent number of units. To do this, the progression from the highest value pit phase to the lowest value pit phase, will provide a scheduling sequence that minimizes the payback period, and maximizes the net present value and project rate of return.

Generally the 3:1 pit shells from the FC sensitivity analysis are used to determine the initial pit pushback since the strip ratio determines the relative value of the pit shells. Access, logistics, and setting up potential backfilling sequences are also used to further subdivide the initial pit phases.

19.8.6 Detailed Pit Designs

Five pit phases are included in the detailed pit phase designs, and a sixth phase follows the surface of the FC shell for the 5:1 strip ratio case. A general description of the phases follows:

Phase	Name	Bottom Elevation	Description
1	P604	2100	From Pit FC 3:1 – Startup phase with the shortest haul to plant site.
2	P614	1830	From Pit FC 3:1 – low strip ratio east slope
3	P624	1965	From Pit FC 3:1 – low strip ratio northeast slope
4	P634	1635	From Pit FC 5:1 – ultimate pit mid-east slope down to the west hanging wall
5	P644	1800	From Pit FC 5:1 – slot from plant site at 1920 elevation
6	P654	1650	From Pit FC 5:1 – final pit limit at north end of FC 5:1 shell

Phases are illustrated in Figure 19-8 to Figure 19-13.

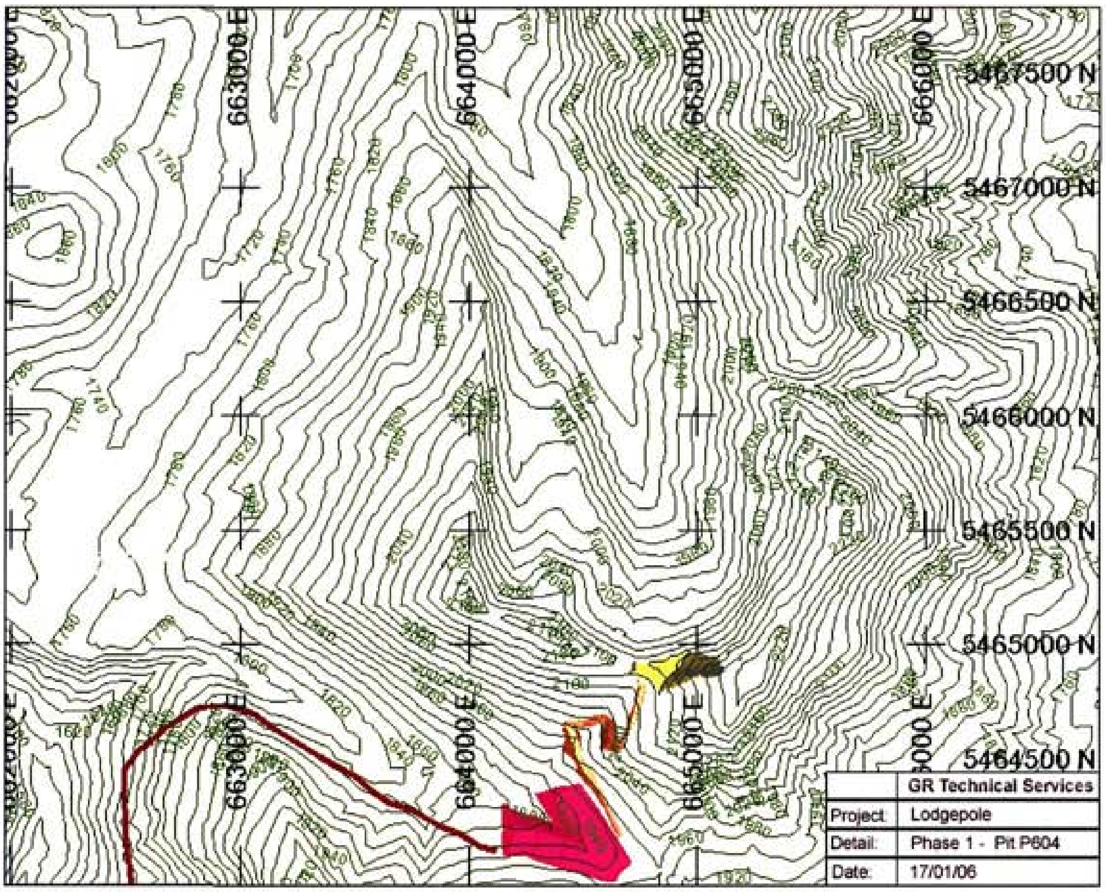


Figure 19-8 Phase 1 (P604)

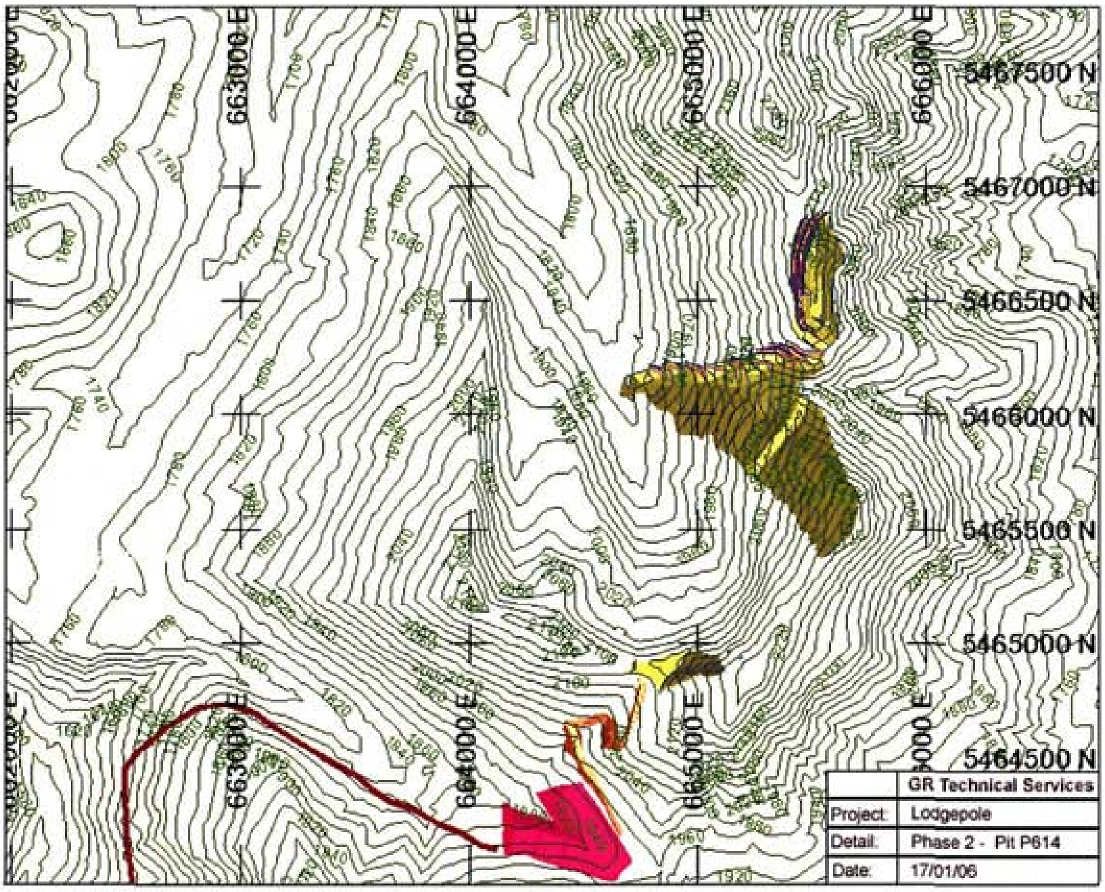


Figure 19-9 Phase 2 (P614)

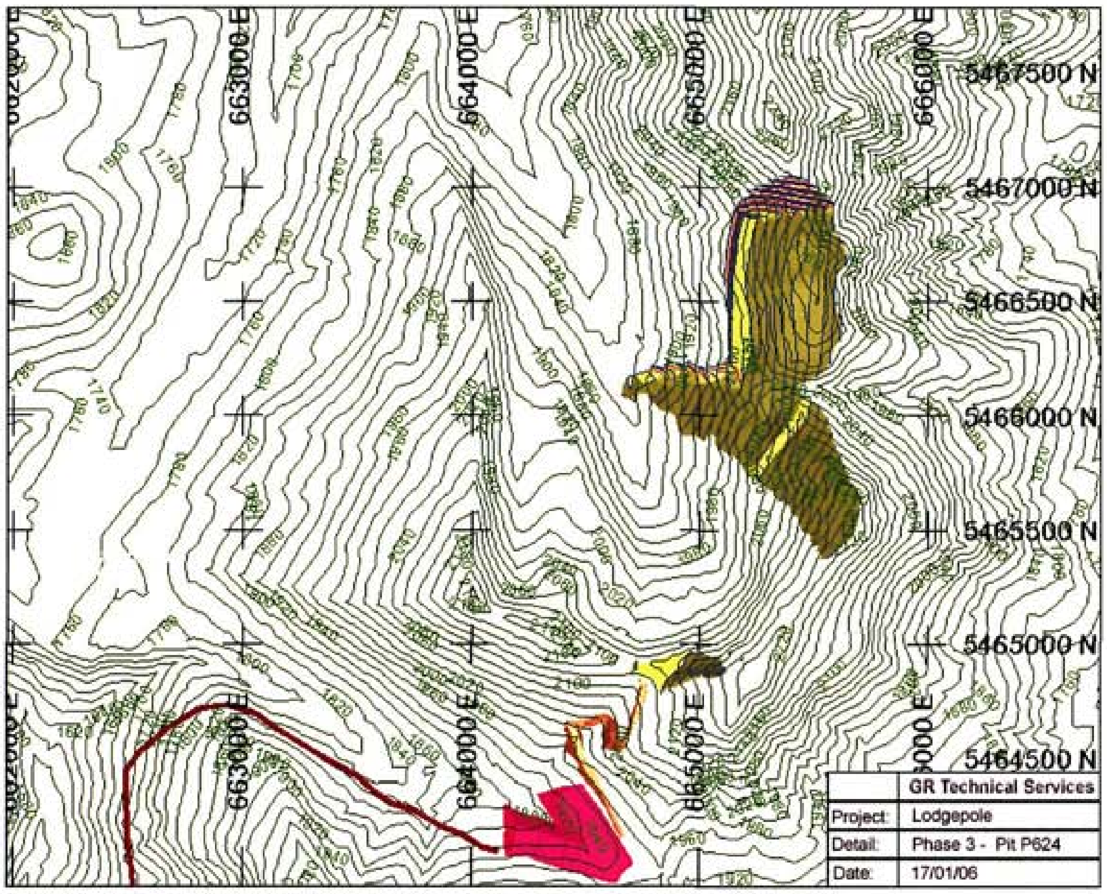


Figure 19-10 Phase 3 (P624)

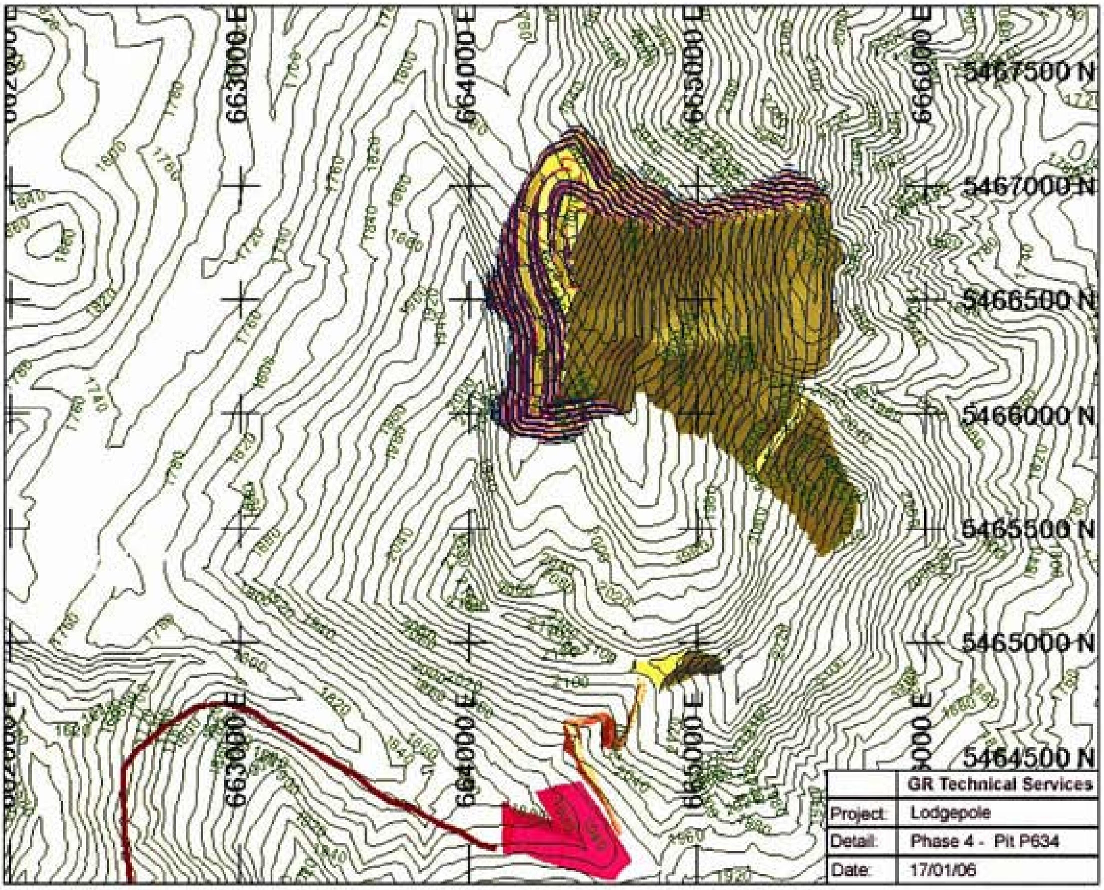


Figure 19-11 Phase 4 (P634)

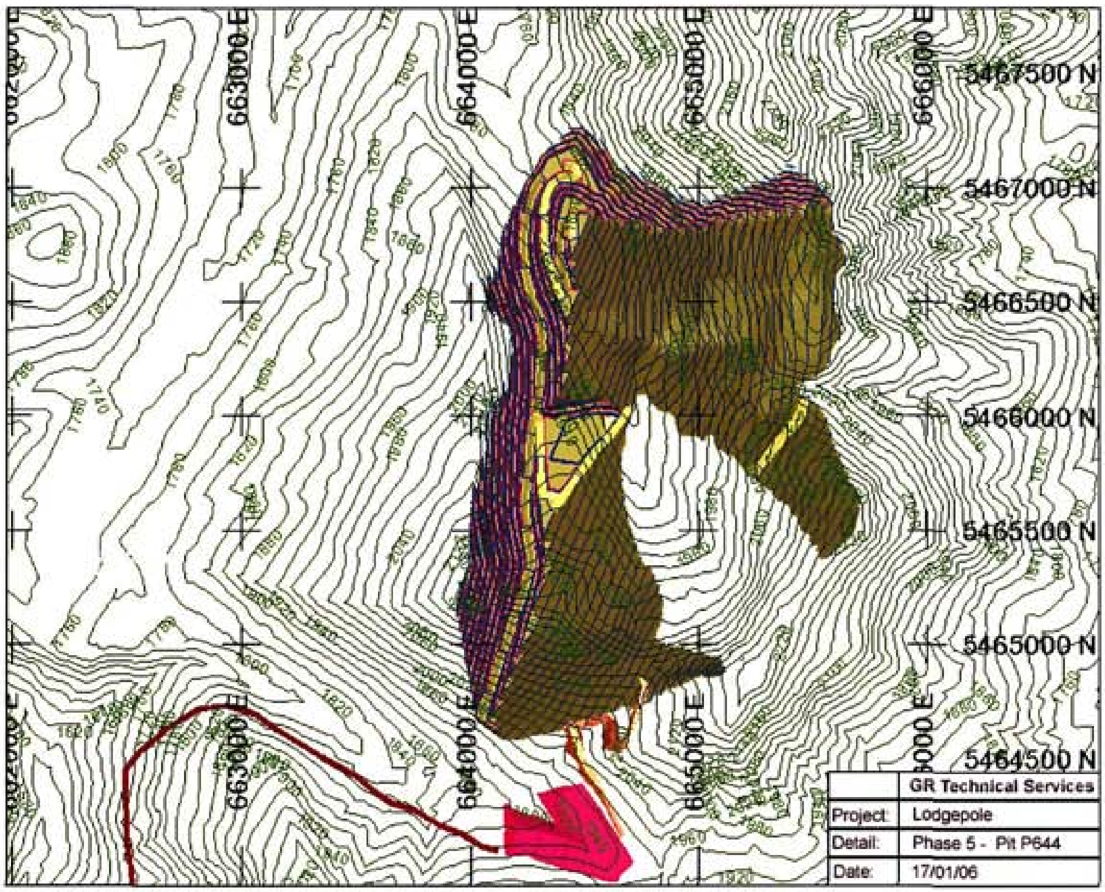


Figure 19-12 Phase 5 (P644)

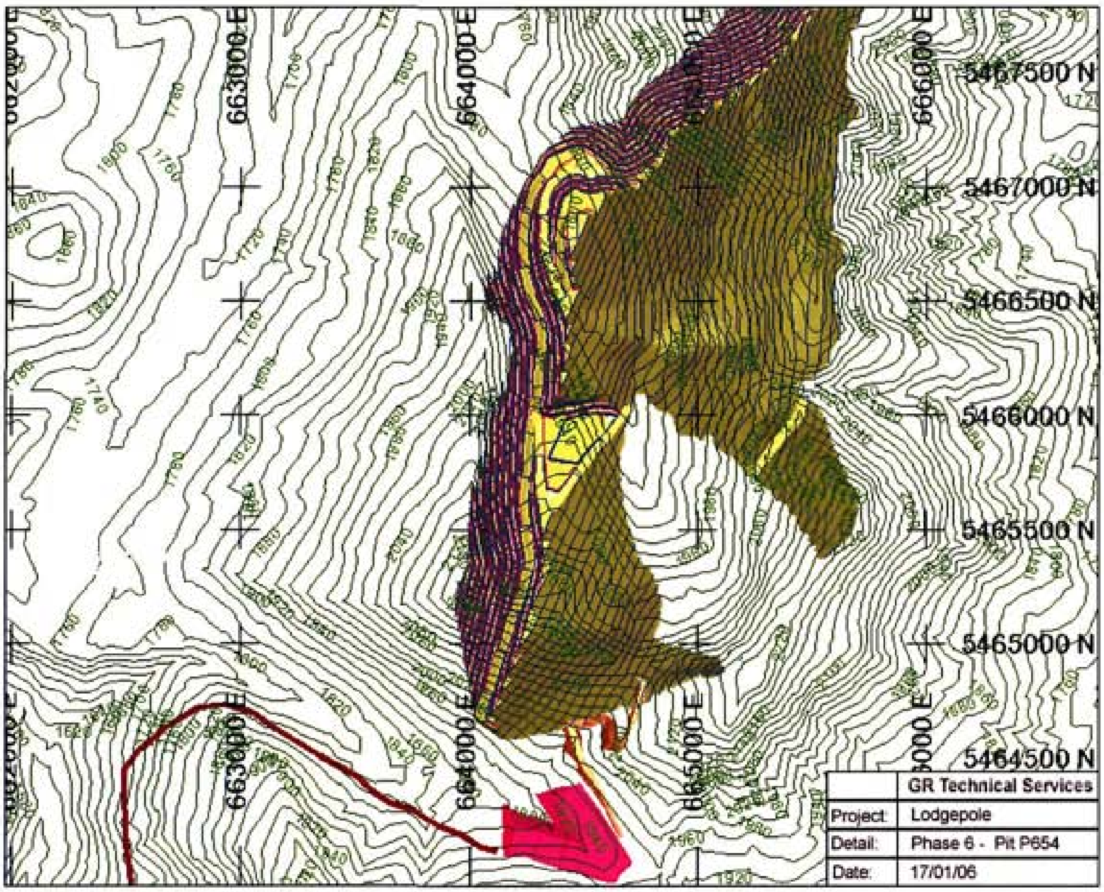


Figure 19-13 Phase 6 (P654)

19.8.7 Mining Reserves

GSC Paper 88-21 requires that mining parameters be applied to in-situ tonnages for the estimation of recoverable reserves. These parameters generally include provisions for mining losses and the inclusion of dilution and their application to appropriate in-situ resources results in the estimation of recoverable reserves. The recoverable reserve is the amount of coal that is expected to be extracted from the resource in-place during the mining process. In the present estimate, and in conformity with the requirements of GSC Paper 88-21, the mining parameters include the following:

- Any coal losses due to mining;
- The in-seam and out-of-seam dilution;
- Provision for oxidation;
- Thickness and depth limits for mining.
- Moisture adjustments

These parameters are included in the Resource model section. The following in-situ reserves are on the same basis as the resource model, with the economic pit limits on an incremental Phase by Phase basis using the pit designs above.

The results of the estimation of recoverable reserves (from measured and indicated resource classes) are summarized in Table 19-19 and Figure 19-14 on a phases by phase incremental basis. Table 19-20 to Table 19-25 list the details of each incremental phase.

Table 19-19 Summary of Lodgepole Phase Reserves (In-place)

PHASE	ROM COAL (kMTRC)	CLEAN COAL (kMTCC)	WASTE (kBCMW)	SR (BCMW/MTCC)	YIELD[1] %
604	292	189	354	1.9	64.7
614	4,851	3,087	12,814	4.2	63.6
624i	4,568	2,830	17,371	6.1	62.0
634i	16,768	11,205	69,961	6.2	66.8
644i	18,887	12,226	97,024	7.9	64.7
654i	17,067	11,060	128,387	11.6	64.8
TOTAL	62,433	40,597	325,911	8.0	65.0

Note: 'i' denotes incremental phase reserve.
1. Modeled plant yield

Table 19-19 shows how the pit phases have been designed to mine from lowest clean coal strip ratio to highest. By sequencing the mining order from highest value pit phase to lowest, the production schedule will produce a more optimal cash flow which will in turn improve the project rate of return.

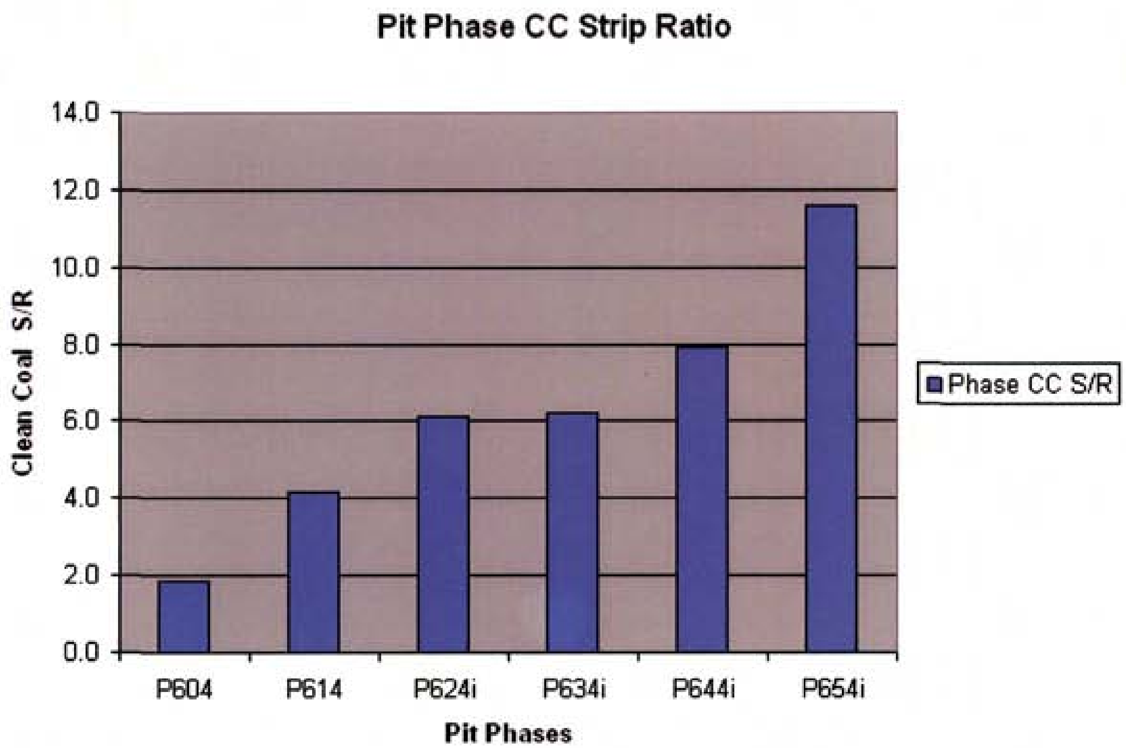


Figure 19-14 Clean Coal Strip Ratio by Pit Phase

Table 19-20 Phase reserves for P604

Pit	Zone	Raw Coal kMTRC	Clean Coal kMTCC	Waste kBCM	Ash %	SR BCMW/MTRC
604	1	292	189		25.5	
	2	1	1		26.0	
Totals		292	189	354	25.5	1.2

BENCH TOE	RAW COAL (kBCM)	RAW COAL (kTONNE)	CLEAN COAL (kTONNE)	WASTE (kBCM)	S/R	ASH %
2190	-	-	-	0	-1	-1
2175	2	2	2	7	3.2	25.9
2160	12	18	11	14	0.8	25.6
2145	23	35	22	27	0.8	26.1
2130	35	52	34	51	1.0	25.7
2115	54	81	53	90	1.1	25.3
2100	70	105	68	164	1.6	25.3
TOTAL:	**195**	**292**	**189**	**354**	**1.2**	**25.5**

Table 19-21 Phase reserves for P614

Pit	Zone	Raw Coal kMTRC	Clean Coal kMTCC	Waste kBCM	Ash %	SR BCMW/MTRC
614	1	4,564	2,889		26.2	
	2	285	196		24.3	
	3	3	3		33.5	
Totals		4,851	3,087	12,814	26.1	2.6

BENCH TOE	RAW COAL (kBCM)	RAW COAL (kTONNE)	CLEAN COAL (kTONNE)	WASTE (kBCM)	S/R	ASH %
2205	6	10	7	101	10.6	28.1
2190	56	83	52	240	2.9	26.4
2175	61	91	57	265	2.9	26.3
2160	60	91	58	347	3.8	26.1
2145	61	92	59	694	7.6	26.6
2130	128	192	129	1,094	5.7	24.6
2115	166	249	164	1,373	5.5	25.3
2100	107	160	102	1,629	10.2	26.6
2085	230	346	206	1,560	4.5	28.0
2070	305	457	273	1,290	2.8	28.0
2055	292	438	263	825	1.9	27.9
2040	147	220	135	733	3.3	27.6
2025	196	294	182	563	1.9	26.9
2010	219	328	206	438	1.3	26.4
1995	175	263	165	378	1.4	26.3
1980	129	194	122	310	1.6	26.3
1965	125	188	120	213	1.1	25.8
1950	134	201	128	149	0.7	25.8
1935	122	182	118	92	0.5	25.4
1920	103	155	102	104	0.7	25.0
1905	104	155	108	100	0.7	23.0
1890	101	152	109	112	0.7	21.8
1875	74	111	80	103	0.9	21.8
1860	50	76	54	78	1.0	22.2
1845	52	77	55	20	0.3	22.6
1830	33	49	35	5	0.1	22.7
TOTAL:	3,234	4,851	3,087	12,815	2.6	26.1

Table 19-22 Incremental Phase reserves for P624i

Pit	Zone	Raw Coal kMTRC	Clean Coal kMTCC	Waste kBCM	Ash %	SR BCMW/MTRC
624i	1	3,600	2,228		26.8	
	2	823	512		27.7	
	3	133	78		31.7	
	4	12	12		33	
	5	1	1		44.5	
Totals		**4,568**	**2,830**	**17,371**	**27.1**	**3.8**

BENCH TOE	RAW COAL (kBCM)	RAW COAL (kTONNE)	CLEAN COAL (kTONNE)	WASTE (kBCM)	S/R	ASH %
2175	-	-	-	3	-1	-1
2160	2	3	3	60	23.2	34.8
2145	7	10	7	137	14.0	33.8
2130	28	41	23	394	9.5	33.8
2115	26	39	24	744	19.1	31.9
2100	108	162	102	1,174	7.3	27.8
2085	107	160	99	1,773	11.1	28.1
2070	145	217	133	2,173	10.0	27.9
2055	326	490	295	2,269	4.6	27.8
2040	524	786	490	1,986	2.5	26.7
2025	424	636	398	1,828	2.9	26.6
2010	364	546	339	1,724	3.2	26.8
1995	327	491	305	1,422	2.9	26.7
1980	322	482	299	1,077	2.2	26.7
1965	338	506	315	611	1.2	26.5
TOTAL:	**3,046**	**4,569**	**2,831**	**17,372**	**3.8**	**27.1**

Table 19-23 Incremental Phase reserves for P634i

Pit	Zone	Raw Coal kMTRC	Clean Coal kMTCC	Waste kBCM	Ash %	SR BCMW/MTRC
634i	1	12,089	8,169		23.9	
	2	2,131	1,298		29.3	
	3	1,235	744		29.8	
	4	643	405		32.1	
	5	137	137		45.3	
	6	534	453		20.1	
Totals		16,768	11,205	69,961	25.4	4.2

BENCH TOE	RAW COAL (kBCM)	RAW COAL (kTONNE)	CLEAN COAL (kTONNE)	WASTE (kBCM)	S/R	ASH %
2190	-	-	-	0	-1	-1
2175	0	0	0	6	72.6	45.1
2160	1	1	1	23	28.7	37.6
2145	1	2	2	33	16.7	33.3
2130	3	5	3	40	8.2	33.6
2115	3	4	2	46	10.7	33.4
2100	5	8	4	56	7.4	32.5
2085	4	7	4	50	7.5	31.3
2070	3	5	3	59	12.2	31.2
2055	15	23	15	37	1.6	26.0
2040	12	18	12	45	2.5	23.4
2025	3	5	4	54	11.4	22.9
2010	4	7	4	130	19.1	34.4
1995	45	67	42	359	5.3	27.1
1980	52	78	50	669	8.6	27.3
1965	42	63	40	1,048	16.5	27.4
1950	397	595	371	1,656	2.8	26.6
1935	392	588	371	1,769	3.0	26.4
1920	443	664	418	2,135	3.2	26.6
1905	421	632	401	2,273	3.6	26.6
1890	393	591	379	2,785	4.7	26.8
1875	416	627	411	3,034	4.8	26.4
1860	485	731	484	3,709	5.9	26.0
1845	565	851	568	4,081	4.8	25.5
1830	684	1,033	702	4,887	4.7	25.0
1815	655	989	665	5,381	5.4	25.6
1800	690	1,040	698	5,973	5.7	25.7
1785	709	1,071	713	5,921	5.5	26.0
1770	748	1,124	781	5,810	5.2	24.5
1755	768	1,154	800	4,860	4.2	24.2
1740	744	1,118	780	4,040	3.6	24.1
1725	652	981	674	2,866	2.9	24.5
1710	547	825	561	2,243	2.7	24.6
1695	414	624	423	1,578	2.5	24.4
1680	313	472	307	1,168	2.5	26.1
1665	207	312	201	684	2.2	26.2
1650	181	273	182	395	1.5	25.0
1635	121	181	129	59	0.3	22.2
TOTAL:	11,137	16,768	11,205	69,961	4.2	25.4

Table 19-24 Incremental Phase reserves for P644i

Pit	Zone	Raw Coal kMTRC	Clean Coal kMTCC	Waste kBCM	Ash %	SR BCMW/MTRC
644i	1	11,895	7,898		24.5	
	2	3,445	2,286		25.4	
	3	1,854	887		36.4	
	4	610	462		39.5	
	5	1,020	630		34	
	6	63	63		54.3	
Totals		18,887	12,226	97,024	26.9	5.1

BENCH TOE	RAW COAL (kBCM)	RAW COAL (kTONNE)	CLEAN COAL (kTONNE)	WASTE (kBCM)	S/R	ASH %
2250	-	-	-	33	-1	-1
2235	-	-	-	142	-1	-1
2160	-	-	-	97	-1	-1
2145	-	-	-	581	-1	-1
2130	0	0	0	1,078	-1	47.9
2115	8	13	9	1,551	122.97	33.9
2100	28	43	27	2,155	50.64	32.5
2085	161	242	155	3,000	12.42	27.5
2070	230	346	221	3,670	10.62	27.5
2055	297	447	285	4,156	9.3	27.6
2040	378	578	353	4,859	8.41	29.5
2025	469	719	442	5,341	7.43	29.6
2010	569	866	528	5,839	6.74	29.1
1995	653	994	620	6,181	6.22	28.6
1980	728	1,108	689	6,766	6.11	28.6
1965	790	1,213	760	7,090	5.84	29.2
1950	845	1,294	813	7,394	5.71	28.8
1935	911	1,386	881	7,226	5.21	28.1
1920	939	1,411	945	6,659	4.72	25.6
1905	868	1,304	881	5,872	4.5	25.7
1890	930	1,397	934	5,010	3.59	25.5
1875	868	1,304	866	4,162	3.19	25.4
1860	819	1,230	808	3,497	2.84	25.4
1845	789	1,184	784	2,706	2.28	25
1830	654	982	655	1,413	1.44	24.7
1815	380	570	388	445	0.78	23.8
1800	172	258	182	104	0.4	22.6
TOTAL:	12,485	18,888	12,226	97,025	5.14	26.9

Table 19-25 Incremental Phase reserves for P654i

Pit	Zone	Raw Coal kMTRC	Clean Coal kMTCC	Waste kBCM	Ash %	SR BCMW/MTRC
654i	1	10,638	6,881		25.4	
	2	3,047	1,802		29.9	
	3	2,017	1,062		34.8	
	4	875	830		30.7	
	5	153	153		50.1	
	6	337	333		51.8	
Totals		**17,067**	**11,060**	**128,387**	**28.3**	**7.5**

BENCH TOE	RAW COAL (kBCM)	RAW COAL (kTONNE)	CLEAN COAL (kTONNE)	WASTE (kBCM)	S/R	ASH %
2250	-	-	-	95	-1	-1
2235	-	-	-	380	-1	-1
2220	-	-	-	980	-1	-1
2205	-	-	-	1,516	-1	-1
2190	1	4	4	2,149	561.2	87.5
2175	3	7	7	2,712	376.7	72.1
2160	8	16	16	3,331	212.8	53.4
2145	29	48	48	3,906	82.1	38.0
2130	65	102	79	4,537	44.5	36.1
2115	88	136	101	5,173	38.15	35.1
2100	162	247	175	5,809	23.5	32.6
2085	237	360	238	6,378	17.7	32.7
2070	363	549	361	6,856	12.5	30.2
2055	503	759	487	7,048	9.3	29.3
2040	567	861	535	7,152	8.3	29.9
2025	657	998	626	6,901	6.9	29.2
2010	656	1,000	623	6,557	6.6	29.5
1995	658	1,004	625	6,146	6.1	29.4
1980	648	988	609	5,766	5.8	29.4
1965	625	955	579	5,288	5.5	29.9
1950	563	863	522	4,916	5.7	30.3
1935	556	840	508	4,421	5.3	28.9
1920	502	759	462	4,041	5.3	29.2
1905	460	695	425	3,632	5.2	29.0
1890	437	661	421	3,284	5.0	27.9
1875	417	630	413	2,918	4.6	26.9
1860	363	549	361	2,635	4.8	26.8
1845	338	511	351	2,366	4.6	25.0
1830	325	491	339	2,094	4.3	25.2
1815	303	457	317	1,856	4.1	24.7
1800	289	435	308	1,593	3.7	24.2
1785	262	394	286	1,367	3.5	23.5
1770	234	352	251	1,142	3.2	24.4
1755	220	330	241	930	2.8	23.3
1740	189	284	203	723	2.5	23.9
1725	137	207	149	584	2.8	24.8
1710	104	157	112	394	2.5	24.3
1695	86	129	89	310	2.4	24.3
1680	79	119	78	230	1.9	25.4
1665	65	98	65	168	1.7	25.1
1650	50	75	51	107	1.4	24.3
TOTAL:	11,248	17,067	11,061	128,387	7.5	28.3

19.9 Potential for Future Resources and Reserves

The Resource model for this study has been limited to the area of immediate interest (The Crabb Creek drainage area) and the extent of the exploration drilling. Table 19-15 indicates that given the proper economic conditions the ultimate pit could be expanded to the west with the potential of doubling the mineable coal tonnes. The mining activities in this plan do not inhibit future expansion of the pit to the west.

The current geology interpretation also shows the extension of the coal seams to the north. There will be additional low ratio coal at the top of the north end of McLatchie Ridge, which can be drilled off in the future. Mine waste dumps are designed to keep this area available for future potential mining. This has the potential of adding another pit phase to the north of this plan.

20.0 Other Relevant Data and Information

20.1 Geotechnical

20.1.1 Geotechnical Program Overview 2005

A field investigation and geotechnical evaluation has been complied to establish design parameters and cost allowance sufficient for feasibility design work. More detailed evaluations will be undertaken in future during the detailed design stage of the project.

The following activities were completed in the 2005 geotechnical program:

- Desktop review of available project data provided by GR Technical Services Ltd. (GR Tech.) and background geological data from published sources.
- Obtained B.C. government 1:30,000 scale colour air photos dated 2004, covering the project area.
- Conducted preliminary air photo interpretation of key project facilities areas.
- Obtained site-specific seismic hazard criteria from Geological Survey of Canada Pacific Geoscience Centre.
- Conducted walkover reconnaissance site inspection of key facilities areas.
- Geomechanical re-logging of drill core from eleven of the fourteen exploratory holes drilled within the main pit area.
- Excavated 21 test pits throughout project area in key facilities areas.
- Drilled two, fifty meter deep diamond drill holes in the valley bottom in the vicinity of a proposed waste rock buttress dam.
- Laboratory tested grain size, Atterberg limits and moisture content on selected samples from the test-pitting program.
- Tested uniaxial compressive strength tests on selected rock samples obtained from the drill holes.
- Measure grain size and Atterberg limits on samples of clay seams obtained from the drill holes.

20.1.2 Background Data

The following summarizes information considered relevant to the Lodgepole Project site geological and geotechnical conditions:

- Project is located in the MacDonald Range, part of the Front Ranges of the Rocky Mountains, within the Cordilleran Physiographic Region.
- Mountain peaks in the region are up to 2130 m in elevation with relief in the order of 600 m.
- McLatchie Ridge forms the eastern limits of the proposed pit are and has a maximum elevation of 2225 m. The base of the valley of Crabb Creek within the pit area is about 1645 m elevation.

- The upper slopes of McLatchie Ridge are sub-alpine with widely spaced, stunted fir trees, while lower slopes are thickly forested with spruce, pine and fir.
- The Lodgepole Coal project is hosted within the Mist Mountain Formation of the Kootenay Group of Jurassic-Cretaceous age.
- The Mist Mountain Formation consists of coastal plain and deltaic sediments, comprising interbeded sandstones, siltstones and claystones (mudstones). Sandstone interbeds include higher energy channel sandstone units with cross-bedding structures and rip-up clasts from the underlying mudstone and siltstone units.
- Within the Mist Mountain Formation, twelve coal seams or Zones have been identified. Mining will be carried out on the lowermost eight Zones of which 6 are recoverable. A minimum coal seam thickness of 0.3 m has been assumed, with interseam partings greater than 0.6 m being mined separately.
- Zones 1 to 3 contain 90% of the modeled coal resources, with the remainder in Zones 4 to 8.
- Zone 1 consists of up to four coal plys with an average coal thicknessof 14.3m.
- Zone 2 consists of up to four coal plys with average coal thickness of 4.6 m.
- Zone 3 consists of up to two coal plys with an average coal thickness of 3.2 m.
- The upper seams consist of multiple plys with coal thickness ranging from 0.2 m to 2.2 m.
- The East Kootenay coalfields are characterized by north to northwest trending concentric folds and west dipping thrust faults.
- Tertiary normal faults, some of which are listric (curvilinear, usually concave- upward) and occupy earlier thrust surfaces are also major features. The Flathead Fault, as mapped, is at least five kilometers to the northeast of the mine area, no major faults are noted in the mine area.
- Bedding in the project area dips to the west with an average regional-scale dip of about 20°. At the local mine scale bedding dips exhibit a wide range from about 15° to 40° with a strike direction varying between N33° E to N40° E.
- Some of the dip variation may be due to cross-bedding structures within the high-energy sandstone units, as well as local deformation associated with regional folding and faulting.
- The western flank of McLatchie Ridge where the mine is situated is a dip slope.

20.1.3 Surficial Geology

The surficial geology of the project area is based on preliminary air photo interpretation of the major project facilities areas, confirmed through site reconnaissance and in some areas by test pitting and drilling.

Within the proposed mining area and steep mountain slopes in general, overburden cover is relatively thin, comprising mainly colluvium under a thin organic layer. Exploration road cuts within the pit area expose weathered bedrock, overlain by colluvium composed of weathered bedrock fragments, derived predominately from the shale and siltstone units and larger cobbles and boulders composed of sandstone. In general, the slopes are covered by less than 1 m thickness of colluvium, thickening to 10 m in the valley bottom.

In the plant site area, thick deposits of colluvium overly till in the valley bottom. Further details are provided in the section describing plant site area conditions.

20.1.4 Seismicity

A site-specific seismic risk calculation was carried out Natural Resources Canada, Pacific Geoscience Centre in Sidney, B.C. for the Lodgepole coal property. The seismic hazard calculation was determined for the Lodgepole mine area, located at Latitude 49.32N and Longitude 114.73 W. Peak ground accelerations and velocities for various annual probabilities of exceedance were determined and are listed in Table 20-1.

Table 20-1 Probabilistic Seismic Ground Motion Analysis

Annual Probability of Exceedance	Return Period (Years)	Peak Ground Acceleration (g)	Peak Ground Velocity (m/s)
0.01	100	0.022	0.026
0.005	200	0.030	0.032
0.0021	475	0.044	0.042
0.001	1,000	0.062	0.052
0.0004*	2,475	0.136	-

*The 1:2,475 return period is the proposed 2005 National Building Code value for the Lodgepole site.

The Lodgepole site falls within the "stable" zone of Canada, which experiences too few earthquakes to define reliable seismic source zones. Although the probability is low, large earthquakes can occur anywhere in Canada. The project area falls in acceleration Zone 1 (Z_a=1) and experiences zonal accelerations of 0.05g. The velocity zone in which the project area falls is Zone 1, (Z_v = 1) with zonal velocities of 0.05 m/s.

In conjunction with the proposed changes to the National Building Code of Canada (NBCC), the evaluation of structures during an earthquake would be based on the 1:2,475 return period earthquake. The NBCC (2005) seismic hazard calculation was carried out specifically for the Lodgepole site. Median (50th percentile values are given in units of g for peak horizontal and 5% damped spectral horizontal accelerations for four different periods in seconds in Table 20-2. These values are based on "firm ground" (NBCC soil class C, average shear wave velocity of 360-750 m/s).

Table 20-2 Median g Values at Four Spectral Acceleration (Sa) Periods (Seconds) for 1:2,475 Return Period

Sa (0.2)	Sa (0.5)	Sa (1.0)	Sa (2.0)
0.271	0.161	0.079	0.044

20.1.5 Geomechanical Logging of Exploratory Drill Core

BGC completed additional geomechanical core logging of boreholes previously drilled in the winter of 2005 by GR Tech. in the mine area. Geomechanical core logging was completed on boreholes 501, 502, 504, 505, 506, 509, 512, 513, BGC prepared geomechanical logs for the two geotechnical holes drilled by BGC in the proposed waste rock buttress dam area (BGC-05-514 and -515). An estimation of the rock mass quality of the footwall zones was determined based on the interpretation of the geomechanical data collected from these holes. A summary of the calculated Rock Mass Rating (RMR) values and Tunneling Quality Index (Q') are provided in Table 20-3 and Table 20-7 respectively below. These rock mass classification systems provide a repeatable means of establishing rock mass quality that can be used for estimating design parameters for open pit and underground excavations.

20.1.5.1 Rock Mass Rating Classification

The RMR values for the individual runs were calculated for each borehole. The run length summation for each RMR description was compared to the total cored length, resulting in a percentage of rock core representing each description. Table 20-3 below identifies the percentage of each description for the separate boreholes.

Table 20-3 Percentages of the RMR Description System for the Open Pit Area

	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	Very Good (%)
BGC05-501	5.1	34.7	58.1	2.15	0
BGC05-502	12.8	5.5	72.2	9.5	0
BGC05-504	0	8.2	63.4	28.4	0
BGC05-505	4.5	45.2	40.2	12.6	0
BGC05-506	0	43.7	56.3	0	0
BGC05-509	9.9	19.7	40.8	29.6	0
BGC05-512	2.8	55.9	35.8	5.6	0
BGC05-513	3	25	56.9	15.1	0

The rock quality according to the RMR classification system varies from very poor to good in the open pit area, with the majority of the rock logged falling into the poor and fair categories. Holes 504 and 509 appear to have the highest rock mass rating with 28.4% and 29.6% of the rock being classified as good. On the contrary, 505, 506 and 512 appear to have the lowest rock mass rating with 45.2%, 43.7% and 55.9% falling into the poor rock category.

Table 20-4 below outlines the summation of the total core length from each RMR description compared to the total core length from all the boreholes in the open pit area, represented as a percentage.

Table 20-4 Percentage of Core in Open Pit Area According to the RMR Classification System

	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	Very Good (%)
Open Pit Area	5.7	30.4	53.9	10.0	0

A summary of the meaning of the RMR rock classes for poor and fair rock is provided in Table 20-5 below.

Table 20-5 Meaning of the RMR Rock Classes

	Poor	**Fair**
Average Stand-up Time	10 hrs for 2.5m span	1 week for 5m span
Cohesion of Rock Mass (kPa)	100-200	200-300
Friction Angle of rock mass (degrees)	15-25	25-35

It can be observed from scrutinizing Table 20-4 that the rock mass quality in the open pit area ranges from very poor to good, according to the RMR Classification System, with the majority of the rock being poor to fair quality.

20.1.5.2 Tunneling Quality Index (Q-System)

The numerical value of the index Q varies on a log scale from 0.001 to 1000 and is defined by:

$$Q = \frac{RQD}{Jn} \bullet \frac{Jr}{Ja} \bullet \frac{Jw}{SRF}$$

Where:

RQD = rock quality designation
Jn = Joint set number
Jr = joint roughness number
Ja = joint alteration number
Jw = joint water reduction factor
SRF=stress reduction factor

This system was used in conjunction with the RMR system since it covers a different range of parameters that provide more information on rock mass discontinuity properties that can be used to estimate shear strength.

The geomechanical log data provides sufficient information for the first four variables (RQD, Jn, Jr, and Ja). Based on these parameters, a value called Q' has been calculated. This equates to a "dry" value of Q, without considering the ambient rock stress conditions. When calculating Q', values for Jw and SRF were not included. The Jw/SRF factor will depend on site-specific conditions. The final Q value may be greater or smaller than Q,' depending on groundwater and rock stress conditions. For the purpose of this assessment, Jw/SRF=1.

The meaning of the various tunneling quality index classes is provided in Table 20-6 below.

Table 20-6 Q Classification System

Description	Value
Exceptionally Poor	0.001-0.01
Extremely Poor	0.01-0.1
Very Poor	0.1-1
Poor	1-4
Fair	4-10
Good	10-40
Very Good	40-100

Like the RMR value, the Q' value was calculated for each run of the boreholes. The sum of the run lengths for the various descriptions was compared to the total run length for the borehole, resulting in a percentage of core that falls into the certain description. Table 20-7 below outlines the percentage of core that lies in each rock mass class based on the Q-system.

Table 20-7 Q' Values from Geomechanical Core Logging Results (Jw/SRF=1)

Borehole Number	Exceptionally Poor (%)	Extremely Poor (%)	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	Very Good (%)
501	0	22.6	50.7	10.2	11.6	4.9	0
502	0	14.7	23.6	28.7	18.9	12.1	1.9
504	0	0	69.4	30.6	0	0	0
505	0	19	48.5	17.7	12.3	2.5	0
506	0	16.1	40.9	21.5	21.5	0	0
509	0	27.4	52.1	6.8	10.3	0	3.4
512	0	14	41.9	19	11.2	14	0
513	0	3	55.1	21.1	17.7	3	0

The tunneling quality index outlined that the rock ranges from extremely poor to very good, with the majority of the rock being classified between extremely poor and fair. Boreholes 501 and 509 demonstrated they had 22.6% and 27.4% of rock falling into the extremely poor rock category while borehole 502 had approximately 12% of the rock being classified as good.

Table 20-8 below outlines the summation of the core length for each description at all boreholes in the open pit area compared to the total core length for all boreholes in the open pit area, outlined as a percentage.

Table 20-8 Percentage of Q' Classification System in the Open Pit

	Exceptionally Poor (%)	Extremely Poor (%)	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	V.Good (%)
Open Pit	0	16.3	43.9	19	14.7	5.4	0.7

The rock tunneling quality index indicates that the rock is classified between extremely poor to very good, with the majority of the rock being classified between extremely poor and fair.

As mentioned above, the Q' values were calculated ignoring both Jw and SRF. However, if these values were taken into consideration, the resulting Q values would be lower. Consequently, a higher percentage of the rock mass would fall between exceptionally poor to poor.

20.1.6 Test Pitting

BGC conducted a test-pitting program around the Lodgepole Coal Property between July 26, 2005 and July 28, 2005. Twenty one (21) test pits were dug around the property, with a track mounted Case CX 210 backhoe. Six test pits were dug in the vicinity of the proposed plant rejects dump, nine (9) were excavated in the vicinity of the proposed plant site while six (6) were logged in the footprint of the waste rock buttress. Soil samples were collected from the test pits and sent to the EBA Laboratory in Calgary for grain size analysis and Atterberg limit testing. Atterberg limit testing was only completed on samples that had a combined silt and clay content greater than 10%.

A summary of the test pit locations are provided in Table 20-9 below. (The test pits are approximately located from a topographic map.)

Table 20-9 Test pit Summary

Test pit	Northing (m)	Easting (m)	Elevation (m)	Depth (m)
TP-BGC05-01	5464000	662500	1675	3.8
TP-BGC05-02	5464000	662500	1675	3.6
TP-BGC05-03	5464400	663525	1783	2.1
TP-BGC05-04	5464400	663525	1783	1.8
TP-BGC05-05	5464780	663360	1800	3.7
TP-BGC05-06	5464815	663305	1800	3
TP-BGC05-07	5464390	664160	1895	5.3
TP-BGC05-08	5464375	664220	1895	4.6
TP-BGC05-09	5464340	664240	1895	4.3
TP-BGC05-10	5464325	664260	1900	3.5
TP-BGC05-11	5464270	664210	1882	4.5
TP-BGC05-12	5464300	664190	1882	5
TP-BGC05-13	5464340	664165	1882	5.2
TP-BGC05-14	5464350	664150	1882	5.2
TP-BGC05-15	5464815	664335	1800	4.2
TP-BGC05-16	5465760	664750	1878	6.2
TP-BGC05-17	5465755	664725	1878	4.3
TP-BGC05-18	5465755	664690	1900	2.4
TP-BGC05-19	5465700	664705	1880	4.6
TP-BGC05-20	5465815	664610	1890	4.5
TP-BGC05-21	5465765	664525	1890	0.8

20.1.7 Geotechnical Drilling

Two-fifty meter deep holes were drilled by BGC in the vicinity of the proposed waste rock buttress to determine the soil conditions, soil density, depth to bedrock, susceptibility of the soil to liquefaction and permeability of the overburden and bedrock.

The drilling was completed by Connors Drilling Ltd. of Kamloops, B.C with a skid mounted diamond drill rig from September 21 to October 15, 2005.

20.1.7.1 Borehole BGC-05-14

Drilling commenced on September 23, 2005 at BGC05-14, located in the valley bottom along the exploration road approximately 10m east of Crabb Creek. Drilling in the overburden was accomplished by washing HW casing down the hole with water and taking SPT samples every 1.5m (5'). Once the contact between the overburden and bedrock had been established, bedrock coring (HQ3) commenced, terminating at a target depth of approximately 50m. Some geomechanical core logging was completed in the field while the remainder was completed in the core shack in Fernie, B.C. Parameters such as RQD, recovery, fracture spacing, fracturing infilling and infilling thickness were identified. After the core logging was completed, water pressure testing (packer tests) was performed every 3.05m (10') to determine the hydraulic conductivity of the bedrock. Artesian conditions in excess of 3 m were noted in the bedrock during drilling.

After completing the water pressure testing, a 1 ¼" piezometer was installed in the bedrock at BGC05-14. It was not possible to install the piezometer at the base of the borehole due to caving of weathered bedrock at approximately 32m. The screened interval of the piezometer extended from approximately 29m to 32m. The screened zone was completely sealed off with a 1m-bentonite seal and then subsequently grouted to the surface. After the piezometer was completed, it was noted that artesian conditions were still prevalent. A 3.05m (10') extension was added to the existing piezometer to determine the head of water in the borehole. After the extension was added, it only took a couple of minutes for water to flow over the top of the extension. Therefore, it was determined that the head of water exceeds 3m in this location.

20.1.7.2 Borehole BGC-05-15

BGC05-15 is located in the valley bottom along the exploratory access road, approximately 100m to the east of Crabb Creek. The drilling procedure at BGC05-15 was similar to that at BGC05-14. Firstly, the overburden drilling was completed by washing HW casing down the hole with water and SPT samples were taken every 1.5m. After refusal was met and drilling in the overburden was completed, HQ3 bedrock coring commenced. Water pressure testing was completed in 3.05m (10') intervals once the borehole termination depth of 50m was achieved. Artesian conditions were noted to exist between 29m and 32m.

A 1 ¼"piezometer was installed in the overburden and bedrock at BGC05-15. The screened interval of the bedrock piezometer was between 47m and 50m, while the screened interval of the overburden piezometer existed between 2.3m and 5.7m. The screened intervals were sealed off with a 1m-bentonite seal and were subsequently grouted to the desired elevation.

A summary of the BGC boreholes drilled at the Lodgepole Coal property in 2005 is provided in Table 20-10 below.

Table 20-10 Summary of BGC Boreholes Drilled

Borehole No.	Elevation (m)	UTM Coordinates	Borehole Depth (m)
BGC05-14	1878	5465755N 664725 E	50.6
BGC05-15	1882	5465760N 664750 E	50.3

The co-ordinates for BGC05-14 and BGC05-15 are approximate co-ordinates obtained from a topographic map.

20.1.8 Laboratory Test Results

Geotechnical laboratory testing was conducted by EBA Engineering Consultants Ltd. In Calgary on selected rock and soil samples collected from the drill holes and the test pits. The following sections summarize the results of testing on these samples.

20.1.8.1 Core Samples

Selected core samples of intact rock were tested for unconfined compressive strength. Core samples of clay filled shear zones were tested for grain size and Atterberg limits.

20.1.8.2 Unconfined Compressive Strength

Table 20-11 summarizes the results of unconfined compressive strength tests on selected core samples. All core samples were HQ sized core (core diameter 63.5 mm).

Table 20-11 Unconfined Compressive Strength of Selected Core Samples

Borehole Number	**Sample Number**	**Depth Interval (m)**	**Lithology**	**Unconfined Compressive Strength (MPa)**
512	4556	21.26- 21.41	Siltstone (Highwall)	64.9
512	4557	46.56- 46.79	Brecciated Claystone (Footwall)	4.0
512	4559	61.57- 61.87	Sheared Mudstone (Footwall)	33.8
512	4560	71.53- 71.81	Siltstone (Footwall)	86.3
Block sample	1	-	Sandstone (from rockslide area)	139.3
Block sample	2	-	"	79.5
Block sample	3	-	"	90.4

The testing indicates a wide range of rock strength for the units in the mine area. The weakest rock unit tested was the brecciated claystone in the footwall (below Zone 1), with a strength of 4.0 MPa. The strongest rock unit was the sandstone, with strengths ranging between 90 to 139 MPA, averaging 103 Mpa.

20.1.8.3 Filled Seams

Several clay filled discontinuities and gouge filled shear zones were observed in the core samples. Selected samples were tested for grain size and Atterberg limits to estimate shear strength properties. Since the core had been allowed to desiccate in storage prior to taking these samples, there was no longer an opportunity to measure the in-situ natural moisture content of these samples.

A total of 17 samples were tested. All of the samples came from the mine footwall (below Zone 1) except for sample 4551, which was the only clay zone noted in the highwall rock units. This may indicate that the footwall has undergone more deformation than the highwall.

Table 20-12 summarizes the results of the grain size and Atterberg limit determinations on these samples.

Table 20-12 Grain Size and Atterberg Limit Determinations on Seam Samples from Drill Core

Borehole Number	Sample Number	Depth (m)	Clay Size(%)	Silt Size(%)	Sand Size(%)	Gravel Size(%)	Liquid Limit	Plastic Limit	Plasticity Index
501	4561	94.79	5	11	76	8	19	14	5
501	4562	113.74	14	39	47	0	25	12	13
501	4563	122.77	0	21	67	12	16	12	4
501	4564	153.77	5	23	40	32	25	13	12
501	4565	153.49	4	8	83	5	17	11	6
502	4566	14.09	4	21	58	17	22	13	9
502	4567	88.85	4	31	63	2	25	22	3
502	4568	88.94	17	39	44	0	18	13	5
504	4569	10.52	0	26	50	24	20	16	4
504	4570	29.41	10	25	29	36	18	11	7
505	4572	57.68	3	40	47	10	18	13	5
509	4571	63.09	2	35	48	15	17	12	5
512	4558	55.47	12	33	46	9	13	8	5
513A	4551	28.55	6	18	20	56	28	15	13
513A	4552	72.51	8	81	10	1	36	17	19
513A	4553	77.32	7	33	34	26	29	16	13
513A	4554	8656	4	24	48	24	21	14	7

20.1.8.4 Test Pit Samples

Selected samples were taken of the various soil units encountered in the test pits. In each case, the sample was selected to be representative of the soil unit encountered. Atterberg limits were measured on selected representative samples. Table 20-13 summarizes the results of the grain size and Atterberg limit determinations on these samples.

Table 20-13 Test Pit Samples Grain Size and Atterberg Limit Determinations

Test Pit Number	Sample Number	Depth Interval (m)	Clay Size (%)	Silt Size (%)	Sand Size (%)	Gravel Size (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
1	1	0.3- 2.8	23	32	33	12	29	13	16
2	1	0.6- 3.6	15	19	29	37	30	15	15
3	1	1.0- 1.5	9	22	33	36	-	-	-
3	2	2.0- 2.5	9	29	49	13	-	-	-
4	1	0.5- 1.0	4	17	28	51	-	-	-
4	2	1.0- 1.5	4	11	30	55	-	-	-
5	1	1.0- 2.0	0	11	25	64	-	-	-
6	1	1.0- 1.5	17	27	34	22	22	15	7
7	1	0.3- 3.0	2	14	39	45	-	-	-
7	2	3.0- 5.3	6	16	38	40	-	-	-
8	1	0.3- 2.3	0	20	76	4	-	-	-
8	2	2.3- 3.8	4	23	44	29	-	-	-
8	3	3.8-4.6	2	13	27	58	-	-	-
9	1	0.4- 3.3	0	19	55	26	-	-	-
10	1	1.2- 1.3	3	10	30	57	-	-	-
11	1	0.3- 4.5	3	17	56	24	-	-	-
12	1	0.4- 5.0	0	13	57	30	-	-	-
13	1	3.5- 5.2	4	35	48	13	-	-	-
14	1	4.0- 5.2	1	6	16	77	-	-	-
15	1	0.3- 4.2	9	24	31	36	-	-	-
16	1	0.3- 6.2	1	24	61	14	-	-	-
17	1	3.3- 4.3	1	30	36	33	-	-	-
18	1	0.3- 2.4	1	24	55	20	-	-	-
19	1	0.3- 4.6	2	17	43	38	-	-	-
20	1	0.4- 4.5	0	25	50	25	-	-	-
21	1	0.1- 0.8	0	16	42	42	-	-	-

20.1.8.5 Bedrock Hydraulic Conductivity Tests

Hydraulic conductivity of the bedrock was evaluated using water pressure tests in the two geotechnical boreholes drilled by BGC in the waste rock buttress dam area, Boreholes BGC-05-14 and -15.

20.1.8.6 BGC-05-14

Water pressure testing (packer) was completed every 3.05m to determine the hydraulic conductivity of the bedrock. Table 20-14 below outlines the hydraulic conductivity of the bedrock for each 3.05m test interval.

Table 20-14 Hydraulic Conductivity of Bedrock at BGC05-14

Testing Interval Below Ground Surface (m)	Hydraulic Conductivity (cm/s)	Bedrock Unit
14.0-17.05	5.3E-6	Medium to coarse grained sandstone
20.1-23.17	2.8E-6	Fine grained sandstone
23.17-26.20	6.8E-6	Medium grained sandstone
26.20-29.25	2.4E-5	Medium grained sandstone
32.3-35.36	1.4E-4	Fine to medium grained sandstone (crushed and decomposed)
35.35-38.41	5E-5	Fine to medium grained sandstone (crushed and decomposed)

20.1.8.7 BGC-05-15

Water pressure testing (packer) was completed every 3.05m to determine the hydraulic conductivity of the bedrock. Table 20-15 below outlines the hydraulic conductivity of the bedrock for each 3.05m test interval.

Table 20-15 Hydraulic Conductivity of the Bedrock at BGC05-15

Testing Interval (m)	Hydraulic Conductivity (cm/s)	Bedrock Unit
12.20-15.25	9.5E-4	Fine to medium grained sandstone
15.25-18.3	8.9E-4	Fine to medium grained sandstone
18.3-21.35	5.7E-7	Fine to medium grained sandstone
21.35-24.4	1.9E-5	Medium to coarse grained sandstone with mudstone rip up clasts
24.40-27.45	2E-5	Medium to coarse grained sandstone with mudstone rip up clasts
27.45-30.5	6.5E-5	Medium to coarse grained sandstone with mudstone rip up clasts
30.50-33.55	6.4E-5	Broken medium to coarse grained sandstone
33.55-36.6	1.7E-5	Broken medium to coarse grained sandstone
36.6-39.65	1.3E-4	Broken medium to coarse grained sandstone
39.65-42.70	5.5E-6	Medium grained sandstone (slickensided, gouge and fault breccia)
42.70-45.75	1.7E-5	Broken medium grained sandstone (slickensided)
45.75-48.8	1.7E-7	Fine to medium grained sandstone

20.1.9 Geotechnical Design Parameters

This section provides preliminary estimates of the geotechnical design parameters for three main project areas:

- Pit walls
- Waste Dumps
- Plant Site

20.1.9.1 Pit Walls

The site geology is basically a simple dip slope, with moderately west dipping strata, which maintains a more or less uniform orientation from north to south and east to west across the proposed mine excavation area.
The proposed mine slopes can therefore be categorized into three structural domains based on the orientation of the slope:

- Footwall slope, comprises all units below Zone 1 along the west facing dip slope of McLatchie Ridge, which will be exposed by mining along the dip.
- Highwall slope, strikes parallel to the regional strike, but is inclined more or less perpendicular to the dip.
- Endwall slope, at the north end of the mine, trending more or less perpendicular to the regional strike direction.

The following sections summarize the relevant design parameters for each of these areas.

20.1.9.1.1 Footwall Slope

The stability of the footwall slope will be primarily controlled by planar failure along the bedding planes. Data from the geomechanical logging suggests that the rock mass may be expected to have an effective angle of shearing resistance ranging from about 15° to about 35°. For preliminary design purposes an angle of 25° is recommended.

Two key elements must be included in the overall footwall design criteria to ensure stability:
The bedding planes cannot be undercut. This means that the bench faces must be parallel to the bedding, or the footwall is unbenched.

The slope must be drained to eliminate the artesian groundwater pressures. This means that the slope, especially the lower half of the slope must be dewatered by pumping prior to start of mining to improve the stability of the overall slope. During mining, vertical pressure relief holes may be required to dewater local pockets of groundwater as mining proceeds. Horizontal drain holes will be required in the final footwall slope to maintain drained conditions in the long term.

20.1.9.1.2 High Wall Slope

The stability of the hanging wall slope will be determined primarily by planar failure along joints that strike parallel to the bedding strike, but are inclined normal to the bedding plane dip. Wedge failures are also possible. There is very little information on the rock mass condition in the highwall. The 2005 drilling only intercepted rock units that form the lower third of the final highwall.

For preliminary design purposes, the bench face angle should be inclined parallel to the planar dip joints, estimated to be in the range of 60° to 65°. The highwall itself should be benched to achieve an overall angle of about 45° to 48°.

Slope drainage is also critical in the highwall since it is anticipated that most of the groundwater flow is in a downdip direction. Therefore drainage towards the mine excavation will occur as the highwall is deepened.

20.1.9.1.3 <u>End Wall</u>

There is no specific drilling data on which to base the end wall design parameters on. Based on the overall geological structure, the end wall orientation will be more or less parallel to the joint sets that are normal to the strike. These joint sets were observed to have primarily sub-vertical dips. These, in conjunction with the bedding plane and the joint sets that are complimentary to the bedding dip will form wedges that have relatively flat lying planes of intersection.

The mine end wall will shift with the sequential northward expansion of the proposed mine and will largely be limited in east-west horizontal dimension, though it may extend over the entire length of the exposed footwall slope. As such, the end wall is assumed to be mainly a working slope that can be modified as required. Stability of the end wall will be primarily wedge-controlled failures, assuming no local rolls or changes in the bedding dip. Based on this assessment the end wall could be excavated somewhat steeper than the hanging wall. For preliminary design purposes, BGC is recommending that the end wall be benched to achieve an overall slope of about 50°.

20.1.9.2 Waste Dumps

Mine waste rock dumps are located both outside and inside the main pit area. The waste rock dumps located outside of the main pit area will be placed on natural slopes. The mine waste placed within the pit will be founded on the excavated footwall of Zone 1. Regardless of location, additional geotechnical investigations will be required for each dumpsite to assess foundation and waste dump stability. Foundation preparation measures may be required to remove unsuitable foundation materials such as clay, organics or other low shear strength and compressible materials. At this point of the study an allowance has been made to remove these materials in the years just prior to the building of the dumps.

Based on experience in the Elk Valley, the average angle of repose of the waste dump material is about 37°. Since the dip slope rock units, including the mine footwall is assumed to have a friction angle of 25° it will not be feasible to dispose of waste rock on the mined footwall or any of the natural dip slopes, unless the waste rock is placed to a flatter slope. Assuming that the waste dump slopes should have an overall factor of safety of 1.3, means that for preliminary design purposes, the waste dump slopes should be limited to more than about 20°. In addition, the foundation and the base of the waste dump must be drained to prevent groundwater from affecting stability.

To overcome this problem, it is recommended that the in-pit waste dumps be constructed against the high wall to provide the required buttressing effect against sliding. In this case, once a stable waste rock base has been constructed above the valley floor, the overlying waste rock material can be dumped at the angle of repose. This will require more detailed mine planning to determine an optimal sequence for excavation and waste rock disposal.

For waste dumps located outside of the main pit area, there is a risk that instability may develop during operations. This would be a concern if there was a potential for downslope risk, such as safety of personnel, damage to equipment or infrastructure facilities or delays to ongoing mining operations to clean up slide debris. These concerns can be mitigated by proper slope stability monitoring practices and construction and operational procedures. Other options include construction of buttressing embankments or consolidation of the foundation with low height lifts. Final reclaimed dump slopes may be re-sloped to 28° if the angle of repose dump face slopes remained stable during placement. If the foundation shear strength is inadequate to prevent instability, flatter reclaimed slopes may be required.

20.1.9.3 Plant Site

Nine (9) test pits were located at the plant site. No drilling was carried out in the plant area.

The material in the vicinity of the plant site was found to range from a thin layer (0.2m) of topsoil and organics overlying gravel and sand with some silt and trace sandstone cobbles to thin layer of topsoil and organics (approximately 0.2m thick) overlying silty sand. The depth of the testpits range from 3.5m to 5.3m below ground surface and the groundwater surface varied in elevation from approximately ground surface to greater than 5.2m in depth.

The thickness of the sand and gravel unit ranges from 0.8m to greater than 5.1 m while the thickness of the silty sand ranges from 4.1m to greater than 5.0m.

The freezing index for Fernie, BC was determined to be 739 Degree-Days Celsius. From Brown (1946), the frost depth can be estimated from the freezing index. Therefore, the estimated frost depth for the City of Fernie was found to be approximately 1.5m. There is no available climatic data for the Lodgepole Coal Site.

The elevation of the City of Fernie is known to be approximately 1009m while the potential Lodgepole Coal plant site has a surface elevation of approximately 1900m to 1950m. Since the elevation difference between Lodgepole and The City of Fernie is approximately 1000m, the temperature differential between the two locations would be approximately -6.4 degrees Celsius. Consequently, the lower temperature experienced at the potential plant site would result in a larger freezing index value and a greater frost depth. The estimated frost depth for the site is approximately 2m.

A bearing capacity for the potential plant site was determined to be approximately 150 kPa (based on a 0.5m wide footing). Prior to constructing the footings, all topsoil, organic, deleterious and soft material such as colluvium must be stripped and removed. In addition, all gravel, cobbles and boulders >75mm in diameter must be removed from the site to minimize potential point loads. A geotechnical engineer should inspect the foundation framework prior to pouring the concrete to ensure a suitable bearing surface has been exposed.

The bearing capacity of the plant site can be increased if the topsoil and overburden material is removed, exposing competent and intact rock. If weathered rock is encountered after stripping the overburden material, it should be ripped, excavated or blasted, exposing a more competent surface. A geotechnical engineer should inspect the bedrock surface prior to constructing the footings to ensure a suitable rock-bearing surface has been exposed.

20.2 Site Layout

20.2.1 General Site Layout

The general site layout and active mining area for the Lodgepole project is designed to utilize the lands required for construction, mining, processing, and materials handling in the immediate mining area. The mining area is in mountainous terrain that presents favorable and sloping topography that will facilitate sustainable open-pit coal mining. The general site layout includes 12,000 hectares of land on which mining or mining support activity will occur. Of this 1050 hectares will be within the active mining footprint.

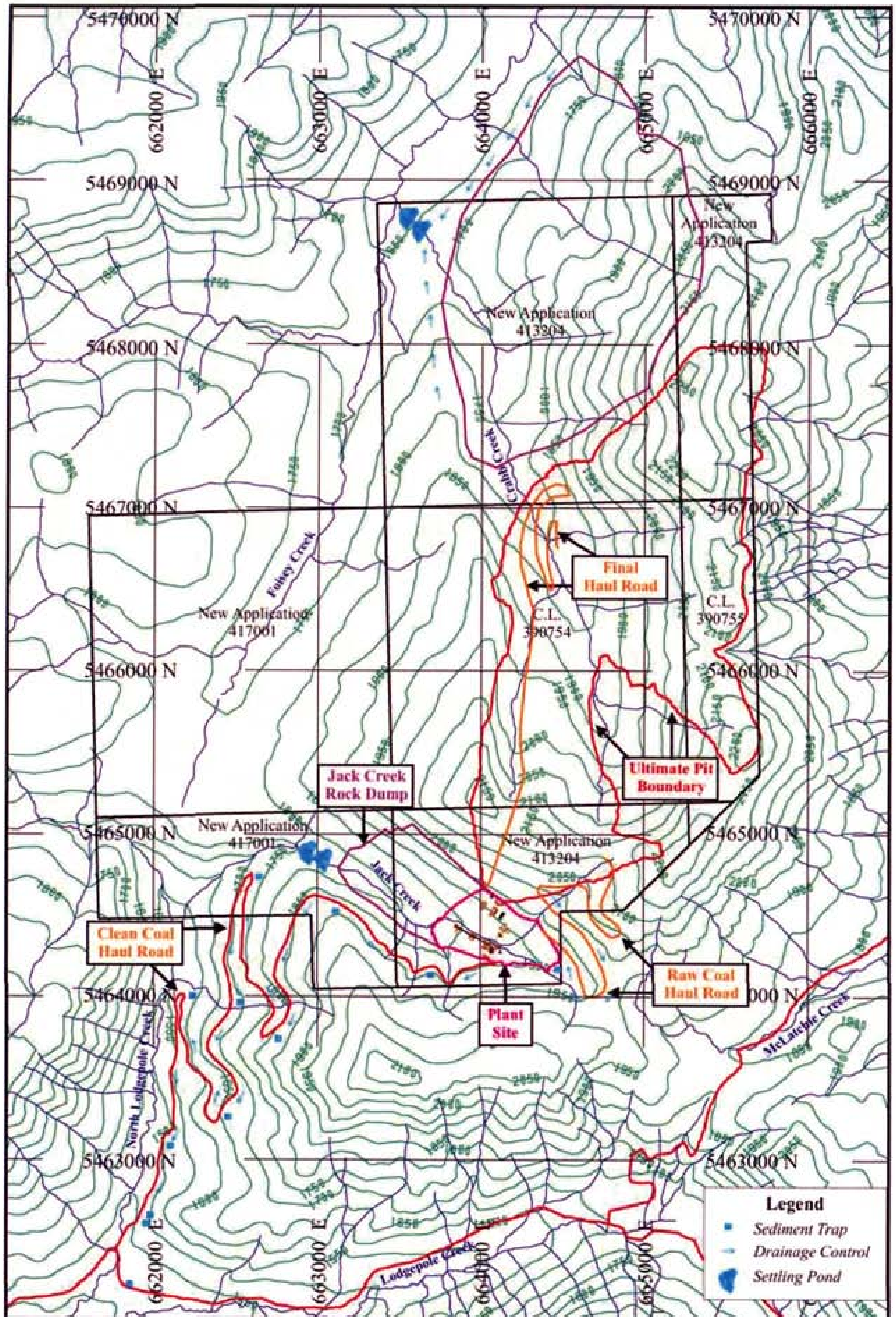
The mountain slopes in the area are fairly consistent and slope at roughly 15 to 25 degrees throughout the project area that is being used for mine development. These slopes allow for cut and fill road construction that will improve overall startup costs. The topography also facilitates safe and more economic waste dumps as terraces will be placed over the natural ground creating more stable long-term waste rock dumps. Steep mountain slopes over 30 degrees do not allow for terraced waste dumps to be constructed and normally result in sliver type failures throughout the project life. The terraced waste dumps provide a more favorable setting that will satisfy mine reclamation and mine abandonment planning needs.

20.2.2 Site Selection and Alternatives

Alternatives were reviewed when locating infrastructure, waste dumps, plant refuse, access roads, open pit limits, plant site, and water management systems. The process of defining the most favorable locations and site work inside the active mining area involves both environmental and economic considerations.

The environmental aspects include drainage and sediment controls, ecological and biological impacts, fish and wildlife impacts and air quality. The project is planned to accommodate the environmental concerns in conjunction with EBA engineering. Figure 20-1 shows the general arrangement of the active mining area.

The economic considerations include assessing the available space required to locate various site requirements and the cost of making the space useable. Once the construction and mining quantities and types of material are known the available space is assessed in terms of capital and operating costs. In mountainous terrain one of the most significant restraints are haulage and transportation costs. Waste rock required from the main pit area to construct the raw coal haulage road and plant site foundations is transported over the shortest possible distance to improve economics during construction. Keeping the areas of disturbance in smaller and more controllable areas minimizes the amount of work required for drainage and sediment control structures.



cline mining corporation

Project: Lodgepole	General Arrangement Map
By: PGB / JJA	Mine Site
GR Technical Services Ltd.	
Date: February 18, 2006	Figure 20.1

Waste dumps are located to provide the best waste haulage costs while providing enough room to accommodate the mine waste rock considering a swell factor of 30%. Pit backfill dump will be designed during the detailed planning stage to further reduce the project footprint by reducing the amount of material in the external waste dumps which are outside the pit limit boundary. Plant refuse will be managed in the same vicinity as the plant in the Jack Creek valley. An alternative tailings dam and pond was originally considered adjacent to the current process plant however, this was replaced by a more costly but more environmentally acceptable dry tailings disposal. The conclusions and results of these and other considerations represent the best economic alternatives considering the site layout.

20.2.2.1 Mine Limit

The ultimate pit perimeter is defined to provide economic coal release over the mine life. Alternate open pit designs were considered until the optimum pit perimeter was achieved, see Section 19.8 for Mine Planning details. Figure 20-2 illustrates the selected pit perimeter. The pit wall slopes and geotechnical aspects are described in Section 20.1.9 .

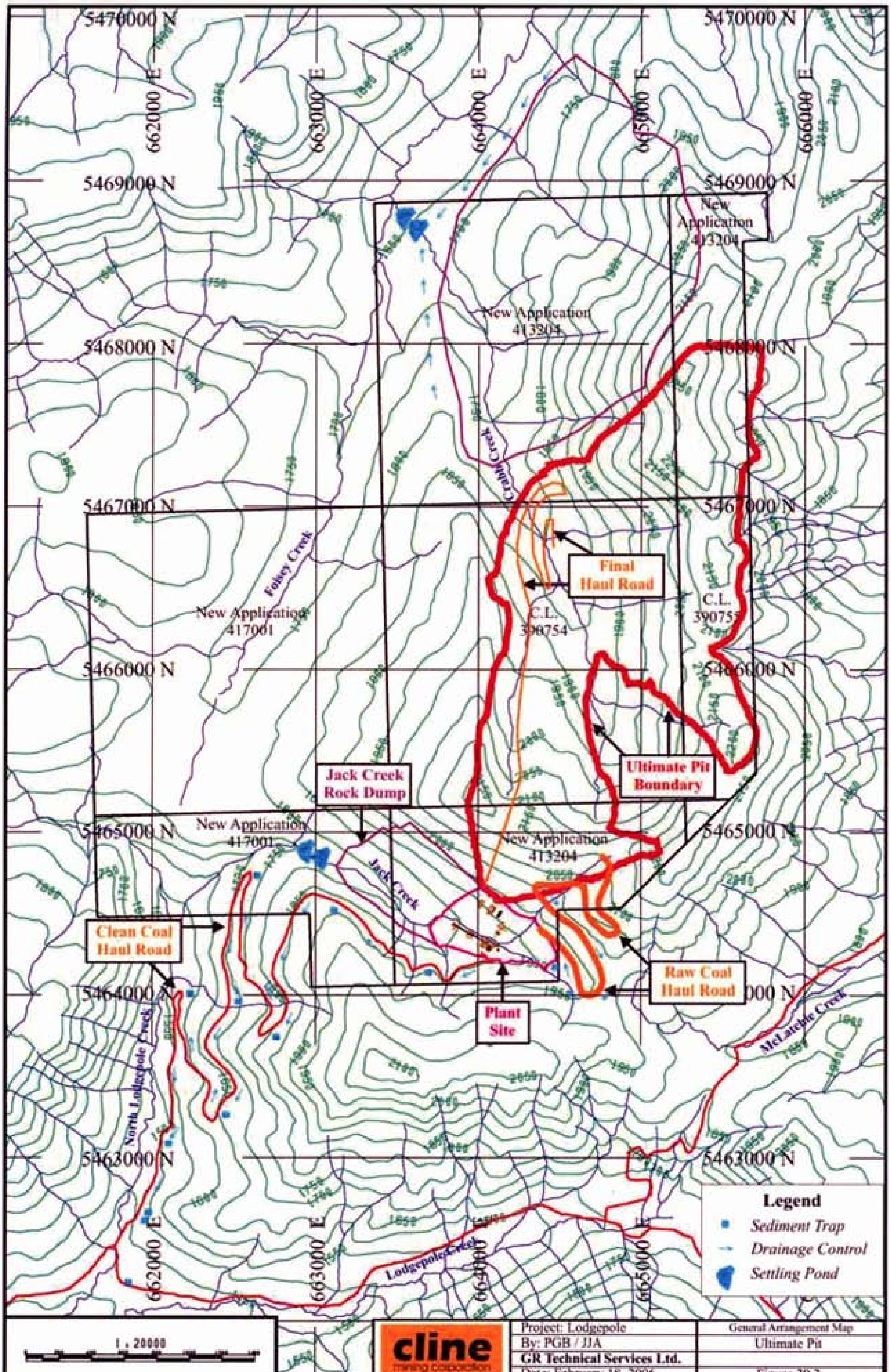
The mineable resources and mining reserves are described in Section 19.0. The project is planned to provide a twenty-year mine life and produce 2.0 million clean tonnes of coal per year. The location of the pit limit is driven by the resource model that is developed from the geological database. Certain economic restraints are placed into the mine design system and the software (MineSight©) defines the pit limits using the provided restraints. Once the pit perimeter is determined the area of influence is considered to assess environmental needs, drainage controls, waste dumps, access systems and other economic alternatives.

20.2.2.2 Plant Site

The plant site is located on favorable topography approximately 0.5 km from the south limit of the main pit area. This location is the most favourable considering the surface area and the volumes of fill required to construct the pads that will support the plant buildings and materials handling system. Because of the proximity to the active pit and the length of the raw coal haulage the proposed plant site location is a more favourable economic alternative. The plant site is shown on Figure 20-3. Several other areas that were considered include:

- The flat area at the headwaters of the Foisey Creek drainage. Because this drainage is not disturbed with mining or processing, this location was rejected as an alternative. The water from Foisey Creek flows directly into the Flathead River and the added environmental concerns were deemed to be unnecessary.

- The areas along the lower Lodgepole access road have been rejected because they are a greater distance from the pit area and present difficult construction requirements. Many different stakeholders use the main Lodgepole road and major construction and road relocations would cause long term access problems and inconvenience.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New Application
413204
New Application
413304
New Application
417001
C.L.
390754
C.L.
390755
Fossey Creek
Crabb Creek
Jack Creek
North Lodgepole Creek
Lodgepole Creek
McLatchie Creek
Final
Haul Road
Ultimate Pit
Boundary
Jack Creek
Rock Dump
Clean Coal
Haul Road
Raw Coal
Haul Road
Plant
Site
Legend
Sediment Trap
Drainage Control
Settling Pond
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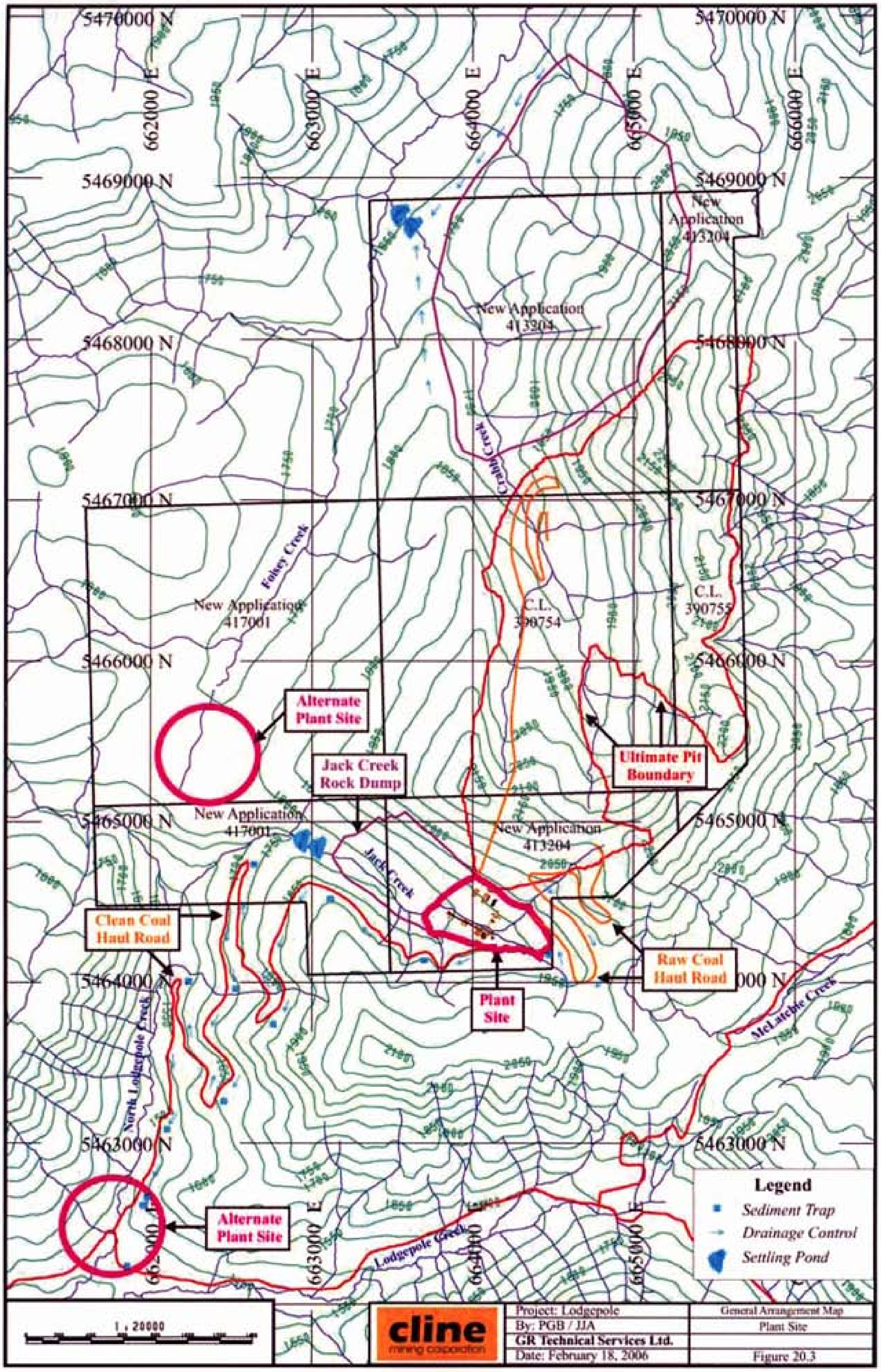
Date: February 18, 2006
General Arrangement Map
Ultimate Pit
Figure 20.2



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New Application
413204
New Application
417001
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C.L.
390755
Folsey Creek
Crabb Creek
Jack Creek
North Lodgepole Creek
Lodgepole Creek
McLatchie Creek
Alternate Plant Site
Jack Creek Rock Dump
Ultimate Pit Boundary
Clean Coal Haul Road
Raw Coal Haul Road
Plant Site
Legend
Sediment Trap
Drainage Control
Settling Pond
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Date: February 18, 2006
General Arrangement Map
Plant Site
Figure 20.3

Another major consideration with both the above alternative sites is that plant rejects from the planned dry tailings system will have to be hauled and placed in controlled dumping areas. In this report the plan is to place plant rejects in the designated dump site just west of the plant site or alternatively some material may be backhauled to the mine waste dumps if required. Proximity to the mining area is therefore an advantage. The alternative plant sites would require a much greater rejects haul to the planned rejects dump site in Jack Creek Valley or another rejects site would need to be defined in the Foisey Creek or Lodgepole drainage basins.

Based on the construction requirements, site access, raw coal haul and plant rejects haul, the selected plant site presents the most favourable alternative.

20.2.2.3 Coal Refuse Site

The plant process is designed to use dry stacked tailings for the waste material cleaned out of the raw coal. This will consist of coarse rejects and finer tailings material, which will be filtered and then co-mingled for disposal in a designated dump area. This process is being successfully used in other Elk Valley operations. The material will be hauled by trucks to an area just west of the plant site in Jack Creek Valley. This site will provide adequate containment for the amount of material in the project plan. It has the advantages of being close to the plant site, close to the mine so pit waste can be readily dumped with the rejects if required, and is within the already controlled site management plan.

The designed dump also has capacity for mine waste rock which will be hauled to the site in later years as a shorter haul alternative to the designed mine dumps. Co-mingling of mine waste with the plant rejects is also a contingency plan if ARD concerns arise from the plant rejects material. The Jack Valley dump site has a capacity of 71.07 million LCM which is more than adequate to contain the 10.3 to 13.9 million LCM of plant rejects that will be generated in in the Life of Mine plan. The dump has also been design to accommodate a down slope containment dyke if required from more detailed geotechnical studies, to ensure containment and stability of the stacked plant rejects. Table 20-16 summarizes the plant rejects requirements.

Table 20-16 Plant Rejects Requirements - Life of Mine

		Units (millions)
Raw Coal Tonnes	62.433	MTRC
Yield	65%	
Clean Coal Tonnes	40.597	MTCC
Dryer Feed (@ 1% of MTCC)	0.406	MTCC
Net Plant Rejects	21.430	MT Rejects
Rejects SG	2.0 to 2.5	
Rejects (swell/compaction)	1.2 to 1.3	
Rejects Volume	10.3 to 13.9	LCM
Dump Capacity	71.07	LCM

In summary, the refuse area will be located within 1 km and downstream from the plant in the Jack Creek Rock Dump (see Figure 20-4). Considering the environmental, water management and economic issues, this location is the most advantageous for the plant refuse dump.

20.2.2.4 Waste Dumps

Mine waste rock dumps will be placed both outside and inside of the main pit area. The planning process starts with designing sufficient dump capacity for all mine waste to be placed in external dumps. Internal dumps and backfilling is designed later as more detail is generated from detailed pit phases and production scheduling. Plant rejects will be hauled to a dump site just west of the plant site and may be co-mingled with mine waste.

20.2.2.4.1 Dump Locations and Alternatives

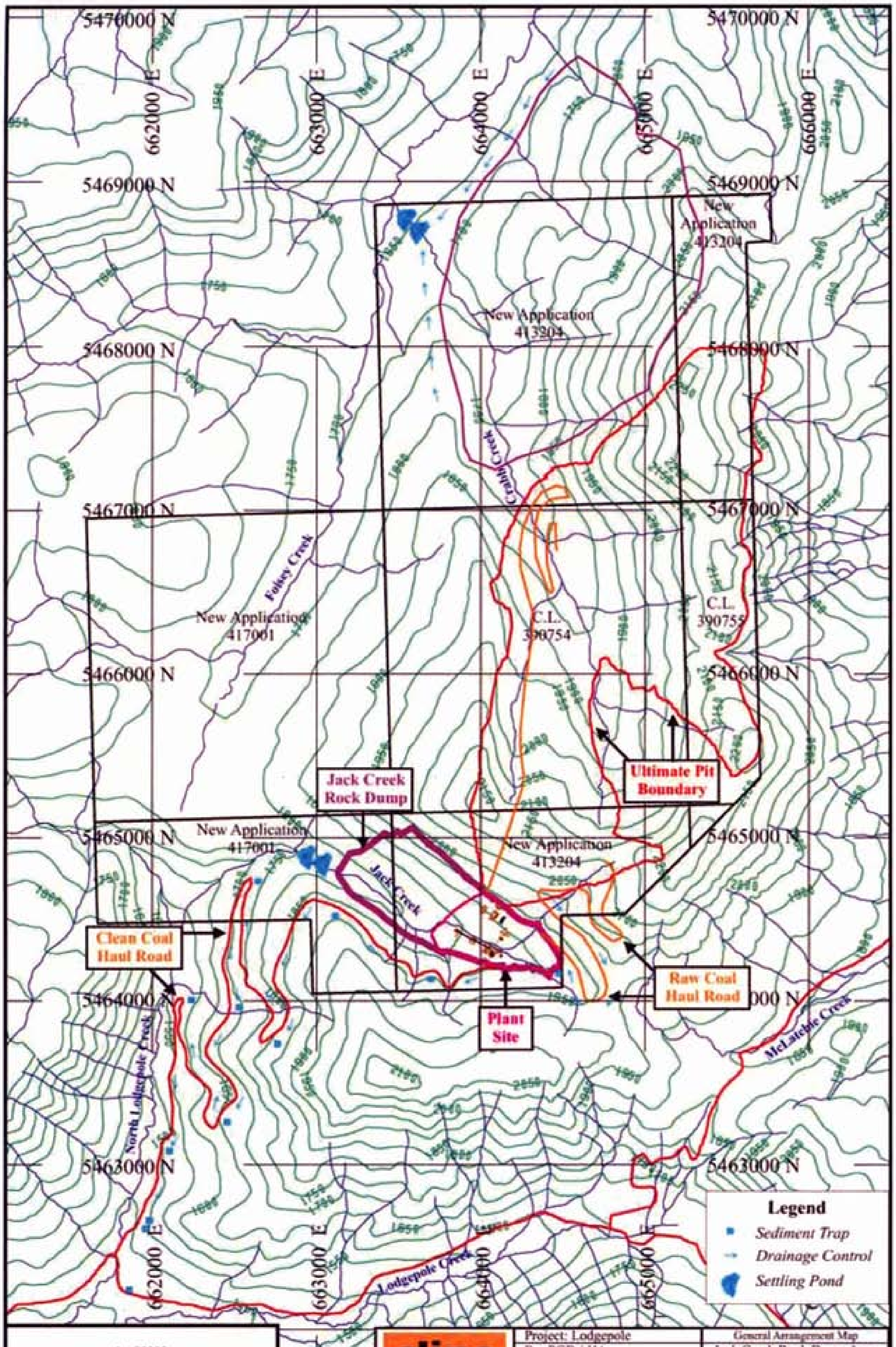
Preproduction waste mining will be used primarily to generate material for construction purposes. This will include a raw coal haul road from the startup mining areas on the 2100m elevation saddle between Jack Creek and Crabb Creek Valleys, fill for the plant site and some minor pit access roads on McLatchie ridge. A total of 2.5 million LCM (1.92 million BCM) is planned in the construction period.

Following the preproduction period, the waste rock will be hauled to designated dump areas outside of the open pit mineable coal resource area. This will be into areas out side the Ultimate economic pit limit (External Dumps) or back filled into mined out areas. (Backfill Dumps).

The dump design process starts with delineating potential external dump locations adjacent to the mining area. The external dump options are then evaluated with respect to the attributes of these dumps to meet the needs of the mining operation. These needs are:

- Located outside current and future surface mineable coal resource areas
- Total capacity meets the waste mined quantities
- Minimize land disturbance and visual impact
- Avoid areas with problematic geotechnical conditions
- Minimize impact on other land use such as water courses &, wildlife terrain
- Allow for level or down hill hauling and to minimum up hill hauling to reduce costs
- Proximity to mining areas to reduce length of hauls to reduce costs
- To not cutoff access to the later mining phases
- Potential for future Back fill

A first pass look at potential dump sites has been done and compared to the above needs. The potential dumpsites are shown in Figure 20-5.



1 : 20000	Project: Lodgepole	General Arrangement Map
cline mining corporation	By: PGB / JJA	Jack Creek Rock Dump Area
	GR Technical Services Ltd.	
	Date: February 18, 2006	Figure 20.4

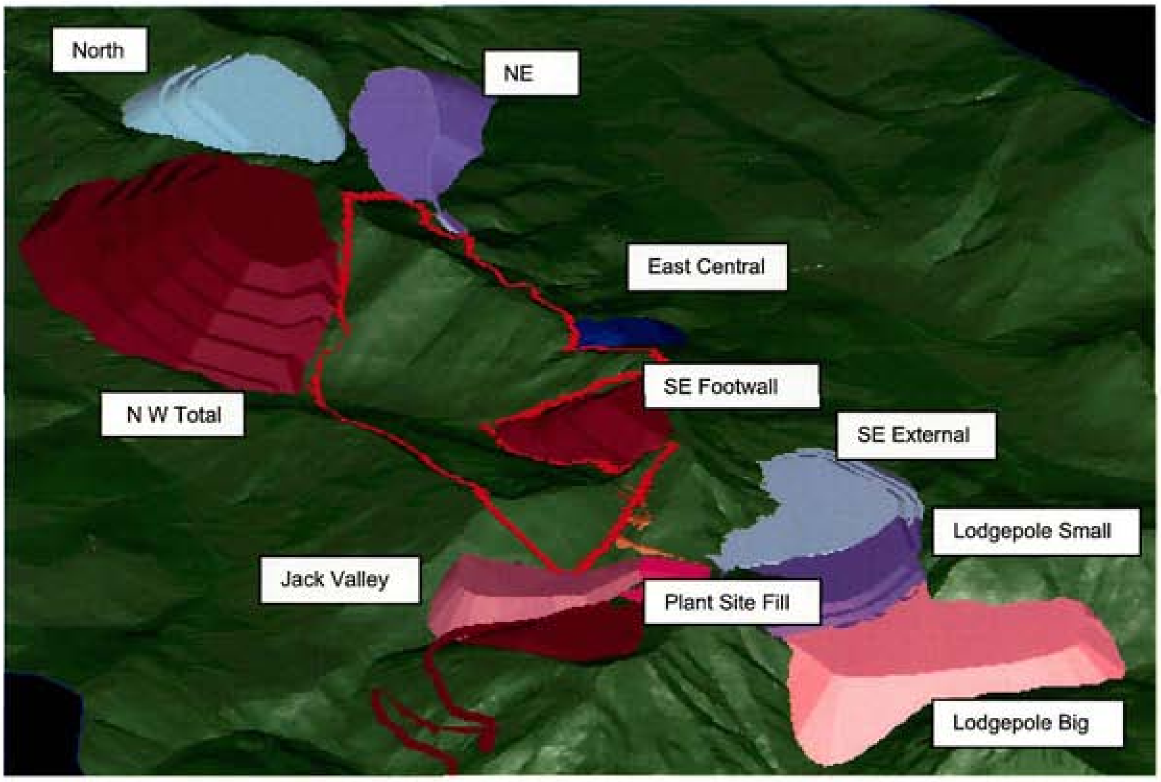


Figure 20-5 Potential Dump Sites

The features of these alternatives external dumps are listed in Table 20-17.

Table 20-17 Alternate Dump Sites

Dump Site	LCM	BCM	Description
	(Millions)	(Millions)	
SE Footwall*	38.41	29.54	Close to early pit phases. Requires toe buttress
NW Total*	383.95	295.35	Can be phased to optimize hauls
North East	88.83	68.33	High visibilty & disturbance, harder to manage water
North	100.90	77.62	Reasonable alternative
East Central	11.59	8.92	High visibilty & disturbance, harder to manage water
SE External	83.60	64.31	Close proximity but drains into McLatchie
Lodgepole - Small	71.05	54.65	High visibilty & disturbance, Elk drainage system
- Big	259.64	199.72	High visibilty & disturbance, Elk drainage system
Jack Valley (Total)	71.07	54.67	For use as Plant Reject dump and mine waste
			(includes plant Site Fill)
Pit Waste - P654		325.90	
Total Plant Reject		10.93	

* *Designed with 28° reclaim angle. Others dumps are rough designs only*

The SE footwall, NW Total, and Jack Valley dumps are used as the basis of the mine plan in this report. Cumulatively they more than meet the volume requirements for the mine waste and plant rejects and have the least visual and aerial impact both during and post mining. The SE Footwall and NE Total dumps are both within the same water management plan area where water from the mining and dumping areas will be directed into settling ponds in the Foisey Valley prior to entering natural streams.

The North East, East Central, and SE External dumps although close to the mining areas and therefore potentially low mining cost areas, are not considered further due to their visual impact and difficulty with respect to other land uses especially for public access into the McLatchie Valley during and after mining. It will also increase the water management requirements by affecting the McLatchie drainage area. The southern end of McLatchie ridge also has been identified as goat habitat.

The North dump has similar characteristics to the NW dump with respect to visual and aerial impact and is within the same water management plan area. The North dump is considered the best alternative dump as a contingency dumping area. It will require higher waste haulage costs if it replaces a lower dump area.

The Lodgepole (Small and Big) dumps do have a high visibility and will impact the public access into the McLatchie Valley. They have the advantage of being in the Lodgepole/Elk Valley drainage system and therefore don't impact the Flathead watershed. These dumps are useful as contingency if future design stages indicate the SE footwall or NW Total dumps can't be filled to their full size. Note: The 'Lodgepole' dumps are each design on a stand-alone basis and should be considered as separate alternatives not as combined or cumulative dump volume.

20.2.2.4.2 Backfilling

In later stages of planning, internal dumps and backfilling will be considered. These will generally replace the use of some of the external dumps. The contingency issues identified in the previous section will be mitigated by reducing the size of the external dumps and replacing the difference in material with backfill dumps. Even if it is not required to reduce the size of the external dumps for stability or land use issues, the backfilling options will be maximized to reduce the land disturbance and to create shorter waste hauls. More efficient mining and less aerial disturbance will reduce operating and reclamation costs.

20.2.2.5 Roads

The current access roads from Morrissey and Elko will continue to be used as the primary access for the project. Some new construction is required on the North Lodgepole Creek access but most of the existing road systems will be upgraded and widened, Figure 7-1.

Alternate access was considered for the clean coal haulage road. A review of the access to the Corbin area near Elk Valley Coal's Coal Mountain Operations was completed to investigate the potential to haul clean coal or run of mine coal to other existing cola processing and rail loadout infrastructure in the area. The service access/access from the lower Lodgepole road to the plant site is the same in both cases.

From the Lodgepole road junction the route would have to go over the pass to McLatchie Creek, an elevation gain of more than 240m with grades up to 14%. The road would follow McLatchie Creek, cross the Flathead River to Squaw Creek. Traveling up Squaw Creek to the Flathead Pass has an elevation gain of more than 260m. The route would continue down Michel Creek to the Corbin area, an elevation drop of more than 260m. (See Figure 6-2)

Because of capital and operating costs this alternative is not considered to be viable as a potential coal haulage route for the Lodgepole property.

A detailed discussion about the main access and clean coal haulage road is provided in the Infrastructure Section (see Section 20.9).

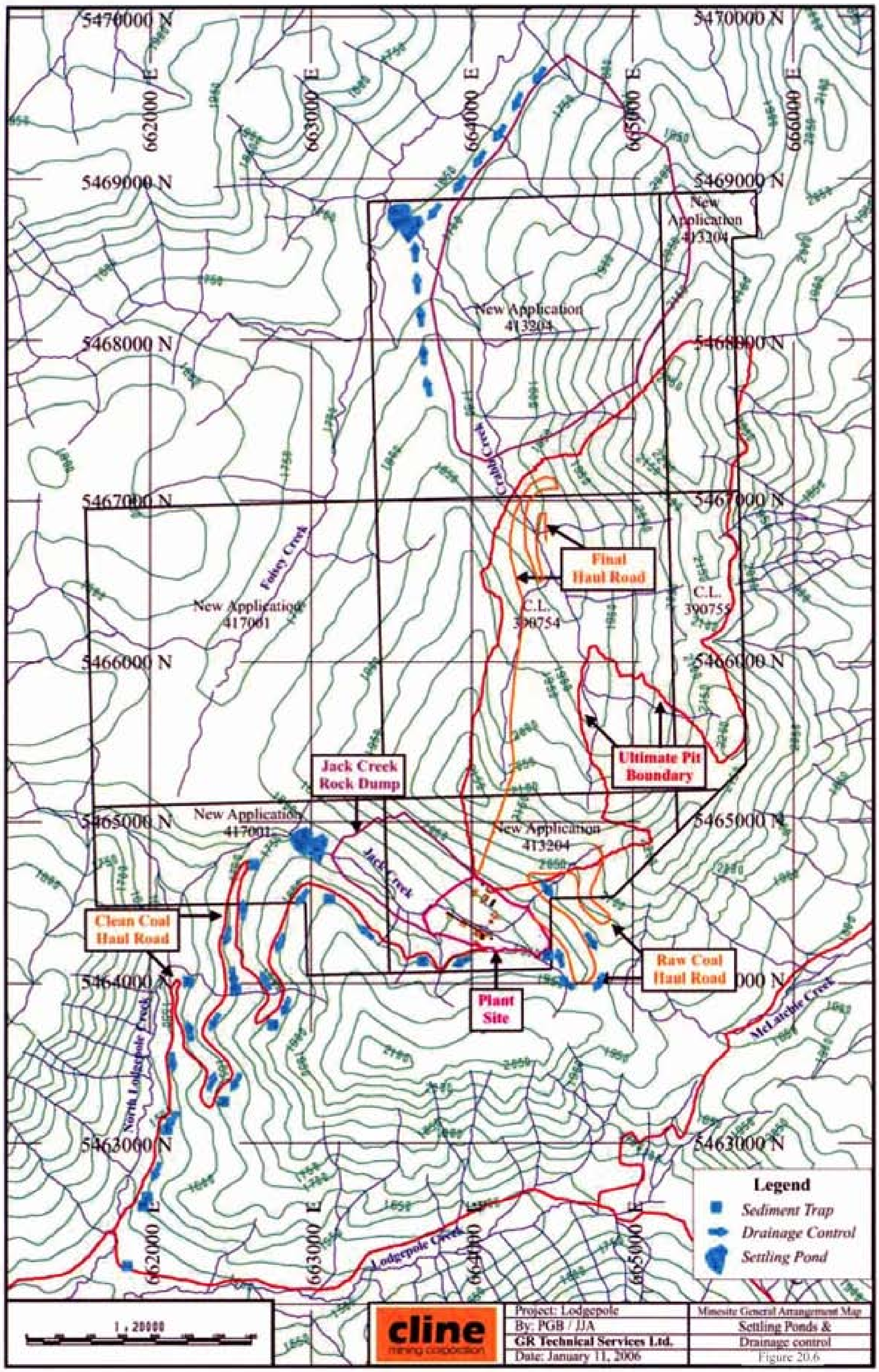
20.2.2.6 Drainage and Settling Ponds

An environmental assessment is being completed by EBA that includes wildlife, vegetation, archeological and hydrology studies in the project area and water management. Section 20.7.3 provides a discussion on water management.

In the active mining area drainage will be controlled by using perimeter ditching that will ensure that all drainage that is impacted by the mining operations is directed into sediment control structures before it is discharged into the natural streams, Figure 20-6. Figure 20-7 provides a typical section for drainage ditches and Figure 20-8 provides a typical section for a settling pond design as provided by EBA.

Water will be directed away from waste dumps to improve stability and directed into the settling facilities. Perimeter ditching will be constructed at grades of 2 % to 3 % where possible. In areas where steeper grades are required energy dissipation structures will be place into the streams.

Drainage along roadways will require some energy control structures and sediment traps will be used to reduce sediment loading along the access roads. All surface water will be directed away from the mining and dumping areas where possible to keep clean water clean.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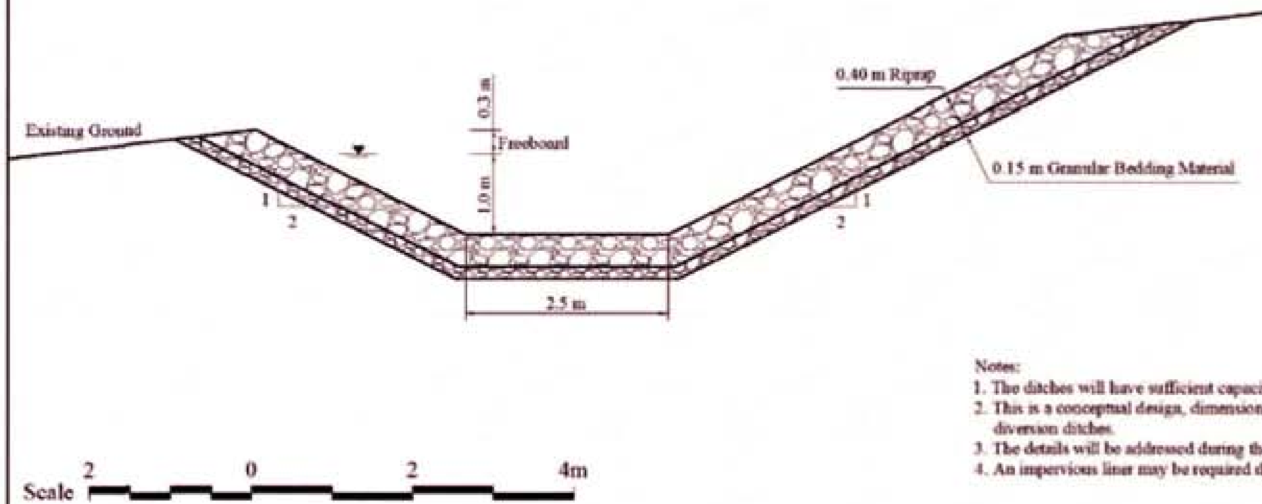
New Application 413204
New Application 417001
C.L. 390754
C.L. 390755
Final Haul Road
Ultimate Pit Boundary
Jack Creek Rock Dump
Clean Coal Haul Road
Raw Coal Haul Road
Plant Site
Jack Creek
Foisey Creek
North Lodgepole Creek
Lodgepole Creek
McLatchie Creek
Legend
Sediment Trap
Drainage Control
Settling Pond
1 : 20000
cline
mining corporation
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: January 11, 2006
Minesite General Arrangement Map
Settling Ponds &
Drainage control
Figure 20.6

Figure 20-7 Typical Ditch Cross-Section



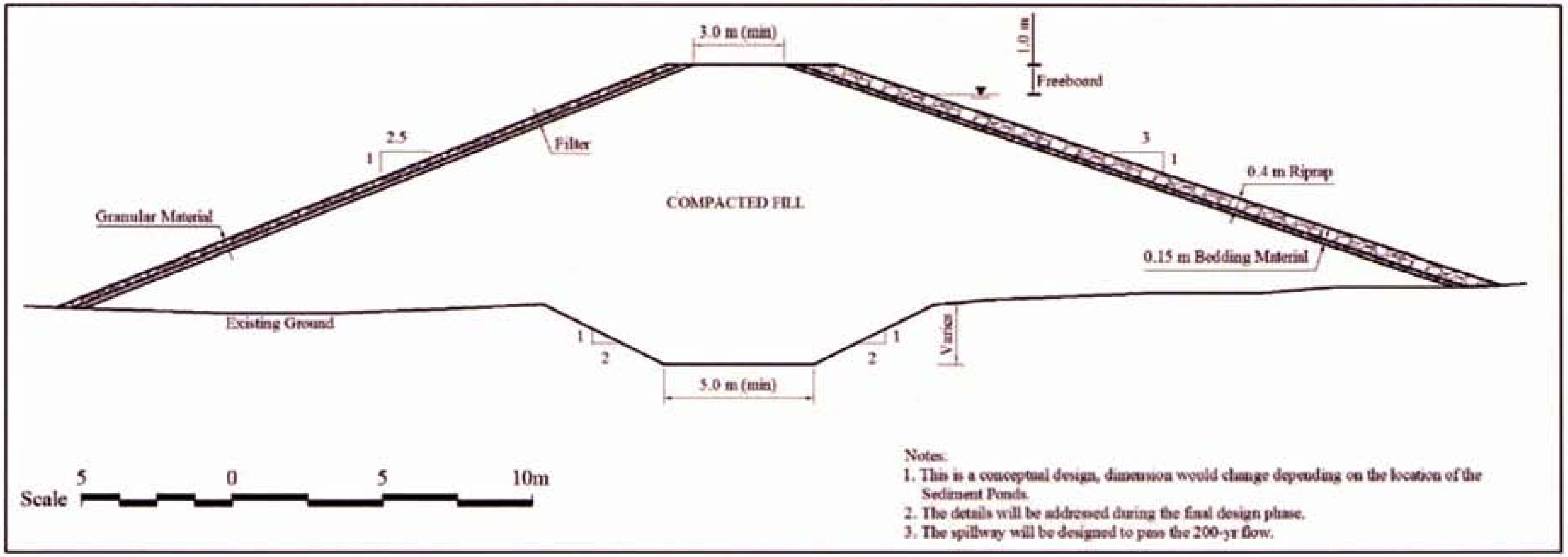
Notes:

1. The ditches will have sufficient capacity to convey the 200-yr runoff with 0.3 m freeboard.
2. This is a conceptual design, dimensions would change depending on the location of the diversion ditches.
3. The details will be addressed during the final design phase.
4. An impervious liner may be required depending on the ground conditions.

TYPICAL DITCH

cline mining corporation	Project: Lodgepole	Typical Ditch, Cross-Section
	By: PGB	
	GR Technical Services Ltd.	
	Date: January 13, 2006	

Figure 20-8Typical Settling Pond Cross-Section



TYPICAL BERM

cline mining corporation	Project: Lodgepole	Typical Settling Pond, Cross-Section
	By: PGB	
	GR Technical Services Ltd.	
	Date: January 13, 2006	

20.3 Production Schedule

20.3.1 Objectives and Targets

The production schedule for the Lodgepole coal project has been developed using Mintec's MineSight Strategic Planning (MSSP) production scheduling software. This uses the pit reserve files listed above (Section 19.8.7), the specified equipment fleet, and the input haulage profiles. The scheduler objectives are to meet the input raw coal feed targets, while balancing waste stripping requirements with the given truck and shovel fleet. Partial bench mining of 2 benches per year is allowed. Pre-strip begins in 'Period 1' and full production begins at the beginning of 'Period 3' ('Year1').

20.3.2 Capacities

The project clean coal target is an average 5,479 MTCCpd or 2,000,000 MTCCpa, and the production equipment fleet used in the Life of Mine production schedule is listed in Table 20-18. Mine fleet capacities are discussed in Section 20.4.

20.3.3 Pre-Production

A pre-strip waste production volume of 2,347 kBCMW is required to ensure suitable material is available for the plant-site construction. This also exposes coal so that coal production is sustainable at the rated plant capacity after start-up. Some coal (653 kMTRC) is mined during preproduction and is stockpiled in the vicinity of the plant. The operating cost for this contract mining activity is included in the project Capital costs.

20.3.4 Production Schedule and End of Period Maps

The Lodgepole production schedule is presented in Table 20-18.

Table 20-18 Lodgepole production schedule

	P1 (9Mth)	P2 (3Mth)	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19
RC	-	104,484	2,982,422	3,310,689	3,339,918	3,310,772	3,339,998	3,339,996	3,339,923	3,310,081	3,330,000	3,329,997	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000
	-	65.1	61.8	64.0	62.4	63.7	67.1	67.6	69.2	66.0	62.5	62.5	64.7	67.2	67.4	67.1	62.7	61.5	61.1
RC	653,093	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RC	653,093	104,484	2,982,422	3,310,689	3,339,918	3,310,772	3,339,998	3,339,996	3,339,923	3,310,081	3,330,000	3,329,997	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000
RC	-	297,000	357,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	64.5	64.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RC	653,093	356,093	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)	(907)
RC	0	401,484	3,339,422	3,310,689	3,339,918	3,310,772	3,339,998	3,339,996	3,339,923	3,310,081	3,330,000	3,329,997	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000	3,330,000
	-	64.7	62.1	64.0	62.4	63.7	67.1	67.6	69.2	66.0	62.5	62.5	64.7	67.2	67.4	67.1	62.7	61.5	61.1
C	0	259,763	2,073,736	2,118,566	2,083,161	2,109,951	2,242,126	2,259,297	2,312,537	2,183,607	2,082,807	2,081,718	2,156,040	2,237,098	2,243,974	2,235,977	2,088,450	2,047,229	2,035,320
W	2,346,756	164,250	9,558,357	11,810,858	10,393,108	12,573,652	16,627,179	18,320,077	17,499,572	17,499,893	20,124,304	19,807,067	19,999,254	20,471,032	22,719,539	23,069,497	25,289,219	19,481,983	17,671,548
W	2,346,756	164,250	9,558,357	11,810,858	10,393,108	12,573,652	16,627,179	18,320,077	17,499,572	17,499,893	20,124,304	19,807,067	19,999,254	20,471,032	22,719,539	23,069,497	25,289,219	19,481,983	17,671,548
MTRC	3.6	1.6	3.2	3.6	3.1	3.8	5.0	5.5	5.2	5.3	6.0	5.9	6.0	6.1	6.8	6.9	7.6	5.9	5.3
MTRC	3.6	3.3	3.2	3.4	3.3	3.4	3.7	4.0	4.2	4.3	4.5	4.7	4.8	4.9	5.0	5.2	5.3	5.4	5.4

20.3.5 End Of Period Maps

End of period maps are generated from the production schedule which shows the mined out surface for the pit phases and the portion of the waste dumps as they are filled out at the end of each period.

Table 20-19 to Table 20-21 summarizes the mining quantities from each pit phase by year. Figures 11.1 to 11.5 show EOP maps for Periods 3,6,10,14 and 21. The material mined during the periods are coloured pink in the EOP maps, and the dump advance for the period are shown as brown. A brief description of the activity in the period follows each Figure.

Table 20-19 Raw Coal Source - MTRC ('000s)

Period	Year	PHS0	PHS1	PHS2	PHS3	PHS4	PHS5	MGS1	TOTAL
P1	Pre Pr.	-	-	-	-	-	-	-	-
P2	Pre Pr.	104	-	-	-	-	-	297	401
P3	Y1	-	2,982	-	-	-	-	357	3,339
P4	Y2	-	1,403	1,907	-	-	-	-	3,310
P5	Y3	-	-	2,661	679	-	-	-	3,340
P6	Y4	-	-	-	3,311	-	-	-	3,311
P7	Y5	-	-	-	3,340	-	-	-	3,340
P8	Y6	-	-	-	3,340	-	-	-	3,340
P9	Y7	-	-	-	3,292	48	-	-	3,340
P10	Y8	-	-	-	2,194	1,116	-	-	3,310
P11	Y9	-	-	-	613	2,717	-	-	3,330
P12	Y10	-	-	-	-	3,330	-	-	3,330
P13	Y11	-	-	-	-	3,330	-	-	3,330
P14	Y12	-	-	-	-	3,319	11	-	3,330
P15	Y13	-	-	-	-	3,029	301	-	3,330
P16	Y14	-	-	-	-	1,998	1,332	-	3,330
P17	Y15	-	-	-	-	-	3,330	-	3,330
P18	Y16	-	-	-	-	-	3,330	-	3,330
P19	Y17	-	-	-	-	-	3,330	-	3,330
P20	Y18	-	-	-	-	-	3,340	-	3,340
P21	Y19	-	-	-	-	-	2,093	-	2,093

Table 20-20 Stockpile Source - MTRC ('000s)

Period	Year	PHS0	PHS1	PHS2	PHS3	PHS4	PHS5	MGS1	TOTAL
P1	Y-2,-1	188	465	-	-	-	-	-	653

Table 20-21 Waste Source - BCM('000s)

Period	Year	PHS0	PHS1	PHS2	PHS3	PHS4	PHS5	MGS1	TOTAL
P1	Pre Pr.	190	2,157	-	-	-	-	-	2,347
P2	Pre Pr.	164	-	-	-	-	-	-	164
P3	Y1	-	9,558	-	-	-	-	-	9,558
P4	Y2	-	1,100	10,711	-	-	-	-	11,811
P5	Y3	-	-	6,660	3,733	-	-	-	10,393
P6	Y4	-	-	-	12,574	-	-	-	12,574
P7	Y5	-	-	-	16,627	-	-	-	16,627
P8	Y6	-	-	-	18,320	-	-	-	18,320
P9	Y7	-	-	-	12,233	5,266	-	-	17,499
P10	Y8	-	-	-	5,673	11,826	-	-	17,499
P11	Y9	-	-	-	801	19,324	-	-	20,125
P12	Y10	-	-	-	-	19,807	-	-	19,807
P13	Y11	-	-	-	-	17,043	2,956	-	19,999
P14	Y12	-	-	-	-	15,593	4,878	-	20,471
P15	Y13	-	-	-	-	5,774	16,946	-	22,720
P16	Y14	-	-	-	-	2,391	20,679	-	23,070
P17	Y15	-	-	-	-	-	25,289	-	25,289
P18	Y16	-	-	-	-	-	19,482	-	19,482
P19	Y17	-	-	-	-	-	17,672	-	17,672
P20	Y18	-	-	-	-	-	14,715	-	14,715
P21	Y19	-	-	-	-	-	5,772	-	5,772

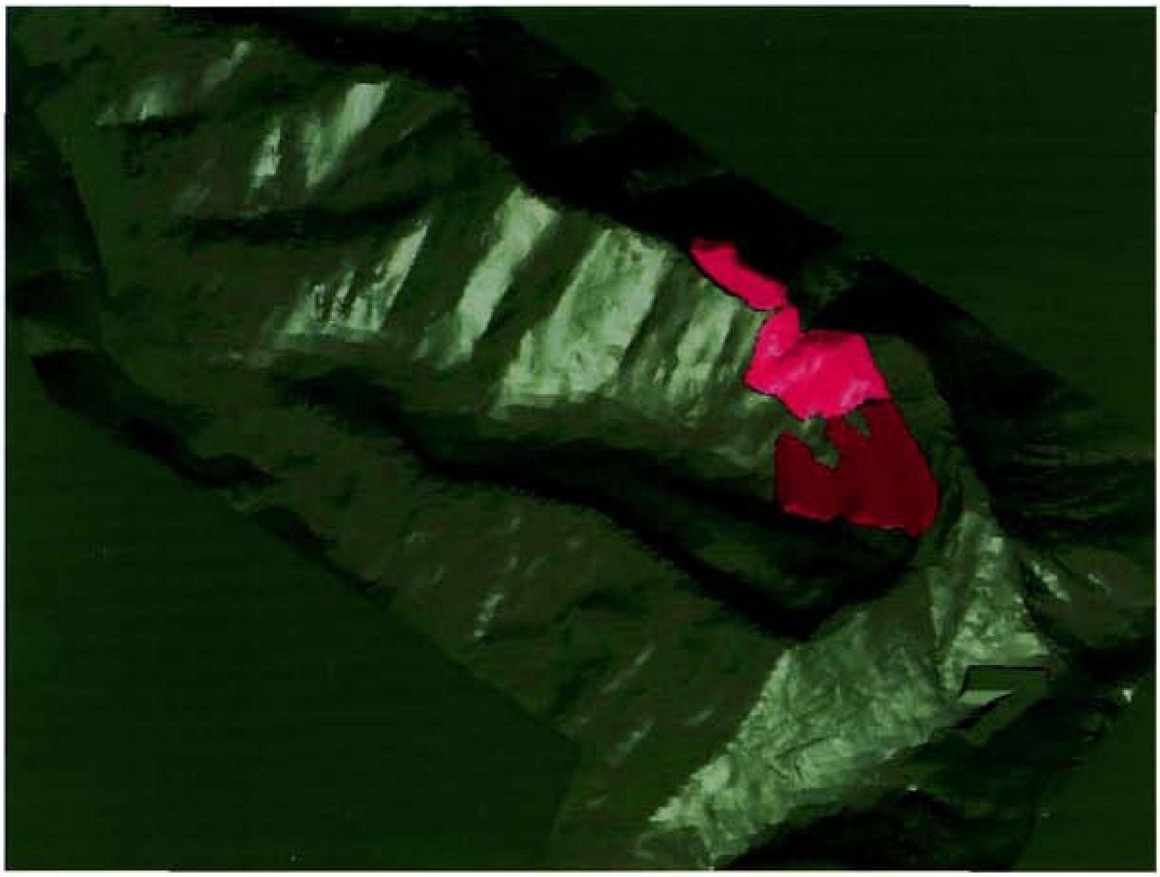


Figure 20-9 EOP map for Period 3

Period 3 – mining in PHS1 from 2130 bench down to the 1980 bench. All material goes to S dump in 3 different lifts, 1950, 2040 and 2130

Figure 20-10 EOP map for Period 7

Period 7 – mining continues in PHS3 down to 1815 bench. All material goes north to the NW dump at the 1800 elevation.

Figure 20-11 EOP map for Period 10

Period 10 – continued mining in PHS3 down to the 1680 bench. This material is hauled to the NW dump and builds a lift to the 1890 elevation. PHS4 is mined down to the 2055 bench and this material goes into finishing the plant site dump.

Figure 20-12 EOP map for Period 14

Period 14 – PHS4 is mined down to the 1875 bench and the material is hauled to the NW dump at the 1890 elevation. PHS5 is mined down to the 2175 bench and the material is hauled to the NW dump at the 2160 elevation.

Figure 20-13 EOP map for Period 21

Period 21 – PHS5 is mined to completion (down to the 1650 bench) and the material is dumped into the backfill in PHS3 at the 1860 elevation.

20.4 Mine Operations

The mining operations at Lodgepole have been planned as a Truck/Shovel operation with no electric equipment in the pit. It is assumed that the mining operations will be contracted out but the model includes all the manpower and equipment hourly requirements for the direct mining, mine maintenance, and General Mine Expense (GME) for the mining operations. A contractor's mark-up has been added to cover the contractor's fee and financing for field facilities and financing of purchases of the ancillary mining equipment plus additional ownership costs for the major equipment.

The mining operation will be similar to the other Rocky Mountain, multi- seam operations with separate unit operation s for coal and waste. In general, bench access will be made from the hanging wall side of the seam (from the west side in these pit phases). The hanging wall waste in front of each seam will be drilled and blasted weeks in advance of the loading and hauling activities. The waste will be mined out along strike, exposing the toe of the coal seam. The waste directly covering the coal will be removed by crawler dozers exposing the top of coal. When the waste mining operations has advanced far enough along strike the un-blasted coal will then be loaded out from below with the hydraulic shovels in front shovel configuration and possibly from above with a shovel in back hoe configuration. With the flat dip of the seams some coal will need to be pushed down to be within the reach of the lower shovel. In pits with more than one seam on a bench this mining progression will be repeated for the next seam to the east until the 1 Zone footwall is reached. This process is used for all seam of recoverable thickness and removable partings are also selectively removed and hauled as waste.

This selective type of operation requires multiple working faces so that the drilling, blasting, and coal mining activities can be sequentially scheduled and to give adequate separation between the operations for efficient operations. The mobility of the diesel hydraulic shovels will be an advantage for this type of operations. The details of the direct mining operations follow.

Mine operations and planning will be managed from the management facilities at the Lodgepole plant site. The management, supervision, and technical positions specified below for the Direct Mining activities of the operation, will be a combination of contractor and owner's personnel. The allegiance of individual positions has not been specified. It is assumed that any additional Contractor's management personnel will be covered under the Contractor's mark-up. Mine and Contractor personnel will liaise to ensure that the mine plan is adhered to.

20.4.1 Fleet

The major mining equipment fleet for the plan in this report is listed in Table 20-22 and the basis of selection is summarized below.

Table 20-22 Major Mine Equipment Fleet

	Unit	# of Units	Description
Shovels	Terex O&K RH 200	1	1 shovel is required from startup in period 1. This unit will be used to load both coal and waste.
		1	+1 shovel is added in period 4. Both units will load coal and waste.
		1	+1 shovel is added in period 15
Drills	Terex SKF Reedrill	1	1 drill is required from startup for the life of mine.
		1	+1 drill is required in Period 3
		1	+1 drill is required in Period 7
Haul Trucks	CAT 785	3	3 trucks are required during preproduction.
		6	+ 6 trucks are required in Period 3.
		1	+ 1 trucks are required in Period 4 to bring the fleet total to 10.
		3	+ 3 trucks are required in Period 6 to bring the fleet total to 13.
		3	+ 3 trucks are required in Period 7 to bring the fleet total to 16
		2	+2 trucks are required in Period 8 to bring the fleet total to 18
		1	+1 truck is required in Period 9 to bring the fleet total to 19
		1	+1 truck is required in Period 10 to bring the fleet total to 20
		2	+2 trucks are required in Period 11 to bring the fleet total to the maximum of 22

***Note: Equivalent equipment types are implied where brand names are use.*

20.4.2 Unit Mining Operations

Mine operations are subdivided into the following primary unit operations: drilling, blasting, loading, hauling, and pit maintenance.

20.4.2.1 Drilling

The Terex SKF Redrill (diesel) or equivalent has been selected as a primary drill to service all the pits. The diesel unit was selected for mobility and flexibility configured to drill 250mm (9 7/8 in.) holes at the anticipated penetration rate of 22.7 m/hr.

Drilling and blasting production assumptions are listed in Table 20-23.

Table 20-23 Drilling and Blasting production assumptions

Blasting Pattern	**Waste**	
Spacing / Burden	8.0	m
Hole Size	251	mm
	9 ⅞	inch hole
Explosive In-Hole Density *	1.00	g/cc
	49.49	kg/m
Bench Height	15	m
Sub-drill	1	m
Collar	3	m
Charge per hole	**643**	**kg/hole**
Yield per hole	960	BCMW/hole
Powder factor	0.670	kg/BCMW
Drill Production	**Waste**	
Spacing/Burden	64	m^2
Bench Height	15	m
Yield	960	BCMW/hole
Penetration Rate	22.7	m/hr
Hole depth	16.00	m
Setup Time	2.0	minutes
Drill Time	42.3	minutes
Move Time	3.0	minutes
Total Cycle Time	47.3	minutes
Holes per Hour	1.27	

** Mix of ANFO (65%) and HANFO*

A 150 mm diesel highwall drill is also specified to operate in all pits for controlled blasting and development of initial upper benches. The highwall drill and the development drilling requirements have not been detailed in this study. An allowance of 15% of the production drill hours has been used as an allowance for costing purposes.

20.4.2.2 Blasting

The Lodgepole project includes waste rock material that is consistent with other mines in the Elk Valley area. The in-place coal can be mined without blasting but it will be necessary to drill and blast the waste rock, with the exception of small amounts of soil and colluvium material that may be freely removed from the surface of the mining benches. The waste rock is inter-bedded mudstones, siltstones, and sandstones deposited as interseam beds or as partings within the seams all dipping at roughly 20 to 25 degrees and aligned with the coal seams.

An assessment of drilling and blasting program has been completed in co-operation with MSI Explosives Inc. Rocky Mountain Operations (MSI). MSI provides most of the explosives to the active Elk Valley coal producers and it is anticipated that they will be bidding for the supply of explosives and blasting technology to the Lodgepole project as well. For the purposes of this study it is assumed the explosives supply will be sub-contracted to the Mining contractor.

The proposed bench height for the project is 15 meters with 1 meter of sub grade drilling to allow for smoother bench floors. For dry holes MSI is recommending a 7.1-meter burden and spacing of 8.2 meters. For this study 50% of the holes are assumed to be wet. The MSI assessment was based on 12-meter high benches but for the purpose of this study and until test blasts are done in the field an 8-meter square blast pattern provides good budgetary costs for 15-meter bench heights and is consistently used in the Elk Valley for this type of rock.

Bulk explosives are to be used composed of Ammonium Nitrate and Fuel Oil (ANFO) for dry holes and Emulsion (HANFO) for wet holes. The ANFO includes 6% fuel oil and is mixed on a delivery truck at the borehole before explosives are loaded down the hole. Emulsion type of explosive are also delivered by the explosives truck and pumped down the blast holes. They are used in wet holes because of they are water resistant however they also are higher density and strength and can be cost effective in stronger rock types. In this study it is assumed that 65% of the blasting will be by ANFO. It is an option to use 6 mm plastic liner and ANFO for wet holes depending on the relative prices of ANFO and Emulsion. For this study liners have not been considered. The ANFO has a density of 41.25 Kg per meter of borehole and the Emulsion has a density of 63.8 Kg per meter of borehole. A detailed blasting study will be required during detailed design.

In both wet and dry holes MSI is recommending that over half of the blast hole is loaded with explosives. The remainder of the hole is backfilled with drill cuttings (stemming material). The overall powder factor used for this study is 0.67 kg/BCMW typical of mines in the area. This results in a per hole charge of 643 kg of explosives per hole. Considering their experience in the Elk Valley, MSI's study will achieve blasted rock with 80% passing 30cm to 35cm diameter, which is suitable for the loading and hauling equipment specified for Lodgepole. This particle size range will allow for optimum productivity when loading with hydraulic excavators.

The bulk explosives will be will be managed by MSI (or other blasting supplier) and stored in a safe location using the specifications provided by the Ministry of Mines for B.C. Section 20.9 provides a discussion on infrastructure that explains the location of the bulk storage and magazine facilities.

The MSI blasting estimate includes the following (as per their letter of September 20, 2005):

- Costs for MSI explosives include the infrastructure, equipment, and personnel.
- MSI will mobilize a maintenance/wash bay along with Emulsion and Prill silos sufficient to accommodate 1 day of loading.
- A two-person team to support blasting.
- One truck is available to in the Elk Valley to provide emulsion for wet hole blasting. Diesel fuel will be supplied by the mine.
- Water and electricity to be provided by the mine.
- Road maintenance would be provided by the mine.
- The site will meet Ministry of Mines Standards (EDR) requirements. (1km from buildings).

- Contract is for a minimum of five years.
- Pricing is FOB bore hole.
- Blasting accessories and magazine are the responsibility of the mine.
- A dewatering truck and liners are supplied and maintained by the mine.

A blasting crew of four employees and a blasting materials supply truck will be required on day shift to load holes and tie in each blast. A one-pound TNT primer will be used for each hole and set off with blasting caps. Down lines, primer cord and surface delays will be used to set off the explosives. These materials and accessories will be stored in a magazine.

Controlled blasting at the highwall is required and careful analysis is needed when production begins in the pit. Evaluation of interim pit walls developed in early pit phases will allow detailed controlled blast techniques to be developed before final walls are put into production. The objective of controlled blasting is to break the wall rock on the final blast row without damaging any long-term pit walls and creating instabilities. This can be in the form of pre-shearing, or buffer or trim blasting. This is accomplished using decoupled blasting techniques that minimize wall damage. Highwall holes will be drilled by the tank drill using 150 mm diameter holes. The detailed technical specifications and resultant costs for controlled blasting have not been developed for this study but an allowance of 15% of the blasting supplies and labor costs in all years has been made. This is conservative since controlled blasting requirements are minimal in early years until final pit walls are developed.

20.4.2.3 Loading

The design basis assumes three shovels as an optimum fleet size to ensure minimum risk to availability along with minimum capital equipment. Three Terex O&K RH200 (26 m^3) hydraulic shovels or equivalent have been selected to excavate the annual waste and raw coal mining requirements to meet the 2.0 million MTCC production target at a strip ratio of 4:1 BCMW:MTCC. The RH200 is a medium capacity diesel shovel with suitable flexibility to be able to travel between waste and coal production faces in multiple pit/bench operating areas. During the future detailed planning stage of the project, it may be demonstrated that half benching for removing the hanging wall waste off the seams and for coal mining operations in the pit it may be more efficient if one of the shovels is delivered in a backhoe configuration.

20.4.2.4 Hauling

Coal and waste haulage will be handled by CAT 785 haul trucks or an equivalent with a 140 tonne payload (78 m^3 heaped capacity). Haulage profiles have been estimated from pit centroids at each bench to designated dumping points for each time period. These haul profiles are inputs to the MineSight© schedule optimization routine (MSSP) which is set to maximize project NPV by using the shortest haul to a feasible destination. MSSP uses the selected haul profile to calculate the required hours per truck type. The required hours are input into the cost model to calculate the fleet requirement as illustrated in Table 20-24 and Table 20-26.

Truck and shovel loading parameters are shown in Table 20-24.

Table 20-24 Truck and shovel loading assumptions

Trucks - CAT 785's		
Maximum Payload	140	tonnes
Heaped Capacity	78	LCM
Coal Capacity (under loaded)	99.5	MTRC
Waste Capacity	68.2	BCMW
Primary Shovels - O&K RH200		
Rated Bucket Capacity	26	LCM
Loading Time Coal (30 sec per load)	2.0	min
Loading Time Waste (30 sec per load)	1.5	min

Table 20-25 Coal Haulage Calculations

COAL Haulers - 2.0 MTPA	**P1 (9Mth)**	**P2 (3Mth)**	**P3**	**P4**	**P5**
Sched. Working Days per Year	266	88	354	354	354
Total Calendar Hours	6384	2112	8496	8496	8496
Availability Lookup - x1000 hrs	20	30	40	50	60
Availability Lookup - %	88%	87%	86%	85%	85%
Mechanical Availability	90%	90%	90%	95%	88%
Shift Utilization	88%	88%	88%	88%	88%
Use of Availability	100%	100%	100%	100%	100%
Operating Hours Available /Year	5,027	1,663	6,691	7,062	6,542
Fleet Required	0.4	0.3	2.0	1.9	1.6
Total Hours / year	1,961	573	13,355	13,680	10,622

Table 20-26 Waste Haulage Calculations

WASTE Haulers - 2.0 MTPA	**P1 (9Mth)**	**P2 (3Mth)**	**P3**	**P4**	**P5**
Sched. Working Days per Year	266	88	354	354	354
Total Calendar Hours	6384	2112	8496	8496	8496
Availability Lookup - x1000 hrs	20	30	40	50	60
Availability Lookup - %	88%	87%	86%	85%	85%
Mechanical Availability	90%	90%	90%	95%	88%
Shift Utilization	88%	88%	88%	88%	88%
Use of Availability	100%	100%	100%	100%	100%
Operating Hours Available /Year	5,027	1,663	6,691	7,062	6,542
Fleet Required	2.2	0.5	6.6	7.7	7.3
Total Hours / year	10,914	749	44,139	54,541	47,994

20.4.2.5 Maintenance and operations support fleet

The expected mine maintenance and operations support fleet is listed in Table 20-27.

Table 20-27 Mine Maintenance and Operations Support Fleet

Mine Operations Support Fleet	**Quantity**
Excavator/Small	1
Graders/Large (CAT 16H)	1
RTDozers/Mech/Large (CAT 834G)	1
Dozers/Large	3
Scrapers/Duel Eng (CAT 637E)	1
Gravel Plant	1
Tire Changer/Med	1
Water Truck	1
FireTruck	1
Ambulance	1
Forklift/Med	1
1/2 Ton Pickups	10
Back Hoe - utility work (Cat 345 Loader)	1
Loader – Utility (Cat 980G)	1
Snowploughs	1
25 Ton Dump Truck	1
Crew Bus	1
Maintenance Fleet	
Cranes/Large	1
Fuel/Lube/Service truck	4

20.4.3 Manpower

Mine personnel requirements were estimated on the basis of the mine working two 10.5-hour shifts per day, 7 days per week, 52 weeks per year.

20.4.3.1 Hourly Employees

Each equipment type has been allocated a labor factor in Man hours/ Operating hour. The labor factor for each trade is multiplied by the fleet operating hours to determine the required hourly worker's manning levels for operations and maintenance. As an example the hourly labor allocation for period 3 from the mine cost model is listed in Table 20-28.

Table 20-28 Hourly labor allocation for period 3

	Number of personnel
MINE OPERATIONS	
Drill Operator	8
Blasters	16
Shovel Operator	8
Haul Truck Driver	44
Grader Operator	4
Excavator Operator	4
Track Dozer Operator	12
Scraper Operator	4
Crusher Operator	4
Water Truck Operator	4
Fuel Truck Operator	8
MINE MAINTENANCE	
Electrician	4
HD Mechanic	28
LD Mechanic	4
Machinist	4
Crane Operator	4
Welder	4
Tireman	4
Labourer Service man	4

20.4.3.2 Supervision and Technical Personnel

The salaried labor summary is shown in Table 20-29. The organizational chart for mine operations and mine maintenance personnel are presented in Figure 20-14 and the Engineering and Technical Services in Figure 20-15. There is a sufficient pool of experienced managerial and technical labor in the Elk Valley mining region to meet human resource requirements of the Lodgepole project.

Table 20-29 Salaried labour summary

Description	# of personnel
MINE OPERATIONS	
Mine Superintendent - Day Only	1
Shift Foreman - Day Only	4
Mine Operations Senior Foreman - Day Only	1
Mine clerks - Day Only	1
MINE MAINTENANCE	
Maintenance Engineer	1
Senior Maintenance Foreman	1
Maintenance Foreman	2
Maintenance Engineer	1
Maintenance Planner - Day Only	1
MINE ENGINEERING	
Chief Engineer - Day Only	1
Senior Mine Engineer - Day Only	1
Junior Mine Engineer	3
Mine clerks - Day Only	1
TECHNICAL SERVICES	
Senior Geologists - Day Only	1
Environment & Reclamation Coordinator	1
ore Mill Feed Grade Technicians	1
Environmental Technician	1
TOTAL SALARIED	23

Figure 20-14 Lodgepole Mine Operations Organizational Chart

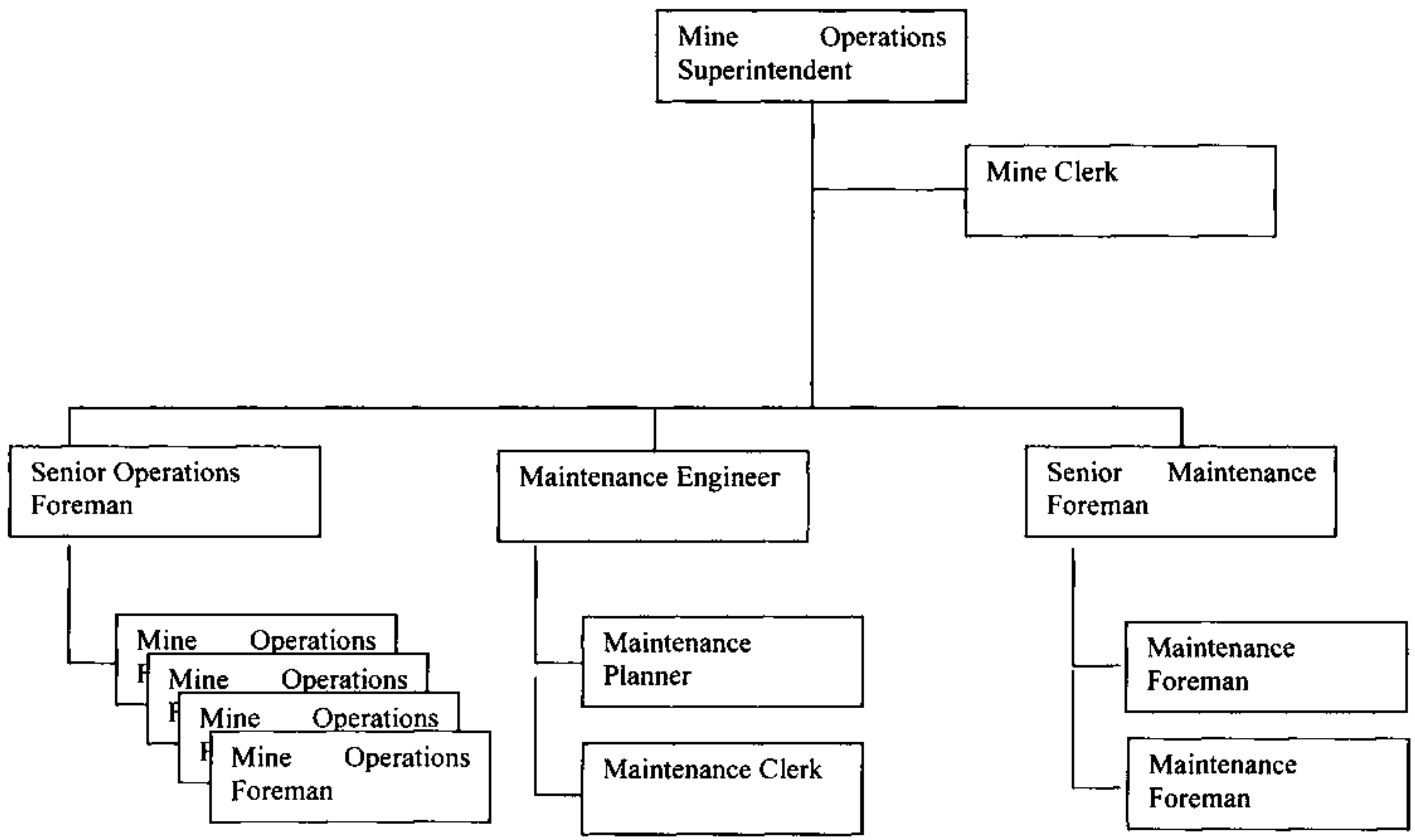
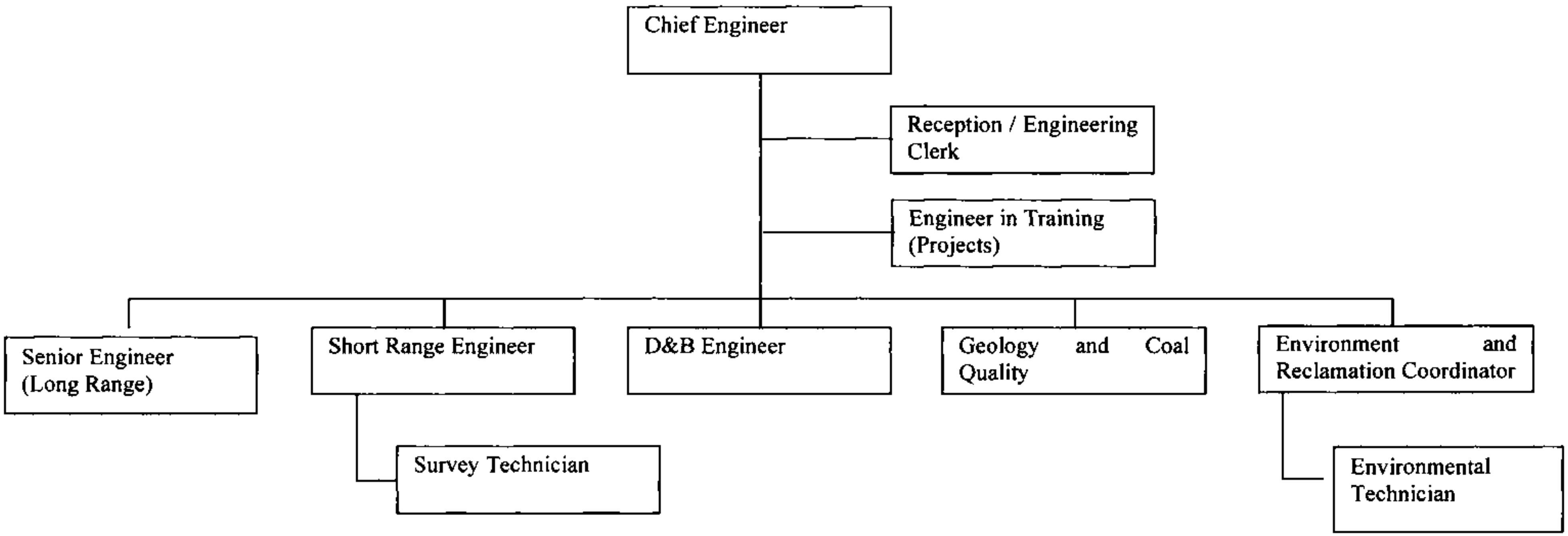


Figure 20-15 Lodgepole Engineering And Technical Services Organizational Chart



20.4.4 Mining Technical Systems

20.4.4.1 Fleet Management

Several commercial systems are available for information gathering and equipment allocation to optimize the Fleet Management. Through a series of component programs for production reporting, truck assignment, health monitoring and fleet analysis, these systems link information gathered from machines in the field to the Administration, Accounting, Mine Engineering, Maintenance and Supervisory functions of the operation. A cost allowance has been made in the Lodgepole cost model for the installation and maintenance of a Fleet Management system.

20.4.4.2 Mine Planning

Allowance has been made for the installation and maintenance of the complete suite of Mintec's MineSight mine planning software, including 10 user licenses. Other systems are available but MineSight© is used almost exclusively for the complex Rocky Mountain coal and personnel in the area are experienced with its use. It will likely be the chosen software package.

20.5 Waste Rock Disposal – Plant Rejects and Mine waste

While the waste rock and pit walls are not anticipated to be much different from the other open pit mines in the Elk Valley, ABA testing was completed on rock samples and kinetic testing is ongoing to assess the acid rock drainage (ARD) and metal leaching)ML) potential.

The waste rock dumps have been designed with safe operating and environmental considerations for the short and long term, including allowance for reclamation and post mining land uses as identified in the environmental assessment and reclamation work being developed by EBA. The dumps are designed to contain the mine waste rock and the plant refuse and placed outside the potential surface mining limits or within the mined out pit areas. The dump designs are developed in conjunction with the water management plan, collection ditches, diversion ditches, settling ponds, and catchment ponds. .

20.5.1 Coal Plant Refuse

Coal plant refuse will be placed in the Jack Valley dump west of the plant site, as illustrated in Table 20-30. which has capacity well in excess of the plant refuse requirements for the life of the project. Plant refuse has been identified as potentially acid generating. To mitigate this potential the plant refuse will be co-mingled with mine waste. This will also enhance the stability of the Coal Refuse Dump.

Refuse material will be placed in lifts on the side slopes of the Jack Creek Valley. Material will be placed so as not to encroach on the clean coal haulage road that traverses the south slope. The topography on the valley slopes is favorable at 15 to 20 degrees. With the containment provided within the Jack Creek Valley and any required waste rock buttresses, the plant rejects can be assured to be contained within this dump area. The dump stability and foundations testing is further described in the geotechnical Section (see Section 20.1).

The plant reject volumes and available dump volume are summarized in Table 20-30.

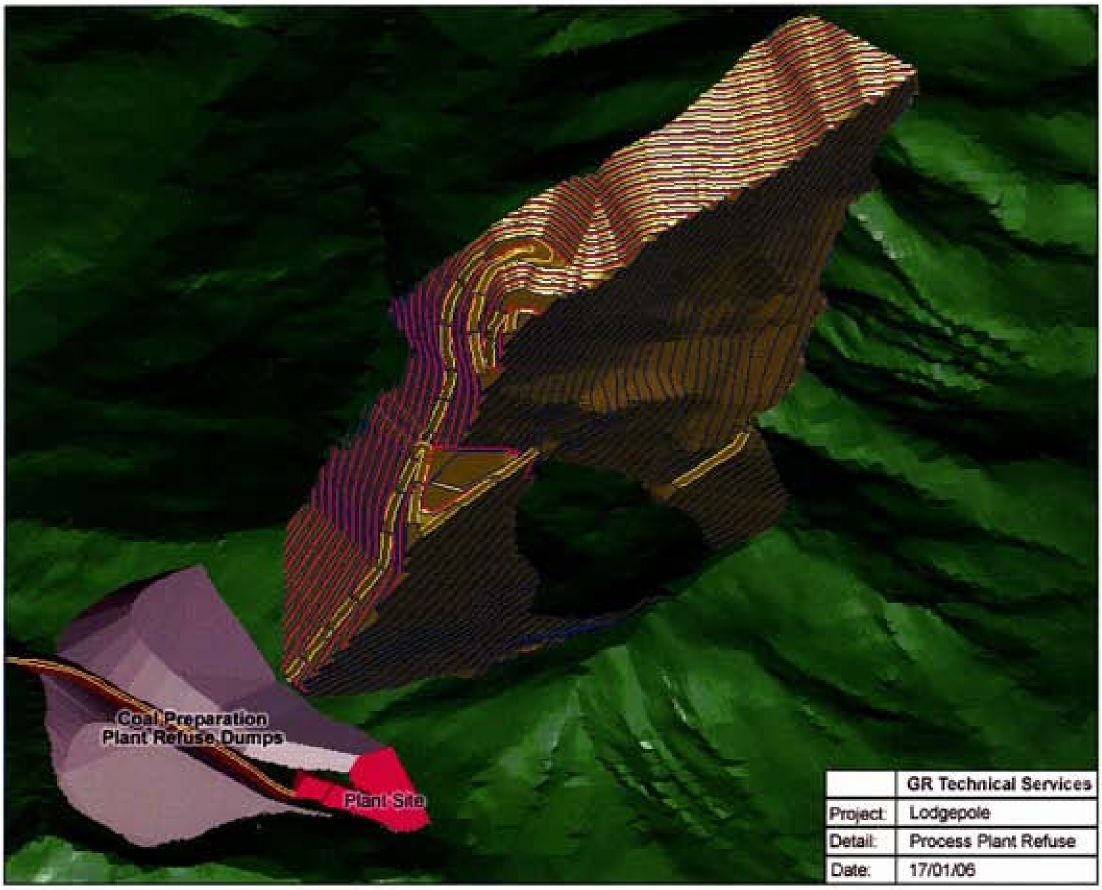


Figure 20-16 Coal Refuse Dump with Plant-Site and Ultimate Pit (P654)

Table 20-30 Plant Rejects Requirements - Life of Mine

		Units (millions)
Raw Coal Tonnes	62.433	MTRC
Yield	65%	
Clean Coal Tonnes	40.597	MTCC
Dryer Feed (@ 1% of MTCC)	0.406	MTCC
Net Plant Rejects	21.430	MT Rejects
Rejects SG	2.0 to 2.5	
Rejects (swell/compaction)	1.2 to 1.3	
Rejects Volume	10.3 to 13.9	LCM
Dump Capacity	71.07	LCM

Plant refuse may also be placed on flat mine dump surfaces in the other waste areas are advanced or in backfill dumps. The tops of the future in-pit and backfill waste rock dumps in the south half of active mining area will be suitable for future plant refuse disposal.

20.5.2 Mine Waste Rock

Mine waste rock dumps will be placed both outside and inside of the main pit area. The current plan includes dumps with sufficient dump capacity for all mine waste to be placed in external dumps. Several contingency dumping areas have been designed should future detailed environmental, geotechnical, and mine optimization studies indicate the planned dumps require modification. The mine costs have also been checked that a reasonable contingency exists for the longer haul cycle times that would be required for the alternative dumps sites. Internal dumps and backfilling will also be considered in future detailed design work which will have the potential for shorter waste hauls and reduced areal disturbance.

20.5.2.1 *Waste Dump Locations and Alternatives*

Preproduction waste mining will be used to provide construction fill including the raw coal haul road from the startup mining areas, the plant site, and pit access roads. A total of 2.5 million LCM (1.92 million BCM) is planned in the pre-production period. After the preproduction period, the rest of the mine waste will be placed in the mine waste dumps. Three dumps have been selected for the Base plan in this report with alternative dump designs for contingency. The SE Footwall, NW Total and Jack Valley dumps are the basis of this plan.

The SE Footwall and NE Total dumps are both within the water management plan area where water from the mining and dumping areas will be directed into settling ponds in the Foisey Valley prior to entering natural streams. The alternate North dump has similar characteristics to the NW dump with respect to visual and aerial impact and is within the same water management plan area. The North dump is considered the best alternative dump as a contingency dumping area. It will require higher waste haulage costs if it replaces a lower dump area. Mine waste will be dumped in the Jack Valley dump to enhance the plant rejects dump characteristics. Generally, hauling later phase mine waste (i.e. from Pit Phase 644) to the Jack Valley dump will replace the higher cost dumping hauls.

20.5.2.2 *Dumping Methods*

Pit waste will be loaded into trucks and hauled to the dump areas and deposited using end dumping techniques common to the mine operations in the Elk Valley and is suitable for the mix of sandstones, silt stones, mudstones and shales that will be encountered from the pits. The free dump face angle of this material is consistently 37 degrees. The end dumping technique involves turning and backing the truck to the edge of the dump face and dumping the load over the edge of the dump. This method allows the material to sort itself as it is placed, where the momentum of the large rocks in the load allows them to roll further down the slope than the finer material, creating a grading of material from coarse to fine from the bottom to the top of each dump area. The alternative techniques of dumping on the top of the dump and pushing the material over the edge with dozers, or building the dumps up in lifts from the bottom doesn't create the graded material configuration that end dumping does. The resulting grading from coarse to fine in the end dump technique results in free draining dumps and a more stable dump configuration. Other operations in the Elk Valley are safely using the end dumping technique some with dump height s in excess of 300m in single lifts. The Lodgepole dumps will not be as high.

20.5.2.3 *Dump Design Parameters*

To facilitate as much down hill hauling as possible and to minimize uphill haulage, the dumps will be built in stages, where upper pit benches will be hauled to upper elevation dump phases and lower pit benches to lower phases. The end result is upper dump platforms with lower phases designed as wrap around fills of the previous phase. The configuration of the wrap around stages allows the overall outside slope angle of the final dump face to be terraced to give an overall final slope angle of 28 degrees. A minimum width of the terraces is specified so that the trucks can turn efficiently while dumping on a wrap around and the vertical interval between the terraces is calculated to achieve the overall final slope angle. After the mining is finished the terraces will be dozed to create a final reclaimed slope. The dump Design Parameters are listed in Table 20-31.

Table 20-31 Dump Design Parameters

Free dump face angle	37°
Swell Factor	1.3
Overall Slope Angle (for final dump reclaim slopes)	28°
Wrap around terrace width	50 m.
Interval between terraces	90 m.

With extensive experience spoiling similar materials throughout the Elk Valley, it can be reasonably assumed that the dumps will be stable during operations and after reclamation based on the above construction techniques and design parameters. (See Section 20.1 Geotechnical). However dump foundations need to be investigated in each specific dump site and construction technique specified to ensure safety for the operations and dump stability. This may involve removal of poor strength material, containment or consolidation with low height lifts, or buttressing dumps against other consolidated rock structures such as the west valley wall, other dumps, or mined out pit walls. Cost allowance has been made in this report for areas of concern. Final specification for safe construction of the waste dumps will be done after next years field season completes test pits of the final dump locations, and the detailed dumping sequence provides for any required toe buttressing.

20.5.2.4 Preproduction and Construction Fill Requirement

During the Preproduction period, waste rock will be hauled to the plant site area to prepare the plant foundations and to the raw coal haulage road, which will be constructed by end dumping waste rock from the initial pit excavations to the plant raw coal stockpile area. The excavation will come from pit Phases 1 and 2, which mine the slot at the saddle between Jack and Crabb Creek Valleys (2100 m el.) and the initial upper benches at the south end of the mining area respectively. (See Figure 19-8 Phase 1 (P604) and Figure 19-9 Phase 2 (P614)). The production schedule indicates 2.347 million BCM's are mined during the Preproduction period. Figure 20-17 shows the Pre-production rock fill areas.

Figure 20-17 shows the boundary of the Ultimate pit limit in red, the Preproduction mining areas in purple, the fill for the Raw Coal Haul Road in brown, and the fill for the Plant site in magenta.

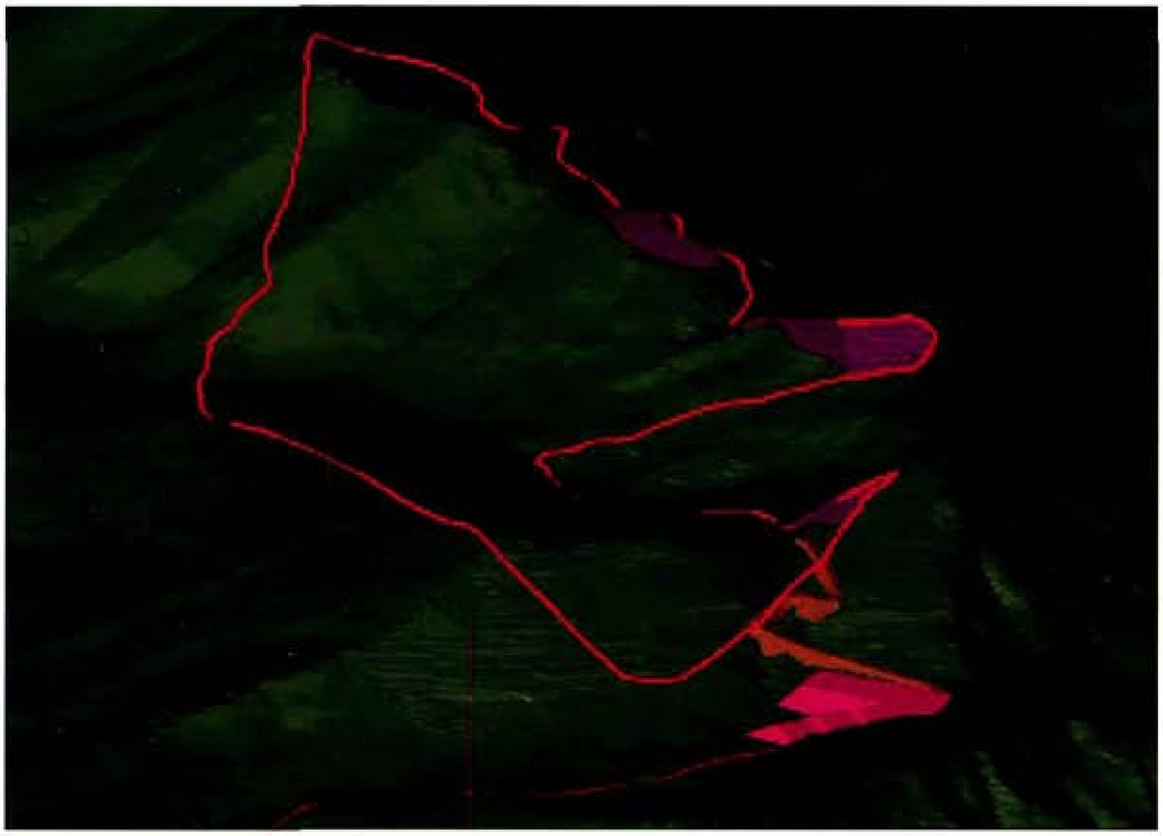


Figure 20-17 Pre-production Mining and Fills

Table 8-2 lists the construction fill requirements. Future detailed design may be able to reduce the Construction fill requirements, which in turn could lead to reducing the contractor's preproduction quantities since it is not critical to mine all the Preproduction material to pre-strip coal for the plant start up. In the current plan the Preproduction mining releases 267,000 MTRC during the course of producing the construction fill requirements.

Table 20-32 Contruction Fill Quantities

	Fill	
	LCM (millions)	BCM (millions)
Coal Haul Road from Saddle to Plant	0.32	0.24
Plant Site	2.18	1.68
Total	2.50	1.92

It is assumed that some of the 2,347 million of pre-production waste will be required for bench access in the mining area and some material will not be suitable for construction purposes. The indicated 0.427 million BCM may be suitable for revegetation and will be stockpiled accordingly. Any other material will be hauled to the planned waste dumps.

20.5.2.5 *Waste Dump Capacities*

Following the preproduction period, the waste rock will be hauled to designated dump areas outside of the open pit mineable coal resource area. In the Base plan these primary dumps are SE Footwall, NW Total and Jack Valley. A list of the planned and alternative dumps is given in Table 20-33. The location of the Base dumps are highlighted in magenta in Figure 20-18. The alternate dumps are also shown.

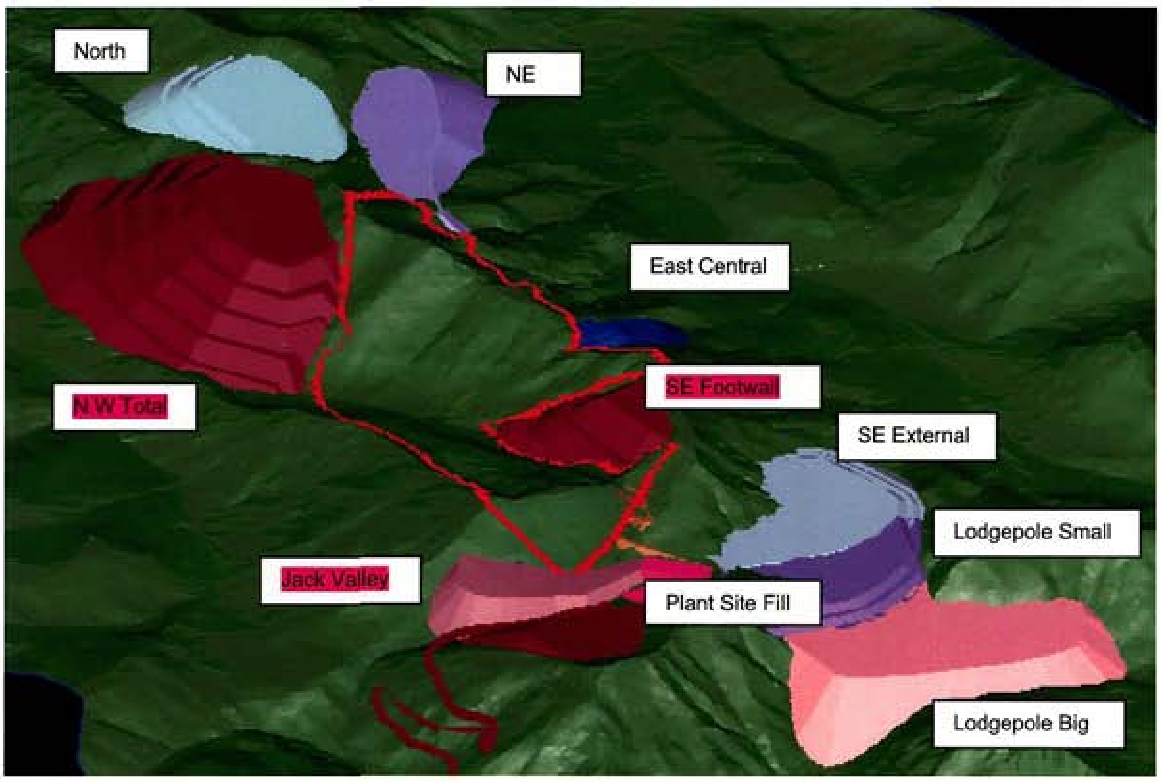


Figure 20-18 Base Plan and Alternate Waste Dump Sites

Table 20-33 Waste Dump Quantities

Dump Site	LCM	BCM	Description
	(Millions)	(Millions)	
Base Plan Dumps SE Footwall	38.41	29.54	Close to early pit phases. Requires toe buttress
NW Total	383.95	295.35	Can be phased to optimize hauls
Jack Valley	71.07	54.67	For use as Plant Reject dump and mine waste
Total	493.43	379.56	
Alternative Dumps			
North East	88.83	68.33	High visibility & disturbance, harder to manage water
North	100.90	77.62	Reasonable alternative
East Central	11.59	8.92	High visibility & disturbance, harder to manage water
SE Footwall	83.60	64.31	Close proximity but drains into McLatchie
Lodgepole - Small	71.05	54.65	High visibility & disturbance, Elk drainage system
- Big	259.64	199.72	High visibility & disturbance, Elk drainage system
Pit Waste - P654		325.90	
Total Plant Reject		10.93	

SE Footwall & NW Total are designed with 28° reclaim angle.

20.5.2.6 Contingency Plans for Mine Waste Dumps

Preliminary Environmental and Geotechnical evaluations of the mine plan have identified areas of concern to be addressed in future planning stages of the project. For this report these issues have been addressed by including allowance for potential cost issues and plan alternatives for contingency plans. The need for these allowances and contingencies will be incorporated if needed into future designs during the detailed planning stage of the project, after more field investigations and evaluations have been done.

All the waste dump sites in the Base plan were not yet identified during the 2005 field season so foundation mapping and sampling has not been done to determine if unsuitable materials need to be removed in advance of dumping. An allowance has been made to remove a quantity of material from the Jack Valley and NW Total Base plan dumpsites as well as the North dump alternate site. A cost allowance has been included in the project periods required to ensure dump foundations are prepared in advance of the dumping. These estimates are made based on typical and conservative experience at other Elk Valley operations. Future field-testing and analysis may eliminate the need for these allowances.

The geotechnical work to date has determined that the existing broken rock in the foundation of the SE Footwall Dump is a stability issue and this dump should be buttressed into the slope to the west. There is no down slope risk during the time this dump is being filled so with proper slope monitoring and careful operating practices this dump could be operated safely. If a slope failure were to occur it would on its own create a buttress for future dumping and it could continue to be operated. However, the additional cost of rehandling failure material in the later years of the mine schedule will need to be accounted for. This will include material that has moved into the benches of Phase 5 pit plus additional waste to ensure the remaining SE footwall dump is stable. It has been identified that this potential rehandle would occur in periods 7 to 8 of the mining schedule.

The environmental impact investigations have identified a concern that the NW dump encroaches on fish habitat in the middle reaches of Crabb Creek. The environmental planning will pursue mitigation measures for the lost fish habitat. If this does not provide a suitable solution then the NW Total dump can be reduced in size. The lost capacity can be replaced by using more of the Jack Valley dump, backfill dumps, or by using the North Dump. The Jack Valley dump will provide waste dumping sites for the nearby Pit phase P644 which is closest to this site and will not be at a higher mining cost than already used in the mine plan. Creating backfill dumps will replace the lower wraparounds of NW dump with similar elevation dumps at similar haulage costs. If the North dump is used to replace the lower wraparounds of NW dump, extra mining costs will be needed to account for the increased up hill hauls.

These allowances and contingencies are viable alternatives for the Base mining plan and will not cause significant increases in the mine operating costs.

20.6 Coal Processing And Handling

The proposed Coal Process for the Lodgepole Coal Project will employ a Dense Medium Cyclone separations circuit, a fines cleaning Water-Only Cyclone / Spirals circuit, and a Classifying Cyclone / Froth Flotation circuit. Tailings will be filtered and formed into a dewatered cake. Clean Coal will be dried in a Coal Fired Thermal Dryer Plant then transferred to the Railcar Loadout Facility.

The coal processing facilities for the Lodgepole Coal Project have included in the design a Coal Preparation Plant, Clean Coal Thermal Dryer and associated ancillary facilities capable of producing 2.0 million tonne/y of clean coal at 10% ash and 8.0 % moisture.
The clean coal will be trucked on an upgraded road from the proposed Coal Processing Plant site to the Clean Coal Railcar Loadout facility the location of which is proposed to be at or near Elko, B.C.

20.6.1 Development of Flow sheet

The Stages of the development of the flowsheet consists of the following:

- Establish the Raw Coal Size Analysis
- Select the Process Equipment to clean the raw coal size fractions
- Flowsheet Selection and Process Description
- Reject Disposal

20.6.1.1 Raw Coal Size Analysis

From the extrapolation of the data available, the raw coal size analysis is as follows:

Size Fraction	Average Weight %
1" x ¼" (25mm x 6mm)	9.3
¼" x 32 mesh (6mm x 0.5mm)	46.8
32 mesh x 100 mesh (0.5mm x 0.15mm)	18.3
-100 mesh x (-0.15mm)	25.6
Total	100.0

20.6.1.2 Process Equipment Selection for Size Fractions

The Coal Preparation Plant will clean the size fractions with the following processes:

Table 20-34 Size Distribution for Process Equipment

SIZE	CLEANING PROCESS	WEIGHT %
1" x 32 mesh (25mm x 0.5mm)	Dense Medium Cyclone	56.1%
32 mesh x 100 mesh (0.5mm x 0.15mm)	Water Only Cyclone/Spirals	18.3%
-100 mesh (-0.15mm)	Froth Flotation	25.6%

20.6.1.3 Flowsheet Selection and Process Description

It is anticipated that the basic Process Flowsheet (see Figure 20-19) is similar to the majority of plants in the Elk valley, but will include the latest technological developments.

The R.O.M. raw coal will be trucked to the preparation plant site and dumped onto a raw coal working- stockpile of 5,000 tonne capacity or dumped directly through a grizzly into the plant raw coal dump hopper. The purpose of the raw coal working stockpile is to maintain a constant feed rate to the plant and to allow the mine to maintain production when the plant is down through scheduled or unscheduled stoppages. A front-end loader will be available to feed the dump hopper in the event that the mine production is disrupted.

The raw coal will be extracted from the Raw Coal dump hopper by a raw coal feeder. This Feeder has the capability to remove any oversize material from the plant feed. The Raw Coal Feeder will transfer the raw coal to a belt conveyor, which in turn will feed the 500 tonne cap. Raw Coal Storage Bin. This Belt Conveyor will be supplied with a tramp metal magnet, Metal Detector and Belt Scale. The raw coal area will be supplied with a dust collection system that will extract fugitive dust from the raw coal Dump hopper, feed belt conveyor and raw coal storage bin.

The raw coal will be extracted from the Raw Coal storage bin by a vibrating feeder. The Vibrating Feeder will transfer raw coal at a controlled rate to the Plant Feed Belt Conveyor, which in turn will convey the raw coal at a nominal feed rate of 550 tonne/hr to the Raw Coal Distribution Box. A belt scale mounted on the Plant Feed Belt Conveyor will record the plant feed rate. The raw coal will be delivered from the Raw Coal Distribution Box to two (2) - 3050 mm W X 6100 mm L Desliming Banana style Screens. The raw coal will be wet screened at 0.5 mm. The oversize fraction would report to the Dense Medium Cyclone circuit and the minus 0.5 mm material will report to the Fines Cleaning circuit.

The 50mm x 0.5mm size fraction will be gravity fed to two (2) -762 mm diameter Dense Medium Cyclones using a magnetite medium to separate the clean coal from the discard material. The gravity fed method of feeding the cyclones, as opposed to pump feeding has been selected in order to avoid size degradation of the coal. Clean coal at 10% ash will be produced in the cyclone overflow and the discard material at 55-65% ash will report to the cyclone underflow. Both products would pass over Banana style Drain & Rinse Screens to remove the magnetite, which will be recovered using Magnetic Drum Separator. The 50mm x 0.5mm clean coal will be dewatered by Centrifuge. The dewatered clean coal will report to the Dryer Plant Feed Belt Conveyor where it will be conveyed to the Thermal Dryer Plant .The coarse discard material from the Drain & Rinse Screens will be conveyed to the Refuse Stockpile.

The minus 0.5mm material from the Desliming Screen Underflow will be cleaned in their relative size fractions by a 2 stage Water-Only Cyclones/Spirals combination (0.5 x0.15mm). Froth Flotation will be used to clean the (-0.15mm).

The 0.5mm x 0 Desliming Screen underflow will report to the Water-Only Cyclone Pump boxes and be pump fed to the 2-stage Water-Only Cyclones/Spiral Circuit. The cleaned product from this circuit will report to Classifying Cyclone Pump boxes and be pump fed to Classifying Cyclones. This circuit will separate the 0.5mm x 0.15mm product from the minus ultra fine 0.15 mm fraction. The ultra fine product will be cleaned by Froth Flotation, using MIBC as a frother and Kerosene fuel oil as a collector.

The clean froth product will join the clean 0.5 x 0.15 mm product and will be dewatered in Screen Bowl Centrifuges and report to the Dryer Plant Feed Belt Conveyor. The combined clean coal will then report to the Coal Fired Fluidized Bed Thermal Dryer Plant. This plant will dry the clean coal from an incoming moisture content of 14% moisture to and outgoing moisture content of 6 % moisture. It is anticipated that the moisture content will increase to 8% due to precipitation on route and to pick up at the terminal. Drying the coal to 6% moisture will avoid freezing of the coal in the rail cars during the winter months.

The underflow from the Fines Refuse Dewatering Screens will join the minus 0.15mm Froth Flotation Tailings and report to the 135,000 mm diameter Tailings Thickener. This reject product will be thickened to 30 % solids using a flocculent reagent. This material will be pumped to the Tailings Belt Filter Presses. This circuit will produce a reject cake of 30 % moisture. This material will be transferred to the Refuse Belt Conveyor and report to the Refuse Stockpile along with the coarse reject.

The dried clean coal product from the Thermal Dryer Plant will be transferred via Belt Conveyor to a 300 tonne capacity Clean Coal Surge Bin from where it will be loaded into 100 tonne cap. Highway Trucks and hauled to the Clean Coal Railcar Loadout Facility near Elko, B.C.

20.6.1.4 Rejects Disposal

The Dewatered Tailings combined with the Coarse Discards will be trucked back to a stacked tailings site in or near the pit. Test work has been initiated to confirm this method of refuse disposal which is currently being used in western Canadian plants at the nearby operations at Coal Mountain and Line Creek, as well as several operations in the USA.

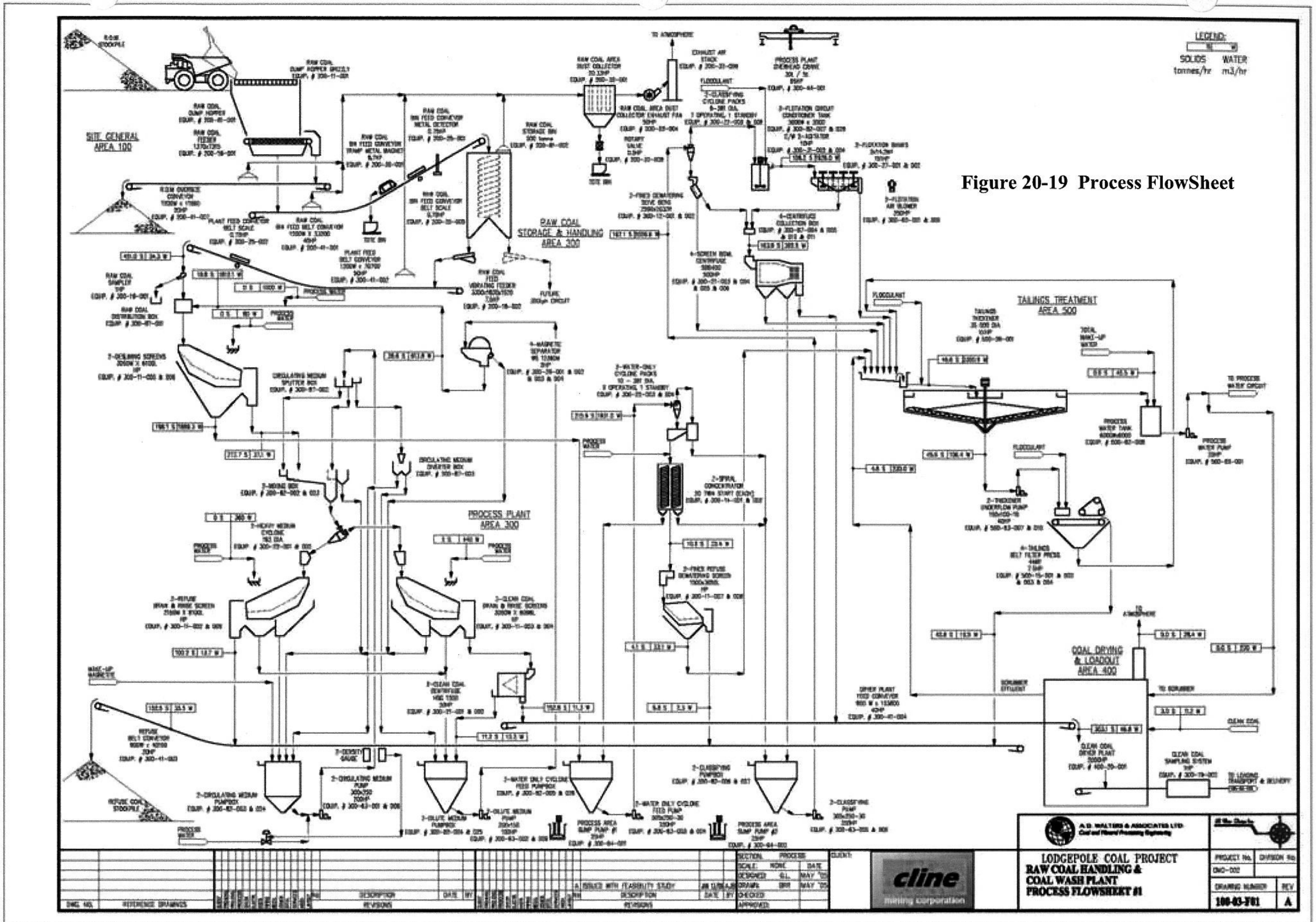


Figure 20-19 Process FlowSheet

20.6.2 Process and Ancillary Facilities

The following provides a brief description of all Process and related Ancillary Facilities associated with the Lodgepole Coal Project.

20.6.2.1 Plantsite Process Facilities

The following provides a brief description of all Process and related Ancillary Facilities. A general Plantsite schematic is shown in Figure 20-20 General Plant Site Schematic.

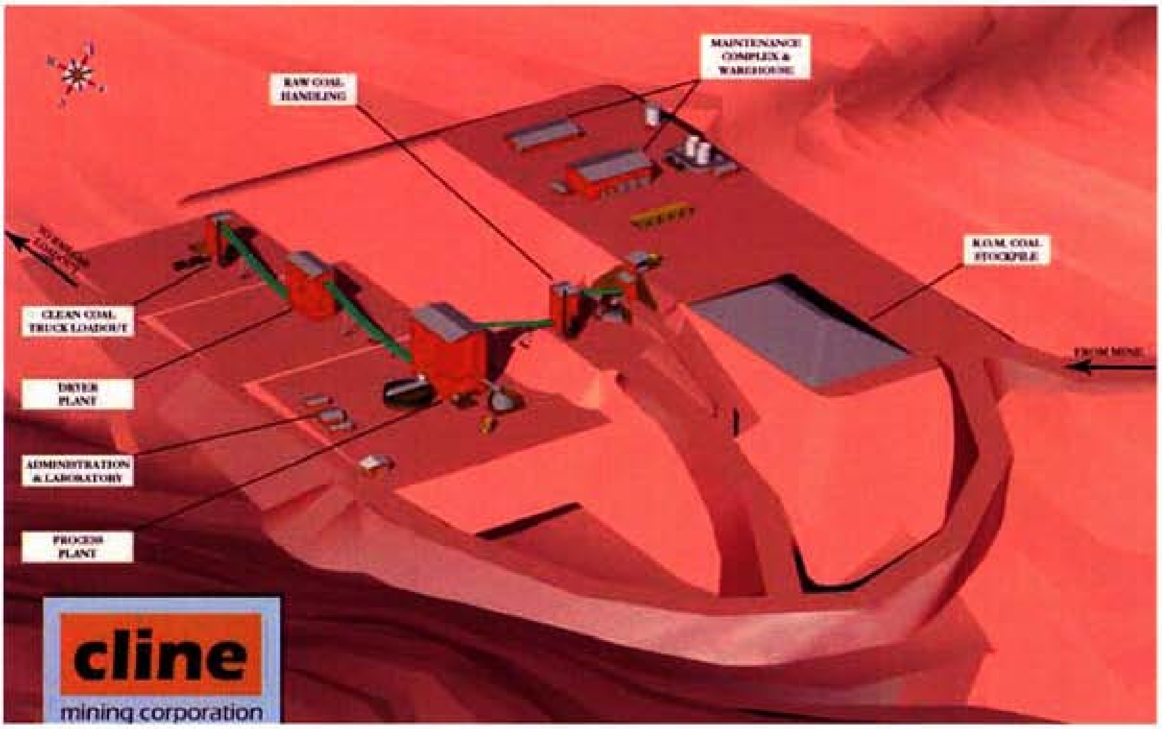


Figure 20-20 General Plant Site Schematic

20.6.2.1.1 <u>Raw Coal Truck Dump</u>

The Raw Coal Truck Dump Facility accepts Raw Coal delivery from the mine haul trucks and transfer that Raw Coal to the Raw Coal Storage Facility. The Raw Coal Truck Dump houses the 300 tonne cap. Raw Coal Dump Hopper. The Hopper supports the Raw Coal Dump Hopper Grizzly. The openings on the Grizzly are set to 300 mm X 300 mm. This Grizzly stops any large lumps of rock or frozen material from entering the coal processing system. Mine haul trucks will dump directly into the Raw Coal Dump Hopper. Alternatively the Dump Hopper will be fed from a Front-End-Loader with Raw Coal from an adjacent Surge Stockpile. A Raw Coal Feeder will draw coal from the bottom of the Hopper and transfer it to the Raw Coal Bin Belt Conveyor. The Raw Coal Feeder will also remove any oversize material from the feed.

20.6.2.1.2 Raw Coal Storage

The Raw Coal Storage Building is to provide surge capacity within the Coal Processing Plant coal feed stream. The Raw Coal Storage Building houses the 500 tonne (live) capacity Raw Coal Storage Bin. This Storage Bin accepts coal transferred from the Raw Coal Dump Hopper. At the bottom discharge point of the Storage Bin is a Vibrating Feeder that meters coal to the Plant Feed Belt Conveyor. This Plant Feed Belt Conveyor delivers the Raw Coal to the Coal Processing Plant.

20.6.2.1.3 Conveying System

The transfer of Raw Coal and Clean Coal between buildings and processes is accomplished with the use of Belt Conveyors. The Conveying System facilitates the movement of both Raw and Clean Coal throughout the facility.

20.6.2.1.4 Coal Preparation Plant

The Coal Preparation Plant building houses all process equipment, maintenance equipment & facilities, control and personnel facilities related to the coal washing process. As well, Reagent Mixing and Dry Tailings process facilities are located in this building.

20.6.2.1.5 Dryer Plant

The Clean Coal Dryer Plant building houses the primary Fluidizing Bed Thermal Coal Dryer along with all associated primary and secondary processes related to the drying of Clean Coal.

20.6.2.1.6 Clean Coal Loadout Facility

The function of the Clean Coal Loadout Facility is to provide surge capacity within the clean coal product stream as well as the capability to facilitate loading of the Clean Coal Haul Trucks. The Clean Coal Loadout Facility houses the 300 tonne cap. (live) Clean Coal Surge Bin. This Surge Bin accepts clean coal product transferred from the Dryer Plant via Belt Conveyor. At the bottom discharge point of the Surge Bin is a fully automatic Truck Loading Chute that will discharge clean coal to the Clean Coal Haul Trucks for transfer to the Railcar Loadout Facility (See Figure 20-21) located approximately 40km from the plant site. The Loading Chute will be controlled by the truck operators and will discharge a regulated amount of clean coal to each haul truck. The

Clean Coal Surge Bin has been designed with provision for an alternative discharge of clean coal to an emergency stockpile through means of an Emergency By-pass Chute. This provision will be used in the event of unexpected delays with the scheduled arrival of the Clean Coal Haul Trucks dues to breakdown or weather related issues.

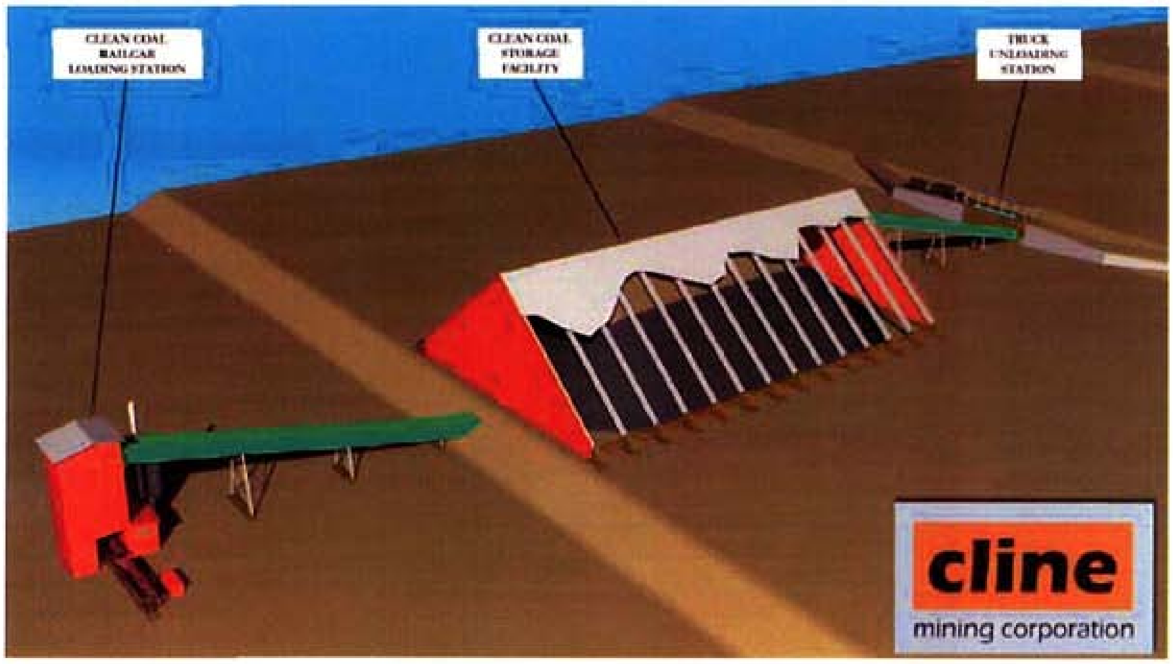


Figure 20-21 Clean Coal Railcar Loadout

20.6.2.1.7 Administration Building

The Administration Building will provide office and working space for general management and administration duties. An adjacent "Dry" building will be provided with shower and change-room facilities for the staff located in the Administration Building and those personnel working in the process areas. Reception, Boardroom and Training Facilities will be part of the Administration Building.

20.6.2.1.8 Security Gatehouse

The Security Gatehouse will provide storage for the plantsite Ambulance and Mine Rescue Vehicle. Plantsite Safety and First-Aid personnel will be located in this building. Overall plantsite security will be managed from this location. General public traffic will be required to stop and register at this building prior to receiving site access. A parking lot will be provided adjacent to the building.

20.6.2.1.9 Laboratory

The Laboratory provides facilities for the analysis of the coal quality. Office and general laboratory areas will be provided. This Laboratory is designed for production coal quality analysis only. For specific sampling campaigns, the gathered samples will be sent to local commercial laboratories.

20.6.2.1.10 Warehouse

The Warehouse will provide storage for Spare Parts, Process Consumables and general plant storage requirements. The Building will be heated and be supplied with heavy-duty storage racking and shelving.

20.6.2.1.11 Lube Oil Storage Building

The Lube Oil Storage Building will provide storage for all required plant lubricants, oils. The Building will be unheated and be supplied with heavy-duty storage racking and shelving. External to the building will be Gasoline and Diesel Storage Tanks for use of plant site vehicle filling. These tanks will be of a "Double-Containment" configuration to conform with all environmental spillage requirements.

20.6.2.2 Clean Coal Loadout Facility

Clean Coal Haul Trucks, loaded at the Plantsite, with approximately 100 tonne of Clean Coal will discharge their loads at this facility. Clean Coal unloaded here will transfer to the Clean Coal Storage Facility via Belt Conveyors. Clean Coal Haul Trucks arriving at this facility will drive over a Steel Grizzly and discharge their loads into a 100 tonne (live) capacity Truck Unloading Hopper. The design of this Hopper is such that the Haul Truck configuration can be either a Rear-Dump or Bottom-Dump. Clean Coal will be drawn from the bottom of the Unloading Hopper by means of a Belt Feeder. This Feeder will transfer clean coal to the Clean Coal Transfer Belt Conveyor which will deliver clean coal to the Clean Coal Storage Facility.

Clean coal will be reclaimed from the Storage stockpile by means of 4 Belt Feeders located in a concrete tunnel beneath the stockpile. The Belt Feeders will discharge clean coal to the Clean Coal Loadout Facility via the Clean Coal Loadout Conveyor. The Storage Facility has been designed to operate in a fully automatic discharge mode, but provision has been made to allow for tracked vehicles to enter the building to assist with clean coal movement.

The function of the Clean Coal Loadout Facility is to provide surge capacity within the clean coal product stream as well as the capability to facilitate loading of the CP Rail Unit-Trains. The Railcar Loadout Facility (See Figure 20-22) houses the 500 tonne capacity

Clean Coal Railcar Surge Bin. This Surge Bin accepts clean coal product transferred from the Clean Coal Storage Building via Belt Conveyor At the bottom discharge point of the Surge Bin is a fully automatic Railcar Loading Chute that will discharge clean coal into the Clean Coal Unit-Trains. The Loading Chute will be controlled by an operator located within the Control Room that is part of the Facility. A regulated amount of clean coal will be discharged into each railcar. The volume of clean coal discharged into each railcar will conform to the maximum load requirements as dictated by CP Rail. An "In-Motion" railcar weighing system will verify and catalogue the weight of each railcar. As each railcar exits the loading station, it will be sprayed with a latex based fixative that will eliminate the escape of any dust during the transit of the Unit-Train to the proposed port facilities.

20.6.3 Site Services

20.6.3.1 The Electrical & Instrumentation

The Lodgepole Mine is located approximately 40 km by road from the Morrissey rail siding. The mine will be served at 69 kV via a transmission line tapped into the existing BC Hydro 60L281 line, between Fernie (FNE) and Elko (ELK).

A 69kV line to the Lodgepole mine will be conductored with wire large enough to serve both Lodgepole and a possible future mine to the southeast. The line from the BC Hydro tap to Lodgepole will be approximately 42 km in length. The cost of the Lodgepole line will be approximately $8.5 million.

The electrical load at the Lodgepole minesite is estimated at 10 MVA. BC Hydro has indicated that 60L281 is capable of supplying this load, however, the line is fairly old and may require upgrading in the future. Specifically, the wire size on 60L281 between Fernie and Elko may have to be increased. It is expected that the upgrades would be completed under BC Hydro's regular Capital Improvement Plan.

To accommodate the Lodgepole load and allow for a further extension, the line from the 60L281 tap to Lodgepole will be conductored with 336 ACSR, rated at 530 Amps. The line will be constructed on single poles generally as shown below. The line will be constructed alongside the road on a right-of-way of approximately 10 meters.

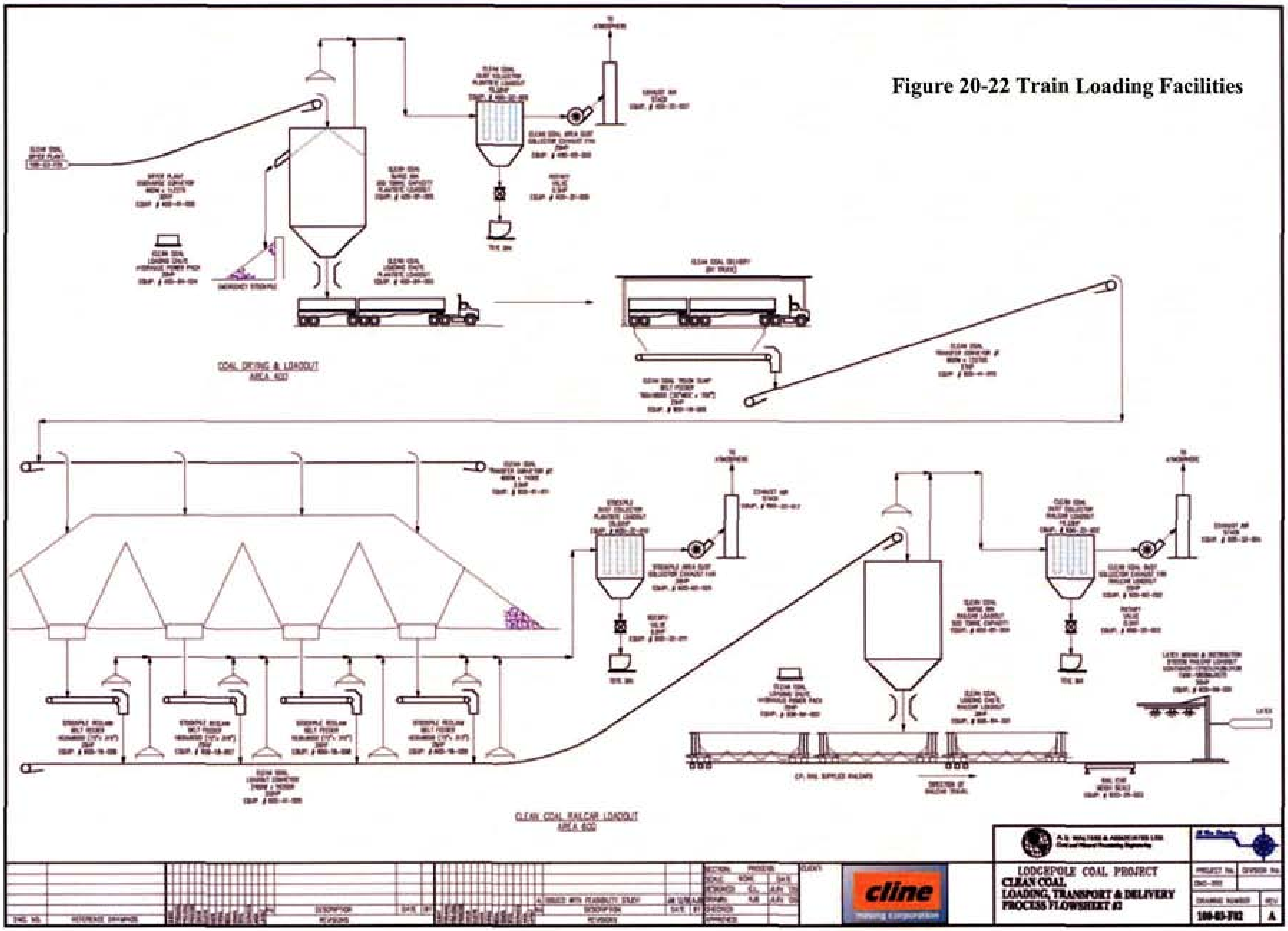


Figure 20-22 Train Loading Facilities

The secondary of the transformer will feed Metalclad Switchgear housed in a block wall building within the substation. The Metalclad Switchgear will contain six 13.8 kV feeder circuit breakers, and a station service transformer.

All transformers will be resistance grounded wye on the secondary side. This will help reduce damage caused by single line to ground faults and will provide increased reliability. The connections between the Metalclad Switchgear and the step down transformers will be provided by armoured cable in buried duct.

The secondaries of the step down transformers will feed Power Distribution Centers (PDCs) which will in turn feed the Motor Control Centers (MCC). The PDCs will be supplied with spare positions to feed future MCCs. The MCCs will be intelligent type to allow remote control via the DCS. Motors less than 200 HP will be fed at 600 volts. Motors equal to or greater than 250 HP will be fed at 4160 Volts.

All electrical connections will be made using Armoured Cable (TECK) and elevated steel cable tray. A START/STOP station will be provided at each motor.

Most or all of the area inside the process buildings will be rated as Hazardous Location, Class II, Group F. Electrical equipment will rated for the appropriate electrical area classification.

The process will be controlled by a Distributed Control System (DCS) or equivalent Programmable Logic Control System (PLC). Graphics Displays will be provided in the operating room for plant control.

Instrumentation will be provided throughout the process plant for measurement and control of critical process parameters. All of the instrumentation, START/STOP stations and MCCs will be connected to the DCS system. Communication networks using fiber optic cable will be used where possible to reduce wiring costs and noise interference.

Process building High Bay lighting will be provided at 347 volts. Pole mounted area lights will be installed around outdoor working areas, also operating at 347 volts. Lighting in other office and working areas will be provided at 120 or 347 volts.

A Fire Alarm system will be installed in a areas of the facility. Closed Circuit TV (CCTV) will be installed in critical process locations and in areas of security concern, and a 800 kVA Emergency Generator will be installed to provide emergency lighting and critical motor power where required.

20.6.3.2 The Water & Associated Systems

It is anticipated that all required water for the Lodgepole plantsite will be supplied from wells drilled in the general vicinity of the plantsite. Well supplied water will be required for the following:

- Fresh Water Make-up for Process requirements
- Fresh Water Supply for domestic requirements (toilets, etc.)
- Fire Water Supply for Plantsite Fire Protection
- Potable Water Supply for Plantsite requirements. Fresh water from well source will be treated with a Potable Water Treatment plant. The plant will include Chlorination, Filtration, Water Softening & Ultra Violet Sterilization of the Fresh Water supply. This water will be suitable for drinking and will be used to supply domestic requirements such as shower, sinks etc.

20.6.4 Plant and Site Infrastructure Capital Cost

The Capital cost for the 2 Million MTCC/yr is $122,879,433.00 (Can). Items included in the capital cost estimate are:

- Site General
- Site Mobile Equipment
- Raw Coal Storage & Handling
- Processing Plant
- Thermal Dryer
- Clean Coal Loading & Handling
- Tailings & Coarse Reject Stacking
- Clean Coal Railcar Loadout
- Ancillary Buildings
- Power Lines & Distribution
- Project Indirects
- Other Costs & Contingency

20.7 Environmental And Reclamation

20.7.1 ARD and Water Quality

While the waste rock and pit walls are not anticipated to be much different from the other open pit mines in the Elk Valley, ABA testing was completed on rock samples and kinetic testing is ongoing to assess the acid rock drainage (ARD) and metal leaching (ML) potential. This information will be incorporated with the water quality data collected from the local streams and used to design and plan water management plans that will be acceptable to the provincial and federal environmental authorities.

20.7.2 Post Mining Topography

The dumps, pits, access roads and the plant site area will be reclaimed to meet the requirements of the British Columbia Ministry of Energy and Mines. The waste rock and mill rejects will be reclaimed utilizing the best available management techniques that have been developed over the years in British Columbia on existing mine sites. The end land use is anticipated to be wildlife habitat, likely grizzly bear and goats.

20.7.3 Water Management

The headwaters of Foisey Creek cover only a very small area of the Flathead Valley and are located well away from the special management area of the Flathead River corridor. The mine project is located on the west slope of McLatchie Ridge and drains into the Crabb Creek which in turn flows into Foisey Creek. It is positioned to take advantage of the terrain to utilize water management facilities to control all contact water and contact runoff and treat, if required, all contact water to meet the Federal and Provincial Government water discharge guidelines. Collection will be done utilizing diversion ditches, collection ditches and sedimentation ponds followed by a polishing pond (See Figure 20-6).

20.7.4 Air Quality Assurance

Acceptable air quality will be achieved by extensive mitigative measures, including watering of mine haul roads, during potential high dust emission periods. These control measures will ensure positive air quality aspects of the project, which include.

- Process plant primarily uses a wet coal cleaning process that prevents particulate emissions.
- There will be lower emissions from mine equipment with new engine technology and better quality fuels.
- There will be no significant air quality effects in the Elk River Valley. Dust suppression on haul roads will be carried out using water trucks.
- There will be no significant air quality effects in Montana.

20.8 Regulatory Requirements

20.8.1 Canadian Environmental Assessment Act

The federal and provincial governments signed the Canada-British Columbia Agreement on Environmental Assessment Cooperation. The agreement is intended to eliminate as much potential procedural duplication as possible and allow the federal agencies to work through the provincial environmental assessment process to complete both screenings and comprehensive study assessments if a project requires the application of the *Canadian Environmental Assessment Act* (CEAA). Under the agreement, the federal government retains its separate decision making authority with respect to the acceptability of projects.

However, the agreement and British Columbia *Environmental Assessment Act* provide for individual projects, which do not trigger the CEAA process, to be reviewed under the British Columbia Environmental Assessment process with the participation of both federal and provincial agencies. Three possible triggers that may require the application of *CEAA* to a mining project are outlined below.

Any redesigned bridges in Lodgepole Creek could require a formal approval under Section 5(1) of the *Navigable Waters Protection Act* (NWPA) if this section of the stream is considered navigable. This has not been defined at this stage.

Placement of waste rock in tributaries to Lodgepole Creek could require formal approval under Section 35(1) of the *Fisheries Act,* which prohibits the harmful alteration, disruption or destruction of fish habitat. Upgrading will be designed to avoid impacting these tributaries.

Manufacturing explosives on site could require a license under Section(7) of the *Explosives Act.* However, if explosives are purchased from a third party explosives supplier off site and using an existing facility as a base site, the supplier could set up a satellite facility at the Lodgepole property which would allow for the storage of ammonium nitrate and emulsion as well as the use of one process vehicle on-site. A satellite facility requires that the supplier apply for a Satellite Certificate from the federal Explosives Regulatory Division of Natural Resources Canada. Application for the Satellite Certificate does not require an *Explosives Act* license and would not trigger the CEAA process.

20.8.1.1 Expected Permit Requirements

In addition to the Project Approval Certificate, a number of permits, licenses and approvals will be required in support of the Lodgepole project. The approvals and applicable legislation that have been identified to date are outlined below.

(A) *Mines Act*, R.S.B.C. 1996, c. 293, and the Health, Safety and Reclamation Code

The *Mines Act* permit application will be required to provide the mine plan and reclamation plan with details of all aspects of mine development, worker health and safety and reclamation.

(B) ***Forest Act*, R.S.B.C. 1996 c. 157**

A license may be required to cut and remove merchantable timber within the project footprint, and an approval for access road upgrade and usage.

(C) ***Waste Management Act*, R.S.B.C. 1996, c. 482**

Approvals under the *Waste Management Act* will be required for emissions to the air, discharge from sediment ponds, sewage disposal (if > 5,000 gpd) and the storage and handling of industrial waste and solid refuse.

(D) ***Water Act* R.S.B.C. 1996, c. 483 - Water Licenses**

An approval under the *Water Act*, may be required if water extraction is required from the Lodgepole or Foisey Creeks.

(E) ***Land Act*, R.S.B.C. 1996, c. 245**

The *Land Act* may be required for a long-term lease over the plant site area. The *Land Act* may also be applicable for tenure to cover the power line corridor from the main line to the plant site.

(F) ***Coal Act*, R.S.B.C. 1996, c. 51**

The *Coal Act* may apply for coal license renewal and for coal lease application.

(G) ***Transport of Dangerous Goods Act***

The *Transport of Dangerous Goods Act* may apply should the feasibility study identify activities required for mine operation that may include the transport of materials that are regulated under the Act.

20.8.2 Environmental Assessment

Adjacent to Akimina-Kishinena Provincial Park in BC and the International Peace Park complex (comprised of Waterton Lakes National Park [AB] and Glacier National Park [MT]), the Flathead Valley is connected ecologically to surrounding jurisdictions. Shared resources and values between British Columbia, Alberta, and Montana include water quality and fisheries, wildlife populations, and connectivity. The Flathead River flows south into the United States and is ultimately a tributary to the Columbia River. The Flathead River Corridor is a special management area. Part of a biologically diverse area, the Flathead has important features including prime habitat, cross-border connectivity, riparian attributes, and rich food sources that support a dense and diverse predator-prey system. Among large mammal systems, the Flathead is considered one of the most intensively studied areas on the continent. The Flathead also supports lesser-known species such as the tailed frog and the Rocky Mountain red-tailed chipmunk, which are red-listed (endangered) in BC.

Providing the single most important carnivore movement corridor between the Canadian and US Rockies, the Flathead has the highest density of non-coastal grizzly bears in North America. Wolf populations, which are currently endangered in Montana, travel considerable distances up and down the valley across the border. The linkage zone in southern Canada is vital to the long-term health of recovering wildlife populations in Montana. Also of international concern are bull trout, which are listed as threatened in Montana, blue-listed in BC, and considered a species of special concern in Alberta.

The headwaters of Foisey Creek cover only a very small area of the Flathead Valley and are located well away from the special management area of the Flathead River corridor. The mine project is located on a ridge high above the valley. It is positioned to take advantage of the terrain to utilize water management facilities to control all contact water and contact runoff and treat, if required, all contact water to meet the Federal and Provincial Government water discharge guidelines.

20.8.2.1 Aquatic Habitat

20.8.2.1.1 Foisey Creek Drainage

The proposed mine is located near the headwaters of Foisey Creek. This reach is a tumbling, turbulent mountain stream with gradients ranging from 5 to 10% and while approximately 50% of the surveyed area may be considered to provide suitable fish cover, the high gradients may well limit fish utilization. A fish survey was carried out during the fall 2005 survey to investigate this further.

20.8.2.1.2 Lodgepole Creek Drainage

The plant site is proposed to be constructed just over the "saddle" (ridge) from the mine site in the Lodgepole Creek catchment area, which drains into the Elk Valley drainage system. The tailings and coarse coal reject deposal site is presently planned for this area.

This reach is very similar to the upper Foisey Creek reach in that it is a tumbling, turbulent mountain stream with gradients ranging from 5 to 10% and while approximately 50% of the surveyed area may be considered to provide suitable fish cover, the high gradients may well limit fish utilization. Scheduled fish survey will investigate this further during the fall survey.

20.8.2.1.3 Water Quality

Water quality data collected on the Flathead and Lodgepole water sheds indicate that both watersheds are characteristic of drainages in mountainous areas of southeastern B.C. The dissolved oxygen at all five locations sampled is near or at saturation; conductivity (TDS) is very low (<20) in the spring during runoff and raises gradually over the summer; and the pH is in the neutral to alkaline range.

Total metals were measured at expected concentrations with none exceeding the CCME guidelines for the protection of Aquatic Life and in most cases below detection.

Nutrients were generally low and well below levels of concern for flowing water.

Turbidity and Suspended solids are below the levels of concern used by DFO.

The collection of water quality data has continued over the summer and fall of 2004 to establish a baseline for environmental management in the area of the mine and plant.

20.8.3 Environmental Consideration

During the certification and permitting process, numerous environmental studies will be completed and, in some cases, continued throughout the life of the mine. However, the environmental work completed during the summer of 2005 recognizes the sensitivity of the area. The current fieldwork data is being used in the Environmental Impact Statements. The future studies will include water quality, hydrology, groundwater, aquatic resources, air, soil, wildlife, vegetation, historical resources, and traditional land use associated with the development. Particular attention has been placed on the following areas:

- Protection of the water quality and fisheries resources of Foisey Creek;
- Minimizing wildlife disturbance;
- Reducing the overall footprint;
- Reclamation planning; and
- Reducing the impacts of access.

20.8.4 Social/Land Use Setting

The land use in the area is mainly forestry, hiking, and hunting. Baldy Mountain Outfitters of Wardner British Columbia has the guiding tenure for this area.

The area is fairly remote and almost inaccessible to the general public.

20.8.5 Socio-Economic Impacts and Benefits

Open-pit mining of the Lodgepole deposit is expected to provide an economically stable source of revenue as well as a stable source of direct and indirect jobs throughout nearby communities. Two unique attributes of the deposit contribute to its operational stability: large resource contained in a very small area and low strip ratio at present and in future.

Large Resource contained in a very small area

The deposit contains 62.4 million tonnes of In-place Raw Coal reserves within the designed ultimate pit limit area where the operations and waste dumps are confined within a relatively small area of 1050 hectares.. Drainage from the entire mine area is restricted fully to the upper headwaters of a tributary to Foisey Creek. Therefore, only a single environmental control structure is needed to ensure focused, environmental safeguards for the receiving environment.

Low Strip Ratio at present and in future

One primary element of open-pit mining costs not controlled by operational efficiencies and technology is stripping ratio or the measure of how much rock must be removed to extract the coal. Mine operations with relatively high strip ratios are at economic risk from other lower strip ratio mines if markets tighten due to lower price for coal sales. The Lodgepole deposit is estimated to have an average raw-coal stripping ratio of approximately 8.0:1 over a 20-year production period at an annual rate of 2 million tonnes per year. This overall ratio makes the project competitive with existing mines and less risk than some of the new projects entering the expanding coal supply market.

Mine operations at Lodgepole are expected to provide the following levels of employment and benefits:

Figure 20-23 Lodgepole levels of employment and benefits

	Average Annual Values (Canadian $'s)
Annual Clean Coal Production	2,000,000 tonnes per year
Coal Sales Revenue	$200 million
B.C. Government Mineral Taxes	$ 5 million
Direct Jobs:	
Mine Operations	129
Mine Maintenance	87
GME	13
Process Plant & Loadout	77
Local Overhead	15
Total	320
Direct Annual Wages	$20.2 million
Indirect + Induced Annual Wages	$6.26 million

20.8.6 First Nations

(*extracted from Ktunaxa public information*)

Ktunaxa (pronounced 'k-too-nah-ha') people have occupied the lands adjacent to the Kootenay and Columbia Rivers and the Arrow Lakes of British Columbia, Canada for more than 10,000 years.

The Traditional Territory of the Ktunaxa Nation covers approximately 70,000 square kilometers (27,000 square miles) within the Kootenay region of southeastern British Columbia and historically included parts of Alberta, Montana, Washington and Idaho.

The Ktunaxa people were nomadic, seasonally migrating to follow vegetation and hunting cycles throughout their territory, across the Rocky Mountains and on the Great Plains of both Canada and the United States.

European settlement in the late 1800s, followed by the establishment of Indian Reserves, led to the creation of the present Indian Bands.

Ktunaxa citizenship is comprised of Nation members from seven Bands located throughout historic traditional Ktunaxa territory. Five Bands are located in British Columbia, Canada and two are in the United States. Many Ktunaxa citizens also live in urban and rural areas "off reserve".

The Ktunaxa language is unique among Native linguistic groups in North America. Ktunaxa names for landmarks throughout their Traditional Territory and numerous heritage sites confirm this region as traditional Ktunaxa land.

Shared lands, a rich cultural heritage, and a language so unique that it is not linked to any other in the world make the Ktunaxa people unique and distinctive.

Ktunaxa/Kinbasket Treaty Council table includes Columbia Lake Band, Lower Kootenay Band, Shuswap Indian Band, St. Mary's Indian Band and Tobacco Plains Band. The traditional territory of the Ktunaxa people extends from Columbia River south to Missoula, Montana, west to Bonner's Ferry, Idaho, north to the Upper Arrow Lakes area of British Columbia and east to the Rocky Mountains.

The Ktunaxa Kinbasket Tribal Council (KKTC) serves approximately 58 communities in the East Kootenay region. The communities served by the KKTC broadband project include the Lower Kootenay Band (near Creston), the Tobacco Plains Band (near Grasmere), the St Mary's Band (near Cranbrook), the Columbia Lake Band (near Windermere), the Shuswap Band (near Invermere) and the Regional District of East Kootenay Areas B, C, E and F.

20.9 Infrastructure

Infrastructure requirements for the Lodgepole Project include the onsite facilities, local services, and regional coal transportation facilities. These are discussed in the following sections.

Local materials required for construction will include materials such as blasted rock and overburden for fill material. Buildings and support structures will require concrete foundations. Other materials and equipment will be supplied locally where possible, from the extensive mining services and supply enterprises in the Elk Valley and East Kootenay area.

20.9.1 Plant Site

The plant site is located on favorable topography south of the main pit area. Considering the surface area and the volumes of fill required to construct the pads that will support the plant buildings and materials handling system the selected area is the most favorable. As well, the proximity to the active pit and the length of the raw coal haulage the proposed plant site location is the best economic alternative.

The plant site construction and access system is planned during the pre-production period. Local material in the form of surface soils, colluviums, and rock will be moved to prepare the foundation and base for the plant site. The surface area required for the plant site and other buildings is less than 10ha.

Plant site construction will initially require cut and fill work to prepare the foundation area. Drainage ditches will be constructed around the site and water will be directed into settling facilities. Once the base is prepared, waste rock will be placed on the area and compacted. The volume of waste rock required to prepare the plant area is 1,680 kBCMW most of which will be supplied by the mine pre-production stripping.

This waste rock fill will also accommodate the raw coal stockpile and plant feeder grizzly. The coal trucks hauling from the pit areas will place raw coal into a stockpile near the feeder grizzly. The plant site includes the coal preparation plant, coal dryer, rejects haul, and clean coal truck loadout. The plant site area will also be used for Administrative, mine maintenance and service facilities. Details of the plant infrastructure are provided in Section 20.6 Coal Processing and Handling.

20.9.1.1 Plant Site Buildings and Rail Loadout

The main construction requirements for the Lodgepole Property are the Process Plant and the Rail Loadout. Other onsite buildings are required for the Administrative, Supervision, and Technical Service functions of the operation.

20.9.1.1.1 Process Plant

The Process Plant requires several buildings that include the feeder grizzly at the raw coal stockpile pad, the coal preparation plant, and the clean coal storage building, details are provided in Section 18.0.

20.9.1.1.2 Loadout and Clean Coal Storage Building

This storage building is designed to accommodate one unit train of clean coal. The building will contain dust suppression systems to ensure air quality. The clean coal storage building is planned to allow truck dumping and to accommodate coal loading into the rail cars.

20.9.1.1.3 Maintenance Building

A maintenance building is required to maintain major mining equipment. The maintenance building is located near the raw coal stockpile pad above the plant site. This location affords better access to the pit area and will separate major mining equipment from public and plant service vehicles. The maintenance building will be built and operated by the Mining Contractor.

The maintenance building will include a warehouse, a wash bay, and maintenance bays. Overhead cranes will be required for maintenance on major equipment. Offices will be needed in the maintenance building for supervisors, loss control, and planning.

20.9.1.1.4 Office Buildings

Office buildings will be located inside the main gate at the plant site. The office facilities will be needed for administration, engineering, geology, environmental and loss control, employee relations, industrial relations, operations supervision and production reporting.

20.9.1.1.5 Explosives Services

MSI explosives provide blasting services and products to the Elk Valley mines and have provided an evaluation of the explosives supply requirements for the Lodgepole project. The infrastructure required to facilitate a full time operation are highly regulated by the explosives division of Energy Mines and Resources Canada.

Guidelines require that we keep explosives and infrastructure I km (minimum 760 meters) from any inhabited buildings or major roadways. The project will require the installation of 60-ton ammonium nitrate (AN) silo and a 40-ton emulsion silo for onsite storage. A 10,000-liter diesel fuel storage tank and a maintenance bay equipped with wash bay facilities will be required. Wastewater from the wash bay will be treated to meet Ministry of Environment standards. A containment area or sump is required to contain residual materials that will be washed from the vehicles.

One heavy ANFO explosives truck will be allocated and stored on site at the maintenance building for explosives loading. A "Triple Threat" delivery unit will be available from contractor's operations at other Elk Valley mining operations to meet wet blast hole loading requirements.

An explosives storage building (Magazine) is required to store detonators and other related supplies. This small building will satisfy health and safety standards. The proposed location for the building is south and east of the raw coal stockpile area and the raw coal haulage road that accesses the plant site from the pit. A narrow road will be required to access the Magazine building.

The AN and Emulsion silos should be located in the vicinity of the explosives truck maintenance building and wash bay. The proposed location for the service facilities and silos is south of the raw coal haulage road and the plant. The topography is gently sloping in this area and a road will be constructed to access the MSI services.

The Magazine and the AN storage areas will afford easy access to the raw coal haulage road and the pit area. Figure 20-24 shows the location of the blasting facilities.

20.9.1.2 Site Services

The Site services are the physical services such as water supply, and sewage treatment on the project site as well as the administrative services for the site including loss control, security, etc. These administrative and support services require onsite offices and facilities

20.9.1.2.1 <u>Loss Control</u>

Loss control and safety facilities include security, fire suppression, safety and first aid, potable water management and waste management. Management of hazardous goods is also a responsibility of loss control. Offices will be located in selected locations inside the proposed buildings. Safety and First Aid facilities and supplies will be located throughout the mining property. The plant, maintenance complex, administration, engineering and field supervision facilities will all be equipped with safety and first aid equipment.

20.9.1.2.2 <u>Security</u>

A security office will be located at the "Mine Gate" near the point where the Lodgepole access road branches off the Lodgepole public access road and travels up the North Lodgepole Valley. (see Figure 20-24). A parking area will be required closer to the Morrissey area and personnel will be bused from there to the mine site. People moving in and out of the active operating area will report to the security office in the Administration office, as they call through from the radio controlled gate and again on site when they arrive at their designated job site. This remote gate method is being successfully used at the other mines in the area to ensure access control and security for the operation.

20.9.1.2.3 <u>Fire Suppression</u>

A fire suppression system will be required and this will be located in the vicinity of the preparation plant. A water storage tank will be used to store water required for the fire truck and the fire suppression systems in the buildings located in and around the plant site and maintenance complex.

20.9.1.2.4 Potable Water

Water for domestic use will be available from wells at the site and a system is planned that will allow for safe storage of potable water. Filters will be used to remove particulate material and bacteria from the water before it is used.

20.9.1.2.5 Septic System

A septic system is required in the vicinity of the plant and maintenance complex.

20.9.2 Power

B.C. Hydro completed a preliminary study to assess the potential to provide power to the mining area from the Elk Valley.

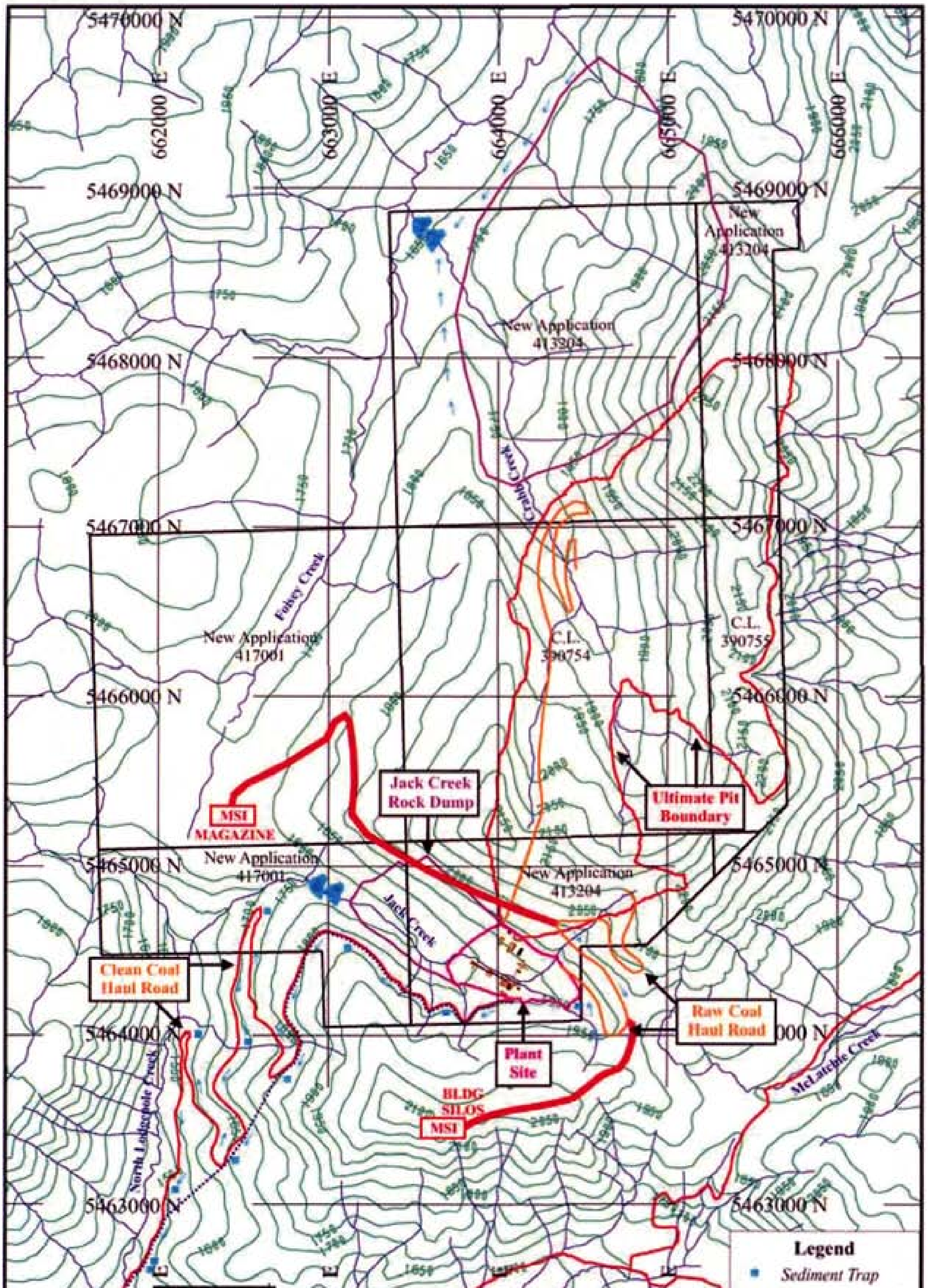
B.C. hydro determined that the electrical load requirements for the mine will be met through the current transmission grid (B.C. Hydro circuit 60L281) supplied from both Natal and Elko substations. A 69 KV transmission tap power line would need to be built off of circuit 60l281 at the cost of the mine.

The new power line must be built to satisfy standards set by BC Hydro. Cost associated with this project include (provided by BC Hydro):

- $100,000.00 to connect to the 60L281 hydro circuit.
- $110,000.00 per Kilometer for new transmission power line materials, construction and design.
- $750,000.00 to $900,000.00 for a new substation at the mine site.

Further costs will include the power line right of way and clearing of the right of way. The property acquisition will depend on the number and type of properties affected by the power line. The costs of clearing will depend on the route that is chosen and the type of vegetation that is encountered.

The hydro line will follow the lower Lodgepole access road for roughly twenty-five kilometers (See Figure 20-25). At North Lodgepole Creek the line will cross the slope for approximately 2.5 km, and follow the upper road to the plant site, approximately 1.3 km (See Figure 20-26).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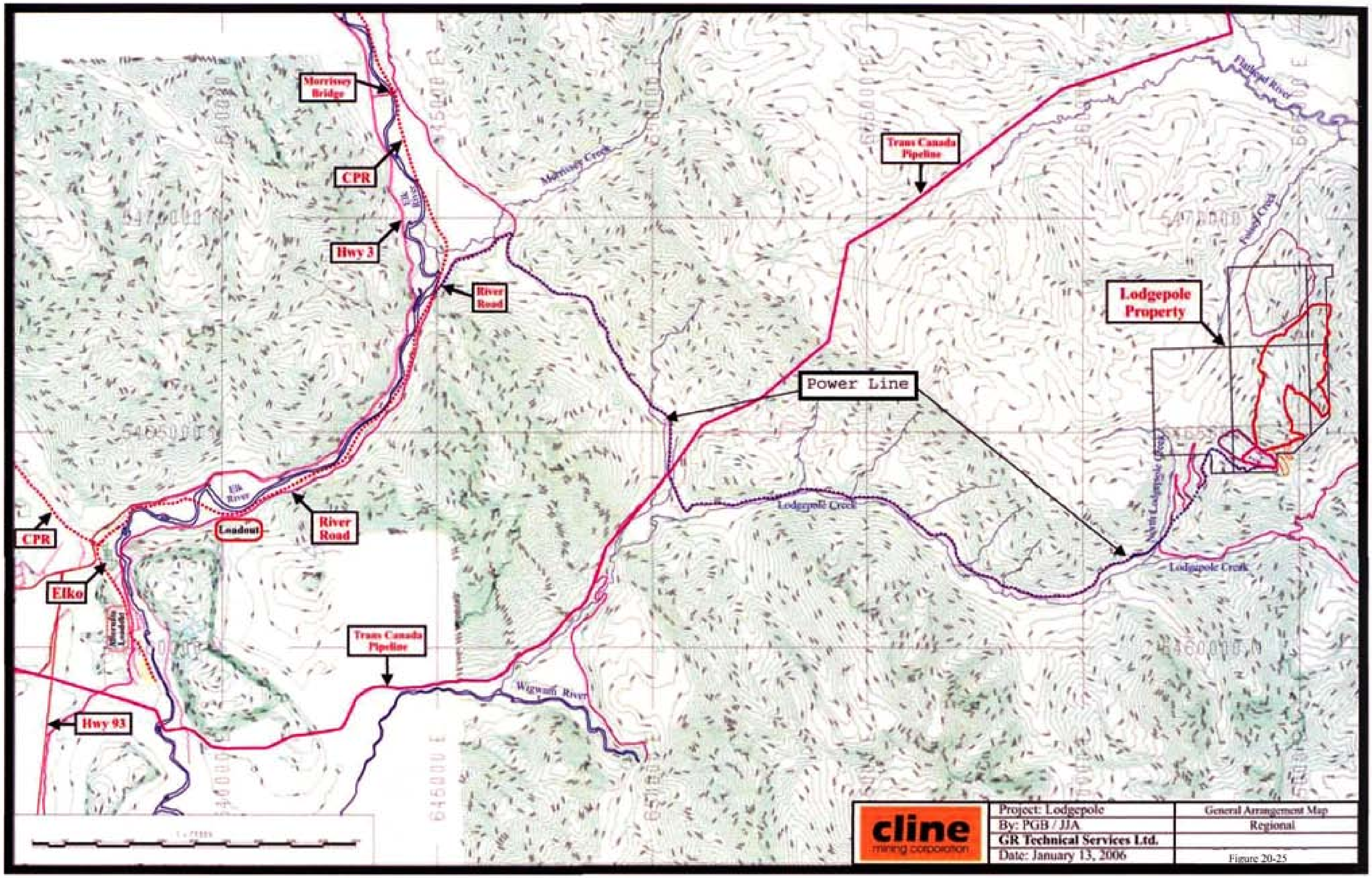
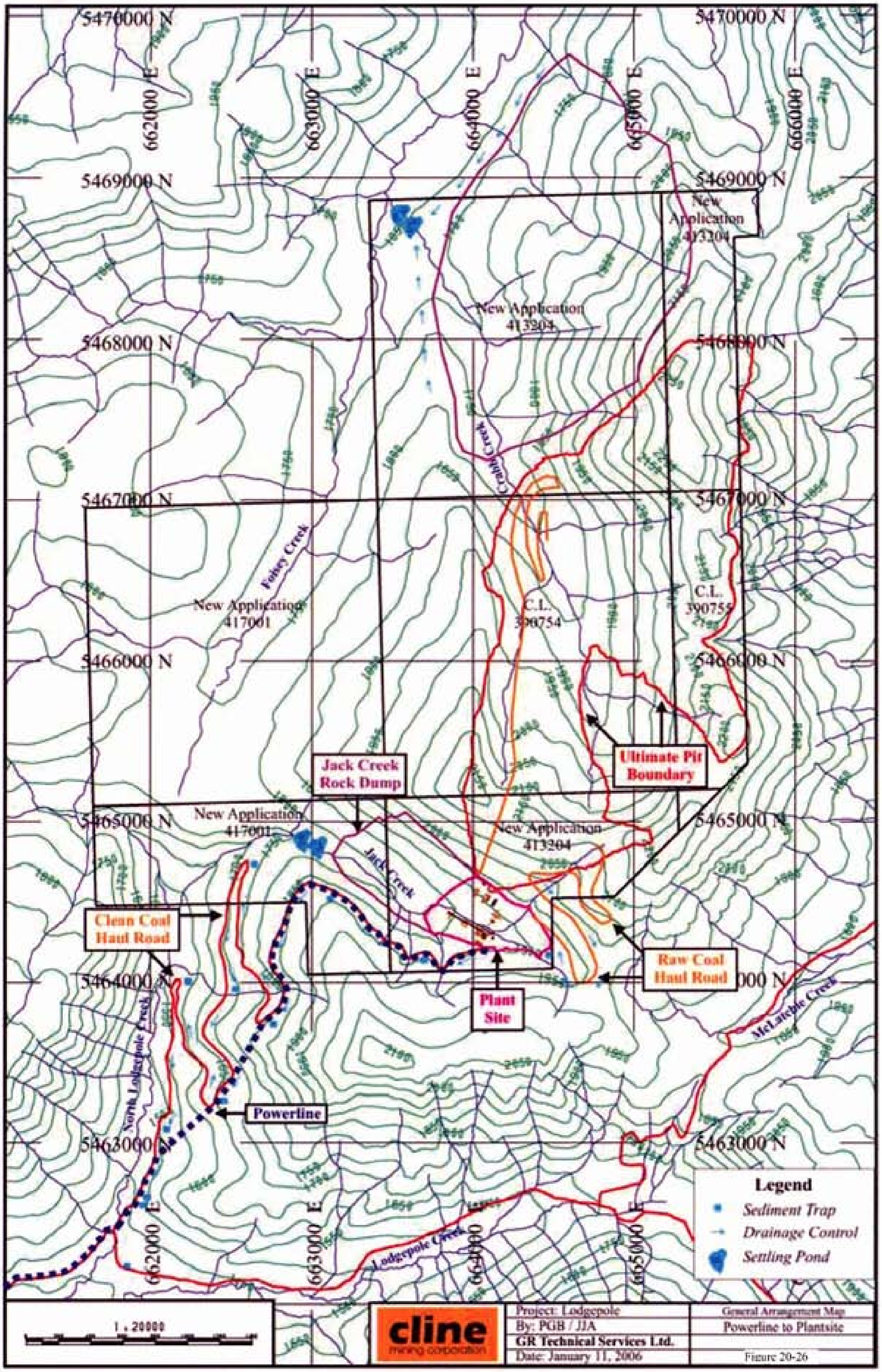
C.L. 390755
Fossey Creek
Jack Creek
Lodgepole Creek
North Lodgepole Creek
McLatchie Creek
MSI MAGAZINE
Jack Creek Rock Dump
Ultimate Pit Boundary
Clean Coal Haul Road
Raw Coal Haul Road
Plant Site
BLDG SILOS MSI
Gate House
Legend
Sediment Trap
Drainage Control
Settling Pond
1 : 20000
cline mining corporation
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: January 13, 2006
General Arrangement Map
MSI Areas
Explosives Infrastructure
Figure 20-24


Morrissey Bridge
CPR
Hwy 3
River Road
Trans Canada Pipeline
Lodgepole Property
Power Line
Loadout
River Road
CPR
Elko
Trans Canada Pipeline
Hwy 93
Elk River
Morrissey Creek
Flathead River
Lodgepole Creek
Wigwam River
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: January 13, 2006
General Arrangement Map
Regional
Figure 20-25
cline
mining corporation


5470000 N
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New Application 413204
New Application 417001
C.L. 390754
C.L. 390755
Jack Creek Rock Dump
Ultimate Pit Boundary
Clean Coal Haul Road
Raw Coal Haul Road
Plant Site
Powerline
Jack Creek
Lodgepole Creek
McLatchie Creek
North Lodgepole Creek
Legend
Sediment Trap
Drainage Control
Settling Pond
1 : 20000
cline mining corporation
Project: Lodgepole
By: PGB / JJA
GR Technical Services Ltd.
Date: January 11, 2006
General Arrangement Map
Powerline to Plantsite
Figure 20-26

Costs associated with this installation could be up to $4.5 million, including:

- $3.4 million for power line construction and design.
- $0.1 million for connection to Elk Valley line.
- $0.8 million for new substation.
- $0.2 million for land agreements

The economics over the life of the project are in favor of building the hydro line from the Elk Valley. A comparison with diesel generator sets was completed for a demand of 52,000,000 KWH for the plant and a maximum demand of 8000 KVA.

For the hydro line energy costs were based on $0.02725 per KWH and a demand cost of $4.625 per KVA per month with a maintenance cost of $0.005 per KWH.

For the diesel generators costs were based on fuel cost of $0.85 per liter. Efficiency was calculated using 5.3 KWH per liter and maintenance costs of $0.01 per KWH.

Table 20-35 shows a comparison between the two alternatives assuming the same startup capital costs. The capital shown in Table 20-35 is from preliminary estimates for comparative purposes only and does not reflect all the costs provided by the local Power company.

Table 20-35 Comparison of power alternatives

	Capital Cost ($ million)	LOM Operating Cost ($ million)
Powerline	$ 25 million	$ 48.4 million
Onsite Diesel Power Generation	$ 14 million	$ 199.1 million

20.9.3 Coal Haul and Site Access

The clean coal haulage and primary access road from the Plant site to the Loadout alternatives near Elko B.C. (39.6 km) provides the best alternative considering the available roads in the vicinity of the Lodgepole mining area (See Figure 20-25). The access road from the Morrissey Bridge to the Lodgepole project provides an alternate access from Fernie that will accommodate busing and public access (34.3 Km).

20.9.3.1 Morrissey Bridge Route

The distance from the Morrissey Bridge to the plant site area is roughly 34.3 km. Road grades will range from 0% to 4% on the lower Lodgepole road (approximately 26km), while the mine access road, along North Lodgepole Creek, will have maximum grades of 8% over 8.3 km.
The first 26 km portion of the Morrissey Bridge route requires minimal upgrading and is currently a two-lane forestry access road. This road will accommodate two-way haulage with some improvements and will need to be well maintained throughout the mine life.

20.9.3.2 Morrissey Creek to Elko B.C. Loadout

The Clean coal haulage road to Elko follows the same access road from the mine site and plant area down to the Elk Valley. Once the road reaches the Elk Valley coal trucks will turn to the southwest towards Elko and the loadout facility. The total clean coal haulage distance is approximately 39.6 km.

The River Road provides access from Morrissey Creek to Elko and is an active logging road. The road is generally flat, though there are grades to 8% over very short distances.

20.9.3.3 North Lodgepole and Plant Access Road

The North Lodgepole access requires upgrading and new construction for roughly 8.3 km along mountain slopes. This section of road must be managed differently than the other portions of the clean coal haulage.

Moving up from the lower Lodgepole road the existing North Lodgepole road presents grades between 2% and 12% over the first 4.5 km and includes two switchbacks. The road width is currently 6 to 8 meters. This portion of the access will be upgraded and widened to accommodate one-way radio controlled coal haulage. A ten meter wide road is planned that will allow for a wide safety berm along the outside edge and a ditch with sedimentation controls along the inside edge.

Runaway lanes will be constructed and pullout areas will be required. The Ministry of Mines safety guidelines will be applied to the design of all safety measures installed along this access road. The road will be adjusted to provide a maximum grade of 8%.

The upper portion of the road, approximately 3.8 km to the plant site, will require new construction. The new road will use the same design parameters as the lower section along the mountain slope for roughly 2.5 km with pullouts and two switchbacks. The final leg of the road to the plant involves roughly 1.3 km along a gently sloping hillside. A fifteen-meter wide road is planned, to allow two-way haulage, with an overall grade of roughly 3%. This upper section of the road will be re-aligned several times over the mine life as plant rejects and mine waste dumps in the Jack Valley are advanced.

20.9.4 Regional Coal Haul Facilities

The regional coal haul facilities include the loadout rail loadout, railroad, and port facilities. The railroad and port facilities are well established and reliable facilities servicing the local coal mines for over 30 years.

20.9.4.1 Rail Loadout

A loadout facility will be constructed near Elko, approximately 30km south of Fernie, Figure 20-25. The loadout will consist of a live coal storage transfer system that includes:

- A drive through truck dump that will allow a coal truck to stockpile clean coal inside a storage building.
- A clean coal storage building that will accommodate at least one unit train of coal.
- A gravity-feed system that will allow coal to be transferred by conveyor to the rail cars.
- Dust control measures will be in-place for the building and loading conveyor that will include physical restraints and a dust suppression spray over the coal.

20.9.4.2 Canadian Pacific Railway

A rail loop will be required to facilitate loading of clean coal into rail cars. Unit trains will be loaded in approximately four hours, from a feeder conveyor that will load the coal into the rail cars as the train passes below, more details are provided in Section 20.6.

20.9.4.3 Port Facilities

Clean coal from the Lodgepole project will be transported via Canadian Pacific Railway to the Roberts Bank coal storage facility near Vancouver, a rail distance of approximately 1100 km.

20.10 Marketing

The marketing information for the Lodgepole property has been provided by Khan and Associates.

20.10.1 Lodgepole- Quality

The following quality attributes of Lodgepole PCI product are based on drill core composite samples, tested in Birtley and other laboratories.

Table 20-36 Typical Quality Attributes (Lodgepole PCI)

Ash (db) %	10.0
Volatile %	19.1
F.C. %	69.87
Sulfur %	0.45
CV (K cal/kg)	7,720
FSI	2.0
Phosphorous (in coal)	0.050
HGI	77
AFT C (Reducing)	+1480

The details of quality attributes are included in Table 20-37 Specification (Projected) of the Lodgepole PCI product.

Table 20-37 Quality and Specification (Projected)
Lodgepole – PCI Product

		Hardgrove Grind Index		59
Proximate Analysis (% dry)		**Ultimate Analysis**		
Volatile Matter	19.13	Moist		0.70
Ash	10.0	% C		80.13
Fixed Carbon	69.4	% H		4.13
		% N		1.14
Sulfur Content, (% dry)	0.45	% S		0.45
		% Ash		10.93
Ash Composition (% in ash)		% O		2.52
SiO_2	51.6			
Al_2O_3	32.07	**Petrographic Analysis**		
Fe_2O_3	2.64	Maceral Composition, Vol. %		
TiO_2	2.19	Reactives	V-Type	
CaO	4.44	13	15.0	
MgO	1.08	14	67.0	
Na_2O	0.03	15	17.0	
K_2O	0.40	16	1.0	
P_2O_5	0.98			
SO_3	4.37			
Undetermined	0.75			
		Vitrinite		33.6
Free Swelling Index	2.0	Exinite		-
		Semifusinite		23.8
Ash Fusion Temp. (Reducing)		Total Reactives		57.4
Initial Deformation C	1452			
Softening Temp C	1468	**Inerts**		
Hemispherical Temp C	+1480	Semifusinite		23.8
Fluid Temp C	+1480	Micrinite		0.9
		Fusinite		9.7
		Mineral Matter (Calc)		5.5
		Total Inerts		42.6
Mean Max Reflectance, %	1.45			
Comp. Balance Index	3.87			
Rank/Strength Index	6.37			
Calc. Stability	46.0			

20.10.2 Coal Characteristics of the Lodgepole Property

The Lodgepole coal is extremely "friable" due to post deposition stress / strain. The fineness of this coal has been accounted for in the plant design and coal recovery.

The general coal characteristics are:

- At 19.1 % VM and reflectance of 1.45%, this coal is ranked as "Borderline" low volatile (LV) as per ASTM / ISO.
- Inherently this product has very low FSI (2.0) and the thermal rheological properties are non-existent, in this area. The main reason this coal is non-coking is the unusually high inerts (40-45 %), preventing the coal macerals from agglomeration during carbonization.
- There are no sign of in-situ or surface oxidation in the fresh coal, yet the agglomerating characteristics are missing due to the high inert levels.
- Due to higher rank (LV), this coal will be attractive for PCI, providing relatively higher coke replacement ratio in blast furnace.

20.10.3 Market Potentials and Value in Use

The present market trend has high demand for Metallurgical and PCI Coal demands. There is currently a projected in-use dollar value of "Hard", "Semi-Soft" and PCI coals in the export market .The price of the Lodgepole PCI product is forecasted at $US80 to $US90 per MTCC.

20.11 Project Schedule

The overall project schedule (see Figure 20-27) is summarized as:

- Development of full Mine Permit application and submission by mid March.
- Project Approval period is 9 ½ months.
- Detailed design, procurement and award of contracts will be under taken during approval period.
- In order to meet a 2008 startup, construction and early ordering of critical path items need to being before permit approvals. This would require certain cost obligations by Cline should permits be delayed or not be granted. Construction and reclamation costs incurred in the case of permit denial will be the risk of Cline.
- Concurrent Mine Pre-Production and Plant Construction periods are 14 months
- First 3 months of Plant production is at half rate for Commissioning
- Coal Produced by Year end of 2007 is 0.2598 Million MTCC
- Full production of 2.0 Million tpa MTCC starts January 2008

			2006	2007	2008
	Start	End	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
Lodgepole Project	6-Jan	7-Dec			
Full Mine Permit Application	in progress	6-Mar			
Permit Approvals	6-Mar	6-Dec			
Planning & Construction	7-Jan	7-Sep			
Commissioning	7-Sep	7-Dec			
Full Production	8-Jan				

Figure 20-27 Project Schedule

20.12 Financial Analysis

20.12.1 Capital Costs

20.12.1.1 Initial Capital Costs

Initial capital costs for the project total $153,554,621, and consist of the following:

- Preproduction costs
- Road upgrade to mine and to Elko
- Plant, loadout & Hydro line
- Land Purchase
- Sediment ponds
- Water Supply

20.12.1.2 Replacement and Sustaining Capital

At this time, the only sustaining capital identified is $2 million for an extension to the stock tailings in Year 6. Mine sustaining capital will be the responsibility of the mining contractor.

20.12.2 Operating Costs

Operating costs were calculated assuming contractor mining. No inflation has been applied to the base case.

Direct mining costs include equipment and mining costs for mining activities, a contractors fee of 20% to include profit, shops, ancillary equipment and contractors overheads. Mining costs consist of direct operating costs of $1.146 billion and contractor financing costs of $84 million.

Processing costs are based on the raw and clean coal schedule which assumes a three-month initial commissioning period in which some 259,763 metric tonnes of clean coal are produced, followed by nineteen years of clean production in excess of 2,000,000 tonnes per year. Process plant and loadout operating costs total some $266.7 million over the life of the project.

Both Local Overhead and General Mine Expense (See Table 20-29) are assumed to be fixed costs for the life of the project, subject to inflation. Local Overhead includes the costs of accounting, employee relations, safety & first aid, purchasing & warehousing and insurance.

Property Taxes, which would be assessed by the Regional District, are estimated at $10.7 million over the life of the mine. Reclamation costs accrued over the life of the mine are expended in the last two years of the project life, and total $6.1 million. British Columbia mineral taxes are estimated at $100.7 million over the mine life.

20.12.3 Cash Flow and Project Economics

Assuming a minimum acceptable rate of return of 10%, the base case generates an Internal Rate of Return of 29.58% over the life of the project, and the present value of cash flows is $274.5 million. Sensitivities run on the base case are summarized in Table 20-38.

Table 20-38 Lodgpole Cashflow Sensitivities

Case Number	Sensitivity	Pre-Tax IRR	NPV at 10%Millions $
Base Case 13		29.58%	$274.50
Case 13a	10% increase in mining costs	27.19%	$230.40
Case 13b	10% increase in rail costs	27.70%	$243.20
Case 13c	10% increase in plant yield	35.47%	$377.70
Case 13d	10% decrease in plant yield	23.14%	$173.20
Case 13e	10% increase in selling price	38.38%	$433.10
Case 13f	10% decrease in selling price	19.11%	$117.50
Case 13g	10% increase in plant capital	27.65%	$265.00
Case 13h	Exchange rate at $0.87US	25.15%	$203.10
Case 13i	Rail costs at $26.52/MTCC	23.49%	$178.30
Case 13j	Exchange rate at $0.79US	34.24%	$355.50
Case 13k	10% decrease in mining costs	32.00%	$320.80
Case 13l	10% decrease in rail costs	31.56%	$308.00
Case 13m	10% decrease in plant capital	31.97%	$286.20

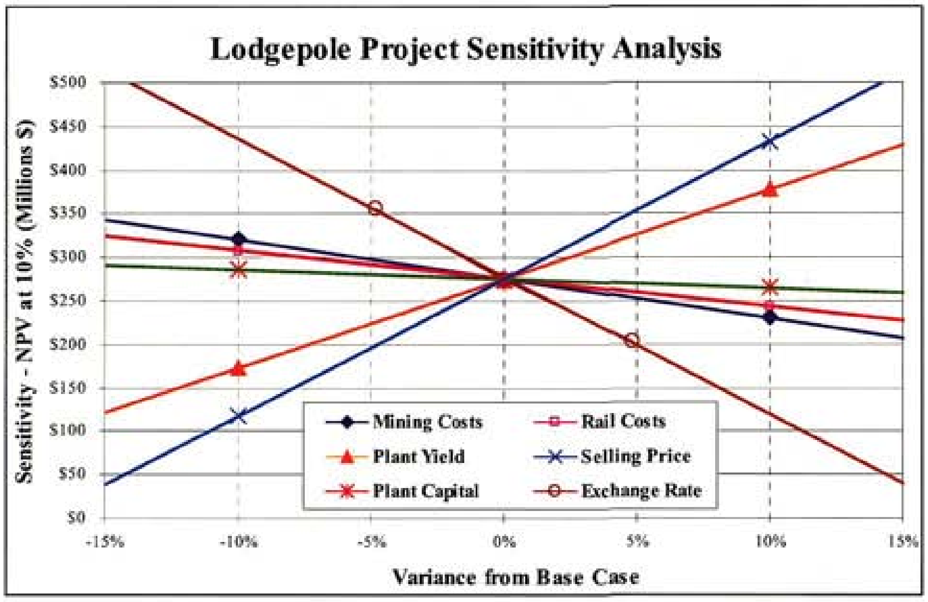

Figure 20-28 Lodgepole Cashflow Sensitivities

Figure 20-28 shows the most sensitive items are selling price, exchange rate and plant yield.

21.0 Interpretation and Conclusions

The Feasibility Study describes the technical and economic aspects of the Lodgepole Project based on historical information, the field data collected, and the Feasibility level planning of the technical evaluation of the consultants involved. The conclusion of the study can be summarized as:

- A Large Coal Resource lies within a compact project area which reduces environmental impact
- There are a minimum number of waste dumps required with the opportunity for backfill.
- There is only one mining area with associated infrastructure which impacts only 2 localized drainage areas.
- The coal is of consistent market quality
- Markets are available
- There is existing infrastructure within an established export coal mining area.
- Local expertise and support enterprises are available to the operation
- The project is located in an active mining region with known regulatory process
- A Dry Tailings system is being used in the design
- The mining Strip ratio is Low in the near and long term
- Certain areas of the study rely on reasonable allowance and contingencies to ensure the project can proceed within the costs estimates of the study. Particularly these areas are in the Coal Load out land position and the location and operating conditions of the waste dumps. The load out land position is in application. The planned and alternate waste dump areas are viable within the cost allowances made but further environmental and geotechnical evaluations are required before the detailed operating design is finalized.
- The project construction schedule is aggressive and the impact of a delay needs to be considered. Alternately certain preparation activities such as access upgrades and establishment of initial construction facilities and sites can be started in advance of final project permits and approvals. This may require the start up to be delayed or corporate commitments by Cline Mining if the permits are delayed or not granted.
- The project has a suitable ROI on a pre-tax basis.

The Lodgepole property is suitable for further investment and justifies proceeding to more advanced levels of design and permitting.

22.0 Recommendations

The level of evaluation and engineering design in this study supports the costs estimates and allowances used in the economic assessment. Additional and ongoing work is required to advance the project to a EPC level and to develop detailed operating plans. More design work will also be required as the EIA and permitting process is advanced. The following work areas are recommended.

- More detail is required on the geotechnical and environmental aspects of the Dry Plant rejects. The dump is contained within the Jack Creek dump but further work will allow this dump to be operated more efficiently.
- More drilling is required to define the coal quality of the upper seams and for ARD/Environmental testing. This information is needed for the later years of the production Schedule.
- Coal Rail Load-out site is not finalized. The contingency for several viable sites has been included and application for crown land has been made. The most suitable location needs to be finalized.
- The Base plan waste dumps and alternatives need to be evaluated in light of the EIA work and ongoing Geotechnical analysis. The dump alternatives used in this plan are economic so the selection of the dump alternatives will need to include thes other aspects of design.
- The use of backfill dumps should be considered in the detailed design stage which will further reduce the land disturbance, reduce the reclamation efforts, and could reduce mining costs with shorter haul distances.
- Work to date has been within the general limits of the slope design parameters provided by BGC. These limits are within the well established experience in the Elk Valley but final Geo-technical evaluation of the final detailed pit and dump designs will be required before mining operations begin.
- Project Schedule is aggressive. Areas where construction can start with preliminary approvals should be investigated.

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24.0 Date and Signatures

24.1 James H. Gray PEng

As the author of this Technical Report on the Resources and Reserves Of The Lodgepole Coal Property, I hereby make the following statements:

- My name is James H Gray and I am a Principal of GR Technical Services Ltd. My office address is 1584 Evergreen Hill SW Calgary Alberta Canada T2Y 3A9.
- I fulfill the requirements of a Qualified Person as specified in National Instrument 43-101 of the Canadian Securities Administrators. I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person".
- I have received a degree in Mining Engineering - Bachelor of Applied Science from the University of British Columbia, Vancouver, 1975.
- I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (11919) and the Association of Professional Engineers, Geologists and Geophysicists of Alberta (M47177).
- I am a member of the Canadian Institute of Mining and Metallurgy.
- The Technical Report is based on a site visit, my personal review of historical reports and data provided by the Project Geologist and from information available from public files.
- I have been practicing as a Professional Engineer for over 25 years with relevant experience for the Technical Report including:
- 1978 to 1989, mine site engineering, operations and management positions, costing, evaluating new mineral projects and development properties. This includes operations experience at Fording River Operations, which is in the vicinity of the Lodgepole Coal Property.
- 1989 to present, mine engineering consultant work on assessment and feasibility studies of numerous coal, base metal, industrial mineral, and precious metal deposits in Canada, United States, Mexico, Chile, Argentina, Peru, Turkey, Iran, and Australia.
- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 22nd day of February 2006, in Calgary Alberta.

"James H. Gray"

J.H. Gray PEng.

24.2 Consent of Author

To: Commission des Valeurs Mobilieres du Quebec
Ontario Securities Commission
Manitoba Securities Commission
Saskatchewan Financial Services Commission – Securities Division
Alberta Securities Commission
British Columbia Securities Commission

I James H Gray PEng., do hereby consent to the filing, with the regulatory authorities referred to above, of the Technical Report titled: "Resources and Reserves Of The Lodgepole Coal Property", dated 22 February 2006 (the "Technical Report") and to the written disclosure of the Technical Report and of extracts from or a summary of the Technical Report by Cline Mining Corporation.

Dated this 22nd day of February 2006.

"James H. Gray"

Signature of Qualified Person

James H. Gray PEng.
Print Name of Qualified Person

24.3 Anthony D. Walters, P Eng

As the author of this Technical Report on the Coal Processing section of the Lodgepole Coal Property, I hereby make the following statements:

- My name is Anthony D Walters and I am the President of A D Walters & Associates Ltd. My office address is 2020 Jones Ave, North Vancouver, British Columbia, Canada V7M 2W6.
- I fulfill the requirements of a Qualified Person as specified in National Instrument 43-101 of the Canadian Securities Administrators. I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person".
- I have received a B.Sc degree in General Sciences and a Post Graduate Diploma in Mineral Processing and Coal Preparation from Leeds University, England 1962 and an M.Eng in Mineral Engineering Management from Pennsylvania State University, USA 1975.
- I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
- I was a member in good standing of the Ontario Society of Professional Engineers from 1977 to 2005.
- I am a member of the Canadian Institute of Mining and Metallurgy.
- The Technical Report is based a site visit, my personal review of historical reports and data provided by the Project Geologist, Elk Valley Environmental Services Laboratories, Sparwood, BC, Birtley Coal & Minerals Testing Division, Calgary and from information available from public files.
- I have been practicing as a Professional Engineer for over 40 years with relevant experience for the Technical Report.
- From 1962-1976 I worked in mineral and coal processing plants in South Africa, Zimbabwe and Zambia.
- From 1977 –1998 I worked for Kilborn Engineering Ltd (Later SNC Lavalin) in Toronto and Vancouver principally on coal processing projects in British Columbia and Alberta and also as project manager on copper/gold feasibility studies in British Columbia. I have carried out consulting work on international projects in Australia, Brazil, Indonesia, Pakistan and Tanzania.
- From 1999 –2001 I was Associate Director, Center for Coal & Mineral Processing, Virginia Polytechnic Institute & State University, USA
- 2002 to present, coal processing consultant on coal projects in Alberta and British Columbia.
- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 22nd day of February 2006, in Vancouver, British Columbia.

"A.D. Walters"

A.D. Walters, PEng

24.4 Consent of Author

To: Commission des Valeurs Mobilieres du Quebec
Ontario Securities Commission
Manitoba Securities Commission
Saskatchewan Financial Services Commission – Securities Division
Alberta Securities Commission
British Columbia Securities Commission

I Anthony David Walters, PEng. do hereby consent to the filing, with the regulatory authorities referred to above, of the Technical Report titled: "Resources and Reserves Of The Lodgepole Coal Property ", and dated 21 February 2006 (the "Technical Report") and to the written disclosure of the Technical Report and of extracts from or a summary of the Technical Report by Cline Mining Corporation.

Dated this 22nd day of February 2006.

"A.D. Walters"

Signature of Qualified Person

Anthony D Walters PEng.
Print Name of Qualified Person

25.0 Additional Requirements for Technical Reports on Development Properties and Production Properties

There is no additional information of this type that is pertinent to the Lodgepole Property. The property is not yet in production.

It is the author's opinion that the Lodgepole property provides an environment in which coal mining may be undertaken.

26.0 Glossary

Adit - Short vertical or horizontal opening to access a coal seam.
Air Dried Basis (adb) Coal that has been left to dry in air and has an approximate 'dry' moisture of 1%
ARD – Acid Rock Drainage
Ash - Impurities consisting of silica, iron, alumina and other incombustible matter that are contained in coal. As increases the weight of coal and adds to the cost of handling. Ash content is measured as a percentage by weight of coal on an "as received" or a "dry" (moisture-free) basis.
As Received Basis (arb) Coal as received with in-situ/drained moisture content assumed to be 8%
ASTM - American Society for Testing and Materials.
BCMW Bank Cubic Meter Waste
BCMRC Bank Cubic Meter Raw Coal
Coal Washability - The analysis of the specific gravity distribution of chemical and physical characteristics of coal.
Drill Hole - A circular hole made by drilling either to explore for minerals or to obtain geological information.
Dip - The angle at which a stratum is inclined from the horizontal, measured perpendicular to the strike and in the vertical plane.
Dry Basis (db) - Coal that has moisture removed by prescribed laboratory procedure or excluded by calculation.
Exploration - The search for coal by geological surveys, prospecting or use of tunnels, drifts or drill holes.
Fault - A fracture in rock along which the adjacent rock surfaces are differentially displaced.
First Nations - An aboriginal governing body organized and established by aboriginal people within their traditional territory in British Columbia, which has been mandated by its constituents to enter into treaty negotiations on their behalf with Canada and British Columbia.
Fixed Carbon - The solid residue, other than ash, remaining after the volatile matter and moisture have been liberated from coal during combustion.
Float/Sink - A laboratory procedure, which measures the floating and sinking of particles of material of various size fractions in heavy liquids at various specific gravities.
FOB - The abbreviation for "free on board". The FOB price is the sales price of coal loaded in a vessel at the port and excludes freight or shipping cost.
Front End Loader - A tractor or wheel type loader with a digging bucket mounted on the front end that dumps.
FSI (Free Swelling Index) - A number assigned to particular coal used in determining its suitability for coke making or other uses. The index, from zero to nine, is determined by tests established by ASTM standards.
Geophysical Log - A graphic record of the measured or computed physical characteristics of the rock section encountered by a probe or sonde in a drill hole, plotted as a continuous function of depth. Also commonly referred to as an e-log.
Highwall - The unexcavated face of exposed overburden and coal or ore in an opencast mine or the face or bank of the uphill side of a contour strip-mine excavation.
Interburden - Waste material located between economically recoverable resources.

Isopach - The areal extent and thickness variation of a stratigraphic unit in geology.
Lease - A contract between a landowner and a lessee, granting the lessee the right to search for and produce coal upon payment of an agreed rental, bonus and/or royalty.
Metallurgical - Coal with characteristics making it suitable for production of coke that can be used by the iron and steel industry.
Mineable - Capable of being mined under current mining technology and environmental and legal restrictions, rules and regulations.
ML – Metal Leaching.
MTCC Metric Tonne Clean Coal
MTRC Metric Tonne Raw Coal
Out-of-Seam Dilution (OSD) - The contamination of mined coal with rock outside of the coal seam being mined.
Outcrop - Coal, which appears at or near the surface; the intersection of a coal seam with the surface.
Overburden - The rock, earth or other material lying over the coal.
Proximate Analysis - Laboratory analysis to determine the percentage by prescribed methods of moisture, volatile matter, fixed carbon and ash.
Pulverized Coal Injection (PCI) - Low-grade metallurgical coking coal.
Raw Coal - The coal that remains after oversized OSD material has been removed in the breaker station and which is the feedstock for the preparation plant.
Reclamation - The restoration of land at a mining site after the coal is extracted. Reclamation operations are usually conducted as production operations are taking place elsewhere at the site. This process commonly includes re-contouring or reshaping the land to its approximate original appearance, restoring topsoil and planting native grasses, trees and ground covers.
Rotary Drill - A drill machine that rotates a rigid, tubular string of rods to which is attached a bit for cutting rock to produce boreholes.
Royalty - A share of the product or profit reserved by the owner for permitting another to use the property. A lease by which the owner or lessor grants to the lessee the privilege of mining and operating the land in consideration of the payment of a certain stipulated royalty on the mineral produced.
Run-of-Mine Coal (ROM) - The coal produced from the mine before it is separated and any impurities removed.
Saleable Coal - The shippable product of a coal mine or preparation plant. Depending on customer specifications, saleable coal may be run-of-mine, crushed-and-screened (sized) coal, or the clean coal from a processing plant.
Strip Ratio - The volume of overburden material (bank cubic meters) that must be removed to provide a unit weight of coal (tonne).
Surface Mining - Methods of mining at or near the surface. Includes mining and removing coal from open cuts with mechanical excavating and transportation equipment and the removal of capping overburden to uncover the coal.
Syncline - A fold in which the core contains the stratigraphically younger rocks; it is generally concave upward.
Tailings - Fine refuse material or waste that has been separated from the fine clean coal in the froth flotation cells in the coal processing plant.
Thermal Coal - Coal with characteristics making it suitable for burning to produce steam for generating electricity.

Thrust Fault - A fault with a dip of 45 degrees or less over much of its extent, on which the hanging wall appears to have moved upward relative to the footwall.
Train Loadout - A facility to load coal in rail cars.
Volatile Matter - Those products, exclusive of moisture, given off by a material such as gas or vapor, determined by definite prescribed methods, which may vary according to the nature of the material.
Yield - The ratio of the clean coal product to the raw coal plant feed, expressed as a percentage.

27.0 List Of Abbreviations

Above mean sea level ....amsl
Ampere .... A
Annum (year) ....a
Bank cubic metre.................... bcm
Cubic metre....................m3
Day....................d
Days per week.................... d/wk
Days per year (annum)....................d/a
Degree.................... °
Degrees....................deg
Degrees Celsius .... °C
Diameter .... ø
Dry metric ton ....dmt
Gram....................g
Grams per cubic centimeter....................g/cc
Grams per litre ....g/L
Grams per tonne....................g/t
Greater than.................... >
Hectare (10,000 m2) ....ha
Hertz .... Hz
Horsepower ....hp
Hour (not hr)....................h
Hours per day ....h/d
Hours per week.................... h/wk
Hours per year ....h/a
Inch .... "
Joule....................J
Joules per kilowatt-hour.................... J/kWh
Kelvin .... K
Kilo (thousand)....................k
Kilocalorie .... kcal
Kilogram....................kg
Kilograms per cubic metre.................... kg/m3
Kilograms per hour ....kg/h
Kilograms per square metre kg/m2
Kilojoule ....kJ
Kilometre....................km
Kilometres per hour ....km/h
Kilonewton .... kN
Kilopascal .... kPa
Kilovolt .... kV
Kilovolt-ampere....................kVA
Kilovolts .... kV

Kilowatt .... kW
Kilowatt hour ....
kWh
Kilowatt hours per short ton (US) .... kWh/st
Kilowatt hours per tonne (metric ton).......... kWh/t
Kilowatt hours per year.......... kWh/a
Kilowatts adjusted for motor efficiency .... kWe
Less than .... <
Litre.......... L
Litres per minute.......... L/m
Megabytes per second .... Mb/s
Megapascal .... MPa
Megavolt-ampere.......... MVA
Megawatt .... MW
Metre.......... m
Metres above sea level.......... masl
Metres per hour.......... m/hr
Metres per minute.......... m/min
Metres per second.......... m/s
Metric ton (tonne).......... t
Micrometre (micron) .... µm
Microsiemens (electrical).......... µs
Miles per hour .... mph
Milliamperes.......... mA
Milligram .... mg
Milligrams per litre.......... mg/L
Millilitre.......... mL
Millimetre.......... mm
Million.......... M
Million tonnes.......... Mt
Minute (plane angle).......... '
Minute (time).......... min
Month.......... mo
Newton.......... N
Newtons per metre .... N/m
Ohm (electrical) .... Ω
Ounce .... oz
Parts per billion.......... ppb
Parts per million.......... ppm
Pascal (newtons per square metre).......... Pa
Pascals per second .... Pa/s
Percent .... %
Percent moisture (relative humidity).......... % RH
Phase (electrical).......... Ph
Power factor.......... pF
Revolutions per minute.......... rpm
Second (plane angle) .... "

Second (time) .... s
Short ton (2,000 lb) .... st
Short ton (US) .... st
Short tons per day (US) .... stpd
Short tons per hour (US) .... stph
Short tons per year (US) .... stpy
Specific gravity .... SG
Square kilometre .... km^2
Square metre m2
Thousand tonnes .... kt
Tonne (1,000 kg) .... t
Tonnes per annum .... tpa
Tonnes per day .... t/d
Tonnes per hour .... t/h
Tonnes per year .... t/a
Total dissolved solids .... TDS
Total suspended solids .... TSS
Volt V
Week .... wk
Weight/weight .... w/w
Wet metric ton .... wmt
Yard .... yd
Year (annum) .... a
Year (US) .... y

List Of Acronyms

air-dried........adb
All-terrain vehicle........ATV
American Society of Testing and Materials........ASTM
Ammonium Nitrate........AN
Ammonium Nitrate and Fuel Oil........ANFO
Ash fusion temperature........AFT
As Received Basis........arb
B.C. Environmental Assessment Act........BCEAA
B.C. Environmental Assessment Office........B.C. EAO
B.C. Utilities Commission........BCUC
Canadian Council of Ministers of the Environment........CCME
Canadian Environmental Assessment Act........CEAA
Canadian Pacific Railway........CPR
Coal processing plant........CPP
Coke strength after reaction........CSR
Construction cost index........CCI
Department of Fisheries and Oceans........DFO
Diamond drill hole........DDH
Discounted cash flow........DCF
Dry, mineral matter-free........dmmf
Elk Valley Environmental Services Laboratories........EVES
Environmental Assessment Office........EAO
Floating Cone........FC
Free On Board........FOB
Free-swelling indices........FSI
General Mine Expense........GME
Geological Survey of Canada........GSC
Gridded Surface File........GSF
Hardgrove indices........HGI
Internal rate of return........IRR
International Organization for Standardization........ISO
Japanese Standards Association........JIS
Land and Resource Management Plan........LRMP
Lands and Water B.C.........LWBC
Life of Mine........LOM
Loose Cubic Meters........LCM
Methylisobutylcarbinol........MIBC
Metric Tonnes Clean Coal........MTCC
Metric Tonnes Raw Coal........MTRC
Migratory Bird Convention Act........MBCA
Minesight Strategic Planner........MSSP
Ministry Energy and Mines........MEM
Ministry of Forests........MOF
Ministry of Sustainable Resource Management........MSRM
Ministry Water Land and Air Protection........MWALP

National Building Code of Canada....NBCC
Navigable Waters Protection Act....NWPA
Net present value.... NPV
Occupant License of Occupation.... OLOC
Potentially reactive....PR
Project Information Centre....PIC
Pulverized coal injection ....PCI
Resource Management Area....RMZ
Road Use Permits....RUP
Rock Mass Rating....RMR
Rock Quality Designation....RQD
Rotary, reverse circulation hole....RCH
Run-of-mine....ROM
Special Use Permits .... SUP
Species at Risk Act....SARA
Specific Gravity....SG
Strip Ratio....SR
Terms of reference ....TOR
Terrain Ecosystem Mapping....TEM
Timber Supply Area....TSA
Ungulate Winter Ranges ....UWRs
Universal Transverse Mercator....UTM
Volatile matter.... VM
Water Land and Air Protection .... WLAP
Wildlife Habitat Areas .... WHAs